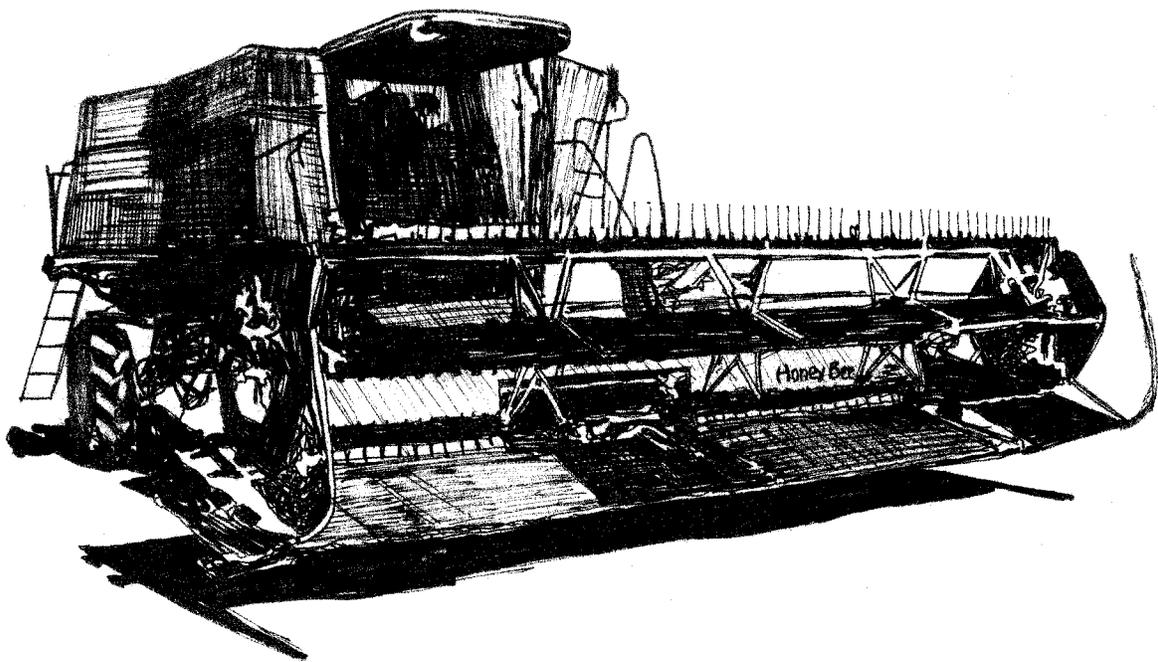


Honey Bee



*Grain/Rice Belt Header
2007 Operator's Manual*

Honey Bee Manufacturing Ltd.
Grain/Rice Belt header – Operator's Manual

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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 After Transporting

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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1 - Safety

In this manual the safety conventions used are as follows:

Safety Terms

WARNING:



Whenever this term is used in this manual or on the machine, possible personal injury or death may occur if instructions are not followed.

CAUTION:



Gives instructions for safe practices in operating, maintaining and common safety practice, which will protect the operator and others from accidents.

DANGER:



Used to warn of immediate danger if safe practices are not followed.

ATTENTION:

Warns of potential damage to the machine if procedures are not followed.

IMPORTANT:

Provides instructions to help you avoid unnecessary strain on, or possible damage to the machine.

Shields

Shields are provided to protect you from injury. Make sure they are in place and secured before starting the machine.

NOTE:	Names given here for parts of the header are those in use at the time of design.
--------------	--

Honey Bee Manufacturing Ltd.

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WARNING:



THIS MACHINE IS POWERED AND RUN BY HYDRAULIC OIL UNDER HIGH PRESSURE. CAUTION MUST BE TAKEN AROUND THE MACHINE BECAUSE HIGH-PRESSURE HYDRAULIC FLUID CAN PENETRATE THE SKIN CAUSING SERIOUS INJURY AND POSSIBLY DEATH.

WHEN LOOKING FOR A HYDRAULIC LEAK, ALWAYS HOLD A PIECE OF CARDBOARD UP TO THE SUSPECTED AREA. NEVER USE YOUR UNPROTECTED HANDS TO LOCATE A LEAK.

ALWAYS WEAR EYE PROTECTION, GLOVES AND LONG SLEEVE CLOTHING WHEN WORKING NEAR HYDRAULICS. SINCE SMALL LEAKS CAN BE INVISIBLE.



Figure 1.1: Hydraulic Hazard Warning

YOU CAN REDUCE THIS HAZARD by relieving system pressure before disconnecting hydraulic lines. Tighten all connections to specifications before re-applying pressure.

WARNING:



If a hydraulic-related accident occurs, see a doctor immediately. Any hydraulic fluid injected into the body 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.

Remember YOU are the key to safety. Good safety practices not only protect you but also the people around you. Make these practices a working part of your safety program. Most accidents can be prevented. 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, and their locations should be known prior to operating the header.



Watch for this symbol, both in this manual and on the header. It will identify hazards that could cause injury or death.

General Safety

1. Maintain moving parts, hydraulics and motors clear of chaff and straw to prevent the possibility of fire.
2. Carry a multipurpose fire extinguisher in the power unit and know how to use it. Check the extinguisher regularly and keep it fully charged.
3. Provide a first aid kit in the cab for emergencies and know how to use it.
4. Do not wear loose clothing or jewelry around moving parts.
5. Wear appropriate protective gear. This list includes but is not limited to:
 - a. A hard hat
 - b. Protective shoes with slip-resistant soles
 - c. Protective glasses or goggles
 - d. Leather gloves
 - e. Hearing protection
 - f. Respirator or filter mask
6. Do not allow any one to ride on the header while it or the combine is in motion.
7. Make certain that the park brake is engaged, and the power unit is in neutral before starting the engine.

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8. Clear the area of bystanders, especially small children before starting the power unit.
9. Do not allow anyone to operate the header who has not been instructed in how to operate the machine.
10. All operators should familiarize themselves with the SAFETY section in the Power unit Operators Manual.
11. Some pictures or illustrations in this manual may not show protective shields in place. This is done in order to make important components visible. Make certain that all protective shields are secured in place before operating the machine.

Operating Safety – Good Practices

1. STOP the power unit, engage the parking brake, place the power unit in neutral, remove the key, and wait until all moving parts stop before leaving the cab.
2. Either lower both the table and the reel, or raise the header to its full height and set the platform lock before servicing the header. If working under reel, set the reel cylinder locks. A loss of hydraulic pressure could cause the header and reel to lower unexpectedly.
3. NEVER operate machinery while tired, sick or otherwise impaired.
4. Do not operate the header in crowded or confined areas.
5. Remember, some models of the header are not centered on the power unit feeder housing, it may be offset to the right, which may distort your judgment.

<i>DANGER:</i>	<i>DO NOT stand between the power unit and the header while raising or lowering the header.</i>
-----------------------	--

Maintenance Safety

1. Before undertaking any maintenance, engage the park brake, either lower the reel and header, or raise and lock the header using the platform lock and shut off the engine of the power unit. Make sure there is no pressure being supplied to the hydraulic lines.
2. Hydraulic leaks can penetrate the skin causing serious injuries. Small leaks

can be invisible and are the most dangerous. Use some kind of object, such as cardboard, to find the leak -- DO NOT USE YOUR HAND.

3. Ensure that all the pressure is released from the hydraulic lines before starting a repair. Replace or repair damaged hoses immediately.
4. Care should be taken when maintaining the knife. Sickle sections are very sharp and can easily cause severe injury. Use heavy leather or canvas gloves when working with the knife. Always ensure everyone is well clear before moving the knife, manually or under power.

Transport Safety

1. Transport the header with the SMV (Slow Moving Vehicle) sign displayed on the rear of the header and use your hazard lights if the law permits. Check local road laws before transporting.
2. When transporting the header on roads, always be aware of the width of the header.
3. For long - distance transporting completely install the full transport assembly. (see dismount section).
4. Do not transport the machine at night, at dawn, or at dusk.
5. Ensure hitch is firmly attached and secured with hitch pins before moving.
6. Attach the hitch safety chain before moving.
7. Do not exceed 40 kph (25 mph) during transport.
8. Ensure you display the Slow Moving Vehicle sign during transport on roadways.

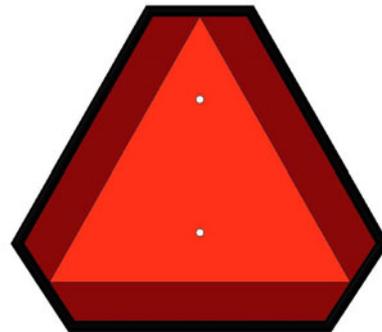


Figure 1.2: Slow Moving Vehicle Sign

Before Transport Checklist

1. Do a complete walk-around and check to be sure there are no loose parts or components.
2. Check:
 - a. all reel mounting, reel drive and adapter assembly bolts to be sure no bolts/nuts are loose;
 - b. wheel bolts to make sure they are tight;
 - c. transport tire pressure. Recommended pressure is 50 psi (345 kPa)
 - d. spindle and hitch lock pins to make sure they are in place and securely fastened.
3. Inspect all hoses. Ensure they are secured so they will not pinch or drag during transport.
4. Ensure hitch tongue and safety chain are securely fastened to the header and to the transporting vehicle.

During Transport Checks

1. Stop after the first 5 to 10 kilometers (2 to 6 miles) and check to make sure the wheel bolts are tight and the wheel hubs are not hot. Make periodic checks every 50 to 60 km (31 -37 miles) if towing the header long distances.
2. Check the hitch bolt and safety chain periodically to make sure they are secure.

In-Field Checks

The First Time Setup and Operation section of your operator's manual covers the adjustments which may be required on your Grain Belt header. Read this section carefully before using your Grain Belt header. Make the necessary adjustments before operating your header, 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 transport position.

If the storage location exposes the header to road salt during the winter months, thoroughly wash the header in spring time.

It is recommended to rotate the drapers so that the seam of the join is located underneath the table. This will improve drainage, thus reducing the possibility of ice buildup damaging the draper material.

Safety Decal Locations

The following safety decals have been placed on your machine in the areas indicated. They are intended for your safety, and the safety of those working with you. Please take this manual, walk around your machine and familiarize yourself with the locations and content of these warning signs and labels. Review this information, and the operating instructions in this manual with your machine operators. Keep decals legible. If they are not, we suggest you obtain replacements from your Honey Bee dealer.

1. Keep them clean, and...
2. Know the location and meaning of all decals. Cross reference the numbers on the diagram below with the chart on the following pages to help identify the label location.

For continued safe operation of this machinery, it is recommended that you replace damaged safety decals immediately. You may purchase replacement decals from your dealer.

The following diagram (See Figure 1.3: Label Locations page 16), indicates the location of all labels on your header. Match the number indicated in this diagram to the numbered illustrations provided. On the following pages, the labels are divided into two groups: Safety-Related, and Additional Equipment-Related Labels. For this reason, they are not shown in numbered sequence.

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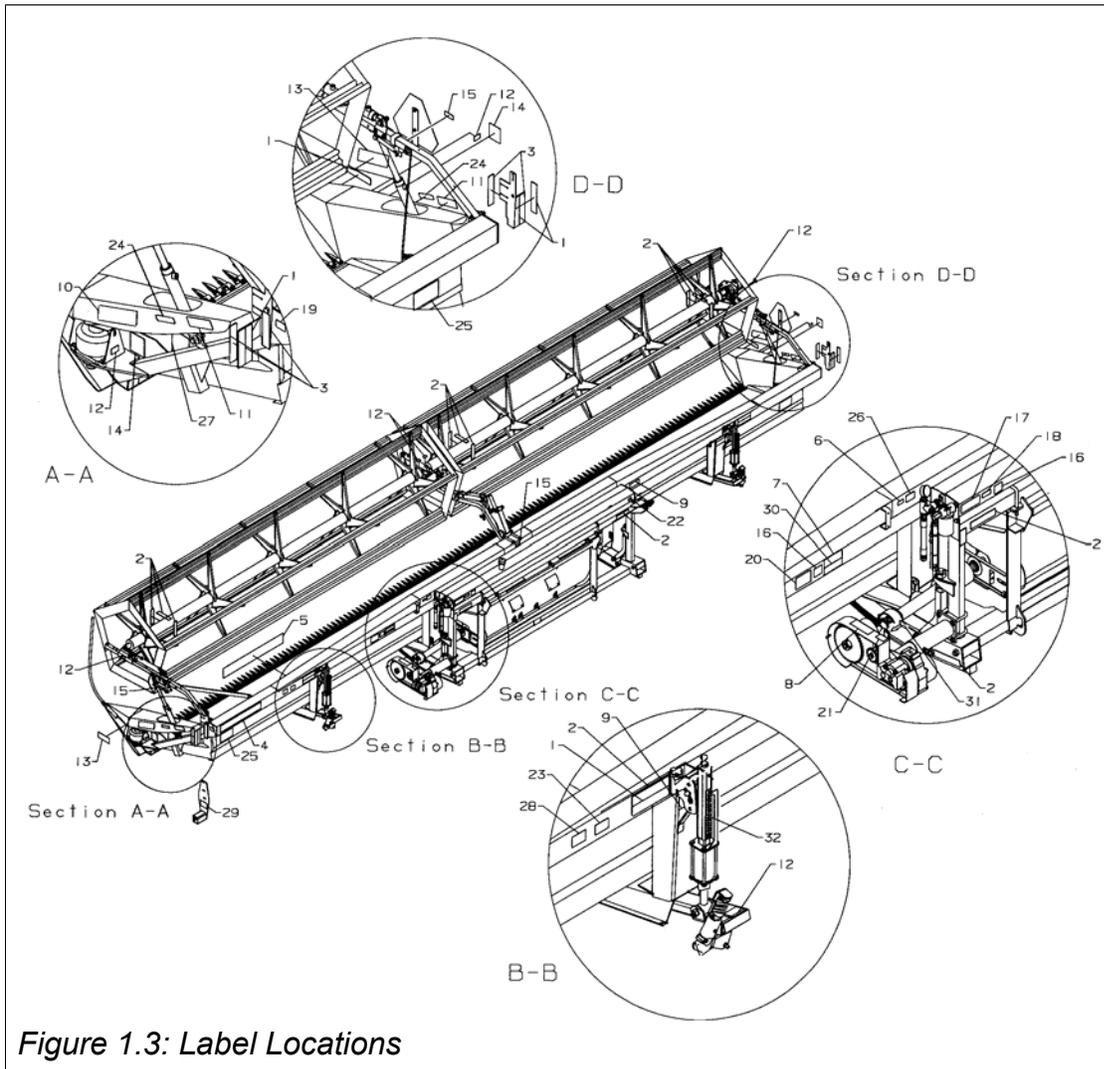


Figure 1.3: Label Locations

Safety-Related Labels

Vehicle Marking Reflectors:

7

1 – Red (2x9)

2 – Yellow (2x9)

3 – Red-Orange (2x9)

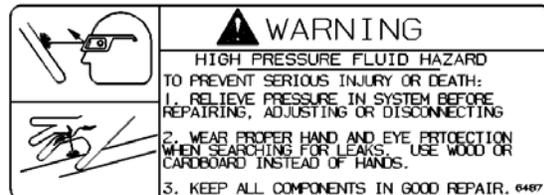


Figure 1.4: WARNING-High Pressure Fluid

8



Figure 1.5: WARNING-Moving Parts

9

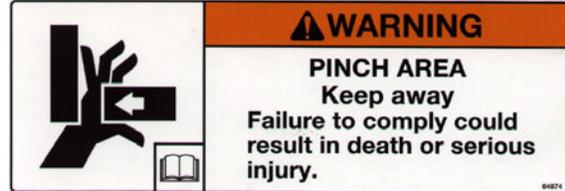


Figure 1.6: WARNING-Pinch Points

11

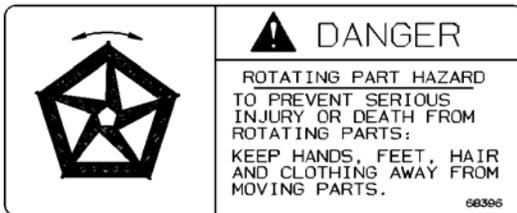


Figure 1.7: Danger-Rotating Parts

13

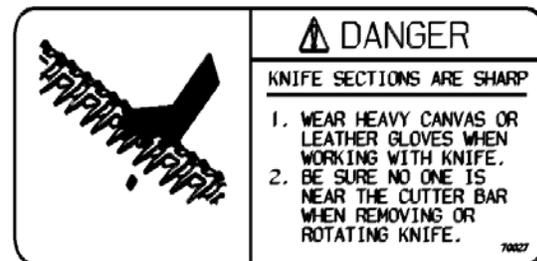


Figure 1.8: DANGER-Sharp Knife Sections

15



Figure 1.9: WARNING-Engage Cylinder Locks

16

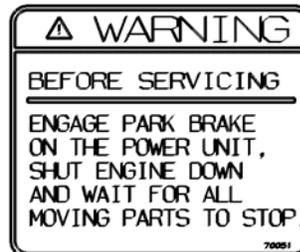


Figure 1.10: WARNING-Before Servicing

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Figure 1.11: WARNING-Rotating Driveline

18



Figure 1.12: DANGER-Lift Warning

19



Figure 1.13: ATTENTION-Secure Reels

20

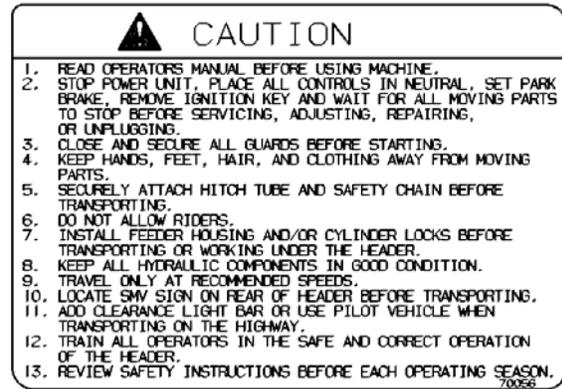


Figure 1.14: CAUTION-Read Operators Manual

21



Figure 1.15: WARNING-Missing Shield

24

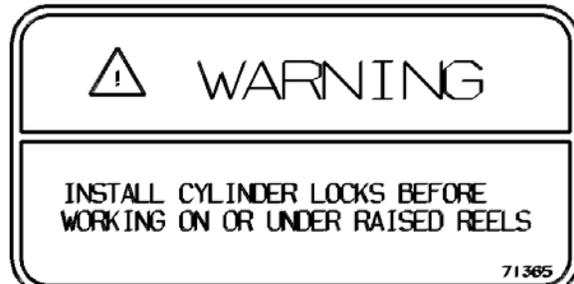


Figure 1.16: WARNING-Cylinder Locks

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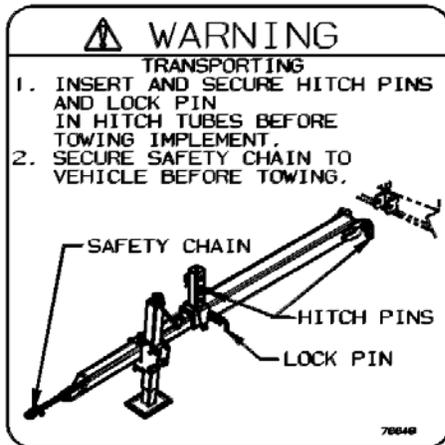


Figure 1.17: WARNING-Transport Hitch

29

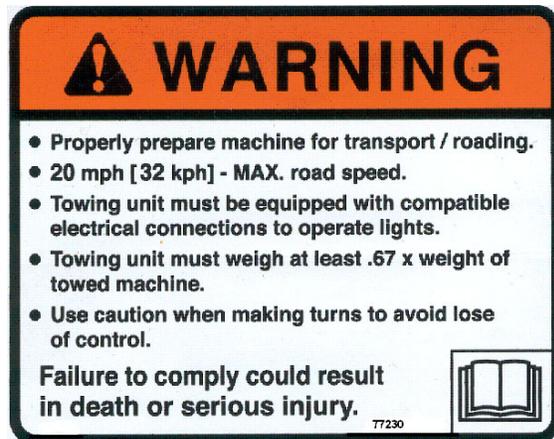


Figure 1.18: WARNING-Transporting Unit

30



Figure 1.19: WARNING-Possible Loss of Control

Additional Equipment-related Labeling

4, 5



Figure 1.20: Honey Bee Logo

6



Figure 1.21: Canvas Speed Control

10



Figure 1.22: Grain Belt by Honey Bee

12

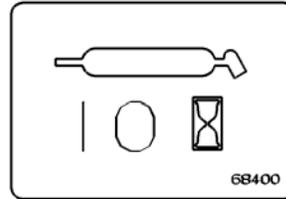


Figure 1.23: 10 HR Grease point

14

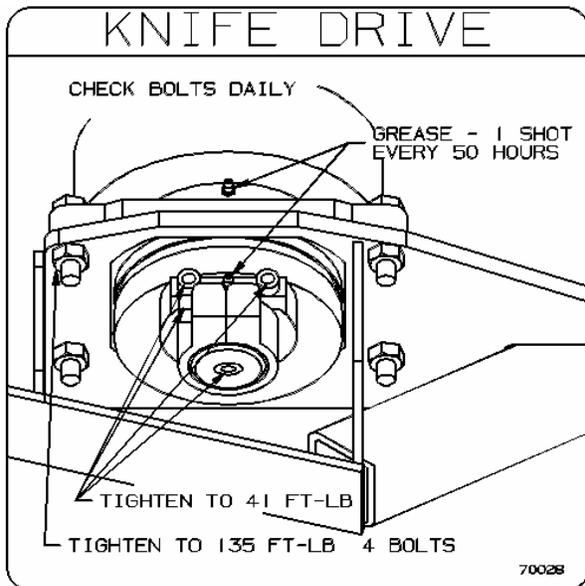


Figure 1.24: Knife Drive Maintenance

22

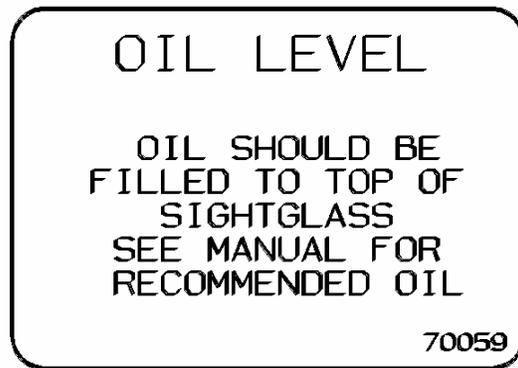


Figure 1.25: Oil Level

23

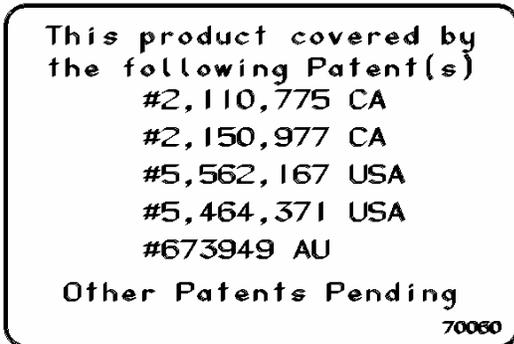


Figure 1.26: Product Patents

25

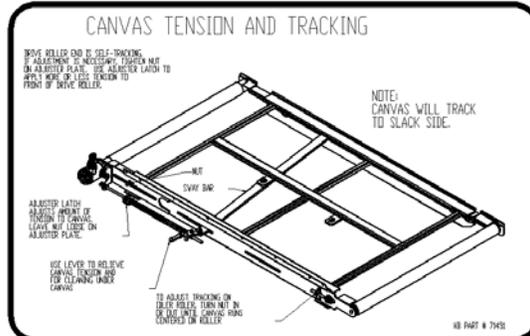


Figure 1.27: Canvas Tension and Tracking

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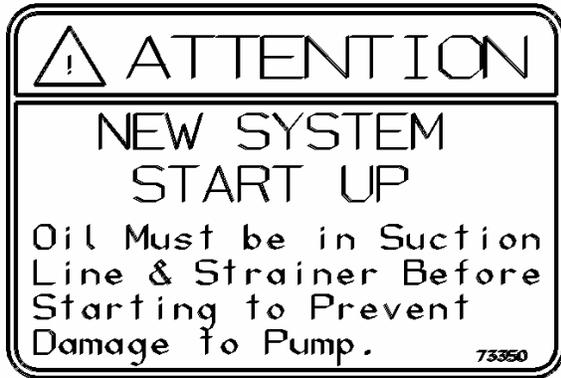


Figure 1.28: ATTENTION-New System Start Up

31

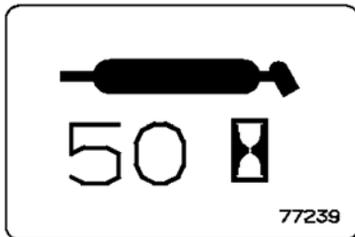


Figure 1.30: 50 HR Grease point

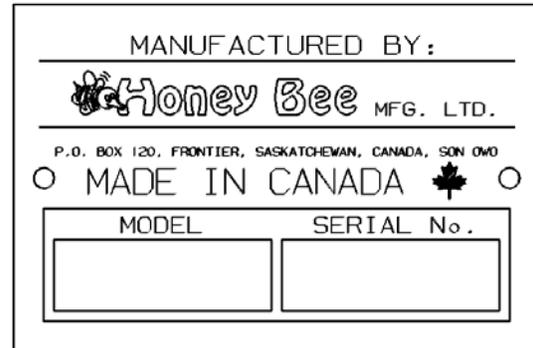


Figure 1.29: Serial Number Plate

32

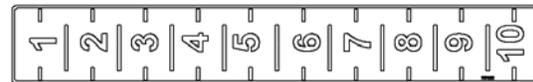


Figure 1.31: Gauge Wheel Height Indicator

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NOTES:

2 - Mounting Instructions

These instructions are designed to help you safely and easily mount your Grain Belt Header onto the combine. If you follow these instructions in the order given, you will avoid difficulties.

Use the **Mounting Checklist** at the end of this section to ensure that the header is mounted properly and is ready for the field.

A complete setup includes the following sections of this manual:

Mounting – (this section)

Coupling

Leveling

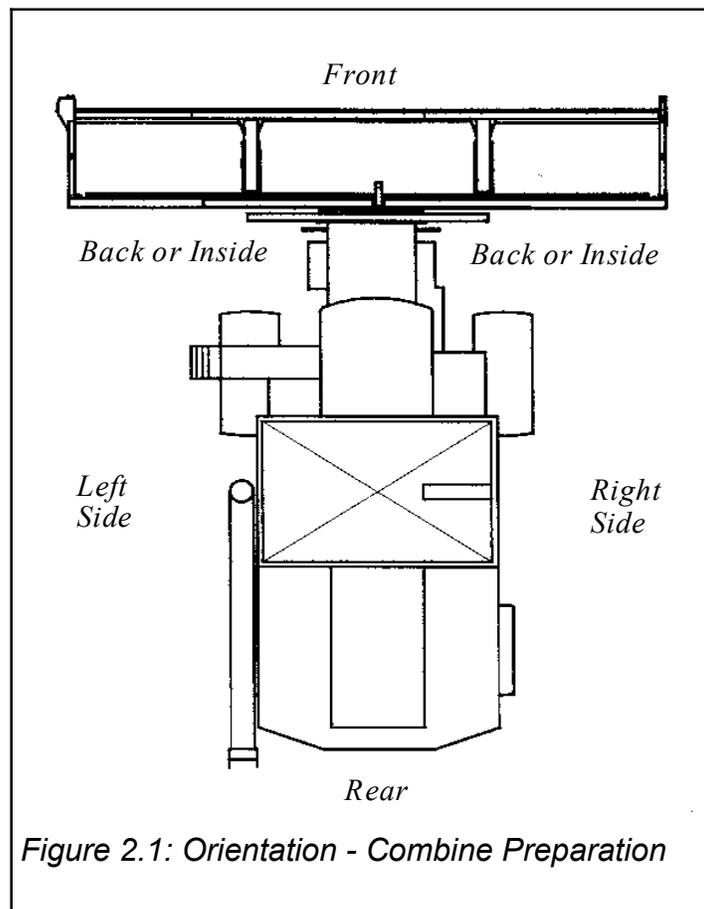
Transport, or Integral Axle removal

Mounting Checklist

Pre-start Checklist

Terminology

COMBINE:	FRONT:	Feeder housing end of the combine
	REAR:	Straw spreader/chopper end of the combine
	RIGHT and LEFT:	As seen when sitting in the driver's seat facing the header
HEADER:	FRONT:	Cutter bar side
	BACK or INSIDE:	Feeder housing 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.



Combine Preparation

1. Remove factory pickup or auger header from the combine as outlined in the Owners/Operators manual supplied by the combine manufacturer.
2. Check feeder housing front and top for straw and chaff build-up. Clean all contact areas thoroughly.
3. Check all locking mechanisms and/or lock pins on feeder housing of combine to ensure they are working properly and will not interfere with the initial mounting of the Grain Belt Header on your combine.
4. Check for leaks and/or loose fittings on hydraulic lines (hoses) which attach to the header. Repair if necessary.
5. Check the feeder house output speed to see that it matches the recommended speed of the header. See the Specifications section of this manual.

Grainbelt Header Preparation

1. Check the feeder housing adapter area on the Grain Belt Header for any obstructions.
2. Be sure the hydraulic pump and attached hoses are clear of the feeder housing adapter opening. Slide the telescoping drive shaft back as far as possible, if necessary, slide the pump back on the mount bracket so it does not interfere with the feeder housing as you drive the combine forward.
3. Check hydraulic hoses to be sure the couplers match those on the combine.

NOTE:	Some types of hydraulic connectors may not be supplied with the Grain Belt Header.
	If the optional transport package was not purchased, the header should be placed on flat, hard and level ground as in the Quick Dismount position. (See the Quick Dismount section of this manual.)

4. Park the Grain Belt Header on flat, hard, and level ground if the optional transport system was purchased. Level the header by adjusting the hitch jack.
5. Install the crop dividers and crop divider pipes to the ends of the table. The crop divider or pipes are not installed at the factory.

The crop divider is held in place with (6) - 3/8" x 1" carriage head bolts.

Three bolts are installed through the base of the crop divider, and into the table shoes at each end of the table. These are held in place by flat washers and crimp lock nuts.

The crop divider **overlaps the outside of the crop deflector** to provide a smooth transition for the crop.

The other three carriage head bolts are installed from the inside of the formed sheet metal portion of the crop divider, into the crop deflector. The bolts are held in place with flat washers and crimp lock nuts.

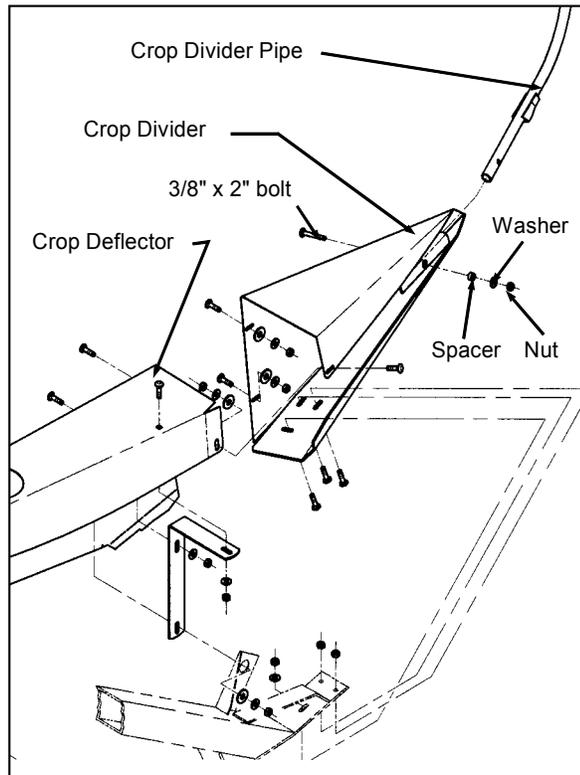


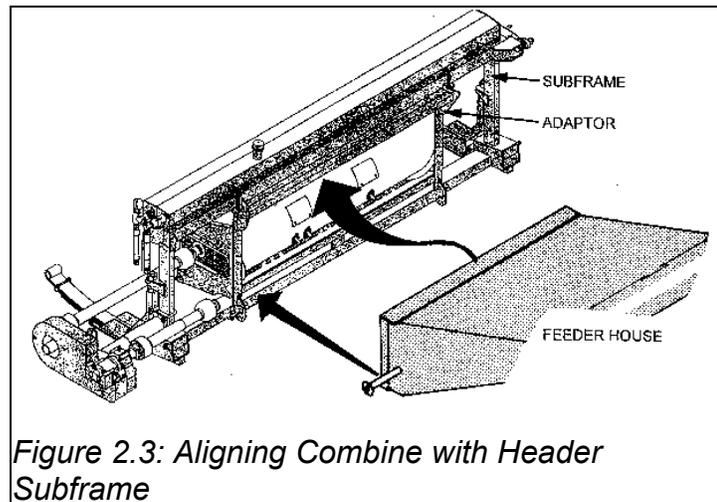
Figure 2.2: Crop Divider – Exploded view

6. Install the crop divider pipe into the crop divider using the 3/8" x 2" carriage head bolt. After the bolt is inserted through the divider and pipe, install a bushing-spacer onto the bolt followed by a flat washer and a lock nut. The bushing-spacer should press tightly against the crop divider pipe to hold it firmly in place.

NOTE:	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.
-------	---

Positioning Header on Feeder Housing:

1. Position combine directly behind the header with the feeder housing aligned as closely as possible, on center, with the feeder housing adaptor on the header sub frame.



2. With the feeder housing on the combine lowered, slowly drive the combine forward until the feeder housing front is aligned both vertically and horizontally with the adapter frame on the header. If the feeder housing does not align horizontally, adjust the optional hitch jack on the header either up or down to improve alignment. Adjust feeder housing height.
3. When the feeder housing is properly aligned with the adapter on the header, drive forward slowly until the feeder housing of the combine is inserted into the adapter frame. Slowly raise the feeder housing on the combine (using the combine control) until the top of the feeder housing makes firm contact with the inside top of the feeder housing adaptor mount. If the bottom of the feeder housing makes contact with the auger adaptor too soon, it may be necessary to extend the top link on the subframe (See **Leveling** or **Troubleshooting** sections of this manual.)
4. Visually check clearance and alignment of the feeder housing to the feeder housing adapter on both sides of the feeder housing as well as on the top and bottom. **Be sure that nothing is interfering with the alignment of the feeder housing to the adapter frame.**



ENGAGE PARKING BRAKE ON THE COMBINE, SHUT ENGINE DOWN AND WAIT FOR ALL MOVING PARTS TO STOP BEFORE LEAVING THE CAB

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5. Check the position of the feed auger in the adapter to be sure it is not contacting the shrouds on the front of the feeder housing. If required, adjust the feed auger to a more forward position in the adapter (See the **Feeder Housing** adjustment section of this manual.)
6. If feeder housing and the feeder adapter are properly aligned, restart the engine and raise the feeder housing (and header) to its fully raised position.

Attention:	<i>If feeder housing and the feeder housing adapter frame ARE NOT properly aligned, repeat steps 2, 3, 4, and 5.</i>
	<i>ENGAGE PARKING BRAKE ON THE COMBINE, SHUT ENGINE DOWN AND WAIT FOR ALL MOVING PARTS TO STOP BEFORE LEAVING THE CAB</i>

7. Lock the feeder housing in the fully raised position as described in your Combine Operators Manual.
8. With the header in the fully raised position insert all lock pins and/or header adapter locking bolts as described in your combine operator's manual.

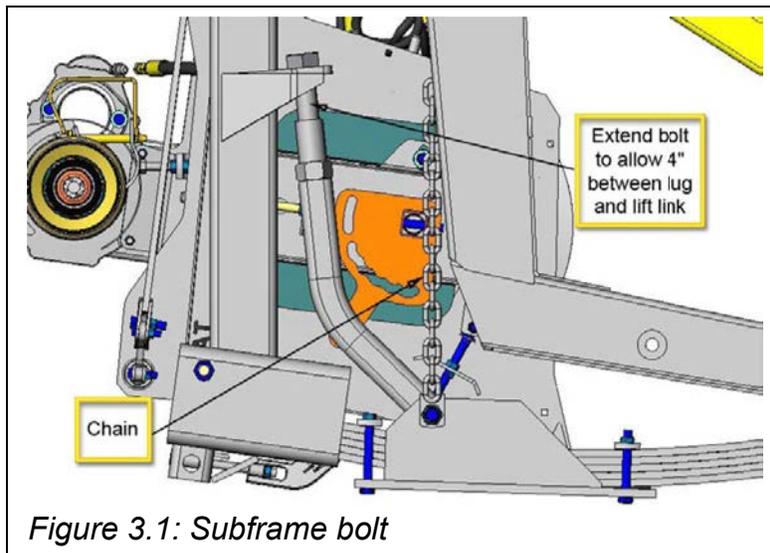
ATTENTION:	<i>BE SURE THESE PINS ARE PROPERLY LOCATED AND SECURELY IN PLACE BEFORE PROCEEDING.</i>
-------------------	--

3 - Coupling

Subframe Adjustment

The subframe requires some adjustment to allow full floatation of the header in the field

1. After header is mounted to the combine, lengthen the right subframe leveling bolt to allow approximately 4" between the lift link and the subframe lug.



2. Repeat this adjustment on the left side. This adjustment allows the cutter bar to drop down, giving more clearance between the ground and the feeder deck. Further adjustments can be made as necessary.

For further instruction on leveling the header, see the Leveling section of this manual.

Restrainer Chains

Locate the transport restrainer chains on both sides of the header adapter frame near the bottom. These chains restrict the amount of header flotation and also suspend the adapter frame when the header is on the transport axle or in the quick disconnect position.

Unhook the chains and re-attach them in the longest position. This will provide unrestricted header flotation in the field.

Coupling the Drive Shaft

Remove the pin and lift the telescoping drive line from the storage bracket. Replace the pin and close the clip. Couple the drive line to the feeder housing shaft. Align the drive line so that a minimal amount of angle is required when the drive line is coupled.

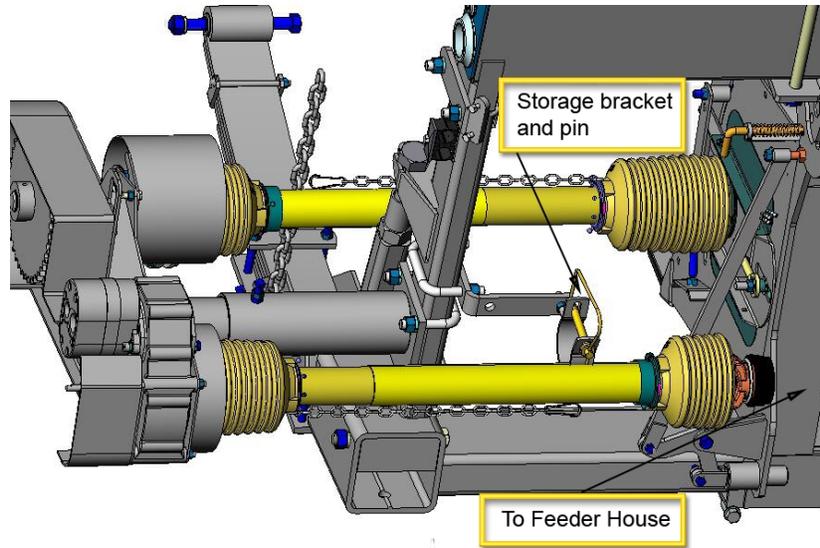


Figure 3.2: Driveshaft

Aligning the Hydraulic Pump

Excessive operating angles in driveline universal joints will cause premature wear and failure. Minimize the angles of operation as follows:

1. Loosen lock bolts. The pump and slip clutch assembly can now be adjusted to pivot up and down, or in and out to align with the feeder housing shaft.
2. When drive line is properly aligned, with the minimum possible angle in the shaft, re-tighten bolts.
- 3.

Couple the drive line to the feeder housing shaft using the coupler supplied with your header.

