

MacDon[®]

M155 **Self-Propelled Windrower**

Operators Manual

169563 Rev. D

Original Instruction

The harvesting specialists worldwide.

This Manual contains instructions for “SAFETY”, “OPERATION”, and “MAINTENANCE/SERVICE” for your new MacDon M155 Self Propelled Windrower.



Published July, 2013

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.

Declaration of Conformity

| | | |
|--|---|---|
| CE | EC Declaration of Conformity | |
| | MacDon Industries Ltd 680 Moray Street Winnipeg, Manitoba, Canada R3J 3S3 | |
| <i>The undersigned hereby declares that:</i> | | |
| | Machine type: | <i>M Series Windrower</i> |
| | Model: | <i>M105, M155, M205</i> |
| | Serial Number(s): | <i>As Per Shipping Document</i> |
| <i>fulfills all relevant provisions and essential requirements of the following directives:</i> | | |
| Directive | Number | Certification Method |
| Machinery Directive | 2006/42/EC | Self-Certification |
| EMC Directive | 2004/108/EC | Self-Certification |
| <i>Name and address of the person in the European Community authorized to compile the technical construction file:</i> | | |
| Johannes Molitor Schwarzwald Strasse 67 66482 Zweibrucken / Germany HRB 31002, Amtsgericht Zweibrucken | | |
| Place of Declaration: | Winnipeg, Manitoba, Canada | Name: Ibrahim Saleh |
| Date of Declaration: | 01 July 2013 | Title: Director, Product Integrity |

Figure 1

Continued on next page.

Whole Body and Hand-Arm Vibration Levels

The weighted root mean square acceleration to which the whole body is subjected to ranges from 0.57 to 1.06 m/s² as measured on a representative machine during typical operations and analyzed in accordance with ISO 5008. During the same operations, the weighted root means square hand-arm vibration was less than 1.45 m/s² when analyzed in accordance with ISO 5349. These acceleration values depend on the roughness of the ground, the speeds at which the windrower is operated, the operator's experience, weight and driving habits.

Noise Levels

The A-weight sound pressure levels inside the operator's station ranged from 70.1 to 73.1 dB(A) as measured on several representative machines in accordance with ISO 5131. The sound pressure level depends upon the engine speed and load, field and crop conditions and the type of platform used.

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 speciality 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.

Serial Number

If you require MacDon® technical assistance, please have your serial number recorded and ready, before you call.

For technical assistance please call: 1 (204) 831 4422.



Figure 2: Machine Serial Number location

A - SN Location



Figure 3: Engine Serial Number location

A - SN Location

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1 Safety

1.1 Safety Alert Symbols

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

This symbol means:

- **ATTENTION!**
- **BECOME ALERT!**
- **YOUR SAFETY IS INVOLVED!**

Carefully read, and follow the safety message accompanying this symbol.

Why is safety important to you?

- Accidents disable and kill.
- Accidents cost.
- Accidents can be avoided.



Figure 1.1: Read operator's manual before operating

SAFETY

1.2 Signal Words

Three signal words, DANGER, WARNING, and CAUTION, are used to alert you to hazardous situations. The appropriate signal word for each situation 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 may also be used to alert against unsafe practices.



CAUTION

Indicates a potentially hazardous situation that, if not avoided, may result in minor, or moderate injury. It may be used to alert against unsafe practices.

1.3 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.

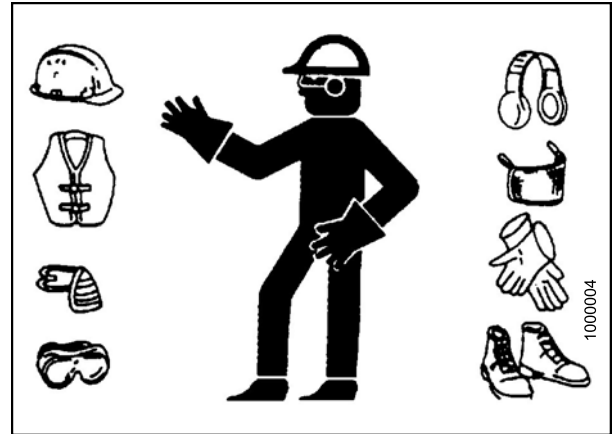


Figure 1.2

You may need:

- A hard hat
- Protective footwear with slip resistant soles
- Protective glasses or goggles
- Heavy gloves
- Wet weather gear
- A respirator or filter mask
- Hearing protection

Be aware that exposure to loud noise can cause impairment, or loss of hearing. Wearing suitable hearing protection devices such as ear muffs, or ear plugs. These will help protect against objectionable, or loud noises.



Figure 1.3

- Provide a first aid kit for use in case of emergencies.
- Keep a fire extinguisher on the machine. Be sure the fire extinguisher is properly maintained. Be familiar with its proper use.
- Keep young children away from the 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.

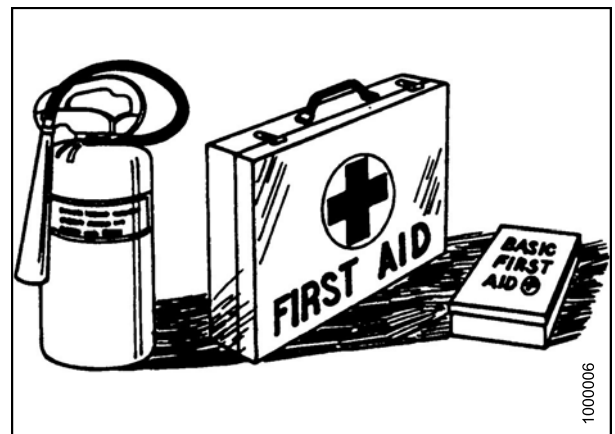


Figure 1.4

SAFETY

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



Figure 1.5

- 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.
- Do **NOT** modify the machine. Non-authorized modifications may impair machine function, and/or safety. It may also shorten the machine's 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

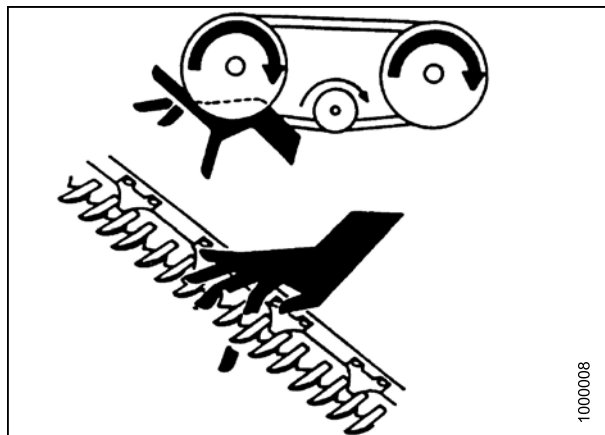


Figure 1.6

- 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.
- Keep work area well lit.
- 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.



Figure 1.7

SAFETY

1.4 Maintenance Safety

To ensure your safety while maintaining the machine

- Review the operator's manual, and all safety items, before operation and/or maintenance of the machine.
- Place all controls in Neutral, stop the engine, set the park brake, remove the ignition key, and wait for all moving parts to stop, before servicing, adjusting, and/or repairing.
- Follow good shop practices:
 - Keep service area clean, and dry.
 - Be sure electrical outlets, and tools, are properly grounded.
 - Use adequate light for the job at hand.
- Relieve pressure from hydraulic circuits, before servicing, and/or disconnecting the machine.
- Before applying pressure to a hydraulic system, make sure all components are tight, and that steel lines, hoses, and couplings, are in good condition.
- Keep hands, feet, clothing, and hair away from all moving, and/or rotating parts.
- Clear the area of bystanders, especially children, when carrying out any maintenance, and repairs, or when making any adjustments.
- Install transport lock, or place safety stands under the frame, before working under the header.
- 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 knife) to move. Stay clear of driven components at all times.
- Wear protective gear when working on the machine.
- Wear heavy gloves when working on knife components.



Figure 1.8: Slip on Puddle



Figure 1.9: Keep Away

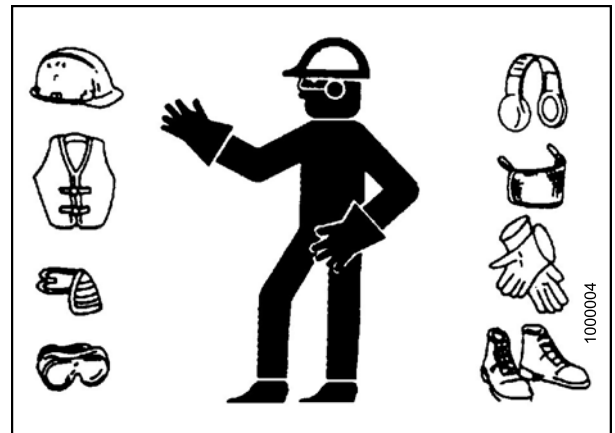


Figure 1.10: Safety Gear

SAFETY

1.5 Hydraulic Safety

- Always place all combine/tractor/windrower hydraulic controls in Neutral before dismounting.
- Make sure that all components in the hydraulic system are kept in good condition and clean.
- Replace any worn, cut, abraded, flattened, or crimped hoses and steel lines.
- Do not attempt any makeshift repairs to the hydraulic lines, fittings, or hoses by using tapes, clamps, cements, or welding. The hydraulic system operates under extremely high pressure. Such makeshift repairs will fail suddenly and create a hazardous and unsafe condition.

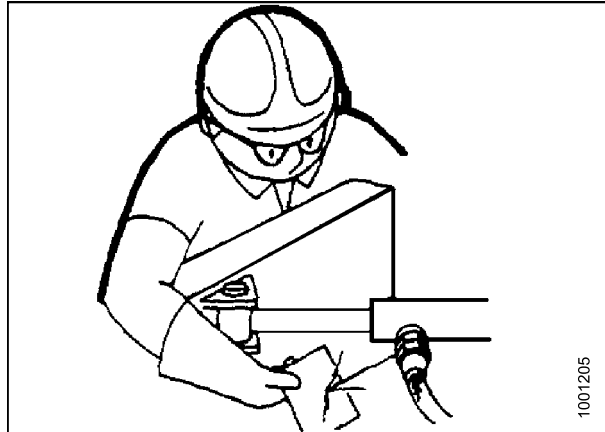


Figure 1.11: Checking Hydraulic Leaks

- Wear proper hand and eye protection when searching for a high-pressure hydraulic leak. Use a piece of cardboard as a backstop instead of hands to isolate and identify a leak.
- If injured by a concentrated high-pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop from hydraulic fluid piercing the skin.



Figure 1.12: Hydraulic Pressure Hazard

- Before applying pressure to a hydraulic system, make sure all components are tight and that steel lines, hoses, and couplings are in good condition.

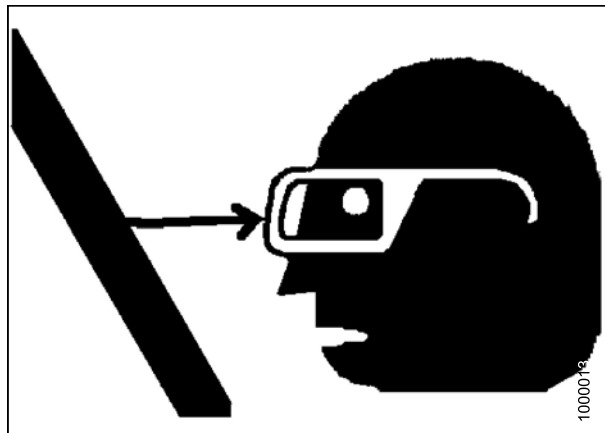


Figure 1.13: Wear Safety Glasses

SAFETY

1.6 Tire Safety

- Failure to follow proper procedures when mounting a tire on a wheel or rim can produce an explosion that may result in serious injury or death.



Figure 1.14: Lower all safety stops

- Do not attempt to mount a tire unless you have the proper training and equipment.

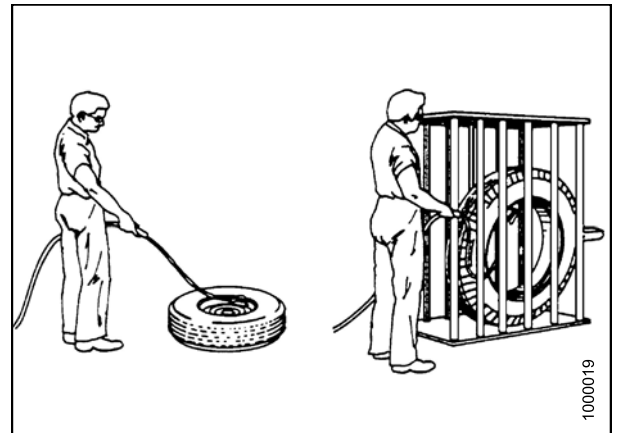


Figure 1.15: Safely filling a tire with air

- Have a qualified tire dealer or repair service perform required tire maintenance.

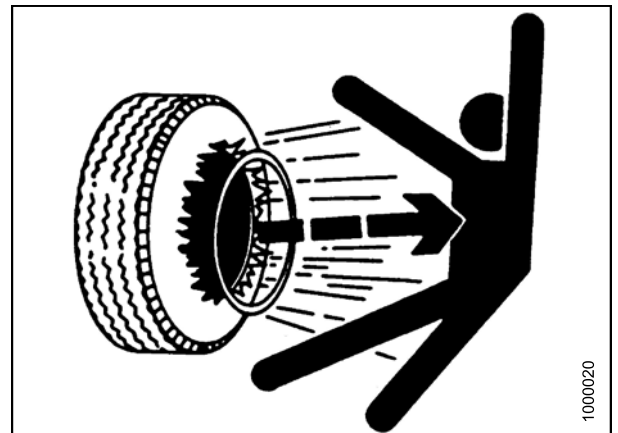


Figure 1.16: Over-inflation of tire

1.7 Battery Safety

WARNING

- Keep all sparks and flames away from the batteries, as a gas given off by electrolyte is explosive.
- Avoid contact with battery electrolyte: wash off any spilled electrolyte immediately.



Figure 1.17

WARNING

- Wear safety glasses when working near batteries.
- Do not tip batteries more than 45°, to avoid electrolyte loss.

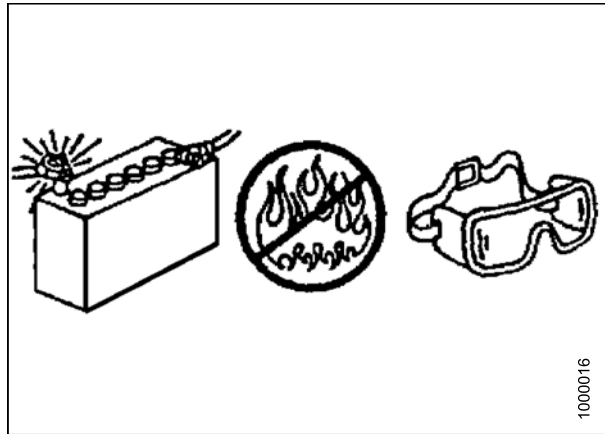


Figure 1.18

WARNING

To avoid injury from spark or short circuit, disconnect battery ground cable before servicing and part of electrical system.

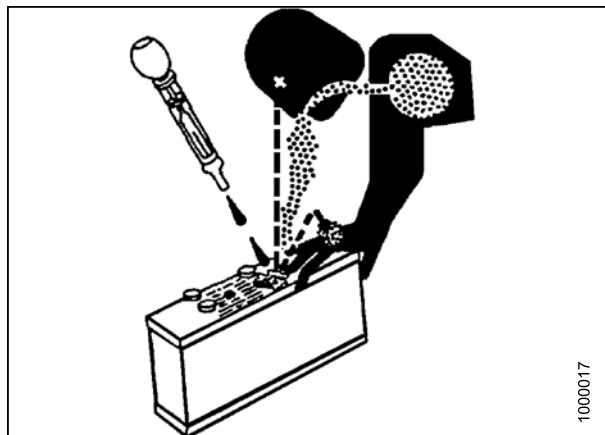


Figure 1.19

SAFETY

1.8 Welding Precaution

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. Refer to your Technical Manual or MacDon dealer for proper procedures.

SAFETY

1.9 Engine Safety



WARNING

Do not use aerosol types of starting aids such as ether. Such use could result in an explosion and personal injury.

1.9.1 High Pressure Rails



CAUTION

Contact with high pressure fuel may cause fluid penetration and burn hazards. High pressure fuel spray may cause a fire hazard. Failure to follow these inspection, maintenance and service instructions may cause personal injury or death.

- In the initial start-up of a new, serviced or repaired engine always make provision to shut the engine off, in order to stop an over-speed. This may be accomplished by shutting off the air and/or fuel supply to the engine. Over-speed shut down should occur automatically for engines that are controlled electronically. If automatic shut down does not occur, press the emergency stop button in order to cut the fuel and/or air to the engine.
- Do not bypass or disable the automatic shutoff circuits. The circuits are provided in order to help prevent personal injury. The circuits are also provided in order to help prevent engine damage. See the Service Manual for repairs and for adjustments.
- Inspect the engine for potential hazards.
- Before starting the engine, ensure that no one is on, underneath, or close to the engine. Ensure that the area is free of personnel.
- If equipped, ensure that the lighting system for the engine is suitable for the conditions. Ensure that all lights work correctly.
- All protective guards and all protective covers must be installed if the engine must be started in order to perform service procedures.
- To help prevent an accident that is caused by parts in rotation, work around the parts carefully.
- If a warning tag is attached to the engine start switch or to the controls, DO NOT start the engine or move the controls. Consult with the person who attached the warning tag before the engine is started.
- Start the engine from the operator's compartment or from the engine START switch. Always start the engine according to the procedure that is described in the operator's Manual, Engine Starting topic in the Operation Section. Knowing the correct procedure will help to prevent major damage to the engine components and prevent personal injury.
- To ensure that the jacket water heater (if equipped) and/or the lube oil heater (if equipped) is working correctly, check the water temperature gauge and/or the oil temperature gauge during the heater operation. Engine exhaust contains products of combustion which can be harmful to your health. Always start the engine and operate the engine in a well ventilated area. If the engine is started in an enclosed area, vent the engine exhaust to the outside.

NOTE: The engine may be equipped with a device for cold starting. If the engine will be operated in very cold conditions, then an extra cold starting aid may be required. Normally, the engine will be equipped with the correct type of starting aid for your region of operation.

SAFETY

1.9.2 Engine Electronics



WARNING

Tampering with the electronic system installation or the OEM wiring installation can be dangerous and could result in personal injury or death and/or engine damage.



WARNING

Electrical Shock Hazard. The electronic unit injectors use DC voltage. The ECM sends this voltage to the electronic unit injectors. Do not come in contact with the harness connector for the electronic unit injectors while the engine is operating. Failure to follow this instruction could result in personal injury or death.

This engine has a comprehensive, programmable engine monitoring system. The Electronic Control Module (ECM) has the ability to monitor the engine operating conditions. If any of the engine parameters extend outside an allowable range, the ECM will initiate an immediate action.

The following actions are available for engine monitoring control:

- Warning
- Derate
- shut down

The following monitored engine operating conditions have the ability to limit engine speed and/or the engine power:

- Engine Coolant Temperature
- Engine Oil Pressure
- Engine Speed
- Intake Manifold Air Temperature

The engine monitoring package can vary for different engine models and different engine applications. However, the monitoring system and the engine monitoring control will be similar for all engines. Together, the two controls will provide the engine monitoring function for the specific engine application.

SAFETY

1.10 Safety Signs

- 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.

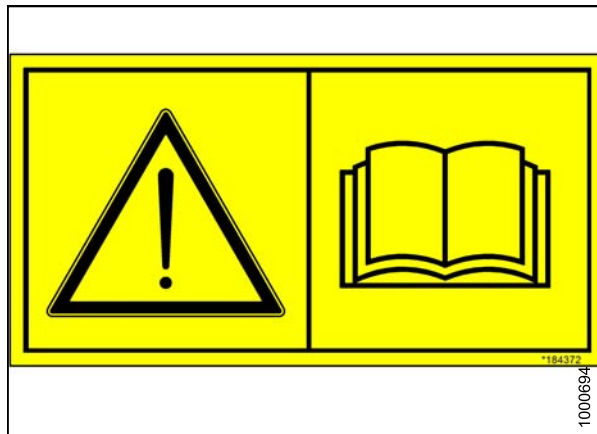


Figure 1.20: Read operator's manual before operating

1.10.1 Installing Safety Decals

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

SAFETY

1.11 Safety Sign Locations

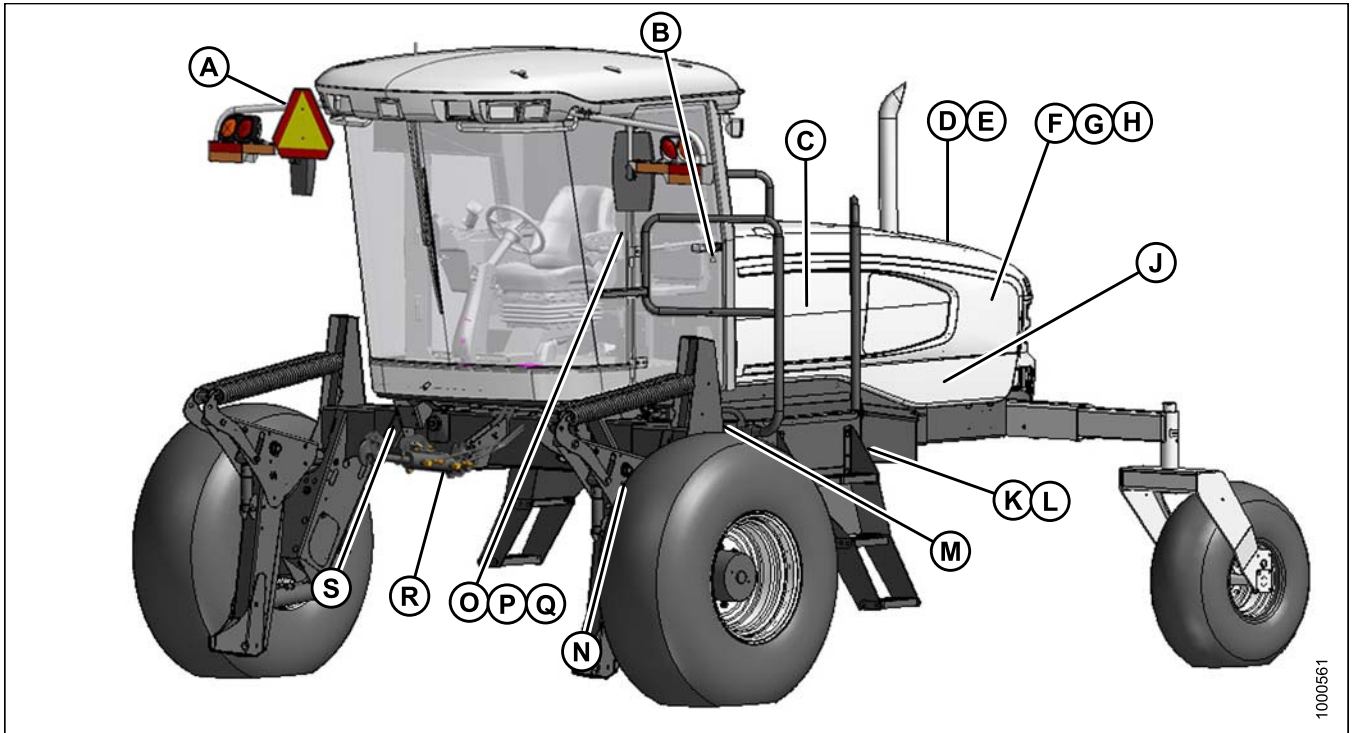


Figure 1.21: Safety Sign Locations (LH Side)

A - Hazard Sign MD #135378

D - Exhaust Cover MD #166450

G - Fan Shroud (Middle) MD #166451

K - Platform (L of Step) MD #166425

N - Lift Linkage MD #166438

Q - Inner Post MD #166463

B - Cab, Door MD #166454

E - Close to Radiator Cap MD #166461

H - Fan Shroud (Bottom) MD #166452

L - Platform (R of Step) MD #166441

O - Inner Post MD #166457

R - Neutral Interlock MD #166425

C - Oil Reservoir under Hood MD #174436

F - Fan Shroud (top) MD #166450

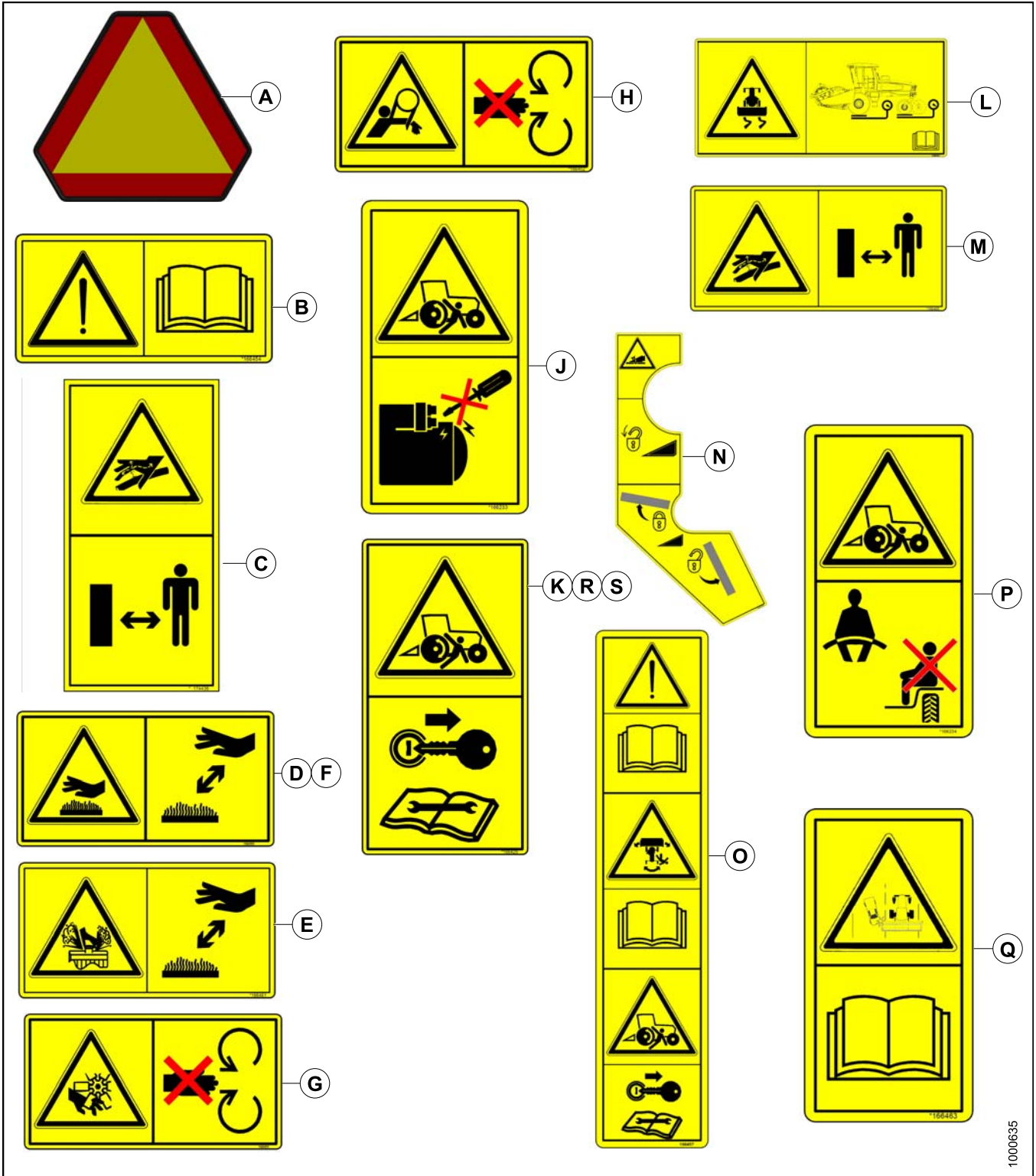
J - Frame Opening MD #166233

M - Frame at Valve Block MD #166466

P - Inner Post MD #166234

S - Frame MD #166425

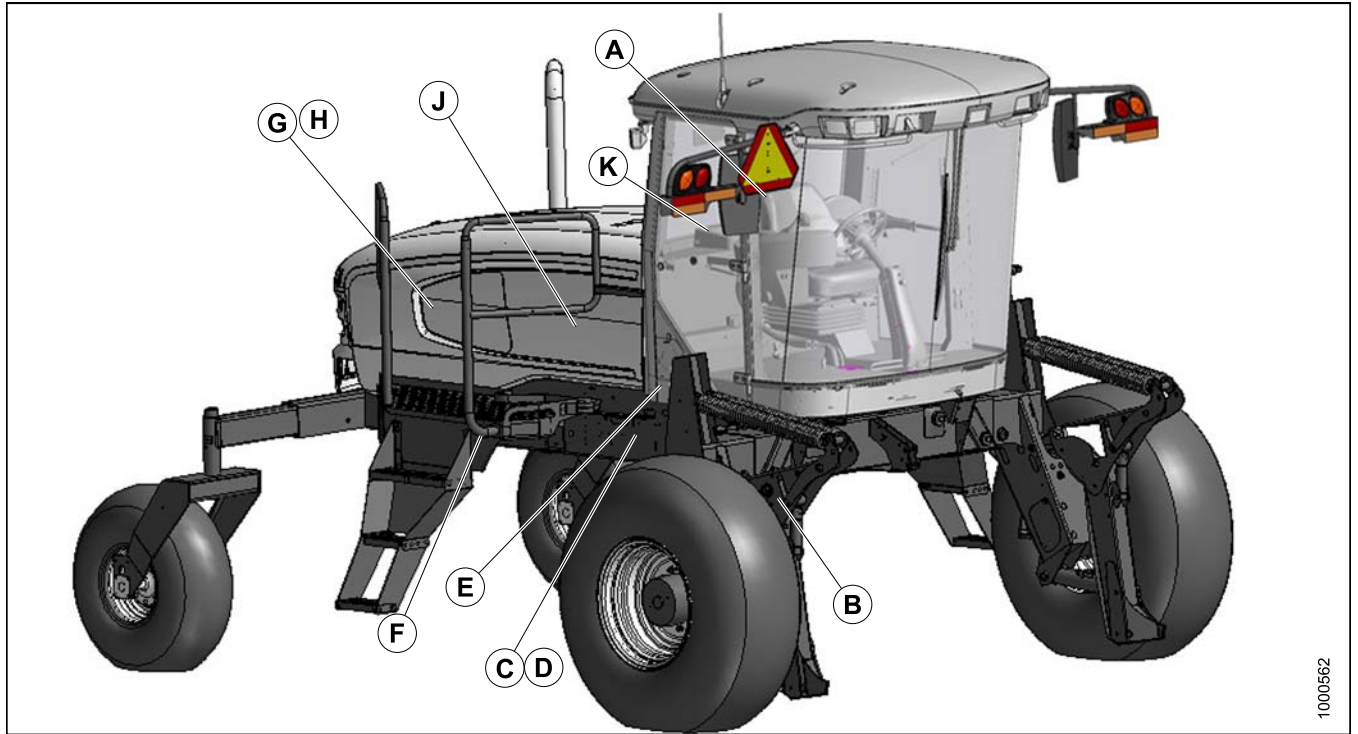
SAFETY



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Figure 1.22: Safety Signs (LH Side)

SAFETY



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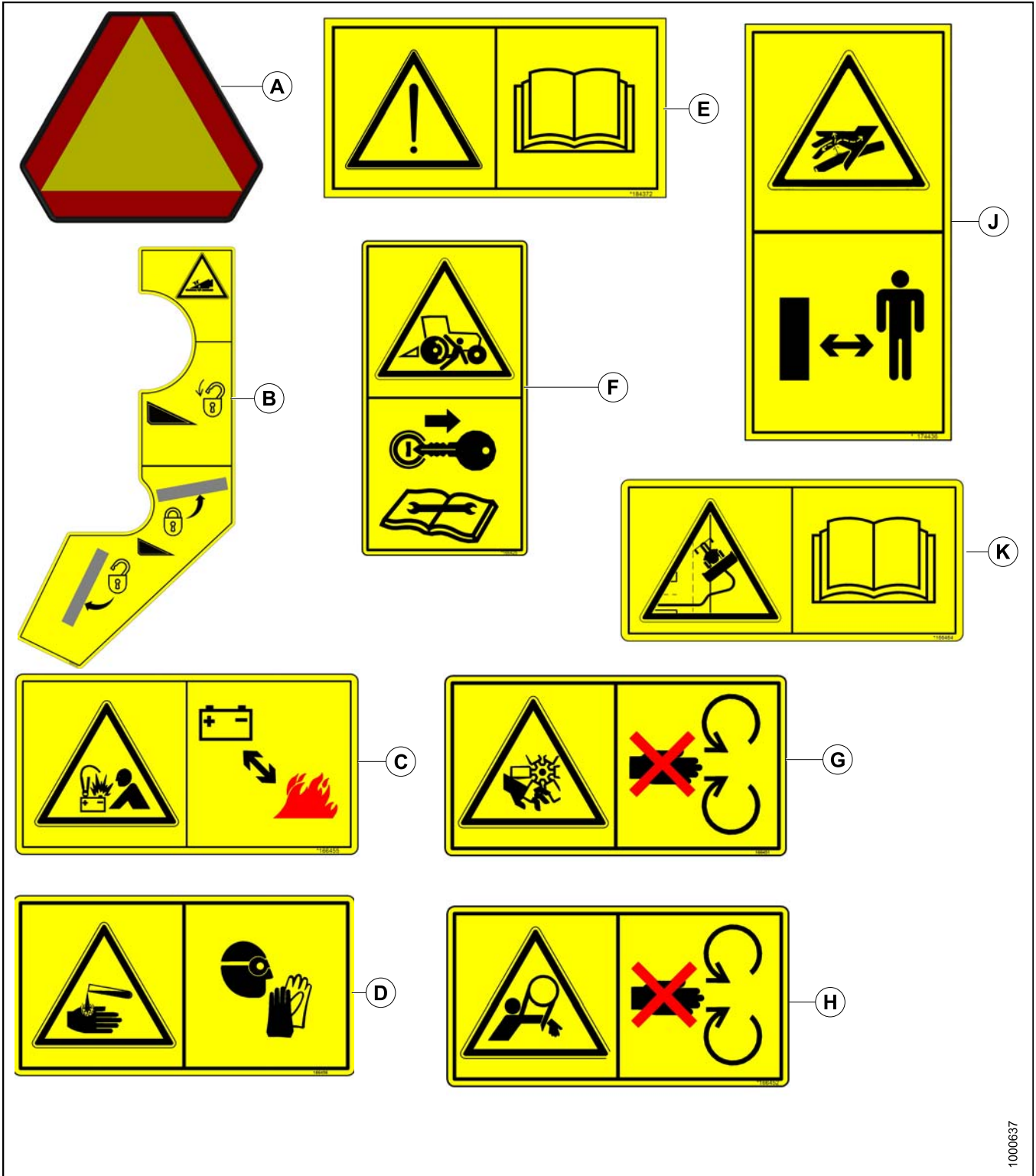
Figure 1.23: Safety Sign Locations (RH Side)

A - Hazard Sign on Seat MD #115148
D - Frame MD #166456
G - Shroud MD #166451
K - Wiper Cover MD #166465

B - Lift Linkage MD #166439
E - Cab Frame MD #184372
H - Shroud MD #166452

C - Frame MD #166455
F - Platform MD #166425
J - Hydraulic Reservoir MD #174436

SAFETY



1000637

Figure 1.24: Safety Signs (RH Side)

SAFETY

1.12 Interpreting Safety Signs

In the safety sign explanations below, (a) refers to the top or left position panel, and (b) refers to the bottom or right position of the safety decal depending on decal orientation.

NOTE: If there are more than two panels in a decal, the lettering will continue downward or to the right, depending on decal orientation.

1. MD #166233
 - a. Run-Over Hazard
 - b. **DANGER**
 - Do not start engine by shorting across starter or starter relay terminals. Machine will start with drive engaged and move if starting circuitry is bypassed.
 - Start engine only from operator's seat. Do not try to start engine with someone under or near machine.



Figure 1.25: MD #166233

2. MD #166234
 - a. Run-Over Hazard
 - b. **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.



Figure 1.26: MD #166234

SAFETY

3. MD #166425

a. Roll-Over Hazard

b. **WARNING**

- Stop engine and remove key from ignition before servicing, adjusting, lubricating, cleaning or unplugging the machine.

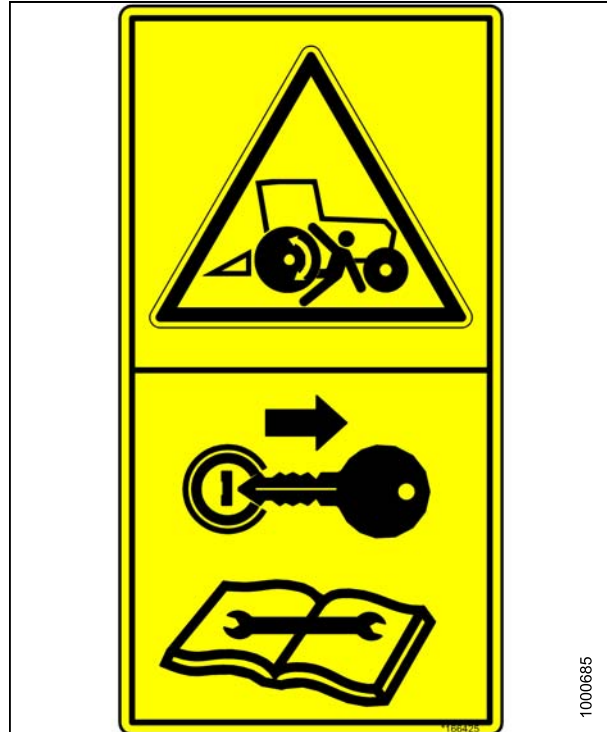


Figure 1.27: MD #166425

4. MD #166438

a. Crushing Hazard

b. **DANGER**

- Rest header on ground or engage mechanical locks before going under unit.

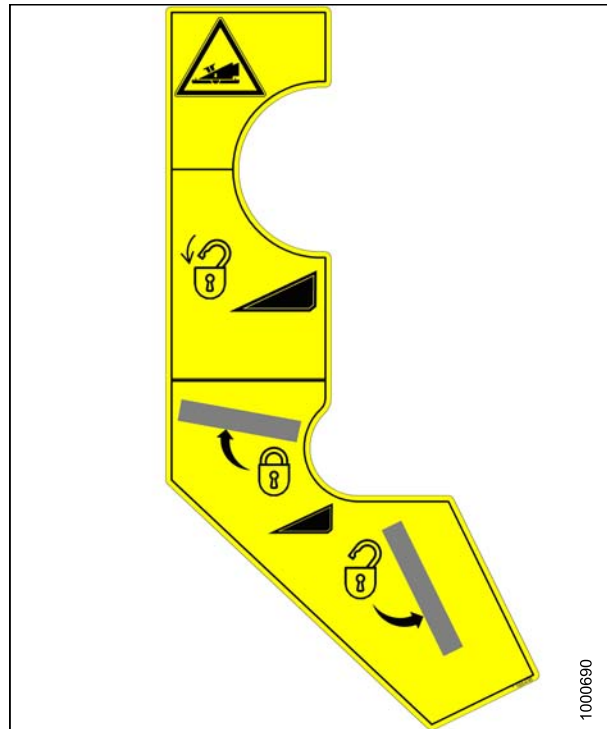


Figure 1.28: MD #166438

SAFETY

5. MD #166439
 - a. Crushing Hazard
 - b. **DANGER**
 - Rest header on ground or engage mechanical locks before going under unit.

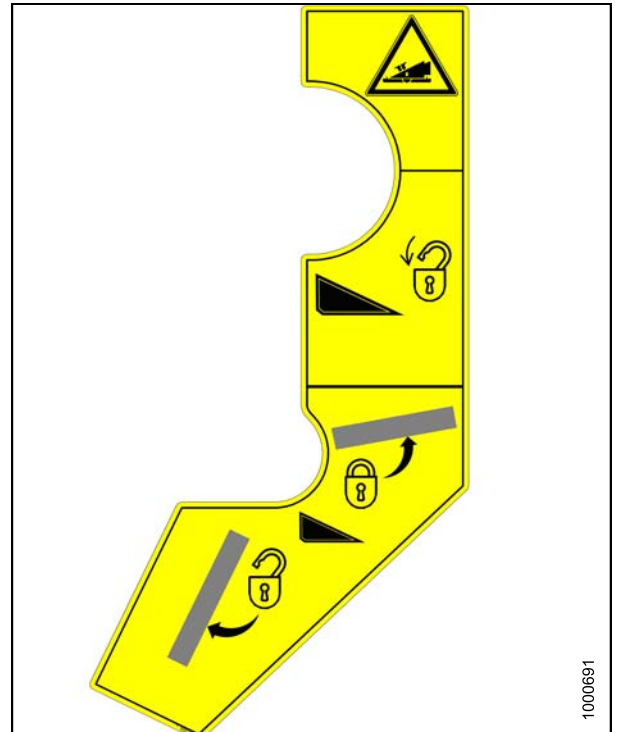


Figure 1.29: MD #166439

6. MD #166441
 - a. Loss Of Control Hazard
 - b. **CAUTION**
 - To prevent machine damage and/or loss of control, it is essential that the machine be equipped such that weights are within the specified limits.

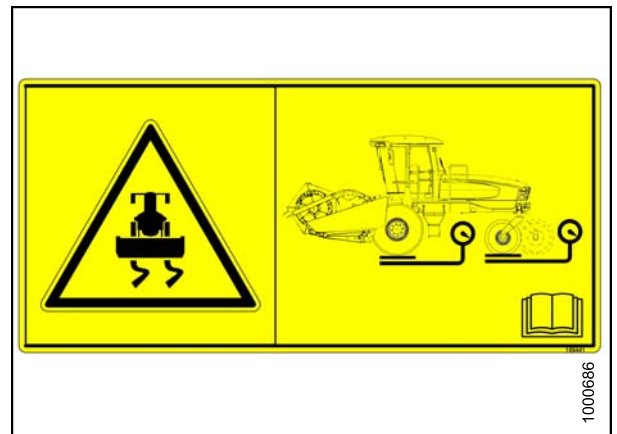


Figure 1.30: MD #166441

SAFETY

7. MD #166450

a. Hot Surface Hazard

b. **WARNING**

- To avoid injury, keep a safe distance from hot surface.

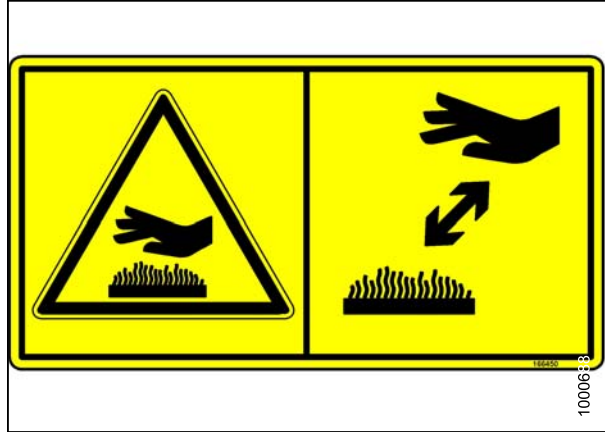


Figure 1.31: MD #166450

8. MD #166451

a. Rotating Fan Hazard

b. **WARNING**

- To avoid injury, stop engine before opening engine hood.

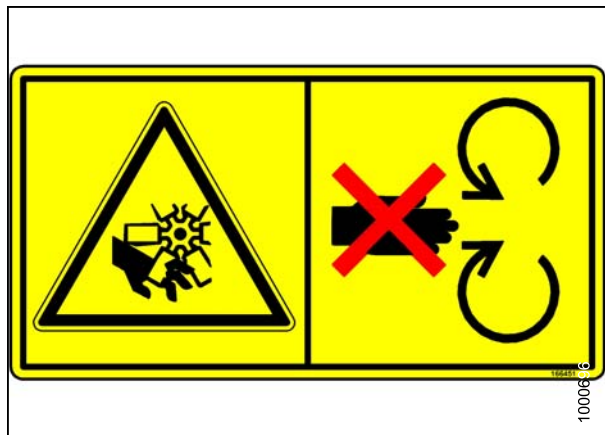


Figure 1.32: MD #166451

9. MD #166452

a. Pinch Point Hazard

b. **WARNING**

- To avoid injury, stop engine before opening engine hood.



Figure 1.33: MD #166452

SAFETY

10. MD #166454

- a. General Hazard Pertaining To Machine Operation And Servicing.

b. **CAUTION**

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

- i. Read the operator's manual, and follow all safety instructions. If you do not have a manual, obtain one from your dealer
- ii. Do not allow untrained persons to operate the machine.
- iii. Review safety instructions with all operators annually.
- iv. Ensure that all safety signs are installed and legible.
- v. Make certain everyone is clear of machine before starting engine and during operation.
- vi. Keep riders off the machine.
- vii. Keep all shields in place, and stay clear of moving parts.
- viii. Disengage header drive, put transmission in neutral and wait for all movement to stop before leaving operator's position.
- ix. Shut off engine and remove key from ignition before servicing, adjusting, lubricating, cleaning, or unplugging machine.
- x. Engage locks to prevent lowering of header or reel before servicing in the raised position.
- xi. Use slow moving vehicle emblem and flashing warning lights when operating on roadways unless prohibited by law.

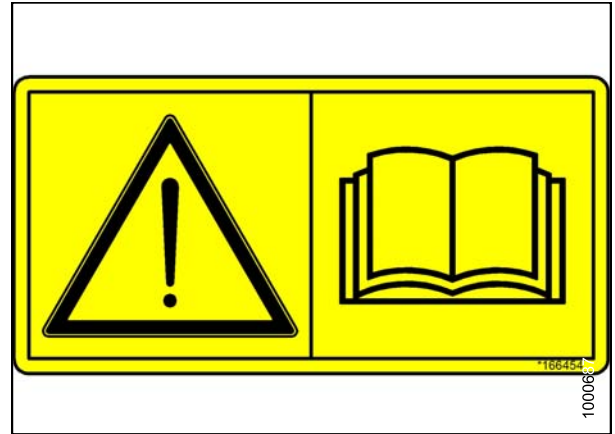


Figure 1.34: MD #166454

11. MD #166455

- a. Explosion hazard

b. **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.



Figure 1.35: MD #166455

SAFETY

12. MD #166456

a. Battery Acid Hazard

b. **WARNING**

- Corrosive and poisonous battery acid. Acid can severely burn your body and clothing.



Figure 1.36: MD #166456

SAFETY

13. MD #166457

- a. General Hazard Pertaining To Machine Operation And Servicing.

b. **CAUTION**

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

- i. Read the Operator's Manual, and follow all safety instructions. If you do not have a manual, obtain one from your dealer
- ii. Do not allow untrained persons to operate the machine.
- iii. Review safety instructions with all operators annually.
- iv. Ensure that all safety signs are installed and legible.
- v. Make certain everyone is clear of machine before starting engine and during operation.
- vi. Keep riders off the machine.
- vii. Keep all shields in place, and stay clear of moving parts.
- viii. Disengage header drive, put transmission in neutral and wait for all movement to stop before leaving operator's position.
- ix. Shut off engine and remove key from ignition before servicing, adjusting, lubricating, cleaning, or unplugging machine.
- x. Engage locks to prevent lowering of header or reel before servicing in the raised position.
- xi. Use slow moving vehicle emblem and flashing warning lights when operating on roadways unless prohibited by law.

- c. Run-Over Hazard

d. **WARNING**

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

- e. Run-Over Hazard

- f. Stop engine and remove key from ignition before servicing, adjusting, lubricating, cleaning or unplugging the machine.

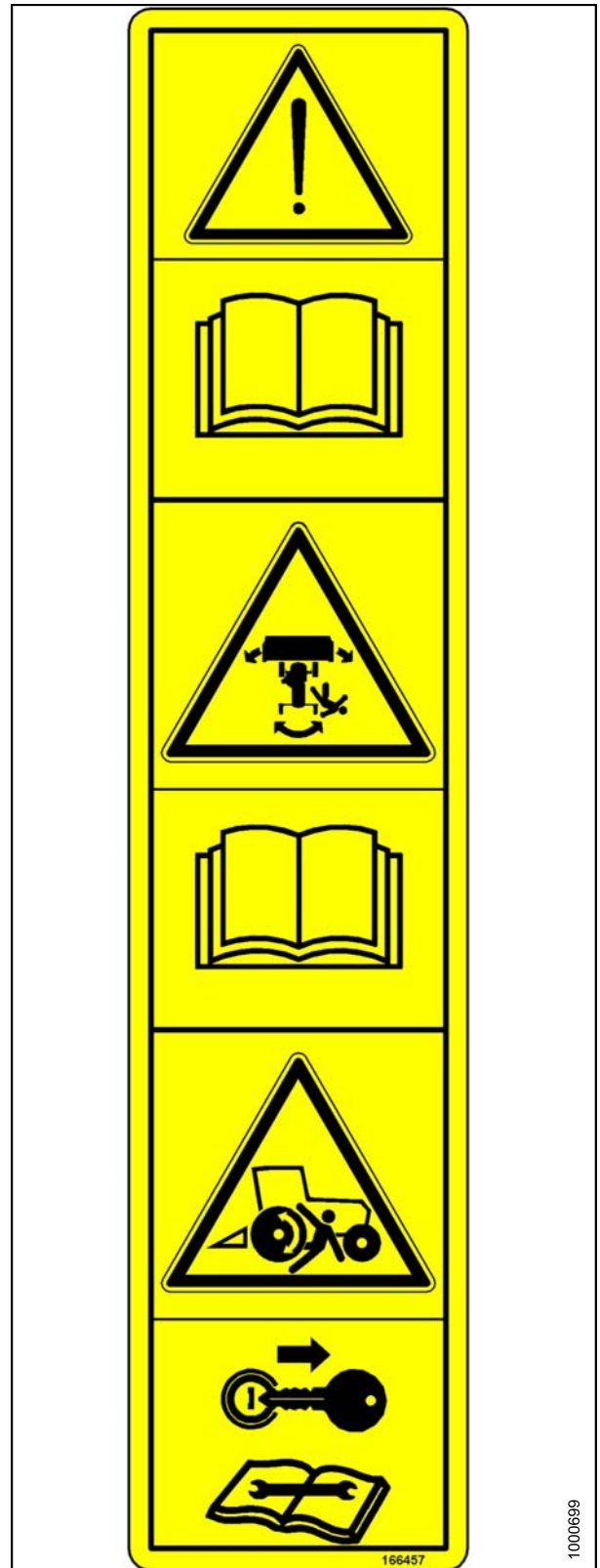


Figure 1.37: MD #166457

SAFETY

14. MD #166461

- a. Hot Fluid Under Pressure Hazard
- b. **CAUTION**
 - Coolant is under pressure and may be hot. Never remove radiator cap when engine is hot.

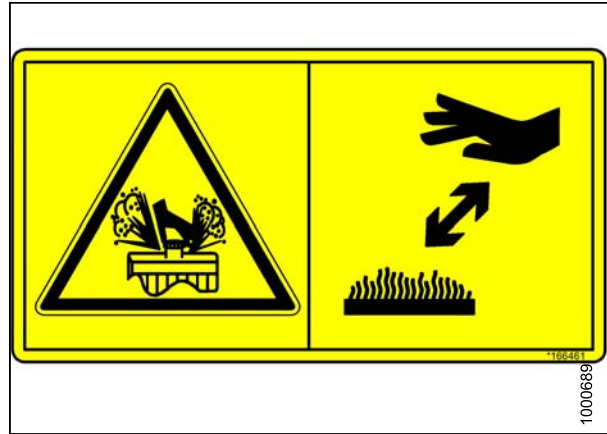


Figure 1.38: MD #166461

15. MD #166463

- a. Collision Hazard In Transport
- b. **WARNING**
 - Collision between windrower and other vehicles may result in injury or death.

When driving windrower on public roadways:

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

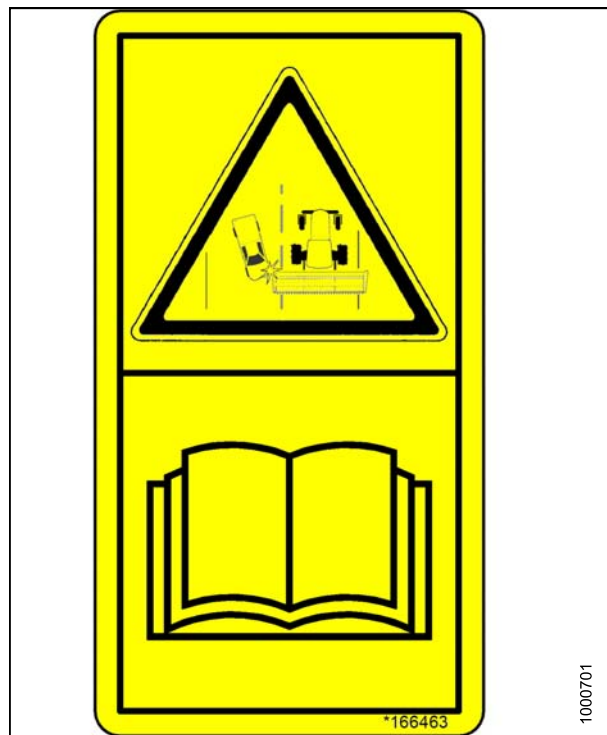


Figure 1.39: MD #166463

SAFETY

16. MD #166465

a. Loss Of Control Hazard

b. **WARNING**

To avoid serious injury or death from loss of control:

- i. Do not make abrupt changes in steering direction.
- ii. Anticipate turns by slowing down well in advance.
- iii. Do not rapidly accelerate or decelerate while turning.
- iv. Limit speed to maximum 20 mph (32 km/h) when towing a header. To ensure steering control refer to operator's manual for adding weight to drive wheels.
- v. When travelling on steep slopes:
 - 1) Reduce speed and lower header.
 - 2) Move ground speed lever to slow end of range.
 - 3) Shift high-low speed control to low range.
- vi. 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:
 - 1) Operate in low speed range.
 - 2) Avoid slopes.
 - 3) Do not tow a header. IF CONTROL OF MACHINE IS LOST, IMMEDIATELY PULL GROUND SPEED LEVER TO NEUTRAL.

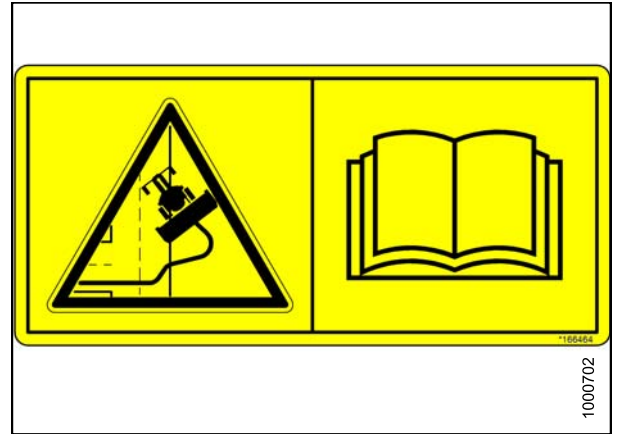


Figure 1.40: MD #166465

SAFETY

17. MD #174436

- a. Hydraulic oil pressure hazard
- b. **CAUTION**
Do not go near leaks
 - High pressure oil easily punctures skin causing serious injury, gangrene or death.
 - If injured, seek emergency medical help
Immediate surgery is required to remove oil.
 - Do not use finger or skin to check for leaks.



Figure 1.41: MD #174436

2 Description

2.1 Definitions

| Term | Definition |
|-------------------|---|
| API | American Petroleum Institute |
| APT | Articulating Power Tongue |
| ASTM | American Society Of Testing and Materials |
| Bolt | A headed and externally threaded fastener that is designed to be paired with a nut. |
| 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. |
| DK | Double Knife |
| DWA | Double Windrow Attachment |
| ECM | Engine Control Module. |
| Engine-Forward | Windrower operation with the Operator and engine facing in the direction of travel. |
| Finger Tight | Finger tight is a reference position where sealing surfaces or components are making contact with each other and the fitting has been tightened to a point where the fitting is no longer loose. For example, with a JIC tube fitting the tube flare or angular female surface of swivel connector must be seated and in light contact with 37° male surface (nose) of fitting body. If necessary, a wrench should be used to pull nut and seat the fitting to this initial reference position. Parker (a hydraulic component Supplier) states finger tight as 30 lbs-in. |
| F.F.F.T | Flats from finger tight |
| GSL | Ground Speed Lever |
| GSS | Grass Seed Special |
| Hard joint | A joint made with the use of a fastener where the joining materials are highly incompressible |
| Header | A machine that cuts and lays crop into a windrow, and is attached to a self-propelled windrower. |
| ISC | Intermediate Speed Control. |
| JIC | Joint Industrial Council: a standards body that developed the standard sizing and shape for original 37° flared fitting. |
| Mower Conditioner | A machine that cuts and conditions hay, and is pulled by an Ag tractor. |
| Nut | An internally threaded fastener that is designed to be paired with a bolt. |
| NPT | National Pipe Thread: a style of fitting used for low pressure port openings. Threads on NPT fittings are uniquely tapered for an interference fit. |
| ORB | O-ring Boss: a style of fitting commonly used in port opening on manifolds, pumps and motors. |
| ORFS | O-ring Face Seal: a style of fitting commonly used for connecting hoses and tubes. This style of fitting is also commonly called ORS, which stands for O-ring Seal. |

DESCRIPTION

| Term | Definition |
|--|---|
| PTO | Power Take-Off |
| RoHS (Reduction of Hazardous Substances) | A directive by the European Union to restrict the use of certain hazardous substances (such as hexavalent chromium used in some yellow zinc platings) |
| SAE | Society Of Automotive Engineers |
| Screw | A headed and externally threaded fastener that threads into preformed threads or forms its own thread in one of the mating parts |
| Self-Propelled Windrower (SP) | Self-propelled machine consisting of a power unit with a header and/or conditioner. |
| SK | Single Knife |
| Soft Joint | A joint made with the use of a fastener where the joining materials are compressible or experience relaxation over a period of time. |
| Tractor | Agricultural type tractor. |
| Tension | Axial load placed on a bolt or screw, usually measured in pounds (lb) or Newtons (N). |
| T.F.F.T. | Turns from finger tight. |
| Torque | The product of a force X lever arm length, usually measured in foot-pounds (ft-lbf) or Newton-meters (Nm). |
| Torque Angle | A tightening procedure where the fitting is assembled to a precondition (finger tight) and then the nut is turned further a number of degrees or a number of flats to achieve its final position. |
| Torque-Tension | The relationship between the assembly torque applied to a piece of hardware and the axial load it induces in the bolt or screw. |
| Truck | A four-wheel highway/road vehicle weighing no less than 7,500 lbs (3,400 kg). |
| Washer | A thin cylinder with a hole or slot located in the center and is to be used as a spacer, load distribution element or a locking mechanism |
| Windrower | Power unit of a self-propelled header. |
| WCM | Windrower Control Module. |

DESCRIPTION

2.2 M155 Windrower Specifications

| ENGINE | | |
|---|--|---|
| Type | Cummins QSB-4.5L 4 Cylinder Turbo Diesel. B20 Biodiesel Approved. | |
| Displacement | 275 cu. in. (4.5 L) | |
| Power | Rated | 148 hp (110 kW) @ 2300 rpm |
| | Peak | 156 hp (116 kW) @ 2000 rpm |
| ELECTRICAL SYSTEM | | |
| Recommended Battery (2) | 12 Volt, Maximum Dimension: 13.25 x 7.37 x 9.44 in (334 x 188 x 232 mm). Group Rating 29H or 31A. Heavy Duty / Off Road / Vibration Resistant. | |
| Minimum CCA per battery (Cold Cranking Amps) | 650 | |
| Battery BCI group rating | 29H or 31A | |
| Alternator | 130 amp | |
| Egress Lighting | Standard | |
| 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 US 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 US Gallons (367 L) | |
| Hydraulic Reservoir | 17.2 US Gallons (65 L) | |
| HEADER DRIVE (see table 2.1 M155 Hydraulic Pumps, page 31). | | |

DESCRIPTION

| HEADER LIFT/TILT | | |
|--|--------------------|--|
| | Type | Hydraulic Double Acting Cylinders. Tilt - Optional Hydraulic Positioning, Optional Hydraulic Center-link |
| | Function | Lift / Tilt / Float |
| HEADER FLOAT | | |
| | Primary Adjustment | Manual, External, Draw-Bolt With Springs (1 per side). One Inner Booster Spring On Left 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 | | One Live, Two On Ignition, One Live/Keyed |
| Mirrors | | One Inside (Transport), 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 |
| TIRE OPTIONS (Refer to 2.2 Drive Tires, page 32 for options.) | | |
| FRAME AND STRUCTURE | | |
| Dimensions | | Refer to section 2.3 M155 Windrower Dimensions, page 32 |
| Frame to Ground (Crop Clearance) | | 45.7 in. (1160 mm) |
| Weight | Base | 9610 lbs (4360 kg) ¹ |
| | Maximum GVW | 21,500 lbs (9750 kg) ¹ |
| | Maximum CGVW | 23,100 lbs (10,480 kg) ¹ |
| HEADER COMPATIBILITY | | |

1. Weights do not include options.

DESCRIPTION

| | | |
|----------------|--------------------------------|--------------------------|
| Auger Headers | A30-D, A40-D | All Sizes |
| Draper Headers | D50, D60 and D65 ² | Up to 35 FT. |
| Draper Headers | D60 and D65 40 FT ² | 40 FT. |
| Rotary Disc | R80 and R85 | 13 FT. Only ³ |

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

Table 2.1 M155 Hydraulic Pumps

| Pump Type | Specifications | Controller Type | Function |
|--|---|--|---|
| Pump A - Load Sense P.C. Piston Pump | Variable Displacement: 0–2.75 cu. in. (0–45 cc) Flow = 0-27 gpm (102 L/min) at 4000 psi (276 Bar) | Electric over Hydraulic Max. Flow rate Determined By Header ID | Knife drive or part of disc drive (option) M1 circuit |
| Pump B - Load Sense P.C. Piston Pump | Variable Displacement: 0–2.32 cu. in. (0–38 cc) Flow = 0-24 gpm (84 L/min) at 3200 psi (220 Bar) | Electric over Hydraulic Max. Flow rate Determined By Header ID | Conveyor and reel drive or part of disc drive (option) M2 circuit |
| Pump C - Gear Pump | Displacement: 1.02 cu. in. (16.7 cc) Flow at Full Throttle 11.5 gpm. (44 L/min) at 2500 psi (172 bar) | Engine RPM | Supercharge flow and pressure for traction drive, brake release, Neutral lock, and DWA draper drive (if installed). |
| Pump D- Gear Pump | Displacement: 1.02 cu. in. (16.7 cc) Flow at Full Throttle 11.5 gpm. (44 L/min) at 2500 psi (172 bar) | Engine RPM | Supercharge flow and pressure for traction drive, brake release, and Neutral lock. |

2. Depending on header options

3. Only 18.4 x 26 tires are compatible with the 13 FT R80 and R85

DESCRIPTION

2.3 M155 Windrower Dimensions

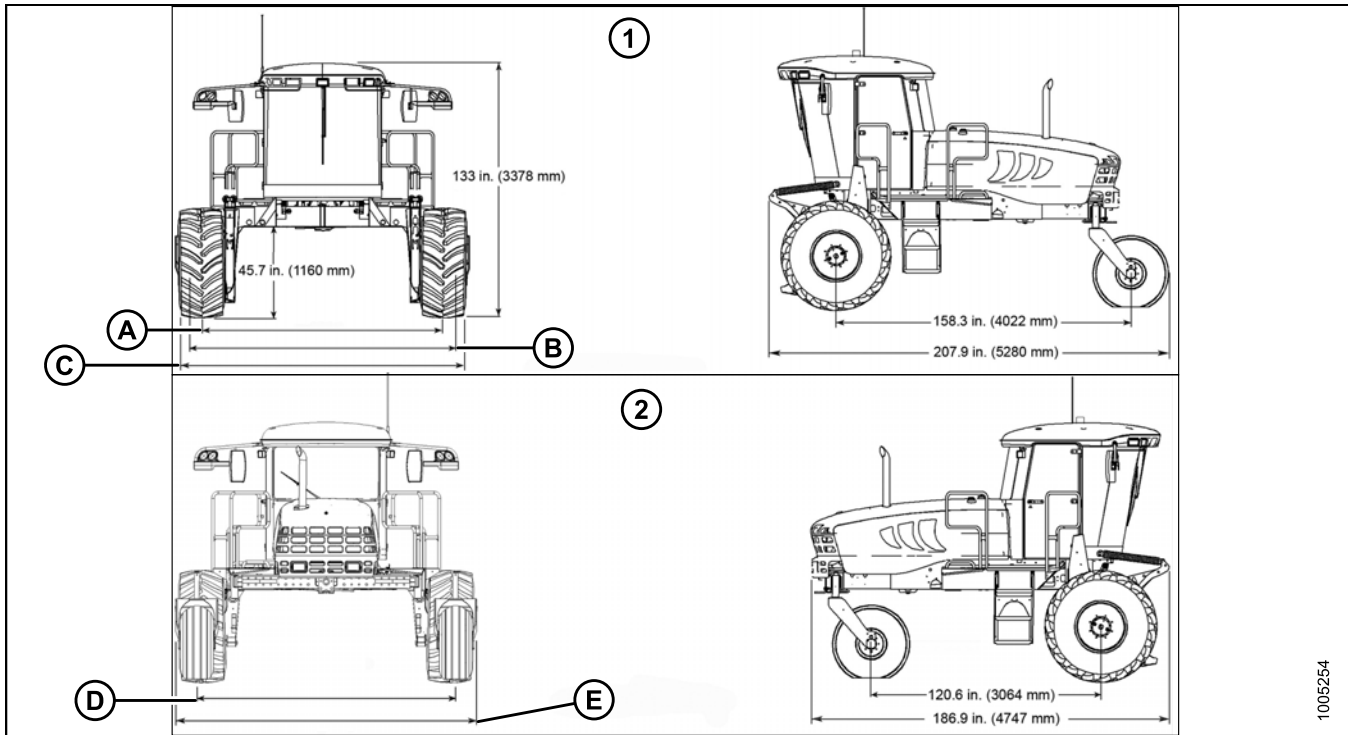


Figure 2.1: Windrower Dimensions

1- Cab Forward

2- Engine Forward

Table 2.2 Drive Tires

| Tire Size | Wheel Position | Tread (A) [Inch (mm)] | Hubs (B) [Inch (mm)] | Tires (C) [Inch (mm)] |
|---|---------------------------|--------------------------|-------------------------|--------------------------|
| 18.4 x 26 Bar & Turf Narrow Track ⁴ | Inner/Outer (Shipping) | 123-3/4 (3144) | 140-9/16 (3571) | 143-7/16 (3644) |
| | Outer/Outer | 130-7/8 (3324) | 147-11/16 (3751) | 150-5/8 (3824) |
| | Inner/Inner | 116-11/16 (2964) | 133-1/2 (3391) | 136-3/8 (3464) |
| 18.4 x 26 Bar & Turf Wide Track ⁴ | Inner/Outer (Shipping) | 130-11/16 (3319) | 140-9/16 (3571) | 150-3/8 (3819) |
| | Outer/Outer | 137-3/4 (3499) | 147-11/16 (3751) | 157-7/16 (3999) |
| | Inner/Inner | 123-9/16 (3139) | 133-1/2 (3391) | 143-1/4 (3639) |
| 600/65R28 Radial Tire | Inner/Outer (Shipping) | 123-9/16 (3139) | 140-9/16 (3571) | 147-15/16 (3758) |
| | Outer/Outer | 130-11/16 (3319) | 147-11/16 (3751) | 155-1/16 (3938) |
| | Inner/Inner | 116-1/2 (2959) | 133-1/2 (3391) | 140-7/8 (3578) |

4. Only 18.4 x 26 tires are compatible with the 13 foot R80 and R85.

DESCRIPTION

| Tire Size | Wheel Position | Tread (A) [Inch (mm)] | Hubs (B) [Inch (mm)] | Tires (C) [Inch (mm)] |
|--------------------------------------|---------------------------|--------------------------|-------------------------|--------------------------|
| 23.1-26 & 580/70R26 Turf Tires | Inner/Outer (Shipping) | 126-1/8 (3203) | 140-9/16 (3571) | 149-5/16 (3793) |
| | Outer/Outer | 133-3/16 (3383) | 147-11/16 (3751) | 156-7/16 (3973) |
| | Inner/Inner | 119 (3023) | 133-1/2 (3391) | 142-1/4 (3613) |

Table 2.3 Caster Tires

| Tire Size | Wheel Position | Tread (D) [(Inch/mm)] | Casters (E) [(Inch/mm)] |
|---------------------|----------------|--------------------------|----------------------------|
| 7.5-16SL | Minimum | 96-7/16 (2448) | 118-15/16 (3032) |
| | Maximum | 135-11/16 (3448) | 158-3/4 (4032) |
| 10-16 Formed Caster | Minimum | 96-7/16 (2448) | 118-15/16 (3032) |
| | Maximum | 135-11/16 (3448) | 158-3/4 (4032) |
| 10-16 Forked Caster | Minimum | 96-7/16 (2448) | 118-11/16 (3014) |
| | Maximum | 135-11/16 (3448) | 158 (4014) |
| 16.5 x 16.1 | Minimum | 96-7/16 (2448) | 118-11/16 (3014) |
| | Maximum | 135-11/16 (3448) | 158 (4014) |

DESCRIPTION

2.4 Component Location

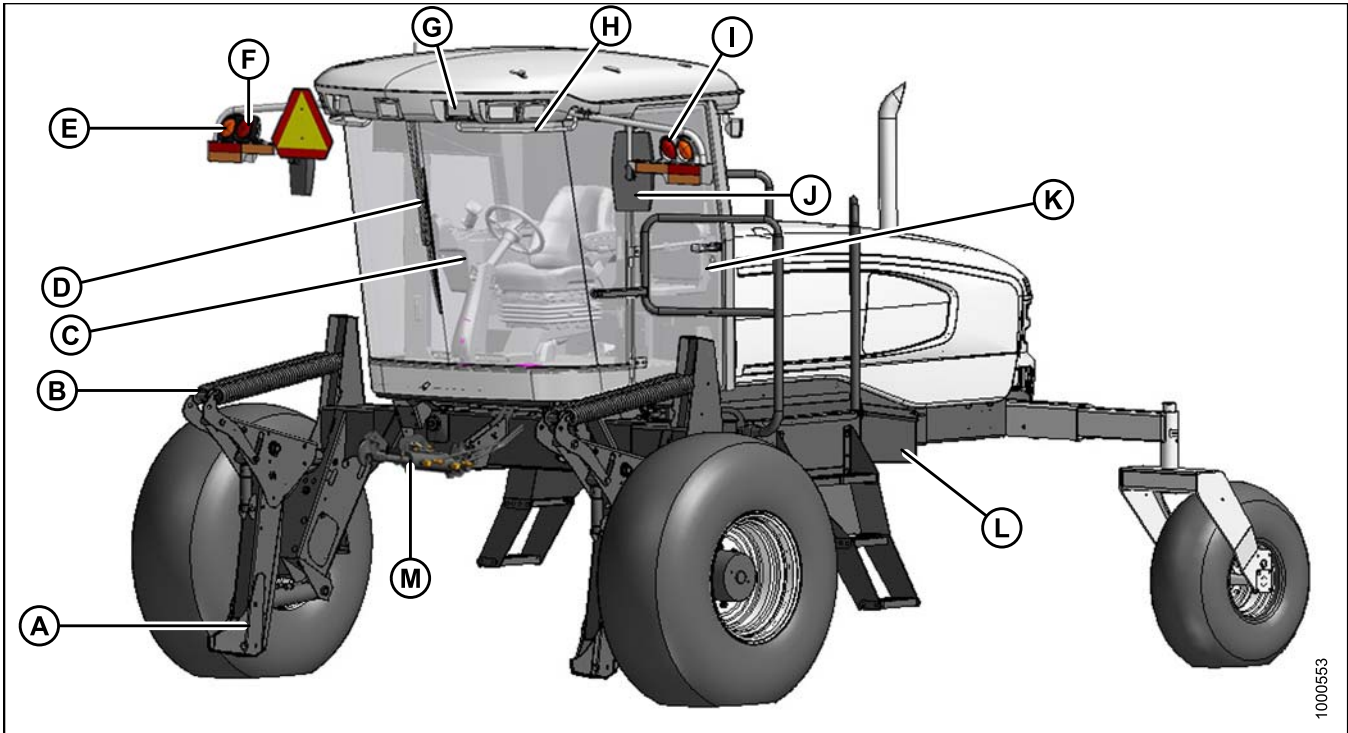


Figure 2.2: M155 Windrower - Front View

- | | | |
|-----------------------|---------------------------------|-------------------------------|
| A - Header Lift Leg | B - Header Float Springs | C - Operator's Station |
| D - Windshield Wiper | E - Turn Signal / Hazard Lights | F - Tail Light Engine-Forward |
| G - Field/Road Lights | H - Hand Rails | I - Tail Light Engine-Forward |
| J - Mirror | K - Door | L - Maintenance Platform |
| M - Center-Link | | |

DESCRIPTION

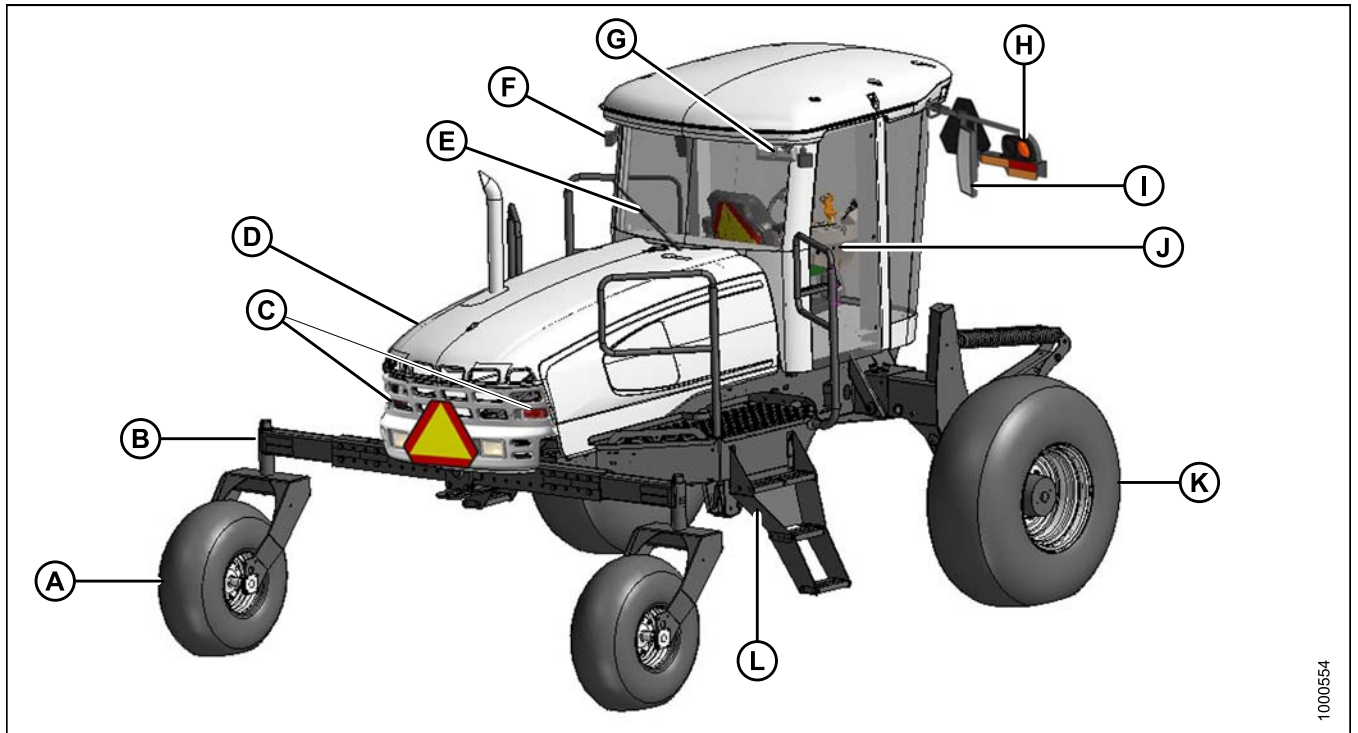


Figure 2.3: M155 Windrower - Rear View

A - Caster Wheel
D - Engine Compartment Hood
G - Horn
J - Door

B - Walking Beam
E - Windshield Wiper
H - Turn Signal/Hazard Lights
K - Drive Wheel

C - Tail Lights - Cab-Forward (Opt)
F - Field/Road Lights
I - Mirror
L - Maintenance Platform

1000554

3 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 degrees so that the Operator maintains access to the windrower controls and gauges regardless of the direction of travel.

3.1 Operator Console

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

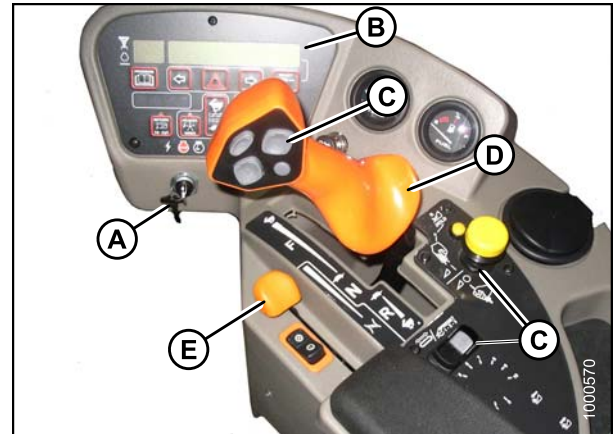


Figure 3.1

A - Ignition
C - Header Controls
E - Throttle

B - Cab Display Module (CDM)
D - Ground Speed Lever

1. Adjusting fore-aft and height:
 - a. Pull lever (A), and slide console fore or aft to the desired position
 - b. Release lever to lock console.

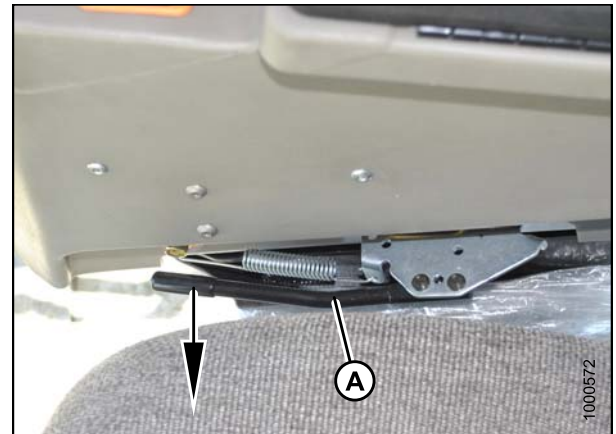


Figure 3.2

OPERATOR'S STATION

2. Adjusting only fore-aft:
 - a. Loosen nuts (A) under console.
 - b. Move console as required.
 - c. Tighten nuts (A).

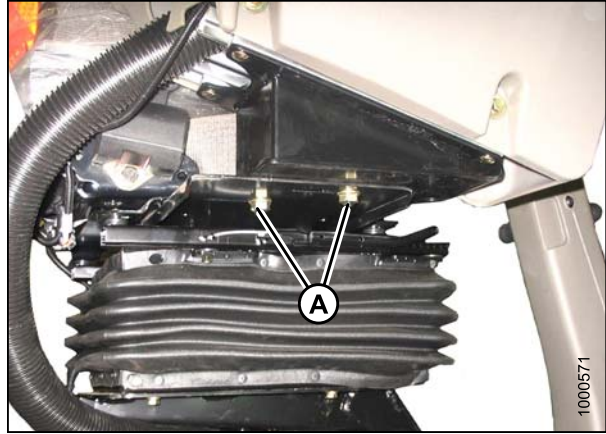


Figure 3.3

OPERATOR'S STATION

3.2 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

3.2.1 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.

3.2.2 Engine and Transmission

- The engine will not be allowed to start when the HEADER DRIVE switch is engaged.
- The engine will shut down when the windrower is moving at 5 mph (8 km/h) or less, and the Operator leaves the seat. 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.
- 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.

OPERATOR'S STATION

3.3 Operator's Seat Adjustment

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

3.3.1 Fore-Aft

1. Pull lever (A) up to release.
2. Move seat forward or rearward.
3. Release lever (A).



Figure 3.4

3.3.2 Weight and Seat Height

Controls suspension stiffness and seat height

INCREASE: Press Upper Switch (A).

DECREASE: Press Lower Switch (B).



Figure 3.5

OPERATOR'S STATION

3.3.3 Vertical Dampener

Adjusts suspension dampening

INCREASE: Turn knob (A) counterclockwise.

DECREASE: Turn knob (A) clockwise.

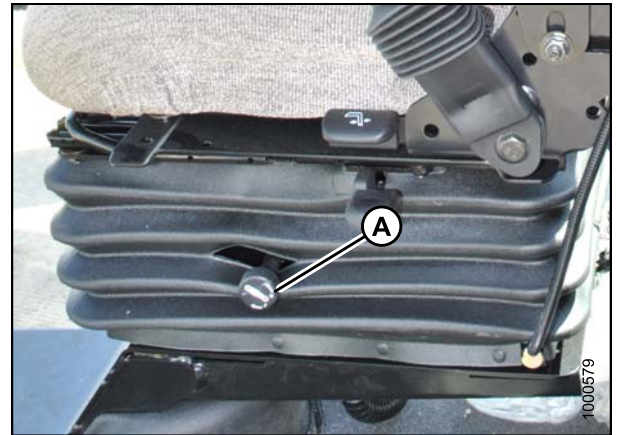


Figure 3.6

3.3.4 Arm Rest

Raise arm rest (A) for easier access to seat.

Lower arm rest (A) after seat belt is buckled.



Figure 3.7

OPERATOR'S STATION

3.3.5 Fore-Aft Isolator Lock

Locks Seat Fore-Aft Isolator

LOCK: Push lever (A) down.

UNLOCK: Pull lever (A) up.



Figure 3.8

3.3.6 Seat Tilt

1. Pull lever (A) up to release.
2. Position seat back as desired.
3. Release lever (A).



Figure 3.9

OPERATOR'S STATION

3.3.7 Arm Rest Angle

Adjusts Angle of Arm Rest

INCREASE: Rotate knob (A) clockwise.

DECREASE: Rotate knob (A) counterclockwise.

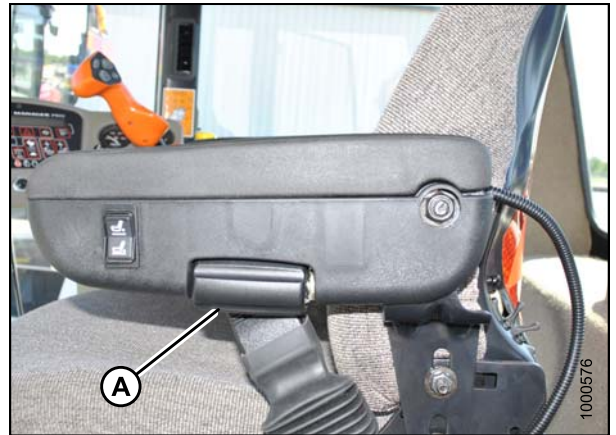


Figure 3.10

3.3.8 Lumbar Support

Adjusts Stiffness of Seat Back

INCREASE: Rotate knob upward (A).

DECREASE: Rotate knob downward (B).



Figure 3.11

OPERATOR'S STATION

3.4 Training Seat

A wall mounted fold-up training seat complete with seat belt is provided.



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.
1. For storage, lift seat (B), and secure with latch (A).

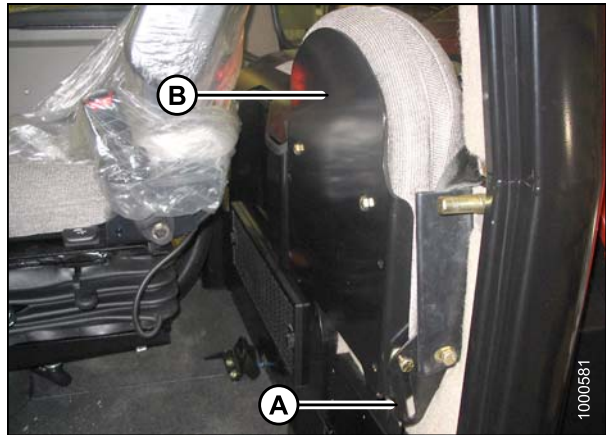


Figure 3.12

2. To lower seat, lift latch (A), and lower seat (B).



Figure 3.13

OPERATOR'S STATION

3.5 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.
1. To fasten seat belt (A), 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.
 2. To release, push the red button (B) in the end of the buckle, and separate the buckle and metal eye.

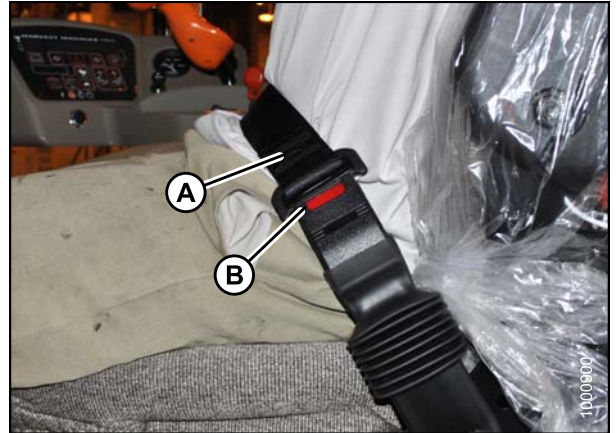


Figure 3.14

OPERATOR'S STATION

3.6 Steering Column Adjustment

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

1. Hold onto steering wheel, lift handle (A), and move steering wheel up or down to desired position.
2. Release handle (A) to lock steering wheel position.

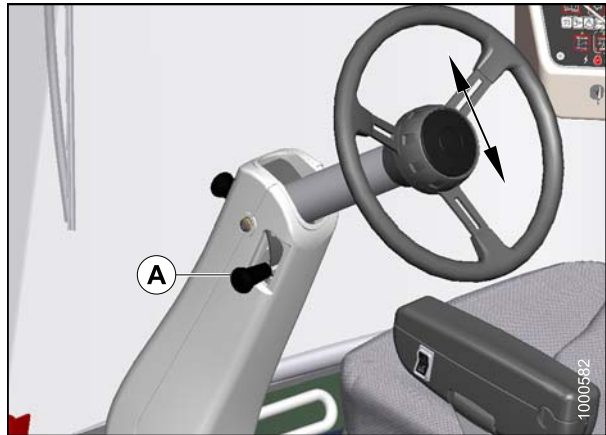


Figure 3.15

OPERATOR'S STATION

3.7 Lighting

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

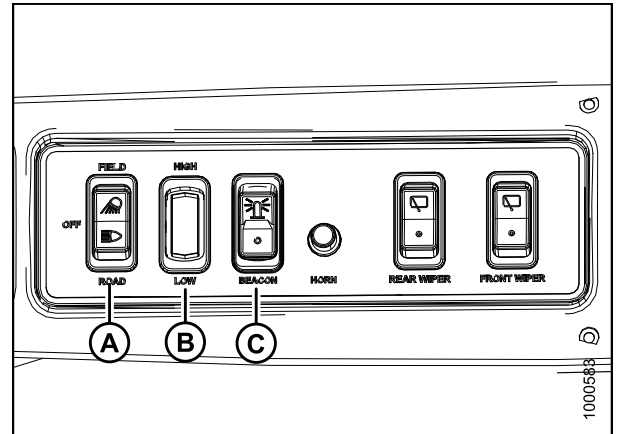


Figure 3.16: Roof Liner Console

A - Field or Road Lights
C - Beacon (If Equipped)

B - Low or High Beams

OPERATOR'S STATION

3.7.1 Cab-Forward Lighting: Field

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.

The hazard lights will be automatically activated when certain conditions are met. The windrower must be cab-forward, medium range, brake off, and header off.

The work lights will not turn on in certain instances. If the windrower is engine-forward or if the windrower is cab-forward, out of park, medium range, and header off.

IMPORTANT

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

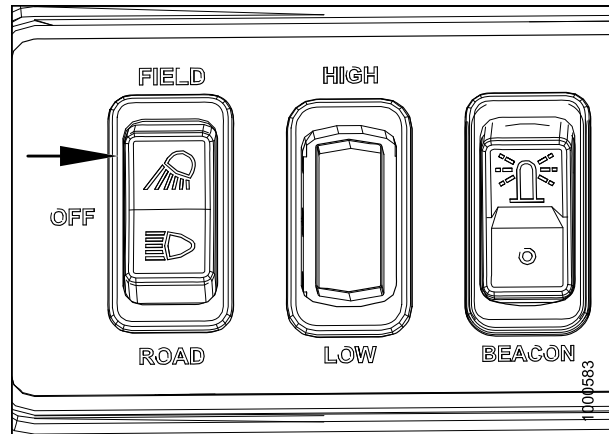


Figure 3.17

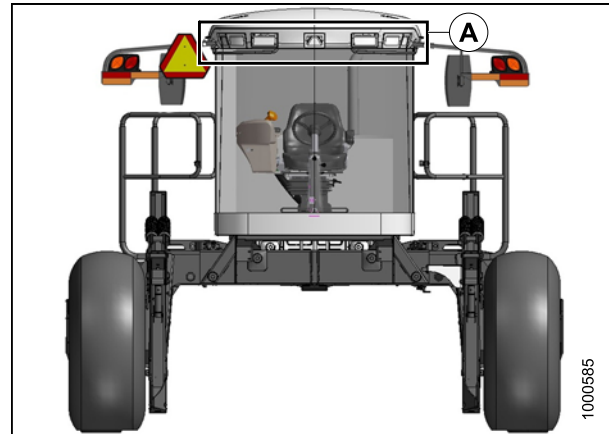


Figure 3.18: Cab-Forward: Front View

A - Field Lights

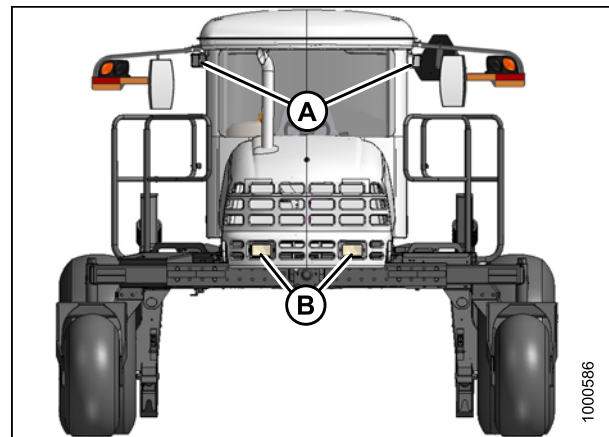


Figure 3.19: Cab-Forward: Rear View

A - Field Lights

B - Swath Lights – Low / High

OPERATOR'S STATION

3.7.2 Engine-Forward Lighting: Road

The following lights are ON/functional when the switch is in the ROAD position. The hazard lights will be automatically activated when driving on the road in engine forward mode.

NOTE: Field lights are not available in engine-forward mode.

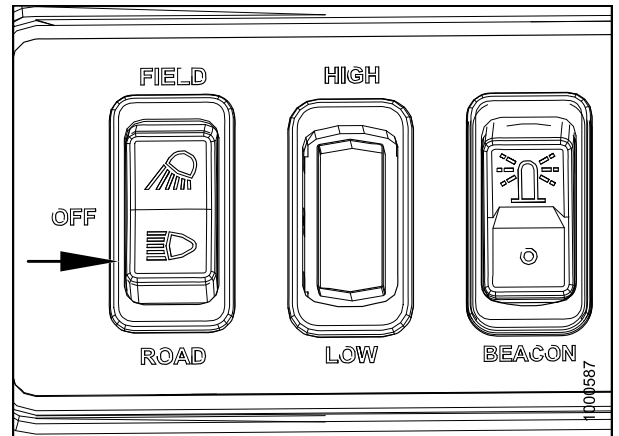


Figure 3.20

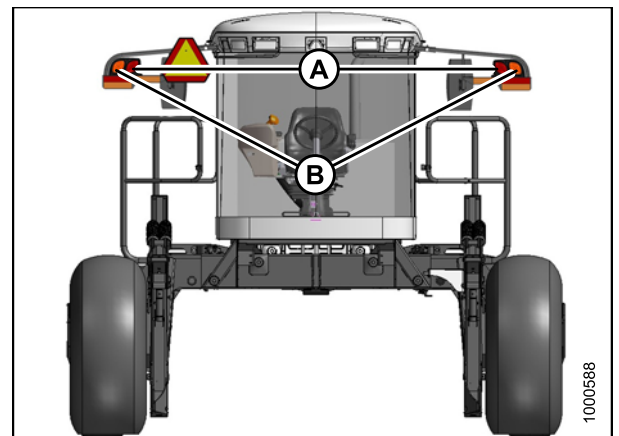


Figure 3.21: Engine-Forward: Rear View

A - Red Tail Lights

B - Amber Turn Signal / Hazard Lights

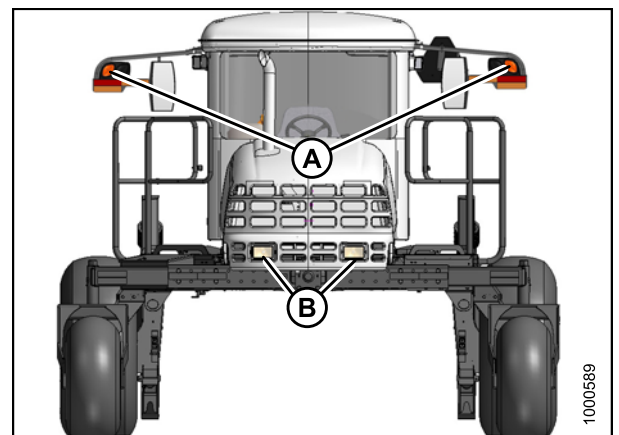


Figure 3.22: Engine-Forward: Front View

A - Amber Turn Signal / Hazard B - Road Lights – Low / High Lights

OPERATOR'S STATION

3.7.3 Cab-Forward Lighting: Road (Optional)

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

The hazard lights will be automatically activated when certain conditions are met. The windrower must be cab-forward, medium range, brake OFF, and header OFF.

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.

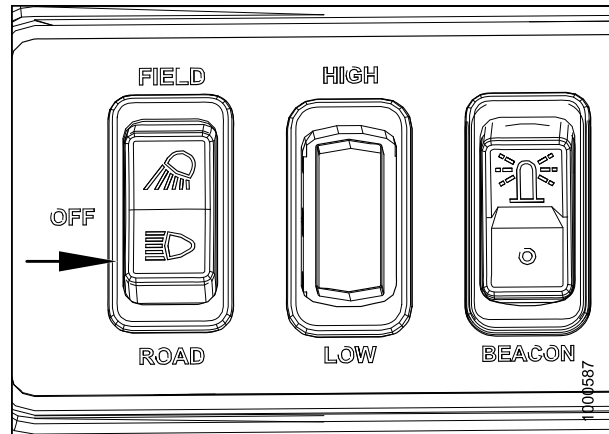


Figure 3.23

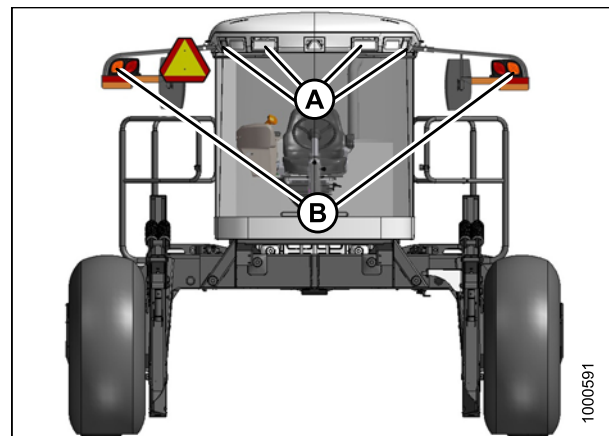


Figure 3.24: Cab-Forward: Front View

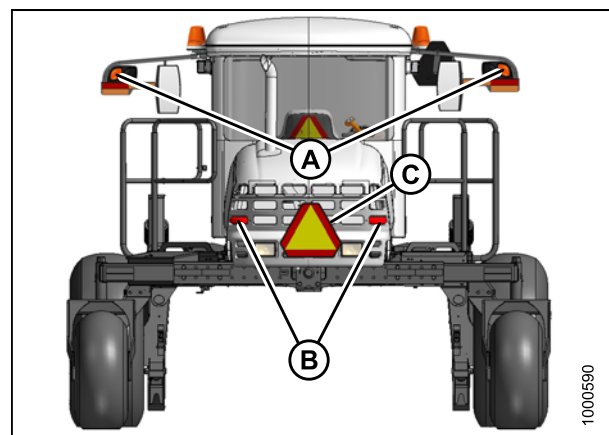


Figure 3.25: Cab-Forward: Rear View

OPERATOR'S STATION

3.7.4 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.

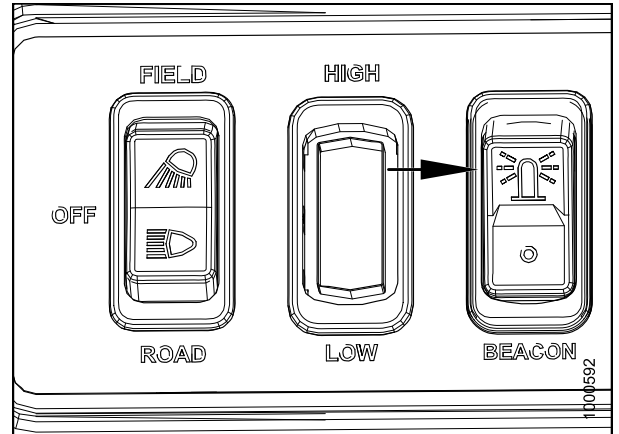


Figure 3.26

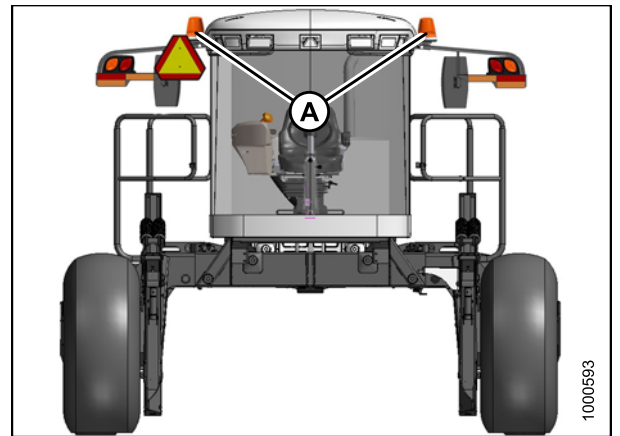


Figure 3.27: Cab-Forward: Front View

OPERATOR'S STATION

3.8 Windshield Wipers

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

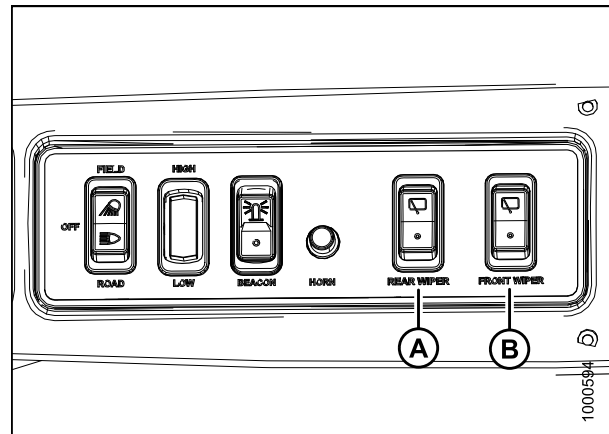


Figure 3.28

A - Rear Wiper

B - Front Wiper

OPERATOR'S STATION

3.9 Rear View Mirrors

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

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

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

A detent-type lock keeps it in place.

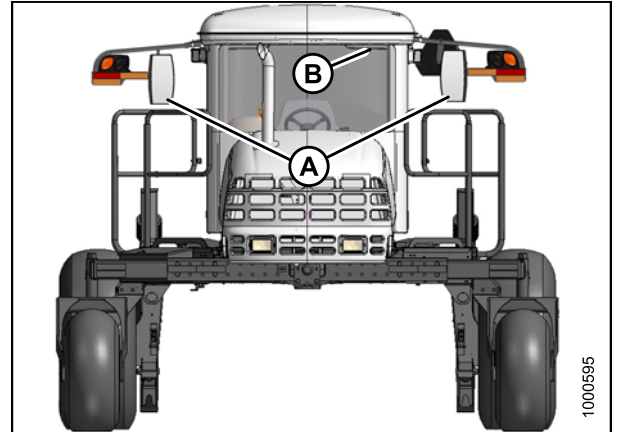


Figure 3.29

OPERATOR'S STATION

3.10 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.

3.10.1 Heater Shut-off

A shut-off valve (A) 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.

For maximum cooling, the valve can be CLOSED.

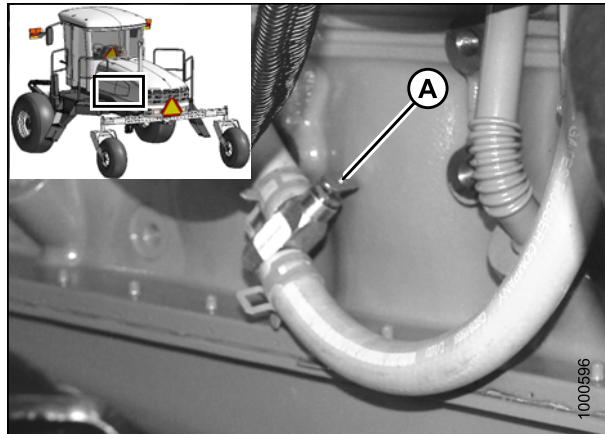


Figure 3.30

3.10.2 Air Distribution

Cab air distribution is controlled through adjustable air vents (A) located in the cab posts.

The vents provide window and Operator ventilation.

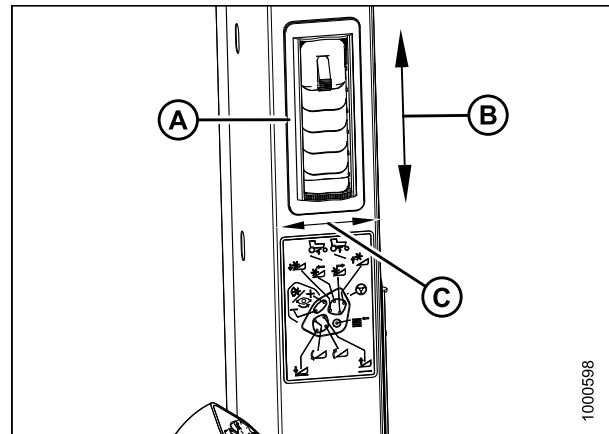


Figure 3.31

A - Vent
C - Direction

B - Open/Close

OPERATOR'S STATION

3.10.3 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:

1. Roof Liner Controls
 - a. Blower Switch controls the blower speed.
OFF / LOW / MEDIUM / HIGH
 - b. Air Conditioning Switch controls A/C system.
OFF: A/C does not operate.
ON: A/C operates with blower switch ON.
 - c. Outside Air Switch controls the air source.
Fresh Air: Starts booster fan, and filtered outside air is drawn into cab.
Recirculate: Stops booster fan, and cab air is recirculated
 - d. Temperature Control controls cab temperature.
Increase: Turn clockwise.
Decrease: Turn counterclockwise.
2. Ensure heater shut-off valve at engine is OPEN. See Section [3.10.1 Heater Shut-off, page 54](#).
3. Turn blower switch to the first position, turn temperature control switch to maximum heating, and A/C control to OFF.
4. Start engine, and operate at low idle until engine is warm.
5. 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.

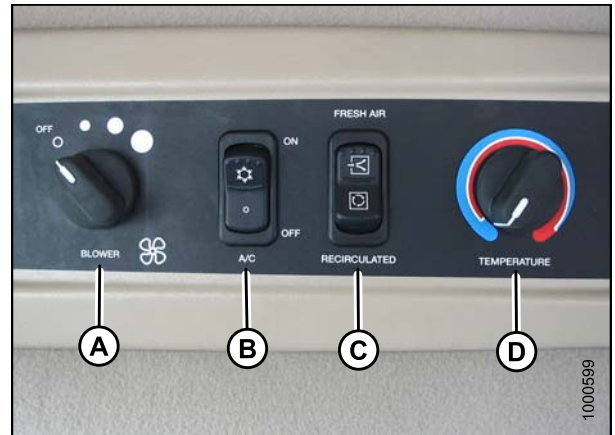


Figure 3.32

A - Blower Switch

B - Air Conditioning Switch

C - Outside Air Switch

D - Temperature Control Switch

OPERATOR'S STATION

3.11 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 key is in the run position. 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.

