



# Operator's Manual

(SN21001-21999)

**Model JS7020 & JS9020**  
**Sidehill Leveling System**  
**S650, S660, S670, S680 & S690**  
**S760, S770, S780 & S790**

D-171206CMA01C  
April, 2021

	 <b>WARNING</b>
	<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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## Model and Serial Number



Write the serial number and the model number of the leveling system and combine on the lines provided. It is important to reference these numbers when ordering parts or requesting technical support. We suggest that you give the leveling system serial number to your John Deere dealer to be kept with their combine serial number records.

(circle one)

Leveling System Model Number	JS7020	JS9020
Leveling System Serial Number		
Combine Model Number		
Combine Serial Number		

## Maximum Header Weights

JS9020	11,700 lbs
JS7020	11,700 lbs

Hillco does not guarantee any non-John Deere header applications and will not be responsible for any damage incurred from improper header configurations.

Please call Hillco Technologies if you have any questions regarding the JS7020 & JS9020 or any other header configuration.

## Introduction

Thank you for choosing the Hillco Technologies' Sidehill Leveling System to compliment your farming operation. This product has been designed and manufactured to meet the needs of farmers wanting to increase the performance of John Deere S Series combines.

Safe, efficient and trouble free use of your Sidehill Leveling System requires that you, and anyone else who will be operating or maintaining the leveling system, read and understand the safety, operation, and maintenance information contained in the Operator's Manual.

If extra copies of the operator's manual are needed, contact Hillco at 1-800-937-2461 or download it from Hillco Technologies' website at [www.hillcotechnologies.com](http://www.hillcotechnologies.com)



Keep this manual handy for frequent reference and to pass on to new operators or owners. Call your Hillco dealer or Hillco if you need assistance or information at 1-800-937-2461.

**OPERATOR ORIENTATION** – The directions left, right, front, and rear, as mentioned throughout this manual, are as seen from the combine operator's seat and facing in the direction of forward travel.

## 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:



**DANGER** - An immediate and specific hazard, which WILL result in severe personal injury or death if the proper precautions are not taken.



**WARNING** - A specific hazard or unsafe practice, which COULD result in severe personal injury or death if proper precautions are not taken.



**CAUTION** - Unsafe practices which COULD result in personal injury if proper practices are not taken, or as a reminder of good safety practices.



**NOTICE** - is used to address practices not related to physical injury.

## Operation Safety

1. Read and understand the Operator's Manual and all safety labels before operating the leveling system.
2. Make sure that all controls are in the manual position before starting the combine.
3. Clear the area of all bystanders, especially children, before starting the leveling system and during operation.
4. Make sure all safety shields are in place before operating the combine. Never operate the machine with the shields removed.
5. Keep hands, feet, hair and clothing away from all moving and/or rotating parts.
6. Stay seated in the cab during operation.
7. Operate controls only when sitting in the seat of the combine.
8. To avoid engine damage, do not run the machine for extended periods of time when it is in the leveled over position.
9. Always travel at a safe speed. Use caution when making turns or traversing ditches.
10. The leveling system is equipped with a maximum level warning lamp. This lamp indicates when the machine has reached its maximum leveling capability. There are restrictions as to tread width and tire selection for combines used in harvesting slopes greater than the maximum leveling capability of the leveling system.
11. The use of after-market grain tank extensions is prohibited from use on combines equipped with Hillco Leveling Systems.
12. Level Limit Stops should be used on combines that rely on the limit switches to stop the leveling prematurely to prevent sheet metal damage.

## Hydraulic Safety

1. Do not search for high-pressure hydraulic leaks without hand and face protection. A tiny, almost invisible leak can penetrate skin, thereby requiring immediate medical attention.
2. Use cardboard or wood to detect leaks – never your hands!
3. Before inspecting the hydraulic system of the leveling system, install the safety stops.
4. Before operating the leveling system, ensure that there are no obstructions between the chassis and the carriage.
5. Maintain proper hydraulic fluid levels.
6. Ensure all fittings and hoses are in good repair.
7. Do not make any repairs to the leveling system hydraulic system including: valves, hydraulic hoses, adapters, pumps, manifolds, or reservoirs without first contacting your authorized Hillco dealer.



## **Service and Maintenance Safety**

1. Review the Operator's Manual and all safety items before servicing or maintaining the leveling system.
2. Place the Auto/Manual leveling switch in the "Manual" position, stop the combine engine, wait for any moving parts to stop, block the tires, the header, and the cylinder areas before servicing, repairing, adjusting, or maintaining the leveling system.
3. Hydraulic oil is under pressure. Use caution when dealing with the hydraulic system.
4. Keep hands, feet, clothing and hair away from all moving and/or rotating parts.
5. Clear the area of bystanders, especially children, when carrying out any maintenance, repairs or making any adjustments.

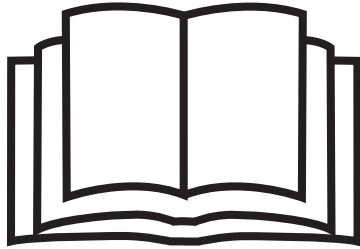
## **Highway Operation and Transport Safety**

1. Check with local authorities regarding combine transport on public roads. Obey all applicable regulations and laws.
2. Check clearance, elevations and widths of combine for travel near power lines, bridges, trees, etc.
3. Make sure the Auto/Manual leveling toggle switch is in the "Manual" position for all transport and highway travel situations.
4. Always travel at a safe speed. Use caution when making corners or meeting traffic.

## 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.



**! DANGER**



**HYDRAULIC HAZARD**

- Loss of hydraulic pressure may cause combine to tip.
- Read operator's manual before disconnecting any hydraulic components.

LL20-100788



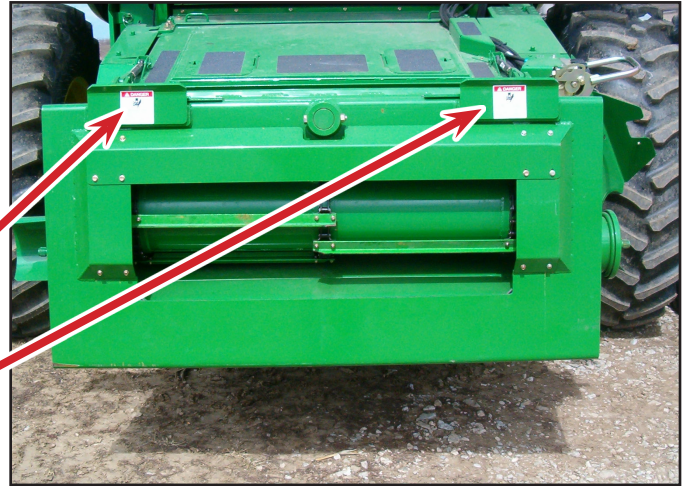
**! DANGER**



**AVOID CRUSHING INJURY**  
Install safety stops on the main leveling cylinders before performing repair or maintenance on the leveling system to prevent accidental tipping of combine chassis.



LL-143621



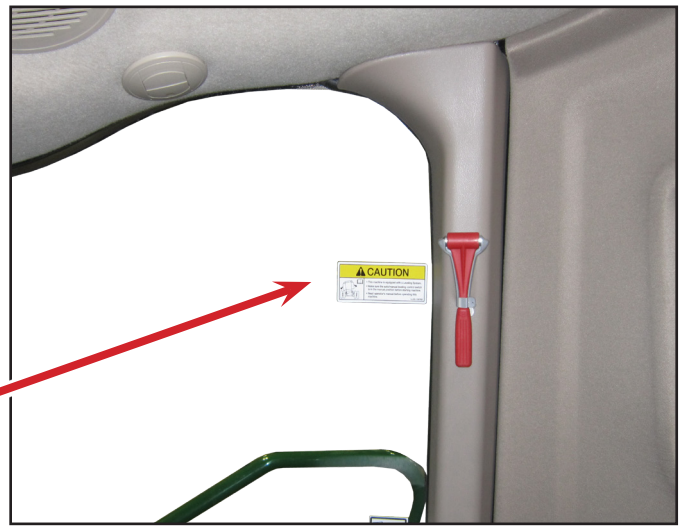
**! DANGER**




**PINCH POINT HAZARD**

- Keep hands, feet and body away from moving parts.
- Do not stand or climb on machine when operating.
- Hazard occurs during leveling and header trim.

LL20-100784



**! CAUTION**



- This machine is equipped with a Leveling System.
- Make sure the Auto/Manual leveling control switch is in the manual position before starting machine.
- Read operator's manual before operating this machine.

LL20-100782

**! DANGER**



**CRUSHING HAZARD**  
To prevent serious injury or death:

- Keep all persons and objects clear while any part of this machine is in motion.

LL20-100783



**! CAUTION**

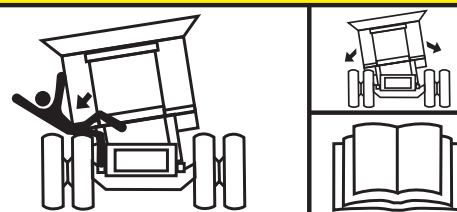


**MOVING STEP HAZARD**  
Bottom step lowers and retracts upward.  
Use caution when using ladder.

LL20-100785



**! CAUTION**



**LEVELING SYSTEM HAZARD**

- This machine is equipped with a leveling system.
- Combine chassis moves independent of carriage.
- Read operator's manual and be aware of hazardous areas at all times.

LL20-100787

**! DANGER**





**HYDRAULIC HAZARD**

- Loss of hydraulic pressure may cause combine to tip.
- Read operator's manual before disconnecting any hydraulic components.

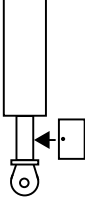
LL20-100788



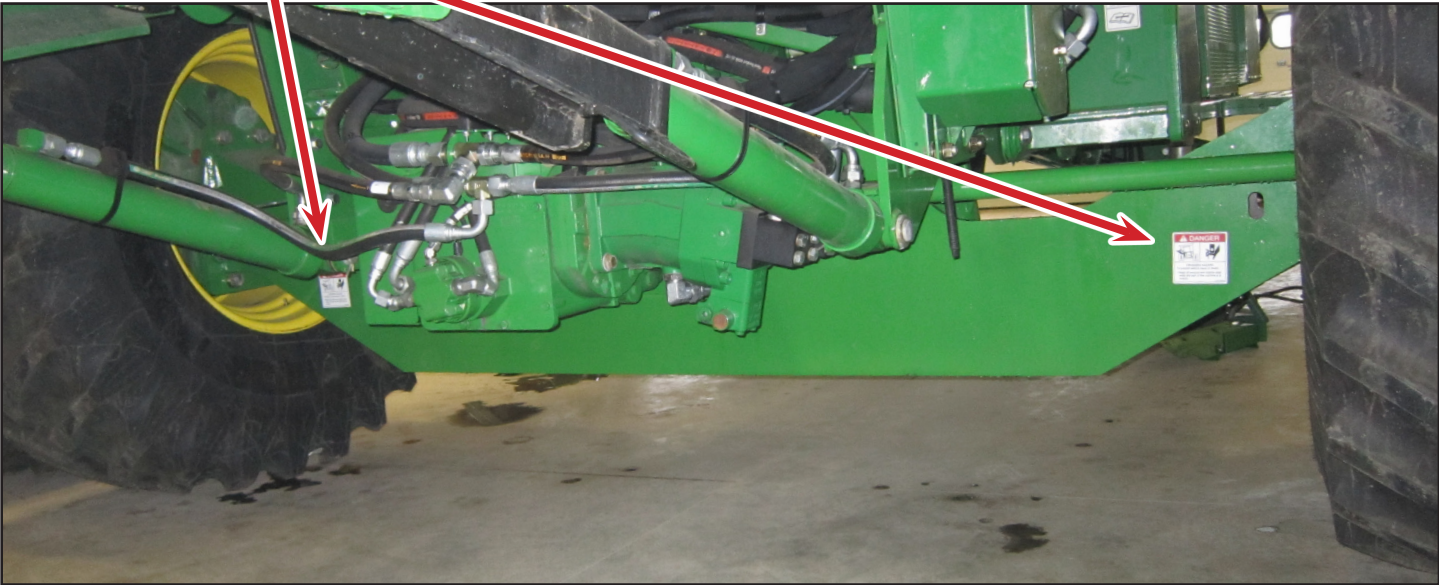
**! DANGER**

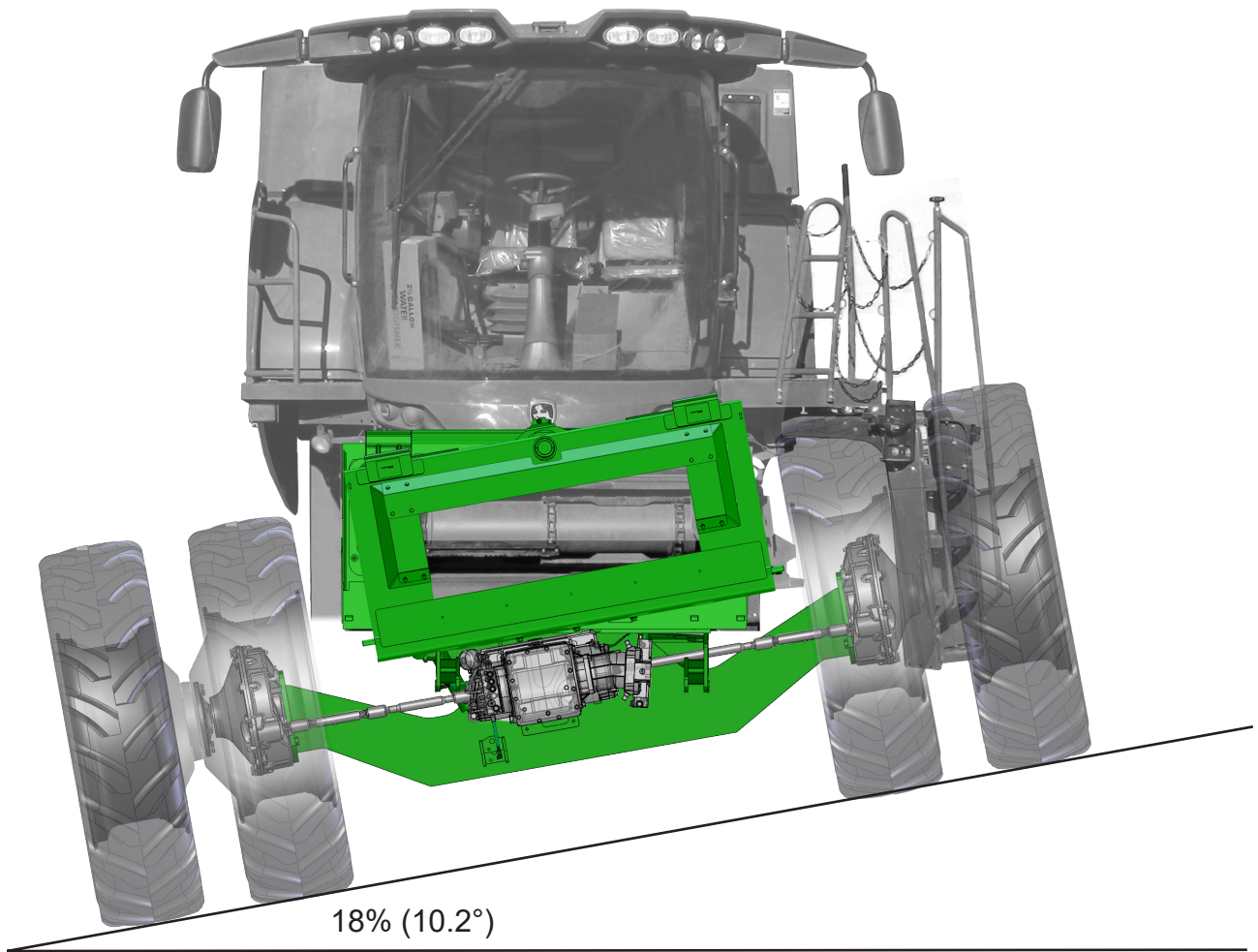
**AVOID CRUSHING INJURY**  
Install safety stops on the main leveling cylinders before performing repair or maintenance on the leveling system to prevent accidental tipping of combine chassis.



LL-143621



## Product Description



The Hillco Sidehill Leveling System is designed for John Deere S Series combines. Hillco designed the Sidehill Leveling System to maintain the combine's threshing capacity and harvesting efficiency on contours of slopes up to 18%. This leveling system is designed to be installed with little modification to the combine.

The Sidehill Leveling System tilts the combine's chassis laterally, automatically compensating for slopes up to 18% as it moves across sloping terrain. The threshing platform remains level and allows both the combine and the operator to perform at maximum efficiency.

The leveling system uses a clinometer to sense the combine's chassis position in relation to "level". As the combine moves onto a slope, the chassis leans out of level and the clinometer senses the deviation and sends a signal the controller. The controller opens the appropriate leveling valve. The leveling valve allows hydraulic oil to flow into the leveling cylinder. The cylinders tilt the combine's chassis to correct for the tilt, bringing the chassis back to level.

As the combine's chassis levels, the master header tilt cylinder pushes hydraulic oil to the header tilt cylinder, which counter-rotates the header to keep it parallel to the ground. The operator can manually adjust the header's position or, alternately, may use the combine's original lateral tilt electronics and sensor-equipped header to automatically compensate for varying ground contours.

# Controls and Components

## Leveling Control Switches & Monitor

The leveling control switches (A) and Leveling System Monitor (B) are located on the far side of the John Deere Monitor.

**Auto/Manual Leveling** — The Auto/Manual leveling button is used to toggle between the Automatic and Manual Modes. In Manual Mode the chassis will not rotate until initiated by the operator. In Automatic Mode, rotation of the chassis is initiated by the controller as dictated by changes in the slope. The operator can momentarily override the controller using the Manual Left and Right Buttons. The combine will return to level once the button is released.

On the lower right corner of the monitor the leveling mode (Auto or Manual) is indicated.

**Manual Tilt Left and Manual Tilt Right** — These buttons allow the operator to rotate the chassis to the left or right as desired.

The monitor gives the operator feedback such as:

- Current Slope
- Current Modes
- Diagnostics
- Alarms

The operator can adjust settings such as:

- Left/Right Limits
- Level Zero point
- Manual Leveling Speed
- Joystick calibrations

Detail description of the monitor and adjustable settings are later in this manual.

**For operation of the leveling system see the Operation section.**

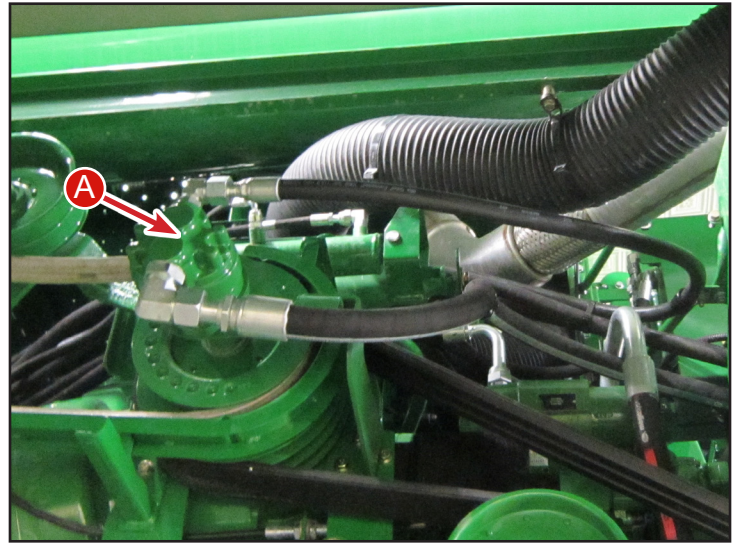


A - Leveling Control Switches  
B - Leveling System Monitor



## Hydraulic Gear Pump

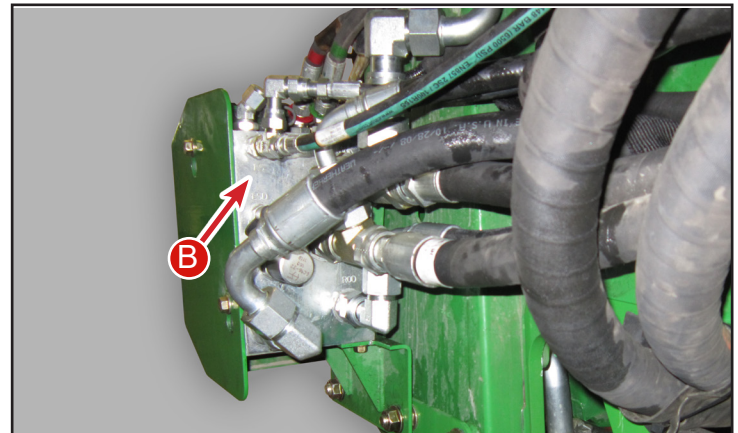
The JS7020 has a Hydraulic Gear Pump (A) that is mounted directly to the output shaft of the combine's rear engine housing. It provides the necessary hydraulic flow to operate the leveling systems functions. The gear pump isolates the leveling system's hydraulic flow from the remaining combine's hydraulics.



