



Model 2955S-70S
Sidehill Leveling System
Operator's Manual

D-040820CLA02A

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.

Leveling System Model Number 2955S 2970S (Circle One)

Leveling System Serial Number _____ - _____

Combine Model Number _____

Combine Serial Number _____

The 2970S is compatible with all John Deere heads up to the weight limit of 9359 lbs. The 2955S is compatible with all John Deere heads up to the weight limit of 6433 lbs. Hillco does not guarantee any non John Deere header applications and will not be responsible for any damage occurred from improper header configurations.

Please call Hillco Technologies if you have any questions regarding the 2955S-70S or any other header configuration.

TABLE OF CONTENTS

MODEL AND SERIAL NUMBER	2
TABLE OF CONTENTS	3
WARRANTY POLICY	4
WARRANTY REGISTRATION	5
INTRODUCTION	6
SAFETY	7
SAFETY ALERT SYMBOL.....	7
SIGNAL WORDS	7
OPERATION SAFETY	8
HYDRAULIC SAFETY	8
SERVICING AND MAINTENANCE SAFETY	9
HIGHWAY OPERATION AND TRANSPORT SAFETY	9
SAFETY LABEL LOCATIONS	10
PRODUCT DESCRIPTION	12
CONTROLS & COMPONENTS	13
LEVELING CONTROLS AND COMPONENTS.....	13
Leveling Control Switches	13
Leveling Control Manifold	15
Leveling Controller.....	15
Limit Switches.....	15
Leveling Cylinder Stops.....	16
Carriage.....	16
Hydraulic Leveling Cylinders and Counter-Balance Valves	16
Leveling Cylinder Safety Stops	17
Drop Axle.....	17
HEADER TILT CONTROLS AND COMPONENTS.....	18
Header Tilt Control Switches.....	18
Header Tilt System	18
OPERATION	19
Ladder Position.....	19
Leveling System Controls.....	19
Lateral Header Tilt / Contour Master	21
Storage.....	21
Transporting Combine on a Trailer.....	21
MAINTENANCE	22
Lubrication – Leveling System.....	22
Lubrication – Header Drive Shafts	23
100 Hour – Annual Inspection	23
ADJUSTMENTS	25
Limit Switch Adjustment	25
Operator Adjustments	26
Header Shims.....	32
Feeder Chain Adjustment.....	32
Fore/Aft Tilt Frame Adjustment.....	32
Lateral Tilt Flow Control Adjustment	33
Lower Feeder Drum Stop Adjustment	34
Rear Axle Spacing	34
SCHEMATICS	35
HEADER TIRE COMPATIBILITY CHART	38
NOTES	41

WARRANTY POLICY



Statement of Limited Warranty (North American Harvest Products)

Hillco Technologies, Inc. (Hillco) warrants its new 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 products invoiced by Hillco from October 1st through May 31st is the first day of June following the Hillco invoice date, or the first date of use, whichever is earliest. For Hillco products invoiced by Hillco from June 1st through September 30th the warranty start date is the date of invoice. Once the warranty period has begun, it cannot be stopped or interrupted.

Hillco's obligation under this warranty shall be limited to repairing or replacing, free of charge to the original purchaser, any part that, in Hillco's judgment, shows evidence of such defect. Hillco additionally agrees to repair, at no cost to the original purchaser, 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.

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.

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

A Hillco Warranty Registration Form must be fully completed and returned to Hillco within 30 days of sale of the product to the retail customer or the first day of use, whichever is earlier.

All warranty claims must be submitted on a fully completed Hillco Warranty Claim Form.

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 dealer's location; or require it to be returned to Hillco, transportation charges prepaid, for inspection.

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.

No 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-041201LJH01

Warranty Registration

Fill out the Warranty Registration Card that accompanies this Operator's Manual and mail it to: Hillco Technologies
107 1st Ave.
Nezperce, Id 83543

 HILLCO TECHNOLOGIES Warranty Registration	
IMPORTANT!! This card must be <u>fully</u> completed and returned to Hillco Technologies within thirty (30) days of purchase by retail customer to validate the product warranty.	
Customer Information:	
Name: _____	Phone: (____) _____ Fax: (____) _____
Address: _____	City: _____ State: _____ Zip Code: _____
Hillco Product Information:	
Product Purchased: _____	Date of Purchase: ____/____/____
Model #: _____	Serial #: _____
Combine & Header Information:	
Combine: Brand: _____	Model #: _____ Serial #: _____
Header: (1) Brand: _____	Model #: _____ Width/Rows: _____
(2) Brand: _____	Model #: _____ Width/Rows: _____
(3) Brand: _____	Model #: _____ Width/Rows: _____
Dealer Information:	Customer Signature:
Dealer Name: _____	I certify that the above information is correct and I have received and read the Operator's Manual. Date: _____
City: _____ State: _____	
Salesman (opt.): _____	
	Signature: _____

Owner's Obligation

Warranty Registration – You must complete the Warranty Registrations Card and submit it to Hillco Technologies, Inc. within thirty (30) days of the date of the delivery to register the new equipment under Hillco's Warranty Policy.

Warranty is Void if Not Registered!
--

Maintenance Service – The operator's manual, furnished to you with the equipment at the time of delivery, contains important maintenance and service information. You should read the manual carefully and follow all maintenance and service recommendations. Doing so will result in greater satisfaction with your equipment and help to avoid service and warranty problems. Please remember that failures due to improper maintenance of your leveling system will not be covered under Hillco's Statement of Limited Warranty.

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 STS 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

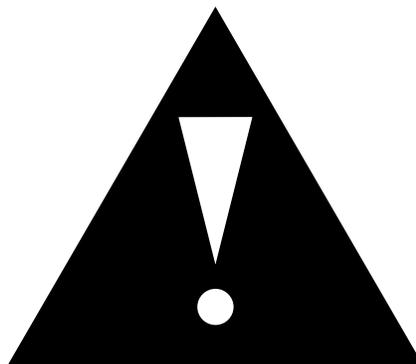


Keep this manual handy for frequent reference and to pass on to new operators or owners. Call your Hillco dealer or Hillco if you need assistance or information at 1-800-937-2461.

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

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 2000 Series 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.

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 equipped combine 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 combine for extended periods of time when it is in an out-of-level position.
9. Always travel at a safe speed. Use caution when making turns or traversing ditches.
10. Leveling cylinder stops should be used on combines that rely on the limit switches to stop the leveling prematurely to prevent sheet metal damage.
11. The use of after-market grain tank extensions is prohibited from use on combines equipped with the Model 2955S-70S leveling systems.
12. Do not operate the leveling system with the ladder in the 90° position. Leveling the combine in the ladder in the 90° will cause damage to the ladder.

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. Gangrene may set in, in as few as 3 hours!
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: cylinders, valves, hydraulic hoses, adapters, pumps, manifolds, or reservoirs without first contacting your authorized Hillco dealer. These hydraulic components stabilize the chassis of the combine. Improper repair or replacement of these components could lead to uncontrolled leveling of the combine's chassis.



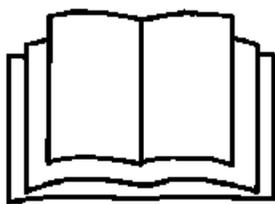
SERVICING AND MAINTENANCE SAFETY

1. Review the Operator's Manual and all safety items before servicing or maintaining the leveling system.
2. Place the leveling system in the "Road" mode (Road Indicator is lit), 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 Leveler monitor is displaying "Road" mode for all transport and highway travel situations.
4. Always travel at a safe speed. Use caution when making corners or meeting traffic.

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.

SAFETY LABEL LOCATIONS

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

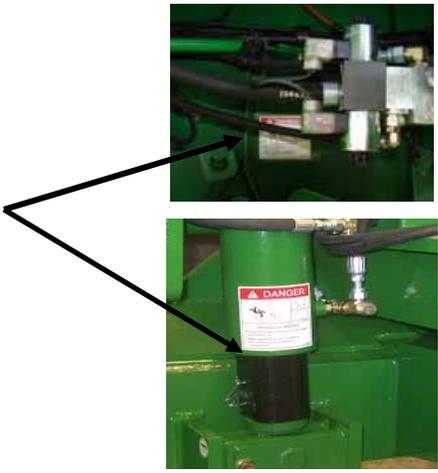
To apply new or replacement labels:

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.

