



JD 4990-4995 Swather

Owner's Manual



Revision 3.0 - 2009



Important Notice

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

Without proper adjustment, damage to the header may occur.

Please wash this equipment after transporting

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

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

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1 - 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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1.5 - Warranty

Honey Bee Manufacturing Ltd. (Honey Bee) warrants your new Grain Belt swather 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 swather.

This warranty shall not apply to any Grain Belt swather 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 swather and further acknowledges that Honey Bee does not assume any liability resulting from the operation of the Grain Belt swather in any manner other than described in this manual.

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Table of Contents

1 - Purchase Information.....	3
1.5 - Warranty.....	5
2 - Safety.....	13
Safety Terms.....	13
Shields.....	13
Hydraulic Safety.....	14
Operation and Maintenance Requirements.....	15
General Safety.....	15
Operating Safety – Good Practices.....	16
Maintenance Safety.....	16
Transport Safety.....	17
Before Transport Checklist.....	17
During Transport Checks.....	18
In-Field Checks.....	18
Storage.....	18
Safety Decal Locations.....	19
Safety-Related Labels.....	20
3 - Installation Instructions.....	23
Mounting and Dismounting Terminology.....	23
Preliminary Leveling.....	24
JD Windrower Float Cylinder Recommendation with Honey Bee.....	24
Single Knife / Double Knife - Single Swath.....	24
Single Knife / Double Knife - Double Swath.....	24
Power Unit Preparation - Hydraulic Modifications.....	25
Installing Quick Couplers.....	25
Storing the John Deere Hydraulic Motor.....	26
Install Tilt Cylinder Quick Couplers.....	27
Install the Windshield Guard.....	28
Install the Manual Lift Link (Standard Equipment).....	29
Install the Hydraulic Tilt Cylinder (Optional Equipment).....	30
Installing the Needle Valve.....	34
Wiring Installation.....	37
Model Identification.....	37

New Models.....	37
Older Production Models.....	37
Draper Option.....	37
New Model Wiring.....	38
Wiring Installation, Older Models.....	40
4990 Model Switch Installation.....	40
4995 Model Switch Installation.....	40
4990 and 4995 Models – Cab Modifications.....	42
Install Lift-Arm Extensions.....	44
Draper Installation.....	44
Swather Preparation – Crop Divider Installation.....	45
Install Strut Rollers.....	46
Mounting the Swather to the Windrower.....	46
Store the Transport Hitch.....	51
Connect Electrical and Hydraulic Systems.....	52
Install the Hose Holder.....	53
Leveling the Swather.....	53
Programming the Tachometer.....	54
JD 4990-4995 Install Flow Control Bracket (Hydraulic Pump Calibration).....	56
Mounting Checklist.....	57
System Tests.....	57
Hydraulics, Electric, and Mechanical Checklist.....	58
Control Console Wiring Schematics.....	59
JD 4895-4995 WS Swather – New Configuration.....	59
JD 4895-4995 WS Swather – Original Configuration.....	60
JD 4890-4990 WS Swather.....	61
4 - Operation.....	63
Initial Start-up.....	63
F-N-R Lever Controls.....	64
Bleeding Air Out Of Reel Lift Circuit.....	64
Single Reel Lift Circuit.....	65
Double Reel Lift Circuit.....	65
36' Single Reel Lift.....	65
Additional Checks:.....	66
Problems frequently encountered during start-up and break in period.....	67
High Hydraulic Pressures - Cold Oil.....	67

Reel Will Not Raise.....	67
Full Dismount.....	68
Self Storing Hitch – Transport Position.....	69
Install Transport Axle.....	70
5 - Reel.....	73
Reel Position.....	73
Fore/Aft Adjustment (Manual Version).....	73
Reel Arm Leveling and Height Adjustment	74
Center Arm Leveling.....	75
Optional Hydraulic Fore & Aft	76
Reel Centering.....	77
Reel Tines.....	77
Reel Drive.....	78
Reel Speed Adjustment.....	79
Universal Ull Pick up Reel.....	80
Tine Pitch Adjustment.....	80
Minimum Reel Height.....	81
Reel Position in "Down" Crops.....	81
Reel Position in Standing Crops.....	81
Reel Speed.....	82
Lubrication - Reel Shaft Bearings.....	82
Control Rings.....	82
Hart-Carter Reel (HCC).....	83
HCC Check Points before Operation.....	84
Tine Pitch Adjustment.....	84
Reel Speed.....	85
Crop Control at Ends of the Swather.....	85
6 - Draper.....	87
Draper Installation.....	87
Tension.....	87
Tension (cont.).....	88
Alignment.....	88
Idler Roller Tracking Adjustment.....	89
Drive Roller Tracking Adjustment.....	89
Draper Speed.....	90
Additional Draper Speed.....	90

Draper Splicing.....	91
Idler Roller Removal.....	92
Drive Roller Removal.....	93
Removing Draper motor.....	93
Installing Draper Motor.....	94
Draper Deck Maintenance:.....	94
7 - Cutting System.....	95
Removing the Knife.....	95
Guards.....	96
Sickle Sections.....	96
Knife Drive/Knife Head.....	97
Connector Bar.....	98
Overlap Kit.....	99
If the sections are loose:.....	99
Repair Broken Knife Back.....	100
Knife Speed Sensor.....	100
Monitoring Knife Speed.....	100
8 - Leveling.....	101
Forward Angle Adjustment	101
Production Swather - Hydraulic Tilt Kit.....	101
Table Angle.....	102
Table Leveling.....	103
Adjusting Table Float.....	104
Preparing the table for further Leveling.....	105
Option 1- Remove the Transport Hitch.....	105
Option 2 - Switch the lift arm float cylinders.....	106
JD Windrower Float Cylinder Recommendation with Honey Bee.....	107
Option 3 - Adjust the set screw on the float cylinders.....	107
9 - Hydraulics.....	109
Flow Divider.....	109
Hydraulic Connection Points.....	109
Operating Pressure - Knife Circuit.....	110
Checking or Adjusting Knife Relief Pressure.....	110
Flow Control Setting.....	111
Draper Relief Pressure.....	112
Adjusting Relief Pressure.....	112

Reel Speed Control.....	113
Additional Reel Speed Control.....	113
Reel Relief Pressure.....	114
Adjusting the Relief Pressure.....	114
Return Line Filter.....	114
Compatible Replacement Filters:.....	114
Hydraulic Fitting Naming Standards.....	115
10 - Hydraulic System Schematics.....	117
Draper Drive – Single Swath (WS Models).....	118
Draper Drive 21-36ft Double Swath (WS Models).....	119
Fore & Aft Assembly – Split Reel (WS Models w/Hydr. Solenoid Kit).....	120
Fore & Aft Assembly – Solid Reel (WS Models w/Hydr. Solenoid Kit).....	121
Single Knife - Drive.....	122
Double Knife - Drive.....	123
Reel – Lift (Solid Reel).....	124
Reel Lift (36 ft Solid Reel).....	125
Reel - Lift (Split Reel).....	126
Single Reel Drive – WS Models.....	127
Double Reel Drive (Series) – WS Models.....	128
Double Reel Drive (Parallel) – WS Models.....	129
Upper Tube Hydraulics Single Swath (WS Models w/Direct Block Drainage).....	130
Upper Tube Hydraulics Dbl Swath (WS Models w/Direct Block Drainage).....	131
11 - Optional Equipment.....	133
Caster Gauge Wheels.....	133
Gauge Wheel Height Adjustment.....	134
End Strut Gauge Wheels.....	135
Vertical Crop Cutters.....	135
Cross Auger.....	136
Double Swath Option – 21, 25, 30, and 36 Foot Tables.....	137
Junior Deck Option – For Swathers With the Double Swath Option.....	139
Steel Skid Plates.....	139
Dimensions – Single Swath Delivery.....	140
Dimensions – Double Swath Delivery.....	141
Draper Extension for Swathing.....	142
Hay Guard / Short Crop Guard.....	143
SCH Crop Lifters.....	144

Hydraulic Tilt Cylinder Assembly.....	145
12 - Windrow Type.....	147
Windrow Formations.....	147
Ground Speed.....	147
Stubble Height.....	147
13 - Lubrication & Maintenance.....	149
Maintenance Related Decals.....	150
14 - Troubleshooting.....	151
Reel.....	151
Knife.....	152
Draper.....	154
Decks.....	154
Hydraulic Oil.....	155
Leveling.....	155
Table Angle.....	155
Lift and Float Systems.....	156
15 - Specifications/Features.....	157
Weights.....	157
Knife Drive Availability.....	157
Technical Specifications.....	158
Options.....	158
Included in Standard Swather.....	159
Bolt Torque.....	159
Hydraulic Fitting Torque.....	160
Tightening O-ring Fittings.....	161
16 - Lighting.....	163
Transport Lights:.....	163
Warning Lights:.....	163
Wiring Schematics.....	164
Light Wiring.....	166
Transport Lights.....	166
Hazard Warning Lights.....	166

2 - Safety

In this manual, the safety conventions used are as follows:

Safety Terms



DANGER

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



WARNING

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



CAUTION

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



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 swather are those in use at the time of design.

Hydraulic Safety



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. Small leaks can be completely invisible.



Illustration 2-1: Hydraulic Hazard Warning

You can reduce this hazard by relieving the system pressure before disconnecting hydraulic lines. Once finished, tighten all connections to specifications before re-applying pressure.



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 Swather. You must ensure that you and anyone else, who is going to operate, maintain or work around the swather 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 swather 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 swather.

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 hard hat
 - Protective shoes with slip-resistant soles
 - Protective glasses or goggles
 - Leather gloves
 - Hearing protection
 - Respirator or filter mask
6. Do not allow any one to ride on the swather while it or the windrower is in motion.
7. Make certain that the park brake is engaged, and the power unit is in neutral before starting the engine.
8. Clear the area of bystanders, especially small children before starting the power unit.
9. Do not allow anyone to operate the swather 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 swather to its full height and set the platform lock before servicing the swather. If working under reel, set the reel cylinder locks. A loss of hydraulic pressure could cause the swather and reel to lower unexpectedly.
3. NEVER operate machinery while tired, sick or otherwise impaired.
4. Do not operate the swather in crowded or confined areas.



Do not stand between the power unit and the swather while raising or lowering the swather.

Maintenance Safety

1. Before undertaking any maintenance, engage the park brake, either lower the reel and swather, or raise and lock the swather 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. Sickles 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 swather with the SMV (Slow Moving Vehicle) sign displayed on the rear of the swather and use your hazard lights if the law permits. Check local road laws before transporting.
2. When transporting the swather on roads, always be aware of the width of the swather.
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.

Before Transport Checklist

1. Do a complete walk-around and check to be sure there are no loose parts or components.
2. Check:
 - All reel mounting, reel drive and adapter assembly bolts to be sure no bolts/nuts are loose.
 - Wheel bolts to make sure they are tight.
 - Transport tire pressure. Recommended pressure is 50 psi (345 kPa)
 - 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 securely to the swather 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 (30 -40 miles) if towing the swather long distances.
2. Check the hitch bolt and safety chain periodically to make sure they are secure.

In-Field Checks

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

Storage

Store the swather on firm ground away from areas of human activity. If the storage location exposes the swather to road salt during the winter months, thoroughly wash the swather 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.

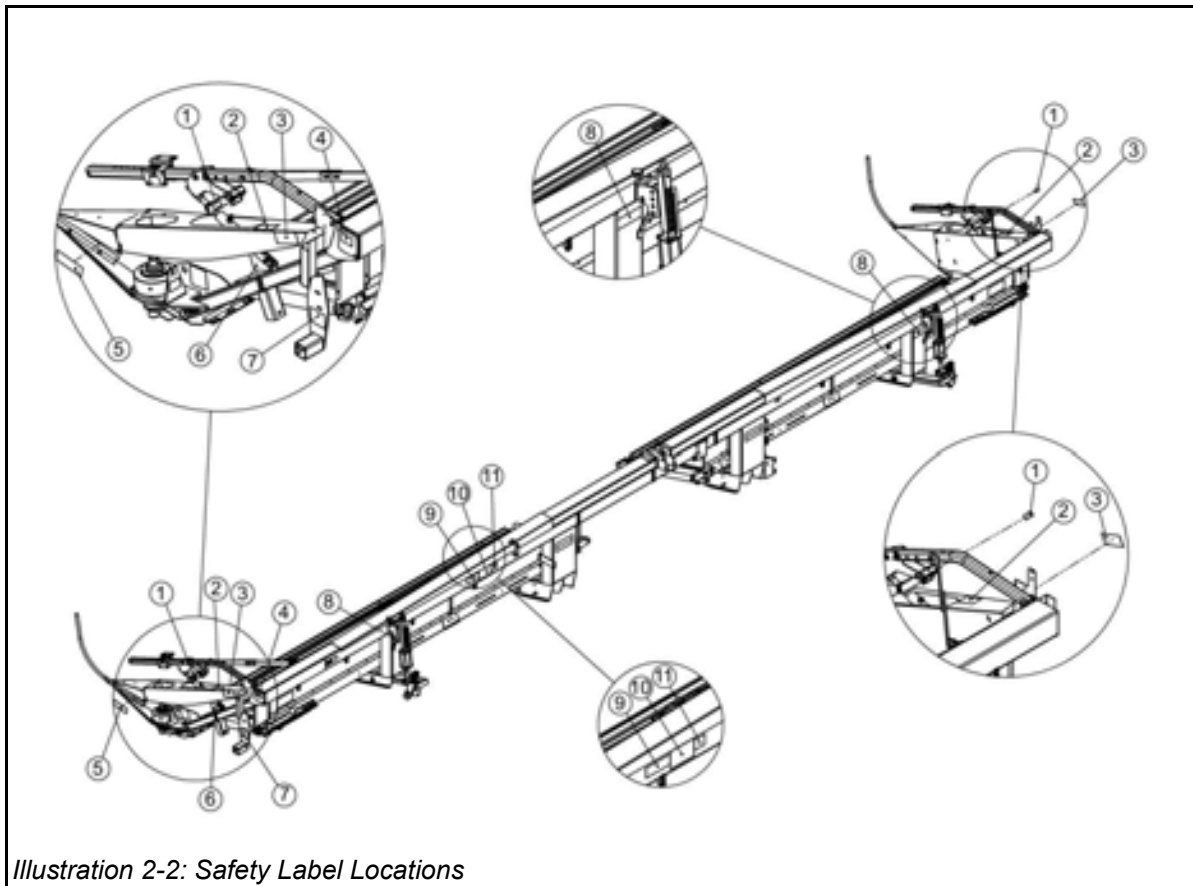
Safety Decal Locations

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.
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 labels.

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.

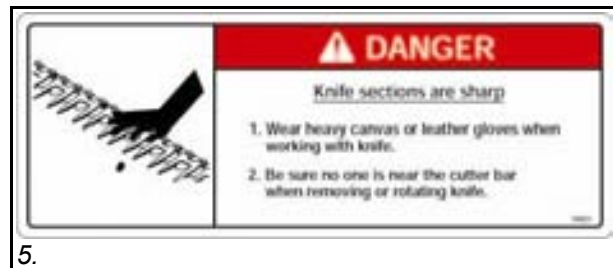
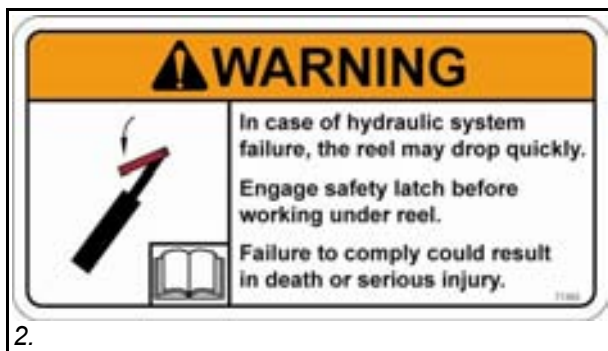
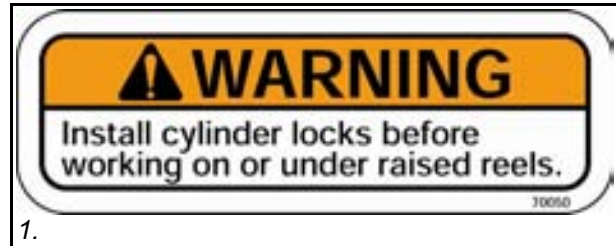
The following diagram, indicates the location of all labels on your swather. Match the number indicated in this diagram to the numbered illustrations provided.

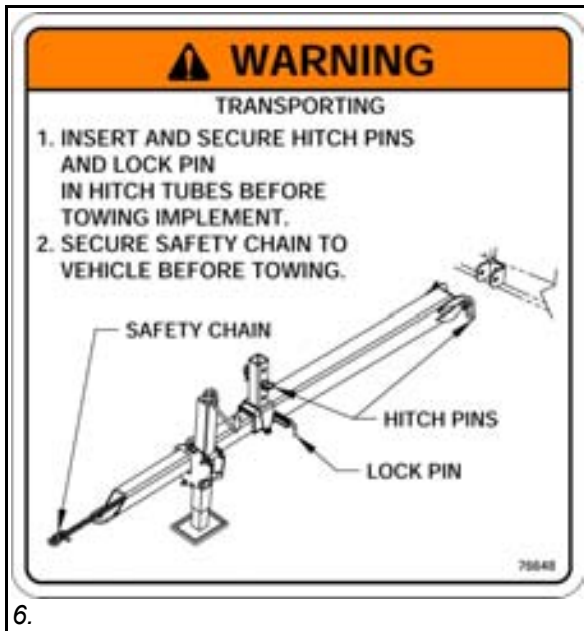


Safety-Related Labels

Vehicle Marking Reflectors:
(not shown on illustration)

- Red (2x9) - 6 Locations
- Yellow (2x9) - 3 Locations
- Red-Orange (2x9) - 4 Locations

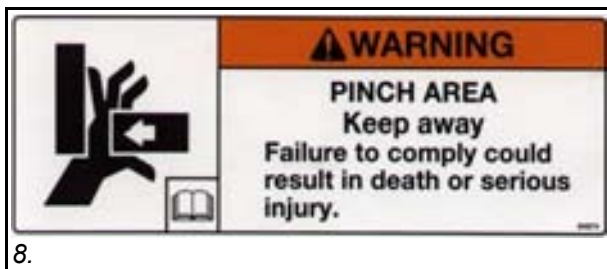




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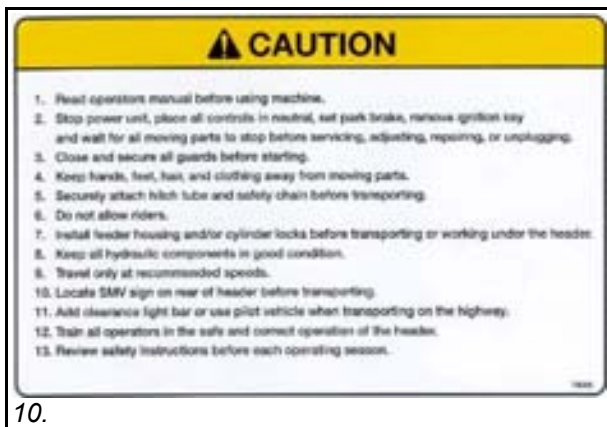
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9.



10.



11.

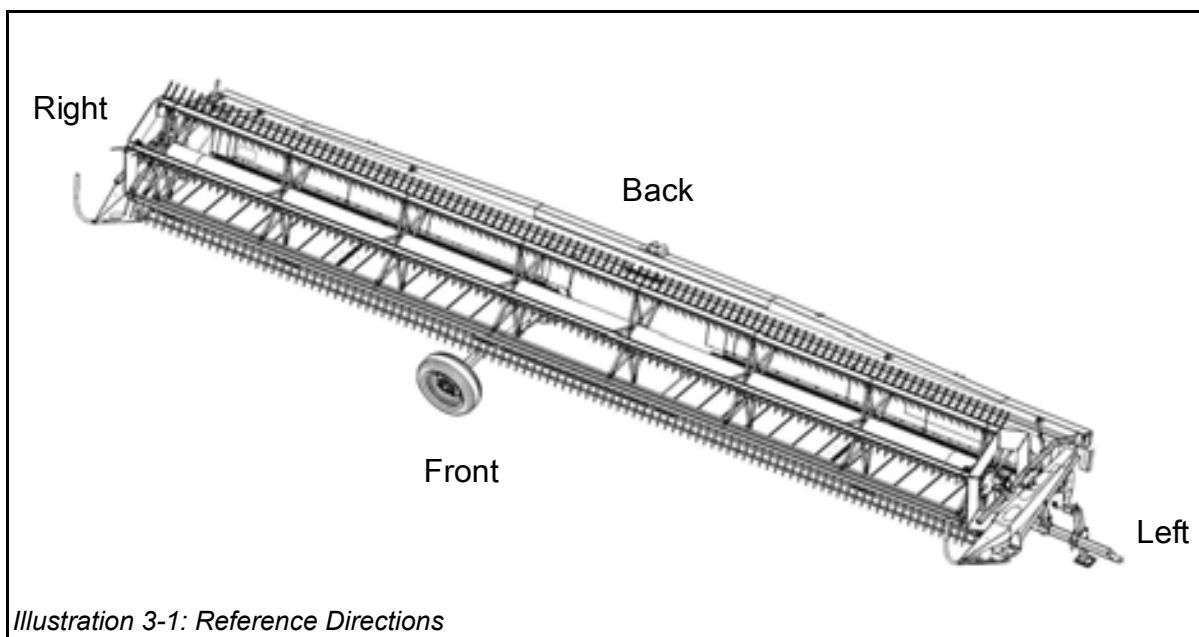
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3 - Installation Instructions

This information is designed for first-time installation, but will be valuable every time you are re-mounting the swather to the windrower. It is suggested that you follow the instructions in the order that they are given to avoid difficulties. Use the check lists at the end of this section to ensure that the swather is mounted properly and ready for the field.

Mounting and Dismounting Terminology

Power Unit:	Front	Lift arm end of the windrower
	Back or Rear	Engine end of the windrower
	Right and Left	As seen when sitting in the driver's seat facing the swather.
Swather Table:	Front	Cutter bar side
	Back or Inside	Lift arm mount side
	Right and Left	As seen when sitting in the driver's seat facing the swather when it is mounted on the windrower.



Preliminary Leveling



Please study the information listed below, prior to starting any work on either the windrower or the table to determine whether the windrower lift-arm cylinders require changes. If changes are required, completing them at this point will result in savings of time in equipment setup.

If your table setup requires that the lift arm float cylinders be swapped, proceed to Leveling - Option 2 - Switch the Lift Arm Cylinders (Located in the Leveling Chapter in this manual). After completing the cylinder switch, return, and proceed from this point in the manual. If you determine that your table does not require swapping the lift arm float cylinders, proceed from this point.

JD Windrower Float Cylinder Recommendation with Honey Bee

Single Knife / Double Knife - Single Swath

	No Hitch	Hitch	Float Pressure
18'	Swap Cylinders	No Change	Approximately 1200 psi at cutting height
21'	Swap Cylinders	No Change	Approximately 1250 psi at cutting height
25'	Swap Cylinders	No Change	Approximately 1500 psi at cutting height
30'	Swap Cylinders	No Change	Approximately 1700 psi at cutting height
*36'	Swap Cylinders	No Change	Approximately 1900 psi at cutting height

Single Knife / Double Knife - Double Swath

	No Hitch	Hitch	Float Pressure
18'	n/a	n/a	n/a
21'	Swap Cylinders	No Change	Approximately 1250 psi at cutting height
25'	Swap Cylinders	No Change	Approximately 1500 psi at cutting height
30'	Swap Cylinders	No Change	Approximately 1700 psi at cutting height
*36'	Swap Cylinders	No Change	Approximately 1900 psi at cutting height

For 36' Double knife with hitch, floatation may be improved by replacing the 2 3/4" cylinder with another 3" cylinder with 1900 psi float pressure.

Power Unit Preparation - Hydraulic Modifications



Remove any attachments that would interfere with the swather from the windrower as outlined in your John Deere Operator's manual.



Mark the hoses before removing them from the motor, so you can identify them correctly for reassembly.

Installing Quick Couplers

Install quick couplers and fittings of the sizes shown, as indicated below:

1. Forward Pressure Line
2. Reverse Pressure Line
3. 16MF-12MB
4. ¾ Quick Coupler Female
5. ¾ Quick Coupler Male
6. 12MB 12FJX Adapter SW
7. 12MJ 16MB 90°
8. JD Motor
9. Plug
10. 4MP-4MP
11. ¼ Quick Coupler Female
12. ¼ Quick Coupler Male
13. 4MP – 8MF (4MP-8MJ alternate)
14. Motor Drain

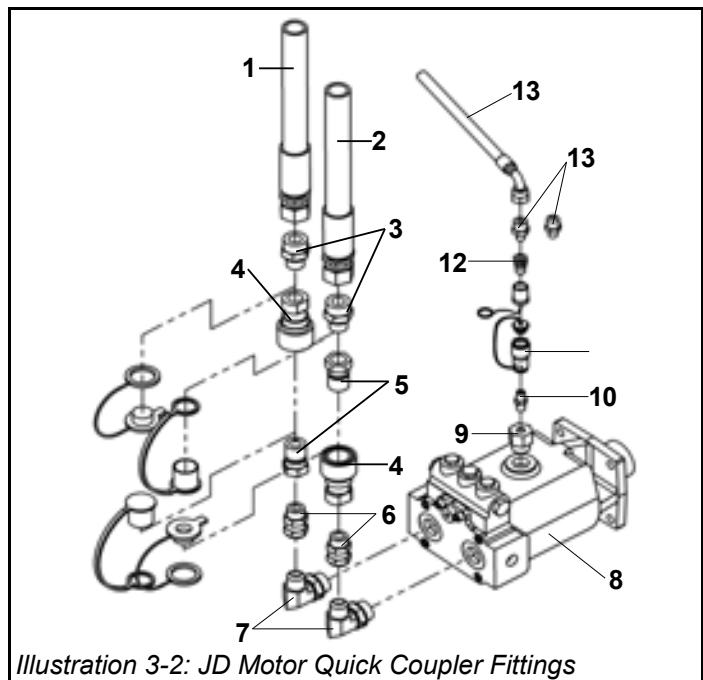


Illustration 3-2: JD Motor Quick Coupler Fittings



Use thread sealant only on fittings with pipe thread. Do not use thread sealant on fittings that have an "O" ring, face seal or JIC swivel.



Refer to the Hydraulic Fitting Naming Standards section of this manual (located on page 115) for further information on identifying different types of hydraulic fittings.

Storing the John Deere Hydraulic Motor

The John Deere hydraulic motor is not used with the Honey Bee swather. If you own an auger platform, the motor, with the newly installed quick couplers, can be stored on the platform. Otherwise store the motor in a clean, safe and convenient location for future use.

1. On the motor, remove the 3/8" case drain hose from the top. Install a 4MP-8MF nipple (also included in the kit is the alternate fitting 4MP- 8MJ) to the hose. To this fitting, install the dust cap and the 1/4" male quick coupler.
2. If the motor has the 8MF-12MB (8MJ-12MB) adapter, remove it from motor and install the plug fitting (fitting with a hole in the middle) into the motor. Install a 4MP-4MP nipple into previous fitting, and install the dust cap and female quick coupler to the nipple.
3. Remove the 16MF-16MB-45° elbows from the motor, and install 16MB-12MJ-45° elbows in their place. Install the 12MB-12FJX swivel adapters, with dust caps to the 3/4" quick couplers; ensuring you put the male fitting on the forward pressure side and female on the return.
4. Thread a 16MF-12MB, dust cap, and 3/4" male quick coupler to the reverse pressure hose.
5. Thread a 16MF-12MB, dust plug, and 3/4" female quick coupler to the forward pressure hose.

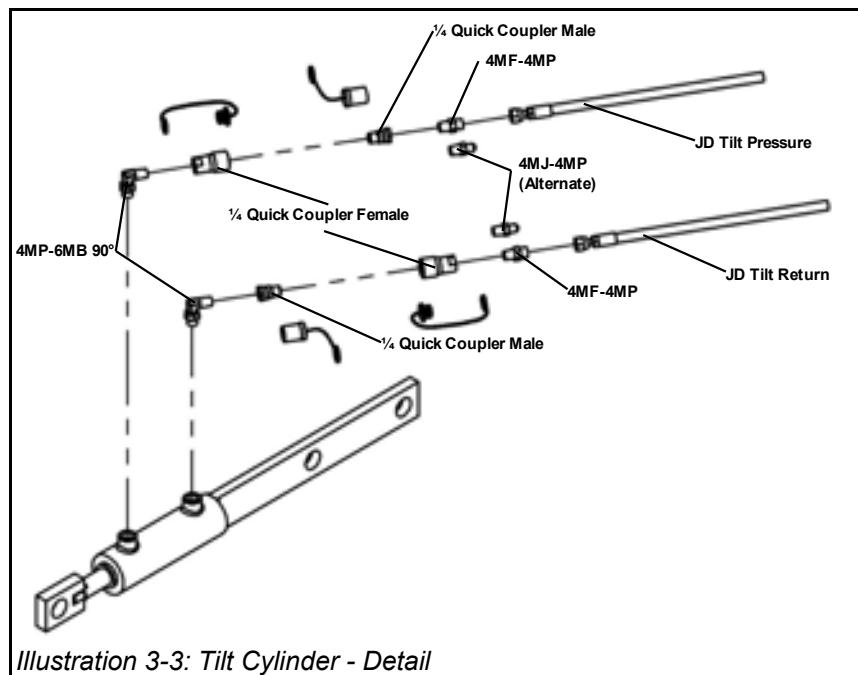
Install Tilt Cylinder Quick Couplers

The John Deere tilt cylinder is not used with the Honey Bee swather. Honey Bee supplies a different tilt cylinder for use with our equipment. Store the JD tilt cylinder in a clean, safe and convenient location for future use.



Mark the hoses before removing them from the cylinder, so you can identify them correctly for reassembly.

1. On the tilt pressure hose, install a 1/4" male quick coupler, dust cap, and a 4MP - 4MF nipple (alternate fitting 4MJ - 4MP).
2. On the return side, install a 1/4" female quick coupler, dust plug, and a 4MP - 4MF nipple (alternate fitting 4MJ - 4MP).
3. Install a 4MP - 6MB 90° elbow to the rod end of the cylinder, and from the elbow, a 1/4" female quick coupler and dust plug.
4. Install a 4MP-6MB 90° elbow, a 1/4" m-quick coupler and dust cap on the cylinder end

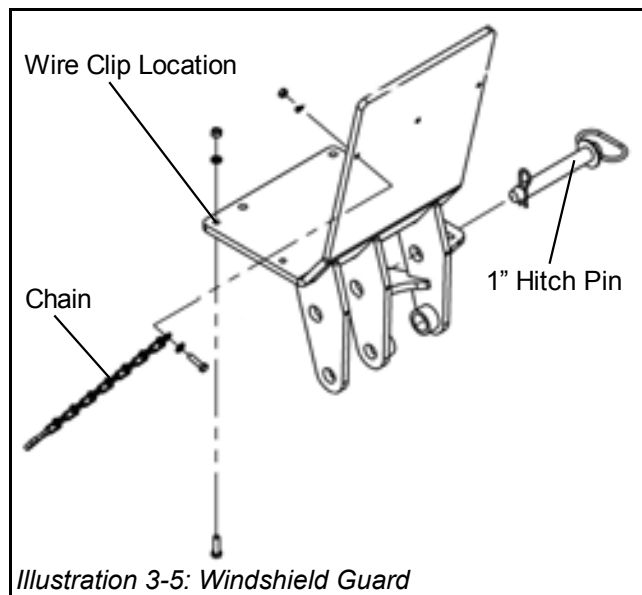
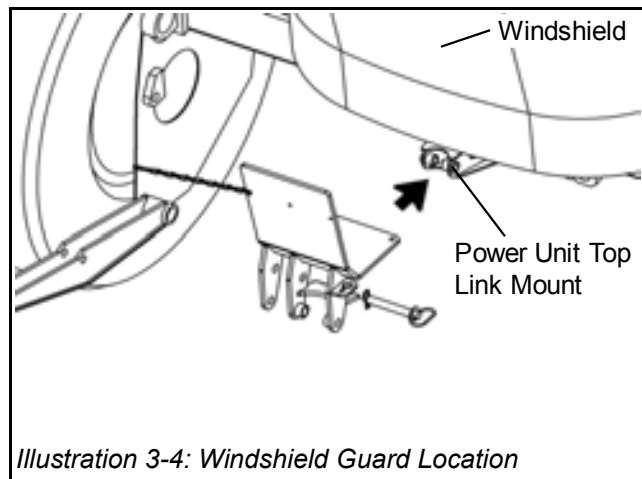


The reel lift is controlled by the platform tilt circuit on the power unit. The hose connected to the front port of the tilt cylinder will be the reel lift pressure hose. The hose from the power unit must have a male quick coupler. If the reel lift does not work check that the hoses are connected properly, and the couplers are fully engaged.

Install the Windshield Guard

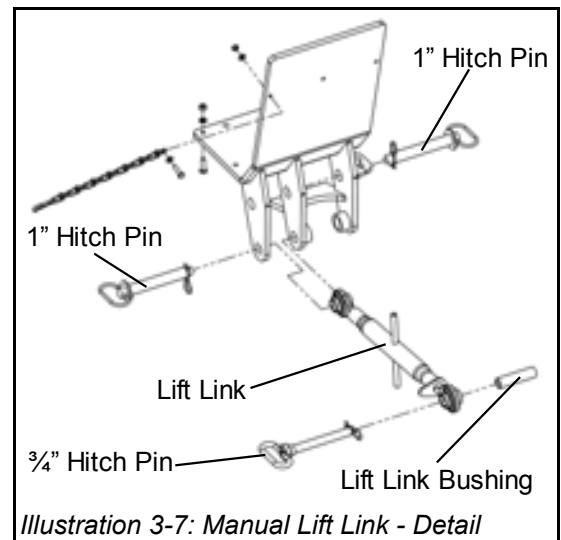
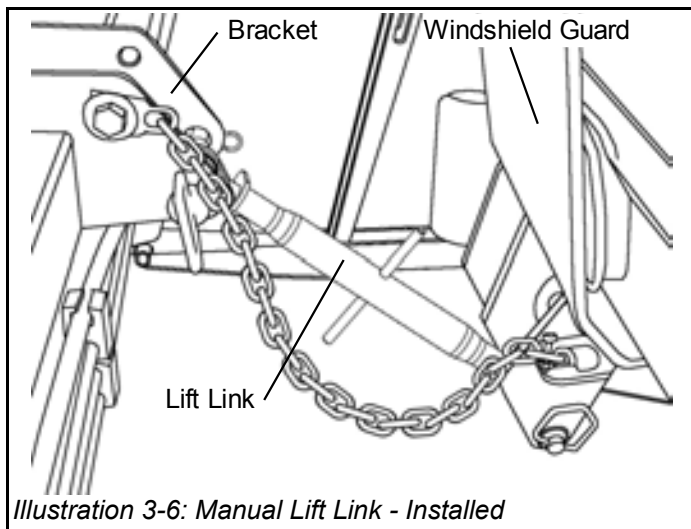
The windshield guard is designed to prevent the top link rising above the designated limit and destroying the glass in the windshield.

1. Install the guard by inserting the hitch pin in the right side of the windshield guard and through the power unit top link mount as shown to the right.
2. A chain is located on the side of the guard to secure the top link to the guard when the table is not connected to the power unit and a quick disconnect is required. Attach the chain using a 5/16 x 1" bolt, two flat washers, and a c/lock nut.
3. An extra hole is located on the guard to relocate the existing wire clip to the guard, keeping the electrical lines in order. Attach the clamp using a 3/8 x 1-1/4" bolt, lock washer, and nut.



Install the Manual Lift Link (Standard Equipment)

The manual lift link comes standard with all Honey Bee Swathers. It is connected to the bracket on the top of the subframe. Install the manual lift link using the following diagram for reference:



Install the Hydraulic Tilt Cylinder (Optional Equipment)

Refer to the table on the following page for descriptions of the numbered items below:

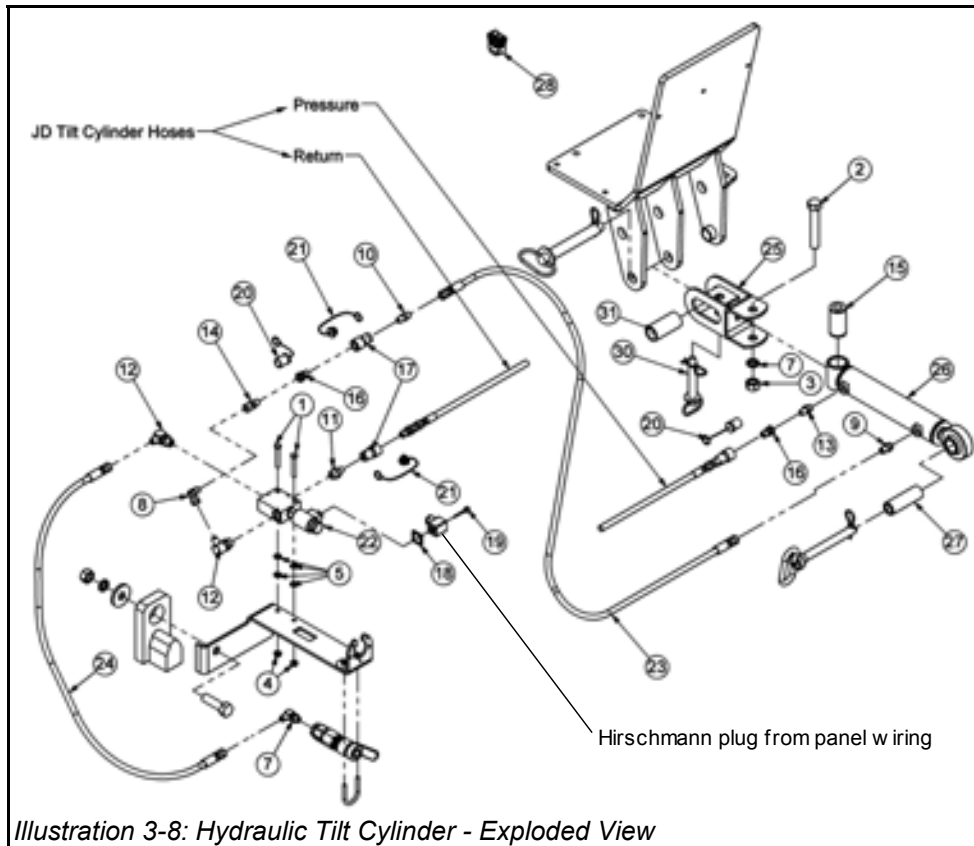


Illustration 3-8: Hydraulic Tilt Cylinder - Exploded View

1. Connect port #1 to hose #24 using a #12 fitting.
2. Connect port #2 to fitting #11 and coupler # 17.
3. Connect port #3 to fitting #12 and hose # 23.

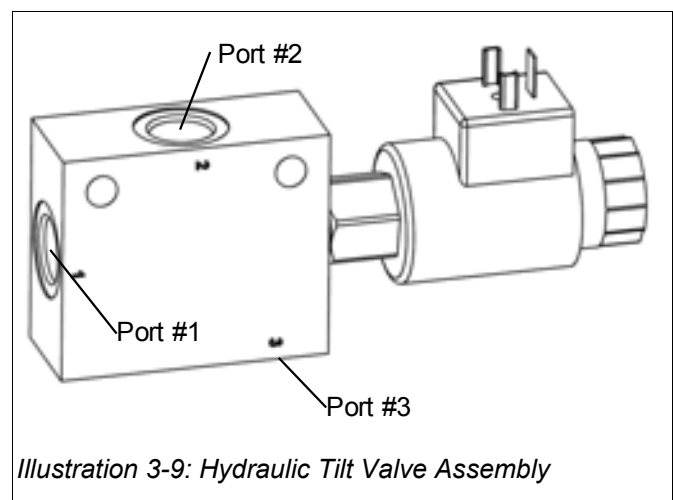


Illustration 3-9: Hydraulic Tilt Valve Assembly

Hydraulic Tilt Cylinder - Parts		
Item #	Quantity	Description
1	2	Bolt – 5/16 x 2 1/4" UNC
2	1	Bolt – 3/4 x 4-1/2" UNC
3	1	Nut - 3/4 UNC
4	2	Nut 5/16 UNC Flange Lock
5	4	Washer, flat 5/16 plated
6	1	Washer, lock 3/4 plated
7	1	Elbow 6MB-6MJ – 90°
8	1	Elbow, swivel 6MJ-6FJX – 90°
9	1	Nipple, 6MB-6MJ
10	1	Nipple, 4MP-6MJ
11	1	Nipple, 4MP-8MB
12	2	Elbow, 6MJ-8MB – 90°
13	1	Nipple, 4MP-6MB
14	1	Adaptor, swivel, 4MP-6FJX
15	1	Bushing, RB-58
16	2	Quick Coupler, 1/4 Male PKR
17	2	Quick Coupler, 1/4 Female PKR
18	1	Hirschmann – Gasket
19	1	Hirschmann – Screw
20	2	Quick Coupler, 1/4 Male Dust Cap
21	2	Quick Coupler, 1/4 Female Dust Cap NH
22	1	Valve Assembly – Hydraulic Header Tilt
23	1	HH04 66 6FJX-6FJX
24	1	HH04 13 6FJX-6FJX
25	1	Lift-link bracket - Slotted
26	1	Cylinder 2" x 8"
27	1	Bushing, Lift-link Cylinder
28	1	In-cab Switch
30	1	Hitch Pin
31	1	Lift-link Sleeve

1. Attach the lift link bracket as shown for the 4990/4995 Windrower, using the items and fasteners shown in Illustration 3-8: Hydraulic Tilt Cylinder - Exploded View on page 30.
2. Attach the 2 x 8" Cylinder by inserting the bushing into the end of the cylinder. Insert this end of the cylinder into the lift-link bracket and secure with the bolt, nut and lock-washer. Refer to Illustration 3-8: Hydraulic Tilt Cylinder - Exploded View on page 30 for details and orientation of the components.
3. Refer to Wiring Bracket - Exploded View, below. Install the bracket mount to the power unit using the hardware shown. Connect the quick coupler valve under the bracket using the 5/16 u-bolt, 1/4 quick coupler dust cap, 5/16 and 3/8 fender washer, and c/lock nuts.
4. If the hydraulic tilt cylinder option has been ordered, install the valve assembly to the mount using the hardware supplied. The Hirschmann plug should also be installed at this time using the gasket and screw provided.

