



Grain Belt Plus

Owner's Manual



Revision 1.0 - 2009



Important Notice

Review the sections of this manual regarding adjustments, settings, leveling, and table height before attempting to operate this header.

Without proper adjustment, damage to the header may occur.

Please wash this equipment after transporting

Honey Bee Manufacturing will not be responsible for any paint deterioration resulting from salt or harsh chemical corrosion if this equipment is not properly washed after transport. Use a mild soap solution, then rinse thoroughly.

If this equipment is stored near salted roadways through the winter months, it should be cleaned each spring.



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Purchase Information

Dealers Name: _____

Address: _____

Phone: () _____

Purchase Date: _____

Model: _____

Serial Number: _____

Delivery Date: _____

Modification Record	
Date	Modification

Improvements

Honey Bee Manufacturing Limited is continually striving to improve its products. We reserve the right to make improvements or changes when it becomes practical and possible to do so, without incurring any obligation to make changes or additions to the equipment sold previously.



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Warranty

Honey Bee Manufacturing Ltd. (Honey Bee) warrants your new Grain Belt header to be free of defects in material and workmanship, under normal use and service. Obligations under this warranty shall extend for a period of 1 year (12 months) following the date of delivery to the original purchaser and shall be limited to, at the option of Honey Bee, replacement or repair of any parts found, upon inspection by Honey Bee, to be defective.

Warranty Claims

The purchaser claiming under this warranty shall report a warranty claim to his Authorized Dealer. The dealer shall complete the claim, on the prescribed form, for inspection by an authorized company representative. Warranty claims must be made within 60 days of warranty expiration.

Limitations of Liability

This warranty is expressly in lieu of all other warranties expressed or implied and all other obligations or liabilities on our part of any kind or character, including liabilities for alleged representations or negligence. We neither assume nor authorize any person to assume, on our behalf, any liability in connection with the subsequent sale of the Grain Belt header.

This warranty shall not apply to any Grain Belt header which has been altered outside the factory in any way so as in the judgment of Honey Bee to affect its operation or reliability, or which has been subject to misuse, neglect, or accident.

Operator's Manual

The purchaser acknowledges having received training in the safe operation of the Grain Belt header and further acknowledges that Honey Bee does not assume any liability resulting from the operation of the Grain Belt header in any manner other than described in this manual.



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Mounting Checklist

<input type="checkbox"/>	Crop dividers and crop divider pipes installed? (pg. 33)
<input type="checkbox"/>	Adapter plate properly fitted to the feeder house of the combine? (pg. 34)
<input type="checkbox"/>	Feeder house pins and/or bolts in place, properly locked and/or tightened?
<input type="checkbox"/>	Is the transport axle/hitch tube collapsed and secured in field position? (pg. 36-38)
<input type="checkbox"/>	If applicable, storage axle/hitch removed? (pg. 37-38)
<input type="checkbox"/>	Gauge wheels installed? (pg. 38-39)
<input type="checkbox"/>	Pump assembly aligned for your combine? (pg. 40)
<input type="checkbox"/>	Drive shaft aligned and connected to the combine? (pg. 41)
<input type="checkbox"/>	All hydraulic lines (quick couplers and multi-link couplers) connected? (pg. 41)
<input type="checkbox"/>	Checked for leaks and loose connections?
<input type="checkbox"/>	All electrical connections completed? (pg. 42)
<input type="checkbox"/>	Header Flotation Restrainer Pins adjusted for desired header flotation? (pg. 56)
<input type="checkbox"/>	Finger auger adjusted? (Auger fingers clear the front of the feeder house.) (pg. 117)
<input type="checkbox"/>	Header is level? (pg. 51)
<input type="checkbox"/>	Are Pan Inserts Properly Installed? (pg. 121)



Do not attempt to operate your header until this checklist has been followed. Failure to do so may result in equipment damage or injury.



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1. Safety

The following are definitions for terms used in this manual:

Safety Terms



Indicates a location or situation where potential danger exists. For example: Shields are intended for your protection from moving parts - make sure they are in place before starting the machine.



Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to warn against unsafe practices.



Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This is limited to the most extreme situations, where typically, machine components cannot be guarded for functional purposes.



This term warns of potential damage to the equipment if instructions are not followed.



Warns of conditions that will cause inefficient operation or possible damage to the machine.



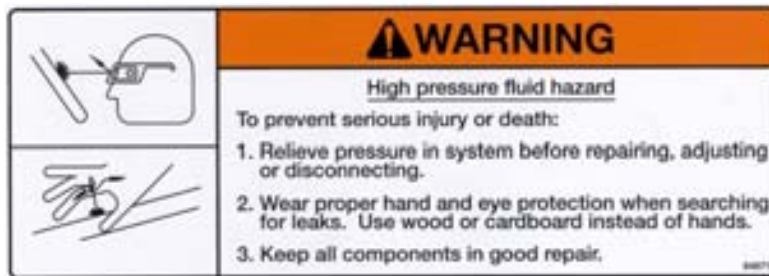
The terms used for parts of the header in this manual are those in use at the time of design. These terms are subject to change in the future.

Hydraulic Safety



This machine is powered by hydraulic oil under high pressure. Caution must be exercised around the machine. Hydraulic fluid under pressure can penetrate the skin, causing serious injury, and even death. When looking for a leak, use a piece of cardboard or other suitable material. Never use your hands to locate the leak.

Always wear eye protection, gloves and long-sleeve clothing when working with hydraulics. The fluid stream from small leaks can be invisible. Always exercise caution when working around hydraulics.



You can reduce this hazard by relieving the pressure before disconnecting hydraulic lines, and by tightening all connections before applying pressure.

Relieving Hydraulic Pressure - General Procedure:

1. Lower all components, such as the reel and the header, so that their weight is fully supported by the ground or by stable supports;
2. Turn off the engine of the combine;
3. Refer to the combine operator's manual for specific instructions on relieving hydraulic pressure in the system.



If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source.



Operation and Maintenance Requirements

You are responsible for the safe operation and maintenance of your Honey Bee Header. You must ensure that you, and anyone else who is going to operate, maintain, or work around the Header be familiar with the operating and maintenance procedures and related SAFETY information contained in this manual.

Most accidents are preventable. You are the key to safety. Good safety practices not only protect you, but also the people around you. Make these practices a part of your daily working practices. Do not risk injury or death by ignoring good safety practices.

Operating instructions for this header should be reviewed by each operator at least once a year per OSHA regulations 1928.57. The meaning of each decal should be understood prior to operating the header, and the operator must be familiar with the location of all hazards on the machine.

General Safety

1. Keep all hydraulic components and motors clean. Remove all chaff and straw to prevent the possibility of fire.
2. Carry a functional, multipurpose fire extinguisher in the cab, and know how to use it. Check the extinguisher regularly and keep it maintained.
3. Provide a first aid kit in the cab for emergencies and know how to use it.
4. Never wear loose clothing or jewelry around machinery.
5. Wear appropriate protective gear. This includes, but is not limited to:
 - A hard hat,
 - Protective shoes with slip resistant soles,
 - Protective glasses or goggles,
 - Leather gloves,
 - Hearing protection,
 - Respirator or filter mask.
6. Do not allow any one to ride outside the cab of the combine.
7. Make certain that the park brake is engaged, and the combine is in neutral before starting the engine.
8. Clear the area of bystanders, especially small children, before starting the combine.
9. Do not allow anyone to operate machinery who has not been thoroughly instructed in its correct use.
10. In addition to this manual, all operators should familiarize themselves with all sections of the Combine Operators Manual.



Shields

Some pictures or illustrations in this document will not show protective shields in place. This is done to explain clearly the operation of a component. This is in no way intended to condone operating equipment without safety shields.

Always ensure all protective shields are in place before starting the machine.

Safe Operating Practices

1. STOP the combine, engage the parking brake, place the combine in neutral, remove the key, and wait until all moving parts stop before leaving the cab.
2. Lower both the table and the reel onto their respective safety locks, or to their lowest point of travel before leaving the combine, or beginning work on the header. If working under the reel, lower the reel onto the cylinder locks. A loss of hydraulic pressure could cause the header or reel to fall suddenly.
3. NEVER operate the combine and the header while tired, ill, or impaired.
4. DO NOT stand between the combine and the header while raising or lowering the header.
5. Do not operate the header in crowded or confined areas.
6. Remember that some models of this header are not centered on the combine feeder housing, but may be offset to the right. This can easily distort your judgment of distances.

Maintenance Safety

1. Before doing any maintenance lower the reel, and the header to their lowest point of travel, or onto the safety locks, shut off the engine of the combine, engage the park brake, Also make sure that there is no pressure in the hydraulic lines. (Refer to the Combine Operator's manual for specific procedures.)
2. Hydraulic leaks can penetrate the skin causing serious injuries. Small leaks can be invisible and are dangerous. Use some kind of disposable object such as cardboard or wood to find the leak - DO NOT USE YOUR HAND.
3. Ensure that all pressure is released from hydraulic lines before attempting repairs. Replace or repair damaged hoses without delay to avoid oil loss, oil contamination, and damage to internal components.
4. Care should be taken when maintaining the knife. The sickle sections are very sharp and can easily cause injury. Use heavy leather or canvas gloves when working with the knife.

Transport Safety

1. Transport the header with a clean SMV (Slow Moving Vehicle) sign displayed on the rear of the header, and use your hazard lights as required by law. Check local road laws before transporting.
2. When transporting the header on roads, be aware of the width of the header.
3. For long-distance transport put the header into full transport position (see the Dismount section).
4. Do not transport the machine at night, dawn, dusk, or in reduced visibility.
5. Ensure the hitch is firmly attached and secured with hitch pins before moving.
6. Attach the safety chain before moving.
7. Do not exceed 32 km/h (20 mph) during transport.

In-Field Checks

The Installation and Operation sections of your operator's manual cover the adjustments which may be required on your swather. Read these sections carefully before using your machine. Make the necessary adjustments before operating your swather, and check these adjustments periodically as required.

Storage

Store the header on firm ground away from areas of human activity. The header may be stored in the quick dismount position or in the full transport position.

Safety Decal Locations

The following pages show the locations of safety decals on your header. They are intended for your safety, and the safety of those working with you. We strongly recommend that you take this manual, walk around your machine and take note of the content, meaning, and location of these warning signs.

Review these decals and the operating instructions in this manual with your machine operators. Keep these decals legible. If they become obscured or damaged, obtain replacements from your Honey Bee dealer.

Decal Location Diagrams

Match the numbers on the diagram to the Illustration numbers on the following pages to locate specific safety and product labels. It is strongly recommended that you, and those working with you become completely familiar with the meaning of these labels.

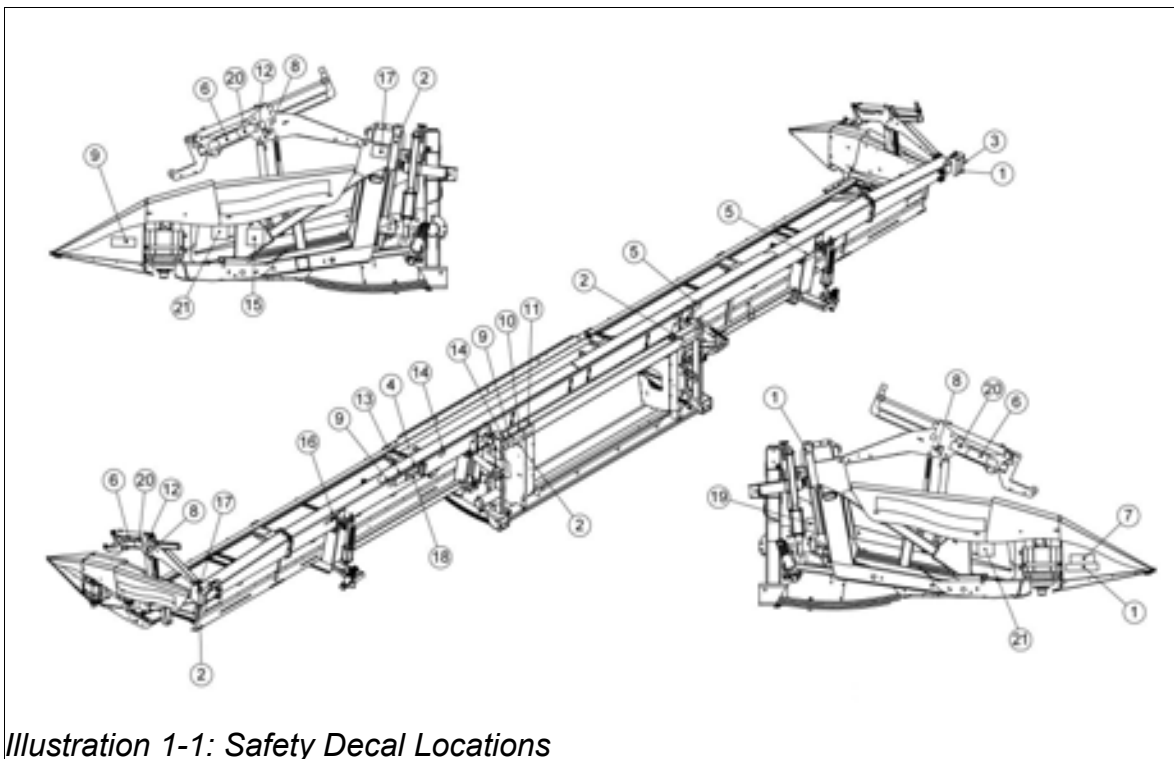
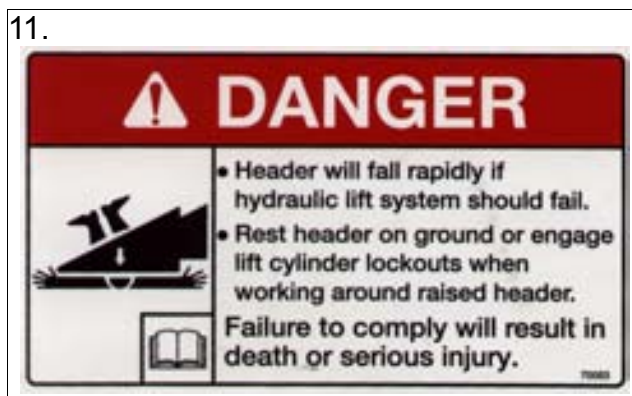
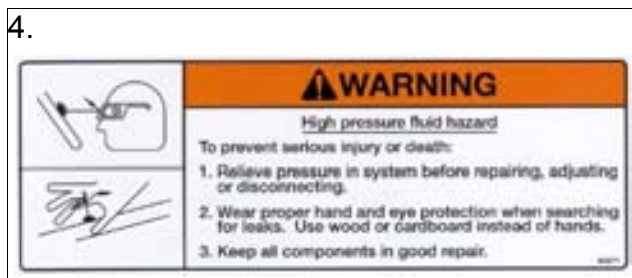


Illustration 1-1: Safety Decal Locations

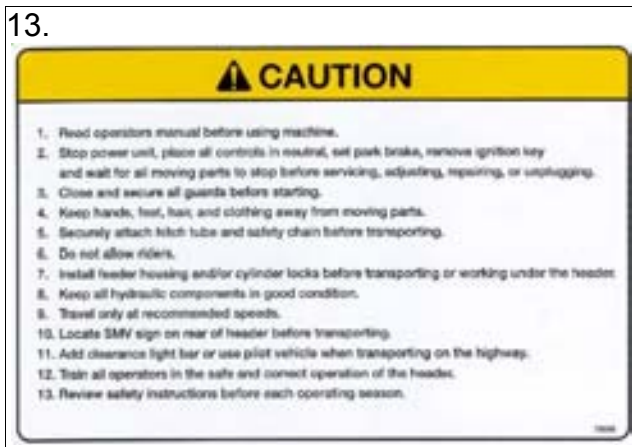
1. Red Reflector (2x9)
2. Yellow Reflector (2x9)
3. Red-Orange Reflector (2x9)



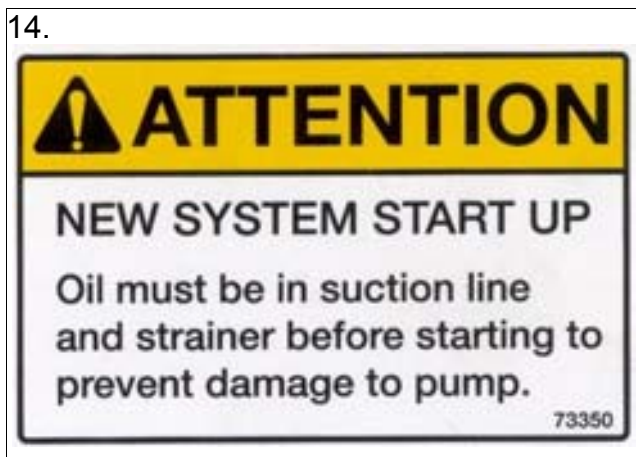
12.



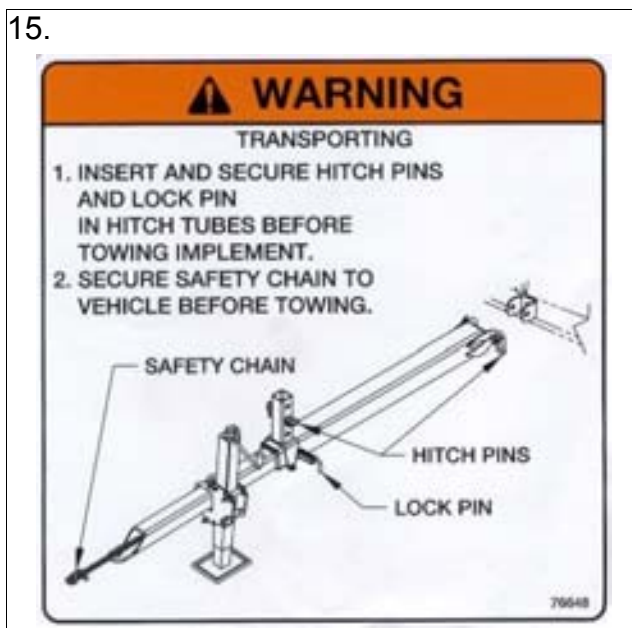
13.



14.



15.



16.



17.

⚠ WARNING

- Properly prepare machine for transport / roading.
- 20 mph [32 kph] - MAX. road speed.
- Towing unit must be equipped with compatible electrical connections to operate lights.
- Towing unit must weigh at least .67 x weight of towed machine.
- Use caution when making turns to avoid lose of control.

Failure to comply could result in death or serious injury.


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18.

⚠ WARNING



Possible loss of control

- Properly ballast Combine when using this header.

Failure to comply could result in death or serious injury.

20.

⚠ WARNING



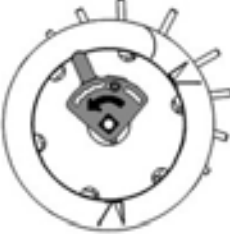
In case of hydraulic system failure, reel may drop quickly. Engage safety pin before working under reel.

Failure to comply could result in death or serious injury.

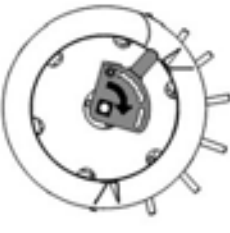

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19.

AUGER TIMING



- For heavy crop conditions; extend fingers earlier in rotation by rotating timing arm rearward. (counter-clockwise)

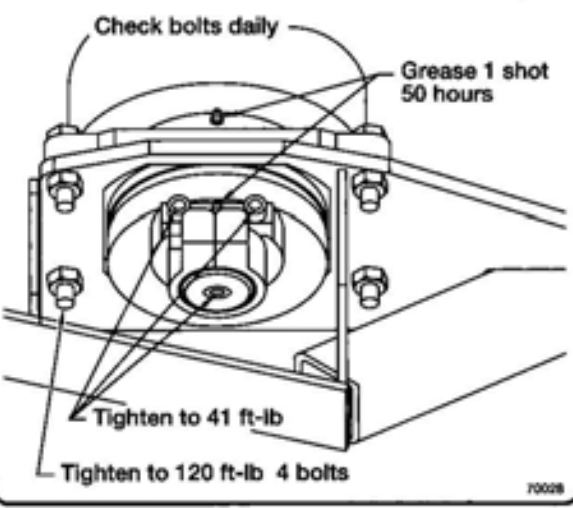


- For light crop conditions; extend finger later in the rotation by rotating timing arm forward. (clockwise)

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21.

KNIFE DRIVE



Check bolts daily

Grease 1 shot 50 hours

Tighten to 41 ft-lb

Tighten to 120 ft-lb 4 bolts

70028

Lights and Signals

All Grain Belt Plus headers are equipped with clearance lights; and depending on the particular size and model of header you have, it may also be equipped with signal and brake lights. Ensure that all lights are in good working order, and that you swing them out to their transport positions before transporting the header.

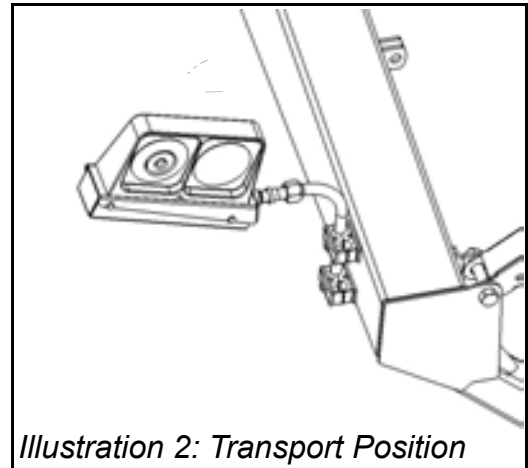


Illustration 2: Transport Position

Pre-Transport Checks

Do a complete walk-around check to be sure there are no unsecured parts or components.

1. Check all reel mount, reel drive and adapter assembly bolts to be sure nothing is loose.
2. Ensure wheel bolts are tight.
3. Check transport tire pressure. Recommended pressure is 50 psi (345 K Pa) for 225/75R15 radial, and 8.00/16-10-ply bias tires.
4. Check spindle and hitch lock pins to make sure they are in place and secure.
5. Tie back all wiring and hoses to make sure they will not pinch or drag during transporting.
6. Ensure the hitch, tongue, and safety chain are secured to the header and to the tow-vehicle.

In-transit Checks

1. If you are towing your header, stop after the first 5 to 10 kilometers (3 to 6 miles) and check to make sure the wheel bolts are tight and the wheel hubs are not hot. Periodic checks 50 to 60 km (31 - 37 miles) should be made if towing the header long distances.
2. Check the hitch bolt and safety chain periodically to make sure they are secure.

In-Field Checks

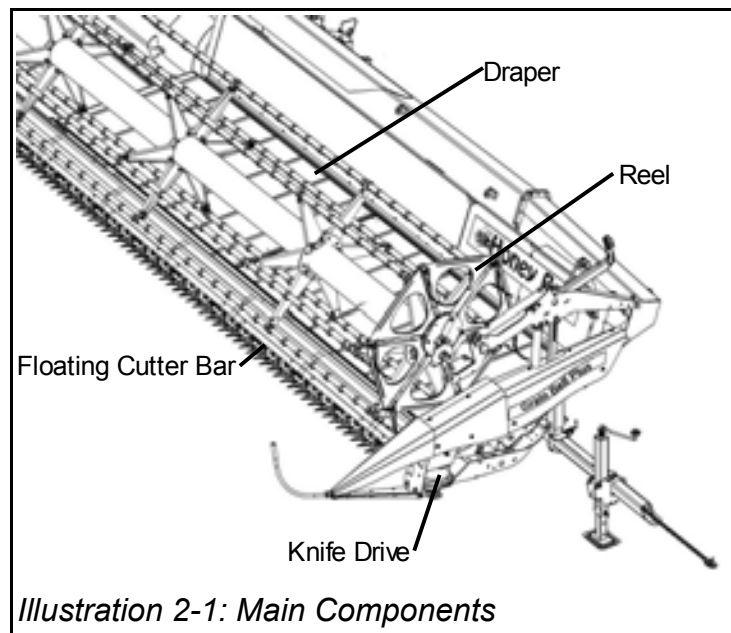
This operator's manual covers the adjustments which may be required on your Grain Belt Plus header. Read this manual carefully before using your Grain Belt Plus header. Make the necessary adjustments before operating your header, and periodically during use, as required.

2. General Information

The Honey Bee Grain Belt Plus header consists of the main components listed below. The adapter and sub-frame attach to the feeder house of the combine. The hydraulic pressure to run the header comes from a hydraulic pump driven from the feeder house of the combine which is supplied by the reel return. The knife is driven by a hydraulic motor to provide the power to cut the crop. The cutter bar consists of flexible panels and air-bag cushions which enable it to follow the contour of the ground as it cuts. The pickup reel lays the crop on the drapers. The lateral drapers carry the crop to the feeder draper, which directs it to the finger auger mounted in the subframe. The finger auger completes the delivery of the crop to the feeder house of the combine.

When in the field position, header flotation is achieved through the use of heavy duty leaf springs and casting gauge wheels; and when in low crop cutting situations, is assisted by the pneumatic (air bag) cutter bar suspension system.

Principal Components



All oil to the pump is supplied by the reel return line, if it is not connected properly, damage will result. Also ensure that the combine return line is installed and connected to the header or damage will result.

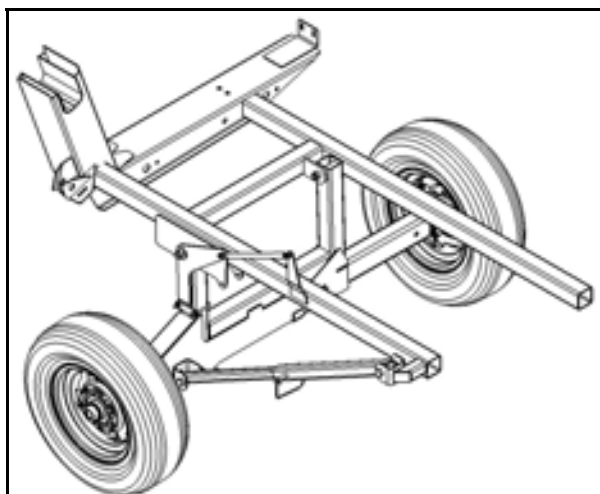


Illustration 2-2: Transport Axle 30-36 ft.

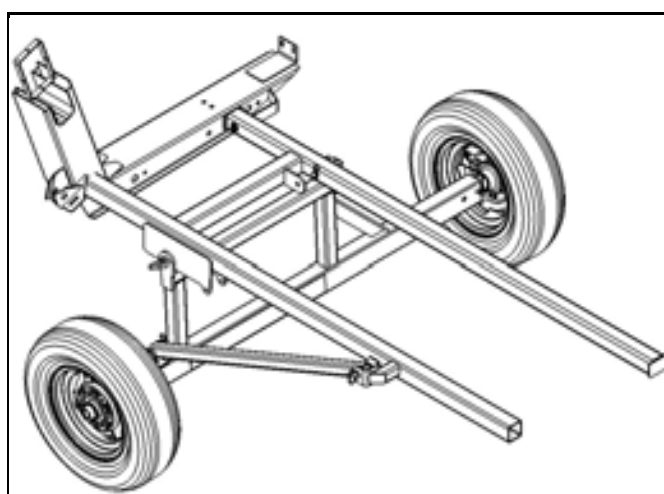


Illustration 2-3: Transport Axle 42-45 ft.

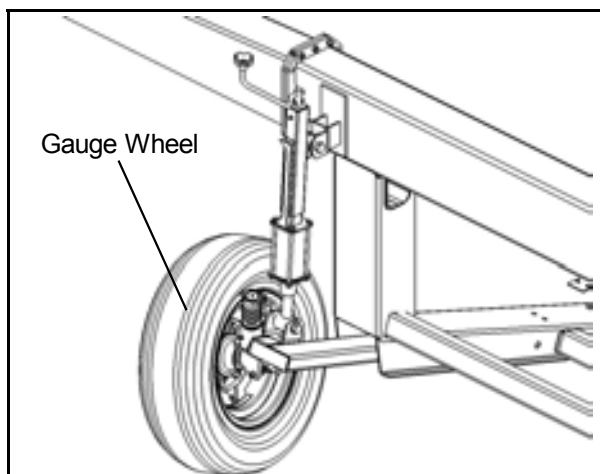


Illustration 2-5: Gauge Wheel - Left Side

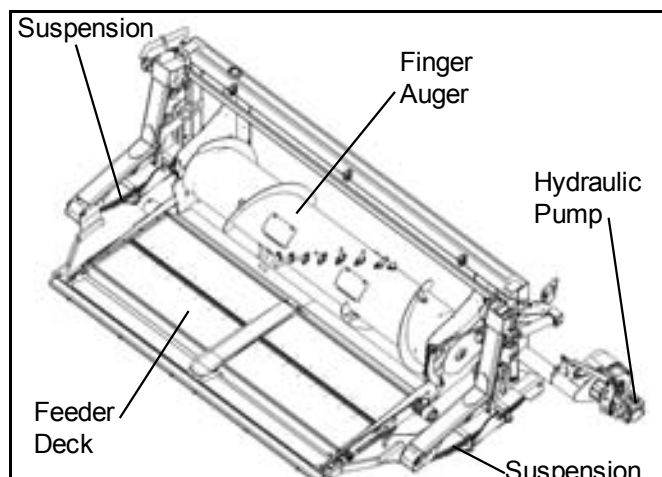


Illustration 2-4: Header Subframe

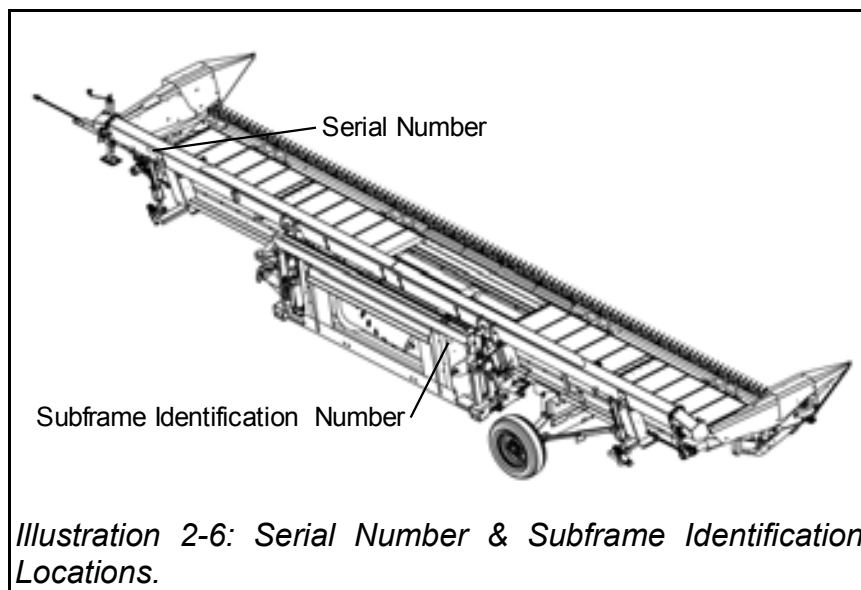
Serial Number Location

To obtain the fastest service when ordering parts, remember to:

1. Order the part by the correct number.
2. State the model.
3. Include the serial number from the header frame for header parts, and the subframe identification number (SIN) for the subframe.

The serial number is stamped on a metal tag which can be found on the back of the upper tube on the left hand side of the table. The SIN is located on the right-hand side of the subframe.

In addition to the serial number, a manufacturing code representing the month and day of manufacture is stamped on the serial number plate. e.g. - C27 The letter represents the month (letters "A" up to "L" represent months of the year from January to December), and the two-digit number is the day of the month.





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3. Operation

Mounting Instructions

These instructions are designed to help you mount your Grain Belt Plus Header on the combine in a safe and efficient manner. If you follow these instructions in the order they are given, you will avoid many potential difficulties.

It is recommended that you always use the check list at the end of this section to double check that the header is mounted properly and ready for the field.

Mounting and Dismounting Terminology

Combine	Front	-Feeder house end of the combine
	Rear	-Straw spreader/chopper end of the combine
Header	Right and Left	-As seen when sitting in the driver's seat facing the header
	Front	-Cutter bar side
	Back	-Feeder house mount side
	Right and Left	-As seen when sitting in the driver's seat facing the header when it is mounted on the combine or standing at the back of the header facing toward the cutter bar.

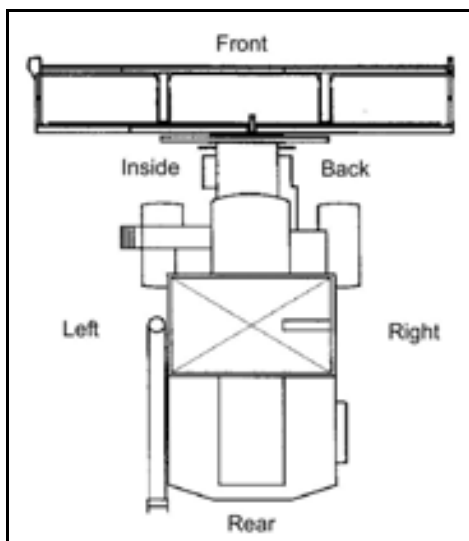


Illustration 3-1: Reference Directions



IMPORTANT Remember to always think safety and work safely!

Combine Preparation

1. Remove the factory pickup or auger header from the combine as outlined in your Owners/ Operators manual, supplied by the combine manufacturer.
2. Check the feeder house front and top for straw and chaff. Clean all contact areas thoroughly.
3. Check all locking mechanisms and/ or lock pins on feeder house of combine to ensure they are working properly and will not interfere with the initial mounting of the Grain Belt Plus header onto your combine.
4. Ensure the Combine Hydraulic Reservoir Integration hose is properly installed.
5. Check for leaks and/ or loose fittings on hydraulic lines (hoses) which attach to the header. Repair if necessary.

Grain Belt Plus Header Preparation

1. Check the feeder house adapter area on the Grain Belt Plus header for any obstructions.
2. Ensure the rotating pump mount and attached hoses are clear of the feeder house opening. Slide the telescoping drive shaft back as far as possible and secure into transport cradle. If necessary, lift and lock the pump mount into transport position so it does not interfere with the feeder house as you drive the combine forward.
3. Check hydraulic hoses to be sure the couplers match those on the combine.



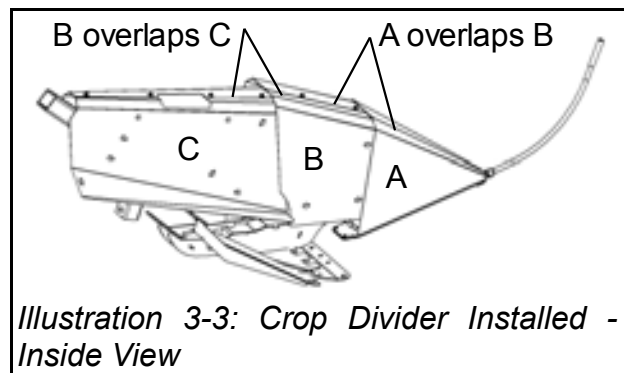
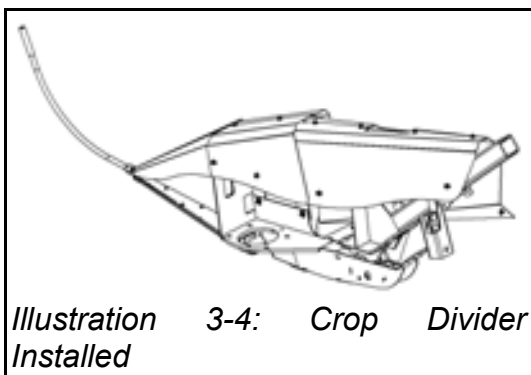
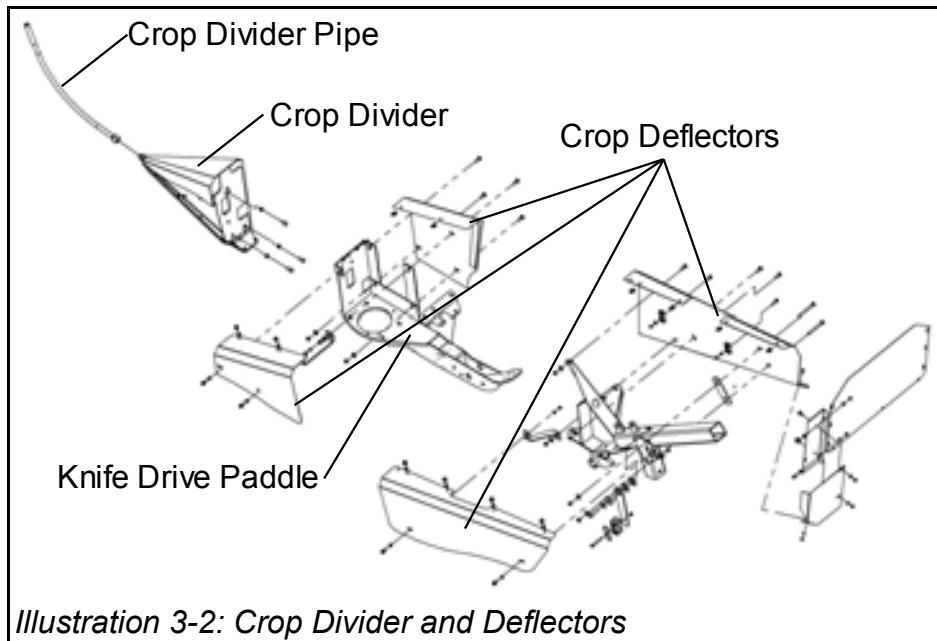
Some types of couplers may not be supplied with the Grain Belt Plus Header.

4. The header should be placed on flat, hard and level ground.
5. If the transport package was not purchased, refer to the TRANSPORT TRAILER MANUAL for Mounting & Dismounting instructions. (*Note: 30 ft and 36 ft models are available with the option of integral transport package or a transport trailer. 42 ft and 45 ft models are available with a storage axle or a transport trailer.
6. If the optional transport system or storage axle was purchased, ensure that the header is sitting level prior to hookup by adjusting the hitch jack up or down as needed.
7. Install the crop dividers and crop divider pipes onto the ends of the table. These items are not installed at the factory. Operators should be aware of the greater transport width of the table with these items installed, and should check local regulations.
8. The crop divider is held in place with (3) 3/8" x 1-1/4" carriage head bolts. Three bolts are installed through the face of the knife drive paddle, into the back of the crop divider. (see *Illustration 3-2: Crop Divider and Deflectors*, *Illustration 3-4: Crop Divider Installed*, and *Illustration 3-3: Crop Divider Installed - Inside View*) These are held in place by flange lock nuts. Note that the crop divider overlaps the crop deflector to provide a smooth transition for the crop.

9. Install the crop divider pipe onto the crop divider and tighten, checking that it is correctly aligned.



The inside edge of the crop divider and pipe should be aligned so that they are approximately perpendicular to the cutter bar. This will allow the crop to be separated well and helps prevent crop from plugging in the corners.



Adapter Plate

All Grain Belt Plus tables are equipped with the same style of sub-frame and finger auger. The make of combine that you use will determine the proper adapter plate, which is bolted to the back of the subframe.

Ensure that all nuts, bolts, and washers are present and secured properly to the subframe prior to mounting on the combine.



Keep all bystanders, ESPECIALLY CHILDREN away from the machine during this procedure!

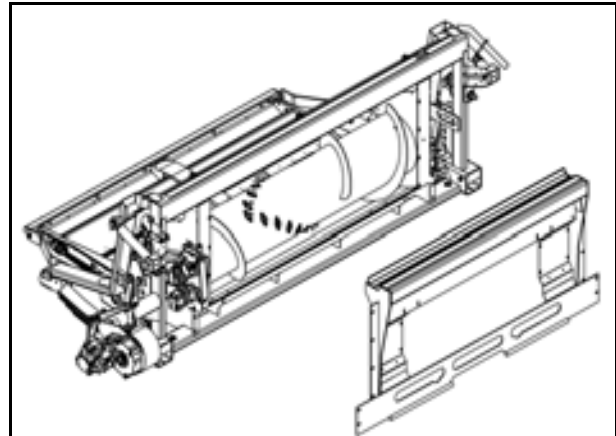


Illustration 3-5: Combine Adapter Plate

Mounting

1. Place the header and combine on firm, level ground.
2. Position combine directly behind the header, with feeder house aligned as closely as possible to the adapter plate which is attached to the sub frame.
3. With the feeder house on the combine lowered, slowly drive the combine forward until it is aligned both vertically and horizontally with the adapter plate on the subframe. If the feeder house does not align horizontally, adjust the hitch jack on the header either up or down to improve alignment. Adjust feeder house height as needed.
4. When the feeder house is properly aligned with the adapter plate on the subframe, drive forward slowly until the feeder house of the combine is inserted into the adapter plate. Slowly raise the feeder house until the top of the feeder house makes contact with the inside top of the feeder house adapter plate.

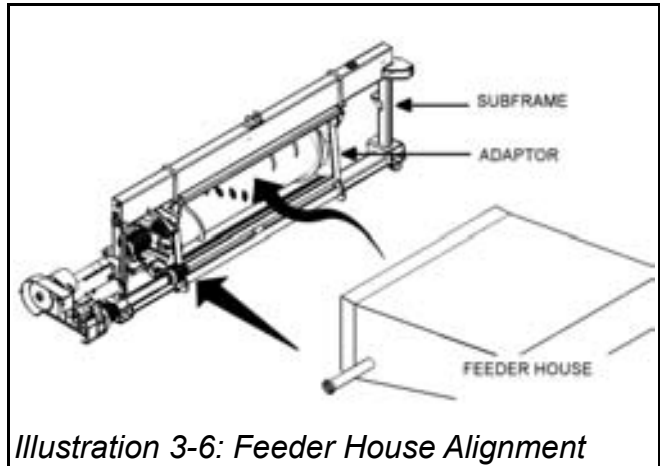


Illustration 3-6: Feeder House Alignment



Engage parking brake on the combine, shut the engine down, and wait for all moving parts to stop before leaving the cab.

5. Check the clearance and alignment of the feeder house to the adapter plate on both sides as well as on the top and bottom. Be sure that nothing is interfering with the alignment of the feeder house to the adapter plate or the finger auger.
6. Inspect the position of the finger auger in the subframe to be sure it is not contacting the shrouds on the front of the feeder house. If required, adjust the finger auger position (see the “Finger Auger” section of this manual).
7. If feeder house and the adapter plate ARE NOT properly aligned, repeat steps 2, 3, 4, and 5. If feeder house and the adapter plate are properly aligned, restart the engine and raise the feeder house (and header) to its full height.



Engage parking brake on the combine, shut the engine down, and wait for all moving parts to stop before leaving the cab. Install feeder house cylinder locks as described in your combine operator's manual.

8. With header in the fully raised position insert all lock pins, hooks and/or bolts as described in your combine operator's manual.



Be sure these pins are properly aligned and securely in place before proceeding!

Convert Optional Transport Axle to Field Position



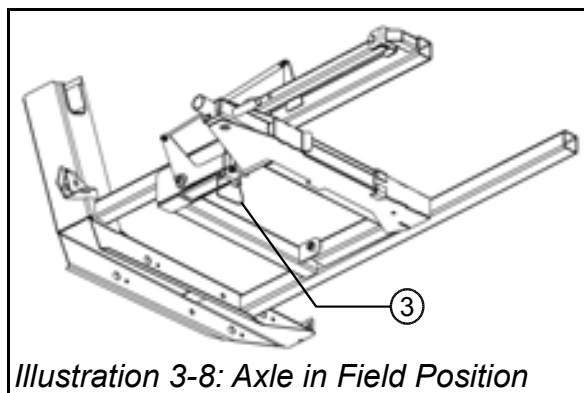
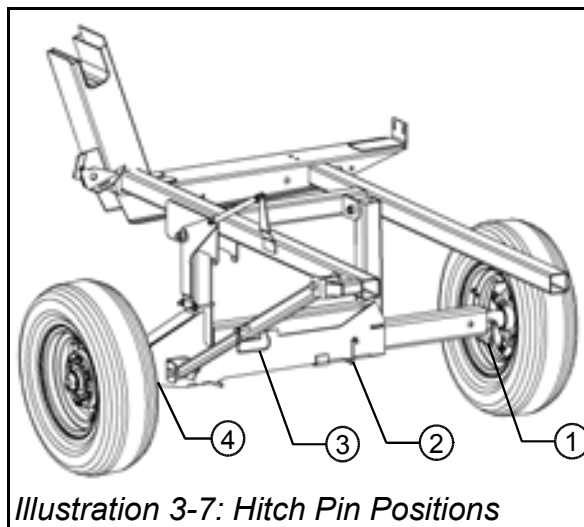
Axle and hitch parts are heavy. Care should be taken when handling them to avoid injury.



The transport axle, storage axle, hitch, and gauge wheels are optional equipment. If not purchased, disregard references to them in this manual.

*With the header in fully raised position, and all cylinder locks, lock pins, hooks and/ or bolts in place as described in your owner's manual, proceed as follows:

1. Remove hitch pin (1) from front wheel assembly, and remove wheel assembly from transport axle. Remove front axle hitch pin (2), and slide axle into center axle tube. Pin inner axle in place by re-inserting hitch pin (2) into center axle tube. Install wheel assembly into Left side gauge wheel bracket (see "Installation of Gauge Wheels" in this chapter), or store in a suitable location.
2. Remove hitch pin (4) (*Illustration 3-7: Hitch Pin Positions*) from the back wheel assembly, and remove wheel assembly from the transport axle. Install wheel assembly into right side gauge wheel bracket, or store wheel assembly in a suitable location.
3. Remove hitch pin (3) from axle support bar, and lift transport axle up and to the right to collapse the transport axle assembly. Insert hitch pin 3 through the now collapsed transport axle, into the frame as shown.



Removing the Storage Axle



Axle components are heavy, exercise caution in handling them.

