



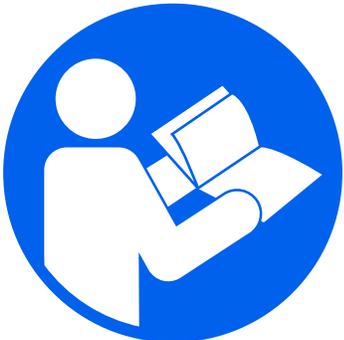
# Operator's Manual

(SN22001-22999)

Model Year 2022

## Model SC1500 Specialty Crop Header

D-220415CMA01

	<p><b>! WARNING</b></p> <p>Read and understand operator's manual prior to operating this equipment.</p> <p>Failure to follow operation instructions could result in personal injury or damage to the equipment.</p>
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# **Statement of Limited Warranty**

## **Class I Warranty**

**Attached / Integrated Equipment, Parts, & Labor**

Hillco warrants its Class I products to be free from defects in material and workmanship for a period of twelve (12) consecutive months following the warranty start date.

The warranty start date for Hillco Class I products is the date of the invoice, or the first date of use, whichever is earliest. Once the warranty period has begun, it cannot be stopped.

Hillco warrants genuine Hillco replacement parts and components to be free from defects in material and workmanship for a period of ninety (90) consecutive days following the Hillco invoice date, or the remainder of the original equipment warranty period, whichever is longer.

Hillco's obligation under this product and parts warranty shall be limited to repairing or replacing, free of charge to the original purchaser, any part(s) that, in Hillco's judgment, shows evidence of such defect. Hillco additionally agrees to repair any physical damage to the product to which the Hillco product is directly attached provided that the damage is directly attributable to a defect in the design or manufacture of the Hillco product, as determined by Hillco, and that the damage occurs during the effective warranty period of the Hillco product.

### **Limitations to Warranty**

This warranty does not cover:

- 1) Any product damaged by accident, abuse, misuse, negligence, or improper maintenance.
- 2) Any unauthorized product alteration or modification.
- 3) Any unauthorized repairs made with parts other than genuine Hillco parts unless specifically authorized by Hillco.
- 4) Any repairs performed by anyone other than Hillco or an authorized Hillco dealer unless specifically authorized by Hillco.
- 5) Any claims directly resulting from improper installation, except those installations performed by Hillco.

### **Warranty Procedure**

No warranty claims will be accepted without a completed Dealer PDI on file at Hillco.

For warranty submission instructions please email [warranty@hillcotechnologies.com](mailto:warranty@hillcotechnologies.com) and request a Warranty Claim Form. Complete the Warranty claim form and submit the claim, via email to [warranty@hillcotechnologies.com](mailto:warranty@hillcotechnologies.com) within thirty (30) days of the occurrence of the failure and within the warranty period.

All warranty work must be performed, and claims submitted, within thirty (30) days of the occurrence of the claim and within the warranty period.

All parts removed during warranty repair should be held for a period of sixty (60) days after the warranty claim has been submitted to Hillco.

Hillco reserves the right to either inspect the product at the original retail purchaser's location, or the authorized Hillco's dealer's location; or require it to be returned to Hillco, transportation charges prepaid, for inspection.

For additional details on Hillco's Warranty Program refer to Hillco's current "Warranty Policy Guide".

### **Limitation of Liability**

Hillco makes no express warranties other than those, which are specifically described herein. Any description of the goods sold hereunder, including any reference to buyer's specifications and any descriptions in circulars and other media published by Hillco is for the sole purpose of identifying such goods and shall not create an express warranty that the goods shall conform to such description.

**THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED. There are no implied warranties of merchantability or fitness for a particular purpose. This warranty states Hillco's entire and exclusive liability and buyer's exclusive remedy for any claim for damages in connection with the sale or furnishing of Hillco products, their design, suitability for use, installation, operation, or for any claimed defects herein. HILLCO WILL IN NO EVENT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER, NOR FOR ANY SUM IN EXCESS OF THE PRICE RECEIVED FOR THE GOODS FOR WHICH LIABILITY IS CLAIMED.**

Neither representative of Hillco nor any dealer associated with Hillco has the authority to change the items of this warranty in any manner whatsoever, and no assistance to purchaser by Hillco in the repair or operation of any Hillco product shall constitute a waiver of the conditions of this warranty, nor shall such assistance extend or revive it.

Hillco reserves the right to make improvements in design or changes in specifications at any time, without incurring any obligation to owners of units previously sold.

D-220525ADB01

## SAFETY ALERT SYMBOL



This Safety Alert symbol means  
**ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**

The Safety Alert symbol identifies important safety messages on the Hillco Leveling System and in the manual. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

## SIGNAL WORDS

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

 <b>DANGER</b>	<b>DANGER</b> - An immediate and specific hazard, which <b>WILL</b> result in severe personal injury or death if the proper precautions are not taken.
 <b>WARNING</b>	<b>WARNING</b> - A specific hazard or unsafe practice, which <b>COULD</b> result in severe personal injury or death if proper precautions are not taken.
 <b>CAUTION</b>	<b>CAUTION</b> - Unsafe practices which <b>COULD</b> result in personal injury if proper practices are not taken, or as a reminder of good safety practices.
 <b>NOTICE</b>	<b>NOTICE</b> - is used to address practices not related to physical injury.

## Serial Number Tag

The serial number tag is located on the left side of the platform (A).

Write down your Serial Number here for future reference.

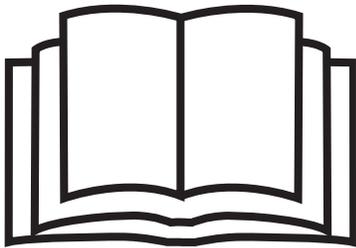
SC1500- \_\_\_\_\_



## Safety Labels

Familiarize yourself with the location of all safety labels. Read them carefully to understand the safe operation of your machine.

### READ OPERATOR'S MANUAL SYMBOL



Decals, which display the Read Operator's Manual symbol, are intended to direct the operator to the Operator's Manual for further information regarding maintenance, adjustments and/or procedures for particular areas of the Leveling System. When a decal displays this symbol refer to the Operator's Manual for further instructions.

### TO APPLY NEW OR REPLACEMENT LABELS

1. Make sure the label area is smooth by removing any debris such as dirt or old labels.
2. Wash the area with soap and water and then dry it thoroughly.
3. After the area has completely dried, peel the backing off the safety label and place it onto the cleaned area.
4. Make sure all areas of the label have adhered to the machine by pressing down on the entire face of the label, including the corners.

(A)

**⚠️ WARNING**

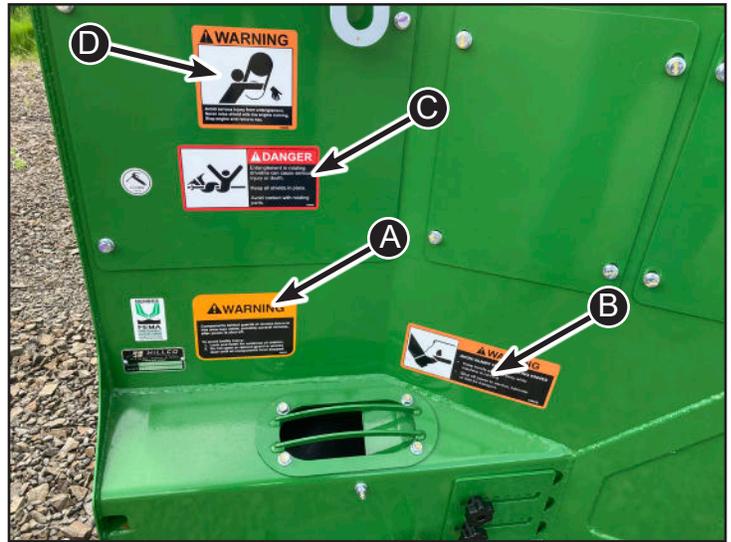
Components behind guards or access doors in this area may rotate possibly several minutes, after power is shut off.

To avoid bodily injury:

1. Look and listen for evidence of rotation.
2. Do not open or move guard or access door until all components have stopped.

156041

Left Side of Platform



(B)

**⚠️ WARNING**

**AVOID INJURY FROM ROTATING KNIVES**

- Keep hands and feet away while machine is running
- Shut off power to service, lubricate or fold for transport.

156042

Right Side of Platform



(C)

**⚠️ DANGER**

Entanglement in rotating driveline can cause serious injury or death.

Keep all shields in place.

Avoid contact with rotating parts.

156045

Both Sides of Platform



(D)

**⚠️ WARNING**

Avoid serious injury from entanglement. Never raise shield with the engine running. Stop engine and remove key.

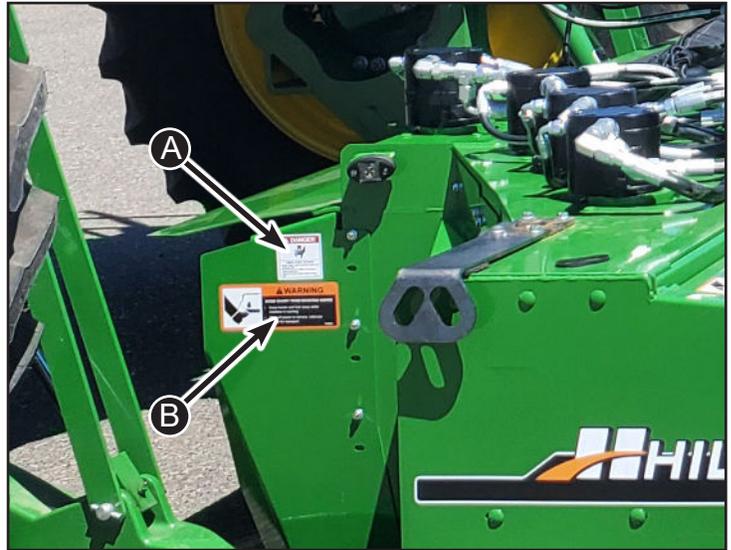
156046

(A)

Both Sides of Platform



(B)



Hillco SC1500 Specialty Seed Crop Header



## **HEADER**

The specialty crop header is equipped with three square drums (on each side) and a smooth forming drum (on each side).

To power these devices an additional pump and controls have been added to the traction unit. To control that hydraulic flow is a manifold is mounted in the center of the header. Control from the microprocessor and screen determine how the valves function. The flow of oil comes from the added pump and is available to power each side of the header, and the canopy up and down. There is a feedback Load sense line that tells the pump what to put out.

The flow of oil goes to the outside motor first (#1) and then to the #2 and then to the #3 and then to #4. From #4 we return oil to the manifold and back to the filter and hydraulic reservoir.

There are 4 motors on each side the first 2 motors #1 and #2 are the same displacement. #3 is slightly larger and #4 is the largest. This provides the speed change of the drums. Outside drums are the fastest, the 3rd drum (tall drum) with a little larger displacement rotates slower yet, the 4th motor is on top of round drum and it rotates slower to form the windrow. Control of speed is from center manifold. Program and controls are added to the W260R. Operator can select speeds for each side.

There are additional manifolds on each side of the head. They are a mirror image of each other. Each manifold has 4 relief valves to protect each motor, 4 one way checks to protect each motor when you turn off the head and allow them to slow down (via the 1 way check) and a large one way check to trap oil in the circuit so during coast down there is no cavitation.

The center manifold provides an electronic splitter, system relief valve, valve to operate the knockdown hood. The flow control valves are operated by the microprocessor on the traction unit. Speed is read on each #2 motor and a target speed is set by the operator in the cab. In addition there are 2 electrical sending units, one for system pressure to run the power meter seen by the operator on the screen, and one for case drain.

## **Traction unit**

The JOHN DEERE W235, W260 or W260R traction unit has been converted to be able to add the additional hydraulic capacity and control of that oil.

A pump has been added as well as lines to get the oil to the header and from the header. There are 4 lines to the header. Pressure, Return, Load Sense and Case drain.

To control the system there is a screen mounted in the cab and also a microprocessor on the header that takes commands of the screen to carry out the function of the system.

# Operation

## GENERAL OPERATION

Control systems are added for the Legacy AIR system some are integrated with John Deere functions.

## OPERATION OF HEADER SYSTEM

The same switch you use to operate the header on a standard JD control also operates the control for the added drums.



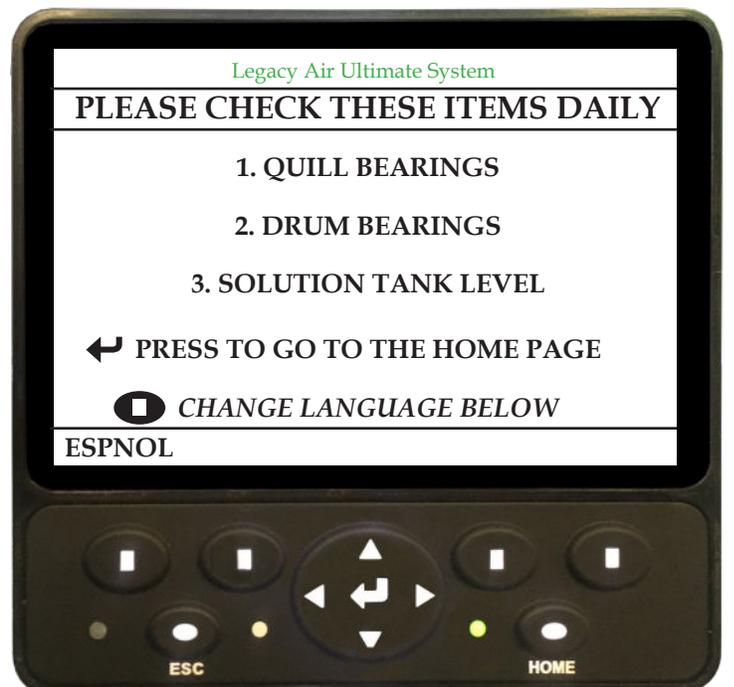
The operators station has a yellow switch to turn on the header and the large control screen 4600 from JD shown here. On the right side of the large screen is the control screen for the Legacy AIR system and the encoder knob.



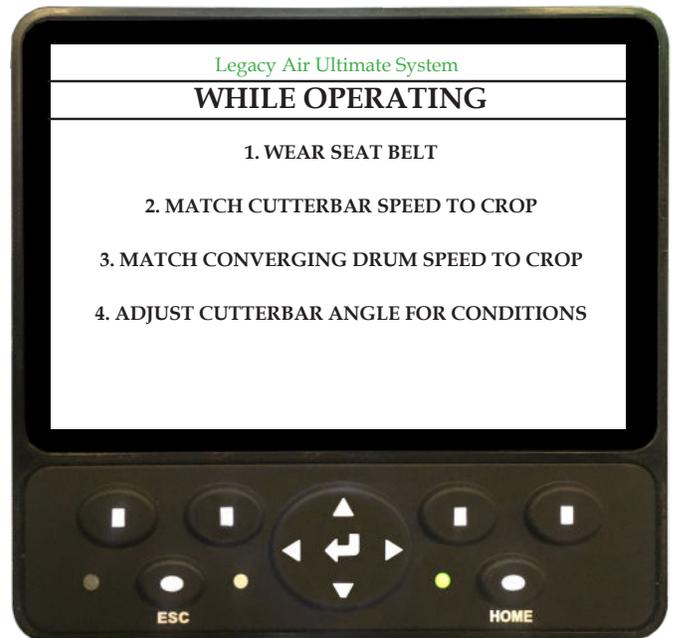
A service reminder comes on each time you start the machine. This reminder tells you to check your:

- 1. Quill Bearings
- 2. Drum Bearings
- 3. Water level in the spray tank.

After you check, press OK, then there is a reminder for other critical functions.



This screen comes on as a quick reminder and helps you or your operators to adjust for conditions.



The screen is operated by buttons at the bottom. Four buttons with Rectangle white marks correspond to the words on the screen. Example: If you push SPEED, it will take you to the next screen.



This screen also shows the power meter on the RH side of the screen (A) and when it is running.

The next chart is a quick reference for you to use when navigating the system.



# Legacy Air Ultimate Control Display Overview DP430 Version 1.4

<b>STARTUP SCREEN</b>	Press Enter to go the the HOME PAGE Press Espanol/English to Change Language
-----------------------	--

<b>HOME PAGE 1</b>	SPEED	Press Button 1 --- drum target speed setting
	FOLD	Press Button 2 --- knockdown bar fold up or down
	MENU	Press ENTER --- MENU PAGE
	LIGHTS	Press Button 3 --- service lights on or off that are located on the platform
	SWAP	Press Button 4 --- swap target drum speeds left and right
	↔	Press Button Right or Left --- page between Home Page 1 and Page 2

<b>HOME PAGE 2</b>	PUMP	Press Button 1 --- solution pump manual operation, turn on automatic setting, or adjust automatic time
	OUTPUT	Press Button 2 --- output manual operation, turn on automatic setting, or adjust automatic time
	MENU	Press ENTER --- MENU PAGE
	TIMER	Press Button 3 --- access automatic pump timer mode for running the pump with the machine turned off
	SWAP	Press Button 4 --- swap target drum speeds left and right
	↔	Press Button Right or Left --- page between Home Page 1 and Page 2

<b>PUMP TIMER PAGE</b>	TIMER	Press Button 1 --- set countdown time
	DURATION	Press Button 2 --- set spray duration
	NUMBER	Press Button 3 --- set spray number
	INTERVAL	Press Button 4 --- set spray interval

<b>MENU PAGE</b>	DATA	Press Button 1 --- DATA PAGE
	OPTIONS	Press Button 2 --- OPTIONS PAGE
	SERVICE	Press Button 3 --- SERVICE PAGE
	SETUP	Press Button 4 --- SETUP PAGE

<b>DATA MENU</b>	DATA 1	Press Button 1 --- view battery and sensor information
	DATA 2	Press Button 2 --- view CAN and switch information
	DATA 3	Press Button 3 --- view calibration values
	DATA 4	Press Button 4 --- view data output values

<b>OPTIONS PAGE</b>	LEDs	Press Button 1 --- access LED (light emitting diode) settings on the display
	BACKLIGHT	Press Button 2 --- backlight adjustment or turn it to automatic
	INCREMENT	Press Button 3 --- target speed increment selection of 100 or 50 RPM
	DISPLAY	Press Button 4 --- speed(s) displayed on RUN PAGE: split target speeds or advanced target speed with RPM

<b>SERVICE PAGE</b>		Press Up or Down arrows to enter the Service Code 18 and press enter arrow
	SERV 1	Press Button 3 --- SERVICE PAGE 1
	SERV 2	Press Button 4 --- SERVICE PAGE 2

<b>SERVICE PAGE 1</b>	SENSOR	Press Button 1 --- enter calibration for pressure transducers
	VALVES	Press Button 2 --- enter calibration for PWM Valves
	SERV 2	Press Button 4 --- SERVICE PAGE 2

<b>SERVICE PAGE 2</b>	FORCE	Press Button 1 --- enter page to force the PWM control valves
	RESET	Press Button 2 --- enter page to reset the calibration values
	SERV 1	Press Button 3 --- SERVICE PAGE 1

<b>SETUP PAGE</b>		Press Up or Down arrows to enter the Setup Code 22 and press enter arrow
	SETUP 1	Press Button 3 --- SETUP PAGE 1

<b>SETUP PAGE 1</b>	MD	Press Button 1 --- access MacDon Mode setting
	DEADBAND	Press Button 2 --- access deadband setting for PID control

12/30/2019

## HOME 1 Navigation Examples

The system is designed to be operator intuitive and not require a large book to follow.

To the right is an example of how messages might appear to the operator.

Each time you make a selection. The screen will come up with instructions for that screen.

This example shows the knockdown bar and how to operate it.



The screen tells the operator the status of various functions.