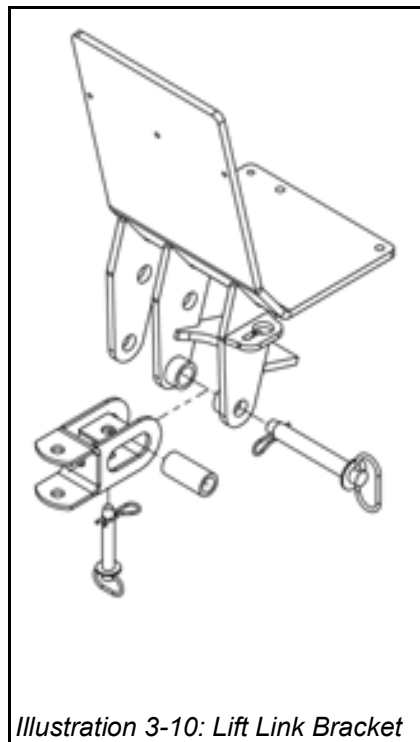


Illustration 3-10: Lift Link Bracket

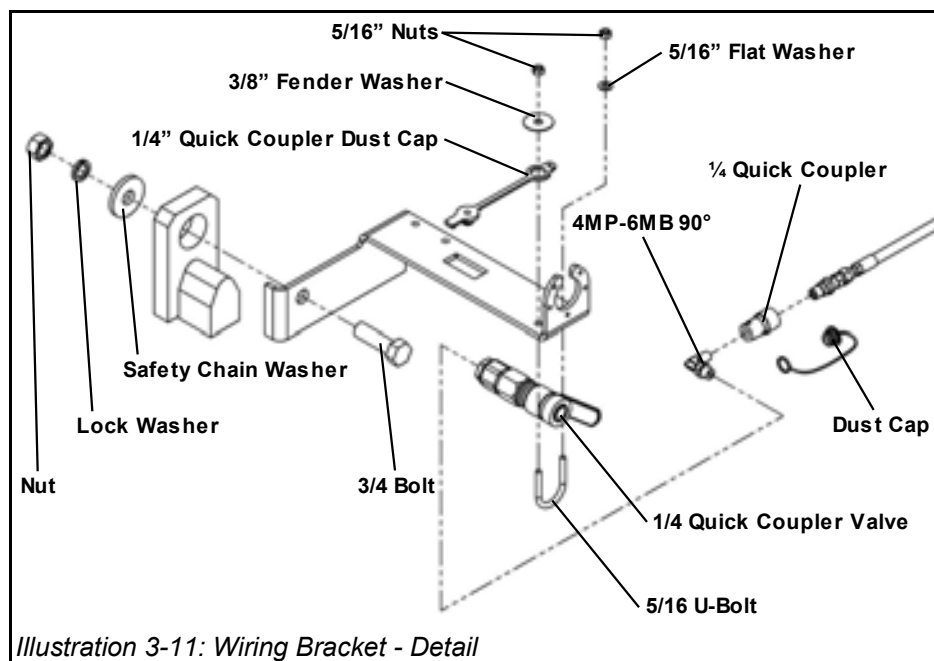


Illustration 3-11: Wiring Bracket - Detail

5. On the tilt pressure hose, install a ¼ inch female quick coupler and dust cap. Install a 4MP – 8 MB nipple to the valve Assembly “2” port.
6. On the return hose, install a 1/4" male quick coupler and dust cap. Install a 4MP - 6MB nipple to the tilt cylinder (cylinder end).
7. From the Rod end of the cylinder, install a 66 inch 6FJX – 6FJX hose with a 6MB – 6MJ nipple. On the other end of the hose install a ¼ inch female quick coupler with a 4MP – 6MJ nipple plus dust plug.
8. From the valve assembly “3” port, connect a 6MJ – 8MB 90° elbow to a 6MJ – 6FJX 90° elbow, to a 4MP – 6FJX adapter, to a ¼ inch male quick coupler and dust plug. This assembly will then be connected to the 66 inch hose assembly.
9. From the “1” port of the valve assembly, install a 6MJ – 8MB 90° elbow to a 13 inch 6FJX – 6 FJX hose, to a 6MB – 6MJ 90° elbow, which is then connected to the quick coupler lever.

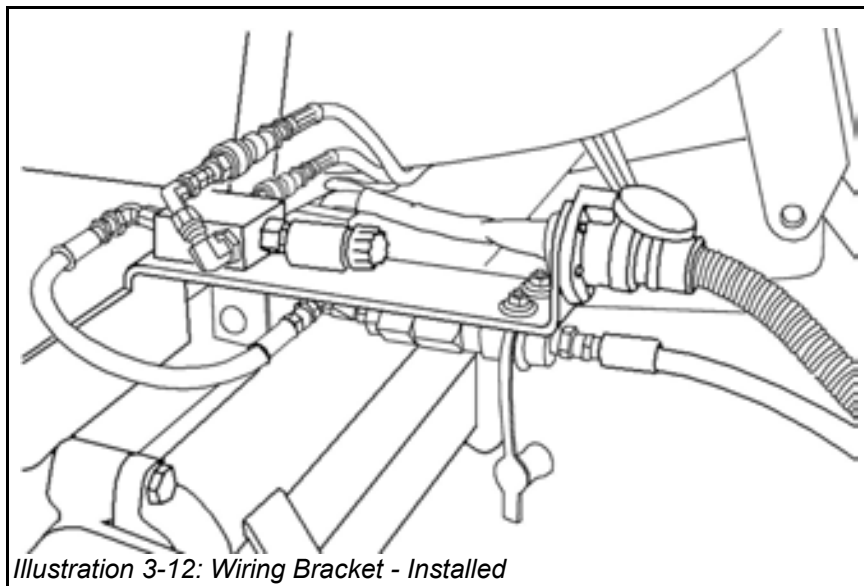


Illustration 3-12: Wiring Bracket - Installed



Refer to Hydraulic Fitting Naming Standards on page 115 for details on identifying hydraulic fittings.

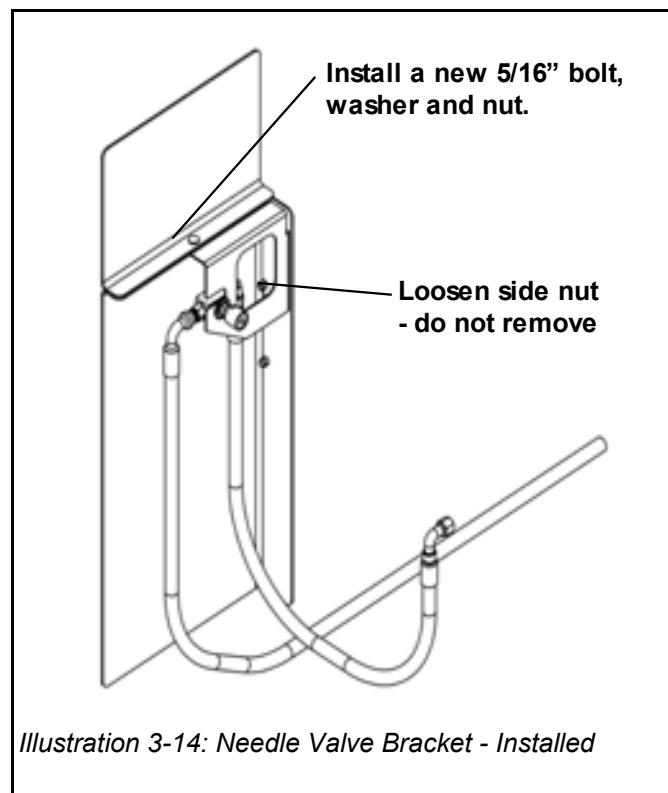
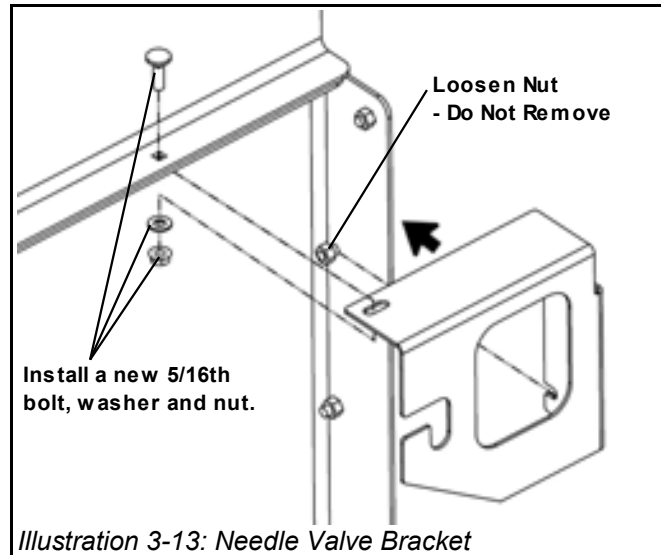
Installing the Needle Valve

Refer to the illustrations on the next two pages to familiarize yourself with the locations of the components involved.

1. On the left side of the power unit at the top of the stairs, access the compartment door behind the cab.

At the top-front of the compartment, you will find small nuts and bolts that will line up with the bracket shown at right. Remove the top bolt, but only loosen the side nut.

2. Loosen the nuts from the two locations identified. Remove the nut and bolt from the top location but **DO NOT REMOVE THE NUT** from the side location (since the bolt may fall out making re installation difficult).
3. Slide the bracket between the previously loosened nut and frame. Insert a 5/16 bolt (included) through the top hole of the frame. Thread the washer and nut onto the top bolt. Tighten the nuts to secure.



4. Locate the manual float release valve and relieve the pressure by opening the valve (counter clockwise).

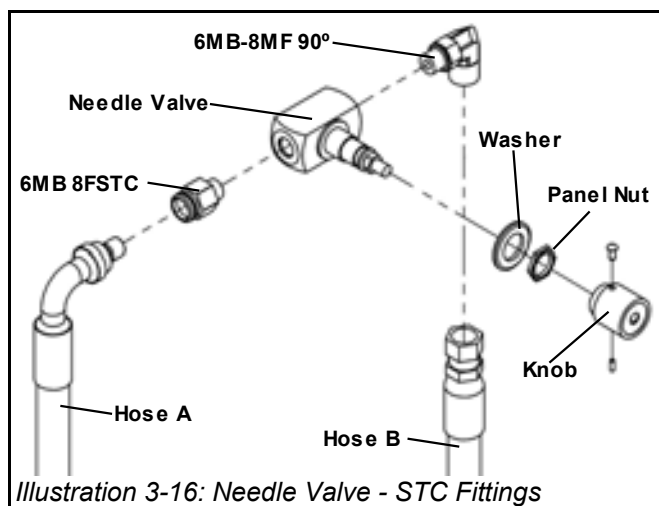
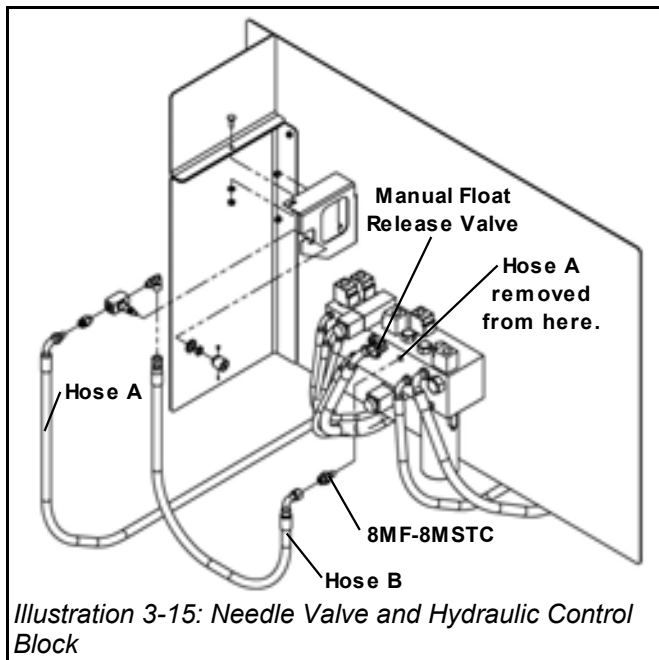


Ensure that you open the valve prior to disconnecting any hoses to avoid excess spillage or potential harm from heated oil.

The following sequence will minimize oil spillage.

5. Disassemble the needle valve knob from the body and reassemble using the panel nut and washer as shown. Install the supplied hose "B."

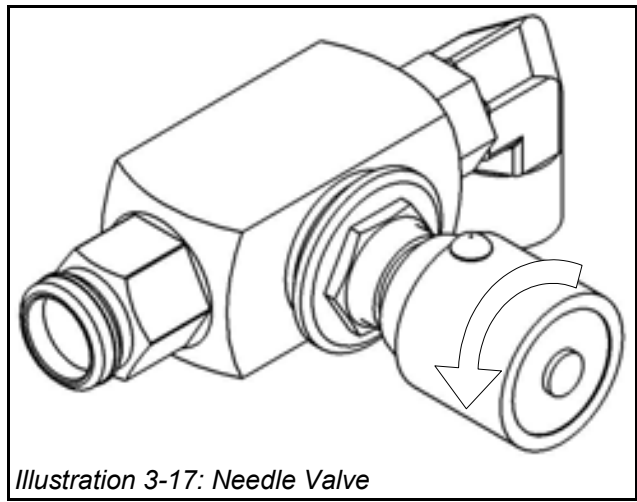
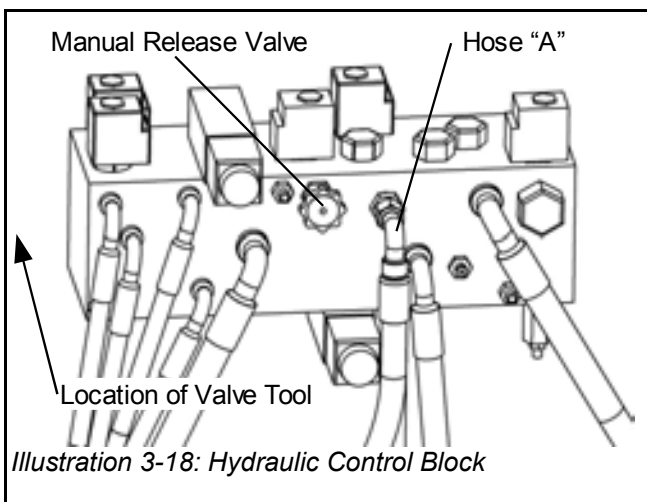
Units with serial numbers starting at 320001 and up will use the needle valve assembly shown to the right in conjunction with non-threaded "STC" fittings.



Units with serial numbers up to and including 320000 will require the threaded hose fittings also included in the installation kit, see Illustration 3-19: Needle Valve - Non-STC Threaded Fittings on the following page.

Refer to Hydraulic Fitting Naming Standards on page 115 for details on identifying hydraulic fittings.

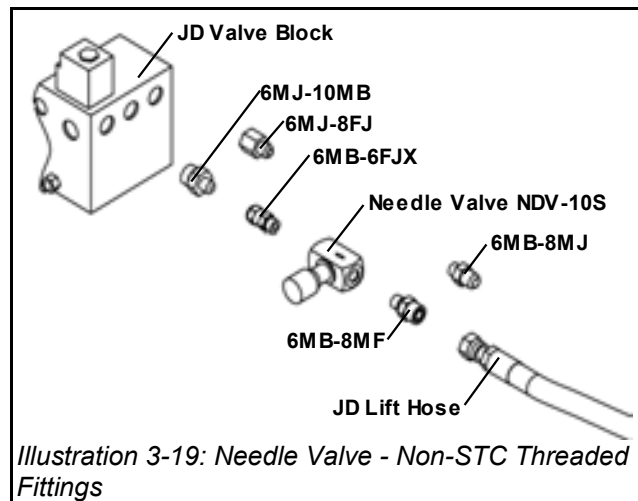
6. Disconnect the platform lift hose "A" at the block, using the valve tool provided in the compartment. Connect the supplied hose "B" as seen in Illustration 3-16: Needle Valve - STC Fittings on page 35. Now connect Hose A to the needle valve, as shown in the same illustration.
7. Slide the needle valve onto the mounting bracket, as *Illustration 3-16: Needle Valve - STC Fittings on page 35*, and secure in place with the panel nut. Close the manual float release valve on the block (clockwise) and set a small flow rate on the needle valve (counter-clockwise.)



Units with serial numbers up to and including 320000 will use the needle valve assembly shown here.



Refer to Hydraulic Fitting Naming Standards on page 115 for details on identifying hydraulic fittings.



Wiring Installation

Model Identification

It is important that you determine exactly which model of windrower you have. Possible variations are:

New Models

New models include all John Deere 4995 units built after 29 January 2007 with serial numbers including, and after EO4995X330675. These units will have the correct in-cab wiring and switch panel factory installed. **No in-cab modification is required!**

Older Production Models

Old models include all John Deere 4895 units built before 29 January 2007 with serial numbers prior to EO4995X330675. Proceed as instructed in Wiring Installation, Older Models on page 40. Switches and in-cab harness will be supplied by Honey Bee. All John Deere 4890 units (regardless of serial number) fall into this category.

Draper Option

If the power unit was ordered specifically for use with a Honey Bee draper platform (Honey Bee Ready,) all switches for this option will be installed in the panel. If the unit was not ordered with this option, the switches will be supplied by Honey Bee, and will need to be installed and plugged into the existing harness by the dealer.

If you have identified your unit as a "New Model," proceed to New Model Wiring, on the following page.



If required, refer to Control Console Wiring Schematics on page 59.

New Model Wiring

1. Identify the 21-pin plug of the wiring adapter, and mount this end in the front bracket of the windrower, located on the right hand side of the cab.
2. Feed the other end of the harness under the cab.
3. You will find a wiring harness clip under the cab floor. Feed the wire into this clip and secure it with a zip-tie.
4. Toward the rear of the cab, you will see an opening in the frame. Feed the 31-pin plug through to the exterior via this access.

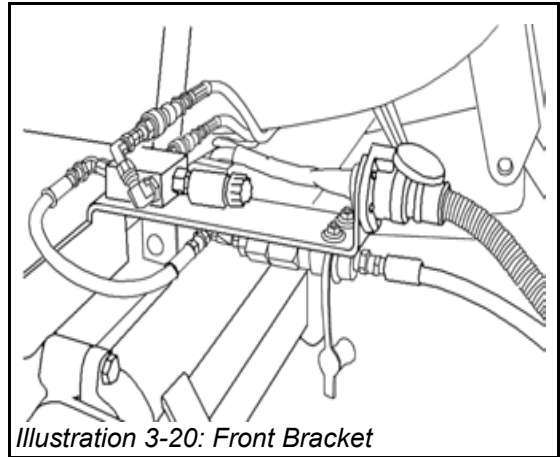


Illustration 3-20: Front Bracket

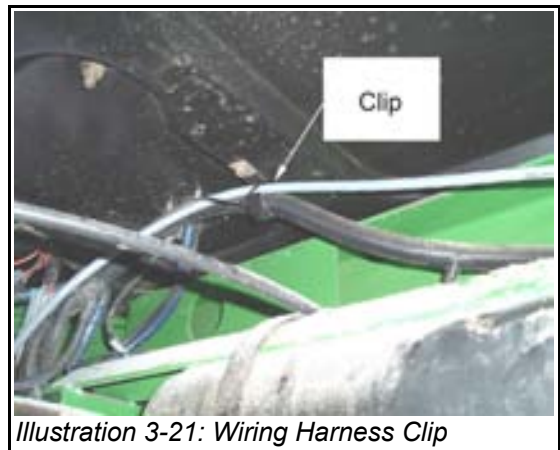


Illustration 3-21: Wiring Harness Clip

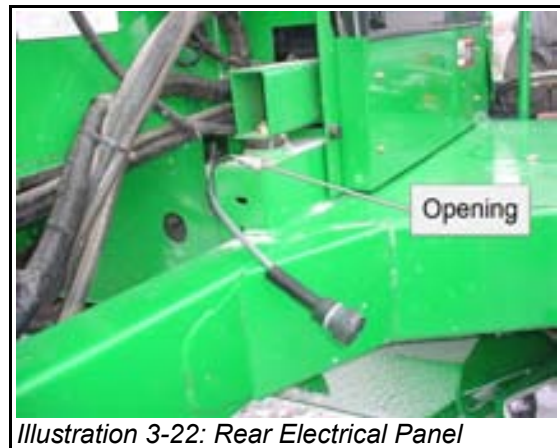
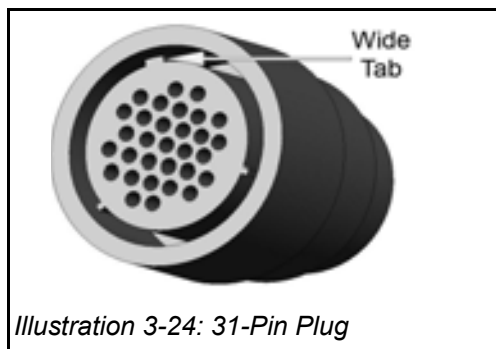
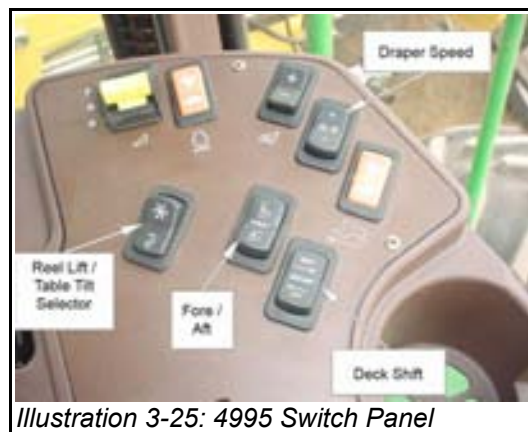


Illustration 3-22: Rear Electrical Panel

5. Insert the 31-pin plug into the receptacle provided. The plug will align in the same fashion as the front plug, by first aligning the widest tab in the plug with the wide slot in the receptacle. Once it is fully seated, turn the locking collar to secure the plug.



6. If the unit was not ordered "Honey Bee Ready," remove the screws holding the switch panel in place, and remove the appropriate switch position blank(s). Snap the new switches in place, as shown here, and connect them to the harness plugs as shown in the windrower manual.
7. Open the electrical panel access on the right side of the windrower. Remove the float relay from the electrical panel. Once removed, the table will raise and lower only so long as the switch is activated, and will stop when it is released.



For the successful completion of this installation, the relay should be removed; however, If you prefer, the relay may be replaced for field use. In this mode the table will lift to maximum height when up is selected, and will lower to the preset float height when down is selected.



When hooking up to the swather, this relay should be removed to provide fine control over the operation of the hydraulics.

Wiring Installation, Older Models

4990 Model Switch Installation

Switches for the standard draper speed control, optional deck shift and reel fore/aft option are supplied for installation into an add-on, pre-wired control panel. This panel is installed using the two screws that secure the cup holder.

Remove the cup holder, place the bracket for the panel, aligning the holes, place the cup holder bracket over this, and replace the screws.

4995 Model Switch Installation

Reel speed and table tilt reel lift operations are controlled with the standard switches located on the F-N-R control lever.

The switches for the standard draper speed control, optional shifting decks, fore/aft reel options, and the table tilt/reel lift options need to be installed in the control console. If additional switches are required, refer to the illustration to the right.

1. Remove the three screws holding the console panel cover, lift the cover, mark, and unplug the cables to the switches.
2. Locate the knockout(s) for the options to be installed, using the suggested sequence shown.
3. With a sharp knife, cut the vinyl cover along the edge of the knockout.
4. Cut the metal tabs at each end of the opening and file any burrs smooth.
5. Insert the new function switch or switches from the top and snap into place.



Illustration 3-27: 4990 Switch Panel

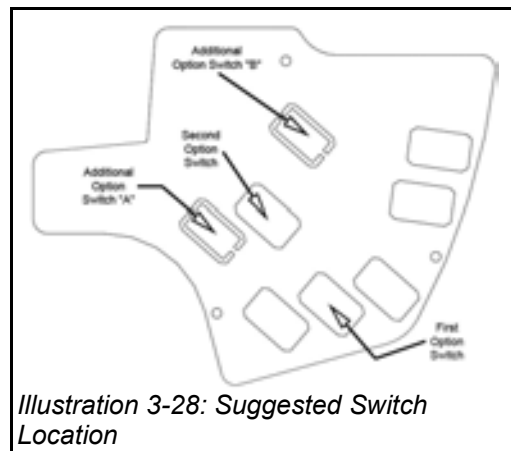


Illustration 3-28: Suggested Switch Location



Illustration 3-29: 4995 - Suggested Switch Locations

If only one option is added, no modification to the control console base are required; however, with two, or more options, the modifications shown to the right are needed.

6. Feed the new harness up, inserting the appropriate plugs through the holes so they will line up with the switches in the panel.
7. Connect the plugs to the corresponding switches, and replace the panel cover using the three screws removed earlier.



Illustration 3-30: Console Modification

The template (Illustration 3-31: Console Cutting Template), will give you the correct sizes for the openings shown above.

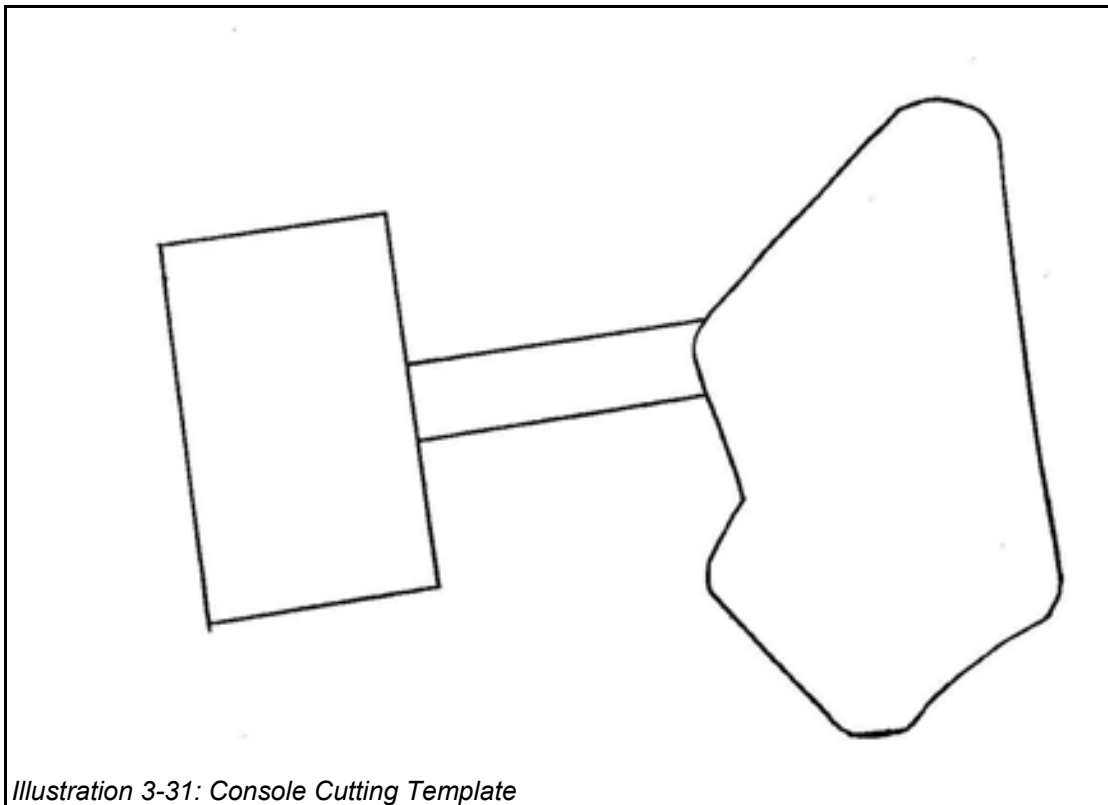


Illustration 3-31: Console Cutting Template

4990 and 4995 Models – Cab Modifications

1. A hole must be made in the floor for the wiring loom supplied for these options. Raise the floor mat and locate a small plate welded to the floor.

The hole diameter should be at least 2-1/2" to allow the pre-wired plug and wiring loom to be fed through the floor.

(See the photos to the right and below.)

2. Install the wiring harness and re-close the hole with the grommet and plate supplied. Secure with four(4) sheet metal screws.



Illustration 3-32: Hole Location



Illustration 3-34: Wiring Installation Complete



Illustration 3-33: Close Up View

3. Open the electrical access panel on the right-hand side of the windrower. Remove the float relay from the panel on the door.
4. If the optional deck shift, draper speed (now standard), fore and aft, and/or hydraulic tilt was purchased, connect the plug from the newly installed console wiring into the optional power source plug.

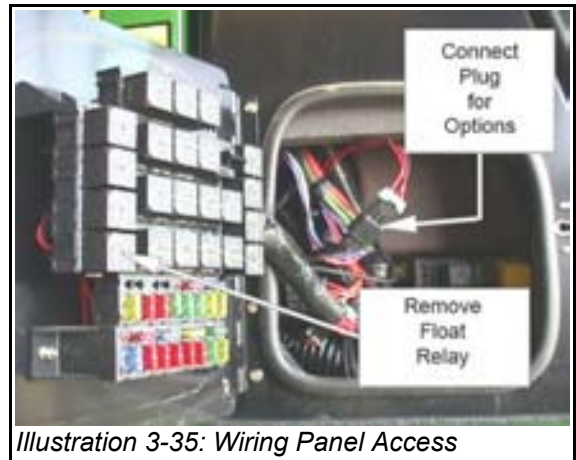


Illustration 3-35: Wiring Panel Access



The swather may be operated with the float relay left in place. In this case, when the “Up” switch is activated, the table will rise to the top of its travel. Similarly, when the “Down” switch is activated, the table will lower to the preset float height.

When hooking up to the swather, this relay should be removed to provide fine control over the operation of the hydraulics.

If the you wish, it may be re-installed once these setup instructions have been completed.

Install Lift-Arm Extensions

1. Place the lift arm extensions on the power unit lift arms. Install the clamp plates under each lift arm using $\frac{3}{4}$ x 7 inch bolts and nuts to secure each extension.

Tighten the bolt only until 2 or 3 threads are exposed past the top of the nut.

2. Secure the lift arm extension in place using the M24 bolt and the M24 nut provided.

Do not over tighten the $\frac{3}{4}$ x 7" bolts. These extensions are designed to act as a hinge between the windrower lift arms and the table.

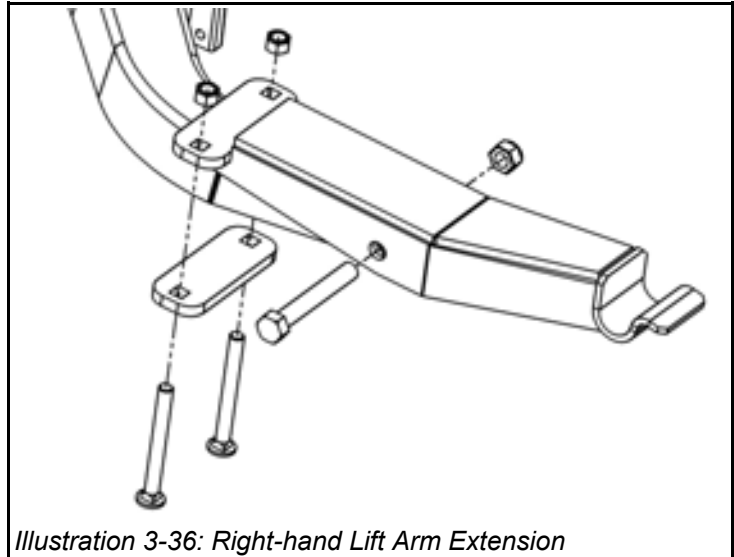


Illustration 3-36: Right-hand Lift Arm Extension

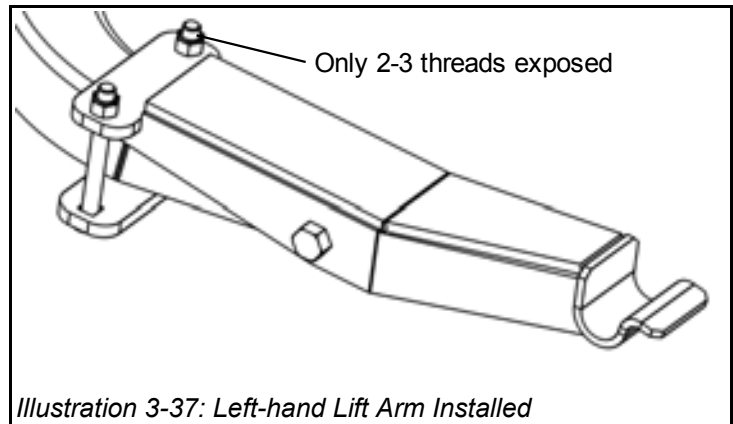


Illustration 3-37: Left-hand Lift Arm Installed

Draper Installation

Refer to the Draper chapter of this operator's manual for installation instructions.

Swather Preparation – Crop Divider Installation

1. Park the Grain Belt Swather on flat, hard, and level ground. Support the hitch end of the unit by extending the hitch jack until the swather is sitting level.
2. Install the crop dividers, and crop divider pipes to the ends of the table. The crop divider and pipes are not installed at the factory for shipping purposes. Once installed, operators should be aware of the assembled width of the swather, and should check local regulations before transporting on public roadways.
3. The crop divider is held in place with six (6) 3/8 x 1-1/4" carriage-head bolts. Three bolts are installed through the base of the divider, and the table shoes at each end of the table. They are held in place using the supplied flat washers and lock-crimp nuts. All holes are pre-drilled.
4. When properly positioned, the crop divider overlaps the outside of the crop deflector to provide a smooth transition for the crop. The remaining three carriage-head bolts are installed from the inside of the formed sheet metal portion of the crop divider, into the crop deflector using flat washers and crimp-lock nuts.
5. Insert the crop divider pipe into the nose of the crop divider and insert a 3/8 x 2" carriage-head bolt. With the bolt in place, place a bushing-spacer followed by a flat washer, and tighten with a lock nut. The bushing should press firmly against the crop divider pipe to hold it firmly in place.

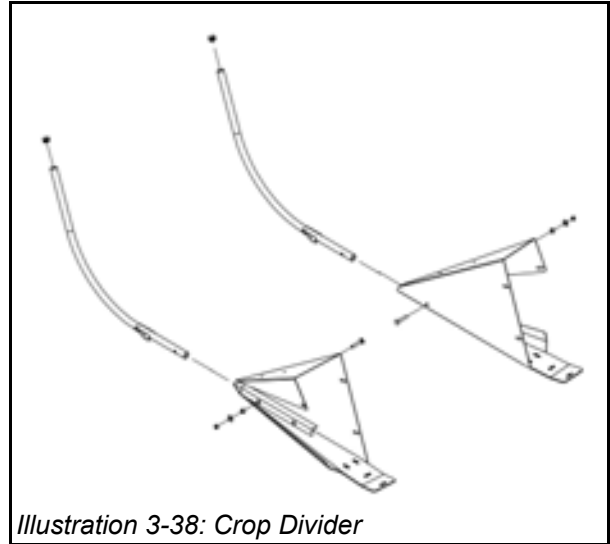


Illustration 3-38: Crop Divider

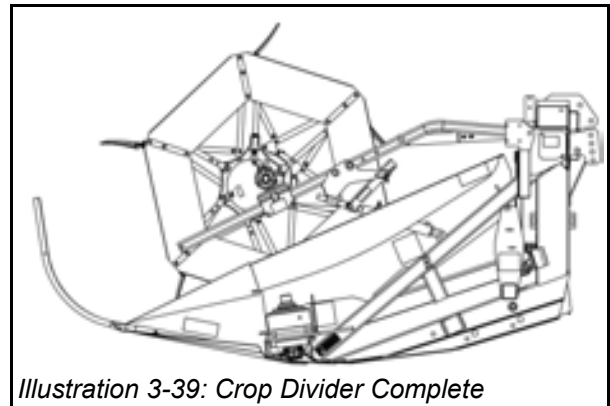


Illustration 3-39: Crop Divider Complete



The inside edge of the crop divider and pipe should be aligned so that they are approximately 90 degrees (right angle) to the cutter bar. This will provide good crop separation, and will help prevent crop plugging in the corners.

Install Strut Rollers

The JD 4990 and 4995 swather comes with two standard rollers from factory, each of which are situated in the opening closest to the center of the table on each strut.

1. Remove both rollers. The roller on the right hand strut, needs to be moved to the outside of the strut, and the roller on the left hand strut needs to be replaced with a base plate roller.
2. Remove the 5/8" hitch pins. These will be used in later step.
3. Connect the base plate roller to the left hand strut using the 1x10" UNC bolt, 3/4x1-1/2" UNC bolt and nuts and washers provided.
4. Connect the standard roller to the right side opening of the right hand strut as shown in the illustration to the right.

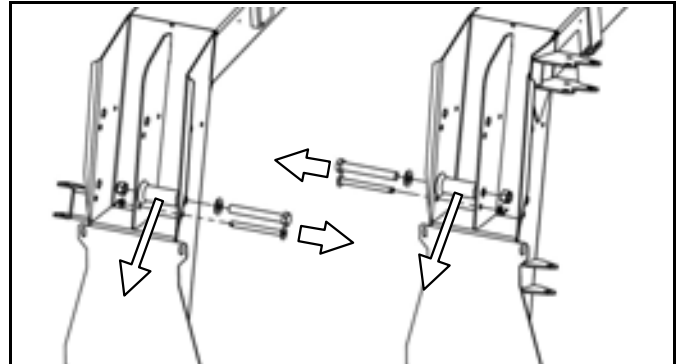


Illustration 3-40: Installation of Strut Rollers

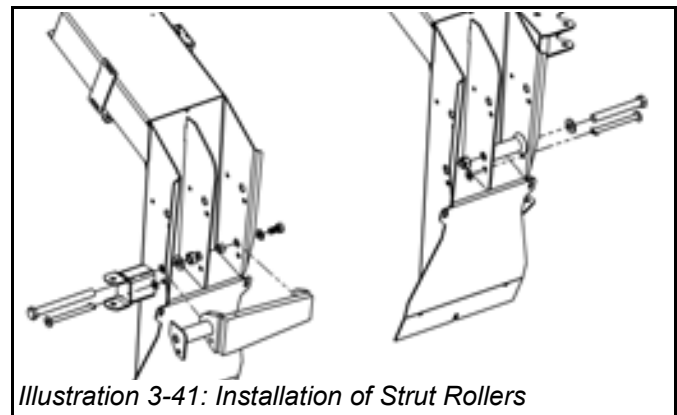


Illustration 3-41: Installation of Strut Rollers

Mounting the Swather to the Windrower

1. Park the swather on firm, level ground, where it will be easily accessible for the windrower operator to pick up.
2. Lower the screw jack, located on the side of the transport axle, and raise the axle until the tire clears the ground.
3. Remove the quick pin securing the hub and spindle, and remove the wheel assembly. Store the wheel assembly in an appropriate location, or if the gauge wheel option has been purchased, install the wheel into one of the gauge wheel mounts and secure with the quick pin.

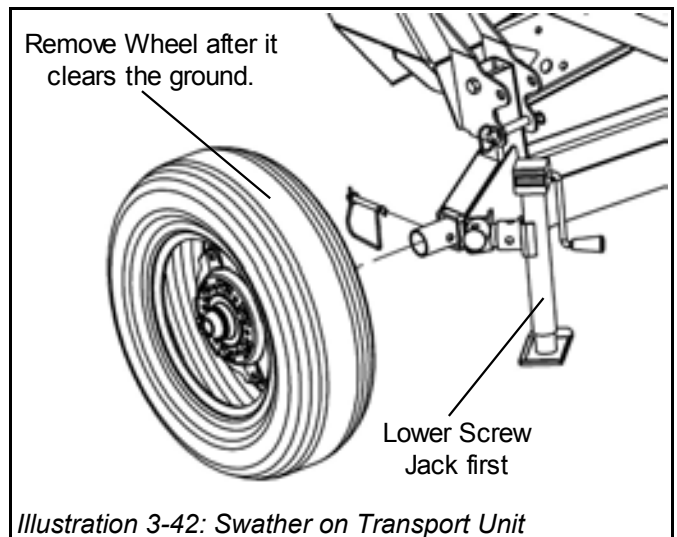


Illustration 3-42: Swather on Transport Unit

4. Start the windrower. Test the lift-arm controls to ensure smooth operation.



If the lift arms move too abruptly, reduce the flow of oil at the needle valve as shown in Illustration 3-17: Needle Valve on page 36.

If they raise and lower fully with one cycle of the control, remove the relay as shown in Illustration 3-26: Electrical Panel - Float Relay on page 39.

5. Move the windrower into position, lining up the lift arm extensions with the outside left of the left hand strut, and the outer right opening of the right hand strut on the swather. Ensure the arms are low enough to move under the struts.

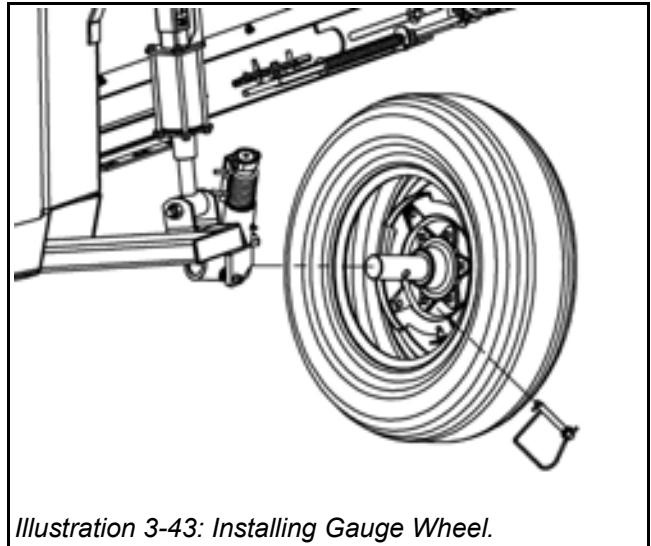


Illustration 3-43: Installing Gauge Wheel.

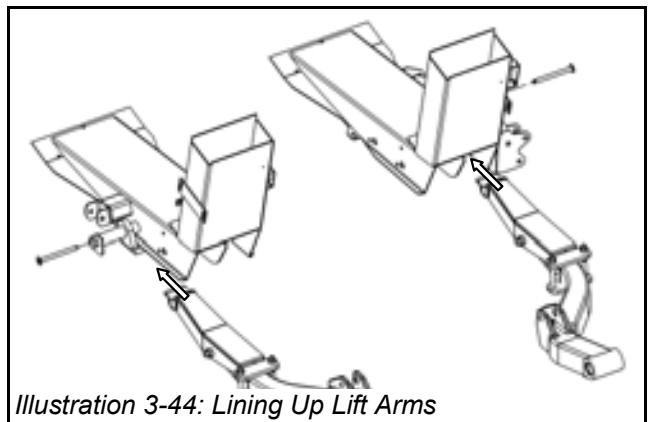


Illustration 3-44: Lining Up Lift Arms

6. Slowly raise the lift arms until they are firmly set on the rollers. Ensure the end of the extension arm has fully engaged the roller. Do not lift any higher until the arms are secured with hitch pins.

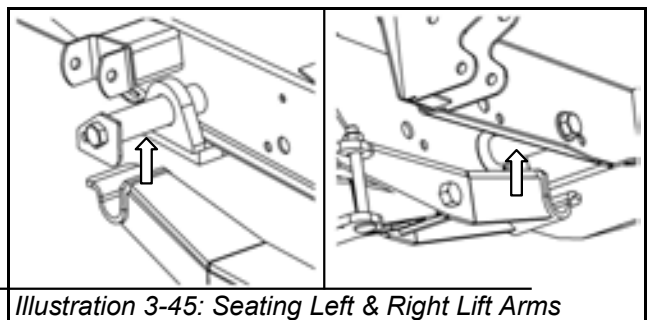


Illustration 3-45: Seating Left & Right Lift Arms



Shut the engine down and wait for all moving parts to stop before leaving the cab. Ensure the park brake is set.

7. If the arms are located correctly, insert the Hitch Pins and secure.
8. Connect the safety chain to the windshield guard, and the swather as shown on *Illustration 3-48: Safety Chain and Hydraulic Tilt*. The chain is supplied with a bolt through one of the links to mark the minimum length of chain. Do not remove this bolt.
9. Attach the manual, or hydraulic top link, as shown in *Illustration 3-48: Safety Chain and Hydraulic Tilt* or *Illustration 3-49: Manual Lift Link* on page 49.
10. Ensure you insert the collar into the swather-end of the link before sliding it in place in the tower. Insert the hitch pin in the lower hole of the bracket tower and secure it.



Do not attempt to lift the swather until safety chain is attached!