1. Raise the header until the wheels are slightly above ground. Ensure the weight of the header is supported by the combine, and suitable blocking is in place under the subframe to prevent the header from falling.
2. Refer to *Illustration 3-9: Storage Axle Assembled*, and *Illustration 3-10: Storage Axle - Detail*.
3. Remove pins 5 and 6 and slide the wheel assemblies out of the axle ends.
4. If you have the gauge wheel option, see *Illustration 3-13: Gauge Wheel Installed*, page 38.
5. Remove pin 3 and lower the end of this tube to the ground.
6. Support the axle, and remove pins 1 and 2.
7. Lower the axle to the ground.
8. Store the axle in a safe and secure location, as there is no storage bracket on the Grain Belt Plus Header for the storage axle.

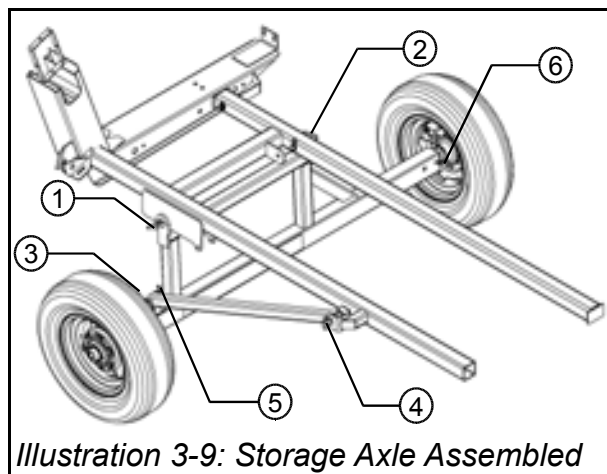


Illustration 3-9: Storage Axle Assembled

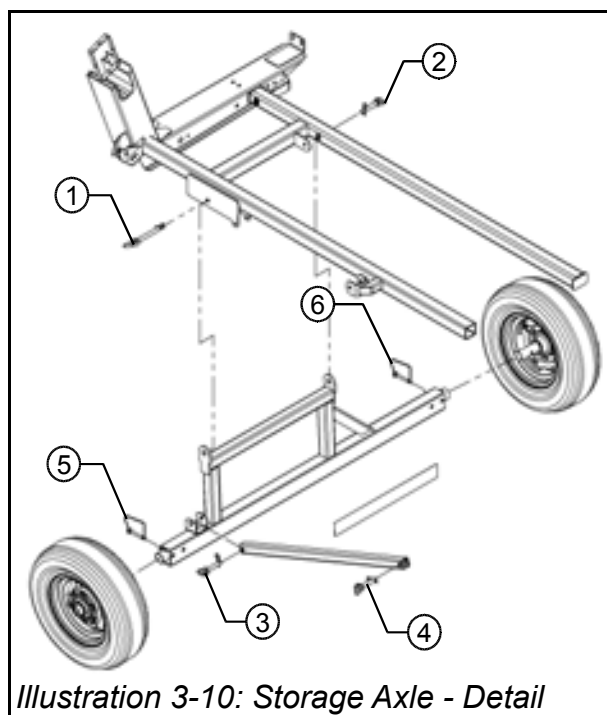


Illustration 3-10: Storage Axle - Detail

Store Hitch Assembly - Integral Transport

With header in fully raised position, and all cylinder locks, lock pins, hooks and/ or bolts in place as described in your owner's manual, proceed as follows:

1. Remove safety pin from jack leg. Using crank-handle on jack, raise jack leg into fully retracted position. Re-insert safety pin into jack leg.
2. Loosen L-Bolt on side of jack assembly, and remove jack assembly from hitch tube. If necessary, remove safety chain from around jack assembly.
3. Disengage lock pin on main hitch assembly, and push hitch tube in to the stop-bolt. Re-engage lock pin so that hitch tube is securely locked in its collapsed position.
4. Place jack assembly onto storage bracket located on the back-left-hand side of the header, and secure in place with hitch pin.

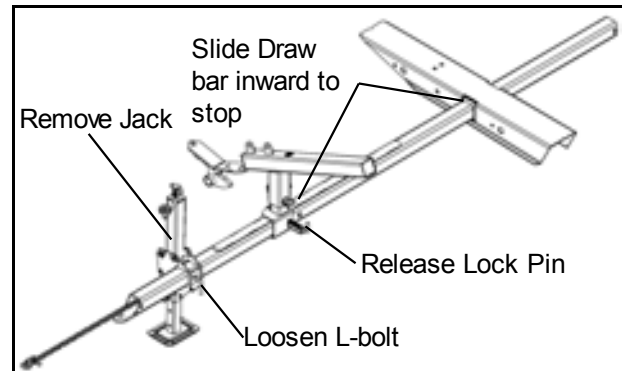


Illustration 3-11: Store Hitch Assembly

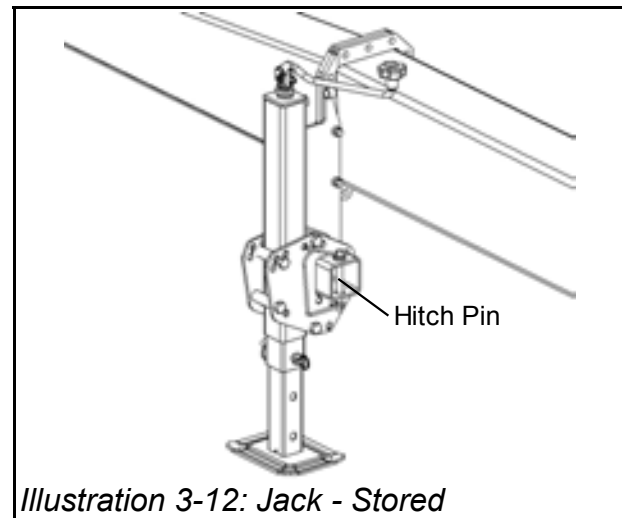


Illustration 3-12: Jack - Stored

Installation of Gauge Wheels

Wheel assemblies removed from the optional transport can be installed as gauge wheels by inserting the spindles into the gauge wheel mounts, and securing with the hitch pin.

The same installation procedure would apply to the wheel assemblies supplied for Grain Belt Plus Headers with only the gauge wheel option. See *Illustration 3-13: Gauge Wheel Installed*

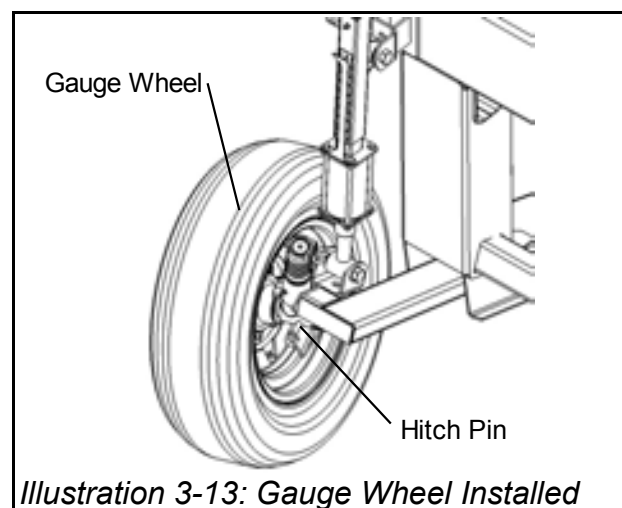


Illustration 3-13: Gauge Wheel Installed



The gauge wheels are designed to caster, so it is normally not necessary to raise the header when cornering; however, damage to the gauge wheels could result if header table and gauge wheels are not lifted off the ground when backing up the combine.

Damage to gauge wheels can also result from making sharp turns with the combine. Extremely sharp turns can cause the wheel on the inside of the turn to be dragged backwards, causing damage to the wheel.

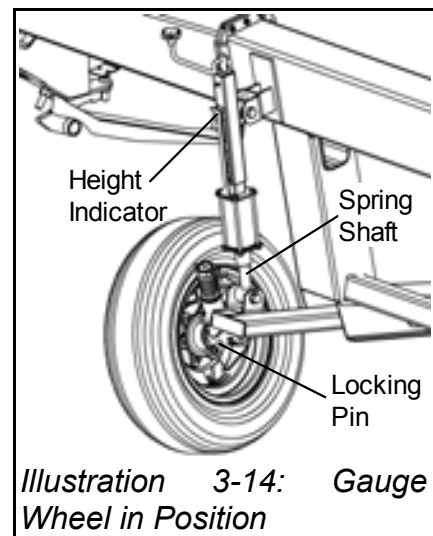
The gauge wheels must be adjusted relative to the height at which the header will be operated in the field. Normal adjustment would allow the weight of the header to compress the spring shaft of the gauge wheel assembly approximately 1.5" (38 mm) to 2.0" (50 mm).



The header should be parked on level ground and should be sitting level before adjusting gauge wheel height.

Gauge Wheel Adjustment:

1. Retract the gauge wheel jacks to their lowest setting, the dial should be at or above the "1" mark.
2. Adjust the header table height until the cutter bar is at an average cutting height for the crop to be cut. (i.e. stubble height) Lower the gauge wheel assembly to the ground using the screw jack.
3. Repeat this procedure on the other gauge wheel assembly.
4. Check the amount of compression on the spring shaft of each gauge wheel assembly (1.5 – 2.0"), if incorrect, repeat steps (1) through (3) as described above.



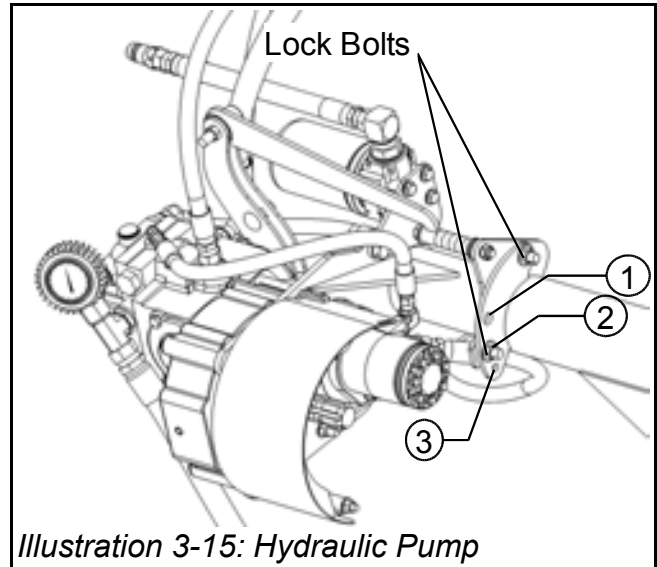
Too much compression of the spring tubes will stress the tilt cylinder, causing it to wear prematurely. Gauge wheels are NOT designed to support the weight of the table!



Adjustments to table tilt, spring flotation, and pitch will affect the amount of compression in the spring tubes. Further adjustments may be necessary.

Hydraulic Pump Alignment

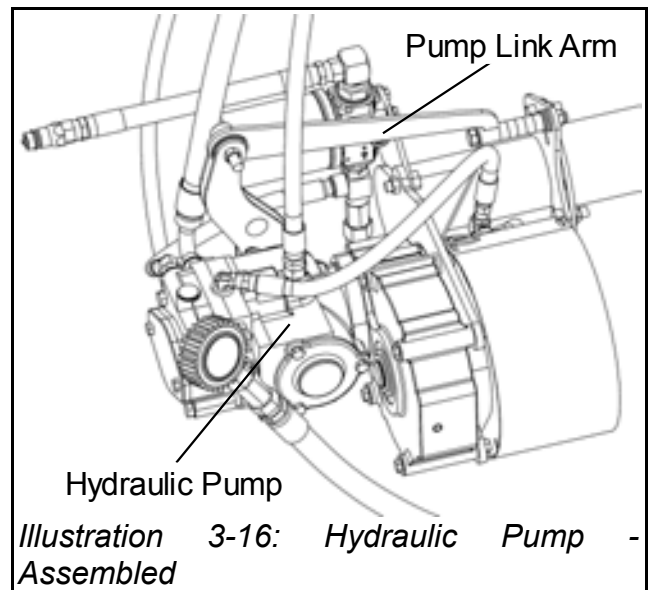
1. Remove lock bolts on each side of rotating pump mount assembly.
2. Lower the rotating pump assembly from the transport position (hole #3), into alignment with hole #1 or #2 on the mounting plate.
3. For AGCO, Case IH, John Deere or New Holland combines use hole #2 (shown here), and for CAT, use hole #1.
4. Re-install the lock bolts.



Header Reverse

When the feeder house of the combine is reversed, it will automatically reverse the finger auger, lateral decks, feeder decks and knife. In order to reverse the feeder house of the combine, refer to the combine operator's manual.

This feature allows the operator to clear built up material in the finger auger, thus preventing stalling the feeder house. This feature also reduces the need to clear the finger auger manually, which can be very difficult, and dangerous.



Coupling the Drive shaft

1. Unhook telescoping drive shaft from the storage bracket.
2. Couple the drive shaft to the feeder house shaft.
3. Align the pump to minimize the amount of angle in the drive shaft universals.

Hydraulic Hoses

The hydraulic lines from the combine to the header are connected through the multi-link system. Connect the multi-link coupler (as described in your combine owner's manual), ensuring that the coupler is aligned properly and the connection is securely locked in place with the locking lever.



This illustration may not exactly match your application.

There are two additional hydraulic connections that you need to ensure are properly secured. Failure in either of these connections can result in damage to your equipment.

The pump supply quick coupler connection is located on the hydraulic pump housing (*See Right*).

The female end of the combine return quick coupler connection is located on the upper left corner of the subframe. The male end is routed down from the combine hydraulic reservoir.

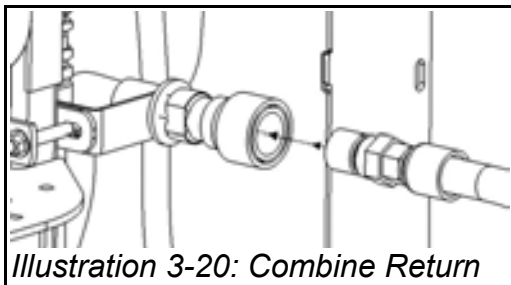


Illustration 3-20: Combine Return

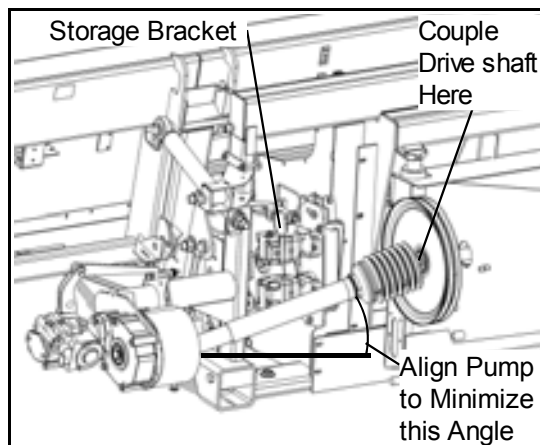


Illustration 3-17: Drive Shaft Installed

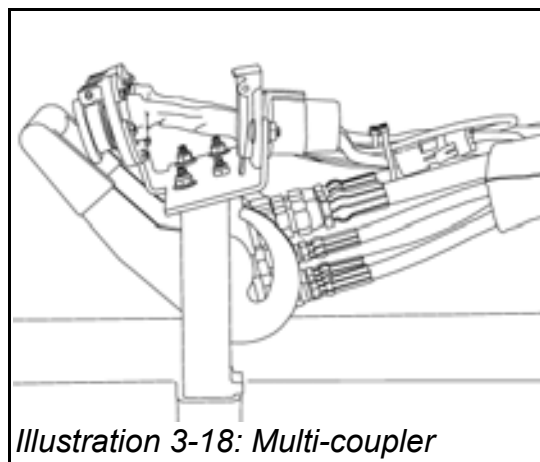


Illustration 3-18: Multi-coupler

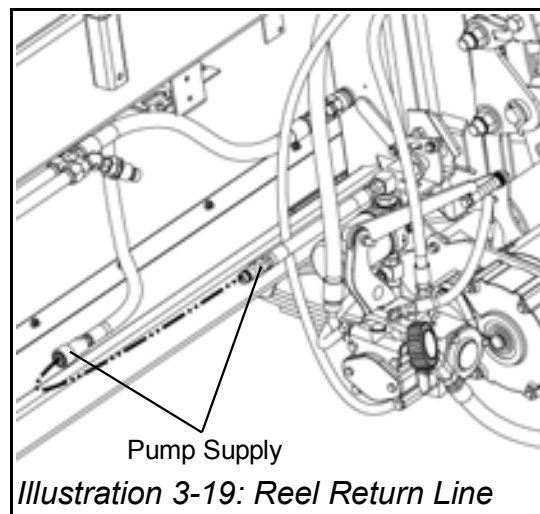
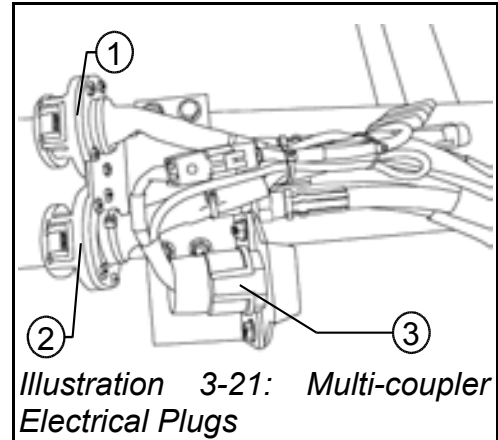


Illustration 3-19: Reel Return Line

Electrical Connections

Refer to *Illustration 3-18: Multi-coupler* as an example. Ensure that all electrical connections have been made. This includes two connections from the combine to the multi-link electrical bracket (1 & 2), and one from the subframe to the multi-link electrical bracket (3). When connecting these lines be sure to align the electrical plugs with their corresponding receptacles.



*Illustration 3-21: Multi-coupler
Electrical Plugs*

Interrupt Harness Connection.

Ensure that the interrupt harness, used for the automatic reel height control is properly installed. Please follow the instructions included with your Automatic Reel Height Control Supplement for the proper connections for your make of combine.



Before continuing, please ensure that you have completed all of the steps listed on the Mounting Checklist, located in the beginning of this manual.

Combine Start-up



Before proceeding, be sure you have been through the mounting check list to assure the header is securely mounted.



Keep bystanders, i.e. small children, away from the machine during startup.



If the unit is equipped with automatic reel-height control, the reel may move up or down at any time without operator input.

15. Remove the feeder house cylinder locks, start the combine and lower the header to the ground. Shut combine down and wait for all moving parts to stop before exiting cab.
16. With header in the lowered position (in contact with the ground), inspect the header for any damaged or loose parts. Repair or replace any such parts immediately.
17. Check oil level in the hydraulic reservoir of the combine. The oil level should be filled as per the combine operator's manual instructions.



The Header hydraulic reservoir is connected directly to the combines reservoir, therefore the header reservoir will always indicate full.

18. Insure that all protective shields are in place and secured properly.
19. Check that the tires are filled to recommended pressure. 50 psi (345 K Pa) for transport, and for field operation.
20. Check all hydraulic hoses and fittings to be sure they are tight and that no hose damage has occurred during mounting. If damage has occurred or if leaks are present, repair or replace the damaged parts before re-starting machine.
21. LUBRICATE THE HEADER - see instructions as outlined in the Lubrication chapter.
22. Restart the combine and engage parking brake. Raise reel to its full height (cylinders fully extended) and hold the switch on momentarily at the full height position then drop the reel to its lowest position (cylinders fully retracted). Complete the cycle at least twice to ensure that all air is worked out of the circuit and that the system is working properly.
23. Extend the Fore & Aft to its fully extended position and hold the switch on momentarily. Then return the fore & aft to its fully retracted position. Complete the cycle at least twice to ensure that all air is worked out of the circuit and the system is working properly.
24. Engage platform drive switch (see Combine Operator's Manual for instruction) with combine at an idle. The platform draper, knife, reel and finger auger should begin to turn.



CAUTION If oil leaks appear, shut the combine down and repair before restarting.

25. Increase idle speed. When the engine is at high idle RPM check and set the following:
 - a. Reel speed - See Combine Operator's Manual
 - b. Knife Speed. (set at 580 to 600 RPM)
12. If adjustments are required refer to Reel, or Knife sections of this manual.
13. With header lowered to approximately 2 inches (5 cm) from the ground, stop the combine, shut the engine down and check the following:
 - a. Header is level (end to end).
 - b. Header cutting angle.
 - c. Lift frame is centered between the pins.
 - d. Gauge wheel height.
 - e. Reel mount bolts.
 - f. Knife head section bolts and bearing block bolt.
 - g. Knife head bearing bolt.
 - h. Knife drive support/ crank bolts.
 - i. Connector bar bolts on knife back. *(applies to 45 ft headers only)
 - j. Knife drive mounting bolts.
 - k. Reel Fore & Aft is even from one end of header to the other.
15. Potential problems you may encounter during start-up and break-in period:
 - a. High Hydraulic Pressures:
 - Cold Oil
 - Sticky Draper
 - Sticky or Tight Knife
 - Draper Too Tight
 - b. Reel Will Not Raise:
 - Low Oil Volume from Combine
 - Defective Cylinders
 - Line Restriction
 - Quick Couplers Not Tight
 - Reel Height Control not in "Manual" mode.
 - c. Fore & Aft does not work
 - Selector switch is set for tilt, not Fore & aft
 - Low Oil Volume from Combine
 - Defective Cylinders
 - Line Restriction
 - Quick Couplers Not Tight
15. Raise and lower the header.



If the combine will not raise the header, see the Troubleshooting section of this manual on page 161.



Make certain no-one is standing near the machine while you are raising or lowering the header.

16. Move the combine to an open area away from people, other machinery, and buildings.
17. Engage the header drive with the engine at idle. The header knife and drapers should operate.
18. Activate the reel.
19. Slowly increase engine speed until normal operating RPM has been reached.
20. With the header raised, select header reverse (see header reversing section), and ensure all systems perform properly.
21. Select header forward, ensure all systems resume normal operation, and the clean-out door has closed.
22. Practice operating the complete unit until you are confident with all controls and the clearances required from your surroundings.

Clearing Obstructions - Reversing the Header

This feature allows the operator to clear built-up material from the center finger auger and draper area. This feature reduces the need to clear obstructions manually, which can be difficult, and dangerous.

While selected, this function will reverse the following components:

1. Finger auger,
2. Feeder deck,
3. Lateral Draper,
4. Knife,
5. Cross-auger (if equipped).

In addition, a clean-out door under the feeder deck will open.



The clean-out door under the feeder deck opens when header reverse is selected, and remains open until header forward is selected.
If this door contacts the ground while open, it will be damaged.

Always follow these important steps when reversing the header:

1. Raise the header, and gauge wheels at least two feet above ground.
2. Back away from the crop if desired.
3. Reverse the combine feeder house, this will automatically reverse the header and should clear away any built up material. (Refer to combine operator's manual for feeder house reversing procedure).
4. Select header forward, and ensure the clean-out door under the feeder deck has closed.
5. Resume normal operations.



Dismounting the Header from the Combine

It is very important to dismount the header properly from the combine for the following reasons:

- Safe storage.
- Ease of remounting.
- Readiness for transport.
- To avoid damage to the header and combine.



Park the combine on hard, level ground. Engage parking brake.

1. With the combine running, lower the reel completely. Raise the header to its fully raised position. Retract the reel until it is fully to the back of its travel, and fully retract the hydraulic tilt cylinders.



Engage parking brake on the combine, shut the engine down, and wait for all moving parts to stop before leaving the cab.

2. Engage feeder house cylinders locks with feeder house in raised position as described in your Combine Operator's Manual.
3. Disconnect the telescoping drive shaft from feeder house shaft. Secure the drive shaft in the storage bracket as shown in the example to the right.

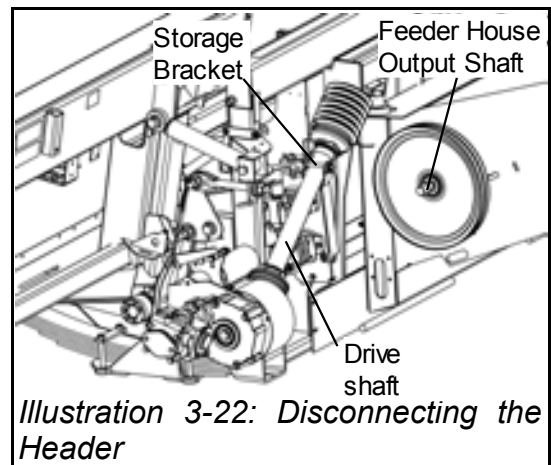


Illustration 3-22: Disconnecting the Header

4. Uncouple the multi link (hydraulic lines) connecting the header to the combine, and store it in the bracket provided on the combine.
5. Disconnect the combine return quick coupler from the upper left corner of the subframe.
6. Disconnect all electrical wires running from the combine to the draper table. Secure the combine hoses and electrical plugs.
7. Retract or remove all lock pins, hooks or bolts which secure the subframe to the feeder house of combine.



Illustration 3-23: Release the Locks

Convert Integral Axle to Transport Position

1. Remove hitch pins from gauge wheel spindles, and remove left and right gauge wheels from gauge wheel assemblies.
2. Remove hitch pin (3) from collapsed transport axle, allowing axle to drop to transport position.



For instructions on installing the storage axle, see the Removing the Storage Axle section, and reverse the procedures shown there. For the Transport Trailer option, see that operator's manual.

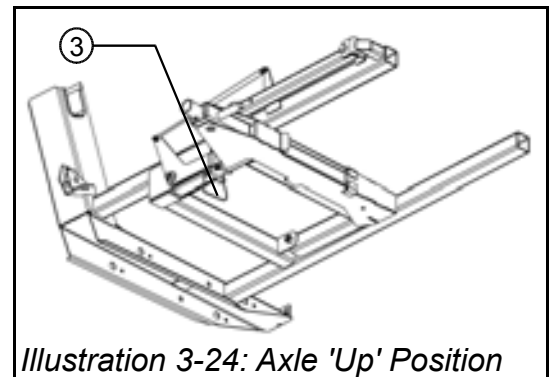


Illustration 3-24: Axle 'Up' Position

3. Insert Hitch Pin (3) as shown here to secure the axle in transport position. Ensure the pin is through the holes in both tubes.
4. Remove Hitch Pin (2) from the front axle tube, slide the inner axle out to the extended position, line up the holes, and reinsert pin (2).
5. Insert the gauge wheel spindles into the transport axle as shown. Line up the holes, and secure them with hitch pins (1 & 4.)

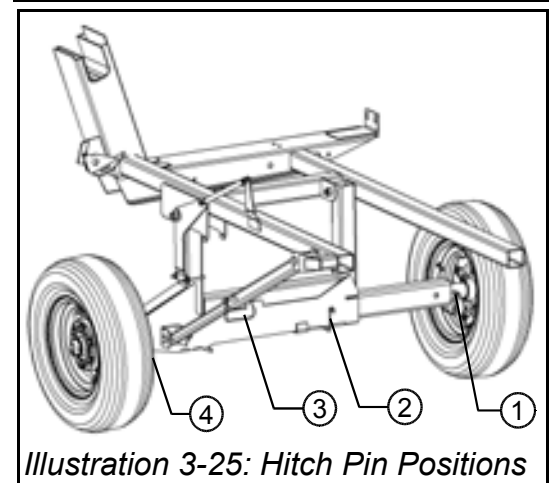
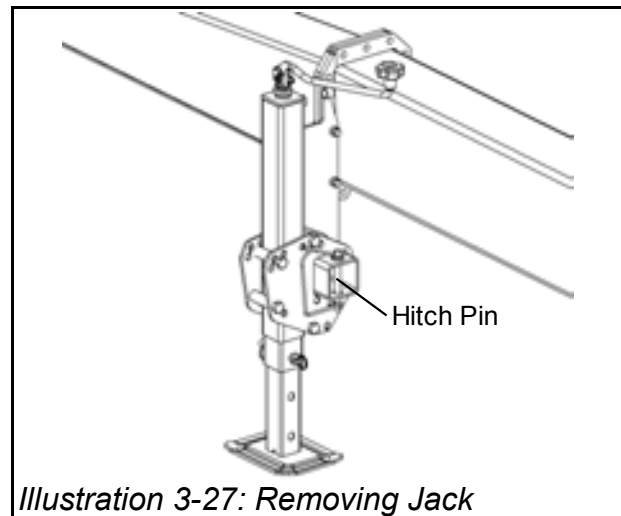
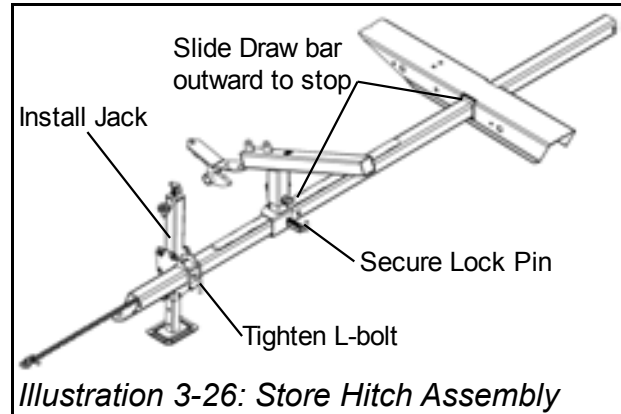


Illustration 3-25: Hitch Pin Positions

Convert Hitch Assembly for Transport

1. Extend the hitch tube assembly by disengaging the lock pin, and sliding the hitch tube out to its extended position.
2. Secure in this position by re-engaging the lock pin.
3. Remove the jack assembly from storage by loosening the L-bolt, removing the hitch pin and sliding the jack from the storage tube. (Jack is located at the rear left side of the header.) Replace the hitch pin into the storage tube.
4. Install jack assembly onto hitch tube, and secure in place by tightening L-Bolt and re-attaching safety chain.
5. Release the feeder house cylinder locks. Restart the combine. Lower the header until transport wheels make light contact with the ground. Turn combine off and dismount.
6. Remove safety pin from jack leg, and lower jack leg to the ground. Raise the hitch end of the table using the jack until the header is sitting level. Once level, re-insert safety pin into jack leg.



Be sure safety lock pin and safety clip are properly in place so the hitch jack is securely fastened to the hitch tube.

Separating the Header from the Combine

1. Restart the combine and lower the draper table until the full weight of the table is on the transport axle and hitch jack.



Engage parking brake on the combine, shut the engine down, and wait for all moving parts to stop before leaving the cab.

2. Check the position of the header to be sure that it is level, and that the hitch jack and transport axle tires are all making solid ground contact. Block the transport axle tires so that the header will not move once the combine has been removed.
3. Restart combine, and continue to lower the feeder house until it is separated from the adapter plate. Back combine slowly away from the header. Be sure that header does not move backwards with the combine. If it does, shut combine down completely. Recheck to be sure all connections have been removed. If they have not, repeat dismounting procedures.

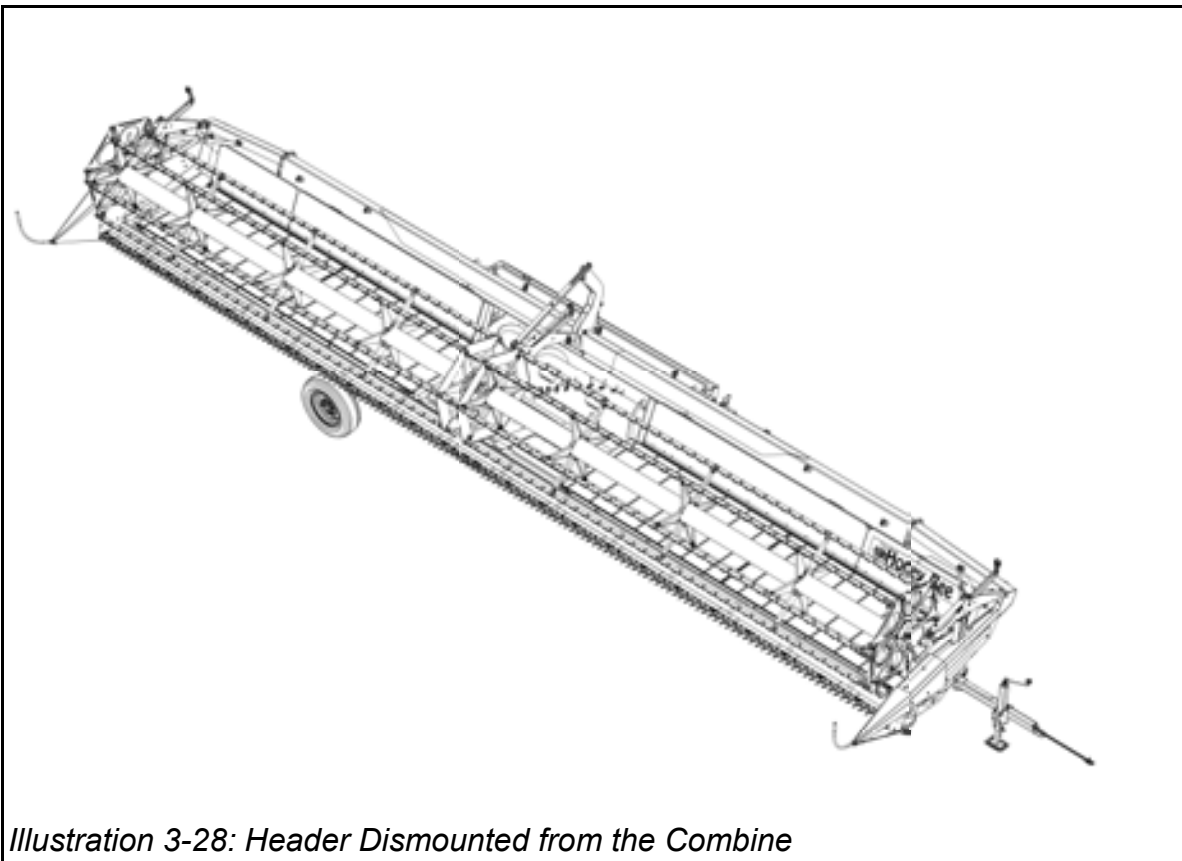


Illustration 3-28: Header Dismounted from the Combine



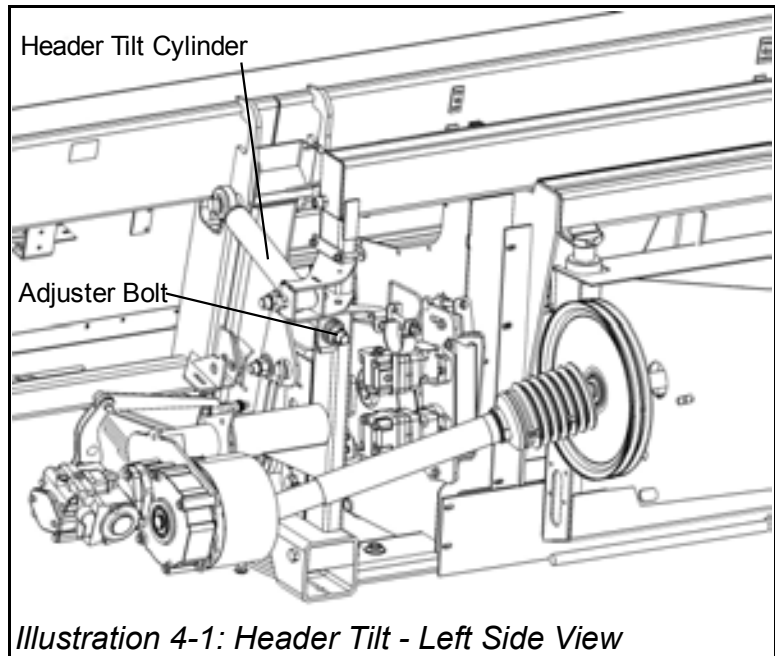
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4. Header Leveling

The sub-frame is attached to the table by the hydraulic header tilt cylinders and two horizontal leaf spring assemblies. The header tilt assembly adjusts the forward angle of the table. This adjustment affects the guard angle to the ground. Two adjuster bolts connect the horizontal leaf spring assemblies to the sub-frame, and adjust the leveling left to right and the spring height up and down. Turning the adjuster bolts will change the amount of clearance between the ground and the back of the subframe. The adjustment of these bolts determines how stiffly the table will be suspended, and affects the total range of tilt.

Forward Angle Adjustment

The forward angle of the cutter bar can be adjusted using the hydraulic header tilt, which is controlled from within the cab of the combine. Extending the hydraulic cylinders on the header tilt will increase the guard angle, while retracting the hydraulic cylinders will reduce the angle, causing it to “level out”. *(See Examples A, B, C and D on the following pages)



Leveling & Table Height Adjustment

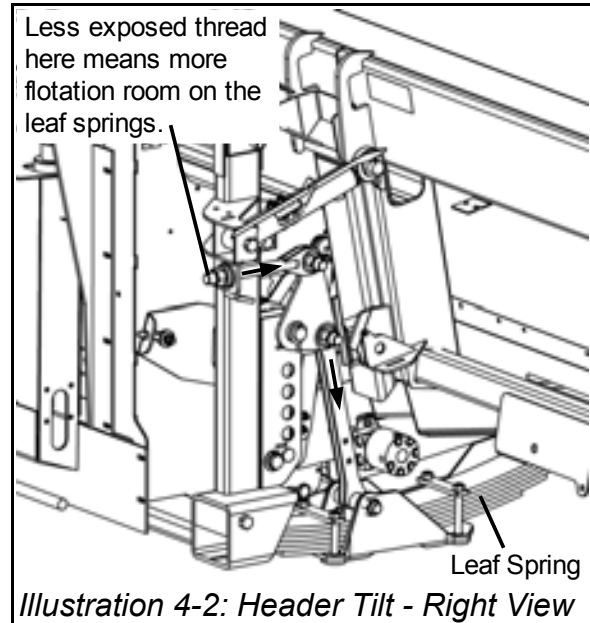
Reducing the amount of exposed threads at the back of the adjuster bolts will lower the table, Increasing the amount of exposed thread will raise table.

To level the table, adjust the amount of exposed thread depending on which side needs to be raised or lowered.



To turn the adjuster bolts, lower the table to the ground. This will take weight off the bolts making them easier to turn.

Refer to the photo on the right. Decreasing the number of threads exposed above the nut will increase header flotation, and improve the operation of the header height control system.



To lower the cutter bar relative to the sub-frame, extend both adjuster bolts. This adjustment will provide more clearance between the sub-frame and the ground; and will also provide more clearance between the feeder deck and the ground. This setting will bring the cutter bar closer to the ground. *(See Examples 4-3 through 4-6)



Avoid a condition where no threads are exposed behind the adjusting nut. In this case, the threads may disengage from the lift link, causing the table to drop suddenly.

In addition, care must be taken when lengthening the adjusting bolts, as this action will decrease the size of the opening leading to the finger auger. The finger auger is stationary in the sub-frame, and as the table lowers with the adjusting bolts, the hydraulic lines under the upper tube get closer to the fingers in the auger. To see that the fingers do not contact the hydraulic lines, disconnect the drive line, lift the finger auger and rotate the drum while checking the clearance.

The following side views of the Grain Belt Plus Header are presented to give a visual picture of what happens when adjustments are made to the leveling (adjuster) bolts and the hydraulic header tilt cylinders. In each of the side views, the sub-frame has been maintained at a constant distance from the ground. These examples depict the extremes in adjustment.

Example A

The adjuster bolts shortened (maximum amount of exposed thread at the back) causing the cutter bar to be lifted, and the header tilt cylinders shortened causing the table to be tipped back.

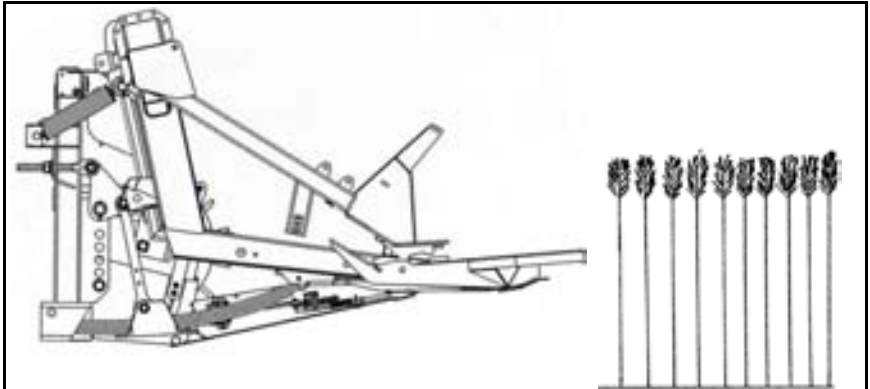


Illustration 4-3: Adjuster Bolts Shortened, Tilt Cylinders Retracted

Example B

The adjuster bolts shortened (maximum amount of exposed thread at the back) with the header tilt cylinders extended. Notice how the hydraulic tilt cylinders tilt the table forward.

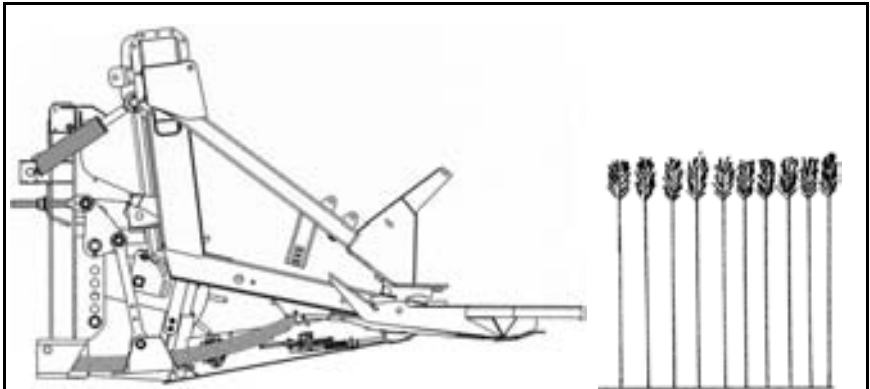


Illustration 4-4: Adjuster Bolts Shortened, Tilt Cylinders Extended



In both of these examples, if the feeder house is lowered to bring the cutter bar closer to the ground, the sub-frame and feeder deck may contact the ground first.

Example C

Shows the adjuster bolts extended (minimum amount of exposed thread at the back) with the header tilt cylinders shortened. The extension of the adjuster bolts allows the table to drop in relation to the sub-frame.

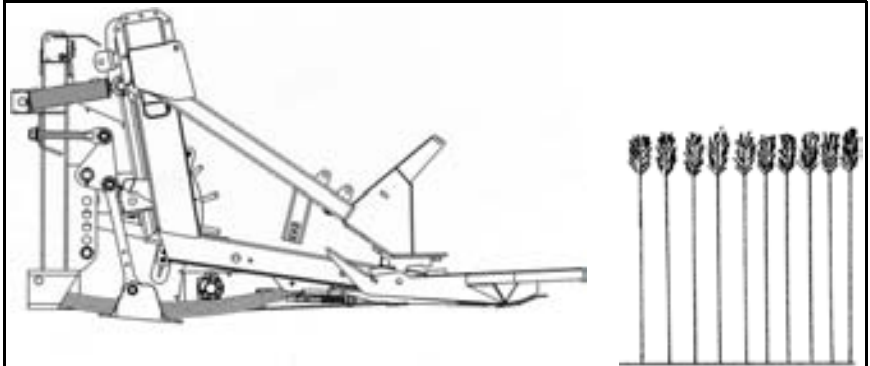


Illustration 4-5: Adjuster Bolts Shortened, Tilt Cylinders Retracted



This adjustment may cause interference between the finger drum and the upper square-tube beam. Before you operate the equipment under power, make certain adequate clearance exists between these points.

Example D

Shows the adjuster bolts extended (minimum amount of exposed thread at the back) with the header tilt cylinders also extended. The header tilt cylinders tilt the table forward bringing the cutter bar closer to the ground.

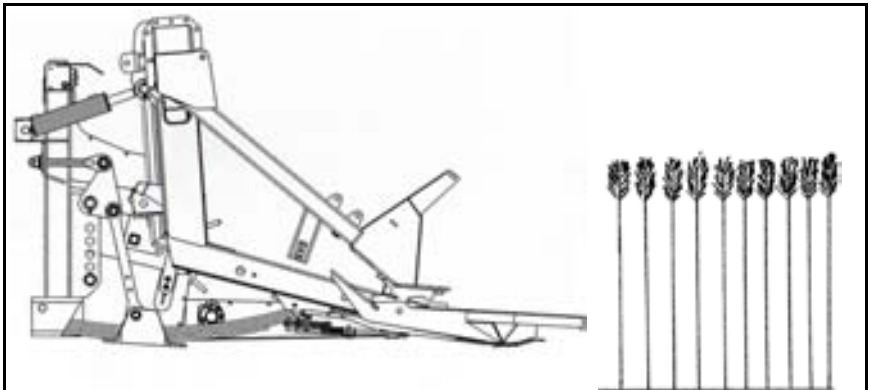


Illustration 4-6: Adjuster Bolts Shortened, Tilt Cylinders Retracted



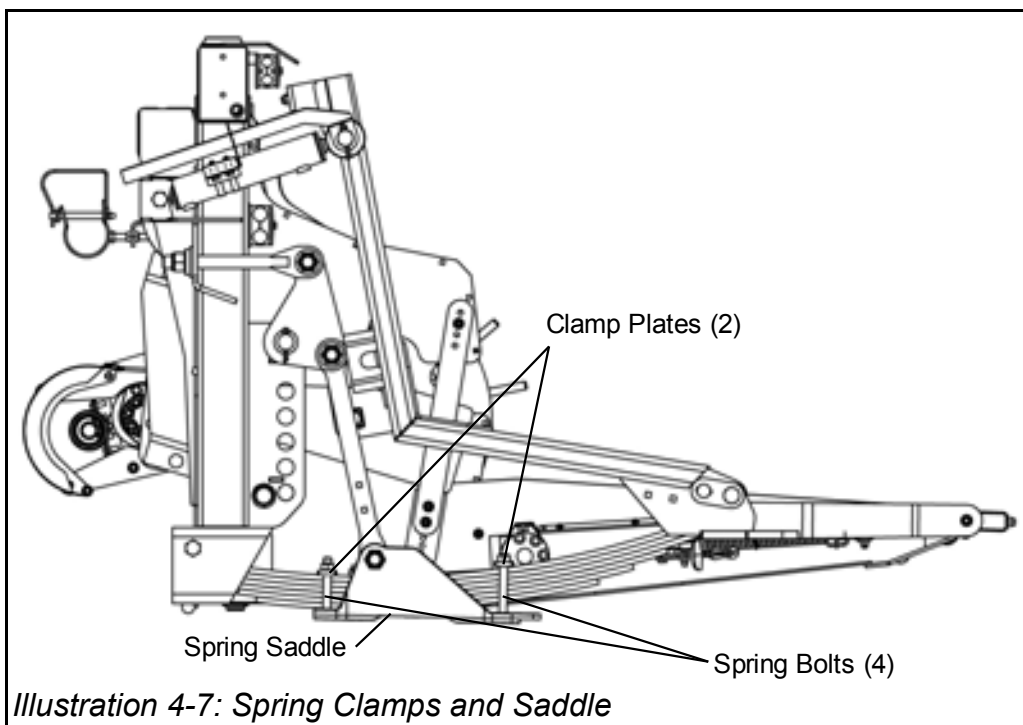
These examples show the extremes of adjustment. It is neither suggested nor recommended that you adjust your header to these limits. Experiment within the range of settings shown here to determine which will be best for your crop cutting conditions.