A - Gear Pump

## JS9020 Hydraulic Flow

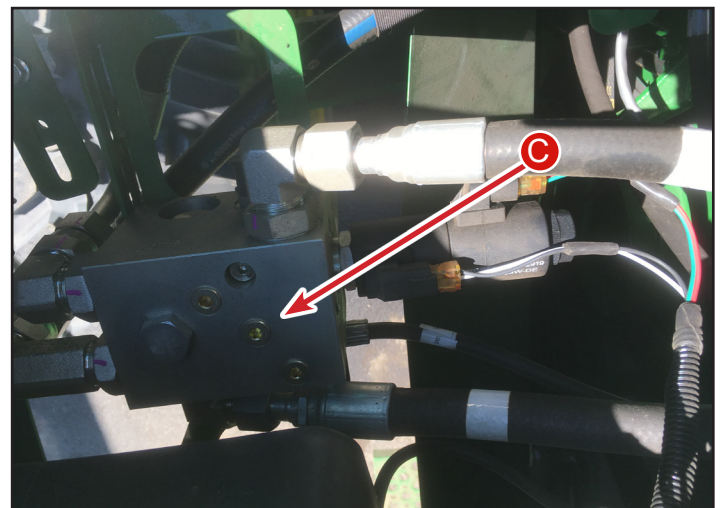
Hydraulic flow for the JS9020 leveling system is supplied from the "T" located in the Deere pressure supply line on the header height valve block (B). This valve is located on the left side of the combine below the cab. From this "T" oil flows to the Hillco leveling valve located behind the inspection door on the operator's platform. Oil is returned from the leveling valve to a "T" located in the John Deere header height valve block.



B - Header Height Valve Block

## Leveling Control Manifold

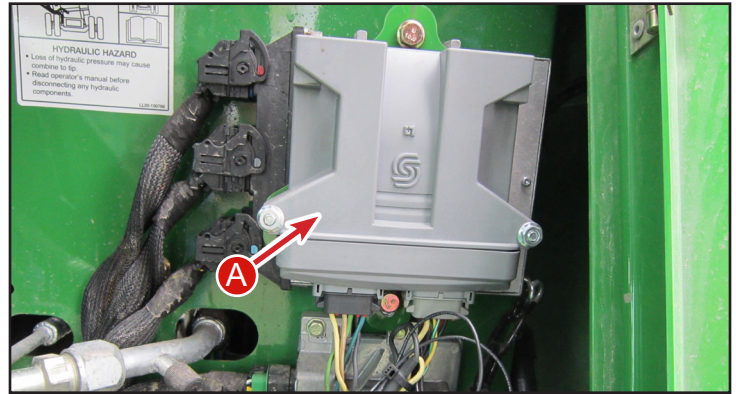
The leveling control manifold (B) is located behind the inspection door on the operator's platform. The operator electronically activates the manifold by either pushing the manual leveling buttons or having it in automatic mode. The manifold diverts hydraulic flow to the corresponding leveling cylinder to rotate the chassis.



C - Leveling Manifold

## Leveling Controller

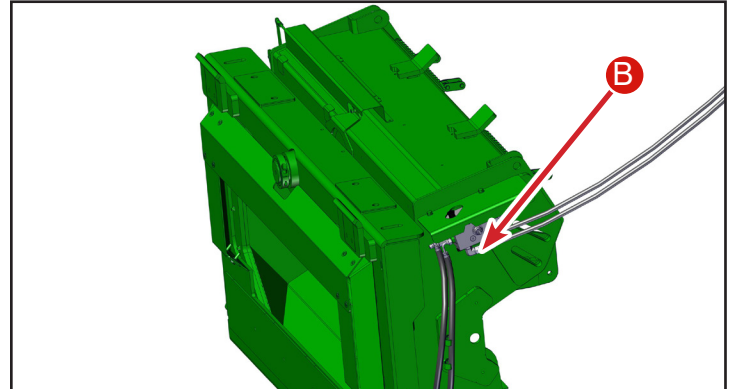
The electronic leveling controller (A) is located behind the inspection door on the operator's platform above the leveling manifold. The controller processes slope information and outputs signals to the hydraulic leveling valve. When auto leveling is activated the leveling controller levels the chassis up to a maximum slope of 27%.



B - Leveling Controller

## Header Tilt Manifold

Located on the left side of the feeder house is the header tilt manifold. This manifold diverts flow to the cylinder in the feeder house pivoting the header. The hydraulic valve fully integrates with the combine's electronics to provide auto lateral tilt. If the combine was originally equipped with Contour Master then the stock valve is used to control the header tilt.



B - Header Trim Manifold

## Overcarriage Position Indicator

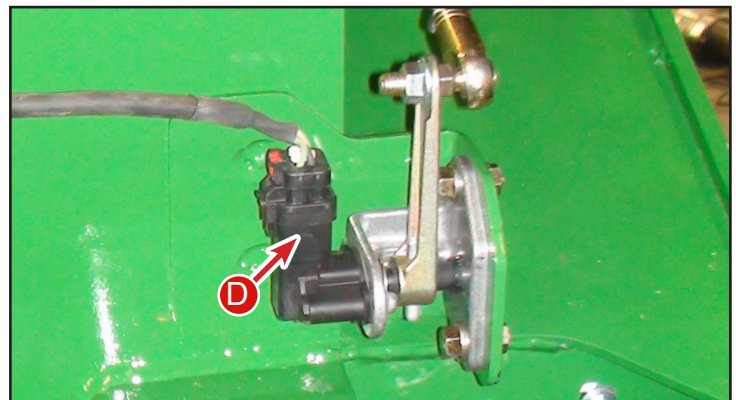
Attached to the overcarriage and undercarriage is the position indicator (C). The position indicator outputs a signal to the controller of the overcarriage position relative to the undercarriage. This also acts as a maximum level indicator. When the combine is nearing maximum level the controller reduces the amps to the leveling valve decreasing the hydraulic flow. This provides for smooth leveling when achieving maximum level.



C - Undercarriage Position Indicator

## Header Position Sensor

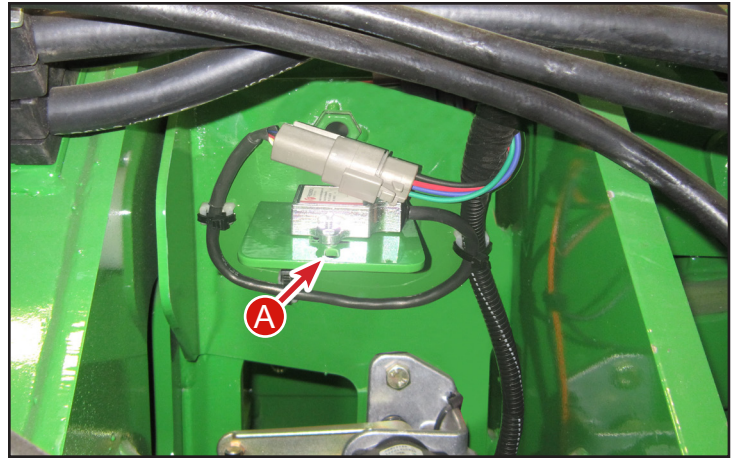
Located on the right side of the transition is the header position indicator (D). It utilizes a linkage between the face plate and the transition to indicate the header position relative to the combine. The position is then displayed in the corner post of the cab.



D - Transition Position Indicator

## Slope Sensing Clinometer

Located on the overcarriage near the Overcarriage Position Indicator is the Slope Sensing Clinometer (A). This clinometer outputs a signal to the controller. This output is a value that tells the controller the chassis' position relative to level.



A - Slope Sensing Clinometer

## Transition

The transition is added to the front of the feeder house to pivot the header and allow it to follow the contour of the ground.



B - Transition

## Feeder Chain and Slats

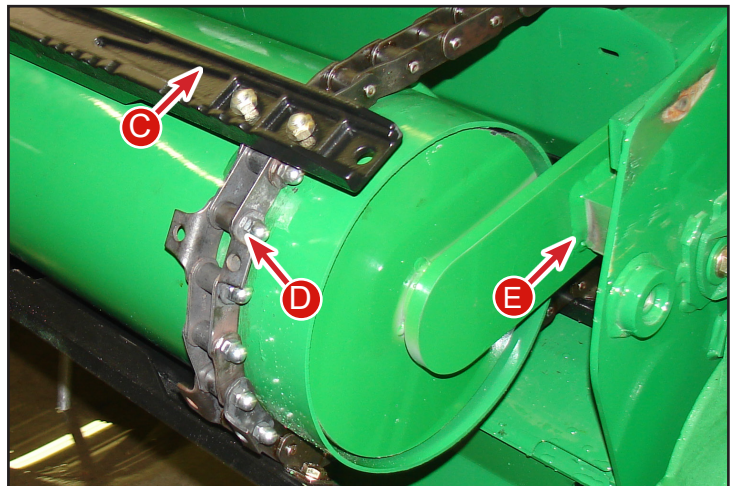
The feeder chain is extended and slats are added to accommodate the increased feeder house length.

### Specifications

Acorn Nut on Feeder Chain	40N*m/30lb-ft
Chain Slat Hardware	40N*m/30lb-ft

## Feeder Drum Arms

Hillco provides longer feeder drum arms that accommodate the increased length of the feeder house.



C - Slat  
D - Acorn Nut  
E - Drum Arm



## Retractable Ladder Step

All sidehill combines are equipped with a retractable bottom step.

If the ladder does not extend and retract properly check the fasteners in all of the pivot locations and make sure they are not over tightened. Over tightening of these fasteners will cause the ladder to bind. Make sure that the gas-charged struts (D) keep the ladder fully retracted. Replace the struts if they appear to be weak. If the ladder does not fully retract, permanent damage may occur during field operation.



D - Gas-charged Struts



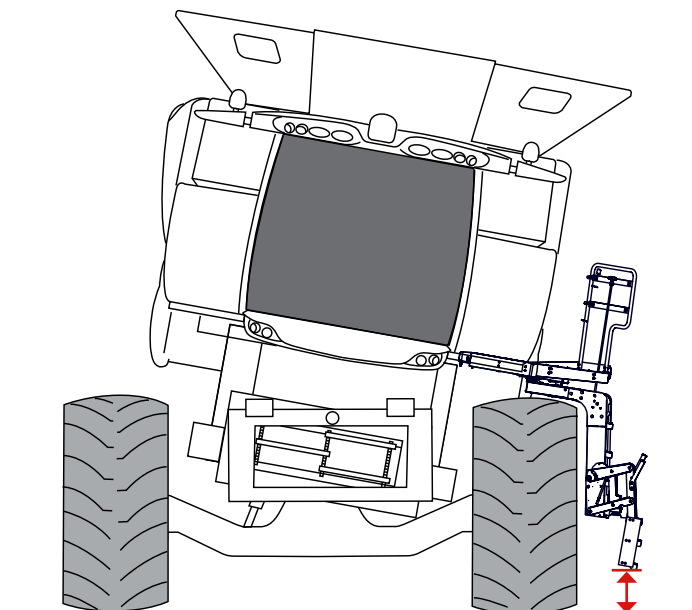
### WARNING!

Use of the double rubber step may cause ladder damage if the rubber step drags on the ground. Damage due to the ladder contacting the ground is not covered by Hillco's warranty. If operator chooses to operate the combine with the double rubber step the combine must maintain at least 12" between the step and the ground when the combine is fully leveled to the ladder side.



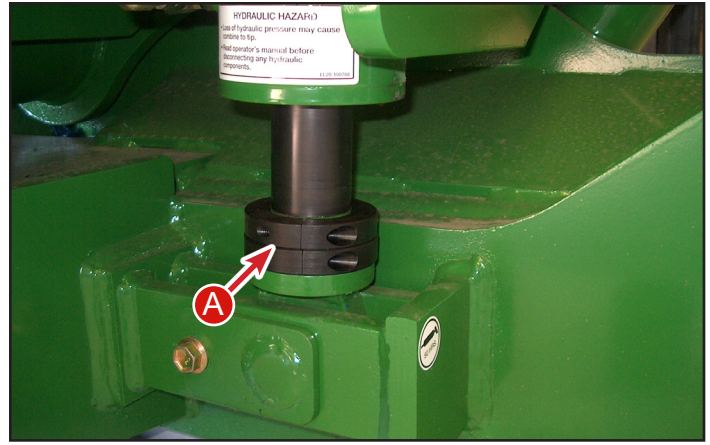
### WARNING!

Damage may occur if ladder is pivoted forward and the rubber step contacts the header or driveline



## Mechanical Leveling Cylinder Stops

Some tire configurations may come into contact with the side panel when the combine is leveled over. Limit switches will prevent this contact, however, Hillco requires installing mechanical leveling cylinder stops. This will prevent damage in the event of hydraulic or electrical failure. After setting the carriage angle limits verify there is 1" between the tire and the closest contact point or 1/4" between the driveshafts and the leveling system chassis. Add cylinder stops to prevent the cylinder from over-leveling the combine. Contact Hillco for these cylinder stops.



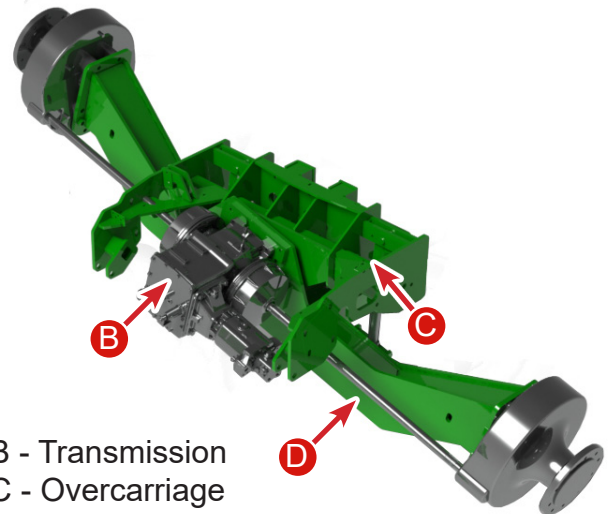
A - Mechanical Leveling Cylinder Stops  
5/8 inch - Part # MC-137251  
1/8 inch - Part # MC-137501



**IMPORTANT!**  
Set Carriage Angle Limits prior to installing Leveling Cylinder Stops.

## Carriage

The carriage is designed to support the combine's chassis while allowing the combine to rotate through full range of motion. It consists of an undercarriage and an overcarriage. The drive wheels, final drives, and transmission are mounted to the undercarriage. The overcarriage bolts to combine's axle and chassis. The leveling cylinders connect to the overcarriage and the undercarriage. The carriage raises the combine chassis seven inches to prevent the tires from coming into contact with the side panels.

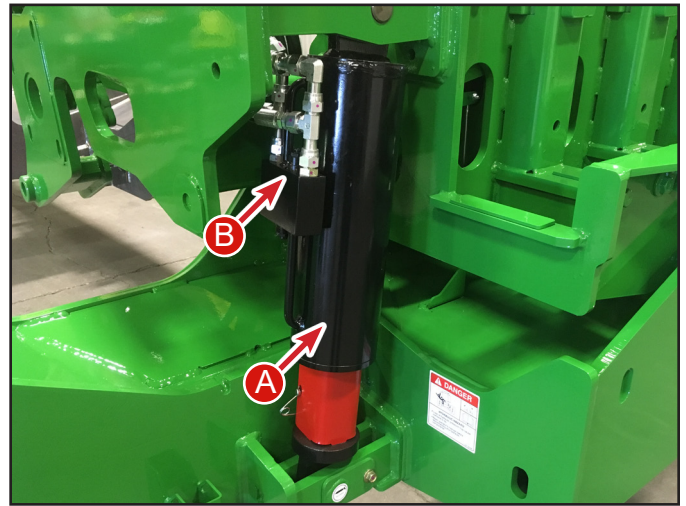


B - Transmission  
C - Overcarriage  
D - Undercarriage  
E - Counter-Balance Valve  
F - Leveling Cylinders

## Hydraulic Leveling Cylinders and Counter-Balance Valves

### JS7020 & JS9020

There are two leveling cylinders (A) located on the rearward side of the leveling system's carriage. These cylinders are pressurized by the leveling hydraulic valve to tilt the combine chassis to correct for slope changes. Both leveling cylinders are equipped with built in hydraulic counter-balance valves (B) that positively lock the oil into the cylinders until a pressure signal is sent from the hydraulic leveling valve. These counter-balance valves lock the chassis position in the event of hydraulic hose failure.




A - Cylinder  
B - Counter Balance Valve

### Leveling Cylinder Safety Stops

When the leveling cylinder safety stops are installed on the leveling cylinders, the carriage cannot rotate. The stops must be installed before working on or around the leveling system and when hauling the combine. It is recommended that the stops be inserted during long-term storage. When the stops are not being used, they should be stored on the mount next to the leveling cylinder.

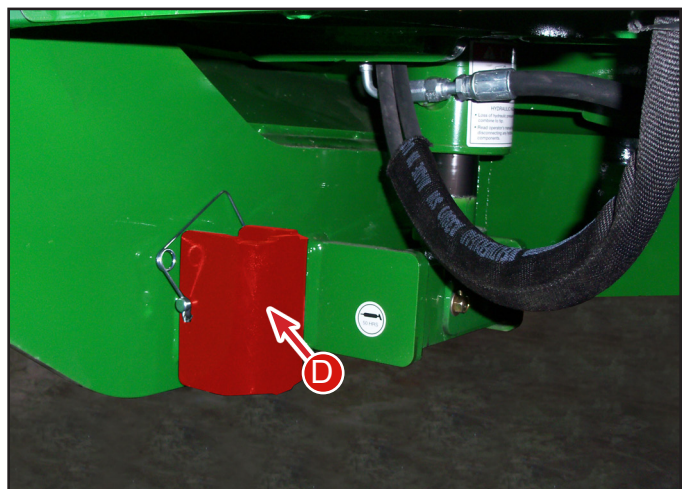


C - Cylinder Safety Stops  
D - Cylinder Safety Stop Holder



## WARNING!

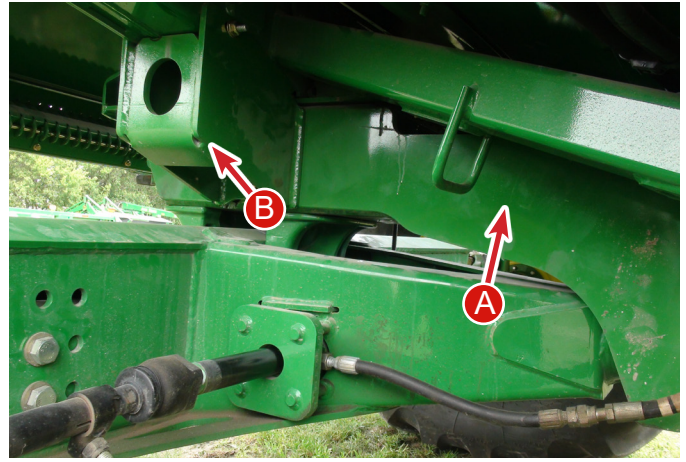
Install the cylinder stops before working on or around the leveling system. Failure to install the cylinder stops before working on or around the leveling system may result in sudden chassis rotation.



## Drop Axle

The drop axle (A) raises the rear of chassis to match the height change due to the leveling carriage. The drop axle allows the rear axle to match the carriage's range of motion.

Drop axle wings (B) are installed for additional stability between the drop axle and the chassis.



A - Drop Axle  
B - Drop Axle Wing



### IMPORTANT!

Because of the increased rotation of the rear axle it is necessary to space the rear wheels out to avoid interference with shields. See the Rear Axle Spacing Chart for more information.

# Header Tilt Controls and Components

## Header Tilt Control Switches

The manual header tilt switch is located in the hydro handle and is used to manually control the header tilt angle. Consult your John Deere Operator's Manual for explanation of the Contour Master operation.