11. Start the windrower

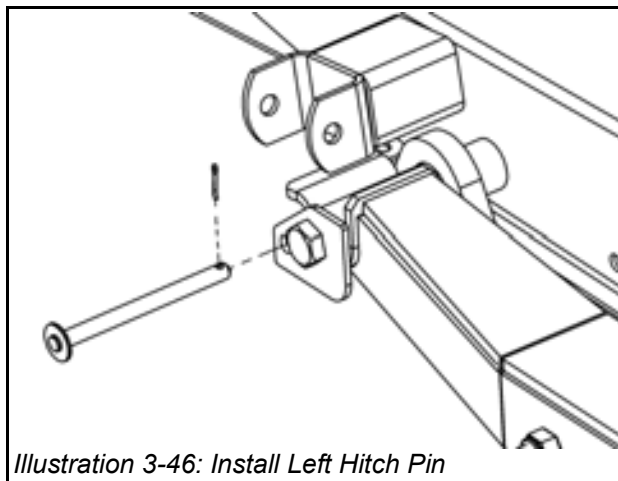


Illustration 3-46: Install Left Hitch Pin

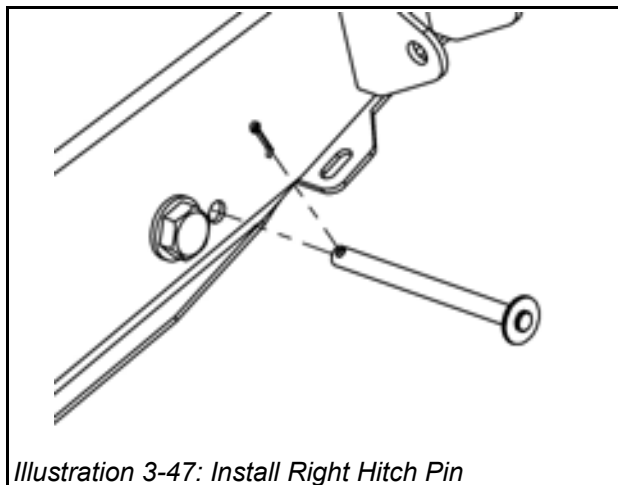


Illustration 3-47: Install Right Hitch Pin

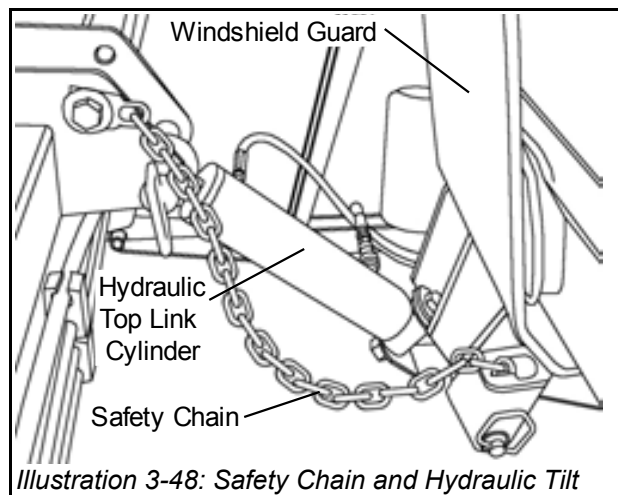


Illustration 3-48: Safety Chain and Hydraulic Tilt

12. If lining up the link is difficult, carefully raise the swather small amounts until it lines up.

13. Observe the positioning of the manual link to the right. You will note this is mounted in the identical locations as used for the hydraulic link shown in Illustration 3-48: Safety Chain and Hydraulic Tilt on page 48.

14. Carefully raise the swather to full height, then lock the arms, using the windrower's lock lever.



Shut the engine down and wait for all moving parts to stop before leaving the cab. Ensure the park brake is set.

15. If the hitch pin is not already in place when using the Hydraulic Tilt Option, secure the hydraulic tilt cylinder in place using the hitch pin provided. Ensure that the hitch pin is inserted from below as shown.

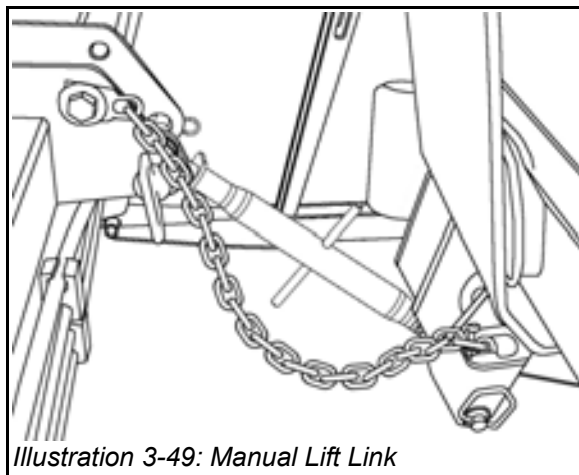


Illustration 3-49: Manual Lift Link

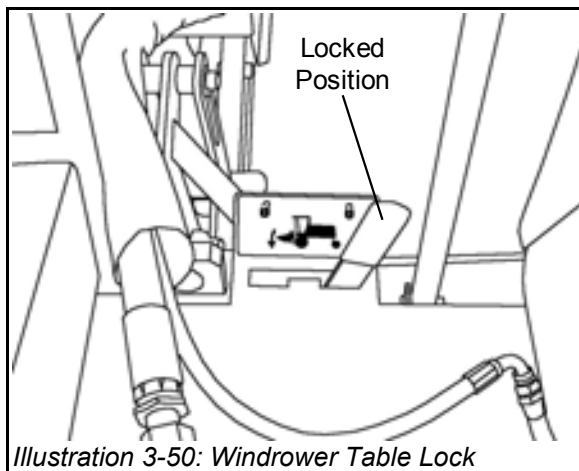


Illustration 3-50: Windrower Table Lock

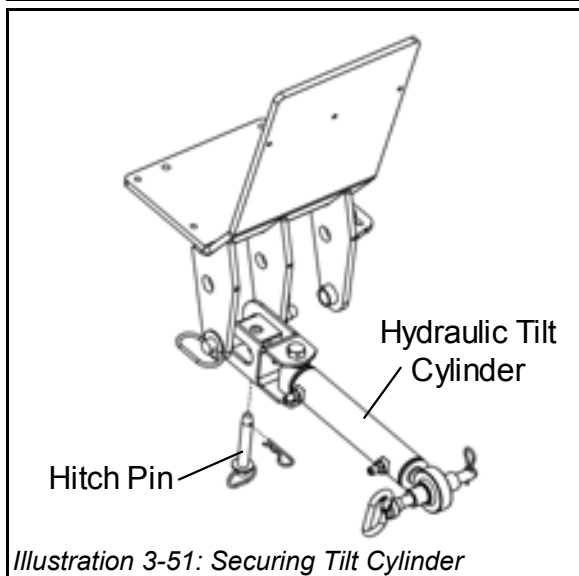


Illustration 3-51: Securing Tilt Cylinder

16. Remove the wheel assembly from the cutter-bar side of the table, and store in an appropriate location, or install onto the remaining gauge wheel mount.
17. Remove the pin which holds the axle extension in place, from position 1 and slide the axle into the housing.
18. Secure the axle in the housing by re-inserting the pin in position 2 as shown in the illustration to the right.
19. Remove the jack and remove the pin holding the axle strut in the vertical position.
20. Swing the axle up, and secure using the pin. Replace the jack as shown and secure with the pin.

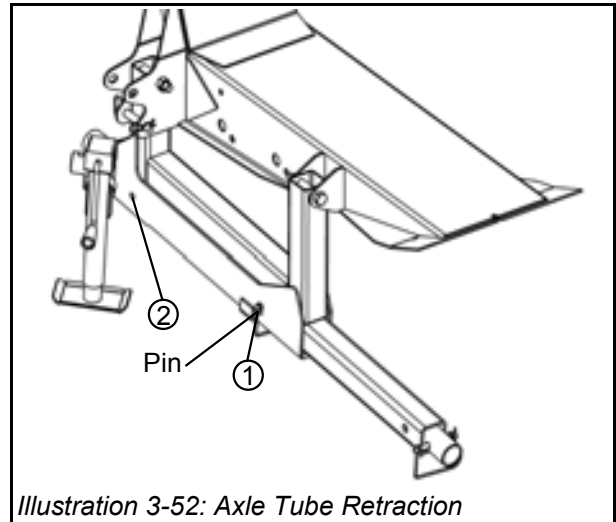


Illustration 3-52: Axle Tube Retraction

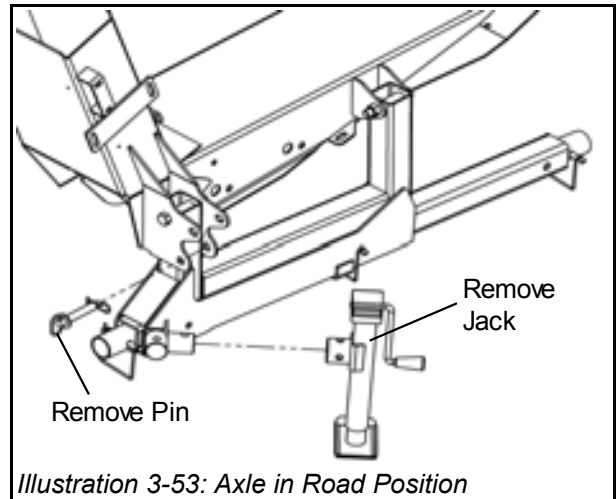


Illustration 3-53: Axle in Road Position



CAUTION The axle is heavy!

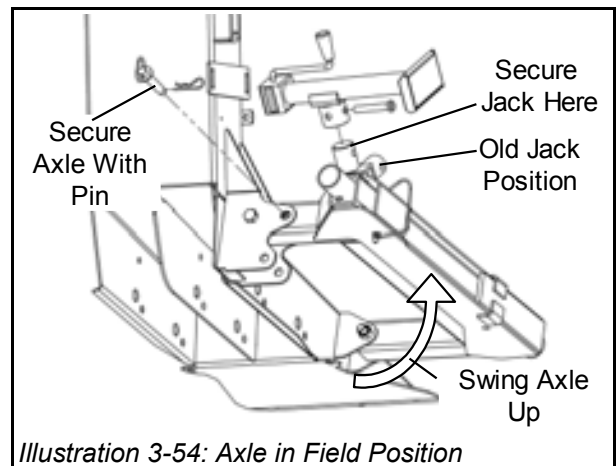


Illustration 3-54: Axle in Field Position

Store the Transport Hitch

1. The swather should still be lifted from the ground at this point, with the table safety lock in place.
2. Fully retract the jack leg, by raising the screw-driven section, and by collapsing the lower section (foot) to the first hole.
3. Release the hitch clamp, and slide the jack off the hitch tube. Store the jack as shown below, and tighten the clamp.

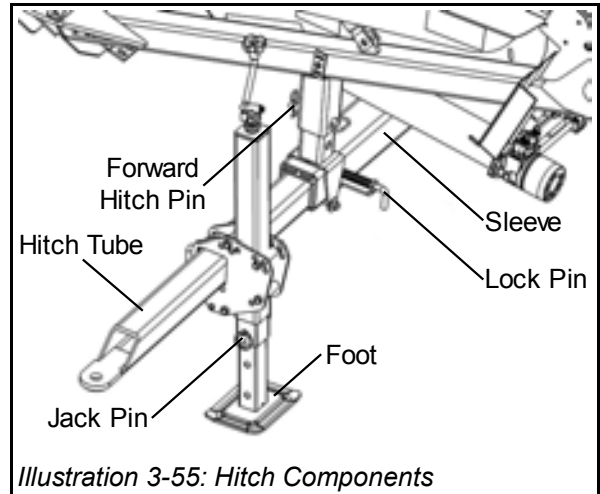


Illustration 3-55: Hitch Components

4. Pull the lock pin on the hitch tube and slide the tube into the storage sleeve. Refer to Illustration 3-55: Hitch Components. Attach the hitch safety chain to the storage stub as shown below.

If excessive vibration occurs, extend the jack until it contacts the hitch tube storage sleeve, as shown below.

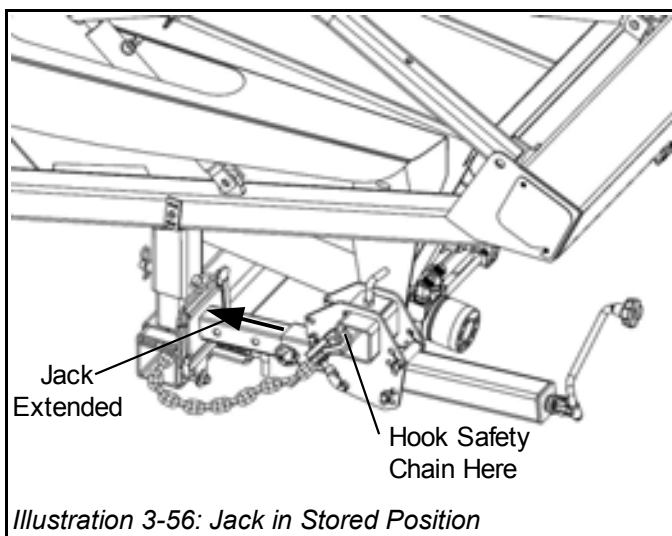


Illustration 3-56: Jack in Stored Position

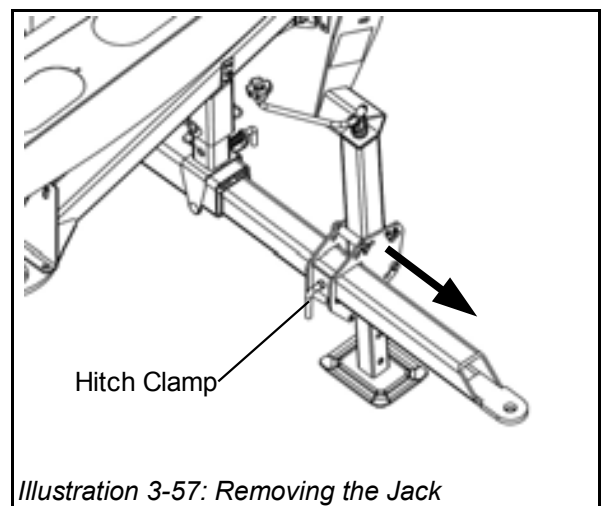


Illustration 3-57: Removing the Jack

Connect Electrical and Hydraulic Systems

Release the table lock, start the windrower engine and lower the table. Shut the engine down and engage the parking brake. Ensure all moving parts have come to a stop before exiting the cab.

1. Connect the electrical lines, and the hydraulic reel lift/tilt hose (standard on all tables) at the plug mount, located on the right-hand side of the cab.



The optional hydraulic swather tilt connection is also shown here (top right). Connect this now if you have not already done so.

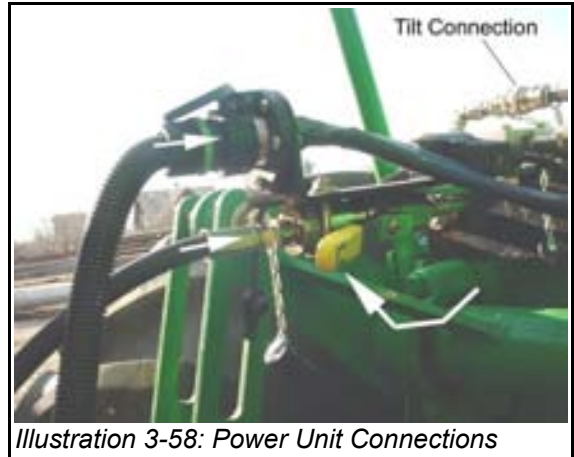


Illustration 3-58: Power Unit Connections

2. Open the valve to the reel lift/tilt cylinder (curved arrow).
3. Connect hydraulics for Pressure, Return, and Case Drain to the swather.



If you need to refer to hydraulic schematics, see the Hydraulics chapter.

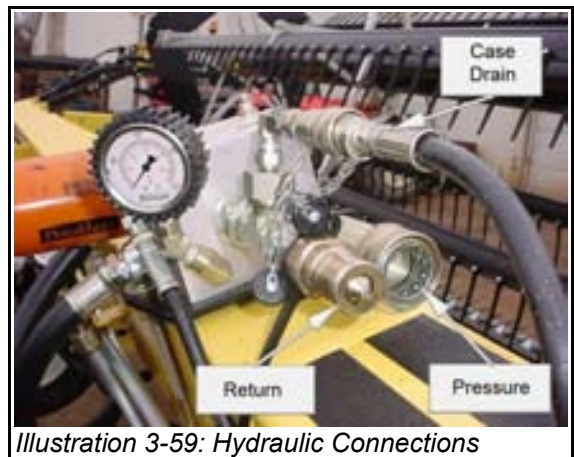


Illustration 3-59: Hydraulic Connections

When the swather is being stored, the case drain hose should be left connected to relieve pressure in the closed hydraulic system, thus avoiding potential damage to system components.

Install the Hose Holder

A bracket and canvas loop are provided to route the hydraulic hoses both while in use, and in storage. Use of this hanger will prevent damage to the hoses and connections from being run over, or trailed on the ground.

The bracket is installed on the cab railing indicated in the photo to the right.

The hydraulic hoses are fed through the canvas loop and then the canvas loop is fed through the bracket.

When the hydraulic hoses are not in use, ensure they are placed in a location where they will not become damaged or contaminated by dirt.



Illustration 3-60: Hose Connected



Illustration 3-61: Hose Stored

Leveling the Swather

If the table requires leveling at this stage, you have three options, of which you may elect to use singly or in any combination. These three options can be found in the Leveling chapter of this manual.

Programming the Tachometer

It is not necessary to start the engine to program the tachometer. These instructions apply to either single or dual display tachometers.

1. Move the key to the "OFF" position.
2. Press, and hold the Ground Speed (C) and Float Pressure (F) buttons while turning the key to the "RUN" position.
3. This will open the setup mode.
4. The "Function Selected" display (A) should highlight the upper left quadrant, and the primary machine code will be displayed in (H)
5. Press the Ground Speed (C) or Engine Speed (D) buttons to incrementally adjust the code up or down until it reads "13."
6. Press Reel Speed (E) and Float Pressure (F) buttons simultaneously to store the code and move to the next step.
7. The upper right quadrant will now be highlighted in the "Function Selected" display (A).
8. Press the Ground Speed (C) or Engine Speed (D) buttons incrementally, until this display reads "0" for the 4990, or "1" for a 4995 which provides greater input range for reel speed and platform speed.

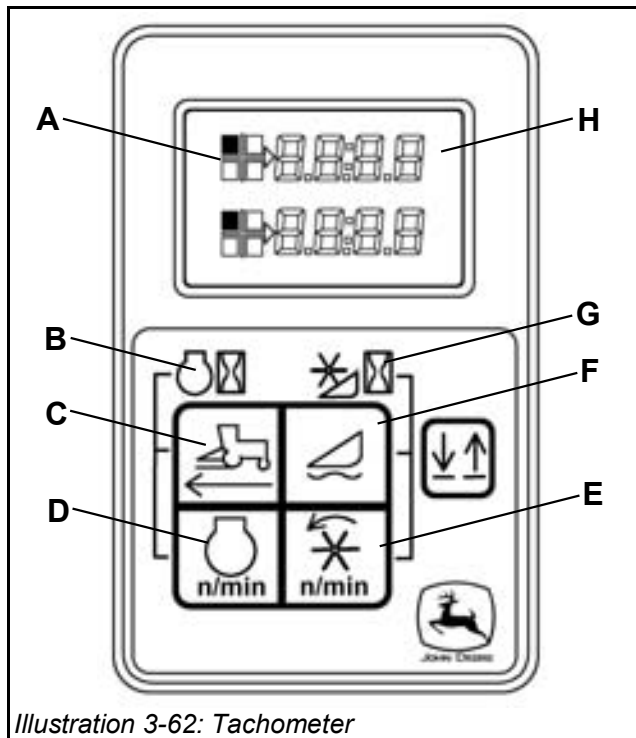


Illustration 3-62: Tachometer

- A – Function Selected
- B – Engine Hours
- C – Ground Speed (mph)
- D – Engine Speed (rpm)
- E – Reel Speed (knife drive)
- F – Float Pressure (psi)
- G – Platform Hours
- H – Digital Display



If the display does not read correctly with Code "1", try Code "0" as an alternate.

9. Press the Reel Speed (E) and Float Pressure (F) buttons simultaneously to store the code and move to the next step.
10. The Function Selected display (A) will now have the lower right quadrant highlighted. Press the Ground Speed (C) or the Engine Speed (D) button incrementally to adjust this reading to “26” for units prior to the 2002 model year. Beginning with the 2002 model year, this number will be “24.5” to reflect the change in final drive ratios.
11. Press the Reel Speed (E) and Float Pressure (F) buttons simultaneously to store this code and move to the next step. The Function Selected display (A) will now have the lower left quadrant highlighted. The number of pulses per engine revolution will be shown on the digital display (H).
12. Press the Ground Speed (C) or the Engine Speed (D) button incrementally until the display reads “30”.
13. Press the Reel Speed (E) and Float Pressure (F) buttons simultaneously to store this code.
14. Turn the key to the “OFF” position to exit the setup mode. Calibrate the Hydraulic Pump

JD 4990-4995 Install Flow Control Bracket (Hydraulic Pump Calibration)

Set the engine high idle to 2100 RPM. Normal pump output is 45 gpm (170 lpm). The Honey Bee swather requires a flow rate of **19.5 gpm (88.5 lpm)**. Install the flow bracket assembly onto the motor mount, located under the windrower, as shown below.

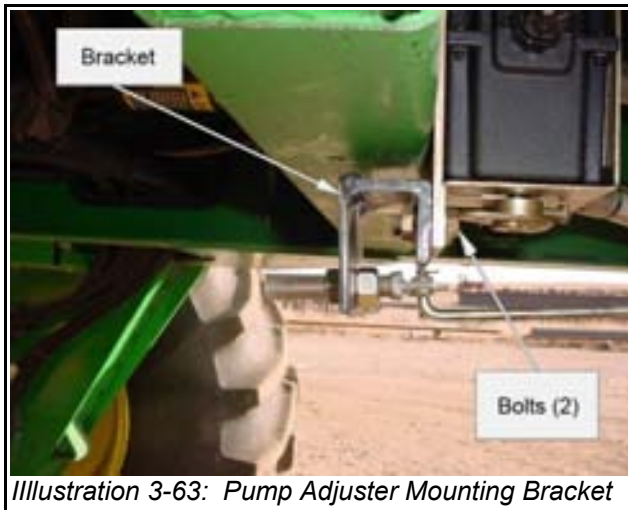


Illustration 3-63: Pump Adjuster Mounting Bracket

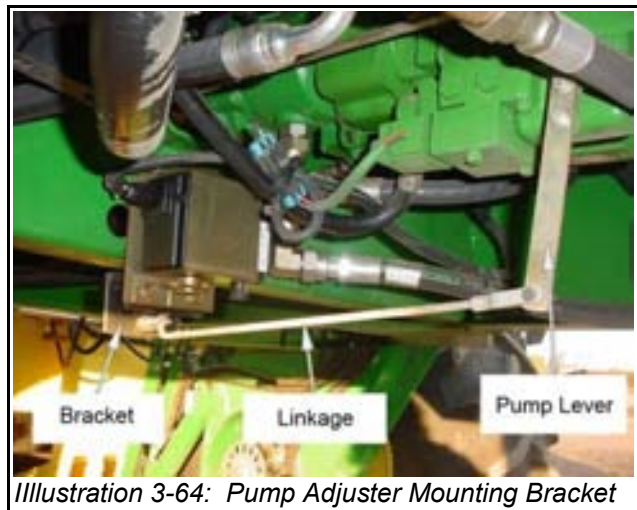


Illustration 3-64: Pump Adjuster Mounting Bracket

1. Remove the nuts from the two bolts holding the electric header pump output controller. Place the bracket on these bolts as shown above, replace and tighten the nuts.
2. Remove the cotter key holding the linkage lever onto the electric controller. **Do not permit the linkage rod to turn in the clevis end of the linkage, to avoid calibration problems when the rod is returned to the electric controller arm for other applications.**
3. Relocate the linkage into the adjusting bolt attached to the bracket you installed previously. Secure by replacing the top washer and use a new cotter key to secure the linkage in place.
4. Start the engine and set high idle (2100 rpm). Select the reel speed display, which shows the knife speed on the tachometer. (See your windrower operator's manual.)
5. Adjust the length of the linkage from the bracket until the readout shows 700rpm. Secure the lock nut. Recheck the knife speed to ensure it has not changed. You may verify this setting by installing a flow-meter to the output and return hoses, (19.5 gpm 88.5 lpm), or by using a phot-electric tachometer on the knife drive, in which case the reading should also be 700 rpm.

Mounting Checklist

	Lift arm assemblies fitted to the lift arms of the windrower.
	Lift arm and top link pins, bolts, and fasteners in place and secure.
	Transport axle and hitch tube in the storage (field) position.
	Transport parts stored for future use.
	Gauge wheels installed and secured. (if equipped.)
	Hydraulic lines (quick couplers) connected.
	Reel lift hose connected to the tilt circuit.
	Electrical connections complete and tested.
	Float relay removed.
	Reel tie down strap removed.
	Swather table leveled.

System Tests

Once all installations have been completed, and checked, the entire system should be tested to ensure everything is operating correctly. If a fault is detected, troubleshoot, and correct as needed.



If possible, the following tests should be completed with an observer present at a safe location outside, with a clear line of sight to the operator. If this is not possible, complete the tests with the cab door open, so the operator can more easily detect unusual noises.

Hydraulics, Electric, and Mechanical Checklist

	Check all fluid levels and top up if needed.
	Start the windrower, run the engine at low idle. Raise and lower the swather and adjust the needle valve to achieve a suitable rate of movement, given the present engine speed. Advance engine RPM to normal operating range, test the rate again, and adjust as necessary.
	Return the engine to idle RPM. Engage each of the swather controls, one by one, to test the electrical and hydraulic connections. Select the applicable function on the tachometer for each system you activate, and monitor its readings to ensure they are accurate.
	Engage all systems, and slowly advance throttle to normal operating RPM. Check that all systems are running at normal speed with no signs of problems or interference.
	Stop all systems, turn the engine off. Inspect the swather to ensure everything is secure, and there are no signs of abnormal operating conditions. Make adjustments as required, and re-test as necessary.
	Check hydraulic fluid levels and top up if necessary.

Control Console Wiring Schematics

JD 4895-4995 WS Swather – New Configuration

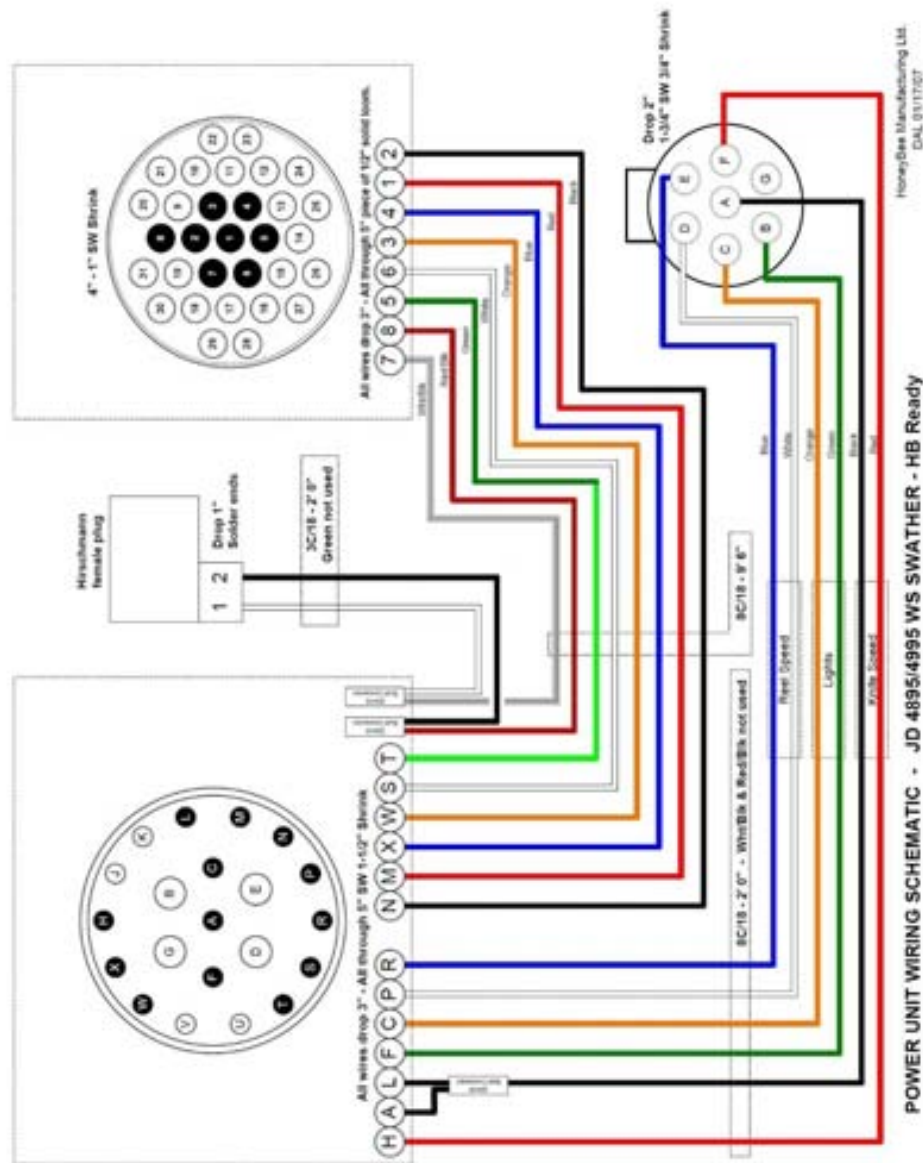


Illustration 3-65: New JD 4895/4995 Wiring Schematic

Applicable to all JD 4995 units with serial numbers including and after E04995X330675 and all JD 4895 units with serial numbers including and after E04895X330107.

[illegible]

Applicable to all JD 4995 units with serial numbers before E04995X330675 and all JD 4895 units with serial numbers before E04895X330107.

JD 4890-4990 WS Swather

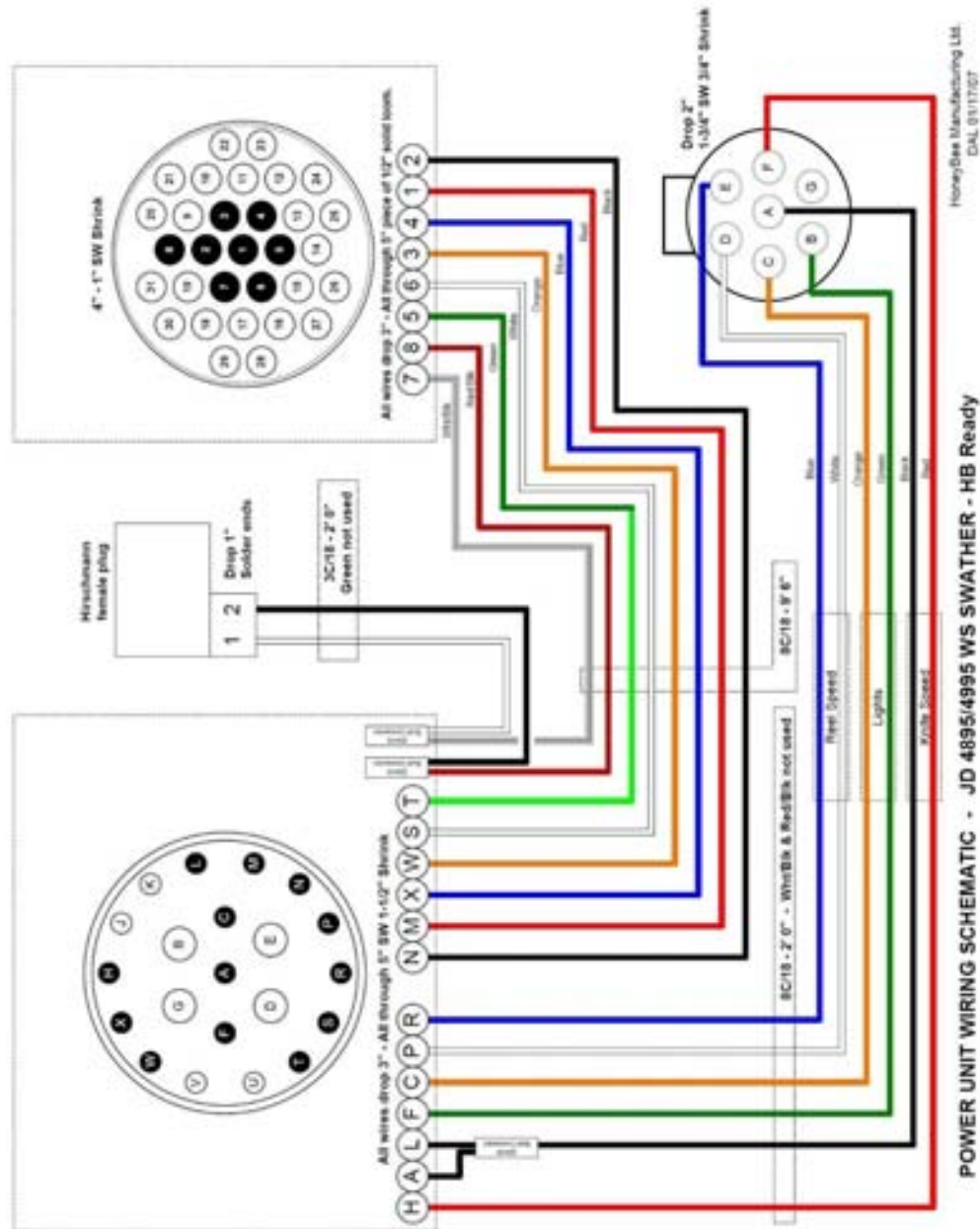


Illustration 3-67: Original JD 4890/4990 Wiring Schematic

Applicable to all JD 4890 and JD 4990 units.

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4 - Operation

Initial Start-up



Keep bystanders, especially children, away from the machine during these operations.

Before attempting these steps, complete the mounting checklist to assure the swather is securely mounted.

1. Unlock the lift arms by disengaging the platform lock as per windrower manual.
2. Start the windrower (see operators manual) and lower the swather to the ground.

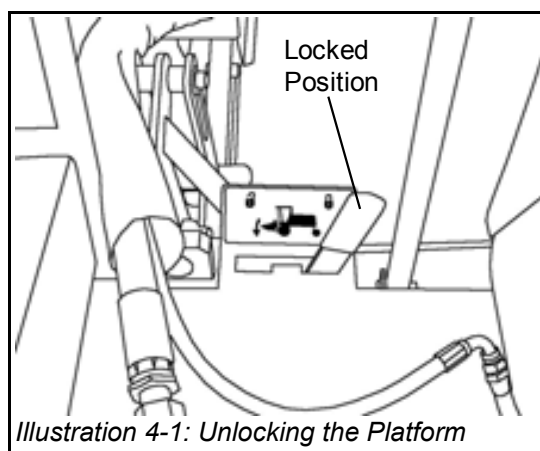


Illustration 4-1: Unlocking the Platform



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

3. With the swather completely lowered, (in full contact with the ground) inspect the swather for damaged or loose parts, nuts and bolts. Repair or replace any such parts as required.
4. Check hydraulic reservoir oil level on the windrower. Fill to recommended level according to instructions in windrower owner's manual.
5. Ensure that all protective shields are in place and properly secured.
6. Check that transport/gauge wheel tires are inflated to the recommended pressure. (50 psi. (345 kPa) for transport, 24 psi. (166 kPa) for field work.)
7. Check all hydraulic hoses and fittings to be sure they are tight, properly connected, and that no hose damage has occurred during mounting. Repair or replace any damaged parts before re-starting the machine.



Do not operate this machinery with defective hoses or fittings. Ensure hydraulic pressure is released before checking or attempting repairs. Pressurized hydraulics can cause serious injury.

8. Lubricate the swather. See service points in the Lubrication section of this manual.
9. Restart the windrower (see windrower Operators Manual). Engage the Park Brake.

F-N-R Lever Controls

1. Locate the platform tilt switch on the F-N-R lever. This switch will be used also as the reel lift/lower control switch. A switch on the console (see below) to the right of the lever allows you to select the function of the switch on the F-N-R lever (if equipped with hydraulic tilt option).
2. Depress the platform tilt switch to raise the reel until the cylinders are fully extended. Hold switch on momentarily, then drop the reel to its lowest position (cylinders fully retracted). Complete this cycle at least twice to ensure the system is working properly.

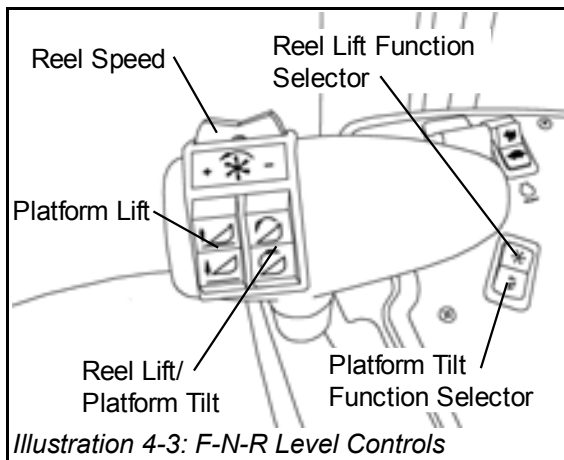


Illustration 4-3: F-N-R Level Controls

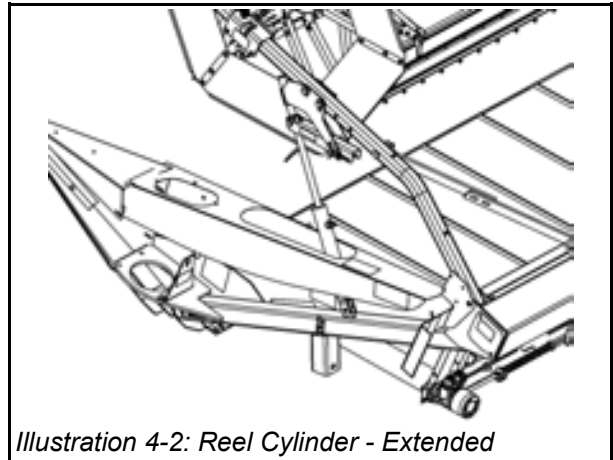


Illustration 4-2: Reel Cylinder - Extended

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 the header drive is disengaged and the header is resting 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".

Cycle the reel to the top of the stroke, then lower the reel until about 2" of cylinder rod remains exposed. Shut the windrower down. Wait for 10 to 15 minutes to allow the air bubbles in the oil to dissipate. Loosen the bleed port cap on the slave cylinder (far left hand cylinder). Air and oil will escape, and the reel will settle. Tighten the bleed screw (cap) and cycle the reel again. If needed, repeat this procedure.

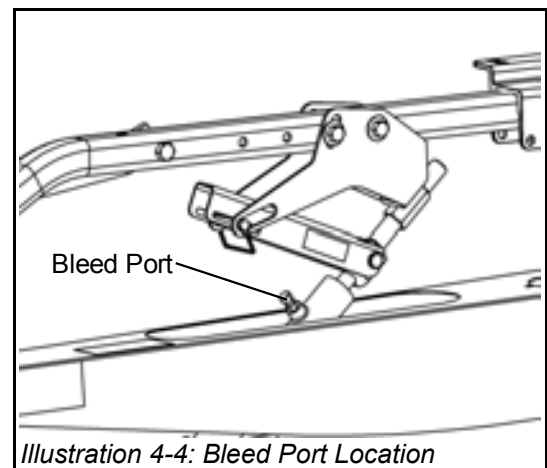


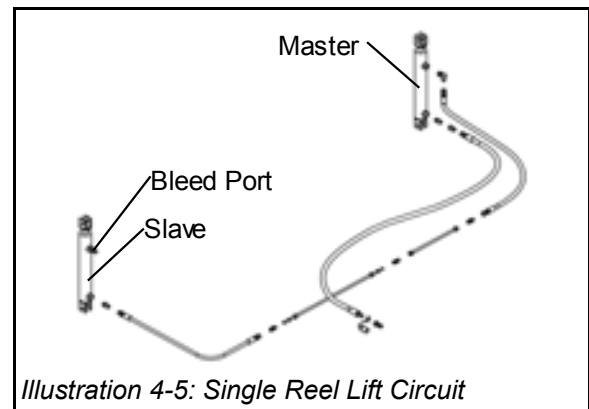
Illustration 4-4: Bleed Port Location



Because of expansion in hydraulic lines, it is normal for the slave cylinder to lag slightly when lifting the reel

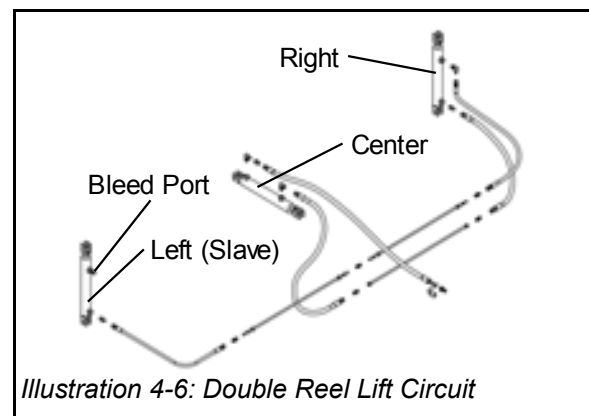
Single Reel Lift Circuit

When the operator opens the valve in the windrower, oil is forced into the barrel end of the right hand master cylinder, as the cylinder piston rises, oil on the top side of the piston is forced out of the rod end port, into the port on the slave cylinder.



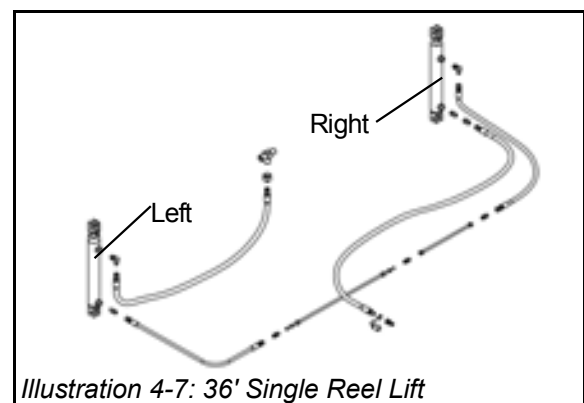
Double Reel Lift Circuit

Pressure from the windrower feeds barrel end of center cylinder. Rod end feeds barrel end of right cylinder. Rod end of right cylinder feeds barrel end of left cylinder (slave).



36' Single Reel Lift

Pressure from the windrower feeds barrel end of right cylinder. As the cylinder piston rises, oil on the top side of the piston is forced out of the rod end port, into the port on the other cylinder. Rod end of slave returns into the table return.



Additional Checks:

1. Unlock the platform, as shown previously.



If the windrower will not lift the swather table, see the Troubleshooting section of this manual.



Be certain no one is standing near the machine while you are raising or lowering the swather.

2. Raise and lower the swather table to ensure the lift cylinders are working properly.
3. With swather lowered to the ground, and the windrower shut down, check the tension on each draper. If adjustments are required, see the Draper section of this manual.
4. Re-start the windrower, engage the parking brake. Engage platform drive switch (see windrower Operator's Manual) with windrower at low idle. The platform draper, knife and reel should begin to turn.



If any leaks appear, shut the unit down, and switch off the engine immediately. Locate the source of the leak, and repair before re-starting.