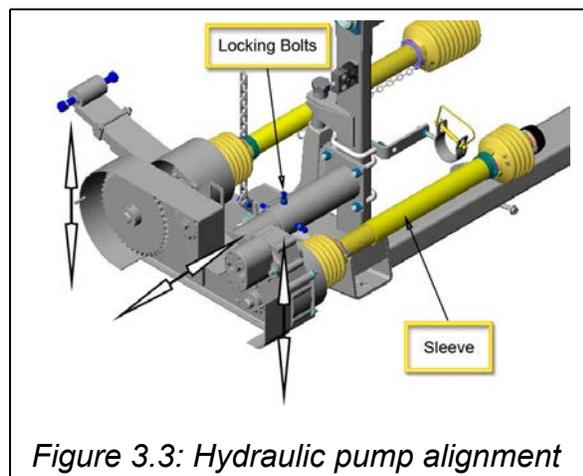


Figure 3.3: Hydraulic pump alignment

Connecting Hydraulic Hoses:

Couple the hydraulic lines.

Be sure the couplers match those on the combine and are fully engaged.

Reel Lift, Reel fore/aft controls (optional).

Reel drive circuit. (Not required if combine is not equipped with hydraulic reel drive circuit.)



Figure 3.4: Connecting Hydraulics

Electrical Connections

If the header hydraulic system is used to drive the reel, the flow control will be equipped with a remote speed adjustment. Connect power wires to a power source on the combine and install a switch in a convenient location.

Connect warning lights and flashers.

Connect reel speed sensor wires.

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NOTES:

4 - Leveling

The header is attached to the adapter frame by the upper suspension link, (located on the right of the header adapter), and two leaf spring assemblies. An optional hydraulic upper link is available, which mounts centrally on top of the header. These top links adjust the forward angle of the table. This directly affects the angle of the cutter bar to the ground. The adjustment bolts on the spring saddles affect leveling and the overall height. Turning the adjustment bolts will alter the clearance between the ground, and the back of the center deck.

Forward Angle – Manual Adjustment

1. Loosen lock tab on top link. Turn top link clockwise to tilt header back, turn counter-clockwise to tilt header forward.
2. Re-tighten lock tab once desired header angle has been reached.
3. To obtain more table angle, the top link may be positioned in the forward mounting hole. To change holes, lower the table to the ground and adjust the top link until it is loose. Remove the threaded pin, shorten the top link, and then replace the threaded pin in the other hole. Adjust top link. Tighten lock tab.

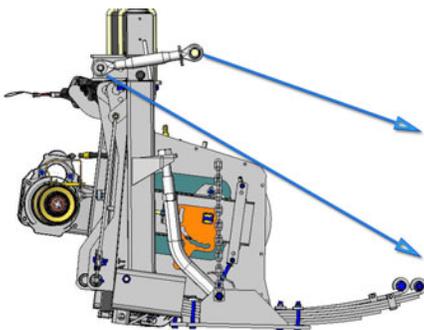


Figure 4.1: Header Adapter - Right Side

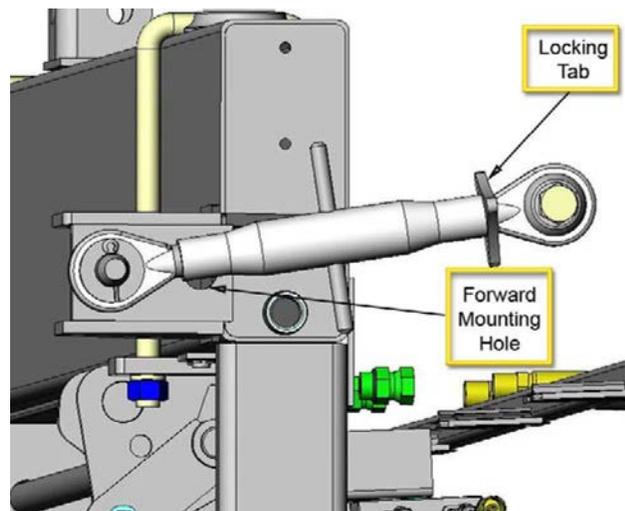


Figure 4.2: Header Top-Link

Attention:	Do not over-extend top link. Maximum extended length is 19" from bolt center to pin center. OVER-EXTENSION OF LINK MAY CAUSE TABLE TO DROP SUDDENLY.
-------------------	---

Leveling and Table Height Adjustment.

1. Shortening the adjusting bolts will raise the table, lengthening the adjusting bolts will lower the table. To level the table, screw the adjusting bolts in or out depending on which side needs to be raised or lowered. To turn the adjusting bolts, lower the table to the ground, this will take the weight off the bolts and will allow them to be turned. They can be turned by hand, but if not use a wrench. Lift table and check level.
2. To lower the cutter bar relative to the sub-frame, extend both adjusting bolts. This will provide more clearance between the sub-frame and the ground. This adjustment will also provide more clearance between the center deck and the ground allowing the cutter bar to contact the ground first.

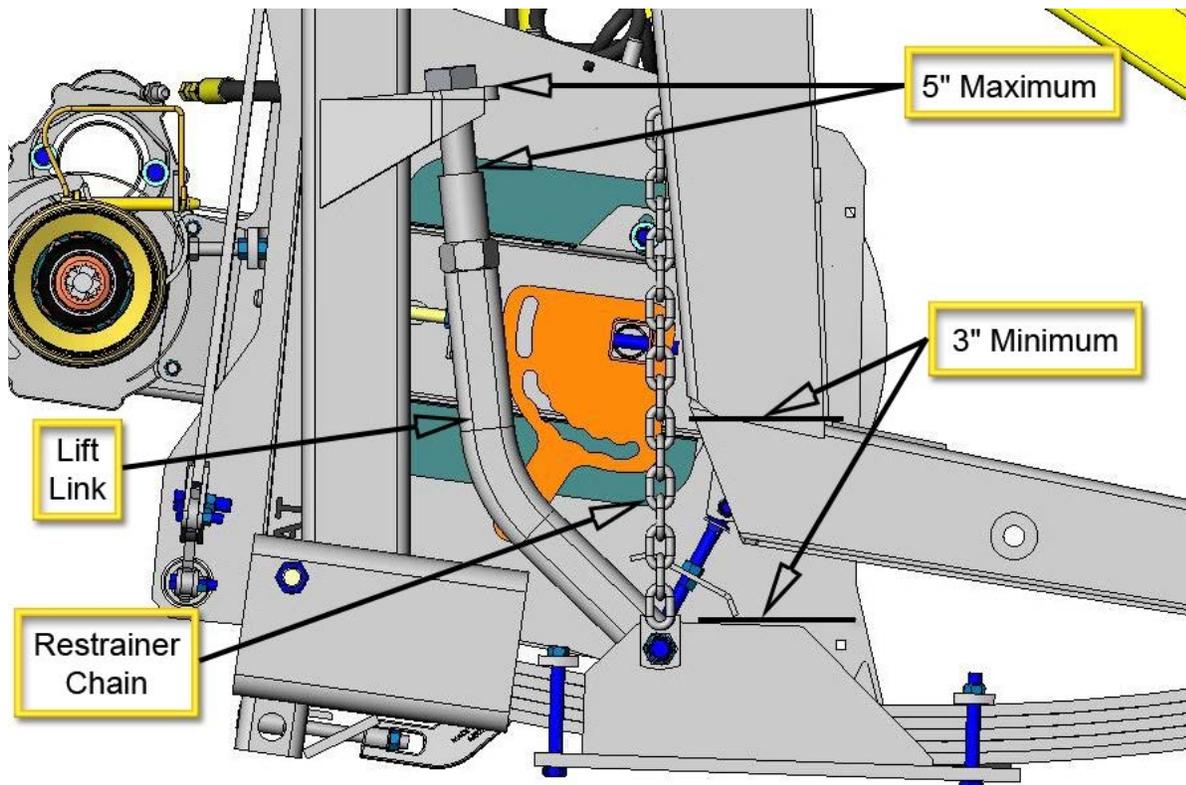


Figure 4.3: Height Adjustment Assembly - Right Side

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Attention:	<i>Do not expose more than 5" (125mm) of thread (including spacer) on the table adjusting bolts. If bolts are extended too far, threads will disengage from the lift link and the table will drop suddenly.</i>
NOTE:	<i>The recommended minimum distance between the top of the spring saddle and the inside of the table strut should be no less than 3" (75mm).</i>
Attention:	<i>Care must be taken when lengthening the adjusting bolts. This action will decrease the size of the opening leading to the auger adapter.</i>

The auger adapter is stationary in the sub-frame, and as the table lowers with the adjusting bolts, the hydraulic lines under the upper tube will move closer to the fingers in the auger. To ensure that the fingers do not contact the hydraulic lines: disconnect the driveline, lift the finger auger and rotate the drum. Check the clearance.

Flotation

To vary the stiffness of the suspension, loosen or tighten the clamping plates on the spring saddles. (Refer to , page .) Whenever the header is lifted using the combine, the clamp plates will be loose. This condition is normal, and acceptable. Tighten the clamp plates only if stiffer flotation is desired.

ATTENTION:	<i>When operating in the field position, the restrainer chains should be at full extension (loosened) to provide maximum end-to-end flotation for the header.</i>
-------------------	--

The following diagrams of the Grain Belt Header are presented to show you the maximum range of adjustments to the leveling bolts and the top link. In each of the views, the sub-frame has been kept at a constant height above the ground. These examples show the possible extremes of these adjustments.

Example A:

The leveling bolts have been shortened, causing the cutter bar to be lifted, and the top link has been shortened, causing the table to be tipped back

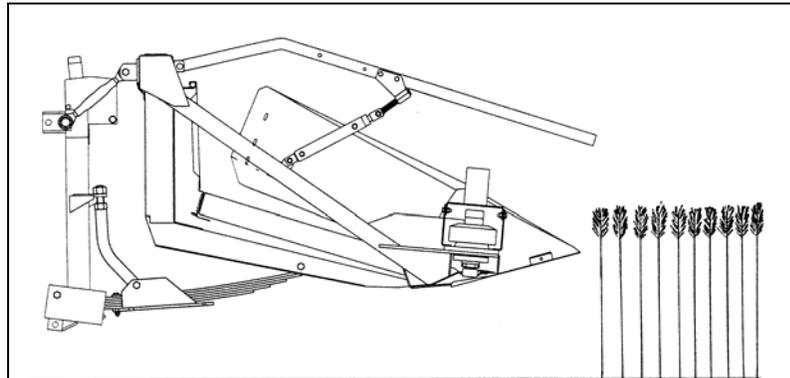


Figure 4.4: Leveling bolts and Top-Link Shortened

Example B:

The leveling bolts have been shortened, and the top link is fully extended. Notice how the top link tilts the table forward.

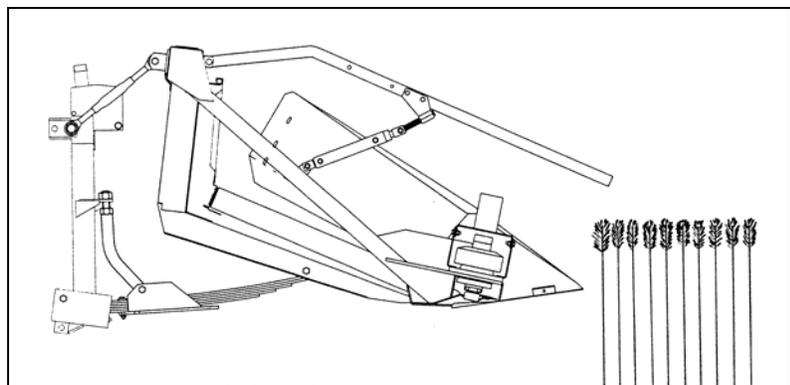


Figure 4.5: Leveling Bolts shortened, top link extended

NOTE:	<i>With both of these examples, if the feeder house is lowered allowing the cutter bar to get closer to the ground, the sub-frame and center deck will contact the ground first.</i>
--------------	---

In most cases the distance between the spring saddle and the table strut should be between 3"(75mm) and 5"(125mm). This should provide adequate flotation and adequate clearance between the auger fingers and the header opening. This distance will change as the header angle is changed, so it may be necessary to re-adjust leveling bolts.

Example C:

The leveling bolts are extended with the top link shortened. The extension of the leveling bolts allows the table to drop in relation to the sub-frame. In this configuration, clearance between the strut and the spring saddle is at a minimum which may not provide adequate end to end float.

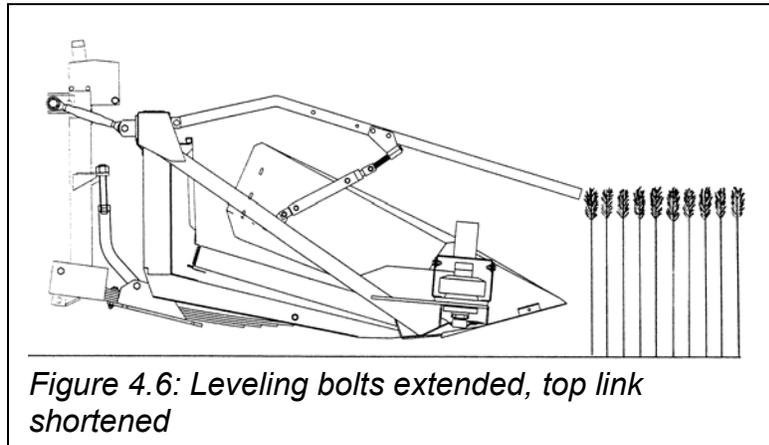


Figure 4.6: Leveling bolts extended, top link shortened

Attention:	<i>At this extreme of the adjustment range, you may encounter interference between the finger drum and the upper tube.</i>
-------------------	---

Example D:

The leveling bolts are extended with the top link also extended. The top link tilts the table forward bringing the cutter bar closer to the ground. The clearance between the strut and the spring saddle is also increased in this example, providing better flotation.

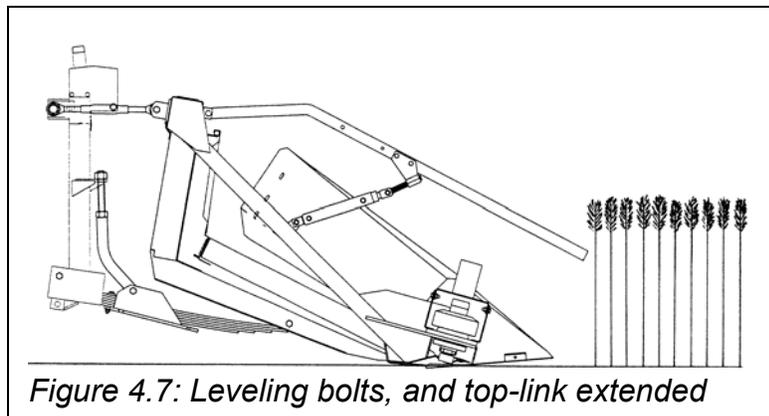


Figure 4.7: Leveling bolts, and top-link extended

NOTE:	<i>Before operation of equipment all clearances must be checked.</i>
	<i>Remember, these examples are extremes, and it is not suggested or recommended to adjust your header to the extreme. Experiment within the range of these “maximum” settings to determine which configuration will be best for your situation and crop cutting conditions.</i>

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For example: In rocky conditions with a short crop, you may want to keep the guard tips oriented flatter in relation to the ground. Try shortening the top link.

In bushy crops such as mustard you may want to tip the header forward with the top link to maximize the opening.

Attention:	<i>Care should be taken not to over extend the top link. The maximum length from bolt center to pin center is 19". Extending further may cause the header to drop suddenly.</i>
-------------------	--

5 - Removal of Transport Axles

Standard Transport Option – Convert to Field Operation

NOTE:	The transport axle, hitch and gauge wheels are optional. If these were not purchased, disregard references to them in this manual.
WARNING: 	<i>Transport axle and transport hitch parts are heavy. Care should be taken when handling them to avoid injury.</i>

With header in raised and locked position:

1. Remove lock pin and wheel assembly from front of transport axle.
2. Insert lock pin back into spindle assembly and close the clip.
3. Store wheel assembly in desired location or install wheel assembly into gauge wheel brackets, if equipped.

4. Remove the back wheel assembly from the transport axle.
5. Remove the transport lock pin which fastens the rear of the transport axle to the header subframe.
6. Slide the transport axle tube toward the front of the header until it falls to the ground.
7. Insert axle lock pin back into the transport axle tube bracket.



Figure 5.1: Front Tire Removal



Figure 5.2: Rear Tire Removed

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Reel Tie-down Strap (For Bat Reel Only...)

1. Remove reel tie down strap from around reel.
2. Attach to the reel hold down bracket for storage.
3. Secure with quick pin.



Figure 5.3: Reel Tie-down Strap

Removing and Storing the Hitch

If desired, the hitch tube may be removed, if the weight of the header needs to be reduced, or if the hitch interferes with the ground when cutting at a low angle.

1. Lift header off the ground with the combine. Lock the main cylinder.
2. Remove jack from hitch tube.
3. Remove pin from drop tube.
4. Remove pin from drop tube.
5. Lower hitch end to the ground.

Remove pin from end of hitch tube where it is connected at the strut. Stay clear of hitch tube as it falls.

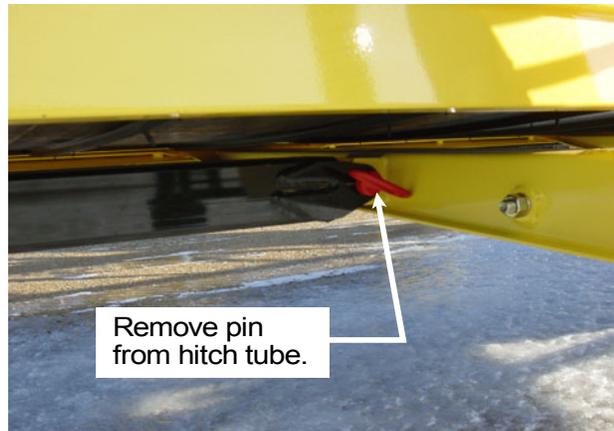


Figure 5.4: Hitch Pin

<p>WARNING:</p> 	<p><i>HITCH PARTS ARE VERY HEAVY.</i></p> <p><i>CARE MUST BE TAKEN WHEN HANDLING THESE PARTS TO PREVENT INJURY</i></p>
--	--

6 - Integral Axle

Integral Axle - Convert to Field Operation

NOTE:	<i>The integral axle, hitch and gauge wheels are optional. If these were not purchased, disregard references to them in this manual.</i>
WARNING: 	TRANSPORT AXLE AND TRANSPORT HITCH PARTS ARE HEAVY. CARE SHOULD BE TAKEN WHEN HANDLING THEM TO AVOID INJURY.

1. Lift header off the ground with combine.
2. Remove lock pin from axle and spindle of rear tire, install wheel into right hand gauge wheel strut.

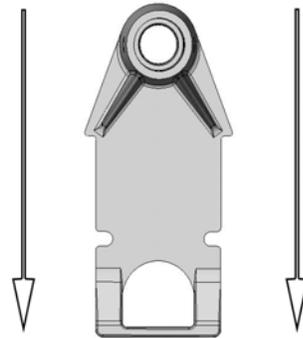


Figure 6.1: Inverted Riser

3. Support axle riser, pull lock pin. (See Figure 6.4: Integral Axle - Locking Pin)
4. Remove axle riser from bracket.
5. Turn riser over, and install upside down in storage bracket. (See Figure 1.1 – Inverted Riser)

NOTE: If this axle riser is not put into field storage position, it may fall out while cutting.

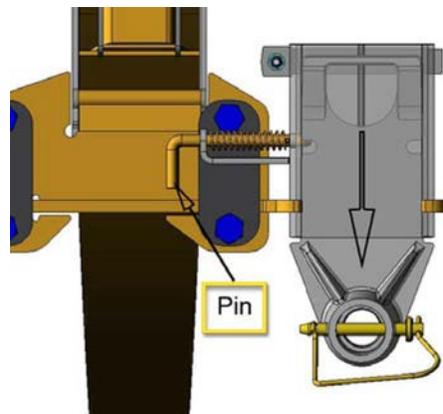


Figure 6.2: Axle Riser in Road Position

Remove lock pin from axle and spindle of front tire.

Push on the end of the transport axle with your foot to loosen the axle.

Take tire around header to left side and install wheel into left hand gauge wheel strut.

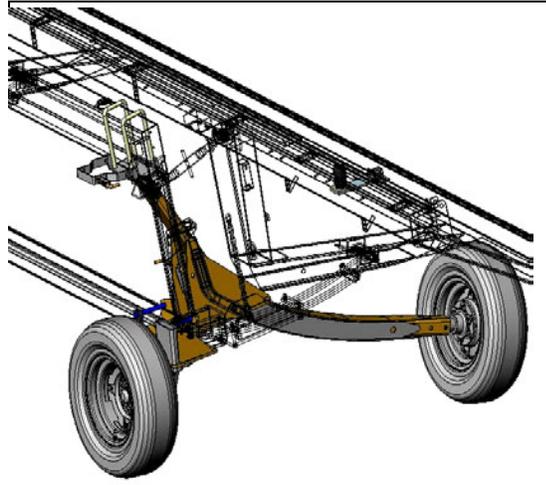


Figure 6.3: Integral Axle Assembled

With both tires removed, pull the transport locking pin.

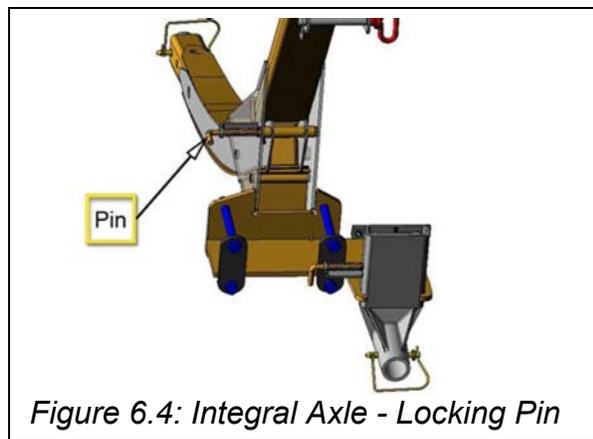


Figure 6.4: Integral Axle - Locking Pin

Grasp the one-inch tubing across the end of the axle, marked "Handle" in the photo to the right.

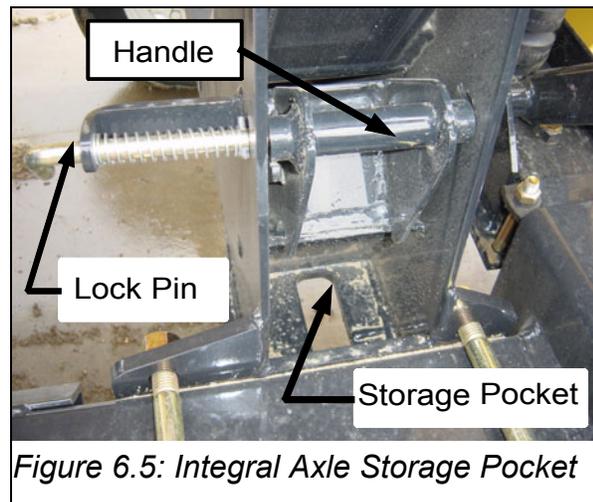


Figure 6.5: Integral Axle Storage Pocket

Retract the lock pin, and pull the axle upward, then set it into the storage pocket.

NOTE: The end of the transport axle should rest in the storage pocket when in field position.)

Ensure the axle is resting in the storage pocket and is supported by the upper bracket as shown here.

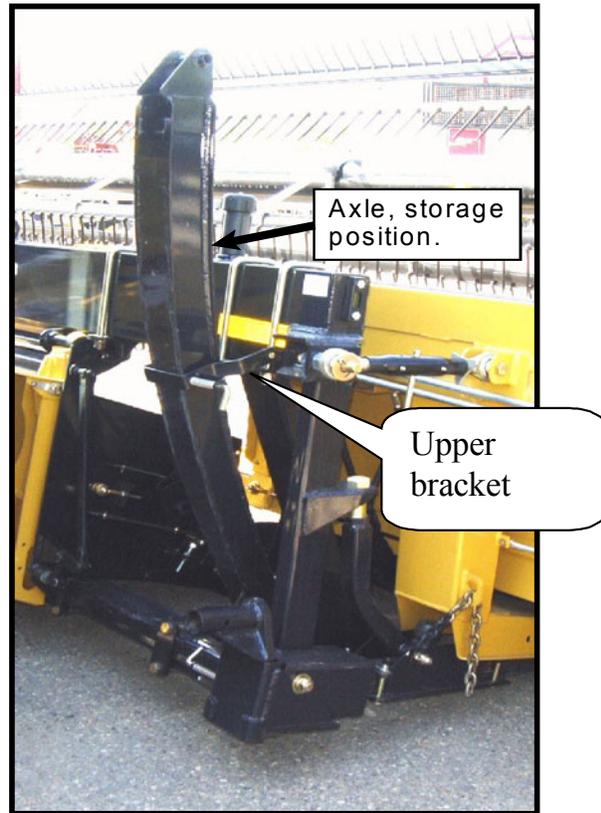


Figure 6.6: Integral Axle - Stored Position

Field storage positions: drop tube and transport axles.

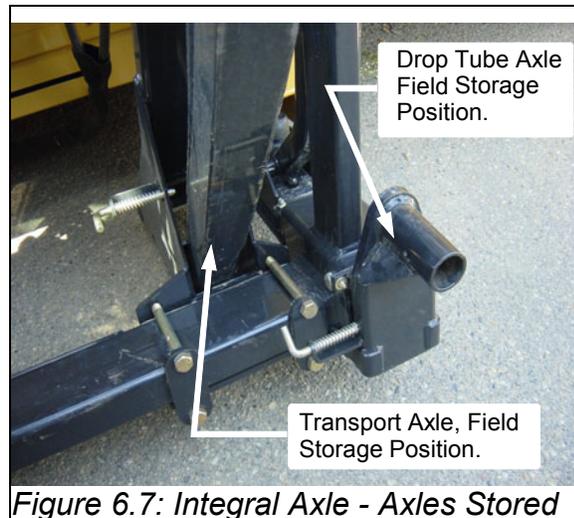


Figure 6.7: Integral Axle - Axles Stored

Integral Axle – Removing the Hitch

Refer to the “***Removal of Transport Axles***” section of this manual – ***Removing and Storing the Hitch***

NOTES:

7 - Mounting Checklist

<input type="checkbox"/>	Header adapter frame aligned and fitted to the feeder house of the combine.
<input type="checkbox"/>	Feed auger adjusted. (Auger fingers do not contact the feeder housing.)
<input type="checkbox"/>	Feeder housing lock pins/bolts in place and properly locked/tightened.
<input type="checkbox"/>	Transport axle tube and hitch tube removed from the header.
<input type="checkbox"/>	Gauge wheels installed as directed. (If equipped.)
<input type="checkbox"/>	Hydraulic lines (quick couplers) fully connected.
<input type="checkbox"/>	Gearbox aligned and connected to the bottom feeder house output shaft.
<input type="checkbox"/>	Finger auger drive shaft aligned and connected.
<input type="checkbox"/>	Electrical connections in place and tested.
<input type="checkbox"/>	Restrainer chains latched in the longest position
<input type="checkbox"/>	Reel tie down strap removed.
<input type="checkbox"/>	Transport parts stored for future use.
<input type="checkbox"/>	Header is level.

WARNING 	<p><i>Before proceeding, be sure you have been through the Mounting Checklist. This will ensure that the header is securely mounted.</i></p> <p><i>KEEP BYSTANDERS AWAY FROM THE MACHINE, ESPECIALLY SMALL CHILDREN.</i></p>
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Raising and lowering the header.

IMPORTANT!	<p><i>If the combine will not raise the header, see the Troubleshooting section of this manual.</i></p>
CAUTION 	<p><i>BE SURE NO ONE IS STANDING NEAR THE MACHINE WHILE YOU ARE RAISING OR LOWERING THE HEADER.</i></p>

Pre-Start Checklist

Start the Combine and lower the header to the ground, if necessary.

<input type="checkbox"/>	Inspect the header for damaged or loose parts. Repair or replace any such parts immediately.
<input type="checkbox"/>	Check oil level in hydraulic reservoir of the header. Add to specified level with the recommended oil, if required.
<input type="checkbox"/>	Ensure that all protective shields are in place and secured.
<input type="checkbox"/>	Inflate tires to 50 psi (345 kPa) for both transport, and for field operation.
<input type="checkbox"/>	Inspect all hydraulic hoses and fittings. Ensure connections are secure and hoses are in good condition.
<input type="checkbox"/>	LUBRICATE THE HEADER as outlined in the Service section of this manual.

Cold Weather Start-up – Temperatures below + 10C/ 50F

ATTENTION:	<i>It is a good practice, and in cold weather it is absolutely necessary, to allow the oil to warm up prior to any cutting. Turn the canvas flow control to zero to prevent pressure spikes</i>
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With combine at low idle, engage header drive. ***Do not increase to high idle until oil has reached operating temperature.*** Once the oil is warm, increase the canvas flow control to desired speed. If oil flow passes over the relief, it may be necessary to adjust the relief pressure. Refer to the ***Hydraulic Section*** of this manual.

Normal Start

1. Start the combine. Using the reel height control, raise the reel to full height (cylinders fully extended). Hold switch on momentarily at the full height position, then drop the reel to its lowest position (cylinders fully retracted). Complete this cycle at least twice to ensure it is working properly.
2. ENGAGE THE PARKING BRAKE. Engage platform drive switch (see Combine Operator's Manual for instruction) with engine at idle RPM. The platform canvas, knife and reel should begin to turn...

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WARNING!



IF ANY OIL LEAKS APPEAR, SHUT THE COMBINE DOWN IMMEDIATELY AND MAKE THE NECESSARY REPAIRS BEFORE RESTARTING.

3. Increase idle speed. When combine is at high idle check and set:
 - a. Reel speed.
 - b. Canvas speed.
 - c. Canvas tracking.If adjustments are required see the appropriate section of this manual.
4. With swather lowered to approximately 2 inches (5 cm) from the ground, STOP COMBINE, SHUT ENGINE DOWN and check:
 - a. Swather leveling (end to end).
 - b. Swather cutting angle.
 - c. Strut and spring saddle separation 3" to 5" recommended.
 - 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.
 - j. Knife drive mounting bolts.
5. With the header raised, engage header drive with combine at idle. The header, knife, and drapers should operate.
6. Activate the reel with combine controls. Steadily increase engine speed until full operating RPM has been reached.

ATTENTION:

PRACTICE OPERATING AND MANOEUVERING THE HEADER AND COMBINE IN AN OPEN AREA AWAY FROM PEOPLE AND BUILDINGS.

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NOTES:

8 - Maintenance and Lubrication

Lubrication

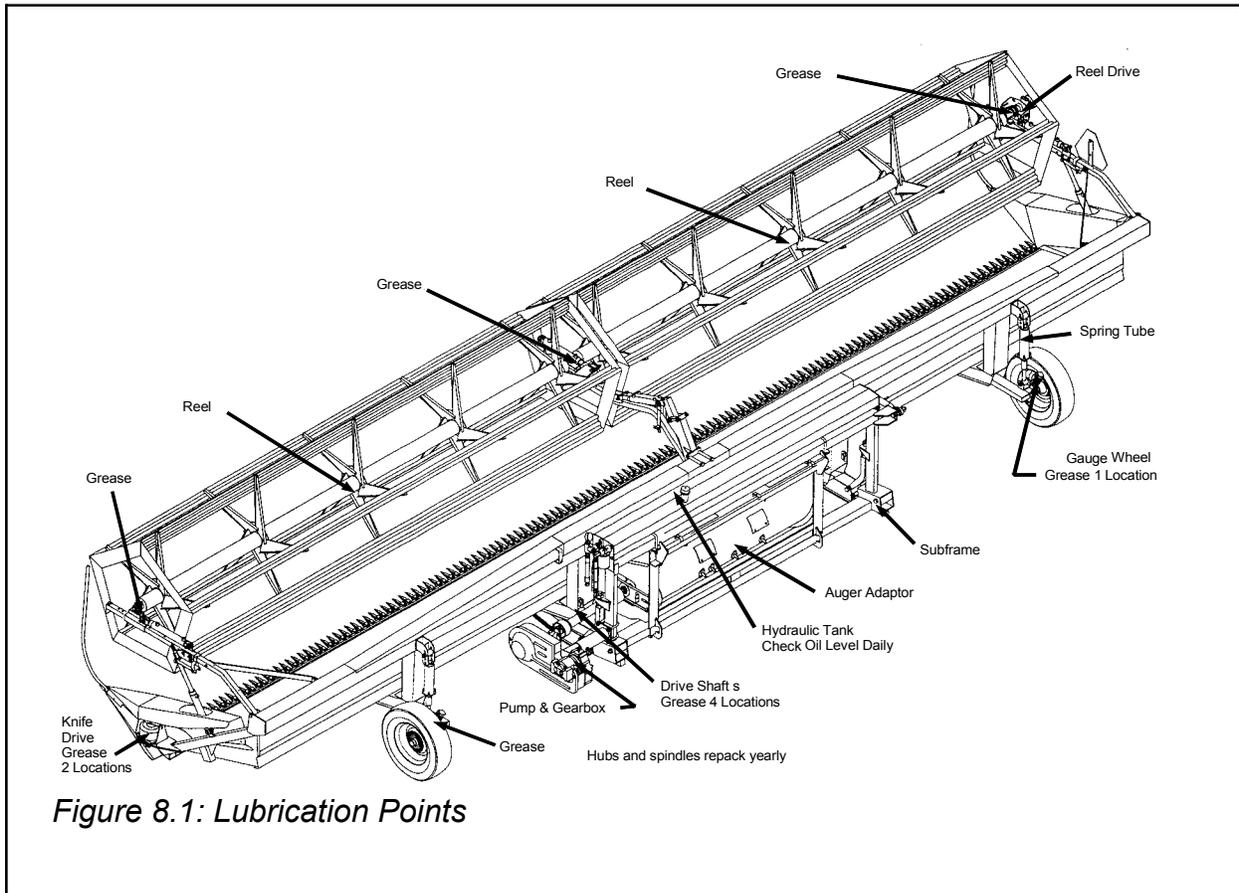
IMPORTANT! USE GOOD QUALITY, GENERAL PURPOSE GREASE.

Item	Lubricant	Quantity	Frequency	Location/comments
Knife Drive motor	Grease	1 shot	50 hours	Bottom of crank shaft
Knife Drive bearing	Grease	1 shot	50 hours	Side of knife drive knuckle
Reel bearings	Grease	1 shot	10 hours	Ends of reel(s)
Gauge Wheels	Grease	1 shot	10 hours	Side of spring tube
Universal Joints	Grease	1 shot	50 hours	Pump driveline ends
	Grease	1 shot	50 hours	Auger driveline (3)
Guard	Grease	1 shot	50 hours	(1 location per cone)
Driveshafts	Grease	1 shot	50 hours	Telescoping members
Knife	Water/ Diesel	Soak	As needed	If knife is gumming
Drive Chain	Chain Lube	Soak	As Required	
Hub and spindle	Grease	Re-pack	Annually	Replace seals as needed
Gear Box - Speed Increaser	Oil Gravity filled from hydraulic tank.			Check daily that no leaks occur
Hydraulic tank	Co-Op Trans-Hydraulic/ Esso Hydraul 56	Replace fluid	Every 3 years, or 1000 hours	Optimum Operating range -30C to +80C (-22F to +176F)

Lubrication Service Locations - (36' Model, with bat reel shown.)

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Filters

The suction line strainer (100 MESH) does not require replacement. In the event the oil becomes contaminated, the strainer should be removed, washed and dried thoroughly before re-installation.

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

Compatible Replacement
Filters:

- Fleetguard HF6510 (10 micron) (25048)
- LHA SPE15 – 10
- Gresen K-2202
- Fram P1653A
- NAPA 51551
- Stauff SF6520

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Maintenance

<i>Item</i>	<i>Look for:</i>
Drive Lines:	<ul style="list-style-type: none">- wear in each yoke and cross kit- lubrication in slide tubes, yokes, and shield bearing.- worn friction disks, pressure plates, and- pressure setting of slip clutch.
Reel:	<ul style="list-style-type: none">- missing, damaged, or broken fingers,- worn bearing joints.- bent, broken, missing parts- wear in reel drive couplers, and reel joints (split reel),- lubrication
Crop Dividers, and Crop Deflectors:	<ul style="list-style-type: none">- damage, abrasive wear on the shoe of the crop divider,- stress cracks
Chain case:	<ul style="list-style-type: none">- sprocket wear,- chain stretch or damage.
Hydraulic System:	<ul style="list-style-type: none">- leaks at pump, hoses, steel lines, and cylinders.- damaged pressure gauges.- squealing relief valve.
Transport and hitch system:	<ul style="list-style-type: none">- all components are secured- cuts and abrasions on tires.
Cutting system:	<ul style="list-style-type: none">- worn, loose skid plates or poly skid under the cutter bar- worn, loose knife head and knife drive bearings.

Service, repair, or replace all components as required.

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Periodic Checks

Check all cutting parts carefully for damage and wear. Worn knives and guards can cause higher cutting pressures and increase incidences of knife 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 approximately the thickness of two sections, it is time to replace the guards.

Check knife back and spacer bars.

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.

Auger drum Maintenance:

High wear parts, such as the finger guides, should be checked carefully. Remove the inspection covers on the drum and examine the inside. Check the finger bearings. None should be binding. Examine the rivet or roll pin in the finger bearing. It must be tight. If the roll pin is working its way out, install a wire in the center of the roll pin.

Inspect the drivelines, and lubricate as shown in the Center-feed Auger section of this manual.

Drapers – Periodic Maintenance:

These eleven steps can significantly reduce repair costs to the drapers:

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 move freely inside the guide tube.
7. Check idler roller bearings, they should spin freely.
8. Check drive roller bearings.

9. Check bearing stubs.
10. If storing header outside with draper installed on decks, position the connector bar on the underside to allow water to drain from decks. Water build up and freezing action may stretch the draper material.
11. Perform these steps on the center deck also.

Replacing Center Bolt in suspension springs.

Header on Combine:

1. Lower the table and let the cutter bar rest on the ground.
2. If header has gauge wheels, extend them until they carry the weight of the back of the header, or else place adequate blocking to support the back of the header before lowering.
3. With the table supported, loosen the leveling bolt on the lift link that has the broken spring bolt.

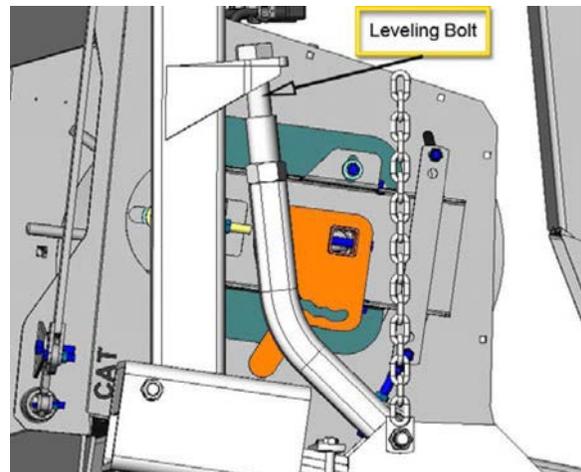


Figure 8.2: Suspension Right Side

4. Loosen the shackles on the spring.
5. Line up the holes in the spring and the spring saddle.
6. The head of the spring bolt is countersunk into the spring saddle. Drive out broken bolt with a punch.
7. Install a new bolt from the bottom and secure with nut.

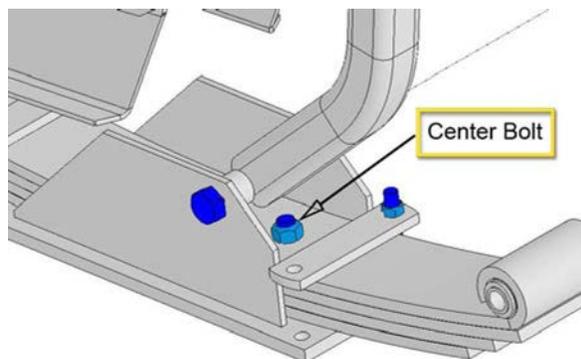


Figure 8.3: Center Bolt

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Header on Transport Axle

1. Loosen restrainer chain on right hand side.
2. Tilt table forward with the top link.
3. Insert a jack under header sub-frame on the left hand end and lift. As the sub-frame rises, the restrainer chain on the left end will loosen.
4. The right side is fully supported by the transport axle, so if the broken bolt is on this side, no jacking is required.
5. Loosen the leveling bolt on the lift link and spring saddle that has the broken bolt.
6. Loosen the spring shackles.
7. Drive out the broken bolt.
8. Line up center bolt hole in spring leafs, insert bolt, and secure with nut.

