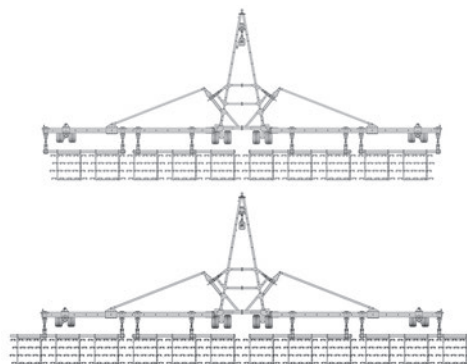
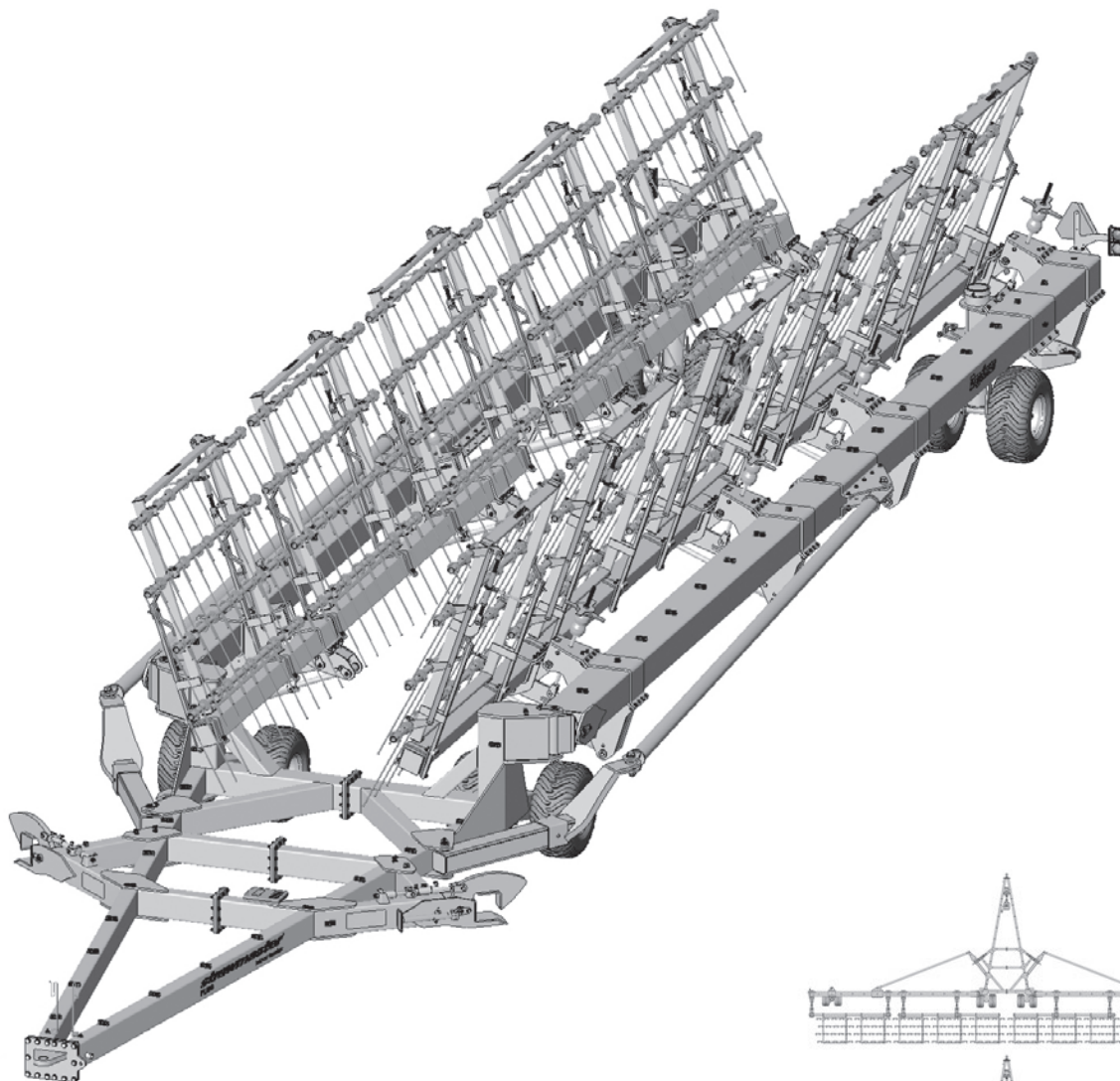


strawmaster[®]

PLUS

harrow drawbar



142634 v2.0

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STRAWMASTER[®] PLUS

100' & 120'

Serial Numbers: SM7157-7160 (100')
SM7207-7212 (120')