5. Increase engine speed, until the windrower is at normal operating engine rpm, check and set the following:
 - Reel speed.
 - Draper speed.
 - Draper tracking.
6. If changes are required see the appropriate section of this, or the windrower manual.
7. With the swather lowered to approximately 2 inches (5 cm) from the ground, stop the windrower, shut the engine down, and check the following:
 - Swather leveling (end to end).
 - Swather cutting angle.
 - Gauge wheel height.
 - Reel mount bolts.
 - Knife head section bolts, Knife head bearing bolt, and bearing block bolt.
 - Knife drive support/crank bolts.
 - Connector bar bolts on knife back.
 - Knife drive mounting bolts.


Problems frequently encountered during start-up and break in period***High Hydraulic Pressures - Cold Oil***

- Sticky Draper
- Sticky or Tight Knife
- Draper Too Tight


Reel Will Not Raise

- Low Oil Volume from windrower
- Line Restriction
- Valve not open

Full Dismount

IMPORTANT  Park the windrower on a hard, level surface. Engage the park brake.


1. With the windrower running, lower the reel to its lowest position. Lower the swather to the ground.

CAUTION  Shut the engine down and wait for all moving parts to stop before leaving the cab. Ensure the park brake is set.

2. Uncouple all hydraulic hoses connecting swather to the windrower. Tie or lay hydraulic hoses in such fashion that they will not interfere with the windrower or the swather when the windrower is being backed away from the swather.
3. Uncouple all wires running from the windrower to the swather (21 pin connector) and store on the dummy connector provided.
4. Start the engine, lift the table to its fully raised position
5. Lock platform in fully raised position as described previously, and in your windrower Operator's Manual.



Illustration 4-8: Transport Electrical Connector

CAUTION  Shut the engine down and wait for all moving parts to stop before leaving the cab. Ensure the park brake is set.

Self Storing Hitch – Transport Position

6. To convert the hitch from storage to transport mode, remove the safety chain from the storage stub. Release the pressure on the jack, loosen the locking lever, and slide the jack off of the stub.

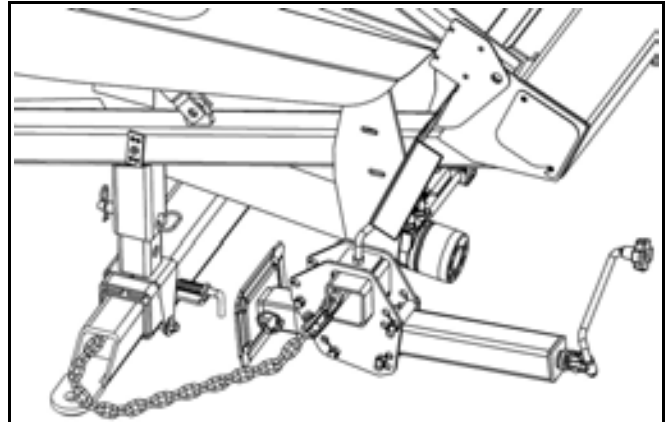


Illustration 4-9: Removing the Jack from Storage

7. Pull the lock pin on hitch tube sleeve, and then pull the hitch tube out of the hitch tube sleeve. Reinsert the lock pin to secure the tube.

8. Install the jack onto the hitch tube, and tighten the locking lever on the jack mount.

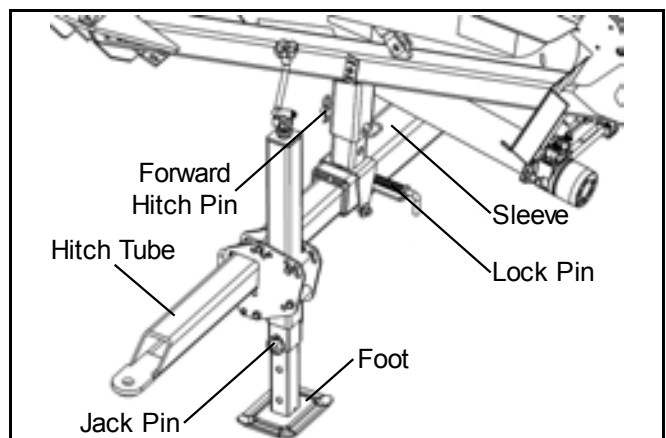


Illustration 4-10: Hitch Tube Extended, Jack Installed

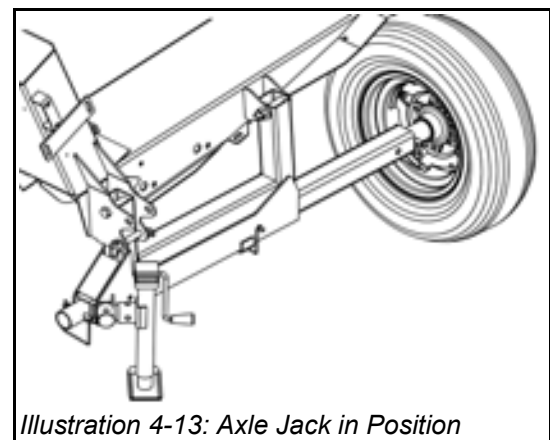
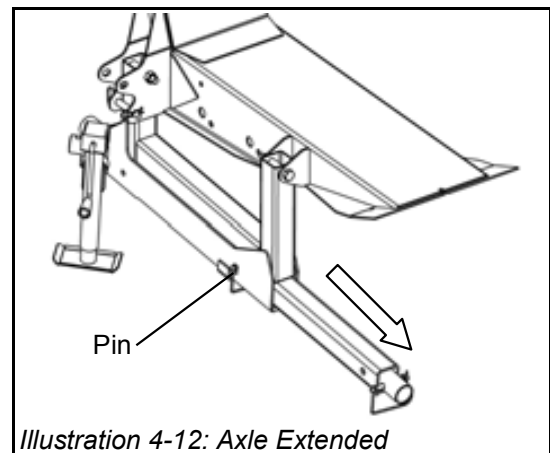
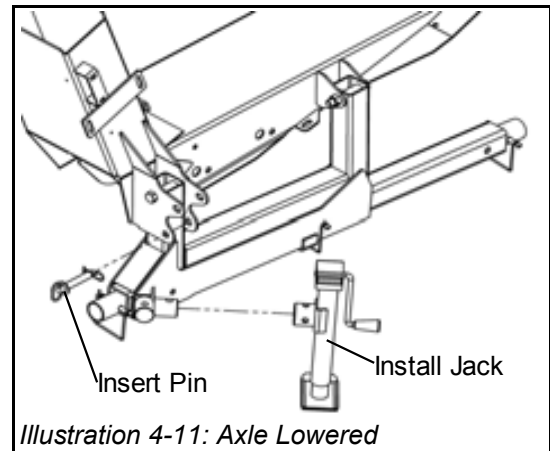
9. Extend the lower leg of the jack to a suitable hole.

Install Transport Axle

10. Carefully lower the axle from the field position to the transport position. Ensure the hitch pin has been inserted back onto the strut in the transport position.
11. Remove the hitch pin securing the extension inside the axle. Pull out the extension and relocate the pin to secure for transport.
12. Install the wheel assembly onto the extension on the cutterbar side of the table, insert lock pin into spindle mount and secure with safety clip.
13. Install the transport axle jack to support the weight at the rear of the table.
14. Place the platform lock in the unlock position, as shown previously and in the windrower operator's manual.
15. Restart the windrower. Lower the swather until the front transport axle wheel, transport screw jack and hitch tube jack just touch the ground. The lift arms should still be firmly set on the strut rollers.



Shut the engine down and wait for all moving parts to stop before leaving the cab. Ensure the park brake is set.



16. Block transport axle tires so the swather will not move once the windrower has been removed from the swather.

17. Release all pressure on the top link, then disconnect the top link.



It may also be necessary to raise the table back up by small amounts to release enough pressure.

18. If the optional hydraulic tilt cylinder is used, you may remove the hitch pin, then disconnect it from the swather, and place the cylinder in its storage position (Tilt Cylinder lifted up against the Windshield Guard and secured with the chain).

19. Store the top link (or hydraulic lift cylinder, if equipped) against the windshield guard and secure with the light chain (and the hitch pin that was removed in step 18 if the hydraulic option is used.)

20. Disconnect the safety chain.

21. Remove the two hitch pins from the table struts.

22. Carefully lower the swather so that the weight is fully on the front wheel, hitch and rear axle jack.

23. Continue to lower the lift arms.

24. Once the lift arms are clear of the rollers inside the swather struts, slowly back away.

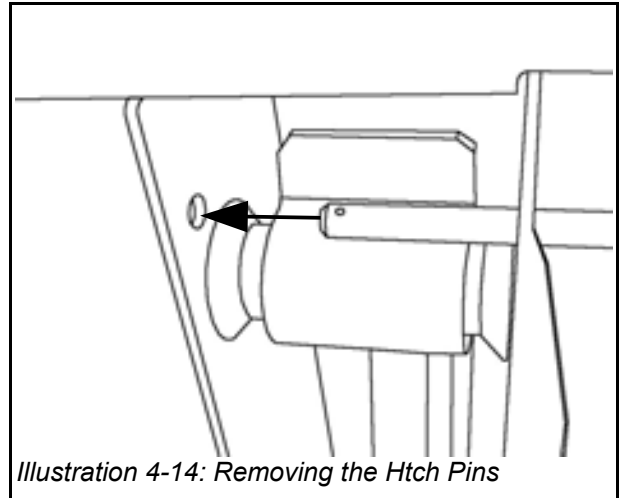


Illustration 4-14: Removing the Hitch Pins

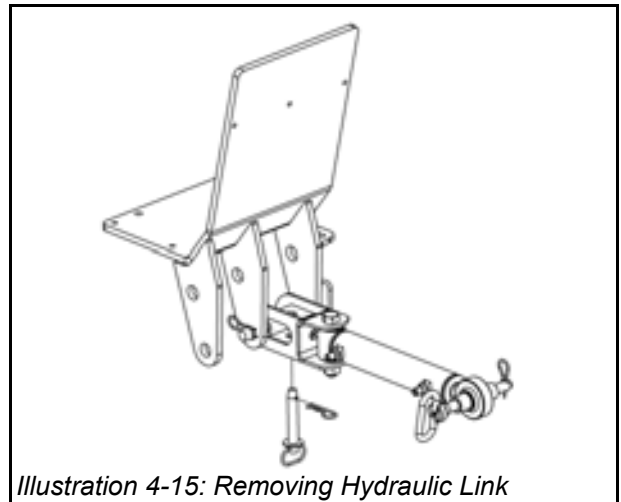


Illustration 4-15: Removing Hydraulic Link



If the swather moves, stop immediately and find the cause.



Once clear of the swather, engage the park brake. Shut the engine down and wait for all moving parts to stop before leaving the cab.

25. Attach the rear wheel and secure with the hitch pin.

26. Lower the jack, remove it and re-install it in the storage position.

27. Check that the swather is level. If necessary adjust the height of the hitch jack.

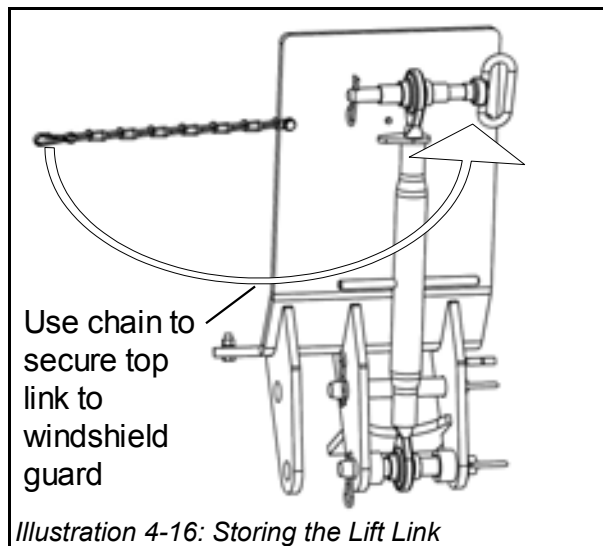


Illustration 4-16: Storing the Lift Link

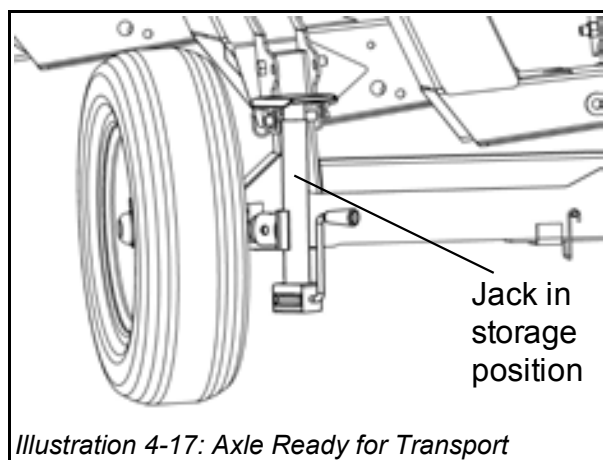


Illustration 4-17: Axle Ready for Transport

5 - Reel

Reel Position

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



Clear the area of bystanders and small children before making any of the following adjustments to the header.

Lower the reel to its lowest position.



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

Measure the amount the reel needs to be moved, either fore, aft, up, or down.

Fore/Aft Adjustment (Manual Version)

1. Pull the lock pins in both reel mount brackets until the pins are clear of the lock hole. Tip the pins to the side of the hole, so that the hole is fully visible.
2. The reel is now free to slide either forward or backward. 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.

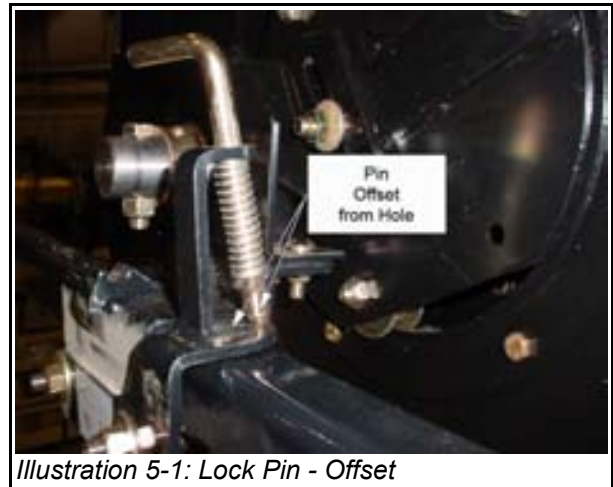


Illustration 5-1: Lock Pin - Offset

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

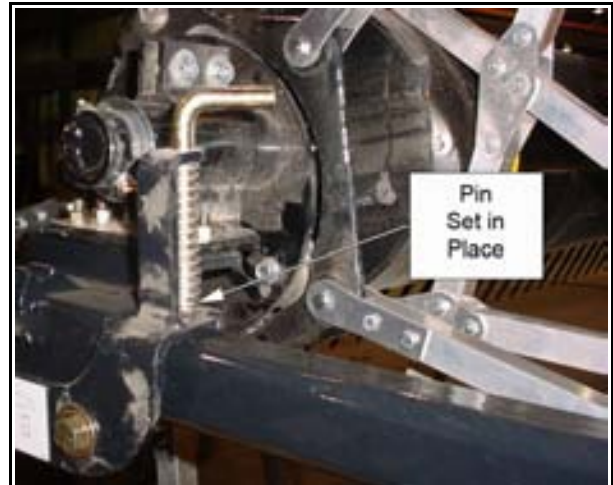


Illustration 5-2: Lock Pin - Set in Place

Reel Arm Leveling and Height Adjustment

1. To level the reels correctly, the reel adjustment brackets (adjuster nut) must be mounted in the proper position on the reel arms.
2. 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.

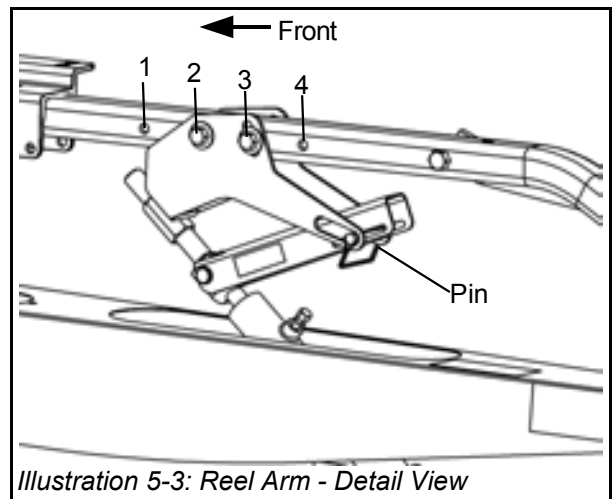


Illustration 5-3: Reel Arm - Detail View

3. If the reel arms need more adjusting, each reel arm can be adjusted separately by turning the reel adjuster screws.
4. Remove pin holding cylinder lock in place. Pivot cylinder lock downward so it can be rotated easily.
5. Measure the amount the reel needs to be adjusted.
6. Rotate cylinder lock clockwise if the arm needs to be lowered, and counter clockwise if it needs to be raised.

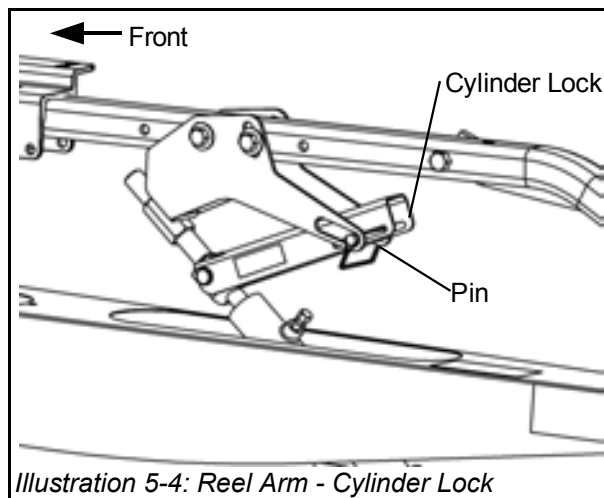


Illustration 5-4: Reel Arm - Cylinder Lock

7. Pin cylinder lock back into the storage position when the reel is level.



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.

Center Arm Leveling

To level the center reel arm on swathers with dual reels adjust as follows.

1. Loosen the lock nut.
2. Turn bolt to adjust height.
3. Re-tighten lock nut.

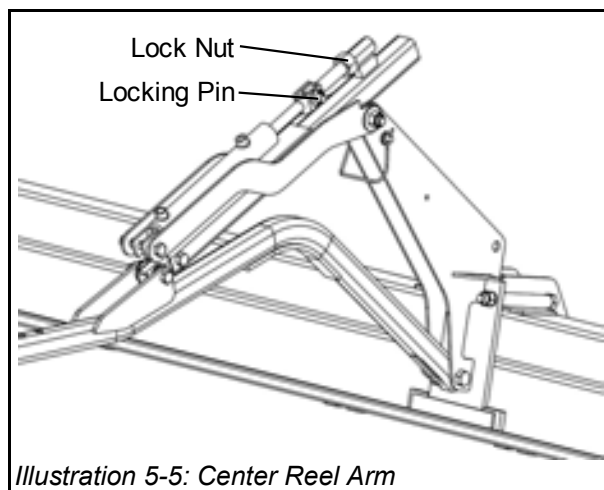


Illustration 5-5: Center Reel Arm

Optional Hydraulic Fore & Aft

Headers equipped with optional hydraulic fore and aft are operated using in-cab controls. Windrower must have fore/aft option or optional hydraulic solenoid kit must be installed to operate fore & aft cylinders.

The fore and aft hydraulic circuit should be plumbed according to the diagram on the right.

To extend the reel on the single reel circuit, the oil flows from the windrower to the barrel end of the master cylinder on the right side. Oil from the rod end of this cylinder flows to the rod end of the cylinder on the left side. Oil from the barrel end of the left cylinder then returns.

To retract the reel, the flow is reversed.

The double reel fore and aft circuit uses three identical cylinders. To extend the reel, oil from the windrower flows to the barrel end of the right hand cylinder, to the rod end of the center cylinder, to the barrel end of the left hand cylinder. Oil from the rod end of the left-hand cylinder then returns.

To retract the reel, oil flow is reversed.

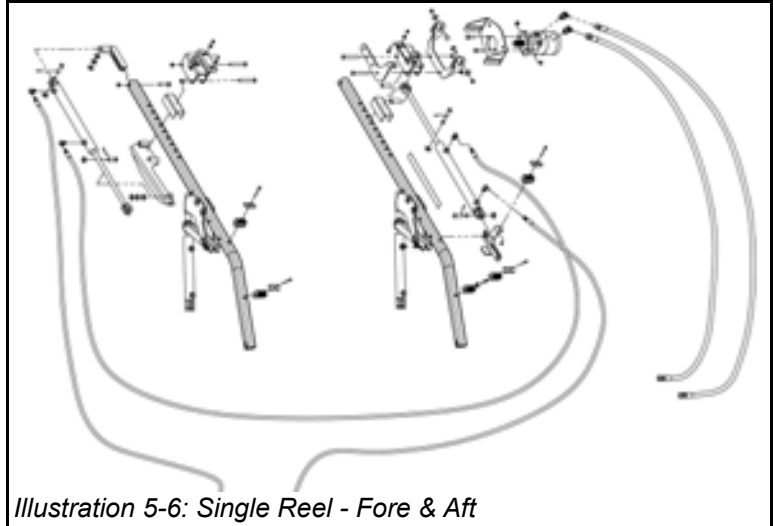


Illustration 5-6: Single Reel - Fore & Aft

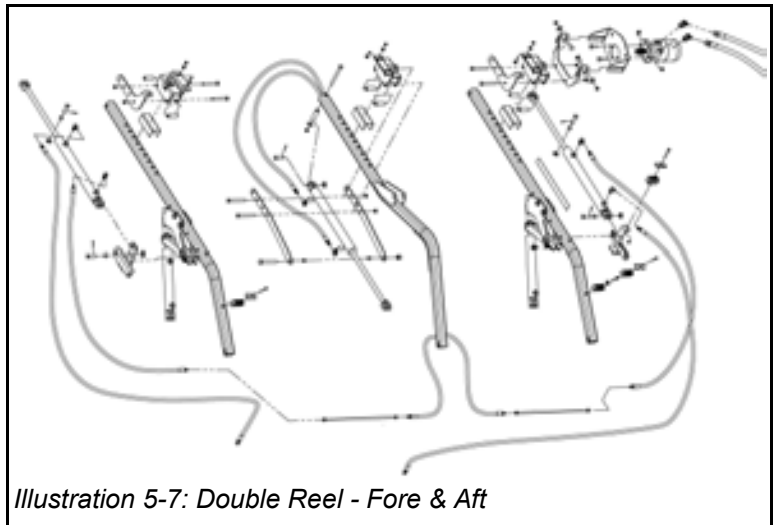


Illustration 5-7: Double Reel - Fore & Aft

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 swather, loosen the two bolts on both the left and right reel arm braces. Push the reel left or right until centered. Re-tighten all bolts.

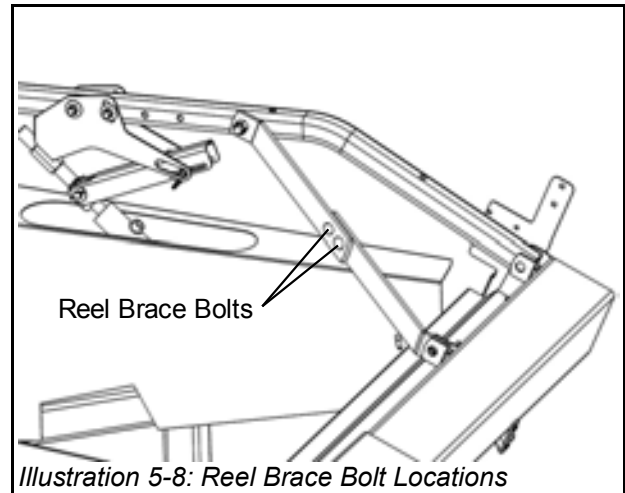


Illustration 5-8: Reel Brace Bolt Locations

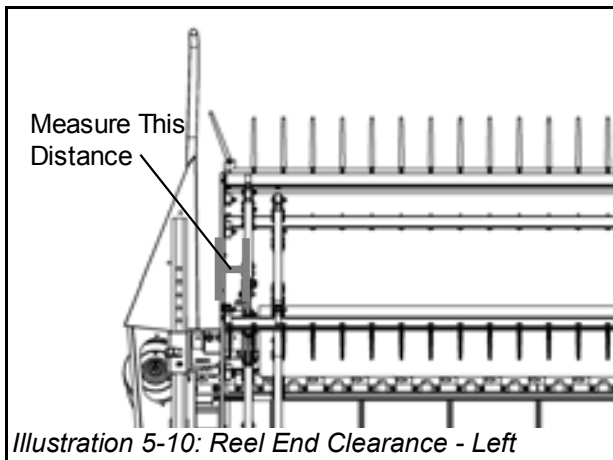


Illustration 5-10: Reel End Clearance - Left

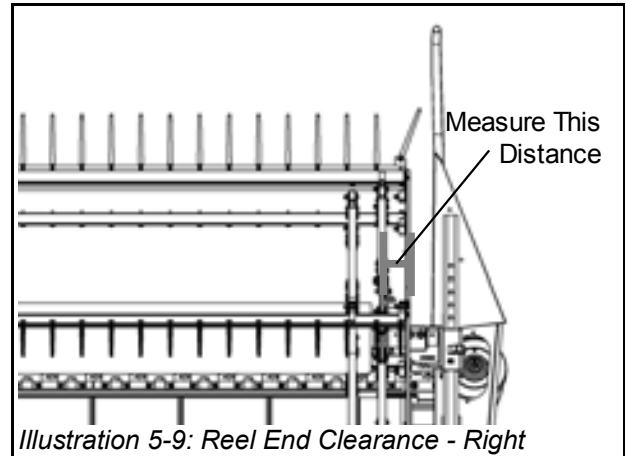


Illustration 5-9: Reel End Clearance - Right

Reel Tines

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.

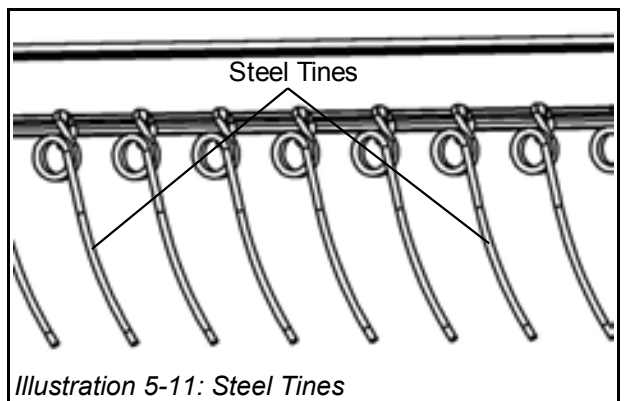


Illustration 5-11: Steel Tines

Reel Drive

The reel is driven by a hydraulic motor with a direct drive coupler to the reel. Check coupler bolts and motor mount bolts regularly for tightness.

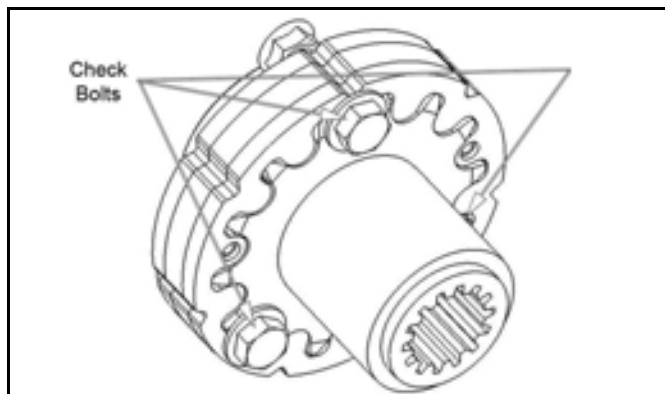


Illustration 5-12: Reel Drive Coupler

Check alignment of motor to reel tube, shim mounting bolts if required.

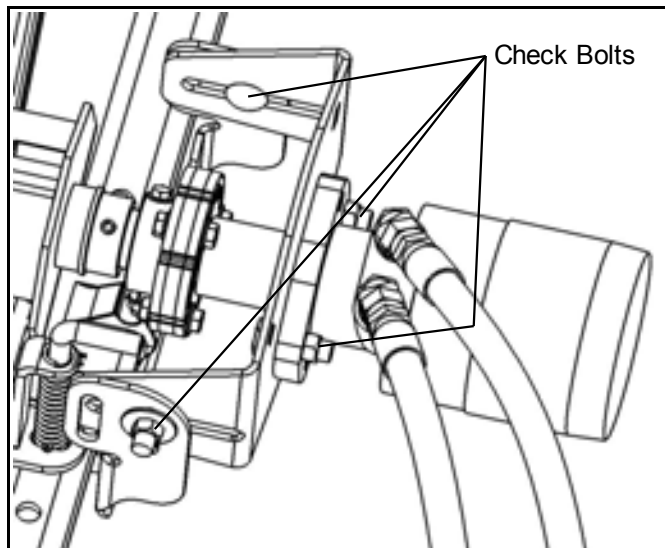


Illustration 5-13: Reel Motor

Reel Speed Adjustment

Normally reel speed is 10% to 20% faster than the ground speed of the windrower. The reel speed can be adjusted via a switch on the FNR handle found within the power unit.

The windrower is equipped with standard reel speed control. The swather is configured with a flow control valve and a remote control motor on the table. The flow control regulates the oil flow, which governs the speed of the reel.

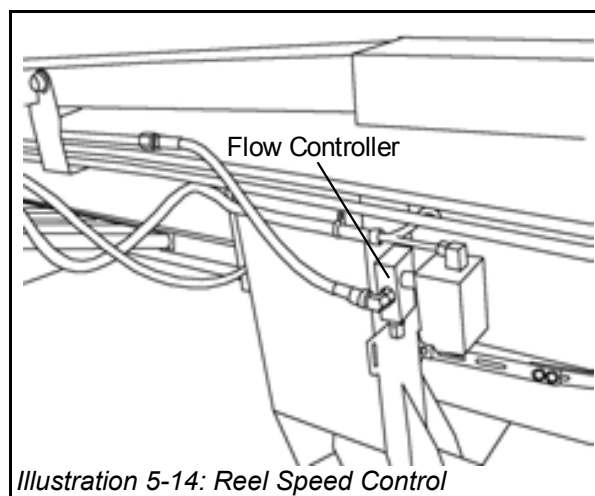


Illustration 5-14: Reel Speed Control

The flow control is also equipped with a relief valve which is factory set at 2200 psi. 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 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.

For more information on adjusting the relief pressure, please refer to the Adjusting the Relief Pressure section in the Hydraulics chapter.

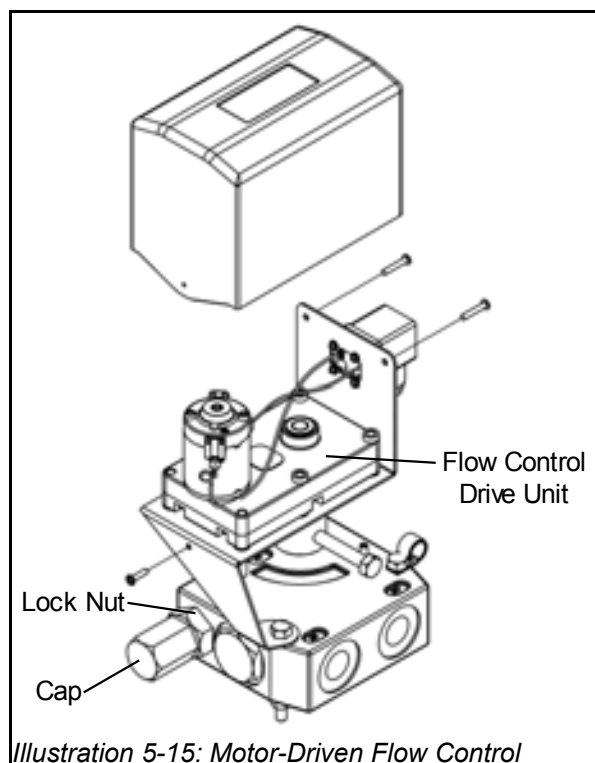


Illustration 5-15: Motor-Driven Flow Control

Universal Ull Pick up Reel

Tine Pitch Adjustment

The pitch of the tines may be adjusted by loosening bolts (shown at right) at BOTH ends of the reel and inserting a suitable tool in tube, 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.



The pitch **MUST** be adjusted the **SAME** at **BOTH** ends of the reel.

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 draper decks. If crop starts to wrap around reel, adjust tines to make the angle of attack less aggressive.

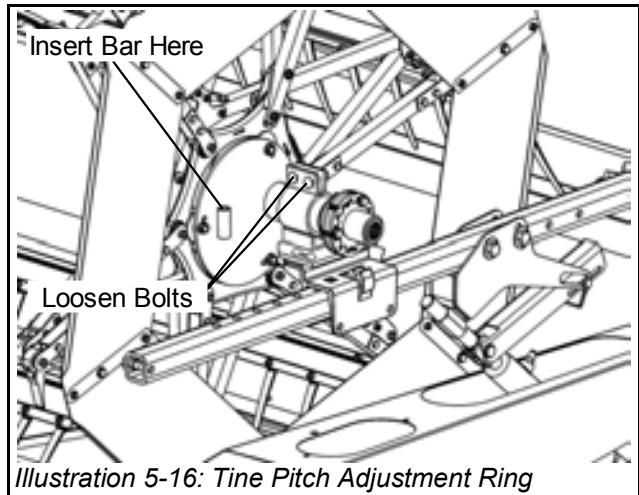


Illustration 5-16: Tine Pitch Adjustment Ring

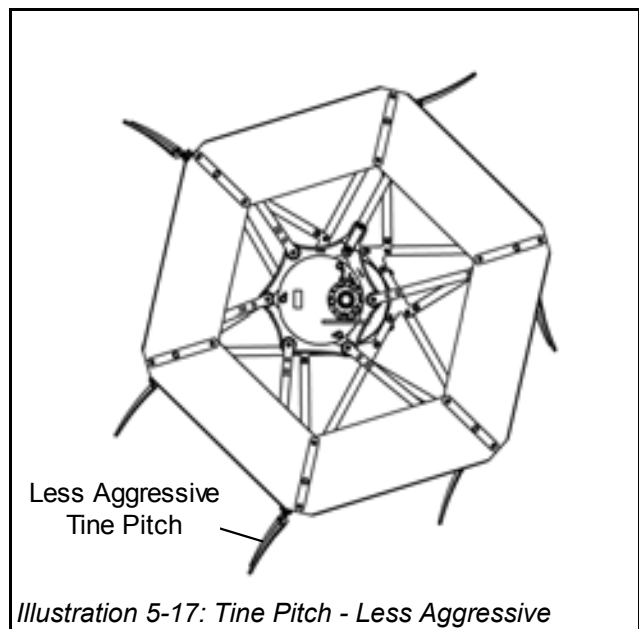


Illustration 5-17: Tine Pitch - Less Aggressive

Minimum Reel Height

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.



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.

Reel Position in "Down" Crops

The pickup reel height in down crops should be low so the tines lift the crop onto the cutter bar. The tines should be adjusted more aggressively, so they pick up the crop and lift it onto the cutter bar without carrying the crop around the reel.

The fore and aft position of the reel should be adjusted so the reel center tube is in front of the cutter bar so the crop is lifted before it gets to the cutter bar.



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

Reel Position in Standing Crops

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

The reel should be positioned 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 will be pushed down before it is cut and some of the heads will be missed.

Reel Speed

Reel speed should be adjusted to match ground speed. The reel should turn approximately 10% - 20% faster than the windrower is traveling. Adjust the reel speed until it appears that the reel is "pulling" the windrower 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 draper.

If the reel speed is too fast, the head or seed pod may be shattered by the impact of the reel. The crop 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 using the grease fitting at each end of the reel shaft. On 36' headers additional grease fittings are on the center reel arm mounts.

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

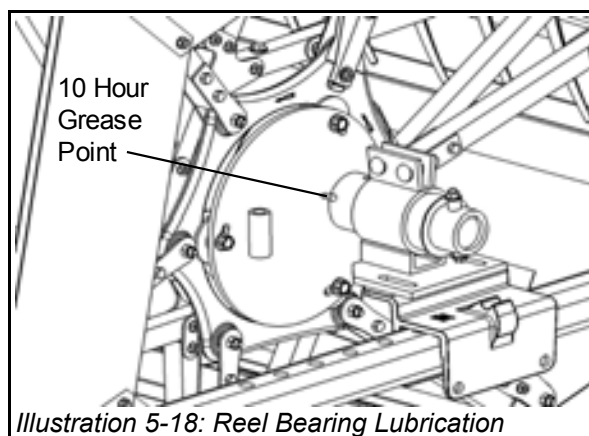


Illustration 5-18: Reel Bearing Lubrication

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 rollers are in the same relative position. Do not take up the slack by adjusting only one roller.

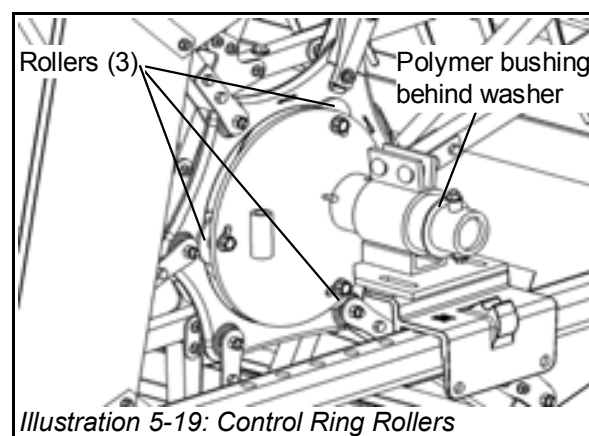


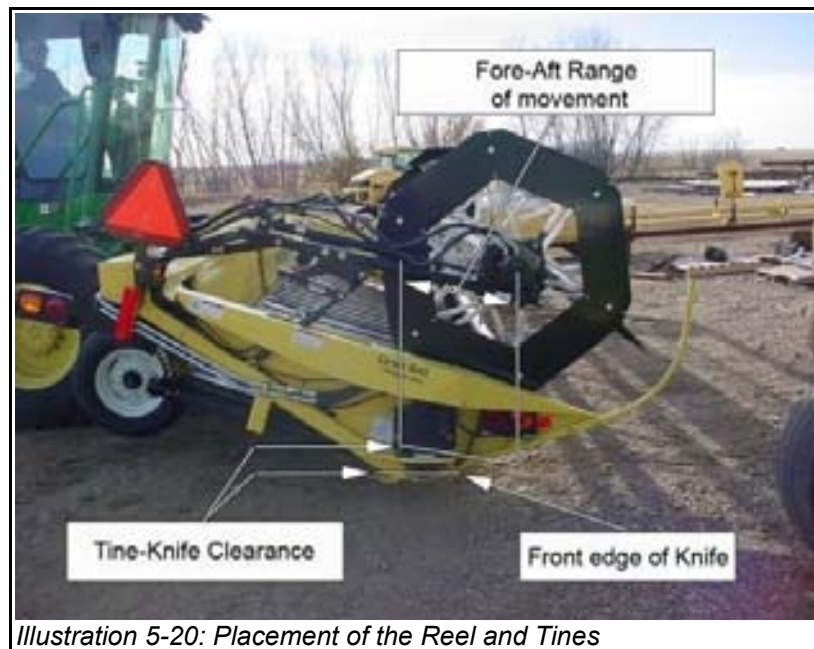
Illustration 5-19: Control Ring Rollers

Hart-Carter Reel (HCC)

Placement of the Reel on the Swather

The fore-aft feature can move the reel back and ahead approximately 12" (300mm).

- Normally, in "down" crop, the reel should be set further ahead.
- In standing crop, the further forward the reel is moved, the less efficiently it will deliver crop onto the knife.
- If using manual fore-aft, set the reel center forward the same amount on both ends.
- For hay crops, the reel should be centered over the cutter bar with minimum tine clearance.
- Adjust the reel arms so that the tine tips will clear the guards and sickle by between 1" (25mm) and 5" (127mm).
- Normally the more "down" the crop; the closer the tines should be placed to the cutter bar.



Always engage reel lift and table lift cylinder locks before working under or around a raised pickup reel. Do not rely on the windrower hydraulic system to support the reel or the swather. A rupture or leak in any part of the system could cause the table to drop abruptly, if these stops were not in place.

HCC Check Points before Operation

- All bolts are tight.
- Tines clear the sickle as reel rotates. (Rotate the reel manually.)
- Auxiliary fingers clear side shields.
- Reel arms are aligned. (No bow in the bat shaft or pivot bracket bat assemblies.)
- Pitch adjustment bolt is in the same location on both sides. (double eccentric reels only).
- Grease fittings on each end, and at the center on double reels.



An initial lubrication of the plastic bat bearings with a light film of oil will improve break-in and enhance the service life of the bearings.

Tine Pitch Adjustment

Begin with a pitch of about 5 degrees as shown below.

- Too much pitch will cause the reel to wind with cut crop because the tines do not release the crop after it is cut.
- For hay crops, the tines should be nearly perpendicular to the cutter bar.

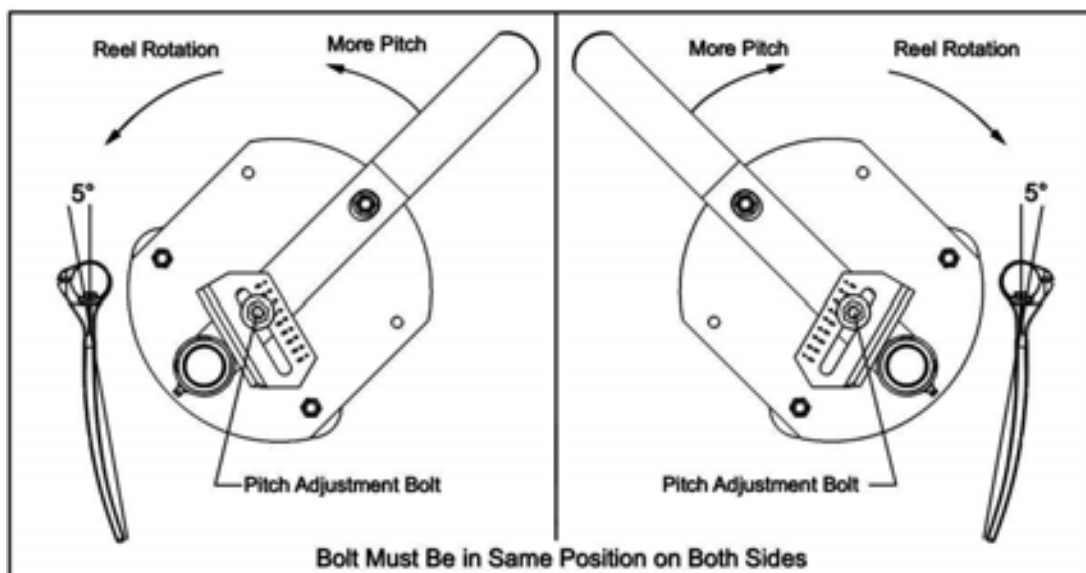


Illustration 5-21: HCC Tine Pitch Adjustment

Reel Speed

Reel speed for a 42" diameter reel should be between 10 and 12 RPM for each mile per hour of machine ground speed. A 52" diameter reel should rotate at 8 to 10 RPM for each mile per hour of machine ground speed. The most effective reel speed may be somewhat higher for down crops than for standing crops.

- When reel speed is too high, cut crop will tend to wind around the reel. The crop does not get the chance to fall away from the reel. High reel speeds may also cause stripping and shelling of uncut crop.
- Too slow a reel speed can cause wrapping of the reel with cut crop. In this case, cut grain falls forward onto the bats instead of onto the draper.
- For hay crops, the reel speed may be higher than for grain crops.