9 - Cutting System

All cutter bar components must be maintained in good condition to obtain acceptable field performance. Inspect the cutter bar daily for damaged and broken parts before starting work. Repair or replace parts as required.

<p>CAUTION</p> 	<p>WHEN WORKING WITH OR AROUND THE KNIFE, THE FOLLOWING PROCEDURES SHOULD BE TAKEN TO PREVENT SERIOUS INJURY OR DEATH TO YOURSELF OR OTHERS AROUND YOU.</p>
	<p>RAISE THE HEADER TABLE, RAISE THE REEL, STOP THE ENGINE, SET THE PARK BRAKE AND REMOVE THE IGNITION KEY BEFORE DISMOUNTING.</p> <p>INSTALL FEEDER HOUSE LIFT CYLINDER LOCKS & REEL LIFT CYLINDER LOCKS.</p> <p>CLEAR THE AREA OF BYSTANDERS, ESPECIALLY SMALL CHILDREN.</p> <p>WEAR HEAVY CANVAS OR LEATHER GLOVES WHEN WORKING WITH THE KNIFE.</p>

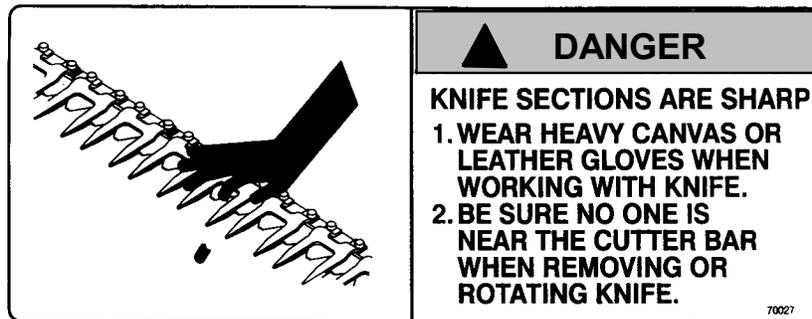


Figure 9.1: Danger Label: Knife Sections

Knife Removal

Remove the two socket-head cap screws on the knife head block. Slide the knife out of the cutter bar.

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 (55 Nm).

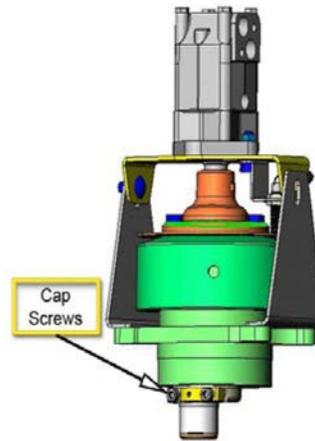


Figure 9.2: Knife Drive Set Screws

Cutting System Maintenance

Guards

“EasyCut” guards are manufactured from heat treated spring steel. They have beveled cutting edges at the top and bottom making the guards cut better and last longer.

When replacing guards always mount the new guard with the SCH stamp to the top. Be sure the spacer bar is on top of the cutter bar. The crimp lock nut on the guard bolt should always be on the top.

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 the guards are aligned. Tighten guard bolts.

Sickle Sections

Install the sickle sections of the knife by alternating the cutting surfaces. Place one section with the cutting surface on top and the next with the cutting surface on the bottom. They must be sharp, and in good condition to obtain optimum cutting performance.

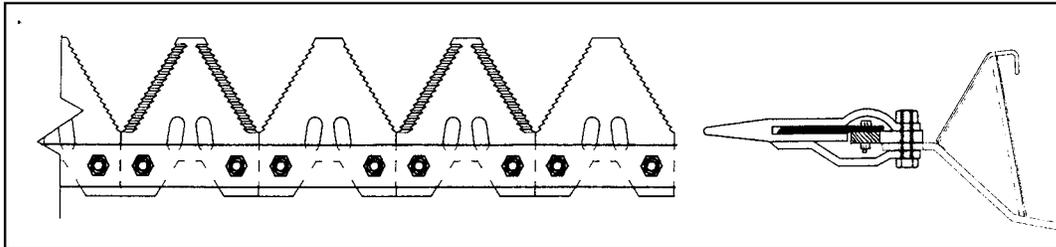


Figure 9.3: Alternating Knife Sections

Replace a Section – Method 1:

Remove the guard to expose the section.

Unbolt the section and install a new one.

Tighten the section bolts and nuts.

Install the guard. Ensure the spacer bar is pushed to the rear, and the guard is as far forward as possible. A small pry-bar may be helpful for this task.

Replace a Section – Method 2:

Move the knife by hand until one section bolt is exposed.

Remove the bolt.

Turn the knife until the other bolt is exposed.

Remove it, and install a new section.

Replace and tighten the bolt.

Turn knife back to install and tighten the other bolt.

<i>IMPORTANT:</i>	<i>Remember when installing sections to alternate the serrations, one facing up and the next facing down</i>
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Knife Drive/Knife Head

Proper maintenance of the knife drive assembly is critical to the performance of your Grain Belt Header. See the Lubrication section of this manual for scheduled maintenance procedures.

1. Check the tightness of the knife drive hold down bolts daily. Tighten to the specified torque.
2. Check the knife head bearing daily. Ensure the bolt is secure. If the bolt is tight, check the condition of the bearing and nylon sleeve. Replace any defective parts immediately to prevent damage to the drive.
3. Check the knife head locking bolt and the socket head cap screws daily. Rotate the knife drive by hand after tightening the knife head bolt to be sure the bearing, and the knife are moving freely.

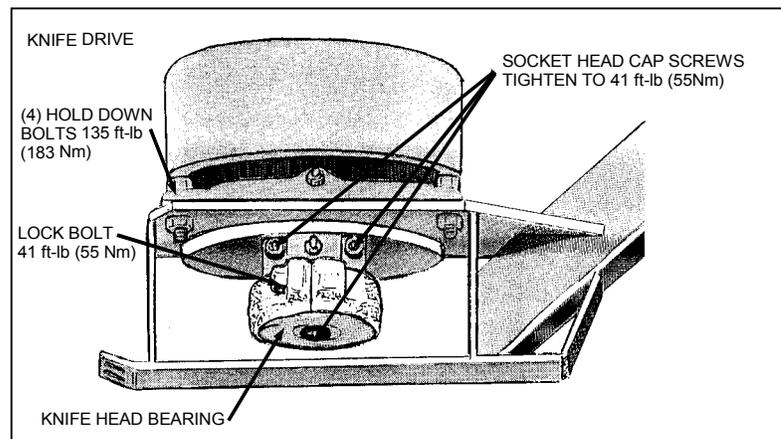


Figure 9.4: Knife Head Bolt

4. Check the knife head bolts, which attach the knife head to the knife back, daily. The bolts should be tightened to 120 in lbs., (13.5 Nm), (9.96 ft lbs.).

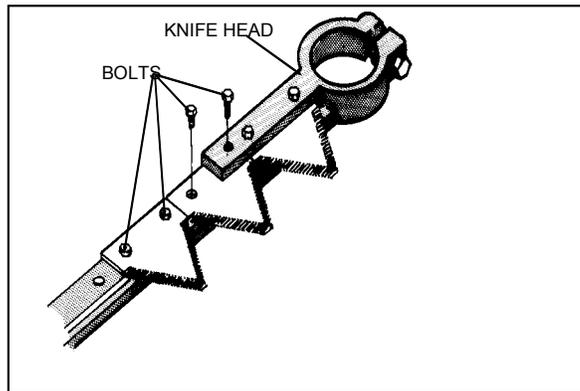


Figure 9.5: Knife-head Bolts

Connector Bar

On some models of Honey Bee headers 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. The connector bar is installed on the underside of the knife back. The 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).

<p>Attention!</p> <p><i>Do not grind the shoulder inserts flush, this will make them ineffective in holding the knife together.</i></p> <p><i>FAILURE OF THE KNIFE MAY RESULT.</i></p>		A cross-sectional diagram showing the assembly of a knife section. A bolt passes through a sickle section and a knife back. The knife back is attached to a connector bar. A shoulder insert is seated between the knife back and the connector bar. Labels 'BOLT', 'SICKLE SECTION', 'KNIFE BACK', 'CONNECTOR BAR', and 'SHOULDER INSERT' point to the respective parts. <p>Figure 9.6: Knife Shoulder Insert</p>
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In the above cross-section drawing, notice how the shoulder insert seats into the knife back bar. Check the tightness of these bolts daily; and replace broken and worn sections as required.

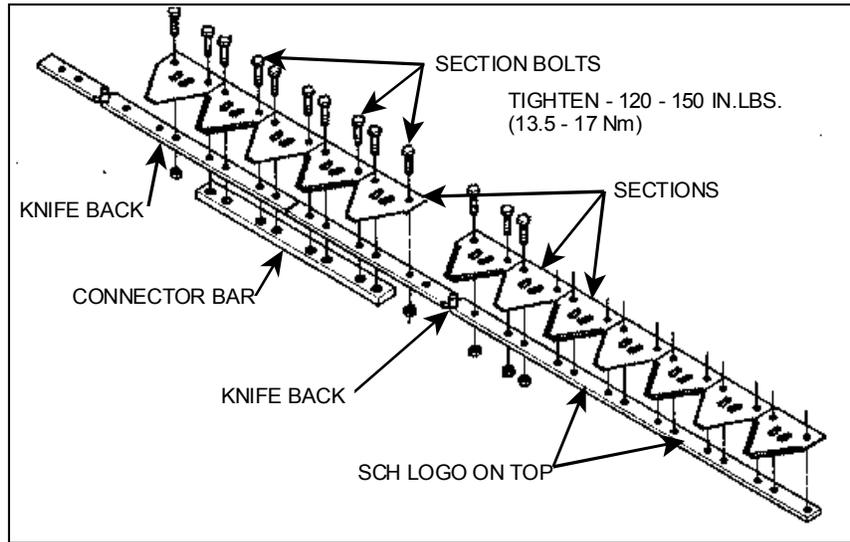


Figure 9.7: Knife Connector Detail

Overlap Kit

The overlap kit is used on headers equipped with double-drive knives. The knife sickle sections that overlap each other use countersunk fasteners to provide a smooth surface over which the other end of the knife slides.

The guards used in this overlap area are open on the top side, and are specially designed to accommodate the extra thickness in this area of the knife. The overlap strap, bolted to the left-hand knife, will offset the countersunk sections to allow the knives to overlap.

If the knife is noisy or overheats, check this area to ensure the overlap guards have been properly installed. The hold down clip has been added to maintain close cutting tolerances, and to prevent the overlap strap from wandering. If this hold down is too tight, install shim washers under the hold down.

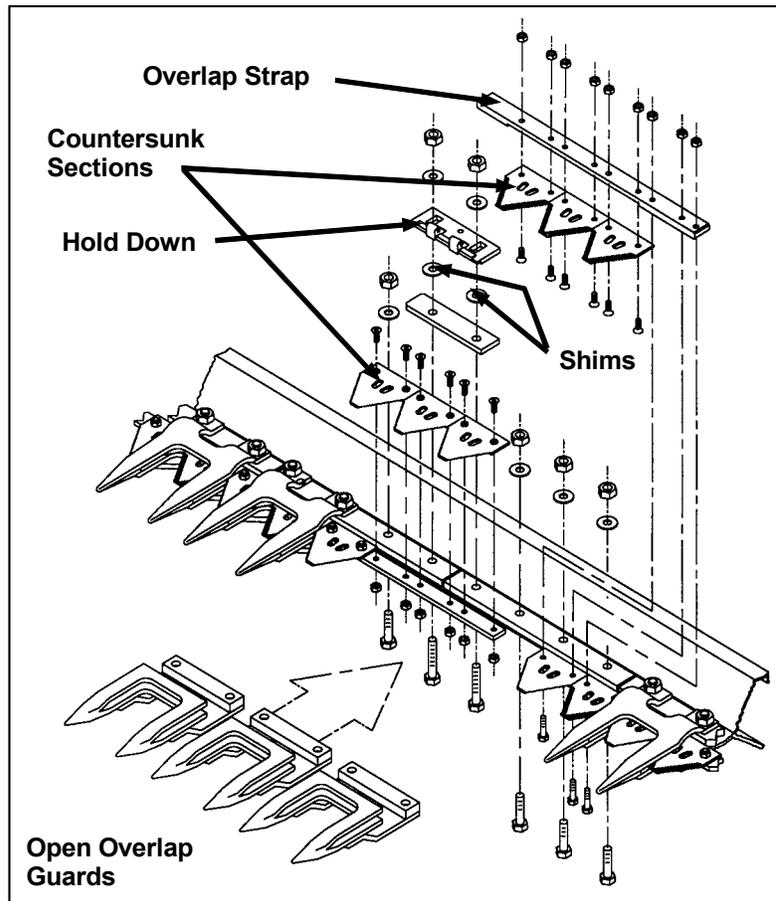


Figure 9.8: Knife Overlap – Dual Drive only

The overlap sections connected to the overlap strap, and the right hand knife back should be tight when the counter sunk bolts are tight. OVERLAP KIT – Continued...

If these sections are loose, it is possible that the countersunk bolts are not seating properly. The backup bar may need to have a slight countersink drilled around the holes to permit the bolts to seat fully.

1. Remove the counter sink bolts.
2. Inspect both sides of the knife back or overlap strap for a counter sunk depression that would allow the head of the counter sink bolt to seat fully.
3. If you do not observe this depression, drill a (9/32") indentation into the holes about 1/32" deep.

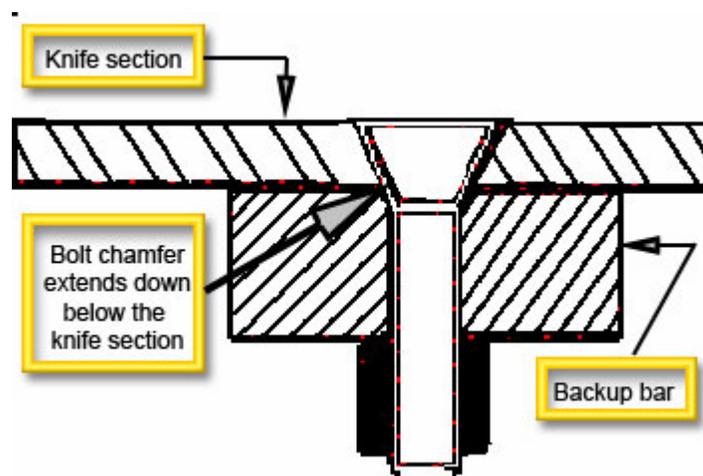


Figure 9.9: Knife Section Countersink

Repair 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 sickle section bolt hole. To use the connector bar properly, the damaged section needs to be cut out and/or a section of knife removed.

<i>Important!</i>	<i>If the knife breaks close to the knife head, remove that section of knife, reconnect the knife head, and then add the new section to the far end of the knife where there is less mechanical stress.</i> <i>The join in the two knives must be located midway under a sickle section, not in the gap between two sickle sections.</i>
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When you encounter this type of break, inspect the knife for dull/damaged guards, and sections, and gummy build-ups which might cause binding. One or more of these problems may have been the cause of the failure.

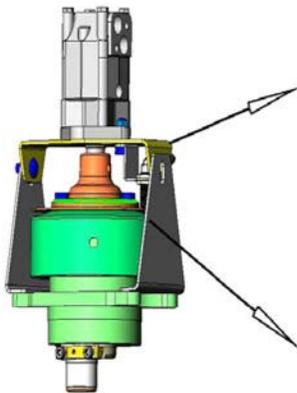


Figure 9.10: Knife Drive Motor

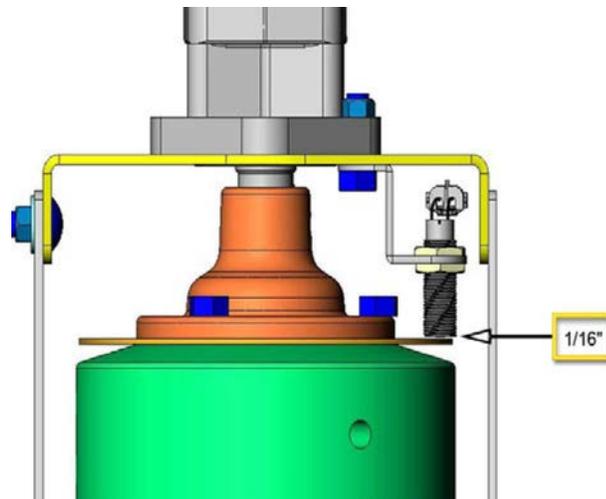


Figure 9.11: Knife Speed Sensor

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NOTES:

10 - Hydraulics

This section outlines the Hydraulic system, which drives the Grain Belt Header. The components, as well as the schematics of the various systems, are shown in the “Hydraulic Schematics” section of this manual.

All of the Grain Belt Headers have a self-contained hydraulic system. The feeder house driveshaft is connected to a speed increaser by a driveline. The output shaft of the speed increaser drives the hydraulic pump. Oil flows to the knife drive, then to the draper control circuit. The draper control circuit is split between the lateral draperes and the center deck. The oil then returns to the reservoir tank. With the optional header-driven reel, the draperes and the reel are plumbed in parallel with separate flow-controls. There are two relief valves in the system, one in the knife drive circuit and the second in the draper circuit.

Operating Pressure – Knife Circuit

The pressure gauge, on the relief valve mounted to the side of the hydraulic reservoir, indicates the total hydraulic pressure required to run the header. To determine how much pressure it is taking to run the knife, subtract the pressure reading on the draper gauge from the reading on the main pressure gauge at the relief valve. This calculation can alert you to high pressures in the knife drive caused by excessive friction or damage.

Example:	If the pressure reading on the gauge at the draper flow-control is 1000 psi (68 bar) and the pressure reading on the gauge at the pressure-relief valve is 1500 psi (103 bar) then the pressure required to drive the knife will be 500 psi (35bar).
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Another method of checking knife-drive pressure is to turn the draper flow-control to zero and read the pressure on the pressure-relief gauge.

Normal Pressures

Operate the header with the combine at high idle, and the ambient oil temperature about 70°F (20°C). Set the flow-control for the draper circuit to zero. The pressure gauge should now be in the 300psi (21 bar) to 800 psi (55 bar) range.

NOTE:	New units tend to operate on the higher side of this range, and double drive knife systems will require approximately 300 psi to 500 psi (21 - 35bar) more pressure for normal operation.
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Oil pressure will increase during normal cutting operations and will vary depending on crop conditions, the condition of the cutting system, draper speed and ground speed.

Cold Weather Operation – Temperatures below +10C/+50F

Attention:	<i>It is always a good practice to allow the oil to warm up prior to cutting, and in cold weather it is absolutely necessary.</i> <i>While warming the oil, turn the draper flow-control to zero to prevent pressure spikes.</i>
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1. Engage header drive with combine at low idle to warm the oil.
2. Do not operate the header drive at a high idle until oil has reached operating temperature.
3. Once the oil is warm, adjust the draper flow-control to the desired speed. If the flow-control passes too much oil over the relief, it may be necessary to adjust the flow-control relief pressure higher. Consult your dealer or a factory representative.

Attention:	<i>It is NOT RECOMMENDED to adjust the relief pressure higher than the factory setting without first consulting your dealer or a factory representative. The relief valve is factory set at 2800 psi (193bar).</i>
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High Pressure Diagnostic Checks

If the pressure required to drive the knife is high, check the cutting system for

1. Material gumming or binding on the knife. Clean as required.
2. Broken and dull sickle sections. Replace as required.
3. Bent, broken and dull guards. Replace as required.

If the cutting system seems to be OK, check the following areas:

1. Knife head bearing. Unbolt knife head block and pull knife back at least 12" (300mm). Refer to the Cutting section for procedures if required.

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2. Turn knife head block and bearing by hand, if bearing is rough or noisy, replace bearing.
3. Leave 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.
4. Start the combine and engage drive. Check knife drive pressure. Normally, it takes 100 psi to 150 psi to operate the drive motor in this manner. If pressure is now significantly lower, the problem will be found in the knife. If pressure is still high, the problem is in the knife drive motor, draper motor circuit or the hydraulic circuit.

Other Problem Sources

If the output rpm of the drive shaft from the combine is too high, or the pump capacity is not matched to the combine, the pressure may be high.

High pressures may indicate a problem in the draper circuit. See “Draper Operating Pressure” in this section.

Low Pressure Diagnostic Checks

1. If the pressure at the main pressure gauge and draper gauge is low, or is fluctuating, shut combine down, and check the oil level in the hydraulic tank. Oil should be visible at the top of the sight glass.
2. If oil pressure drops when making a right hand turn or on a side hill, shut combine down, and check oil level.
3. If the knife stalls while cutting, check for:
 - a. low oil level,
 - b. leaking relief valve,
 - c. worn pump.

HINT:	If there is a sudden loss of hydraulic pressure, check for major leaks in the system. If no leaks are found, inspect the splined output shaft of the pump. If the shaft is sheared or stripped, install a coupler kit.
NOTE:	<i>If none of the above items are the cause of low oil pressure, it will be necessary to install a flow meter to determine the cause. Contact your dealer for assistance.</i>

Check or Adjust Knife Relief Pressure



ENGAGE PARKING BRAKE ON COMBINE, SHUT ENGINE DOWN AND WAIT FOR ALL MOVING PARTS TO STOP BEFORE LEAVING CAB.

1. Jam a wood block tightly in the knife, between a guard and a cutting section.
2. Restart the combine, engage the feeder housing and check the pressure on the gauge. The relief pressure should be 2800 psi (193 bar). If adjustments are required, proceed as follows:



ENGAGE PARKING BRAKE ON COMBINE, SHUT ENGINE DOWN AND WAIT FOR ALL MOVING PARTS TO STOP BEFORE LEAVING CAB.

3. Locate the relief valve on the side of the hydraulic reservoir. Remove the cap over the relief adjustment screw. Loosen lock nut and turn the relief screw clockwise to increase pressure, counter clockwise to decrease. Adjust the relief screw 1/4 turn at a time in the appropriate direction.

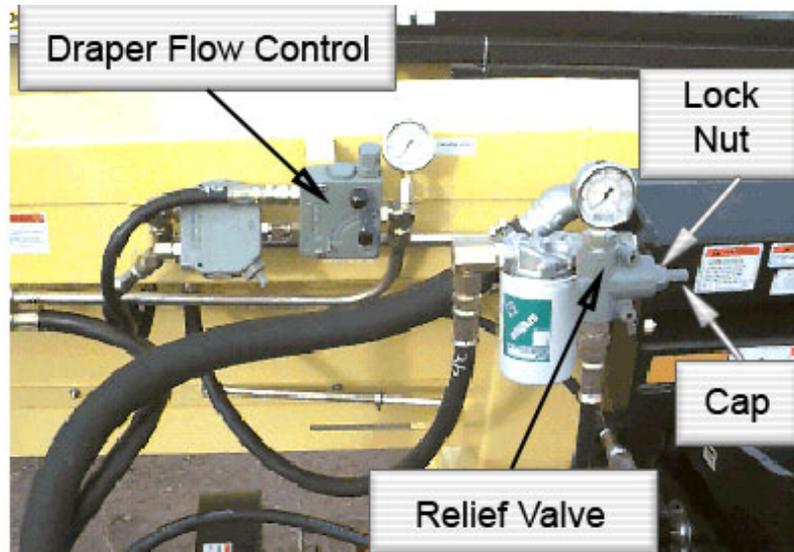


Figure 10.1: Relief Valve Adjustment

4. With the knife still jammed, restart the combine, engage the feeder house drive and check the pressure on the gauge.

WARNING



BE SURE ALL BYSTANDERS ARE AWAY FROM THE MACHINE PRIOR TO ENGAGING THE HEADER.

Repeat the above steps until the desired pressure reading is attained.

IMPORTANT:

The relief pressure should not exceed 2800 psi/ 193bar. Damage to the pump and the hydraulic system could result.

Draper Operating Pressure

The pressure indicated on the draper flow-control gauge is the amount of force required to pump oil through the draper circuit. When the flow-control lever is set to zero, the oil is diverted through the EF (Excess Flow) port of the flow-control which returns it directly to the tank. When the flow-control lever is set to ten, all the oil goes through the CF (Control Flow) port to the flow divider, through the draper motors and then returns to the tank. Adjust this lever to achieve the desired draper speed.

The flow-control is equipped with a relief valve, which is factory preset at 2200 psi. If the operating pressure is consistently at or near this range, oil will bypass over the relief to the EF port. When oil is bypassed over the relief, heat is generated. If this condition is excessive, the oil may over-heat. Damage to the pump and motors may result. When oil flows over the relief valve, an audible squeal may be heard from the flow-control.

If adjustment of the relief valve is required:

1. Remove the cap over the relief adjustment screw. Loosen the lock nut. Check draper operation after adjusting relief 1/4 turn.
2. Turn the internal screw clockwise to increase the pressure, counterclockwise to reduce it. Do not adjust relief by more than 1/4 turn before testing the results.

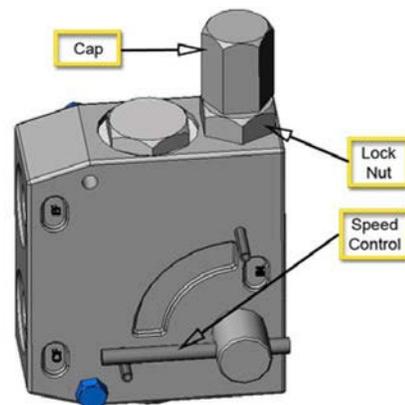


Figure 10.2: Draper Flow Control

If the draper pressure is high, check:

1. That the draper tension is not too tight.
2. That material is not wrapping around rollers. Clean rollers as required.
3. Bearings in drive and idler rollers. Replace as required.
4. Oil pressure with tension on draper released (motors running free). Continued high pressure will indicate a faulty draper motor. Replace as required.

If a faulty draper motor is suspected:

1. Let the system cool down.
2. Start up and run draper at full speed. Record the reading on the pressure gauge.
3. Look for motors that seem to be running more slowly.
4. Check the temperature of each motor to see if one is hotter than the others.
5. SHUT COMBINE DOWN.
6. Grab the drive roller of a deck with both hands and rotate the roller back and forth. If the motor is difficult to turn, disconnect these hoses and install a fitting to bypass the suspect motor.
7. Restart the combine and run the draper. Record the difference in draper pressure, and observe whether the draper speed of the other decks returns to normal.
8. If the differences are significant, replace the motor.

Bleeding Air Out Of Reel Lift Circuit:

If the reel does not go up or down evenly, it may be necessary to bleed the slave cylinder. Complete this procedure only when header drive is disengaged and header is on the ground. Lower the reel to the bottom of the cylinder stroke. The reel cylinders have a center to center collapsed length of 18". Fully extended, cylinder length is 28". There are two methods of bleeding the system:

Slave Cylinder with Bleed Port.

Cycle the reel up to the top of the stroke. Cycle reel down but stop reel when about 2" of cylinder rod is still exposed and before cylinders reaches the bottom of their strokes. Shut combine down. It is best to wait for 10 to 15 minutes so air bubbles in the oil can dissipate. Using a screw driver or a wrench (depending on the style of cylinder), loosen the bleed port hex cap on the slave cylinder (far right hand cylinder). Air and oil will escape, and the reel will drop. Tighten bleed screw (cap) and cycle reel. Repeat if necessary.

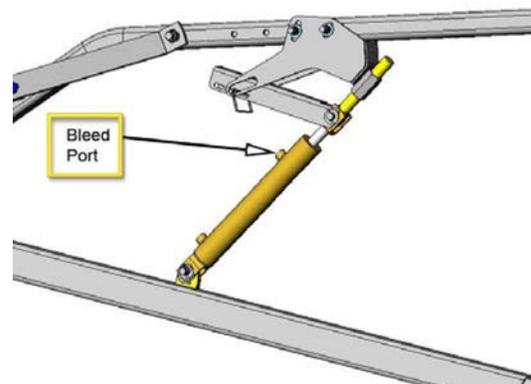


Figure 10.3: Reel Cylinder- Bleed Port

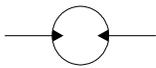
NOTE:	Because of expansion in hydraulic lines, it is normal for the right hand slave cylinder to lag slightly when lifting reel.
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NOTES:

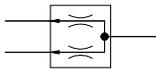
11 - Hydraulic System Schematics

Hydraulic Schematic Symbols - Draper Drive

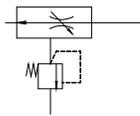


Hydraulic motor – fixed displacement, reversible.

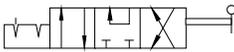
***Note:** All our motors are reversible, but in instances where motor rotation is indicated with a single arrow - head, they are intended to run in one direction only due to uni-directional oil flow.



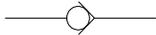
Flow – divider (Prince RD510P)



Flow control valve (Prince RDRS110 - 20 gallons per minute, with relief)



Selector control valve assembly - 4 port, 3 position, manually operated (lever) with detent.



Free – flow check valve assembly.



Pressure gauge (0 – 4,000 PSI)



Oil flow (uni – directional)



Oil flow (bi – directional)



Case drain/ bypass flow



Junction/ Intersection



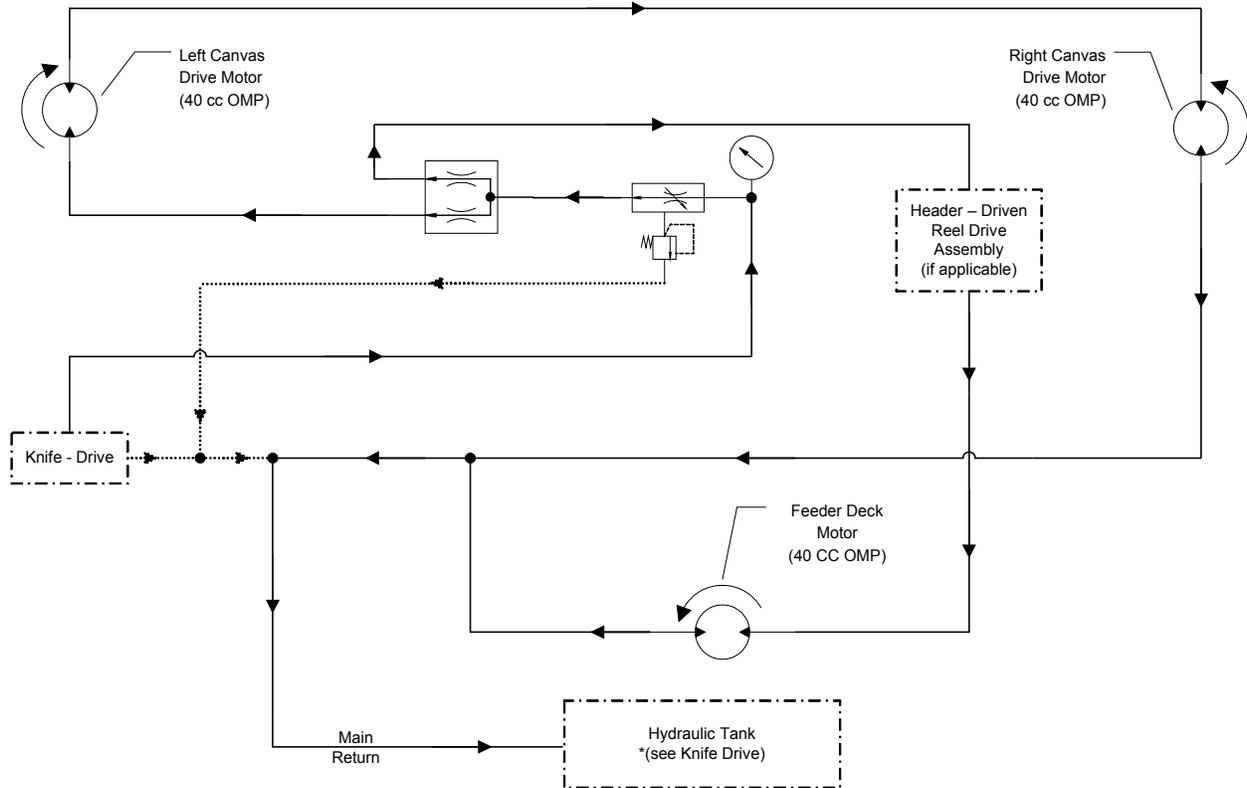
Motor rotation (uni – directional)



Motor rotation (bi – directional)

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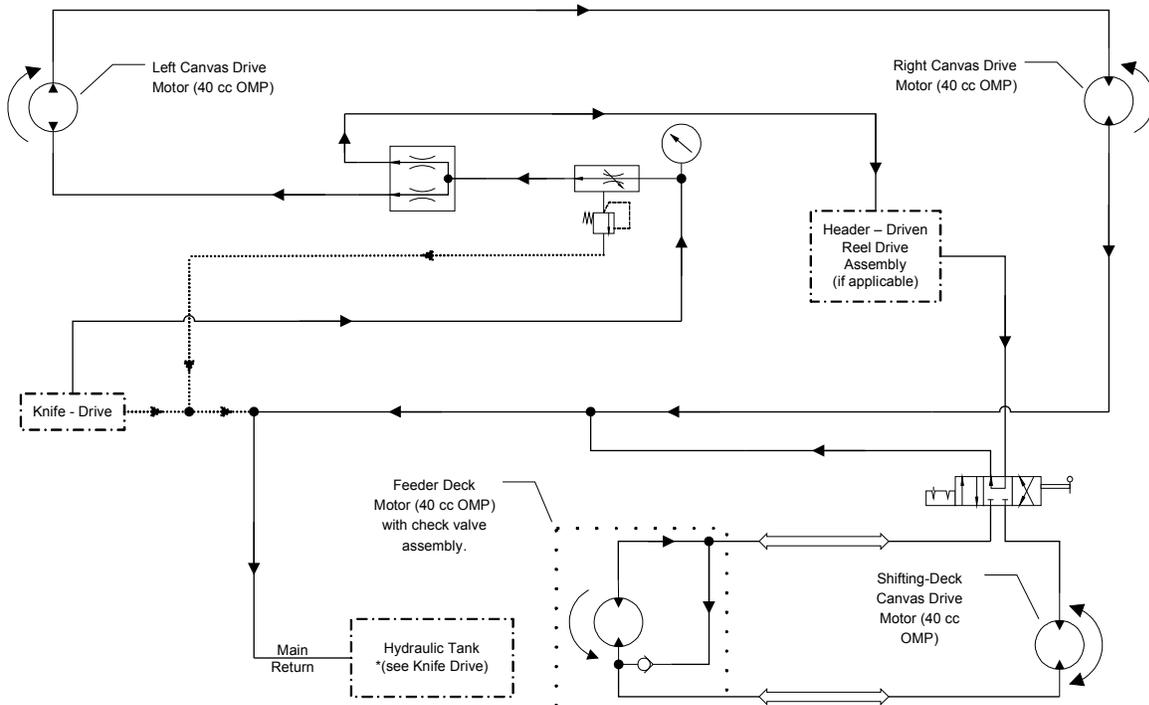
Draper Drive – 18 to 42 ft Headers with Standard Deck



Schematic 1: Draper Drive - 18 to 42 ft Headers - Standard Deck

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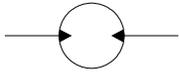
Draper Drive – 30 to 42 ft Headers with Manual Deck



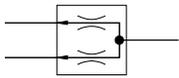
Schematic 2: Draper Drive - 30 to 42 ft Headers with Manual Deck

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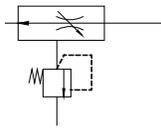
Hydraulic Schematic Symbols Cross Auger



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.



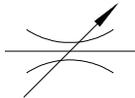
Flow – divider (Prince RD510P)



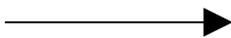
Flow control valve (Prince RDRS110 - 20 gallons per minute, with relief)



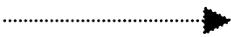
Pressure gauge (0 – 4,000 PSI)



Restrictor valve (2 port fully adjustable needle valve)



Oil flow (uni – directional)



Case drain/ bypass flow



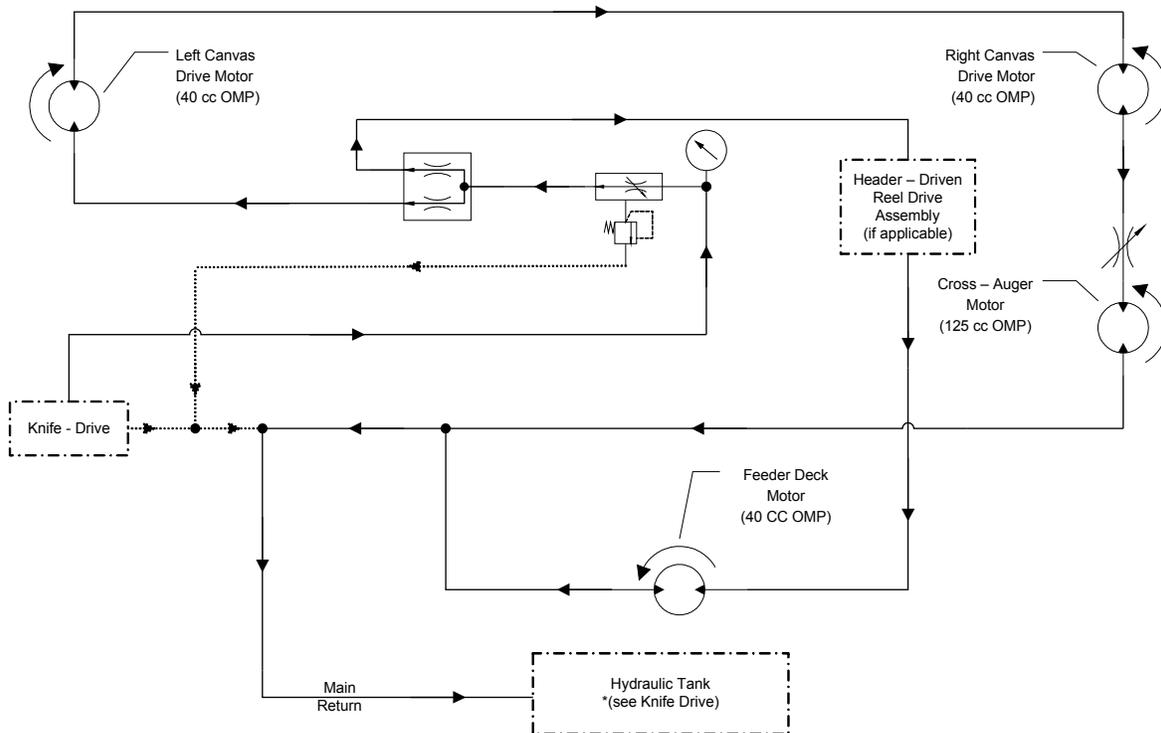
Junction/ Intersection



Motor rotation (uni – directional)

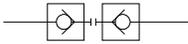
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Cross – Auger Assembly (with Draper Drive – Std Deck)

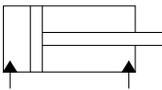


Schematic 3: Cross-Auger Assembly with Draper Drive - Std Deck

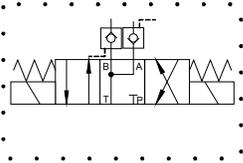
Hydraulic Schematic Symbols - Fore & Aft



Hydraulic coupler



Double - acting hydraulic cylinder assembly



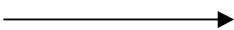
Solenoid – operated directional control valve (4 port; 3 position), with 4 port check valve assembly attached (contains 2 pilot-to-open check valves with standard pilot).



