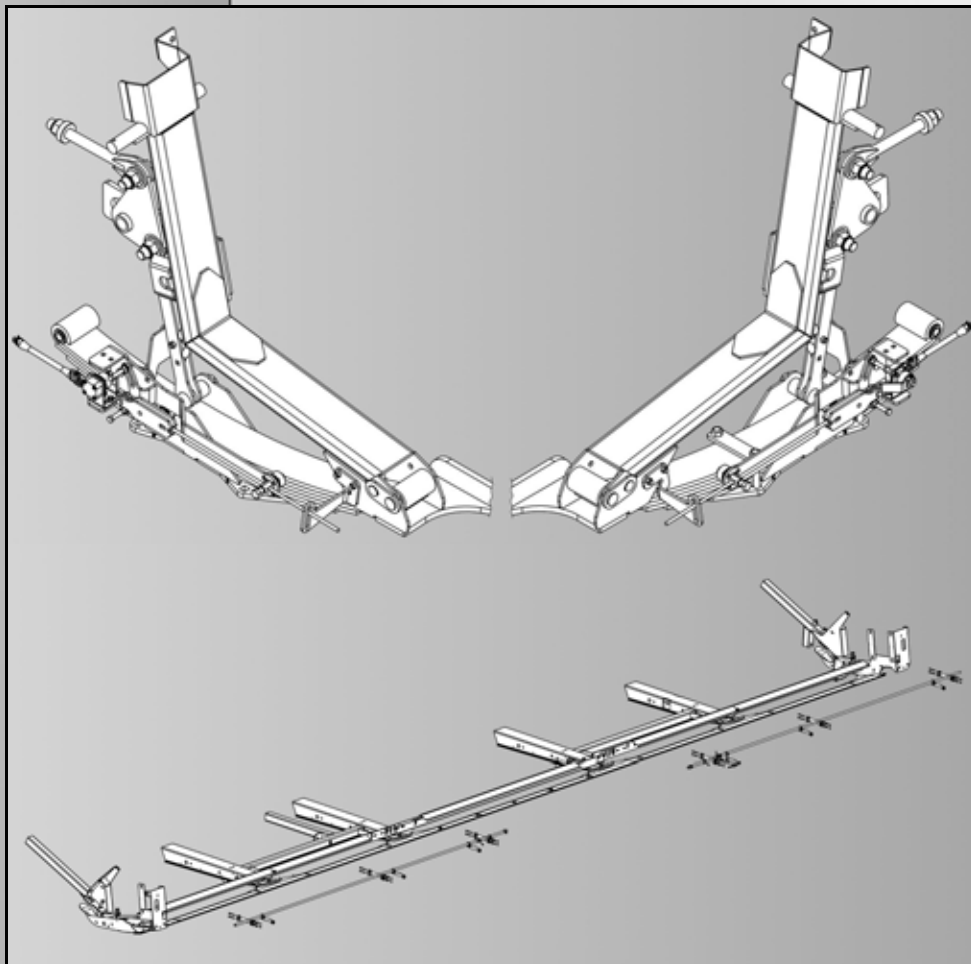




John Deere STS 9x70 Header Height Control Install & Configuration Instructions



Revision 2.0 - 2009

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Header Height Control

Introduction

The Header Height Control system is greatly affected by the other settings on the header. For this reason, it is critical to the correct operation of the Header Height Control that it be adjusted after the header is prepared for the crop conditions that exist in your location. To achieve this, it must be set up in the shop simulating these operating parameters, or in the field under actual operating conditions. The header must be lowered into the cutting position, with the proper amount of weight on the gauge wheels and with the cutting angle set.

Since the header tilt changes the header's center of gravity and cutting angle, adjustments to the header tilt will affect the deflection of the suspension springs, which in turn will affect the calibration of the height sensor. Make sure that the cutting angle is properly set.

Refer to the Operator's Manual. Ensure the header is level, the cutter bar is at a good height for most crops, and that the flotation arms, and lift link bolts are set correctly. When you are satisfied that the header is physically set up, study these instructions, then install and calibrate the Header Height Control.

There are two types of Header Height Control for the Grain Belt Plus; the *Sub Frame Header Height Control*, and the *Cutter Bar Header Height Control*. Each is used for different circumstances. The subframe version is intended for tall crops that do not require the cutter bar to run directly on the ground. The cutter bar version is intended for short crops, and will only function if the cutter bar is touching the ground while harvesting.



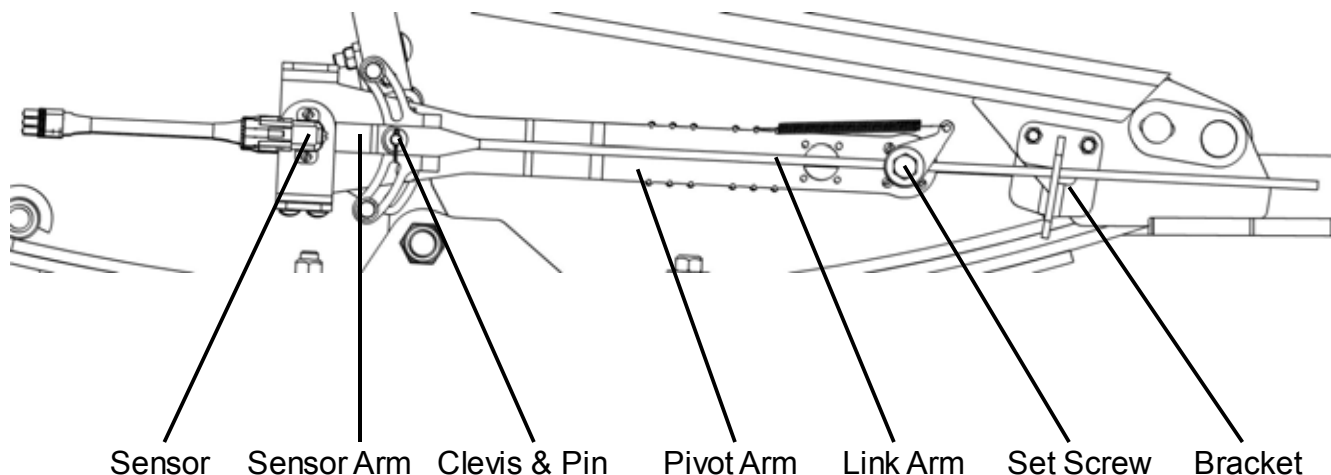
When working on the header, ensure that the parking brake is set, and the reel lift locks and feeder house cylinder locks are securely in place. Ensure the combine engine is off. Stay clear of any moving parts.

Sub Frame Header Height Control

The sub frame header height control option uses a sensor assembly to measure changes in the vertical displacement of the leaf springs (caused by varying terrain). These changes are electronically relayed to the combines header height control, which compensates accordingly.

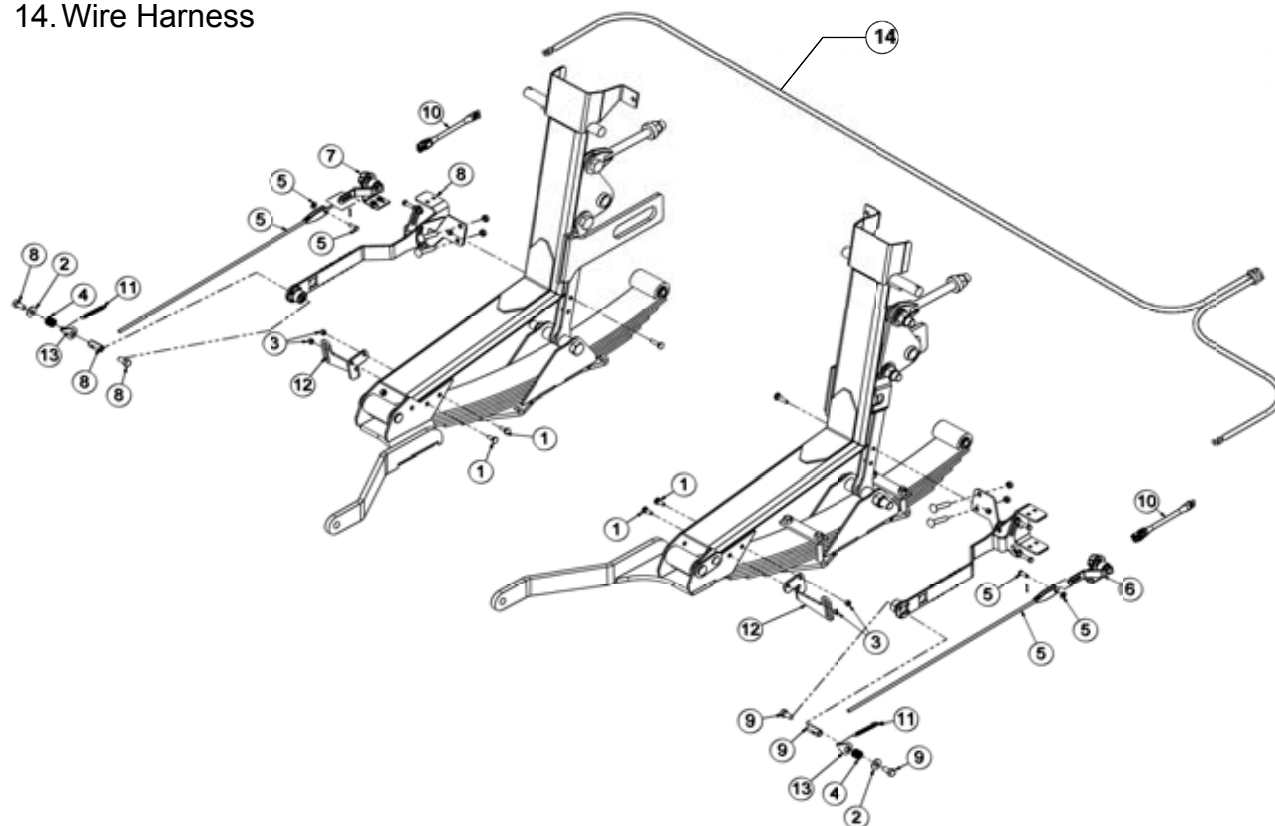
Terminology

The following diagram illustrates the important components and the terms used for them in this installation guide.



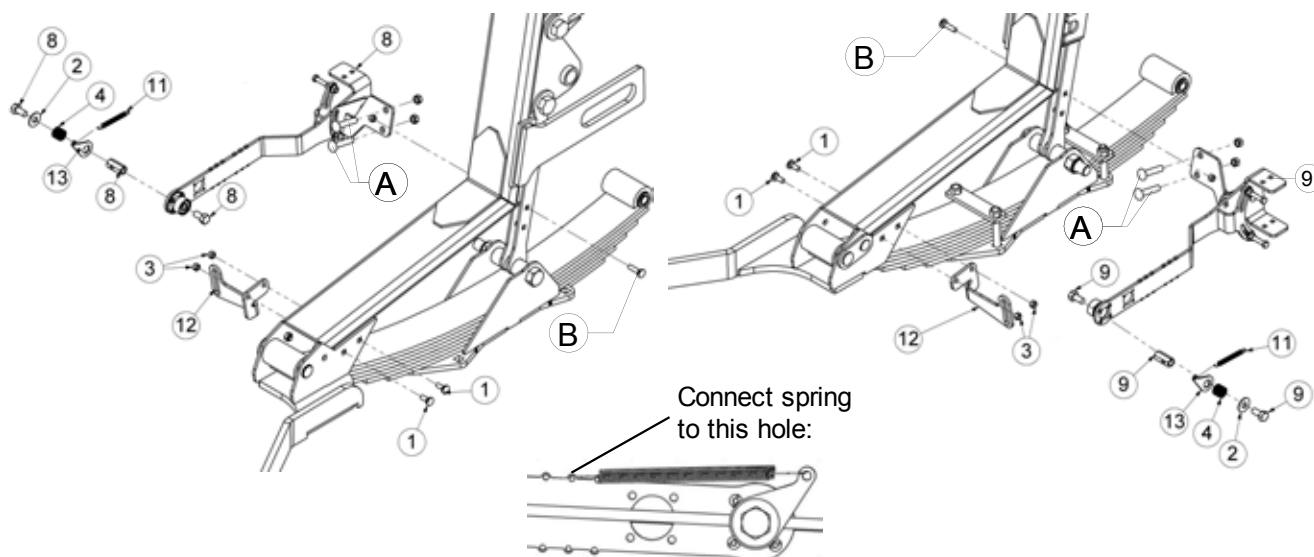
Parts List

1. 4x Bolt 3/8 x 1 1/4 UNC
2. 2x Washer Flat 1/2
3. 4x Nut 3/8 UNC C/Lock
4. 2x Spring 0.062x1x1-15/16
5. 2x Sensor Link Arm Assembly
6. Sensor Assembly LH
7. Sensor Assembly RH
8. Sensor Mount RH
9. Sensor Mount LH
10. 2x Wire Harness Adapter (Not required for all models)
11. 2x Spring Extension 0.041x0.385x4 SS
12. 2x Bracket – Sensor Rod Slot
13. 2x Arm Spring
14. Wire Harness