In rocky conditions, with a short crop you may want to keep the guard tips up. Try shortening the header tilt cylinders.

In bushy crops such as mustard, tilt the header forward using the header tilt cylinders to maximize the opening.

The stiffness of the header flotation can be adjusted by loosening or tightening the 4 bolts on the clamp plates of the spring saddles. When the header is lifted fully off the ground, the clamp plates will be loose. This condition is acceptable. Tighten clamp plates only if a stiffer flotation is desired.



Header flotation Restrainer Plate

The header flotation restrainer plates, pins, and arm allow the operator to adjust the amount, and the direction of header flotation.

Placing a pin through the restrainer plates so that the upper (1) side of the arm comes into contact with the pin will restrict the amount the header can float upward. A pin placed below side (3) will limit the degree of motion downward. Lastly, a pin placed through the center (2) of the arm will lock the header in that position.

To obtain maximum end-to-end flotation when in field position, the restrainer pins may be removed and placed into the storage hole provided at the lower rear area of the restrainer plate. To make adjustments to the flotation restrainer plates, proceed as follows:

With the header raised, feeder house cylinder locks on and combine shut down, locate the header flotation restrainer plates on the bottom left and the bottom right of the header adapter frame.

Remove the restrainer pin and place it in the desired hole on the restrainer plate. Repeat this procedure for the other side, placing the pin at the same height. Be sure to secure restrainer pins in place by replacing the washers and pin locks.

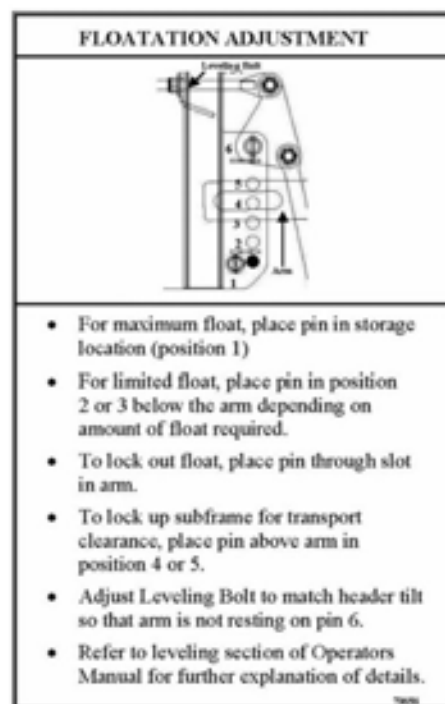
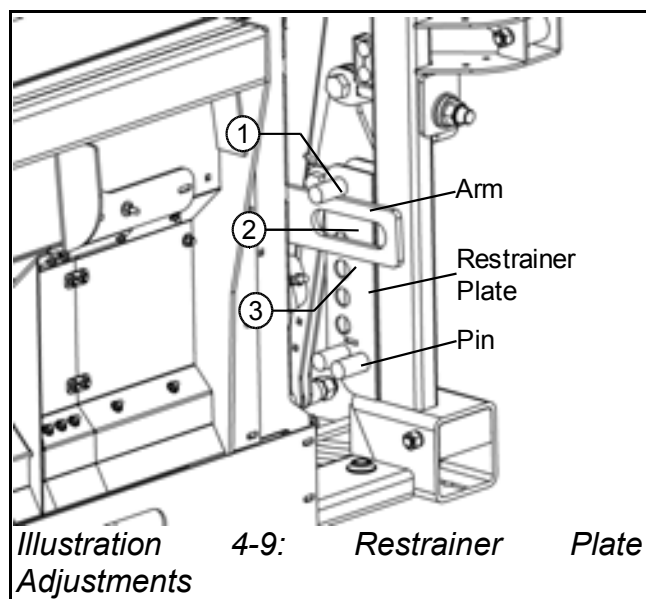


Illustration 4-8: Flotation Adjustment Decal

5. Hydraulics

This section describes the hydraulic system which drives the Grain Belt Plus Header. The hydraulic components, as well as the plumbing of the various hydraulic systems, are detailed in this section.

All Grain Belt Plus Headers are integrated into the combines hydraulic system, with specific components controlled using combine hydraulics. In the header drive hydraulic system, the output shaft of the gearbox drives the variable displacement piston pump. The charge pump, which is part of the displacement pump, draws oil from the combine reservoir through the reel drive return and supplies oil to the displacement pump. This oil is then pumped to the finger auger motor assembly, which evenly divides the oil flow between the left and right sides of the header.

On the left side circuit, the oil flows from the finger auger motor to the knife motor, then to the left draper motor and the left feeder deck motor before returning to the pump.

On the right side circuit, the oil flows from the finger auger motor to the knife motor, then to the right side draper motor and the right feeder deck motor, with a built-in loop flush system (for hot oil) and a check-valve system (for the feeder deck trap door cylinder), before returning to the pump.

The reel drive, reel lift, reel fore & aft and hydraulic header tilt systems are directly controlled with the combine hydraulics.

Excess oil from the loop flush, charge pump and case drain is returned to the combine reservoir through a dedicated return line which is hooked directly to the combine reservoir.



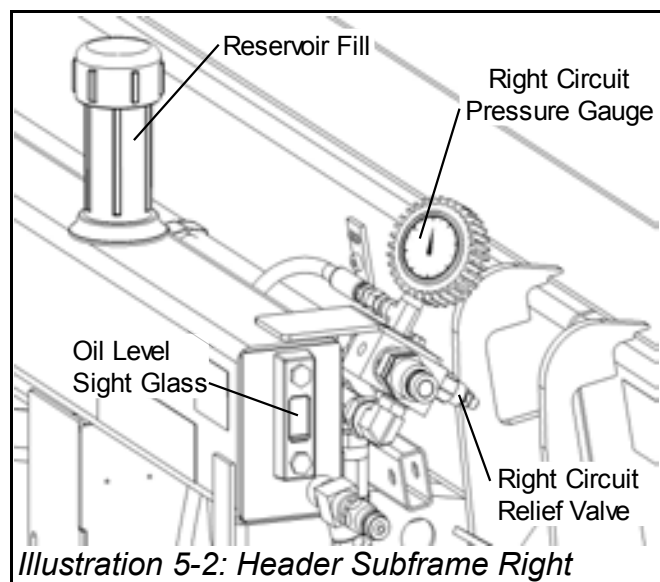
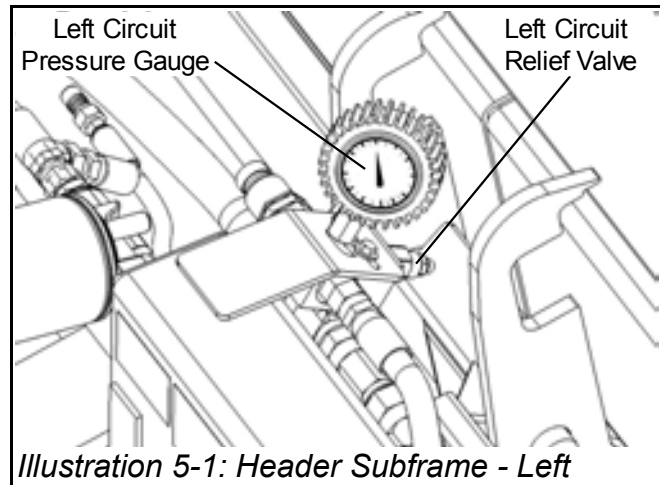
Please refer to the corresponding hydraulic schematics in this section for further routing details.

Pump Operating Pressure

The hydraulic pressures for the left and right sides of the self-contained hydraulic system are individually monitored with pressure gauges, located on the upper left and right corners of the hydraulic reservoir. While operating the combine at full engine rpm, the pressure gauges should indicate a pressure range between 1,000 and 1,500 psi at normal operating temperature.

New units will tend to have higher pressures than those that have completed their break-in period.

The pressures can also fluctuate during normal cutting operations, as crop conditions, the condition of the cutting system, draper speed and ground speed change. The relief valve is factory set at 2,800 psi. Upward adjustment of the relief pressure is **NOT RECOMMENDED** without consulting your dealer or factory representative.



For cold weather start up (Temperatures below 10 °C/ 50 °F): It is necessary to allow the oil to warm up prior to any cutting, especially in cold weather.

To warm the oil, engage header drive with the engine at idle. Allow the header some time to warm the oil before increasing the engine to normal operating rpm.

High Pressure Checks

The relief valves are factory set at 2,800 psi. When the pressure in the hydraulic system exceeds 2,800 psi, oil is passed through the relief and routed back to the hydraulic reservoir. As this happens, the oil passing through the relief will generate heat and cause an audible “squeal”. If you observe high pressure on the pressure gauges or hear the relief valve, check the following:



Never attempt to inspect or adjust any part of the header with the combine running. Shut the combine down, and ensure that all moving parts have come to a stop before attempting to inspect or adjust moving parts.



Before checking around the machine ensure that the reel is fully lowered and that the table is properly supported to prevent sudden drops.

Knife Drive & Cutting System

- Check for material gumming or binding on the knife. Clean as required.
- Check for broken and dull sickle sections. Replace as required.
- Check for bent or broken guards. Replace as required.

Inspect Knife Head Bearings

Unbolt knife head block and pull knife back at least 12" (300 mm). *(Refer to Knife Section in this manual for procedures.) Turn knife head block and bearing by hand, if bearing is rough or noisy, replace bearing. Repeat procedure for other side of header.



Handle the knife head with caution, the bearing may be hot!

Inspect Bearings and Gears

Leaving the knife pulled out, insert a bar into the knife drive fly wheel and turn flywheel. Feel for roughness or binding in bearings or gears. Remove bar! Start the combine and engage the header drive. Check knife drive pressure. Normally it takes 100 psi to 150 psi to drive the knife motor with the knife disconnected. If pressure has dropped significantly, the problem is likely in the knife. If pressure is still high the problem may be in the knife drive, the knife drive motor, draper motor circuit or the hydraulic lines.

Draper Drive and Drapers

- Ensure the draper tension is not excessive. Material wrapping onto the rollers will cause increased draper tension. Adjust, or clean the rollers as required.
- Check pressure with tension on draper released.
- Check bearings in drive rollers and idler rollers. Replace as required.
- Check for faulty draper motor. Replace as required.

If a Faulty Draper Motor is Suspected

- Let the system cool down.
- Start up and run draper at full speed. Record the pressure on the pressure gauge.
- Check if any motors seem to be running slower.
- Check temperature of each motor to see if one motor is hotter than the others.
- SHUT COMBINE DOWN.
- Grab the drive roller of a deck with both hands and rock the roller back and forth. If motor is hard to turn, disconnect hoses and install a fitting to bypass the motor.
- Record the difference in pressure, and draper speed of the other decks. If the difference is significant, replace the motor.

Other Possible Causes for Excessive Pressure

Check the header's hydraulic system for hydraulic lines or hoses that have been pinched or kinked. Replace any damaged hydraulic lines or hoses. Do not attempt to repair or replace leaking hydraulic lines or hoses without proper safety equipment and clothing, as high pressure fluid leaks can puncture the skin causing injury or death.

Ensure the combine return line is properly connected.

Above normal pressure may also result if the pump is not adjusted to the shaft RPM. Check that the knife is in the proper RPM range.



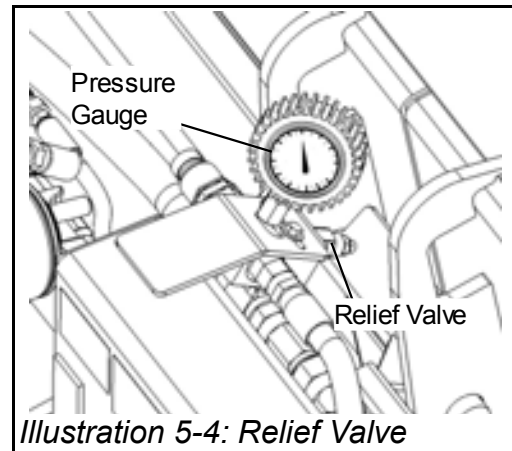
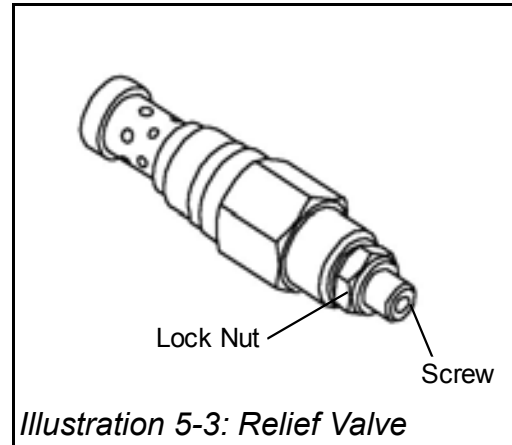
In certain harvesting conditions (such as a tough or heavy crop), the operating pressure of the header will be higher than usual. In cases such as this, it may be necessary to reduce the ground speed of the combine (in order to reduce the demand for overall operating pressure of the header). An alternate procedure would be to increase the pressure setting of the relief valves. Do not adjust the relief valves to pressures above 3,000 psi.

Adjusting the Relief Valve

In certain harvesting conditions, it may be necessary to adjust the relief valves in order to increase the output and allow for efficient harvesting of the crop. If you are harvesting in tough or heavy crop conditions, and an audible squeal can be heard coming from the relief valve, this may be the case.

The relief valves are factory set at 2,800 psi, and can be adjusted up to a maximum of 3,000 psi. To increase the pressure setting of the relief valve, proceed as directed on the following page.

1. Loosen the lock nut on the relief valve.
2. Insert an Allen wrench into the screw on the top of the relief cartridge, and gently turn clockwise. (One full revolution of the screw will give an increase of approximately 500 psi, so turn no more than 2/5 of a full revolution.)
3. With Allen wrench still inserted, hold the screw in place and re tighten the lock nut. Repeat the above procedures for the other relief valve. *To reduce the pressure later, repeat above procedures with a counter-clockwise motion on the screw.



The relief valve screw has safety stop rings installed on its threads to prevent the valve from being over-adjusted.

It is important to not force the screw past its stop points, turn the Allen wrench using only your fingers; paying special attention to any resistance you encounter.



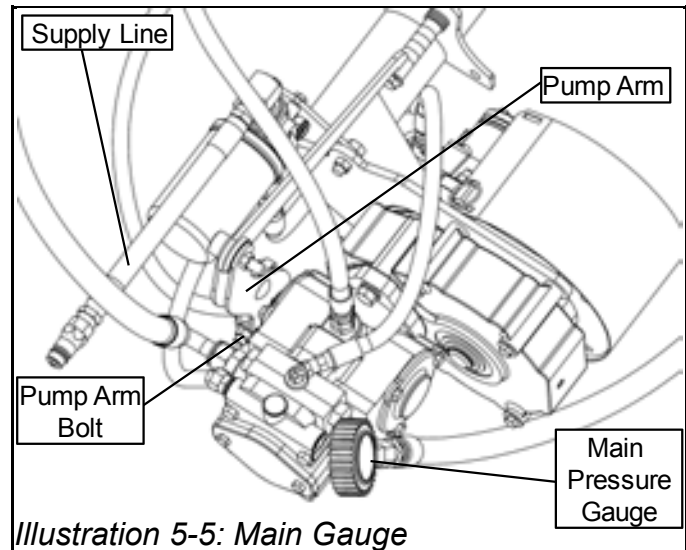
If you wish to verify the pressure setting for the relief valves, disconnect the 3/4" quick couplers. This creates a dead-end for the oil flow. When the knife drive encounters this resistance, pressure will build in the hydraulic circuit, activating the relief valve. The pressure shown on the pressure gauge will indicate the setting of the relief valve.

Low Pressure Checks

If the pressure at the main pressure gauge is low or is fluctuating, shut the combine down, and check the level of oil in the combines hydraulic tank. The oil level should be at the top of the sight glass as per the combine operator's manual. Also make sure that the pump supply line is connected.

If the knife stalls while cutting, check for:

- Is the oil level low?
- Is the relief valve leaking?
- Is the pump worn out?
- Is the pump arm loose?



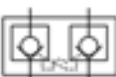










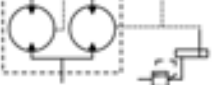
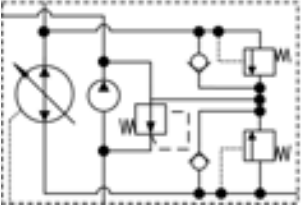


Ensure that the pump arm bolt is torqued to 70 ft. lbs. (95 N-m).

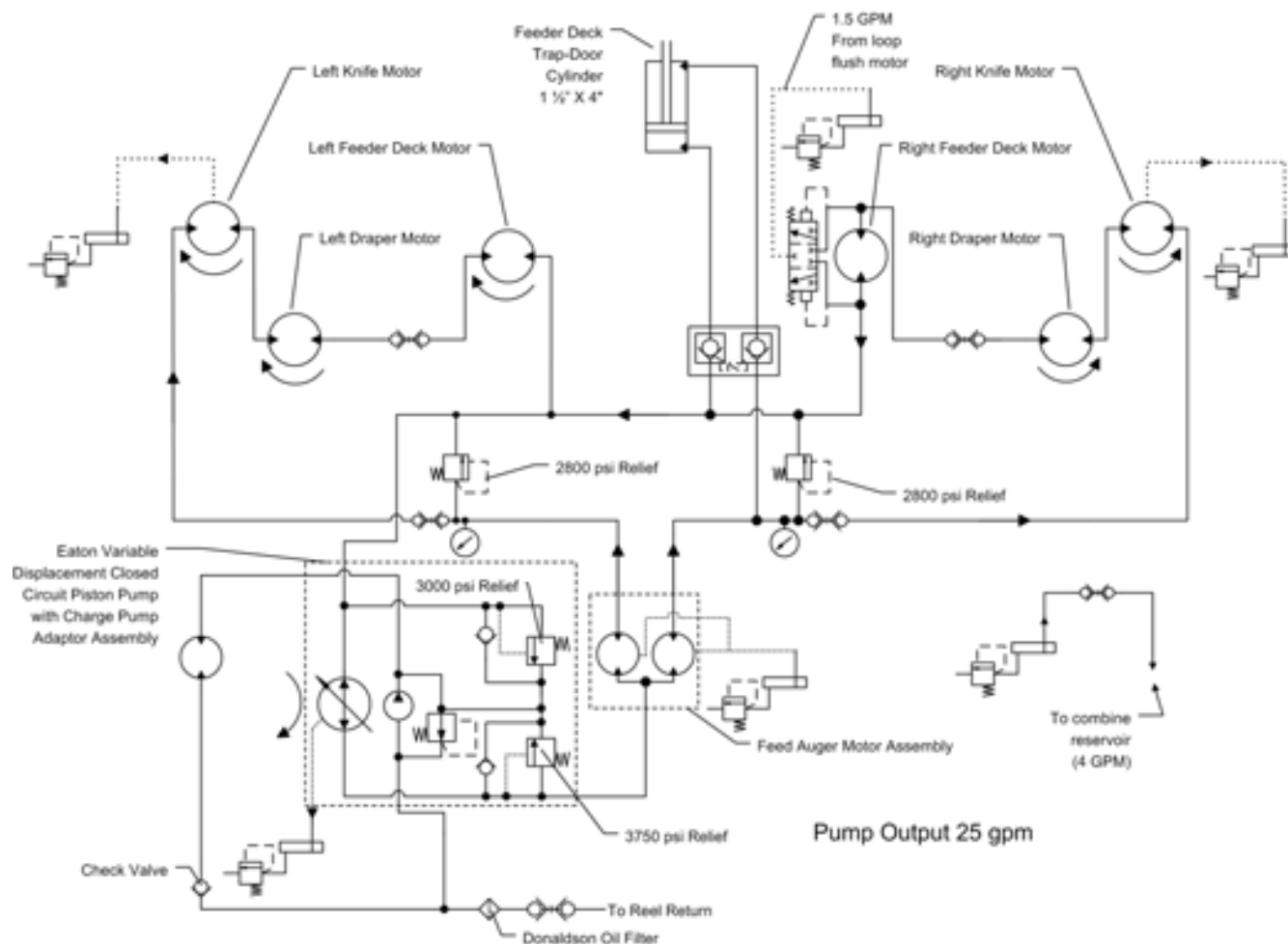
If low oil level is not the cause of low oil pressure, it will be necessary to install a flow meter to determine the cause. Contact your dealer for assistance.

6. Hydraulic Schematics

Hydraulic Schematic Symbols – Main Table Hydraulic Circuit

	Hydraulic motor – fixed displacement, reversible.
	Double – acting hydraulic cylinder (1 ½" x 4").
	Double "pilot – to open" check valve assembly.
	Oil Filter (pressure or return; 10 micron, 24" NPT, 25 GPM).
	Oil Filter (Donaldson – 10 HMK).
	Hydraulic reservoir.
	Pressure relief valve.
	Pressure gauge (0 – 4,000 PSI).
	Flat – faced hydraulic couplers.
	Primary oil flow direction.
	Case drain/ bypass flow.
	Junction/ Intersection.
	Primary motor rotation.
	Feed auger motor assembly (White RE500 with internal flow divider - 195 RPM).
	Eaton variable pump assembly with 4,000 psi forward relief, 3,000 psi reverse relief and charge pump adaptor (24 GPM nom. setting, maximum 25.1 GPM @ 520 RPM).

Main Table Hydraulic Circuit – Grain Belt Plus Header



Hydraulic Schematic Symbols – Reel Lift; Reel Drive



Hydraulic motor – fixed displacement, reversible.

***Note:** All motors are reversible, but in instances where motor rotation is indicated with a single arrow - head, they are intended to run in one direction only due to uni-directional oil flow.



Hydraulic coupler



Double - acting hydraulic cylinder assembly



Primary motor rotation



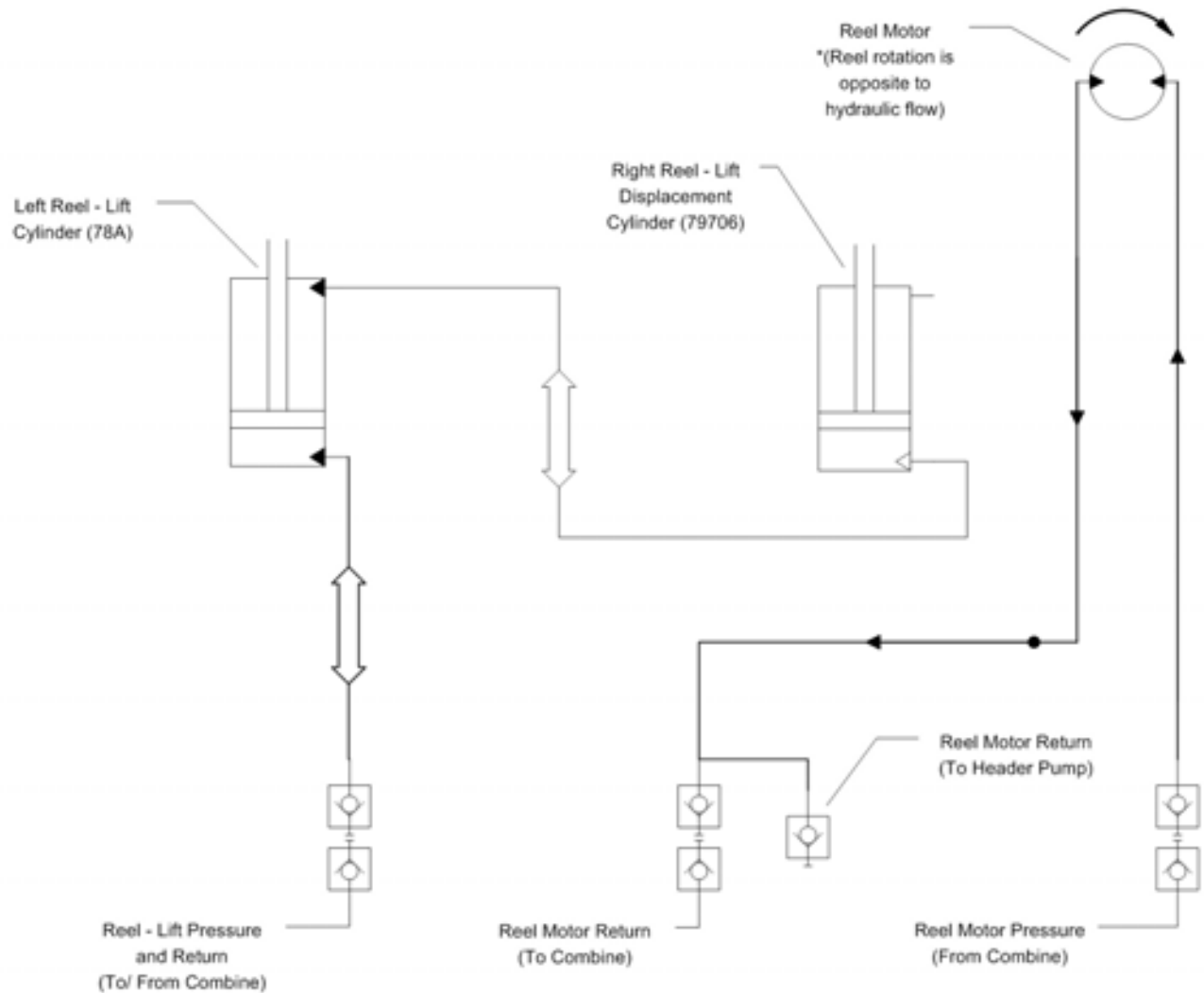
Oil flow (bi - directional)

*used in schematic diagrams where uni-directional oil flow is also present.

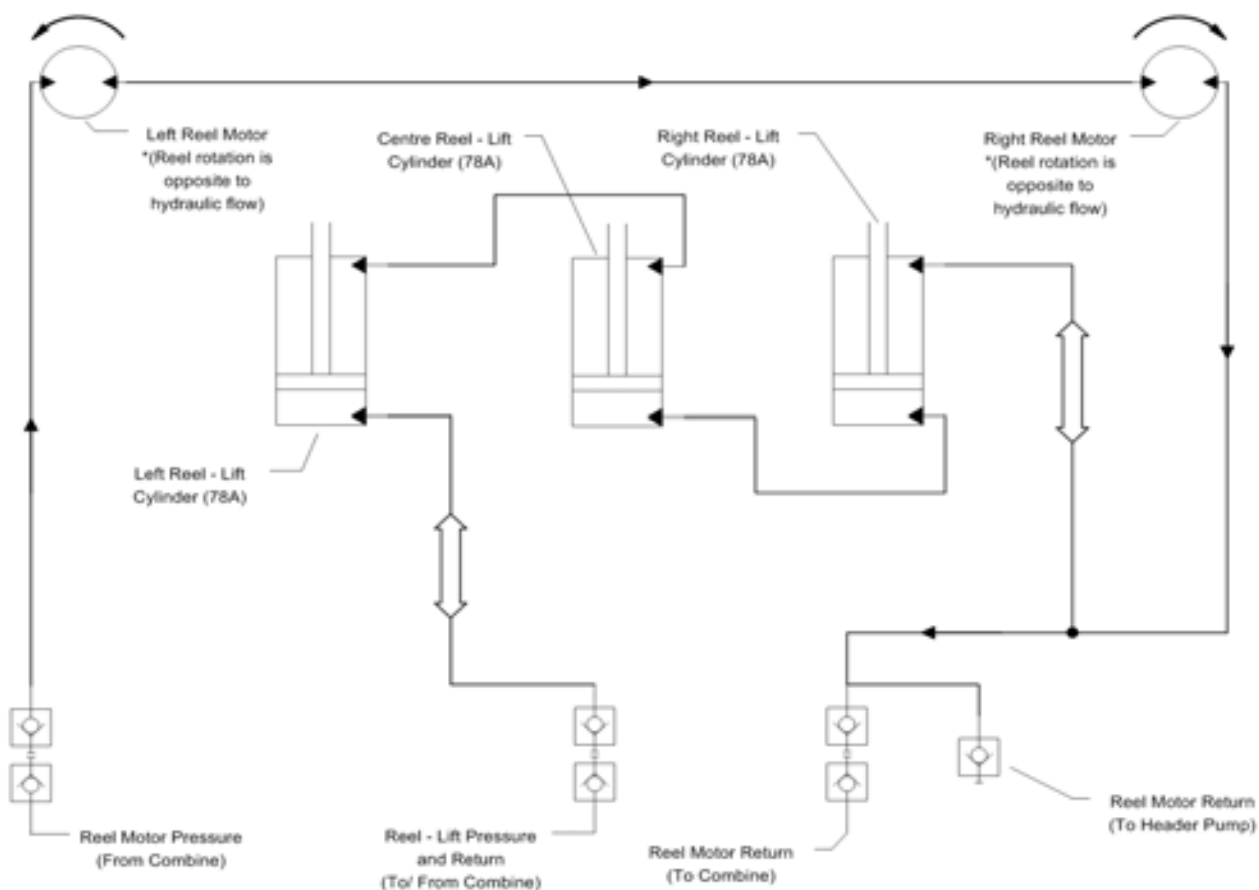


Oil flow (uni - directional)

Solid – Reel Lift Circuit with Single Reel Drive (30 and 36 ft Headers)



Split – Reel Lift Circuit with Double Reel Drive (42 and 45 ft Headers)



Hydraulic Schematic Symbols – Reel Fore/Aft; Hydraulic Header Tilt



3 - way, 2 - position, direct - acting, solenoid - operated directional poppet valve



Hydraulic coupler



Double - acting hydraulic cylinder assembly



Oil flow (bi - directional)

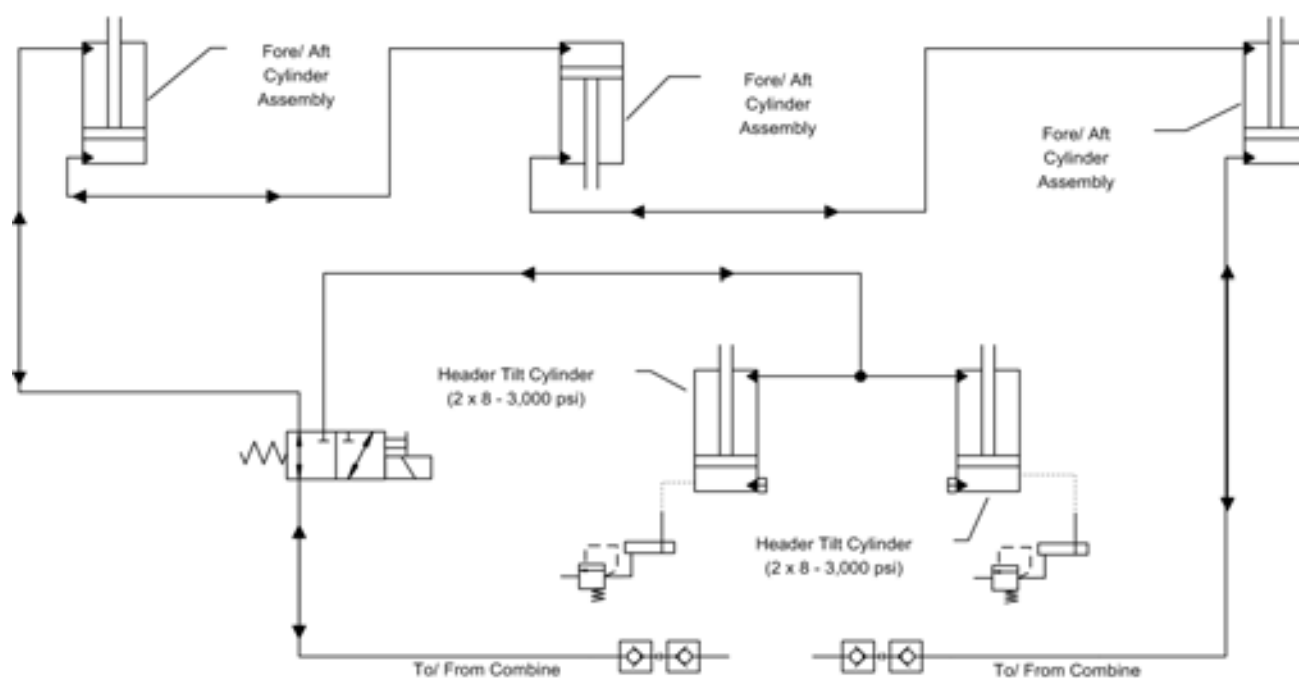


Junction

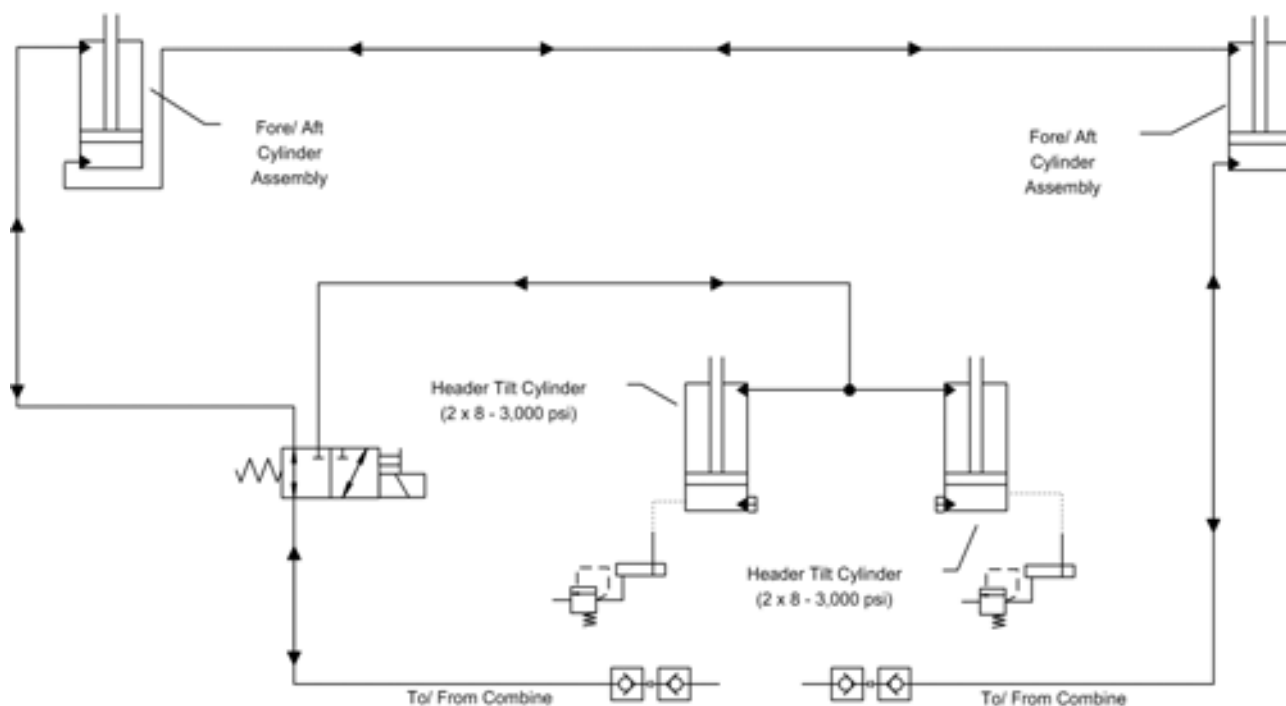


Breather - cap

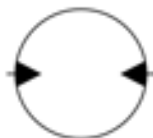
Hydraulic Fore & Aft with Hydraulic Header Tilt Assembly (Split Reel)



Hydraulic Fore & Aft with Hydraulic Header Tilt Assembly (Solid Reel)



Hydraulic Schematic Symbols – Cross Auger



Hydraulic motor – fixed displacement, reversible.

***Note:** All our motors are reversible, but in instances where motor rotation is indicated with a single arrow - head, they are intended to run in one direction only due to uni-directional oil flow.



Needle valve.

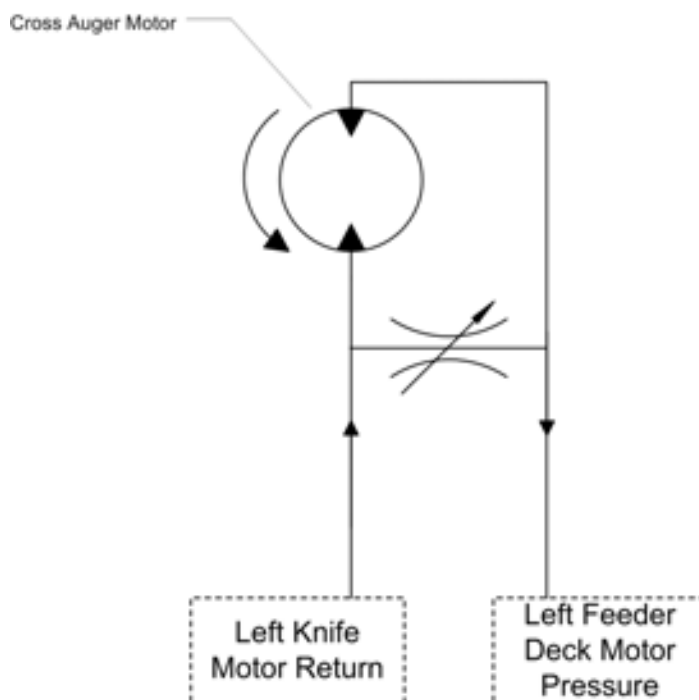


Primary motor rotation



Oil flow (uni - directional)

Grain Belt Plus – Cross Auger



7. Sub-Frame Removal

In some cases, removal of the sub-frame may be required for access to certain components. Some operators also find the combine is better balanced during transport with the sub-frame on the combine. This chapter details mounting and dismounting the sub-frame from the header.

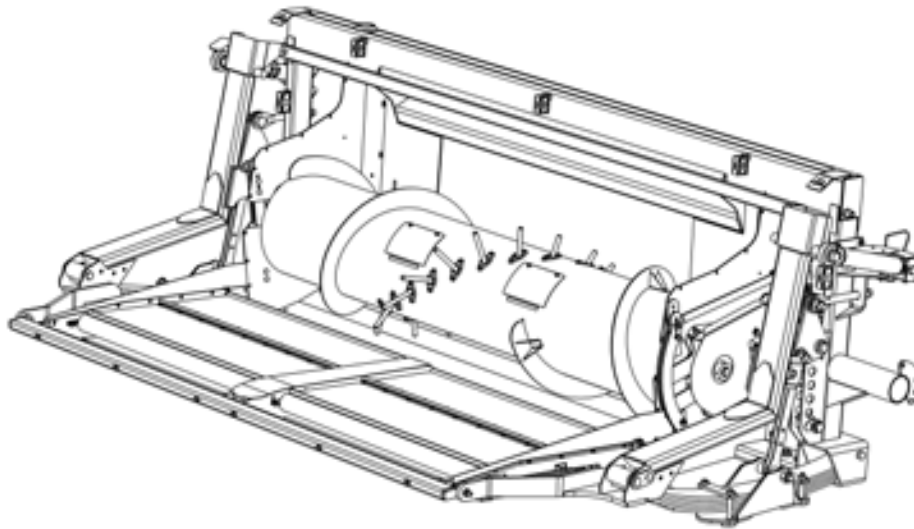


Illustration 7-1: Sub Frame

Removal of the Header Sub-frame

1. Ensure the header and combine are parked on hard, level ground; with the header in transport configuration, properly leveled, and supported by the transport axle and hitch (refer to Dismounting section of OPERATION chapter in this manual), or properly mounted and secured on the transport trailer (*refer to the Header Storage Trailer Manual).
2. With the combine shut down, the emergency brake engaged and the feeder house securely attached to the sub-frame, disconnect all electrical and hydraulic connections from the combine to the header. (refer to “Hydraulic Hoses” and “Electrical Connections” sections in the OPERATION chapter in this manual)



If your combine hydraulics hook to the header through a Multi-Link hydraulic coupling, be sure to place the header's Multi-Link bracket into its storage bracket on the header frame, as shown on the following page.

3. Disconnect left side pressure and return lines between sub-frame and header.
4. To ensure that disconnected lines are out of the way and couplings are kept clean, connect the pressure line on the header to the steel return line (both ends should now be attached in a loop to the header frame,) and likewise connect the return line in a loop on the sub-frame into the pressure port on the sub-frame.
5. Set the Multi-link into the bracket as shown here.
6. The pressure and return line couplers are equipped with a sleeve - locking mechanism. When disconnecting the hydraulic couplers, be sure that the ball and notch on the sleeve of the female coupler are aligned. (See photo to the right.) This will allow the sleeve to be compressed, and the coupling to be disconnected.



Illustration 7-2: Hydraulic Disconnects



Illustration 7-3: Hydraulic Lines - Storage

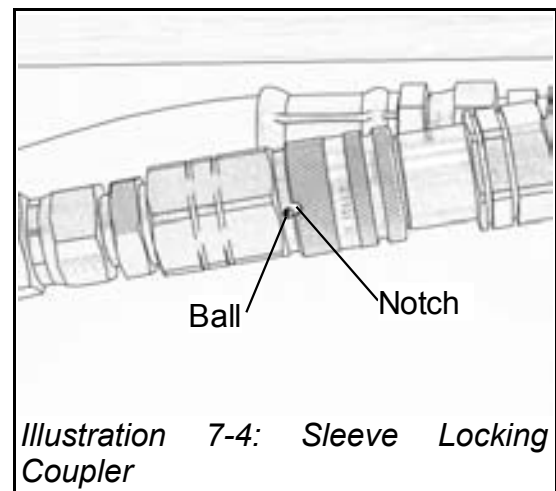


Illustration 7-4: Sleeve Locking Coupler

7. Locate the left side header tilt cylinder control valve, and turn to “off” position (turn lever to the left). Disconnect the pressure line for header tilt cylinder.

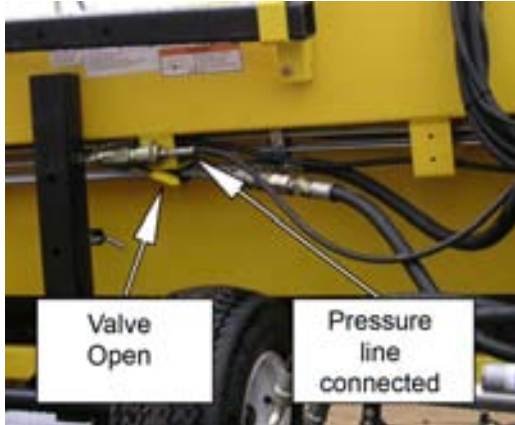


Illustration 7-5: Header Tilt Valve - Open



Illustration 7-6: Header Tilt Valve - Closed

8. Disconnect the reel return to header pump supply line

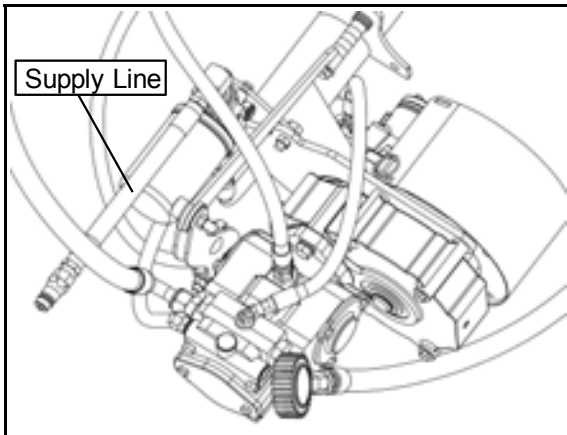


Illustration 7-7: Hydraulic Disconnects

9. Disconnect right side pressure and return lines between sub-frame and header. Disconnect the pressure line from the reservoir.
10. In the same manner as on the left side, connect the pressure line on the header to the steel return line on the header, and connect the return line on the sub-frame into the pressure port on the sub-frame. Also, connect the drain line to the mounted coupler on the back of the header.



Illustration 7-8: Hydraulic Line Storage

11. Locate the sub-frame to header lock pin on the right side of the sub-frame. (See photos to the right, and below.) Lift the retaining latch (1), and pull the locking lever back (2). Disengage the pin by sliding it to the right (3). (See the photo below.) Repeat the same process for the lock pin on the left side of the sub-frame, lifting the latch, pulling the locking lever back and sliding the pin to the left.

