

MacDon[®]

M105 **Self-Propelled Windrower**

Operator's Manual

169890 Revision A

Original Instruction

The harvesting specialists worldwide.

This manual contains instructions for SAFETY, OPERATION, and MAINTENANCE/SERVICE for the MacDon M105 Self-Propelled Windrower.




Published July, 2014

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

		
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, Amtgericht Zweibrucken		
Place of Declaration:	<u>Winnipeg, Manitoba, Canada</u>	Name: <u>Ibrahim Saleh</u>
Date of Declaration:	<u>01 July 2013</u>	Title: <u>Director, Product Integrity</u>

1005251

Figure 1: Declaration of Conformity

Continued on next page.

Whole Body and Hand-Arm Vibration Levels

The weighted root mean square acceleration, to which the whole body is subjected, 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-weighted 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 M105 Self-Propelled Windrower, which is designed to cut and lay in windrows a wide variety of grain, hay, and specialty crops. Windrowing allows starting the harvest earlier, protects the crop from wind damage, and gives you more flexibility in scheduling combine time.

The power unit (referred to in this manual as the “windrower”), when coupled with one of the specially designed auger or draper headers, provides a package which incorporates many features and improvements in design.

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 M105 Windrower will work well for many years.

Use this manual in conjunction with your header operator's manual.

A manual storage case is provided in the cab. 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.

CAREFULLY READ ALL THE MATERIAL PROVIDED BEFORE ATTEMPTING TO USE THE MACHINE.

NOTE: Keep your MacDon publications up-to-date. The most current version can be downloaded from our website www.macdon.com or from our Dealer-only site (<https://portal.macdon.com>) (login required).

List of Revisions

At MacDon, we are continuously making improvements: occasionally these improvements impact product documentation. The following list provides an account of major changes from the previous version of this document.

Summary of Change	Location
Added new safety sign locations.	1.11 Safety Sign Locations, page 13
Updated lift linkage images to include the new decal.	Various locations throughout. 4.4.3 Levelling the Header, page 121
Restructured the header attach and detach procedures to improve readability.	4.5 Attaching and Detaching Headers, page 131
Removed reference to the walking beam grease zerk in the Lubrication Points section. No longer required with new design.	5.6.2 Lubrication Points, page 210
Replaced the missing Hydraulic Oil Maintenance instruction.	Checking and Filling Hydraulic Oil, page 288
Modified the procedure for changing the new LED dome light assembly.	Dome Light, page 281
Added the Adjusting Reel Drop Rate section.	Adjusting Reel Drop Rate, page 295
Updated drive wheel images and references to represent the new 10-bolt wheel drive assembly.	Various locations throughout. 5.7.10 Wheels and Tires, page 298
Updated the Header Functions section	4.2.3 Header Functions, page 84
Removed references to optional Pre-Cleaner and Radiator/Charge Air Cooler Sweeps	7.1 Available Options and Attachments, page 337
Added case drain kit information to the Options and Attachments section.	7.1.6 Draper Header Case Drain Kit, page 338

Serial Number

If you require MacDon® technical assistance, please have the serial number recorded and ready, before you call. Record the model number, model year, and serial number of the windrower and engine on the lines below.

The windrower serial number plate (A) is located on the left side of the main frame near the walking beam.

WINDROWER MODEL NUMBER _____
WINDROWER SERIAL NUMBER _____
YEAR OF MANUFACTURE _____



Figure 2: Machine Serial Number Location

The serial number plate (A) is located on top of the engine cylinder head cover.

ENGINE SERIAL NUMBER _____
DATE OF MANUFACTURE _____



Figure 3: Engine Serial Number Location

TABLE OF CONTENTS

Declaration of Conformity	i
Whole Body and Hand-Arm Vibration Levels	ii
Noise Levels	ii
Introduction	iii
List of Revisions	iv
Serial Number	v
1 Safety	1
1.1 Safety Alert Symbols	1
1.2 Signal Words	2
1.3 General Safety	3
1.4 Maintenance Safety	5
1.5 Hydraulic Safety	6
1.6 Tire Safety	7
1.7 Battery Safety	8
1.8 Welding Precaution	9
1.9 Engine Safety	10
1.9.1 High Pressure Rails	10
1.9.2 Engine Electronics	11
1.10 Safety Signs	12
1.10.1 Installing Safety Decals	12
1.11 Safety Sign Locations	13
1.12 Interpreting Safety Signs	17
2 Description	27
2.1 Definitions	27
2.2 Specifications	29
2.3 Windrower Dimensions	32
2.4 Component Location	34
3 Operator's Station	35
3.1 Operator Console	35
3.2 Operator Presence System	36
3.2.1 Header Drive	36
3.2.2 Engine and Transmission	36
3.3 Operator's Seat Adjustments	37
3.4 Training Seat (Optional)	38
3.5 Seat Belts	39
3.6 Steering Column Adjustment	40
3.7 Lighting	41
3.7.1 Field Lighting	41
3.7.2 Road Lighting	42
3.7.3 Beacon Lighting	43
3.7.4 Optional HID Auxiliary Lighting (If installed)	44
3.8 Windshield Wiper	45
3.9 Rear View Mirrors	46
3.10 Cab Temperature	47
3.10.1 Heater Shut-Off	47
3.10.2 Air Distribution	47
3.10.3 Controls	48
3.10.4 Air Conditioning Compressor Protection	48
3.11 Interior Lights	49
3.12 Operator Amenities	50
3.13 Radio	51
3.13.1 AM/FM Radio	51
3.13.2 Antenna Mounting	51

TABLE OF CONTENTS

3.14	Horn	53
3.15	Engine Controls and Gauges	54
3.16	Windrower Controls	55
3.17	Header Controls	56
3.17.1	Header Drive Switch	56
3.17.2	Deck Shift Switch–Draper Header Option	56
3.17.3	Ground Speed Lever (GSL) Header Switches	57
	Display Selector Switch	58
	Reel Position Switches	58
	Header Position Switches	59
	Reel Speed Switches	59
3.18	Cab Display Module (CDM)	60
3.18.1	Engine and Windrower Functions	60
3.18.2	Header Functions	61
3.18.3	Operating Screens	62
	Ignition ON, Engine Not Running	62
	Engine Running – At Initial Start Up	62
	Engine Running, Header Disengaged	63
	Engine Running, Header Engaged, Auger Header	63
	Engine Running, Header Engaged, Draper Header, Index Switch OFF	64
	Engine Running, Header Engaged, Draper Header, Index Switch ON	65
	Miscellaneous Operational Information	66
3.18.4	Cab Display Module (CDM) Warning/Alarms	67
	Engine Warning Lights	67
	Display Warnings and Alarms	68
3.18.5	Cab Display Module (CDM) Programming	70
	Programming Guidelines	71
	Detailed Programming Menu Flow Chart	72
	Operating Information Screens	78
3.18.6	Engine Error Codes	79
3.18.7	Cab Display Module (CDM) and Windrower Control Module (WCM) Fault Codes	79
4	Operation	81
4.1	Owner/Operator Responsibilities	81
4.2	Symbol Definitions	82
4.2.1	Engine Functions	82
4.2.2	Windrower Operating Symbols	83
4.2.3	Header Functions	84
4.3	Operating the Windrower	85
4.3.1	Operational Safety	85
4.3.2	Break-In Period	86
4.3.3	Preseason Checks/Annual Service	86
	Air Conditioning Compressor Coolant Cycling	87
4.3.4	Daily Check	87
4.3.5	Engine Operation	88
	Starting the Engine	88
	Engine Warm-Up	91
	Engine Intermediate Speed Control (ISC)	91
	Shutting Down the Engine	91
	Filling Fuel Tank	92
	Engine Temperature	93
	Engine Oil Pressure	93
	Electrical	93
	Engine Warning Lights	94
4.3.6	Windrower Operation	94

TABLE OF CONTENTS

	Ingress/Egress	96
	Driving Forward	97
	Driving in Reverse	98
	Spin Turning	98
	Stopping	99
4.3.7	Adjusting Caster Tread Width	100
4.3.8	Transporting the Windrower	101
	Driving on the Road	101
	Towing Header with Windrower	104
	Towing the Windrower (Emergency)	114
	Final Drives	115
4.3.9	Storing the Windrower	115
4.4	Operating with a Header	117
4.4.1	Header Safety Props	117
4.4.2	Header Float	119
	Float Operating Guidelines	119
	Checking Float	120
4.4.3	Levelling the Header	121
4.4.4	Header Drive	124
	Engaging and Disengaging the Header	124
4.4.5	Adjusting Header Angle	124
	Checking Self-Locking Center-Link Hook	126
4.4.6	Cutting Height	127
	Return to Cut	127
	Programming Return to Cut Feature	128
	Using Return to Cut Feature	129
4.4.7	Swath Roller Operation	130
4.5	Attaching and Detaching Headers	131
4.5.1	Attaching a D-Series Header	131
	Attaching a D-Series Header: Hydraulic Center-Link	131
	Attaching a D-Series Header: Mechanical Center-Link	136
4.5.2	Detaching a D-Series Header	141
	Detaching a D-Series Header: Hydraulic Center-Link	142
	Detaching a D-Series Header: Mechanical Center-Link	145
4.5.3	Attaching an A-Series Header	148
	Attaching an A-Series Header: Hydraulic Center-Link	149
	Attaching an A-Series Header: Mechanical Center-Link	154
4.5.4	Detaching an A-Series Header	159
	Detaching an A-Series Header: Hydraulic Center-Link	160
	Detaching an A-Series Header: Mechanical Center-Link	163
4.6	Operating with a D-Series Header	167
4.6.1	Configuring Hydraulics	167
4.6.2	Attaching Header Boots	168
4.6.3	Header Position	168
4.6.4	Reel Fore-Aft Position	169
4.6.5	Reel Height	169
4.6.6	Reel Speed	169
	Reel to Ground Speed	169
4.6.7	Draper Speed	171
	Draper to Ground Speed	171
	Setting Draper Minimum Speed	172
	Setting Draper Index	173
	Setting Draper Speed Independent of Ground Speed	174
4.6.8	Knife Speed	175

TABLE OF CONTENTS

	Setting Knife Speed (with Expansion Module MD #4666)	175
	Setting Knife Speed (without Expansion Module MD #B4666)	177
4.6.9	Deck Shift Control	178
	Deck Shift	178
4.7	Operating with an A-Series Header	179
4.7.1	Auger Speed	179
	Auger Speed on A30-D Headers	179
	Auger Speed on A40-D Headers	180
4.7.2	Reel Speed	181
	Reel Speed on A30-D Headers	181
	Reel Speed on A40-D Headers	181
4.7.3	Knife Speed	182
	Setting Knife Speed (With Expansion Module MD #4666 Installed)	182
	Setting Knife Speed (Without Expansion Module MD #B4666)	184
5	Maintenance and Servicing	185
5.1	Preparation For Servicing	185
5.2	Torque Specifications	186
5.2.1	SAE Bolt Torque Specifications	186
5.2.2	Metric Bolt Specifications	188
5.2.3	Metric Bolt Specifications Bolting into Cast Aluminum	191
5.2.4	Flare-Type Hydraulic Fittings	191
5.2.5	O-Ring Boss (ORB) Hydraulic Fittings (Adjustable)	193
5.2.6	O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)	195
5.2.7	O-Ring Face Seal (ORFS) Hydraulic Fittings	196
5.3	Maintenance Specifications	198
5.3.1	Recommended Fuel, Fluids, and Lubricants	198
	Storing Lubricants and Fluids	198
	Fuel Specifications	198
	Lubricants, Fluids, and System Capacities	199
	Filter Part Numbers	200
5.3.2	Conversion Chart	201
5.4	Engine Compartment Hood	202
5.4.1	Opening Hood (Lower Position)	202
5.4.2	Closing Hood (Lower Position)	203
5.4.3	Opening Hood (Highest Position)	203
5.4.4	Closing Hood (Highest Position)	204
5.5	Maintenance Platform	205
5.5.1	Opening Platform (Standard Position)	205
5.5.2	Closing Platform (Standard Position)	206
5.5.3	Opening Platform (Major Service Position)	207
5.5.4	Closing Platform (Major Service Position)	208
5.6	Windrower Lubrication	209
5.6.1	Lubricating the Windrower	209
5.6.2	Lubrication Points	210
5.7	Operator's Station	211
5.7.1	Seat Belts	211
5.7.2	Safety Systems	211
	Checking Operator Presence System	211
	Checking Engine Interlock	212
5.7.3	Ground Speed Lever (GSL) Adjustments	212
	Adjusting Ground Speed Lever (GSL) Lateral Movement	212
	Adjusting Ground Speed Lever (GSL) Fore-Aft Movement	213
	Adjusting Ground Speed Lever (GSL) Position	213
5.7.4	Steering Adjustments	214

TABLE OF CONTENTS

	Checking Steering Link Pivots	214
5.7.5	Neutral Start Switch.....	217
5.7.6	Heating, Ventilating, and Air Conditioning (HVAC) System	218
	Fresh Air Intake Filter.....	218
	Return Air Cleaner/Filter.....	219
	Air Conditioning Condenser.....	221
	Air Conditioning Evaporator.....	222
	Air Conditioning (A/C) Compressor	224
5.7.7	Engine.....	225
	General Engine Inspection	225
	Turning Engine Manually.....	226
	Engine Oil	227
	Air Intake System.....	230
	Fuel System	237
	Engine Cooling System.....	245
	Exhaust System.....	255
	Belts	256
	Engine Speed.....	258
5.7.8	Electrical System.....	259
	Batteries	259
	Field Lights.....	269
	Flood Lights: Forward	270
	HID Auxiliary Lighting (Optional - MD #B5596).....	272
	Swath Lights.....	275
	Amber Lights.....	276
	Red Tail Lights	277
	Beacons (if installed).....	277
	Dome Light.....	281
	Ambient Light	282
	Turn Signal Indicators	282
	Circuit Breakers and Fuses	282
5.7.9	Hydraulic System	287
	Checking and Filling Hydraulic Oil.....	288
	Hydraulic Oil Cooler	289
	Draining Hydraulic Oil	290
	Changing Hydraulic Oil Filters.....	290
	Header and Reel Hydraulics.....	294
	Traction Drive Hydraulics.....	296
	Hoses and Lines.....	298
5.7.10	Wheels and Tires	298
	Drive Wheel	298
	Caster Wheel	305
5.7.11	Maintenance Schedule	313
	Break-In Inspections	313
	End of Season Service.....	314
	Maintenance Schedule/Record.....	315
6	Troubleshooting.....	317
6.1	Engine Troubleshooting	317
6.2	Electrical Troubleshooting	323
6.3	Hydraulics Troubleshooting	325
6.4	Header Drive Troubleshooting	326
6.5	Traction Drive Troubleshooting	327
6.6	Steering and Ground Speed Control Troubleshooting.....	330
6.7	Cab Air Troubleshooting.....	331

TABLE OF CONTENTS

6.8	Operator's Station Troubleshooting	335
7	Options and Attachments	337
7.1	Available Options and Attachments	337
7.1.1	AM/FM Radio	337
7.1.2	Anti-Shimmy Shocks for Casters	337
7.1.3	Automated Steering Systems	337
7.1.4	Booster Spring Kit (External)	337
7.1.5	Booster Spring Kit (Internal)	337
7.1.6	Draper Header Case Drain Kit	338
7.1.7	Draper Header Reel Drive and Lift Plumbing	338
7.1.8	Engine Block Heater	338
7.1.9	Engine Fan Air Baffle	338
7.1.10	Expansion Module	338
7.1.11	HID Auxiliary Lighting	338
7.1.12	Hydraulic Center-Link	339
7.1.13	Light Header Flotation	339
7.1.14	Mechanical Center-Link	339
7.1.15	Swath Roller	339
7.1.16	Towing Harness	339
7.1.17	Training Seat	339
7.1.18	Transport Drawbar	340
7.1.19	Warning Beacons	340
7.1.20	Weight Box	340
7.1.21	Windshield Shades	340
8	Engine Error Codes	341
9	Cab Display Module (CDM) Error Codes	359
	Index	361

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: Safety Symbol

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.

• 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.

- 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.

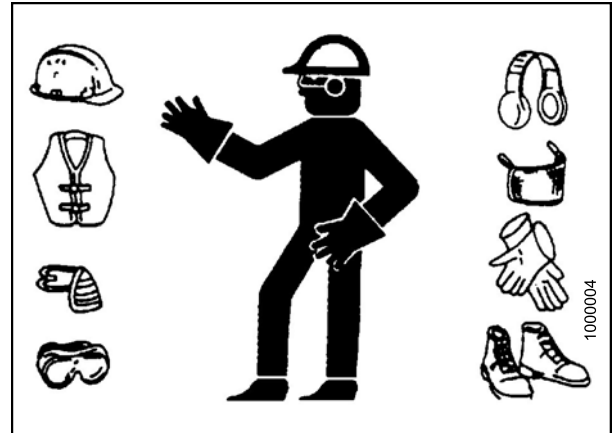


Figure 1.2: Safety Equipment

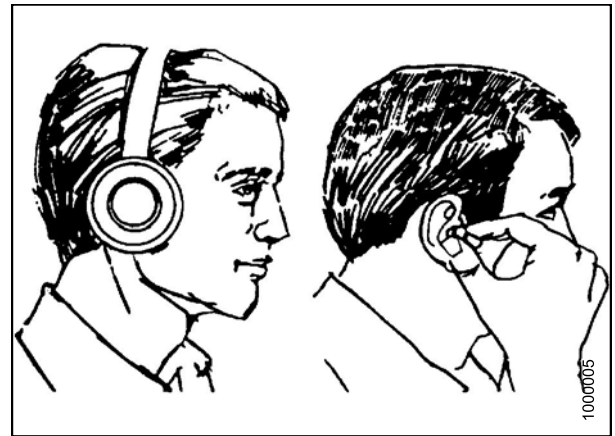


Figure 1.3: Safety Equipment

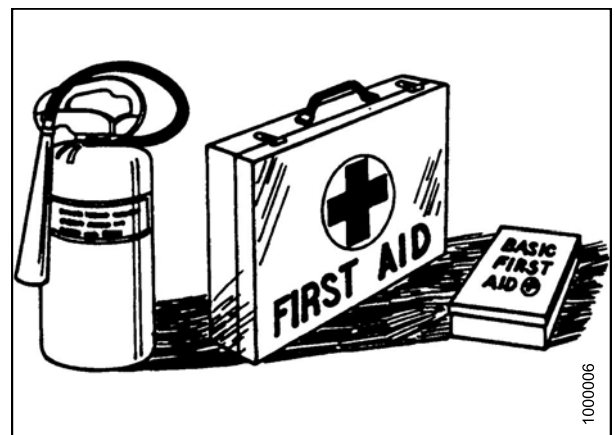


Figure 1.4: Safety Equipment

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: Safety around Equipment

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

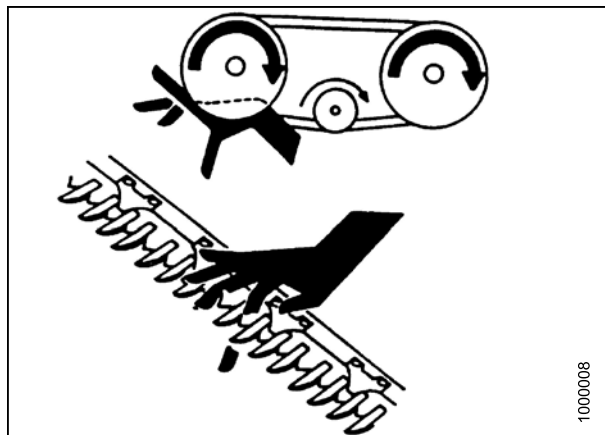


Figure 1.6: Safety around Equipment

- 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 around Equipment

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 windrower.
- 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: Safety around Equipment

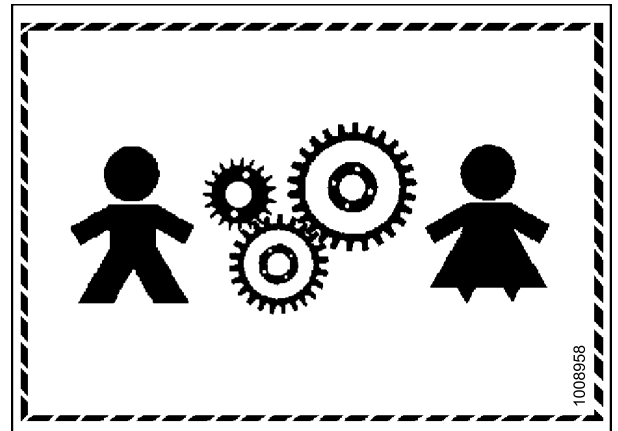


Figure 1.9: Equipment NOT Safe for Children

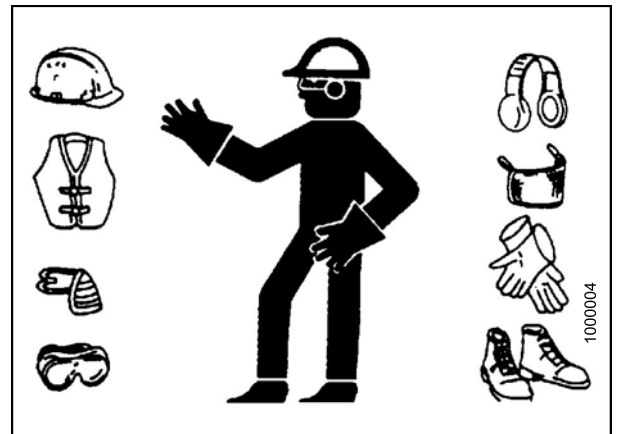


Figure 1.10: Safety Equipment

1.5 Hydraulic Safety

- Always place all 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.

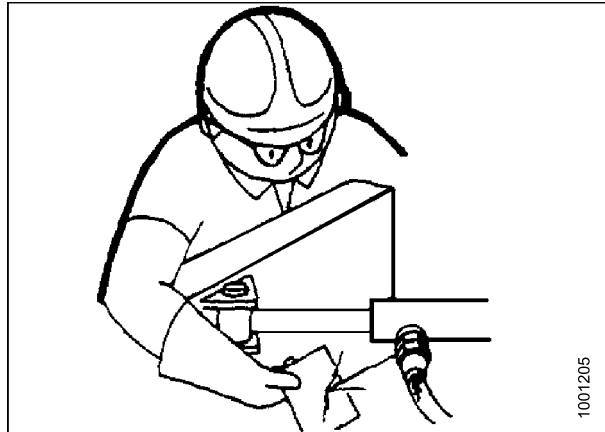


Figure 1.11: Checking Hydraulic Leaks

- 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.

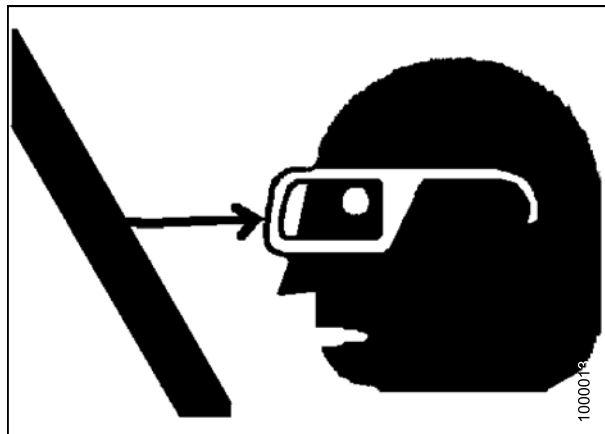


Figure 1.13: Safety Glasses

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.

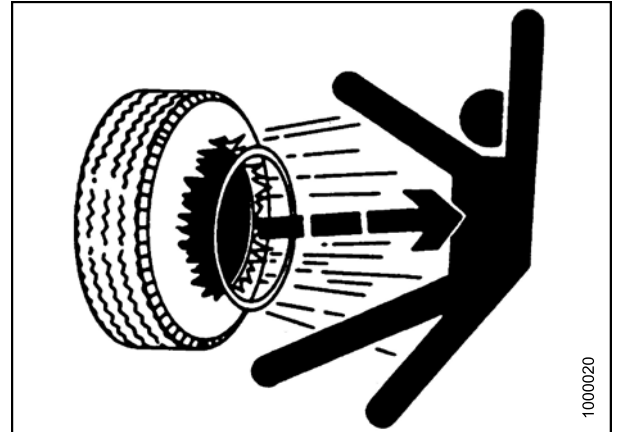


Figure 1.14: Over-Inflated Tire

- Do **NOT** attempt to mount a tire unless you have the proper training and equipment.
- Have a qualified tire dealer or repair service perform required tire maintenance.

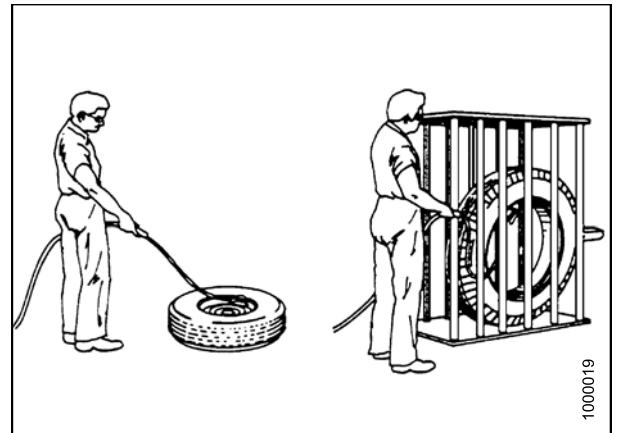


Figure 1.15: Safely Filling a Tire with Air

1.7 Battery Safety

WARNING

- Keep all sparks and flames away from the batteries, as a gas given off by electrolyte is explosive.
- Ventilate when charging in enclosed space.

WARNING

- Wear safety glasses when working near batteries.
- Do NOT tip batteries more than 45° to avoid electrolyte loss.
- Battery electrolyte causes severe burns. Avoid contact with skin, eyes, or clothing.
- Electrolyte splashed into the eyes is extremely dangerous. Should this occur, force the eye open, and flood with cool, clean water for five minutes. Call a doctor immediately.
- If electrolyte is spilled or splashed on clothing or the body, neutralize it immediately with a solution of baking soda and water, then rinse with clear water.

WARNING

- To avoid injury from spark or short circuit, disconnect battery ground cable before servicing and part of electrical system.
- Do NOT operate the engine with alternator or battery disconnected. With battery cables disconnected and engine running, a high voltage can be built up if terminals touch the frame. Anyone touching the frame under these conditions would be severely shocked.
- When working around storage batteries, remember that all of the exposed metal parts are live. Never lay a metal object across the terminals because a spark or short circuit will result.
- Keep batteries out of reach of children.



Figure 1.16: Safety around Batteries

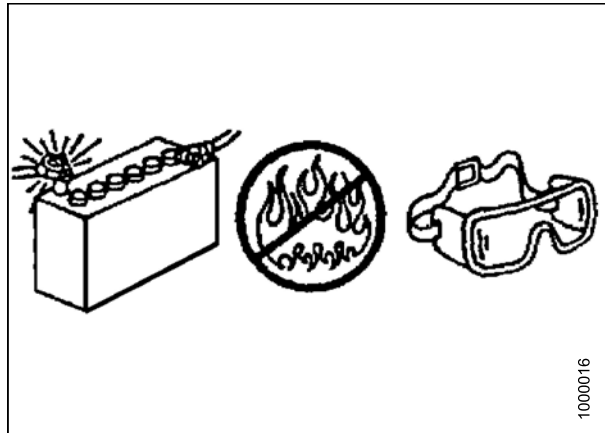


Figure 1.17: Safety around Batteries

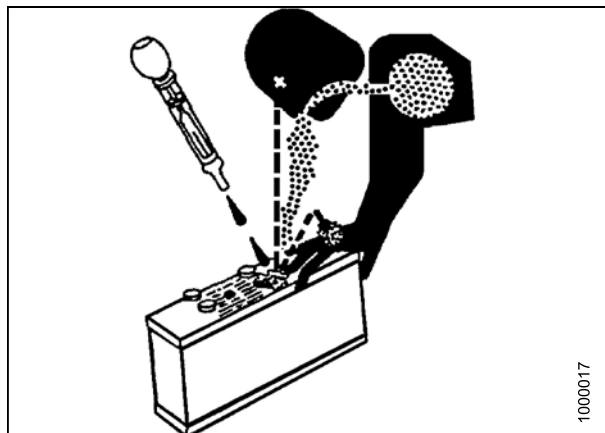


Figure 1.18: Safety around Batteries

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 MacDon Dealer for proper procedures.

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.

CAUTION

- 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.
- 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. Refer to your MacDon Dealer for repairs and 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 people clear the area.
- 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. Always start the engine according to the procedure that is described in the Starting the Engine section of the operator's manual. 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 additional cold starting aid may be required. Normally, the engine will be equipped with the correct type of starting aid for your region of operation.

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.

1.9.2 Engine Electronics

WARNING

Tampering with the electronic system installation or the original equipment manufacturer (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 engine control module (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 ECM has the ability to monitor the engine operating conditions. If conditions exceed the allowable range, the ECM will initiate an immediate action.

The following actions are available for engine monitoring control:

- Warning
- Derate
- Shutdown

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 provide the engine monitoring function for the specific engine application.

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.

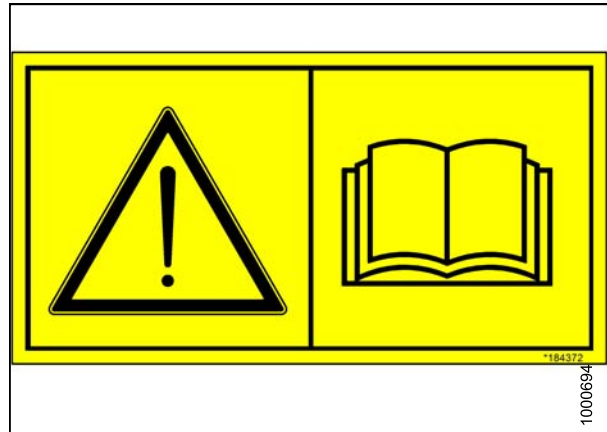


Figure 1.19: Operator's Manual Decal

1.10.1 Installing Safety Decals

To install a safety decal, follow these steps:

1. Clean and dry the installation area.
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. Prick small air pockets with a pin and smooth out.

1.11 Safety Sign Locations

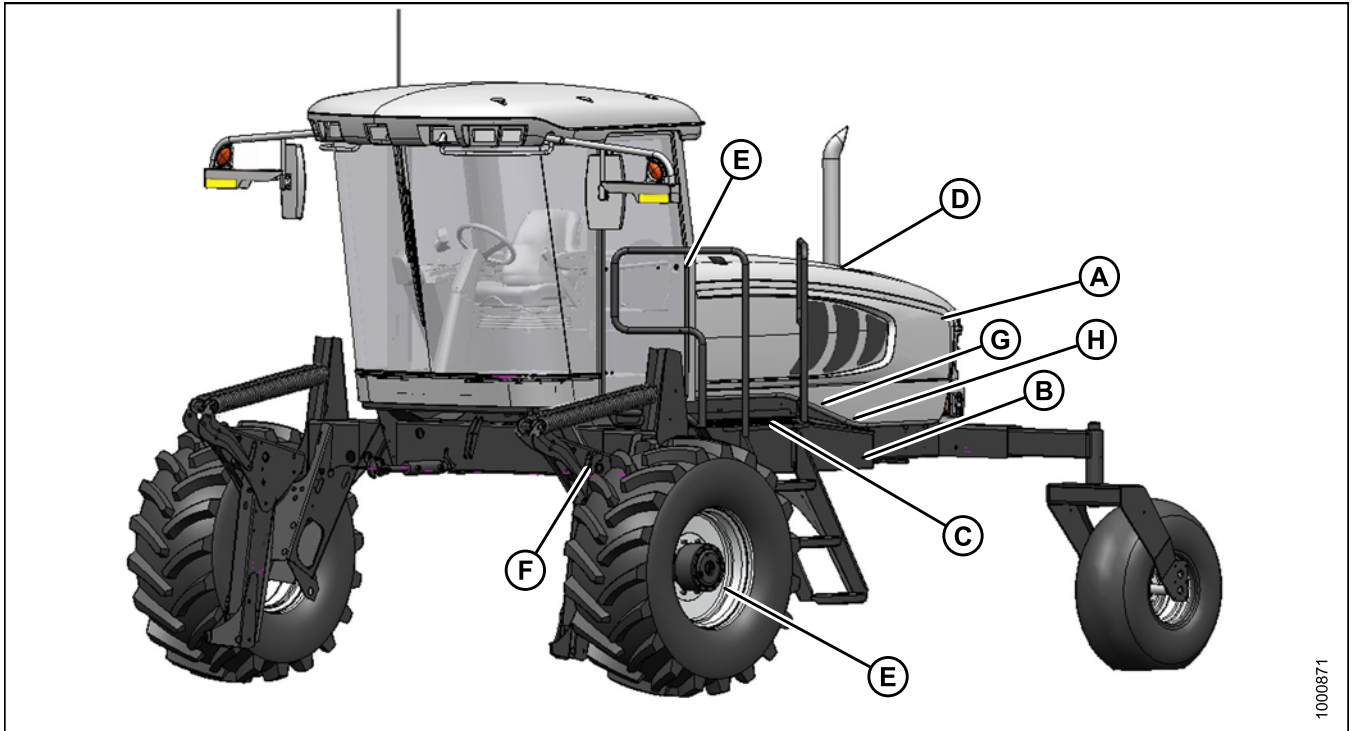


Figure 1.20: Safety Sign Locations (LH Side)

A - MD #166450 Fan Shroud (Top)

B - MD #166425 LH of Step

D - MD #166450 LH, Close to the Exhaust

F - MD #166438 LH Lift Linkage

H - MD #166233 LH Frame Behind Battery Bracket

A - MD #166451 Fan Shroud (Middle)

B - MD #166440 RH of Step

D - MD #166461 RH, Close to Radiator Cap

G - MD #166456 LH, Battery Bracket

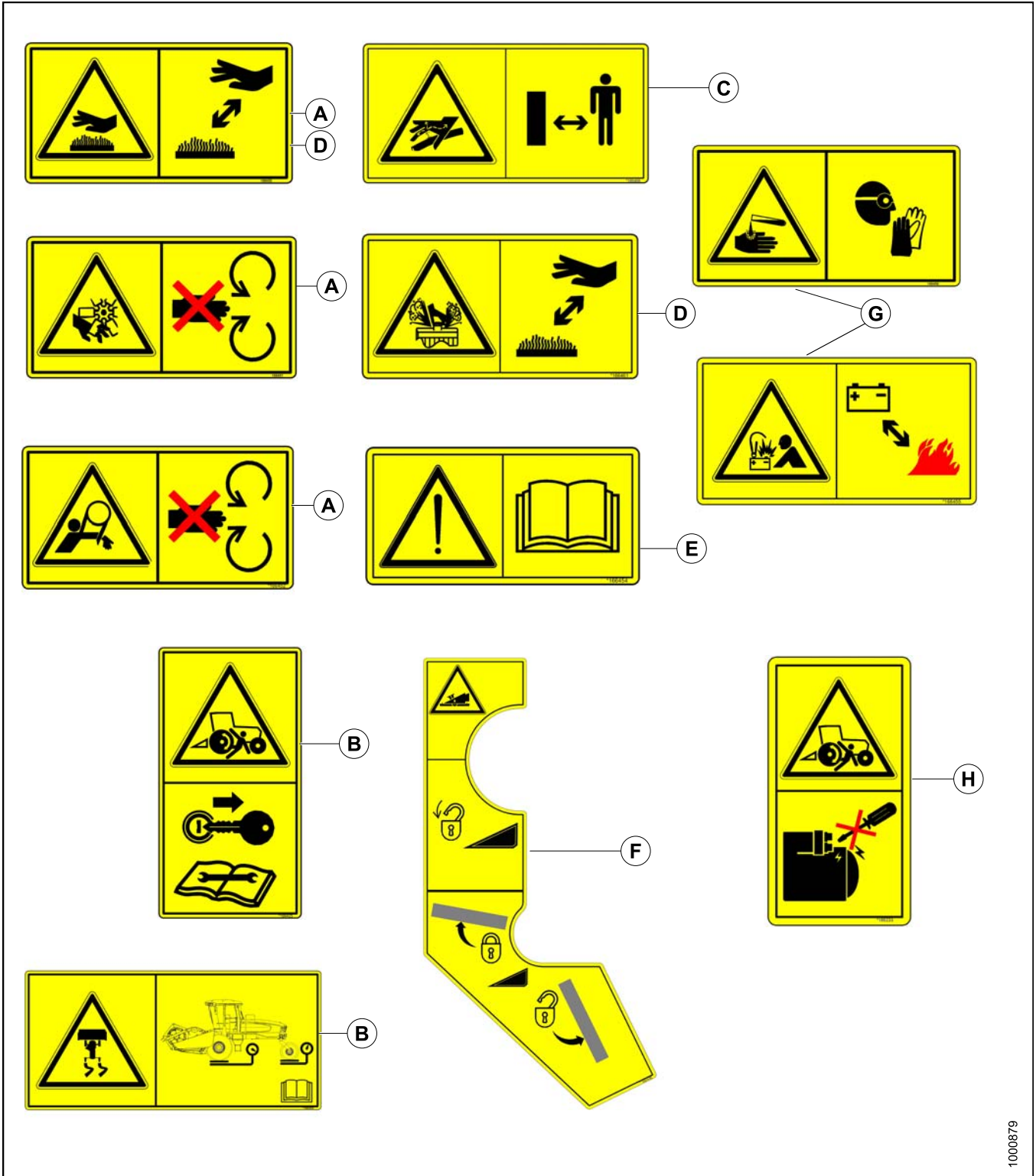
A - MD #166452 Fan Shroud (Bottom)

C - MD #166466 LH Frame

E - MD #166438 LH Cab Door and Rim

G - MD #166455 RH, Battery Bracket

SAFETY



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Figure 1.21: Safety Signs (LH Side)

SAFETY

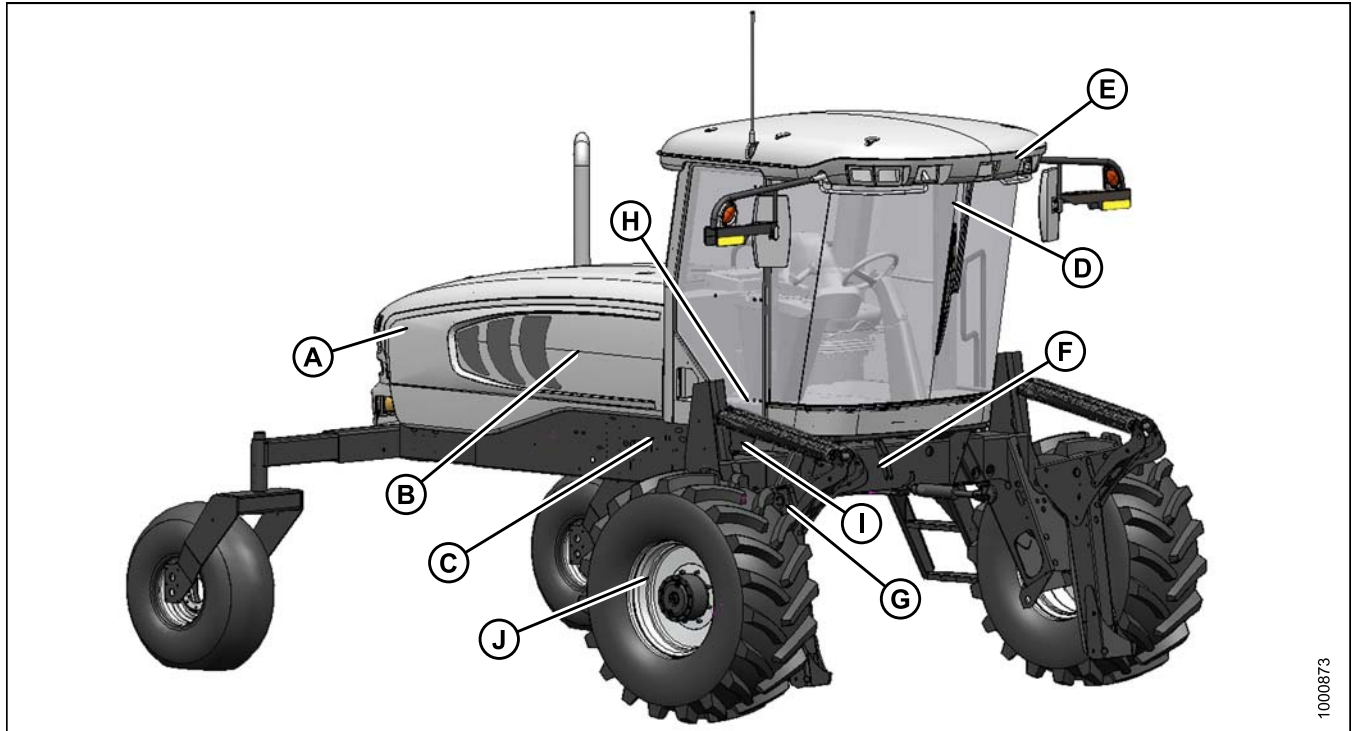


Figure 1.22: Safety Sign Locations (RH Side)

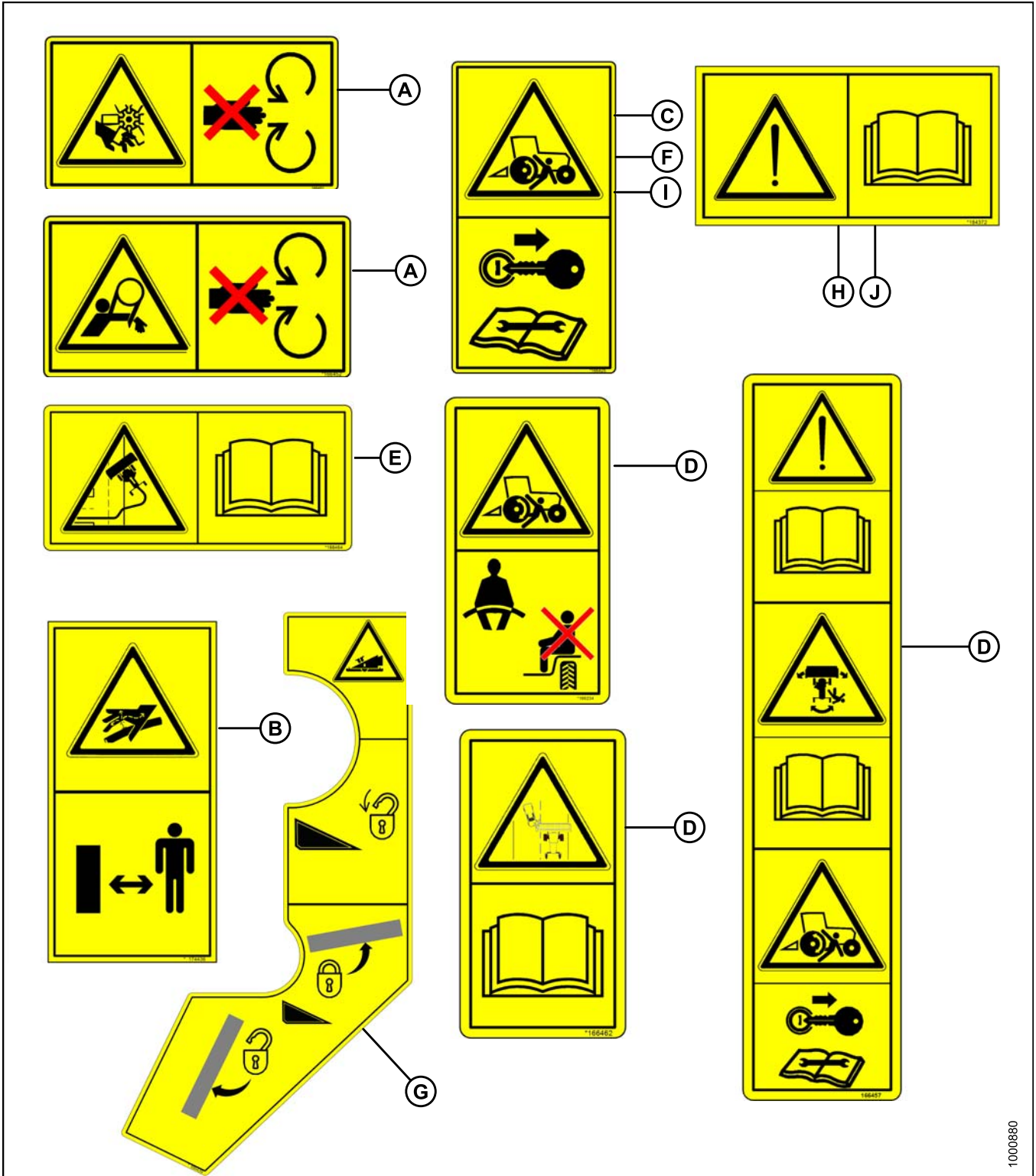
A - MD #166451 RH, Fan Shroud (Top)
C - MD #166425 Traction Pump Mount
D - MD #166462 Interior Post (Bottom)
G - MD #166439 RH, Lift Linkage
J - MD #166438 Rim

A - MD #166452 RH, Fan Shroud (Bottom)
D - MD #166457 Interior Post (Above Vent)
E - MD #166464 Radio Panel
H - MD #184372 RH, Door Assembly

B - MD #174436 Center, Hydraulic Reservoir
D - MD #166234 Interior Post (Below Vent)
F - MD #166425 Front Frame (Below Cab)
I - MD #166425 RH Frame

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SAFETY



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Figure 1.23: Safety Signs (RH Side)

1.12 Interpreting Safety Signs

In the safety sign explanations below, (a) refers to the top or left position panel, (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 1.24: 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 1.25: MD #166234

SAFETY

3. MD #166438
 - a. Crushing hazard.
 - b. **DANGER**
 - Rest header on ground or engage safety props before going under unit.

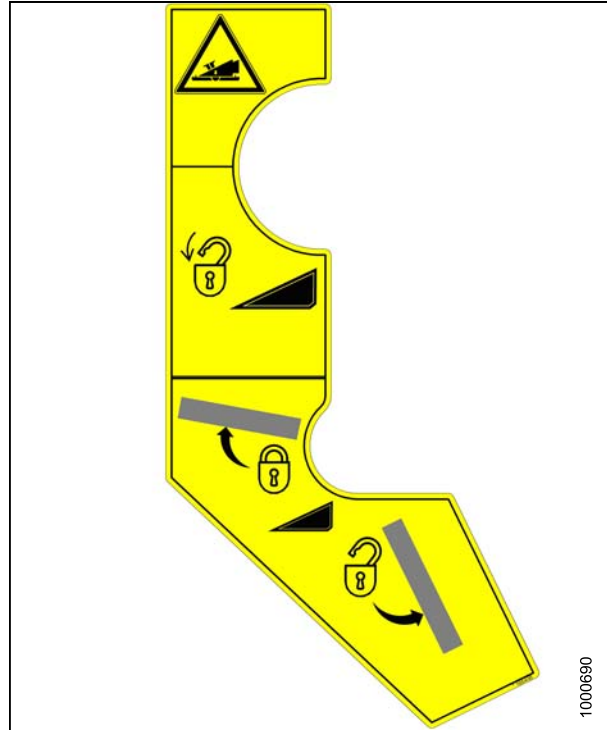


Figure 1.26: MD #166438

4. MD #166439
 - a. Crushing hazard.
 - b. **DANGER**
 - Rest header on ground or engage safety props before going under unit.

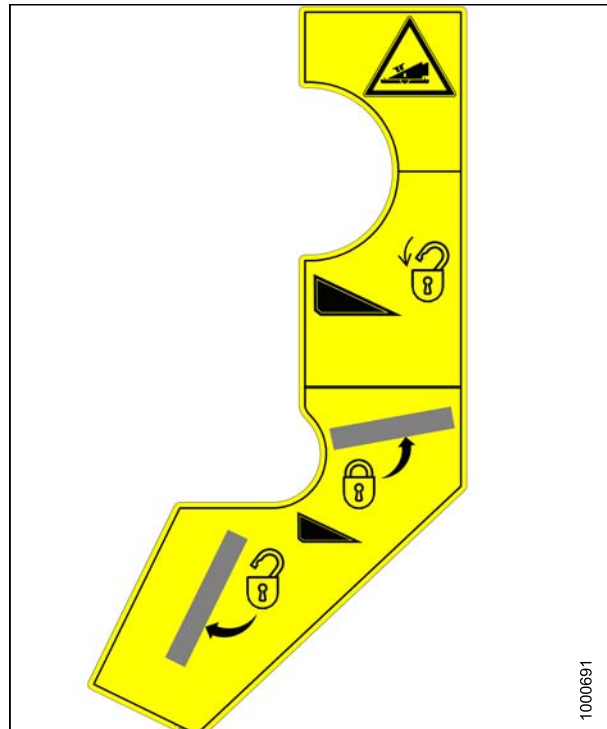


Figure 1.27: MD #166439

SAFETY

5. MD #166440

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.

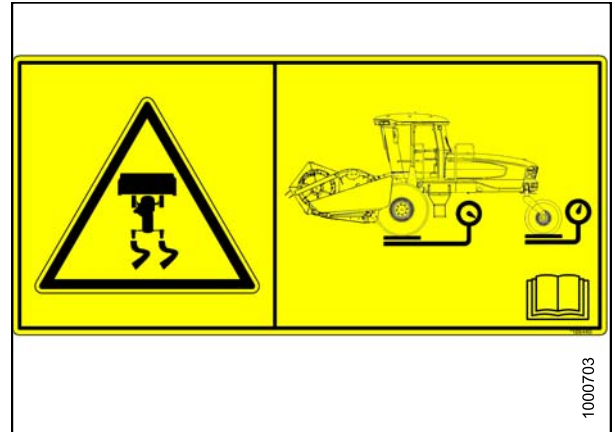


Figure 1.28: MD #166440

6. MD #166450

a. Hot surface hazard.

b. **WARNING**

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

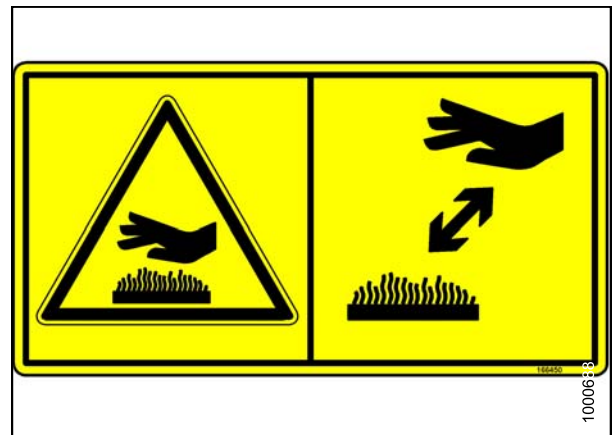


Figure 1.29: MD #166450

7. MD #166451

a. Rotating fan hazard.

b. **WARNING**

- To avoid injury, stop the engine and remove the key before opening engine hood.

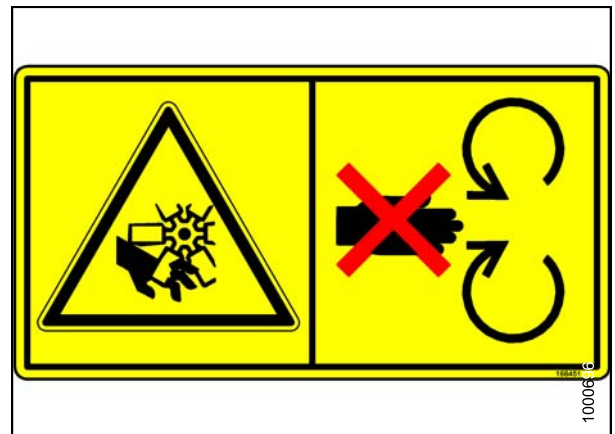


Figure 1.30: MD #166451

SAFETY

8. 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 the engine and remove the 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.

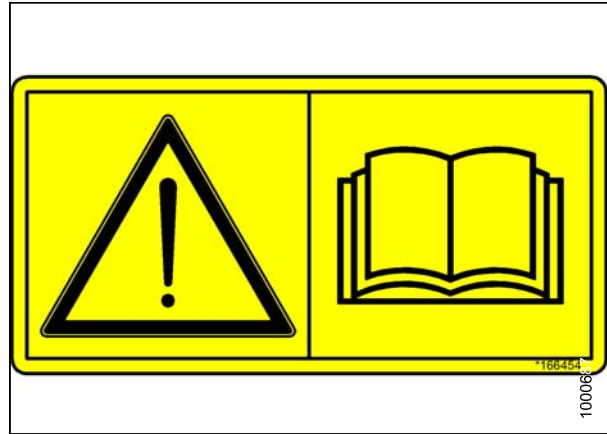


Figure 1.31: MD #166454

9. 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 1.32: MD #166455

SAFETY

10. MD #166456

a. Battery acid hazard.

b. **WARNING**

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



Figure 1.33: MD #166456

SAFETY

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

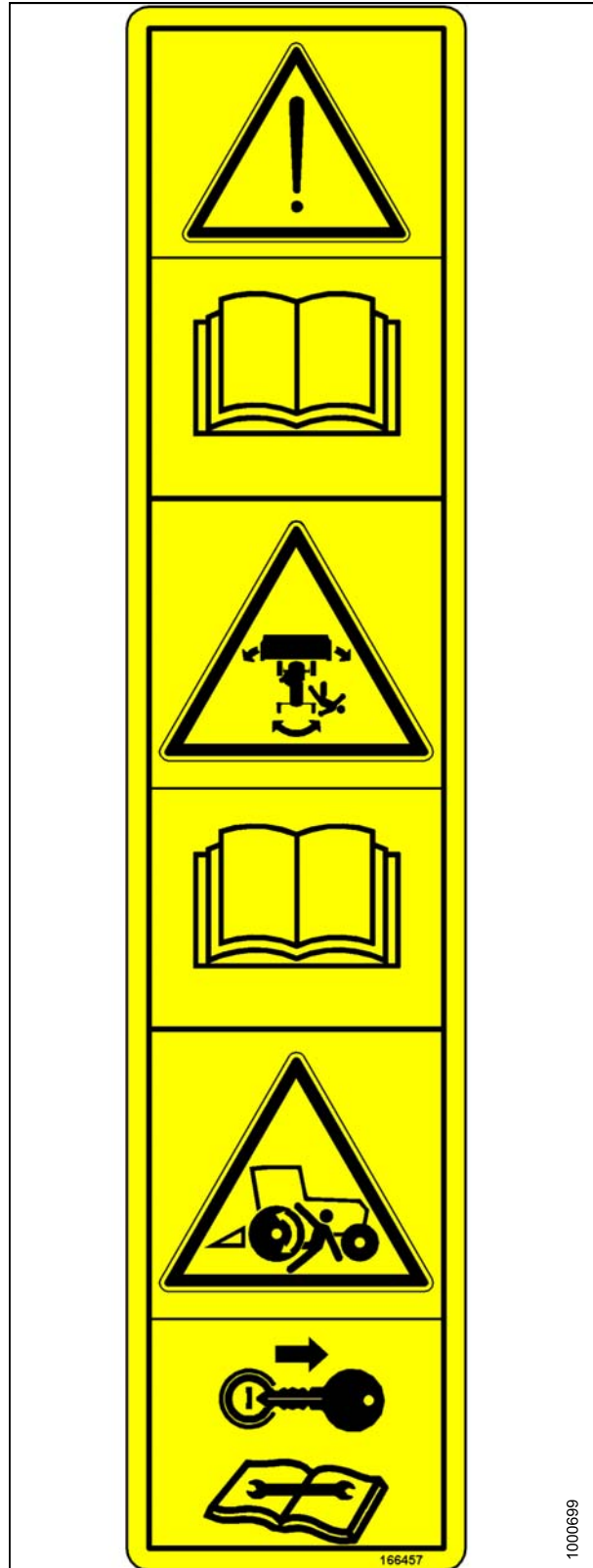


Figure 1.34: MD #166457

SAFETY

12. 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 1.35: MD #166461

13. MD #166462

- 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 operator's manual for safe procedure to tow header.

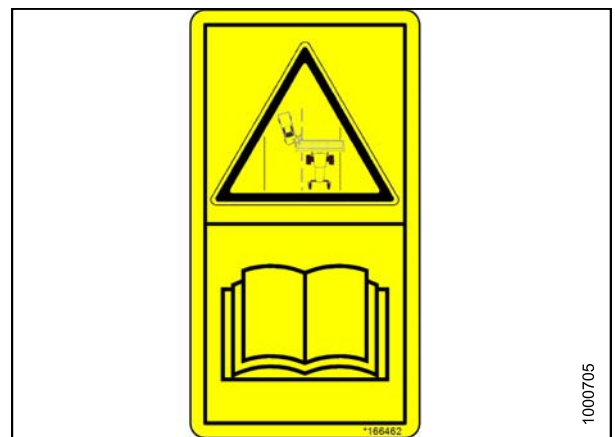


Figure 1.36: MD #166463

14. MD #166466

- a. High pressure oil hazard.
- b. **WARNING**

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.
 - Lower load or relieve hydraulic pressure before loosening fittings.



Figure 1.37: MD #166466

SAFETY

15. MD #174436

- a. High pressure oil hazard.
- b. **WARNING**
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.
 - Lower load or relieve hydraulic pressure before loosening fittings.



Figure 1.38: MD #174436

16. MD #184372

- a. General hazard pertaining to machine operation and servicing.
- b. **CAUTION**
To avoid injury or death from improper or unsafe machine operation:
 - Read the operator's manual and follow all safety instructions. If you do not have a manual, obtain one from your Dealer.
 - Do not allow untrained persons to operate the machine.
 - Review safety instructions with all Operators annually.
 - Ensure that all safety signs are installed and legible.
 - Make certain everyone is clear of machine before starting engine and during operation.
 - Keep riders off the machine.
 - Keep all shields in place and stay clear of moving parts.
 - Disengage header drive, put transmission in Neutral, and wait for all movement to stop before leaving operator's position.
 - Shut off the engine and remove the key from ignition before servicing, adjusting, lubricating, cleaning, or unplugging machine.
 - Engage safety props to prevent lowering of raised unit before servicing in the raised position.
 - Use slow moving vehicle emblem and flashing warning lights when operating on roadways unless prohibited by law.

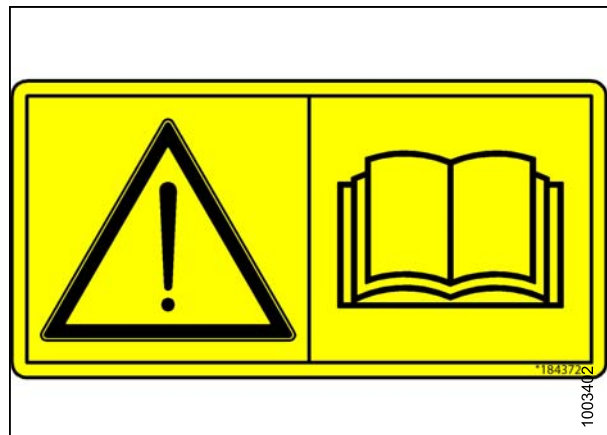


Figure 1.39: MD #184372

SAFETY

17. MD #190546

- a. Slippery surface.
- b. **WARNING**
Do not place foot.
 - Do not use this area as a step or platform.
 - Failure to comply could result in serious injury or death.



Figure 1.40: MD #190546

2 Description

2.1 Definitions

The following terms and acronyms may be used in this manual.

Term	Definition
A-Series header	MacDon auger header.
API	American Petroleum Institute.
ASTM	American Society of Testing and Materials.
Bolt	A headed and externally threaded fastener that is designed to be paired with a nut.
CDM	Cab display module on a self-propelled windrower.
Center-link	A hydraulic cylinder or manually adjustable turnbuckle type link between the header and the machine to which it is attached. It is used to change header angle.
CGVW	Combined vehicle gross weight.
D-Series header	MacDon rigid draper header.
ECM	Engine control module.
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.
FFFT	Flats from finger tight.
GSL	Ground speed lever.
GVW	Gross vehicle weight.
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.
Hex key	A hex key or Allen key (also known by various other synonyms) is a tool of hexagonal cross-section used to drive bolts and screws that have a hexagonal socket in the head (internal-wrenching hexagon drive).
hp	Horsepower.
ISC	Intermediate Speed Control.
JIC	Joint Industrial Council: a standards body that developed the standard sizing and shape for original 37° flared fitting.
Knife	A cutting device which uses a reciprocating cutter. Also called a sickle.
n/a	Not applicable.
Nut	An internally threaded fastener that is designed to be paired with a bolt.
N-DETENT	The slot opposite the NEUTRAL position on operator's console.
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.

DESCRIPTION

Term	Definition
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.
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 (SP) Windrower	Self-propelled machine consisting of a power unit with a header.
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.
spm	Strokes per minute.
Tractor	Agricultural type tractor.
Truck	A four-wheel highway/road vehicle weighing no less than 7500 lbs (3400 kg).
Tension	Axial load placed on a bolt or screw, usually measured in pounds (lb) or Newtons (N).
TFFT	Turns from finger tight.
Torque	The product of a force X lever arm length, usually measured in foot-pounds (ft-lbf) or Newton-meters (N·m).
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.
UCA	Upper cross auger.
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 Specifications

ENGINE		
Type	Cummins QSB - 4.5L 4 Cylinder Turbo Diesel. B20 Biodiesel Approved.	
Displacement	275 cu. in. (4.5 L)	
Power	Rated	110 hp (81 kW) @ 2,500 rpm
	Peak	115 hp (86 kW) @ 2300 rpm
Bore	4-21/100 in. (107 mm)	
Stroke	4-22/25 in. (124 mm)	
Maximum rpm (no load) - header not engaged	2610–2650 rpm	
Idle rpm	1070–1130 rpm	
ELECTRICAL SYSTEM		
Recommended Battery (2)	12 Volt, Min. 650CCA. Group Rating 29H or 31A. Heavy Duty / Off Road / Vibration Resistant.	
Alternator	130 amp	
Starter	Wet Type as supplied (Dry Type may be used)	
Working Lights	11	
TRACTION DRIVE (E)¹		
Type	Hydrostatic, Two-Speed Electric Shift	
Speed	Field	Low Range 11 mph (0–18 km/h)
	Reverse	6 mph (9.6 km/h)
	Transport	High Range 0–16 mph (0–26 km/h)
Transmission	Type	2 Piston Pumps: 1 per Drive Wheel.
	Displacement	3.0 cu. in. (50 cc)
	Flow	33 U.S. gpm (125 L/min)
	Pressure	5000 psi (34,473 kPa)
Final Drive	Type	Planetary Gearbox
	Ratio	41.42:1
Wheel Motor Displacement	Low Range	2.80 cu. in. (46 cc)
	High Range	1.65 cu. in. (27 cc)

1. Refer to Step 1, page 31 for pump orientation.

DESCRIPTION

SYSTEM CAPACITIES			
Fuel Tank	97 US Gallons (367 L)		
Cooling	6.6 US Gallons (25 L)		
Hydraulic Reservoir	11.5 US Gallons (44 L)		
HEADER DRIVE ¹			
	Single Piston Pump (D)¹	Gear Pump (B)¹	Gear Pump (A)¹
Type	Hydraulic, Load Sensing Control	Gear	Gear
Displacement (manually adjusted for header type and/or size)	0–3 cu. in. (49 cc)	1.02 cu. in. (16.7 cc)	1.02 cu. in. (16.7 cc)
Flow	0–30 gpm (0–114 L/min)	0–11.5 gpm (0–44 L/min)	0–11.5 gpm (0–44 L/min)
Pressure	4000 psi (27,579 kPa)	2500 psi (17,237 kPa)	2500 psi (17,237 kPa)
Function	Knife and Brake Charge	Reel Drive and Supercharge for Traction Drive	Conveyor (Draper, Reel/Auger- header dependent)
HEADER LIFT/TILT Pump (C) ¹			
Type	Hydraulic Double Acting Cylinders. Tilt - Optional Hydraulic Positioning, Optional Hydraulic Center-link		
Gear Pump	Displacement	1.02 cu. in. (16.7 cc)	
	Flow	0–11.5 gpm (44 L/min)	
	System Pressure (Relief/Max)	2500 psi (17,237 kPa)	
	Function	Lift / Tilt / Float	
HEADER FLOTATION			
	Primary Adjustment	Manual, External, Drawbolt With Springs (1 per side).	
	Inner Booster Springs	Two	
CAB			
Mounting Type	Rubber Isolation		
Dimensions	Width	63 in. (1600 mm)	
	Depth	68-1/3 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	31-1/2 in. (800 mm) Blade		
Heater	24,000 Btu/h (7038 W)		

DESCRIPTION

Air Conditioning	28,280 Btu/h (8288 W)	
Electrical Outlets	One Live, One on Ignition, One Live/Keyed	
Mirrors	Two Outside (Field)	
Radio	Two Speakers and Antenna Factory Installed. Radio Dealer Installed	
SYSTEM MONITORING		
Speeds	Ground (mph or km/h), Engine (rpm), Conveyor (Ref. No.), Knife (spm) (Optional), Reel (rpm or mph/km/h) (Optional)	
Header	Height, Angle (Optional)	
TIRE OPTIONS , Refer to 2.1 Drive Tires, page 32		
FRAME AND STRUCTURE		
Dimensions	Refer to 2.3 Windrower Dimensions, page 32	
Frame to Ground (Crop Clearance)	45-3/4 in. (1160 mm)	
Weight	Base	8820 lbs (4000 kg) ²
	Maximum GVW	17,750 lbs.(8050 kg)
	Maximum CGVW	20,200 lbs (9160 kg)
HEADER COMPATIBILITY		
Auger Headers	A30-D, A40-D	Compatible
Draper Headers	D50, D60, D65 up to 35 ft. ³	Compatible

NOTE:

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

1. Pump Orientation:

- a. Gear pump (center). Draper control D-Series; Reel/Auger control A-Series.
- b. Gear pump (inboard). Reel control D-Series; Reel/Auger control A-Series. Supercharge for traction drive pumps.
- c. Gear pump (outboard). Lift, Tilt, and Reel Fore-aft circuits.
- d. Single piston pump (closest to engine). Knife drive and brake pressure.
- e. Tandem piston pumps and traction drive.

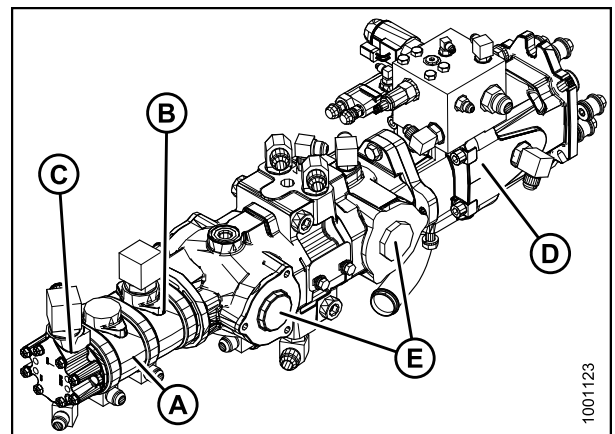


Figure 2.1: Pump Orientation

2. Weights do not include options.
3. Depending on header options.

DESCRIPTION

2.3 Windrower Dimensions

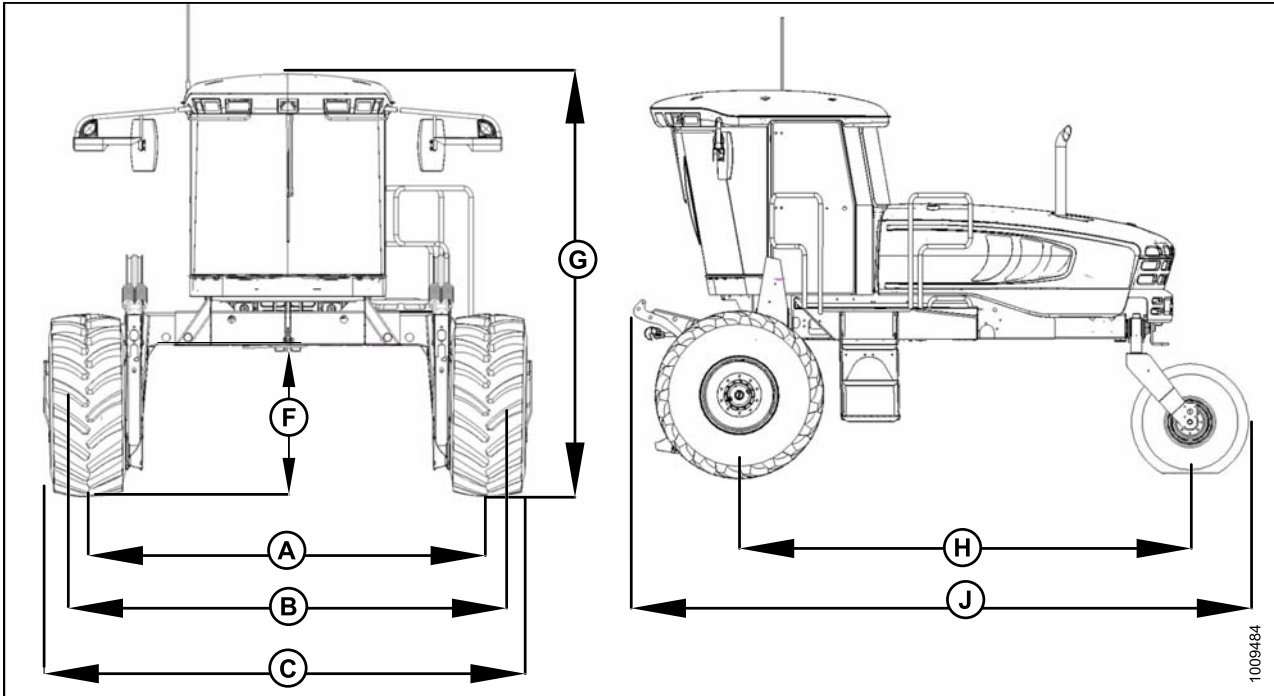


Figure 2.2: Windrower Dimensions – Forward

- | | | |
|---------------------------|-----------------------|----------------------------|
| A - Drive Tire Tread | B - Drive Tire Hubs | C - Drive Tires |
| F - 45-3/4 in. (1160 mm) | G - 133 in. (3378 mm) | H - 158-5/16 in. (4022 mm) |
| J - 207-7/8 in. (5280 mm) | | |

Table 2.1 Drive Tires

Tire Size	Wheel Position	Tread (A) in. (mm)	Hubs (B) in. (mm)	Tires (C) in. (mm)
18.4 x 26 Bar & Turf Narrow Track	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 and Turf Wide Track	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)
23.1-26 and 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)

DESCRIPTION

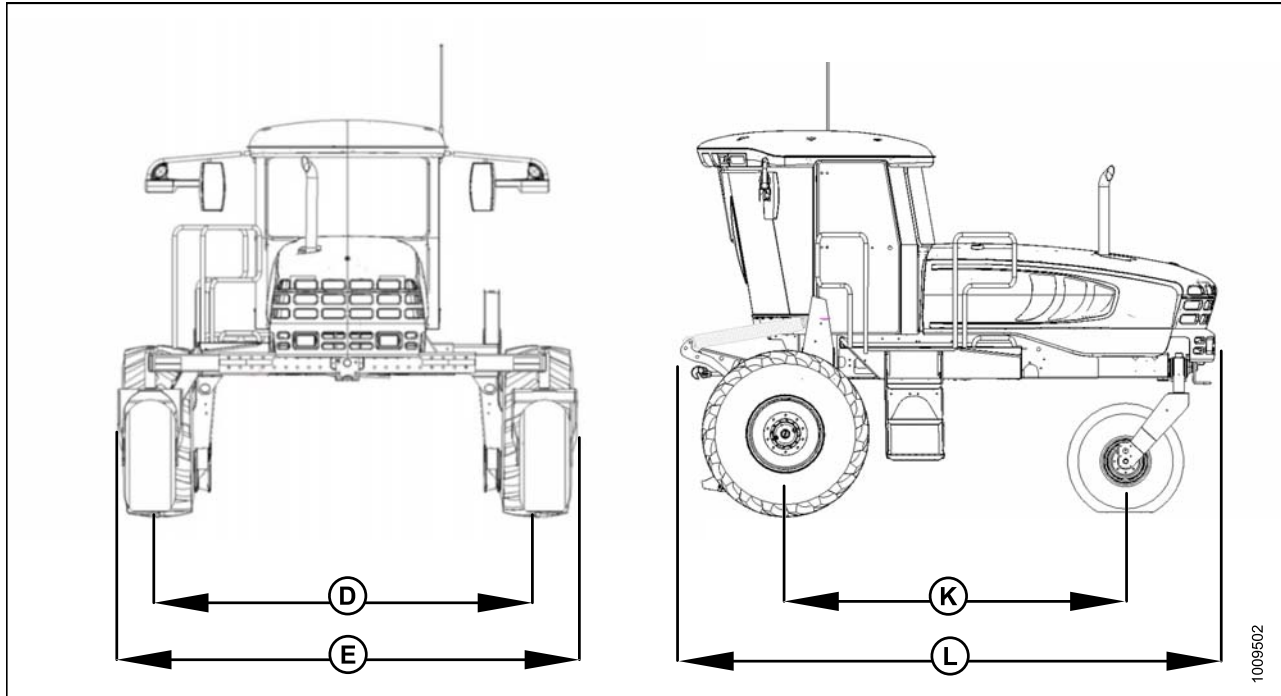


Figure 2.3: Windrower Dimensions – Reverse

D - Caster Tire Tread
L - 186-7/8 in. (4747 mm)

E - Caster Tire Casters

K - 120-9/16 in. (3064 mm)

Table 2.2 Caster Tires

Tire Size	Wheel Position	Tread (D) in. (mm)	Castors (E) in. (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)

2.4 Component Location

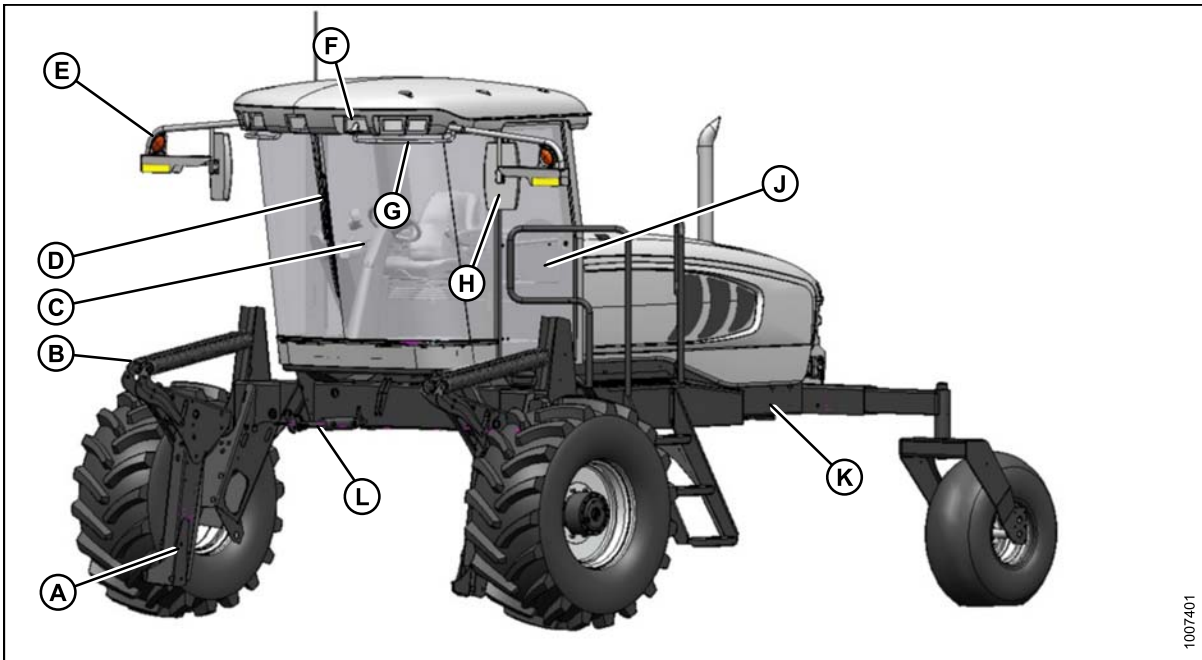


Figure 2.4: Front View

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

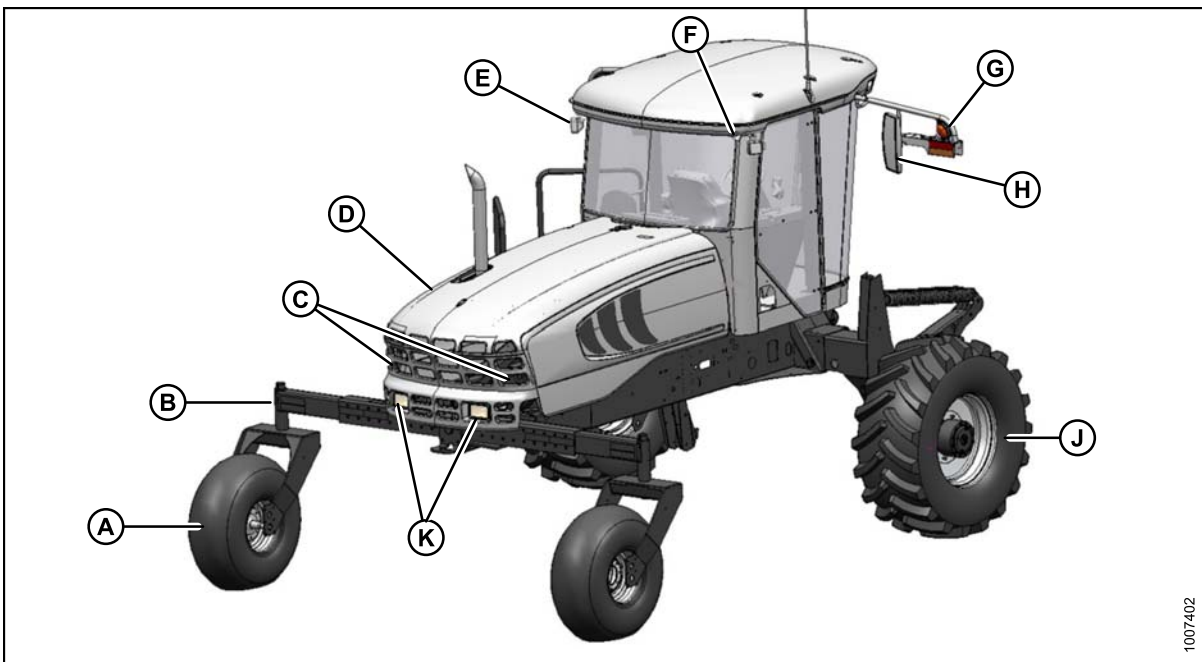


Figure 2.5: Rear View

- | | | | |
|------------------|------------------|-------------------------------|-----------------------------|
| A - Caster Wheel | B - Walking Beam | C - Red Tail Lights | D - Engine Compartment Hood |
| E - Flood Lights | F - Horn | G - Turn Signal/Hazard Lights | H - Mirror |
| J - Drive Wheel | K - Swath Lights | | |

3 Operator's Station

The operator's station is designed to provide access to windrower controls and operator amenities.

3.1 Operator Console

The console contains controls to operate the windrower, as well as amenities for the Operator.

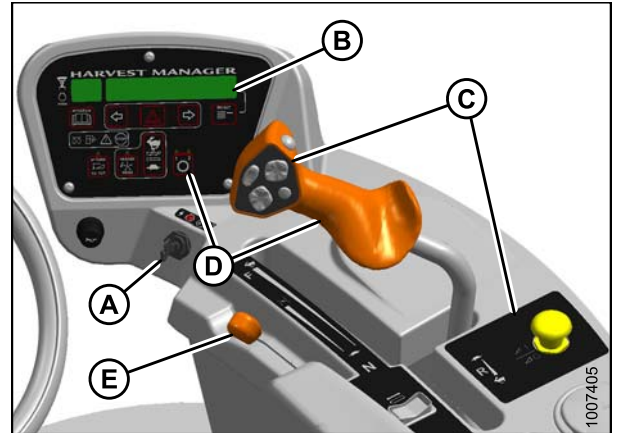


Figure 3.1: Operator Console

- A - Ignition
- B - Engine/Windrower Cab Display Module (CDM)
- C - Header Controls (GSL, Header Drive Switch, Deck Shift)
- D - Ground Speed Controls
- E - Throttle

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 five 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 restart the header.

3.2.2 Engine and Transmission

- The engine will not start when the HEADER DRIVE switch is engaged.
- The engine will not start when the transmission is **NOT** locked in NEUTRAL.
- The engine will shut down when the windrower is moving at 5 mph (8 km/h) or less and the Operator leaves the seat. 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 two seconds the lower display will flash "NOT IN NEUTRAL", and an alarm will sound.

3.3 Operator's Seat Adjustments

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

A – Armrest Up or Down

- Raise armrest (A) for easier access to the seat.
- Lower armrest (A) after seat belt is buckled.

B – Lumbar Support (Stiffness of Seat Back)

- Rotate knob (B) upward to increase stiffness.
- Rotate knob (B) downward to decrease stiffness.

C – Angle of Armrest

- Rotate knob (C) clockwise to increase armrest angle.
- Rotate knob (C) counterclockwise to decrease angle of the armrest.

D – Angle of Seat Back

- Pull lever (D) up to release the seat back.
- Position seat back as desired.
- Release lever (D) to lock the seat back in position.

E – Seat Fore-Aft Position

- Pull lever (E) up to release the seat for adjustment.
- Move the seat forward or backward as desired.
- Release lever (E) to lock the seat in position.

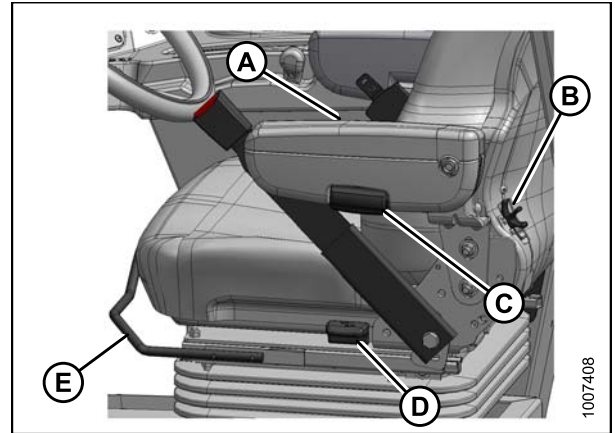


Figure 3.2: Seat Adjustments

A - Armrest B - Lumbar Support C - Armrest Angle
 D - Seat Back Angle E - Seat Fore-Aft Position

3.4 Training Seat (Optional)

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.

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

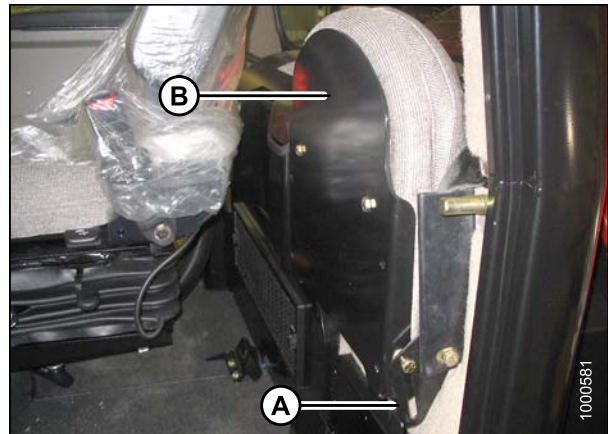


Figure 3.3: Training Seat

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



Figure 3.4: Training Seat

3.5 Seat Belts

The windrower is equipped with a seat belt on the operator's and trainer's seats.

WARNING

The seat belt can help ensure your safety if it is used and maintained.

- Before starting the engine, securely fasten your seat belt. Ensure that anyone occupying the trainee's seat is secured by a seat belt as well.
- 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.

To fasten seat belt (A):

1. Pull belt at right side completely across your body.
2. Push the metal eye (B) into the buckle (C) until it locks.
3. Adjust the position of the belt as low on your body as possible.

To release seat belt (A):

4. Push the red button (D) in the end of the buckle.
5. Separate the buckle (C) and metal eye (B).

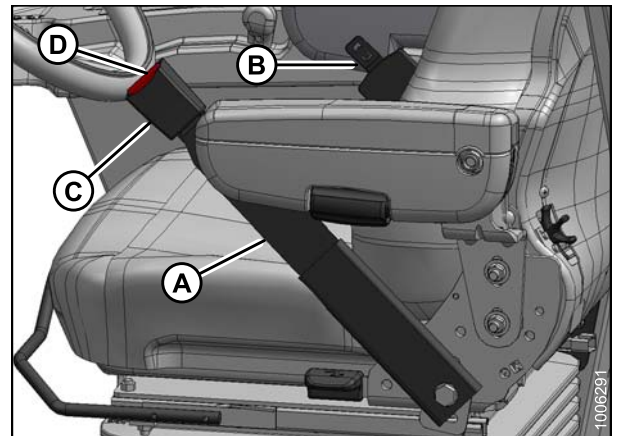


Figure 3.5: Seat Belt

A - Seat Belt B - Metal Eye C - Buckle D - Red Button

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.

To adjust the steering column:

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

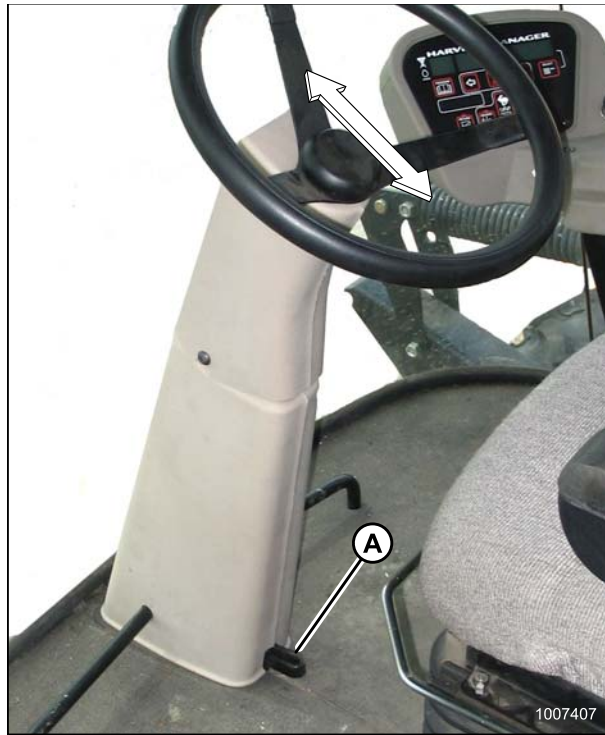


Figure 3.6: Adjust Steering Column

3.7 Lighting

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

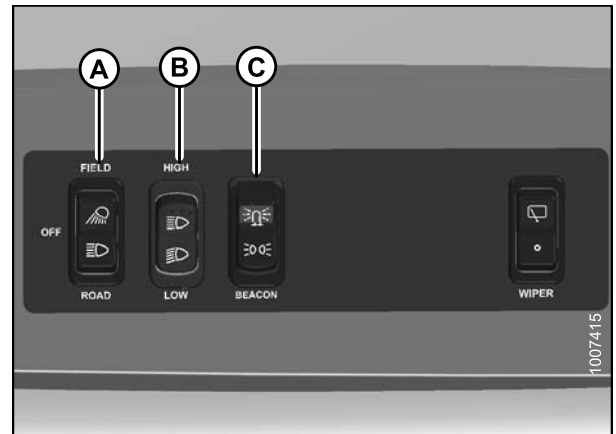


Figure 3.7: Light Switches

- A - Field and Road/Transport Lights (FIELD / OFF / ROAD)
- B - Low or High Beams for Road/Transport Lights (LOW / HIGH)
- C - Beacons on Cab Roof (If Installed) (OFF / ON)

3.7.1 Field Lighting

The following lights are ON/functional when the switch is in the FIELD position:

- field lights (forward)
- flood lights (rear)
- swath lights (rear) (select HIGH / LOW)
- optional HID auxiliary lighting (if installed)



Figure 3.8: Field Light Switch

OPERATOR'S STATION

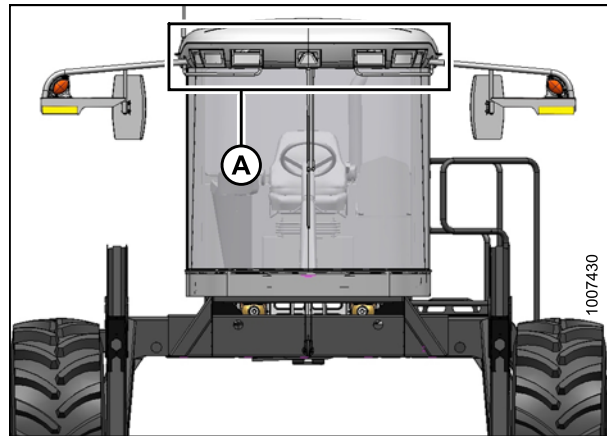


Figure 3.9: Front View - Field Lights

A - Field Lights

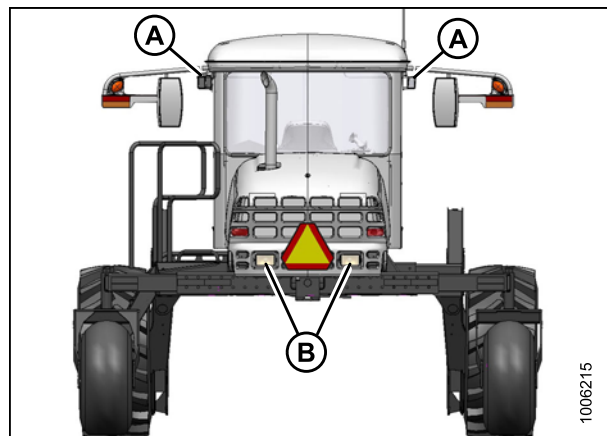


Figure 3.10: Rear View

A - Flood Lights

B - Swath Lights - HIGH / LOW

3.7.2 Road Lighting

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

- road lights (front)
- turn signals/hazards (amber) (front)
- turn signals/hazards (amber) (rear)
- red tail lights

NOTE:

The hazard lights **MUST** be activated with the switch on the cab display module (CDM) when driving on the road.