Crop Control at Ends of the Swather

- It is 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 will wind onto the ends of the reel.
- Auxiliary end fingers are standard equipment on reels to help control crop lodging and wrapping at the ends of the reel.
- If crop is building up between a split reel, the innermost fingers may be heated and slightly bent to help prevent crop from entering the gap.

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6 - Draper

Depending on the options purchased, there may be two or three lateral drapers on the table which move the crop to the opening. All drapers must be set, and maintained properly to perform well. Quick release adjusters with spring tensioning allow easy access for cleaning, and maintain proper draper tension.

Draper Installation

1. Unpack draper. Check size to ensure it correct for the size of the deck. Be sure to align the v-guide with the notched side of the roller toward the rear end of the swather. Place draper bundle on the top of deck runners, and unroll with the slats facing up.
2. Wrap draper around one of the rollers and feed draper into the bottom runner of the deck. The bottom runners will support the draper, and prevent it from hanging down.
3. Pull draper through bottom runner, and wrap around the other roller. Pull the ends of the draper together. Install a connector bar to close the joint.
4. The heads of the screws should be installed from the center deck opening side. This helps prevent the crop being caught on the screws. Complete the installation by adjusting tension and tracking.



Illustration 6-1: Unpacking the Draper



Illustration 6-2: Feeding Draper onto Bottom Runner

Tension

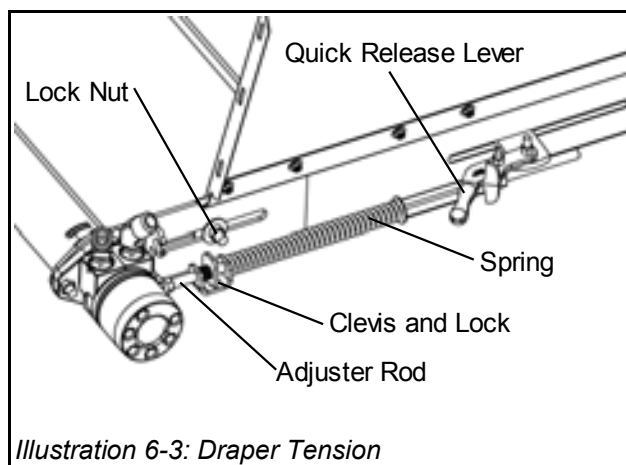
Proper tension must be maintained on the draper to prevent slipping on the drive rollers. The draper tension is changed by adjusting the drive roller of each deck.



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.

Tension (cont.)

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



When adjusting the draper tension and tracking, check the clearance between the draper deck slats and the end strut.

5. The draper may be damaged if it, or deck parts contact the end strut. A minimum of 2" (50 mm) clearance is recommended. If necessary, loosen the deck restrainer and slide deck over.

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.

1. Lower the header to the ground.
2. Raise the reel to its maximum height and place the locks on the reel lift cylinders.
3. Engage the swather drive with the engine at low idle.
4. Observe from the cab how the drapers are tracking.
5. If adjustment is required, shut down the swather, and turn off the engine.



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

Idler Roller Tracking Adjustment

This roller is fixed at the cutter bar, so is adjustable only at the back panel. If the 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 more slack in the draper at the cutter bar.

If the draper tracks toward the cutter bar, 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.

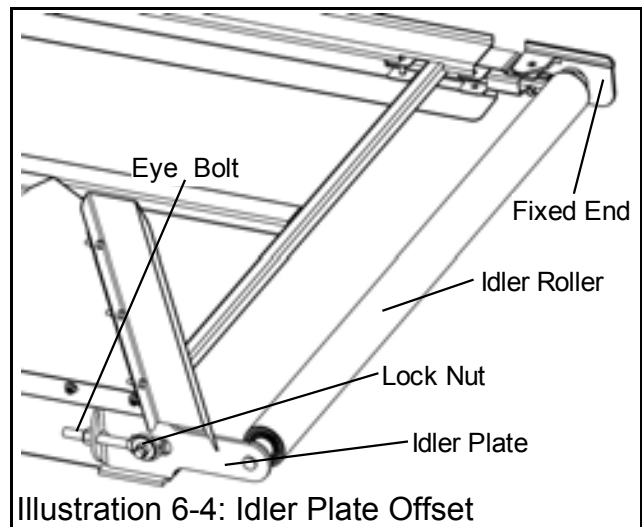


Illustration 6-4: Idler Plate Offset

Drive Roller Tracking Adjustment

With quick release tensioning, the motor mount plate is normally left loose. To adjust the tracking at this end the lock nut holding the motor mount plate in place will need to be tightened. When the motor mount plate is tight, the back panel end of the drive roller will be fixed and the cutter bar end will be adjustable.

Adjust the spring tension as needed by sliding the Clevis and lock on the adjuster rod. If the roller does not move easily, tapping the motor housing with a rubber mallet will help the roller to move.

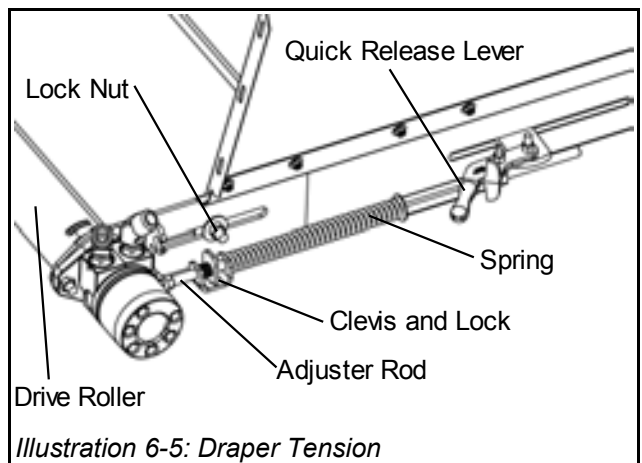


Illustration 6-5: Draper Tension

Re-test the tracking by running the swather at engine low idle.

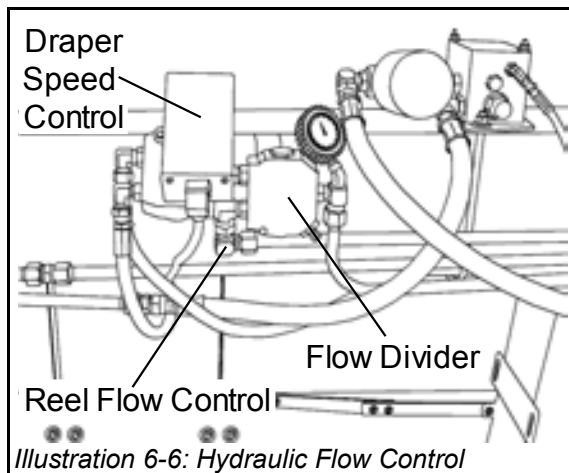


Shut the swather down, turn the engine off, and wait for all moving parts to stop before leaving the cab.

Once the roller is tracking properly, loosen the lock bolt.

Draper Speed

Proper draper speed is critical to the performance of your Grain Belt Swather. The draper speed should be set to match the field speed of the swather and to deliver the material smoothly to the center opening. The speed of the lateral draper is controlled by an adjustable flow control. Adjusting the flow control will affect decks equally.



Additional Draper Speed

The spool flow divider splits the oil flow between the draper motors and the reel. If installed, the junior deck receives oil from the reel circuit. A fine adjustment screw on the flow divider is used to vary the flow division to suit the conditions. Remove cap, turn adjustment screw with a flat blade screw driver. As flow in one circuit increases, the other will decrease.

When swathing, the draper speed should be set to form a good windrow, removing material from the cutter bar, and delivering the material smoothly to the opening.

Experiment with various draper speeds to determine the best swath formation for the existing cutting conditions. It may be necessary to make further adjustments as crop and moisture conditions change.



Excessive draper speed will cause abnormal wear, and will shorten the service life of the draper.



The flow divider has a fine adjustment screw which can be used to adjust the flow to a limited degree. As one circuit increases the other will decrease.

Draper Splicing

Honey Bee Mfg. strives to provide top quality draper material on their products. Our draper is made from rubberized polyester with fiberglass reinforced slats. Regular maintenance will extend the life of your draper. Proper tension and tracking are very important. If material builds up inside the deck, it will wrap around the idler and drive rollers causing the draper to tighten. As the draper tightens, additional stress is put on the motor and the draper. If this condition is not corrected, it will result in failure of the drive roller motor or the draper. Tears in the draper can be caused by poor tracking, foreign materials, or from careless use. If only a portion of draper is damaged, a splice may be installed.

Before beginning this repair, you will need an additional connector bar set and a section of draper that is at least 2 ½" longer than the piece to be removed.



If the damaged section is not near an existing connector bar, you will need 2 connector bar sets and a piece of draper 5" longer than the damaged piece.

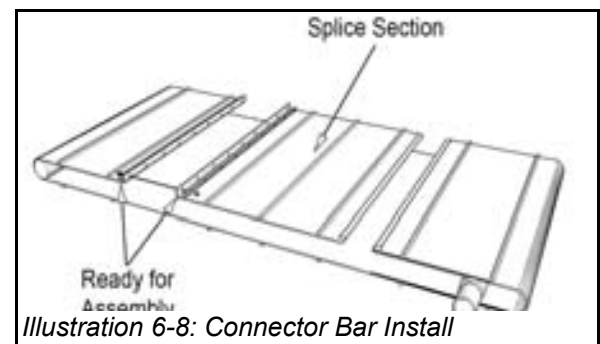
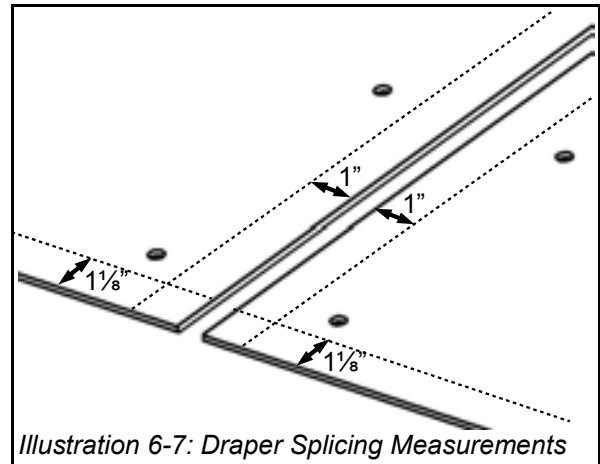
1. Raise header table and install lift cylinder locks. (If this is too high for comfortable access, the table can be set on blocks or lowered to the ground.)
2. Raise the reel and place the locks on the lift cylinders to prevent the reel from falling.



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

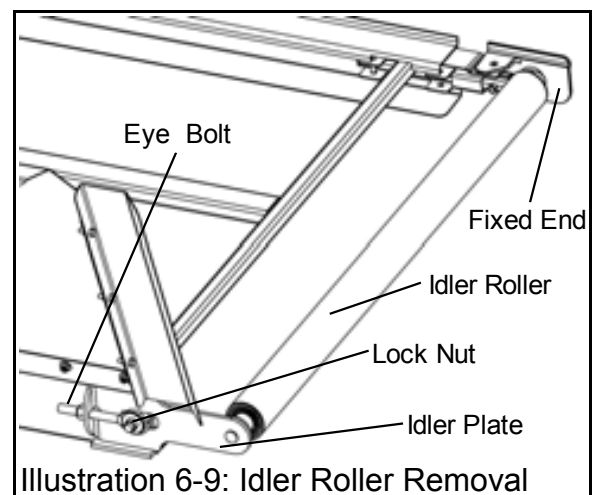
3. Release the draper tension.
4. Remove draper connecting bar.
5. Correct the cause of the draper failure.
6. The draper should be cut midway between two slats to provide ample material for the new join. With a measuring tape, measure, and mark a line six inches from a slat on a good portion of the draper. Place a board directly under the line you have marked, to support the section you will be cutting. With a utility knife and a straight edge cut the draper along the marks. This cut must be accurate, and square, to assure that the draper will track properly. Repeat this step on the other side of the damaged area.
7. Lay the piece you have removed flat, and measure the width, then add 3 1/2 inches. The total will be the length of material you require for the splice. (If you need two new connector bar sets, add 5".)

8. To mark the location for holes, measure 1" in from each edge to be joined, and mark a line parallel to the cut edges.
9. On each of these lines, measure 1-1/8" from the front edge of the draper, and make a mark for the first hole.
10. Drill 3/16" holes through each mark.
11. Place the backs of the draper together, lining up these drilled holes.
12. Place a connector bar on each side, line up the holes, and secure with a machine screw and nut.
13. Match up the edges of the draper and drill a hole at the opposite end on the 1" line, using the connector bar as a template. Insert a screw and secure in place. Drill the remaining holes through the holes in the connector bar, insert screws and secure.
14. Adjust draper tension. Trim all joins to 1/2" above connector bar.
15. Adjust tracking.



Idler Roller Removal

1. Relieve the tension from the draper.
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.



The spacer in step 4 must be re-installed for the idler plate to function.

Drive Roller Removal

1. Ensure lock nut on the motor mount adjuster plate is loose.
2. Release quick tension lever.
3. Loosen lock nuts on adjuster screw. Back off nuts about 3/4". Slide sleeve and spring down adjuster screw. Lift adjuster screw out of adjuster plate.
4. Mark hydraulic hoses on draper motor. Remove hoses. Insert plugs into hoses and caps on the motor to reduce oil loss and to prevent contamination.
5. Remove the lock nut from the adjuster plate.
6. Pull adjuster plate, motor, and drive roller out of deck.
7. Check bearing in end of roller, and remove any build up of material on roller.

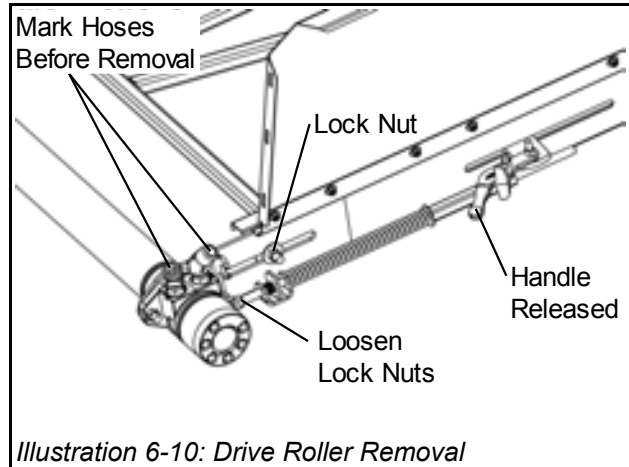


Illustration 6-10: Drive Roller Removal



Check and remove any built up material from the draper deck runners. If necessary, split draper at connector bar to gain access to inside of the deck. To re-install drive roller, reverse above procedure. Adjust tension and tracking.

Removing Draper motor

1. Remove Hex Bolt set screws.
2. Insert two pry bars one on each side of motor, and pry motor out of drive roller. Do not hammer on the housing flanges of the motor. Damage to motor will void warranty.
3. If motor does not move, insert a 7/8" or 3/4" rod through the center of drive roller and apply force directly to the shaft of the motor.

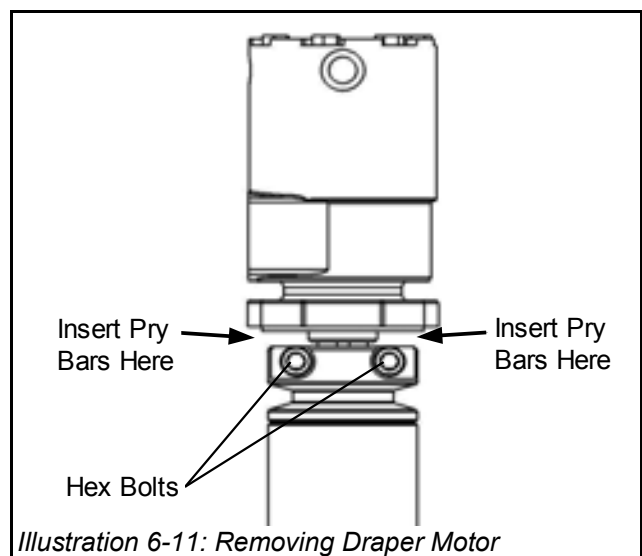
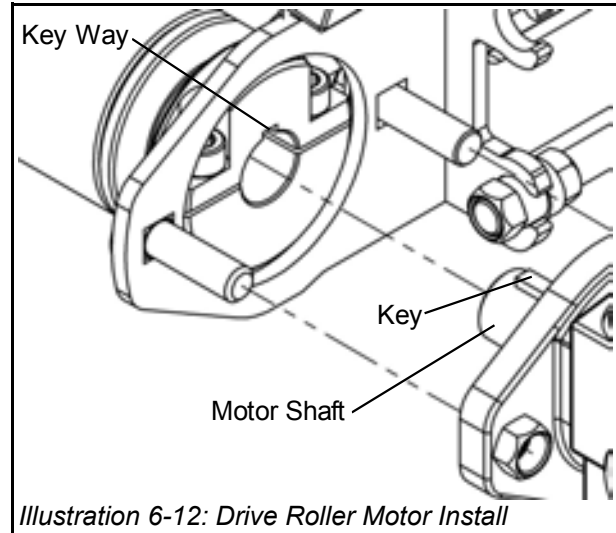


Illustration 6-11: Removing Draper Motor

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, lining key on shaft with the key-way in the hub. Do not use a hammer on housing flange; damage of this nature to the motor will void warranty. Use a soft blow or rubber hammer to apply force to end of motor.
4. Tighten set screws.



Draper Deck Maintenance:

- Remove draper connector bar.
- Remove draper - clean draper of debris, both sides.
- Store draper indoors.
- Clean debris from rollers, deck channels, and runners.
- Check and bend down corners of deck runners so draper does not get caught.
- Clean adjusters; lubricate guide tubes and adjuster tubes. Adjusters should move freely inside the guide tube.
- Check idler roller bearings; they should spin freely.
- Check drive roller bearings.
- Check bearing stubs.



If you elect to store the header outside with draper installed, position the connector bar on the underside to aid water drainage. Ice build-up underneath could cause draper to sag and drop out of the lower runner. If this is not noticed and corrected, damage may occur to draper on start-up.

7 - 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.



When working with or around the knife, take the following precautions to avoid death or serious injury.

- Raise the table, raise the reel, stop the engine, set the park brake, and remove the ignition key.
- Wait for all moving parts to stop before dismounting.
- Install the reel and table lift cylinder locks.
- Clear the area of bystanders, especially children.
- Wear heavy canvas or leather gloves when working with the knife.

Removing the Knife

Remove the two socket head cap screws (1) 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 (1) before installation. Torque to recommended specifications - 59 ft-lb (80 Nm)

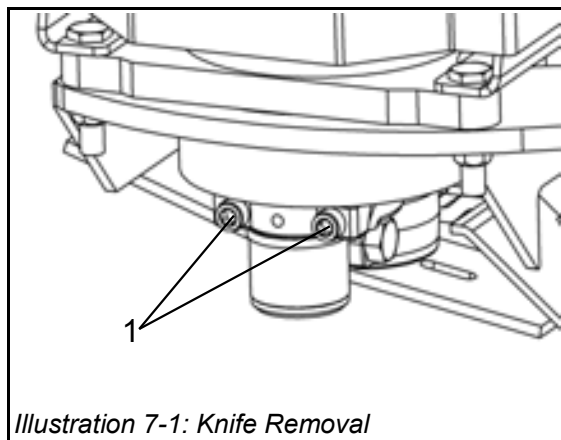


Illustration 7-1: Knife Removal

Guards

EasyCut guards are manufactured from heat treated spring steel with beveled cutting edges at the top and bottom which make the guards cut well 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 top.

Alignment 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

The sickle sections of the knife are installed with alternating cutting surfaces. One section will have the cutting surface on the top and the next will have the cutting surface on the bottom. They must be in good condition to obtain proper cutting.

Replace a Section:

- | | | |
|--|------|---|
| <ol style="list-style-type: none">1. Remove the guard to expose the section.2. Unbolt the section and install a new one.3. Tighten the section bolts and nuts.4. Install the guard. | -OR- | <ol style="list-style-type: none">1. Turn the knife by hand until one section bolt is exposed.2. Remove the bolt.3. Turn the knife until the other bolt is exposed.4. Remove it, and install a new section by reversing this procedure.5. Tighten section bolts and nuts. |
|--|------|---|



Always alternate the sickle sections, one with the serrations facing up, the next, facing down.

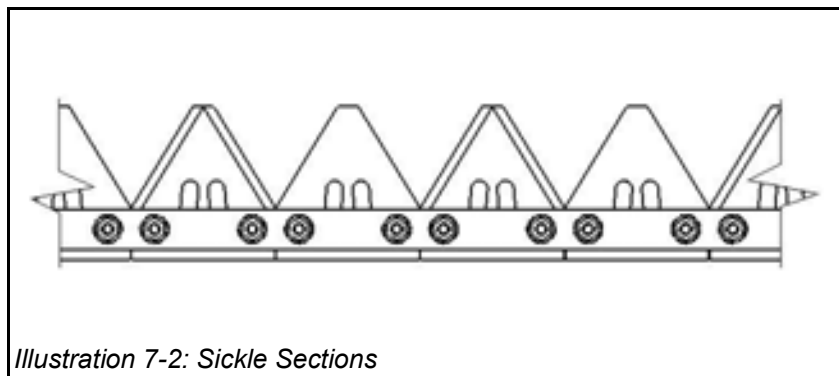


Illustration 7-2: Sickle Sections

Knife Drive/Knife Head

Proper maintenance of the knife drive and the knife head is critical to the performance of your Grain Belt Header.

Check the knife drive hold down bolts daily. Tighten to the specified torque as needed.

Check the knife head bearing daily. If the bearing is loose, check the tightness of the bolt. If the bolt is tight, check the condition of the bearing and sleeve. If any parts are defective, replace them immediately to avoid damage to the drive.

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 bearings rotate freely.



Knife drives should always rotate counter-clockwise to keep the bottom cap screw from coming loose.

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.)

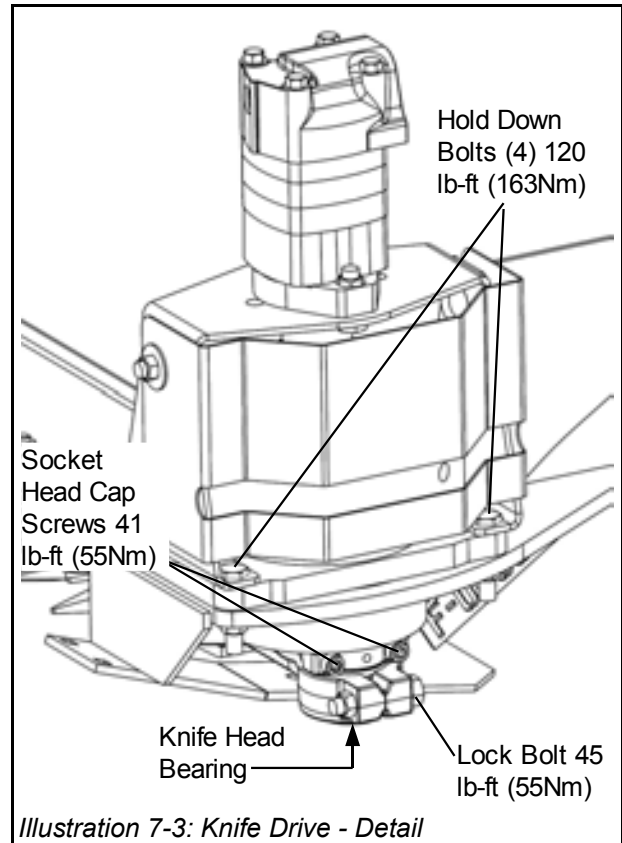


Illustration 7-3: Knife Drive - Detail

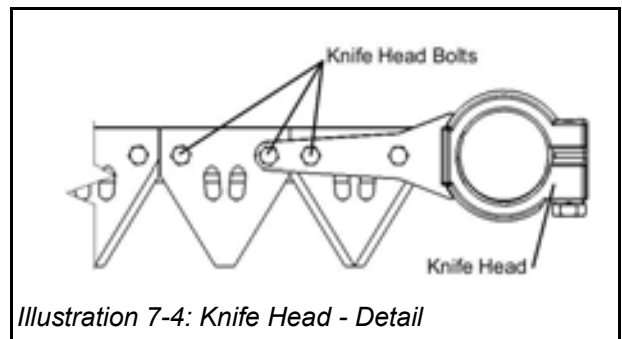
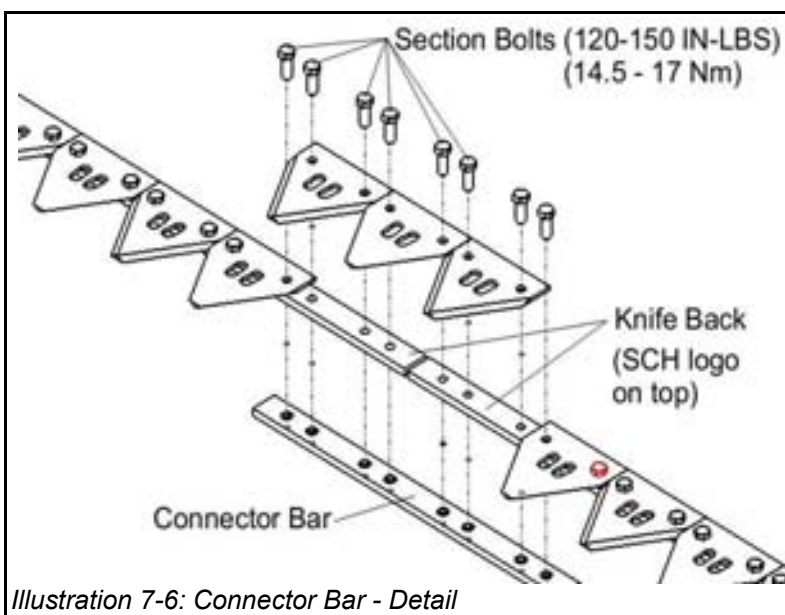
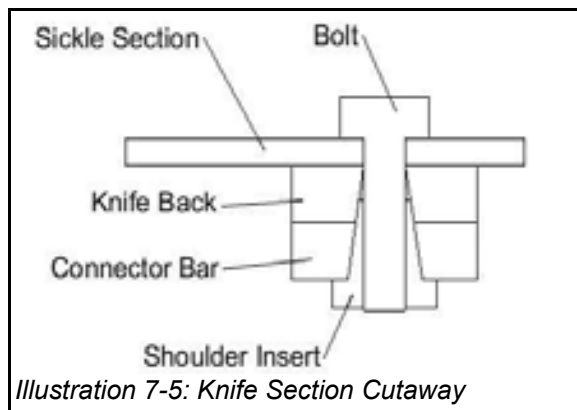


Illustration 7-4: Knife Head - Detail

Connector Bar

On some models of Honey Bee headers a connector bar is used to join two sections of knife back. The sickle sections are bolted to the knife back. The connector bar is attached to the underside of the knife back with eight threaded inserts installed into the bar which protrude slightly on the side that contacts the knife back. The knife back is punched with slightly tapered holes to accommodate the sickle sections. The knife sections must be installed on the top side of the knife back (the side stamped "TOP") 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 them to clamp down on the bolt. The bolts should be tightened to 120 - 150 in-lbs, (13.5 - 17 Nm).



Do not grind the inserts flush with the connector bar. This will defeat their function, and may cause a knife failure. Check tightness of bolts daily; replace broken and worn sections as required.

Overlap Kit

The overlap kit is used on swathers equipped with double knife drives. The fasteners in the overlapping portion of the knife are countersunk to provide a smooth-sliding surface. The overlap guards are open on top, and are deeper to provide room for the double thickness of the knife. The overlap strap bolted to the left-hand knife will slide over the countersunk sections where the knives overlap. If knives are noisy or are over heating, check to see if the overlap guards have been properly installed.

The knife sections that are on the overlap strap and the right hand knife back need to be snugged down to the back up bar when the countersink bolts are tight.

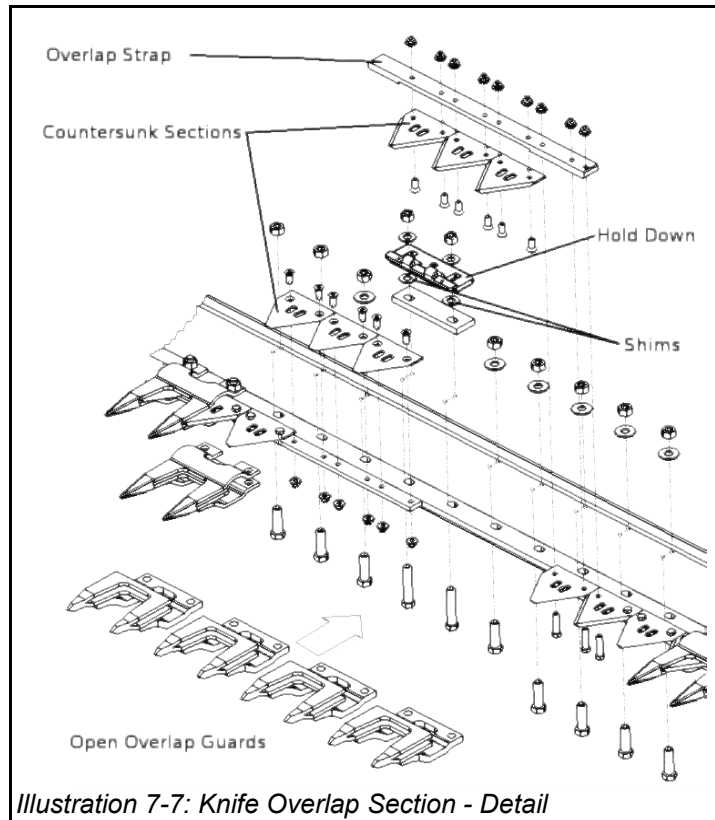


Illustration 7-7: Knife Overlap Section - Detail

If the sections are loose:

1. Remove the countersink bolts.
2. Inspect the holes drilled into the knife back or overlap strap for a countersunk depression. This allows the tapered head of the bolt to draw down fully, seating in the knife section.
3. If no countersink is found, drill them in (about 1/32" deep) with a 9/32" drill bit.

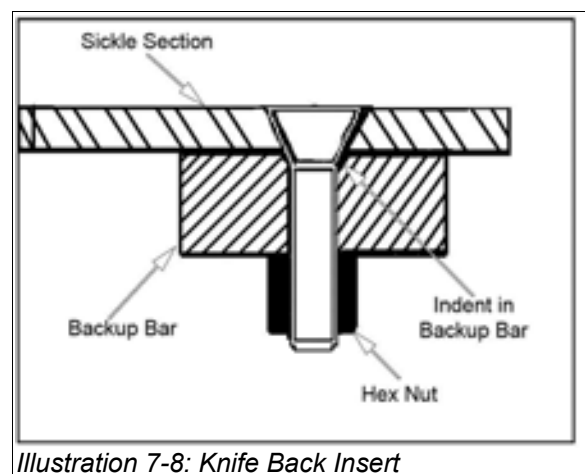


Illustration 7-8: Knife Back Insert

Repair Broken Knife Back

If the knife breaks during use, repairs can usually be made using a connector bar. Typically, the knife back will break across a sickle section bolt hole. The damaged section needs to be cut out and/or a section of knife removed. If the knife breaks close to the knife head end, remove that section of knife, reconnect the knife head, then add the new piece to the far end of the knife where there is less mechanical stress on the knife.

The join must be directly under the center of a sickle section, not where two sickle sections join.

Inspect the knife for dull/damaged guards and sections and built up crop residues. These are the most common causes of knife breakage.

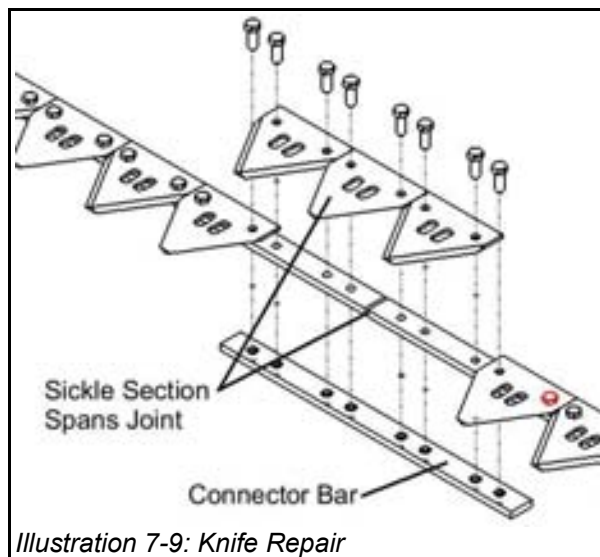


Illustration 7-9: Knife Repair



IMPORTANT Correct any of these cause factors before resuming operation.

Knife Speed Sensor

The table is equipped with a sensor, located on the knife drive motor, which provides the ability to monitor and calibrate knife speed.

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

Monitoring Knife Speed

Knife speed can be displayed on the control panel in the cab of the power unit.

The reel speed option on this panel is now used to select the knife speed function.

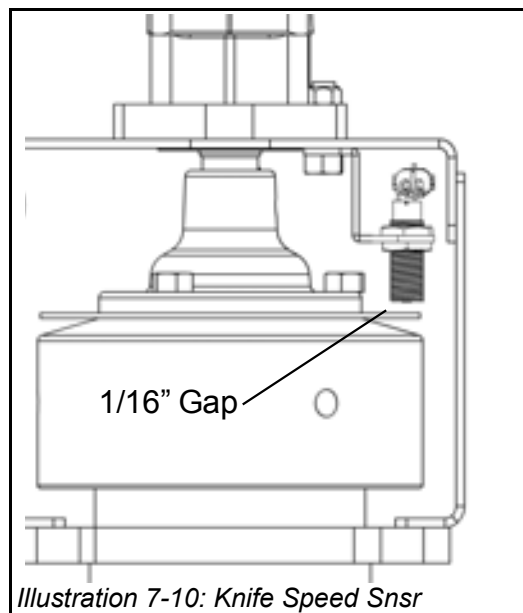


Illustration 7-10: Knife Speed Snsr

8 - Leveling

The swather is attached to the windrower by one upper suspension link (Top Link) and two lift arm assemblies which slide onto the lift arms of the windrower. The top link adjusts the forward angle of the table. This adjustment affects the angle of the cutter bar in relationship to the ground.

Forward Angle Adjustment

1. Loosen lock tab on the top link. With a suitable size rod, turn top link clockwise to tilt swather back, counter-clockwise to tilt swather forward.
2. Re-tighten lock tab once the desired swather angle has been reached.

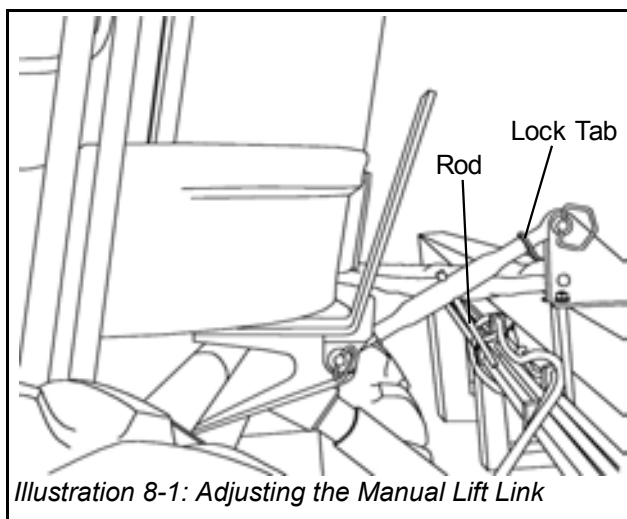


Illustration 8-1: Adjusting the Manual Lift Link

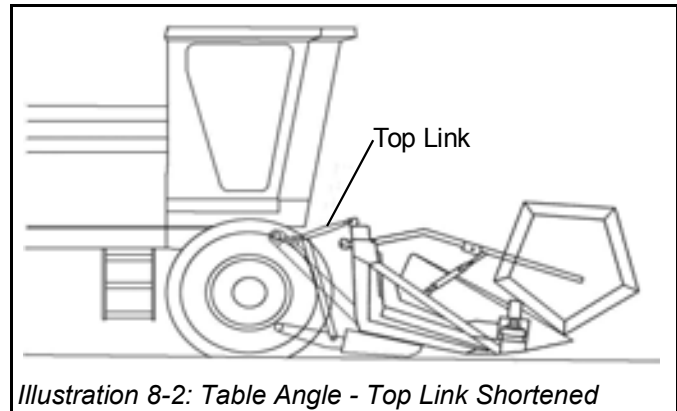
Production Swather - Hydraulic Tilt Kit

The Honeybee Swather has an optional hydraulic control system for the swather tilt function. The kit includes everything required for installing the system.

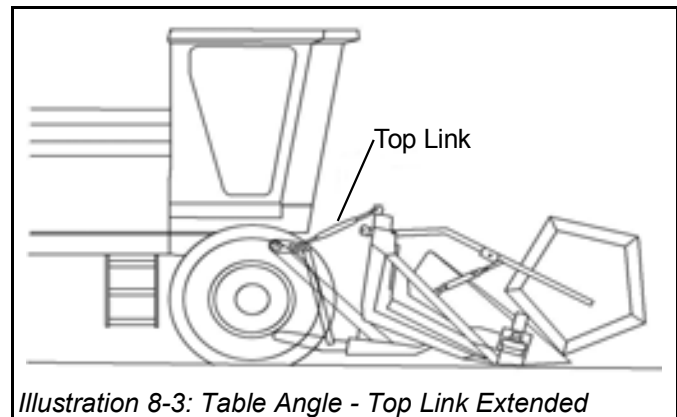
Table Angle

These views of the windrower and table show the results of adjustments to the top link.

This Illustration shows the top link fully retracted, drawing the top of the table back. The draper decks will run more horizontal to the ground.



This Illustration shows the top link fully extended, tilting the table forward. The draper decks will run at a steeper angle to the ground.



*Remember that the above examples represent the extreme range of adjustment.



Do not extend the top link beyond 3.25" of thread exposed at each end. Over-extending the top link may result in the table suddenly tipping forward. Retracted, the top link measures 17-1/2", extended, it measures 24".

Experiment within this range of adjustment to determine the best setting for your operating conditions and for the type of swath you want.



In rocky conditions, with a short crop, it may be beneficial to keep the guard tips up. Try shortening the top link.

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

Table Leveling

1. Park the unit on a smooth, level surface.
2. Ensure the tires are all at equal pressure.
3. Equalize the angles of the extensions on the lift arms. Increasing or decreasing the number of threads exposed above the nuts will raise and lower the outer ends of the lift arms. In most cases, an equal number of threads on each bolt will equalize the height of the lift-arm ends.

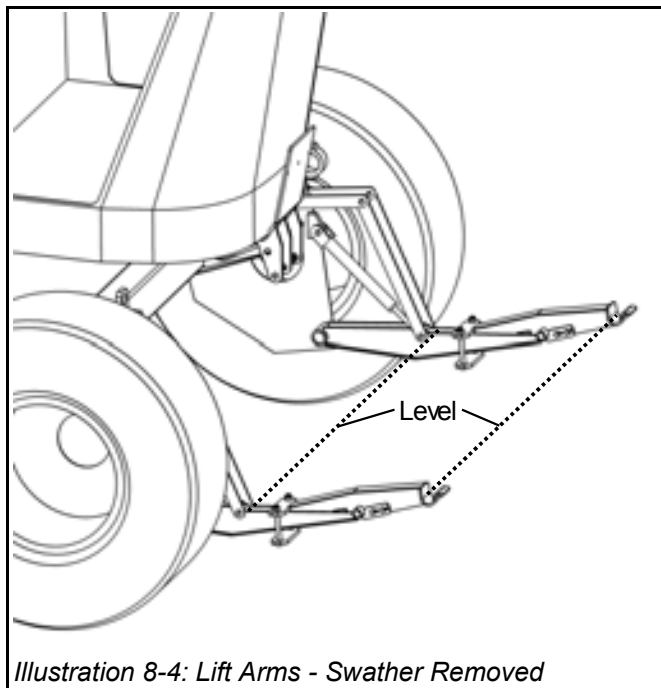


Illustration 8-4: Lift Arms - Swather Removed



The lift arms may not appear the same as those shown in the image above.

4. Begin by exposing $\frac{1}{2}$ inch of thread past the nut on all four bolts. Increase or decrease the thread numbers protruding above the nuts to level the extensions. Work in small increments to ensure you do not over-correct.



To ensure full strength, do not reduce the number of exposed threads above the nuts to less than 2. The thread count above the nuts on an individual arm should be the same to ensure even clamping.

Adjusting Table Float

Use the lightest float setting, that will keep the table from bouncing, while allowing it to follow uneven ground without gouging or scraping.



If the platform has been raised for any length of time, it may lower slowly or may not lower all the way to the ground. This is due to the temperature difference in the accumulator. Once the platform has been lowered and temperatures equalize, the float will function normally.

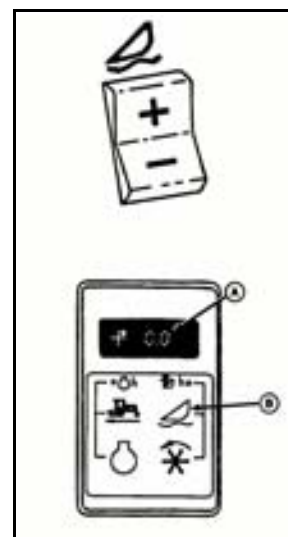
If the windrower does not maintain float pressure, check the needle valve on the side of the high pressure valve, it must be closed. Refer to owner-operators manual.

1. Park swather on level ground, lower platform and set engine speed at operating rpm.



Float pressure is displayed in increments of 100 psi. On later models, pressure is displayed in increments of 10 psi.

2. Press platform float function (B) on the digital tachometer.
3. Press and release '+' on the float switch until platform starts to move upward.
4. Back off the psi reading, on the digital display (A), 100 psi by pressing and releasing '-' on the float switch.
5. Raise and lower the swather table several times.
6. With the swather table on the ground, stop the engine.
7. Check the platform float by lifting at each end of the table. Normally it should require less than 150 lbs. (68kg) to lift the end of the table.
8. Adjust float pressure as needed and repeat steps 5 through 7 until desired float pressure is attained.



Once the platform has been set, the system will retain the setting after the swather has been stopped.

Refer to your owner operator's manual for more detailed information on the operation of the JD 4990/JD 4995 Self Propelled Windrower.

Preparing the table for further Leveling

If the table requires further leveling, you have 3 options (found on the following pages) that can be completed individually or in combination:

Option 1- Remove the Transport Hitch

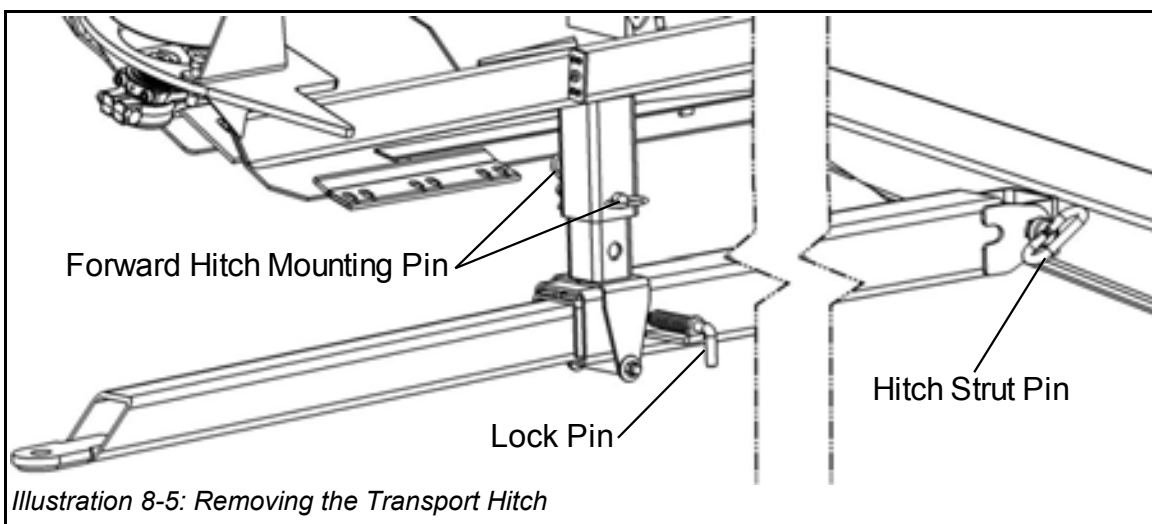
If the hitch end of the swather is low, this condition may be due to the weight of the hitch.