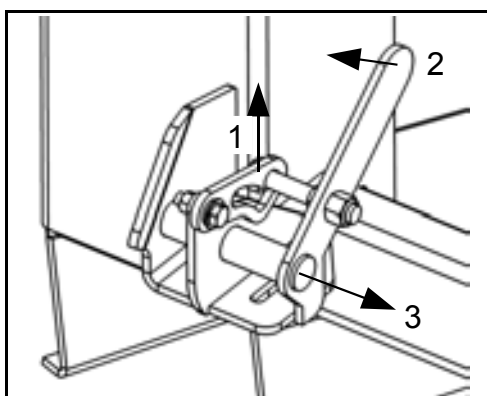


Illustration 7-10: Lock Close Up

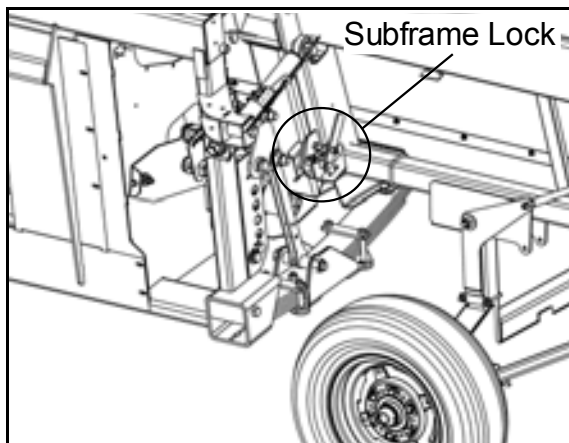


Illustration 7-9: Sub Frame Lock

12. Start the combine, and slowly lower the feeder house, only enough for the header tilt cylinder pins to clear the bottom of their mounting plates. (If lowered too much, the sub-frame assembly may make contact with the transport tire or other components when backing up.)
13. When adequately lowered, slowly back up the combine removing the sub-frame from the header.

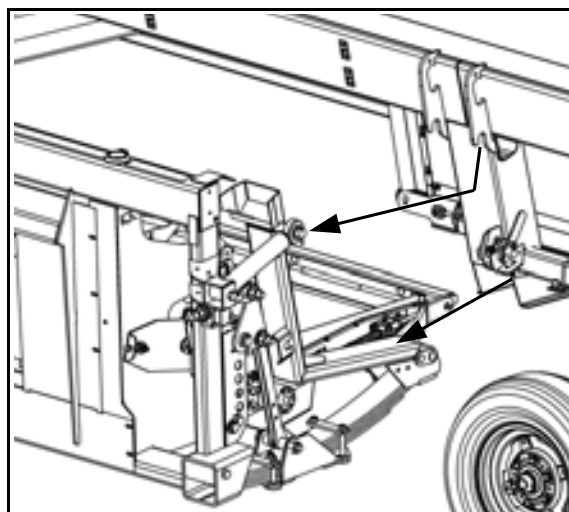


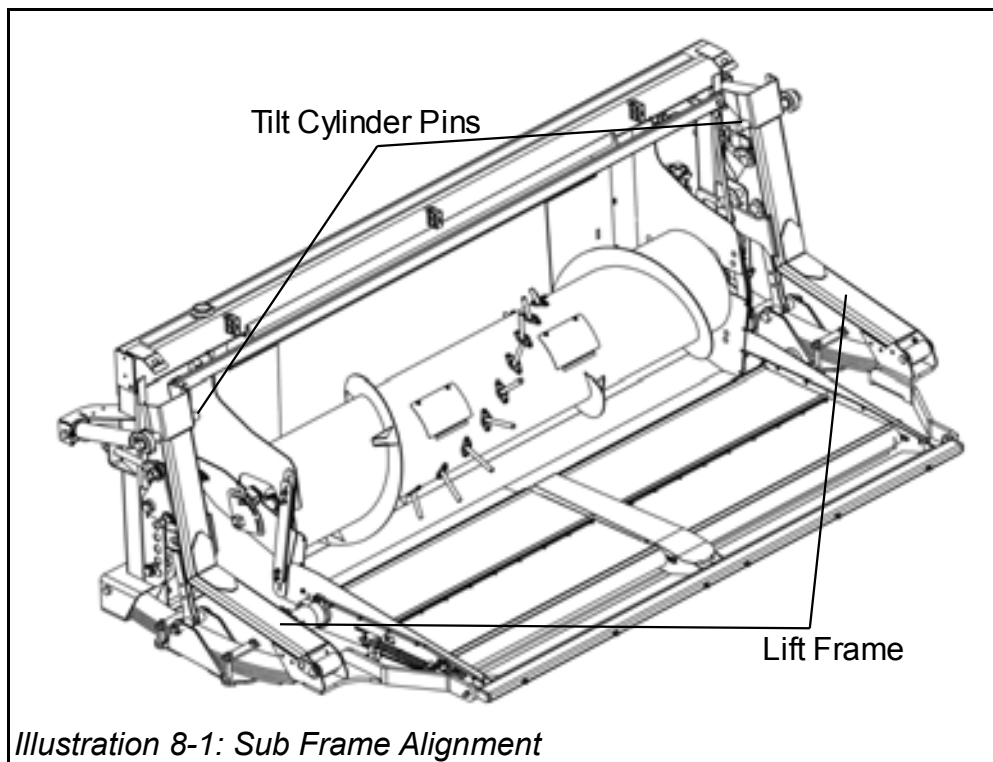
Illustration 7-11: Removing Sub Frame

8. Remounting the Sub-frame to the Header

1. Ensure that the header is parked on hard, level ground, with the header in transport configuration and properly leveled using the transport axle and hitch (if necessary, refer to Dismounting section of the OPERATION chapter in this manual), or on the header storage trailer.
2. Start the combine, and slowly drive toward the header. As you approach, center the sub-frame assembly vertically and horizontally with the center opening in the header frame. Align the right and left lift frames with the corresponding header struts; and the right and left header tilt cylinder pins slightly below the lower lips of the mounting plates. (See the photo below.)



It is important to accomplish this alignment prior to inserting the sub-frame assembly in the center opening, otherwise, the sub-frame can make contact with the transport tire and other components.



3. Move forward slowly, paying special attention to the alignments mentioned on the previous page. Ensure that the tilt cylinder pins will barely clear the bottoms of the mounting plate notches. If the sub-frame is too much lower than this, you may encounter interference between the guide plate sides and the mounting plate notches.

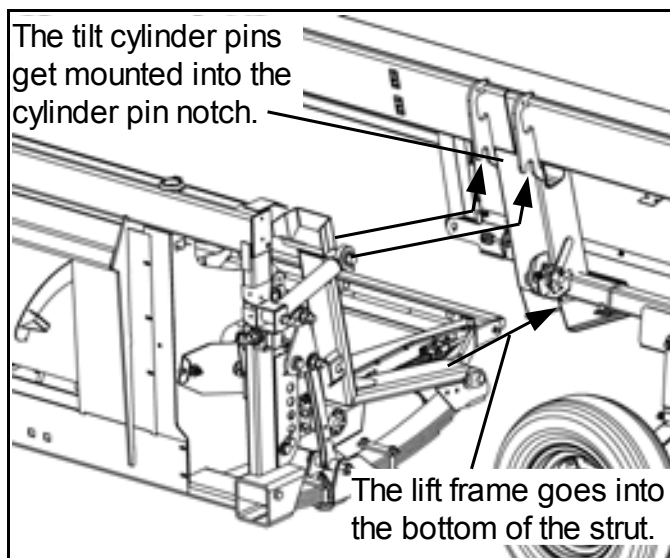


Illustration 8-2: Guide Plate Alignment

4. When the tilt cylinder pins are directly below the mounting plate notches and the lift arms are fully inserted into the frame struts, slowly raise the sub-frame until the tilt cylinder pins are fully seated in the mounting plate notches.

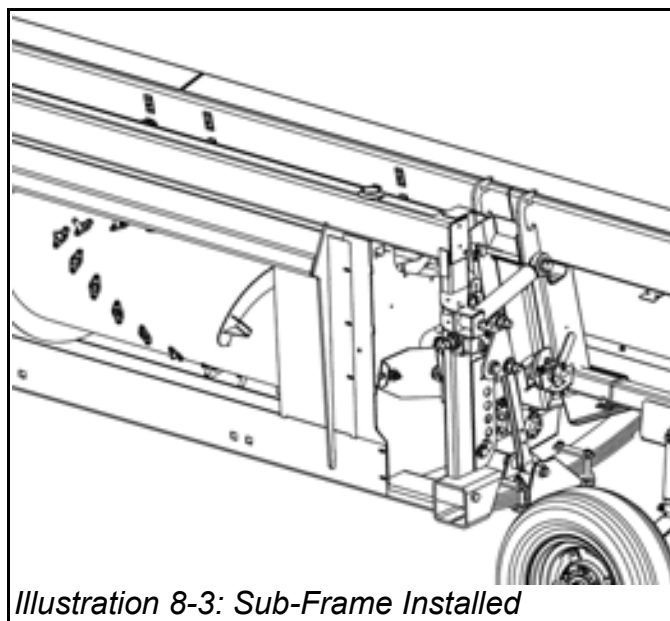


Illustration 8-3: Sub-Frame Installed



Shut combine down, engage the emergency brake, and wait for all moving parts to stop before leaving cab.

5. Locate the left sub-frame to header lock pin, and insert it fully into the sub-frame (1). Push the locking lever forward (2). Ensure that bottom leg of lever is inserted into slot on bottom (3), and that the retaining latch has dropped into place (4). Repeat this process for the right side retaining latch. (See photo at right for the right-hand side.)
6. Align the ball and notch on the sleeve of the female coupler. This will allow the sleeve to be compressed, and the coupling to be connected.

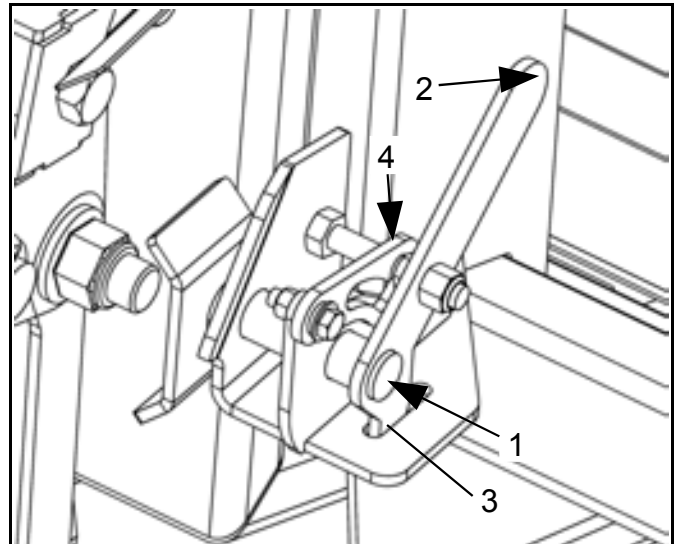


Illustration 8-4: Sub-Frame to Header Lock - Right Side

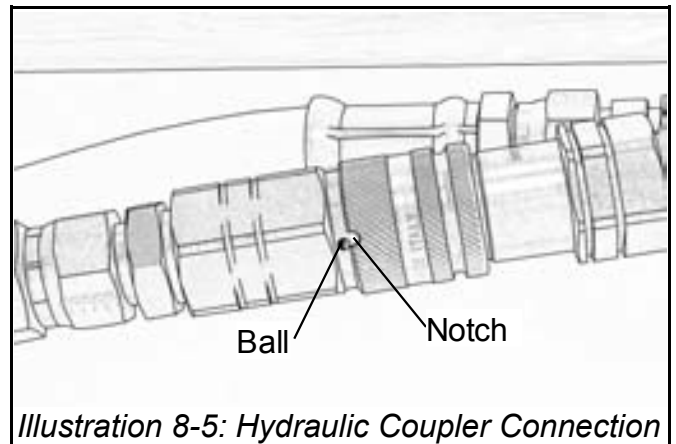


Illustration 8-5: Hydraulic Coupler Connection



When connecting couplers with sleeve-locking mechanisms, it is important to turn the sleeve until the ball and notch are off-set. This locks the latching mechanism, preventing the coupling from accidentally separating.

7. With lift frames, header tilt cylinders, and lock pins secured in place, hook up the right side hydraulic lines. First disconnect right side pressure, return and drain lines, from their storage locations, then reconnect these lines to their corresponding locations indicated in the photo to the right.



Illustration 8-6: Connecting Right Side Hydraulics

8. Repeat this process for the left side of the header and sub-frame. Disconnect the pressure and return lines from their storage locations, and reconnecting them to the pressure coupler (A), and the return coupler (B) as shown here.

9. Connect the reel return to header pump supply line (C)

10. Place the Multi-link coupler (D) in its bracket on the subframe, connect to the combine, and move the handle down into the fully locked position.

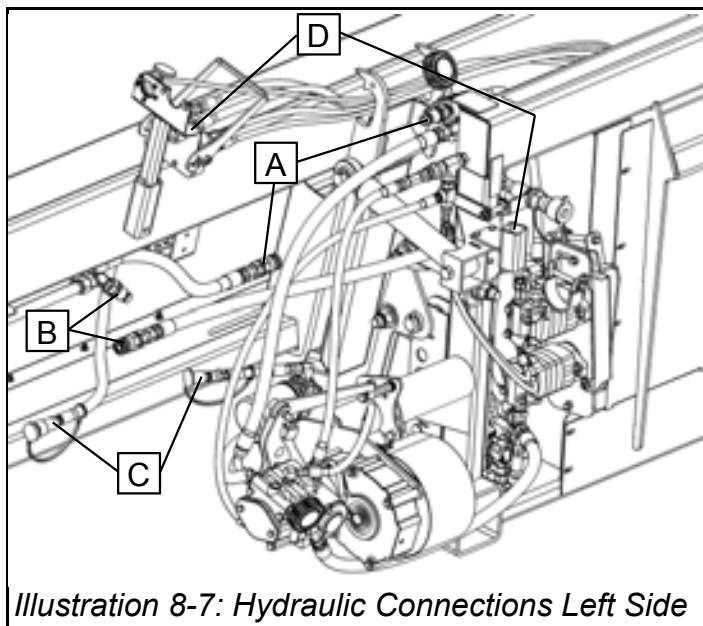


Illustration 8-7: Hydraulic Connections Left Side

11. Locate the header tilt cylinder valve on the left side of the frame, and connect the pressure line for the header tilt cylinders here. When connected, turn the valve to “on” position by moving the lever to the right.

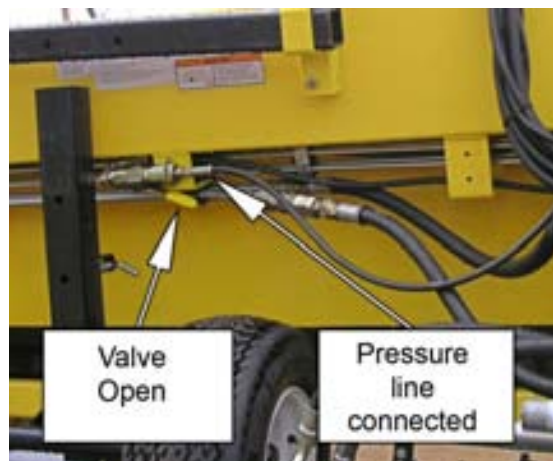


Illustration 8-8: Hydraulic Tilt Pressure Line

12. Connect the electrical connectors (1, 2, and 3), taking care to line up the connector guide-pins.

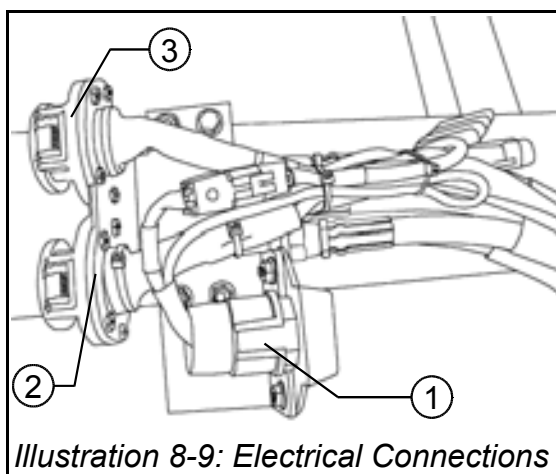


Illustration 8-9: Electrical Connections



If your combine hydraulics hook to the header through a Multi-Link hydraulic coupling, be sure to store the header's Multi-Link bracket in the tube on the sub-frame.

Your header sub-frame has now been reinstalled. To convert the header from transport position to field position please refer to the “Mounting” section of the OPERATION chapter in this manual, or refer to your Header Storage Trailer Manual (if applicable) for instructions.



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9. Lubrication & Maintenance

Lubrication

BE SURE TO USE HIGH QUALITY, GENERAL PURPOSE GREASE

Grease every 10 Hours:

- Reel bearings
- Caster Gauge Wheels

Grease every 50 Hours:

- Knife Drives (1 shot, every 10 hours, the zerk is on the side of the knife drive).
- Grease knife head bearing (The zerk is on the side of the bearing block).
- Universal Joints (2 locations)
- Guard (one per cone)
- Telescoping members
- Gauge Wheel Screw Jacks

Other Lubrication Maintenance:

- Knife: If knife is gumming, soak with water first, as alternative soak with diesel fuel.
- Gear Box: Gravity filled from hydraulic tank. Check daily that no leaks occur.
- Hub and Spindle: Re-pack annually.



COLD WEATHER START UP (TEMP. BELOW 10 °C/ 50 °F)

It is a good practice to allow the oil to warm up prior to any cutting, and in cold weather it is absolutely necessary.

To warm the oil, engage header drive when engine is at idle. Allow the header some time to warm the oil before increasing the engine to full operating speed.



Hydraulic Oil

Use one of the compatible oils listed below.

Optimum Temperature Operating range -30 C to 80 C (-22 F to 176 F)

Exchange hydraulic oil every 3 (three) years or every 1000 hrs (whichever comes first).

Pressure and Return Line Filters

Change the suction and return line hydraulic filters after the first 50 hours of operation and seasonally thereafter.

Compatible Hydraulic fluids

- Co-Op Trans-Hydraulic
- ESSO Hydraul 56
- Chevron 1000 ATF
- Petro-Can Duratron
- Shell Donax TD
- UFA THG Ultra

Pressure and Return Line Filters (10 micron)

- Stauff SF6520
- Fleetguard HF6510
- LHA SPE15 - 10
- Gresen K-2202
- Fram P1653A
- NAPA 51551

Maintenance

Finger Auger

High wear parts such as the finger guides should be checked carefully. Remove the inspection cover on the drum to examine the inside. Check the finger bearings. Each one should be free of any binding. Examine the rivet or roll pin in the finger bearing. It must be tight. If roll pin is working its way out, install a wire in the center of the roll pin.

Hydraulic System

- Check for leaks at pump, motors, hoses, steel lines, and cylinders. Tighten, repair, or replace as required.
- Check pressure gauges for proper operating pressure.

Crop Dividers and Crop Deflectors

- Check for damage; abrasive wear on the shoe of the crop divider. Repair as required.
- Check for stress cracks. Repair as required.

Cutting System

- Check daily, and clean all built-up straw, dirt and debris from under the feather plates and the sensor paddles for the reel-height control
- Check knife head and knife drive bearings. Grease as required.
- Check all cutting parts carefully for damage and wear. Worn knives and guards can cause higher cutting pressures and increased stalling. Sickle sections are considered worn if the cutting edges are chipped, broken or dull.
- The cutting edge of the guard gets rounded and wider as the guards wear. When the gap is about the thickness of two sickle sections, it is time to replace the guards.
- Check knife back and bridge rollers.
- Check connector bar joints. The center of the connector bar should be directly under the middle of a sickle section.
- Oil knife and guards for storage.

Decks

- See deck maintenance in the Draper section of this manual on page 116.

Drive Shaft

- Check each yoke and cross kit for wear. Replace as required.
- Grease slide tubes, yokes and shield bearing.

Reel

- Inspect reels for missing, damaged or broken fingers.
- Inspect bearing joints; service or replace as required.
- Inspect arms and braces; bent, broken, missing parts.
- Inspect reel drive couplers and reel joints (split reel).
- Inspect reel drive motor.
- Check poly skid under the cutter bar. Replace as required.

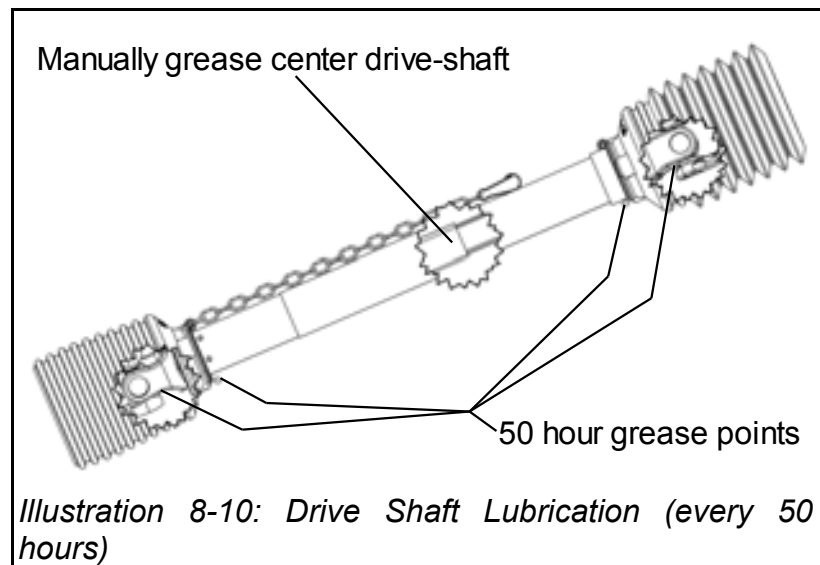
Transport and Hitch System

- Check tires for wear, cuts, and abrasions. Replace as needed.
- Ensure that all bolts and pins are securely in place.
- Ensure that all wheels are turning freely.
- Check wheel bolt torque frequently. All wheel bolts are to be maintained at a torque rating of 120 ft-lbs/ 163 Nm.
- Check tire pressures frequently, and maintain at the pressures specified below.
- 225/ 75-R15 (STD transport & gauge wheel tire) – Maximum 50 psi (cold)
- 20.5/ 8.0 X 10 (HD slow speed transport tire) – Maximum 70 psi (cold)

Service Locations

Drive Shaft:

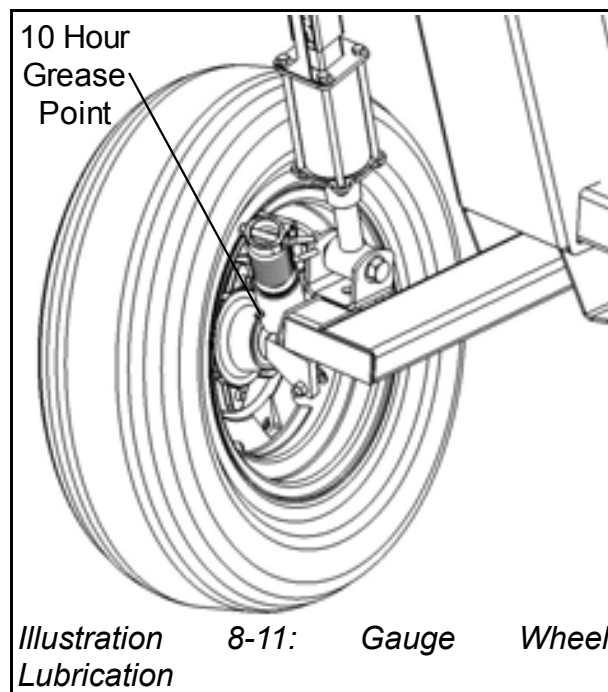
*(4 locations)



The center drive-shaft joint will need to be taken apart and manually greased. Refer to **OPERATING THE PTO – Lubrication** portion of the **FINGER AUGER** section in this manual.

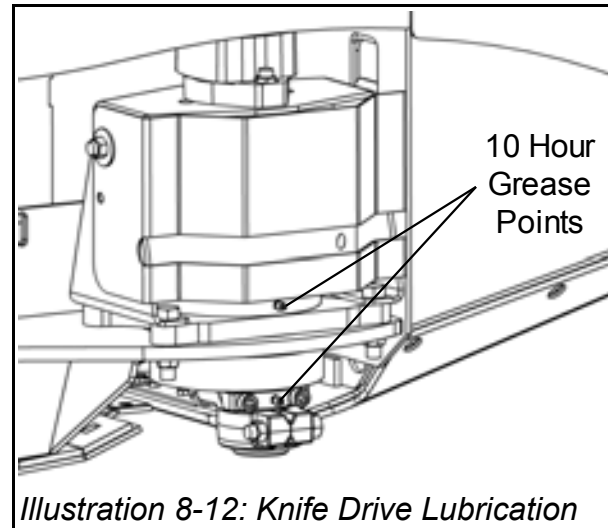
Castering Gauge Wheels:

*(1 location per wheel)



Knife Drive:

*(2 locations per Knife drive.)



Reel Drive:

*1 location per reel end

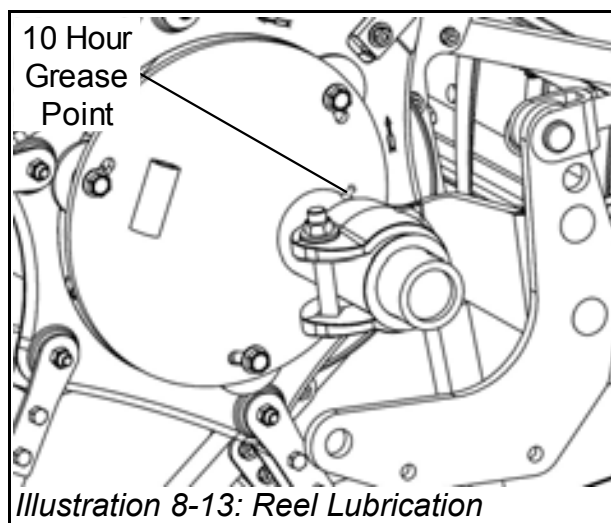


Illustration 8-13: Reel Lubrication

Double Reel Drive - Split Reel:

*Two center locations.

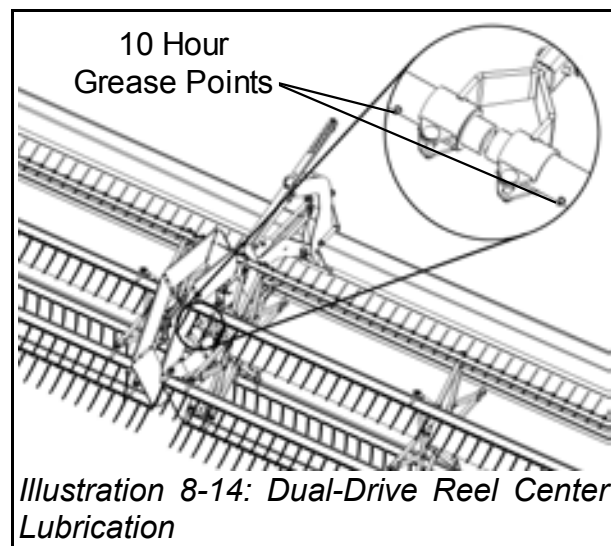


Illustration 8-14: Dual-Drive Reel Center Lubrication

10. Reel

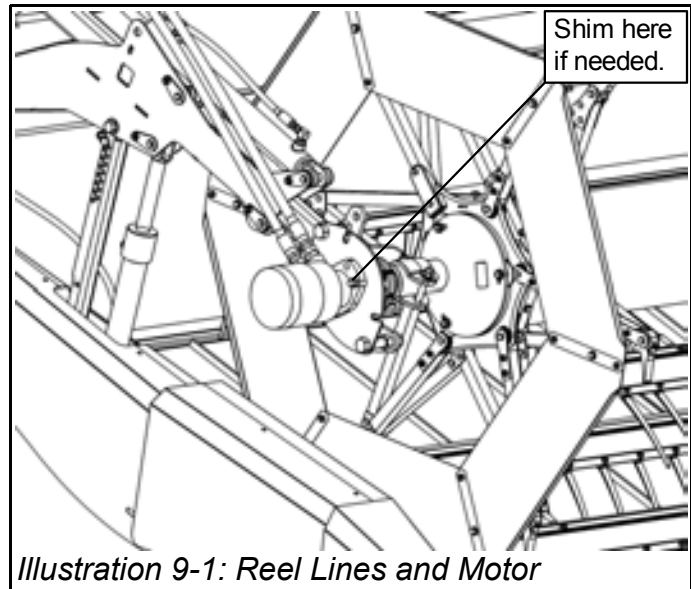
Reel Drive

Depending on the model of header, the reel is driven by either one or two hydraulic motors with a direct drive coupler to the reel.

Check coupler bolts and motor mount bolts regularly for tightness. Check alignment of motor to reel tube, and shim the mounting bolts if needed.

ATTENTION

Reel motors are capable of bi-directional operation. As installed on the header they run in one direction only and are supplied with unidirectional hydraulic oil flow. For this reason, it is important to mark the lines and their corresponding motor ports whenever you are removing hydraulic lines.



Reel Speed Adjustment

Reel speed should normally be set 10% to 20% faster than the ground speed of the combine (approximately 8 – 10 rpm for every 1 mph of machine ground speed, for a 52" diameter reel). "Down" crops will require a somewhat higher speed than standing crops. Reel speed is determined by a control in the combine. Adjust the reel speed so that the reel has the appearance of "pulling" the combine through the field.

- If reel speed is set too slow, the crop will not be pushed against the cutter bar and swept onto the draper. This can result in a portion of the cut crop being pushed forward onto the ground. Slow reel speed may also cause a wrapping of the reel with cut crop, as it bunches along the front of the cutter bar. It is very important that the reel gently guides the crop onto the cutter bar, then sweeps it onto the draper.
- If reel speed is too high, the crop may be stripped or shelled out by the impact of the reel. The crop may also be pushed down before it can be cut, leaving uncut grain in the field. Excessive reel speed may also cause cut crop to wrap onto the reel, as the crop does not get a chance to fall onto the draper.
- In general, hay crops can be cut using higher reel speeds.

Reel Position

Hydraulic Fore & Aft

All Grain Belt Plus Header reels are equipped with hydraulic fore and aft, controlled from the combine. This feature allows the operator to move the reel assembly forward and backward.

The combine must be equipped with the fore/aft control to make this option functional.

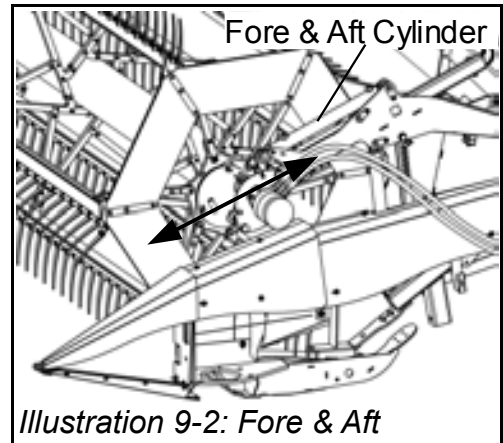


Illustration 9-2: Fore & Aft

Split-Reel Lift Hydraulic Circuit

Pressure from the combine feeds the barrel end of the left cylinder. As the barrel rises, oil on the bottom side of the piston is forced out of the rod end port, into the rod end port on the center cylinder. The cylinder piston rises and oil from barrel end port of center cylinder is forced out into the barrel end of right cylinder. As the right cylinder piston rises, oil is forced out of the rod end port into the reel return line, and back to the combine hydraulic reservoir. To lower the reel, a check valve assembly located on the combine opens to allow oil to free flow in reverse due to the weight at the reel.

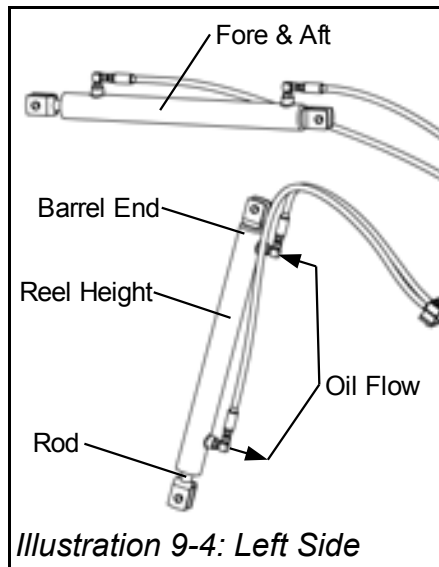


Illustration 9-4: Left Side

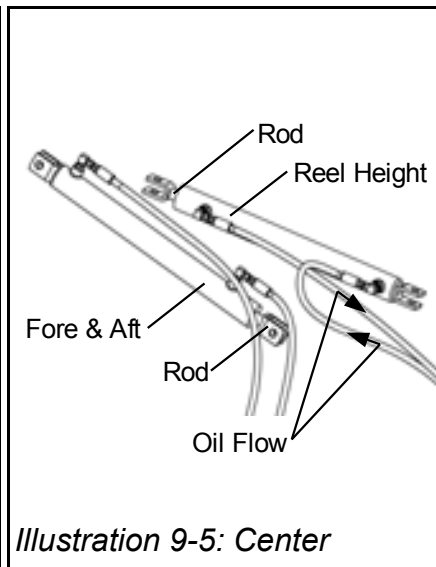


Illustration 9-5: Center

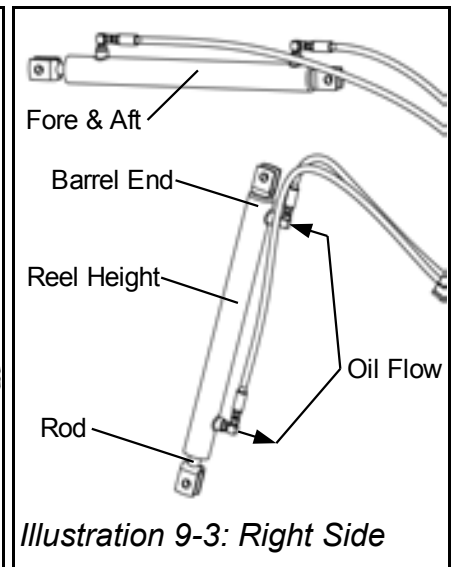


Illustration 9-3: Right Side

Solid Reel Hydraulic Circuit

Pressure from the combine feeds the barrel end of the left-hand cylinder. As the cylinder barrel rises, oil below the piston is displaced. The volume of the rod on the left cylinder matches the volume of the barrel on the right cylinder. The displaced oil causes the right cylinder to raise. This cylinder has a vent to bleed air from the system.

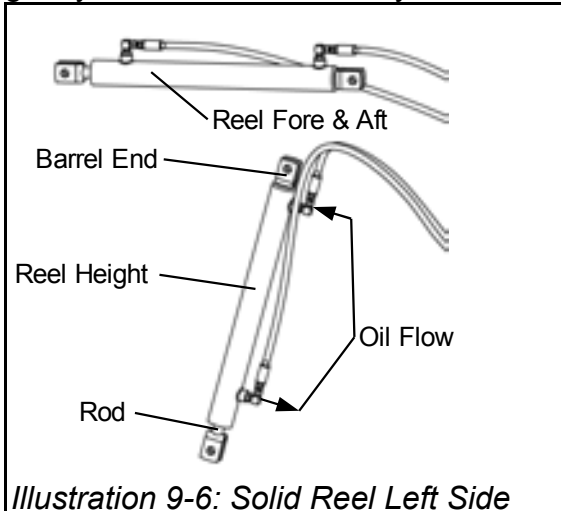


Illustration 9-6: Solid Reel Left Side

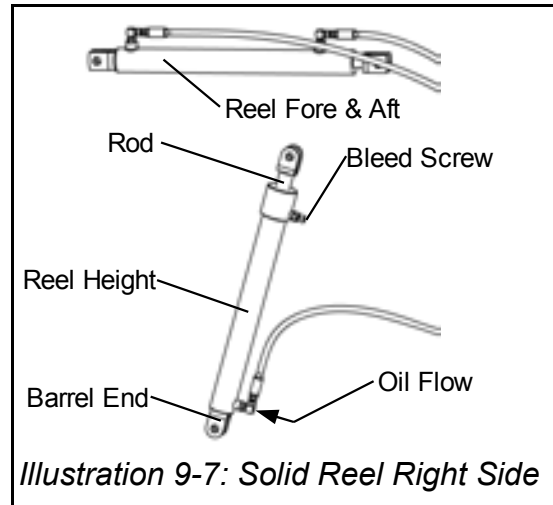


Illustration 9-7: Solid Reel Right Side

Reel Arm Leveling and Height Adjustment

Reel Height Adjustment

Grain Belt Plus Headers are equipped with adjustable reel height stops, which limit how much the reel can be lowered, and how close the reel can come to the header. These stops are located behind the reel-lift cylinders.

To adjust the height limits:

1. Start the combine, and with the header fully lowered, raise the reel to maximum height.
2. Engage the emergency brake, shut combine down, and allow all moving parts to come to a complete stop before exiting the cab.
3. Remove lock pin from left side reel height control arm, and replace into the desired location (hole). Ensure that pin is fully engaged and locked in place with the safety clasp. Take note of the exact location of the pin.

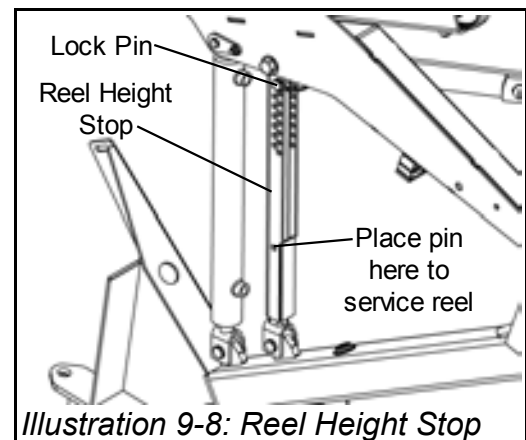
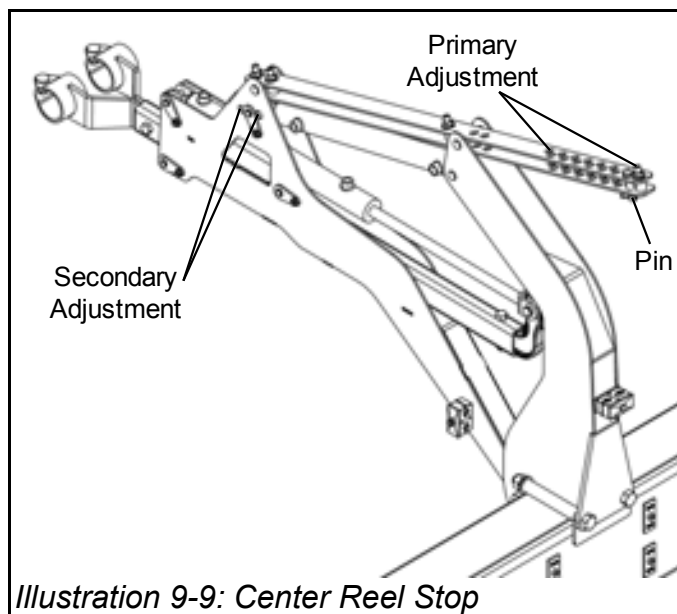


Illustration 9-8: Reel Height Stop

4. Repeat this procedure for right side of the header, ensuring that this pin is inserted at the same height as the left side.
5. If your header has a split (double) reel, the center reel height stop will also need to be adjusted. The holes for the center stop, however, do not correspond with the outside stops. For this reason, it must be adjusted visually, using the primary holes first, then the secondary, if required, in order to obtain a level reel. For safety purposes, all adjustments to the center reel arm should be made from the rear of the header.
6. Restart combine, and slowly lower the reel to it's lowest position. Ensure the reel tines will not contact any part of the deck, draper, or cutter bar.



When servicing the reel, it is necessary to have the reel locked into the servicing (highest) position, with the lock pins securely in place.

When the reel is set for short crops, and the fore-aft control is retracted, the reel will contact the feather plates, and draper, causing increased wear.

Reel Height Control (Optional Equipment)



For information on the optional reel height control, please refer to the "OPTIONAL EQUIPMENT" chapter in this manual.

Reel Centering

Measure the clearance from the end shield on the reel to the crop divider on each end of the header. See the illustration below.

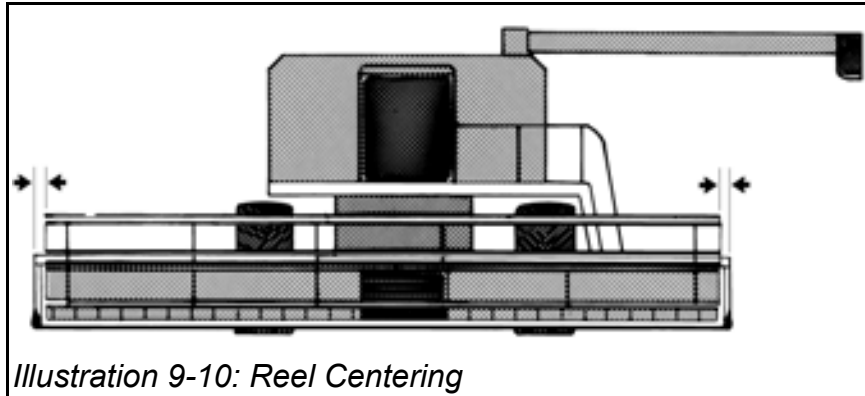


Illustration 9-10: Reel Centering

If the reel is not centered on the header, proceed as follows:

1. Fully lower the table and reel, and engage parking brake.
2. Turn combine off and allow all moving parts to come to a complete stop before exiting the cab.
3. Loosen the carriage bolts that secure the reel arm braces on both ends of the reel.
4. Push the reel arms until reel is centered.
5. Tighten bolts when centered. (See *Illustration 9-11: Reel Arm Brace*).

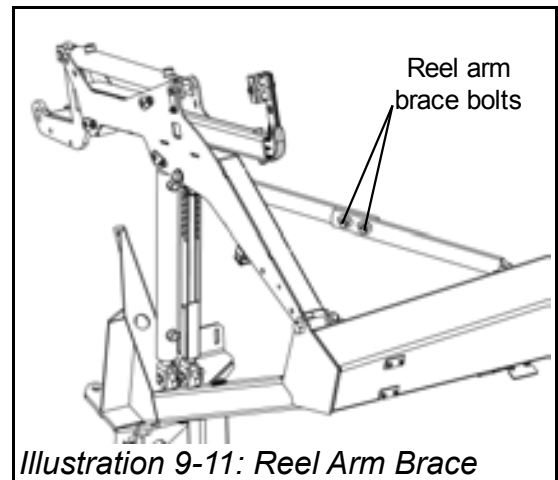


Illustration 9-11: Reel Arm Brace

Placement of the Reel on the Grain Belt Plus Header

The distance from the tip of the guard to the tip of the reel tines can be adjusted from 1" to 12" (300 mm) depending on the crop.

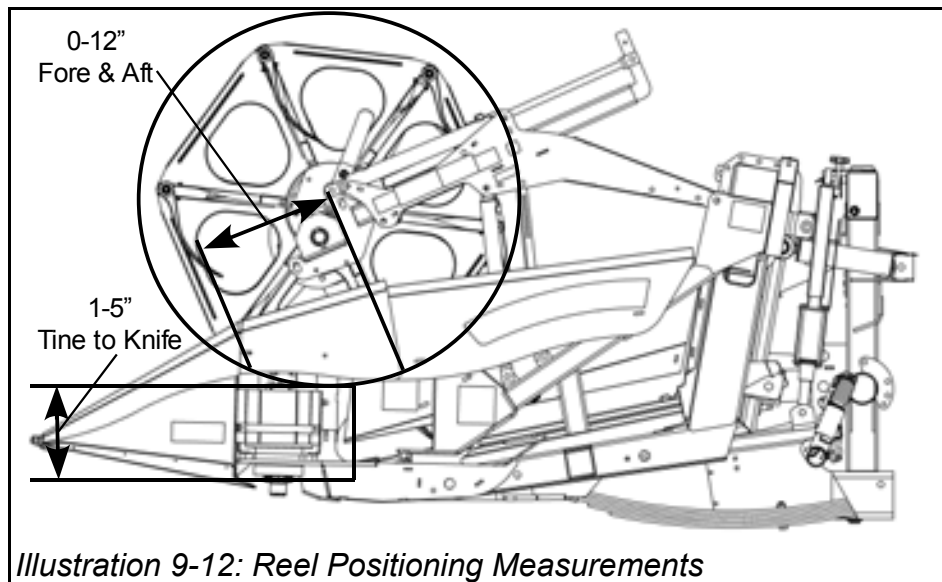
- Normally the more "down" the crop, the further ahead the reel should be set.
- Setting the reel too far ahead will not push the crop into the knife will be cut, nor will it efficiently deliver it onto the draper.
- Set the reel tines the same distance from the guards on both ends.

- Adjust the reel height stops so that the tine tips will miss the guards and sickle by at least 1" with the cutter bar fully raised, to avoid cutting tines, and breaking knife sections.
- Normally the more "down" the crop; the closer the tines will need to be placed to the cutter bar, down to this 1" minimum.



Minimum reel height is determined by the setting of the reel height stops. The automatic Reel Height Control option is designed to sense the tine-to-knife distance, and adjust the reel height accordingly. If the header you are using is not equipped with this option, it will be necessary to pre-adjust the minimum tine-to-knife distance based on the variability of the terrain over which you will be operating the header.

Bear in mind that the cutter bar on the Grain Belt Plus header is designed to flex over uneven ground. Setting the reel height too low for the amount of flexing you will encounter may result in damage to knife sections, guards, and reel tines.



Reel Position in Down Crops

- The reel height in down crops should be low enough that the tines can lift the crop up and onto the cutter bar.
- The tines should be adjusted so they pick up the crop and lift it onto the cutter bar with a minimum of the crop carrying around the reel.
- The fore and aft position of the reel should be adjusted so the reel center tube is about 12 inches (300 mm) in front of the cutter bar so the crop is lifted before it gets to the cutter bar.