Figure 3.11: Road Lighting Switch

OPERATOR'S STATION

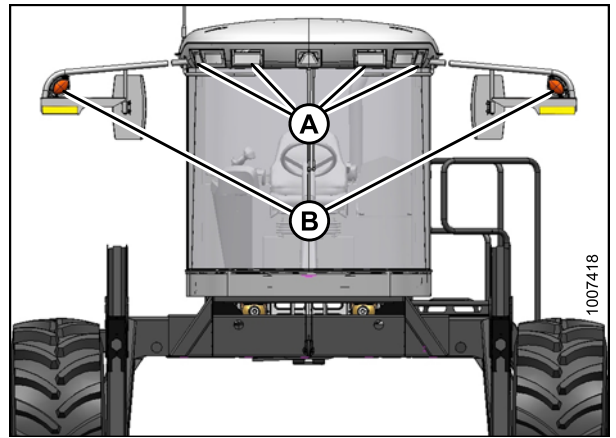


Figure 3.12: Front View

A - Road Lights

B - Turn Signals / Hazards - Amber

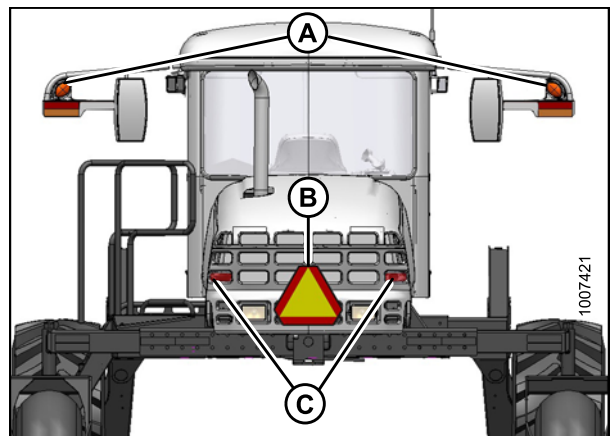


Figure 3.13: Rear View

A - Turn Signals / Hazards - Amber

B - SMV Sign

C - Red Tail Lights

3.7.3 Beacon Lighting

MD #B5582

Beacon lighting is an optional feature inside North America but comes standard on windrowers exported outside North America.

OPERATOR'S STATION

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



Figure 3.14: Beacon Light Switch

The amber warning beacons (A) MUST be used when driving on the road where required by law.

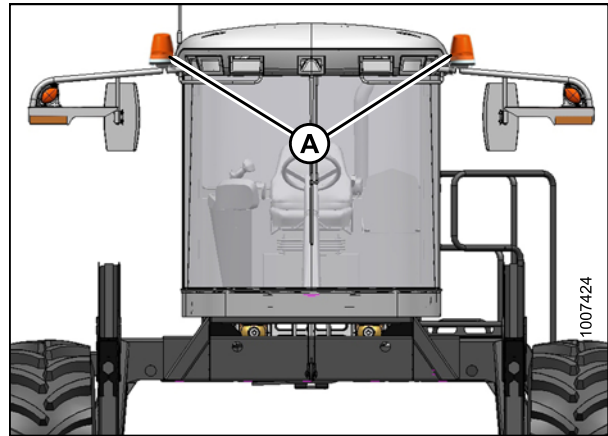


Figure 3.15: Optional Beacon Lights

3.7.4 Optional HID Auxiliary Lighting (If installed)

Two optional High Intensity Discharge (HID) lights (MD #B5596) provide additional lighting during field operation.

If installed, they are located on the mirror supports, and are activated with the light switch in the FIELD position.



Figure 3.16: Field Light Switch

3.8 Windshield Wiper

The ON-OFF windshield wiper control is located in the cab headliner.



Figure 3.17: Switch in Cab Headliner

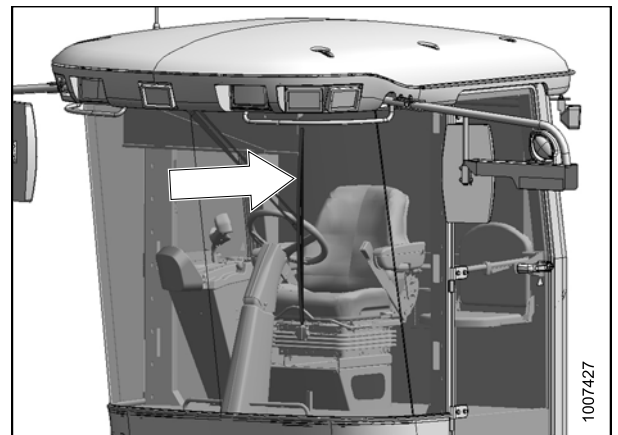


Figure 3.18: Wiper in Park Position

3.9 Rear View Mirrors

Two adjustable outside mounted mirrors (A) provide rear view vision.

The mirror/light assembly is designed to fold backwards if accidentally struck either during normal operation or by another machine. A detent-type lock keeps it in place.

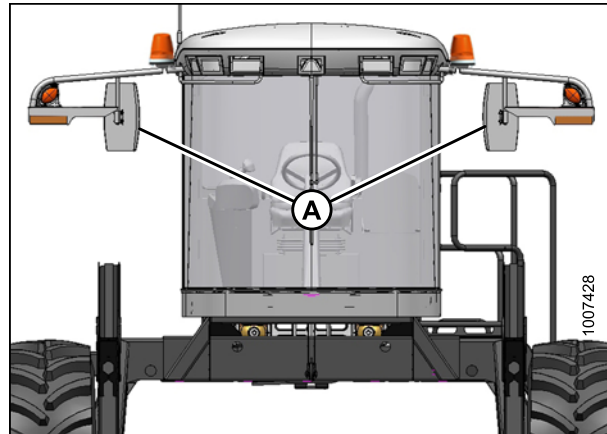


Figure 3.19: Mirrors

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, but for maximum cooling, the valve can be CLOSED.

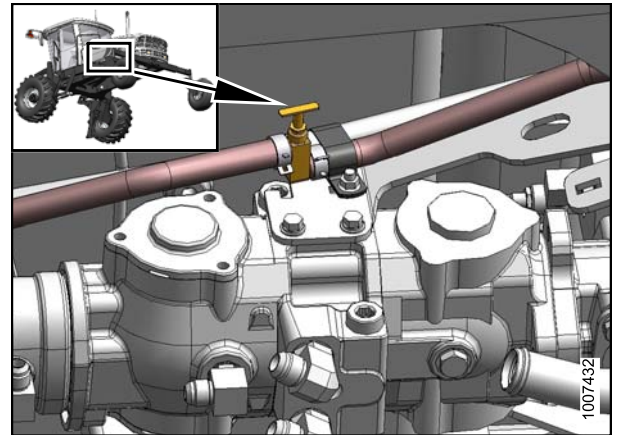


Figure 3.20: Heater Shut-Off Valve

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.

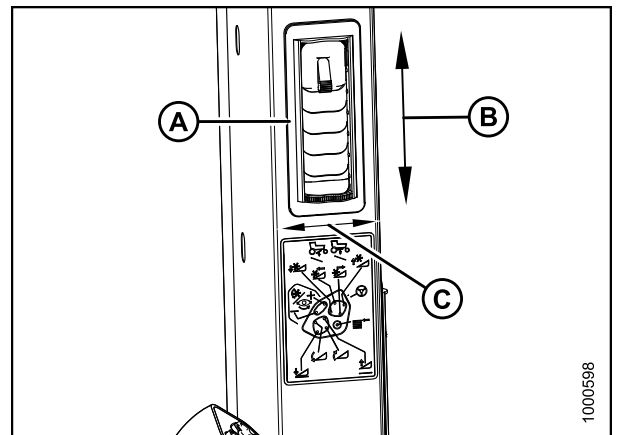


Figure 3.21: Adjustable Air Vents

A - Vent

B - Open/Close

C - Direction

OPERATOR'S STATION

3.10.3 Controls

A – Temperature Control Dial controls cab temperature.

- Clockwise: Increases temperature.
- Counterclockwise: Decreases temperature.

B – Blower Switch controls the blower speed.

- OFF / LOW / MEDIUM / HIGH

C – Air Conditioning Switch controls the A/C system.

- OFF: A/C does not operate.
- ON: A/C operates with blower switch ON.

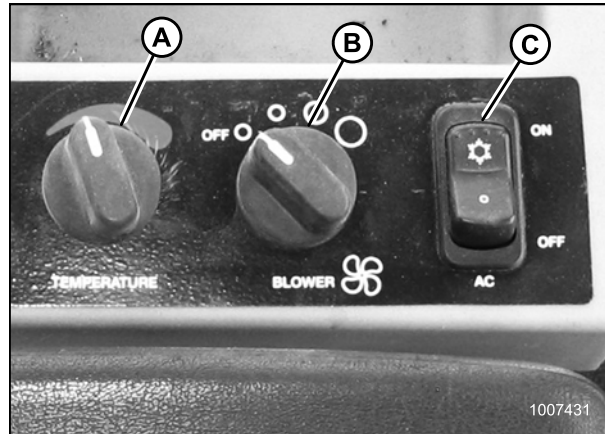


Figure 3.22: Climate Controls

A - Temperature Control
C - Air Conditioning

B -Blower

IMPORTANT:

To distribute the refrigerant oil throughout the A/C system, perform the following steps when starting the windrower after more than one week of storage:

1. Ensure heater shut-off valve at engine is OPEN. Refer to [3.10.1 Heater Shut-Off, page 47](#).
2. Turn blower switch to the first position, turn temperature control switch to MAXIMUM heating, and A/C control to OFF.
3. Start engine and operate at low idle until engine is warm.
4. Click A/C switch from OFF to ON for 1 second, then back to OFF for 5 to 10 seconds. Repeat this step ten times.

3.10.4 Air Conditioning Compressor Protection

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

- The LOW PRESSURE switch opens when the pressure falls to 2–8 psi (14–55 kPa), and shuts down the compressor. When the pressure rises to 15–25 psi (103–172 kPa), the switch closes, and allows the compressor to run.
- The HIGH PRESSURE switch opens and stops the compressor when the pressure rises to 315–335 psi (2172–2310 kPa). When the pressure falls to 220–280 psi (1517–1930 kPa), the switch closes and allows the compressor to run.

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

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, and functions only when the ROAD/FIELD light switch is ON. An ON-OFF switch is located on the light.

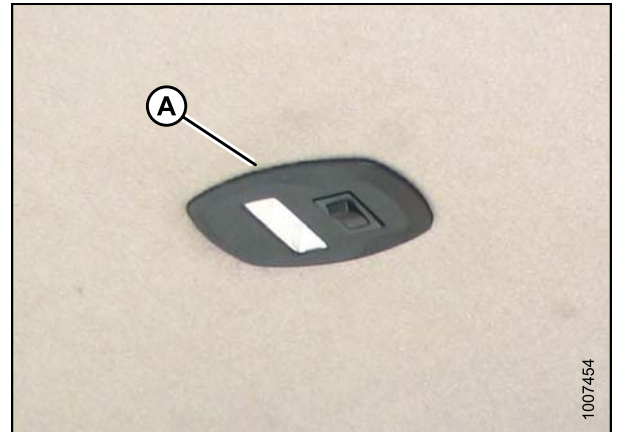


Figure 3.23: Interior Lights

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 3.24: Interior Lights

3.12 Operator Amenities

The operator's station includes the following amenities:

Operator's Console

- A - Cigarette Lighter
- B - Ashtray/Cupholders
- C - Utility Tray
- D - Auxiliary Power
- E - Data Link Receptacle
- F - Live/Switchable/Ground - 20 A
- G - Manual Storage Case

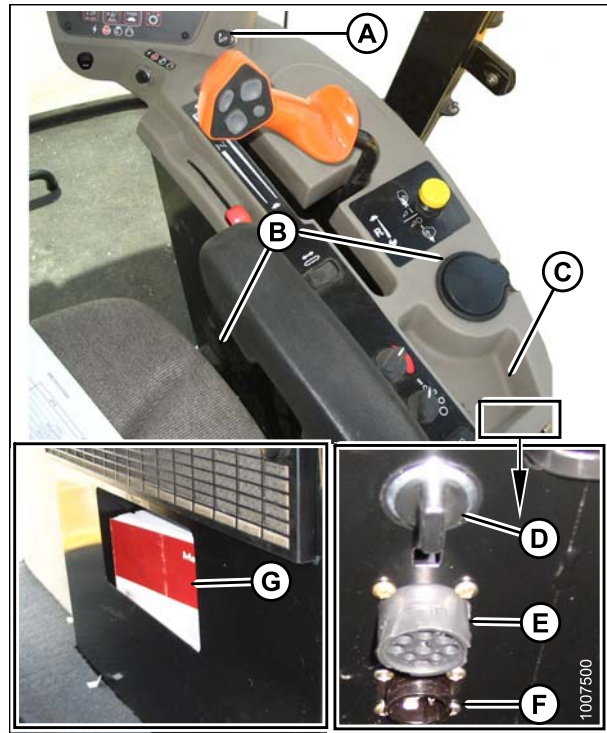


Figure 3.25: Operator Amenities

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.

For radio installation procedures, refer to M105 Self-Propelled Windrower Unloading and Assembly Instructions for North America (MD #169893)⁴ or M-Series Self-Propelled Windrower Unloading and Assembly Instructions for Container Shipments (MD #169886)⁴.

Operating instructions are supplied with the radio.

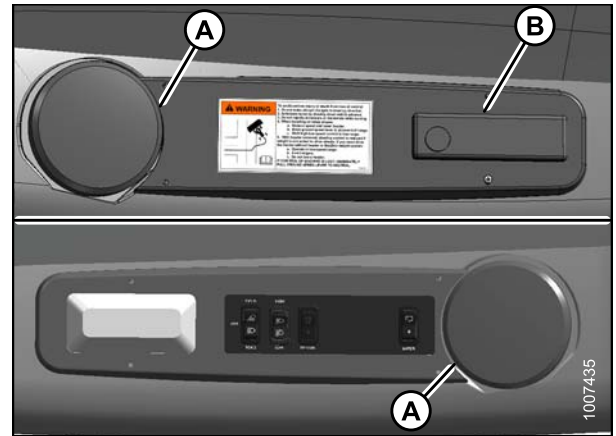


Figure 3.26: Radio and Speakers

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, or refer to [3.28: Template for Antenna Mount, page 52](#) for dimensions.

IMPORTANT:

Antenna base can only be installed on the left- and right-hand rear cab roof bolts.

It accommodates most CB, satellite, and two-way radio antennas. Refer to M105 Self-Propelled Windrower Unloading and Assembly Instruction for North America (MD #169893) for installation procedures⁵.

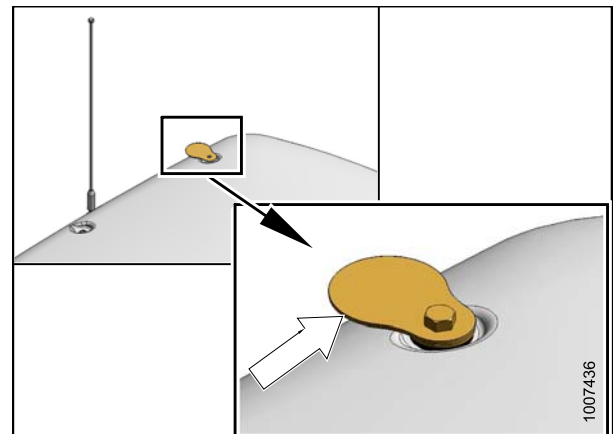


Figure 3.27: Antenna Mount

4. Instructions not sold separately. Access unload and assembly instructions on the MacDon corporate website www.macdon.com.

5. Instructions not sold separately. Access unload and assembly instructions on the MacDon corporate website www.macdon.com

OPERATOR'S STATION

To make your own mount, refer to dimensions template.
Use 11 GA. or 3.0 mm steel sheet.

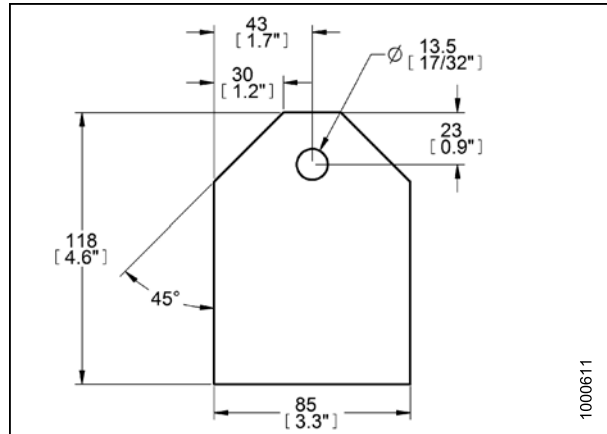


Figure 3.28: Template for Antenna Mount

3.14 Horn

The horn is activated by pushing button (A) located beside the ignition key.

Sound the horn three times prior to starting the engine.



Figure 3.29: Operator Console

The horn (A) is located outside the cab on the rear right-hand corner of the cab, under the roof.

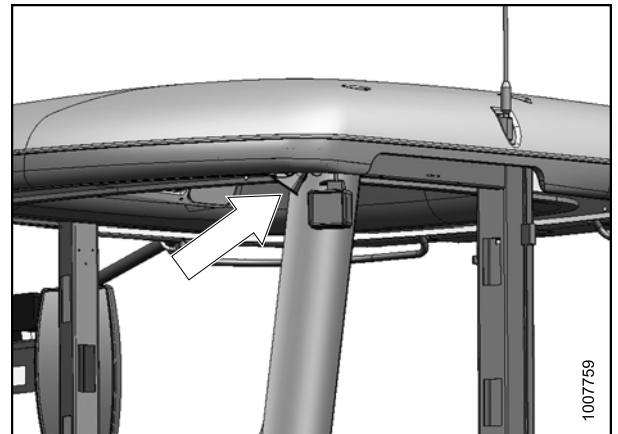


Figure 3.30: Horn Location

3.15 Engine Controls and Gauges

All engine controls are conveniently located on the operator's console.

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

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 – Throttle controls engine speed.

- FULL: Push lever forward
- OPERATING: Refer to [4.3.6 Windrower Operation, page 94](#)
- CLOSED: Pull lever back

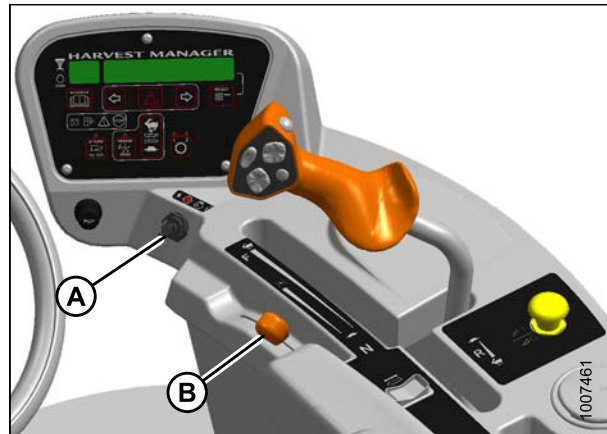


Figure 3.31: Engine Controls

A - Ignition Switch

B - Throttle

3.16 Windrower Controls

Console Controls:

A – TURN SIGNALS activate 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 activate signals on windrower and header.

- Push-ON / Push-OFF

E – N-Detent

F – Horn

Autosteer Control:

A – AUTOSTEER ENGAGEMENT SWITCH engages/disengages the automated steering -system (if compatible system is installed).

- ENGAGE: Click to engage
- DISENGAGE: Turn steering wheel or click to disengage

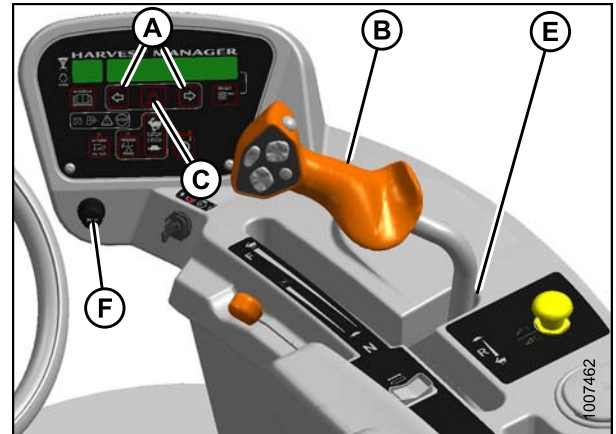


Figure 3.32: Console Controls

- | | |
|---------------------------|------------------------------|
| A - Turn Signals | B - Ground Speed Lever (GSL) |
| C - Hazard Warning Lights | E - N-Detent Position |
| F - Horn | |

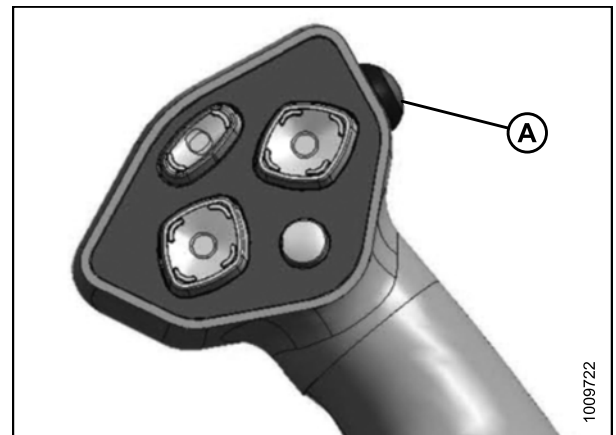


Figure 3.33: Autosteer

3.17 Header Controls

All header controls are conveniently located on the operator's console and on the ground speed lever (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.

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

3.17.1 Header Drive Switch

The header drive switch (A) engages and disengages the header drive.

To engage the header drive, push the switch to center and pull up.

To disengage the header drive, push the switch down.

IMPORTANT:

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

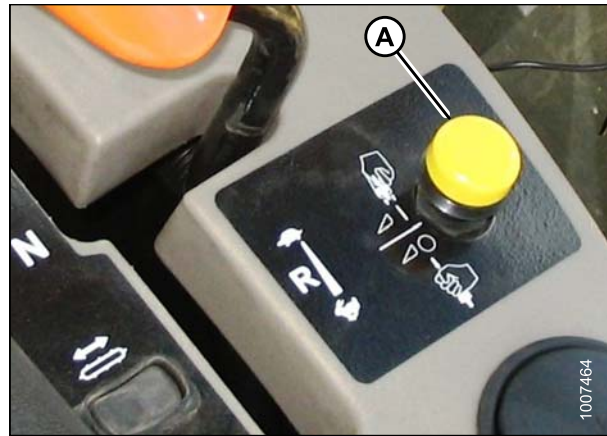


Figure 3.34: Header Drive Switch

3.17.2 Deck Shift Switch—Draper Header Option

The deck shift switch selects the crop delivery options when the windrower is attached to a draper header equipped with deck shift. The three crop delivery options include:

- Right side delivery (A)
- Center delivery (B)
- Left side delivery (C)

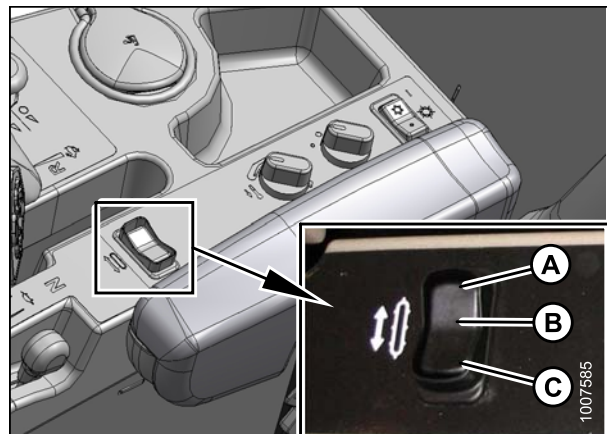


Figure 3.35: Deck Shift Switch

A - Right Side Delivery B - Center Delivery C - Left Side Delivery

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.

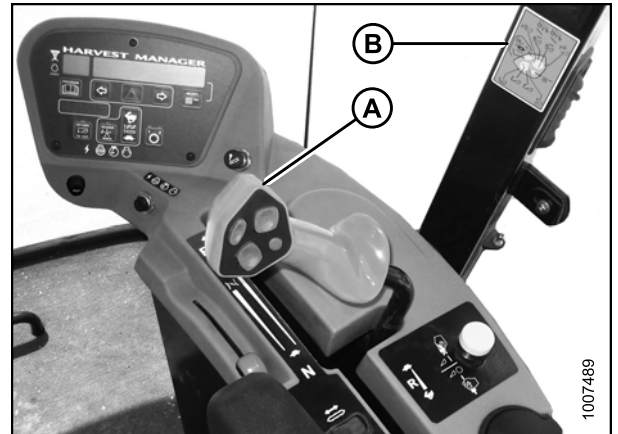


Figure 3.36: GSL

NOTE:

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

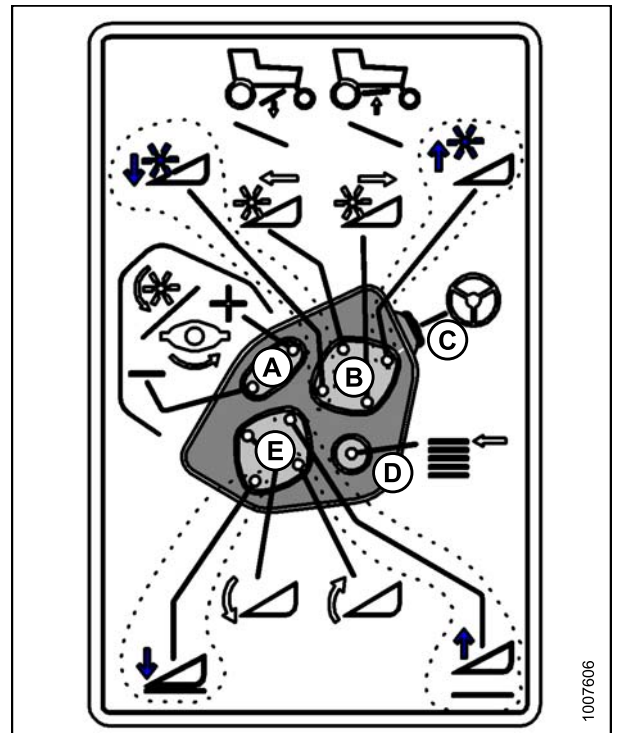


Figure 3.37: GSL Function Groups

- A - Reel Speed
- B - Reel Position
- C - Autosteer Engagement
- D - Display Selector
- E - Header Position

OPERATOR'S STATION

Display Selector Switch

The display selector switch (A) selects and displays the settings in the cab display module (CDM) top line read-out (A) for each of the header controls.

Press switch (B) to scroll through settings.



Figure 3.38: GSL

Reel Position Switches

NOTE:

Reel position switches work on draper headers only.

To move reel, press and hold the switch at the location shown. Release switch at desired position.

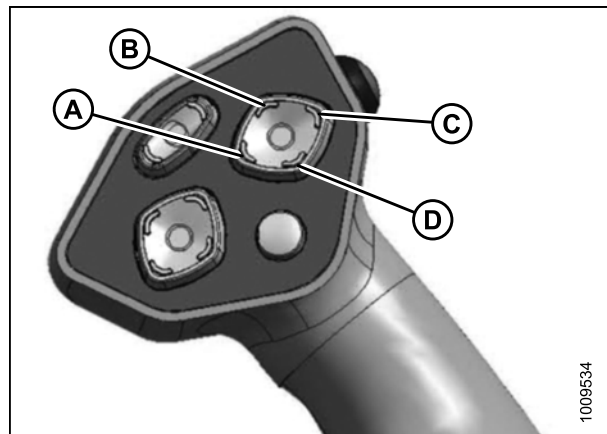


Figure 3.39: Ground Speed Lever

A - Reel Down B - Reel Forward
C - Reel Up D - Reel Aft

OPERATOR'S STATION

Header Position Switches

Press and hold switch at location shown to move header up or down and to change the angle of the header relative to the ground. Release switch at desired position.

NOTE:

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

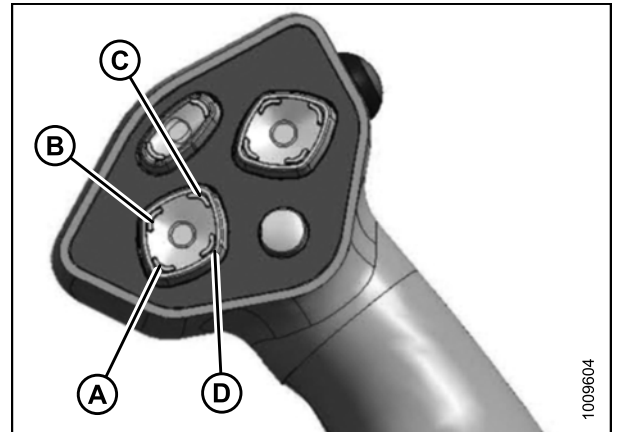


Figure 3.40: Ground Speed Lever

A - Header Down
C - Header Up

B - Header Tilt Down
D - Header Tilt Up

Reel Speed Switches

Press and hold switch (A) to increase the reel speed. Press and hold switch (B) to decrease the reel speed. Release switch at desired speed.

NOTE:

Auger speed is adjusted proportionately when reel speed is changed.

For further details, refer to [4.6.6 Reel Speed, page 169](#) for D-Series headers or [4.7.2 Reel Speed, page 181](#) for A-Series headers.

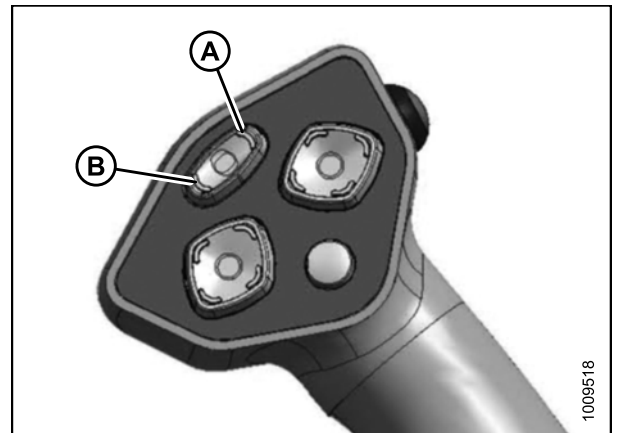


Figure 3.41: Ground Speed Lever

A - Fast

B - Slow

3.18 Cab Display Module (CDM)

3.18.1 Engine and Windrower Functions



Figure 3.42: CDM 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 SIGNAL 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.

3.18.2 Header Functions



Figure 3.43: Cab Display Module

- | | | |
|--|--|--|
| A - Display | B - Select Switch | C - Reel/Auger Speed Controls (Auger Header) |
| D - Draper Speed Control (Draper Header) | E - Header Index Switch (Options Required) | F - Return to Cut Height Switch |

- DISPLAY: Header functions
- SELECT SWITCH: Allows Operator to select display item on lower line. Push to SELECT.
- REEL/AUGER SPEED CONTROLS: AUGER HEADER controls auger and reel speed.
- DRAPER SPEED CONTROL: DRAPER HEADER controls draper speed. Push UPPER switch to increase draper speed. Push LOWER switch to decrease draper speed. With optional expansion module, controls Draper Speed INDEX with INDEX SWITCH ON, and controls Draper Speed with INDEX SWITCH OFF.
- HEADER INDEX SWITCH: Links Reel and Conveyor Speed to Ground Speed. Push-ON / Push-OFF. Illuminates in ON position.

NOTE:

Expansion module (MD# B4666) required for header index feature.

NOTE:

Header must be engaged.

- RETURN TO CUT HEIGHT SWITCH: Allows cutting height preset. Push-ON / Push-OFF. Illuminates in ON position.

NOTE:

Header must be engaged.

OPERATOR'S STATION

3.18.3 Operating Screens

The 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 3.44: 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. OK to start.

Engine Running – At Initial Start Up

Display (upper line) (2–3 seconds)	Description
HEADER TYPE AND SIZE	Ignition start, engine running.
IN PARK	Indicates ground speed lever (GSL) in N-DETENT. On startup.

OPERATOR'S STATION

Engine Running, Header Disengaged

Scroll through display with cab display module (CDM) switch or ground speed lever (GSL) switch.

Display (lower or upper line)	Description
#####.# ENGINE HRS	Total engine operating time.
#####.# UNIT HRS	Total windrower 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. Optional. ⁶
##.# VOLTS	Engine electrical system operating voltage.
FUEL ■■■■ ■■■■	Level of fuel in tank. NOTE: When fuel level is low, menu selections will be disrupted.
ENGINE TEMP ### °F ENGINE TEMP ### °C (if metric)	Engine coolant temperature.
SCROLL SUB-MENU (Lower Line Only) ##.# HEADER HEIGHT FUEL ■■■■ ■■■■ ENGINE TEMP ### °F ENGINE TEMP ### °C	Displays above items after 2–3 seconds; press SELECT to cancel.
ROAD GEAR (upper line)	Ground speed range switch in HIGH range. Only if 2 selected.

Engine Running, Header Engaged, Auger Header

Scroll through display with cab display module (CDM) switch or ground speed lever (GSL) switch.

Display (Lower or Upper Line)	Description
#####.# ENGINE HRS	Total engine operating time.
#####.# UNIT HRS	Total windrower 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.

6. Optional: Available with installation of Optional Expansion Module Installation—Whole Goods Bundle MD #B4666.

OPERATOR'S STATION

Display (Lower or Upper Line)	Description
##### TOTAL ACRES ##### TOTAL HECT (if Metric)	Total area cut by machine.
### REEL RPM ### REEL SENSOR (Flashing)	Reel rotational speed. Optional ⁷ Sensor disabled.
### AUGER SPEED	Auger rotational speed (4.7–9.9).
#### KNIFE SPEED #### KNIFE SENSOR (Flashing)	Knife speed In strokes per minute. Optional ⁷ . Sensor disabled.
### HEADER HEIGHT ### HEADER SENSOR (Flashing)	Distance setting (00.0–10.0) between cutterbar and ground. Sensor disabled.
### HEADER ANGLE ### ANGLE SENSOR	Angle setting (00.0–10.0) header relative to ground. Optional ⁷ . Sensor disabled.
### VOLTS	Engine electrical system operating voltage.
FUEL ■■■■ ■■■■	Level of fuel in tank.
ENGINE TEMP ### °F ENGINE TEMP ### °C (if Metric)	Engine coolant temperature.
SCROLL SUB-MENU (Lower Line Only) #### KNIFE SPEED ### AUGER SPEED ### REEL RPM ### HEADER HEIGHT	Displays sub-menu after 2–3 Seconds. Press SELECT to cancel. Scroll through sub-menu display with CDM switch. Knife speed is optional ⁷ . Reel rpm is optional ⁷ .

Engine Running, Header Engaged, Draper Header, Index Switch OFF

Scroll through display with cab display module (CDM) switch or ground speed lever (GSL) switch.

Display (lower or upper line)	Description
#####.# ENGINE HRS	Total engine operating time.
#####.# UNIT HRS	Total windrower operating time.
#####.# HEADER HRS	Total header operating time.
### ACRES/HOUR ### HECTARES/HOUR (if metric)	Actual cutting rate in acres (hectares)/hour.
###.# SUB ACRES ###.# SUB HECTARES (if metric)	Area cut since last reset. To reset, display SUB ACRES on lower line, and hold down program switch until display resets (5–7 seconds).
##### TOTAL ACRES ##### TOTAL HECT (if metric)	Total area cut by machine.
###.# REEL MPH or REEL RPM ###.# REEL KPH (if metric) ###.# REEL SENSOR (flashing)	Reel peripheral speed in miles per hour or rpm. Optional ⁸ . Sensor Disabled.
###.# DRAPER SPEED	Draper speed (0.0–10.0).

7. Optional: Available with Expansion Module installation – Whole Goods Bundle MD #B4666.

8. Optional: Available with Expansion Module Installation – Whole Goods Bundle MD #B4666.

OPERATOR'S STATION

Display (lower or upper line)	Description
#### KNIFE SPEED #### KNIFE SENSOR (flashing)	Knife speed In strokes per minute. Optional. ⁸ Sensor Disabled.
##.# HEADER HEIGHT ##.# HEADER SENSOR (flashing)	Distance setting (00.0–10.0) between cutterbar and ground. Sensor Disabled.
##.# HEADER ANGLE ##.# HEADER SENSOR (flashing)	Header Angle setting (00.0–10.0) relative to ground. Optional. ⁸ Sensor Disabled. ANGLE and SENSOR alternate at 1 second intervals.
##.# VOLTS	Engine electrical system operating voltage.
FUEL ■■■■ ■■■■	Level of fuel in tank.
ENGINE TEMP ### °F ENGINE TEMP ### °C (if metric)	Engine coolant temperature.
SCROLL SUB-MENU (lower line only) #### KNIFE SPEED ##.# REEL RPM ##.# DRAPER SPEED FUEL ■■■■ ■■■■	Displays sub-menu after 2–3 seconds. Press SELECT to cancel. Scroll through sub-menu display with CDM switch. Optional. ⁸
KNIFE SPD OVERLOAD (lower line)	Knife speed is less than programmed set point.

Engine Running, Header Engaged, Draper Header, Index Switch ON

Scroll through display with cab display module (CDM) switch or ground speed lever (GSL) switch.

Display (lower or upper line)	Description
#####.# ENGINE HRS	Total engine operating time.
#####.# UNIT HRS	Total windrower operating time.
#####.# HEADER HRS	Total header operating time.
##.# ACRES/HOUR ##.# HECTARES/HOUR (if metric)	Actual cutting rate in acres (hectares)/hour.
##.#.# SUB ACRES ##.#.# SUB HECTARES (if metric)	Area cut since last reset. To reset, display SUB ACRES on lower line and hold down program switch until display resets (5–7 Seconds).
##### TOTAL ACRES ##### TOTAL HECT (if metric)	Total area cut by machine.
##.#.#.# REEL IND ##.#.# REEL.SENSOR (flashing)	Reel peripheral speed along with ground speed in mph or kph. Optional. ⁹ Sensor Disabled.
##.#.#.# DRAP INDX	Draper speed along with ground speed in mph or kph.
#### KNIFE SPEED #### KNIFE SENSOR (flashing)	Knife speed in strokes per minute. Optional ⁹ Sensor Disabled.
##.# HEADER HEIGHT ##.# HEADER SENSOR (flashing)	Distance setting (00.0–10.0) between cutterbar and ground. Sensor Disabled.

9. Optional: Available with Expansion Module installation—Whole Goods bundle MD #B4666.

OPERATOR'S STATION

Display (lower or upper line)	Description
### HEADER ANGLE ### HEADER SENSOR (flashing)	Angle setting (00.0–10.0) header relative to ground. Optional ⁹ . Sensor Disabled.
### VOLTS	Engine electrical system operating voltage.
FUEL ■■■■ ■■■■	Level of fuel in tank.
ENGINE TEMP ### °F ENGINE TEMP ### °C (if metric)	Engine coolant temperature.
SCROLL SUB-MENU (lower line Inly) #### KNIFE SPEED ### HEADER HEIGHT ### ## REEL IND ### ## DRAP INDX	Displays sub-menu after 2–3 seconds. Press SELECT to cancel. Scroll through sub-menu display with CDM switch. Optional ⁹
### REEL MIN RPM (lower line)	Reel speed drops below programmed set-point.
MINIMUM (lower line)	Optional ⁹

Miscellaneous Operational Information

Scroll through display with cab display module (CDM) switch or ground speed lever (GSL) switch.

Display (upper line)	Description
< LEFT TURN ■	Indicates left turn when left arrow is pressed on CDM.
■ RIGHT TURN >	Indicates right turn when right arrow is pressed on CDM.
■ HAZARD ■	Indicates hazard warning lights are ON when hazard button is pressed on CDM.
ROAD GEAR	With High Range selected on Console switch.
HEADER ENGAGED	Header drive engaged (engine will not start).
CENTER STEERING	Center steering wheel and/or GSL not in N-DETENT.

3.18.4 Cab Display Module (CDM) Warning/Alarms

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

Engine Warning Lights



Figure 3.45: CDM Engine Warning Lights

A - Engine Pre-Heat
C - Caution
E - Display

B - Water in Fuel
D - Stop

- ENGINE PRE-HEAT: Illuminates yellow. Wait to start engine.
- WATER IN FUEL: Illuminates yellow. Service recommended.
- CAUTION: Illuminates yellow. Prompt attention is required. Refer to display code.
- STOP: Illuminates red. Stop engine immediately. Refer to display code.
- DISPLAY: Displays malfunction code. Refer to [8 Engine Error Codes, page 341](#) or Dealer.

OPERATOR'S STATION

Display Warnings and Alarms

Informs Operator of abnormal windrower conditions.



Figure 3.46: CDM Display Warnings and Alarms

Display (A)	Flashing	Alarm Tone	Description
CENTER STEERING		Beeps at 2 per second until corrected	Interlock switch not closed with key ON / engine OFF: GSL not in N-DETENT or steering wheel not centered
DISENGAGE HEADER	X	None	Header switch is ON when ignition switch turned ON
ENGINE OIL PRESSURE	X	Continuous loud tone until oil pressure is regained	Low engine oil pressure accompanied by warning lights
ENGINE TEMPERATURE	X	Ongoing intermittent moderate tone until temperature is below 215°F (102°C)	Engine temperature over 230°F (110°C) accompanied by warning lights
HEADER DISENGAGED		None	Normal
IN PARK	X	One short beep	GSL in N-DETENT, steering wheel centered, and brakes are engaged
KNIFE SPEED OVERLOAD	X	Ongoing intermittent moderate tone until condition is corrected	Machine overload: knife speed drops below programmed value

OPERATOR'S STATION

Display (A)	Flashing	Alarm Tone	Description
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 DRIVE switch must be moved to OFF position and then to ON position to restart the header
NO OPERATOR		Continuous tone	Operator not detected in seat with header engaged or out of N-DETENT: engine shutdown after 5 seconds
NOT IN PARK	X	Short beep with each flash	GSL or interlock switches not closed with key ON / engine OFF
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 221°F (105°C)
##.# LOW VOLTS	X	short beep every 2 seconds: flashes every second	Voltage below 11.5
##.# HIGH VOLTS	X	short beep every 2 seconds: flashes every second	Voltage above 15.5

3.18.5 Cab Display Module (CDM) Programming



Figure 3.47: CDM

- | | | |
|------------------------------|-------------------------------|--------------------|
| A - Side Display | B - Main Display | C - Select Switch |
| D - Menu Item Scroll Forward | E - Menu Item Scroll Backward | F - Program Switch |

SIDE DISPLAY: displays software revision status.

- Upper Line – C### (CDM)
- Lower Line – M### (WCM)

MAIN DISPLAY displays menu item and selection.

- Upper Line – Menu Item
- Lower Line – Selection

SELECT SWITCH places monitor into Program Mode with PROGRAM switch. Press to accept menu item and advance to next item.

MENU ITEM SCROLL FORWARD displays value under menu item.

- Push to scroll forward
- Hold down for fast scroll¹⁰

MENU ITEM SCROLL BACKWARD displays value under menu item.

- Push to scroll backward
- Hold down for fast scroll¹⁰

PROGRAM SWITCH places monitor into program mode. Press while pressing SELECT switch.

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

OPERATOR'S STATION

NOTE:

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

Proceed as follows to program the CDM:

IMPORTANT:

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

NOTE:

Pressing PROGRAM at any time will cancel the programming mode/menus and return back to the main operating displays. For detailed programming menu selection, refer to [Detailed Programming Menu Flow Chart, page 72](#).

1. Turn ignition key to RUN or start the engine.
2. On CDM, press PROGRAM and SELECT to enter programming mode.
3. Press SELECT. WINDROWER SETUP? with header width displayed on upper line.
4. Press left or right arrow to change value on lower line.
5. Press SELECT to advance to the next L1 item and press arrow keys to change values.
6. Set the following functions:

NOTE:

The following can be set by the Dealer provided that the header is installed and other information needed is available.

- TILT CYL INSTALLED?
- DISC BLK INSTALLED?
- HDR CUT WIDT?
- HAY CONDITIONER?
- SET TIRE SIZE?

7. Press PROGRAM to exit programming mode when finished entering values.

Programming Guidelines

Use the following guidelines when programming the cab display module (CDM):

1. 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.
2. Programming the system may be accomplished with or without the engine running.
 - If the engine is running, the transmission must be in Neutral (GSL in N-DETENT).
 - If the engine is not running, the ignition must be turned to RUN.
3. The system only needs to be programmed once for each header. Most functions are preset at the factory but the Operator can make changes later on to suit windrowing conditions or modifications to the machine.
4. Input values for the windrower are provided in this manual, and values for the header functions are in the operator's manual for the applicable header.

OPERATOR'S STATION

5. The CDM must be in programming mode to view the program menus. Press PROGRAM and SELECT on the CDM to enter programming mode. Exit programming mode at any time by pressing PROGRAM or by turning ignition to OFF.
6. Refer to the [Detailed Programming Menu Flow Chart, page 72](#) for a listing of all the menus with user information for each menu item.

NOTE:

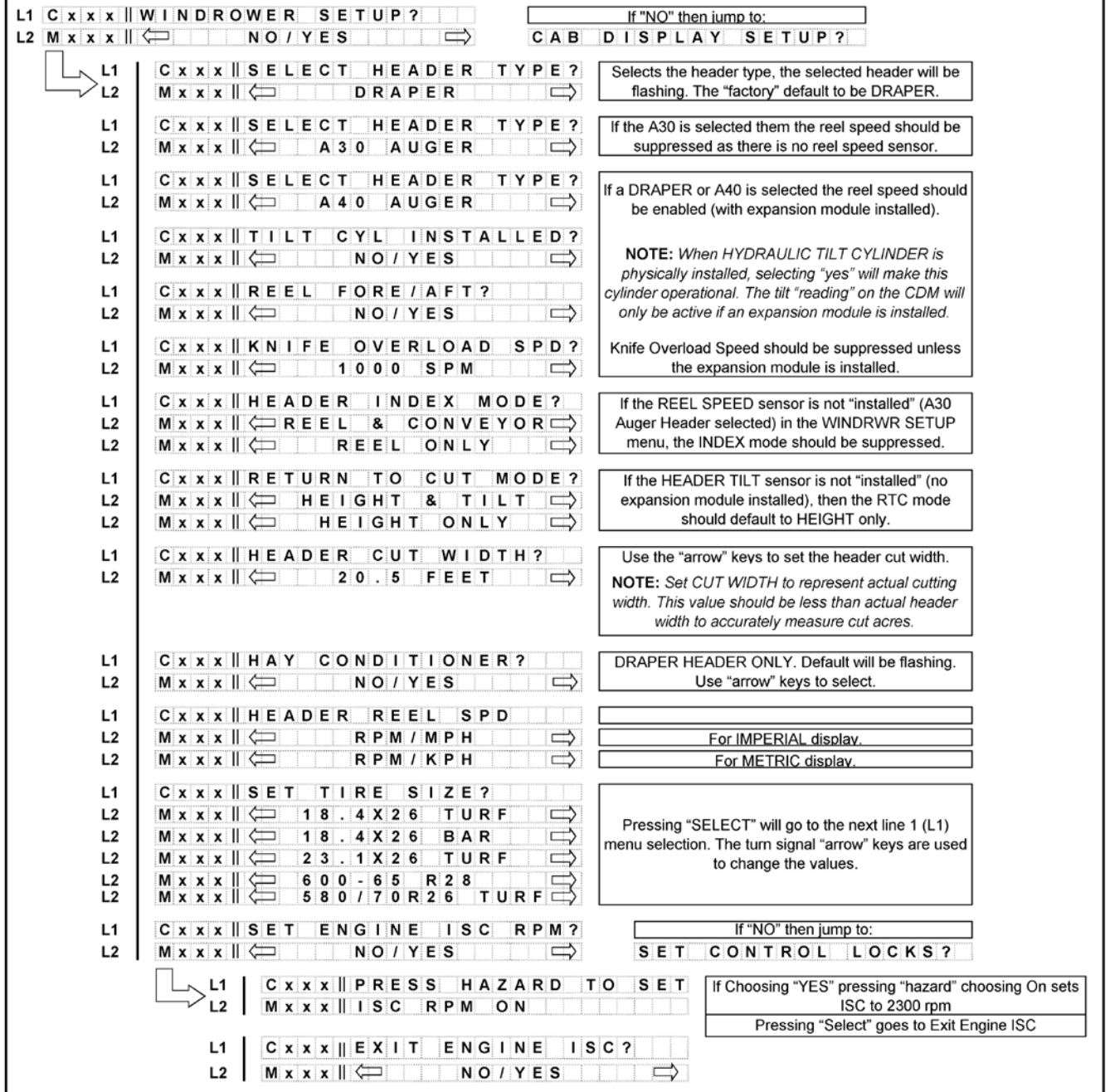
Contact your MacDon dealer for information about software updates to the electronic modules. Your Dealer will have the necessary interface tools and access to the latest software upgrades

Detailed Programming Menu Flow Chart

The programming menu flow chart is current for cab display module (CDM) software C107 and windrower control module (WCM) software M102.

OPERATOR'S STATION

Programming Menu Flow Chart for Software version C107 and M102 (or higher)



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 DRAPER SPEED	This menu allows the operator to selectably "lock out" the control functions for the various header functions. The default or selected "status" for each item will flash. NOTE: AUGER SPEED option only available with A40 Auger
L2	M x x x ← ENABLED / LOCKED →	
L1	C x x x AUGER SPEED	If the expansion module is not installed the corresponding menu items should be suppressed. NOTE: REEL SPEED option only available with expansion module and draper or A40 auger.
L2	M x x x ← ENABLED / LOCKED →	
L1	C x x x REEL SPEED	The "arrow" keys are used to ENABLE or LOCK OUT each function. Pressing "SELECT" will go to the next L1 menu item. NOTE: REEL FORE/AFT option only available with FORE/AFT installed
L2	M x x x ← ENABLED / LOCKED →	
L1	C x x x REEL FORE / AFT	Tilt to be suppressed if not "installed" in the windrower setup menu. NOTE: HEADER TILT option only available when HYDRAULIC TILT CYLINDER is installed
L2	M x x x ← ENABLED / LOCKED →	
L1	C x x x HEADER TILT	If "NO" then jump to: DRAPER SPEED ← ENABLED / LOCKED →
L2	M x x x ← NO / YES →	
L1	C x x x EXIT CONTROL LOCKS ?	If "NO" then jump to: DRAPER SPEED ← ENABLED / LOCKED →
L2	M x x x ← NO / YES →	
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 DRAPER SPEED	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.
L2	M x x x 5 7 5 . 1 HRS ENABLED	
L2	M x x x 6 4 8 . 6 HRS LOCKED	Using the "arrow" keys allows the operator to select the various functions. Pressing "SELECT" will go to the EXIT VIEW LOCKOUTS ? menu selection.
L1	C x x x AUGER SPEED	
L2	M x x x 5 7 5 . 1 HRS ENABLED	If any of the HDR ANGLE / KNIFE SPEED or REEL SPEED sensors are not "installed" (no expansion module or A30 Auger header selected, they should be suppressed.
L2	M x x x 6 4 8 . 6 HRS LOCKED	
L1	C x x x REEL SPEED	If "NO" then jump to: DRAPER SPEED ← ENABLED / LOCKED →
L2	M x x x 5 7 5 . 1 HRS ENABLED	
L2	M x x x 6 4 8 . 6 HRS LOCKED	If any of the HDR ANGLE / KNIFE SPEED or REEL SPEED sensors are not "installed" (no expansion module or A30 Auger header selected, they should be suppressed.
L1	C x x x REEL FORE / AFT	
L2	M x x x 5 7 5 . 1 HRS ENABLED	If "NO" then jump to: DRAPER SPEED ← ENABLED / LOCKED →
L2	M x x x 6 4 8 . 6 HRS LOCKED	
L1	C x x x HEADER TILT	If "NO" then jump to: DRAPER SPEED ← ENABLED / LOCKED →
L2	M x x x 5 7 5 . 1 HRS ENABLED	
L2	M x x x 6 4 8 . 6 HRS LOCKED	If "NO" then jump to: DRAPER SPEED ← ENABLED / LOCKED →
L1	C x x x EXIT VIEW LOCKOUTS ?	
L2	M x x x ← NO / YES →	SELECT HEADER TYPE ?
L1	C x x x EXIT WINDRWR SETUP ?	If "NO" then jump to:
L2	M x x x ← NO / YES →	SELECT HEADER TYPE ?

1001732

OPERATOR'S STATION

L1 C x x x || CAB DISPLAY SETUP?
 L2 M x x x || ← NO / YES →

If "NO" then jump to:
CALIBRATE SENSORS?

NOTE: CALIBRATE SENSORS option is only available when engine is running during selection, otherwise system jumps to DIAGNOSTIC MODE

L1 C x x x || DISPLAY LANGUAGE?
 L2 M x x x || ← ENGLISH →
 L2 M x x x || ← ESPANOL →
 L2 M x x x || ← RUSSIAN →

Use the "arrow" keys to change the default language. Pressing "SELECT" goes to the next L1 menu selection.

NOTE: North America have English and Spanish options; Overseas have English and Russian options.

L1 C x x x || DISPLAY UNITS?
 L2 M x x x || ← IMPERIAL →
 L2 M x x x || ← METRIC →

The "arrow" keys are used to select between IMPERIAL or METRIC. The default value will be displayed first.

L1 C x x x || BUZZER VOLUME
 L2 M x x x || ← [Bar Graph] →

The "arrow" keys are used to change the CDM buzzer volume, CDM backlighting or the CDM contrast, with the bar graph indicating the relative level for each item. When "SELECT" is pressed the program goes to the EXIT DISPLAY SETUP? menu selection.

L1 C x x x || BACKLIGHTING
 L2 M x x x || ← [Bar Graph] →

L1 C x x x || DISPLAY CONTRAST
 L2 M x x x || ← [Bar Graph] →

L1 C x x x || EXIT DISPLAY SETUP?
 L2 M x x x || ← NO / YES →

If "NO" then jump to:
DISPLAY LANGUAGE?

NOTE: If "yes" is selected and engine is not running, system will jump to DIAGNOSTIC MODE

L1 C x x x || CALIBRATE SENSORS?
 L2 M x x x || ← NO / YES →

If "NO" then jump to:
DIAGNOSTIC MODE?

NOTE: CALIBRATE SENSORS option is only available with engine running

L1 C x x x || TO CALIBRATE SELECT
 L2 M x x x || ← HEADER HEIGHT →
 L2 M x x x || ← HEADER TILT →
 L2 M x x x || ← STOP & EXIT →

The operator can select any of the two items requiring calibration or to STOP & EXIT the menu.

When a function is activated, the display will indicate the function being calibrated. HOLD will flash until the system has completed reading in the signal with the header fully raised.

DONE will flash and prompt the operator to COMPLETE the sensor calibration by lowering the header.

When sensor is displayed, press "select" to enter calibration sequence and follow prompts on display

L1 C x x x || HEIGHT SENSOR CAL
 L2 M x x x || RAISE HDR TO START

L1 C x x x || CALIBRATING HEIGHT
 L2 M x x x || RAISE HEADER HOLD
 L2 M x x x || RAISE HEADER DONE

L1 C x x x || HEIGHT SENSOR CAL
 L2 M x x x || PRESS LOWER HEADER

L1 M x x x || CALIBRATING HEIGHT
 L2 M x x x || LOWER HEADER HOLD
 L2 M x x x || HT SENSOR COMPLETE

L1 C x x x || TO CALIBRATE SELECT
 L2 M x x x || ← HEADER HEIGHT →

The menu will display the last item selected when the calibration routine is completed.

L1 C x x x || TO CALIBRATE SELECT
 L2 M x x x || ← HEADER HEIGHT →
 L2 M x x x || ← HEADER TILT →

L1 M x x x || HDR TILT SENSOR CAL
 L2 M x x x || EXTEND TLT TO START

L1 C x x x || CALIBRATING TILT
 L2 M x x x || EXTEND TILT HOLD
 L2 M x x x || EXTEND TILT DONE

If the HEADER TILT option in the TRACTOR SETUP is set to NO and/or no expansion module then HEIGHT is only option for calibration.

L1 M x x x || HDR TILT SENSOR CAL
 L2 M x x x || PRESS RETRACT TILT

L1 C x x x || CALIBRATING TILT
 L2 M x x x || RETRACT TILT HOLD
 L2 M x x x || HDR TILT COMPLETE

L1 C x x x || TO CALIBRATE SELECT
 L2 M x x x || ← HEADER TILT →
 L2 M x x x || ← STOP & EXIT →

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

If "NO" then jump to:
TO CALIBRATE SELECT

NOTE: If "yes" is selected, then system jumps to DIAGNOSTIC MODE

1001733

OPERATOR'S STATION

L1	C x x x D I A G N O S T I C M O D E ?	If "NO" then jump to:
L2	M x x x ← NO / YES →	W I N D R O W E R S E T U P ?
<div style="border: 1px solid black; padding: 2px; display: inline-block; transform: rotate(-90deg); transform-origin: left top; white-space: nowrap;">SAMPLE CODES</div>		
L1	C x x x V I E W E R R O R C O D E S ?	If "NO" then jump to:
L2	M x x x ← NO / YES →	E N T E R S E N S O R S E T U P ?
L1	C x x x V I E W W I N D R W R C O D E S ?	If "NO" then jump to:
L2	M x x x ← NO / YES →	E X I T E R R O R C O D E S ?
L1	1 1 2 3 4 . 5 H R S 1 2 3	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.
L2	E 4 7 S E N S O R V O L T S L O W	
L1	2 1 2 3 4 . 5 H R S 1 2 3	If "NO" then scrolls to: Initial error code displayed See Sample Codes
L2	E 7 1 L O W H Y D R A U L I C O I L	
L1	C x x x E X I T W I N D R W R C O D E S ?	
L2	M x x x ← NO / YES →	
L1	C x x x E X I T E R R O R C O D E S ?	If "NO" then jump to:
L2	M x x x ← NO / YES →	V I E W W I N D R W R C O D E S ?
L1	C x x x E N T E R S E N S O R S E T U P ?	If "NO" then jump to:
L2	M x x x ← NO / YES →	R E A D S E N S O R I N P U T S ?
L1	C x x x H E A D E R H T S E N S O R	The operator can select each sensor and selectively enable or disable the sensor in the event of a sensor malfunction.
L2	M x x x ← E N A B L E / D I S A B L E →	
L1	C x x x H E A D E R T I L T S E N S O R	If no expansion module or an A30 auger header is selected, the corresponding menu items should be suppressed.
L2	M x x x ← E N A B L E / D I S A B L E →	
L1	C x x x K N I F E S P E E D S E N S O R	When "SELECT" is pressed the program goes to the EXIT SENSOR SETUP? selection.
L2	M x x x ← E N A B L E / D I S A B L E →	
L1	C x x x R E E L S P E E D S E N S O R	
L2	M x x x ← E N A B L E / D I S A B L E →	
L1	C x x x E X I T S E N S O R S E T U P ?	If "NO" then jump to:
L2	M x x x ← NO / YES →	H E A D E R H T S E N S O R
Or to the first sensor "installed"		
L1	C x x x R E A D S E N S O R I N P U T S ?	If "NO" then jump to:
L2	M x x x ← NO / YES →	A C T I V A T E F U N C T I O N S ?
L1	C x x x S E N S O R I N P U T	For diagnostic purposes each sensors input signal can be read.
L2	M x x x H D R H E I G H T 3 . 5 9 V	
L1	C x x x S E N S O R I N P U T	If no expansion module or an A30 auger header is selected, the corresponding menu items should be suppressed.
L2	M x x x H E A D E R A N G L E 1 . 8 4 V	
L1	C x x x S E N S O R I N P U T	When "SELECT" is pressed the program goes to the EXIT READ SENSORS? menu selection.
L2	M x x x K N I F E S P E E D 1 2 3 H Z	
L1	C x x x S E N S O R I N P U T	Adds a selection to be able to read in the wheel speed frequency.
L2	M x x x R E E L S P E E D 1 2 3 H Z	
L1	C x x x S E N S O R I N P U T	NOTE: If a sensor has been disabled "SENSOR" will be flashing in the area where the input reading would have been.
L2	M x x x W H E E L S P E E D 1 2 3 H Z	
L1	C x x x S E N S O R I N P U T	If no expansion module or an A30 auger header is selected, the corresponding menu items should be suppressed.
L2	M x x x H D R H E I G H T S E N S O R	
L1	C x x x S E N S O R I N P U T	
L2	M x x x H E A D E R A N G L E S E N S O R	
L1	C x x x S E N S O R I N P U T	
L2	M x x x K N I F E S P E E D S E N S O R	
L1	C x x x S E N S O R I N P U T	
L2	M x x x R E E L S P E E D S E N S O R	
L1	C x x x E X I T R E A D S E N S O R S ?	If "NO" then jump to:
L2	M x x x ← NO / YES →	S E N S O R I N P U T
H D R H E I G H T 3 . 5 9 V		

OPERATOR'S STATION

L1	C x x x ACTIVATE FUNCTIONS ?	If "NO" then jump to:	
L2	M x x x <input type="button" value="←"/> NO / YES <input type="button" value="→"/>	EXIT DIAGNOSTIC ?	
	<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">↙</div> <div style="border: 1px solid black; padding: 2px;"> L1 C x x x ACTIVATE FUNCTIONS ? L2 M x x x HEADER <input type="button" value="←"/> DOWN / UP <input type="button" value="→"/> </div> </div>	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.	
	<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">↘</div> <div style="border: 1px solid black; padding: 2px;"> L1 C x x x ACTIVATE FUNCTIONS ? L2 M x x x REEL <input type="button" value="←"/> DOWN / UP <input type="button" value="→"/> </div> </div>		
	<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">↘</div> <div style="border: 1px solid black; padding: 2px;"> L1 C x x x ACTIVATE FUNCTIONS ? L2 M x x x HDR TILT <input type="button" value="←"/> IN / OUT <input type="button" value="→"/> </div> </div>	If the HEADER TILT cylinder or the REEL FORE / AFT valve is not installed under the TRACTOR SETUP menu then the ACTIVATE FUNCTIONS menu selection for these items should be suppressed.	
	<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">↘</div> <div style="border: 1px solid black; padding: 2px;"> L1 C x x x ACTIVATE FUNCTIONS ? L2 M x x x KNIFE DRIVE ON <input type="button" value="→"/> </div> </div>		
	<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">↘</div> <div style="border: 1px solid black; padding: 2px;"> L1 C x x x ACTIVATE FUNCTIONS ? L2 M x x x DRAPER / AUGER ON <input type="button" value="→"/> </div> </div>	For DRAPER / AUGER ON and REEL DRIVE ON (A40 and Draper Headers Only). REEL DRIVE ON and DRAPER / AUGER ON are suppressed for A30 Only.	
	<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">↘</div> <div style="border: 1px solid black; padding: 2px;"> L1 C x x x ACTIVATE FUNCTIONS ? L2 M x x x REEL DRIVE ON <input type="button" value="→"/> </div> </div>		
	<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">↘</div> <div style="border: 1px solid black; padding: 2px;"> L1 C x x x ACTIVATE FUNCTIONS ? L2 M x x x REEL <input type="button" value="←"/> AFT / FORE <input type="button" value="→"/> </div> </div>		
	<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">↘</div> <div style="border: 1px solid black; padding: 2px;"> L1 C x x x ACTIVATE HYD PURGE ? L2 M x x x <input type="button" value="←"/> NO / YES <input type="button" value="→"/> </div> </div>	If "NO" then jump to:	EXIT FUNCTION MENU ?
	<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">↘</div> <div style="border: 1px solid black; padding: 2px;"> L1 C x x x TO ACTIVATE PURGE L2 M x x x PRESS AND HOLD <input type="button" value="→"/> </div> </div>	ACTIVATE HYD PURGE - This is to allow the operator to purge the air from a new or changed pump system. Pressing and holding the right hand "arrow" button activates a predetermined timed purge cycle. Releasing pressure on the switch or a completed cycle (timed out) will jump to the PURGE CYCLE ENDED menu selection.	
	<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">↘</div> <div style="border: 1px solid black; padding: 2px;"> L1 C x x x PURGE CYCLE STARTED L2 M x x x PRESS AND HOLD <input type="button" value="→"/> </div> </div>		
	<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">↘</div> <div style="border: 1px solid black; padding: 2px;"> L1 C x x x PURGE CYCLE ENDED L2 M x x x </div> </div>		
	<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">↘</div> <div style="border: 1px solid black; padding: 2px;"> L1 C x x x PURGE CYCLE ENDED L2 M x x x <input type="button" value="←"/> NO EXIT YES <input type="button" value="→"/> </div> </div>	If "NO" then jump to:	TO ACTIVATE PURGE
	<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">↘</div> <div style="border: 1px solid black; padding: 2px;"> L1 C x x x EXIT FUNCTION MENU ? L2 M x x x <input type="button" value="←"/> NO / YES <input type="button" value="→"/> </div> </div>	If "NO" then jump to:	HEADER <input type="button" value="←"/> DOWN / UP <input type="button" value="→"/>
	<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">↘</div> <div style="border: 1px solid black; padding: 2px;"> L1 C x x x EXIT DIAGNOSTIC ? L2 M x x x <input type="button" value="←"/> NO / YES <input type="button" value="→"/> </div> </div>	If "NO" then jump to:	VIEW ERROR CODES ?
L1	C x x x EXIT SETUP ?	If "NO" then jump to:	
L2	M x x x <input type="button" value="←"/> NO / YES <input type="button" value="→"/>	WINDROWER SETUP ?	
		If "YES", exit to RUN screens	

OPERATOR'S STATION

Operating Information Screens

Cab Display Monitor - Operating Information Screens

IGNITION ON / ENGINE NOT RUNNING
 L1 HEADER DISENGAGED

ENGINE RUNNING - AT INITIAL START UP
 L1 HEADERTYPE AND SIZE
 L1 IN PARK

MISCELLANEOUS OPERATIONAL INFORMATION
 L1 < LEFT TURN >
 L1 RIGHT TURN
 L1 HAZARD
 L1 ROAD GEAR
 L1 HEADER ENGAGED
 L1 CENTER STEERING

ENGINE RUNNING / HEADER DISENGAGED

L1 or L2	##### ENGINE HRS		
L1 or L2	##### UNIT HRS		
L1 or L2	##### SUB ACRES		
L1 or L2	##### TOTAL ACRES		
L1 or L2	##### HEADER HEIGHT		
L1 or L2	##### HEADER ANGLE		
L1 or L2	##### VOLTS		
L1 or L2	FUEL #####		
L1 or L2	ENGINE TEMP ###°F		

Metric Equivalents

L1 or L2	##### SUB HECTARES		
L1 or L2	##### TOTAL HECT		

Metric Equivalents

L1 or L2	ENGINE TEMP ###°C		
----------	-------------------	--	--

Scroll Sub-Menu

L2	##### HEADER HEIGHT		
L2	FUEL #####		
L2	ENGINE TEMP ###°F		
L2	ENGINE TEMP ###°C		

L1 ROAD GEAR

ENGINE RUNNING / HEADER ENGAGED
 AUGER HEADER

L1 or L2	##### ENGINE HRS		
L1 or L2	##### UNIT HRS		
L1 or L2	##### HEADER HRS		
L1 or L2	##### ACRES / HOUR		
L1 or L2	##### SUB ACRES		
L1 or L2	##### TOTAL ACRES		

Metric Equivalents

L1 or L2	##### HECTARES / HOUR		
L1 or L2	##### SUB HECTARES		
L1 or L2	##### TOTAL HECT		

Flashing

L1 or L2	##### REEL RPM		
L1 or L2	##### AUGER SPEED		
L1 or L2	##### KNIFE SPEED		
L1 or L2	##### HEADER HEIGHT		
L1 or L2	##### HEADER ANGLE		
L1 or L2	##### VOLTS		
L1 or L2	FUEL #####		
L1 or L2	ENGINE TEMP ###°F		

Metric Equivalents

L1 or L2	ENGINE TEMP ###°C		
----------	-------------------	--	--

Scroll Sub-Menu

L2	##### KNIFE SPEED		
L2	##### AUGER SPEED		
L2	##### REEL RPM		
L2	##### HEADER HEIGHT		

L1 SCROLL

ENGINE RUNNING / HEADER ENGAGED
 DRAPER HEADER / INDEX SWITCH OFF

L1 or L2	##### ENGINE HRS		
L1 or L2	##### UNIT HRS		
L1 or L2	##### HEADER HRS		
L1 or L2	##### ACRES / HOUR		
L1 or L2	##### SUB ACRES		
L1 or L2	##### TOTAL ACRES		
L1	##### REEL MPH or		
L2	##### REEL RPM		

Metric Equivalents

L1 or L2	##### HECTARES / HOUR		
L1 or L2	##### SUB HECTARES		
L1 or L2	##### TOTAL HECT		
L1 or L2	##### REEL MPH		

Flashing

L1 or L2	##### REEL SENSOR		
L1 or L2	##### KNIFE SENSOR		
L1 or L2	##### HEIGHT SENSOR		
L1 or L2	##### ANGLE SENSOR		

Metric Equivalents

L1 or L2	ENGINE TEMP ###°C		
----------	-------------------	--	--

Scroll Sub-Menu

L2	##### KNIFE SPEED		
L2	##### REEL RPM		
L2	##### DRAPER SPEED		
L2	FUEL #####		

L1 SCROLL

L2 KNIFE SPD OVERLOAD

ENGINE RUNNING / HEADER ENGAGED
 DRAPER HEADER / INDEX SWITCH ON

L1 or L2	##### ENGINE HRS		
L1 or L2	##### UNIT HRS		
L1 or L2	##### HEADER HRS		
L1 or L2	##### ACRES / HOUR		
L1 or L2	##### SUB ACRES		
L1 or L2	##### TOTAL ACRES		

Metric Equivalents

L1 or L2	##### HECTARES / HOUR		
L1 or L2	##### SUB HECTARES		
L1 or L2	##### TOTAL HECT		

Flashing

L1 or L2	##### REEL SENSOR		
----------	-------------------	--	--

Flashing

L1 or L2	##### KNIFE SENSOR		
L1 or L2	##### HEIGHT SENSOR		
L1 or L2	##### ANGLE SENSOR		

Metric Equivalents

L1 or L2	ENGINE TEMP ###°C		
----------	-------------------	--	--

Scroll Sub-Menu

L2	##### KNIFE SPEED		
L2	##### HEADER HEIGHT		
L2	##### REEL IND		
L2	##### DRAP INDX		

L1 SCROLL

L2 REEL MIN RPM

L2 MINIMUM

1001736

3.18.6 Engine Error Codes

The cab display module (CDM) displays error codes when there is a fault with one of the several sensors that monitor and control engine operation, to assist the Operator or Technician in locating a specific problem with engine operation. Refer to [8 Engine Error Codes, page 341](#).

3.18.7 Cab Display Module (CDM) and Windrower Control Module (WCM) Fault Codes

The CDM displays fault codes when there is a fault with one of the several sensors that monitor and control windrower operation, to assist the Operator or Technician in locating a specific problem with the windrower. Refer to [9 Cab Display Module \(CDM\) Error Codes, page 359](#).

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.

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.

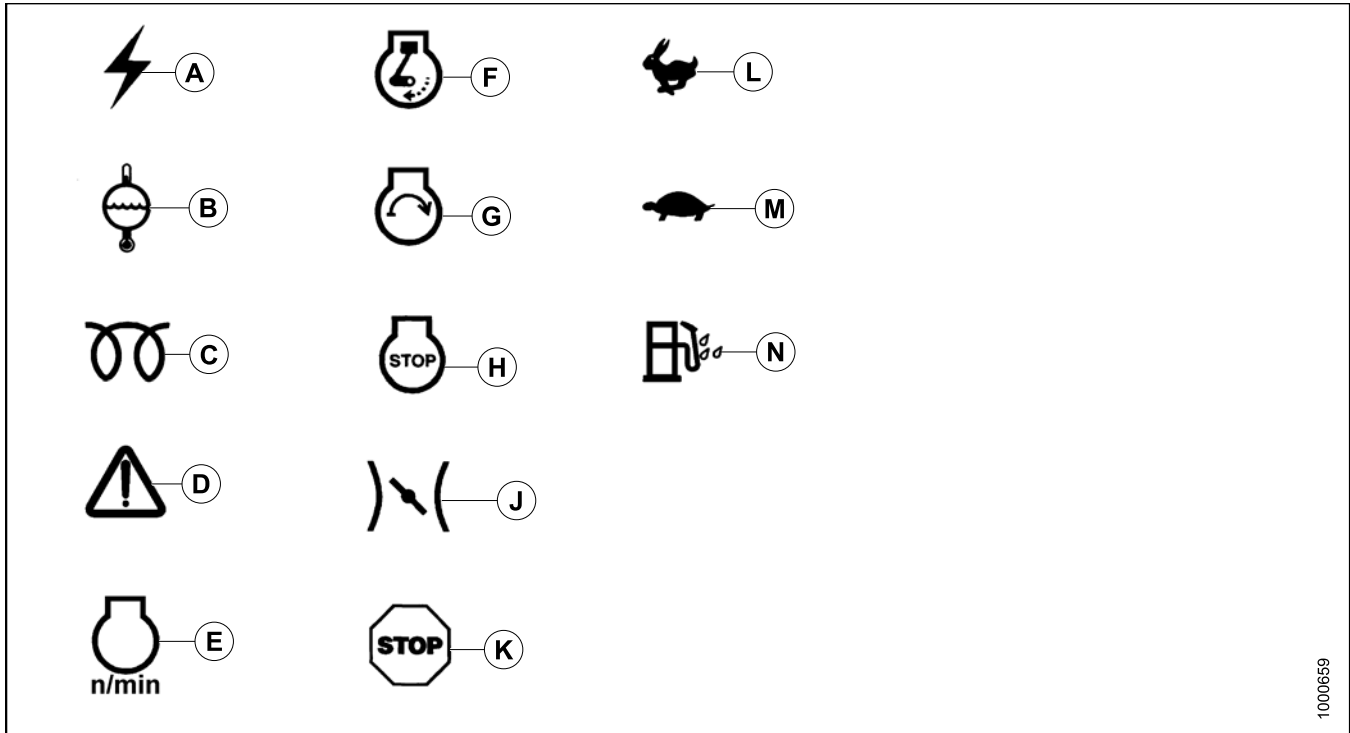


Figure 4.1: Engine Function Symbols

- | | | |
|------------------------------------|--------------------------------|-----------------------|
| 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 | | |

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

C - Forward

E - Reverse

G - Headlights High Beam / Road Lights

J - Lighter

L - Blower

N - Seat Height Up

P - Seat Fore and Aft

R - Seat Back Fore and Aft

T - Cab Temperature Control

V - Recirculate

B - Hazard Warning Lights

D - Neutral

F - Headlights Low Beam / Road Lights

H - Work Light

K - Fresh Air

M - Windshield Wiper

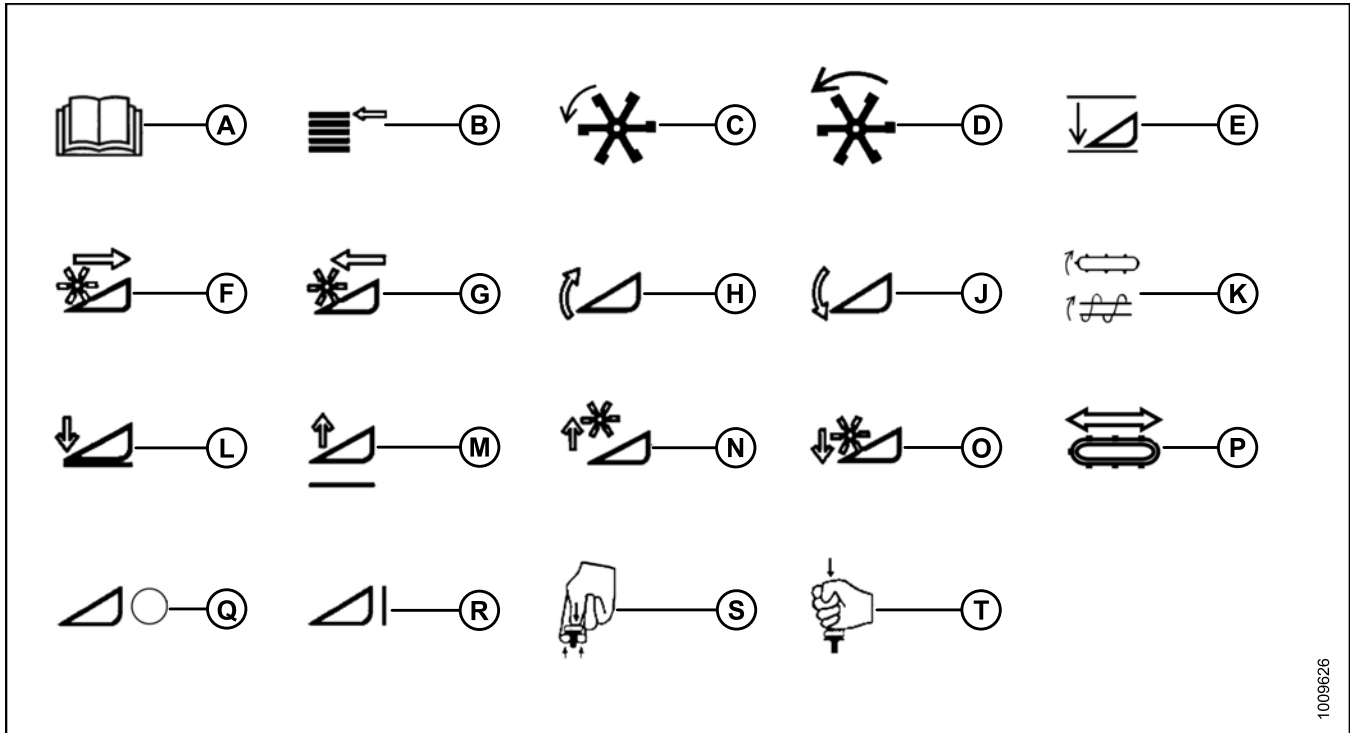
O - Seat Height Down

Q - Seat Fore Aft Isolator

S - Seat Ride Damping

U - Air Conditioning

4.2.3 Header Functions



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Figure 4.3: Header Function Symbols

- | | | |
|--------------------------------|--------------------|---------------------------|
| A - Program | B - Display Select | C - Header Index |
| D - Reel Speed | E - Return to Cut | F - Reel Rearward |
| G - Reel Forward | H - Header Tilt Up | J - Header Tilt Down |
| K - Conveyor/Auger Speed | L - Header Down | M - Header Up |
| N - Reel Up | O - Reel Down | P - Deck Shift |
| Q - Header Disengage | R - Header Engage | S - Pull Up Header Engage |
| T - Push Down Header Disengage | | |

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.
- Carry with you any protective clothing and personal safety devices that **COULD** be necessary through the day. Don't take chances.
- You may need:
 - a hard hat
 - protective glasses or goggles
 - heavy gloves
 - respirator or filter mask
 - wet weather gear

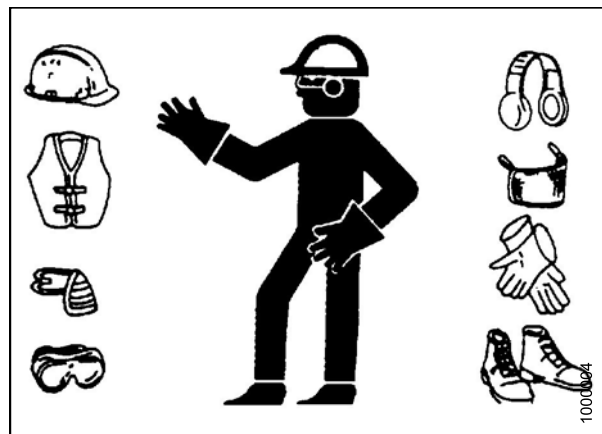


Figure 4.4: Safety Equipment

- Protect against noise. Wear a suitable hearing protective device such as ear muffs or ear plugs to protect against objectionable or uncomfortable loud noises.
- Follow all safety and operational instructions given in your operator's manuals. If you do not have a header manual, get one from your Dealer and read it thoroughly.
- Never attempt to start the engine or operate the machine except from the operator's seat
- Check the operation of all controls in a safe clear area before starting work.
- Check for excessive vibration and unusual noises. If there is any indication of trouble, shut down and inspect the machine. Follow proper shutdown procedure. Refer to [Shutting Down the Engine, page 91](#).
- Operate only in daylight or good artificial light.



Figure 4.5: Safety Equipment

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 [Break-In Inspections, page 313](#).

DANGER

Before investigating an unusual sound or attempting to correct a problem, place ground speed lever (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.

- Operate engine at moderate load and avoid extremely heavy or light loading for longer than 5 minutes.
- Avoid unnecessary idling. If engine will be idling longer than 5 minutes after reaching operating temperature, turn key OFF to stop engine.
- Check engine oil level frequently. Watch for any signs of leakage. If oil must be added, refer to [Checking Engine Oil Level, page 227](#).

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.

- 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 [Engine Cooling System, page 245](#). If over-heating problems occur, check for coolant leaks.

4.3.3 Preseason Checks/Annual Service

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.

1. Perform the following checks:

- a. Drain off excess hydraulic oil added for storage. Refer to [Draining Hydraulic Oil, page 290](#).
- b. Remove plastic bags and/or tape from all sealed openings (air cleaner intake, exhaust pipe, fuel tank).
- c. Charge battery and install. Be sure terminals are clean and cables are connected securely.

OPERATION

- d. Adjust tension on air conditioning (A/C) compressor belt. Refer to [Tensioning Air Conditioner \(A/C\) Compressor Belt, page 257](#).
 - e. Distribute A/C refrigerant by cycling A/C switch. Refer to [Air Conditioning Compressor Coolant Cycling, page 87](#).
 - f. Check the entire A/C system for leakage at the beginning of each season.
2. Perform annual maintenance. Refer to [5.7.11 Maintenance Schedule, page 313](#).

Air Conditioning Compressor Coolant Cycling

Cycle A/C switch to distribute the air conditioning (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 (B) to first position, turn temperature control switch (A) to MAXIMUM heating, and A/C control (C) 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.

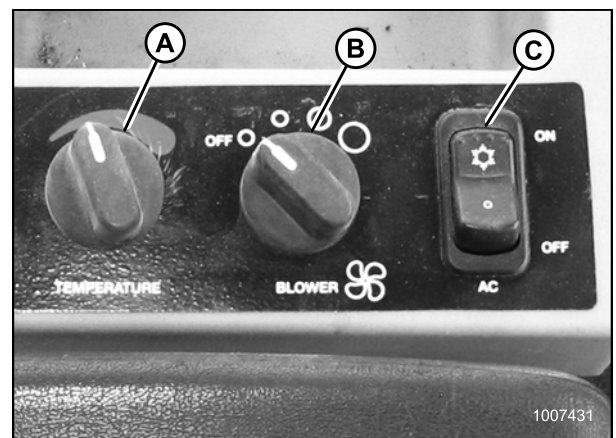


Figure 4.6: Climate Control

A - Temperature Control B - Blower Switch
C - Air Conditioning Switch

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 [Hoses and Lines, page 298](#).

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 [5.7.11 Maintenance Schedule, page 313](#).

4.3.5 Engine Operation

Starting the Engine

⚠ DANGER

- Avoid possible injury or death from a runaway machine.
- This machine has safety devices which allow the engine to start only when the ground speed lever is in N-DETENT, the steering wheel is locked in the NEUTRAL position, and the header drive switch is in the OFF position. Under no circumstances are these devices to be deliberately rewired or misadjusted so that the engine can be started with controls out of NEUTRAL.
- Do NOT start engine by shorting across starter or starter relay terminals. Machine will start with drive engaged and move if normal starting circuitry is bypassed.
- Start engine only from operator's seat with controls in NEUTRAL. NEVER start engine while standing on ground. Never try to start engine with someone under or near machine.
- Before starting engine, be sure there is plenty of ventilation to avoid asphyxiation.

IMPORTANT:

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

⚠ WARNING

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

1. A battery main disconnect switch (A) is located on the battery support in the engine compartment. Ensure switch is switched to POWER ON position.

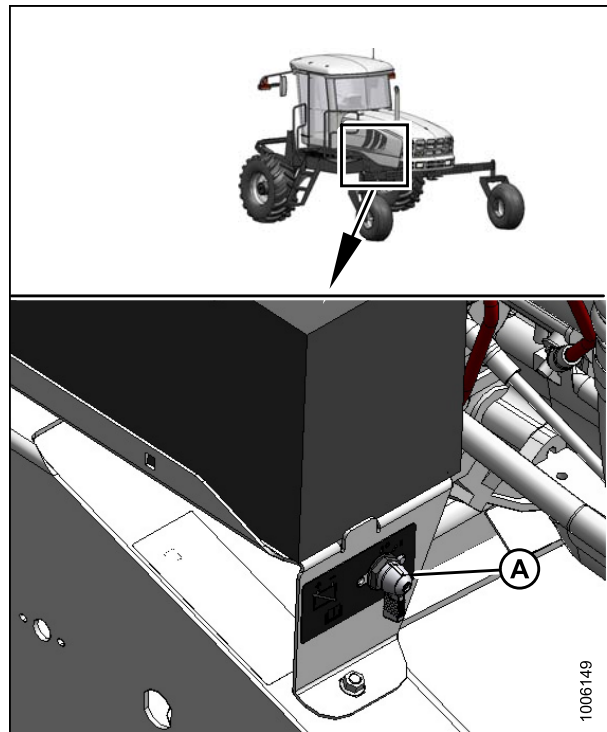


Figure 4.7: Battery Disconnect

OPERATION

2. Move ground speed lever (GSL) (A) into N-DETENT (B).
3. Turn steering wheel until it locks. It may be possible to move the steering wheel slightly in the locked position.

IMPORTANT:

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

4. Fasten seat belt.
5. Push HEADER DRIVE switch (C) to ensure it is OFF.

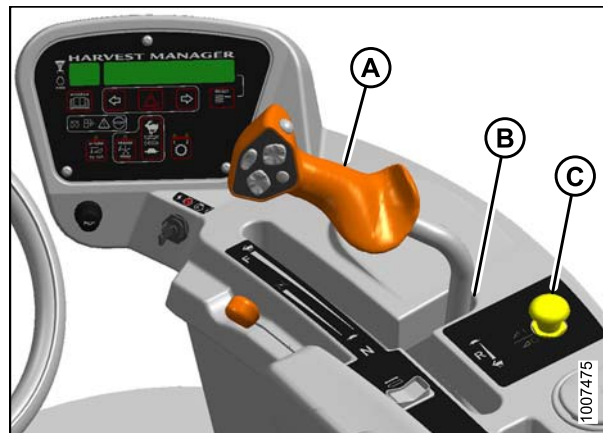


Figure 4.8: Operator Console

Normal Start

Engine temperature above 60°F (16°C):

WARNING

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

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 [3.15 Engine Controls and Gauges, page 54](#).

CAUTION

Check to be sure all bystanders have cleared the area.

2. Sound horn (C) three times.
3. Turn ignition key (B) to RUN position. Single loud tone sounds, engine warning lights illuminate as a self-test, and cab display module (CDM) displays “HEADER DISENGAGED” and “IN PARK”.
4. Turn ignition key (B) to START position until engine starts, and then release key.

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 317](#).

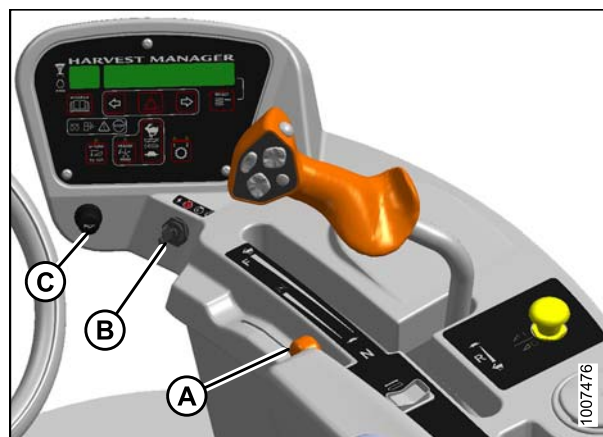


Figure 4.9: Operator Console

OPERATION

Cold Start

Engine temperature below 40°F (5°C)

WARNING

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

1. Set throttle (A) to START position - fully back (low idle).
2. Turn ignition key (B) to RUN.
3. Grid heater light (D) on CDM will cycle ON / OFF / ON after 2 seconds for a preset length of time. The operating period for the glow plug light will change depending engine temperature.
4. Sound horn (C) three times.
5. When grid heater light (D) goes out, turn ignition key to START, and crank engine until it starts. Leave throttle (A) at IDLE.
6. If engine fails to start, repeat procedure beginning with step 2., [Cold Start, page 90](#).