Junction/ Intersection



Oil flow (bi - directional)



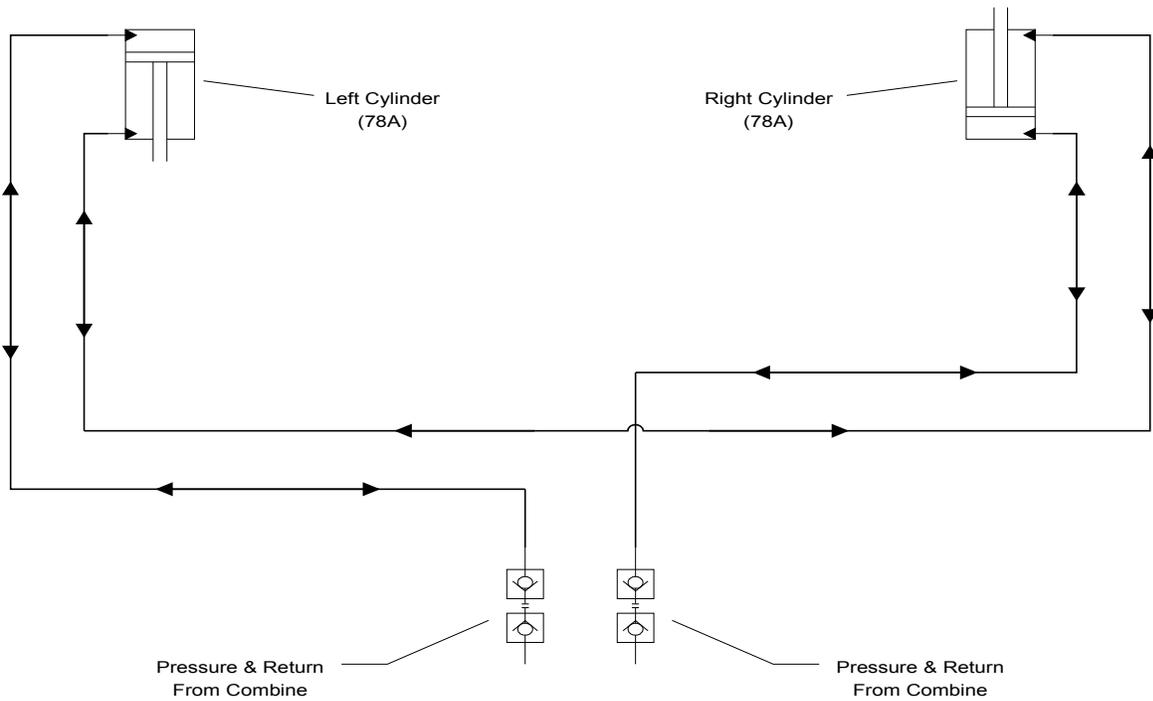
Oil flow (uni - directional)



Case Drain/ Bypass flow

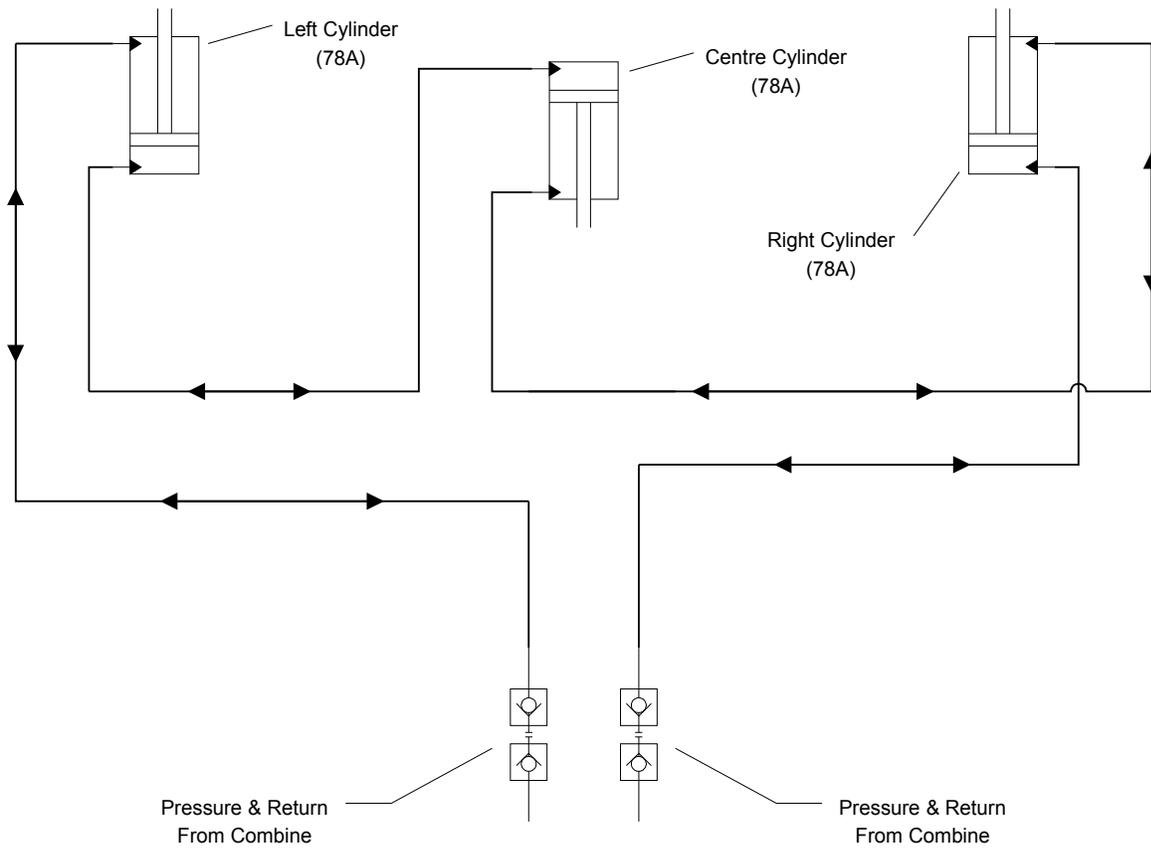
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Fore & Aft Assembly – Solid Reel (Combine Driven)



Schematic 4: Reel Fore and Aft Control - Solid Reel - Combine Driven

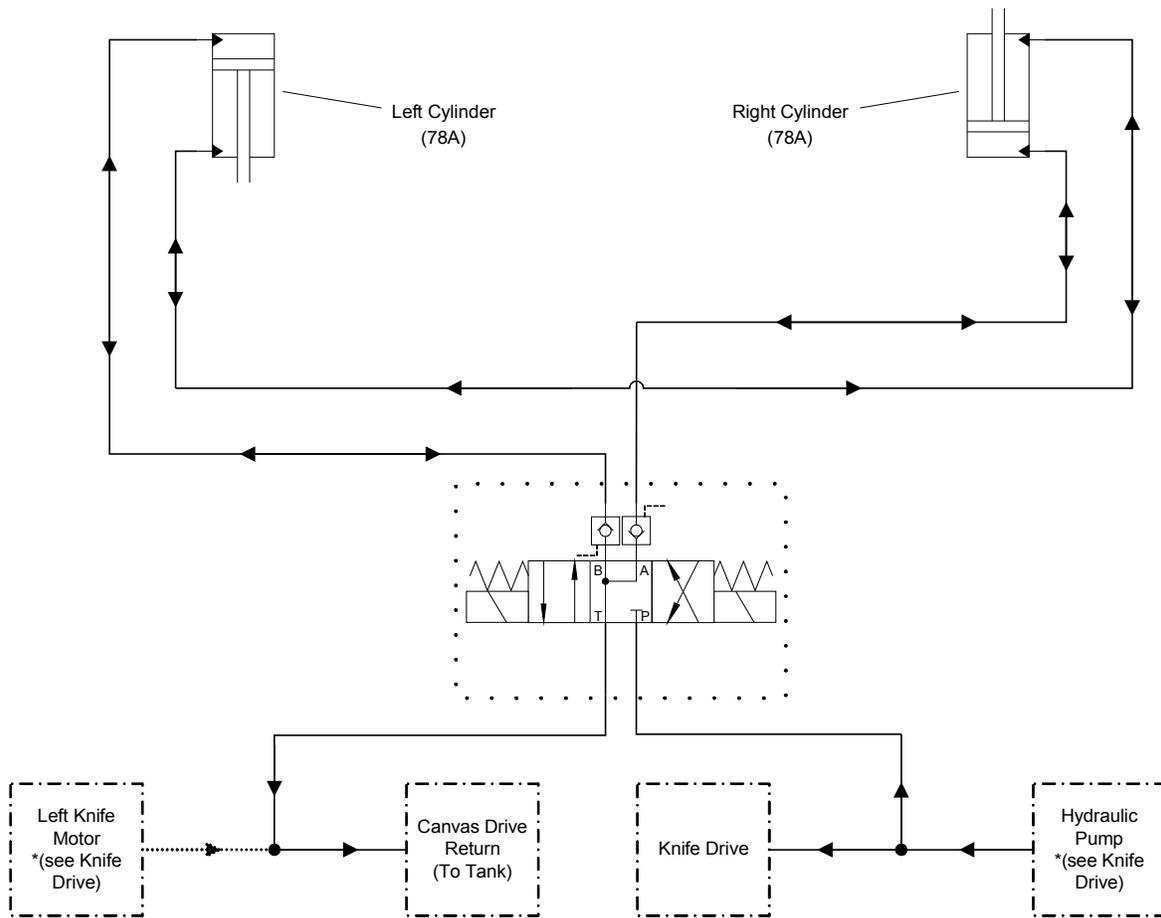
Fore & Aft Assembly – Split Reel (Combine Driven)



Schematic 5: Fore and Aft Control - Split Reel - Combine Driven

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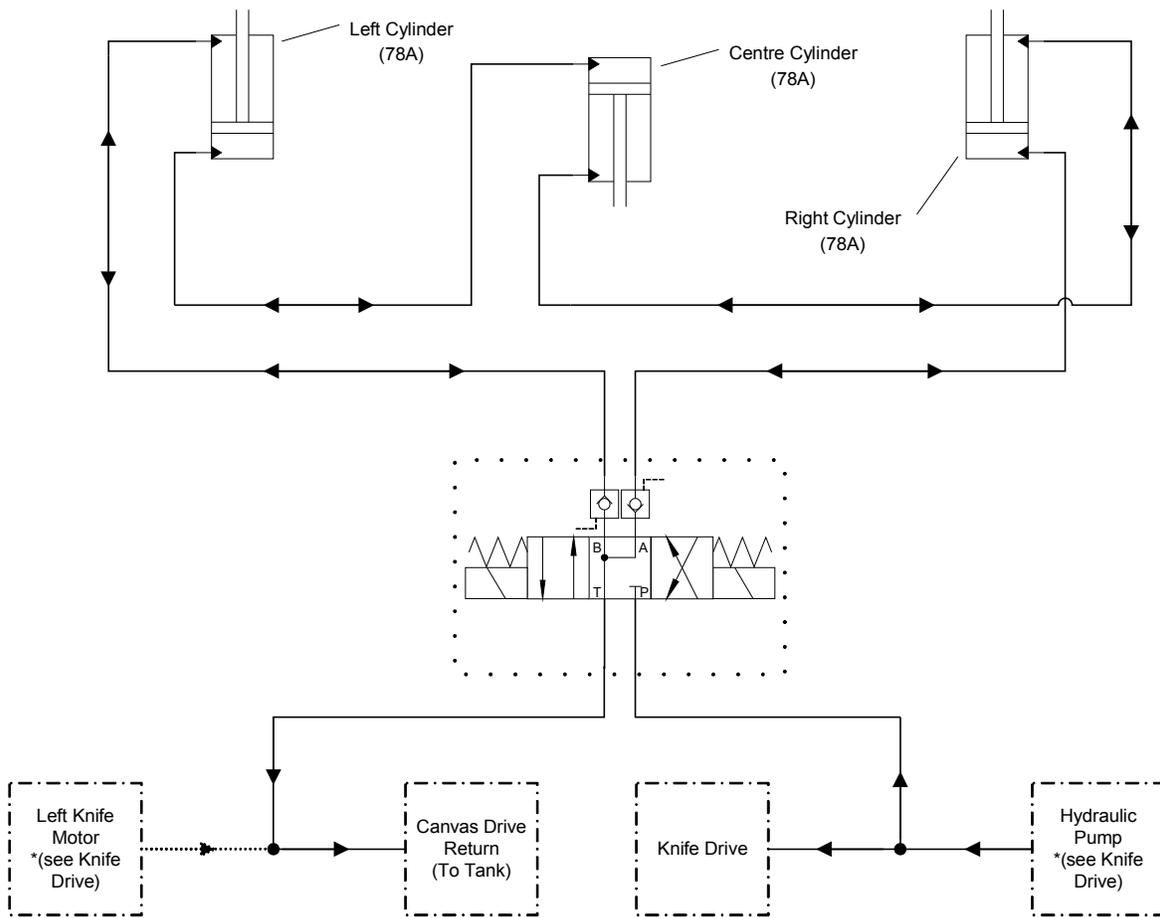
Fore & Aft Assembly – Solid Reel (w/ Hydr. Solenoid Kit)



Schematic 6: Reel Fore and Aft Control - Solid Reel - Solenoid

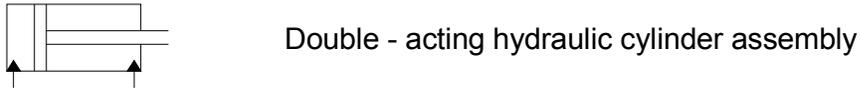
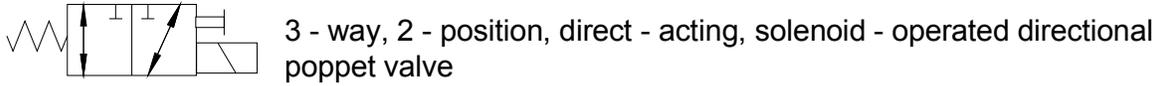
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Fore & Aft Assembly – Split Reel (w/ Hydr. Solenoid Kit)



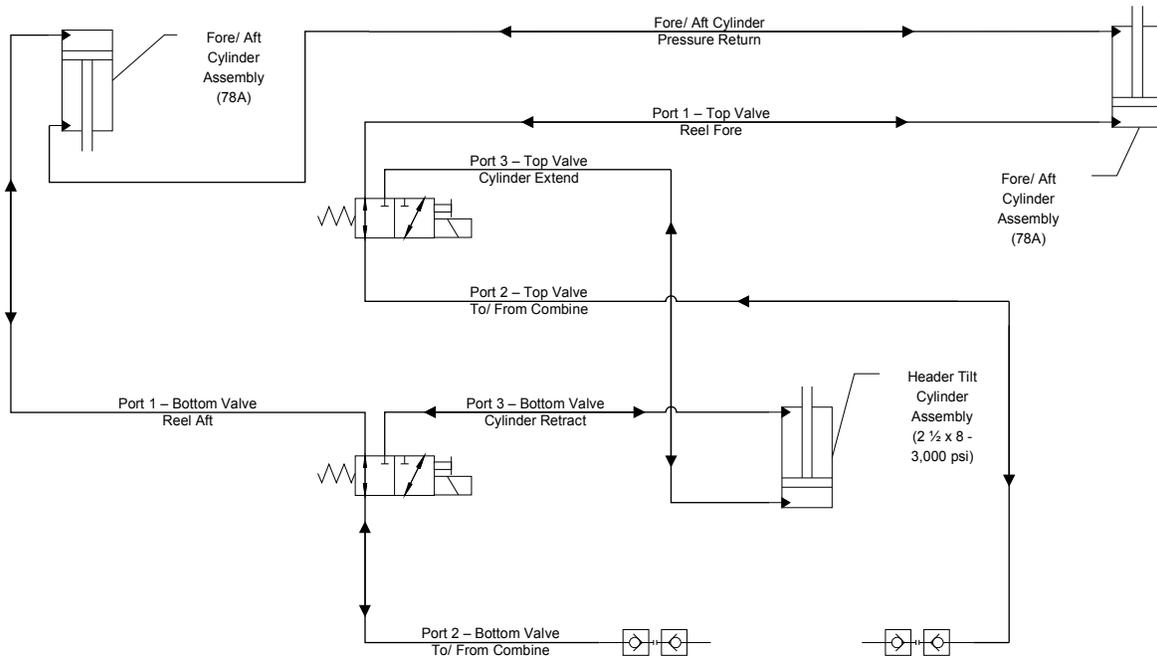
Schematic 7: Reel Fore and Aft Control - Split Reel - Solenoid

Hydraulic Schematic Symbols - Hydraulic Header Tilt



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Hydraulic Header Tilt Assembly

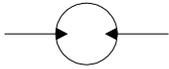


Schematic 8: Hydraulic Header Tilt

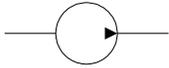
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Hydraulic Schematic Symbols - Knife Drive



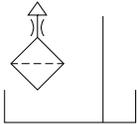
Hydraulic motor – fixed displacement, reversible.
***Note:** All our motors are reversible, but in instances where motor rotation is indicated with a single arrow - head, they are intended to run in one direction only due to uni-directional oil flow.



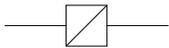
Uni – directional hydraulic pump.



Pressure gauge (0 – 4,000 psi)



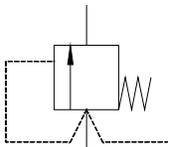
Vented hydraulic tank (58 Litre/ 16 Gallons US)



Suction strainer (5 psi, 140 micron)



Oil filter (10 micron)



Pressure relief valve with vent port (3 port, 2,850 psi)



Junction/ Intersection



Motor rotation (uni – directional)

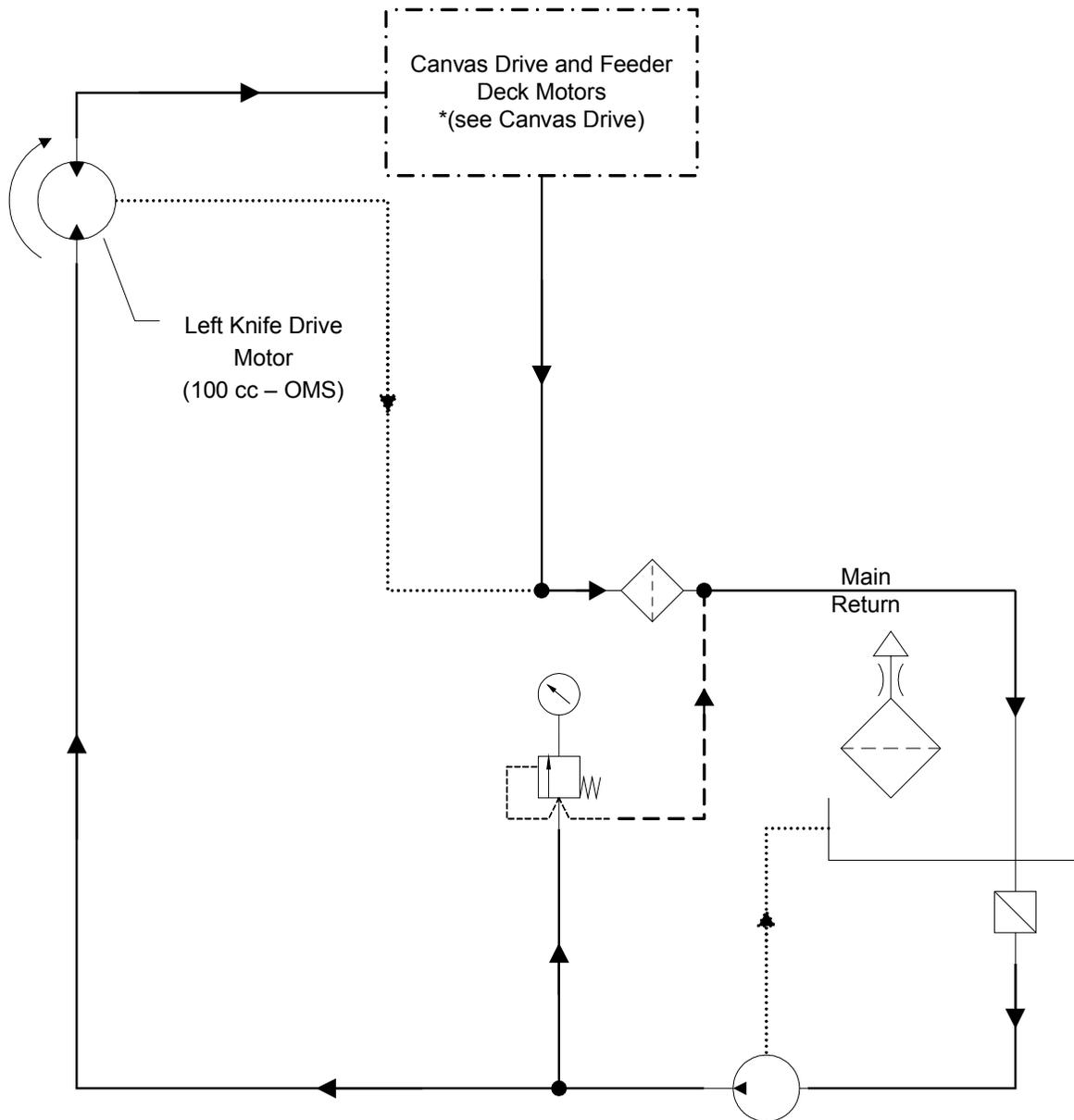


Case drain



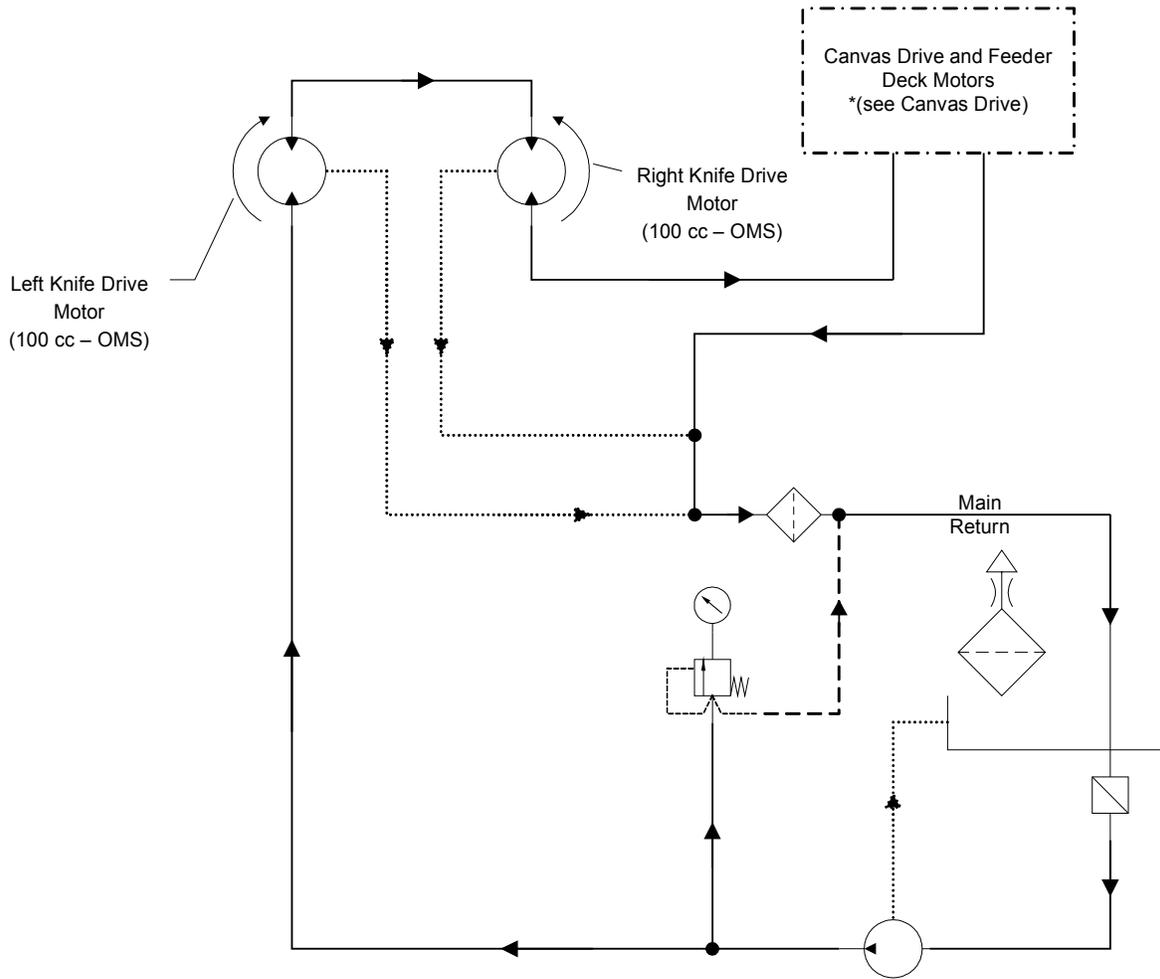
Oil flow (uni – directional)

Single Knife - Drive



Schematic 9: Single Knife Drive

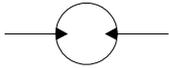
Double Knife - Drive



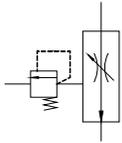
Schematic 10: Double Knife Drive

Honey Bee Manufacturing Ltd.
Grain/Rice Belt header – Operator's Manual

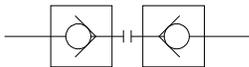
Hydraulic Schematic Symbols - Reel Drive



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.



Flow control valve (Prince RDRS110 - 10 gallons per minute, with relief)



Hydraulic coupler



Oil flow (uni – directional)



Bypass flow

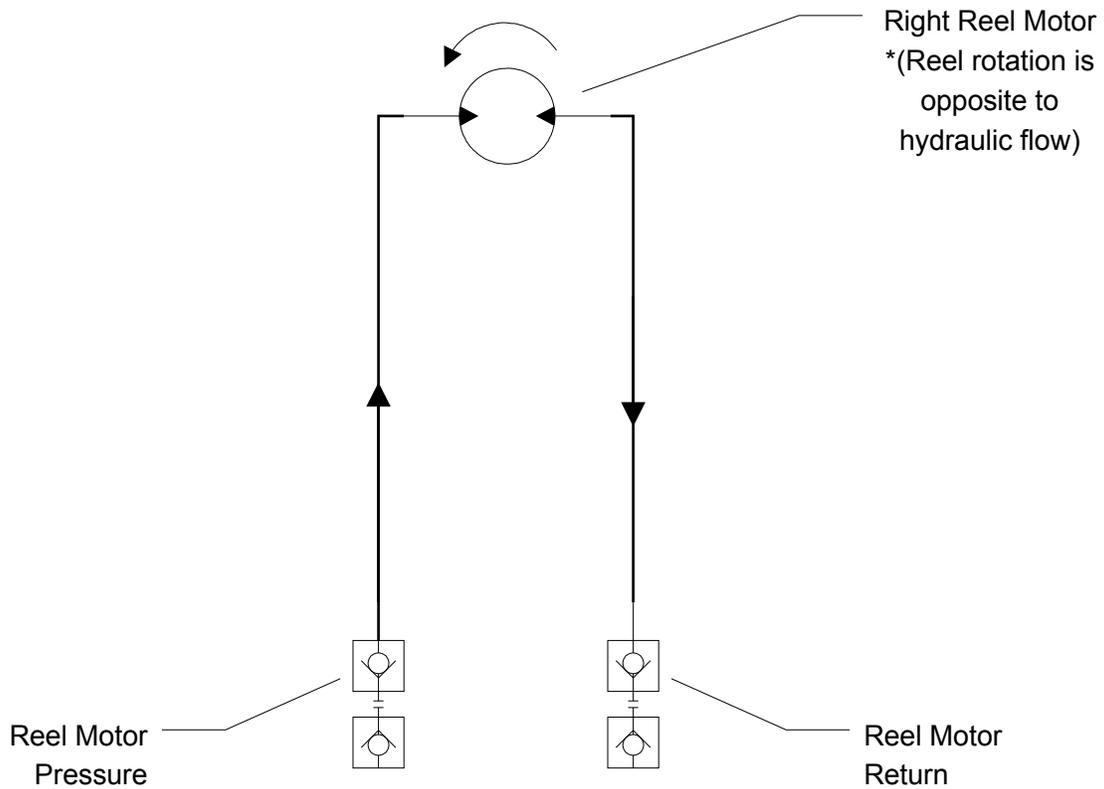


Junction/ Intersection



Motor rotation (uni – directional)

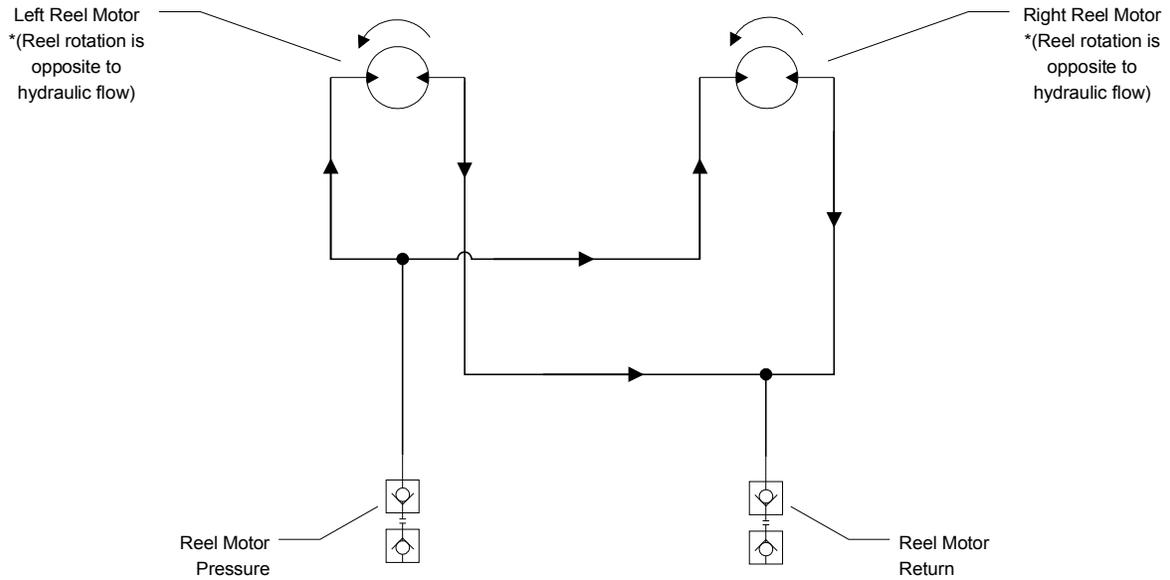
Single Reel Drive – (Combine Driven)



Schematic 11: Single Reel Drive - Combine Driven

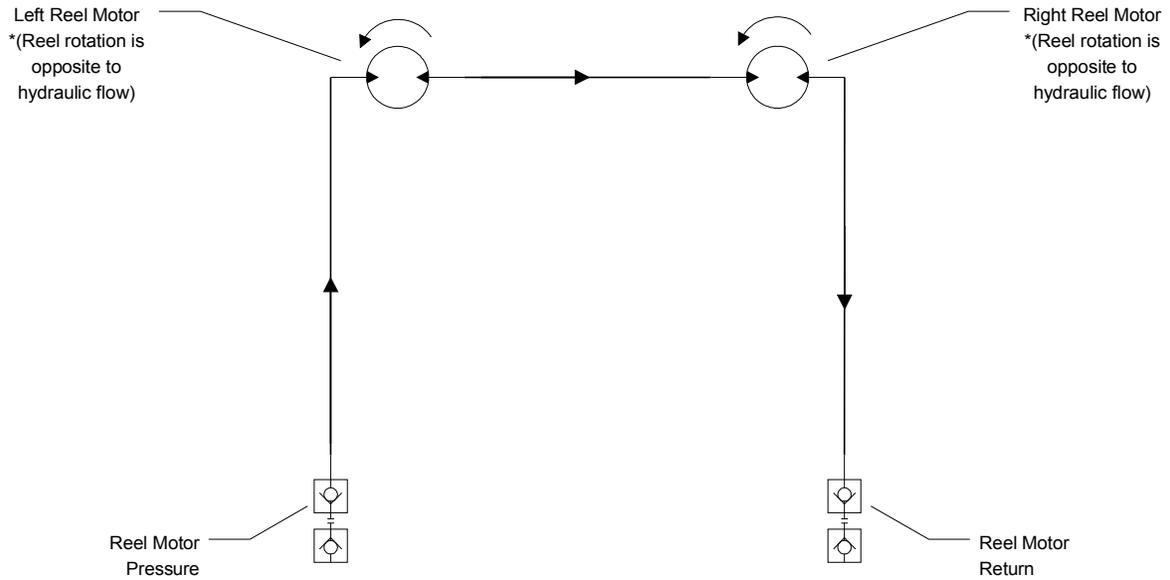
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Double Reel Drive – 18 to 36 ft (Combine Driven)



Schematic 12: Double Reel Drive - 18 to 36 ft - Combine Driven

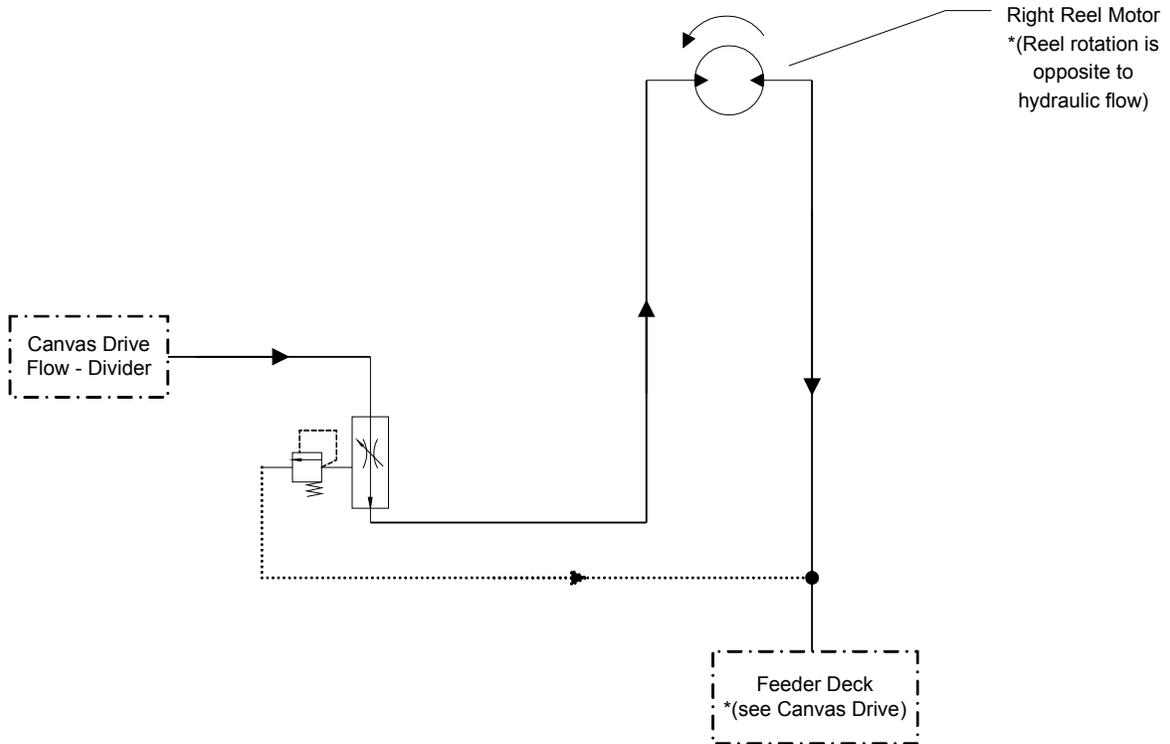
Double Reel Drive – 40 to 42 ft (Combine Driven)



Schematic 13: Double Reel Drive - 40 to 42 ft - Combine Driven

Honey Bee Manufacturing Ltd.
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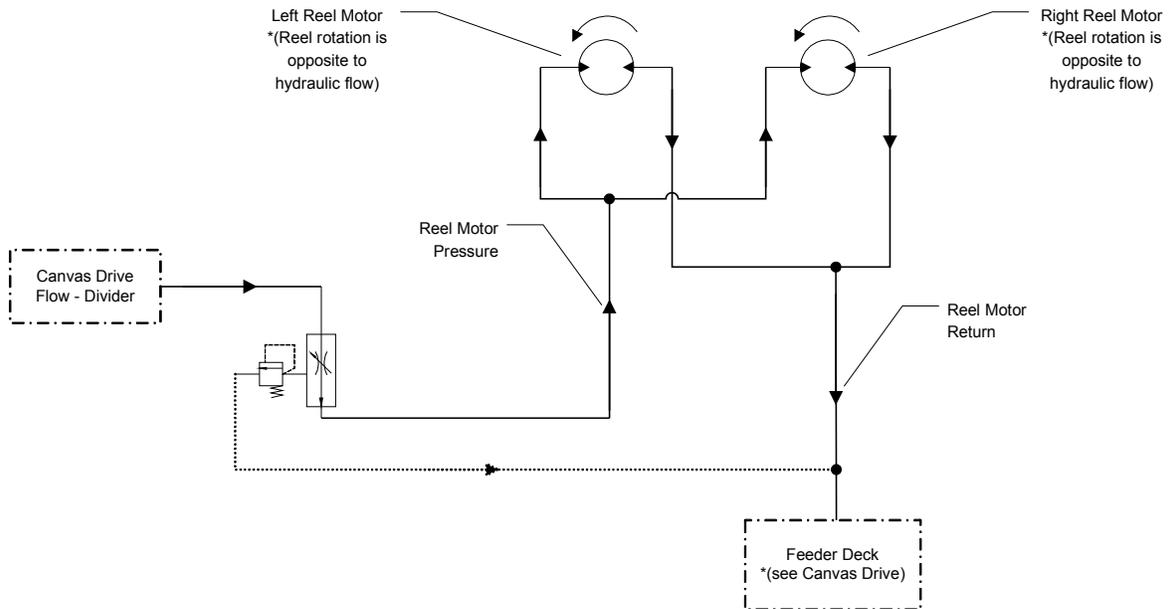
Single Reel Drive (Header Driven)



Schematic 14: Single Reel Drive - Header Driven

Honey Bee Manufacturing Ltd.
Grain/Rice Belt header – Operator's Manual

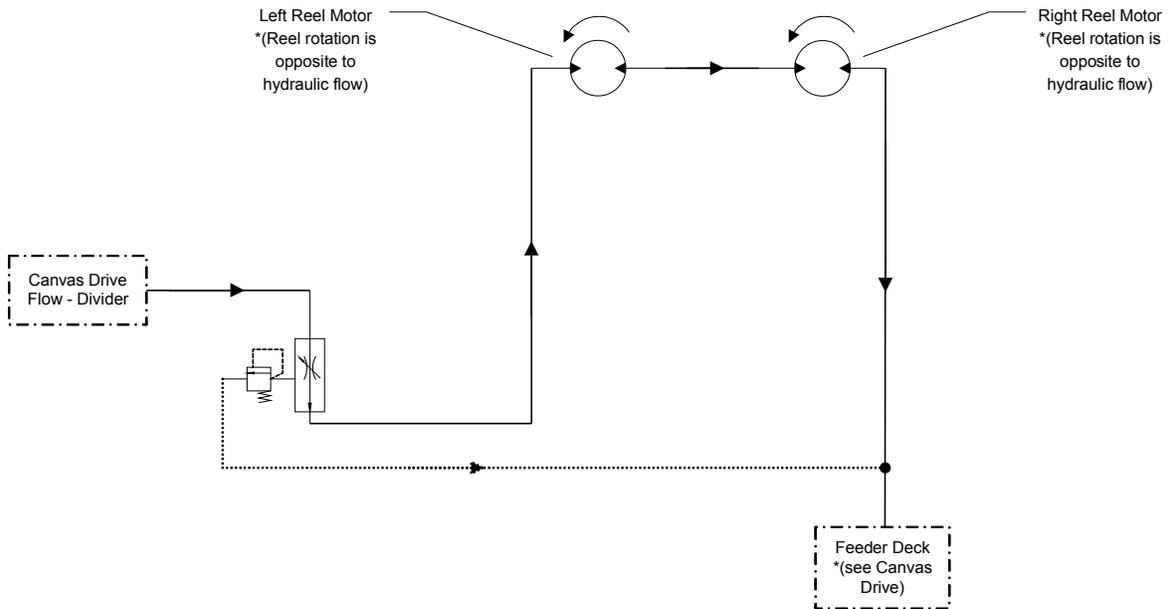
Double Reel Drive 18 to 36 ft (Header Driven)



Schematic 15: Double Reel Drive - 18 to 36 ft - Header Driven

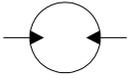
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Double Reel Drive 40 to 42 ft (Header Driven)

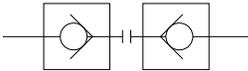


Schematic 16: Double Reel Drive - 40 to 42 ft - Header Driven

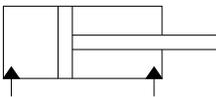
Hydraulic Schematic Symbols - Reel Lift



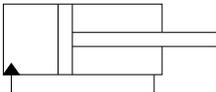
Hydraulic motor – fixed displacement, reversible.
***Note:** All our motors are reversible, but in instances where motor rotation is indicated with a single arrow - head, they are intended to run in one direction only due to uni-directional oil flow.