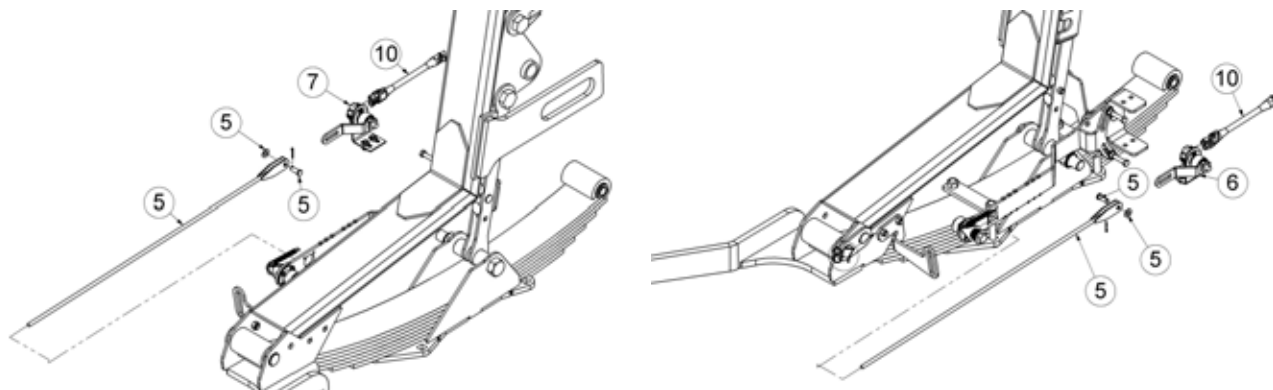
Installation

1. Attach the Mounting Brackets and pivot points to the frame on the left and right sides.

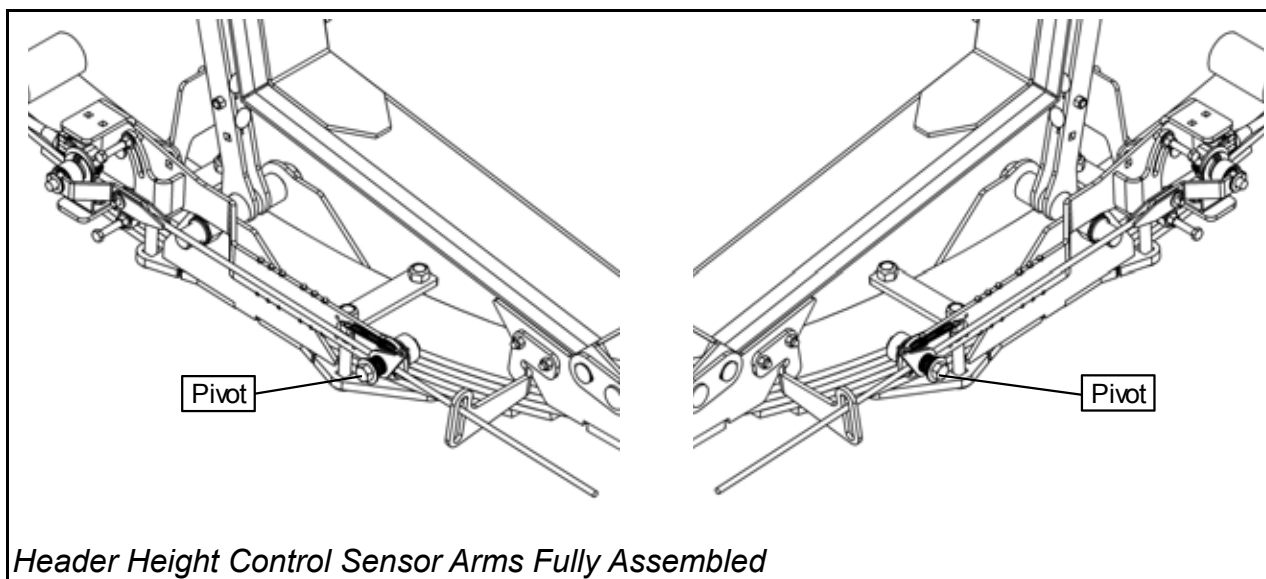


When connecting the sensor mount (8,9), Ensure that the two bolts (A) go on either side of bolt (B).

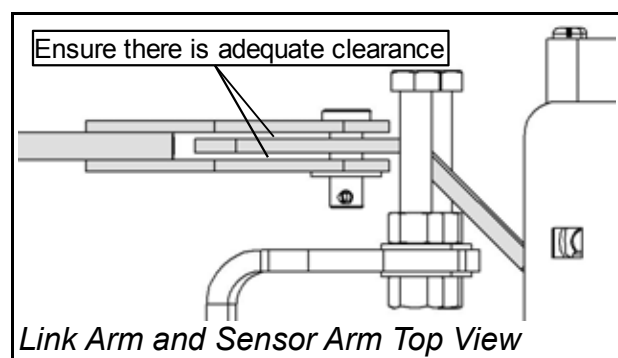
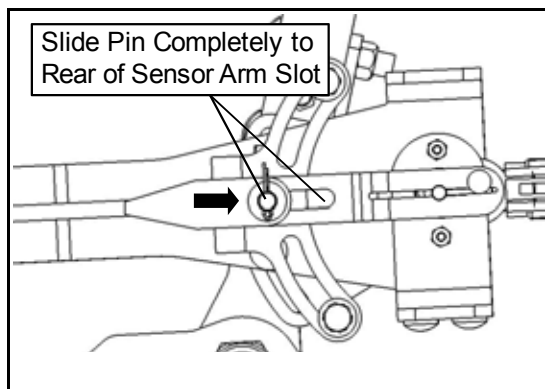
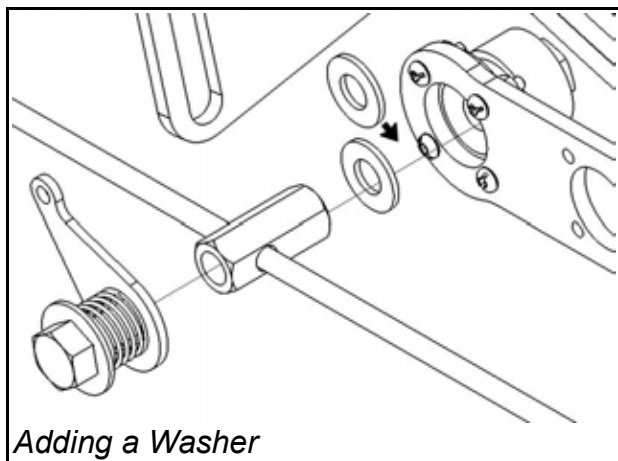
2. Connect and assemble the Link arm, sensor assembly and the pivot point.



3. Ensure everything is assembled as shown in the illustration below.



4. Check the pivot to ensure it does not bind and has adequate room for movement. If it is restricted, unscrew the pivot point and install additional ½" SAE Washers in between the coupler nut and bearing to increase the clearance.
5. Ensure the Clevis and Pin rotate freely and do not bind (See Lower Right). If there is not enough clearance, pry the clevis slightly apart with a screwdriver. Make sure the pin is located in the rear of the sensor arm slot (See Below).

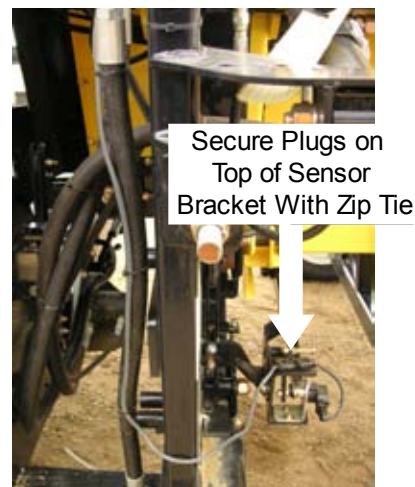


6. Find the two available plugs located close to both the left and right sensors. Run the plugs down to the sensor securing with more zip ties. Connect the wire to the sensor on the right side and secure on top of sensor bracket with zip tie (*See Right*).



Left Side Sensor

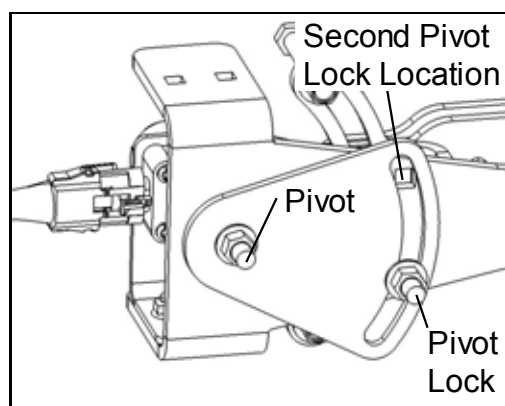
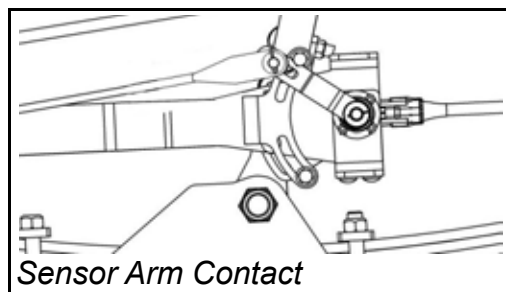
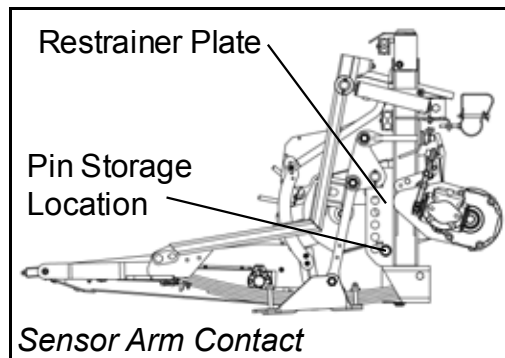
7. Plug in the remaining wire into the left side sensor. Securing with a zip tie. (*See Left*)



Right Side Sensor

Initial Setting

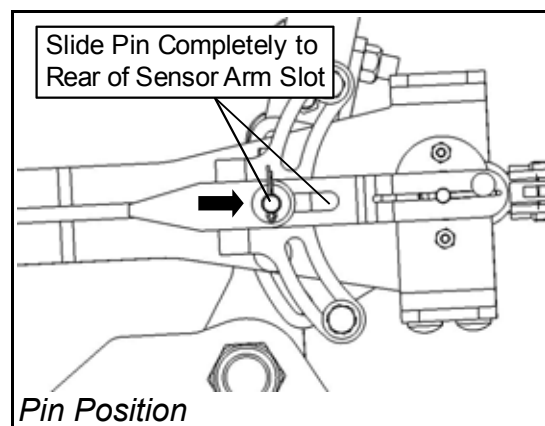
1. Ensure the header is properly installed on the combine, leveled and fully connected to all hydraulic and electrical systems.
2. Park the unit on a flat, hard surface and fully raise the header off the ground so there is no weight on the gauge wheels.
3. Ensure that the pin in the restrainer plate is in the storage position so it does not interfere with tilting the table.
4. Set the header tilt to the anticipated operating angle, using the hydraulic tilt.
5. Set the feeder house lift cylinder safety locks in place.
6. Turn off the combine and wait for all moving parts to stop before exiting the cab.
7. Check the pressure of the sensor arm against the top stop. The arm should contact the stop very lightly.
8. If the arm does not contact the top stop or it is too tight against the stop, loosen the pivot and pivot lock bolts and tilt the unit until the desired contact pressure is achieved.
9. Proceed to the Calibration chapter on page 31. If the calibration is successful, the unit is ready to operate. If the combine computer cannot calibrate the header, one or more voltages is outside the parameters. Continue with "Detailed Setting".



On some headers, there may be two pivot locks. In which case they would both need to be loosened before adjusting the pivot.