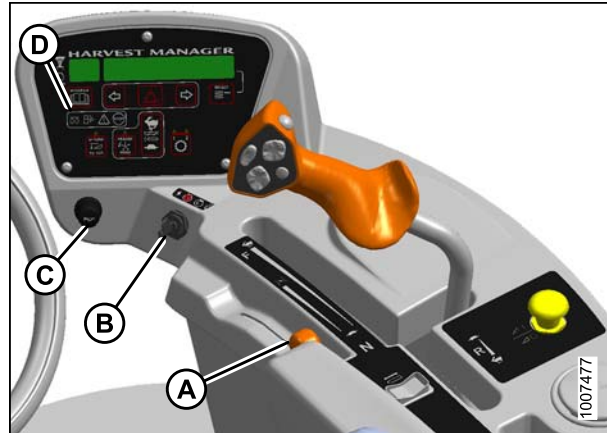


Figure 4.10: Operator Controls

A - Throttle B - Ignition Key C - Horn D - Grid Heater Light

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 317](#).

NOTE:

The engine will cycle through a period where it appears to labor until the engine warms up. The throttle is nonresponsive during this time as the engine is in warm-up mode. This mode will last from 30 seconds to 3 minutes depending on the temperature. After the engine has stabilized and is idling normally, the throttle becomes active.

IMPORTANT:

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

OPERATION

Engine Warm-Up

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

NOTE:

Scroll through cab display module (CDM) for engine temperature.

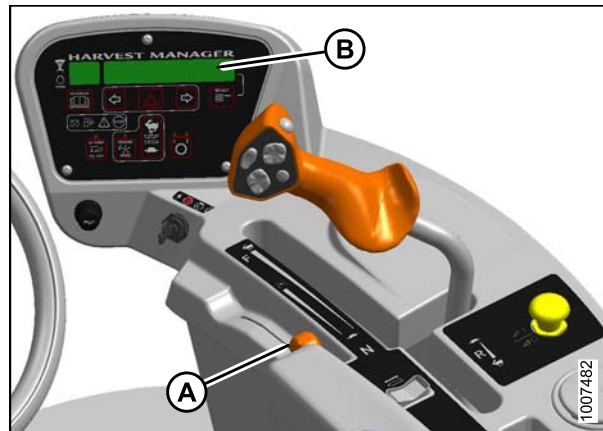


Figure 4.11: Operator Console

Engine Intermediate Speed Control (ISC)

Engine 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.

With the ISC activated, the engine speed automatically reverts to 2300 rpm when the header is engaged.

Programming instructions are provided in [3.18.5 Cab Display Module \(CDM\) Programming, page 70](#).

Shutting Down the Engine

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. Lower header.
2. Place ground speed lever (GSL) (B) into N-DETENT.
3. Lock steering wheel.
4. Turn ignition key (A) counterclockwise to OFF position.

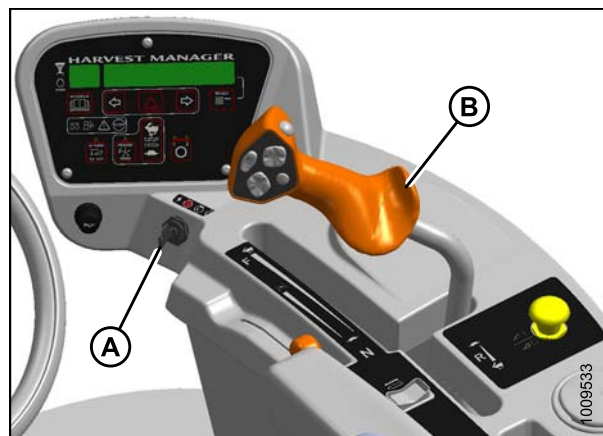


Figure 4.12: Operator Console

OPERATION

Filling Fuel Tank

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

DANGER

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

WARNING

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

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 244](#).

1. Stop windrower and remove key.
2. Stand on 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 then remove cap.
5. Fill tank with approved fuel. Refer to [Lubricants, Fluids, and System Capacities, page 199](#).

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.

NOTE:

Fuel tank capacity is 97 US gal. (367 L).

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

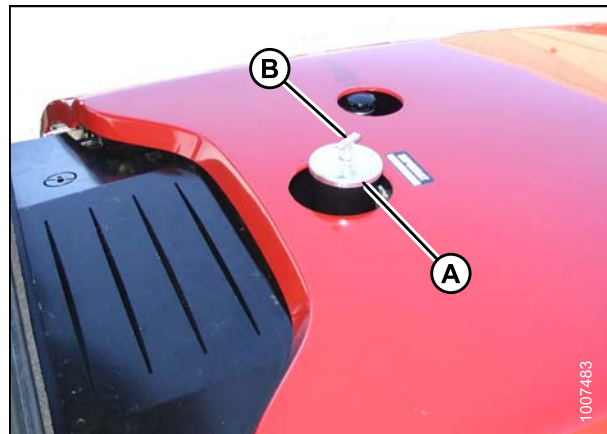


Figure 4.13: Fuel Cap

OPERATION

Engine Temperature

The normal engine operating temperature range is 180–225°F (82–107°C).

If the temperature exceeds 230°F (110°C), an ongoing intermittent tone will be heard and the cab display module (CDM) (A) will flash “ENGINE TEMP”. Stop the engine **immediately** and determine cause. The tone will stop and the CDM (A) will return to normal when the temperature drops below 225°F (107°C).



Figure 4.14: CDM

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 the oil pressure drops below the preset level of 7.5 psi (52 kPa), the cab display module (CDM) flashes an error code and error message.

If the STOP ENGINE light illuminates, stop the engine **IMMEDIATELY** and investigate.

If the yellow CAUTION light illuminates, stopping immediately is optional. You may continue operations and investigate later, but you are **STRONGLY** advised to monitor the situation carefully.

Electrical

The electrical system voltage is displayed on the cab display module (CDM) when selected with the SELECT button on the ground speed lever (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
		> 16.0 ¹¹	Regulator out of adjustment
		< 12.5 ¹¹	Alternator not working or regulator out of adjustment
	Shut down	12.0	Battery normal

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

OPERATION

Engine Warning Lights

Four engine warning lights indicate abnormal engine conditions. Engine warning lights should **NOT** be illuminated under normal operating conditions.

- **ENGINE PRE-HEAT (A)** illuminates yellow. Wait to start engine.
- **WATER IN FUEL (B)** illuminates yellow. Service recommended.
- **CAUTION (C)** illuminates yellow. Prompt attention is required. Refer to display (E) for malfunction code.
- **STOP (D)** illuminates red. Stop engine immediately. Refer to display (E) for malfunction code.
- **DISPLAY (E)** shows the malfunction code. For details, refer to [8 Engine Error Codes, page 341](#).

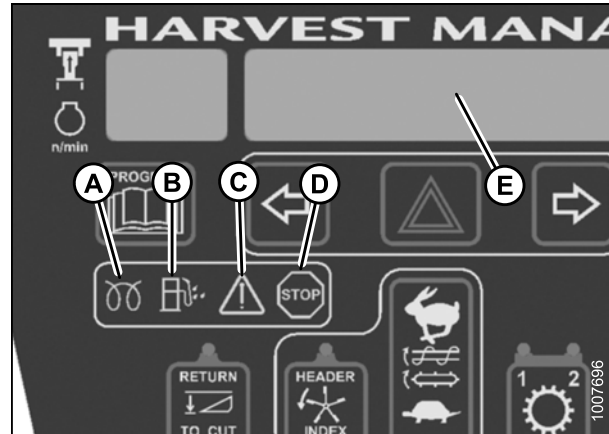


Figure 4.15: CDM

4.3.6 Windrower Operation

WARNING

The seat belt can help ensure your safety if it is used and maintained.

- Before starting the engine, securely fasten your seat belt. Ensure that anyone occupying the trainee's seat is secured by a seat belt as well.
- 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.

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 [Towing Header with Windrower, page 104](#). 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 from conventional steering mechanisms.

OPERATION

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 ground speed lever (GSL) is in N-DETENT and the steering wheel is centered and locked.

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.

OPERATION

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.)

A swing away platform and steps (A) are provided to accommodate access to the operator's station, as well as maintenance tasks.

Opposite to the entry/exit door (B) is a door-size window (C) that latches in the partially open position if desired, and can be fully opened for emergency exit.

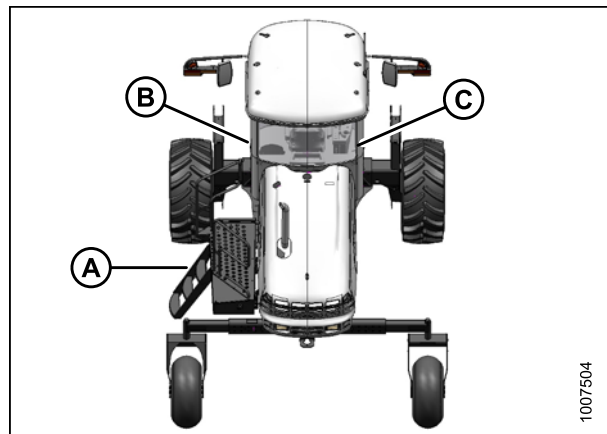


Figure 4.16: Platforms and Doors

OPERATION

To open right side window, pull over-center latch (A) forward, and slightly push on window until latch goes over-center, and lock window in OPEN position.

To close right side window, pull latch (A) inward to until window closes, and then push rearward to lock.

To fully open window, pull pin (B) out of latch, and push window open.

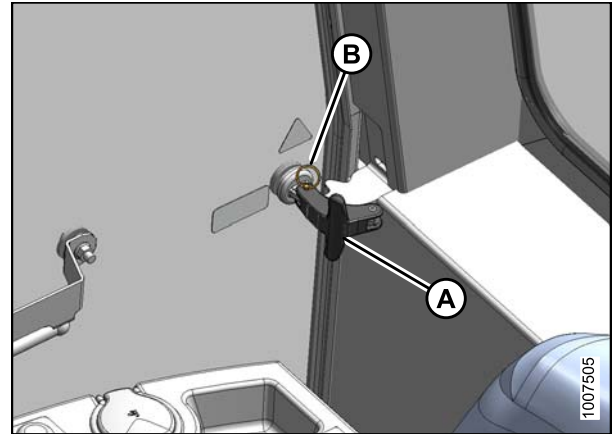


Figure 4.17: Right Side Window

Driving Forward

CAUTION

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

1. Place ground speed lever (GSL) (A) in N-DETENT. Engine can be running.
2. Ensure seat belt is fastened.
3. Start engine if not running. Refer to [Starting the Engine, page 88](#).
4. Set GROUND SPEED RANGE switch (B) to either of the following:
 - 2 for road speed: 0–16 mph (25.7 km/h)
 - 1 for field speed: 0–11 mph (17.7 km/h)
5. The cab display module (CDM) will display an engine status at (C).
6. Slowly push throttle (D) to full forward (operating speed). The CDM should display 2270–2330 rpm at (E).

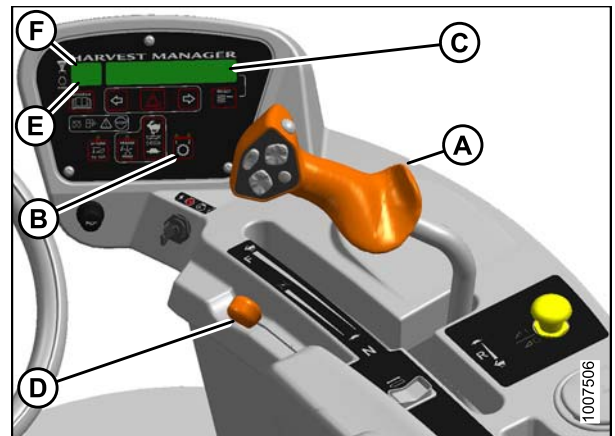


Figure 4.18: Operator Console

A - Ground Speed Lever B - Ground Speed Range Switch
C - Engine Status Display D - Throttle
E - RPM Display F - Speed Display

CAUTION

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

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

IMPORTANT:

The windrower can be equipped with an automatic steering system for use in the field. An automated steering system is available as an option and can be installed by a MacDon Dealer. The GSL has been pre-wired at the factory with a switch. Also refer to [7.1.3 Automated Steering Systems, page 337](#).

OPERATION

Driving in Reverse

WARNING

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

1. Set ground speed range switch (A) to 1 (field speed).
2. Move throttle lever (B) to a mid-range position.

NOTE:

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

CAUTION

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

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

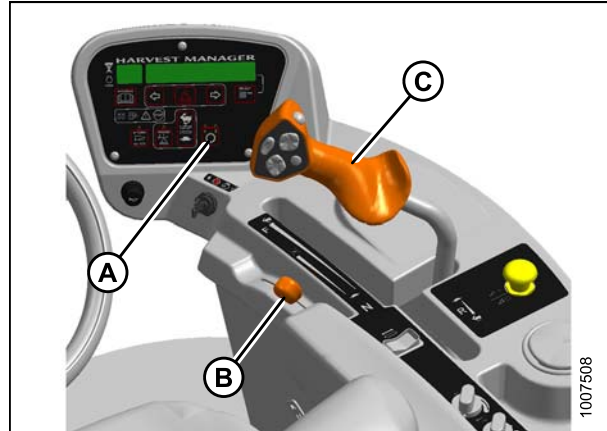


Figure 4.19: Operator's Console

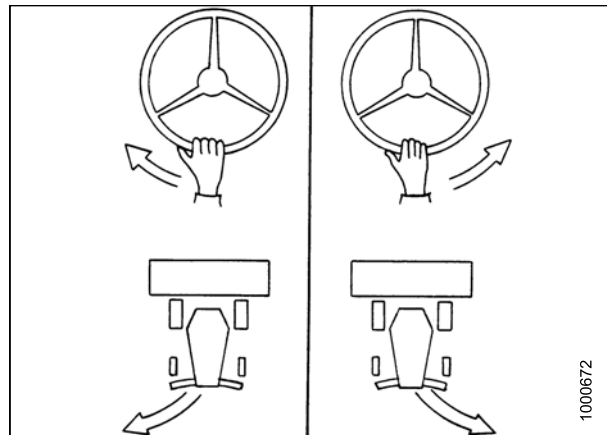


Figure 4.20: Reverse Steering

Spin Turning

Hydrostatic steering provides 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.

OPERATION

1. Move the ground speed lever (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 increase the turn radius, slowly move the GSL away from NEUTRAL. Remember that this will increase ground speed as well.
4. To stop the turn, slowly turn the steering wheel back to its centered position.

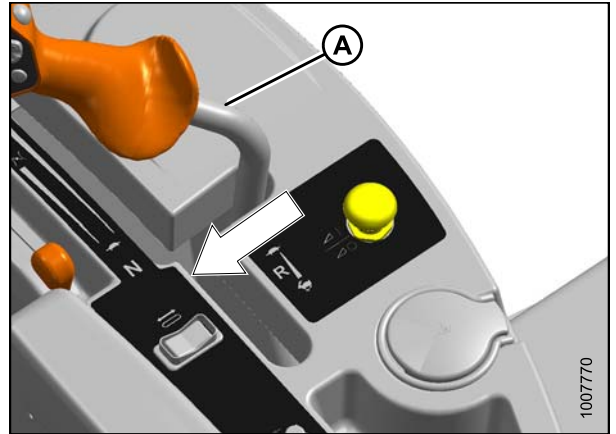


Figure 4.21: Ground Speed Lever (GSL)

Stopping

WARNING

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

To stop the windrower:

1. **SLOWLY** return the ground speed lever (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 GSL in N-DETENT and steering wheel locked.

IMPORTANT:

Before stopping engine, run at low idle for approximately 5 minutes to cool engine parts (and allow turbocharger to slow down while engine oil pressure is available).

5. Turn ignition key counterclockwise to OFF position.

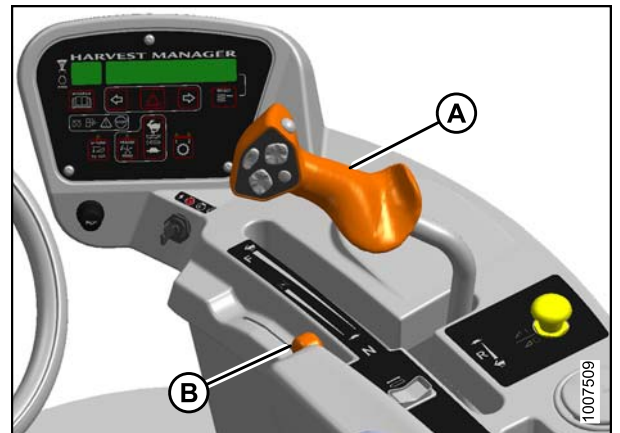


Figure 4.22: Operator Console

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.

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

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

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.

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.

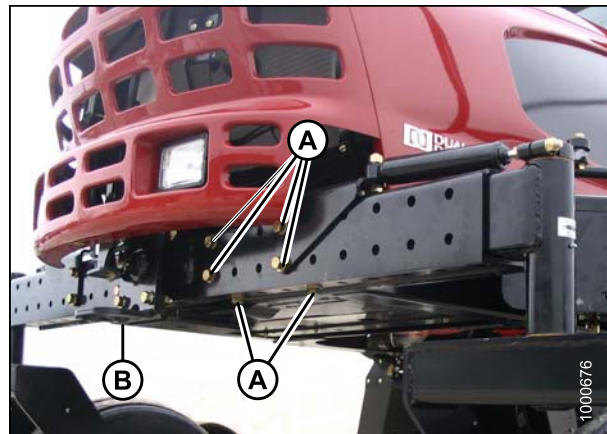


Figure 4.23: Caster Wheel Extensions



Figure 4.24: Caster Wheel Extensions

OPERATION

IMPORTANT:

Caster wheels must be equidistant from center of windrower.

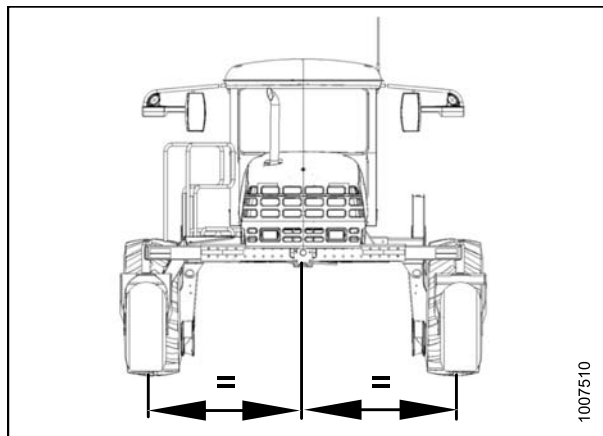


Figure 4.25: Adjustable Caster Wheels

4. Position bracket (A) and install back bolts (C). The two shorter bolts are installed at the back inboard locations.
5. Install bottom bolts (B).
6. Tighten bolts as follows:
 - a. Snug bottom bolts (B).
 - b. Tighten and torque back bolts (C) to 330 ft lbf (447 N·m).
 - c. Tighten and torque bottom bolts (B) to 330 ft lbf (447 N·m).
7. Lower windrower to ground.

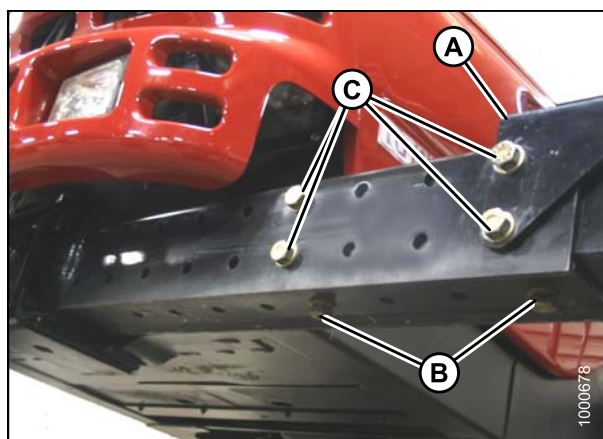


Figure 4.26: Caster Wheel Extensions

IMPORTANT:

Torque bolts after first 5 and 10 hours of operation.

4.3.8 Transporting the Windrower

Driving on the Road

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.

OPERATION

WARNING

Do **NOT** drive windrower on a road or highway at night, or in conditions that reduce visibility, such as fog or rain. The width of the windrower may not be apparent under these conditions.

CAUTION

Operate both steering wheel and ground speed lever slowly for familiarization. Remember that steering is more sensitive when ground speed-range control switch is set to ROAD position - 2. Avoid the common tendency of new Operators to oversteer.

CAUTION

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

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.
5. Push LIGHT switch (A) to ROAD position to activate lamps. Always use these lamps on roads to provide warning to other vehicles.
 - a. Use HIGH / LOW LIGHTS (B) as required when other vehicles are approaching.
 - b. Do **NOT** use FIELD lamps on roads, other drivers may be confused by them.
6. Push BEACON switch (C) ON to activate beacons .

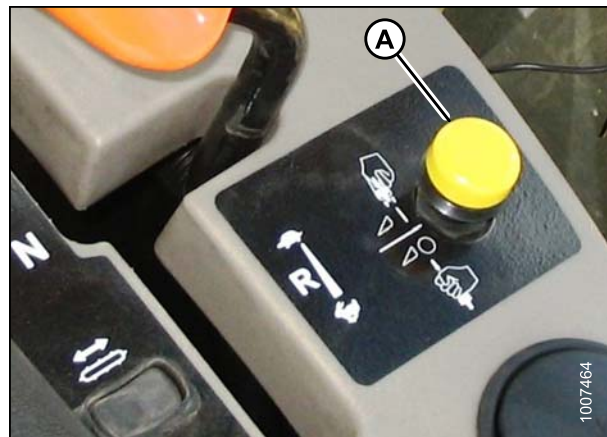


Figure 4.27: Header Drive Switch

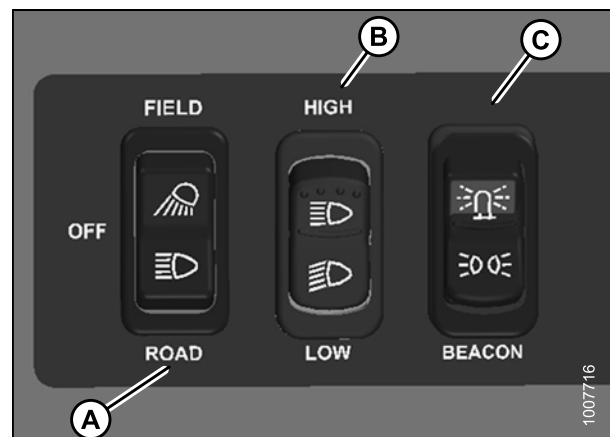


Figure 4.28: Light Switches

OPERATION

- Press switch (A) on cab display module (CDM) to activate hazard lights.



Figure 4.29: CDM

- Set ground speed range switch (A) to 2 for ROAD speed. CDM will display ROAD GEAR at (B).

NOTE:

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

- Slowly push throttle (C) to full forward (operating speed). CDM should display 2270–2330 rpm at (D).
- Slowly move the ground speed lever (GSL) (E) forward to desired speed which will be displayed at (F).
- If towing a header, refer to [Towing Header with Windrower](#), page 104.

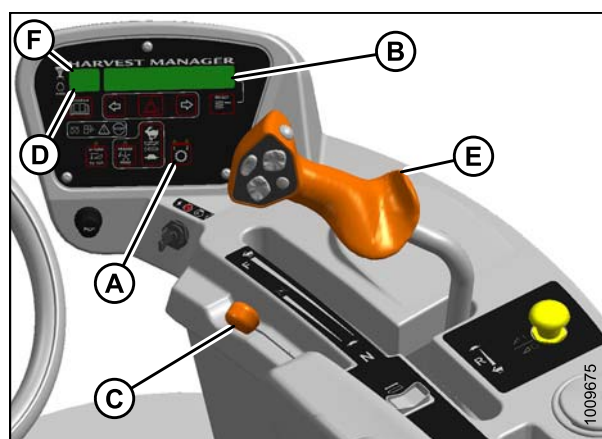


Figure 4.30: Operator Console

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 (GSL) closer to NEUTRAL to reduce speed.
- Lower header.
- Set GROUND SPEED RANGE switch to 1 - field 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 1 – field 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 (GSL) to NEUTRAL.

OPERATION

Towing Header with Windrower

The windrower can be used to tow a MacDon draper header that has the optional slow speed transport option installed, **PROVIDED** the optional weight box is installed on the windrower or an approved header transporter with weight transfer to the lift arms.

WARNING

Draper Header with Transport Option Installed

- The windrower without the header must **NOT** be used to tow headers due to reduced traction and possible loss of control unless a weight box option (7.1.20 Weight Box, page 340) is installed on the windrower or a header transporter that transfers weight to the lift arms.

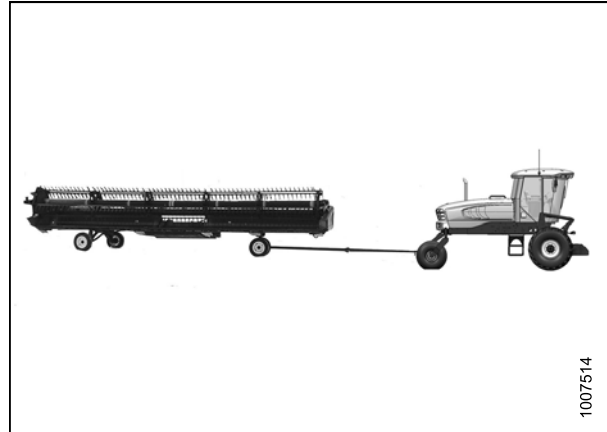


Figure 4.31: Towing a Header

CAUTION

- To tow a header for transporting with an M105 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** connect any towed implement except for header transport trailers for 20–25-foot D-Series headers or 30–35-foot D-Series headers that are equipped with the slow speed transport option.
- Tongue weight must **NOT** exceed 500 lbs (227 kg).
- 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:

		lbs	kg
Maximum GVW (includes mounted implements)		17,750	8050
Maximum CGVW (includes towed and mounted implements)		20,200	9160
Weight (A) on both drive wheels	Maximum	16,300	7390
	Minimum	9150	4150
Maximum weight (B) on both caster tires		3550	1610

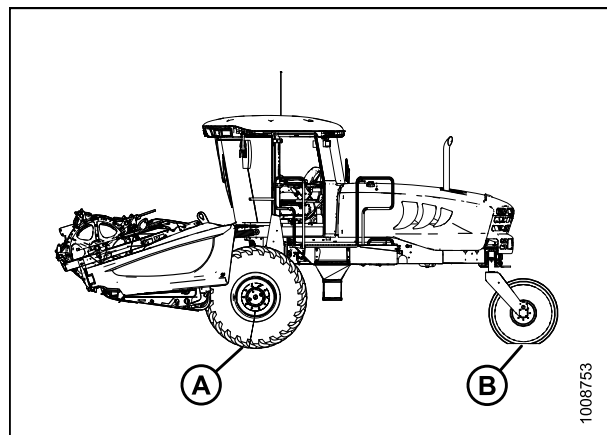


Figure 4.32: Maximum Weight

OPERATION

Converting from Field to Transport Mode

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.

DANGER

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

1. Set header on the ground (field position).
2. Disconnect the following hydraulic and electrical connections:
 - a. **Left Side** – Store hydraulic hoses and electrical cable into the storage position. Refer to header operator's manual.
 - b. **Right Side** – Release the multi-link and place into storage on windrower. Refer to header operator's manual.
3. Retrieve temporary lift pin from storage location on weight box and install into **rear hole (A)** at the top of the lift arms. This provides additional lift height for transport wheel deployment.

CAUTION

Check to be sure all bystanders have cleared the area.

4. Raise header to full height and stop engine.
5. Engage safety props on lift cylinders. Refer to [4.4.1 Header Safety Props, page 117](#).
6. Deploy header slow speed transport system. Refer to header operator's manual.

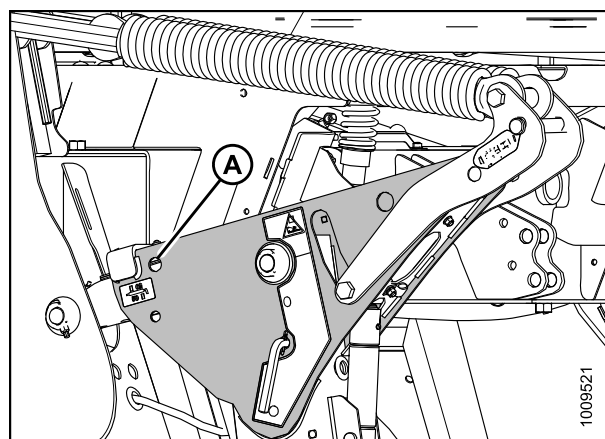


Figure 4.33: Lift Linkage



Figure 4.34: Header in Transport Mode

OPERATION

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

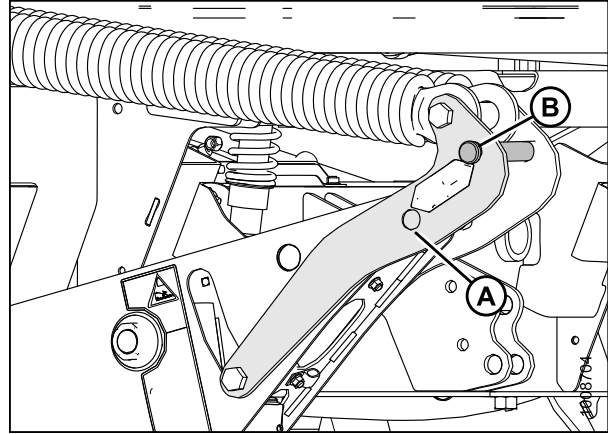


Figure 4.35: Lift Arms

- Remove pins (A) from lower end of lift linkages.

NOTE:

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

- Release the safety props on the header lift cylinders. (Refer to [4.4.1 Header Safety Props, page 117.](#))
- Start engine and lower header down onto the transport wheels.

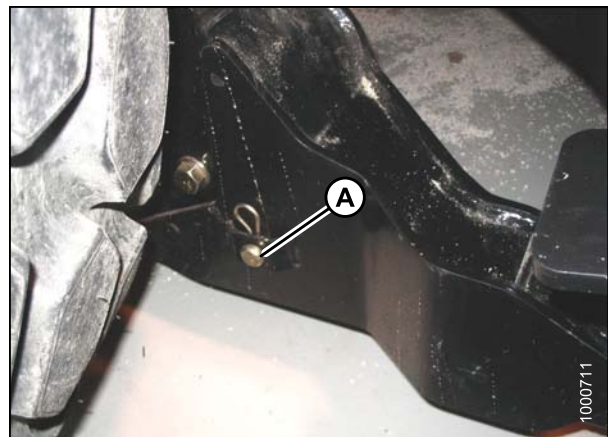


Figure 4.36: Lift Arms

- Use the HEADER TILT switches to release load on the cylinder if necessary.
- Shut down engine and remove key from ignition.

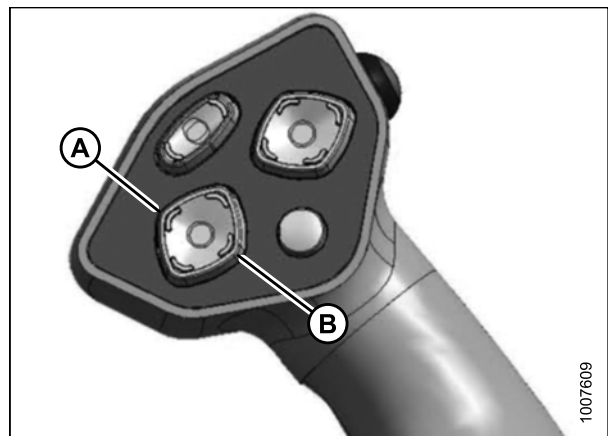


Figure 4.37: Ground Speed Lever (GSL)

A - Header Tilt Down

B - Header Tilt Up

OPERATION

Disconnect the center-link as follows:

Hydraulic Link

13. If using hydraulic link, disconnect the center-link as follows:
 - a. Pull up on latch (A), and position latch into notch (B) on top of hook.
 - b. Release safety props on the header lift cylinders ([4.4.1 Header Safety Props, page 117](#)).
 - c. Lower header down onto the transport wheels.
 - d. Disengage top link from the header. If necessary, use the HEADER TILT switch to release load on the cylinder.

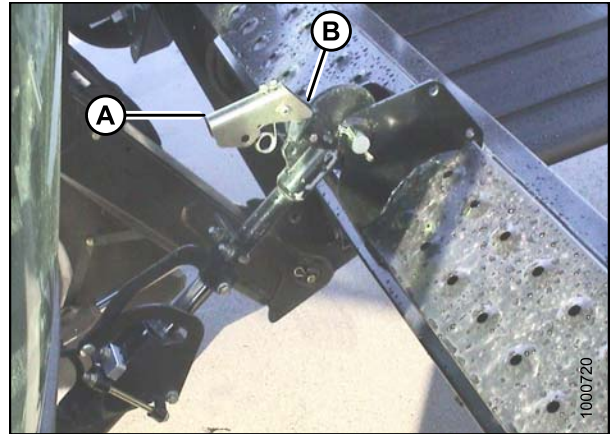


Figure 4.38: Hydraulic Link

Mechanical Link

14. If using a mechanical link, disconnect the center-link as follows:
 - a. Loosen nut (A), and rotate barrel (B) to relieve load on link.
 - b. Remove cotter pin (D) on pin (C), and remove pin to disconnect from windrower. Reinstall pin in header.

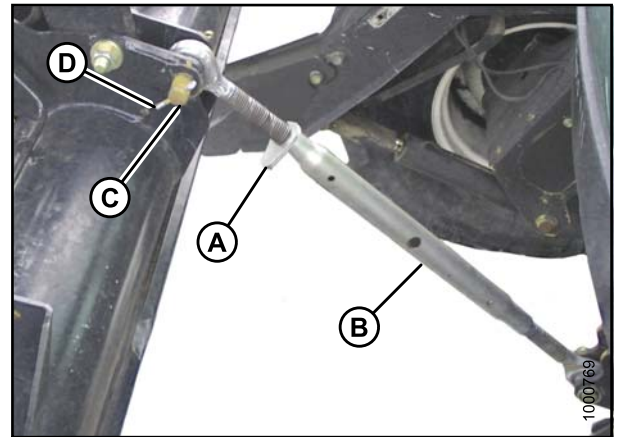


Figure 4.39: Mechanical Link

15. Back windrower away from header.
16. Remove tow-bar sections from storage locations on header, assemble, and attach to header. Refer to header operator's manual.

Attach optional weight box to windrower as follows:

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).

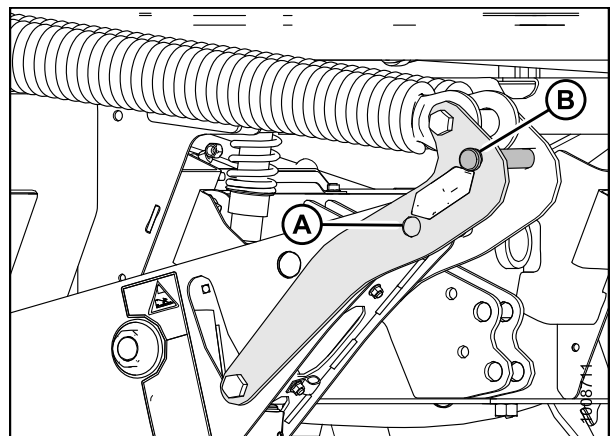


Figure 4.40: Lift Linkage

OPERATION

17. Drive windrower so that windrower lift arms are located in the weight box pockets.
18. Raise lift arms slightly.
19. Stop engine, and remove key.
20. 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.

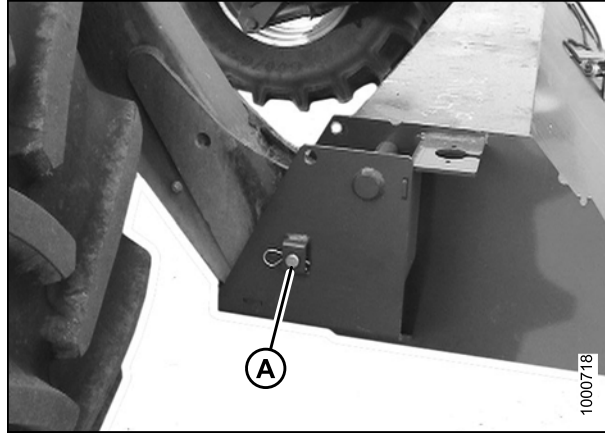


Figure 4.41: Lift Arms

At rear of windrower, lower the drawbar bracket as follows:

21. Hold drawbar support (A), and remove the two pins (B) at the forward end.
22. Lower support to position shown, and reinstall the two pins (B) in uppermost pair of holes in support.
23. Alternative drawbar (C) can be removed if desired.

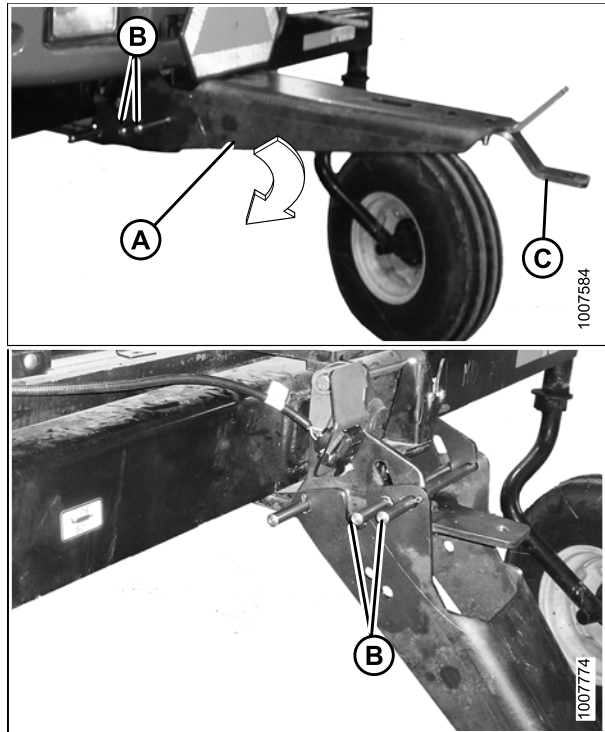


Figure 4.42: Drawbar

OPERATION

The optional M105 transport drawbar (MD #B5411) mounts to the walking beam and provides approximately 12 in. (300 mm) of fore-aft movement to ease the attachment of a towed implement. Refer to [7.1.18 Transport Drawbar, page 340](#) for more information.

Attach the tow-bar to the windrower as follows:

24. Back the windrower up to the tow-bar (A) so that the drawbar hole (B) is within 6 in. (150 mm) (D) of the tow-bar clevis pin (C).
25. Stop engine, and remove key.

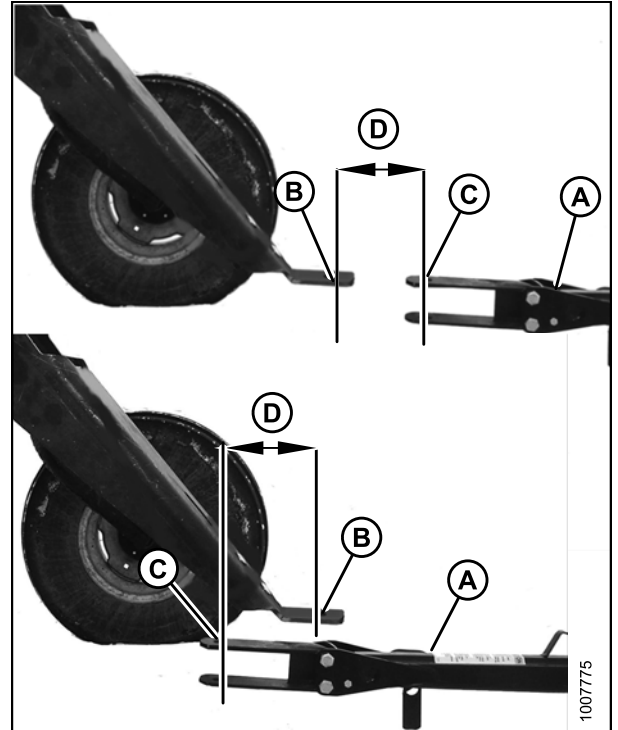


Figure 4.43: Towing Components

A - Tow-Bar
B - Drawbar Hole
C - Tow-Bar Clevis Pin
D - Within 6 inches (150 mm)

26. If the tow-bar (A) is **TOO FAR** from the drawbar (B):
 - a. Remove pin (C), lift the drawbar support (D) until the tow-bar clevis aligns, and then install the drawbar pin (E).
 - b. Start engine, and gently reverse the windrower until the drawbar support pivots down to transport position.
 - c. Stop engine, and remove key.
 - d. Reinstall pin (C) to secure drawbar support, and connect the safety chain. Proceed to step [28., Converting from Field to Transport Mode, page 110.](#)

IMPORTANT:

Ensure lynch pins are secure in all three pins, and that the drawbar pin is also secured by a locking pin.

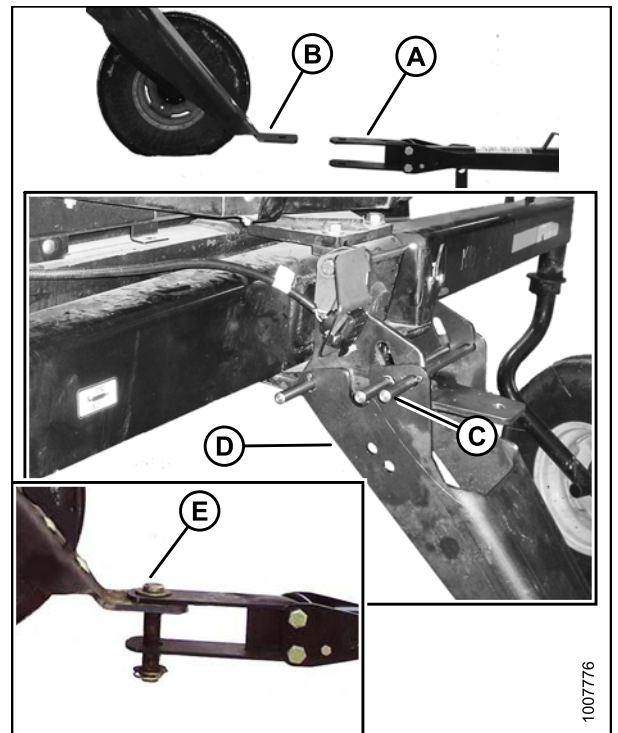


Figure 4.44: Towing Components

OPERATION

27. If the tow-bar (A) is **TOO CLOSE** to the windrower:
- Remove pin (B), lower the drawbar support (C) until the tow-bar clevis aligns, and then install the drawbar pin (D).
 - Start engine, and gently drive the windrower forward until the drawbar support pivots up to transport position.
 - Stop engine, and remove key.
 - Reinstall pin (B).

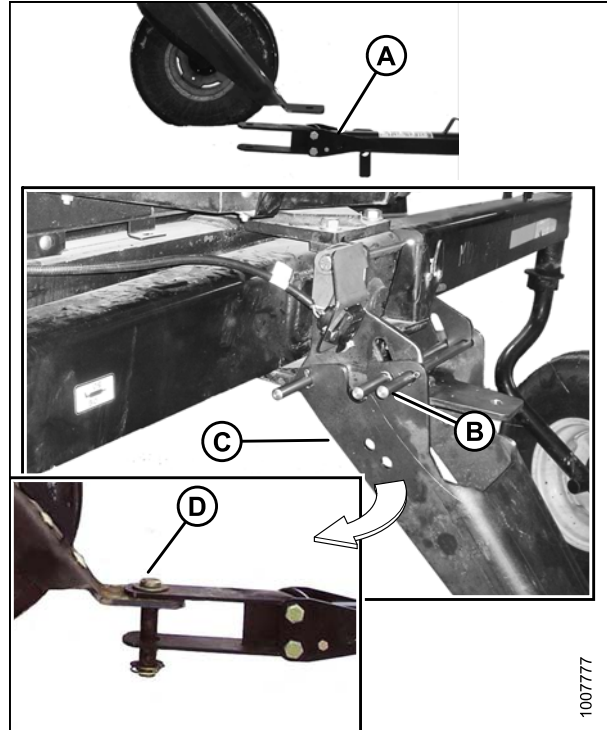


Figure 4.45: Towing Components

28. Connect safety chain (A) through the slot in the drawbar support (B), and securely attach the hook (C) to the chain. Leave enough slack to allow the hitch to pivot.

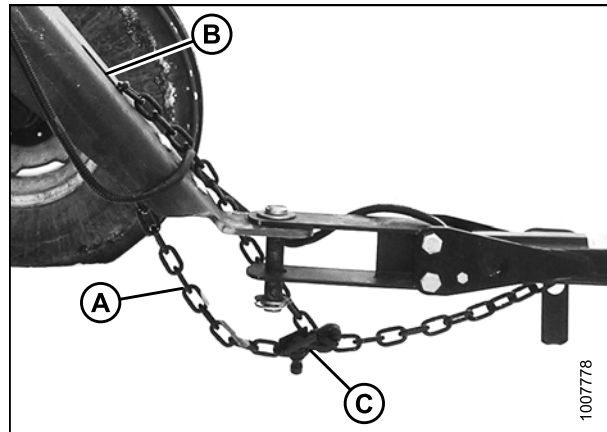


Figure 4.46: Towing Components

OPERATION

29. At the drawbar, connect the tow-bar harness plug (A) to the receptacle on the windrower.

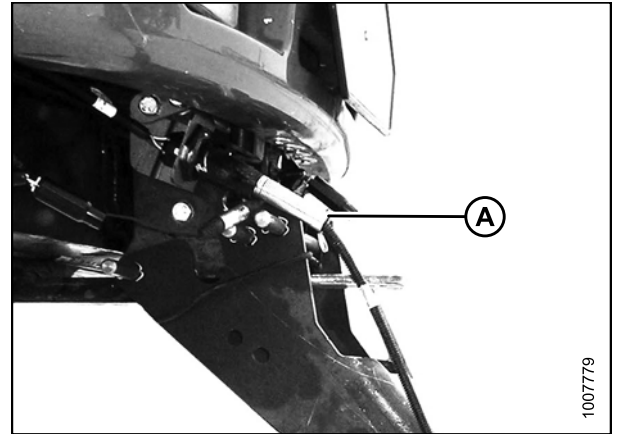


Figure 4.47: Towing Harness

30. At the LH float spring tower, attach connector (A) on windrower harness to towing harness receptacle (B).

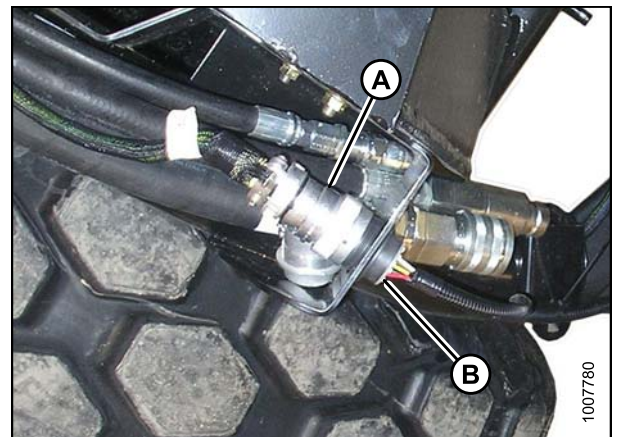


Figure 4.48: Towing Harness

31. Confirm that the flashing amber and signal lights on header function properly.
32. Before moving the machine, double check that all pins are secure, the drawbar and hitching components are not showing signs of damage, and that all safety equipment is installed and fully functional.

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.

OPERATION

2. Disconnect electrical harness at connector (B) from windrower and store harness (A) on weight box.

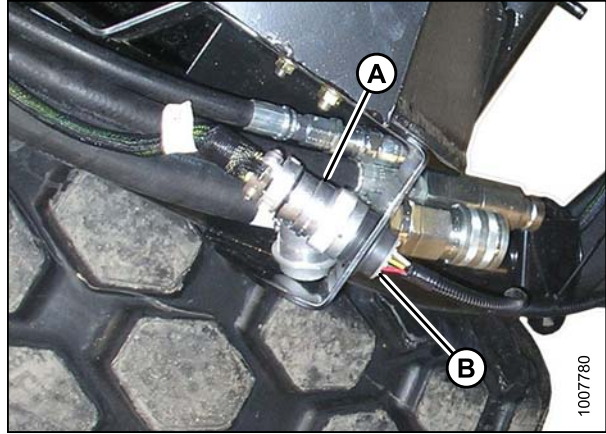


Figure 4.49: Electrical Harness

3. Disconnect electrical harness (A) from windrower, and store harness on tow-bar.

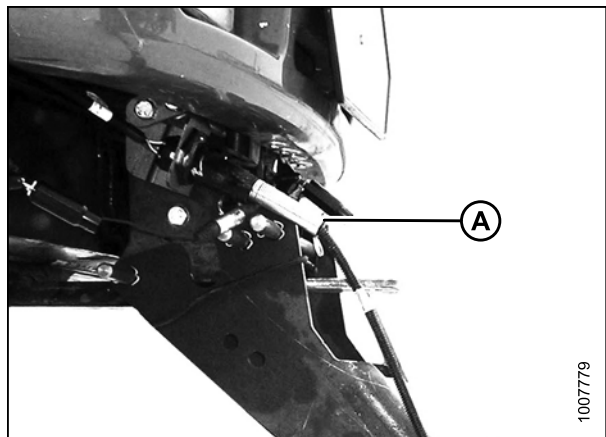


Figure 4.50: Electrical Connector

4. Undo lock (A), remove safety chain (B) from drawbar, and remove clevis pin (C).

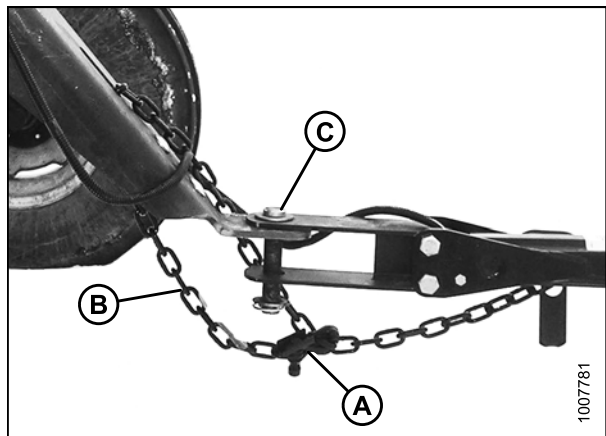


Figure 4.51: Drawbar Hitch

OPERATION

5. Move tow-bar off drawbar.
6. At rear of windrower, remove pins (A), lift drawbar support (B) to horizontal position, and reinstall pins (a) as shown.
7. Alternative drawbar (C) is used for attaching a tow-bar behind swath roller.

IMPORTANT:

Do **NOT** use alternative drawbar for any other purpose.

8. Disassemble tow-bar, and store on header. Refer to header operator's manual.

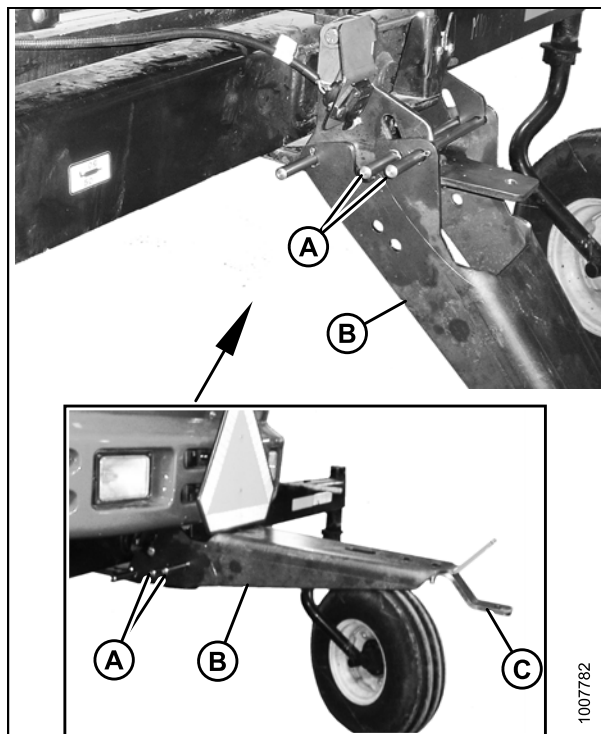


Figure 4.52: Drawbar Hitch

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).

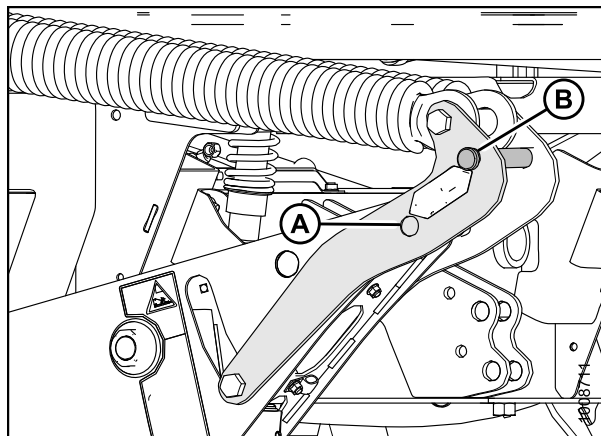


Figure 4.53: Lift Arms

OPERATION

- Remove pins (A) securing lift linkages to weight box, and retain pins for attaching header to windrower.
- Start engine, lower weight box onto blocks, and back away.
- Attach header to windrower. Refer to [4.5.1 Attaching a D-Series Header, page 131](#).
- Convert header to field position. Refer to header operator's manual for procedure.

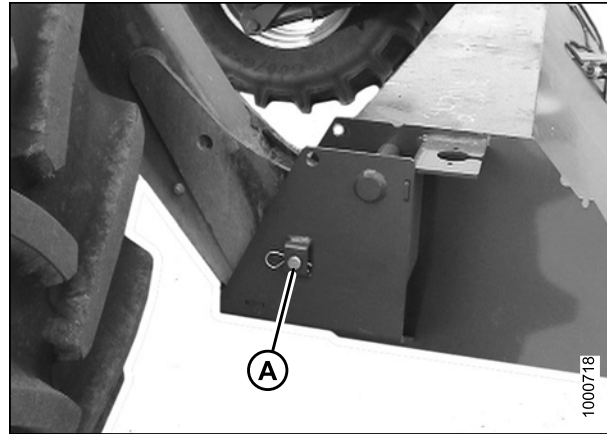


Figure 4.54: Weight Box

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

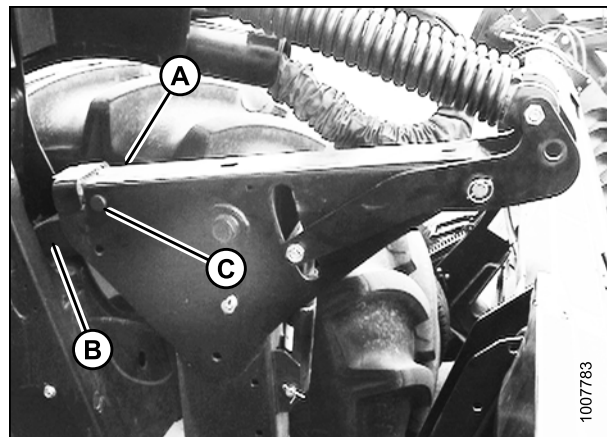


Figure 4.55: Lift Arms

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.

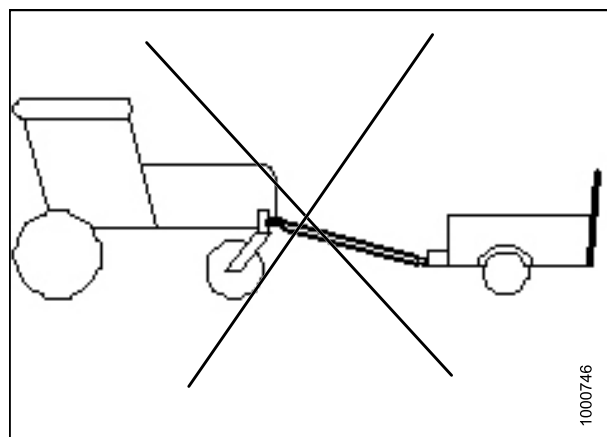


Figure 4.56: Improper Towing Procedure

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 ground speed lever (GSL) is in N-DETENT before detaching from towing vehicle.

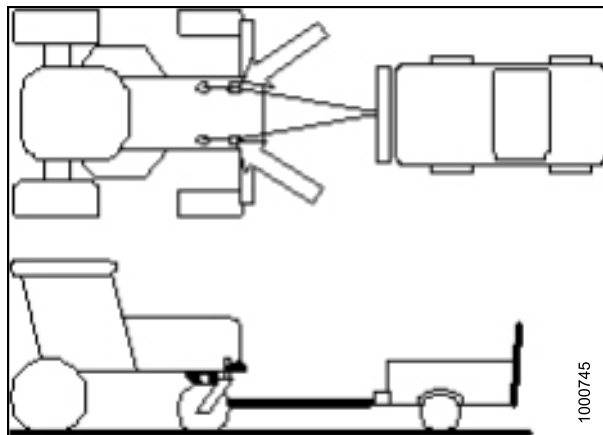


Figure 4.57: Correct Towing Procedure

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 bolts (A) at the 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 (B) to engage final drives. Be sure plunger at center of wheel pops out to engage drive.

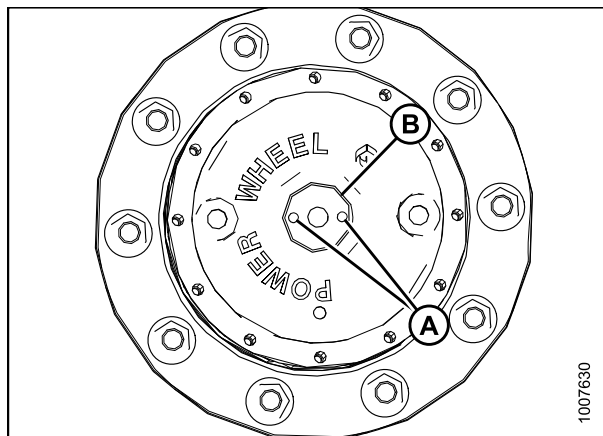


Figure 4.58: Final Drives

4.3.9 Storing the Windrower

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

WARNING

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

OPERATION

CAUTION

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

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.

1. Clean the windrower thoroughly.
2. Store windrower in a dry protected place.
3. Remove battery. Refer to [Removing Battery, page 266](#).
4. Bring to full charge and store in a cool, dry place not subject to freezing.
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. Refer to [5.2 Torque Specifications, page 186](#).
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 [Checking and Filling Hydraulic Oil, page 288](#).
14. Test engine coolant antifreeze concentration to ensure it is sufficient to protect engine against lowest expected temperature.

4.4 Operating with a Header

The M105 Self-Propelled Windrower is designed to use the MacDon A-Series Auger Header, and D65 Rigid Draper Header (up to 35-foot), 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 Safety Props

Safety props are located on both header lift cylinders on the windrower.

DANGER

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

Engage safety props as follows:

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

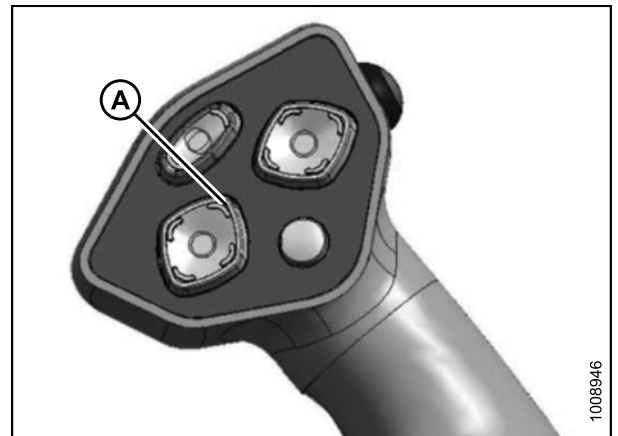


Figure 4.59: Ground Speed Lever (GSL)

OPERATION

3. Pull lever (A) and rotate toward header to lower safety prop (B) onto cylinder. Repeat for opposite cylinder.

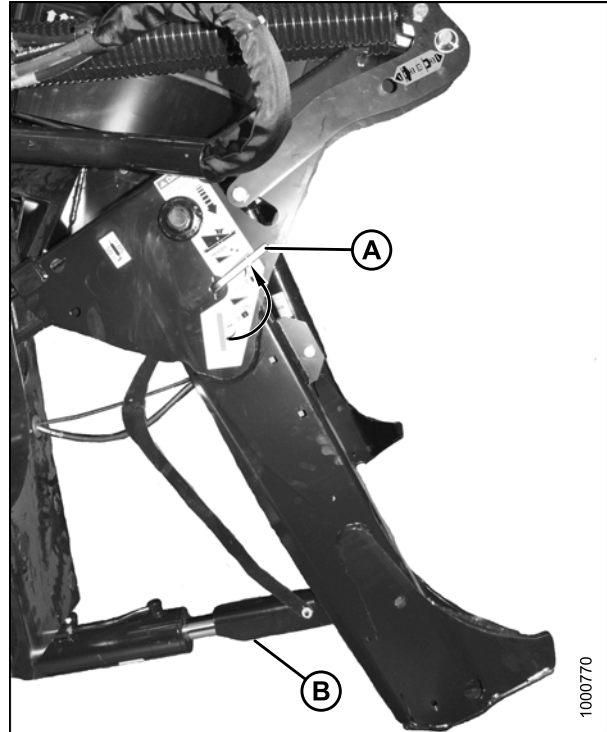


Figure 4.60: Safety Prop

4. To disengage safety props and for storage, turn lever (A) away from header to raise safety prop until lever locks into vertical position. Repeat for opposite cylinder.

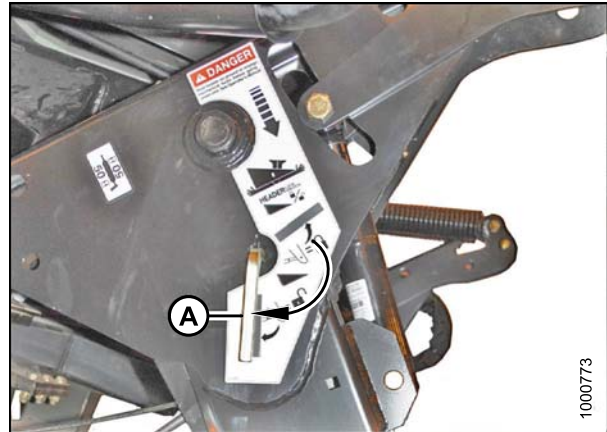


Figure 4.61: Safety Prop

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

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 knife 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.
- The stabilizer wheels are designed to minimize bouncing at the header ends and **NOT** float the header. Refer to your header operator's manual for float setting and adjustment guidelines.

Float Operating Guidelines

When working with the cutterbar on the ground:

1. Set center-link to mid-range position (05.0 on cab display module [CDM]). Refer to [4.4.5 Adjusting Header Angle, page 124](#).
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 Adjusting Header Angle, page 124](#).
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 127](#).

OPERATION

Checking Float



Figure 4.62: Cab Display Module (CDM) Float Adjustment

A - CDM Display

B - Header Tilt Down

C - Header Tilt Up

D - Header Up

E - Header Down

Check header float 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.

! CAUTION

Check to be sure all bystanders have cleared the area.

1. Start the engine.
2. If hydraulic center-link is installed, use HEADER TILT switches (B, C) to 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. Shut down the engine and remove the key.
5. Grasp the divider rod at the end of the header 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 Required to Lift Header at the Ends with Lift Cylinder Fully Retracted
Auger	75–85 lbf (335–380 N)
Draper	75–85 lbf (335–380 N) with stabilizer/transport wheels raised (if equipped).

OPERATION

Adjusting Float Using Drawbolts

Float adjustment uses drawbolts to change the tension on the springs in the lift linkages.

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

CAUTION

Check to be sure all bystanders have cleared the area.

1. Start engine.
2. Using HEADER UP (A) switch on ground speed lever (GSL), raise the header fully, shut down engine, and remove key.



Figure 4.63: GSL

3. Turn drawbolt (A) clockwise to increase float (makes header lighter) or counterclockwise to decrease float (makes header heavier).
4. Recheck the header float as described in [Checking Float, page 120](#).

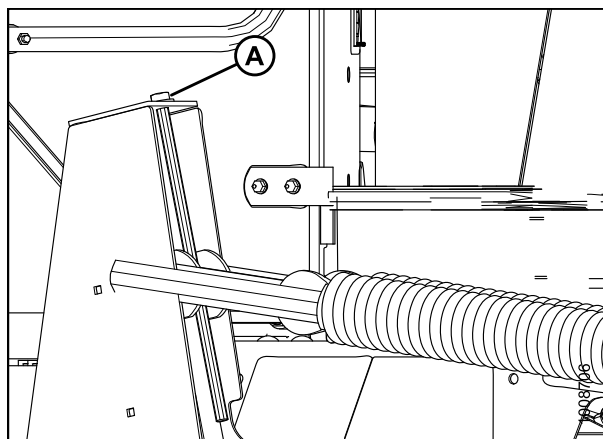


Figure 4.64: Header Float Adjustment

4.4.3 Levelling the Header

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

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

If the header is not level, perform the following checks prior to adjusting the levelling linkages.

NOTE:

The float springs are **NOT** used to level the header.

- Raise header to full height, and keep HEADER UP switch pressed to ensure lift cylinders are phased.
- Check drive wheel tire pressures.
- Check and set float adjustment. Refer to [Checking Float, page 120](#).

To level the header, follow these steps:

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

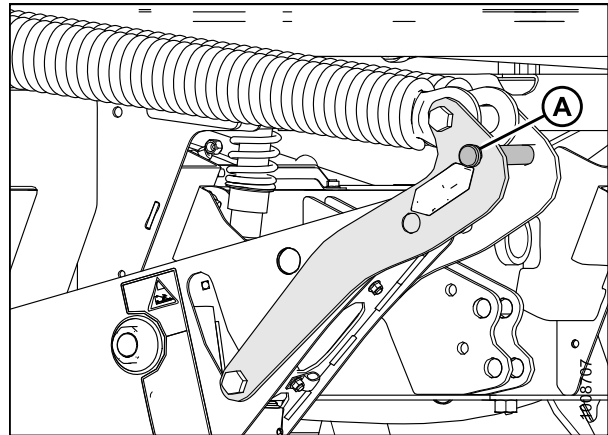


Figure 4.65: Float Pins

2. Park windrower on level ground.
3. Set header approximately 6 in. (150 mm) off ground and check that member (A) is against link (B). Note the high and low end of header.
4. Place wooden blocks under header cutterbar and legs.

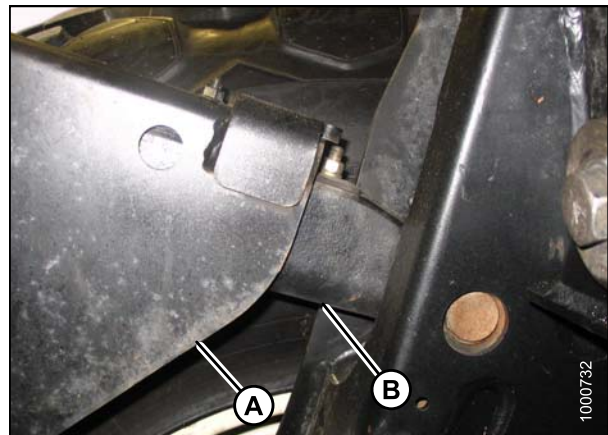


Figure 4.66: Lift Linkage

OPERATION

5. Lower header onto blocks so that member (A) lifts off link (B) on both sides.
6. Stop engine and remove key.

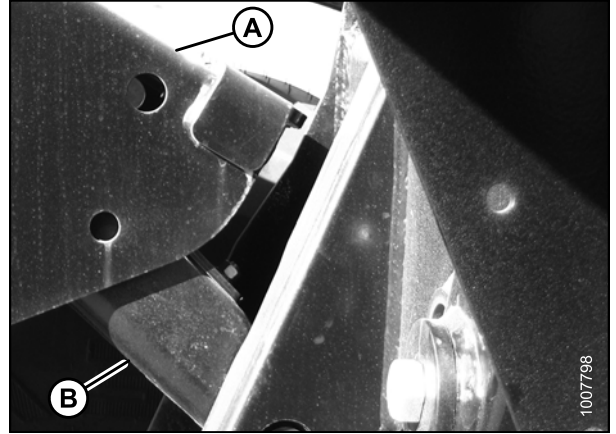


Figure 4.67: Lift Linkage

7. On high side, remove nut, washer, and bolt (A) that attaches shims (B) to link.
8. Remove one or both shims (B) and reinstall the hardware (A).

CAUTION

Check to be sure all bystanders have cleared the area.

9. Start engine and raise header slightly. Check level of header.
10. If additional levelling is required, install the removed shim on the opposite linkage.

NOTE:

If required, additional shims are available from your Dealer.

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

NOTE:

Float does **NOT** require adjustment after levelling header.

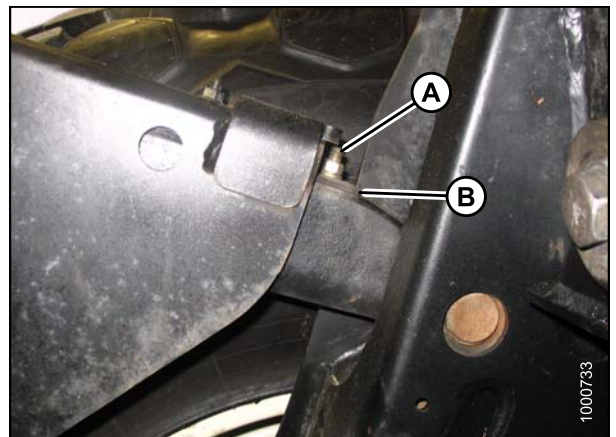


Figure 4.68: Lift Linkage

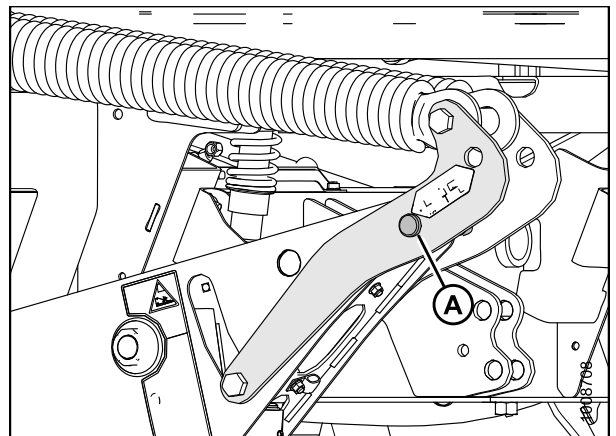


Figure 4.69: Float Pins

OPERATION

4.4.4 Header Drive

The headers are hydraulically driven and controlled from the windrower with no mechanical drive shafts.

One hydraulic piston pump on the windrower provides fluid power to the knife, and three gear pumps power the drapers or auger, reel, lift, and positioning systems and optional attachments.

All header controls are conveniently located on the operator's console and on the ground speed lever (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.

Engaging and Disengaging the Header

IMPORTANT:

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

CAUTION

Check to be sure all bystanders have cleared the area.

1. To Engage Header:

- Move throttle (A) to adjust engine speed to idle.
- Push down on the yellow knob in the center of the HEADER DRIVE switch (B) and pull up on the black ring at the base of the switch. A slight delay between switch ON and operating speed is normal.

2. To Disengage Header:

- Push HEADER DRIVE switch (B) down to disengage header drive.

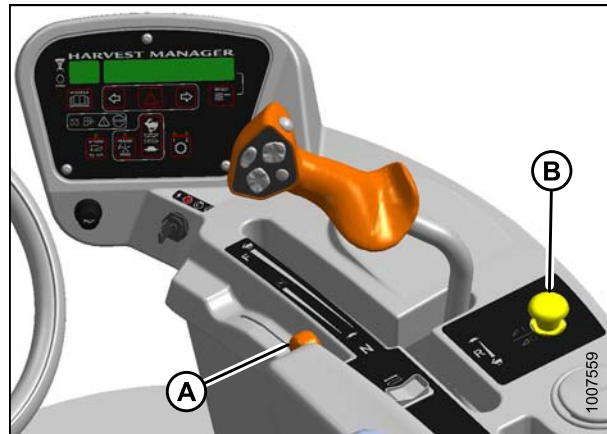


Figure 4.70: Operator Console

4.4.5 Adjusting 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 the 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 cab display module (CDM) allows you to establish settings for each crop condition. This feature requires that the optional expansion module MD #B4666 be installed, either at the factory or at your MacDon Dealer.

OPERATION

IMPORTANT:

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



Figure 4.71: Operator Console

A - Program Button
D - Header Tilt Up

B - Display
E - Display Selector

C - Header Tilt Down

Change header angle as follows:

Hydraulic Link (Optional)

- To decrease (flatten) header angle, operate HEADER TILT UP switch (C) on ground speed lever (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.
 - To increase (steepen) header angle, operate HEADER TILT DOWN switch (D) on GSL handle so the cylinder extends. The CDM display will show a reading on the lower line of increasing value between 00.0 and 10.0.
 - 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 70](#).
1. Switch to PROGRAM mode on CDM.
 2. Press SELECT until SET CONTROL LOCKS? is displayed.
 3. Press the right arrow to display HEADER TILT.
 4. Press the right arrow to LOCK (deactivate) the control.
 5. Press PROGRAM (A) to exit.

OPERATION

Checking Self-Locking Center-Link Hook

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

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

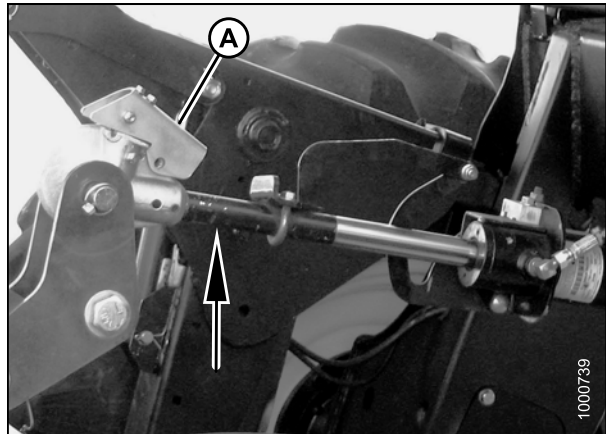


Figure 4.72: Center-Link

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.

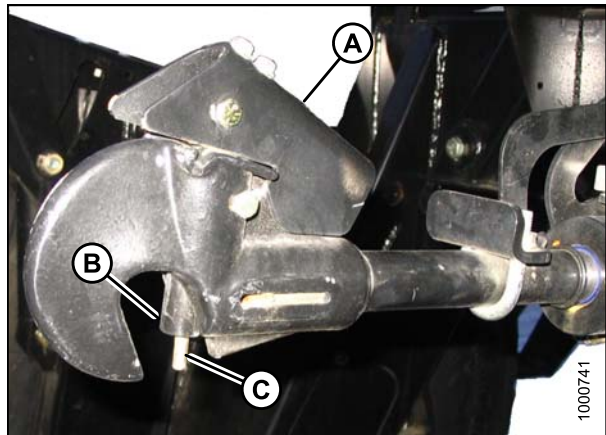


Figure 4.73: Center-Link Hook

A - Handle

B - Lock Pin

C - Actuator Rod

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



Figure 4.74: Center-Link Hook

4.4.6 Cutting Height



Figure 4.75: Operator Console

A - Display

B - Header Up

C - Header Down

D - Display Selector

Cutting height is adjusted by raising or lowering the header with the HEADER UP (B) or HEADER DOWN (C) switches on the ground speed lever (GSL).

The cab display module (CDM) indicates header height with 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 you in maintaining the desired cutting height with the RETURN TO CUT feature. This feature can be turned OFF or ON with a switch on the cab display module (CDM).

The return to cut (RTC) feature provides preset cutting height and tilt angle settings for the header.

NOTE:

To enable the RTC header tilt feature, the optional hydraulic center-link and expansion module must be installed. Refer to [7.1.12 Hydraulic Center-Link, page 339](#) and [7.1.10 Expansion Module, page 338](#).

If desired, the CDM can be programmed so only the cutting height feature is active. The unit will default to cutting height only if no hydraulic center-link or expansion module is installed.

Refer to the following procedures:

- [Programming Return to Cut Feature, page 128](#)
- [Using Return to Cut Feature, page 129](#)

OPERATION

Programming Return to Cut Feature



Figure 4.76: Operator Console

A - Return to Cut
D - Display

B - Header Up
E - Header Tilt Up

C - Header Down
F - Header Tilt Down

Program the RETURN TO CUT (RTC) feature as follows:

IMPORTANT:

To enable the RTC header tilt feature, the hydraulic center-link and expansion module options must be installed.

CAUTION

Check to be sure all bystanders have cleared the area.

1. Start windrower and engage the header.
2. Set RETURN TO CUT switch (A) to OFF (indicator light is OFF).
3. Adjust the header to the desired cutting height with the HEADER UP (B) or HEADER DOWN (C) switches on the ground speed lever (GSL). The cab display module (CDM) displays between **00.0 and 10.0** at (D).
4. Adjust the header angle with the HEADER TILT UP (E) or HEADER TILT DOWN (F) switches on the GSL. The CDM displays between **00.0 and 10.0**. This step is not required when height only has been preselected.
5. Press the RETURN TO CUT switch (A) on the CDM. The indicator light will illuminate and the settings are now programmed into the windrower control module (WCM).

OPERATION

Using Return to Cut Feature



Figure 4.77: Operator Console

A - Return to Cut
D - Display

B - Header Up
E - Header Tilt Up

C - Header Down
F - Header Tilt Down

Use the RETURN TO CUT feature as follows:

IMPORTANT:

Ensure the header is engaged and the RETURN TO CUT switch (A) is illuminated.

NOTE:

The header can be raised or lowered by **pressing and holding** the HEADER UP (B) or HEADER DOWN (C) switches on the ground speed lever (GSL).

1. If header is above the preset cutting height, **momentarily press** HEADER DOWN switch (C) and the header will return to preset height.
2. If the header is below the preset height, **press and hold** the HEADER UP (B) switch to raise the header. Release switch to stop header. Alarm will sound when header rises past the preset height.
3. If the header angle changes (for machines equipped with optional hydraulic center-link and expansion module), double-click (two clicks within 0.5 seconds) the HEADER TILT UP (E) or HEADER TILT DOWN switch (F) and the header will return to the preset angle.

NOTE:

If the header cannot return to the preset 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 (A) to reactivate.

4.4.7 Swath Roller Operation

Refer to the operating instructions that are provided with an optional Swath Roller kit. Refer to [7.1.15 Swath Roller, page 339](#) for more information.

4.5 Attaching and Detaching Headers

4.5.1 Attaching a D-Series Header

Refer to the procedure that is appropriate for the center-link installed on the windrower:

- [Attaching a D-Series Header: Hydraulic Center-Link, page 131](#)
- [Attaching a D-Series Header: Mechanical Center-Link, page 136](#)

Attaching a D-Series Header: Hydraulic Center-Link

NOTE:

This topic assumes that draper header boots have already been attached to the windrower lift linkage. If that is not the case, refer to [4.6.2 Attaching Header Boots, page 168](#).

To attach a D-Series header to a windrower equipped with a hydraulic center-link, follow these steps:

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 hairpin (A) from pin (B) and remove the pins from both header legs.

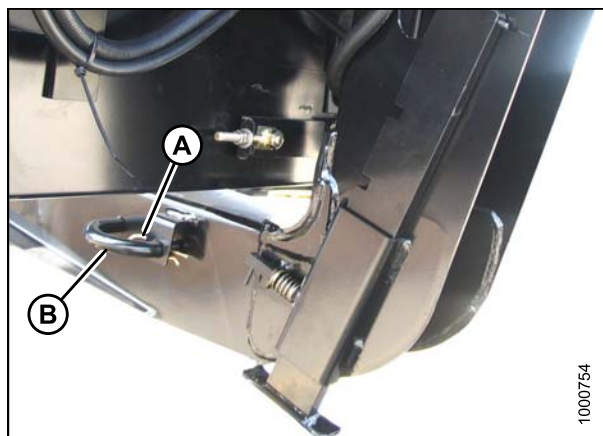


Figure 4.78: Header Leg

CAUTION

Check to be sure all bystanders have cleared the area.

2. Start engine and activate HEADER DOWN button (A) on the ground speed lever (GSL) to fully retract header lift cylinders.

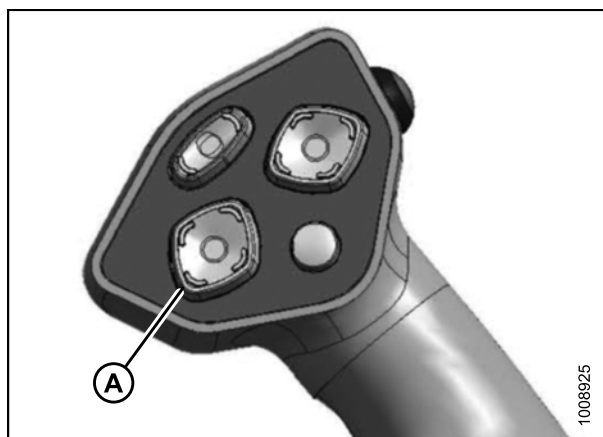


Figure 4.79: GSL

OPERATION

3. If necessary, relocate the pin (A) at the frame linkage as required to raise the center-link (B) so that the hook (B) is above the attachment pin on the header.

IMPORTANT:

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

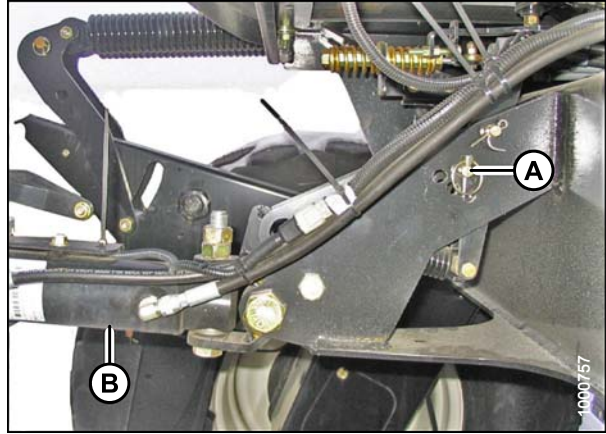


Figure 4.80: Hydraulic Center-Link

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

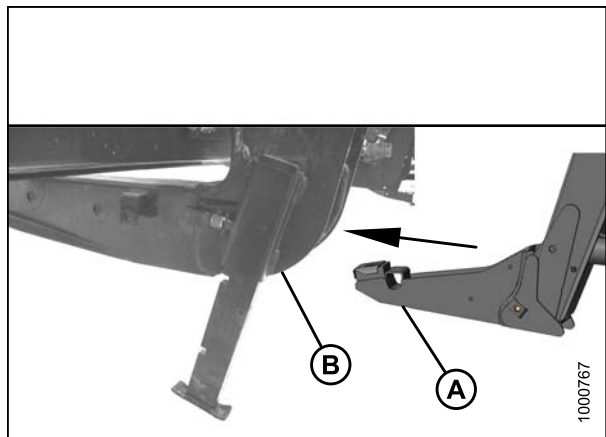


Figure 4.81: Header Leg and Boot

6. Activate HEADER TILT cylinder switches on ground speed lever (GSL) to extend or retract center-link cylinder so that the hook lines up with the header attachment pin.
7. Stop engine and remove key from ignition.

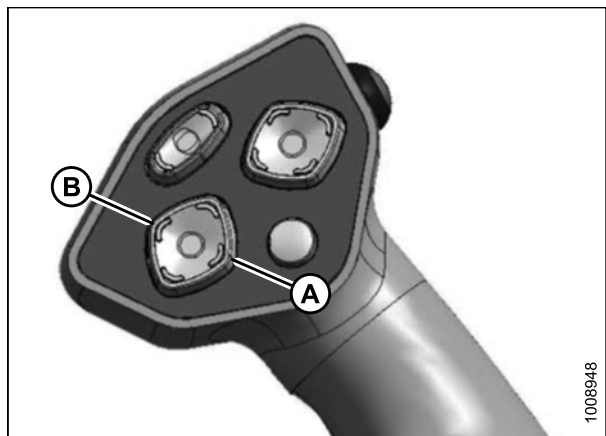


Figure 4.82: GSL

A - Header Tilt Up

B - Header Tilt Down

OPERATION

8. Push down on rod end of link cylinder (B), until hook engages pin on header and is locked.

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.

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

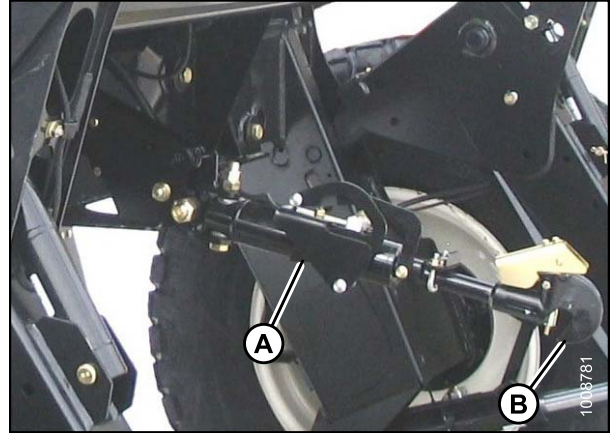


Figure 4.83: Hydraulic Center-Link

CAUTION

Check to be sure all bystanders have cleared the area.

10. Start engine and press the HEADER UP switch (A) to raise header to maximum height.

NOTE:

If one end of the header does **NOT** raise fully, rephase the cylinders 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. Cylinders are now phased.

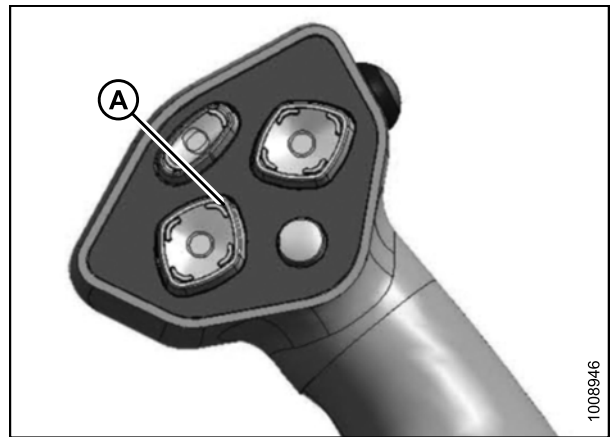


Figure 4.84: GSL

OPERATION

11. Engage safety props 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 the cylinder stop (B) onto cylinder.
 - c. Repeat for the opposite lift cylinder.

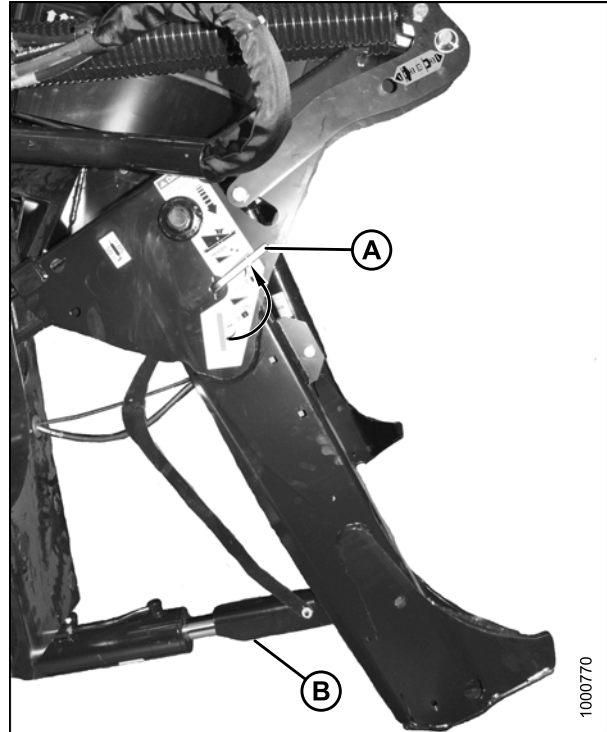


Figure 4.85: Cylinder Stop

12. Install the 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 spring pin (C) and lifting stand into uppermost position. Release spring pin (C).