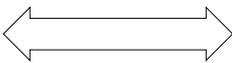
Hydraulic coupler



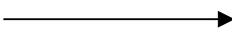
Double - acting hydraulic cylinder assembly



Single - acting hydraulic cylinder assembly



Oil flow (bi - directional)
*used in schematic diagrams where uni-directional oil flow is also present.



Oil flow (uni - directional)

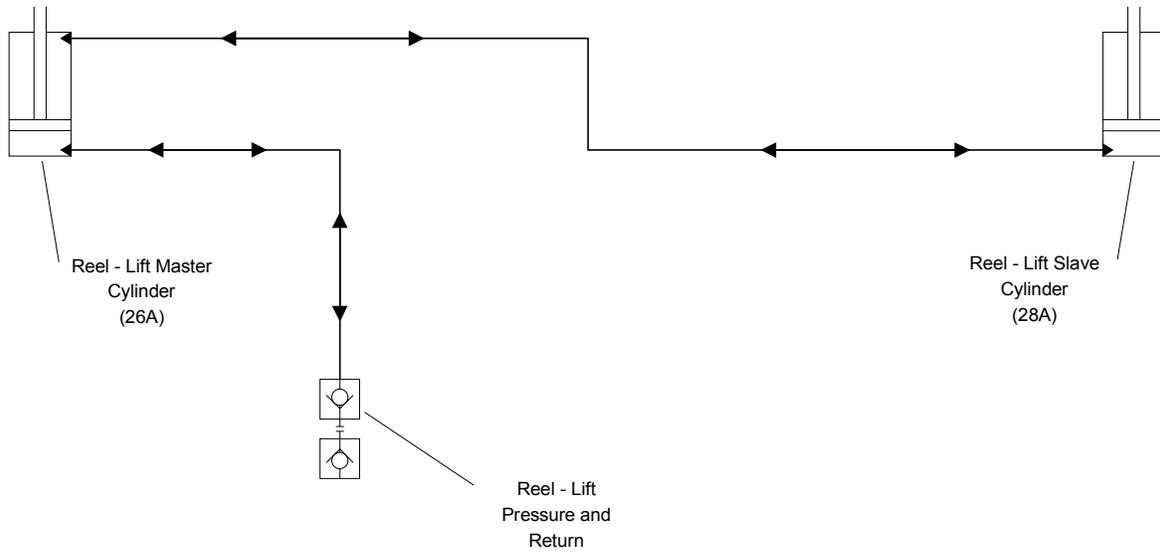


Oil flow (bi - directional)



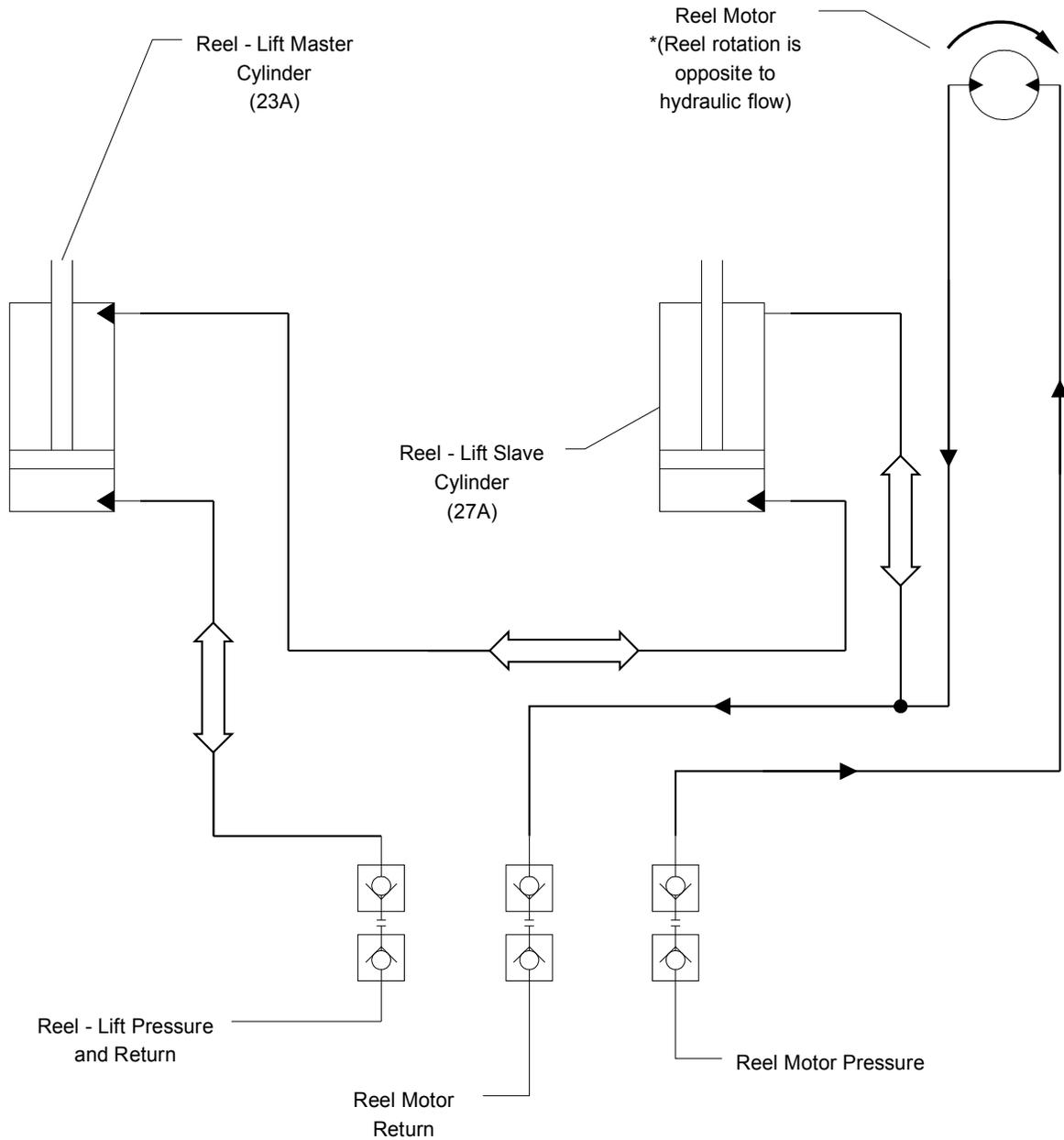
Uni - directional motor rotation

Solid - Reel Lift Circuit



Schematic 17: Solid Reel Lift Circuit

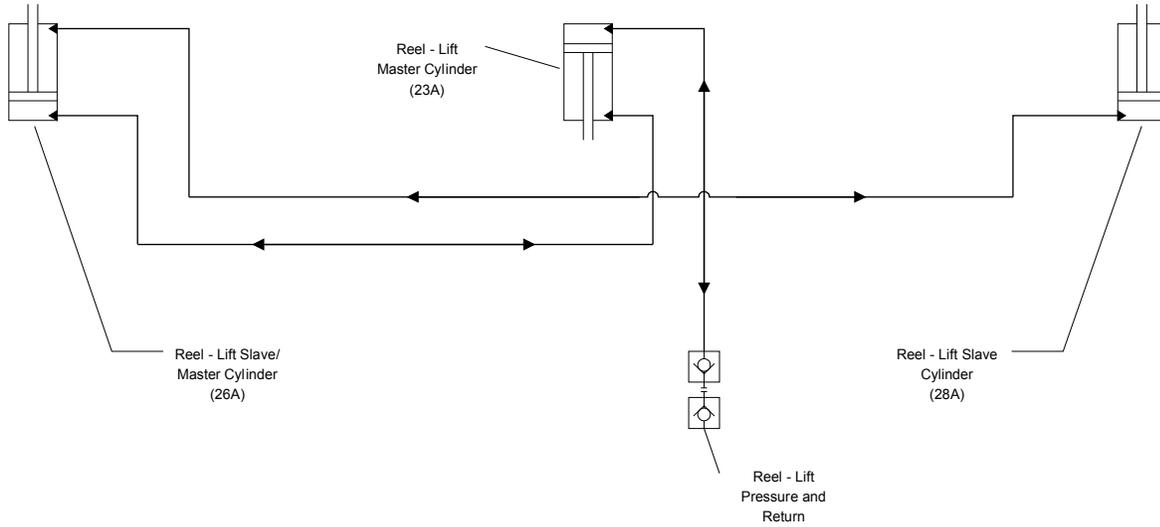
Solid – Reel Lift Circuit (36' Header)



Schematic 18: Solid Reel Lift Circuit - 36 ft Header

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Grain/Rice Belt header – Operator's Manual

Split - Reel Lift Circuit



Schematic 19: Split Reel Lift Circuit

12 - Reel

The reel should be located directly above or slightly ahead of the knife to move the crop material to the canvases and sweep the cutter bar clean. To adjust the reel, use the following procedures.

IMPORTANT!	<i>Clear the area of all bystanders before making any of the following adjustments.</i>
	<i>ENGAGE PARKING BRAKE ON THE POWER UNIT, SHUT ENGINE DOWN AND WAIT FOR ALL MOVING PARTS TO STOP BEFORE LEAVING THE CAB.</i>

Fore/Aft Adjustment

1. Lower the reel to its lowest position.
2. Measure the amount the reel needs to be moved, either fore or aft or up or down.
3. Pull vertical lock pins in both reel mount brackets until the pins are removed from the lock hole.

Tip pins to the side of the hole until the hole is fully visible. Reel is then free to slide either forward or backward.

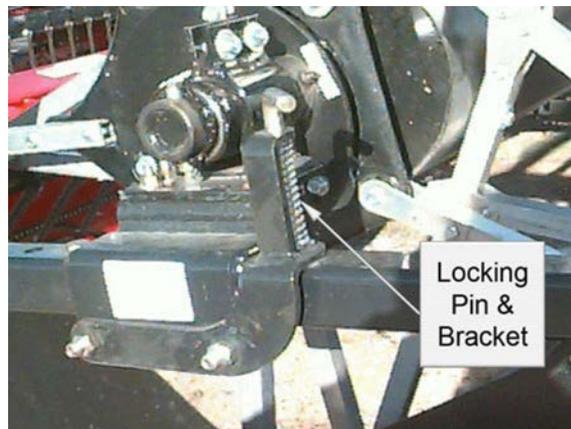


Figure 12.1: Reel Fore-Aft Adjustment

Try to slide both ends of the reel at the same time to prevent the reel from binding. If binding occurs, loosen the four centering bolts on the reel arm braces this should relieve pressure from brackets. If necessary tap reel mount with a block of wood and a hammer. Lock pin holes are located 2" apart on the reel arm.

After reel has been located in the desired position, insert lock pins through the hole in mount bracket and reel arm, making sure they are securely locked into reel arm. Set reel mount brackets in the same hole on each reel arm. Tighten any bolts that were loosened.

Reel Arm Leveling and Height Adjustment

To level reels correctly, the reel adjustment brackets (adjuster nut) must be mounted in the proper position on the reel arms.

Each adjuster nut should be placed in holes #2 and #3 from the front for the Universal Harvester Ull Pickup Reel, Hart Carter Pickup Reel and Honey Bee Bat Reel. If the reel arms need more adjusting, each reel arm can be adjusted separately by turning the reel adjuster screws.

1. Remove pin holding cylinder lock in place. Pivot cylinder lock downward so it can be rotated easily.
2. Measure the amount the reel needs to be adjusted.
3. Rotate cylinder lock clockwise if the arm needs to be lowered, and counter clockwise if it needs to be raised.
4. When the reel is level, realign the cylinder lock and replace the pin.

Hint:	If the reel is lifted all the way up, leveled, then dropped down to half way, it will be easier to rotate the cylinder lock. Adjust the reel by the amount previously measured.
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Reel Height/Reel Type Adjustment

Mount the fore and aft bracket in hole #5 on the drive motor end. The left hand end requires mounting the cylinder to the front of the reel arm. Detailed instructions are included in the kits.

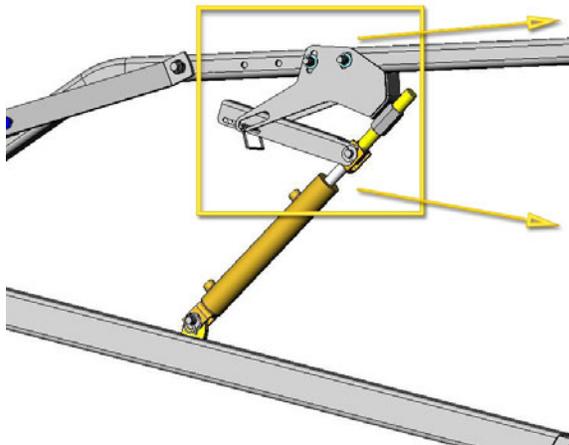


Figure 12.2: Fore-Aft Bracket

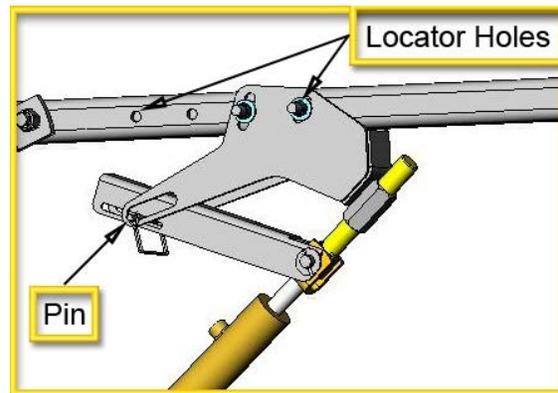


Figure 12.3: Fore-Aft Bracket (close-up)

Hydraulic Fore & Aft - Optional

Headers that are equipped with optional hydraulic fore and aft are operated using power unit controls. Power unit must have fore/aft option or optional hydraulic solenoid kit must be installed to operate fore & aft cylinders.

The double reel hydraulic fore and aft circuit uses three identical cylinders. The pressure from the power unit goes to the barrel end of the right hand cylinder. Oil from the rod end goes to the rod end of the center cylinder. Oil from the barrel end of the center cylinder goes to the barrel end of the left hand cylinder. Oil from the rod end will return to the power unit. To retract reel, oil flow is reversed.

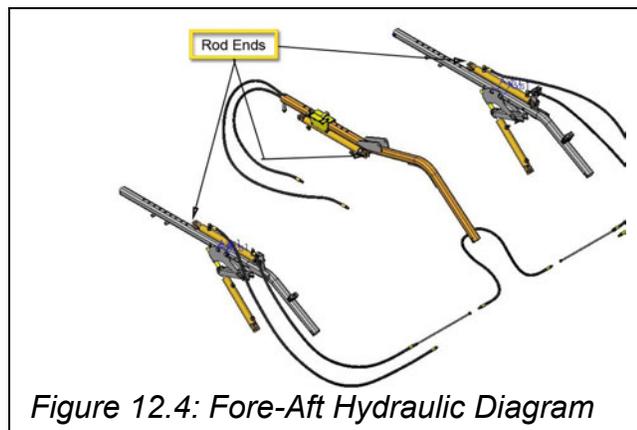


Figure 12.4: Fore-Aft Hydraulic Diagram

Center Reel Arm Adjustment – Dual Reel Headers

To level the center reel arm:

- a. Loosen the lock nut.

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- b. Remove pin. Turn bolt to adjust height. Insert pin.
- c. Re-tighten lock nut

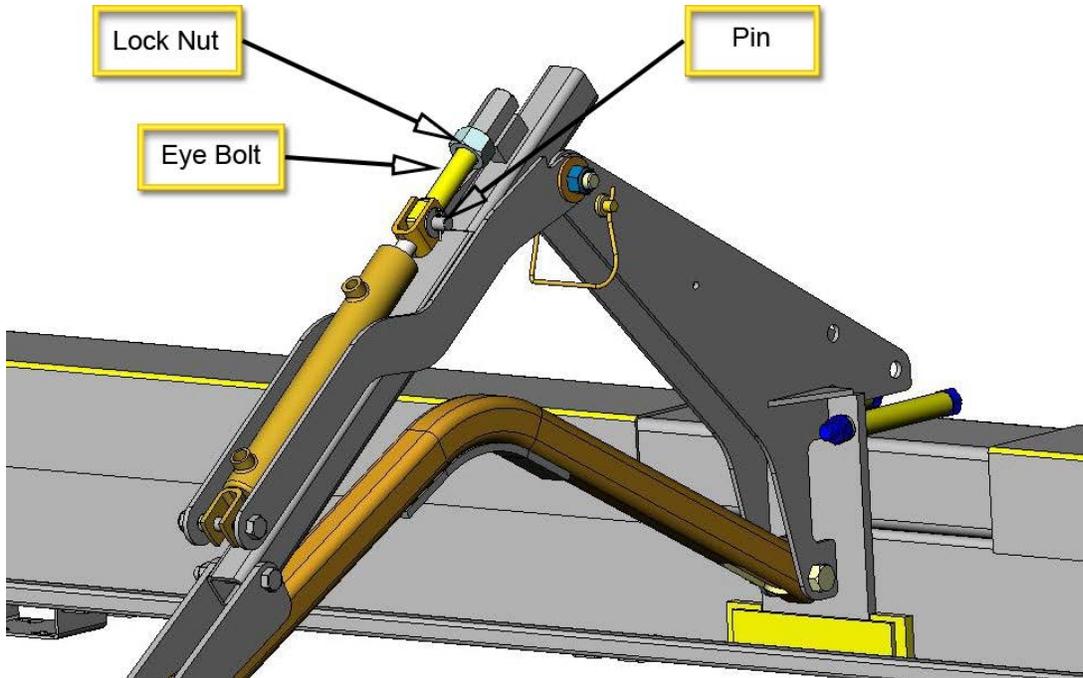


Figure 12.5: Center Reel Height Adjustment

Reel Centering

Measure the clearance from the end shield on the reel to the crop divider on each end of the swather. If the reel is not centered on the header, loosen the two bolts on both the left and right reel arm braces. Push the reel arms left or right to center the reel. Re-tighten all bolts

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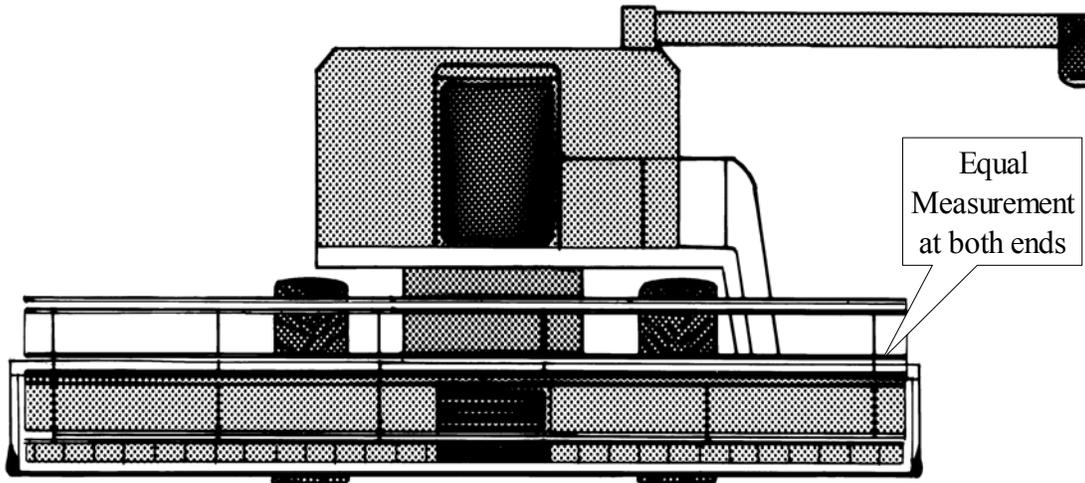


Figure 12.6: Reel Centering

Measure the end clearances, adjust reel until it is centered.

Loosen the carriage bolts securing the reel arm braces on both ends of the reel. Push the arms until reel is centered. Tighten bolts when finished.



Figure 12.7: Reel Arm Brace

Reel Drive

The reel is driven by a hydraulic motor with a direct drive coupler to the reel. Check the coupler bolts and motor mount bolts regularly for tightness. Check alignment of motor to reel tube, shim mounting bolts if required.

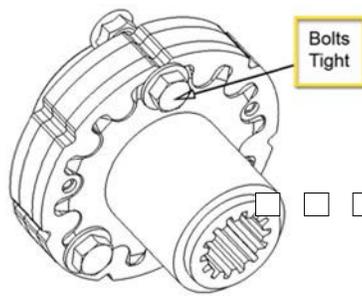


Figure 12.8: Reel Mounted Coupler

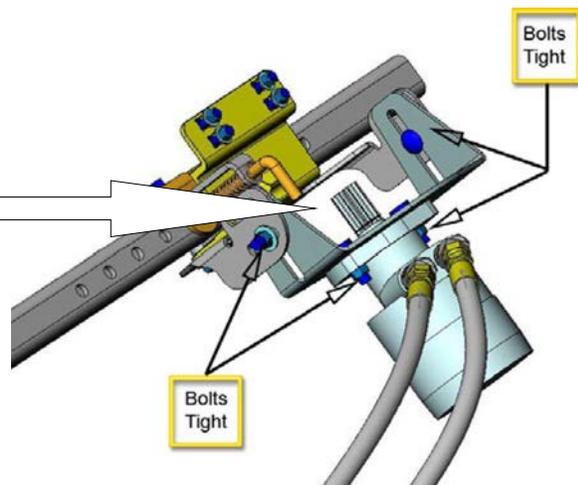


Figure 12.9: Reel Motor and Brackets

Reel Speed Adjustment

Normally reel speed is 10% to 20% faster than the ground speed of the power unit. The reel speed is dependant on the setting of reel speed control in the power unit.

The power unit is equipped with standard reel speed control. The swather hydraulics are configured with a flow control valve and a remote motor control on the table...

The flow control regulates the speed of the reel. The flow control is also equipped with a relief valve which is factory set at 2200 psi.

Do not exceed this pressure, damage to reel or reel motor may result.

If a squealing noise can be heard, this indicates that the relief pressure will need to be set higher.

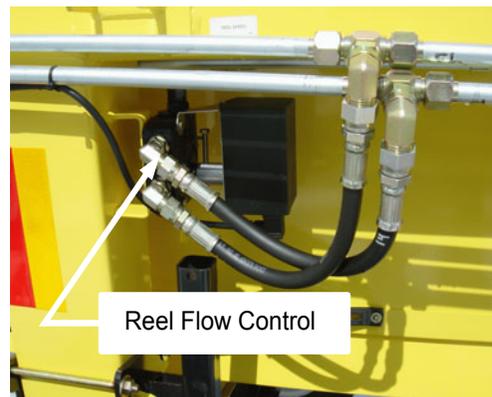
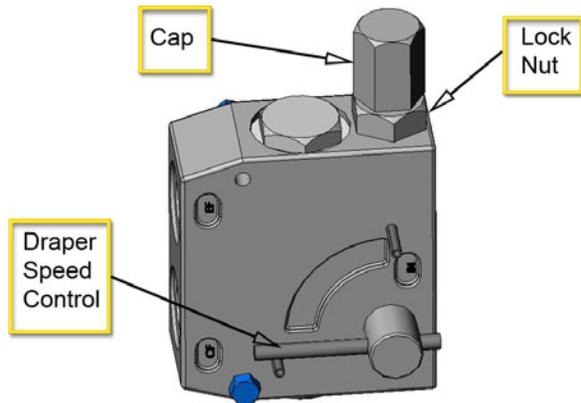


Figure 12.10: Reel Flow Control

Flow Controls – Header Driven Reel

The flow control is equipped with a relief valve. The relief is factory preset at 2200 psi (104 bar). If the operating pressure is consistently at or near this range, oil will bypass over the relief to the EF port. When oil is bypassed over the relief, an audible squeal may be heard and the reel may stall in crop.

If adjustment of the relief valve is required, remove the cap over the relief adjustment screw, loosen the lock nut and turn screw clockwise to increase the pressure. Check reel operation after adjusting relief 1/4 turn. Do not adjust relief by more than 1/4 turn increments.



Universal Ull Pick up Reel Tine Pitch Adjustment

IMPORTANT:	The pitch MUST be adjusted the SAME at BOTH ends of the reel.
-------------------	--

The pitch of the tines may be adjusted by loosening bolts (1) at BOTH ends of the reel and inserting a suitable long bar in tube (2) and partially rotating the control ring assembly.

To increase the pitch of the tines, turn in direction of reel rotation.

To decrease the pitch of the tines, turn in opposite direction to reel rotation.

Adjust tine pitch initially so tines are perpendicular to the cutter bar. Too great a pitch causes the reel to carry the cut crop around the reel, because the tines do not release the crop after it is cut.

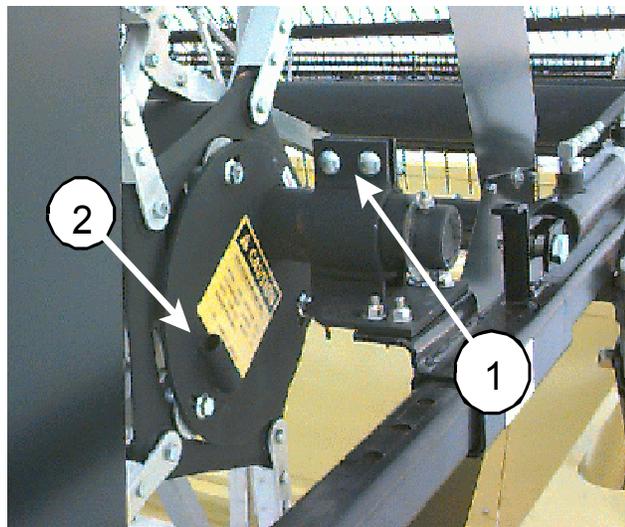


Figure 12.12: Tine Pitch Adjustment

The tine pitch is critical to the operation of the header. Adjust the tines to suit your individual needs and make note of what works best for your conditions and crops.

In crops that are down or lodged, adjust reel so that center of reel is ahead of cutter bar. Adjust tines to be aggressive, lifting crop and dropping it onto the canvas decks. If crop starts to wrap around reel, adjust tines to make them less aggressive.

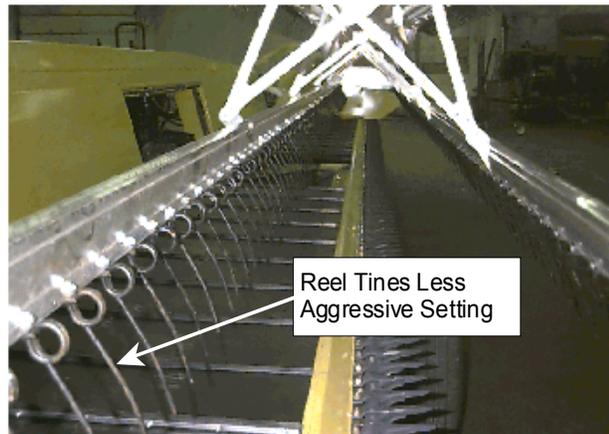


Figure 12.13: Reel Tines – Less Aggressive

Minimum Reel Height

The minimum reel height is determined by the position of the reel lift cylinders on the header, the minimum (retracted) length of the reel lift cylinders, and the length of the adjusting screws on the lift cylinders.

Attention:	<i>A 2" (50mm) minimum clearance between the tips of the pickup reel tines and the cutter bar MUST be maintained with the reel lift cylinders in their fully retracted position. Inadequate clearance can result in damage to knife sections, guards, and reel tines.</i>
-------------------	--

Reel Position in "Down" Crops

The pickup reel height in down crops should be low so 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 (300mm) in front of the cutter bar so the crop is lifted before it gets to the cutter bar.

Attention:	<i>At no time should the reel tines contact the ground. Contact with the ground or with rocks will cause damage to the tines, pivot points and stars.</i>
-------------------	--

Reel Position in Standing Crops

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

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The fore and aft position of the reel should be adjusted 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.

Reel Speed

Reel speed must be adjusted in balance with ground speed. The reel should turn approximately 10% - 20% faster than the power unit is traveling. Adjust the reel speed so it looks like the reel is “pulling” the power unit through the field.

If the reel speed is too slow, the crop will not be pushed against the cutter bar and a portion of the cut crop will fall to the ground because the reel doesn't push it onto the canvas...

If the reel speed is too fast, the crop may be shattered by the impact of the reel. The crop also may be pushed down before it can be cut and the uncut grain will be left in the field.

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. On 36', 39', and 42' headers, you will find additional grease fittings on the center reel arm mounts.

Yearly, remove and examine the polymer liners in the control plate tubes and replace if worn.

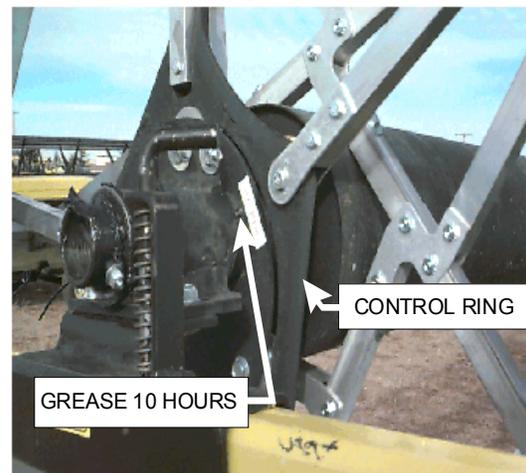


Figure 12.14: Reel Shaft Lubrication

Reel Tines

Reel tines are attached to the leading side of the reel bats with 1/4" bolts and nuts. Either spring steel or plastic (Delrin) tines may be installed on the bats.



Figure 12.15: Steel Tines

Control Rings

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 so that all three roller bolts are in the same position in the slot. Do not take up the slack by moving only one roller.

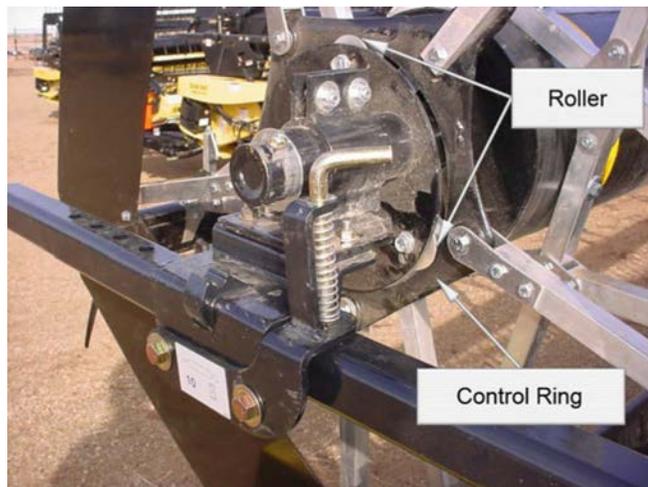


Figure 12.16: Tine Control Rings

Placement of Reel on Header

The distance from the tip of the knife section to the vertical centerline of the reel can be adjusted from 0" to 12" (300mm) depending on the crop.

1. Normally the more "down" the crop, the further ahead the reel must be set.
2. Do not set reel ahead more than 12" (300mm) as reel will not hold the crop while being cut or deliver it efficiently onto the canvas.

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3. Set reel center forward the same amount on both ends.
4. For hay crops, the reel center normally should be over the cutter bar, and the tines should have the minimum clearance from the cutter bar.
5. Adjust the reel arms so that the tine tips will miss the guards and sickle by no less than 1" (25mm) to 5" (127mm). Three inches is an average setting. The more "down" the crop; the closer the tines will need to be placed to the cutter bar.
6. Center the reel horizontally in the header and ensure the tines clear the knife by the same vertical measurement on both sides.

See the following photo-illustration.

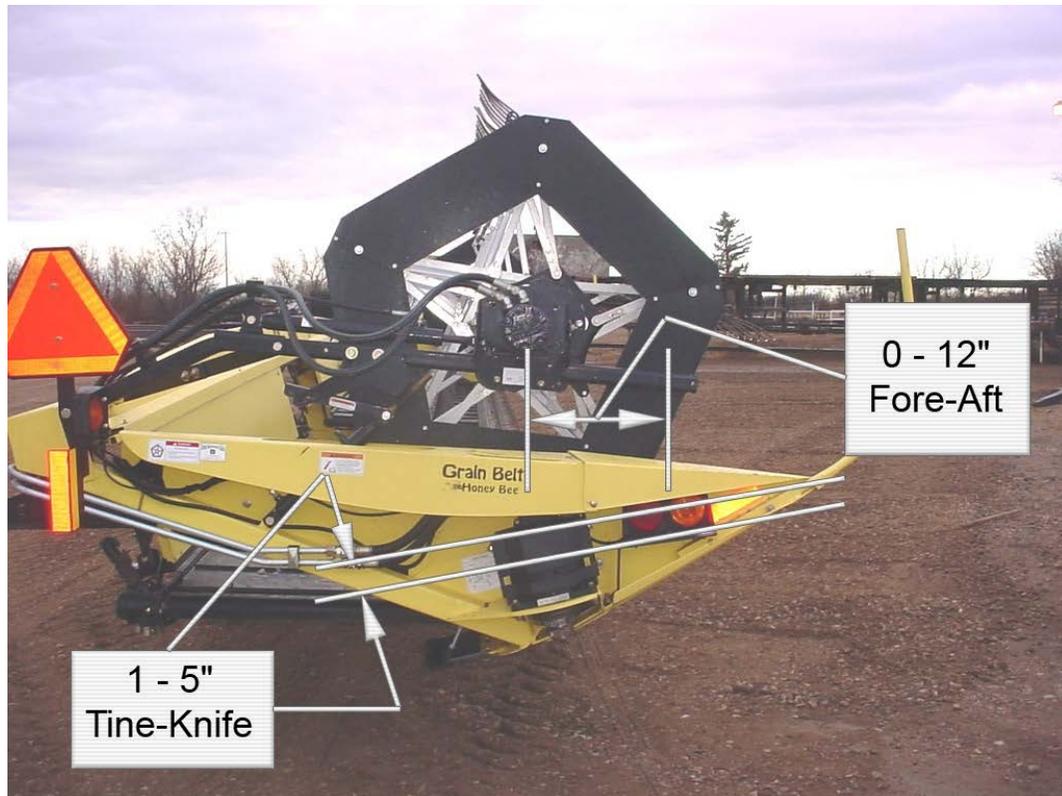


Figure 12.17: Reel to Knife Measurements

Hart-Carter Reel (HCC)

Points to check before Operation

<p>CAUTION</p> 	<p><i>Always engage reel lift cylinder locks and table lift cylinder locks before working under or around raised pickup reel. Do not rely on the power unit hydraulic system for support. A rupture or a leak in any part of the system will allow the table to lower if the proper stops are not in place.</i></p>
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1. Ensure all bolts are tight.
2. Manually rotate reel. Check tine clearance with sickle.
3. Check auxiliary finger clearance with side shields.
4. Be sure the reel arms have been aligned so that there is no bow in the bat shaft or pivot bracket bat assemblies.
5. Be sure the reel turns freely, without binding.
6. Ensure the pitch adjustment bolt is in the same location on both sides (for double eccentric reels). Single eccentric reels will have only one pitch adjustment bolt.

Lubrication

Grease fittings are located on each end, and at the center on double reels. Initial lubrication of the plastic bat bearings with a light film of oil will improve break-in and extend the service life of the bearings.

Tine Pitch Adjustment

1. Start reel with pitch of about 5 degrees as shown below.

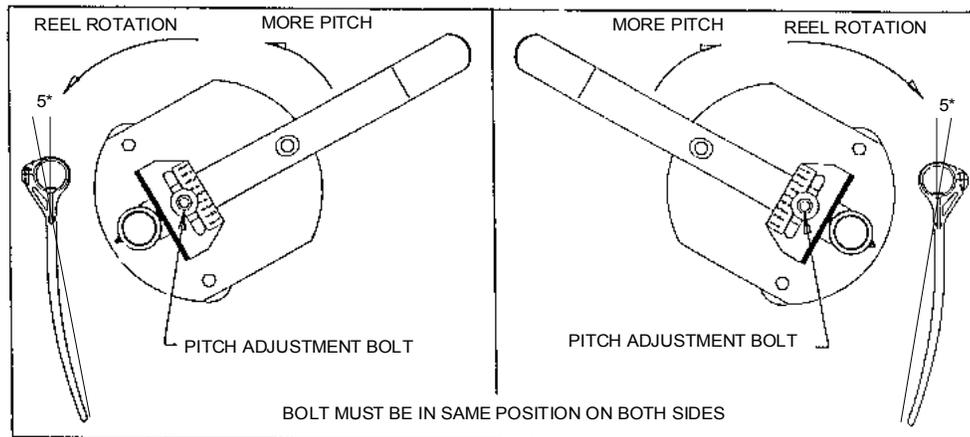


Figure 12.18: Hart-Carter Reel Pitch Adjusters

2. Too great a pitch causes reel to plug with cut crop because the tines do not release the crop after it is cut.
3. For hay crops, the tines should be perpendicular when over the cutter bar.

Reel Speed

1. The reel speed for a 42" diameter reel should be between 10 and 12 RPM for every mile per hour of machine ground speed. A 52" diameter reel should rotate at 8 to 10 RPM for every mile per hour of machine ground speed. The reel speed should be somewhat higher for down crops than for standing crops.
2. Too great a reel speed causes winding of reel with cut crop. Reel does not get a chance to let crop loose. High reel speeds also causes stripping and shelling of uncut crop.
3. Too slow a reel speed can also cause wrapping of the reel with cut crop. Cut grain falls forward instead of onto the draper.
4. For hay crops, the reel speed should be increased for general use.

Crop Control at Ends of Header

1. It is very important that the crop is completely divided before it contacts the cutter bar; otherwise the crop will lodge on the ends of the header and eventually be wound up on the ends of the reel.
2. Auxiliary end fingers are standard equipment and will control crop lodging and wrapping at the ends of the reel.
3. If crop is building up between the center shields on a split reel, the fingers may be heated and slightly bent to ensure crop does not enter the gap.

Bleeding Air Out Of Reel Lift Circuit:

If the reel does not go up or down evenly, it may be necessary to bleed the slave cylinder to level the reel. Complete this procedure only when header drive is disengaged and header is on the ground. Lower the reel to the bottom of the cylinder stroke. The reel cylinders have a center to center collapsed length of 18". Fully extended cylinder length is 28". There are two methods of bleeding the system:

A: Static Method.

Cycle the reel up to the top of the stroke. Cycle reel down but stop reel when about 2" of cylinder rod is still exposed and before cylinders reach the bottom of their strokes. Shut combine down. It is best to wait for 10 to 15 minutes so air bubbles in the oil can dissipate. Using a screw driver or a wrench (depending on the style of cylinder), loosen the bleed port hex cap on the slave cylinder (far right hand cylinder). Air and oil will escape, and the reel will drop. Tighten bleed screw (cap) and cycle reel. Repeat this procedure again if necessary.

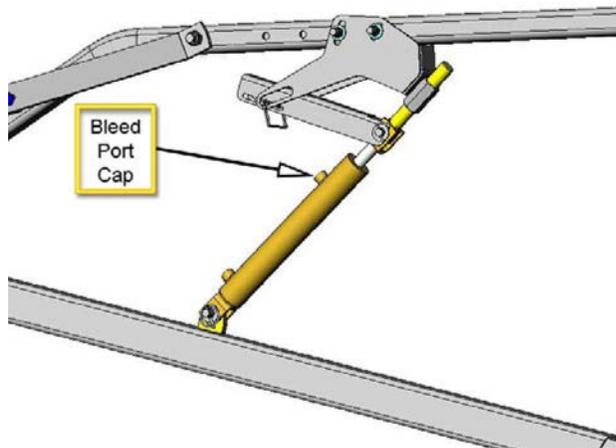


Figure 12.19: Reel-lift Bleed Port

B: Alternate method

Lower the reel to the bottom of its stroke. Shut combine down. Using a screw driver or a wrench (depending on the style of cylinder), loosen the bleed port hex cap on the slave cylinder (far right hand cylinder). Start combine and lift reel until cylinders are fully extended and the air has escaped from slave cylinder. Lower the reel, shut combine down and tighten cylinder head on slave cylinder. Cycle the reel and repeat procedure if necessary.