Park the windrower on a hard, level surface, and engage the park brake.

Raise the swather to the fully raised position, shut the unit down, and wait for all moving parts to stop. Lock the platform in the fully raised position.

1. Release the safety chain from the jack storage tube, if necessary. Pull the hitch tube lock pin, and extend the hitch tube.
2. Support the hitch, and remove the forward hitch mounting pin. Lower this end of the hitch to the ground.
3. Position yourself under the swather near, but not below the inner end of the hitch sleeve, and remove the pin holding the sleeve onto the strut. Allow the sleeve to drop to the ground.
4. Store the hitch components in an appropriate location.

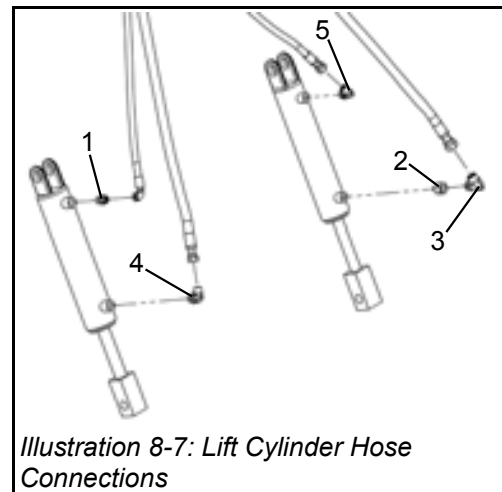
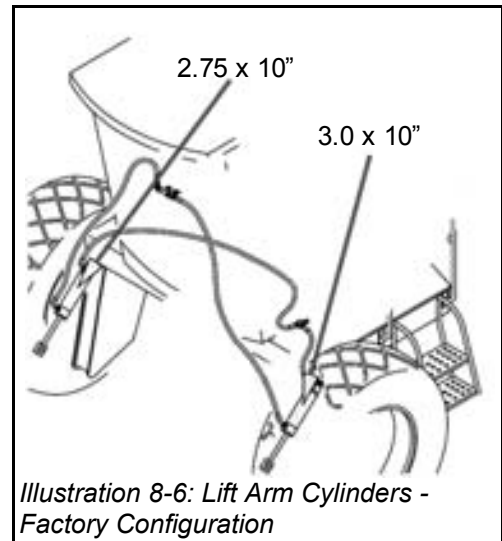


Option 2 - Switch the lift arm float cylinders



Before you begin this option, refer to the JD Windrower Float Cylinder Recommendation with Honey Bee on page 24 for important recommendations.

1. Before mounting the table to the windrower, swap the left (3.00 x 10.00) and right (2.75 x 10.00) hand cylinders. The larger cylinder will compensate with the extra power to lift the right side of the table evenly.
 2. The cylinders have different sized hoses flowing to and from the windrower. Fittings will need to be changed.
 3. Make the connections as shown, using the components listed below, which correspond to the numbers in the diagram.
1. 6MF-8MB
 2. 6MB-8FB
 3. 8MB-10MF-90°
 4. 8MB-8MF-90°
 5. 6MB-8MF-90° (from rod-end port of 2.75 inch cylinder.)



Please study the information on page 24 prior to starting any work on either the windrower or the table to determine whether the windrower lift-arm cylinders require changes. If changes are required, completing them at this point will result in savings of time in equipment setup.

JD Windrower Float Cylinder Recommendation with Honey Bee

This table can be found on page 24. In the Installation chapter.

Option 3 - Adjust the set screw on the float cylinders

1. At the top of the float cylinders on both lift arms, there is a bolt used to set the point from which the cylinder lifts on the windrower.
2. Adjust these screws, alternately raising the low side and lowering the high side, until the swather sits level.



Illustration 8-8: Float Cylinder Set Screw

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9 - Hydraulics

The Grain Belt Swather uses windrower hydraulics to power the various systems. The rate of oil flow from the windrower must be reduced to provide a maximum of 700 rpm for the knife drive. Hydraulic pressure from the windrower flows to the knife drive, then to a flow divider which supplies pressure to the draper and reel circuits. The system is protected by a pressure relief valve which should be set at 3000 psi. Return-flow oil is filtered before returning to the windrower.



JD 4990/4995 windrowers require the reverse side of the pump to be set to run the knife drive at a maximum of 700rpm.

Flow Divider

One side of the flow divider supplies a 10GPM (37.8LPM) flow control for the drapers, while the other side supplies a 20 GPM (75.6 lpm) flow control for the reel. The "CF" (control flow) port of the draper flow control goes to the draper motors. The "CF" (control flow) port of the reel flow control goes to the reel motor. The "EF" (excess flow) port of both flow controls diverts oil directly to the return circuit.



The windrower relief valve is set to 5000 psi. Care must be used when working around pressurized hydraulic systems.

Quick couplers must be securely connected before the windrower is started, and power is applied to the swather. Serious injury, and/or damage to equipment may result from poor connections.

Hydraulic Connection Points

Connect the hydraulic hoses from the windrower to the couplers shown to the right.

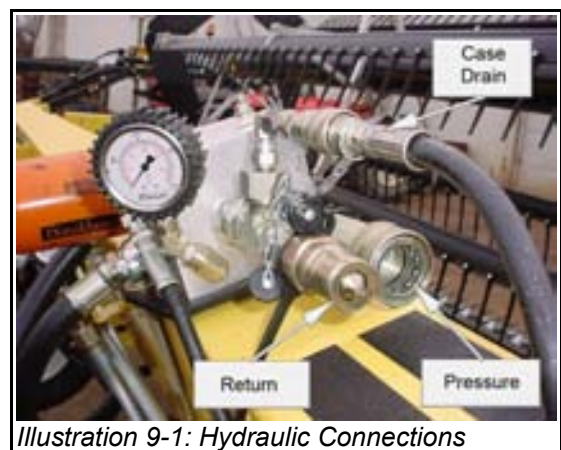


Illustration 9-1: Hydraulic Connections

Operating Pressure - Knife Circuit

The pressure gauge, located on the manifold block, indicates the total hydraulic pressure required to run the knife, reel, and draper.

Normal operating pressure should range between 1500 and 2000 psi when the windrower is operating at normal working rpm, and the oil is at operating temperature.

It is normal for pressure to fluctuate while cutting, due to changing crop conditions. Other factors that will affect pressure include the condition of the cutting system, and ground speed.

To determine the pressure required to run the knife, subtract the draper and reel pressure readings (found on the gauge located on the flow divider) from the manifold block reading. Alternatively, you may set the draper and reel flow controls to zero and read the pressure at the manifold block gauge. This reading will be slightly higher due to back-pressure generated from the flow controls.



Double knife drive systems typically operate at 500 psi higher pressure.

Checking or Adjusting Knife Relief Pressure



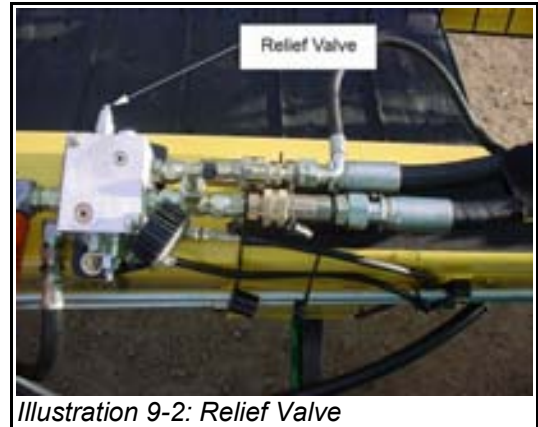
Set the park brake, shut the engine down, and wait for all moving parts to stop before leaving cab.

Be certain all bystanders are away from the machine prior to engaging the pump. Only stall the knife long enough to obtain accurate readings. Prolonged operation in this condition could cause damage.

1. Jam a wood block tightly in the knife, between a guard and cutting section.
2. Restart windrower. Raise the reel, and insert the cylinder lock. Set the reel flow control to "0".
3. Engage the hydraulic pump drive, bring the engine rpm to the normal working range, and check the pressure on the gauge. If the reading is 3000 psi, shut the windrower down, remove the wood block, and reel cylinder stop.
4. Reset the reel flow control.

If adjustments are required, shut the windrower down, and continue with the following:

1. Locate the relief valve on the manifold block. Adjust the relief screw; turning clockwise will increase, and counter-clockwise will decrease the pressure.
2. Adjust the relief screw to the retaining ring; this should give the maximum relief of 3000 psi.
3. With the knife jammed as described previously, restart the windrower, engage the hydraulic pump drive, and re-check the pressure reading.

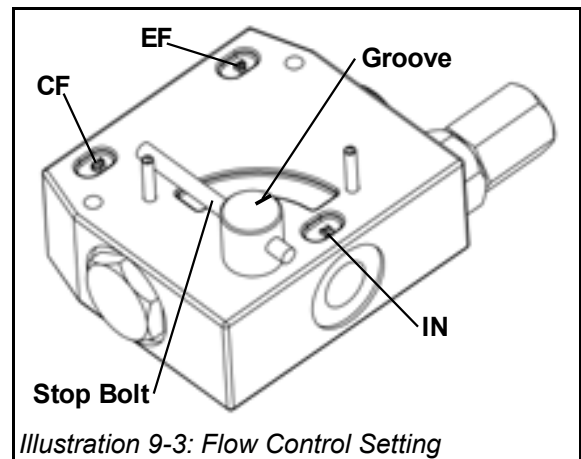


Flow Control Setting.

There is a separate hydraulic flow control for both the draper and reel, however they should both be set the same way.

With the stop bolt on the flow control pointed to the CF port or the 0 (Zero) setting, the groove on the adjustment should be pointed towards the 10 (Ten).

The location of the flow control for the draper and the reel hydraulic systems is described on the following pages.



Draper Relief Pressure

The draper circuit flow control is equipped with a relief valve, preset to 2200 psi (151.5 bar). If an excessive amount of oil is passing over the relief, a squeal may be heard, and the drapers may stall.

Adjusting Relief Pressure

Locate the flow control, behind the speed control box. See the illustration shown to the right for reference.

Remove the cap (acorn nut) over the relief adjustment screw, loosen the lock nut, and turn the screw clockwise to increase the relief pressure.

Re-check draper operation after each 1/4 turn of adjustment.

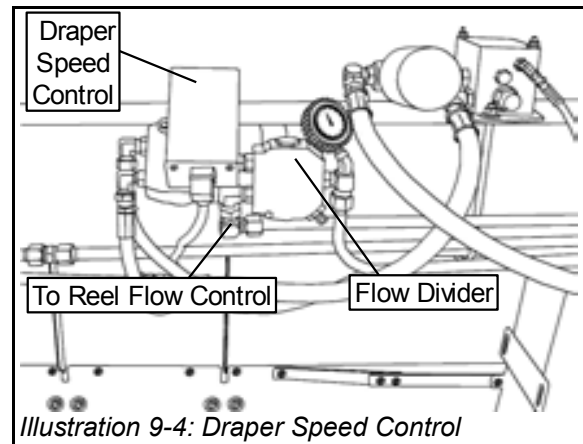


Illustration 9-4: Draper Speed Control



Normal operating pressure for the draper circuit, with warm oil, and the flow control set at eight, should be within 1200-2000 psi (124-137 bar).



Setting the draper relief pressure too high may cause damage if a foreign object gets caught in the mechanism.

Reel Speed Control

Reel speed is controlled by an electric motor attached to a 20 gpm (75.7 lpm) flow control. The motor is actuated by a switch in the cab.

Additional Reel Speed Control

Oil flow to the reel is supplied from the 50/50 flow divider.

If more reel speed is required, and the reel flow control is at maximum, the flow divider can be adjusted to divert more oil to the reel.

Remove the acorn nut, and turn the adjusting screw to increase the oil flow to the reel.

Increasing reel speed using the flow divider will result in an equal reduction in draper speed.

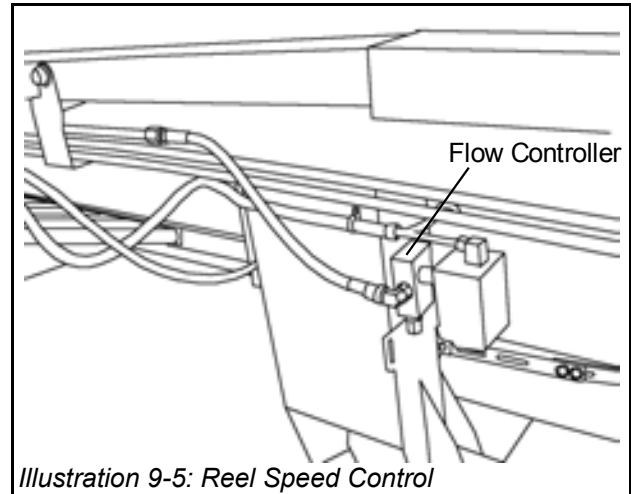


Illustration 9-5: Reel Speed Control

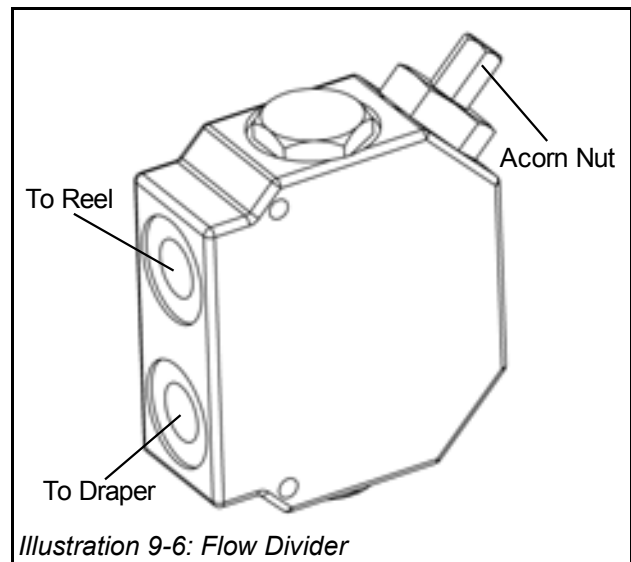


Illustration 9-6: Flow Divider

Reel Relief Pressure

The flow control for the reel speed circuit, is equipped with a relief valve, factory preset at 2200 psi (124 bar). If excessive oil is passing over the relief valve, a squealing noise may be heard, or the reel may stall.

Adjusting the Relief Pressure

Remove the cap (acorn nut) over the relief adjustment screw, loosen the lock nut, and turn the screw clockwise to increase the relief pressure.

Re-check reel operation after each 1/4 turn of adjustment.



Increasing the relief pressure will not increase reel speed.



Setting the reel relief pressure too high may cause damage if it contacts a solid object.

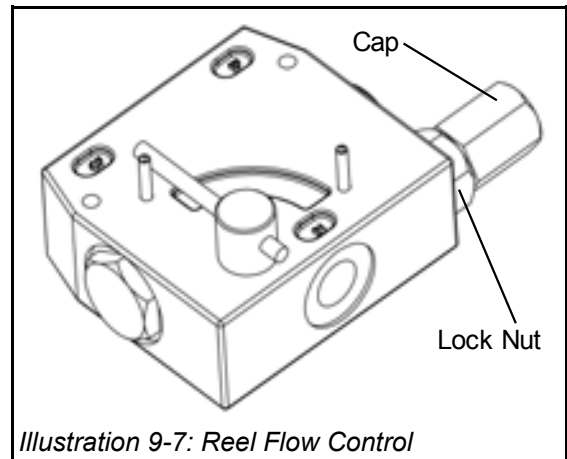


Illustration 9-7: Reel Flow Control

Return Line Filter

This filter cleans the oil as it returns to the windrower. Change this filter after the first 50 hours of operation, and seasonally thereafter.

A partially plugged oil filter can adversely affect the flow of oil in the system.

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

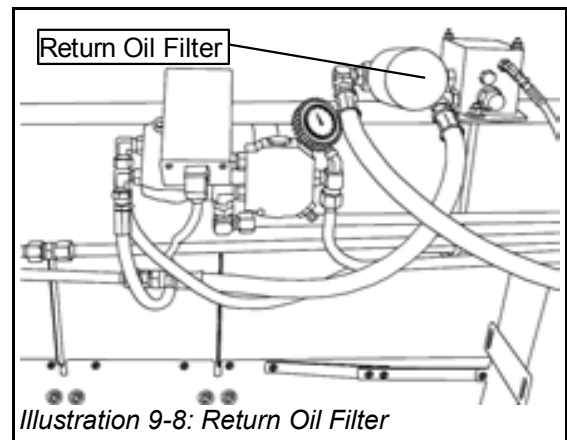


Illustration 9-8: Return Oil Filter

Hydraulic Fitting Naming Standards

There will be a number of different hydraulic fittings used in this manual. The naming standards can be a little confusing, however this section should clear up any questions you may have.

A standard 2 sided hydraulic fitting is named in the following format:

- ##XX-##XX

The information on each side of the hyphen represents its respective end of the fitting. The '#' is the size designation. The 'X' denotes the type of end on that side of the fitting, this information is divided into a prefix and a suffix. The prefix indicates either male or female, and the suffix indicates the type of connection.

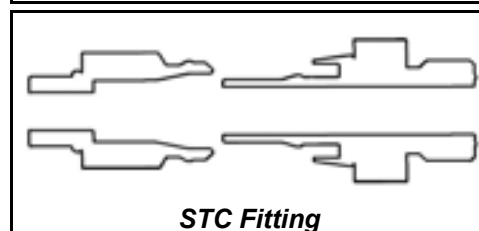
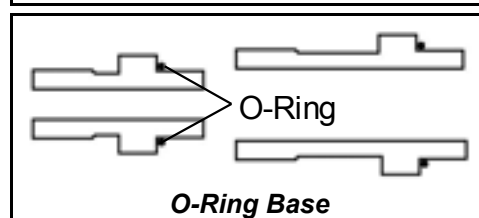
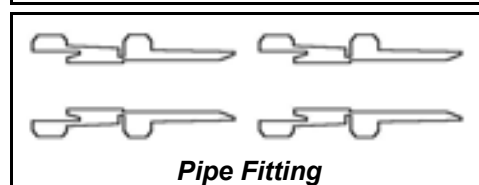
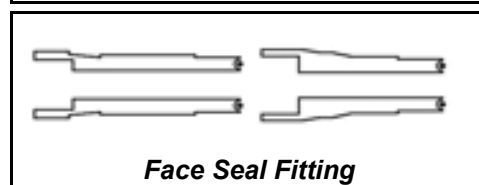
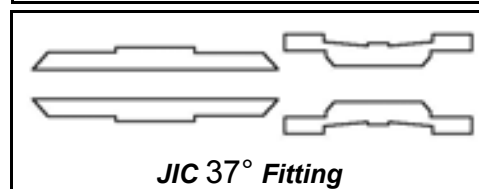
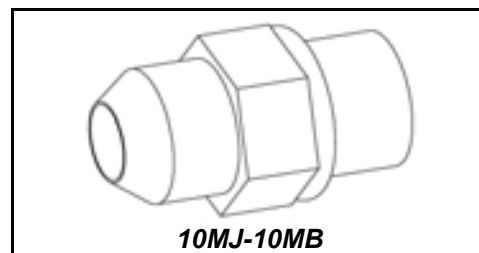
A 'T' fitting will be named in the following format:

- ##XX-##XX-##XX

The center set of characters describes the middle port on the 'T' fitting.

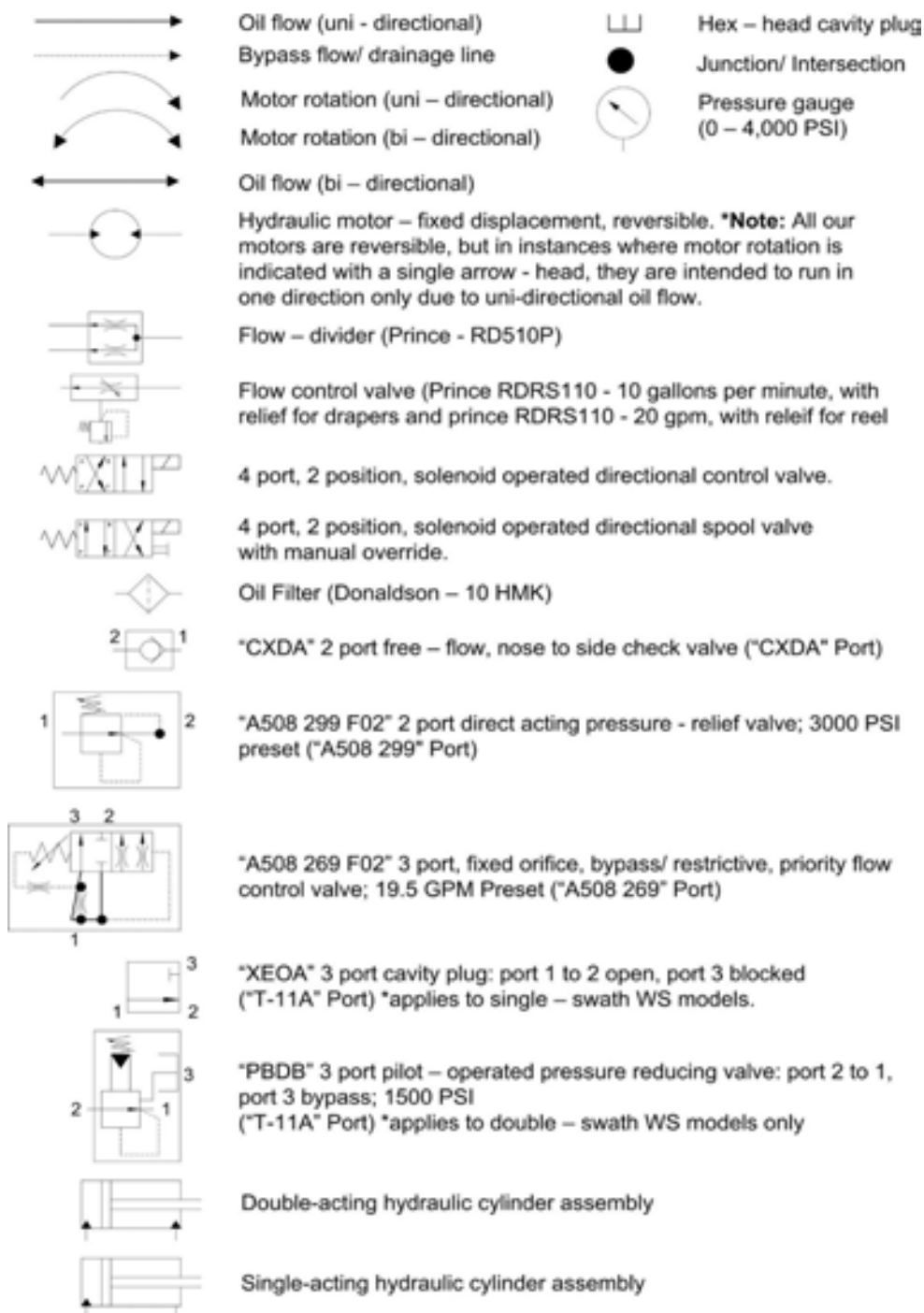
The size designations denotes which fittings go together. For example, a 10FJ fitting will fit with a 10MJ fitting, but not a 12MJ.

Hydraulic Fitting Types		
Prefix	Suffix	Description
M or F	J	JIC 37° flared connectors
M or F	F	Face Seal
M or F	P	Pipe Fitting
M or F	B	O-Ring Base
F only	X	Swivel (no image shown)
M or F	STC	Snap To Connect

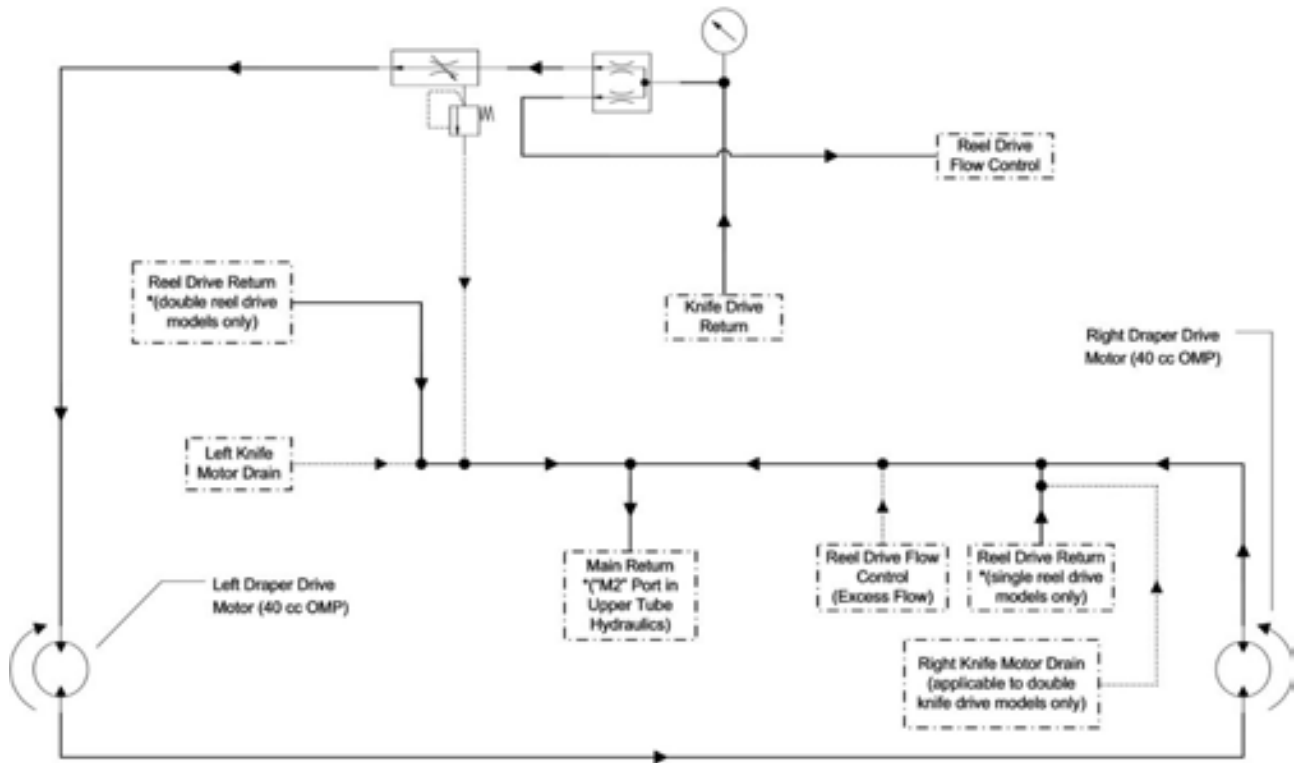


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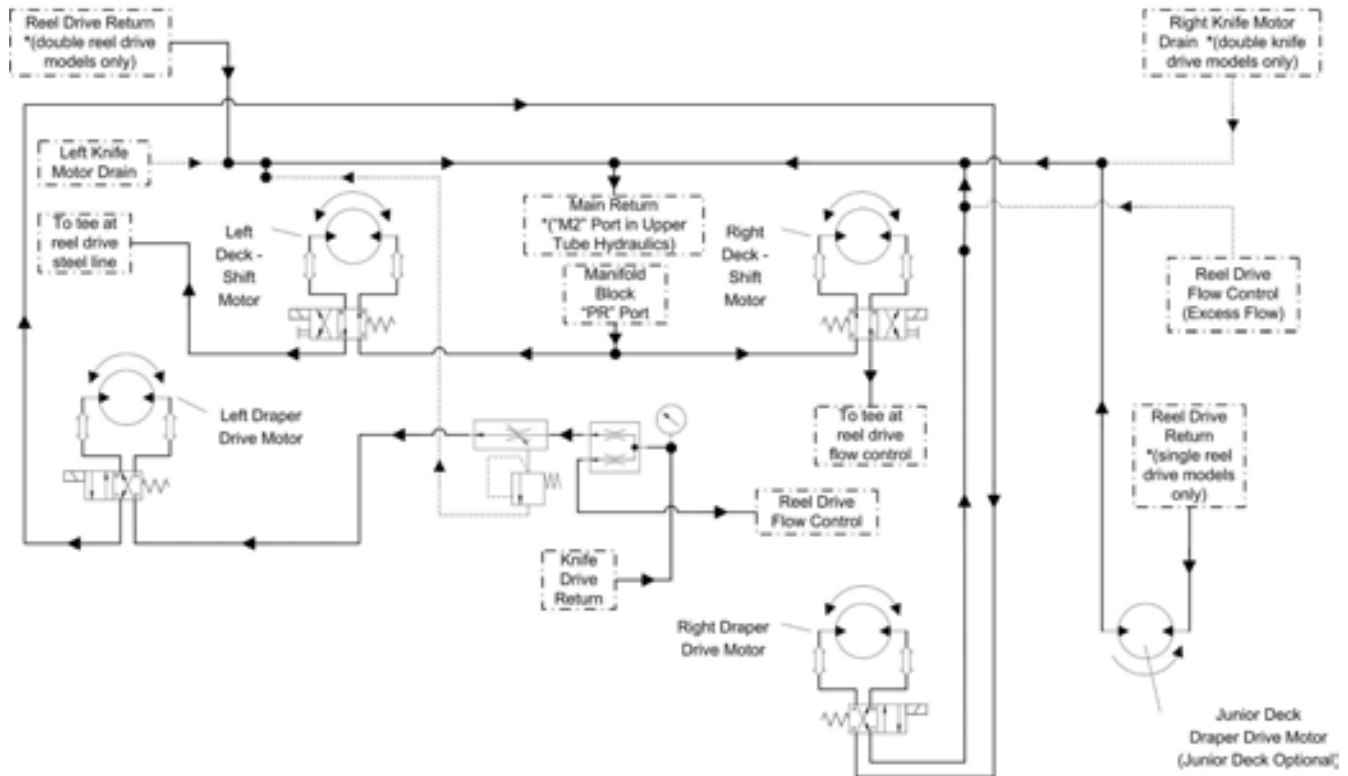
10 - Hydraulic System Schematics



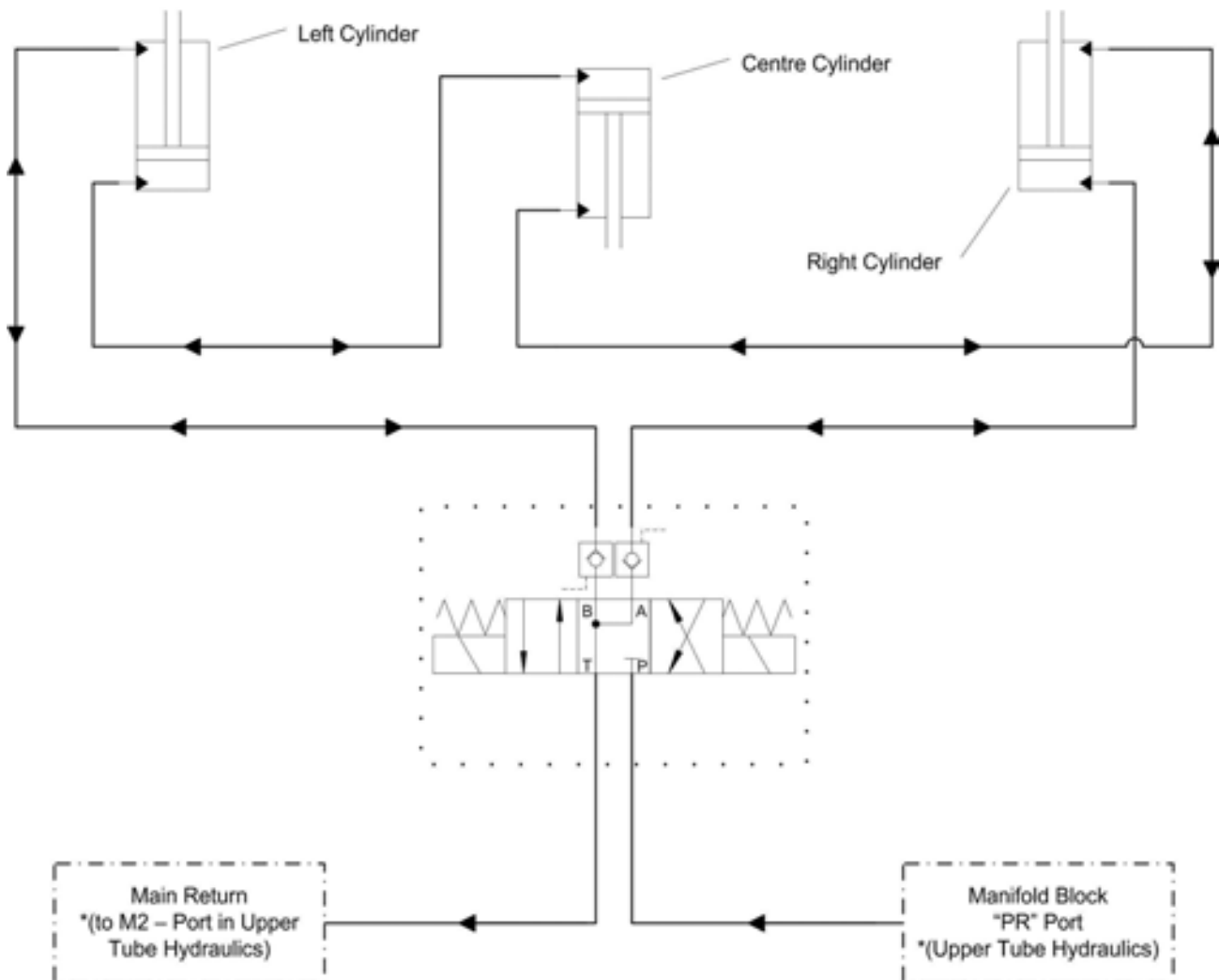
Draper Drive – Single Swath (WS Models)



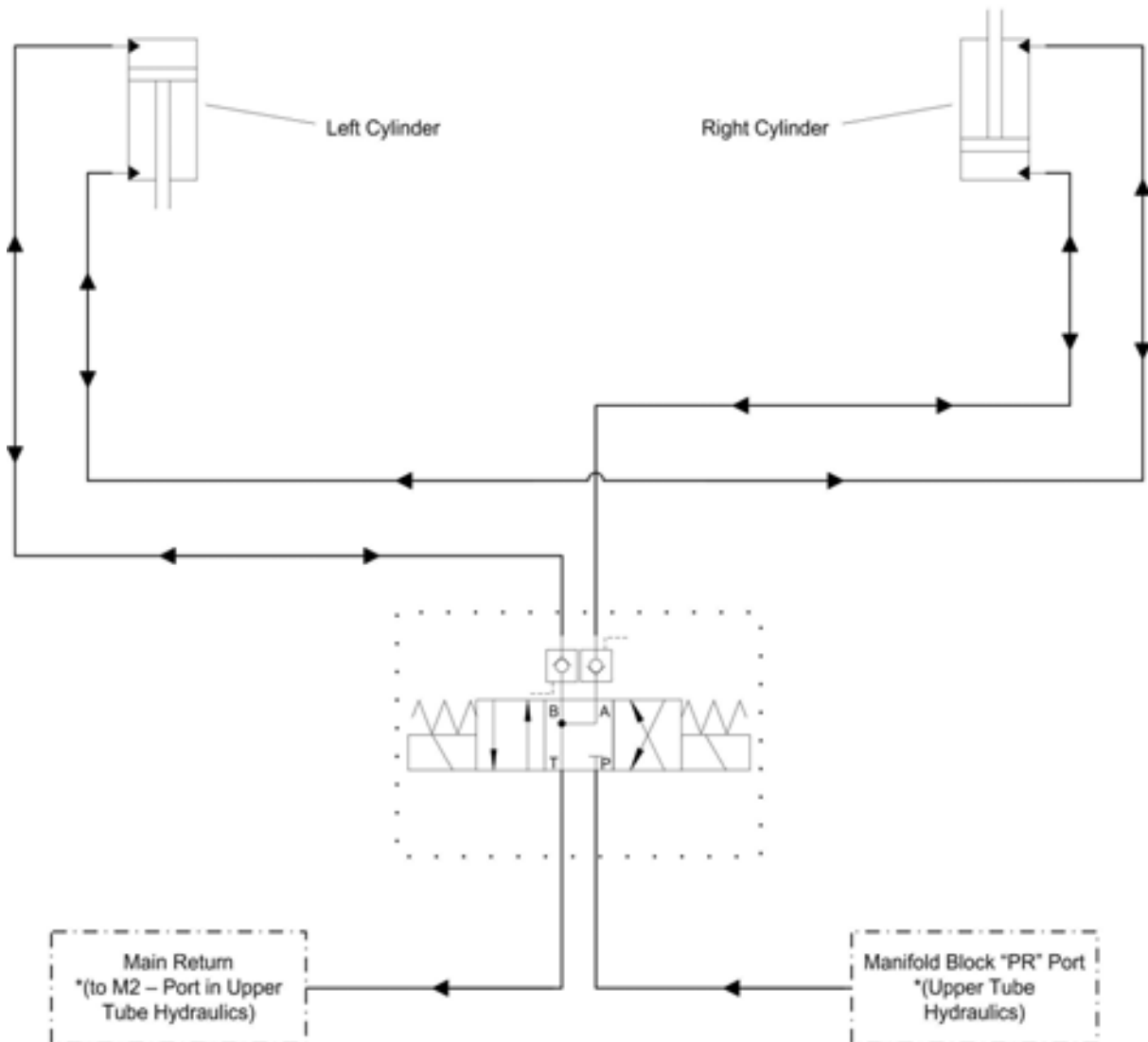
Draper Drive 21-36ft Double Swath (WS Models)



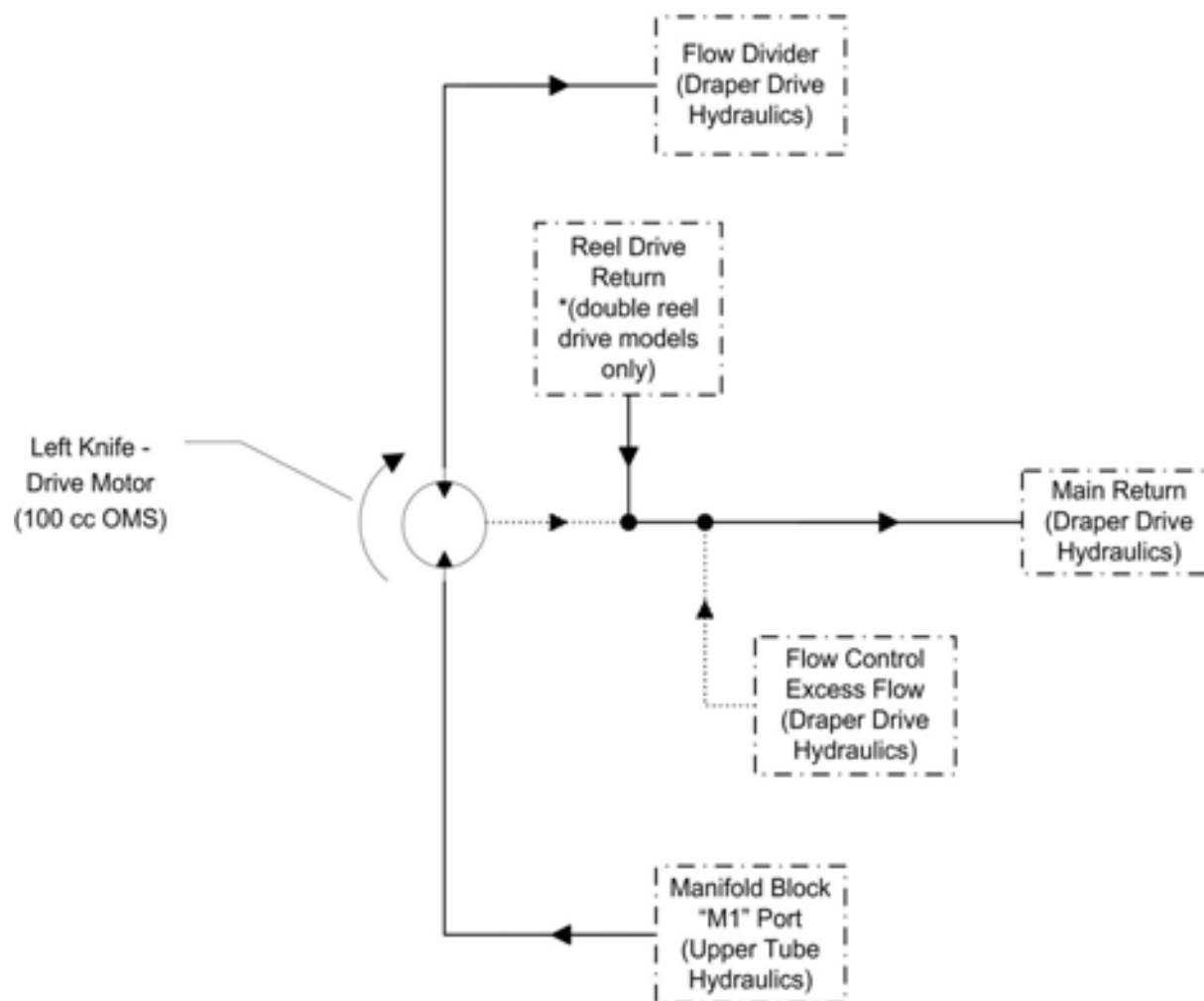
Fore & Aft Assembly – Split Reel (WS Models w/Hydr. Solenoid Kit)