**(Manual Spray)** (A) on means the spray system is on manually.

**(Manual electricity)** (B) on means the auxiliary electrical output wire has power.

**SWAP** (C) When you have a different RPM on LH vs RH you can swap the speeds if you are windrowing back and forth.

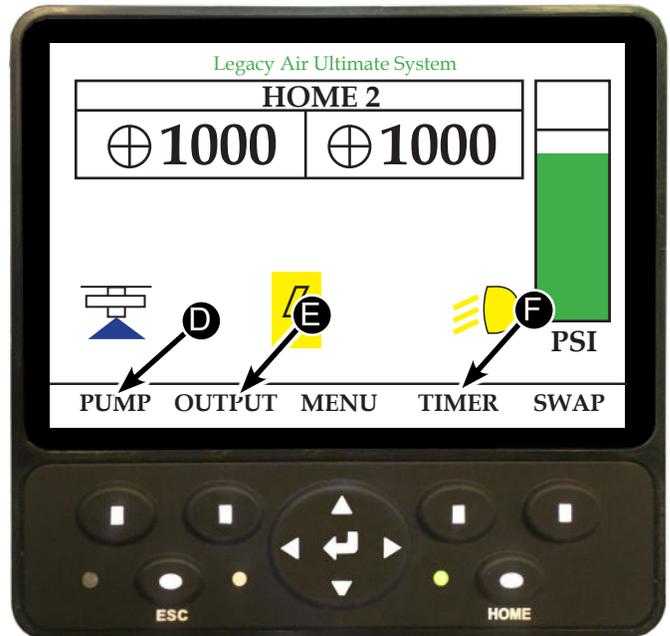
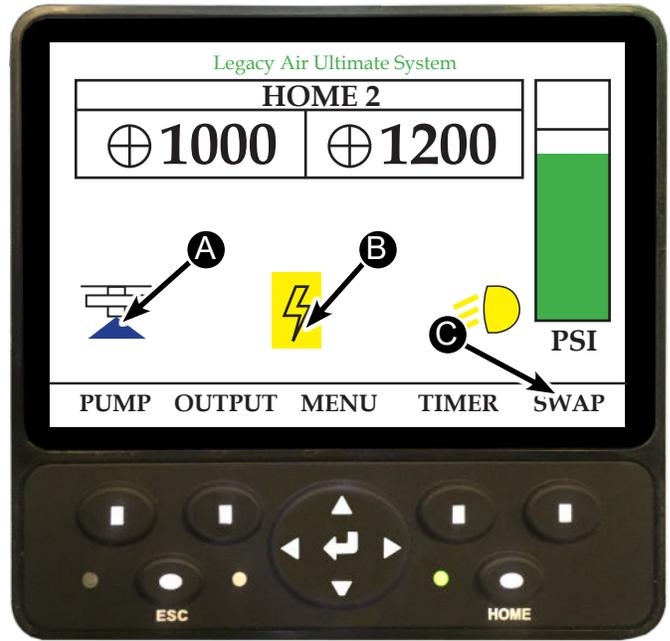
Example: you are traveling East because the way the crop is laying.

You have adjusted the LH to be at 1000 and the RH to be at 1200. When you get to the end of the Run to the East and turn 180 degrees to go West you can hit the swap button and the speeds change to LH = 1200 and RH = 1000. Hit it again at the other end and the speeds change back to original settings.

Service pages are protected by a password. That password is **18**

Setup pages are protected by a password. That password is **22**

Home 2 has some common items with HOME 1 and (3) that are different. We now can see PUMP (D), OUTPUT (D), and TIMER (F). Since many of the screen items are the same you can run the machine in either HOME page.



When you enter the pump mode you will see this screen and be able to select:

**Spray when Platform Raised:** ON, 5, 10 or 15 seconds

Manual spray      ON   OFF

**Spray when Platform Lowered** ON, continuous

Solution mix:

mix with 50 gallons of clean water  
6 oz. of Wetter Sticker  
12 oz. Rubbing alcohol

Example of graphics to show spray on. Note that this happens on Run screens as well top of LH column.



Output mode is for a trigger wire is integrated into the harness that runs back to the solution pump. That trigger wire is available to operate a relay to provide power for different customer functions.

When you select the output mode you will be able to select:

**Output when Platform Raised** ON, 5, 10, 15 seconds

**Manual Output:** ON OFF

**Output when Platform Lowered:** ON

Picture to the right also shows graphic ON. This graphic will also appear on home pages.

## Speeds of Drums - Select Speed

Critical to the operation of the machine is the speed control of the drums. This system allows them to be individually adjusted for conditions and will allow you to "toggle" the speed when cutting back and forth.

Follow the instructions on the screen to increase or decrease your target speed.

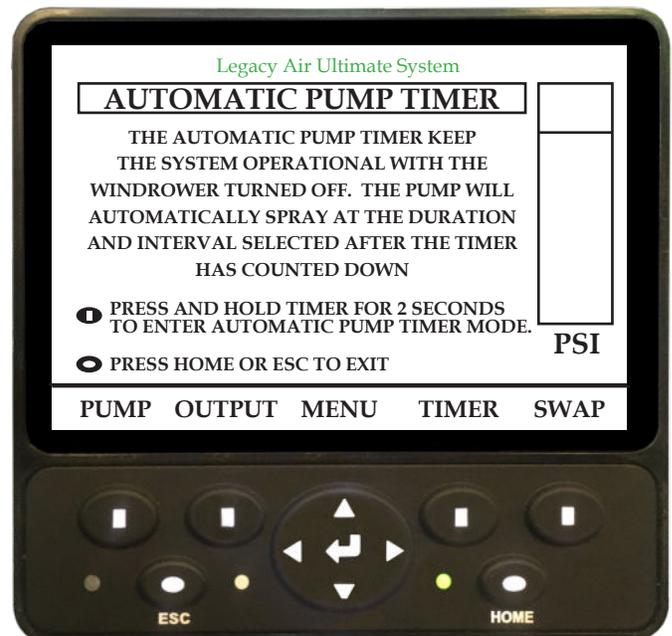
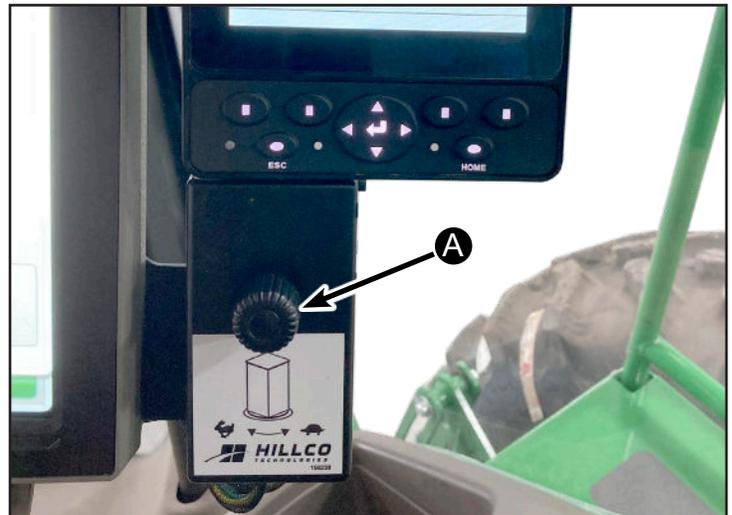
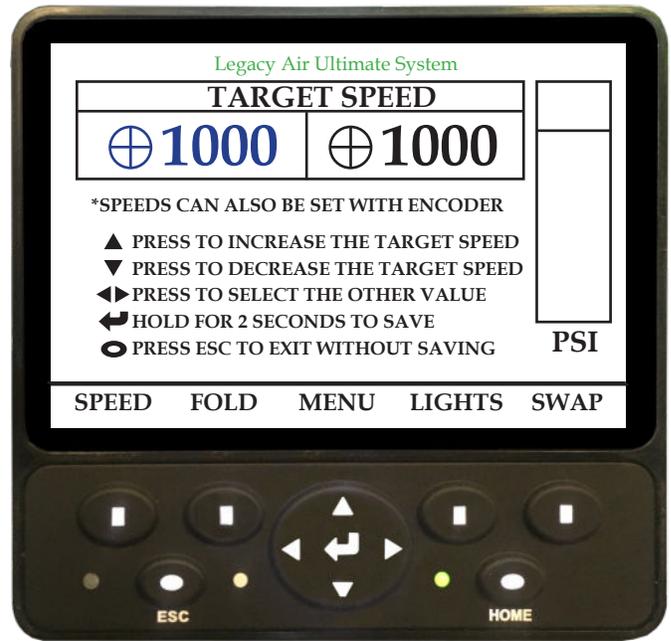
You can have 2 different speeds LH vs. RH After selection of speed go back to the run page while operating.

In addition to setting the drum speed on the screen you may also use the encoder knob (shown to the right) to adjust speeds while operating. Turning this knob will change the speeds in 100 RPM\* increments. It will move both RH and LH speeds up or down at the same time. If you have an offset in the speed # it will keep the offset and move both numbers up or down.

\* options page will allow 100 or 50 RPM changes, default is set at 100 RPM increments.

## Advanced Features - Automatic Pump Timer

Purpose of the automatic pump timer is to have the machine "wake up" and spray to soak the debris in advance of going back to work. These instructions will allow you to set the time and the duration.



Sets your Time, Duration, Number of Spray Cycles, and Spray Intervals.



Follow on screen instructions correctly and you will see "Timer Armed". You can turn off the key. The system will wake up and do the spray when commanded.



## Main Menu

The MENU page give you access to an additional number of items:

DATA  
OPTIONS  
SERVICE  
SETUP

DATA and OPTIONS are not protected.  
SERVICE is protected by password 18  
SETUP is protected by password 22

Legacy Air Ultimate System			
MAIN MENU			
■ PRESS THE BUTTON BELOW TO MAKE A SELECTION			
○ PRESS HOME TO RETURN HOME			
DATA	OPTIONS	SERVICE	SETUP

## Data Menu

You can see that there are 4 different pages available to see DATA

Legacy Air Ultimate System			
DATA MENU			
PRESSURE SENSOR WITHIN RANGE			
■ PRESS THE BUTTON BELOW TO MAKE A SELECTION			
○ PRESS ESC TO RETURN TO THE MAIN MENU			
○ PRESS HOME TO RETURN TO THE HOME			
DATA 1	DATA 2	DATA 3	DATA 4

In DATA 1 you can see many of the sensors on the machine and can see them live if you need to while operating.

Legacy Air Ultimate System			
DATA 1 SENSOR INFORMATION 1			
BATTERY		12.20	VDC
LEFT DRUM SPEED SENSOR		1000	RPM
RIGHT DRUM SPEED SENSOR		1000	RPM
MAIN PRESSURE SENSOR		0.88	VDC
MAIN PRESSURE SENSOR		500	PSI
CASE PRESSURE SENSOR		0.76	VDC
CASE PRESSURE SENSOR		35	PSI
DATA 1	DATA 2	DATA 3	DATA 4

In DATA 2 you can see additional information the might be used by service tech.

Legacy Air Ultimate System			
DATA 2 SENSOR INFORMATION 2			
CAN COMMUNICATION		ON	
FILTER RESTRICT		OFF	
SEAT SWITCH		ON	
PLATFORM SWITCH		OFF	
QUICKSTOP SWITCH		OFF	
MACDON MODE		OFF	
DATA 1	DATA 2	DATA 3	DATA 4

In DATA 3 are the calibration values recorded from calibrating the machine. Also has software versions, and serial number.

Legacy Air Ultimate System			
DATA 3 SENSOR INFORMATION 3			
PWM START LEFT		1600	
PWM START RIGHT		1800	
PWM MAX LEFT		5800	
PWM MAX RIGHT		5900	
DISPLAY SOFTWARE		v 1.4	
CONTROLLER SOFTWARE		v 3.8	
SERIAL NUMBER		1W2001	
DATA 1	DATA 2	DATA 3	DATA 4

In DATA 4 shows Valve PWM outputs and could be used for diagnosis of valve that controls the speed of the drums.

Legacy Air Ultimate System			
DATA 4 OUTPUTS			
LEFT PWM OUTPUT		0	
RIGHT PWM OUTPUT		0	
DATA 1	DATA 2	DATA 3	DATA 4

### Options Menu

In the options menu you chose: LED's, Backlight, Increment, Display

Legacy Air Ultimate System			
OPTIONS MENU			
	PRESS THE BUTTON BELOW TO MAKE A SELECTION		
	PRESS ESC TO RETURN TO THE MAIN MENU		
	PRESS HOME TO RETURN TO THE HOME		
LEDs	BACKLIGHT	INCREMENT	DISPLAY

You can set your system to have warning lights for the hydraulic pressure OR no warnings.

Legacy Air Ultimate System			
LED SETTINGS			
<b>HYDRAULIC PRESSURE</b>			
	PRESS TO CHANGE THE SETTING		
	HOLD FOR 2 SECONDS TO SAVE		
	PRESS ESC TO RETURN TO THE MAIN MENU		
	PRESS HOME TO RETURN HOME		
LEDs	BACKLIGHT	INCREMENT	DISPLAY

Legacy Air Ultimate System			
LED SETTINGS			
<b>NO PRESSURE LEDs</b>			
	PRESS TO CHANGE THE SETTING		
	HOLD FOR 2 SECONDS TO SAVE		
	PRESS ESC TO RETURN TO THE MAIN MENU		
	PRESS HOME TO RETURN HOME		
LEDs	BACKLIGHT	INCREMENT	DISPLAY

You can set your system to change the Backlight. You can have an automatic adjustment based on light in the cab or can control it manually.

Increment = Speed adjust increments. You can adjust for 50 RPM or 100 RPM increments.

Display = Layout of speed readings on the screen. Above you see the default setting. You can set the display to show target and actual for understanding or service diagnosis. The size of the numbers in the lower setting is smaller and harder to use.

Legacy Air Ultimate System			
<b>BACKLIGHT SETTINGS</b>			
<b>AUTOMATIC BACKLIGHT</b>			
▲	PRESS TO CHANGE THE SETTING		
▲ ↻	HOLD FOR 2 SECONDS TO SAVE		
○	PRESS ESC TO RETURN TO THE MAIN MENU		
○	PRESS HOME TO RETURN HOME		
LEDs	BACKLIGHT	INCREMENT	DISPLAY

Legacy Air Ultimate System			
<b>SPEED ADJUST INCREMENTS</b>			
<b>50 RPM</b>			
▲	PRESS TO CHANGE THE SETTING		
▲ ↻	HOLD FOR 2 SECONDS TO SAVE		
○	PRESS ESC TO RETURN TO THE MAIN MENU		
○	PRESS HOME TO RETURN HOME		
LEDs	BACKLIGHT	INCREMENT	DISPLAY

Legacy Air Ultimate System			
<b>SPEED ADJUST INCREMENTS</b>			
<b>100 RPM</b>			
▲	PRESS TO CHANGE THE SETTING		
▲ ↻	HOLD FOR 2 SECONDS TO SAVE		
○	PRESS ESC TO RETURN TO THE MAIN MENU		
○	PRESS HOME TO RETURN HOME		
LEDs	BACKLIGHT	INCREMENT	DISPLAY

Legacy Air Ultimate System					
<b>SPEED DISPLAY SETTINGS</b>					
<table border="1" style="width: 100%;"> <tr> <td style="text-align: center;">⊕ TARGET RPM</td> <td style="text-align: center;">⊕ TARGET RPM</td> </tr> </table>				⊕ TARGET RPM	⊕ TARGET RPM
⊕ TARGET RPM	⊕ TARGET RPM				
▲	PRESS TO CHANGE THE SETTING				
▲ ↻	HOLD FOR 2 SECONDS TO SAVE				
○	PRESS ESC TO RETURN TO THE MAIN MENU				
○	PRESS HOME TO RETURN HOME				
LEDs	BACKLIGHT	INCREMENT	DISPLAY		

Legacy Air Ultimate System							
<b>SPEED DISPLAY SETTINGS</b>							
<table border="1" style="width: 100%;"> <tr> <td style="text-align: center;">⊕ TARGET RPM</td> <td style="text-align: center;">⊕ TARGET RPM</td> </tr> <tr> <td style="text-align: center;">○ ACTUAL RPM</td> <td style="text-align: center;">○ ACTUAL RPM</td> </tr> </table>				⊕ TARGET RPM	⊕ TARGET RPM	○ ACTUAL RPM	○ ACTUAL RPM
⊕ TARGET RPM	⊕ TARGET RPM						
○ ACTUAL RPM	○ ACTUAL RPM						
▲	PRESS TO CHANGE THE SETTING						
▲ ↻	HOLD FOR 2 SECONDS TO SAVE						
○	PRESS ESC TO RETURN TO THE MAIN MENU						
○	PRESS HOME TO RETURN HOME						
LEDs	BACKLIGHT	INCREMENT	DISPLAY				

## Setup Screen

There is a set up screen that requires a password.

That password is 22. The service tech at your dealership may have set the machine from this setup list. Follow on screen instructions.

Legacy Air Ultimate System			
<b>SETUP</b>			
<b>SETUP CODE:22</b>			
	PRESS TO CHANGE THE SETUP CODE VALUE		
	PRESS TO ENTER THE CODE		
	PRESS ESC TO RETURN TO THE MAIN MENU		
	PRESS HOME TO RETURN HOME		
LEDs	BACKLIGHT	INCREMENT	DISPLAY

Legacy Air Ultimate System			
<b>SETUP</b>			
<b>SETUP CODE ACCEPTED</b>			
	PRESS THE BUTTON BELOW TO MAKE A SELECTION		
	PRESS ESC TO RETURN TO THE MAIN MENU		
	PRESS HOME TO RETURN HOME		
LEDs	BACKLIGHT	INCREMENT	DISPLAY

There are 2 items to adjust here. MacDon mode or Drum Deadband. Drum Deadband is to increase or decrease the sensitivity of adjusting speed of drums.

Legacy Air Ultimate System			
<b>SETUP 1</b>			
<b>MD: MACDON MODE</b>			
<b>DEADBAND: DRUM DEADBAND</b>			
	PRESS THE BUTTON BELOW TO MAKE A SELECTION		
	PRESS ESC TO RETURN TO THE MAIN MENU		
	PRESS HOME TO RETURN HOME		
LEDs	BACKLIGHT	INCREMENT	DISPLAY

This is the way it should be selected for all John Deere traction units.

Legacy Air Ultimate System			
<b>SETUP MD MODE</b>			
<b>MACDON MODE OFF</b>			
	PRESS TO CHANGE THE SETTING		
	HOLD FOR 2 SECONDS TO SAVE		
	PRESS ESC TO RETURN TO THE MAIN MENU		
	PRESS HOME TO RETURN HOME		
MD	DEADBAND	SETUP 1	

You can adjust the range of deadband here from 0-4. The default setting is 2.

Legacy Air Ultimate System			
<b>SPEED DEADBAND</b>			
<b>DEADBAND VALUE : 2</b>			
2 = DEFAULT 0 = MINIMUM SENSITIVITY 4 = MAXIMUM SENSITIVITY			
	PRESS TO CHANGE THE SETTING		
	HOLD FOR 2 SECONDS TO SAVE		
	PRESS ESC TO RETURN TO THE MAIN MENU		
	PRESS HOME TO RETURN HOME		
MD	DEADBAND	SETUP 1	

## Legacy Air Platform Set-up Procedures

The diversity of specialty seed crops windrowed by the 995 Legacy AIR platform require the consideration of several operating parameters before beginning to windrow a field.