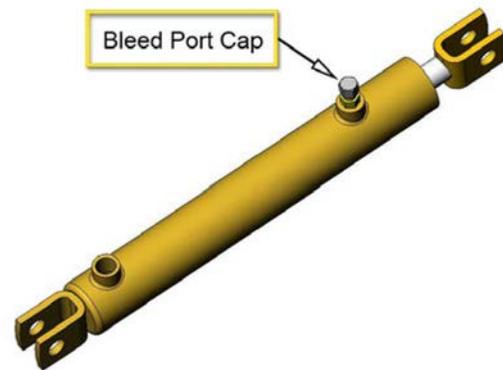


Figure 12.20: Reel Lift Cylinder C15-28A

NOTE:	<i>Because of expansion in hydraulic lines, it is normal for the right hand slave cylinder to lag slightly when lifting reel.</i>
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NOTES:

13 - Draper

Depending on how the header is equipped there may be two or three lateral drapers on the header as well as the rearward feeding center draper. The lateral drapers move the material from the cutter bar to the center draper. The center draper moves the material to the finger auger which feeds the feeder house of the combine. All draper must be set properly and maintained in good condition to perform well. Quick release adjusters with spring tensioning have been installed to allow for easier cleaning of internal parts and to maintain proper draper tension.

Draper Installation

Unpack draper, and check size so that it corresponds to the size of the deck. Place draper bundle on the top of deck runners. Unroll draper with the slats facing up.

From one end, wrap draper around an idler roller. Pull the draper under the roller, and onto the lower runner of the deck. On the underside of the deck, the lower runners should support the draper, preventing it from hanging down.

Continue to pull the draper until it can be wrapped around the other roller. Pull the ends of the draper together on top of the deck. Install a connector bar to the draper joint using the pre-punched holes. The heads of the screws should be installed from the center deck opening side. This helps to prevent the crop from being caught on the screws. Complete the installation by adjusting tension and tracking.



Figure 13.1: Unrolling Draper



Figure 13.2: Wrapping Draper

Lateral Draper Tension

Proper tension must be maintained on the draper to prevent slipping on the drive rollers. The draper tension is changed by adjusting the drive roller of each deck.

ATTENTION!	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.
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1. Lower the header to the ground.
2. Raise the reel to its maximum height and place the locks on the reel lift cylinders to prevent reel from falling.
3. Loosen the lock nut. Release the tension with the quick release lever. Pull on the roller from side of header to stretch the draper. Slide the adjuster clevis to compress the tension spring. Complete tightening by over-centering the quick release lever. If tracking is good, leave the lock nut on the motor mount plate loose.

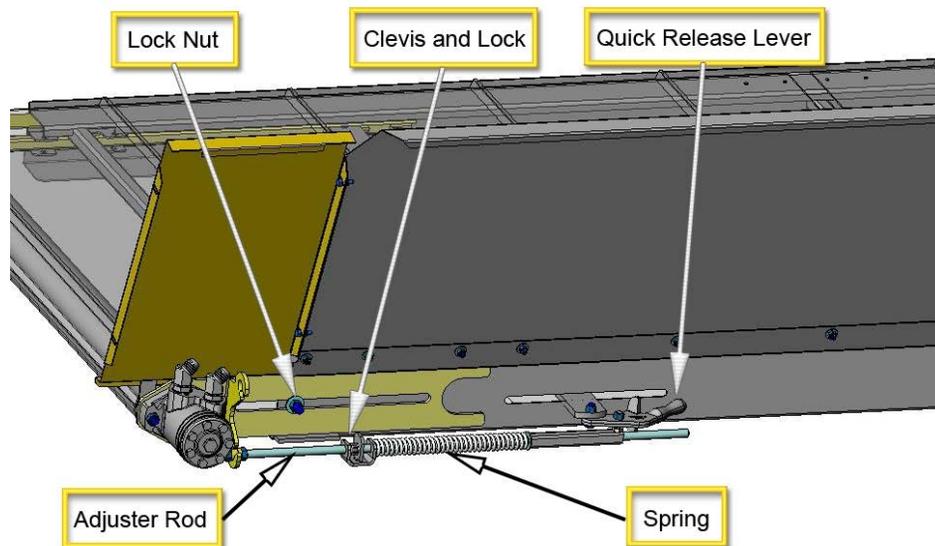


Figure 13.3: Draper Tension Adjustment

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NOTE:	When adjusting the draper tension and tracking, check the clearance between the draper deck and the 3" x 3" end strut. Problems may be encountered if draper or deck parts contact the end strut. A minimum of 2" (50 mm) clearance is recommended. If necessary, loosen the deck restrainer bar and slide deck over.
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Alignment

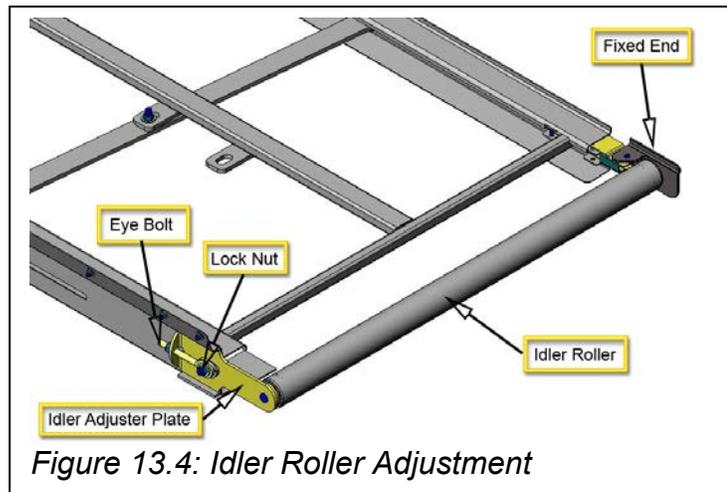
The draper must track properly on the rollers to avoid damage to the draper. The decks allow approximately 1/4" of clearance on each side. Draper tracking can be adjusted at the drive or idler end of the deck by adjusting the adjuster screw on the motor mount plate of the draper drive roller or the eye bolt tightener on the idler roller mount plate. Begin adjusting draper tracking at the idler end of the deck.

1. Lower the header to the ground.
2. Raise the reel to its maximum height and place the locks on the reel lift cylinders to prevent the reel from falling.
3. ENGAGE PARKING BRAKE ON THE POWER UNIT, IF POSSIBLE HAVE A QUALIFIED OPERATOR IN CONTROL OF THE MACHINE AS YOU WORK.

WARNING 	<i>You will be working on moving machinery!</i> <i>Exercise extreme caution!</i>
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The idler roller is fixed at the cutter bar end and is adjustable only from the back panel. If draper is tracking toward the back panel, tighten the nut on the eye bolt (shorten the eye bolt). This will push the idler mount plate and idler roller at the back panel end out, creating slack in the draper at the cutter bar. Draper should move towards the cutter bar. If draper is tracking toward the cutter bar, loosen the nut on the eye bolt (lengthen the eye bolt). This will pull the idler mount plate and idler roller in, creating slack in the draper at the back panel end. Draper will track toward the end of the roller with the lowest tension. See Draper Drive Motor page 118.

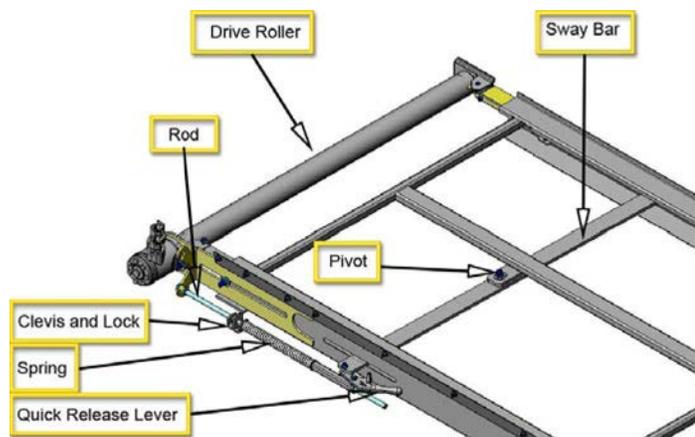
4. Begin at the idler roller end of the draper. Loosen the lock nut, and adjust the eye-bolt length by turning the adjuster nut as described above.
5. Observe the tracking of the draper for a few moments. If tracking is satisfactory, tighten the lock nut.



Move to the drive-roller end of the draper. With quick release tensioning, the motor mount plate is normally left loose enough that the spring on the tensioner can move the sway bar by itself. The adjusting clip is connected at the lever end of the tensioning spring. Increasing the spring compression will tend to push the cutter bar end of the roller out, which should bring tracking to the rear. Easing the tension by sliding the clip toward the sway bar will draw the cutter bar end of the roller inward, and cause the draper to track toward the cutter bar. See , page 118

5. Check the tightness of the motor-mount plate Lock Nut. It should be loose enough for the tensioner to move the plate, but not so loose that it is sloppy. Increase or decrease the spring pressure as described above to achieve the desired draper tracking.

Observe the tracking a few moments to be certain it is stable before resuming cutting.



Draper Speed

Proper draper speed is critical to the performance of your Grain Belt Header. The draper speed should be balanced with the field speed of the combine to deliver the material smoothly to the center draper. The speed of the lateral draper and the center deck draper is controlled by an adjustable flow control. Adjusting this control will affect all decks. The flow control will regulate the volume of oil feeding the flow divider. The flow divider splits the oil flow equally between the lateral draperes and the center deck draper. A fine adjustment screw on the flow divider can be used to adjust the speed to suit your needs. As one circuit increases the other will decrease.

When using the header as a swather the draper speed should be set to form a good windrow, to remove the cut crop from the cutter bar and to deliver it smoothly to the opening.

Things to Observe while cutting

1. Excessive draper speeds may form a poor swath. The heads tend to be thrown to the center and can fall through the stubble.
2. Draper speeds that are too slow for the field speed tend to overload the decks with cut crop and can result in plugging the cutter bar. In lighter crops, the swath is often too open and may fall through the stubble, making it difficult to pick up.

Experiment with different draper and field speeds to obtain the best swath formation for the cutting conditions. It may also be necessary to make adjustments as conditions change.

ATTENTION!	Avoid over-speeding the draper. Excessive draper speed will cause premature wear and shorten draper life significantly.
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Draper Speed - Feeder Deck

On all headers with combine driven reels the feeder deck draper drive motor is plumbed in parallel with the lateral draper deck drive motors. Both draper circuits are controlled with one flow control, and with a fine speed adjustment on the flow divider. Adjusting the flow control will change the speed of the feeder draper as well as the lateral draper. Adjusting the flow divider changes the proportion of oil to the lateral decks or the feeder deck. As one increases the other will decrease.

NOTE: 1	Any adjustment to the flow control will affect the lateral and center draper speed.
NOTE 2:	The flow divider has a fine adjustment screw which can be used to adjust the balance of the flow to a limited degree. Remove cap, loosen lock nut, and turn adjustment screw with a hex wrench. As one circuit increases the other will decrease, affecting individual draper speeds.

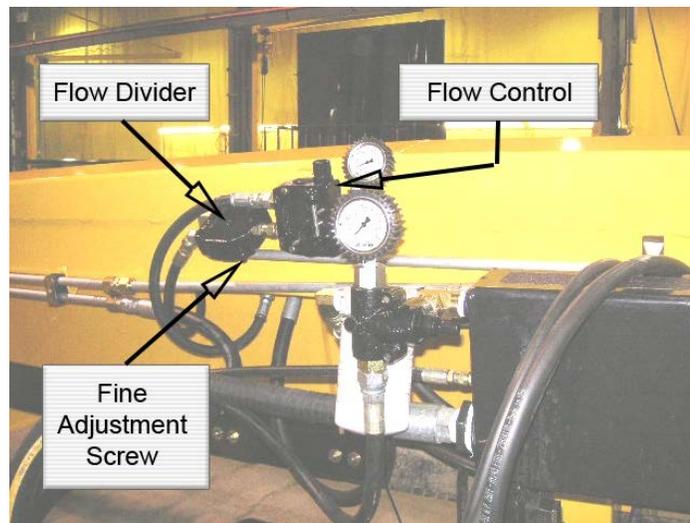


Figure 13.6: Hydraulic Flow Adjustment

Center Draper - (Rearward Feeding)

Proper tension must be maintained on the draper to prevent slipping on the drive roller. The draper tension is changed by adjusting the idler roller at the front of the deck.

Adjusting Center Draper Tension:

When the draper is correctly tensioned, you should be able to lift the side of the draper approximately two inches without effort.

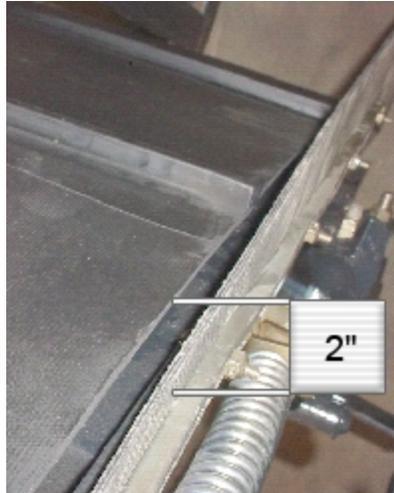


Figure 13.7: Draper Slack Measurement

Draper tension can be easily modified by releasing the quick lever, located on the side of the draper deck, and adjusting the spring loaded rod assembly accordingly. Lock the quick lever to re-apply the tension onto the draper.

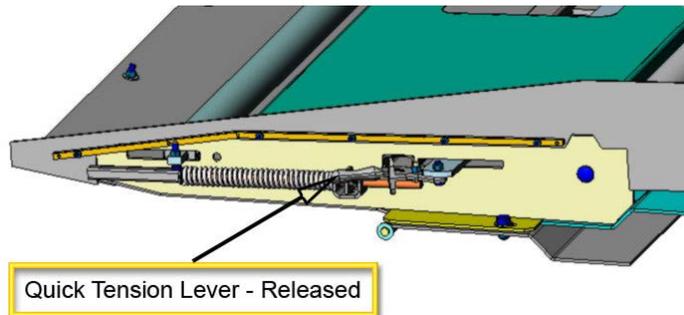


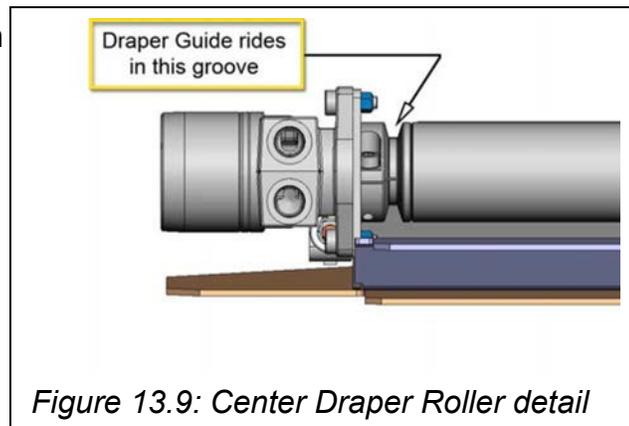
Figure 13.8: Quick Tension Lever - Released

ATTENTION:

Do not over-tighten the center draper; it should only be tensioned enough to prevent it from slipping on the drive roller. Over-tightening will decrease draper life and may cause premature failure of the rollers.

Alignment

The draper deck is self tracking, with an extruded “V” on the draper and a slotted groove on the roller. No adjustment is needed to the center deck rollers for aligning the draper



Draper Splicing

Honey Bee Mfg. strives to use top quality draper material on their headers and swathers. Our draper is made from rubberized polyester with fiberglass reinforced slats. Regular maintenance will help to ensure maximum life-span, and will minimize problems. Checking tension and tracking on a regular basis is very important. If material is allowed to build up inside the draper deck it tends to wrap around the idler and drive rollers, causing the draper to tighten. As the draper tightens, stress is put on the motor, bearings, and the draper belt.

Failure of the motor or bearings, or tearing of the draper can result. Tearing of the draper can also result from mechanical failure or damage from careless use. It is important to identify and correct the condition 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.

1. Before making 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 #7)
2. Engage parking brake, raise header table and install locks on the feeder house lift cylinders. (If this height is not suitable the table can be set on blocks or lowered onto the ground)
3. 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.
4. Turn combine off, and wait for all moving parts to come to a complete stop before leaving the cab.
5. Release the tension on the draper to be spliced.

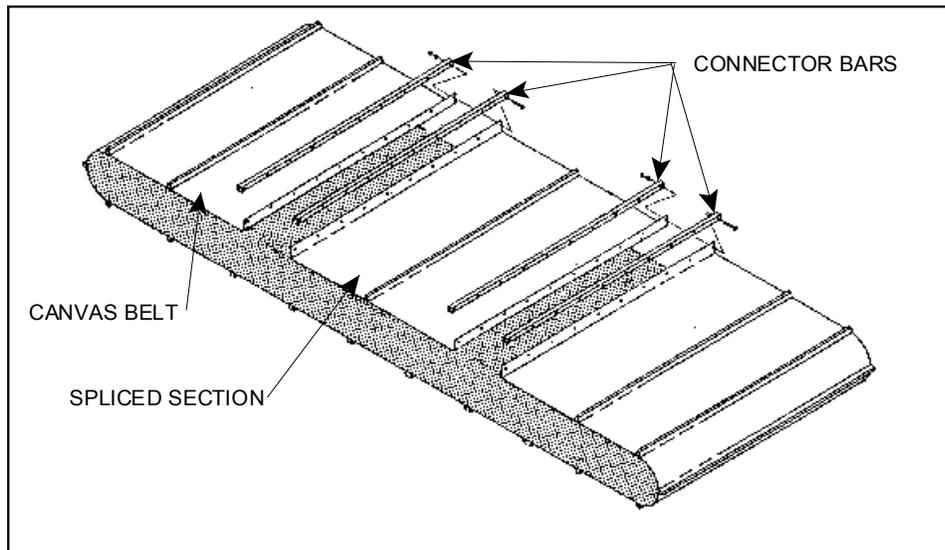


Figure 13.11: Inserting a Splice in Draper

10. 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. (You may find it useful to clamp the loose end in place before drilling.) Insert a screw and secure this end in place.
11. Ensuring that the draper edges remain lined up, (clamps may again help you to keep the edges straight.) drill the rest of the holes, insert screws and secure.
12. Repeat this procedure for the other join.
13. Adjust draper tension. Trim draper lip to no more than $\frac{1}{2}$ " above connector bar.
14. Start combine, run draper, and inspect spliced piece to ensure that the splice was successful, and that the draper is tracking properly.
15. Adjust tracking as required. Refer to the Alignment section of this chapter.

NOTE:

If the splice is not near a connector bar, you will need two (2) connector bar sets and a piece of draper 5" longer than the damaged piece to be removed.

Idler-Roller Removal

It may be necessary, from time to time, to remove an idler roller in order to check the bearings or to clean the roller:

1. Release the draper tension.
2. Remove the nut that holds the eye bolt and the draper idler plate in place.
3. Remove idler plate from deck.
4. Remove spacer from bolt.
5. Pull idler roller out of deck.
6. Check bearings on each end and remove any material build up on roller.
7. Re-assemble in reverse order.

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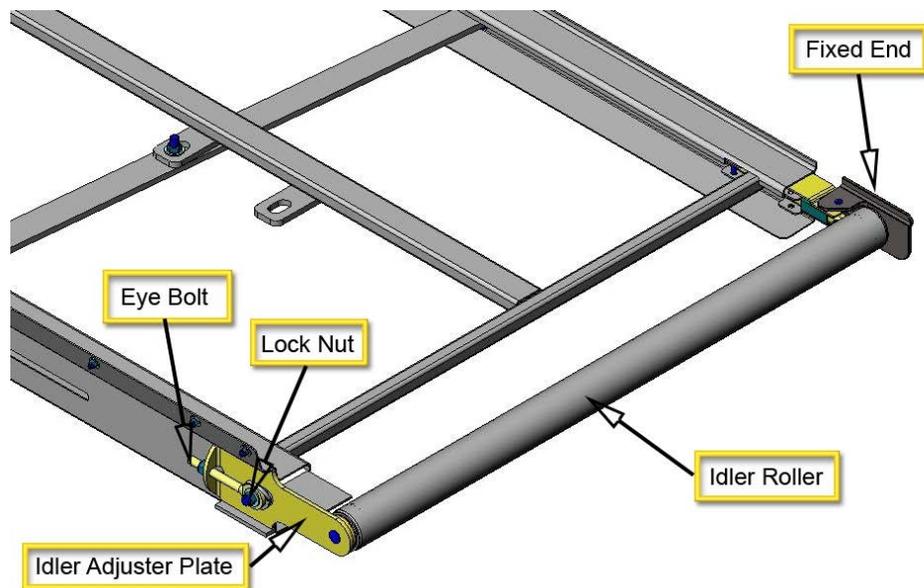


Figure 13.12: Idler Adjustment Plate

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Drive-roller Removal

To remove a drive roller, to check bearings or to clean roller:

1. Check lock nut on the motor mount adjuster plate to see that it is loose.
2. Release tension from draper with quick release tension lever.
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 nuts and bolts from the motor mounting flange.
6. Pull motor, and drive roller out of deck.
7. Check bearing in end of roller, and remove any build up of material on roller.

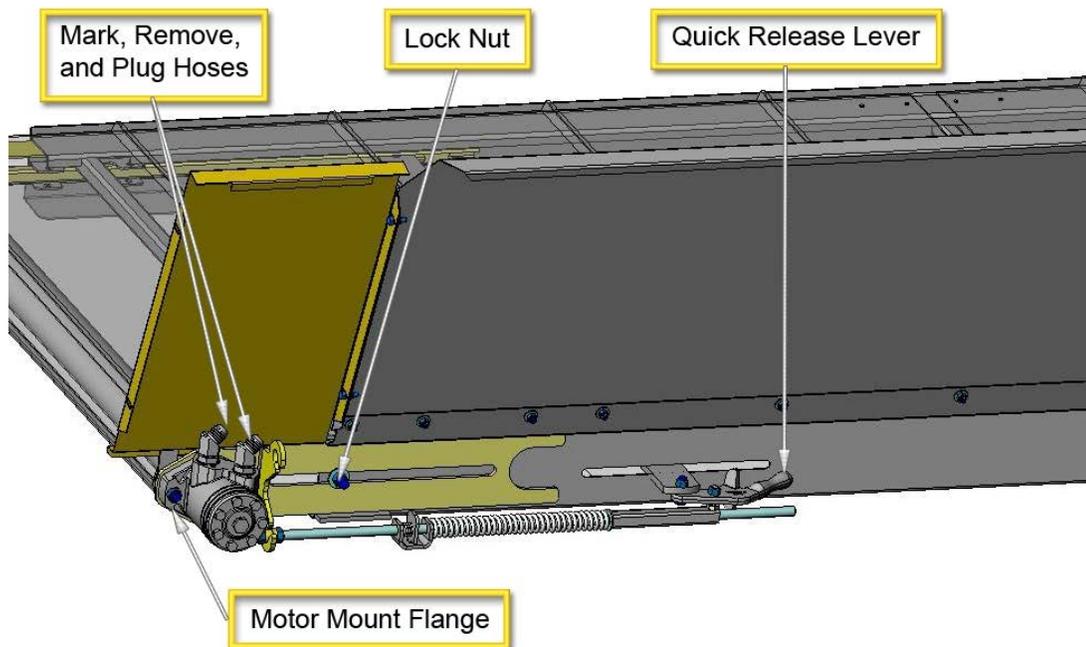


Figure 13.13: Draper Drive Motor

To re-install drive roller, reverse above procedure. Adjust tension and tracking. See Alignment section of this chapter.

NOTE:	Look for, and remove any buildup of material on draper deck runners. If necessary, split draper at connector bar to gain access to the inside of the deck.
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Center Deck Idler-roller Removal

1. Relieve tension from draper by releasing the over-center tightener.
2. Remove connector bar from canvas and open the canvas to reveal the idler roller.
3. Remove roller.
4. Check bearings in each end of roller, and remove any build up of material on roller.
5. To remove bearing, first remove the snap ring. Pull bearing with a slide hammer bearing puller, or insert a rod through the roller and tap bearing out.

Reverse the above order to reassemble, adjust tension and tracking.

Installation of Center-deck Draper

To re-install the center draper, wrap draper around rollers, ensuring that the groove in the roller lines up with the v-guide on the bottom of the draper.

Insert bolts into connector bar. Line up bolts and connector bar along the flap of draper, insert bolts into holes of both flaps then into the second connector bar, secure with nuts. Install all four connector bars, tighten nuts and bolts.

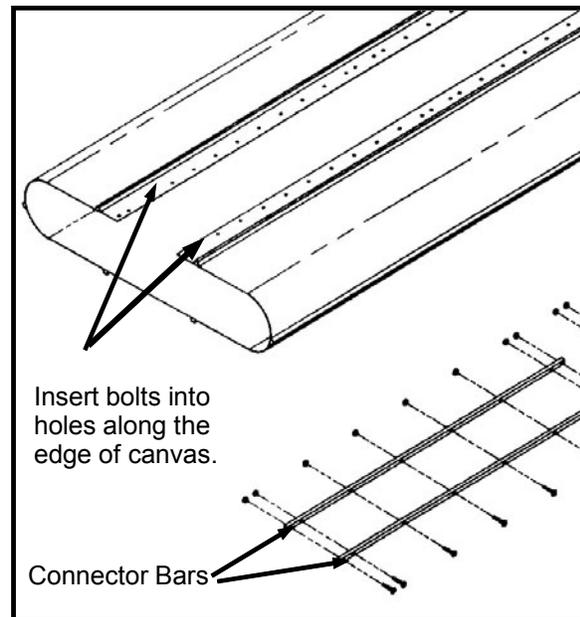


Figure 13.14: Joining Draper

Center-deck Cleanout

The center deck has provision for cleaning debris from the underside of the deck. Remove the two bolts from each side of the hinged door. If required, drop door, remove debris, replace door and secure with bolts.

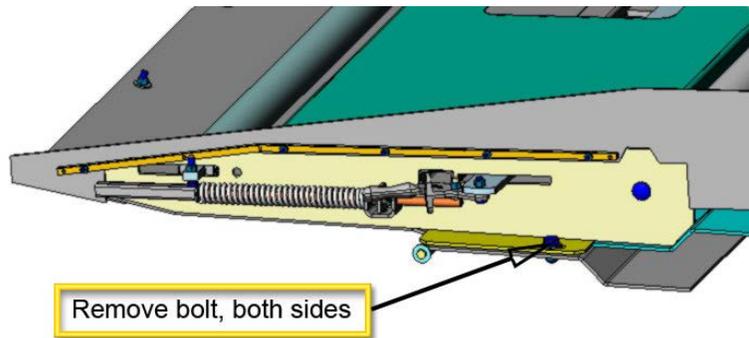


Figure 13.15: Center-deck Cleanout

Remove Bearings from Rollers

The roller bearings are pressed into the rollers with a friction fit and held in place with a retaining ring.

1. Remove roller from the draper deck.
2. Remove retaining ring that holds the bearing.
3. Use an internal bearing puller on the inside of the bearing.

If an internal puller is not available;

4. Remove retaining ring that holds the bearing.
5. Insert a rod small enough in diameter to go through the inside of the bearing, and long enough to reach to the opposite end of the roller.
6. Drive bearing out with the rod.
7. Install new bearing, and replace retaining ring.

Roller Bearing – Center-deck Drive Roller

Before installing a new bearing into the drive roller:

1. Remove the set screws from bearing shoulder.
2. Press bearing into roller, shoulder side out. Be sure bearing is not too tight or too loose. If loose use locktite to hold bearing steady.
3. Install retaining ring to secure bearing.

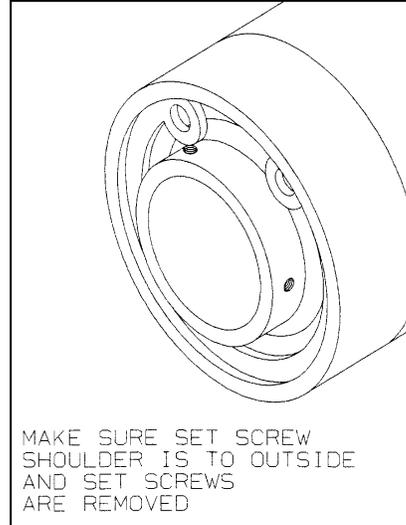


Figure 13.16: Bearing Set Screws

Installing Draper motor.

1. Clean motor shaft and hub of drive roller. Apply anti-seize to shaft.
2. Insert key in motor shaft.
3. Insert motor into hub.

Do not hammer on the motor-mounting flange.

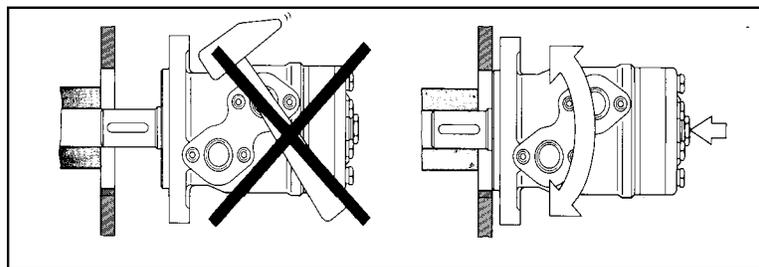


Figure 13.17: Draper Motor Installation

4. Tighten set screws

Damage to motor will void warranty. Use a soft blow or rubber hammer to apply force only to the end of motor.

Removing draper motor.

Remove set screws.

Insert two pry bars one on each side of motor, and pry motor out of drive roller. A second person to assist you will be beneficial.

Do not use a hammer on the mounting flanges of the motor.

Damage to motor will void warranty.

If motor will not move, insert a 7/8" or 3/4" rod through the center of drive roller and apply force to the end of the motor shaft.

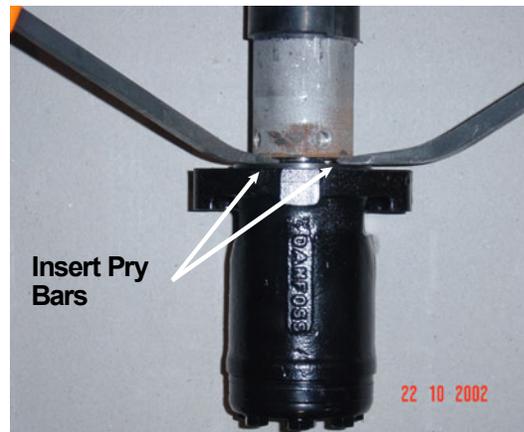


Figure 13.18: Use of Pry Bars

14 - Center Feed Auger

The center feed auger receives the material from the center draper and propels it into the feeder housing of the combine. The adjustment of the fingers, as well as the height of the auger, is critical for the optimum transfer of material into the combine feeder house. This adjustment may need to be changed for different crop types and conditions to maintain an optimum flow of material from the drapers into the feeder house.

Standard Adjustments

Adjust the auger fingers to clear the pan or pan inserts by approximately ¼" (6mm) to ½" (13mm). This is the recommended minimum clearance. Some crops may require greater clearance, and you may find other settings that suit your operating conditions better.

<p>CAUTION</p> 	<p><i>Before proceeding with the following adjustments, lower the combine header completely to the ground or raise header to its full height and put feeder house cylinder locks in the place, whichever position will give you the most comfortable access to the center auger.</i></p>
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	<p><i>ENGAGE PARKING BRAKE ON THE COMBINE, SHUT ENGINE DOWN AND WAIT FOR ALL MOVING PARTS TO STOP BEFORE LEAVING THE CAB.</i></p>
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Finger Extension Adjustment

The extension - retraction action of the fingers is adjustable to suit the type of crop being harvested.

To adjust the extension/retraction of the fingers, locate timing plate arm (1) on the right-hand end of the auger adapter

Loosen lock bolt (2).

Pull the timing plate arm backward to increase the finger extension toward the top and back of the auger drum.

Push the timing plate arm forward to increase the finger extension toward the front of the auger.

When proper indexing is achieved, re-tighten lock bolt (2).

NOTE: 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.)

Adjust the auger fingers so that they clear the pan or pan inserts by $\frac{1}{4}$ " (6mm) to $\frac{1}{2}$ " (13mm).

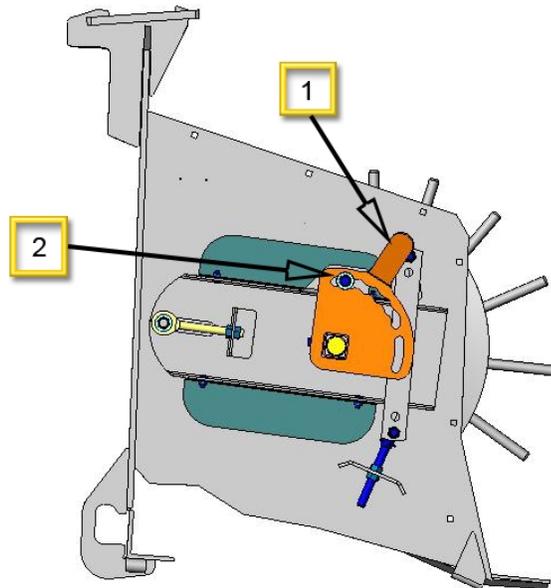


Figure 14.1: Adjust Finger Timing

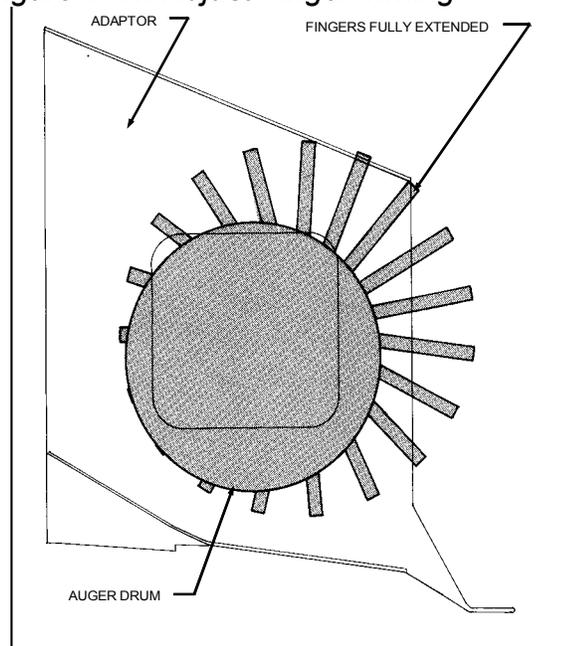


Figure 14.2: Optimum Finger Timing

Auger Drum Height Adjustment

The feed auger floats in the adapter frame. Stop blocks located at the front of the auger adapter frame restrict the minimum and maximum height. The clearance between the fingers, flighting of the auger drum and the pan of the adapter frame can be adjusted as follows:

Loosen lock bolts (1) and (2) on the auger height adjustment bracket, at both ends of the adapter frame.

Locate vertical adjustment bolt (3), on each end of the adapter frame, and loosen the lock nut on the bottom of the bolt. Hold the carriage bolt still while turning the top nut. Increasing the length of the bolt will lift the auger, shortening it will lower the auger. Adjust both ends the same so full length of auger will run parallel to the adaptor pan.

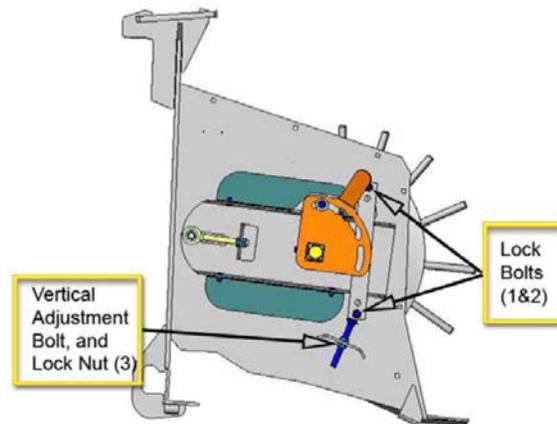


Figure 14.3: Center Auger Adjuster

When the desired clearance is attained, tighten the lock nuts on adjustment bolt (3), and lock bolts (1) and (2) on the height adjustment bracket.

Fore – Aft Adjustment of the Center-Feed Auger

The auger drum can be adjusted forward and backward by moving the carrier arm. The slotted hole in the carrier arm allows about 2" (50mm) of travel. Care should be taken to ensure that both sides are adjusted by the same amount. When moving the auger drum ensure that the auger flighting and the auger fingers do not contact the feeder chain on the combine or the draper on the feeder deck.

Adjust the clearance as follows:

Locate the adjustment bolt (1) on left and right sides of the auger adapter frame.

To decrease the clearance between the adapter frame and the auger; loosen lock nut (2) and turn lock nut (3) clockwise.

To increase the clearance, reverse this procedure.

When the desired clearance has been attained, re-tighten lock nuts (2) and (3).

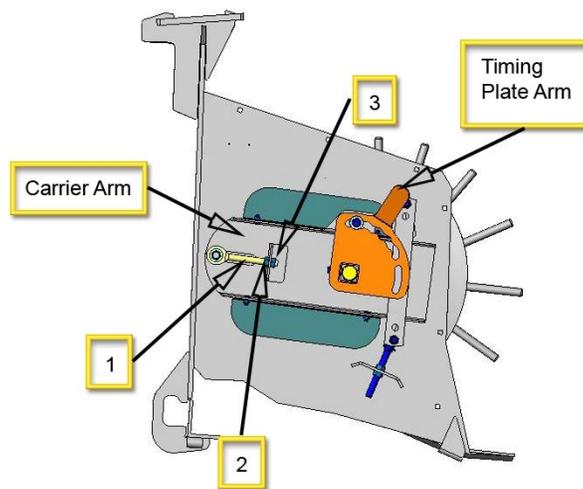


Figure 14.4: Center Auger Fore-Aft Adjustment

For proper performance of the finger auger, each end of the auger should be adjusted with the same amount of clearance along the full length of the auger.

Attention!	<p><i>Slowly rotate finger auger by hand to be sure the flighting and the fingers do not contact the feeder house, shrouds, feeder chain, drapers, or header decks.</i></p> <p><i>Damage to the combine or header arising from improper adjustment WILL NOT BE COVERED BY WARRANTY.</i></p>
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Auger Drive Assembly Adjustment

The auger drive assembly and the chain case mount are located on the left-hand side of the sub-frame. The chain case mount is secured to the sub-frame by two 5/8" u-bolts, which provide height adjustment. The pipe on the auger drive assembly is inserted into the mount tubing and is locked in place by set screws. This design allows the auger drive chain case to rotate up and down and to move in and out for optimum alignment of the drive line.

Note:	<i>Alignment of the drive line should be checked before operation of the header. The telescoping drive line is equipped with universal joints at each end, so minor misalignment is acceptable up to 25 degrees. Try to keep the drive line (from feeder house to the gearbox) adjusted as straight as possible.</i>
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IMPORTANT:	<i>As the operating angle of the driveshaft increases, the life of the universal joints will decrease.</i>
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Driveline Adjustment:

Loosen the set screws on the chain case mount.

Rotate the auger drive chain case and slide it in and out to align, and provide adequate sleeving of the center section of the drive line.

It is important to ensure you have enough overlap in the driveline sleeving.

If necessary, loosen the two U-bolts, and move the entire unit up or down.

Remember, the less angle in the drivelines, the longer their life.

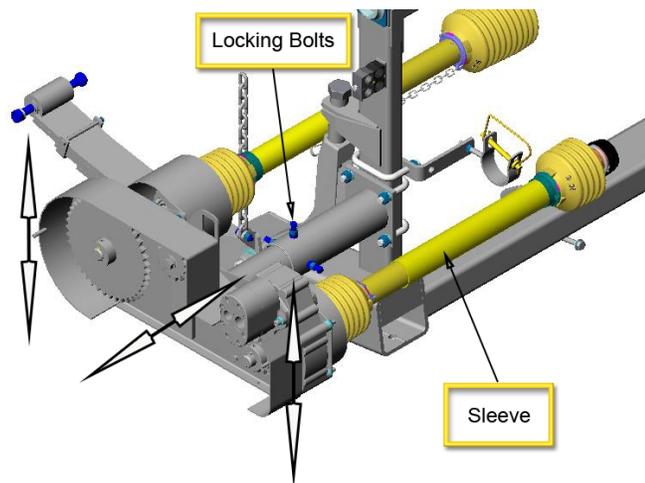


Figure 14.5: Driveline Alignment

Note:	<i>When changing to another combine, it may be necessary to loosen the U-Bolts on the chain-case mount and lift the complete assembly to achieve proper alignment.</i>
--------------	---

Chain Tension Adjustment

Remove the chain case shield from the auger drive assembly.

Loosen the idler sprocket, insert a pry bar into the bolt slot.

Apply downward pressure to the idler sprocket with a pry bar until approximately ½" (13mm) to ¾" (19mm) of slack remains along the bottom run of chain.

Tighten the idler sprocket, and recheck the tension.

Do not over-tighten the chain.