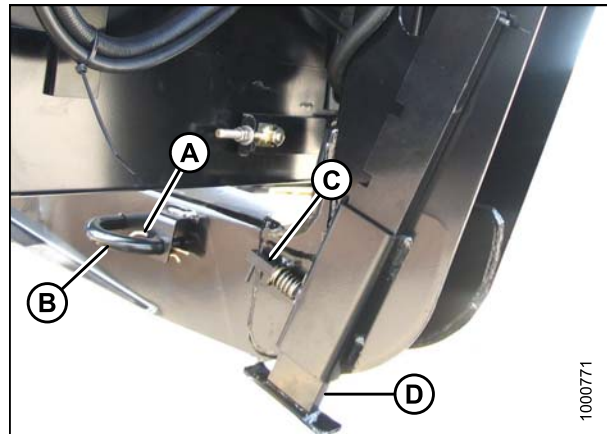


Figure 4.86: Header Leg

OPERATION

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

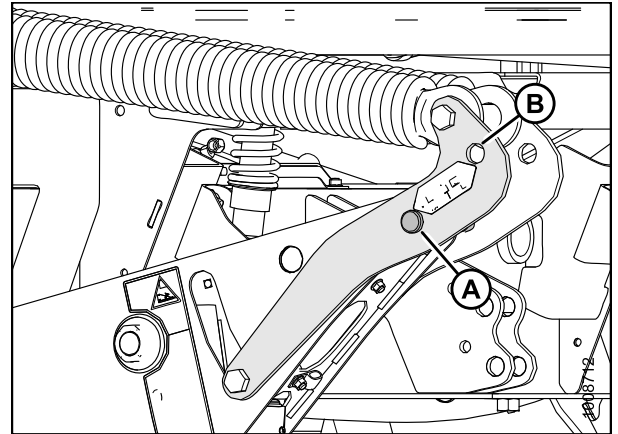


Figure 4.87: Header Lift Linkage

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

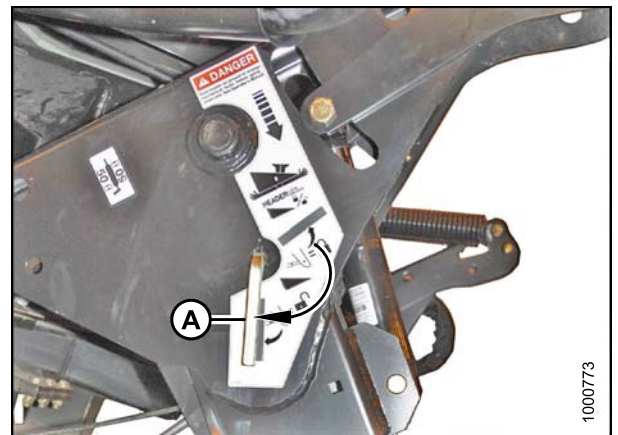


Figure 4.88: Cylinder Stop

CAUTION

Check to be sure all bystanders have cleared the area.

17. Start engine and activate HEADER DOWN switch (A) on GSL to lower header fully.
18. Stop engine and remove key.

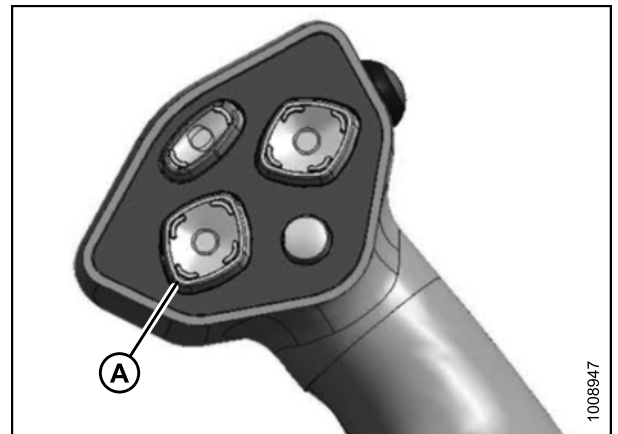


Figure 4.89: GSL

OPERATION

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

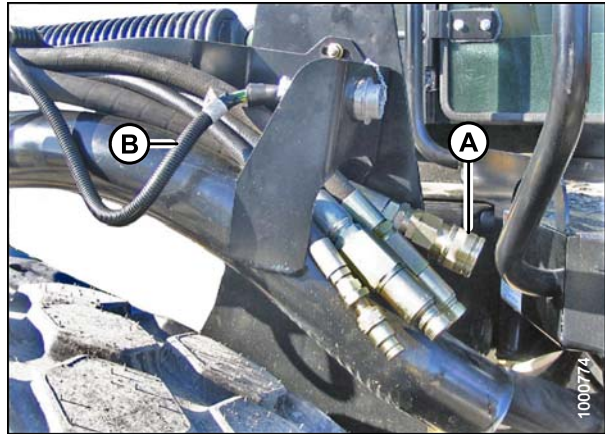


Figure 4.90: Header Drive Hoses and Harness

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

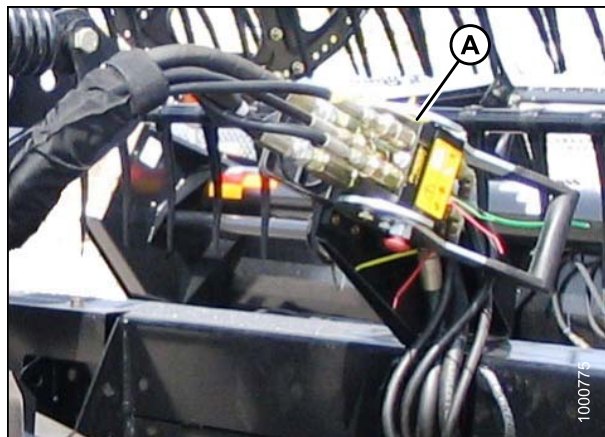


Figure 4.91: Reel Hydraulics

Attaching a D-Series Header: Mechanical Center-Link

NOTE:

This topic assumes that draper header boots have already been attached to the windrower lift linkage. If that is not the case, refer to [4.6.2 Attaching Header Boots, page 168](#).

To attach a D-Series header to a windrower equipped with a mechanical center-link, follow these steps:

⚠ 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

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



CAUTION

Check to be sure all bystanders have cleared the area.

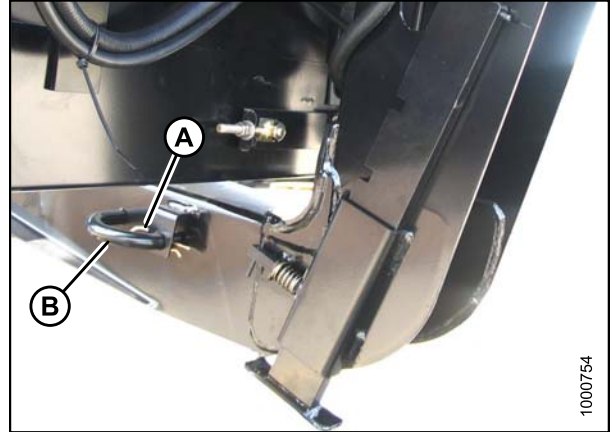


Figure 4.92: Header Leg

2. Start engine and activate HEADER DOWN button (A) on the ground speed lever (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.

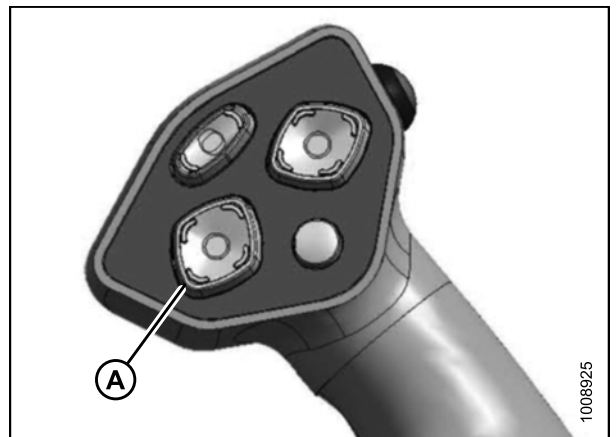


Figure 4.93: GSL

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

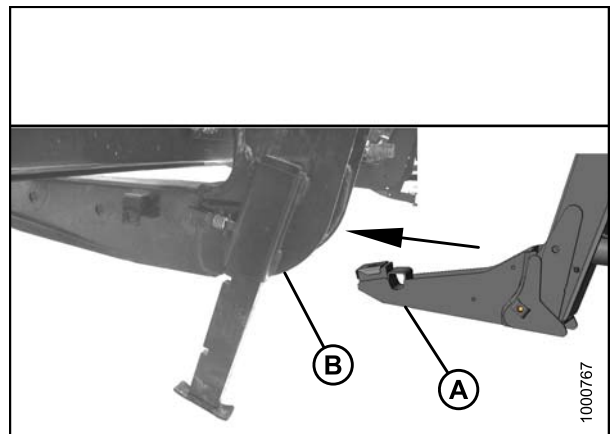


Figure 4.94: Header Leg and Boot

5. Stop engine and remove key from ignition.

OPERATION

- Loosen nut (A) and rotate barrel (B) to adjust length so that the link lines-up with header bracket.
- Install clevis pin (C) and secure with cotter pin (D).
- 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.

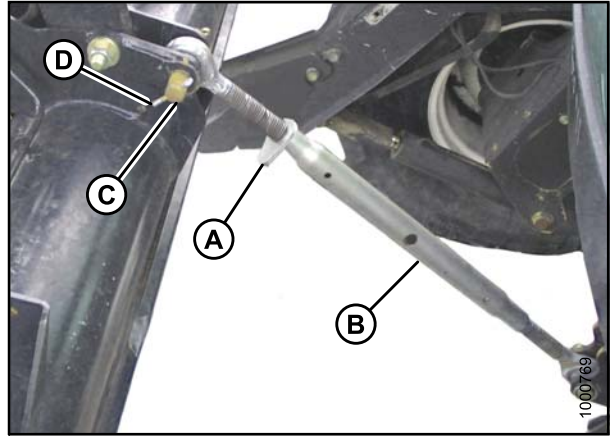


Figure 4.95: Mechanical Center-Link

CAUTION

Check to be sure all bystanders have cleared the area.

- Press the HEADER UP switch (A) to raise header to maximum height.

NOTE:

If one end of the header does **NOT** raise fully, rephase the cylinders as follows:

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



Figure 4.96: GSL

OPERATION

10. Engage safety props 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 the safety prop (B) onto cylinder.
 - c. Repeat for the opposite lift cylinder.

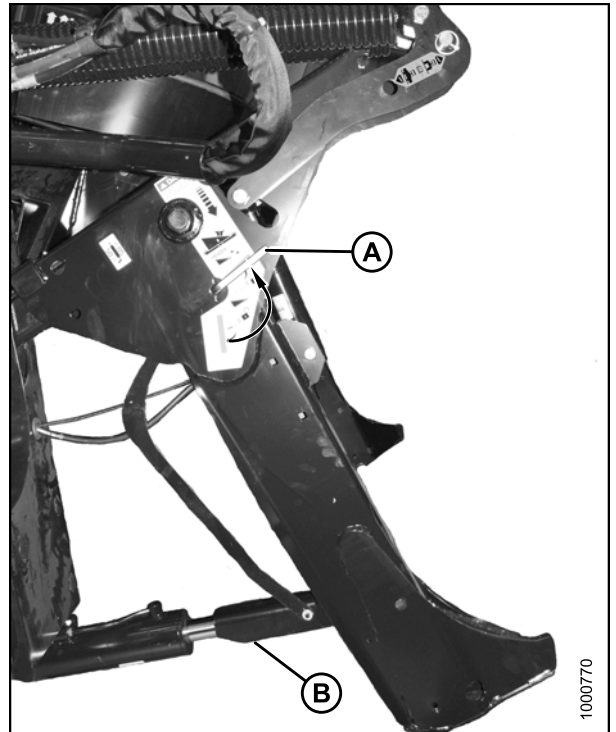


Figure 4.97: Cylinder Stop

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

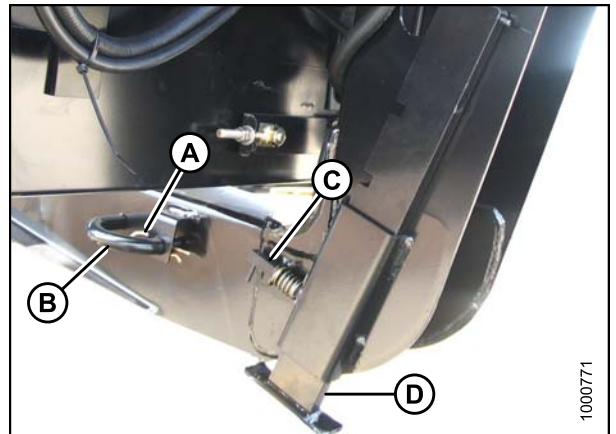


Figure 4.98: Header Leg

OPERATION

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

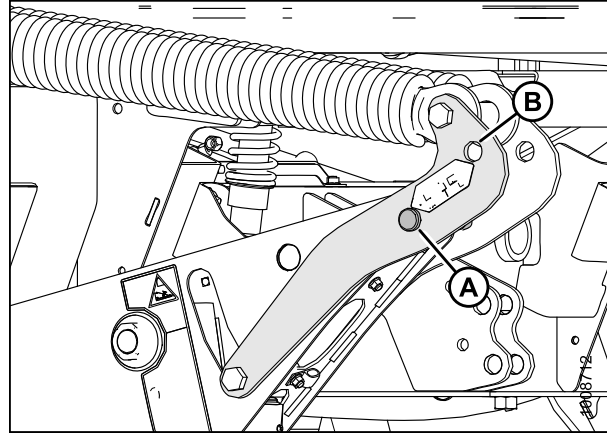


Figure 4.99: Header Lift Linkage

14. Disengage safety prop by turning lever (A) downward to release and lower stop until lever locks into vertical position.
15. Repeat for opposite safety prop.

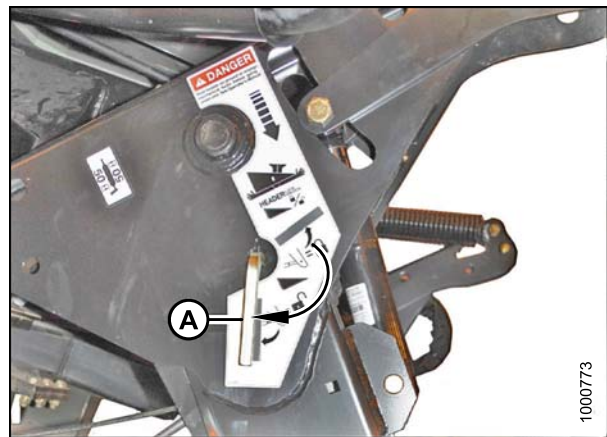


Figure 4.100: Cylinder Stop

CAUTION

Check to be sure all bystanders have cleared the area.

16. Start engine and activate HEADER DOWN switch on GSL (A) to lower header fully.
17. Stop engine and remove key.

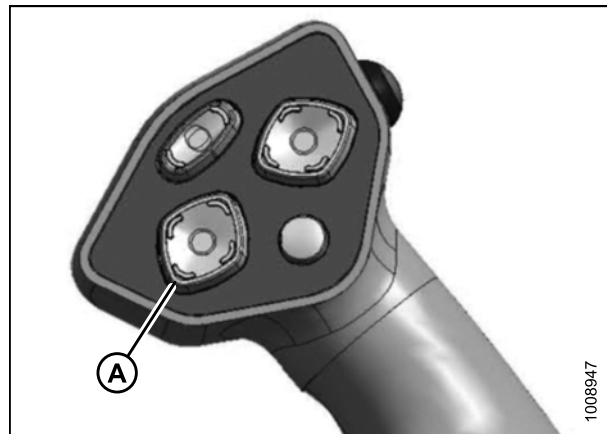


Figure 4.101: GSL

OPERATION

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

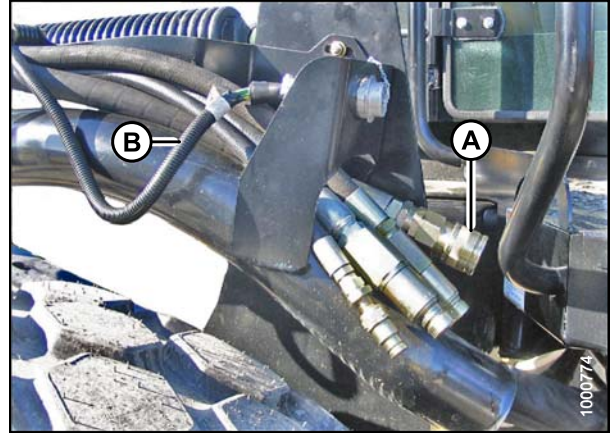


Figure 4.102: Header Drive Hoses and Harness

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

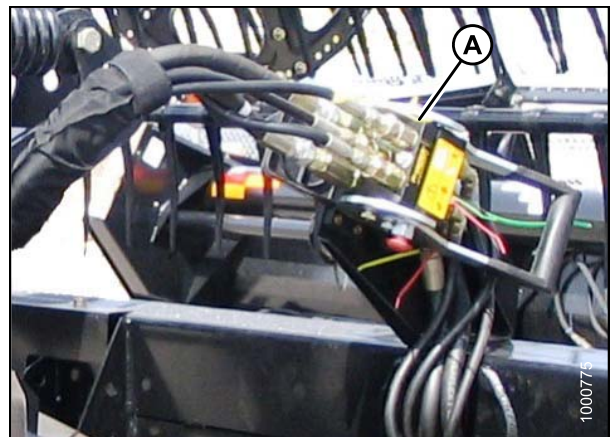


Figure 4.103: Reel Hydraulics

4.5.2 Detaching a D-Series Header

Refer to the procedure that is appropriate for the center-link installed on the windrower:

- [Detaching a D-Series Header: Hydraulic Center-Link, page 142](#)
- [Detaching a D-Series Header: Mechanical Center-Link, page 145](#)

OPERATION

Detaching a D-Series Header: Hydraulic Center-Link

To detach a D-Series header from an M-Series windrower equipped with a hydraulic center-link, follow these steps:

⚠ 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. Start engine and press HEADER UP (A) switch to raise header to maximum height.
2. Rephase cylinders if one end of the header does not raise fully. If rephasing is needed, proceed as follows:
 - a. Press and hold the HEADER UP (A) switch until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds. Cylinders are phased.
3. Stop engine and remove key.
4. Pull lever (A) and rotate toward header to lower safety prop (B) onto cylinder. Repeat for opposite cylinder.



Figure 4.104: GSL

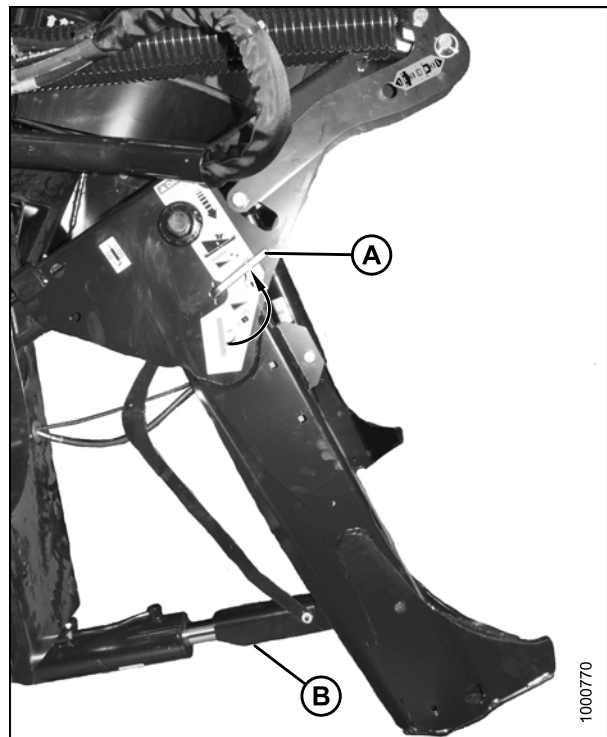


Figure 4.105: Safety Prop

OPERATION

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

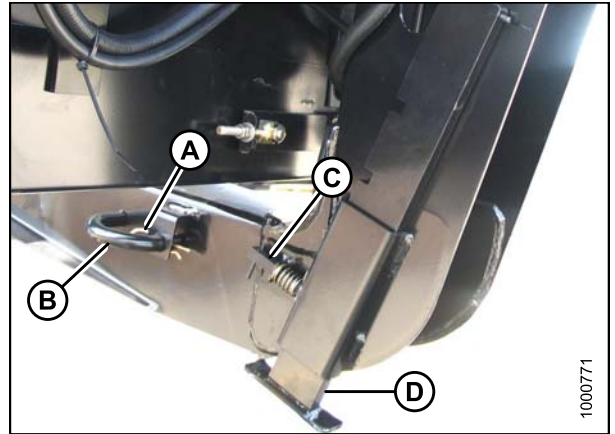


Figure 4.106: Header Stands

7. Remove clevis pin from location (A) to disengage float springs and insert in storage hole (B). 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).

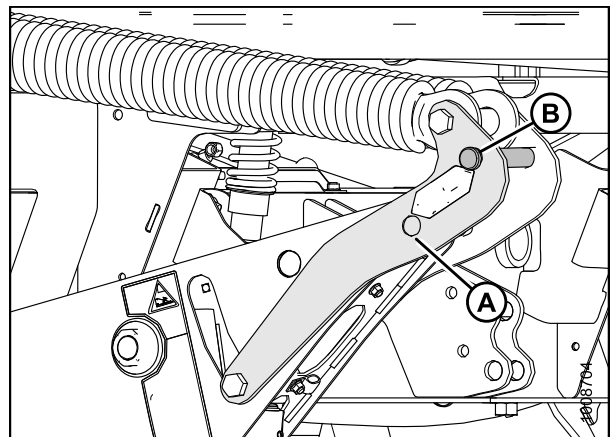


Figure 4.107: Header Lift Linkage

8. To disengage safety props and for storage, turn lever (A) away from header to raise safety prop until lever locks into vertical position. Repeat for opposite cylinder.

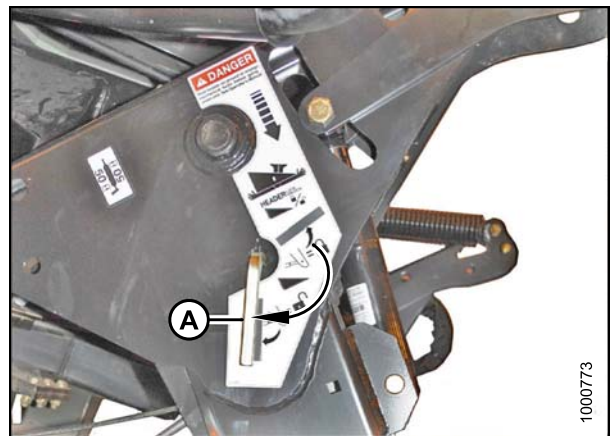


Figure 4.108: Safety Prop

OPERATION

9. Disconnect header drive hydraulics (A) and electrical harness (B) from header and store in support on windrower left cab-forward side. Refer to the draper header operator's manual for further information.

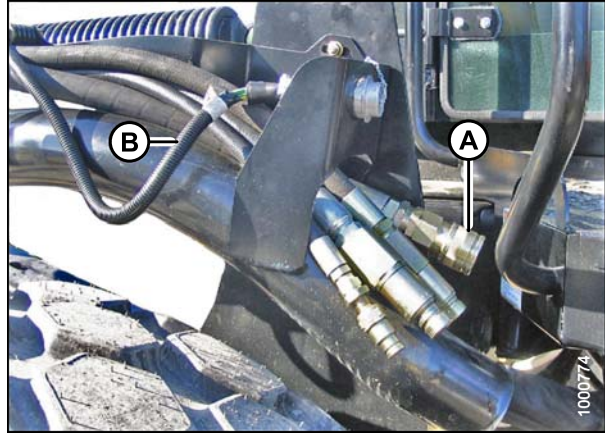


Figure 4.109: Header Drive Hydraulics

10. Disconnect reel hydraulics (A) from header and store on bracket at windrower left cab-forward side. Refer to the draper header operator's manual for further information.

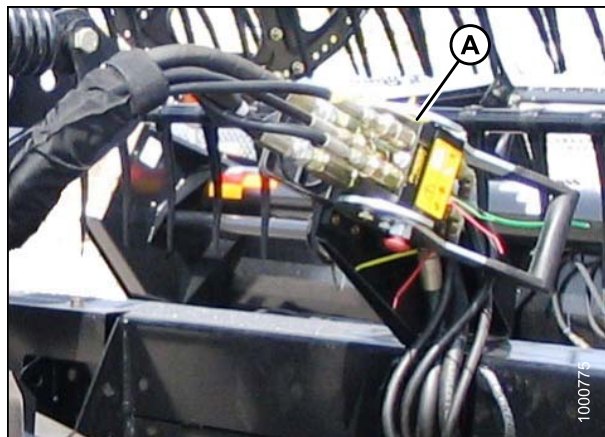


Figure 4.110: Reel Hydraulics

CAUTION

Check to be sure all bystanders have cleared the area.

11. Start engine and activate HEADER TILT cylinder switch on ground speed lever (GSL) to release load on center-link cylinder.

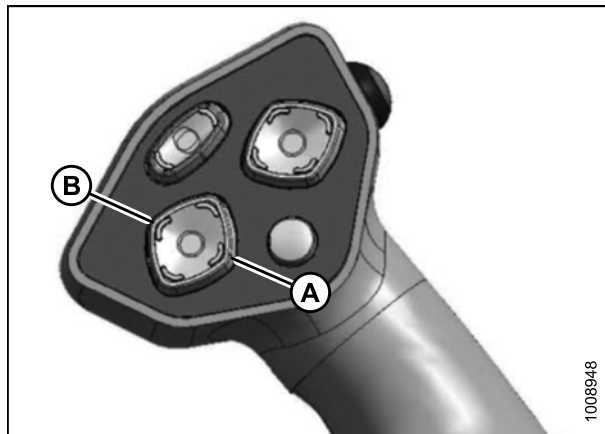


Figure 4.111: GSL

A - Header Tilt Up

B - Header Tilt Down

OPERATION

12. 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.

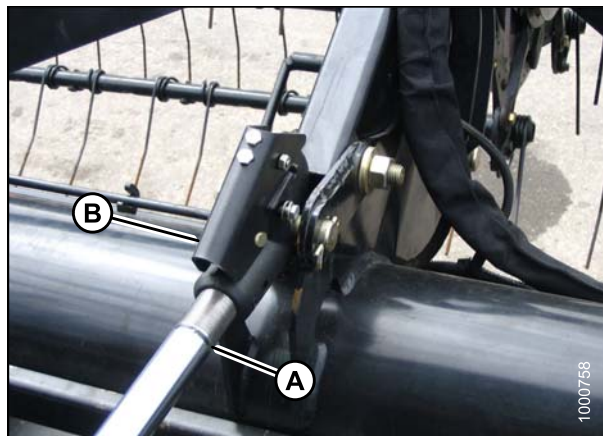


Figure 4.112: Hydraulic Center-Link

13. Reinstall pin (A) into header leg and secure with a hairpin (B).

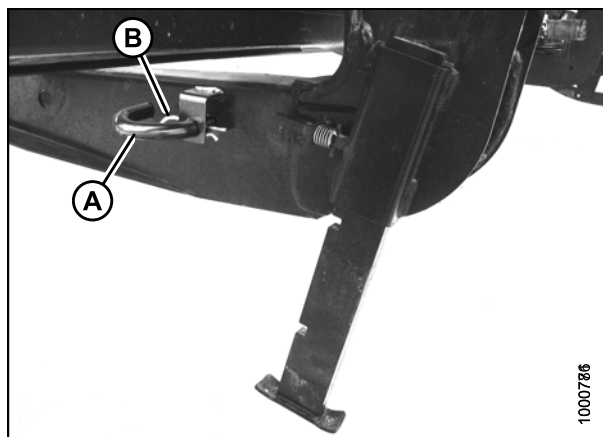


Figure 4.113: Header Stand

Detaching a D-Series Header: Mechanical Center-Link

To detach a D-Series header from an M-Series windrower equipped with mechanical center-link, follow these steps:

⚠ 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. Start engine and press HEADER UP (A) switch to raise header to maximum height.
2. If one end of the header does **NOT** raise completely, rephase the cylinders as follows:
 - a. Press and hold the HEADER UP (A) switch on the ground speed lever (GSL) until both cylinders stop moving.
 - b. Continue to hold the switch for 3–4 seconds. Cylinders are phased.
3. Stop engine and remove key.



Figure 4.114: GSL

OPERATION

4. To engage the safety props, pull lever (A) and rotate toward header to lower safety prop (B) onto cylinder. Repeat for the opposite cylinder.

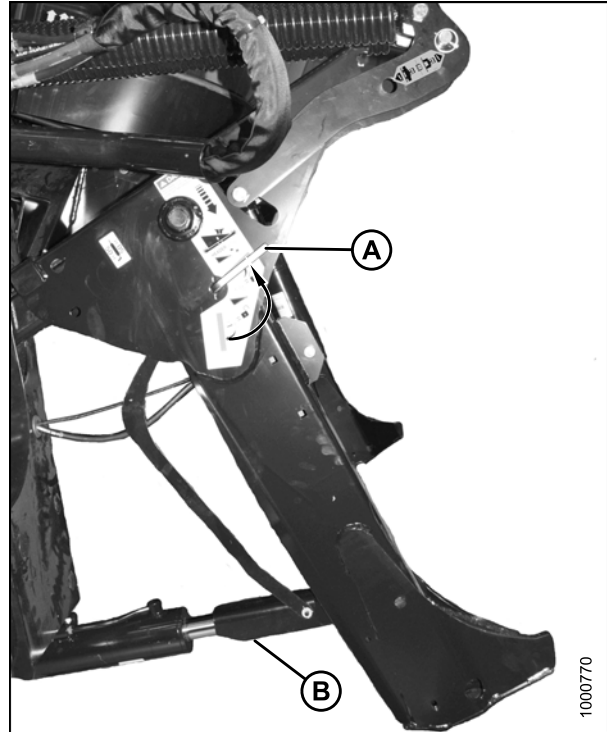


Figure 4.115: Safety Prop

5. Remove the clevis 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.

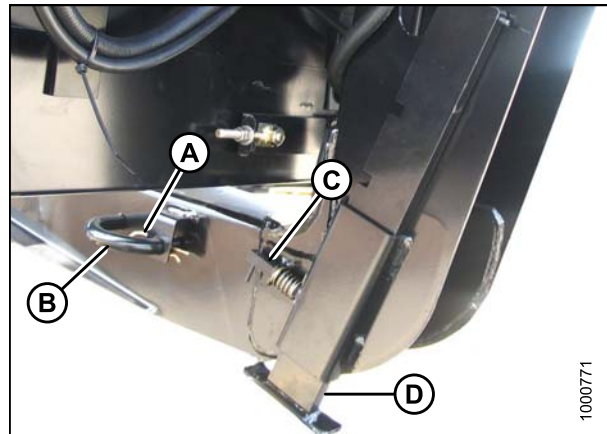


Figure 4.116: Header Stands

OPERATION

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

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).

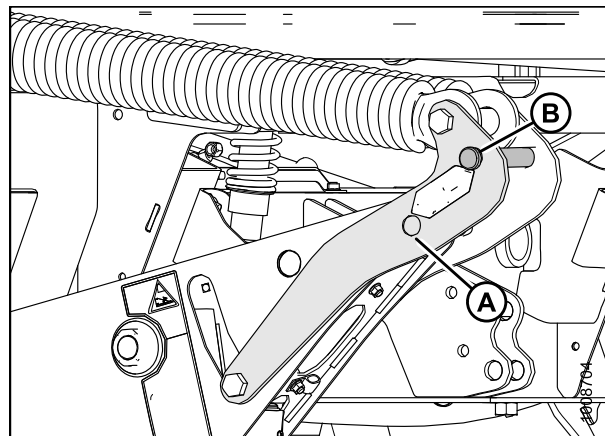


Figure 4.117: Header Lift Linkage

8. To disengage safety props and for storage, turn lever (A) away from header to raise safety prop until lever locks into vertical position. Repeat for opposite cylinder.

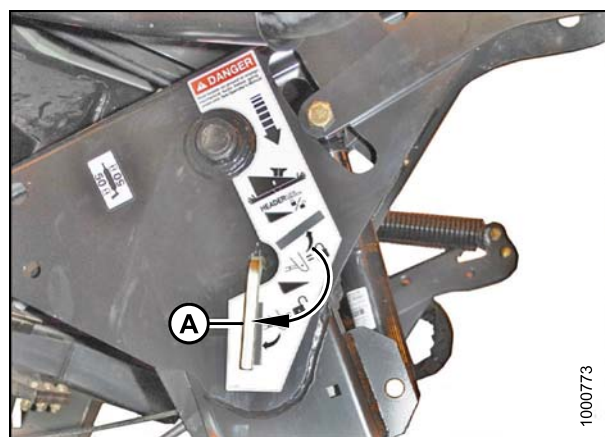


Figure 4.118: Safety Prop

9. Disconnect header drive hydraulics (A) and electrical harness (B) from header and store in support on windrower left cab-forward side. Refer to the draper header operator's manual for further information.

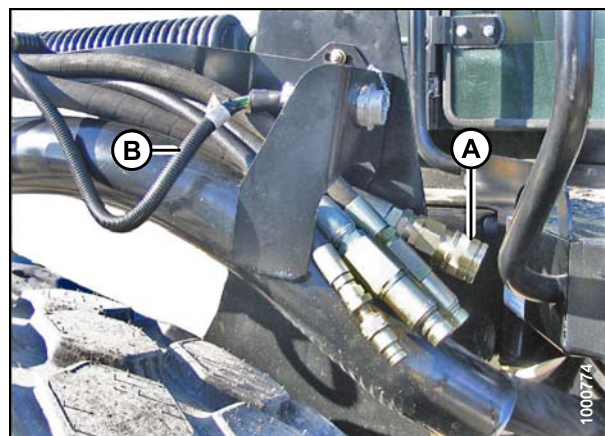


Figure 4.119: Header Drive Hydraulics

OPERATION

10. Disconnect reel hydraulics (A) from header and store on bracket at windrower left cab-forward side. Refer to the draper header operator's manual for further information.

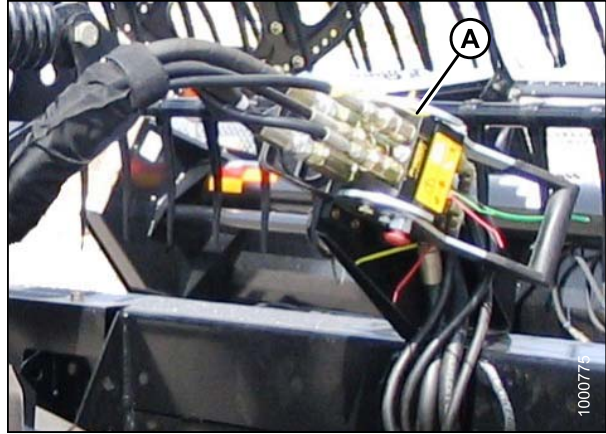


Figure 4.120: Reel Hydraulics

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

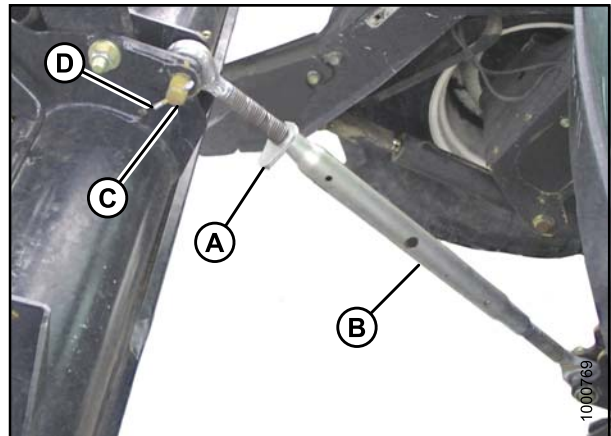


Figure 4.121: Mechanical Center-Link

14. Reinstall pin (A) into header leg and secure with a hairpin (B).

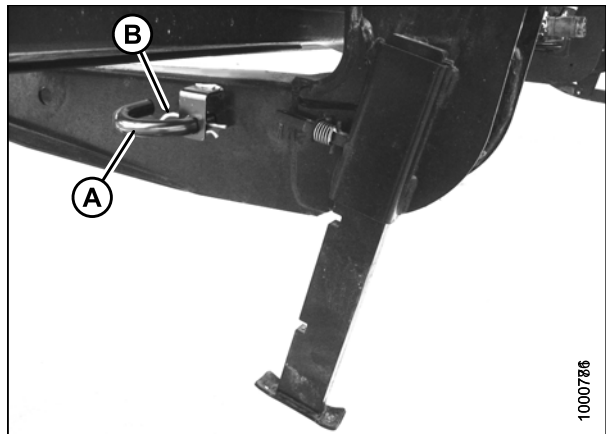


Figure 4.122: Header Leg

4.5.3 Attaching an A-Series Header

Refer to the procedure that is appropriate for the center-link installed on the windrower:

- [Attaching an A-Series Header: Hydraulic Center-Link, page 149](#)
- [Attaching an A-Series Header: Mechanical Center-Link, page 154](#)

OPERATION

Attaching an A-Series Header: Hydraulic Center-Link

To attach an A-Series header to a windrower equipped with a hydraulic center-link, follow these steps:

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 hairpin (A) from clevis pin (B) and remove the clevis pin from left and right header boots (C) on header.

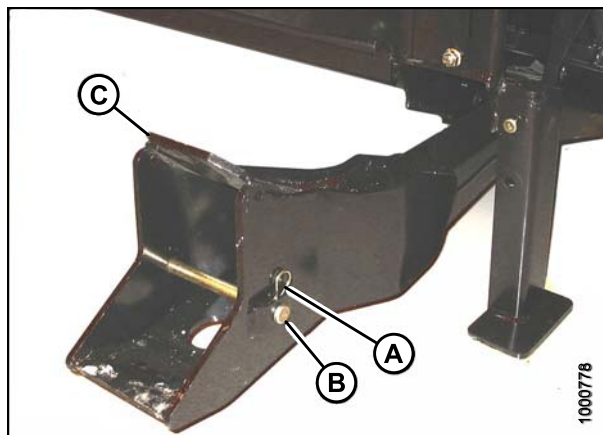


Figure 4.123: Header Boot

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).

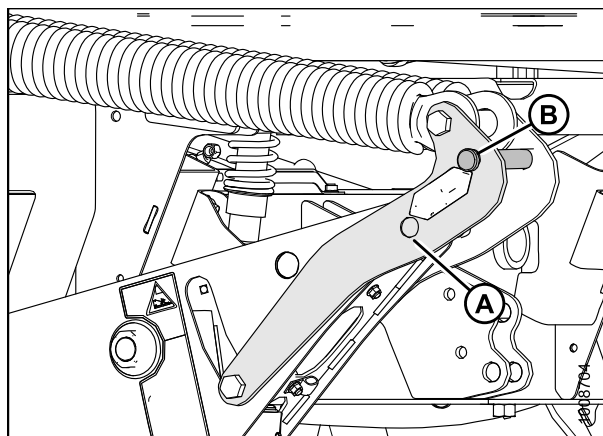


Figure 4.124: Header Lift Linkage

CAUTION

Check to be sure all bystanders have cleared the area.

2. Start the engine and activate HEADER DOWN button (A) on the ground speed lever (GSL) to fully retract header lift cylinders.

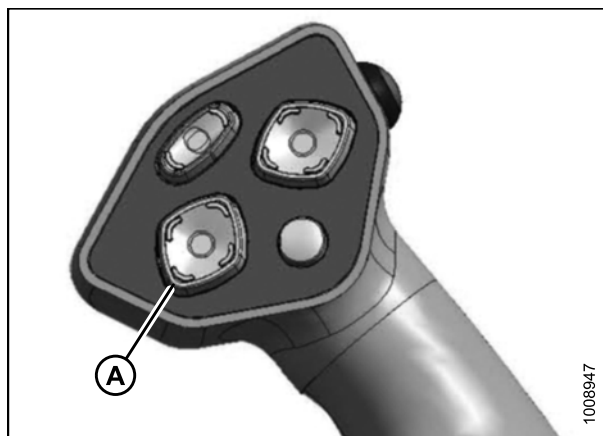


Figure 4.125: GSL

OPERATION

3. If necessary, relocate pin (A) at the frame linkage as required to raise the center-link (B) so that the hook is above the attachment pin on the header.

IMPORTANT:

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

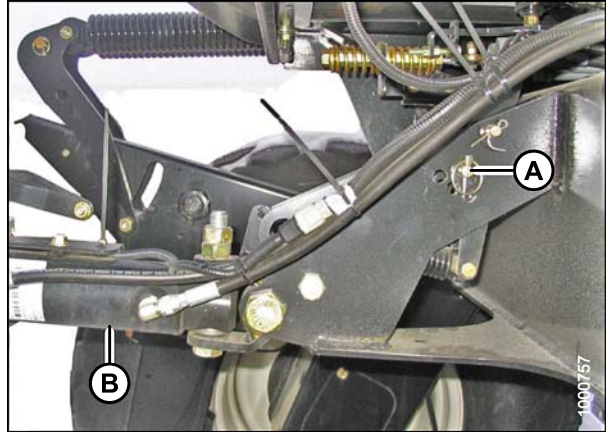


Figure 4.126: Hydraulic Center-Link without Self-Alignment Kit

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

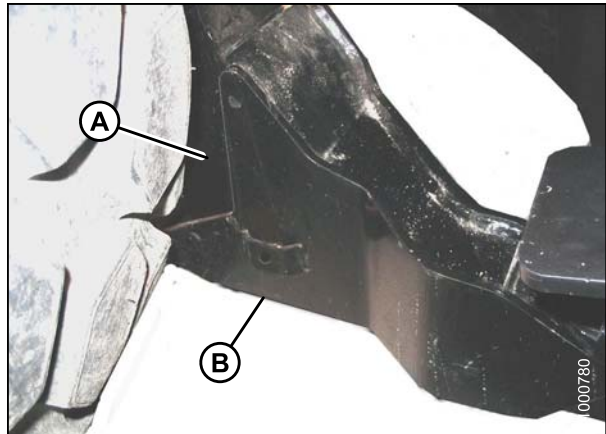


Figure 4.127: Header Boot

5. Activate HEADER TILT cylinder switches on ground speed lever (GSL) to extend or retract center-link cylinder so that the hook lines up with the header attachment pin.
6. Stop engine and remove key from ignition.

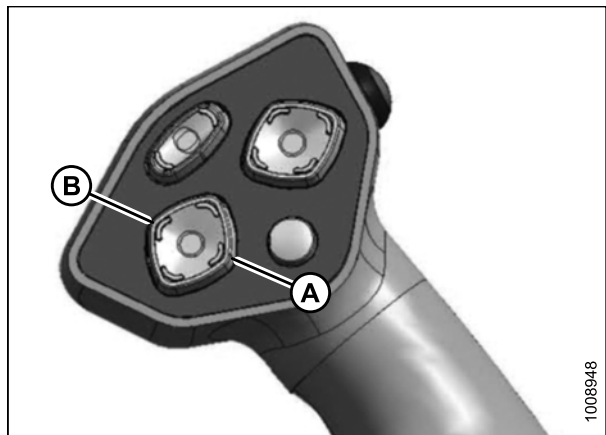


Figure 4.128: GSL

A - Header Tilt Up

B - Header Tilt Down

OPERATION

7. Push down on rod end of link cylinder (B), until hook engages pin on header and is locked.

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

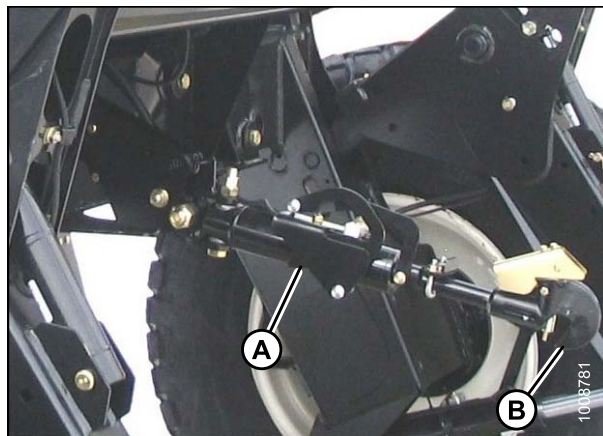


Figure 4.129: Hydraulic Center-Link

CAUTION

Check to be sure all bystanders have cleared the area.

9. Start engine and press the HEADER UP switch (A) to raise header to maximum height.

NOTE:

If one end of the header does **NOT** raise fully, the lift cylinders require rephasing. If rephasing 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. Cylinders are now phased.

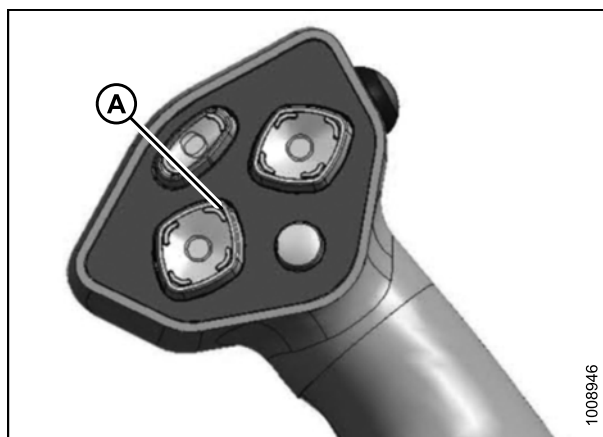


Figure 4.130: GSL

OPERATION

10. Engage safety props 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 the safety prop (B) onto cylinder.
 - c. Repeat for the opposite lift cylinder.

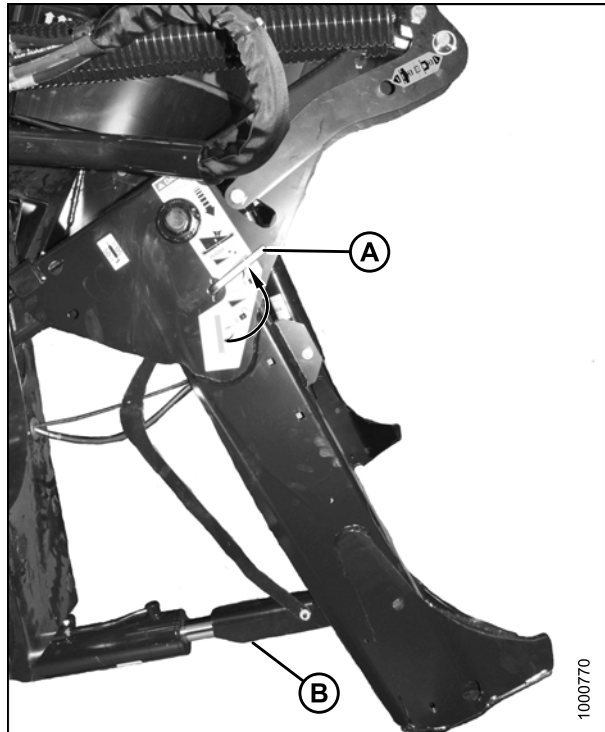


Figure 4.131: Cylinder Stop

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

IMPORTANT:

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

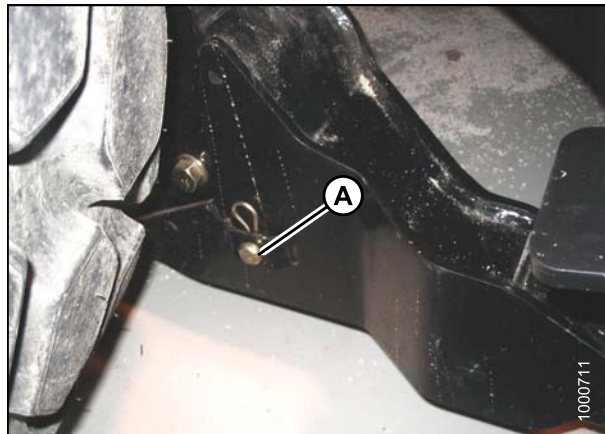


Figure 4.132: Header Boot

OPERATION

12. Remove lynch pin from clevis pin (A) in stand (B).
13. Hold stand (B) and remove pin (A).
14. Position stand to storage position by inverting stand and relocating on bracket as shown. Reinsert clevis pin (A) and secure with lynch pin.

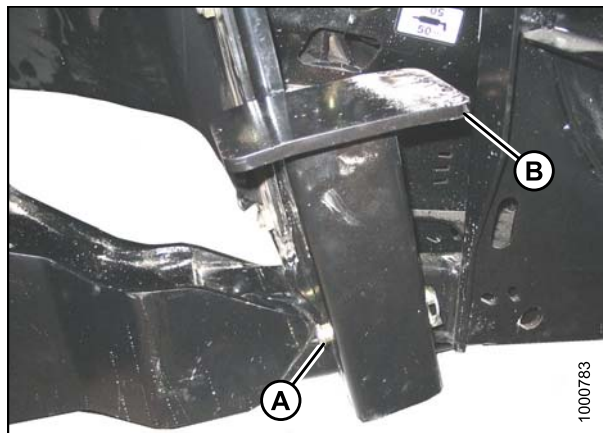


Figure 4.133: Header Stand

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

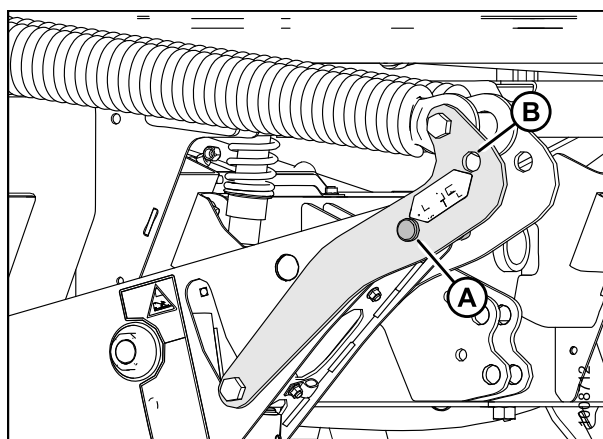


Figure 4.134: Header Lift Linkage

16. Disengage safety prop by turning lever (A) downward to release and lower safety prop until lever locks into vertical position.
17. Repeat for opposite safety prop.

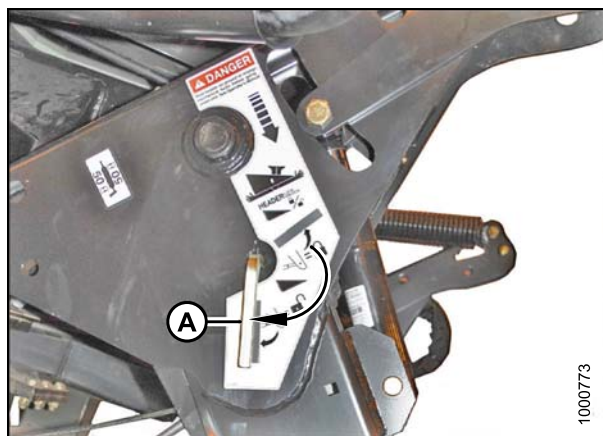


Figure 4.135: Safety Prop

OPERATION

CAUTION

Check to be sure all bystanders have cleared the area.

18. Start engine and activate HEADER DOWN switch (A) on GSL to lower header fully. Stop engine and remove key.

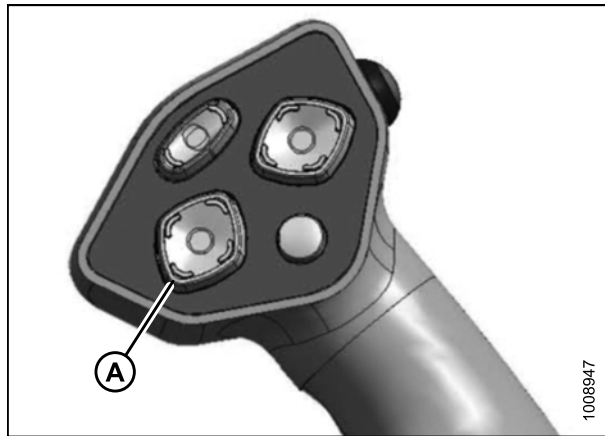


Figure 4.136: GSL

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

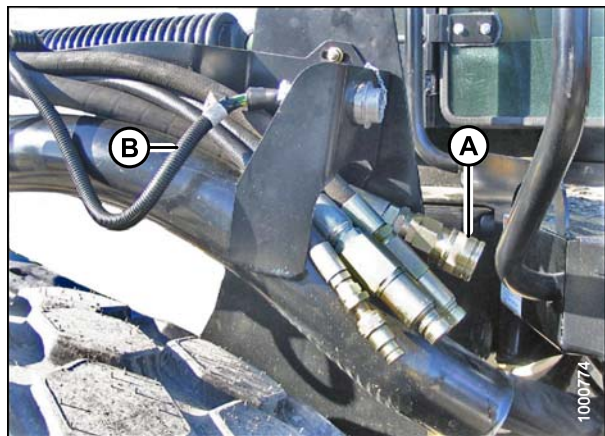


Figure 4.137: Header Drive Hoses and Harness

Attaching an A-Series Header: Mechanical Center-Link

To attach an A-Series header to a windrower equipped with a mechanical center-link, follow these steps:

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

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

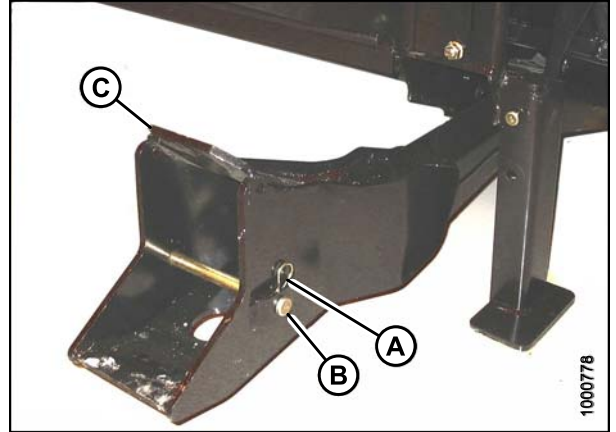


Figure 4.138: Header Boot

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).

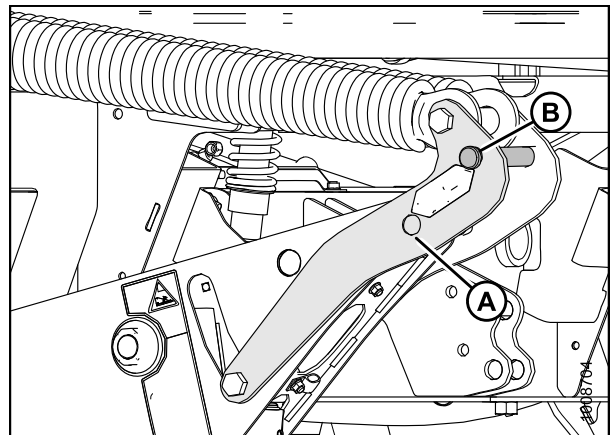


Figure 4.139: Header Lift Linkage

CAUTION

Check to be sure all bystanders have cleared the area.

2. Start the engine and activate HEADER DOWN button (A) on the ground speed lever (GSL) to fully retract header lift cylinders.

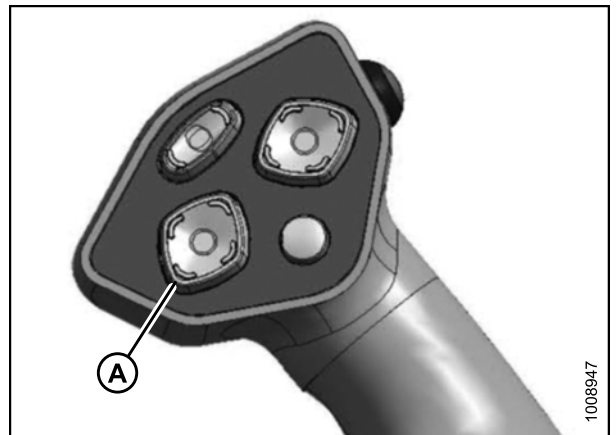


Figure 4.140: GSL

OPERATION

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

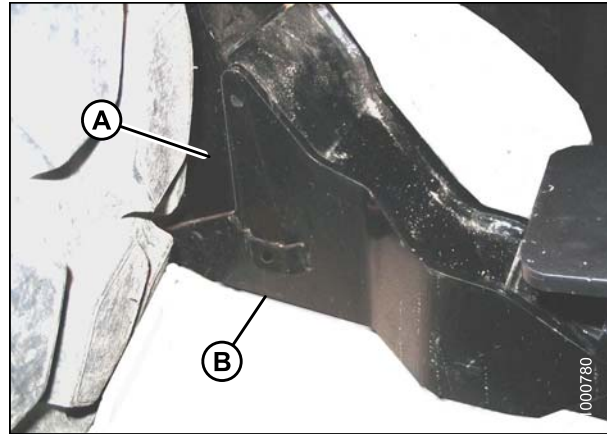


Figure 4.141: Header Boot

4. Stop engine and remove key from ignition.
5. Loosen nut (A) and rotate barrel (B) to adjust length so that the link lines-up with header bracket.
6. Install clevis pin (C) and secure with cotter pin (D).
7. 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.

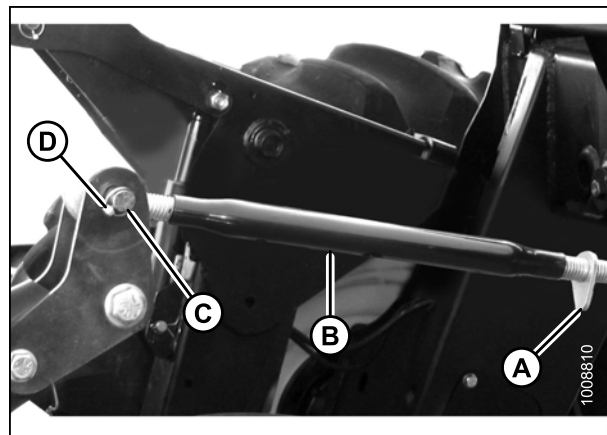


Figure 4.142: Mechanical Center-Link

CAUTION

Check to be sure all bystanders have cleared the area.

8. Start engine and press the HEADER UP switch (A) to raise header to maximum height.

NOTE:

If one end of the header does **NOT** raise fully, the lift cylinders require rephasing. If rephasing 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. Cylinders are now phased.



Figure 4.143: GSL

OPERATION

9. Engage safety props 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 the safety prop (B) onto cylinder.
 - c. Repeat for the opposite lift cylinder.

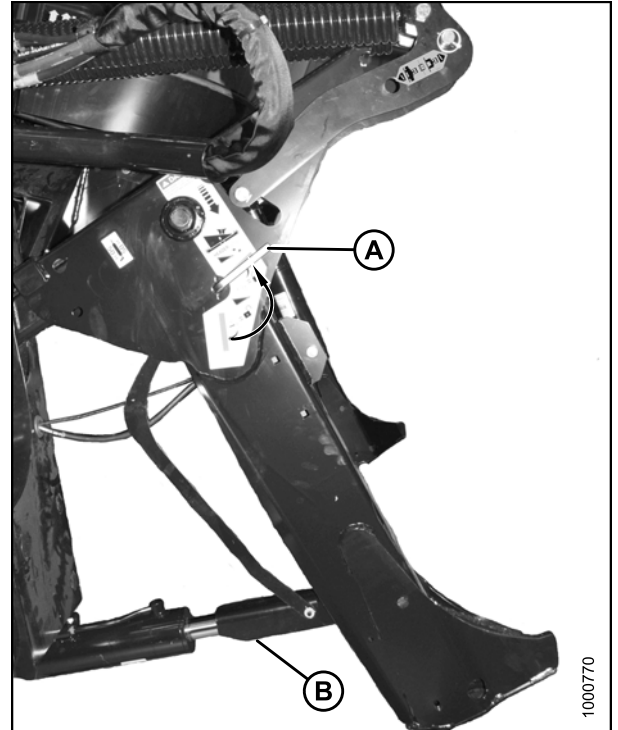


Figure 4.144: Cylinder Stop

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

IMPORTANT:

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

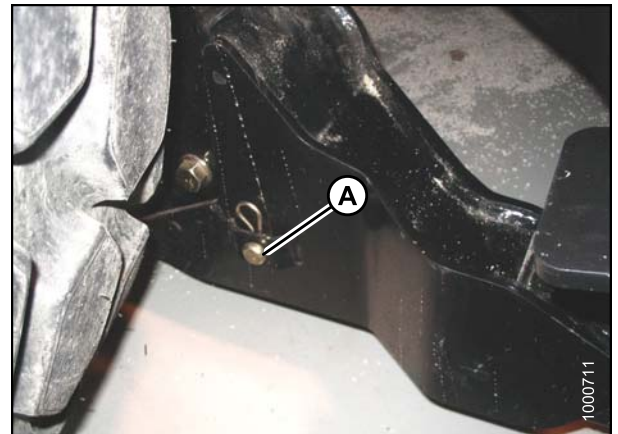


Figure 4.145: Header Boot

OPERATION

11. Remove lynch pin from clevis pin (A) in stand (B).
12. Hold stand (B) and remove pin (A).
13. Position stand to storage position by inverting stand and relocating on bracket as shown. Reinsert clevis pin (A) and secure with lynch pin.

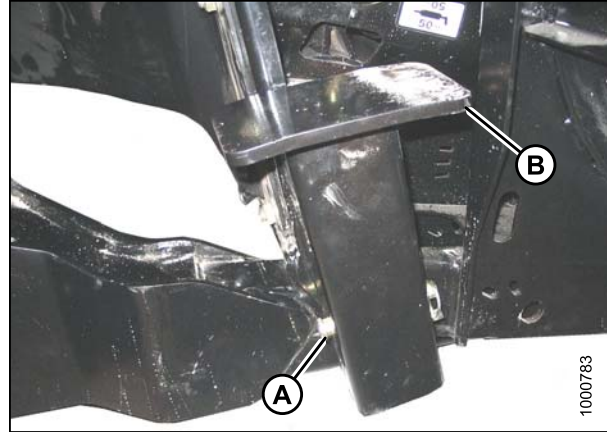


Figure 4.146: Header Stand

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

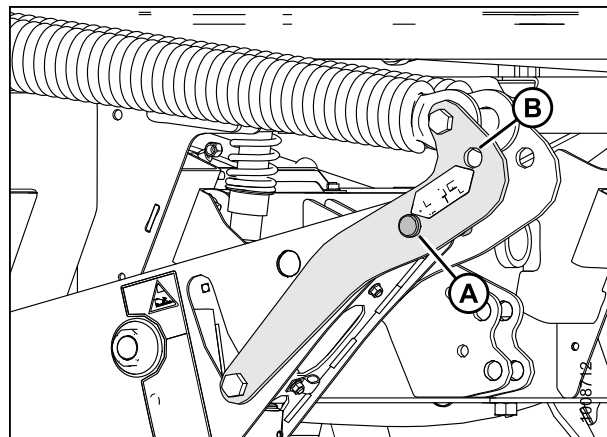


Figure 4.147: Header Lift Linkage

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

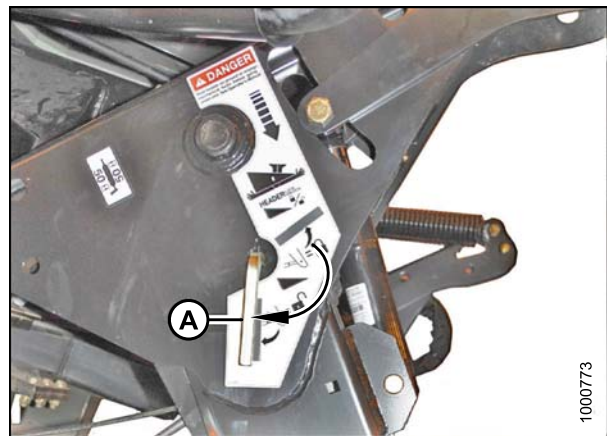


Figure 4.148: Safety Prop

OPERATION

CAUTION

Check to be sure all bystanders have cleared the area.

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

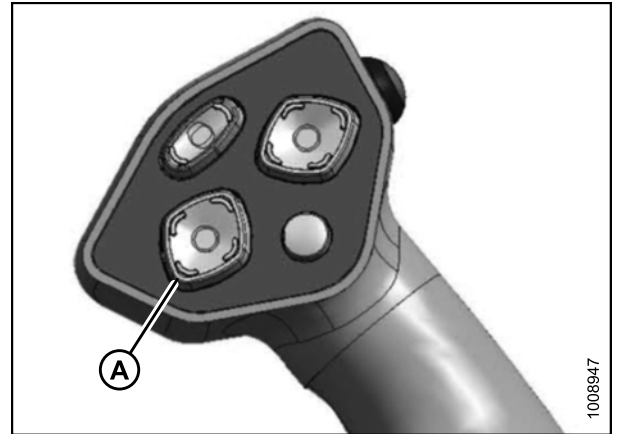


Figure 4.149: GSL

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

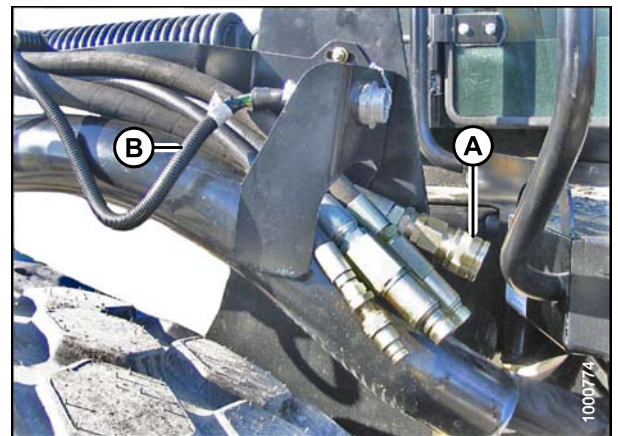


Figure 4.150: Header Drive Hoses and Harness

4.5.4 Detaching an A-Series Header

Refer to the procedure that is appropriate for the center-link installed on the windrower:

- [Detaching an A-Series Header: Hydraulic Center-Link, page 160](#)
- [Detaching an A-Series Header: Mechanical Center-Link, page 163](#)

OPERATION

Detaching an A-Series Header: Hydraulic Center-Link

To detach an A-Series header from a windrower with hydraulic center-link, follow these steps:

WARNING

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

1. Start engine and press HEADER UP button (A) on ground speed lever (GSL) to raise header to maximum height.
2. If one end of the header does **NOT** raise fully, rephase the cylinders as follows:
 - a. Press and hold the HEADER UP (A) switch until both cylinders stop moving
 - b. Continue to hold the switch for 3–4 seconds. Cylinders are phased.
3. Stop engine and remove key.

DANGER

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

4. Pull lever (A) and rotate toward header to lower safety prop (B) onto cylinder. Repeat for opposite cylinder.



Figure 4.151: GSL

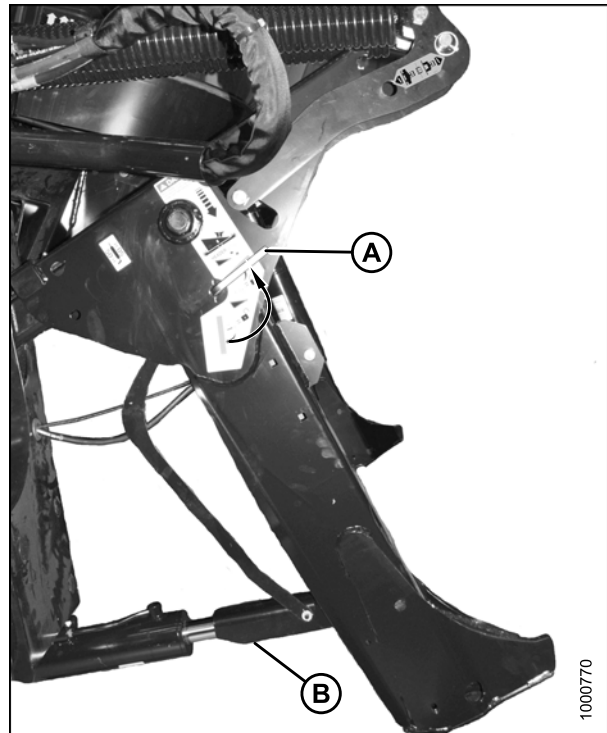


Figure 4.152: Safety Prop

OPERATION

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

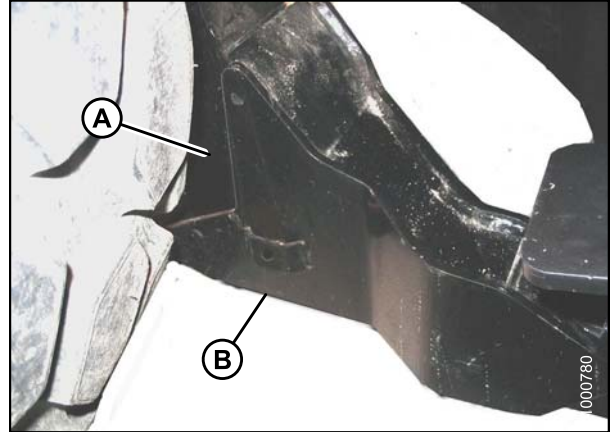


Figure 4.153: Header Boot

6. Lower the stand (A) by pulling clevis pin (B), inverting stand, and relocating on bracket. Reinsert pin (B) and secure with hairpin.

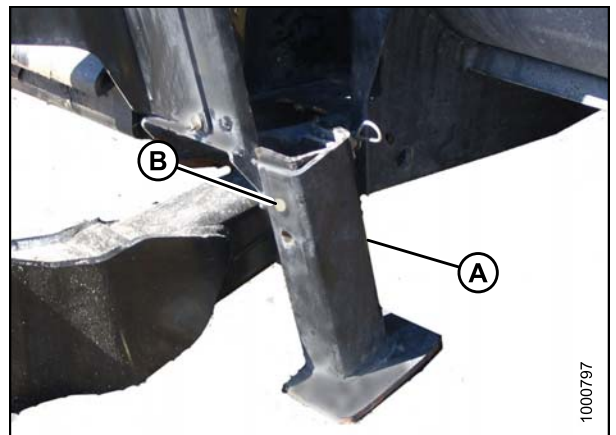


Figure 4.154: Header Stand

7. Remove the clevis 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).

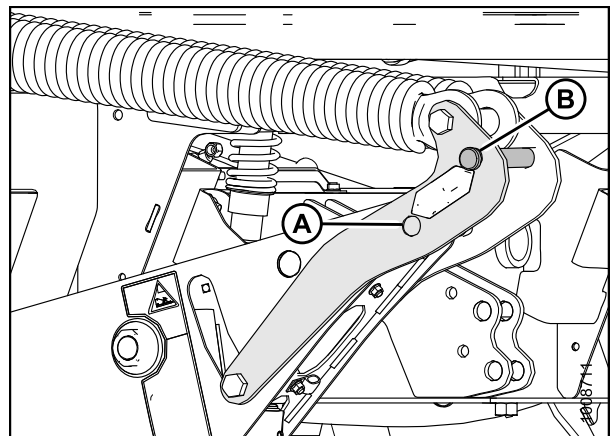


Figure 4.155: Header Lift Linkage

OPERATION

- To disengage safety props and for storage, turn lever (A) away from header to raise safety prop until lever locks into vertical position. Repeat for opposite cylinder.

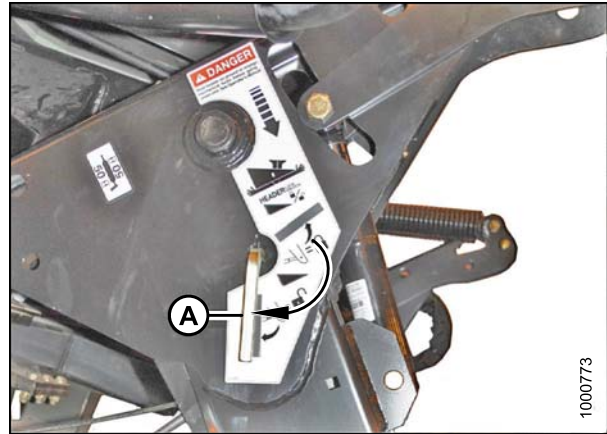


Figure 4.156: Safety Props

CAUTION

Check to be sure all bystanders have cleared the area.

- Start engine, choose a level area, and lower header to the ground.
- Activate HEADER TILT cylinder switch on ground speed lever (GSL) to release load on center-link cylinder.

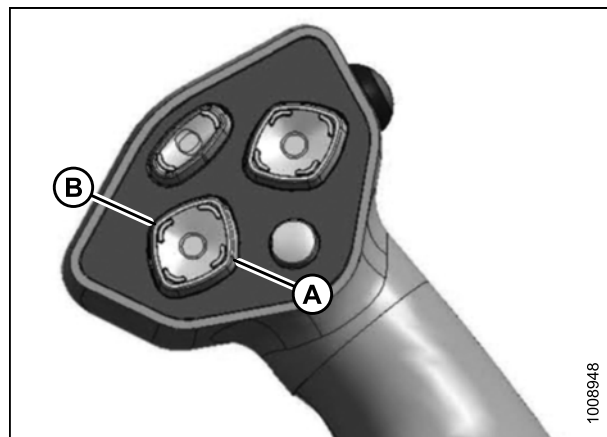


Figure 4.157: GSL

A - Header Tilt Up

B - Header Tilt Down

- Stop engine, and remove key from ignition.
- 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.

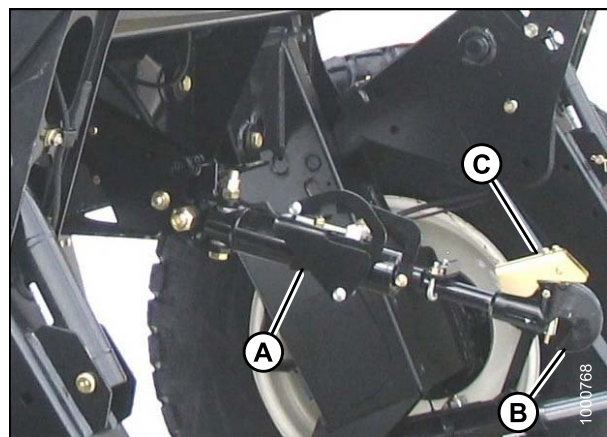


Figure 4.158: Hydraulic Center-Link

OPERATION

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

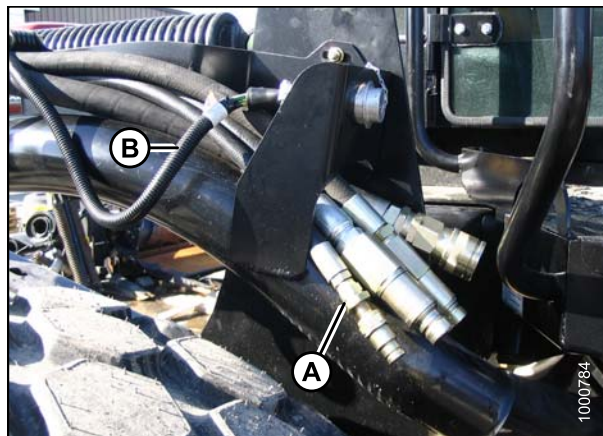


Figure 4.159: Header Drive Hydraulics

15. Reinstall clevis pin (B) and secure with hairpin (A) in header boot (C).
16. Repeat for the opposite side.

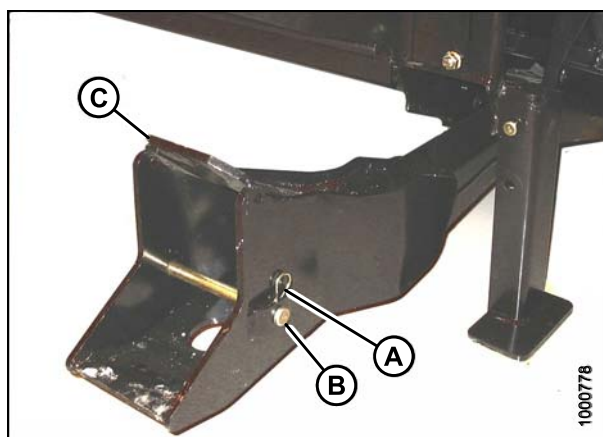


Figure 4.160: Header Boots

Detaching an A-Series Header: Mechanical Center-Link

WARNING

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

1. Start engine and press HEADER UP button (A) on ground speed lever (GSL) to raise header to maximum height.
2. If one end of the header does **NOT** raise fully follow these steps to rephase the cylinders:
 - a. Press and hold the HEADER UP (A) switch until both cylinders stop moving
 - b. Continue to hold the switch for 3–4 seconds. Cylinders are phased.
3. Stop engine and remove key.

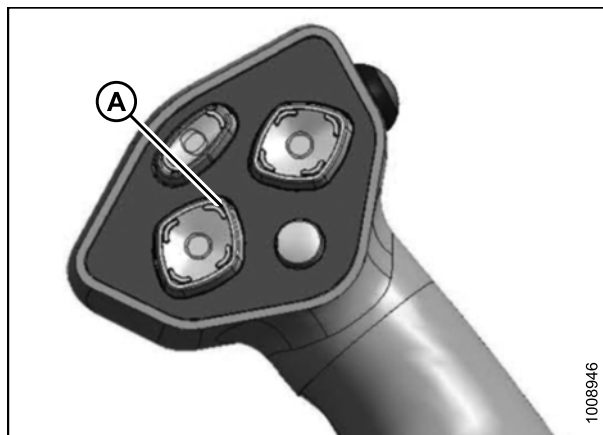


Figure 4.161: GSL

OPERATION

DANGER

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

4. Pull lever (A) and rotate toward header to lower safety prop (B) onto cylinder. Repeat for opposite cylinder.

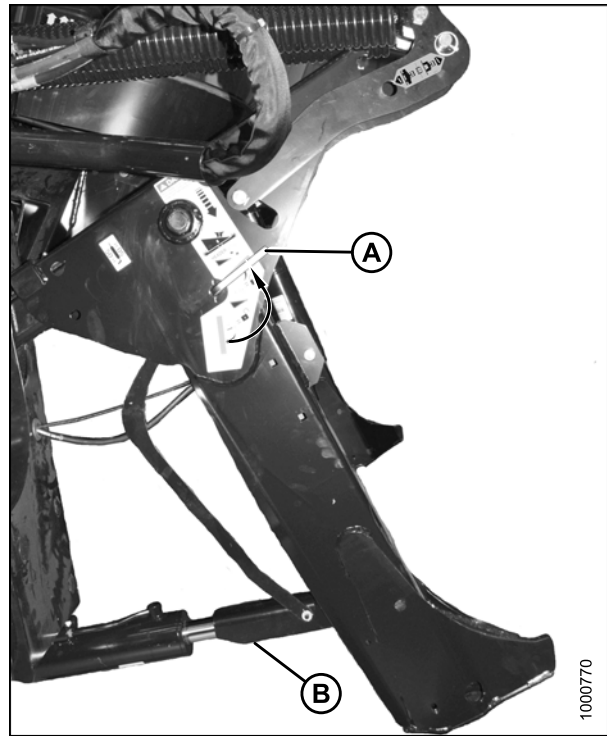


Figure 4.162: Safety Prop

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

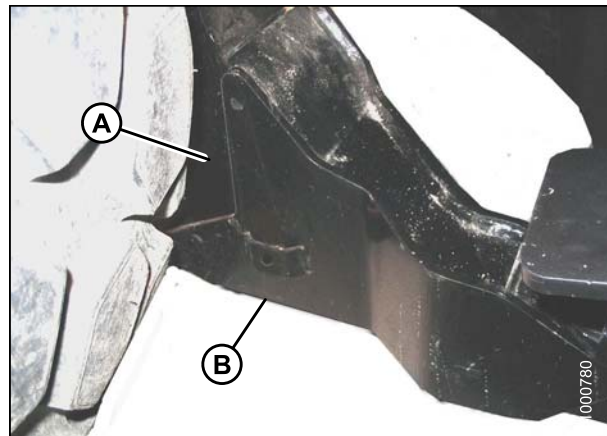


Figure 4.163: Header Boot

OPERATION

- Lower the header stand (A) by pulling clevis pin (B), inverting stand, and relocating on bracket. Reinsert clevis pin (B) and secure with hairpin.

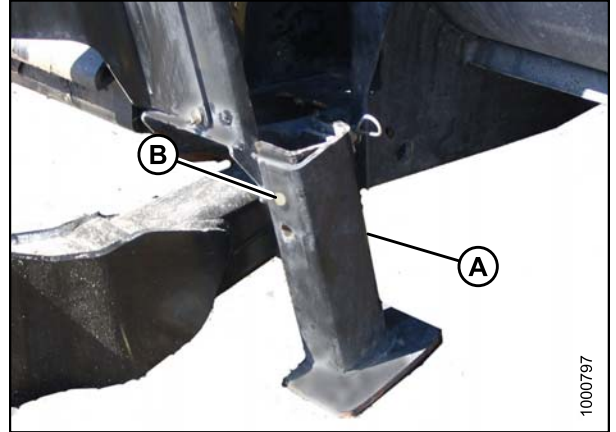


Figure 4.164: Header Stands

- Remove clevis 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).

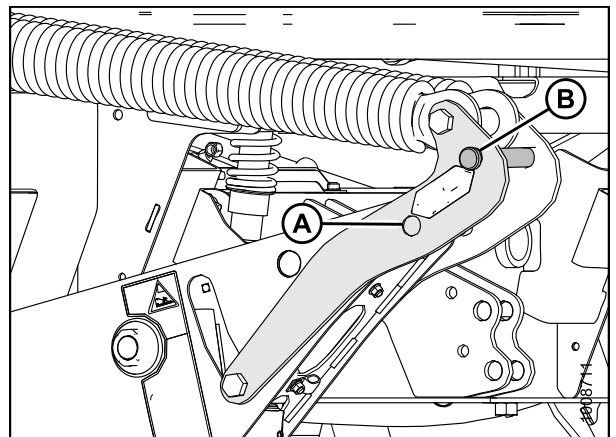


Figure 4.165: Header Lift Linkage

- To disengage safety props and for storage, turn lever (A) away from header to raise safety prop until lever locks into vertical position. Repeat for opposite cylinder.
- Start engine, choose a level area, and lower header to ground.
- Stop engine and remove key from ignition.

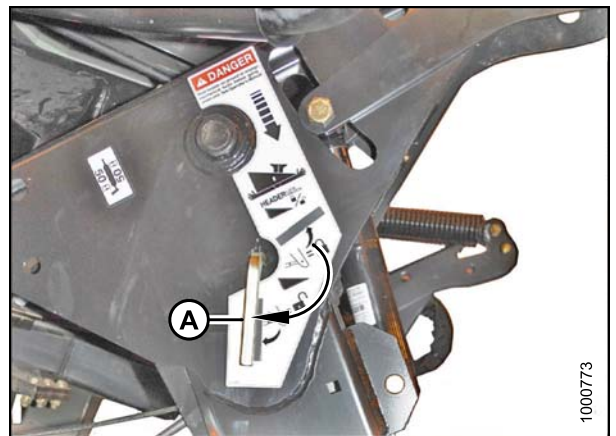


Figure 4.166: Safety Prop

OPERATION

11. Loosen nut (A) and rotate barrel (B) to relieve load on link.
12. Remove cotter pin (D) on clevis pin (C) and remove pin to disconnect from header.
13. Reinstall clevis pin in header.

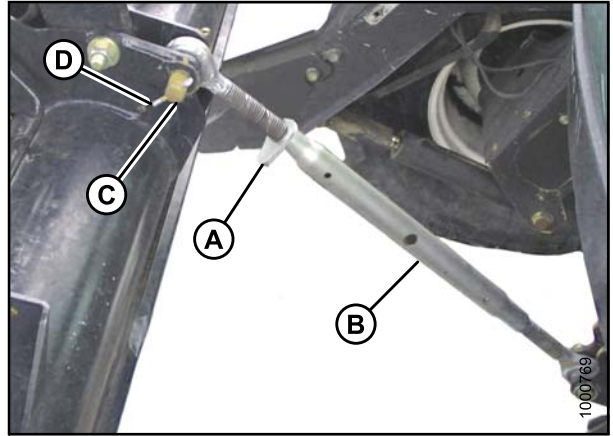


Figure 4.167: Mechanical Center-Link

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

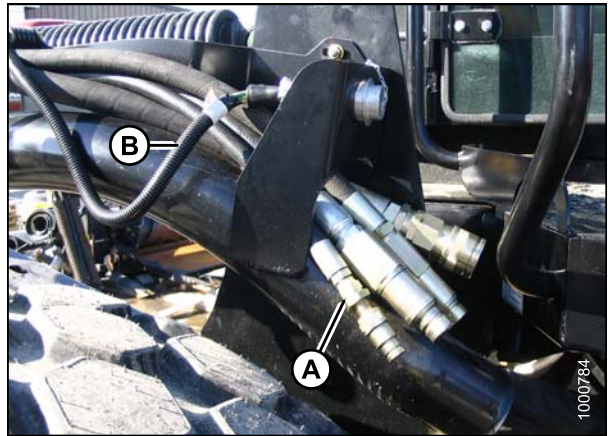


Figure 4.168: Header Drive Hydraulics

16. Reinstall clevis pin (B) and secure with hairpin (A) in header boot (C).
17. Repeat for the opposite side.

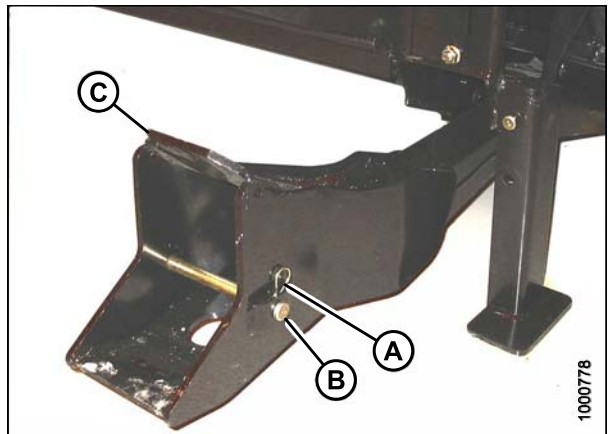


Figure 4.169: Header Boot

4.6 Operating with a D-Series Header

4.6.1 Configuring Hydraulics

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

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

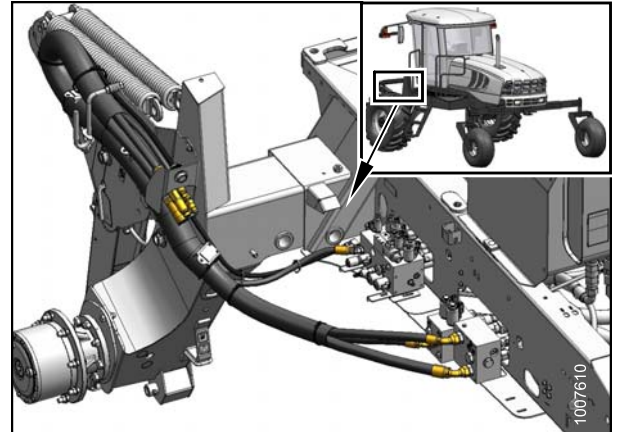


Figure 4.170: Draper Header Drive Hydraulics

There are also up to five reel drive hoses on the RH side.

If necessary, obtain the following kit from your MacDon Dealer.

- Base Kit MD #B5577 (Installation instruction MD #169537 is supplied with the kit.)

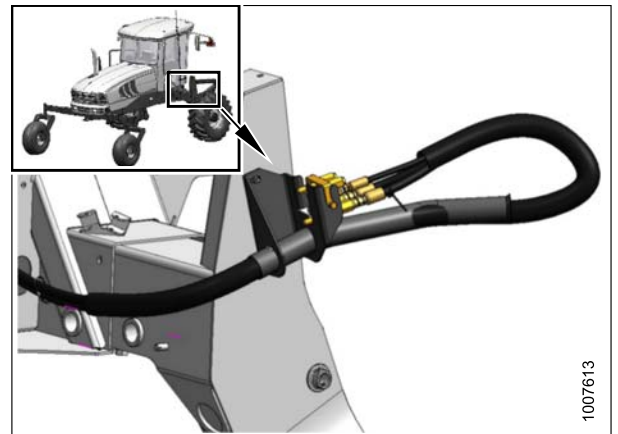


Figure 4.171: Draper Header Reel Hydraulics

4.6.2 Attaching Header Boots

Header boots are required to attach a D-Series Draper Header to the windrower.

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).