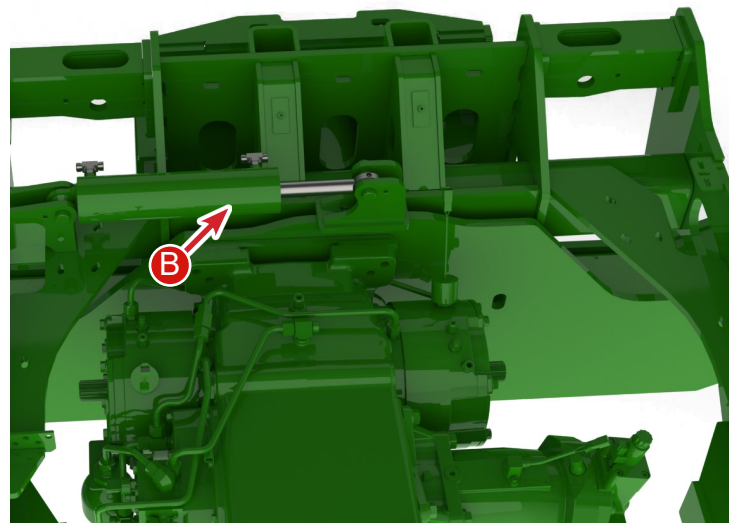


A - Header Trim Switch  
B - Master Cylinder

## Header Tilt System

The header tilt hydraulic system consists of the header tilt control valve, master cylinder, slave cylinder, flow control, and relief valve. As the combine levels, the carriage extends or retracts the master cylinder, which sends oil to the slave cylinder. The slave cylinder counter-rotates the header. No electronic function is required for this action to occur.

The operator can manually trim the header angle with the header trim switch on the hydro control handle. In the Contour Master mode, the header angle is automatically trimmed by activating the lateral tilt valve, which is coupled to the master/slave circuit. In case the header contacts the ground, a relief valve prevents damage to the header and feeder house.



C - Slave Cylinder

## Operation, Setup, and Maintenance



### **CAUTION!**

Before operating the leveling system, ensure that the leveling cylinder safety stops are not installed on the leveling cylinder. Operating the system with the safety stops installed may cause damage to the carriage, leveling cylinders, or stops.



### **CAUTION!**

Do not operate the leveling system with the ladder in the extended or 90° position otherwise ladder damage may result.



### **CAUTION!**

Do not unload grain from the combine while operating the Leveling System in Automatic Mode. The chassis may tilt unexpectedly and cause damage to the unloading auger.

# Operation, Setup, and Maintenance

## Leveling System Controls

The leveling controls on the Home Screen are shown below. The monitor and controls are located to the right side of the CommandTouch Monitor.

The Road/Field Mode (A) must be in the Field selection for leveling functions to work. If it is in the Road Mode then the leveling functions are disabled. Pushing combine's Road/Field button toggles the leveling system between Road and Field.

**AUTO:** Pushing the Auto/Manual Leveling Button (B) once will toggle between Auto & Manual. When Auto is showing on the display (C), this means automatic leveling operation is engaged. The automatic leveling controller monitors changes in slope and corrects chassis position to maintain a level chassis position. The Manual Left/Right Leveling Buttons (D, E) will override the automatic leveling controller while the switch is depressed. Upon release of the switch, the leveling system will return to automatic leveling mode.

**MANUAL:** Push the Auto/Manual Leveling Button (B) once to enter the Manual Leveling mode (Manual will be displayed). In Manual mode the Manual Left/Right leveling switches will level the combine left and right. When the switch is released the combine chassis will maintain its current position.

- A - Road/Field
- B - Auto/Manual Switch
- C - Manual Left
- D - Manual Right



**IMPORTANT**  
Monitor defaults to Road Mode each time system is powered up. This is done to prevent any accidental leveling. The Road/Field mode is controlled by the combine's Road/Field switch.

**Leveling Controls:** Located on the right side of the CommandCenter Monitor. These switches allow for Auto/Manual control (B) and Left/Right leveling (C, D).



## Maximum Level

The leveling system is equipped with a maximum level warning indicator on the monitor. On the Main Control Screen Max Level will be displayed. This indicates when the machine has reached its maximum leveling capability.



## Header Trim Controls

The header trim switch is the four-position header control switch mounted in the combine's SR control lever. It is used to raise and lower the header as well as trim the header left and right.

**TILT LEFT:** Push the switch to the left to tilt the header counterclockwise.

**TILT RIGHT:** Push the switch to the right to tilt the header clockwise



Header Trim Switch



## Rear Wheel Assist Warning Alarm

The Rear Wheel Assist (RWA) Warning Alarm is located in the Leveling System Control Monitor in the right corner of the cab. It will sound an alarm, a warning light will flash and RWA/SLOPE WARNING will be displayed on the monitor if the combine is traversing down a slope that is greater than 20% and the Rear Wheel Assist is engaged. Disengage the Rear Wheel Assist and the warning alarm and light will stop. On downhill slopes less than 20%, level ground or uphill slopes the alarm will never sound if RWA is engaged.

See your combine's Operator's Manual to understand how to operate the Rear Wheel Assist (RWA).



Rear Wheel Assist Engage/Disengage

RWA Slope Warning will be displayed.



## **WARNING!**

When the Rear Wheel Assist Warning Alarm Sounds and Warning Light Flashes **IMMEDIATELY DISENGAGE** the Rear Wheel Assist or Control of the Combine **COULD** be lost.

## Operator Adjustments

From the Home Screen, Push the Menu button to enter the Main Menu.



Push the up or down arrows to move to the desired function. Once the desired function is highlighted press the Enter button to go into that page. Press the Home button to go to the Home screen.



## Operator Settings Menu

Select the desired Function in the Operator Settings Menu. Scroll up and down using the up and down arrows. When the desired function is highlighted select the enter button. To go back to the main menu select the Back button.



## Manual Speed

The manual leveling speed can be sped up or slowed down. This setting only affects manual leveling and not auto leveling speed.

The current setting is displayed on the top. When you input a new setting it will be displayed in the white text. If you power off the unit the white text will always read 7000 however the Current Setting will always read was the user last inputted regardless if it was powered down.

The Range is from 3000-7000 with 3000 being the slowest and 7000 the fastest. These numbers represent what percentage the coil is opening the valve up. 3000 = 30% and 7000=70% of the valve open. Anything over 7000 is an invalid entry as it will level the combine too fast making it very jerky and unsafe.



## Invalid Entry

Invalid Entry appears when a value has been entered that is not within the acceptable range.



## Display Backlight

The brightness can be adjusted up and down. Use the up and down arrows to adjust the brightness and then hit Enter to save the setting.



## Smart Unload

Smart Unload is an optional safety feature that puts the leveling system in manual mode when unloading. This prevents the unloading auger from coming in contact with the grain cart while unloading on the go on changing terrain.

As soon as the unloading auger starts to swing out the system changes from Auto Leveling to Manual Leveling.

When the auger is in all the way the operator must cycle the auto manual switch to go back to auto leveling.

The setting is defaulted to OFF. If you wish to turn it on push the On button (A). The red OFF will turn to a green ON.



## Calibration

From the Main Menu select Calibration.

*Continued on next page.*



After you select Calibration the message to the right appears.

Press Enter (A)



### Joystick Calibration

Highlight Joystick and press Enter (B).

WARNING

When in the Calibration Menu screen all limits have been deactivated. The carriage can rotate until the cylinders bottoms out.



With the Joystick in the center position press the Enter button (C).



Push the Joystick lever all the way to the right and then press the Enter button (A).



Push the Joystick lever all the way to the right and then press the Enter button (B).



Joystick Calibration is now complete.



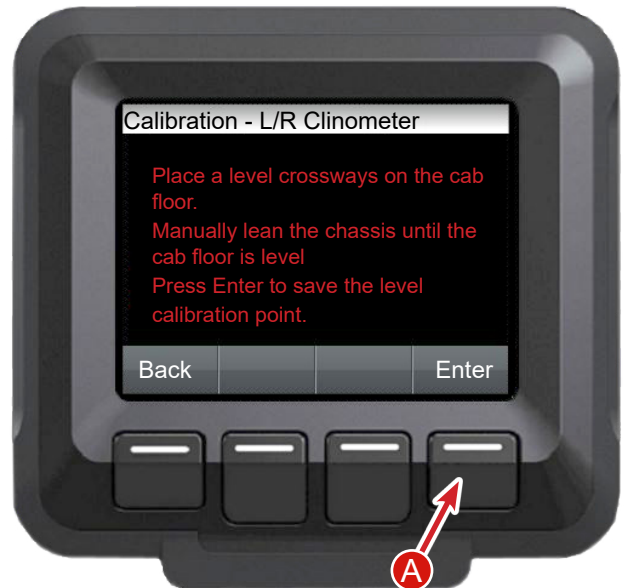
## Level Zero Point

From the Home Screen select Main Menu. Then select Calibration Menu.

Highlight Left/Right Clinometer and press Enter (A).



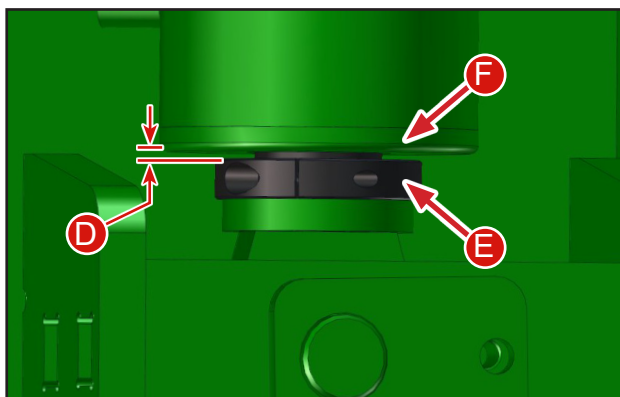
Follow the directions on the screen. When the combine is level side to side press Enter (A).



## Carriage Angle Left Limit

This setting sets the maximum tilt to the left.

1. Start the combine and park on level ground
2. Set the park brake
3. Raise the feeder spout and drop the header lift cylinder safety stop.
4. From the Home Select Menu
5. From Menu Select Calibration
6. From Calibration Select Carriage Angle Left Limit (A)
7. Manually tilt the combine to the left such that the cylinder bottoms out or so that the first contact point touches. (B) The software will adjust automatically to give 1" of clearance..  
On the left side it is usually the ladder platform that comes in contact with the tires first.
8. Verify there is at least 1/4" clearance between the front axle and the frame.
9. Press Enter Button (C) when maximum level has been reached.
10. If the left cylinder is not bottomed out fill exposed rod area on the cylinder with the provided mechanical stops. Leave 1/8" gap (D) between the stop (E) and the rod cap (F). Hillco provides 5/8" and 1/8" stops (F). Do not use any other type of stop. The gap is there so that the electronics stop the leveling prior to the cylinder coming in contact with the stops. The stops are there are there to prevent damage in the event of an electrical or hydraulic failure.
11. Set Right Limit - See next page.



### IMPORTANT

With certain tire selections the limit sensors can be used to prevent the need to modify the sheet metal on the left and right side panels of the combine. Installation of level limit stops is recommended to prevent sheet metal damage in the event of a limit switch failure. (See LEVEL LIMIT STOPS section)

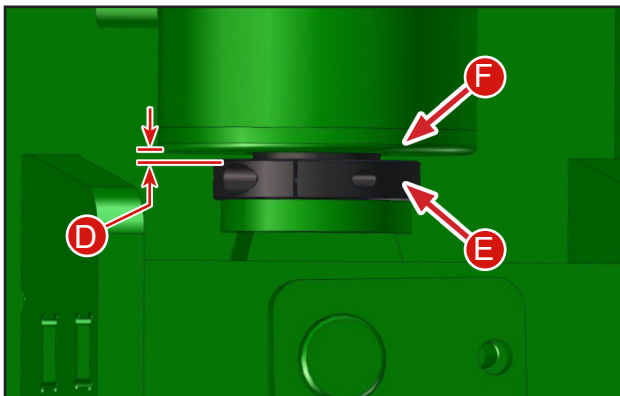
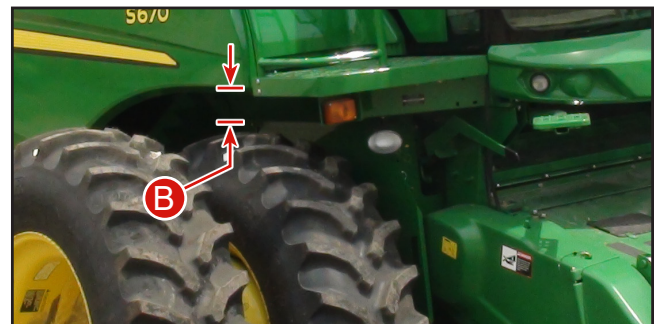
If Level Limit Stops are used be sure that the limit sensor has been calibrated with that stop in place. Damage to the cylinders or other leveling system components may occur if sensor is not properly.



## Carriage Angle Right Limit

This setting sets the maximum tilt to the right.

1. Start the combine and park on level ground
2. Set the park brake
3. Raise the feeder spout and drop the header lift cylinder safety stop.
4. From the Home Select Menu
5. From Menu Select Calibration
6. From Calibration Select Carriage Angle Right Limit (A)
7. Manually tilt the combine to the right such that the cylinder bottoms out or so that the first contact point touches. (B) The software will adjust automatically to give 1" of clearance.  
On the right side it is usually the side panel that comes in contact with the tires first.
8. Verify there is at least 1/4" clearance between the front axle and the frame.
9. Press Enter Button (C) when maximum level has been reached.
10. If the right cylinder is not bottomed out fill exposed rod area on the cylinder with the provided mechanical stops. Leave 1/8" gap (D) between the stop (E) and the rod cap (F). Hillco provides 5/8" and 1/8" stops (F). Do not use any other type of stop. The gap is there so that the electronics stop the leveling prior to the cylinder coming in contact with the stops. The stops are there to prevent damage in the event of an electrical or hydraulic failure.
11. Verify max level appears on monitor home screen to both left and right.



### IMPORTANT



With certain tire selections the limit sensors can be used to prevent the need to modify the sheet metal on the left and right side panels of the combine. Installation of level limit stops is recommended to prevent sheet metal damage in the event of a limit switch failure. (See LEVEL LIMIT STOPS section)

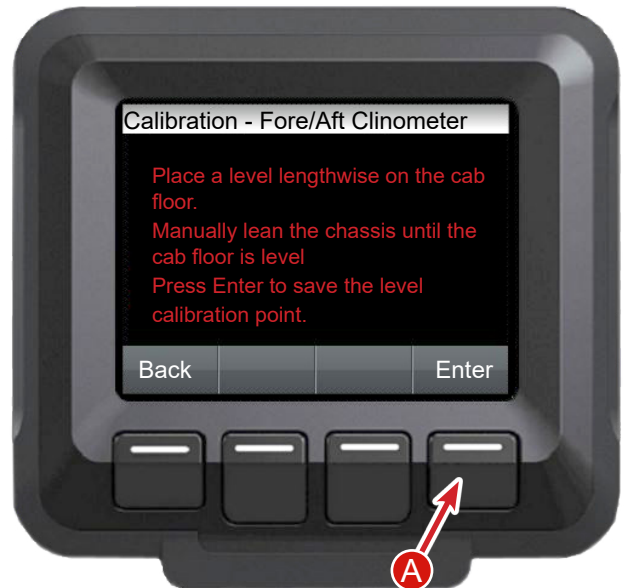
If Level Limit Stops are used be sure that the limit sensor has been calibrated with that stop in place. Damage to the cylinders or other leveling system components may occur if sensor is not properly.

## Fore/Aft Clinometer

Highlight Fore/Aft Clinometer and press Enter (A).



When the combine is level front to back press Enter (A).



## Diagnostics

From the Main Menu select Diagnostics.



The Diagnostics menu allows the operator to view output information from the electrical system on the leveling system.

Select Clinometers and press Enter (A) to view the output of the clinometers.

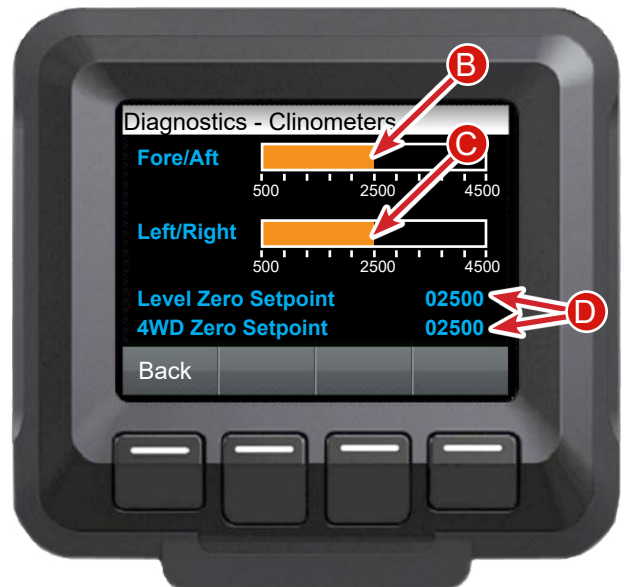


## Clinometers

Fore/Aft (B) shows the current clinometer output. By driving up or down a hill this value will change.

Left/Right (C) shows the current clinometer output. By leveling the combine back and forth the values will change.

The value for Level Zero Setpoint and 4WD Zero Setpoint (D) are the current calibration values. These values are set in the Calibration screen under Left/Right Clinometer and Fore/Aft Clinometer.

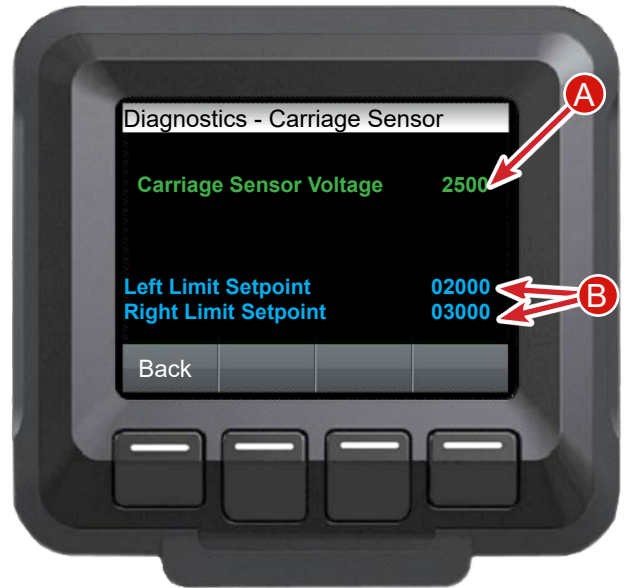


## Carriage Sensor

The Carriage Sensor Voltage is the current voltage output at a given carriage position.

Leveling the combine back and forth will change this value. Leveling to the right will increase the value.

The value for Left and Right Limit Setpoint (B) are the current calibration values for maximum level to both sides.



## Valve Coils

Range is from 0-18000.

Only one coil will be activated at a time.



## Joystick

Range is from 500-4500.



## Combine CAN

The Signal can be OFF, ON, or “ - - - “.

“ - - - “ means the display is not receiving the CAN message.



## Active Alarms

From the Main Menu select Active Alarms and press ENTER (B).



If you have an Active Alarm the warning icon will appear on the home screen in the upper left corner.



The Active Alarms that will appear are:

- Clinometer Fault
- Potentiometer Fault
- Joystick Fault

If any of the sensors output fall outside of the expected range an alarm will trigger on the screen listing the fault and the current output of the sensor in question. While the alarm screen can be cleared the automatic function of the leveling system may be disabled until the fault is corrected. Once an alarm screen has been cleared the fault condition is denoted by an alert icon in the top left of the screen. If the icon is displayed then the alarms screen in the system menu will show which sensors are in a fault condition.



Potentiometer Fault (Carriage Angle Sensor Fault)



Clinometer Fault



## Joystick Fault



## Dealer Settings

Dealer Settings is a password protected screen that is for dealers to make adjustments to the leveling system.



Password protected page:



## Storage

When storing the combine between seasons, Hillco strongly recommends that the leveling cylinder safety stops are installed on the leveling cylinders. This will ensure that the combine does not settle during storage.

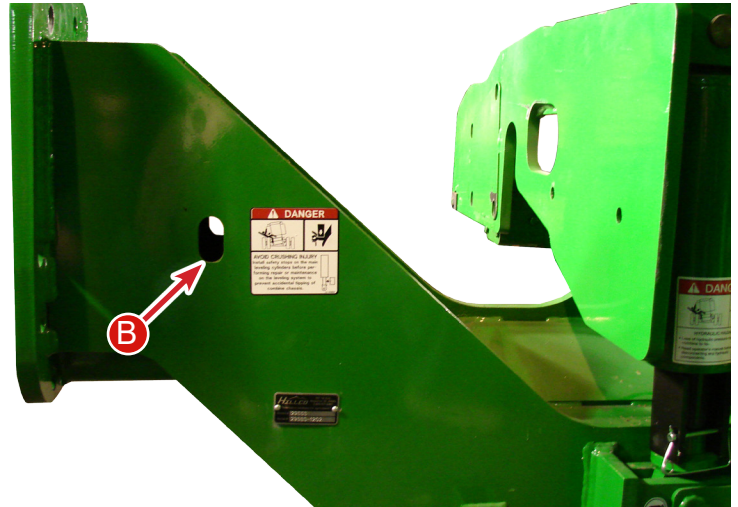
## Transporting Combine on a Trailer

Before loading the combine, switch the leveling system into manual mode and install the cylinder stops. This will ensure that there are not any unexpected weight shifts during the loading process. In addition to the Tie Down locations on the combine, Hillco provides T-hook slots (B) on the undercarriage for securing combine to the trailer.