Right Cab Window



Leveling Cylinder And Manifold



Leveling Controller



Leveling System Hazard (Located In the Second Step)



Front of Carriage and Rear Drop Axle (Left and right sides)



Transition Adapter



PRODUCT DESCRIPTION



The Hillco Sidehill Leveling System is designed for John Deere STS combines. Hillco designed the Sidehill Leveling System to maintain the STS combine's thrashing 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 thrashing 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 Contour Master electronics and sensor-equipped header to automatically compensate for varying ground contours.

CONTROLS & COMPONENTS

LEVELING CONTROLS AND COMPONENTS

Leveling Control Switches

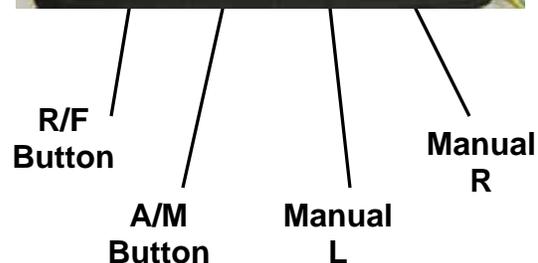
The leveling control switches are located on the monitor mounted in the upper right corner of the cab.

R/F Button— The **R/F Button** is used to toggle between road and field modes. In road mode the leveling system is disabled. Field mode allows the leveling system to operate. In addition, holding the **R/F Button** for two seconds will open the Menu Screen.

A/M Button— The **A/M 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 L and R Buttons**. The combine will return to level once the buttons are depressed.

Manual L and R Buttons— These buttons allow the operator to rotate the chassis to the left or right as desired

Remote Leveling Switches— Located above the Command Center are remote leveling switches. These switches allow for Auto/Manual control and Left/Right leveling.



Hydraulic Gear Pump

The Hydraulic Gear Pump 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.



Optional PFC Premium Pump

The PFC premium pump is mounted off the main engine gear case and is powered off the output shaft that drives the unloading auger. It reduces horsepower consumption by only producing enough flow as the leveling system requires.

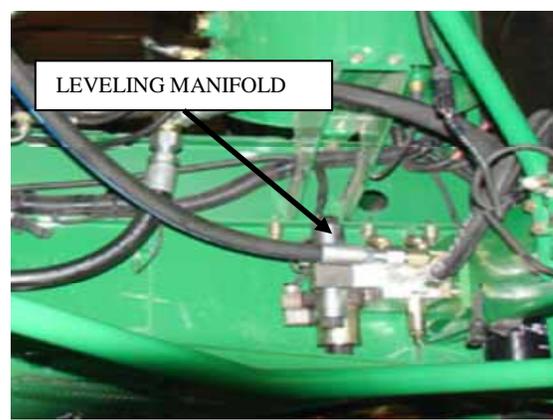


Overhung Load Adapter filled with 2.5 fl. oz. of SHC 526 Synthetic Hydraulic Oil (ISO 68)

IMPORTANT!
Recommended Oil Change Interval for the Over-Hung Load Adapter is 1000 Hrs. Please order Part Number LA-260401 for 2.5 fl. oz. of replacement oil. Do Not Over or Under Fill or damage to the Over-Hung Load Adapter may occur.

Leveling Control Manifold

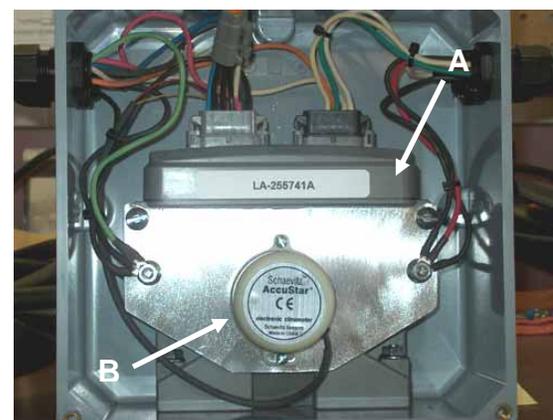
The leveling control manifold is located below the hydraulic reservoir on the left side of the combine. The operator electronically activates it by either the automatic leveling controller or by the manual override.



Leveling Controller

The electronic leveling controller consists of a clinometer for slope sensing and a control module to process that information and output signals to the hydraulic leveling valve. When auto leveling is activated the leveling controller levels the chassis up to a maximum slope of 18%.

- A- Leveling Control Module**
- B- Clinometer Slope Sensor**



Limit Switches

When the combine rotates to its maximum, the limit switch shuts off the leveling signal, which destrokes the gear pump by opening the dump valve. The maximum level is determined by either the stroke of the leveling cylinder or by the drive wheel clearance. The limit switch lights the maximum level indicator and displays the Maximum Level message on the monitor.

- A- Limit Switches**



Leveling Cylinder Stops

In some tire configurations; the leveling system can tilt the combine until the drive wheels contact the gull wing doors. Although the limit switches will prevent this contact, Hillco strongly recommends installing leveling cylinder stops to prevent damage in the event of hydraulic or electrical failure. To set the stops level the combine over both directions until there is $\frac{3}{4}$ " between the tire and the closest contact point. At this point add cylinder stops to prevent the cylinder from leveling the combine further. Contact Hillco for these cylinder stops.

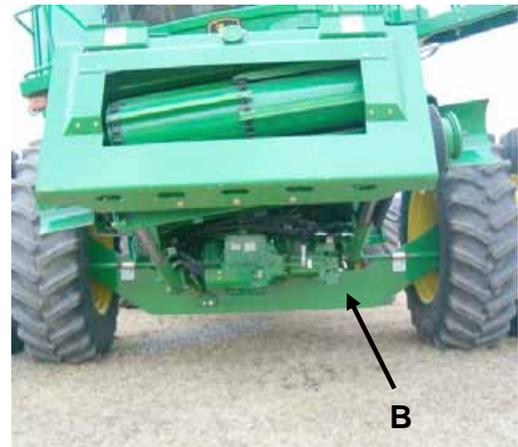
A- Leveling Cylinder Stops



Carriage

The carriage is designed to support the combine's chassis while allowing the combine to rotate through 20° 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 controller and limit switches are mounted to back of the overcarriage. The leveling cylinders connect the overcarriage to the undercarriage. The carriage raises the combine chassis five inches.

B- Carriage

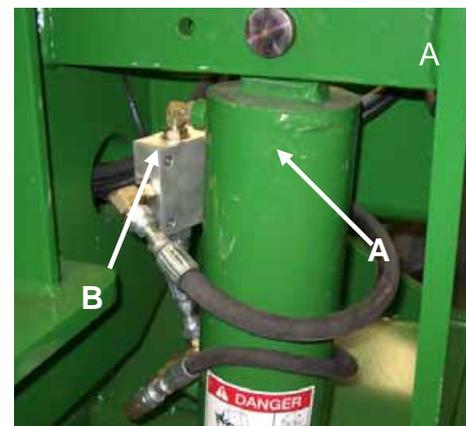


Hydraulic Leveling Cylinders and Counter-Balance Valves

There are two leveling cylinders 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 hydraulic counter-balance valves 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- Leveling Cylinders

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 also 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.

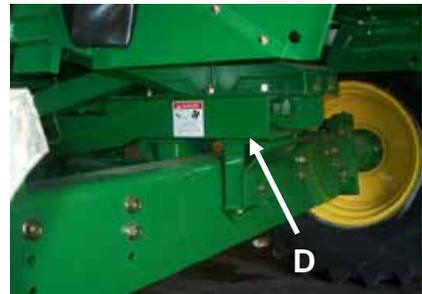


C- Cylinder Safety Stops

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 sudden chassis rotation.

Drop Axle

The drop axle accomplishes two things. First the drop axle raises the rear of chassis five inches to match the height change due to the leveling carriage. Second, the drop axle allows the rear axle to match the carriage's range of motion.