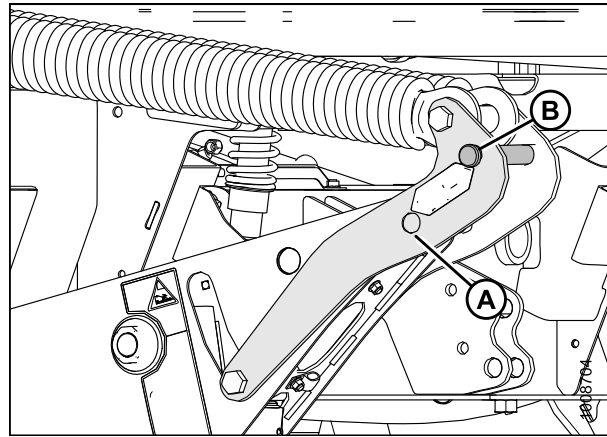


Figure 4.172: Header Lift

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

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

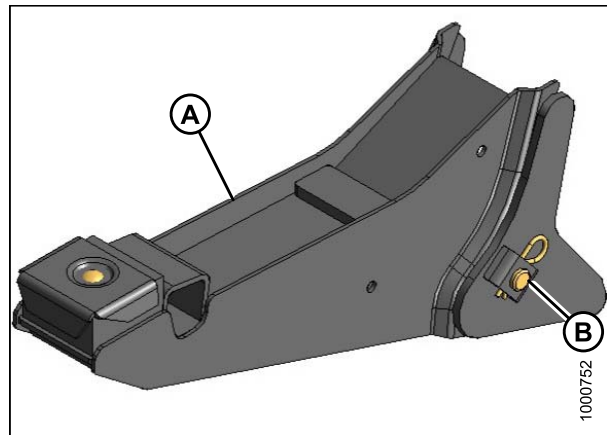


Figure 4.173: Header Boot

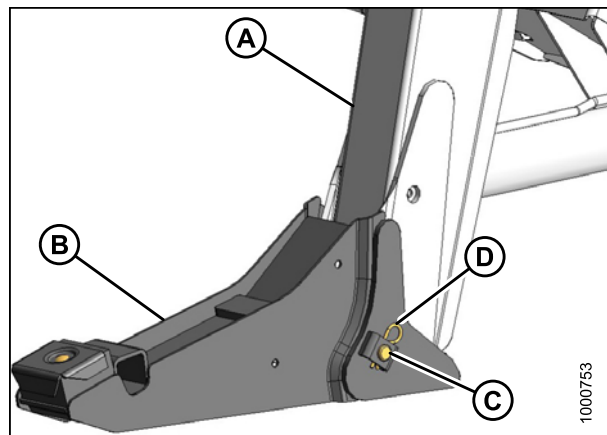


Figure 4.174: Header Boot

4.6.3 Header Position

Refer to [4.4 Operating with a Header, page 117](#) for procedures for controlling header height, header tilt, and float.

4.6.4 Reel Fore-Aft Position

Press and hold the switch for the desired FORWARD (A) or AFT (B) movement of the reel.



Figure 4.175: Ground Speed Lever (GSL)

4.6.5 Reel Height

Press and hold the switch for the desired movement of the reel REEL UP (A) or REEL DOWN (B).

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.

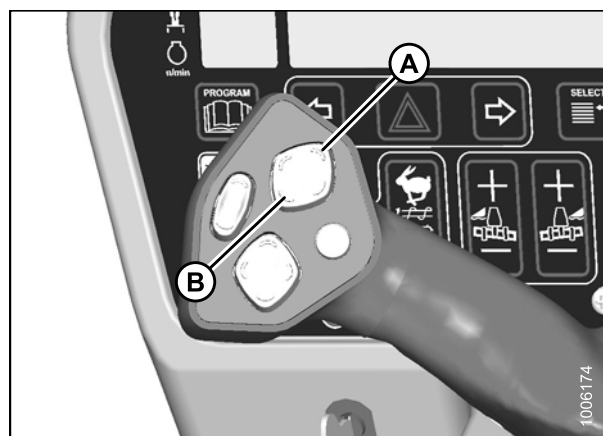


Figure 4.176: Ground Speed Lever (GSL)

4.6.6 Reel Speed

The reel speed is controlled with switches on the Ground Speed Lever (GSL) in the cab. 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) allows you to run the engine at lower rpm while maintaining the desired ground and reel speed. Reducing engine speed saves fuel and reduces noise in the cab.

NOTE:

The header index feature requires the optional expansion module. Refer to [7.1.10 Expansion Module, page 338](#).

OPERATION

This mode requires setting the **MINIMUM REEL SPEED** and the **REEL INDEX**.



Figure 4.177: Operator Console

A - Display
D - Slow

B - Header Index
E - Display Selector

C - Fast

IMPORTANT:

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

1. Set the **MINIMUM REEL SPEED** as follows:
 - a. Engage header.
 - b. Set HEADER INDEX switch (B) to **ON**.
 - c. On ground speed lever (GSL), press DISPLAY SELECTOR (E) to display **###.## MIN REEL** or press FAST (C) or SLOW (D) switch.
###.## = RPM or MPH or KPH¹² .
 - 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 you 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:
 - 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 KPH¹² , -1.9 to +3.0

12. As per settings in CDM programming

OPERATION

- c. Press FAST (C) or SLOW (D) until desired reel index is displayed.

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.

4.6.7 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 cab display module (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 you to run the engine at lower rpm while maintaining the desired ground and draper speed. Reducing engine speed saves fuel and reduces noise in the cab.

This mode requires setting the **MINIMUM DRAPER SPEED** and setting the **DRAPER INDEX**.

Refer to the following:

- [Setting Draper Minimum Speed, page 172](#)
- [Setting Draper Index, page 173](#)

Setting Draper Minimum Speed



Figure 4.178: Operator Console

A - Display
D - Draper Slow

B - Header Index
E - Display Selector

C - Draper Fast

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 cab display module (CDM) press **SLOW (D)** until beep is heard.
5. Display (A) shows **###.### DRAPER MIN**¹³.

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

Setting Draper Index



Figure 4.179: Operator Console

A - Display

B - Header Index

C - Draper Fast

D - Draper Slow

E - Display Selector

Set **DRAPER INDEX** as follows:

IMPORTANT:

Windrower can be moving, but must be **GREATER THAN** minimum reel speed.

1. Engage header.
2. Set **HEADER INDEX** switch (B) to **ON**.
3. Press **DISPLAY SELECTOR** (E) so that **DRAPER INDX** is displayed at (A).
4. On cab display module (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.

Setting Draper Speed Independent of Ground Speed



Figure 4.180: Operator Console

A - Display
D - Draper Slow

B - Header Index
E - Display Selector

C - Draper Fast

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. Engage header.
2. Set HEADER INDEX switch (B) to **OFF**.
3. Press DISPLAY SELECTOR (E) to display at (A) **DRAPER SPEED**.
4. On cab display module (CDM) press **FAST** (C) or **SLOW** (D) until desired draper speed is displayed at (A). Display shows **### DRAPER SPEED**.

= MPH or KPH

4.6.8 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. Refer to the header operator's manual for more information on knife speeds.

The knife speed is manually set by making adjustments to the knife drive pump, and has been preset at the lowest knife rpm. For optimum performance, adjust the knife speed according to the header being used. Refer to the following table.

If the machine is equipped with the appropriate sensor and optional module, the cab display module (CDM) will notify you when the knife speed reaches an overload preset (usually 75% of knife speed).

The preset can be changed on the CDM. Refer to [3.18.5 Cab Display Module \(CDM\) Programming, page 70](#).

NOTE:

The knife speed should be set within the range specified for each header.

Table 4.1 D-Series Knife Speed

Header Description		Knife Speed			
Type	Size (ft)	Minimum		Maximum	
		rpm ¹⁴	spm ¹⁵	rpm ¹⁴	spm ¹⁵
Draper Double Knife	15	750	1500	950	1900
	20 and 25	700	1400	850	1700
	30	600	1200	800	1600
	35			700	1400
Draper Single Knife	20 and 25	550	1100	750	1500
	30			700	1400
	35				

Setting Knife Speed (with Expansion Module MD #4666)



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.

14. Revolutions per minute - Speed of knife drive box pulley

15. Strokes per minute of knife (rpm x 2)

OPERATION

1. Start engine. Refer to [Starting the Engine, page 88](#).
2. Move throttle to adjust engine speed to IDLE.
3. Set the intermediate speed control (ISC) to OFF. Refer to [Engine Intermediate Speed Control \(ISC\), page 91](#).
4. Engage header.
5. Run engine at maximum rpm.
6. Press SELECTOR button (B) on the ground speed lever (GSL) until the CDM (A) displays the knife speed in SPM (strokes per minute). This indicates that the optional expansion module (MD #B4666) is installed.
7. If knife speed is **NOT** displayed, the optional expansion module is not installed, proceed to [Setting Knife Speed \(without Expansion Module MD #B4666\), page 177](#).
8. Compare the reading to Table [4.1 D-Series Knife Speed, page 175](#).



Figure 4.181: Operator Console

9. If required, adjust knife speed as follows:
10. Shut down engine, and open engine hood.
11. Locate the knife drive pump (A) and knife speed adjuster screw (B) under the right (cab forward) side of the windrower.

NOTE:

The knife speed adjuster screw may have a plastic cap (B) covering it. Pull this cap off to expose the screw.

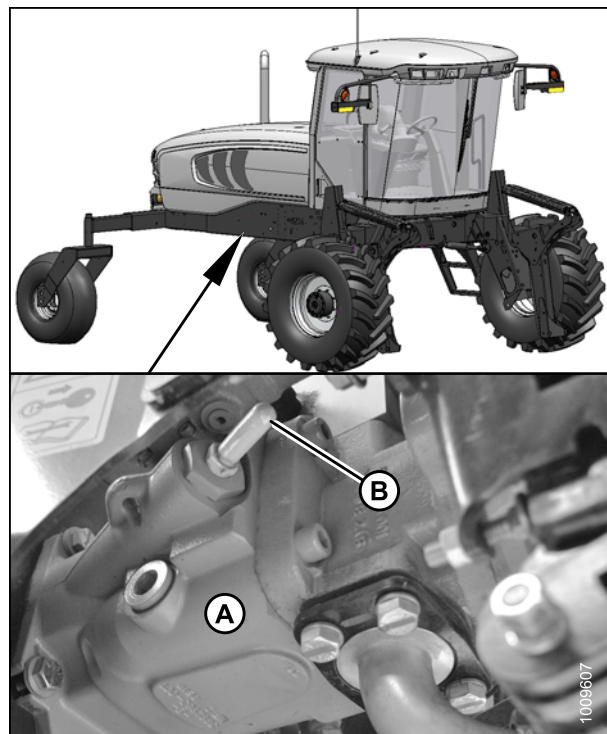


Figure 4.182: Knife Drive Pump

OPERATION

- Loosen jam nut (A).
- Turn adjuster screw (B) clockwise (screw in) to decrease knife speed, and counterclockwise (screw out) to increase the knife speed.

NOTE:

One turn of the adjuster screw (B) will change the knife speed by approximately 116 strokes per minute (spm), or the knife drive box pulley speed by 58 revolutions per minute (rpm).

- Once adjustment has been made, torque jam nut (A).
- Close hood, start engine, and recheck knife speed.

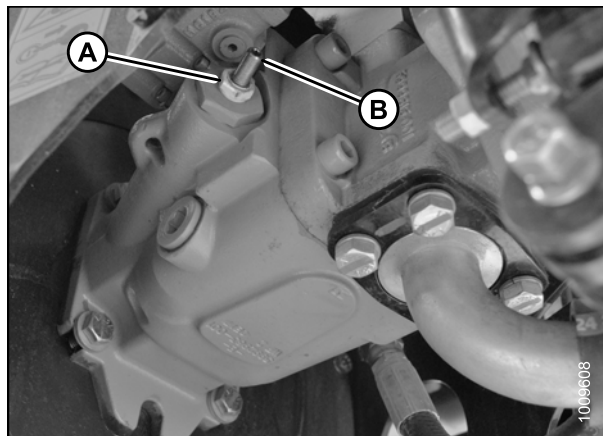


Figure 4.183: Knife Speed Adjuster Screw

Setting Knife Speed (without Expansion Module MD #B4666)

- Check header knife drive box pulley speed with a handheld tachometer.
- Multiply the rpm reading by 2 to obtain the knife speed in strokes per minute.
- Compare reading to Table [4.1 D-Series Knife Speed](#), page 175.
- If required, adjust knife speed. Refer to Step 9., [Setting Knife Speed \(with Expansion Module MD #4666\)](#), page 176.



Figure 4.184: Knife Drive Box on Header

OPERATION

4.6.9 Deck Shift Control

When connected to a draper header with the deck shift option, hydraulic deck shift control allows you to select the deck position and draper rotation of the header from the operator's station. It selects crop delivery from the left side, center, or right side of the header.

Deck Shift

CAUTION

Check to be sure all bystanders have cleared the area.

Shift decks as follows:

1. Engage header by pushing down on the yellow HEADER DRIVE button (A) , and pulling up on the black ring at the base of the switch.
2. Push the rocker switch to desired delivery position. Deck(s) will move and direction of drapers will change accordingly.
3. Operate windrower.



Figure 4.185: Header Drive Button

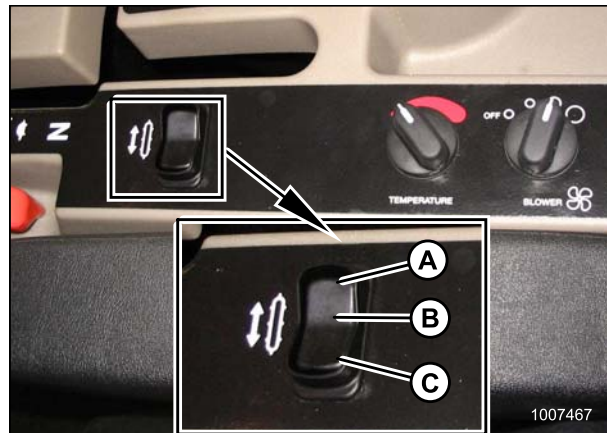


Figure 4.186: Deck Shift Switch

A - Right Side Delivery
C - Left Side Delivery

B - Center Delivery

4.7 Operating with an A-Series Header

The M105 is factory-equipped to run an A-Series Auger Header.

4.7.1 Auger Speed

This feature requires that the optional expansion module (MD #B4666) be installed, either at the factory or at your MacDon Dealer.

Auger Speed on A30-D Headers

On A30-D Auger Headers, the auger speed is fixed to the knife speed.

NOTE:

Auger speed can be independently changed from the knife speed by changing the auger drive sprocket. Refer to the A30-D and A40-D Pull-Type Mower Conditioner and Self-Propelled Auger Header Operator's Manual (MD #169000).



Figure 4.187

A - Display

D - Auger Slow

B - Header Index Switch

E - Display Selector

C - Auger Fast

D - Auger Slow

Display the auger speed as follows:

1. Engage header.
2. Set HEADER INDEX switch (B) to **OFF**
3. On ground speed lever (GSL), press DISPLAY SELECTOR switch (E) for **##.# AUGER SPEED**
##.# = 00.0–99.0
4. Press FAST (C) or SLOW (D) on CDM until desired auger speed is displayed at (A).

OPERATION

Auger speed **NOT** to exceed 320 rpm.

Auger Speed on A40-D Headers

On A40-D double knife headers, the auger speed is interdependent on reel speed, and is controlled by a switch on the ground speed lever (GSL).

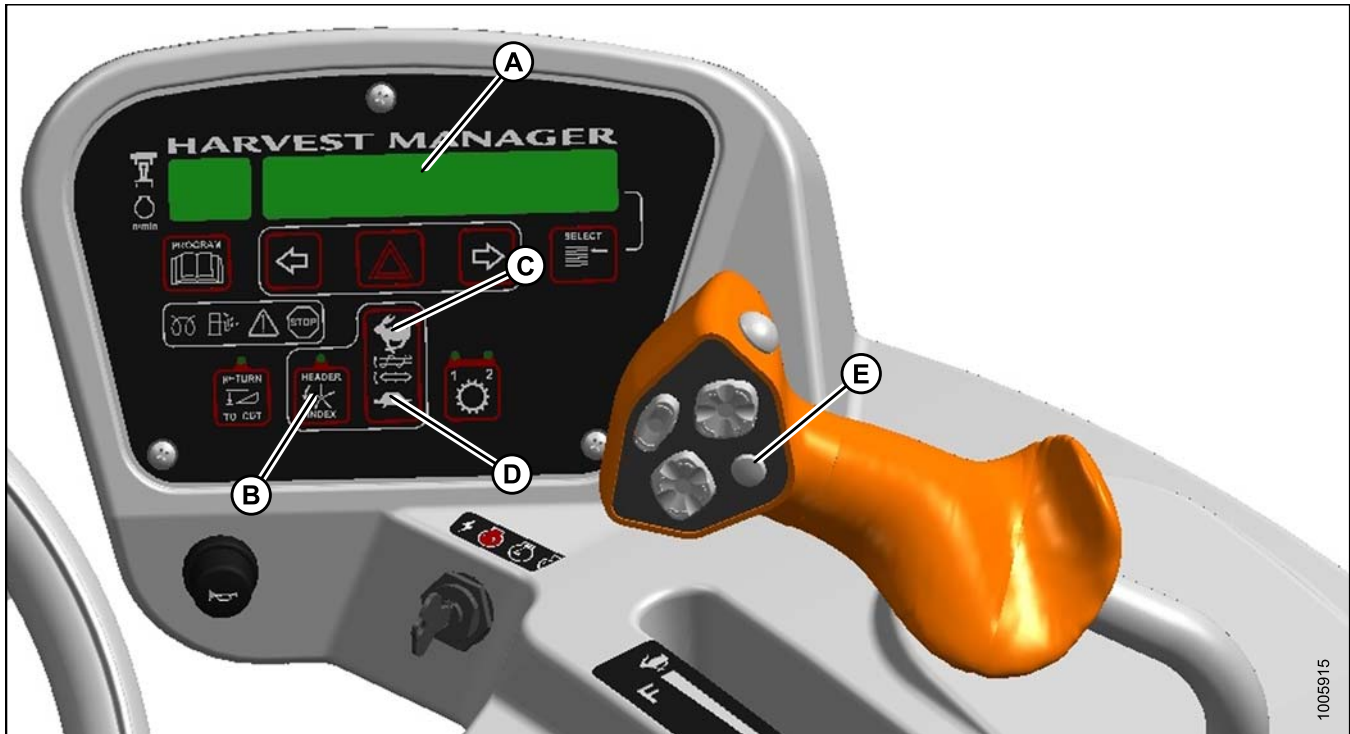


Figure 4.188: Operator Console

A - Display
D - Auger Slow

B - Header Index Switch
E - Display Selector

C - Auger Fast
D - Auger Slow

CAUTION

Check 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 ground speed lever (GSL), press DISPLAY SELECTOR switch (E) until **### AUGER SPEED** is displayed. Display (A) shows **### AUGER SPEED**¹⁶.
= 4.7 to 9.9
4. Press FAST (C) or SLOW (D) on CDM until desired auger speed is displayed at (A).

¹⁶. Auger speed not to exceed 320 rpm.

4.7.2 Reel Speed

Refer to your header operator's manual for recommended reel speed settings for your particular crop.

Reel Speed on A30-D Headers

The reel speed is fixed to the auger speed and to the knife speed. Both can be changed by installing alternate drive sprockets. Refer to your auger header operator's manual.

Reel Speed on A40-D Headers

The A40-D Auger Header features a hydraulic direct drive reel with an operating speed range of 15–50 rpm that is controlled with switches on the cab display module (CDM) and on the ground speed lever (GSL) at the operator's station.

The hydraulic flows for the reel and auger are interconnected so that the auger and reel speeds are controlled using the GSL switches.



Figure 4.189: Operator's Console

A - Display	B - Header Index	C - Auger Fast	D - Auger Slow
E - Reel Fast	F - Reel Slow	G - Display Selector	

1. Engage header.
2. Set HEADER INDEX switch (B) to **OFF**.
3. On ground speed lever (GSL), press DISPLAY SELECTOR switch (E) until **### AUGER SPEED** is displayed (### = 4.7–9.9)
4. On ground speed lever (GSL), press DISPLAY SELECTOR switch (E) until **### REEL SPEED** is displayed
5. On ground speed lever (GSL), press REEL SLOW (F) or REEL FAST (E) until desired speed is reached. DISPLAY (A) shows **### REEL RPM**.

OPERATION

REEL RPM, MPH, KPH)

NOTE:

Auger Speed **NOT** To Exceed 320 rpm.

4.7.3 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 knife speed is manually set by making adjustments to the knife drive pump, and has been preset at the lowest knife rpm.

For optimum performance, adjust the knife speed according to the header being used. Refer to the following table.

If the machine is equipped with the appropriate sensor and optional module, the cab display module (CDM) will notify you when the knife speed reaches an overload preset (usually 75% of knife speed).

The preset can be changed on the CDM. Refer to [3.18.5 Cab Display Module \(CDM\) Programming, page 70](#).

NOTE:

The knife speed should be set within the range specified for each header.

Table 4.2 A-Series Knife Speed

Header Description		Knife Speed			
Type	Size	Minimum		Maximum	
		rpm ¹⁷	spm ¹⁸	rpm ¹⁷	spm ¹⁸
Auger A30-D	All	775	1550	925	1850
Auger A40-D		700	1400	975	1950

Setting Knife Speed (With Expansion Module MD #4666 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. Start engine. Refer to [Starting the Engine, page 88](#).
2. Move throttle to adjust engine speed to IDLE.
3. Set the intermediate speed control (ISC) to OFF. Refer to [Engine Intermediate Speed Control \(ISC\), page 91](#).
4. Engage header.
5. Run engine at maximum rpm.

17. rpm = speed of knife drive box pulley (revolutions per minute)

18. spm = strokes per minute of knife (rpm x 2)

OPERATION

6. Press SELECTOR button (B) on the ground speed lever (GSL) until the CDM (A) displays the knife speed in SPM (strokes per minute). This indicates that Optional Expansion Module MD #B4666 is installed.
7. If knife speed is **NOT** displayed, the optional expansion module is not installed, proceed to .
8. Compare reading to Table [4.2 A-Series Knife Speed](#), [page 182](#).



Figure 4.190: Operator Console

9. If required, adjust knife speed as follows:
10. Shut down engine, and open engine hood.
11. Locate the knife drive pump (A) and knife speed adjuster screw (B) under the right (cab forward) side of the windrower.

NOTE:

The knife speed adjuster screw may have a plastic cap (B) covering it. Pull this cap off to expose the screw.

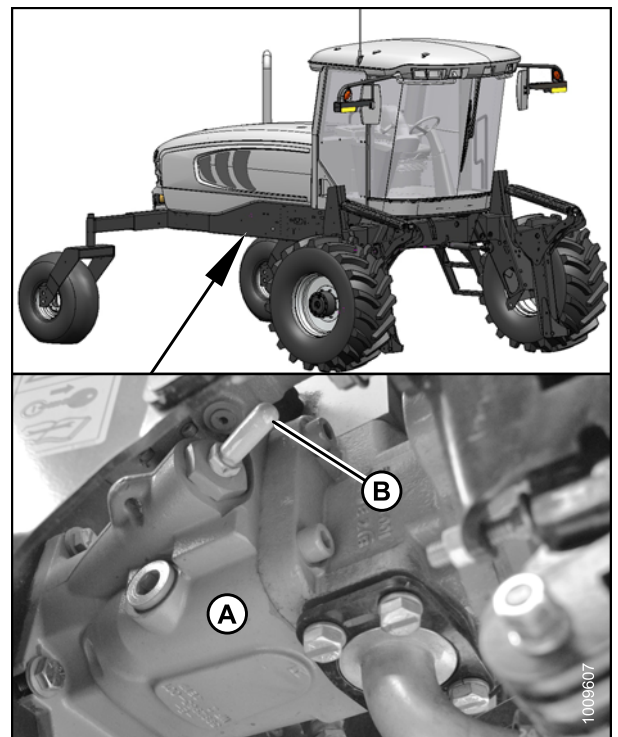


Figure 4.191: Knife Drive Pump

OPERATION

- Loosen jam nut (A).
- Turn adjuster screw (B) clockwise (screw in) to decrease knife speed, and counterclockwise (screw out) to increase the knife speed.

NOTE:

One turn of the adjuster screw (B) will change the knife speed by approximately 116 strokes per minute (spm), or the knife drive box pulley speed by 58 revolutions per minute (rpm).

- Once adjustment has been made, torque jam nut (A).
- Close hood, start engine, and recheck knife speed.

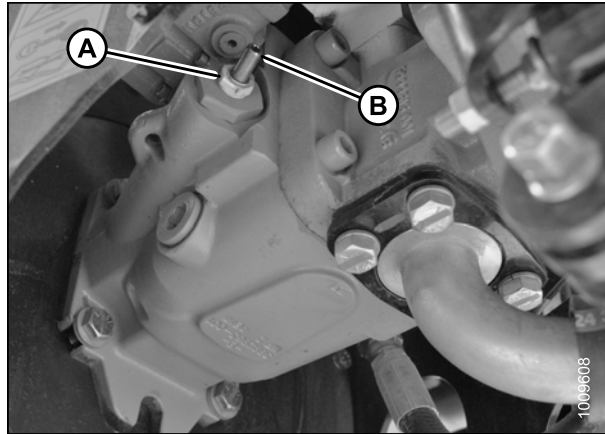


Figure 4.192: Knife Speed Adjuster Screw

Setting Knife Speed (Without Expansion Module MD #B4666)

- Check header knife drive box pulley speed with a handheld tachometer.
- Multiply the rpm reading by 2 to obtain the knife speed in strokes per minute.
- Compare reading to Table [4.2 A-Series Knife Speed, page 182](#).
- If required, adjust knife speed. Refer to step [9., Setting Knife Speed \(With Expansion Module MD #4666 Installed\), page 183](#).



Figure 4.193: Knife Drive Box on Header

5 Maintenance and Servicing

The following section is intended to guide you through some of the windrower's basic maintenance and service requirements.

More detailed maintenance, service, and parts information is available from your MacDon Dealer.

5.1 Preparation For Servicing

WARNING

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

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

5.2 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.

5.2.1 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 Nut

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

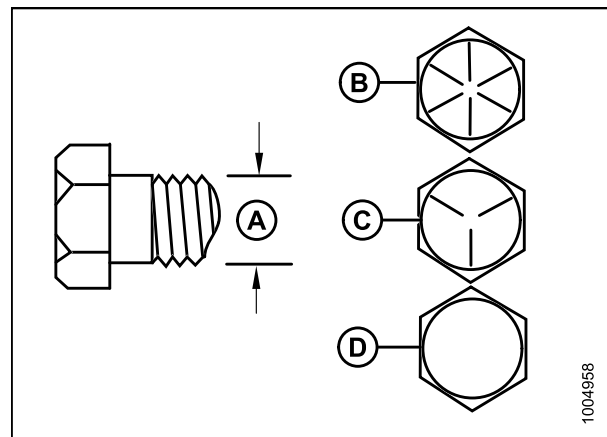


Figure 5.1: Bolt Grades

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

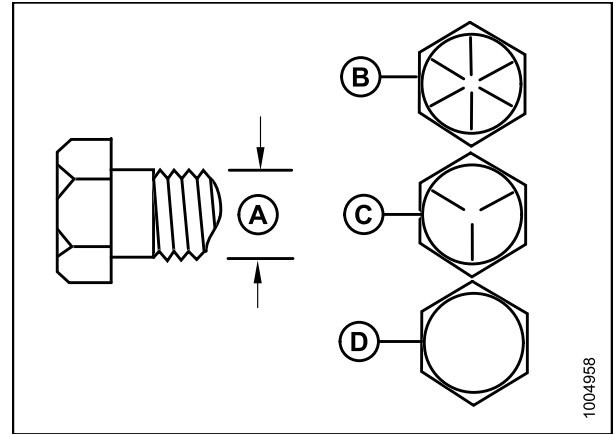


Figure 5.2: Bolt Grades

A - Nominal Size
C - SAE-5

B - SAE-8
D - SAE-2

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

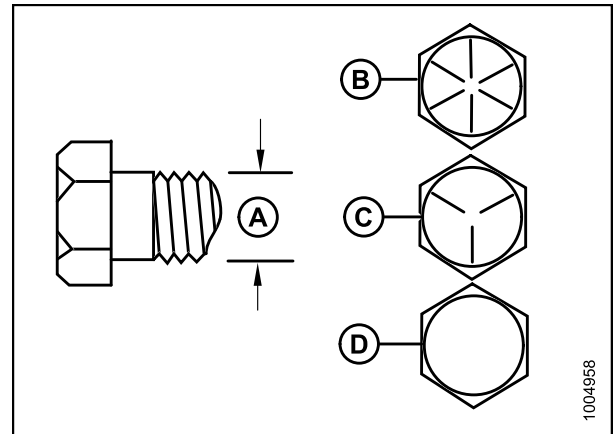


Figure 5.3: Bolt Grades

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

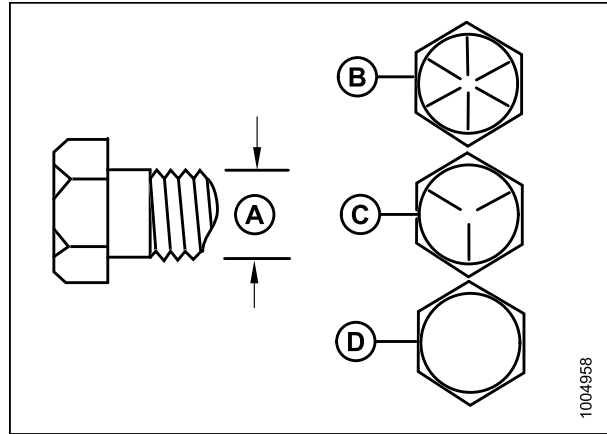


Figure 5.4: Bolt Grades

A - Nominal Size
C - SAE-5

B - SAE-8
D - SAE-2

5.2.2 Metric Bolt Specifications

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

Nominal Size (A)	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

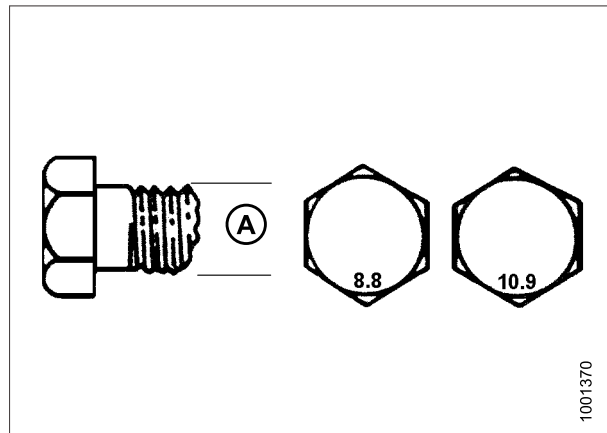


Figure 5.5: Bolt Grades

MAINTENANCE AND SERVICING

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

Nominal Size (A)	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

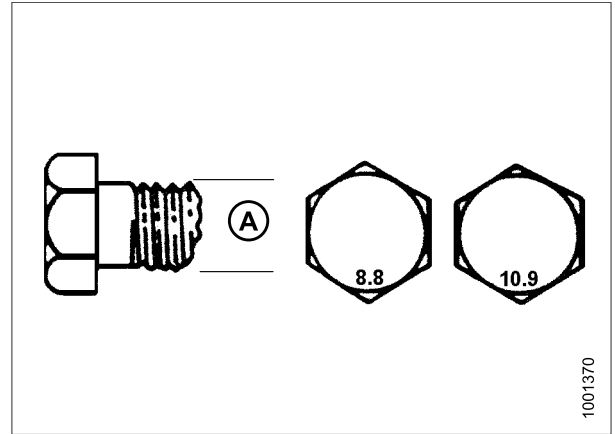


Figure 5.6: Bolt Grades

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

Nominal Size (A)	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

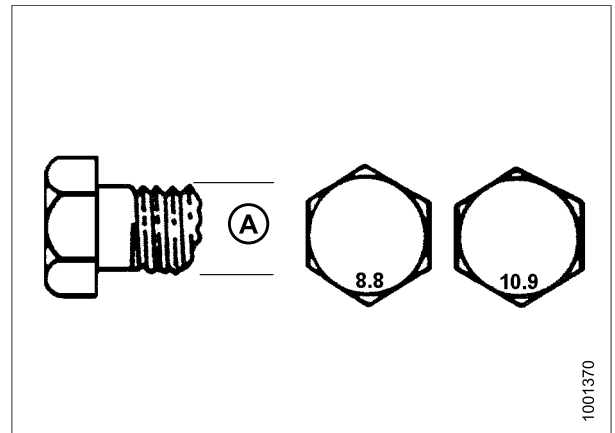


Figure 5.7: Bolt Grades

MAINTENANCE AND SERVICING

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

Nominal Size (A)	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

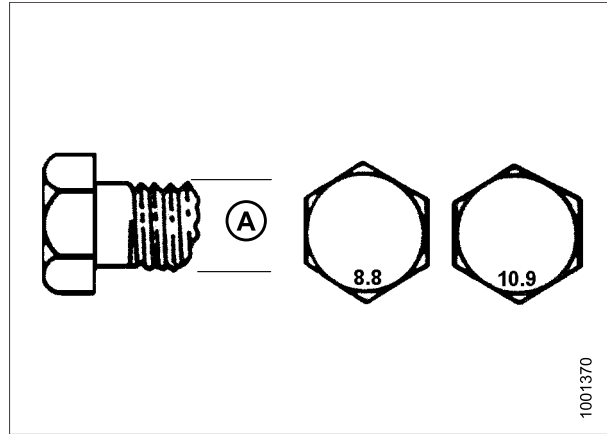


Figure 5.8: Bolt Grades

5.2.3 Metric Bolt Specifications Bolting into Cast Aluminum

Table 5.9 Metric Bolt Bolting into Cast Aluminum

Nominal Size (A)	Bolt Torque			
	8.8 (Cast Aluminum)		10.9 (Cast Aluminum)	
	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				

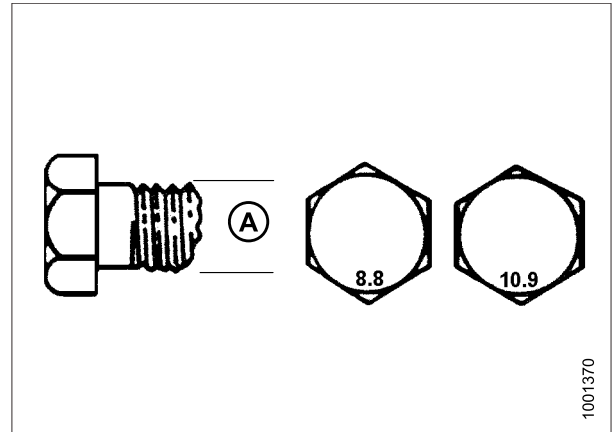


Figure 5.9: Bolt Grades

5.2.4 Flare-Type Hydraulic Fittings

1. Check flare (A) and flare seat (B) for defects that might cause leakage.
2. Align tube (C) with fitting (D) and thread nut (E) onto fitting without lubrication until contact has been made between the flared surfaces.
3. Torque the fitting nut (E) to the specified number of flats from finger tight (FFFT) or to a given torque value shown in the following table.
4. To prevent the fitting (D) from rotating, use two wrenches. Place one wrench on the fitting body (D) and tighten the nut (E) with the other wrench to the torque shown.
5. Assess the final condition of the connection.

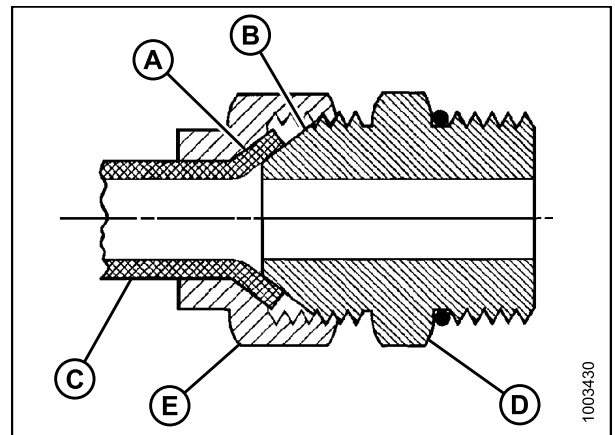


Figure 5.10: Hydraulic Fitting

MAINTENANCE AND SERVICING

Table 5.10 Flare-Type Hydraulic Tube Fittings

SAE No.	Tube Size O.D. (in.)	Thread Size (in.)	Nut Size across Flats (in.)	Torque Value ¹⁹		Flats from Finger Tight (FFFT)	
				ft·lbf	N·m	Flats	Turns
3	3/16	3/8	7/16	6	8	1	1/6
4	1/4	7/16	9/16	9	12	1	1/6
5	5/16	1/2	5/8	12	16	1	1/6
6	3/8	9/16	11/16	18	24	1	1/6
8	1/2	3/4	7/8	34	46	1	1/6
10	5/8	7/8	1	46	62	1	1/6
12	3/4	1-1/16	1-1/4	75	102	3/4	1/8
14	7/8	1-3/8	1-3/8	90	122	3/4	1/8
16	1	1-5/16	1-1/2	105	142	3/4	1/8

¹⁹. Torque values shown are based on lubricated connections as in reassembly.

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

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

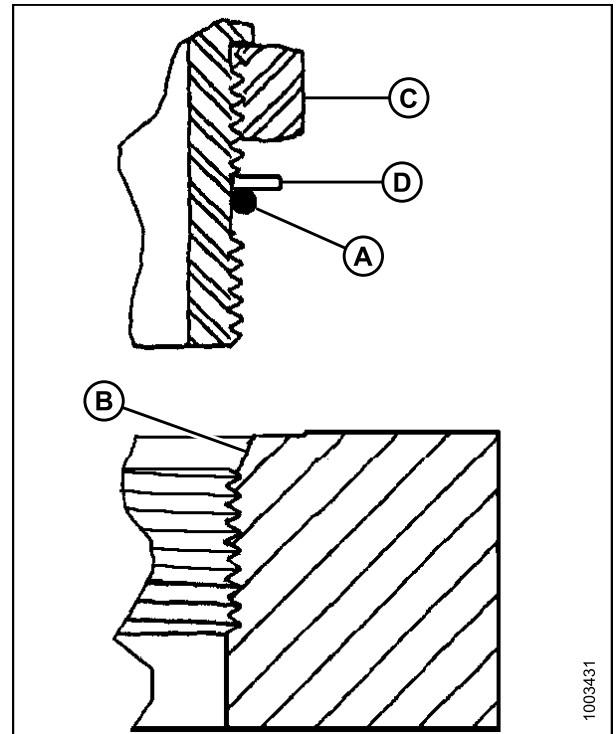


Figure 5.11: Hydraulic Fitting

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

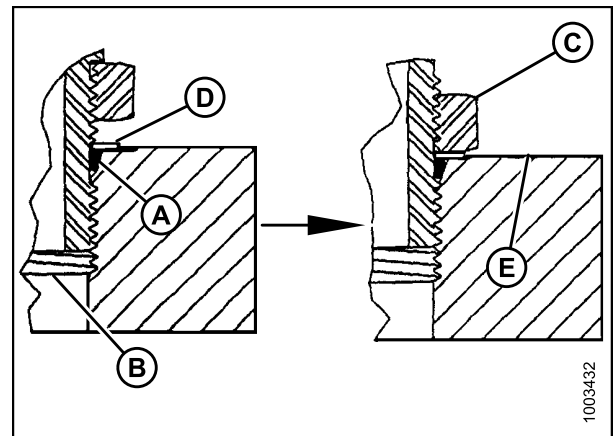


Figure 5.12: Hydraulic Fitting

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

SAE Dash Size	Thread Size (in.)	Torque Value ²⁰	
		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

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

MAINTENANCE AND SERVICING

SAE Dash Size	Thread Size (in.)	Torque Value ²⁰	
		ft·lbf (*in·lbf)	N·m
-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

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

1. Inspect O-ring (A) and seat (B) for dirt or obvious defects.
2. Check that O-ring (A) is **NOT** on the threads, adjust if necessary.
3. Apply hydraulic system oil to the O-ring.
4. Install fitting (C) into port until fitting is hand tight.
5. Torque fitting (C) per value in chart. Refer to Table 5.12 *O-Ring Boss (ORB) Hydraulic Fittings (Non-Adjustable)*, page 195.
6. Check the final condition of the fitting.

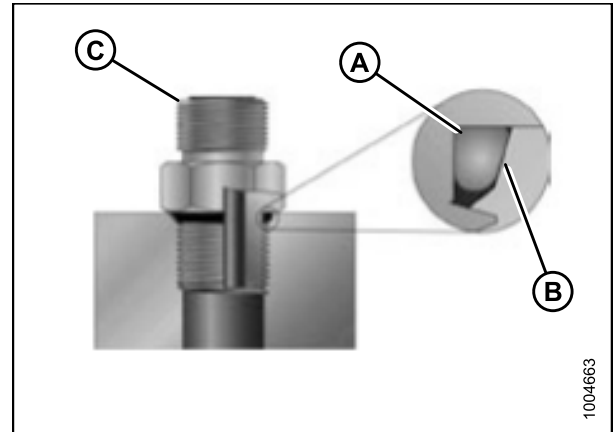


Figure 5.13: Hydraulic Fitting

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

SAE Dash Size	Thread Size (in.)	Torque Value ²¹	
		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

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

5.2.7 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 5.14: Hydraulic Fitting

2. Apply hydraulic system oil to the O-ring (B).
3. Align the tube or hose assembly so that the flat face of the sleeve (A) or (C) comes in full contact with O-ring (B).
4. Thread tube or hose nut (D) until hand-tight. The nut should turn freely until it is bottomed out.
5. Torque fitting further to the torque value in the table shown in the opposite column.

NOTE:

If applicable, hold the hex on the fitting body (E) to prevent rotation of fitting body and hose when tightening the fitting nut (D).

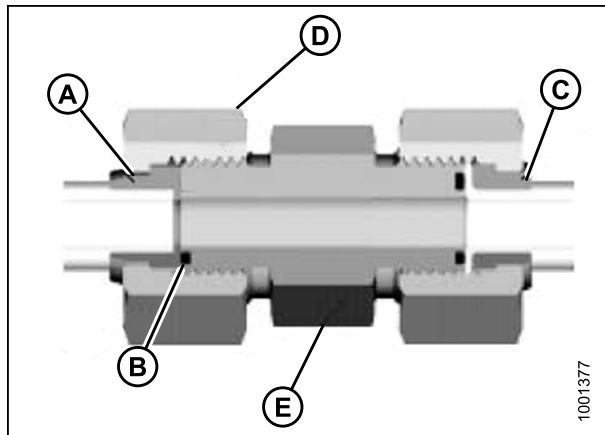


Figure 5.15: Hydraulic Fitting

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

MAINTENANCE AND SERVICING

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

SAE Dash Size	Thread Size (in.)	Torque Value ²²	
		ft·lbf (*in·lbf)	N·m
-3	Note ²³	–	–
-4	9/16–18	18–21	25–28
-5	Note ²³	–	–
-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	Note ²³	–	–
-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

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

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

5.3 Maintenance Specifications

5.3.1 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.

Fuel Specifications

Use good quality diesel fuel from a reputable supplier. For most year-round service, No. 2 diesel fuel meeting ASTM specification D975 Grade S15 will provide good performance.

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

Table 5.14 Fuel Specification

Fuel	Specification	Sulphur (by weight)	Water and Sediment (by volume)	Cetane no. °C	Lubricity
Grade No. 2	ASTM D975	0.5% Maximum	0.05% Maximum	40° Minimum	520 Microns
Grade No.1 and 2 mix ²⁴	n/a	1% Maximum 0.5% Maximum Preferred	0.1% Maximum	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 before using fuel additives. Situations where additives are useful include:

- 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.

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

24. Optional when operating temperature below 0°C (32°F).

MAINTENANCE AND SERVICING

Lubricants, Fluids, and System Capacities

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 and 2 mix ²⁵ ; refer to Fuel Specifications, page 198 for more information.	97 US gallons (367 liters)
Hydraulic oil	Hydraulic reservoir	SAE 15W-40 Compliant With SAE Specs For API Class CJ-4 Engine Oil Which Meets or Exceeds CES 20081 and API Performance Classification CJ-4.	11.5 US gallons (44 liters)
Gear lubricant	Wheel drive ²⁶	SAE 75W-90, API Service Class GL-5. Fully Synthetic Gear Lubricant, (SAE J2360 Preferred).	1.5 US quarts (1.4 liters)
Antifreeze	Engine cooling system	ASTM D-6210 and Fleetguard ES Compleat®.	6.6 US gallons (25 liters) ²⁷
Engine oil	Engine oil pan	SAE 15W-40 Compliant With SAE Specs For API Class SJ and CH-4 Engine Oil.	12.6 US quarts (11.9 liters) ²⁸
Air conditioning refrigerant ²⁹	Air conditioning system	R134A	5 lbs (2.27 kg)
Air conditioning refrigerant oil ³⁰	Air conditioning system total capacity	PAG SP-15	8.1 fl. oz. (240 cc)
Receiver drier (MD #183273)	Air conditioning system	PAG SP-15	2 fl. oz. (60 cc)
Condenser (MD #138983)	Air conditioning system	PAG SP-15	1 fl. oz. (30 cc)
Evaporator (MD #160130)	Air conditioning system	PAG SP-15	2 fl. oz. (60 cc)
Hoses	Air conditioning system	PAG SP-15	1 fl. oz. (30 cc)

25. Optional when operating temperature is below 0°C (32°F).

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

27. Equal parts with water, high quality, soft, de-ionized or distilled water as recommended by supplier.

28. Includes filter

29. For prior models who have not upgraded to 5 lbs of refrigerant order Kit MD #183180, which includes high pressure switch and decal to advise of systems 5 lbs charge requirement. Refer to Service Bulletin 1254.

30. New compressor (MD #203013) comes filled. If installing on 2014 and prior, refer to Service Bulletin 1254.

MAINTENANCE AND SERVICING

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 M105 Filter Part Numbers

Filter	Part Number
Engine Oil Filter	MD #111974
Charge Oil Filter	MD #112419 ³¹
Return Oil Filter	MD #151975 ³²
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 #42445
Primary Air Filter Element	MD #111954
Safety Air Filter Element	MD #111955

31. Located on the return manifold, closer towards the rear of the windrower.

32. Located on the return manifold, closer towards the middle of the windrower.

MAINTENANCE AND SERVICING

5.3.2 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

5.4 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.

5.4.1 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. Stop 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.

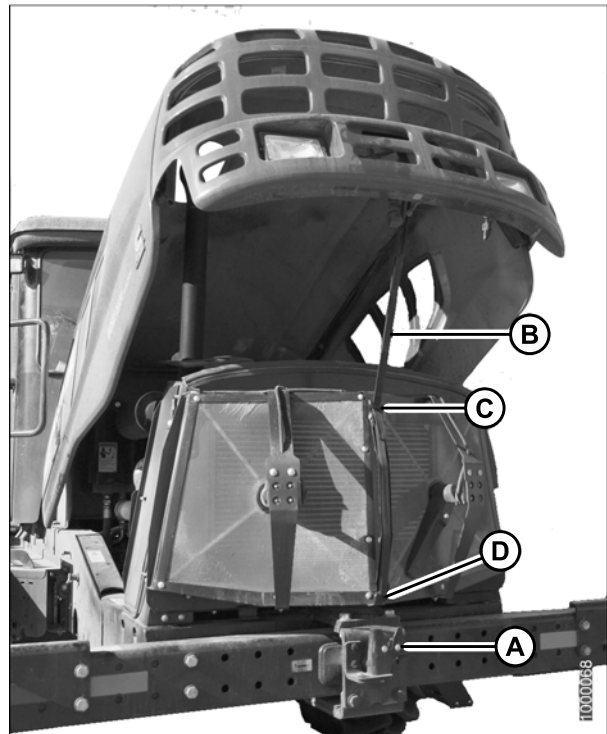


Figure 5.16: Accessing Engine Compartment

5.4.2 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).

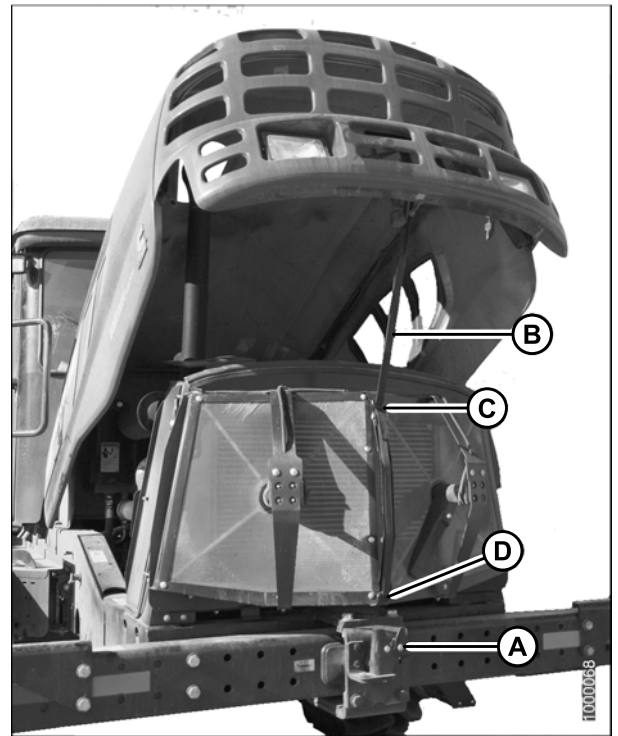


Figure 5.17: Accessing Engine Compartment

5.4.3 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. Stop the engine and remove the key.

MAINTENANCE AND SERVICING

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 5.18: Accessing Engine Compartment

5.4.4 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 5.19: Accessing Engine Compartment

5.5 Maintenance Platform

A swingaway platform/stair is provided for access to the operator's station and engine bay maintenance.

The maintenance platform has two positions:

- Standard Position
- Major Service Position

5.5.1 Opening Platform (Standard Position)

CAUTION

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

1. Approach the platform/stair unit (A) on the LH side of the windrower.

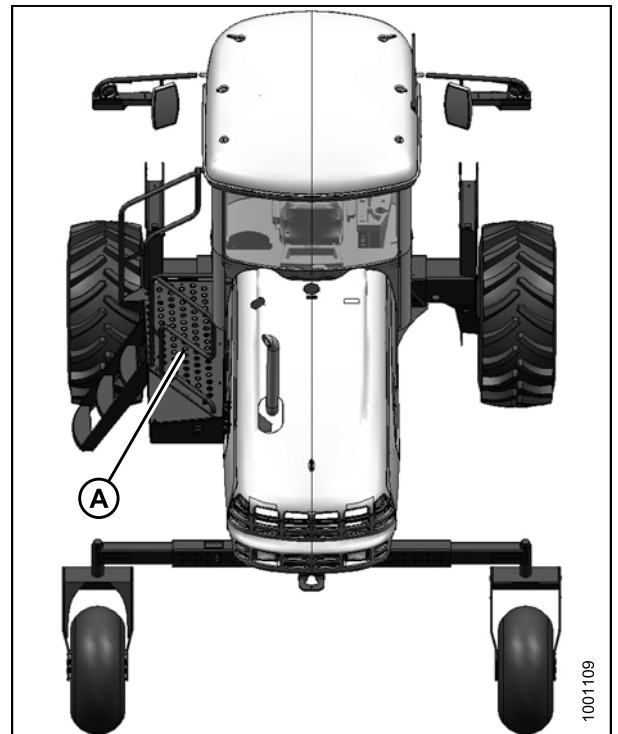


Figure 5.20: Platforms

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

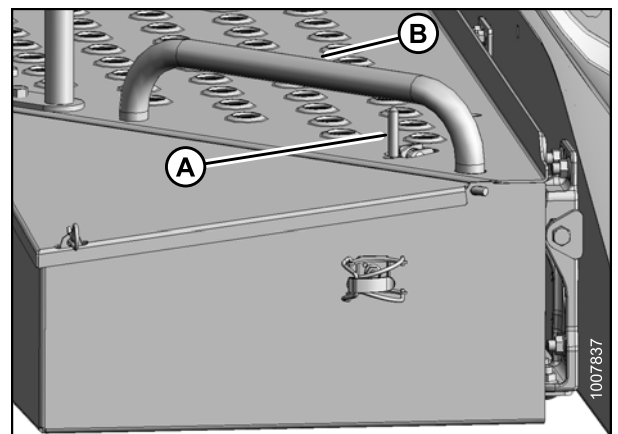


Figure 5.21: Platform Latch

5.5.2 Closing Platform (Standard Position)

CAUTION

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

This procedure describes how to close the platform (A).

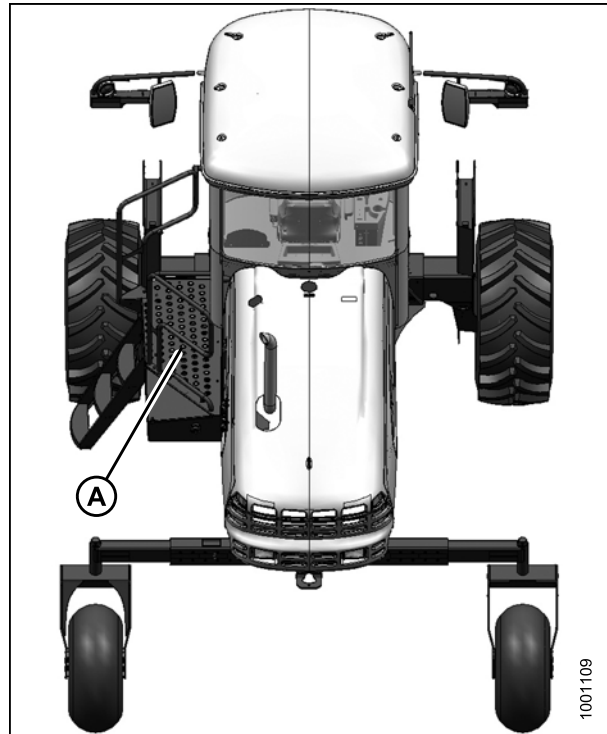


Figure 5.22: Platforms

1. If platform is latched in the open position, push latch (A) to unlock it.
2. Grasp handle (B) on platform and push forward until it stops and latch (A) engages.

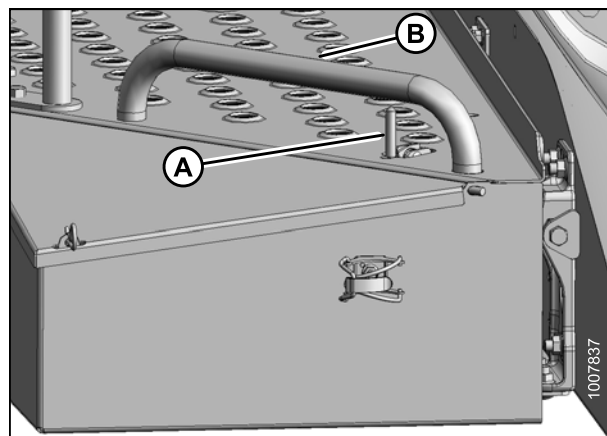


Figure 5.23: Platform Latch

5.5.3 Opening Platform (Major Service Position)

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

⚠ CAUTION

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

1. Open the hood. Refer to [5.4.1 Opening Hood \(Lower Position\)](#), page 202.

IMPORTANT:

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

2. Approach the platform/stair unit (A) on the LH side of the windrower.

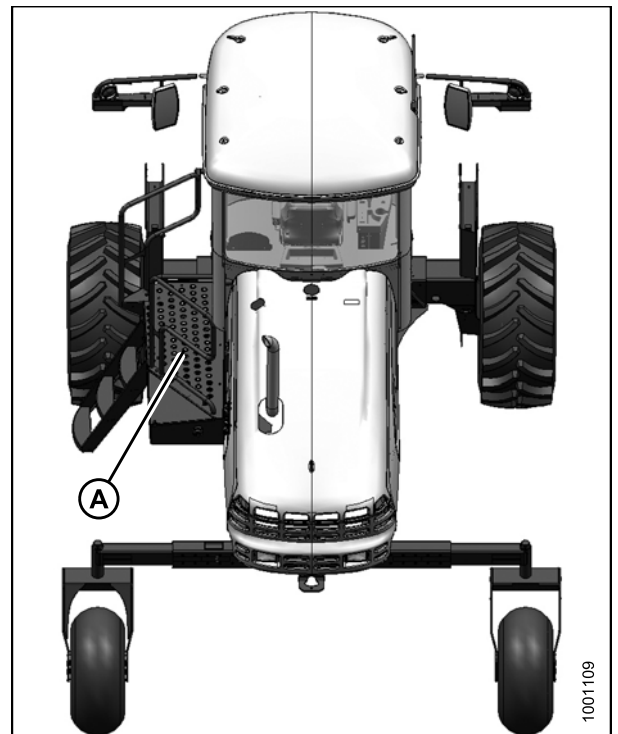


Figure 5.24: Platforms

3. Unlock latch (A) and move platform (B) toward open position. Do **NOT** lock in full aft position.

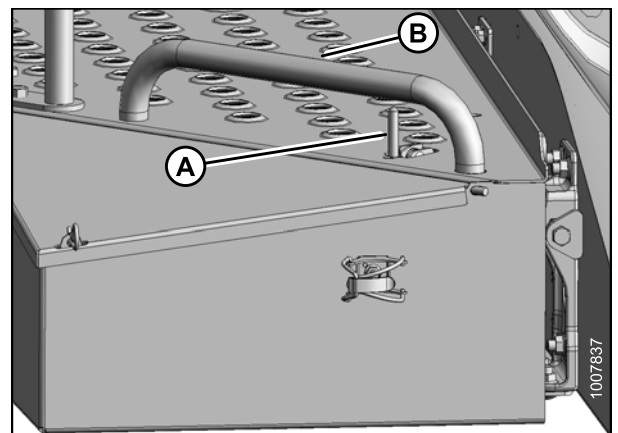


Figure 5.25: Platform Latch

MAINTENANCE AND SERVICING

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.

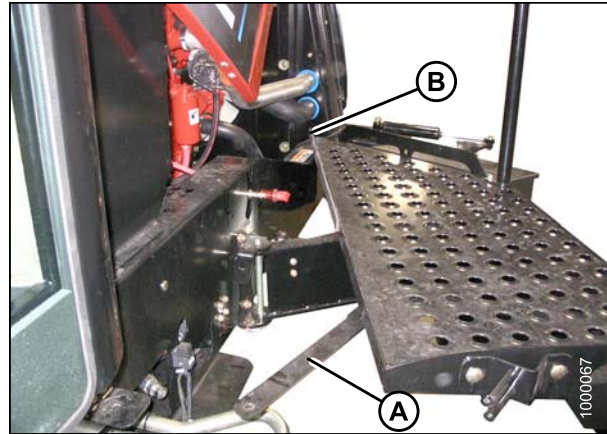


Figure 5.26: Platforms

5.5.4 Closing Platform (Major Service Position)

CAUTION

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

1. Swing link (A) all the way forward.
2. Push the front (cab-forward) end of platform towards the frame while moving the platform forward (cab-forward).
3. Position link (A) on bracket and install bolt and nut. Tighten enough so that link can still swivel on bracket.
4. Move platform (B) forward (cab-forward) until it stops and latch (A) engages.
5. Close the hood. Refer to [5.4.2 Closing Hood \(Lower Position\)](#), page 203.

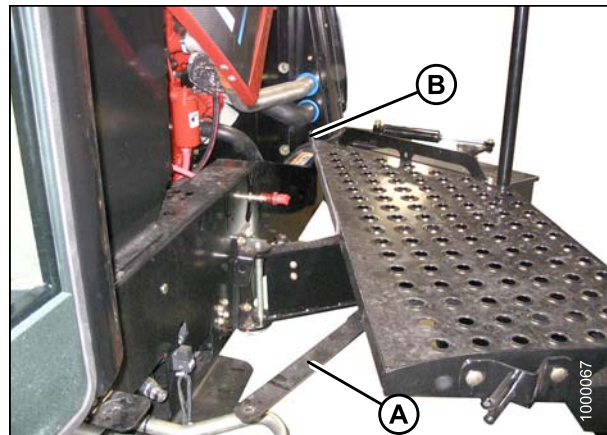


Figure 5.27: Platforms

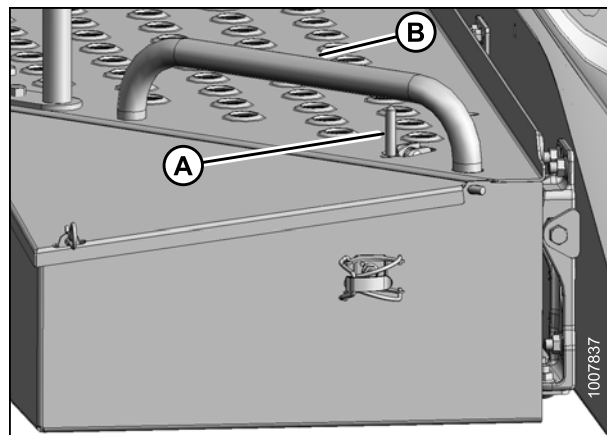


Figure 5.28: Platform Latch

5.6 Windrower Lubrication

WARNING

To avoid personal injury, before servicing windrower or opening drive covers, follow procedures in the 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 *Maintenance Schedule/Record, page 315*.

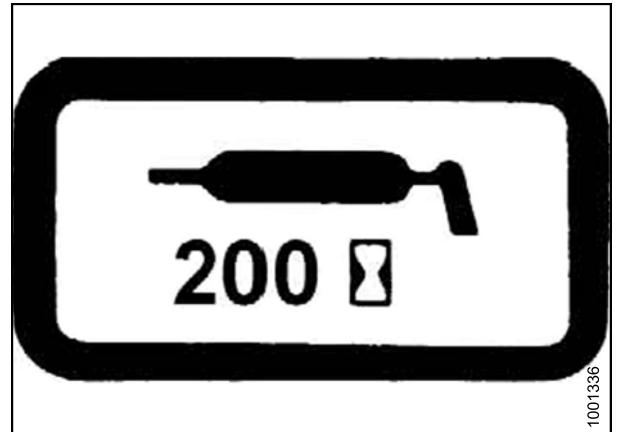


Figure 5.29: Lubrication Interval Decal

5.6.1 Lubricating the Windrower

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. To avoid injecting dirt and grit, wipe grease fitting with a clean cloth before greasing.
2. Inject grease through fitting with grease gun until grease overflows fitting, except where noted. Refer to *Lubricants, Fluids, and System Capacities, page 199*.
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.

5.6.2 Lubrication Points

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

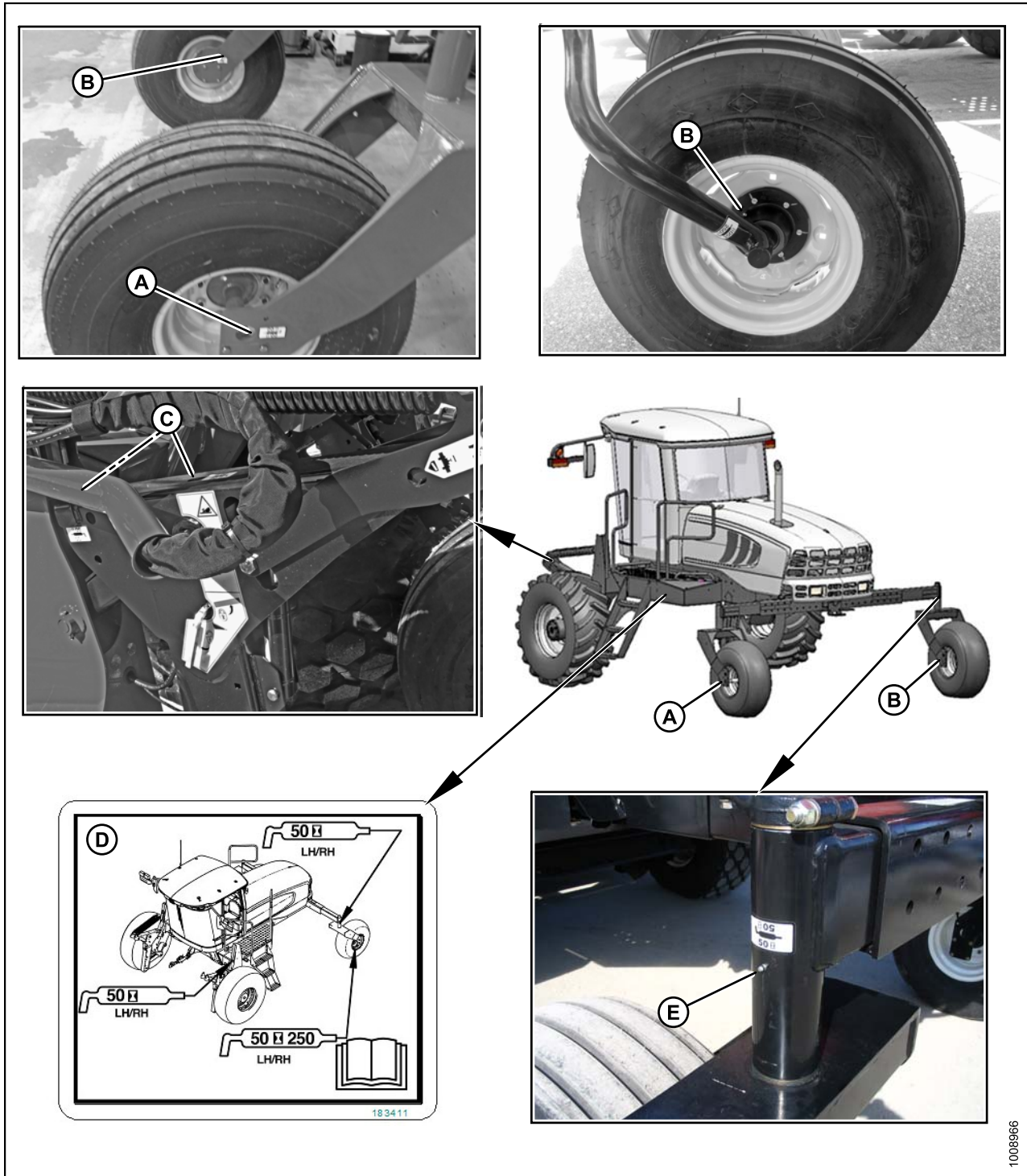


Figure 5.30: Lubrication Points

A - Forked Caster Wheel Bearing (2 Places) (Outer—Both Wheels)
 C - Top Link (2 Places) (Both Sides)
 D - Lubrication Decal (MD #183411)

B - Forked/Formed Caster Wheel Bearing (2 Places)
 (Inner—Both Wheels) (50 Hrs/250 Hrs)
 E - Caster Pivot (Both Sides)

5.7 Operator's Station

5.7.1 Seat Belts

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

5.7.2 Safety Systems

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

Checking Operator Presence System

1. While the windrower engine running, place the ground speed lever (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 restart the header, move the HEADER DRIVE switch to OFF position and back to the ON position again.

3. With the windrower moving at less than 5 mph (8 km/h):
 - a. Stand up out of the seat.
 - b. The cab display module (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.
4. With the windrower moving at more than 5 mph (8 km/h):
 - a. Stand up out of the seat.
 - b. The CDM should beep once and display "NO OPERATOR" on the lower line.
 - c. If **NOT**, the Operator Presence System requires adjustment. See your MacDon Dealer.

Checking Engine Interlock

1. 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.
2. With the engine shut down, steering wheel **NOT** centered, and the ground speed lever (GSL) in NEUTRAL, but **NOT** in N-DETENT, try to start the engine. The cab display module (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).

5.7.3 Ground Speed Lever (GSL) Adjustments

Adjusting Ground Speed Lever (GSL) Lateral Movement

DANGER

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

The ground speed lever (GSL) (A) should easily move into the N-DETENT (B) by itself.

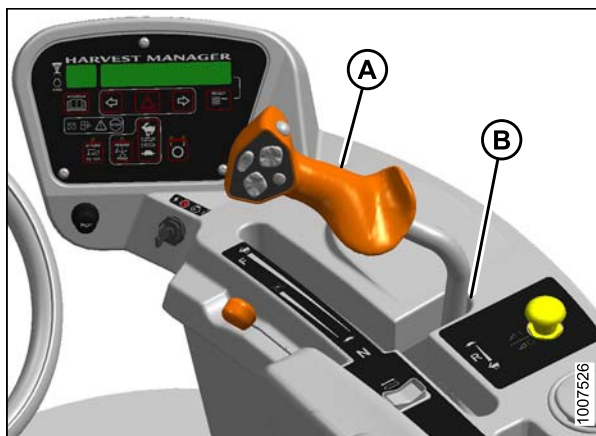


Figure 5.31: Operator Console

MAINTENANCE AND SERVICING

The tensioner cable (A) should be tight when the GSL is at the right-hand side of the N-DETENT.

The NEUTRAL START switch should also be fully compressed. If the cable is too tight, it will prevent the NEUTRAL START switch from fully compressing, and prevent proper engagement of the pintle arm. Refer to [5.7.5 Neutral Start Switch, page 217](#).

Adjust the cable tension as follows:

1. Hold nut (B) from turning and loosen jam nut (C).
2. To increase the tension, turn the nut (B) clockwise.
3. To decrease the cable tension, turn the nut (B) counterclockwise.
4. Hold nut (B) from turning and tighten jam nut (C).

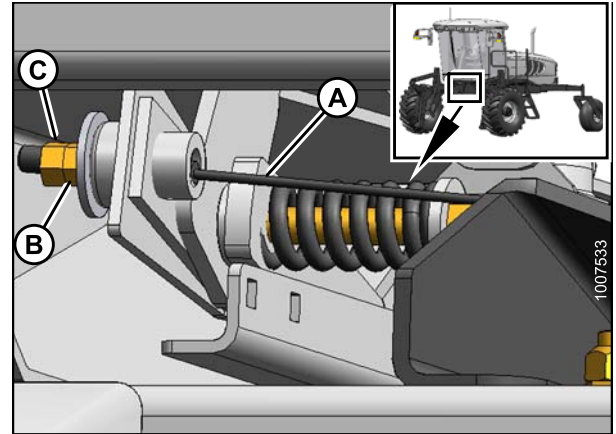


Figure 5.32: GSL Tension Cable

Adjusting Ground Speed Lever (GSL) Fore-Aft Movement

The GSL should remain as positioned by the Operator yet be movable without excessive force. The spring (C) is set at the factory to 2-1/2 in. (64 mm). If necessary, adjust as follows:

1. Hold nut (A) from turning, and loosen jam nut (B).
2. To increase the pivot resistance, turn the nut (A) clockwise to compress the spring.
3. To decrease the resistance, turn the nut (A) counterclockwise to release the spring tension.
4. Hold nut (A) from turning, and tighten jam nut (B).

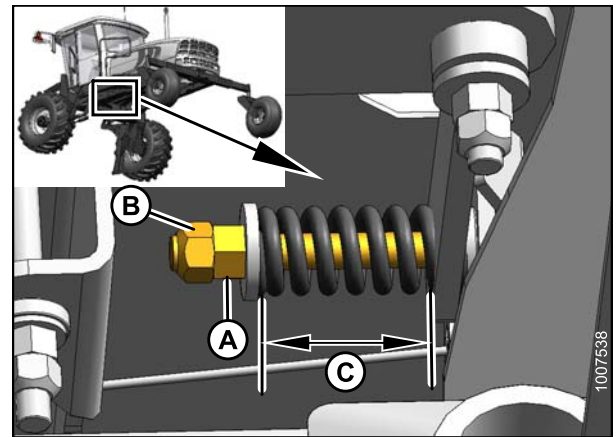


Figure 5.33: GSL Adjustment Spring

Adjusting Ground Speed Lever (GSL) Position

The GSL (A) should be centered fore-aft in the N-DETENT slot (B) when the steering wheel is centered and locked.

If necessary, adjust GSL position as follows:

IMPORTANT:

Neutral Interlock must be properly adjusted before adjusting GSL position.

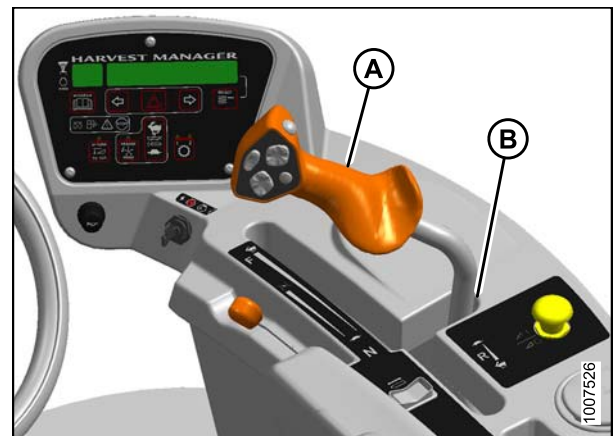


Figure 5.34: Operator Console

MAINTENANCE AND SERVICING

1. Loosen nuts (A)
2. Hold GSL in center of N-DETENT slot to locate support (B).
3. Tighten nuts (A, and torque to 80–90 lbf-ft (108–122 Nm).

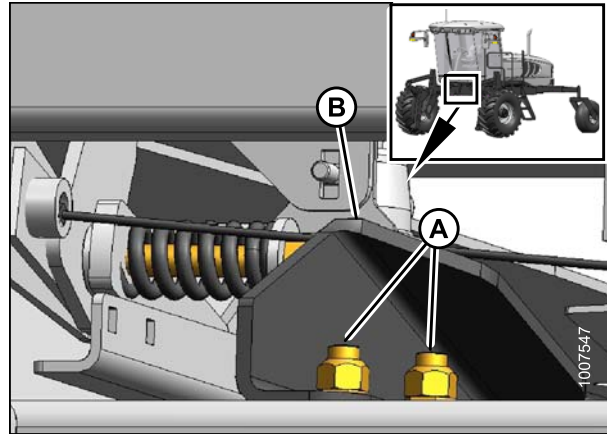


Figure 5.35: GSL Adjust Support

5.7.4 Steering Adjustments

Checking 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 ground speed lever (GSL) (A) in N-DETENT, shut down engine, and remove key.

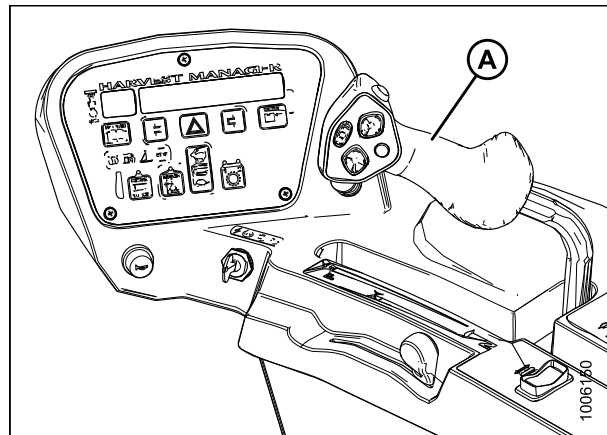


Figure 5.36: Operator Console

MAINTENANCE AND SERVICING

2. Beneath the cab, check for evidence of interference of moving parts with hoses, tubes, and other linkages.



Figure 5.37: Windrower Underside

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

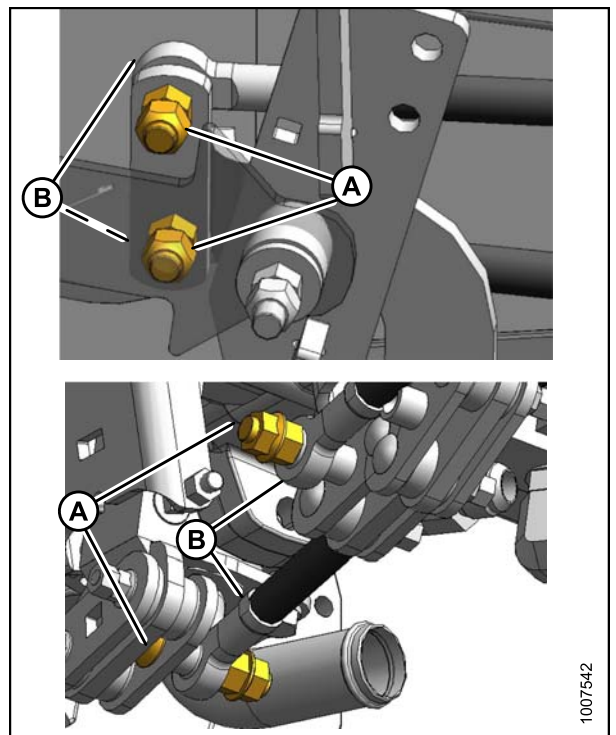


Figure 5.38: Steering Rods

MAINTENANCE AND SERVICING

4. If steering rod bolts are loose:
 - a. Back off outer 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).

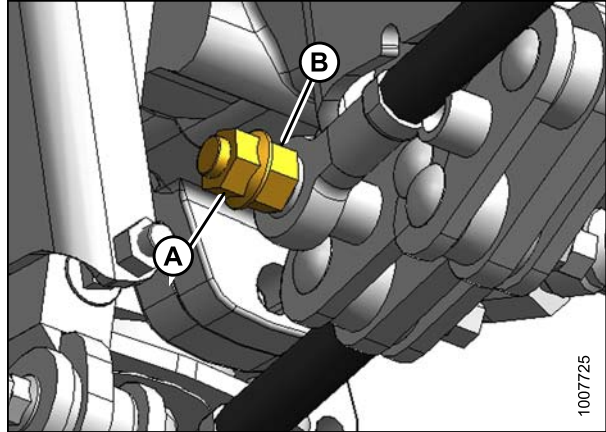


Figure 5.39: Steering Rod Bolts

5. If steering steering rod ball joints (A) are loose, they should be replaced. See your MacDon Dealer.

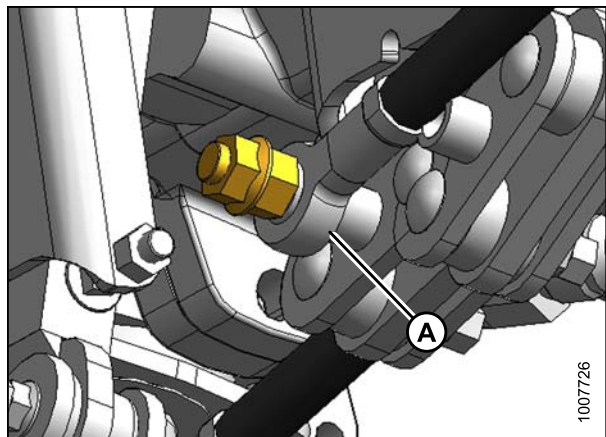


Figure 5.40: Steering Rod Ball Joints

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

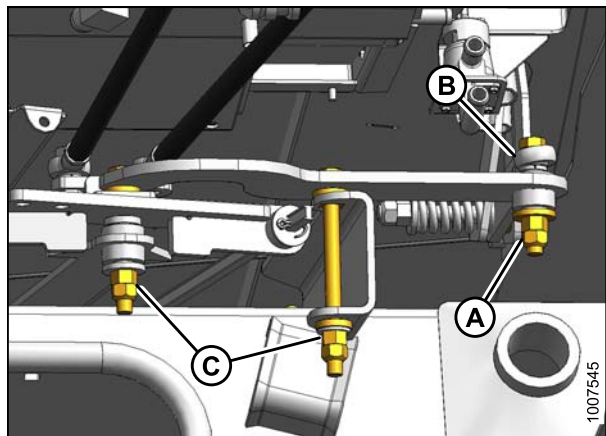


Figure 5.41: Steering Link

MAINTENANCE AND SERVICING

7. If steering link bolts (A) are loose:
 - a. Back off outer jam nut (B).
 - b. Tighten inside nut (C) to 5–10 lbf-ft (7–13 N·m).
 - c. Hold inside nut (C), and tighten jam nut (B) to 60–70 lbf-ft (81–95 N·m).
8. If steering link ball joints (D) are loose, they should be replaced. Contact your MacDon Dealer for replacement procedures.

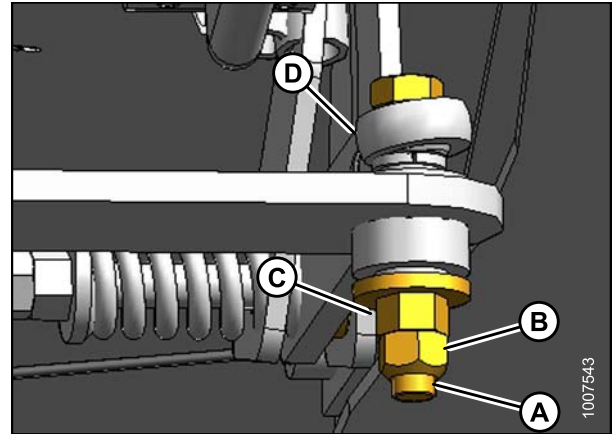


Figure 5.42: Steering Link Bolts

9. After replacing parts or making adjustments, perform checks for Neutral Interlock and steering lock. Refer to [5.7.2 Safety Systems, page 211](#).

5.7.5 Neutral Start Switch

The NEUTRAL START Switch (A) is located on the frame adjacent to the hydrostatic transmission, and it must be closed before the engine can be started.

The switch is closed when the Neutral Interlock on the pump is activated by positioning the Ground Speed Lever (GSL) into N-DETENT, and locking the steering wheel in CENTER position.

When the switch closes, and the machine starts and runs, the brakes continue to be applied to the drive wheels as park brake solenoid is energized preventing brake release.

1. Check that electrical connections are good at NEUTRAL START Switch (A).
2. Check that the plunger of switch is fully compressed when the steering is locked, and the GSL is fully in N-DETENT. Adjust switch support if required as follows:
 - a. Loosen nut (B), and adjust support (C) as required.
 - b. Tighten nut (B).

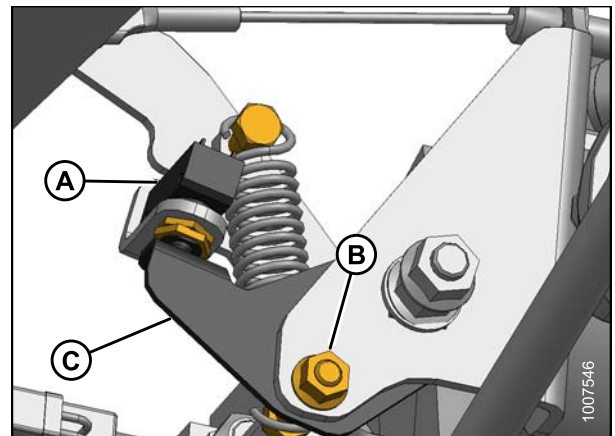


Figure 5.43: Neutral Start Switch

IMPORTANT:

Do **NOT** over-adjust switch support, as this will prevent pintle arms from locking.

5.7.6 Heating, Ventilating, and Air Conditioning (HVAC) System

Fresh Air Intake Filter

The fresh air filter is located under the cab roof, behind the rear window, and should be serviced daily.

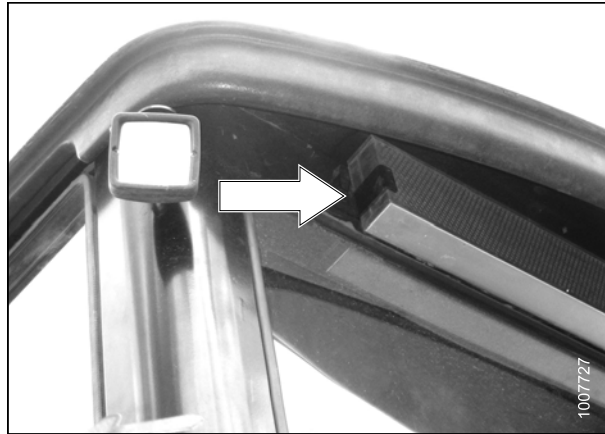


Figure 5.44: Fresh Air Filter

Servicing Fresh Air Intake 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. Loosen knob (B), and slide retainer out to release filter (A) from rear of cab roof.

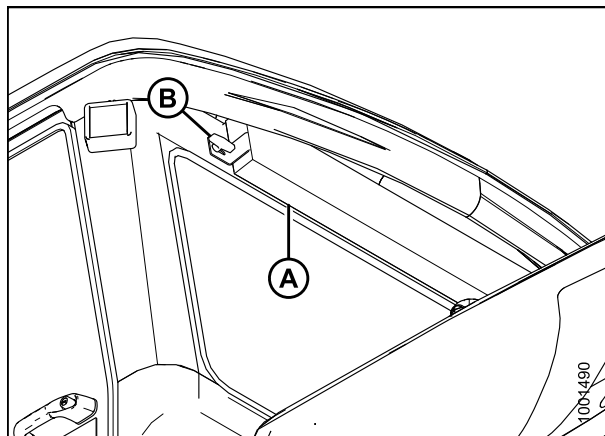


Figure 5.45: Fresh Air filter

MAINTENANCE AND SERVICING

2. Tap filter gently on a flat surface, dirty side down. Do **NOT** tap on a tire, treads may damage filter pleats.
3. Direct compressed air (100 psi [700 kPa] maximum) through filter in opposite direction of air flow arrows.
4. Wash filter as required:
 - a. Soak 15 minutes in warm water (**NOT** over 100°F [40°C]) with Filter Element Cleaner (Donaldson D 1400 or equivalent).
 - b. Rinse thoroughly with clean water (maximum pressure 40 psi [275 kPa]).
 - c. Shake excessive water from filter, and allow element to dry. Do **NOT** use compressed air to dry filter as it may rupture the wet element. Protect element from freezing until dry.
5. Inspect filter before installing as follows:
 - a. Hold a bright light on one side element, and check carefully for holes. Discard any element which shows the slightest hole.
 - b. Be sure outer screen is not dented. Vibration would quickly wear a hole in the filter.
 - c. Be sure filter gasket is in good condition. If gasket is damaged or missing, replace element.
6. Reinstall filter, making sure air flow arrows point towards cab.



Figure 5.46: Cleaning the Fresh Air Filter

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.

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.

MAINTENANCE AND SERVICING

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

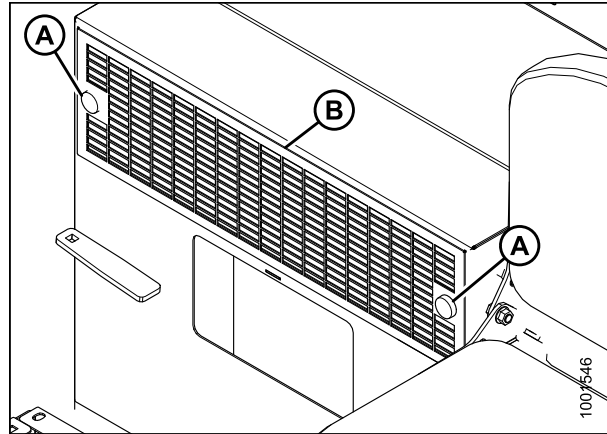


Figure 5.47: Return Air Filter

2. Separate the filter (B) from the cover (A).
3. Clean or replace filter. If cleaning filter, refer to [Cleaning Return Air Cleaner, page 220](#).
4. Assemble the cleaner (B) and cover (A), and position on cab wall over opening.

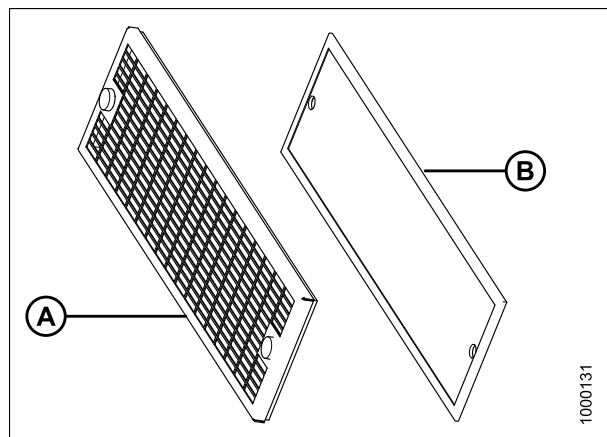


Figure 5.48: Return Air Filter

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

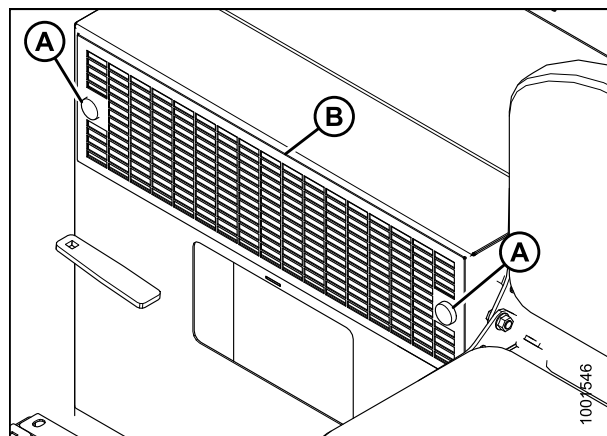


Figure 5.49: Return Air Filter

Cleaning Return Air Cleaner

Clean the electrostatic filter as follows:

MAINTENANCE AND SERVICING

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 then dry with compressed air.
4. Inspect filter for damage, separation, and holes. Replace if damaged.

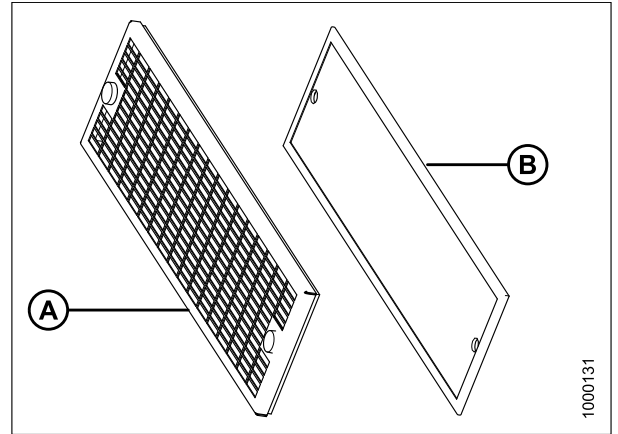


Figure 5.50: Return Air Filter

Air Conditioning 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 [Maintaining Engine Cooling Box, page 250](#).

Air Conditioning 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. It is accessed by removing the cover from the unit.