## CAUTION!

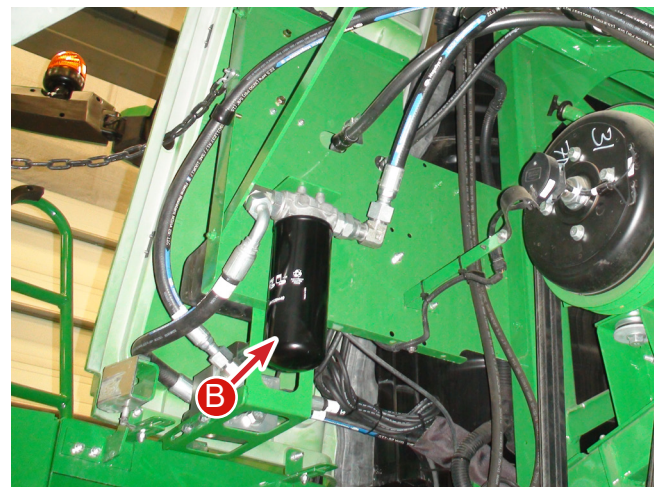
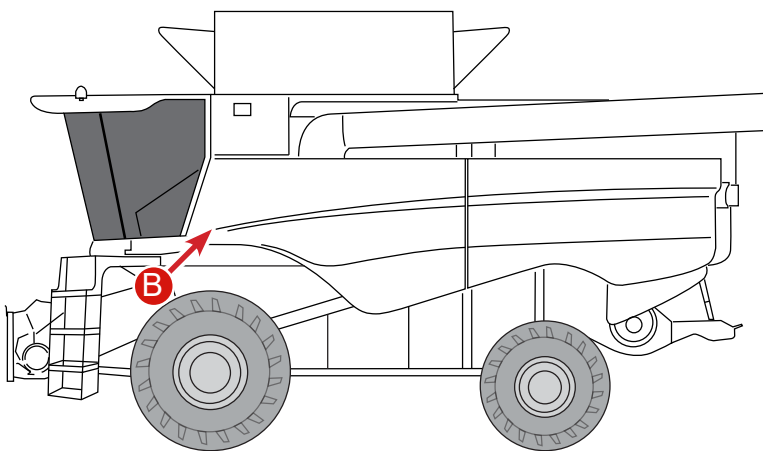
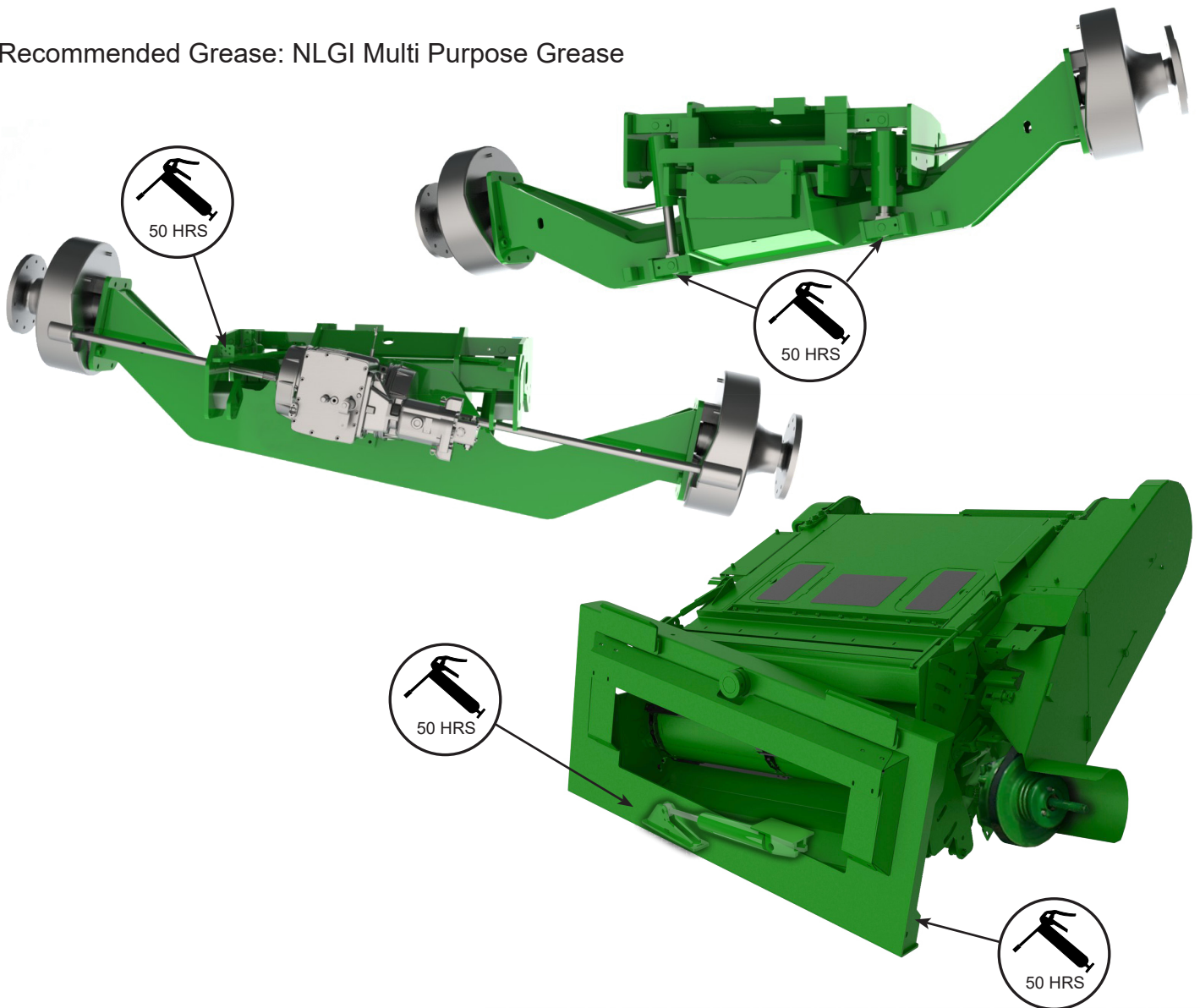
Before driving the combine into a building, ensure that the leveling system is in the road transport mode. This will ensure that the combine does not unexpectedly level. Unexpectedly leveling may cause damage to the building or the combine.





# Maintenance

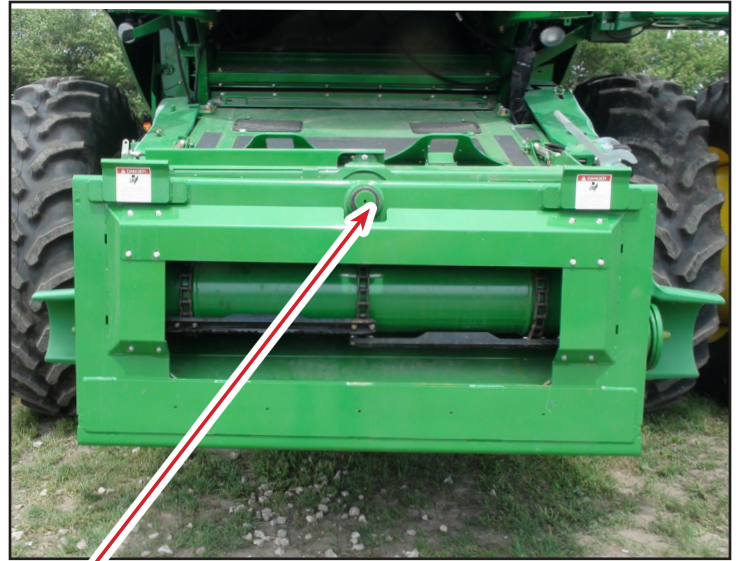
Recommended Grease: NLGI Multi Purpose Grease



## Hydraulic Filter

On JS7020 models replace the filter (B) after the first 100 hrs of service, then 400 hr intervals. Replace with John Deere Filter Part No AH128449.

The Transition Pivot Pin and the Rear Drop Axle Spacer utilize Graphite Micarta Bushings that do not require grease.




Graphite Micarta Bushings



### Driveline Maintenance

Standard PTO Style Drive Shafts - These drive shafts utilize a single cross at each end of the drive shafts. Grease zerks on both crosses and the zerk on the outer profile tube (at the slip joint) should be greased on 50-hour intervals.

Constant Velocity Drive Shafts - These drive shafts utilize two universal joints and a ball-and-socket joint at each end of the drive shaft. There are a total of 7 grease zerks per drive shaft and they must be greased on 8-hour intervals and more frequent in severe duty applications.



**WARNING!**

It is important that headers equipped CV drivelines be greased at the appropriate intervals to prevent damage. Warranty will not cover drivelines not properly maintained.



## 100 Hour - Annual Maintenance

Inspect the following areas:

### REAR AXLE

- All bolts are properly tightened (combine to spacer 235lb-ft and spacer to rear axle are 153 lb-ft)
- Steering hoses are properly routed and allow for rear axle rotation

### OVERCARRIAGE / UNDERCARRIAGE

- Torque all mounting bolts properly
- Hydro hoses routed properly
- Brakes are adjusted properly and pedals should depress no more than ½ way
- Brake lines are routed properly, secured and free of pinch and abrasion points

Mounting Bolt Location	Torque
Carriage to Chassis	M16@235lb-ft; M20@450lb-ft
Axle Extensions	675 lb-ft
Final Drive Mounting Bolts	475 lb-ft (oiled)
Transmission Mounting Bolts	235 lb-ft

### HYDRAULICS

- Hoses cleanly and securely routed with no pinch or abrasion points
- Hydraulic Reservoir & Main Engine Gear Case are filled to the proper level
- Hydrostatic Hose 4-bolt flange cap screws are tightened to proper torque
- No leaks in the hydraulic system
- Torque gear pump coupler to 130lb-ft (JS7020)
- Hoses by header lift manifold do not come in contact with drive shaft on JS9020
- Replace Hydraulic Oil Filter after first 100 hrs then at 400 hr intervals (JS5010 & JS7020)

Hose Size	Cap Screws Torque
-16	68lb-ft
-20	111lb-ft

### ELECTRICAL

- Harnesses are cleanly and properly routed and secured without pinch or abrasion points
- Mechanical Leveling Stops are set so that there is no less than 3/4" clearance around the drive tires.
- Left and right limits are set so that there is no less than 1" clearance around the drive tires.

### TRANSITION

- Feeder chain links and slats are properly tightened
- Feeder chain is properly tension according to JD specification

### FUNCTION CHECKS

- Combine responds properly to manual leveling switch (leveling direction matches button)
- Automatic Leveling System responds properly to changes in slope
- Clinometer has been zeroed and the combine returns to level in automatic mode
- Automatic Header Tilt system keeps the transition parallel to ground as the combine levels
- Manual Header Tilt system responds properly to switch and cycle time is set to 14 seconds
- Ladder pivots and locks into place
- Moving step retracts fully and operates smoothly
- Rear Wheels are properly spaced



## WARNING!

Failure to conduct these inspections may result in serious damage to the combine, leveling system or could result in injury.

## Critical Joint Inspection

The Hillco Leveling System depends on several critical joints integrating the Leveling System to the John Deere combine. These joints require specific torques for safe operation. Operational conditions can over time loosen these joints. Hillco strongly recommends checking these joints annually.

Failure to check these joints annually may result in critical damage to the combine and leveling system.

Please reference the following pages calling out the fasteners holding these critical joints.

### Rear Axle

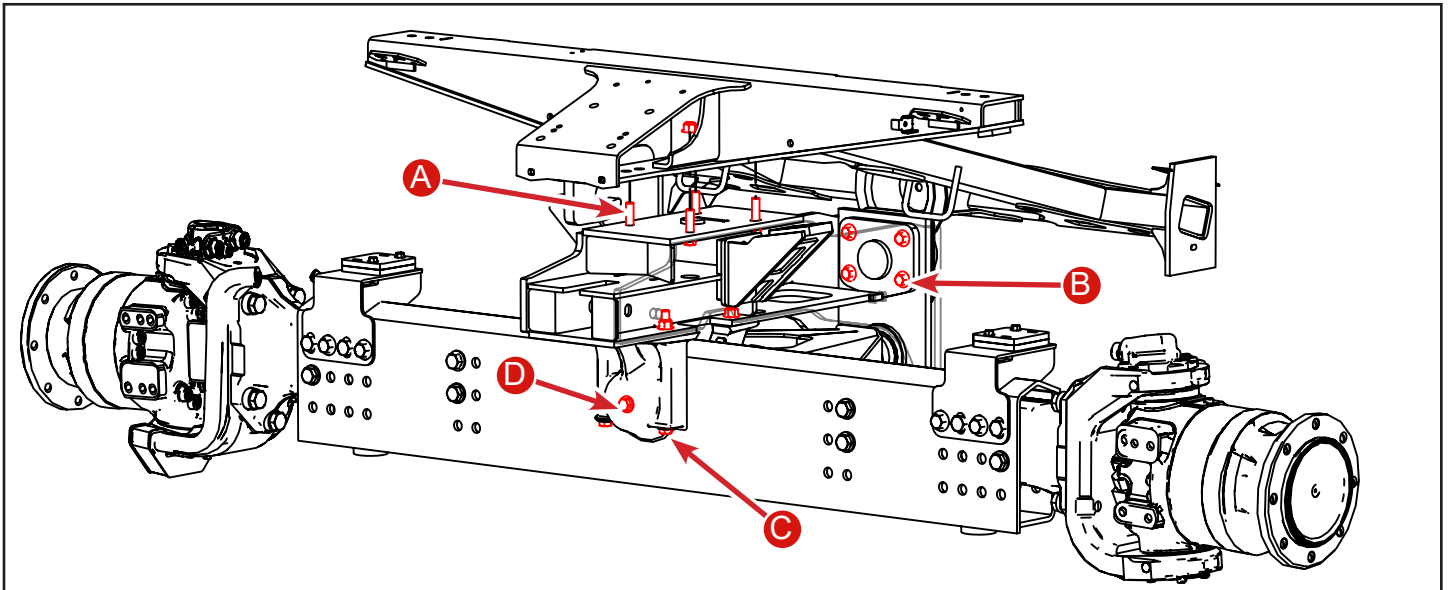
**A - Hillco Spacer to John Deere Chassis (4 bolts on MY15-18, 6 bolts MY14 and older) 235 lb-ft**

**B - Hillco Pin (4 bolts) 235 lb-ft**

**C - Cast Standoff to Hillco Spacer (4 Bolts) S600 ( -78500) 258 lb-ft, S600 (785001- ) & S700 236 lb-ft.**

**D - Cross Bolt (1 Bolt) 152 lb-ft**

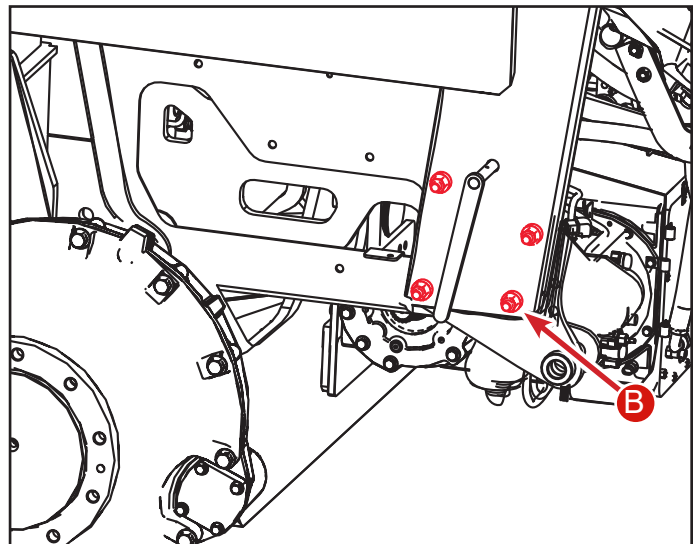
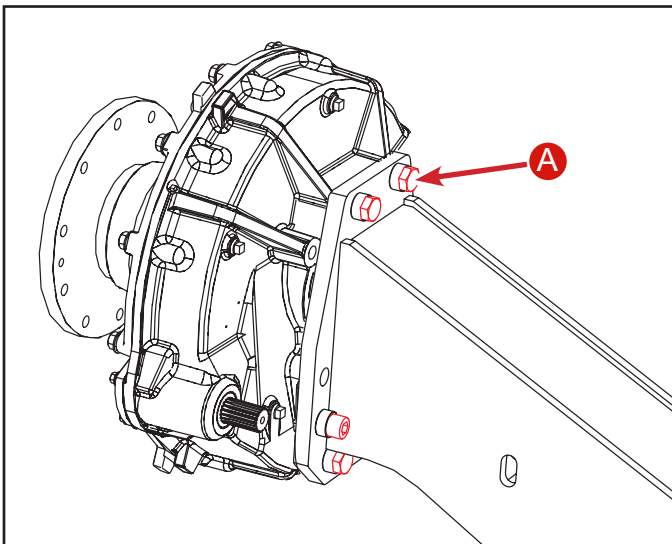
*Note: If any bolts are loose, remove bolt and apply Loctite 242 to threads, install and torque.*



### Carriage

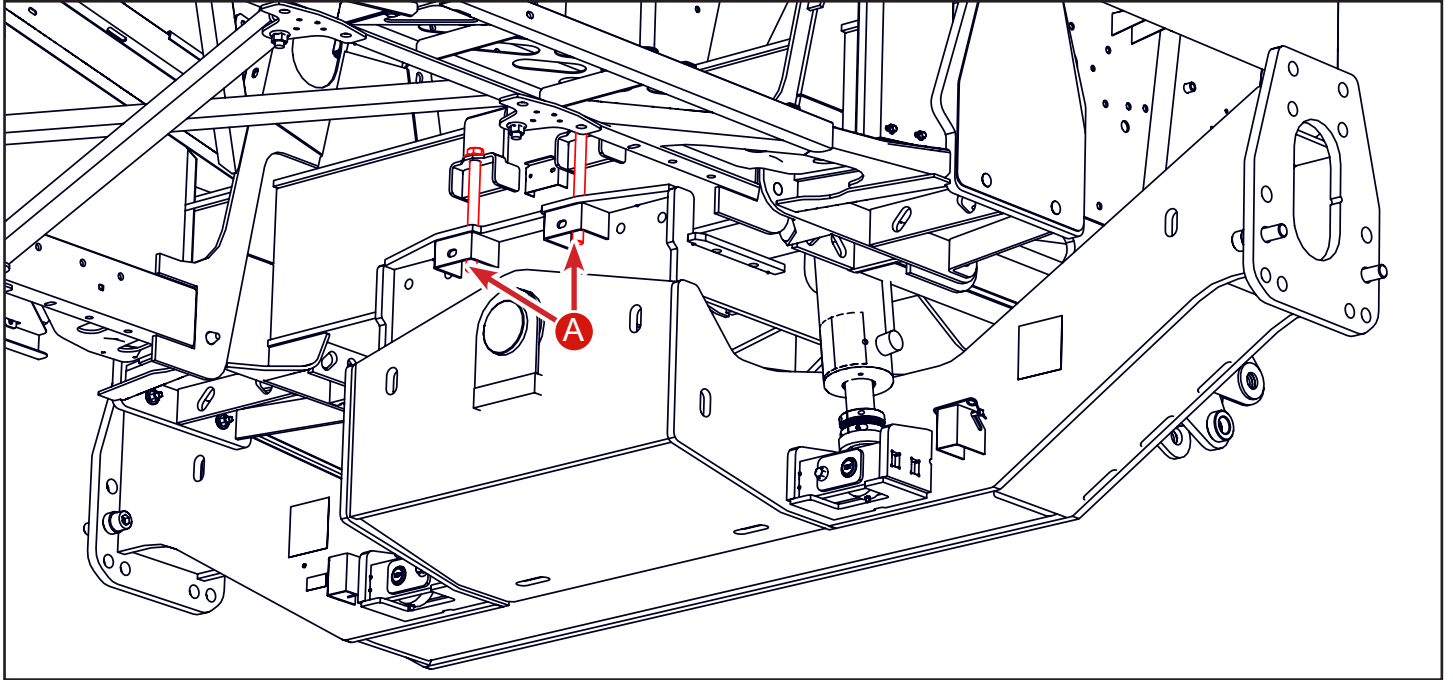
**A - Final Drives to Hillco Carriage (6 bolts on each side of the combine. Consult Combine's Operators Manual)**