STRAWMASTER PLUS QUICK-START GUIDE

Degelman

A Connect Hydraulics

① **HARROW LIFT CIRCUIT...** Harrow Lift Cylinders

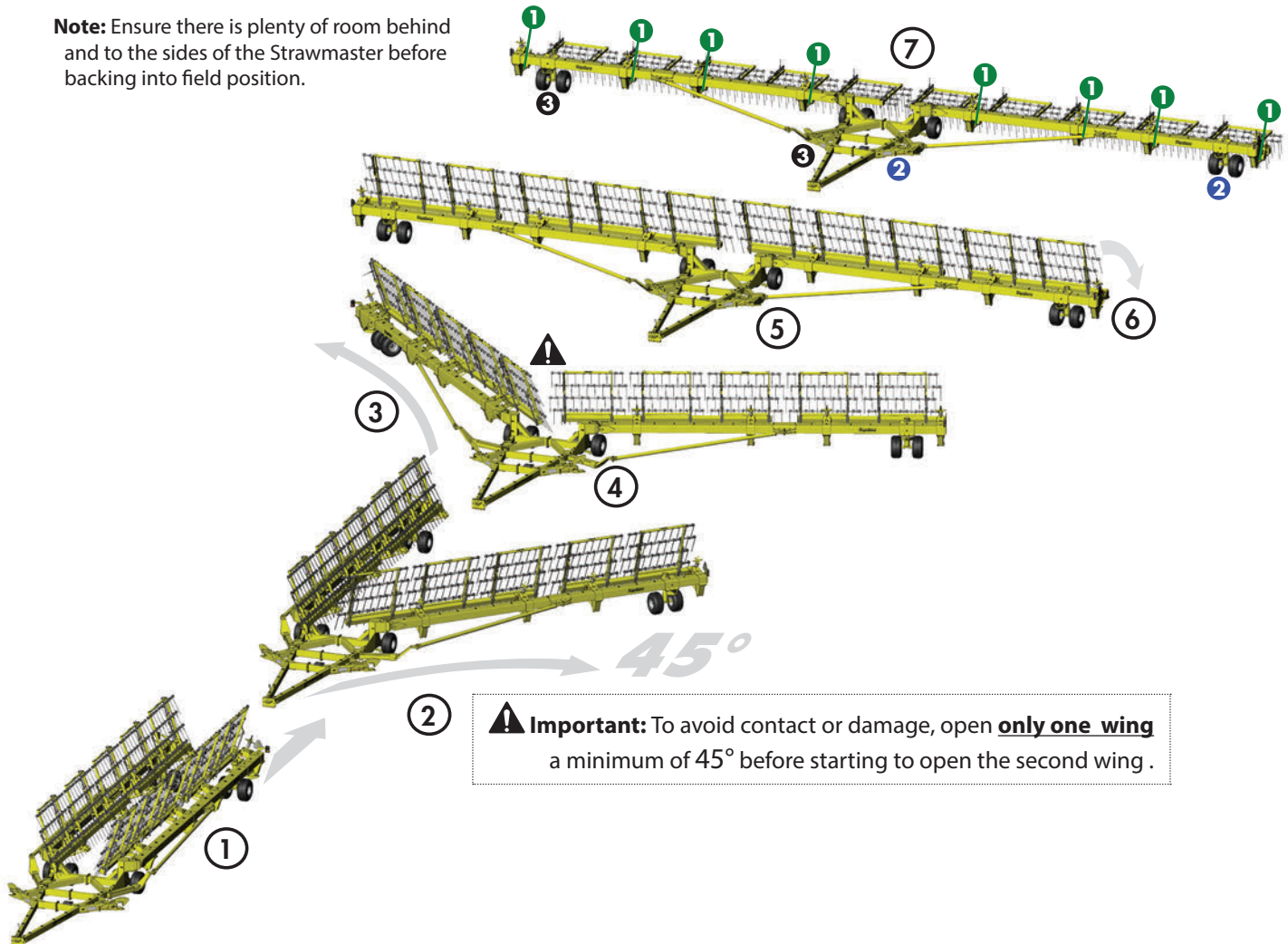
② **LEFT WING CIRCUIT.....** Endwheel & Left Latch

③ **RIGHT WING CIRCUIT.....** Endwheel & Right Latch

Caution: Before working in field, lock the function for both the Left ② and Right ③ Wing Circuits to avoid accidental operation.

B Backing Into Field Position

Note: Ensure there is plenty of room behind and to the sides of the Strawmaster before backing into field position.



1) Remove Transport Locks from Wing Beam connections (8) and Endwheel locations (2).

2) Slowly Back-up Strawmaster Assembly while extending the Endwheel steering cylinder on only one wing to spread the wing partially open to a minimum of 45°.