Those parameters are:

1. Platform float pressure affects quality of cut, traction unit performance and wear and tear on the platform.
  - A. The larger the float pressure value the lighter the pressure will be on the ground, we typically run in the 1000-1200 range.
  - B. If the pressure is too light, the platform will bounce excessively and cause a shaggy quality of cut, run just enough pressure to keep the platform engaging the ground.
  - C. If the pressure is too low, extra power will be consumed to push the platform, because it is not floating or following the ground and in crops like Fescue that can damage the plant crowns affecting next year's yield.
2. Cutterbar angle affects quality of cut, knife wear, and the ability to divide cleanly on the end sheets.
  - A. Cutterbar angle is also critical for a clean cut and reduced shatter in lodged crops. When the crop is laying away from the cutterbar, more angle is required to prevent the cutterbar from running over the crop and leaving too much stem remaining on the ground. When laying into the cutterbar the angle needs to be reduced to cut the crop before it is contacting the converging drums and causing excessive shatter, and reduce damage in particular to Fescue crowns.
  - B. Cutterbar angle also affects a clean divide particularly in Turnips, Radish and Chicory. The knives on the end discs sweep against the cast iron insert in the end sheet to make a clean divide. When these large, dense, bushy crops are laying in to the platform, again reduce cutterbar angle to cut the crop earlier and enable a clean divide. When laying away the divide is not the issue but a clean cut is to increase the angle enough to cleanly cut off the crop.
3. Skid Shoes have 5 positions for varying conditions and crops. In most specialty crops position 2 or 3 is utilized, however in very short White Clover position 1 can help to cut cleanly and position 4 and 5 can be useful in tall crops. Remember to recheck cutterbar angle if the skid shoe position is changed.
4. Cutterbar configuration is also important to platform performance. The ability to add or remove accelerators on the discs and utilize two different knife pitches enable the operator to fine tune the performance of the platform and influence row formation.
  - A. In heavy or dense crops install accelerators on discs 1, 2 and 3 on each side, along with 18 degree knives. On discs 4 and 5 on each side install 11 degree knives. This accomplishes two purposes, first the accelerators and 18 degree knives create more lift and air lifting the crop higher reducing shatter and recut on the material processed by the first 3 discs. Second, using the lower pitch knives in the center, allows the crop processed by those discs to enter the throat under the material from the sides forming a more uniform and smoother windrow.
  - B. In shorter less dense crops accelerators may be removed and 11 degree knives used across the entire cutterbar to reduce lift and air so as to not cause the windrow to "blow up". It is not recommended to remove the accelerators from the first disc on each side. Accelerators also have an "arrow" wear indicator and when the point is gone the accelerator needs to be replaced.

## 5. Cutterbar Speed

A. Cutterbar speed is critical to performance. As a general rule enough speed is required to keep the knives fully extended (straight out) under full load. In nearly all seed crops that number is a minimum of 2800 RPM with 3000 RPM being optimum. When cutterbar speed drops and the knives are not fully extended the quality of cut will diminish and if the speed falls to far the knives will “Crash” causing them to hit each other and destroying their cutting surface. It is important to drive a speed that maintains knife speed as opposed to driving a fixed speed. If you are having difficulty maintaining knife speed check the wear on the knife. Once the square tip on the leading edge is worn off the knife will require flipping to the other side or replacement whichever is appropriate.

B. In short crops such as White Clover experience has shown that a cutterbar speed of 2400 RPM is appropriate in conjunction with a ground speed of 8 mph seems to produce the best row.

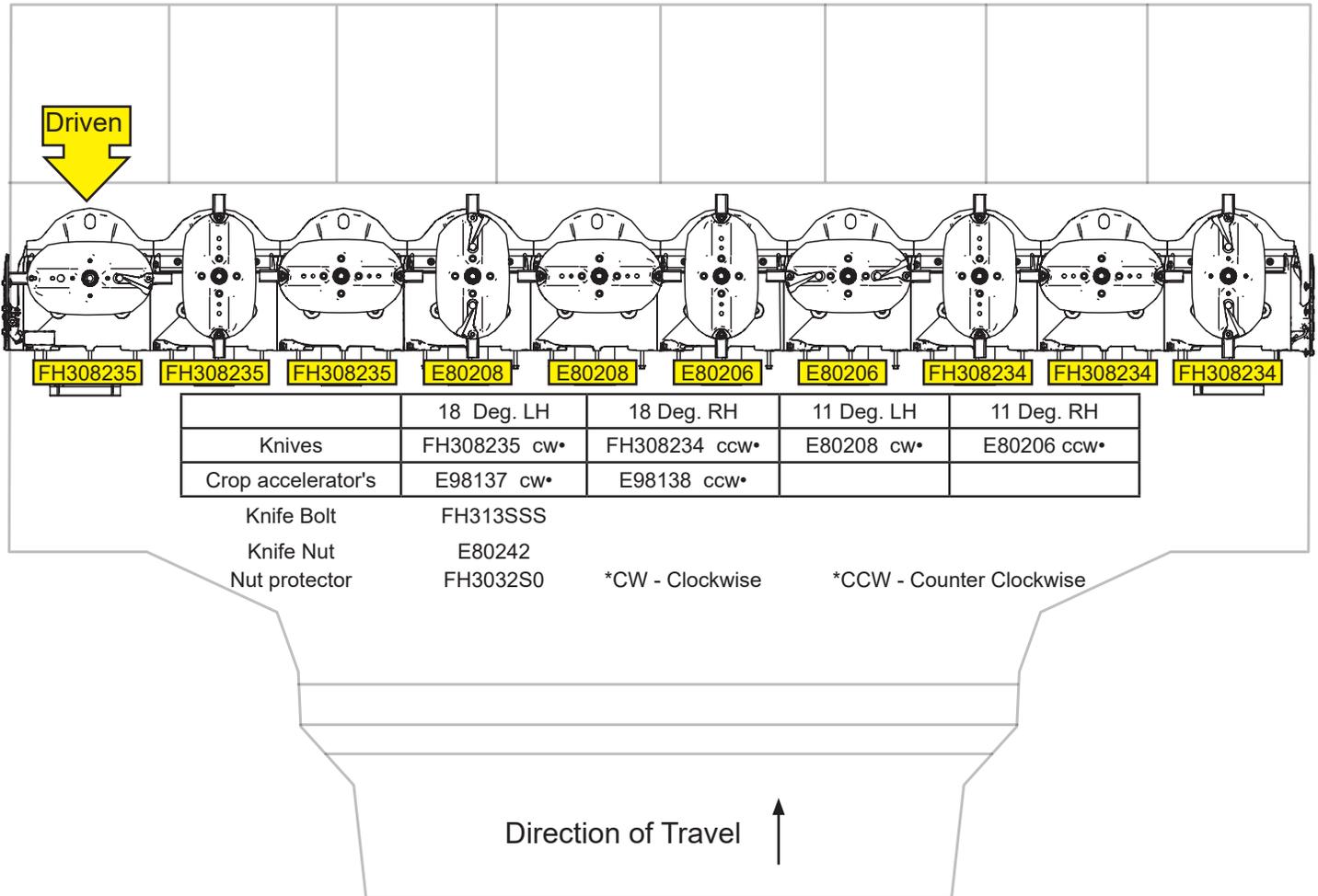
6. Converging drum speed is the last setting to consider and has the most impact on windrow quality. The Legacy AIR Platform has the ability to adjust drum speed to suit individual conditions.

A. For most crops the target speed is 1200 RPM. This is measured on the second suspended drum on each side. In lighter crops such as White Clover, the drum speed is more likely to be 800 RPM. 1200 RPM in most crops will work with ground speeds up to 12 mph. It may be necessary to adjust the drum speed to match ground speed in certain conditions. The ability to match drum speed to ground speed is unique to the Legacy AIR platform. When the drum and ground speeds are matched you will observe the crop “rolling over” as it comes by the PVC forming drum in the throat. If that is not occurring and you are maintaining cutter bar speed increase the drum speed to get the crop to roll. If the crop is pulsating thru the throat, slow the drums down to smooth out the flow.

7. “Trust, but Verify”. When first starting a field check the quality of cut on each side of the field and make changes as necessary to insure a clean cut and smooth uniform windrow. How well this task is performed will determine how well the combine functions eight to ten days later.

# Crop Conditions Recommendations

Crop	Crop Conditions	Cutter Bar Speed	Drum Speed	Accelerators Conditions will determine	Knives	Approximate Ground Speed	Knock-down Bar	Misc. Notes
Tall Fescue	Heavy Down	3000 RPM	1800 RPM	2-3 and 8-9	Mix	8-10	Yes	Direction of crop lean will determine speed
Tall Fescue	Light	3000 RPM	1600 RPM	2-3 and 8-9	All 11 deg.	12-14	Yes	Standing tall fescue cuts very easy
Fine Fescue	Heavy Down	3000 RPM	1800 RPM	2-3 and 8-9	Mix	8-10	No	May need to use all 11's to make windrow look uniform
Fine Fescue	Light	3000 RPM	1600 RPM	2-3 and 8-9	All 11 deg.	12-14	Maybe	Use slower drum speed for better windrow
Annual Ryegrass	Heavy Down	3000 RPM	1800 RPM	1-2-3 & 8-9-10	Mix	8-10	No	Cut height is low will need to change knives more often
Annual Ryegrass	Light	3000 RPM	1600 RPM	1-2-3 & 8-9-10	All 11 deg.	12-14	No	Same note as above
Perennial Ryegrass	Heavy Down	3000 RPM	1800 RPM	1-2-3 & 8-9-10	Mix	10-11	No	Cut height is low will need to change knives more often
Perennial Ryegrass	Light	3000 RPM	1600 RPM	1-2-3 & 8-9-10	Mix	10-14	No	Dry brown thin cuts hard
Bluegrass	Heavy	3000 RPM	1500-1800	3 and 8 or none at all	Mix	8-12	Maybe	Wet cuts hard Slower forward speed
Bent Grass	Heavy	3000 RPM	1600-1800	1-2-3 & 8-9-10	Mix or all 11's	8-12	No	Can be tough to cut depending on the year
Meadow foam	Average	2100-3000	1000-1500	3 and 8 Or none at all	All 11 Deg	10-15	No	Very light thin crop do not need much to form windrow
Clover	Heavy	2000-3000	1000-1800	Variable depending on crop most likely 2-3 and 8-9	Mix or all 11's	10-14	No	Lower drum speed or may need to lower cutterbar speed
Sugar Beets	Average	3000 RPM	1800	1-2-3 & 8-9-10	Mix	8-10	Yes	Very tall tangled crop may need to change accelerator configuration
Turnips	Average	2600-3000	1600	2-3 and 8-9	All 11 deg.	10-14	Yes	Easy cutting
Radish	Average	2600-3000	1600	2-3 and 8-9	All 11 deg.	10-15	Yes	Easy cutting



## Lubrication and Maintenance

### CAUTION

To prevent injury, never lubricate or service machine with engine running. Engine must be off and key removed.

### Grease

Use grease based on NLGI consistency numbers and the expected air temperature range during the service interval.

- **John Deere SD Polyurea Grease** is preferred. (TY6341)

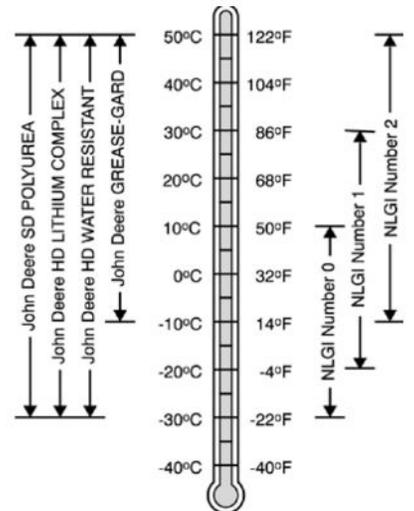
The following greases are also recommended:

- John Deere HD Lithium Complex Grease (TY6333)
- John Deere HD Water Resistant Grease (TY24425)

Other greases may be used if they meet the following:

- NLGI Performance Classification GC-LB

**IMPORTANT:** Some types of grease thickeners are not compatible with others. Consult your grease supplier before mixing different types of grease.



Greases for Air Temperature Ranges

### Cutterbar Drive & Cutterbar oil

Use oil viscosity based on the expected air temperature range during the period between oil changes.

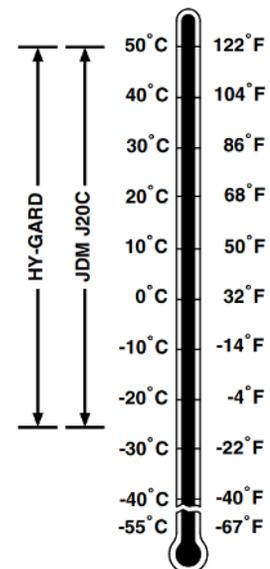
The following oil is preferred:

- **John Deere Hy-Gard™** (TY6354 - 1 gallon container)

Other oils can be used if they meet the John Deere

- Standard JDM J20C.

John Deere Low Viscosity Hy-Gard™ and BIO-HY-GARD™ oils are **NOT** recommended.



Oils for Air Temperature Ranges

## Service Intervals

Service	Interval					
	Daily	First 50 hours	50 hours	100 hours	150 hours (Yearly)	800 hours
<b>X Required service interval</b>						
Clean cutterbar	X					
Change cutterbar oil		X				
Change cutterbar drive gear case oil		X				
Lubricate cutterbar driveline			X			
Check cutterbar oil level				X		
Change cutterbar oil					X	
Clean cutterbar					X	
Check quill bearings					X	
Return Filter					X	
Case Drain Filter					X	

## Daily Service

### Clean Cutterbar

Before each use of machine, clean cutterbar.

**IMPORTANT:** Buildup of debris can cause excessive wear on cutting components and affect quality of cut.

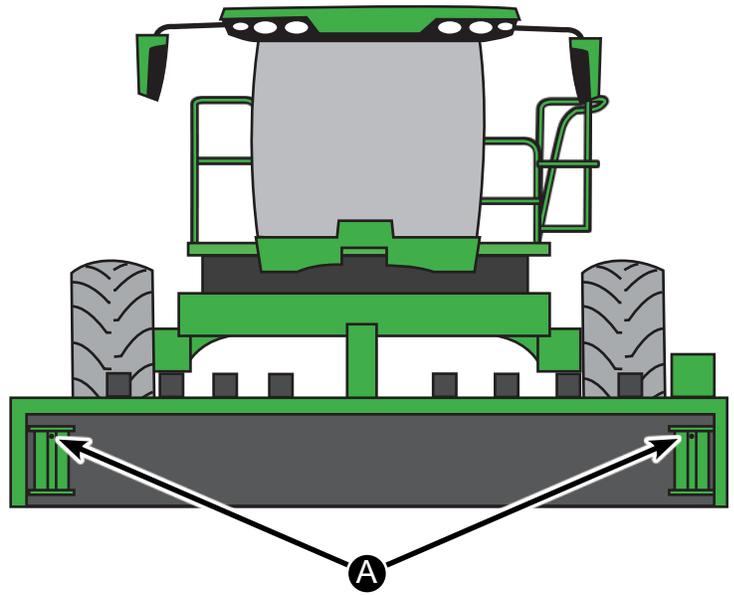
Remove all crop material, dirt, mud, and debris from around cutterbar and cutting components.



## Every 10 Hours Service

### Lubricate Drum Driveshaft

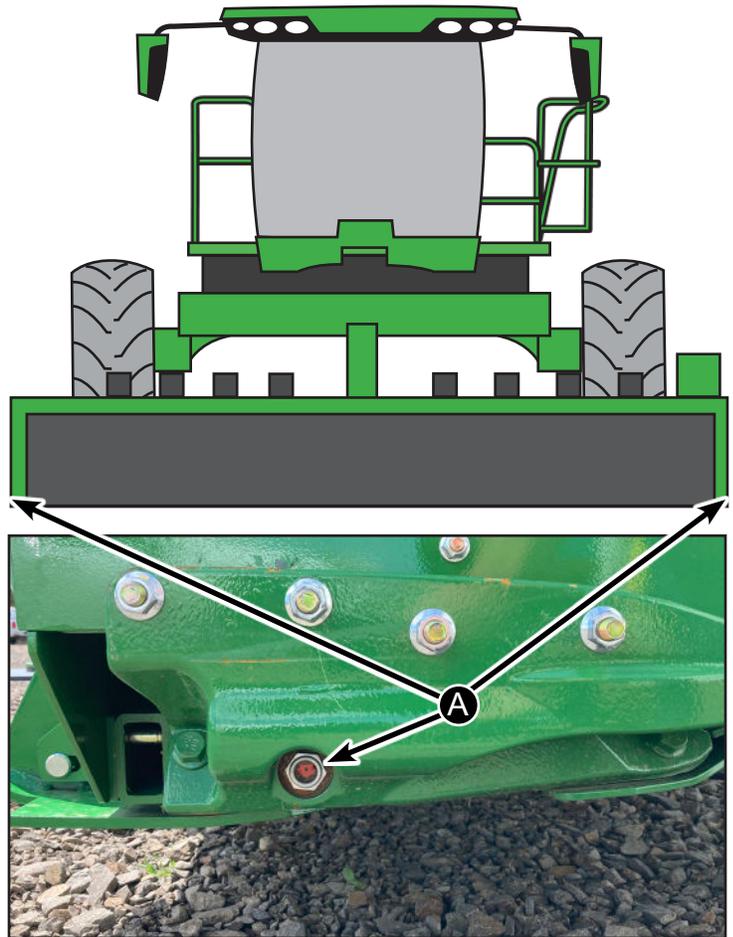
Every 10 hours of operation lubricate both drum driveshafts (A).



## Every 10 Hours Service

### Check Cutterbar Oil Level

1. Park machine on level surface, lower platform, and tilt platform to flattest angle.
2. Remove key.
3. It is necessary for the platform to be as level as possible.
4. Level platform side-to-side by using a jack under low end.
5. Give oil time to level out.
6. Check Oil Level through sight glass (A) on each side.
7. Required level in sight glass is 1/3 full. Follow diagram
8. Use oil viscosity based on the expected air temperature range during the period between oil changes. (See next page for adding oil).



A - Sight Gauge

The following oil is preferred:

- **John Deere Hy-Gard™**

Other oils can be used if they meet the John Deere Standard JDM J20C.

John Deere Low Viscosity Hy-Gard™ and BIO-HY-GARD™ oils are **NOT** recommended.

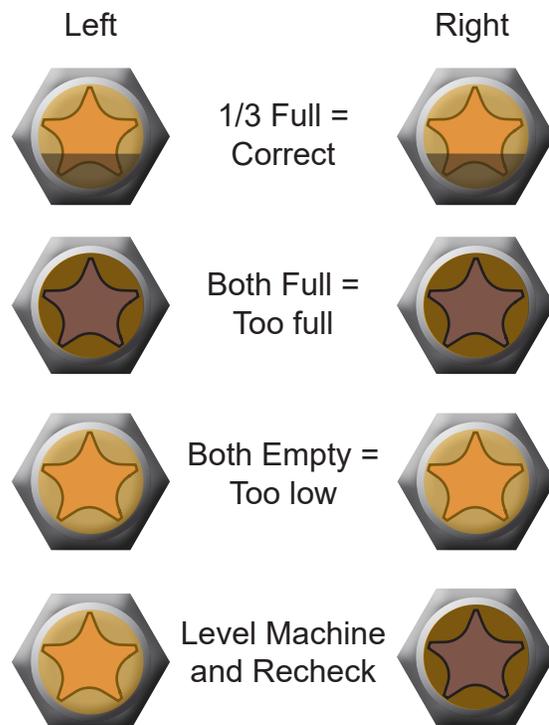
Oil shows 1/3 full in both sight glasses= correct oil level.

Oil shows full in both sight glasses= too full

No oil in either sight glass= too low

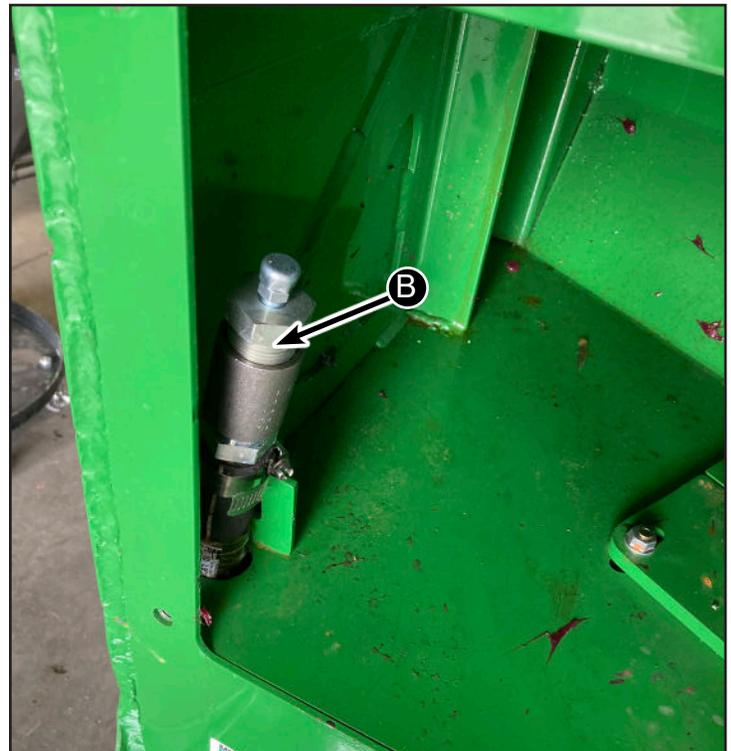
One sight glass full one empty= level the machine and recheck.