Care must be taken to ensure that the reel tines do not come in contact with the cutter bar. Tine contact will cause damage to the tines, knife sections, and guards. At no time should the reel tines contact the ground. Contact with the ground or with rocks will cause damage to the reel.

Reel Position in Standing Crops

The reel height on standing crops is usually correctly adjusted when the reel bats contact the crop about midway between the cutoff point and the top.

The reel should be adjusted fore and aft so the reel center tube is slightly ahead of the cutter bar. If the reel is too far forward, the crop will not be pushed against the cutter bar and a portion of the cut crop will fall to the ground. If the reel is too far back, the crop is pushed down too low when it is cut and some of the heads will be missed.

Universal – Ull Pick-Up Reel: Tine Pitch Adjustment

Plastic (Delrin) reel tines are attached to the leading side of the reel bats with 1/4" bolts and nuts. To adjust the pitch of the tines, proceed as follows:

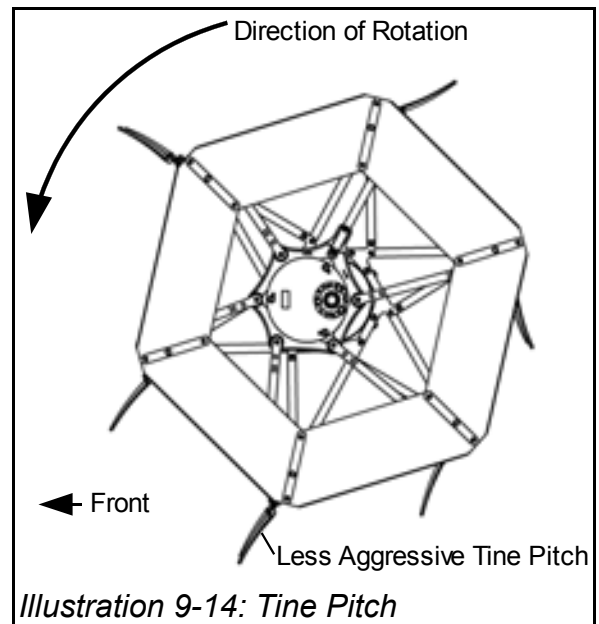
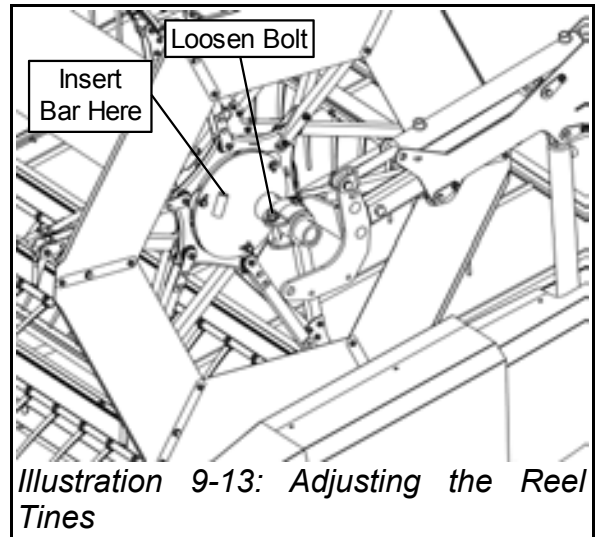
1. Loosen the bolts (shown here) at both ends of the reel and insert a suitable tool into the tube.
2. Partially rotate the control ring assembly, noting the change in tine pitch on the tines nearest the cutting bar.
 - To increase the pitch of the tines, turn the ring in the direction of reel rotation.
 - To decrease the pitch of the tines, turn in the opposite direction to reel rotation.
3. Re-tighten bolts at BOTH ends of the reel.

Adjust tine pitch initially so tines are perpendicular to the cutter bar. Too great a pitch may cause the cut crop to be scooped up and carried around the reel.

For crops that are down or lodged, adjust reel so that center of reel is ahead of cutter bar, and adjust tines to be more aggressive, lifting the crop, yet dropping it onto the draper decks after cutting.

If the crop starts to wrap around reel, this indicates the need to adjust the tines to a less aggressive setting.

Tine pitch is critical to the operation of the header. Adjust the tines to suit your individual needs and make note of the best settings for each of the crop conditions you encounter.



IMPORTANT Tine pitch must be the same at both ends of the reel.



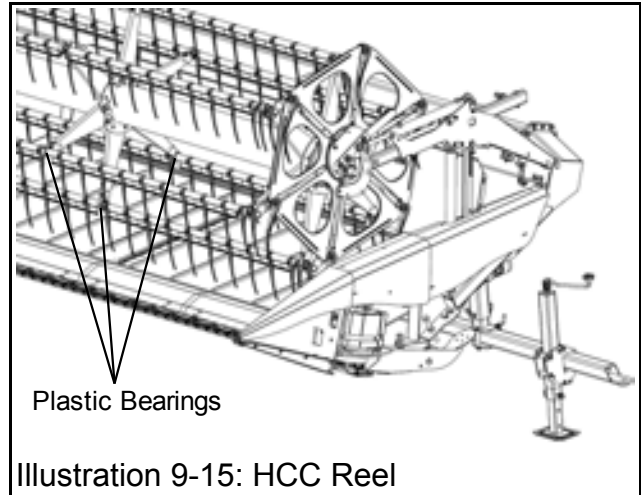
If crop is building up in the center of a split reel, the fingers/ tines may be heated and bent slightly to ensure the crop does not build up at the gap.

Hart-Carter (HCC) Reel

The HCC reels supplied with the Grain Belt Plus header are 6-bat reels, with plastic tines.

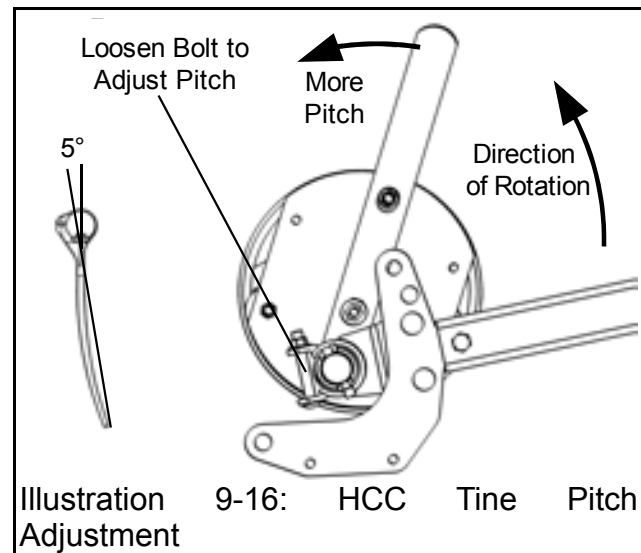
The tines are fastened around steel bat tubes using 7/32" metal screws. The bats pivot within plastic bearings that are located at the ends of each reel arm (spoke).

To adjust the pitch of the tines, refer to the illustrations and instructions below.



HCC Reel – Tine Pitch Adjustment

1. Locate the tine pitch adjustment levers, and tine-pitch adjustment bolts, located at both ends of the reel.
2. Loosen the adjustment bolts, and then move the adjustment levers accordingly to set the desired pitch. (*Hint: Start reel with a pitch of about 5° as shown.)
3. Re tighten the adjustment bolt, securing the pitch setting.



Ensure that the adjustment bolts & levers are set to the same relative position for each side. Too great a pitch causes reel to wind with cut crop because the tines do not release the crop after it is cut.

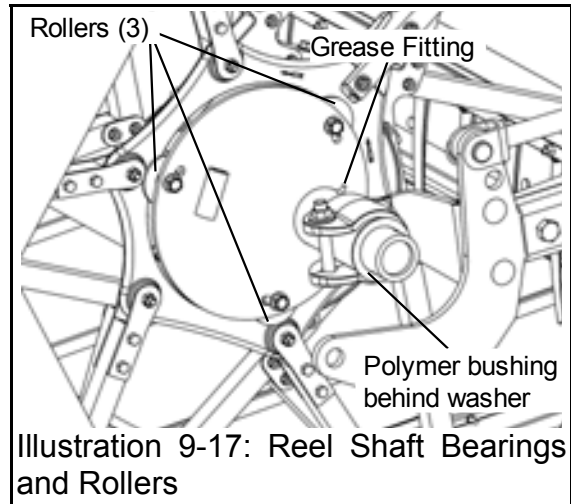
Lubrication – Reel Shaft Bearings

Lubricate every 10 hours of operation (or daily) with multi-purpose lithium base type grease. Lubricate the grease fitting at each end of the reel shaft, and also at the center on double reel models.

Annually, remove and examine the polymer liners in the control plate tubes. Replace if worn.



Initial lubrication of the plastic bat bearings (HCC Reels only) with a light film of oil will improve the break-in and service life of the bearings.



Control Rings (U-II Reels only)

The control ring assemblies each have three rollers mounted in adjusting slots. To compensate for wear to the control ring, the rollers may be adjusted outward in the slots so that all three rollers are lightly in contact with the control ring.



All three rollers at each end of the reel must be moved the same amount relative to each other, so that all three roller bolts are in the same position in the slot. Do not move only one roller.

Check Points Before Operation:



Always engage reel lift cylinder locks and table lift cylinder locks before working under or around raised reel. Do not rely on the combine hydraulic system for support. A rupture or a leak in any part of the system will cause the table and reel to drop if the proper stops are not in place.

- All bolts are tight.
- Reel turns, by hand, without binding. (With some resistance from hydraulics.)
- Tines uniformly clear the knife.
- Reel arms are aligned. (No bow in the bat shaft or pivot bracket bat assemblies.)
- Auxiliary fingers have adequate clearance with side shields (HCC Reels only).
- Tine pitch has been set for the current application, and is uniform across header.
- Hydraulic cylinders are functioning smoothly.
- Minimum reel height has been set correctly on the reel height control arms.
- Fore & aft hydraulic cylinders extend and retract fully.
- Vertical distance from the knife to the reel center is set for the current application.
- Reel is horizontally centered in the header opening.



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11. Draper

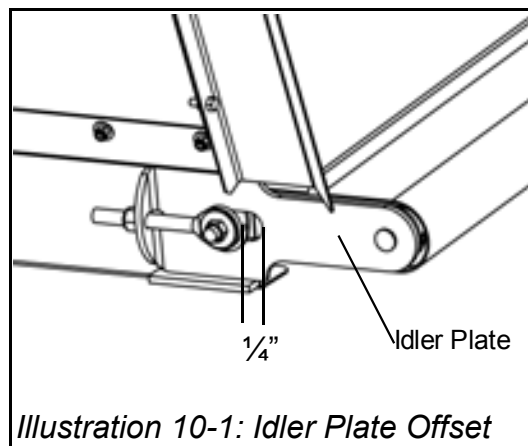
The Grain Belt Plus Header is equipped with two lateral drapers, and two rearward feeding center drapers. The lateral drapers move the material from the cutter bar toward the center. The center drapers move the material toward the finger auger which, in turn, directs the crop into the feeder house of the combine. All drapers must be set properly, and in good condition to perform well. Quick release adjusters with spring tensioning allow for easy cleaning of internal parts and facilitate maintaining proper draper tension.



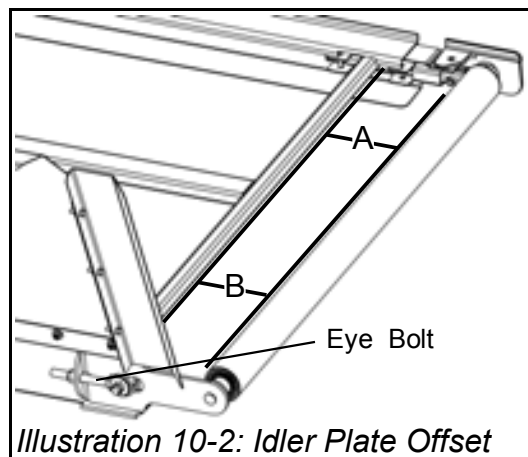
Combine must be fully shut down, with park brake on, feeder house, and reel lift cylinder locks engaged before installing drapers!

Lining Up the Idler Roller

Prior to installing the draper, ensure that the idler roller (the draper roller without the motor) is properly aligned. This is usually done by extending the idler plate $\frac{1}{4}$ " past the draper deck. This is accomplished by adjusting the eye bolt.



Once extended, you should make sure that everything is parallel. The easiest way to do this, is to measure the distance between the roller and the closest cross brace on the draper deck. Make sure measurement "A" is the same distance as measurement "B". If it still does not line up, you may adjust the eye bolt again.



Draper Installation

1. Make sure that the quick release lever is in the open position prior to installing the canvas on the draper deck.
2. Place draper bundle on the top of deck runners, and unroll with the slats facing up. Be sure to align the v-guide with the notched side of the roller toward the rear end of the swather.
3. Wrap draper around one of the rollers and feed draper into the bottom runner of the deck. The bottom runners will support the draper, and prevent it from hanging down.
4. Pull draper through bottom runner, and wrap around the other roller. Pull the ends of the draper together. Install a connector bar to close the joint.
5. The heads of the screws should be installed from the center deck opening side. This helps prevent the crop being caught on the screws. Complete the installation by adjusting tension and tracking.
6. Once the draper is installed on the draper deck, close the quick release lever to apply tension to the draper.



Illustration 10-3: Unrolling the Draper

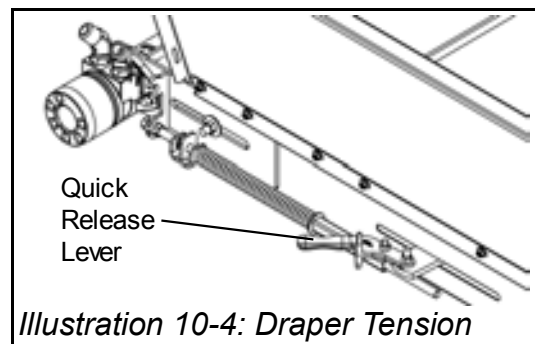


Illustration 10-4: Draper Tension



Illustration 10-5: Wrapping Draper

Lateral Drapers Tension:

Engage the power unit drive with the engine at low idle. Observe from the cab how the drapers are tracking.



If adjustment is required, lower the header to the ground, raise the reel to its maximum height and lock the reel height control arms in the servicing position to prevent the reel from falling in the event of hydraulic failure. Shut down the swather, and turn off the engine before exiting the cab.

If tensioning is still needed:

1. Release the quick release lever.
2. Pull the roller evenly from the side to stretch the draper.
3. Slide the adjuster clevis to compress the tension spring.
4. Complete tightening by over-centering the quick release lever.
5. Restart the windrower and repeat the running test. If tracking is good, leave the lock nut on the motor mount plate loose.

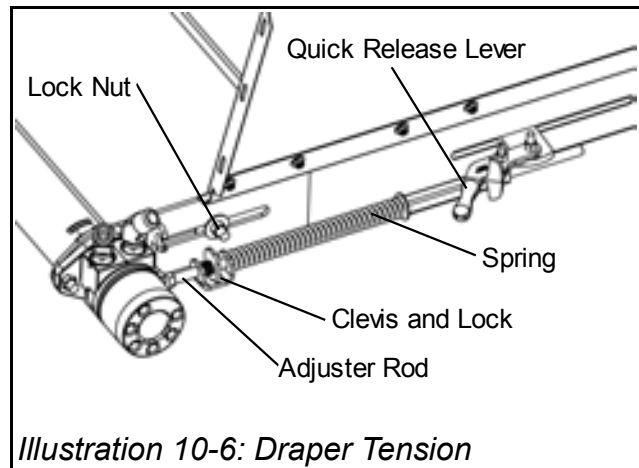


Illustration 10-6: Draper Tension



When adjusting the draper tension and tracking, check the clearance between the draper deck slats and the end strut. A minimum of 2" (50 mm) clearance is recommended. If necessary, loosen the deck restrainer and slide deck over.

Draper tension should be just enough to prevent slipping. Do not over tighten as it may cause failure to the bearings, draper rollers and/ or draper belts.

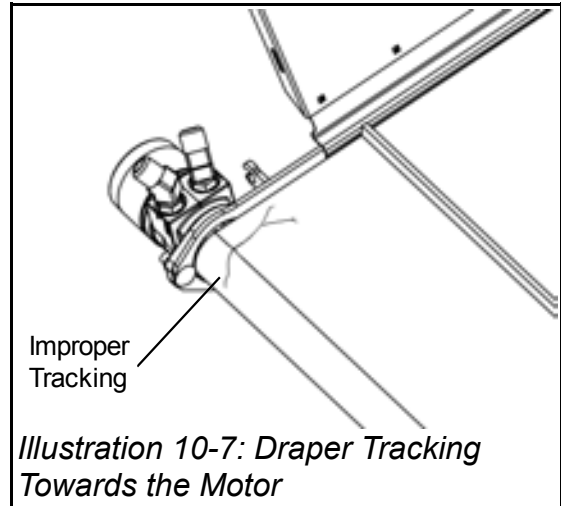
The draper may be damaged if it, or deck parts contact the end strut.

Lateral Drapers Alignment:

The canvas must track properly on the rollers to avoid damage to the drapers. The draper decks allow for approximately $\frac{1}{4}$ " clearance on each side.

If the draper is **tracking towards the back** of the machine then **increase the tension at the back** (use step 4a).

If the draper is **tracking towards the front** of the machine, then **increase the tension at the front** (use step 4b).

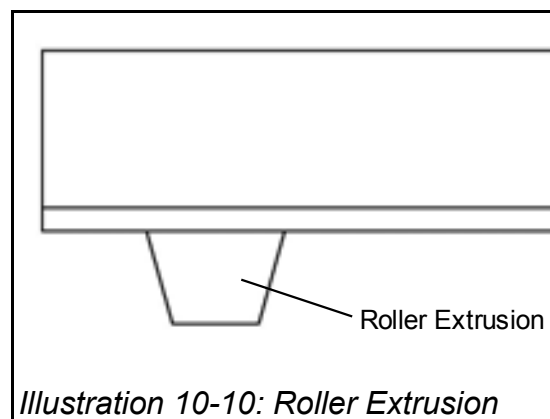
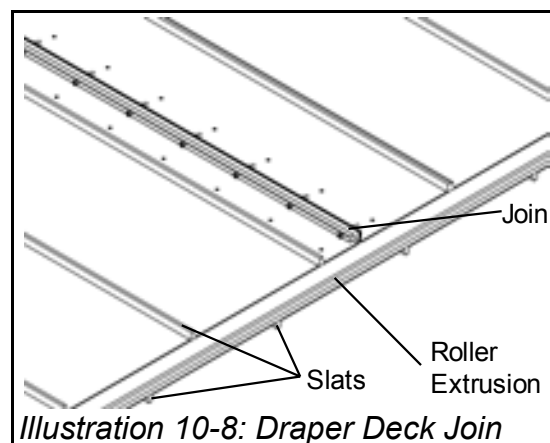
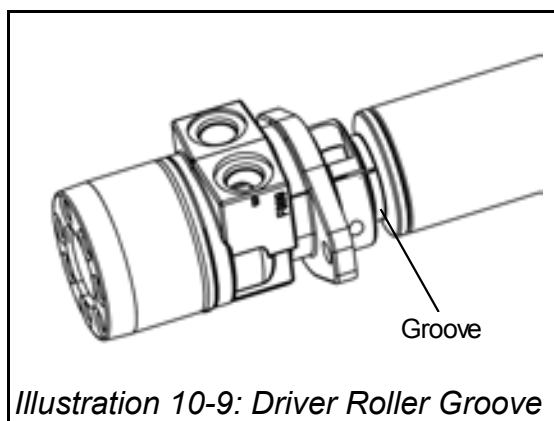


To increase the tension:

1. Tighten the canvas as tight as possible.
2. Tighten the lock nut to hold the motor plate in position.
3. Release tension on the draper.
4. Move the clevis lock...
 - 4a. outwards slightly ($\frac{1}{8}$ "") to increase the tension at the back.
 - 4b. inwards slightly ($\frac{1}{8}$ "") to increase the tension at the front.
5. Re-tighten the draper with the quick release lever.
6. Start and run the machine at low idle, check the tracking.
7. Repeat steps 3-6 until the canvas tracks properly.

Once the machine is broken in (after about 50 hours of operation), loosen the lock bolt. This allows the roller to float, which will help it to “self adjust” if any crop material gets stuck inside the draper and wrapped around the roller.

With the “V-guided” draper, it is much easier to set the tracking or alignment of the draper, provided that the roller extrusion on the underside of the draper is seated in the groove on the motor end of the drive – roller, much as a V-belt rides in a pulley. (See illustrations below.)



Draper Speed:

Proper draper speed is critical to the performance of your Grain Belt Plus Header. The draper drives are part of a closed hydraulic circuit and are not adjustable. Their operating speed is linked to the speed of the knife drive, which, in turn is controlled by the speed of the Eaton variable pump. This pump should be set specifically for your combine type in order to ensure the Grain Belt Plus header functions properly.

Center Drapers (Feeder Deck)

Proper tension must be maintained on the center drapers to prevent the drive rollers from slipping. As there are two separate drapers on the feeder deck, the tension is independently adjusted for each side by changing the positioning of the idler rollers at the front of the feeder deck.



Raise the header, and engage parking brake.

Raise the reel to its maximum height. Shut the engine down, and wait for all moving parts to stop. Set the header cylinder locks in place, and lock reel height control arms in servicing position to prevent reel from falling in the event of a hydraulic failure.

1. Release the tension on the draper to be adjusted with the quick release lever. (Illustration 10-11: Center Draper - Left Side.)
2. Pull the idler roller towards the cutter bar to stretch the draper. Slide the adjuster clevis to compress the tension spring. Complete tightening by over-centering the quick release lever.
3. Repeat the process for the other draper if needed.



Do not over tighten the drapers. Excessive tension may cause premature failure of bearings, rollers, and/or draper belts.

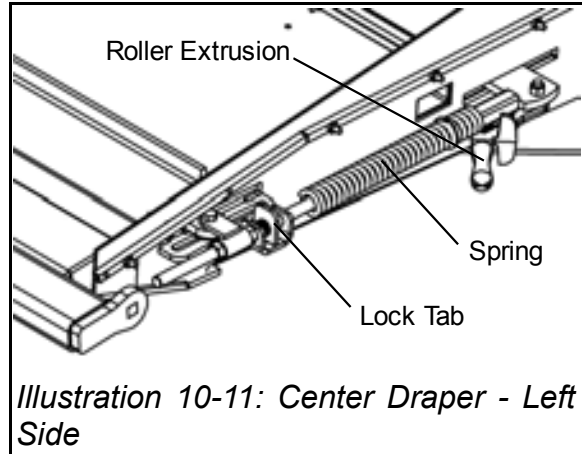


Illustration 10-11: Center Draper - Left Side

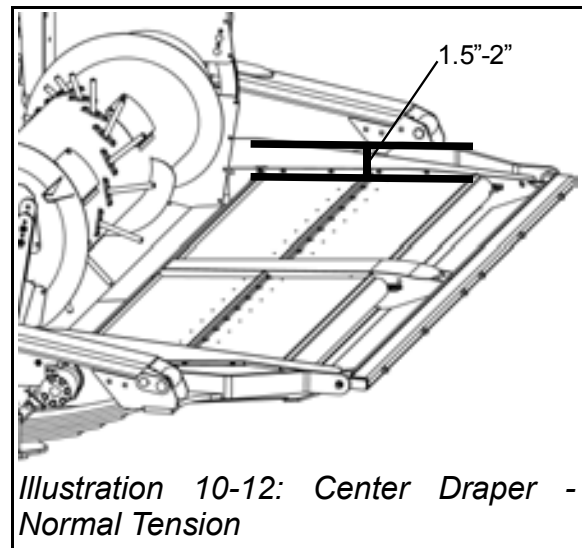


Illustration 10-12: Center Draper - Normal Tension

Normal adjustment of the center draper would provide 1.5" - 2.0" (3.8 cm - 5.0 cm) of slack in the center of the draper (when measuring vertically from the top of the draper runner on the inside of the deck, to the top of the draper).

Alignment:

In the same fashion as the lateral drapers, the feeder deck drapers are self tracking, with an extruded “V” on the draper, and a slotted groove (“V” recession) on the roller. With the “V–guided” draper, some adjustment may still be required for proper tracking. (See Illustration 10-8: Draper Deck Join, Illustration 10-9: Driver Roller Groove and Illustration 10-10: Roller Extrusion.)

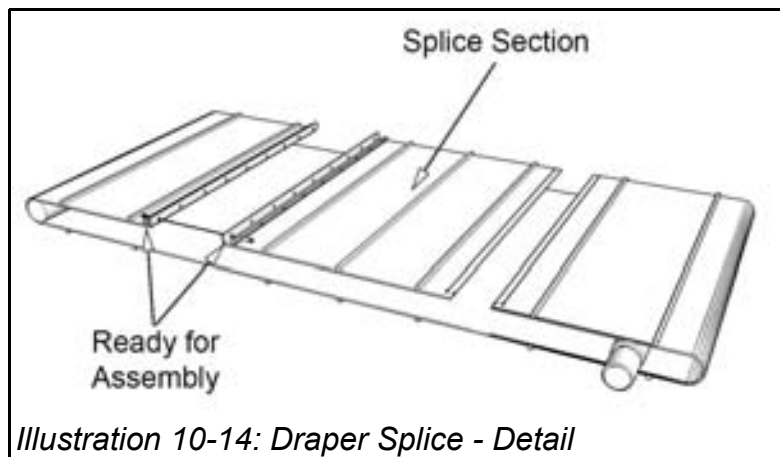
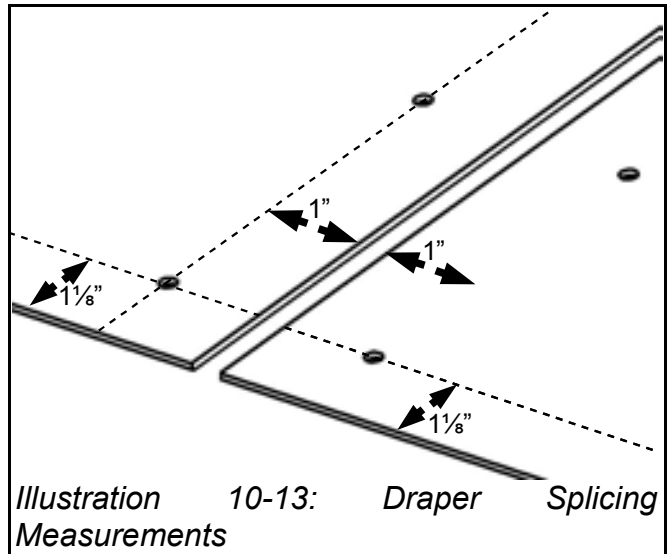
Draper Splicing

Honey Bee Mfg. strives to use top quality draper or draper material on their headers and swathers. Our draper is made from rubberized polyester with fiberglass reinforced slats. Regular draper maintenance will help to ensure maximum life-span and minimal problems with your draper. Checking tension and tracking on a regular basis is very important. If material is allowed to get inside the draper deck it tends to wrap around the idler and drive rollers causing the draper to tighten. As the the draper tightens, increased stress is placed on the motor, bearings, and the draper belt. Premature failure of the motor or bearings, or tearing of the draper can result. Damage to the draper can arise from a mechanical failure or field hazards. It is important to identify and correct the condition(s) that caused the failure, before attempting to repair the draper. If only a portion of draper is damaged, a splice can be installed to repair it.

Before beginning any repairs you will need two sets of connector bars (including machine screws and nuts) and a length of draper 6 inches longer than the section to be removed. (To determine this length, refer to step #8)

1. Engage parking brake, raise header table and install locks on the feeder house lift cylinders. (If table height is too high for working, table can be set on blocks or right on the ground)
2. Raise the reel to its maximum height and lock reel height control arms in servicing position to prevent reel from falling in the event of a hydraulic failure.
3. Turn combine off, and wait for all moving parts to come to a complete stop before leaving the cab.
4. Loosen the tension on the draper.
5. The squareness of the cut is critical to the tracking of the draper. The draper should be cut between two slats. With a measuring tape, measure and mark a line six inches from a slat on a good portion of the draper. Place a board under the draper and with a utility knife and a straight edge cut the draper along the marks. Repeat this procedure on the other side of the damaged area, cutting this section out.
6. Lay the removed section flat and measure it's overall length. Take this measurement and add 6 inches to determine the total length of the replacement piece required.
7. Using a sharp utility knife, trim back and remove 2” of the “V” extrusion from both ends of the spliced draper, as well as both ends of the old draper.

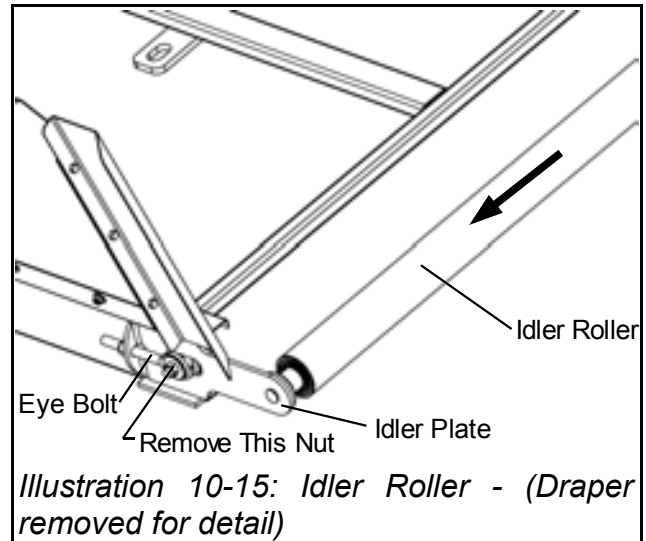
8. Mark draper pieces for connector bar holes: From the end (cut edge) of each draper, measure and mark a $\frac{3}{4}$ " line parallel to the end cut. On each line mark the first hole 1-1/8" from the edge. Drill $\frac{3}{16}$ " holes through each of these marks. (See diagrams on the following page.) Placing back sides of draper together, line up drilled holes and place a connector bar on each side and secure with a machine screw and nut. Line up the edges of the draper and drill a hole at the opposite end on the $\frac{3}{4}$ " line using the connector bar as a template. Insert a screw and secure in place. Ensuring that the draper edges remain lined up, drill the rest of the holes, insert screws and secure.



9. Repeat procedure for the other join.
10. Adjust draper tension. Trim draper lip to no more than $\frac{1}{2}$ " above connector bar.
11. Start combine, run draper, and inspect the spliced piece to ensure that installation was successful.

Idler Roller Removal

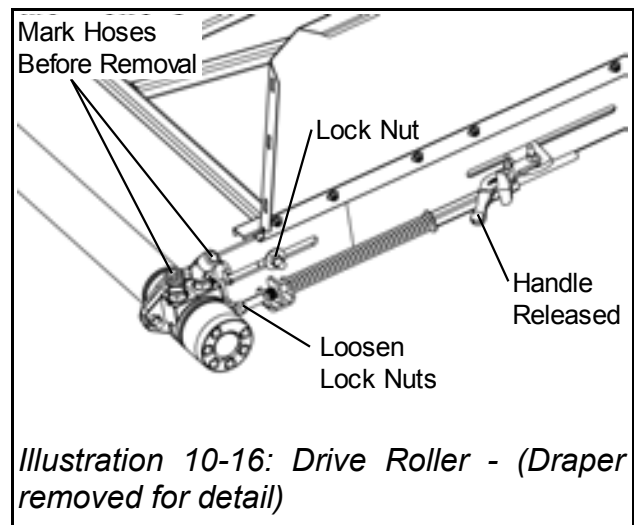
1. Relieve the tension from the draper. (See Lateral Drapers – Tension section on page 103 in this chapter).
2. Remove the nut that holds the eye bolt and the draper idler plate in place.
3. Remove idler plate from the deck.
4. Remove spacer from the bolt (behind eye-bolt head).
5. Pull idler roller out of deck.
6. Check bearings on each end and remove any material build up on the roller.
7. Re-assemble in reverse order.



Spacer must be re-installed for idler plate to function properly.

Drive Roller Removal

1. Check the lock nut on the motor mount adjuster plate to see that it is loose.
2. Relieve tension from the draper with quick release lever (See the Lateral Drapers – Tension section on page 103 in this chapter).
3. Loosen lock nuts on adjuster rod. Back off nuts about 3/4". Slide sleeve and spring down adjuster rod. Lift adjuster rod out of adjuster plate.
4. Mark hydraulic hoses on draper motor. Remove hoses. Insert plugs into hoses and caps on the motor to reduce oil loss and to prevent contamination.
5. Remove the lock nut from adjuster plate.
6. Pull adjuster plate, motor, and drive roller out of deck.
7. Check bearing in end of roller, and remove any build up of material on roller.





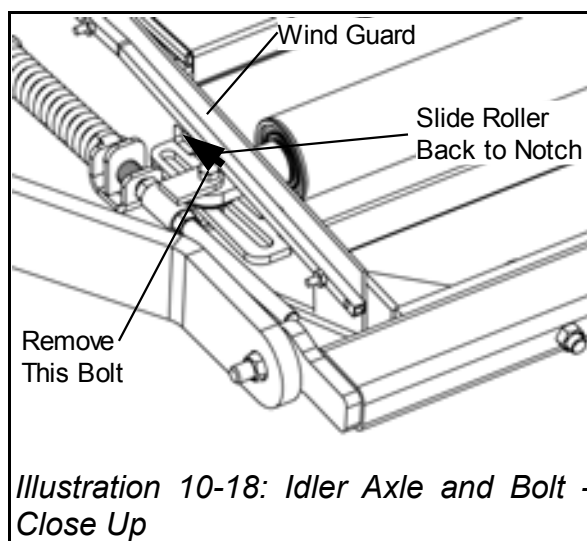
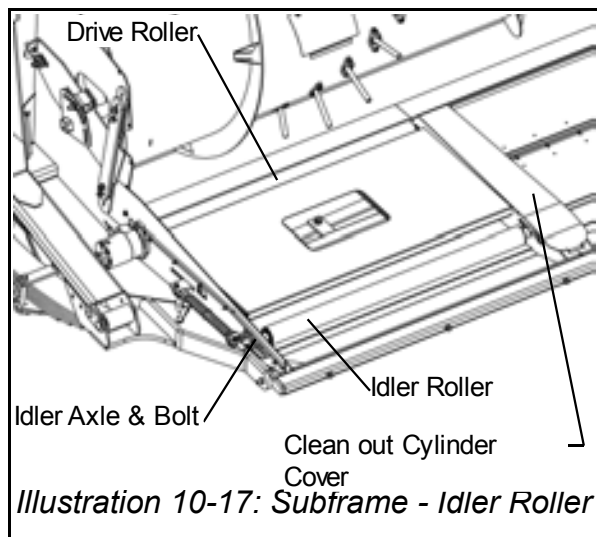
Check and remove any buildup of material from draper deck runners. If necessary, split draper at connector bar to gain access to the inside of the deck.

To re-install drive roller, reverse above procedure. (Ensure that extruded “V” on back of draper is properly seated into recessed “V” on drive roller; adjust tension.)

Feeder Deck Idler Roller Removal

Refer to Illustration 10-17: Subframe - Idler Roller, Illustration 10-18: Idler Axle and Bolt - Close Up, and Illustration 10-19: Idler Roller - Center Axle, page 111.

1. Separate the sub-frame from the header.
2. Relieve tension from the draper with quick release tension lever. (refer to Draper Tension section in this chapter)
3. Remove connector bar from the draper. Open draper to expose idler roller.
4. Remove the Outside wind guard to access the idler axle bolt.



5. Remove the bolts that connect the idler axle to the adjuster rods. (In order to access the inside bolts, it is necessary to remove the clean out cylinder cover, at the center of the feeder deck. This is accomplished by removing the nut at the back of the shield, and lifting the shield up and out.)
6. Disconnect the adjusters from the axle, and move the roller assembly backward, to the end of the guide channel.
7. Slide the outer axle out of the idler roller.
8. Remove the roller by lifting the outer end up, and sliding it off of the axle.
9. Check bearings in each end of roller, and remove any build up of material on roller.
10. To re-install idler roller, reverse above procedure. (Ensure that extruded “V” on the inside of the draper is properly seated into recessed “V” on drive roller; adjust tension.)

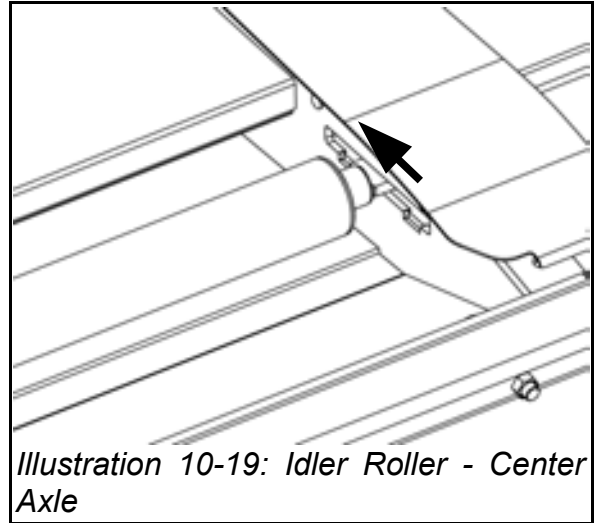


Illustration 10-19: Idler Roller - Center Axle

Feeder Deck Drive Roller Removal

1. Relieve tension from the draper with quick release tension lever. (refer to Draper Tension section in this chapter)
2. Mark hydraulic hoses on draper motor. Remove hoses. Insert plugs into hoses and caps on the motor to reduce oil loss and to prevent contamination.
3. This step is optional unless it is necessary to clean inside the deck: Remove draper connector bar, and open the draper to expose the drive roller.
4. Remove the 2 bolts (top and bottom) that fasten the motor mount to the feeder deck.
5. Slide motor and drive roller assembly out of deck.
6. Check bearings in the end of the roller, and remove any build up of material on the roller.
7. Repair or replace parts as needed.

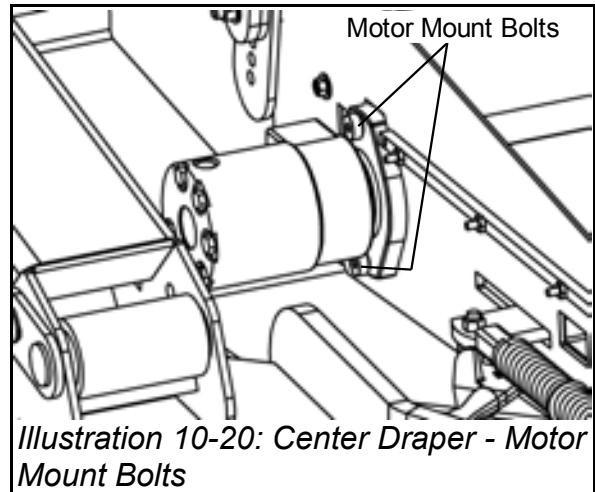


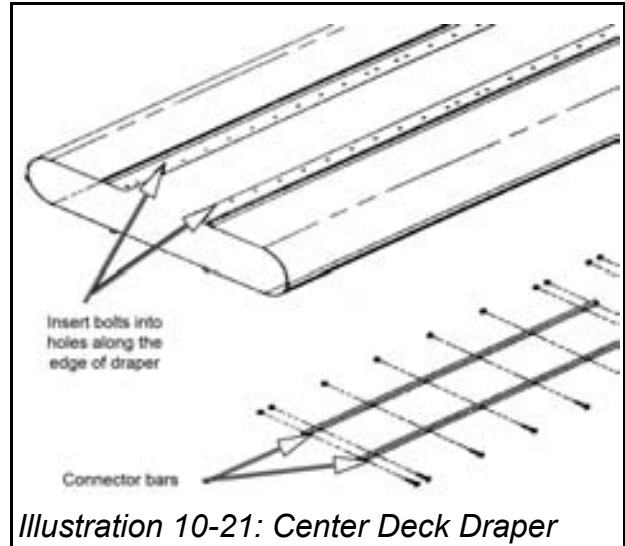
Illustration 10-20: Center Draper - Motor Mount Bolts

To re-install drive roller, reverse the above procedure, and adjust tension.

Installation of Feeder Deck Draper

To install the feeder deck draper:

1. Wrap draper around rollers.
2. Insert bolts into connector bar.
3. Line up bolts and connector bar along the flap of draper.
4. Insert the bolts into holes of both flaps, then into the second connector bar.
5. Secure with nuts.



Feeder Deck Clean out

The feeder deck has provision for cleaning out debris from in front of the drapers. This is activated by a double acting hydraulic cylinder, located between the two feeder deck drapers, which is part of the main hydraulic circuit.

When the operator reverses the main table hydraulic flow, the lateral drapers, draper drives, feeder decks, knife and feed auger are all reversed. The feeder deck clean-out cylinder opens the clean-out doors, located at the forward edge of the underside of the feeder deck.

When the operator selects forward hydraulic flow, all draper, feeder deck, knife and auger drives return to normal operating direction, and the feeder deck clean-out closes.

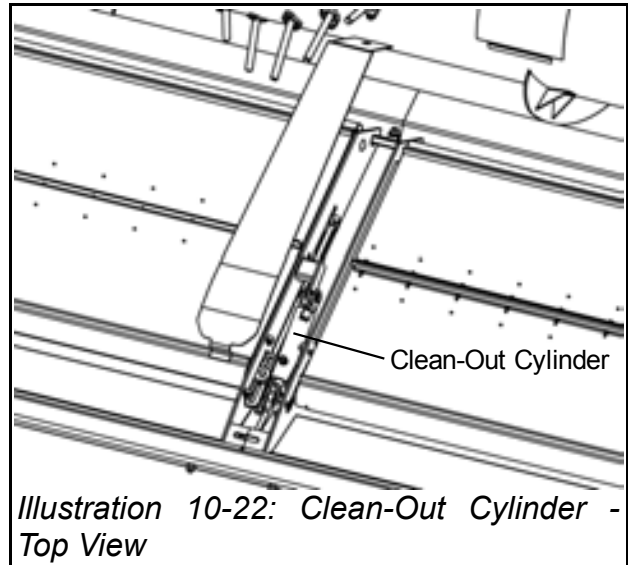


Illustration 10-22: Clean-Out Cylinder - Top View

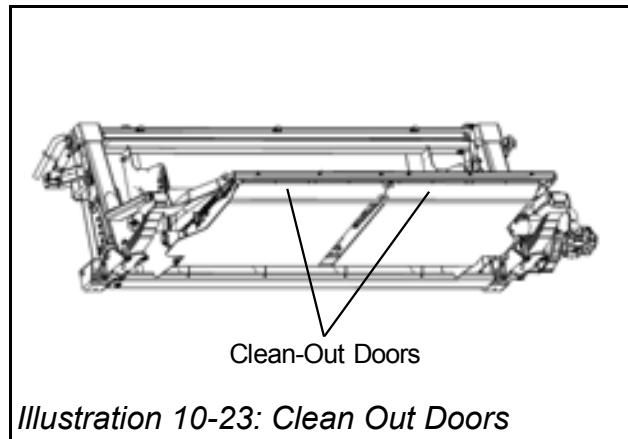


Illustration 10-23: Clean Out Doors



Raise the header at least two feet above ground before engaging the header reverse. Engage header forward, and ensure the clean-out door has closed before lowering the header.

Bearing Removal – Idler Roller

To remove bearing:

1. Remove idler roller.
2. Remove snap rings at both ends of the roller.
3. Tap the axle sleeve on the opposite end of the idler roller using a rubber mallet or block of wood (soft material to avoid damaging the axle sleeve). Bearing should pop out, along with steel insert and seal.

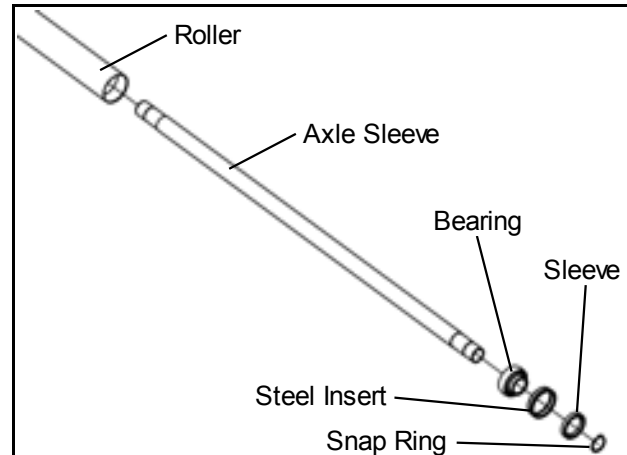


Illustration 10-24: Idler Roller - Detail

Bearing Installation – Idler Roller

To reinstall bearing:

1. Insert bearing onto axle sleeve (ENSURE that the side of the bearing with the wide shoulder is facing out.).
2. Install the snap-ring to hold bearing in place.
3. Apply a film of grease to the bearing, where it makes contact with the steel insert.
4. Tap in steel insert, using a rubber mallet, or hammer and block of wood. (only softer materials should be used to avoid damaging the parts)
5. Install seal, using the same method as in #4.
6. Fill the bearing with grease using a needle syringe between the seal and the bearing.
7. Reinstall idler roller.