Detailed Setting

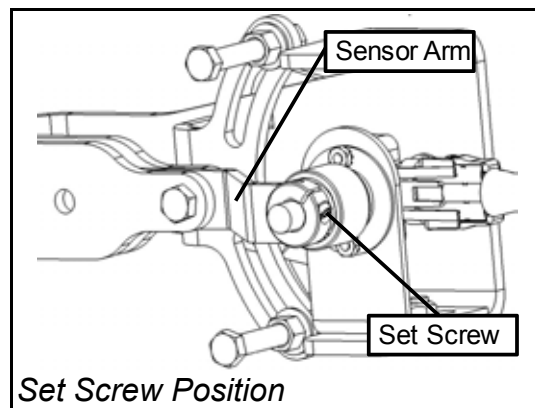
1. To obtain the maximum range of voltage variation from the sensors, make sure that the clevis on the link arm is extended all the way towards the back of the header. If not, loosen the set screw located at the center of the link arm, and slide the clevis portion of the link arm as far as possible to the rear, while maintaining the line of sight previously set. Secure the set screw at the center of the link arm. (See Right)



Some sensors are internally limited in their travel, and forcing them will break the sensor. These units can be identified by turning the sensor shaft and noting a slight spring-loading in one direction of travel.

If you cannot easily align the unit, check your assembly against the sensor diagrams provided in the operator's manual, and correct as needed.

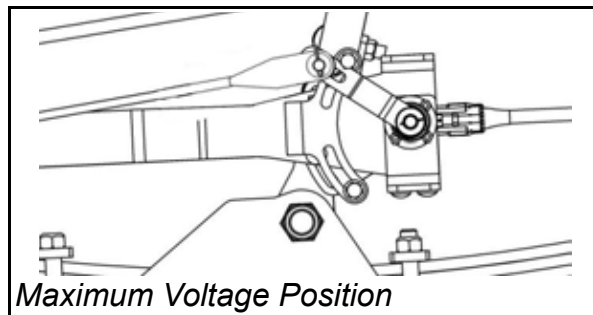
2. If the sensor arm reaches the top or bottom stop but it does not reach its max/min voltage, loosen the hex-head set screw and adjust the sensor arm. If the sensor reaches the top stop but does not reach maximum voltage, lower the sensor arm. If the sensor reaches the bottom stop but does not reach minimum voltage, raise the sensor arm. Re-tighten the set screw.



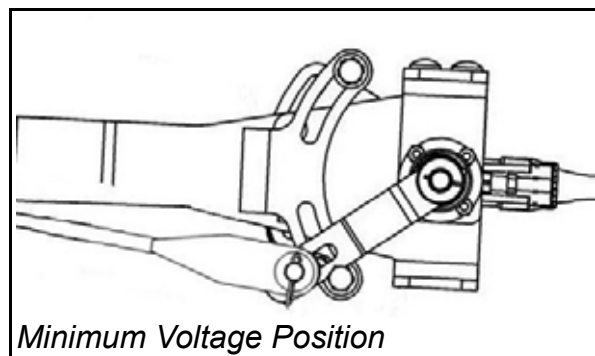
3. If the sensor arm reaches the end of it's travel before contacting either the top or the bottom stops, loosen the stop bolt and move it into light contact with the arm, then re-tighten.

Max/Min Voltage

1. The maximum and minimum voltage should be properly set, however if something shifts during shipping it may need to be recalibrated. The dealership is best suited to measure the voltage, but you may order a special adapter that allows you to use a multimeter to check the voltage.
2. Check the multi-coupler plug connection to ensure it is fully seated.
3. Review in detail the calibration chapter on page 31 of this booklet.
4. If the readings are within the specified range, (*High reading not above 4.5 volts, Low reading not below 0.5 volts*), the unit is calibrated. If not, follow the steps on the previous page under "Detailed Settings"



Maximum Voltage Position

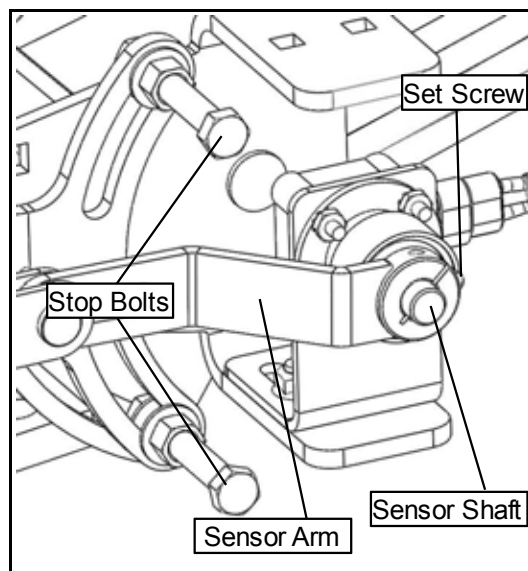


Minimum Voltage Position

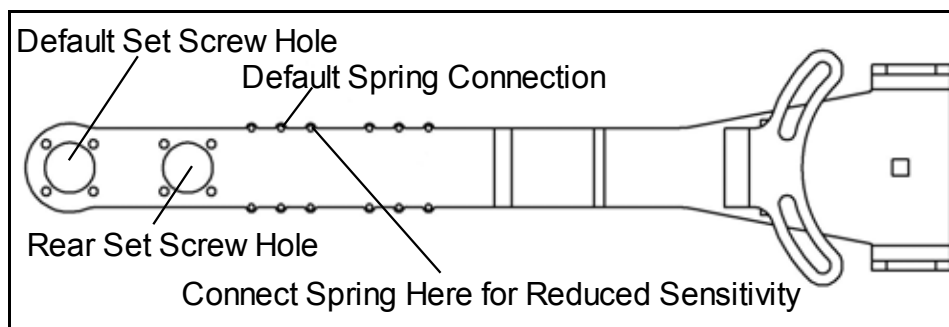
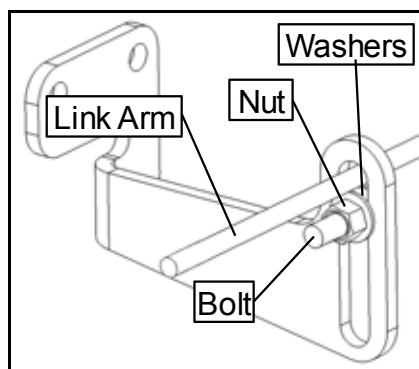
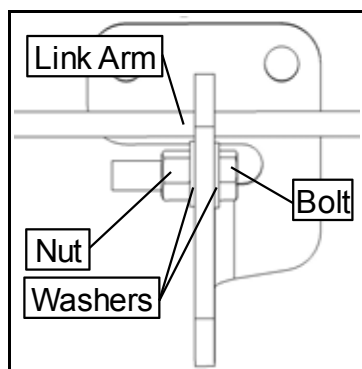
Fault Diagnosis

Some of the most frequently encountered problems may include:

- If the upper position voltage reading is above the maximum, (or you receive an upper limit error code), you can decrease the upper voltage reading by using the following steps:
 - Lift the sensor arm to the maximum position.
 - Loosen the hex-head set screw holding the sensor arm to the sensor.
 - Rotate the sensor shaft slightly **anticlockwise** until the desired voltage is reached.
 - re-tighten the set screw.
 - If this adjustment makes the lower position voltage too low, loosen the bottom stop bolt and raise it up until the low position voltage reaches the desired value. Re-tighten the stop bolt.
- If the lower position voltage is too low, (or you receive a low limit error code), you can increase the lower voltage reading by using the following steps:
 - Lower the sensor arm to the minimum position.
 - Loosen the hex-head set screw holding the sensor arm to the sensor.
 - Rotate the sensor shaft slightly **clockwise** until the desired voltage is reached.
 - re-tighten the set screw.
 - If this adjustment makes the upper position voltage too high, loosen the top stop bolt and lower it up until the upper position voltage reaches the desired value. Re-tighten the stop bolt.
- If the difference between “High” and “Low” voltages is too small, a restriction in movement of the suspension, or a problem with the clevis pin location is indicated. Look for any restriction, such as flotation arms not set or restrainer plate pinned in place. Ensure the clevis is set fully to the back of the sensor bracket, with the line of sight as close to straight as possible.



- If the link arm is vibrating excessively up and down, a nut, two washers and bolt can be added to the sensor rod slot bracket to reduce the vibration (shown below). Alternatively you can move the spring back one space and hook it in the next hole.
- For some conditions/combines, it may be necessary to install the set screw in the rear hole of the pivot arm in order to decrease the sensitivity of the sensor.

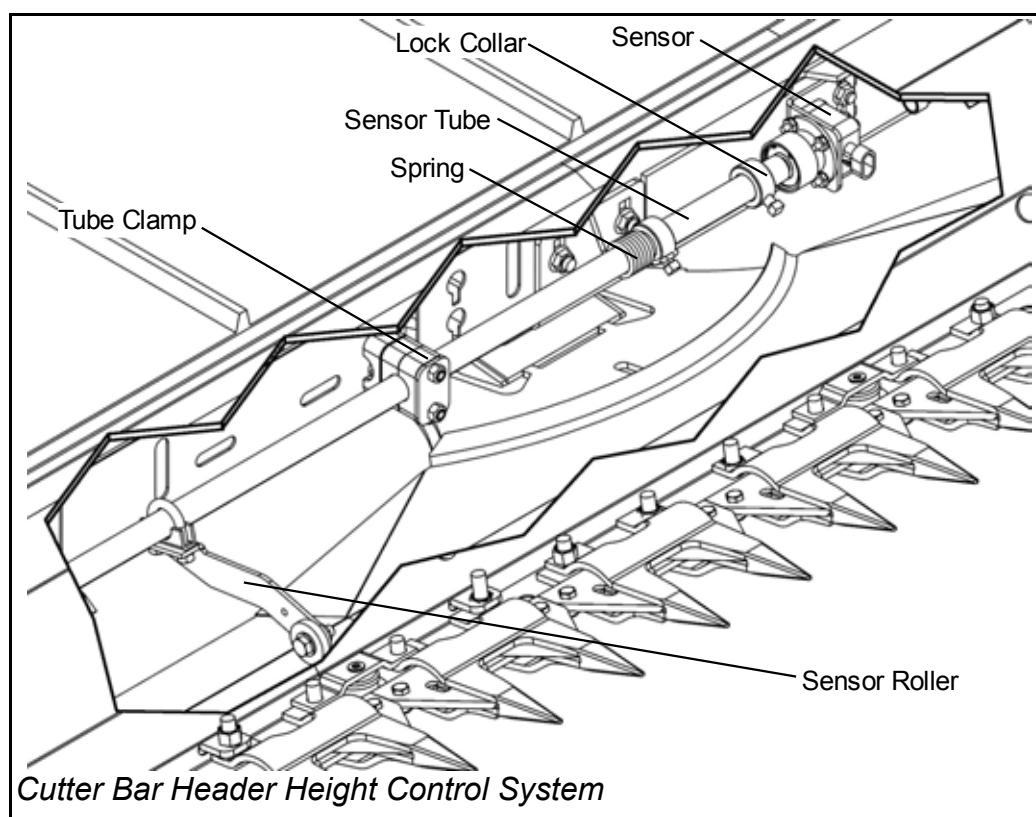


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Cutter Bar Header Height Control

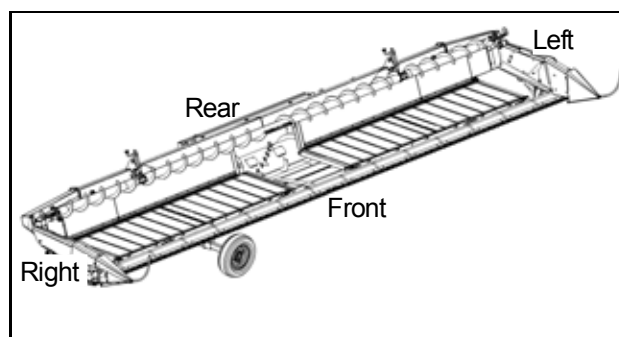
The cutter bar header height control option uses a sensor assembly to measure changes in the vertical displacement of the cutter bar (caused by varying terrain). These changes are electronically relayed to the combines header height control, which compensates accordingly.