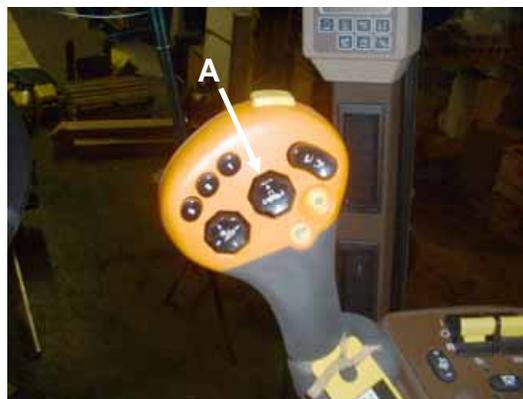
D- Drop Axle

Warning –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 Adjustment Section for more information.

HEADER TILT CONTROLS AND COMPONENTS

Header Tilt Control Switches

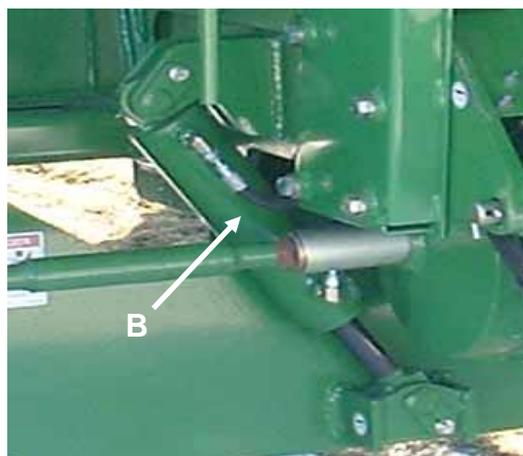
The manual header tilt switch is located in the hydro handle and is used to manually control the header tilt angle. Consult your John Deere Operator's Manual for explanation of the Contour Master operation.



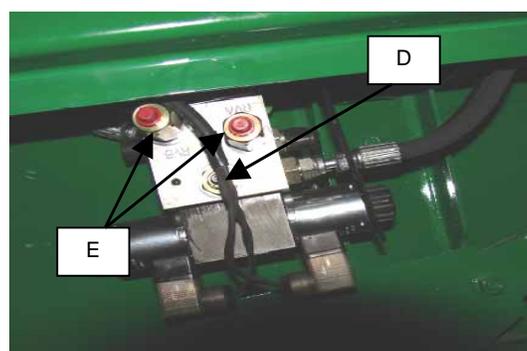
Header Tilt System

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.



- A- Header Trim switch**
- B- Master Cylinder**
- C- Slave Cylinder**
- D- Trim Flow Valve**
- E- Trim Relief Valves**



OPERATION



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.

Ladder Position



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

Operating the leveler with the ladder in the 90° will damage the ladder. To provide increased operator access, Hillco has provided an alternative ladder position of 52° and installed a ladder stop. The ladder stop prevents the ladder from rotating into the extended or 90° position.

Leveling System Controls

The leveling controls on the main page are shown below. The R/F (Road/Field) button must be in the F (Field) selection for the other buttons to function. If it is in the R (Road) selection then none of the other buttons will function. Pushing the button once will toggle the selection between R & F.

LEVEL LEFT: Push down on the Manual L (Left) Button.

LEVEL RIGHT: Push down on the Manual R (Right) Button.



R/F (Road/Field) button

Auto/Manual (A/M)

Manual Left

Manual Right

AUTOMATIC MODE: Pushing the A/M (Auto/Manual) Leveling Button will toggle between A & M. When the A is showing on the display 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 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 and search for level.

MANUAL MODE: Pushing the A/M (Auto/Manual) Leveling Button will toggle between A & M. When the M is showing on the display manual leveling operation is engaged. In Manual mode the Manual Left/Right leveling switch will level the combine left and right. When the switch is released the combine chassis will maintain the current chassis position.

REMOTE LEVELING SWITCHES: Located above the command center are remote leveling switches. These switches allow you to toggle between Auto and Manual and the ability to lean the combine left and right. They function the same as the Auto/Manual and Left/Right on the display monitor.



 **Caution—Do not unload the combine while operating the leveler in Automatic Mode. The chassis may tilt unexpectedly and cause damage to the unloading auger.**

The leveling system is equipped with a maximum level warning indicator on the monitor. On the Main Control Screen **MAXIMUM LEVEL** will be displayed and the lower right red LED will illuminate. This indicates when the machine has reached its maximum leveling capability.



Lateral Header Tilt / Contour Master

To tilt the header manually, depress the header tilt switch (A) on the left for tilt left, or on the right side for tilt right.

The Hillco leveling system is fully compatible with John Deere's Contour Master lateral tilt electronics.

To run the Contour Master functions refer to your combine operator's manual.



A- Header Tilt Switch

Note—The Contour Master's Angle Sensor In-Cab Display will not function when the combine is equipped with a sidehill leveling system. When calibrating the header do not calibrate the Angle Sensor. Attempts to calibrate the sensor will cause the system to display error codes. The Contour Master functionality will not be affected by not calibrating the angle sensor.

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.



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.

Transporting Combine on a Trailer

Before loading the combine, switch the leveling system into the road transport 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 location, Hillco provides T-hook slots on the carriage for securing combine to the trailer.

A-Tie Down Slots



MAINTENANCE

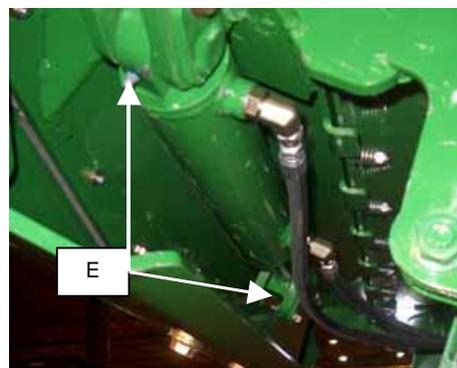
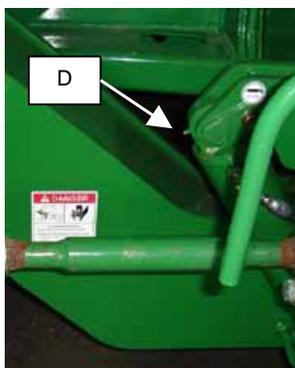
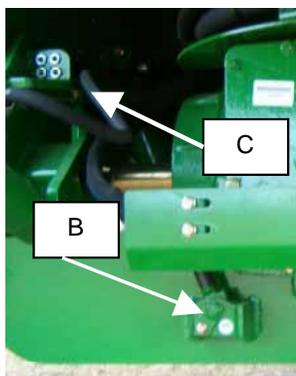


Prior to any maintenance, follow these procedures:
Park the combine on level ground, raise the header, turn off the ignition, block the tires, and lower the header lift cylinder safety stop.

Lubrication – Leveling System

All grease points on the Hillco Leveling System require a 50-hour grease interval. None of the lubrication points can be over-greased.

- A- Rod end of main leveling cylinders
- B- Rod end of the master cylinder
- C- Grease bulkhead
- D- 2955s ONLY- Base end of the master cylinder
- E- Base and rod end of the slave cylinder



Lubrication – Header Drive Shafts

Because there are a number of header configurations that can be used with this leveling system, Hillco cannot anticipate the drive shafts used to drive these headers. It will be necessary to modify the drive shafts to allow access for greasing.

Standard PTO Style Drive Shafts - These drive shafts utilize a single cross at each end of the drive shaft. Grease zerks on both crosses and the zerk on the outer profile tube (at the slip joint) should be greased on 50-hour intervals. The zerk on the outer profile tube can be accessed through the grease slot in the outer shield tube by fully collapsing the driveline. Hillco suggests adding an additional access slot in the outer shield tube that aligns with the grease zerk when the drivelines are coupled to the combine's reverser shaft and the combine is on level ground.

Constant Velocity Drive Shafts - Due to the high working angles of the drive shafts on narrow headers, constant velocity drive shafts are used to transmit power to the header. 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. CV drive shafts will not tolerate a lack of grease. The grease zerks access slots should be enlarged to ensure that these zerks could be greased.

Consult the lubrication label on each drive shaft for more details.

100 Hour – Annual Inspection

Hillco leveling systems pass through several quality control pre-delivery inspections to ensure that all mounting fasteners are tightened to proper torque before entering service. However during the break-in process, mating surfaces may readjust and reduce the torque of these fasteners. It is strongly recommended that the operator perform the following inspection at 100 hours and again prior to each year of service.