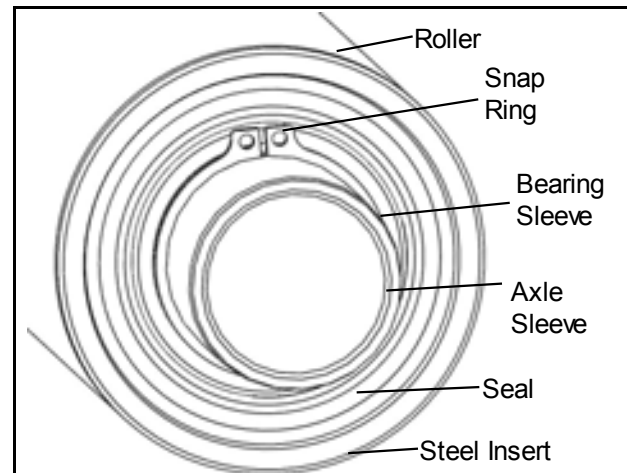
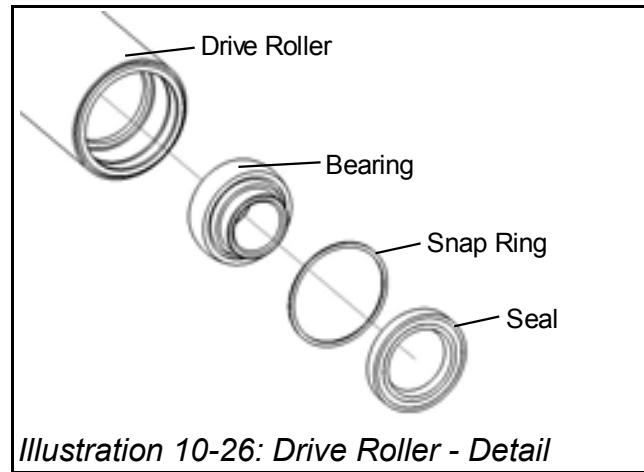


Illustration 10-25: Idler Roller - Complete

Bearing Removal - Drive Roller

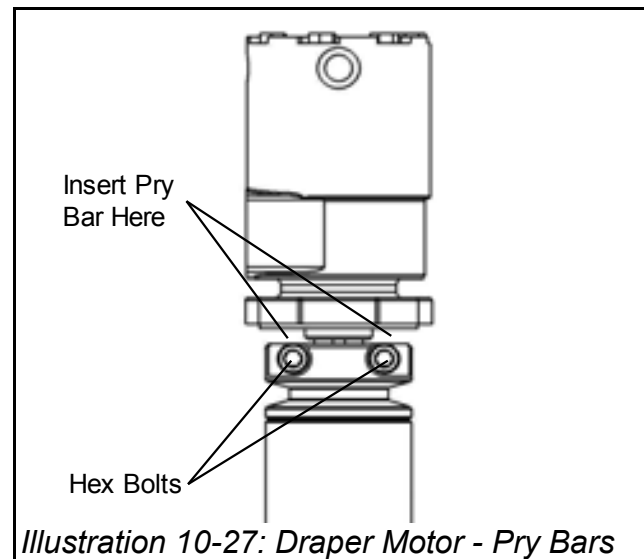
1. To remove the bearing:
2. Remove the drive roller.
3. Remove the rubber seal.
4. Remove the snap ring.
5. Pull the bearing with a slide hammer bearing puller, or, Insert a rod through the roller from the other end, and tap the bearing out. (This method would require removing the draper motor. Refer to Remove Draper Motor section.)

**Bearing Installation – Drive Roller**

1. Insert bearing into drive roller (Ensure that the side of the bearing with wide shoulder is facing out.).
2. Install snap ring to secure bearing into place.
3. Apply a film of grease to the inside lip of the drive roller and outside of rubber seal. Tap rubber seal into place using a rubber mallet, or hammer and a block of wood. (only softer material should be used to avoid damaging the parts)
4. Fill the bearing with grease using a needle syringe between the seal and the bearing.
5. Reinstall drive roller. (See above illustration.)

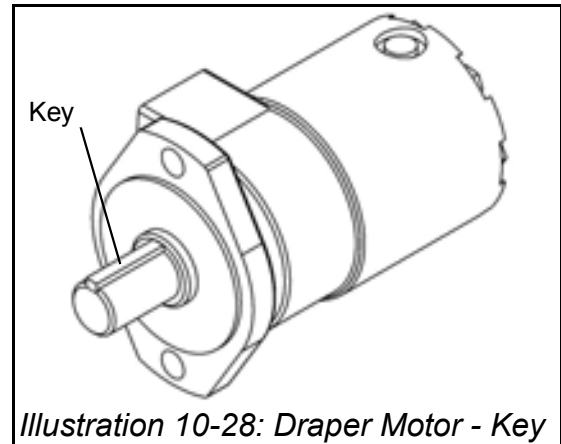
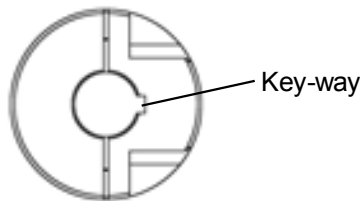
Remove Draper Motor

1. Remove drive roller assembly.
2. Loosen hex bolts from drive roller
3. Remove the draper motor from drive roller.
4. If required, insert tow pry bars one on each side of motor, and pry motor out of drive roller. Do not use a hammer on housing flanges of the motor. Impact damage to motor will void warranty.
5. If Motor still does not move, insert a 7/8" or 3/4" rod through the center of driver roller and apply force to the end of the motor shaft.



Installing Draper motor

1. Clean motor shaft and hub of drive roller.
Apply anti-seize to shaft.
2. Insert key in motor shaft.
3. Ensure that key in motor shaft is aligned with key way in drive roller, and fully insert motor shaft in the hub.
4. Tighten hex bolts to 65 ft-lbs.



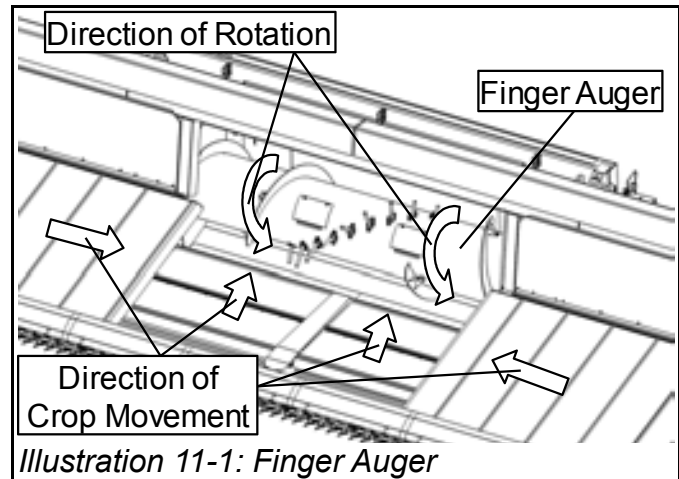
Do not use a hammer on rear end of the motor to make it fit. Impact damage of this type to the motor will void the warranty.
Use a soft block or rubber hammer to apply force to end of the motor. Rocking motor up and down or side to side may also help.

Year – End Draper and Deck Maintenance

1. Remove draper connector bar.
2. Remove draper – clean draper of debris, both sides.
3. Clean debris from rollers.
4. Clean debris from deck channels and runners.
5. Check and bend down corners of deck runners so draper does not get caught.
6. Clean adjusters; lubricate guide tubes and adjuster tubes. Adjusters should be able to move freely inside the guide tube.
7. Check idler roller bearings, they should spin freely.
8. Check driver roller bearings
9. Check bearing stubs.
10. If storing header outside with the draper installed, position the connector bar on the underside to allow water to drain from decks. Water build up may cause stretching.
11. Repeat these steps on the feeder deck.

12. Finger Auger

The finger auger is designed to receive the material from the feeder deck drapers, and then propel it into the feeder house of the combine. The adjustment of the auger fingers, as well as the height of the auger, is critical to the proper feeding of the material into the combine feeder house. Adjust the auger fingers to clear the pan or pan inserts by approximately $\frac{1}{4}$ " (6mm) to $\frac{1}{2}$ " (13mm). This is a recommended minimum adjustment. Some crops may require raising the drum higher. Experiment with different settings to suit crop conditions.



Before making the following adjustments, lower the combine header completely to the ground, or raise header to its full height and engage feeder house cylinder locks.



Engage the parking brake on the combine, shut the engine down, and wait for all moving parts to stop before leaving the cab.

To Adjust Auger Drum Clearance:

1. Remove pressure from the carrier arms on each side of the sub frame by lifting the finger auger, and inserting wood blocks under each side.
2. Loosen and remove lock bolts holding the auger stops in place at both ends of the adapter frame. (See below)
3. Raise or lower the auger stops to desired position, and then secure in place by re-installing bolts in the closest hole positions. Tighten bolts and remove wood blocks.
4. Turn auger drum by hand for a minimum of one full rotation, ensuring that all auger fingers and flighting clear the pan and pan inserts. If necessary, increase the auger's minimum clearance.

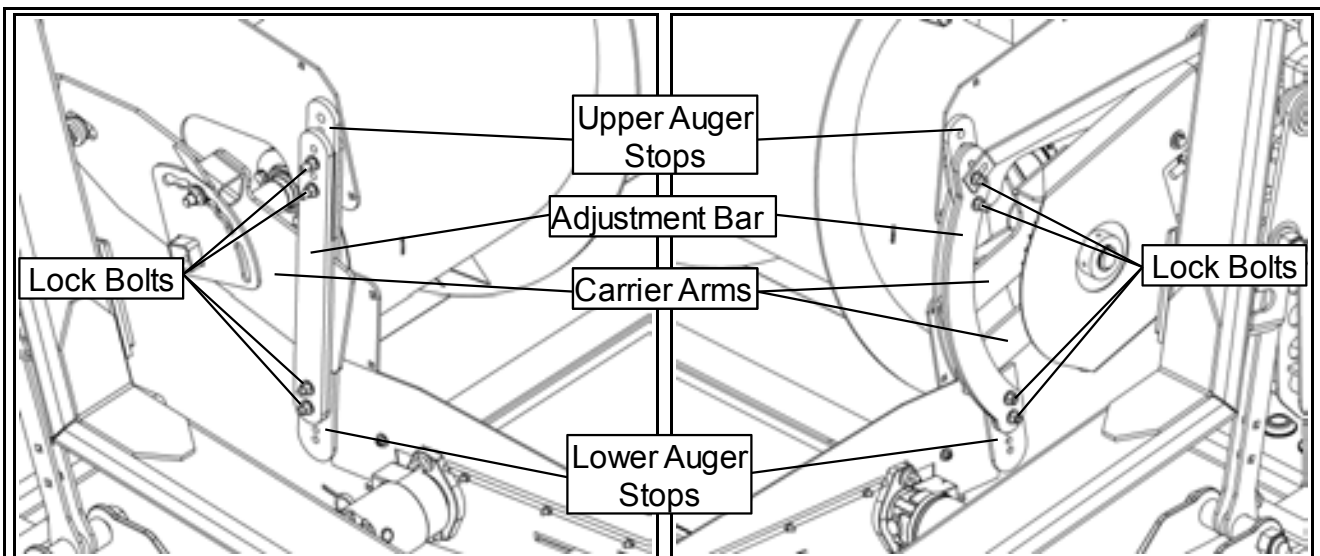


Illustration 11-2: Finger Auger Height Adjustment



Adjust both ends to the same level so the full length of the finger auger will run parallel to the subframe pan.

Fore and Aft Adjustments of the Finger Auger

The finger auger can be adjusted forward and backward by moving the carrier arm. The slotted hole in the carrier arm allows about 2" (50 mm) of travel. Both sides should be adjusted equally. When moving the auger drum check to see that the auger flighting and/or the auger fingers do not contact the feeder chain on the combine, or on the feeder deck drapers.

1. Locate adjustment bolt (1) on each side of the subframe.
2. To decrease the clearance between the subframe and the auger; loosen lock nut (2) and turn lock nut (3) clockwise. To increase the clearance, turn lock nut (3) counter-clockwise.
3. When the desired clearance has been attained, re-tighten lock nuts (2) and (3). For proper performance, each end of the finger auger should be adjusted with the same amount of clearance.

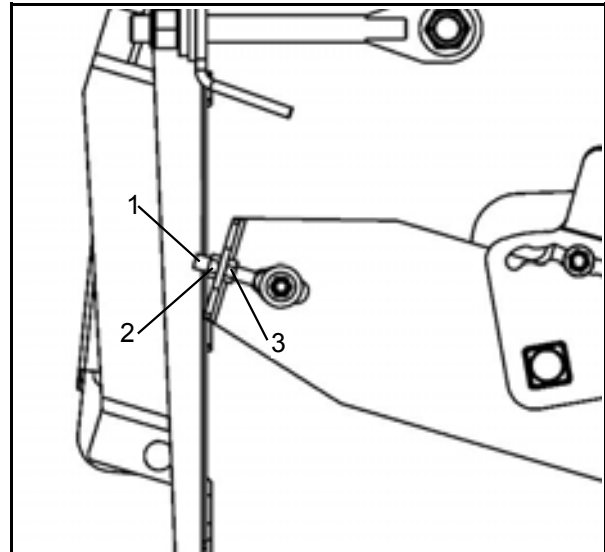


Illustration 11-3: Finger Auger Fore & Aft Adjustment



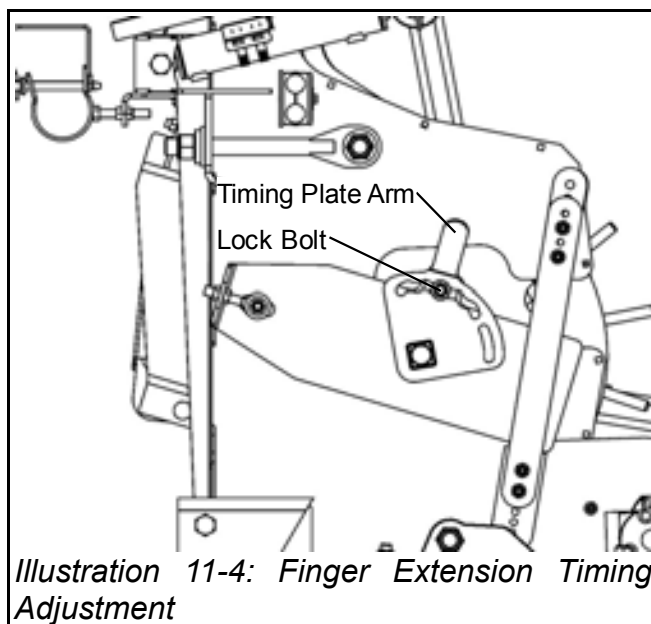
After making height, and/or fore-aft adjustments to the auger, rotate the finger auger slowly by hand to be sure the flighting and the fingers do not contact the feeder house, shrouds, feeder chain, drapers, or header decks. Damage to the combine or header parts from improper adjustment will not be covered by your warranty.

Finger Extension Timing Adjustment

The extension and retraction point of the fingers may be adjusted in order to suit the type of crop being harvested.

To adjust the point of extension/ retraction of the fingers, locate timing plate arm on the right-hand side of the subframe:

1. Loosen lock bolt.
2. Pull the timing plate arm backward to increase the finger extension toward the top and back of the auger drum.
3. Push the timing plate arm forward to increase the finger extension toward the front of the auger.
4. When proper indexing is achieved, re-tighten lock bolt.



Normal adjustment of the fingers is to have them fully extended at the two or three o'clock position (viewing the auger from the right-hand end of the tube.).

Refer to this decal for recommendations for heavy/light crop conditions.



Under all situations, adjust the auger fingers so that they clear the pan or pan inserts by approximately 1/4" (6 mm) to 1/2" (13 mm).

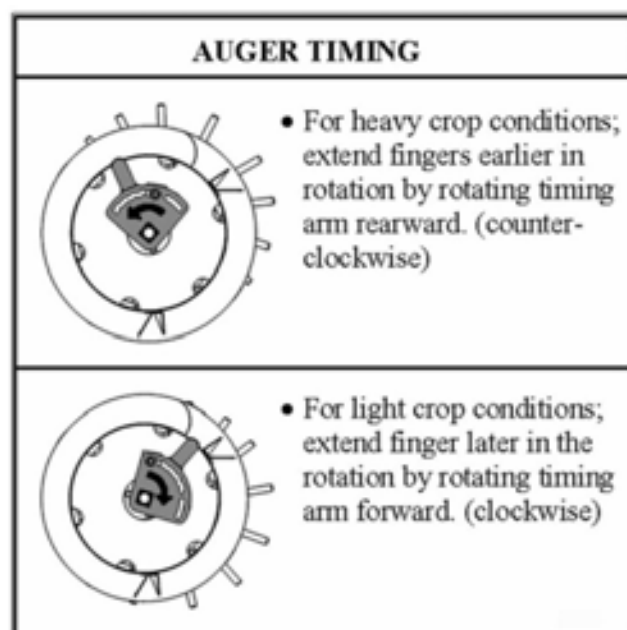
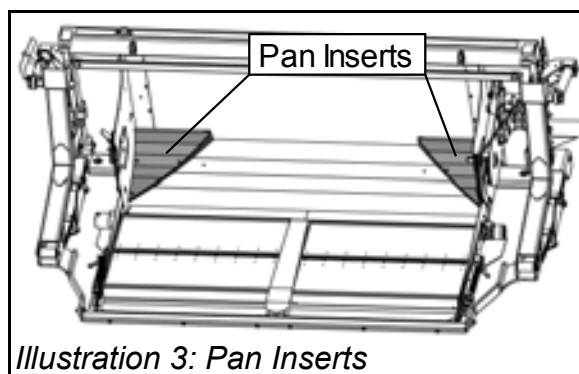


Illustration 11-5: Auger Timing Decal

Pan Inserts

Pan inserts are installed underneath the finger auger against the adapter plate. They improve the feeding of material through to the combine. Without the pan inserts, crops will jam up under the finger auger. Ensure that the pan inserts are properly installed and secure.



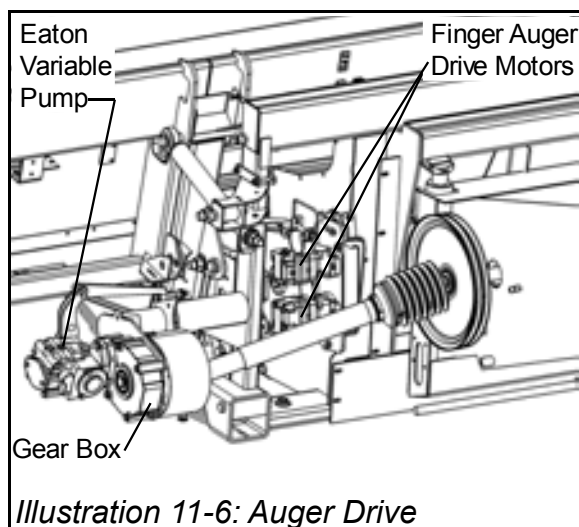
Auger Drive Assembly

Power is transferred from the combine to the header via the header drive shaft. As the drive shaft turns, power is transferred through the gear box, to the Eaton variable speed pump assembly. This pump assembly has a charge pump, which supplies oil to the main pump

Hydraulic oil is drawn out of the header's reservoir, and then sent through the hydraulic circuit, where it is used to power the auger, knife, draper, and feeder deck motors.

The linear actuator enables the operator to reverse the flow in the hydraulic circuit for clean-out purposes.

For further details on hydraulic routing, refer to the "HYDRAULICS" chapter in this manual.



Drive Shaft – Walterscheid

For complete operating information on the installation, service, and safety instructions for input drive lines and clutches, refer to the operator's manual shipped with each drive shaft. These instructions are intended to point out some of the basic safety situations which may be encountered during the normal operation and maintenance of your machine and to suggest possible ways of handling these situations.

Read the manufacturer's operator's manual before operating the equipment. If there are no manuals with the machine, request them from the manufacturer. Study them before you start work. If you don't understand any of the material in the manuals, ask your supervisor or equipment dealer to explain it to you.

Operating the PTO

When closing down operation of PTO driven equipment, shift the PTO control to neutral, shut off the engine and wait for the PTO (feeder house) to stop before getting off the combine.



Do not wear loose fitting clothing or long, free hanging hair when operating the power take-off, or when near rotating equipment.

To avoid injury do not clean, adjust, unclog, or service PTO driven equipment when the combine engine is running.

Never exceed the recommended operating speed for the particular equipment in use. Implement input drive lines, clutches and freewheels are designed for specific machine types and power requirements. They must not be replaced by any shaft other than that recommended by the implement manufacturer. Ensure that the implement input drive shaft is securely connected at both ends.

Only use a completely guarded drive system! See the illustrations on the following page.

PTO systems with complete guarding include the combine master shield, the implement input drive shaft guard and the implement shielding. These guards and shields must be installed at all times. If any component of the guarding system has been removed for any reason, it must be replaced or repaired prior to operation of the machine.



Do not exceed the maximum operating length of the drive shaft!

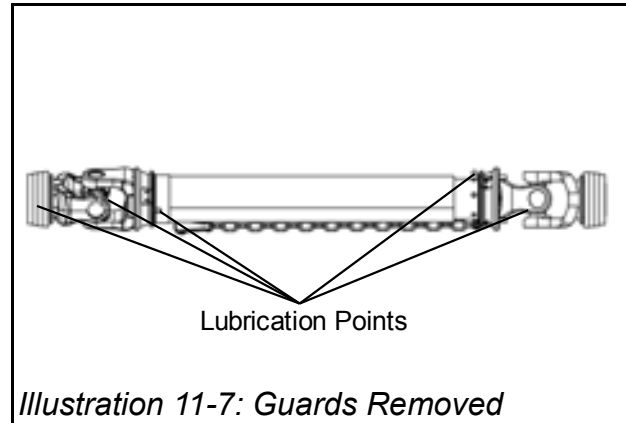
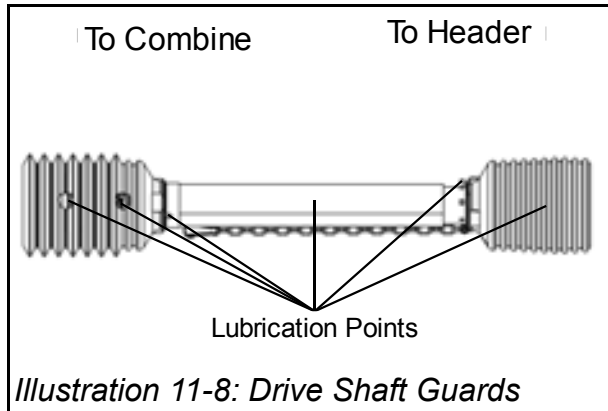
In all working positions the implement input drive shaft should never be extended by more than half the available overlap of the telescoping (overlapping) segment.

To determine this length:

1. Fully compress the drive shaft to its shortest length,
2. Measure the total length,
3. Extend the drive shaft until it separates.
4. Measure this total length,
5. Calculate the difference. One-half of this value is the maximum recommended extension of the drive shaft.
6. Add this calculated distance to the shortest drive shaft length, which you obtained earlier, to determine the maximum recommended length.

Lubrication:

In “as-delivered” condition, Walterscheid PTO drive shafts are greased and ready for operation. For subsequent lubrication of the PTO drive shafts, use lithium base saponified high quality grease with E.P. Additives.



ATTENTION Do not use grease agents containing MoS2!

Regardless of the operating hour total, the system should be lubricated at the end of every season. Especially when a high-pressure cleaner has been used, lubrication is required immediately after cleaning in order to press out any water that might have penetrated into the joint.

Lubricate with high quality grease before starting work, and every 50 operating hours. Clean and grease the implement input drive shaft before each prolonged period of non-use.

Molded nipples on the guard near each guard bearing are grease fittings and should be lubricated every 50 hours of operation if the guard is chained so that it does not rotate.

Telescoping members must have regular lubrication to operate successfully.

Telescoping members without grease fittings should be pulled apart and greased manually.

Check and grease the guard tubes at the end of each season to prevent seizing.

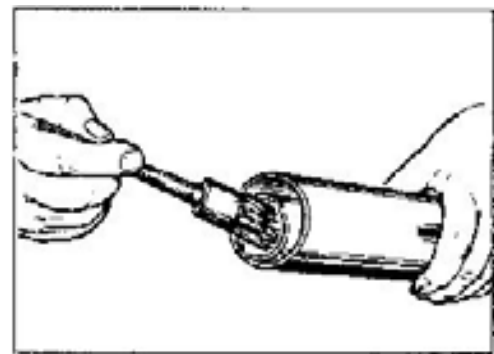
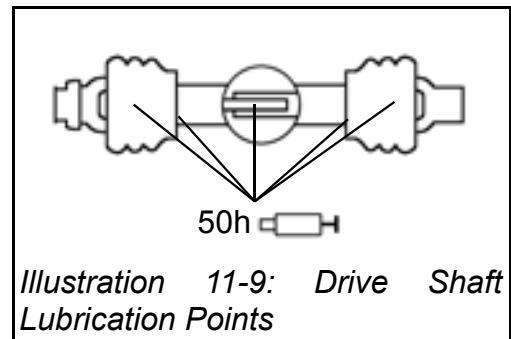


Illustration 11-10: Lubrication Telescoping Section of Drive Shaft

Coupling the implement input drive shaft.

Clean and grease the PTO and the implement input connection.

AS-Lock:

Pull locking collar and simultaneously push implement input drive shaft onto PTO shaft until the locking device engages.



Ensure all safety locks are securely in position before starting work on the implement input drive shaft.

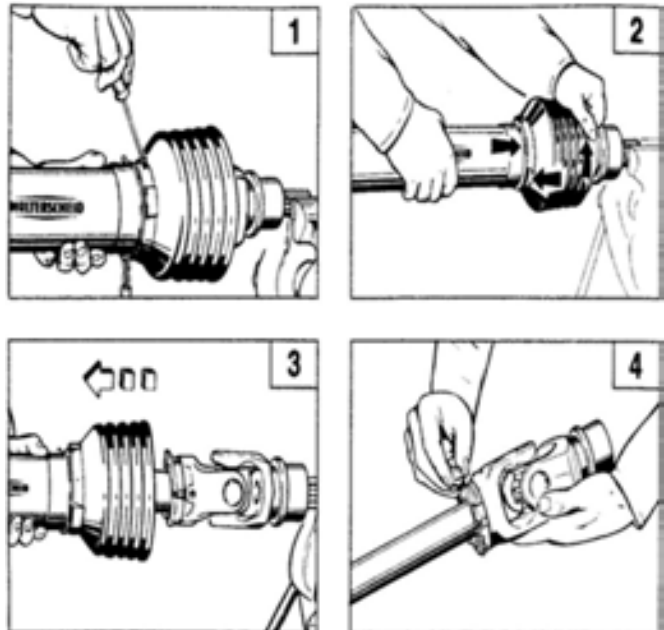
Drive-Line Guard Restrainer Chain:

The chain prevents the guard from rotating against stationary parts, reducing the potential for damage, and accelerated wear. A properly installed and maintained chain will increase the service life of the guard.

1. Chains must be attached to allow sufficient articulation of the shaft in all working positions. Care must be taken to be sure that chain does not become entangled with draw bar hitch or other restrictions during operation or transport of machine.
2. The chain is not designed to carry the weight of the implement input drive shaft. Damage will occur if suspended by the chain.

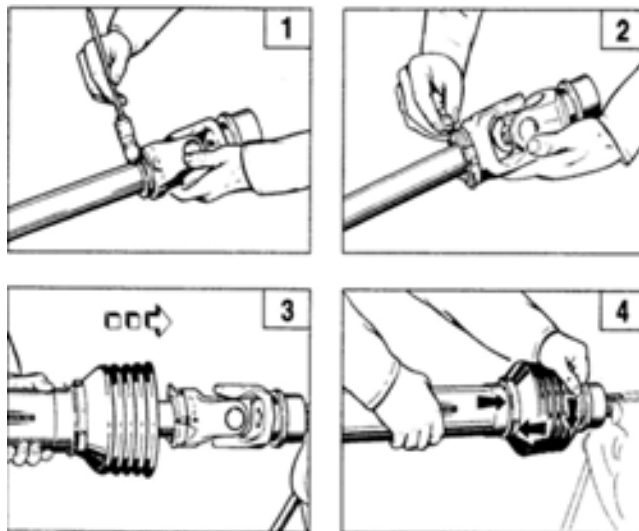
Drive Shaft Guard Disassembly:

1. Remove locking screw.
2. Align bearing tabs with cone pockets.
3. Remove half-guard.
4. Remove bearing ring.



Drive Shaft Guard Assembly

1. Grease yoke groove and inner profile tube.
2. Fit bearing ring in the groove with recesses facing profile tube.
3. Slip on half-guard.
4. Turn cone until it engages correctly.
5. Install locking screw.



Replacing Drive Shaft Guard Cone:

Disassemble guard. See the previous illustrations. Remove the old cone (i.e. cut open with knife). Remove chain. Place neck of new cone in hot water (approx. 80 C/180 F) and pull onto bearing housing.

1. Turn guard cone into assembly position. Follow the assembly instructions above.
2. Reconnect the chain, if applicable.



Guards are designed to protect the user. Defective and damaged guards must be repaired immediately. Only original Waltersheid Agraset spare parts should be used. For further information, contact your dealer.

Drive Shaft Clutch:

The drive shaft on the Grain Belt Plus header has an over-running clutch, which ensures uni-directional orbiting of the drive shaft. There is no torque setting for this particular style of clutch, as the relief valves in the header's hydraulic circuit replace any need for clutching.



This drive shaft will provide power in only one direction of rotation. The clutch end of drive shaft should be installed onto the gearbox of the header, not the feeder house of the combine. Reversal of the drive shaft connections will result in no power reaching the header.

This feature will aid installation, since the shaft may be easily rotated in reverse to line up with the splines on the feeder house.

No field servicing is required with this drive shaft, other than basic inspection of the safety components (shields), and lubrication (as detailed in Lubrication).

Maintain drive shaft in accordance with the manufacturer's recommendations.

13. Cutting System

In order to obtain optimum performance from your Grain Belt Plus Header, all cutter bar components must be maintained in good working condition. Inspect the cutter bar daily for damaged and broken parts before starting work. Repair or replace parts as required.



When working near the knife ensure that the following procedures are followed:

Raise the header table, raise the reel, stop the engine, set the park brake, and remove the ignition key before dismounting. Install the feeder house lift cylinder locks & reel lift cylinder locks to prevent any equipment from falling on you in the event of hydraulic system failure.

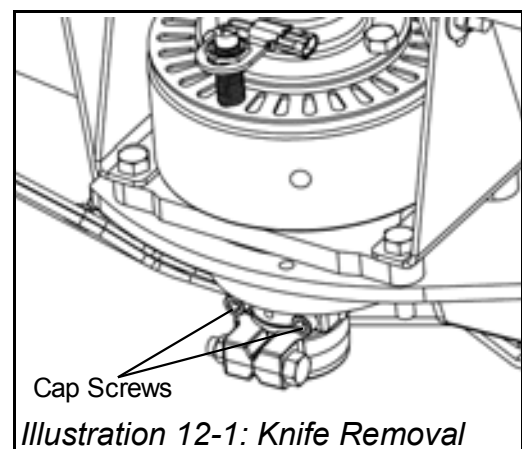
Clear the area of bystanders, especially children.

Wear heavy canvas or leather gloves when working with the knife.



Knife Removal

1. Remove the two-socket head cap screws on the knife head block
2. Slide the knife out of the cutter bar.
3. Reverse the procedure when installing the knife. Apply a small amount of thread lock solution to cap screws before installation. Torque bolts to the recommended specifications of 41 ft-lb (56 Nm)



Guards

EasyCut guards are manufactured from heat treated spring steel. The guards have beveled cutting edges at the top and bottom, which enable them to cut better and last longer.

1. When replacing guards always mount the new guard with the SCH stamp to the top. Be sure the knife is on top of the bridge roller spacer. The crimp lock nut on the guard bolt should always be on the top.
2. Alignment of the guards is critical. Before tightening the guard bolts, push the spacer bar as far back on the cutter bar as possible, and pull the guard ahead as far as possible. Sight down the cutter bar to be sure all of the guards are aligned. Tighten guard bolts.

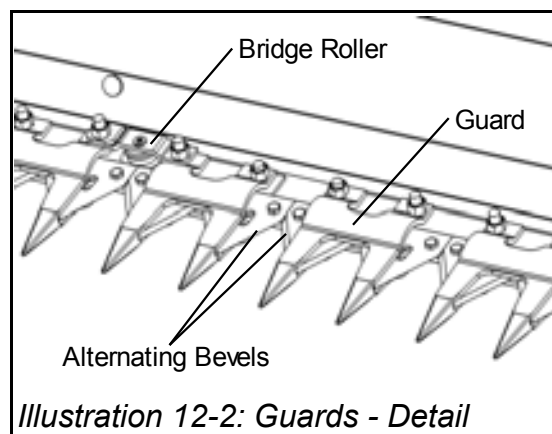


Illustration 12-2: Guards - Detail

Bridge Rollers

The bridge roller bar aids in guiding the travel of the knife. The bridge rollers, allow the knife to slide freely back and forth as it cuts, without any friction to the back of the spacer bar. The sickles should rest on top of the spacer lip at the base of the roller. The backs of the sickles should be in firm contact with the center body of the roller. (See *Illustration 12-2: Guards - Detail*.)

Sickle Sections

The sickle sections of the knife are installed with alternated cutting surfaces. One section will have the cutting bevel facing up, and the next will have the cutting bevel facing down. The edges must be in good condition to obtain proper cutting.

To Replace a Section:

1. Remove the guard to expose the section.
2. Unbolt the section and install a new one.
3. Tighten the section bolts and nuts.
4. Re-install the guard.

OR:

1. Turn the knife by hand until one section bolt is exposed. This can be done by inserting a metal rod into the hole on the knife drive flywheel, and pushing or pulling in the desired direction.
2. Remove the bolt.
3. Continue turning the knife drive until the other bolt is exposed.
4. Remove second bolt along with the section. Install a new section and first bolt, and tighten. Turn knife back, and tighten the other bolt.

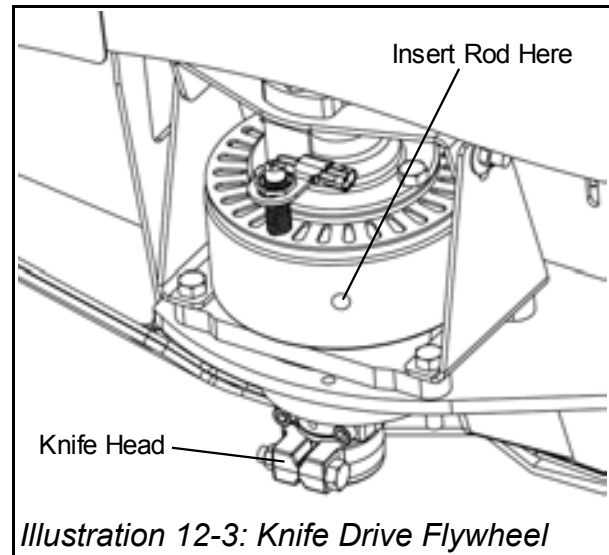


Illustration 12-3: Knife Drive Flywheel



When installing sections, remember to rotate the beveled serrations, one facing up and the next one facing down (See the illustrations below.)

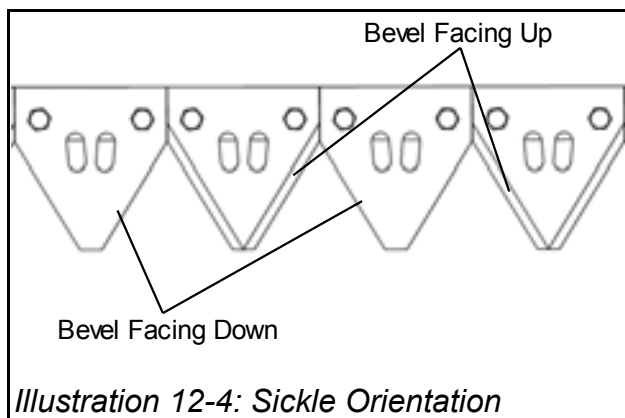


Illustration 12-4: Sickle Orientation

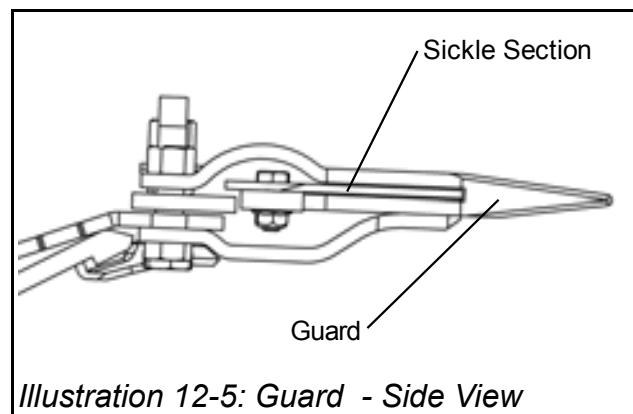
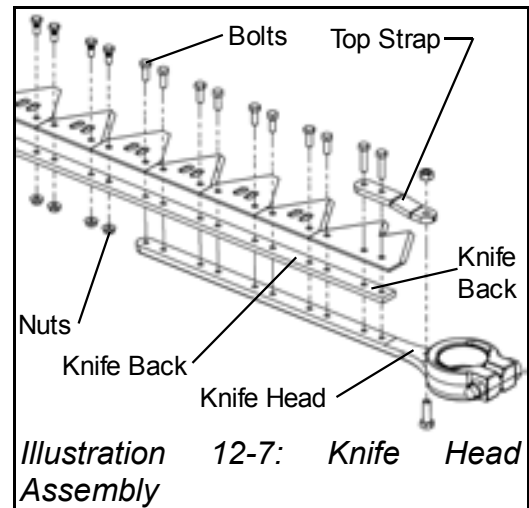
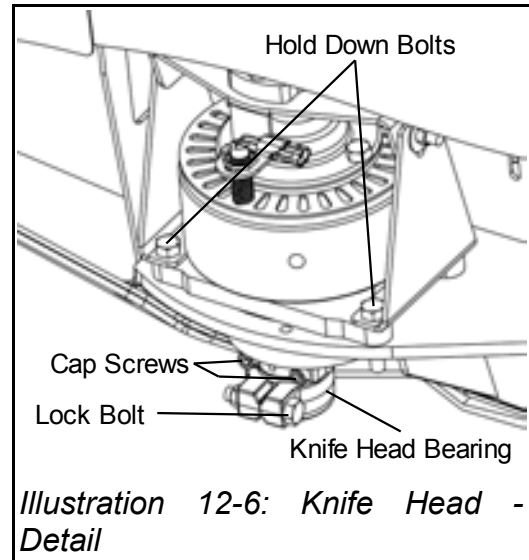


Illustration 12-5: Guard - Side View

Knife Drive/ Knife Head

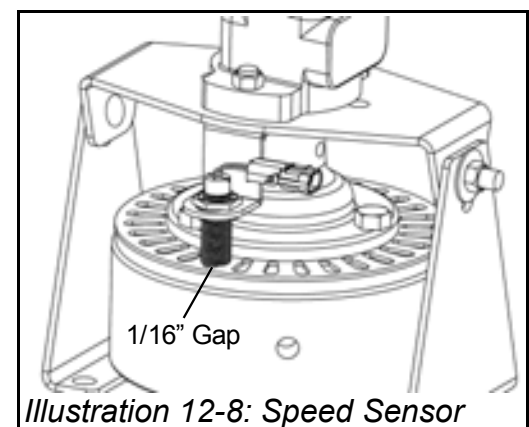
Proper care and maintenance of the knife drive and knife head is critical to the performance of your Grain Belt Plus Header. Refer to the Lubrication section of this manual for lubrication points and procedures. The photo below shows the critical check points.

1. Check the tightness of the knife drive hold-down bolts daily. Torque to 120 ft-lb. (163 Nm).
2. Check the knife head bearing daily. If the bearing is loose, check the tightness of the lock bolt (41 ft-lb.- 56 Nm). If the lock bolt is tight, check the condition of the bearing and steel sleeve. If any parts are defective, replace them to avoid damage to the drive.
3. Check the socket head cap screws daily (41 ft-lb. - 56 Nm). Rotate the knife drive by hand to be sure the knife head bearing is rotating freely.
4. Daily, check the knife head bolts which attach the knife head to the knife back. The bolts should be tightened to 120 in-lbs, (9.96 ft -lbs); (13.5 Nm).



Knife Speed Sensor

The Grain Belt Plus Header has a standard Knife Speed monitoring system. This connects to the monitor system, allowing the operator to monitor the knife speed. Recommended knife speed is between 580-600 RPM, adjusted using the procedure outlined in Knife Speed Adjustment



Knife Speed Adjustment

If the knife speed, indicated on the in-cab readout, is not correct (between 580 & 600 rpm), the pump control arm, located on the main hydraulic pump, will need to be adjusted.

1. Ensure the Pump Control Arm is set up with all washers and spacers on the left side of the rotation plate, as shown in Illustration 12-10: Pump Control Arm – Factory Setup.
2. Start the combine and run for a minute at normal operating speed. Take note of the knife speed on the in-cab readout.



Raise the header, shut down the engine, and wait for all moving parts to come to a complete stop before exiting the cab. Insert the safety lock(s) on the header lift cylinders.

3. If the knife speed is too low, start moving spacers and/or washers over to the right side of the rotation plate. This will increase the knife speed. One spacer is the same size as 5 washers, start by moving the 5 washers over (Illustration 12-11: Washers Moved to the Right.)
4. Restart the combine, operate the header at normal working RPM, and observe the knife speed on the in-cab readout.
5. If the speed is still too low, move additional spacers over to the right side. If the speed is too high move some washers back over to the left side of the rotation plate.
6. Repeat until the in-cab knife speed readout shows between 580 & 600 rpm.

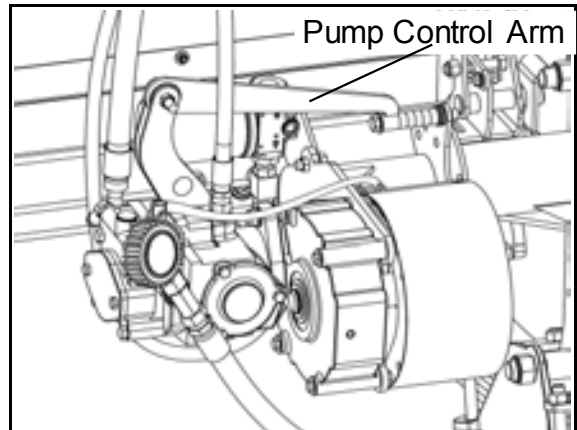


Illustration 12-9: Pump Control Arm Location

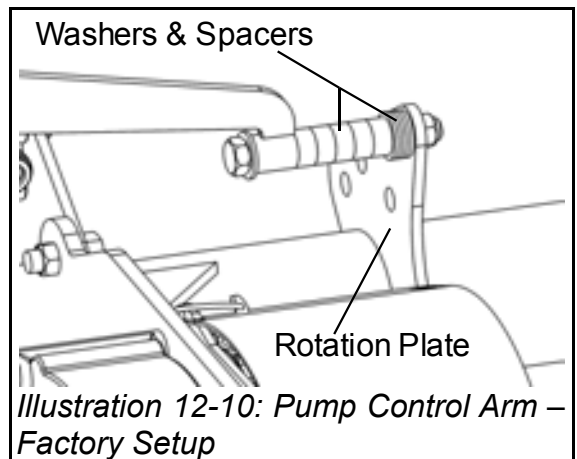


Illustration 12-10: Pump Control Arm – Factory Setup

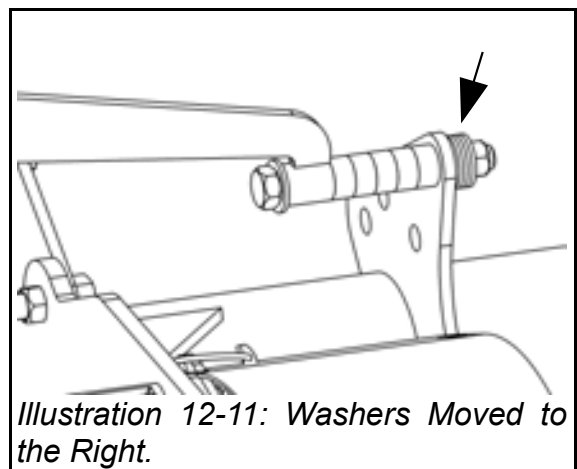
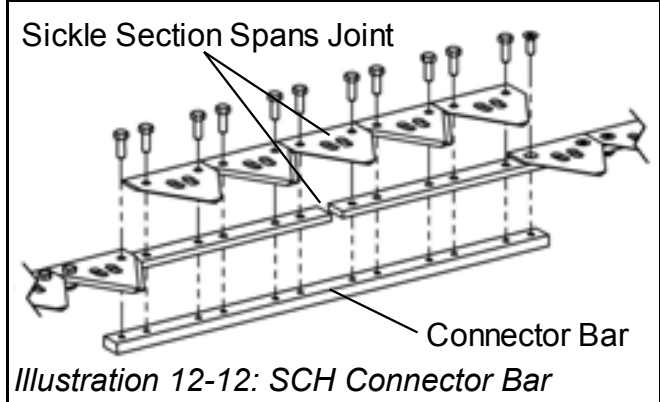


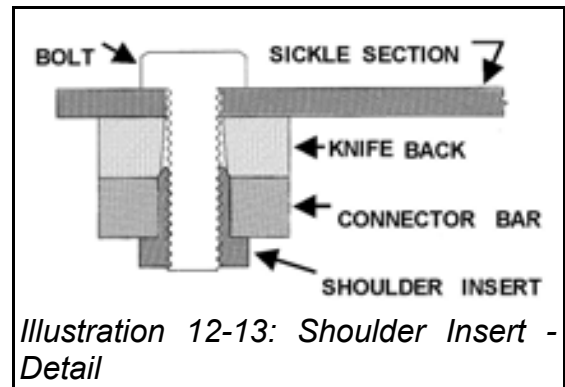
Illustration 12-11: Washers Moved to the Right.

SCH Connector Bar

On some models of Honey Bee Grain Belt Plus a connector bar is used to connect two sections of knife. The knife back is the part of the knife to which the sickle sections are bolted. On units that use the SCH cutting system, the connector bar is installed on the underside of the knife back. The SCH connector bar has eight threaded inserts installed into the bar which protrude slightly on the side that contacts the knife back. The knife back is punched with holes to accommodate the sickle sections and the holes are slightly tapered from the bottom.