Reinstall, and secure the chain case shield.

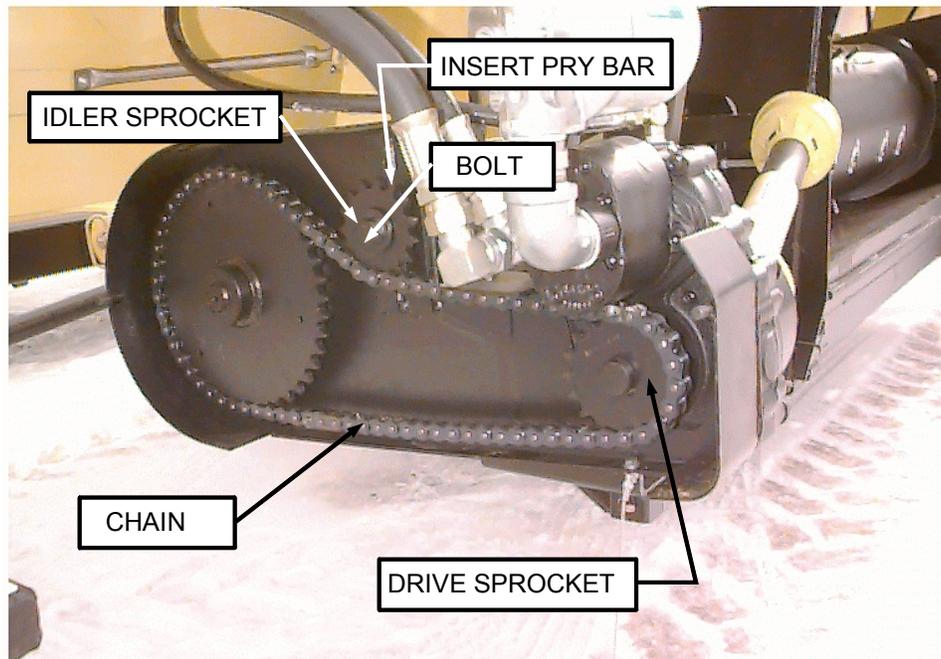


Figure 14.6: Chain-case, Auger Drive

Drive line - Walterscheid

For complete information on the installation, service, and safety instructions for input drive lines and clutches refer to the operator's manual shipped with each drive line.

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 dealing with these conditions.

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

Operating the PTO

When closing down operation of PTO driven equipment, shift PTO control to neutral, shut off the engine and wait until the PTO (feeder house) stops 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 any rotating equipment.

 <p>CAUTION</p>	<p><i>To avoid injury do not clean, adjust, unclog, or service PTO driven equipment while the combine engine is running.</i></p>
--	---

Never exceed the recommended operating speed of the equipment.

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. Always ensure that the implement input drive line is securely connected at both ends.

1. Only operate a drive system when all safety guards are in place. PTO safety systems include: the combine master shield, the implement input drive line guard and the implement shielding.
2. If any component of the guarding system has been removed for any reason, it must be replaced or repaired prior to operating the machine.
3. Note the maximum driveline operating length. The implement input driveline should not be extended by more than half the telescoping overlap available.
4. Driveline universals should not be operated with greater than 25 degree angles.

Driveline 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 samponified high quality grease with E.P. additives.

Attention:	<i>Do not use grease agents containing MoS2!</i>
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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 to force out any water that may have penetrated into the joints.

Lubricate points 1 through 6 as shown in Driveline Alignment, page 135, and Center Sleeve Lubrication, page 139 below, with quality grease before starting work and every 50 operating hours thereafter. Clean and grease the input drive line before each prolonged period of storage. Molded plastic nipples on the guard near each guard bearing are intended as grease fittings and should be lubricated every 50 hours of operation if the guard is chained so that it does not rotate.

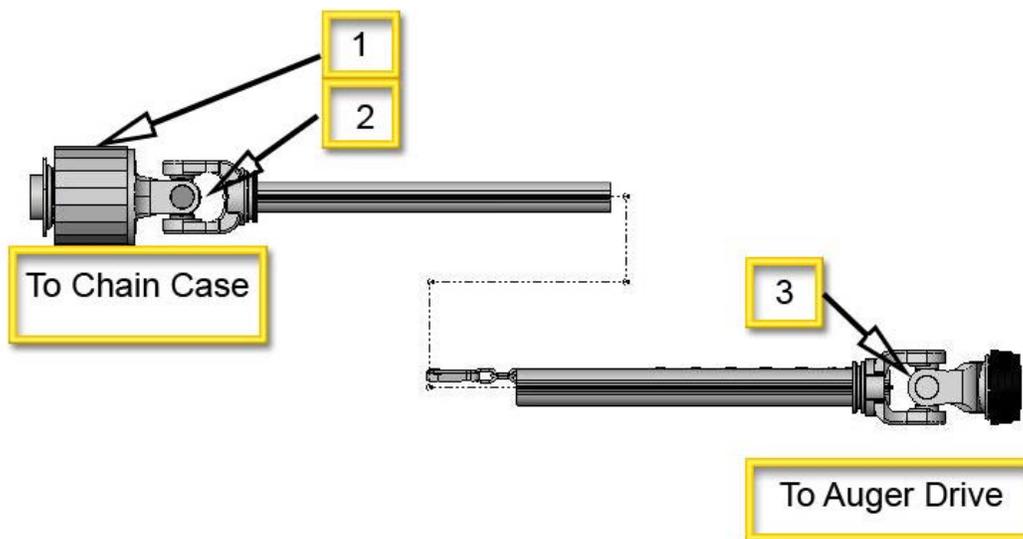


Figure 14.7: Driveline Lubrication Points

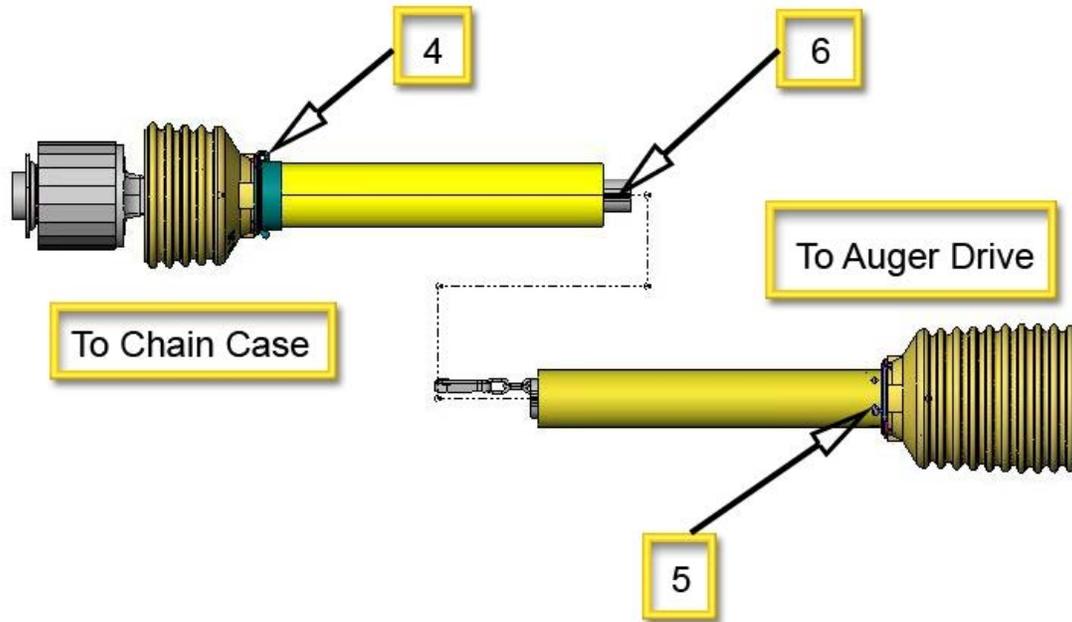


Figure 14.8: Driveline Lubrication Points (2)

Telescoping members must have lubrication to operate reliably regardless of whether or not a grease fitting is present.

Telescoping members without grease fittings should be pulled apart periodically, and grease should be added manually.

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

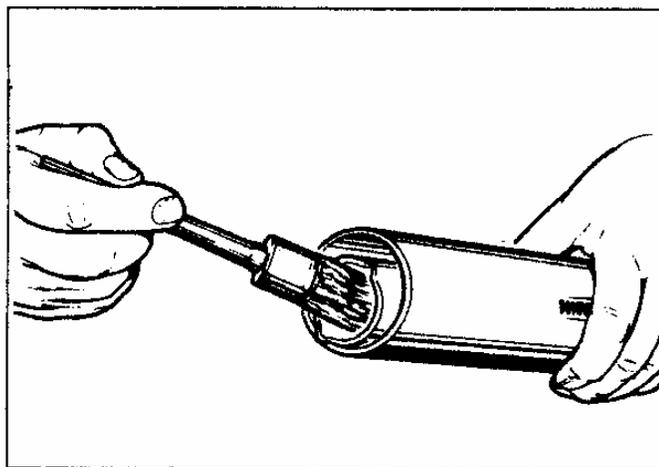


Figure 14.9: Center Sleeve Lubrication

Coupling the input driveline

Clean and grease the PTO and implement input connection.

Driveline Lock

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

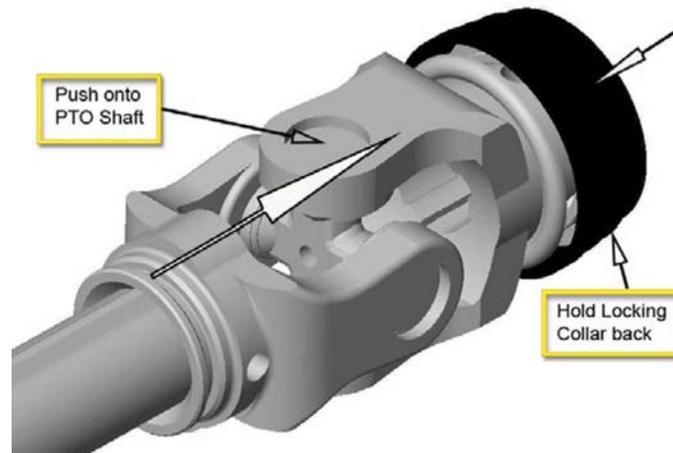


Figure 14.10: Driveline Locking Collar

WARNING



CHECK TO ENSURE ALL THE LOCKS ARE SECURELY ENGAGED BEFORE STARTING WORK WITH THE IMPLEMENT INPUT DRIVE LINE.

NOTE:

The chain is intended to prevent the guard from rubbing against non-moving parts, thereby reducing premature wear and damage. With proper maintenance, a properly installed chain will increase the service life of the guard.

Chains must be attached to allow sufficient articulation of the shaft in all working positions. Care must be taken to ensure the chain does not become entangled with nearby components during operation or transport of machine.

The chain is not designed to carry the weight of the implement input driveline. Damage will occur if it is suspended by the chain.

Driveline Guard Disassembly

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

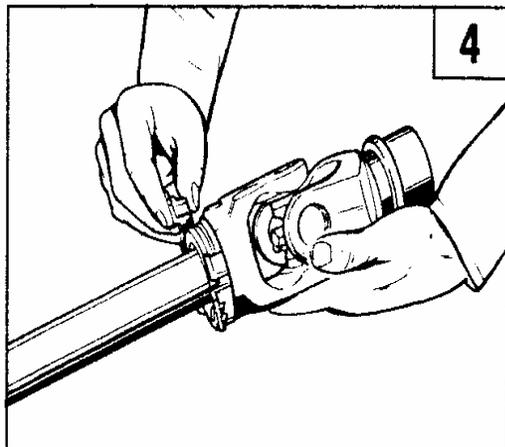
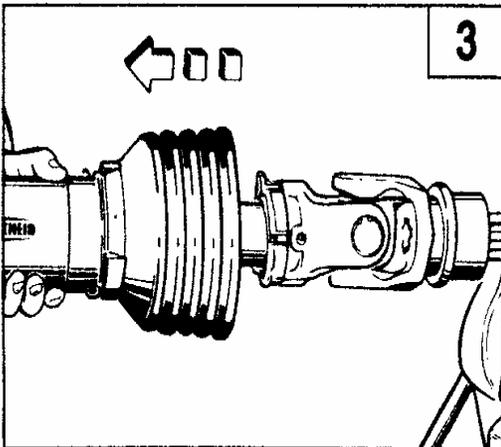
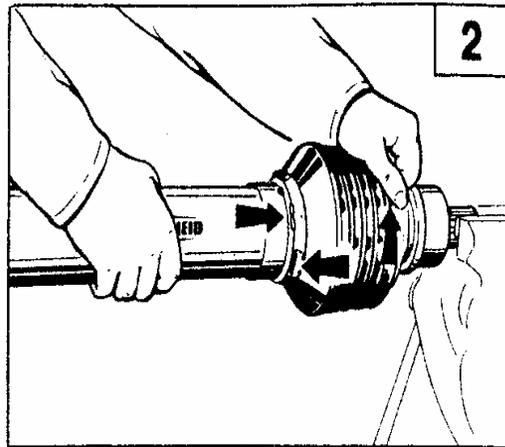
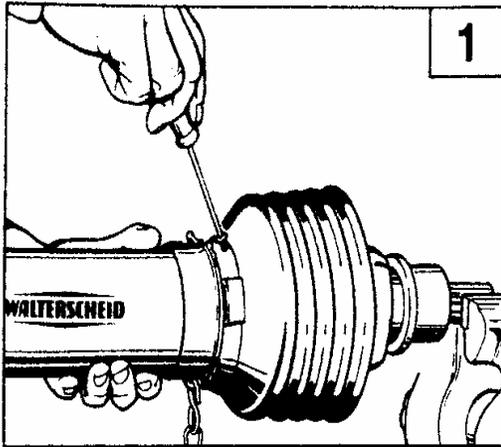


Figure 14.11: Driveline Guard Removal

Driveline Guard Assembly

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

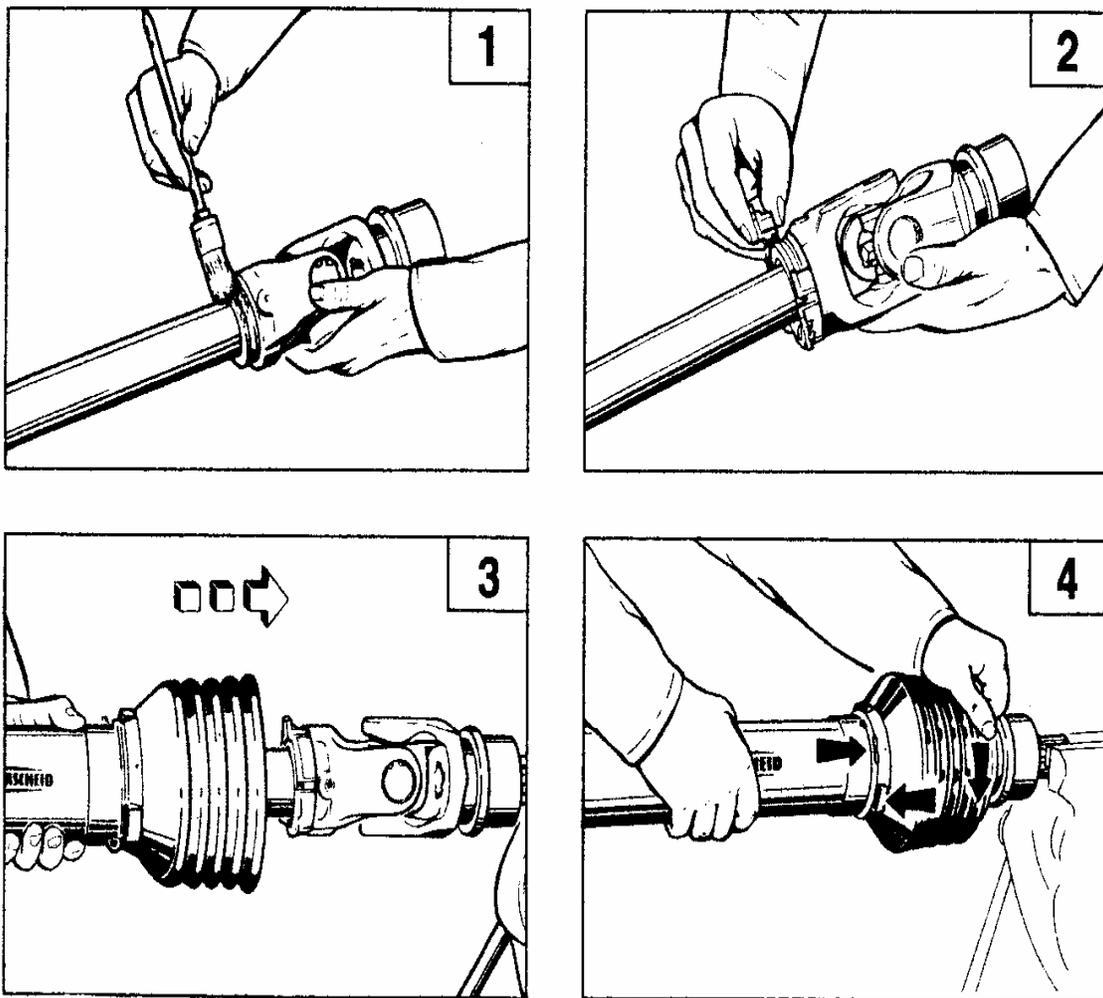


Figure 14.12: Driveline Guard Installation

Replace Cone:

1. Disassemble guard as shown previously.
2. Remove old cone (e.g. cut open with knife).
3. Remove chain.
4. Place neck of new cone in hot water (approximately 80 C/180 F) and when heated, pull onto bearing housing.
5. Follow the assembly instructions listed above.
6. Reconnect chain.

Drive Line Clutch

The drive line contains a radial pin clutch, which is pre-set to 1,200 Nm (885 Lb-Ft) by the manufacturer. It should not require any adjustment. Lubricate the drive-line (every 50 hrs), at the 6 points indicated previously in this chapter; and maintain in accordance with the manufacturer's recommendations.

WARNING



GUARDS ARE DESIGNED TO PROTECT THE USER.

Defective and damaged guards must be repaired or replaced immediately. Only original "Waltersheid Agraset" parts should be used (contact your dealer.)

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NOTES:

15 - Dismounting Draper Table from Combine

There are three methods of removing the draper table, which differ only in the equipment used to support the header after it is removed from the combine:

1. Quick Dismount, without using either transport axle package, found in this section of the manual.
2. Standard Dismount, using the Standard Transport Axle package. Refer to Dismount Header onto Standard Axle, Section 17, page 153.
3. Integral Axle Dismount, which utilizes the Integral Axle Transport package. Refer to Dismount Header onto Integral Axle, Section 16, page 149.

It is important to dismount the draper table properly from the combine for four reasons:

- 1) Safe storage.
- 2) Ease of remounting.
- 3) Readiness for transport.
- 4) To avoid possible damage to the draper table and combine.

WARNING 	<i>Keep bystanders away from the machine, especially children as you complete these operations. Select a storage site away from human activity.</i>
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Quick Dismount

<i>IMPORTANT!</i>	<i>Park the combine on hard, level ground. Engage the park brake.</i>
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1. Run the harvester:
 - a. Lower the reel to its lowest possible position.
 - b. Raise the draper table to its fully raised position.

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ENGAGE PARKING BRAKE ON THE COMBINE, SHUT ENGINE DOWN AND WAIT FOR ALL MOVING PARTS TO STOP BEFORE LEAVING CAB. Lock the feeder house lift cylinders in raised position as described in your Combine Operator's Manual.

2. Disconnect telescoping drive line from bottom left feeder housing shaft
3. Secure the drive line in the storage bracket, as indicated.

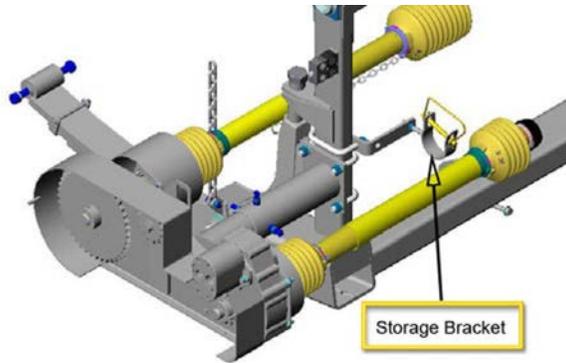


Figure 15.1: Drive lines

4. Uncouple Multi Link (or individual hydraulic lines) connecting the draper table to the combine.
- 5.
6. Secure the hydraulic lines
7. Disconnect all wires running from the combine to the draper table. ie: Remote Reel, Remote Canvas. Ensure they will not interfere with the combine or the draper table when the combine is being backed away from the draper table.
8. Shorten both restrainer chains. These chains will support the subframe in the quick dismant position.

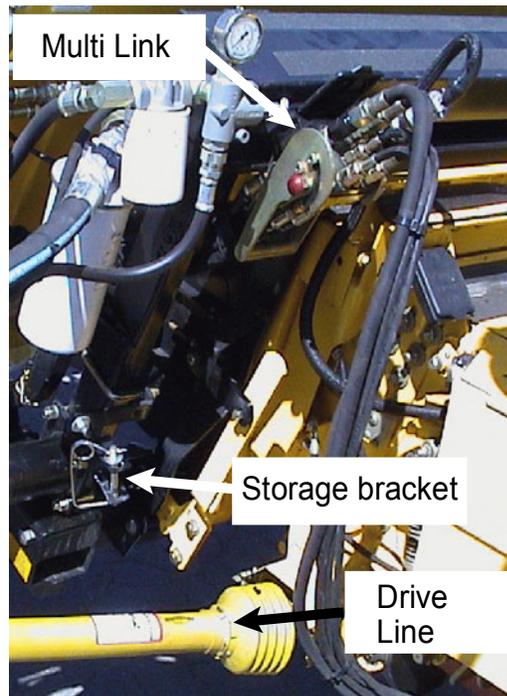


Figure -15.2 - Multi-Link

- Retract or remove all lock pins/bolts which hold auger adapter to the feeder house of combine.
9. Lay two (2) blocks (4"x 4" x 16") or (6" x 6" x 16") directly under the cutter bar, aligned with the two table struts located closest to the end of the header.

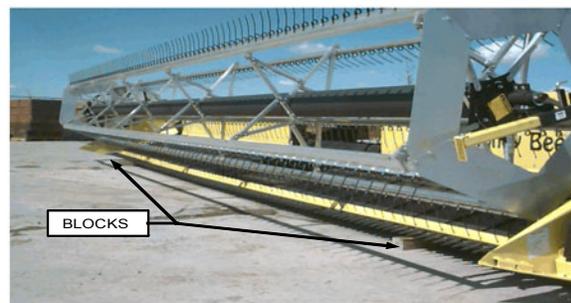


Figure -15.3 - Supporting Cutter Bar

10. Remove the feeder house cylinder locks.
11. Restart the combine. Lower the header until it is approximately 12" above the ground.
12. Dismount from the combine and check position of blocks to be sure they will contact the cutter bar See Figure 30.37

13. Lower the table onto the blocks.

If header table is equipped with gauge wheels, the gauge wheels will support the back end of the table

NOTE: If spring tube is not shortened, the subframe may tilt forward too far when released from combine, making it difficult to pick up.



Figure -15.4 - Gauge Wheel Option

14. If not equipped with gauge wheels, place blocks under the subframe. Ensure they will fully contact the sub-frame and support it stably at a suitable height.
15. Restart combine and slowly lower header onto blocks. When cutter bar contacts blocks, check position of blocks to be sure that cutter bar is making solid contact, and the blocks are laying absolutely flat so header will not slide off once the combine has been removed from header.
16. Restart combine continue to lower the feeder house until it is totally retracted from the auger adapter frame.
17. Slowly back combine 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 pins have been removed.

NOTE:	<i>In the Quick Dismount position, the subframe should be vertical or tilted slightly back toward the combine. This will make re-mounting easier.</i>
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16 - Dismounting Integral Axle

Attention:	<i>Park the combine on hard, level ground. Engage the park brake.</i>
	<i>Axle parts are heavy! Handle with care, and get someone to help if available.</i>

1. With the combine running, lower the reel to its lowest position.
2. Raise the header to its fully raised position.
3. Engage the feeder safety lock. (See your combine manual.)

Warning! 	<i>Always shut the engine off, set the park brake, remove the key, and place the feeder safety lock into position on the lift cylinder before working under the header.</i> <i>Failure to engage this safety lock could result in serious injury or death.</i>
---	---

4. Uncouple the telescoping driveline from the left side of the feeder house. Set the driveline into the storage hanger, and install the pin.
5. Uncouple the hydraulic hoses between the header and the combine. Secure the hoses on both the combine and the header so that they will not interfere with separating the feeder house and the header.
6. Disconnect and store all wiring from the combine to the header in the same fashion as above.

7. Lock the subframe and header together by shortening the left and right restrainer chains as much as possible.

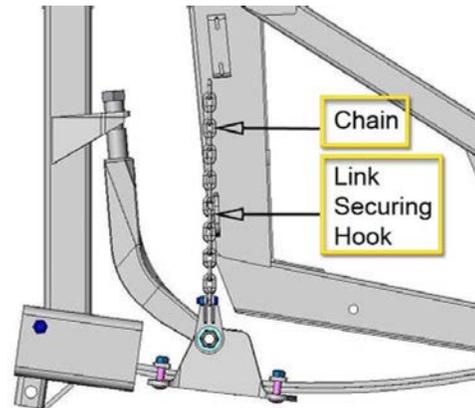


Figure 16.1: Restrainer Chain

8. Lift transport axle out of the storage pocket, and slide it into the transport bracket. Secure it with the locking pin.

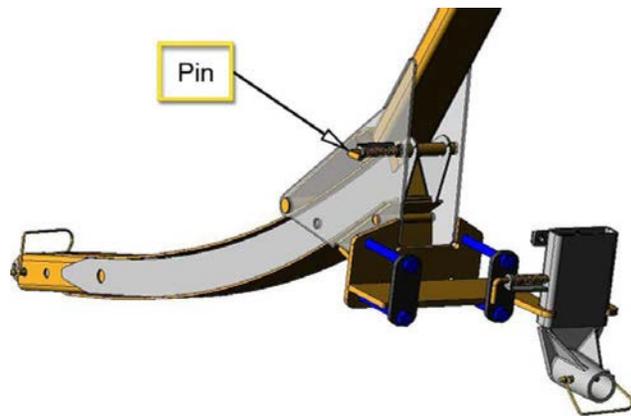
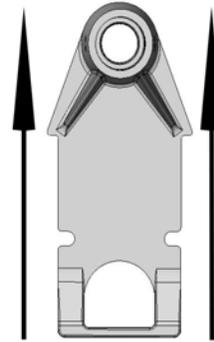


Figure 16.2: Transport Axle in position



9. Remove the drop tube axle from the bracket by pulling the lock pin and lifting upward. Turn it over, and reinsert it into the bracket from the bottom, as seen here,. Secure it with the locking pin.

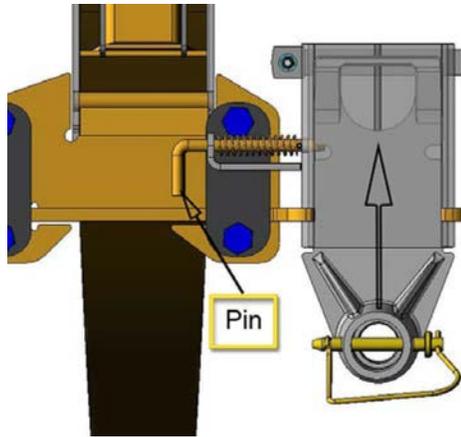
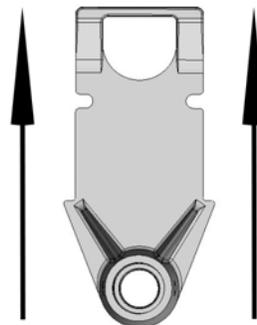


Figure 16.3: Drop tube axle in place



10. Install the rear tire and wheel assembly, and secure with the safety clip. Install the front tire and wheel assembly, and secure with the safety clip.

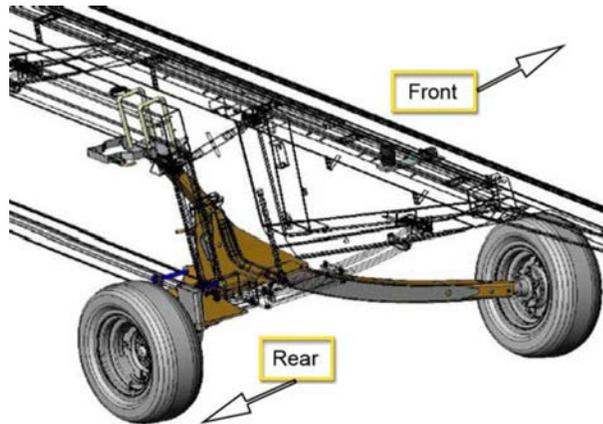


Figure 16.4: Integral Axle Assembled View

17 - Dismount Header onto Standard Axle

Attention:	<i>Park the combine on hard, level ground. Engage the park brake.</i>
	<i>Axle parts are heavy! Handle with care, and get someone to help if available.</i>

1. With the combine running, lower the reel to its lowest position.
2. Raise the header to its fully raised position.
3. Engage the feeder safety lock. (See your combine manual.)

Warning!	<i>Always shut the engine off, set the park brake, remove the key, and place the feeder safety lock into position on the lift cylinder before working under the header.</i> <i>Failure to engage this safety lock could result in serious injury or death.</i>
-----------------	---

4. Uncouple the telescoping driveline from the left side of the feeder house. Set the driveline into the storage hanger, and install the pin.
5. Uncouple the hydraulic hoses between the header and the combine. Secure the hoses on both the combine and the header so that they will not interfere with separating the feeder house and the header.
6. Disconnect and store all wiring from the combine to the header in the same fashion as above.

7. Lock the subframe and header together by shortening the left and right restrainer chains as much as possible.

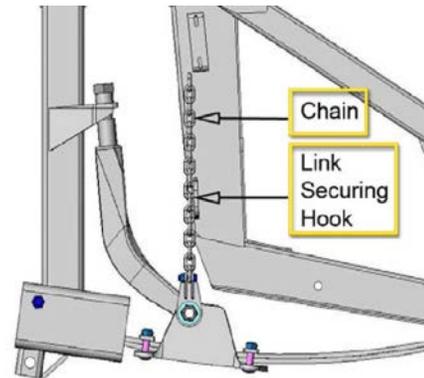


Figure 17.1: Restrainer Chain

8. Place the transport axle under the header, with the strut oriented to the cutter-bar side (front) of the header.

Lift the front of the axle and hook the tabs on the top of the strut onto the lip at each side of the header adapter frame.

Remove the pin from the top U-bracket. Lift the rear of the axle into position and reinsert the pin.

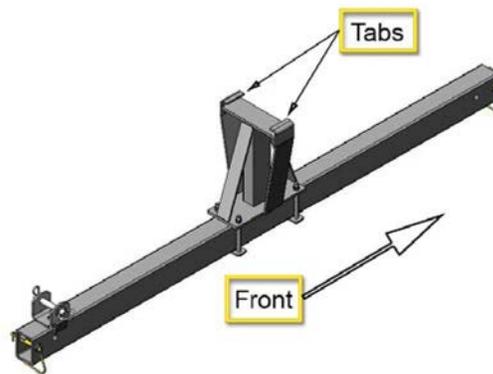


Figure 17.2: Standard Axle

9. For headers without gauge wheels, remove the safety pins, install the tire and wheel assembly into the axle, and reinsert the safety pin.

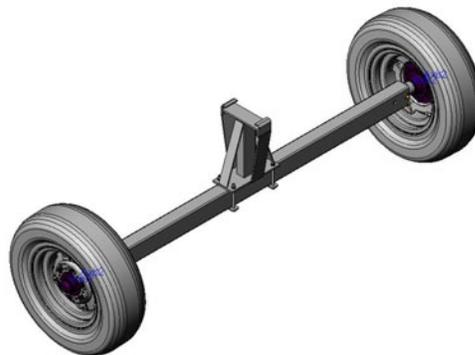


Figure 17.3: Standard Axle

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10. For headers with gauge wheels, remove the right hand gauge wheel assembly from its mount and install it in the rear spindle mount of the transport axle. Secure it with the safety pin.
11. Remove the left hand gauge wheel assembly from its mount and install it in the front spindle mount of the transport axle. Secure it with the safety pin.

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NOTES:

18 - Installing the Hitch and Hitch Tube

1. **Ensure it is safe to remove cylinder locks, and lower the header.**
2. Remove safety chain from storage position.
3. Pull lock pin on hitch tube, and slide the hitch tube out of the storage position.

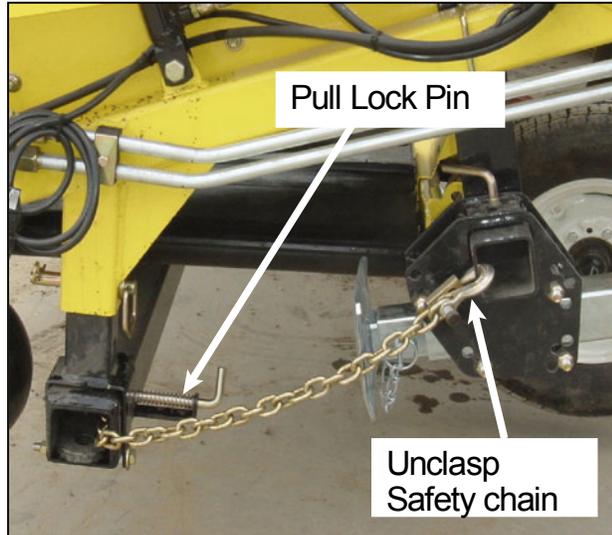


Figure 18.1: Hitch Tube

4. Remove the hitch jack from the storage position, and install it onto the hitch tube.
5. Tighten the lock lever of the jack bracket to the hitch tube.
6. Lower the hitch jack so the draper table will be as close to level as possible once it is sitting on the ground.

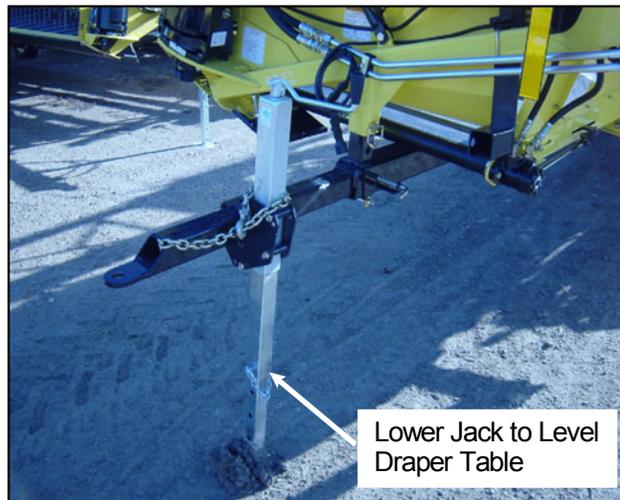


Figure 18.2: Leveling the Table

Attention:

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

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NOTES:

19 - Optional Equipment

Caster Gauge Wheels

The gauge wheels enhance the table's ability to follow the profile of uneven ground. In the cutting position, especially in short or "down" crops, this can prove to be essential. These wheels are designed to caster, making it unnecessary to raise the header when cornering. To achieve this, it is essential to correctly adjust the height of the gauge wheel assembly relative to the cutting height. The gauges on the screw-jacks will assist in making consistent settings.

<i>Attention:</i>	<i>Damage to the caster wheels could result if header table and gauge wheels are not lifted clear of the ground when backing up the power unit.</i> <i>Damage to castor wheels can also result from making tight turns with the power unit. The sharp turning capabilities of some power units can cause one of the wheels to be dragged backwards. This could cause damage to the wheel.</i>
<i>Note:</i>	<i>The header should be parked on level ground and leveled before attempting to adjust gauge wheel height.</i>

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" (38mm) to 2.0" (50mm). Two adjustment locations are incorporated into the design of the gauge wheel assemblies.

1. Adjustment lugs on the back of the header frame.
2. Screw type Jack with height indicator.

<i>IMPORTANT:</i>	<i>EXCESSIVE COMPRESSION OF THE SPRING TUBES WILL CAUSE STRESS AND PREMATURE WEAR IN THE TOP LINK.</i>
<i>Note:</i>	<i>Adjustments to table tilt, spring floatation, and pitch will affect the amount of compression in the spring tubes. Check spring compression, and adjust accordingly, after any of these adjustments.</i>
<i>Attention:</i>	<i>Remember, the Gauge Wheels are NOT designed to support the weight of the table! Their purpose is to help guide the table over variations in ground levels.</i>

The four mounting holes on the header frame allow for additional adjustment when cutting crops high, leaving lots of stubble, or cutting low with the table tilted forward. The bolt spacing on the lugs is 1-1/2" (38mm) apart. Primary adjustment should be done by the float spring jack. Height adjustment of the jack will vary, depending upon header tilt and the type of crop being cut.

Height Adjustment

1. Retract the gauge wheel jack to its lowest position, the pointer should be at or above the "1" mark.
2. Set the gauge wheel pin into one of the mounting holes on the table (usually the second hole from the top).
3. Adjust the header table height until the cutter bar is at the desired average cutting height for the crop being cut. i.e. stubble height.

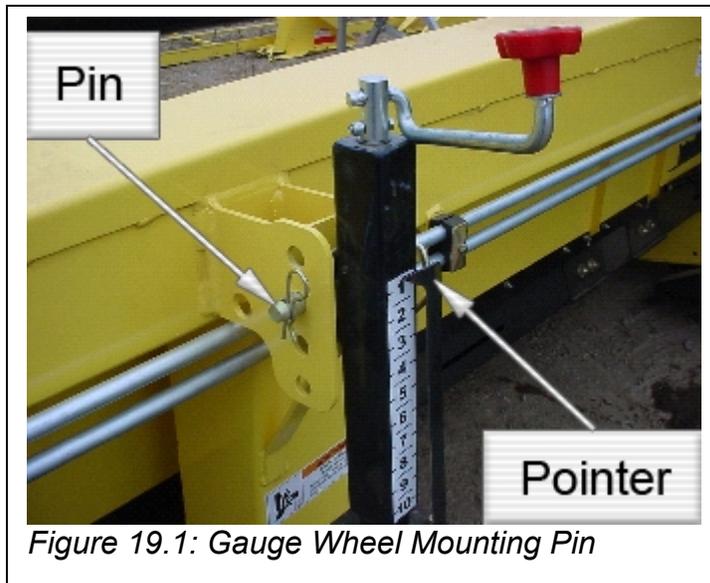


Figure 19.1: Gauge Wheel Mounting Pin

4. Lower the gauge wheel assembly to the ground using the screw jack until the Spring Shaft is compressed 1.5 to 2.0". Repeat this procedure on the other gauge wheel assembly.
5. Confirm that the spring shaft of the gauge wheel assembly is compressed to the specified 1.5 - 2.0" range. If incorrect, repeat steps (1-4) as described above.



Figure 19.2: Gauge Wheel Spring

Gauge Wheel Assembly Variations

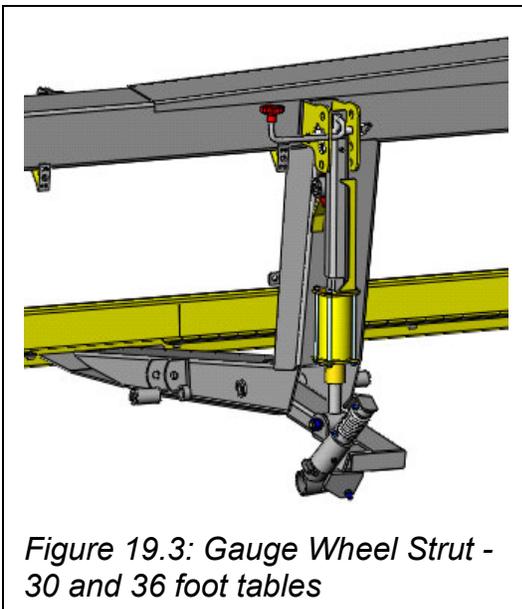


Figure 19.3: Gauge Wheel Strut - 30 and 36 foot tables

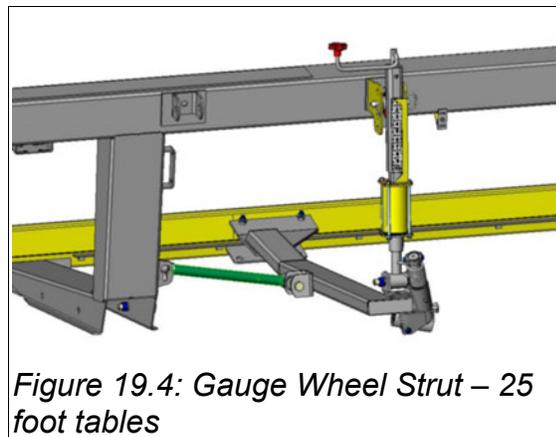


Figure 19.4: Gauge Wheel Strut – 25 foot tables

End Strut Gauge Wheels

End strut gauge wheels are mounted to the end struts of the main table frame. Special crop deflectors are required for this installation. This option allows the cutter bar to closely follow the contour of the ground.