Terminology

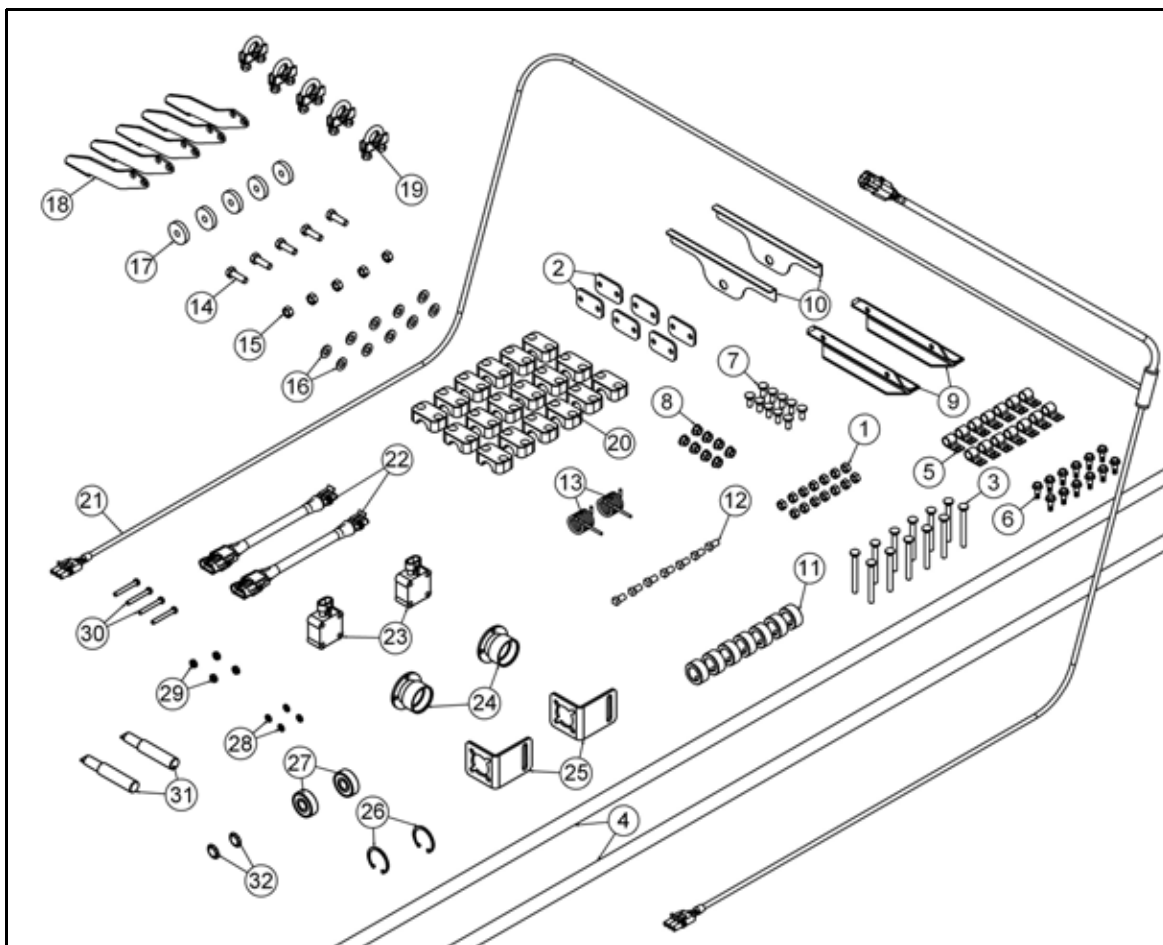


Directions

For the purposes of these instructions, all directions will be addressed as if you are standing behind the header facing towards the front. Refer to the image to the right for details.



Parts List:



Num.	Description	Qty.	Num.	Description	Qty.	Num.	Description	Qty.
1.	1/4" C/Lock Nut	14	14.	Bolt 5/16" x 1"	5	27.	Bearing	2
2.	Tube Clamp Cover	6	15.	5/16" C/Lock Nut	5	28.	Lock Star	4
3.	1/4" x 2 1/2" Carriage Bolt	12	16.	5/16" Flat Washer	10	29.	Nut #10/32	4
4.	Tube	2	17.	Roller	5	30.	Screw #10-24	4
5.	Cable Clamp 3/8"	14	18.	Roller Arm	5	31.	Sensor Pin	2
6.	Self Tapping Screw	12	19.	Roller Saddle	5	32.	Spring Retainer Washer	2
7.	1/4" x 3/4" Carriage Bolt	10	20.	Tube Clamp	18			
8.	1/4" F/Lock Nut	8	21.	Wire Harness	1			
9.	Wire Protector	2	22.	Sensor Harness Adapter	2			
10.	Wire Holder	2	23.	Sensor	2			
11.	3/4" Lock Collar	7	24.	Bearing Housing	2			
12.	Set Screw 5/16" x 1/2"	7	25.	Sensor Mount	2			
13.	Spring	2	26.	Retainer Ring	2			

Installation (Pre-2009 Headers)**IMPORTANT**

If your header was manufactured prior to 2009, follow the instructions below. If your header was manufactured in 2009 or later, proceed to Installation (2009 and Newer Headers) on page 24.

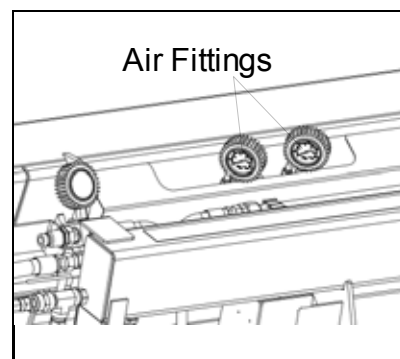
1. Remove the feeder house cylinder safety lock, lower the header to its normal operating height, and set the header tilt to the desired angle.
2. Raise the table until the cutter bar is at a comfortable working height.

**WARNING**

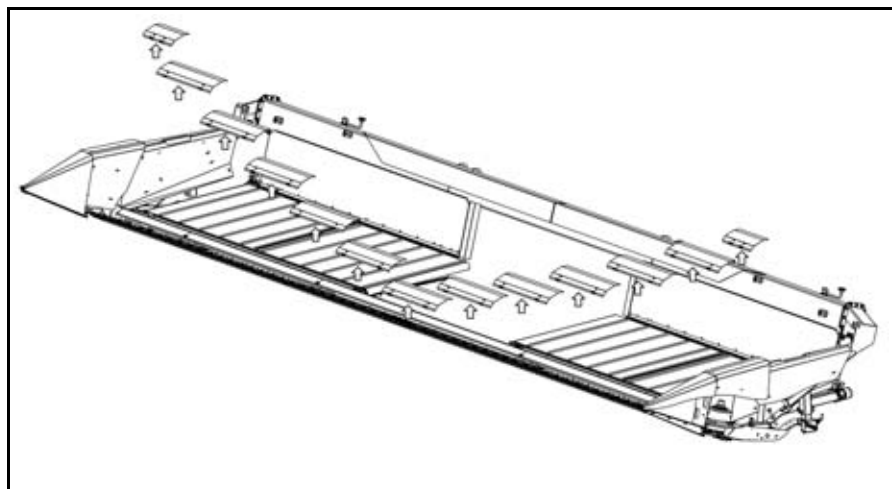
With the header and reel fully raised, set the parking brake, reel lift locks and feeder house cylinder locks. Shut combine engine off and wait for all moving parts to come to a complete stop before exiting.

**NOTE**

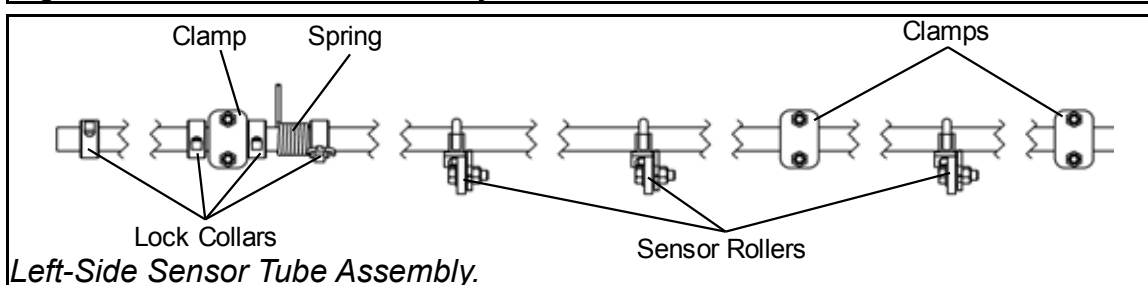
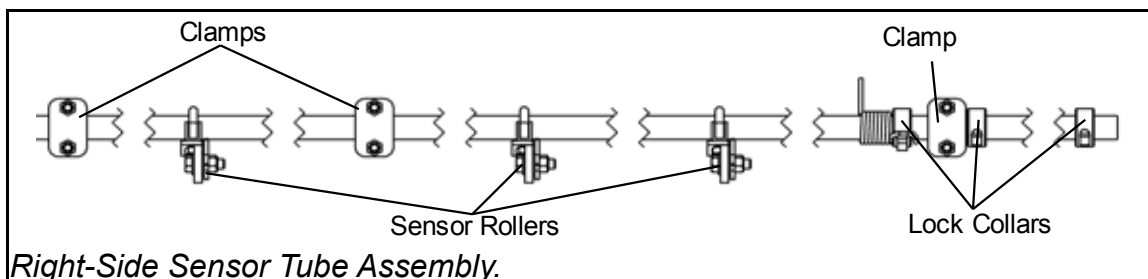
A compressed air supply will be required to refill the air system.



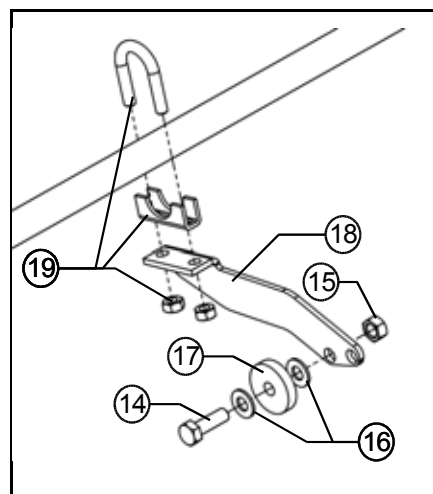
3. Release air from the fittings located next to the air gauges between the subframe and the main header frame until the cutter bar reaches its lowest point of travel.
4. Starting at the outside ends and working your way to the center of the table, remove all of the feather plates from the cutter bar.



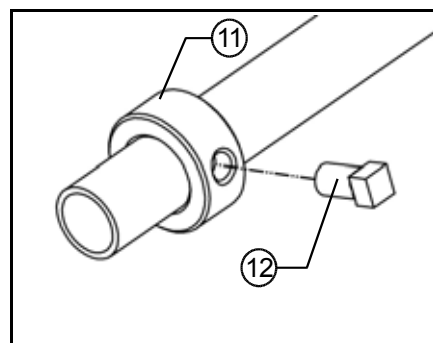
5. Study the two illustrations below. They show the order in which the components should be added to the sensor tube. Exact location is not important until the tube gets mounted on the table.



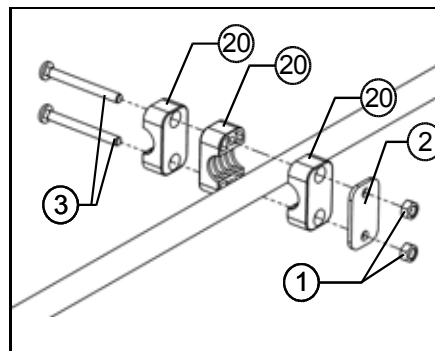
6. Assemble the sensor rollers as shown in the illustration. Ensure that the roller portion will be facing the front of the table. Do not tighten.



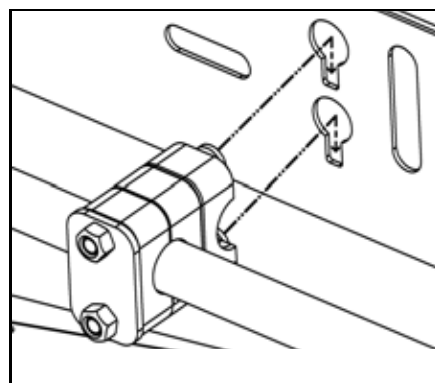
7. Slide the lock collars to their appropriate locations on the sensor tube, insert the set screw. Do not tighten.