**B - Carriage to corner post (4 bolts on each side of combine) 235 lb-ft**



## Carriage

**A - Axle Straps (2 bolts) 375 lb-ft**

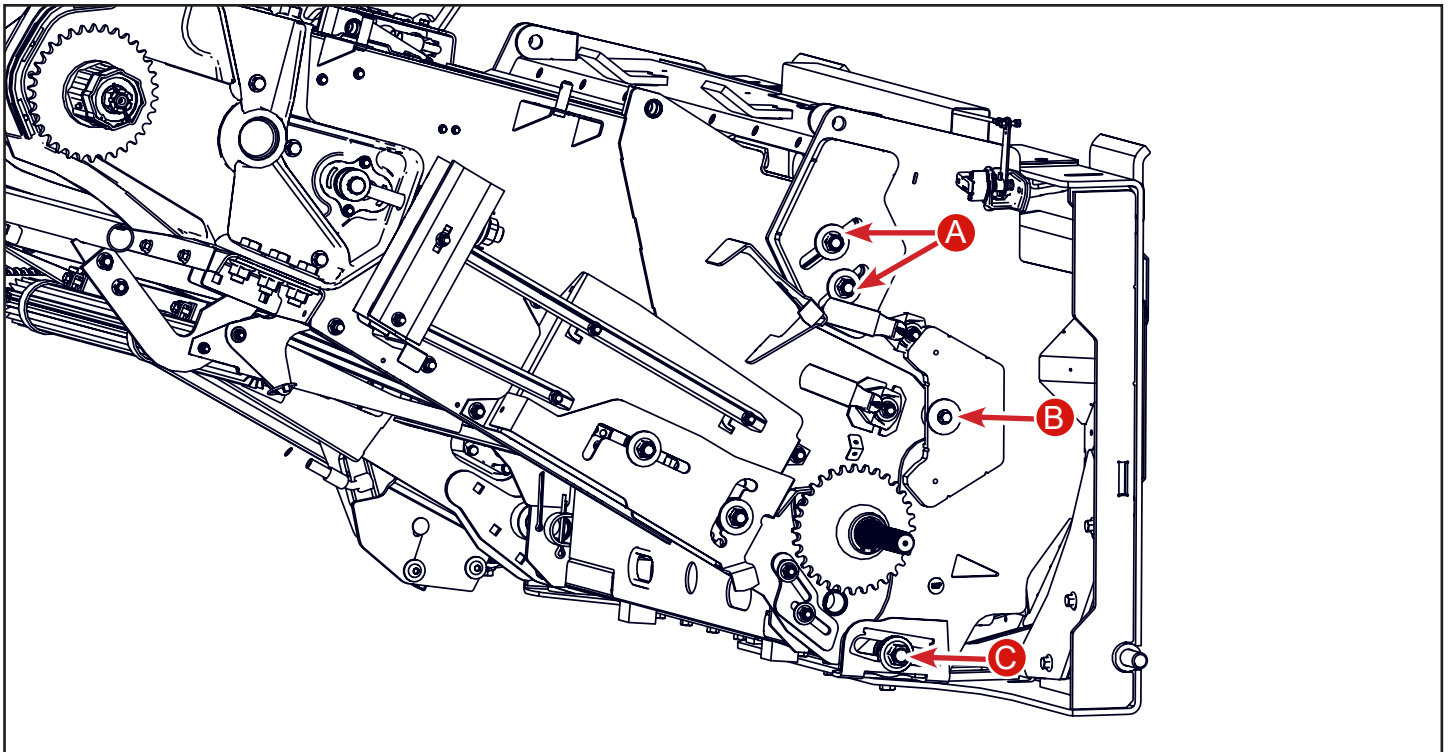


## Transition

**A - Mounting Bolts (4 bolts) 235 lb-ft**

**B - Pivot Bolts (2 bolts) 235 lb-ft**

**C - Bottom Lock Bolts (2 bolts) 460 lb-ft**



# Adjustments

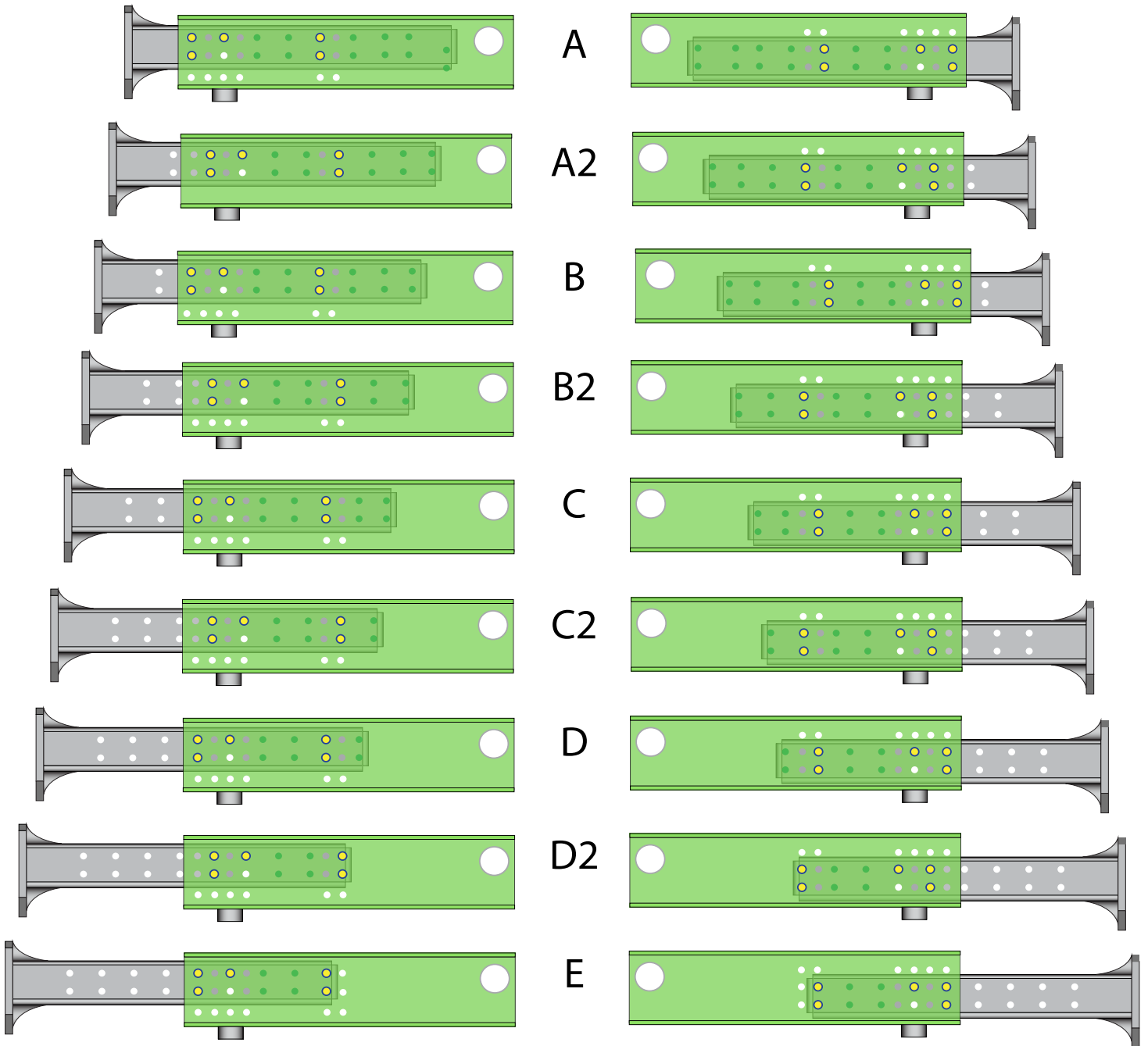
## Rear Axle Spacing

On a combine equipped with a Hillco Leveler the rear axle has a greater rotation range. As a result the rear axle spacing must be changed to prevent shield interference. Refer to the diagram below and the following charts for Hillco's rear axle spacing recommendations.

### Rear Axle Position Chart

Standard Rear Axle Position

High Clearance Rear Axle Position



### Heavy Duty Rear Axle Spacing

Rear Axle Tire	Rear Axle Position	Center to Center (in)	Outside to Outside (in)	Inside to Inside (in)
480/70R30 (152A8) R1W	A		Not allowed due to rear shielding interference	
	A2		Not allowed due to rear shielding interference	
	B	126.4	146.2	106.6
	B2	130.4	150.2	110.6
	C	134.4	154.2	114.6
	C2	138.4	158.2	118.6
	D	142.4	162.2	122.6
	D2	146.4	166.2	126.6
E	150.4	170.2	130.6	
600/65R28 (154A8) R1W	A		Not allowed due to rear shielding interference	
	A2		Not allowed due to rear shielding interference	
	B	125.5	150.0	101.1
	B2	129.5	154.0	105.1
	C	133.5	158.0	109.1
	C2	137.5	162.0	113.1
	D	141.5	166.0	117.1
	D2	145.5	170.0	121.1
E	149.5	174.0	125.1	
28L-26 (158A8) R1	A		Not allowed due to rear shielding interference	
	A2		Not allowed due to rear shielding interference	
	B		Not allowed due to rear shielding interference	
	B2	140.3	170.9	109.7
	C	144.3	174.9	113.7
	C2	148.3	178.9	117.7
	D	152.3	182.9	121.7
	D2	156.3	186.9	125.7
E	160.3	190.9	129.7	
28L-26 (158A8) R2	A		Not allowed due to rear shielding interference	
	A2		Not allowed due to rear shielding interference	
	B		Not allowed due to rear shielding interference	
	B2		Not allowed due to rear shielding interference	
	C	144.3	174.8	113.7
	C2	148.3	178.8	117.7
	D	152.3	182.8	121.7
	D2	156.3	186.8	125.7
E	160.3	190.8	129.7	
620/75R26 (166A8) R1W	A		Not allowed due to rear shielding interference	
	A2		Not allowed due to rear shielding interference	
	B		Not allowed due to rear shielding interference	
	B2	131.3	157.2	105.5
	C	135.3	161.2	109.5
	C2	139.3	165.2	113.5
	D	143.3	169.2	117.5
	D2	147.3	173.2	121.5
E	151.3	177.2	125.5	
23.1LR26 (166A8) R1	A		Not allowed due to rear shielding interference	
	A2		Not allowed due to rear shielding interference	
	B		Not allowed due to rear shielding interference	
	B2	131.3	156.4	106.2
	C	135.3	160.4	110.2
	C2	139.3	164.4	114.2
	D	143.3	168.4	118.2
	D2	147.3	172.4	122.2
E	151.3	176.4	126.2	
28LR26 (169A8) R1W	A		Not allowed due to rear shielding interference	
	A2		Not allowed due to rear shielding interference	
	B		Not allowed due to rear shielding interference	
	B2	140.3	170.8	109.7
	C	144.3	174.8	113.7
	C2	148.3	178.8	117.7
	D	152.3	182.8	121.7
	D2	156.3	186.8	125.7
E	160.3	190.8	129.7	
750/65R26 (166A8) R1W	A		Not allowed due to rear shielding interference	
	A2		Not allowed due to rear shielding interference	
	B		Not allowed due to rear shielding interference	
	B2	140.3	171.5	109.1
	C	144.3	175.5	113.1
	C2	148.3	179.5	117.1
	D	152.3	183.5	121.1
	D2	156.3	187.5	125.1
E	160.3	191.5	129.1	

**Extra Heavy Duty Rear Axle Spacing**

Rear Axle Tire	Rear Axle Position	Center to Center (in)	Outside to Outside (in)	Inside to Inside (in)
480/70R30 (152A8) R1W	A	Not allowed due to rear shielding interference		
	A2	Not allowed due to rear shielding interference		
	B	Not allowed due to rear shielding interference		
	B2	134.8	154.6	115.0
	C	138.8	158.6	119.0
	C2	142.8	162.6	123.0
	D	146.8	166.6	127.0
	D2	150.8	170.6	131.0
600/65R28 (154A8) R1W	E	154.8	174.6	135.0
	A	Not allowed due to rear shielding interference		
	A2	Not allowed due to rear shielding interference		
	B	129.6	154.0	105.1
	B2	133.6	158.0	109.1
	C	137.6	162.0	113.1
	C2	141.6	166.0	117.1
	D	145.6	170.0	121.1
28L-26 (158A8) R1	D2	149.6	174.0	125.1
	E	153.6	178.0	129.1
	A	Not allowed due to rear shielding interference		
	A2	Not allowed due to rear shielding interference		
	B	Not allowed due to rear shielding interference		
	B2	143.7	174.3	113.2
	C	147.7	178.3	117.2
	C2	151.7	182.3	121.2
28L-26 (158A8) R2	D	155.7	186.3	125.2
	D2	159.7	190.3	129.2
	E	163.7	194.3	133.2
	A	Not allowed due to rear shielding interference		
	A2	Not allowed due to rear shielding interference		
	B	Not allowed due to rear shielding interference		
	B2	Not allowed due to rear shielding interference		
	C	147.7	178.3	117.1
620/75R26 (166A8) R1W	C2	151.7	182.3	121.1
	D	155.7	186.3	125.1
	D2	159.7	190.3	129.1
	E	163.7	194.3	133.1
	A	Not allowed due to rear shielding interference		
	A2	Not allowed due to rear shielding interference		
	B	Not allowed due to rear shielding interference		
	B2	133.9	159.8	108.1
23.1LR26 (166A8) R1	C	137.9	163.8	112.1
	C2	141.9	167.8	116.1
	D	145.9	171.8	120.1
	D2	149.9	175.8	124.1
	E	153.9	179.8	128.1
	A	Not allowed due to rear shielding interference		
	A2	Not allowed due to rear shielding interference		
	B	Not allowed due to rear shielding interference		
28LR26 (169A8) R1W	B2	133.9	159.0	108.8
	C	137.9	163.0	112.8
	C2	141.9	167.0	116.8
	D	145.9	171.0	120.8
	D2	149.9	175.0	124.8
	E	153.9	179.0	128.8
	A	Not allowed due to rear shielding interference		
	A2	Not allowed due to rear shielding interference		
750/65R26 (166A8) R1W	B	Not allowed due to rear shielding interference		
	B2	144.5	175.1	113.9
	C	148.5	179.1	117.9
	C2	152.5	183.1	121.9
	D	156.5	187.1	125.9
	D2	160.5	191.1	129.9
	E	164.5	195.1	133.9
	A	Not allowed due to rear shielding interference		
750/65R26 (166A8) R1W	A2	Not allowed due to rear shielding interference		
	B	Not allowed due to rear shielding interference		
	B2	144.5	175.7	113.3
	C	148.5	179.7	117.3
	C2	152.5	183.7	121.3
	D	156.5	187.7	125.3
	D2	160.5	191.7	129.3
	E	164.5	195.7	133.3



## Lateral Tilt Flow Control Adjustment

For combines that have a Hillco lateral tilt manifold the lateral tilt flow control valve adjusts the speed at which the header rotates. If the combine is an S680 or S690 and came stock with Contour Master the original stock manifold and valve control the tilt (refer to the John Deere Operator's manual for adjustment). The header should rotate at the chassis' rotation rate. The tilt speed is a compromise between manual tilt mode and automatic tilt mode. The rotation rate is set at the factory; however with larger header configurations it may be necessary to adjust the header's rotational rate.

To test the header rotation rate, push the tilt button to the left until the tilt frame is rotated to the left limit. Push the tilt button to the right until the tilt frame reaches its right limit. The cycle time should meet the specification of 14 seconds.

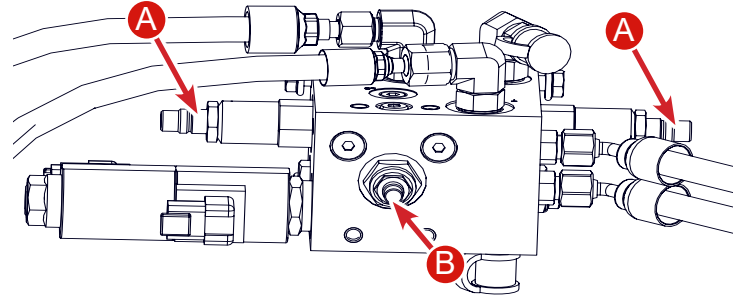
### Specification

*Left-to-Right Cycle Time-14 seconds*

If the cycle time is shorter than the specification, turn the flow control set screw clockwise a quarter turn at a time until the cycle time meets the specification. If the cycle time is longer than the specification, turn the flow control screw counterclockwise a quarter turn at a time until the cycle time meets the specification. This specification ensures that tilt speed is adequate for manual operation. With some header configurations this tilt speed may cause the automatic mode to be unstable. Hillco recommends adjusting the Contour Master's sensitivity until it becomes stable. Refer to the combine's operators manual for Contour Master adjustments.

For changing the header tilt speed on a JS9020 Leveling System consult the John Deere Operator's Manual.

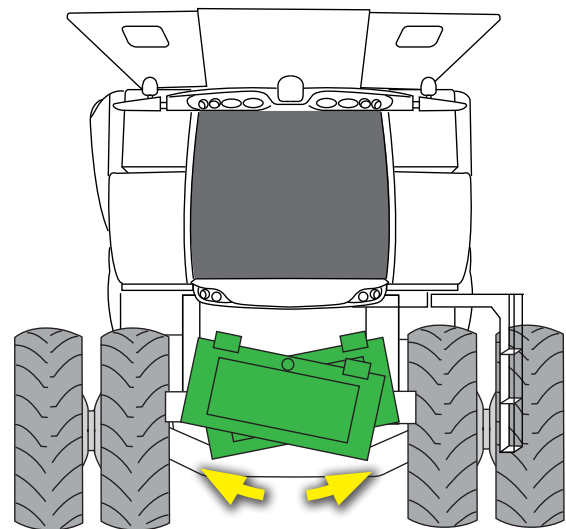
D-171206CMA01C



Located Below the Cab

A - Relief Ports

B - Flow Control



14 second rotation time from one side to other

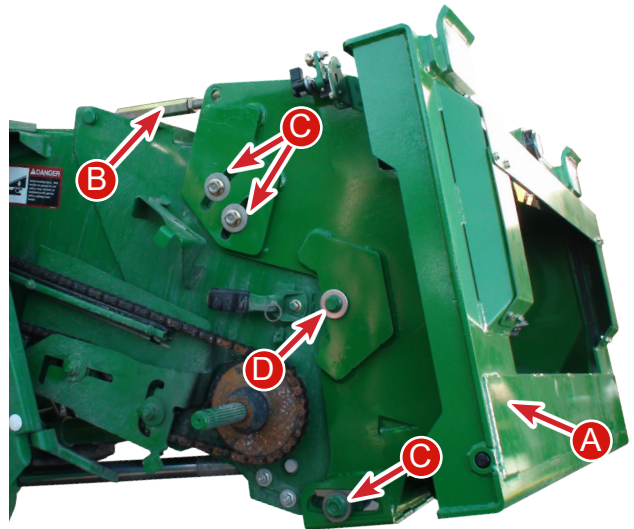


### IMPORTANT!

The pressure relief valve is set during installation. Changing the setting may cause damage to the tilt frame or hydraulic system. However, in very large header configurations, it may be necessary to change the setting. Contact your dealer to reset the relief valve.

## Transition Fore/Aft Adjustment Procedure

1. Loosen the clamping bolts and the pivot bolt on each side of the feeder house.
2. Loosen the jam nuts on the turnbuckles.
3. Adjust the turnbuckles until the desired header angle is achieved.
4. Tighten the jam nuts.
5. Tighten the clamping and pivot bolts to 153 lb-ft of torque.



- A - Transition
- B - Turnbuckle
- C - Clamping Bolts
- D - Pivot Bolts

## Lower Feeder Drum Stop Adjustment

The Hillco leveling system does not change the feeder drum stop adjustment. Refer to the John Deere Operator's Manual for your combine for the feeder drum stop adjustment.



**IMPORTANT**—Failure to tighten the clamping bolts and pivot bolts to proper torque may cause damage to the turnbuckle mounts.

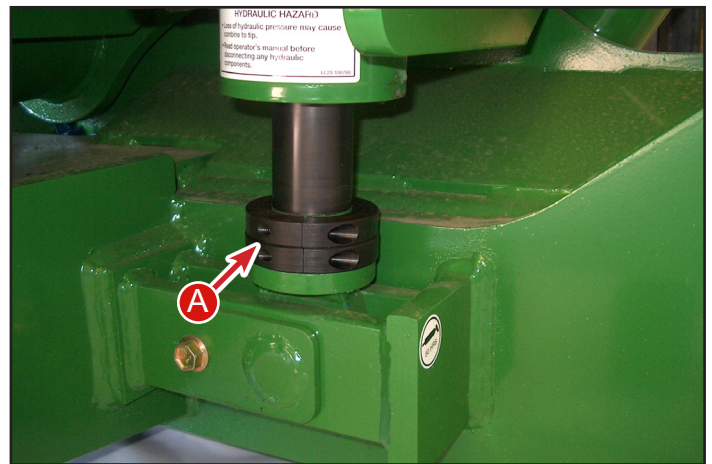


**IMPORTANT**—Do not adjust the tilt frame with the header on the combine. Shut the engine off, set parking brake and remove key.