Having the machine level is very critical to the cutterbar oil level. (See next page for adding oil)



## Adding Oil Cutterbar

1. Remove shield (A).
2. Remove filler plug (B).
3. Add John Deere Hy-Gard™ oil, or equivalent.
4. Install filler plug (B) and close door.

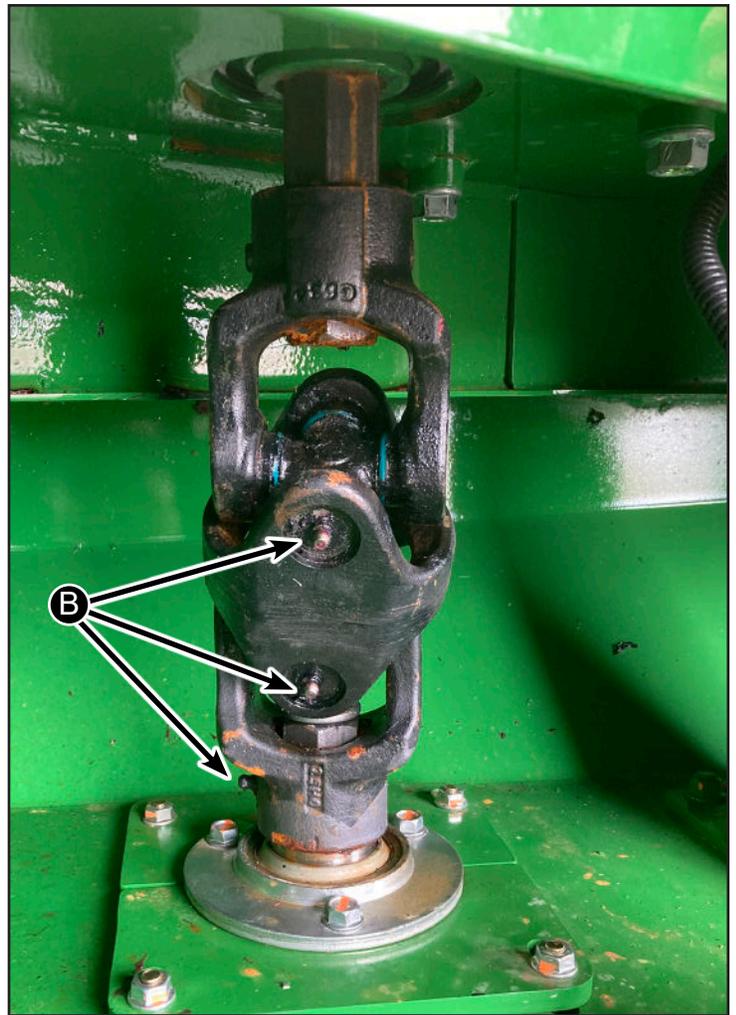


## Every 50 Hours Service

### Lubricate Driveline

Every 50 hours of operation lubricate cutterbar driveline.

1. Remove Shield (A)
2. Lubricate grease fittings (B). (3 Grease Zerks)
3. Replace Shield



## First 50 Hours Service

### Change Cutterbar Oil

First 50 hours of operation, change cutterbar oil.

1. Park machine on level surface, lower platform, and tilt platform to flattest angle.
2. Run machine to warm cutterbar oil.

### CAUTION

Prevent bodily injury or death. Do not work under or around raised platform without engaging lockout lever. Raise platform, engage platform lift lockout lever, turn off engine, and remove key.

3. Raise platform and engage platform lift lockout lever. Turn off engine and remove key.

4. Position three 150 x 150 mm (6 x 6 in.) wooden blocks, stacked on top of each other, under right-hand side of platform.

5. Position one 150 x 150 mm (6 x 6 in.) wooden block under left-hand side of platform.

6. Place a 15.1 L (4 gal.) container under cutterbar sight glass (A).

7. Loosen sight glass with 7/8 in. socket. Do not remove at this time.

8. Lower platform onto wooden blocks. Turn off engine and remove key.

9. Remove sight glass to drain oil.

10. Install sight glass after oil has been removed and tighten to specification.

#### Specification

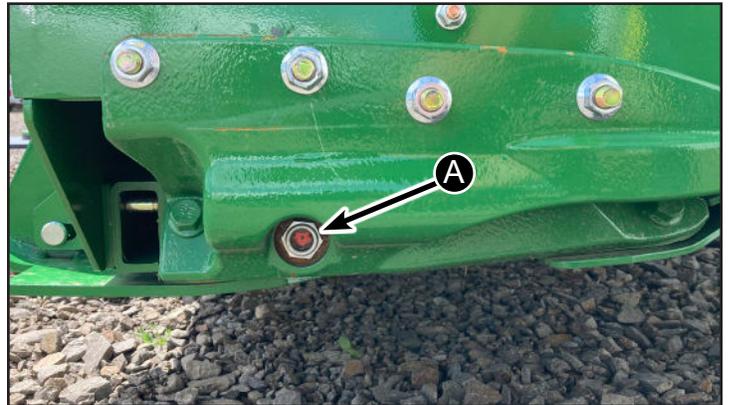
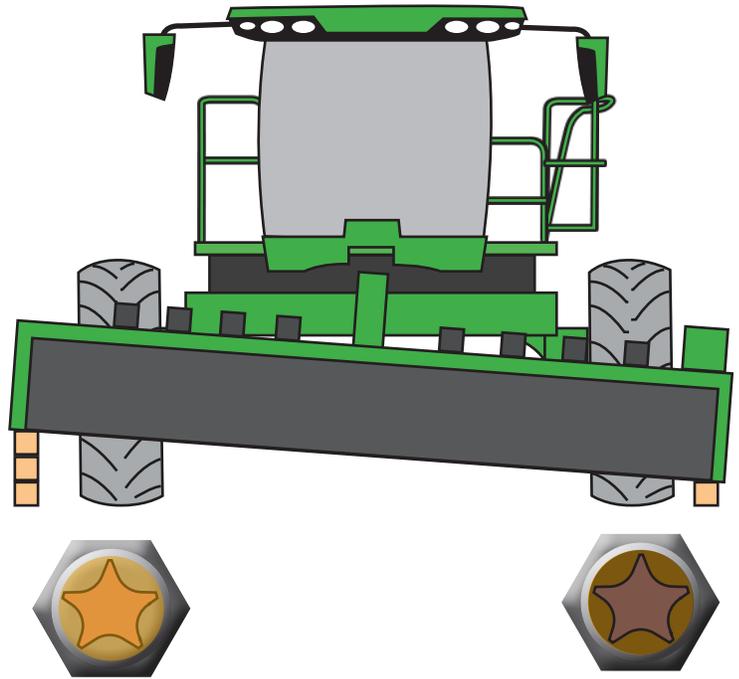
Sight glass—Torque.....65 N·m  
(48 lb.-ft.)

11. Raise platform and engage platform lift lockout lever. Turn off engine and remove key.

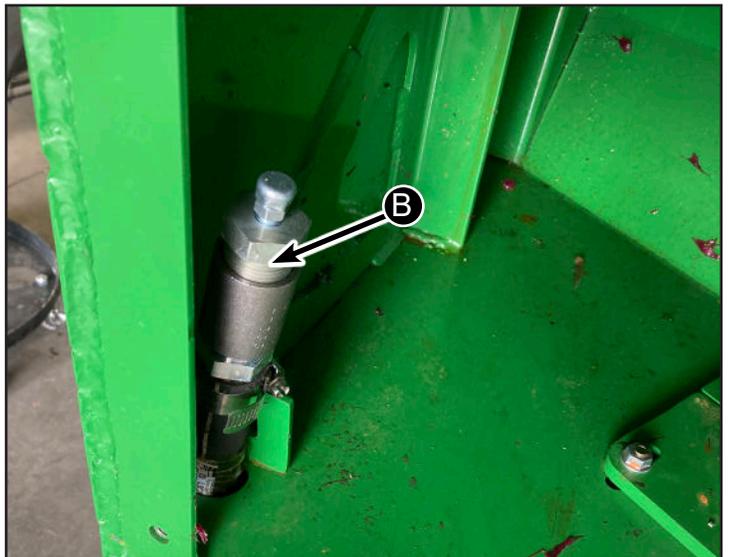
12. Remove wooden blocks.

13. Lower platform.

14. Open door at left-hand side of machine to access fill plug (B). (continued on next page)



A - Sight Gauge



B - Fill Plug

Specification

Cutterbar - Capacity.....11.5 L  
(12 qt)

**IMPORTANT: Too much oil in cutterbar can cause overheating and cutterbar damage**

15. Use sight glass at both ends of cutterbar to check oil level.

16. Level platform side-to-side by using a jack under low end. Give oil time to level out.

17. Check oil level in sight glasses (A) on both sides of machine.

Oil shows 1/3 full in both sight glasses = correct oil level.

Oil shows full in both sight glasses= too full

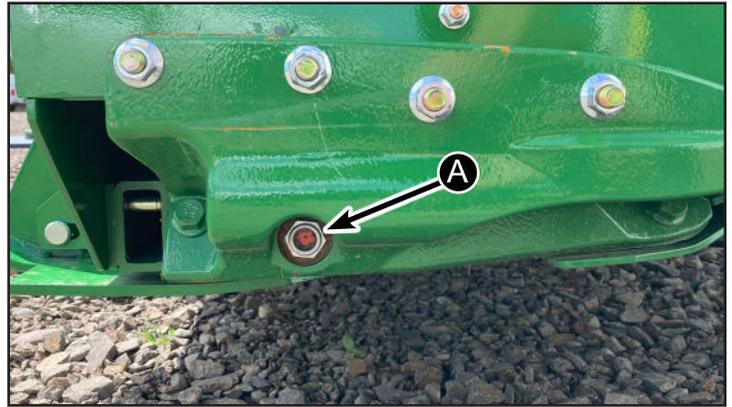
No oil in either sight glass= too low

One sight glass full one empty= level the machine and recheck.  
Having the machine level is very critical to the cutterbar oil level. (See next page for adding oil)

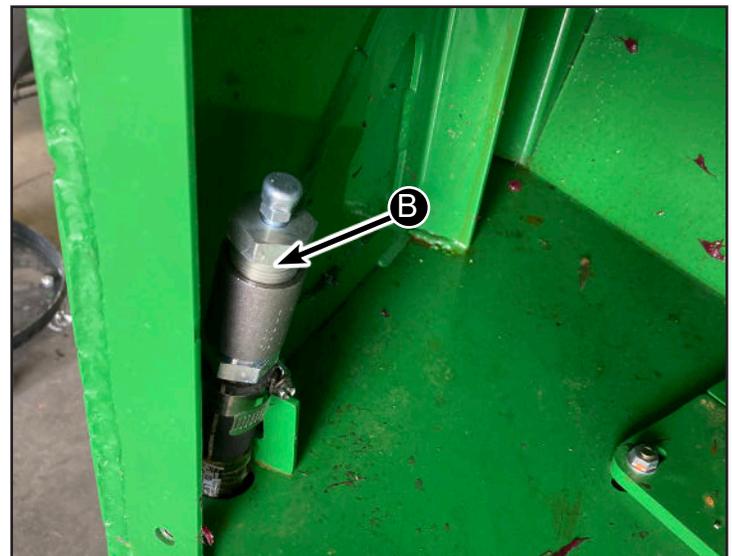
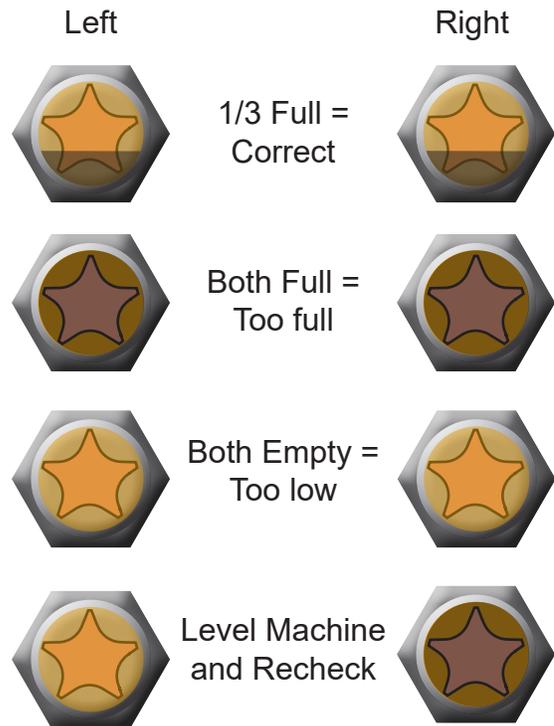
18. Remove filler plug (B).

19. Add John Deere Hy-Gard™ oil, or equivalent.

20. Install filler plug (B) and reinstall cover.



A - Sight Gauge



B - Fill Plug

## Supplemental instructions for Checking Cutterbar Oil

Move machine to a level surface. Retract the top link fully. Lower the header to the ground.

Check both of your sight gauges on each end. They should both show no oil in sight glass.

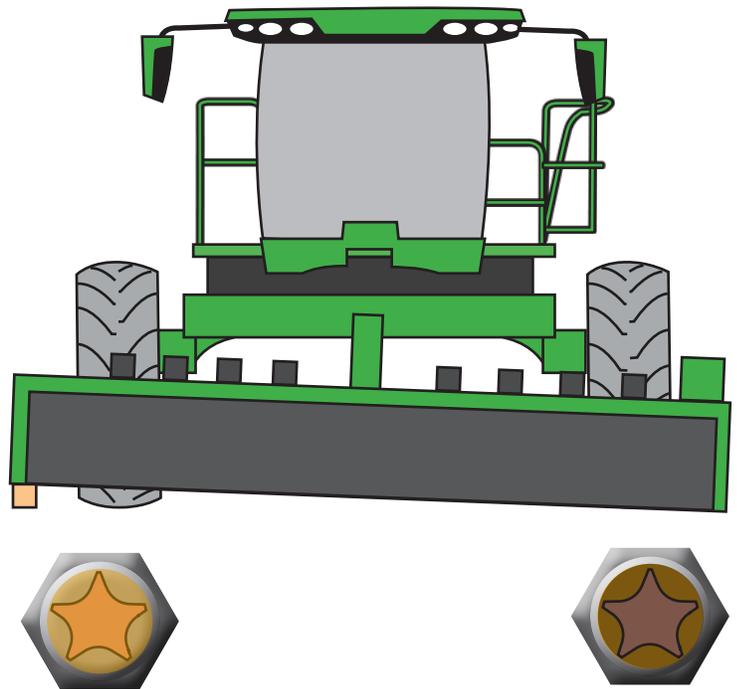
Now raise the header and put a 2" block under the header at one end.

Wait 5 minutes for oil level to equalize.

The sight gauge on the other end should be full.

The sight gauge on the 2" raised end should be empty.

Sight gauge will usually show a small amount trapped in the gauge.



### Alternative Method

If you are not sure of the level of oil in the cutterbar you can drain it out by lifting one end and pulling the sight gauge.

Measure what came out for verification.

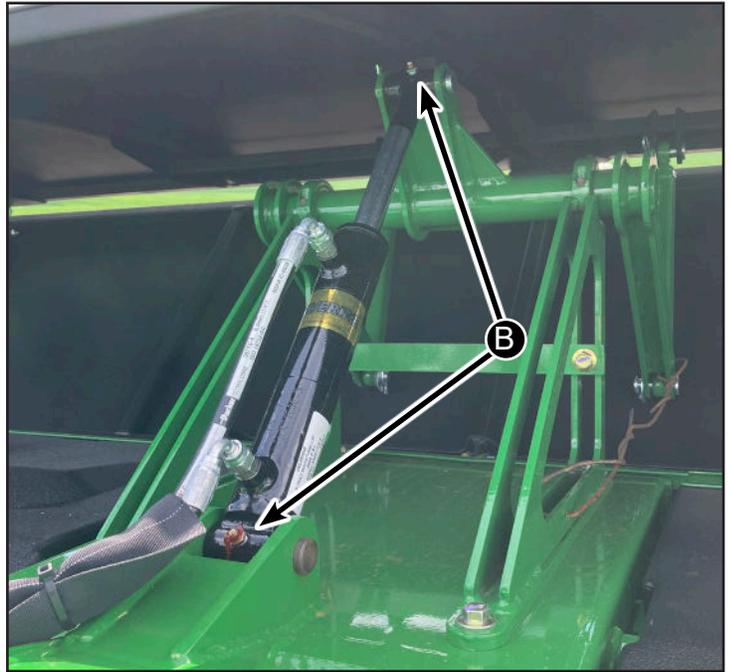
If you drained overnight refill with 12 qts of HYGARD

If you drained and want to refill quickly, use 10.5 qts. of HYGARD

**Every 150 Hours Service Or Seasonal**

**Lubricate Deflector Lift Cylinder**

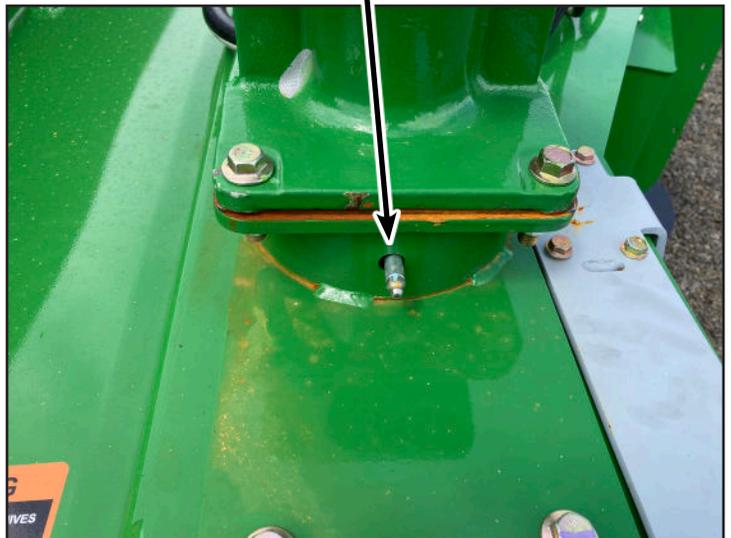
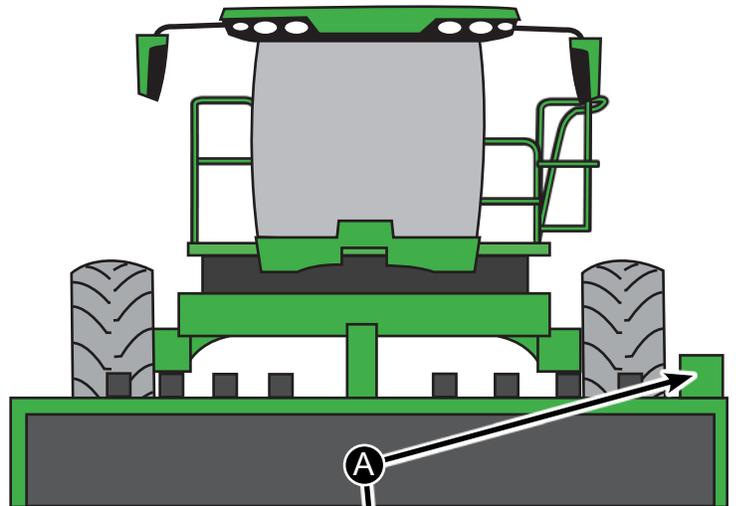
Every 100 hours of operation lubricate deflector lift cylinder (B).



**Every 150 Hours Service Or Seasonal**

**Lubricate Hydraulic Drive Motor Adapter**

Every 150 hours of operation lubricate hydraulic drive motor adapter (A).



## Every 150 Hours Service or Seasonal

### Change Cutterbar Oil

Every 200 hours of operation, change cutterbar oil.