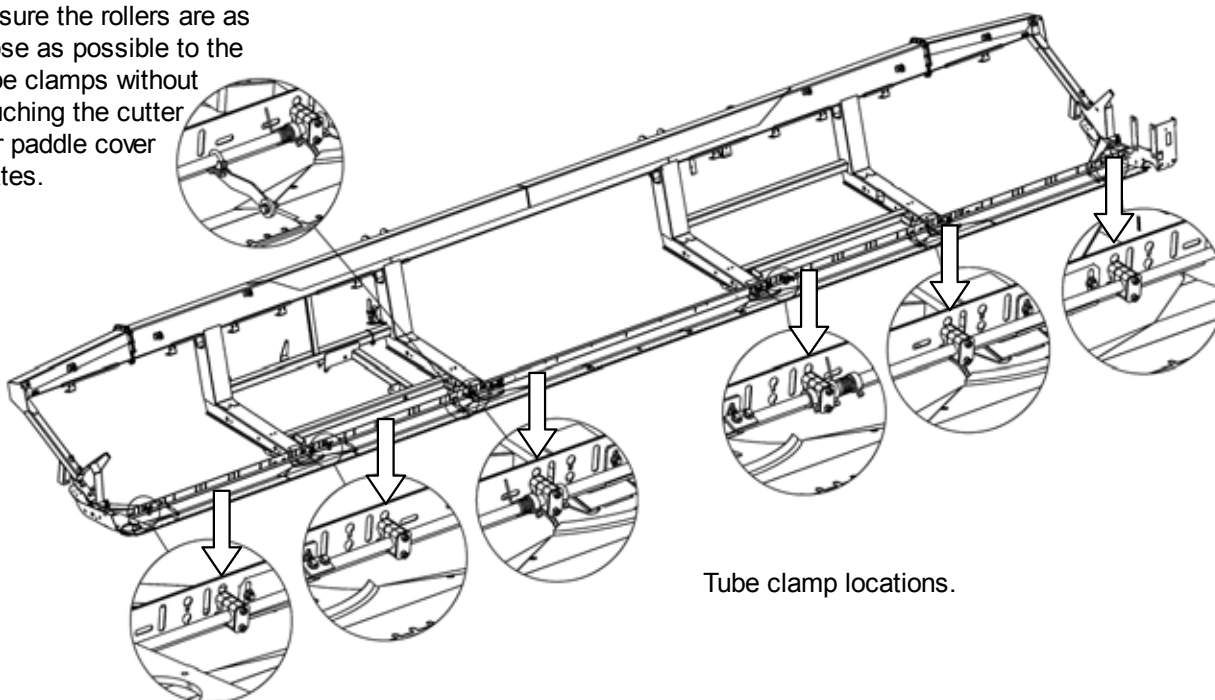
8. Secure the tube clamps to the sensor tube. The tube clamp cover should be facing towards the front. Do not tighten.



9. Secure the completed sensor tubes to the deck mounts on the header. The heads of the bolts on the tube clamps fit in the holes indicated to the right, you then slide them down and to the side. Tighten the nuts to secure. Position the rollers as close to the clamps as possible without overlapping any of the cutter bar paddle.



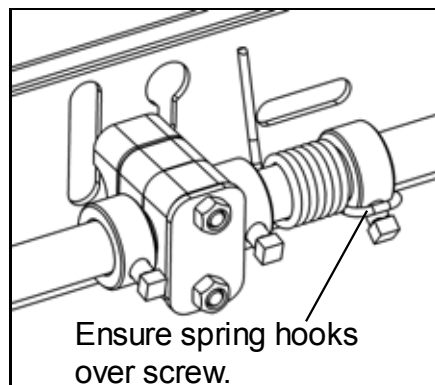
Ensure the rollers are as close as possible to the tube clamps without touching the cutter bar paddle cover plates.



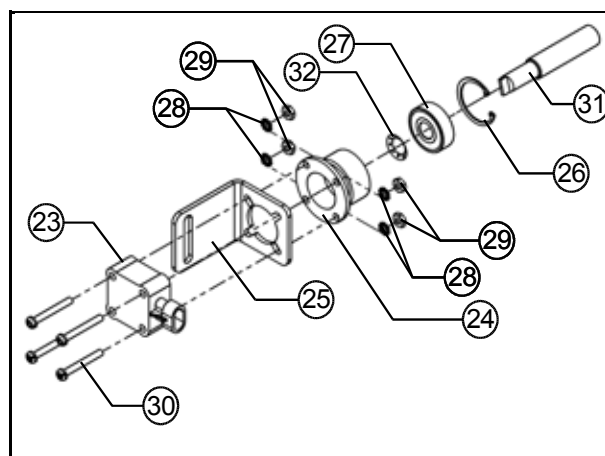
Tube clamp locations.

Clamp and roller positioning.

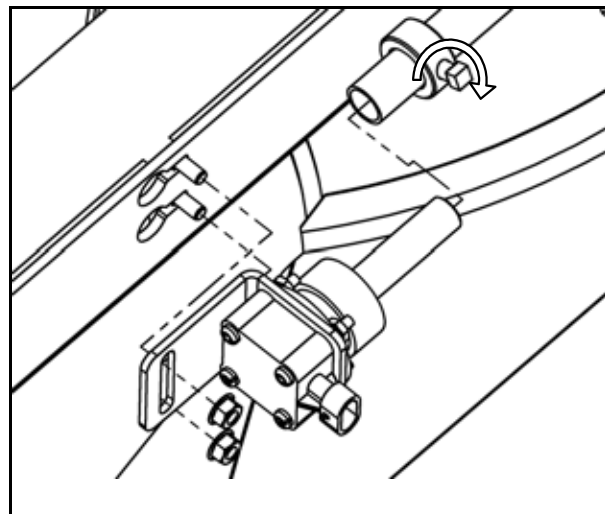
10. Ensure that the hook on each spring goes over the set screws on the lock collars and that the arm is pressing against the deck mount.



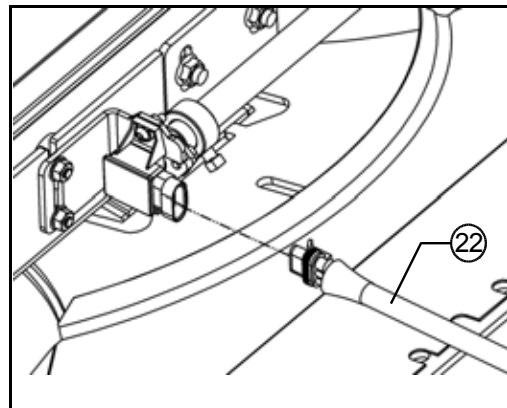
11. Once the tube is secure, assemble each sensor and bracket.



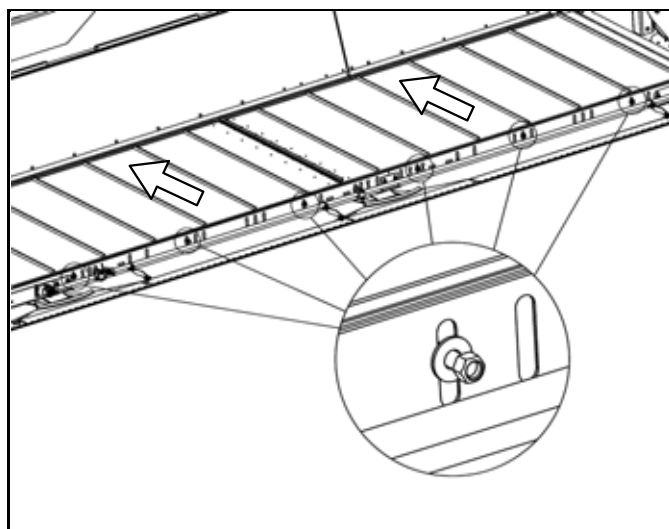
12. Secure the sensor shafts to the sensor tubes. Secure the sensor mounting bracket to the deck mount as shown. Once secured, tighten the screw on the lock collar.



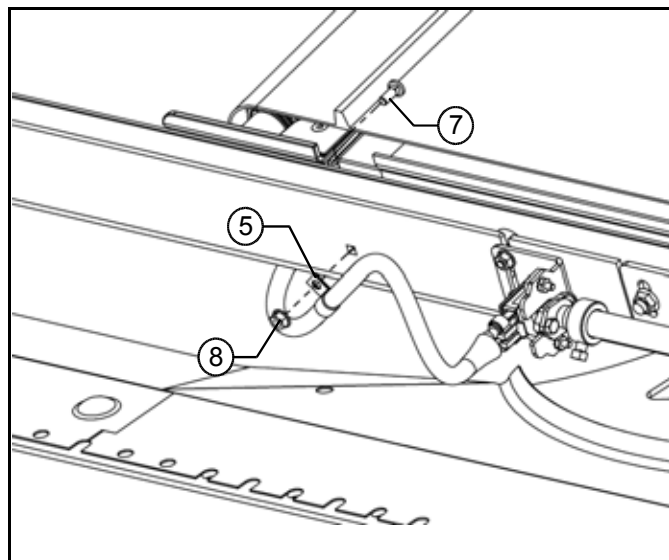
13. Secure the adapter harnesses to each sensor.



14. Loosen all the bolts holding the draper to the deck mounts on each side of the table. Shift the decks back towards the rear of the table to allow room to install the bolt in the following step.

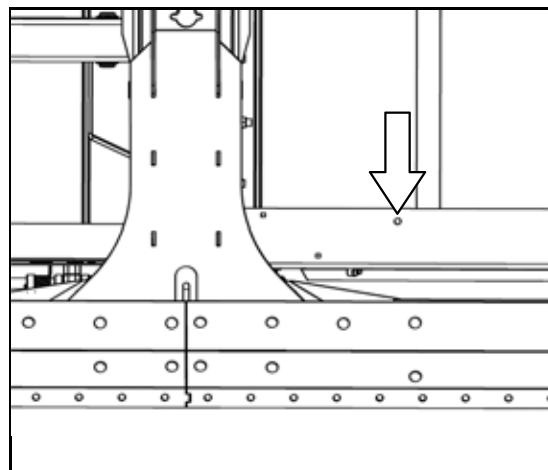
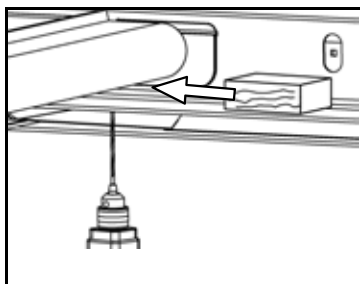


15. Insert the bolt from the space between the draper deck and deck mount as shown to the right. Secure the adapter harness to the cable clamp and secure in place with the nut. Repeat for the other adapter harness.

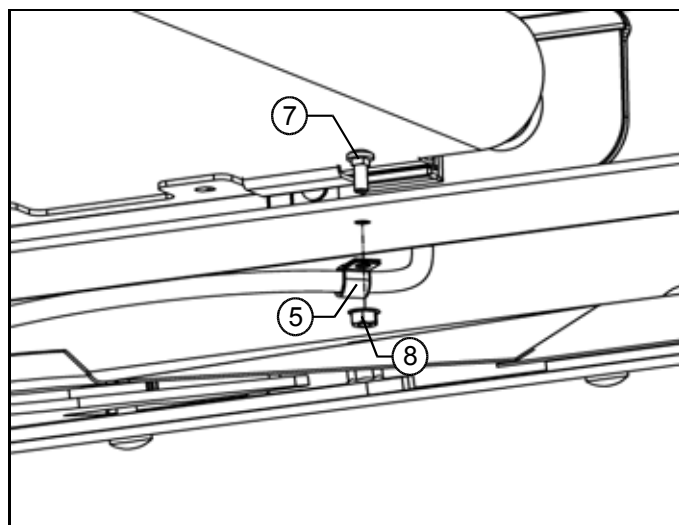


- Shift the draper decks back to their original positions, and secure with the nuts that you had loosened in the previous step.

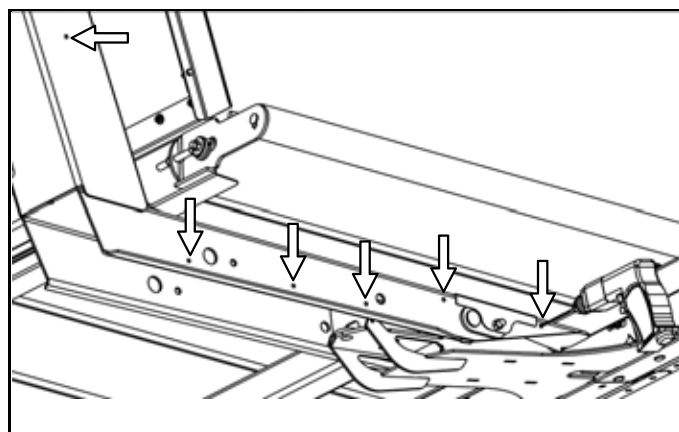
16. Drill a 9/32" hole at the indicated location, taking care to not damage the draper in the process. It is suggested that you use a block of wood between the metal plate and the draper to protect the material. Repeat for the other side.