Inspect the following areas:

REAR AXLE

- All Bolts are properly tightened (combine to spacer and spacer to rear axle are 153 lb-ft)
- Torque wheel bolts (150 lb-ft + ¼ turn)
- Steering hoses are without pinch or abrasion points

	Bolt location	Torque
	Overcarriage to JD Axle	400 lb-ft
	Axle Extensions	675 lb-ft
	Final Drive Mounting (top two)	300 lb-ft
	Final Drive Mounting (bottom rear)	148 lb-ft +1/4 turn
	Final Drive Mounting (bottom front)	148 lb-ft +1/2 turn
	Transmission Mounting	235 lb-ft

CARRIAGE

- Torque all bolts properly
- Hydro hoses routed properly
- Brake Pedal should depress no more than ½ of full stroke
- Adjust parking brake properly
- Brake lines are properly secured and free of pinch and abrasion points
- Check Transmission Output Shafts, Drive Shafts, Couplers, and Input Shafts for wear

HYDRAULICS

- Hoses are without pinch or abrasion points
- Hydraulic reservoir is filled to the proper level
- Main Engine Gear Case is filled to proper level
- No leaks in the hydraulic system
- Torque pump mounting bolts to 39 lb-ft of torque
- For combines equipped with the optional PFC Premium pump check oil level in overhung load adapter yearly.

ELECTRICAL

- Harnesses are without pinch or abrasion points
- Limit switches set such that the rotation stops ¼" short of cylinder's full stroke or there is no less than 1" of clearance between the drive wheels and the gull wing doors.

TRANSITION

- Tighten the clamping and pivot bolts to 153 lb-ft torque
- Tighten the tilt slave cylinder mount bolts to a torque of 225 lb-ft



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

ADJUSTMENTS

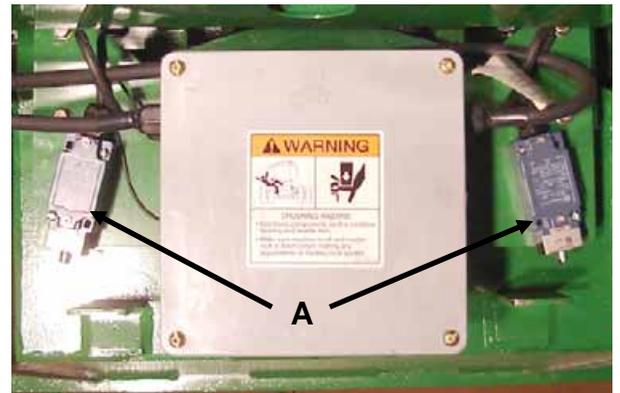


Prior to any adjustments, follow these procedures:
Park the combine on level ground, raise the header, turn off the ignition, block the tires, and lower the header lift cylinder safety stop.

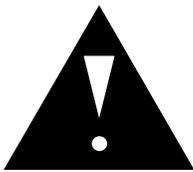
Limit Switch Adjustment

Locate the two limit switches that are mounted beside the gray controller box near the leveling system's main pivot pin and on the back of the carriage.

Loosen the two mounting screws on each limit switch and lift them up to the top of their slots, then slightly tighten the screws to hold the limit switches in place.



Next, place the leveling system into manual mode and lean the combine to the left until either the maximum leveling capabilities of the leveling system are reached or there is approximately one inch of clearance between the tires and any portion of the combine's chassis. Next, shut off the machine. Loosen the two screws that mount the left limit switch to its mounting plate. Adjust the left limit switch downward until the undercarriage front plate activates the plunger. You will hear a click when the switch is activated. The plunger should be compressed 1/16-1/8" past the point that it clicks. Test the limit switch by manually leveling right, away from the switch, and then back to the left. The combine should stop leveling when the switch is activated and the maximum level indicator lamp on the steering column should illuminate. Repeat the process for the right limit switch.



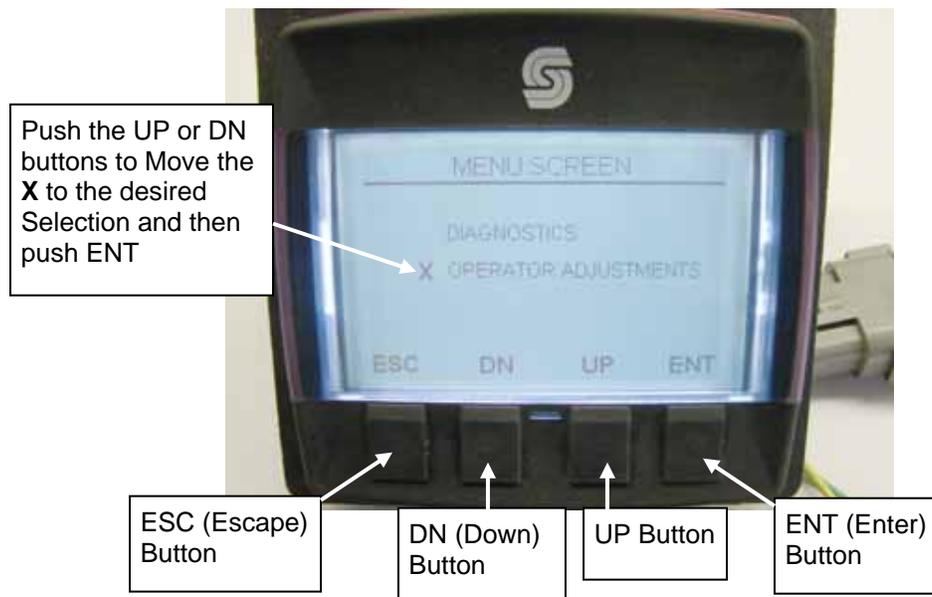
Caution—In some tire configurations, the tire can contact the gull wing doors. In this case, the limit switches must be adjusted to prevent tire contact with the combine chassis. However, to prevent chassis and tire damage in the event of a hydraulic or electrical failure, Hillco strongly recommends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

Operator Adjustments

From the Main Control Screen, Push & Hold the R/F button for two (2) seconds to go to the Menu Screen.

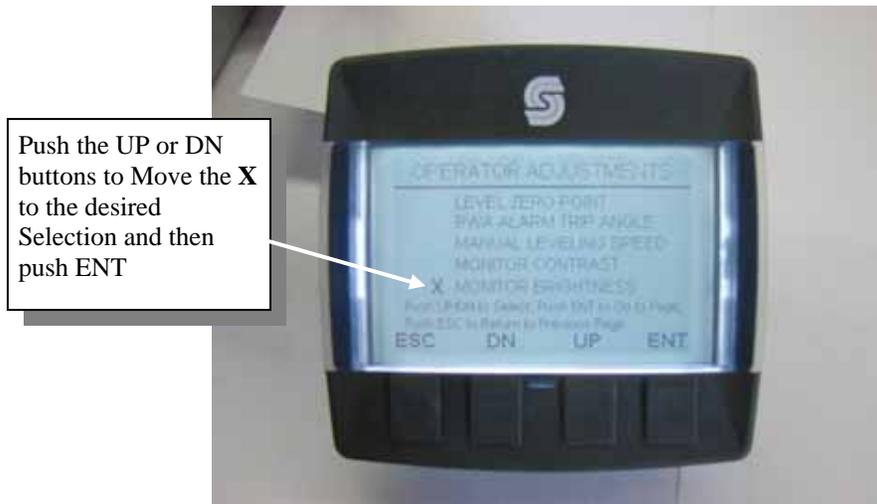


Push the **UP** or **DN** buttons to move the **X** to the Operator Adjustments Line and then push the **ENT** button to go into that Page. Note: Pushing the **ESC** button will take you back to the Main Control Screen.



LEVELING ZERO POINT ADJUSTMENT

From the Operator Adjustments Screen, Push the **UP** or **DN** buttons to move the **X** to the Level Zero Point and push **ENT**. Note: Pushing the **ESC** button will take you back to the Menu Screen.



Once in the Level Zero Point Screen place a level on the cab floor. Manually level the combine to the left (**L**) or right (**R**) until the bubble shows level. Push and hold the **ENT** button for 1 second. This will set the Zero Point for Leveling. This is a one (1) time adjustment unless the clinometer or controller has been replaced. When done push the **ESC** button to leave the page. Note: Pushing the **ESC** button will take you back to the Menu Screen.