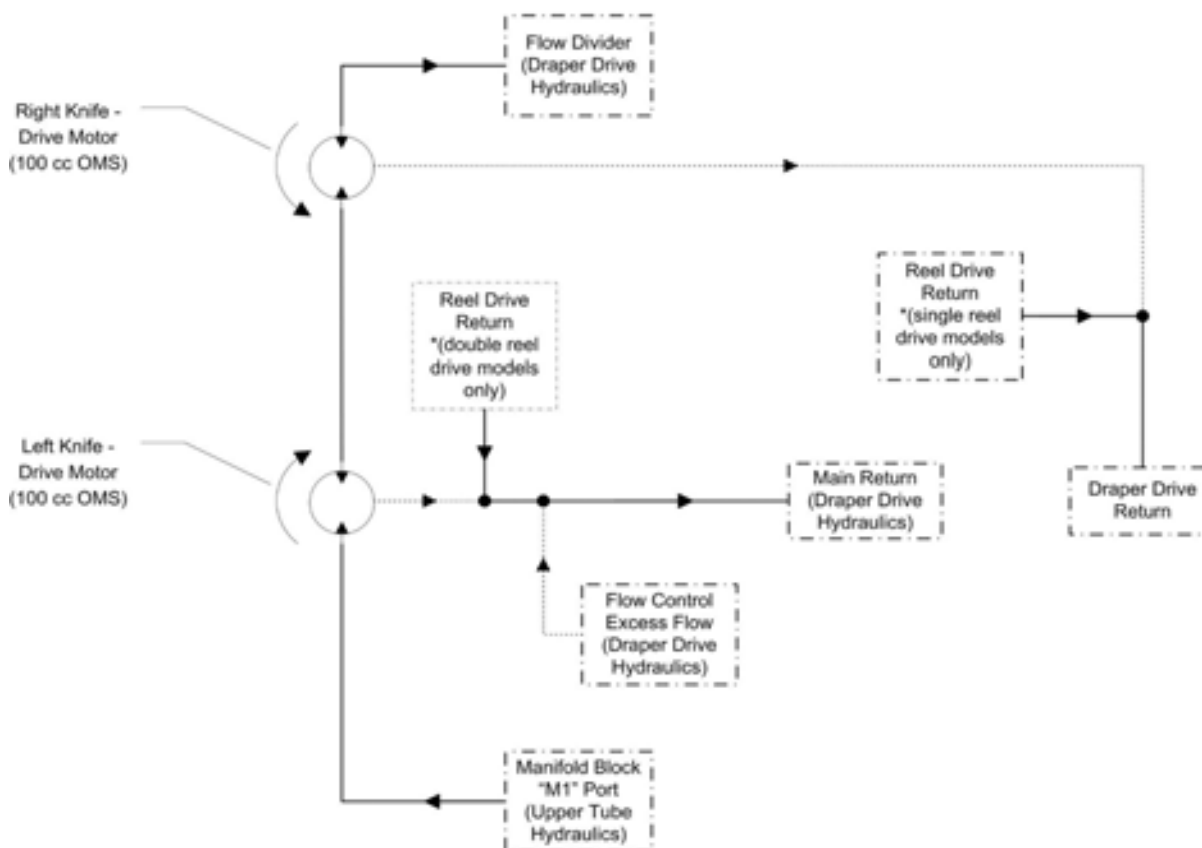
Fore & Aft Assembly – Solid Reel (WS Models w/Hydr. Solenoid Kit)

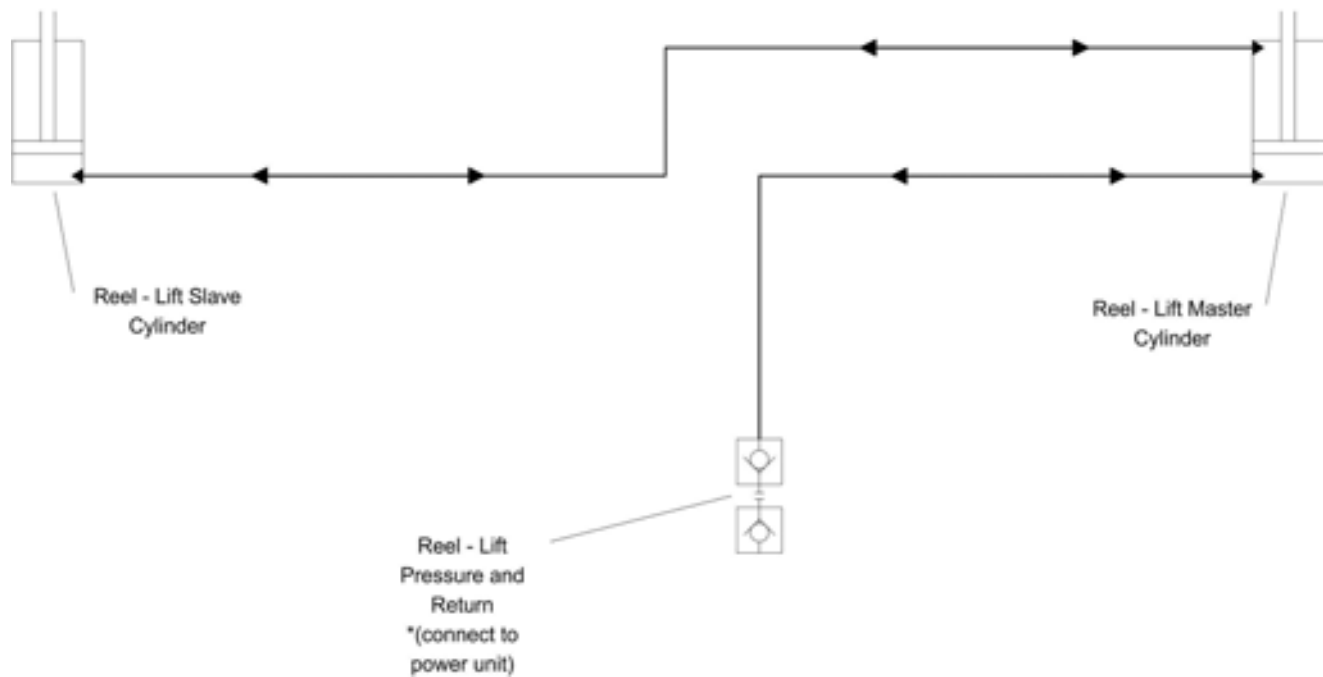


Single Knife - Drive

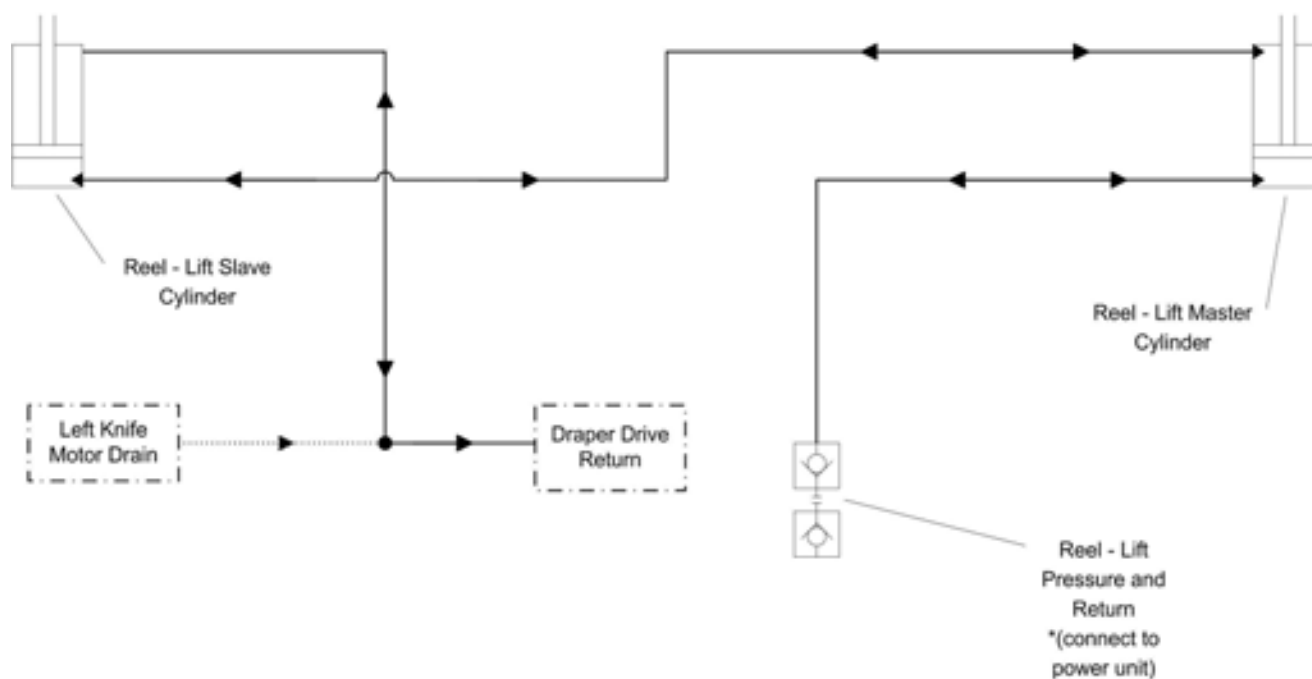


Double Knife - Drive

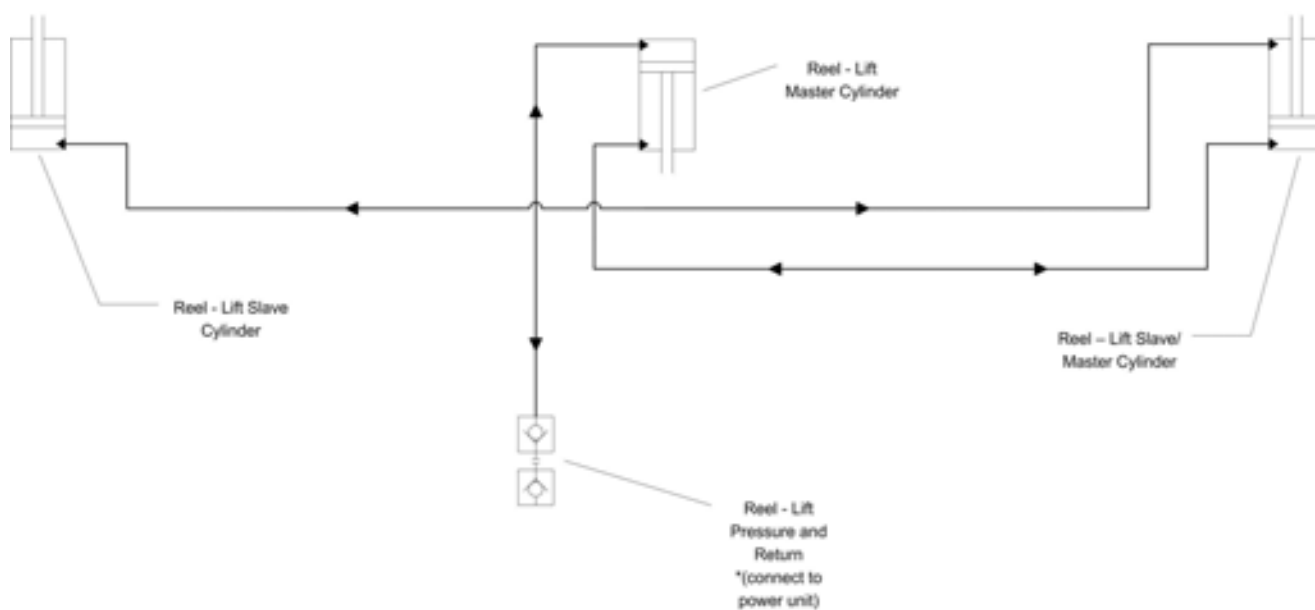


Reel – Lift (Solid Reel)

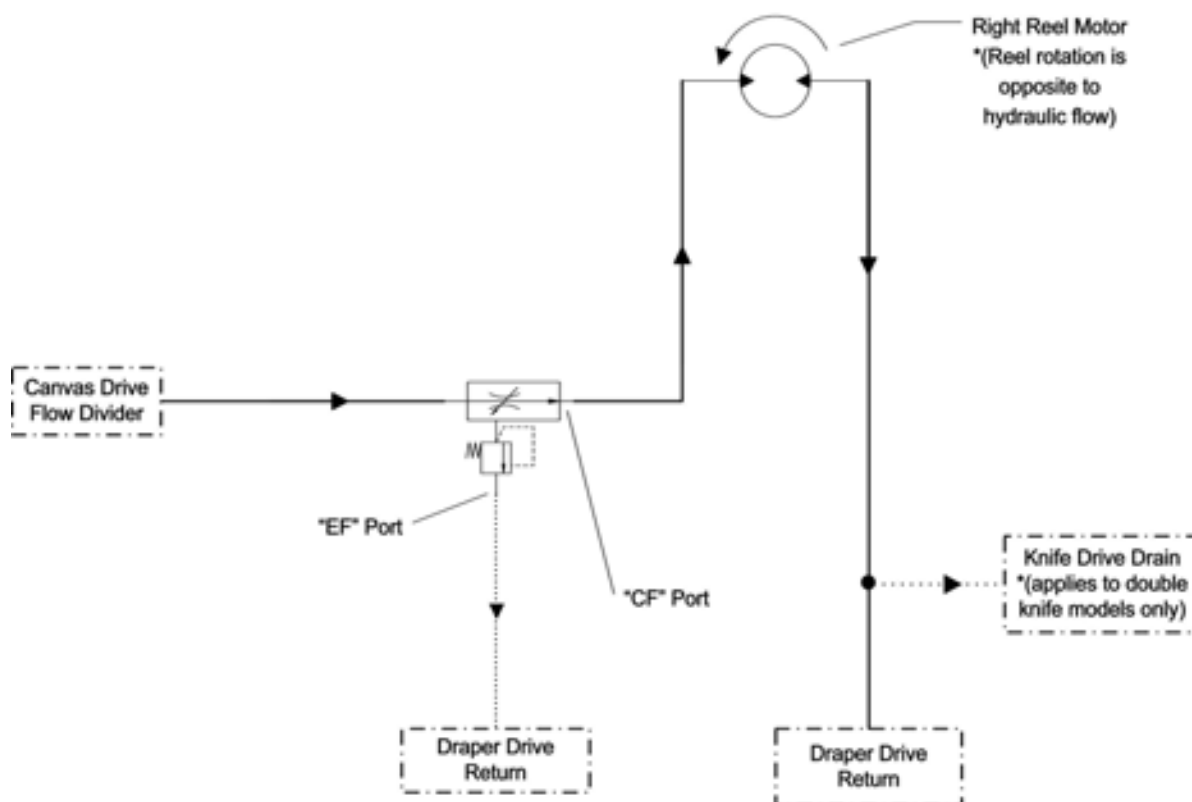
Reel Lift (36 ft Solid Reel)



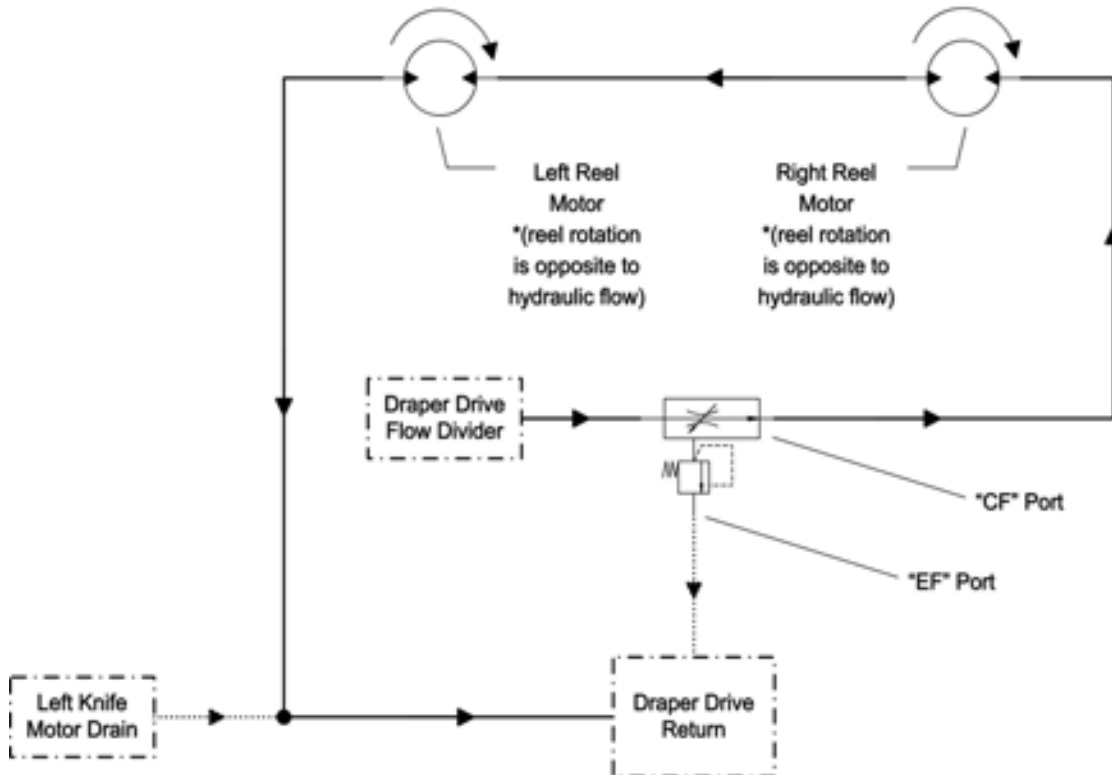
Reel - Lift (Split Reel)



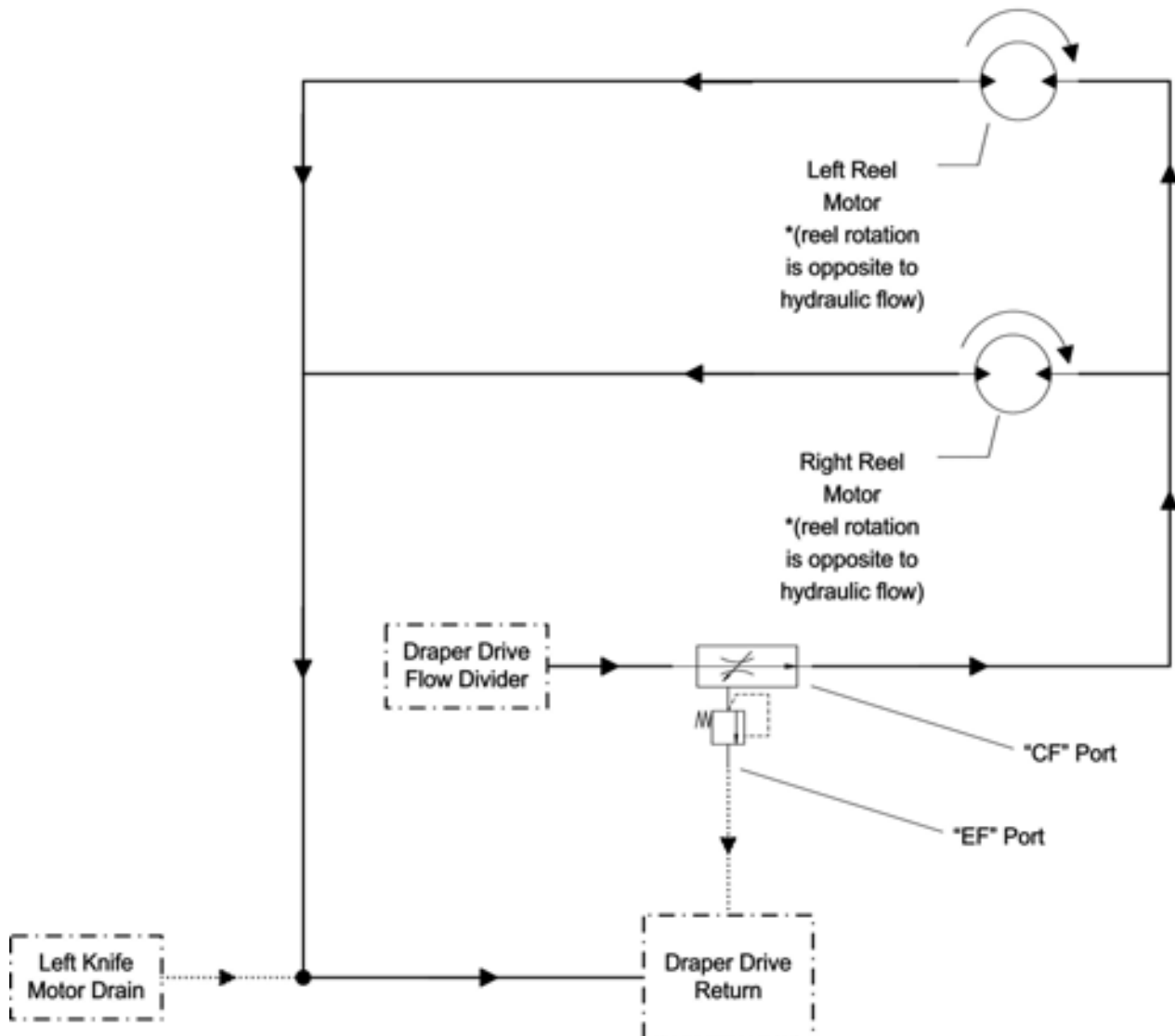
Single Reel Drive – WS Models



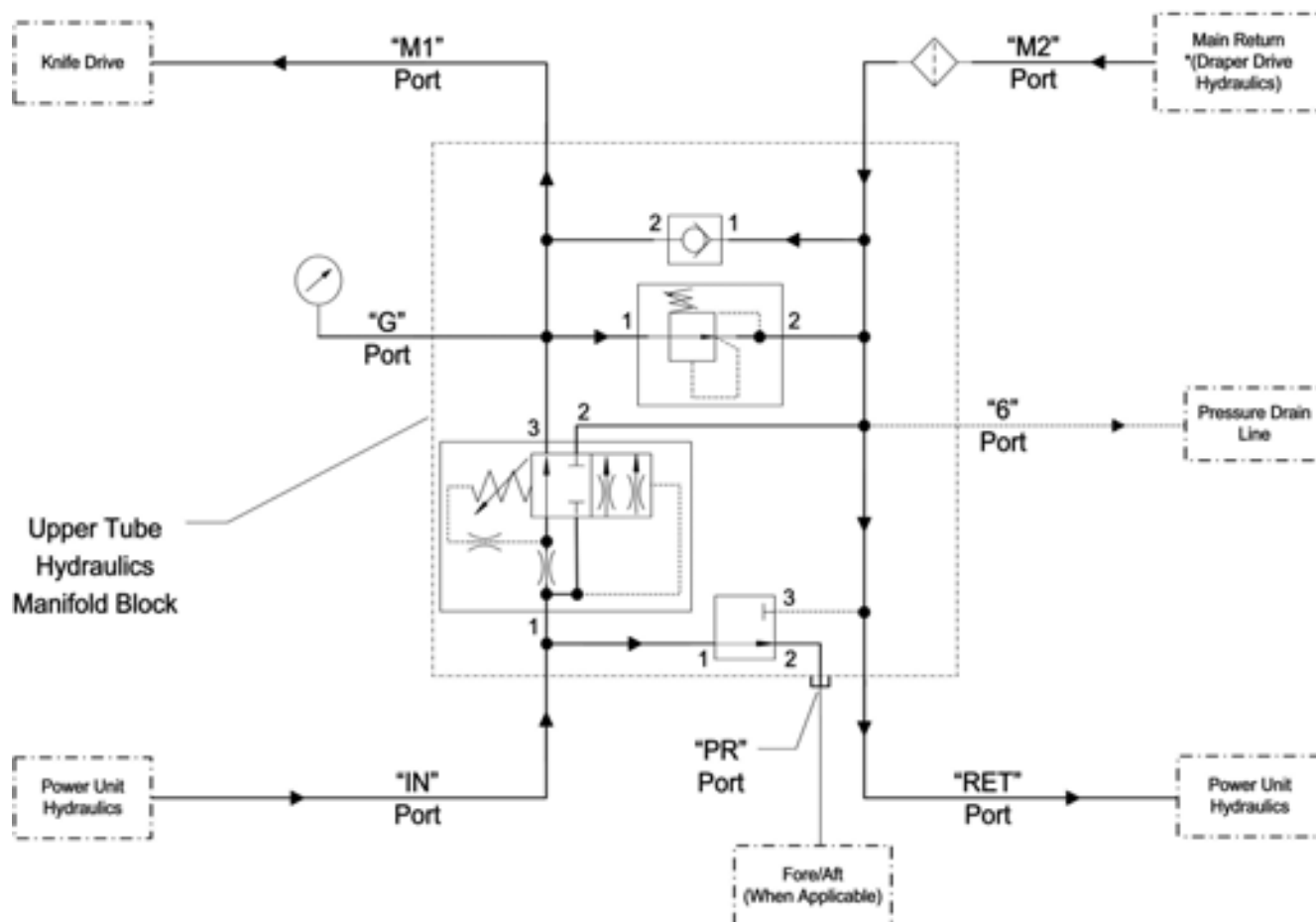
Double Reel Drive (Series) – WS Models



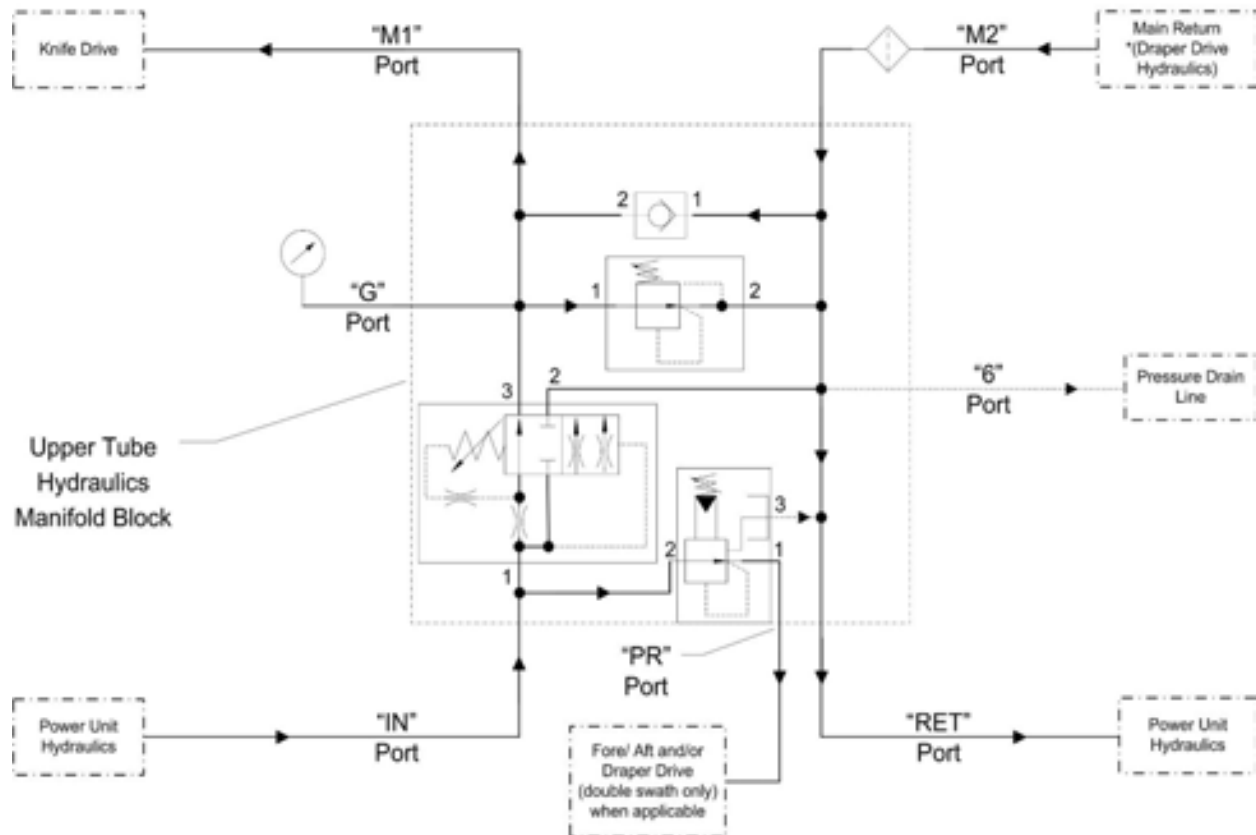
Double Reel Drive (Parallel) – WS Models



Upper Tube Hydraulics Single Swath (WS Models w/Direct Block Drainage)



Upper Tube Hydraulics Dbl Swath (WS Models w/Direct Block Drainage)



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11 - Optional Equipment

Caster Gauge Wheels

The gauge wheels are part of the system that keeps the table aligned with the profile of the ground while cutting. They provide improved lateral flotation of the header in rough and uneven ground conditions. The gauge wheels are designed to caster, so it is normally not necessary to raise the header when cornering. The adjustment of the gauge wheel assembly relative to the cutting height is essential to effective terrain following.



Lift the header table and gauge wheels off the ground when backing up the windrower.

Damage to caster wheels can also result from making sharp turns with the windrower. The sharp turning radius of the windrower can cause one of the wheels to be dragged backwards, potentially causing damage to the wheel.



The swather should be leveled and parked on level ground before attempting to adjust gauge wheel height.

Gauge wheels must be adjusted with the knife set at field operating height. Normal adjustment compresses the spring shafts of the gauge wheels approximately 1.5" (38mm) to 2.0" (50mm). Two adjustments are incorporated into the design of the gauge wheel assemblies.

- Top-mount lugs on the back of the header frame.
- Screw type Jack with height indicator.

Gauge Wheel Height Adjustment

1. Retract the gauge wheel jack to its lowest position, pointer should be above the "1" mark.
2. Set the gauge wheel 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 an average cutting height for the crop being cut. ie. desired stubble height.
4. Lower the gauge wheel assembly to the ground using the screw jack.
5. Repeat this procedure on the other gauge wheel assembly.
6. Check the amount of compression on the spring shaft of the gauge wheel assemblies, if incorrect, repeat steps (1) through (4) as described above until both springs are equally compressed within the specified amounts (1.5" (38mm) to 2.0" (50mm)).
7. It may be necessary to re-locate the pin in the top link to obtain satisfactory adjustment.

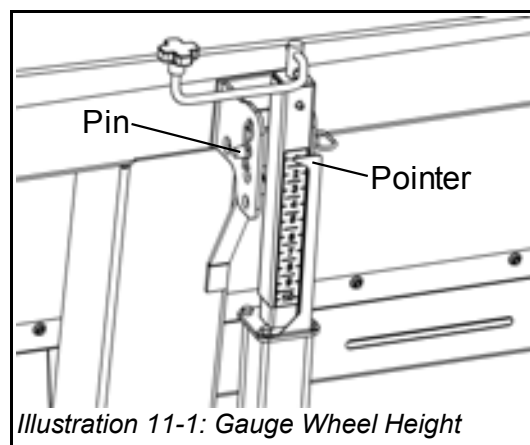


Illustration 11-1: Gauge Wheel Height

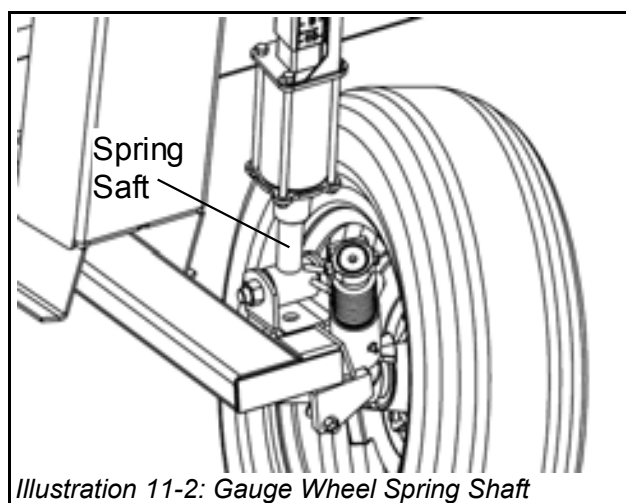


Illustration 11-2: Gauge Wheel Spring Shaft



Excessive compression of the spring tubes will add stress to the top link, causing premature wear.



Adjusting table tilt, spring floatation, and pitch will affect the amount of compression in the spring tubes. Further adjustments to the gauge wheels will be necessary.



Gauge wheels are not designed to support the weight of the swather table.

End Strut Gauge Wheels

End strut gauge wheels are mounted at the outboard ends of the main table frame to enhance the ability to closely follow the contour of the ground with the cutter bar.

Holes drilled in the wheel mount provide height adjustment by relocating the axle shaft as needed.



The draper decks may need to be moved to allow at least 1" of clearance from the end strut gauge wheels.

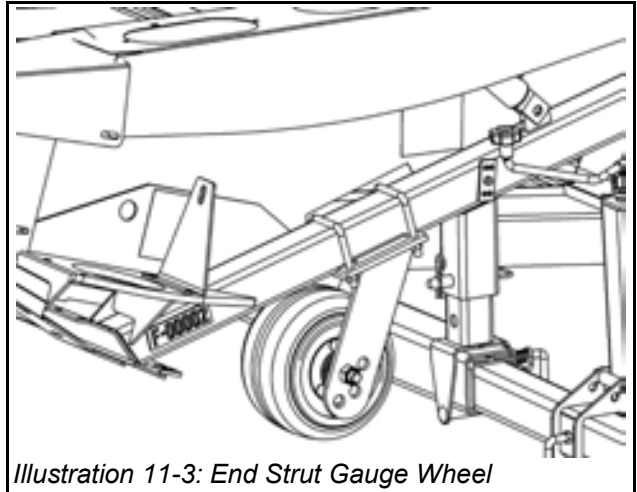


Illustration 11-3: End Strut Gauge Wheel

Vertical Crop Cutters

Vertical crop cutters are offered by a variety of third party vendors. They are designed to cut in a vertical direction on for use in cutting entangled crops such as canola and peas and preventing the crop from being entangled on the ends of the cutting bar.

The crop cutters must operate in series from the **last** reel drive motor in the circuit. The circuit flows from the **last** reel motor return port to the power inlet of the left-hand crop cutter motor, to the power inlet of the right hand crop cutter motor to the main return line of the header/swather.

Cross Auger

The cross auger can improve the cutting of specialty crops such as peas, canola, mustard, safflower, and lupins. Many of these crops are not heavy enough to keep them firmly on the draper. Bushy or crops with vines tend to slide on the draper, causing them to fall into the windrow in bunches or wads.

The left and right hand flighting on the cross auger gently pushes the crop down onto the draper, assisting its movement toward the windrow.

Some cross auger models include jacks where the cross auger mounts onto the frame. These jacks allow you to raise or lower the cross auger to account for different crop conditions.

The cross auger is plumbed into the draper circuit with a manual speed control (needle valve).

The rotation speed should be adjusted no faster than necessary to keep the crop moving evenly.

If set to rotate too quickly, the crop may wrap onto the flighting.

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. Draper speed should not be affected.

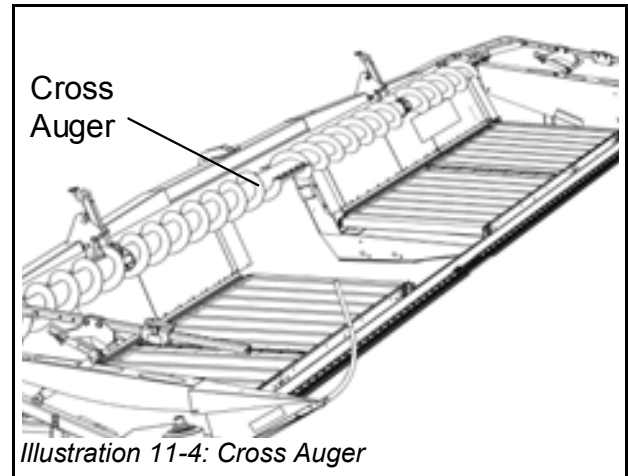


Illustration 11-4: Cross Auger

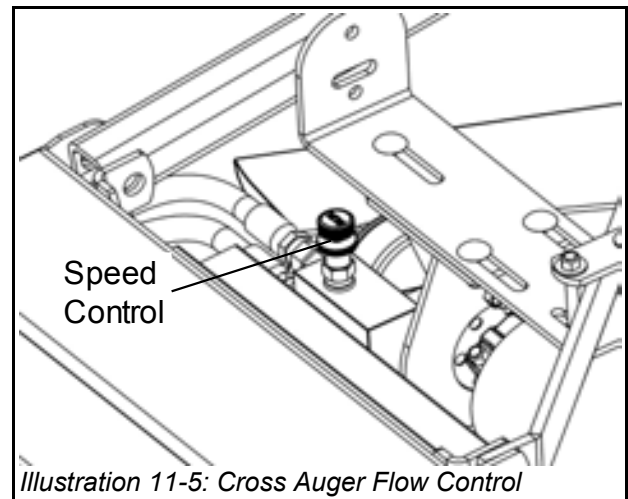


Illustration 11-5: Cross Auger Flow Control

Double Swath Option – 21, 25, 30, and 36 Foot Tables

Most Honey Bee Grain Belt Swathers can be equipped with a double swath option. This option allows the operator to lay two swaths. The first swath will be delivered to the opening on the right end of the swather. On the next round, the decks can be shifted to the right, creating an opening on the left end of the swather. This places the second swath beside the first. This option is useful in light crop conditions.

The decks are shifted using hydraulic motors activated by an electric solenoid on the selector valve.

The solenoid selector valve reverses the flow through the output ports when activated.

The deck shift motor and the draper motor are connected in parallel, so that when the deck arrives in its new position, the deck shift motor stops and the draper motor will be running in the opposite direction.

The deck shift roller chains are located on the back of the rear panel.

Adjuster bolts at either end of the chain are used to adjust tension.

The chains should not have too much slack, nor should they be too tight.

Excess tension will cause the decks to warp.

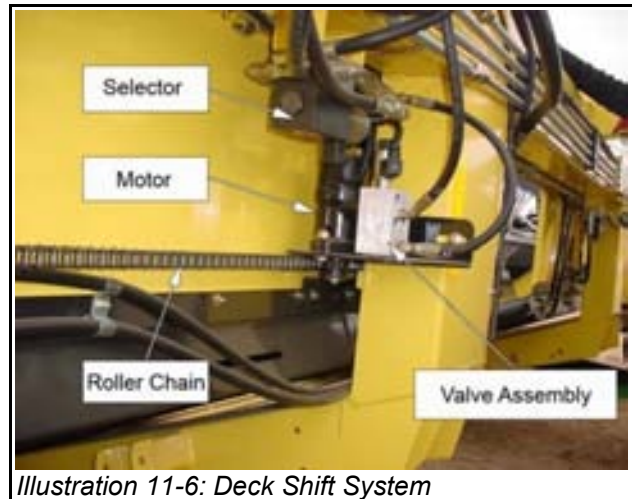


Illustration 11-6: Deck Shift System



Illustration 11-7: Roller Chain Tensioner

Deck shift stops are installed on each chain. Before adjusting these stops, determine how much the deck needs to be shifted. Then move the appropriate stop.

To have a deck move further/less to the left, the right hand stop will need to be moved, conversely, for the deck to move further/less to the right, the left hand stop will need to be moved.

The stop should be set so that the deck does not hit against the other draper decks or the swather frame. Allow approximately 1" of space between the decks.

Check all hose clearances on hydraulic motors after shifting the deck, to ensure they are not pinched or stretched.

Check draper tracking and adjust if required. See Draper Adjustment section of this manual for assistance.



Illustration 11-8: Deck Shift Stops



Illustration 11-9: Setting Deck Gap



When shifting the deck for the double swath option, you must disconnect the cross auger motor from the hydraulic circuit using the quick couplers provided. The cross auger motor is connected in series with the draper motor, therefore the hydraulic lines will become damaged if the draper motor is moved while still connected to the cross auger motor.

Junior Deck Option – For Swathers With the Double Swath Option

When using the double swath option, the Jr. Deck can be installed on the far right hand side of the swather to move the swath away from the standing crop. This leaves a larger gap between the swaths.

The Jr. Deck can be left on the swather when single swath delivery is required, but will leave a narrower swath.

The Jr. Deck is easily removed if a wider swath is required.

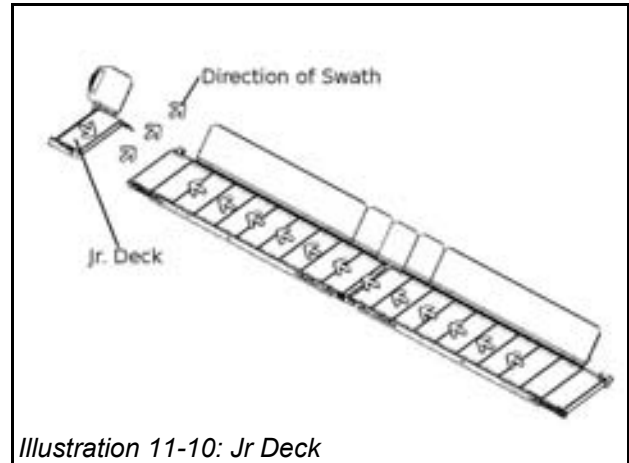


Illustration 11-10: Jr Deck

Steel Skid Plates

Steel skid plates are available for your swather unit as an add on option. They ensure your ability to hug the ground, without unnecessary wear to your swather.

These plates are located on the bottom of the cutter bar, bolted to the guard sections of the knife.

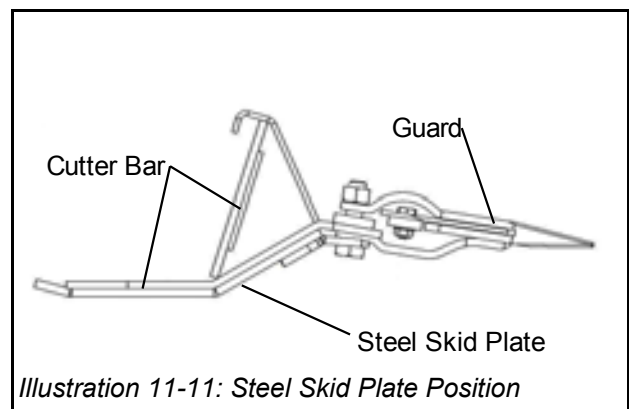


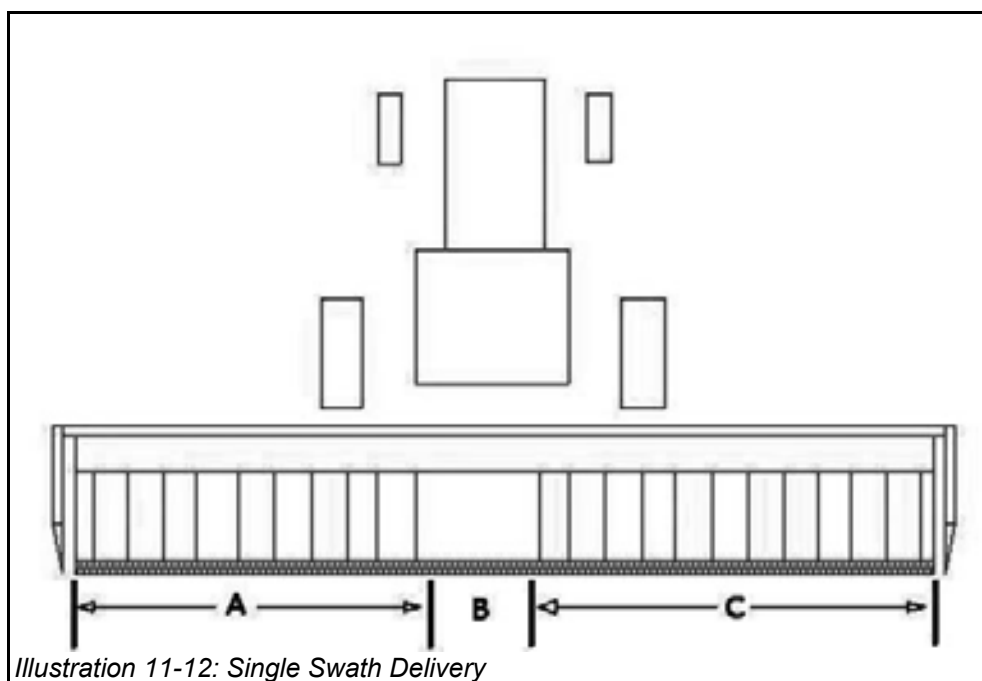
Illustration 11-11: Steel Skid Plate Position

Dimensions – Single Swath Delivery

Refer to the illustration below for the following dimensions:

Model (ft/m)	A (in/cm)	B (in/cm)	C (in/cm)
18HB (18/5.5)	80/208	50/130	80/208
21HB (21/6.4)	99/257	50/130	99/257
25HB (25/7.6)	104/270	80/208	104/270
	104/270	68/177	118/307*
	118/307*	56/146	118/307*
30HB (30/9.1)	136/354	80/208	136/354
	136/354	68/177	150/390*
	150/390*	56/146	150/390*
36HB (36/11)	175/450	80/208	175/450
	175/450	68/177	189/486*
	189/486*	56/146	189/486*

*	Indicates the addition of one 14" deck
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Dimensions – Double Swath Delivery

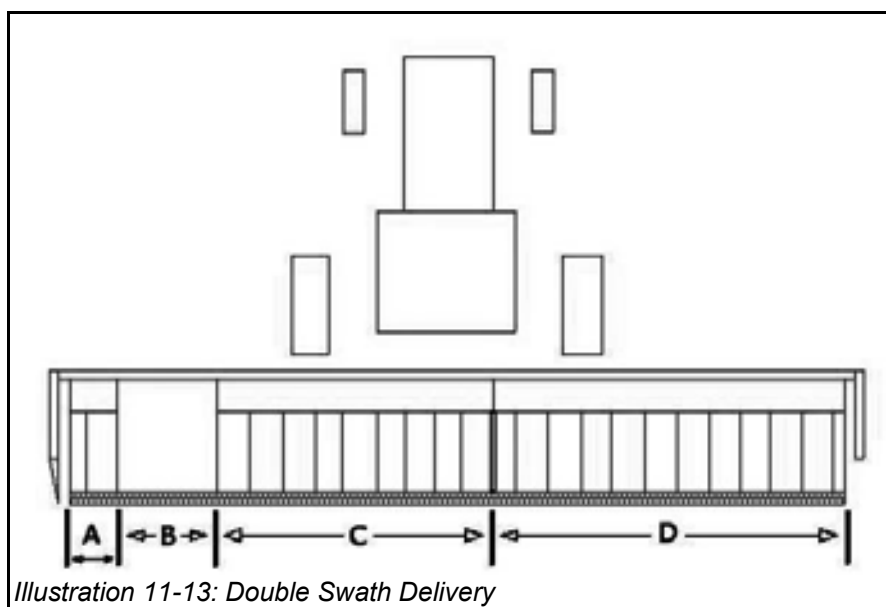
Refer to the illustration below for the following dimensions:

Model	A (in/cm)	B (in/cm)	C (in/cm)	D (in/cm)
21HB (21/6.4)	6/16	45/114	99/257	99/257
	-	50/130 (X)	99/257	99/257
25HB (25/7.6)	19/48	41/135 (J)	118/307	118/307
	6/16	54/140	118/307	118/307
	-	56/142 (X)	118/307	118/307
	-	68/172 (X)	118/307	104/264 *
	-	80/208 (X)	104/264 *	104/264 *
30HB (30/9.1)	19/48	37/121 (J)	150/390	150/390
	6/16	50/130	150/390	150/390
	-	56/142 (X)	150/390	150/390
	-	68/172 (X)	150/390	136/345 *
	-	80/208 (X)	136/345 *	136/345 *
36HB (36/10.9)	19/48	35/115 (J)	189/480	189/480
	6/16	48/158	189/480	189/480
	-	56/142 (X)	189/480	189/480
	-	68/172 (X)	189/480	175/445 *
	-	80/208 (X)	175/445 *	175/445 *

(X) - Indicates only available with centre delivery.