17. Secure each adapter cable to the bottom of the feeder deck at the holes that you had drilled in the previous step.

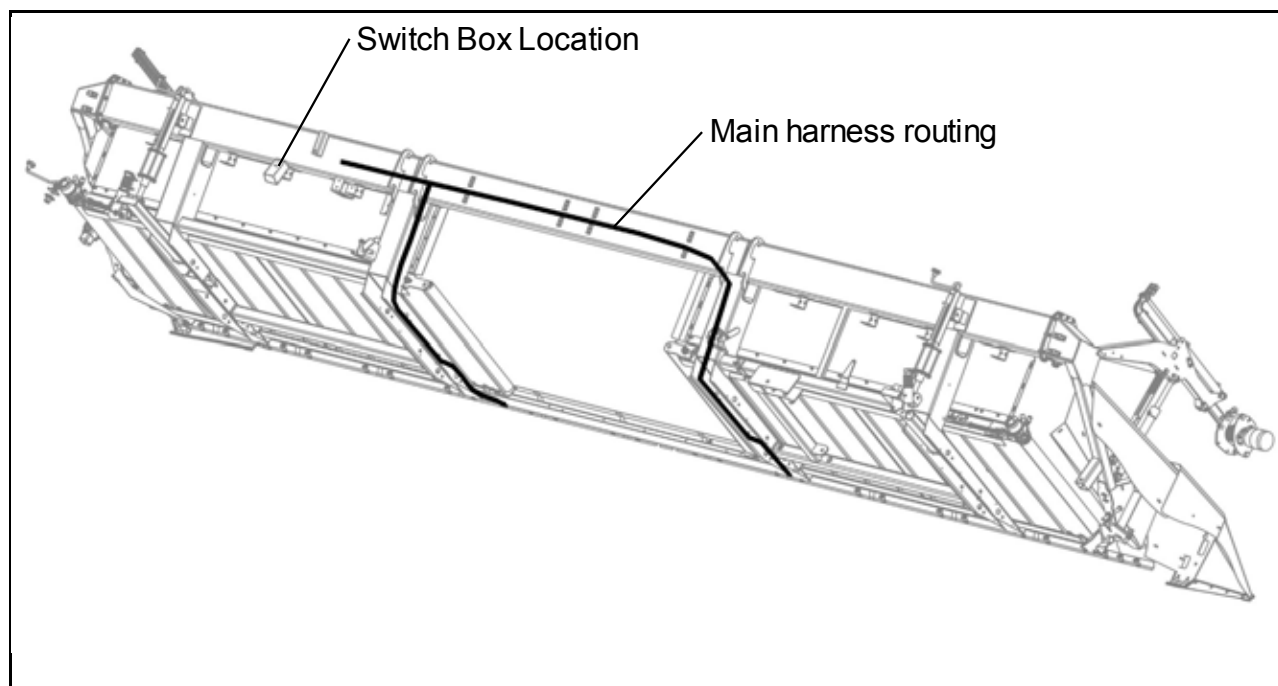
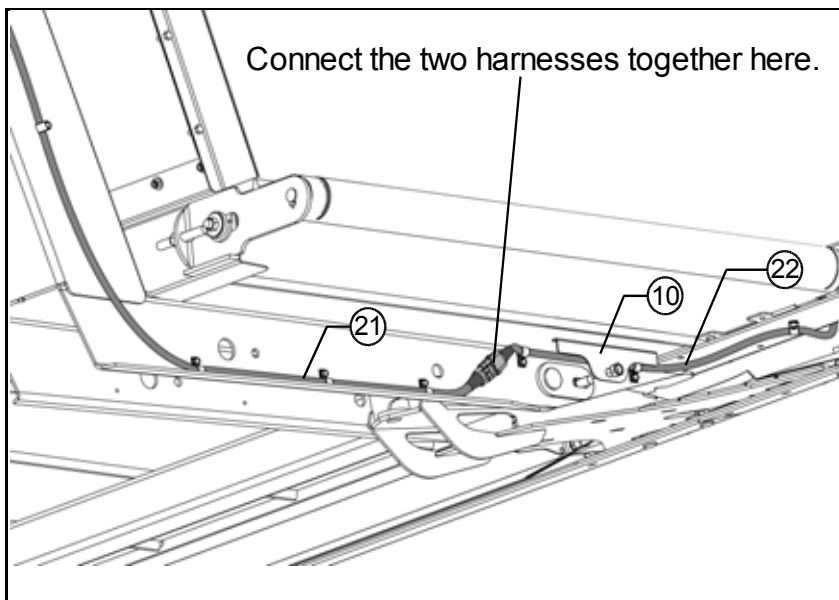


18. Drill out the six holes indicated on the inside edge of each center strut. Take care not to damage anything in the interior of the strut with the drill.



19. Secure both of the adapter harnesses and the main harness to the inside edge of each center strut as shown. Place the wire holder over each harness to secure them in place. Plug the two harnesses together at the indicated locations.

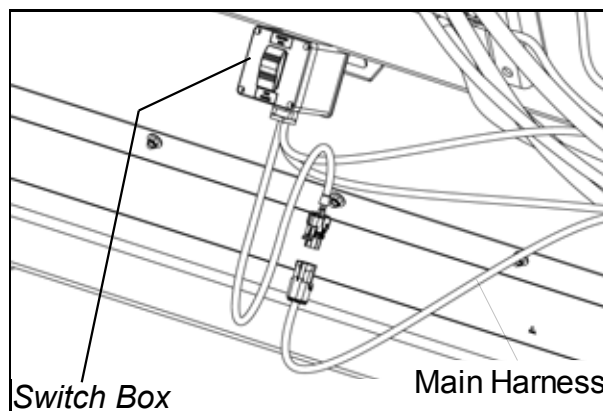
Where there are no cable clamps, use zip ties to secure the harness in place. Ensure that you do not run it anywhere where it may become damaged.



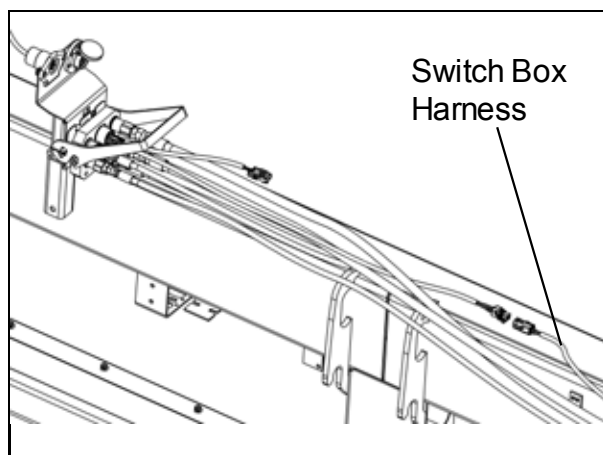


If your header has a switch box (as shown below) follow steps 20, 21, and 22. If your table does not have a switch box, proceed directly to step 23

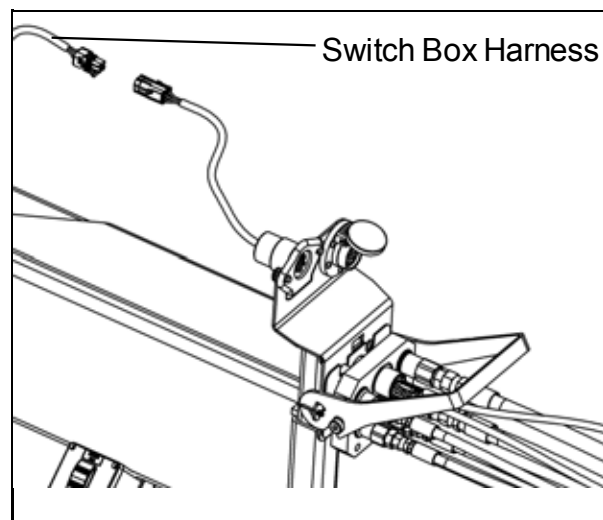
20. Plug the end of the harness into the 1"6' cable that comes out of the switch box.



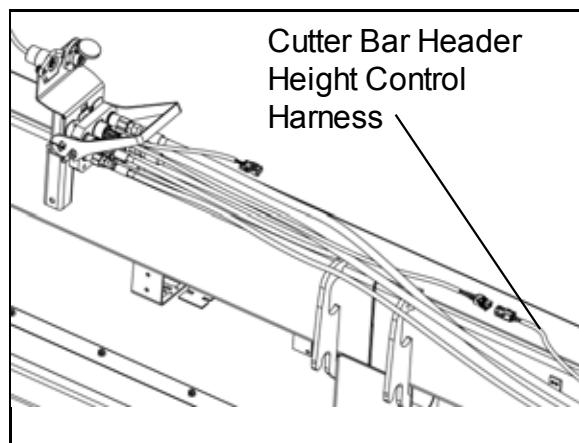
21. Ensure that the 10" 6' cable with the female connector that comes from the switch box is secured to the adapter harness on the multi coupler as shown to the right.



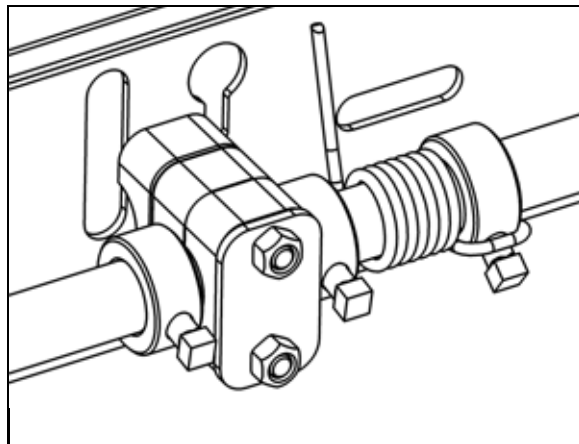
22. Ensure that the 10" 6' cable with the male connector that comes from the switch box is secured to the adapter harness on the electrical plug as shown to the right.



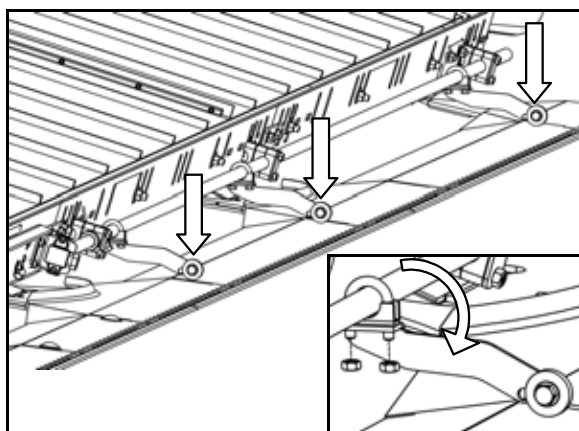
23. If your header does not have a switch box, secure the main cutter bar header height control harness to the adapter plug on the multicoupler as shown to the right.



24. Ensure that all springs are oriented in the same way so as to provide equal pressure to the sensor tube.



25. Make sure that all the rollers are touching the cutter bar. Loosen the nuts and adjust them as necessary.



Installation (2009 and Newer Headers)



If your header was manufactured in 2009 or later but no header height control system was installed, follow the instructions below. If your header was manufactured prior to 2009, proceed directly to Initial Physical Adjustment and Set-up on page 29.

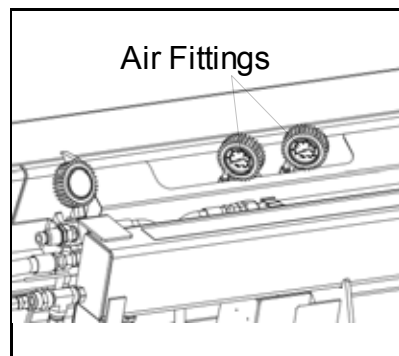
1. Remove the feeder house cylinder safety lock, lower the header to its normal operating height, and set the header tilt to the desired angle.
2. Raise the table until the cutter bar is at a comfortable working height.



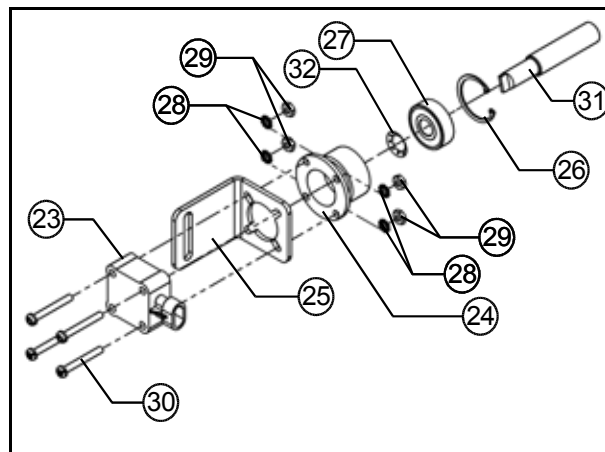
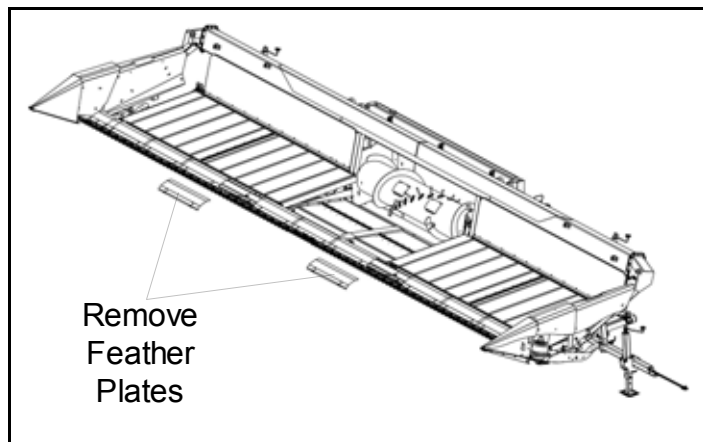
With the header and reel fully raised, set the parking brake, reel lift locks and feeder house cylinder locks. Shut combine engine off and wait for all moving parts to come to a complete stop before exiting.