ALARM TRIP ANGLE ADJUSTMENT

From the Operator Adjustments Screen, Push the **UP** or **DN** buttons to move the **X** to the RWA Alarm Trip Angle and push **ENT**. Note: Pushing the **ESC** button will take you back to the Menu Screen.

Push the UP or DN buttons to Move the **X** to the desired Selection and then push ENT

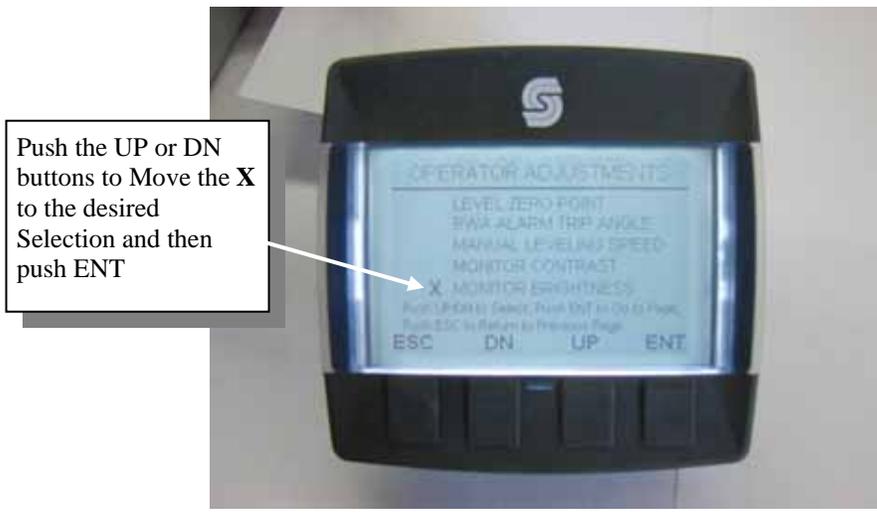


Once in the Alarm Trip Angle Page push and hold the **ENT** button for one (1) second to set the Alarm Trip Angle. This is a one (1) time adjustment unless tire size increases/decreases or the clinometer is replaced. Push **ESC** to leave the page. Note: Pushing the **ESC** button will take you back to the Operator Adjustments Screen.



MANUAL LEVELING SPEED ADJUSTMENT

From the Operator Adjustments Screen, Push the **UP** or **DN** buttons to move the **X** to Manual Leveling Speed and push **ENT**. Note: Pushing the **ESC** button will take you back to the Menu Screen.

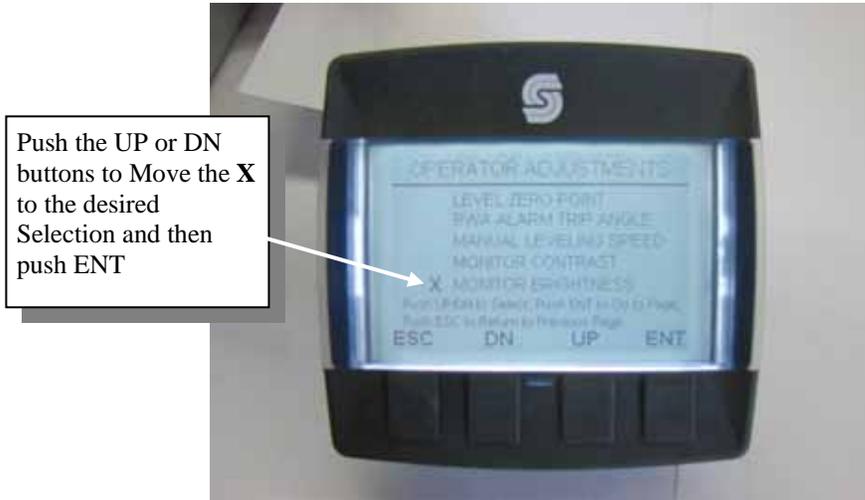


Once in the Manual Leveling Speed Screen, push the **UP** or **DN** buttons to increase or decrease the manual leveling speed (Default Setting is 13). Once the desired setting is reached on the bar graph, push and hold the **ENT** button for 1 second. This will lock the new manual leveling speed setting. When done push the **ESC** button to leave the page. Note: Pushing the **ESC** button will take you back to the Menu Screen.



MONITOR CONTRAST ADJUSTMENT

From the Operator Adjustments Screen, Push the **UP** or **DN** buttons to move the **X** to Monitor Contrast and push **ENT**. Note: Pushing the **ESC** button will take you back to the Menu Screen.



Once in the Monitor Contrast Screen, push the **UP** or **DN** buttons to increase or decrease the contrast (Default Setting is -3). Once the desired setting is reached, push and hold the **ENT** button for 1 second. This will lock the new monitor contrast setting. When done push the **ESC** button to leave the page. Note: Pushing the **ESC** button will take you back to the Menu Screen.



MONITOR BRIGHTNESS ADJUSTMENT

From the Operator Adjustments Screen, Push the **UP** or **DN** buttons to move the **X** to Monitor Brightness and push **ENT**. Note: Pushing the **ESC** button will take you back to the Menu Screen.

Push the UP or DN buttons to Move the **X** to the desired Selection and then push ENT



Once in the Monitor Brightness Screen, push the **UP** or **DN** buttons to increase or decrease the brightness (Default Setting is 8). Once the desired setting is reached, push and hold the **ENT** button for 1 second. This will lock the new monitor brightness setting. When done push the **ESC** button to leave the page. Note: Pushing the **ESC** button will take you back to the Menu Screen.



Header Shims

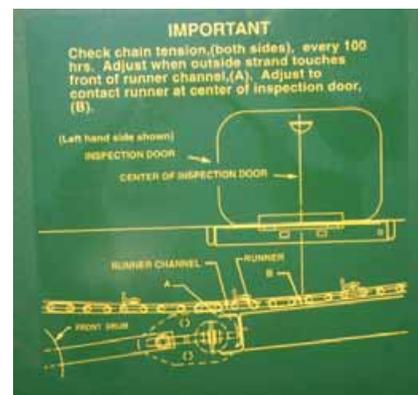
Shims can be purchased from your JD dealer to raise the header in relation to the Hillco transition's header adapter. The floor of the header should sit level or slightly higher than the bottom of the opening of the header adapter, to allow for smooth crop flow. These are the same plates that are used on the original JD feeder house.

A- John Deere Header Shims



Feeder Chain Adjustment

Follow the original John Deere feeder chain adjustment instructions found on the underside of the inspection doors on the top of the combine's feeder spout.



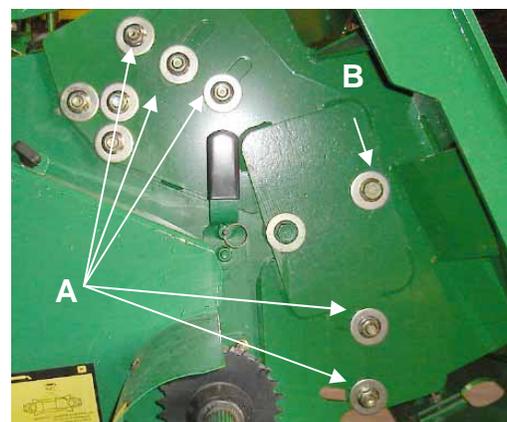
Fore/Aft Tilt Frame Adjustment



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

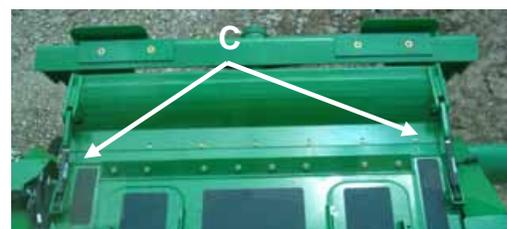
- Loosen the five clamping bolts (A) and the pivot bolt (B) on each side of the feeder house.
- Loosen the jam nuts on the turnbuckles.
- Adjust the turnbuckles until the desired header angle is achieved.
- Tighten the jam nuts.
- Tighten the clamping bolts and pivot bolt to 153 lb-ft of torque.