## Mechanical Leveling Cylinder Stops

In the event of electrical controller or hydraulic failure Hillco requires installation of mechanical Leveling Cylinder Stops on combines equipped with oversized drive tires that limit leveling. With certain oversized tires leveling must be limited. The Leveling Cylinder Stops will prevent side panel or tire damage. Contact Hillco for further details.

Stops are available in two thicknesses, 5/8" and 1/8" for adequate adjustment. If additional stops are needed contact Hillco.



A - Mechanical Leveling Cylinder Stops (5/8" thick Cylinder Stops Shown)

See the "Max Level Calibration" section for instructions on how to place the leveling cylinder stops.




## CAUTION

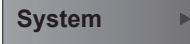
Caution—In some tire configurations, the tire can contact the gull wing doors or the ladder. In this case, the maximum level must be adjusted to prevent tire contact with the combine chassis. However, to prevent chassis and tire damage in the event of a hydraulic or electrical failure, Hillco strongly recommends that cylinder stops be installed on the leveling cylinders. Hillco is not responsible for chassis damage that occurs due to the lack of appropriate cylinder stops.


## Header Tilt Setup


Contour Master functionality should have been turned on during the installation process. If it is not functional follow the below instructions to activate the Contour Master function in the combine's Command Center.

1. Key switch on.

2. Select the Main Menu Icon  in the lower right corner of the "Harvesting" screen.

3. Select System Icon 

4. Select Diagnostics Center Icon 

5. Select Controller Diagnostics Icon 

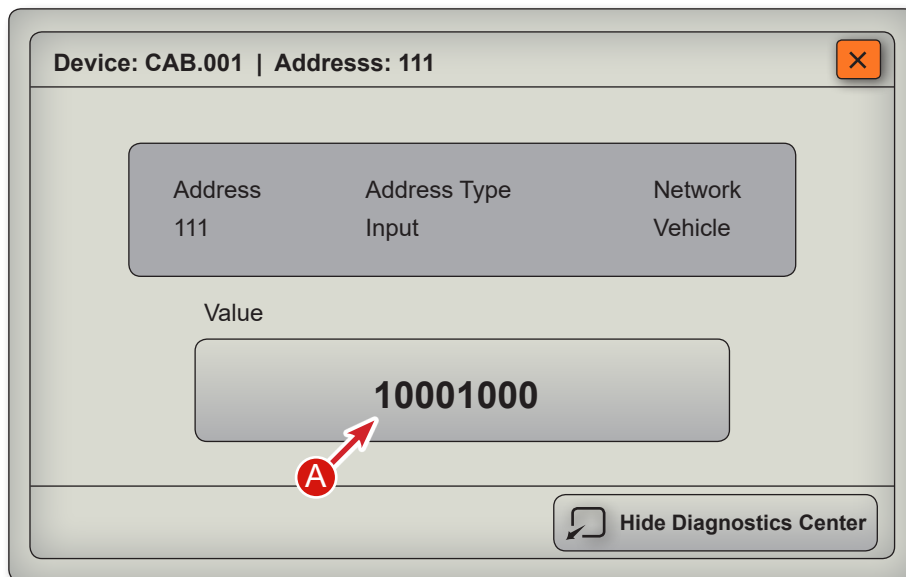
6. Scroll down and select Cab Controller

**Cab Controller**  
CAB.001 | 0x33 | Vehicle

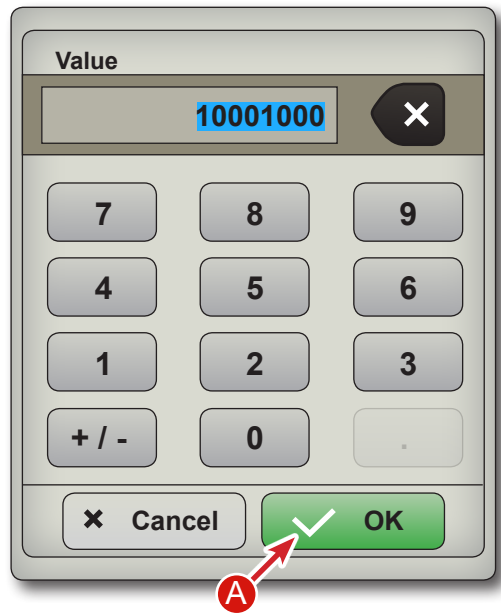
7. Scroll down and select address 111

111    Input    10001000

8. This popup screen will appear. Select the Value (A).



9. Enter the value 10001000 and select OK (A).



10. You will get a popup that says "Calibration Procedures Problem". Select OK as this will be resolved when calibrated.

## **Tire Selection**

The JS7020/JS9020 Leveling Systems are designed to achieve full leveling with 20.8x 42 duals and 30.5 x 32 single drive tires. Tires with a larger diameter or width may limit leveling.

## **Header Tire Compatibility**

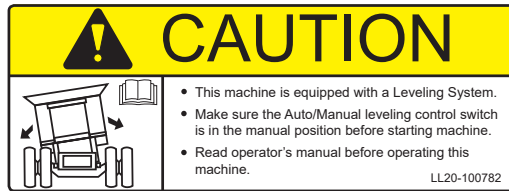
Refer to your local John Deere dealer for tire header compatibility charts.

# Header Compatibility Chart

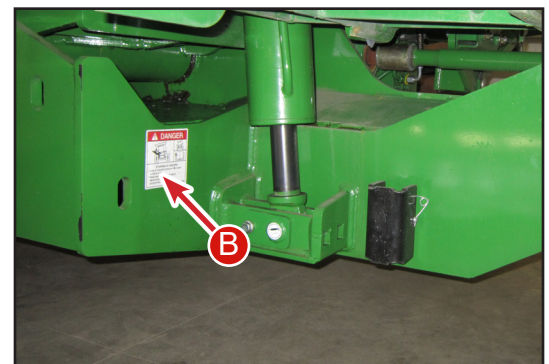
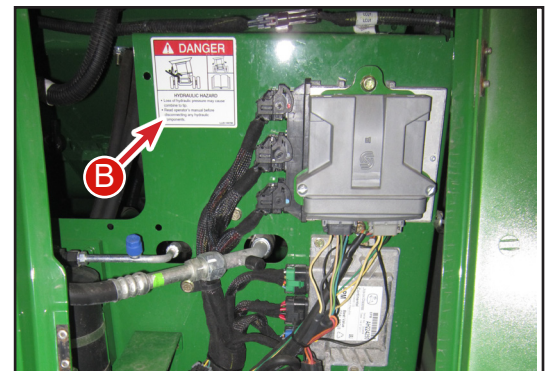
To determine if a header kit is required or available for a specific leveling system model match the appropriate header with the corresponding leveling system model to determine availability. Contact Hilco for pricing as well as header kit availability for any John Deere header not listed below. Operator is responsible for ensuring that combine has proper ballast.		Hilco Leveling System Model				
		2955S Sidehill	2970S Sidehill	JS5010 Sidehill	JS7020 Sidehill	JS9020 Sidehill
Max Header Weight		6,433 lbs	9,400 lbs.	6,433 lbs	11,700 lbs	11,700 lbs
PICKUP HEADS	615	N/A	Yes	Yes	Yes	Yes
	914	N/A	N/A	N/A	N/A	N/A
Platforms Rigid / Flex	618	Yes	Yes	Yes	Yes	Yes
	620	Yes	Yes	Yes	Yes	Yes
	622	Yes	Yes	Yes	Yes	Yes
	630	Yes	Yes	Yes	Yes	Yes
	635	N/A	Yes	Yes	Yes	Yes
	920 Early S/N	Yes	Yes	Yes	Yes	Yes
	920 Late S/N	Yes	Yes	Yes	Yes	Yes
	922 Early S/N	Yes	Yes	Yes	Yes	Yes
	922 Late S/N	Yes	Yes	Yes	Yes	Yes
	925 Early S/N	Yes	Yes	Yes	Yes	Yes
	925 Late S/N	Yes	Yes	Yes	Yes	Yes
	930 Early S/N	Yes	Yes	Yes	Yes	Yes
930 Late S/N	Yes	Yes	Yes	Yes	Yes	
CORNEHEADS	606C / 706C	Yes	Yes	Yes	Yes	Yes
	606C / 708C SM	N/A	Yes	Yes	Yes	Yes
	608C / 708C	Yes	Yes	Yes	Yes	Yes
	608C SM / 708C SM	Yes	Yes	Yes	Yes	Yes
	608 FC / 708 FC	N/A	N/A	N/A	Yes	Yes
	608 FC SM / 708 FC SM	N/A	N/A	N/A	Yes	Yes
	612C 20" / 712C 20"	Yes	Yes	Yes	Yes	Yes
	612C 30" / 712C 30"	N/A	Yes	Yes	Yes	Yes
	612C 30" SM / 712C 30" SM	N/A	Yes	Yes	Yes	Yes
	612 FC / 712 FC	N/A	N/A	N/A	Yes - Only with HFA	Yes - Only with HFA
	612 FC SM / 712 FC SM	N/A	N/A	N/A	Yes - Only with HFA	Yes - Only with HFA
	616C / 716C	N/A	N/A	Call Hilco	Yes	Yes
	616C SM / 716 SM	N/A	N/A	N/A	N/A	Yes
	618C / 718C	N/A	N/A	N/A	N/A	Yes
	618C SM / 718C SM	N/A	N/A	Yes	Yes	Yes
	693 S/N ( ) - 695000	Yes	Yes	Yes	Yes	Yes
	693 S/N 695001- ( )	Yes	Yes	Yes	Yes	Yes
	893	Yes	Yes	Yes	Yes	Yes
	1293 S/N S/N ( ) - 694999	Yes	Yes	Yes	Yes	Yes
	1293 S/N 695000 - ( )	Yes	Yes	Yes	Yes	Yes
700 Series	TBD	TBD	TBD	TBD	TBD	
Draper Heads	625D	N/A	Yes	Yes	Yes	Yes
	630D	N/A	Yes	Yes	Yes	Yes
	635D	N/A	Yes	Yes	Yes	Yes
	925D	N/A	N/A	N/A	N/A	N/A
	930D	N/A	N/A	N/A	N/A	N/A
	936D	N/A	N/A	N/A	N/A	N/A
Flex Draper Heads	630FD w/o top auger	N/A	N/A	N/A	Yes	Yes
	630FD w/ top auger	N/A	N/A	N/A	Yes	Yes
	635FD w/o top auger	N/A	N/A	N/A	Yes	Yes
	635FD w/ top auger	N/A	N/A	N/A	Yes	Yes
	640FD w/o top auger	N/A	N/A	N/A	Yes	Yes
	640FD w/ top auger	N/A	N/A	N/A	Yes	Yes
	645FD w/ top auger	N/A	N/A	N/A	Yes	Yes
	645FD w/o top auger	N/A	N/A	N/A	Yes - Only with HFA	Yes - Only with HFA
	MacDon D60/FD70 (30', 35', 40')	N/A	Call Hilco	Yes	Yes	Yes
	MacDon D65/FD75 (30', 35', 40', 45')	N/A	Call Hilco	Yes	Yes	Yes
	MacDon D1 & FD1 (30', 35', 40', 45')	N/A	Call Hilco	Yes	Yes	Yes
700 Series FD	N/A	Call Hilco	Call Hilco	Call Hilco	Call Hilco	

# Decal Placement

## A - Right cab window



## B - Leveling cylinder and manifold



## C - Leveling system hazard (Located between the second and third step)



D - Back of undercarriage

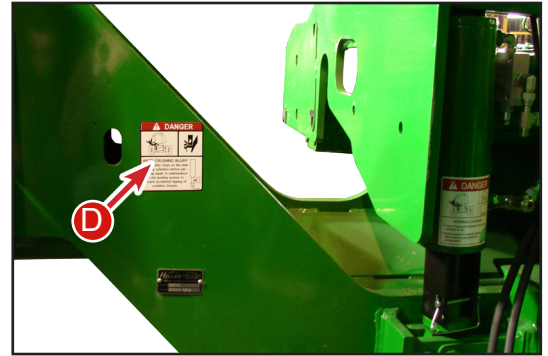
**⚠ DANGER**



**AVOID CRUSHING INJURY**  
Install safety stops on the main leveling cylinders before performing repair or maintenance on the leveling system to prevent accidental tipping of combine chassis.



LL-143621



E - Rear drop axle (left and right sides)

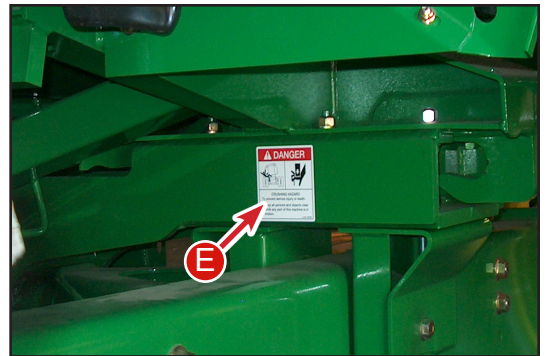
**⚠ DANGER**



**CRUSHING HAZARD**  
To prevent serious injury or death:

- Keep all persons and objects clear while any part of this machine is in motion.

LL20-100783



F - Transition header hooks

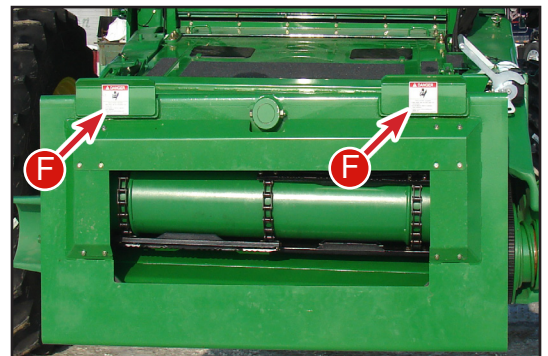
**⚠ DANGER**



**PINCH POINT HAZARD**

- Keep hands, feet and body away from moving parts.
- Do not stand or climb on machine when operating.
- Hazard occurs during leveling and header trim.

LL20-100784

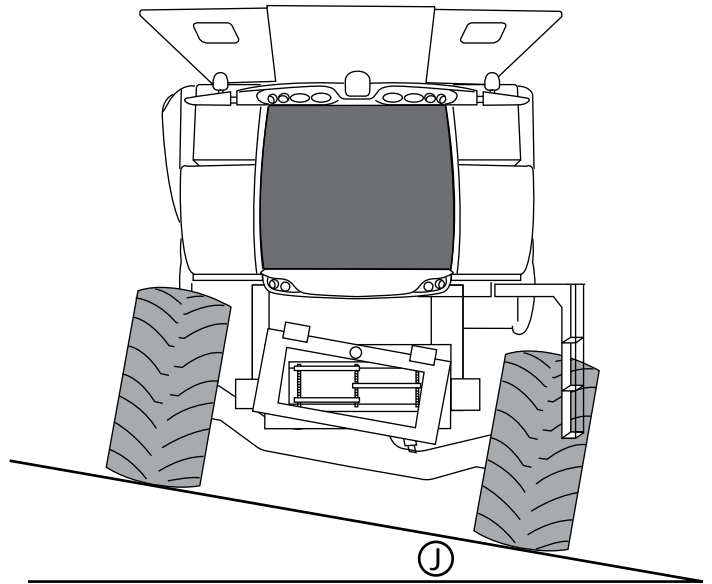
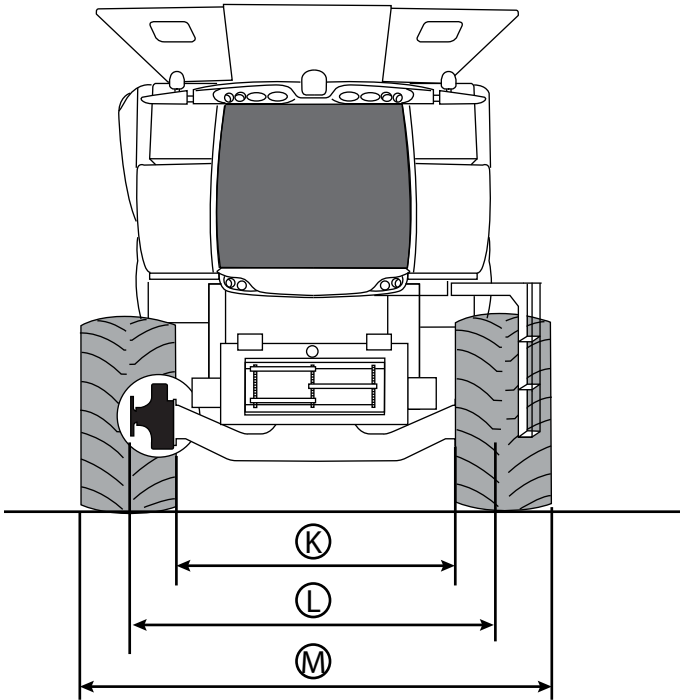
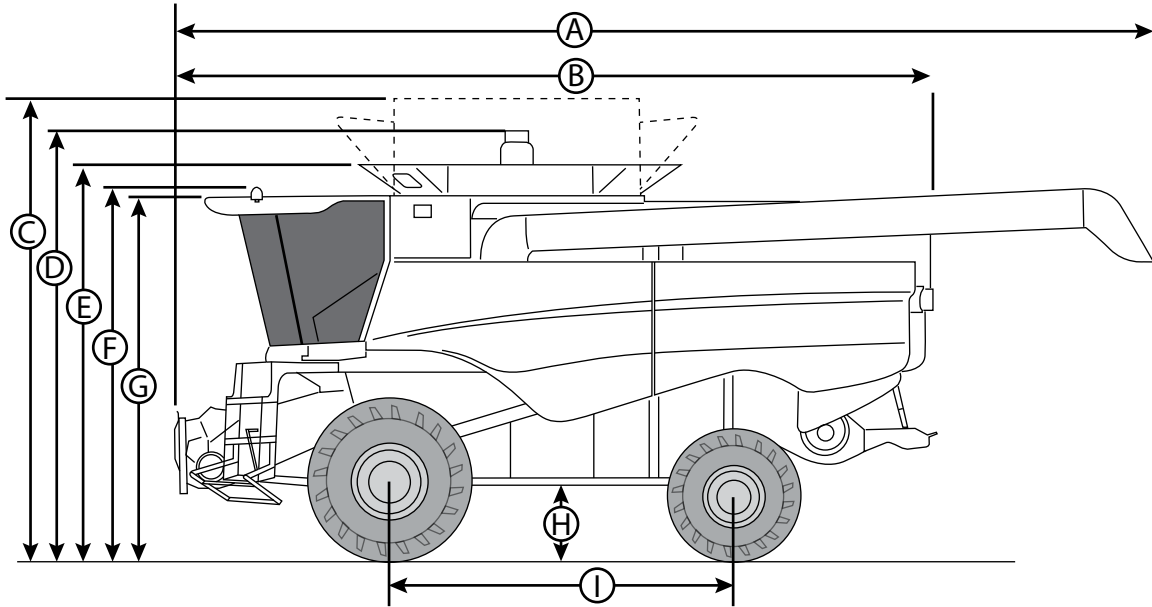


G - Side panel of combine (left and right)





# Leveling System Specifications



NOTE: Dimensions are approximate and subject to change without notice.

Dimension Reference Points are on the previous page.