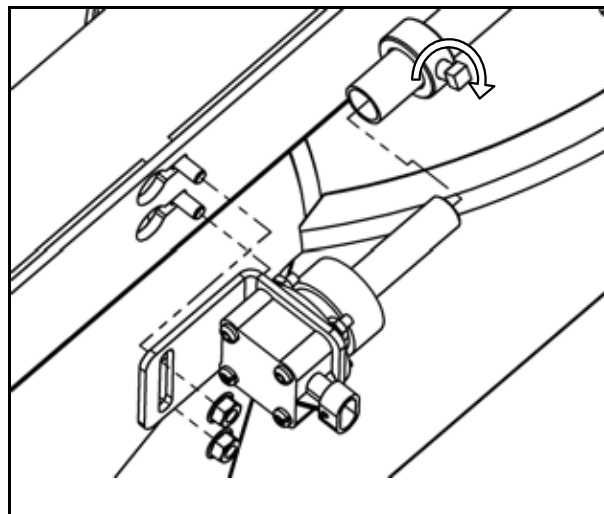
A compressed air supply will be required to refill the air system.



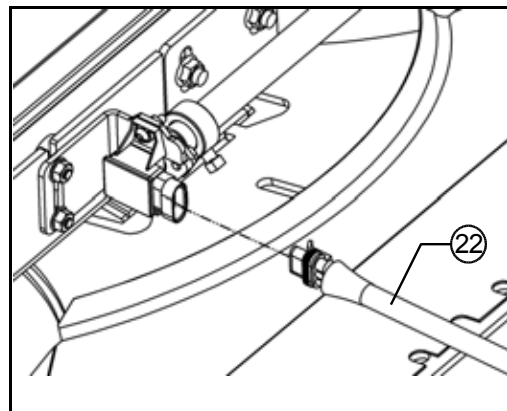
3. Release air from the fittings located next to the air gauges between the subframe and the main header frame until the cutter bar reaches its lowest point of travel.
4. Assemble each sensor and bracket.
5. Remove the feather plates indicated below.



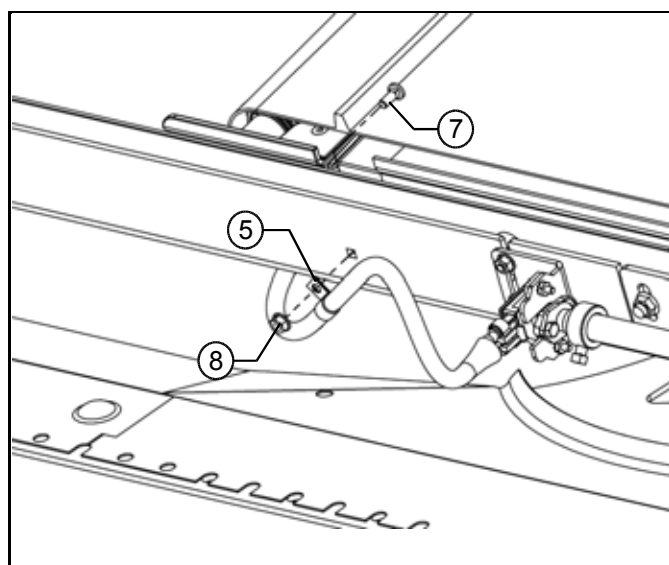
6. Secure the sensor shafts to the sensor tubes. Secure the sensor mounting bracket to the deck mount as shown. Once secured, tighten the screw on the lock collar.



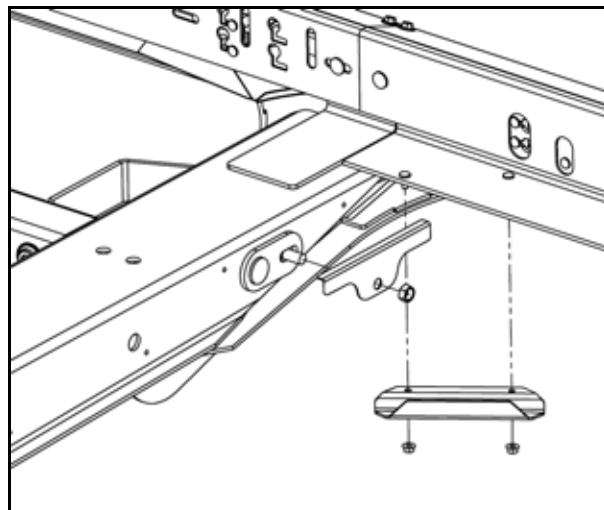
7. Secure the adapter harnesses to each sensor.



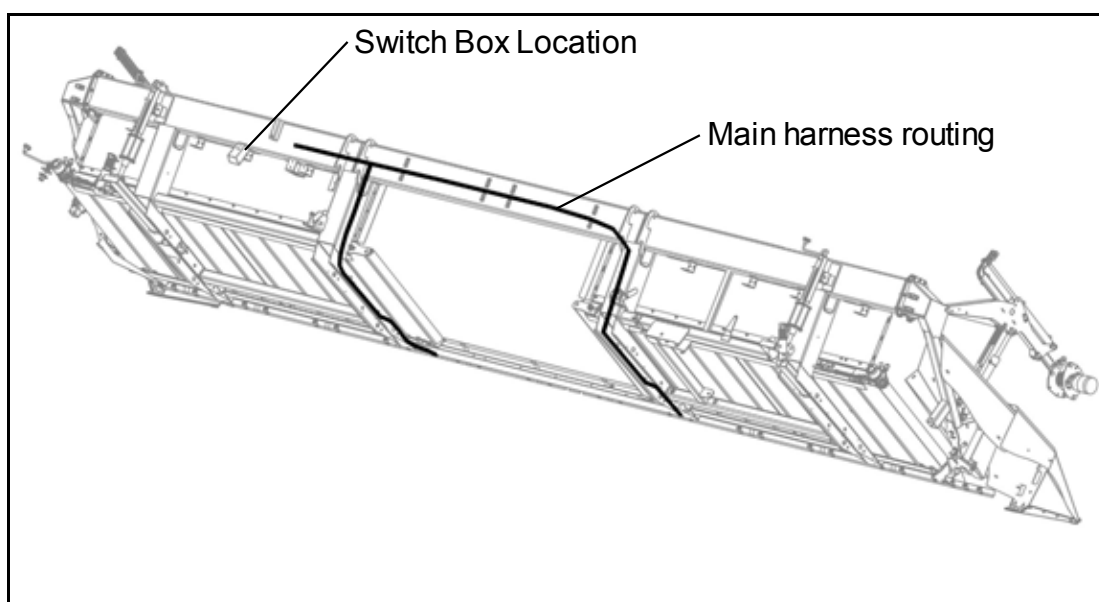
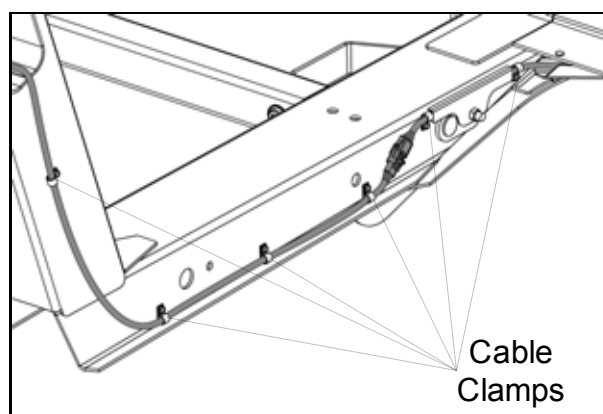
8. Insert the bolt from the space between the draper deck and deck mount as shown to the right. Secure the adapter harness to the cable clamp and secure in place with the nut. Repeat for the other adapter harness.



9. Install the wire protector and wire holder in place as shown to the right. Repeat for the other end of center of frame.



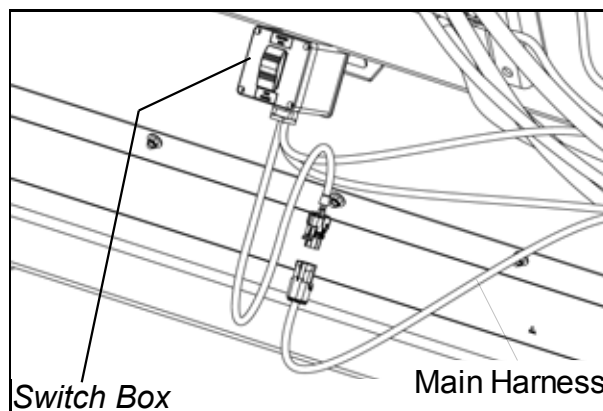
10. Secure the wire to the cable clamps and run the wire along the route indicated to the right. Ensure the wire is safely held by the wire protector, holder and clamps. Repeat for other sensor wire.



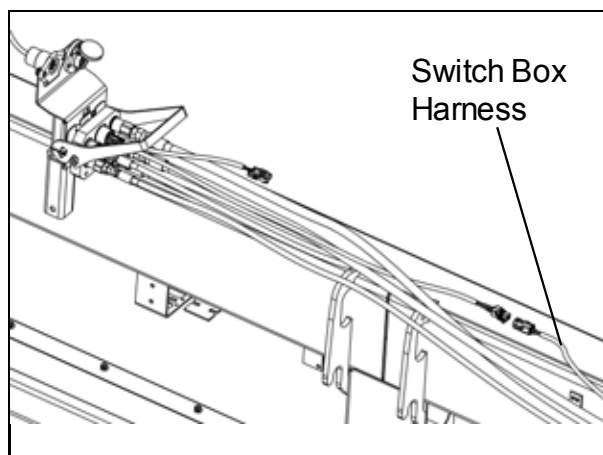


If your header has a switch box (as shown below) follow steps 11, 12, and 13. If your table does not have a switch box, proceed directly to step 14

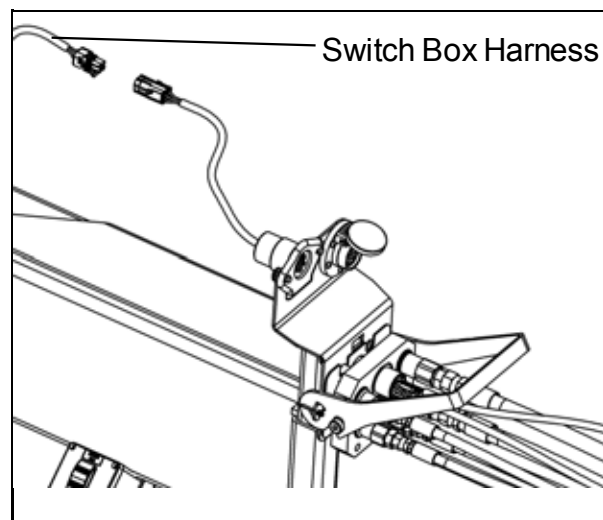
11. Plug the end of the harness into the 1"6' cable that comes out of the switch box.



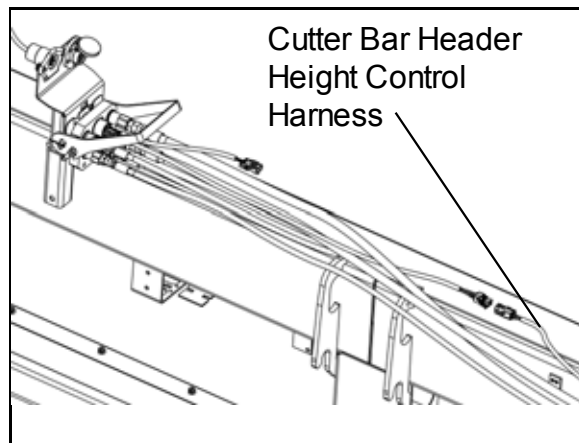
12. Ensure that the 10" 6' cable with the female connector that comes from the switch box is secured to the adapter harness on the multi coupler as shown to the right.