- A—Clamping Bolts**
- B—Pivot Bolt**
- C—Turnbuckle**





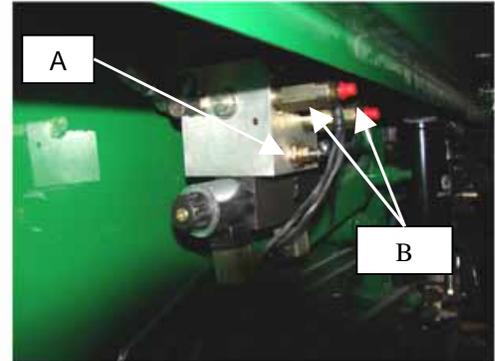
Caution—Failure to tighten the clamping bolts and pivot bolts to proper torque may cause damage to the turnbuckle mounts.



Lateral Tilt Flow Control Adjustment

The lateral tilt flow control valve (A) adjusts the speed at which the header rotates. 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 necessary to adjust the header's rotational rate.

To adjust the header rotational 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.



Specification

Left-to-Right Cycle Time-14 sec

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. However in 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.

- A- Tilt Flow Control Screw**
- B- Tilt Pressure Relief Valve**



Caution— The pressure relief valve is pre-set at the factory. 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.

Lower Feeder Drum Stop Adjustment

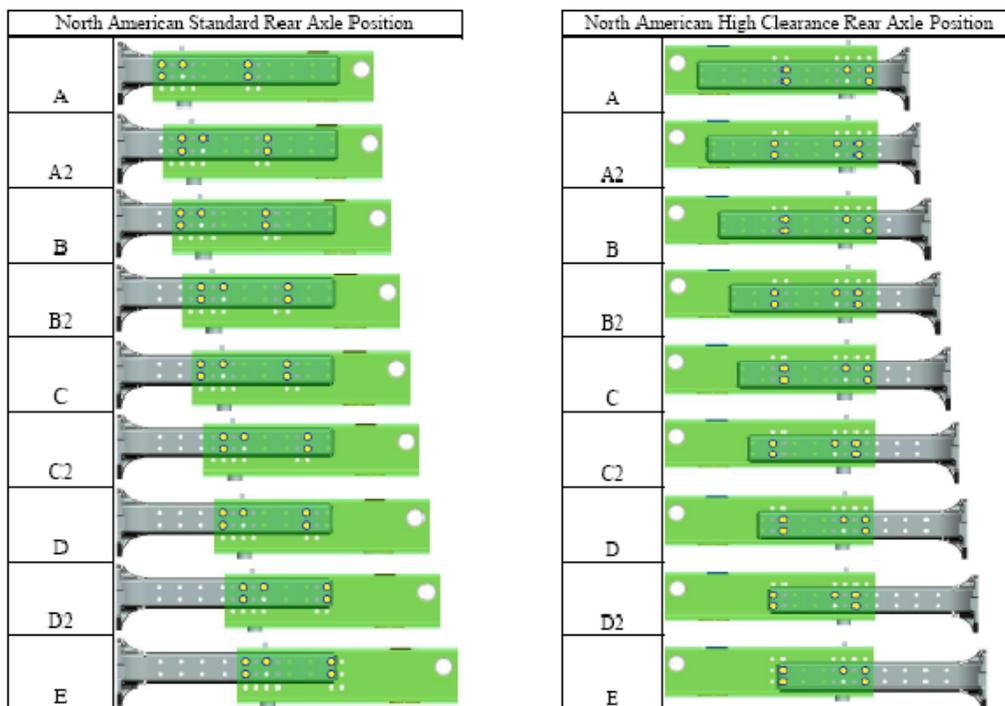
The Hillco leveling system does not change the feeder drum stop adjustment. Refer to the John Deere Operator’s Manual for your combine for the feeder drum stop adjustment.

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 spaced to prevent shielding interference. Refer to the following chart for Hillco’s rear axle spacing recommendations

Tire Tread- Centerline to Centerline in inches										
Steering Tire	Rear Axle Type	Position A	Position A2	Position B	Position B2	Position C	Position C2	Position D	Position D2	Position E
480/70R30	Adjustable	X	X	X	130.3	134.3	138.3	142.3	146.3	150.3
	Adjustable 4WD	X	X	X	133.2	137.2	141.2	145.2	149.2	153.2
16.9-26 R1	Adjustable	X	X	130.4	134.4	138.4	142.4	146.4	150.4	154.4
	Adjustable 4WD	X	X	132.8	136.8	140.8	144.8	148.8	152.8	156.8
18.4R-26 R1	Adjustable	X	X	127.4	131.4	135.4	139.4	143.4	147.4	151.4
	Adjustable 4WD	X	X	129.9	133.9	137.9	141.9	145.9	149.9	153.9
600/65R28 R1W	Adjustable	X	X	X	X	133.5	137.5	141.5	145.5	149.5
	Adjustable 4WD	X	X	X	X	136	140	144	148	152
18.4-30 R2	Adjustable	X	X	X	X	134.3	138.3	142.3	146.3	150.3
	Adjustable 4WD	X	X	X	X	137.2	141.2	145.2	149.2	153.2
28L-26 R1 12PR	Adjustable	X	X	X	X	X	X	152.3	156.3	160.3
	Adjustable 4WD	X	X	X	X	X	X	154.9	158.9	162.9
28L-26 R2 12PR	Adjustable	X	X	X	X	X	X	152.3	156.3	160.3
	Adjustable 4WD	X	X	X	X	X	X	154.9	158.9	162.9

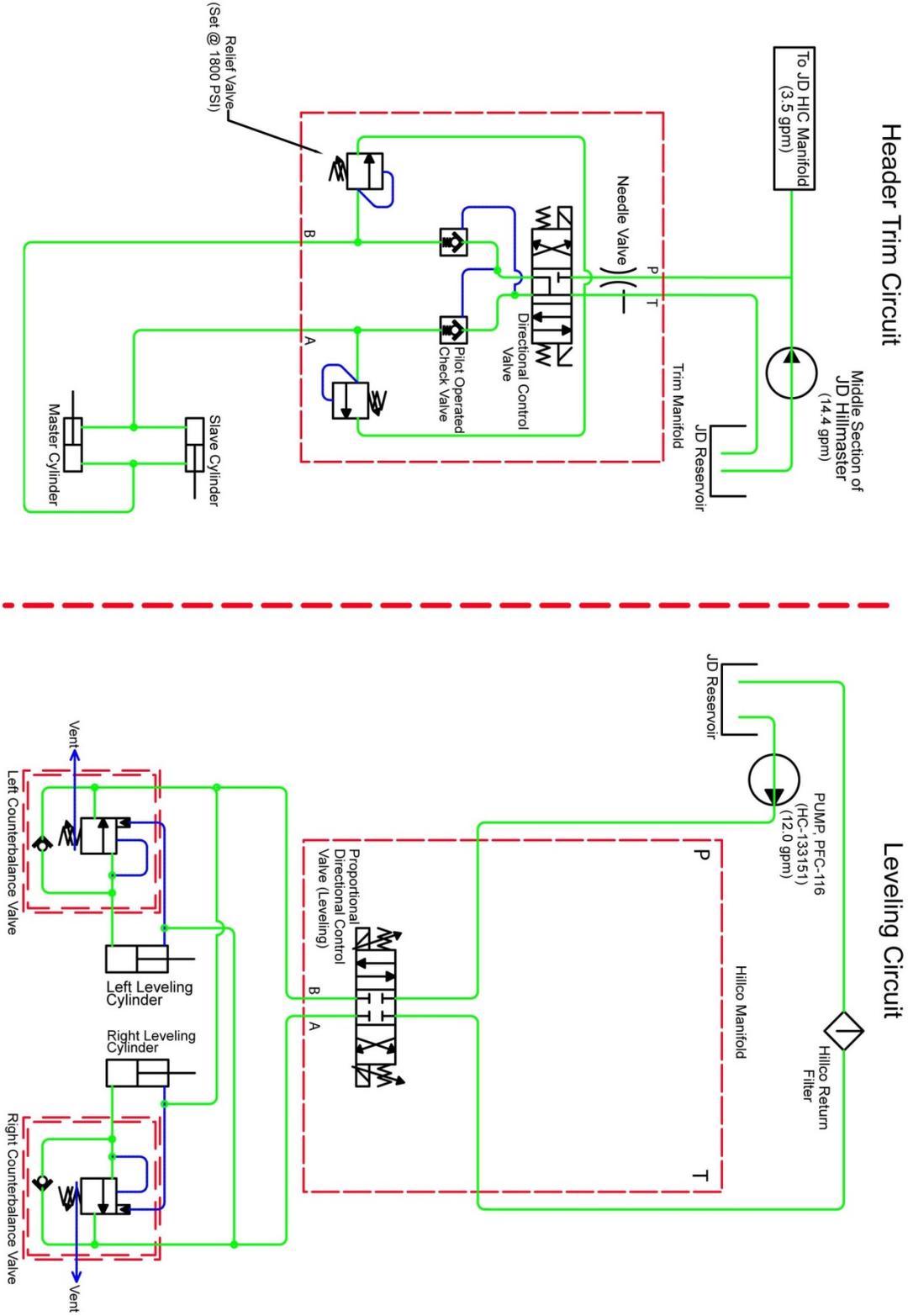
X—Not recommended due to shielding interference.