(J) - Indicates the addition of a junior deck.

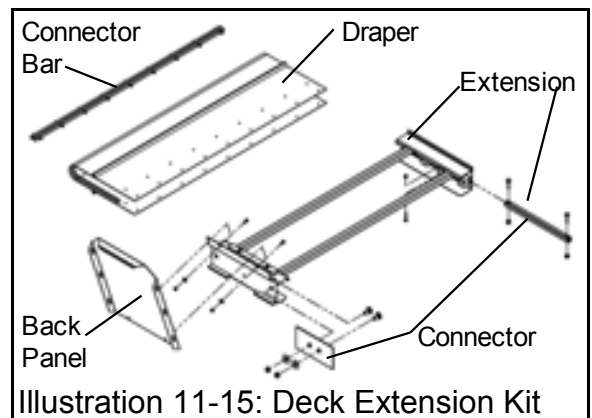
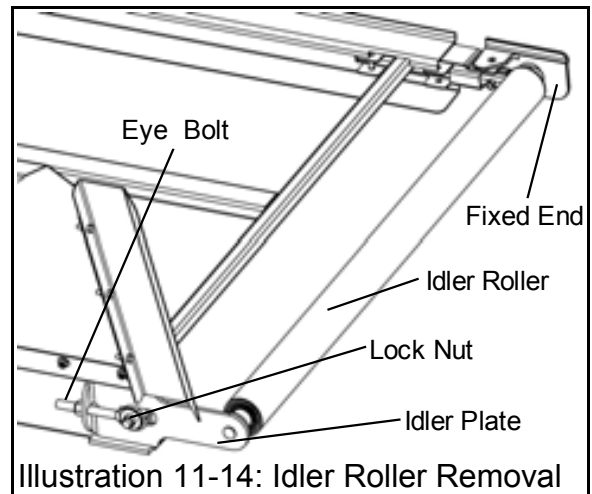
* - Indicates the the removal of one 14" deck.



Draper Extension for Swathing

When swathing in light crop conditions, it may be necessary to narrow the opening in order to lay a tight swath. One option is to add the 14 inch deck extension kit to the idler end of a deck, and add to or replace the existing draper with a longer one.

1. Remove the connector bar and open the draper to expose 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" draper extension to the regular draper with a connector bar.
9. Wrap draper around the rollers and connect ends together with the connector bar.
10. Adjust draper tension and tracking.



Hay Guard / Short Crop Guard

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

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.

Remove the self tapping screw 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 ribs of the draper and the underside of the hay guard.



Illustration 11-16: Self Tapping Screw Locations



Do not over-torque self-tapping screws. Their hardened threads will quickly strip out the hole to oversize.

Secure tab through hay guard and into the cutter bar. Install the remainder of the bolts to hay guard. Install the next section of hay guard, butting it up to the first section. Install self tapping screws to secure. Continue until all sections of hay guard are installed.

The hay guard profile is designed so the draper runs along the angle iron welded to the underside of the guard.

SCH Crop Lifters

Install the lifter spools to the underside of the guards using the longer bolts supplied in the kit. The spools should be spaced equally along the cutter bar, one per foot is recommended.

The socket of the lifter has three locking pin positions for adjusting the lifter angle. The lock pin can be placed in any of the three holes. For additional adjustment, flat washers can be added between the guard and the crop lifter spool.

For crop lifters to work properly the bottom runners must be parallel to the ground when the platform is in cutting position. *Illustration 11-19: Crop Lifter Orientation* shows the correct position of a standard crop lifter.

The bottom runner of the Special Series lifter should be parallel to the ground. To find the correct setting of the lifters for a given platform, drive on to a smooth, flat surface. Mount one lifter in the middle of the platform.

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 achieved.



Illustration 11-17: Crop Lifters Installed

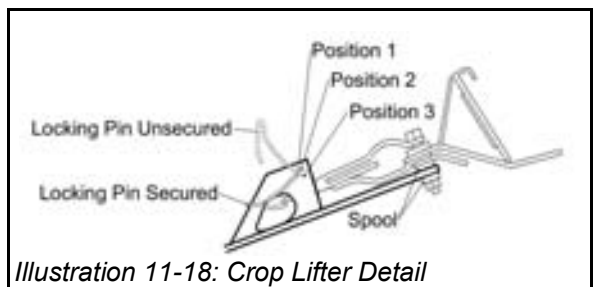


Illustration 11-18: Crop Lifter Detail

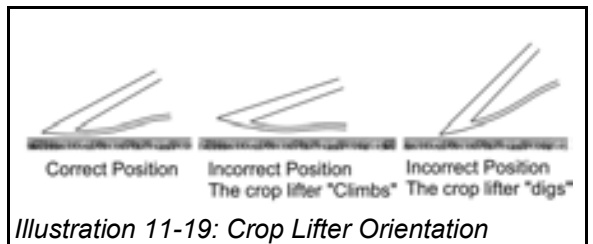


Illustration 11-19: Crop Lifter Orientation

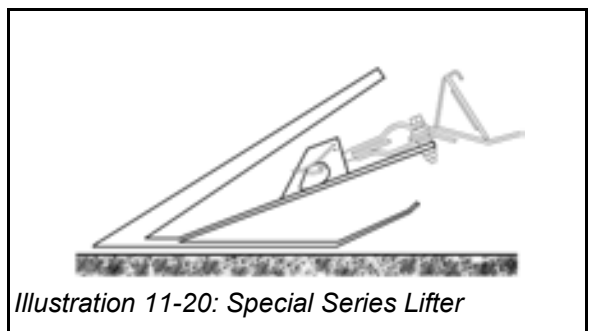


Illustration 11-20: Special Series Lifter

Hydraulic Tilt Cylinder Assembly

An option to the standard manual top- link is the hydraulic tilt cylinder which provides control of the table's angle from the cab of the windrower.

Switches for the platform tilt are located on the F-N-R lever and the adjacent control panel. Details on the F-N-R lever can be found on page 64.

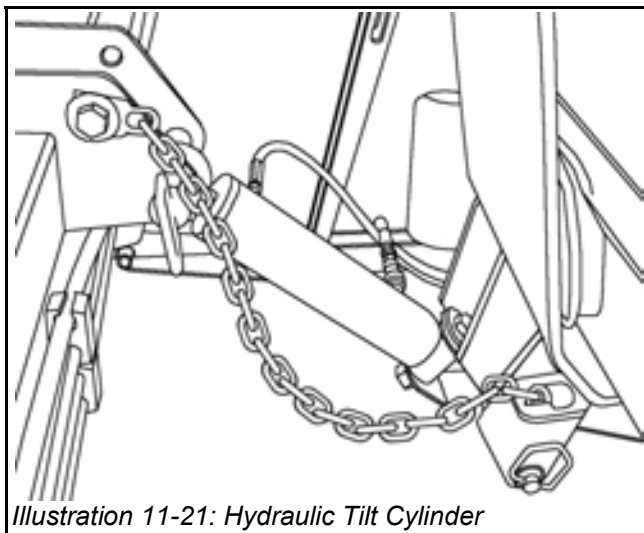


Illustration 11-21: Hydraulic Tilt Cylinder

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12 - Windrow Type

Several factors affect windrow formation: Ground speed, draper speed, type of crop, reel speed, table angle, and stubble height. This manual will give the operator some guidelines in how machine settings can affect windrow formation. It is the operator's responsibility to adjust the settings for the type of windrow desired.

Windrow Formations

Herringbone: The ideal formation for weathering and ease of pick up. The crop needs to be standing straight or leaning uniformly in one direction.

Parallel: A good windrow that is easier to form.

Angled Parallel (75 Degree Diagonal): A good windrow but not as good as the parallel.

Fan Tail: Good weathering ability and easy to pick up, but not as good as the first three types.

Diagonal (45 Degrees): This swath is less desirable, because the heads are concentrated on one side of the swath. It is more difficult to pick up and is more easily affected by wind or rain.

Dovetail: Also less desirable, because heads are concentrated in the middle of the swath. More difficult to pick up and more easily affected by wind or rain.

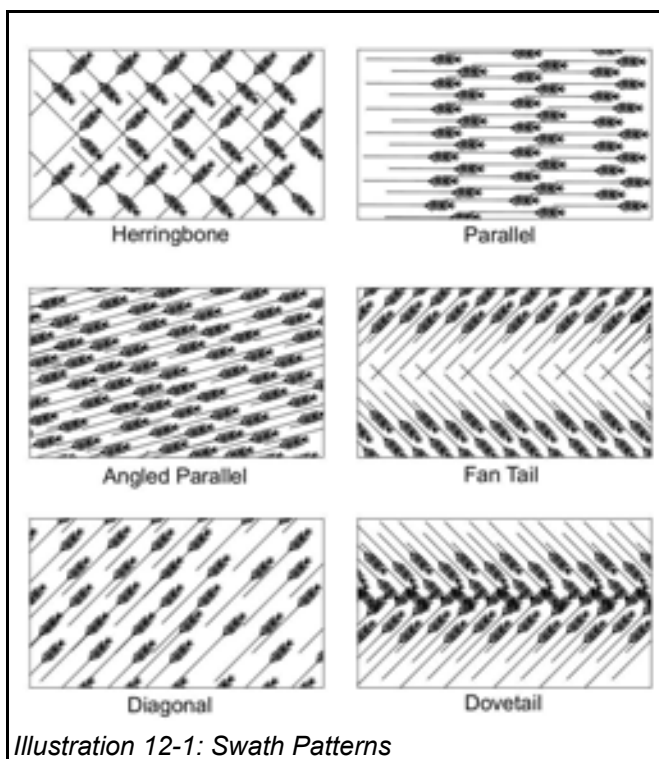


Illustration 12-1: Swath Patterns

Ground Speed

Use windrow quality as a guide to travel speed. Cut at lower speeds when terrain is rough and when crops are lodged or tangled. Excessive speed may be indicated by a ragged cut in the stubble.

Stubble Height

For most crop types, best results are obtained when the table is adjusted for a stubble height of 6" to 8" or (150 to 200 mm). This height of stubble should have strength to support the windrow and to provide air flow underneath. Also, the windrow should be easier to pick up.

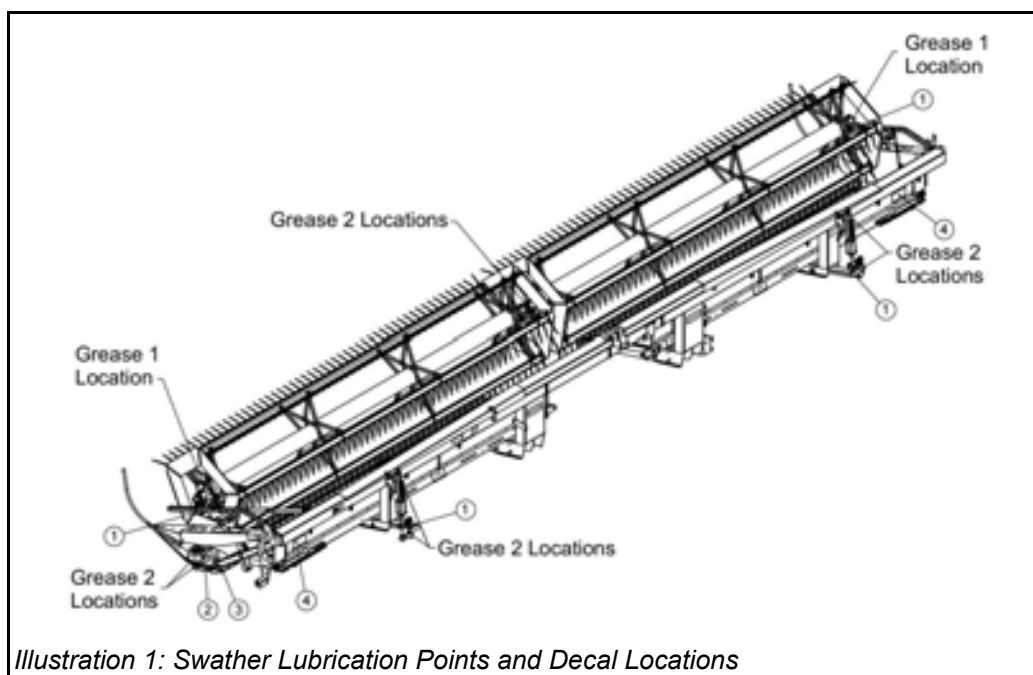
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13 - Lubrication & Maintenance

IMPORTANT Use good quality, general purpose grease.

Component	Lubricant	Frequency/Notes
Knife Drives	Grease	50 hours
Knife Head Bearing	Grease	Grease fitting on bottom of crank shaft)
Main Bearing and Gear	Grease	Grease fitting on side of knife drive
Knife	Diesel	Soak with diesel or clean with a pressure washer
Reel Bearings	Grease	10 hours
Gauge Wheels – King Pin	Grease	10 hours
Wheel Bearings	Grease	Disassemble and re-pack yearly.
Hydraulic Return Line Filter	n/a	Change after first 50 hours of operation and seasonally thereafter. (Filter: HB - 27281/Donaldson – P164375) Refer to page 114 for a list of compatible filters.

The following maintenance decals and lubrication locations have been placed on your machine in the areas indicated. Please take this manual, walk around your machine and familiarize yourself with the lubrication locations and content of these decals. Review this information, with your machine operators. Please keep decals legible.



Maintenance Related Decals

1.

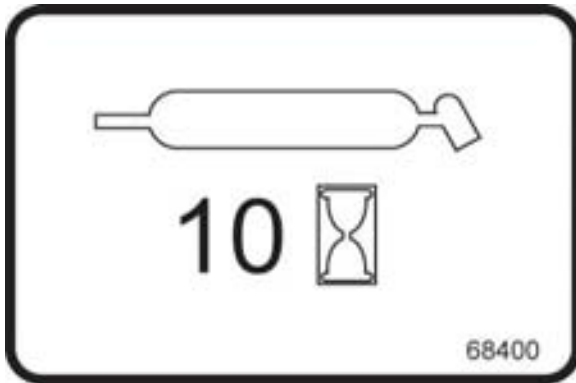


Illustration 3: Grease every 10 hours

2.

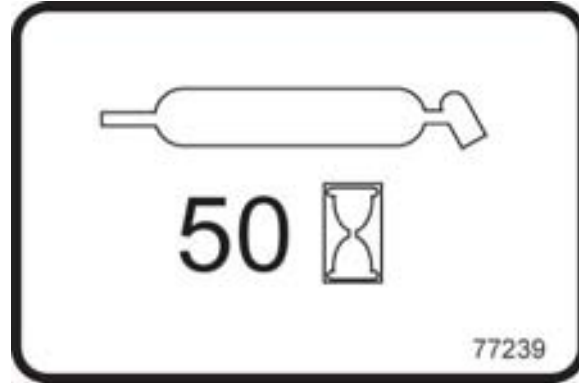


Illustration 2: Grease every 50 hours

3.

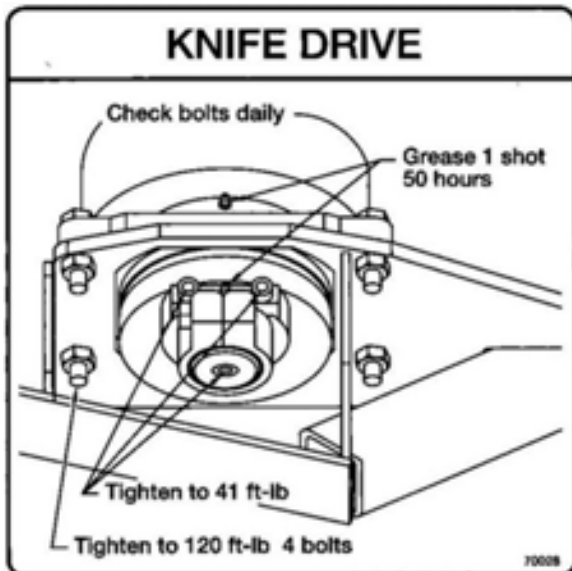


Illustration 5: Torque and Grease Requirements

4.

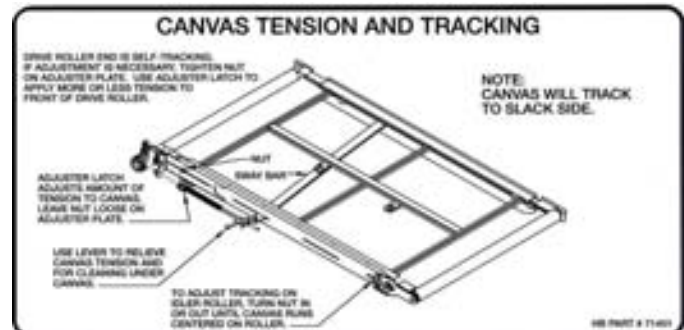


Illustration 4: Draper Tension and Tracking

14 - Troubleshooting

Problem	Possible Cause	Solution
Reel		
Reel won't hold height.	Leaking hose or fitting. Valve in windrower leaking.	Repair or replace. See windrower Manual.
Reel won't hold level.	Leaking hose or fitting. Air in system. Faulty master cylinder.	Repair or replace. Bleed slave cylinder. Repair or replace.
Reel raises or lowers erratically	Reel cylinders binding. Arms bent or binding. Low hydraulic oil.	Replace cylinder. Repair or replace. See windrower Manual.
Reel won't raise.	Hydraulic couplers don't match. Valve is not open. Faulty windrower hydraulics. Reel not plumbed into tilt circuit.	Install correct couplers. Open Valve. See windrower Manual. Check plumbing schematic.
Damage to center of reel.	Reel set too low. Reel tube bent.	Adjust height. Replace.
Reel hitting at end.	Reel not centered.	Adjust centering.
Reel will not turn or turns erratically.	Flow control set too low. Draper flow set too high. Faulty relief valve. Seized bearing(s). Faulty drive motor. Reel Tied Down.	Advance setting. Reduce draper speed. Clean or replace. Replace bearing(s). Replace motor. Release Reel.
Reel Speed cannot be adjusted.	Poor electrical connection. Defective reel speed motor. Circuit breaker open or burnt out.	Check connections and cable. Replace motor. Replace.

Problem	Possible Cause	Solution
Knife		
Knife won't run.	Low hydraulic oil.	Add oil. Determine cause of oil loss.
	Cutter bar jammed.	Check for damaged guards or sections.
	Faulty drive motor.	Repair or replace motor.
	Faulty knife drive.	Repair or replace.
	Faulty hydraulic pump.	Repair or replace.
Knife stalls easy.	Knife gummed.	Clean cutter bar.
	Type of material being cut.	Reduce ground speed.
	Low pressure at knife motor.	Check system pressure.
	Bent guards or cutter bar.	Repair or replace.
	Faulty knife drive.	Check for loose crank shaft.
	Seized knife head bearing.	Replace.
	Knife head out of alignment.	Adjust knife head bearing.
Unloaded system pressure too high.	Faulty draper motor.	Repair or replace.
	Relief valve set too low (3000 psi).	Adjust.
	Relief valve stuck open.	Remove and clean or replace cartridge.
	Wrong type of hydraulic oil.	Change windrower hydraulic oil.
Knife running too slow.	Flow control set low.	Set control higher.
	Low oil level.	Add oil, locate cause and repair.
	Relief valve stuck open.	Remove and clean or replace cartridge.
	Low oil volume.	Reset volume, 19.5 gpm required.
	Wrong motor size.	Check with manufacturer.
	Worn pump or motor.	Repair or replace.

Problem	Possible Cause	Solution
Excessive vibration.	Check oil volume (19.5 gpm)	Reset if needed.
	Loose bearings in drive.	Replace bearings.
	Loose knife head bolts.	Tighten.
	Damaged sickles or guards.	Replace.
Excessive noise.	First guard bent or out of alignment.	Straighten or replace.
	Knife drive bearing faulty.	Replace.
	Knife drive loose.	Tighten bolts and check for damage to housing.
	Knife head adjusted too high or too low.	Loosen clamp bolt on knife head bearing and adjust.
Knife leaves strip of crop standing.	Excessive ground speed.	Slow down.
	Bent or broken guard.	Straighten or replace.
	Broken knife section.	Replace.
	Plugged guard.	Clean.
Connector bar breaks	Damaged sections or guards.	Repair or replace.
	Knife gummed up.	Soak with diesel fuel, or wash with pressure washer.
	Section bolts not tight.	Tighten or replace.
	Sections on knife back installed on wrong side.	Remove sections, turn knife over and replace sections.
Knife head breaks	Section bolts not tight.	Tighten and/or replace bolts.
	Knife gummed up.	Soak with diesel fuel, or wash with pressure washer.
	Damaged sections or guards.	Repair and/or replace.
	Sickle sections dull.	Replace sections.
	Tough crop.	Reduce ground speed.
	Knife drive running to fast.	Check speed with photo tach.

Problem	Possible Cause	Solution
Draper		
Draper not tracking straight.	Drive or idler roller out of alignment. Draper splice not cut straight. Material building up on rollers.	Adjust draper tracking. Re-punch connector bar holes in draper. Clean rollers.
Draper slipping.	Draper too loose. Draper is snagging.	Adjust draper tension. Check alignment. Look for obstructions.
Draper not turning.	Draper is snagged or caught. Flow control is shut off. Oil flow is being by-passed.	Check for interference. Adjust flow control. Check relief valve setting. Remove and clean relief cartridge.
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.
Decks		
Decks creep sideways.	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 are not installed.	Place deck in proper position. Tighten or replace.
Decks will not shift.	Poor electrical connections. Electrical cable not plugged into windrower or control box. Decks or back panels jammed or binding.	Trace and repair. Check connections. Check decks and clean out debris.

Problem	Possible Cause	Solution
Heads shattering or breaking off.	Reel speed too fast. Ground speed too high. Crop over-ripe.	Reduce reel speed. Reduce ground speed. Cut earlier in morning or late at night when humidity is higher.
Cut grain falling off cutter bar.	Reel set too high. Table set too high. Reel too slow for ground speed.	Lower reel. Lower table. Increase reel speed.
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 pickup.	Lower table. Lower reel. Move reel forward. Reduce ground speed or increase reel speed. Install optional Pickup Reel. Install optional SCH Crop Lifters.

Hydraulic Oil

Temperature High	Excessive oil going over reliefs. Faulty pump or motors. Draper too tight or not tracking. Oil too light.	Check reliefs on flow controls. Repair or replace. Adjust draper alignment. Refill with correct grade.
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Leveling

Swather not level.	Float pressure too low.	Adjust float pressure.
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Table Angle

Draper running too flat or too steep.	Tilt (turnbuckle or hydraulic) out of adjustment.	Adjust.
Raising and lowering the Swather		
Swather will not lift.	Windrower lift capacity.	Check system pressure. Check the needle valve, table lift circuit. Increase needle valve opening.

Problem	Possible Cause	Solution
Swather table lifts and lowers too slowly.	Needle valve set too low.	Adjust needle valve on lift circuit.
Lift and Float Systems		
Platform Does Not Follow Ground Contour.	Platform float pressure too high, making platform feel light.	Check windrower operator's manual. Adjust float pressure.
NOTE: <i>If float pressure is set too high platform will feel light and bouncy. If float pressure is too low, platform will feel heavy and unresponsive. It should require less than 150 lbs. to lift the end of the platform.</i>	Field/Road switch in the ROAD Position.	Set switch to FIELD position.
	Faulty Relay.	Replace Relay.
	Accumulator pre-charge pressure too low.	See your John Deere dealer.
Platform Digs Into Ground and Pushes Hard.	Guards digging into ground.	Adjust guard angle, with turnbuckle or hydraulic tilt.
	Platform float pressure too low, making platform feel too heavy.	Adjust float pressure.
	Accumulator pre-charge pressure too high.	See your John Deere Dealer
Platform Drops Too Fast or Does Not Lower Smoothly	Platform float pressure too low, making platform too heavy.	Adjust platform float.
	Accumulator pre-charge pressure too high.	Adjust needle valve. See your John Deere Dealer.
Platform Will Not Lift or Lifts Too Slow	Needle valve set too low.	Adjust needle valve.
	Binding lift linkage.	Replace bent or worn parts.
	Platform float pressure too low, making platform too heavy.	Adjust platform Float.
	Worn lift pump.	
	Low Relief valve setting.	See your John Deere dealer.
	Excessive charge oil flow to pumps.	See your John Deere dealer.
	Faulty switch or relay.	See your John Deere dealer.
	Faulty solenoid or valve cartridge.	Replace.
		Replace.

15 - Specifications/Features

Weights

Weights are given in lbs/kg format.

Model	WS18	WS21	WS25	WS30	WS36
Width	18'	21'	25'	30'	36'
Weight	1792/815	1980/900	2280/1036	2710/1232	3207/1458

- Weight includes - Swather assembly c/w decks and attached hydraulic components.
- Weight does not include - Double swath decks or lift arms.

Component	WS18	WS21	WS25	WS30	WS36
Pick-up Reel - 490/223 UII Universal		562/255	624/283	720/327	980/446
Pick-up Reel HCC ML	502/228	566/257	625/284	718/326	884/401
Lift Arms	200/91	200/91	200/91	200/91	200/91
Transport Axle	206/93	206/93	206/93	206/93	206/93

Knife Drive Availability

Model	WS18	WS21	WS25	WS30	WS36
Single Knife	standard	standard	standard	standard	n/a
Double Knife	optional	optional	optional	optional	standard

Technical Specifications

- Knife Drive - SCH epicyclic 3 5/16" stroke, hydraulically driven, 1100-1400 strokes per minute. (2 strokes = 1 RPM)
- Cutting System - SCH Easy Cut, spring steel guards and bolted sections.
- V-Guided Draper - 42" Rubberized polyester, fiberglass reinforced, tie bar connectors.
- Draper Speed - adjustable in cab, 0-575 fpm.
- Reel Speed - adjustable in cab.
- Adjustable cutting angle.
- Standard single swath opening is approximately 81" +/- 3".
- Standard double swath opening is approximately 46" +/- 6".
- Swath opening may be decreased for WS25, WS30, WS36 tables by inserting 14" Deck extensions.



Specifications are subject to change without notice or obligation.

Options

- Pickup Reel - 6 bat, 42" diameter Universal U-II Pickup Reel, plastic fingers.
- Pickup Reel - 6 bat, 44" diameter HCC Level-II Pickup Reel, plastic fingers
- Steel Fingers for U-II Pickup Reel.
- Fore/Aft - Hydraulic reel adjustment
- Double Reel Drive
- End Strut Gauge Wheels
- Castering Gauge Wheels without tires or wheels - WS25 (Not offered for WS21 models)
- Steel Skid Plate (Not available for WS36)
- Hydraulic Tilt
- Quick Coupler Finishing Kit
- Junior Deck for Double Swath Tables.
- 14" Deck Extension Kit
- Cross Auger Kit (Not available for WS21)
- Swath Delivery Kits - Hydraulic deck shift.
- Crop Lifters for cereals and/or specialty crops.

Included in Standard Swather

- Storage Axle and Hitch
- Remote Draper Speed Control
- Hay Guard
- UHMW Poly Skid Plate
- Castering Gauge Wheels - WS30, WS36
- Tires/Wheels/Hubs/Spindles

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. Always replace fasteners with the same strength rating and size.

<i>Unified Torque Specifications</i>				
Grade	SAE 5		SAE 8	
Size	Nm	Lb-ft	Nm	Lb-ft
1/4"	12	9	17	12
5/16"	25	19	36	27
3/8"	45	33	63	45
7/16"	72	53	100	75
1/2"	110	80	155	115
9/16"	155	115	220	165
5/8"	215	160	305	220
3/4"	390	290	540	400
7/8"	570	420	880	650
1"	915	675	1320	970

<i>Metric Torque Specifications</i>				
Grade	8.8		10.9	
Size	Nm	Lb-ft	Nm	Nm
M6	11	8.5	17	12
M8	28	20	40	30
M10	55	40	80	60
M12	95	70	140	105
M14	150	110	225	165
M16	240	175	350	255
M18	330	250	475	350
M20	475	350	675	500
M22	650	475	925	675
M24	825	600	1150	850



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

Hydraulic Fitting Torque

Tightening Flare Type Tube Fittings

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

Hydraulic Torque Fitting Table					
Tube OD Size	Nut Size	Torque Value	Torque Value	Flats to tighten	Turns to tighten
Inches	Inches	Nm	lb-ft	-	-
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"	1 1/16"	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



The torque values shown are based on lubricated connections as will be found in reassembly.

Tightening O-ring Fittings

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

<i>O-ring Fitting Values</i>					
OD Thread Size - Inches	Nut Size - Inches	Torque Value - Nm	Torque Value - Lb-ft	Flats to Tighten	Turns to Tighten
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	1/2	62	146	1-1/2	1/4
1-1/16	1-1/4	102	75	1-1/2	1/6
1-3/16	1-3/8	122	90	1-1/2	1/6
1-5/16	1-1/2	142	105	3/4	1/8
1-5/8	1-7/8	190	140	3/4	1/8
1-7/8	2-1/8	217	160	1/2	1/12



The torque values shown are based on lubricated connections as will be found in reassembly.

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16 - Lighting

The lighting system incorporates two circuits, details for these two circuits can be found on the following pages:

- Transport running lights. Items # 3, 4, 6.
- Warning flashers. Items # 1, 2, 5.

Transport Lights:

- The transport lights consist of two wiring harnesses and two (tail, signal, and stop) lights.
- The 46ft (14.03M) Harness extension with a male (Universal Trailer Connector, 4 Pole) leads to the towing vehicle. It is the transporters' responsibility to ensure proper connection to towing vehicle.
- The 6ft (1.83M) Harness wishbone with male (Universal Trailer Connector, 4 Pole) that connects to the female end of the 46 ft (14.03M) extension harness. The plugs on the other end connect directly to the pig tail of the lights.

Warning Lights:

- The warning flasher light wiring consists of a 10 ft (3.05M) pigtail harness that attaches from the windrower to the warning flasher harness. The adaptor plug (JD - 7 - way connector) is installed at factory with the reel speed wiring plug.
- The warning flasher harness is a total of 45 ft (13.73M) in length and connects the warning flasher lights to the windrower.

Wiring Schematics

1. Harness 10ft Pigtail
2. Harness Warning Flashers
3. Harness 46ft extension
4. Harness 6ft Wishbone
5. Amber - Warning Flasher
6. Red/Amber - Tail. Signal and Stop

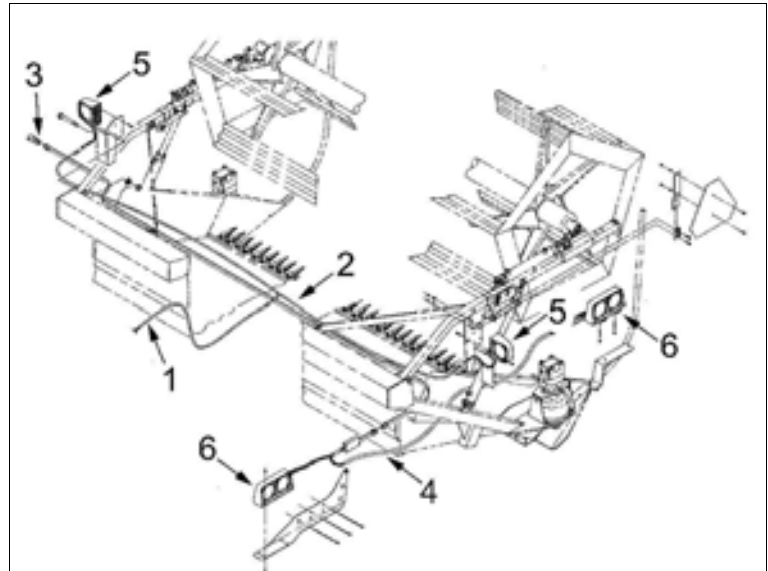


Illustration 16-1: Light Schematic

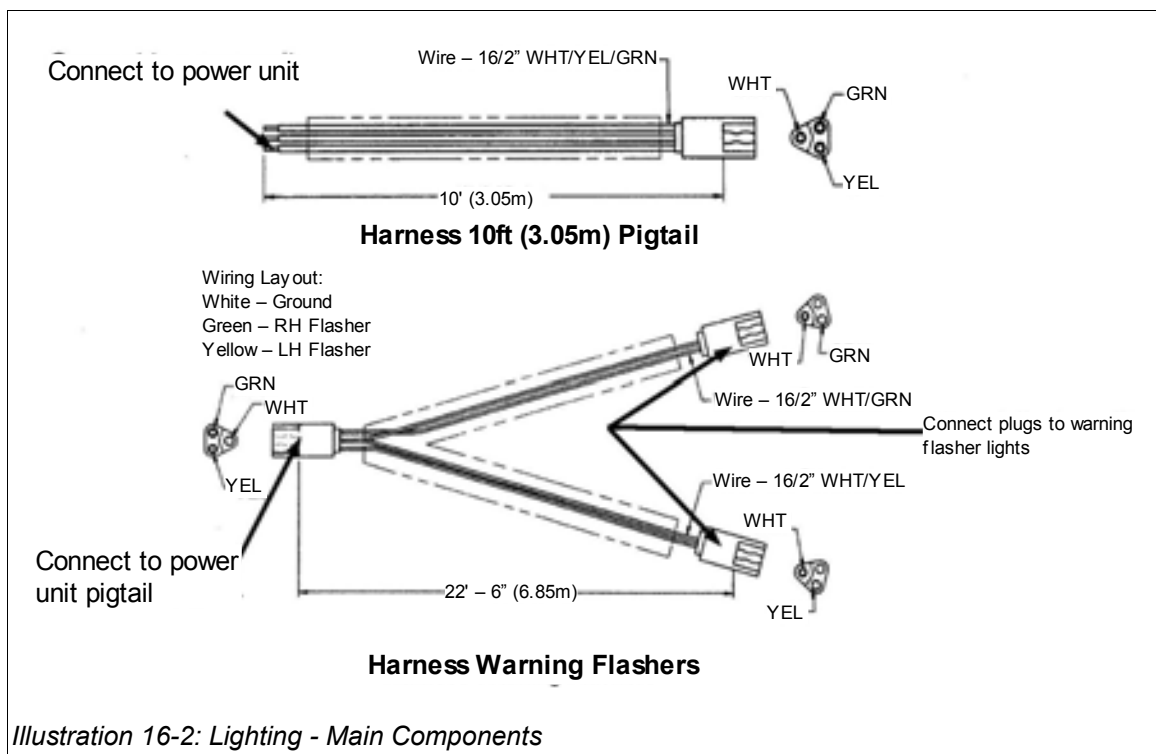
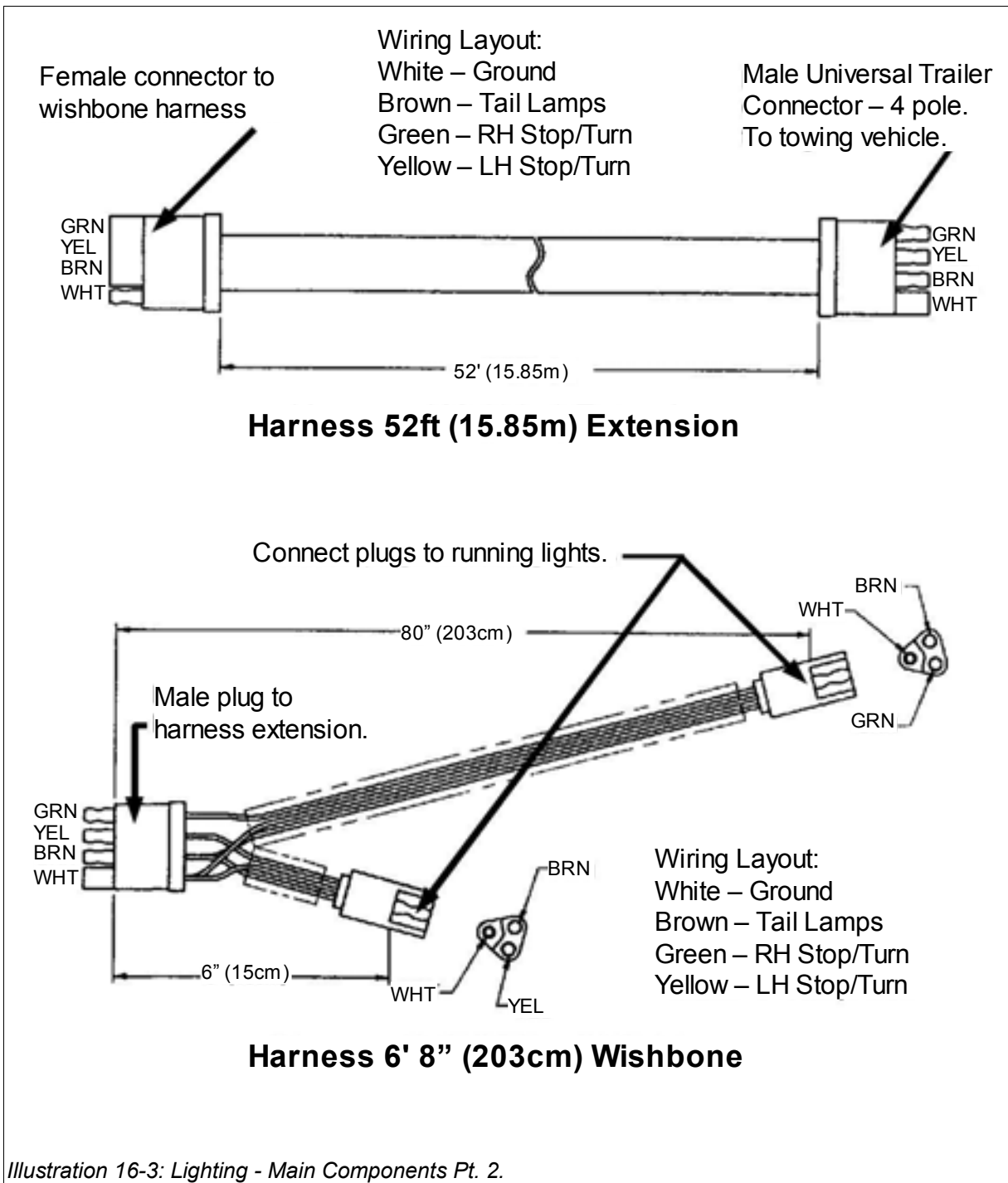


Illustration 16-2: Lighting - Main Components



Light Wiring

The lights operate on two circuits:

1. Transport running lights.
2. Warning flashers.

Transport Lights

Transport lights should be used at all times when the header is towed on public roads. Connect to the tow vehicle using the proper plugs.

Wiring color code:

White - Ground

Brown - Tail Lamps

Green - Right Hand Stop / Turn signal

Yellow - Left Hand Stop / Turn signal

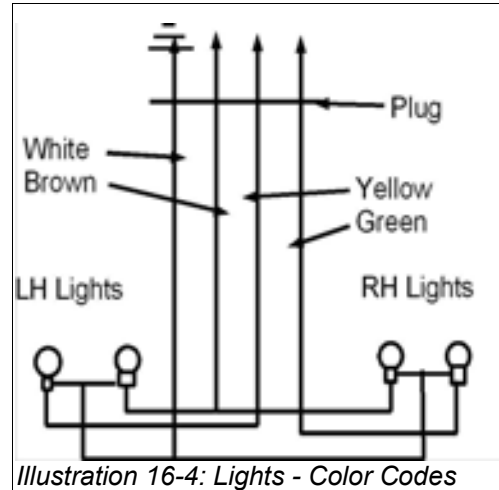


Illustration 16-4: Lights - Color Codes

Hazard Warning Lights

When transporting the swather while it is mounted to the windrower, hazard warning lights must be connected and operating. The amber warning lamps must be visible from both the front and the rear.

Wiring Layout:

White - Ground

Green - Right Flasher

Yellow - Left Flasher

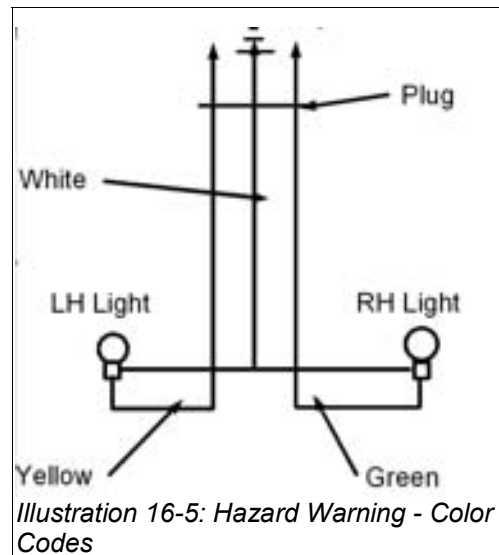


Illustration 16-5: Hazard Warning - Color Codes

Be Seen. Be Safe!



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