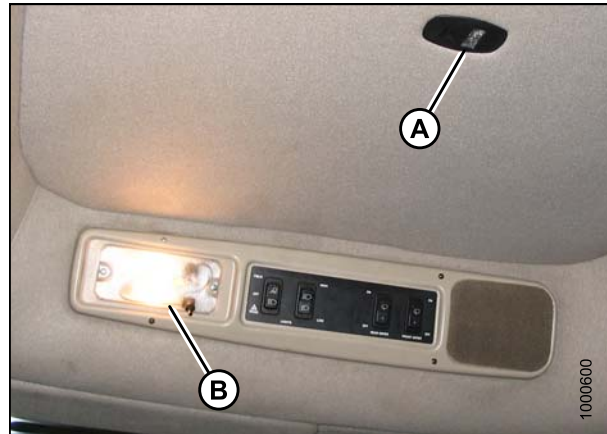


Figure 3.33

OPERATOR'S STATION

3.12 Operator Amenities

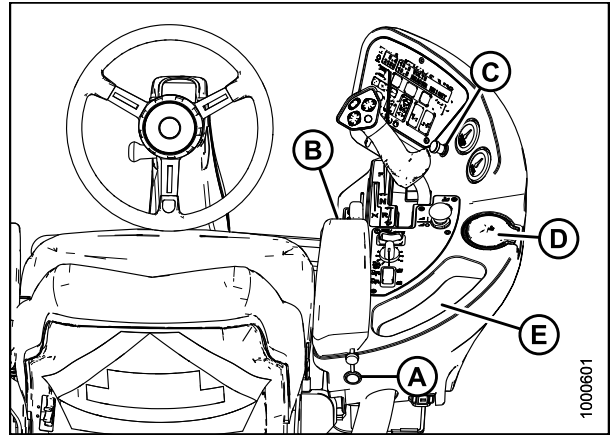


Figure 3.34: Console

- A - Auxiliary Power Outlet
- B - Utility Tray Under Arm Rest
- C - Cigarette Lighter
- D - Ashtray / Cup Holder
- E - Utility Tray

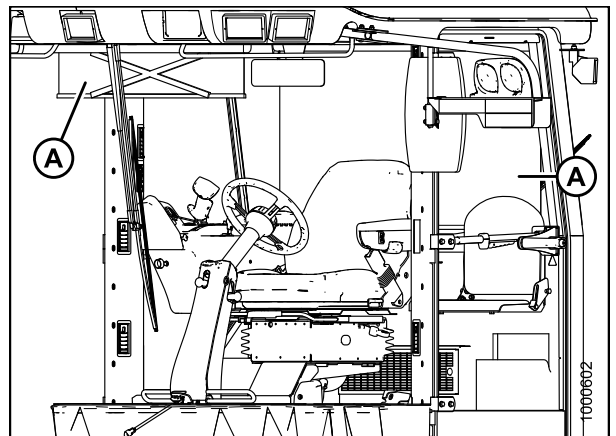


Figure 3.35: Window Shades (option)

- A - Window Shades (optional)

OPERATOR'S STATION

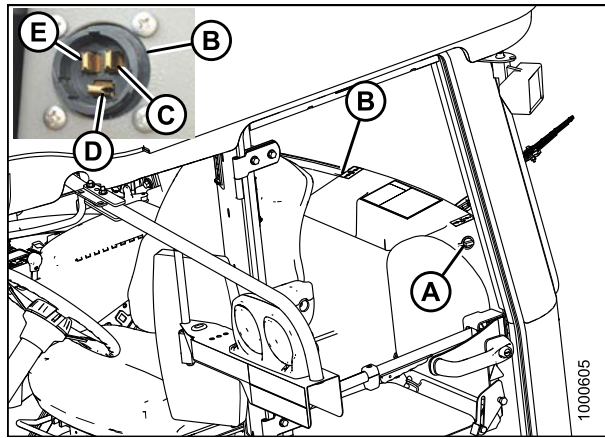


Figure 3.36: Auxiliary Outlets

- A - Auxiliary Power Outlet
- B - Auxiliary Power Outlet
- C - Battery Terminal
- D - Ground Terminal
- E - Switched Terminal

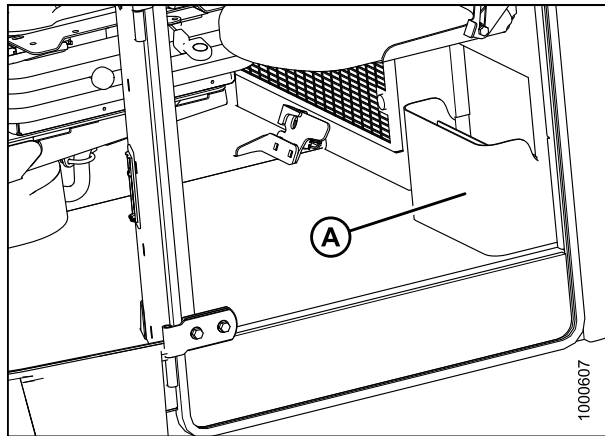


Figure 3.37: Manual Storage

- A - Manual Storage

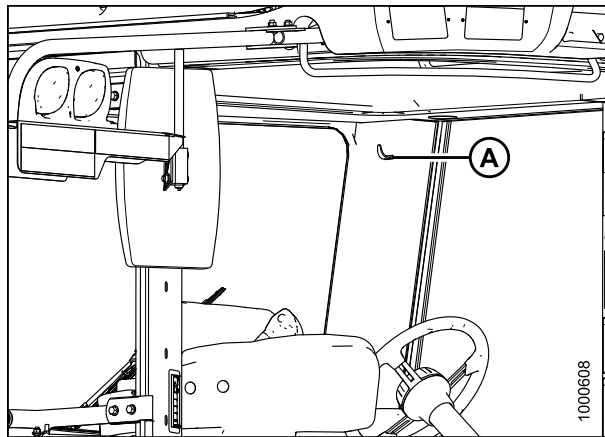


Figure 3.38: Coat Hook

- A - Coat Hook

OPERATOR'S STATION

3.13 Radio

A radio is available as optional equipment from your Dealer.

3.13.1 AM/FM Radio

A space (B) is provided in the cab headliner to accommodate the installation of an AM/FM radio that is available as optional equipment from your Dealer.

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

Operating instructions are supplied with the radio.

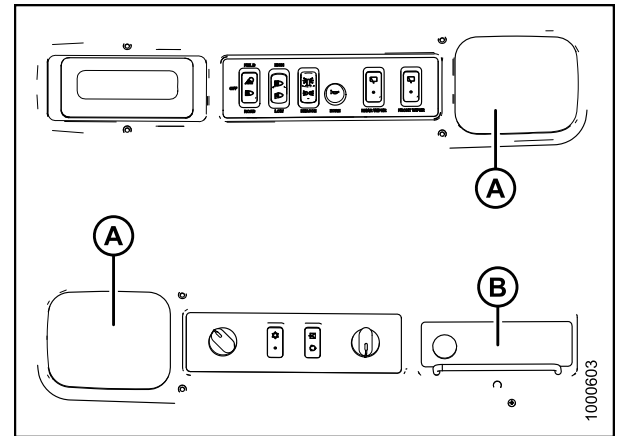


Figure 3.39: Speakers in Roof Liner

A - Speakers

B - Radio Mounting Location

3.13.2 Antenna Mounting

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

Order antenna mount MD #160288 (B), or see illustration for part dimensions for a homemade version.

It accommodates most CB, 2-way radio and satellite radio antennas. A knockout (C) for the antenna lead is provided on the cab post.

IMPORTANT

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

1. Remove existing bolt (A).
2. Install antenna mount (B) and secure with bolt (A)

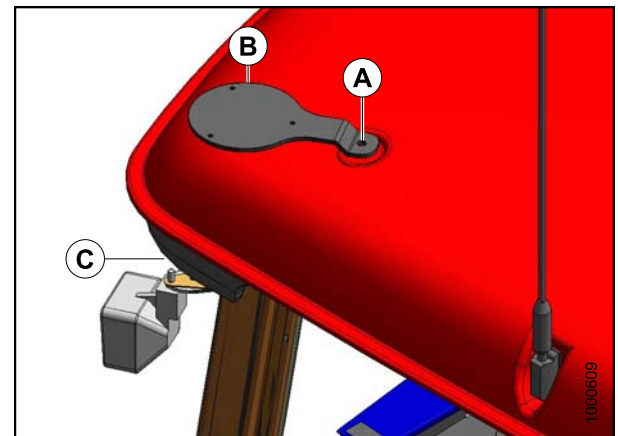


Figure 3.40

OPERATOR'S STATION

The knockout is located on the exterior RH rear corner post of the cab, under the roof, between the horn and the light.

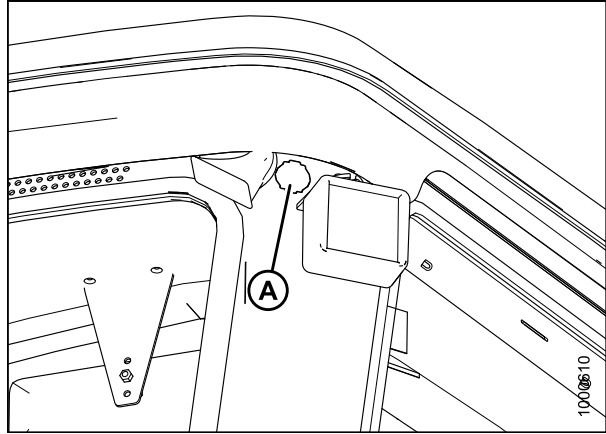


Figure 3.41: Knockout location in Cab

To make your own mount, see template for mount. Use 11 GA. or 3.0 mm steel sheet.

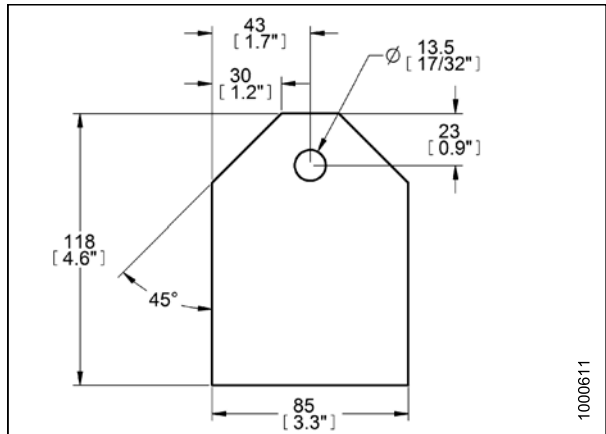


Figure 3.42: Template for Antenna Mount

OPERATOR'S STATION

3.14 Horn

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

Sound the horn three times prior to starting the engine.

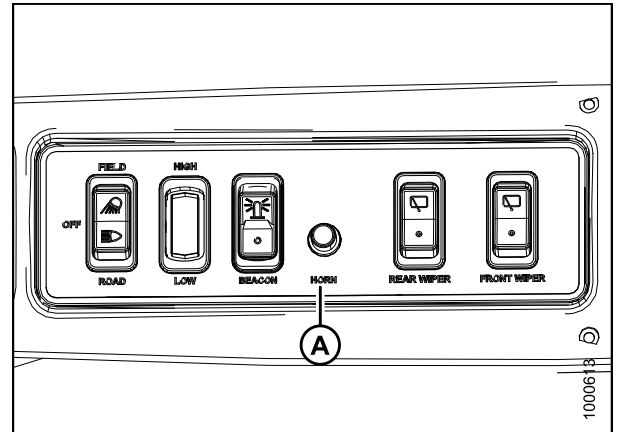


Figure 3.43

The horn is located outside the cab on the rear RH corner of the cab, under the roof.

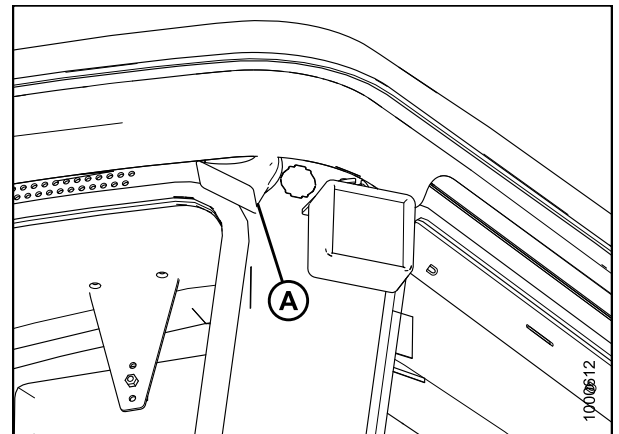


Figure 3.44: Horn Location

OPERATOR'S STATION

3.15 Engine Controls and 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.

1. Engine Controls

a. Ignition Switch

- ACC: Fully counterclockwise
- OFF: All Electrical Systems OFF
- RUN: Clockwise
- START: Fully Clockwise To Crank Engine. Release and Switch Returns to RUN
- REMOVE KEY WHEN WINDROWER NOT IN USE. KEY ALSO LOCKS DOORS.

b. Engine Temperature Gauge indicates Engine Coolant Temperature

- Normal Running: 180°–225°F (82°–107°C).
- Warning Tone Over 230°F (110°C).

c. Fuel Gauge indicates Fuel Level in Tank.

- E: Empty
- F: Full

d. Throttle controls engine RPM

- FULL: Push lever forward
- OPERATING: See [4.3.6 Driving the Windrower, page 108](#)
- CLOSED: Pull Lever Back



Figure 3.45: Engine Controls/Gauges

A - Ignition Switch
C - Fuel Gauge

B - Engine Temperature Gauge
D - Throttle - Controls Engine RPM.

OPERATOR'S STATION

3.16 Windrower Controls

1. Console Controls

- a. TURN SIGNALS: Activates Turn Signals on Windrower and Header.
Push-ON / Push-OFF
- b. GROUND SPEED LEVER (GSL): Controls Speed and Direction of Movement.
 - F: Forward
 - N: NEUTRAL
 - N-DETENT: Engages Neutral Interlock, and applies park brake when steering locked in center.
 - R: Reverse
- c. HAZARD WARNING LIGHTS: Activates Signals on SP Windrower and Header.
 - Push-ON / Push-OFF
- d. GROUND SPEED RANGE SWITCH: Shifts Transmission Speed Range

High range: 0–23 mph (37 km/h).
ENGINE-FORWARD ONLY.

Mid range: 0–16 mph (25.7 km/h).
CAB-FORWARD ONLY

Low range: 0–11 mph (17.7 km/h)

2. AUTOSTEER

- a. AUTO-STEER ENGAGEMENT SWITCH: Engages Auto-Steer System (If compatible system is installed).
 - ENGAGE: Click To Engage.
 - DISENGAGE: Turn Steering Wheel Or Click To Disengage.



Figure 3.46

- | | |
|---------------------------|-------------------------------|
| A - Turn Signals | B - Ground Speed Lever (GSL) |
| C - Hazard Warning Lights | D - Ground Speed Range Switch |
| E - N-Detent | |

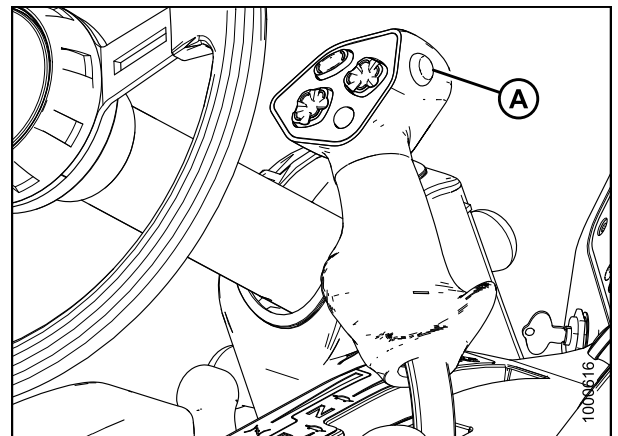


Figure 3.47

- A - Auto-Steer Engagement Switch

OPERATOR'S STATION

The auto-steer engagement switch harness terminates (A) beneath the cab between the fuel tank and evaporator box.



Figure 3.48

OPERATOR'S STATION

3.17 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.

3.17.1 Header Drive Switch

Engages and disengages header drive.

ENGAGE: Push Center and Pull Up

DISENGAGE: Push Down

IMPORTANT

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

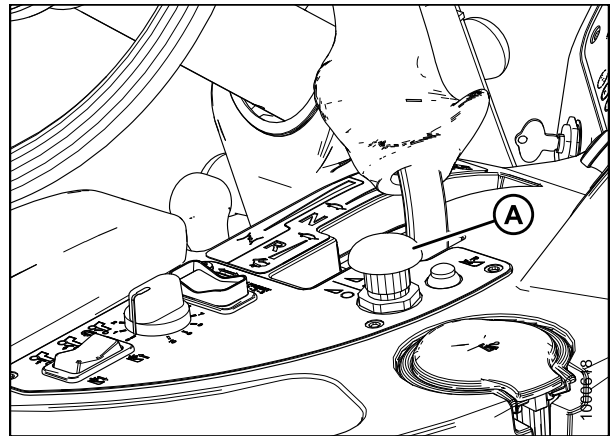


Figure 3.49

3.17.2 Header Drive Reverse Button

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

ENGAGE: Push and Hold Reverser Button (B) and Engage Header with Switch (A).

DISENGAGE: Release Button (B).

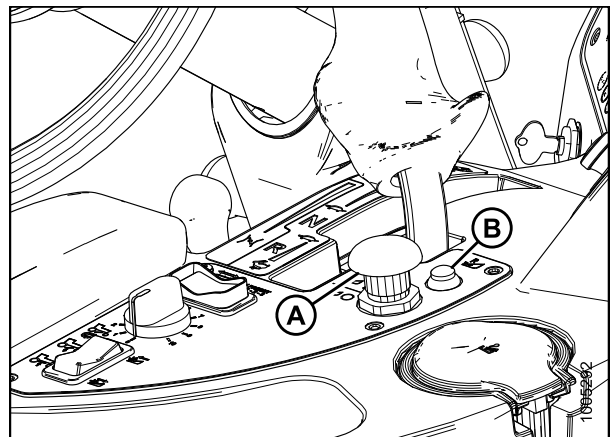


Figure 3.50

OPERATOR'S STATION

3.17.3 Ground Speed Lever (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.

NOTE: A decal (B) identifying switch functions is located on the cab post above the Operator's console.

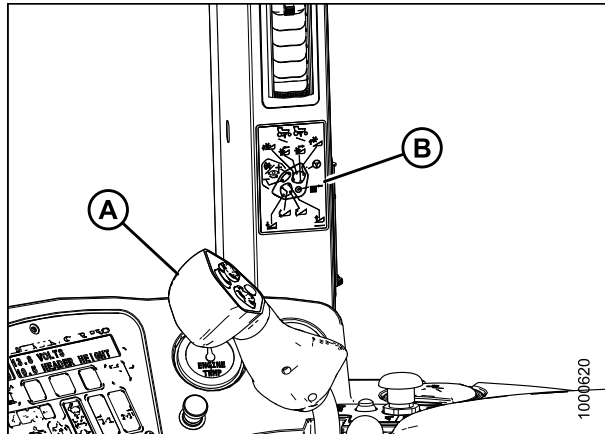


Figure 3.51

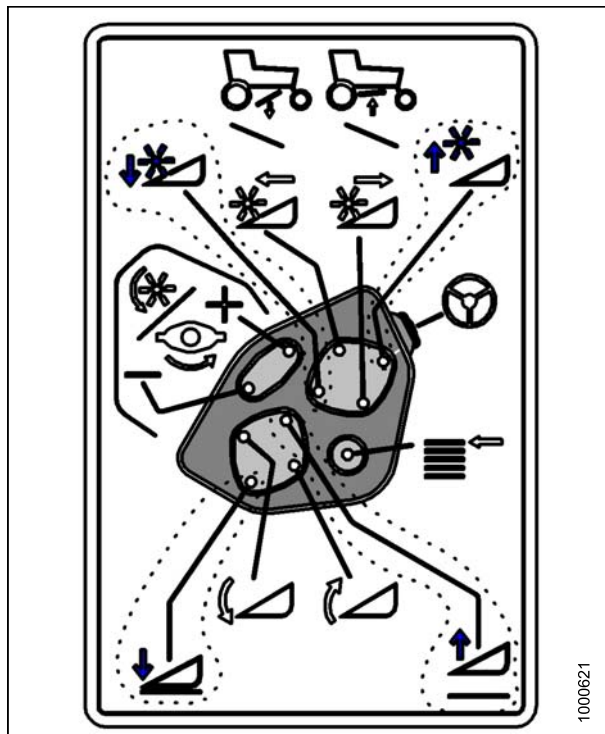


Figure 3.52

OPERATOR'S STATION

3.17.4 Display Selector Switch

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

- Press switch (A) to scroll through settings.

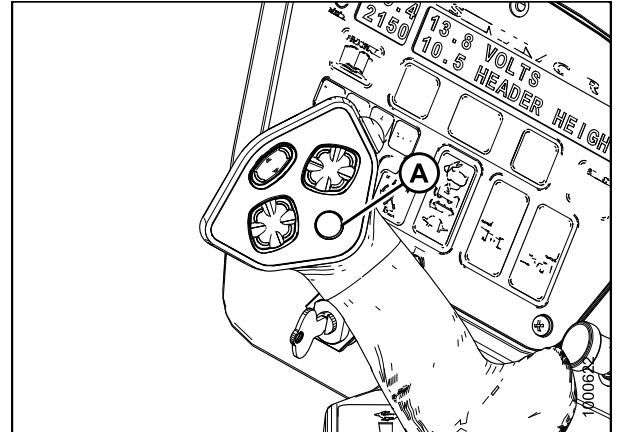


Figure 3.53

3.17.5 Reel Position Switches

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

- DWA Position. See Section [4.4.7 Double Windrowing](#), page 154.
- Reel Fore-Aft Position and Height on Draper Headers. See Sections [4.5.6 Reel Fore-Aft Position](#), page 187 and [4.5.7 Reel Height](#), page 188.
- Center-link Assist Cylinder. See Sections [4.5.3 Attaching a D-Series Header](#), page 159, [4.6.1 Attaching an A-Series Header](#), page 199, or [4.7.1 Attaching an R-series Header](#), page 228 (depending on your header).

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

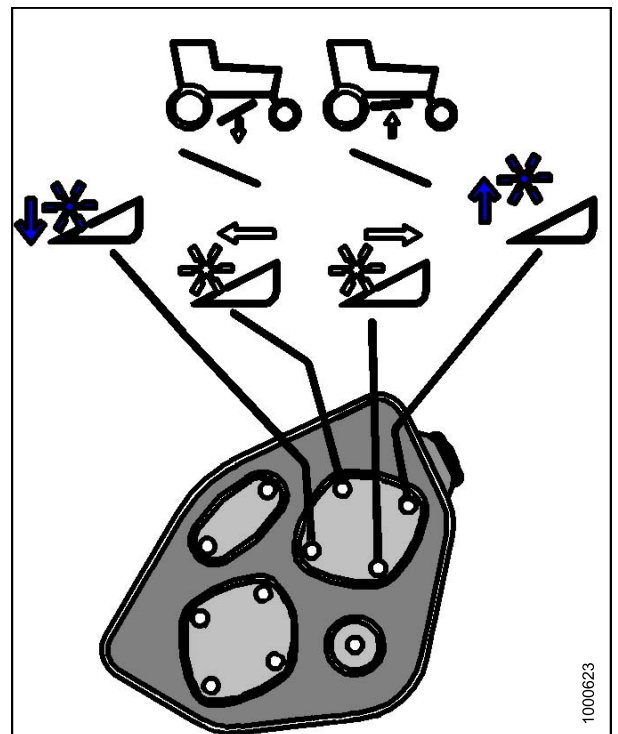


Figure 3.54

OPERATOR'S STATION

3.17.6 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.

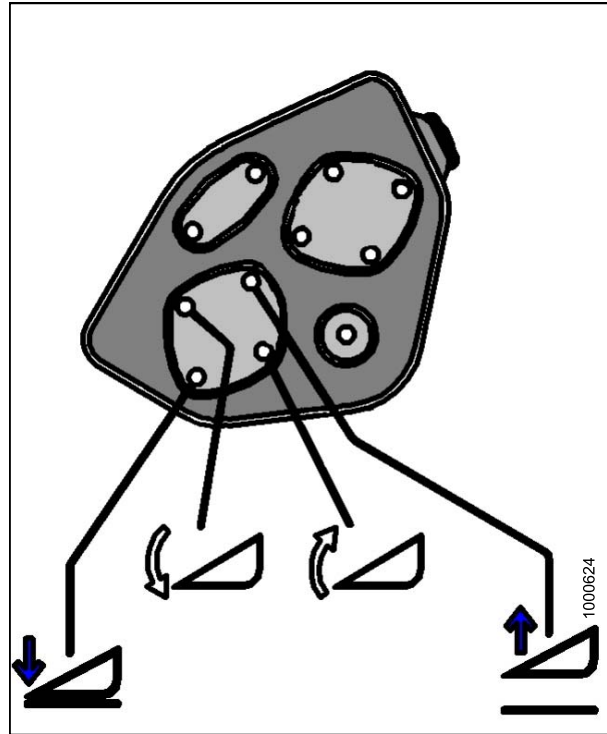


Figure 3.55

3.17.7 Reel/Disc Speed Switches

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

1. Auger Header

- A30 header: Not applicable
- A40 header: Auger speed is automatically maintained when reel speed is changed.

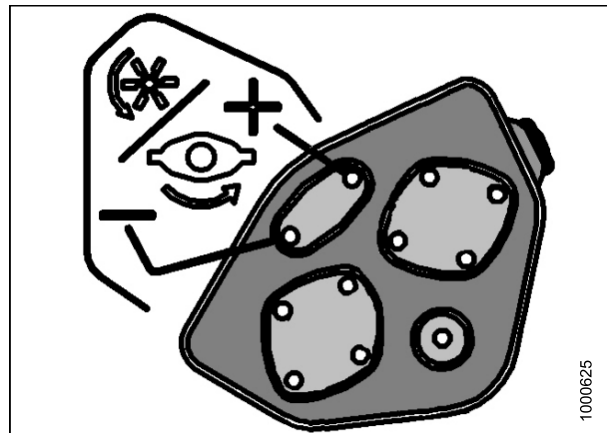


Figure 3.56

OPERATOR'S STATION

IMPORTANT

Reel speed on auger header must not exceed 85 rpm. Auger speed must not exceed 320 rpm.

2. Draper Header

- Reel speed is limited in INDEX HEADER SPEED mode.

3. Rotary Header

- Conditioner speed automatically adjusts when DISC SPEED is changed.

3.17.8 Console Header Switches

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

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.

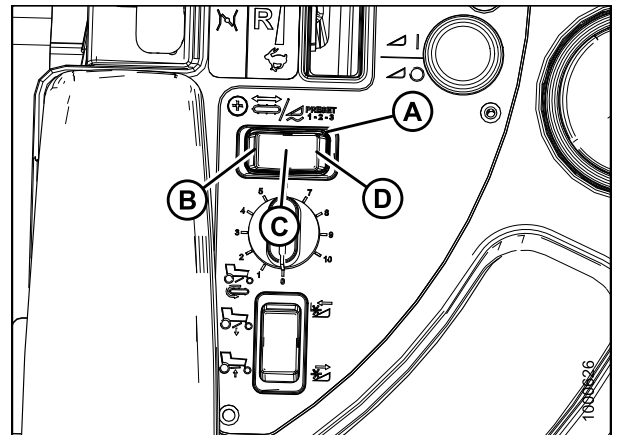


Figure 3.57

A - Deck Shift/Float Preset Switch
C - Center Delivery

B - Left Side Delivery
D - Right Side Delivery

OPERATOR'S STATION

Draper Header with Fixed Decks/Auger Header/Rotary Header

- Selects pre-programmed header float settings. Refer to [Float Adjustment, page 139](#) for instructions to preset the float.

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

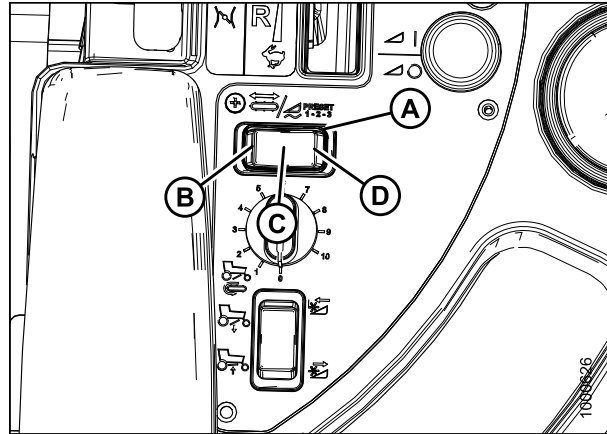


Figure 3.58

A - Deck Shift/Float Preset Switch B - Float Preset 1
C - Float Preset 2 D - Float Preset 3

DWA/Swath Roller Switch (If Installed)

Double Windrow Attachment

- DWA deck is raised (C) or lowered (B), if switch is installed in the console and CDM is programmed for this configuration. It may be used in lieu of the DWA switches on the GSL.

Swath Roller

- Roller is raised (E) or lowered (D) when switch is pressed.

NOTE: You may swap controls to the rocker switch or to the GSL handle, by changing the programming in the CDM. See [Detailed Programming Menu Flow Chart, page 86](#).

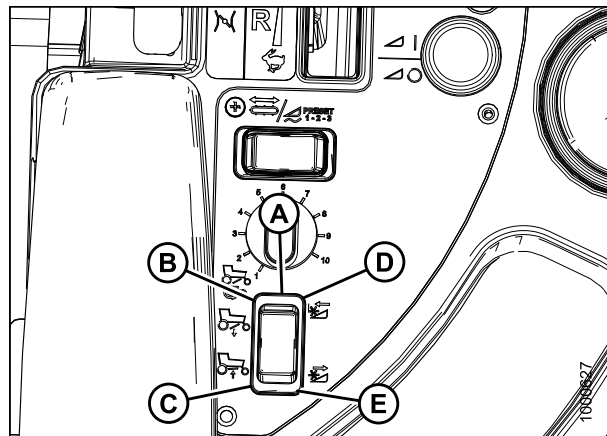


Figure 3.59

A - DWA/Swath Roller Switch B - DWA Down
C - DWA Up D - Swath Roller Down
E - Swath Roller Up

OPERATOR'S STATION

3.18 Cab Display Module (CDM)

3.18.1 Engine and Windrower Functions



Figure 3.60: CDM Engine and Windrower Functions

A - Engine RPM

B - Ground Speed

C - Display

D - Hazard Warning Lights

E - Select Switch

F - Turn Signals Switches

G - Ignition Switch Positions

H - Engine Warning Lights

1. Engine and Windrower Functions

- a. Engine RPM
- b. Ground Speed: mph or kph
- c. Display: Engine/Windrower Functions
- d. Hazard Warning Lights Switch: Activates Hazard Warning Lights, Cancels Turn Signal
- e. Select Switch: Allows Operator To Select Display Item On Lower Line. Push to SELECT
- f. Turn Signals Switches: Activates Turn Signals on Windrower and Header Push-ON / Push-OFF
- g. Ignition Switch Positions: Accessory / Stop / Run / Start
- h. Engine Warning Lights: Engine Pre-Heat / Water In Fuel / CAUTION / Stop Engine

OPERATOR'S STATION

3.18.2 Header Functions



Figure 3.61: CDM Header Functions

A - Display

D - Float Switch – Header Left Side

G - Return to Cut Height Switch

B - Select Switch

E - Auger/Draper Speed Adjust

C - Float Switch – Header Right Side

F - Header Index Switch

1. Header Functions

- a. DISPLAY: Header Functions
- b. SELECT SWITCH: Allows Operator to select display item. On lower line, push to SELECT
- c. FLOAT SWITCH: Header Right Side – Changes Header Float. The system remembers setting with deck shift option if activated with float setting switch. Push + to Increase. Push – to Decrease
- d. FLOAT SWITCH:– Header Left Side: Changes Header Float. The system remembers setting with deck shift option if activated with float setting switch. Push + to Increase. Push – to Decrease
- e. AUGER/DRAPER SPEED ADJUST: Changes Auger / Draper Speed INDEX with INDEX SWITCH ON. Changes Auger / Draper SPEED with INDEX SWITCH OFF. Push Upper Switch to Increase. Push Lower Switch to Decrease.
- f. HEADER INDEX SWITCH: Links Reel and Conveyor Speed to Ground Speed. Push-ON / Push-OFF

NOTE: Illuminates in ON position

NOTE: Header must be engaged

- g. RETURN TO CUT HEIGHT SWITCH: Allows Cutting Height Pre-Set. Push-ON Push-OFF

NOTE: Illuminates in ON position

NOTE: Header must be engaged

OPERATOR'S STATION

3.18.3 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.

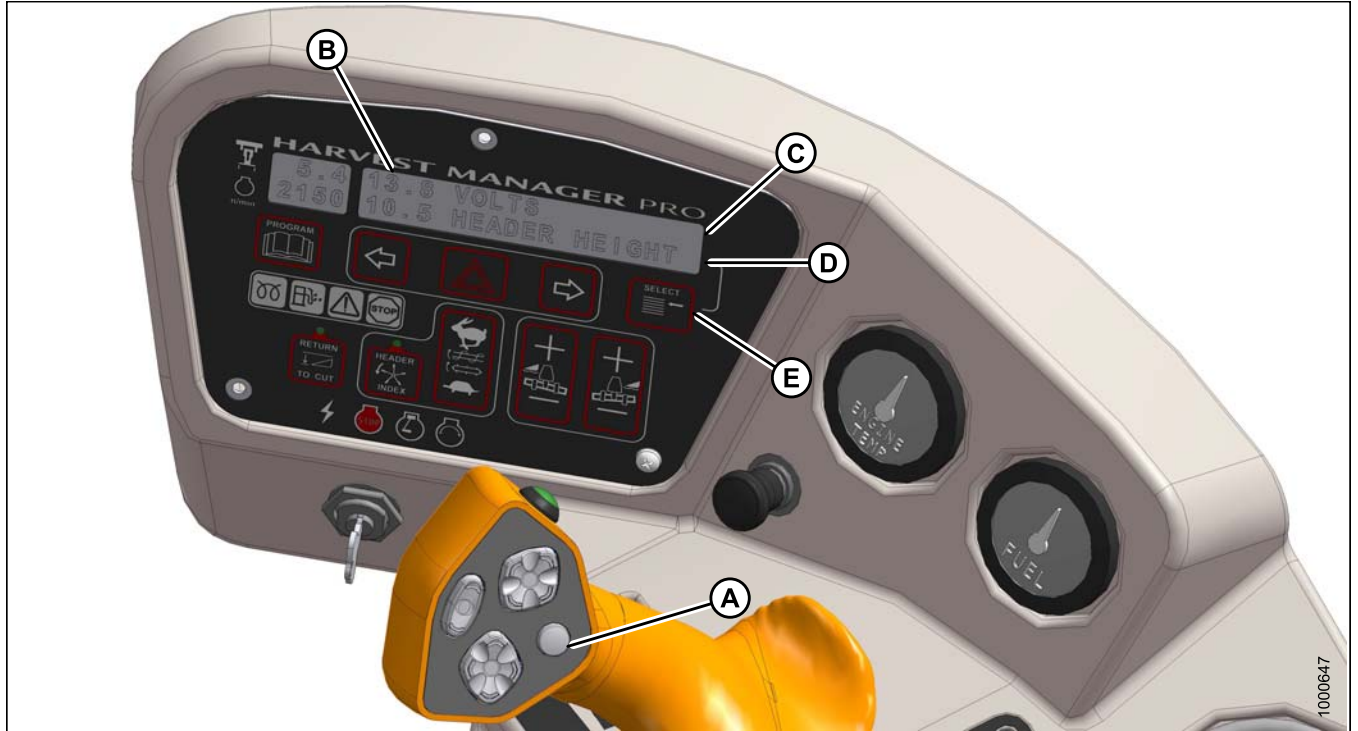


Figure 3.62: CDM Operating Screen

A - Display Selector for Upper Line
D - CDM Lower Line

B - Display
E - Display Selector for Lower Line

C - CDM Upper Line

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

| 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. |

OPERATOR'S STATION

| Display | Description |
|--|--|
| ##.# 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). |

OPERATOR'S STATION

| Display (Lower or Upper Line) | Description |
|--|---|
| ##### 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 ⁵ . |
| ### °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. |

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). |

5. The LOAD sensor to monitor knife/conditioner circuit pressure is optional. To monitor reel/auger circuit pressure, relocate sensor as per Form 169031 that is available through your Dealer.

OPERATOR'S STATION

| Display (Lower or Upper Line) | Description |
|--|---|
| ##### 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 ⁶ |
| ### °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. |

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). |

6. The LOAD sensor to monitor knife/conditioner circuit pressure is optional. To monitor reel/auger circuit pressure, relocate sensor as per Form 169031 that is available through your Dealer.

OPERATOR'S STATION

| Display (Lower or Upper Line) | Description |
|--|---|
| ##### 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 ⁷ |
| ###.# °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 ■■■■ ■■■■ #### ###.### REEL MPH ###.# DRAPER SPEED | Displays Sub-Menu After 2-3 Seconds. Press SELECT to cancel. Scroll Through Sub-Menu Display with CDM Switch. |

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. |

7. The LOAD sensor to monitor knife/conditioner circuit pressure is optional. To monitor reel/auger circuit pressure, relocate sensor as per Form 169031 that is available through your Dealer.

OPERATOR'S STATION

| Display (Lower or Upper Line) | Description |
|--|---|
| ###.# 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 ⁸ |
| ###.# °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. |
| SCROLLSUB-MENU (Lower Line Only)#### KNIFE SPEED##.# HEADER HEIGHTLOAD ■■■■ ■■■■ #####.# 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. |

Cab-Forward, Engine Running, Header Engaged, Rotary Header Installed

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. |

8. The LOAD sensor to monitor knife/conditioner circuit pressure is optional. To monitor reel/auger circuit pressure, relocate sensor as per Form 169031 that is available through your Dealer.

OPERATOR'S STATION

| Display (Lower or Upper Line) | Description |
|---|---|
| ###.# 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 ⁹ . |
| ### °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. |

Miscellaneous Operational Information

Scroll Through Display with CDM Switch or GSL Switch

| Display (Upper Line) | Description |
|----------------------|---|
| < LEFT TURN ■ | Indicates Left Turn When left arrow Is Pressed On CDM. Engine Forward Mode Only ¹⁰ . |
| ■ RIGHT TURN > | Indicates Right Turn When right arrow Is Pressed On CDM. Engine Forward Mode Only ¹¹ |
| ■ HAZARD ■ | Indicates Hazard Warning Lights Are On When hazard button Is Pressed On CDM. |

9. The LOAD sensor to monitor knife/conditioner circuit pressure is optional-installed. To monitor reel/auger circuit pressure, relocate sensor as per Form 169031 that is available through your Dealer.

10. If road light kit is not installed, CDM will display E135 LEFT STOP LAMP as a malfunction in CAB-FORWARD mode.

11. If road light kit is not installed, CDM will display E134 RIGHT STOP LAMP as a malfunction in CAB-FORWARD mode.

OPERATOR'S STATION

| Display (Upper Line) | Description |
|----------------------|--|
| HEADER REVERSE | Header Drive Running In Reverse. |
| HEADER ENGAGED | Header Drive Engaged. |
| ROAD GEAR | With High Range Selected On Console Switch. Engine-Forward Only ¹¹ |

3.18.4 Cab Display Module (CDM) Warning/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.

Engine Warning Lights



Figure 3.63: CDM Engine Warning Lights

- | | | |
|---------------------|-------------------|-------------|
| A - Engine Pre-heat | B - Caution | C - Display |
| D - Stop | E - Water In Fuel | |

1. Engine Warning Lights

- a. ENGINE PRE-HEAT: Illuminates yellow, wait to start engine.
- b. CAUTION: Illuminates yellow, Prompt attention is required, refer to display code.
- c. DISPLAY: Displays malfunction code, refer to Appendix and technical service manual.
- d. STOP: Illuminates red, stop engine immediately refer to display code.
- e. WATER IN FUEL: Illuminates yellow, service recommended.

OPERATOR'S STATION

Display Warnings and Alarms

Informs Operator of abnormal windrower conditions



Figure 3.64: CDM Display Warnings and Alarms

A - Display

| Display | Flashing | Alarm Tone | Description |
|---|----------|-----------------------------|--|
| BRAKE OFF | X | Short Beep With Each Flash. | Engine Running, Brake Solenoid Not Activated. |
| BRAKE ON | X | Short Beep With Each Flash. | GSL Out Of N-DETENT, But Interlock Switch Remains Closed To Apply Brake. |
| BRAKE SW FAILURE | X | Short Beep With Each Flash. | Ignition ON / Engine Not Running, Brake Switch and Relay Closed. |
| CAB-FORWARD SW ON/ ENG-FORWARD SW ON | X | 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 HEADERRE-ENGAGE <1800RPM> | X | None | R80/R85 - Engine RPM Above 1800 when engaging header. |

OPERATOR'S STATION

| Display | Flashing | Alarm Tone | Description |
|--------------------------|----------|--|---|
| ENGINE AIR FILTER | X | Single Loud Tone For 10 Seconds. Repeats Every 30 Minutes Until Condition Is Corrected. | Engine Air Filter Requires Servicing. |
| ENGINE TEMPERATURE | X | Ongoing Intermittent Moderate Tone Until Temperature Is Below 215°F (102°C.) | Engine Temperature Over 110°C (230°F). |
| HEADER DISENGAGED | | None | Normal |
| DISENGAGE HEADER | X | None | Header Switch Is In ON Position When Ignition Switch Turned ON. |
| HEADER OIL PRESS | X | 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 | X | Single Loud Tone For 10 Seconds. Repeats Every 15 Minutes Until Condition Is Corrected. | Excessive Pressure Increase Across Hydraulic Oil Filter. |
| ### °C or F HYD OIL COLD | X | 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 (50°F). |
| ### °C or F HYD OIL HOT | X | 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 | X | One Short Beep. | GSL In N-DETENT, Steering Wheel Centerd, and Brakes Are Engaged. |
| KNIFE SPEED OVERLOAD | X | Short Beep With Each Flash Until Condition Is Corrected. | Machine Overload. Knife or Disc Speed Drops Below Programmed Value. |
| LOCK SEAT BASE | X | None | Seat Base Not Detected In Cab or Engine-Forward Position. |
| LOW HYDRAULIC OIL | X | 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. |

OPERATOR'S STATION

| Display | Flashing | Alarm Tone | Description |
|------------------------------|----------|---|---|
| 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 | X | 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 | X | 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 | X | Continuous Loud Tone Until Oil Pressure Is Regained. | Low Transmission Charge Oil Pressure. |
| TRANS OIL TEMP | X | Ongoing Intermittent Moderate Tone Until Temperature Is Below Acceptable Level. | Transmission Oil Temperature Above 106°C (221°F) . |
| ### LOW VOLTS | X | Single Loud Tone For 10 Seconds. | Voltage Below 11.5. |
| ### HIGH VOLTS | X | Single Loud Tone For 10 Seconds. | Voltage Above 15.5. |

OPERATOR'S STATION

3.18.5 Cab Display Module (CDM) Programming



Figure 3.65: CDM Programming

A - Side Display

B - Main Display

C - Select Switch

D - Menu Item Scroll Forward

E - Menu Item Scroll Backward

F - Program Switch

1. To view programming in CDM you must be in programming mode. To enter programming mode, press PROGRAM and SELECT on CDM to enter programming mode
 - a. SIDE DISPLAY: Displays Software Revision Status
Upper Line - C### (CDM), Lower Line - M### (WCM)
 - b. MAIN DISPLAY: Displays Menu Item and Selection
Upper Line - Menu Item, Lower Line - Selection
 - c. SELECT SWITCH: Places Monitor into Program Mode with PROGRAM SWITCH
Press to accept menu item and advance to next item.
 - d. MENU ITEM SCROLL FORWARD: Displays value under menu item
Push To Scroll Forward.
Keep Depressed For Fast Scroll¹².
 - e. MENU ITEM SCROLL BACKWARD: Displays Value under Menu Item
Push To Scroll Backward.
Keep Depressed For Fast Scroll¹².
 - f. PROGRAM SWITCH: Places monitor into program mode.
Press while depressing SELECT switch.

¹². Fast scroll applies only when changing KNIFE SPEED, OVERLOAD PRESSURE, and TIRE SIZE.

OPERATOR'S STATION

2. Press PROGRAM switch to Exit Program Mode.

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.

See [3.18.5 Cab Display Module \(CDM\) Programming, page 84](#) 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.

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.

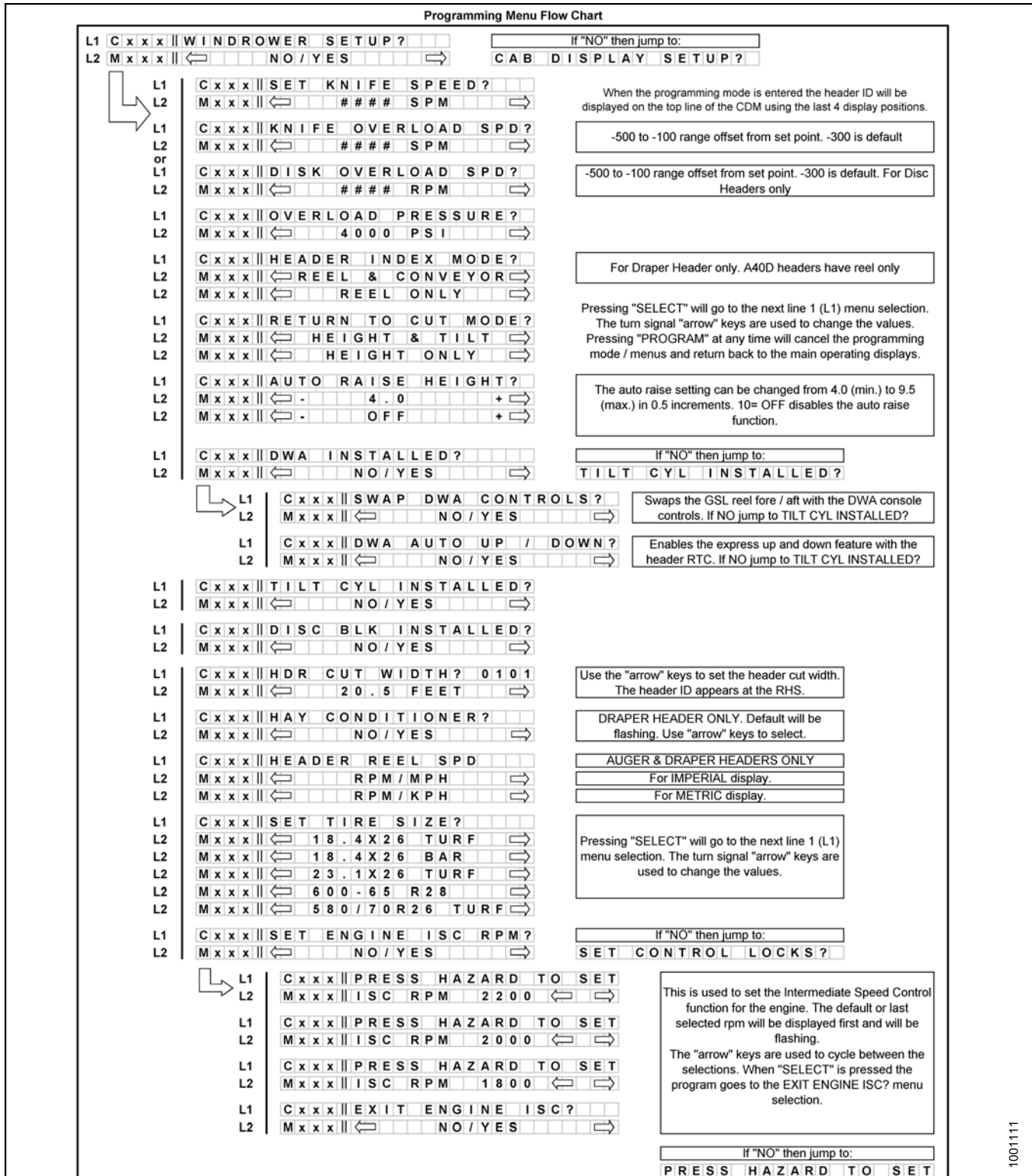
Proceed as follows to program the CDM:

1. Turn ignition key to RUN, or start the engine.
2. Press PROGRAM and SELECT on CDM to enter programming mode. The four digit header ID code is displayed.
3. Press SELECT. WINDROWER SETUP? with header width is displayed on upper line.
4. Press right arrow until SET KNIFE SPEED? is displayed.
5. Press left or right arrow to change value on lower line.
6. Press SELECT. KNIFE OVERLOAD SPD? is displayed
7. Press left or right arrow to change value on lower line.
8. Press SELECT. OVERLOAD PRESSURE? is displayed.
9. Press left or right arrow to change value on lower line
10. Press SELECT to advance to the next L1 item and press arrow keys to change values.
11. Press PROGRAM to exit programming mode when finished entering desired values.

OPERATOR'S STATION

Detailed Programming Menu Flow Chart

The programming menu flow chart is current for CDM software 315 and WCM software 214.



100111

OPERATOR'S STATION

L1 | C x x x || SET CONTROL LOCKS? | If "NO" then jump to: _____
 L2 | M x x x || ← NO / YES → | VIEW CONTROL LOCKS?

↙ L1 | C x x x || HEADER TILT |
 L2 | M x x x || ← ENABLED / LOCKED →

L1 | C x x x || HEADER FLOAT |
 L2 | M x x x || ← ENABLED / LOCKED →

L1 | C x x x || REEL FORE / AFT |
 L2 | M x x x || ← ENABLED / LOCKED →

L1 | C x x x || DRAPER SPEED |
 L2 | M x x x || ← ENABLED / LOCKED →

L1 | C x x x || AUGER SPEED |
 L2 | M x x x || ← ENABLED / LOCKED →

L1 | C x x x || KNIFE SPEED |
 L2 | M x x x || ← ENABLED / LOCKED →

L1 or L2 | C x x x || DISK SPEED |
 L2 | M x x x || ← ENABLED / LOCKED →

L1 | C x x x || REEL SPEED |
 L2 | M x x x || ← ENABLED / LOCKED →

L1 | C x x x || EXIT CONTROL LOCKS? |
 L2 | M x x x || ← NO / YES →

This menu allows the operator to selectively "lock out" the control functions for the various header functions. The default or selected "status" for each item will flash.

The "arrow" keys are used to ENABLE or LOCK OUT each function. Pressing "SELECT" will go to the next L1 menu item.

If "NO" then jump to: _____
 HEADER TILT | ← →

L1 | C x x x || VIEW CONTROL LOCKS? | If "NO" then jump to: _____
 L2 | M x x x || ← NO / YES → | EXIT WINDRWR SETUP?

↙ L1 | C x x x || HEADER TILT | ← →
 L2 | M x x x || 5 7 5 . 1 HRS ENABLED
 L2 | M x x x || 6 4 8 . 6 HRS LOCKED

L1 | C x x x || HEADER FLOAT | ← →
 L2 | M x x x || 5 7 5 . 1 HRS ENABLED
 L2 | M x x x || 6 4 8 . 6 HRS LOCKED

L1 | C x x x || REEL FORE / AFT | ← →
 L2 | M x x x || 5 7 5 . 1 HRS ENABLED
 L2 | M x x x || 6 4 8 . 6 HRS LOCKED

L1 | C x x x || DRAPER SPEED | ← →
 L2 | M x x x || 5 7 5 . 1 HRS ENABLED
 L2 | M x x x || 6 4 8 . 6 HRS LOCKED

L1 | C x x x || AUGER SPEED | ← →
 L2 | M x x x || 5 7 5 . 1 HRS ENABLED
 L2 | M x x x || 6 4 8 . 6 HRS LOCKED

L1 | C x x x || KNIFE SPEED | ← →
 L2 | M x x x || 5 7 5 . 1 HRS ENABLED
 L2 | M x x x || 6 4 8 . 6 HRS LOCKED

L1 | C x x x || DISK SPEED | ← →
 L2 | M x x x || 5 7 5 . 1 HRS ENABLED
 L2 | M x x x || 6 4 8 . 6 HRS LOCKED

L1 | C x x x || REEL SPEED | ← →
 L2 | M x x x || 5 7 5 . 1 HRS ENABLED
 L2 | M x x x || 6 4 8 . 6 HRS LOCKED

L1 | C x x x || EXIT VIEW LOCKOUTS? |
 L2 | M x x x || ← NO / YES →

When the control lock outs are viewed the lower display line (L2) will show the engine hours and either ENABLED or LOCKED to indicate the present status along with the engine hours at which time the function was either ENABLED or LOCKED.

Using the "arrow" keys allows the operator to select the various functions. Pressing "SELECT" will go to the EXIT VIEW LOCKOUTS? menu selection.

If "NO" then jump to: _____
 HEADER TILT | ← →

L1 | C x x x || EXIT WINDRWR SETUP? | If "NO" then jump to: _____
 L2 | M x x x || ← NO / YES → | SET KNIFE SPEED? |

or | DISC OVERLOAD SPD? |

Disc Header Only

OPERATOR'S STATION

| | | |
|--|---|--|
| <p>L1 <input type="checkbox"/> L2 <input type="checkbox"/> C x x x VIEW ERROR CODES ?</p> <p>M x x x <input type="checkbox"/> NO / YES <input type="checkbox"/></p> | <p style="text-align: right;">If "NO" then jump to:</p> <p style="text-align: center;">ENTER SENSOR SETUP ?</p> | |
| <p>L1 <input type="checkbox"/> L2 <input type="checkbox"/> C x x x VIEW WINDRWR CODES ?</p> <p>M x x x <input type="checkbox"/> NO / YES <input type="checkbox"/></p> <p>L1 <input type="checkbox"/> 1 1 2 3 4 . 5 HRS 1 2 3 <input type="checkbox"/></p> <p>L2 E 4 7 SENSOR VOLTS LOW <input type="checkbox"/></p> <p>L1 <input type="checkbox"/> 2 1 2 3 0 . 5 HRS 1 2 3 <input type="checkbox"/></p> <p>L2 E 7 1 LOW HYDRAULIC OIL <input type="checkbox"/></p> <p>L1 <input type="checkbox"/> C x x x EXIT WINDRWR CODES ?</p> <p>L2 M x x x <input type="checkbox"/> NO / YES <input type="checkbox"/></p> <p>L1 <input type="checkbox"/> C x x x VIEW ENGINE CODES ?</p> <p>L2 M x x x <input type="checkbox"/> NO / YES <input type="checkbox"/></p> <p>L1 <input type="checkbox"/> 1 PREVIOUS ENG. CODES</p> <p>L2 <input type="checkbox"/> # # # # S # # F # # C</p> <p>L1 <input type="checkbox"/> C x x x EXIT ENGINE CODES ?</p> <p>L2 M x x x <input type="checkbox"/> NO / YES <input type="checkbox"/></p> <p>L1 <input type="checkbox"/> C x x x EXIT ERROR CODES ?</p> <p>L2 M x x x <input type="checkbox"/> NO / YES <input type="checkbox"/></p> | <p style="text-align: right;">If "NO" then jump to:</p> <p style="text-align: center;">VIEW ENGINE CODES ?</p> <p>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.</p> <p style="text-align: right;">If "NO" then jump to the first error code logged.</p> <p style="text-align: center;">If "NO" then jump to:</p> <p style="text-align: center;">EXIT ERROR CODES ?</p> <p>The last 10 distinct error codes are stored.</p> <p style="text-align: right;">If "NO" then jump to the first engine error code logged.</p> <p style="text-align: center;">If "NO" then jump to:</p> <p style="text-align: center;">VIEW WINDRWR CODES ?</p> | |
| <p>L1 <input type="checkbox"/> L2 <input type="checkbox"/> C x x x ENTER SENSOR SETUP ?</p> <p>M x x x <input type="checkbox"/> NO / YES <input type="checkbox"/></p> <p>L1 <input type="checkbox"/> C x x x KNIFE SPEED SENSOR</p> <p>L2 M x x x <input type="checkbox"/> ENABLE / DISABLE <input type="checkbox"/></p> <p>L1 <input type="checkbox"/> C x x x HEADER HT SENSOR</p> <p>L2 M x x x <input type="checkbox"/> ENABLE / DISABLE <input type="checkbox"/></p> <p>L1 <input type="checkbox"/> C x x x HEADER TILT SENSOR</p> <p>L2 M x x x <input type="checkbox"/> ENABLE / DISABLE <input type="checkbox"/></p> <p>L1 <input type="checkbox"/> C x x x HEADER FLOAT SENSOR</p> <p>L2 M x x x <input type="checkbox"/> ENABLE / DISABLE <input type="checkbox"/></p> <p>L1 <input type="checkbox"/> C x x x OVERLOAD PRESSURE</p> <p>L2 M x x x <input type="checkbox"/> ENABLE / DISABLE <input type="checkbox"/></p> <p>L1 <input type="checkbox"/> C x x x HYD OIL TEMP SENSOR</p> <p>L2 M x x x <input type="checkbox"/> ENABLE / DISABLE <input type="checkbox"/></p> <p>L1 <input type="checkbox"/> C x x x EXIT SENSOR SETUP ?</p> <p>L2 M x x x <input type="checkbox"/> NO / YES <input type="checkbox"/></p> | <p style="text-align: right;">If "NO" then jump to:</p> <p style="text-align: center;">READ SENSOR INPUTS ?</p> | <p>The operator can select each sensor and selectively enable or disable the sensor. This can be used to disable a failed sensor to eliminate false or erratic display readings.</p> <p>When "SELECT" is pressed the program goes to the EXIT SENSOR SETUP? menu selection.</p> <p>NOTE: The oil temp. readout applies to units with the Sensata oil temp. sensor.</p> <p style="text-align: right;">If "NO" then jump to:</p> <p style="text-align: center;">KNIFE SPEED SENSOR</p> |
| <p>L1 <input type="checkbox"/> L2 <input type="checkbox"/> C x x x READ SENSOR INPUTS ?</p> <p>M x x x <input type="checkbox"/> NO / YES <input type="checkbox"/></p> <p>L1 <input type="checkbox"/> C x x x SENSOR INPUT <input type="checkbox"/></p> <p>L2 M x x x HDR HEIGHT 3 . 5 9 V</p> <p>L1 <input type="checkbox"/> C x x x SENSOR INPUT <input type="checkbox"/></p> <p>L2 M x x x HDR ANGLE 1 . 8 4 V</p> <p>L1 <input type="checkbox"/> C x x x SENSOR INPUT <input type="checkbox"/></p> <p>L2 M x x x 2 . 4 5 V FLOAT 2 . 8 4 V</p> <p>L1 <input type="checkbox"/> C x x x SENSOR INPUT <input type="checkbox"/></p> <p>L2 M x x x KNIFE SPEED 1 2 3 HZ</p> <p>L1 <input type="checkbox"/> C x x x SENSOR INPUT <input type="checkbox"/></p> <p>L2 M x x x WHEEL SPEED 1 2 3 HZ</p> <p>L1 <input type="checkbox"/> C x x x SENSOR INPUT <input type="checkbox"/></p> <p>L2 M x x x HYD OIL TEMP 1 . 0 0 V</p> <p>L1 <input type="checkbox"/> C x x x EXIT READ SENSORS ?</p> <p>L2 M x x x <input type="checkbox"/> NO / YES <input type="checkbox"/></p> | <p style="text-align: right;">If "NO" then jump to:</p> <p style="text-align: center;">ACTIVATE FUNCTIONS ?</p> | <p>For diagnostic purposes each sensors input signal can be read. This helps in determining how each sensor is operating and if the proper output voltages are being received by the control system.</p> <p>When "SELECT" is pressed the program goes to the EXIT READ SENSORS? menu selection.</p> <p style="text-align: right;">If "NO" then jump to:</p> <p style="text-align: center;">SENSOR INPUT <input type="checkbox"/></p> <p style="text-align: center;">HDR HEIGHT 3 . 5 9 V</p> <p>If a sensor has been disabled "SENSOR" will be flashing in the area where the input reading would have been.</p> <p>If a sensor has been disabled "SENSOR" will be flashing in the area where the input reading would have been.</p> <p>If a sensor has been disabled "SENSOR" will be flashing in the area where the input reading would have been.</p> <p>NOTE: The oil temp. readout applies to the M205 model with the Sensata oil temp. sensor.</p> |

OPERATOR'S STATION

| | | | |
|----|---------|---------------------------------------|--|
| L1 | C x x x | ACTIVATE FUNCTIONS? | If "NO" then jump to: |
| L2 | M x x x | ← NO / YES → | FORCE HEADER TYPE? |
| L1 | C x x x | ACTIVATE HEADER HT | 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. |
| L2 | M x x x | ← DOWN / UP → | |
| L1 | C x x x | ACTIVATE REEL HT | If a disk header is detected then the nomenclature should read: DISC DRIVE instead of KNIFE DRIVE. |
| L2 | M x x x | ← DOWN / UP → | |
| L1 | C x x x | ACTIVATE HDR TILT | 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. |
| L2 | M x x x | ← IN / OUT → | |
| L1 | C x x x | KNIFE DRV SPD XXXX | For Disc Header only |
| L2 | M x x x | D 0 P 0 ← - Δ + → | |
| L1 | C x x x | DRAPER DRV SPD XXXX | The DWA menu selection should only be available if the DWA INSTALLED? is set to YES. |
| L2 | M x x x | D 0 P 0 ← - Δ + → | |
| L1 | C x x x | REEL DRV SPD XXXX | For Disc Header only |
| L2 | M x x x | D 0 P 0 ← - Δ + → | |
| L1 | C x x x | DISC DRV SPD XXXX | ACTIVATE HYD PURGE - This is to allow the operator to purge the air from a new or changed pump system. |
| L2 | M x x x | D 0 P 0 ← - Δ + → | |
| L1 | C x x x | ACTIVATE DWA DRV | 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. |
| L2 | M x x x | D 0 P 0 ← - Δ + → | |
| L1 | C x x x | ACTIVATE REEL F/A | If "NO" then jump to: TO ACTIVATE PURGE |
| L2 | M x x x | ← FORE / AFT → | |
| L1 | C x x x | ACTIVATE HYD PURGE? | If "NO" then jump to: ACTIVATE HEADER HT |
| L2 | M x x x | ← NO / YES → | |
| L1 | C x x x | TO ACTIVATE PURGE | If "NO" then jump to: EXIT DIAGNOSTIC? |
| L2 | M x x x | ← PRESS AND HOLD → | |
| L1 | C x x x | PURGE CYCLE STARTED | 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. |
| L2 | M x x x | ← PRESS AND HOLD → | |
| L1 | C x x x | PURGE CYCLE ENDED | If "NO" then jump to: SELECT HEADER TYPE |
| L2 | M x x x | ← NO EXIT YES → | |
| L1 | C x x x | PURGE CYCLE ENDED | If "NO" then jump to: VIEW ERROR CODES? |
| L2 | M x x x | ← NO EXIT YES → | |
| L1 | C x x x | EXIT FUNCTION MENU? | If "NO" then jump to: WINDROWER SETUP? |
| L2 | M x x x | ← NO / YES → | |
| L1 | C x x x | FORCE HEADER TYPE? "NO" then jump to: | If "YES" then jump to: OPERATING SCREENS |
| L2 | M x x x | ← NO / YES → | |
| L1 | C x x x | SELECT HEADER TYPE | 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. |
| L2 | M x x x | ← DISK 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 → | |
| L1 | C x x x | EXIT FORCE HEADER? | If "NO" then jump to: SELECT HEADER TYPE |
| L2 | M x x x | ← NO / YES → | |
| L1 | C x x x | EXIT DIAGNOSTIC? | If "NO" then jump to: VIEW ERROR CODES? |
| L2 | M x x x | ← NO / YES → | |
| L1 | C x x x | EXIT SETUP? | If "NO" then jump to: WINDROWER SETUP? |
| L2 | M x x x | ← NO / YES → | |

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OPERATOR'S STATION

If the CDM or GSL select switch is pressed the CDM will display the values from the sensors (unless disabled). It is only when the function switch (that would activate a valve) is pressed that the display would show "LOCKED" for that function.

AUGER HEADER

| | | | | |
|-------------|------------|--------|--------|--|
| HEADER TILT | HEADER | TILT | LOCKED | |
| HEADER FLT | HEADER | FLOAT | LOCKED | |
| REEL | FORE / AFT | LOCKED | | |
| AUGER SPD | AUGER | SPEED | LOCKED | |
| KNIFE SPEED | KNIFE | SPEED | LOCKED | |
| REEL SPEED | REEL | SPEED | LOCKED | |

ALTERNATE DISPLAY - LOCKED AT RHS

| | | | | |
|-------------|------------|-------|--|--------|
| HEADER TILT | HEADER | TILT | | LOCKED |
| HEADER FLT | HEADER | FLOAT | | LOCKED |
| REEL | FORE / AFT | | | LOCKED |
| AUGER SPD | AUGER | SPEED | | LOCKED |
| KNIFE SPEED | KNIFE | SPEED | | LOCKED |
| REEL SPEED | REEL | SPEED | | LOCKED |

DRAPER HEADER

| | | | | |
|-------------|------------|--------|--------|--|
| HEADER TILT | HEADER | TILT | LOCKED | |
| HEADER FLT | HEADER | FLOAT | LOCKED | |
| REEL | FORE / AFT | LOCKED | | |
| DRAPER SPD | DRAPER | SPEED | LOCKED | |
| KNIFE SPEED | KNIFE | SPEED | LOCKED | |
| REEL SPEED | REEL | SPEED | LOCKED | |

DRAPER HEADER

| | | | | |
|-------------|------------|-------|--|--------|
| HEADER TILT | HEADER | TILT | | LOCKED |
| HEADER FLT | HEADER | FLOAT | | LOCKED |
| REEL | FORE / AFT | LOC | | LOCKED |
| DRAPER SPD | DRAPER | SPEED | | LOCKED |
| KNIFE SPEED | KNIFE | SPEED | | LOCKED |
| REEL SPEED | REEL | SPEED | | LOCKED |

DISK HEADER

| | | | | |
|-------------|--------|-------|--------|--|
| HEADER TILT | HEADER | TILT | LOCKED | |
| HEADER FLT | HEADER | FLOAT | LOCKED | |
| DRAPER SPD | DISK | SPEED | LOCKED | |

DISK HEADER

| | | | | |
|-------------|--------|-------|--|--------|
| HEADER TILT | HEADER | TILT | | LOCKED |
| HEADER FLT | HEADER | FLOAT | | LOCKED |
| DRAPER SPD | DISK | SPEED | | LOCKED |

OPERATOR'S STATION

3.18.6 Setting Guidelines

Header Pressure Settings

| Header Model | Application / System | Suggested Overload Warning Setting psi (kPa) | Windrower Pressure Differential Relief Setting psi (kPa) |
|---------------------|------------------------------|---|---|
| R-series | Disc Pressure | 4000 (27,579) | 4200 (28,958) |
| D-series | Reel / Draper Pressure | 3000 (20,684) | 3200 (22,063) |
| A-series | Knife / Conditioner Pressure | 4000 (27,579) | 4200 (28,958) |

R-Series Header: Rotary Disc Speed

| 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 |

3.18.7 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. See section [9 Engine Error Codes, page 413](#).

3.18.8 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. See section [8 CDM Error Codes, page 409](#).

4 Operation

4.1 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 NOT modify the machine. Unauthorized modifications may impair the function and/or safety and affect machine life.
- The safety information given in this manual does NOT replace safety codes, insurance needs, or laws governing your area. Be sure your machine meets the standards set by these regulations.

OPERATION

4.2 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.

4.2.1 Engine Functions

These are the symbols that are used on the console.

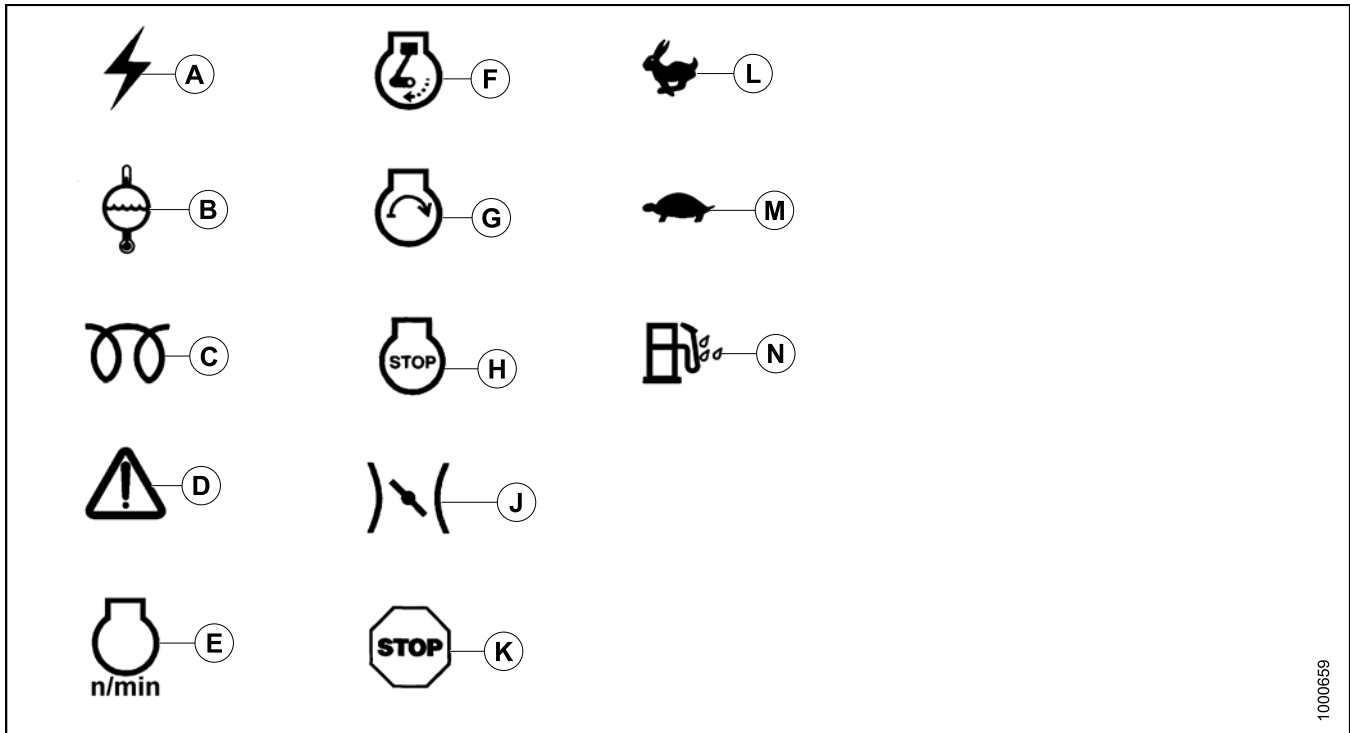


Figure 4.1: Engine Function Symbols

A - Electrical Power – Accessories

B - Engine Coolant Temperature

C - Engine Glow Plugs

D - Engine Malfunction

E - Engine RPM

F - Engine Run

G - Engine Start

H - Engine Stop

J - Engine Throttle

K - Engine Urgent Stop

L - Fast

M - Slow

N - Water in Fuel

OPERATION

4.2.2 Windrower Operating Symbols

These are the symbols used on the console for windrower operation.



Figure 4.2: Windrower Operating Symbols

- | | |
|-----------------------------|----------------------------|
| A - Turn Signals | B - Hazard Warning Lights |
| C - Forward | D - Neutral |
| E - Reverse | F - Headlights Low Beam |
| G - Headlights High Beam | H - Work Light |
| J - Lighter | K - Fresh Air |
| L - Blower | M - Windshield Wiper |
| N - Seat Height Up | O - Seat Height Down |
| P - Seat Fore and Aft | Q - Seat Fore Aft Isolator |
| R - Seat Back Fore and Aft | S - Seat Ride Damping |
| T - Cab Temperature Control | U - Air Conditioning |
| V - Recirculate | |

OPERATION

4.2.3 Header Functions

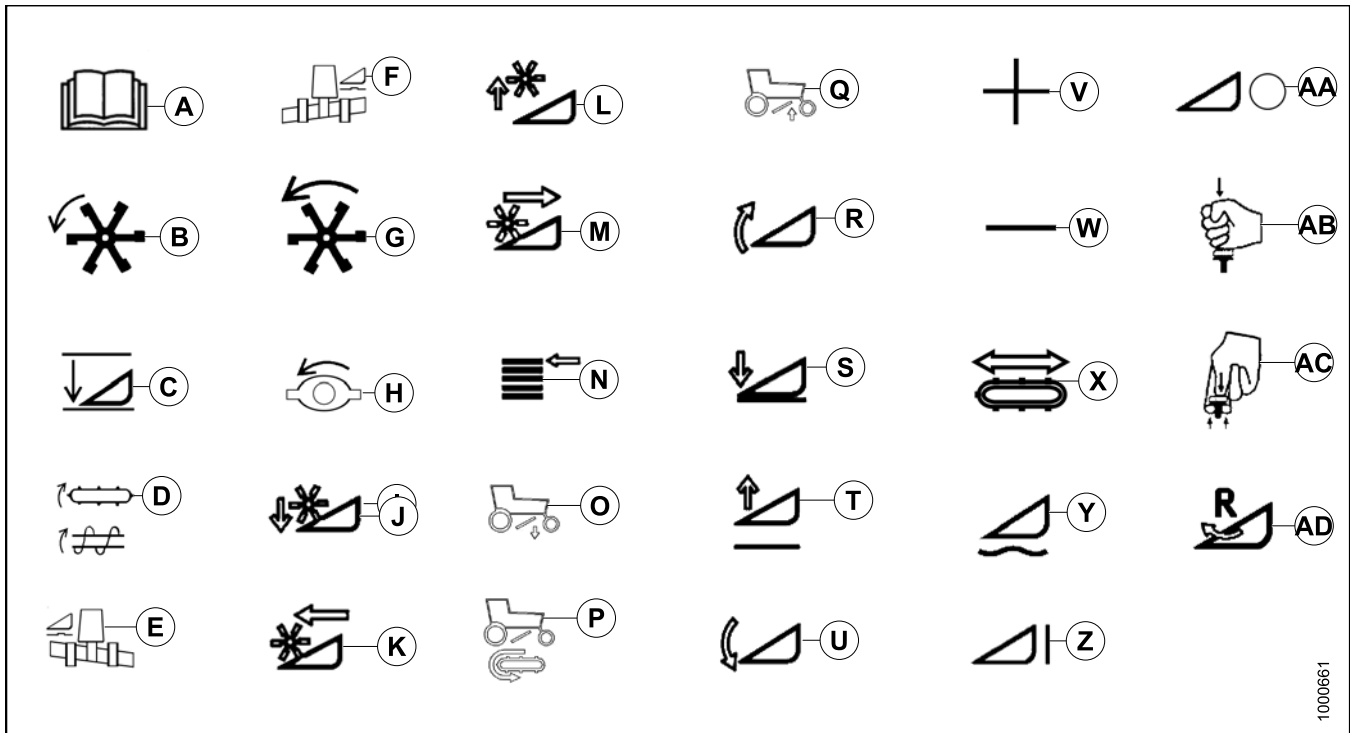


Figure 4.3: Header Function Symbols

- | | | |
|----------------------------|-----------------------|---------------------------------|
| A - Program | B - Header Index | C - Return to Cut |
| D - Conveyor/Auger Speed | E - Float Left | F - Float Right |
| G - Reel Speed | H - Disc Speed | J - Reel Down |
| K - Reel Back | L - Reel Up | M - Reel Rearward |
| N - Display Select | O - DWA Down | P - DWA Draper Speed |
| Q - DWA Up | R - Header Tilt Up | S - Header Down |
| T - Header Up | U - Header Tilt Down | V - Increase |
| W - Decrease | X - Deck Shift | Y - Float |
| Z - Header Engage | AA - Header Disengage | AB - Push Down Header Disengage |
| AC - Pull Up Header Engage | AD - Header Reverse | |

4.3 Operating the Windrower

4.3.1 Operational Safety

CAUTION

Follow these safety precautions:

- 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.
- Protect against noise. Wear a suitable hearing protective device such as ear muffs or ear plugs to protect against objectionable or uncomfortable loud noises.

You may need:

- a hard hat
- protective glasses or goggles
- heavy gloves
- respirator or filter mask
- wet weather gear

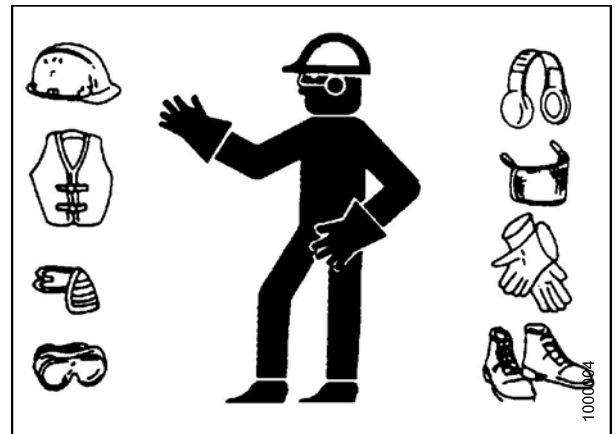


Figure 4.4

- 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.

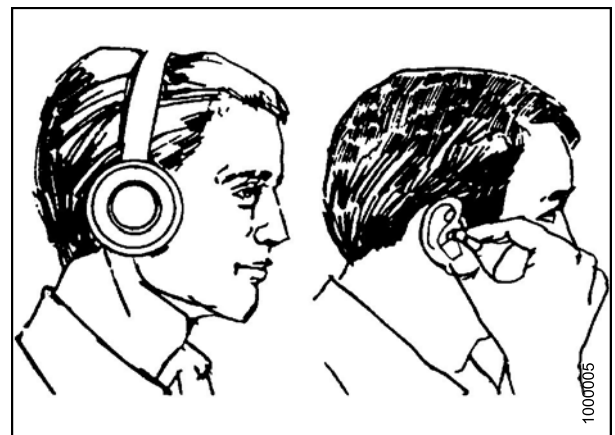


Figure 4.5

OPERATION

- 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 shutdown procedure. Refer to [Shutdown, page 106](#).
- Operate only in daylight or good artificial light.

4.3.2 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 paragraph [5.11.1 Break-In Inspections, page 380](#).



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.

1. Operate engine at moderate load and avoid extremely heavy or light loading for longer than 5 minutes.
2. Avoid unnecessary idling. If engine will be idling for longer than 5 minutes after reaching operating temperature, turn key OFF to stop engine.
3. Check engine oil level frequently. Watch for any signs of leakage. If oil must be added, refer to [5.6.3 Checking Engine Oil Level, page 297](#).

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.

4. Watch coolant gauge in cab for temperature rising beyond normal operating range. Check that coolant level at reserve tank (mounted next to radiator) stays between HOT and COLD marks on tank. Refer to [5.6.8 Engine Cooling System, page 314](#). If over-heating problems occur, check for coolant leaks.

OPERATION

4.3.3 Preseason Check

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.

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

1. Drain off excess hydraulic oil added for storage. Refer to Section [5.9.3 Draining Hydraulic Oil, page 360](#).
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 [Tensioning A/C Compressor Belt, page 324](#).
5. Check the entire air conditioning system for leakage at the beginning of each season.
6. Perform annual maintenance. See Section [5.11 Maintenance Schedule, page 380](#).

A/C Compressor Coolant Cycling

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:

1. Turn blower switch (A) to the first position, turn temperature control switch (D) to maximum heating, and A/C control switch (B) to OFF.
2. Start engine, and operate at low idle until engine is warm.
3. Click A/C switch (B) from OFF to ON for one second, then back to OFF for 5 to 10 seconds. Repeat this step ten times.

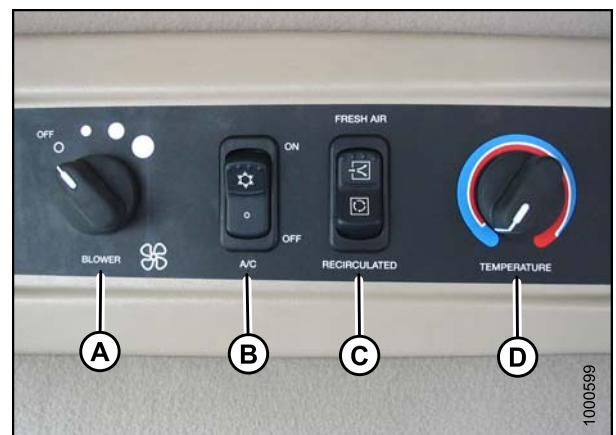


Figure 4.6

A - Blower Switch

B - Air Conditioning Switch

C - Outside Air Switch

D - Temperature Control

OPERATION

4.3.4 Daily Check

1. 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 [5.9.7 Hoses and Lines, page 365](#).

2. 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 handholds on the cab front corners, and stand on the header anti-slip strips to wash the front window.
3. Clean all lights and reflective surfaces to maintain visibility to others.
4. Perform Daily Maintenance. Refer to Section [5.11 Maintenance Schedule, page 380](#).

4.3.5 Engine Operation

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 mis-adjusted 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.

OPERATION

1. 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.

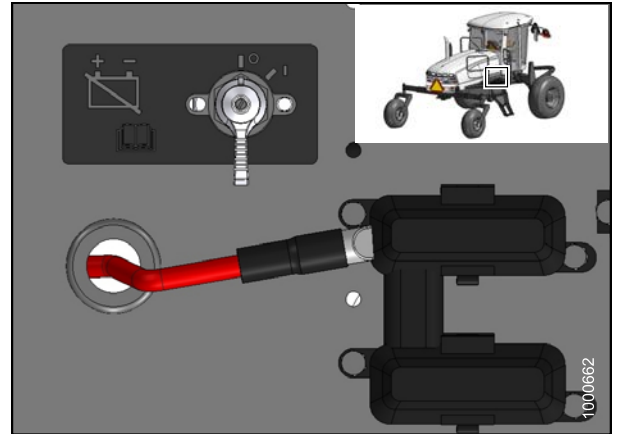


Figure 4.7

2. Lock (A) must be engaged at cab-forward or engine-forward position.
3. Move GSL (B) into N-DETENT.
4. Turn steering wheel until it locks. It may be possible to move the steering wheel slightly in the locked position.



Figure 4.8

IMPORTANT

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

5. Fasten seat belt.
6. Push HEADER DRIVE switch (C) to OFF.



Figure 4.9

OPERATION

Normal Start

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

1. Set throttle (A) 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 3.15 Engine Controls and Gauges, page 62](#).



CAUTION

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

2. Sound horn three times.
3. Turn ignition key (B) 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.



Figure 4.10

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 [6.1 Engine Troubleshooting, page 385](#).



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.

OPERATION

Cold Start

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

1. Follow procedure for normal start, see [Normal Start, page 104](#).
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 40°C (100°F).



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.

Engine Warm-Up

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



Figure 4.11

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.

ISC 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 [3.18.5 Cab Display Module \(CDM\) Programming, page 84](#).

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

OPERATION

Shutdown

CAUTION

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

1. Turn key counterclockwise to OFF position.



Figure 4.12

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.

1. Stop windrower, and remove key.
2. Stand on either platform to access the fuel tank filler pipe.
3. Clean the area around filler cap (A).
4. Turn cap handle (B) counterclockwise until loose, and remove cap.
5. Fill tank with approved fuel. See section [Lubricants Fluids System Capacities, page 267](#).
6. Replace fuel tank cap (A), and turn cap handle (B) clockwise until snug.

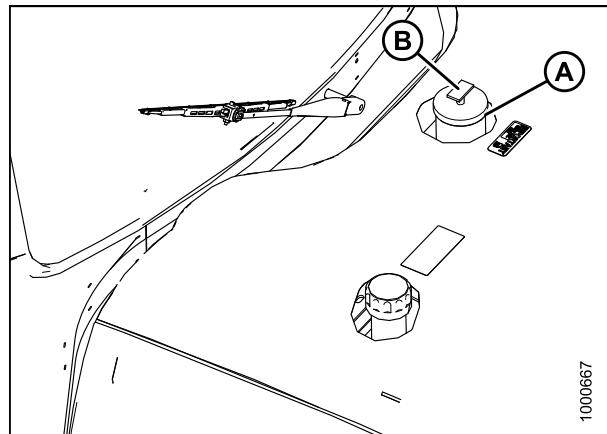


Figure 4.13

OPERATION

NOTE: Fill fuel tank daily, preferably at the end of the day's operation to help prevent condensation in the tank.

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.

CAUTION

Do not allow tank to empty. Running out of fuel can cause air locks and/or contamination of the fuel system. Refer to [System Priming, page 314](#).

Engine Temperature

The normal engine operating temperature range is 180–225°F (82–107°C), and is indicated by the temperature gauge (B) 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).



Figure 4.14

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.

Electrical

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.

| Ignition | Engine | Reading | Indicated Condition |
|----------|----------|----------------------|---|
| ON | Running | 13.8–15.0 | Normal |
| ON | Running | > 16.0 ¹³ | Regulator Out of Adjustment |
| ON | Running | < 12.5 ¹³ | Alternator Not Working or Regulator Out of Adjustment |
| ON | Shutdown | 12.0 | Battery Normal |

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

OPERATION

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.



Figure 4.15: CDM Engine Warning Lights

- | | | |
|---------------------|-------------------|-------------|
| A - Engine Pre-heat | B - Caution | C - Display |
| D - Stop | E - Water In Fuel | |

1. Engine Warning Lights

- ENGINE PRE-HEAT: Illuminates yellow, wait to start engine.
- CAUTION: Illuminates yellow, Prompt attention is required, refer to display code.
- DISPLAY: Displays malfunction code, refer to Appendix and technical service manual.
- STOP: Illuminates red, stop engine immediately refer to display code.
- WATER IN FUEL: Illuminates yellow, service recommended.

4.3.6 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.
- 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.

OPERATION



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

- 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.

OPERATION

DANGER

- NEVER move the ground speed lever or steering wheel until you are sure all bystanders have cleared the area.
- Make sure area is clear before making turns, as the ends of a header travel in a large arc.
- Check the operation of all controls in a safe, clear area before starting work.
- Do know the capacity and operating characteristics of your machine.
- Do NOT allow riders in or on the machine.
- Do NOT operate unless seated in the Operator's position.
- Do NOT attempt to get on or off a moving windrower.
- AVOID sudden starts and stops.
- AVOID inclines, ditches and fences.
- Do NOT rapidly accelerate or decelerate when turning
- REDUCE your speed before turning, crossing slopes, or travelling over rough ground.
- Do NOT allow anyone to stand behind the machine while operating. Foreign objects may be forcibly ejected.

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.)

OPERATION

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.

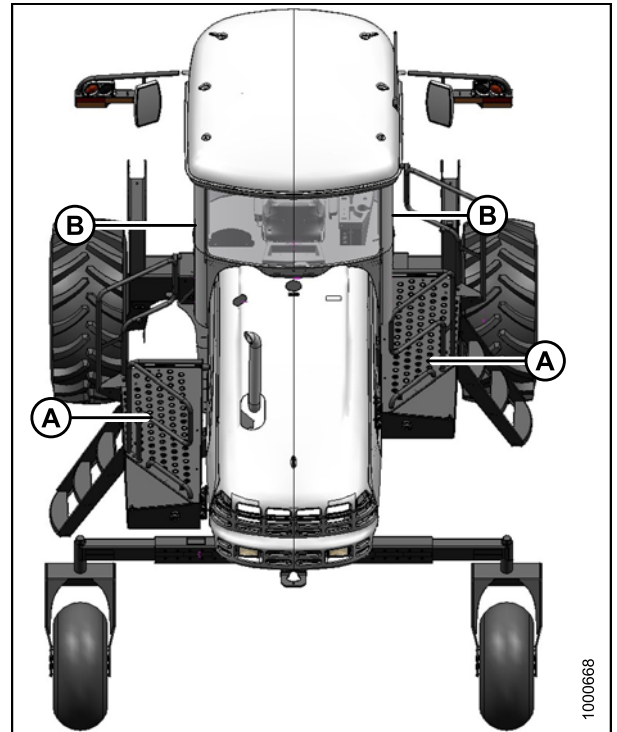


Figure 4.16

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.



Figure 4.17: Cab-Forward Shown

OPERATION

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 counterclockwise to pivot Operator's station clockwise 180° until pin engages latch to secure Operator's station in new position.



Figure 4.18

4. Ensure seat belt is fastened.
5. Start engine if not running. Refer to [Starting, page 102](#).
6. There are two cab-forward speed ranges. Set ground speed range switch (A) to either **H** (0-16 mph [25.7 km/h]), or **L** (0-11 mph [17.7 km/h]).
7. Slowly push throttle (B) to full forward (operating speed). CDM should display 2320-2350 rpm at (C).



CAUTION

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

8. Move the GSL (E) out of N-DETENT, and slowly forward to desired speed which will be displayed at (D).

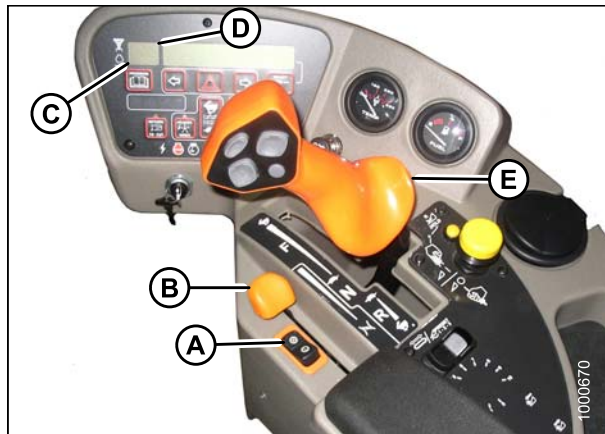


Figure 4.19



CAUTION

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

9. 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 [7.1.17 Auto-Steer, page 407](#).

OPERATION

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.

1. Steer as shown.

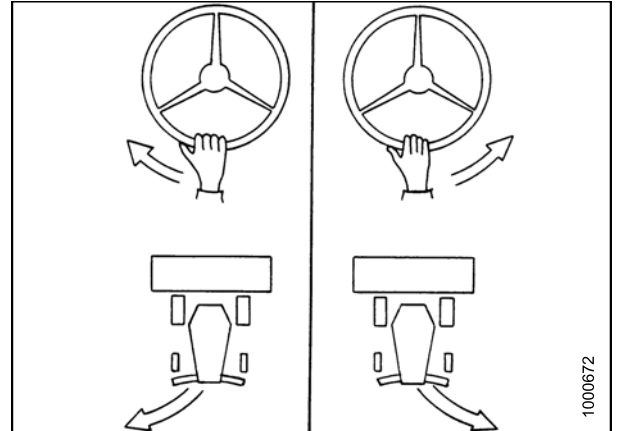


Figure 4.20: Cab-Forward Mode

Engine-Forward Operation

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



Figure 4.21: Engine-forward - Seat Faces Engine

OPERATION

1. Place ground GSL (A) in N-DETENT, and lock steering wheel. 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 clockwise to pivot Operator's station counterclockwise 180° until pin engages latch to secure Operator's station in new position.
4. Start engine if not running. Refer to [Starting](#), page 102.
5. Set ground speed range switch (A) to **H** for road speed (0–23 mph [37 km/h]). CDM will display ROAD GEAR at (F), and an alarm will briefly sound.
6. Slowly push throttle (B) to full forward (operating speed). CDM should display 2320–2350 RPM at (C).



CAUTION

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

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



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.

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

8. Move the GSL (E) closer to NEUTRAL.
9. Switch speed-range control (B) to **L** (low range).

Once the lugging condition no longer exists:

10. Set GSL (E) to **NOT MORE THAN HALF** maximum forward speed.
11. Move speed-range control (B) to **H** (high range). Steering is more sensitive in this speed range.



Figure 4.22

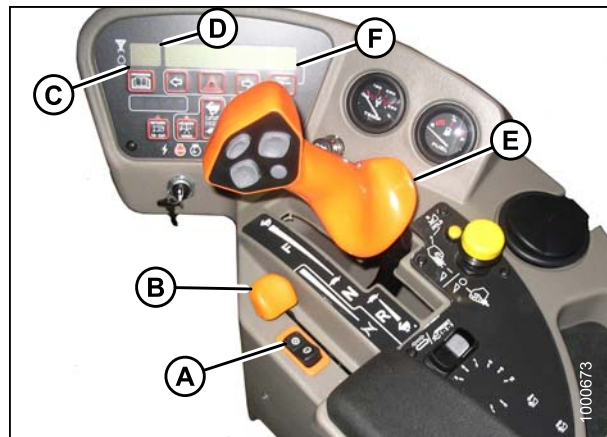


Figure 4.23

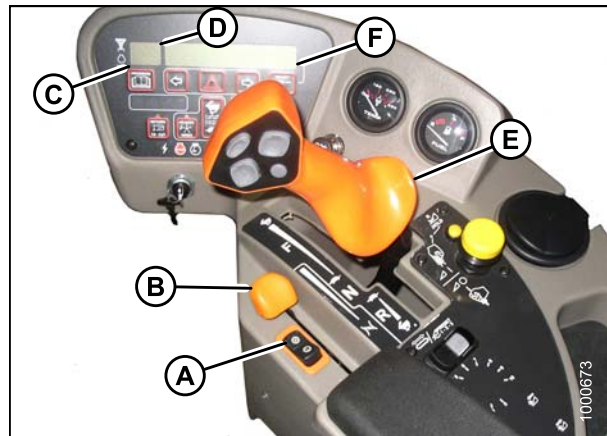


Figure 4.24

OPERATION

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.

1. Move speed-range switch (A) to L.
2. Move throttle lever (B) 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.



Figure 4.25



CAUTION

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

3. Move the GSL (C) rearward to desired speed.
4. Steer as shown.

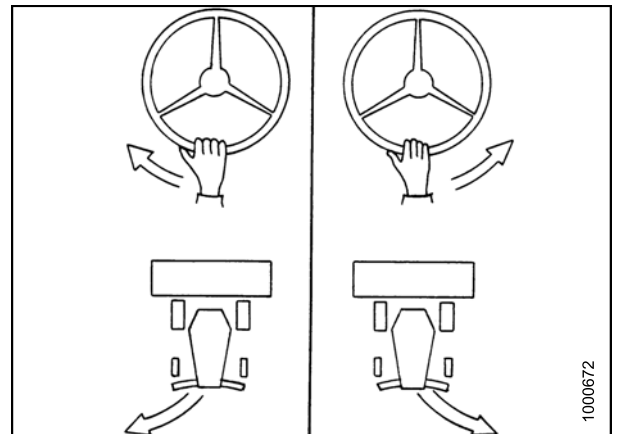


Figure 4.26

OPERATION

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.

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



Figure 4.27

OPERATION

Stopping



WARNING

Do **NOT** move ground speed lever rapidly back to NEUTRAL. Operator may be thrown forward by sudden stop. Always wear seat belt when operating windrower.

1. **SLOWLY** return the GSL (A) to NEUTRAL, and into N-DETENT.
2. Turn steering wheel until it locks.
3. Move throttle lever (B) to low idle position
NOTE: Avoid unnecessary idling. Stop engine if it will be idling for longer than 5 minutes.
4. 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).

5. Turn key counterclockwise to OFF position.

4.3.7 Adjusting 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 manoeuvrability 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.



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.



Figure 4.28

OPERATION

Adjust the caster tread width as follows:

1. 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 at (B).

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

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

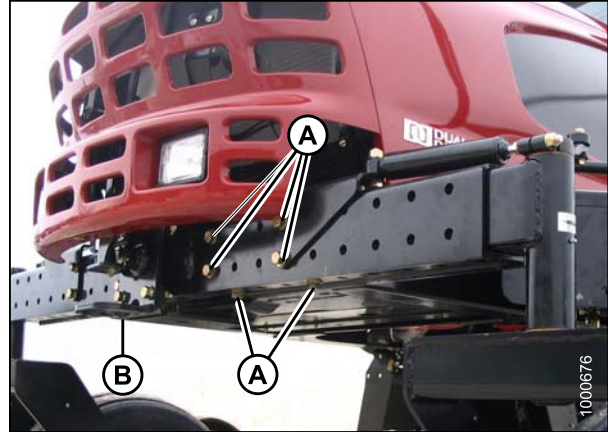


Figure 4.29

3. 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.



Figure 4.30

IMPORTANT

Caster wheels must be equidistant from center of windrower.

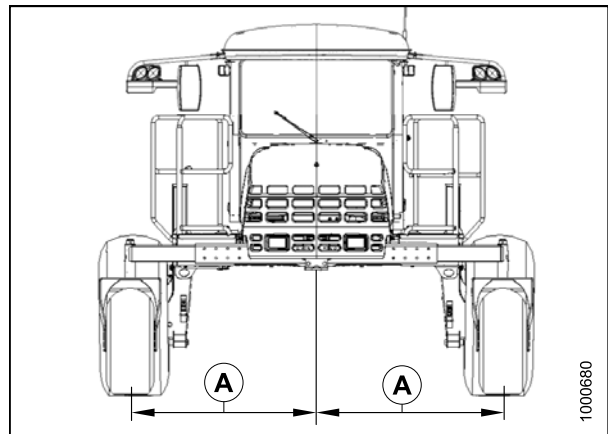


Figure 4.31

OPERATION

4. Line up holes then install shorter bottom bolts (B).
5. Position bracket (A), and install back bolts (C).
6. Tighten bolts as follows, snug bottom bolts (C), then snug back bolts (C).
7. Tighten and torque back bolts (C) to 330 ft·lbf (447 Nm).
8. Tighten and torque bottom bolts (B) to 330 ft·lbf (447 Nm).
9. Lower windrower to ground.

IMPORTANT

Retorque bolts after first 5, and 10 hours of operation.

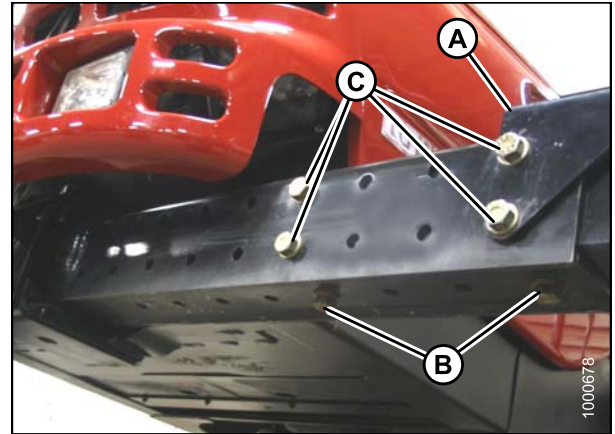


Figure 4.32

4.3.8 Transporting

Driving on Road

The self-propelled 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 [Engine-Forward Operation, page 113](#). 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 NOT 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 7.1.15 Lighting and Marking for Cab-Forward Road Travel, page 407](#).
- Do NOT drive windrower on a road or highway at night, or in conditions which reduce visibility, such as fog or rain. The width of the windrower may not be apparent under these conditions.

OPERATION

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.

Before driving windrower on a roadway:

1. Ensure HEADER DRIVE switch (A) is pushed to OFF position (DOWN).
2. Clean flashing amber lamps, red tail lamp and head lamps, and check that they work properly.
3. Clean all reflective surfaces and slow moving vehicle emblems.
4. Adjust interior rear view mirror, and clean windows.



Figure 4.33

5. Push LIGHT switch (A) to ROAD position to activate lamps. Always use these lamps on roads to provide warning to other vehicles.

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

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

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

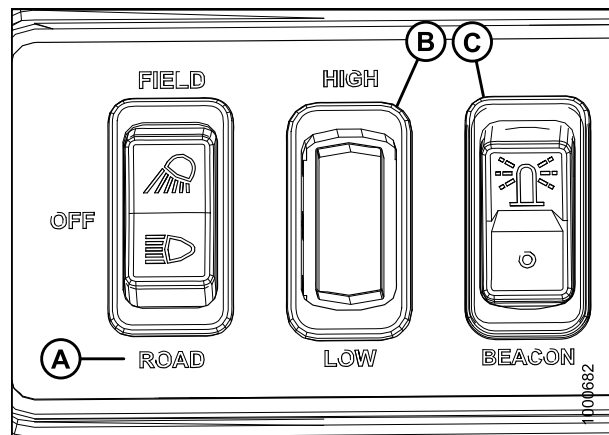


Figure 4.34

OPERATION

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



Figure 4.35

8. Set ground speed range switch (A) for road speed. CDM will display ROAD GEAR at (F) 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.

9. Slowly push throttle (B) to full forward (operating speed). CDM should display 2320–2350 RPM (C).
10. Slowly move the GSL (E) forward to desired speed which will be displayed at (F).
11. To slow the windrower, pull the GSL (E) rearward to decrease the speed.
12. Move the GSL (E) to N-DETENT.
13. Lock steering wheel.
14. Shut of engine by turning key counterclockwise to OFF position.
15. If towing a header, refer to [Towing Header with Windrower, page 122](#).

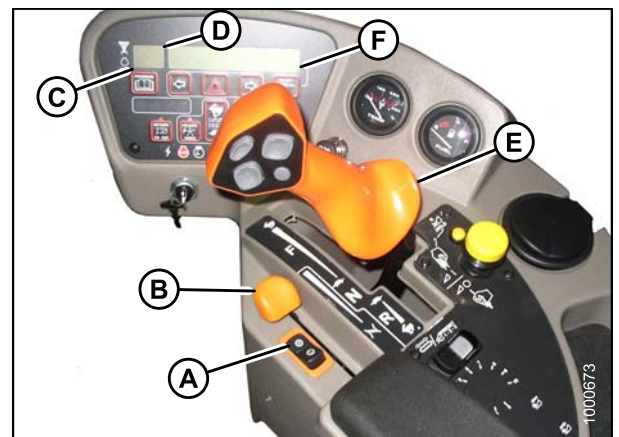


Figure 4.36

OPERATION

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:

- Move ground speed lever closer to NEUTRAL to reduce speed.
- Lower header.
- Move GROUND SPEED RANGE switch to L - low range.
- 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.

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).



Figure 4.37

OPERATION

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 |

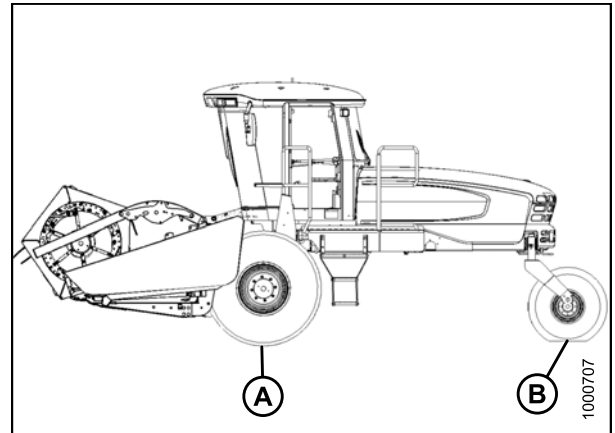


Figure 4.38

Converting From Field to Transport Mode

1. 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.

2. Disconnect hydraulic and electrical connections:
 - a. **Left Side** - Store hydraulic hoses and electrical cable into the storage position. See header operator's manual.
 - b. **Right Side** - Release the multi-link, and place into storage on windrower. See header operator's manual.

OPERATION

- 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.

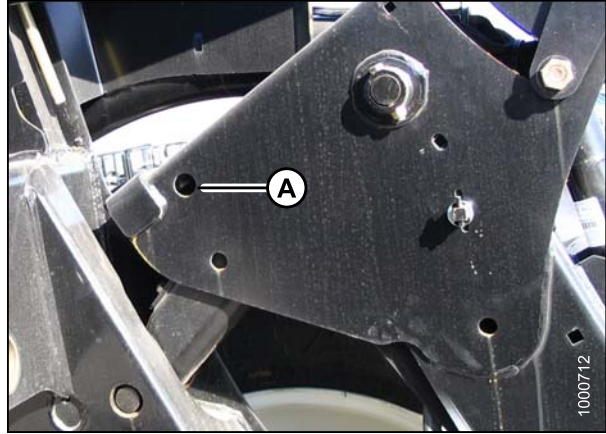


Figure 4.39



CAUTION

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



DANGER

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

- Start engine and raise header to full height.
- Stop engine, and engage safety locks on lift cylinders.
- Deploy header slow speed transport system. See header operator's manual.



Figure 4.40

OPERATION

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

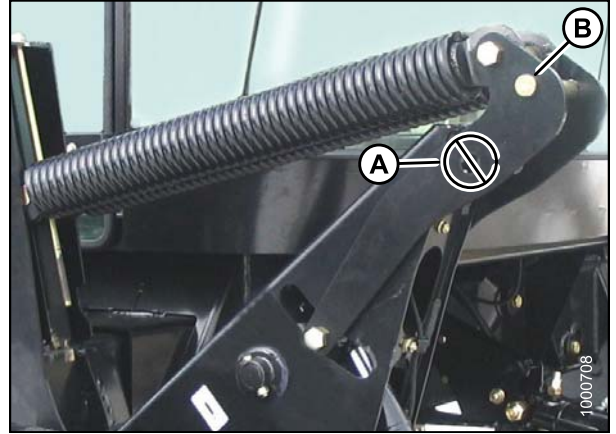


Figure 4.41

8. Remove pins (A) from lower end of lift linkages.
NOTE: Pins (A) are also used to secure weight box to windrower linkage.
9. Release the safety lock on the header lift cylinders.
10. Start engine, and lower header down onto the transport wheels.