Schematics

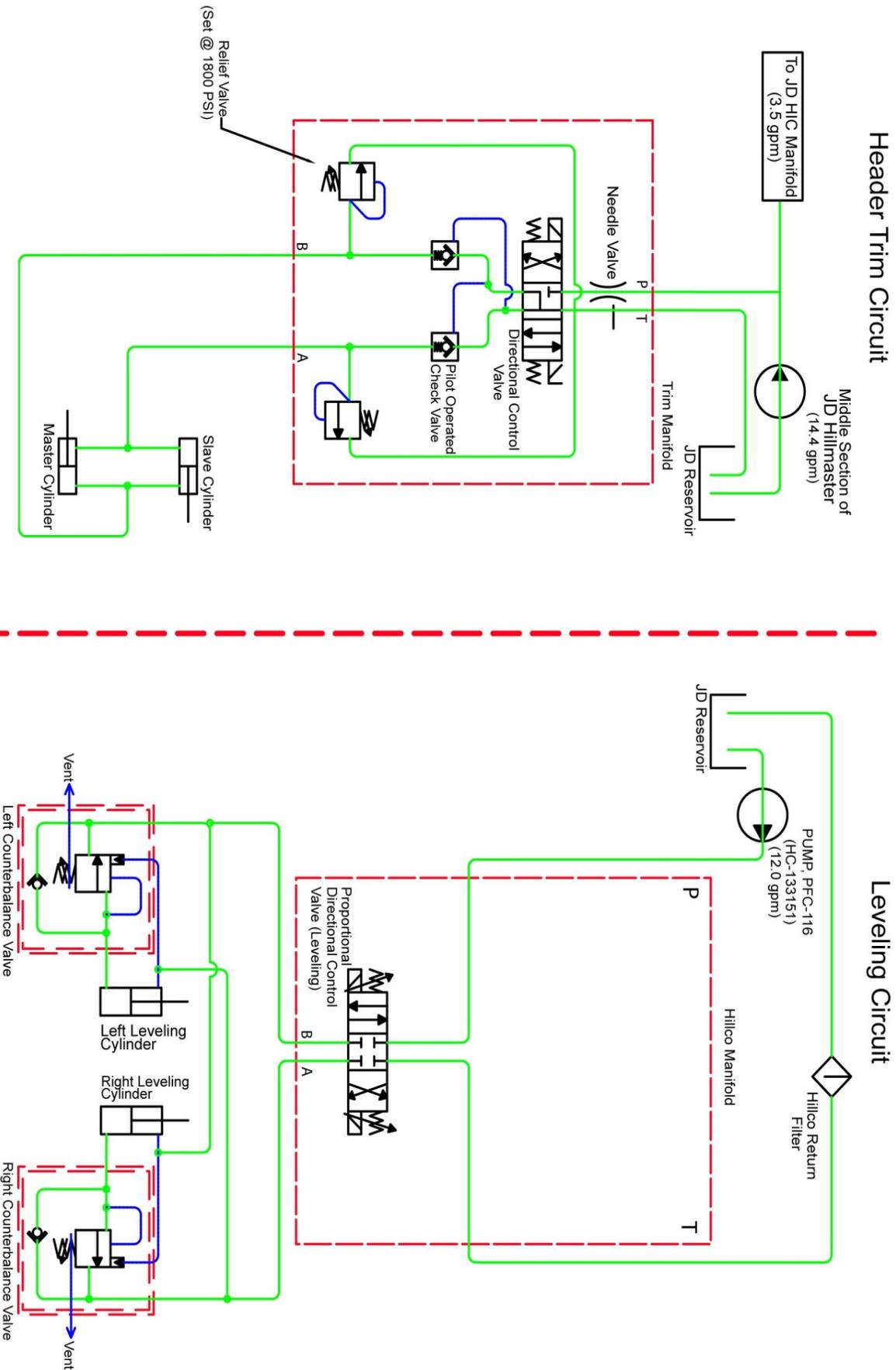
Standard (Gear Pump) Hydraulic Circuit Schematic

For JD STS Combines:
S/N 1601 thru Current



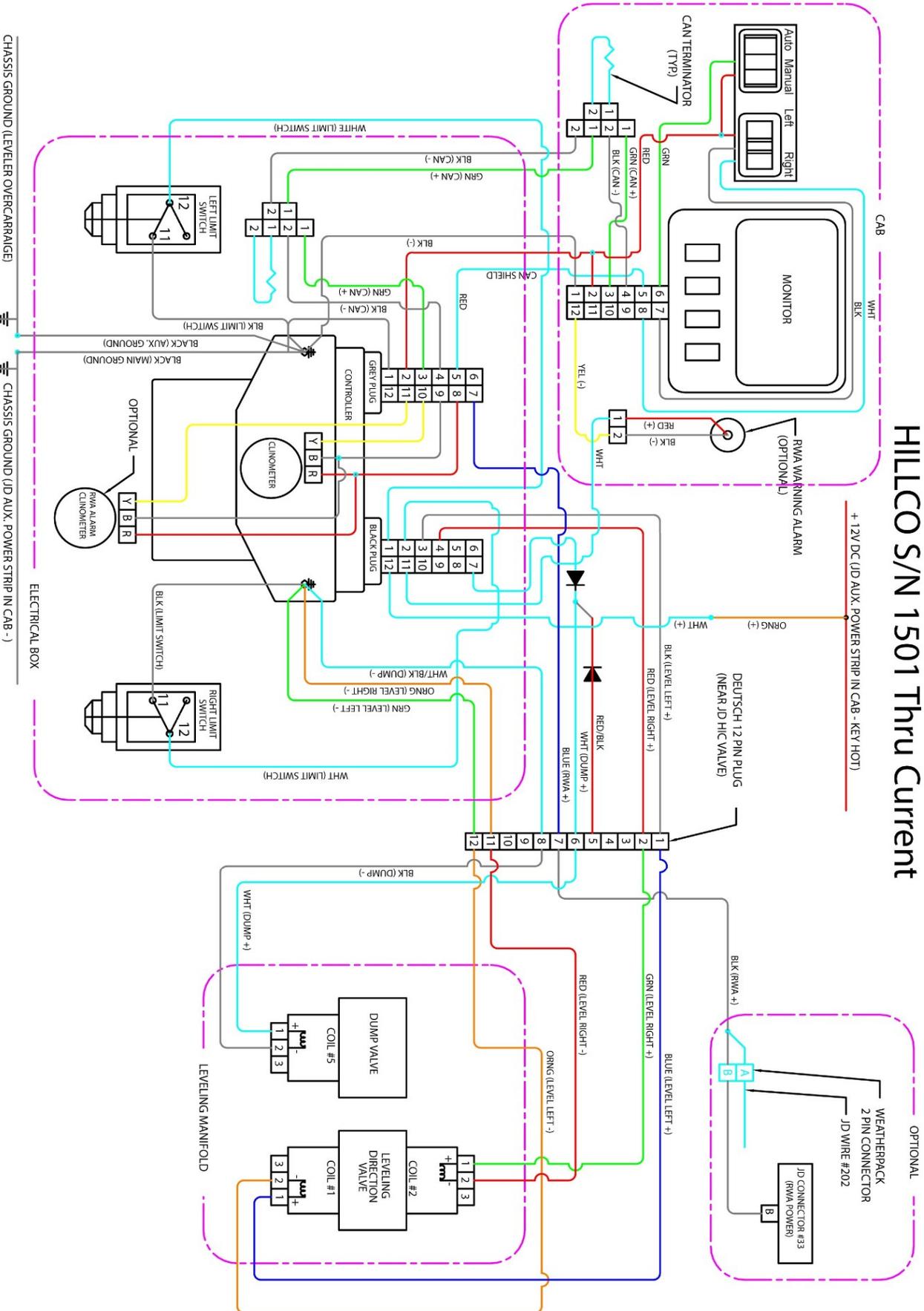
Premium (PFC Pump) Hydraulic Circuit Schematic