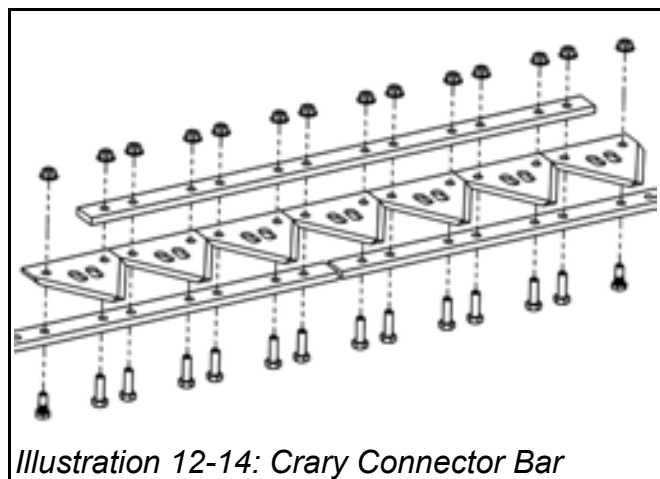
Knife sections must be installed on the top side of the knife back (the side with the SCH Logo) so that the protruding inserts of the connector bar will fit snugly into the tapered section holes. As the section bolts are tightened, the inserts in the connector bar are drawn into the knife back forcing the threads to tighten on the bolt. The bolts should be tightened to between 120 - 150 in-lbs, (13.5 - 17 Nm).



Do not grind the inserts off, as this will make them ineffective in securing the knife. Failure of the knife may result.

Crary Connector Bar

The knife sections must be installed on top of the knife back, then secured in place with the connector bar on top of the sections. Torque the nuts and bolts to between 120 – 150 in-lbs (13.5 – 17 Nm). Check the tightness of these bolts daily; and replace broken and worn sections as required.



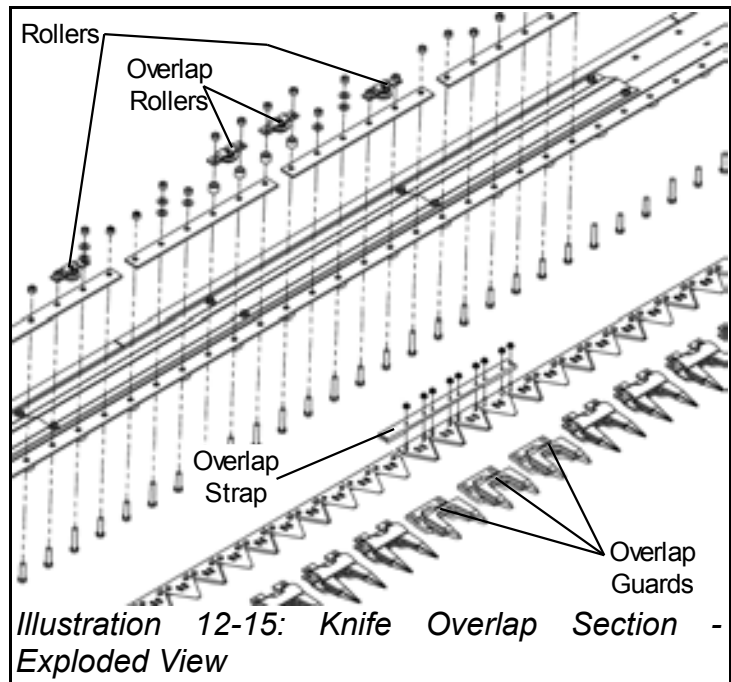
Overlap Kit

The overlap kit is used on all Grain Belt Plus headers, and is a necessary item with double knife drives. The knives overlap at the center of the table.

In this portion of the knife, the sickle sections have countersunk bolt holes to provide a smooth cutting surface. The overlap guards are open on top, and are designed to provide for the extra thickness in the knife. The overlap strap bolted to the left-hand knife will offset the countersunk sections to allow the knives to overlap.

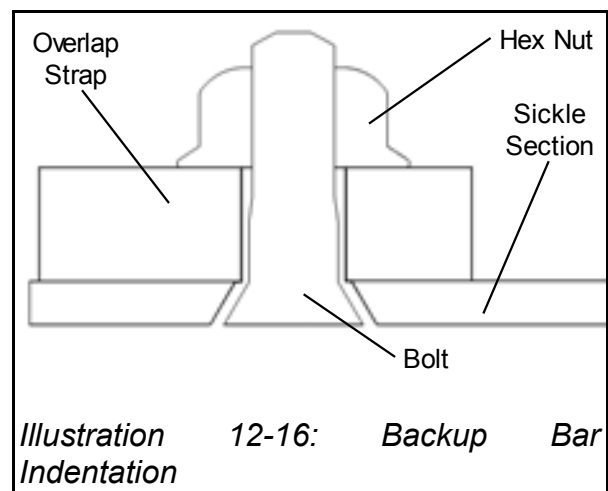


If knives are noisy or are overheating, check to see if the overlap guards have been properly installed.



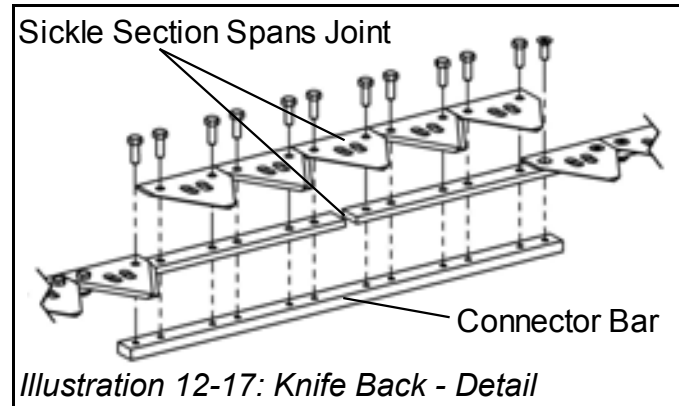
The overlap sections (on the overlap strap), and the right hand knife back should be tight to each other when the counter sunk bolts are tight.

Ensure that the bolt heads are fully seated in the indentation in the sickle section where they connect to the overlap strap.



To repair a broken knife back:

If the knife breaks during use, repairs can usually be made with a connector bar. Most often the knife back will break across a bolt hole that holds a sickle section in place. To use the connector bar properly, the damaged section needs to be cut out and/or a section of knife removed. If the knife breaks close to the knife head end, remove that section of knife, reconnect the knife head, and then add another piece to the far end of the knife where there is less cutting stress on the knife.



The joint in the two knives must be centered under a full sickle section, with the connector bar centered underneath the joint.

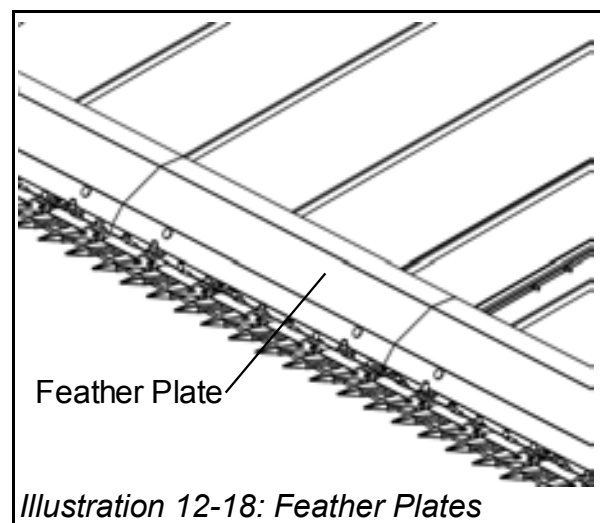


To avoid knife failure, do not place the joint where two sickle sections join.

Check the knife for dull or damaged guards and sections, replacing as necessary.

Feather Plates

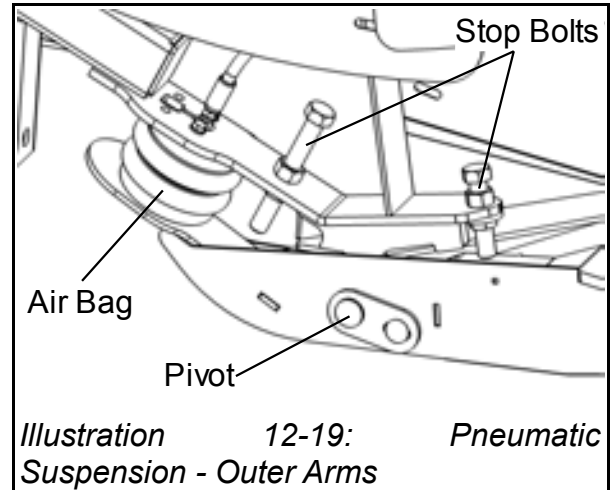
The Grain Belt Plus header is equipped with feather – plates that span the width of the cutter bar. The function of the feather plates is to provide a transition for the cut crop traveling from the knife to the draper. As these items are fastened individually to the guards, they are allowed to travel in unison with the guards and cutter bar in uneven terrain.



Pneumatic Cutter Bar Suspension

Grain Belt Plus headers are equipped with a pneumatic cutter bar suspension.

This system is designed to assist the cutter bar with flotation in low crop cutting situations. In total, there are 6 locations equipped with suspension paddles and air-bags – one on each side of the header, and one on each of the frame struts under the header.

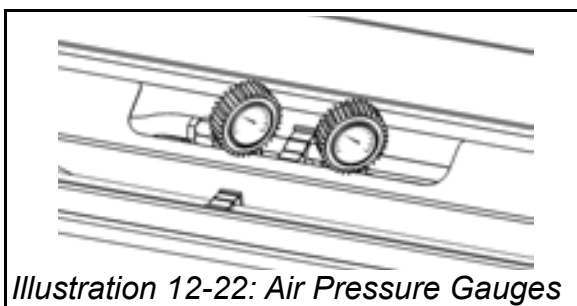
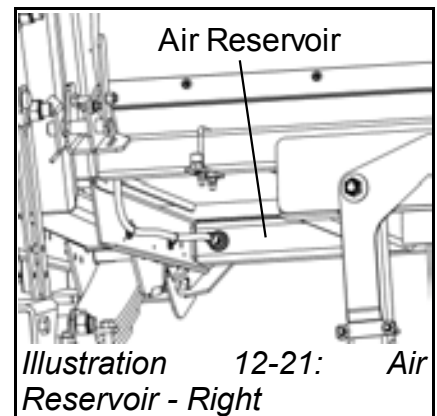
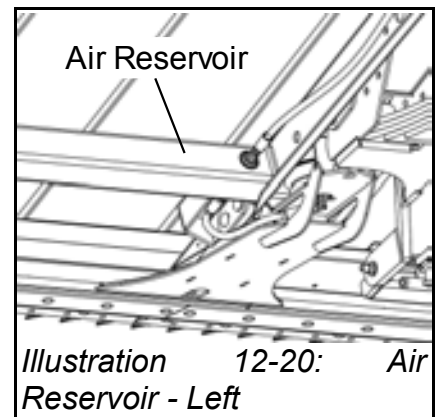


Air Pressure Management

The air pressure for the pneumatic suspension system is contained in two mid-frame tubes on underside of the header, adjacent to the sub frame struts. Refer to the following photos for the location of the reservoirs.

The pressure in the tubes should be maintained at 20 psi for average cutter bar flotation. This pressure can be varied, depending on the desired amount of float. If the tube becomes over-pressurized, air may be released by depressing the needle in the center of the air nipple.

The reservoirs are linked to the 4 center paddles and are filled through the LH nipple and monitored by the adjoining air gauge. The end air bags are independent of the center ones and are filled through the RH nipple and monitored by the adjoining air gauge. This allows independent adjustment between the center and end air bags.



Paddle Travel

The travel of the suspension paddle is limited by one adjustment bolt behind the pivot point and a rotating shim in front. These act as “stoppers” when they make contact with the strut. To adjust the amount of travel, loosen the lock nut, and then turn the bolt either clockwise (to reduce travel), or counter clockwise (to increase travel). Tighten the lock nuts when desired travel is attained. The forward stop on the mid-frame paddles is adjusted by loosening the nut and rotating the shim.

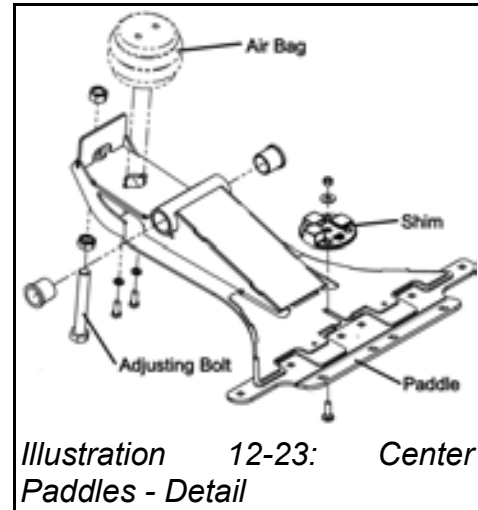


Illustration 12-23: Center Paddles - Detail



This system is also useful to “lock” the paddles in a full-up position. A second method of limiting upward movement of the paddles involves increasing the air pressure until the desired resistance is obtained.

Maintenance

As with other components on the Grain Belt Plus header, the pneumatic table suspension system should be regularly inspected to ensure that it is in good working order.

1. Check pressure gauges for proper air pressure in reservoirs.
2. Observe any excessive loss of air pressure, and locate the cause.
3. Inspect the air lines and air bags to ensure they are free of cuts, scrapes, splits, and gouges. Replace damaged parts.
4. Ensure that the air lines are not loose or dangling, and that they are in no danger of being pinched in other parts of the header. Restrain lines as necessary.

14. Miscellaneous, and Optional Equipment

Header Storage Trailer

The header storage trailer is used for highway transportation of the header. For information on the optional Header Storage Trailer, please refer to the “HEADER STORAGE TRAILER” operator’s manual (supplied with trailer).

SCH Crop Lifters

Crop lifters are a valuable tool for harvesting situations involving “downed” or lodged crop. Follow these instructions to install the optional Schumacher crop lifters.

1. Install the lifter spools to the underside of the guards using the longer bolts supplied in the kit. The spools should be spaced equally along the cutter bar, one per foot is recommended.
2. Insert the “V” at the back of the runner into the center recession on the spool.
3. With the pin removed from the guard pocket, lift up on the crop lifter, and insert the guard tooth into the guard pocket.
4. Next, install the locking pin. The guard pocket of the lifter has three locking pin holes, which allow for three different lifter angles. Install the locking pin in the hole which best suits your harvesting needs, snapping it forward and down to secure.
5. For additional adjustment, flat washers can be added between the guard and the crop lifter mounting spool.

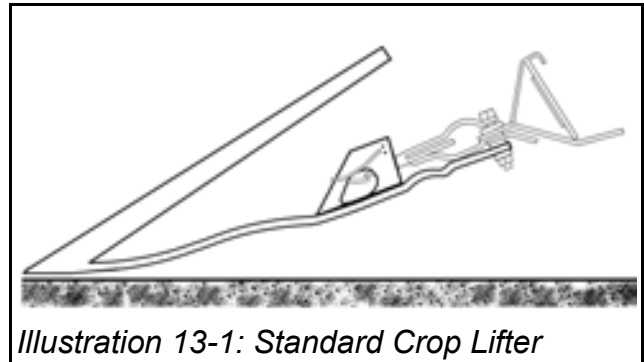


Illustration 13-1: Standard Crop Lifter

For crop lifters to work properly the bottom runners must be parallel to the ground when the platform is in cutting position. The diagram below illustrates positioning of a standard crop lifter.

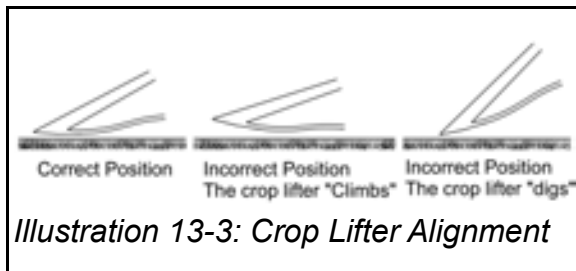


Illustration 13-3: Crop Lifter Alignment

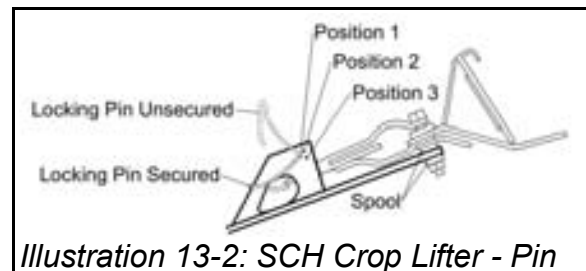


Illustration 13-2: SCH Crop Lifter - Pin

Special Series Lifter

The bottom runner of the Special Series lifter should be parallel to the ground. To find the correct mounting position of the lifters for a given platform, drive the combine onto a flat surface (concrete, asphalt).

Mount one lifter in the middle of the platform. Lower the platform until the crop lifter just touches the ground. The runner of the lifter should be parallel to the ground. If it is not, change lock pin positions and if necessary, vary number of flat washers until the correct position is found.

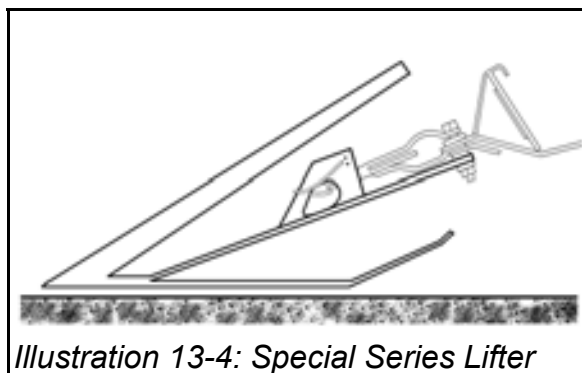


Illustration 13-4: Special Series Lifter

Adapter Plate

All Grain Belt Plus tables are equipped with the same style of sub-frame and center feed auger. The make of combine that you use will require the proper adapter plate which is bolted to the back of the subframe. Different adapter plates are available for AGCO, Case IH, CAT, John Deere, and New Holland combines.

Ensure that all nuts, bolts, and washers are present and secured properly to the sub-frame prior to mounting on the combine.

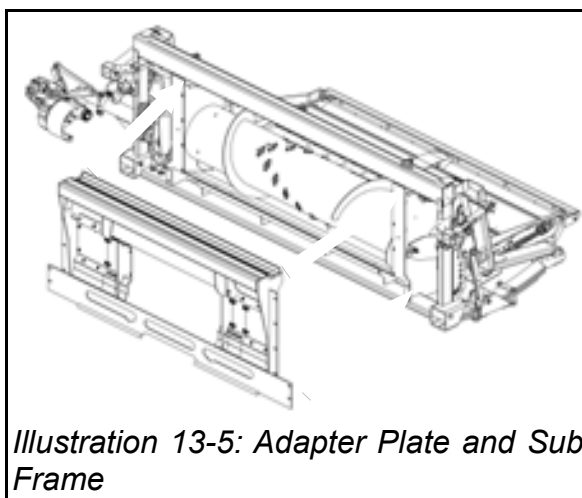


Illustration 13-5: Adapter Plate and Sub Frame

AGCO Bezels

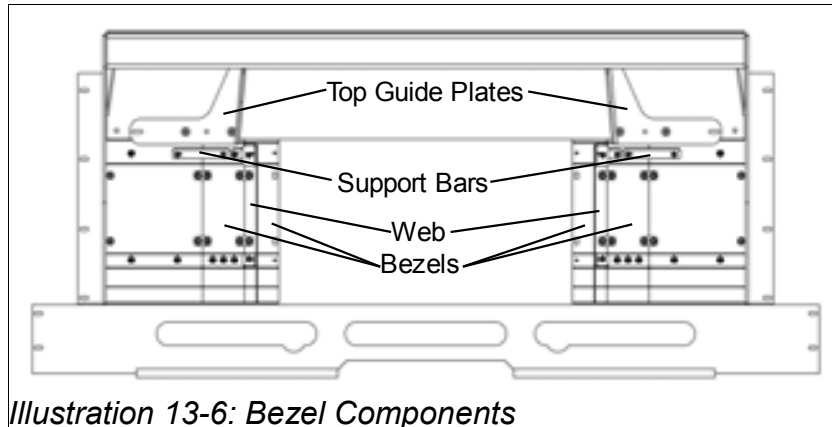
Depending on the combine that you use, the AGCO style of auger adapter has a series of combinations of bezel layouts that must be followed. These bezels change the size of the feeder house opening, so that it matches the make and model of combine being used.

Grain Belt Plus headers leave the factory with all bezel pieces and hardware attached. Depending on the make and model of your AGCO combine, some or all of these components may be required. Use the following chart, and corresponding layouts to determine which one is correct for your combine.

Combine	Model	Lateral Tilt	Non Lateral Tilt	Note
Gleaner	R75/65/72/62	Layout 2	Layout 1	62/72 if equipped with removeable indexing blocks.
	C62	N/A	Layout 5	Use 3/16 tab as spacer at top of web.
	A65	Layout 3	Layout 3	
	A85/75	Layout 4	Layout 4	Use 3/16 tab as spacer at top of web
Massey Ferguson	9790/9895	Layout 4	Layout 4	Use 3/16 tab as spacer at top of web.
	9690	Layout 3	Layout 3	
	8780 V	Layout 3	Layout 3	
	8780 XP/W	Layout 3	Layout 3	
	8570	N/A	Layout 6	Cut end off guides and drill new inner hole to place as shown.
	8680	N/A	Layout 5	Use 3/16 tab as spacer at top of web
Challenger	670/680B	Layout 4	Layout 4	
	660	Layout 3	Layout 3	

Terms used for the AGCO Bezels

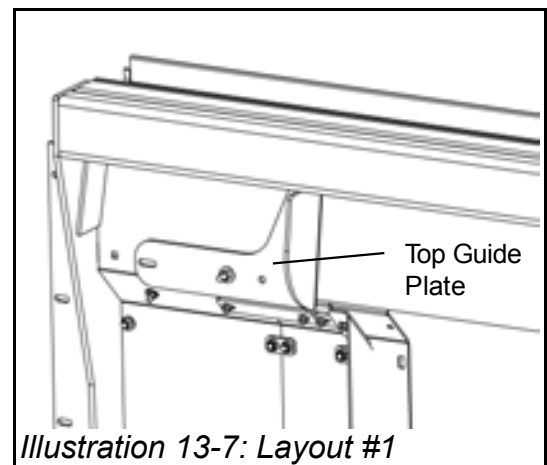
Left and right sides are shown here with terminology used in this manual:



Layout #1

All hardware used.

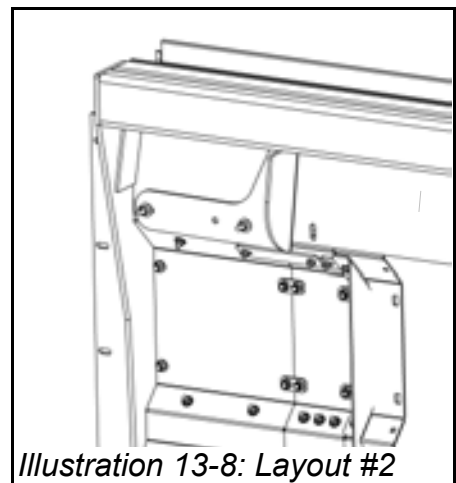
Note the position of the top guide plate.



Layout #2

All hardware used.

Note the position of the top guide plate (moved towards the outer edge of the subframe).



Layout #3

Both top guide plates should be removed, along with the first bezels (closest to the center of the subframe). The hardware and short support bar holding the first bezels in place should also be removed. The web is repositioned to the remaining bezel.

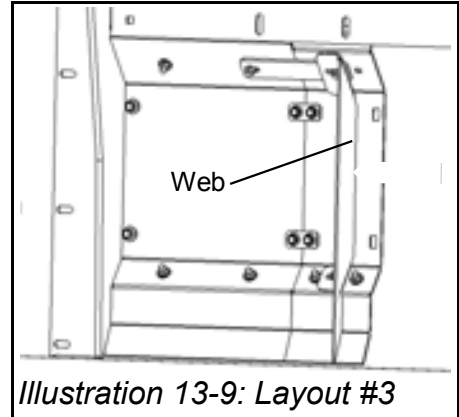


Illustration 13-9: Layout #3

Layout #4

No guide plates are used, both bezels are removed and both webs are moved towards the outer edge of the subframe (as indicated to the right)

The short support bar is used at the top

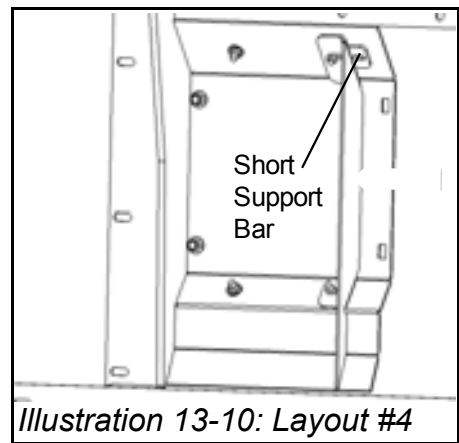


Illustration 13-10: Layout #4

Layout #5

No guide plates are used, both bezels are removed and both webs are moved further towards the outer edge of the subframe (as indicated to the right)

The short support bar is used at the top

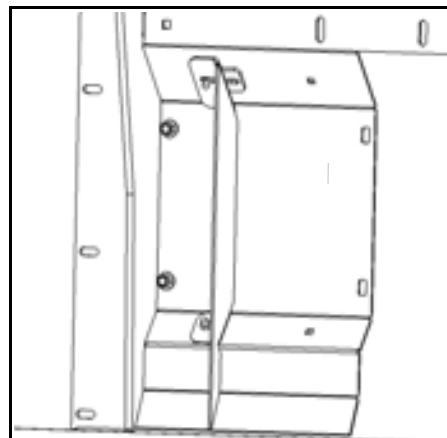


Illustration 13-11: Layout #5

Layout #6

All hardware is used.

Note the position of the guide plates. They will have to be cut to fit properly.

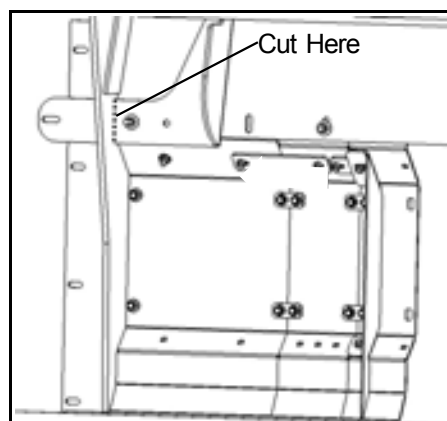


Illustration 13-12: Layout #6

Grain Belt Plus 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.

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.

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.



Raise the header, shut down the engine and wait for all moving parts to stop before leaving the cab. Set the feeder house lift cylinder safety locks.

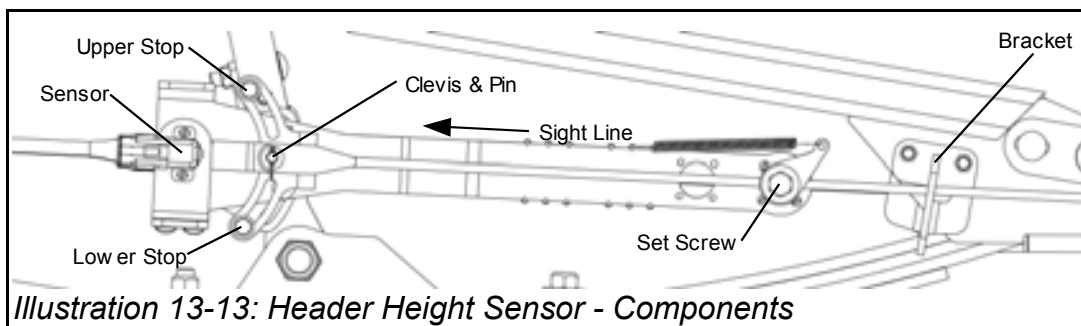


Illustration 13-13: Header Height Sensor - Components

2. With light pressure, manually move the sensor arm down to the center of its range of motion. Check that the clevis and pin is set close to the rear of the sensor arm while in this position.
3. With the upper and lower stops at their outer limits, move the sensor arm to its upper and lower limits of travel.
4. If the type of sensor installed is adjustable, see items 8 and 9 for sensor adjustment.

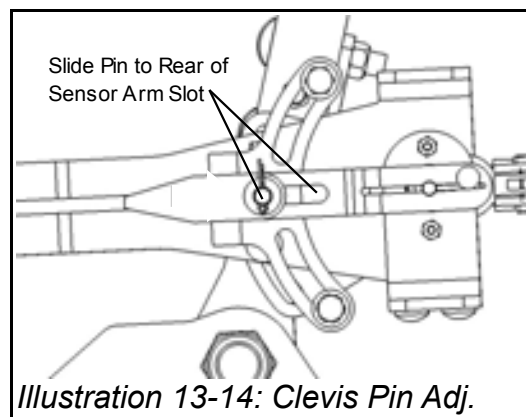


Illustration 13-14: Clevis Pin Adj.

5. This type of sensor is not adjustable.

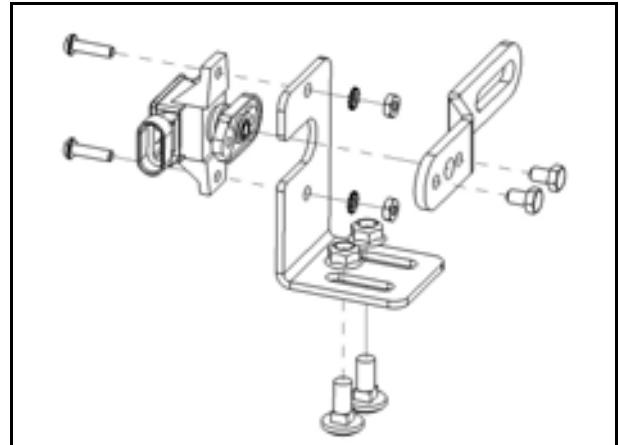


Illustration 13-15: Non-Adjustable Sensor

6. This type of sensor is adjusted by loosening the set screw on the sensor arm locking collar, and moving it until equal travel up and down is available within specified voltage range for your type of combine.

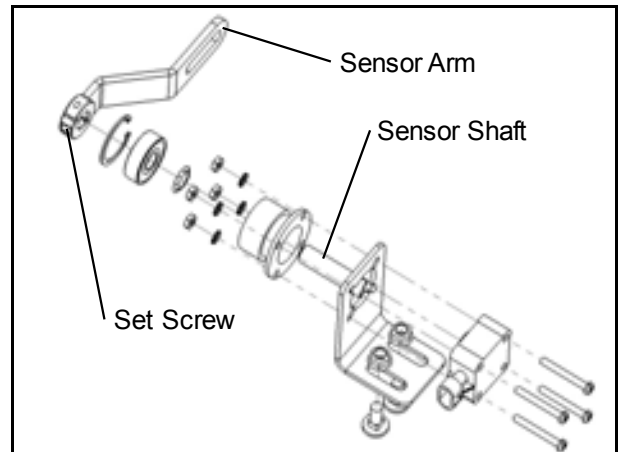


Illustration 13-16: Adjustable Sensor – Type 1

7. This type of sensor is adjusted by loosening the two screws shown here, and turning the body of the sensor until equal travel up and down is available within specified voltage range for your type of combine.

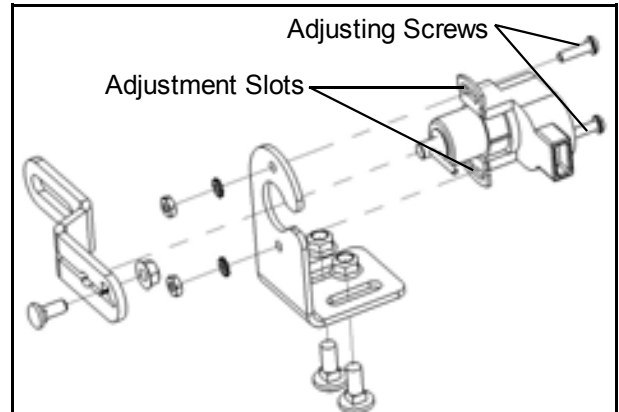


Illustration 13-17: Adjustable Sensor – Type 2

8. To adjust the voltage range, grasp the sensor pin with a pair of pliers. Loosen the set screw on the sensor arm. Rotate the sensor pin until equal travel up and down is available within the specified voltage range for your type of combine. Re-tighten the set screw on the sensor arm before releasing the sensor pin.

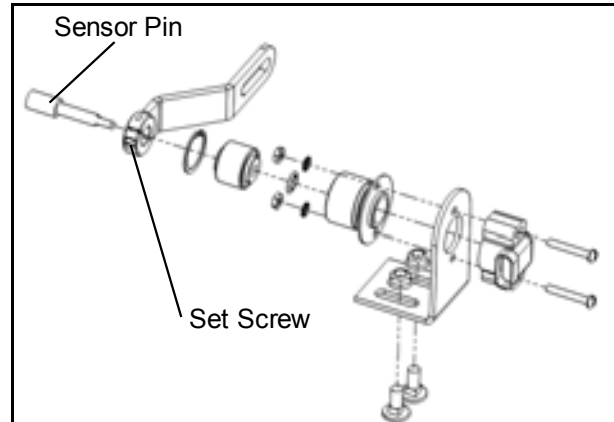


Illustration 13-18: Adjustable Sensor – Type 3

9. With the header fully raised, the sensor arms on both sides of the subframe should be resting lightly against the upper stop. If this is not the case, loosen the lock and pivot bolts and adjust. When the sensor is set correctly, re-tighten the bolts.

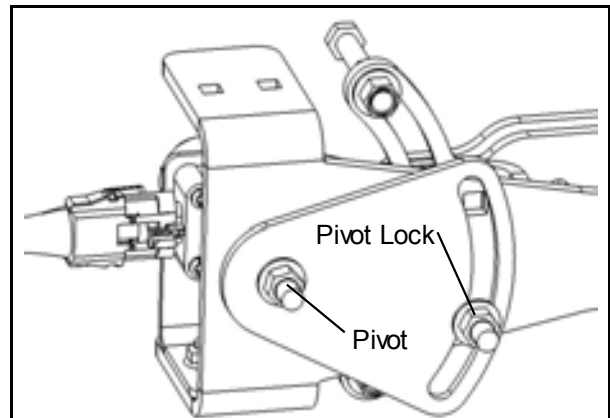


Illustration 13-19: Header Height Sensor - Left Side

10. Move the sensor arm down with your finger. If it does not reach the lower stop, loosen the link arm set screw, hold the sensor arm at its center of travel, and set a straight line of sight through these parts. See *Illustration 13-13: Header Height Sensor - Components* on page 142 for proper alignment and line of site reference.
11. If the sensor arm reaches the end of its travel before contacting either the top, or the bottom stops, loosen the stop, and move it into light contact with the arm, then re-tighten.

Setting Header Height Control in the Field

If significant adjustments are made to the cutting angle and float of the header, it will be necessary to re-calibrate the header height control. Sensor arm assemblies are located on either side at the base of the sub-frame.

Depending on the particular make of combine, the following chart gives a list of appropriate voltage ranges for the header height control.



Variation refers to the total voltage used, and is determined by subtracting the voltage reading at the lowest position, from the voltage reading at the highest position. For example, if the voltage at the high position is 7.0, and the voltage at the low position is 4.0, then the Variation (or total voltage used) is 3.0 volts.

	High Reading Not above:	Low Reading Not Below:	Maximum Difference:	Minimum Difference:
2008 New Holland CR 9040/9060	4.5 Volts	0.5 Volts	4.5 Volts	1.5 Volts
New Holland CR/CX	7.5 Volts	2.5 Volts	5.0 Volts	2.0 Volts
CASE IH	4.5 Volts	0.5 Volts	4.0 Volts	2.0 Volts
John Deere 50/60	4.5 Volts	0.5 Volts	4.0 Volts	2.0 Volts
CAT Lexion 400/500	4.5 Volts	0.5 Volts	4.0 Volts	2.0 Volts
Challenger 660/670	4.5 Volts	0.5 Volts	4.0 Volts	2.0 Volts
MF-9690/9790	4.5 Volts	0.5 Volts	4.0 Volts	2.0 Volts
Gleaner R 65/R75	4.5 Volts	0.5 Volts	4.0 Volts	2.0 Volts
AGCO w/ Multi Coupler	3.8 Volts	1.5 Volts	2.3 Volts	1.5 Volts

Once you have established the correct header float and angle of cut for a particular harvesting application, proceed as follows:

Calibration of Sensors

1. Turn the key on in the cab of the combine, and wait for the display screen to activate.
2. Proceed to the header diagnostics section of the digital menu.



Not available on all combines. You must use error codes given during calibration on some machines. Refer to combine Operator's Manual.

3. Begin recording the voltage readings for the maximum upward (raised) and maximum downward (lowered) ranges of the left sensor arm assembly.
4. Continue recording the voltage readings for the maximum upward (raised) and maximum downward (lowered) ranges of the right sensor arm assembly.
5. If the ranges recorded are within the chart ranges specified above, then proceed with header height control calibration in your combine operator's manual.

6. If the ranges are not within the ranges specified in the chart (either too high or too low), then proceed to Manually Adjusting the Sensors.

Manually Adjusting the Sensors



The following steps are best performed with two people – one in the cab of the combine, and one on the ground with the header height control sensors.

1. Determine the sensor, or sensors not properly calibrated.
2. On the sensor arm assemblies, locate the pivot lock and pivot bolts.
3. Loosen the lock on the pivot arm, so that the sensor arm assembly can pivot independently of the sensor.
4. Adjust the sensor arms up or down in small increments, re-testing the voltage from the cab of the combine each time.
5. Once the sensor arm provides the required voltage ranges, tighten the pivot lock. If the sensor arm travel no longer reaches the upper or lower stop, move the stop into light contact with the arm.
6. Complete the header height control calibration, as detailed in your combine operator's manual.

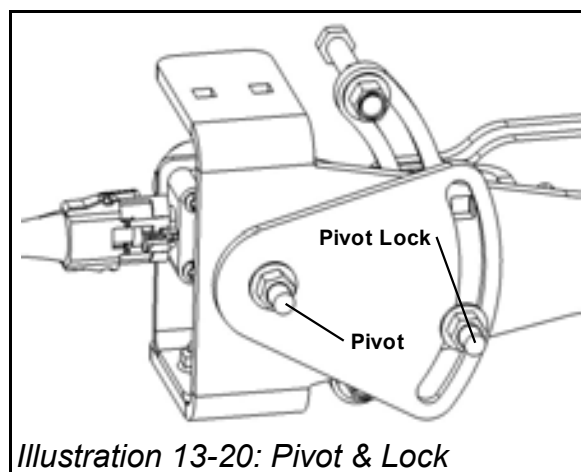


Illustration 13-20: Pivot & Lock

Adjusting the Overall Setup

If the initial physical setup procedure did not bring the voltage readings within range, and if the total voltage available is too low (less than the Min. Variation listed for your combine), then there may be a problem with the physical setup of the header. One of two situations are commonly responsible for this problem. Please refer to Scenario 1, and Scenario 2 on the following page for possible problems, and corrective actions.

Once the appropriate corrective action has been taken, repeat Calibration of Sensors.

Scenario 1:

The flotation restrainer pins are set too high and need to be either lowered, or removed altogether and placed into the storage hole, to allow a full range of flotation. (See Illustration 13-21: Header Subframe - Left Hand Side.)

To change the position of the flotation restrainer pins, refer to the “Header Flotation Restrainer Plate” subsection in the LEVELING chapter of this manual.

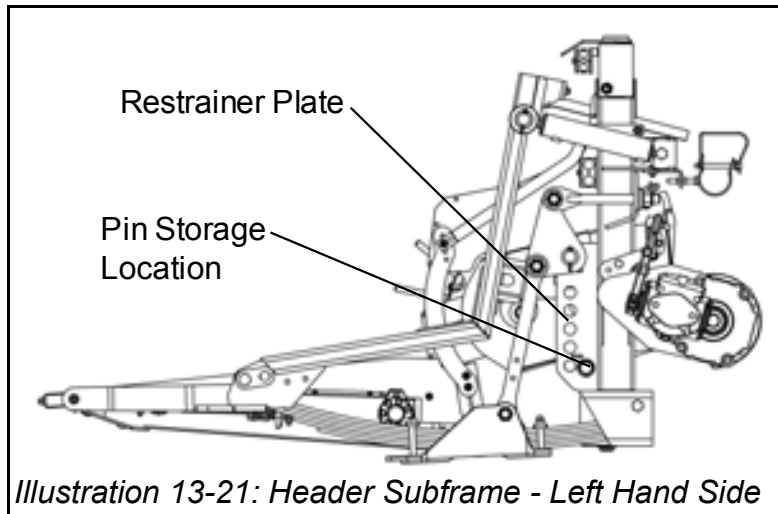


Illustration 13-21: Header Subframe - Left Hand Side

Scenario 2:

The link arm is set up too short (not pushed far enough in to the clevis pin slot). The clevis end of the sensor rod must be pushed to the rear, into the slot of the sensor arm. If it is not, you will get a very short or small voltage range.

To change this distance, see Illustration 13-14: Clevis Pin Adj. on page 142, and proceed as follows:

1. Loosen the link arm set screw, located at the pivot.
2. Slide the clevis end of the link arm as far back as possible into the slot of the sensor arm while in its mid (horizontal) position.

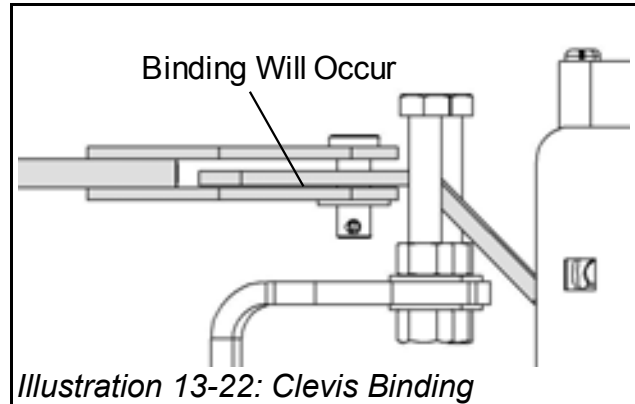
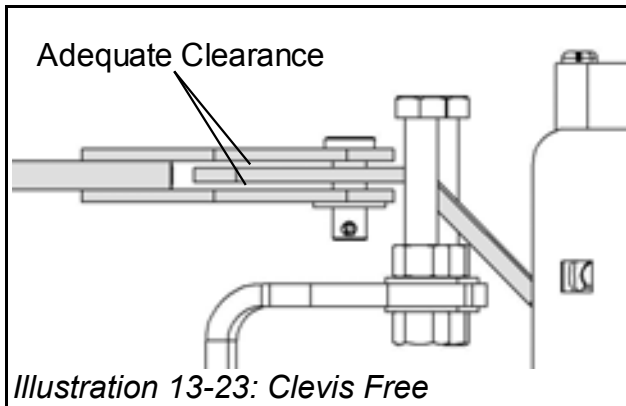


It is important to keep the rod and sensor arm in line with each other when performing this procedure. If they are not in line when securing the clevis pin into the sensor arm slot, the assembly will bind as it approaches horizontal.

3. Re-tighten the rod locking coupler nut.

Tips for smooth operation of the Header Height Control Sensors.

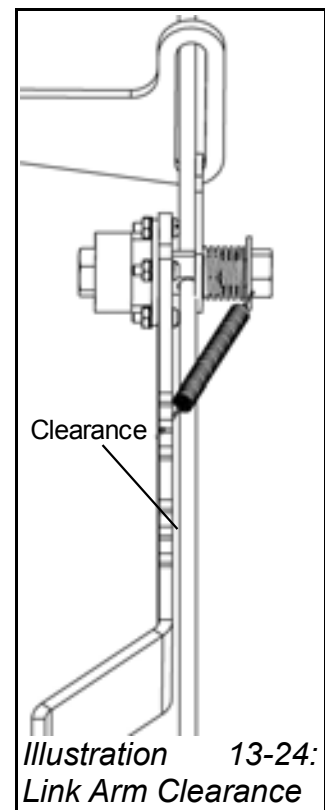
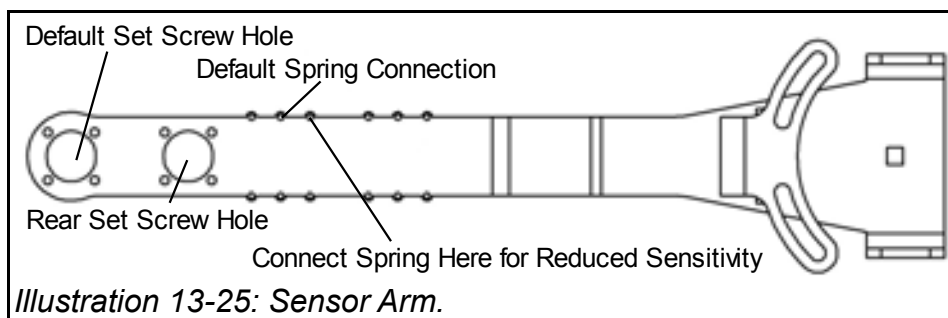
As discussed in the Note in Scenario 2, ensure that the sensor arm is in it's mid (horizontal) position, and that the sensor rod and sensor arm are parallel with each other when tightening the rod locking coupler nut. (See the following illustrations.)



Ensure that the link arm is adequately spaced from the bearing assembly on the sensor mount, so that it moves freely and does not rub against the sensor mount.

If the link arm is vibrating excessively up and down, move the spring to the next hole on the sensor arm towards the rear of the header.