13. Ensure that the 10" 6' cable with the male connector that comes from the switch box is secured to the adapter harness on the electrical plug as shown to the right.



14. If your header does not have a switch box, secure the main cutter bar header height control harness to the adapter plug on the multicoupler as shown to the right.



Initial Physical Adjustment and Set-up

1. Remove the feeder house cylinder safety lock, lower the header to its normal operating height, and set the header tilt to the desired angle.
2. Raise the table until the cutter bar is at a comfortable working height.

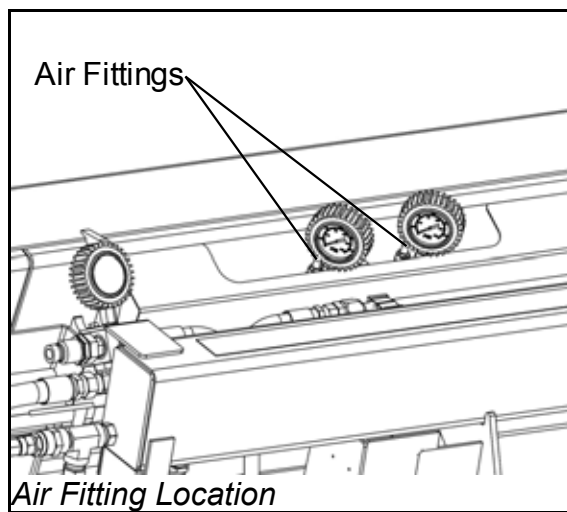


With the header and reel fully raised, set the parking brake, reel lift locks and feeder house cylinder locks. Shut combine engine off and wait for all moving parts to come to a complete stop before exiting the cab.



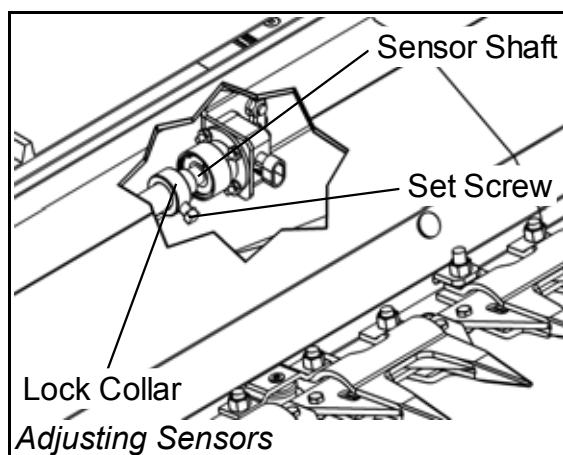
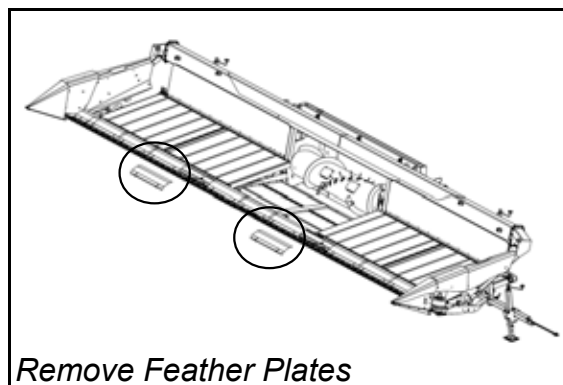
A compressed air supply will be required to refill the air system.

3. Release air from the fittings located next to the air gauges between the subframe and the main header frame until the cutter bar reaches its lowest point of travel.
4. The sensors should already be set up with the proper voltages, however if something shifts during shipping they may need to be re-calibrated. The dealership is best suited to read the voltages, however you may order a special adapter so you can use a multimeter to read the sensor voltage. Lift the cutter bar by hand to its highest point and record the voltage coming from the sensor. Lower the cutter bar to its lowest point and record the voltage.



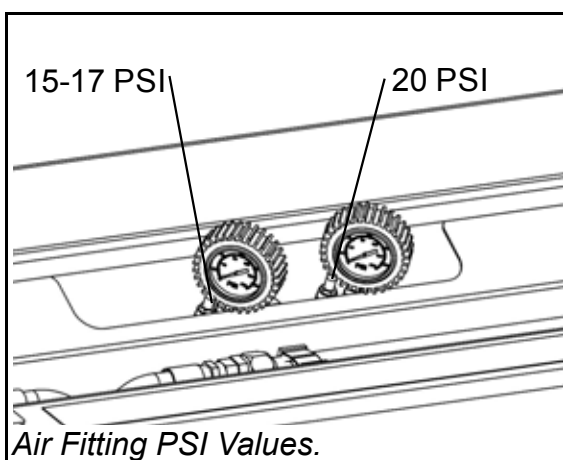
5. Once you have the upper and lower voltages, ensure that the high reading is not above 4.5 volts, and the low reading is not below 0.5 volts. The maximum difference should not exceed 4.0 volts.

6. If the voltage range for each sensor does not come close to those mentioned above, adjust each sensor as follows:
 - a. Remove the feather plates covering the sensors located in front of the two center support struts as shown in to the right.
 - b. Loosen the set screw to allow you to turn the sensor shaft.
 - c. Turn the sensor shaft with a pair of needle-nosed pliers to achieve the desired voltage.
 - d. Once the desired voltage range is achieved, re-tighten the set screw on the lock collar.



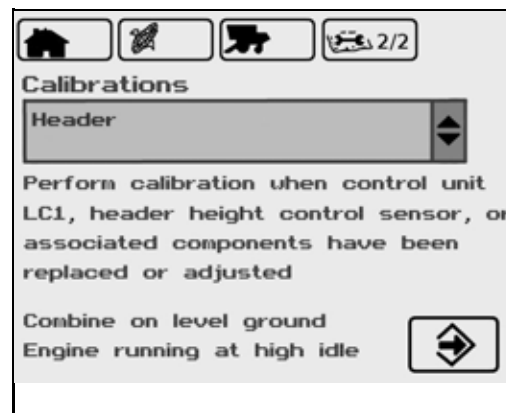
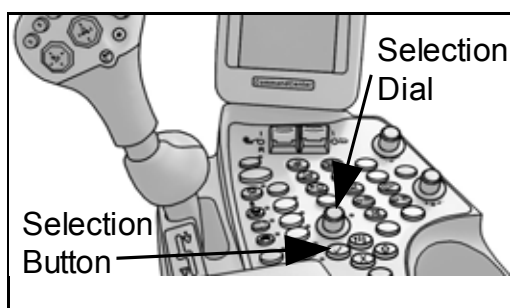
Your sensor may not appear exactly as the ones shown in the illustrations.


7. Once the sensor voltage range is properly set, calibrate the header height control using your combine control system.
8. Refill the pneumatic air system. The inside air reservoir (Left Air Gauge) should be filled to approximately 15-17 PSI. The outside air reservoir (Right Air Gauge) should be filled to about 20 PSI.



Calibration

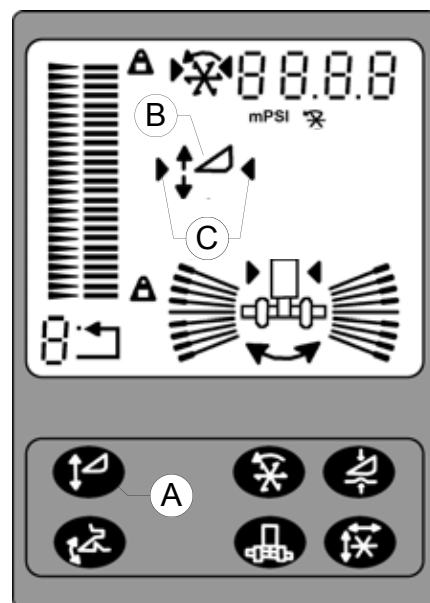
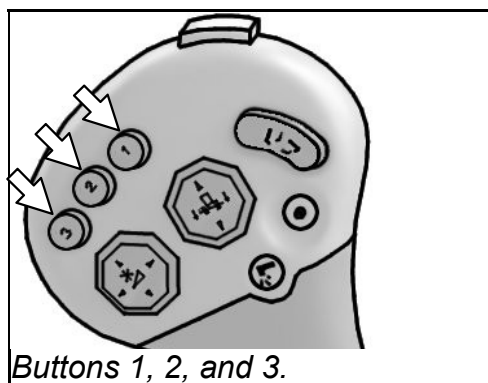
1. Under the diagnostics and calibration screen, rotate the selection dial until the header calibration menu is highlighted. Press the selection button, you should then see the screen shown on the right.



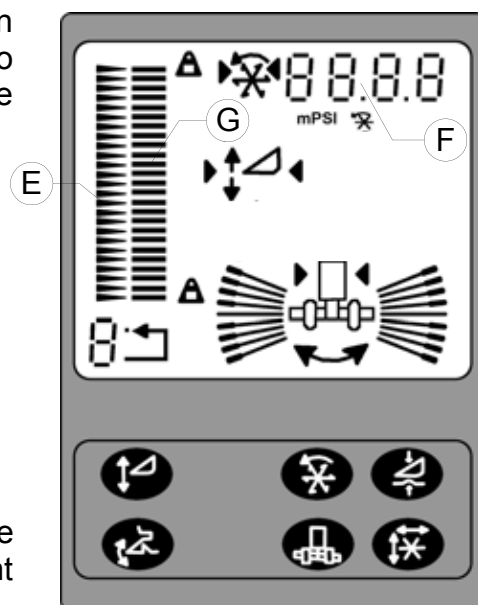
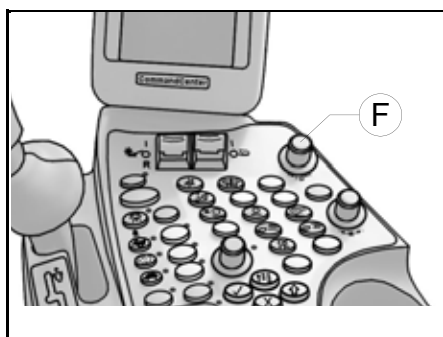
2. Turn the selection dial until the enter icon is highlighted () press the selection button and follow the instructions given to you on the screen.
 - Lower the header to the ground, then select the next step.
 - Press and hold the header raise switch, calibration will proceed automatically.
 - 'Calibration Complete' should be displayed on the screen when the process is complete.
 - Press the Selection Button to save the changes.

Operation

1. To enable the system, press the Header Height Control Sensing Button (A), the symbol on the button should appear on the display (B).
2. Turn on Automatic Header Height Control by pressing buttons 1, 2 or 3 on the control handle. Once turned on, activation arrows should show up on the display (C). The number in the lower left corner of the display indicates the button that was selected.



3. To change the height set point (E) of each activation button, select the activation button that you wish to change (1, 2 or 3) and adjust the height via the header height control dial (F).



The bar graph (G) and numeric display (H) show the headers relative position based on the Header Height sensor linked to the header.

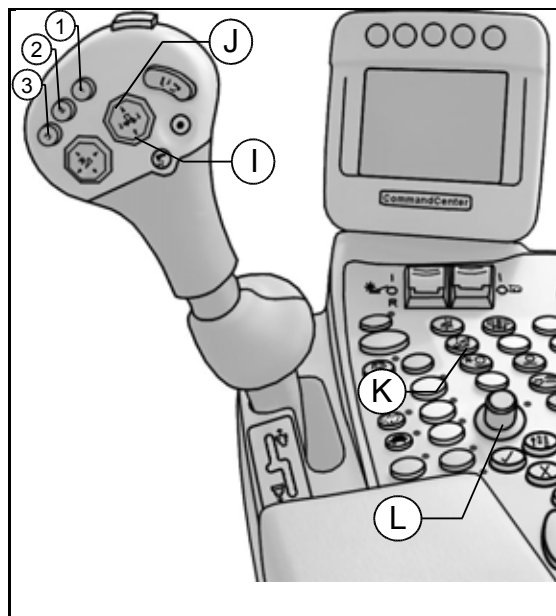
4. Manually adjusting the header height with the header lower switch (I) will override the system until released. Once the switch is released, the system will return to automatic mode.

Using the header raise switch (J) will deactivate the system until the header lower switch (I) is pressed at which point the system will be reactivated.

5. Press activation buttons 1, 2, or 3 to reactivate system. Header will automatically move to the preselected height.

6. The sensitivity and raise/lower rate can be adjusted using the following:

- To adjust the **raise/lower rate**, press the rate/sensitivity adjust button (K) **once** and then use the selection dial (L) to adjust the rate.
- To adjust the **sensitivity**, press the rate/sensitivity adjust button (K) **twice** and then use the selection dial (L) to adjust the rate.



The system is deactivated by pressing the Header Height Control Sensing Button (A, on the previous page) again.



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Revision 2.0 - 2009