Removing Air Conditioning Cover

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

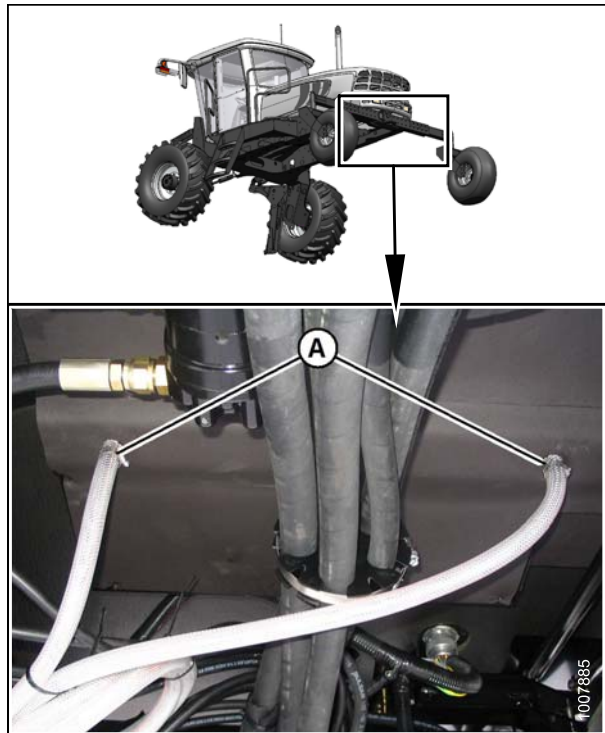


Figure 5.51: HVAC System

2. Remove the ten fasteners (A) that attach the cover to the housing. Remove the cover.

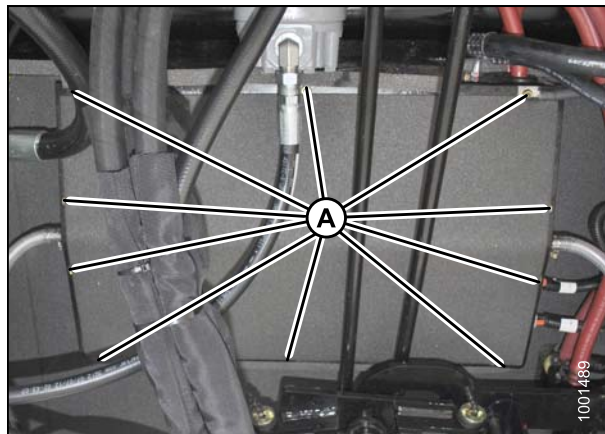


Figure 5.52: HVAC System

Cleaning Air Conditioning 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 (A) 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 (B).
4. If dirt is still present, soak evaporator in water to loosen dirt and then blow out with compressed air.

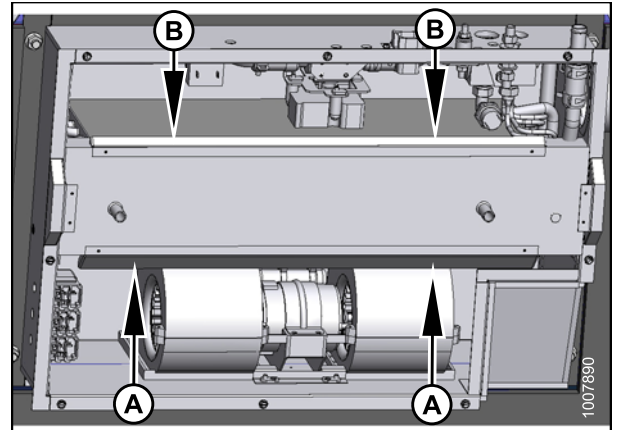


Figure 5.53: HVAC System

Installing Air Conditioning Cover

1. Straighten any bent fins.
2. Position cover and attach with ten fasteners (A).

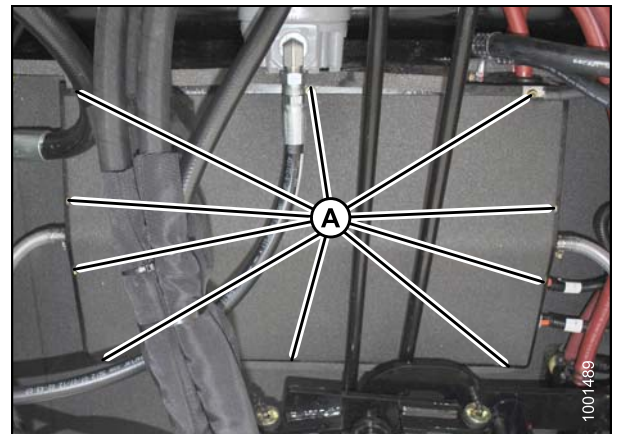


Figure 5.54: HVAC System

MAINTENANCE AND SERVICING

3. Reattach drain hoses to drain tubes and secure with hose clamps (A).

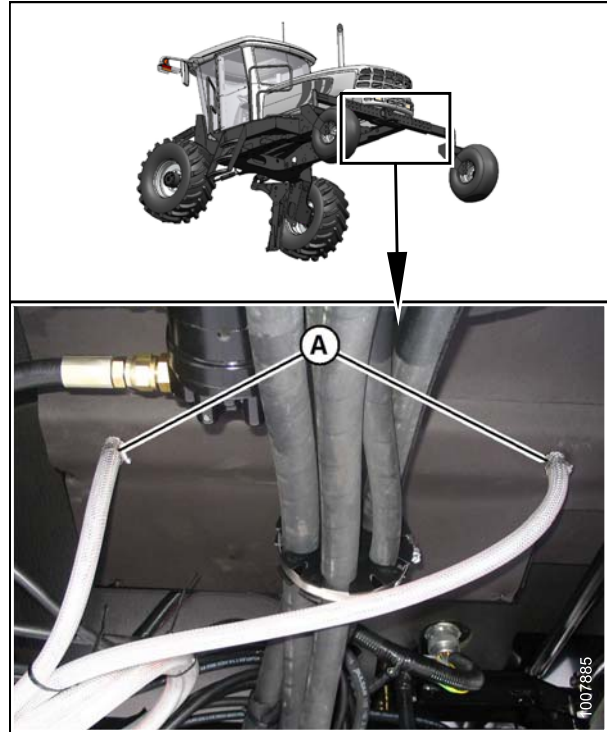


Figure 5.55: HVAC System

Air Conditioning (A/C) Compressor

The compressor is protected from excessively low suction and high discharge pressures by two switches that shut down the compressor to prevent damage to the system. These switches do not require any regular servicing or maintenance, so if problems occur and the switches are suspect, contact your MacDon Dealer.

- The 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).
- The high pressure switch is normally closed with an A/C charge in the system and is located on the receiver drier (right-hand 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.

If the compressor cycles rapidly due to rapid pressure changes, the cab display module (CDM) displays a warning “CHECK A/C SYSTEM”. Contact your Dealer.

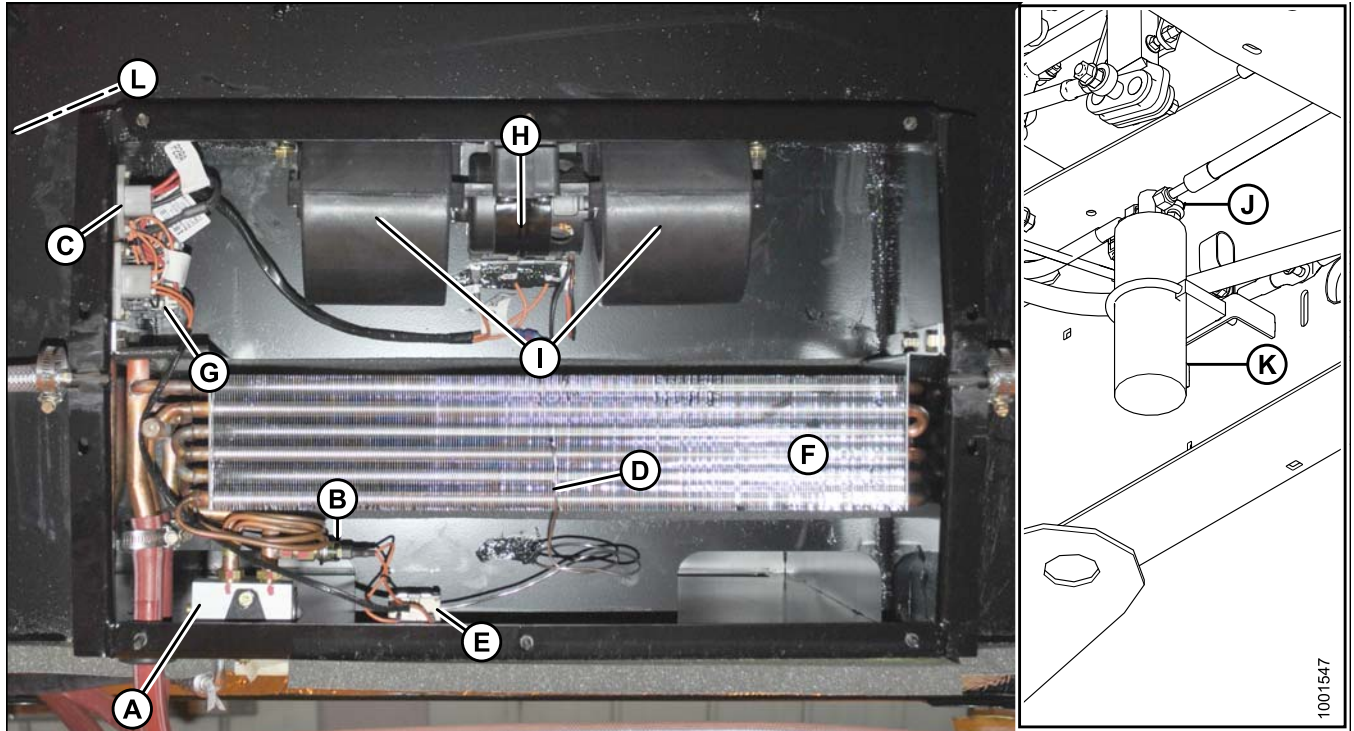


Figure 5.56: HVAC System

A - Expansion Valve
E - Thermostat
I - Blower Fans

B - Low Pressure Switch
F - Evaporator Core
J - High Pressure Switch

C - Electrical Connector
G - A/C Relays
K - Receiver Dryer

D - Capillary Tube
H - Blower Motor
L - Heater Valve (Not Shown)

Servicing the Air Conditioning Compressor

Refer to [Replacing Air Conditioner A/C Compressor Belt, page 257](#) for belt replacement procedure.

See your MacDon Dealer for all other servicing procedures.

5.7.7 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.

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 are supplied with your machine).

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.

⚠ DANGER

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

IMPORTANT:

Ensure nothing falls into gearbox oil reservoir.

1. Stop engine and remove ignition key.
2. Open the hood to the lowest position, refer to [5.4.1 Opening Hood \(Lower Position\)](#), page 202.
3. Remove positive (red) cables (A, C) from battery posts first, then remove negative (black) cables (B, D) from both battery posts.

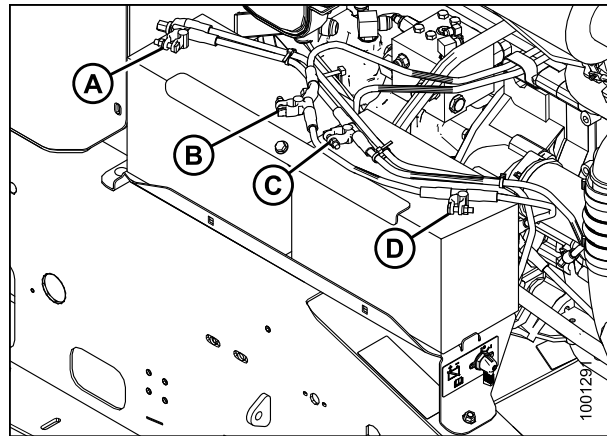


Figure 5.57: Electrical System

4. Clean area around the plastic cap on access hole (A). Remove the cap.
5. Insert the barring tool (B) into the flywheel housing until it engages the ring gear.
6. Attach a 1/2 in. square drive ratchet or breaker bar, and turn.
7. Remove barring tool (B) and clean oil from around access hole.
8. Clean plastic cap and reinstall in access hole (A) with silicone sealant.

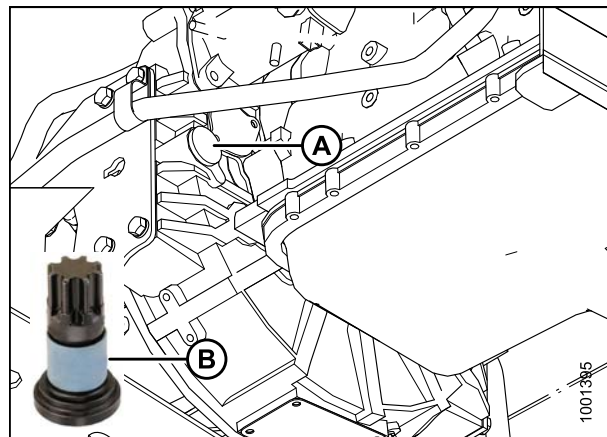


Figure 5.58: Access Hole Location for Barring Tool

MAINTENANCE AND SERVICING

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.

9. Attach negative (black) cables (B, D) to negative posts on batteries, and tighten clamps. Then attach positive (red) cables (A, C) to positive post on batteries and tighten clamps.
10. Position plastic covers onto clamps.
11. Close the hood, refer to [5.4.2 Closing Hood \(Lower Position\)](#), page 203.

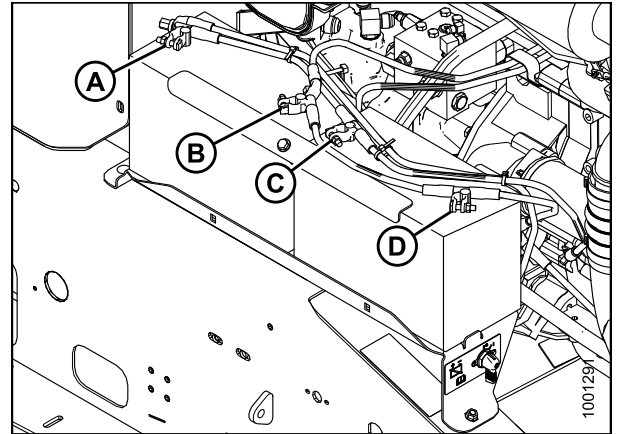


Figure 5.59: Battery Terminal Location

Engine Oil

Checking Engine Oil Level

Check engine oil level frequently and watch for any signs of leakage.

To check the engine oil level, follow these steps:

NOTE:

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

1. Open the hood to the lowest position. Refer to [5.4.1 Opening Hood \(Lower Position\)](#), page 202.
2. Operate the engine at low idle, and check for leaks at the filter and drain plug.
3. Stop the engine and remove the key. Wait about 5 minutes.
4. Remove dipstick (A) by turning it counterclockwise to unlock.
5. Wipe clean, reinsert in engine, and then remove.

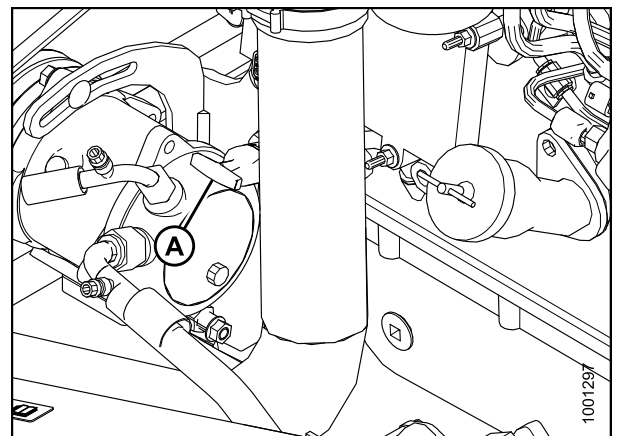


Figure 5.60: Engine Oil Level

MAINTENANCE AND SERVICING

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

NOTE:

If you need to add oil, refer to [Adding Engine Oil, page 229](#).

- Replace dipstick and turn it clockwise to lock.
- Close the hood. Refer to [5.4.4 Closing Hood \(Highest Position\), page 204](#).

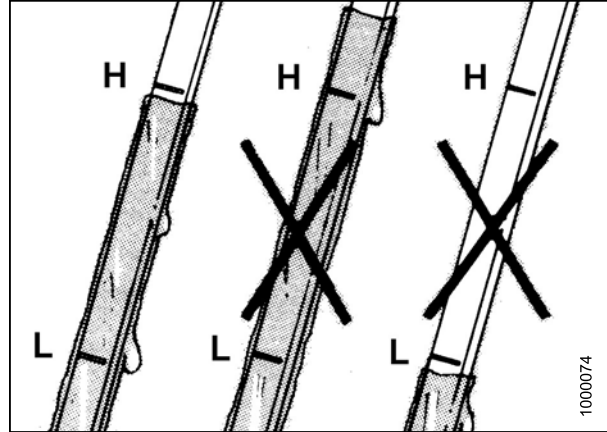


Figure 5.61: Engine Oil Level

Changing Engine Oil

Refer to the following procedures:

- [Checking Engine Oil Level, page 227](#)
- [Draining Engine Oil, page 228](#)
- [Replacing Engine Oil Filter, page 229](#)
- [Adding Engine Oil, page 229](#)

Draining Engine 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.

NOTE:

The engine should be warm prior to changing the oil.

- Stop the engine and remove the key.
- Place a drain pan with a capacity of about 6 US gallons (24 liters) under the engine oil drain.

MAINTENANCE AND SERVICING

3. Remove oil drain plug (A) and allow the oil to completely finish draining.
4. Replace drain plug (A).
5. 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.
6. Properly dispose of used oil.

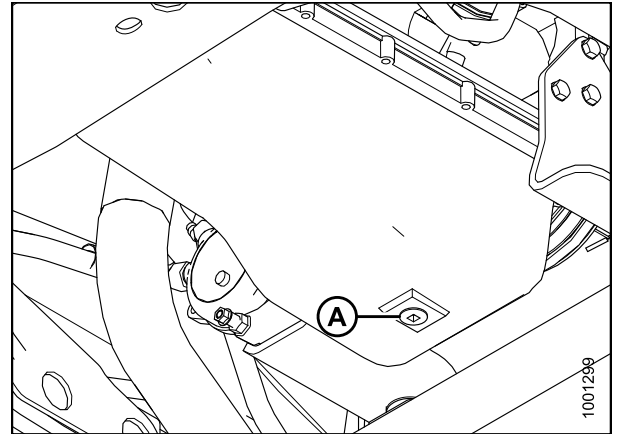


Figure 5.62: Engine Oil Drain Plug

Replacing Engine Oil Filter

NOTE:

Replace oil filter each time engine oil is changed.

1. Open the hood. Refer to [5.4.1 Opening Hood \(Lower Position\)](#), page 202.
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. Refer to [Filter Part Numbers](#), page 200 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.

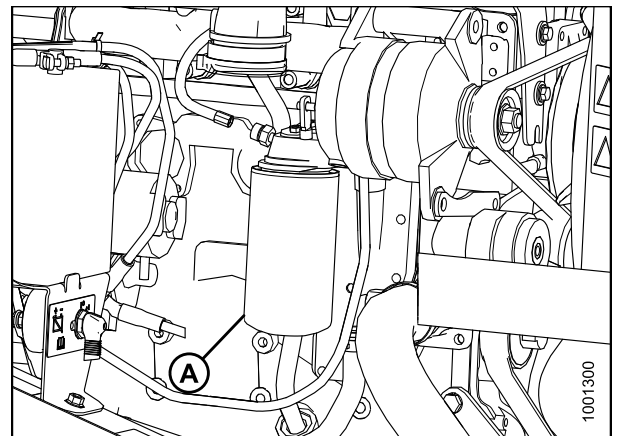


Figure 5.63: Engine Oil Filter

IMPORTANT:

Do **NOT** use a filter wrench to install the oil filter. Overtightening can damage the gasket and filter.

8. Properly dispose used oil filter.

Adding Engine Oil

1. Stop the engine and remove the key. Wait about 5 minutes.
2. Open the hood. Refer to [5.4.1 Opening Hood \(Lower Position\)](#), page 202.

MAINTENANCE AND SERVICING

3. Remove filler cap (A) by turning it counterclockwise.
4. Carefully pour the oil. A funnel is recommended to avoid spillage. Refer to [Lubricants, Fluids, and System Capacities](#), page 199 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. Refer to [Checking Engine Oil Level](#), page 227.
7. Close the hood. Refer to [5.4.2 Closing Hood \(Lower Position\)](#), page 203.

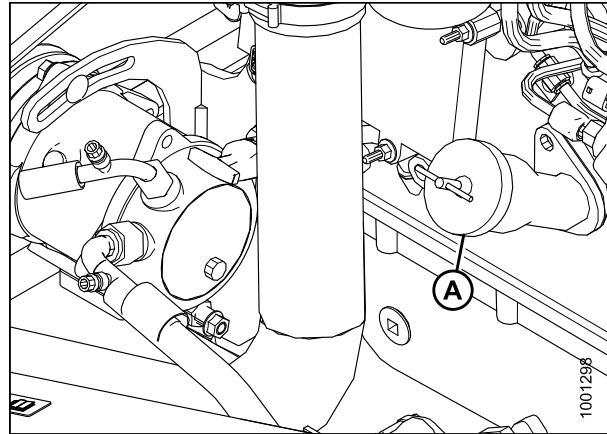


Figure 5.64: Oil Filler Cap

Air Intake System

IMPORTANT:

Do **NOT** run engine with air cleaner disconnected or disassembled.

Engine intake air is drawn through a duct (A) from the cooling box that precleans the air and then through a dual element filter (B).

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

The air cleaner is also equipped with an air filter restriction switch (D) that indicates when the primary filter element requires cleaning.

Refer to [Filter Part Numbers](#), page 200.

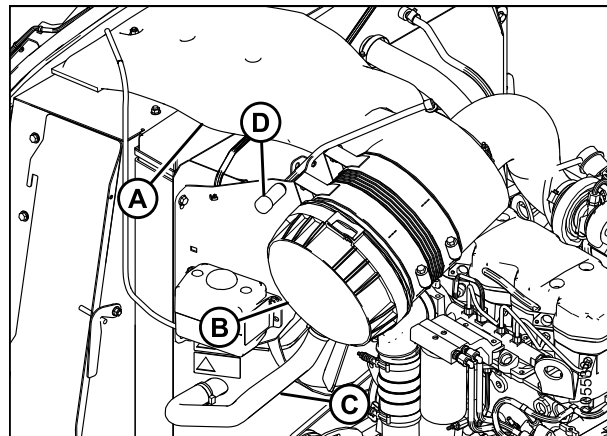


Figure 5.65: Air Intake System

IMPORTANT:

- Do **NOT** run engine with air cleaner disconnected or disassembled.
- 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 [Maintenance Schedule/Record](#), page 315.

MAINTENANCE AND SERVICING

Air Filter Restriction Indicator

During engine operation, the indicator shows the vacuum in inches of H₂O and kPa. As dirt accumulates in the filter, the restriction increases.

When indicator gauge (A) shows a restriction of 25 inches of H₂O (6.20 kPa) and window (B) shows red, the filter requires servicing.

IMPORTANT:

Over-servicing the filter element increases the risk of dirt being ingested by the engine, and severely damaging the engine.

Service air filter **ONLY IF** indicator (A) reads 25 inches H₂O (6.20 kPa) and/or indicator (B) shows red.

IMPORTANT:

After servicing filters, press button (C) to reset the gauge and clear the red indicator from window (B).



Figure 5.66: Air Filter Restriction Indicator

Removing Primary Air Filter

1. Open the hood, refer to [5.4.1 Opening Hood \(Lower Position\)](#), page 202.
2. Slightly lift catch (A) at side of end cap (B) and rotate end cap counterclockwise until it stops.
3. Make sure arrow (A) lines up with UNLOCK symbol on end cap.
4. Pull off the end cap.

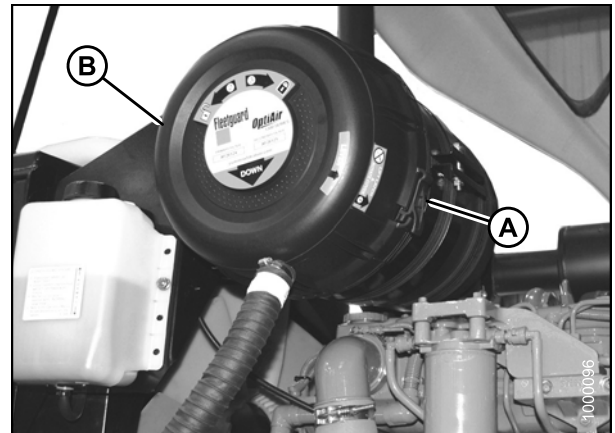


Figure 5.67: Engine Air Cleaner



Figure 5.68: Engine Air Cleaner

MAINTENANCE AND SERVICING

5. Check the aspirator duct opening (A) for obstructions or damage. Clean if necessary.

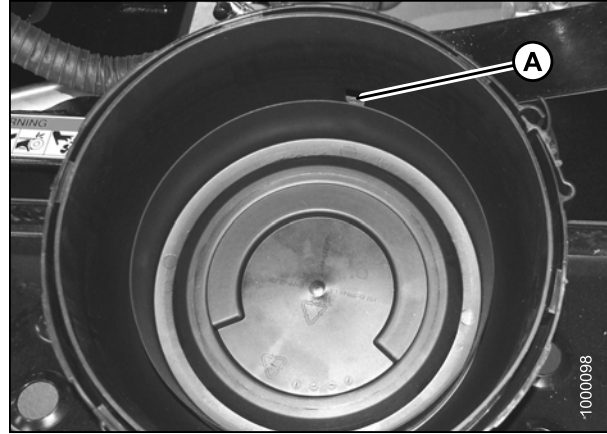


Figure 5.69: Engine Air Cleaner

6. Pull out the primary filter element (A).

IMPORTANT:

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.

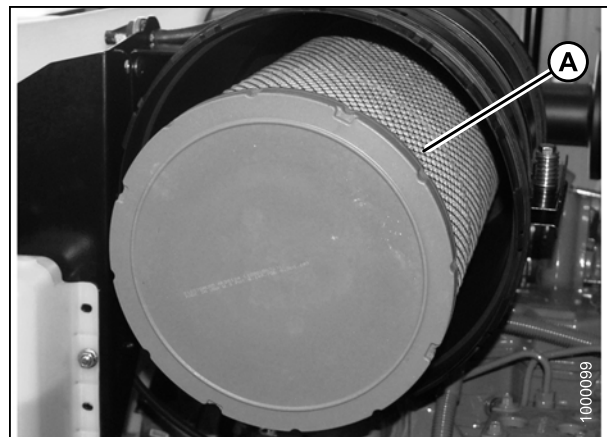


Figure 5.70: Engine Air Cleaner

Replace the secondary air filter (A) every year or after every third primary filter change (even if it appears clean).

If you're changing the secondary air filter because it is dirty, inspect the primary filter and the filter canister to determine the reason for contamination.

- Examine the filter canister for cracks and replace if necessary.
- Ensure filter sealing surfaces are soft, flexible, and sealing properly. Hard seals may allow debris through to the secondary filter.
- Ensure canister retaining latches are secure.

IMPORTANT:

- Do **NOT** remove the secondary filter element unless it needs replacing.
- Do **NOT** attempt to clean the secondary element (A). Replace only.

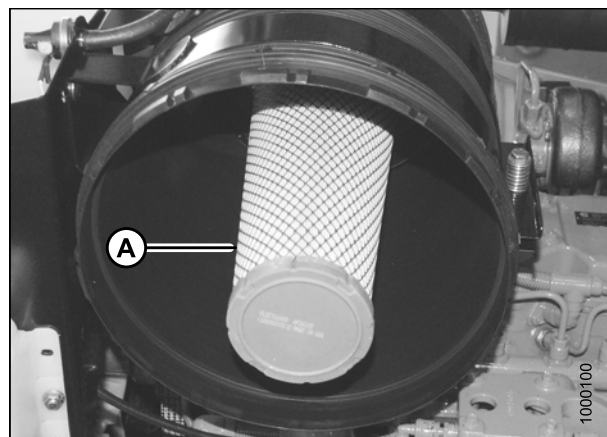


Figure 5.71: Engine Air Cleaner

MAINTENANCE AND SERVICING

7. Clean the inside of the canister housing and end cap carefully. Dirt left in the air cleaner housing may be harmful to your engine.
 - Remove hardened dirt ridges wherever filter gaskets contact the cleaner housing.
 - Clean the gasket sealing surfaces of the housing. An improper gasket seal is one of the most common causes of engine contamination.
 - Wipe every surface clean with a clean, water-dampened cloth.
 - Check it visually to make sure it is clean before putting in a new element.
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.
 - Press on the fresh gasket to see if it springs back.
 - Check the gasket for correct sizing. 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 the gasket is not forming a perfect seal, you will **NOT** have protection.
 - Ensure the sealing surface in the housing is clean, and the filter element is the correct model number. It may be too short for the housing.
 - Identify and rectify the cause of any leaks before replacing the filter element.
9. If required, also change the secondary filter. Refer to [Removing and Installing Secondary Air Filter, page 236](#).

Installing Primary Air Filter

NOTE:

If replacing air filter, refer to [Filter Part Numbers, page 200](#).

MAINTENANCE AND SERVICING

1. Insert new primary filter element (A) into canister over secondary element, and push into place, ensuring that element is firmly seated in canister.

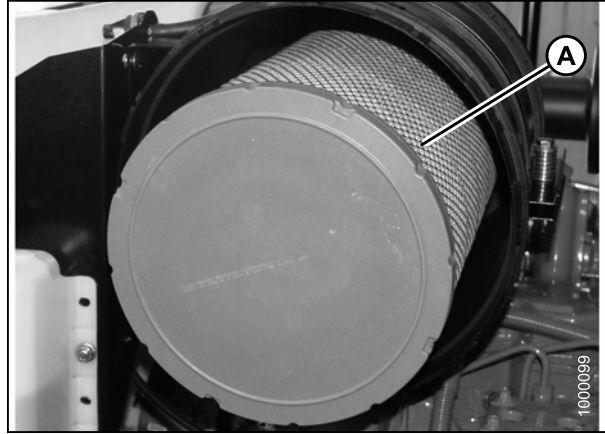


Figure 5.72: Engine Air Cleaner

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.

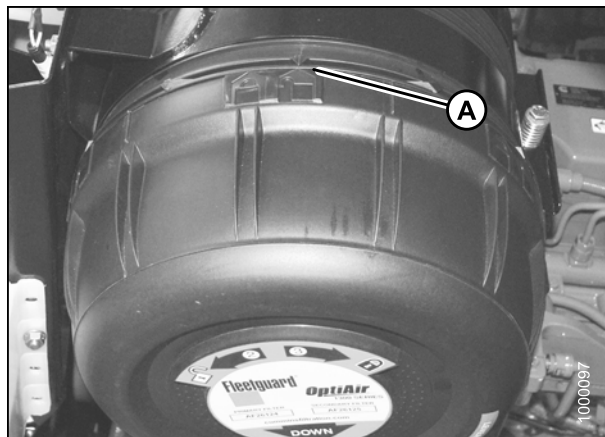


Figure 5.73: Engine Air Cleaner

4. Position end cap (B) onto filter housing with aspirator pointing approximately down.
5. Secure end cap onto filter housing by closing latch (A).

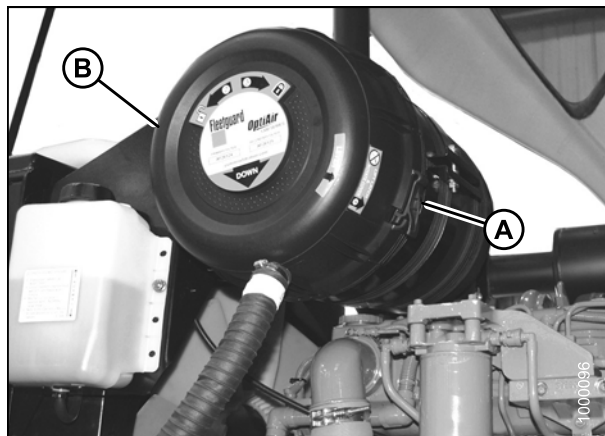


Figure 5.74: Engine Air Cleaner

MAINTENANCE AND SERVICING

6. After servicing the filter, you must reset the restriction switch (A) by pushing the button on the end of it to reset it.
7. Close the hood, refer to [5.4.2 Closing Hood \(Lower Position\)](#), page 203.

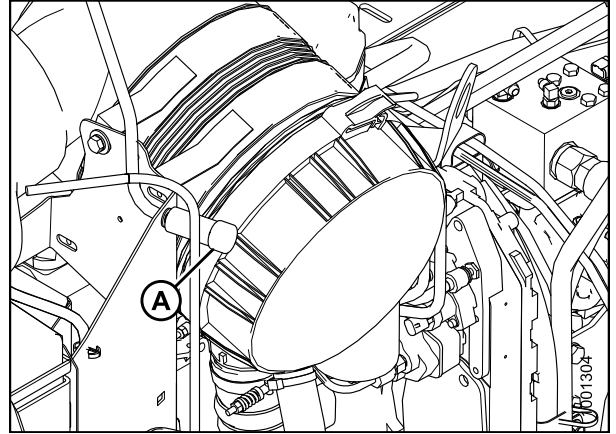


Figure 5.75: Engine Air Cleaner

Cleaning Engine Air Filter Primary Element

IMPORTANT:

The secondary (inner) element should NEVER be cleaned, only replaced.

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 secondary element for cleanliness. If there is visible dirt on the secondary element, replace both primary and secondary elements. Do **NOT** clean.

IMPORTANT:

The air cleaner's primary (outer) filter element should be replaced after three cleanings or at the specified interval. The secondary (inner) element should be replaced every third time the primary element is changed. Refer to [5.7.11 Maintenance Schedule, page 313](#) for the required interval.

6. If secondary element passes inspection, clean primary 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 cleaning's (or at the specified interval), replace the primary element.
7. Repeat inspection before installing.

Removing and Installing Secondary Air Filter

Replace the secondary air filter (A) every year or after every third primary filter change (even if it appears clean).

If you're changing the secondary air filter because it is dirty, inspect the primary filter and the filter canister to determine the reason for contamination.

- Examine the filter canister for cracks and replace if necessary.
- Ensure filter sealing surfaces are soft, flexible, and sealing properly. Hard seals may allow debris through to the secondary filter.
- Ensure canister retaining latches are secure.

NOTE:

- Do **NOT** remove the secondary filter element unless it needs replacing.
- Do **NOT** attempt to clean the secondary element (A). Replace only.

1. Remove the primary filter, refer to [Removing Primary Air Filter, page 231](#).

IMPORTANT:

When replacing secondary filter, reinsert new filter as soon as possible to prevent dirt from entering engine intake.

2. Remove the secondary element (A), and pull it out of the canister.

NOTE:

If replacing filter, refer to [Filter Part Numbers, page 200](#).

3. Insert new secondary filter element (A) into canister, seal first, and push until seal is seated inside canister.
4. Reinstall the primary filter, refer to [Installing Primary Air Filter, page 233](#).

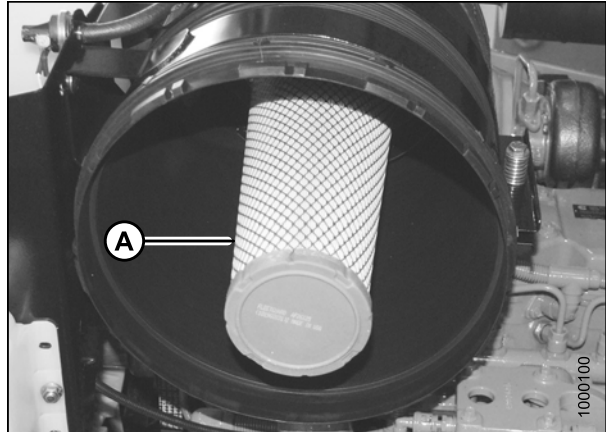


Figure 5.76: Engine Air Cleaner

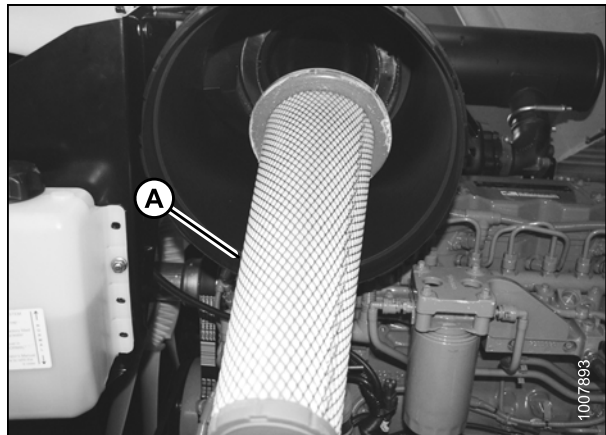


Figure 5.77: Engine Air Cleaner

Fuel System

Removing and Installing Fuel Tank Vent Filter

The fuel tank is vented by a hose that is connected to the filler tube. The hose is connected to a filter that should be changed annually.

Change the filter as follows:

DANGER

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

WARNING

To avoid personal injury or death from explosion or fire, do NOT smoke or allow flame or sparks near windrower when servicing.

1. Stop the engine and remove the key.
2. Open the hood. Refer to [5.4.3 Opening Hood \(Highest Position\)](#), page 203.
3. Open the left cab-forward side maintenance platform. Refer to [5.5.1 Opening Platform \(Standard Position\)](#), page 205.
4. Locate filter (A) on vent line against hydraulic oil reservoir.
5. Release hose tension clamps (B) and slide away from filter. Pull hoses off filter.
6. 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.

7. Attach lower hose to filter and secure both hoses with tension clamps (B).
8. Close hood, refer to [5.4.4 Closing Hood \(Highest Position\)](#), page 204.

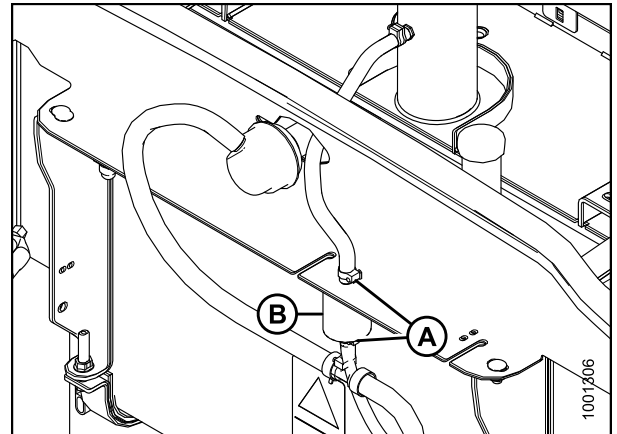


Figure 5.78: Fuel System

Maintaining Fuel Filters

The windrower fuel system is equipped with primary (A) and secondary (B) screw-on cartridge type filters. The primary filter (A) is equipped with a separator that separates sediment and water from the fuel.

Change both filters every 500 hours of operation.

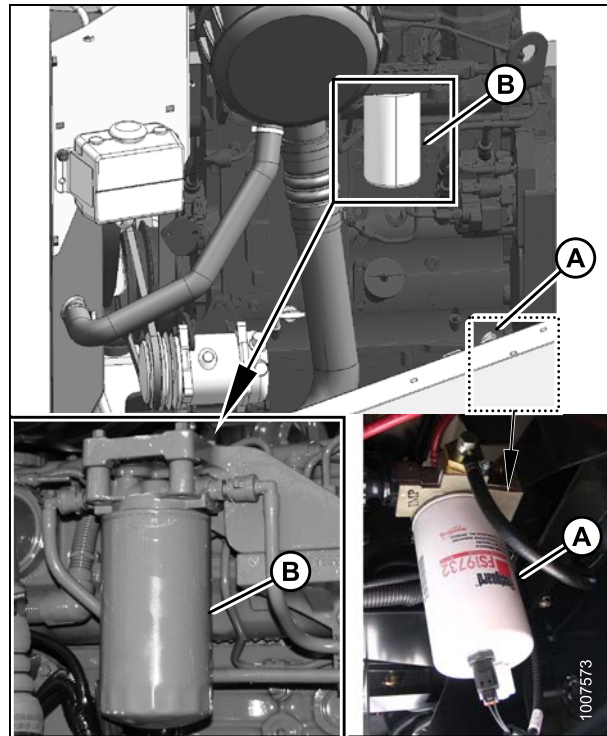


Figure 5.79: Fuel System Filters

Refer to the following procedures:

- [Removing Primary Fuel Filter, page 238](#)
- [Installing Primary Fuel Filter, page 239](#)
- [Removing Secondary Fuel Filter, page 240](#)
- [Installing Secondary Fuel Filter, page 240](#)

Removing Primary Fuel 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. Stop the engine and remove the key.
2. Open the hood, refer to [5.4.3 Opening Hood \(Highest Position\), page 203](#).

MAINTENANCE AND SERVICING

3. On the bottom of the fuel tank, locate the fuel supply valve (A) and move it to the closed position.

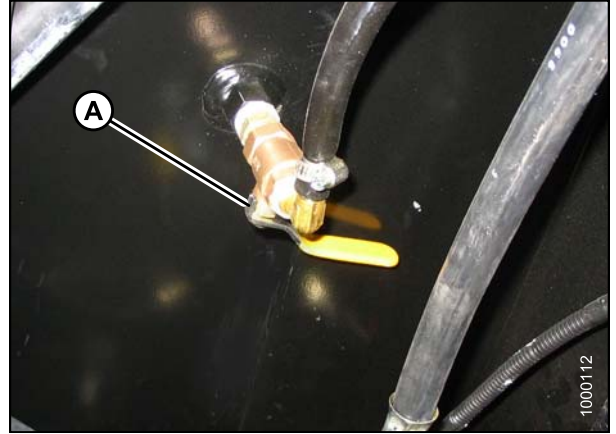


Figure 5.80: Fuel System

4. Locate the primary fuel filter (A) on the right cab-forward side of the windrower.

NOTE:

Bottom part of the image made transparent to show location of the primary filter.

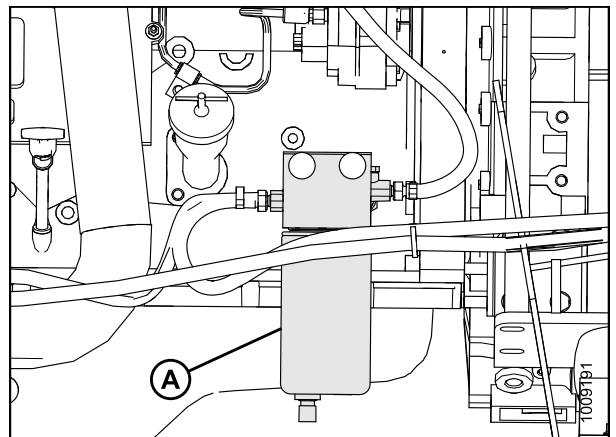


Figure 5.81: Fuel Filter Locations

5. Clean around the primary filter (A) head.
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 (A) with a filter wrench.
9. Clean gasket mating surface.

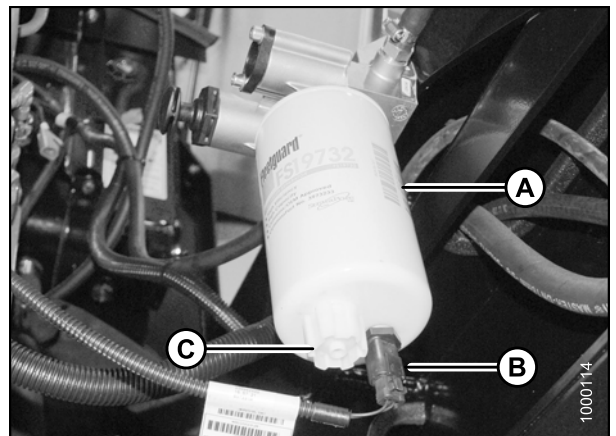


Figure 5.82: Fuel System

Installing Primary Fuel Filter

IMPORTANT:

Do **NOT** prefill filter with fuel. Prefilling can contaminate the fuel system.

MAINTENANCE AND SERVICING

NOTE:

If replacing filter, refer to [Filter Part Numbers, page 200](#).

1. Screw the new filter (A) onto the filter mount until the gasket contacts the filter head.
2. Reconnect 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. Overtightening can damage the gasket and filter.

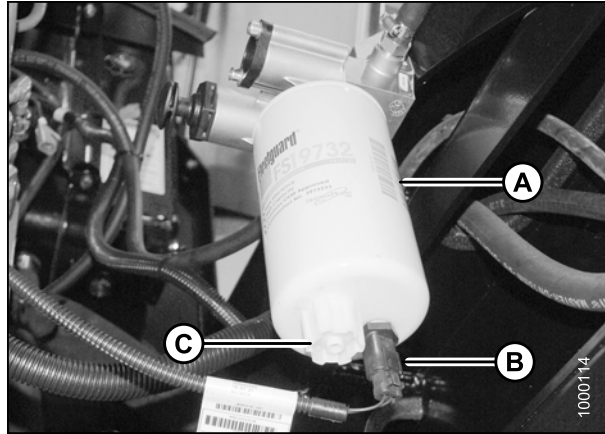


Figure 5.83: Fuel System

Removing Secondary Fuel Filter

1. Stop the engine and remove the key.
2. Open the hood, refer to [5.4.3 Opening Hood \(Highest Position\), page 203](#).
3. Clean around the secondary filter head (A).
4. Place a container under the filter to catch spilled fluid.
5. Remove filter (B) with a filter wrench.
6. Clean gasket mating surface.

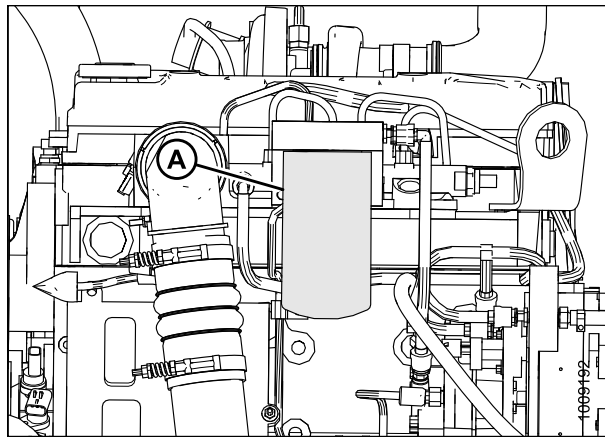


Figure 5.84: Fuel System

Installing Secondary Fuel Filter

IMPORTANT:

Do **NOT** prefill filter with fuel. Prefilling can contaminate the fuel system.

NOTE:

If replacing filter, refer to [Filter Part Numbers, page 200](#).

MAINTENANCE AND SERVICING

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.

IMPORTANT:

Do **NOT** use a filter wrench to install the filter. Overtightening can damage the gasket and filter.

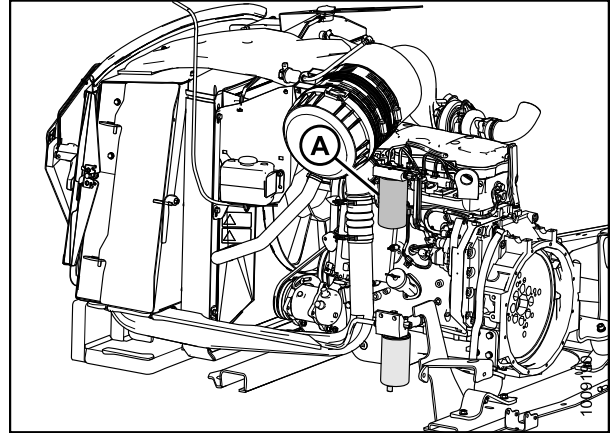


Figure 5.85: Fuel System

3. Open fuel valve (A) under fuel tank.
4. Prime the fuel system, refer to [Priming Fuel System, page 244](#).

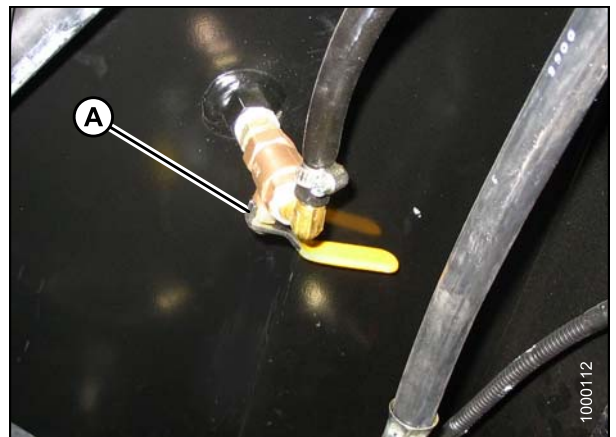


Figure 5.86: Bottom of Fuel Tank

Draining Fuel Tank

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.

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 the engine and remove the key.
2. Open the hood, refer to [5.4.1 Opening Hood \(Lower Position\), page 202](#).

MAINTENANCE AND SERVICING

3. Close fuel supply valve (A). Located on the bottom of the fuel tank.

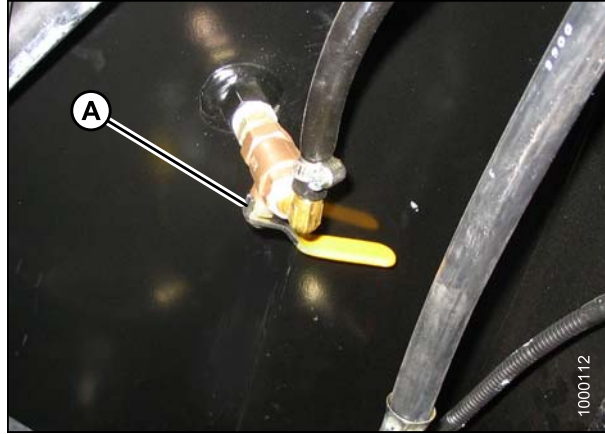


Figure 5.87: Bottom of Fuel Tank

4. Place a 5 U.S. gallon (20 liter) drain pan under the fuel supply hose (A) at primary filter.
5. Loosen clamp (B) and pull fuel supply hose (A) off fitting.

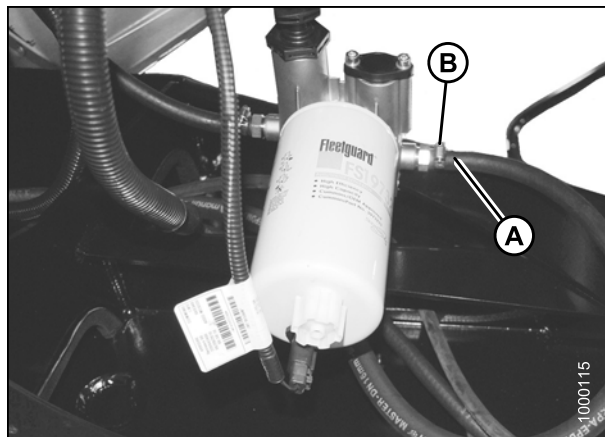


Figure 5.88: Fuel System

6. Route hose to drain pan and open valve (A) to drain tank.

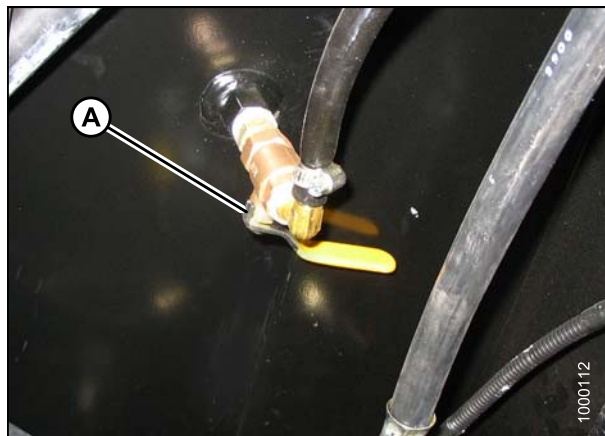


Figure 5.89: Fuel System

MAINTENANCE AND SERVICING

7. Add some clean fuel to tank to flush out any remaining contaminants.
8. Reattach fuel supply hose (A) to fitting. Install clamp (B) and tighten.

NOTE:

Do **NOT** refill the fuel tank if you need to work on the system. Refill it once work is completed. Refer to [Filling Fuel Tank, page 92](#).

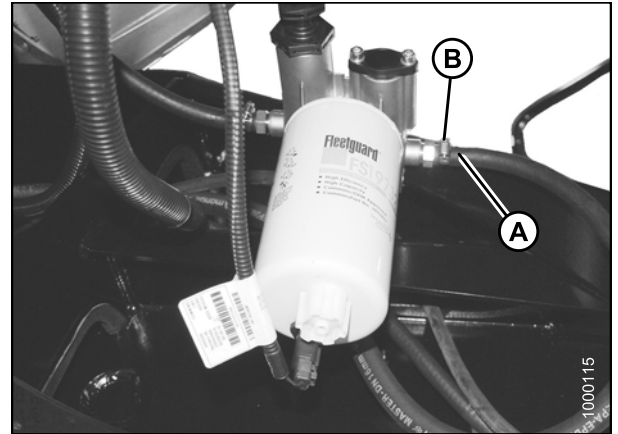


Figure 5.90: Fuel System

Fuel/Water Separator

A fuel water separator is incorporated into the primary fuel filter. The separator is equipped with a drain and with a sensor that detects water in the fuel and alerts the Operator on the cab display module (CDM).

Refer to the following procedure to remove water from the fuel system:

- [Removing Water from Fuel System, page 243](#).

Removing Water from Fuel System

Drain the water and sediment as follows from the separator daily, or at any time the cab display module (CDM) water in fuel (WIF) light illuminates.

1. Stop the engine and remove the key.
2. Open the hood, refer to [5.4.1 Opening Hood \(Lower Position\), page 202](#).
3. Place a container under the filter (A) to catch spilled fluid.
4. Turn drain valve (C) by hand 1-1/2 to 2 turns counterclockwise until draining occurs.
5. Drain the filter sump of water and sediment until clear fuel is visible.
6. Turn the valve clockwise to close the drain.
7. Dispose of fluid safely.
8. Close the hood, refer to [5.4.2 Closing Hood \(Lower Position\), page 203](#).

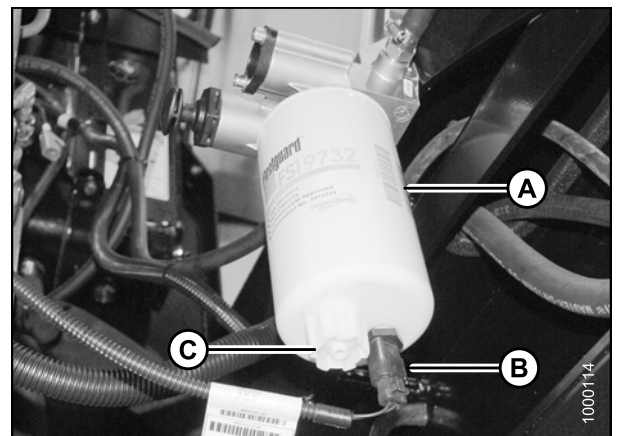


Figure 5.91: Fuel System

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.

IMPORTANT:

Bleeding the fuel system is **NOT** recommended or required. Manual priming will be required if:

- Fuel filter is replaced.
- Injection pump is replaced.
- High-pressure fuel lines are replaced.
- Engine is run until fuel tank is empty.

Priming Fuel System

To prime the fuel system, follow these steps:

⚠ DANGER

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

⚠ WARNING

The fuel pump high-pressure fuel lines and fuel rail contain extremely high pressure fuel. Never loosen any fittings. Personal injury and property damage can result.

1. Stop the engine and remove the key.
2. Open the hood to lowest position. Refer to [5.4.1 Opening Hood \(Lower Position\)](#), page 202.
3. Turn the priming knob (A) counterclockwise to unlock the plunger on the primary filter head.
4. Pump approximately 120 times to pressurize the fuel system.
5. Lock the plunger by turning knob (A) clockwise until snug.
6. Try starting engine. If engine does **NOT** start, repeat priming.
7. Close hood. Refer to [5.4.2 Closing Hood \(Lower Position\)](#), page 203.



Figure 5.92: Fuel System

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.

Refer to *Lubricants, Fluids, and System Capacities*, page 199 for detailed information.

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.

1. Open the hood. Refer to *5.4.3 Opening Hood (Highest Position)*, page 203.
2. Open the platform. Refer to *5.5.1 Opening Platform (Standard Position)*, page 205.
3. Turn the cap (A) counterclockwise to the first notch to relieve pressure before removing cap completely.
4. Turn the cap (A) again and remove.
5. Check the gasket for cracks or deterioration and replace the cap if necessary.
6. Check that the spring in the cap moves freely.
7. Replace the cap if spring is stuck.
8. Close the platform. Refer to *5.5.2 Closing Platform (Standard Position)*, page 206.
9. Close the hood. Refer to *5.4.4 Closing Hood (Highest Position)*, page 204.

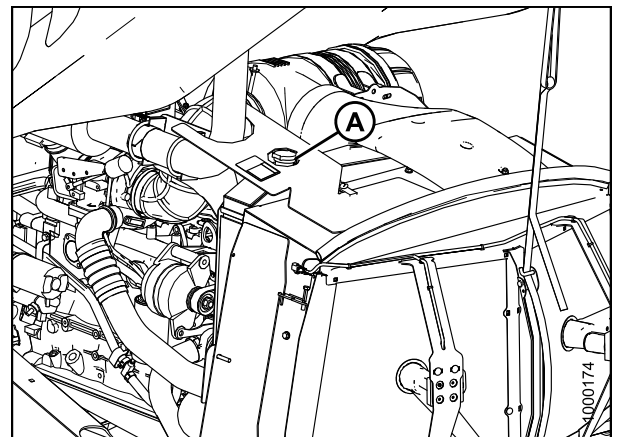


Figure 5.93: Engine Cooling System

Checking Engine Coolant Strength

Check the anti-freeze in the radiator with a tester annually, preferably before off-season storage.

CAUTION

To avoid personal injury from hot coolant, do **NOT** turn radiator cap until engine cools.

MAINTENANCE AND SERVICING

1. Open the hood. Refer to [5.4.3 Opening Hood \(Highest Position\)](#), page 203.
2. Open the platform. Refer to [5.5.1 Opening Platform \(Standard Position\)](#), page 205.
3. Remove the radiator cap (A).

IMPORTANT:

Turn the cap (A) counterclockwise to the first notch to relieve pressure before removing cap completely.

4. Check the coolant in the radiator using an antifreeze tester. Tester should indicate protection to temperatures of -30°F (-34°C).
5. Inspect the radiator cap before reinstalling, refer to [Inspecting Radiator Cap](#), page 245.
6. Replace radiator cap (A).
7. Close the platform. Refer to [5.5.2 Closing Platform \(Standard Position\)](#), page 206.
8. Close the hood. Refer to [5.4.4 Closing Hood \(Highest Position\)](#), page 204.

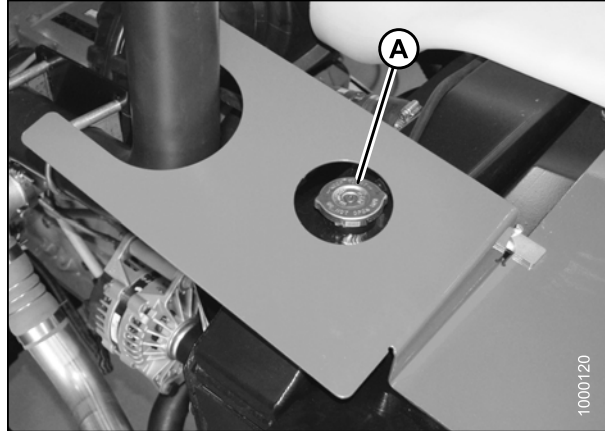


Figure 5.94: Engine Cooling System

Checking Coolant Level

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 coolant level in the coolant recovery tank daily.

1. Stop the engine and remove the key.
2. Open the hood. Refer to [5.4.3 Opening Hood \(Highest Position\)](#), page 203.
3. Open the platform. Refer to [5.5.1 Opening Platform \(Standard Position\)](#), page 205.

NOTE:

To view coolant capacities, refer to [Lubricants, Fluids, and System Capacities](#), page 199.

4. Close the platform. Refer to [5.5.2 Closing Platform \(Standard Position\)](#), page 206.
5. Close the hood. Refer to [5.4.4 Closing Hood \(Highest Position\)](#), page 204.

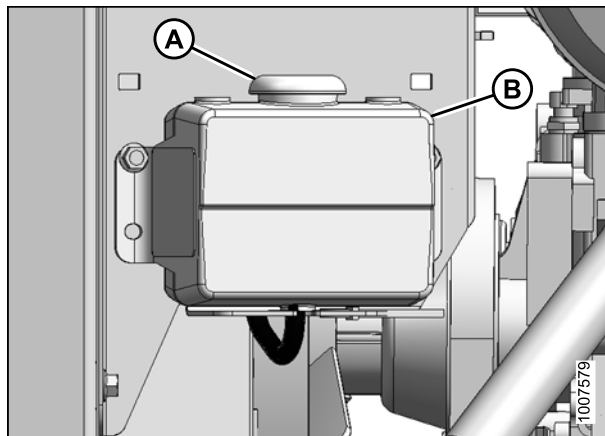


Figure 5.95: Engine Cooling System

MAINTENANCE AND SERVICING

Changing Coolant

Coolant should be drained and the system flushed and filled with new coolant every **2000 hours or 2 years**.

Refer to the following procedures:

- [Draining Coolant, page 247.](#)
- [Adding Coolant, page 249.](#)

Draining Coolant

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

To avoid personal injury from hot coolant, do **NOT** turn radiator cap until engine cools.

1. Stop the engine, remove the key. Let the engine cool.
2. Open the hood. Refer to [5.4.3 Opening Hood \(Highest Position\), page 203.](#)
3. Open the platform. Refer to [5.5.1 Opening Platform \(Standard Position\), page 205.](#)
4. Turn the radiator cap (A) to the first notch to relieve pressure before removing cap completely.

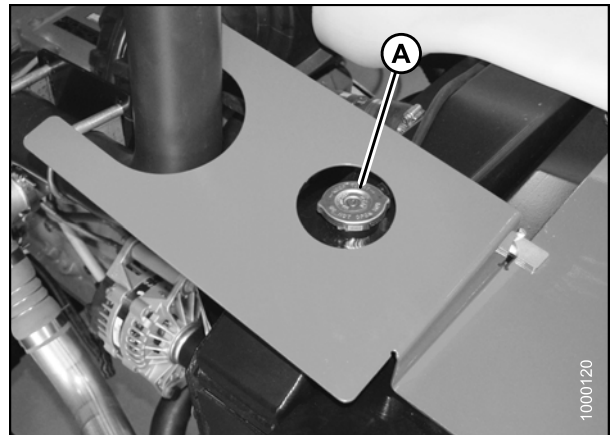


Figure 5.96: Engine Cooling System

MAINTENANCE AND SERVICING

5. Remove the radiator cap and open radiator drain valve (A) at the bottom of the engine side of the radiator lower tank.

IMPORTANT:

Place a drain pan (about 8 U.S. gallons [30 liters]) under the engine and radiator and use a deflector or hose to prevent coolant running onto frame.

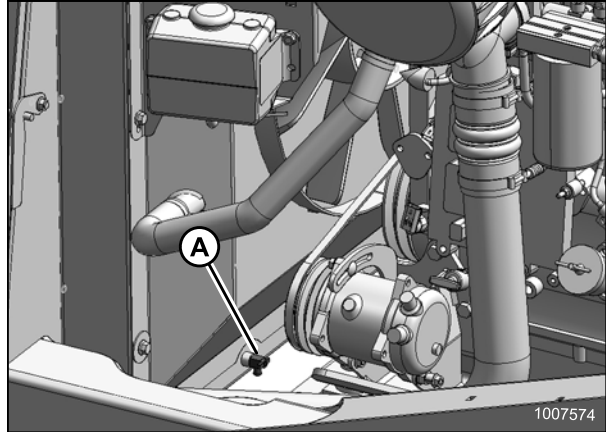


Figure 5.97: Engine Cooling System

6. Close the heater shut-off valve and disconnect hose on heater side of valve.
7. Open valve to drain the block.
8. When system is drained, reattach hose on valve.

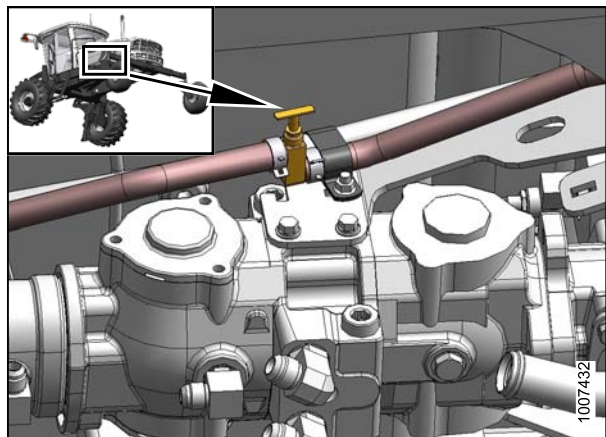


Figure 5.98: Engine Cooling System

9. Close radiator drain valve (A) at the bottom of the engine side of the radiator lower tank.
10. Fill system with clean water through the radiator and replace radiator cap.

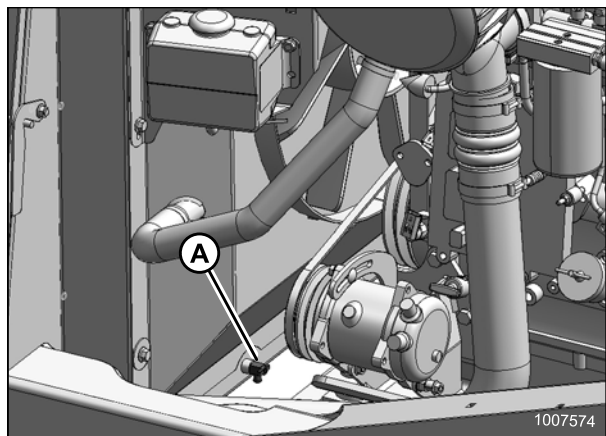


Figure 5.99: Engine Cooling System

MAINTENANCE AND SERVICING

11. Open heater shut-off valve.
12. Start engine and turn temperature control knob to HIGH. Run engine until normal operating temperature is reached.
13. Stop the engine and drain water out before rust or sediment settles. Repeat coolant removal procedure.
14. Close drain valves and fill system with a solution of clean water and a heavy duty radiator cleaner. Follow instructions provided with cleaner.
15. After using cleaner solution, again flush system with clean water. Inspect radiator, hoses, and fittings for leaks
16. Close drain valves and fill system. Refer to [Adding Coolant, page 249](#).
17. Close the platform. Refer to [5.5.2 Closing Platform \(Standard Position\), page 206](#).
18. Close the hood. Refer to [5.4.4 Closing Hood \(Highest Position\), page 204](#).

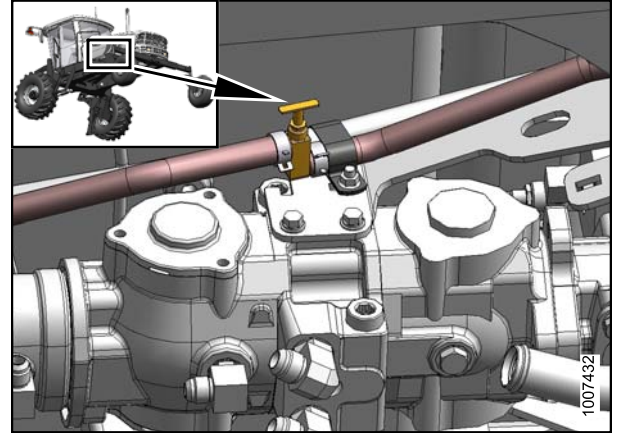


Figure 5.100: Engine Cooling System

Adding Coolant

Check the coolant level in the coolant recovery tank (A) daily, the tank should be at least one-half full. If less, add coolant.

CAUTION

To avoid personal injury from hot coolant, do **NOT** turn radiator cap until engine cools.

NOTE:

Do **NOT** add coolant to radiator except when changing coolant.

To add coolant to the coolant recovery tank, follow these steps:

1. Open the hood. Refer to [5.4.3 Opening Hood \(Highest Position\), page 203](#).
2. Open the platform. Refer to [5.5.1 Opening Platform \(Standard Position\), page 205](#).

MAINTENANCE AND SERVICING

3. Remove cap (B) and add coolant until one-half full.

NOTE:

For coolant specifications, refer to [Lubricants, Fluids, and System Capacities, page 199](#).

4. Replace cap (B).
5. Close the platform. Refer to [5.5.2 Closing Platform \(Standard Position\), page 206](#).
6. Close the hood. Refer to [5.4.4 Closing Hood \(Highest Position\), page 204](#).

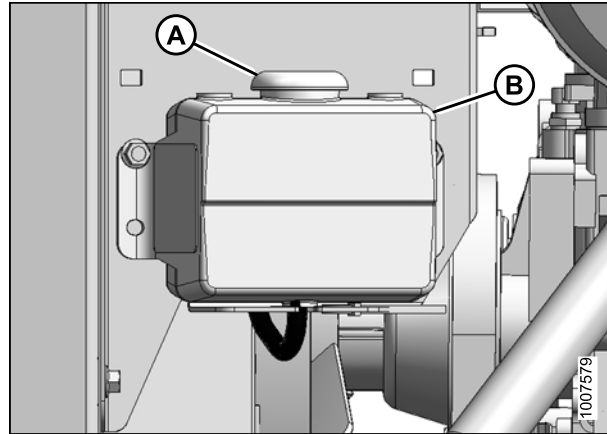


Figure 5.101: Engine Cooling System

Maintaining Engine Cooling Box

Refer to the following procedures:

- [Opening Cooler Box Screen, page 250](#)
- [Cleaning Screens and Coolers, page 251](#)
- [Cleaning Cooler Box Components, page 252](#)
- [Adjusting Screen Cleaner Duct to Screen Clearance, page 254](#)
- [Closing Cooler Box Screen, page 255](#)

Opening Cooler Box Screen

1. Open the hood. Refer to [5.4.3 Opening Hood \(Highest Position\), page 203](#).
2. Push latch (A) and open screen assembly access door (B). Secure with rod stored inside screen door.

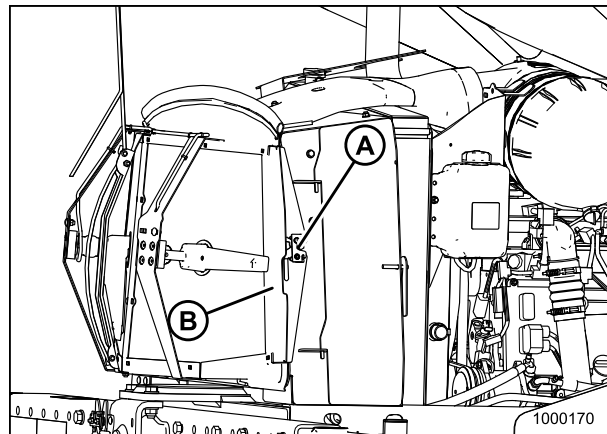


Figure 5.102: Engine Cooling System

MAINTENANCE AND SERVICING

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 are plugged, clean as follows:

1. Open the hood. Refer to [5.4.3 Opening Hood \(Highest Position\)](#), page 203.
2. Remove nuts (B).
3. Pivot screen cleaner assembly (C) away from screen.
4. Blow out debris from ducts (A) with compressed air.
5. If ducts are plugged, open the cooler box screen. Refer to [Opening Cooler Box Screen](#), page 250.
6. Blow debris out of ducts (A) with compressed air.
7. Clean screen with compressed air.

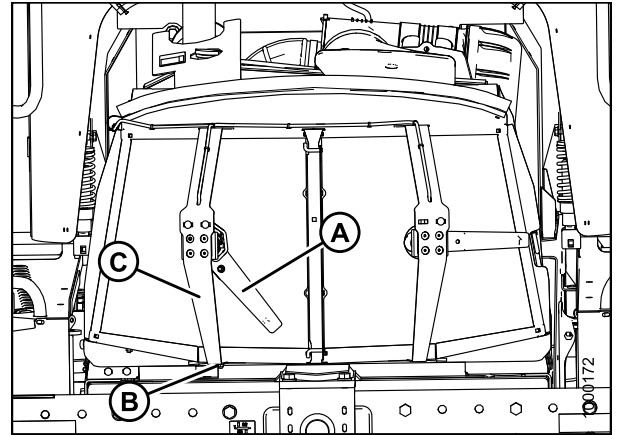


Figure 5.103: Engine Cooling System

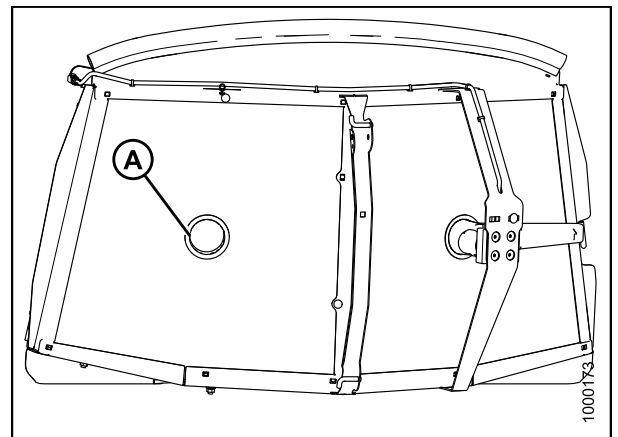


Figure 5.104: Engine Cooling System

MAINTENANCE AND SERVICING

8. Move the screen cleaner assembly (C). Secure with bolts and nuts (B).
9. Close the cooler box screen. Refer to [Closing Cooler Box Screen, page 255](#).
10. Close the hood. Refer to [5.4.4 Closing Hood \(Highest Position\), page 204](#).

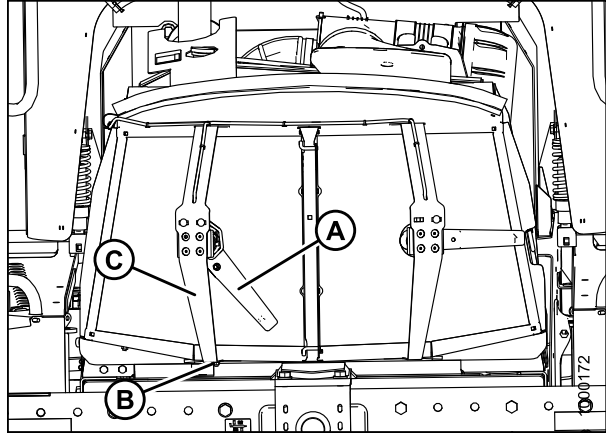


Figure 5.105: Engine Cooling System

Cleaning Cooler Box Components

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, proceed as follows:

1. Open cooler box screen. Refer to [Opening Cooler Box Screen, page 250](#).
2. Lift latch (A) and open the right hand access door (B).

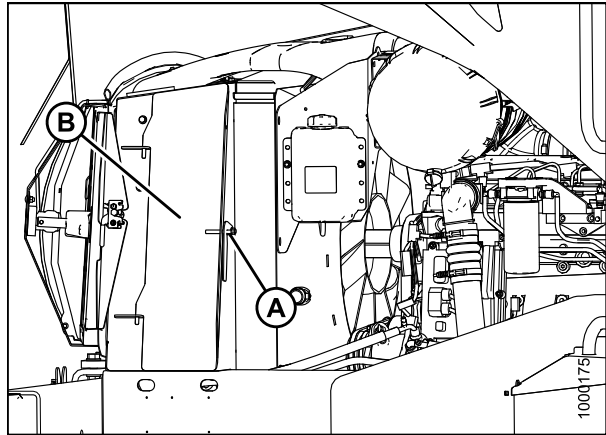


Figure 5.106: Engine Cooling System

MAINTENANCE AND SERVICING

- Slide out the oil cooler / air conditioning condenser assembly (A).

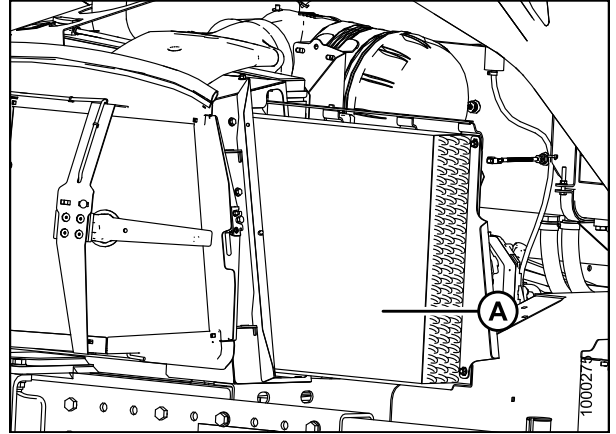


Figure 5.107: Engine Cooling System

- Lift latch (A) and open the left hand access door (B).

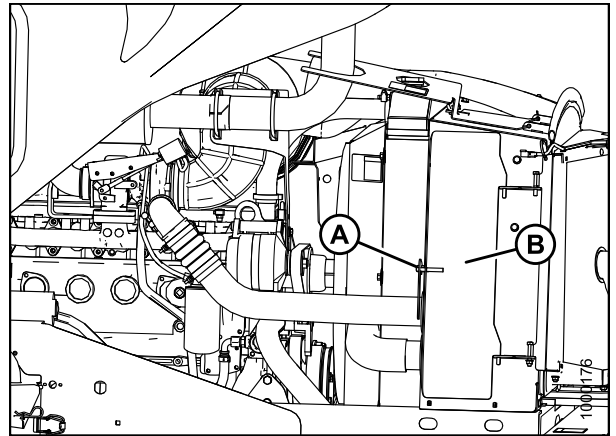


Figure 5.108: Engine Cooling System

- 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.

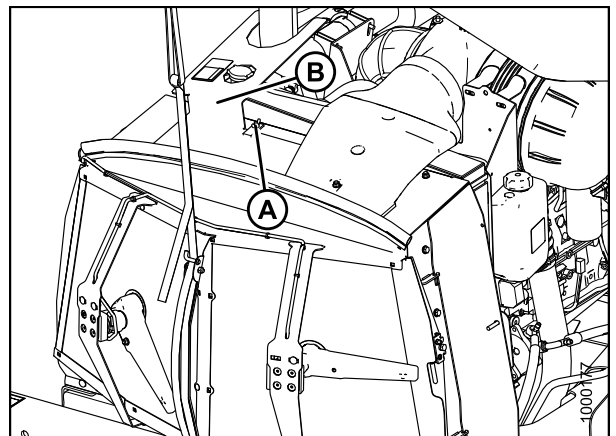


Figure 5.109: Engine Cooling System

MAINTENANCE AND SERVICING

6. Clean radiator (D) through access holes in cooling box with compressed air.
7. Clean oil cooler / air conditioning condenser (A), charge air cooler (E), fuel cooler (B), and cooling box (C) with compressed air.
8. Inspect all lines and coolers for evidence of leaks and damage.
9. Slide oil cooler / air conditioning condenser (A) back into cooling box (C).
10. Close side access door and lock with lever.
11. Close access door on top of the cooling box and secure with wing nut.
12. Close cooler box screen. Refer to [Closing Cooler Box Screen, page 255](#).

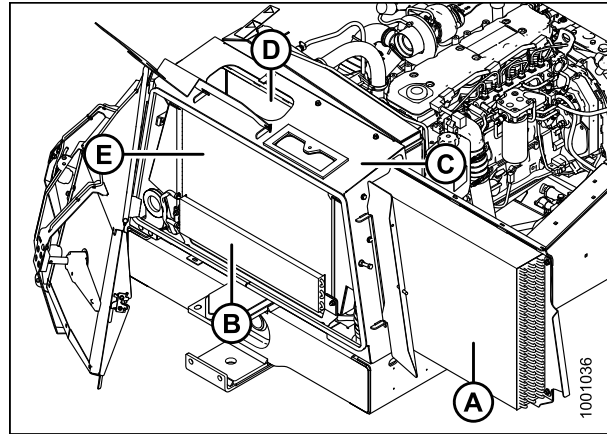


Figure 5.110: Engine Cooling System

Adjusting Screen Cleaner Duct to Screen Clearance

Check clearance between trailing edge of screen cleaner duct (A) and screen. It should be $3/64$ – $5/16$ 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. Refer to [5.4.1 Opening Hood \(Lower Position\), page 202](#).
2. Loosen nut (B) on motor support (C).
3. Move support in or out until duct is $3/32$ – $1/4$ in. (2–6 mm) from screen near the center.
4. Retighten nut (B).
5. Loosen the two motor mount bolts (D).
6. Move motor/duct assembly (E) to obtain $3/64$ – $5/16$ in. (1–8 mm) gap to screen at full rotation of the duct.
7. Retighten nuts (D) on motor mount.
8. Close the hood. Refer to [5.4.2 Closing Hood \(Lower Position\), page 203](#).

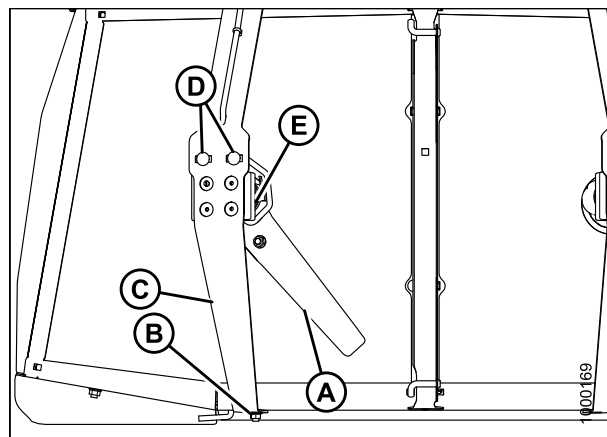


Figure 5.111: Engine Cooling System

Closing Cooler Box 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. Refer to [5.4.4 Closing Hood \(Highest Position\)](#), page 204.

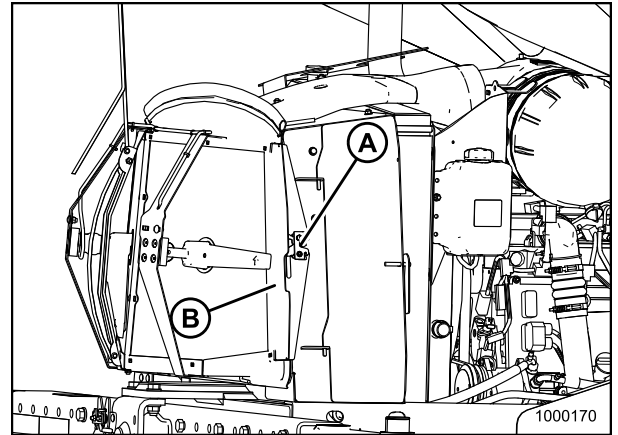


Figure 5.112: Engine Cooling System

Exhaust System



Engine exhaust stack may be hot. To avoid burns, do NOT touch muffler when engine is running. Allow sufficient cooling time after shut-down.

The exhaust system requires no regular maintenance, but it should be inspected periodically as follows:

1. Open the hood to its highest position. For instructions, refer to [5.4.3 Opening Hood \(Highest Position\)](#), page 203.
2. 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.
3. Check tubing for dents or crushed areas. 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.
4. Make sure the exhaust system is secured to eliminate vibration. The brackets (B) should fit securely to the muffler (C), and to the engine.

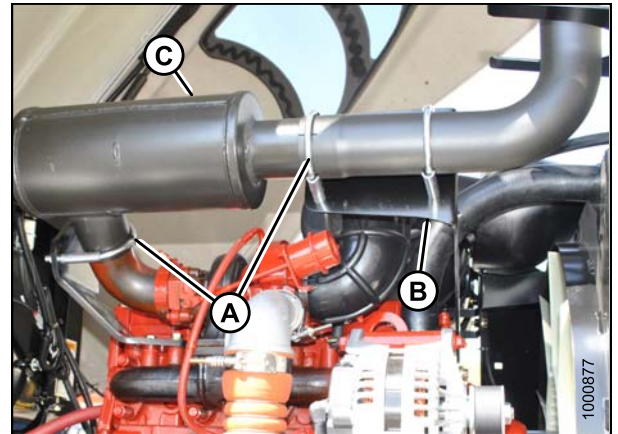


Figure 5.113: Exhaust System

IMPORTANT:

Do **NOT** change muffler type, piping sizes, or exhaust configuration. See your Dealer for proper replacement parts.

Belts

Tensioning Alternator/Fan Belt

The alternator, water pump, and fan belt are automatically tightened; manual adjustment is **NOT** required.

Replacing Fan Belt

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 LH platform. Refer to [5.5.1 Opening Platform \(Standard Position\)](#), page 205.
3. Open the hood. Refer to [5.4.1 Opening Hood \(Lower Position\)](#), page 202.
4. Loosen compressor mounting hardware (B) and push compressor towards engine to release tension.
5. Remove belt (A) from compressor.

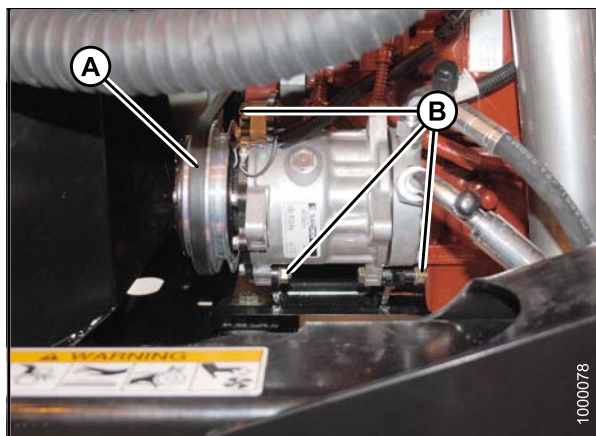


Figure 5.114: A/C Compressor

6. Insert the drive end of a 1/2 in. drive ratchet wrench into the belt tensioner (B).
7. Rotate tensioner counterclockwise until fan belt (C) can be slipped off pulley (D). Release tensioner and remove wrench.
8. Remove belt in order 1–2–3 as shown. Route fan belt around fan and remove belt.
9. Install new belt (C) around fan and onto pulleys in order 3–2–1.
10. Insert the drive end of a 1/2 in. drive ratchet wrench into the belt tensioner (C).
11. Rotate tensioner counterclockwise until belt (C) can be slipped onto pulley (D). Release tensioner and remove wrench.
12. Check that belt is properly seated in all pulley grooves.

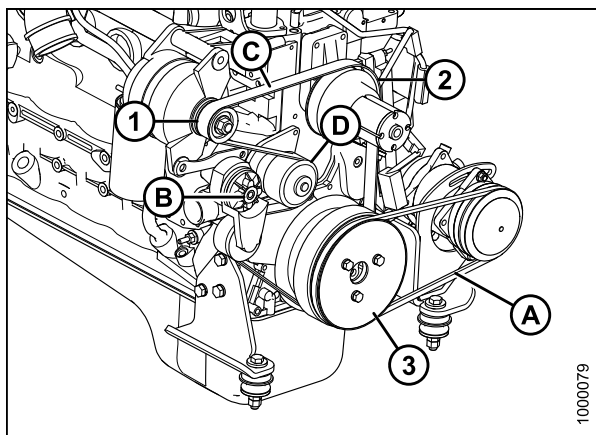


Figure 5.115: Engine Belts

A - A/C Compressor Belt B - Belt Tensioner
C - Fan Belt D - Pulley

MAINTENANCE AND SERVICING

13. Install new compressor belt (A).
14. Pry compressor away from engine so that a force of 8–12 ft·lbf (35–55 N·m) deflects the belt (A) 3/16 in. (5 mm) at mid-span.
15. Tighten compressor mounting hardware (B).
16. Recheck tension and readjust as required.
17. Close the hood. Refer to [5.4.2 Closing Hood \(Lower Position\)](#), page 203.
18. Close the platform. Refer to [5.5.2 Closing Platform \(Standard Position\)](#), page 206.

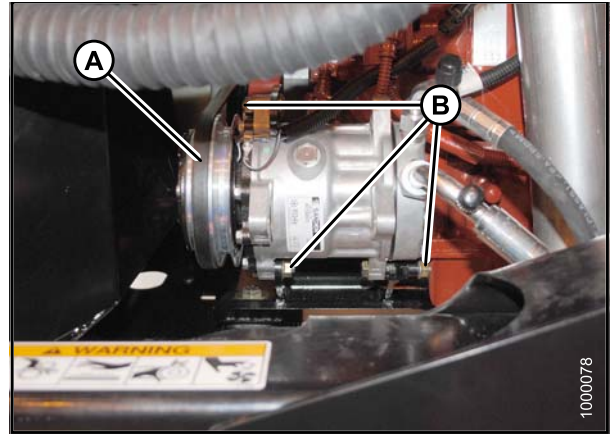


Figure 5.116: A/C Compressor

Tensioning Air Conditioner (A/C) Compressor Belt

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 hood. Refer to [5.4.1 Opening Hood \(Lower Position\)](#), page 202.
3. Loosen compressor mounting hardware (B).
4. Pry compressor away from engine so that a force of 8–12 ft·lbf (35–55 N·m) deflects the belt (A) 3/16 in. (5 mm) at mid-span.
5. Tighten compressor mounting hardware (B).
6. Recheck tension and readjust as required.
7. Close the hood, refer to [5.4.2 Closing Hood \(Lower Position\)](#), page 203.