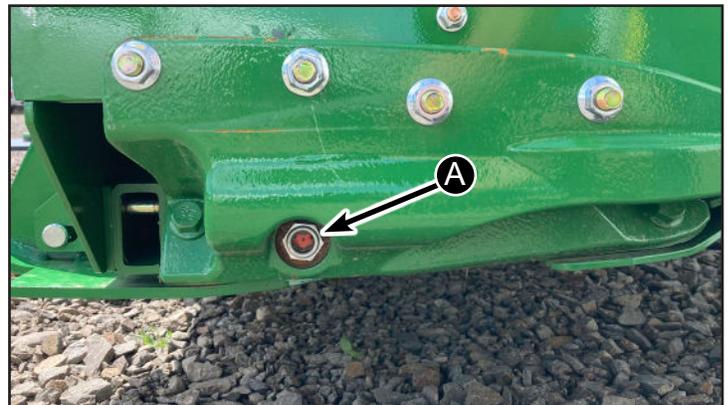
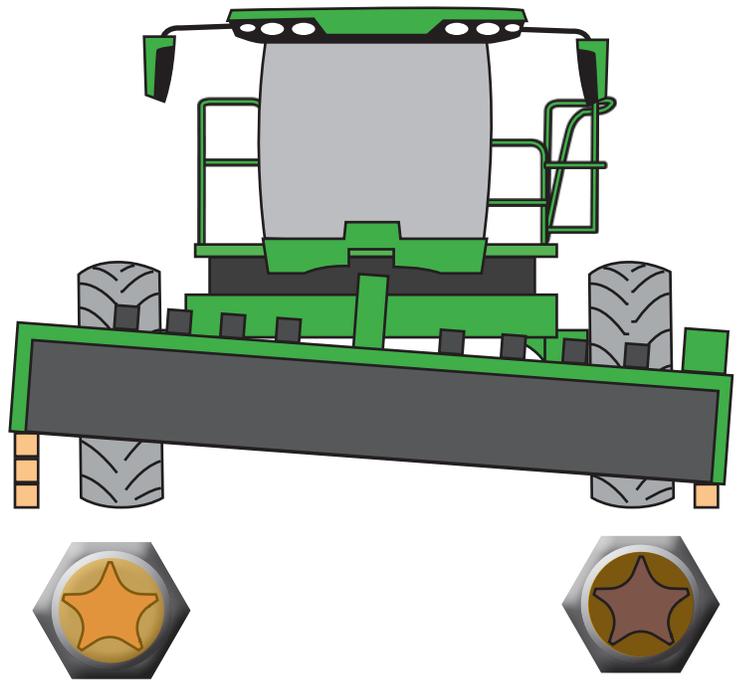
1. Park machine on level surface, lower platform, and tilt platform to flattest angle.
2. Run machine to warm cutterbar oil.

### CAUTION

Prevent bodily injury or death. Do not work under or around raised platform without engaging lockout lever. Raise platform, engage platform lift lockout lever, turn off engine, and remove key.

3. Raise platform and engage platform lift lockout lever. Turn off engine and remove key.
4. Position three 150 x 150 mm (6 x 6 in.) wooden blocks, stacked on top of each other, under right-hand side of platform.
5. Position one 150 x 150 mm (6 x 6 in.) wooden block under left-hand side of platform.
6. Place a 15.1 L (4 gal.) container under cutterbar sight glass (A).
7. Loosen sight glass with 7/8 in. socket. Do not remove at this time.
8. Lower platform onto wooden blocks. Turn off engine and remove key.
9. Remove sight glass to drain oil.
10. Install sight glass after oil has been removed and tighten to specification.  

Specification	
Sight glass—Torque.....	65 N·m (48 lb.-ft.)
11. Raise platform and engage platform lift lockout lever. Turn off engine and remove key.
12. Remove wooden blocks.
13. Lower platform.
14. Open door at left-hand side of machine to access fill plug (B). (continued on next page)



A - Sight Gauge



B - Fill Plug

Specification

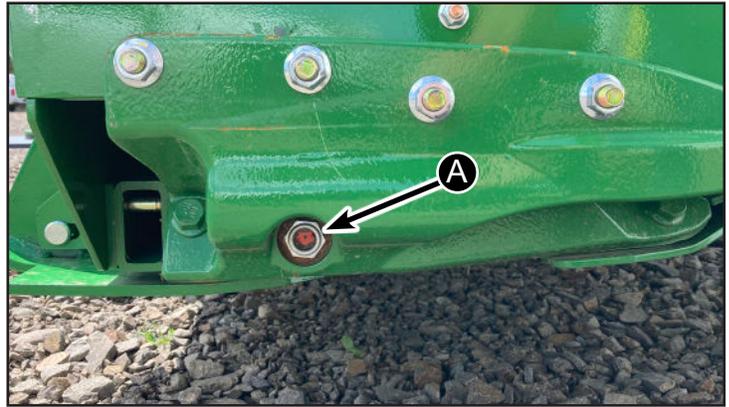
Cutterbar - Capacity.....10 L  
(10.5 qt)

**IMPORTANT: Too much oil in cutterbar can cause overheating and cutterbar damage**

15. Use sight glass at both ends of cutterbar to check oil level.

16. Level platform side-to-side by using a jack under low end. Give oil time to level out.

17. Check oil level in sight glasses (A) on both sides of machine.



A - Sight Gauge

Oil shows 1/3 full in both sight glasses = correct oil level.

Oil shows full in both sight glasses= too full

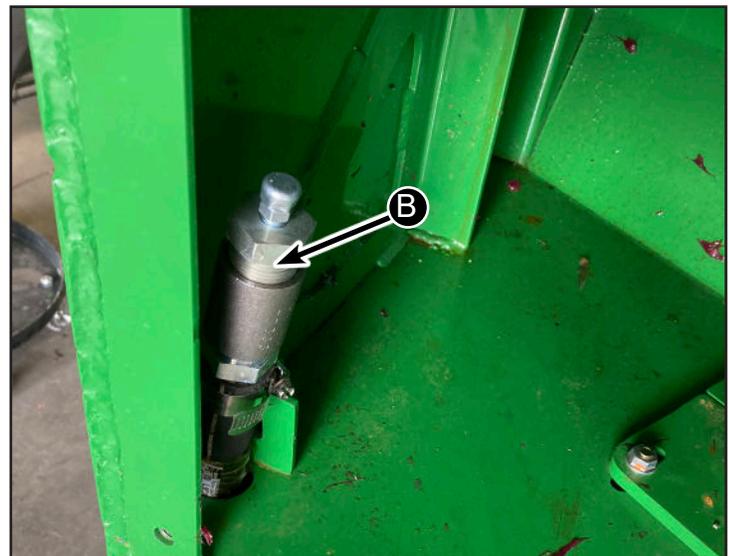
No oil in either sight glass= too low

One sight glass full one empty= level the machine and recheck.  
Having the machine level is very critical to the cutterbar oil level. (See next page for adding oil)

18. Remove filler plug (B).

19. Add John Deere Hy-Gard™ oil, or equivalent.

20. Install filler plug (B) and reinstall cover.

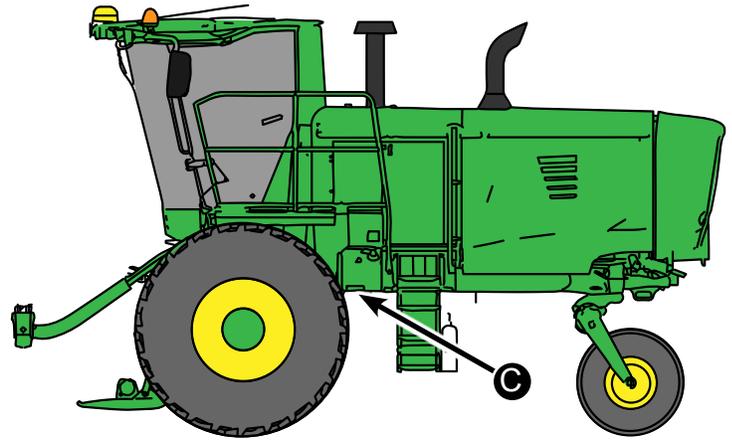


## Every 150 Hours Service or Yearly

Every 150 hours of operation replace return oil filter (A) & case drain filter (B).

Return filter (A) and Case Drain filter (B) are located under machine below operator's station (C).

Replace with John Deere Oil Filter Part No AH128449



### CAUTION

Do NOT attempt to remove or service hydraulic oil filters while engine is running.

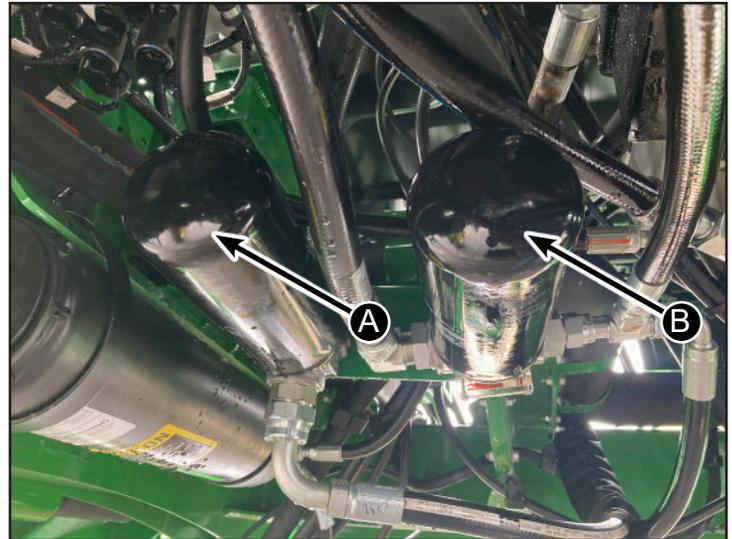
NOTE: Place a bucket under machine frame below hydraulic filters.

1. Remove filters.
2. Apply a light coat of hydraulic oil to seal before installing new filter.
3. Tighten filter until filter seal contacts mounting surface. Tighten an additional 1/2 turn.

### CAUTION

Do NOT check filter seal for leaks when engine is running.

4. Sound horn, start engine, and allow to run for several minutes.
5. Turn off engine and remove key, wait a few minutes, and visually check filter seal for leaks.



A - Return Filter (AH128449)  
B - Case Drain Filter (AH128449)

## Every 150 Hours Service or Yearly

Every 150 hours of operation, clean cutterbar.

### CAUTION

Prevent bodily injury or death. Do not work under or around raised platform without engaging lockout lever. Raise platform, engage platform lift lockout lever, turn off engine, and remove key.

**IMPORTANT:** Buildup of debris can cause excessive wear on cutting components and affect quality of cut.

Remove all crop material, dirt, mud, and debris from around cutterbar and cutting components.



## Check Quill Bearings

Every 200 hours of operation, check quill bearings.

1. Raise front curtains to access cutterbar.
2. If total end play exceeds 1 mm (0.04 in.) at tip of disk (A), replace quill bearing.

	Specification
Disk—End Play.....	1 mm (0.04 in.)



## Service and Troubleshooting

### Theory of Operation: Legacy Air Ultimate Windrower W260R

Controller Version 3.5 Display Version 3.5

Windrowers with Legacy Air Ultimate control systems prior to 2019 can be updated to these software versions.

### Control System Overview:

The Legacy Air system is controlled by a Danfoss MC38-10 controller and DM430E display screen. They communicate via the CAN Bus in the Legacy Air harness which is connected into the John Deere CAN system. The display has four buttons located on the bottom of the face of the display that are used to make inputs or changes to the system. The display is an operational aide and diagnostic tool. Target drum speed can be changed by rotating the John Deere HHS Encoder or by adjusting it in the display. The controller and display screen are connected through the Legacy Air wiring harness to the power strip. If the system is installed on a non-John Deere windrower the CAN bus is completely stand alone.

### Added sensor inputs for the Legacy Air Conversion:

Speed Sensor Left Sensor that monitors the drum speed of number 2 drum on the left side, located on the platform.

Speed Sensor Right Sensor that monitors the drum speed of number 2 drum on the right side, located on the platform.

Pressure Sensor Main Sensor that monitors the main working system pressure, located on the main hydraulic valve block on the platform.

Pressure Sensor Case Drain Sensor that monitors the case drain system pressure, located on the main hydraulic valve block on the platform.

John Deere CAN Bus Switch Data used:

- Seat Switch Switch that detects if operator is present, located in the seat frame.
- Quick Stop Switch Switch that stops the header functions when pressed, located on the hydro handle.
- Platform Engage Switch Switch that engages the platform, located on the armrest.
- Platform Raise Switch Switch that raises the platform, located on the multifunction control handle.

**Legacy Air Drum Control:**

The platform has eight total converging drums: four on the left and four on the right. The left and right drum speeds can be changed independently. The motors are plumbed in two series of four: one series on the left and one series on the right. When the speed (RPM) is changed on the display screen it affects all drums on that side. The speed (RPM) is read off of drum number two on each side.

The operator will press the platform engage switch forward on the armrest which sends a CAN message that the MC38-10 controller will see as an ON. The MC38-10 controller will send out PWM signal to each control valve independently. This signal will vary depending on the target speeds and actual speeds. The DP430E display is used to interface the control system. It allows the operator to adjust the target drum speed, fold and unfold the canopy, spray the water pump, turn on the service lights, set the automatic pump timer, view diagnostic information, and calibrate the system.

The target drum RPM set in the DM430E display can be changed during operation between 500-1800 RPM. Left and right drum target speeds can be set independent of each other. Lastly, MC38-10 software version 3.0 and higher can see the John Deere HHS encoder CAN message and adjust the target drum speed by 100 RPM (default) or 50 RPM (optional) when rotated. When the target speed is adjusted on the display the setting is saved to memory at that time. When the speed is adjusted with the encoder the target speed is saved after five minutes.

When the control system is installed on a non-John Deere windrower a wire is connected to the controller to tell the system the platform is engaged.

**Hydraulic Pump:**

A closed-center load sense pressure compensated axial piston pump has been installed on the auxiliary engine drive. Oil is supplied from the standard John Deere hydraulic oil reservoir. The oil is filtered in an added filter before returning back to the John Deere system. This single pump supplies all the oil used for the Legacy Air System. The standby pressure is 300 PSI and maximum pump pressure is 3000 PSI.

**Main Hydraulic Manifold:**

The main hydraulic manifold is comprised of two proportional control valves, one canopy valve, one system relief valve, one main system pressure sensor, one case drain pressure sensor, and two load sense check valves. The proportional valves control the left or the right converging drums. These valves use PWM signal that is generated from the MC38-10. The canopy valve is a two function cartridge valve with two coils on the stem. It is operated with 12 VDC, one coil will retract the cylinder and the other coil will extend the cylinder, neutral is closed. Canopy speed is regulated by orifices in the manifold. Main system relief is set at 3000 PSI. The system pressure sensor is a John Deere RE204264 operating off 5.0 VDC. The case drain pressure sensor is a John Deere AXE16689 operating off 5.0 VDC. Both pressure sensors have sensor signal wires that return to the MC38-10 controller.

### Hydraulic Motors:

There are eight total hydraulic motors on the platform: four left and four right. The left side motors are plumbed in series starting with the outer motor. The right side motors are plumbed in their own series starting with the outer motor. These motors are either controlled with the left or the right PWM proportional control valve depending on which side of the platform they are located. Regulated pressure oil leaves the center manifold to the left and to the right motors outer motors. The outer two motors on each side are 22.4cc. The third motor in is 26.2cc. The inside motor is 34.4cc. These motors are protected by their own relief valves located in an aluminum block on the platform one on the left and one on the right side. These relief valves are set at 3000 PSI. Case drain oil is routed into these outer manifolds and then combined into the center manifold and then back to the machine. Return oil is routed to the center main manifold and then back to the machine.

### Canopy Cylinder:

A hydraulic cylinder located on the platform raises or lowers the knockdown bar canopy. Its dimensions are 1.5" bore, 1" rod, and 6" stroke.

### Hydraulic Valves:

Valve: .....	Use: Control:
Proportional Left .....	Normally closed valve that meters oil the left motors
PWM	
Proportional Right .....	Normally closed valve that meters oil the right motors
PWM	
Canopy .....	Normally closed valve that extends or retracts the canopy
cylinder .....	12VDC
System Relief .....	Adjustable relief valve set at 3000 PSI Adjustable Spring
Load holding valves .....	Normally closed valve, locks oil to cylinder to hold. unlocks
.....	to allow oil to return to manifold by cross drilled passage.

**Calibration Information:**

Calibration is performed at Papé Machinery after the Legacy Air System controls are installed. The calibration and service screens are located under MENU, SERVICE, Password "18". The Calibration Incomplete message will be displayed until the calibration procedure is completed in the Service Pages. The Pressure calibration will zero the two pressure transducers on the center manifold. The PWM Start and PWM Max calibrations must both be completed without cycling the key to get the Calibration Complete message to display. When calibration is complete the Legacy Air System will be fully functional and turn on with the platform engage switch. Once the calibration has been completed a technician can perform the calibration(s) if necessary at a later date.

**Service Information:**

The DM430E display can force the left and right control valves for a service technician. The calibration and service screens are located under MENU, SERVICE, Password "18". One Service Page 2 there is an option for FORCE. Here the technician can turn on the control valve and then adjust the duty cycle to spool the valves open or closed. Operator must be in the seat to force the valve. Feedback % will be displayed. The closer the feedback is to 100% the better the connection through the coil. The drum speed RPM is also visible on this screen.

**Logic Modules:** These are small programs within the overall control program in the micro controller. This is more in depth view of what logic is behind the Legacy Air operation.

**Sensor Failure:** The main system pressure sensor and case drain pressure sensor signal voltage are monitored by the MC38-10 controller. If the feedback signal goes below 0.2 VDC or the signal goes above 4.9 VDC a "SENSOR FAILURE" CAN message will be sent to the DM430E to be displayed on the screen.

**EEPROM:** This area houses the information that is programmed in when the software payload is downloaded to the controller. The data contained is: Model Year, Serial Number, Control Valve T1, Control Valve P, Control Valve I, Control Valve D, Control Valve Max, Control Valve Min, Deadband Warning Speed, Controller Version M1-M2.

**Memory:** The memory area has settings that are set or adjusted by the operator are saved here. Pump timer information, Speed display, Speed setting, LED settings, Speed Deadband, Calibration Complete.

**Canopy:** The MC38-10 controller will receive a CAN message from the DM430E display to raise or lower the canopy knockdown bar. The MC38-10 is also looking for the Deere CAN message for operator presence. It takes both signals to perform the raise or lower output function.

## **PWM Calibration:**

This calibration is broken into two parts: Start Calibration and Max Calibration. To perform the start calibration the system is looking for a CAN message from the DM430E display button press calibrate PWM start and the Deere CAN message operator's presence is on. The control system will output a PWM signal to the left and right control valves. The system will slowly increase the PWM signal until the RPM on the drum is greater than 700. If the RPM gets above 700 it will decrease the PWM signal. When the system is satisfied that the RPM is between 600 and 700 RPM it will save the setting. When the left and right sides are satisfied the calibration will be completed.

Max calibration the system is looking for a CAN message from the DM430E display button press calibrate PWM max and the Deere CAN message for operator's presence is on. The control system will output a PWM signal to the left and right control valves. The system will slowly increase the PWM signal until the RPM on the drum is greater than 1800. If the RPM gets above 1900 it will decrease the PWM signal. When the system is satisfied that the RPM is between 1800 and 1900 RPM it will save the setting. When the left and right sides are satisfied the calibration will be completed.

**Valve Driver:** The valve driver portion of the control system controls the left and the right valves independently. They are a mirror image of each other. The valve driver is driven by a function called a PID Controller. This control function will have a predetermined setpoint (drum RPM) and will monitor the feedback (drum RPM) while outputting a signal that is converted to PWM signal to the control valve. It will regulate the PWM signal to keep the feedback as close as possible to the setpoint. The response of the PWM signal can be modified through the P Gain, I Gain, and D Gain. These values are preset during the download of the payload into the MC38-10 controller. The PID controller function cannot output any value without the platform engage switch on or if the operator's presence switch is not on.