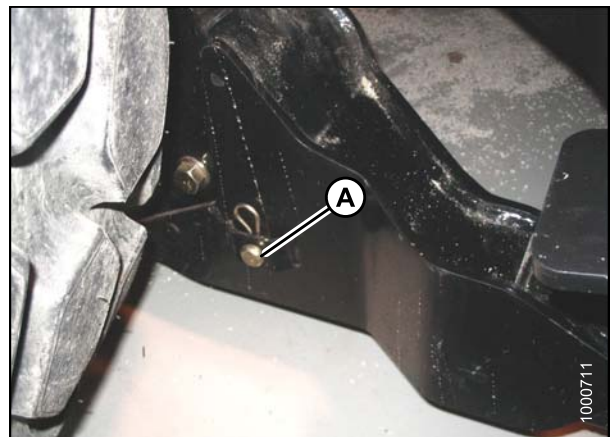


Figure 4.42

OPERATION

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

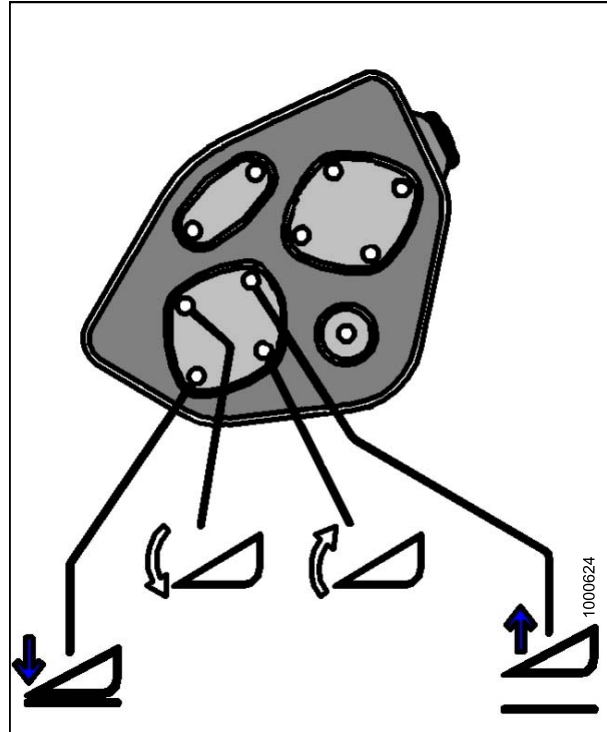


Figure 4.43

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.

12. Shut down engine and remove key from ignition.
13. To unlock the center-link, pull up on latch (A), and locate latch into notch (B) on top of hook.
14. 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.
15. Slowly back windrower away from header, shut engine OFF, and remove key from ignition.

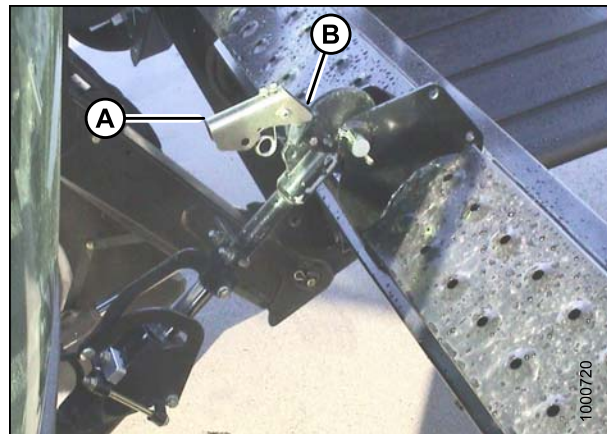


Figure 4.44

OPERATION

Attaching Header Transport Hitch to Header

Attach header transport hitch to header as follows:

1. Position end (A) of the aft section onto front wheel hook (B).
2. Push down until latch (C) captures the end (A).
3. Secure latch (C) with clevis pin (D).

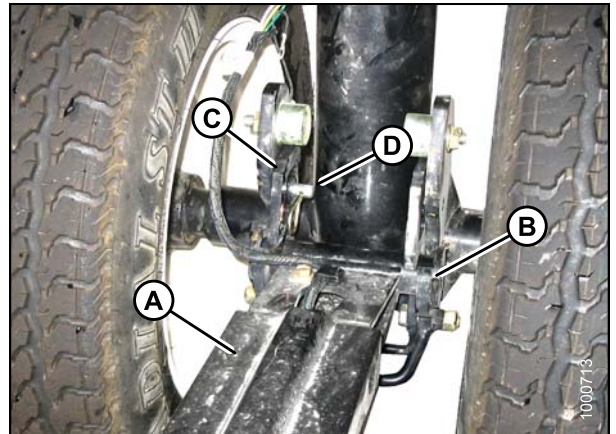


Figure 4.45

4. Remove the L-pin from end (A) of aft section (if installed).

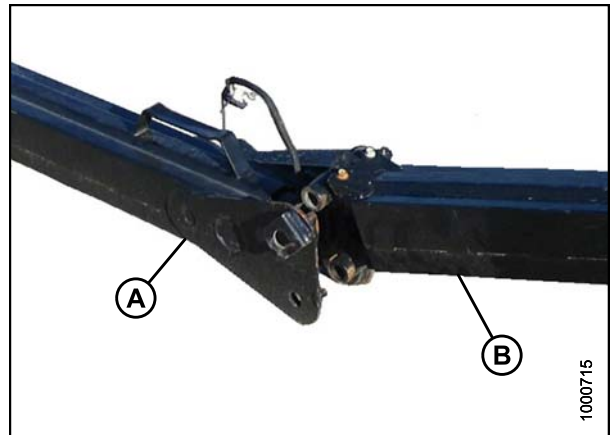


Figure 4.46

5. Position end (B) of the forward section into end (A) of the aft section.

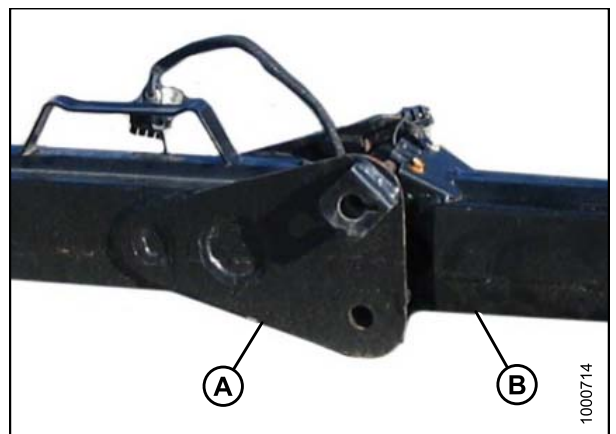


Figure 4.47

OPERATION

6. Fully insert L-pin (A) in upper hole, and turn pin to lock it. Secure with ring pin (B).
7. Make electrical connection at the joint (C).

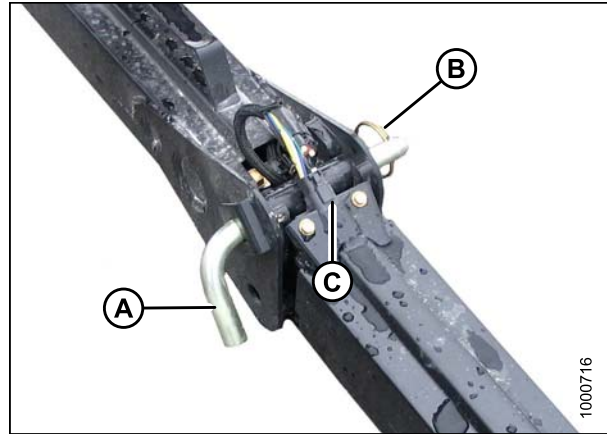


Figure 4.48

8. Make the electrical connection at the header wheel (A)



Figure 4.49

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 (B), and NOT installed at hole location (A).

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

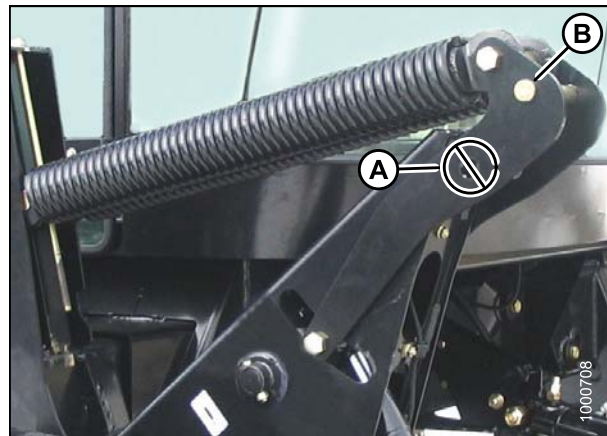


Figure 4.50

OPERATION

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

NOTE: Pins (A) were previously removed from the header lift linkage lower end.

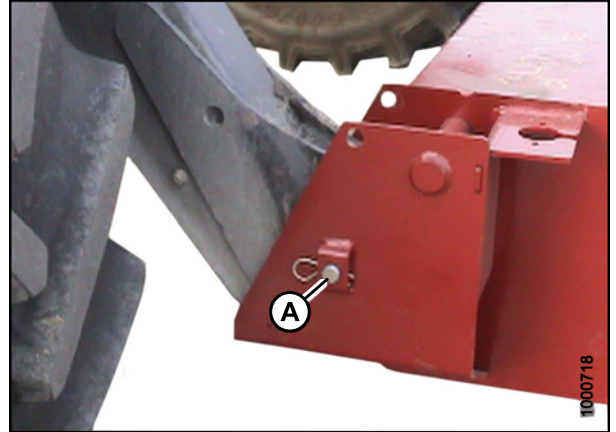


Figure 4.51

11. Route the weight box harness (A) to the electrical connector at the left side lift linkage, and connect harness to connector on windrower (B).
12. Raise lift arms fully, shut engine OFF, and remove key from ignition.

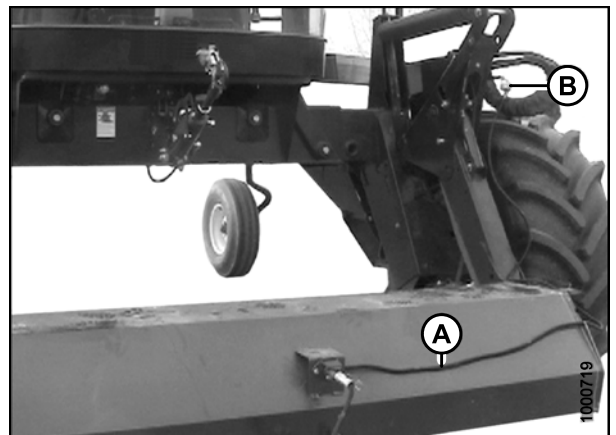


Figure 4.52

13. Move float pins from storage location (A) to engaged position (B).

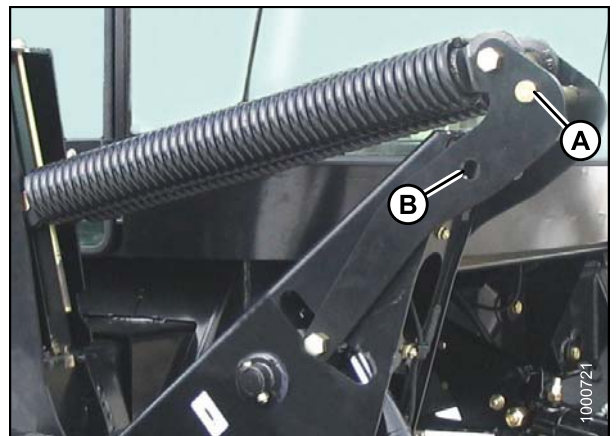


Figure 4.53

OPERATION

14. 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.

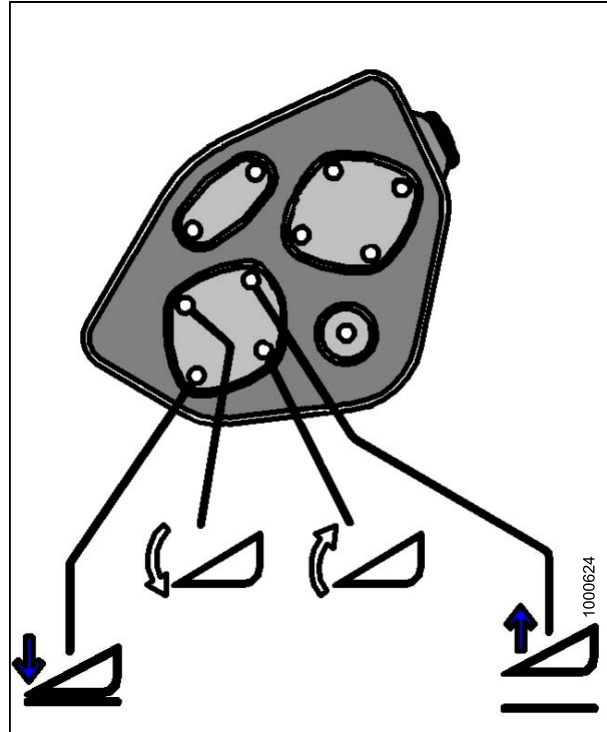


Figure 4.54

15. Attach slow speed transport hitch to the weight box tongue with drawbar pin. Secure using lynch pin (A). Attach safety chain (B).
16. Connect hitch harness (C) to electrical socket at front of weight box.

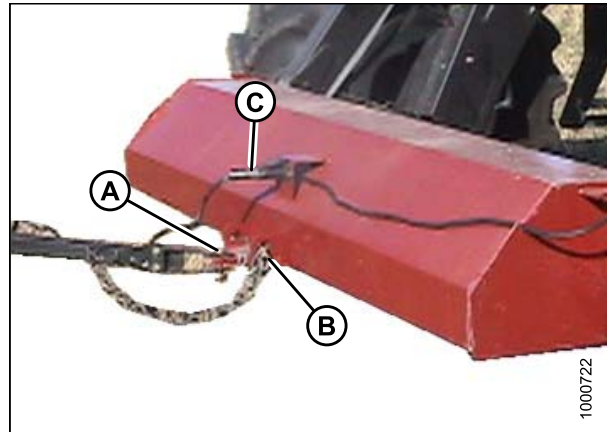


Figure 4.55

OPERATION

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

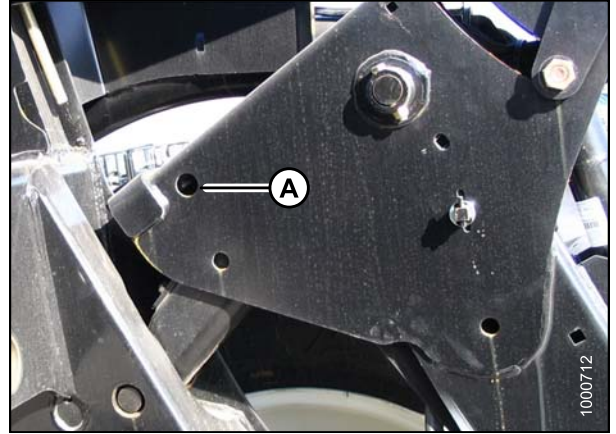


Figure 4.56

Converting 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.

1. Stop engine, and remove key from ignition.
2. Disconnect electrical harness at connector (B) from windrower, and store harness (A) on weight box.

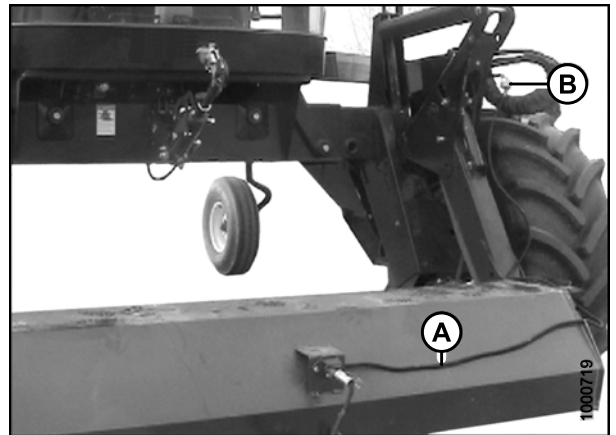


Figure 4.57

OPERATION

3. Disconnect wiring connector (A) at front wheel.



Figure 4.58

4. Remove clevis pin (D).
5. Push latch (C), and lift tow-bar (A) from hook. Release latch, and replace clevis pin.
6. Unhook tow-bar from weight box.

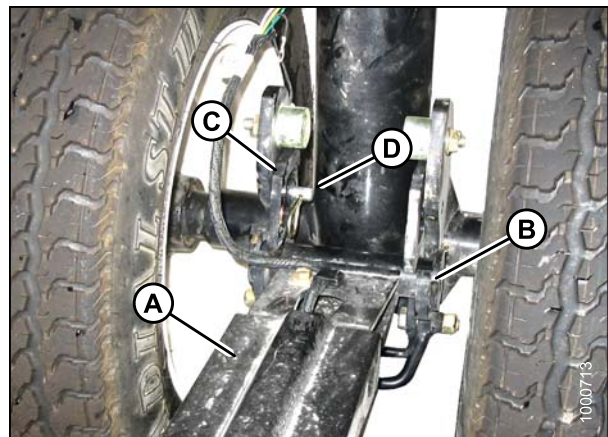


Figure 4.59

CAUTION

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

7. Start engine, and lower lift arms until rear of lift arms floats up and away from the lift arm mechanism.
8. Stop engine, and remove key from ignition.

OPERATION

9. Remove temporary lift pins (A) from weight box, and install pins (F) into holes at rear of lift arms.
10. Start engine, and fully raise lift arms. Stop engine, and remove key from ignition.
11. Engage lift cylinder stops.

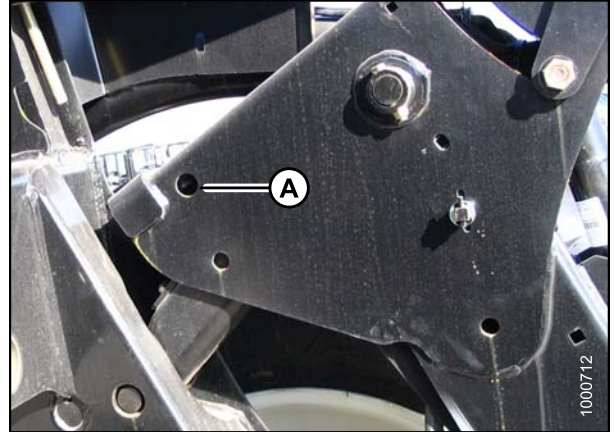


Figure 4.60

12. Move float pins from working hole location (A) to disengage the float, and store pins at storage hole location (B).

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 hole location, and NOT installed in working hole location.

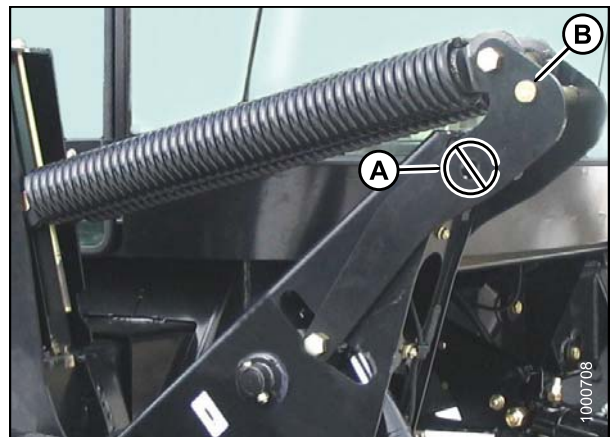


Figure 4.61

13. Remove pins (A) securing lift linkages to weight box, and retain pins for attaching header to windrower. Disengage lift cylinder locks.
14. Start engine, lower weight box onto blocks, and back away.
15. Attach header to windrower. Refer to section [4.5.3 Attaching a D-Series Header](#), page 159.
16. Convert header into field position. See Header Operator's Manual for procedure.

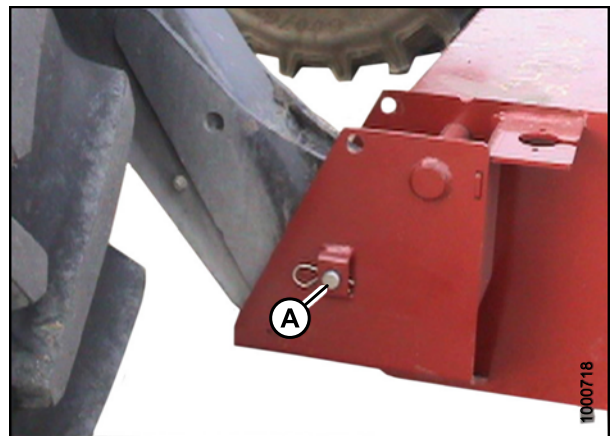


Figure 4.62

OPERATION

17. Start engine, and lower header to ground. Continue to retract lift cylinders so that member (A) lifts off of link (B)
18. Remove temporary lift pins (C) from lift arms, and install pins into storage holes in weight box.
19. Before operating the machine, double check that all pins are secure, and that all safety equipment is installed and fully functional.
20. Proceed with operation of header.

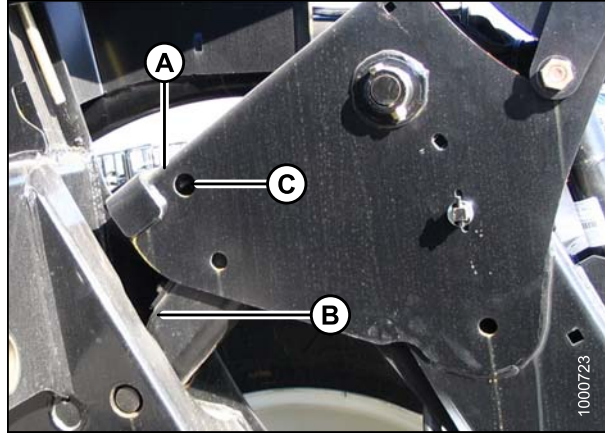


Figure 4.63

Towing the Windrower (Emergency)

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.

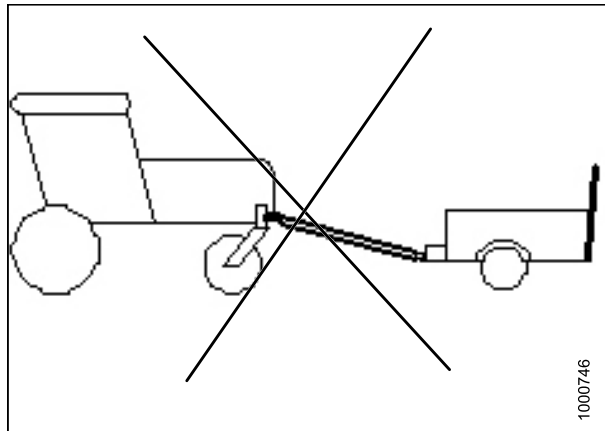


Figure 4.64

OPERATION



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.

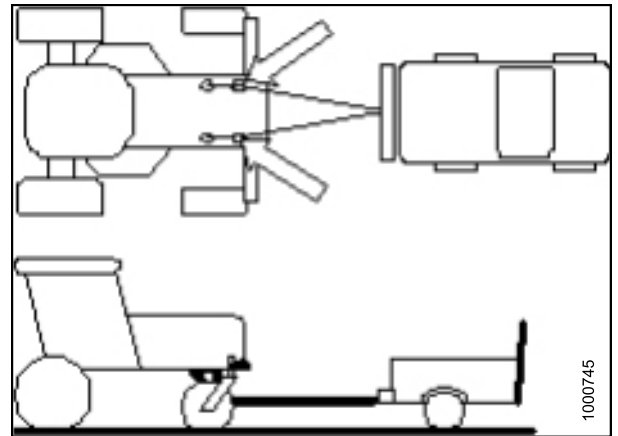


Figure 4.65

IMPORTANT

- Failure to disengage final drives before towing will result in serious transmission damage.
- Do NOT exceed 16 mph (26 km/h) when towing windrower.
- Do NOT use this towing method for normal transporting of windrower.
- Even with final drives disengaged, rolling speeds of more than 16 mph (26 km/h) will cause final drive gears to run at excessive speeds, possibly severely damaging or causing the unit to fail.

Final Drives

Disengage and engage final drives as follows:

1. Remove the two hex bolts (A) at center of drive wheel.
2. Remove cap (B), and flip over so that dished side faces in. The cap depresses a pin that disengages the gearbox.
3. After towing, reverse cover (A) to re-engage final drives. Be sure plunger at center of wheel “pops out” to engage drive.

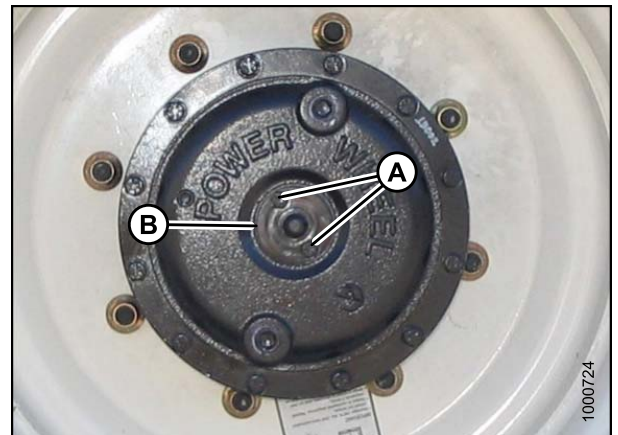


Figure 4.66

OPERATION

4.3.9 Storing the Windrower

At the end of each operating season, you need to store your windrower properly.

1. Clean the windrower thoroughly.



WARNING

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

2. Store windrower in a dry protected place.



CAUTION

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

3. Remove battery. Refer to [Removing Battery, page 336](#)
4. 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.

5. If stored outside, always cover windrower with a waterproof tarpaulin or other protective material. This will protect the switches, instruments, tires, etc. from inclement weather.
6. If no cover is available; seal air cleaner intake and exhaust pipe with plastic bags and/or waterproof tape.
7. 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.
8. Repaint all worn or chipped painted surfaces to prevent rust.
9. 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.
10. Check for worn components and repair. Tighten loose hardware, and replace any missing hardware. See [5.1.1 Torque Specifications, page 255](#).
11. 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.
12. 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.
13. To prevent condensation, fill hydraulic oil reservoir to filler neck with approved hydraulic system oil. Refer to .
14. Test engine coolant antifreeze concentration to ensure it is sufficient to protect engine against lowest expected temperature.

OPERATION

4.4 Operating with a Header

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.

4.4.1 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.

1. Start engine, and press HEADER UP switch to raise header to maximum height.
2. If one end of the header does not raise fully, the lift cylinders require re-phasing. If re-phasing is needed, proceed as follows:
 - a. Press and hold the HEADER UP switch until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds.
 - c. Cylinders are phased.

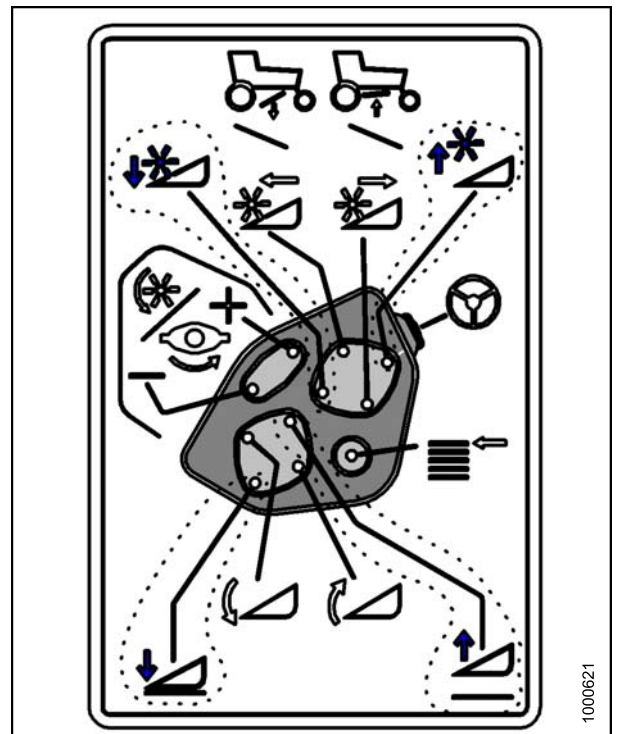


Figure 4.67

OPERATION

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



Figure 4.68

4. To disengage lift cylinder stops, turn lever (A) away from header to raise stop until lever locks into vertical position. Repeat for both lift cylinders.
5. Start engine, choose a level area, and lower header to the ground. Stop engine, and remove key.

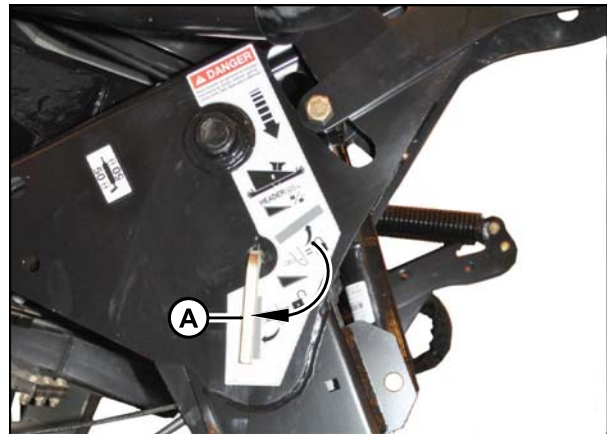


Figure 4.69

4.4.2 Header Float

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.

OPERATION

IMPORTANT

The stabilizer wheels are designed to minimize bouncing at the header ends and not “float” the header. Refer to your header for float setting guidelines.

Float Operating Guidelines

When working with the cutterbar on the ground;

1. Set center-link to mid-range position (05.0 on CDM). Refer to [4.4.5 Header Angle, page 147](#).
2. In rocky fields, adjust skid shoes down to raise guards when operating at flattest header angle to minimize scooping rocks.
3. Adjust header height or adjust header angle to minimize pushing soil.

When working with the cutterbar off the ground (Draper Header Only);

1. Set center-link to mid-range position (05.0 on CDM). Refer to [4.4.5 Header Angle, page 147](#)
2. The proper setting requires balancing the amount of header weight carried by the float and stabilizer wheels. Refer to your draper header Operator's Manual.
3. Use the CDM controls to automatically maintain cutting height. Refer to [4.4.6 Cutting Height, page 150](#)

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.

OPERATION

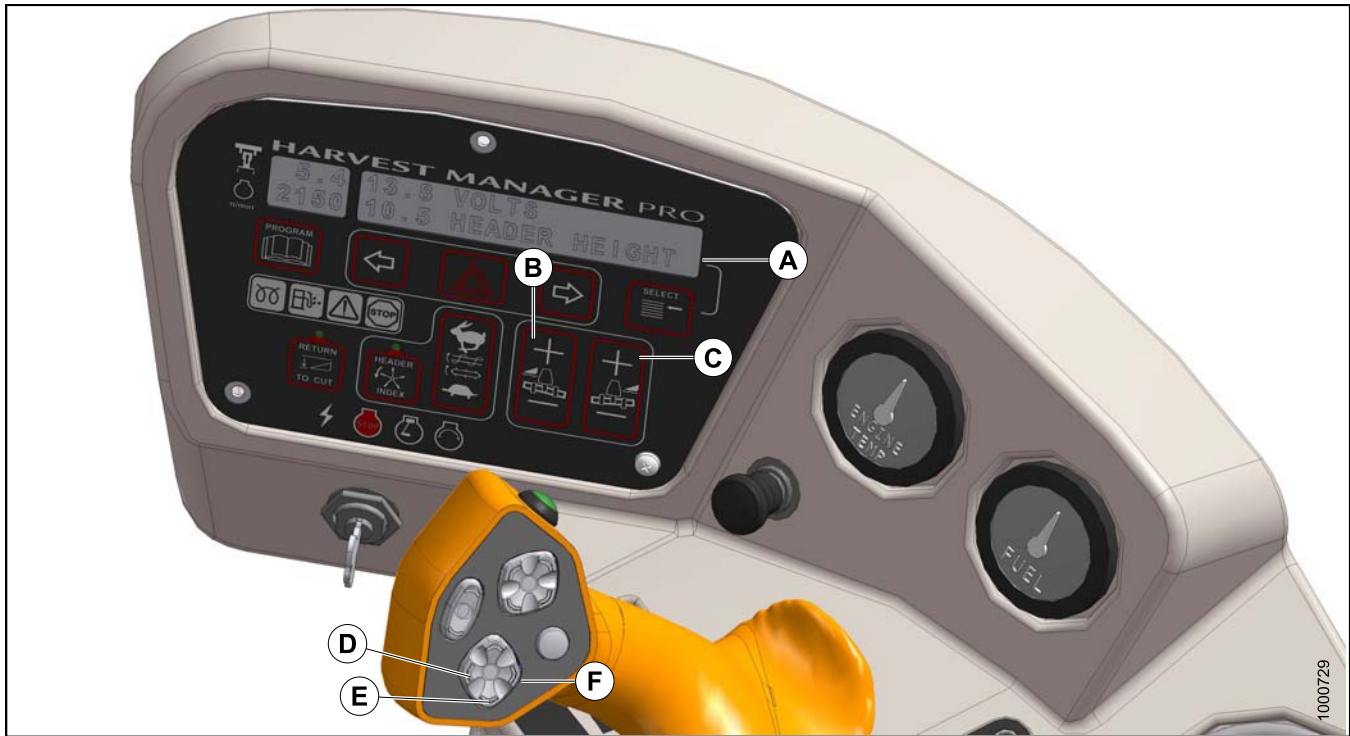


Figure 4.70: CDM Float Adjustment

A - CDM Display

C - Right Float Adjustment

E - Header Lower

B - Left Float Adjustment

D - Header Tilt Down

F - Header Tilt Up

Check header float as follows:

CAUTION

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

1. Start the engine.
2. Using HEADER TILT switches (D, F), set center-link to mid-range position (5.0 on CDM) (A).
3. Using HEADER DOWN switch (E), lower header fully with lift cylinders fully retracted.
4. Set left (B) and right (C) float fine adjustments on the CDM to approximately 5.0 as follows:
 - a. 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).
 - b. 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.

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.

OPERATION

- 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). |

Adjusting Float Using Drawbolts

Coarse float adjustment is done using the drawbolts located on either side of the windrower.

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



CAUTION

Check to be sure all bystanders have cleared the area.

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

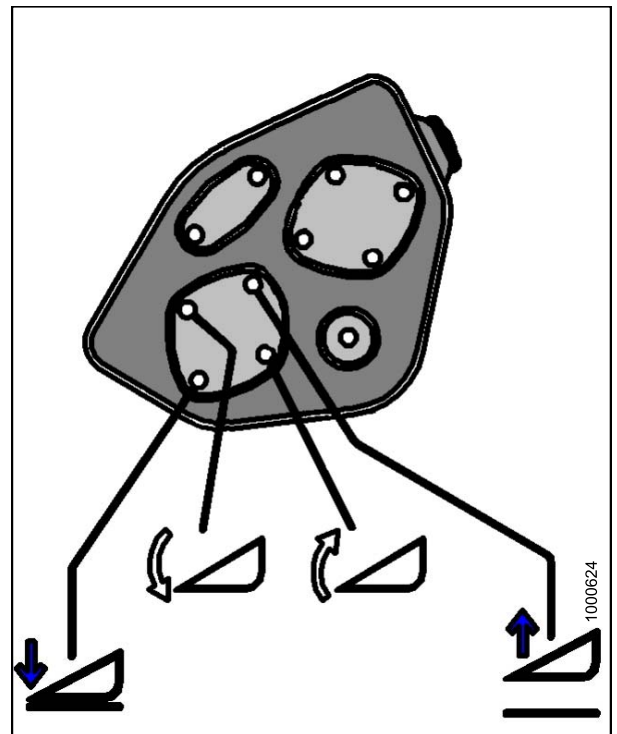


Figure 4.71

OPERATION

3. Turn drawbolt (A) clockwise to increase float (makes header lighter), or counterclockwise to decrease float (makes header heavier).
4. Re-check the header float..



Figure 4.72

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.

Example:

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

Set float presets as follows:

1. Engage header.
2. Push FLOAT PRESET SWITCH (A) to Position 1 (B).

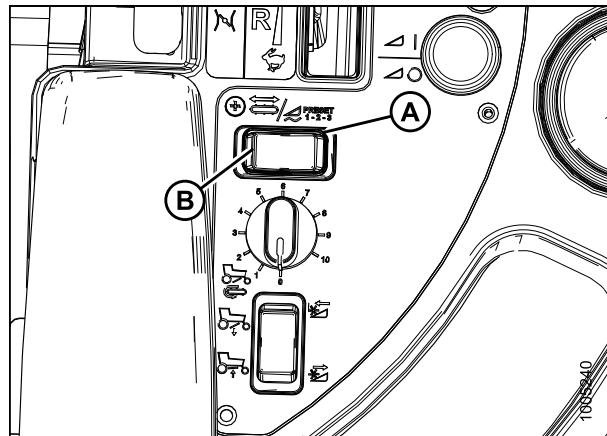


Figure 4.73

OPERATION

- Using HEADER TILT switches (D, F), set center-link to mid-range position (5.0 on CDM) (A).
- Using HEADER DOWN switch (E), lower header fully with lift cylinders fully retracted.
- Set left (B) and right (C) float fine adjustments on the CDM to approximately 5.0 as follows:
 - 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).
 - Repeat for right side float with switch (C). Display will indicate float for both sides, for example (5.0 L FLOAT R 5.0).

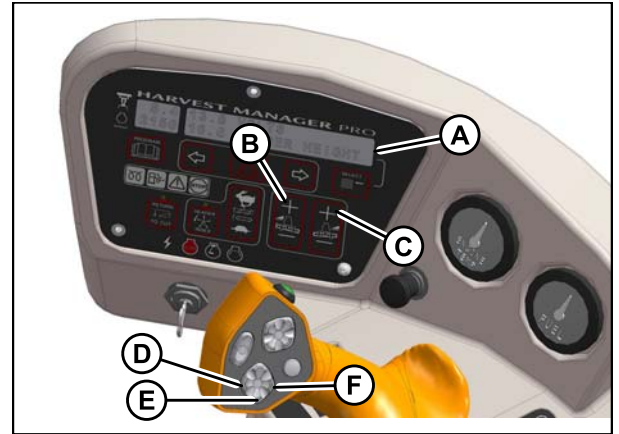


Figure 4.74

- | | |
|----------------------------|---------------------------|
| A - CDM Display | B - Left Float Adjustment |
| C - Right Float Adjustment | D - Header Tilt Down |
| E - Header Lower | F - Header Tilt Up |

- Select a second preset with the FLOAT PRESET 2 SWITCH (C).
- Repeat steps 1., [Float Options, page 142](#) and 2., [Float Options, page 142](#) to set the float.
- Select a third preset with the FLOAT PRESET 3 SWITCH (D).
- Repeat steps 1., [Float Options, page 142](#) and 2., [Float Options, page 142](#) to set the float.
- 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 [Float Options with Deck Shift, page 198](#).

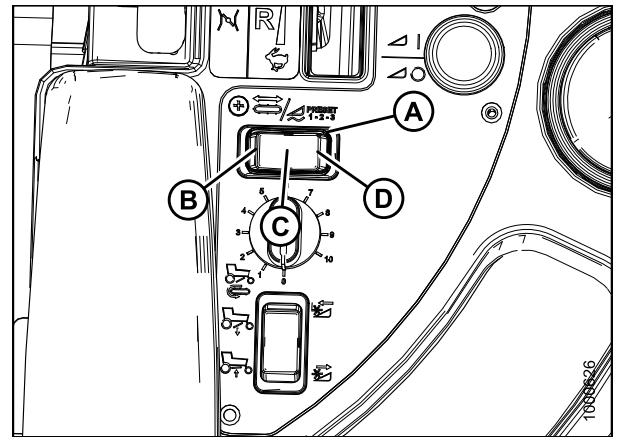


Figure 4.75

4.4.3 Header 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 levelling linkages. The float springs are **not** used to level the header.

- Check windrower tire pressures.

OPERATION

2. Place float pins in locked out location (A).



Figure 4.76

Level header as follows:

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

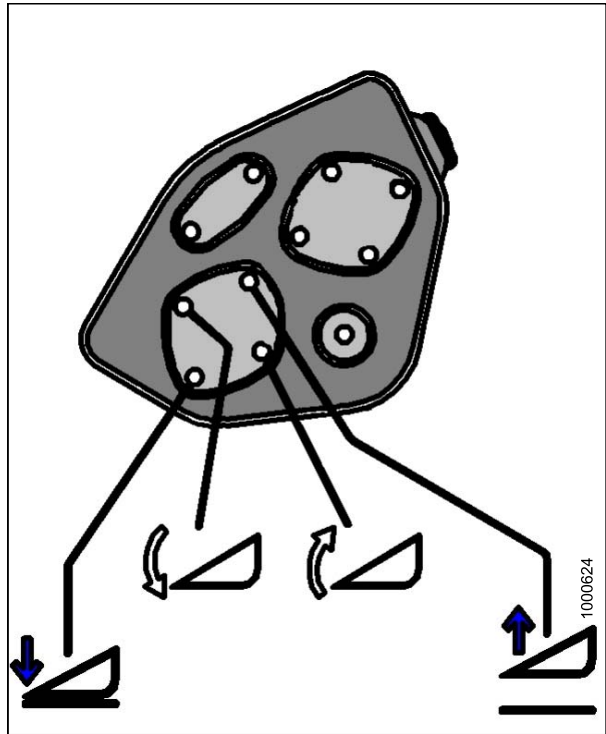


Figure 4.77

OPERATION

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



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.

8. On high side, remove nut, washer and bolt (A) that attaches shims (B) to link.
9. Remove one or both shims (B), and re-install the hardware (A).
10. Start engine, and raise header slightly. Check level of header.
11. If additional levelling is required, install the removed shim on the opposite linkage.

NOTE: If required, additional shims are available from your Dealer.

12. Once header is level, return float pins to their engaged position (A).

NOTE: Float does **not** require adjustment after levelling header.

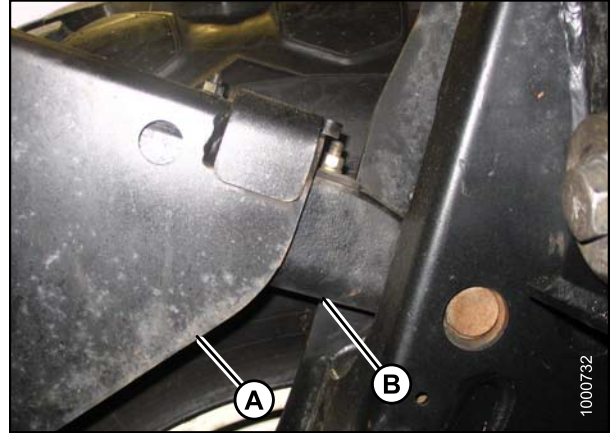


Figure 4.78

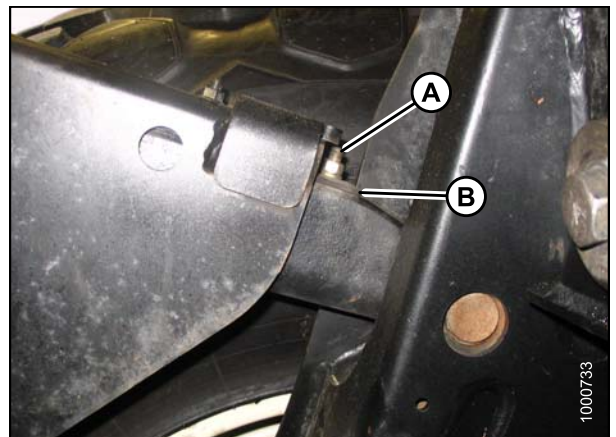


Figure 4.79



Figure 4.80

OPERATION

4.4.4 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 nonfunctional for certain headers.

CAUTION

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

IMPORTANT

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

Engaging the Header

Engage the header as follows:

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



Figure 4.81

Reversing the Header

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 A40-D auger header and D50 or D65 draper header, the hose plumbing to the reverser valve **MUST** be changed to suit the header type. Refer to Instruction MD #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.

OPERATION

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

1. Push down and hold HEADER DRIVE REVERSE button (A), and pull up the HEADER DRIVE switch (B).
2. CDM will display HEADER REVERSE.
3. **RELEASE REVERSE BUTTON (A) TO STOP HEADER.**
4. Push down the HEADER DRIVE switch (B) to OFF, so that it can be re-started.



Figure 4.82

4.4.5 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.

OPERATION

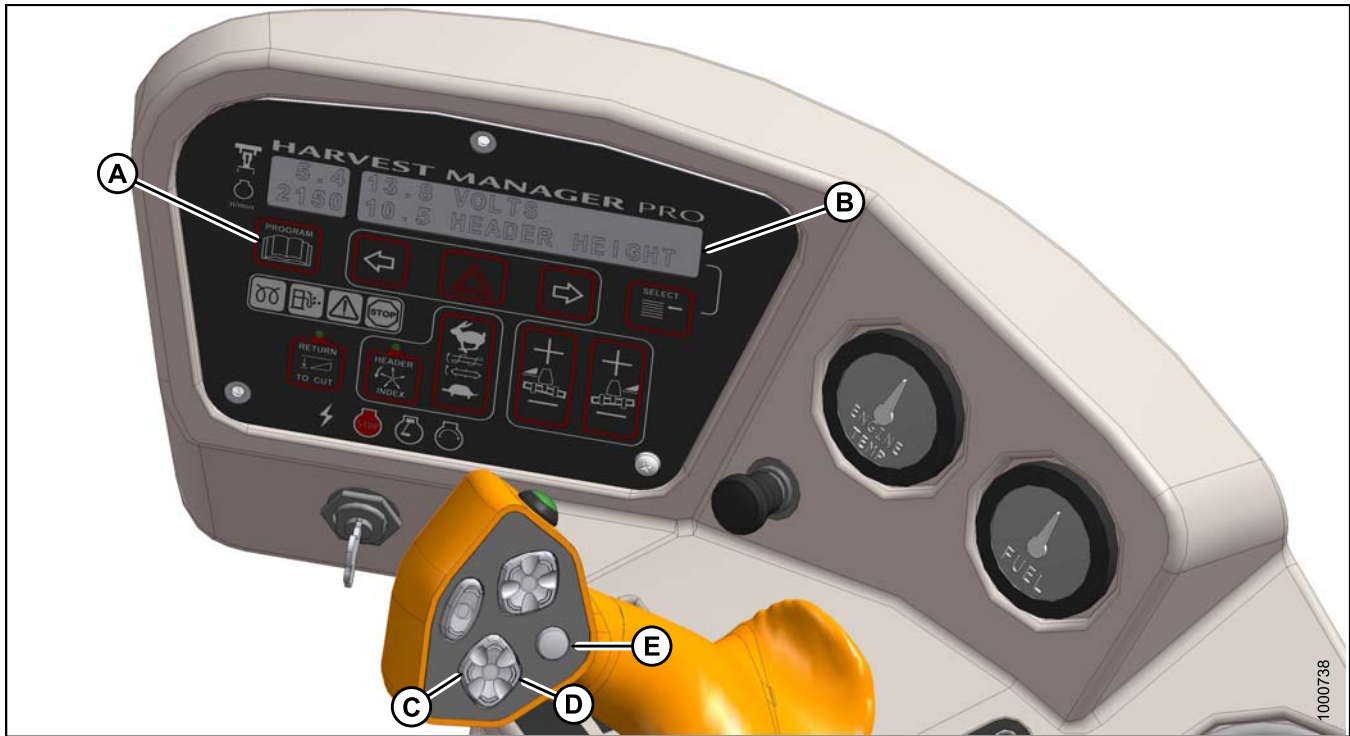


Figure 4.83: CDM

A - Program Button

B - Display

C - Header Tilt Down

D - Header Tilt Up

E - Display Selector

Change header angle as follows:

1. To decrease (flatten) header angle, operate HEADER TILT UP switch (D) 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.
2. To increase (steepen) header angle, operate HEADER TILT DOWN switch (C) 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.
3. The header tilt switch can be deactivated to prevent inadvertent header angle changes when pressing the HEADER HEIGHT control switches. Refer to [3.18.5 Cab Display Module \(CDM\) Programming, page 84](#).
 - a. Switch to PROGRAM mode on CDM.
 - b. Press SELECT until SET CONTROL LOCKS? is displayed.
 - c. Press the right arrow to display HEADER TILT.
 - d. Press the right arrow to LOCK (deactivate) the control.
 - e. Press PROGRAM (A) to exit.

Self-Locking Center-Link Hook

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

OPERATION

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.

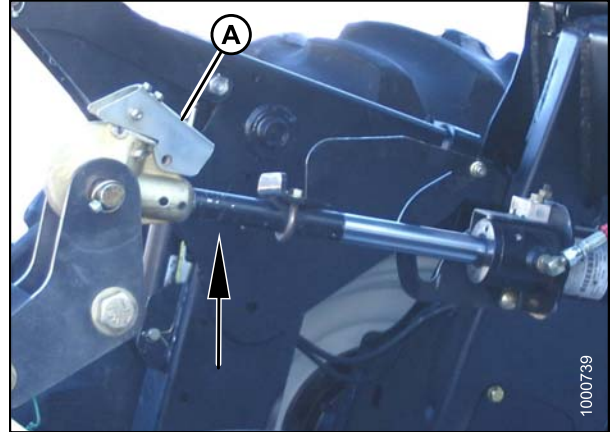


Figure 4.84

2. Lower the handle (A) into the **LOCK** position.
3. Push up on lock pin (B) only. Handle should catch on casting, and pin should **NOT** lift.

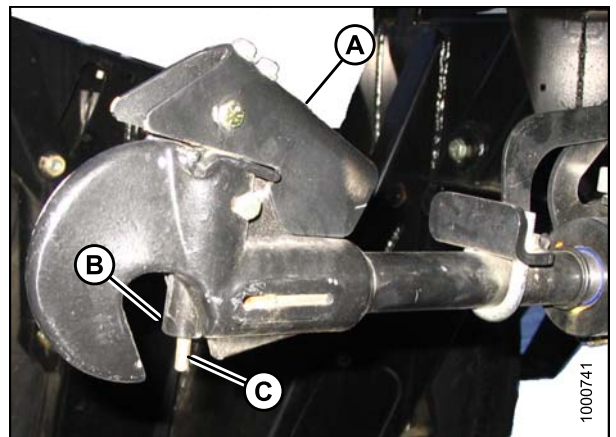


Figure 4.85

A - Handle

B - Lock Pin

C - Actuator Rod

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



Figure 4.86

OPERATION

4.4.6 Cutting Height



Figure 4.87

A - Display

B - Header Raise

C - Header Lower

D - Display Selector

The header is raised or lowered with the HEADER UP (B) or HEADER DOWN (C) switches on the GSL.

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

Use DISPLAY SELECTOR switch (D) to display the current setting.

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 [Programming Auto Raise Height Feature, page 153](#).

OPERATION

Programming Return to Cut Feature



Figure 4.88

A - Return To Cut
D - Header Up
G - Header Tilt Up

B - Display
E - Header Down

C - Display Selector
F - Header Tilt Down

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.

OPERATION

Using Return to Cut Feature

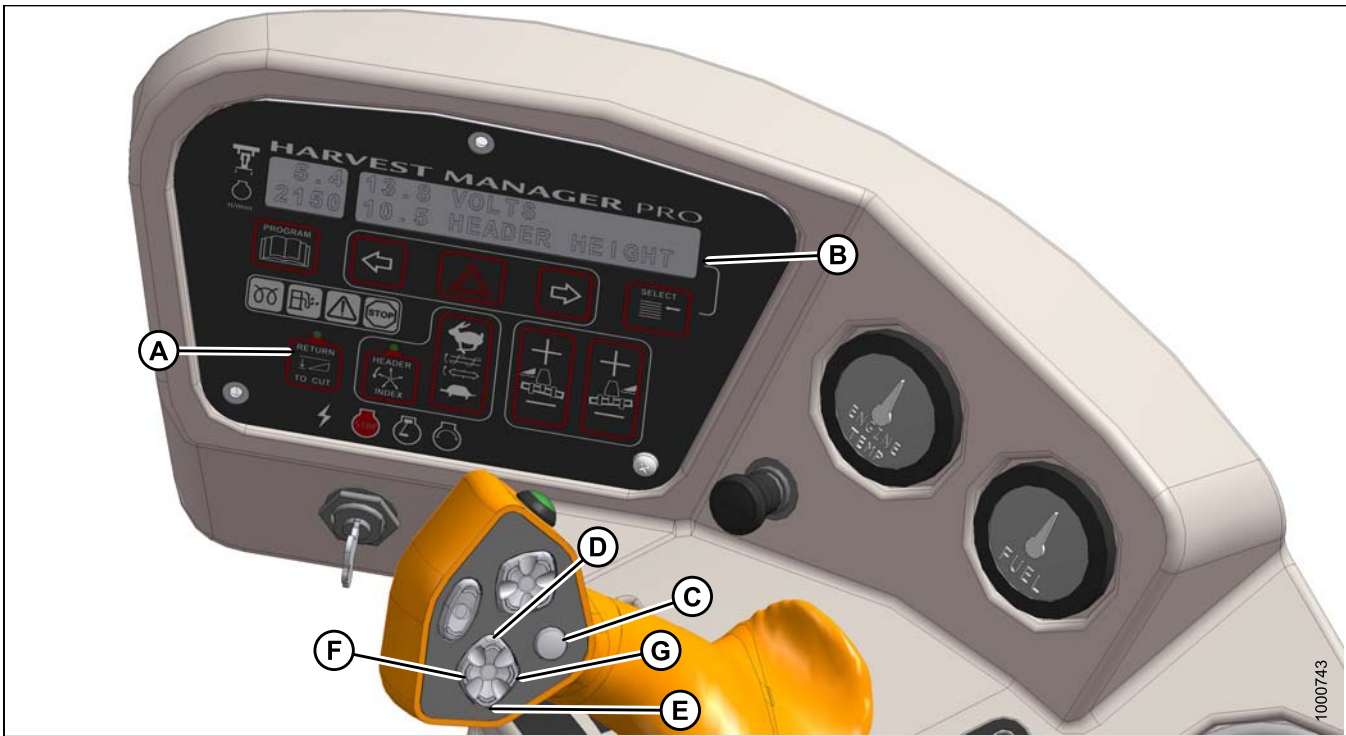


Figure 4.89

A - Return To Cut
D - Header Up
G - Header Tilt Up

B - Display
E - Header Down

C - Display Selector
F - Header Tilt Down

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.
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.

OPERATION

Auto Raise Height

The header can be automatically raised if programmed into the CDM.

Programming Auto Raise Height Feature



Figure 4.90

A - Return To Cut

B - Display

C - Display Selector

D - Header Up

E - Header Down

F - Header Tilt Down

G - Header Tilt Up

Program the AUTO RAISE HEIGHT feature as follows:

1. RETURN TO CUT switch (A) can be OFF or ON.
2. Press PROGRAM and SELECT on CDM to enter programming mode.
3. Press SELECT. WINDROWER SETUP? is displayed on upper line.
4. Press right arrow, then SELECT. SET KNIFE SPEED? is displayed.
5. Press SELECT until AUTO RAISE HEIGHT is displayed.
6. Press left arrow or right arrow 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.

OPERATION

Using Auto Raise Height Feature

Use the AUTO RAISE HEIGHT feature as follows:

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.

IMPORTANT

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

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 > preset cutting height.

2. Momentarily press the HEADER DOWN switch on the GSL to return the header to the preset cutting height.

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 [Adjusting Header Drop Rate, page 363](#)

4.4.7 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 D6 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 MD #169216) for complete operating and maintenance instructions. The manual is shipped with the DWA Kit.



Figure 4.91

OPERATION

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.

To swap controls from the console to the GSL, see [Detailed Programming Menu Flow Chart, page 86](#).

NOTE: The same switch is used for raising and lowering a swath roller (if installed).

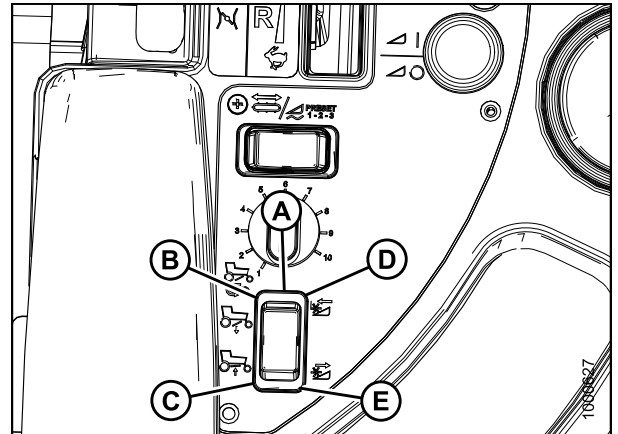


Figure 4.92

Draper Speed

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

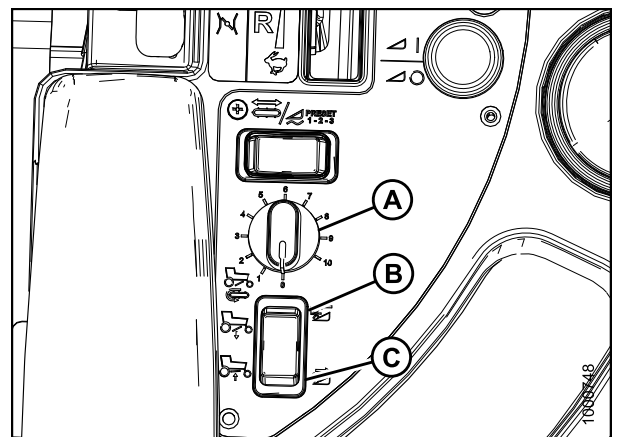


Figure 4.93

A - Draper Speed

B - DWA Down

C - DWA Up

OPERATION

4.4.8 Swath Roller Operation

The Swath roller 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 Swath Roller. See [Detailed Programming Menu Flow Chart, page 86](#) if you want to swap controls from the console to the GSL.

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

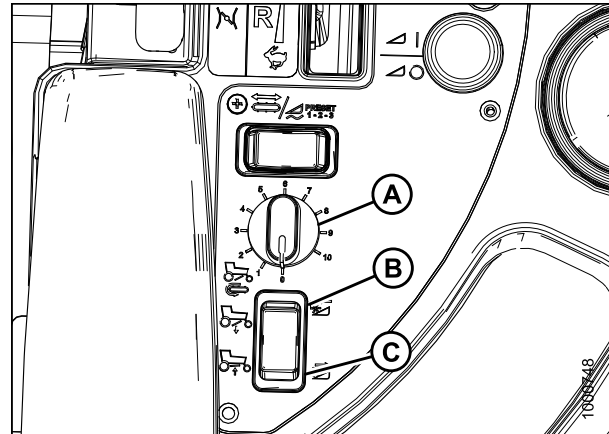


Figure 4.94

A - Draper Speed

B - DWA Down

C - DWA Up

OPERATION

4.5 Operating with a D-Series Header

4.5.1 Configuring Hydraulics

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

Windrowers equipped with D-Series hydraulics have four header drive hoses on the LH side.

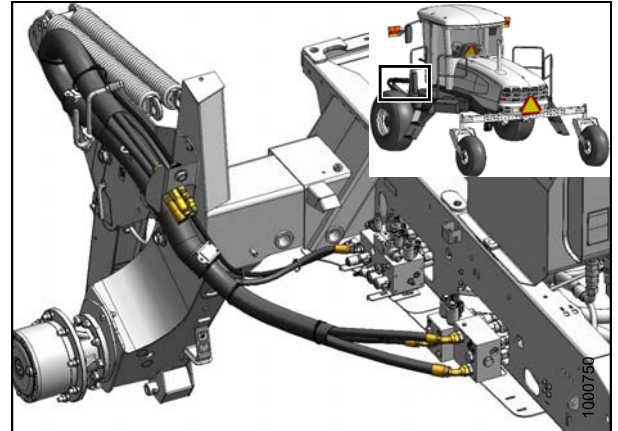


Figure 4.95: Draper Header Drive Hydraulics

There are also 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 MD #B5577

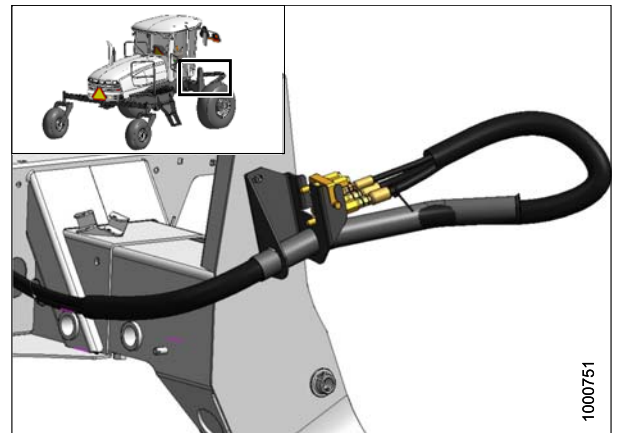


Figure 4.96: Draper Header Reel Hydraulics

OPERATION

4.5.2 Attaching Header Boots



CAUTION

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 (B), and NOT installed at hole location (A).

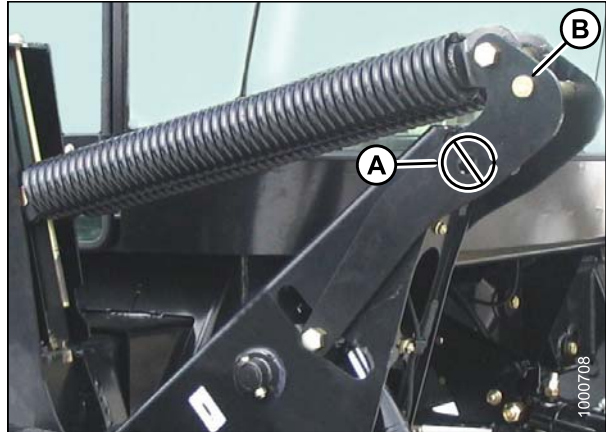


Figure 4.97

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

1. Remove pin (B) from boot (A).
2. Locate boot (B) on lift linkage (A) and re-install pin (C). Pin may be installed from either side of boot.
3. Secure pin (C) with hairpin (D).
4. Repeat for opposite side.

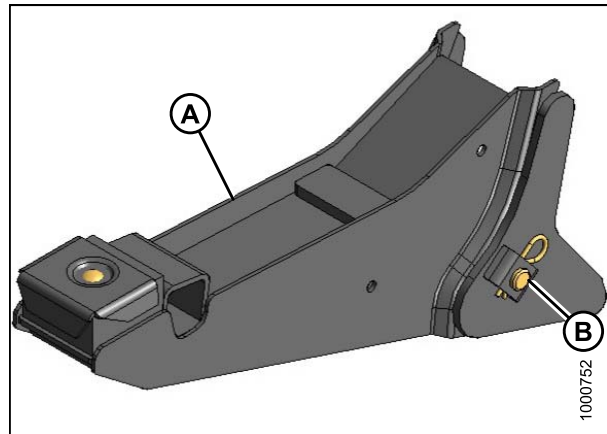


Figure 4.98

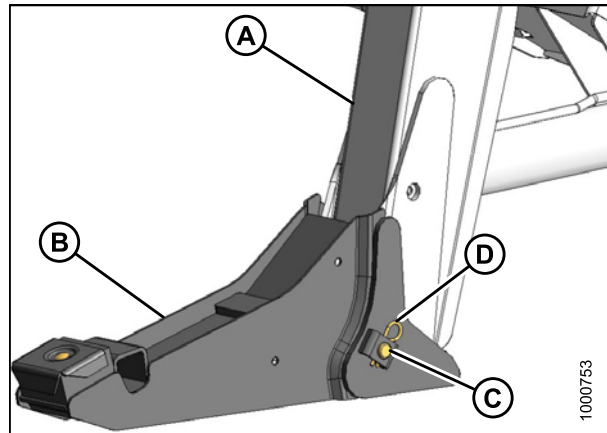


Figure 4.99

OPERATION

4.5.3 Attaching a D-Series Header

Hydraulic Link with Optional Self-Alignment Kit

1. Remove hairpin (A) on pins (B), and remove pins from header legs.



CAUTION

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

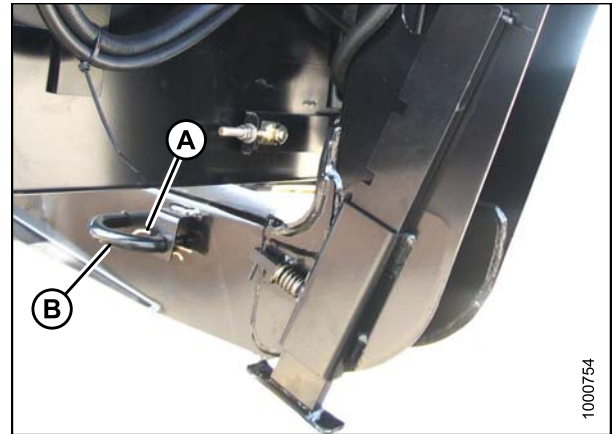


Figure 4.100

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

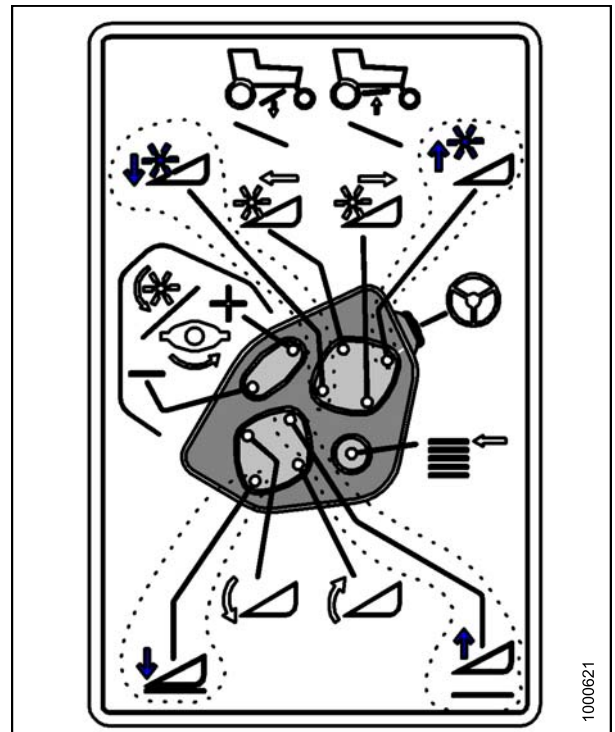


Figure 4.101

OPERATION

IMPORTANT

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

3. If necessary, adjust position of the hydraulic center-link (A) so that the hook (B) is above the attachment pin on the header. Activate the REEL UP switch on the GSL to raise the center-link.

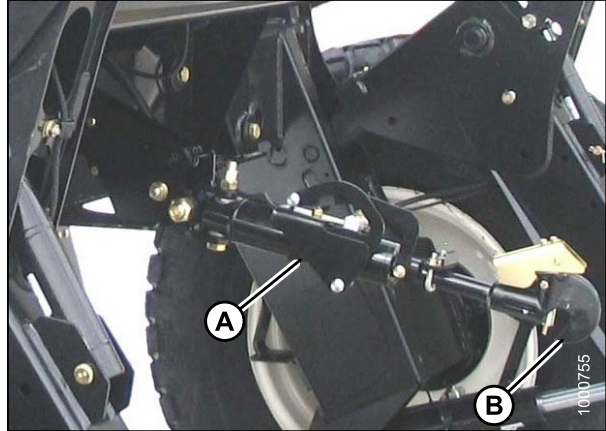


Figure 4.102

4. Slowly drive windrower forward so that boots (A) enter header legs (B). Continue to drive slowly forward until lift linkages contact support plates in the header legs, and header nudges forward.
5. Ensure that lift linkages are properly engaged in header legs, contacting support plates.

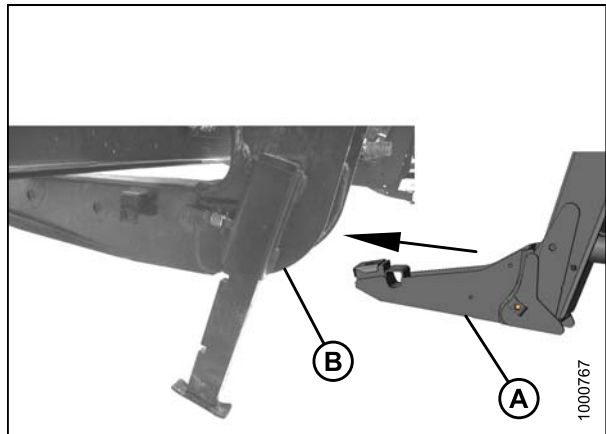


Figure 4.103

OPERATION

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

IMPORTANT

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

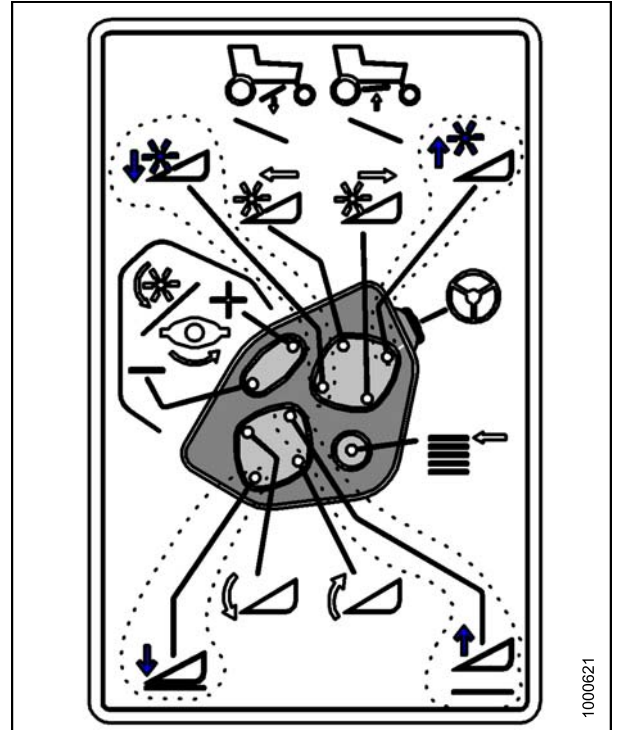


Figure 4.104

- Lower center-link (A) onto the header with REEL DOWN switch until it locks into position (hook release (C) is down).
- Check that center-link is locked onto header by pressing the REEL UP switch on the GSL.

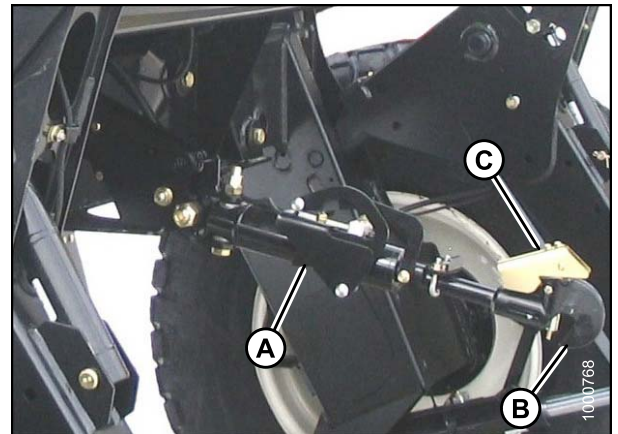


Figure 4.105

OPERATION

9. Start engine, and press HEADER UP switch to raise header to maximum height.
10. If one end of the header does not raise fully, the lift cylinders require re-phasing. If re-phasing is needed, proceed as follows:
 - a. Press and hold the HEADER UP switch until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds.
 - c. Cylinders are phased.

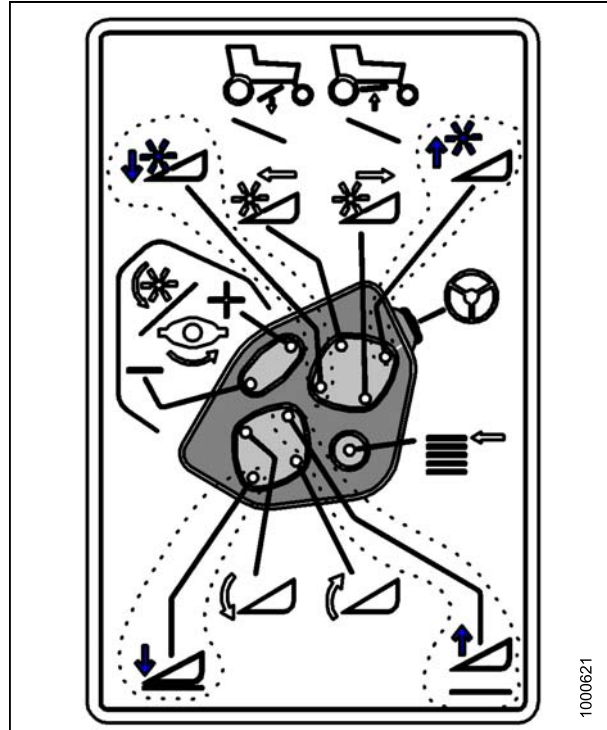


Figure 4.106

11. Cylinder stops are located on both header lift cylinders on the windrower. Engage lift cylinder stops on both lift cylinders as follows:
 - a. Stop engine, and remove key from ignition.
 - b. Pull lever (A), and rotate toward header to release and lower cylinder stop (B) onto cylinder.
 - c. Repeat for opposite lift cylinder.

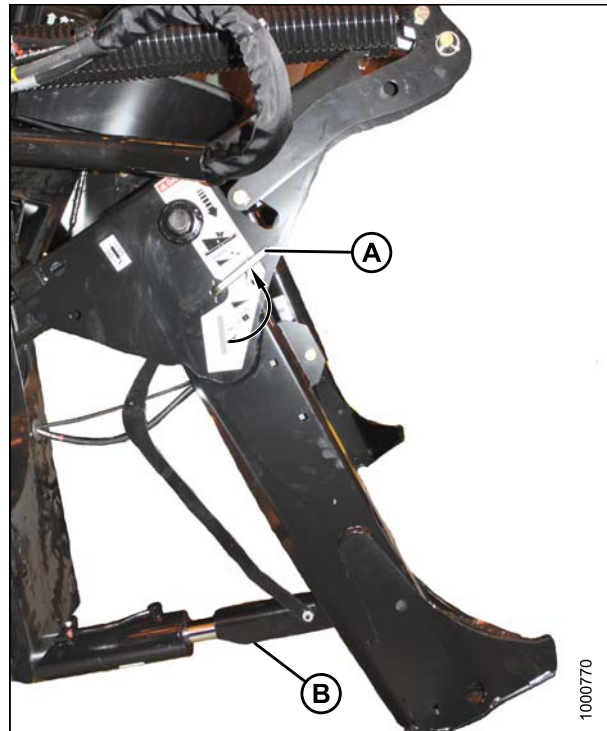


Figure 4.107

OPERATION

12. Install pin (B) through header leg, (engaging U-bracket in lift linkage) on both sides, and secure with hairpin (A).
13. Raise header stand (D) to storage position by pulling pin (C), and lifting stand into uppermost position. Release pin (C).

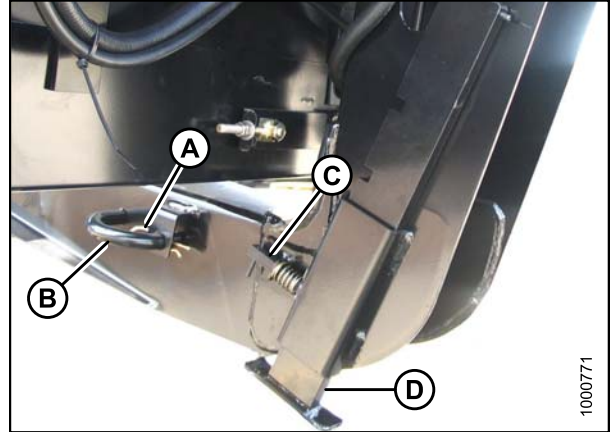


Figure 4.108

14. Remove pin from storage position (B) in linkage, and insert in hole (A) to engage float springs. Secure with hairpin.

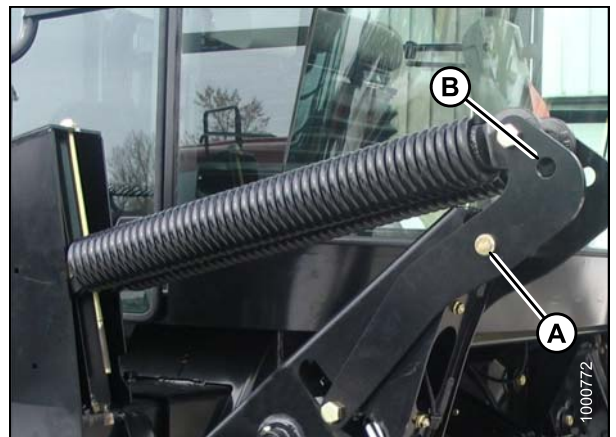


Figure 4.109

15. Disengage lift cylinder stop by turning lever (A) downward to release and lower stop until lever locks into vertical position.
16. Repeat for opposite lift cylinder stop.

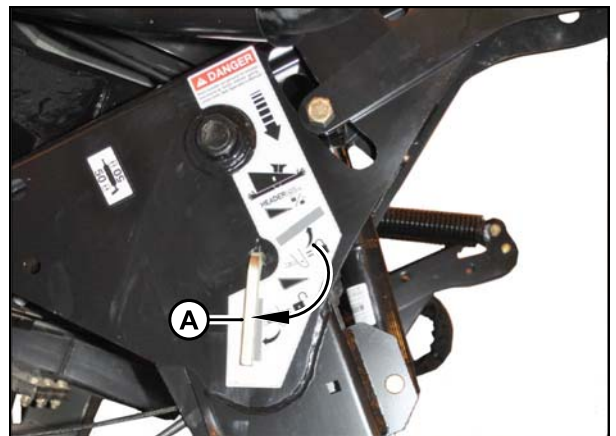


Figure 4.110

OPERATION

CAUTION

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

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

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.

18. Connect header drive hoses (A) and electrical harness (B) to header. Refer to the draper header operator's manual.

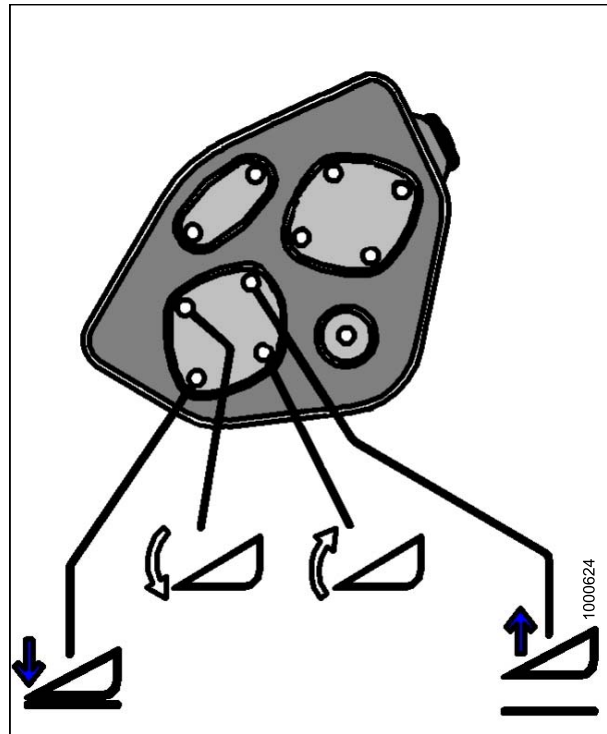


Figure 4.111

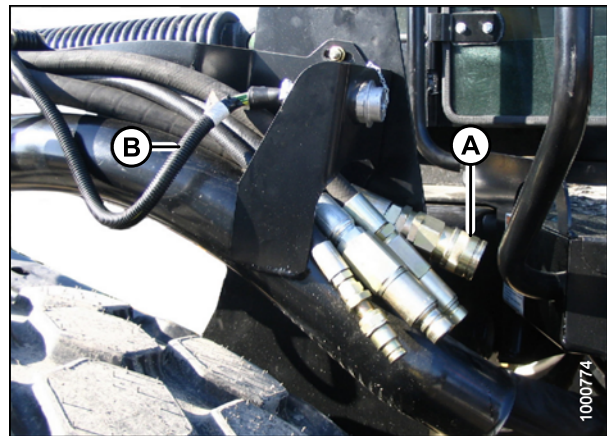


Figure 4.112

OPERATION

19. Connect reel hydraulics (A) at RH side of windrower. Refer to the draper header operator's manual.

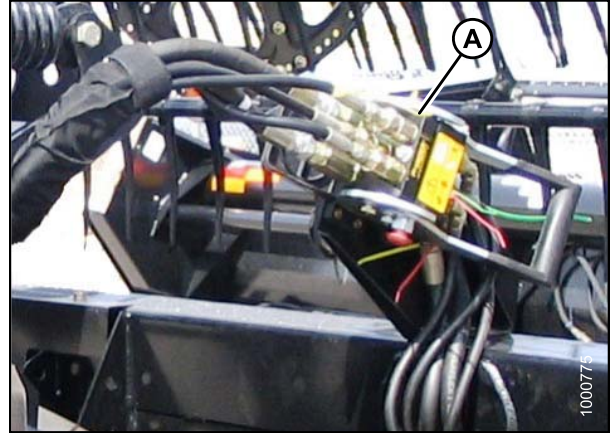


Figure 4.113

Hydraulic Link without Optional Self-Alignment Kit

1. Remove hairpin (A) on pins (B), and remove pins from header legs.

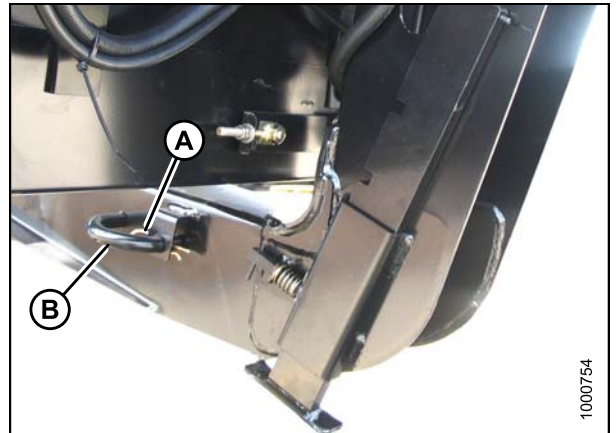


Figure 4.114

OPERATION

CAUTION

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

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

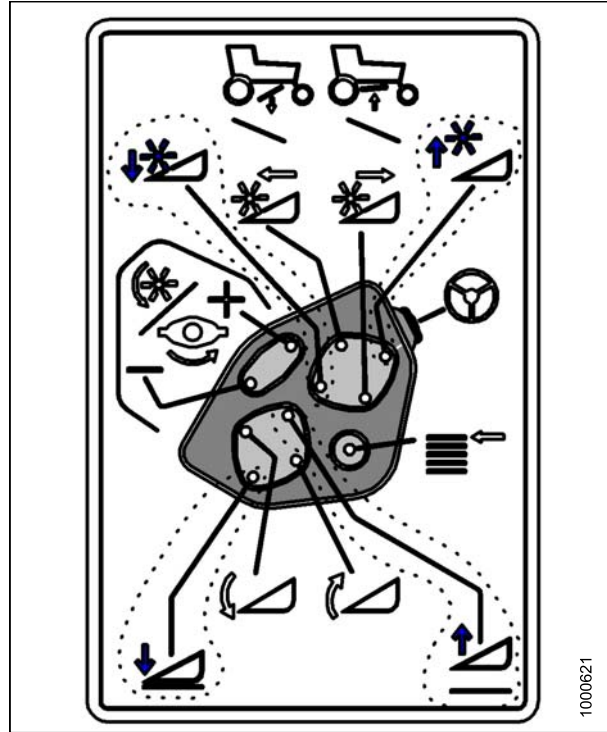


Figure 4.115

IMPORTANT

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

3. If necessary, adjust position of the hydraulic center-link (A) so that the hook (B) is above the attachment pin on the header.

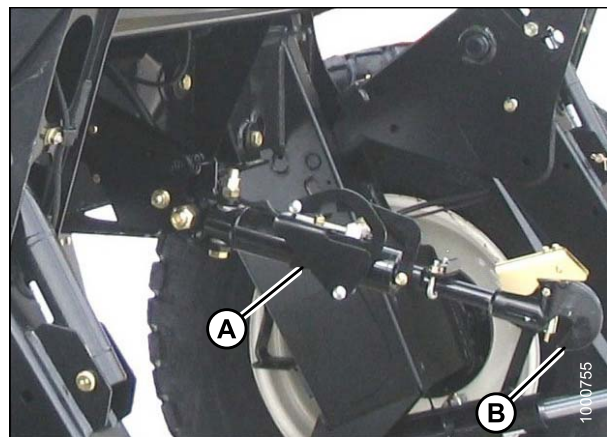


Figure 4.116

OPERATION

4. Relocate the pin (A) at the frame linkage as required to raise the center-link.

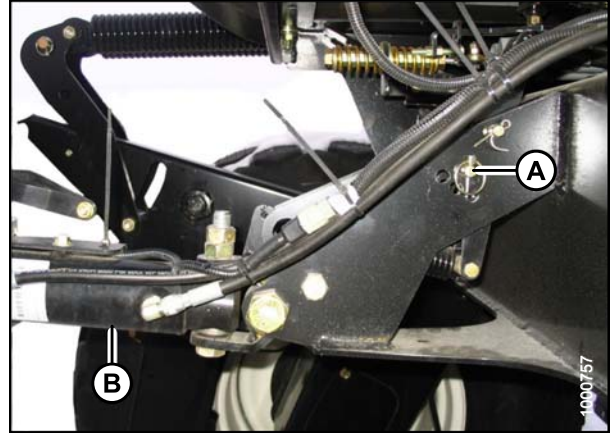


Figure 4.117

5. Slowly drive windrower forward so that boots (A) enter header legs (B). Continue to drive slowly forward until lift linkages contact support plates in the header legs, and header nudges forward.
6. Ensure that lift linkages are properly engaged in header legs, contacting support plates.

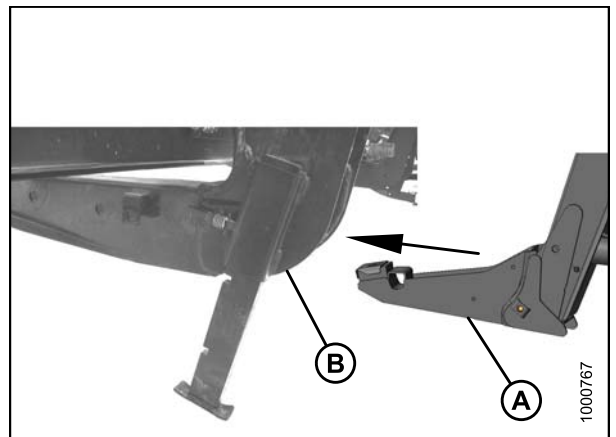


Figure 4.118

OPERATION

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

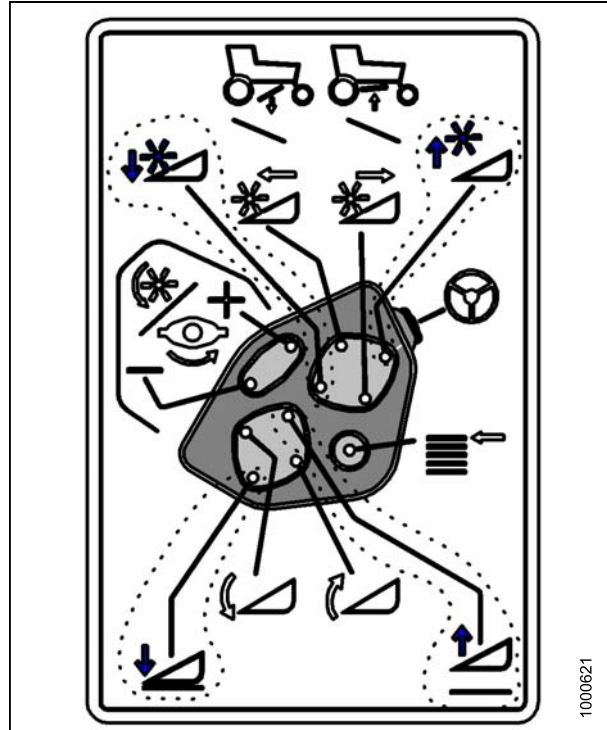


Figure 4.119

IMPORTANT

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

10. Check that center-link (A) is locked onto header by pulling upward on rod end (B) of cylinder.

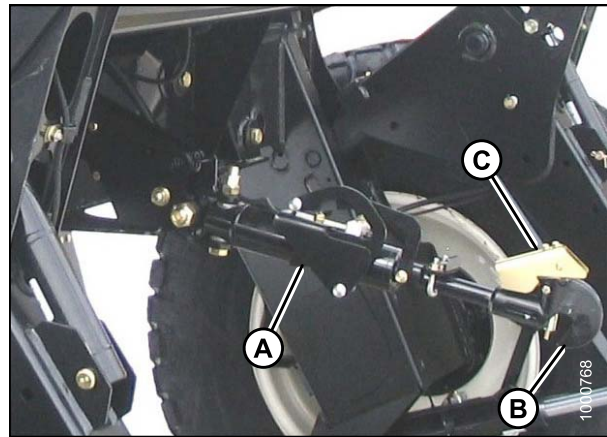


Figure 4.120

OPERATION

11. Start engine, and press HEADER UP switch to raise header to maximum height.
12. If one end of the header does not raise fully, the lift cylinders require re-phasing. If re-phasing is needed, proceed as follows:
 - a. Press and hold the HEADER UP switch until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds.
 - c. Cylinders are phased.

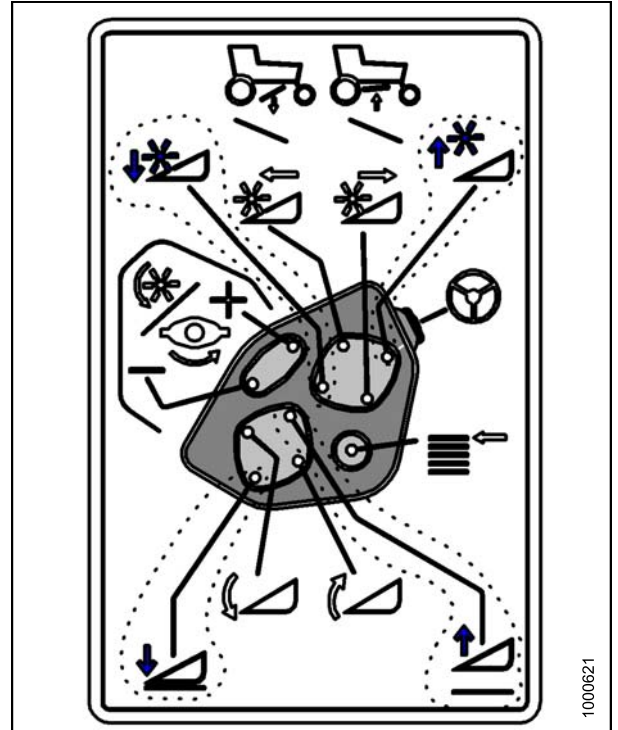


Figure 4.121

13. Cylinder stops are located on both header lift cylinders on the windrower. Engage lift cylinder stops on both lift cylinders as follows:
 - a. Stop engine, and remove key from ignition.
 - b. Pull lever (A), and rotate toward header to release and lower cylinder stop (B) onto cylinder.
 - c. Repeat for opposite lift cylinder.

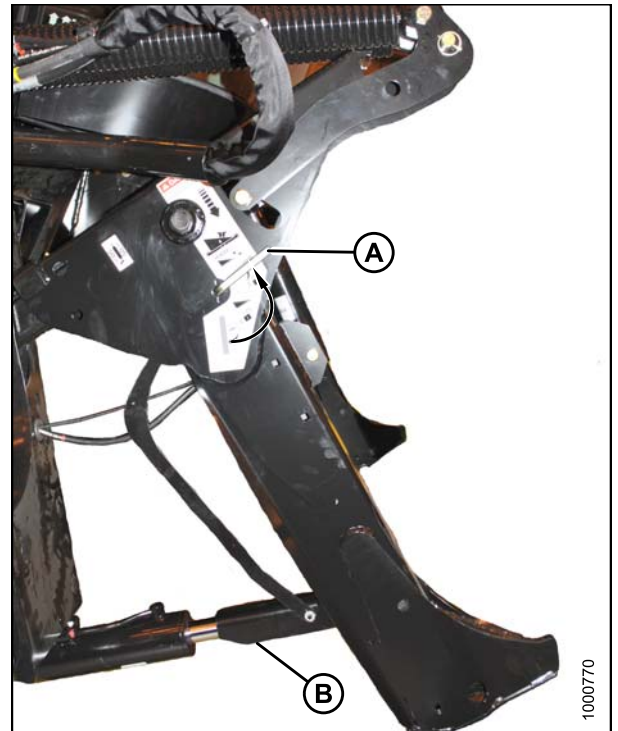


Figure 4.122

OPERATION

14. Install pin (B) through header leg, (engaging U-bracket in lift linkage) on both sides, and secure with hairpin (A).
15. Raise header stand (D) to storage position by pulling pin (C), and lifting stand into uppermost position. Release pin (C).

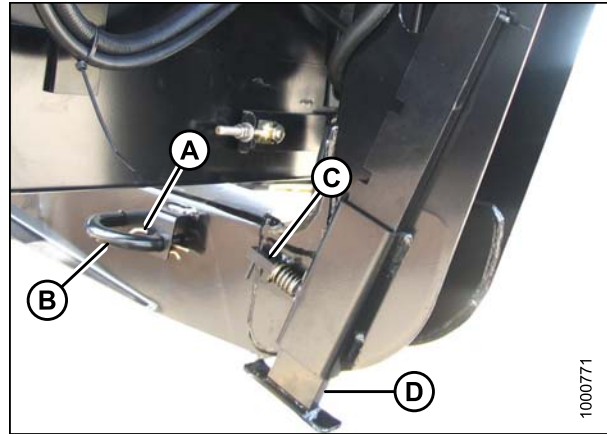


Figure 4.123

16. Remove pin from storage position (B) in linkage, and insert in hole (A) to engage float springs. Secure with hairpin.

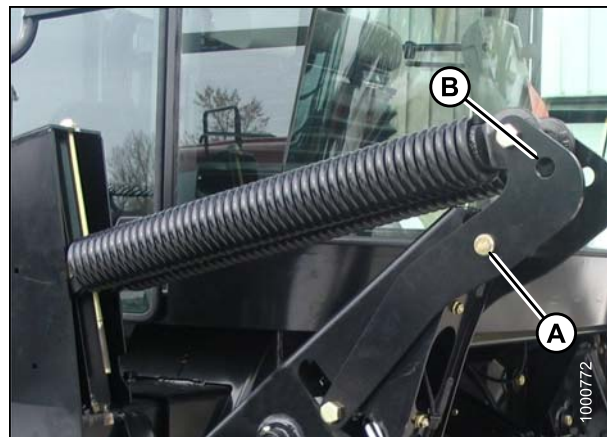


Figure 4.124

17. Disengage lift cylinder stop by turning lever (A) downward to release and lower stop until lever locks into vertical position.
18. Repeat for opposite lift cylinder stop.



Figure 4.125

OPERATION



CAUTION

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

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



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.

20. Connect header drive hoses (A) and electrical harness (B) to header. Refer to the draper header operator's manual.

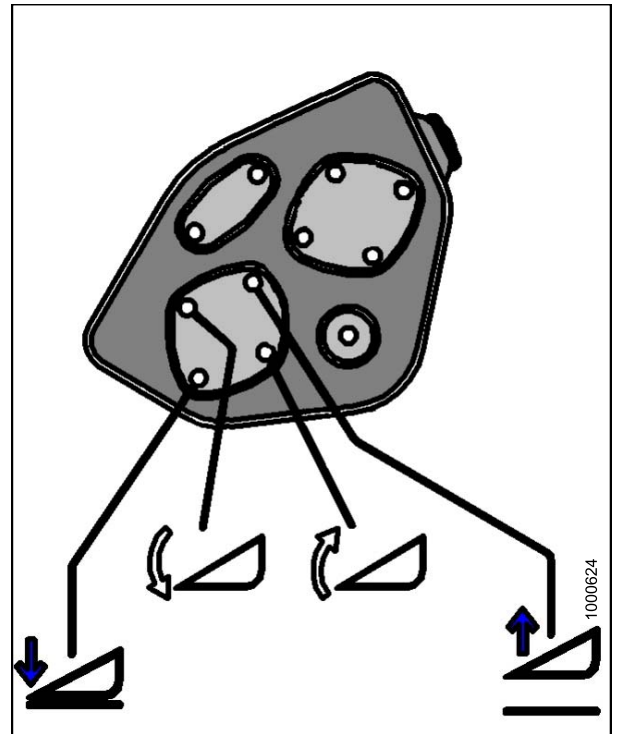


Figure 4.126

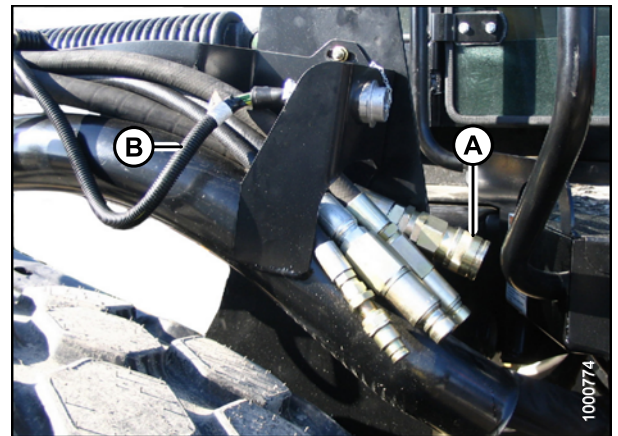


Figure 4.127

OPERATION

21. Connect reel hydraulics (A) at right side of windrower. Refer to the draper header operator's manual.

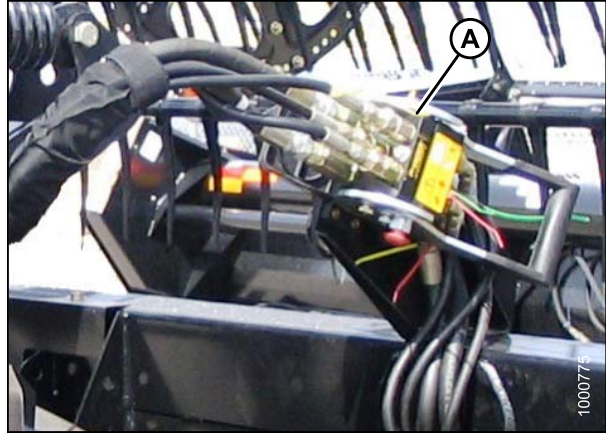


Figure 4.128

Mechanical Link (Optional)

1. Remove hairpin (A) on pins (B), and remove pins from header legs.

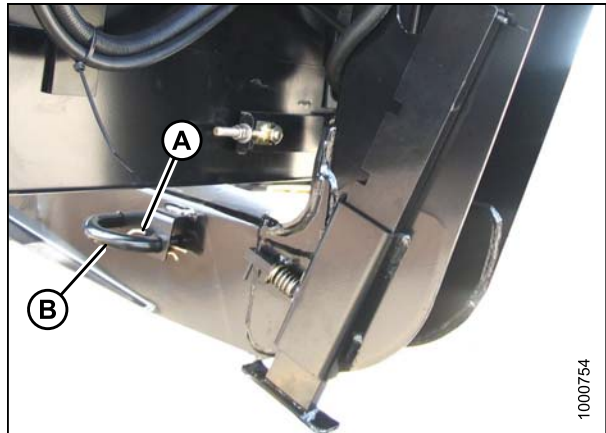


Figure 4.129

OPERATION



CAUTION

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

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

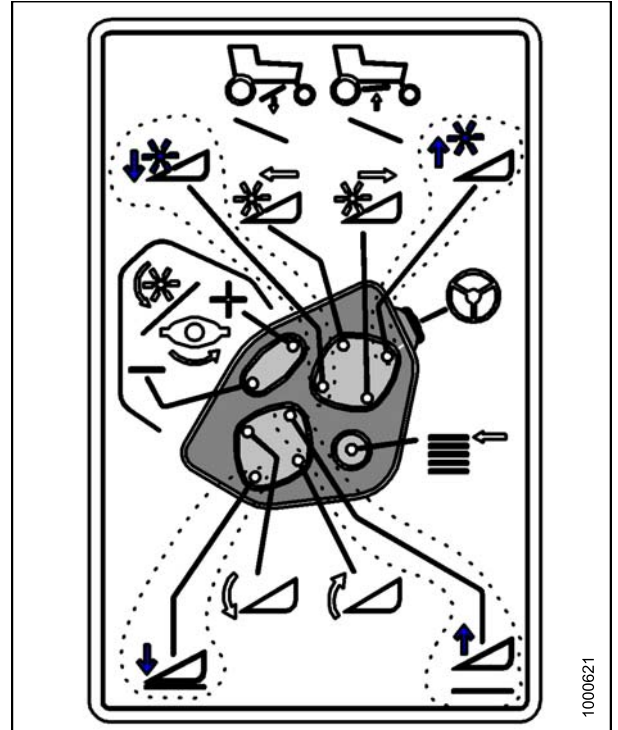


Figure 4.130

IMPORTANT

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

3. Slowly drive windrower forward so that boots (A) enter header legs (B). Continue to drive slowly forward until lift linkages contact support plates in the header legs, and header nudges forward.
4. Ensure that lift linkages are properly engaged in header legs, contacting support plates.

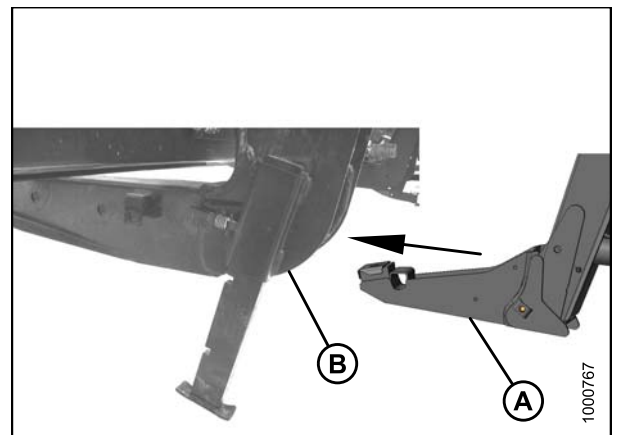


Figure 4.131

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.

5. Stop engine, and remove key from ignition.
6. Loosen nut (A), and rotate barrel (B) to adjust length so that the link lines-up with header bracket.
7. Install pin (C), and secure with cotter pin (D).
8. 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 again to be sure all bystanders have cleared the area.

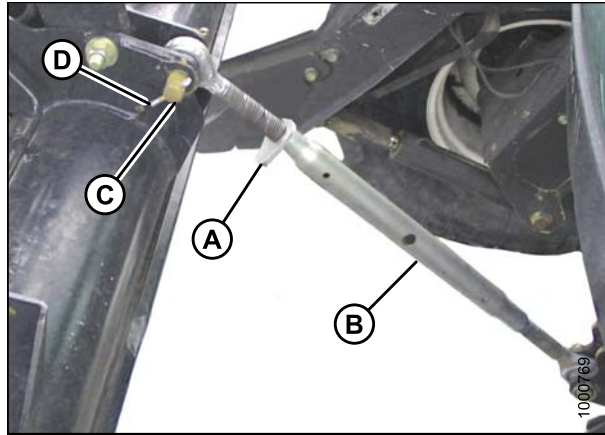


Figure 4.132

9. Start engine, and press HEADER UP switch to raise header to maximum height.
10. If one end of the header does not raise fully, the lift cylinders require re-phasing. If re-phasing is needed, proceed as follows:
 - a. Press and hold the HEADER UP switch until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds.
 - c. Cylinders are phased.

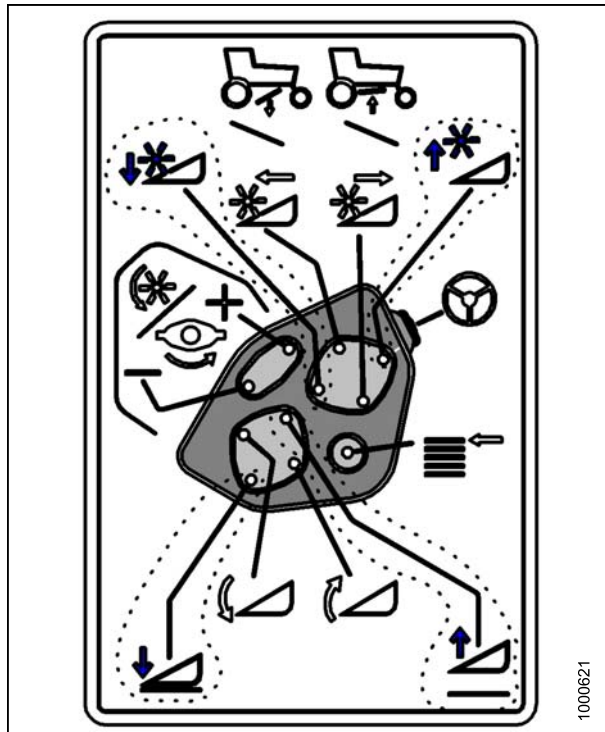


Figure 4.133

OPERATION

11. Start engine, and press HEADER UP switch to raise header to maximum height.
12. If one end of the header does not raise fully, the lift cylinders require re-phasing. If re-phasing is needed, proceed as follows:
 - a. Press and hold the HEADER UP switch until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds.
 - c. Cylinders are phased.