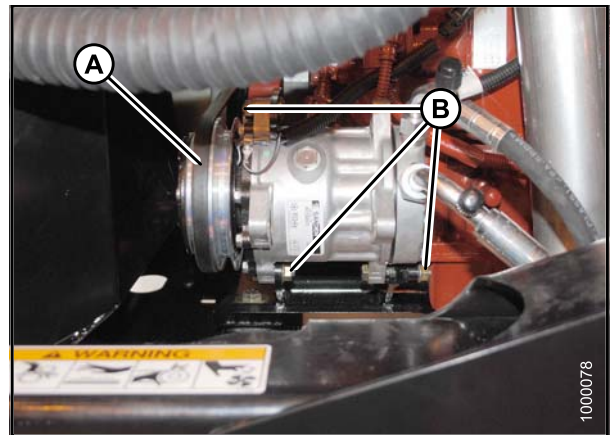


Figure 5.117: A/C Compressor

Replacing Air Conditioner A/C Compressor Belt

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 hood. Refer to [5.4.1 Opening Hood \(Lower Position\)](#), page 202.

MAINTENANCE AND SERVICING

3. Loosen compressor mounting hardware (B) and push compressor towards engine to release tension.
4. Remove belt (A) from compressor.
5. Install new compressor belt (A).
6. Pry compressor away from engine so that a force of 8–12 ft·lbf (35–55 N·m) deflects the belt (A) 3/16 in. (5 mm) at mid-span.
7. Tighten compressor mounting hardware (B).
8. Recheck tension and readjust as required.
9. Close the hood, refer to [5.4.2 Closing Hood \(Lower Position\)](#), page 203.

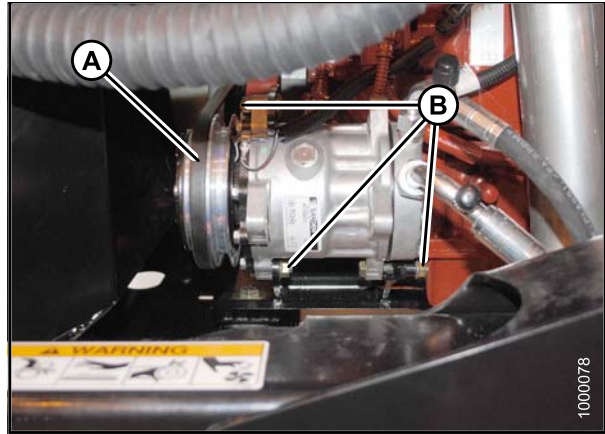


Figure 5.118: A/C Compressor

Engine Speed

The maximum and idle engine speeds are factory set.

Refer to [2.2 Specifications](#), page 29 for detailed information. If specified speeds cannot be maintained, see your MacDon Dealer.

Refer to [Engine Intermediate Speed Control \(ISC\)](#), page 91 for information about engine speed.

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 may need adjustment. See your MacDon Dealer.

5.7.8 Electrical System

Batteries

The M105 is equipped with two batteries that are located under the engine compartment hood at the left side of the engine compartment.

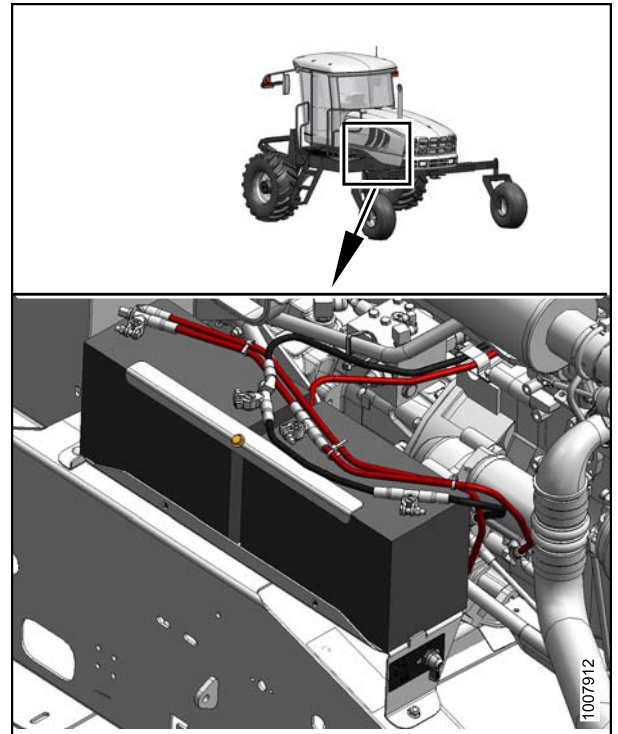


Figure 5.119: Batteries

MAINTENANCE AND SERVICING

Preventing Electrical System Damage

To prevent electrical system damage, take the following precautions:

- Carefully observe polarity when attaching booster battery.
- Do **NOT** short across battery or alternator terminals, or allow battery positive (+) cable or alternator wire to become grounded.
- Be sure alternator connections are correct before cables are connected to battery.
- When welding on any part of the machine, disconnect battery cables and alternator wire. Refer to [1.8 Welding Precaution, page 9](#).
- Always disconnect battery ground cable when working with the alternator or regulator.
- Never attempt to polarize alternator or regulator.
- If wires are disconnected from the alternator, use the illustration to ensure proper reconnection.
- Never ground the alternator field terminal or field.
- Never connect or disconnect alternator or regulator wires with battery connected or alternator operating.
- Always disconnect cables from the battery when using a charger to charge battery in windrower.
- Ensure all cables are securely connected before operating engine.

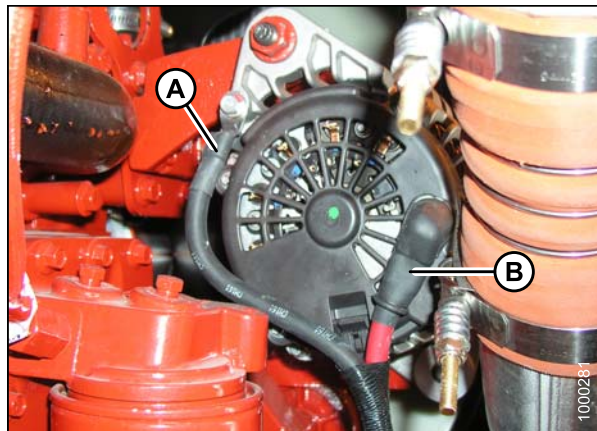


Figure 5.120: Alternator

A - Negative Terminal

B - Positive Terminal

Maintaining Batteries

CAUTION

Do NOT attempt to service battery unless you have the proper equipment and experience to perform the job. Have it done by a qualified Dealer.

- Check 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. Refer to [Charging the Battery, page 262](#). Add electrolyte if necessary. Refer to [Adding Electrolyte to the Battery, page 265](#).
- Keep batteries clean by wiping with a damp cloth.
- 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.
- 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.
- Do **NOT** stack storage batteries on top of each other.

MAINTENANCE AND SERVICING

Battery Main Disconnect Switch

A battery main disconnect switch is located on the battery tray.

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.

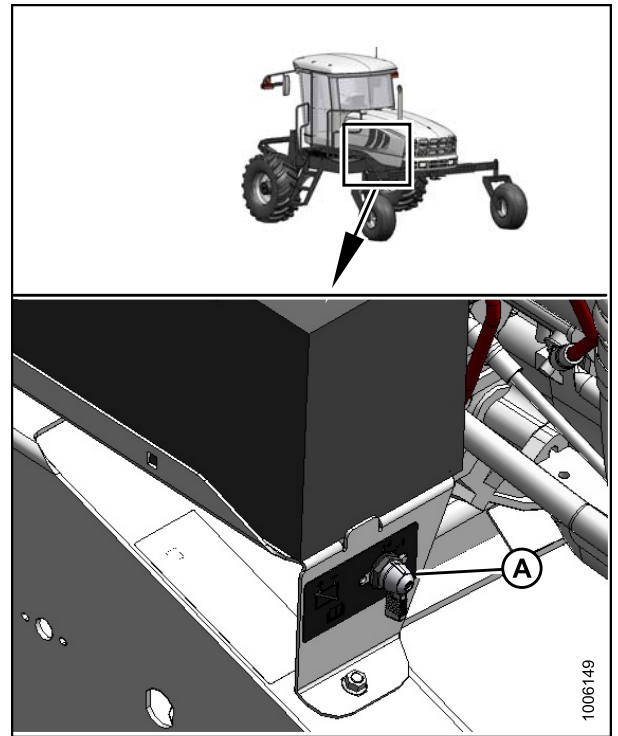


Figure 5.121: Electrical System

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).
- 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.

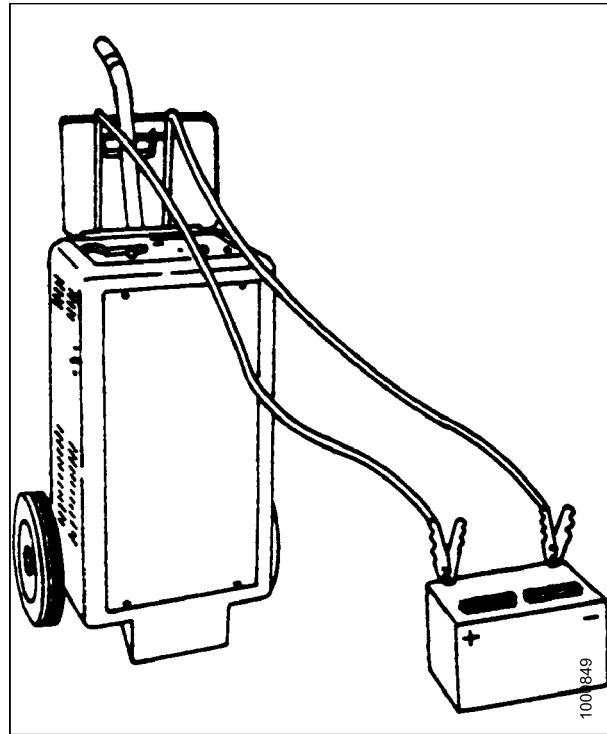


Figure 5.122: Charging Battery

Table 5.17 Voltage Chart

Voltage	State of Charge (%)	Approximate Battery Charging Time ³³ to Full Charge at 80°F/27°C. (Minutes)			
		Maximum Rate at (Amps)			
Standard Battery		50	30	20	10
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

33. Charging time depends upon battery capacity, condition, age, temperature, and efficiency of charger.

⚠ CAUTION

Follow all instructions and precautions furnished by the battery charger manufacturer, including the following:

- Charge at recommended rates and times.
- Turn off charger prior to hook up to avoid dangerous sparks. Wear proper eye protection.
- Reduce charge rate if the terminal voltage is higher than 16.0 volts while charging. The maximum charge rate in amperes should NOT exceed 1/3 of the battery's reserve capacity minute rating.
- Continue charging if there is no change in voltage or current for a period of two-hour and reduce the rate as needed.
- If the battery case gets hot during charging or spews large amount of gasses, temporarily stop charging.

IMPORTANT:

NEVER overcharge batteries. Excessive charging will shorten battery life.

To charge battery, follow these steps:

⚠ 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 the engine and remove the key.
2. Move platform on left cab-forward side of machine to open position. Refer to [5.5.1 Opening Platform \(Standard Position\)](#), page 205.
3. Open hood to highest position to allow access to the batteries. Refer to [5.4.3 Opening Hood \(Highest Position\)](#), page 203
4. Remove red plastic cover (A) from positive cable clamps.
5. Remove black plastic cover (B) from negative terminals.
6. If charging battery in windrower, disconnect **positive** battery cable (A), then connect charger cable to positive post. Connect charger ground cable to the engine block last, away from battery.
7. Charge batteries in accordance with charger manufacturer's instructions.
8. Close platform. Refer to [5.5.2 Closing Platform \(Standard Position\)](#), page 206.
9. Close hood. Refer to [5.4.4 Closing Hood \(Highest Position\)](#), page 204.

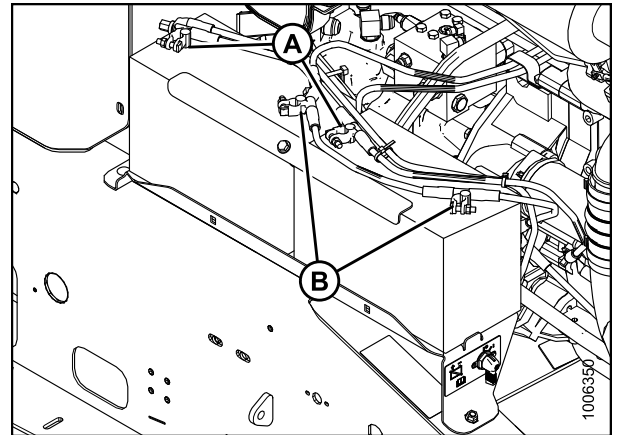


Figure 5.123: Battery Terminal Location

Boosting the Battery

A 12 volt battery can be connected in parallel (+ to +) with the windrower battery. Use heavy-duty battery cables.

⚠ CAUTION

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

1. Open the engine compartment hood to the lowest position. Refer to [5.4.1 Opening Hood \(Lower Position\)](#), page 202.
2. Remove red rubber cover (A) from windrower battery positive terminal.

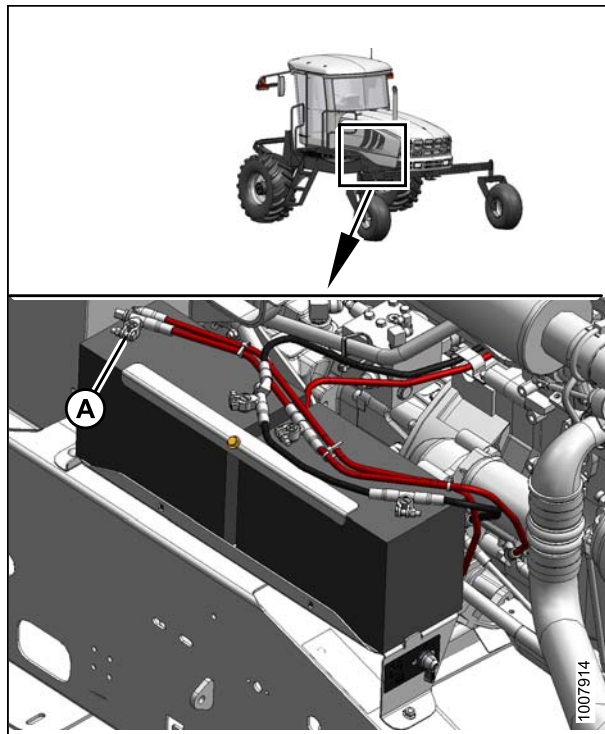


Figure 5.124: Battery Boost Terminal

3. Attach one end of battery cable to positive terminal (A) of booster battery, and other end to positive terminal (B) of windrower batteries.
4. Attach second cable to negative terminal (C) of booster battery, and then to a good ground (D) on windrower frame.
5. Turn IGNITION switch in cab as with normal startup.
6. After engine starts, disconnect cable from windrower ground FIRST, and then disconnect the other cables.
7. Close engine compartment hood. Refer to [5.4.2 Closing Hood \(Lower Position\)](#), page 203.

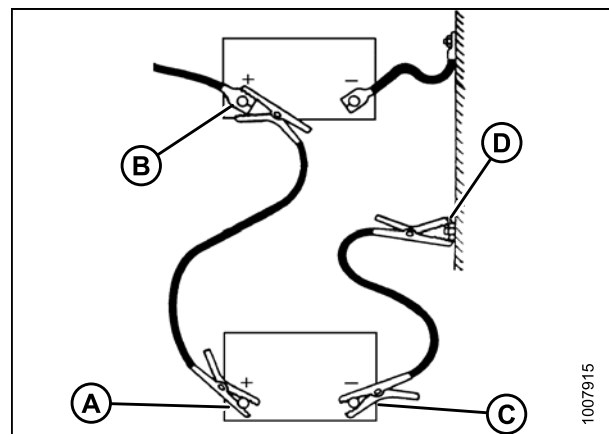


Figure 5.125: Boost Cable Configuration

Adding Electrolyte to the Battery

⚠ 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 5.126: Battery Safety

⚠ 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.

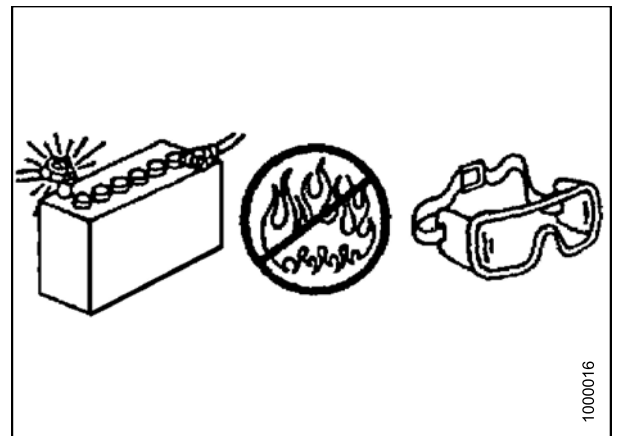


Figure 5.127: Battery Safety

⚠ 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. If battery is installed in windrower, stop the engine and remove the key.
2. Open the platform. Refer to [5.5.1 Opening Platform \(Standard Position\)](#), page 205.
3. Open the hood. Refer to [5.4.3 Opening Hood \(Highest Position\)](#), page 203.
4. Add electrolyte in accordance with the battery manufacturer's instructions.
5. Close the platform. Refer to [5.5.2 Closing Platform \(Standard Position\)](#), page 206.
6. Close the hood. Refer to [5.4.4 Closing Hood \(Highest Position\)](#), page 204.

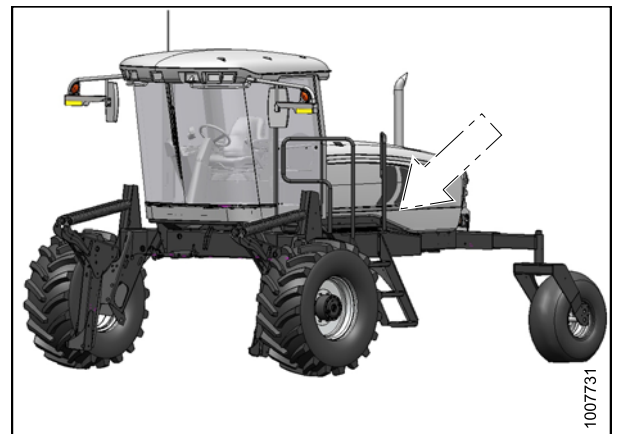


Figure 5.128: Platform Location

Removing Battery

CAUTION

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

DANGER

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

1. Open the hood, refer to [5.4.3 Opening Hood \(Highest Position\)](#), page 203.
2. Open the platform, refer to [5.5.1 Opening Platform \(Standard Position\)](#), page 205.
3. Remove the red plastic cover from positive cable clamps (A, C). Loosen the clamps and remove cable from batteries.
4. Loosen clamps (B, D) on negative terminals and remove cable from batteries.

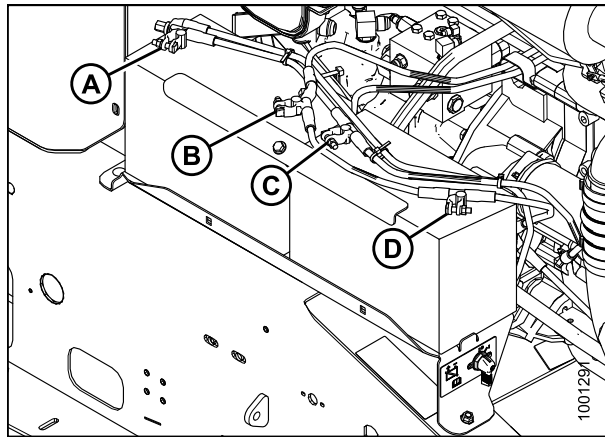


Figure 5.129: Electrical System

5. Remove the bolt (A) that secures the battery angle (B) to the battery strap. Remove the battery angle (B).

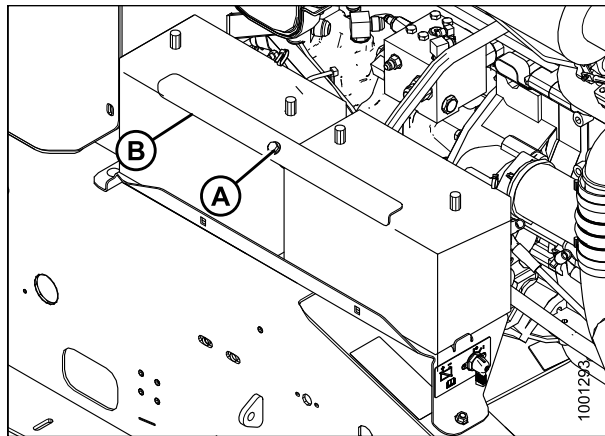


Figure 5.130: Electrical System

MAINTENANCE AND SERVICING

- Lift batteries (A) off the support.

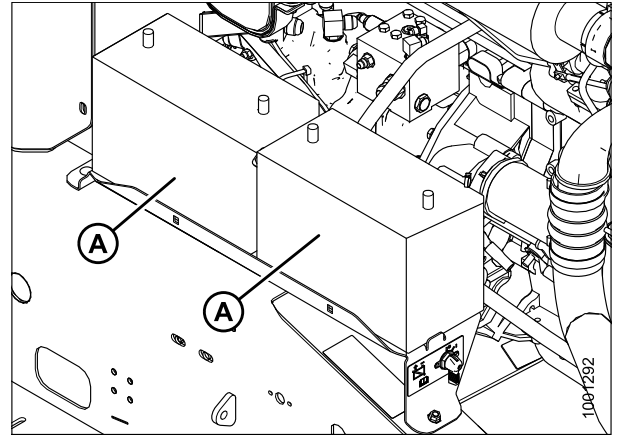


Figure 5.131: Electrical System

Installing Battery

Table 5.18 Battery Specification

Rating	Group	CCA	Volt	Qty	Maximum Dimension
Heavy duty, off-road, vibration resistant	BCI 29H or 31A	650	12	2	13 in. x 7.4 in. x 9.13 in. (334 x 188 x 232 mm)

- Position new batteries (A) on battery support.

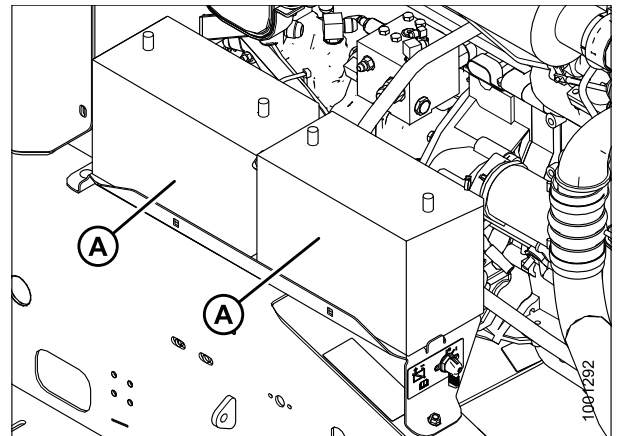


Figure 5.132: Electrical System

- Install battery angle (B) and secure it with bolt (A).

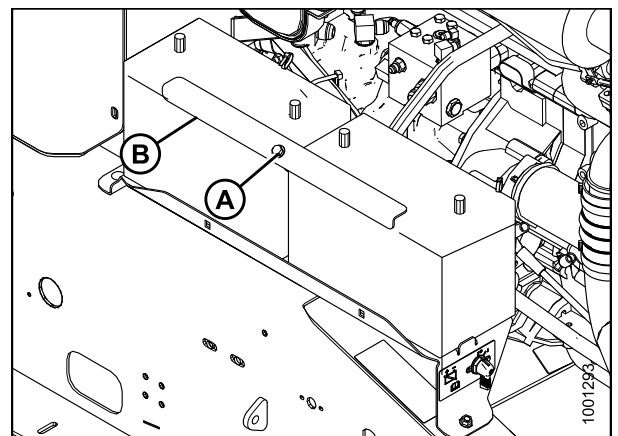


Figure 5.133: Electrical System

MAINTENANCE AND SERVICING

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 (B and D) to negative post on batteries and tighten clamps.
4. Attach positive (red) cable clamps (A and C) to positive post on batteries and tighten. Position plastic covers onto clamps.
5. Close the platform, refer to [5.5.2 Closing Platform \(Standard Position\)](#), page 206.
6. Close the hood, refer to [5.4.4 Closing Hood \(Highest Position\)](#), page 204.

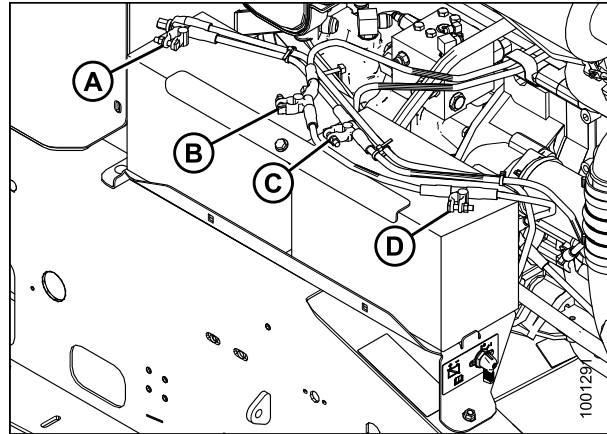


Figure 5.134: Electrical System

Connecting Batteries

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 the engine and remove the key.
2. The battery main disconnect switch (A) is located on the right-hand frame rail beside the batteries. Ensure battery switch (A) is switched to POWER OFF position.
3. Remove cable ties securing battery cables to battery clamp.

IMPORTANT:

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

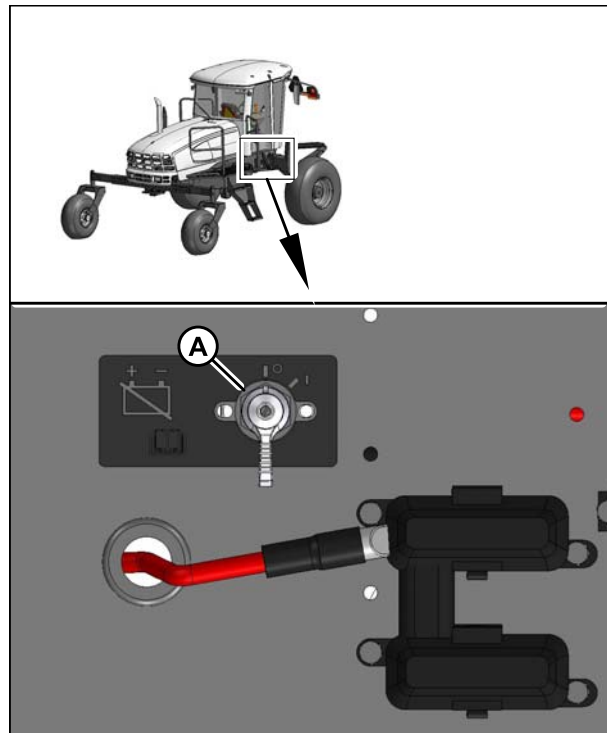


Figure 5.135: Battery Switch

MAINTENANCE AND SERVICING

4. Remove plastic caps from battery posts.
5. Attach positive (red) cable terminals to positive post (A) on batteries and tighten. Reposition plastic covers onto clamps.
6. Attach negative (black) cable terminals to negative post (B) on batteries and tighten clamps.
7. Turn battery switch to POWER ON position.

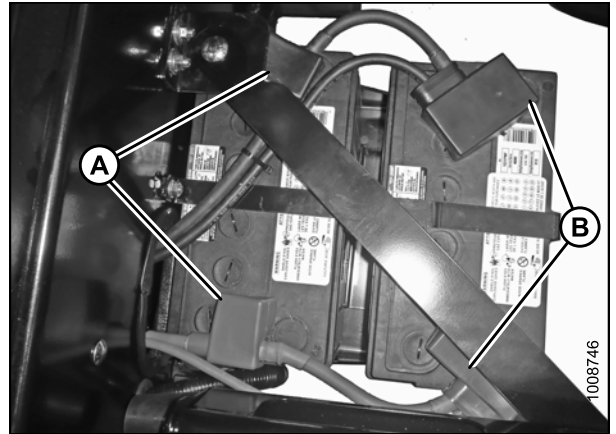


Figure 5.136: Batteries

Field Lights

Adjusting Field Lights

The field lights are best adjusted with the machine in the field (or equivalent) to suit Operator preference.

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. Hold onto handholds (A) on the cab front corners, and stand on header anti-slip strips.
2. Adjust lights with screws (A).



Figure 5.137: Field Lights

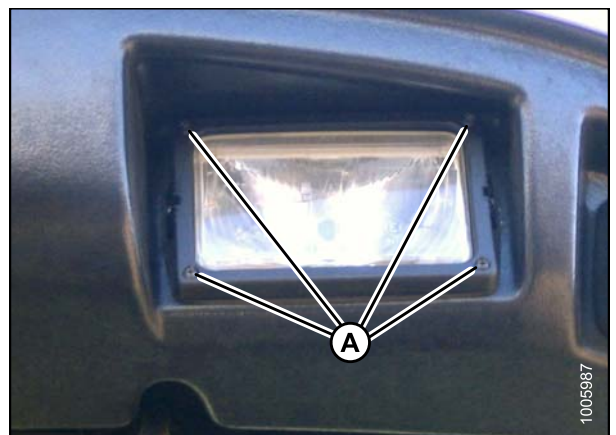


Figure 5.138: Field Lights

MAINTENANCE AND SERVICING

Replacing Field Light Bulb

1. Remove two screws (A), and remove light assembly.
2. Replace bulb as described in [Replacing Field Light Bulb, page 270](#).

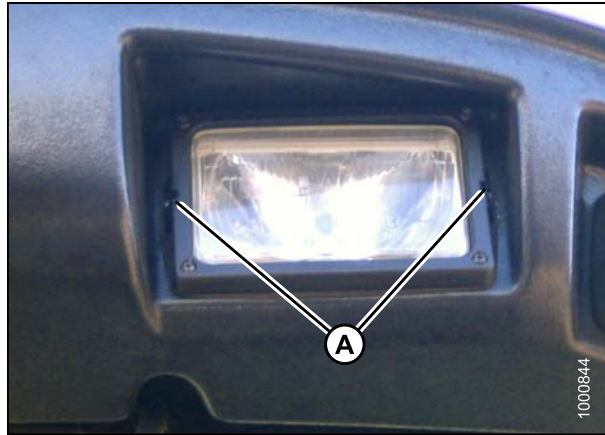


Figure 5.139: Field Lights

Flood Lights: Forward

Adjusting Forward Flood Lights

The forward flood lights are **NOT** adjustable.

Replacing Bulb in Cab-Forward Flood Light

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.

Replace bulbs as follows:

1. Shut down engine and remove key. Turn lights OFF.

MAINTENANCE AND SERVICING

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.

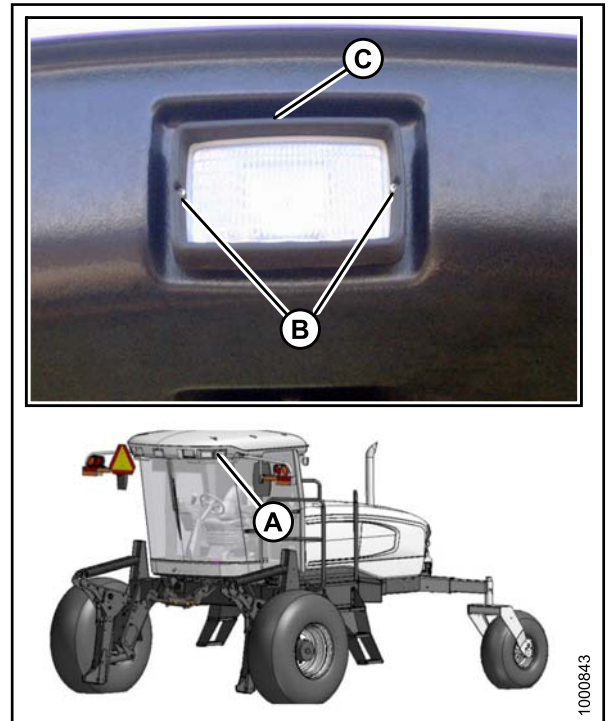


Figure 5.140: Forward Flood Lights

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.

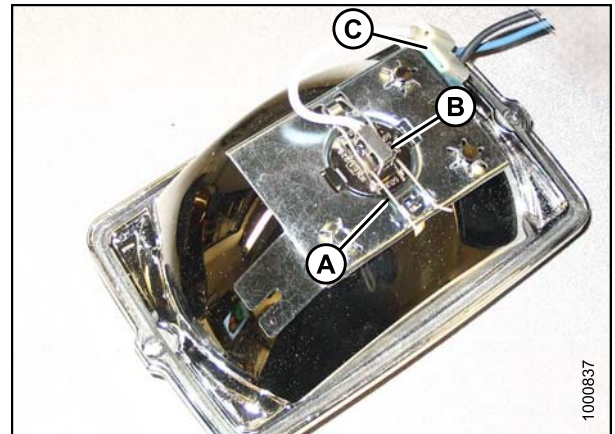


Figure 5.141: Flood Light Assembly

MAINTENANCE AND SERVICING

- Match slots on new bulb (B) with lugs (D) in optical unit and insert bulb into unit.
- Secure bulb with wire retainer (A).
- Push wire into connector (C).

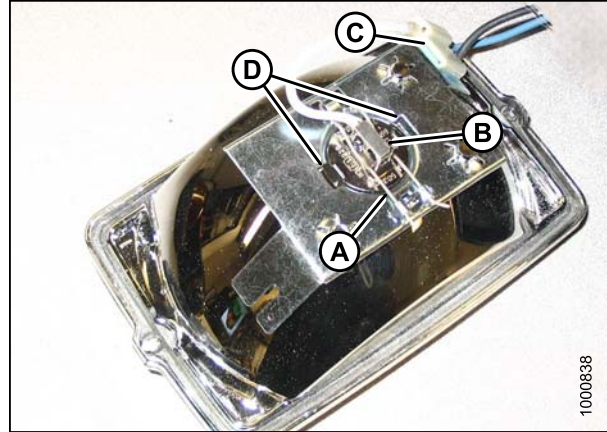


Figure 5.142: Flood Light Assembly

- Position light into light receptacle, ensuring top is up and secure with bezel (C) and screws (B).

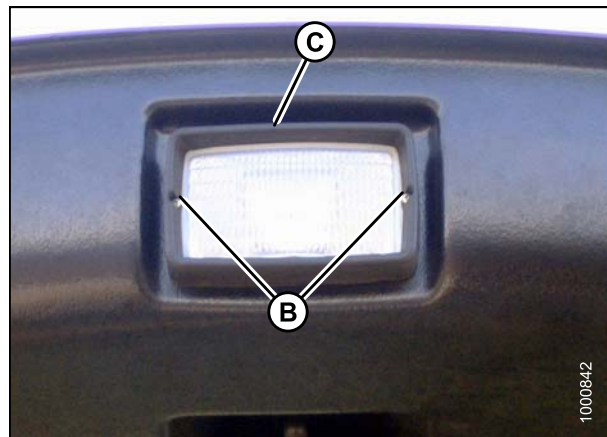


Figure 5.143: Forward Flood Light

HID Auxiliary Lighting (Optional - MD #B5596)

Two optional High Intensity Discharge (HID) lights provide additional lighting during field operation.

Adjusting HID Auxiliary Lights (if Installed)

If installed, HID auxiliary lights are best adjusted with the machine in the field (or equivalent) to suit Operator preference.

⚠ 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.

MAINTENANCE AND SERVICING

1. Shut down engine and remove key. Turn lights ON.
2. Loosen bolt (A) and nut (B) (located inside light / mirror support).
3. Position light to desired position.
4. Tighten bolt (A) and nut (B).

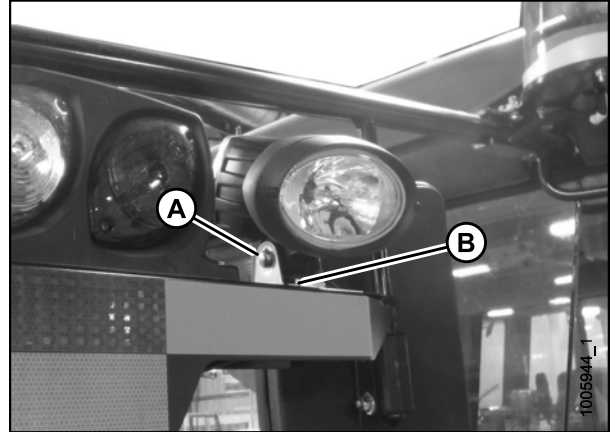


Figure 5.144: HID Auxiliary Lights

Replacing HID Lamp (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.

NOTE:

Hold onto the handholds on the cab front corners and stand on the header anti-slip strips, or stand on the maintenance platform when accessing the HID auxiliary lights.

2. Disconnect lamp connector (A) from electrical harness (B).

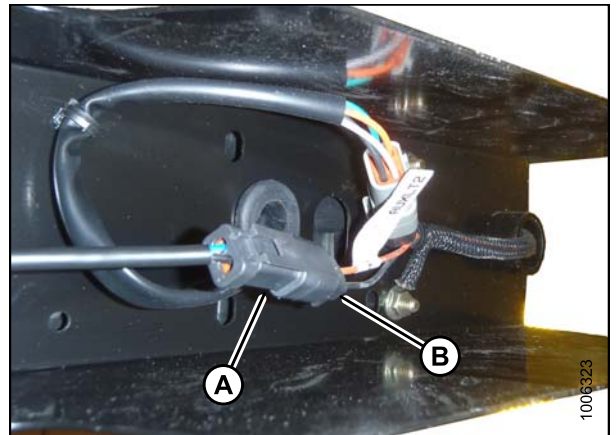


Figure 5.145: HID Auxiliary Light Harness

MAINTENANCE AND SERVICING

3. Remove grommet (A) from light support (B).
4. If replacing lamp and bracket assembly, remove nut (C) and spring washer from inside light support (B) and remove light assembly.

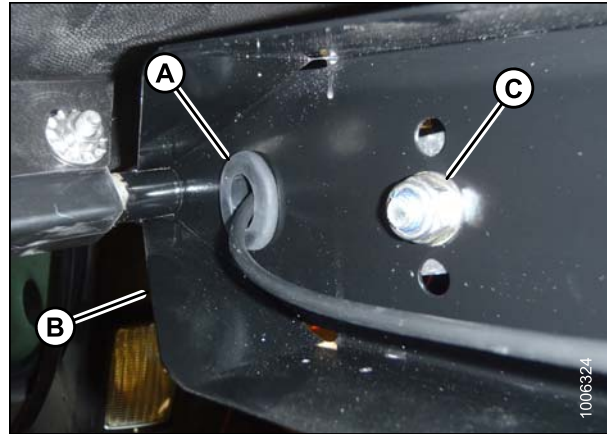


Figure 5.146: HID Light Assembly

5. If replacing the lamp only, remove the nut, spring washer and bolt (A) securing lamp (B) to lamp bracket (C) and remove lamp (B).
6. If installing lamp only, position new lamp (B) in lamp bracket (C) and secure with bolt (A), spring washer and nut. Adjust lamp (B) to desired position and tighten bolt (A).

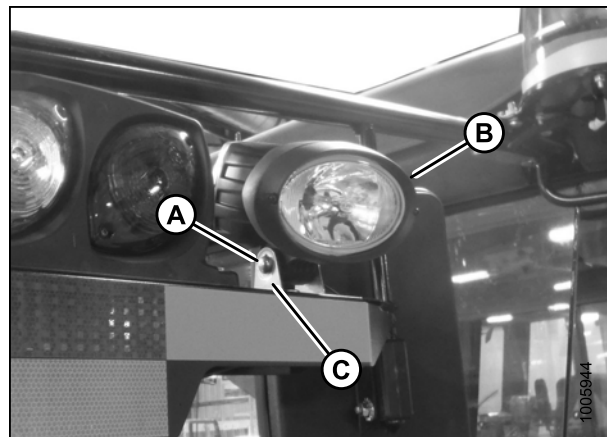


Figure 5.147: HID Auxiliary Lights

7. If installing light/bracket assembly, locate light in center hole in light support (B) and secure with hardware (C) provided with light assembly. Adjust light assembly to desired position and tighten nut (C).
8. Route lamp harness through grommet (A) and slot in light support (B).
9. Reinstall grommet (A) in light support (B).

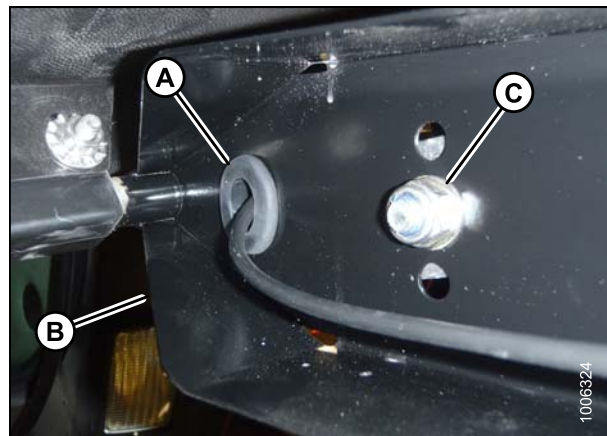


Figure 5.148: HID Light Assembly

MAINTENANCE AND SERVICING

10. Connect lamp plug (A) to main harness connector (B).

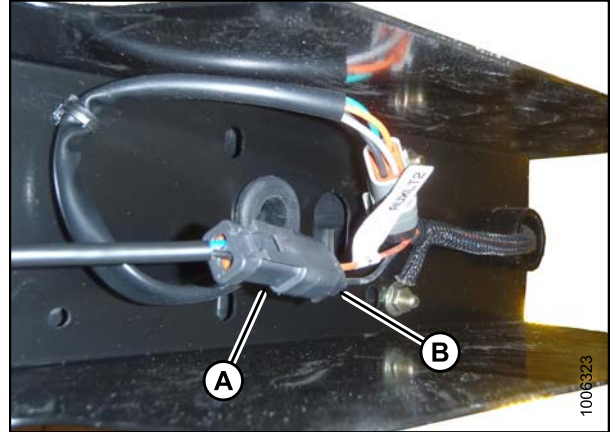


Figure 5.149: HID Auxiliary Light Harness

Swath 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.

The swath lights are **NOT** adjustable.

Replace bulbs as follows:

1. Shutdown the engine and remove the key.
2. Remove the two screws (A), and remove light bezel (B).
3. Remove light from receptacle.

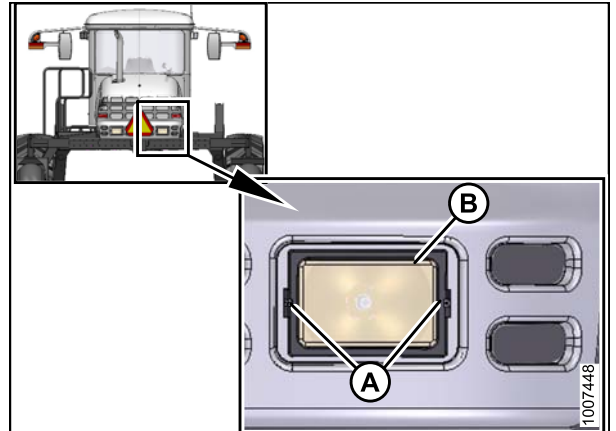


Figure 5.150: Swath Lights

MAINTENANCE AND SERVICING

4. Pinch the wire retainer (A), and lift away from hooks.
5. 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.

6. Match slots on new bulb (B) with lugs (D) in optical unit, and insert bulb into unit.
7. Secure bulb with wire retainer (A).
8. Push wire into connector (C).

IMPORTANT:

For proper lighting pattern, be sure lights are installed right side up.

9. Position light into light receptacle, ensuring top is up, and secure with bezel (B) and screws (A).

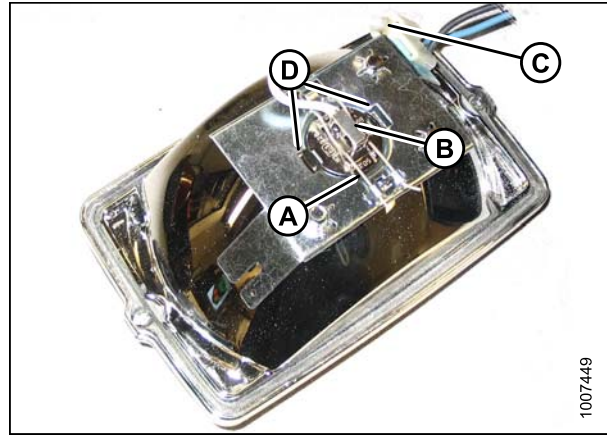


Figure 5.151: Lamp Assembly

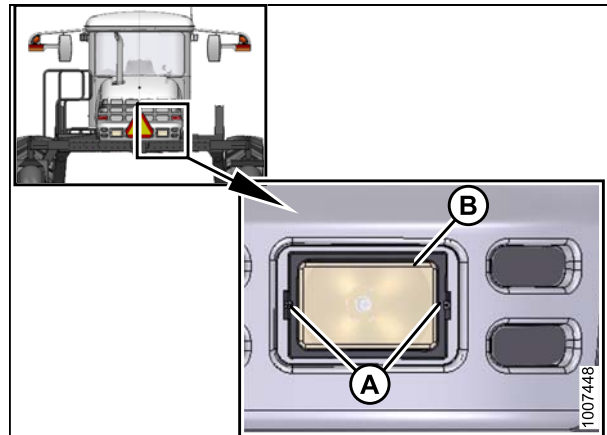


Figure 5.152: Swath Lights

Amber Lights



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.

MAINTENANCE AND SERVICING

1. Shut down engine and remove the key. Turn lights OFF.

NOTE:

Hold onto handholds (A) on cab front corners and stand on header anti-slip strips, or stand on maintenance platform when accessing the amber lights.

2. Remove two screws (B) from lens, and remove lens.
3. Push and twist light bulb to remove from socket.
4. Install new bulb, ensuring that bulb base is properly engaged in socket. Use Bulb Trade #1156.
5. Reinstall lens with screws (B).

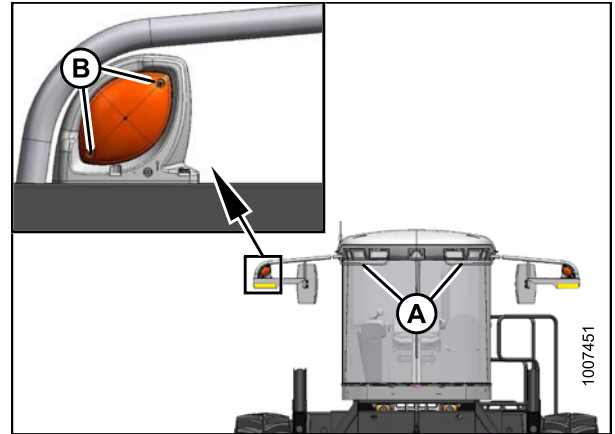


Figure 5.153: Amber Lights

Red Tail 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.
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).

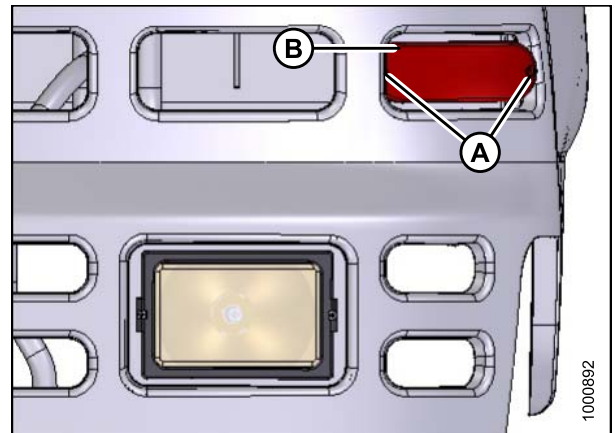


Figure 5.154: Red Tail Lights

Beacons (if installed)

Warning beacons are available as an optional Dealer-installed attachment (MD #B5582).

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.

MAINTENANCE AND SERVICING

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).

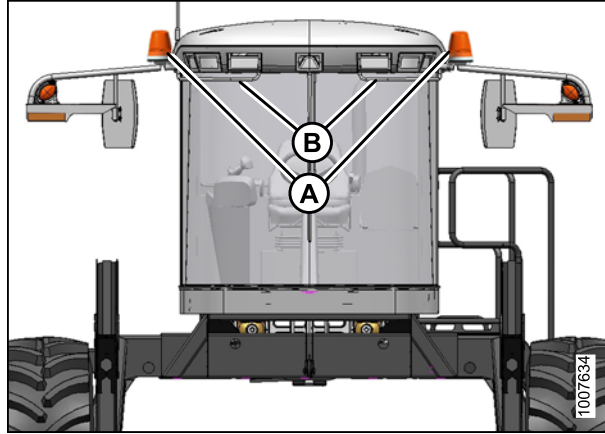


Figure 5.155: Warning Beacons

2. Turn lens (A) counterclockwise to unlock lens from base and remove lens.

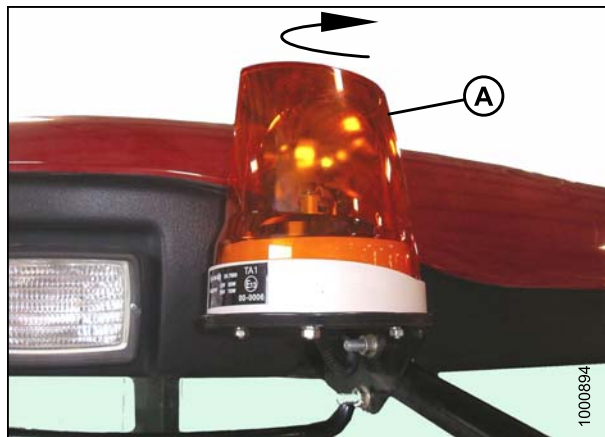


Figure 5.156: Warning Beacons

3. Pinch retainer (A) and remove it from lamp socket.
4. Pull lamp out of socket.

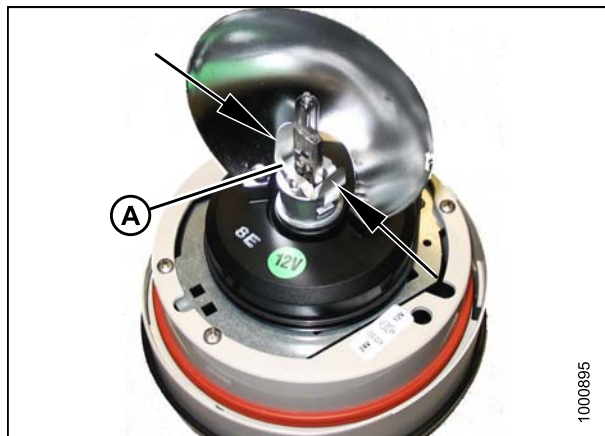


Figure 5.157: Beacon Lamp Assembly

MAINTENANCE AND SERVICING

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 5.158: Beacon Lamp Assembly

6. Connect harness to new lamp, place lamp in socket, and line up the flat side on lamp with recess in socket.



Figure 5.159: Beacon Lamp Assembly

MAINTENANCE AND SERVICING

- Place retainer (A) over lamp and pinch tabs to secure retainer to socket.

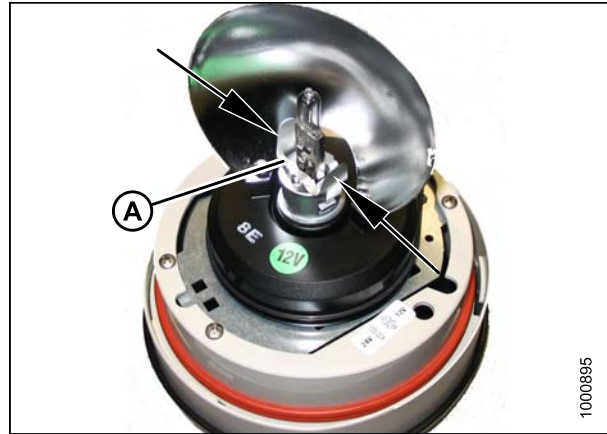


Figure 5.160: Beacon Lamp Assembly

- Line up the three lugs (one is longer) in the base with slots in lens, and seat the lens against the rubber seal.

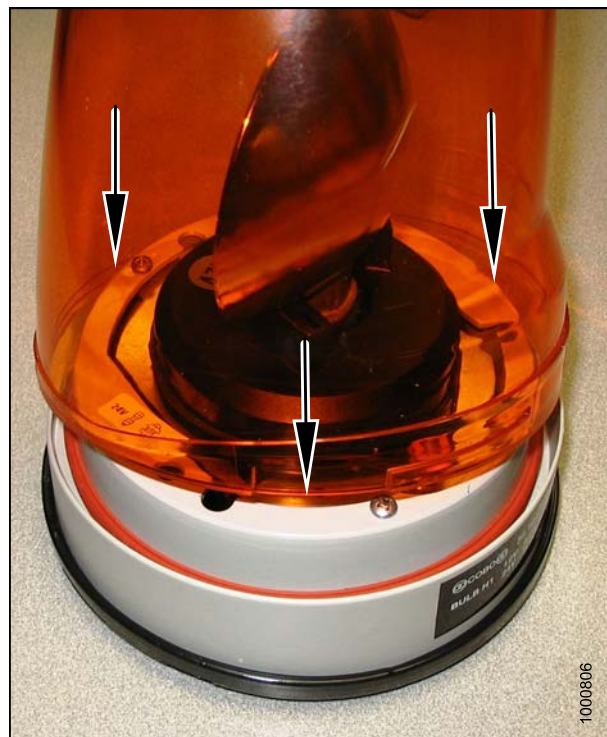


Figure 5.161: Beacon Lamp Assembly

MAINTENANCE AND SERVICING

9. Turn the lens clockwise to lock it in place.

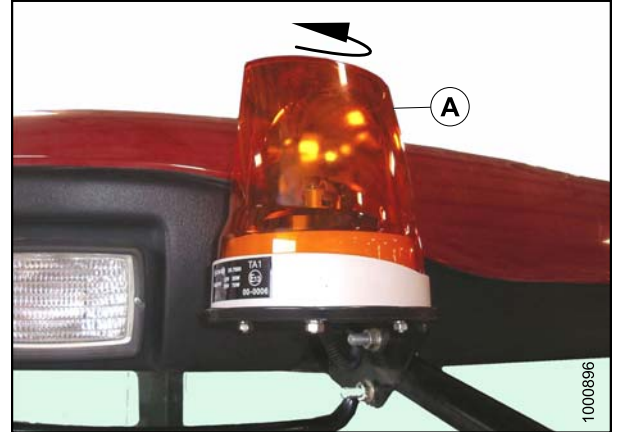


Figure 5.162: Warning Beacons

Dome Light

To replace a cabin dome light, follow these steps:

1. Shut down engine.
2. Remove two screws (A) from the dome light assembly and remove the assembly.
3. Disconnect the old dome light assembly from the wiring harness.
4. Connect the new dome light MD #183413 to the wiring harness.
5. Install the new dome light with two screws (A).

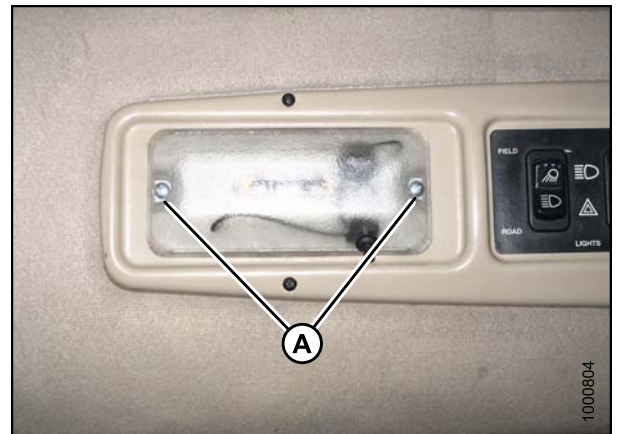


Figure 5.163: Cabin Dome Light

Ambient Light

To replace the ambient light fixture, follow these steps:

1. Shut down engine.
2. Locate the ambient light fixture (A) in the roof liner.



Figure 5.164: Ambient Light Fixture

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.

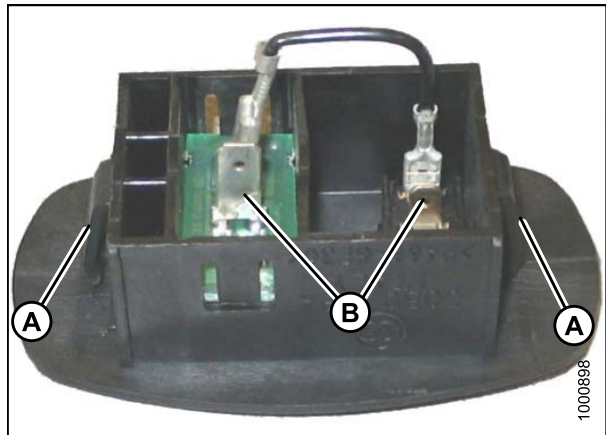


Figure 5.165: Ambient Light Fixture

Turn Signal Indicators

If the turn signal indicators on the cab display module (CDM) do **NOT** function, contact your MacDon Dealer.

Circuit Breakers and Fuses

The circuit breakers and fuses are located inside a fuse box mounted on the right (cab-forward) side of the frame.

The circuit breakers automatically reset. Fuses are the plastic blade type.

⚠ 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.

Access the breakers and fuses as follows:

1. Stop engine and remove key.

MAINTENANCE AND SERVICING

2. Remove wing nut (A) and remove fuse box cover (B).
3. Refer to the decal on inside of cover for identification of fuses and circuit breakers.
4. A cover may be installed over the circuit breaker. Remove it to access the breaker.

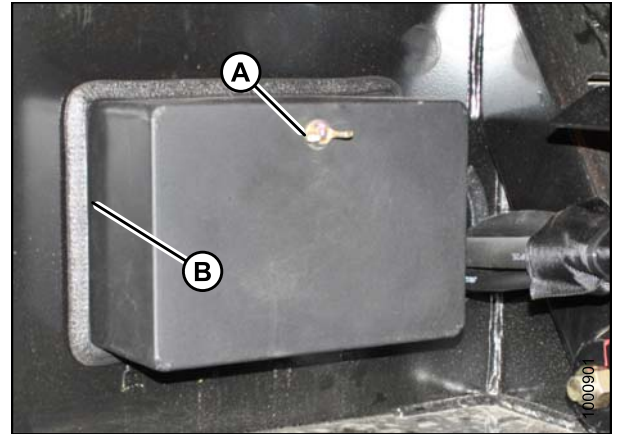


Figure 5.166: Fuse Box

Checking and 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.

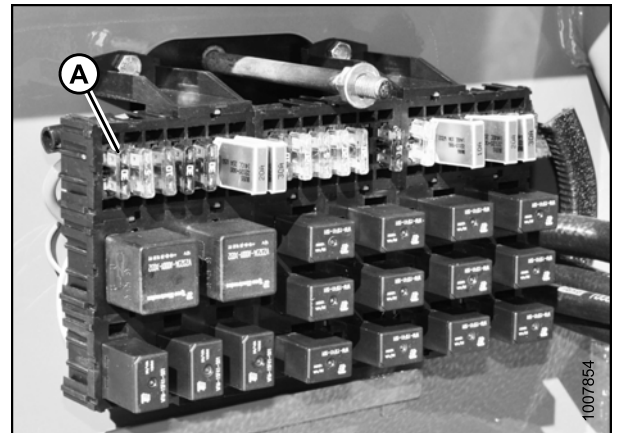


Figure 5.167: Fuses

Replacing Circuit Breakers and Relays

⚠ 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.

Replace breakers and relays as follows:

1. Stop engine and remove key.

MAINTENANCE AND SERVICING

2. To replace circuit breaker (A), pull breaker out of receptacle and install new circuit breaker.
3. To replace relay (B), pull relay out of receptacle and install new relay.
4. Reinstall cover and secure with wing nut.



Figure 5.168: Breakers and Relays

MAINTENANCE AND SERVICING

Fuse Box Decal

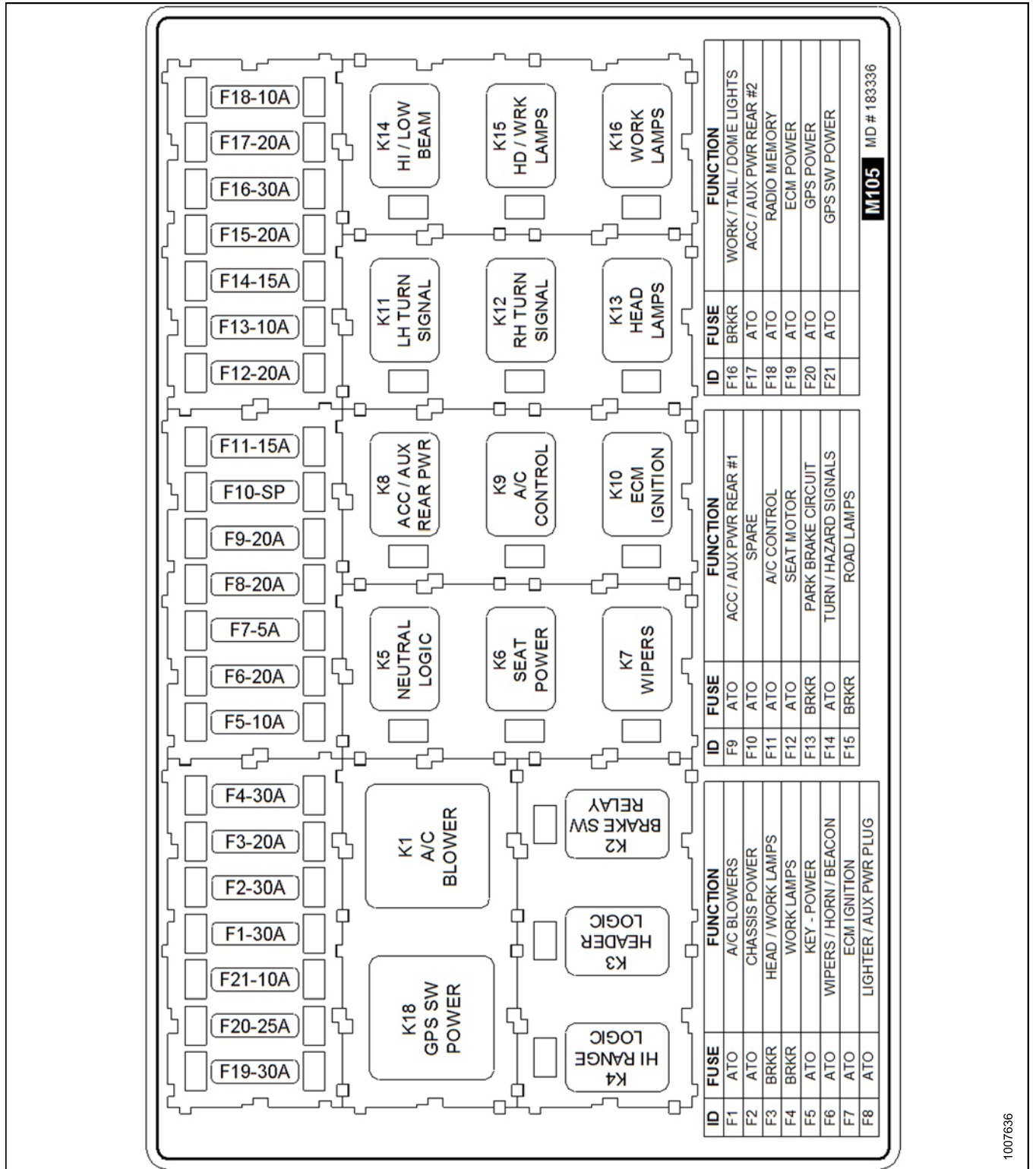


Figure 5.169: Fuse Decal

MAINTENANCE AND SERVICING

Inspecting and Replacing 125A Main Fuses

The 125A main fuse holders are located on the frame under the right cab-forward side platform beside the battery.

Access the 125A main 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. To check condition of fuse (A), pull tab (A) and open cover (B).

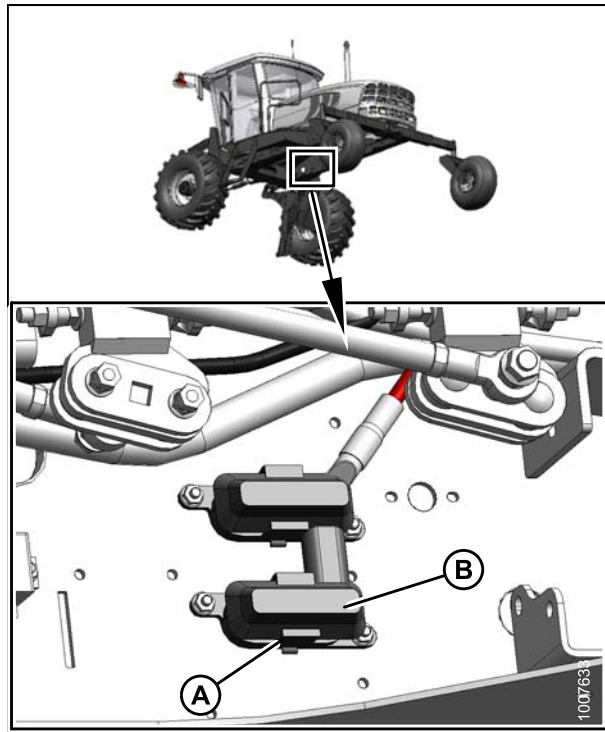


Figure 5.170: 125A Main Fuses

3. Visually examine fuse (B) for indications of melting.
4. Remove fuse (B), remove two nuts (C) and pull fuse free from holder (existing wiring may need to be pulled off the stud first).
5. Install new fuse on studs and any existing wiring that was removed.
6. Secure with nuts (C).



Figure 5.171: 125A Main Fuse

7. Close cover (B) and secure with tab (A).

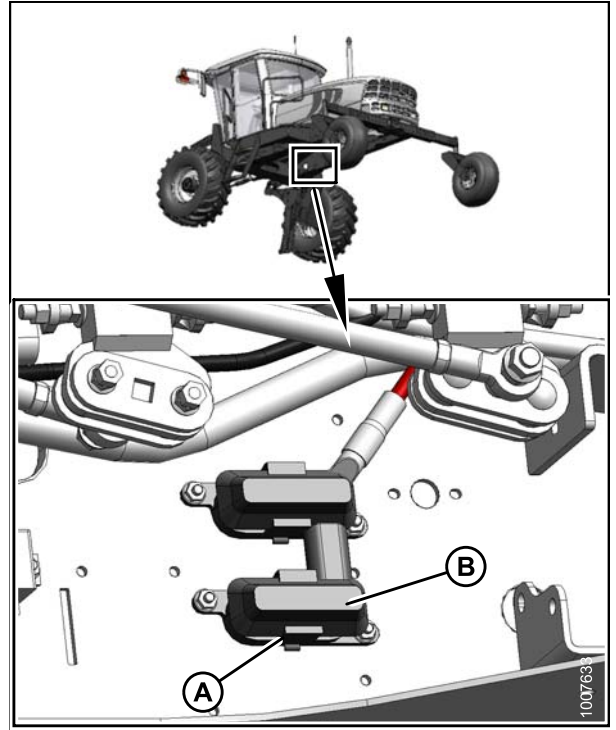


Figure 5.172: 125A Main Fuses

5.7.9 Hydraulic System

The M105 windrower hydraulic system provides oil pressure for the windrower drive system, 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.



Figure 5.173: Hydraulic Pressure Hazard

WARNING

- 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.

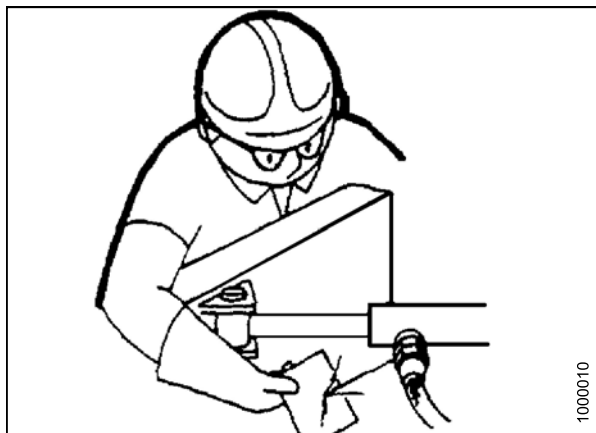


Figure 5.174: Checking Hydraulic Leaks

IMPORTANT:

Foreign material such as dirt, dust, and water is the major cause of trouble in the hydraulic system.

If hydraulic system components must 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 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 hydraulic system components 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.

Checking and Filling Hydraulic Oil

Follow these steps to check and fill the hydraulic 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. Park windrower on level ground and lower header and reel so that lift cylinders are fully retracted.
2. Stop the engine and remove the key.
3. Open the hood. Refer to [5.4.1 Opening Hood \(Lower Position\)](#), page 202.

NOTE:

A sight glass is provided under the hood on the right side of the tank. It indicates oil level and signs of contamination. No oil in the sight glass indicates oil level is below the add mark on the dipstick.



Figure 5.175: Engine Hood

4. If necessary, add oil to maintain a level between the LOW and FULL marks.
Refer to [Lubricants, Fluids, and System Capacities](#), page 199 for hydraulic oil specifications and quantity.

NOTE:

When dipstick is showing LOW, approximately 1 US gallon (4 liters) is required to reach the FULL mark.

IMPORTANT:

- Use good quality, prefiltered oil.
 - Exercise care to prevent debris from falling into tank.
5. Reinstall dipstick and filler cap, and turn clockwise to tighten/lock.
 6. Close the hood. Refer to [5.4.2 Closing Hood \(Lower Position\)](#), page 203.

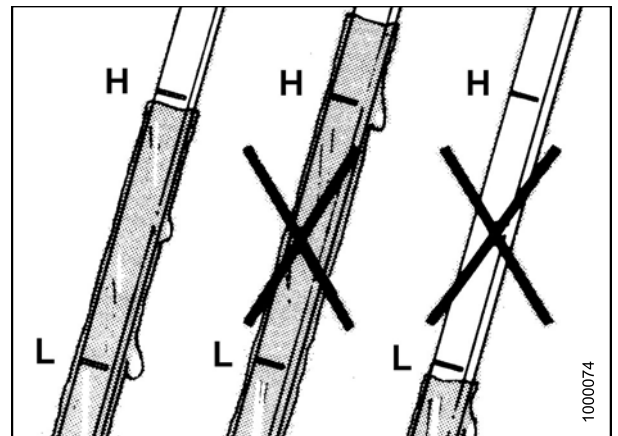


Figure 5.176: Checking Hydraulic Oil

Hydraulic Oil Cooler

The hydraulic oil cooler is located inside the cooling box behind the radiator.

It should be cleaned daily with compressed air. Refer to [Cleaning Cooler Box Components](#), page 252.

Draining Hydraulic 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.

NOTE:

Change hydraulic oil every 1500 hours or every 2 years.

1. Park windrower on level ground and lower header and reel so that lift cylinders are fully retracted.
2. Stop the engine and remove the key.
3. Open the hood. Refer to [5.4.3 Opening Hood \(Highest Position\)](#), page 203.
4. Place a clean container (at least 14 U.S gallons [50 liters]) under the drain at the bottom of the hydraulic reservoir to collect the oil.
5. Remove drain plug (A) and allow oil to drain.
6. 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.
7. Install drain plug (A).
8. Fill hydraulic oil reservoir. Refer to [Checking and Filling Hydraulic Oil](#), page 288.

Changing Hydraulic Oil Filters

The charge filter (A) and return filter (B) are located just inside the frame on the left side and are accessible from under the windrower. Change as follows:

NOTE:

Change hydraulic oil filters after the first 50 hours of operation, and every 500 hours thereafter. Filter (A) (MD #112419) and filter (B) (MD #151975) can be obtained from your Dealer.

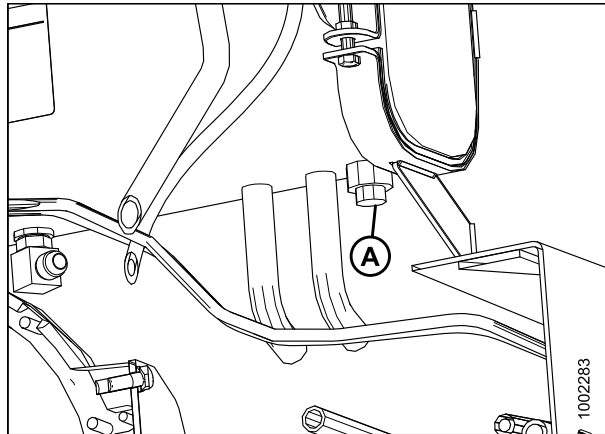


Figure 5.177: Hydraulic Oil Drain Plug

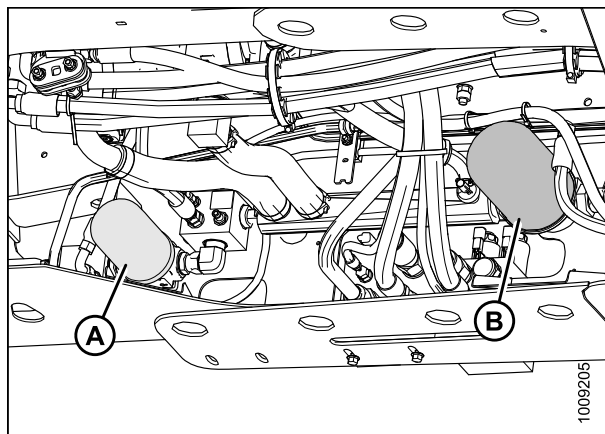


Figure 5.178: Hydraulic Oil Filters

MAINTENANCE AND SERVICING

Charge Filter

The charge filter filters the oil in the windrower hydraulic charge circuit that supplies make up oil for normal losses at motor and pump case drains and associated circuits.

Refer to the following procedures to change the charge filter:

- [Removing Charge Filter, page 291](#)
- [Installing Charge Filter, page 291](#)

Removing Charge 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. Stop the engine and remove the key.
2. Clean around head of the filter.
3. Place a container beneath the filter to collect any oil that may leak out.
4. Unscrew filter (A) with a filter wrench.
5. Dispose of used oil and filter in accordance with local environmental legislation.

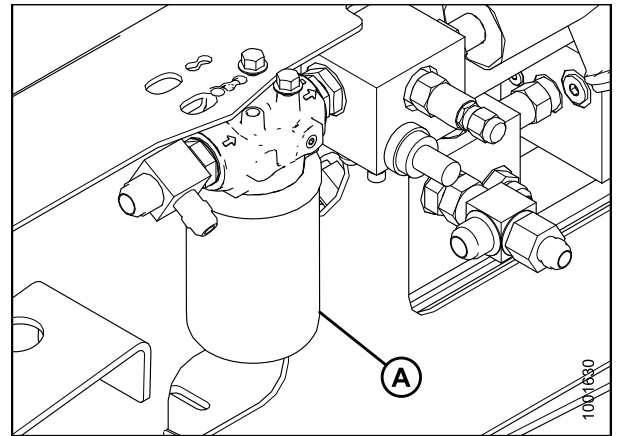


Figure 5.179: Hydraulic System

Installing Charge Filter

NOTE:

For charge filter replacement part number, refer to [Filter Part Numbers, page 200](#).

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. Overtightening can damage gasket and filter.

5. Check hydraulic fluid levels, refer to [Checking and Filling Hydraulic Oil, page 288](#). For capacity level, refer to [Lubricants, Fluids, and System Capacities, page 199](#).

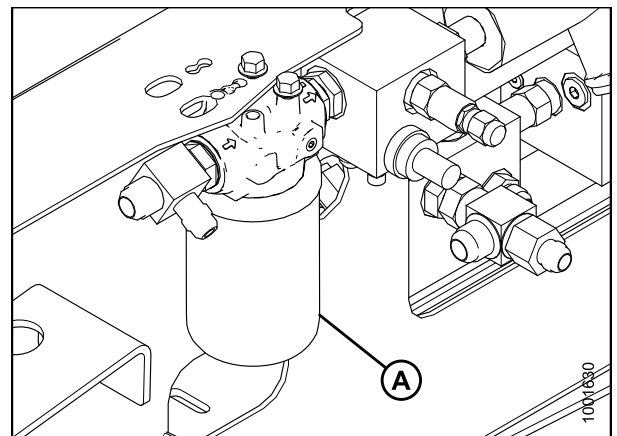


Figure 5.180: Hydraulic System

Return Filter

The return filter filters the oil in the header drive systems and should be changed after the first 50 hours and then at 500 hour intervals.

To change the return filter, refer to the following procedures:

- [Removing Return Filter, page 292](#)
- [Installing Return Filter, page 293](#)

Removing Return 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. Stop the engine and remove the key.
2. Locate the return filter (A) inside the left frame. It is accessible from under the windrower.
3. Clean around head of the filter (A).
4. Place a container beneath the filter (A) to collect any oil that may leak out.
5. Unscrew filter (A) with a filter wrench.
6. Dispose of used oil and filter in accordance with local environmental legislation.

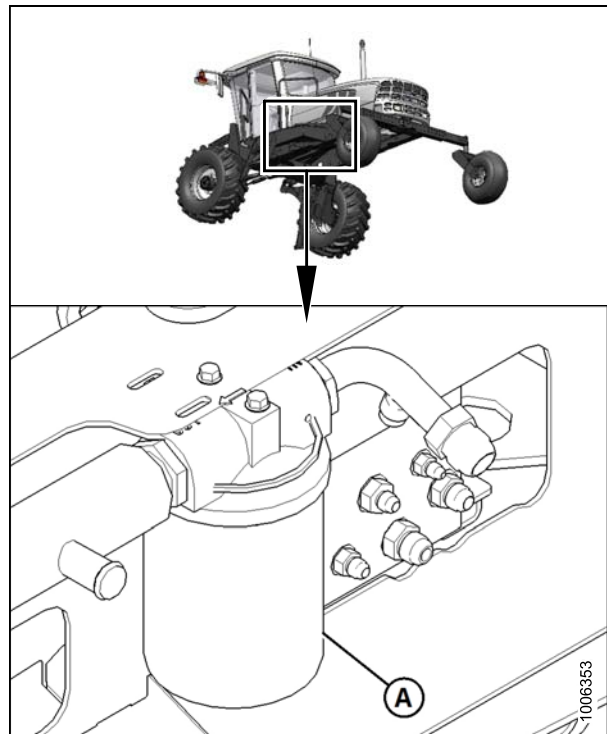


Figure 5.181: Hydraulic System

MAINTENANCE AND SERVICING

NOTE:

Image showing filter head removed to show component clarity.

7. Remove gasket (C) from groove (B) in filter head (A).

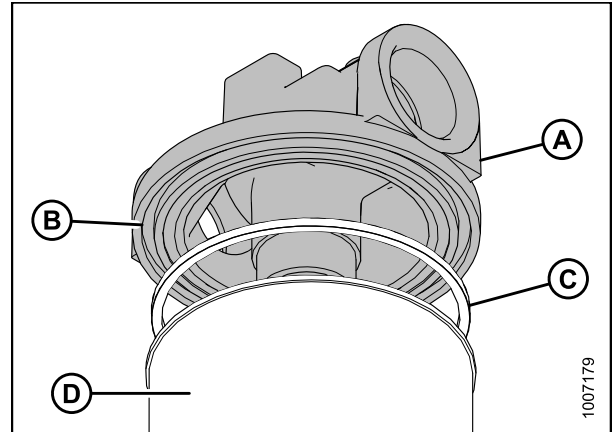


Figure 5.182: Hydraulic System

Installing Return Filter

NOTE:

For filter specifications, refer to [Filter Part Numbers](#), page 200.

NOTE:

Image showing filter head removed to show component clarity.

1. Clean the gasket groove (B) in the filter head (A).
2. Apply a thin film of clean oil to the filter gasket (C).
3. Install new gasket into the groove (B) in the filter head (A).
4. Screw the new filter (D) onto the filter head until the gasket contacts the filter.

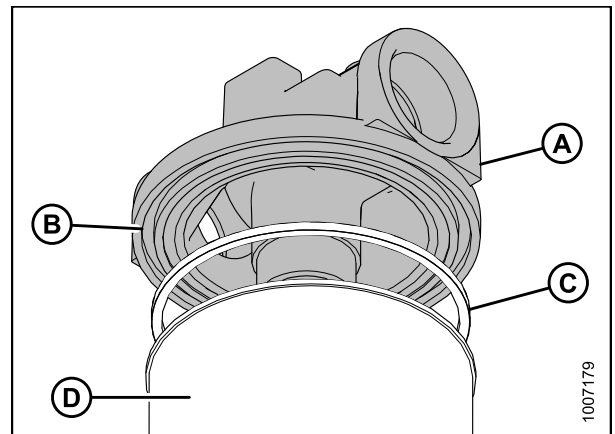


Figure 5.183: Hydraulic System

5. Tighten filter an additional 3/4 turn by hand.

IMPORTANT:

Do **NOT** use a filter wrench to install oil filter. Overtightening can damage gasket and filter.

6. Check hydraulic fluid levels. Refer to [Checking and Filling Hydraulic Oil](#), page 288. For capacity level, refer to [Lubricants, Fluids, and System Capacities](#), page 199.

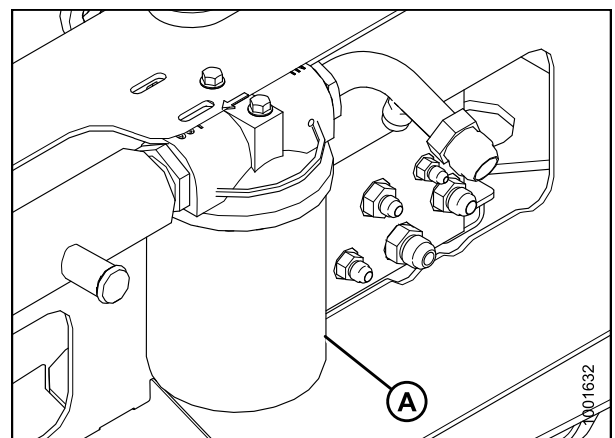


Figure 5.184: Hydraulic System

Header and Reel Hydraulics

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.

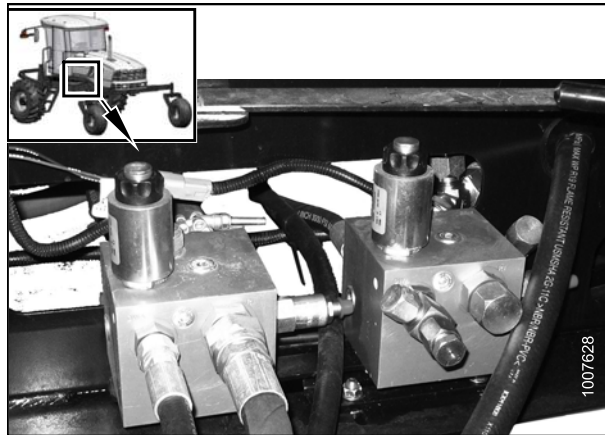


Figure 5.185: Hydraulic Valve Blocks

Knife Drive Valve Block

The ON/OFF valve on the valve block turns the knife ON. It is mounted on top of the knife drive pump.

The flow to the knife drive is mechanically set on the pump itself. Adjusting oil flow changes knife speed.

To set the knife speed, refer to the knife speed section for your header type:

- D-Series header: [4.6.8 Knife Speed, page 175](#)
- A-Series header: [4.7.3 Knife Speed, page 182](#)

Knife speed varies depending on the header size, header type, and whether the header has a single knife or double knife.

Knife speed is **NOT** monitored by cab display module (CDM) unless the optional expansion module MD #B4666 is installed. Refer to [7.1.10 Expansion Module, page 338](#).

Knife speed has been factory set for lower knife speeds.

Record the knife speed for your header type here:

- **HEADER TYPE:** _____
- **RECOMMENDED KNIFE SPEED:** _____

For units used with more than one header, knife speed will need to be changed when switching headers.

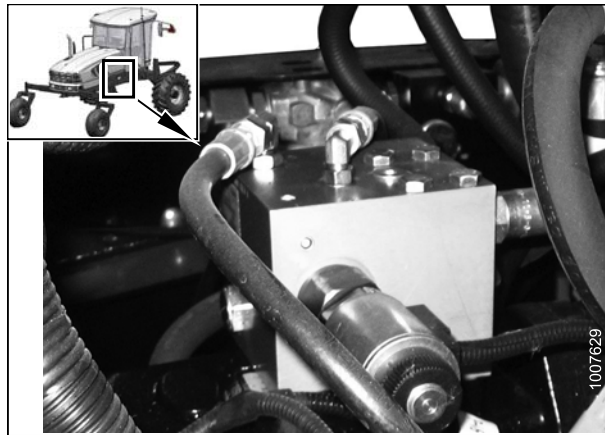


Figure 5.186: Knife Drive Valve Block

Adjusting Header Drop Rate

The header should lower gradually when the lower header switch is pressed. From full height to ground should take approximately 3–4 seconds.

If drop rate is too slow, return to cut height or tilt or float presets may time out. This is to keep the hydraulics from being pressurized.

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 the engine, and remove the key.
2. Move left cab-forward side platform rearward. Refer to [5.5.1 Opening Platform \(Standard Position\), page 205](#).
3. Loosen setscrew (B) on valve (A).
4. Turn cap (C)
 - Clockwise to decrease the drop rate
 - Counterclockwise to increase the drop rate
5. Check drop rate and readjust as required.
6. Tighten setscrew (B).

NOTE:

To reset to factory specifications, fully close the needle valve and open it four turns (counterclockwise).

7. Close the platform. Refer to [5.5.2 Closing Platform \(Standard Position\), page 206](#).

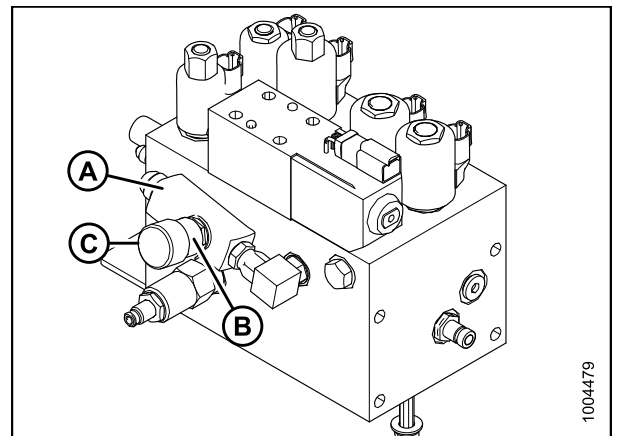


Figure 5.187: Hydraulic Valve Block

Adjusting Reel Drop Rate

The reel should lower gradually when the lower reel switch is pressed. From fully raised to fully lowered should take approximately 3–4 seconds. Drop rate is a customer preference and will vary based on crop type and cutting condition.

NOTE:

Drop speed should **NOT** be less than 3 to 4 seconds from all the way up to all the way down as structural damage may result.

NOTE:

If drop rate is too slow, return to cut height or tilt or float presets may time out. This is to keep the hydraulics from being pressurized.

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.

MAINTENANCE AND SERVICING

1. Lower header to ground, stop the engine, and remove the key.
2. Open the left cab-forward side maintenance platform. Refer to [5.5.1 Opening Platform \(Standard Position\)](#), page 205.
3. Locate valve (A) installed at port D, it controls the reel drop rate.

NOTE:

This valve is only installed with a draper header.

4. Loosen setscrew (B) and turn cap (C),
 - Clockwise to decrease the drop rate
 - Counterclockwise to increase the drop rate
5. Check drop rate and adjust as required
6. Tighten setscrew (B).

NOTE:

To reset to factory specifications, fully close the needle valve and open it four turns counterclockwise.

7. Close the platform. Refer to [5.5.2 Closing Platform \(Standard Position\)](#), page 206.

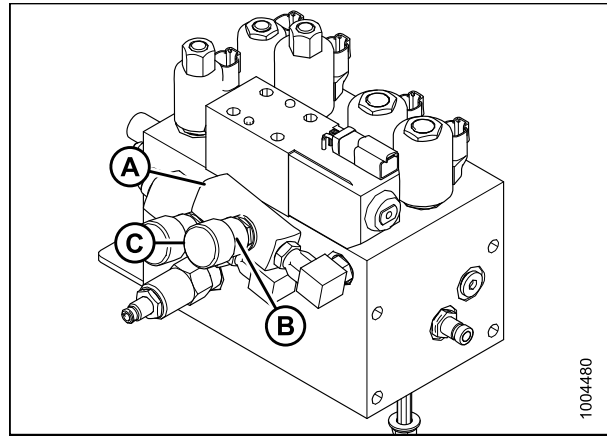


Figure 5.188: Hydraulic Valve Block

Traction Drive Hydraulics

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 in order to

- Make up for internal leakage
- Maintain positive pressure in the main circuit
- Provide flow for cooling
- Replace any leakage losses from external valving or auxiliary systems

The charge pressure is monitored. The cab display module (CDM) sounds a tone and displays a flashing warning if charge pressure drops below 250 psi (1725 kPa). Refer to [3.18.4 Cab Display Module \(CDM\) Warning/Alarms](#), page 67.