Figure 19.5: End-Strut Gauge Wheel

Cross Auger

The cross auger can be beneficial for handling specialty crops such as peas, canola, mustard, safflower, and lupins. Many of these crops are not heavy enough to keep them firmly on the canvas. Crops that are bushy or have vines tend to ride above the canvas as the canvas moves under them. This often causes them to enter the feeder house in bunches or wads.

The cross auger features left and right hand flighting which gently pushes the crop down onto the canvas while moving it toward the feeder deck and feed auger.

The cross auger is suspended above the decks of the header on special mounting brackets.



Figure 19.6: Cross-Auger

The cross auger is plumbed into the canvas circuit with a manual speed control (needle valve). The speed of the cross auger should be adjusted only fast enough to keep the crop moving. If the cross auger rotates too quickly, wrapping may occur.

The cross auger can be left in position even if it is not being used, such as when harvesting cereal grains. The cross auger can be turned off by fully opening the needle valve. This should not affect the canvas speed.

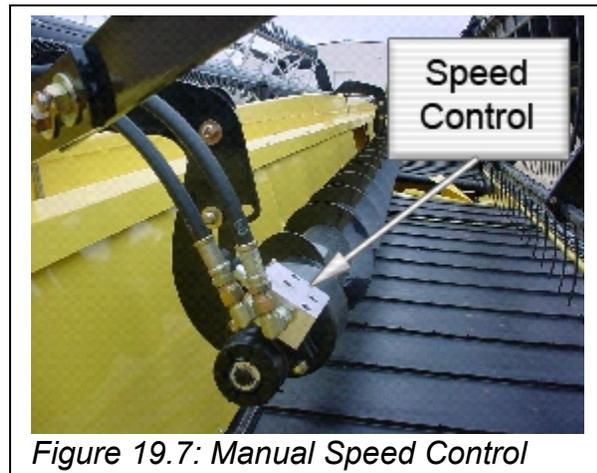


Figure 19.7: Manual Speed Control

Swath Option

Honey Bee Grain Belt Headers SP36, SP40 and SP42 are available with a swath option package. The manual swath option allows the operator to utilize the header as a swather as well as a straight cut header while attached to the combine. The swath will be delivered to the right side of the combine. Normal header functions are basically the same as outlined previously in this manual.

NOTE:	<i>The operator should consider disengaging the threshing unit on his combine if the unit is going to be used for a prolonged swathing operation. Consult Combine Owners Manual for proper disengagement procedure.</i>
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Manual Swath Option (with 2 or 3 decks)

The manual swath option permits the operator to slide the right hand deck over the center canvas on the header. The swath opening, on the right hand end of the header, will therefore be the same width as the center opening was previously.

1. Unbolt deck restrainer bar from the deck to be shifted.
2. Locate the shift valve on the right hand side of the header frame. Shifting the lever past the neutral position all the way over to swath position will reverse the direction of the canvas on the deck to the right of center and stop the center canvas from turning.



3. **IMPORTANT: Disconnect the auger drive line between the chain case drive and the auger drum assembly.**

4. Store the driveline in a convenient location.

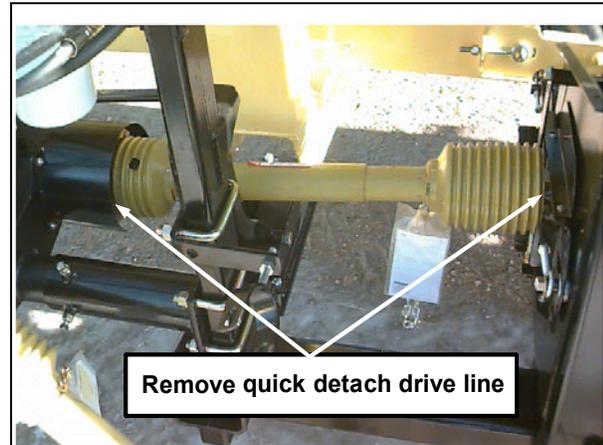


Figure 19.9: Drive Line

5. Before sliding the right hand deck, check the extension of the fingers on the center auger to make sure they will not interfere with the rear of the deck as it slides in front of the auger. It may be necessary to withdraw the fingers with the timing plate. (See the Center Auger section of this manual.) To allow more clearance between the auger finger drum and the shifted deck, the top link can be extended.
6. Manually slide the deck to the left until it meets the right hand end of the deck on the left side of the header. The shifted deck will cover the center canvas opening. Allow approximately 1½" (38mm) of clearance between decks. If slats on the canvas contact each other, open the distance between the decks.
7. Reconnect restrainer bar to the shifted deck.
8. Check all hose clearances on hydraulic motors after shifting the deck to ensure that they are not pinched, kinked, or stretched.
9. Start combine and engage feeder house drive. Check canvas tracking and adjust if required. See Canvas Adjustment section of this manual for assistance
10. With a three deck swath option, the swath will deliver to the left hand side of the right strut. , page 10. With a two deck swath option, the swath will deliver to the end of the table on the right hand side. (Not Shown)

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Figure 19.10: Swath Opening

NOTES:

Canvas Extension for Swathing

The Grain Belt Header has a delivery opening of approximately 60 inches. When swathing in light crop conditions, it may be necessary to narrow the opening width in order to lay a tight swath.

An option for this requirement is the 14 inch deck extension kit, which is installed on the idler end of a deck.

NOTE:	<i>The Extension deck can be added to either deck. Left hand side installation is shown below.</i>
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Refer to Figure 19.7: Manual Speed Control on the following page.

1. Remove the canvas connector bar and open the canvas to reveal the idler roller.
2. Remove the nut and washer that hold the idler adjuster plate in place.
3. Remove the idler plate, idler roller, and front adjuster.
4. Install the 14" back panel to the 14" extension deck.
5. Install extension deck and back panel onto the end of the deck being extended.
6. Install the front connector and the rear deck connector.
7. Install the front adjuster, idler roller, and idler plate.
8. Join the 30" canvas extension to the regular canvas with a second connector bar.
9. Wrap canvas around the rollers and connect ends together with the other connector bar.
10. Adjust canvas tension and tracking.

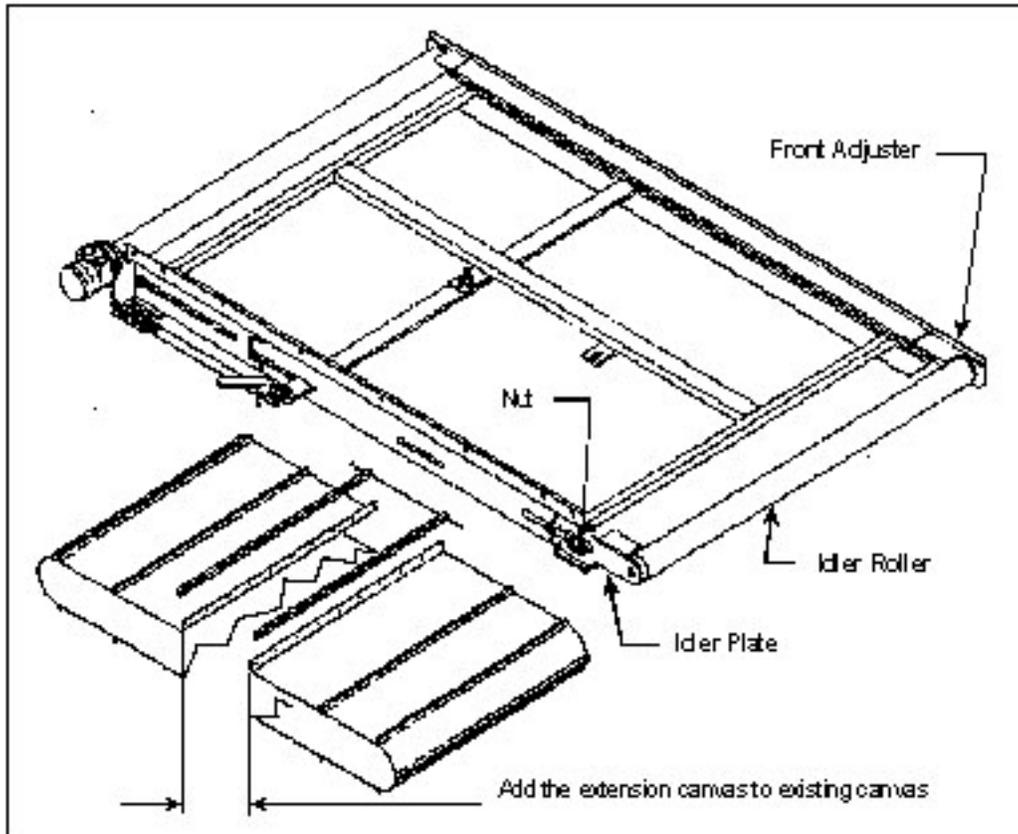


Figure 19.11: Draper Extension kit

Hay Guard / Short Crop Guard

The Hay Guard comes pre-punched for easy installation of self tapping (Tech) screws.

ATTENTION:	<i>Self-tapping (Tech) screws can readily strip the metal out of the hole in sheet metal. DO NOT OVERTIGHTEN.</i>
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1. Lay out Hay Guard starting at the end of the cutter bar. Install the longest section at the ends. The hay guard/ short crop guard butt together end to end.
2. Remove the self tapping screws holding the tab of the crop deflector. The hay guard should fit tight against the rise of the cutter bar leaving approximately ½" clearance between the top ribs of the canvas, and the underside of the hay guard.
3. Secure tab through hay guard and into the cutter bar. Install remainder of bolts to hay guard.
4. Install the next section of hay guard, butting it up to the first section. Install self tapping screws to secure.
5. Continue until all sections of hay guard are installed.



Figure 19.12: Hay Guard



Figure 19.13: Hay Guard profile view

NOTE:	<i>The hay guard profile is designed so that the draper runs along the angle iron located on the underside of the guard.</i>
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SCH Crop Lifters

1. Install the lifter spools to the underside of the guards, using the longer bolts that are supplied in the kit.
2. The spools should be spaced equally along the cutter bar, one per foot is recommended.
3. The guard pocket of the lifter has three locking pin positions to allow adjusting the lifter angle.

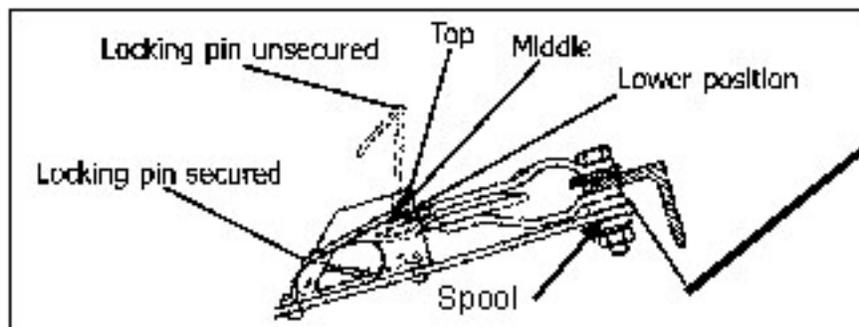


Figure 19.14: Crop Lifter Mounting Detail

The above diagram shows a crop lifter attached to a guard. The lock pin can be placed in any of the three holes, each position producing a different angle of attack to the ground for the lifter, as illustrated below.



Figure 19.15: Crop Lifter Angle of Attack

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NOTE:	For additional adjustment, flat washers can be added between the guard and the crop lifter mounting spool. For crop lifters to work properly, the bottom runners must be parallel to the ground when the platform is in cutting position.
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Special Series Lifters

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 on to a flat surface (concrete, asphalt).

1. Mount one lifter in the middle of the platform.
2. Lower platform until 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.
3. Install the remaining lifters using the same settings.

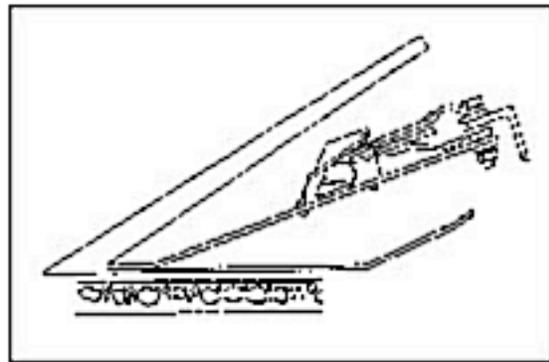


Figure 19.16: Special Series Crop Lifter

Hydraulic Fore & Aft Reel Controls

Headers equipped with optional hydraulic fore and aft reels require dedicated combine controls or the optional hydraulic solenoid kit in order to operate fore & aft cylinders.

If you are installing a hydraulic fore and aft kit, lock pins and brackets must be removed from the reel assembly.

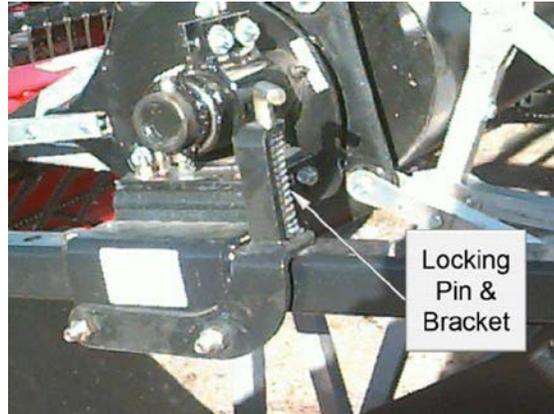


Figure 19.17: Reel Locking Pin

The double reel circuit uses three identical cylinders. Pressure from the combine goes to the barrel end of the right hand cylinder. Oil from the rod end goes to the rod end of the center cylinder. Oil from the barrel end of the center cylinder goes to the barrel end of the left hand cylinder. Oil from the rod end of right cylinder returns to the combine.

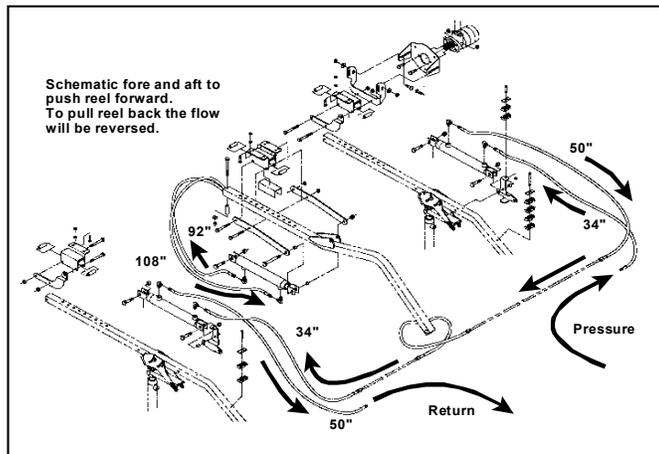


Figure 19.18: Dual Reel Fore and Aft Hydraulic Circuit

On the single reel circuit, the pressure from the combine goes to the barrel end of the master cylinder on the right side.

Oil from the rod end will pressurize the rod end of the cylinder on the left side.

Oil from the barrel end of the left cylinder then returns to the combine.

Oil flow is reversed when reel is retracted

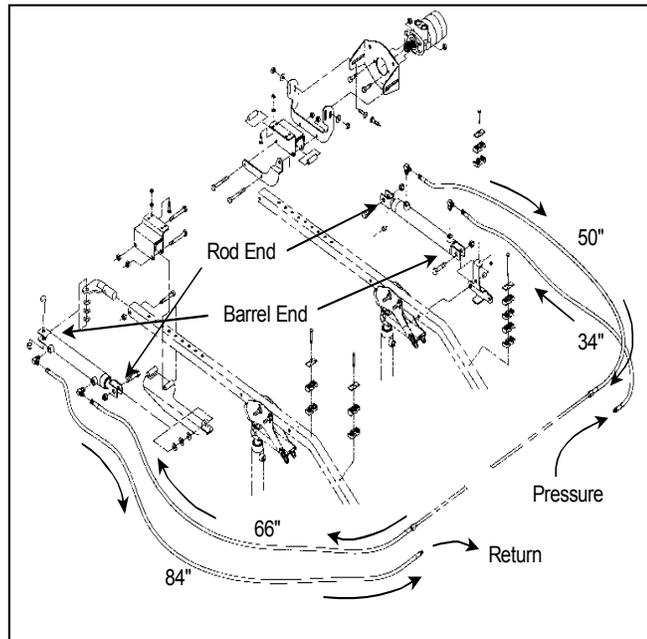


Figure 19.19: Single Reel Fore and Aft Hydraulic Circuit

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Agco Bezels

The Agco style of auger adapter provides a series of bezel layouts. These adaptors are needed to match your new header to the opening of the feeder house on your combine. Refer to the following application chart to determine the layout for your machine, then proceed to “Configuring the AGCO Bezels” page 175.

Combine	Model	Lateral Tilt	Non Lateral Tilt	Note
Gleaner	R75/65/72/6 2	Layout 2	Layout 1	
	C62	N/A	Layout 5	Use 3/16 tab as spacer at top of web.
Massey Ferguson	9790	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	
Challenger	670	Layout 4	Layout 4	
	660	Layout 3	Layout 3	

Configuring the Agco Bezels

Refer to the following diagram to familiarize yourself with the appearance of each component:

1. Guide Plate (includes a portion bent back at ninety degrees)
2. Bezel
3. Bezel #2
4. Web (extends backward from the bezels at ninety degrees)

In addition, there are long and short sections of flat-bar used to reinforce connections.

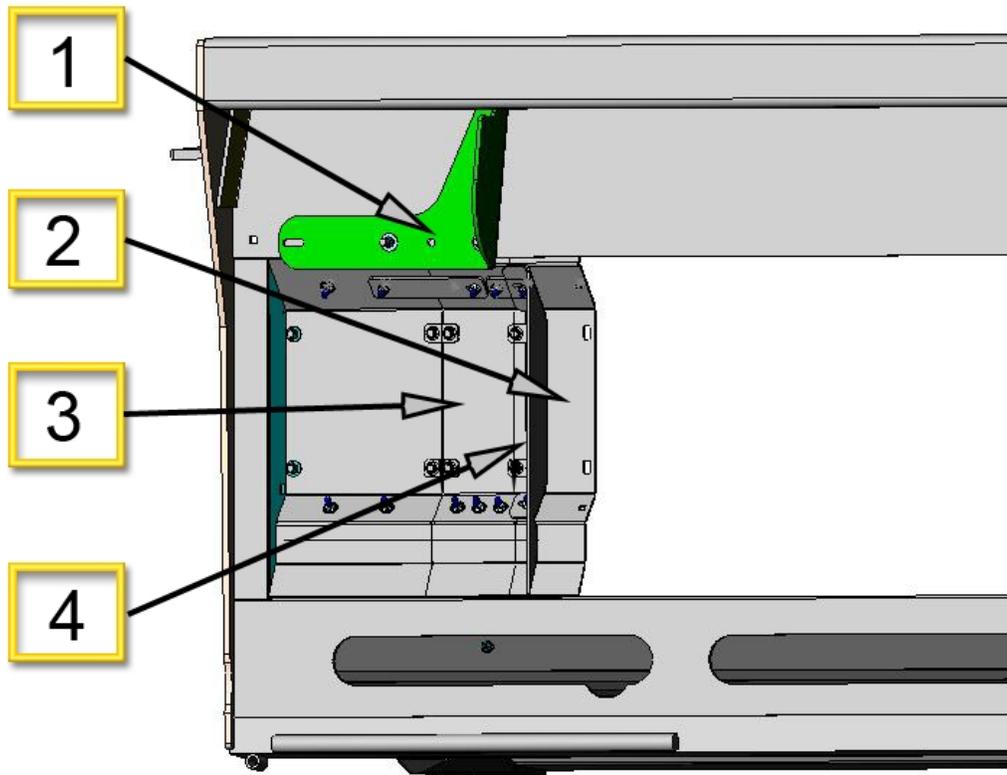


Figure 19.20: Bezel Components

NOTE: Only the left side is shown here. (See Gauge Wheel Strut - 30 and 36 foot tables, page 161 showing left and right-hand components in place.)

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<i>Configuration</i>	<i>Components Used</i>	<i>Notes</i>
<i>Layout #1</i>	Uses all components, 1, 2 3, and 4	The Guide Plates (#1) are positioned using the innermost holes, as seen in the main diagram.
<i>Layout #2</i>	Uses all components 1, 2 3, and 4	The Guide Plates (1) are moved outward exposing one hole on the inner side.
<i>Layout #3</i>	Uses component 3 and 4.	The Guide Plates (1) and Bezel (2) are removed. Reposition the Web so that the vertical portion is midway on the remaining Bezel.
<i>Layout #4</i>	Uses component 4	The Web is positioned in the innermost top and bottom holes, with one short support bar, used as a spacer, at the top of each Web.
<i>Layout #5</i>	Uses component 4	The Web is positioned in the outermost top and bottom holes, with one short support bar, used as a spacer, at the top of each Web.
<i>Layout #6</i>	Uses all components 1, 2 3, and 4	The Guide Plate is positioned using the extreme outer holes, and the portion extending beyond the adapter's outer edge is trimmed off. All other components are as shown in the main diagram.

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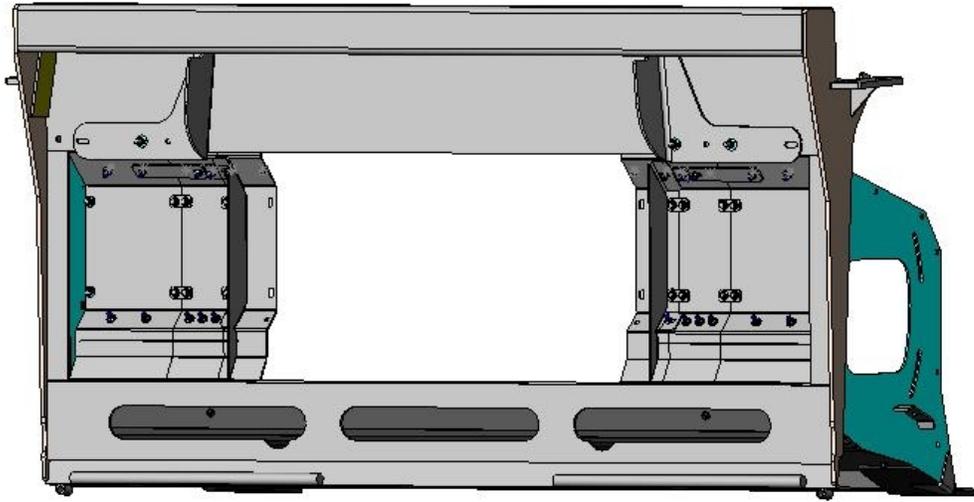


Figure 19.21: AGCO Bezel

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NOTES:

20 - Troubleshooting

Common Problems You May Encounter

Symptom	Common Cause
High Hydraulic Pressures	Cold Oil Sticky Canvas Sticky or Tight Knife Canvas Too Tight
Reel Will Not Raise	Low Oil Volume from Combine Defective Cylinders Line Restriction Quick Couplers Not Tight

Troubleshooting Checklist

PROBLEM	POSSIBLE CAUSE	SOLUTION
<i>Reel</i>		
Reel will not hold height.	Leaking hose or fitting. Valve in Combine leaking	Repair or replace. See 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/lowers erratically.	Reel cylinders binding. Arms bent or binding. Low hydraulic oil.	Replace cylinder. Repair or replace. See Combine Manual.

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PROBLEM	POSSIBLE CAUSE	SOLUTION
Reel will not raise.	Hydraulic couplers don't match. Hydraulic couplers not engaged. Faulty Combine hydraulics	Install correct couplers. Re-couple properly. See Combine Manual.
Reel raises slowly.	Elbow in master cylinder too tight Hydraulic couplers not engaged.	Loosen fitting. Re-couple quick couplers.
Damage to center of reel	Reel set too low.	Adjust height.
Reel hitting at end.	Reel not centered.	Adjust centering.
Reel will not turn/turns erratically	Flow control set too low. Draper flow set too high. Faulty relief valve. Seized bearing(s). Faulty drive motor. Reel Tied Down. Hydraulic couplers not engaged.	Advance setting Reduce draper speed. (Only when using header hydraulic system) Clean or replace. Replace bearing(s). Replace motor. Release Reel. Re-couple properly.
Reel Speed cannot be adjusted. - Header driven reel	Poor connection in electrical wires or cable. Defective reel speed motor.	Check connections and condition of cable. Replace motor. Reel speed can be adjusted manually if necessary.
Reel Speed cannot be adjusted. - Combine driven reel	Faulty flow control.	See combine manual.

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PROBLEM	POSSIBLE CAUSE	SOLUTION
<i>Single Reel</i>		
Reel does not raise level.	Air in system.	Bleed slave cylinder.
Right side goes up slowly.	Air in system. Restricted hyd. hose or fitting.	Bleed slave cylinder. Replace hose or fitting.
Right side will not raise.	Leaking hose, fitting, or cylinder seal.	Repair or replace.
Left side goes up slowly.	Faulty master piston seal.	Replace seals.
Left side will not raise or fully extend.	Faulty master cylinder. Faulty bypass port Faulty master cylinder piston seal.	Replace cylinder. Replace cylinder. Replace seals.
<i>Single Reel – 36'</i>		
Reel will not raise.	Quick couplers to combine reel drive not connected.	Couple reel drive hoses.
<i>Double Reel</i>		
Reel does not raise level.	Air in system.	Bleed slave cylinder.
Right side goes up slowly.	Air in system.	Bleed slave cylinder.
Right side cylinder does not fully extend	Air in system.	Bleed slave cylinder.
Lift cylinders out of phase.	Install spacer inside center master cylinder.	Check with manufacturer.
Ends lift before center.	Center master cylinder "O" ring damaged.	Replace seal.
Right-hand reel goes out of phase.	Air in system.	Bleed slave cylinder.
System loses residual pressure.	Install spacer inside center master cylinder.	Check with manufacturer.

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PROBLEM	POSSIBLE CAUSE	SOLUTION
Sickle Sections Breaking.	Steel tines of reel catching in the knife.	Adjust reel height.
<i>Knife</i>		
Knife will not run.	Low hydraulic oil. Faulty drive motor Faulty knife drive. Faulty hydraulic pump. Cutter bar jammed.	Add oil, Check for leaks Repair or replace motor. Repair or replace. Repair or replace. Clean, lubricate cutter bar. Check for damaged guards or sections
Knife stalls easily.	Type of material being cut Low oil volume, less than 14gpm Low pressure at knife motor. Bent guards or cutter bar. Dull or incorrect type of sections. Faulty knife drive. Seized knife head bearing. Knife head out of alignment. Unloaded system pressure too high. Relief valve stuck open	Reduce ground speed. Check flow s/b 16 gpm. Check system pressure. Repair or replace. Replace Check for loose crankshaft. Replace. Adjust alignment on knife Check for faulty draper motor. Check that each draper is running freely. Remove and clean cartridge.

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PROBLEM	POSSIBLE CAUSE	SOLUTION
Knife running too slow or too fast. (Correct Range: 500-600 rpm)	Low oil level Relief valve stuck open. Worn pump or knife motor Wrong pump for combine.	Add oil. Determine cause. Clean or replace cartridge. Repair or replace. Check with manufacturer.
Excessive vibration	Knife running too fast. Loose bearings in drive. Loose knife head bolts.	Check speed s/b (500-600 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 adjusted 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 500-600 rpm. Loosen clamp bolt on knife head bearing and adjust. Check that all guards are the same. 12mm required.
Knife leaves strip of crop standing.	Bent or broken guard. Dull/Broken knife section Plugged guard	Straighten or replace. Replace. Clean.

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PROBLEM	POSSIBLE CAUSE	SOLUTION
Connector Bar Breaks	<p>Damaged sections or guards</p> <p>Knife gummed up.</p> <p>Section bolts not tight.</p> <p>Sections on knife back installed on wrong side</p>	<p>Repair or replace</p> <p>Soak with diesel fuel.</p> <p>Tighten or replace.</p> <p>Remove sections, turn knife back over and replace sections</p>
Knife Head Breaks	<p>Section bolts not tight</p> <p>Knife gummed up</p> <p>Damaged sections or guards</p> <p>Sickle sections dull</p> <p>Tough crop</p> <p>Knife drive running to fast</p> <p>Steel tines on reel hitting knife</p> <p>Guards don't match</p>	<p>Tighten and/or replace bolts</p> <p>Soak with diesel fuel</p> <p>Repair and/or replace</p> <p>Replace sections</p> <p>Reduce ground-speed.</p> <p>Check speed with photo tach</p> <p>Raise Reel</p> <p>Check that all guards are the same. 12mm required</p>
<i>Draper</i>		
Draper not tracking straight	<p>Drive or idler roller out of alignment</p> <p>Draper splice not cut straight</p> <p>Material building up on rollers</p>	<p>Adjust draper tracking</p> <p>Re-punch connector bar holes in draper</p> <p>Clean rollers</p>
Draper slipping	<p>Draper too loose</p> <p>Insufficient traction</p> <p>Draper is snagging</p>	<p>Adjust draper tension</p> <p>Roughen drive roller</p> <p>Check alignment</p>

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PROBLEM	POSSIBLE CAUSE	SOLUTION
Draper not turning	Draper is snagged or caught Flow control is shut off Oil flow going over the relief	Check for interference Adjust flow control Check relief setting Remove and clean relief cartridge, check spring
Draper oil pressure in excess of 2200 psi	Material build up on rollers Faulty bearing in roller Faulty draper motor	Clean rollers. Replace bearing Check motor temperature, check for oil leaking from shaft seal Replace motor
<i>Decks</i>		
Decks creep sideways in the header	Restrainer tubes not installed or have fallen off	Install or replace tubes
Decks lift out of position	Deck is not locked under rear edge of cutter bar Hold down clips on back panels are loose or not installed	Place deck in proper position Tighten or replace
Decks will not shift	Decks or back panels jammed or binding	Check decks and clean out debris On hydraulic swath, to get more power to shift deck, remove one hose from draper deck motor, screw a plug onto the hose, cap the port on motor. Shift deck. Re-connect hoses to draper deck motor to run header.

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PROBLEM	POSSIBLE CAUSE	SOLUTION
Grain Heads shattering or breaking off	Reel speed too fast Ground speed too fast Crop too ripe	Reduce reel speed Reduce ground speed Cut early in morning or late at night when humidity is higher
Cut grain falling off cutter bar	Reel too high Table set too high	Lower reel Lower table
Does not pick up lodged crop	Table too high Reel too high Reel too far back Ground speed too fast for reel speed Bat reel not suitable Crop lying too flat for guards to pick up	Lower table Lower reel Move reel forward Reduce ground speed or increase reel speed Install optional Pickup Reel Install optional SCH Crop Lifters
Material builds up at ends of cutter bar	Crop dividers and pipes spread out too far Pick up reel tines not sweeping crop off cutter bar	Loosen bolts on crop divider shoe and pull divider in. Retighten bolts. Bend the tines on end of reel to reach into the corners
<i>Adapter</i>		
Combine will not hook into top of adapter	Header tilted back/forward too far Cutter bar side tire too low Feeder house adjustment on combine set wrong Subframe not level with combine	Extend/Retract top link Run tire onto a block See Combine Manual Adjust hitch jack
<i>Pump</i>		

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PROBLEM	POSSIBLE CAUSE	SOLUTION
Oil running hot	Excessive oil going over relief Faulty pump or motors Draper too tight or not tracking	Clean or replace relief cartridge Repair or replace Adjust draper alignment
Pump vibrating	Faulty Universal Joint bearings Angle too great in drive line	Repair or replace Align auger & pump drive line
<i>Leveling</i>		
Header not level	Leveling bolts out of adjustment	Adjust bolts
Table Angle		
Draper running too flat or too steep	Turnbuckle out of adjustment	Adjust turnbuckle
<i>Table Bounce</i>		
Suspension feels soft	Clamp plates on spring saddles are loose	Tighten clamp plates for stiffer suspension
<i>Subframe</i>		
Too close to the ground with cutter bar down	Leveling adjustment bolts too tight Turnbuckle/ hydraulic tilt adjusted too short	Loosen bolts Lengthen as needed
<i>Header</i>		
Header will not lift	Combine lift capacity Add a hydraulic cylinder to feeder house	Check system pressure See Combine Manual
Oil leaking between pump and gearbox	Faulty Silicone seal No silicone between pump and gearbox	Re-seal pump Apply Silicone

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PROBLEM	POSSIBLE CAUSE	SOLUTION
<i>Center Deck</i>		
Center draper not turning	Center draper too loose Faulty drive motor Failed bearing(s) in idler or drive rollers Material buildup on rollers Foreign material under draper	Adjust draper tension Repair or replace Repair or replace Clean rollers Clean under draper
Center draper slipping	Center draper too loose Insufficient traction	Adjust draper tension Roughen drive roller
Center draper not tracking straight	Drive or idler rollers out of alignment Draper splice not cut straight Material buildup on rollers	Adjust draper tracking Re-punch connector bar holes in draper Clean rollers
<i>Feed Auger</i>		
Auger stops when full of material	Auger drive clutch is slipping	Check and set preload on drive assembly clutch Check and clean clutch disks and pressure plates
Material (straw) wrapping on auger	Reduce size of feeder house opening Indexing of fingers is incorrect Fore/aft adjustment is incorrect	Remove outer fingers Install stripper bars in adaptor Adjust finger indexing (timing). Adjust auger position

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PROBLEM	POSSIBLE CAUSE	SOLUTION
Material will not feed under auger	Indexing of fingers is incorrect	Adjust finger indexing (timing).
	Auger drive is slipping	Check drive assembly clutch
	Auger is not floating	Auger float seized or binding on side plates
	Fingers on drum not extending low enough	Adjust finger indexing (timing).

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NOTES:

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21 - Specifications

NOTE: All weights are given in lbs/kg format.

Model	SP25	SP30	SP36	SP40	SP42
Size	25'	30'	36'	40'	42'
Weight	3417/1551	3952/1796	4205/1911	TBA	4812/2187

Model	SP25	SP30	SP36	SP40	SP42
Bat Reel	400/181	502/228	640/291	TBA	700/318
Pickup Reel Ull Universal – 5 Bat – Steel Teeth	650/296	805/366	980/446	TBA	1072/478
Pickup Reel HCC ML – 6 Bat	645/293	725/330	900/409	TBA	1056/480
Transport Axle/Hitch- tube Package	210/96	210/96	210/96	210/96	210/96
Gauge Wheel Package	136/62	125/57	125/57	125/57	125/57

Knife Drive Single	standard	standard	standard	standard	N/A
Knife Drive Double	optional	optional	optional	optional	standard

Note 1: Weight includes: header assembly c/w decks, subframe, center deck, auger drive, pump mounting, hydraulic pump, hydraulic tank, and attached hydraulic components.

Note 2: Above weights do not include swath options or double knife drives.

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Combine Adapters

Includes: - complete feed auger adapter, latching hardware, drive lines, and hydraulic hose kit to the combine.

NOTE: The output speed of the feeder house shaft must be set to the recommended header input speed.

Brand/Model	Weight lbs/kg	Pump Capacity – cu.in.	Header Input Shaft Speed - RPM
Massey Ferguson 9690, 9790, 9895 Gleaner R Series (R65, R75), A5 Series (A-85) Challenger 660, 670, 680B	804/366	1.37	625
Gleaner C Series	770/350	1.37	625
Massey Ferguson 8680, 8780W, 8780XP	770/350	1.37	625
Massey Ferguson: 8570, 8590	760/346	1.94	500
Massey Ferguson/Claas: MF 8450, 8460, Claas 98, 108	680/309	1.37	770
John Deere: 9400, 9500, 9600, 9410, 9510, 9610 CTS, CTSII, Contour Master 50 Series, 60 Series	785/351	1.94	500
Case IH: 1660, 1680, 1688, 2166, 2188, 2366, 2388, 2577, 2588	770/350	1.94	500
Case IH: AFX 7010/8010	680/309	1.77	575
New Holland: TR/TX, CR/CX	680/309	1.77	575
Lexion: 400, 500 Series	782/355	1.37	770

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Cross Augers

Length	Unit	Weight
20ft	One Piece	180/82
30ft	Two Piece	270/123

Knife Drive SCH epicyclic 3 5/16" stroke, hydraulically driven, 1200 - 1400 strokes per minute
(2 strokes = 1 RPM)

Cutting System SCH Easy Cut, spring steel guards and bolted sections.

Draper 42" rubberized polyester, fiberglass reinforced slats, tie bar connectors.

Draper Speed Adjustable flow control located on the header, 0 - 500 fpm.

Center Deck/Draper 68" wide, single 68" draper. Speed adjustable independently from side draper (adjustable center draper speed is not available with header driven reel package).

Reel Hydraulically driven using combine hydraulics (or optional header hydraulics).

Reel Speed Adjustable in cab.

Header Flotation Lateral and vertical leaf spring float system.

Cutting Angle Manually adjustable on all models.

Warning light kit. SP18, SP21, and SP25 - center mounted on feeder housing.
SP30 and SP36 - 12" right hand offset mount or center mount.
SP39 - 30" right hand offset mount.
SP42 - 36" right hand offset mount.

NOTE:	THESE SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE OR OBLIGATION.
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Options:

•Bat Reel - 5 bat, 54" diameter.

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- Pickup Reel - 5 bat, 42" diameter Universal U-II Pickup Reel, wire or plastic fingers.
- Pickup Reel - 6 bat, 44" diameter HCC ML Pickup Reel, plastic fingers.
- Storage Transport Axle.
- Hitch Kit.
- Tire assemblies P225 x 75R 15 tires.
- Castering Gauge Wheels - compression spring carriers.
- Poly Skid Plate on cutter bar and skid shoes.
- Hydraulic fore and aft on the reel.
- Cross auger.
- Swath Delivery Kits

Manual deck shift.

Model SP36, SP40, & SP42 - delivery to the right hand side of the combine, (3rd deck combination required).

Model SP18, SP21, SP25 and SP30- not available.

Crop Lifters for cereals and/or specialty crops.

Combine adaptor:- Available for most models of self propelled combines.

- John Deere
- Case IH
- Gleaner
- Massey Ferguson
- Claas
- New Holland

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Rice Belt Header

The "Rice Belt" header has been modified specifically for harvesting rice. Standard features and specifications include:

- Center mounting.
- High torque, dual hydraulic direct reel drive motors.
- Vulcanized rubber drive rollers of the lateral draper decks.
- Stainless Steel lining in the auger adapter.
- Poly skid plate on the cutter bar.
- Levee Shields.

MODEL	SP18R	SP21R	SP25R	SP30R
SIZE	18'	21'	25'	30'
WEIGHT lbs/kg	2955/1343	3159/1436	3357/1525	TBA

Weights are given less reel & combine adapter package.

Pickup Reel Assemblies:

U II Univeral

6 Bat, 42" diameter, wire or plastic fingers, includes mounting hardware.

HCC

6 Bat, 44" diameter, plastic fingers, includes mounting hardware.

All weights are given in lbs/kg format.

<i>U II Univeral</i>	550/250	628/285	705/320
<i>HCC</i>	450/205	528/240	645/293

Optional Equipment:

Remote Draper Shutoff

SCH cutting system.

No cutting system.

All other options are the same as for the Grain Belt Header.

Reel relief valve

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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.

<i>Unified Torque Specifications</i>			<i>Metric Torque Specifications</i>		
Size	SAE 5	SAE 8	Size	8.8	10.9
	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%

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.

Hydraulic Fitting Torque Table

Tube Size OD	Nut Size	TorqueValue **		Turns to Tighten (After Finger-Tightening)	
		(Nm)	(lb-ft)	(Flats)	(Turns)
(in.)	(in.)				
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

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

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.

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

Thread Size OD	Nut Size	Torque Value		Turns to Tighten (After Finger Tightening)	
		(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

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