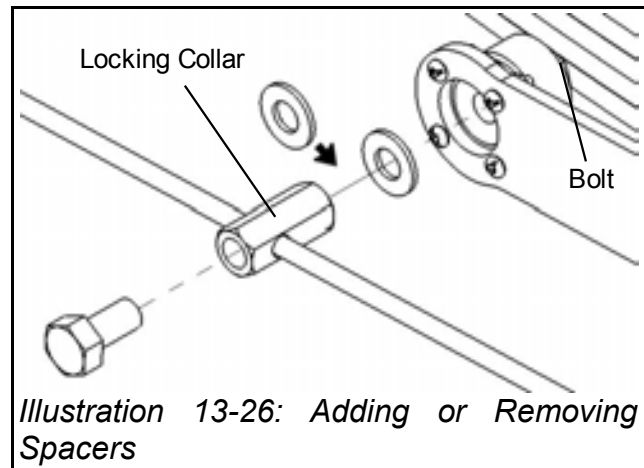
For some conditions/combines, it may be necessary to install the set screw in the rear hole of the sensor arm in order to decrease the sensitivity of the sensor.



If the sensor arm is too close or rubs on the sensor mount, it may be necessary to install one or more spacers (washers) behind the rod locking collar. Do this by first loosening the bolt on the inside of the sensor mount, then removing the rod locking collar. Next add spacer(s) into the pocket behind the locking collar, and re-assemble. Re-check the alignment and spacing between the sensor rod and sensor arm.

Ensure the sensor rod is free to move through the slot in the front sensor mount. If it is not moving freely, the sensor rod, sensor mount or sensor arm may be bent; or too many or too few spacers may have been installed in the previous adjustment.

Ensure you have a good line of sight down the link arm to the sensor arm. Some adjustment of the sensor arm may be required, and is acceptable, so long as it does not cause the voltage range to exceed the established limits.

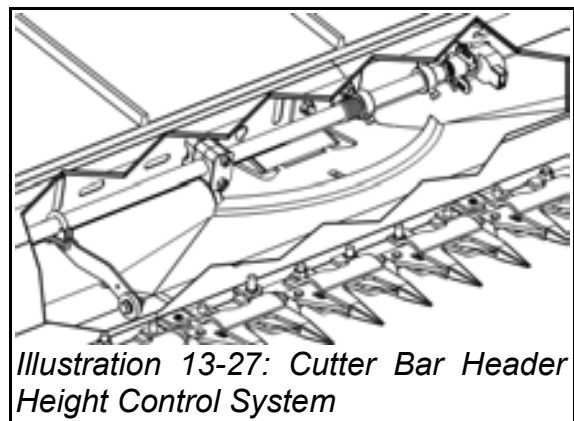


Grain Belt Plus Cutter Bar Header Height Control

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.



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



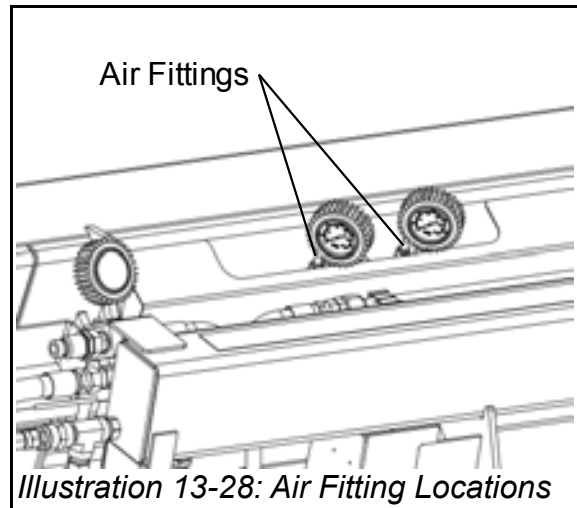
Initial Physical Adjustment and Set-up

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.

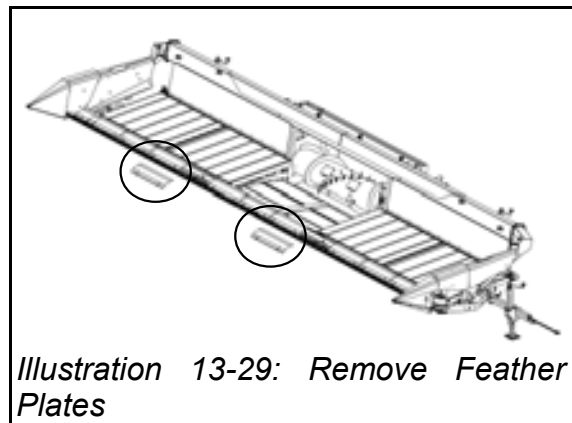
3. Release air from the fittings located next to the air gauges between the subframe and the main header frame until the cutter bar reaches its lowest point of travel.
4. Lift the cutter bar by hand to its highest point and record the voltage coming from the sensor. Lower the cutter to its lowest point and record the voltage. Depending on your make of combine you may be able to use the in-cab display for the sensor voltage (see combine owners manual), otherwise, you will need to use a multimeter.



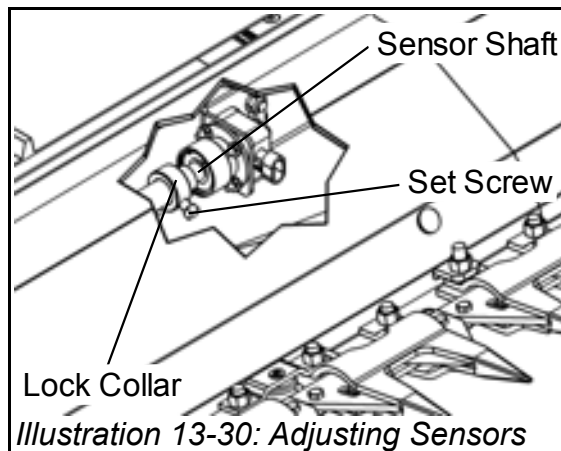
5. Once you have the upper and lower voltages, compare them to table below.

Combine Make/Model	High Reading Not above:	Low Reading Not Below:	Maximum Difference:	Minimum Difference:
2008 New Holland CR 9040/9060	4.5 Volts	0.5 Volts	4.5 Volts	1.5 Volts
New Holland CR/CX	7.5 Volts	2.5 Volts	5.0 Volts	2.0 Volts
CASE IH	4.5 Volts	0.5 Volts	4.0 Volts	2.0 Volts
John Deere 50/60	4.5 Volts	0.5 Volts	4.0 Volts	2.0 Volts
CAT Lexion 400/500	4.5 Volts	0.5 Volts	4.0 Volts	2.0 Volts
Challenger 660/670	4.5 Volts	0.5 Volts	4.0 Volts	2.0 Volts
MF-9690/9790	4.5 Volts	0.5 Volts	4.0 Volts	2.0 Volts
Gleaner R 65/R75	4.5 Volts	0.5 Volts	4.0 Volts	2.0 Volts
AGCO w/ Multi Coupler	3.8 Volts	1.5 Volts	2.3 Volts	1.5 Volts

6. If the voltage range for each sensor does not come close to those listed in the table 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 Illustration 13-29: Remove Feather Plates.

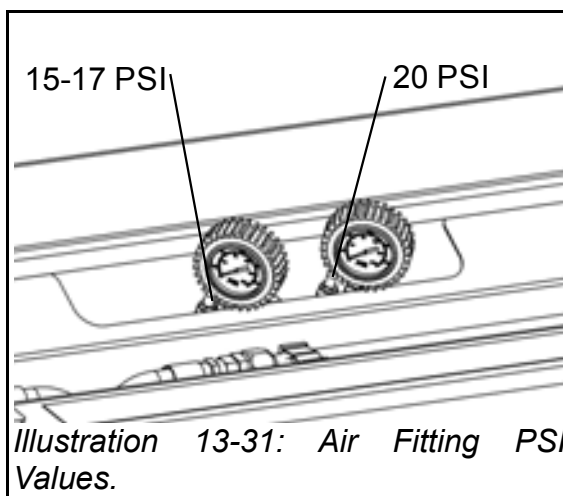


- b. Loosen the set screw to allow you to turn the sensor shaft.
- c. Turn the sensor shaft with a pair of needle nosed pliers to achieve the desired voltage.
- d. Once the desired voltage range is achieved, re-tighten the set screw on the lock collar.



Your sensor may not appear exactly as the one shown in the illustration.

7. Once the sensor voltage range is properly set, calibrate the header height control using your combine control system (See your combine Operator Manual).
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.



Automatic Reel Height Control



The automatic reel height control may cause the reel to move unexpectedly on start-up. Ensure everyone is, and will remain well clear before turning the ignition key.

The reel height control operates in response to cutter bar movement as it follows ground contours. The minimum distance ("Safety Set Point") between the cutter bar and the reel is selected from the combine. The sensors then monitor the cutter bar's height; and activate the reel hydraulics to compensate for any changes that would compromise this minimum distance. Compensation is made directly by the reel height control as it electronically controls the valve responsible for the hydraulic flow to and from the reel lift cylinders.

Operation: Reel Height Control System

Power-On Test:

When the system is first powered up, it will perform a self-test and initialization procedure for approximately 10 seconds, prior to commencing normal operation. During this time, the cab Reel Height Control console will cycle through each indicator to test its operation.

Automatic, and Manual Modes:

The operator can switch the system between Automatic Mode and Manual Mode using the control mode button on the cab console. The current mode will be shown in the lower left of the display (As shown in Illustration 13-32 on the following page).

Manual Mode Operation

In this mode, the combine reel height switch is active. The operator must monitor the reel height, and adjust the distance between the reel, and the knife manually.

Automatic Mode Operation



The cutter bar must be unlocked (floating) for this operation.

When the Automatic Mode is selected, the system automatically goes into Hold Auto Mode until the knife speed exceeds 25rpm, at which point Automatic Mode engages. This is to prevent the header from moving unexpectedly before being used in the field.

In Automatic Mode, the reel will automatically lift if the safety set point is exceeded. Up and Down input signals are transferred to the Up and Down outputs according to the controller logic, but a Down request will be blocked if it would cause the reel to go lower than the Safety Set Point. This is called the Block function, and the Block indicator is lit on the console when it is active.

If the reel and cutter bar get closer than the safety set point, the Up output is activated to lift the reel out of the way. This is called the Clear function, and the Clear indicator is lit on the console when it is active.

After a period of time, the controller will activate the Down output signal to return the reel to its set height. This is called the Return to Set function. The Return to Set indicator will be lit on the console when it is active.

Sensitivity:

The sensitivity of the control system can be adjusted using the multi-position rotary switch on the console. This may be used by the operator to adjust for different machine response, or crop conditions. The current sensitivity is shown in the upper right of the display.

High sensitivity will cause the reel to react more quickly and also cause the reel to move a greater distance. If the sensitivity is too high it will cause the reel to move too much or start hunting.

Low sensitivity will take greater cutter bar movement to move the reel and will move the reel less distance. If the sensitivity is too low, the reel fingers may be cut off by the knife.

When operating the reel close to the knife, a higher sensitivity will cause the reel to respond more quickly to small movements in the knife. Similarly, when the distance between the reel and knife can be set at a higher value, the sensitivity may be reduced, allowing the sensors to tolerate greater movement in the knife before responding.

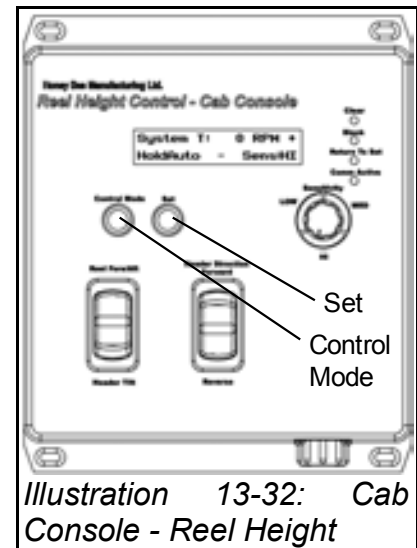
Setting the Automatic Reel Height (Safety Set Point)

The Safety Set Point can be programmed when the control system is in Manual Mode.



To program the Safety Set Point, select Manual Mode using the Control Mode button.

1. Use the combine controls to place the reel at a safe distance from the cutter bar, place the header at cutting height, then press and hold the Set button until the display shows the message, "Set Point Stored."
2. Select Automatic Mode, using the Control Mode button to return to normal operation.
3. Use the combine controls to raise the reel slightly until the "Block" light goes out.
4. If the Automatic Reel Height control operation is not satisfactory, refer to Adjusting Cutter Bar Sensors for Reel Height Control.



CAN Communication:

The cab console and the controller use an advanced system called CAN to communicate. When CAN communication is operating properly, the "Comm Active" indicator will be lit on the cab console. If the communication link fails, this LED will be extinguished. Depending on the type of failure, a diagnostic message may also be shown on the display.

Adjusting Cutter Bar Sensors for Reel Height Control

In certain situations, it may be necessary to adjust or re-align the cutter bar sensors for the reel height control. Should these sensors become misaligned or require adjusting, proceed as follows:



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.

1. Remove the feather plates from the header by first removing the guard nuts that secure the feather plate tabs; then lift the whole feather plate out.
2. Next, verify that the cutter bar is set level. From the side of each suspension paddle, measure the distance between the back of the cutter bar and bottom of the deck. This measurement should be consistent.
3. If the distance needs to be adjusted, do so by loosening the lock nut on the front or rear bolt on the suspension paddle, as required, and turn the adjustment bolt to attain the required distance. Re tighten the lock nut once the required spacing is achieved.

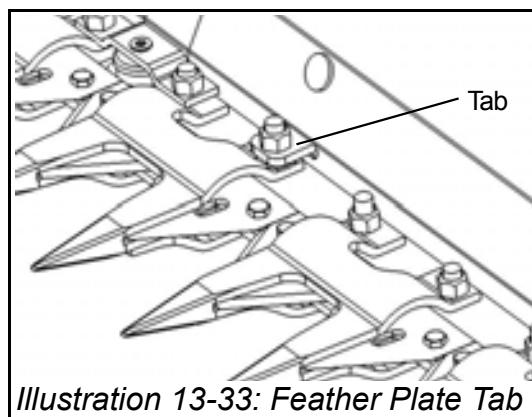


Illustration 13-33: Feather Plate Tab

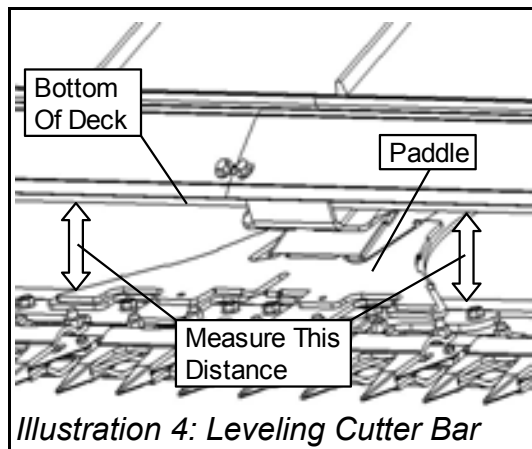
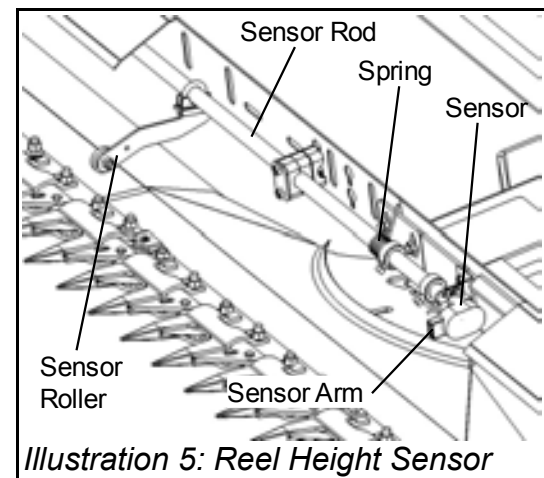
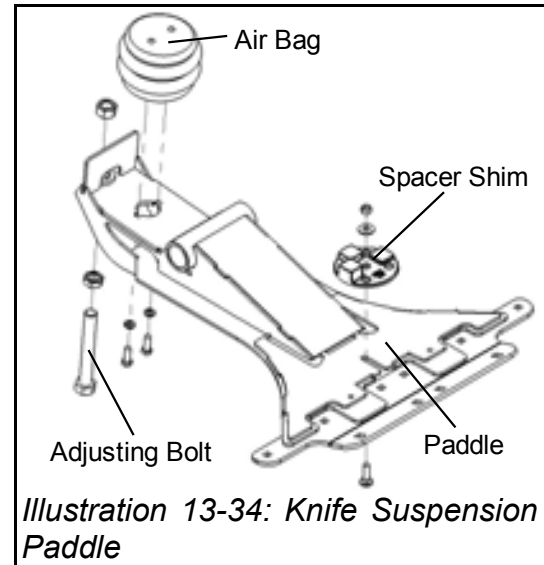


Illustration 4: Leveling Cutter Bar

4. Loosen the clamp bolts that secure the sensor paddles to the torsion bar. The sensor paddles should now be free to move up and down without moving the sensor rod. Do one sensor paddle at a time.
5. Set the height sensor paddles at the front of the deck. This is done by rotating the sensor paddle until it is resting on the corner plate. As the clamp bolts were loosened earlier, it will be necessary to tighten them once the sensor is properly set. This will hold the sensor paddle in place.
6. Check to be sure there is some resistance through the whole range of motion of the sensor paddles. If there is not, locate the resistance spring on each sensor rod. Loosen the bolt securing the spring, and rotate the spring so that the tine pushes against the deck, causing a “downward pressure” on the sensor paddles. Re-tighten the lock bolt. This should hold all the sensor paddles, with moderate pressure, to the paddle stops.
7. If all sensor paddles are flush and snug against their corresponding paddle stops, and all bolts have been re-tightened, the feather-plates can be reinstalled. Start with the center feather plate (if removed), and build out from either side of it with the remaining feather plates.

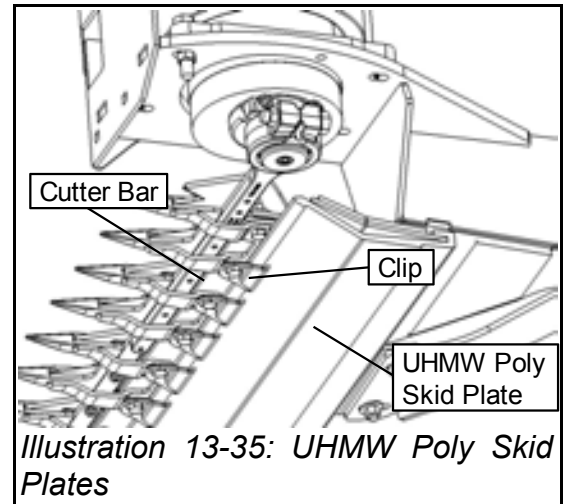


8. With the cutter bar at its lowest position, the sensor arm should point slightly down and be located on the front side of the sensor assembly.

Skid Plates

All Grain Belt Plus headers are equipped with UHMW/Poly-Skid plates, which protect the cutter bar from abrasive contact with the ground during field-use.

These plates are located on the bottom of the cutter bar, held in place with clips bolted to the guard sections of the knife.



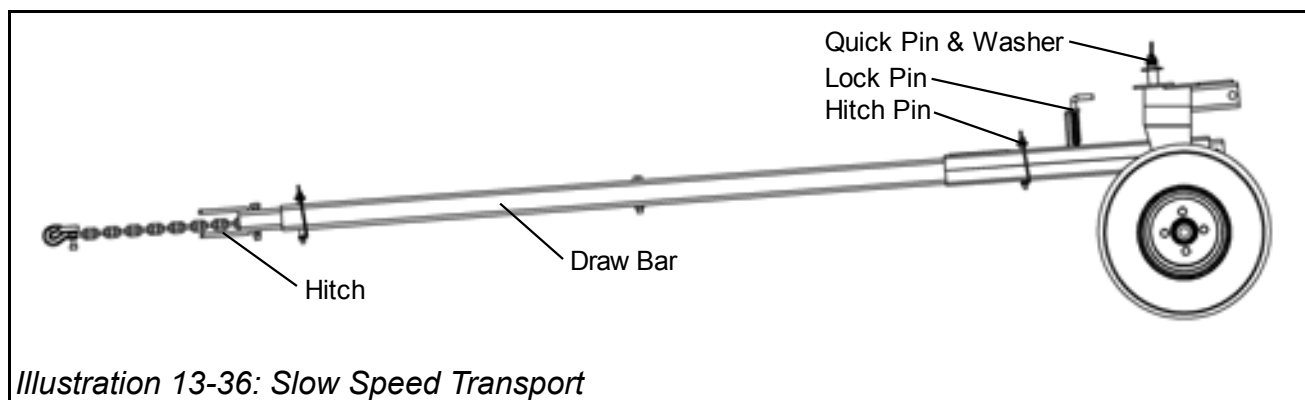
Changing the Skid Plates

To change worn out or damaged skid-plates:

1. Loosen or remove the clips from the portion of UHMW poly skid plate to be removed.
2. Remove the old section of poly by tapping it on the front edge, toward the back of the header.
3. If necessary, measure and cut new piece to correct length.
4. Using a rubber mallet, tap the rear lip of the skid plate over the back of the cutter bar.
5. Reinstall and tighten clips.

Slow Speed Transport

The Slow Speed Transport supports much of the weight that would normally be transferred to the rear axle of a towing vehicle.

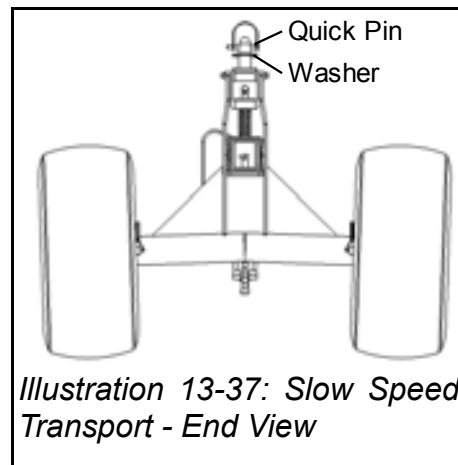


Towing with the Slow-Speed Transport

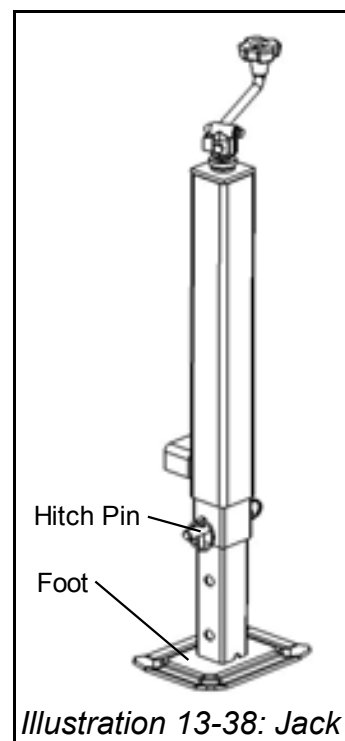


The header and slow speed transport are designed for transport speeds no greater than 32 km/h (20 mph). Exceeding this speed may result in damage to the equipment, serious injury to yourself or others, and could even result in loss of life.

1. Ensure the header is fully dismantled from the combine, (*refer to the DISMOUNTING section of the OPERATION chapter in this manual).
2. Ensure the header is sitting level, on hard, flat ground, and the tires are blocked both in front and rear.
3. Using the jack on the header hitch, raise the hitch enough to clear the slow speed transport assembly as you roll it under the hitch.
4. Remove the quick pin and washer from the mounting pin on the top of the slow speed transport frame. Roll the slow speed transport assembly under the header hitch.
5. Using the jack, lower the header hitch onto the mounting pin on the top of the slow speed transport. Replace the quick pin and washer to secure.



6. Connect the safety chain between the header and the frame of the slow speed transport.
7. Connect the wiring harness on the header to the harness that runs through the draw-bar of the slow speed transport. Ensure that wires are not dangling or dragging, but that there is adequate slack to allow for turning.
8. Align the draw bar hitch with the towing vehicle's hitch, and engage the parking brake on the towing vehicle. Attach the draw bar hitch to the towing vehicle with a hitch pin, and secure in place.
9. Test the brake and signal lights to ensure they are working properly.
10. Attach the safety chain from the slow speed transport to the rear of the towing vehicle.
11. Crank the jack handle counter-clockwise to raise the jack leg off the ground.
12. To obtain maximum clearance between the foot of the jack and the ground, remove the hitch pin from the jack leg, and slide the jack leg up into the outer tube. Re-insert the hitch pin to secure the jack leg in it's highest position, then lock it in place using the lynch pin.
13. Inspect the towing vehicle, slow speed transport, and header to ensure everything is secure.
14. Remove blocks from front and back of trailer wheels.
15. Begin towing header. A smooth, steady driving style will reduce abrupt shocks to the equipment.



Storing the Slow-Speed Transport

The Grain Belt Plus Header is equipped with mounting brackets for storing the slow speed transport. This feature retains the transport equipment with the header while working in the field.

This procedure should be done with the header fully mounted to the combine (see the **Mounting** section in the **Operation** chapter of this manual), and the slow speed transport detached from the header:

1. Remove ½" hitch pin from the draw bar, and disengage (lift) lock pin.
2. Remove the draw-bar from the slow speed transport frame. Wrap the ends of the safety chain and wiring harness around the hitch end of the draw-bar. Ensure the rest of the wiring harness remains inside the draw-bar.
3. Set the draw-bar onto the back of the header frame by sliding the rear end of the draw-bar into the square bracket provided. Secure the draw-bar in the front mounting bracket using the ½" hitch pin.

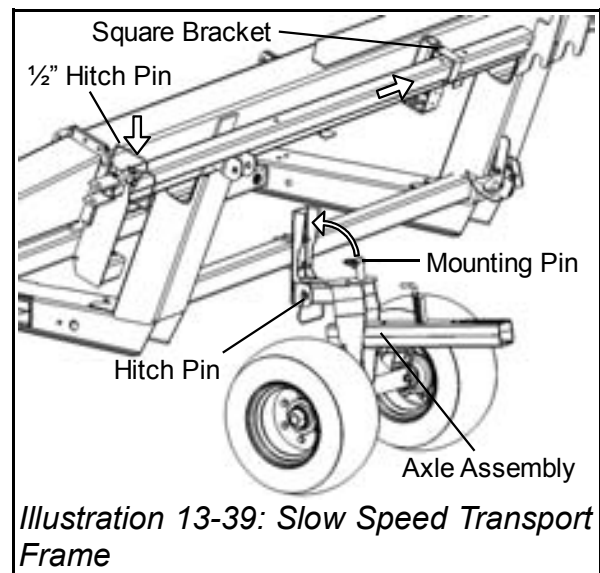


Illustration 13-39: Slow Speed Transport Frame

4. Attach the slow speed transport axle assembly to the storage bracket on the back of the header. Secure using the hitch pin provided.
5. Remove the washer and quick pin from the mounting pin on the slow speed transport. (See Illustration 13-37: Slow Speed Transport - End View, page 157.)
6. Lift the front of the slow speed transport frame into its storage position against the back of the header. Push the mounting pin through the hole provided in the storage bracket. Secure the mounting pin to the back of the storage bracket using the hitch pin and washer.

Cross Auger Assembly

The Grain Belt Plus Header is available with a cross-auger. This option is beneficial when harvesting light, or bulky crops that tend to bunch up on the table due to their bushy texture. The cross auger improves the flow of cut product toward the feeder decks.

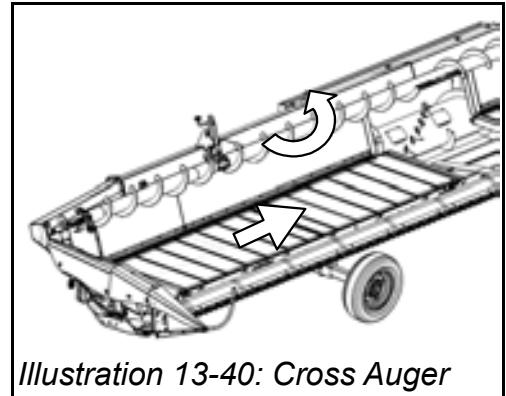


Illustration 13-40: Cross Auger

The cross auger is powered by a hydraulic motor that is fed from the left draper motor return port. The oil from the cross auger motor then feeds back into the main return line, to the left feeder deck motor. You can adjust the speed of the cross auger by turning the needle valve, located on the manifold mounted to the cross auger motor.

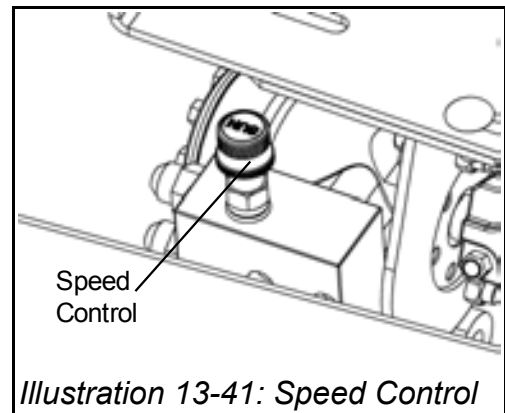


Illustration 13-41: Speed Control

Reel Speed Sensor

The reel may be equipped with a reel speed sensor. This component provides the ability to set the reel speed, and to monitor that speed when cutting. The sensor employs a pulse wheel, from which it reads the reel speed. This pulse information is relayed back to the combine electronically (through the multi-link).

The sensor should be positioned so that there is a gap of 1/16" to 1/8" between the pulse wheel and the sensor.

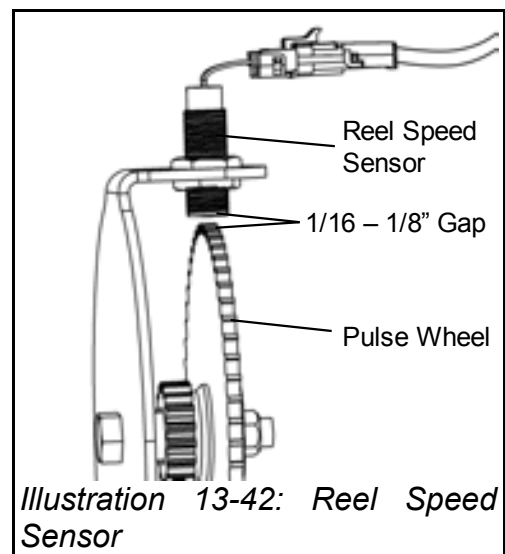


Illustration 13-42: Reel Speed Sensor

15. Troubleshooting

Problem	Possible Cause	Solution
Adapter		
Combine will not hook into top of adapter.	Feeder house adjustment on combine set wrong.	See Combine Manual.
	Header tilted back/ forward too far.	Run low-side tire onto a block.
	Subframe not level with combine	Adjust hitch jack.
Draper		
Draper not tracking straight.	V-guided draper not properly installed.	Ensure extruded “V” on draper is properly seated into recession on drive roller.
	Draper splice not cut straight.	Using a square, re-punch connector - bar holes in draper.
	Material buildup on rollers.	Clean rollers.
Draper slipping.	Draper too loose.	Adjust draper tension.
	Roller polished, losing traction	Roughen drive roller.
	Draper is snagging.	Ensure that extruded “V” on draper is properly seated into groove in drive roller.
Draper not turning.	Draper too loose.	Adjust draper tension.
	Faulty drive motor.	Repair or replace.
	Failed bearing(s) in idler or drive rollers.	Replace.
	Material build-up on rollers.	Clean rollers.
	Rock or material under draper.	Clean under draper.
	Draper is snagged or caught.	Check for interference.
	Oil flow going over the relief.	Check relief setting. Remove and clean relief cartridge; check spring.

Problem**Possible Cause****Solution**

System oil pressure excessively high.
(>3,000 psi)

Material buildup on rollers.
Faulty bearing on roller.
Faulty draper motor.

Clean rollers.
Replace bearing.
Check motor temperature.
Check for oil leaking from shaft seal.
Replace motor.

Decks

Deck lifts out of position.

Bolts on front edge loose or missing.
Bolts on back panel are loose or missing.

Tighten or replace.

Finger Auger

Auger stops when full of material.

Auger is plugged.

Raise header, reverse system and engage center deck clean out.

Material wrapping on auger.

Narrow feeder house opening.

Ensure that proper pan inserts and bezels (AGCO only) have been installed.

Indexing of fingers is incorrect.
Fore/ aft adjustment is incorrect.

Adjust finger indexing.
Adjust auger position.

Material will not feed under auger.

Indexing of fingers is incorrect.
Auger is plugged.

Adjust finger indexing.
Raise header, reverse system and engage center deck clean out

Auger is not floating.

Auger float is seized or binding on side plates.

Fingers on drum not extending low enough.

Adjust finger indexing.

Material is bunching under finger auger.

Pan Inserts have been removed or are not properly installed.

Ensure Pan Inserts are properly installed.

Auger cannot float high enough

Adjust auger stops.

Problem	Possible Cause	Solution
Material is bunching up between finger auger and combine feeder house.	The finger auger is floating up too high.	Adjust the auger stops to keep the finger auger lower.
Knife		
Knife stalls easily.	Crop too heavy for ground speed.	Reduce ground speed.
	Knife speed not set properly.	Adjust knife speed.
	Low hydraulic pressure at knife motor.	Check system pressure.
	Bent guards or cutter bar.	Repair or replace.
	Dull or wrong type of sections.	Replace sections.
	Faulty knife drive.	Check for loose crank shaft.
	Seized knife head bearing.	Replace.
	Knife head out of alignment.	Adjust alignment on knife.
	Unloaded system pressure too high.	Check for faulty draper motor. Check that each draper is running freely.
	Pump arm is too tight.	Loosen the hydraulic pump arm.
Knife running too slow or too fast. (<580/ >600 rpm)	Relief valve stuck open.	Remove and clean cartridge.
	Low hydraulic oil.	Add oil
	Relief valve stuck open.	Clean/ replace cartridge.
	Worn pump or knife motor.	Repair or replace.
	Pump set incorrectly for combine.	Adjust pump setting.
Knife will not run.	Low hydraulic oil.	Add oil. Determine cause of low oil.
	Faulty drive motor.	Repair or replace motor.
	Faulty knife drive.	Repair or replace.
	Faulty hydraulic pump.	Repair or replace.
	Cutter bar jammed.	Check for damaged guards or sections.

Problem	Possible Cause	Solution
Excessive Vibration.	Knife running too fast. Loose bearings in drive. Loose knife head bolts.	Check speed. (580-600 rpm) Replace bearings. Tighten.
Excessive Noise.	Loose or damaged sections and/ or guards. First guard bent or out of alignment. Knife drive bearing faulty. Knife drive loose. Knife drive running too fast. Knife head positioned too high or too low. Guards don't match.	Replace or tighten. Straighten or replace. Replace. Tighten bolts and check for damage to housing. Slow down to 580 - 600 rpm. Loosen clamp bolt on knife-head bearing and adjust. Check that all guards are the same. (12 mm required).
Connector bar breaks.	Damaged sections or guards. Knife gummed up. Section bolts not tight. Sections on knife back installed on wrong side.	Repair or replace. Soak with diesel fuel. Tighten and/ or replace. Remove sections; turn knife back over and replace sections.
Knife head breaks.	Section bolts not tight. Knife gummed up. Damaged sections or guards. Sickle sections dull. Tough crop. Knife drive running too fast. Guards don't match.	Tighten and/ or replace bolts. Soak with diesel fuel. Repair and/ or replace. Replace sections. Reduce ground speed. Check speed w/ photo tach. Check that all guards are the same (12 mm req'd).
Knife leaves strip of crop standing.	Bent or broken guard. Broken knife section. Plugged guard.	Straighten or replace. Replace. Clean.

Problem	Possible Cause	Solution
Leveling		
Header not level.	Leveling adjustment bolts not set properly.	Adjust bolts.
Pump		
Oil running hot.	Excessive oil going over relief. Faulty pump or motor(s). Hot oil dump on right-hand deck motor not functioning properly. Draper too tight.	Clean or replace relief cartridge. Repair or replace. Clean or replace. Adjust draper tension.
Oil leaking between pump and gear box.	Silicone/Gasket seal broken. No silicone between pump and gear box.	Re-seal pump. Apply silicone.
Pump vibrating.	Faulty universal joint bearings. Incorrect angle on drive-line.	Replace. Verify that rotating pump mount assembly is in correct alignment for combine make.
Low Pressure	Supply line not connected The pump arm is too tight.	Connect supply line. Loosen the hydraulic pump arm.
Raising Header		
Header will not lift.	Inadequate combine lift capacity.	Check system pressure. Add hydraulic cylinder to feeder house. (*Refer to Combine Manual.)

Problem	Possible Cause	Solution
Reel		
Reel will not raise.	Hydraulic couplers don't match. Hydraulic couplers not engaged. Faulty combine hydraulics.	Install correct couplers. Re-couple properly. Refer to Combine Manual.
Reel raises slowly.	Elbow in master cylinder too tight. Hydraulic couplers not engaged.	Loosen fitting. Re-couple quick couplers.
Reel does not raise.	Air in system.	Bleed slave cylinder.
Right side goes up slowly.	Air in system.	Bleed slave cylinder.
Reel will not hold height.	Leaking hose or fitting. Valve in combine leaking.	Repair or replace. Refer to Combine Manual.
Reel will not hold level.	Leaking hose or fitting. Air in system. Faulty master cylinder. Leaking cylinder seal.	Repair or replace. Bleed slave cylinder. Repair or replace. Replace seal.
Reel raises or lowers erratically.	Reel cylinders binding. Arms bent or binding. Low hydraulic oil.	Replace cylinder. Repair or replace. Refer to Combine Manual.
Right side cylinder does not fully extend.	Air in system. Lift cylinders out of phase.	Bleed slave cylinder. Install spacer inside center master cylinder. (Check w/ manufacturer.)
Ends lift before center.	Center master cylinder "O" ring damaged.	Replace seal.
Right hand cyl. goes out of phase.	Air in system. System losing residual pressure.	Bleed slave cylinder. Install spacer inside center master cylinder. (Check w/ manufacturer.)

Problem	Possible Cause	Solution
Damaged/ cut reel tines.	Tines of reel catching in the knife.	Raise reel to allow more clearance from reel tines to cutter bar.
Damage to center of reel.	Reel set too low.	Adjust height.
Reel hitting at end.	Reel not centered.	Adjust centering.
Reel will not turn, or turns erratically.	Seized bearing(s). Faulty drive motor. Reel tied down. Hydraulic couplers not coupled.	Replace bearing(s). Replace motor. Release reel. Re-couple properly.
Reel speed can not be adjusted.	Poor connection in electrical wires or cable.	Check connections and condition of cable.

Sub Frame

Too close to the ground with cutter bar down.	Leveling adjustment bolts too tight. Tilt cylinder adjusted too short.	Loosen bolts. Adjust tilt cylinder.
-----------------------------------------------	---------------------------------------------------------------------------	----------------------------------------

Table

Draper running too flat or too steep.	Tilt cylinder out of adjustment.	Adjust tilt cylinder.
Suspension/float feels soft.	Clamp plates on spring saddles are loose.	Tighten clamp plates to stiffen suspension.

Miscellaneous

Material builds up at ends of cutter bar.	Pick-up reel tines not sweeping crop off cutter bar.	Check position & bend the tines on the reel.
Heads shattering or breaking off.	Reel speed too fast. Ground speed too fast. Crop too ripe.	Reduce reel speed. Reduce ground speed. Cut in higher humidity
Cut grain falling off cutter bar.	Reel set too high. Table set too high.	Lower reel. Lower table.

Problem

Does not pick up
lodged crop.

Possible Cause

Reel set too high.
Table set too high.
Reel set too far back.
Ground speed too fast for reel
speed.
Crop laying too flat for guards
to pick up.

Solution

Lower reel.
Lower table.
Move reel forward.
Reduce ground speed or
increase reel speed.
Install optional SCH Crop
Lifters.



16. Specifications

Weights

Weights are given in lbs/kg format.

Model	3055	3655	4255	4555
Width	30'	36'	42'	45'
Weight	6290/2859	6487/2948	7417/3364	7719/3501

- Weight includes - header assembly, subframe, feeder deck, auger drive, double knife drive, hydraulic pump with pump mount, hydraulic tank, gauge wheels, and attached hydraulic components. All weights are approximate and are subject to change.

Component	3055	3655	4255	4555
Pick-up Reel - UII Universal	803/365	964/438	1138/517	1221/555
Pick-up Reel HCC ML	734/334	909/413	1000/454	1038/470
Transport Package	247/112	284/129	266/121	290/132
Cross Auger Kit	273/124	305/138	327/148	353/160
Slow Speed Transport:	211/96	211/96	211/96	211/96



Standard Equipment

- Knife Drive - SCH epicyclic 3 5/16" stroke, hydraulically driven, 1160-1200 strokes per minute. (580-600 RPM)
- Knife Speed Sensor.
- Cutting System - SCH Easy Cut, spring steel guards and bolted sections. Adjustable contour cutter bar.
- Lateral Deck/ Drapers - 42" wide, V-guided draper, w/ rubberized polyester, fiberglass reinforced slats and tie bar connectors. Draper Speed: non-adjustable, fixed speed.
- Feeder Deck/ Drapers – 2, 42" wide, V-guided drapers w/ rubberized polyester, fiberglass reinforced slats and tie bar connectors. Speed non-adjustable. Same hydraulic circuit as lateral draper drive and knife drive.
- Reel - hydraulically driven using combine hydraulics.
- Header Flotation - lateral and vertical leaf spring float system; air bag suspension on cutter bar.
- Cutting Angle - hydraulically adjustable on all models.
- Warning light kit.

*SPECIFICATIONS ARE SUBJECT TO CHANGE
WITHOUT NOTICE OR OBLIGATION.

Options:

- Header transport trailer.
- Cross auger assembly.
- SCH Crop Lifters for cereals and/or specialty crops.
- Automatic reel height control.
- Automatic header height control.
- 6 bat Universal (U-II) reel or 6 bat Hart-Carter (HCC) reel.
- Combine adapter plates- Available for most models of self propelled combines; each make listed here may require a unique adapter plate.

Massey Ferguson
Challenger
Gleaner

John Deere
Case IH
New Holland
Lexion (CAT)



Bolt Torque

The tables shown below give correct torque values for various bolts and cap screws. Tighten all bolts to the torques specified in chart unless otherwise noted. Check tightness of bolts periodically, using bolt torque chart as a guide. Replace hardware with the same strength bolt.

UNIFIED TORQUE SPECIFICATIONS

METRIC TORQUE SPECIFICATIONS

Bolt Torque

<u>Size</u>	<u>SAE 5</u>	<u>SAE 8</u>	<u>Size</u>	<u>8.8</u>	<u>10.9</u>
	Nm (lb-ft)	Nm (lb-ft)		Nm (lb-ft)	Nm (lb-ft)
1/4"	12 (9)	17 (12)	M6	11 (8.5)	17 (12)
5/16"	25 (19)	36 (27)	M8	28 (20)	40 (30)
3/8"	45 (33)	63 (45)	M10	55 (40)	80 (60)
7/16"	72 (53)	100 (75)	M12	95 (70)	140 (105)
1/2"	110 (80)	155 (115)	M14	150 (110)	225 (165)
9/16"	155 (115)	220 (165)	M16	240 (175)	350 (255)
5/8"	215 (160)	305 (220)	M18	330 (250)	475 (350)
3/4"	390 (290)	540 (400)	M20	475 (350)	675 (500)
7/8"	570 (420)	880 (650)	M22	650 (475)	925 (675)
1"	915 (675)	1320 (970)	M24	825 (600)	1150 (850)

***** Torque figures indicated above are valid for non-greased or non-oiled threads and heads. Do not grease or oil bolts or cap screws unless otherwise specified in this manual. When using locking elements, increase torque values by 5%.**



Hydraulic Fitting Torque

Tightening Flare-type Tube Fittings

1. Check flare and flare seat for defects that might cause leakage.
2. Align tube with fitting before tightening.
3. Lubricate connection and hand tighten swivel nut until snug.
4. To prevent twisting the tube(s), use two wrenches. Place one on the connector body, and with the other, tighten the swivel nut to the torque shown.

***** The torque values shown are based on lubricated connections as in reassembly.**

Tube Size (OD)	Nut Size	Torque Value **		Turns to Tighten (After Finger Tight)	
		(Nm)	(lb-ft)	(Flats)	(Turns)
3/16	7/16	8	6	1	1/6
1/4	9/16	12	9	1	1/6
5/16	5/8	16	12	1	1/6
3/8	11/16	24	18	1	1/6
1/2	7/8	46	34	1	1/6
5/8	1	62	46	1	1/6
3/4	1-1/4	102	75	3/4	1/8
7/8	1-3/8	122	90	3/4	1/8

Tightening O-ring Fittings

1. Inspect O-ring and seat for dirt or obvious defects.
2. On angle fittings, back the lock nut off until washer bottoms out at top of groove.
3. Tighten fitting by hand until back-up washer or washer face (if straight fitting) bottoms on face and O-ring is seated.
4. Position angle fittings by unscrewing no more than one turn.
5. Tighten straight fittings to torque shown.
6. Tighten angle fittings to torque shown while holding body of fitting with a wrench.

Thread Size (Outside Diameter)	Nut Size	Torque Value ***		Turns to Tighten (After Finger Tight)	
		(Nm)	(lb-ft)	(Flats)	(Turns)
3/8	1/2	8	6	2	1/3
7/16	9/16	12	9	2	1/3
1/2	5/8	16	12	2	1/3
9/16	11/16	24	18	2	1/3
3/4	7/8	46	34	2	1/3
7/8	1	62	46	1-1/2	1/4
1-1/16	1-1/4	102	75	1	1/6
1-3/16	1-3/8	122	90	1	1/6
1-5/16	1-1/2	142	105	3/4	1/8
1-5/8	1-7/8	190	140	3/4	1/8
1-7/8	2-1/8	217	160	1/2	1/12

***The torque values shown are based on lubricated connections as in reassembly.



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