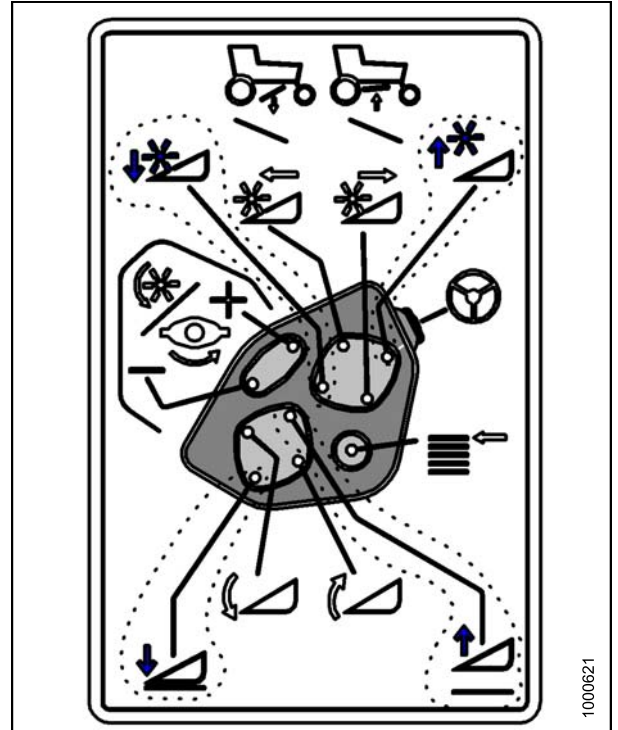


Figure 4.134

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

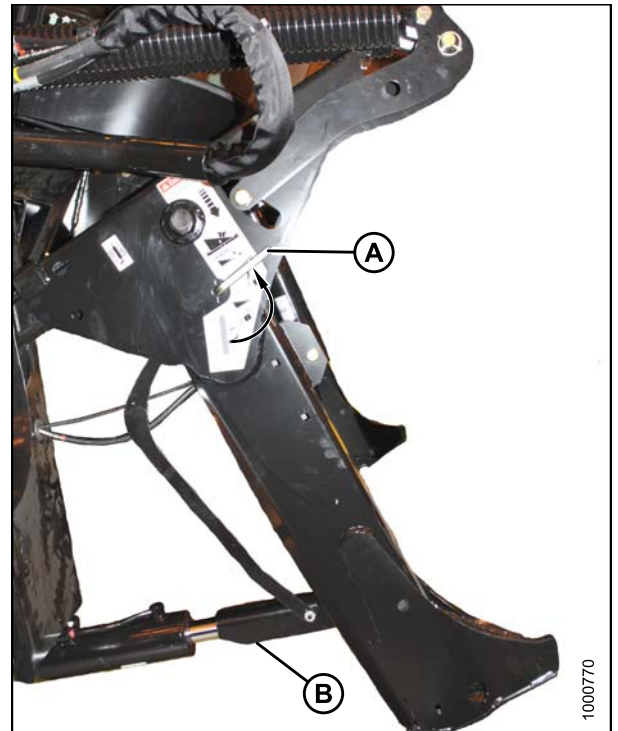


Figure 4.135

OPERATION

14. Install pin (B) through header leg, (engaging U-bracket in lift linkage) on both sides, and secure with hairpin (A).
15. Raise header stand (D) to storage position by pulling pin (C), and lifting stand into uppermost position. Release pin (C).

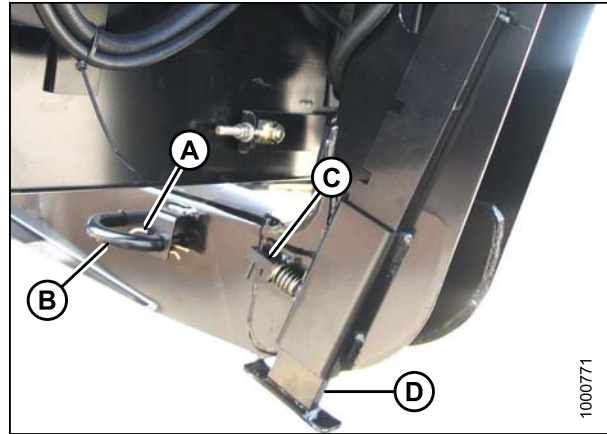


Figure 4.136

16. Remove pin from storage position (B) in linkage, and insert in hole (A) to engage float springs. Secure with hairpin.

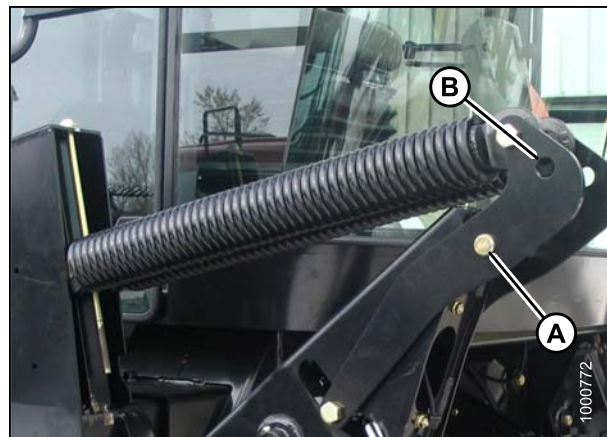


Figure 4.137

17. To disengage lift cylinder stops, turn lever (A) away from header to raise stop until lever locks into vertical position. Repeat for both lift cylinders.
18. Start engine, choose a level area, and lower header to the ground. Stop engine, and remove key.

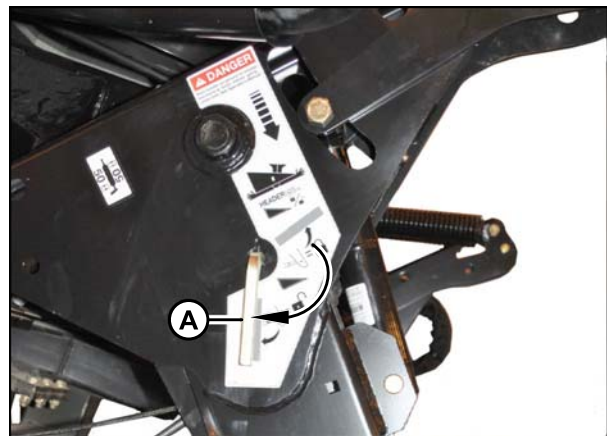


Figure 4.138

OPERATION



CAUTION

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

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



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.

20. Connect header drive hoses (A) and electrical harness (B) to header. Refer to the draper header operator's manual.

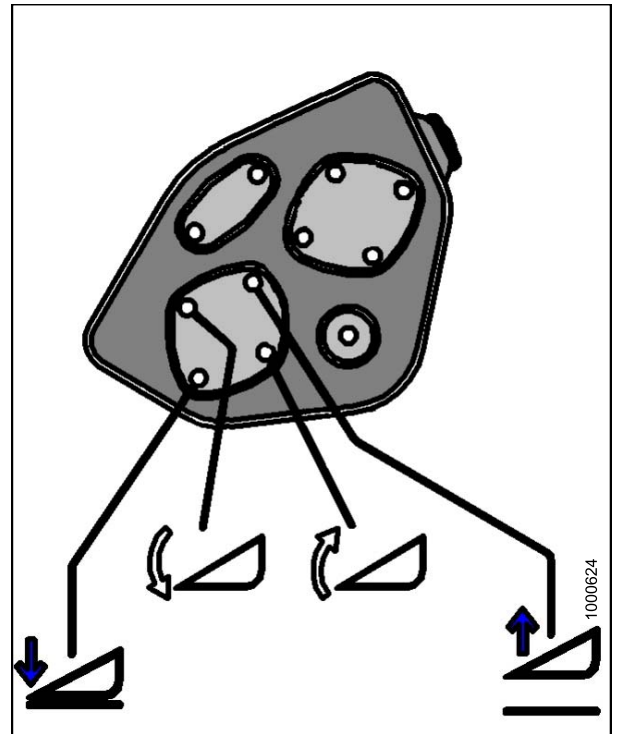


Figure 4.139

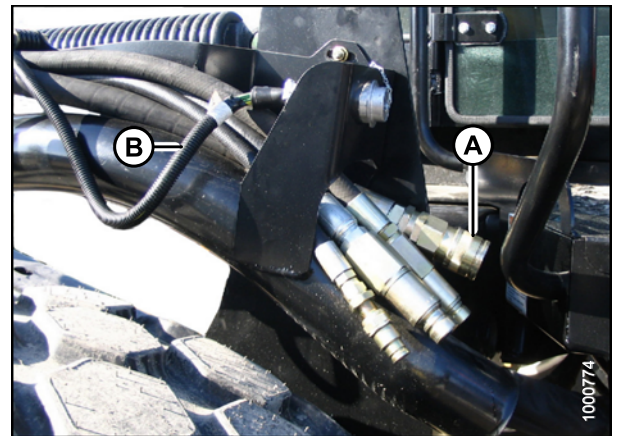


Figure 4.140

OPERATION

21. Connect reel hydraulics (A) at RH side of windrower.
Refer to the draper header operator's manual.

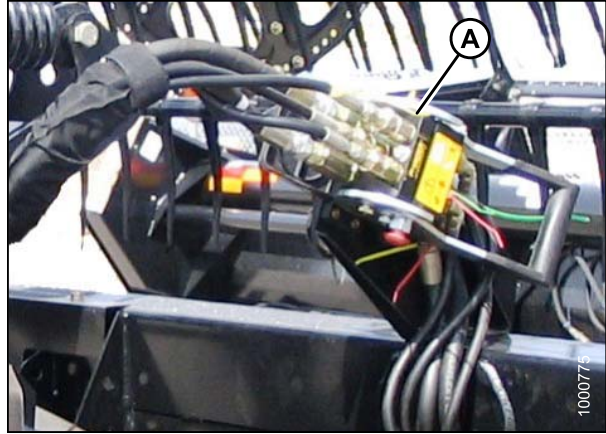


Figure 4.141

Re-phasing Lift Cylinder

1. Start engine, and press HEADER UP switch to raise header to maximum height.
2. If one end of the header does not raise fully, the lift cylinders require re-phasing. If re-phasing is needed, proceed as follows:
 - a. Press and hold the HEADER UP switch until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds.
 - c. Cylinders are phased.

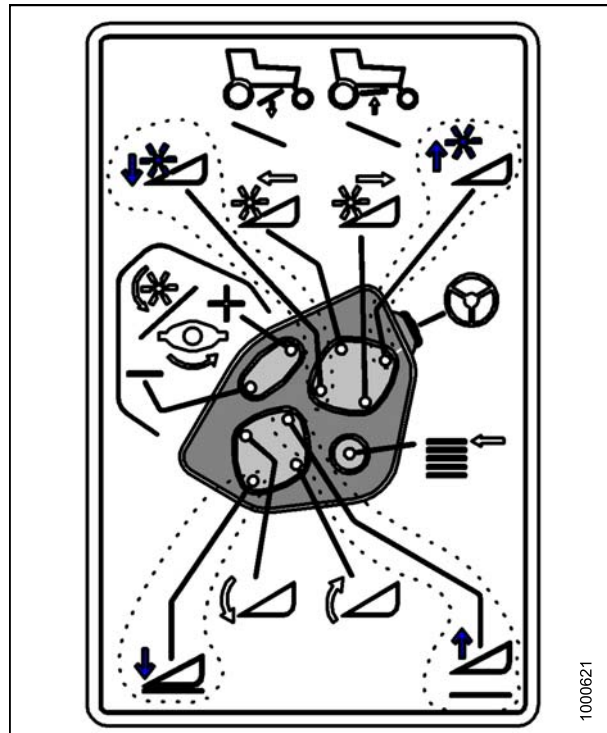


Figure 4.142

OPERATION

4.5.4 Detaching a D-Series Header

Hydraulic Link

1. Start engine, and press HEADER UP switch to raise header to maximum height.
2. If one end of the header does not raise fully, the lift cylinders require re-phasing. If re-phasing is needed, proceed as follows:
 - a. Press and hold the HEADER UP switch until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds.
 - c. Cylinders are phased.
3. Stop engine, and remove key

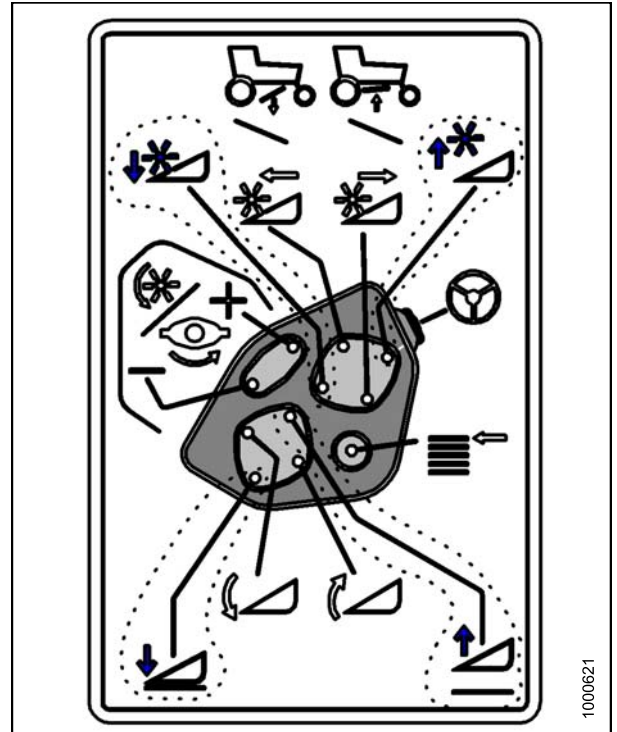


Figure 4.143

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

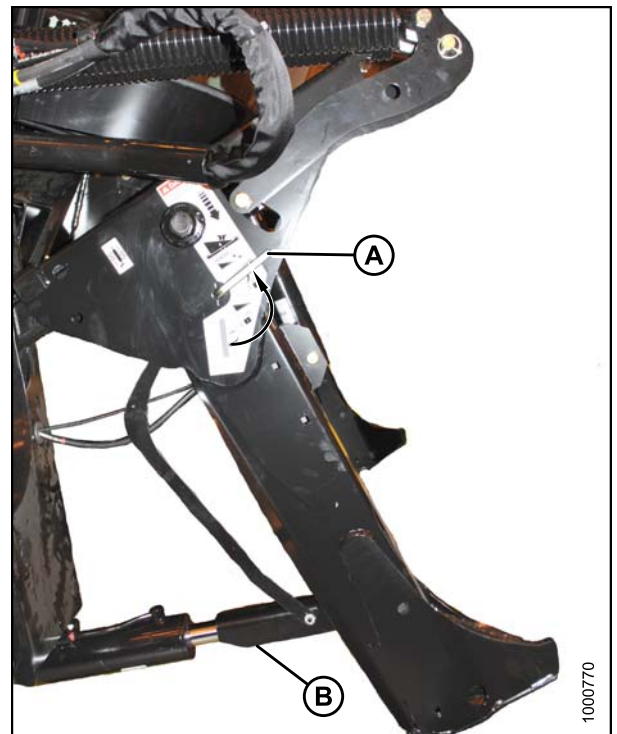


Figure 4.144

OPERATION

5. Remove pin (B) by removing hairpin (A) from header leg on both sides.
6. Lower header stand (D) by pulling spring loaded pin (C). Release pin to lock stand.

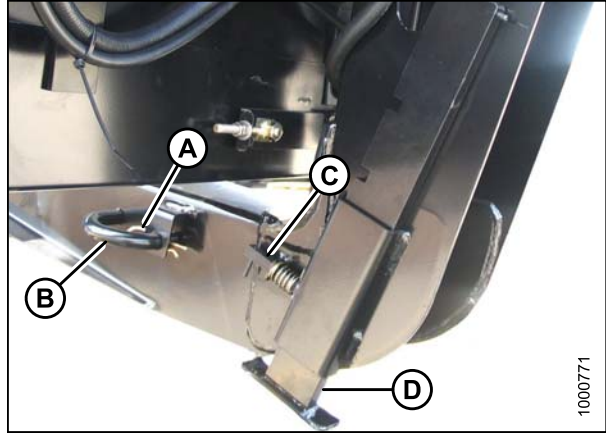


Figure 4.145

7. Remove pin from location (A) to disengage float springs, and insert in storage hole (B). Secure with lynch pin.

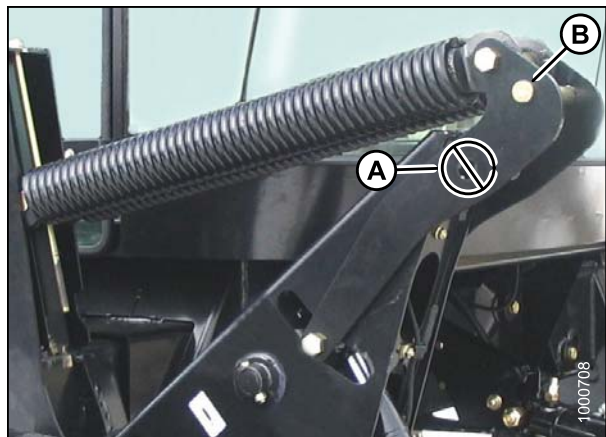


Figure 4.146

OPERATION

CAUTION

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 (B), and NOT installed at hole location (A).

8. To disengage lift cylinder stops, turn lever (A) away from header to raise stop until lever locks into vertical position. Repeat for both lift cylinders.
9. Start engine, choose a level area, and lower header to the ground. Stop engine, and remove key.
10. Disconnect header drive hydraulics (A) and electrical harness (B) from header. Refer to the draper header operator's manual.

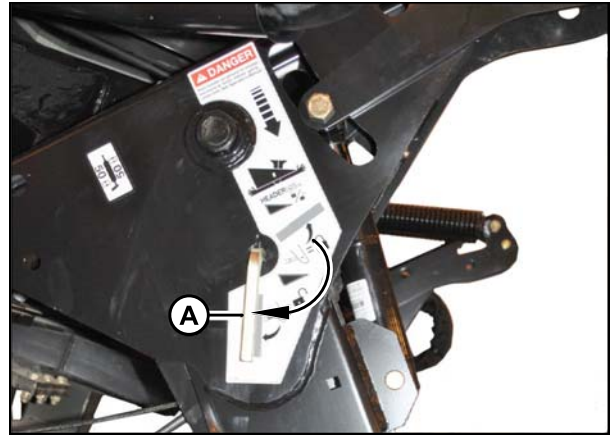


Figure 4.147

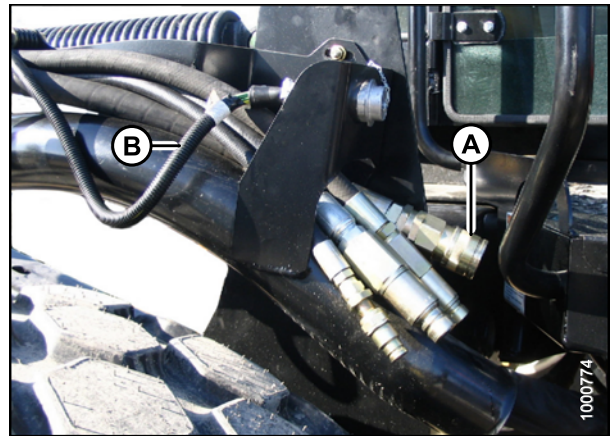


Figure 4.148

OPERATION

11. Disconnect reel hydraulics (A), and store on bracket at windrower LH side.

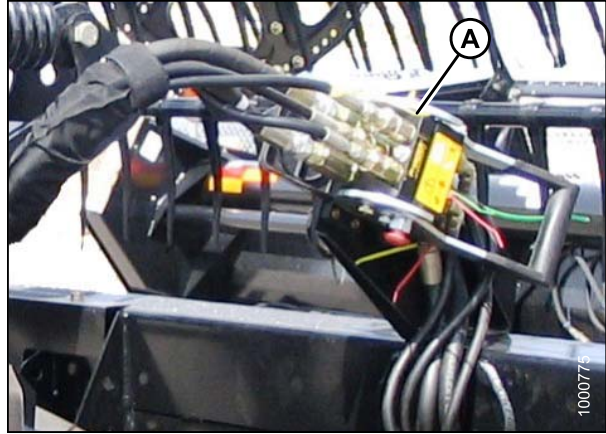


Figure 4.149

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

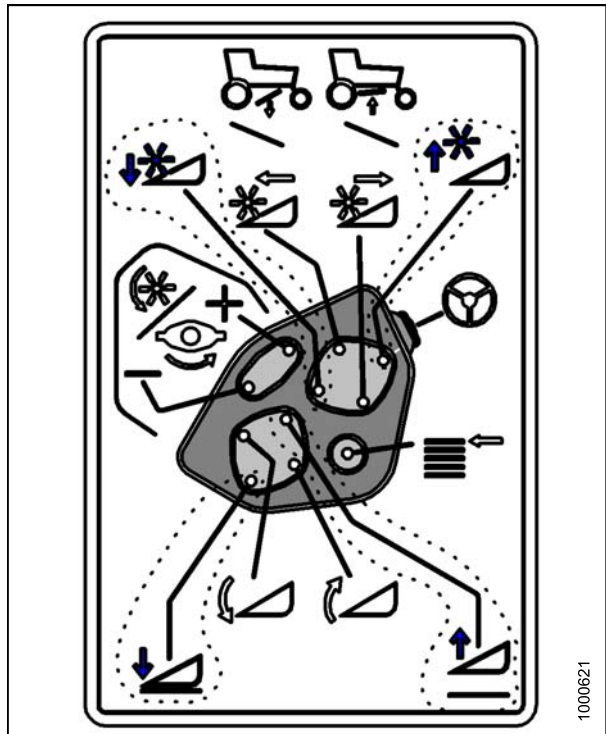


Figure 4.150

OPERATION

13. Disconnect center-link by lifting release (B), and lift hook (A) off header.

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

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

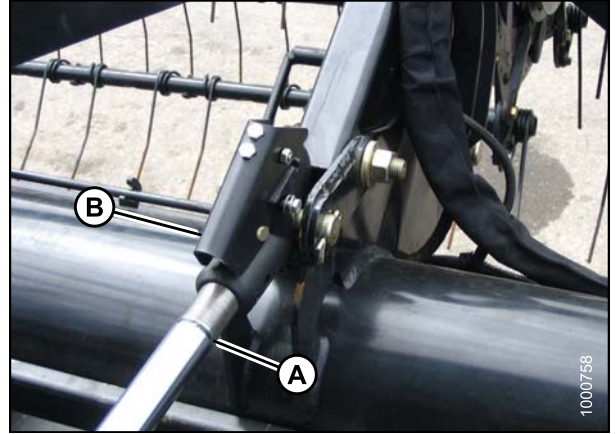


Figure 4.151

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

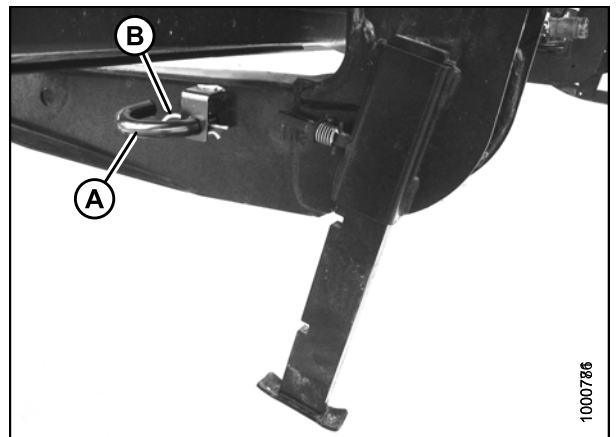


Figure 4.152

OPERATION

Mechanical Link (Optional)

1. Start engine, and press HEADER UP switch to raise header to maximum height.
2. If one end of the header does not raise fully, the lift cylinders require re-phasing. If re-phasing is needed, proceed as follows:
 - a. Press and hold the HEADER UP switch until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds.
 - c. Cylinders are phased.
3. Stop engine, and remove key from ignition.

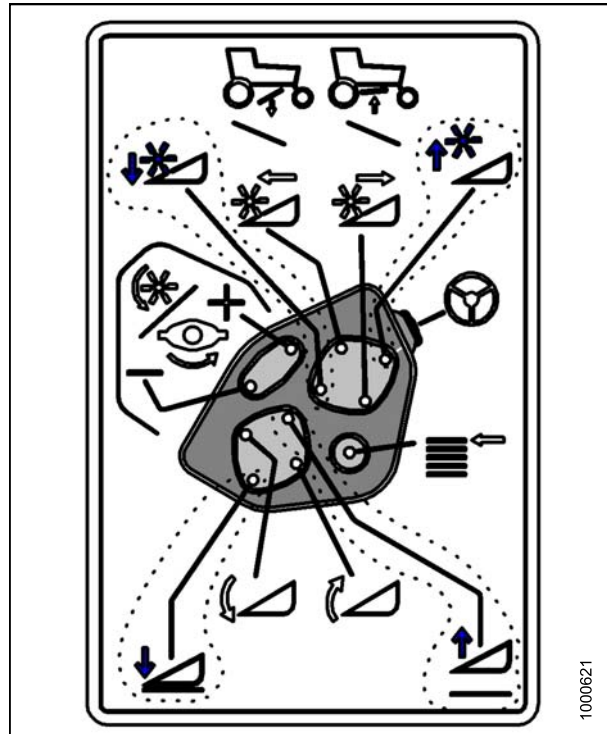


Figure 4.153

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

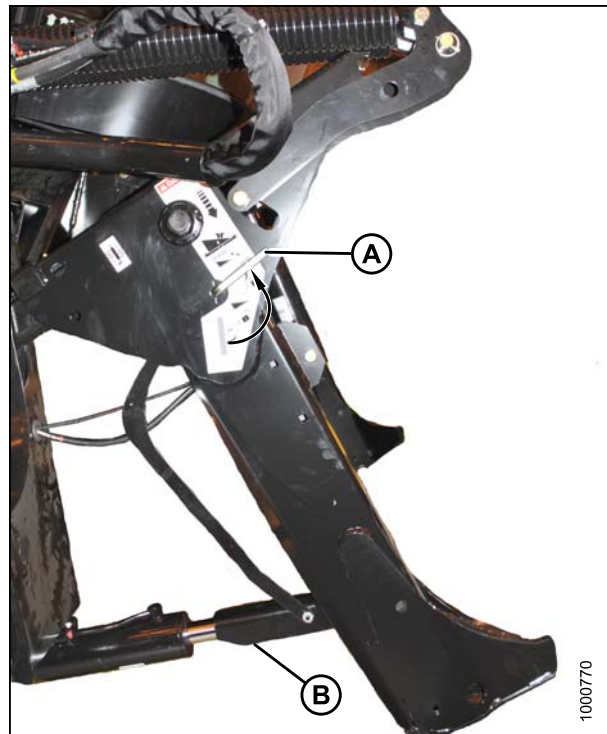


Figure 4.154

OPERATION

5. Remove pin (B) by removing hairpin (A) from header leg on both sides.
6. Lower header stand (D) by pulling spring loaded pin (C). Release pin to lock stand.

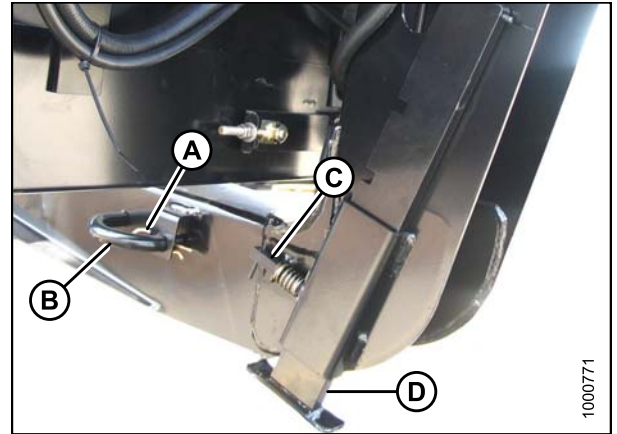


Figure 4.155

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



CAUTION

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 (B), and NOT installed at hole location (A).

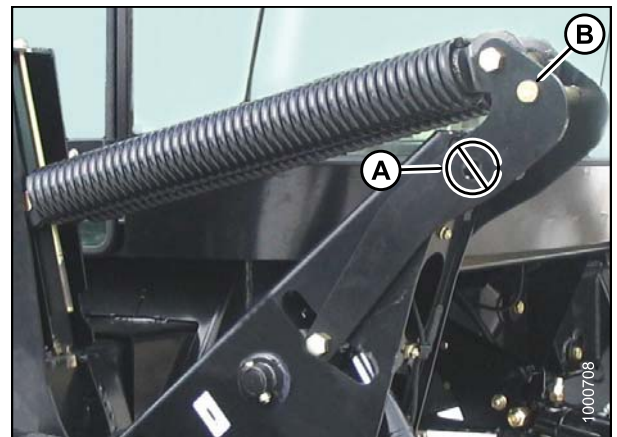


Figure 4.156

8. To disengage lift cylinder stops, turn lever (A) away from header to raise stop until lever locks into vertical position. Repeat for both lift cylinders.
9. Start engine, choose a level area, and lower header to the ground. Stop engine, and remove key.

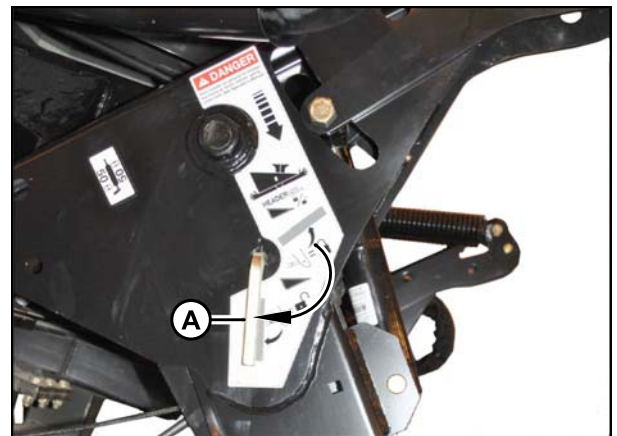


Figure 4.157

OPERATION

10. Disconnect header drive hydraulics (A) and electrical harness (B) from header. Refer to the draper header operator's manual.

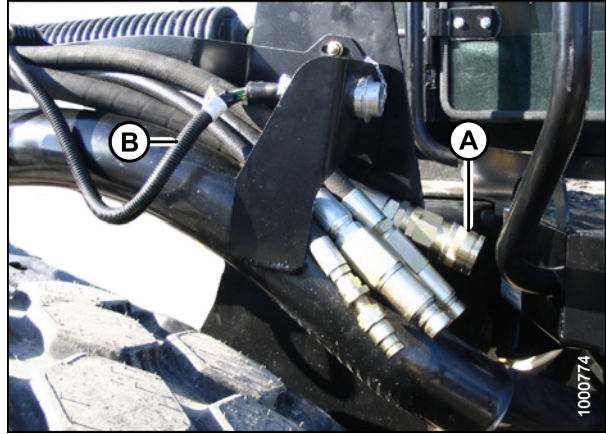


Figure 4.158

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

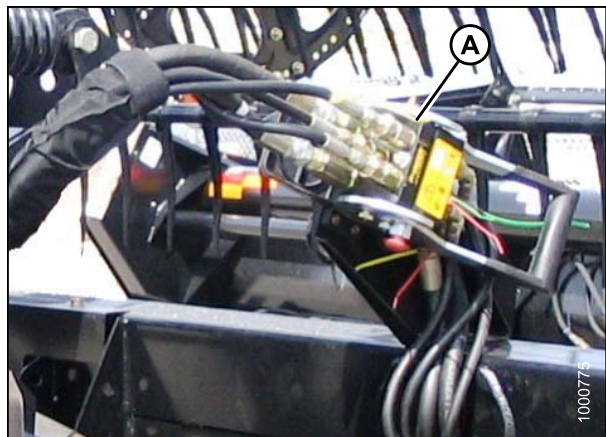


Figure 4.159

12. Loosen nut (A), and rotate barrel (B), to relieve load on link.
13. Remove cotter pin on pin (D), and remove pin (C) to disconnect from windrower. Re-install pin (C) in header.
14. Tighten nut (A) against barrel. A slight tap with a hammer is sufficient.

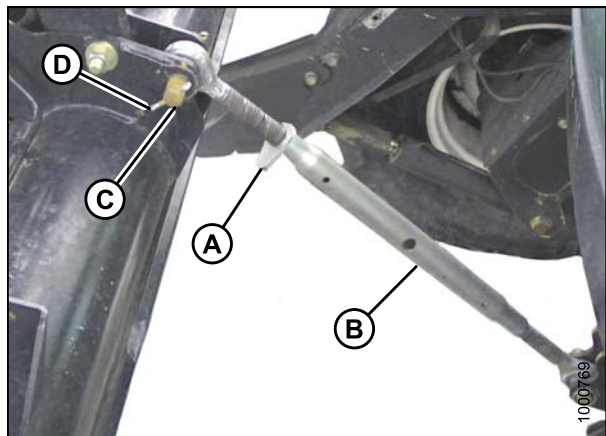


Figure 4.160

OPERATION

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

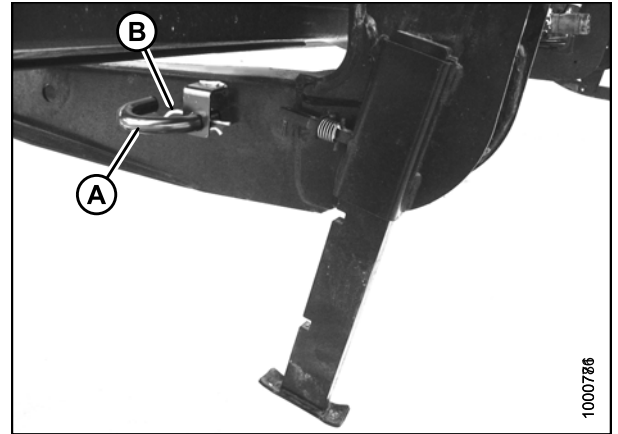


Figure 4.161

4.5.5 Header Position

Refer to [4.4 Operating with a Header](#), page 137 for procedures for controlling header height, header tilt, and float.

4.5.6 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 Window Attachment (DWA) conveyor, and can be activated during programming the CDM.

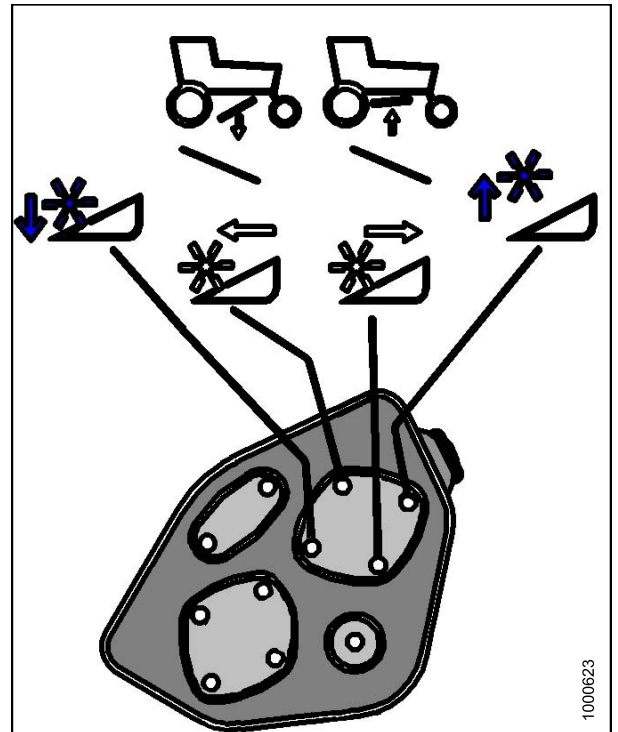


Figure 4.162

OPERATION

4.5.7 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.

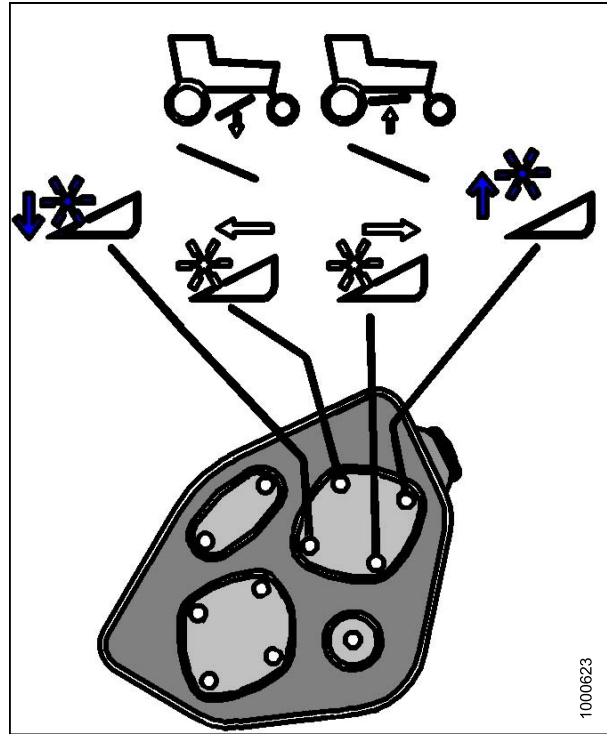


Figure 4.163

4.5.8 Reel Speed

The reel speed 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.

Reel to Ground Speed

Setting the speed of the reel relative to ground speed using the Header Index function automatically adjusts the reel speed with changes in ground speed. Operator fatigue is reduced and more consistent crop flow onto the drapers is achieved.

This mode requires setting the **Minimum Reel Speed** and the **Reel Index**.

IMPORTANT

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

OPERATION



Figure 4.164

A - Display
D - Slow

B - Header Index
E - Display Selector

C - Fast

1. Set the Minimum Reel Speed as follows:
 - a. Engage header.
 - b. Set HEADER INDEX switch (B) to **ON**.
 - c. On GSL press DISPLAY SELECTOR (E) to display **###.### MIN REEL**, or press FAST (C) or SLOW (D) switch. **###.###** = RPM or MPH or KPH¹⁴.
 - d. Press FAST (C) or SLOW (D) until desired minimum reel speed is displayed.

NOTE: The reel will continue operating at the Minimum Reel Speed setting when ground speed drops below this value. DISPLAY (A) will flash **###.### MIN REEL** (RPM or 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.

2. Set the Reel Index as follows with the windrower operating at normal field speed but greater than Minimum Reel Speed:
 - a. Set HEADER INDEX (B) switch to **ON**.
 - b. On GSL press DISPLAY SELECTOR (E) to display **###.### ##.# REEL IND**, or press FAST (C) or SLOW (D) switch. **###.###** = RPM or MPH or KPH¹⁴, **##.#** = 0.0 to 9.9.
 - c. Press FAST (C) or SLOW (D) until desired reel index is displayed.

14. As per settings in CDM programming

OPERATION

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.

Reel Only Speed



Figure 4.165

A - Display

B - Header Index

C - Reel Fast

D - Reel Slow

E - Display Selector



CAUTION

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

Set the speed of the reel independently of ground speed as follows while operating the windrower:

OPERATION

NOTE: This procedure is similar to changing the draper speed “on the go” with the conveyor speed control switch. See [Draper Speed Independent of Ground Speed, page 194](#). These changes become the new set-points.

1. Set HEADER INDEX (B) to **OFF**.
2. On GSL press REEL FAST (C) or REEL SLOW (D) until desired reel speed is displayed at (A).
3. DISPLAY (A) shows **##.## REEL MPH**.

4.5.9 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.

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.

OPERATION

Draper Minimum Speed



Figure 4.166

A - Display

B - Header Index

C - Draper Fast

D - Draper Slow

E - Display Selector

IMPORTANT

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

Set Draper Minimum Speed as follows:

1. Engage header.
2. Set HEADER INDEX (B) switch to **ON**.
3. Press DISPLAY SELECTOR (E) for **DRAPER MIN**
4. On CDM press SLOW (D) until beep is heard.
5. Display (A) shows **### DRAPER MIN**.¹⁵

15. 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.

OPERATION

Draper Index



Figure 4.167

A - Display

B - Header Index

C - Draper Fast

D - Draper Slow

E - Display Selector

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

1. Set HEADER INDEX switch (B) to **ON**.
2. Press DISPLAY SELECTOR (E) so that **DRAPER INDX** is displayed at (A).
3. On CDM press DRAPER FAST (C) or SLOW (D) until desired index is displayed at (A). Display shows **###.## DRAP IND.**
###.## = MPH or KPH
###.## = -1.9 to +3.0

OPERATION

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.

Draper Speed Independent of Ground Speed

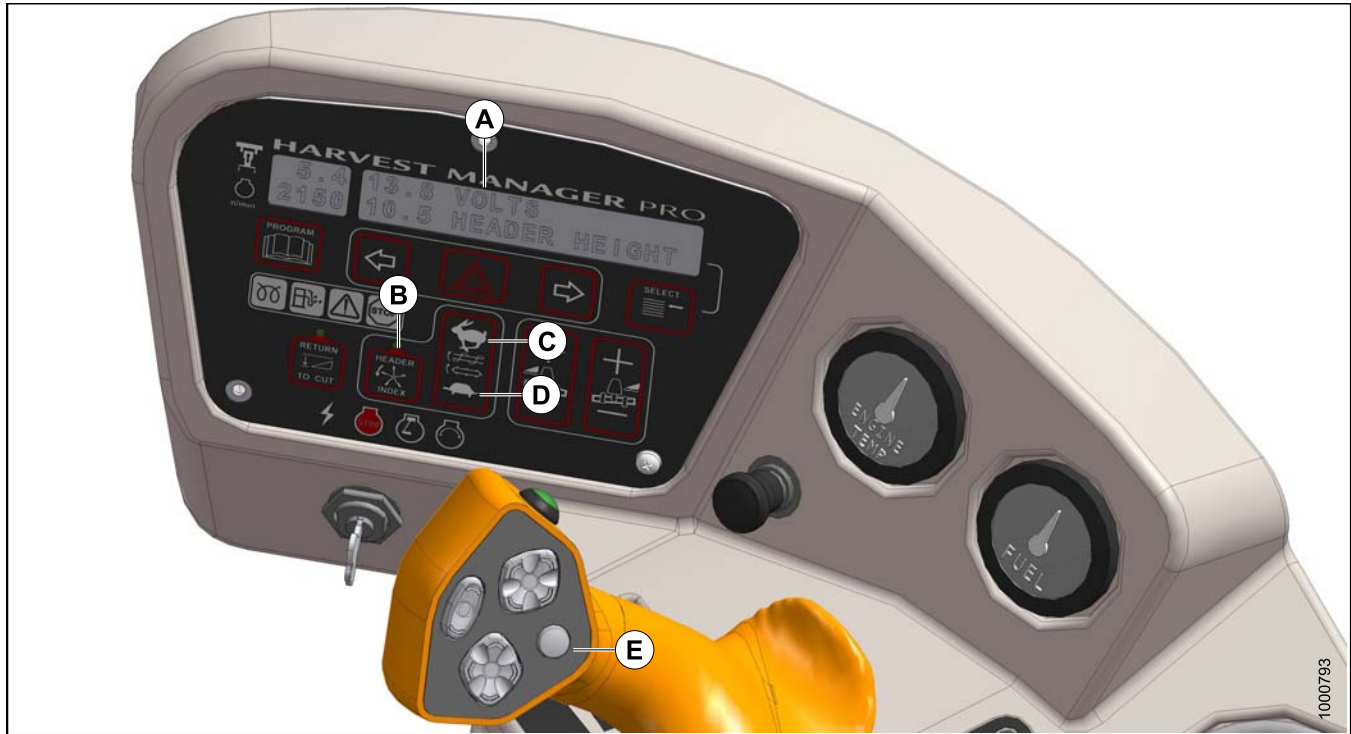


Figure 4.168

A - Display

B - Header Index

C - Draper Fast

D - Draper Slow

E - Display Selector

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.

OPERATION

1. Header engaged.
2. Set HEADER INDEX switch (B) to **OFF**.
3. Press DISPLAY SELECTOR (E) to display at (A) **DRAPER SPEED**.
4. On CDM press **FAST** (C) or **SLOW** (D) until desired draper speed is displayed at (A).
5. Display shows **### DRAPER SPEED**.
= MPH or KPH

4.5.10 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 preset the speed.

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

| Header Description | | Knife Speed ¹⁶ (Strokes Per Minute [SPM]) | |
|--------------------|-----------|--|------|
| Type | Size (FT) | Min | Max |
| Double Knife | 15 | 1500 | 1900 |
| | 20, 25 | 1400 | 1700 |
| | 30 | 1200 | 1600 |
| | 35 | | 1400 |
| | 40 | 1100 | 1400 |
| Single Knife | 20, 25 | 1200 | 1400 |
| | 30 | | 1400 |
| | 35 | 1100 | 1300 |
| | 40 | 1050 | 1200 |

¹⁶. Suggested Overload Setting: 75% of Knife Speed set point.

OPERATION

Knife Speed Setting “On the Go”



Figure 4.169

A - Display

B - Slower

C - Faster

D - Program

E - Select

CAUTION

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

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

1. Header engaged.
2. On CDM press PROGRAM (D) and SELECT (E).
3. DISPLAY (A) shows **#### KNIFE SPM.**
= strokes per minute.
4. Press SLOWER (B) or FASTER (C) until desired knife speed is displayed at (A).

OPERATION

4.5.11 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.

CAUTION

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

Shift decks as follows:

1. Engage header.
2. Push switch (A) to desired delivery position. Deck(s) will move, and direction of drapers will change accordingly.
3. Operate windrower.

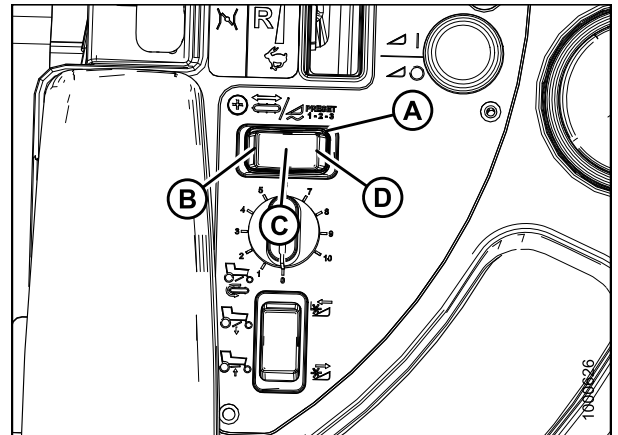


Figure 4.170

A - Deck Shift Switch

B - Left Side Delivery

C - Center Delivery

D - Right Side Delivery

OPERATION

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.

CAUTION

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

Program the float as follows:

1. Engage header.
2. Using HEADER TILT SWITCHES, set center-link to mid-range position (05.0 on DISPLAY).
3. Push DECK SHIFT switch to desired delivery position.
4. Using HEADER DOWN switch, lower header fully with lift cylinders fully retracted.
5. 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).
6. Repeat for right side float with RIGHT switch. DISPLAY will indicate float for both sides, for example (8.0 L FLOAT R 3.0).
7. Select a second deck position with the DECK SHIFT switch.
8. Repeat steps 5., [Float Options with Deck Shift, page 198](#) and 6., [Float Options with Deck Shift, page 198](#) to set the float.
9. Select a third position if desired with the DECK SHIFT switch.

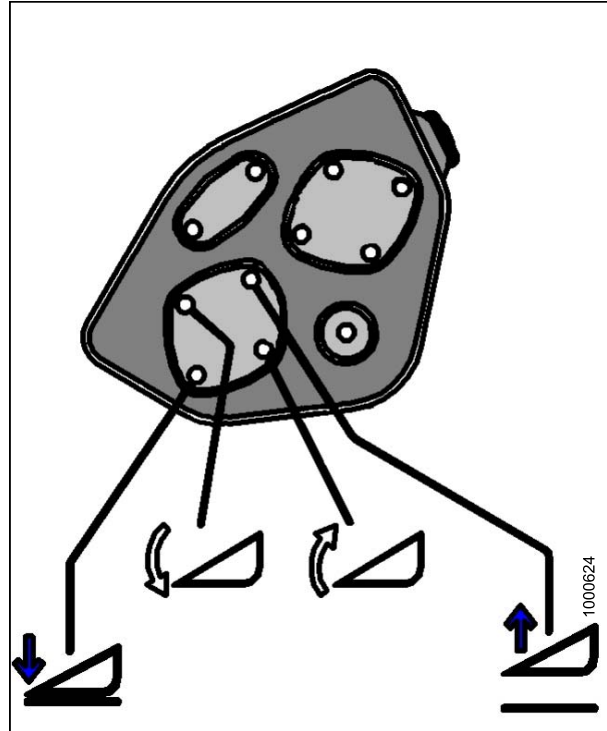


Figure 4.171

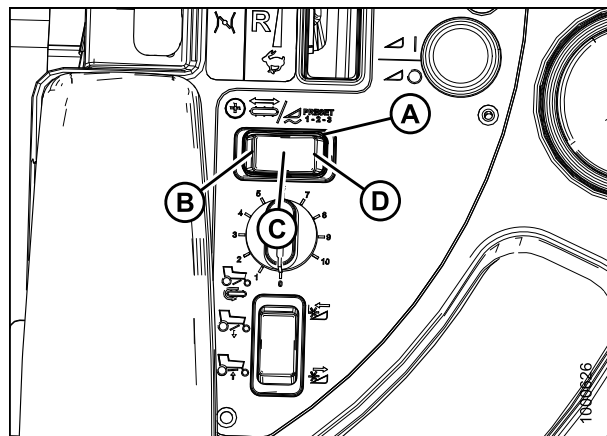


Figure 4.172

A - Deck Shift Switch

B - Left Side Delivery

C - Center Delivery

D - Right Side Delivery

OPERATION

4.6 Operating with an A-Series Header

4.6.1 Attaching an A-Series Header

Hydraulic Link

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

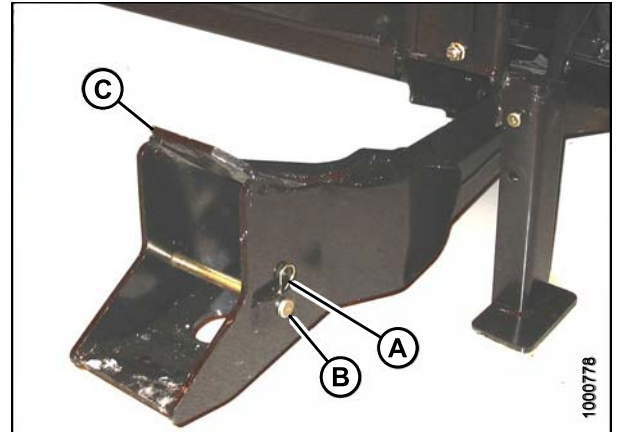


Figure 4.173



CAUTION

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 (B), and NOT installed at hole location (A).



CAUTION

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

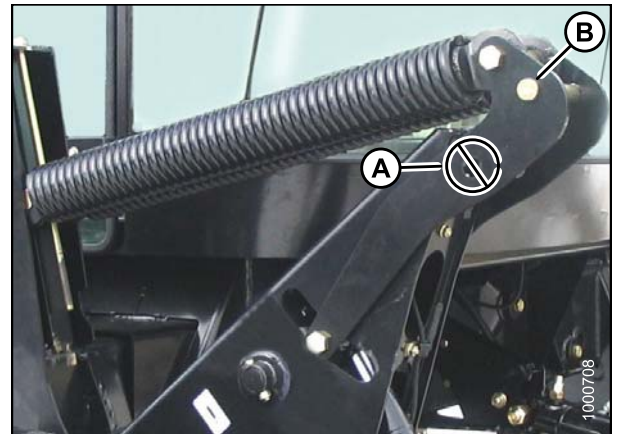


Figure 4.174

OPERATION

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

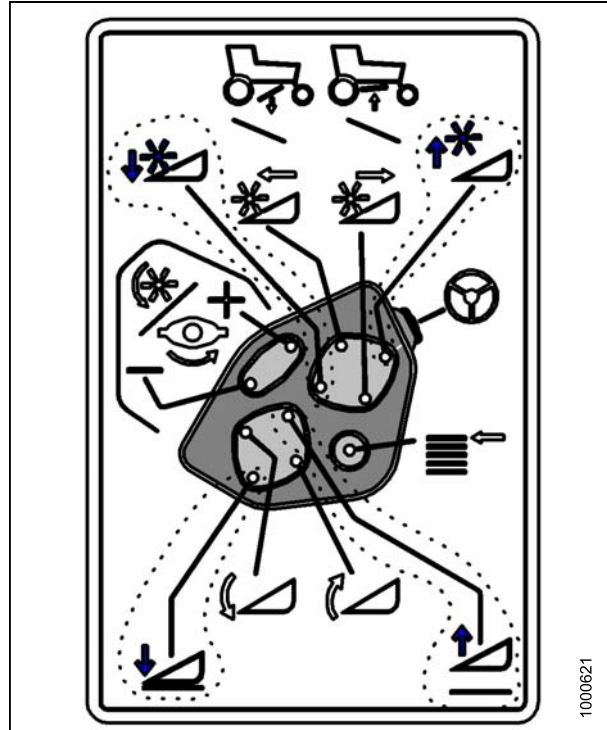


Figure 4.175

IMPORTANT

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

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

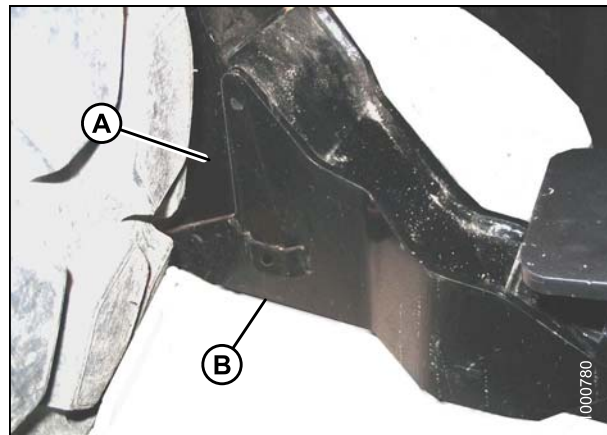


Figure 4.176

OPERATION

4. Activate HEADER TILT cylinder switches on GSL to extend or retract center-link cylinder (C) so that the hook (A) lines-up with the header attachment pin (B).

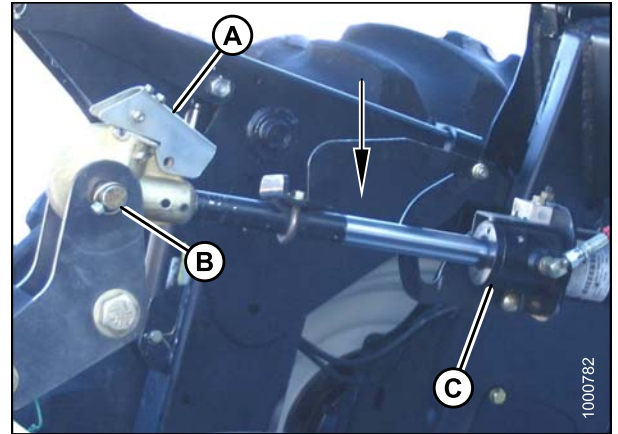


Figure 4.177

5. Relocate the pin (A) at the frame linkage as required to raise the center-link (B).



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.

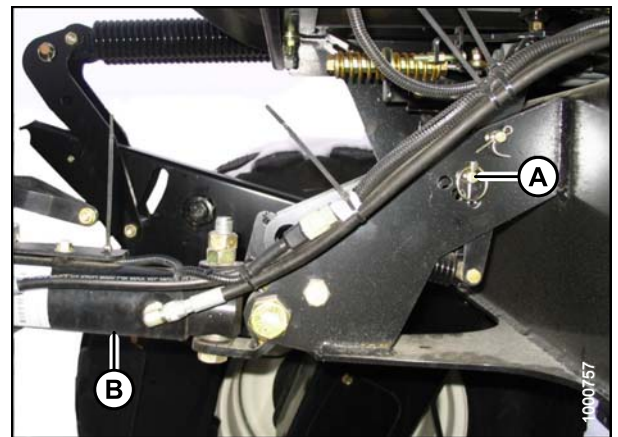


Figure 4.178

6. Stop engine, and remove key from ignition.
7. Push down on rod end of link cylinder (C) until hook engages pin (B) on header, and is hook release is down.

IMPORTANT

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

8. Check that the hook is locked onto header by pulling upward on rod end of cylinder (C).

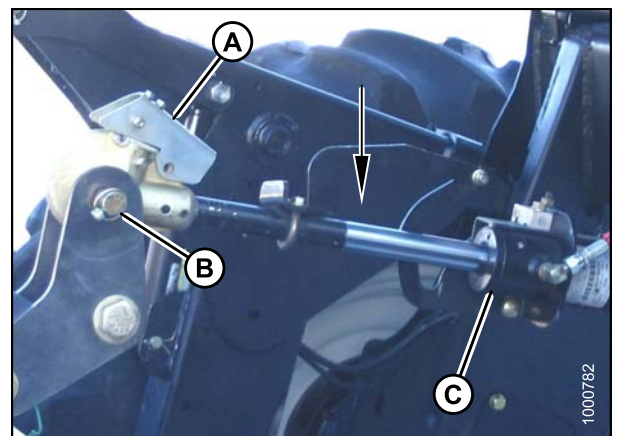


Figure 4.179

OPERATION

9. Start engine, and press HEADER UP switch to raise header to maximum height.
10. If one end of the header does not raise fully, the lift cylinders require re-phasing. If re-phasing is needed, proceed as follows:
 - a. Press and hold the HEADER UP switch until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds.
 - c. Cylinders are phased.

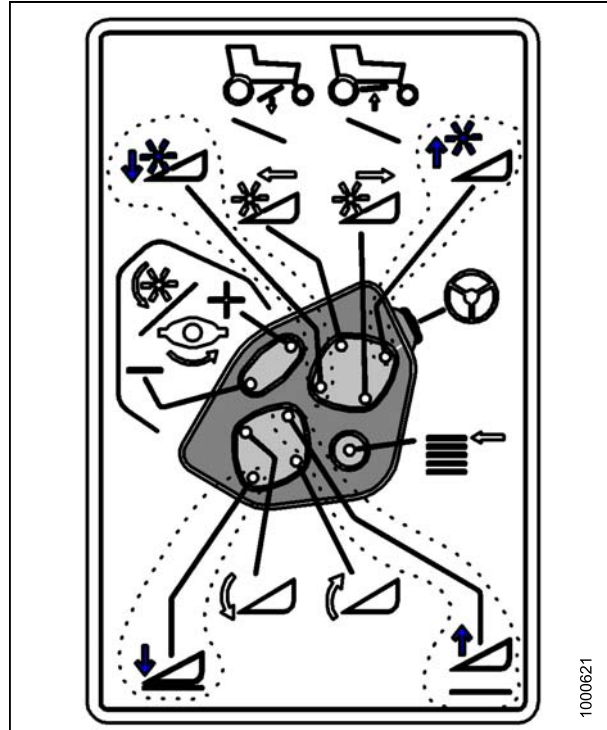


Figure 4.180

11. Pull lever (A), and rotate toward header to release and lower cylinder stop (B) onto cylinder. Repeat for both lift cylinders.
12. Stop engine, and remove key from ignition.

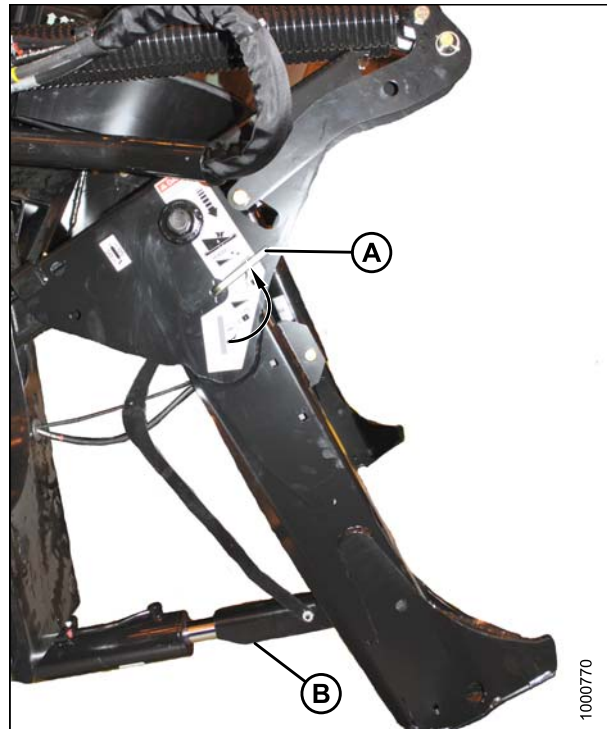


Figure 4.181

OPERATION

13. Install pin (A) through each boot and foot, and secure with hairpin. Do this to both sides.

IMPORTANT

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

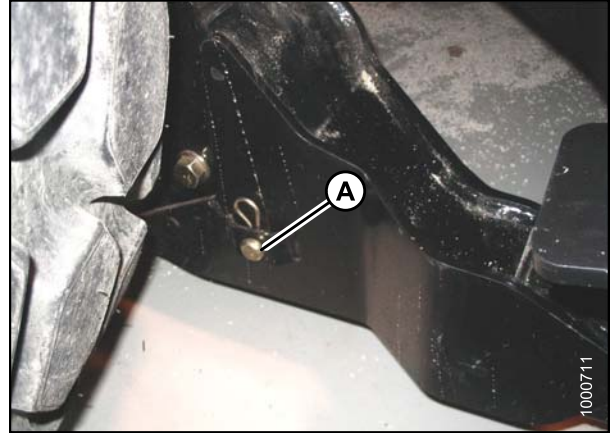


Figure 4.182

14. Remove lynch pin from pin (A) in stand (B).
15. Hold stand (B), and remove pin (A).
16. Re-position stand to storage position by inverting stand, and re-locating on bracket as shown. Re-insert pin (A), and secure with lynch pin.

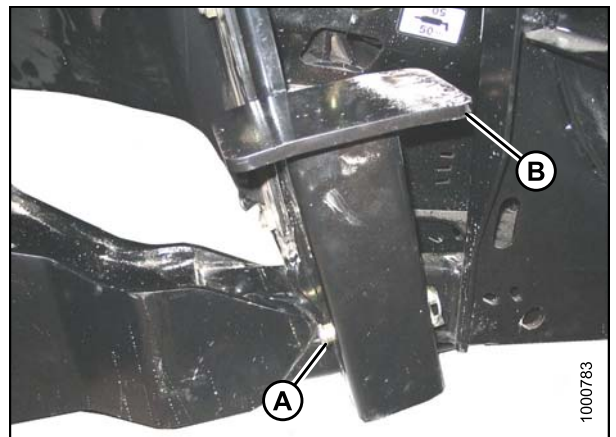


Figure 4.183

17. Remove pin from storage position (B) in linkage, and insert in hole (A) to engage float springs. Secure with hairpin.

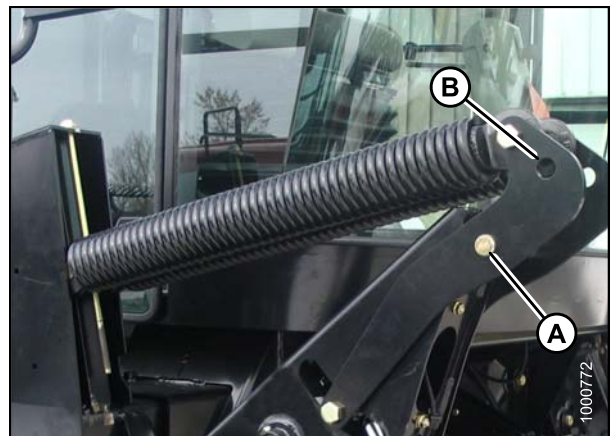


Figure 4.184

OPERATION

18. To disengage lift cylinder stops, turn lever (A) away from header to raise stop until lever locks into vertical position. Repeat for both lift cylinders.
19. Start engine, choose a level area, and lower header to the ground. Stop engine, and remove key.



Figure 4.185

20. Connect header drive hoses (A) and electrical harness (B) to header. Refer to the draper header operator's manual.

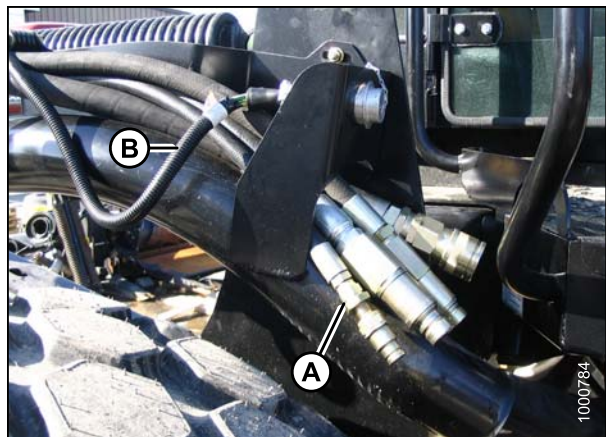


Figure 4.186

Mechanical Link (Optional)

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

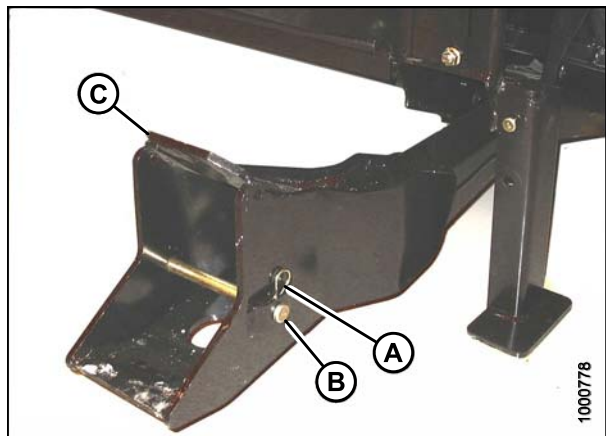


Figure 4.187

OPERATION

CAUTION

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 (B), and NOT installed at hole location (A).

CAUTION

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

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

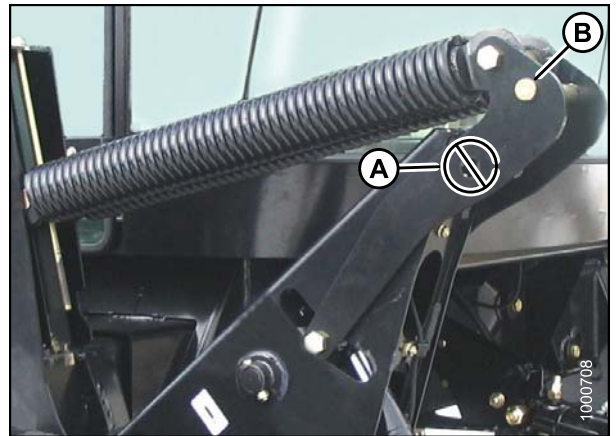


Figure 4.188

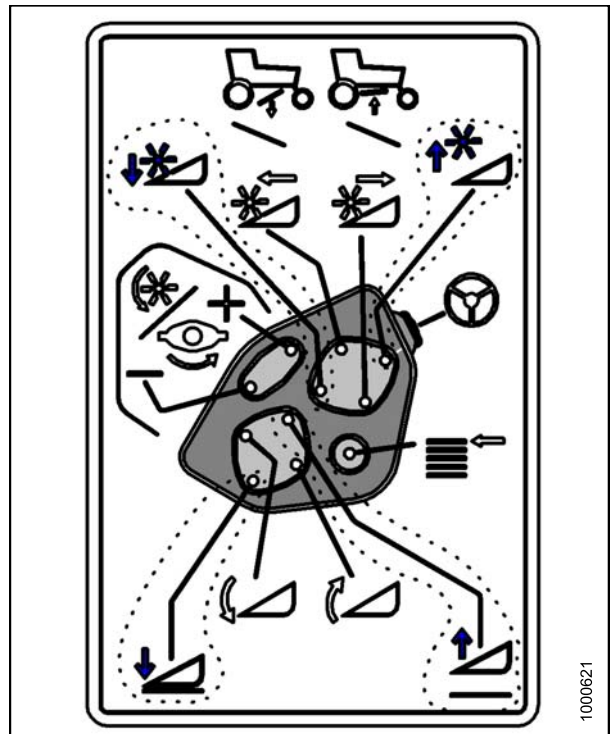


Figure 4.189

OPERATION

IMPORTANT

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

3. Slowly drive windrower forward so that feet (A) on windrower enter boots (B) on the header. Continue to drive slowly forward until feet engage the boots, and header nudges forward.
4. Stop engine, and remove key from ignition.

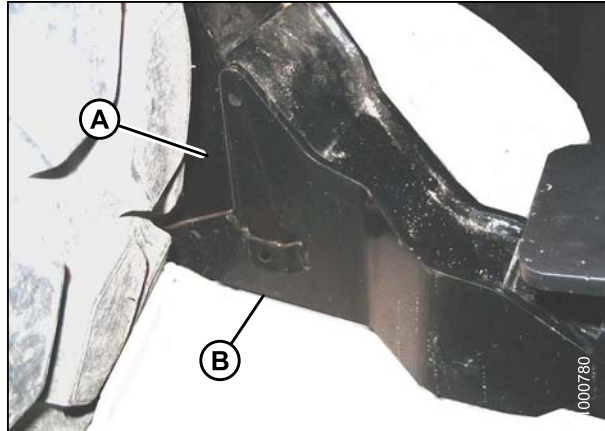


Figure 4.190

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

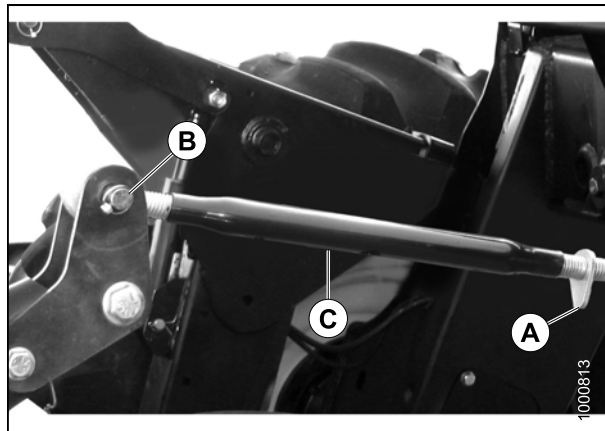


Figure 4.191

OPERATION



CAUTION

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

8. Start engine, and press HEADER UP switch to raise header to maximum height.
9. If one end of the header does not raise fully, the lift cylinders require re-phasing. If re-phasing is needed, proceed as follows:
 - a. Press and hold the HEADER UP switch until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds.
 - c. Cylinders are phased.

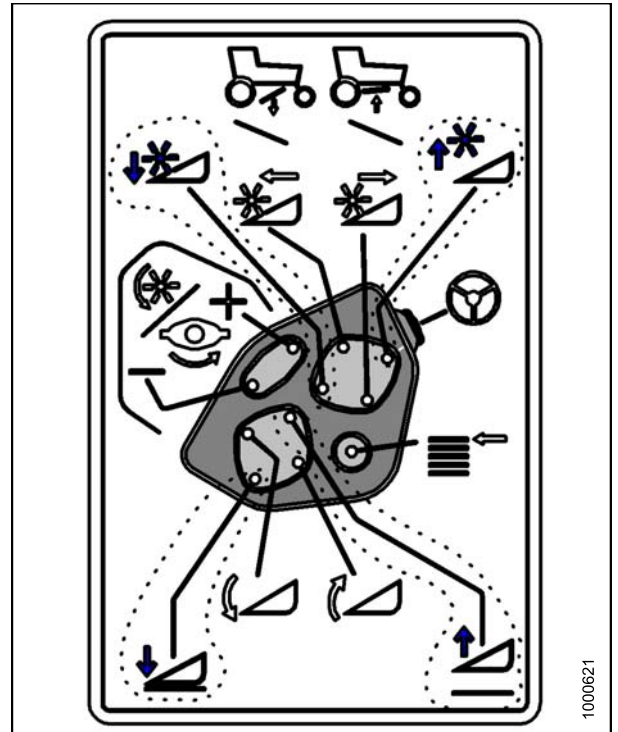


Figure 4.192

OPERATION

10. Pull lever (A), and rotate toward header to release and lower cylinder stop (B) onto cylinder. Repeat for both lift cylinders.
11. Stop engine, and remove key from ignition.

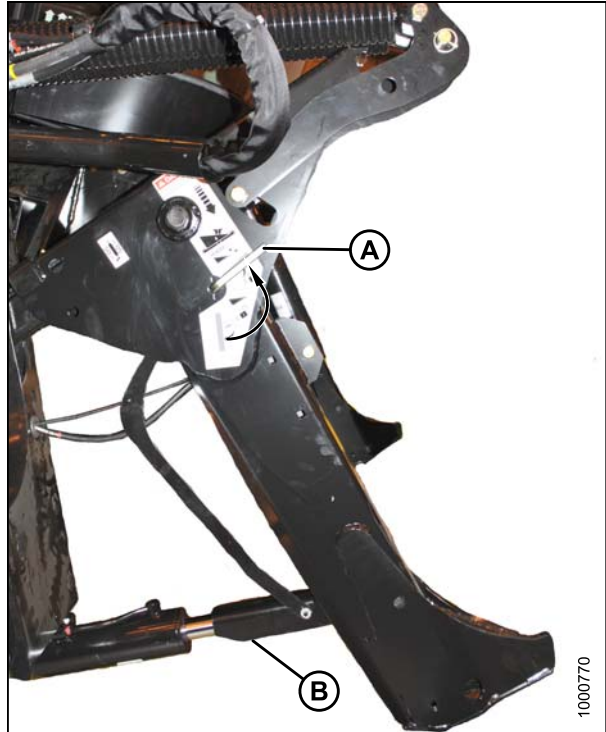


Figure 4.193

12. Install pin (A) through each boot and foot, and secure with hairpin. Do this to both sides.

IMPORTANT

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

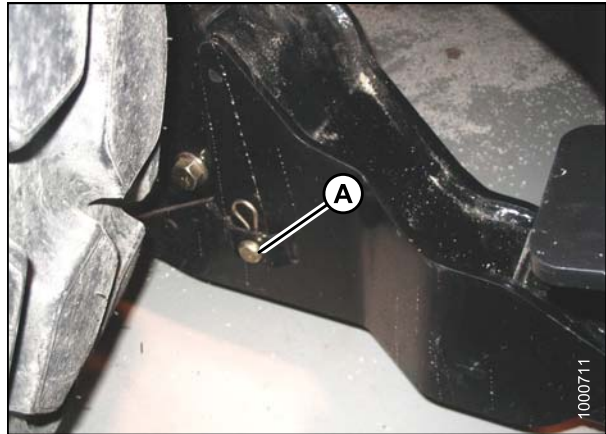


Figure 4.194

OPERATION

13. Remove lynch pin from pin (A) in stand (B).
14. Hold stand (B), and remove pin (A).
15. Re-position stand to storage position by inverting stand, and re-locating on bracket as shown. Re-insert pin (A), and secure with lynch pin.

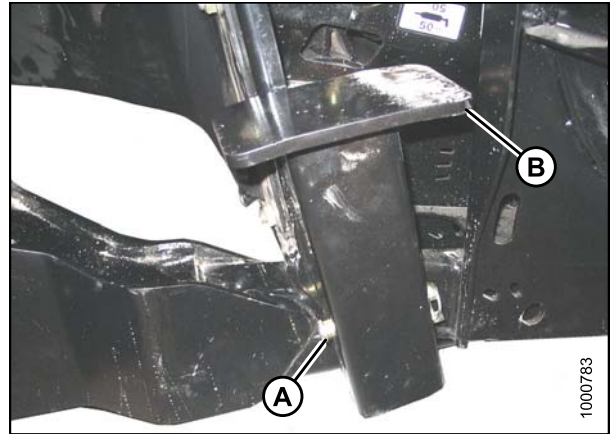


Figure 4.195

16. Remove pin from storage position (B) in linkage, and insert in hole (A) to engage float springs. Secure with hairpin.

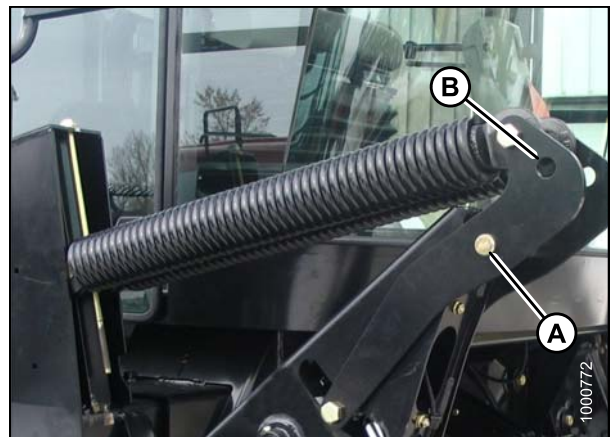


Figure 4.196

17. Disengage lift cylinder stop by turning lever (A) downward to release and lower stop until lever locks into vertical position.
18. Repeat for opposite lift cylinder stop.



Figure 4.197

OPERATION

CAUTION

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

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

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.

21. Connect header drive hoses (A) and electrical harness (B) to header. Refer to the draper header operator's manual.

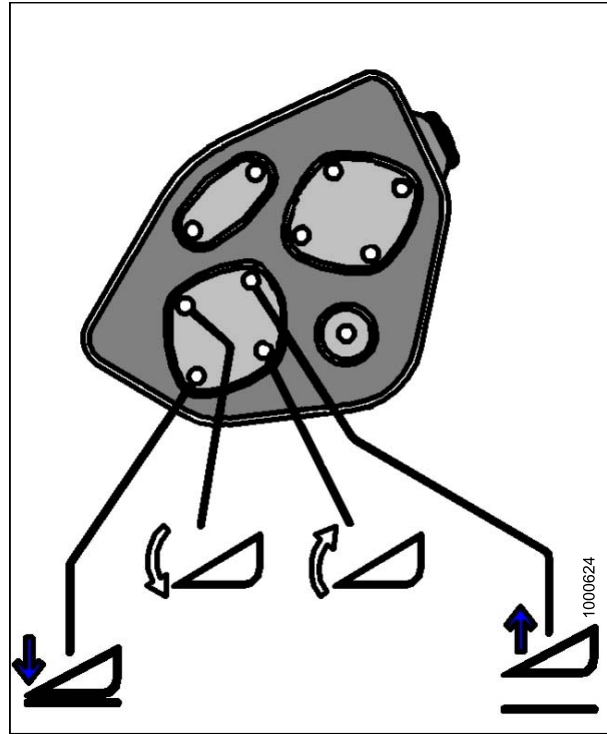


Figure 4.198

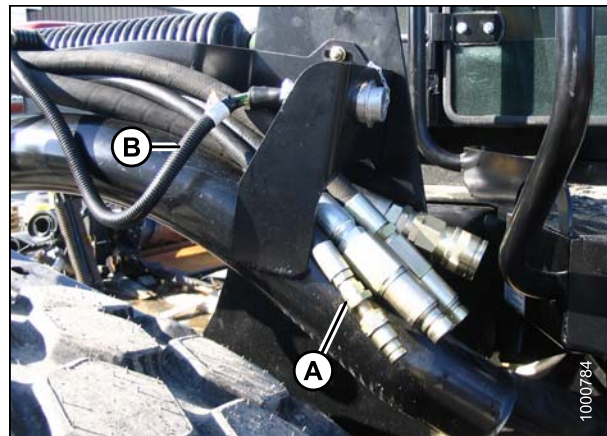


Figure 4.199

OPERATION

Re-phasing Lift Cylinder

1. Start engine, and press HEADER UP switch to raise header to maximum height.
2. If one end of the header does not raise fully, the lift cylinders require re-phasing. If re-phasing is needed, proceed as follows:
 - a. Press and hold the HEADER UP switch until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds.
 - c. Cylinders are phased.

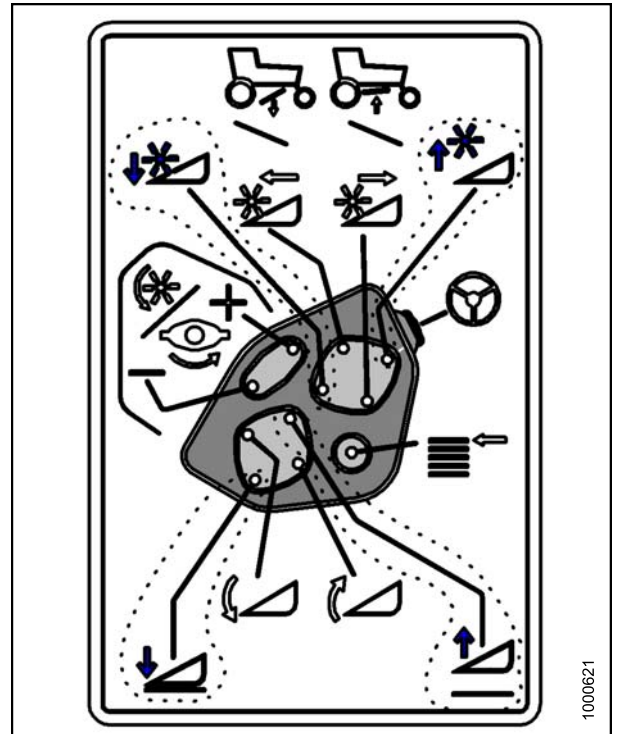


Figure 4.200

OPERATION

4.6.2 Detaching an A-Series Header

Hydraulic Link

1. 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.

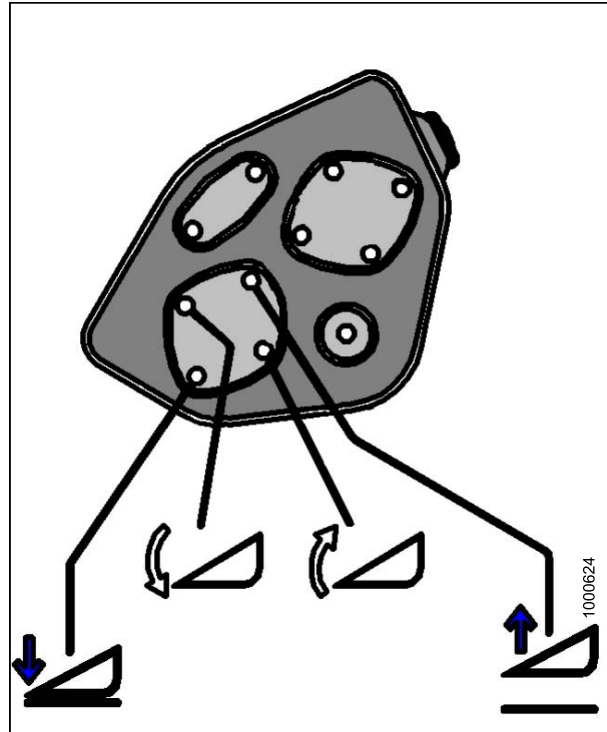


Figure 4.201

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

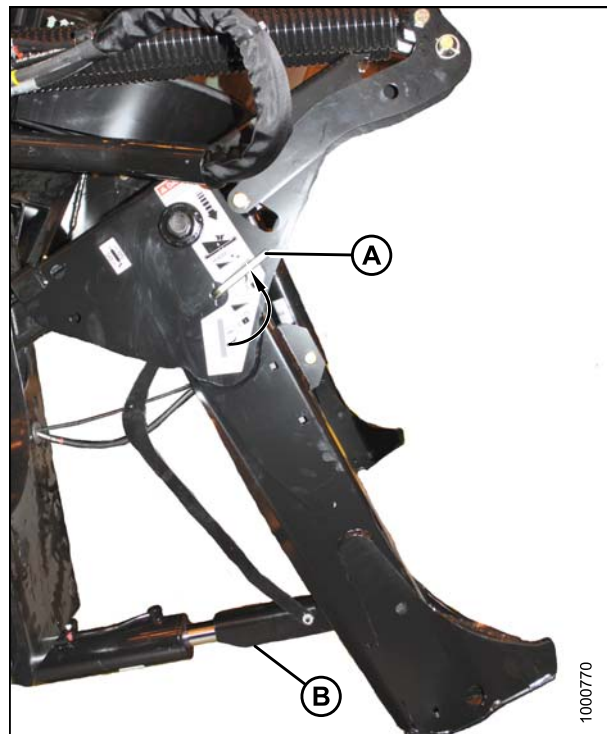


Figure 4.202

OPERATION

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

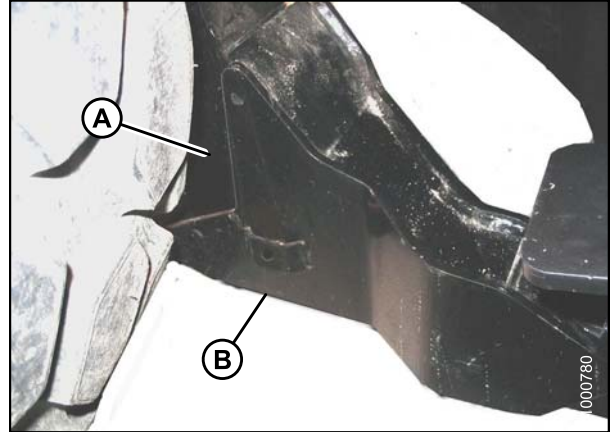


Figure 4.203

4. Lower stand (A) by pulling pin (B), inverting stand, and re-locating on bracket. Re-insert pin (B), and secure with hairpin.

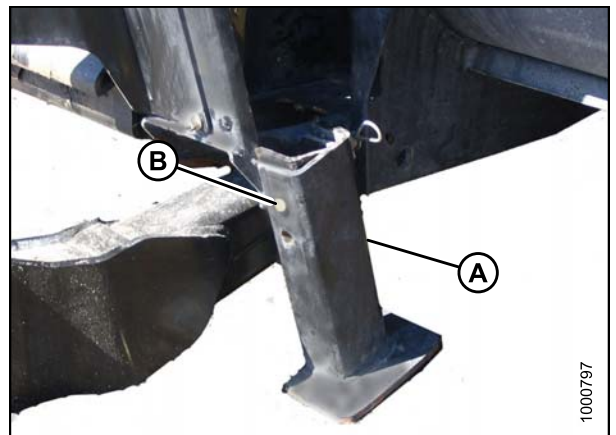


Figure 4.204

5. Remove pin from linkage (A) to disengage float springs, and insert in storage hole (B). Secure with lynch pin. Repeat for opposite linkage.



CAUTION

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 (B), and NOT installed at hole location (A).

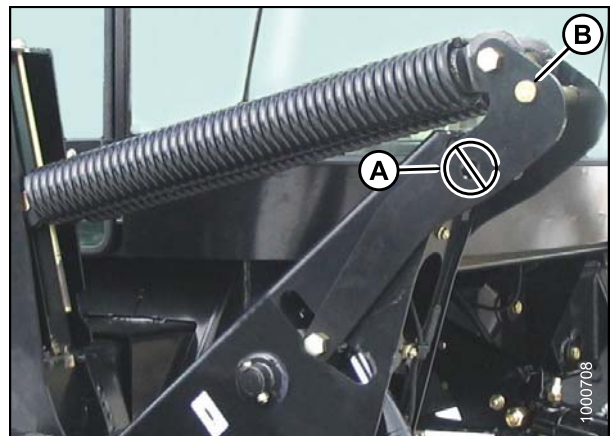


Figure 4.205

OPERATION

6. To disengage lift cylinder stops, turn lever (A) away from header to raise stop until lever locks into vertical position. Repeat for both lift cylinders.
7. Start engine, choose a level area, and lower header to the ground. Stop engine, and remove key.



Figure 4.206

8. Activate HEADER TILT cylinder switches on GSL to release load on center-link cylinder.

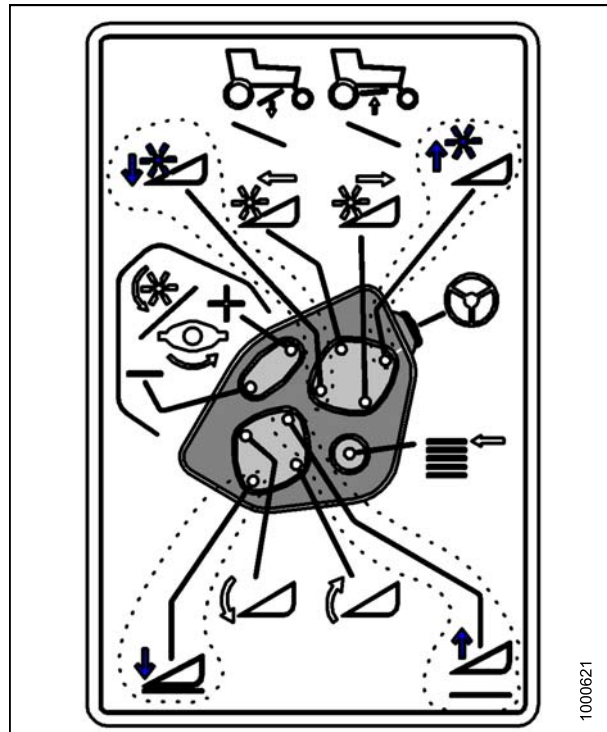


Figure 4.207

OPERATION

- Lift hook release (C), and lift hook (B) off header pin.

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

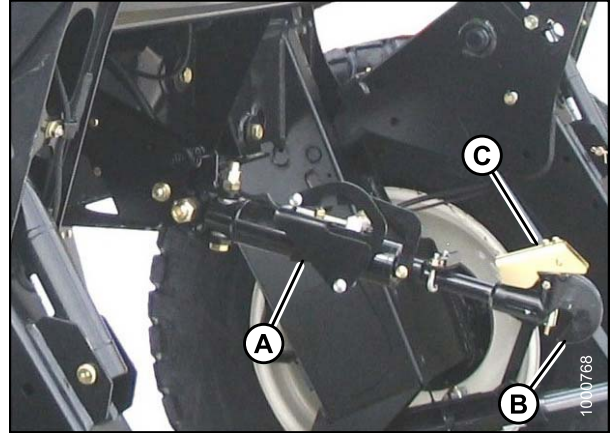


Figure 4.208

- Disconnect header drive hydraulics (A) and electrical harness (B). Refer to the auger header operator's manual.
- Slowly back windrower away from header.

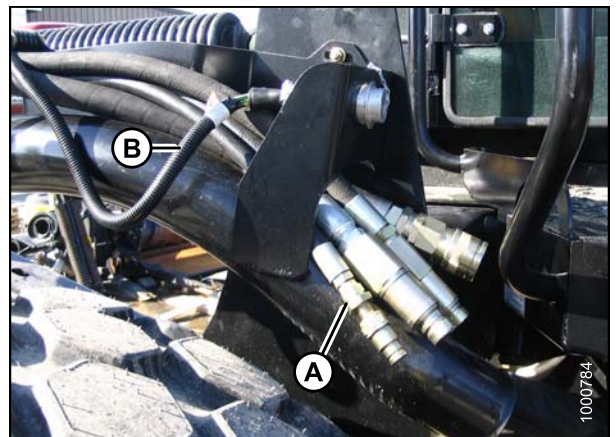


Figure 4.209

- Re-install pins (B), secure with hairpin (A) in header boots (C).

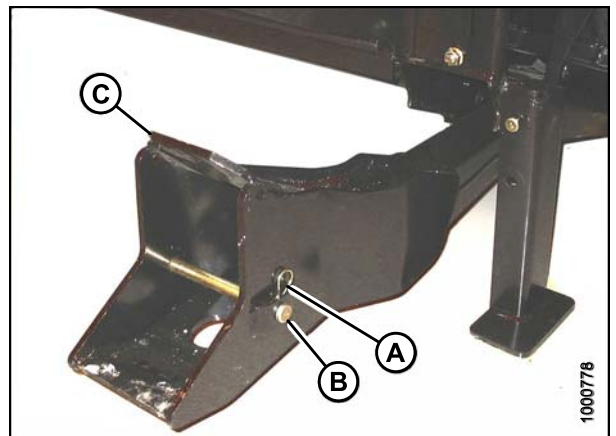


Figure 4.210

OPERATION

Mechanical Link (Optional)

1. Start engine, and press HEADER UP switch to raise header to maximum height.
2. If one end of the header does not raise fully, the lift cylinders require re-phasing. If re-phasing is needed, proceed as follows:
 - a. Press and hold the HEADER UP switch until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds.
 - c. Cylinders are phased.

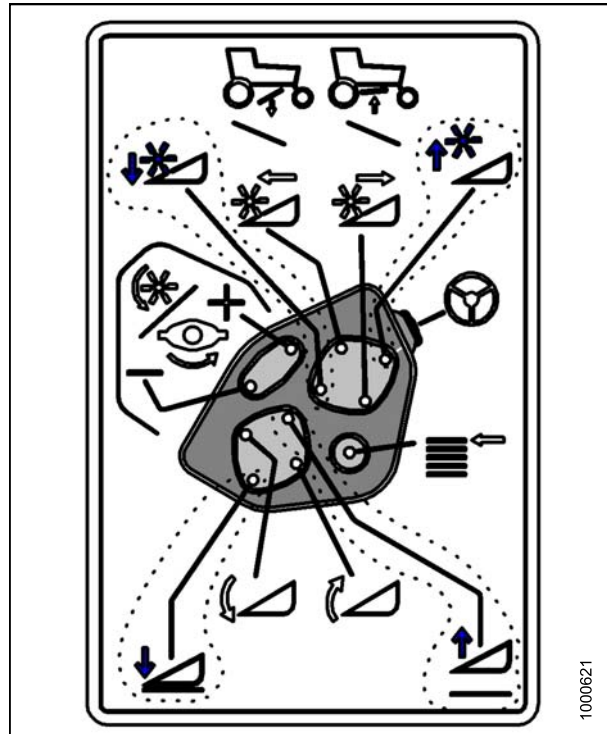


Figure 4.211

3. Pull lever (A), and rotate toward header to release and lower cylinder stop (B) onto cylinder. Repeat for both lift cylinders.
4. Stop engine and remove key from ignition

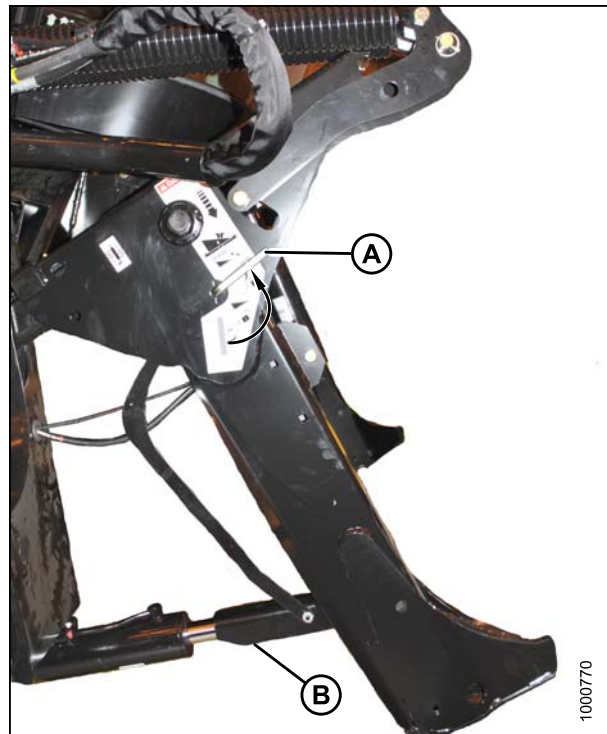


Figure 4.212

OPERATION

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

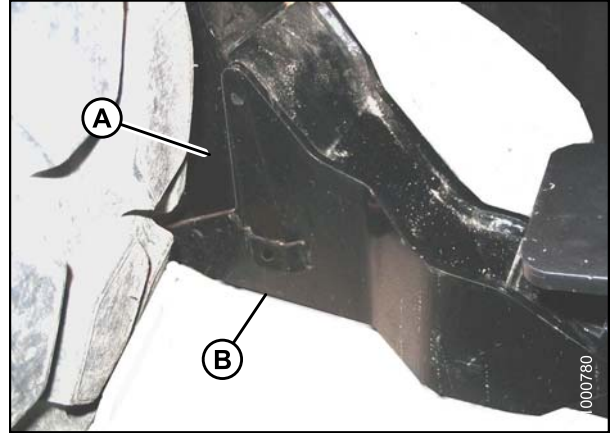


Figure 4.213

6. Lower stand (A) by pulling pin (B), inverting stand, and re-locating on bracket. Re-insert pin (B), and secure with hairpin.

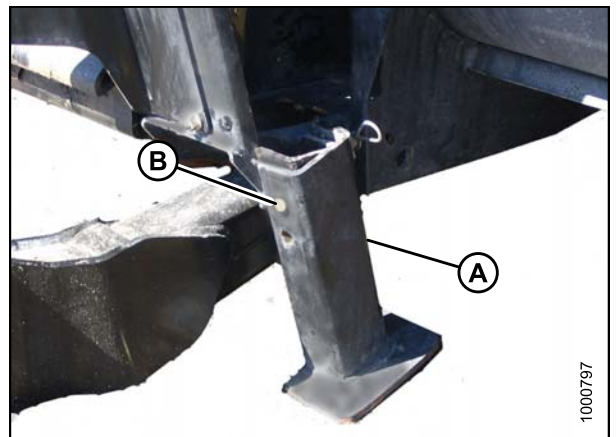


Figure 4.214

7. Remove pin from linkage (A) to disengage float springs, and insert in storage hole (B). Secure with lynch pin. Repeat for opposite linkage.



CAUTION

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 (B), and NOT installed at hole location (A).

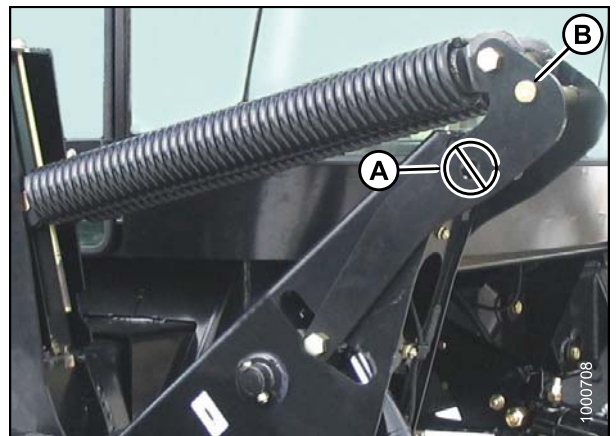


Figure 4.215

OPERATION

8. To disengage lift cylinder stops, turn lever (A) away from header to raise stop until lever locks into vertical position. Repeat for both lift cylinders.
9. Start engine, choose a level area, and lower header to the ground. Stop engine, and remove key.



Figure 4.216

10. Loosen nut (A), and rotate barrel (B) to relieve load on link.
11. Remove cotter pin (D) on pin (C), and remove pin to disconnect from header. Re-install pin in header.

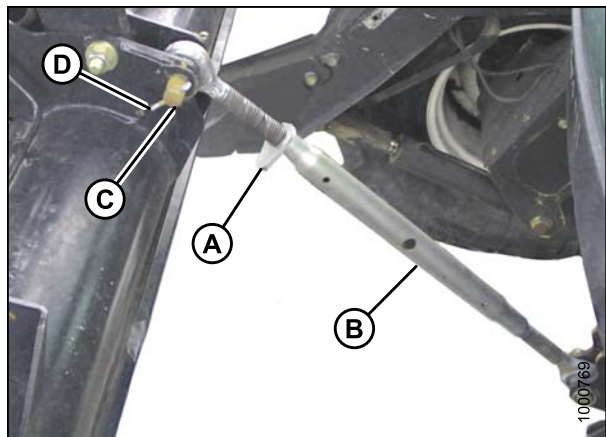


Figure 4.217

12. Disconnect header drive hydraulics (A) and electrical harness (B). Refer to the auger header operator's manual.
13. Slowly back windrower away from header.

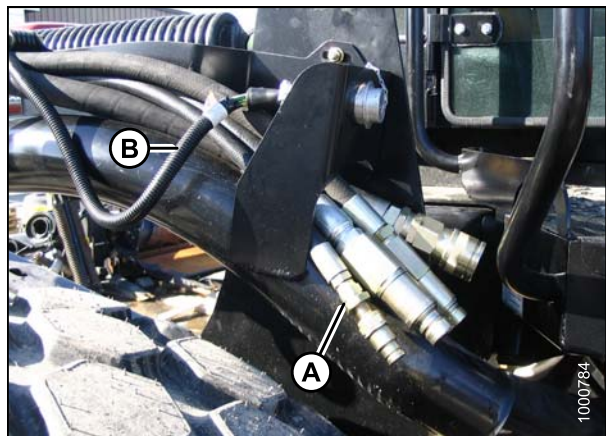


Figure 4.218

OPERATION

14. Re-install pins (B), secure with hairpin (A) in header boots (C).

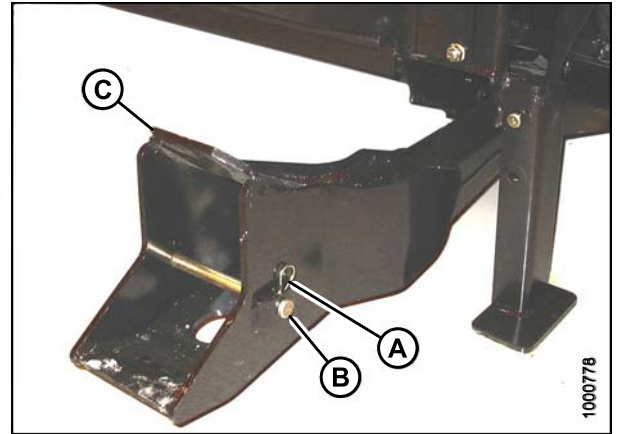


Figure 4.219

4.6.3 Auger Speed

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.

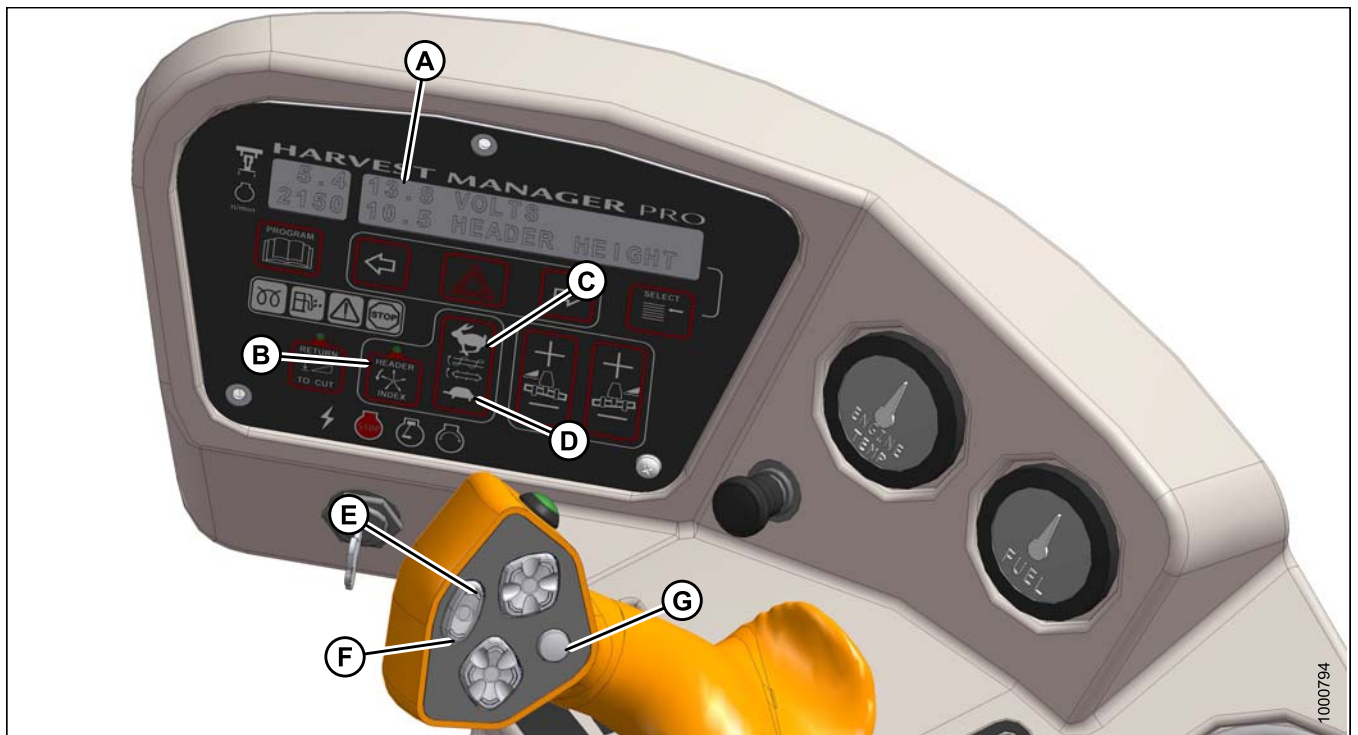


Figure 4.220

A - Display
D - Auger Slow
G - Display Selector

B - Header Index Switch
E - Reel Fast

C - Auger Fast
F - Reel Slow

OPERATION



CAUTION

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

Change auger speed as follows:

1. Engage header.
2. Set HEADER INDEX switch (B) to **OFF**
3. On GSL press DISPLAY SELECTOR switch (E) for **##.# AUGER SPEED**, or on CDM, press FAST (C) or SLOW (D) until desired auger speed is displayed at (A).
4. Display (A) shows **##.# AUGER SPEED**.
##.# = 4.7 to 9.9
4.7 = 150 rpm
9.9 = 320 rpm¹⁷

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 Header Operator's Manual (MD #169000).