**Solution Pump:** The solution pump can be operated in manual mode, automatic mode, or timer mode. When in manual mode a button press on the DM430E will tell the MC38-10 to output power to the pump to spray, this is a latching command that will stay on until another button press. Platform raise automatic mode will spray solution if the display is in automatic mode, platform engage switch is on, and the platform raise button is pressed for 700 milliseconds. The pump will run for 5 seconds, 10 seconds, or 15 seconds depending on which time option the customer has selected. Platform lower automatic mode will spray solution continuously after the lower button is held for 200 milliseconds. It will spray continuously until the platform raise button is pressed for 300 milliseconds. The final mode is the timer mode. All the timer mode logic is based in the DM430E display. The operator will set a countdown timer and what interval the pump will spray. For example the customer can choose 4 sprays cycles that last 1 minute each at an interval of 1 hour starting 12 hours from now. The control system will go to sleep after the system is armed only waking up to pump and spray the product. When the final pump cycle is completed the system will automatically power off. If the battery voltage drops below 9.5 volts for 30 seconds the system will power off. If the operator wants to interrupt the pump system after it has been armed, starting the engine will reset the display and controller.

Specifications for Automatic Pump Timer:

Countdown Timer: 0-24 Hours

Spray Duration: 2, 5, or 10 Minutes

Spray Number: 1-8

Spray Interval: 30 or 60 Minutes

Output (auxiliary electric): The system also has an additional 12VDC output that can be used to operate a relay. It can be operated in manual mode, automatic mode, or timer mode. When in manual mode a button press on the DM430E will tell the MC38-10 to output power, this is a latching output that stays on until commanded off with a button press. Platform raise automatic mode will output 12 VDC if the display is in automatic mode, platform engage switch is on, and the platform raise button is pressed for 700 milliseconds. The output 12 VDC will stay on for 5 seconds, 10 seconds, or 15 seconds depending on which time option the customer has selected. Platform lower automatic mode will output 12 VDC continuously after the lower button is held for 200 milliseconds. It will stay on until the platform raise button is pressed for 300 milliseconds.

**Output (auxiliary electric):**

The system also has an additional 12VDC output that can be used to operate a relay. It can be operated in manual mode, automatic mode, or timer mode. When in manual mode a button press on the DM430E will tell the MC38-10 to output power, this is a latching output that stays on until commanded off with a button press. Platform raise automatic mode will output 12 VDC if the display is in automatic mode, platform engage switch is on, and the platform raise button is pressed for 700 milliseconds. The output 12 VDC will stay on for 5 seconds, 10 seconds, or 15 seconds depending on which time option the customer has selected. Platform lower automatic mode will output 12 VDC continuously after the lower button is held for 200 milliseconds. It will stay on until the platform raise button is pressed for 300 milliseconds.

**Filter Restricted:** The added hydraulic filter base has a switch that connects to ground if the filter is restricted. The Filter Restricted message has a delay that will not let it go active until the machine has run 4 minutes and the filter base switch must maintain the “on” signal for 2 seconds before it will display Filter Restricted on the DM430E display.

**Service Lights:** The MC38-10 controller will receive a CAN message from the DM430E display to turn on the service lights. When this message is “on” the output from the controller will be 12VDC on the light circuits.

**Diagnostic Information:**

Service Page 2 Valve Force will override all logic including seat switch. The only thing that can interrupt the output is the quickstop switch on the multifunction lever.

PWM output voltage: OP value 1800 is 2.56 VDC, OP value 3600 is 5.03 VDC, OP Value 6000 is 8.33 VDC

## Calibration of Valves

To enter the calibration you will need a password.  
That password is 18.

You can now select Service 1 or Service 2.

Service 1 is the standard calibration

Service 2 is force or reset calibration

## Service Page 1 Calibrations

When you have entered the SERVICE 1 screen  
you will chose:

**Sensor** Calibration or **Valve** Calibration

With Engine running but header not engaged.  
Do the calibration procedure on the screen this  
will match the electrical output of the sensors to  
the microprocessor.

Legacy Air Ultimate System	
<b>SERVICE</b>	
CALIBRATION COMPLETE <b>SERVICE CODE: 18</b>	
↕	PRESS TO CHANGE THE SERVICE CODE VALUE
↩	PRESS TO ENTER THE CODE
⊙	PRESS ESC TO RETURN TO THE MAIN MENU
⊙	PRESS HOME TO RETURN HOME
SERV1	SERV2

Legacy Air Ultimate System	
<b>SERVICE</b>	
CALIBRATION COMPLETE <b>SERVICE CODE ACCEPTED</b>	
⊙	PRESS THE BUTTON BELOW TO MAKE A SELECTION
⊙	PRESS ESC TO RETURN TO THE MAIN MENU
⊙	PRESS HOME TO RETURN HOME
SERV1	SERV2

Legacy Air Ultimate System	
<b>SERVICE 1</b>	
CALIBRATION COMPLETE	
⊙	SENSOR = PRESSURE SENSOR CALIBRATION
⊙	VALVES: PWM VALVE CALIBRATION
⊙	PRESS THE BUTTON BELOW TO MAKE A SELECTION
⊙	PRESS ESC TO RETURN TO THE MAIN MENU
⊙	PRESS HOME TO RETURN HOME
SERV1	SERV2

Legacy Air Ultimate System	
<b>PRESSURE SENSOR CALIBRATION</b>	
MAIN PRESSURE SENSOR	0.49 VDC
CASE PRESSURE SENSOR	0.47 VDC
⏪	PRESS AND HOLD FOR 2 SECONDS TO CALIBRATE
⊙	PRESS THE BUTTON BELWO TO MAKE A SELECTION
⊙	PRESS ESC FOR SERVICE - HOME RETURNS HOME
SENSOR	VALVES
SERV1	SERV2

## Calibration of PWM Valves

After you complete the Pressure Calibration you will select PWM Start. Have engine WOT but do not turn on the header. Only the drums will turn. Press ARROW shown.

Caution! Drums will rotate! The platform does not need to be engaged. By holding down ARROW the system will start to activate the PWM valves increasing the PWM duty cycle until the drum speed is between 600-700 RPM.

During this time it is determining the voltage required to crack the valves open or start them. Screen will say Calibration complete.

After you complete the PWM start you will select PWM Max. Again have engine WOT but do not turn on the header. Only the drums will turn. Press ARROW shown.

Screen will say Calibration complete.

Additional note: for these to operate properly there needs to be a good speed signal from each side. The microprocessor is using that speed signal.

## Service 2

On Service Page 2 there is a FORCE and RESET option. The FORCE allows the technician to manually send PWM signal to the PWM control valves for the drums.

The RESET will allow the technician to reset.

This is what the Service Control Valve Force screen looks like with the system off.

Legacy Air Ultimate System			
PWM START CALIBRATION			
LH RPM 0		LH PWM START 500	
RH RPM 0		RH PWM START 500	
<p>← PRESS AND HOLD UNTIL CALIBRATION IS COMPLETE</p> <p>⏏ PRESS THE BUTTON BELWO TO MAKE A SELECTION</p> <p>⏏ PRESS ESC FOR SERVICE - HOME RETURNS HOME</p>			
SENSOR	START	MAX	SERV2

Legacy Air Ultimate System			
PWM MAX CALIBRATION			
LH RPM 0		LH PWM MAX 4000	
RH RPM 0		RH PWM MAX 4000	
<p>← PRESS AND HOLD UNTIL CALIBRATION IS COMPLETE</p> <p>⏏ PRESS THE BUTTON BELWO TO MAKE A SELECTION</p> <p>⏏ PRESS ESC FOR SERVICE - HOME RETURNS HOME</p>			
SENSOR	START	MAX	SERV2

Legacy Air Ultimate System			
SERVICE 2			
CALIBRATION COMPLETE			
FORCE : MANUAL VALVE CONTROL			
RESET: TO RESET CALIBRATIONS			
<p>⏏ PRESS THE BUTTON BELOW TO MAKE A SELECTION</p> <p>⏏ PRESS ESC TO RETURN TO THE MAIN MENU</p> <p>⏏ PRESS HOME TO RETURN HOME</p>			
FORCE	RESET	SERV1	SERV2

Legacy Air Ultimate System			
PWM VALVE FORCE			
LH RPM 0	OFF	RH RPM 0	
OUTPUT 0		OUTPUT 0	
FEEDBACK 0%	DUTY CYCLE 0	FEEDBACK 0%	
<p>⬆ PRESS TO CHANGE THE DUTY CYCLE</p> <p>← PRESS TO FORCE THE VALVES ON/OFF</p> <p>⏏ PRESS THE BUTTON BELOW TO MAKE A SELECTION</p> <p>⏏ PRESS HOME TO RETURN HOME</p>			
FORCE	RESET	SERV1	SERV2

This is what the Service Control Valve Force screen looks like when you start to increase the duty cycle of the valve.

Legacy Air Ultimate System			
PWM VALVE FORCE			
LH RPM 800 OUTPUT 1600 FEEDBACK 90%	OFF DUTY CYCLE 50	RH RPM 800 OUTPUT 1600 FEEDBACK 90%	
	PRESS TO CHANGE THE DUTY CYCLE		
	PRESS TO FORCE THE VALVES ON/OFF		
	PRESS THE BUTTON BELOW TO MAKE A SELECTION		
	PRESS HOME TO RETURN HOME		
FORCE	RESET	SERV1	SERV2

If you need to reset the calibration and start over you can do that here. This resets both the Start and the Max Calibration. This also resets the pressure calibrations.

Legacy Air Ultimate System			
RESET CALIBRATION			
CALIBRATION COMPLETE			
<b>WARNING!</b>			
ALL CALIBRATIONS WILL RETURN TO 0 IF RESET			
	PRESS AND HOLD FOR 5 SECONDS TO RESET		
	PRESS THE BUTTON BELOW TO MAKE A SELECTION		
	PRESS ESC FOR SERVICE - HOME RETURNS HOME		
FORCE	RESET	SERV1	SERV2

## Electrical System and Components

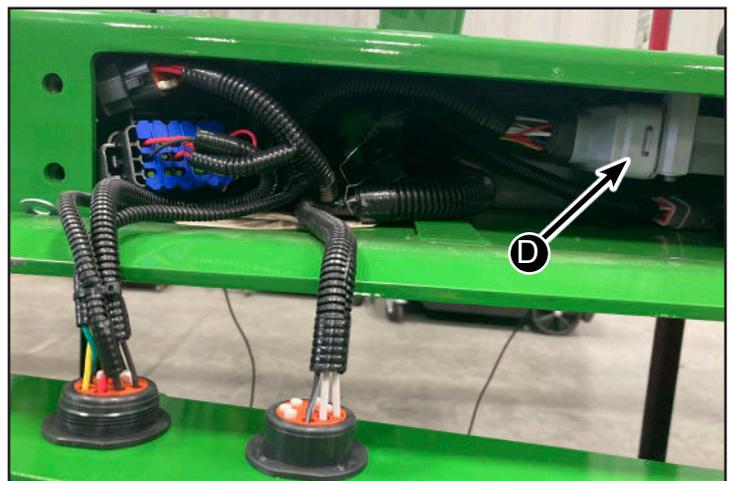
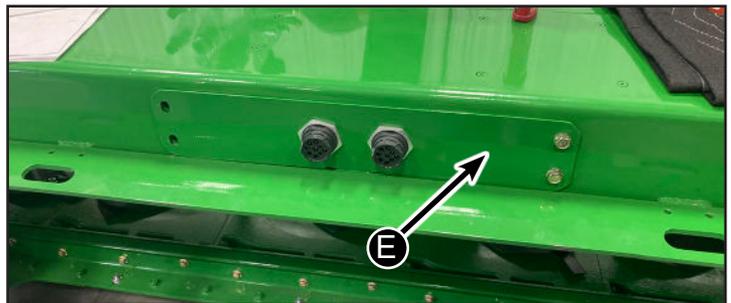
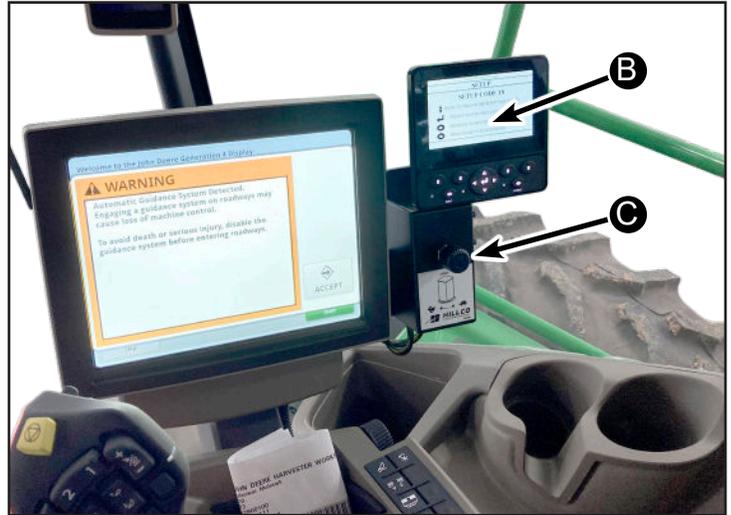
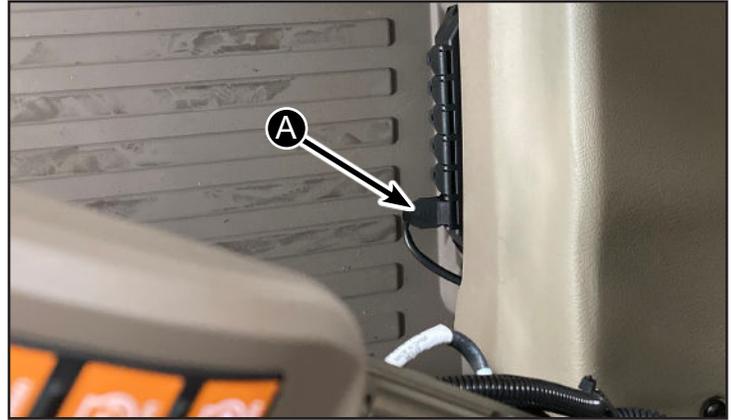
Electrical system power source is the John Deere power strip (A) on the RH floor of the operators station. It plugs into a standard slot and uses both the Red (power live) and Orange (key power) posts in the power strip along with the ground wire.

When the key is turned on the power comes on the orange wire and triggers the relay for power for both the screen and the microprocessor. In addition to the power and ground that they share they also have CAN wires to communicate on.

The screen (B) is mounted beside the John Deere control screen. The operators section explains how to navigate the monitor screen. Below the screen is the drum speed dial (C).

The controller (D) is located on the platform behind the electrical connectors (E). When properly powered there is a green light on the face of the controller.

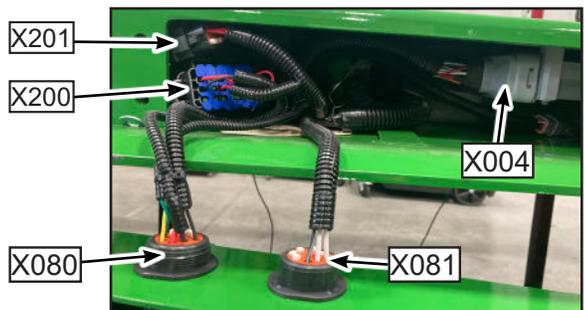
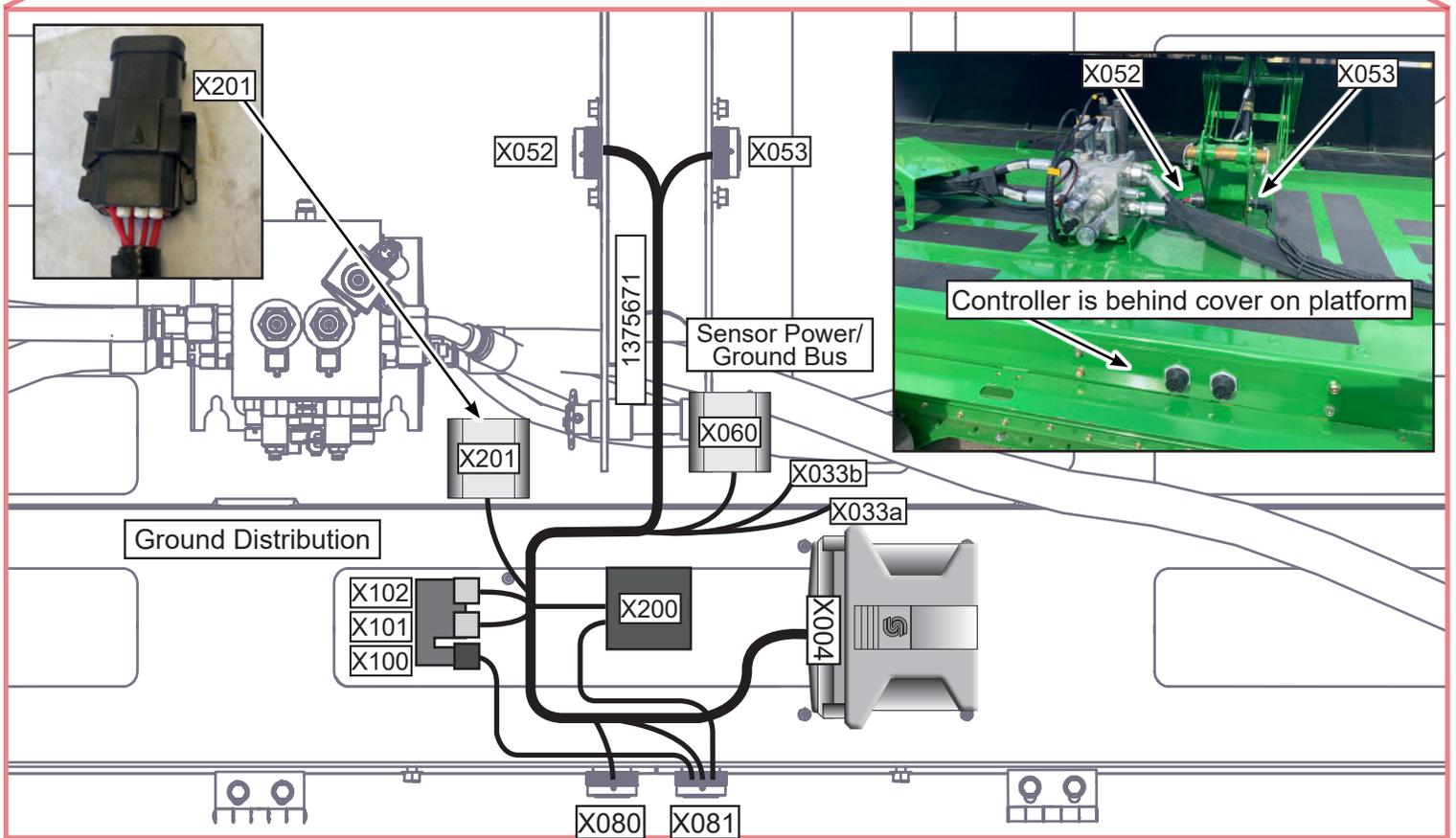
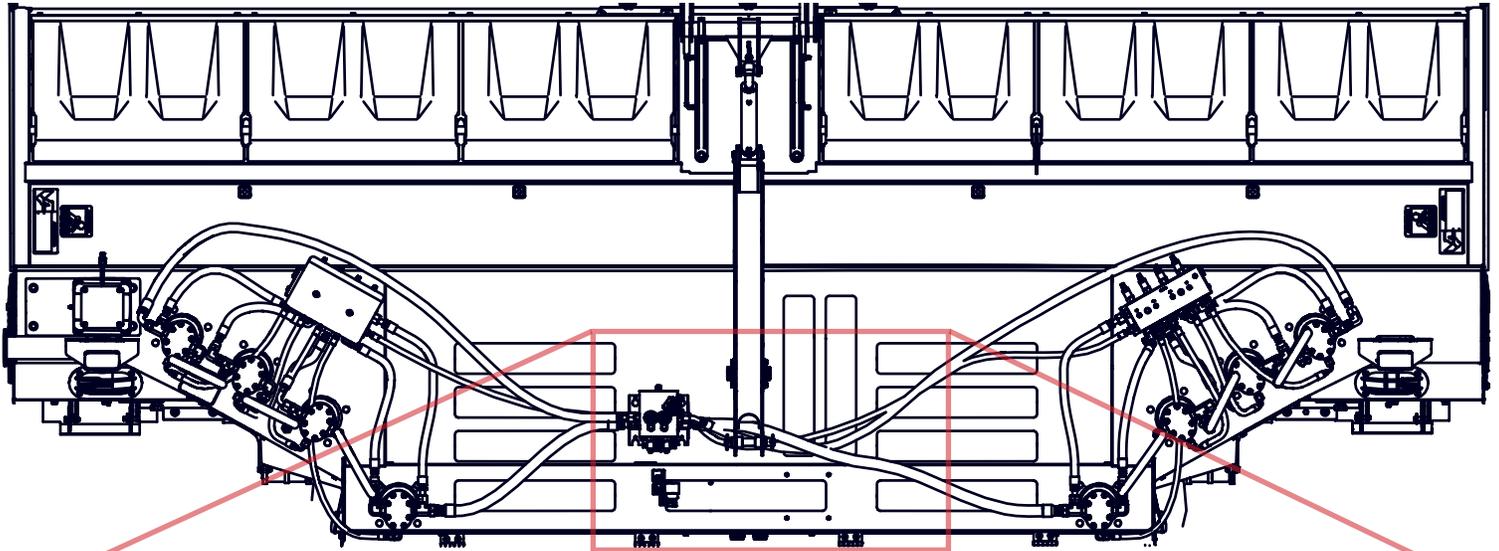
To access the controller remove the 4 bolts.