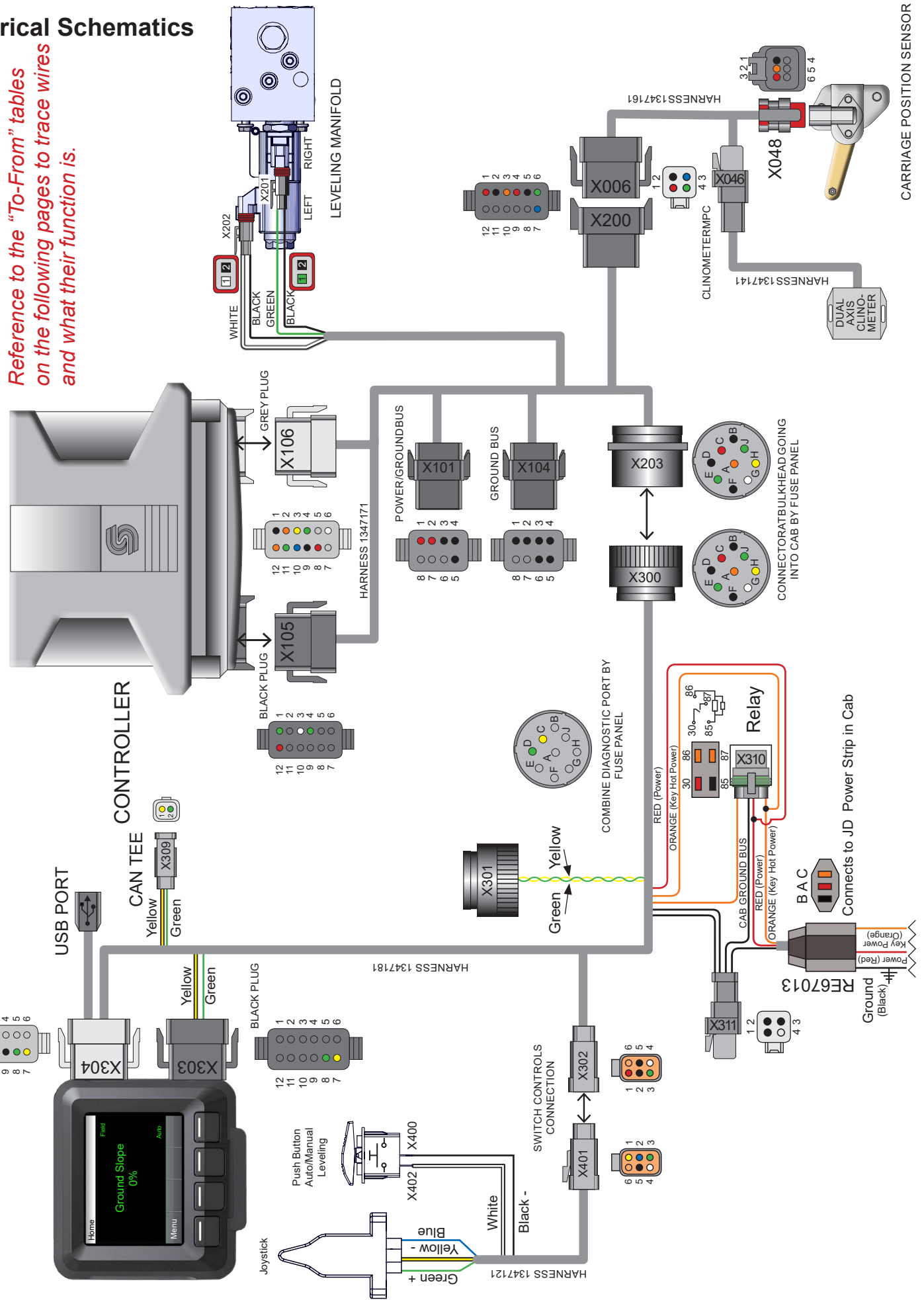
Dimension	JS9020	JS7020	JS5010
	900/60R32 Front Tires 620/75R26 Rear Tires	900/60R32 Front Tires 480/70R30 Rear Tires	30.5LR32 Front Tires 480/70R30 Rear Tires
John Deere Models	S680, S690, S780, S790	S650, S660, S670, S760, S770	S550
A	36 ft 3 in, (22 ft 5 in Standard Unloading Auger)	33 ft 6 in, (22 ft 5 in Standard Unloading Auger)	30 ft 11 in (18 ft 5 in Unloading Auger)
B	28 ft 1 in	28 ft 2 in	27 ft 9 in
C	16 ft 3 in (400 bu. Folding)	16 ft 2 in (300 bu. Folding)	NA
D	15 ft 10 in	15 ft 9 in	14 ft 10 in
E	15 ft 1 in (400 bu. Extensions)	15 ft (300 bu. Extensions)	13 ft 9 in
F	13 ft 2 in	13 ft 3 in	13 ft
G	13 ft	13 ft	12 ft 10 in
H	2 ft 2 in	2 ft 2 in	1 ft 11 in
I	12 ft 11 in	12 ft 11 in	12 ft 11 in
J	18% (10.2°)	18% (10.2°)	18% (10.2°)
K <sup>a</sup>	10 ft 1 in	8 ft 7 in (Narrow UC), 10 ft 1 in (Std UC)	8 ft 10 in (Narrow UC), 10 ft 1 in (Narrow UC with dual extensions)
L <sup>a</sup>	12 ft 6 in	10 ft 11 in (Narrow UC), 12 ft 6 in (Std UC)	10 ft 11 in (Narrow UC), 12 ft 6 in (Narrow UC with dual extensions)
M <sup>a</sup>	15 ft 11 in	14 ft 3 in (Narrow UC), 15 ft 11 in (Std UC)	14 ft (Narrow UC), 15 ft 7 in (Narrow UC with dual extensions)
Leveling Controller	Clinometer (Accuracy +/- 3/4°)		
Leveling Speed	Proportional Control with Auto / Manual		
Leveling Hydraulic System	Integrated into Combine's Close Center Hydraulics	Gear Pump	Gear Pump
Header Lateral Tilt Control	Hydraulic Master / Slave Cylinder w/ Auto/Manual Override		
Feeder Transition	Extended Feeder Chain		
Weight added to combine	4,100 lbs	4,100 lbs	3,700 lbs

<sup>a</sup>Due to different tire configurations, row spacings, axle configurations, wheel offsets, axle positions and spindles types, machine widths will vary. Measurements given in chart are for minimum and maximum widths with single drive tires. For more detailed width information please contact Hillco.

# Electrical Schematics

JS7020, JS9020, JH7020 & JH9020 Electrical Leveling Schematic  
SN (20001-20999)

Reference to the "To-From" tables on the following pages to trace wires and what their function is.



JS7020, JS9020, JH7020 & JH9020 Electrical Leveling Schematic  
SN (20001-20999)

X006 - Sensor Package			To	
Pin	Wire Color	Description	Connector	Pin
1	Red	Carriage Sensor Power	X048	3
2	Black	Carriage Sensor Ground	X048	1
3	Orange	Carriage Sensor Signal	X048	2
4	Red	Clinometer Power	X046	1
5	Black	Clinometer Ground	X046	2
6	Green	Clinometer F/A Signal	X046	4
7	Blue	Clinometer L/R Signal	X046	3
8	-	-	-	-
9	-	-	-	-
10	-	-	-	-
11	-	-	-	-
12	-	-	-	-

X046 - Clinometer MPC			To	
Pin	Wire Color	Description	Connector	Pin
1	Red	Clinometer Power	X006	4
2	Black	Clinometer Ground	X006	5
3	Blue	Clinometer L/R Signal	X006	7
4	Green	Clinometer F/A Signal	X006	6

X046 - OC Position Sensor			To	
Pin	Wire Color	Description	Connector	Pin
1	Black	Carriage Sensor Ground	X006	2
2	Orange	Carriage Sensor Signal	X006	3
3	Red	Carriage Sensor Power	X006	1
4				
5				
6				

X101 - Sensor Power/Ground Bus			To	
Pin	Wire Color	Description	Connector	Pin
1	Red	Sensor Power Supply	X106	8
2	Red	Joystick Power	X203	3
3	Black	Sensor Ground Supply	X106	9
4	Black	Joystick Ground	X203	4
5	Black	UC Sensor Ground	X200	2
6	-	-	-	-
7	-	-	-	-
8	Red	UC Sensor Power	X200	1

X104 - Ground Bus			To	
Pin	Wire Color	Description	Connector	Pin
1	Black	Ground Bus	X203	2
2	Black	Controller Ground	X106	1
3	Black	Clinometer Ground	X200	4
4	Black	Left Valve Ground	X202	2
5	Black	Right Valve Ground	X201	2
6	Black	Auto Switch Ground	X203	6
7	-	-	-	-
8	-	-	-	-

X105 - Controller B Black Connector			To	
Pin	Wire Color	Description	Connector	Pin
1	Green	Joystick Signal	X203	5
2	-	-	-	-
3	White	Left Valve Power	X202	1
4	Green	Right Valve Power	X201	1
5	-	-	-	-
6	-	-	-	-
7	-	-	-	-
8	-	-	-	-
9	-	-	-	-
10	-	-	-	-
11	-	-	-	-
12	Red	Clinometer Power	X200	4

X106 - Controller A Grey Connector			To	
Pin	Wire Color	Description	Connector	Pin
1	Black	Clinometer Ground	X104	2
2	Orange	Controller Power	X203	1
3	Yellow	CAN High	X203	8
4	Green	CAN Low	X203	9
5	-	-	-	-
6	White	Auto Switch Signal	X203	7
7	-	-	-	-
8	Red	Sensor Power Supply	X101	1
9	Black	Sensor Ground Supply	X101	3
10	Blue	Clinometer Left/Right Signal	X200	7
11	Green	Clinometer Fore/Aft Signal	X200	6
12	Orange	UC Sensor Signal	X200	3

JS7020, JS9020, JH7020 & JH9020 Electrical Leveling Schematic  
SN (20001-20999)

X200 - Sensor Package			To	
Pin	Wire Color	Description	Connector	Pin
1	Red	UC Sensor Power	X101	8
2	Black	UC Sensor Ground	X101	5
3	Orange	UC Sensor Signal	X106	12
4	Red	Clinometer Power	X105	12
5	Black	Clinometer Ground	X104	3
6	Green	Clinometer F/A Signal	X106	11
7	Blue	Clinometer L/R Signal	X106	10

X201 - Right Valve			To	
Pin	Wire Color	Description	Connector	Pin
1	Green	Right Valve Power	X105	4
2	Black	Right Valve Ground	X104	5

X202 - Left Valve			To	
Pin	Wire Color	Description	Connector	Pin
1	White	Left Valve Power	X105	3
2	Black	Left Valve Ground	X104	4

X203 - Cab Bulkhead			To	
Pin	Wire Color	Description	Connector	Pin
A	Orange	Controller Power	X106	2
B	Black	Controller Ground	X104	1
C	Red	Joystick Power	X101	2
D	Black	Joystick Ground	X101	4
E	Green	Joystick Signal	X105	1
F	Black	Auto Switch Ground	X104	6
G	White	Auto Switch Signal	X106	6
H	Yellow	CAN High	X106	3
J	Green	CAN Low	X106	4

X300 - Cab Bulkhead			To	
Pin	Wire Color	Description	Connector	Pin
A	Orange	Key Power	X310	C
B	Black	Controller Ground	X311	3
C	Red	Joystick Power	X302	1
D	Black	Joystick Ground	X302	2
E	Green	Joystick Signal	X302	3
F	Black	Auto Switch Ground	X302	5
G	White	Auto Switch Signal	X302	4
H	Yellow	CAN High	X304	7
J	Green	CAN Low	X304	8

X301 Diagnostic MPC				To	
Pin	Wire Color	Description	Connector	Pin	Pin
A	-	-	-	-	-
B	-	-	-	-	-
C	Yellow	CAN1 High	X303	7	7
D	Green	CAN1 Low	X303	8	8
E	-	-	-	-	-
F	-	-	-	-	-
G	-	-	-	-	-
H	-	-	-	-	-
J	-	-	-	-	-

X302 - Switch Box				To	
Pin	Wire Color	Description	Connector	Pin	Pin
1	Red	Joystick Power	X300	C	C
2	Black	Joystick Ground	X300	D	D
3	Green	Joystick Signal	X300	E	E
4	White	Auto Switch Signal	X300	G	G
5	Black	Auto Switch Ground	X300	F	F
6	-	-	-	-	-

X303 - Display B				To	
Pin	Wire Color	Description	Connector	Pin	Pin
1	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-
5	-	-	-	-	-
6	-	-	-	-	-
7	Yellow	CAN1 High	X301	C	C
8	Green	CAN1 Low	X301	D	D
9	-	-	-	-	-
10	-	-	-	-	-
11	-	-	-	-	-
12	-	-	-	-	-

**JS7020, JS9020, JH7020 & JH9020 Electrical Leveling Schematic**  
**SN (20001-20999)**

X304 - Display A			To	
Pin	Wire Color	Description	Connector	Pin
1	Red	Battery Power	X310	H
2	Black	Display Ground	RE67013	A
3	Orange	Keyed Power	X310	F
4	-	-	RE67013	C
5	-	-	-	-
6	-	-	-	-
7	Yellow	CAN0 High	X300	H
8	Green	CAN0 Low	X300	J
9	Black	USB Ground	USB	
10	White	USB Data +	USB	
11	Green	USB Data -	USB	
12	Red	USB Power	USB	

Note: Pin 1 Red wire T's and one leg goes to X310 pin H and the other leg goes to John Deere Power Strip Connector RE67013 pin A.

Note: Pin 3 Orange wire T's and one leg goes to X310 pin F and the other leg goes to John Deere Power Strip Connector RE67013 pin C.

X309 - CAN Tee			To	
Pin	Wire Color	Description	Connector	Pin
1	Yellow	CAN O High Tee	X300	H
2	Green	CAN O Low Tee	X300	J
			X304	8

Yellow wire tees with legs going to X300 pin H and X304 Pin 7. Green wire tees with legs going to X300 pin J and X304 Pin 8.

X310 - Power Distribution Tee			To	
Pin	Wire Color	Description	Connector	Pin
A	Black	Relay Ground	X311	4
B	-	-	-	-
C	Orange	Controller Power	X300	A
D	-	-	-	-
E	-	-	-	-
F	Orange	Keyed Power	RE67013	C
G	-	-	-	-
H	Red	Battery Power	RE67013	A

X311 - Cab Ground Bus				To	
Pin	Wire Color	Description	Connector	Pin	
1	Black	Ground	RE37013	B	
2	Black	Display Ground	X304	2	
3	Black	Controller Ground	X300	B	
4	Black	Relay Ground	X310	A	

RE67013 - John Deere Powerstrip Connector				To	
Pin	Wire Color	Description	Connector	Pin	
A	Red	Power	X310	H	
B	Black	Ground	X304	1	
C	Orange	Key Power	311	1	
			X310	F	
			X304	3	

Note: Red wire T's and one leg goes to X310 pin H and the other leg goes to X304 pin 1.

Note: Orange wire T's and one leg goes to X310 pin F and the other leg goes to X304 Pin 3

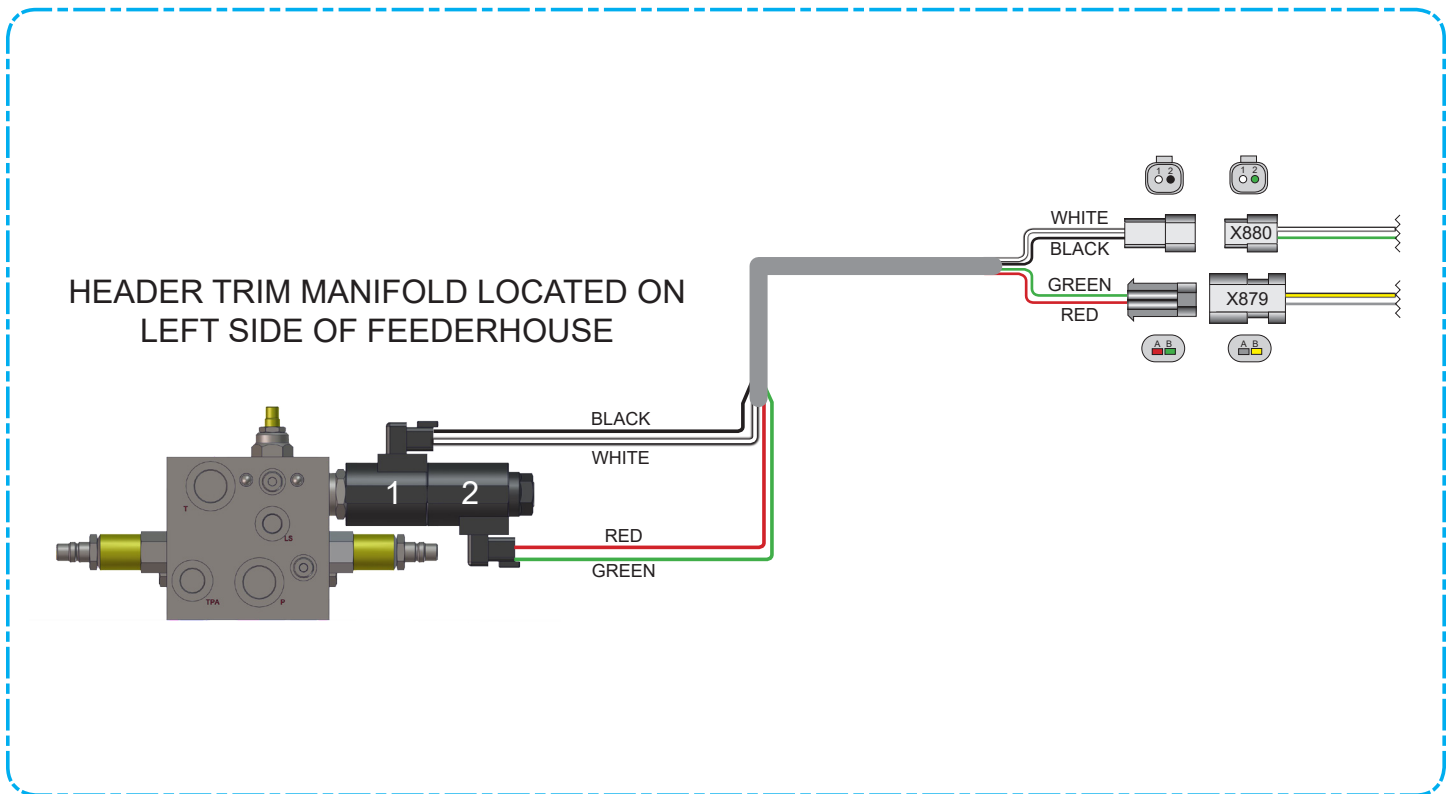
X400 - Auto Switch Signal			To	
Pin	Wire Color	Description	Connector	Pin
1	White	Auto Switch Signal	X401	4

X401 - Switch Box			To	
Pin	Wire Color	Description	Connector	Pin
1	Yellow	Joystick Power	Joystick Pigtail	
2	Blue	Joystick Ground		
3	Green	Joystick Signal		
4	White	Auto Switch Signal	400	1
5	Black	Auto Switch Ground	402	1
6	-	-	-	-

X402 - Auto Switch Ground			To	
Pin	Wire Color	Description	Connector	Pin
1	Black	Auto Switch Ground	X401	5

JS9020 Header Trim Electrical Schematic  
 SN 18001-19999  
 For Combines Equipped with Hillco Header Tilt Valve

WIRING HARNESS 1320731



**JOHN DEERE PLUG X879**  
 LOCATION: Left side of Feederhouse

PIN	COLOR	FUNCTION	To
1	WHITE	Trim Left Power	Coil #1 Pin 1
2	BLACK	Trim Left Ground	Coil #1 Pin 2

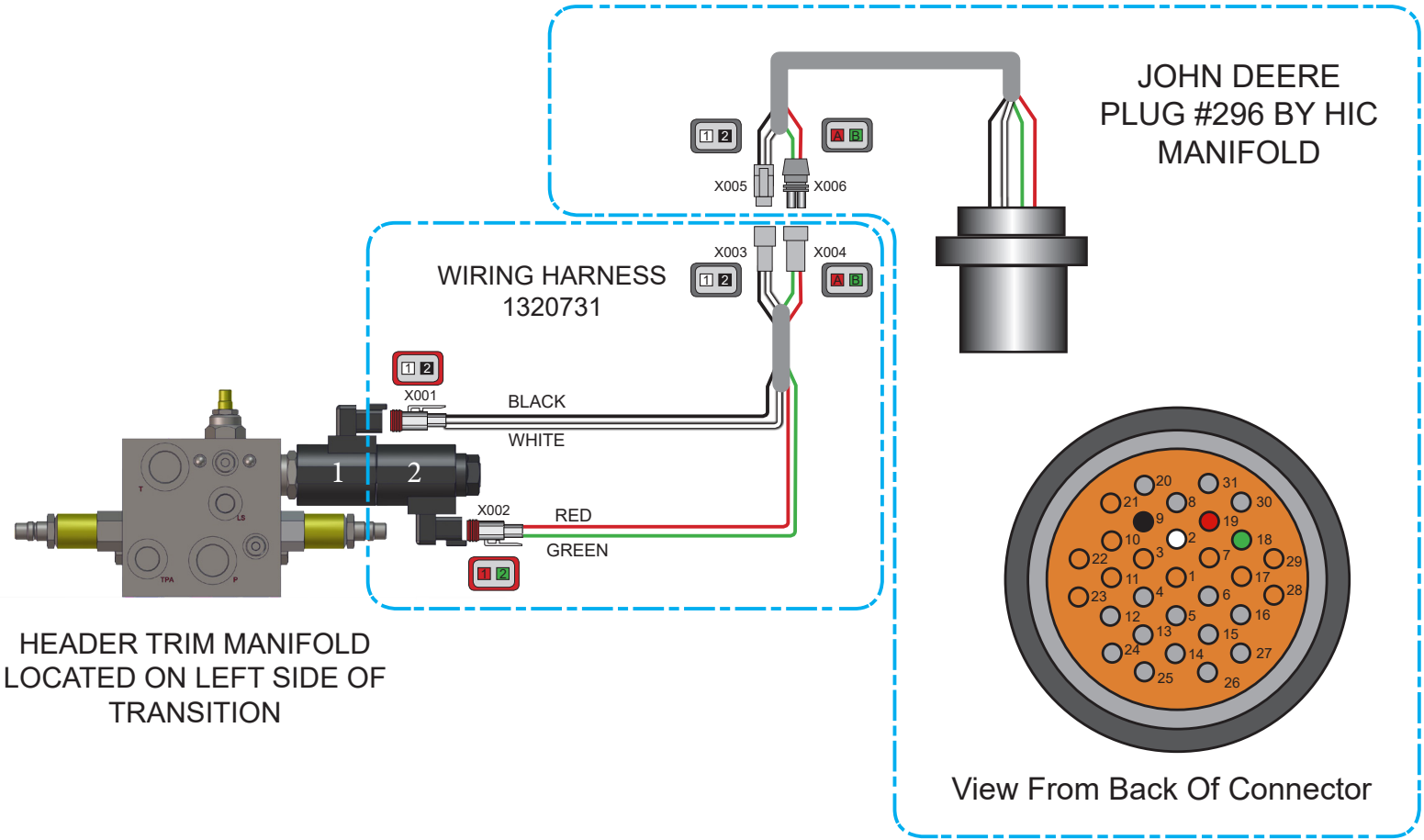
**JOHN DEERE PLUG X880**  
 LOCATION: Left side of Feederhouse

PIN	COLOR	FUNCTION	To
A	RED	Trim Right Ground	Coil #2 Pin 1
B	GREEN	Trim Right Power	Coil #2 Pin 2

For JS9020 Header Trim Electrical Schematic refer to the John Deere Combine Operator's Manual.