17. Auger Speed Not to Exceed 320 rpm.

OPERATION

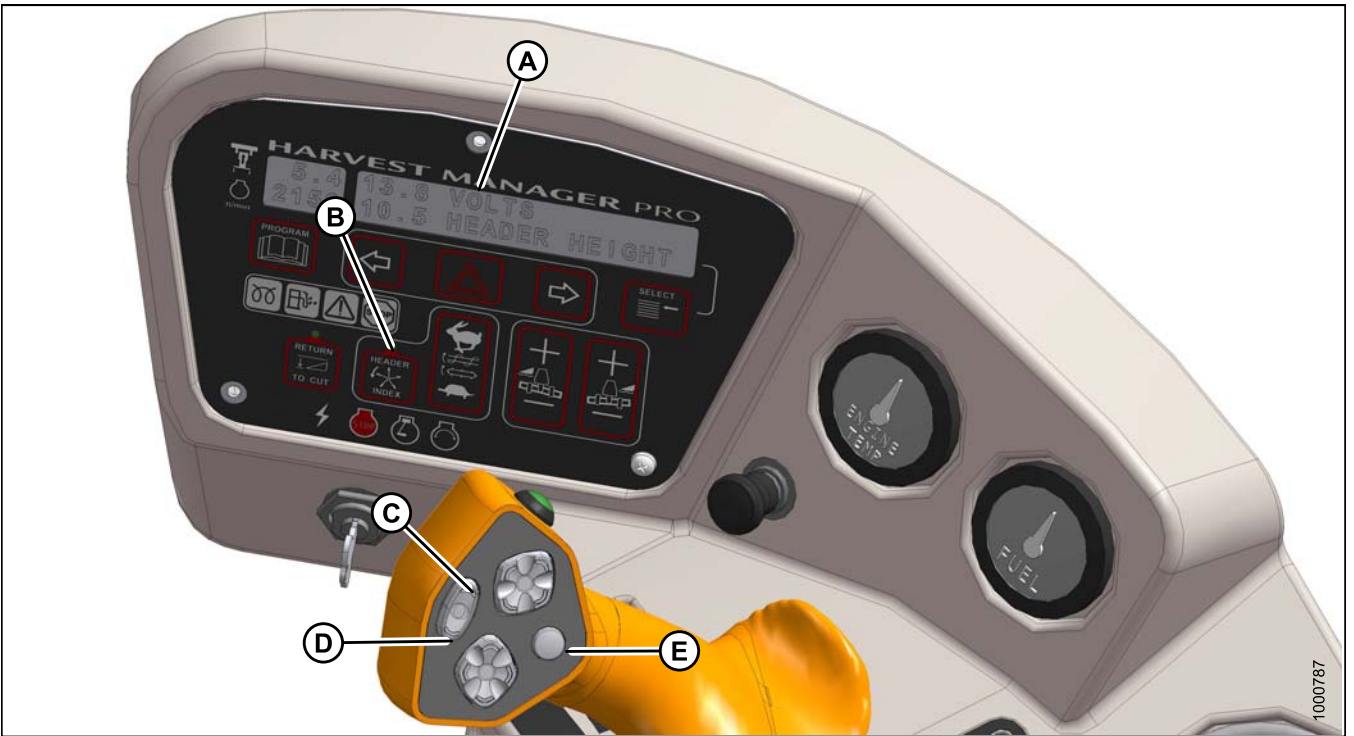


Figure 4.221

A - Display

B - Header Index Switch

C - Fast

D - Slow

E - Display Selector

Display the auger speed as follows:

1. Engage header.
2. Set HEADER INDEX switch (B) to **OFF**.
3. On GSL press DISPLAY SELECTOR (E) or SELECT switch on CDM to display **### AUGER SPEED**.
4.7 = 150 rpm, 9.9 = 320 rpm.¹⁸

¹⁸. Auger Speed Not to Exceed 320 rpm.

OPERATION

4.6.4 Reel Speed

A40-D Header

Reel Only Speed

The A40 reel drive is hydraulically driven. Adjusting reel speed also changes auger speed, unless the auger speed is initially set at a pre-determined value.

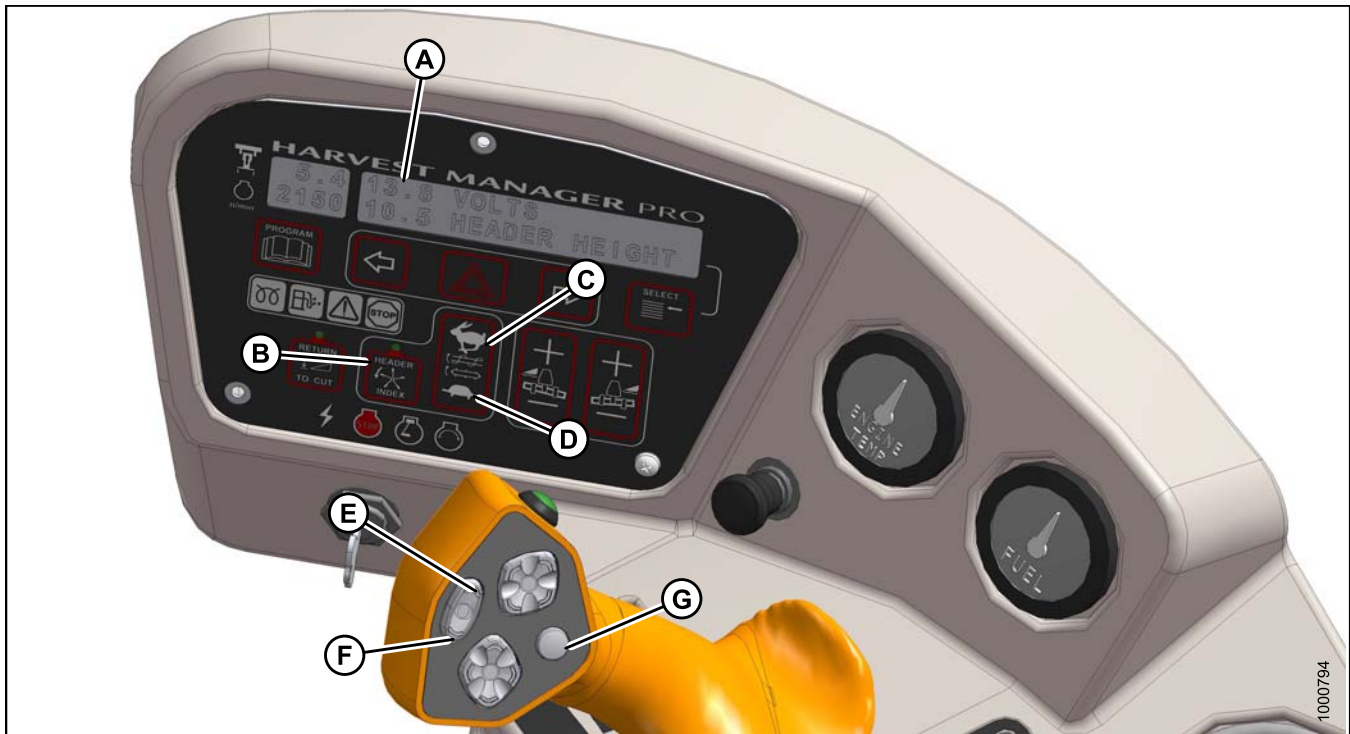


Figure 4.222

A - Display

B - Header Index

C - Auger Fast

D - Auger Slow

E - Fast

F - Slow

G - Display Selector

IMPORTANT

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

1. Engage header.
2. Set HEADER INDEX SWITCH (B) to **OFF**.
3. On GSL press REEL SLOW switch (F) until a beep is heard.
4. DISPLAY (A) shows **###.## REEL RPM**.
5. On CDM press AUGER SLOW (D) or FAST (C) switch to set desired auger speed.
6. DISPLAY (A) shows **###.## AUGER SPEED**.
7. On GSL press REEL SLOW (F) or FAST (E) switch to set desired reel speed.

OPERATION

8. DISPLAY (A) shows **###.## REEL RPM**.

NOTE: The auger speed will not change if the reel speed is adjusted.

Adjusting Reel Speed “On The Go”

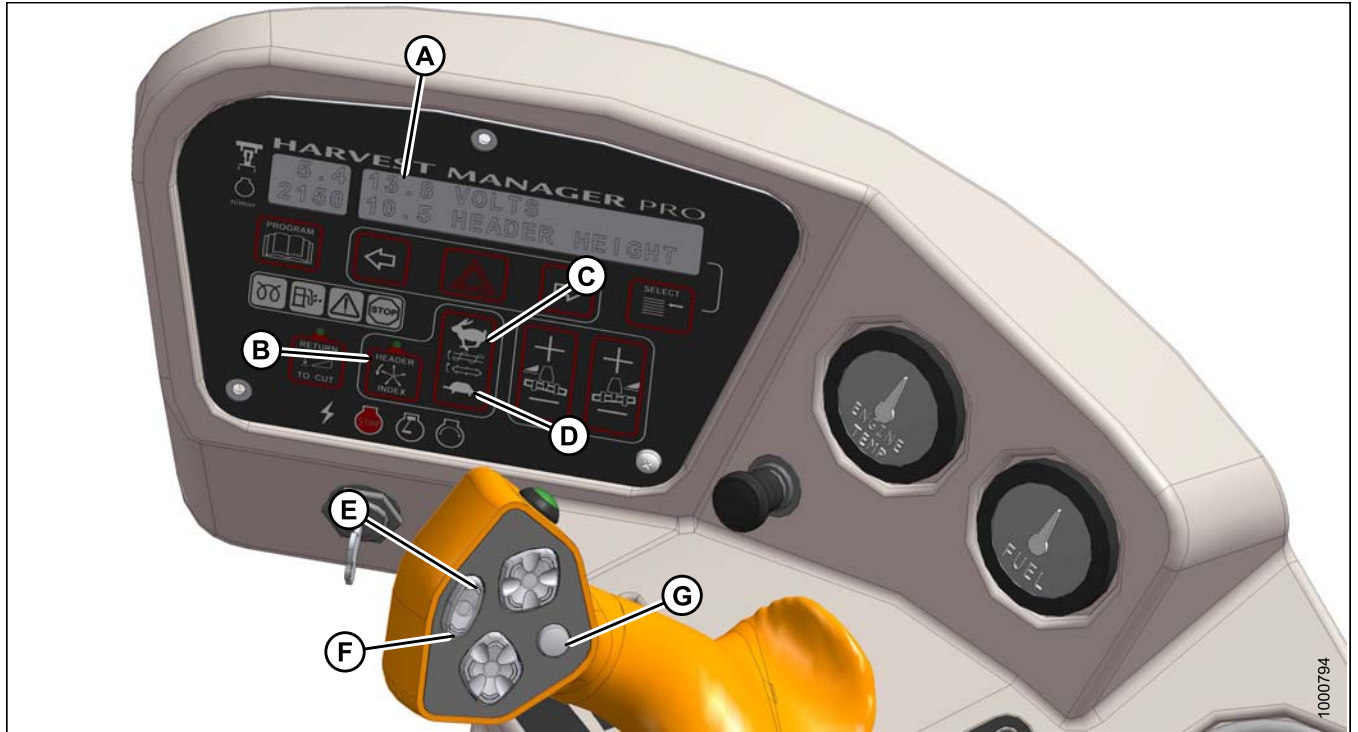


Figure 4.223

A - Display
D - Auger Slow
G - Display Selector

B - Header Index
E - Reel Fast

C - Auger Fast
F - Reel Slow

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

1. Set HEADER INDEX switch (B) to **OFF**.
2. On GSL, press REEL SLOW (F) or REEL FAST (E).
3. DISPLAY (A) shows **###.## REEL RPM**.

Setting Reel to Ground Speed

Setting the speed of the reel relative to ground speed using the Header Index function automatically adjusts the reel speed with changes in ground speed. Operator fatigue is reduced and more consistent crop flow into the auger is achieved.

This mode requires setting the **Minimum Reel Speed** and the **Reel Index**.

IMPORTANT

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

OPERATION



Figure 4.224

A - Display
D - Slow

B - Header Index
E - Display Selector

C - Fast

1. Set the Minimum Reel Speed as follows:
 - a. Engage header.
 - b. Set HEADER INDEX switch (B) to **ON**.
 - c. On GSL press DISPLAY SELECTOR (E) to display **###.### MIN REEL**, or press FAST (C) or SLOW (D) switch. **###.###** = RPM or MPH or KPH¹⁹
 - d. Press FAST (C) or SLOW (D) until desired minimum reel speed is displayed.

NOTE: The reel will continue operating at the Minimum Reel Speed setting when ground speed drops below this value. DISPLAY (A) will flash **###.### MIN REEL** (RPM or 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.

2. Set the Reel Index as follows with the windrower operating at normal field speed but greater than Minimum Reel Speed:
 - a. Set HEADER INDEX (B) switch to **ON**.
 - b. On GSL press DISPLAY SELECTOR (E) to display **###.### ###.## REEL IND**, or press FAST (C) or SLOW (D) switch. **###.###** = RPM or MPH or KPH¹⁹, **###.##** = 0.0 to 9.9.
 - c. Press FAST (C) or SLOW (D) until desired reel index is displayed.

19. As per settings in CDM programming.

OPERATION

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.

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 and reel drive sprockets, or by varying the windrower engine rpm.

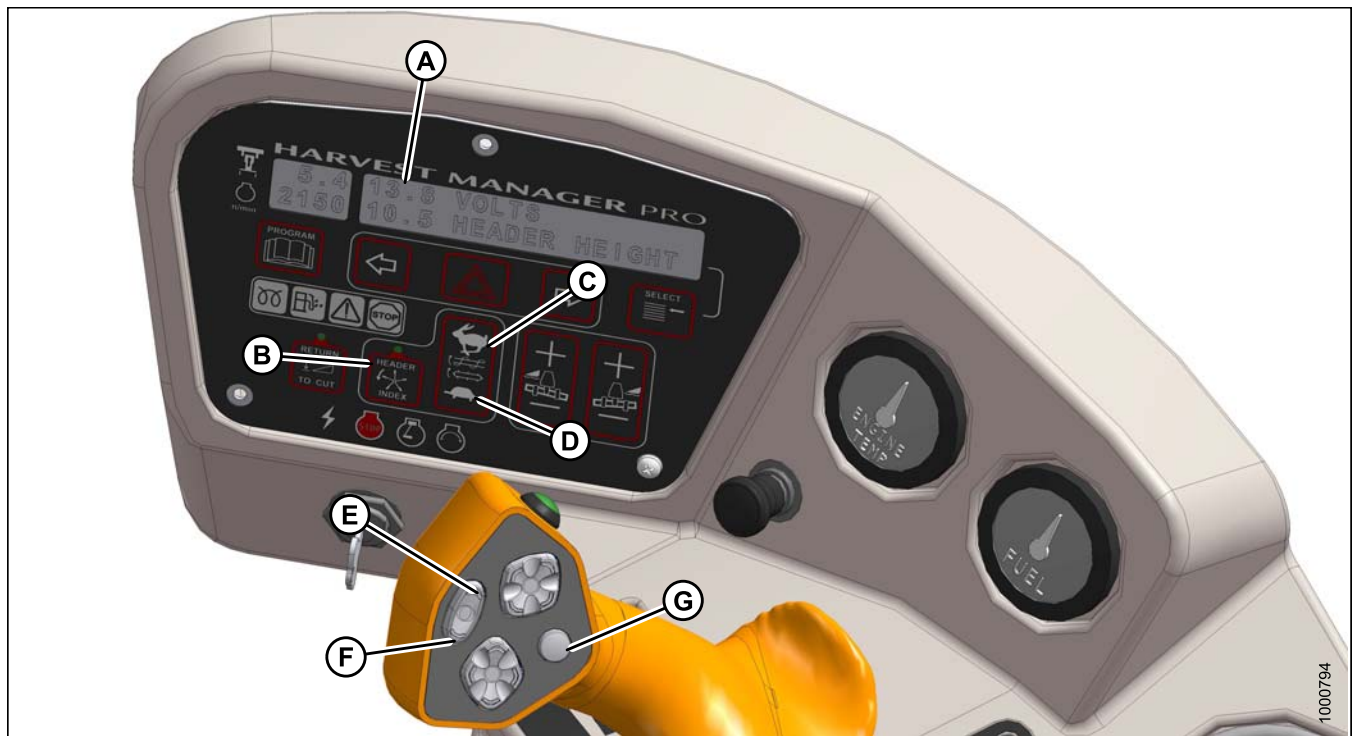


Figure 4.225

A - Display

D - Auger Slow

G - Display Selector

B - Header Index

E - Fast

C - Auger Fast

F - Slow

Display the reel speed as follows:

1. Engage header.
2. Set HEADER INDEX (B) to **OFF**.

OPERATION

- On GSL press DISPLAY SELECTOR (G) or SELECT SWITCH on CDM until **###.### REEL RPM** displays at (A).
###.### = 15.00 – 85.00

4.6.5 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 preset the speed.

| Header Description | | Knife Speed ²⁰ (Strokes Per Minute [SPM]) | |
|--------------------|------|--|---------|
| Type | Size | Minimum | Maximum |
| Auger A40-D | All | 1400 | 1950 |
| Auger GSS | All | 1400 | 1950 |
| Auger A30-S | All | 1250 | 1550 |
| Auger A30-D | All | 1550 | 1850 |

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.

²⁰ Suggested Overload Setting: 75% of Knife Speed set point.

OPERATION

Setting Knife Speed “On the Go”



Figure 4.226

A - Display
D - Program

B - Slower (Left Arrow)
E - Select

C - Faster (right Arrow)

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



CAUTION

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

1. Header must be engaged.
2. Press PROGRAM (D) and SELECT (E).
3. DISPLAY (A) shows **#### KNIFE SPM.**
4. To adjust knife speed, press ARROW (B) or ARROW (C).
5. Display (A) shows new knife speed **#### KNIFE SPM.**

OPERATION

4.7 Operating with an R-Series Header

1. The R85 13-foot header is shipped without the motor and hoses installed, and the installation of a separate motor and hose bundle is necessary.
2. If required, obtain Kit MD #B5510 from your MacDon Dealer, and install it in accordance with the instructions supplied with the Kit.

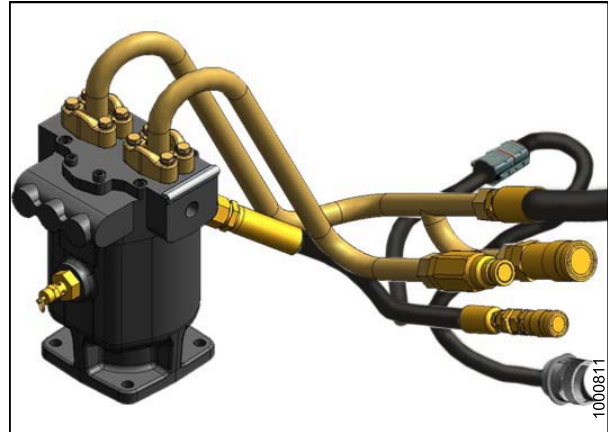


Figure 4.227: B5510

4.7.1 Attaching an R-series Header

Hydraulic Link with Optional Self-Alignment Kit

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

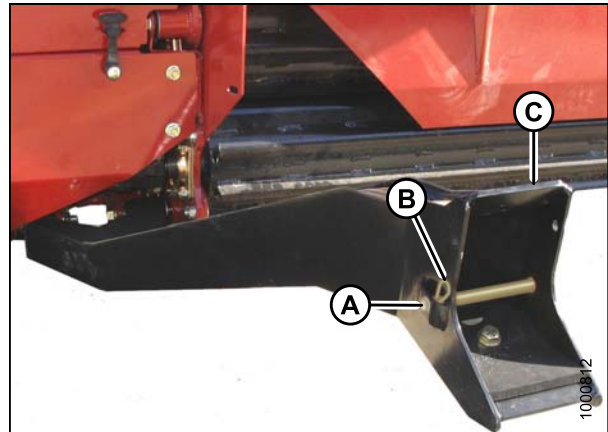


Figure 4.228

CAUTION

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 (B), and NOT installed at hole location (A).

CAUTION

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

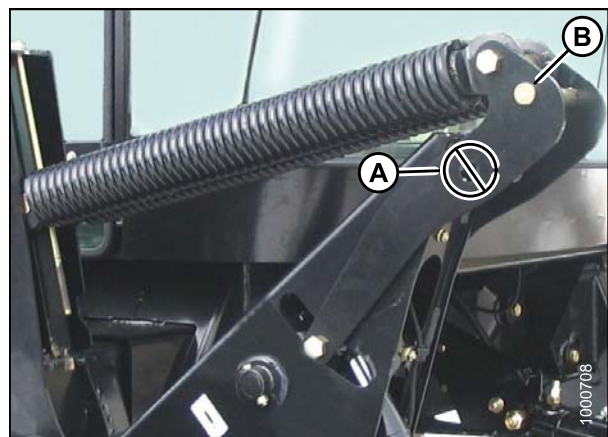


Figure 4.229

OPERATION

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

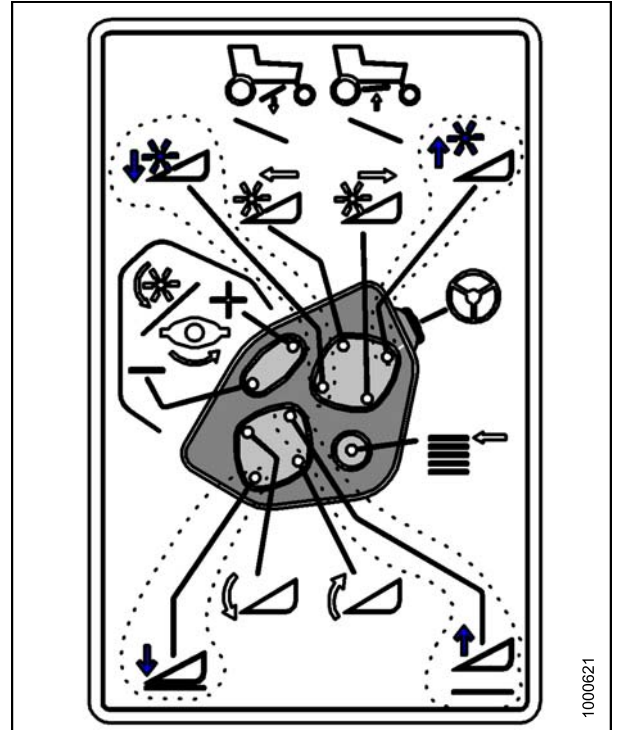


Figure 4.230

IMPORTANT

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

3. If necessary, use one of the following methods to adjust position of the hydraulic center-link (A) so that the hook (B) is above the attachment pin on the header:

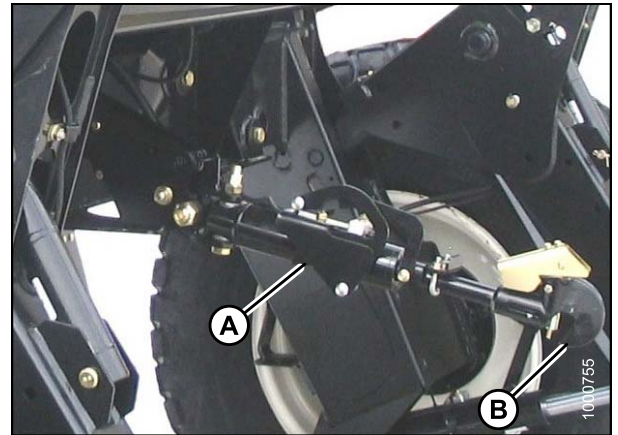


Figure 4.231

OPERATION

4. With the optional center-link self-alignment kit (A) installed, activate the REEL UP switch on the GSL to raise the center-link .

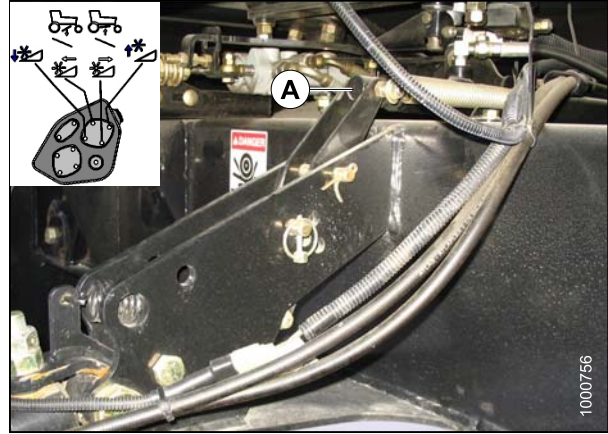


Figure 4.232

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

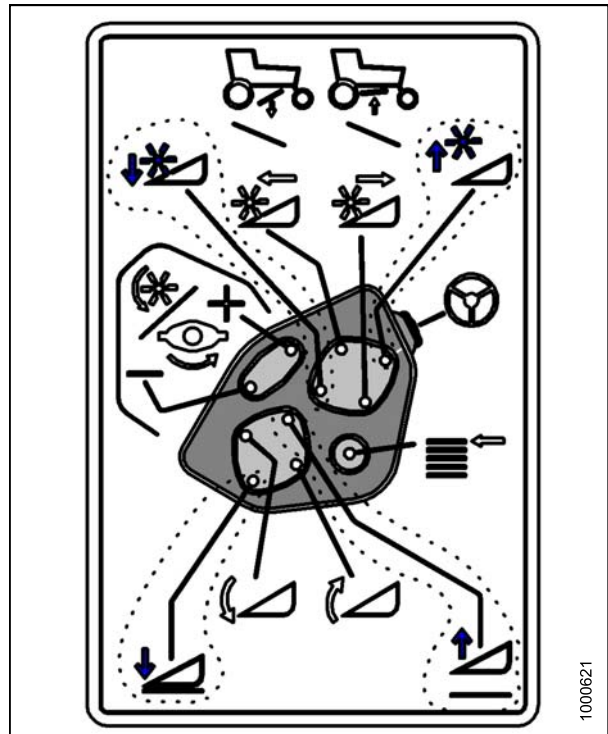


Figure 4.233

OPERATION

IMPORTANT

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

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

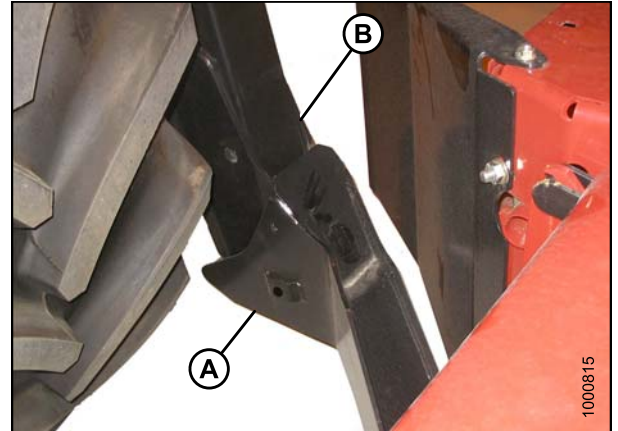


Figure 4.234

8. Activate HEADER TILT cylinder switches on GSL to extend or retract center-link cylinder (A) so that the hook (B) lines-up with the header attachment pin.
9. Lower the center-link onto the header with REEL DOWN switch until it locks into position (hook release is down).
10. Check that center-link is locked onto header pin by pressing the REEL UP switch on the GSL.

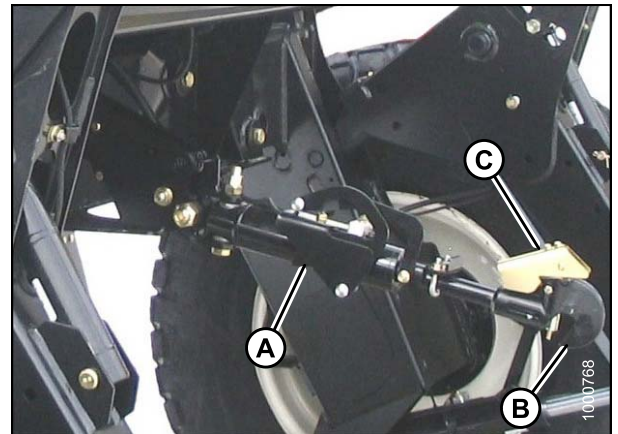


Figure 4.235

OPERATION

IMPORTANT

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

11. Start engine, and press HEADER UP switch to raise header to maximum height.
12. If one end of the header does not raise fully, the lift cylinders require re-phasing. If re-phasing is needed, proceed as follows:
 - a. Press and hold the HEADER UP switch until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds.
 - c. Cylinders are phased.
13. Stop engine, and remove key from ignition.

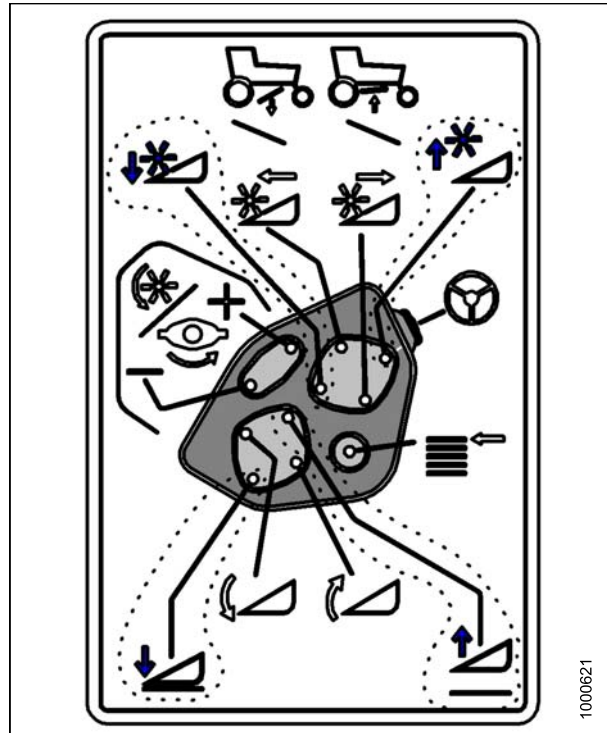


Figure 4.236

OPERATION

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

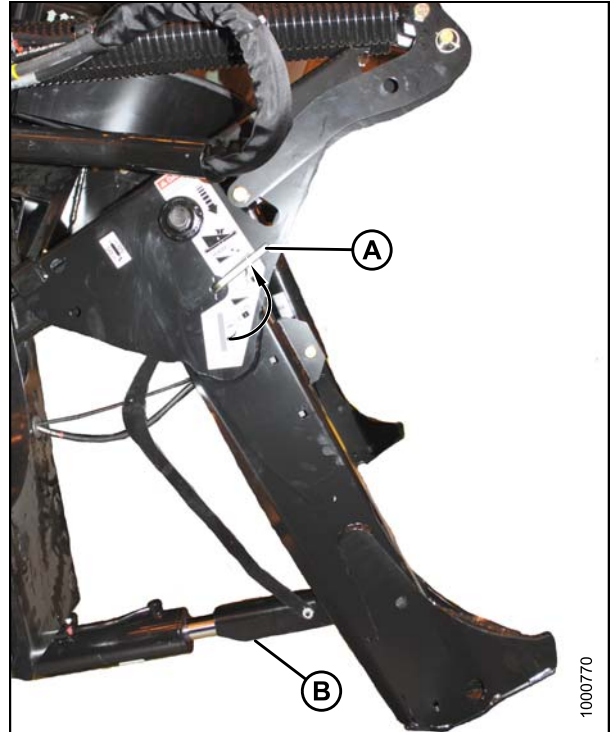


Figure 4.237

15. Install pin (A) through each boot and foot, and secure with hairpin (B). Do this to both sides.

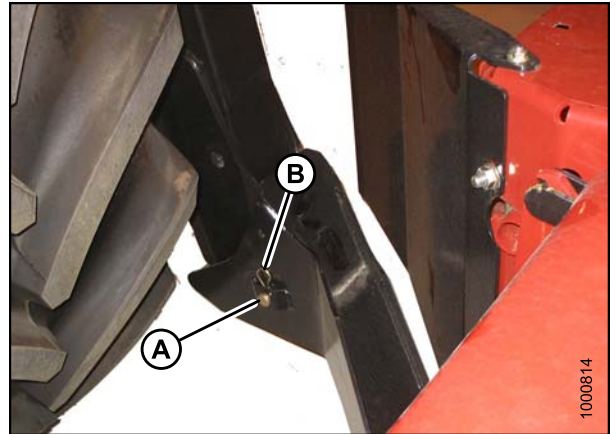


Figure 4.238

OPERATION

IMPORTANT

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

16. Remove pin from storage position (B) in linkage, and insert in hole (A) to engage float springs. Secure with hairpin.

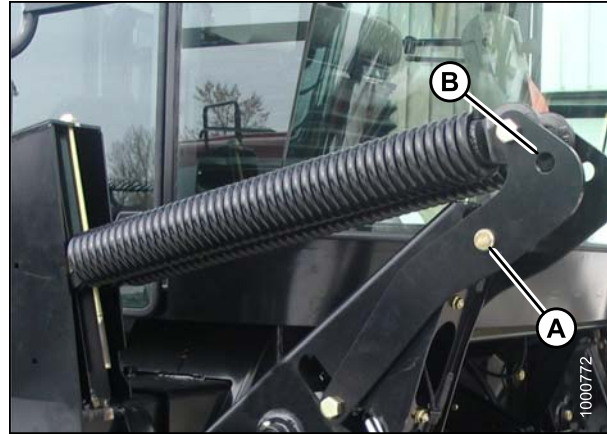


Figure 4.239

17. To disengage lift cylinder stops, turn lever (A) away from header to raise stop until lever locks into vertical position. Repeat for both lift cylinders.
18. Start engine, choose a level area, and lower header to the ground. Stop engine, and remove key.
19. Connect header drive hydraulics and electrical harness to header. Refer to your rotary eisc header operator's manual.



Figure 4.240

Hydraulic Link without Optional Self-Alignment Kit

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

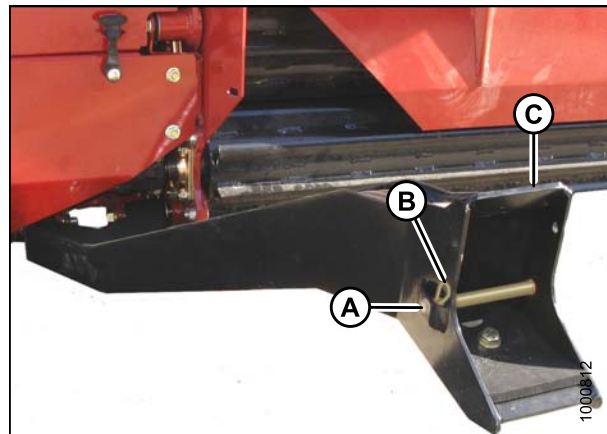


Figure 4.241

OPERATION

CAUTION

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 (B), and NOT installed at hole location (A).

CAUTION

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

2. 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.

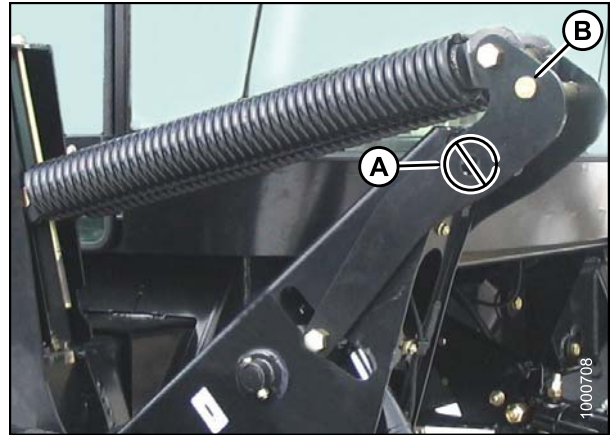


Figure 4.242

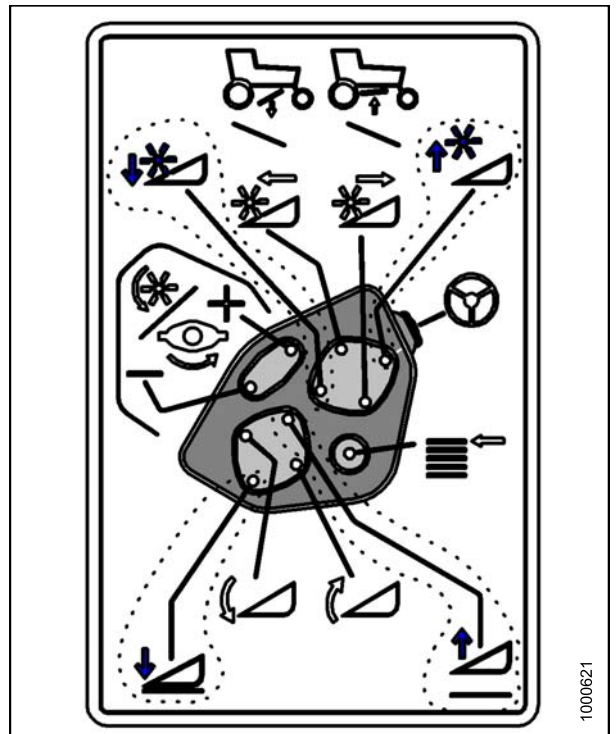


Figure 4.243

OPERATION

3. If necessary, adjust position of the hydraulic center-link (A) so that the hook (B) is above the attachment pin on the header by one of the following methods:

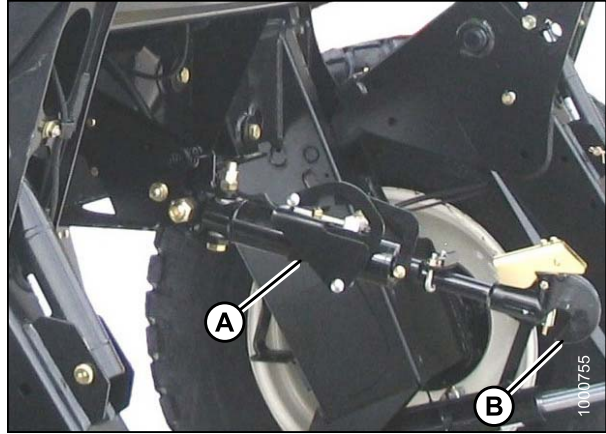


Figure 4.244

4. Without the self-alignment kit, relocate the pin (A) at the frame linkage as required to raise the center-link (B).

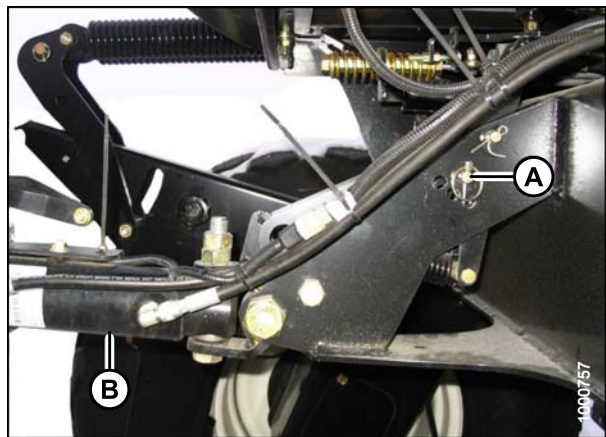


Figure 4.245

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

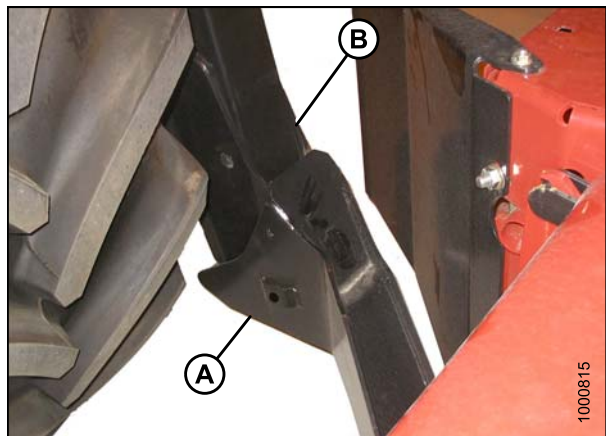


Figure 4.246

OPERATION

7. Activate HEADER TILT cylinder switches on GSL to extend or retract center-link cylinder (A) so that the hook (B) lines-up with the header attachment pin.
8. Stop engine, and remove key from ignition.
9. Push down on rod end of link cylinder (A) until hook engages pin on header, and hook release (C) is down and locked.
10. Check that center-link is locked onto header by pulling upward on rod end of cylinder.

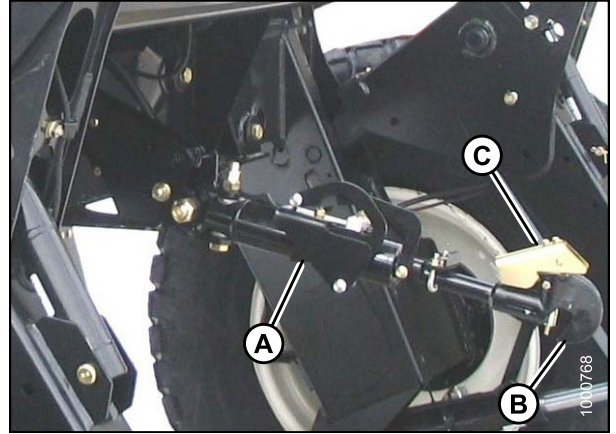


Figure 4.247

IMPORTANT

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

11. Start engine, and press HEADER UP switch to raise header to maximum height.
12. If one end of the header does not raise fully, the lift cylinders require re-phasing. If re-phasing is needed, proceed as follows:
 - a. Press and hold the HEADER UP switch until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds.
 - c. Cylinders are phased.
13. Stop engine, and remove key from ignition.

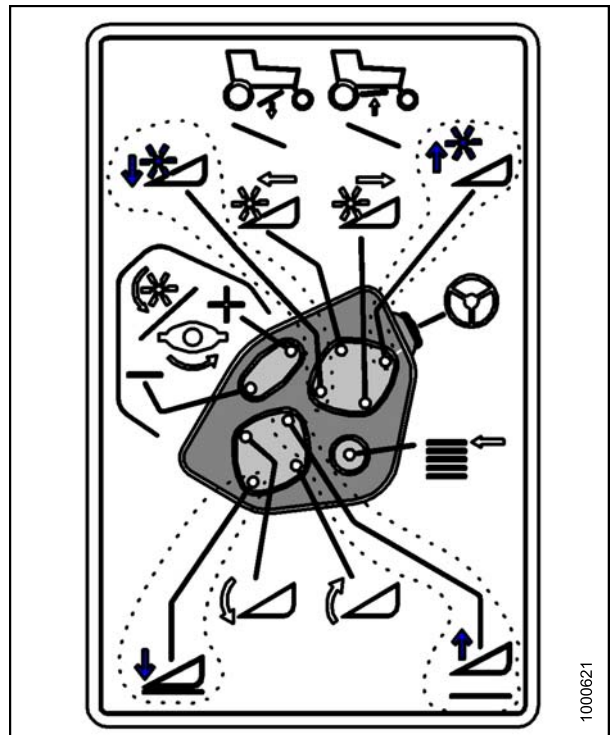


Figure 4.248

OPERATION

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

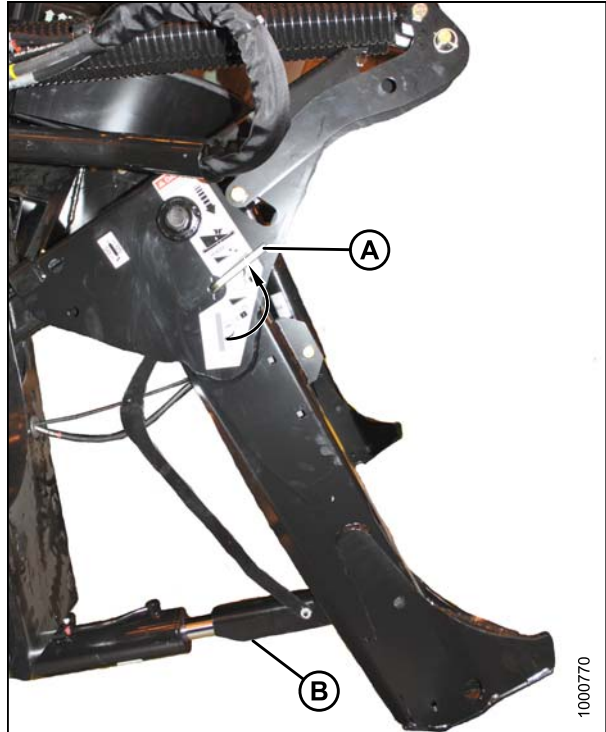


Figure 4.249

15. Install pin (A) through each boot and foot, and secure with hairpin (B). Do this to both sides.

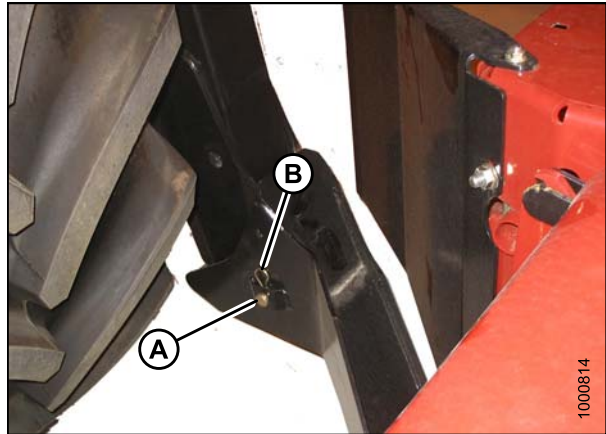


Figure 4.250

OPERATION

IMPORTANT

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

16. Remove pin from storage position (B) in linkage, and insert in hole (A) to engage float springs. Secure with hairpin.

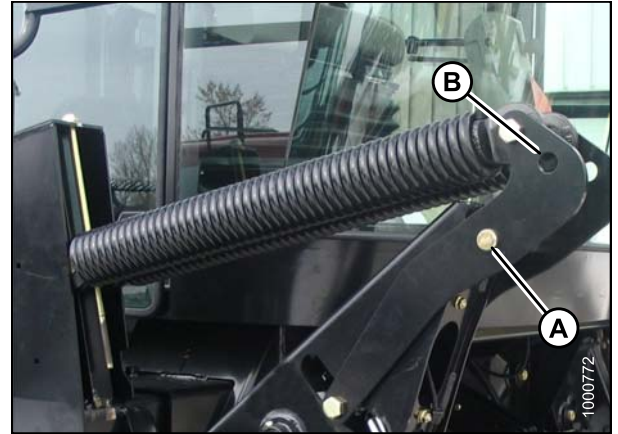


Figure 4.251

17. To disengage lift cylinder stops, turn lever (A) away from header to raise stop until lever locks into vertical position. Repeat for both lift cylinders.
18. Start engine, choose a level area, and lower header to the ground. Stop engine, and remove key.
19. Connect header drive hydraulics and electrical harness to header. Refer to your Rotary Disc Header Operator's Manual.



Figure 4.252

Mechanical Link (Optional)

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

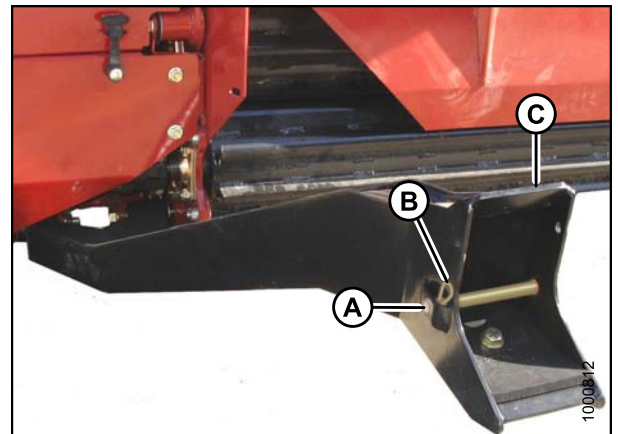


Figure 4.253

OPERATION

CAUTION

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 (B), and NOT installed at hole location (A).

CAUTION

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

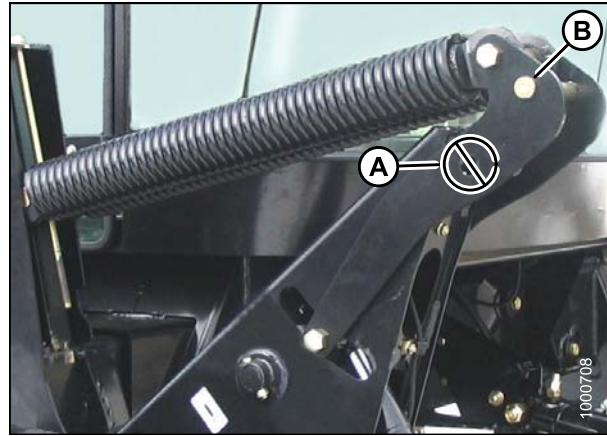


Figure 4.254

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

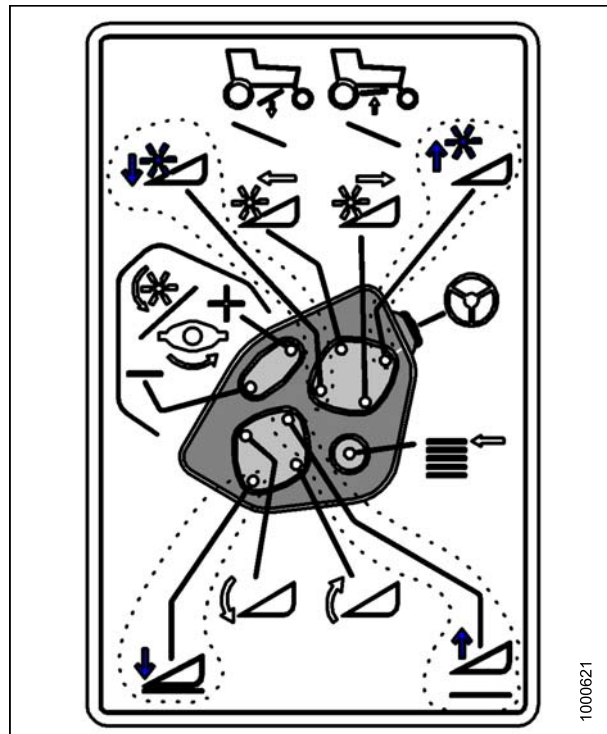


Figure 4.255

IMPORTANT

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

3. Stop engine, and remove key from ignition.

OPERATION

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

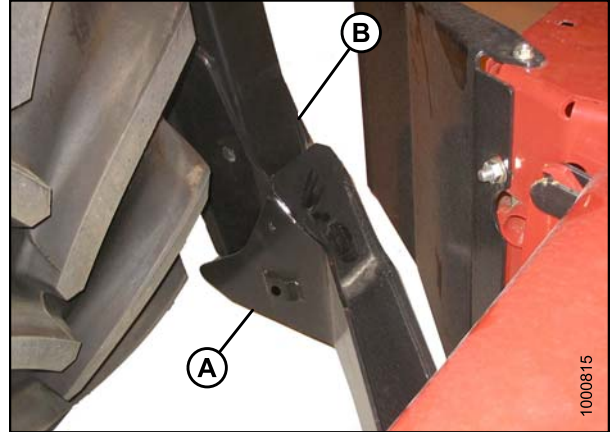


Figure 4.256

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

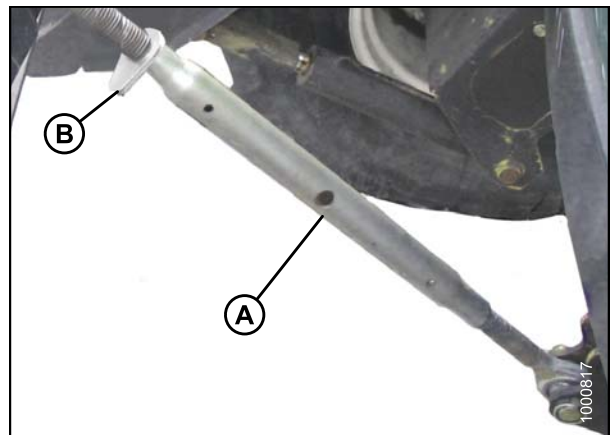


Figure 4.257

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

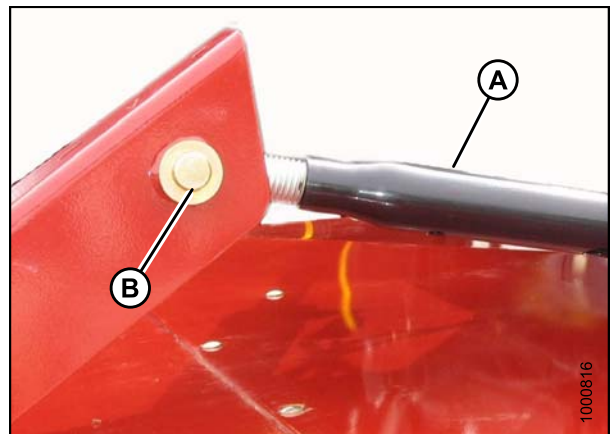


Figure 4.258

OPERATION

CAUTION

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

9. Start engine, and press HEADER UP switch to raise header to maximum height.
10. If one end of the header does not raise fully, the lift cylinders require re-phasing. If re-phasing is needed, proceed as follows:
 - a. Press and hold the HEADER UP switch until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds.
 - c. Cylinders are phased.
11. Stop engine, and remove key from ignition.

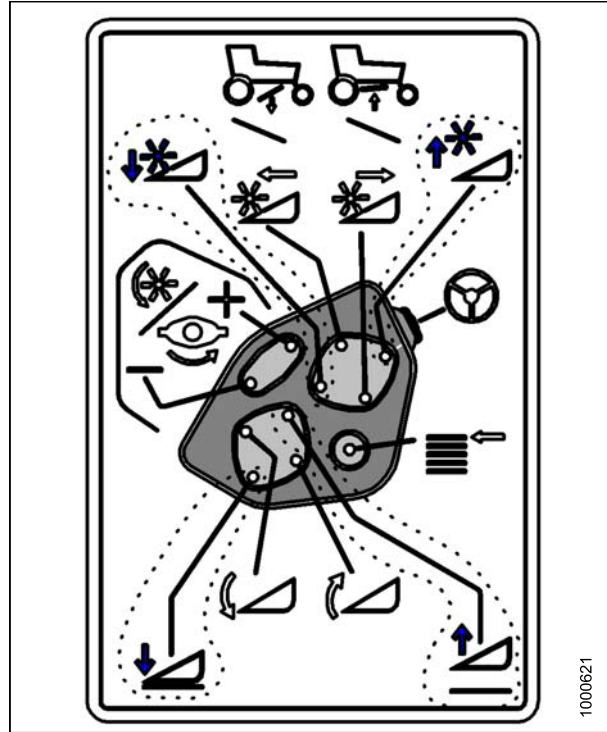


Figure 4.259

OPERATION

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

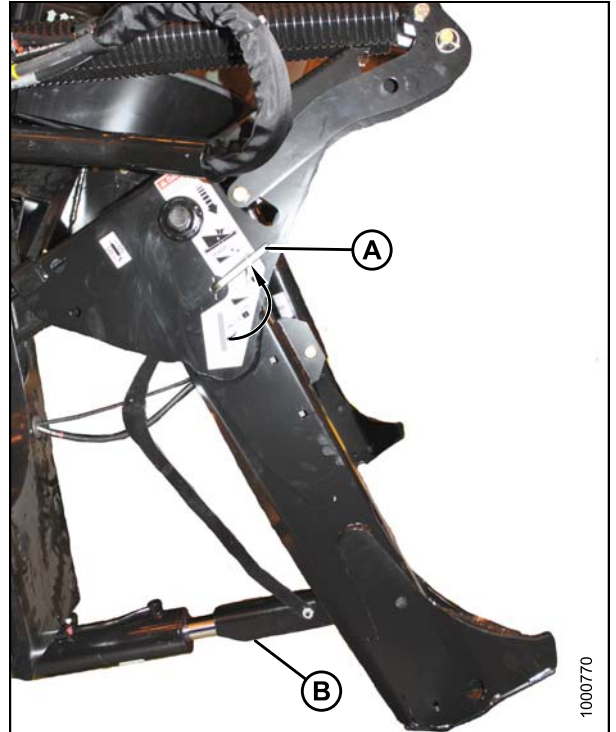


Figure 4.260

13. Install pin (A) through each boot and foot, and secure with hairpin (B). Do this to both sides.

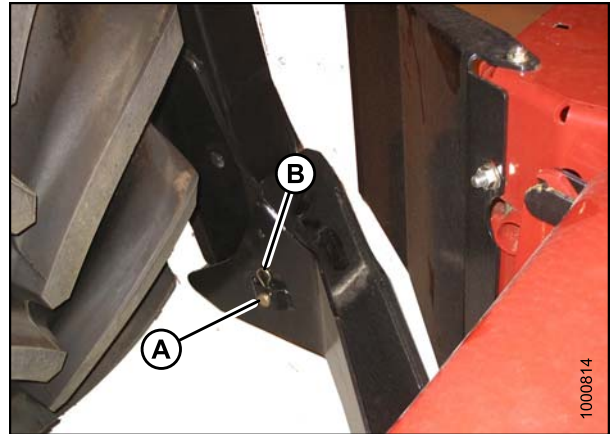


Figure 4.261

OPERATION

IMPORTANT

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

14. Remove pin from storage position (B) in linkage, and insert in hole (A) to engage float springs. Secure with hairpin.

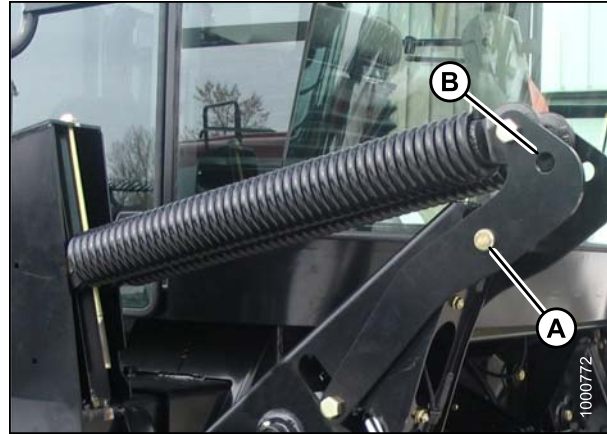


Figure 4.262

15. To disengage lift cylinder stops, turn lever (A) away from header to raise stop until lever locks into vertical position. Repeat for both lift cylinders.
16. Start engine, choose a level area, and lower header to the ground. Stop engine, and remove key.
17. Connect header drive hydraulics and electrical harness to header. Refer to your rotary disc header operator's manual.



Figure 4.263

OPERATION

Re-phasing Lift Cylinder

1. Start engine, and press HEADER UP switch to raise header to maximum height.
2. If one end of the header does not raise fully, the lift cylinders require re-phasing. If re-phasing is needed, proceed as follows:
 - a. Press and hold the HEADER UP switch until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds.
 - c. Cylinders are phased.

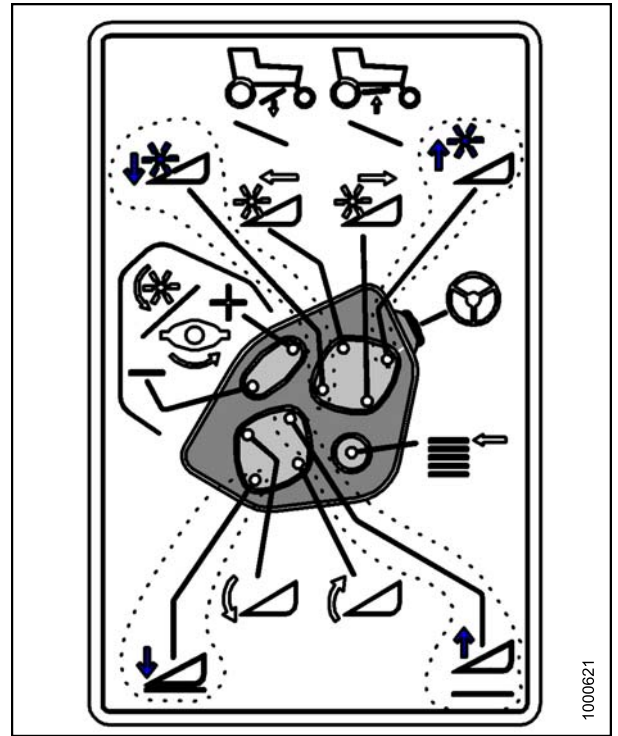


Figure 4.264

OPERATION

4.7.2 Detaching an R-Series Header

Hydraulic Link

1. Start engine, and press HEADER UP switch to raise header to maximum height.
2. If one end of the header does not raise fully, the lift cylinders require re-phasing. If re-phasing is needed, proceed as follows:
 - a. Press and hold the HEADER UP switch until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds.
 - c. Cylinders are phased.

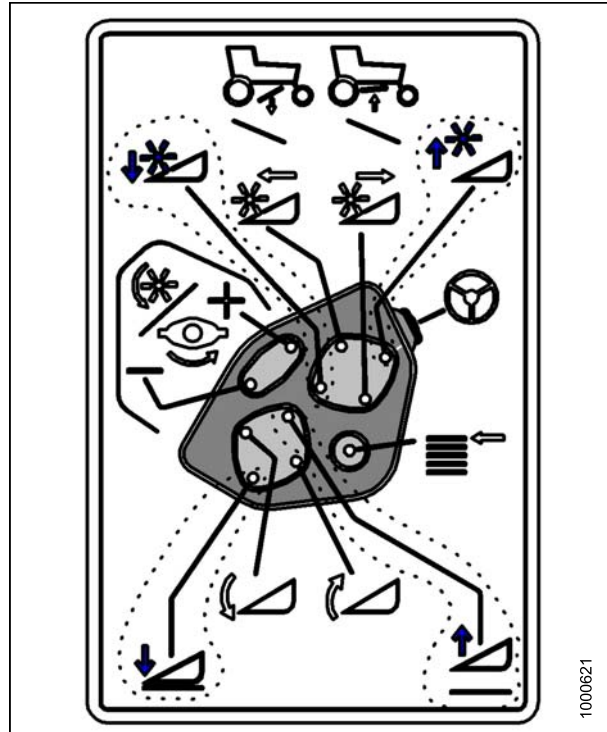


Figure 4.265

3. Pull lever (A), and rotate toward header to release and lower cylinder stop (B) onto cylinder. Repeat for both lift cylinders.
4. Stop engine, and remove key from ignition.

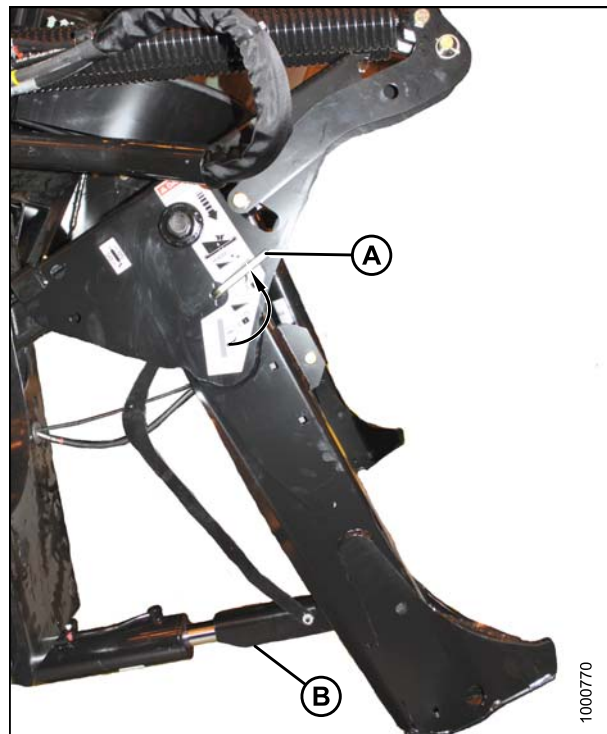


Figure 4.266

OPERATION

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

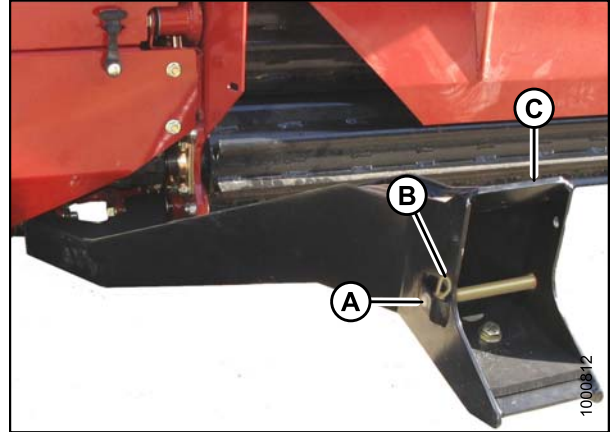


Figure 4.267

6. Remove pin from location (A) to disengage float springs, and insert in storage hole (B). Secure with hairpin.



CAUTION

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 (B), and NOT installed at hole location (A).

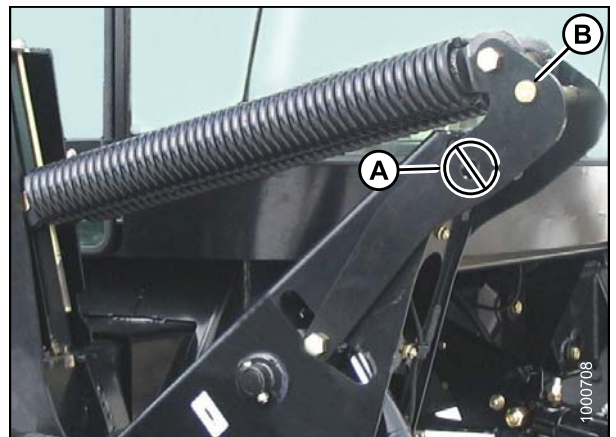


Figure 4.268

7. To disengage lift cylinder stops, turn lever (A) away from header to raise stop until lever locks into vertical position. Repeat for both lift cylinders.
8. Start engine, choose a level area, and lower header to the ground. Stop engine, and remove key.



Figure 4.269

OPERATION

9. Activate HEADER TILT cylinder switch on GSL to release load on center-link cylinder (A).
10. Lift hook release (C), and lift hook (B), off header pin.

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

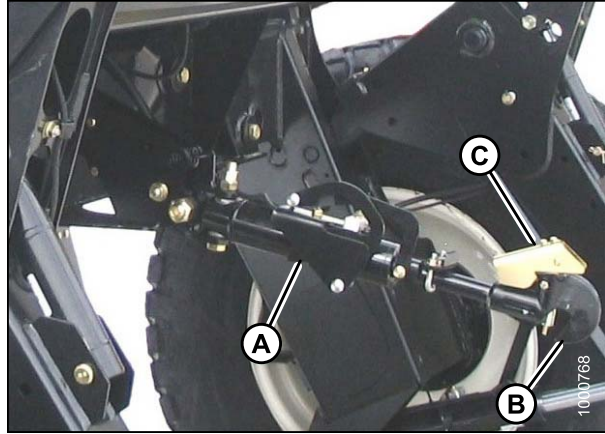


Figure 4.270

11. Disconnect header drive hydraulics (A) and electrical harness (B). Refer to the R80 or R85 Header Operator's Manual.
12. Slowly back windrower away from header.

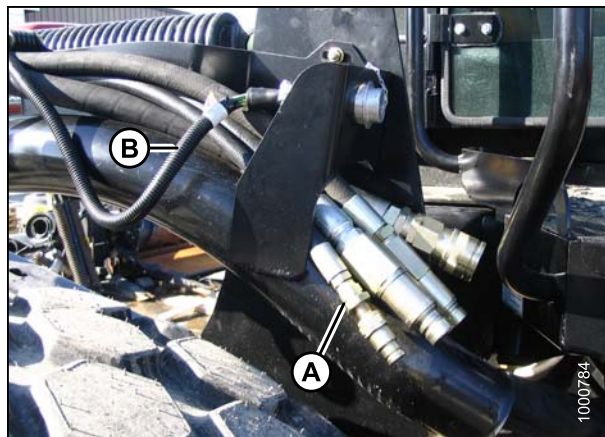


Figure 4.271

13. Re install pin (A) through each boot (C), and secure with hairpin (B). Do this to both sides.

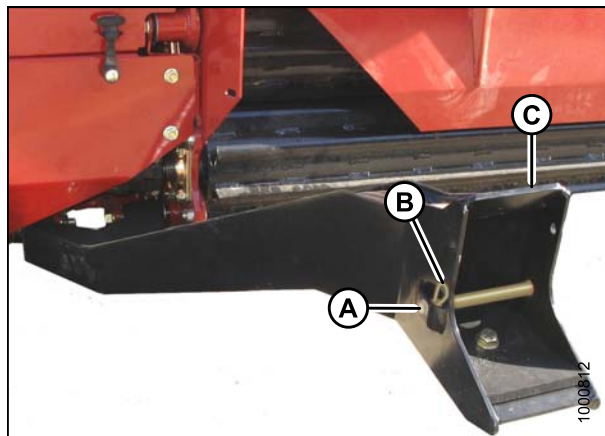


Figure 4.272

OPERATION

Mechanical Link (Optional)

1. Start engine, and press HEADER UP switch to raise header to maximum height.
2. If one end of the header does not raise fully, the lift cylinders require re-phasing. If re-phasing is needed, proceed as follows:
 - a. Press and hold the HEADER UP switch until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds.
 - c. Cylinders are phased.
3. Stop engine, and remove key from ignition.

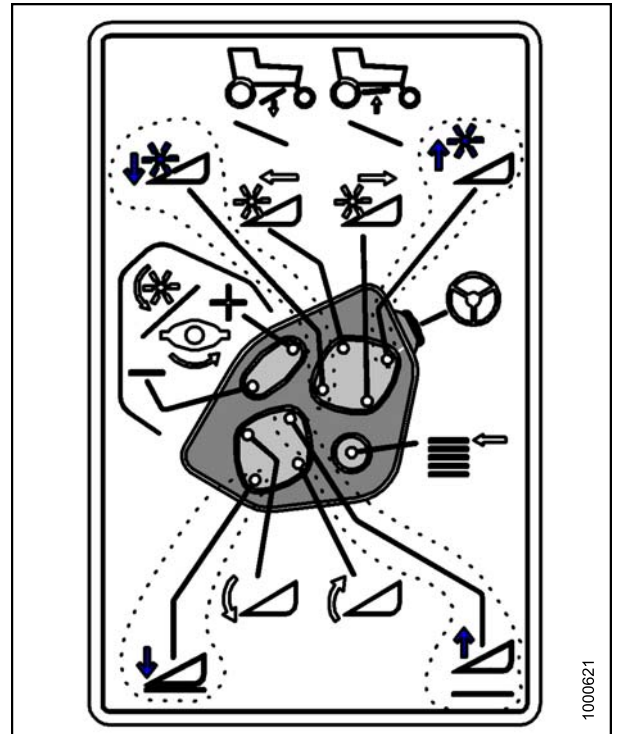


Figure 4.273

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

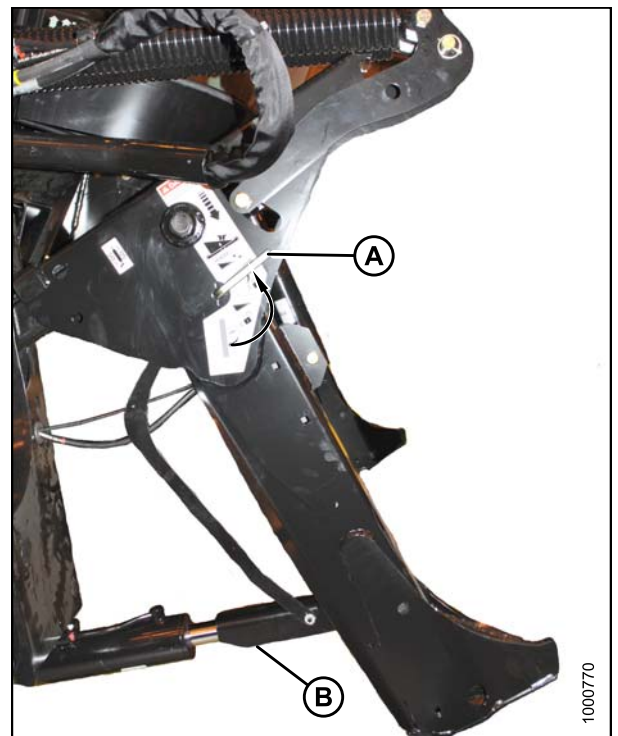


Figure 4.274

OPERATION

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

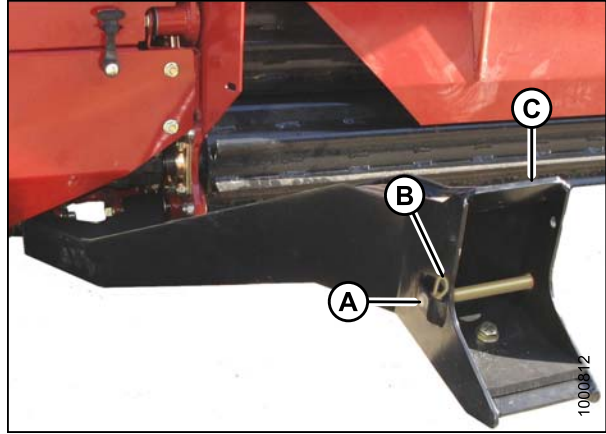


Figure 4.275

6. Remove pin from location (A) to disengage float springs, and insert in storage hole (B). Secure with hairpin.

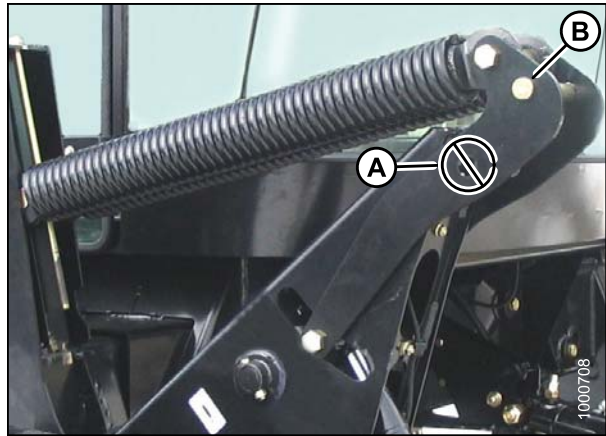


Figure 4.276

OPERATION

CAUTION

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 (B), and NOT installed at hole location (A).

7. To disengage lift cylinder stops, turn lever (A) away from header to raise stop until lever locks into vertical position. Repeat for both lift cylinders.
8. Start engine, choose a level area, and lower header to the ground. Stop engine, and remove key.



Figure 4.277

9. Loosen nut (B), and rotate barrel (A) to relieve load on link.

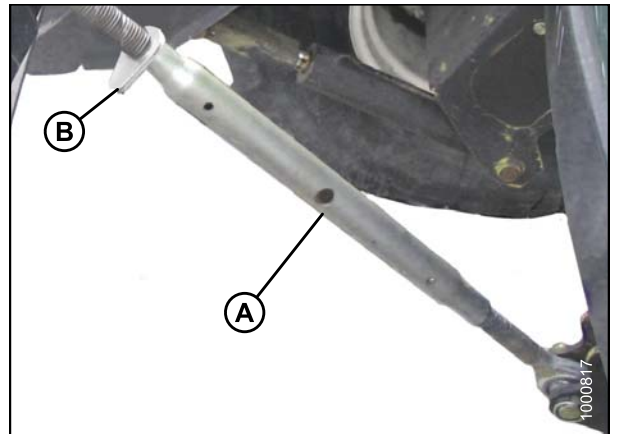


Figure 4.278

OPERATION

10. Remove cotter pin on pin (B), and remove pin to disconnect from header. Re-install pin in header.
11. Tighten nut against barrel (A). A slight tap with a hammer is sufficient.

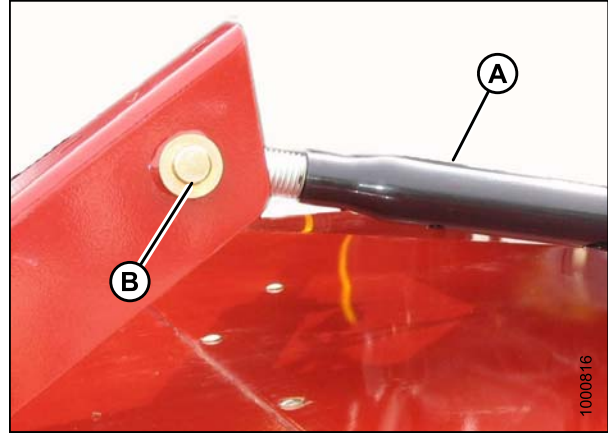


Figure 4.279

12. Disconnect header drive hydraulics (A) and electrical harness (B). Refer to the R80 or R85 Header Operator's Manual.
13. Slowly back windrower away from header.

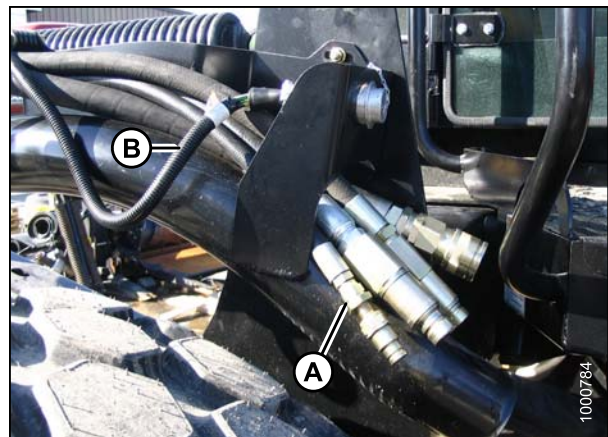


Figure 4.280

14. Re install pin (A) through each boot (C), and secure with hairpin (B). Do this to both sides.

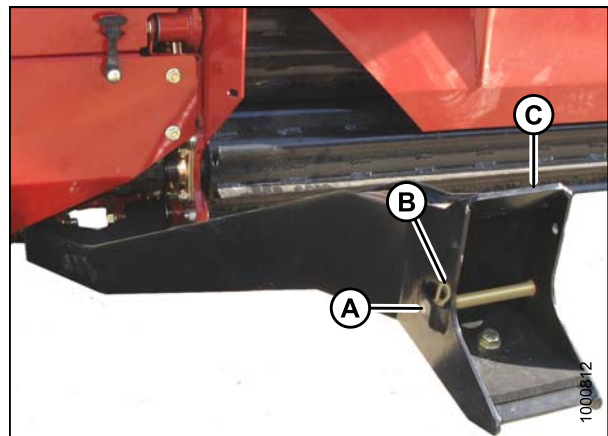


Figure 4.281

OPERATION

4.7.3 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 ²¹ |
|-------------------------------------|-----------------|------------------------|
| Alfalfa | Heavy | 2100–2300 |
| | Light | 1800–2000 |
| Sudan, Sorghum, Hay Grazer, Timothy | Tall and Stemmy | 2300–2500 |
| Short Grass | Dense | 2500 |
| | Thin | 2000–2200 |

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.

21. Suggested Overload Setting: 1300 rpm.

OPERATION

Setting Disc Speed



Figure 4.282

A - Display

B - Header Index

C - Fast

D - Slow

E - Display Selector

CAUTION

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

Display and set the desired disc speed as follows:

1. Engage header.
2. Set HEADER INDEX switch (B) to **OFF**.
3. On GSL press FAST (C) or SLOW (D) until desired disc speed is displayed at (A).
4. Display (A) shows **#### DISC RPM**.
= RPM

5 Maintenance and Servicing

5.1 Maintenance Specifications

5.1.1 Torque Specifications

The following tables give correct torque values for various bolts, cap screws, and hydraulic fittings.

- Tighten all bolts to the torques specified in chart (unless otherwise noted throughout this manual).
- Replace hardware with the same strength and grade bolt.
- Check tightness of bolts periodically, using the tables below as a guide.
- Torque categories for bolts and cap screws are identified by their head markings.

SAE Bolt Torque Specifications

Torque values shown in this table are valid for non-greased, or non-oiled threads and heads. Therefore, do **NOT** grease or oil bolts or cap screws unless otherwise specified in this manual.

Table 5.1 SAE Grade 5 Bolt and Grade 5 Free Spinning

| Nominal Size (A) | Torque (ft-lbf) (*in-lbf) | | Torque (N-m) | |
|------------------|------------------------------|------|--------------|------|
| | Min. | Max. | Min. | Max. |
| 1/4-20 | *106 | *117 | 11.9 | 13.2 |
| 5/16-18 | *218 | *241 | 24.6 | 27.1 |
| 3/8-16 | 32 | 36 | 44 | 48 |
| 7/16-14 | 52 | 57 | 70 | 77 |
| 1/2-13 | 79 | 87 | 106 | 118 |
| 9/16-12 | 114 | 126 | 153 | 170 |
| 5/8-11 | 157 | 173 | 212 | 234 |
| 3/4-10 | 281 | 311 | 380 | 420 |
| 7/8-9 | 449 | 496 | 606 | 669 |
| 1-8 | 611 | 676 | 825 | 912 |

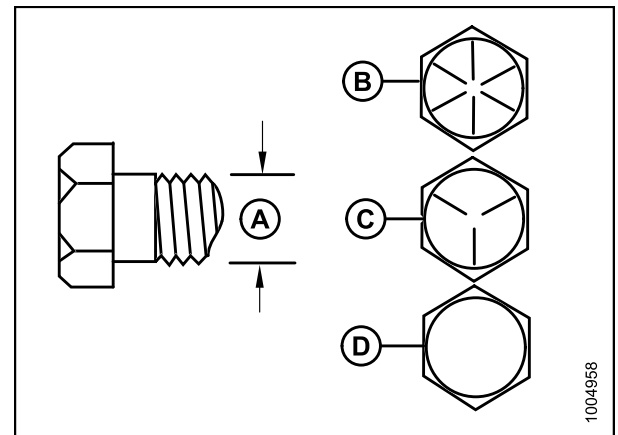


Figure 5.1

A - Nominal size
C - SAE-5

B - SAE-8
D - SAE-2

MAINTENANCE AND SERVICING

Table 5.2 SAE Grade 5 Bolt and Grade 5 Distorted Thread Nut

| Nominal Size (A) | Torque (ft-lbf) (*in-lbf) | | Torque (N-m) | |
|------------------|------------------------------|------|--------------|------|
| | Min. | Max. | Min. | Max. |
| 1/4-20 | *72 | *80 | 8.1 | 9 |
| 5/16-18 | *149 | *164 | 16.7 | 18.5 |
| 3/8-16 | 22 | 24 | 30 | 33 |
| 7/16-14 | 35 | 39 | 48 | 53 |
| 1/2-13 | 54 | 59 | 73 | 80 |
| 9/16-12 | 77 | 86 | 105 | 116 |
| 5/8-11 | 107 | 118 | 144 | 160 |
| 3/4-10 | 192 | 212 | 259 | 286 |
| 7/8-9 | 306 | 338 | 413 | 456 |
| 1-8 | 459 | 507 | 619 | 684 |

Table 5.3 SAE Grade 8 Bolt and Grade 8 Distorted Thread Nut

| Nominal Size (A) | Torque (ft-lbf) (*in-lbf) | | Torque (N-m) | |
|------------------|------------------------------|------|--------------|------|
| | Min. | Max. | Min. | Max. |
| 1/4-20 | *150 | *165 | 16.8 | 18.6 |
| 5/16-18 | 18 | 19 | 24 | 26 |
| 3/8-16 | 31 | 34 | 42 | 46 |
| 7/16-14 | 50 | 55 | 67 | 74 |
| 1/2-13 | 76 | 84 | 102 | 113 |
| 9/16-12 | 109 | 121 | 148 | 163 |
| 5/8-11 | 151 | 167 | 204 | 225 |
| 3/4-10 | 268 | 296 | 362 | 400 |
| 7/8-9 | 432 | 477 | 583 | 644 |
| 1-8 | 647 | 716 | 874 | 966 |

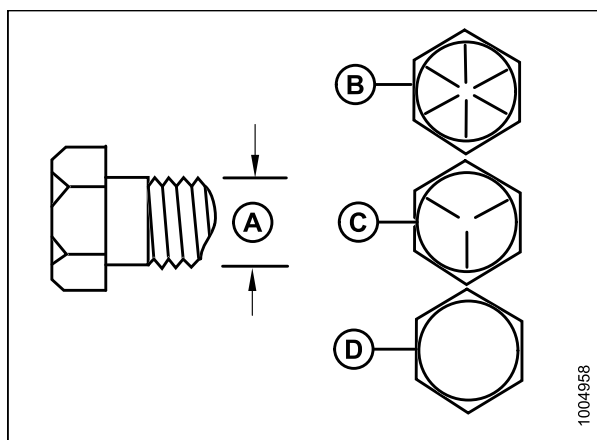


Figure 5.2

A - Nominal size
C - SAE-5

B - SAE-8
D - SAE-2

MAINTENANCE AND SERVICING

Table 5.4 SAE Grade 8 Bolt and Grade 8 Free Spinning Nut

| Nominal Size (A) | Torque (ft-lbf) (*in-lbf) | | Torque (N-m) | |
|------------------|------------------------------|------|--------------|------|
| | Min. | Max. | Min. | Max. |
| 1/4-20 | *150 | *165 | 16.8 | 18.6 |
| 5/16-18 | 26 | 28 | 35 | 38 |
| 3/8-16 | 46 | 50 | 61 | 68 |
| 7/16-14 | 73 | 81 | 98 | 109 |
| 1/2-13 | 111 | 123 | 150 | 166 |
| 9/16-12 | 160 | 177 | 217 | 239 |
| 5/8-11 | 221 | 345 | 299 | 330 |
| 3/4-10 | 393 | 435 | 531 | 587 |
| 7/8-9 | 633 | 700 | 855 | 945 |
| 1-8 | 863 | 954 | 1165 | 1288 |

Metric Bolt Specifications

Table 5.5 Metric Class 8.8 Bolts and Class 9 Free Spinning Nut

| Nominal Size | Torque (ft-lbf) (*in-lbf) | | Torque (N-m) | |
|--------------|------------------------------|------|--------------|------|
| | Min. | Max. | Min. | Max. |
| 3-0.5 | *13 | *14 | 1.4 | 1.6 |
| 3.5-0.6 | *20 | *22 | 2.2 | 2.5 |
| 4-0.7 | *29 | *32 | 3.3 | 3.7 |
| 5-0.8 | *59 | *66 | 6.7 | 7.4 |
| 6-1.0 | *101 | *112 | 11.4 | 12.6 |
| 8-1.25 | 20 | 23 | 28 | 30 |
| 10-1.5 | 40 | 45 | 55 | 60 |
| 12-1.75 | 70 | 78 | 95 | 105 |
| 14-2.0 | 113 | 124 | 152 | 168 |
| 16-2.0 | 175 | 193 | 236 | 261 |
| 20-2.5 | 341 | 377 | 460 | 509 |
| 24-3.0 | 589 | 651 | 796 | 879 |

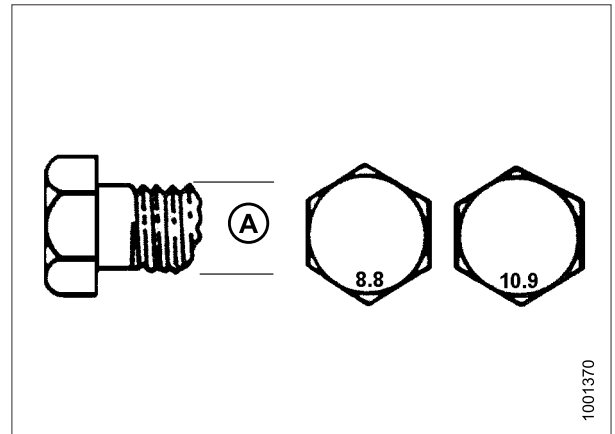


Figure 5.3
A - Nominal size

MAINTENANCE AND SERVICING

Table 5.6 Metric Class 8.8 Bolts and Class 9 Distorted Thread Nut

| Nominal Size | Torque (ft-lbf) (*in-lbf) | | Torque (N-m) | |
|--------------|------------------------------|------|--------------|------|
| | Min. | Max. | Min. | Max. |
| 3-0.5 | *9 | *10 | 1 | 1.1 |
| 3.5-0.6 | *14 | *15 | 1.5 | 1.7 |
| 4-0.7 | *20 | *22 | 2.3 | 2.5 |
| 5-0.8 | *40 | *45 | 4.5 | 5 |
| 6-1.0 | *69 | *76 | 7.7 | 8.6 |
| 8-1.25 | *167 | *185 | 18.8 | 20.8 |
| 10-1.5 | 28 | 30 | 37 | 41 |
| 12-1.75 | 48 | 53 | 65 | 72 |
| 14-2.0 | 77 | 85 | 104 | 115 |
| 16-2.0 | 119 | 132 | 161 | 178 |
| 20-2.5 | 233 | 257 | 314 | 347 |
| 24-3.0 | 402 | 444 | 543 | 600 |

Table 5.7 Metric Class 10.9 Bolts and Class 10 Free Spinning Nut

| Nominal Size | Torque (ft-lbf) (*in-lbf) | | Torque (N-m) | |
|--------------|------------------------------|------|--------------|------|
| | Min. | Max. | Min. | Max. |
| 3-0.5 | *18 | *19 | 1.8 | 2 |
| 3.5-0.6 | *27 | *30 | 2.8 | 3.1 |
| 4-0.7 | *41 | *45 | 4.2 | 4.6 |
| 5-0.8 | *82 | *91 | 8.4 | 9.3 |
| 6-1.0 | *140 | *154 | 14.3 | 15.8 |
| 8-1.25 | 28 | 31 | 38 | 42 |
| 10-1.5 | 56 | 62 | 75 | 83 |
| 12-1.75 | 97 | 108 | 132 | 145 |
| 14-2.0 | 156 | 172 | 210 | 232 |
| 16-2.0 | 242 | 267 | 326 | 360 |
| 20-2.5 | 472 | 521 | 637 | 704 |
| 24-3.0 | 815 | 901 | 1101 | 1217 |

MAINTENANCE AND SERVICING

Table 5.8 Metric Class 10.9 Bolts and Class 10 Distorted Thread Nut

| Nominal Size | Torque (ft-lbf)(*in-lbf) | | Torque (N-m) | |
|--------------|--------------------------|------|--------------|------|
| | Min. | Max. | Min. | Max. |
| 3-0.5 | *12 | *13 | 1.3 | 1.5 |
| 3.5-0.6 | *19 | *21 | 2.1 | 2.3 |
| 4-0.7 | *28 | *31 | 3.1 | 3.4 |
| 5-0.8 | *56 | *62 | 6.3 | 7 |
| 6-1.0 | *95 | *105 | 10.7 | 11.8 |
| 8-1.25 | 19 | 21 | 26 | 29 |
| 10-1.5 | 38 | 42 | 51 | 57 |
| 12-1.75 | 66 | 73 | 90 | 99 |
| 14-2.0 | 106 | 117 | 143 | 158 |
| 16-2.0 | 165 | 182 | 222 | 246 |
| 20-2.5 | 322 | 356 | 434 | 480 |
| 24-3.0 | 556 | 614 | 750 | 829 |

MAINTENANCE AND SERVICING

Metric Bolt Specifications Bolting into Cast Aluminium

Table 5.9 Metric Bolt Bolting into Cast Aluminium

| Nominal Size | Bolt Torque | | | |
|--------------|-------------------------|-----|--------------------------|-----|
| | 8.8 (Cast Aluminium) | | 10.9 (Cast Aluminium) | |
| | ft-lbf | N·m | ft-lbf | N·m |
| M3 | | | 1 | |
| M4 | | | 2.6 | 4 |
| M5 | | | 5.5 | 8 |
| M6 | 6 | 9 | 9 | 12 |
| M8 | 14 | 20 | 20 | 28 |
| M10 | 28 | 40 | 40 | 55 |
| M12 | 52 | 70 | 73 | 100 |
| M14 | | | | |
| M16 | | | | |

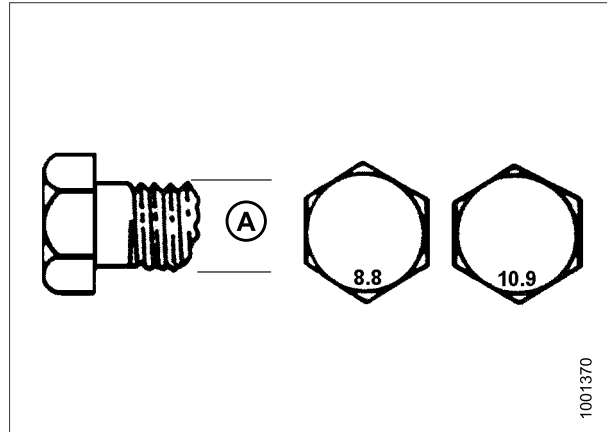


Figure 5.4
A - Nominal size

MAINTENANCE AND SERVICING

Flare-type Hydraulic Tube Fittings

To tighten flare-type hydraulic fittings, follow these steps:

1. Check flare (A), and flare seat (D) for defects that might cause leakage.
2. Align tube with fitting before tightening.
3. Lubricate connection, and hand-tighten swivel nut (B) until snug.
4. To prevent twisting the tube(s), use two wrenches. Place one wrench on the connector body (C), and with the second, tighten the swivel nut (B) to the torque shown.

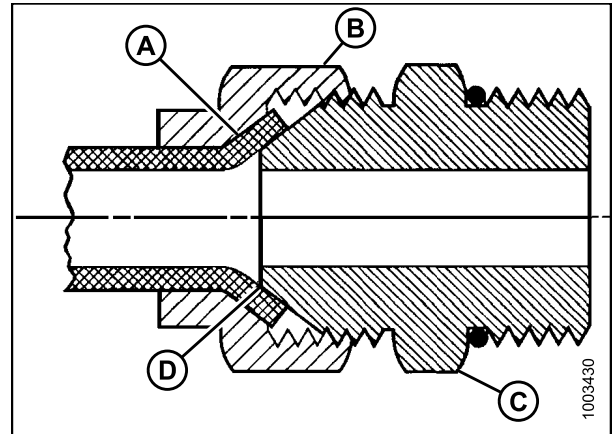


Figure 5.5

A - Flare
C - Flareseat

B - Nut
D - Body

Table 5.10 Flare-type Hydraulic Tube Fittings

| SAE Dash Size | THREAD Size (in.) | Torque Value ²² | | Flats From Finger Tight (FFFT) | |
|---------------|-------------------|----------------------------|---------|--------------------------------|--------------------------|
| | | ft-lbf (*in-lbf) | N-m | Tube conn. | Swivel nut or hose conn. |
| -3 | 3/8-24 | *60-72 | 7-8 | - | - |
| -4 | 7/16-20 | *156-168 | 18-19 | 2-1/2 | 2 |
| -5 | 1/2-20 | 14-15 | 19-21 | 2 | 2 |
| -6 | 9/16-18 | 22-24 | 30-33 | 2 | 1-1/2 |
| -8 | 3/4-16 | 42-46 | 57-63 | 2 | 1-1/2 |
| -10 | 7/8-14 | 60-66 | 81-89 | 1-1/2 | 1-1/2 |
| -12 | 1-1/16-12 | 83-91 | 113-124 | 1-1/2 | 1-1/4 |
| -14 | 1-3/8-12 | 100-110 | 136-149 | 1-1/2 | 1-1/4 |
| -16 | 1-5/16-12 | 118-130 | 160-176 | 1-1/2 | 1 |
| -20 | 1-5/8-12 | 168-184 | 228-250 | 1 | 1 |
| -24 | 1-7/8-12 | 195-215 | 264-291 | 1 | 1 |

22. Torque values shown are based on lubricated connections as in reassembly.

MAINTENANCE AND SERVICING

O-Ring Boss (ORB) Hydraulic Fittings (Adjustable)

1. Inspect O-ring, and seat for dirt or obvious defects.
2. Back off the lock nut as far as possible. Ensure that washer is not loose, and is pushed toward the lock nut as far as possible.
3. Check that O-ring is not on the threads, adjust if necessary.
4. Apply hydraulic system oil to the O-ring.

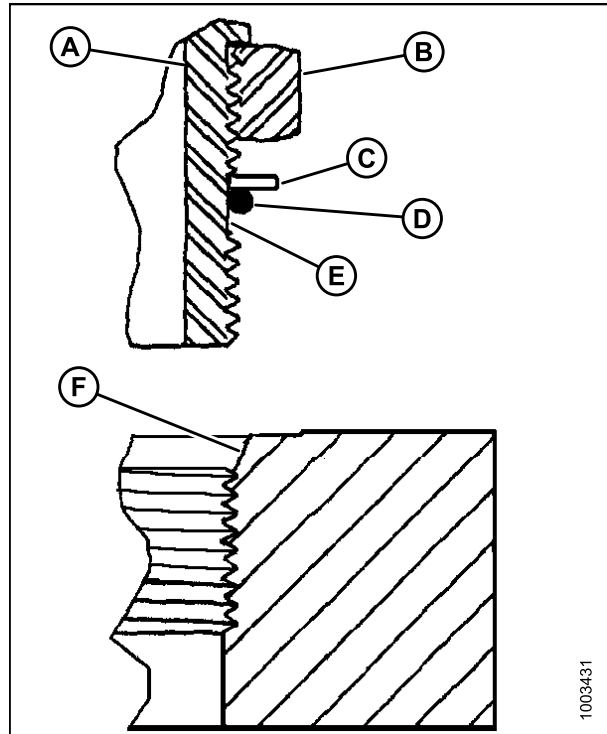


Figure 5.6

A - Fitting B - Lock nut C - Washer
D - O-ring E - Groove F - Seat

5. Install fitting into port until back up washer (A) and O-ring contacts on part face (C).
6. Position angle fittings by unscrewing no more than one turn.
7. Turn lock nut down to washer, and tighten to torque shown. Use two wrenches, one on the fitting and the other on the locknut.
8. Check the final condition of the fitting.

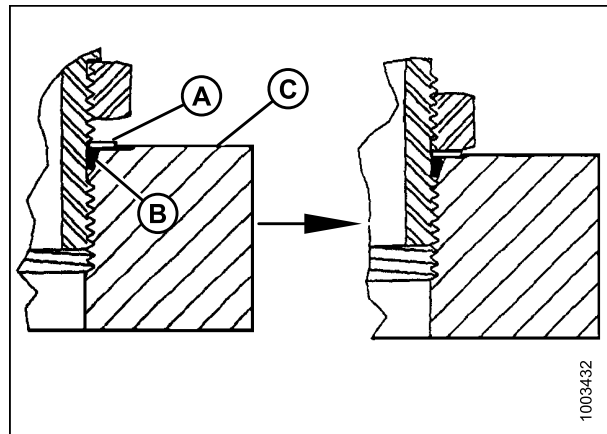


Figure 5.7

MAINTENANCE AND SERVICING

Table 5.11 O-Ring Boss (ORB) Hydraulic Fittings (Adjustable)

| SAE Dash size | THREAD Size (in.) | Torque Value ²³ | |
|---------------|-------------------|----------------------------|---------|
| | | ft·lbf (*in·lbf) | N·m |
| -3 | 3/8-24 | *106–115 | 12–13 |
| -4 | 7/16–20 | 14–15 | 19–21 |
| -5 | 1/2–20 | 15–24 | 21–33 |
| -6 | 9/16–18 | 19–21 | 26–29 |
| -8 | 3/4–16 | 34–37 | 46–50 |
| -10 | 7/8–14 | 55–60 | 75–82 |
| -12 | 1-1/16-12 | 88–97 | 120–132 |
| -14 | 1-3/8-12 | 113–124 | 153–168 |
| -16 | 1-5/16-12 | 130–142 | 176–193 |
| -20 | 1-5/8-12 | 163–179 | 221–243 |
| -24 | 1-7/8-12 | 199–220 | 270–298 |

23. Torque values shown are based on lubricated connections as in reassembly.

MAINTENANCE AND SERVICING

O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)

1. Inspect O-ring, and seat for dirt or obvious defects.
2. Check that O-ring is not on the threads, adjust if necessary.
3. Apply hydraulic system oil to the O-ring.
4. Install fitting into port until fitting is hand tight.
5. Torque fitting per value in chart. See chart below.
6. Check the final condition of the fitting.

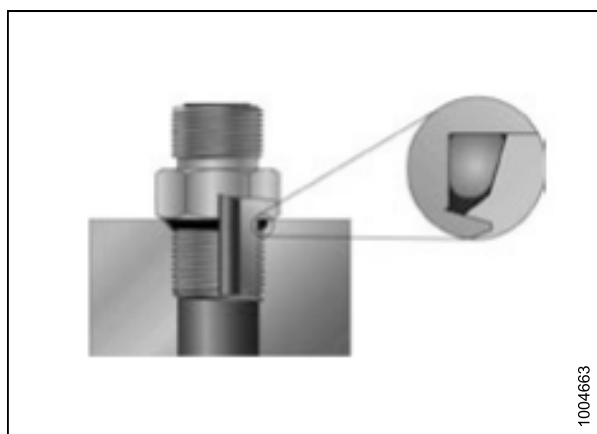


Figure 5.8

A - Fitting B - Lock nut C - Washer
 D - O-ring E - Groove F - Seat

Table 5.12 O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)

| SAE Dash Size | THREAD Size (in.) | Torque Value ²⁴ | |
|---------------|-------------------|----------------------------|---------|
| | | ft-lbf (*in-lbf) | N-m |
| -3 | 3/8-24 | *106–115 | 12–13 |
| -4 | 7/16–20 | 14–15 | 19–21 |
| -5 | 1/2–20 | 15–24 | 21–33 |
| -6 | 9/16–18 | 19–21 | 26–29 |
| -8 | 3/4–16 | 34–37 | 46–50 |
| -10 | 7/8–14 | 55–60 | 75–82 |
| -12 | 1-1/16-12 | 88–97 | 120–132 |
| -14 | 1-3/8-12 | 113–124 | 153–168 |
| -16 | 1-5/16-12 | 130–142 | 176–193 |
| -20 | 1-5/8-12 | 163–179 | 221–243 |
| -24 | 1-7/8-12 | 199–220 | 270–298 |

24. Torque values shown are based on lubricated connections as in reassembly.

MAINTENANCE AND SERVICING

O-Ring Face Seal (ORFS) Hydraulic Fittings

To tighten O-ring face seal (ORFS) hydraulic fittings, follow these steps:

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



Figure 5.9

2. Apply hydraulic system oil to the O-ring.
3. Align the tube or hose assembly. Ensure that flat face of the mating flange comes in full contact with O-ring.
4. Thread tube or hose nut until hand-tight. The nut should turn freely until it is bottomed out.
5. Torque fitting further to a given torque value in the table shown in the opposite column.

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

6. When assembling unions or two hoses together, three wrenches will be required.
7. Check the final condition of the fitting.

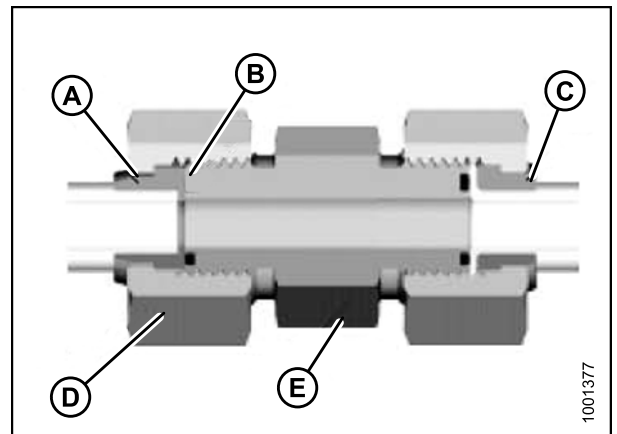


Figure 5.10

A - Brazed sleeve
C - Two piece sleeve
E - Fitting body

B - O-ring
D - Nut

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Table 5.13 O-Ring Face Seal (ORFS) Hydraulic Fittings

| SAE Dash Size | THREAD Size (in.) | Torque Value ²⁵ | |
|---------------|-------------------|----------------------------|---------|
| | | ft·lbf (*in·lbf) | N·m |
| -3 | ²⁶ | – | – |
| -4 | 9/16–18 | 18–21 | 25–28 |
| -5 | ²⁶ | – | – |
| -6 | 11/16–16 | 29–32 | 40–44 |
| -8 | 13/16-16 | 41–45 | 55–61 |
| -10 | 1–14 | 59–65 | 80–88 |
| -12 | 1-3/16-12 | 85–94 | 115–127 |
| -14 | ²⁶ | – | – |
| -16 | 1-7/16-12 | 111–122 | 150–165 |
| -20 | 1-11/16-12 | 151–167 | 205–226 |
| -24 | 2–12 | 232–256 | 315–347 |
| -32 | 2-1/2-12 | 376–414 | 510–561 |

5.1.2 Recommended Fuel, Fluids, and Lubricants

Storing Lubricants and Fluids

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.