Checking Transmission Oil Pressure

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 [Checking and Filling Hydraulic Oil](#), page 288.
2. Check the hoses and lines for leakage.
3. Check the charge pressure relief valve. Refer to [Checking Charge Pump Pressure](#), page 297.
4. If charge pressure still cannot be maintained, do **NOT** operate the windrower. Contact your MacDon Dealer.

Checking Charge Pump Pressure

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.

Incorrect charge pressure settings may result in the inability to build required system pressure and/or inadequate loop flushing flows.

Correct charge pressure **MUST** be maintained under all conditions to maintain pump control performance and to operate the brake release.

Check charge pump pressure as follows:

1. Open hood fully. Refer to [5.4.3 Opening Hood \(Highest Position\)](#), page 203.
2. 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.
3. Locate the test port (A) which is located on the charge filter head. Clean test port fitting and attach hose to the fitting.
4. Start engine, and leave at idle. Pressure should be 200 to 250 psi (1379 to 1724 kPa) with the hydraulic oil at 100°F (40°C) minimum.
5. Note reading and shut down windrower.
6. If pressure is **NOT** within this range, contact your MacDon Dealer.
7. Otherwise, remove hose from test port and close the hood. Refer to [5.4.4 Closing Hood \(Highest Position\)](#), page 204.

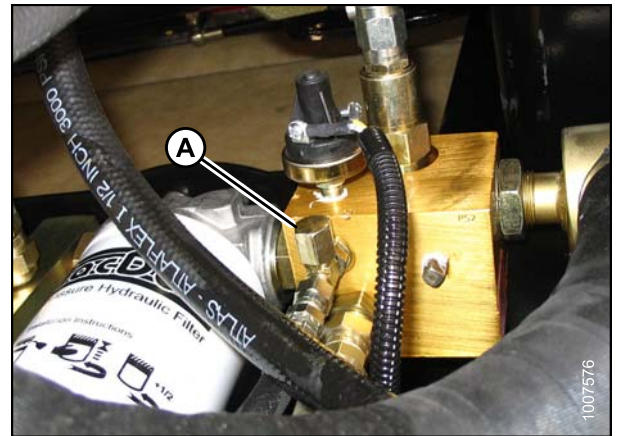


Figure 5.189: Charge Pump Test Port

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.

5.7.10 Wheels and Tires

Drive Wheel

Inflating Drive Wheel Tire

⚠ DANGER

- Use a safety cage if available.
- Do NOT stand over tire. Use a clip-on chuck and extension hose.
- NEVER install a tube in a cracked wheel rim.
- NEVER weld a wheel rim.
- Do NOT exceed maximum inflation pressure as per label on tire.
- Make sure all the air is removed from a tire before removing the tire from the rim.



Figure 5.190: Hydraulic Pressure Hazard

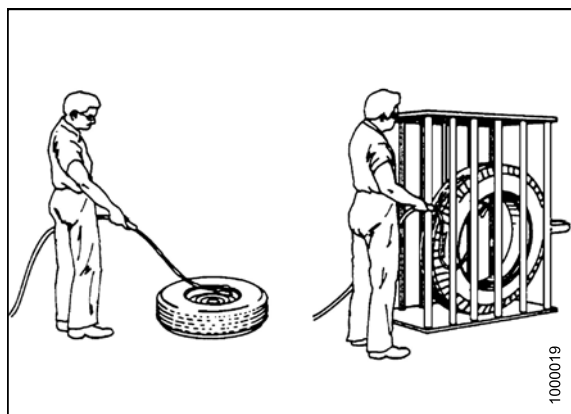


Figure 5.191: Drive Tire Inflation

MAINTENANCE AND SERVICING

DANGER

- **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.

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.

Visually check daily that tires have not lost pressure. Adjust pressure as required. Under-inflation of drive tires can cause side wall cracks.

Measure tire pressure annually with a gauge. Maintain tire pressure as follows:

1. Shut down the engine and remove key.
2. Determine the type and size of tire that is installed on your machine.
3. Refer to the following table to determine the appropriate tire pressure:

Table 5.19 Drive Wheel Tire Options

Drive Wheel Tire Options				
18.4-26 Bar	600 / 65 R28 Bar	18.4-26 Turf	23.1-26 Turf	580 / 70 R26 Turf
32 psi (221 kPa)	26 psi (179 kPa)	35 psi (241 kPa)	20 psi (138 kPa)	24 psi (165 kPa)

4. Adjust tire pressure as required.

Tightening Drive Wheel Nuts

At first use, or when a wheel is removed, torque drive wheel nuts after one hour of operation.

Continue with torque procedure every hour until two consecutive checks produce no movement of the nuts.

IMPORTANT:

- To avoid damage to wheel rims and studs, tighten nuts by hand, do **NOT** use an impact gun, do **NOT** use lubricant or Never-Seez® compound, and do **NOT** overtighten wheel nuts.
- Ensure only the manufacture's specified nuts are used.

MAINTENANCE AND SERVICING

1. Tighten drive wheel nuts (A). Ensure nuts and studs are dry with no lubricant or Never-Seez® compound. Torque each to 375 lbf ft (510 N·m) using the tightening sequence shown at right.
2. Repeat torque procedure every hour until two consecutive checks produce no movement of the nuts.

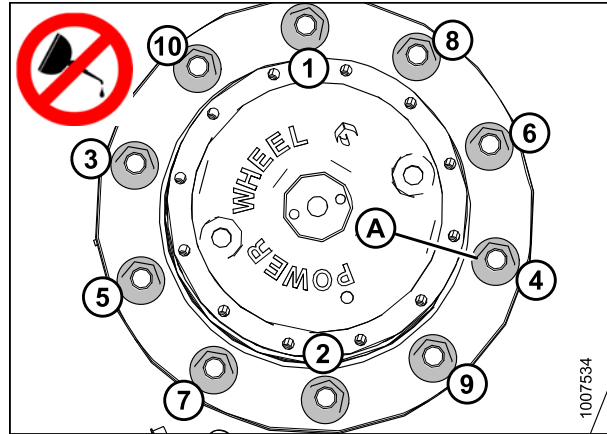


Figure 5.192: Wheel Drive Assembly

Lubricating Wheel Drive

Refer to these procedures to lubricate the wheel drive.

- [Checking Wheel Drive Lubricant Level, page 300](#)
- [Adding Wheel Drive Lubricant, page 300](#)
- [Changing Wheel Drive Lubricant, page 302](#)

Checking Wheel Drive Lubricant Level

Check the wheel drive lubricant level every 200 hours or annually.

1. Park the windrower on level ground.
2. Position windrower so that plugs (A) and (B) are horizontally aligned with the center (C) of the hub.
3. Remove plug (A) or (B). The lubricant should be visible through the port or running out slightly. If lubricant needs to be added, Refer to [Adding Wheel Drive Lubricant, page 300](#).

NOTE:

The type of lubricant used after the first lubricant change is different from the factory supplied lubricant.

4. Reinstall plugs and tighten.

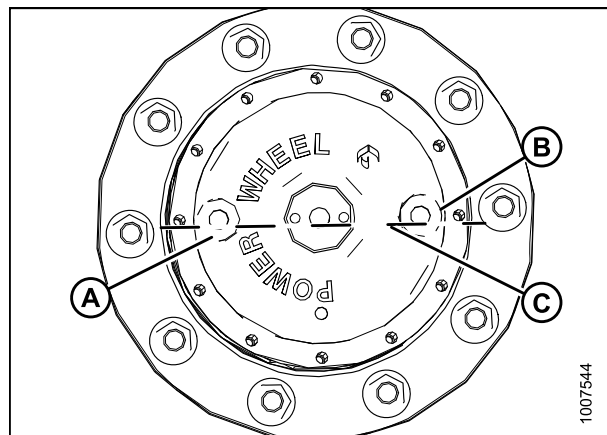


Figure 5.193: Wheel Drive Assembly

Adding Wheel Drive Lubricant

NOTE:

Do **NOT** mix lubricants of different brands or characteristics.

MAINTENANCE AND SERVICING

NOTE:

For lubricant specifications, Refer to [Lubricants, Fluids, and System Capacities, page 199](#).

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. Rotate wheel so that one of the plugs (A) is horizontally aligned with the center of the hub.
2. Stop windrower and remove key from ignition.
3. Remove the plug. The oil should be visible through the hole, or slightly running out.
4. If lubricant needs to be added, remove the second plug (B), and add lubricant until lubricant runs out at (A).

NOTE:

PRIOR TO FIRST CHANGE: use SAE 85W140, API Service, Class GL-5, Extreme Pressure Gear Lubricant.

NOTE:

AFTER FIRST CHANGE: use SAE 75W90, API Service, Class GL-5, Fully Synthetic Transmission Lubricant (SAE J2360 preferred).

5. Reinstall and tighten plugs (A) and (B).
6. Start up and operate the windrower for a few minutes, then stop and check the oil level. Refer to [Checking Wheel Drive Lubricant Level, page 300](#). If necessary, add more oil.

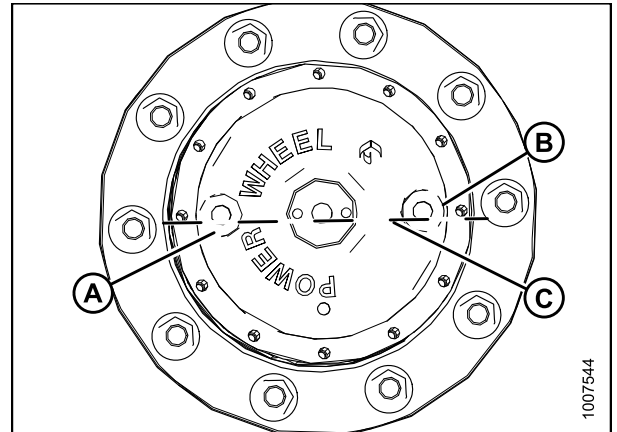


Figure 5.194: Wheel Drive

MAINTENANCE AND SERVICING

Changing Wheel Drive Lubricant

The wheel drive lubricant should be changed after the first 50 hours and then in accordance with the maintenance schedule. Change the lubricant when it is warm.

Check the level every 200 hours or annually, and change every 1000 hours.

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. Park windrower on level ground and position windrower so drain plug (B) is at the lowest point.
2. Shut down the windrower and remove key from ignition.
3. Place a large enough container (about 2 quarts [2 liters]) under the lower drain plug (B).
4. Remove top plug (A), and drain lubricant. Ideally, the lubricant should be at operating temperature for good draining.

CAUTION

Dispose oil in a manner that is in compliance with the local rules and regulations.

5. When lubricant has drained, rotate wheel so that one of the plugs (B) is horizontally aligned with the center of the hub (C) as shown.

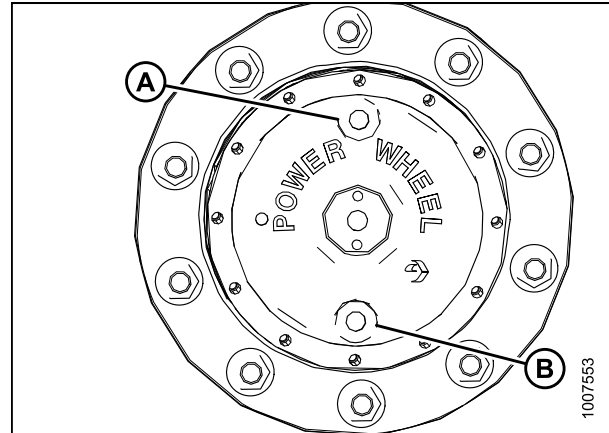


Figure 5.195: Wheel Drive

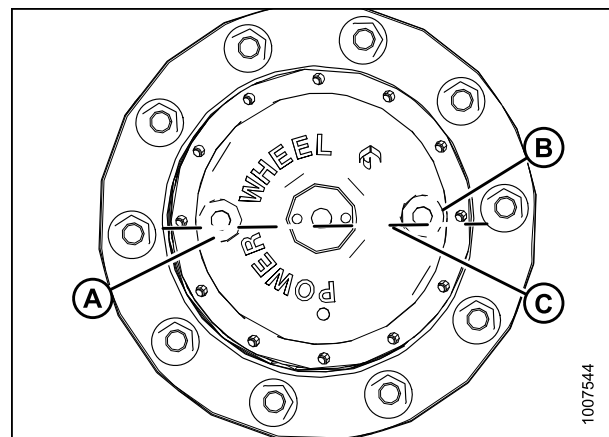


Figure 5.196: Wheel Drive

6. Add lubricant. Refer to [Adding Wheel Drive Lubricant, page 300](#).

NOTE:

The type of lubricant used after first lubricant change is different from factory supplied lubricant.

Servicing Drive Wheel

To service a drive wheel, refer to the following procedures:

- [Raising Drive Wheel, page 303](#)
- [Removing Drive Wheel, page 304](#)
- [Installing Drive Wheel, page 304](#)
- [Lowering Drive Wheel, page 305](#)

Raising Drive Wheel

This procedure can be used on both drive wheels.

CAUTION

Header **MUST** be removed and **NO** weight box installed. Use a hydraulic jack with minimum lifting capacity of 5000 lb (2268 kg) to provide adequate support for the machine.

1. Remove the header.
2. Park windrower on level ground and block all 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.

3. Place ground speed lever (GSL [A]) in N-DETENT (B), shut down engine, and remove key.

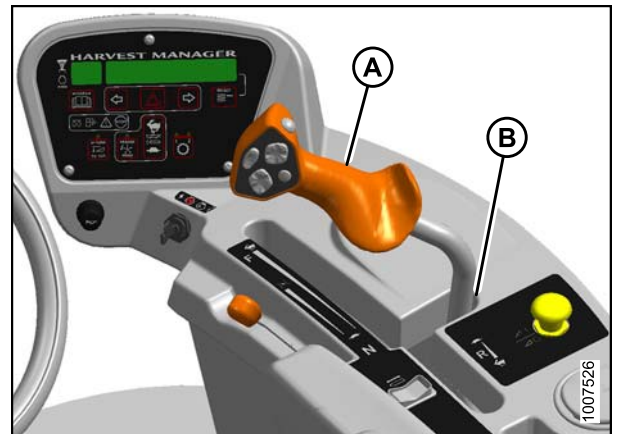


Figure 5.197: Ground Speed Lever

CAUTION

Jack stand must be capable of supporting a minimum of 5000 lb (2268 kg).

4. Place a jack under the leg jack point (A) and raise the drive wheel until it is slightly off ground. Place a jack stand beneath the lift cylinder mount (B).

NOTE:

Do **NOT** place jack stand under the cylinder. Use a small metal plate on top of the jack stand.

5. Lower the windrower onto the jack stand.

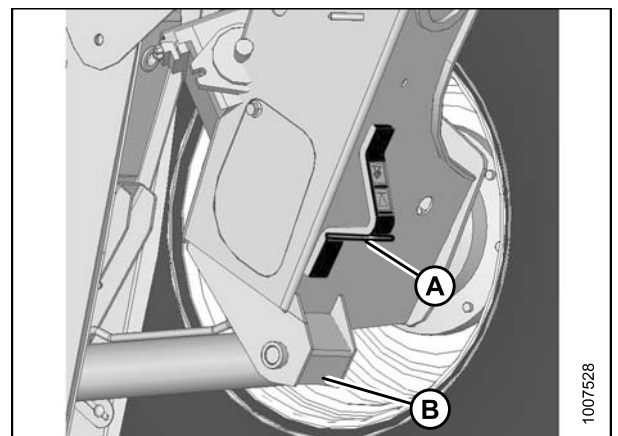


Figure 5.198: Drive Wheel Jack Point

Removing Drive Wheel

CAUTION

Use a suitable lifting device capable of supporting a minimum of 2000 lbs (907 kg) to lift the wheel assembly away from the windrower.

1. Raise the windrower drive wheel (A) off the ground. Refer to [Raising Drive Wheel, page 303](#).
2. Remove the wheel nuts (B).
3. Remove the drive wheel (A).

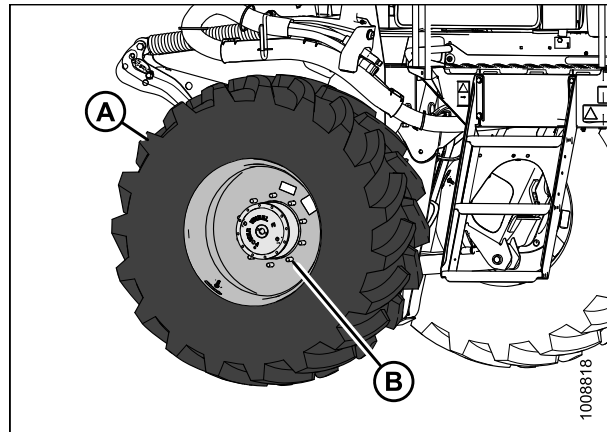


Figure 5.199: Drive Wheel Assembly

Installing Drive Wheel

NOTE:

Windrower must be supported off the ground with stands. Refer to [Raising Drive Wheel, page 303](#).

1. Position drive wheel (A) against wheel drive hub (B), so that air valve (C) is on the outside and tire tread (D) points forward. For Turf tires (diamond tread), be sure arrow on sidewall points in forward rotation.
2. Lift wheel on hub with lifting device.
3. Lower lifting device.

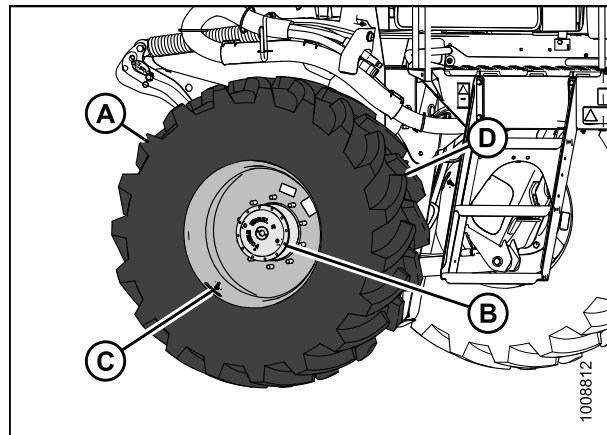


Figure 5.200: Drive Wheel Assembly

4. Line up the holes in the rim with the studs on the wheel drive hub and install wheel nuts (A).

NOTE:

To avoid damage to wheel rims and studs, tighten nuts by hand, do **NOT** use an impact gun, do **NOT** use lubricant or Never-Seez® compound, and do **NOT** overtighten wheel nuts.

5. Torque drive wheel nuts. Refer to [Tightening Drive Wheel Nuts, page 299](#).
6. Lower the windrower, and remove jack. Refer to [Lowering Drive Wheel, page 305](#).
7. After one hour of operation, retorque the wheel nuts. Then check every hour until two consecutive checks produce no movement of the nuts.

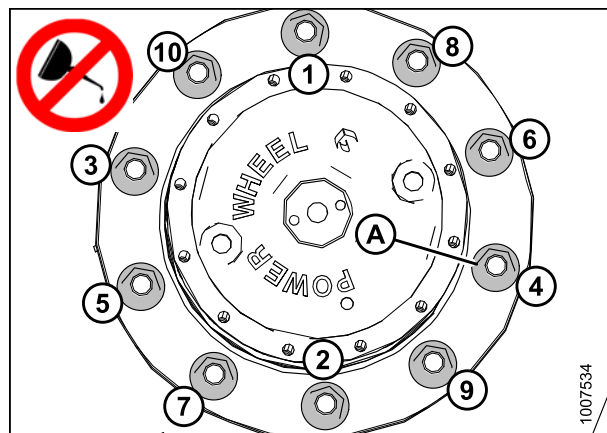


Figure 5.201: Drive Wheel Nuts

Lowering Drive Wheel

This procedure can be used on both drive wheels.

CAUTION

Jack stand must be capable of supporting a minimum of 5000 lb (2268 kg).

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 from under the cylinder lift mount (B) and lower the drive wheel to the ground.
3. Remove the jack.

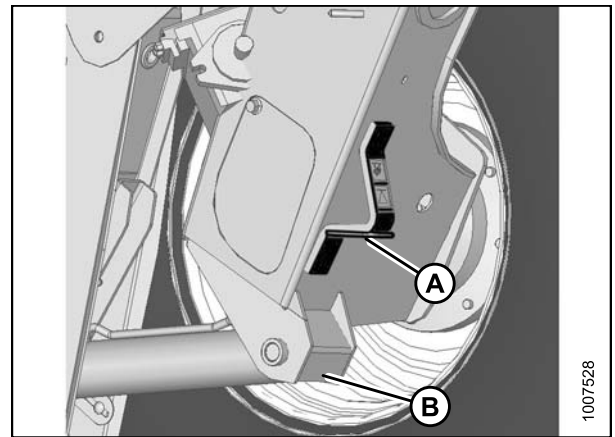


Figure 5.202: Drive Wheel Leg Jacking Point

Caster Wheel

Inflating Caster Tire

DANGER

- 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.
- 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.

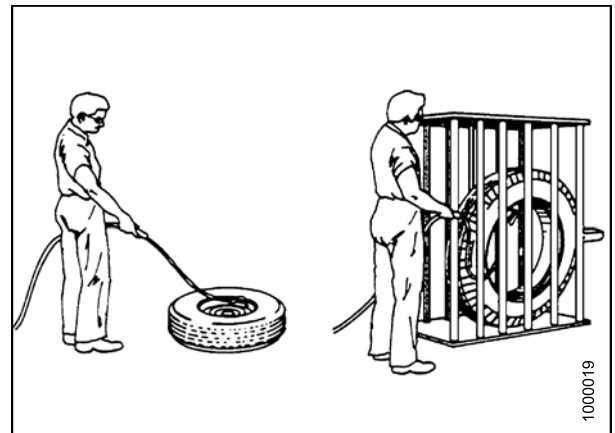


Figure 5.203: Safely Filling a Tire with Air

DANGER

- 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.
- To avoid severe personal injury or death caused by machine runaway, shut off engine and remove key before performing any of the following checks and/or adjustments.

MAINTENANCE AND SERVICING

Measure tire pressure annually with a gauge. Caster tire pressure should be 10 psi (69 kPa).

To maintain pressure, visually check daily that tires have not lost pressure, and adjust pressure as needed. Under-inflation of tires can cause side wall cracks.

NOTE:

If caster wheels shimmy, a possible cause is over-inflation.

NOTE:

An anti-shimmy dampener kit is available for rear caster wheels. Refer to [7.1.2 Anti-Shimmy Shocks for Casters, page 337](#) for information.

Table 5.20 Caster Tire Options

Formed Caster	Forked Caster
7.5 – 16SL Single Rib, 10 - 16 Front Steer Tire	16.5L – 16.1 Rib Implement Flotation, 10 – 16 Front Steer Tire
10 psi (69 kPa)	10 psi (69 kPa)

Tightening Caster Wheel Nuts

At first use, or when a wheel is removed, check caster wheel bolt torque as follows after 5 hours, and then at 200 hour intervals:

NOTE:

To avoid damage to wheel rims, do **NOT** over-tighten wheel nuts.

MAINTENANCE AND SERVICING

To tighten the caster wheel nuts on either forked or formed caster wheels, follow these steps:

1. Position wheel assembly on hub and install wheel bolts (A).
2. Tighten wheel nuts (A) to 120 ft·lbf (163 N·m) using the tightening sequence suitable for the type of caster wheel shown at right. Repeat the tightening sequence three times.

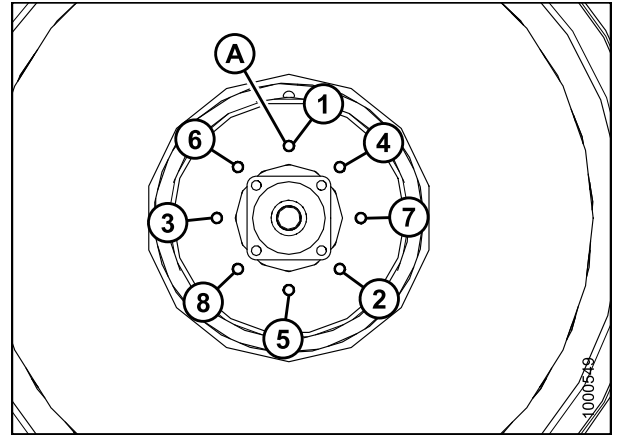


Figure 5.204: Forked Caster Wheel Tightening Sequence

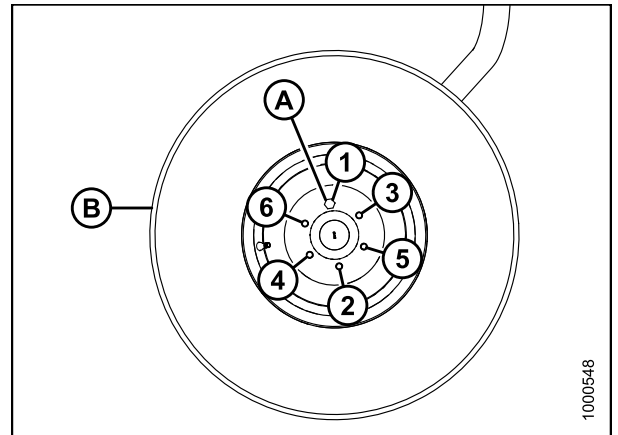


Figure 5.205: Formed Caster Wheel Tightening Sequence

Servicing Caster Wheels

Refer to the following procedures:

- [Raising Caster Wheel \(Formed and Forked\)](#) , page 308
- [Lowering Caster Wheel \(Formed and Forked\)](#), page 309
- [Removing Forked Caster Wheel](#), page 309
- [Installing Forked Caster Wheel](#), page 310
- [Removing Formed Caster Wheel](#), page 310 [Installing Formed Caster Wheel](#), page 311

MAINTENANCE AND SERVICING

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.

1. Park windrower on level ground and block the drive wheels.
2. Place the ground speed lever (GSL [A]) in N-DETENT (B), stop the engine, and remove the key.

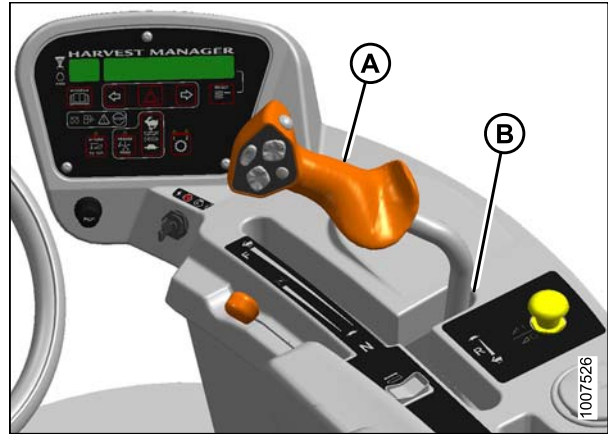


Figure 5.206: GSL Position

3. Raise end of walking beam (A) using a suitable lifting device capable of lifting 5000 lb (2268 kg) minimum until the caster wheel assembly (B) is slightly off the ground.
4. Place a jack stand beneath the walking beam and lower the beam until resting on the stand.

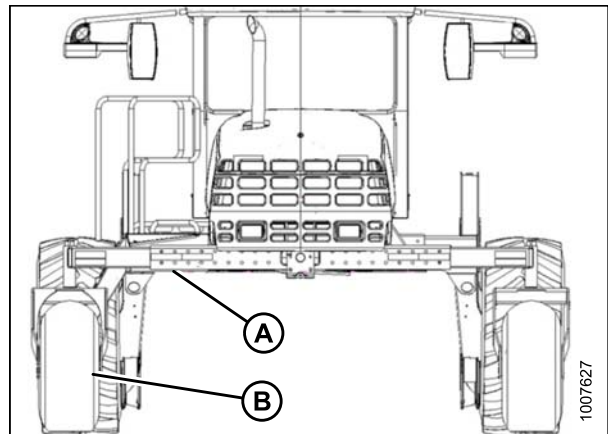


Figure 5.207: Caster Wheel Assembly

Lowering Caster Wheel (Formed and Forked)

This procedure is the same for forked and formed caster wheels.

1. Raise the end of walking beam (A) slightly, using a suitable lifting device capable of lifting minimum 5000 lb (2268 kg).
2. Remove the jack stand and lower the end of the walking beam until the caster wheel assembly (B) is on the ground.
3. Remove blocks from the drive tires.

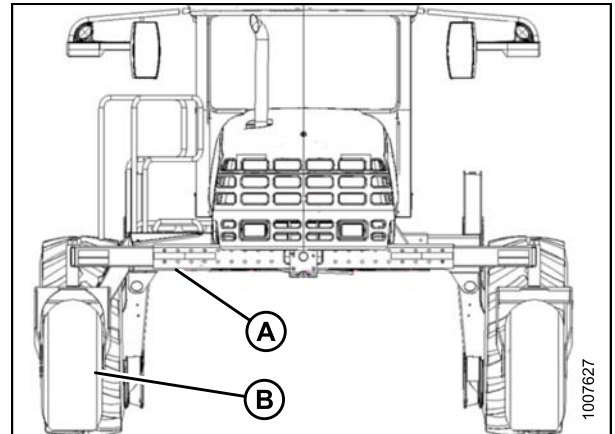


Figure 5.208: Caster Wheel Assembly

Removing Forked Caster Wheel

⚠ CAUTION

Wheel assemblies are heavy. Support wheel assembly before removing axle bolts.

1. Raise caster wheel. Refer to [Raising Caster Wheel \(Formed and Forked\)](#), page 308.
2. Remove the eight bolts (A) (four on each side of caster) attaching axle (B) and cover (C) to forked caster (E), and remove wheel assembly (D) from caster (E).
3. Remove the eight wheel nuts (A) that secure the axle (B) to the wheel (C).
4. Separate axle (B) and wheel (C).

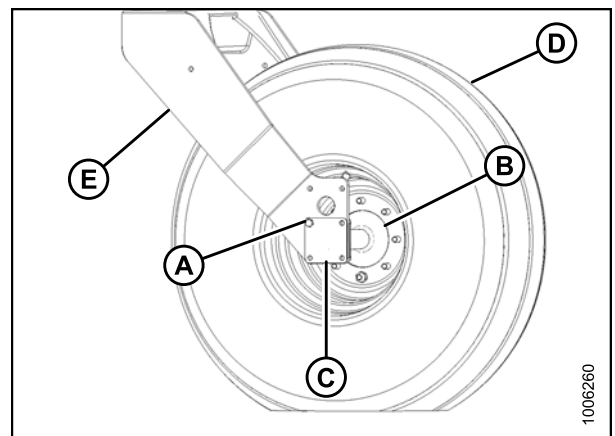


Figure 5.209: Caster Wheel Assembly

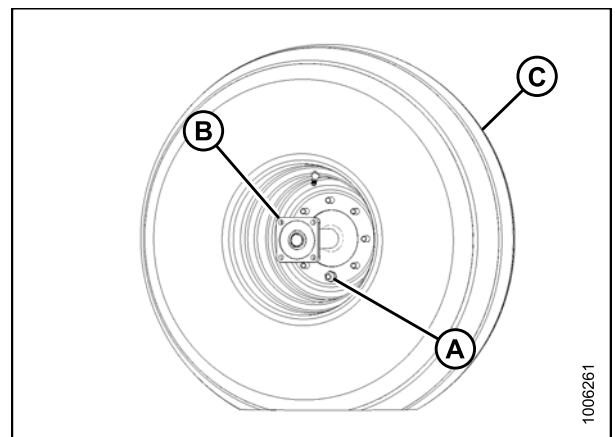


Figure 5.210: Caster Wheel Assembly

Installing Forked Caster Wheel

1. Position wheel assembly (C) on axle assembly (B) and install wheel nuts (A).
2. Torque wheel nuts (A). Refer to [Tightening Caster Wheel Nuts, page 306](#).

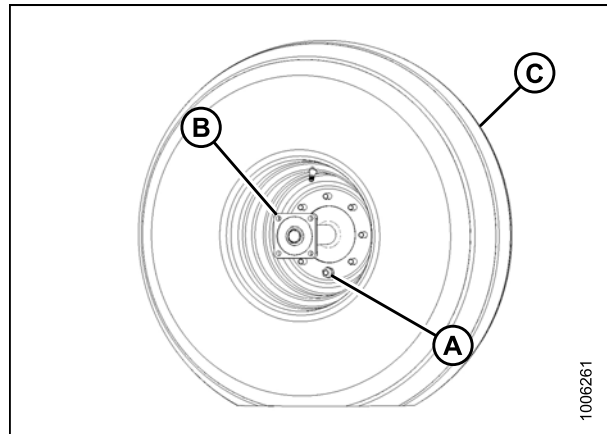


Figure 5.211: Caster Wheel Assembly

3. Position wheel assembly (D) in forked caster (E).
4. Position cover plates (C) and install eight bolts (A) (four on each side of caster) to secure axle (B) to caster (E). Torque bolts to 75–79 ft·lbf (97–107 N·m).
5. Lower caster wheel. Refer to [Lowering Caster Wheel \(Formed and Forked\), page 309](#).

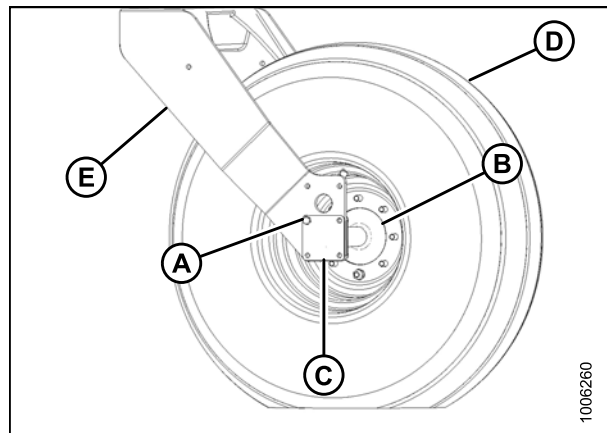


Figure 5.212: Caster Wheel Assembly

Removing Formed Caster Wheel

1. Raise caster wheel. Refer to [Raising Caster Wheel \(Formed and Forked\) , page 308](#).
2. Remove the six bolts (A) that secure the wheel (B) to the hub.
3. Remove wheel (B).

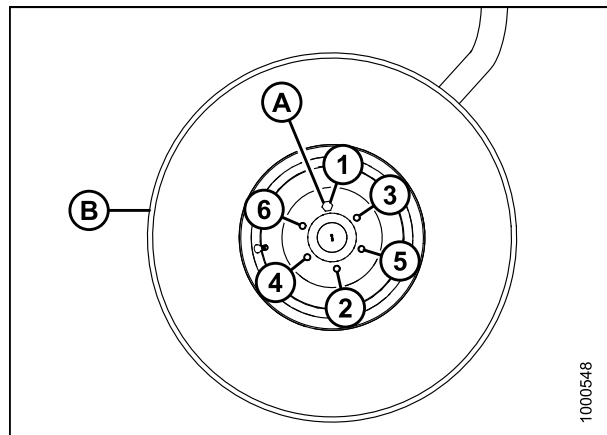


Figure 5.213: Caster Wheel Assembly

Installing Formed Caster Wheel

1. Position wheel assembly (B) on hub, and install the six wheel bolts (A).
2. Torque bolts (A). Refer to [Tightening Caster Wheel Nuts, page 306](#).
3. Lower caster wheel. Refer to [Lowering Caster Wheel \(Formed and Forked\), page 309](#).

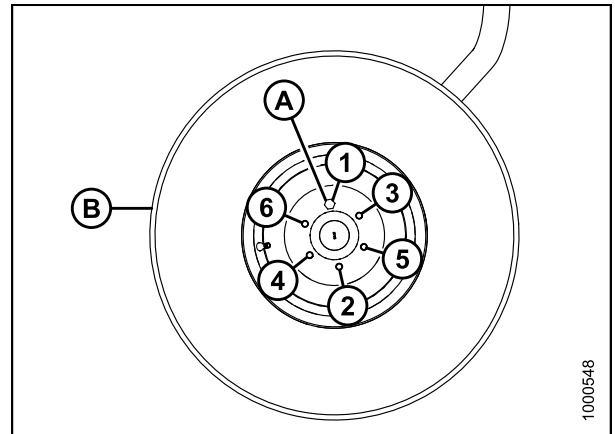


Figure 5.214: Caster Wheel Assembly

Caster Wheels Anti-Shimmy Shocks (MD #B5346) (if installed)

Each caster can be equipped with a fluid-filled anti-shimmy dampener (A).

If installed, the mounting bolts (B) need to be checked periodically for security. Refer to [5.7.11 Maintenance Schedule, page 313](#).

- Inboard bolt should be tightened to 100 ft·lbf (135 N·m).
- Outboard bolt should be tightened to 85 ft·lbf (115 N·m).

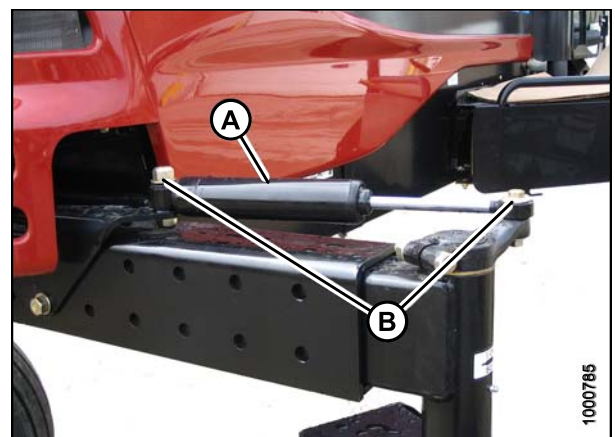


Figure 5.215: Anti-Shimmy Dampener

MAINTENANCE AND SERVICING

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 the machine varies with different attachments, windrower options, terrain, and the 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.

Table 5.21 Fluid Capacity and Ballast Weight

Tire Size	Fluid Per Tire at 75% Fill US Gallons (Liters)	Total Weight of Both Tires lb (kg) ³⁴
7.5 X 16	10 (38)	200 (91)
10 X 16	18 (69)	380 (170)
16.5 X 16.1	41 (158)	830 (377)

Table 5.22 Recommended Ballast Weight

Header Description		Recommended Ballast				Recommended Tire Size
		Level Ground		Hills		
Type	Size	Per Tire	Both Tires	Per Tire	Both Tires	
		US Gallons (Liters)	lb (kg) ³⁵	US Gallons (Liters)	lb (kg) ³⁵	
A and D-Series All Options	25-ft. and Down	0	0	0	0	7.5 X 16 10 X 16 16.5 X 16.1
	30-ft. Single or Double Reel without Conditioner. 35-ft. Single Reel	0	0	10 (38)	200 (91)	
D-Series	30-ft. Double Reel Steel Fingers and Conditioner. 35-ft. Double Reel (5 or 6-Bat)	18 (69)	380 (170)	30 (115)	630 (288)	Level Ground: 10 X 16 Level Ground: 16.5 X 16.1 Hills: 16.5 X 16.1

34. 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 anti-freeze protection).

35. If only water is used, increase volume of water by 20% (up to maximum allowable fill per tire) to compensate.

5.7.11 Maintenance Schedule

The Maintenance Schedule specifies the recommended 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 the various procedures in this chapter. Use the fluids and lubricants specified in [5.3.1 Recommended Fuel, Fluids, and Lubricants, page 198](#).

Service Intervals: The recommended service intervals are in hours of operation. Where a service interval is given in more than one time frame, for example, 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 in [1 Safety, page 1](#).

Break-In Inspections

Break-In Inspections		
Hours	Item	Check
1 Hour	Drive wheel nuts	Torque: 375 lbf·ft (510 N·m) dry. Repeat checks at one hour intervals until torque stabilizes at two consecutive checks
At 5 Hours	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)
At 10 Hours	Walking beam width adjustment bolts	Torque: 330 ft·lbf (448 N·m)
	Neutral adjustment	Check. Dealer adjusted
At 50 Hours	Hose clamps: air intake / radiator / heater / hydraulic	Check. Refer to specific hose clamp section Hand-tighten unless otherwise noted
	Walking beam width adjustment bolts	Torque: 330 ft·lbf (448 N·m)
	Caster wheel anti-shimmy dampener bolts (if installed)	Inboard bolt torque: 100 ft·lbf (135 N·m) Outboard bolt torque: 85 ft·lbf (115 N·m)
	Drive wheel lubricant	Change
	Hydraulic Oil Filters	

MAINTENANCE AND SERVICING

End of Season Service

Perform the following at the end of each operating season:

CAUTION

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

1. Clean the machine thoroughly.
2. Store in a dry, protected place if possible. If stored outside, always cover with a waterproof canvas or other protective material.
3. Raise header, and engage safety props ([4.4.1 Header Safety Props, page 117](#)).
4. If possible, block up the header.
5. Repaint all worn or chipped painted surfaces to prevent rust.
6. Loosen drive belts.
7. Lubricate the header thoroughly, leaving excess grease on fittings to keep moisture out of bearings. Apply grease to exposed threads, cylinder rods, and sliding surfaces of components. Oil cutterbar components to prevent rust.
8. Check for worn components, and repair as necessary.
9. Check for broken components and order replacements from your MacDon Dealer. Attention to these items right away will save time and effort at beginning of next season.
10. Replace or tighten any missing or loose hardware.
11. Remove tall crop dividers (if equipped) to reduce space required for inside storage.

MAINTENANCE AND SERVICING

Maintenance Schedule/Record

WINDROWER SERIAL NUMBER: _____

Combine this record with the record in the header operator's manual. Copy this page to continue record.

Refer to [5 Maintenance and Servicing, page 185](#) for details on each maintenance procedure.

Maintenance Record	Action:	✓ - Check	⬇ - Lubricate	▲ - Change	✳ - Clean	+ - Add												
Hour meter reading																		
Date																		
Serviced by																		
FIRST USE, Refer to Break-In Inspections, page 313																		
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																		
ANNUALLY³⁸																		
✓ A/C Blower																		
✓ Antifreeze Concentration																		
✓ Battery Charge																		
✓ Battery Fluid Level																		
▲ Fuel Tank Vent Line Filter																		
✓ Steering Linkages																		
END OF SEASON SERVICE Refer to End of Season Service, page 314																		
50 HOURS																		
✳ Cab Fresh Air Intake Filter																		

36. Whichever occurs first.

37. A record of daily maintenance is not normally required but is at the Owner/Operator's 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													
⬇ Caster Pivots																			
⬇ Forked Caster Spindle Bearings																			
⬇ Top Lift Link Pivots																			
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																			
⬇ Formed Caster Wheel Hub Bearings																			
✓ Drive Wheel Lubricant																			
500 HOURS OR ONCE A YEAR^{36, 38}																			
▲ Engine Oil and Filter																			
▲ Hydraulic Oil Filters																			
▲ Fuel Filters																			
✓ Safety Systems																			
1000 HOURS																			
▲ Drive Wheel Lubricant																			
1500 HOURS OR EVERY TWO YEARS³⁶																			
▲ Hydraulic Oil																			
2000 HOURS OR EVERY TWO YEARS³⁶																			
▲ Engine Coolant																			
✓ General Inspection																			
5000 HOURS OR EVERY TWO YEARS³⁶																			
✓ 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 the Engine, page 88
		Move steering wheel to locked position.	
		Disengage header drive switch.	4.4.4 Header Drive, page 124
	NEUTRAL Interlock misadjusted	Contact Dealer.	Contact Dealer.
	No fuel to engine	Fill empty fuel tank. Replace clogged filter.	Filling Fuel Tank, page 92 and Maintaining Fuel Filters, page 238
	Old fuel in tank	Drain tank. Refill with fresh fuel.	Fuel System, page 237
	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 198
	Crankcase oil too heavy	Use recommended oil.	Lubricants, Fluids, and System Capacities, page 199
	Low battery output	Have battery tested. Check battery electrolyte level.	Batteries, page 259
	Poor battery connection	Clean and tighten loose connections.	
	Faulty starter	Contact Dealer.	Contact Dealer.
	Loose electrical connection at fuel pump	Ensure connector at pump is fully pushed in.	Contact Dealer.
	Wiring shorted, circuit breaker open	Check continuity of wiring and breaker (manual reset).	Checking and Replacing Fuses, page 283
	ECM fuse (1 of 2) blown	Replace.	
	ECM Ignition relay faulty		
	NEUTRAL Logic relay faulty		
Faulty injectors	Contact Dealer.	Contact Dealer.	

TROUBLESHOOTING

Symptom	Problem	Solution	Section
Engine knocks	Engine out of time	Contact Dealer.	Contact Dealer.
	Insufficient oil	Add oil.	Adding Engine Oil, page 229
	Low or high coolant temperature	Contact Dealer.	Contact Dealer.
	Improper fuel	Use proper fuel.	Fuel Specifications, page 198
Low oil pressure	Low oil level	Add oil.	Adding Engine Oil, page 229
	Improper type of oil	Drain and fill crankcase with proper oil.	Lubricants, Fluids, and System Capacities, page 199
	Worn components	Contact Dealer.	Contact Dealer.
Internal parts worn			
High oil consumption	Crankcase oil too light	Use recommended oil.	Lubricants, Fluids, and System Capacities, page 199
	Oil leaks	Check for leaks around gaskets, seals, and drain plugs.	Checking Engine Oil Level, page 227
	Unsteady fuel supply	Change filter on fuel tank vent line. Replace clogged fuel filter.	Removing and Installing Fuel Tank Vent Filter, page 237 and Fuel System, page 237
Engine runs irregularly or stalls frequently	Water or dirt in fuel system	Drain, flush, and fill fuel system.	Lubricants, Fluids, and System Capacities, page 199
	Low coolant temperature	Remove and check thermostat.	Contact Dealer.
	Air in fuel system	Contact Dealer.	
	Dirty or faulty injectors		

TROUBLESHOOTING

Symptom	Problem	Solution	Section
Lack of power	Incorrect timing	Contact Dealer.	Contact Dealer.
	Engine oil viscosity too high	Use recommended oil.	<i>Lubricants, Fluids, and System Capacities, page 199</i>
	Intake air restriction	Service air cleaner.	<i>Air Intake System, page 230</i>
	Clogged fuel filter	Replace primary fuel filter, and if necessary, replace secondary fuel filter.	<i>Maintaining Fuel Filters, page 238</i>
	High back pressure	Clean out or replace muffler.	<i>Exhaust System, page 255</i>
	Improper type of fuel	Use proper fuel.	<i>Fuel Specifications, page 198</i>
	High or low engine temperature	Remove and check thermostat.	Contact Dealer.
	Improper valve clearance	Contact Dealer.	
	Faulty injectors		
Engine temperature below normal	Defective thermostat	Remove and check thermostat.	
Warning alarm sounds	Engine overheated	Check coolant level.	<i>Checking Coolant Level, page 246</i>
		Check thermostat.	Contact Dealer.
	Low engine oil pressure	Check oil level.	<i>Checking Engine Oil Level, page 227</i>
	Low transmission oil pressure		<i>Checking and Filling Hydraulic Oil, page 288</i>

TROUBLESHOOTING

Symptom	Problem	Solution	Section
Engine overheats	Low coolant level	Fill reserve tank to proper level. Check system for leaks.	Engine Cooling System, page 245
	Water only for coolant	Replace with antifreeze.	
	Engine overloaded	Reduce ground speed.	4.3.6 Windrower Operation, page 94
	Defective radiator cap	Replace cap.	Inspecting Radiator Cap, page 245
	Defective fan belt	Replace belt.	Replacing Fan Belt, page 256
	Dirty radiator screen, rotors turning	Check for obstructions in ducting from screen to fan shroud.	Maintaining Engine Cooling Box, page 250
	Dirty radiator screen, rotors not turning	Check connections to rotor electric motor.	
	Dirty radiator core	Clean radiator.	Engine Cooling System, page 245
	Cooling system dirty	Flush cooling system.	
	Defective thermostat	Remove and check thermostat.	Contact Dealer.
	Defective temperature gauge or sender	Check coolant temperature with thermometer. Replace gauge if necessary.	
Defective water pump	Contact Dealer.		
High fuel consumption	Clogged or dirty air cleaner	Service air cleaner.	Air Intake System, page 230
	Engine overloaded	Reduce ground speed.	4.3.6 Windrower Operation, page 94
	Improper valve clearance	Contact Dealer.	Contact Dealer.
	Engine out of time		
	Dirty injector nozzles		
	Low engine temperature	Check thermostat.	
Improper type of fuel	Use proper fuel.	Fuel Specifications, page 198	

TROUBLESHOOTING

Symptom	Problem	Solution	Section
Engine emits black or grey exhaust	Improper type of fuel	Consult your fuel supplier, and use proper type fuel for conditions.	Fuel Specifications, page 198
	Engine overloaded	Reduce ground speed.	4.3.6 Windrower Operation, page 94
	Clogged or dirty air cleaner	Service air cleaner.	Air Intake System, page 230
	Defective muffler	Check muffler for possible damage that might create back pressure.	Exhaust System, page 255
	Dirty or faulty injectors	Contact Dealer.	Contact Dealer.
	Engine out of time		
	Air in fuel system		
Engine emits white exhaust	Engine out of time	Contact Dealer.	Contact Dealer.
	Improper type of fuel	Consult your fuel supplier, and use proper type fuel for conditions.	Fuel Specifications, page 198
	Cool engine	Warm engine up to normal operating temperature.	Engine Warm-Up, page 91
	Defective thermostat	Remove and check thermostat.	Contact Dealer.

TROUBLESHOOTING

Symptom	Problem	Solution	Section
Starter cranks slowly or will not operate	Low battery output	Check battery charge.	<i>Maintaining Batteries, page 260</i>
	Loose or corroded battery connections	Clean and tighten loose connections.	<i>Maintaining Batteries, page 260</i>
	Controls not in NEUTRAL	Move GSL to NEUTRAL.	<i>4.3.6 Windrower Operation, page 94</i>
		Move steering wheel to CENTER position.	<i>Driving in Reverse, page 98</i>
		Disengage header.	<i>Engaging and Disengaging the Header, page 124</i>
	Relay not functioning	Check relay and wire connections.	<i>5.7.8 Electrical System, page 259</i>
	Main fuse defective/blown	Replace main fuse.	
	Key power fuse blown	Replace.	
	Key switch worn or terminals loose	Contact Dealer.	Contact Dealer.
	Switch at Interlock not closed or defective	Adjust switch or replace. Contact your Dealer.	
Crankcase oil too high viscosity	Use recommended oil.	<i>Lubricants, Fluids, and System Capacities, page 199</i>	
Air filters require frequent cleaning	Aspirator plugged	Clean out aspirator.	<i>Air Intake System, page 230</i>

TROUBLESHOOTING

6.2 Electrical Troubleshooting

Symptom	Problem	Solution	Section
Low voltage and/or battery will not charge.	Defective battery	Have battery tested.	Batteries, page 259
	Loose or corroded connections	Clean and tighten battery connections.	Maintaining Batteries, page 260
	Defective alternator belt	Replace worn belt.	Replacing Fan Belt, page 256
	Alternator or voltage regulator not connected properly	Connect properly.	Batteries, page 259
	Dirty or defective alternator, defective voltage regulator, or high resistance in circuit	Contact Dealer.	Contact Dealer.
Lights dim.	Defective light switch		
	High resistance in circuit or poor ground on lights	Check the wiring circuit for a break in a wire or a poor ground.	—
Lights do not light.	Burned out or defective light bulb	Replace light bulb.	Replacing Field Light Bulb, page 270
			Replacing Bulb in Cab-Forward Flood Light, page 270
			Swath Lights, page 275
			Amber Lights, page 276
			Beacons (if installed), page 277
			Replacing HID Lamp (if Installed), page 273
	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.	Circuit Breakers and Fuses, page 282
	Defective relay	Replace relay.	Replacing Circuit Breakers and Relays, page 283
Defective light switch	Contact Dealer.	Contact Dealer.	

TROUBLESHOOTING

Symptom	Problem	Solution	Section
Turn signals or indicators showing wrong direction.	Reversed wires	Contact Dealer.	Contact Dealer.
No current to cab.	Broken or disconnected wire	Contact Dealer.	Contact Dealer.
	Circuit breaker tripped	Breaker automatically resets.	—
	Battery disconnect switch is OFF	Turn battery disconnect switch ON.	<i>Battery Main Disconnect Switch, page 261</i>

TROUBLESHOOTING

6.3 Hydraulics Troubleshooting

Symptom	Problem	Solution	Section
Header or reel not lifting	Appropriate solenoids not being energized by activating switch	Contact Dealer.	Contact Dealer.
	Contaminant in relief valve	Clean relief valve at cylinder control valve.	Contact Dealer.
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.	Contact Dealer.
Reel and/or conveyor not turning	HEADER DRIVE switch not engaged	Engage HEADER DRIVE switch.	Engaging and Disengaging the Header, page 124
	Flow controls adjusted too low	Toggle speed controls on CDM to increase flow.	D-Series: 4.6.7 Draper Speed, page 171 , and 4.6.6 Reel Speed, page 169 A-Series: 4.7.1 Auger Speed, page 179
	Appropriate solenoid on flow control block not being energized	Contact Dealer.	Contact Dealer.
Reel and/or conveyor turns but lacks power	Relief pressure too low	Check/adjust/clean relief valve.	Contact Dealer.
Hydraulic oil high-temperature alarm	Hydraulic oil cooling system not working properly	Check/clean cooling box.	Maintaining Engine Cooling Box, page 250
	Faulty bypass valve	Clean or replace.	Contact Dealer.
Hydraulic oil low-temperature alarm	Hydraulic oil too cold	Run engine until hydraulic oil warms up.	—
Header or reel lifts unevenly	Air in system	Fully raise header or reel and hold switch.	4.4.1 Header Safety Props, page 117

TROUBLESHOOTING

6.4 Header Drive Troubleshooting

Symptom	Problem	Solution	Section
Header drive not engaging	Header DRIVE switch in cab not engaged	Engage HEADER DRIVE switch.	<i>Engaging and Disengaging the Header, page 124</i>
	Operator Presence switch not closed or faulty	Occupy operator's seat or replace switch. Contact your Dealer.	Contact Dealer.
	Appropriate solenoid not being energized by activating switch	Contact Dealer.	
Header drive lacks power	Relief valve setting too low		<i>Driving Forward, page 97</i>
	Header drive overload	Reduce ground speed.	
Warning alarm sounds	Relief valve setting too low	Contact Dealer.	Contact Dealer.

TROUBLESHOOTING

6.5 Traction Drive Troubleshooting

Symptom	Problem	Solution	Section
Warning alarm sounds and trans oil pressure is displayed	Low hydraulic oil level	Stop engine, and add oil to hydraulic system.	Checking and Filling Hydraulic Oil, page 288
	Low hydraulic pressure	Contact Dealer.	Contact 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	Contact Dealer.	Contact Dealer.
	Insufficient torque at drive wheels	Move ground speed range control to field position (1), and reduce ground speed.	Driving Forward, page 97
	Loose or worn controls	Check controls.	5.7.3 Ground Speed Lever (GSL) Adjustments, page 212
	Air in system	Use proper oil.	Lubricants, Fluids, and System Capacities, page 199
		Check oil level and leaks.	Checking and Filling Hydraulic Oil, page 288
		Check hydraulic oil filters.	5.7.9 Hydraulic System, page 287
	Brakes binding or not releasing fully	Check pressure on brake release valve (min. 200 psi [1379 kPa]).	Contact Dealer.
	Relief valve in tandem pump dirty or damaged	Replace relief valve.	
With steering wheel centered, one wheel pulls more than the other	Leakage at pump or motor	Contact Dealer.	Contact Dealer.
	Wheels not in same speed range		
	Faulty relief valve	Repair or replace valve. Contact Dealer.	

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.	Contact Dealer.
	Brakes binding or not releasing fully	Check pressure on brake release valve (min. 200 psi [1379 kPa]).	
	Low oil level	Check oil reservoir level.	<i>Checking and Filling Hydraulic Oil, page 288</i>
	Final drives (power hubs) disengaged	Engage final drives.	<i>Final Drives, page 115</i>
	Damaged hydraulic lines preventing proper oil flow	Replace damaged lines.	Contact Dealer.
	Ground speed range control not working	Contact Dealer.	
	Steering controls worn or defective	Check GSL and steering for loose, worn or damaged ball joints and connecting rods.	<i>5.7.3 Ground Speed Lever (GSL) Adjustments, page 212 and 5.7.4 Steering Adjustments, page 214</i>
	Charge pressure relief valve misadjusted or damaged	Check the valve adjustment. Check valve parts and seat.	<i>Checking Charge Pump Pressure, page 297</i>
	Failed pump or motor	Contact Dealer.	Contact Dealer.

TROUBLESHOOTING

Symptom	Problem	Solution	Section
One wheel does not pull in forward or reverse	One final drive disengaged	Engage final drive.	Final Drives, page 115
	Steering controls worn or defective	Check GSL and steering for loose, worn or damaged ball joints and connecting rods.	5.7.3 Ground Speed Lever (GSL) Adjustments, page 212 and 5.7.4 Steering Adjustments, page 214
	High pressure relief valve stuck open, damaged seat	Check valve, and clean or replace.	Contact Dealer.
	Brakes binding or not releasing fully	Check pressure on brake release valve) (min. 200 psi [1379 kPa]).	
	Pump arm or shaft is broken	Contact Dealer.	
	Damaged hydraulic lines preventing proper oil flow		
	Ground speed range control not working		
Failed pump, motor or power hub			
Excessive noise from drive system	Mechanical interference in steering or ground speed linkage	Adjust, repair, replace.	5.7.3 Ground Speed Lever (GSL) Adjustments, page 212 and 5.7.4 Steering Adjustments, page 214
	Brakes binding or not releasing fully	Check pressure on brake release valve) (min. 200 psi [1379 kPa]).	Contact Dealer.
	Faulty pump or motor	Contact 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.	
	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.	5.7.4 Steering Adjustments, page 214
Machine moves on flat ground with controls in NEUTRAL	Neutral interlock misadjusted.	Contact Dealer.	Contact Dealer.
	Parking brake not functioning.		
	GSL cable misadjusted.		
Steering wheel will not lock with GSL in N-DETENT	Transmission interlock misadjusted.	Contact Dealer.	Contact Dealer.
Steering wheel will not unlock	Transmission interlock cylinder not working.		
Insufficient road speed	Ground speed range control in Mode 1 - Field: (0–11mph [17.7 km/h]).	Move ground speed range control to Mode 2 - Road (0–16 mph) (25.7 km/h).	Driving on the Road, page 101

TROUBLESHOOTING

6.7 Cab Air Troubleshooting

Symptom	Problem	Solution	Section
Blower fan will not run.	Burned out motor.	Contact Dealer.	Contact 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 Engine Air Filter Primary Element, page 235
	Dirty recirculating air filter.	Clean recirculating filter.	Cleaning Return Air Cleaner, page 220
	Evaporator clogged.	Clean evaporator.	Cleaning Air Conditioning Evaporator Core, page 223
	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 47
	Defective thermostat in engine water outlet manifold.	Replace thermostat.	Contact Dealer.
	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 Engine Air Filter Primary Element, page 235 and Cleaning Return Air Cleaner, page 220

TROUBLESHOOTING

Symptom	Problem	Solution	Section
Air conditioning not cooling.	Low refrigerant level.	Add refrigerant. Contact Dealer.	Contact Dealer.
	Compressor clutch coil burned out or disconnected.	Contact Dealer.	
	Blower motor disconnected or burned out.		
	Switch contacts in thermostat burned excessively, or sensing element defective.	Replace thermostat.	
	Compressor partially or completely seized.	Remove compressor for service or replacement.	
	Condenser fins plugged.	Clean condenser.	<i>Air Conditioning Condenser, page 221</i>
	Loose or broken compressor drive belt.	Replace drive belt and/ or tighten to specifications.	<i>Tensioning Air Conditioner (A/C) Compressor Belt, page 257 and Replacing Air Conditioner A/C Compressor Belt, page 257</i>
	Dirty filters. Plugged filters.	Clean fresh air and recirculation filters.	<i>Cleaning Engine Air Filter Primary Element, page 235 and Cleaning Return Air Cleaner, page 220</i>
	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 Dealer.	Contact 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.	Contact Dealer.
	Thermostat defective or improperly adjusted.	Replace thermostat.	
	Clogged air filters.	Remove air filters, and clean or replace as necessary.	Cleaning Engine Air Filter Primary Element, page 235 and Cleaning Return Air Cleaner, page 220
	Heater circuit is open.	Close temperature control in cab, and valve on engine).	3.10.3 Controls, page 48 and 3.10.1 Heater Shut-Off, page 47
	Insufficient air circulation over condenser coil; fins clogged with dirt or insects.	Clean condenser.	Air Conditioning Condenser, page 221
	Evaporator fins clogged.	Clean evaporator fins (under cab floor).	Air Conditioning Evaporator, page 222
	Refrigerant low.	Contact Dealer.	Contact Dealer.
	Clogged expansion valve.		
	Clogged receiver-drier.		
	Excessive moisture in system.		
	Air in system.		
Blower motor sluggish in operation.			
Windows fog up.	High humidity.	Run A/C to dehumidify air and heater to control temperature.	3.10.3 Controls, page 48
Air conditioning cools intermittently.	Unit icing up due to thermostat adjusted too low.	Adjust thermostat.	Contact Dealer.
	Unit icing up due to excessive moisture in system.	Contact Dealer.	Contact Dealer.
	Unit icing up due to incorrect super-heat adjustment in the expansion valve.		
	Thermostat defective.		
	Defective blower switch or blower motor.		
	Partially open, improper ground or loose connection in compressor clutch coil.		
	Compressor clutch slipping.		

TROUBLESHOOTING

Air conditioning system too noisy	Defective winding or improper connection in compressor clutch coil or relay.	Contact Dealer.	Contact Dealer.
	Excessive charge in system.		
	Low charge in system.		
	Excessive moisture in system.		
	Loose or excessively worn drive belt.	Tighten or replace as required.	<i>Tensioning Air Conditioner (A/C) Compressor Belt, page 257 or Replacing Air Conditioner A/C Compressor Belt, page 257</i>
	Noisy clutch.	Remove clutch for service or replacement as required.	Contact Dealer.
	Noisy compressor.	Check mountings and repair. Remove compressor for service or replacement.	
	Compressor oil level low.	Add SP-15 PAG refrigerant oil.	
	Blower fan noisy due to excessive wear.	Remove blower motor for service or replacement as necessary.	

6.8 Operator's Station Troubleshooting

Symptom	Problem	Solution	Section
Rough ride	Seat suspension not adjusted for operator's weight	Adjust seat suspension.	<i>3.3 Operator's Seat Adjustments, page 37</i>
	High air pressure in tires	Deflate to proper pressure.	<i>Inflating Drive Wheel Tire, page 298 and Inflating Caster Tire, page 305</i>

7 Options and Attachments

7.1 Available Options and Attachments

The following options and attachments are available through your MacDon Dealer. The Dealer will require the part number (MD #) to determine pricing and availability.

7.1.1 AM/FM Radio

The cab is pre-wired for easy installation of a DIN “E”-style audio component available from your MacDon Dealer. Speakers are factory-installed.

For installation details, refer to the unloading and assembly instructions supplied with your windrower.

7.1.2 Anti-Shimmy Shocks for Casters

Prevents caster wheel shimmy when travelling at road speed.

MD #B5346

Also includes instruction MD #169661

7.1.3 Automated Steering Systems

A MacDon-approved automated steering system is available from MacDon Dealers that provide installation and support services.

MacDon windrowers are prewired for either the Trimble® AutoPilot™ hydraulically integrated steering system or the Trimble EZ-Pilot™ wheel/column based assisted steering system. The windrower’s ground speed lever (GSL) has an automated steering (autosteer) engage switch and the Trimble® display mounting kit MD #183348 is supplied in the cab.

The Trimble® AutoPilot™ system requires the MacDon automated steering hydraulic interface kit MD #B5589. Installation instruction MD #169539 is included with the kit.

Other GPS providers may supply parts in their vehicle specific installation packages or make installation kits available through MacDon Dealers.

7.1.4 Booster Spring Kit (External)

Available for headers over 6000 lb (2724 kg) to increase the float capacity.

MD #B4659 – Booster Spring Kit (external) includes two springs (one for each side) and mounting bracket.

Instruction MD #169032 is included with the bundle.

7.1.5 Booster Spring Kit (Internal)

An additional spring that is installed inside the header lift spring for increased float capacity.

MD #B5303 - includes one spring and castings for one side of the windrower.

Instruction MD #169316 is included with the bundle.

OPTIONS AND ATTACHMENTS

7.1.6 Draper Header Case Drain Kit

The Draper Header Case Drain kit must be installed when attaching a MacDon D50, D60, or D65 draper header with an upper cross auger (UCA) but without double draper drive. Case Drain Kit (MD #B5842) is **NOT** required for double draper drive headers equipped with kits (MD #B5606) and (MD #B5653).

MD #B5842

7.1.7 Draper Header Reel Drive and Lift Plumbing

Base kit required to run draper header. Includes draper header reel drive and lift plumbing (less valve) and reel fore-aft hydraulics.

NOTE:

If the last digit of windrower code is B, this bundle is already installed.

MD #B5577

Includes Instruction MD #169537.

7.1.8 Engine Block Heater

Contact your nearest Cummins Engine Distributor, and provide your engine model and serial numbers to ensure the proper heater is supplied.

7.1.9 Engine Fan Air Baffle

Prevents the windrow from being disturbed by engine cooling fan air blast.

MD #B5440

Instruction MD #169443 is included with the bundle

7.1.10 Expansion Module

Allows electronic monitoring of header knife speed, reel speed, and header angle. Also required for indexing reel speed to ground speed. The windrower must be equipped with a hydraulic center-link (MD #B4650 and #B5269) for header angle sensing: the header must be equipped with knife speed and reel speed sensors.

MD #B4666

Instruction MD #169392 is included with the bundle

7.1.11 HID Auxiliary Lighting

Provides additional field lighting. The kit includes two cab-mounted high intensity discharge (HID) lamps and installation instructions.

MD #B5596

Instruction MD #169621 is included with the bundle

7.1.12 Hydraulic Center-Link

Allows remote adjustment of the header angle using a hydraulic cylinder between the header and the windrower.

NOTE:

The optional expansion module (MD #B4666) is required for the center-link position to be displayed on the cab display module.

MD #B4650 (hydraulic center-link)

Instruction MD #169236 is included with the bundle.

and

MD #B5269 (auxiliary valve)

Instruction MD #169271 is included with the bundle.

7.1.13 Light Header Flotation

Available for headers that do not require as much spring tension for header float.

MD #B4664

Instruction MD #169033 is included with the bundle.

7.1.14 Mechanical Center-Link

The mechanical center-link provides a manually adjustable connection between the windrower and the header/mower conditioner.

MD #B4665

7.1.15 Swath Roller

An 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 your MacDon Dealer for information.

7.1.16 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.

MD #B5280 – Weight box harness only. Includes hitch pin and wiring for use with slow speed header transport option.

Instruction MD #169278 is included with the bundle.

7.1.17 Training Seat

A fold-down seat complete with a seat-belt can be mounted in the cab beside the operator's seat for Operator training purposes.

MD #B4667

OPTIONS AND ATTACHMENTS

7.1.18 Transport Drawbar

The transport drawbar mounts to the walking beam and allows the M105 to tow MacDon headers equipped with a slow-speed transport system. This drawbar is to be used for hitching tow-behind swath rollers only. Requires a weight box.

MD #B5411³⁹

Instruction MD #169420 is included with the bundle

7.1.19 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 are optional for North America. Fits 2009 and newer machines.

MD #B5582

Instruction MD #169538 is included with the bundle.

7.1.20 Weight Box

To move the windrower without an attached header, attach the weight box to the header lift system. The weight box allows transporting a header behind the windrower by providing additional weight on the drive wheels.

MD #B5238 – Weight box without harness⁴⁰

MD #B5240 – Weight box without harness and concrete.⁴⁰

Instruction MD #169280 is included with the bundle.

MD #B5280 – Wiring harness for weight box. Includes hitch pin and wiring for use with slow speed transport. Use with MD #B5238 and MD #B5240. Required when towing header with SP windrower.

Instruction MD #169278 is included with the bundle.

7.1.21 Windshield Shades

Retractable sun shades for front and rear windows. Attachment hardware is included.

MD #B4866

Instruction MD #169218 is included with the bundle.

39. Weight box is required, refer to [7.1.20 Weight Box, page 340](#)

40. Wiring harness MD #B5280 is also required to tow a header. Refer to [7.1.16 Towing Harness, page 339](#)

8 Engine Error Codes

Example: cab display module (CDM) displays the Error Code 110S 16F 28C

1. 110S - S represents the SPN column. Locate code 110 in that column.
2. 16F - F represents the FMI column. 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		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	
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
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	

ENGINE ERROR CODES

J1939 SPN	J1939 FMI	Lamp Color	Cummins Code	J1939 SPN	Cummins Description	Category	CDM Error Message	
109	3	Amber	231		Coolant Pressure	Coolant Pressure	Coolant Pressure	
	4	Amber	232					Coolant pressure sensor circuit - Voltage above normal, or shorted to high source
	18	Amber	233					Coolant pressure sensor circuit - Voltage below normal, or shorted to low source
110	0	Red	151	168	Engine Coolant Temperature	Engine Coolant Temperature	Engine Coolant Temperature	
	2	Amber	334					Coolant pressure - Data valid but below normal operational range - Moderately severe level
	3	Amber	144	168				Coolant temperature low - Data valid but above normal operational range - Most severe level
	4	Amber	145	168				Coolant temperature sensor circuit - Data erratic, intermittent, or incorrect
	15	None	2963	168				Coolant temperature sensor circuit - Voltage above normal, or shorted to high source
	16	Amber	146	168				Coolant temperature sensor circuit - Voltage below normal, or shorted to low source
					Engine coolant temperature high - Data valid but above normal operational range - Least severe level			
					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	Accelerator Pedal Low Idle Switch
	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
627	2	Amber	434		Power Supply	Power lost without ignition off - Data erratic, intermittent, or incorrect	Power Supply

ENGINE ERROR CODES

J1939 SPN	J1939 FMI	Lamp Color	Cummins Code	J1939 SPN	Cummins Description	Category	CDM Error Message
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	
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	

ENGINE ERROR CODES

J1939 SPN	J1939 FMI	Lamp Color	Cummins Code	J1939 SPN	Cummins Description	Category	CDM Error Message
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	
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	

ENGINE ERROR CODES

J1939 SPN	J1939 FMI	Lamp Color	Cummins Code	J1939 SPN	Cummins Description	Category	CDM Error Message
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	
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	

ENGINE ERROR CODES

J1939 SPN	J1939 FMI	Lamp Color	Cummins Code	J1939 SPN	Cummins Description	Category	CDM Error Message	
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		
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		

ENGINE ERROR CODES

J1939 SPN	J1939 FMI	Lamp Color	Cummins Code	J1939 SPN	Cummins Description	Category	CDM Error Message
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
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	

ENGINE ERROR CODES

J1939 SPN	J1939 FMI	Lamp Color	Cummins Code	J1939 SPN	Cummins Description	Category	CDM Error Message
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	

9 Cab Display Module (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			
E4			
E5			
E6		TEMP GAUGE SHORT	Wiring / connection problem.
E7		SPEED STICK SHORT	Wiring / connection problem.
E8		HEADER ENABLE SHORT	Wiring / connection problem.
E9			
E10		CDM INTERNAL ERROR	Internal hardware or software problem.
E11		CDM POWER UP	CDM Module did not power up correctly.
E12			
E13		FUEL SOLENOID	WCM Fuel solenoid output fault detected.
Error Codes E14 to E23 not allocated			
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			
E27			
E28	E128	TILT P2A	Header Tilt solenoid P2A (V2A) fault detected
E29	E129	TILT P4C	Header Tilt solenoid P4C (V4C) fault detected
E30	E130	4 WAY VALVE P5A	4 Way valve solenoid P5A (V5A) fault detected
E31	E131	BYPASS VALVE P1	Bypass valve solenoid P1 (V1) fault detected
E32	E132	HEADER UP/DOWN P4A	Header up / down solenoid P4A (V4A) 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			
E39			
E40	E140	HIGH RANGE P5B	High range solenoid P60 fault detected

CAB DISPLAY MODULE (CDM) ERROR CODES

Codes		CDM Display	Description
E41			
E42	E142	REEL P4D	Reel fore / aft solenoid P4D (V4D) fault detected
E43	E143	REEL UP/DOWN P4B	Reel up / down solenoid P4B (V4B) fault detected
E44			
E45			
E46		SENSOR VOLTS HIGH	WCM's 9V Sensor voltage output high. (wire 5019)
E47		SENSOR VOLTS LOW	WCM's 9V Sensor voltage output low. (wire 5019)
E48			
E49			
E50		BATT+ OUT OF RANGE	System voltage above 15.5 VDC.
Error codes E52 to E64 not allocated			
E65		KNIFE OVERLOAD	Low knife speed detected (less than programmed overload speed in CDM)
E66		##.# LOW VOLTS	Low system voltage <11.5 VDC
E67		TRANS OIL PRESSURE	Supercharge pressure low (switch 208 on hydraulic schematic)
E68		TRANS Temp	Oil Tank temp >221°F. / 105°C.
E69			
E70			
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.

Index

A

A-Series header	
A30-D	
auger speed	179
reel speed	181
A40-D	
auger speed	180
reel speed	181
attaching.....	148
auger speed.....	179
hydraulic center-link	
attaching to M105	149
knife speed	182
setting with expansion module	182
setting without expansion module.....	184
mechanical center-link	
attaching to M105	154
air conditioning, <i>See</i> HVAC system	
antenna mounting.....	51
API	
definition.....	27
assembly	
attaching A-Series header to M105	
hydraulic center-link	149
mechanical center-link.....	154
attaching D-Series header to M105	131
hydraulic center-link	131
mechanical center-link.....	136
connecting batteries	268
installing drive wheels.....	304
ASTM	
definition.....	27
auger speed	179
A30-D header	179
A40-D header	180
automated steering.....	337

B

battery	
adding electrolyte	265
boosting.....	264
charging	262
connecting.....	268
installing	267
main disconnect switch.....	261
maintaining	260
removing	266
safety	8
belt	
A/C compressor belt	

replacing	257
tensioning.....	257
alternator/fan belt	
replacing	256
tensioning.....	256
break-in inspection.....	313

C

cab display module (CDM)	
CDM/WCM fault codes	79
engine and windrower functions	60
engine error codes	79, 341
engine warning lights.....	67
header functions.....	61
operating screens.....	62
programming.....	70
warning/alarms.....	67
cab temperature, <i>See</i> HVAC system	
California proposition 65.....	2
CanWin	
cab display module (CDM)	
error codes	359
operating information screens	78
programming	72
caster wheel, <i>See</i> wheel and tire	
center-link	27
<i>See also</i> hydraulic link	
<i>See also</i> mechanical link	
definition.....	27
self-locking center-link hook mechanism	126
circuit breaker	
accessing	282
replacing.....	283
climate control system, <i>See</i> HVAC system	
component location.....	34
console	35
controls.....	48
conversion chart	201
cutting height.....	127

D

D-Series header	
attaching.....	131
header boots	168
attaching to M105.....	131
deck shift	178
draper index	
setting draper index.....	173
draper speed.....	171

INDEX

- setting draper speed 171
- setting independent of ground speed 174
- setting minimum draper speed 172
- header position 168–169
- hydraulic center-link
 - attaching to M105 131
- hydraulics configuration - D-Series
 - header 167
- knife speed 175
 - setting with expansion module 175
 - setting without expansion module 177
- mechanical center-link
 - attaching to M105 136
- reel fore-aft position 169
- reel height 169
- reel speed 169
 - reel index 169
 - reel minimum speed 169
 - reel to ground speed 169
- setting draper to ground speed 171
- decal
 - fuse box decal 285
 - GSL header switch functions 57
- deck shift - D-Series header 178
- declaration of conformity i
- definition of terms 27
- draper index
 - setting for D-Series header 173
- draper speed
 - setting for D-Series header 171
 - setting independent of ground speed 174
 - setting minimum draper speed 172
- drive wheel
 - installing 304
- driving the windrower 94
 - driving in reverse 98
 - driving on road 101
 - ingress/egress 96
 - operation 97
 - spin turn 98
 - stopping 99
- E**
- electrical system 93, 259
 - accessing circuit breakers and fuses 282
 - battery 259
 - adding electrolyte 265
 - battery main disconnect switch 261
 - boosting the battery 264
 - charging the battery 262
 - maintaining the battery 260
 - checking and replacing fuses 283
 - fuse box decal 285
 - inspecting 125A main fuse 286
 - preventing damage to electrical system 260
 - replacing 125A main fuse 286
 - replacing circuit breaker/relay 283
- end of season service 314
- engine 225
 - air intake system 230
 - belt 256
 - cleaning filter element 235
 - engine compartment hood 202
 - engine controls and gauges 54
 - engine cooling system 245
 - engine error codes on CDM display 79
 - engine oil - check, change, drain, replace 227
 - general engine inspection 225
 - inspecting exhaust system 255
 - manually turning the engine 226
 - manuals 225
 - oil - check, change, drain, replace 227
 - warning lights 94
- engine compartment hood
 - closing (highest position) 204
 - closing (lower position) 203
 - opening (highest position) 203
 - opening (lower position) 202
- engine cooling system 245
 - cooler box 250
 - cleaning screens and coolers 251
 - closing screen 255
 - maintaining 252
 - opening screen 250
 - screen cleaner duct to screen clearance 254
- engine coolant
 - adding coolant 249
 - changing coolant 247
 - checking coolant level 246
 - checking coolant strength 245
 - draining coolant 247
- radiator cap
 - inspecting radiator cap 245
- engine operation
 - adjusting the throttle 258
 - engine speed 258
 - engine temperature 93
 - fuelling 92
 - intermediate speed control (ISC) 91
 - oil pressure 93
 - shutting down the engine 91
 - starting the engine 88
 - cold start 90
 - engine warm-up 91
 - normal start 89
- engine warning lights 67

INDEX

error codes
engine error codes 341

F

filters
air filter
installing primary air filter 233
removing primary air filter 231
removing/installing secondary air filter 236
servicing air filter restriction indicator 231
charge filter 291
installing charge filter 291
removing charge filter 291
engine filter
cleaning filter element 235
fuel filter 238
installing primary fuel filter 239
installing secondary fuel filter 240
removing primary fuel filter 238
removing secondary fuel filter 240
HVAC filter
cleaning return air cleaner/filter 220
removing/installing return air
filter/cleaner 219
servicing fresh air filter 218
hydraulic oil filters 290
return filter 292
installing return filter 293
removing return filter 292
final drive 115
float, *See* header float
fuel system 237
fuel filter 238
installing primary fuel filter 239
installing secondary fuel filter 240
removing primary fuel filter 238
removing secondary fuel filter 240
fuel specifications 198
fuel tank
draining the fuel tank 241
fuel/water separator 243
removing water-in-fuel system 243
removing/installing fuel tank vent filter 237
fuel, fluids, and lubricants 198
priming 244
fuse
accessing 282
checking and replacing 283
inspecting and replacing 125A 286
fuse box decal 285

G

glossary 27
gps automated steering systems 337
GSL, *See* header controls

H

header
definition 27
header angle 124
header controls 56
console header switches
deck shift switch 56
display selector switch 58
ground speed lever (GSL) header switches 57
header drive switch 56
header position switches 59
reel position switches 58
reel speed switches 59
header drive 124
header float 119
adjusting float using drawbolts 121
checking float 120
float operating guidelines 119
header levelling 121
header operation 117
drop rate 295
engaging the header 124
header and reel hydraulics 294
header angle 124
header drive 124
header float 119
header safety prop 117
levelling the header 121
operating with a header
A-Series header 179
D-Series header 167
headers
A-Series headers
attaching
hydraulic center-link 149
mechanical center-link 154
detaching
hydraulic center-link 160
mechanical center-link 163
D-Series headers
attaching
hydraulic center-link 131
mechanical center-link 136
detaching
hydraulic center-link 142
mechanical center-link 145
heater shut-off valve 47
heating, *See* HVAC system

INDEX

- hood
 - closing from highest position 204
 - closing from lower position 203
 - opening to highest position 203
 - opening to lowest position 202
- horn 53
- HVAC system
 - A/C compressor 224
 - compressor protection 48
 - coolant cycling 87
 - servicing the compressor 225
 - A/C condenser 221
 - A/C cover
 - installing cover 223
 - removing cover 222
 - A/C evaporator 222
 - cleaning evaporator core 223
 - air distribution 47
 - controls 48
 - fresh air intake filter 218
 - servicing 218
 - heater shut-off valve 47
 - return air cleaner/filter 219
 - cleaning 220
 - removing/installing 219
- hydraulic fitting
 - flare-type 191
 - O-ring boss (ORB) adjustable 193
 - O-ring boss (ORB) non-adjustable 195
 - O-ring face seal (ORFS) 196
- hydraulic system
 - changing hydraulic oil filters 290
 - charge filter 291
 - installing charge filter 291
 - removing charge filter 291
 - checking/filling hydraulic oil 288
 - D-Series header hydraulics 167
 - draining hydraulic oil 290
 - header and reel hydraulics 294
 - flow control blocks 294
 - header drop rate 295
 - knife drive valve block 294
 - hydraulic hoses and lines 298
 - hydraulic oil cooler 289
 - reel drop rate
 - adjusting 295
 - return filter 292
 - installing return filter 293
 - removing return filter 292
 - traction drive hydraulics 296
 - charge pump pressure 297
 - transmission oil pressure 296
 - warnings 287
- hydraulics
 - safety 6
 - traction drive hydraulics 296
- K**
- knife speed
 - A-Series header 182
 - setting with expansion module 182
 - setting without expansion module 184
 - D-Series header 175
 - setting with expansion module 175
 - setting without expansion module 177
- L**
- lighting 41
 - amber lights
 - replacing bulb 276
 - beacons 43
 - replacing bulb 277
 - field lights 41
 - adjusting field lights 269
 - replacing bulb 270
 - flood lights 41
 - adjusting cab-forward flood lights 270
 - replacing bulb in cab-forward flood light 270
 - HID auxiliary lighting 44, 272, 338
 - adjusting HID light 272
 - replacing HID lamp 273
 - interior lights
 - ambient light 282
 - dome light 281
 - red tail lights
 - replacing bulb 277
 - road lighting 42
 - swath lights 41
 - replacing bulbs 275
 - turn signal indicators 282
- lubricating the windrower 209
 - lubricants/fluids/system capacities 199
 - lubricating wheel drive 300
 - adding lubricant 300
 - changing wheel drive lubricant 302
 - checking lubricant level 300
 - lubrication points 210
 - lubrication procedure 209
 - recommended fuel, fluids, and lubricants 198
 - storing lubricants and fluids 198
- M**
- maintenance 185
 - A/C compressor belt

INDEX

<ul style="list-style-type: none"> replacing 257 tensioning 257 battery 259 <ul style="list-style-type: none"> installing 267 removing 266 break-in inspection 313 conversion chart 201 electrical system 259 end of season service 314 engine 225 <ul style="list-style-type: none"> air intake system 230 engine oil <ul style="list-style-type: none"> check, change, drain, replace 227 general engine inspection 225 manually turning the engine 226 engine belt 256 engine compartment <ul style="list-style-type: none"> opening and closing hood 202 opening and closing platforms 205 engine cooling system 245 engine exhaust system 255 engine oil 227 filter part numbers 200 fuel system 237 <ul style="list-style-type: none"> priming the fuel system 244 fuel, fluids, and lubricants 198 HVAC system 218 lubricating the windrower 209 maintenance record 315 maintenance schedule 313 operator presence system 211 operator's station 211 <ul style="list-style-type: none"> engine interlock 212 preparing for servicing 185 safety systems 211 specifications 198 system priming 244 wheel and tire 298 maintenance and servicing <ul style="list-style-type: none"> maintenance safety 5 maintenance platform 205 maintenance schedule 313 metric bolt <ul style="list-style-type: none"> torque 188 torque when bolting onto cast aluminum 191 minimum reel speed 169 	<ul style="list-style-type: none"> replacing engine oil filter 229 oil change, <i>See</i> oil (engine) operation 85 <ul style="list-style-type: none"> <i>See also</i> engine operation <i>See also</i> header operation break-in period 86 daily check 87 driving the windrower 94 operating with a header 117 <ul style="list-style-type: none"> A-Series header 179 D-Series header 167 preseason checks/annual service 86 <ul style="list-style-type: none"> distributing A/C compressor coolant 87 return to cut feature <ul style="list-style-type: none"> programming return to cut feature 128 using return to cut feature 129 operator presence system 36 <ul style="list-style-type: none"> engine and transmission 36 header drive 36 operator's seat <ul style="list-style-type: none"> seat adjustments <ul style="list-style-type: none"> armrest angle 37 armrest up or down 37 seat back angle 37 seat back stiffness (lumbar support) 37 seat fore-aft position 37 operator's station 35, 211 <ul style="list-style-type: none"> AM/FM radio 51 beacon lighting 43 climate controls 48 engine controls and gauges 54 engine interlock 212 GSL adjustments 212 <ul style="list-style-type: none"> adjusting GSL fore-aft movement 213 adjusting GSL lateral movement 212 adjusting GSL position 213 header controls 56 HID lighting (optional) 44 horn 53 lighting 41 <ul style="list-style-type: none"> field mode 41 road mode 42 operator amenities 50 operator console 35 operator presence system 36, 211 <ul style="list-style-type: none"> engine and transmission 36 header drive 36 rear view mirror 46 safety systems 211 seat belts 39, 211 steering 214 steering column 40 training seat 38 windrower controls 55
---	--

O

<ul style="list-style-type: none"> oil (engine) 227 <ul style="list-style-type: none"> adding engine oil 229 changing engine oil 228 checking level 227 draining 228 	
--	--

INDEX

windshield wiper.....	45
options and attachments	337
AM/FM radio	337
anti-shimmy shock kit for casters.....	311
anti-shimmy shocks for casters	337
automated steering.....	337
booster spring kit - external.....	337
booster spring kit - internal.....	337
case drain kit.....	338
center-link	
hydraulic	339
mechanical.....	339
engine block heater	338
expansion module	338
fan air baffle.....	338
HID auxiliary lighting.....	338
light header flotation	339
swath roller	130, 339
towing harness.....	339
transport drawbar	340
warning beacons	340
weight box	340
windshield shades.....	340
owner/operator responsibilities	81

P

platform	205
closing platform (major service).....	208
closing platforms (standard position).....	206
opening platform (major service)	207
opening platform (standard position).....	205
pressurized coolant tank	
inspecting pressurized coolant tank cap.....	245
programming	
cab display module (CDM).....	70
CDM operating information screens.....	78
CDM programming instructions	72
return to cut-feature.....	128

R

radiator	
inspecting radiator cap.....	245
radio	51
rear view mirror	46
reel height	
D-Series header.....	169
reel index	169
reel minimum speed	169
reel speed	
A30-D header	181
A40-D header	181
D-Series header.....	169

reel-to-ground speed.....	169
relay	
replacing.....	283
return to cut feature	127
programming return to cut.....	128
using return to cut	129
rpm	
definition.....	27

S

SAE	
bolt torque	186
definition.....	27
safety	
alert symbols.....	1
battery safety	8
engine safety	10
engine electronics.....	11
high pressure rails.....	10
general safety	3
hydraulic safety.....	6
maintenance and servicing.....	5
operational safety.....	85
safety sign	
locations.....	13
safety sign decals.....	12
installing.....	12
interpreting	17
signal words.....	2
tire safety.....	7
seat belts	39
maintaining seat belts.....	211
serial number	
location.....	v
shutting down the engine	91
specification	
filter part numbers	200
fuel.....	198
lubricants/fluids/system capacities.....	199
maintenance specifications	198
torque specifications.....	186
windrower dimensions	32
windrower specifications	29
spm	
definition.....	27
starting the engine	88
cold start.....	90
engine warm-up	91
normal start.....	89
steering.....	214
adjusting steering column	40
checking steering link pivots.....	214
storing the windrower	115

INDEX

swath roller	130
symbol	
definition	82
engine function	82
header function	84
windrower operating	83

T

temperature	
cab	47
engine	93
torque specification	186
flare-type hydraulic fittings	191
metric bolt	188
metric bolt bolting into cast aluminum	191
O-ring boss (ORB) hydraulic fitting	
adjustable	193
non-adjustable	195
O-ring face seal (ORFS) hydraulic fitting	196
SAE bolt	186
towing	
towing header with windrower	104
towing the windrower (emergency)	114
tractor	
definition	27
training seat	38
transporting	
converting from field to transport mode	105
converting from transport to field mode	111
troubleshooting	
cab air	331
electrical	323
engine	317
header drive	326
hydraulics	325
operator's station	335
steering and ground speed control	330
traction drive	327

truck	
definition	27

V

ventilating, See HVAC system

W

wheel and tire	298
See also drive wheel installing	
adjusting caster tread width	100
caster wheel	100, 305
anti-shimmy dampener	311
ballast requirement	312
caster wheel nut torque	306
inflating caster tire	305
installing forked caster wheel	310
installing formed caster wheel	311
lowering formed/forked caster wheel	309
raising forked/formed caster wheel	308
removing forked caster wheel	309
removing formed caster wheel	310
servicing caster wheels	307
drive wheel	298
drive wheel nut torque procedure	299
inflating drive tire	298
lowering	305
raising	303
removing	304
servicing	303
safety	7
wheel drive	
adding lubricant	300
changing lubricant	302
checking lubricant level	300
lubricating wheel drive	300
windshield wiper	45

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