For JD STS Combines:
S/N 1601 thru Current



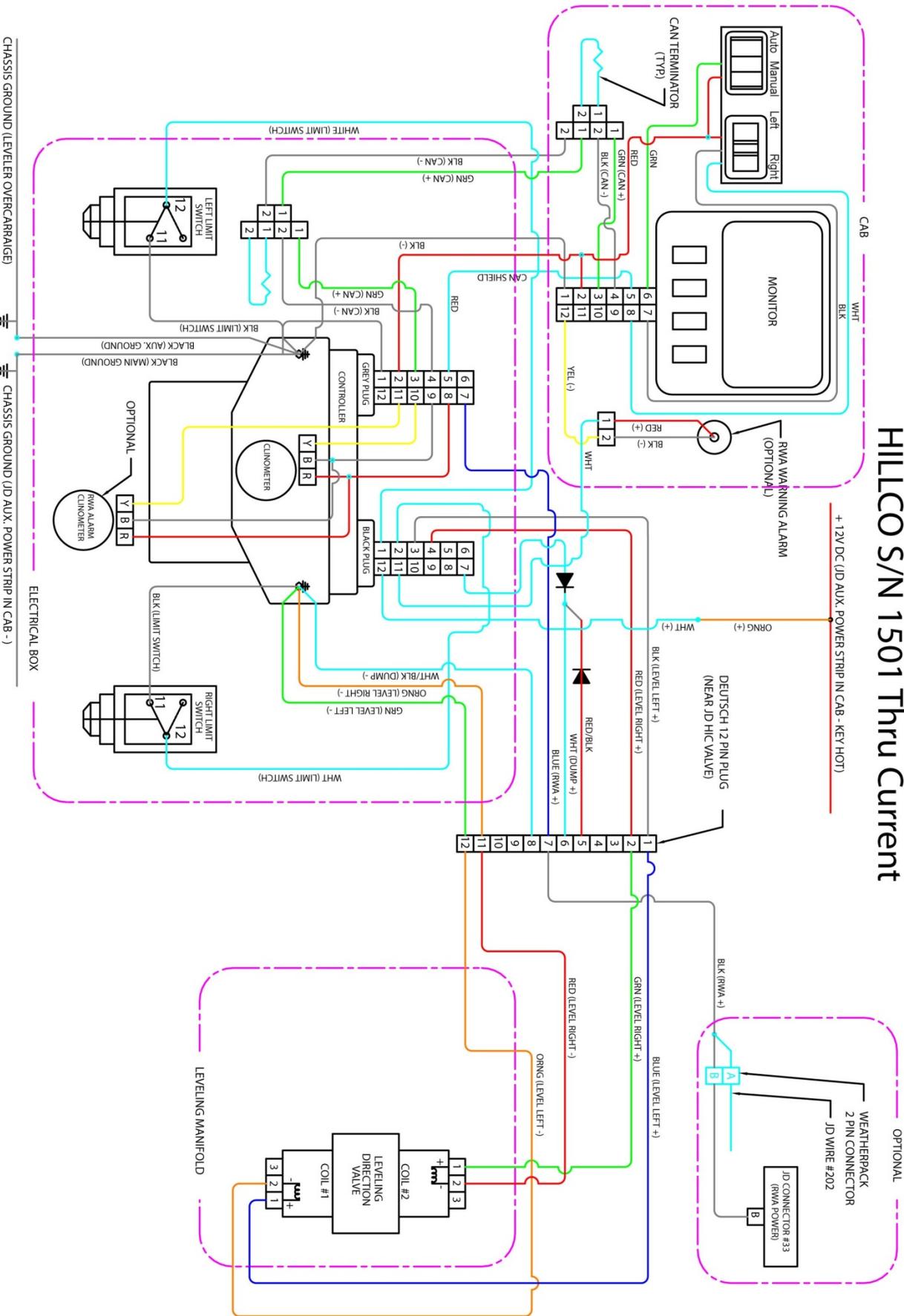
Standard Gear Pump Leveling System Electrical Circuit Schematic

FOR ALL 50, 60 AND 70 SERIES STS COMBINES
HILCO S/N 1501 Thru Current



Premium (PFC Pump) Leveling System Electrical Circuit Schematic

FOR ALL 50, 60 AND 70 SERIES STS COMBINES
HILCO S/N 1501 Thru Current



9660-70, 9760-70, 9860-70

Front Tire Selection, Header Compatibility Chart, Final Drive Selection - 9660-70, 9760-70, 9860-70 STS Combines equipped with Hillico 2970S Leveling Systems

To determine the tire / header compatibility select the tire size in the first column and match it to the proper header model number from the top row.
 NR = Not Recommended X = Recommended

Front Tire Size	Front Tire / Header Compatibility Chart Use 600 series platform for 900 series compatibility																																		
	Cornhead										BPU	Rigid Platform					Flex Platform					Diaper Platform													
	492	494	502	502	594	592	592	593	594	1290	1291	1293	606C	606C-SM	608C	608C-SM	612C	612C-SM	615	618R	620R	622R	625R	630R	615F	618F	620F	622F	625F	630F	635F	925D	930D	936D	
30.5L-32 14PR R1 ^{1,2} & R2 ^{1,2}	X	X	X	X	X	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	X	X	X	X	X	NR	NR	X	X	X	X	X	X	X	X	X	X
80065R32 (172A8) RTW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
30.5L-R-32 3 STAR R1 ¹	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
80070R38 (173A8) RTW	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
90060R32 (176A8) R1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
90065R32 (172A8) R2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
36.5L-32 R2 12 Ply ^{1,3}	X	X	X ⁴	X ⁴	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	X ^{4,5}	X ^{4,5}	NR	NR	NR	NR	X ^{4,5}	X ^{4,5}	NR	NR						
70x50-32 16PR HF3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
20.8R38-2 STAR R1 Duals	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18.4R42-3 STAR R1 Duals	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
20.8R42-2 STAR R1 Duals	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
20.8R42-2 STAR R2 Duals	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
65095R38 (176A8 RTW) Duals ⁶	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

¹ Not available on 9670 STS
² Not available on 9770 STS
³ Not available on 9870 STS
⁴ Not recommended for use with 9760-70 STS
⁵ Not recommended for use with 9860-70 STS
⁶ Cannot be set on 30" rows
⁷ Cannot be disled in due to rim to final preference
⁸ Not recommended limits leveling capabilities

Rear Tire Selection, Header Compatibility Chart, - 9660-70, 9760-70, 9860-70 STS Combines equipped with Hillico 2970S Leveling Systems

To determine the tire / header compatibility select the tire size in the first column and match it to the proper header model number from the top row.
 NR = Not Recommended X = Recommended

Rear Tire Size	Rear Tire / Header Compatibility Chart																																			
	Cornhead										BPU	Rigid Platform					Flex Platform					Diaper Platform														
	492	494	502	502	594	592	592	593	594	1290	1291	1293	606C	606C-SM	608C	608C-SM	612C	612C-SM	615	618R	620R	622R	625R	630R	615F	618F	620F	622F	625F	630F	635F	925D	930D	936D		
18.4R26-2 STAR R1 ¹	NR	NR	NR	X ⁴	X ⁴	X	X	X	X	X	X	X	X	X	X	X	X	X	X ⁴	X ⁴	X ⁴	X ⁴	X	X	NR	X ⁴	X ⁴	X	X	X	X	X	X	X	X	
48070R30 (152A8) R1W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18.4-30 10PR RZ ²	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
60065 R28 (147A8) R1W ³	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
28L-26 12PR R1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
28L-26 12PR R2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

¹ Not available on 9670 STS
² Not available on 9770 STS
³ Not available on 9870 STS
⁴ Not recommended for use with 9760-70 STS
⁵ Not recommended for use with 9860-70 STS

Notes