25. Torque values and angles shown are based on lubricated connection, as in reassembly.

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

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Fuel Specifications

Table 5.14 Fuel Specification

| Fuel | Specification | Sulphur (by weight) | Water and Sediment (by volume) | Cetane No. °C | Lubricity |
|---|---------------|-------------------------------------|--------------------------------|---|-------------|
| Diesel Grade No. 2 | ASTMD-975 | 0.5% Max. | 0.05% Max. | 40° Min | 520 Microns |
| Diesel Grade No.1 and 2 mix ²⁷ | n/a | 1% Maximum 0.5% Max.Preferred | 0.1% Max. | 45–55° Cold Weather / High Altitude | 460 Microns |

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 the situations where additives can prove useful are the following:

- 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.

Lubricants Fluids System Capacities

Refer to

Table 5.15 System Capacities

| Lubricant / Fluid | Location | Description | Capacity |
|-------------------|---|--|-------------------------------|
| Grease | As Required Unless Otherwise Specified. | SAE Multi-Purpose.High Temperature Extreme Pressure (EP2) Performance With 1% Max Molybdenum Disulphide (NLGI Grade 2) Lithium Base. | |
| Diesel Fuel | Fuel Tank | Diesel Grade No.2, or Diesel Grade No.1 & 2 mix ²⁸ ; See Fuel Specifications, page 267 for more information. | 97 U.S. Gallons (378 liters) |
| Hydraulic Oil | Hydraulic Reservoir | SAE 15W-40 Compliant With SAE Specs For API Class CJ-4 Engine Oil which Meets or Exceeds CES20081 and API Performance Classification CJ-4. | 17.2 U.S. Gallons (66 liters) |

27. Optional when operating temp below 0°C. (32°F)

28. Optional when operating temp below 0°C. (32°F).

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| Lubricant / Fluid | Location | Description | Capacity |
|---|--|--|--|
| Gear Lubricant | Gear Box | SAE 75W-90, API Service Class GL-5. Fully Synthetic Gear Lubricant, (SAE J2360 Preferred). | 2.2 U.S. Quarts (2.1 liters) |
| | Drive Wheel ²⁹ | | 1.5 U.S. Quarts (1.4 liters) |
| Anti Freeze | Engine Cooling System | ASTM D-6210 and Fleetguard ES Compleat®. See Below. | 6.6 U.S. Gallons (25 liters) ³⁰ |
| Engine Oil | Engine Oil pan | SAE 15W-40 Compliant With SAE Specs For API Class SJ and CH-4 Engine Oil. | 11.6 U.S. Quarts (11 liters) |
| Air Conditioning Refrigerant ³¹ | Air Conditioning System | R134A | 5 lbs (2.27 kg) |
| Air Conditioning Compressor Oil ³² | Air Conditioning System Total Capacity | PAG SP-15 | 8.1 fl. oz. (240 cc) |

If Fleetguard ES Compleat® is unavailable, use a coolant concentrate or prediluted coolant intended for use with heavy duty diesel engines and with a minimum of the following chemical and physical properties:

- Is formulated with a quality nitrite free additive package.
- Provides cylinder cavitation protection according to fleet study run at or above 60% load capacity.
- Protects the cooling system metals (cast iron, aluminum alloys, and copper alloys such as brass) from corrosion.

The additive package must be part of one of the following coolant mixtures:

- Ethylene glycol or propylene glycol base prediluted (40–60%) heavy duty coolant.
- Ethylene glycol or propylene glycol base heavy duty coolant concentrate in a 40–60% mixture of concentrate with quality water.

Water quality is important to the performance of the cooling system. Distilled, deionized, or demineralized water is recommended for mixing with ethylene glycol and propylene glycol base engine coolant concentrate.

IMPORTANT

Do NOT use cooling system sealing additives or antifreeze that contains sealing additives. Do NOT mix ethylene glycol and propylene glycol base coolants. Do NOT use coolants that contain nitrites.

Filter Part Numbers

Table 5.16 Filter Part Numbers M155

| Filter | Part Number |
|-------------------|-------------|
| Engine Oil Filter | MD #111974 |
| Charge Oil Filter | MD #112419 |
| Return Oil Filter | MD #151975 |

29. SAE 85W-140 API Service Class GL-5. Extreme Pressure Gear Lubricant is used before initial change.

30. Equal Parts With Water, High quality, soft, de-ionized or distilled water as recommended by Supplier.

31. For prior models who have not upgraded to 5 lbs of refrigerant order Kit MD #183180, which includes decal to advise of systems 5 lbs charge requirement . See SB 1254

32. Check to see if oil is present prior to installation. A new compressor (**MD #109617**) comes from the MacDon Parts System with 8.1 fl oz. (240 cc) of PAG SP-15 refrigerant oil inside of it.

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| Filter | Part Number |
|-------------------------------|-------------|
| Primary Fuel Filter Element | MD #111972 |
| Fuel Strainer Filter | MD #111608 |
| Secondary Fuel Filter Element | MD #166312 |
| Fuel Filler Filter | MD #163989 |
| Primary Element (CAB) | MD #111060 |
| Primary Air Filter Element | MD #111954 |
| Safety Air Filter Element | MD #111955 |

5.1.3 Conversion Chart

| Quantity | Inch-Pound Units | | Factor | SI Units (Metric) | |
|-------------|-----------------------------|------------------|---------------------------------------|---------------------|-----------------------|
| | Unit Name | Abbreviation | | Unit Name | Abbreviation |
| Area | acres | acres | $\times 0.4047 =$ | hectares | ha |
| Flow | US gallons per minute | gpm | $\times 3.7854 =$ | liters per minute | L/min |
| Force | pounds force | lbf | $\times 4.4482 =$ | Newtons | N |
| Length | inch | in. | $\times 25.4 =$ | millimeters | mm |
| | foot | ft. | $\times 0.305 =$ | meters | m |
| Power | horsepower | hp | $\times 0.7457 =$ | kilowatts | kW |
| Pressure | pounds per square inch | psi | $\times 6.8948 =$ | kilopascals | kPa |
| | | | $\times .00689 =$ | megapascals | MPa |
| | | | $\div 14.5038 =$ | bar (non-SI) | bar |
| Torque | pound feet or foot pounds | ft·lbf | $\times 1.3558 =$ | newton meters | N·m |
| | pound inches or inch pounds | in·lbf | $\times 0.1129 =$ | newton meters | N·m |
| Temperature | degrees fahrenheit | °F | $(^{\circ}\text{F}-32) \times 0.56 =$ | Celsius | °C |
| Velocity | feet per minute | ft/min | $\times 0.3048 =$ | meters per minute | m/min |
| | feet per second | ft/s | $\times 0.3048 =$ | meters per second | m/s |
| | miles per hour | mph | $\times 1.6063 =$ | kilometres per hour | km/h |
| Volume | US gallons | US gal | $\times 3.7854 =$ | liters | L |
| | ounces | oz. | $\times 29.5735 =$ | milliliters | ml |
| | cubic inches | in. ³ | $\times 16.3871 =$ | cubic centimetres | cm ³ or cc |
| Weight | pounds | lbs | $\times 0.4536 =$ | kilograms | kg |

MAINTENANCE AND SERVICING

5.2 Engine Compartment Hood

The engine hood has two open positions. The lowest 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.

5.2.1 Opening Hood (Lower 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.

1. Shut down the engine and remove the key.
2. Locate latch (A) behind grill and lift to release hood.
3. Raise hood until strap (B), which should be looped under hooks (C) and (D), stops it at approximately a 40° angle.
4. Remove strap from hook (C) and allow hood to raise slightly further.

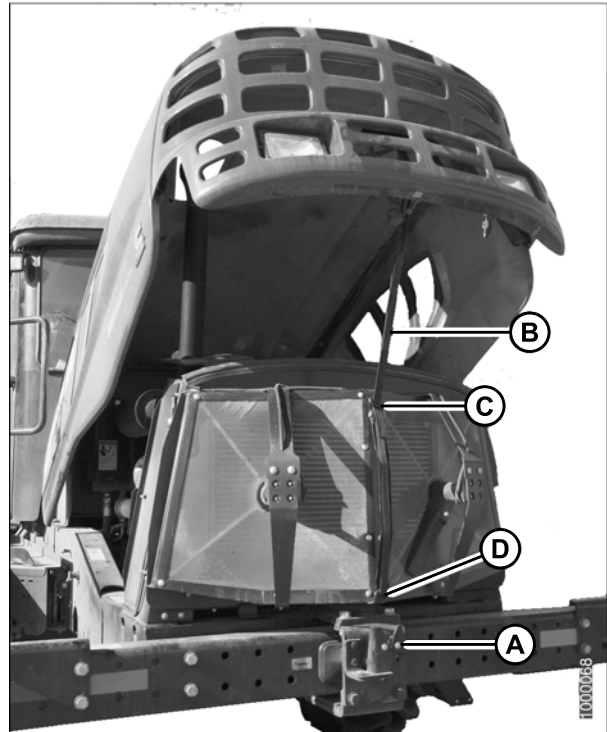


Figure 5.11

MAINTENANCE AND SERVICING

5.2.2 Closing Hood (Lower Position)

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).

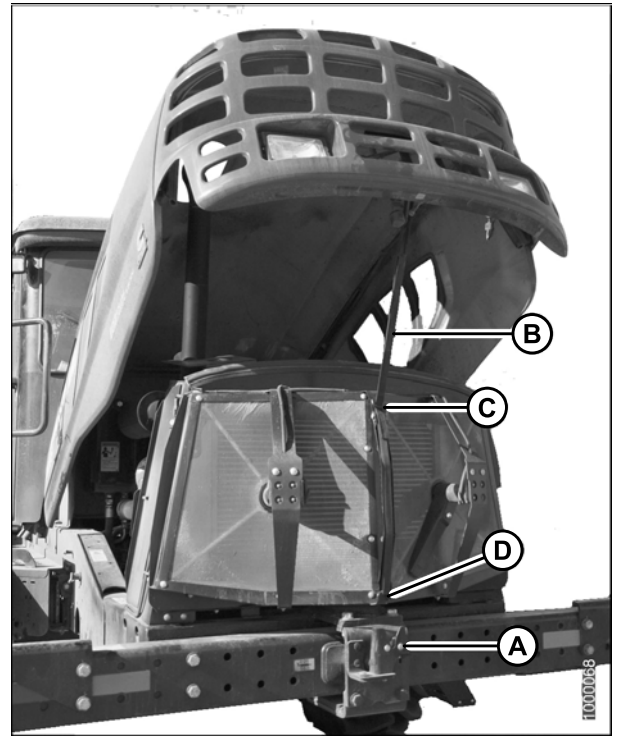


Figure 5.12

5.2.3 Opening Hood (Highest 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.

1. shut down the engine and remove key.
2. Locate latch (A) behind grill, and lift to release hood.
3. Raise hood until strap (B) [which should be looped under hooks (C) and (D)], stops it at approximately a 40° angle.
4. Remove strap from hook (C), and allow hood to raise slightly further.
5. Remove strap from hook (D), and allow hood to raise fully to approximately 65°.

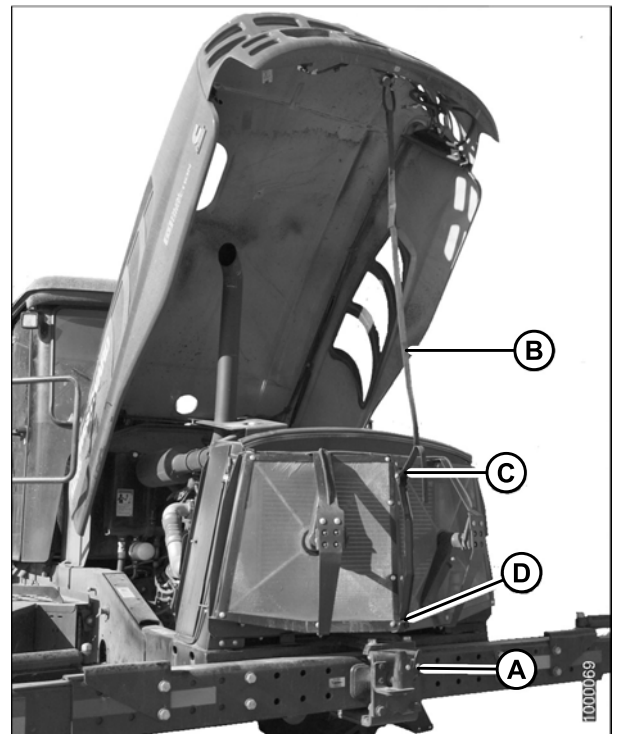


Figure 5.13

MAINTENANCE AND SERVICING

5.2.4 Closing Hood (Highest Position)

1. Pull down on strap (B), and loop under lower hook (D).
2. Grasp the strap, and loop under upper hook (C).

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).

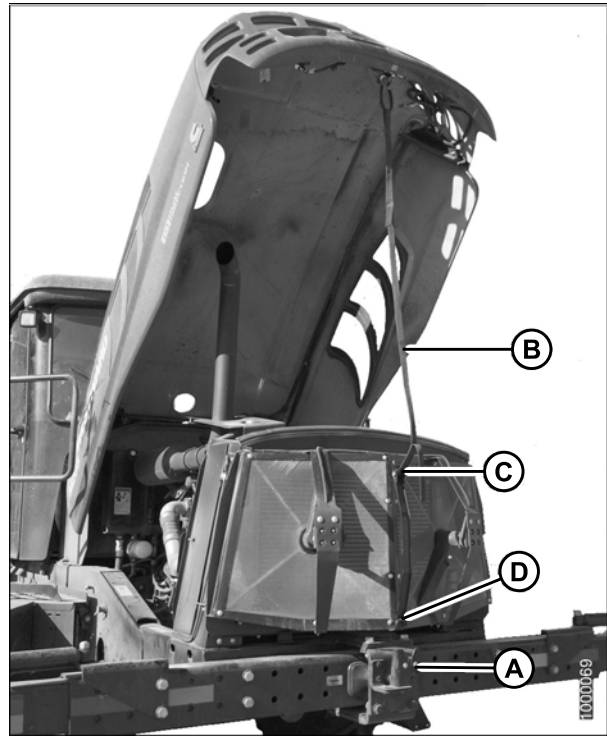


Figure 5.14

MAINTENANCE AND SERVICING

5.3 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.

To improve access to the hydraulics plumbing or battery, the platforms can be swung away from the windrower. Left side cab-forward platform shown.

The maintenance platforms have two positions:

1. Standard
2. Major Service

5.3.1 Opening Platforms (Standard Position)

1. Locate the swing away platform / stair units (A) that you want to move.

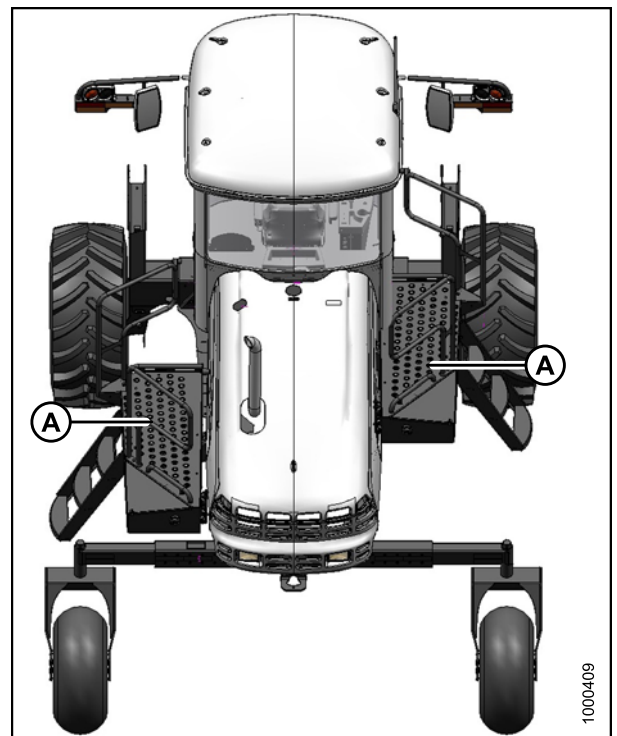


Figure 5.15

MAINTENANCE AND SERVICING

2. Push latch (A) down and pull platform (B) toward walking beam until it stops and latch re-engages in open position.

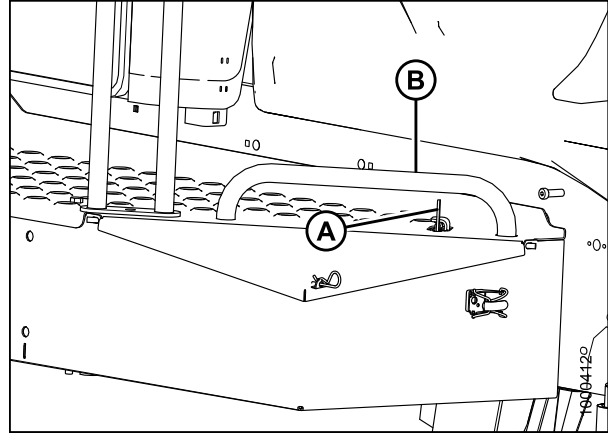


Figure 5.16

5.3.2 Closing Platforms (Standard Position)

1. Close the platform (A).

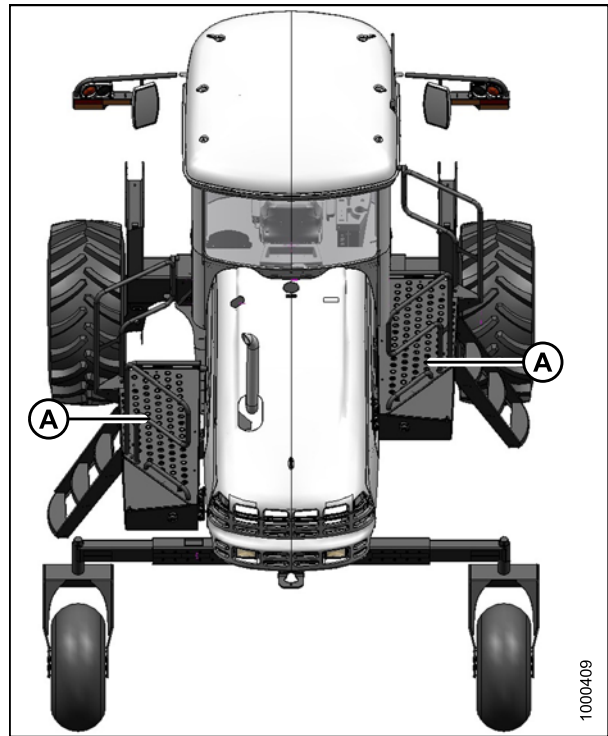


Figure 5.17

MAINTENANCE AND SERVICING

2. Move platform (B) forward until it stops and latch (A) re-engages.

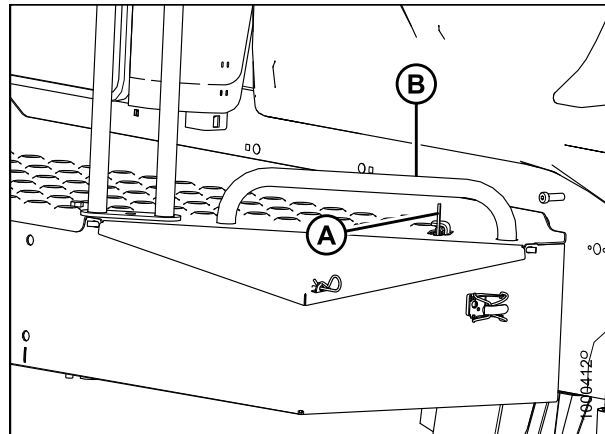


Figure 5.18

5.3.3 Opening Platforms (Major Service Position)

To improve access to the hydraulics plumbing or battery, the platforms can be swung away from the windrower.

1. Open the hood, see [5.2.1 Opening Hood \(Lower Position\)](#), page 270.

IMPORTANT

Failure to open hood will result in damage to the hood when the platform is repositioned.

2. Locate the swing away platform / stair units (A) that you want to move.

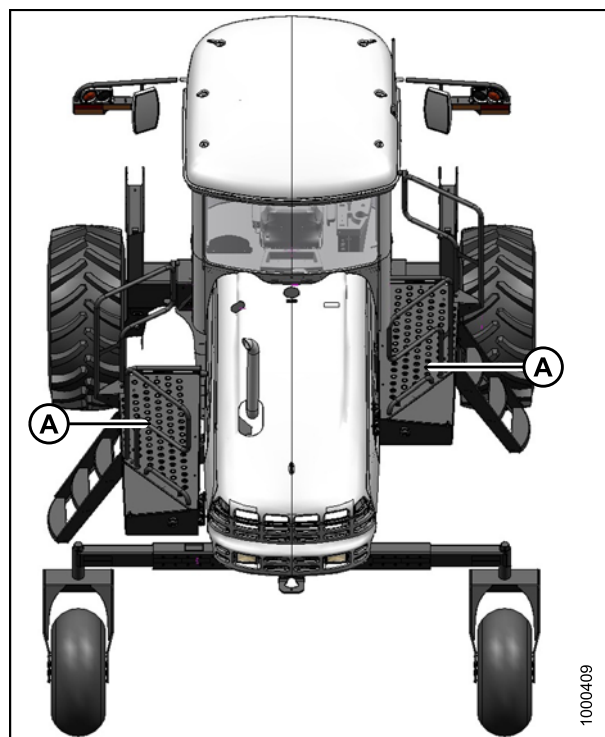


Figure 5.19

MAINTENANCE AND SERVICING

3. Unlock latch (A) and move platform (B) toward open position but do not lock in full aft position.

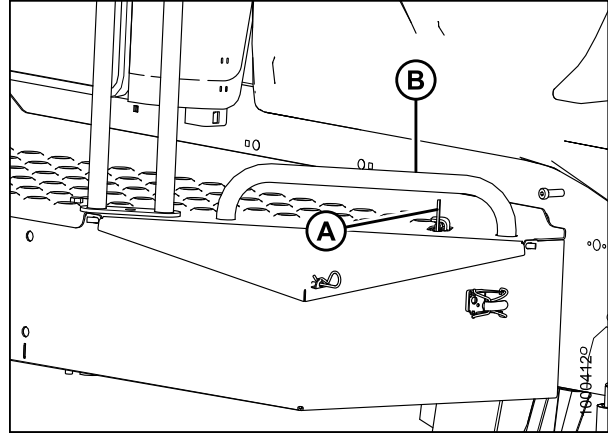


Figure 5.20

4. Remove the nut and bolt that secures the link (A) to the frame. Swing link (A) out of the way.
5. Pull the front (cab-forward) end of platform away from frame while moving it towards the walking beam. Aft corner (B) of platform should project slightly into engine bay when optimum opening is reached.

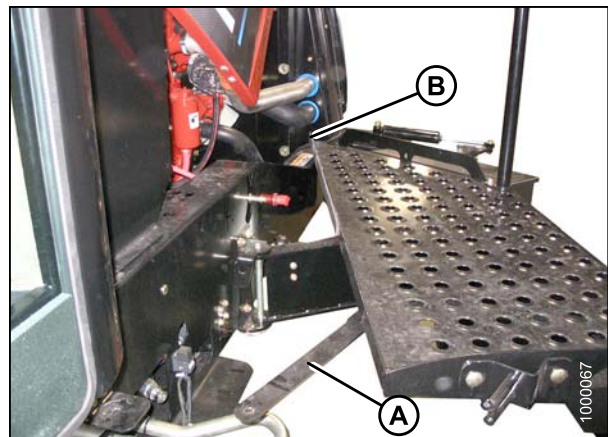


Figure 5.21

5.3.4 Closing Platforms (Major Service Position)

CAUTION

Do not stand on the platform in the unlocked position. It is unstable and may result in a fall.

1. Push the front (cab-forward) end of platform towards the frame while moving the platform forward (cab-forward).
2. Position link (A) on bracket and install bolt and nut. Tighten enough so that link can still swivel on bracket.

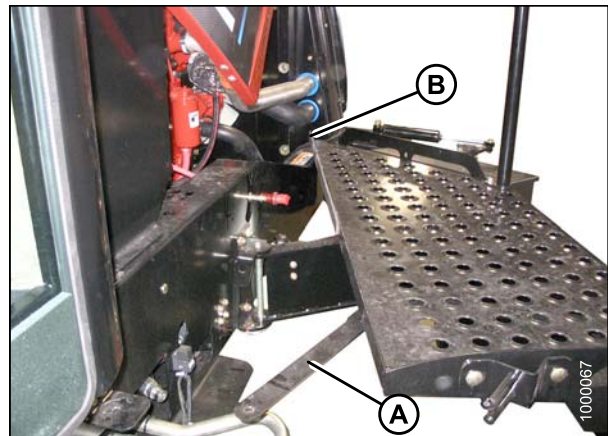


Figure 5.22

MAINTENANCE AND SERVICING

3. Move platform (B) forward (cab-forward) until it stops and latch (A) re-engages.
4. Close the hood, see [5.2.2 Closing Hood \(Lower Position\)](#), page 271.

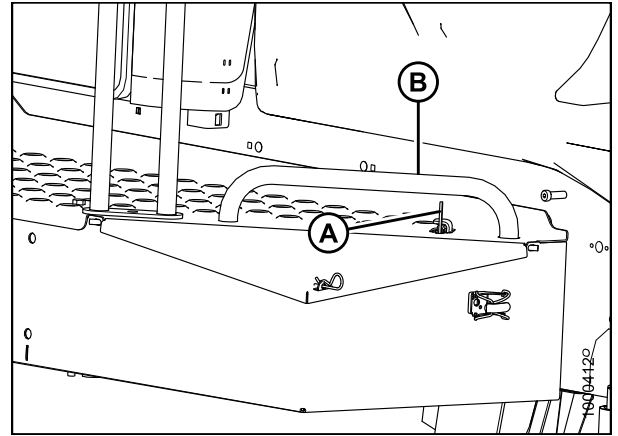


Figure 5.23

MAINTENANCE AND SERVICING

5.4 Lubricating the Windrower



WARNING

To avoid personal injury, before servicing windrower or opening drive covers, follow procedures in SAFETY section.

The greasing points are marked on the machine by decals showing a grease gun and grease interval in hours of operation.

Log hours of operation, and use the Maintenance Checklist provided to keep a record of scheduled maintenance. Refer to [5.11.2 Interval Maintenance, page 381](#).

5.4.1 Lubrication 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.

1. Wipe grease fitting with a clean cloth before greasing, to avoid injecting dirt and grit.
2. Inject grease through fitting with grease gun until grease overflows fitting, except where noted. See [Lubricants Fluids System Capacities, page 267](#).
3. Leave excess grease on fitting to keep out dirt.
4. Replace any loose or broken fittings immediately.
5. If fitting will **not** take grease, remove and clean thoroughly. Also clean lubricant passageway. Replace fitting if necessary.

5.4.2 Lubrication Points

Refer to the following illustrations to identify various locations that require lubrication.

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Figure 5.24: Lubrication Points

A - Walking Beam Pivot

B - Formed Caster Wheel 1 Place (Both wheels)

B- Forked Caster Wheel 2 Places (Both Wheels)

C- Caster Pivot (Both Sides)

D - Top Link 2 Places (Both Sides)

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5.5 Operator's Station

5.5.1 Seat Belts

1. Keep sharp edges and items that can cause damage away from the belts.
2. From time to time, check belts, buckles, retractors, tethers, slack take-up system and mounting bolts for damage.
3. Replace all parts that have damage or wear.
4. Replace belts that have cuts that can weaken the belt.
5. Check that bolts are tight on the seat bracket or mounting.
6. 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.

5.5.2 Safety Systems

Perform the following checks on the Operator's presence and engine lock-out systems annually or every 500 hours - whichever occurs first.

Operator Presence System

1. While the windrower engine running, place the GSL in NEUTRAL, and turn the steering wheel until it locks.
2. With everyone clear of the machine, engage header drive switch:
 - a. After header drives are running, stand up out of the seat. In approximately 5 seconds, the header should shut off.
 - b. 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.
3. With the engine running, position the GSL in NEUTRAL, and in N-DETENT:
 - a. Swivel the Operator's station, but do not lock into position.
 - b. 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".
 - c. Swivel and lock the Operator's station, and the display should return to normal.
 - d. If the engine does **not** shut down, the seat position switches require adjustment. See your MacDon Dealer.
4. With the windrower moving at less than 5 mph (8 km/h):
 - a. Stand up out of the seat.
 - b. 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.
 - c. If the engine does **not** shut down, the Operator Presence System requires adjustment. See your MacDon Dealer.
5. With the windrower moving at more than 5 mph (8 km/h):
 - a. Stand up out of the seat.
 - b. The CDM beeps once and displays "NO OPERATOR" on the lower line.
 - c. If **not**, the Operator Presence System requires adjustment. See your MacDon Dealer.

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Engine Interlock

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.

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).

5.5.3 GSL Adjustments

The GSL should easily move into the N-DETENT by itself. Adjust the lateral pivot resistance if it does not.

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.

1. Remove the five screws (A) securing control panel (B) to console, remove panel, and store in the tray.

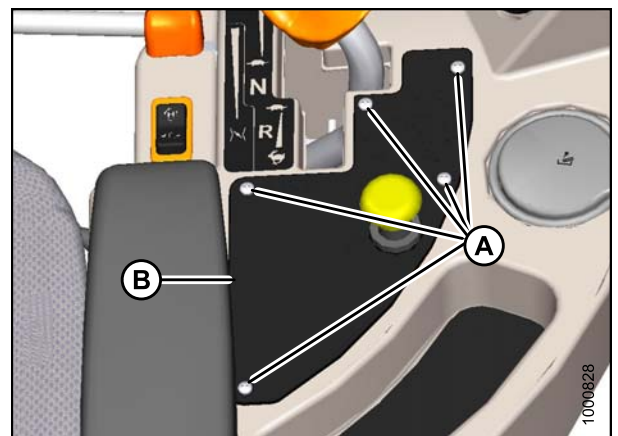


Figure 5.25

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2. Back off the jam-nut (A), and turn nut (B) to either tighten or loosen the pivot. The nut should be tightened to snug, and then backed-off 1/2 turn.
3. Tighten jam-nut (A).
4. Check movement of GSL.

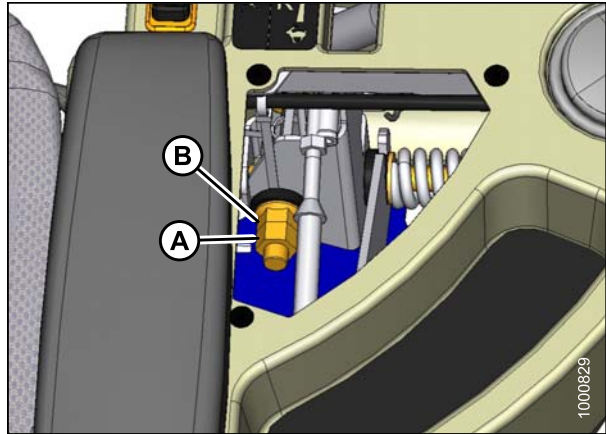


Figure 5.26

5. Re-install the control panel (B) with the five screws (A).

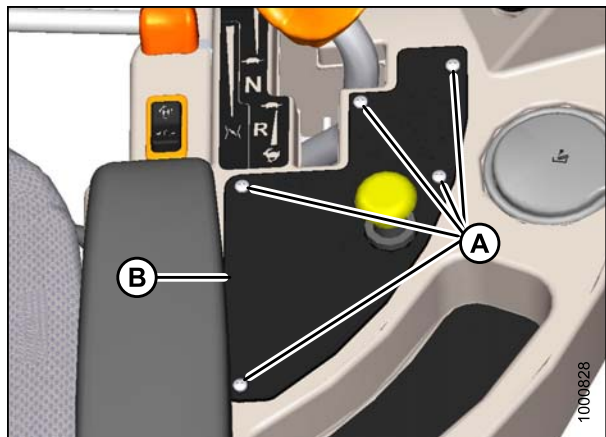


Figure 5.27

GSL Fore-Aft Movement

The GSL should remain as positioned by the Operator, and yet can be moved without excessive force.

Adjust as follows:

1. Pull handle (A) toward the Operator's seat and move the console fully forward to ease accessibility from the underside of the console.

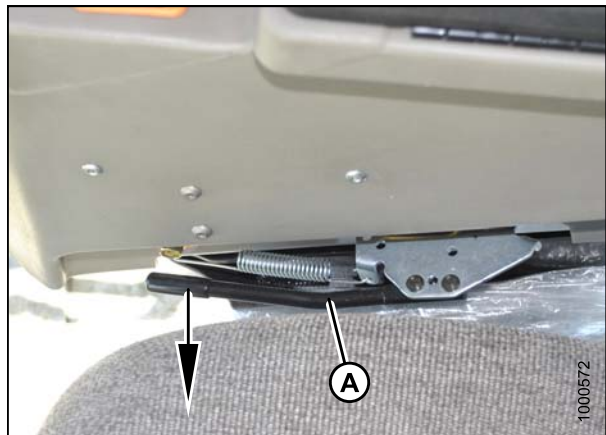


Figure 5.28

MAINTENANCE AND SERVICING

2. Set spring dimension (B) to 1.25 in. (32 mm).
3. To increase the pivot resistance, turn the nut (A) clockwise to compress the spring.
4. To decrease the resistance, turn the nut (A) counterclockwise to release the spring tension.

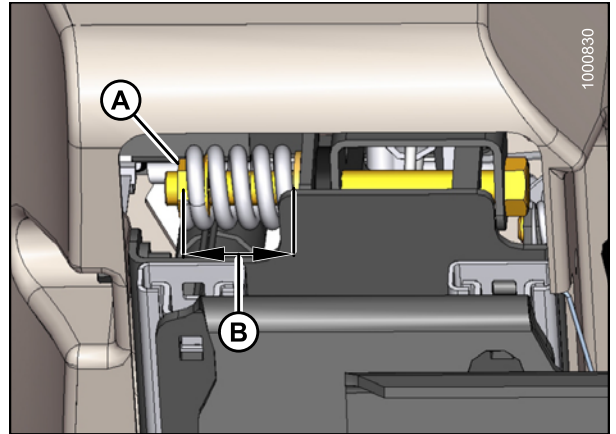


Figure 5.29

5.5.4 Steering Adjustments

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.

1. Place GSL (A) in N-DETENT, shut down engine, and remove key.
2. Beneath the cab, check for evidence of interference of moving parts with hoses, tubes, other linkages.



Figure 5.30

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3. Check steering rod bolts (A) for looseness, and ball joints (B) for any perceptible play or movement.

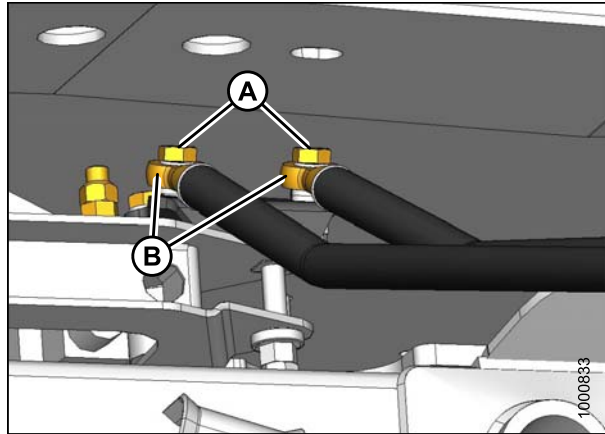


Figure 5.31: Steering Rods

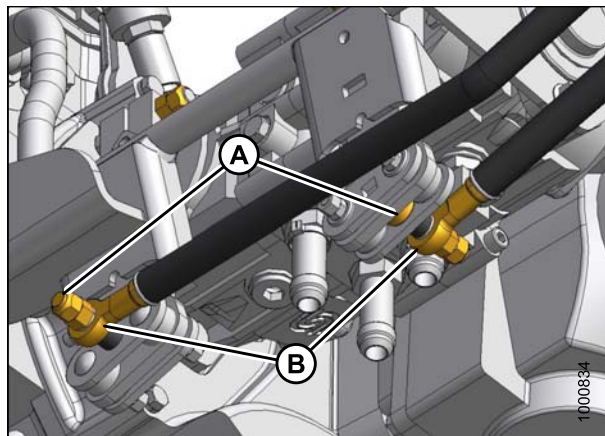


Figure 5.32: Steering Rods (Pump End)

4. Check steering link bolts (A) for looseness, and ball joints (B) for any perceptible play or movement.

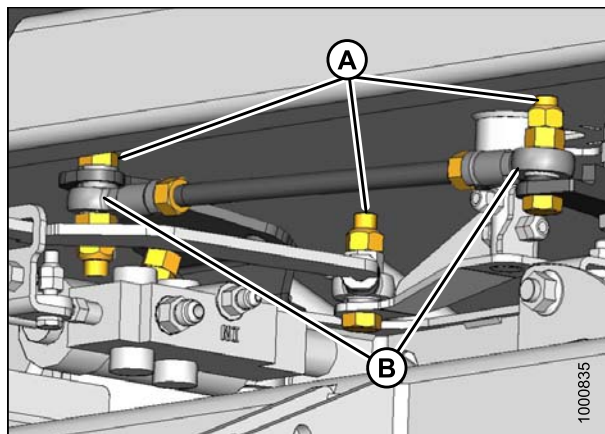


Figure 5.33

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5. If bolts are loose:
 - a. Back off jam-nut (A).
 - b. Tighten inside nut (B) to 70–80 ft·lbf (95–108 N·m).
 - c. Hold inside nut (B), and tighten jam-nut (A) to 60–70 ft·lbf (81–95 N·m).
6. If steering link ball joints 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.

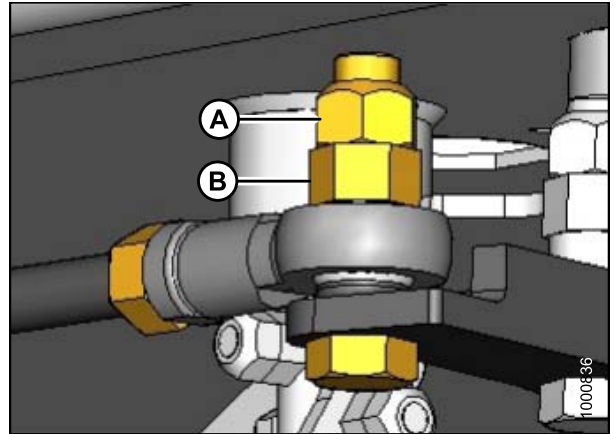


Figure 5.34

7. After replacing parts or making adjustments, perform checks for Neutral interlock and steering lock. Refer to [5.5.2 Safety Systems, page 280](#).

Steering Chain Tension



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. 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:

2. Swivel the Operator's station to position steering column close to the door.
3. At the base of the steering column, check dimension "C" at spring. It should be 5/8 inches (16 mm).

Adjust dimension as follows:

- a. Loosen nut (A), and turn nut (B) to achieve 5/8 inches (16 mm) dimension.
- b. Tighten nut (A) against nut (B) to secure position.
- c. Check that steering chain is taut, and steering shaft is free to rotate.

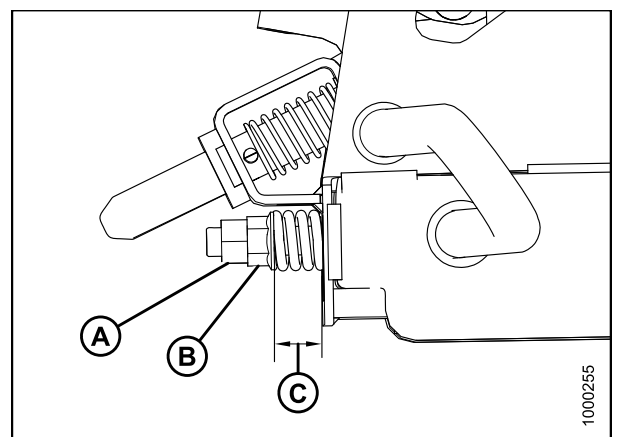


Figure 5.35

MAINTENANCE AND SERVICING

5.5.5 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.

Interlock Switch

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.

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.

Adjust or replace switch as follows:

1. Place GSL in N-DETENT, shut down engine and remove key.
2. Remove the five screws (A) securing control panel (B) to console, remove panel, and store in the tray.



Figure 5.36

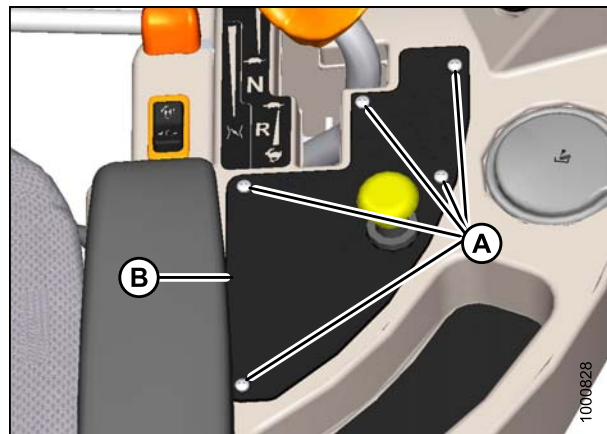


Figure 5.37

MAINTENANCE AND SERVICING

3. From inside the console, pull switch support (A) so that rubber nuts (B) pull out of mounting holes, and remove switch complete with support from console.

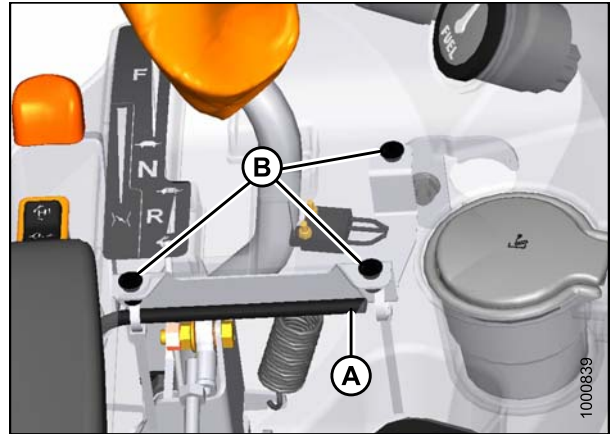


Figure 5.38

4. Adjust switch (A) as follows:
 - a. Loosen screws (B), and rotate switch on support sufficiently so that GSL will contact switch lever (C), and push in the plunger.
 - b. Tighten screws (B).

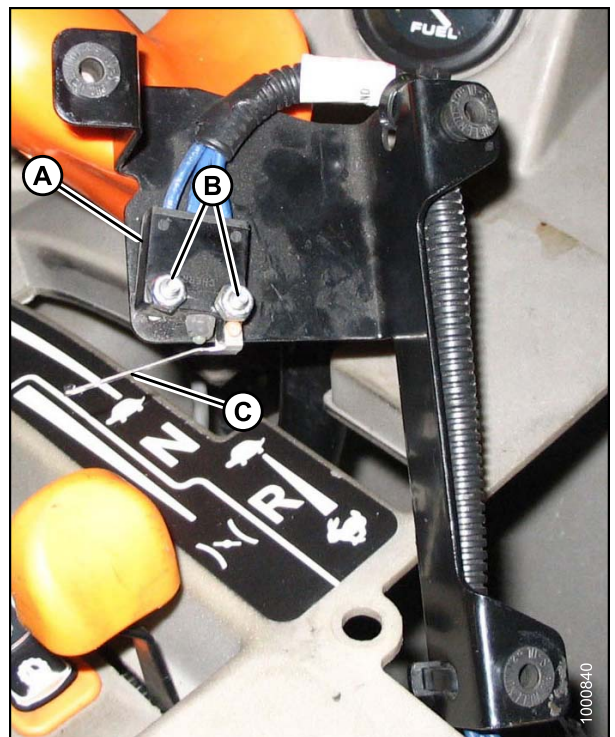


Figure 5.39

MAINTENANCE AND SERVICING

If necessary, replace switch as follows:

5. Disconnect wiring harness at connector (C).
6. Cut nylon ties (A).
7. Remove screws (B), and remove switch.
8. Install new switch on support with screws (B).
9. Secure harness to support (D) with nylon ties (A).
10. Connect harness to console wiring (C).

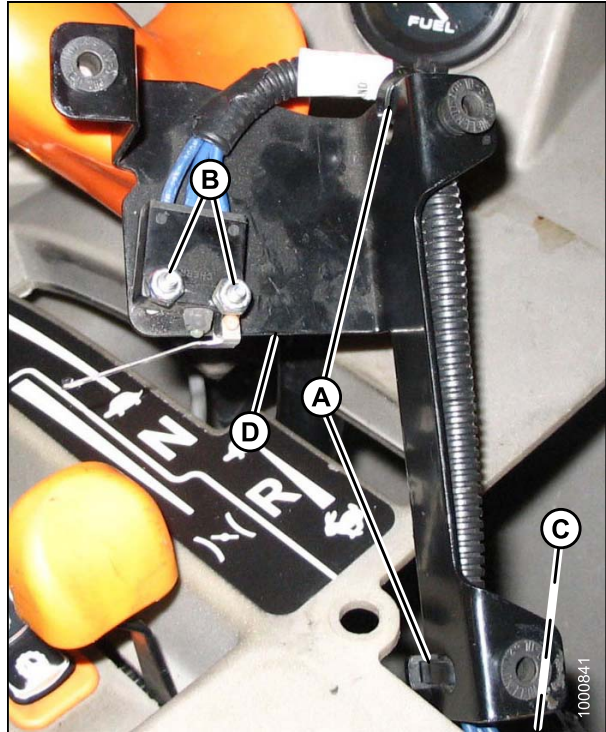


Figure 5.40

11. Position switch support (A) inside console, and push rubber nuts (B) into holes.
12. Check operation of switch.

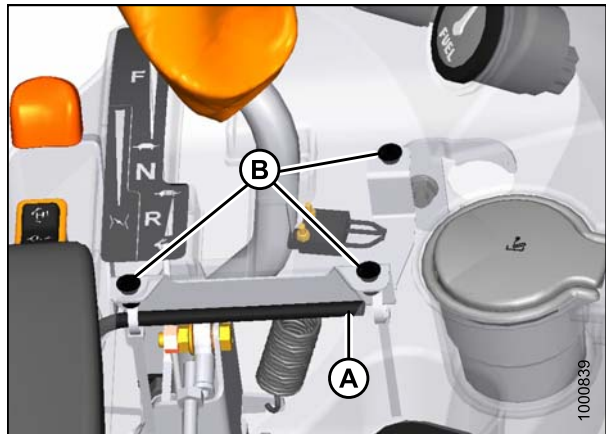


Figure 5.41

MAINTENANCE AND SERVICING

13. Re-install control panel (B) with five screws (A).

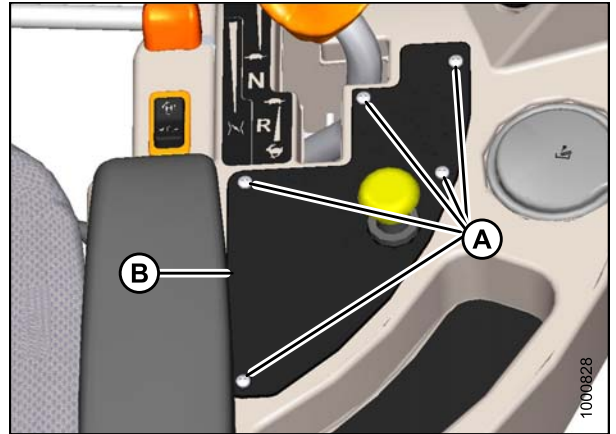


Figure 5.42

5.5.6 HVAC System

Fresh Air Intake Filter

The fresh air filter is located outside the right rear of the cab, and should be serviced every 50 hours under normal conditions, and more frequently in severe conditions.

Removing Fresh Air Filter



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. Open the right-hand platform (see [5.3.1 Opening Platforms \(Standard Position\)](#), page 273).
2. Rotate latch (A), and slide filter tray (B) out of the housing.

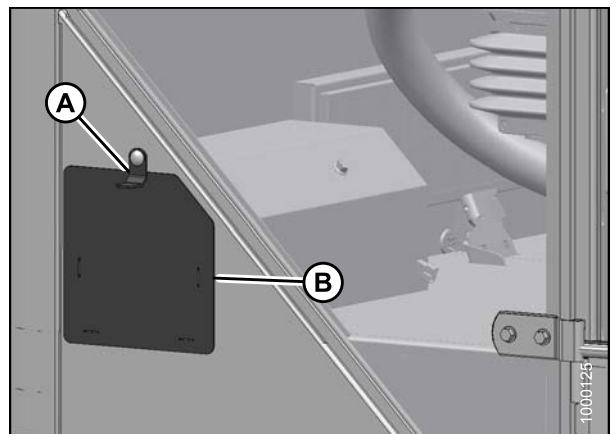


Figure 5.43

MAINTENANCE AND SERVICING

3. Remove filter (A) from tray (B).

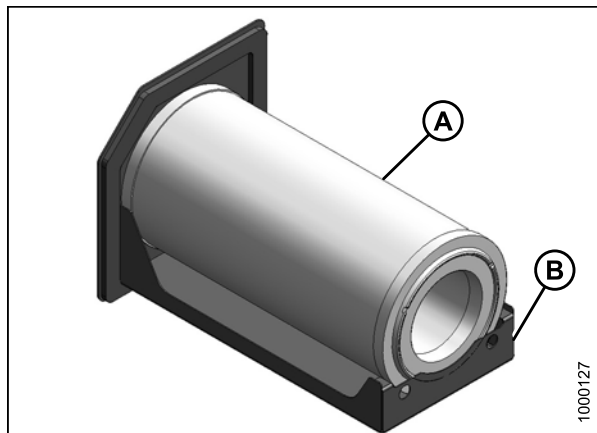


Figure 5.44

Inspecting And Cleaning Fresh Air Filter Element

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. 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. Repeat inspection before installing.

If element passes inspection, clean element with compressed air not exceeding 60 psi (400 kPa), using a Dry Element Cleaner Gun. Hold nozzle next to inner surface only, and move up and down on pleats. The filter element should be replaced after three cleaning's or at the specified interval.

Installing Fresh Air Filter

1. Clean tray (B) and interior of filter housing.
2. Place filter (A) onto tray (B).

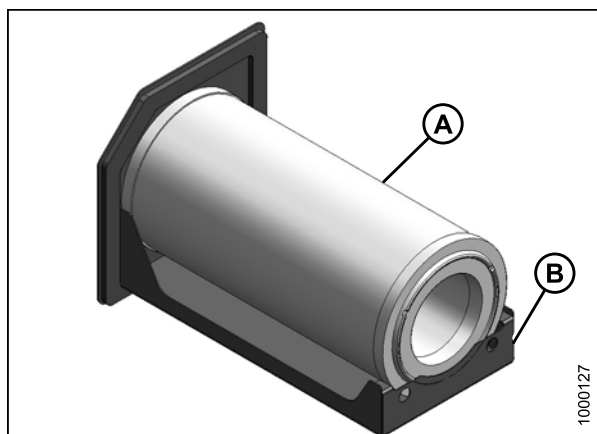


Figure 5.45

MAINTENANCE AND SERVICING

3. Slide filter tray (B) into housing.
4. Close and latch housing door (A).

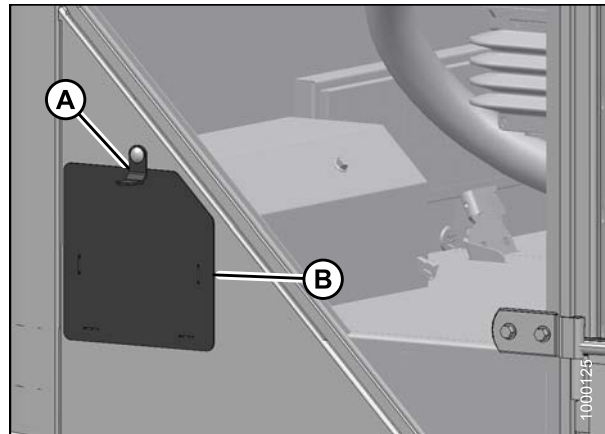


Figure 5.46

Return Air Cleaner/Filter

The return air cleaner/filter is located behind the Operator's seat on the cab wall, and should be serviced every 100 hours as follows:

Removing and Installing Return Air Filter/Cleaner



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. Unscrew the two knobs (A) attaching cover and filter to cab wall, and remove the cover and filter assembly (B).

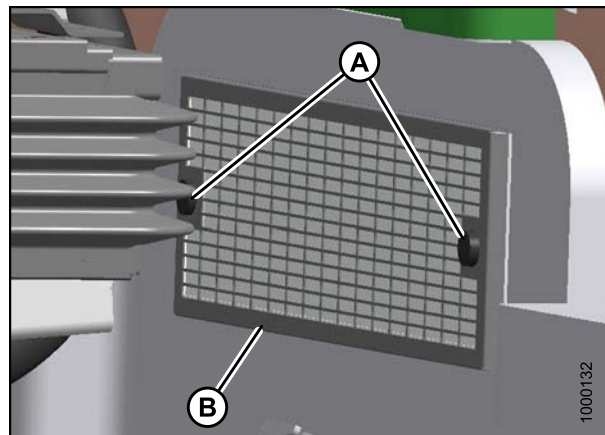


Figure 5.47

2. Separate the filter (B) from the cover (A).
3. Clean or replace filter. If cleaning filter, see [Cleaning Return Air Cleaner, page 292](#).
4. Assemble the cleaner (B) and cover (A), and position on cab wall over opening.

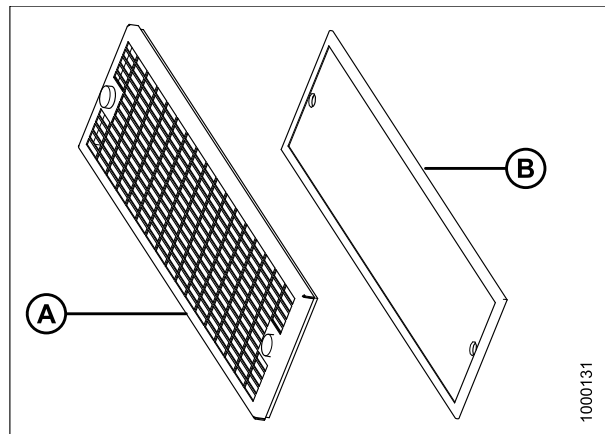


Figure 5.48

MAINTENANCE AND SERVICING

5. Secure filter assembly (B) to cab wall with knobs (A).

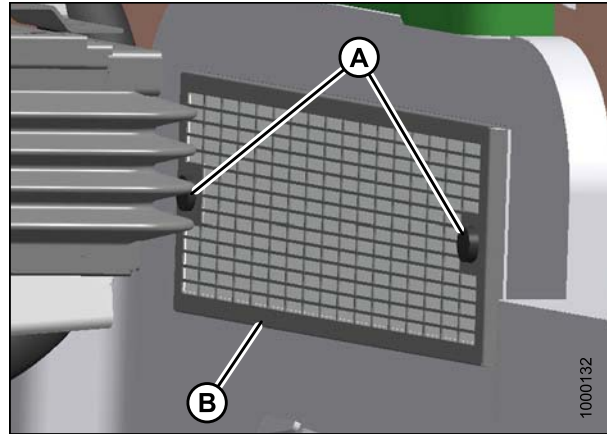


Figure 5.49

Cleaning Return Air Cleaner

Clean the electrostatic filter as follows

1. Mix a solution of warm water and detergent in a suitable container so that the filter (B) 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.

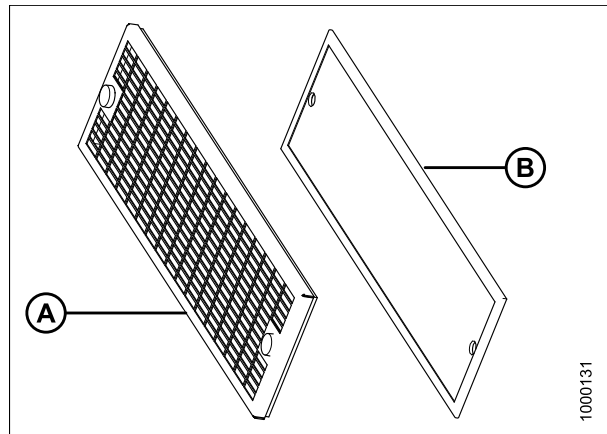


Figure 5.50

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 [5.7 Engine Cooler Box, page 326](#).

MAINTENANCE AND SERVICING

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, and it is accessed by removing the A/C cover.

Removing A/C Cover

1. Loosen the clamps (A) on the two drain hoses, and pull the hoses off the air conditioning drain tubes.

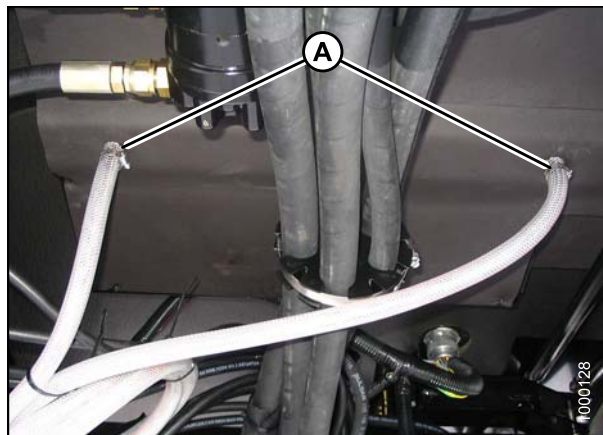


Figure 5.51

2. Remove the eight screws (A) that attach the cover (B) and remove the cover.

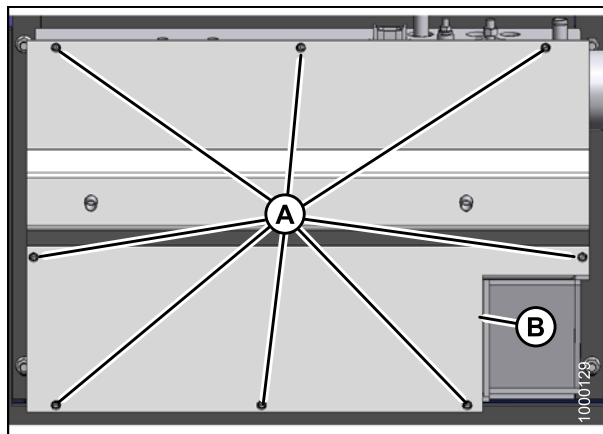


Figure 5.52

MAINTENANCE AND SERVICING

Cleaning A/C Evaporator Core

WARNING

To avoid cuts from evaporator fins, do not use bare hands to brush away clogs.

1. Use a vacuum or compressed air to remove dirt from inside the unit.
2. 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.
3. Repeat the previous step from the side opposite the blowers.
4. If dirt is still present, soak evaporator in water to loosen dirt, and then blow out with compressed air.

Installing A/C Cover

1. Straighten any bent fins.
2. Reposition cover (B), and attach with eight screws (A).

3. Re-attach drain hoses to drain tubes, and secure with hose clamps (A).

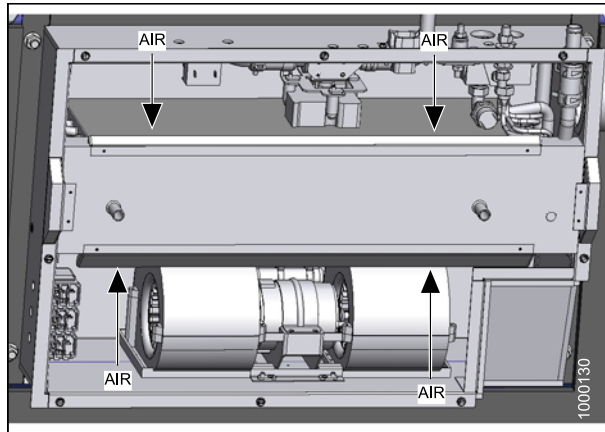


Figure 5.53

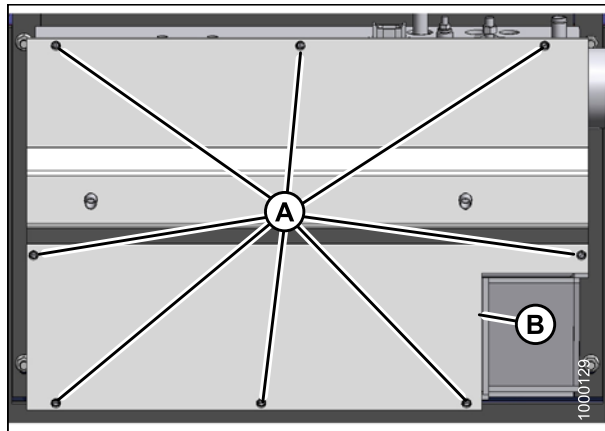


Figure 5.54

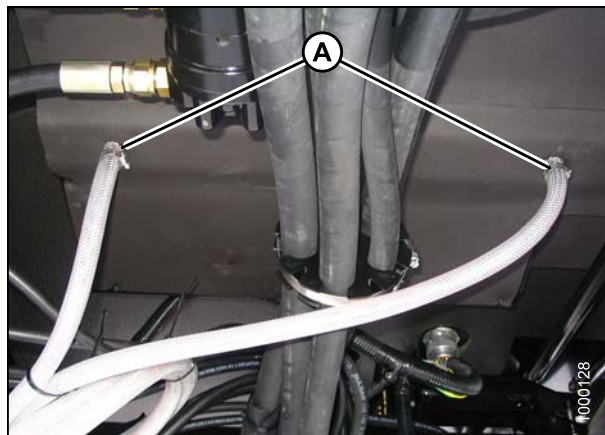


Figure 5.55

MAINTENANCE AND SERVICING

Protecting A/C Compressor

The compressor is protected from excessively low suction and high discharge pressures by two switches. If the system requires servicing, refer to the Technical Manual or see your MacDon Dealer:

- Low pressure switch is normally closed with an A/C charge in the system. It is located at the outlet of the evaporator (under cab in A/C box). It will open when the pressure falls to 2–8 psi (14–55 kPa) and close when pressure rises above 15–25 psi (103–172 kPa).
- High pressure switch is normally closed with an A/C charge in the system and is located on the receiver drier (RH frame rail, behind back of fuse panel). It opens if pressure exceeds 360–380 psi (2482–2620 kPa) on rising pressure. It will close when pressure falls below 220–280 psi (1517–1931 kPa) on falling pressure.

Servicing the A/C Compressor

1. Refer to [Replacing A/C Compressor Belt, page 325](#) for procedure.
2. See your MacDon Dealer or your Technical Service Manual for all other servicing procedures

MAINTENANCE AND SERVICING

5.6 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.

5.6.1 General Engine Inspection

Engine inspection should be performed by your MacDon Dealer.

Refer to your Engine Manual for further information. (Owner's Manual QSB 4.5 and QSB 6.7 Engine Cummins # 4021531 supplied with your machine).

5.6.2 Turning Engine Manually

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.

IMPORTANT

Ensure nothing falls into gearbox oil reservoir.

1. Open the hood, see [5.2.1 Opening Hood \(Lower Position\)](#), page 270.
2. Remove the red plastic covers (A) from the positive cable clamps. Loosen the clamps and remove cable from batteries.

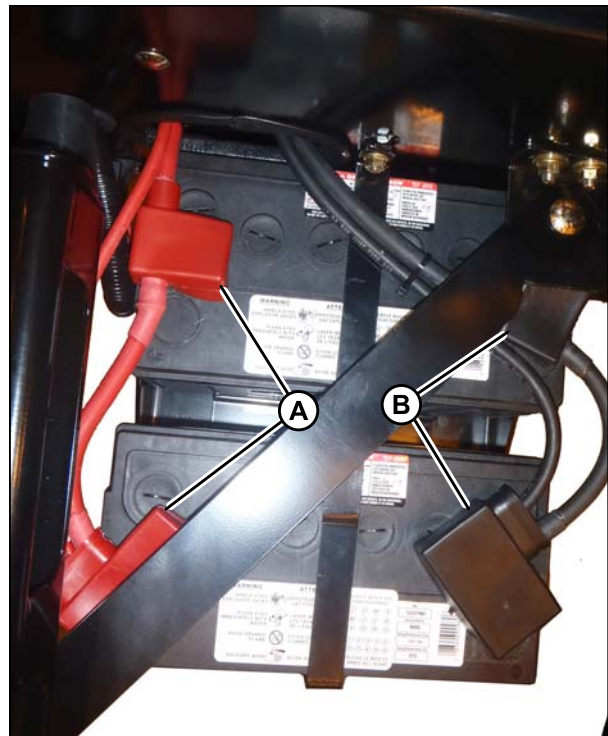


Figure 5.56

MAINTENANCE AND SERVICING

- Clean area around the plastic cap on access hole (A). Remove the cap.
- Insert the barring tool (B) into the flywheel housing until it engages the ring gear.
- Attach a 1/2 in. square drive ratchet or breaker bar, and turn.
- Remove barring tool, and clean oil from around access hole.
- Clean plastic cap, and reinstall in hole (A) with silicone sealant.
- Close the hood, see [5.2.2 Closing Hood \(Lower Position\)](#), page 271.

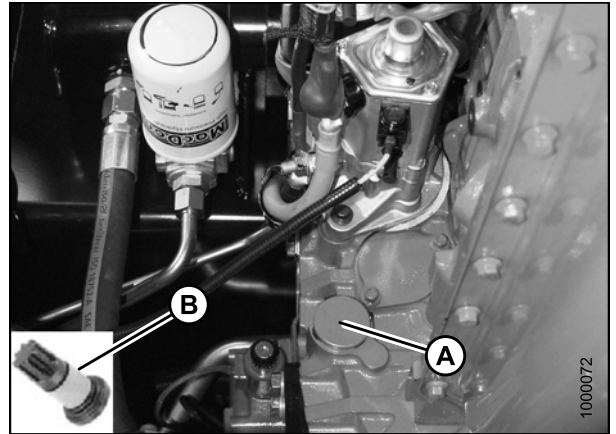


Figure 5.57

5.6.3 Checking Engine Oil Level

Procedure for checking engine oil level.

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

- Open the hood, see [5.2.1 Opening Hood \(Lower Position\)](#), page 270.
- Operate the engine at low idle and check for leaks at the filter and drain plug.
- Wait about 5 minutes, then remove dipstick (B) by turning it counterclockwise to unlock.

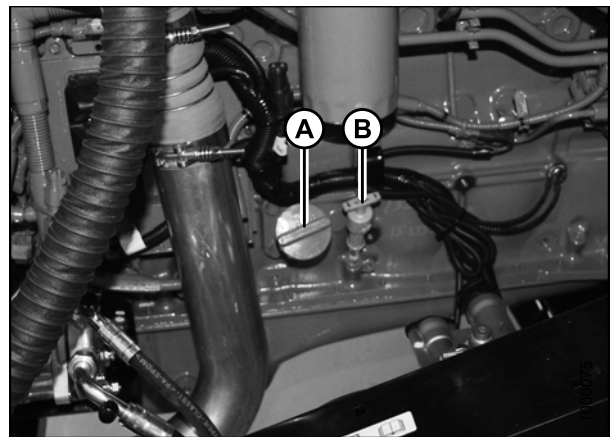


Figure 5.58

- Oil level should be between LOW and HIGH. If level is below LOW mark, 2 U.S. quarts (1.9 liters) will raise the level from LOW to HIGH.

NOTE: If you need to add oil, see [Adding Engine Oil](#), page 299

- Replace dipstick, and turn it clockwise to lock.
- Close the hood, see section [5.2.4 Closing Hood \(Highest Position\)](#), page 272.

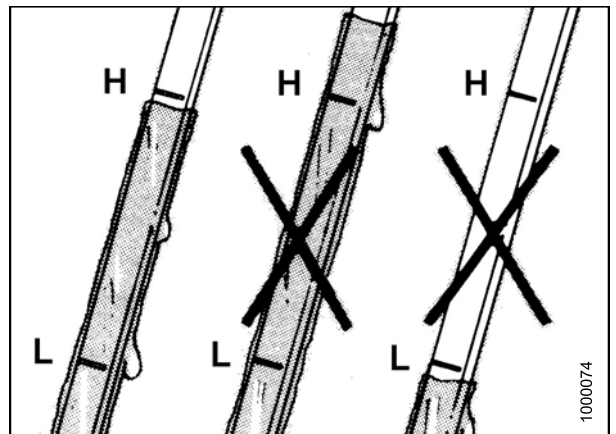


Figure 5.59

MAINTENANCE AND SERVICING

5.6.4 Changing Engine Oil

Draining Engine Oil

NOTE: The engine should be warm prior to changing the oil.



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. Place a drain pan of about 6 U.S. gallons (24 liters) under the engine oil drain.
2. Remove oil pan drain plug (A), and allow the oil to completely finish draining.
3. Check the condition of the used oil. If either of the following is evident, have your dealer correct the problem before starting the engine:
 - Thin black oil indicates fuel dilution.
 - Milky discoloration indicates coolant dilution.
4. Properly dispose of used oil.

Replacing Engine Oil Filter

NOTE: Replace oil filter as follows each time engine oil is changed.

1. Open the hood, see [5.2.1 Opening Hood \(Lower Position\)](#), page 270.
2. Clean around the filter head (A).
3. Remove filter.
4. Clean gasket mating surface.
5. Apply a thin film of clean oil to the gasket on the new filter. See [Filter Part Numbers](#), page 268 for recommended oil filter to use.
6. Screw the new filter onto the filter mount until the gasket contacts the filter head.
7. Tighten the filter an additional 1/2 to 3/4 turn by hand.

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

8. Properly dispose of used oil filter.

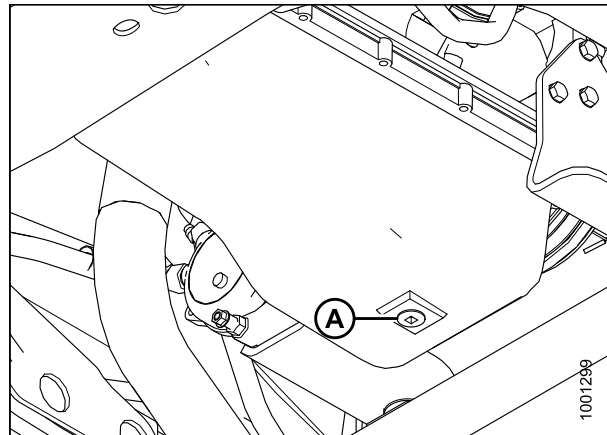


Figure 5.60

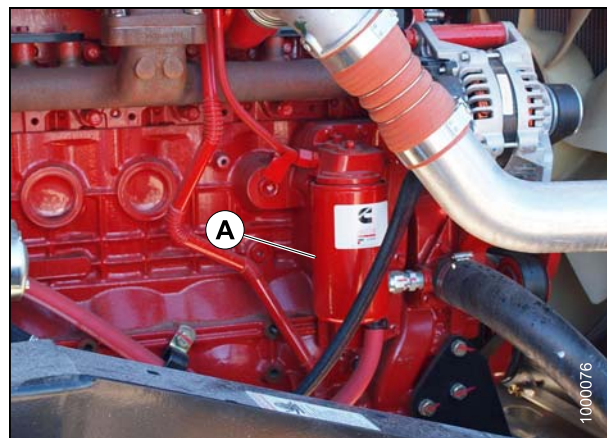


Figure 5.61

MAINTENANCE AND SERVICING

Adding Engine Oil

Procedure for adding engine oil

1. Stop engine, and remove key. Wait about 5 minutes.
2. Open the hood, see [5.2.1 Opening Hood \(Lower Position\)](#), page 270.
3. Remove filler cap (A) by turning it counterclockwise.
4. Carefully pour the oil. A funnel is recommended to avoid spillage. See [Lubricants Fluids System Capacities](#), page 267 for oil specifications.



CAUTION

Do not fill above the HIGH mark.

5. Replace oil filler cap (A) and turn it clockwise until snug.
6. Check the oil level. See [5.6.3 Checking Engine Oil Level](#), page 297
7. Close the hood, see [5.2.2 Closing Hood \(Lower Position\)](#), page 271

5.6.5 Air Intake System

IMPORTANT

Do NOT run engine with air cleaner disconnected or disassembled.

Engine intake air (A) is drawn through a duct (D) from the cooling box that pre-cleans the air, and then through a dual element filter (B).

The air cleaner canister is equipped with aspirator (C) that removes dust continuously from the air cleaner housing.

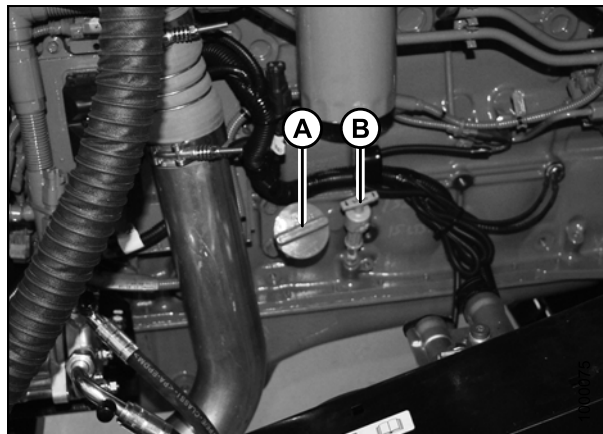


Figure 5.62

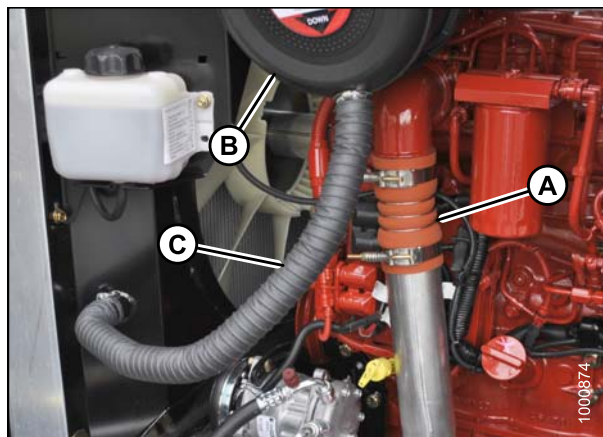


Figure 5.63

MAINTENANCE AND SERVICING

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.

After servicing the filter, you must reset the restriction switch by pushing the button on the end of it to reset it.

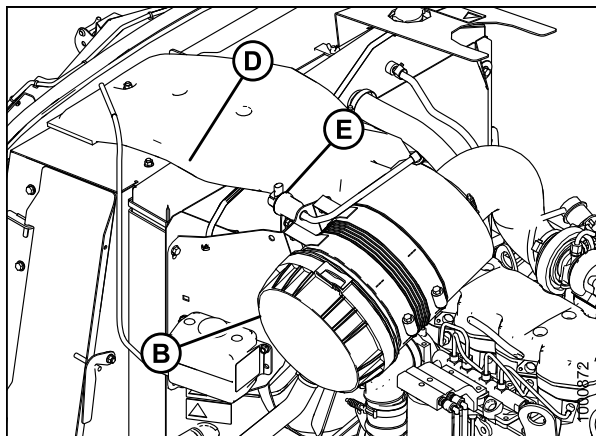


Figure 5.64

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 [5.11.2 Interval Maintenance, page 381](#)

Primary Air Filter Removal and Installation

Removing Primary Air Filter

1. Open the hood - see [5.2.1 Opening Hood \(Lower Position\), page 270](#).
2. Slightly lift catch (A) at side of end cap (B), and rotate end cap counterclockwise until it stops.

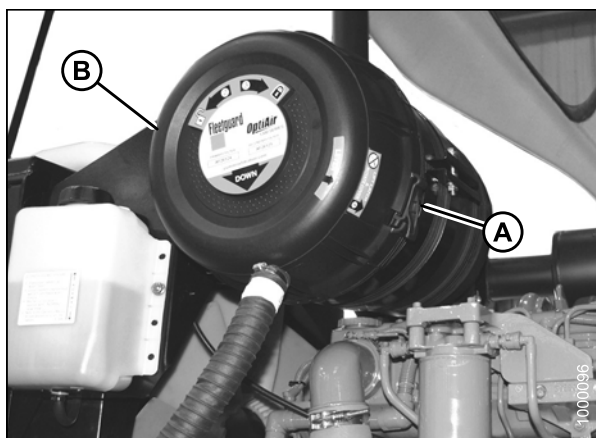


Figure 5.65

MAINTENANCE AND SERVICING

3. Make sure arrow (A) lines up with UNLOCK symbol on end cap.
4. Pull off the end cap

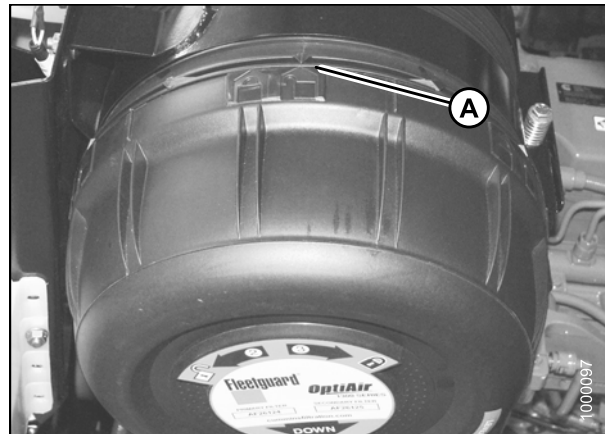


Figure 5.66

5. Check the aspirator duct opening (A) for obstructions or damage. Clean if necessary.

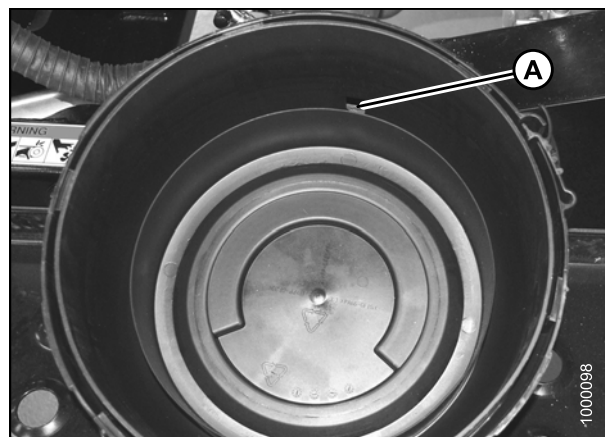


Figure 5.67

6. Pull out the primary filter element (A).

NOTE: Be extremely careful with the dirty element, until you get it completely out of the housing. Accidentally bumping it while still inside means dropped dirt and dust may contaminate the clean side of your filter housing, before the new filter element has a chance to do its job.

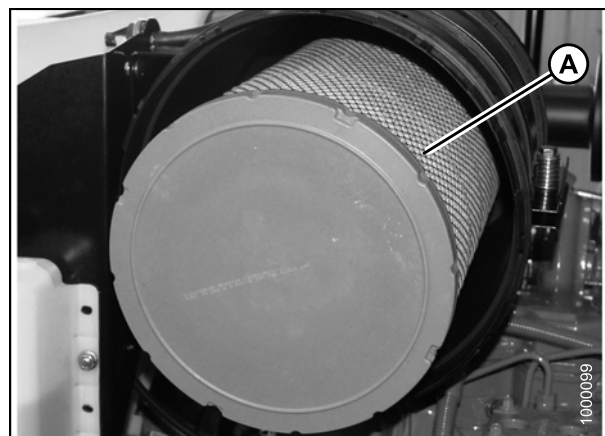


Figure 5.68

IMPORTANT

- **Do NOT remove the secondary safety filter element unless it needs replacing. The secondary (inner) safety element must never be cleaned.**
 - **Replace safety element annually or after every third primary filter change.**
 - **Remove safety filter element. If you are changing the safety element after the THIRD primary filter change, and the filter looks clean, discard and replace with new.**
 - **If you are changing the safety element because it looked dirty, a further inspection will be required.**
 - **Examine filter canister for cracks and replace as necessary.**
 - **Ensure canister retaining latches are secure.**
 - **Ensure filter sealing surfaces are soft, flexible and sealing, not hard, and allowing debris through to safety filter.**
7. Clean the inside of the housing and end cap carefully. Dirt left in the air cleaner housing may be harmful to your engine.
- Use a clean, water dampened cloth to wipe every surface clean.
 - Check it visually to make sure it is clean before putting in a new element.
 - Always clean the gasket sealing surfaces of the housing. An improper gasket seal is one of the most common causes of engine contamination.
 - Make sure that all hardened dirt ridges are completely removed wherever filter gaskets contact the cleaner housing.

MAINTENANCE AND SERVICING

8. Check for uneven dirt patterns on your old element, your old element is a valuable clue to potential dust leakage or gasket sealing problems.
 - A pattern on the element clean side is a sign that the old element was not firmly sealed or that a dust leak exists.
 - Make certain the cause of that leak is identified and rectified before replacing the element.
 - Press fresh gasket to see if it springs back.
 - On a radial seal element the gasket surface is the inside diameter of the open end cap.
 - Make sure the gasket is seating evenly, if you don't feel the gasket is seating evenly for a perfect seal, you may not have protection.
 - Re-check to see if the sealing surface in the housing is clean, or if the element is the correct model number. It may be too short for the housing.

9. If required, also change the safety filter.

Installing Primary Air Filter

NOTE: If replacing air filter, see section [Filter Part Numbers](#), page 268.

1. Insert new primary filter element (A) into canister over safety element, and push into place, ensuring that element is firmly seated in canister.

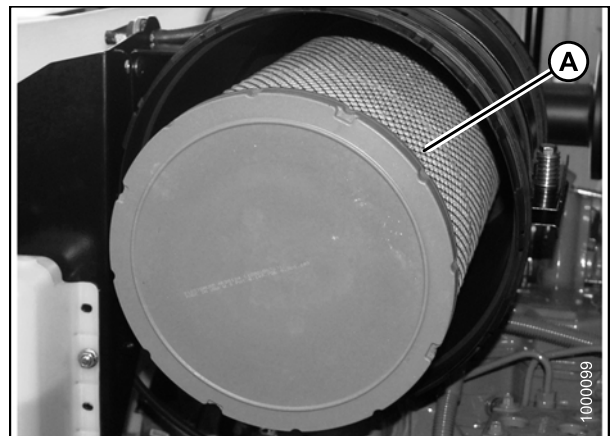


Figure 5.69

MAINTENANCE AND SERVICING

2. Align arrow (A) to UNLOCK position on end cap, and push end cap fully onto housing.
3. Rotate end cap clockwise until catch (A) engages housing to prevent end cap from turning.

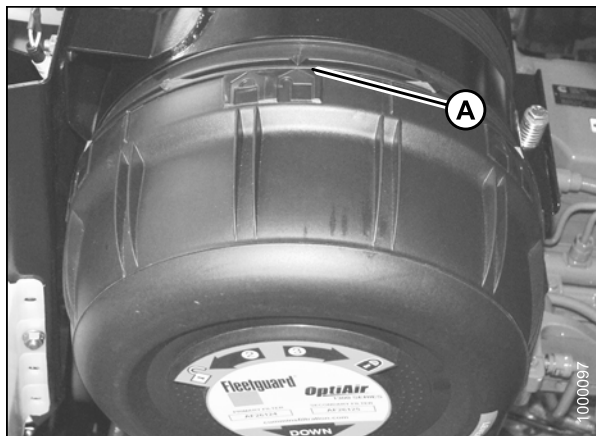


Figure 5.70

4. Position end cap (B) onto filter housing with aspirator pointing approximately down.

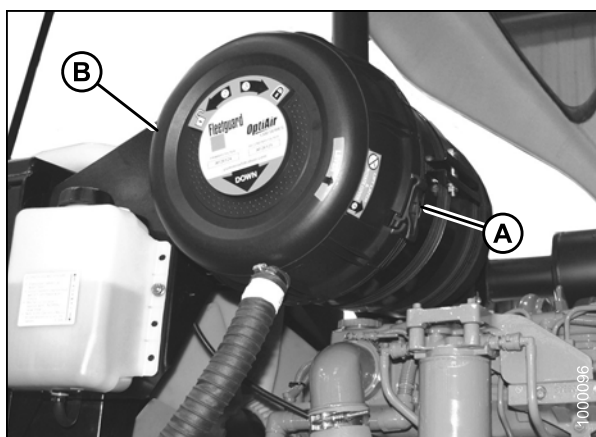


Figure 5.71

5. After servicing the filter, you must reset the restriction switch (A) by pushing the button on the end of it to reset it.
6. Close the hood - see [5.2.2 Closing Hood \(Lower Position\)](#), page 271.

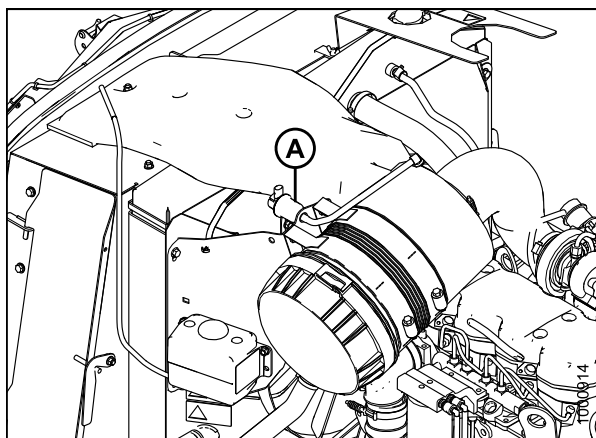


Figure 5.72

Cleaning Filter Element

IMPORTANT

The safety (inner) element should NEVER be cleaned, only replaced.

MAINTENANCE AND SERVICING

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. 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 cleanliness. If there is visible dirt on the safety element, replace both primary and safety elements. Do **NOT** clean.
6. If safety element passes inspection, clean outer element as follows:
 - a. Use compressed air not exceeding 60 psi (400 kPa), and a Dry Element Cleaner Gun.
 - b. Hold nozzle next to inner surface only, and move up and down on pleats.
 - c. After three cleanings (or at the specified interval), replace the element.
7. Repeat inspection before installing.

MAINTENANCE AND SERVICING

Removing and Installing Secondary Air Filter

IMPORTANT

- The safety (inner) element should never be cleaned only replaced. Do not remove the secondary safety filter element unless it needs replacing. The secondary (inner) safety element must never be cleaned
 - Replace safety element annually or after every third primary filter change.
 - Remove safety filter element, if you are changing the safety element after the third primary filter change and the filter looks clean, discard and replace with new.
 - If you are changing safety element because it looked dirty a further inspection will be required.
 - Examine filter canister for cracks and replace as necessary.
 - Ensure canister retaining latches are secure. Ensure filter sealing surfaces are soft, flexible and sealing, not hard and allowing debris through to safety filter.
1. Remove the primary filter - see [Removing Primary Air Filter, page 300](#).
 2. If required, also change the safety filter.

IMPORTANT

When replacing safety filter, re-insert new filter as soon as possible to prevent dirt from entering engine intake.

3. Remove the safety element (A) and pull it out of the canister.
NOTE: If replacing air filter, see section [Filter Part Numbers, page 268](#).
4. Insert new safety filter element (A) into canister, seal first, and push until seal is seated inside canister.
5. Install the primary filter, see [Installing Primary Air Filter, page 303](#).

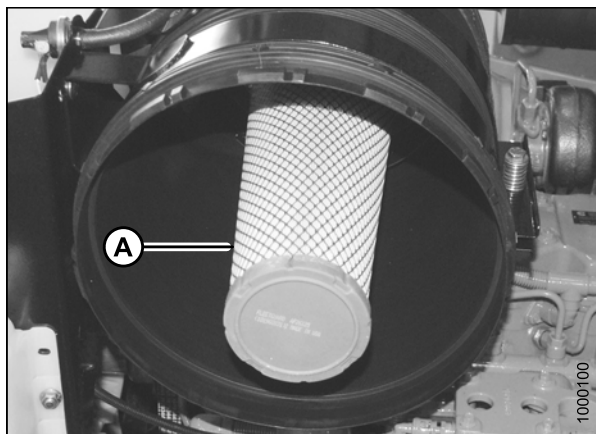


Figure 5.73

MAINTENANCE AND SERVICING

5.6.6 Charge Air Cooling

After the intake air passes through the air filter, it passes through the turbocharger (A) that boosts the pressure.

This process heats the air so it is passed through pipe (B) to a cooler before entering the engine intake.

The cooler is located in the cooling box (C) behind the radiator, and should be cleaned daily with compressed air. Refer to section [5.7 Engine Cooler Box](#), page 326.

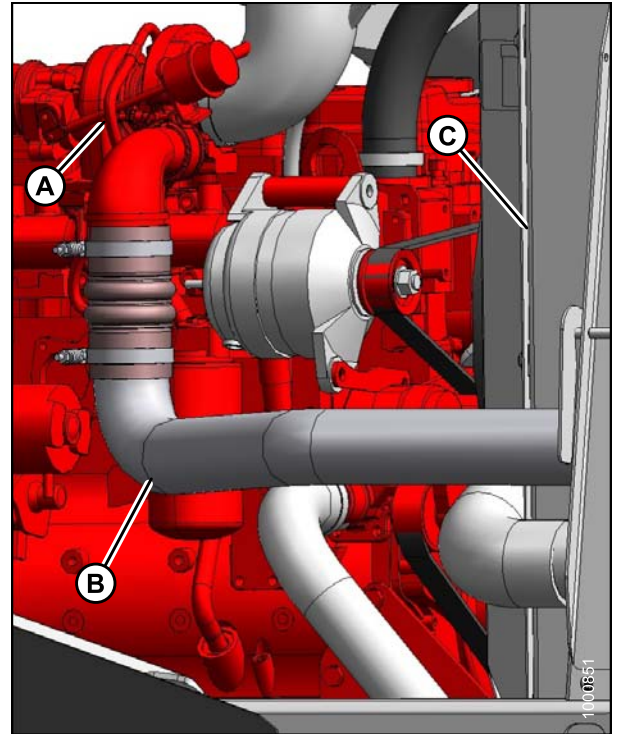


Figure 5.74

MAINTENANCE AND SERVICING

5.6.7 Fuel System

Fuel Tank Vent

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.

Removing and Installing Fuel Tank Vent

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.

1. Shut down engine, and remove key from ignition
2. Open the hood, see [5.2.3 Opening Hood \(Highest Position\)](#), page 271.
3. Locate filter (A) on vent line against hydraulic oil reservoir.
4. Release hose tension clamps (B) and slide away from filter. Pull hoses off filter.
5. 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.

6. Attach lower hose to filter and secure both hoses with tension clamps (B).
7. Close hood, see [5.2.4 Closing Hood \(Highest Position\)](#), page 272.

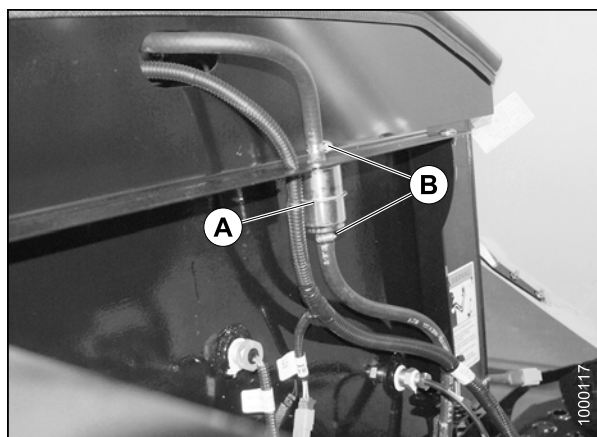


Figure 5.75

Fuel Filters

The windrower fuel system is equipped with primary and secondary screw-on cartridge type filters. The primary filter is equipped with a separator that separates sediment and water from the fuel.

Removing Primary Fuel Filter



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. Shut down engine, and remove key from ignition
2. Open the hood, see [5.2.3 Opening Hood \(Highest Position\)](#), page 271.
3. On the bottom of the fuel tank, locate the fuel supply valve (A) under fuel tank and move it to the closed position.

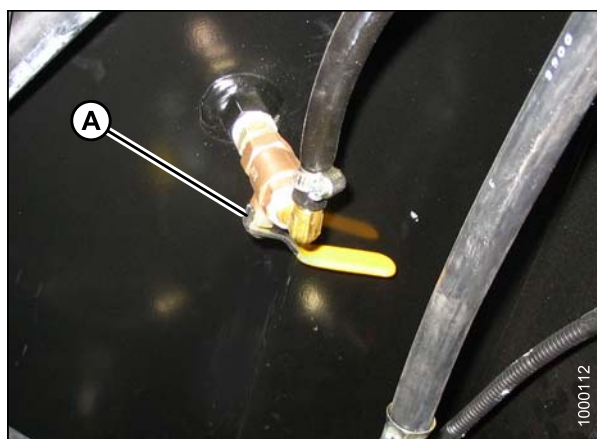


Figure 5.76

MAINTENANCE AND SERVICING

4. Locate the primary (B) fuel filter, it is located on the RH side of the windrower in cab forward.

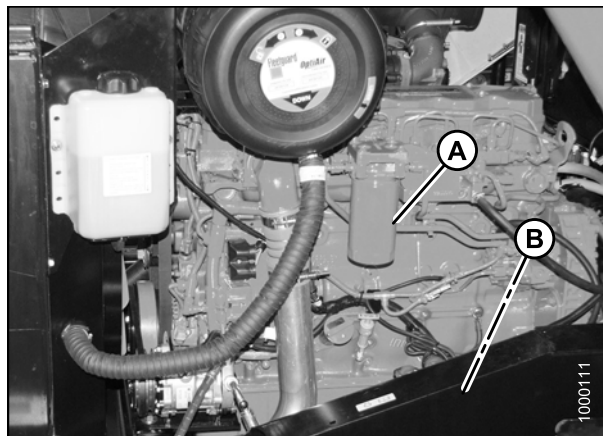


Figure 5.77: Fuel Filter Locations

5. Clean around the primary filter head (A)
6. Disconnect the water in fuel (WIF) sensor (B) from bottom of filter.
7. Turn drain valve (C) by hand counterclockwise until draining occurs, and drain filter into a container.
8. Remove filter (D) with a filter wrench.
9. Clean gasket mating surface.

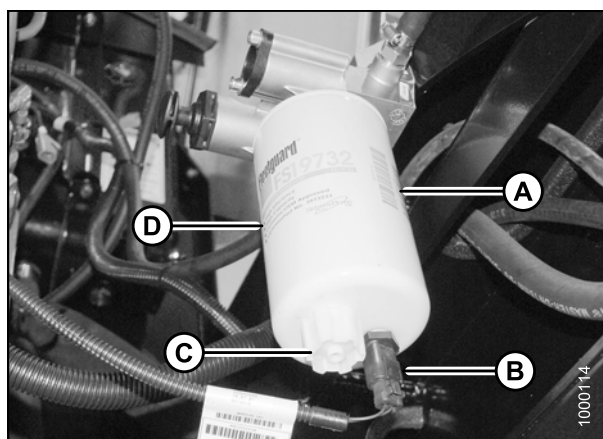


Figure 5.78

MAINTENANCE AND SERVICING

Installing Primary Fuel Filter

IMPORTANT

Do not pre-fill filter with fuel. Pre-filling can contaminate the fuel system.

NOTE: If replacing fuel filter, see section [Filter Part Numbers, page 268](#)

1. Screw the new filter (D) onto the filter mount until the gasket contacts the filter head.
2. Re-connect water in fuel (WIF) sensor (B).
3. 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.

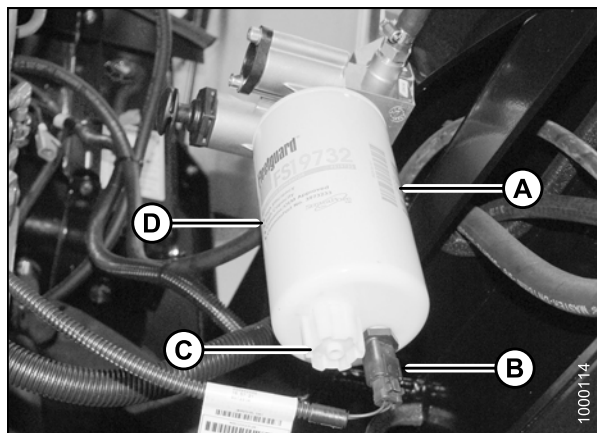


Figure 5.79

Removing Secondary Fuel Filter

1. Clean around the secondary filter head (A).
2. Place a container under the filter to catch spilled fluid.
3. Remove filter (A) with a filter wrench.
4. Clean gasket mating surface.

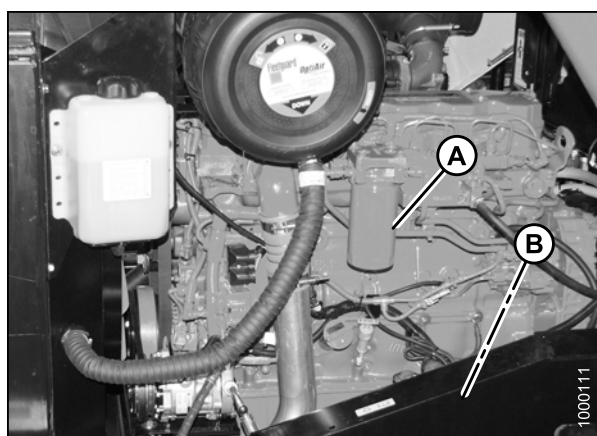


Figure 5.80

Installing Secondary Fuel Filter

IMPORTANT

Do not pre-fill filter with fuel. Pre-filling can contaminate the fuel system

NOTE: If replacing air filter, see section [Filter Part Numbers, page 268](#).

1. Screw the new secondary filter (A) onto the filter mount until the gasket contacts the filter head.
2. Tighten the filter an additional 1/2 to 3/4 turn by hand.

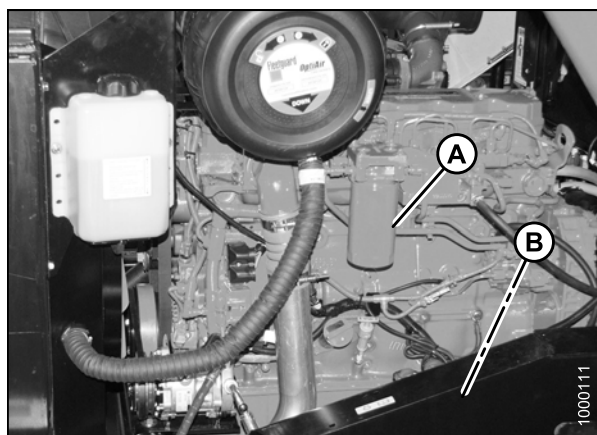


Figure 5.81

IMPORTANT

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

3. Open fuel valve (A) under fuel tank.
4. Prime the fuel system, see [Priming Fuel System, page 314](#).

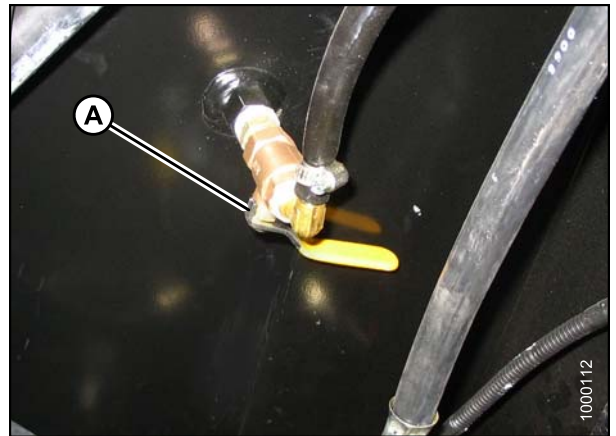


Figure 5.82

Draining the Fuel Tank

NOTE: Draining the fuel tank is necessary to remove old or contaminated fuel.



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.
1. Shut down engine, and remove key from ignition.
 2. Open the hood, see [5.2.1 Opening Hood \(Lower Position\), page 270](#).
 3. Close fuel supply valve (A). Located on the bottom of the fuel tank.
 4. Place a 5 US gallon (20 liter) drain pan under the fuel supply hose (A) at primary filter.
 5. Loosen clamp (B), and pull hose (A) off fitting.

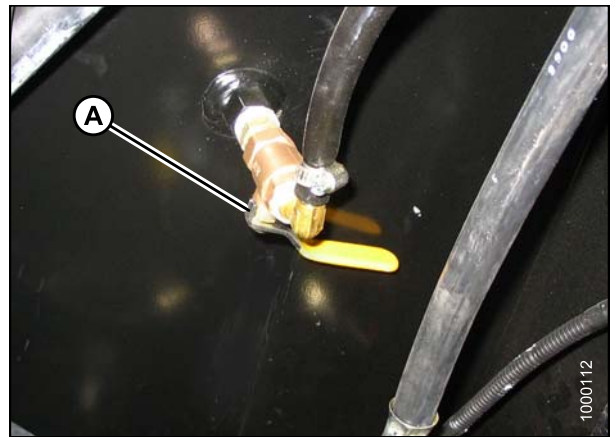


Figure 5.83: Fuel Shutoff Valve

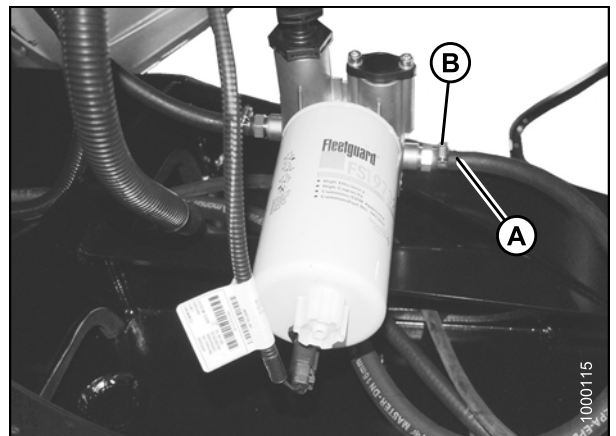


Figure 5.84

MAINTENANCE AND SERVICING

- Route hose to drain pan, and open valve (A) to drain tank.

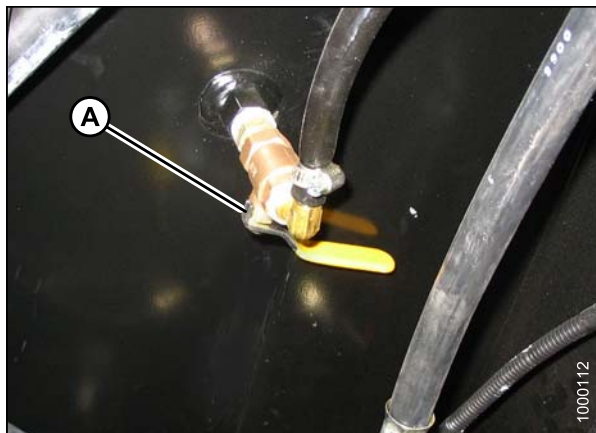


Figure 5.85: Fuel Shut off Valve

- Add some clean fuel to tank to flush out any remaining contaminants.
- Re-attach hose (A) to fitting. Install clamp (B), and tighten.

NOTE: Do not refill the fuel tank if you are needing to work on the system. Refill it once work is completed. See [Filing Fuel Tank, page 312](#).

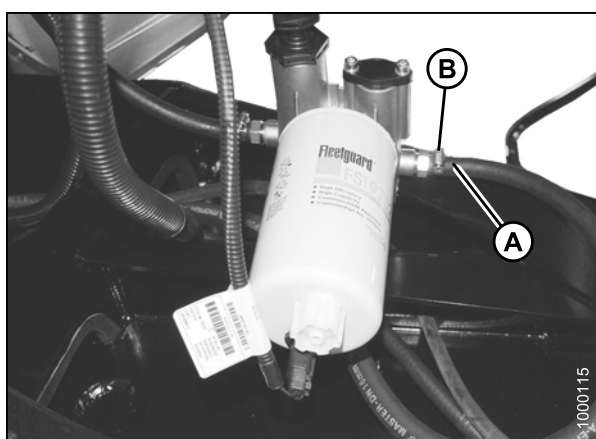


Figure 5.86

Filing Fuel Tank

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.

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.

- Shut down engine, and remove key from ignition.
- Stand on either platform to access the fuel tank filler pipe.
- Clean the area around the filler cap.
- Turn cap handle counter clockwise until loose, and remove cap.
- Fill tank with approved fuel, see [Lubricants Fluids System Capacities, page 267](#).

MAINTENANCE AND SERVICING

NOTE: Fill fuel tank daily, preferably at the end of the day's operation to help prevent condensation in the tank.