# Electrical Schematics and Harnesses

## Primary Wiring Harness (1375671)

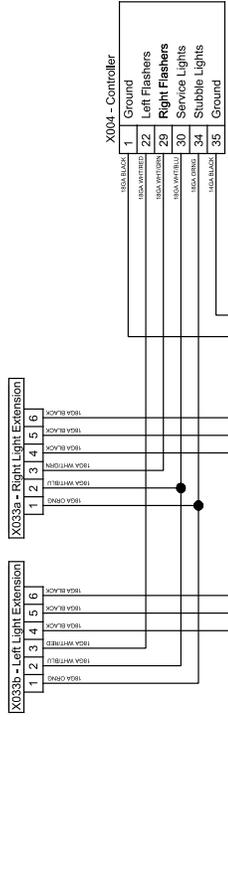
Harness is located inside of platform.





REV.	DESCRIPTION	DATE	BY	WELD SYMBOLS	Part #	1375671	C
A	Released for Production	01/05/2022	SJM	01/05/2022	DT ASM - HARNESS HCU PRIMARY		
B	Shortened legs 2 and 3 and replaced X35 & X01 w/ X081 & X081	02/02/2022	SJM	02/02/2022	Description	DT ASM - HARNESS HCU PRIMARY	Freightment
C	Corrected part numbers for X100 housing and terminal & X200 pin assignments	04/11/2022	SJM	04/11/2022	Material	SEE BELOW	Freightment
					Designated	US, DV, P, S, W, N/A	
					UNIT OF MEASURE	INCHES	Sheet 2 of 2
					Weld according to HILCO welding Standards	Doc: TP-06280000A	

LIGHTS



1	WIRE BLACK
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11	WIRE BLACK
12	WIRE BLACK

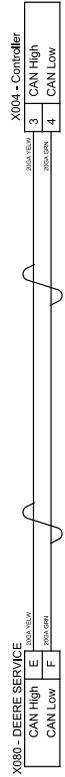
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9	WIRE BLACK
10	WIRE BLACK
11	WIRE BLACK
12	WIRE BLACK

CAN BUS

WIRES SHALL FORM A TWISTED PAIR PER SAE J1939-15  
 CABLE TWISTING MUST BEGIN AT LEAST 2 INCHES FROM THE CONNECTOR TERMINALS  
 CABLE TWIST RATE SHALL BE A MINIMUM OF 1 TWIST PER INCH



1	WIRE YELLOW
2	WIRE GREEN
3	CAN High
4	CAN Low

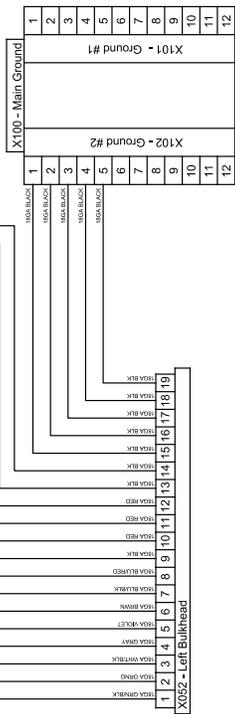
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C	WIRE WHITE
D	WIRE WHITE

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28	WIRE BLACK
32	WIRE BLACK
33	WIRE BLACK



1	WIRE YELLOW
2	WIRE GREEN
3	CAN High
4	CAN Low

1	WIRE BLACK
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12	WIRE BLACK

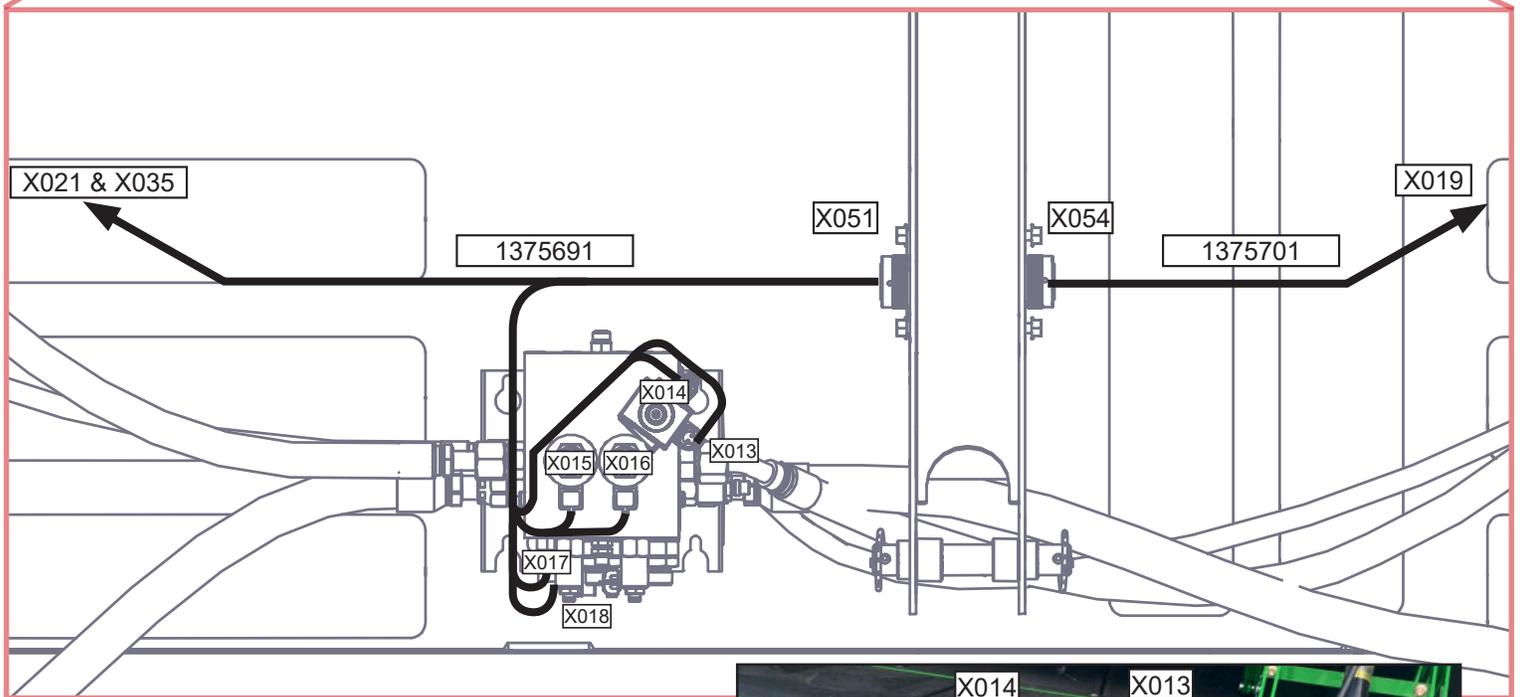
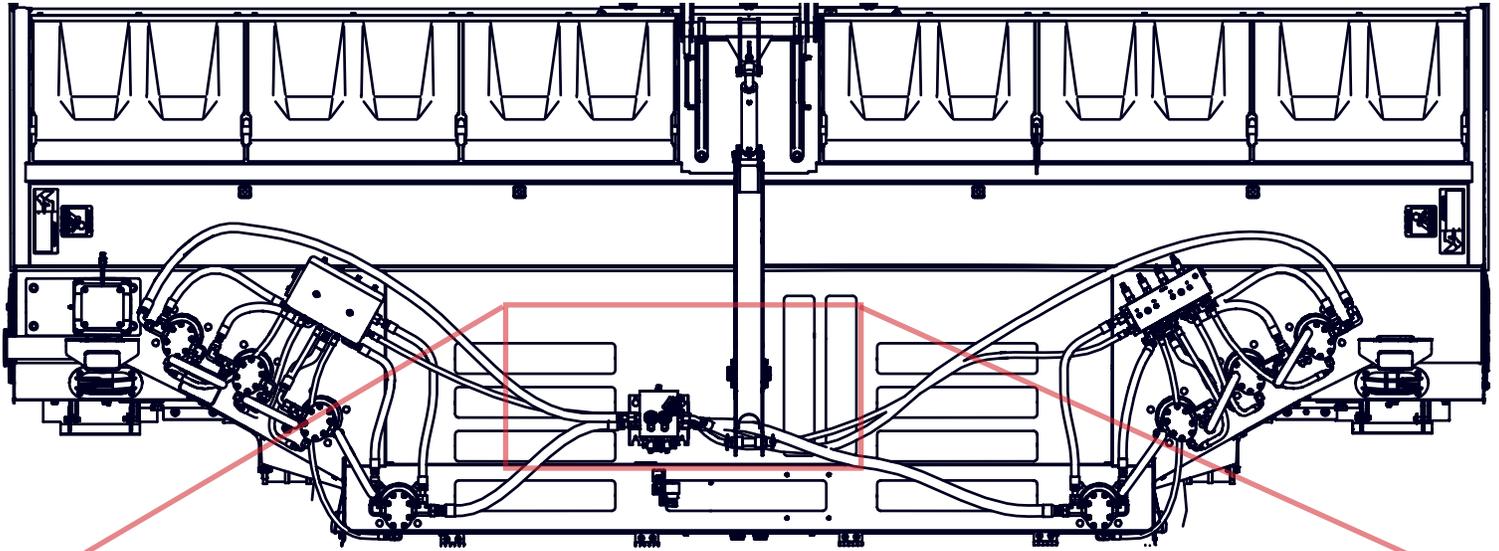
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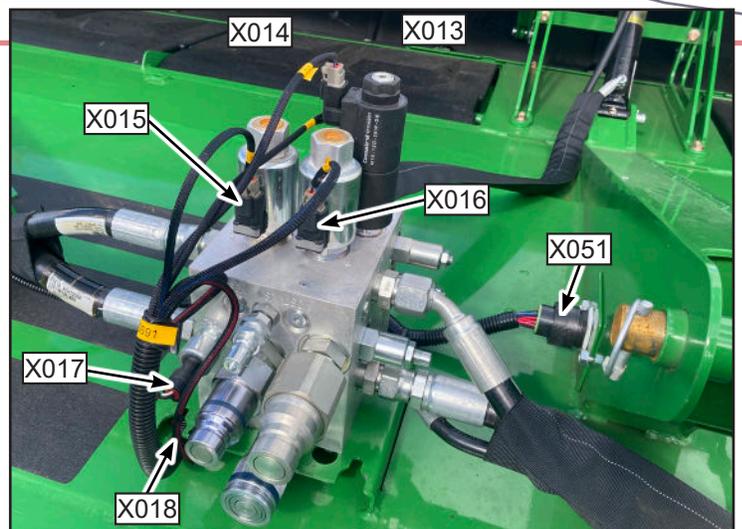
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12	WIRE BLACK

# Manifold Harness & Speed Sensor Harness (1375691 & 1375701)

Harness is located on top of platform by middle manifold.



D-220415CMA01



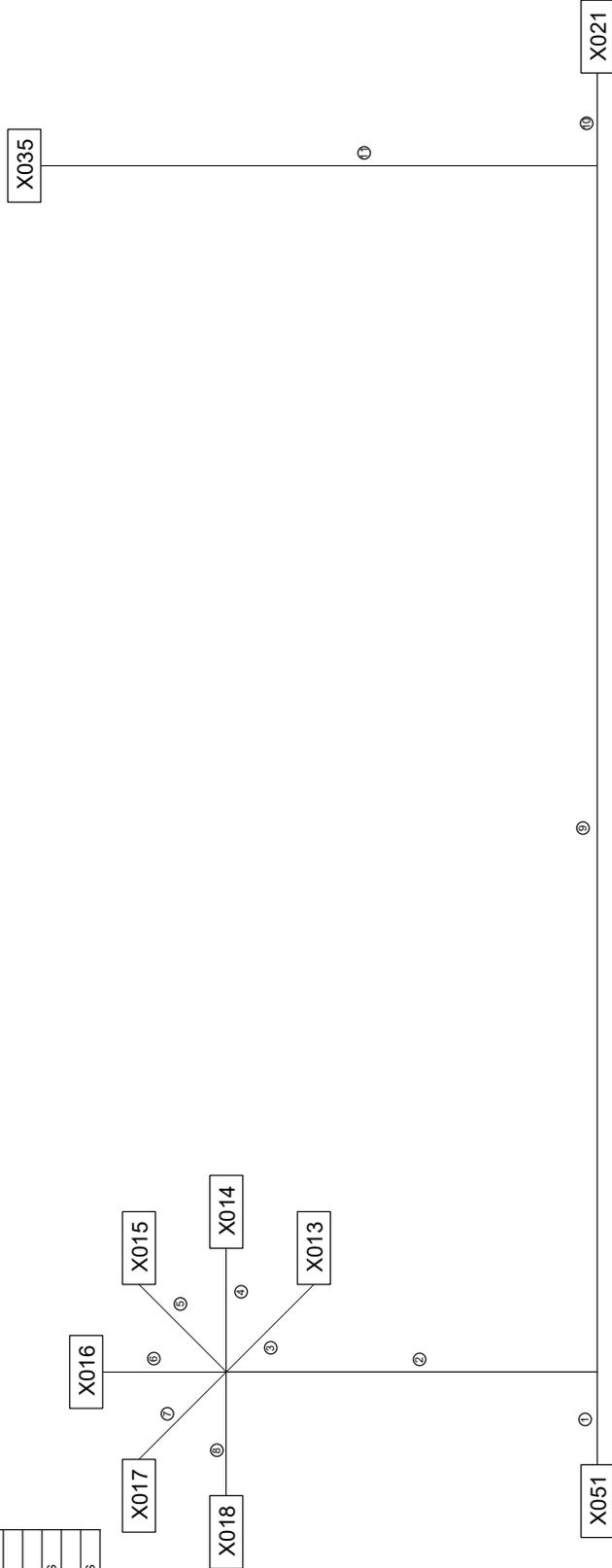
Hillco Technologies, Inc.

April 2022

REV.	DESCRIPTION	DATE	BY	WELD SYMBOLS	HILCO	PART #	1375691	B
A	Released for Production	01/10/2022	SJV	Regular = 11° TOLERANCES See 81	OT ASM, HARNESS, HCU LEFT CONTROL			
B	Revised W02 to W03 to avoid confusion	02/15/2022	SJV	xxx ± 0.05 xxxx ± 0.05 UNIT OF MEASURE: INCHES Weld according to HILCO Welding Standards Doc ID: 062141000a	DESCRIPTION SEE BELOW Material S/WV Designed S/WV Sheet 1 of 2 V/U N/A			

CONNECTOR	DESCRIPTION	TYPE	HOUSING PART #	TERMINAL PART #	ACCESSORIES PART #
X051	LEFT BULKHEAD	DEUTSCH	HDP26-16-21SN	0462-201-20141	HD30-18BT-BK, 0413-204-2005
X013	KDB RAISE COIL	DEUTSCH	DT06-2S	0462-201-16141	W2S
X014	KDB LOWER COIL	DEUTSCH	DT06-2S	0462-201-16141	W2S
X015	PWM RIGHT COIL	DEUTSCH	DT06-2S	0462-201-16141	W2S
X016	PWM LEFT COIL	DEUTSCH	DT06-2S	0462-201-16141	W2S
X017	WORK PRESSURE SENSOR	APTIV	12065287	12048074	
X018	CD PRESSURE SENSOR	AMPEAL 16	776426-1	1924464-1	
X021	LEFT MOTOR SPEED SENSOR	DEUTSCH	DTM06-3S	0462-201-20141	WM1-3S
X035	CUTTERBAR SPEED SENSOR	APTIV	12010973	12089040	

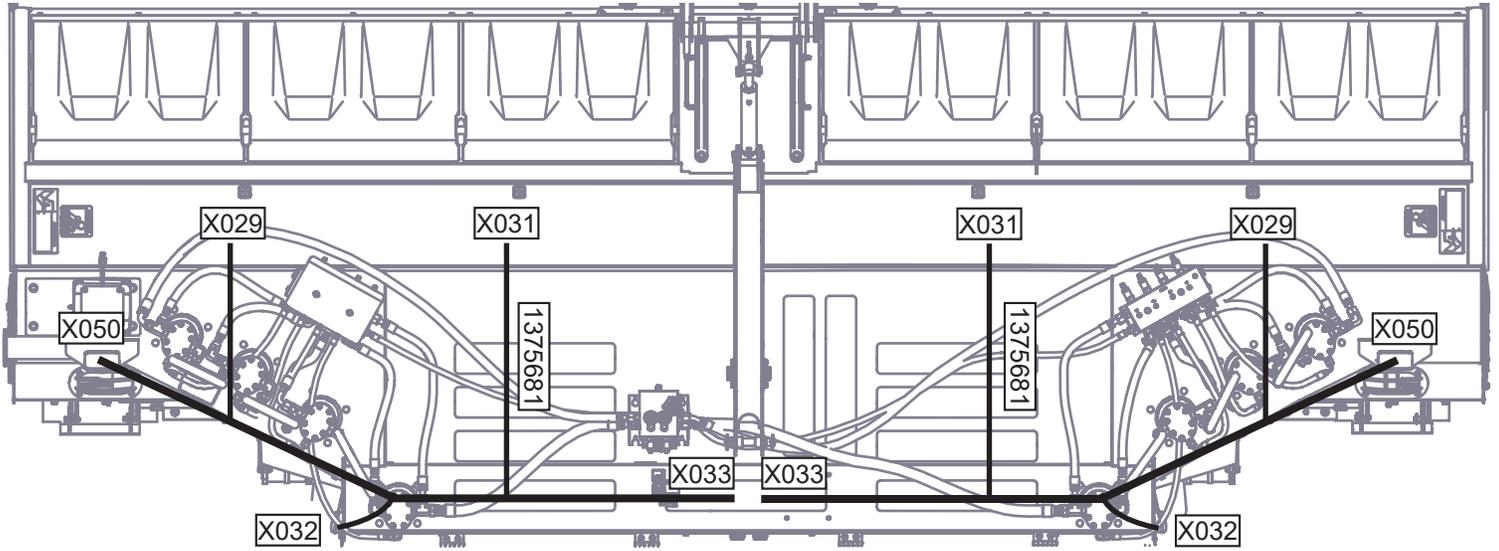
BRANCH	LENGTH
1	6 INCHES
2	24 INCHES
3	8 INCHES
4	8 INCHES
5	8 INCHES
6	8 INCHES
7	8 INCHES
8	8 INCHES
9	78 INCHES
10	6 INCHES
11	36 INCHES