# JS5010, JS7010 & JH7010 Header Trim Electrical Schematic SN 20001-20999

## WIRING HARNESS 1322771



HEADER TRIM MANIFOLD  
LOCATED ON LEFT SIDE OF  
TRANSITION

X001			To	
PIN	Wire Color	Description	Connector	Pin
1	WHITE	Trim Left Power	X003	1
2	BLACK	Trim Left Ground	X003	2

X002			To	
PIN	Wire Color	Description	Connector	Pin
1	RED	Trim Right Ground	X004	A
2	GREEN	Trim Right Power	X004	B

X003			To	
PIN	Wire Color	Description	Connector	Pin
1	WHITE	Trim Left Power	X001	1
2	BLACK	Trim Left Ground	X001	2

X004			To	
PIN	Wire Color	Description	Connector	Pin
A	RED	Trim Right Ground	X001	1
B	GREEN	Trim Right Power	X001	2

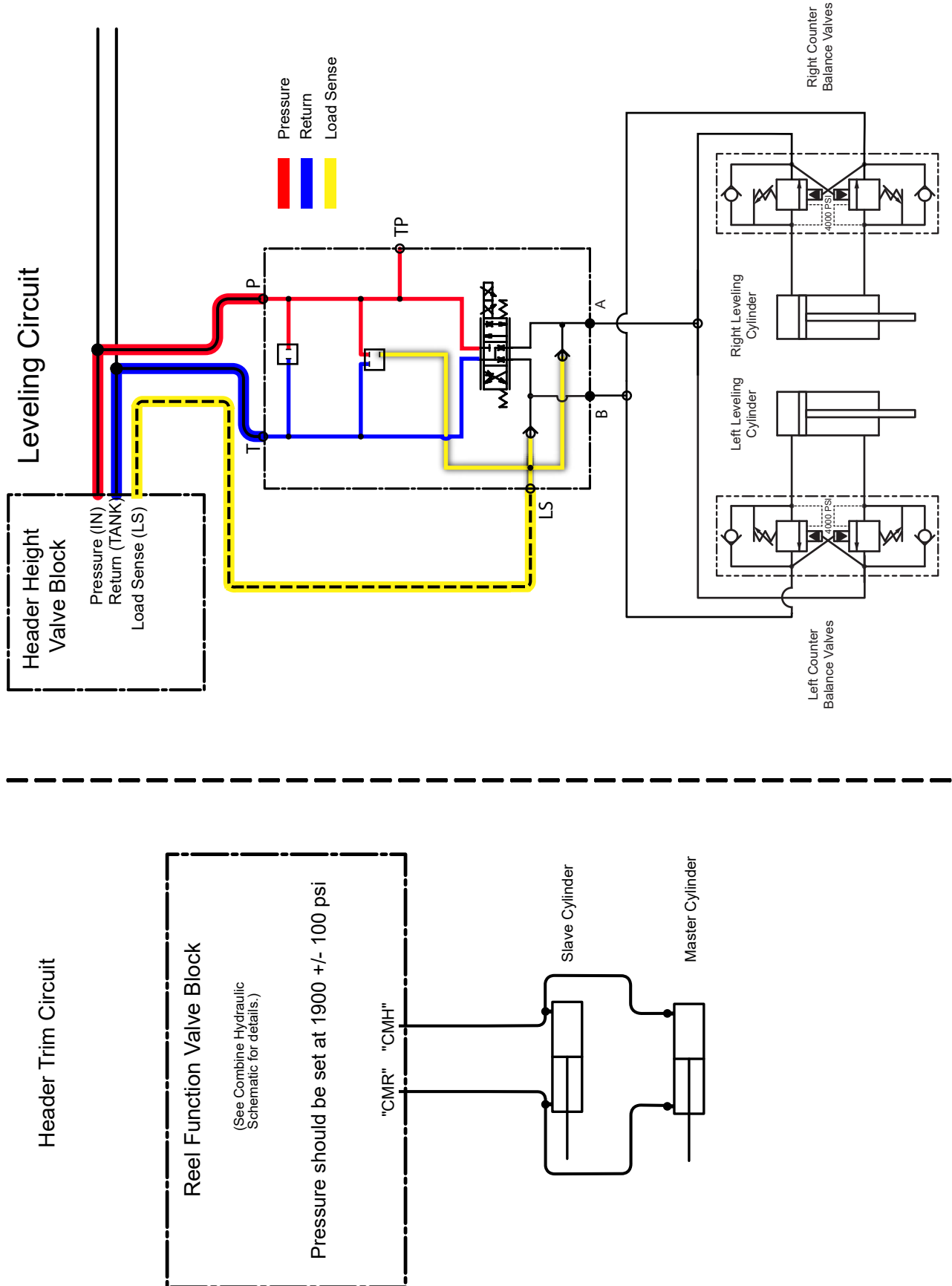
X005			To	
PIN	Wire Color	Description	Connector	Pin
1	WHITE	Trim Left Power	296	2
2	BLACK	Trim Left Ground	296	9

X006			To	
PIN	Wire Color	Description	Connector	Pin
A	RED	Trim Right Ground	296	19
B	GREEN	Trim Right Power	296	18



# JS9020 & JH9020 Hydraulic Circuit Schematic

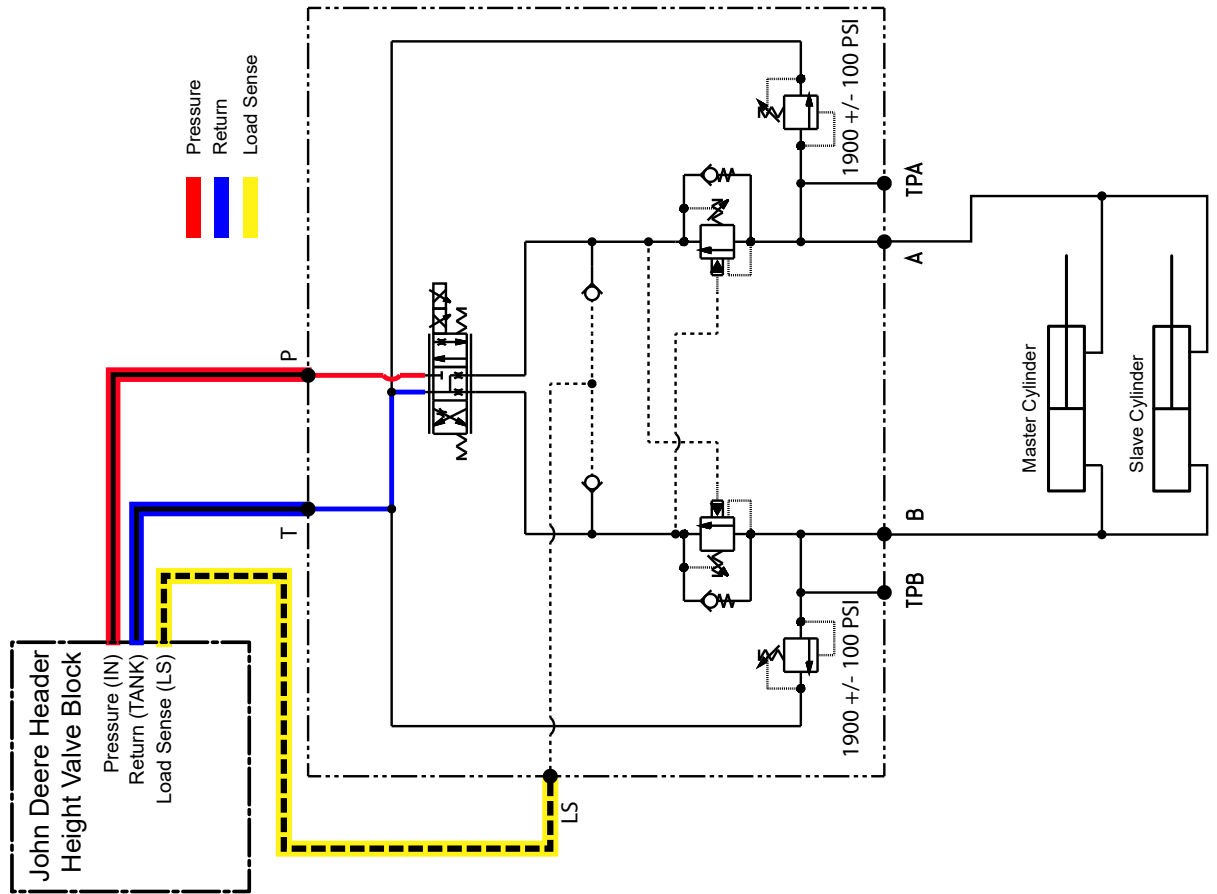
For John Deere S680, S690, S780 & S790 Combines with Contour Master  
HILLCO Serial Number 20001 thru 20999



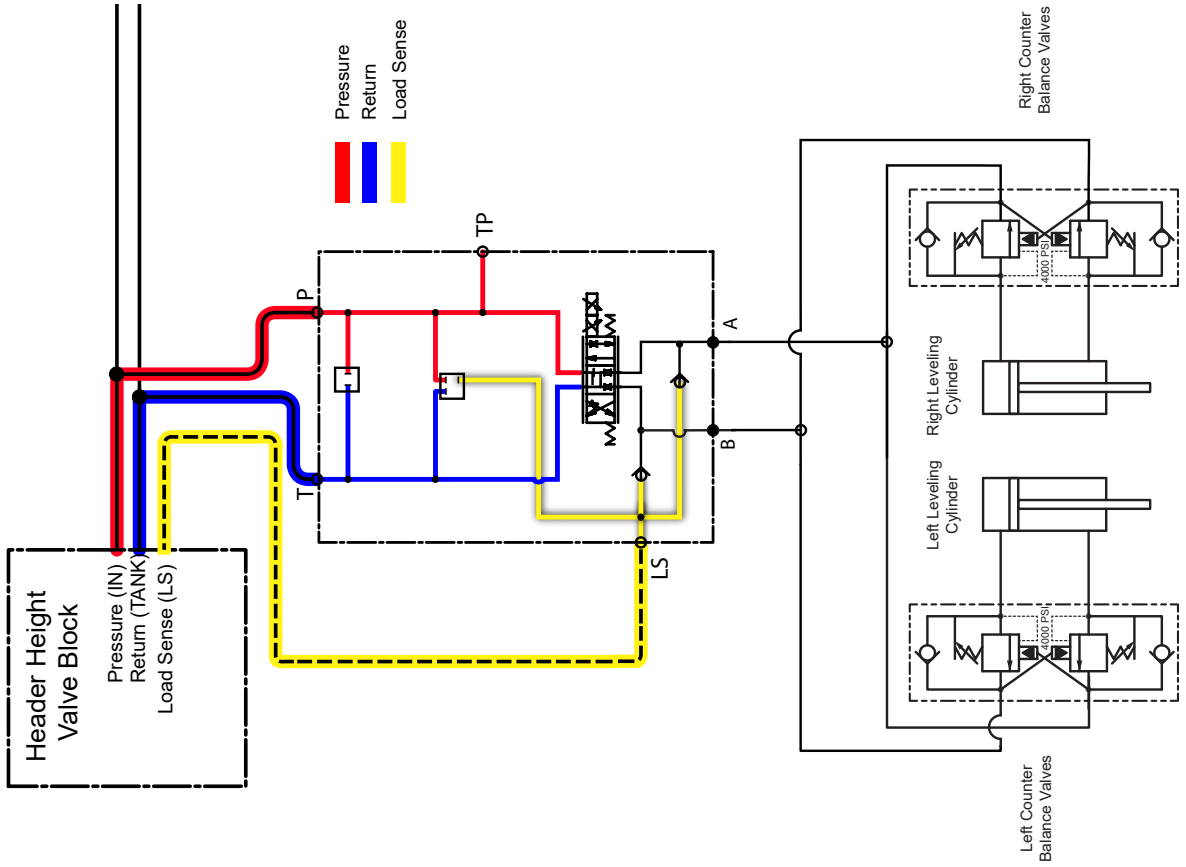
# JS9020 & JH9020 Hydraulic Circuit Schematic

For John Deere S680, S690, S780 & S790 Combines with Hillico Lateral Tilt Valve  
 HILLCO Serial Number 20001 thru 20999

## Header Trim Circuit



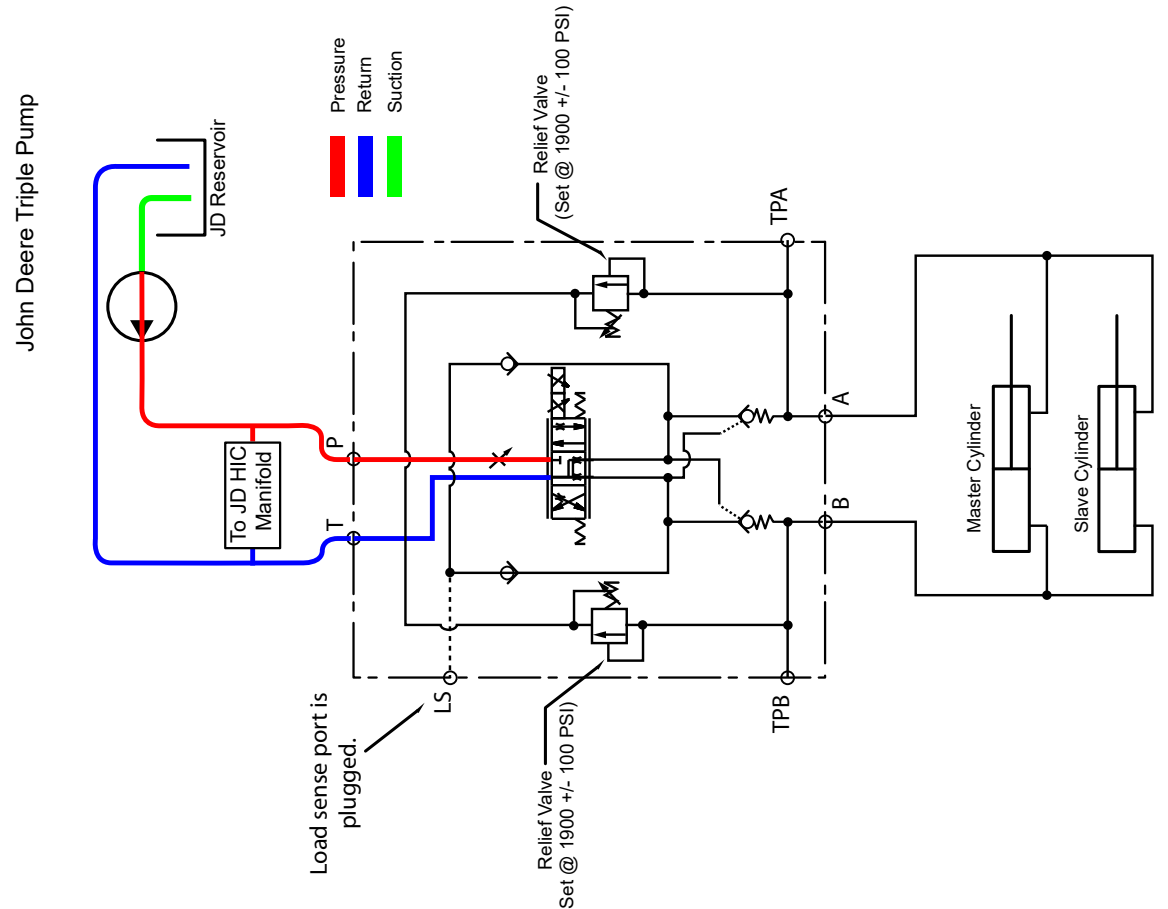
## Leveling Circuit



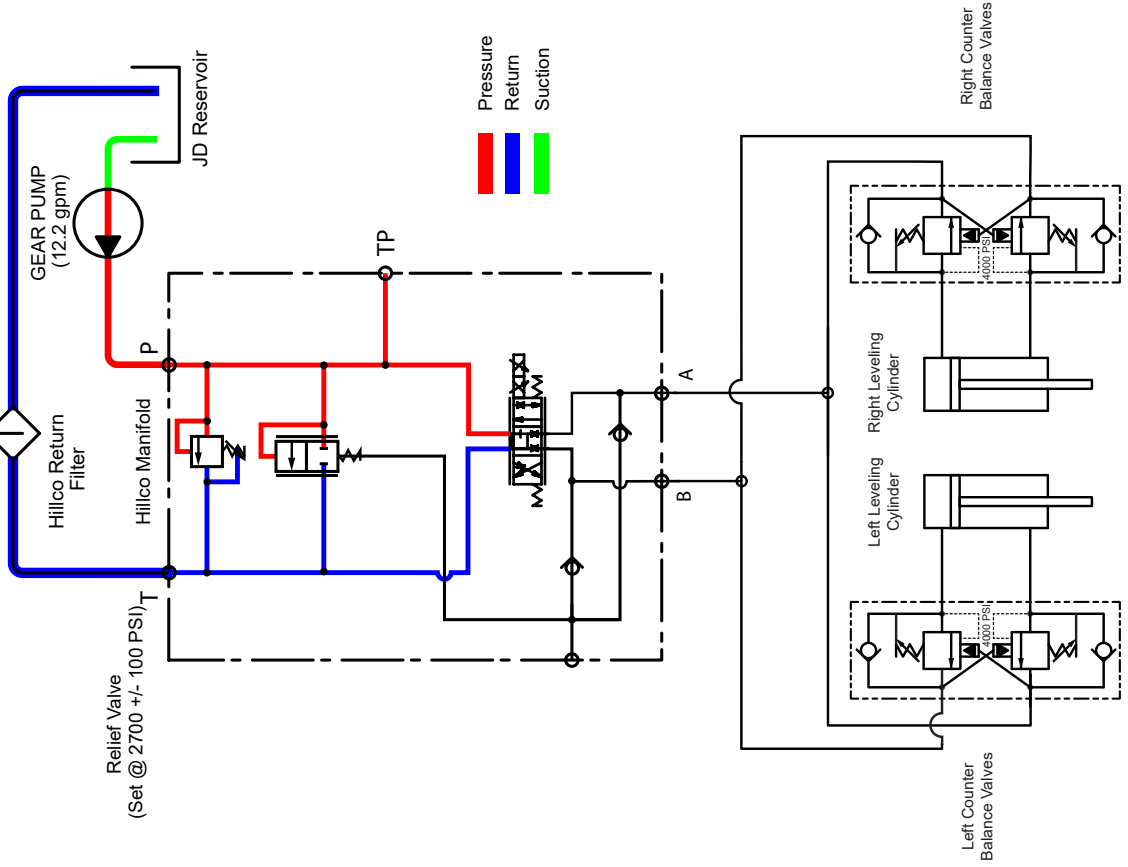
# JS5010, JS7020 & JH7020 Standard (Gear Pump) Hydraulic Circuit Schematic

For John Deere S550, S650, S660, S670, S670, S760 & S770 Combines:  
Hillco Serial Number 20001-20999

## Header Trim Circuit



## Leveling Circuit



## Notes