IMPORTANT

Do not fill tank completely as 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. See [Priming Fuel System, page 314](#) for priming procedures.

Fuel/Water Separator

A fuel water separator is incorporated into the primary fuel filter. The separator is equipped with a sensor that detects water in the fuel and alerts the Operator on the CDM, and a drain. Drain the water and sediment as follows from the separator daily, or at any time the CDM "Water in Fuel" (WIF) light illuminates.

Removing Water in Fuel System

1. Open the hood, see [5.2.1 Opening Hood \(Lower Position\), page 270](#).
2. Place a container under the filter to catch spilled fluid.
3. Turn drain valve (C) by hand 1-1/2 to 2 turns counterclockwise until draining occurs.
4. Drain the filter sump of water and sediment until clear fuel is visible.
5. Turn the valve clockwise to close the drain.
6. Dispose of fluid safely.
7. Close the hood, see [5.2.2 Closing Hood \(Lower Position\), page 271](#).

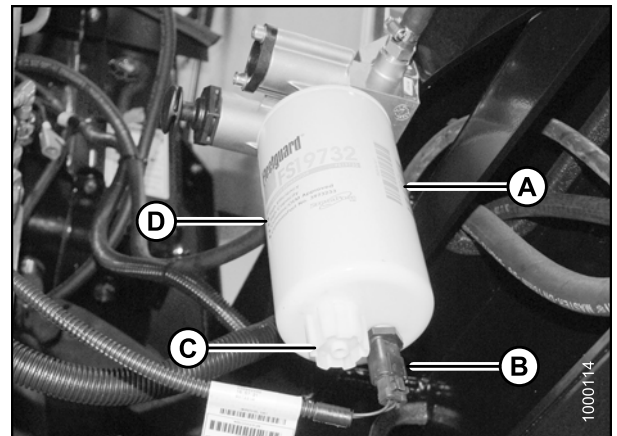


Figure 5.87

MAINTENANCE AND SERVICING

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.

Priming Fuel System

1. Open the hood, see [5.2.1 Opening Hood \(Lower Position\)](#), page 270.
2. Turn the priming knob (A) counterclockwise to unlock the plunger on the primary filter head.
3. Pump approximately 120 times to pressurize the fuel system.
4. Lock the plunger by turning knob (A) clockwise until snug.
5. Try starting engine. If engine does not start, repeat priming.
6. Close hood, see [5.2.2 Closing Hood \(Lower Position\)](#), page 271.



Figure 5.88

5.6.8 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.

MAINTENANCE AND SERVICING

Checking Coolant Level

Check coolant level in the coolant recovery tank (A) daily. Tank should be at least one-half full.

1. Open the hood, see [5.2.3 Opening Hood \(Highest Position\)](#), page 271.
2. Open the platform, see [5.3.1 Opening Platforms \(Standard Position\)](#), page 273.

NOTE: To view coolant capacities, refer to section [Lubricants Fluids System Capacities](#), page 267

3. If coolant level is low, 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.

4. Replace cap (B).
5. Close the platform, see [5.3.2 Closing Platforms \(Standard Position\)](#), page 274.
6. Close the hood, see [5.2.4 Closing Hood \(Highest Position\)](#), page 272.

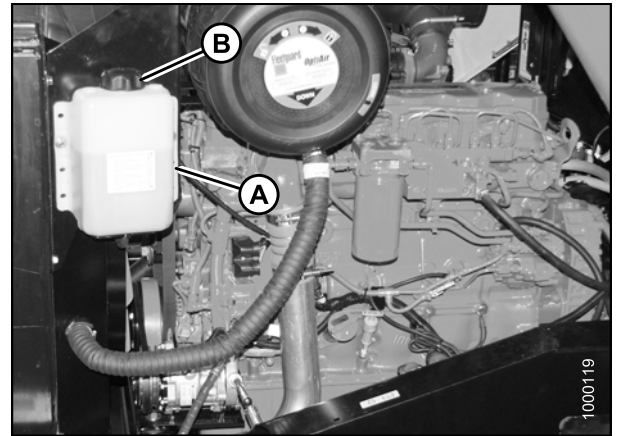


Figure 5.89

MAINTENANCE AND SERVICING

Checking Engine Coolant Strength

CAUTION

- To avoid personal injury from hot coolant, do not turn radiator cap until engine cools.
 - Engine exhaust stack may be hot.
1. Open the hood, see [5.2.3 Opening Hood \(Highest Position\)](#), page 271.
 2. Open the platform, see [5.3.1 Opening Platforms \(Standard Position\)](#), page 273.
 3. Remove the radiator cap (A).
 4. Turn the cap (A) counterclockwise to the first notch to relieve pressure before removing cap completely.
 5. Turn cap (A) again, and remove.
 6. Check the coolant in the radiator using an antifreeze tester, preferably before off-season storage. Tester should indicate protection to temperatures of -30°F (-34°C).
 7. Inspect the radiator cap before reinstalling, see [Inspecting Radiator Cap](#), page 317.
 8. Install radiator cap (A).
 9. Close the platform, see [5.3.2 Closing Platforms \(Standard Position\)](#), page 274.
 10. Close the hood, see [5.2.4 Closing Hood \(Highest Position\)](#), page 272.

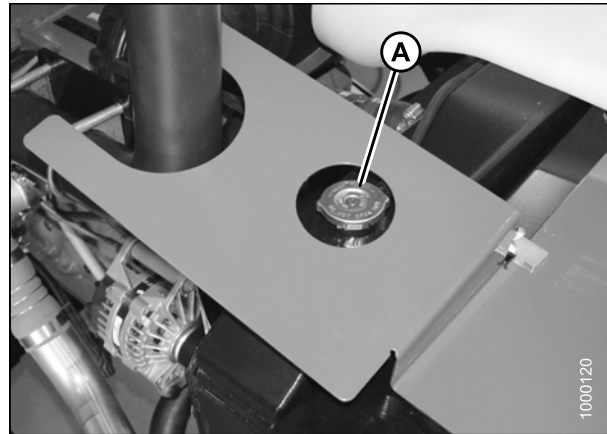


Figure 5.90

MAINTENANCE AND SERVICING

Inspecting Radiator Cap

The radiator cap must fit tightly and the cap gasket must be in good condition to maintain the 14–18 psi (97–124 kPa) pressure in the cooling system.



CAUTION

- To avoid personal injury from hot coolant, do not turn radiator cap until engine cools.
 - Engine exhaust stack may be hot.
1. Open the hood, see [5.2.3 Opening Hood \(Highest Position\)](#), page 271.
 2. Open the platform, see [5.3.1 Opening Platforms \(Standard Position\)](#), page 273.
 3. The radiator cap (A) 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.
 4. Turn the cap (A) counterclockwise to the “first notch” to relieve pressure before removing cap completely.
 5. Turn the cap (A) again, and remove.
 6. Check the gasket for cracks or deterioration, and replace the cap if necessary.
 7. Check that the spring in the cap moves freely.
 8. Replace the cap if spring is stuck.
 9. Close the platform, see [5.3.2 Closing Platforms \(Standard Position\)](#), page 274.
 10. Close the hood, see [5.2.4 Closing Hood \(Highest Position\)](#), page 272.

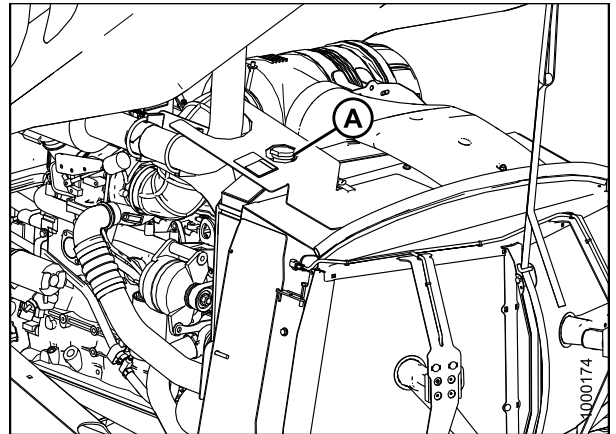


Figure 5.91

MAINTENANCE AND SERVICING

Changing Coolant

Coolant should be drained, and the system flushed and filled with new coolant every **2000 hours or 2 years**.

Draining Coolant



WARNING

To avoid personal injury from hot coolant, do not turn radiator cap until engine cools.

Engine exhaust may be hot.

1. Open the hood, see [5.2.3 Opening Hood \(Highest Position\)](#), page 271.
2. Open the platform, see [5.3.1 Opening Platforms \(Standard Position\)](#), page 273.
3. Let the engine cool before working on it.
4. Turn the radiator cap (A) to the first notch to relieve pressure before removing cap completely.
5. Place a drain pan (about 8 U.S. gallons [30 liters]) under the engine and radiator.
6. Remove the radiator cap, and open radiator drain valve (A) at the bottom of the engine side of the radiator lower tank. (Frame has been removed for clarity.)

NOTE: Use a deflector or a hose to prevent coolant running onto frame.

7. Close the heater shutoff valve (A), and disconnect hose on heater side of valve.
8. Open valve to drain the block.
9. When system is drained, replace hose on valve (A).

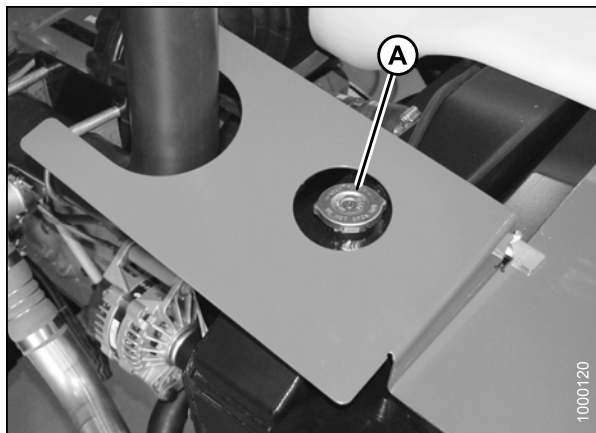


Figure 5.92

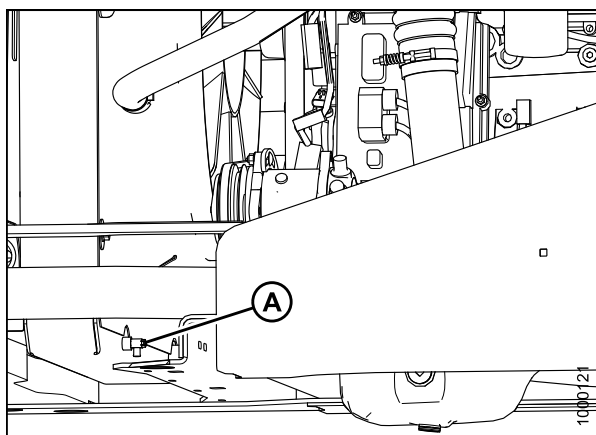


Figure 5.93

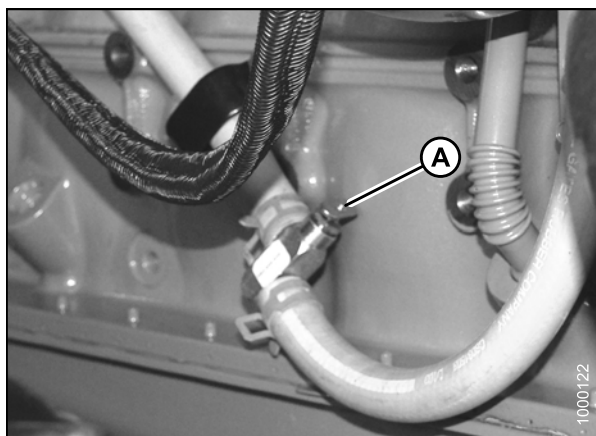


Figure 5.94

MAINTENANCE AND SERVICING

10. Close radiator drain valve (A) at the bottom of the engine side of the radiator lower tank. (Frame has been removed for clarity.)
11. Fill system with clean water through the radiator, and replace radiator cap.

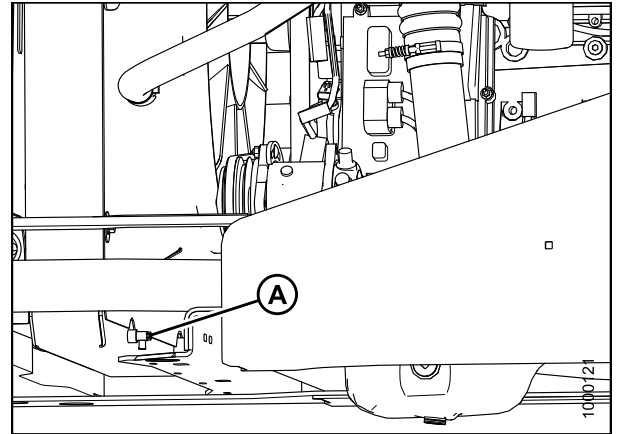


Figure 5.95

12. Open heater shut-off valve (A).
13. Start engine, and turn temperature control knob to HIGH. Run engine until normal operating temperature is reached.
14. Stop engine, and drain water out before rust or sediment settles. Repeat coolant removal procedure.
15. Close drain valves, and fill system with a solution of clean water and a heavy duty radiator cleaner. Follow instructions provided with cleaner.
16. After using cleaner solution, again flush system with clean water. Inspect radiator, hoses and fittings for leaks.
17. Close drain valves, and fill system. See [Adding Coolant, page 320](#).
18. Close the platform, see [5.3.2 Closing Platforms \(Standard Position\), page 274](#).
19. Close the hood, see [5.2.4 Closing Hood \(Highest Position\), page 272](#).

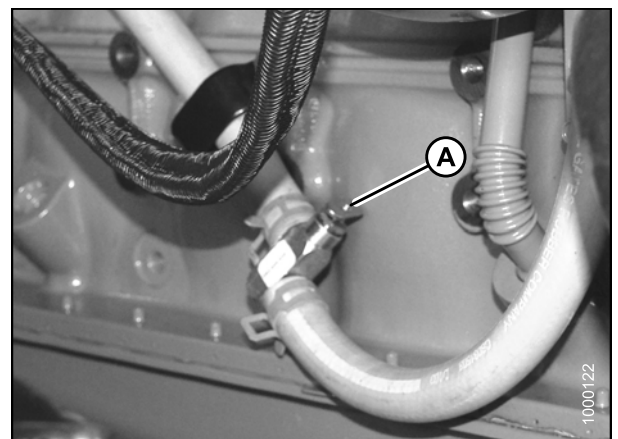


Figure 5.96

MAINTENANCE AND SERVICING

Adding Coolant

1. Open the hood, see [5.2.3 Opening Hood \(Highest Position\)](#), page 271.
2. Open the platform, see [5.3.1 Opening Platforms \(Standard Position\)](#), page 273.
3. Check daily the coolant level in the coolant recovery tank (A), the tank should be at least half full.
4. If less, then remove cap (B), and add coolant.

NOTE: To view coolant specifications, refer to section [Lubricants Fluids System Capacities](#), page 267

NOTE: Do not add coolant to radiator except when changing coolant.

5. Replace cap (B).
6. Close the platform, see [5.3.2 Closing Platforms \(Standard Position\)](#), page 274.
7. Close the hood, see [5.2.4 Closing Hood \(Highest Position\)](#), page 272.

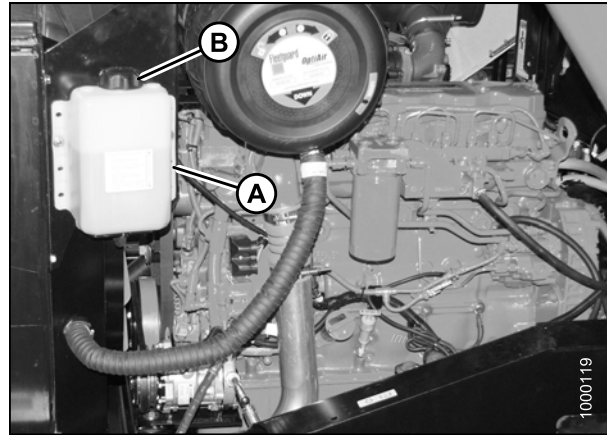


Figure 5.97

5.6.9 Gearbox

Checking Lubricant Level and Adding Lubricant

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.

Check the lubricant level every 50 hours as follows:

1. Park the windrower on level ground, shut down engine, and remove key.

MAINTENANCE AND SERVICING

2. Under the windrower, beneath the main pumps, locate and remove check plug (A). The lubricant should be visible through the hole or slightly running out.

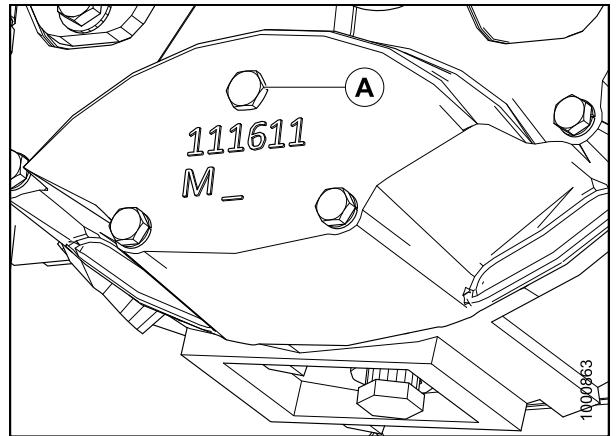


Figure 5.98

NOTE: To view lubricant specifications, refer to section [Lubricants Fluids System Capacities](#), page 267

Add lubricant as follows:

3. Remove breather cap (A), and add lubricant until it runs out at the check plug.
4. Replace check plug and breather cap, and tighten.
5. Operate the engine at low idle, and check for leaks at the check plug and drain plug.

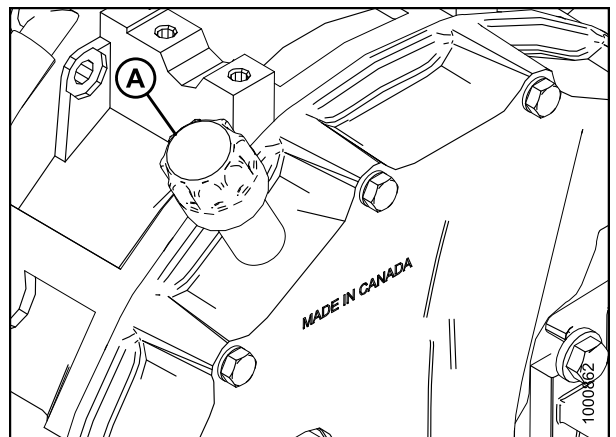


Figure 5.99

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.

1. Stop engine, and remove key.
2. Place a 1 U.S. gallon (4 liters) drain pan under the gearbox.

MAINTENANCE AND SERVICING

3. Remove drain plug (B), and allow oil to completely finish draining.
4. Install drain plug (B), and remove check plug (A).

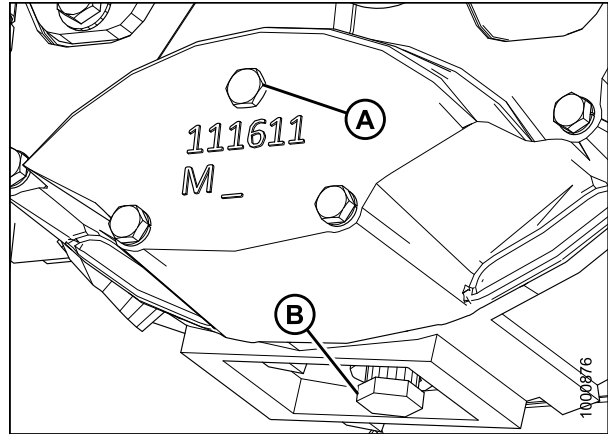


Figure 5.100

NOTE: To view oil specifications, refer to [Lubricants Fluids System Capacities](#), page 267

5. Remove breather cap (A), and add lubricant until it runs out at the check plug.
6. Replace check plug and breather cap, and tighten.
7. Operate the engine at low idle, and check for leaks at the check plug and drain plug.

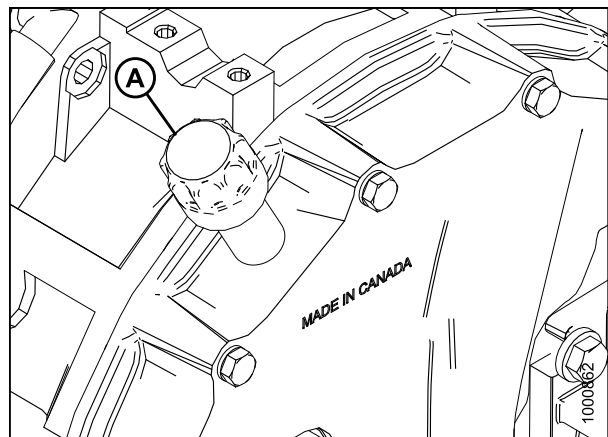


Figure 5.101

5.6.10 Exhaust System



CAUTION

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

MAINTENANCE AND SERVICING

The exhaust system requires no regular maintenance, but it should be inspected periodically as follows:

1. 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.
2. 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.
3. The exhaust system should be secured to eliminate vibration. The brackets (B) should fit securely to the muffler (C), and to the engine.
4. Do **NOT** change muffler type, piping sizes or exhaust configuration. See your Dealer for proper replacement parts.

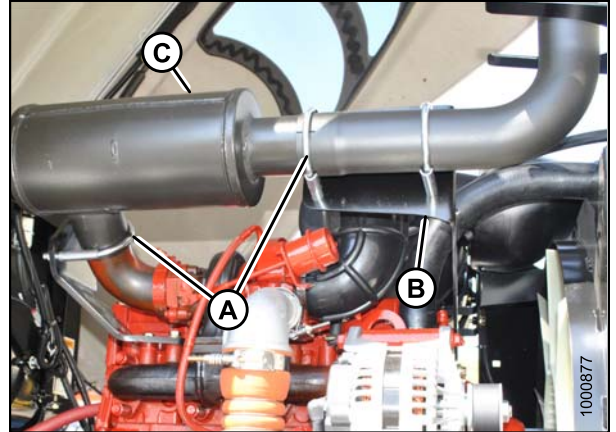


Figure 5.102

5.6.11 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.

Tensioning Alternator/Fan Belt

The alternator/fan belt is automatically tightened and manual adjustment is not required.

Replacing Fan Belt

1. Open the LH platform, see [5.3.1 Opening Platforms \(Standard Position\)](#), page 273.
2. Open the hood, see [5.2.1 Opening Hood \(Lower Position\)](#), page 270.
3. Loosen compressor mounting hardware (B) and push compressor towards engine to release tension.
4. Remove belt (A) from A/C compressor.

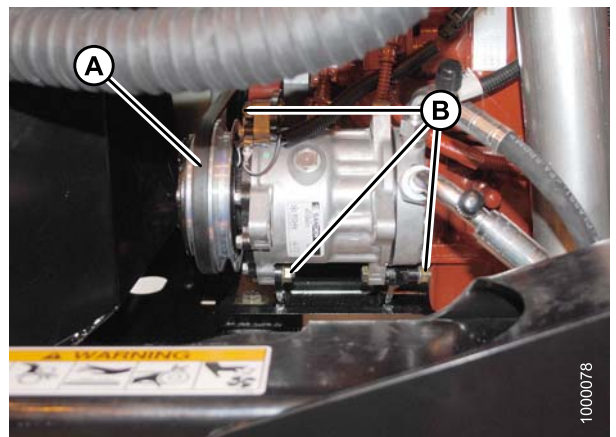


Figure 5.103

MAINTENANCE AND SERVICING

5. Insert the drive end of a 1/2 in. drive ratchet wrench into the belt tensioner (B).
6. Rotate tensioner counterclockwise until fan belt (C) can be slipped off pulley (D). Release tensioner and remove wrench.
7. Remove belt in order 1–2–3 as shown. Route fan belt around fan and remove belt.
8. Install new belt (C) around fan and onto pulleys in order 3–2–1.
9. Insert the drive end of a 1/2 in. drive ratchet wrench into the belt tensioner (C).
10. Rotate tensioner counterclockwise until belt (C) can be slipped onto pulley (D). Release tensioner and remove wrench.
11. Check that belt is properly seated in all pulley grooves.
12. Install A/C compressor belt (A).
13. Pry compressor away from engine so that a force of 8-12 ft·lbf (35-55 Nm) deflects the belt (A) 3/16 in. (5 mm) at mid-span.
14. Tighten compressor mounting hardware (B).
15. Recheck tension and re-adjust as required.
16. Close the hood, see [5.2.2 Closing Hood \(Lower Position\)](#), page 271.
17. Close the platform, see [5.3.2 Closing Platforms \(Standard Position\)](#), page 274.

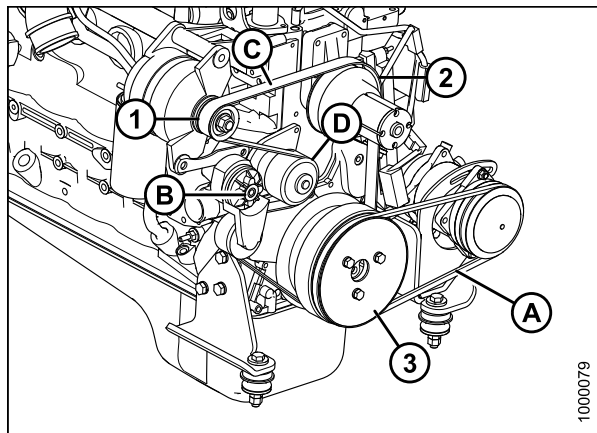


Figure 5.104: Engine Belts

- | | |
|-------------------------|--------------------|
| A - A/C Compressor Belt | B - Belt Tensioner |
| C - Fan Belt | D - Pulley |

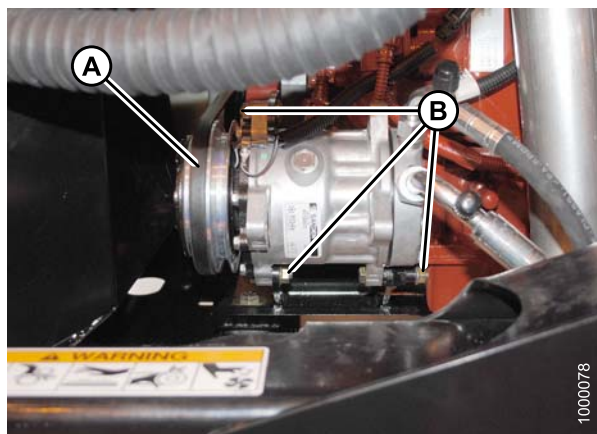


Figure 5.105

Tensioning A/C Compressor Belt

1. Open the hood, see [5.2.1 Opening Hood \(Lower Position\)](#), page 270.
2. Loosen compressor mounting hardware (B).
3. Pry compressor away from engine so that a force of 8-12 ft·lbf (35-55 Nm) deflects the belt (A) 3/16 in. (5 mm) at mid-span.
4. Tighten compressor mounting hardware (B).
5. Recheck tension and re-adjust as required.
6. Close the hood, see [5.2.2 Closing Hood \(Lower Position\)](#), page 271.

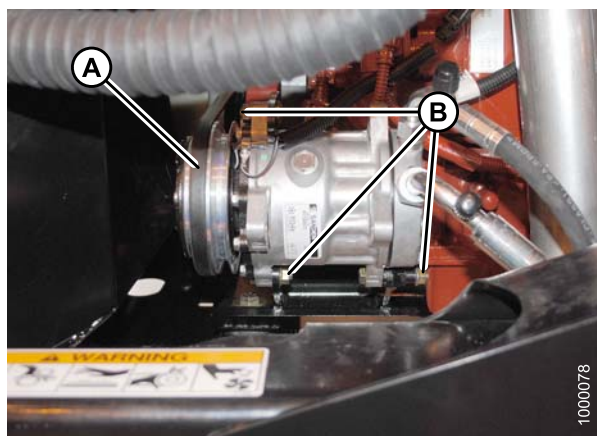


Figure 5.106

MAINTENANCE AND SERVICING

Replacing A/C Compressor Belt

1. Open the hood, see [5.2.1 Opening Hood \(Lower Position\)](#), page 270.
2. Loosen compressor mounting hardware (B) and push compressor towards engine to release tension.
3. Remove belt (A) from A/C compressor.

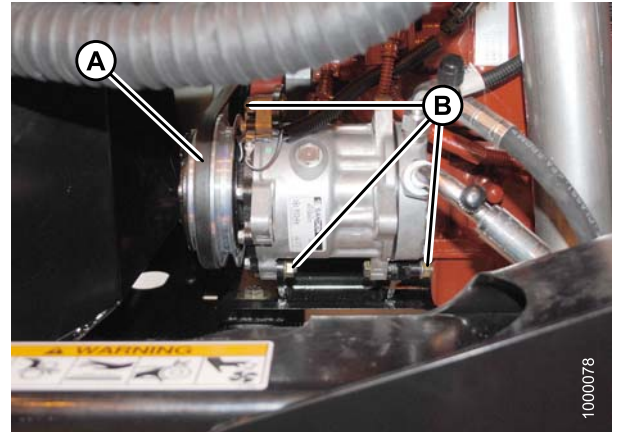


Figure 5.107

4. Install A/C compressor belt (A).
5. Pry compressor away from engine so that a force of 8-12 ft·lbf (35-55 Nm) deflects the belt (A) 3/16 in. (5 mm) at mid-span.
6. Tighten compressor mounting hardware (B).
7. Recheck tension and re-adjust as required.
8. Close the hood, see [5.2.2 Closing Hood \(Lower Position\)](#), page 271.

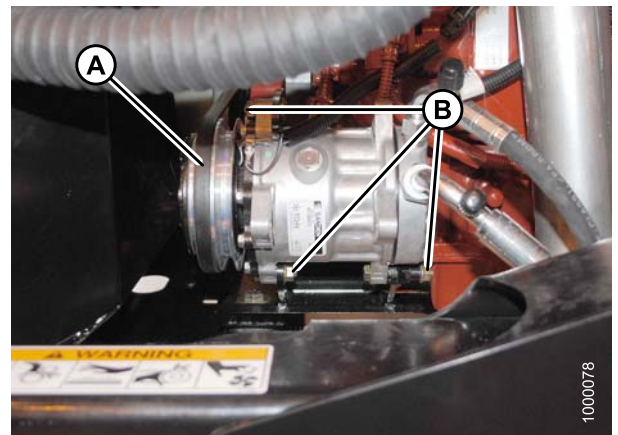


Figure 5.108

5.6.12 Engine Speed

The maximum and idle engine speeds are factory set.

See section [2.2 M155 Windrower Specifications](#), page 29 for detailed information. 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 [Engine Intermediate Speed Control \(ISC\)](#), page 105.

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.

MAINTENANCE AND SERVICING

5.7 Engine Cooler Box

5.7.1 Opening Cooler Box Screen

1. Open the hood, see [5.2.3 Opening Hood \(Highest Position\)](#), page 271.
2. Push latch (A) and open screen assembly access door (B). Secure with rod stored inside screen door.

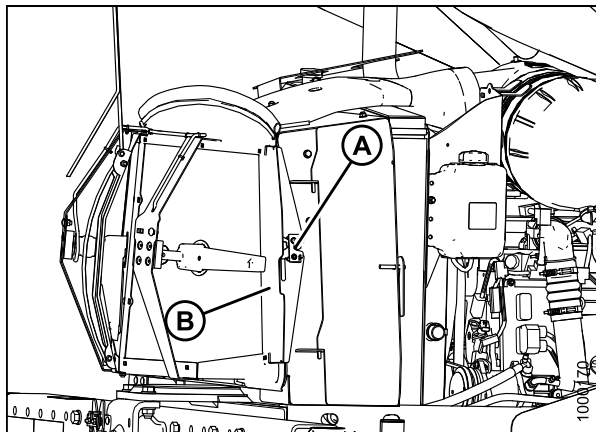


Figure 5.109

5.7.2 Cleaning Screens and Coolers

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.

If rotors (A) are plugged, clean as follows:

1. Open the hood, see [5.2.3 Opening Hood \(Highest Position\)](#), page 271.
2. Remove nut (B).
3. Pivot rotor assembly (C) away from screen.
4. Blow out debris from rotors (A) with compressed air.

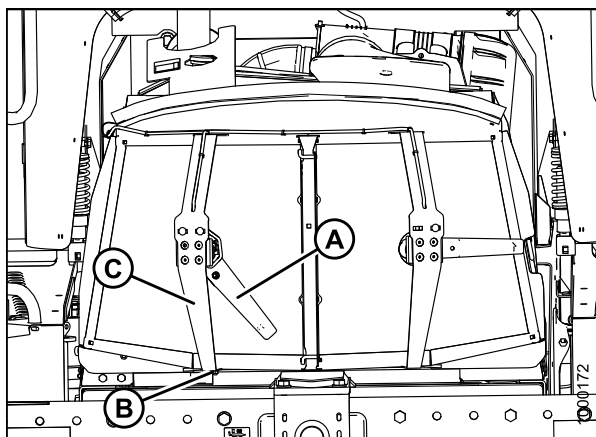


Figure 5.110

MAINTENANCE AND SERVICING

5. If ducts are plugged, push latch (A), and open screen assembly access door (B). Secure with rod stored inside screen door.

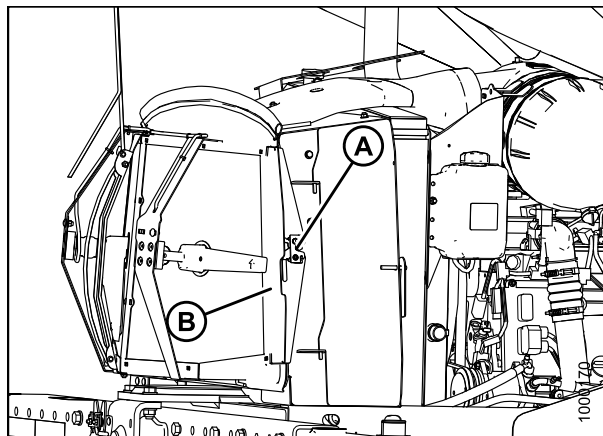


Figure 5.111

6. Blow debris out of duct (A) with compressed air.
7. Clean screen with compressed air.

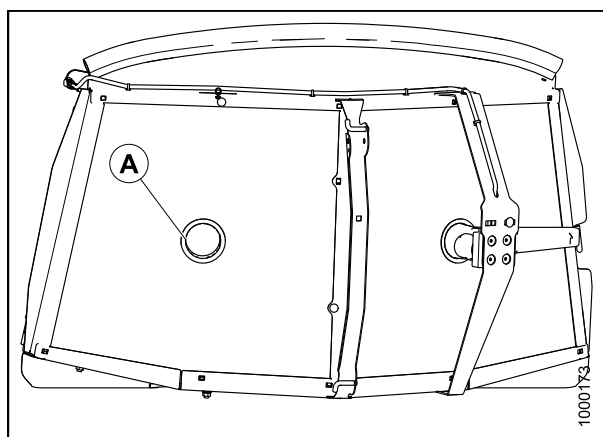


Figure 5.112

8. Install the rotor assembly (C). Secure with bolt and nut (B).
9. Close the hood, see [5.2.4 Closing Hood \(Highest Position\)](#), page 272.

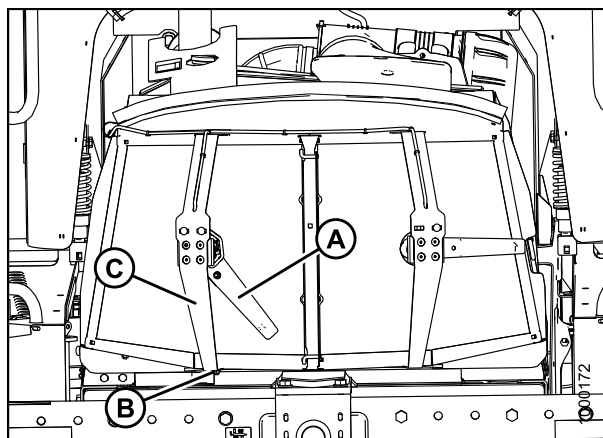


Figure 5.113

MAINTENANCE AND SERVICING

5.7.3 Maintaining Cooler Box

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:

1. Lift lever (A), and pull open the RH access door (B).

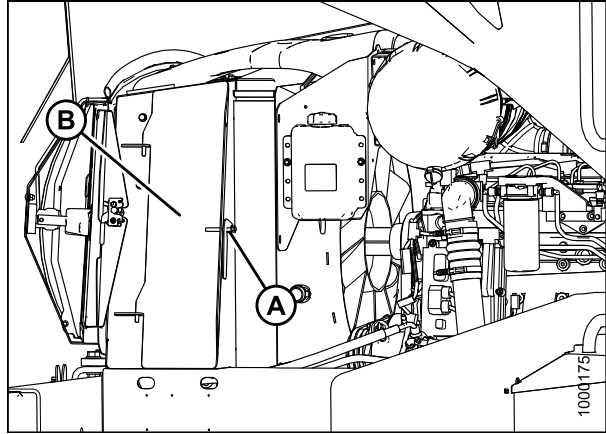


Figure 5.114

2. Slide out the oil cooler / A/C condenser assembly (A).

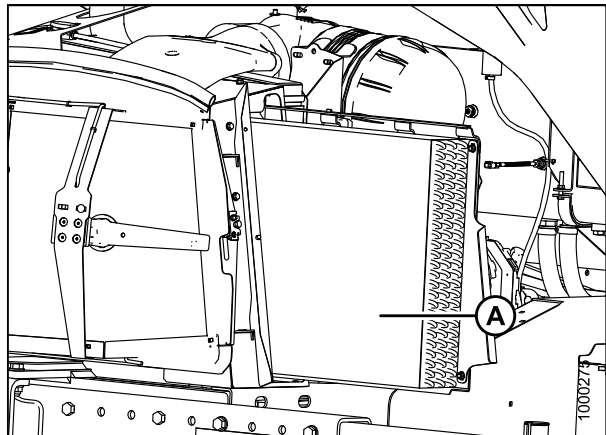


Figure 5.115

3. Lift latch (A), and open the LH access door (B) at left side of cooling box.

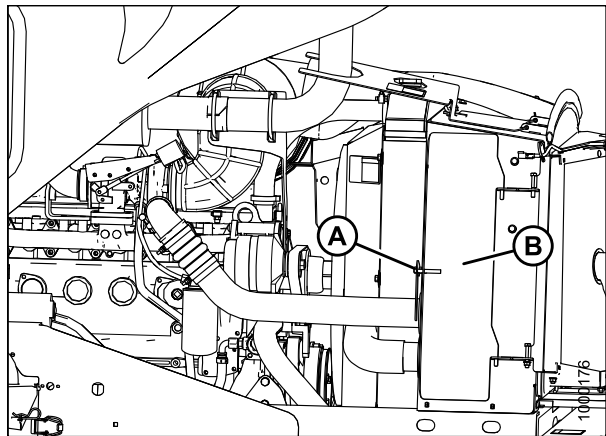


Figure 5.116

MAINTENANCE AND SERVICING

- Loosen wing-nut (A), and open access door (B) at top of cooling box.

NOTE: Fins on coolers can be very easily bent which may interfere with its function. Exercise caution when cleaning.

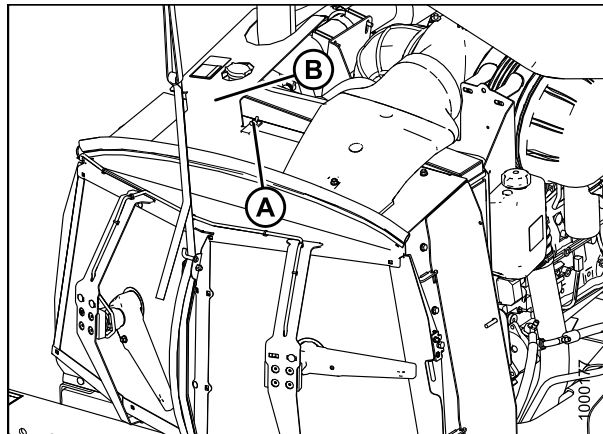


Figure 5.117

- Clean radiator (D) through access holes in cooling box with compressed air.
- Clean oil cooler / A/C condenser (A), charge air cooler (E), fuel cooler (B) and cooling box (C) with compressed air.
- Inspect all lines and coolers for evidence of leaks and damage.
- Slide oil cooler / A/C condenser (A) back into cooling box (C).
- Close side access door, and lock with lever.
- Close access door on top of the cooling box, and secure with wing-nut.

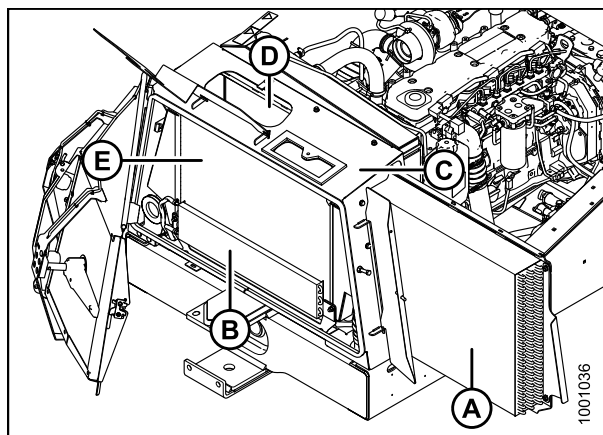


Figure 5.118

MAINTENANCE AND SERVICING

5.7.4 Screen Cleaner Duct to Screen Clearance

Check clearance between trailing edge of screen cleaner duct (A) and screen. It should be 0.04–0.32 in. (1–8 mm) at all locations when rotating.

NOTE: Screen cleaner ducts rotate counterclockwise and may touch screen as long as it continues to rotate

If necessary, adjust clearance as follows:

1. Open the hood, see [5.2.1 Opening Hood \(Lower Position\)](#), page 270.
2. Loosen nut (B) on motor support (C).
3. Move support in or out until duct is 0.08–0.24 in. (2–6 mm) from screen near the center.
4. Tighten nut (B).
5. Loosen the two motor mount bolts (D).
6. Move motor/ duct assembly (E) to obtain 0.04–0.32 in. (1–8 mm) gap to screen at full rotation of the duct.
7. Tighten nuts (D) on motor mount.
8. Close the hood, see [5.2.2 Closing Hood \(Lower Position\)](#), page 271.

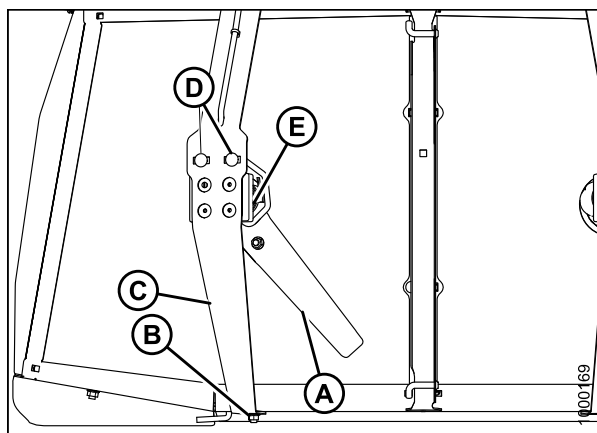


Figure 5.119

5.7.5 Closing Cooler Screen

1. Unhook the support rod and store it in the screen door. Close screen access door (B) and engage latch (A).
2. Close the hood, see [5.2.4 Closing Hood \(Highest Position\)](#), page 272.

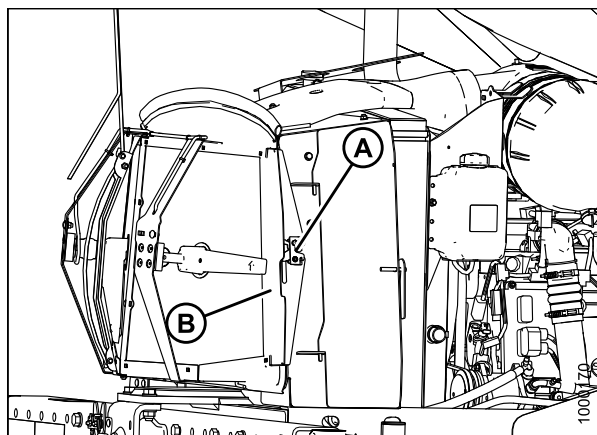


Figure 5.120

5.8 Electrical System

5.8.1 Battery

Battery Safety

WARNING

- Keep all sparks and flames away from the batteries, as a gas given off by electrolyte is explosive.
- Avoid contact with battery electrolyte: wash off any spilled electrolyte immediately.



Figure 5.121

WARNING

- Wear safety glasses when working near batteries.
- Do not tip batteries more than 45° degrees, to avoid electrolyte loss.

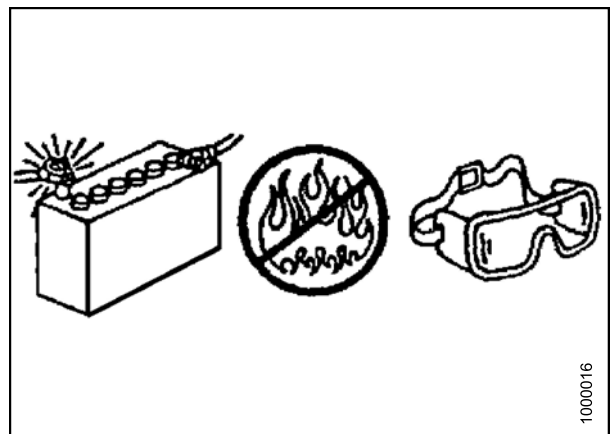


Figure 5.122

WARNING

To avoid injury from spark or short circuit, disconnect battery ground cable before servicing and part of electrical system.

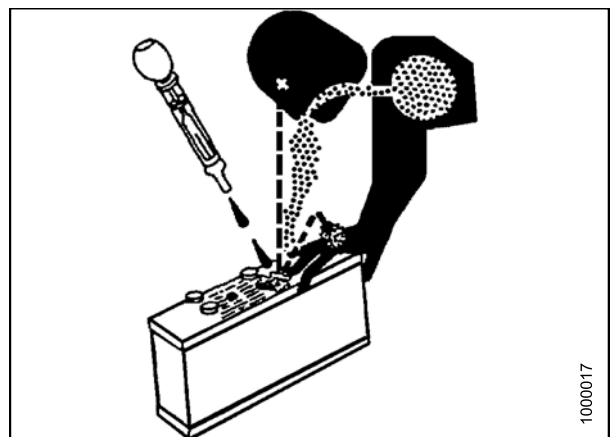


Figure 5.123

MAINTENANCE AND SERVICING

Maintaining the 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.

1. 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 [Charging the Battery, page 333](#). Add electrolyte if necessary. See .
2. Keep battery clean by wiping it with a damp cloth.
3. 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.
4. 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.
5. Do **NOT** stack storage batteries on top of each other.

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.

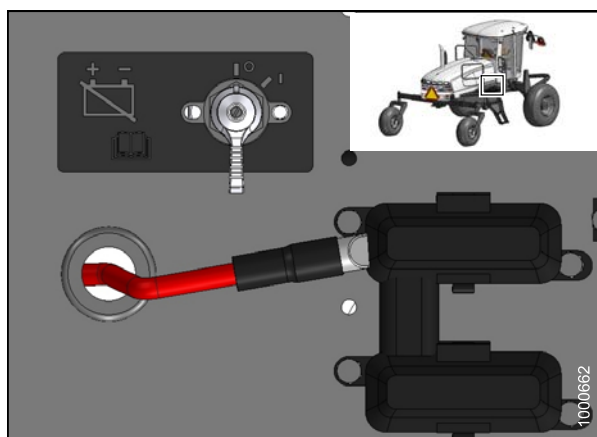


Figure 5.124

MAINTENANCE AND SERVICING

Charging the Battery

CAUTION

- Ventilate the area where batteries are being charged.
- Do NOT charge a frozen battery. Warm to 60°F (16°C) before charging.
- Do NOT connect or disconnect live circuits. To prevent sparks, turn off charger and connect positive cable first. PROTECT YOUR EYES.
- 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.
- The maximum charge rate in amperes should be NO MORE than 1/3 of the battery's reserve capacity minute rating. If the terminal voltage exceeds 16.0 volts while charging, reduce the charge rate.
- Continue charging and reduce the rate as needed until a two hour period results in no increase in voltage or decrease in current.

WARNING

- Gel and AGM (Absorbed Glass Mat) batteries require a voltage-limited charger. Charging a Gel or AGM battery on a typical shop charger - even one time - may greatly shorten its life.
- If the electrolyte is accessible, verify that plates are covered before beginning to charge. At the end of charge, add distilled water as needed to bring levels to the proper height. If water is added, charge for an additional 30 minutes to mix. If electrolyte levels are low, but battery is not accessible, remove battery from service.

IMPORTANT

NEVER overcharge batteries. Excessive charging will shorten battery life.

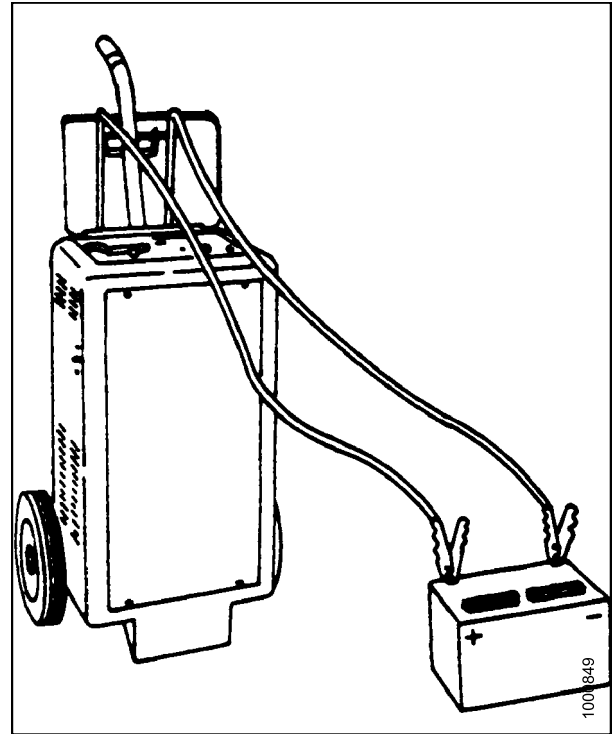


Figure 5.125

| VOLTAGE | STATE OF CHARGE (%) | APPROXIMATE BATTERY CHARGING TIME* TO FULL CHARGE AT 80°F/27°C. (minutes) | | | |
|------------------|---------------------|---|---------|---------|---------|
| | | Maximum Rate at | | | |
| STANDARD BATTERY | | 50 Amps | 30 Amps | 20 Amps | 10 Amps |
| 12 Volts | | | | | |
| 12.6 | 100 | — FULL CHARGE — | | | |
| 12.4 | 75 | 20 | 35 | 48 | 90 |
| 12.2 | 50 | 45 | 75 | 95 | 180 |
| 12.0 | 25 | 65 | 115 | 145 | 280 |
| 11.8 | 0 | 85 | 150 | 195 | 370 |

* Charging time depends upon battery capacity, condition, age, temperature and efficiency of charger.

MAINTENANCE AND SERVICING

1. Stop engine, and remove key.
2. Move platform on right cab-forward side of machine to open position to allow access to the batteries. See [5.3.1 Opening Platforms \(Standard Position\)](#), page 273.
3. Remove red plastic cover (A) from positive cable clamps.
4. Remove black plastic cover (B) from negative terminals.



CAUTION

Follow all instructions and precautions furnished by the battery charger manufacturer. Charge at recommended rates and times.

5. If charging battery in windrower, disconnect **positive** battery cable before connecting charger cable, then connect ground cable last, away from battery.
6. Close platform. See [5.3.2 Closing Platforms \(Standard Position\)](#), page 274.

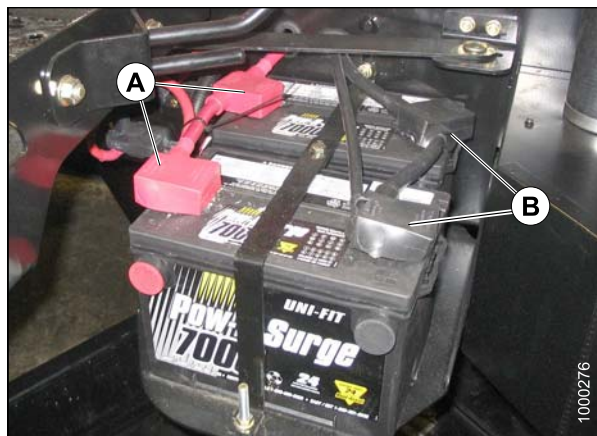


Figure 5.126

A - Positive Terminals

B - Negative Terminals

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.

1. Remove red rubber cover from boost post (A) on windrower frame.
2. Attach one end of battery cable to positive (+) terminal of booster battery, and other end to positive boost post (A) on windrower frame.
3. Attach second cable to negative (-) terminal of booster battery, and then to ground post (B) on windrower frame.
4. Turn ignition switch in cab as with normal start up.
5. After engine starts, disconnect cable from windrower ground first, and then disconnect the other cables.
6. Replace rubber cover on boost post (A).

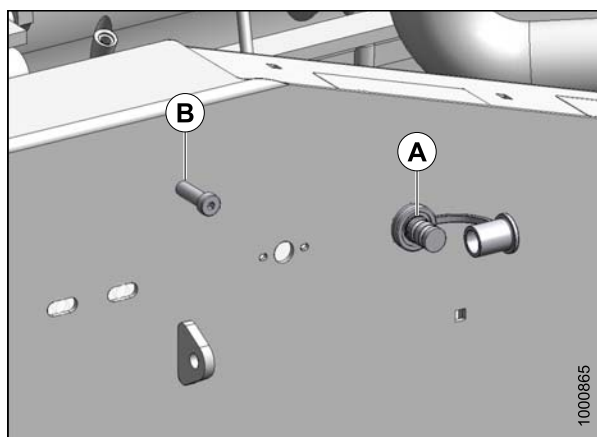


Figure 5.127

MAINTENANCE AND SERVICING

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.



Figure 5.128

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.

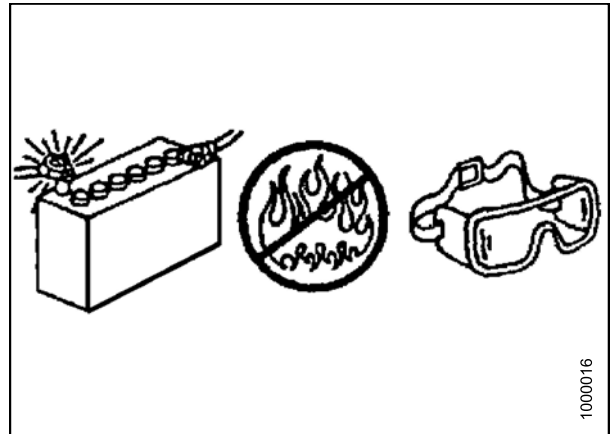


Figure 5.129

1. If battery is installed in windrower, shut down engine, and remove key.
2. Open the platform on the right side of the cab, see section [5.3.1 Opening Platforms \(Standard Position\)](#), page 273.
3. Add electrolyte in accordance with the battery manufacturer's instructions.
4. Close the platform, see section [5.3.2 Closing Platforms \(Standard Position\)](#), page 274.



Figure 5.130

MAINTENANCE AND SERVICING

Removing Battery

CAUTION

Do not attempt to service battery unless you have the proper equipment and experience to perform the job.

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. Shut down the engine and remove the key.
2. Open the right cab-forward platform to expose the batteries, see [5.3.1 Opening Platforms \(Standard Position\)](#), page 273.
3. Remove the bolt (A) that secures the platform arm to the platform. Swing arm (B) out of the way.
4. Remove the red plastic cover from positive cable clamps (C). Loosen the clamps and remove cable from batteries.
5. Loosen clamps (D) on negative terminals and remove cable from batteries.
6. Remove bolts (E) securing strap (F) to frame, and remove strap.
7. Lift batteries off holder (G).

NOTE: Dual battery support can be removed from frame by simply lifting support, and pulling it away from frame.

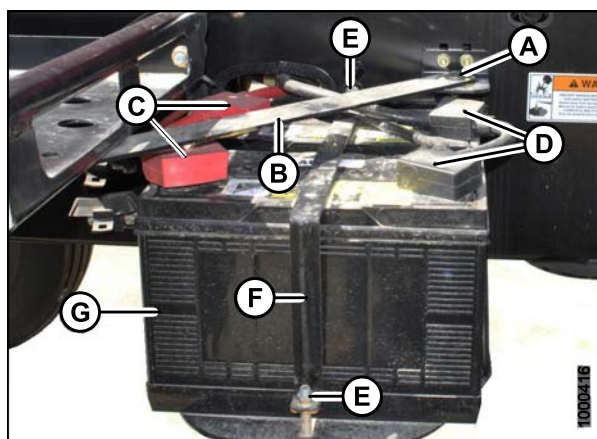


Figure 5.131

Installing Battery

Table 5.17 Battery Specification

| Rating | Group | CCA (min) | Volt | Maximum Dimension |
|---|----------------|-----------|------|--|
| Heavy duty, Off-road, Vibration Resistant | BCI 29H or 31A | 650 | 12 | 13.25 x 7.37 x 9.44 inches (334 x 188 x 232 mm) |

MAINTENANCE AND SERVICING

1. Position new batteries on dual battery support.
2. Install strap (F) with bolts (E).

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.

3. Attach negative (black) cable clamps (D) to negative post on batteries and tighten clamps.
4. Attach positive (red) cable clamps (C) to positive post on batteries and tighten. Reposition plastic covers onto clamps.
5. Close the platform, see [5.3.2 Closing Platforms \(Standard Position\)](#), page 274.

Preventing Electrical System Damage

1. Carefully observe polarity when attaching booster battery.
2. Do not short across battery or alternator terminals, or allow battery positive (+) cable or alternator wire to become grounded.
3. Be sure alternator connections are correct before cables are connected to battery. Refer to illustration below.
4. When welding on any part of the machine, disconnect battery cables and alternator wire. See [1.8 Welding Precaution](#), page 9.
5. Always disconnect battery ground cable when working with the alternator or regulator.
6. Never attempt to polarize alternator or regulator.
7. If wires are disconnected from the alternator, use the illustration to ensure proper reconnection.
8. Never ground the alternator field terminal or field
9. Never connect or disconnect alternator or regulator wires with battery connected or alternator operating.
10. Always disconnect cables from the battery when using a charger to charge battery in windrower.
11. Ensure all cables are securely connected before operating engine.

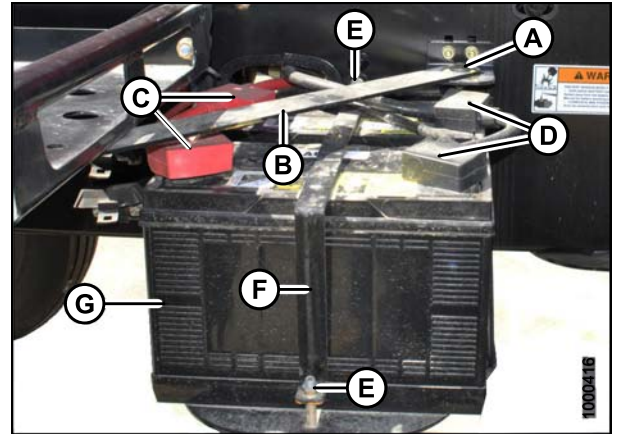


Figure 5.132

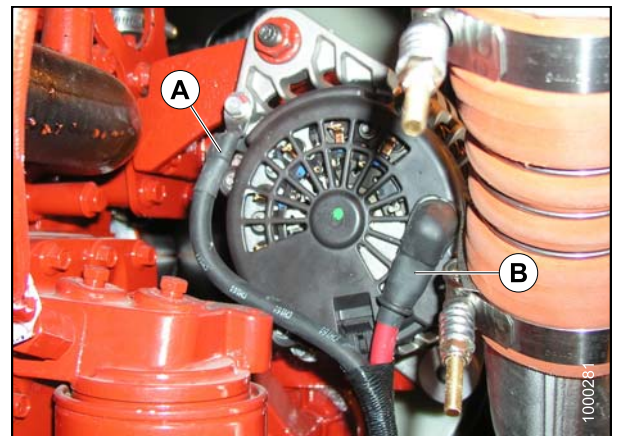


Figure 5.133: Alternator

A - Negative Terminal

B - Positive Terminal

MAINTENANCE AND SERVICING

5.8.2 Headlights: Engine-Forward

Aligning Headlights



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.

1. Position windrower on level ground in front of a vertical surface in accordance with the illustration.
2. Shut down engine, and remove key.
3. Turn on ROAD lights, and switch to low-beam.

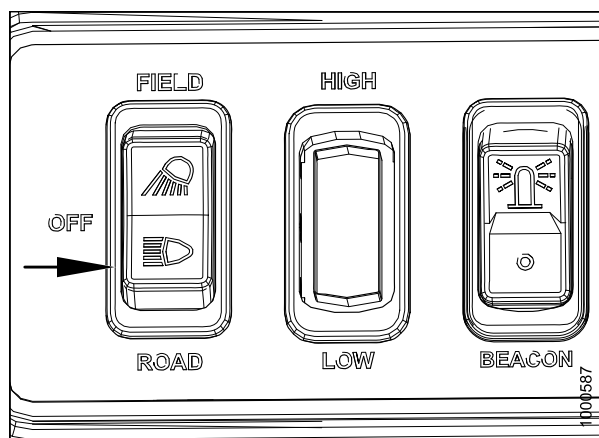


Figure 5.134

4. Align the headlights to the following specifications by turning adjusting screws (A).
 - 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.



Figure 5.135

MAINTENANCE AND SERVICING

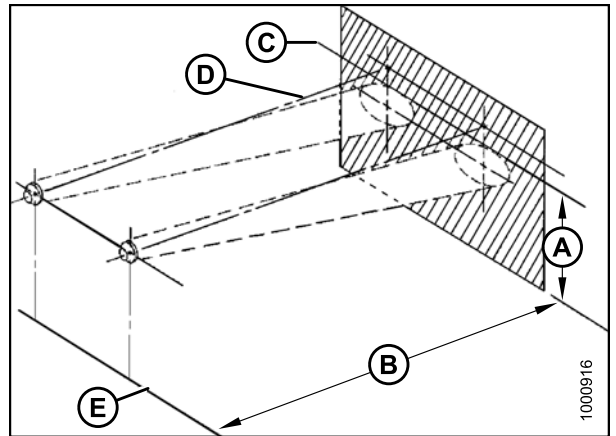


Figure 5.136

A - 266 cm (105 in) Maximum

B - 7.5 m (25 ft.)

C - Top Edge of Beam

D - Beam Centered on Direction
of Travel Line

E - Ground

Replacing Bulb

1. Remove two screws (A), and remove headlight assembly from hood.



Figure 5.137

2. Pull wiring harness connector off the headlight assembly, and remove rubber insulator boot (B).

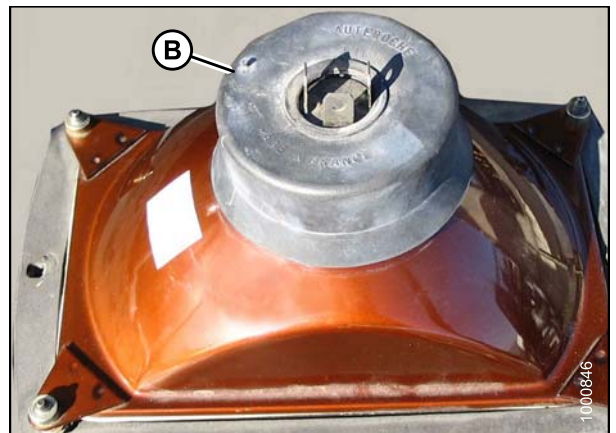


Figure 5.138

MAINTENANCE AND SERVICING

3. Pinch the wire retainer (C), and lift away from hooks.
4. Remove bulb (D) 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.

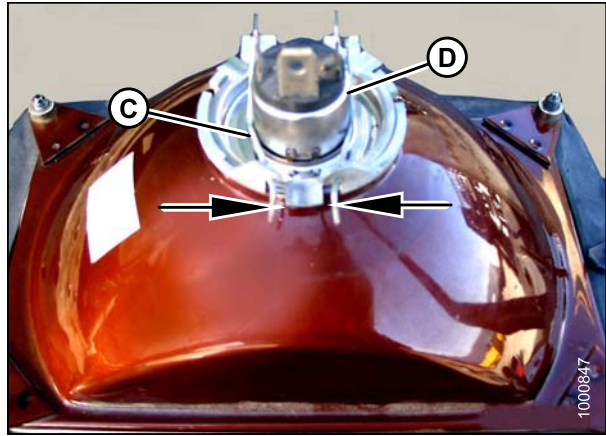


Figure 5.139

5. Align lugs on new bulb with slots (E) in body, and push into place.
6. Secure bulb with wire retainer (C)

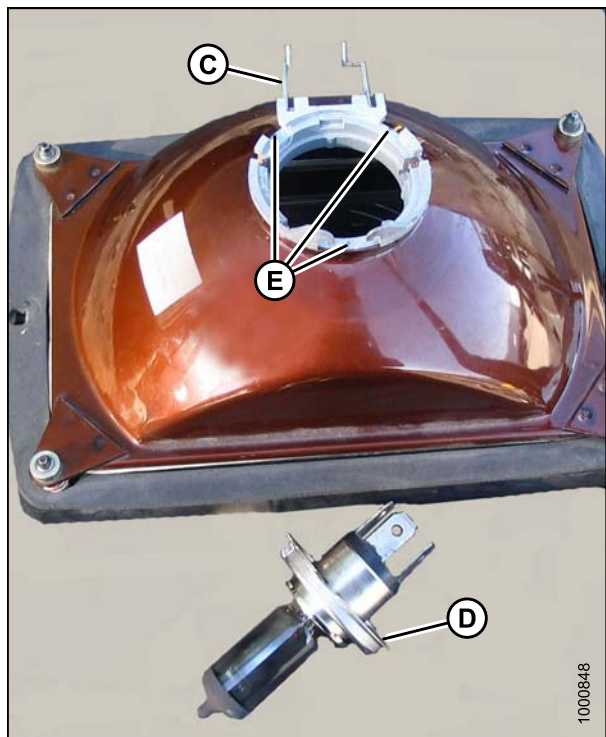


Figure 5.140

MAINTENANCE AND SERVICING

- 7. Replace rubber insulator boot (B).
- 8. Push connector onto light bulb.

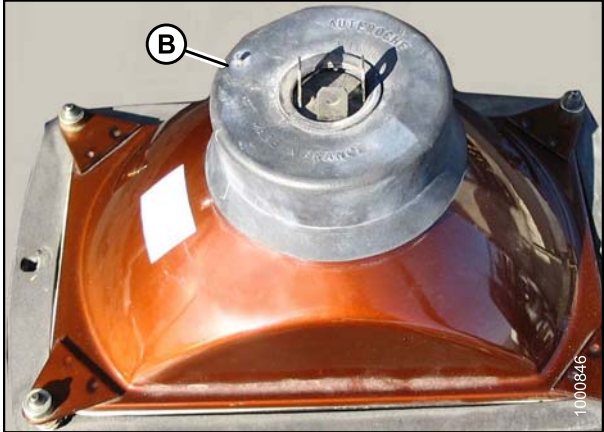


Figure 5.141

- 9. Position headlight into light receptacle, ensuring top is up, and secure with screws (A).
- NOTE:** Aligning of light should not be necessary.



Figure 5.142

MAINTENANCE AND SERVICING

5.8.3 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.

Adjusting Lights

The field lights are best adjusted with the machine in the field (or equivalent) to suit Operator preference.

1. Hold onto handholds (A) on the cab front corners, and stand on header anti-slip strips.

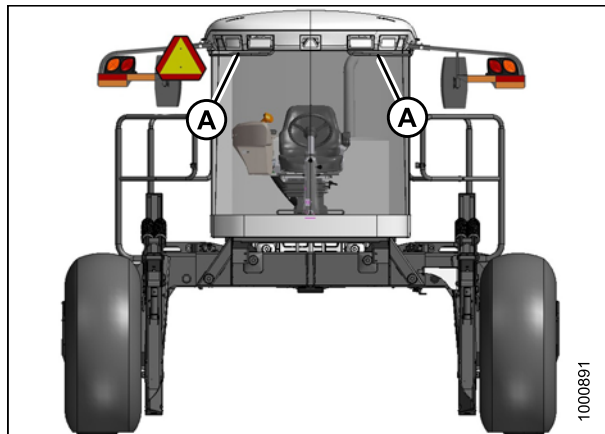


Figure 5.143

2. Adjust lights with screws (A).

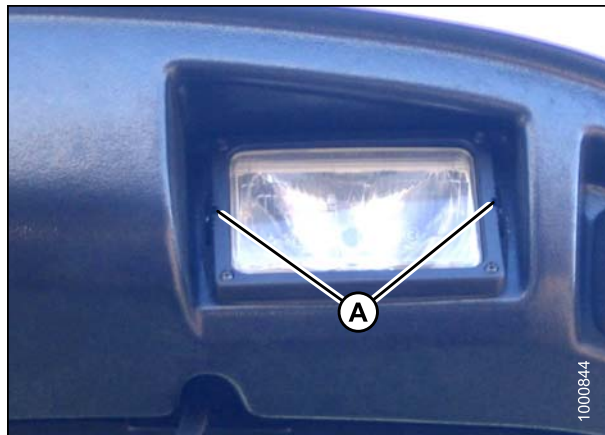


Figure 5.144

MAINTENANCE AND SERVICING

Replacing Bulb

1. Remove two screws (A), and remove light assembly.
2. Replace bulb as described in Section [Replacing Bulb](#), page 343

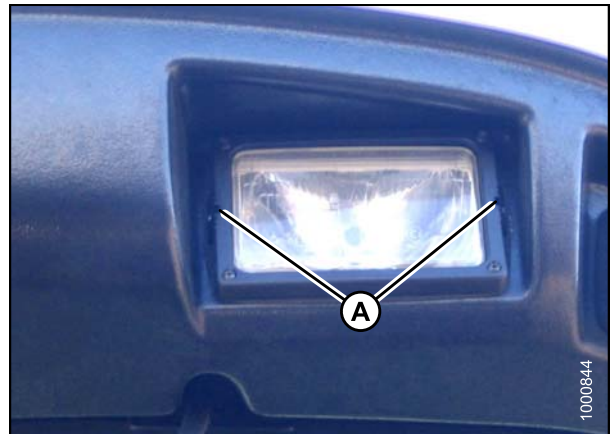


Figure 5.145

5.8.4 Floodlights: Forward

Adjusting Forward Floodlights

The forward floodlights are **NOT** adjustable.

Replacing Bulb in Forward Floodlight

Replace bulbs as follows:

1. Shut down engine, and remove key. Turn lights OFF.
2. Hold onto the handholds (A) on the cab front corners, and stand on the header anti-slip strips when removing the forward field lights.
3. Remove two screws (B), and remove light bezel (C).
4. Remove light from receptacle.

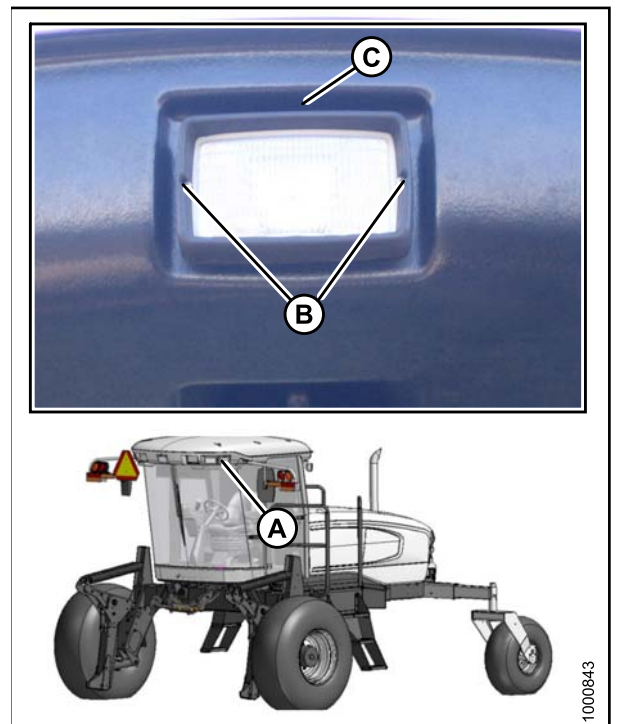


Figure 5.146

MAINTENANCE AND SERVICING

5. Pinch the wire retainer (A), and lift away from hooks.
6. Remove bulb (B) from body, and pull wire from connector (C).

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.

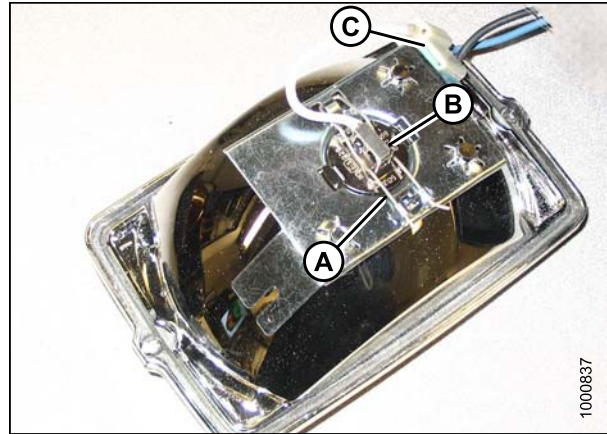


Figure 5.147

7. Match slots on new bulb (B) with lugs (D) in optical unit, and insert bulb into unit.
8. Secure bulb with wire retainer (A).
9. Push wire into connector (C).

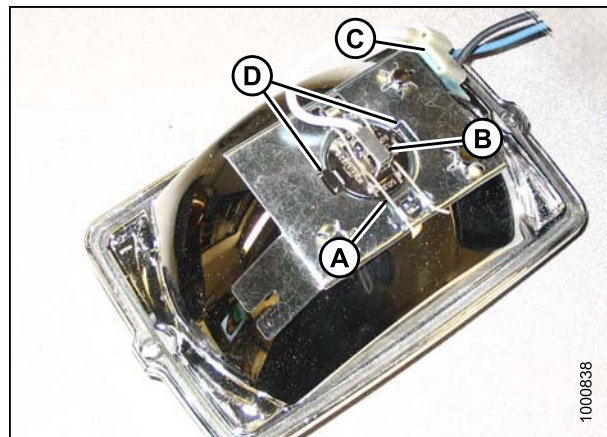


Figure 5.148

10. Position light into light receptacle, ensuring top is up, and secure with bezel (C) and screws (B).

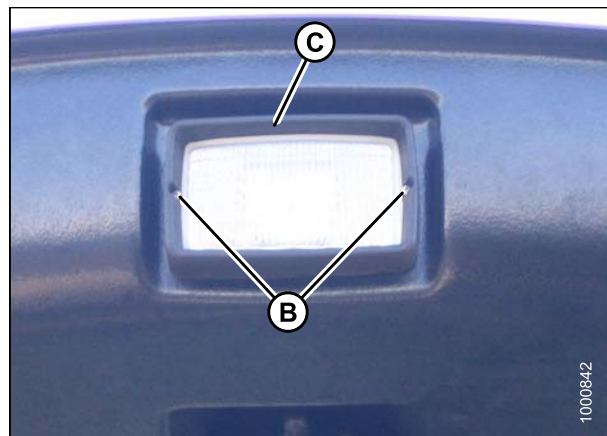


Figure 5.149

MAINTENANCE AND SERVICING

5.8.5 Floodlights: Rear

Adjusting the Rear Floodlights

The rear floodlights are best adjusted with the machine in the field (or equivalent) to suit Operator preference.

1. Shut down engine, and remove key. Turn lights ON.
2. Loosen bolts (A) and (B).
3. Position light to desired position.
4. Tighten bolts (A) and (B).

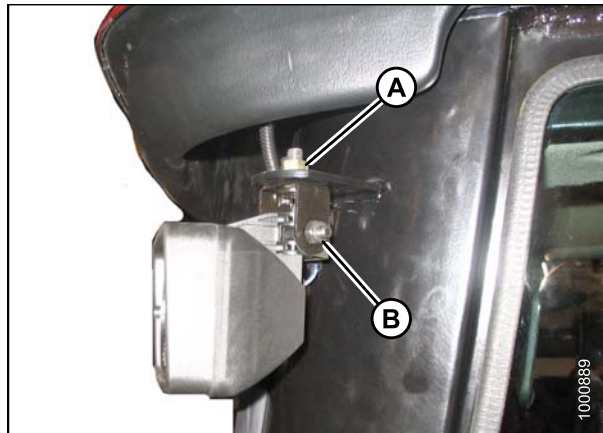


Figure 5.150

Replacing Bulb in Rear Floodlight

1. Shut down engine, and remove key. Turn lights OFF.
2. Remove two screws (A), and remove light bezel (B).
3. Remove light from receptacle.

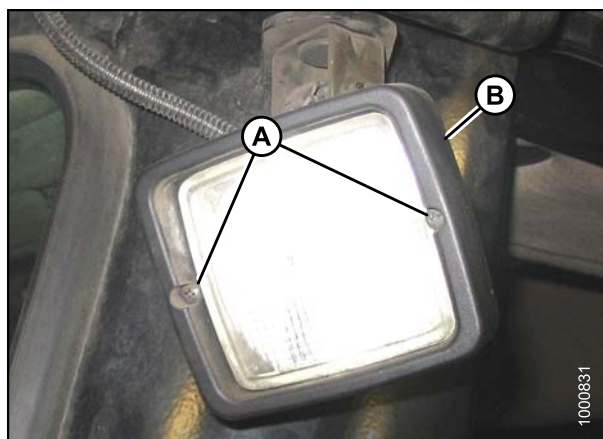


Figure 5.151

MAINTENANCE AND SERVICING

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.

4. Pinch the wire retainer (C), and lift away from hooks.
5. Remove bulb (D) from body, and pull wire from connector (F).
6. Match slots on new bulb (D) with lugs (E) in optical unit, and insert bulb into unit.
7. Secure bulb with wire retainer (C).
8. Push wire into connector (F).

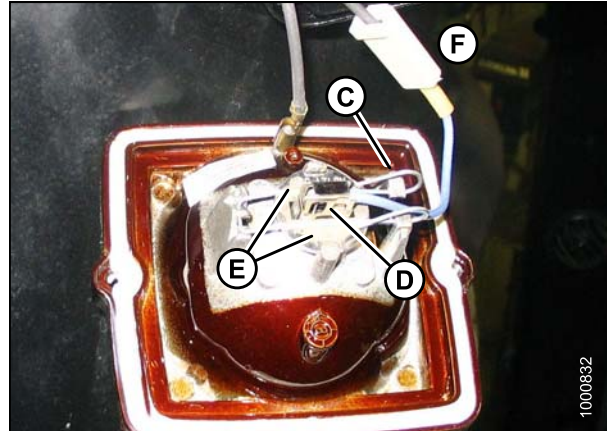


Figure 5.152

9. Position light into light receptacle, ensuring top is up, and secure with bezel (B) and screws (A).

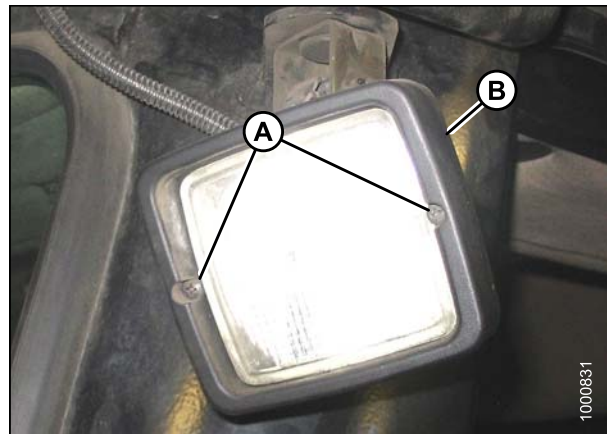


Figure 5.153

MAINTENANCE AND SERVICING

5.8.6 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.

1. Shut down engine, and remove key. Turn lights OFF.

NOTE: Hold onto the handholds (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.

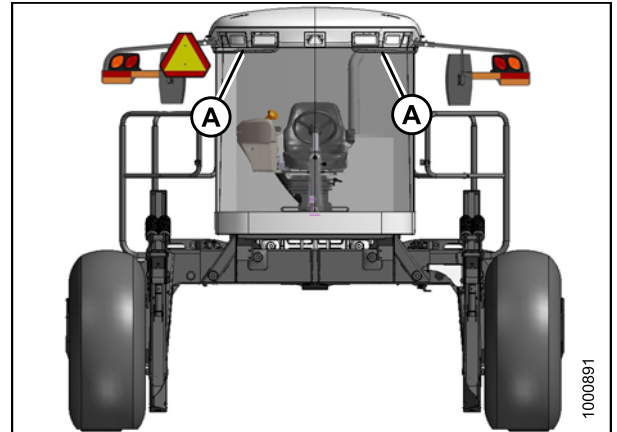


Figure 5.154

2. Remove two screws (A) from lens, and remove lens.
3. Push and twist light bulb to remove from socket.
4. 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.
5. Re-install lens with screws (B).

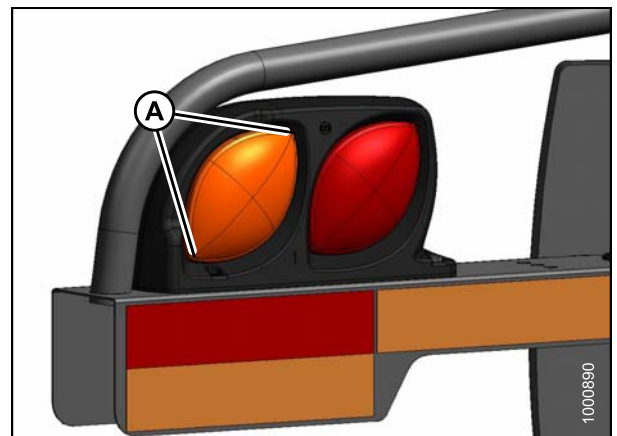


Figure 5.155

5.8.7 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.

1. Shut down engine, and remove key. Turn lights OFF.

MAINTENANCE AND SERVICING

2. In the grill of the hood, remove two screws (A) from light (B), and remove light.
3. Remove connector from light.
4. Connect wiring harness to new light (B), and install light with screws (A).

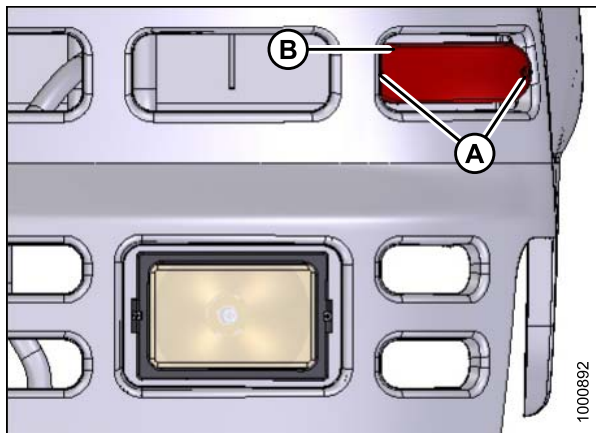


Figure 5.156

5.8.8 Beacons (if installed)

Beacons are available as a Dealer-installed optional attachment

1. Shut down engine, and remove key. Turn beacons OFF.

NOTE: Hold onto the handholds (B) on the cab front corners, and stand on the header anti-slip strips, or stand on the maintenance platform when accessing the beacons (A).

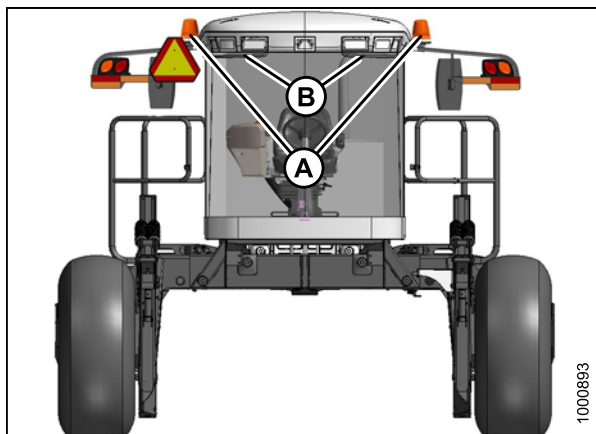


Figure 5.157

2. Turn lens (A) counterclockwise to unlock lens from base, and remove lens.

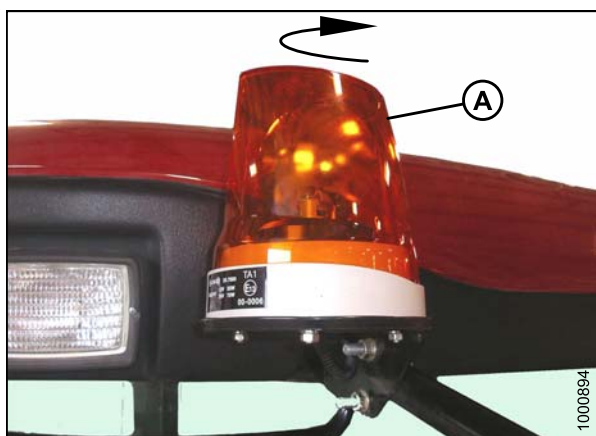


Figure 5.158

MAINTENANCE AND SERVICING

3. Pinch retainer (A), and remove it from lamp socket.
4. Pull lamp out of socket.

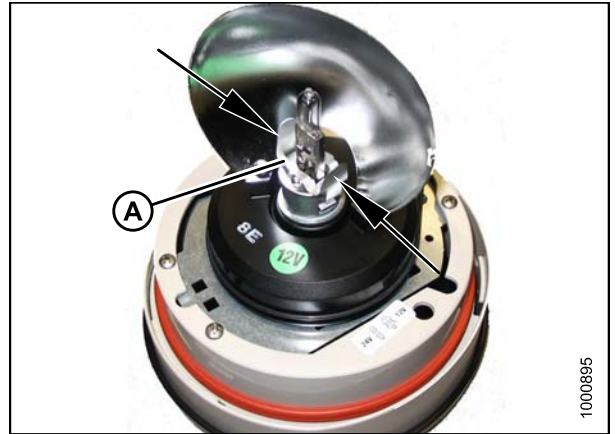


Figure 5.159

5. Disconnect harness from lamp.

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.

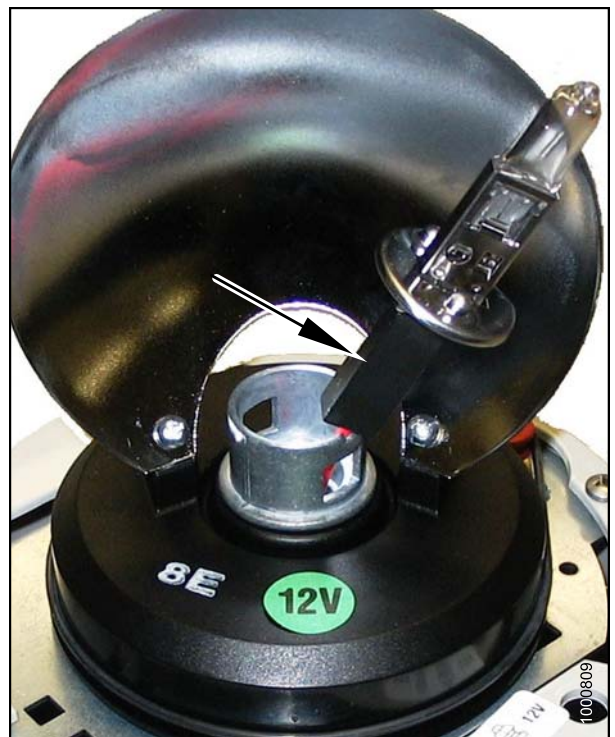


Figure 5.160

MAINTENANCE AND SERVICING

6. Connect harness to new lamp, place lamp in socket, and line up the flat side on lamp with recess in socket.



Figure 5.161

7. Place retainer over lamp, and pinch tabs to secure retainer to socket.

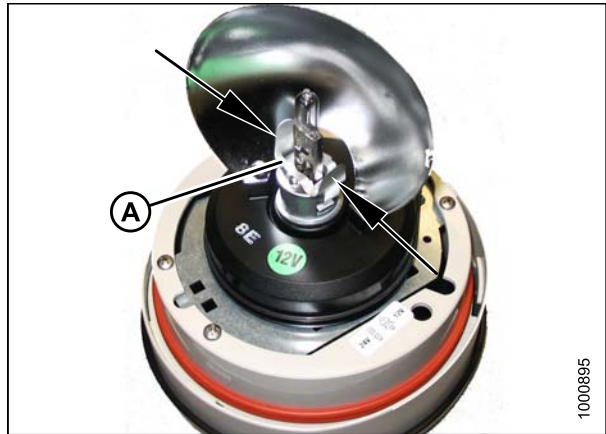


Figure 5.162

MAINTENANCE AND SERVICING

8. Line up the three lugs (one is longer) in the base with slots in lens, and seat the lens against the rubber seal.

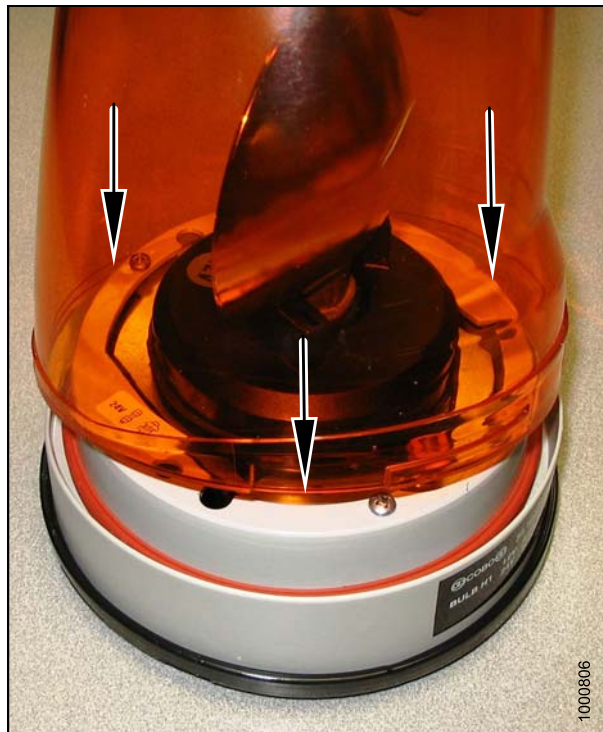


Figure 5.163

9. Turn the lens clockwise to lock it in place.

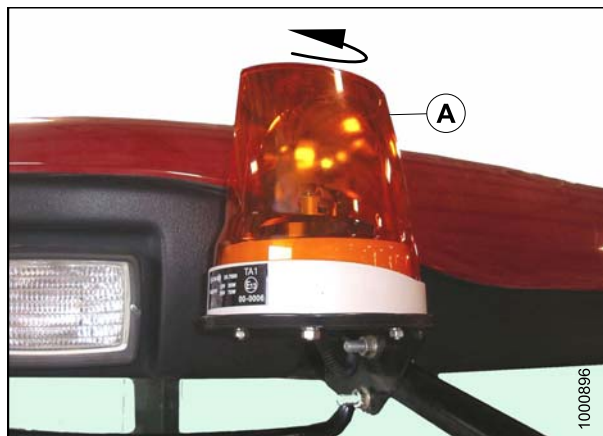


Figure 5.164

5.8.9 Console Gauge Light

1. Shut down engine, and remove key. Turn lights OFF.

MAINTENANCE AND SERVICING

2. Remove the appropriate gauge access hole decal (A) behind the Operator's console.

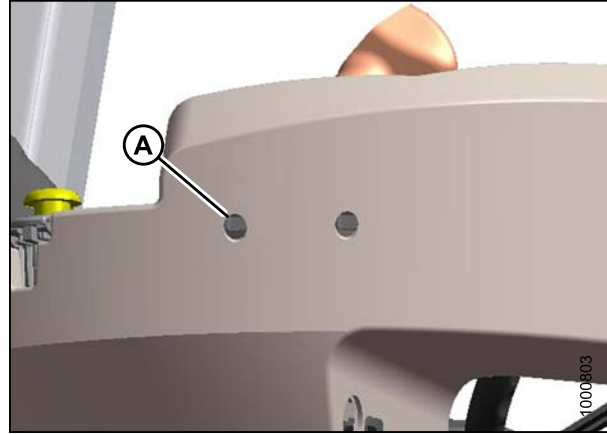


Figure 5.165

3. Remove nut (B) securing mounting bracket (C) to gauge inside the console.
4. Pull gauge out from console. It is not necessary to disconnect the wiring harness to back of gauge.
5. Twist bulb holder (D) counterclockwise until loose, and pull bulb holder from back of gauge.
6. Insert new bulb into gauge, and turn clockwise until it locks.
7. Push gauge into console.
8. Locate bracket (C) onto back of gauge, and secure with nut (B). Tighten nut to 75–96 in-oz (529–678 mN·m).
9. Replace gauge access-hole decal (A).

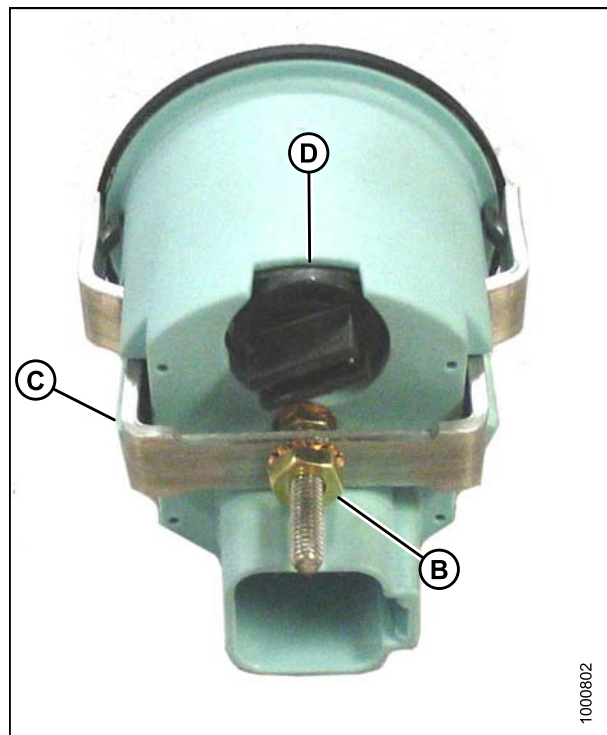


Figure 5.166

5.8.10 Dome Light

1. Shut down engine.

MAINTENANCE AND SERVICING

2. Remove two screws (A) from plastic lens, and remove lens.
3. Replace bulb.
4. Re-install plastic lens with screws (A).

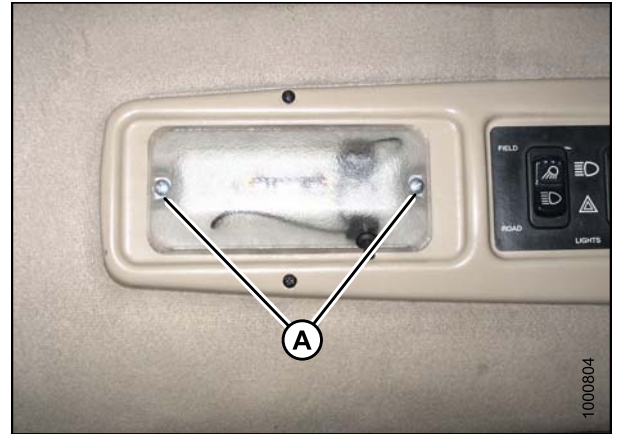


Figure 5.167

5.8.11 Ambient Light

1. Shut down engine.
2. Locate the ambient light fixture (A) in the roof liner.

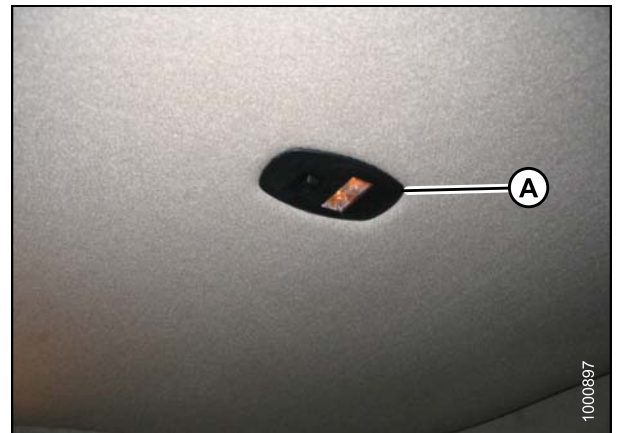


Figure 5.168

3. Push against tabs (A) with a screwdriver, and pull ambient light fixture out of cab roof.
4. Remove wires from connectors (B).
5. Connect wires to new light fixture.
6. Push into place in cab roof until tabs hold fixture in place.

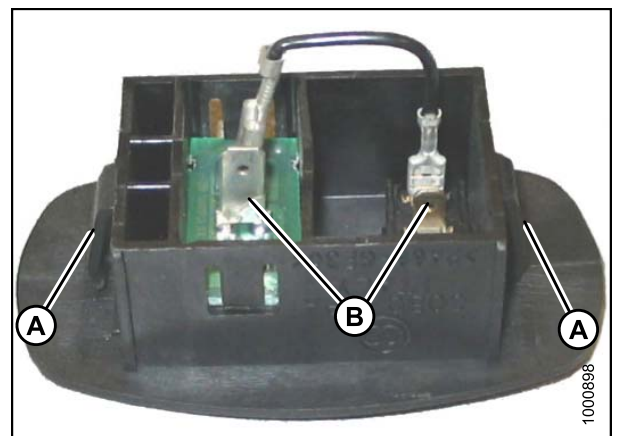


Figure 5.169

MAINTENANCE AND SERVICING

5.8.12 Turn Signal Indicators

If the turn signal indicators on the CDM do **not** function, contact your MacDon Dealer.

5.8.13 Circuit Breakers and Fuses

The circuit breakers and fuses are located inside the fuse box that is mounted on the frame under the right cab-forward side platform.



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 automatically reset. Fuses are the plastic blade type.

Access the breakers and fuses as follows:

1. Stop engine, and remove key.
2. Move right cab-forward side platform rearward (cab-forward).
3. Remove wing nut (A), and remove fuse box cover (B).
4. Refer to decal on inside of cover for identification of fuses and circuit breakers. See illustration on next page.

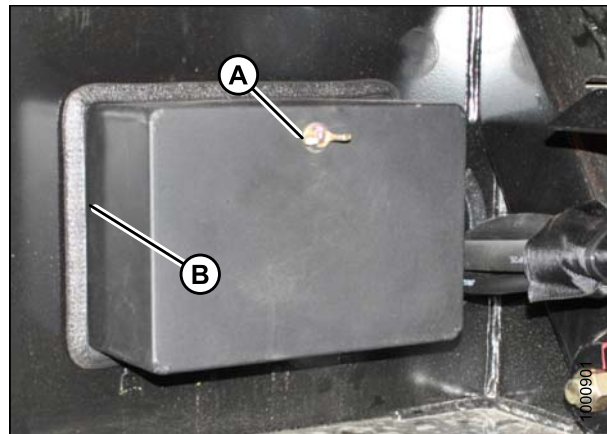


Figure 5.170

MAINTENANCE AND SERVICING

Checking, Replacing Fuses

1. To check fuse, pull fuse (A) out of receptacle, and visually examine.
2. To replace fuse, insert new fuse into receptacle.

IMPORTANT

Replacement fuses should match rating on decal shown on following page.

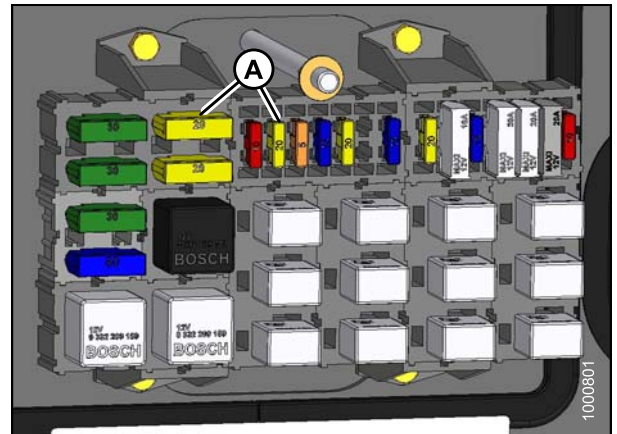


Figure 5.171

Replacing Circuit Breakers/Relays

Access the breakers and relays as follows:

1. Stop engine, and remove key.
2. Move right cab-forward side platform rearward (cab-forward).
3. To replace circuit breaker (A), pull breaker out of receptacle, and install new circuit breaker.
4. To replace relay (B), pull relay out of receptacle, and install new relay.
5. Re-install cover, and secure with wing nut.

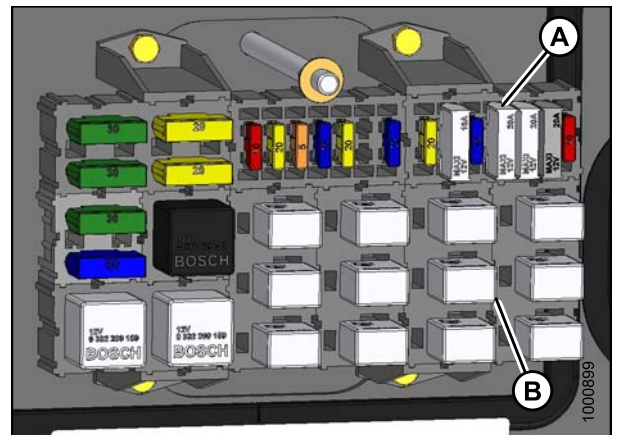


Figure 5.172

MAINTENANCE AND SERVICING

Fuse Box Decal

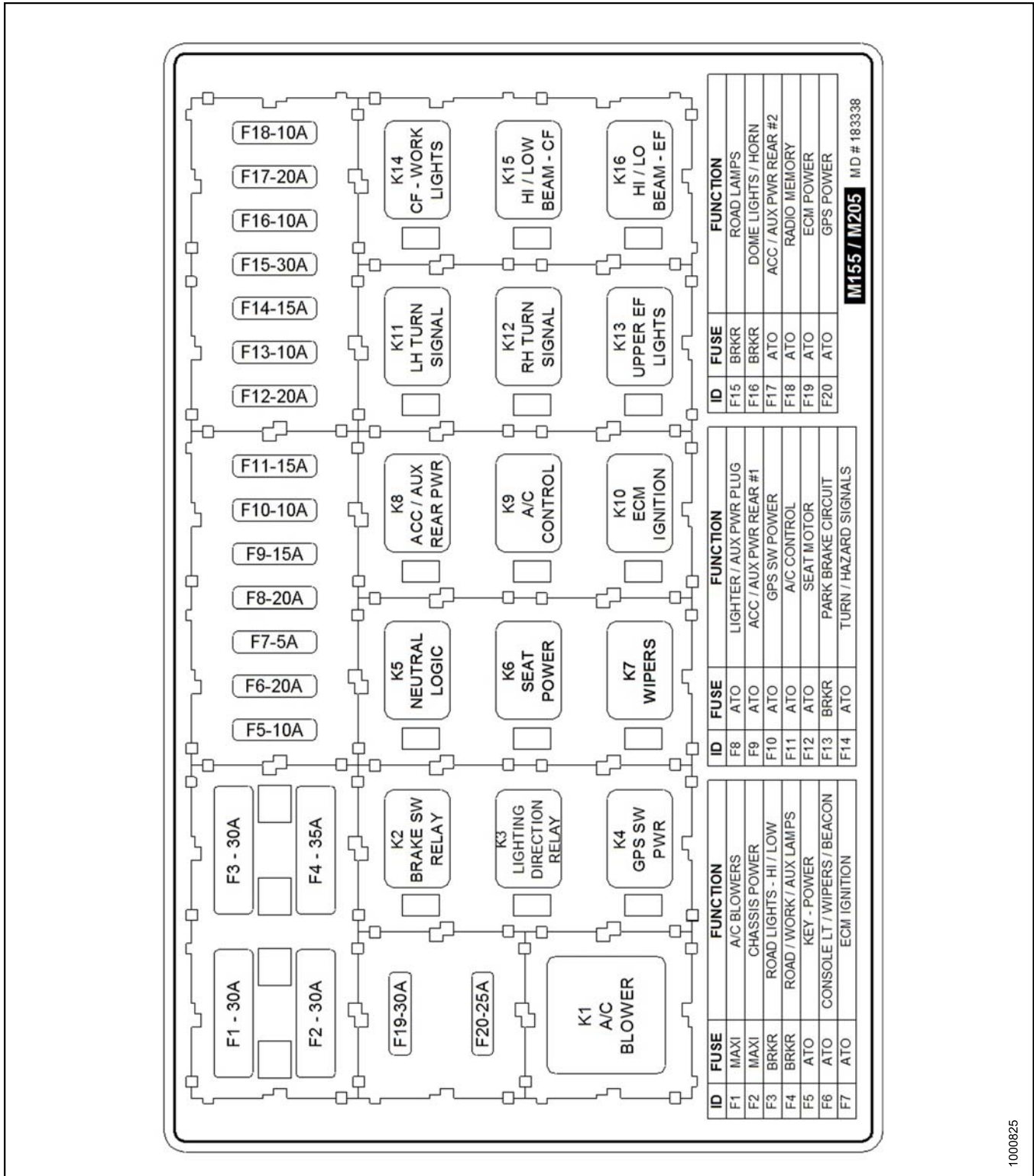


Figure 5.173: Fuse Decal

1000825

MAINTENANCE AND SERVICING

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.