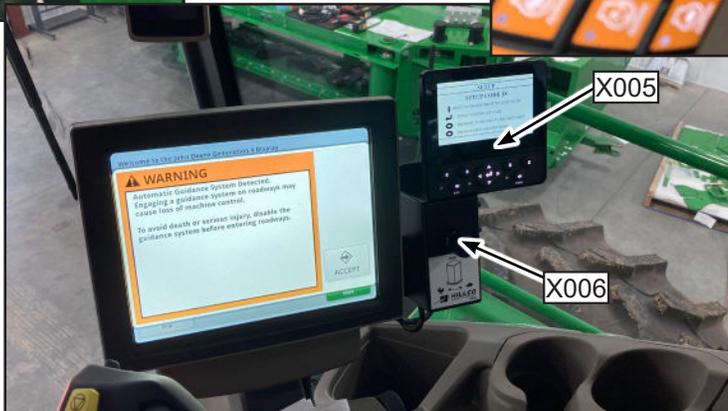
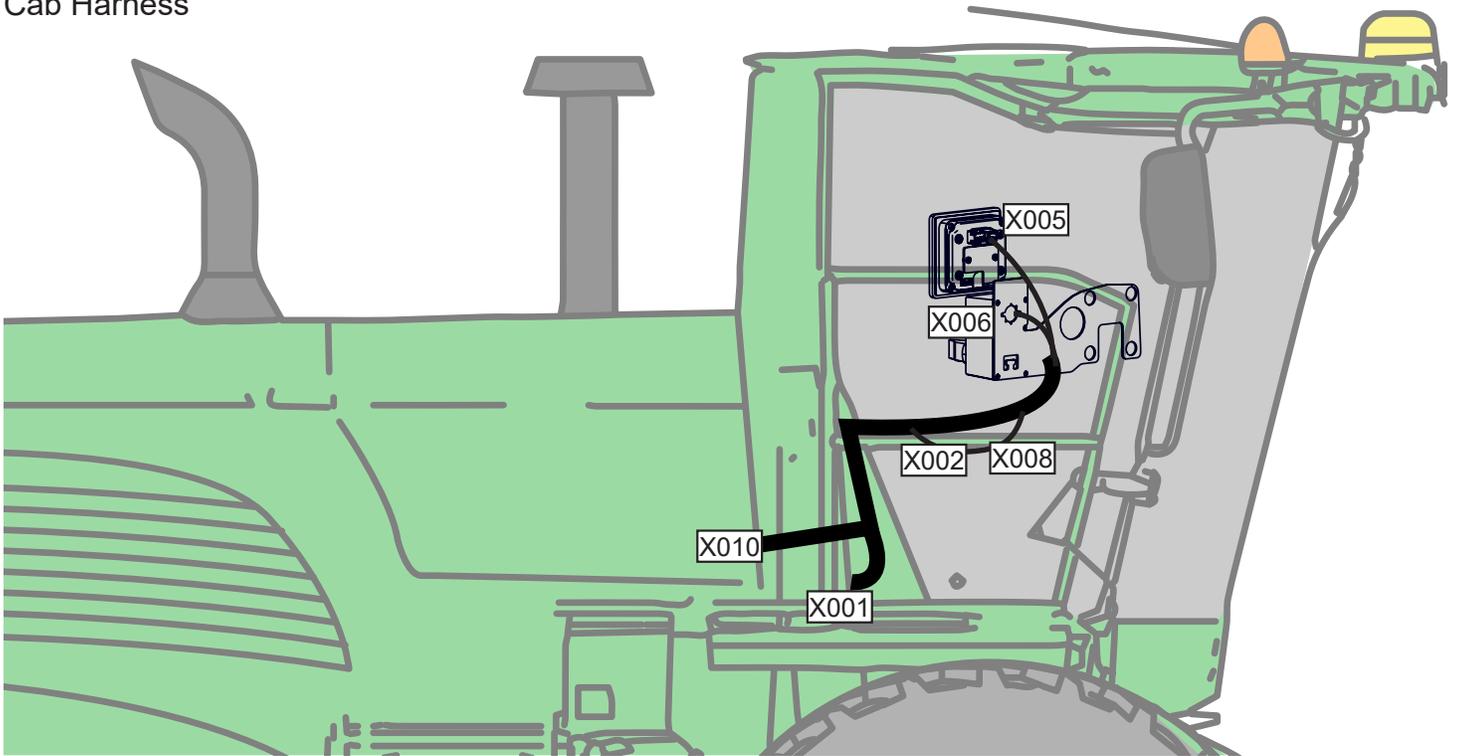
**Light harness (1375681)**  
Installed inside of platform





# HCU Harness (1375992)

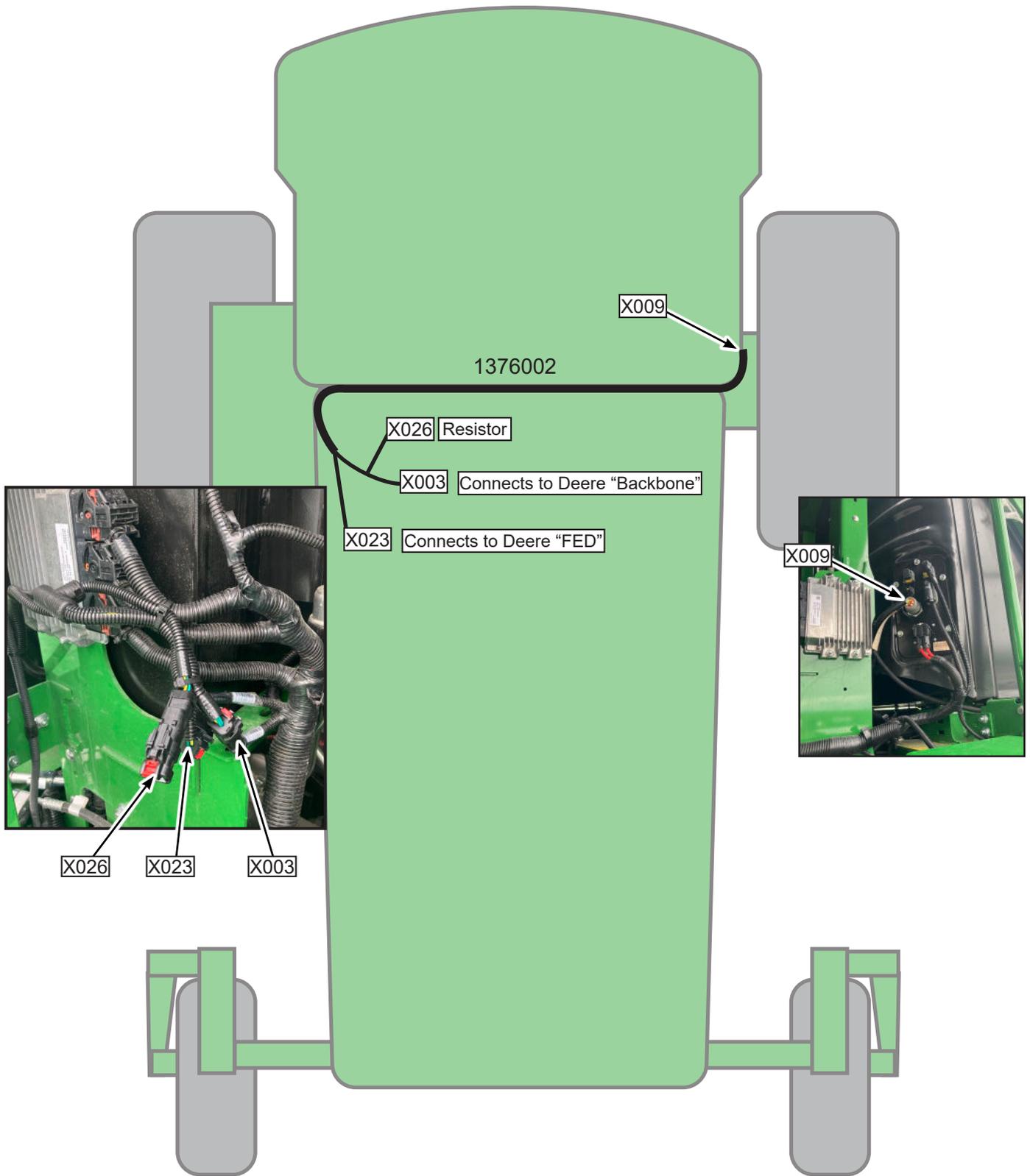
## Cab Harness





# HCU CAN Extension Harness (1376002)

Cab Harness

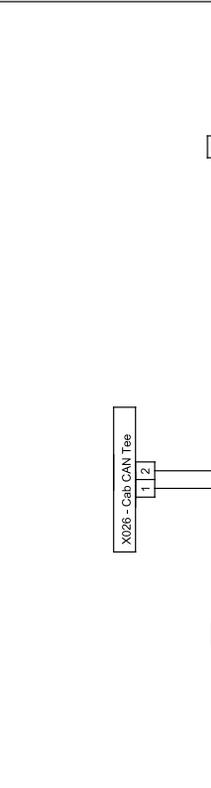


REV.	DESCRIPTION	DATE	BY	DESCRIPTION	Part #	1376002	B
A	Released for Production Lengthened branch 3 1/2"	04/13/2022	SJM	OT ASM. HARNESS. HCU CAN EXTENSION			
B		04/26/2022	SJM				

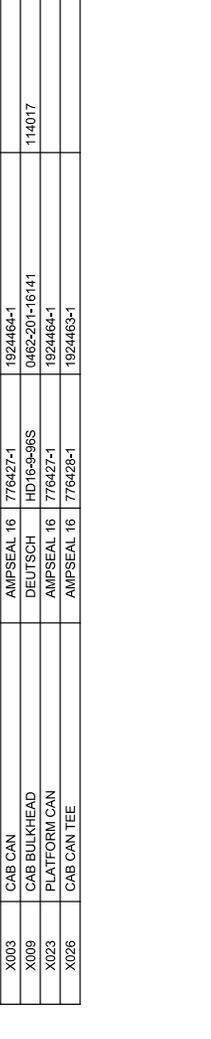
MAX. WIRE SIZE	TO INCH SCALE	DESCRIPTION	OT ASM. HARNESS. HCU CAN EXTENSION
14-2	1/16	Material	SEE BELOW
14-2	1/16	Designated	T/SJW
14-2	1/16	Sheet 1 of 2	N/A
UNIT OF MEASURE	INCHES	Weight	N/A
Weld according to ILLICO Welding Standards	Doc. #P-002/01/01/01	Treatment	NONE

CONNECTOR	DESCRIPTION	TYPE	HOUSING PART #	TERMINAL PART #	ACCESSORIES PART #
X003	CAB CAN	AMPSEAL 16	776427-1	1924464-1	
X009	CAB BULKHEAD	DEUTSCH	HD16-3-96S	0462-201-16141	114017
X023	PLATFORM CAN	AMPSEAL 16	776427-1	1924464-1	
X026	CAB CAN TEE	AMPSEAL 16	776428-1	1924463-1	

CONNECTOR	DESCRIPTION	TYPE	HOUSING PART #	TERMINAL PART #	ACCESSORIES PART #
X003	CAB CAN	AMPSEAL 16	776427-1	1924464-1	
X009	CAB BULKHEAD	DEUTSCH	HD16-3-96S	0462-201-16141	114017
X023	PLATFORM CAN	AMPSEAL 16	776427-1	1924464-1	
X026	CAB CAN TEE	AMPSEAL 16	776428-1	1924463-1	



BRANCH	LENGTH
1	8 INCHES
2	8 INCHES
3	74 INCHES
4	8 INCHES



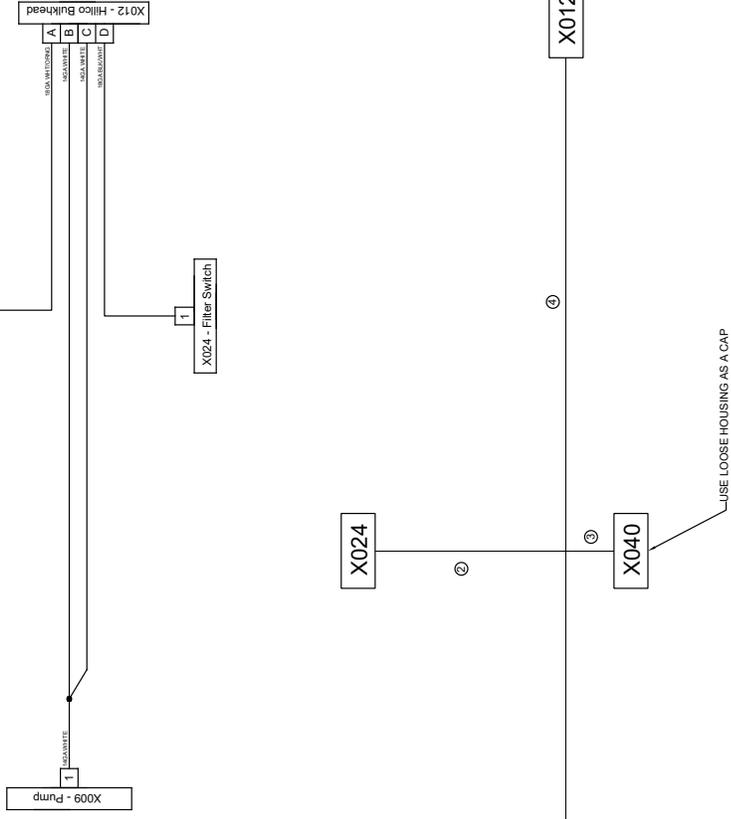
CONNECTOR	DESCRIPTION	TYPE	HOUSING PART #	TERMINAL PART #	ACCESSORIES PART #
X003	CAB CAN	AMPSEAL 16	776427-1	1924464-1	
X009	CAB BULKHEAD	DEUTSCH	HD16-3-96S	0462-201-16141	114017
X023	PLATFORM CAN	AMPSEAL 16	776427-1	1924464-1	
X026	CAB CAN TEE	AMPSEAL 16	776428-1	1924463-1	

REV. A	DESCRIPTION	DATE	BY	SCALE	DESCRIPTION	OT ASM. HARNESS, WETKIT	PART #	1376011	B
B	Released for Production	07/19/2022	SJM	1:1	Revised X011 to X012 to avoid confusion	SEE BELOW			

UNIT OF MEASURE	INCHES	DESIGNED	TSJW	DRAWN	TSJW
TOLERANCES	±.005	±.005	±.005	±.005	±.005
WELDING	Weld according to HILLCO Welding Standards	Doc. 10-0024/000A			

CONNECTOR	DESCRIPTION	TYPE	HOUSING PART #	TERMINAL PART #	ACCESSORIES PART #
X009	PUMP	MOLEX		19606-0005	
X012	HILLCO BULKHEAD	DEUTSCH	HD10-9-96P-E025	04602-215-16141	2411-002-1805, 114017
X024	FILTER SWITCH	MOLEX		19044-0075	
X040	AUXILIARY OUTPUT	APTIV	12010996	12089040	15324982, 12015791, 12010300

BRANCH	LENGTH
1	118 INCHES
2	24 INCHES
3	6 INCHES
4	62 INCHES

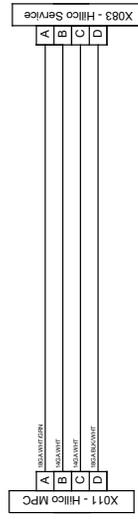




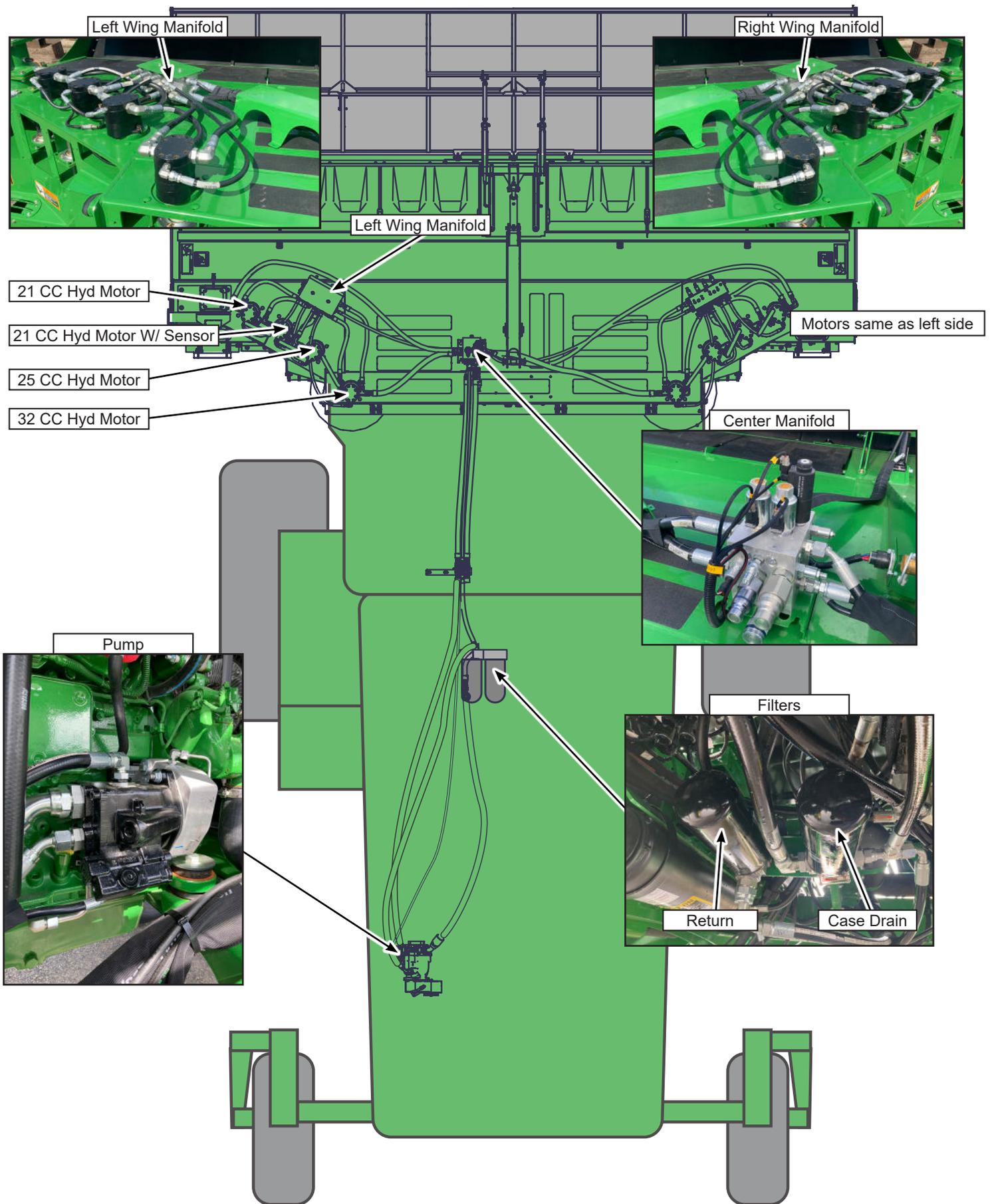
REV. A	DESCRIPTION Released for Production	DATE 02/02/2022	BY SJM	 <b>HILLCO</b> Part # 1376251 HILLCO SERVICE	A
HILLCO SERVICE 1376251 0462-201-16141		DATE 02/02/2022	BY SJM	Description: OT ASM HAR HILLCO SERVICE Material: SEE BELOW Treatment: NONE Qty: 1000 Price: \$117 Size: 4.00 Weight: 0.005 Design: SUNJ Drum: SUNJ Unit of Measure: INCHES Sheet 1 of 1 W/P: N/A Doc ID: 0261000A	All information contained in this document is confidential and proprietary. Do not distribute or reproduce without Hillco Technologies, Inc.'s written permission. Any use, except that for which it may be licensed, is prohibited.

CONNECTOR TABLE				
CONNECTOR	DESCRIPTION	TYPE	HOUSING PART #	TERMINAL PART #
X011	HILLCO MPC	DEUTSCH	HD16-9-96S	A ACCESSORIES PART # HD30-18BT-BK, 114017
X083	HILLCO SERVICE	DEUTSCH	HD16-9-96S	HD30-18BT-BK, 114017

LENGTH TABLE	
BRANCH	LENGTH
1	70 INCHES



# Hydraulic Components & Schematic



# Hydraulic Schematic