1. Stop engine, and remove key.
2. Move right cab-forward side platform rearward (cab-forward).
3. To check condition of fuse (A), pull tab (B), and open cover (C).

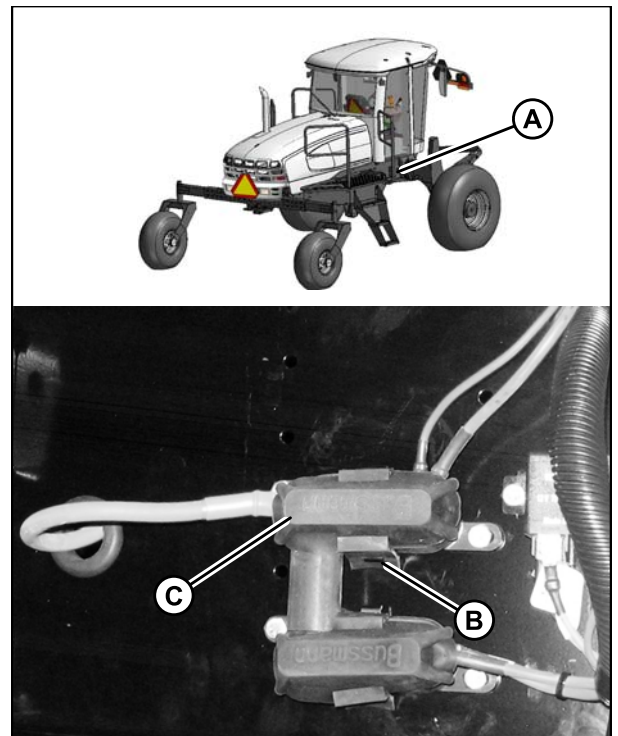


Figure 5.174

MAINTENANCE AND SERVICING

4. Visually examine fuse (B) for indications of melting.
5. To remove fuse (B), remove two nuts (C), and pull fuse free from holder. Existing wiring may need to be pulled off the stud first.
6. Install new fuse on studs and any existing wiring that was removed.
7. Secure with nuts (C).

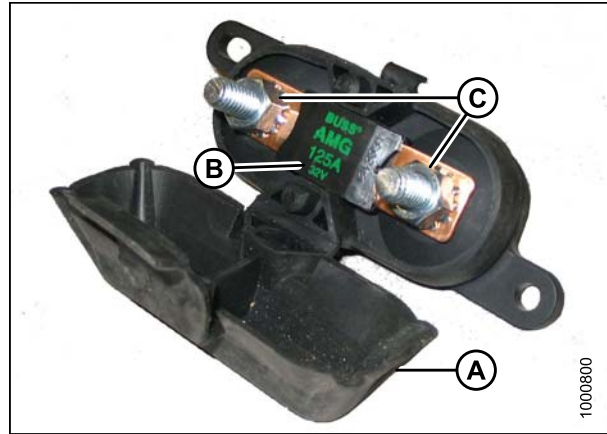


Figure 5.175

8. Close cover (C), and secure with tab (B).
9. Return platform to operating position. Ensure lock engages.

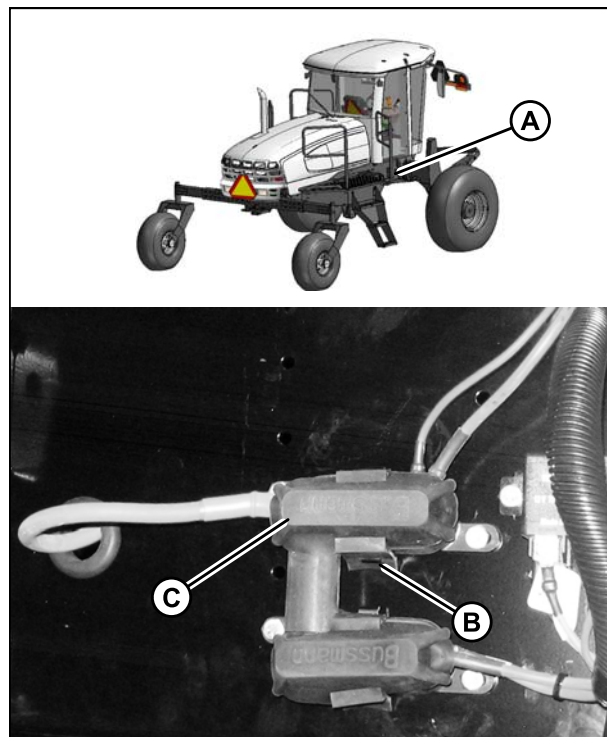


Figure 5.176

MAINTENANCE AND SERVICING

5.9 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.
- 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.

5.9.1 Checking, Filling Hydraulic Oil

5.9.2 Hydraulic Oil Cooler

The hydraulic oil cooler is located inside the cooling box behind the radiator.



Figure 5.177

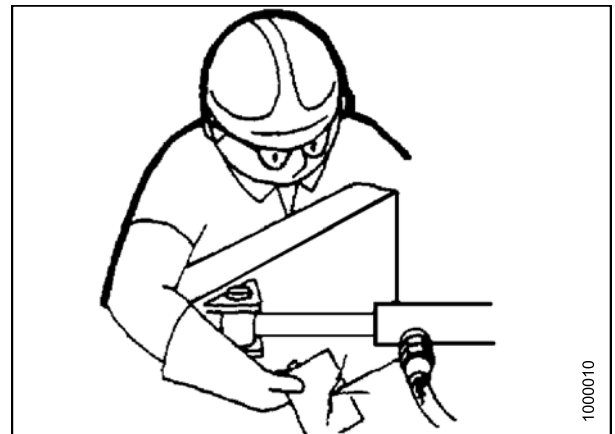


Figure 5.178

MAINTENANCE AND SERVICING

It should be cleaned daily with compressed air. Refer to [5.7.3 Maintaining Cooler Box, page 328](#).

5.9.3 Draining Hydraulic Oil

NOTE: Change hydraulic oil every 1500 hours.

1. Park windrower on level ground, and lower header and reel so that lift cylinders are fully retracted.
2. Stop engine and remove key.
3. Open the hood, see [5.2.3 Opening Hood \(Highest Position\), page 271](#).
4. Use a clean, appropriately sized container (at least 20 U.S gallons [75 liters]) to collect the oil.
5. Disconnect the hose connection to the pump, and allow oil to drain.
6. Remove drain plug (A), and allow oil to drain.
7. Clean off any metal debris that may have accumulated on magnetic plug. Wipe plug with a clean cloth. Check O-ring condition. Look for cracking, breakage or deformation that may impede sealing ability and replace as required.
8. Install drain plug (A).
9. Install hydraulic oil, see [Checking, Filling Hydraulic Oil](#).

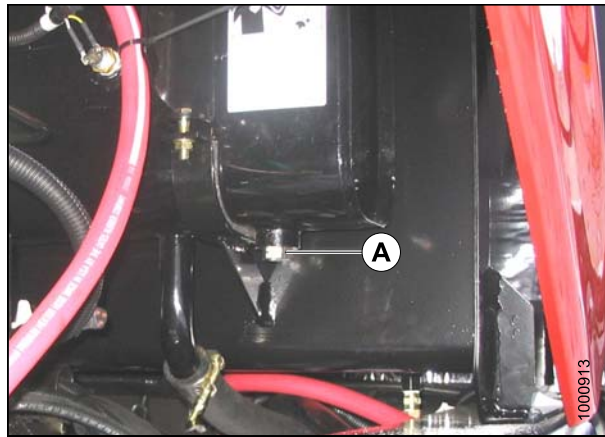


Figure 5.179

5.9.4 Hydraulic Filter Change

Charge Filter

Removing Charge Filter

NOTE: Change hydraulic oil filter after the first 50 hours of operation, and every 500 hours thereafter.

1. Stop engine, and remove key.
2. Clean around head of the filter.
3. Place a container beneath the filter to collect any oil that may leak out. Unscrew filter (A) with a filter wrench.
4. Dispose of used oil in accordance with local environmental legislation.

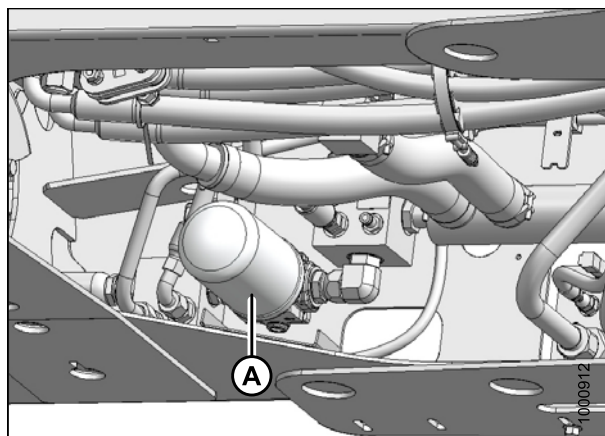


Figure 5.180

MAINTENANCE AND SERVICING

Installing Charge Filter

1. Clean the gasket surface of the filter head.
2. Apply a thin film of clean oil to the filter gasket.
NOTE: To view filter specifications, refer to section [Filter Part Numbers, page 268](#)
3. Screw the new filter (A) onto the mount until the gasket contacts the filter head.
4. 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.

5. Check hydraulic fluid levels, see [Checking, Filling Hydraulic Oil](#). For capacity level, see [Lubricants Fluids System Capacities, page 267](#).

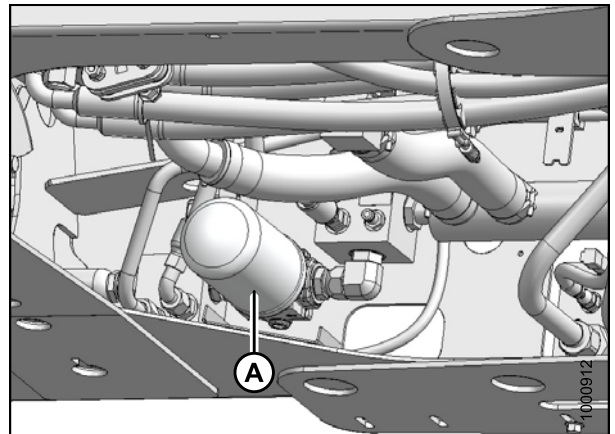


Figure 5.181

Return Filter

Removing Return Filter

NOTE: Change hydraulic oil filter after the first 50 hours of operation, and every 500 hours thereafter.

1. Stop engine, and remove key.
2. Clean around head of the filter.
3. Place a container beneath the filter to collect any oil that may leak out. Unscrew filter (A) with a filter wrench.
4. Dispose of used oil in accordance to local environmental legislation.

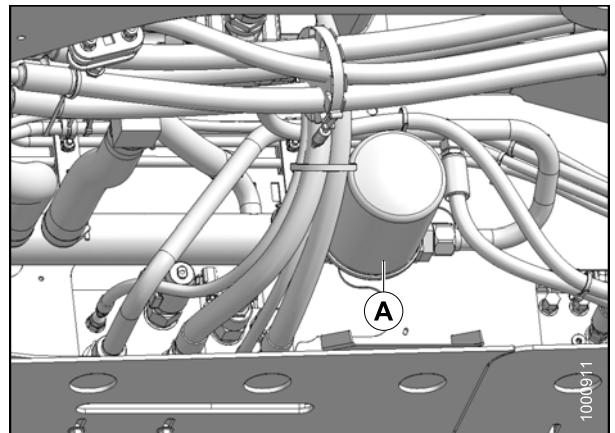


Figure 5.182

MAINTENANCE AND SERVICING

Installing Return Filter

1. Clean the gasket surface of the filter head.
2. Apply a thin film of clean oil to the filter gasket.
3. Screw the new filter (A) onto the mount until the gasket contacts the filter head.
4. 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.

5. Check hydraulic fluid levels, see [Checking, Filling Hydraulic Oil](#). For capacity level, see [Lubricants Fluids System Capacities, page 267](#).

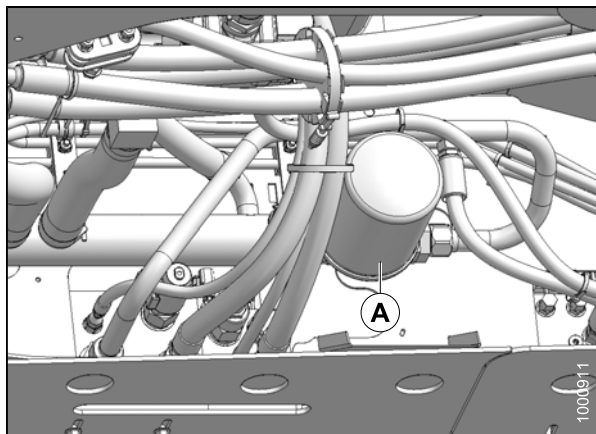


Figure 5.183

5.9.5 Header and Reel Hydraulics

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 Differential Relief Setting psi (kPa) |
|--------------|------------------------------|---|---|
| R-series | Disc Pressure | 4000 (27,579) | 4200 (28,958) |
| D-series | Reel / Draper Pressure | 3000 (20,684) | 3200 (22,063) |
| A-series | Knife / Conditioner Pressure | 4000 (27,579) | 4200 (28,958) |

MAINTENANCE AND SERVICING

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.

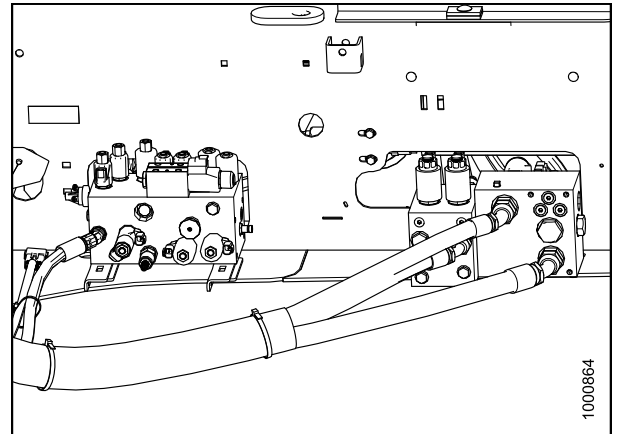


Figure 5.184

Adjusting 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.



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. Lower header to ground, stop engine, and remove key.
2. Move left cab-forward side platform rearward. See [5.3.1 Opening Platforms \(Standard Position\)](#), page 273
3. Loosen inner knob (A) on needle valve, and then turn outer knob (B):
 - a. Clockwise to decrease the drop rate, or
 - b. Counterclockwise to increase the drop rate.
4. Tighten inner knob (A).
5. Check drop rate, and re-adjust as required.
6. Close the platform, see [5.3.2 Closing Platforms \(Standard Position\)](#), page 274

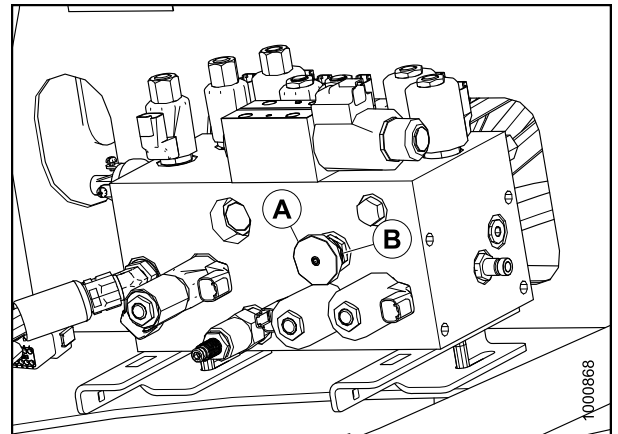


Figure 5.185

MAINTENANCE AND SERVICING

5.9.6 Traction Drive Hydraulics

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 [3.18.4 Cab Display Module \(CDM\) Warning/Alarms, page 80](#).

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:

1. Check the hydraulic fluid level in the tank. Refer to .
2. Check the hoses and lines for leakage.
3. Check the charge pressure relief valve. Refer to following section.
4. If charge pressure still cannot be maintained, do **NOT** operate the windrower. Contact your MacDon Dealer.

Checking Charge Pump Pressure

Correct charge pressure must be maintained under all conditions to maintain pump control performance, and to operate the brake release

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

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.

Check charge pump pressure as follows:

1. 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.
2. Clean test port fitting, and attach hose to the fitting.
3. Start engine, and leave at idle. Pressure should be 240–325 psi (1655–2241) kPa with the hydraulic oil at 100°F (40°C) minimum.
4. If pressure is **NOT** within this range, see your MacDon dealer or refer to the Technical Service Manual.

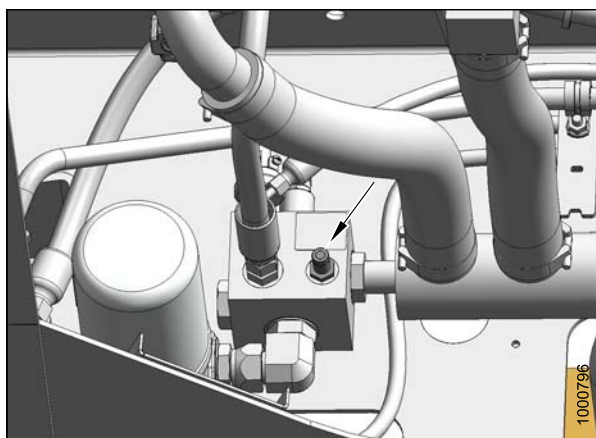


Figure 5.186

MAINTENANCE AND SERVICING

5.9.7 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.



Figure 5.187

MAINTENANCE AND SERVICING

5.10 Wheels and Tires

5.10.1 Drive Wheels

Drive Tire Inflation

Measure tire pressure annually with a gauge.

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.

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.

Measure tire pressure annually with a gauge. Maintain the pressure as follows:

1. Visually check daily that tires have not lost pressure. Under-inflation of drive tires can cause side wall cracks.
2. Determine tire size and type that is installed on your machine.
3. Adjust tire pressure as required.

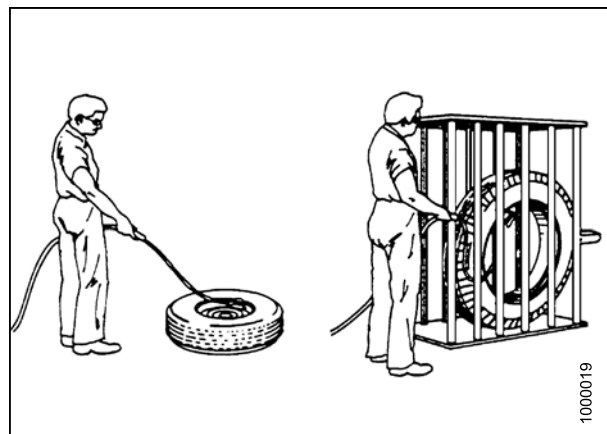


Figure 5.188

MAINTENANCE AND SERVICING

Table 5.18 Tire Pressure

| Tire Options | | | | | |
|--------------|---|---------------------|---------------------|---------------------|---------------------|
| Drive Tires | 18.4-26 Bar | 600 / 65 R28 Bar | 18.4-26 Turf | 23.1-26 Turf | 580 / 70 R26Turf |
| | 32 psi (221 kPa) | 26 psi (179 kPa) | 35 psi (241 kPa) | 20 psi (138 kPa) | 24 psi (165 kPa) |
| Rear Tires | 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 | | | | |
| | All Rear Tire Pressures are 10 psi (69 kPa) | | | | |

Drive Wheel Nut Torque Procedure

At first use, or when a wheel is removed, re-torque drive wheel nut torque after one hour of operation.

Continue with torquing procedure at one hour intervals of operation until two consecutive checks produce no movement of the nuts.

1. Tighten nuts to 220 ft·lbf (300 N·m) using the tightening sequence as shown.

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

2. Repeat sequence three times.

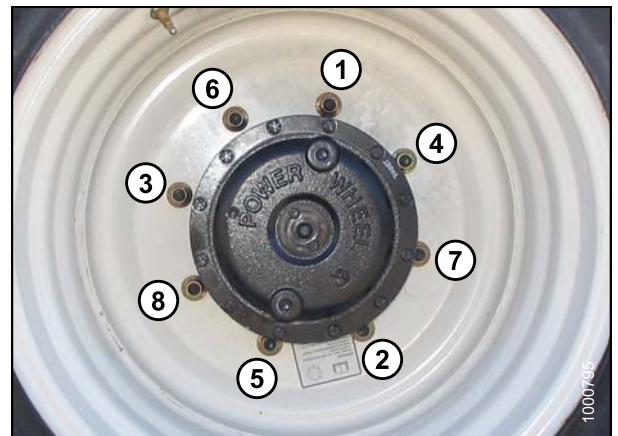


Figure 5.189

MAINTENANCE AND SERVICING

Servicing Drive Wheel

Raising Drive Wheel

This procedure can be used on both drive wheels.

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.

CAUTION

Header **MUST** be removed, and **NO** weight box installed. Use a hydraulic jack with minimum lifting capacity of 5000 lbs (2268 Kg) to provide adequate support for the machine.

1. Remove the header.
2. Place GSL in N-DETENT, shut down engine and remove key.
3. Park windrower on level ground and block all wheels.

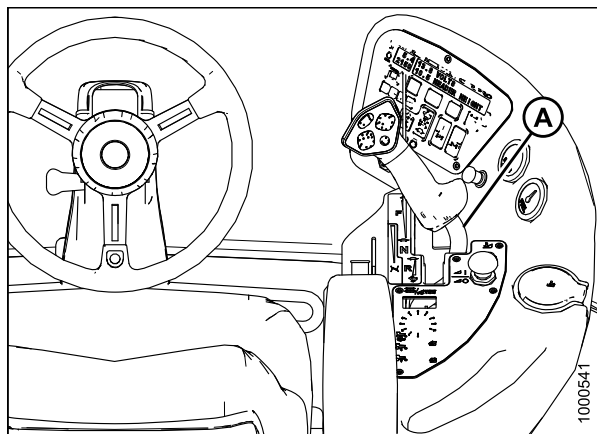


Figure 5.190

4. Place a jack under the leg jack point (A) and raise the drive wheel slightly off ground. Place a jack stand beneath the lift cylinder mount (B).

NOTE: Ensure you do not contact the cylinder. You may need to use a small metal plate on top of the jack stand.

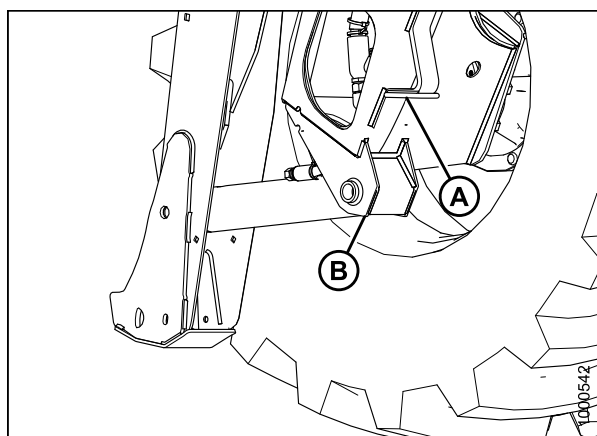


Figure 5.191

MAINTENANCE AND SERVICING

Removing Drive Wheel

1. Raise the windrower drive tire off the ground, see [Raising Drive Wheel, page 368](#).
2. Remove wheel nuts (A).
3. Remove the wheel (B).

NOTE: Use an appropriate lifting device capable of supporting a minimum of 2000 lbs. (907 kg) to lift the wheel assembly away from the windrower.

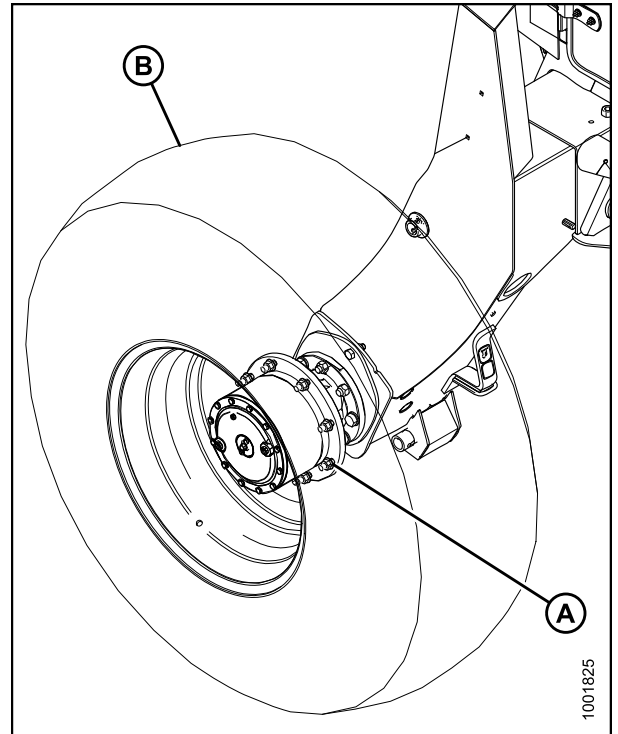


Figure 5.192

Installing Drive Wheel

1. Install tire, ensure that the valve stem (A) is on the outside of the rim, and tire tread (B) points forward. For Turf tires (diamond tread), be sure arrow on sidewall points in forward rotation.

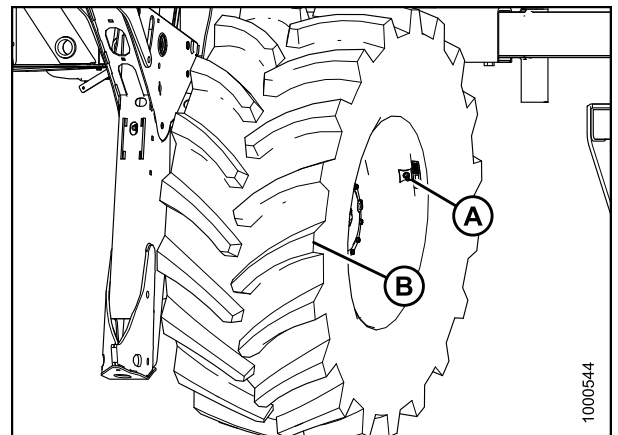


Figure 5.193

MAINTENANCE AND SERVICING

2. Position tire on hub and install wheel nuts (A).
3. Tighten nuts (A) to 220 ft·lbf (300 N·m) using the tightening sequence as shown.

NOTE: To avoid damage to wheel disks, do **NOT** overtighten wheel nuts.

4. Repeat sequence three times. Then check every hour until two consecutive checks produce no movement of the nuts.
5. Lower windrower to the ground, see [Lowering Drive Wheel, page 370](#).

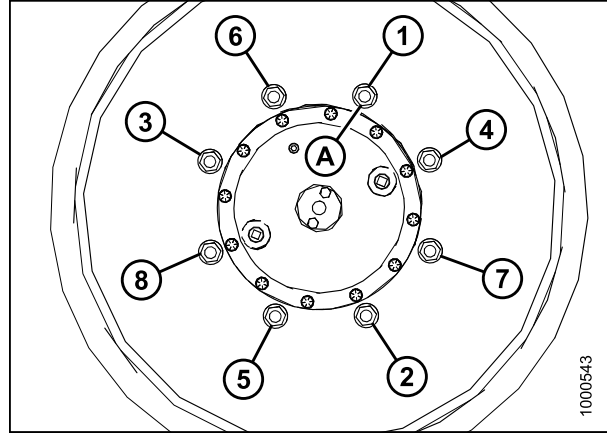


Figure 5.194

Lowering Drive Wheel

This procedure can be used on both drive wheels.

1. Place a jack under the leg jack point (A) and raise the drive wheel slightly off the jack stand.
2. Remove the jack stand and lower the tire to the ground.
3. Remove the jack.

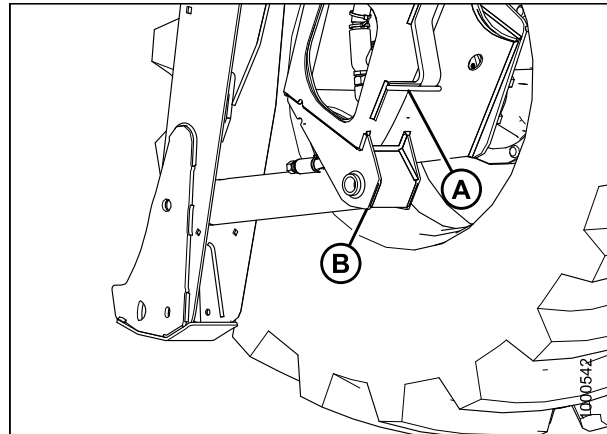


Figure 5.195

MAINTENANCE AND SERVICING

Lubrication

Checking Drive Wheel Lubricant Level

Check the level every 200 hours or annually.

NOTE: The windrower should be on level ground when checking lubricant level.

1. Position windrower so that plugs (A) and (B) are horizontally aligned with the center (C) of the hub.
2. Remove plug (A) or (B). The lubricant should be visible through the port, or slightly running out. If lubricant needs to be added, see [Adding Drive Wheel Lubricant, page 371](#)
3. Re-install plug and tighten.

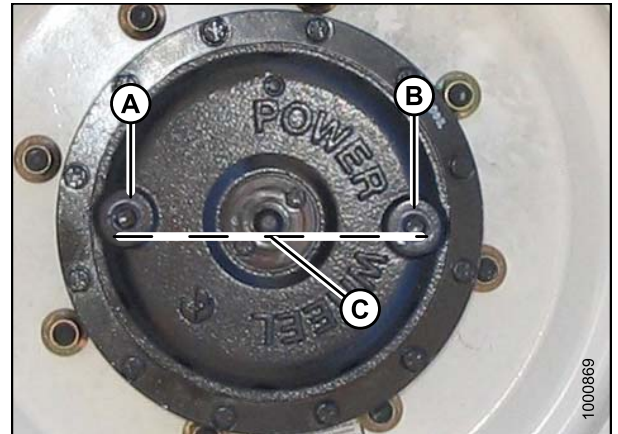


Figure 5.196

Adding Drive Wheel Lubricant

NOTE: Do **NOT** mix lubricants of different brands or characteristics.

NOTE: For lubricant specifications, refer to section [Lubricants Fluids System Capacities, page 267](#)

1. Rotate the drive wheel so plugs (A) and (B) are horizontal (C) (if it is not already in that position).
2. Stop windrower and remove key from ignition.
3. Remove the two plugs (A) and (B).

NOTE: PRIOR TO FIRST CHANGE: use SAE 85W-140, API Service, Class GL-5, Extreme Pressure Gear Lubricant.

NOTE: AFTER FIRST CHANGE: use SAE 75W-90, API Service, Class GL-5, Fully Synthetic Transmission Lubricant (SAE J2360 preferred).

4. Add lubricant through one of the ports until the lubricant flows out of the other port.
5. Re-install and tighten plugs (A) and (B).
6. Start up and operate the windrower for a few minutes, then stop and check the oil level. See [Checking Drive Wheel Lubricant Level, page 371](#). If necessary, add more oil.

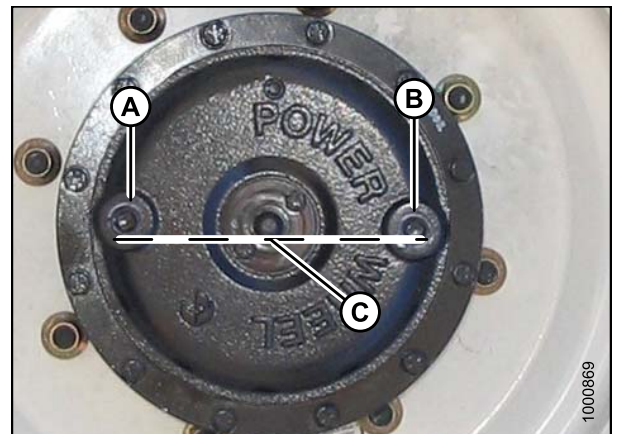


Figure 5.197

MAINTENANCE AND SERVICING

Changing Drive Wheel Lubricant

The drive wheel lubricant should be changed after the first 50 hours and then in accordance with the schedule in this manual. Change the lubricant when it's at a temperature such that it drains easily.

1. Park windrower on level ground and position windrower so that drain plug (B) is at the lowest point.
2. shut down windrower and remove key from ignition.
3. Place a large enough container (about 2 liters) under the lower plug (B).
4. Remove plugs (A) and (B) and drain lubricant into the 2 liter container.
5. After the lubricant has completely drained, position windrower so that ports (A) and (B) on wheel are level (C) as shown.
6. Add lubricant as per [Adding Drive Wheel Lubricant, page 371](#)

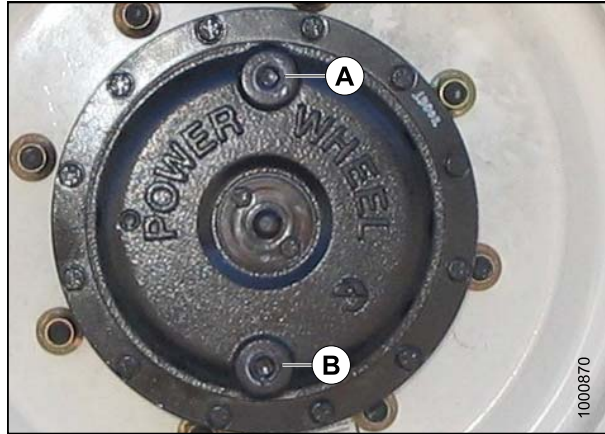


Figure 5.198



CAUTION

Do NOT dispose of the oil in the natural environment but be careful to eliminate it in compliance with the relative rules and regulations that govern locally.

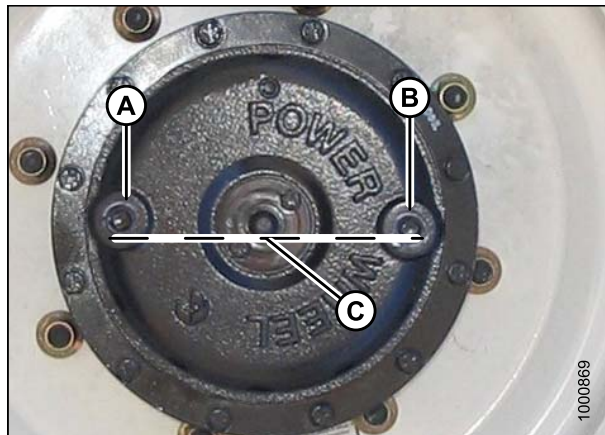


Figure 5.199

MAINTENANCE AND SERVICING

5.10.2 Caster Wheels

Caster Tire Inflation

Measure tire pressure annually with a gauge



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.



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.

Measure tire pressure annually with a gauge. Maintain the pressure as follows:

1. Visually check **daily** that tires have not lost pressure. Under-inflation of drive tires can cause side wall cracks.
2. Measure caster tire pressure annually with a gauge. Maintain the caster tire pressure at 10 psi (69 kPa).

NOTE: If caster wheels shimmy, a possible cause is over-inflation.

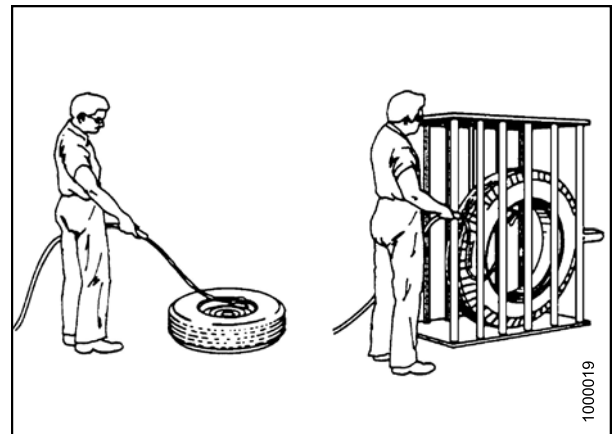


Figure 5.200

MAINTENANCE AND SERVICING

Table 5.19 Tire Pressure

| Tire Options | | | | | |
|--------------|---|---------------------|---------------------|---------------------|---------------------|
| Drive Tires | 18.4-26 Bar | 600 / 65 R28 Bar | 18.4-26 Turf | 23.1-26 Turf | 580 / 70 R26Turf |
| | 32 psi (221 kPa) | 26 psi (179 kPa) | 35 psi (241 kPa) | 20 psi (138 kPa) | 24 psi (165 kPa) |
| Rear Tires | 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 | | | | |
| | All Rear Tire Pressures are 10 psi (69 kPa) | | | | |

Caster Wheel Nut Torque

At first use, or when a wheel is removed, check wheel nut/bolt 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.

1. Tighten wheel nuts/bolts (A) to 120 ft·lbf (163 N·m) using the tightening sequence as shown.
2. Repeat sequence three times.

- Forked Caster

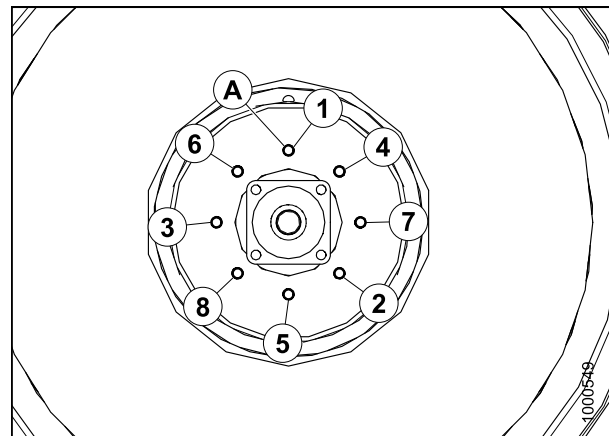


Figure 5.201

- Formed Caster

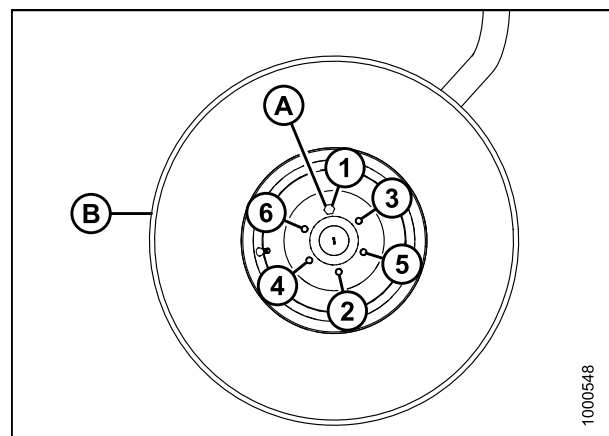


Figure 5.202

MAINTENANCE AND SERVICING

Servicing Caster Wheels

Raising Caster Wheel (Formed and Forked)

This procedure is the same for forked and formed caster wheels.

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.

CAUTION

Header **MUST** be removed, and **NO** weight box installed. Use a hydraulic jack with minimum lifting capacity of 5000 lbs (2268 Kg) to provide adequate support for the machine.

1. Park windrower on level ground and block all wheels.
2. Place GSL (ground speed lever) in N-DETENT, shut down engine and remove key.

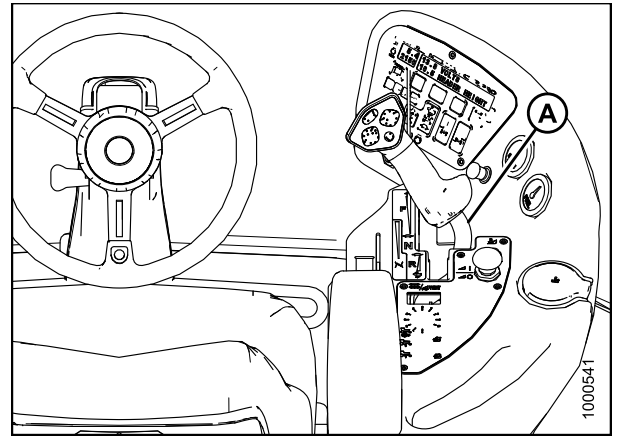


Figure 5.203

3. Raise end of walking beam (A) using a jack with a minimum capacity of 5000 lbs (2268 kg). or other suitable lifting device until the caster wheel assembly (B) is slightly off the ground.

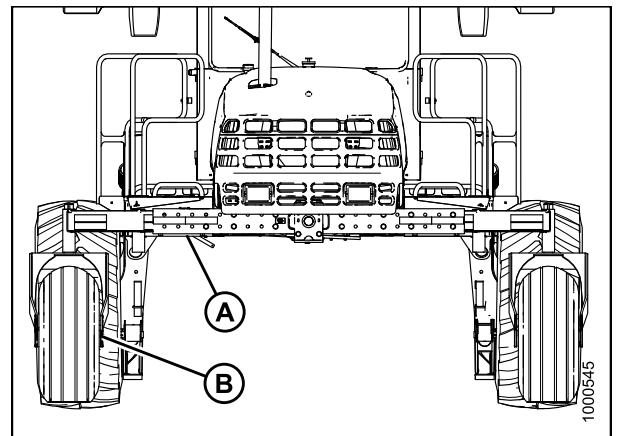


Figure 5.204

MAINTENANCE AND SERVICING

Removing Forked Caster Wheel

1. Raise caster wheel. See [Raising Caster Wheel \(Formed and Forked\)](#), page 375
2. Remove the four bolts (A) attaching axle (B) to forked caster, and remove wheel assembly from caster (C). (Eight bolts per caster.)

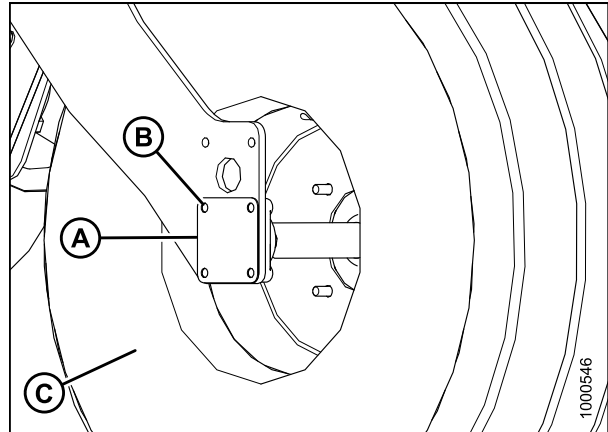


Figure 5.205

3. Remove the eight wheel nuts (A) that secure the axle to the wheel.

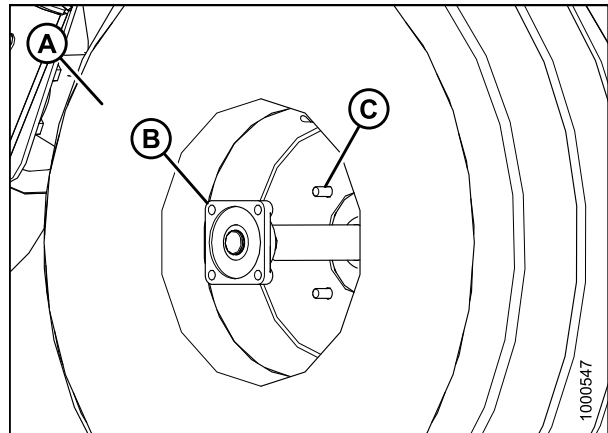


Figure 5.206

Installing Forked Caster Wheel

1. Position wheel assembly (A) on axle assembly (B), and install wheel nuts (C).

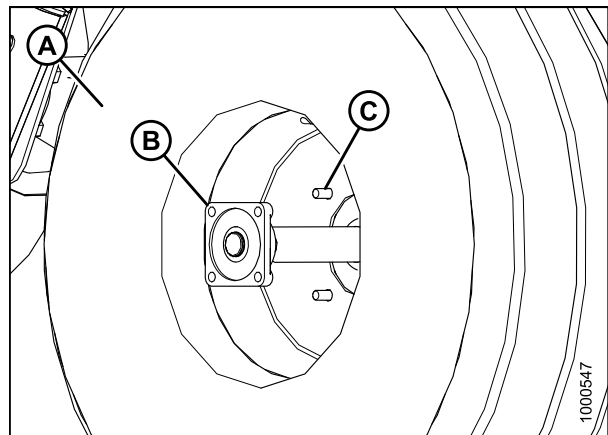


Figure 5.207

MAINTENANCE AND SERVICING

- Torque nuts (A) to 120 ft lbf (163 Nm) using the tightening sequence as shown.

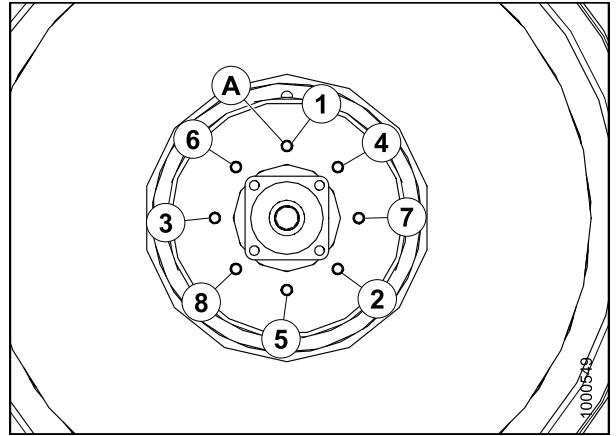


Figure 5.208

- Position wheel assembly (C) in forked caster. Install cover plate (A) and secure with bolts (B). Torque bolts to 75-79 ft·lbf (97-107 Nm).
- Lower caster wheel.

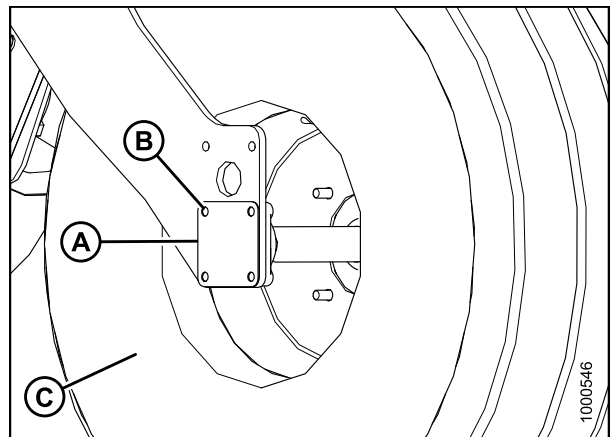


Figure 5.209

Removing Formed Caster Wheel

- Raise caster wheel. See [Raising Caster Wheel \(Formed and Forked\)](#), page 375
- Remove the six wheel bolts (A) that secure the wheel assembly (B) to the hub.

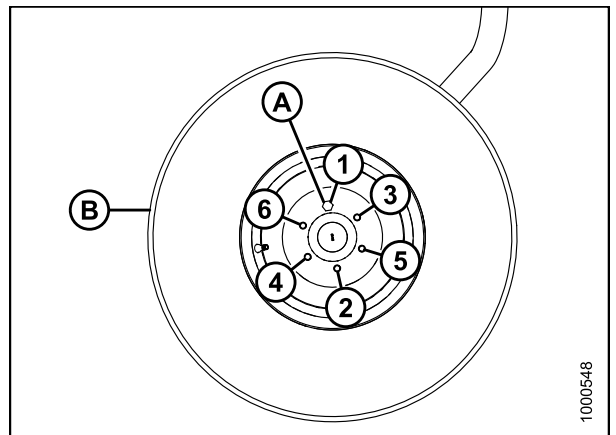


Figure 5.210

MAINTENANCE AND SERVICING

Installing Formed Caster Wheel

1. Position wheel assembly (B) on hub, and install wheel bolts (A).
2. Torque bolts (A) [Caster Wheel Nut Torque, page 374](#).
3. Lower caster wheel.

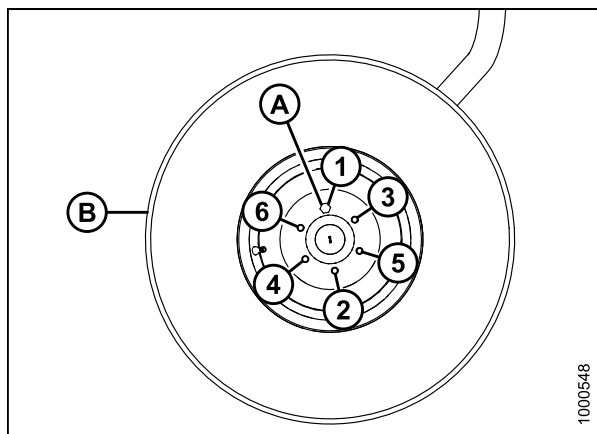


Figure 5.211

Caster Wheels Anti-Shimmy Dampeners

Each caster is equipped with a fluid filled anti-shimmy dampener (A).

The mounting bolts (B) need to be checked periodically for security. Refer to Section [5.11 Maintenance Schedule, page 380](#).

- Inboard bolt should be tightened to 100 ft·lbf (135 Nm).
- Outboard bolt should be tightened to 85 ft·lbf (115 Nm).

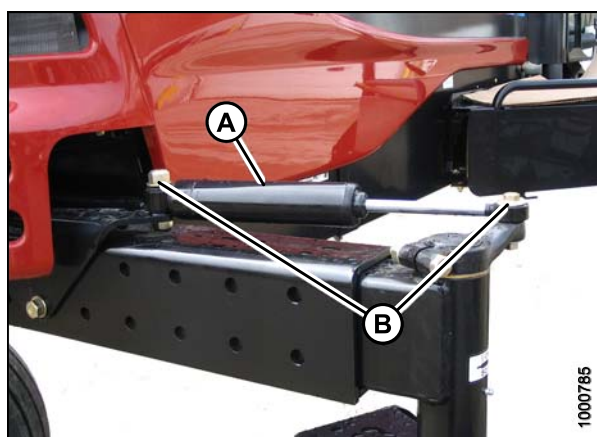


Figure 5.212

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. Always add an equal amount of fluid on **both** sides.

MAINTENANCE AND SERVICING

| Header Description | | Recommended Ballast | | | | Recommended Tire Size |
|--------------------|---|---------------------|-----------------------|--------------------|-----------------------|--|
| | | Level Ground | | Hills | | |
| Type | Size | Per Tire | Both Tires | Per Tire | Both Tires | |
| | | U.S. Gal. (Liters) | lb (kg) ³³ | U.S. Gal. (Liters) | lb (kg) ³³ | |
| A-series | All Options | 0 | | | | 7.5 X 1610 X 1616.5 X16.1 |
| R-series | 13 FT ONLY | | | | | |
| | 25 FT and Down | | | | | |
| D-series | 30 FT Single or Split Reel without Conditioner. 35 FT Single Reel | 0 | 0 | 10 (38) | 200 (91) | |
| | 30 FT Split Reel Steel Fingers and Conditioner. 35 FT Split Reel (5- or 6-Bat) | 18 (69) | 380 (170) | 30 (115) | 630 (288) | Level Ground:10 X 1616.5 X16.1 Hills: 16.5 X 16.1 |
| | 40 FT | 30 (115) | 630 (288) | 41 (158) | 830 (377) | 16.5 X 16.1 |

33. 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)

MAINTENANCE AND SERVICING

5.11 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 . Use the fluids and lubricants specified in [5.1.2 Recommended Fuel, Fluids, and Lubricants, page 266](#).

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 **RECOMMENDED SAFETY PROCEDURES**.

5.11.1 Break-In Inspections

| Break-In Inspections | | |
|----------------------|---|---|
| Hours | Item | Check |
| 1 | Drive Wheel Nuts | Torque: 220 ft·lbf (300 N·m). Repeat Checks At 1 Hour Intervals Until Torque Stabilizes At Two Consecutive Checks. |
| 5 | A/C Compressor 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). |
| | Neutral | Dealer Adjusted. |
| 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 Lubricant | Change. |
| | Main Gearbox Oil | |
| | Charge System Hydraulic Oil Filter | |
| | Manifold Oil Filter | |

MAINTENANCE AND SERVICING

5.11.2 Interval Maintenance

| Interval | Service |
|---|--|
| FIRST USE | Refer To 5.11.1 Break-In Inspections, page 380. |
| ANNUALLY ³⁴ | <ol style="list-style-type: none"> 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 4.3.9 Storing the Windrower, page 136 |
| 10 HOURS OR DAILY ³⁵ | <ol style="list-style-type: none"> 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 | <ol style="list-style-type: none"> 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 ^{34, 35} | <ol style="list-style-type: none"> 1. Clean Cab Air Return Filter |
| 250 HOURS OR ANNUALLY ^{34, 35} | <ol style="list-style-type: none"> 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 |

34. It is recommended that annual maintenance be done prior to start of operating season.

35. Whichever occurs first..

MAINTENANCE AND SERVICING

| Interval | Service |
|---|--|
| 500 HOURS OR ANNUALLY ³⁴ , ³⁵ | <ol style="list-style-type: none"> 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 | <ol style="list-style-type: none"> 1. Change Drive Wheel Lubricant |
| 1500 HOURS OR BI-ANNUALLY ³⁵ | <ol style="list-style-type: none"> 1. Change Hydraulic Oil |
| 2000 HOURS OR BI-ANNUALLY ³⁵ | <ol style="list-style-type: none"> 1. Perform General Engine Inspection 2. Change Engine Coolant |
| 5000 HOURS | <ol style="list-style-type: none"> 1. Check Engine Valve Tappet Clearance |

MAINTENANCE AND SERVICING

Maintenance Record

WINDROWER SERIAL NUMBER: _____

Combine this record with the record in the Header Operator's Manual. Copy this page to continue record.

Refer to Maintenance and Servicing section in this manual for details on each maintenance procedure.

| Maintenance Record | Action: | ✓ - Check | ⬇ - Lubricate | ▲ - Change | ✳ - Clean | + - Add | | | | | | | | | | |
|--|---|-----------|---------------|------------|-----------|---------|--|--|--|--|--|--|--|--|--|--|
| Hour Meter Reading | | | | | | | | | | | | | | | | |
| Date | | | | | | | | | | | | | | | | |
| Serviced By | | | | | | | | | | | | | | | | |
| FIRST USE, Refer to 5.11.1 Break-In Inspections, page 380 | | | | | | | | | | | | | | | | |
| 10 HOURS OR DAILY³⁶ | | | | | | | | | | | | | | | | |
| ✳ | A/C Condenser ³⁷ | | | | | | | | | | | | | | | |
| ✳ | Charge Air Cooler ³⁷ | | | | | | | | | | | | | | | |
| ✓ | Engine Oil Level ³⁷ | | | | | | | | | | | | | | | |
| ✓ | Engine Coolant Level ³⁷ | | | | | | | | | | | | | | | |
| ✓ | Fuel Tank ³⁷ | | | | | | | | | | | | | | | |
| ✓ | Fuel Filter Water Trap ³⁷ | | | | | | | | | | | | | | | |
| ✓ | Hydraulic Hoses and Lines ³⁷ | | | | | | | | | | | | | | | |
| ✳ | Hydraulic Oil Cooler ³⁷ | | | | | | | | | | | | | | | |
| ✓ | Hydraulic Oil Level ³⁷ | | | | | | | | | | | | | | | |
| ✳ | Radiator ³⁷ | | | | | | | | | | | | | | | |
| ✓ | Tire Inflation ³⁷ | | | | | | | | | | | | | | | |
| ANNUALLY ³⁸ | | | | | | | | | | | | | | | | |
| ✓ | 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 | | | | | | | | | | | | | | | |

36. Whichever occurs first.

37. A record of daily maintenance is not normally required but is at the Owner/Operators discretion.

38. It is recommended that annual maintenance be done prior to start of operating season..

MAINTENANCE AND SERVICING

| Maintenance Record | Action: | ✓ - Check | ⬇ - Lubricate | ▲ - Change | ✳ - Clean | + - Add | | | | | | | | | | | |
|--|---------|-----------|---------------|------------|-----------|---------|--|--|--|--|--|--|--|--|--|--|--|
| ⬇ Forked Caster Spindle Bearings | | | | | | | | | | | | | | | | | |
| ✓ Gear Box Oil Level | | | | | | | | | | | | | | | | | |
| ⬇ Top Lift Link Pivots | | | | | | | | | | | | | | | | | |
| ⬇ Walking Beam Center Pivot | | | | | | | | | | | | | | | | | |
| 100 HOURS OR ANNUALLY^{36, 38} | | | | | | | | | | | | | | | | | |
| ✳ Cab Air Return Filter | | | | | | | | | | | | | | | | | |
| 250 HOURS OR ANNUALLY^{36, 38} | | | | | | | | | | | | | | | | | |
| ▲ Engine Oil and Filter | | | | | | | | | | | | | | | | | |
| ▲ Engine Air Cleaner Primary Filter Element | | | | | | | | | | | | | | | | | |
| ⬇ Forked Caster Wheel Hub Bearings | | | | | | | | | | | | | | | | | |
| ✓ Drive Wheel Lubricant | | | | | | | | | | | | | | | | | |
| ✓ Wheel Nut Torque | | | | | | | | | | | | | | | | | |
| 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-ANNUALLY³⁶ | | | | | | | | | | | | | | | | | |
| ▲ Hydraulic Oil | | | | | | | | | | | | | | | | | |
| 2000 HOURS OR BI-ANNUALLY³⁶ | | | | | | | | | | | | | | | | | |
| ▲ Engine Coolant | | | | | | | | | | | | | | | | | |
| ✓ General Inspection | | | | | | | | | | | | | | | | | |
| 5000 HOURS OR BI-ANNUALLY³⁶ | | | | | | | | | | | | | | | | | |
| ✓ Engine Valve Tappet Clearance. | | | | | | | | | | | | | | | | | |

6 Troubleshooting

6.1 Engine Troubleshooting

| Symptom | Problem | Solution | Section |
|---|---|--|---|
| Engine Hard To Start or Will Not Start. | Controls not in NEUTRAL. | Move GSL to NEUTRAL. | Starting, page 102 |
| | | Move steering wheel to locked position. | |
| | | Disengage header clutch. | 4.4.4 Header Drive, page 146 |
| | NEUTRAL interlock misadjusted. | Contact your Dealer. | |
| | No fuel to engine. | Fill empty fuel tank. Replace clogged filter. | Fueling, page 106 Fuel Filters, page 308 |
| | Old fuel in tank. | Drain tank. Refill with fresh fuel. | 5.6.7 Fuel System, page 308 |
| | Water, dirt or air in fuel system. | Drain, flush, fill and prime system. | |
| | Improper type of fuel. | Use proper fuel for operating conditions. | Fuel Specifications, page 267 |
| | Crankcase oil too heavy. | Use recommended oil. | Lubricants Fluids System Capacities, page 267 |
| | Low battery output. | Have battery tested. Check battery electrolyte level. | |
| | 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). | Checking, Replacing Fuses, page 355 |
| | ECM fuse (1 of 2) blown. | Replace. | |
| | ECM Ignition relay faulty. | | |
| | NEUTRAL Logic relay faulty. | | |
| Faulty injectors. | Contact your Dealer. | | |

TROUBLESHOOTING

| Symptom | Problem | Solution | Section |
|-----------------------|----------------------------------|--|---|
| Engine Knocks. | Engine out of time. | Contact your Dealer. | |
| | Insufficient oil. | Add oil. | Adding Engine Oil, page 299 |
| | Low or high coolant temperature. | Remove and check thermostat. See Engine Overheats section in Technical Manual. | Refer to Windrower Technical Manual |
| | Improper fuel. | Use proper fuel. | Fuel Specifications, page 267 |
| Low Oil Pressure. | Low oil level. | Add oil. | Adding Engine Oil, page 299 |
| | Improper type of oil. | Drain and fill crankcase with proper oil. | Lubricants Fluids System Capacities, page 267 |
| | Worn components. | Contact your Dealer. | |
| High Oil Consumption. | Internal parts worn. | Contact your Dealer. | |
| | Crankcase oil too light. | Use recommended oil. | Lubricants Fluids System Capacities, page 267 |
| | Oil leaks | Check for leaks around gaskets, seals, and drain plugs. | 5.6.3 Checking Engine Oil Level, page 297 |

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. | Removing and Installing Fuel Tank Vent, page 308 5.6.7 Fuel System, page 308 |
| | Water or dirt in fuel system. | Drain, flush, and fill fuel system. | Lubricants Fluids System Capacities, page 267 |
| | Low coolant temperature. | Remove and check thermostat. | Refer to Windrower Technical Manual |
| | Air in fuel system. | Contact your Dealer. | |
| | Dirty or faulty injectors. | | |
| Lack Of Power. | Incorrect timing. | | |
| | Engine oil viscosity too high. | Use recommended oil. | Lubricants Fluids System Capacities, page 267 |
| | Intake air restriction. | Service air cleaner. | 5.6.5 Air Intake System, page 299 |
| | Clogged fuel filter. | Replace primary fuel filter, and if necessary, replace secondary fuel filter. | Fuel Filters, page 308 |
| | High back pressure. | Clean out muffler. | 5.6.10 Exhaust System, page 322 |
| | Improper type of fuel. | Use proper fuel. | Fuel Specifications, page 267 |
| | High or low engine temperature. | Remove and check thermostat. | Refer to Windrower Technical Manual |
| | Improper valve clearance. | Contact your Dealer. | |
| | Faulty injectors. | | |
| Engine Temp. Below Normal. | Defective thermostat. | Remove and check thermostat. | Refer to Windrower Technical Manual |

TROUBLESHOOTING

| Symptom | Problem | Solution | Section |
|-----------------------|--|---|---|
| Warning Alarm Sounds. | Engine overheated. | Check coolant level. | Checking Coolant Level, page 315 |
| | | Check thermostat. | Refer to Windrower Technical Manual |
| | Low engine oil pressure. | Check oil level. | 5.6.3 Checking Engine Oil Level, page 297 |
| | Low transmission oil pressure. | | |
| Engine Overheats. | Low coolant level. | Fill reserve tank to proper level. Check system for leaks. | 5.6.8 Engine Cooling System, page 314 |
| | Water only for coolant. | Replace with antifreeze. | |
| | Engine overloaded. | Reduce ground speed. | 4.3.6 Driving the Windrower, page 108 |
| | Defective radiator cap. | Replace cap. | Inspecting Radiator Cap, page 317 |
| | Defective fan belt. | Replace belt. | Replacing Fan Belt, page 323 |
| | Dirty radiator screen: Rotors turning | Check for obstructions in ducting from screen to fan shroud. | 5.7 Engine Cooler Box, page 326 |
| | Rotors not turning | Check connections to rotor electric motor. | |
| | Dirty radiator core. | Clean radiator. | 5.6.8 Engine Cooling System, page 314 |
| | Cooling system dirty. | Flush cooling system. | |
| | Defective thermostat. | Remove and check thermostat. | Refer to Windrower Technical Manual |
| | Defective temperature gauge or sender. | Check coolant temperature with thermometer. Replace gauge if necessary. | Refer to Windrower Technical Manual |
| | Defective water pump. | Contact your Dealer. | |

TROUBLESHOOTING

| Symptom | Problem | Solution | Section |
|-------------------------------------|-------------------------------|--|---|
| High Fuel Consumption. | Clogged or dirty air cleaner. | Service air cleaner. | 5.6.5 Air Intake System, page 299 |
| | Engine overloaded. | Reduce ground speed. | 4.3.6 Driving the Windrower, page 108 |
| | Improper valve clearance. | Contact your Dealer. | |
| | Engine out of time. | | |
| | Injection nozzles dirty. | | |
| | Low engine temperature. | Check thermostat. | Refer to Windrower Technical Manual |
| | Improper type of fuel. | Use proper fuel. | Fuel Specifications, page 267 |
| Engine Emits Black or Grey Exhaust. | Improper type of fuel. | Consult your fuel supplier, and use proper type fuel for conditions. | Fuel Specifications, page 267 |
| | Engine overloaded. | Reduce ground speed. | 4.3.6 Driving the Windrower, page 108 |
| | Clogged or dirty air cleaner. | Service air cleaner. | 5.6.5 Air Intake System, page 299 |
| | Defective muffler. | Check muffler for possible damage that might create back pressure. | 5.6.10 Exhaust System, page 322 |
| | Dirty or faulty injectors. | Contact your Dealer. | |
| | Engine out of time. | | |
| | Air in fuel system. | | |

TROUBLESHOOTING

| Symptom | Problem | Solution | Section |
|--|--|--|---|
| Engine Emits White Exhaust. | Engine out of time. | Contact your Dealer. | |
| | Improper type of fuel. | Consult your fuel supplier, and use proper type fuel for conditions. | Fuel Specifications, page 267 |
| | Cool engine. | Warm engine up to normal operating temperature. | Engine Warm-Up, page 105 |
| | Defective thermostat. | Remove and check thermostat. | Refer to Windrower Technical Manual |
| Starter Cranks Slowly or Will Not Operate. | Low battery output. | Check battery charge. | Maintaining the Battery, page 332 |
| | Loose or corroded battery connections. | Clean and tighten loose connections. | |
| | Controls not in NEUTRAL. | Move GSL to NEUTRAL. | 4.3.6 Driving the Windrower, page 108 |
| | | Move steering wheel to center position. | Reverse in Cab-Forward Mode, page 113 |
| | | Disengage header. | Engaging the Header, page 146 |
| | Relay not functioning. | Check relay and wire connections. | 5.8 Electrical System, page 331 |
| | 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. Contact your Dealer. | |
| Crankcase oil too high viscosity. | Use recommended oil. | Lubricants Fluids System Capacities, page 267 | |
| Air Filters Require Frequent Cleaning. | Vacuator plugged. | Clean out vacuator. | 5.6.5 Air Intake System, page 299 |
| | Pre-cleaner rotor not turning freely. | Repair / replace. | 5.7 Engine Cooler Box, page 326 |

TROUBLESHOOTING

6.2 Electrical Troubleshooting

| Symptom | Problem | Solution | Section |
|---|--|--|---|
| Low Voltage and / or Battery Will Not Charge. | Defective battery. | Have battery tested. | 5.8.1 Battery, page 331 |
| | Loose or corroded connections. | Clean and tighten battery connections. | Maintaining the Battery, page 332 |
| | Defective alternator belt. | Replace worn belt. | Replacing Fan Belt, page 323 |
| | Alternator or voltage regulator not connected properly. | Connect properly. | 5.8.1 Battery, page 331 |
| | Dirty or defective alternator, defective voltage regulator, or high resistance in circuit. | Contact your Dealer. | |
| Defective light switch. | | | |
| Lights Dim. | High resistance in circuit or poor ground on lights. | Check the wiring circuit for a break in a wire or a poor ground. | — |

TROUBLESHOOTING

| Symptom | Problem | Solution | Section |
|---|------------------------------------|---|---|
| Lights Do Not Light. | Defective light bulb. | Replace light bulb. | Replacing Bulb, page 339 Replacing Bulb in Forward Floodlight, page 343 Replacing Bulb in Rear Floodlight, page 345 |
| | 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 | 5.8.13 Circuit Breakers and Fuses, page 354 |
| | Defective relay. | Replace relay | Replacing Circuit Breakers/Relays, page 355 |
| | Defective light switch. | | |
| Turn Signals or Indicators Showing Wrong Direction. | Reversed wires. | Contact your Dealer | |
| No Current To Cab. | Broken or disconnected wire. | | |
| | Circuit breaker tripped. | Breaker automatically resets. | — |
| | Battery disconnect switch is OFF. | Turn switch ON. | Battery Main Disconnect Switch, page 332 |

TROUBLESHOOTING

6.3 Hydraulics Troubleshooting

| 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. | Refer to Windrower Technical Manual |
| 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. | Engaging the Header, page 146 |
| | Flow controls adjusted too low. | Toggle speed controls on CDM to increase flow. | 4.5.8 Reel Speed, page 188 4.6.4 Reel Speed, page 222 4.7.3 Disc Speed, page 253 |
| | 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. | Refer to Windrower Technical Manual |
| Hydraulic Oil High-Temp. Alarm. | Hydraulic oil cooling system not working properly. | Check / clean cooling box. | 5.7 Engine Cooler Box, page 326 |
| | Faulty bypass valve. | Clean or replace. | See your MacDon Dealer |
| Hydraulic Oil Low-Temp. Alarm. | Hydraulic oil too cold. | Run engine until hydraulic oil warms up. | — |

TROUBLESHOOTING

6.4 Header Drive Troubleshooting

| Symptom | Problem | Solution | Section |
|----------------------------|--|--|--|
| Header Drive Not Engaging. | HEADER DRIVE switch in cab not engaged. | Engage switch. | Engaging the Header, page 146 |
| | Operator Presence switch not closed or faulty. | Occupy Operator's seat or replace switch. Contact your Dealer. | |
| | Appropriate solenoid not being energized by activating switch. | Contact your Dealer. | |
| Header Drive Lacks Power. | Relief valve setting too low. | | Engine-Forward Operation, page 113 |
| Warning Alarm Sounds. | Header drive overload. | Reduce ground speed. | |
| | Relief valve setting too low. | Contact your Dealer. | |

TROUBLESHOOTING

6.5 Traction Drive Troubleshooting

| 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. | |
| | 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. | Engine-Forward Operation, page 113 |
| | Loose or worn controls. | Check controls. | 5.5.3 GSL Adjustments, page 281 |
| | Air in system. | Use proper oil. | Lubricants Fluids System Capacities, page 267 |
| | | Check oil level, and leaks. | |
| | | Check hydraulic oil filters. | 5.9 Hydraulic System, page 359 |
| | Brakes binding or not releasing fully. | Check pressure on brake release valve (min. 200 psi [1379 kPa]). | Refer to Windrower Technical Manual |
| Relief valve in tandem pump dirty or damaged. | Replace relief valve. | | |

TROUBLESHOOTING

| Symptom | Problem | Solution | Section |
|--|--|--|---|
| Both Wheels Will Not Pull In Forward or Reverse. | Pump arms have broken shaft or loose hardware. | Repair or tighten. | Refer to Windrower Technical Manual |
| | Brakes binding or not releasing fully. | Check pressure on brake release valve (min. 200 psi (1379 kPa)). | |
| | Low oil level. | Check oil reservoir level. | |
| | Power hubs disengaged. | Engage final drives. | Final Drives, page 135 |
| | Damaged hydraulic lines preventing proper oil flow. | Replace damaged lines. Contact your Dealer. | |
| | 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. | 5.5.3 GSL Adjustments, page 281 5.5.4 Steering Adjustments, page 283 |
| | Charge pressure relief valve misadjusted or damaged. | Check the valve adjustment. Check valve parts and seat. | Checking Charge Pump Pressure, page 364 |
| | Failed pump or motor. | Contact your Dealer. | |

TROUBLESHOOTING

| Symptom | Problem | Solution | Section |
|--|--|--|---|
| One Wheel Does Not Pull In Forward or Reverse. | Broken pump arm or shaft. | Contact your Dealer | |
| | One final drive disengaged. | Engage final drive. | Final Drives, page 135 |
| | Steering controls worn or defective. | Check GSL and steering for loose, worn or damaged ball joints and connecting rods. | 5.5.3 GSL Adjustments, page 281 5.5.4 Steering Adjustments, page 283 |
| | High pressure relief valve stuck open, damaged seat. | Check valve, and clean or replace. | Refer to Windrower Technical Manual |
| | 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. | | |
| Leakage at pump or motor. | | | |
| With Steering Wheel Centered, One Wheel Pulls More Than The Other. | Wheels not in same speed range. | Repair or replace valve. Contact your Dealer. | |
| | Faulty relief valve. | | |
| Excessive Noise From Drive System. | Mechanical interference in steering or ground speed linkage. | Adjust, repair, replace. | 5.5.3 GSL Adjustments, page 281 5.5.4 Steering Adjustments, page 283 |
| | Brakes binding or not releasing fully. | Check pressure on brake release valve) (min. 200 psi [1379 kPa]). | Refer to Windrower Technical Manual |
| | 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. | Charge System |
| | Damaged seal or threads. | Replace filter or filter head. | |

TROUBLESHOOTING

6.6 Steering and Ground Speed Control Troubleshooting

| Symptom | Problem | Solution | Section |
|--|--|---|--|
| Machine Will Not Steer Straight. | Linkage worn or loose. | Adjust steering chain tension. Replace worn parts. Adjust linkage. | 5.5.4 Steering Adjustments, page 283 |
| 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. | Contact your Dealer. | |
| Steering Wheel Will Not Unlock. | Transmission interlock cylinder not working. | | |
| Insufficient Road Speed. | Speed-range control in field position. | Move to road position. | Driving on Road, page 119 |
| Steering Is Too Stiff or Too Loose. | Steering chain tension is out of adjustment. | Adjust steering chain tension. | 5.5.4 Steering Adjustments, page 283 |

TROUBLESHOOTING

6.7 Cab Air Troubleshooting

| 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. | Cleaning Filter Element, page 304 |
| | Dirty re-circulating air filter. | Clean re-circulating filter. | Cleaning Return Air Cleaner, page 292 |
| | Evaporator clogged. | Clean evaporator. | Cleaning A/C Evaporator Core, page 294 |
| | Air flow passage blocked. | Remove blockage. | — |
| Heater Not Heating. | Heater shut-off valve at engine closed. | Open valve. | 3.10.1 Heater Shut-off, page 54 |
| | Defective thermostat in engine water outlet manifold. | Replace thermostat. | Refer to Windrower Technical Manual |
| | 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. | Cleaning Filter Element, page 304 Cleaning Return Air Cleaner, page 292 |

TROUBLESHOOTING

| Symptom | Problem | Solution | Section |
|---|---|--|---|
| Air Conditioning Not Cooling. | Low refrigerant level. | Add refrigerant. Contact your Dealer. | |
| | 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. | Refer to Windrower Technical Manual |
| | Compressor partially or completely seized. | Remove compressor for service or replacement. | |
| | Condenser fins plugged. | Clean condenser. | A/C Condenser, page 292 |
| | Loose or broken drive belt. | Replace drive belt and/ or tighten to specs. | Tensioning A/C Compressor Belt, page 324 Replacing A/C Compressor Belt, page 325 |
| | Dirty filters. | Clean fresh air and re-circulation filters. | Cleaning Filter Element, page 304 Cleaning Return Air Cleaner, page 292 |
| | 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. | |
| | 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. | | | |

TROUBLESHOOTING

| Symptom | Problem | Solution | Section |
|--|--|---|---|
| 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. | Refer to Windrower Technical Manual |
| | Thermostat defective or improperly adjusted. | Replace thermostat. | |
| | Clogged air filters. | Remove air filters, and clean or replace as necessary. | Cleaning Filter Element, page 304 Cleaning Return Air Cleaner, page 292 |
| | Heater circuit is open. | Close temperature control in cab, and valve on engine). | 3.10.3 Controls, page 55 3.10.1 Heater Shut-off, page 54 |
| | Insufficient air circulation over condenser coil; fins clogged with dirt or insects. | Clean condenser. | A/C Condenser, page 292 |
| | Evaporator fins clogged. | Clean evaporator fins (under cab floor). | A/C Evaporator, page 293 |
| | 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. | Tighten or replace as required. | Tensioning A/C Compressor Belt, page 324 Replacing A/C Compressor Belt, page 325 |
| | Excessive charge in system. | | |
| | Low charge in system. | | |
| | Excessive moisture in system. | | |
| | Loose or excessively worn drive belt. | Remove clutch for service or replacement as required. | Refer to Windrower Technical Manual |
| | Noisy clutch. | | |

TROUBLESHOOTING

| Symptom | Problem | Solution | Section |
|--|--|--|--|
| Air Conditioning System Too Noisy. | Noisy compressor. | Check mountings and repair. Remove compressor for service or replacement. | Refer to Windrower Technical Manual |
| | 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. | |
| 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. | 3.10.3 Controls, page 55 |

TROUBLESHOOTING

6.8 Operator's Station Troubleshooting

| Symptom | Problem | Solution | Section |
|------------|---|-----------------------------|---|
| Rough Ride | Seat suspension not adjusted for Operator's weight. | Adjust seat suspension. | 3.3 Operator's Seat Adjustment, page 40 |
| | High air pressure in tires. | Deflate to proper pressure. | Drive Tire Inflation, page 366 Caster Tire Inflation, page 373 |

7 Options/Attachments

7.1 Options and Attachments

The following options and attachments are available through your MacDon Dealer. The dealer will require the B number for pricing and availability.

7.1.1 Header Drive Reverser

Allows the conditioner, knife, auger, and reel to reverse on the auger header, and the conditioner and knife to reverse on the draper header.

7.1.2 Rotary Header Drive Hydraulics (13-foot)

Used to allow operation of a 13-foot rotary header. The kit includes header drive plumbing and installation instructions.

7.1.3 Double Windrow Attachment

Allows auger header windrower to lay a double windrow. The kit includes a draper deck, linkage assembly, hydraulics, and installation instructions.

7.1.4 Self-Aligning Center-Link

Allows the center-link cylinder to be hydraulically positioned and connected to the header without leaving the Operator's station.

7.1.5 External Booster Spring

Available for headers over 6000 lb (2724 kg) to increase the float capacity.

B4659

7.1.6 Internal Booster Spring

An additional spring that is installed inside the header lift spring for increased float capacity.

B5303

7.1.7 Light Header Flotation

Available for headers that do not require as much spring tension for header float.

B4664

7.1.8 Windshield Shades

Retractable sun shades for front and rear windows.

B4866

OPTIONS/ATTACHMENTS

7.1.9 AM/FM Radio

Available for installation into pre-wired cab. Speakers are factory-installed.

For installation details, refer to the Self-Propelled Windrower Unloading and Assembly Instructions that was supplied with your windrower.

7.1.10 Pressure Sensor

Monitors knife drive (or reel drive) hydraulic pressure, and warns of overload conditions.

7.1.11 Weight Box

The weight box is designed to attach to the header lift system for driving on roads without the header attached .

Weight box without harness³⁹

B5238

Weight box without harness and concrete³⁹

B5240

7.1.12 Towing Harness

The towing harness is used together with the weight box when towing a D-series draper header equipped with slow speed transport option behind the windrower .

Weight box harness only

B5280

7.1.13 Swath Roller

The axle-mounted swath roller increases the windrow's resistance to wind disturbance, especially in canola or similar crops. It can be fitted with a hydraulic lift with in-cab controls.

Contact: Free Form Plastic Products, Box 159, 502 F.P.
Bourgault Drive, St. Brieux, SK, (306) 275-2155.

<http://www.freeformplastics.com>

7.1.14 Warning Beacons

Two rotating warning beacons that are designed for installation onto the pre-wired cab. The kit includes the beacons, a switch, mounting hardware, and instructions.. The beacons are standard equipment for exported windrowers, and optional for North America.

B5582

³⁹. Towing harness is also required when towing a header. See [7.1.12 Towing Harness, page 406](#)

OPTIONS/ATTACHMENTS

7.1.15 Lighting and Marking for Cab-Forward Road Travel

Allows the windrower to be compliant with vehicle lighting regulations when travelling in the cab-forward mode on public roads. The kit includes red tail lights, slow moving vehicle (SMV) markings, hardware, and installation instructions.

B5412

7.1.16 Fan Air Baffle

Provides a baffle to reduce windrow disturbance by air exiting the engine cooling fan.

B5440

7.1.17 Auto-Steer

MacDon works with GPS Auto Steer providers to enable a wide range of systems including electric steering wheel/column-based systems and hydraulically integrated systems. In both cases, wire harness routing is enabled by knock-outs in the cab frame. The ground speed lever (GSL) has been pre wired with an Auto-Steer engage button. Hydraulic systems require the use of a hydraulic interface kit (hydraulic valve, steering cylinder, etc.) Some GPS providers supply these parts in their vehicle specific installation packages. Other providers have made arrangements with MacDon to make these installation Kits available through MacDon Dealers.

B5589

7.1.18 HID Auxiliary Lighting

Provides additional field lighting. The kit includes two cab-mounted high intensity discharge lamps and installation instructions.

B5596

8 CDM Error Codes

NOTE: In the case of dual codes being shown for an item (primarily the solenoid valves), the first code indicates a SHORT CIRCUIT condition, while the second code indicates an OPEN CIRCUIT condition. IE. E41 would be a SHORT in the Reel Aft solenoids (P55, P59), while E141 would indicate an OPEN circuit.

| Codes | | CDM Display | Description |
|-------|------|----------------------|---|
| E1 | | | |
| E2 | | RTCH NOT ALLOWED | Return To Cut activated with the header off. |
| E3 | | CDM CAN BUS ERROR | Canbus error with CDM. Check electrical connections. |
| E4 | | HDR DRV NOT ALLOWED | Header engage switch activated while in engine-forward. |
| E5 | | CHECK HEADER ID | Header ID change has been detected while the header was engaged |
| E6 | | TEMP GAUGE SHORT | Wiring / connection problem. |
| E7 | | SPEED STICK SHORT | Wiring / connection problem. |
| E8 | | HEADER ENABLE SHORT | Wiring / connection problem. |
| E9 | | WCM ENABLE SHORT | Wiring / connection problem. |
| E10 | | CDM INTERNAL ERROR | Internal hardware or software problem. |
| E11 | | CDM POWER UP | CDM Module did not power up correctly. |
| E12 | | WCM POWER UP | WCM Module did not power up correctly. |
| E13 | | FUEL SOLENOID | WCM Fuel solenoid output fault detected. |
| E14 | | | |
| E15 | | KNIFE DRIVE PWM P68 | Knife Drive – PWM solenoid P68 drive fault detected |
| E16 | | DRAPER DRIVE PWM P69 | Draper Drive – PWM solenoid P69 drive fault detected |
| E17 | | REEL DRIVE PWM P70 | Reel Drive – PWM solenoid P70 drive fault detected |
| E18 | | | |
| E19 | E119 | Load Sense P75 | Disc Block Valve – Solenoid P75 drive fault detected |
| E20 | | | |
| E21 | E121 | REVERSER P106 | Reverser Solenoid P106 fault detected |
| E22 | | | |
| E23 | E123 | REVERSER | Reverser – Solenoid (P65, P66, P67) fault detected |
| E24 | E124 | DECK SHFT RIGHT P95 | Right Deck Shift solenoid P95 fault detected |
| E25 | E125 | DECK SHFT LEFT P96 | Left Deck Shift solenoid P96 fault detected |
| E26 | E126 | DWA UP | DWA Raise solenoid P72, P73 fault detected |
| E27 | E127 | DWA DOWN | DWA Lower solenoid P72, P73, fault detected circuit |
| E28 | E128 | TILT RETRACT | Header Tilt Retract solenoid P54, fault detected |
| E29 | E129 | TILT EXTEND | Header Tilt Extend solenoid P53, P54, fault detected |
| E30 | E130 | 4 WAY VALVE P62 | 4 Way valve solenoid P62 fault detected |

CDM ERROR CODES

| Codes | | CDM Display | Description |
|--------------------------------------|------|---------------------|---|
| E31 | E131 | BYPASS VALVE P52 | Bypass valve solenoid P52 fault detected |
| E32 | E132 | HEADER UP/DOWN P57 | Header up / down solenoid P57, fault detected |
| E33 | E133 | SCREEN CLEANERS | Screen cleaner output fault detected |
| E34 | E134 | RIGHT STOP LAMP | Right stop lamp output fault detected |
| E35 | E135 | LEFT STOP LAMP | Left stop lamp output fault detected |
| E36 | E136 | RIGHT TURN LAMP | Right turn lamp output fault detected |
| E37 | E137 | LEFT TURN LAMP | Left turn lamp output fault detected |
| E38 | E138 | MAIN DRIVE | Main header drive solenoid P71 fault detected |
| E39 | E139 | LOW RANGE P61 | Low range solenoid P61 fault detected |
| E40 | E140 | HIGH RANGE P60 | High range solenoid P60 fault detected |
| E41 | E141 | REEL AFT | Reel aft solenoid P55, P59, fault detected |
| E42 | E142 | REEL FORE | Reel fore solenoid P55, P59, fault detected |
| E43 | E143 | REEL UP/DOWN P58 | Reel up / down solenoid P58, P52, P62 fault detected |
| E44 | E144 | FLOAT RHS P64 | RHS float solenoid P64, fault detected |
| E45 | E145 | FLOAT LHS P63 | LHS float solenoid P63, fault detected |
| E46 | | SENSOR VOLTS HIGH | WCM's 9V Sensor voltage output high. (wire 5) |
| E47 | | SENSOR VOLTS LOW | WCM's 9V Sensor voltage output low. (wire 5) |
| E48 | | WCM OVER TEMP | WCM over temp fault. |
| E49 | | WCM LOW TEMP | WCM low temp fault. |
| E50 | | BATT+ OUT OF RANGE | System voltage above 15.5 VDC. |
| E51 | E151 | DISK DRIVE PWM P68 | Disk header drive solenoid P68 fault detected |
| E52 | | | |
| E53 | | | |
| E54 | | | |
| E55 | | DISK SPD OVERLOAD | Low disk speed detected < setpoint |
| Error codes E56 to E63 not allocated | | | |
| E64 | | HEADER OIL PRESSURE | Header drive charge pressure low (MD #112848 on return manifold) |
| E65 | | KNIFE OVERLOAD | Low knife speed detected < setpoint |
| E66 | | ### LOW VOLTS | Low system voltage <11.5 VDC |
| E67 | | TRANS OIL PRESSURE | Supercharge pressure low (switch 202 on hydraulic schematic) |
| E68 | | HYDRAULIC OIL HOT | Oil Tank temp >230°F. / 110°C. |
| E69 | | ENGINE AIR FILTER | Engine air filter plugged |
| E70 | | HYDRAULIC FILTER | Hydraulic filter pressure too high. (switch 227 on hydraulic schematic) |

CDM ERROR CODES

| Codes | | CDM Display | Description |
|---------------------------------------|--|--------------------|---|
| E71 | | LOW HYDRAULIC OIL | Low hydraulic oil level sensor tripped. (switch 225 on hydraulic schematic) |
| E72 | | ##.# HIGH VOLTS | System voltage above 15.5 VDC |
| Error codes E73 to E100 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. |

9 Engine Error Codes

Example: CDM displays the Error Code 110S 16F 28C

1. 110S - S is SPN column, then locate code 110 in that column.
2. 16F - F is the FMI column, then locate code 16 in that column.
3. 28C - C is occurrences, 28 is the quantity.
4. DESCRIPTION - Coolant Temperature High – Data Valid but Above Normal Operational Range - Moderately Severe Level Engine Coolant Temp.
5. Refer to LAMP COLOR and specific ENGINE CODES as required.

| J1939 SPN | J1939 FMI | Lamp Color | Cummins Code | J1939 SPN | Cummins Description | Category | CDM ERROR MESSAGE |
|-----------|-----------|------------|--------------|-----------|---------------------|---|---------------------|
| 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 | |
| 32 | 3 | Amber | 2111 | | Coolant Temperature | Coolant Temperature 2 Sensor Circuit - Voltage Above Normal, or Shorted to High Source | Coolant Temperature |
| 52 | 0 | Red | 2114 | | | Coolant Temperature 2 - Data Valid but Above Normal Operational Range - Most Severe Level | |
| | 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 | |

ENGINE ERROR CODES

| J1939 SPN | J1939 FMI | Lamp Color | Cummins Code | J1939 SPN | Cummins Description | Category | CDM ERROR MESSAGE |
|-----------|-----------|------------|--------------|-----------|----------------------------|--|----------------------------|
| 91 | 0 | Red | 148 | | Accelerator Pedal Position | 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 | 154 | | Accelerator Pedal or Lever Position Sensor 1 and 2 - Data Erratic, Intermittent, or Incorrect | |
| | 3 | Red | 131 | 154 | | Accelerator Pedal or Lever Position Sensor Circuit - Voltage Above Normal, or Shorted to High Source | |
| | 4 | Red | 132 | 154 | | Accelerator Pedal or Lever Position Sensor Circuit - Voltage Below Normal, or Shorted to Low Source | |
| | 8 | 154 | | 154 | Throttle Position Sensor | Abnormal frequency, pulse width, or period | |
| | 12 | 154 | | 154 | Throttle Position Sensor | Bad Device or component | |
| | 19 | Red | 287 | | Accelerator Pedal Position | SAE J1939 Multiplexing Accelerator Pedal or Lever Sensor System Error - Received Network Data In Error | |
| 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 | |
| | 18 | Amber | 2215 | | | Fuel Pump Delivery Pressure - Data Valid but Below Normal Operational Range - Moderately Severe Level | |

ENGINE ERROR CODES

| J1939 SPN | J1939 FMI | Lamp Color | Cummins Code | J1939 SPN | Cummins Description | Category | CDM ERROR MESSAGE |
|-----------|-----------|------------|--------------|-----------|-------------------------|---|-------------------------|
| 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 | |
| 100 | 1 | Red | 415 | 157 | 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 | 157 | | Oil Pressure Sensor Circuit - Voltage Above Normal, or Shorted to High Source | |
| | 4 | Amber | 141 | 157 | | Oil Pressure Sensor Circuit - Voltage Below Normal, or Shorted to Low Source | |
| | 10 | 157 | | 157 | | Engine oil pressure sensor 5V supply connection open circuit | |
| | 17 | N/A | | 157 | | Low oil pressure - WARNING | |
| | 18 | Amber | 143 | 360 | | Oil Pressure Low – Data Valid but Below Normal Operational Range - Moderately Severe Level | |

ENGINE ERROR CODES

| J1939 SPN | J1939 FMI | Lamp Color | Cummins Code | J1939 SPN | Cummins Description | Category | CDM ERROR MESSAGE |
|-----------|-----------|------------|--------------|-----------|----------------------|--|----------------------|
| 102 | 2 | Amber | 433 | | Boost Pressure | Intake Manifold Pressure Sensor Circuit - Data Erratic, Intermittent, or Incorrect | Boost Pressure |
| | 3 | Amber | 122 | 197 | | Intake Manifold Pressure Sensor Circuit – Voltage Above Normal, or Shorted to High Source | |
| | 4 | Amber | 123 | 197 | | Intake Manifold Pressure Sensor Circuit – Voltage Below Normal, or Shorted to Low Source | |
| | 10 | Amber | | 197 | | Intake Manifold Pressure Sensor Circuit – Abnormal Rate of Change | |
| 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 | |

ENGINE ERROR CODES

| J1939 SPN | J1939 FMI | Lamp Color | Cummins Code | J1939 SPN | Cummins Description | Category | CDM ERROR MESSAGE |
|-----------|-----------|------------|--------------|-----------|--------------------------------|--|--------------------------------|
| 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 Temperature |
| | 3 | Amber | 153 | 133 | | Intake Manifold Air Temperature Sensor Circuit - Voltage Above Normal, or Shorted to High Source | |
| | 4 | Amber | 154 | 133 | | Intake Manifold Air Temperature Sensor Circuit - Voltage Below Normal, or Shorted to Low Source | |
| | 15 | None | 2964 | 133 | | Intake Manifold Temperature High - Data Valid but Above Normal Operational Range - Least Severe Level | |
| | 16 | Amber | 488 | 133 | Intake Manifold | Intake Manifold 1 Temperature - Data Valid but Above Normal Operational Range - Moderately Severe Level | |
| 106 | 3 | 135 | | 1785 | Inlet Manifold Pressure Sensor | Voltage above normal or shorted high | Inlet Manifold Pressure Sensor |
| | 4 | 135 | | 1785 | | Voltage below normal or shorted low | |
| | 10 | 135 | | 1785 | | Inlet Manifold Pressure Sensor 5V supply connection open circuit | |
| 107 | 15 | Amber | | 151 | Air Filter Restriction | High Air Filter Restriction | Air Filter |

ENGINE ERROR CODES

| J1939 SPN | J1939 FMI | Lamp Color | Cummins Code | J1939 SPN | Cummins Description | Category | CDM ERROR MESSAGE |
|-----------|-----------|------------|--------------|-----------|---------------------|--|---------------------|
| 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 | |

ENGINE ERROR CODES

| J1939 SPN | J1939 FMI | Lamp Color | Cummins Code | J1939 SPN | Cummins Description | Category | CDM ERROR MESSAGE |
|-----------|-----------|------------|--------------|-----------|----------------------------|--|----------------------------|
| 110 | 0 | Red | 151 | 168 | 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 | 168 | | Coolant Temperature Sensor Circuit – Voltage Above Normal, or Shorted to High Source | |
| | 4 | Amber | 145 | 168 | | Coolant Temperature Sensor Circuit – Voltage Below Normal, or Shorted to Low Source | |
| | 15 | None | 2963 | 168 | | Engine Coolant Temperature High - Data Valid but Above Normal Operational Range - Least Severe Level | |
| | 16 | Amber | 146 | 168 | | Coolant Temperature High - Data Valid but Above Normal Operational Range - Moderately Severe Level | |

ENGINE ERROR CODES

| J1939 SPN | J1939 FMI | Lamp Color | Cummins Code | J1939 SPN | Cummins Description | Category | CDM ERROR MESSAGE |
|-----------|-----------|------------|--------------|-----------|-----------------------------------|---|-----------------------------------|
| 157 | 0 | Red | 449 | 159 | Injector Metering Rail 1 Pressure | Fuel Pressure High - Data Valid but Above Normal Operational Range – Moderately Severe Level | Injector Metering Rail 1 Pressure |
| | 1 | Amber | 2249 | 159 | | 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 | 159 | | Injector Metering Rail #1 Pressure Sensor Circuit - Voltage Above Normal, or Shorted to High Source | |
| | 4 | Amber | 452 | 159 | | 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 | | 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 |

ENGINE ERROR CODES

| J1939 SPN | J1939 FMI | Lamp Color | Cummins Code | J1939 SPN | Cummins Description | Category | CDM ERROR MESSAGE |
|-----------|-----------|------------|--------------|-----------|--------------------------------|---|--------------------------------|
| 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 | | 422 | ECM Battery Power | Excessive battery power | ECM Battery Power |
| | 1 | | | | | Low battery power | |
| | 2 | | | | | Intermittent | |
| | 16 | Amber | 442 | | Electrical Potential (Voltage) | Battery #1 Voltage High - Data Valid but Above Normal Operational Range – Moderately Severe Level | |
| | 18 | Amber | 441 | | Electrical Potential (Voltage) | 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 | |
| 173 | 15 | Amber | | 185 | High Exhaust Temperature | High Exhaust Temperature | Exhaust Temp |

ENGINE ERROR CODES

| J1939 SPN | J1939 FMI | Lamp Color | Cummins Code | J1939 SPN | Cummins Description | Category | CDM ERROR MESSAGE |
|-----------|-----------|------------|--------------|-----------|-----------------------|---|-----------------------|
| 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 | |
| | 8 | 141 | | 141 | Speed/Timing Sensor | Abnormal signal frequency | |
| | 15 | N/A | | 141 | Engine Speed | Engine Overspeed - WARNING | |
| 251 | 2 | Maint | 319 | | Real Time Clock Power | Real Time Clock Power Interrupt - Data Erratic, Intermittent, or Incorrect | Real Time Clock Power |

ENGINE ERROR CODES

| J1939 SPN | J1939 FMI | Lamp Color | Cummins Code | J1939 SPN | Cummins Description | Category | CDM ERROR MESSAGE |
|-----------|-----------|------------|--------------|-----------|------------------------------------|--|-----------------------------------|
| 558 | 2 | Amber | 431 | 91 | Accelerator Pedal Low Idle Switch | Accelerator Pedal or Lever Idle Validation Circuit - Data Erratic, Intermittent, or Incorrect | |
| | 2 | 155 | | 774 | Secondary Throttle Position Sensor | Data erratic, intermittent, or incorrect | |
| | 4 | Amber | 55 | | Accelerator Pedal Low Idle Switch | Accelerator Pedal or Lever Idle Validation Circuit - Voltage Below Normal, or Shorted to Low Source | |
| | 13 | Red | 432 | | Accelerator Pedal Low Idle Switch | Accelerator Pedal or Lever Idle Validation Circuit - Out of Calibration | |
| 611 | 3 | Amber | 2185 | | System Diagnostic Code # 1 | Sensor Supply Voltage #4 Circuit – Voltage Above Normal, or Shorted to High Source | Accelerator Pedal Low Idle Switch |
| | 4 | Amber | 238 | | System Diagnostic Code # 1 | Sensor Supply Voltage #3 Circuit – Voltage Below Normal, or Shorted to Low Source | |
| | 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 | |
| | 31 | Amber | 757 | | Electronic Control Module | Electronic Control Module data lost - Condition Exists | Electronic Control Module |
| 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 |

ENGINE ERROR CODES

| J1939 SPN | J1939 FMI | Lamp Color | Cummins Code | J1939 SPN | Cummins Description | Category | CDM ERROR MESSAGE |
|-----------|-----------|------------|--------------|-----------|-----------------------------------|---|-----------------------------------|
| 627 | 2 | Amber | 434 | | Power Supply | Power Lost without Ignition Off - Data Erratic, Intermittent, or Incorrect | Power Supply |
| 629 | 12 | Red | 111 | | Controller #1 | Engine Control Module Critical internal failure - Bad intelligent Device or Component | Controller #1 |
| 630 | 2 | Amber | 341 | 527 | 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 | | 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 | | 143 | Primary To Secondary Speed Signal | Calibration fault | Primary to secondary speed signal |
| 639 | 9 | Amber | 285 | 247 | 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 | |
| 1484 | 31 | None | 211 | | J1939 Error | Additional Auxiliary Diagnostic Codes logged - Condition Exists | J1939 Error |
| 641 | 3 | Amber | 2385 | | Variable Geometry Turbocharger | VGT Actuator Driver Circuit - Voltage Above Normal, or Shorted to High Source | Variable Geometry Turbocharger |
| | 4 | Amber | 2384 | | | VGT Actuator Driver Circuit - Voltage Below Normal, or Shorted to Low Source | |
| 646 | 5 | 177 | | 526 | Turbo Wastegate | Solenoid Current Low | Turbo Wastegate |
| | 6 | 177 | | 526 | | Solenoid Current High | |

ENGINE ERROR CODES

| J1939 SPN | J1939 FMI | Lamp Color | Cummins Code | J1939 SPN | Cummins Description | Category | CDM ERROR MESSAGE |
|-----------|-----------|------------|--------------|-----------|----------------------|---|-----------------------|
| 651 | 2 | | | 111 | Cylinder #1 Injector | Cylinder # 1 Injector Erratic, Intermittent or Incorrect | Injector Cylinder #01 |
| | 5 | Amber | 322 | 1 | | Injector Solenoid Cylinder #1 Circuit – Current Below Normal, or Open Circuit | |
| | 6 | N/A | | 1 | | Injector Current High | |
| | 7 | Amber | 1139 | 1 | | Injector Cylinder #1 - Mechanical System Not Responding Properly or Out of Adjustment | |
| 652 | 2 | | | 112 | Cylinder #2 Injector | Cylinder # 2 Injector Erratic, Intermittent or Incorrect | Injector Cylinder #02 |
| | 5 | Amber | 331 | 2 | | Injector Solenoid Cylinder #2 Circuit – Current Below Normal, or Open Circuit | |
| | 6 | N/A | | 2 | | Injector Current High | |
| | 7 | Amber | 1141 | 2 | | Injector Cylinder #2 - Mechanical System Not Responding Properly or Out of Adjustment | |
| 653 | 2 | | | 113 | Cylinder #3 Injector | Cylinder # 3 Injector Erratic, Intermittent or Incorrect | Injector Cylinder #03 |
| | 5 | Amber | 324 | 3 | | Injector Solenoid Cylinder #3 Circuit – Current Below Normal, or Open Circuit | |
| | 6 | N/A | | 3 | | Injector Current High | |
| | 7 | Amber | 1142 | 3 | | Injector Cylinder #3 - Mechanical System Not Responding Properly or Out of Adjustment | |

ENGINE ERROR CODES

| J1939 SPN | J1939 FMI | Lamp Color | Cummins Code | J1939 SPN | Cummins Description | Category | CDM ERROR MESSAGE |
|-----------|-----------|------------|--------------|-----------|---|---|---|
| 654 | 2 | | | 114 | Cylinder #4 Injector | Cylinder # 4 Injector Erratic, Intermittent or Incorrect | Injector Cylinder #04 |
| | 5 | Amber | 332 | 4 | | Injector Solenoid Cylinder #4 Circuit – Current Below Normal, or Open Circuit | |
| | 6 | N/A | | 4 | | Injector Current High | |
| | 7 | Amber | 1143 | 4 | | Injector Cylinder #4 - Mechanical System Not Responding Properly or Out of Adjustment | |
| 655 | 2 | | | 115 | Cylinder #5 Injector | Cylinder # 5 Injector Erratic, Intermittent or Incorrect | Injector Cylinder #05 |
| | 5 | Amber | 323 | 5 | | Injector Solenoid Cylinder #5 Circuit – Current Below Normal, or Open Circuit | |
| | 6 | N/A | | 5 | | Injector Current High | |
| | 7 | Amber | 1144 | 5 | | Injector Cylinder #5 - Mechanical System Not Responding Properly or Out of Adjustment | |
| 656 | 2 | | | 116 | Cylinder #6 Injector | Cylinder # 6 Injector Erratic, Intermittent or Incorrect | Injector Cylinder #06 |
| | 5 | Amber | 325 | 6 | | Injector Solenoid Cylinder #6 Circuit – Current Below Normal, or Open Circuit | |
| | 6 | N/A | | 6 | | Injector Current High | |
| | 7 | Amber | 1145 | 6 | | Injector Cylinder #6 - Mechanical System Not Responding Properly or Out of Adjustment | |
| 676 | 5 | 199 | | 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 | |

ENGINE ERROR CODES

| J1939 SPN | J1939 FMI | Lamp Color | Cummins Code | J1939 SPN | Cummins Description | Category | CDM ERROR MESSAGE |
|-----------|-----------|------------|--------------|-----------|--------------------------------|---|--------------------------------|
| 678 | 3 | 517 | | 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 | |
| 723 | 2 | Amber | 753 | | Engine Speed Sensor #2 | Engine Speed/Position #2 Camshaft sync error -Data Erratic, Intermittent, or Incorrect | Engine Speed Sensor #2 |
| | 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 | | 142 | Secondary Engine Speed Sensor | Abnormal signal frequency | |
| 729 | 3 | Amber | 2426 | | Inlet Air Heater Driver #1 | Intake Air Heater #1 Circuit - Voltage above Normal, or Shorted to High Source | Grid Heater |
| | 4 | | 2427 | | | Intake Air Heater #1 Circuit - Voltage above Normal, or Shorted to High Source | |
| 1043 | 3 | Amber | 387 | | Internal Sensor Voltage Supply | Accelerator Pedal or Lever Position Sensor Supply Voltage Circuit - Voltage Above Normal, or Shorted to High Source | Internal Sensor Voltage Supply |
| | 4 | Amber | 284 | | | Engine Speed/Position Sensor (Crankshaft) Supply Voltage Circuit - Voltage Below Normal, or Shorted to Low Source | |

ENGINE ERROR CODES

| J1939 SPN | J1939 FMI | Lamp Color | Cummins Code | J1939 SPN | Cummins Description | Category | CDM ERROR MESSAGE | |
|-----------|-----------|------------|--------------|-----------|--|---|--|--|
| 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 | | |
| 1079 | 3 | Amber | 386 | 516 | 5 Volts DC Supply | Sensor Supply Voltage #1 Circuit – Voltage Above Normal, or Shorted to High Source | 5 Volts DC Supply | |
| | 4 | Amber | 352 | 516 | | Sensor Supply Voltage #1 Circuit – Voltage Below Normal, or Shorted to Low Source | | |
| 1080 | 3 | Amber | 227 | | | Sensor Supply Voltage #2 Circuit – Voltage Above Normal, or Shorted to High Source | | |
| | 4 | Amber | 187 | | | Sensor Supply Voltage #2 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 #1 Compressor 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 | | |

ENGINE ERROR CODES

| J1939 SPN | J1939 FMI | Lamp Color | Cummins Code | J1939 SPN | Cummins Description | Category | CDM ERROR MESSAGE |
|-----------|-----------|------------|--------------|-----------|---|---|---|
| 1188 | 5 | Amber | | 177 | Turbo Wastegate | Turbo Wastegate Drive Current Below Normal | Turbo Wastegate |
| | 6 | | | | | Turbo Wastegate Drive Current Above Normal | |
| | 7 | | | | | Turbo Wastegate not responding | |
| 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 | | 162 | Fuel Rail Pump | Output current low | |
| | 6 | 162 | | 162 | | Output current high | |
| | 7 | Amber | 281 | 162 | Fuel Pump Pressurizing Assembly #1 | High Fuel Pressure Solenoid Valve #1 – Mechanical System Not Responding Properly or Out of Adjustment | |
| 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 | |
| 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 |

ENGINE ERROR CODES

| J1939 SPN | J1939 FMI | Lamp Color | Cummins Code | J1939 SPN | Cummins Description | Category | CDM ERROR MESSAGE |
|-----------|-----------|------------|--------------|-----------|----------------------------|--|----------------------------|
| 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 | |
| 2629 | 15 | None | 2347 | | System Diagnostic Code #1 | Turbocharger Compressor Outlet Temperature (Calculated) - Data Valid but Above Normal Operational Range – Least Severe Level | System Diagnostic Code #1 |
| 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 |
| 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 | |

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