⚠ IMPORTANT: This is to avoid contact of harrow sections between the wings while unfolding.

3) When the first wing has been unfolded 45° or more, you can start extending the Endwheel steering cylinder on the second wing.

4) When the autofold swing arms are close to closing you can activate the endwheel cylinder circuit again to open the latch clamp.

5) When the swing arms are in position, this circuit can be activated again (fully extended) to close the clamps.

Note: If Latches have been left in the down position, the Swing Arms can also be engaged by allowing the Swing Arms to ride into the Latches and “click” into engagement.

Caution: Lock hydraulic functions for both wing circuits before working in field to avoid accidental operation while in use.

6) Lower the Harrow Sections down fully into field position.

Adjustment Settings

7) Adjust settings for light or aggressive harrowing.

8) Adjust Tine Angle as needed.

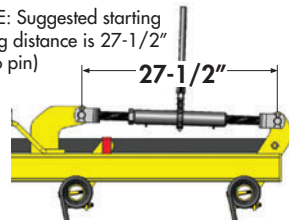
9) Adjust Parallel Angle as needed.

C Setting Tine Angle, Pressure & Frame

Tine Angle Adjustment

There are no standard angles for running the tines, the operator may adjust the tine angles as needed to achieve desired results.

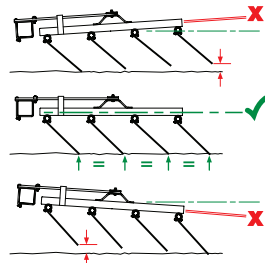
(NOTE: Suggested starting setting distance is 27-1/2" pin to pin)



Parallel Adjustment

For initial setup and each time after you make adjustments to the harrow tine angles, you should check and ensure that the harrow frame sections are running parallel to the ground.

(Check that the front rows and back rows are applying equal pressure)



1 - Lift harrow sections to relieve tension on springs.



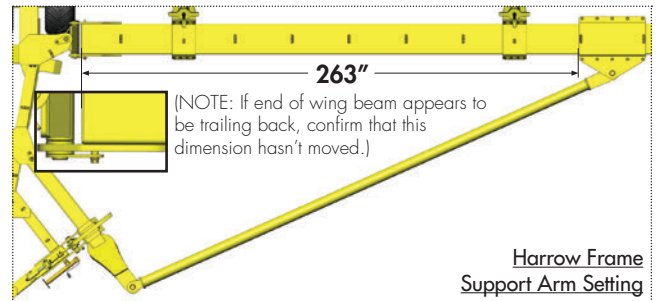
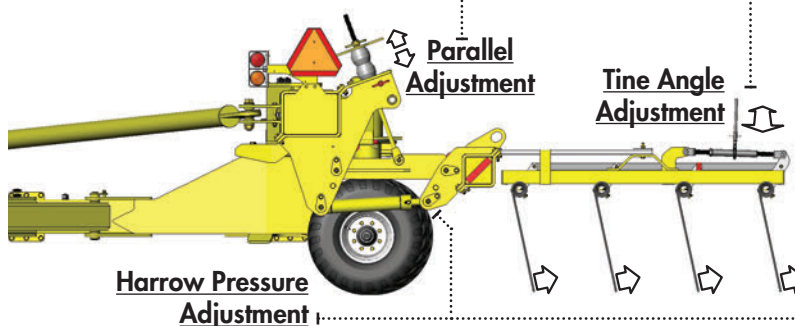
8" or 9"

2 - Loosen top Jam nut arm to allow adjustment.

3 - Adjust bottom arm as needed.

(NOTE: A suggested starting distance, from top of rod to top of lock nut is 9" for Light harrowing or 8" for Aggressive harrowing. Increasing this distance will raise front of the harrow section, decreasing will lower it.)

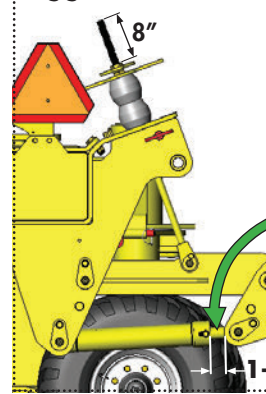
4 - Re-tighten top Jam nut arm.



Harrow Frame
Support Arm Setting

Harrow Pressure Adjustment

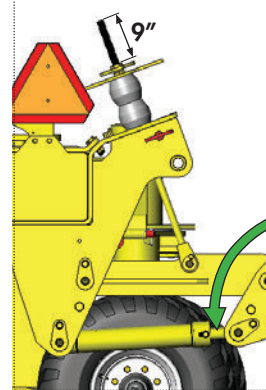
Aggressive Harrowing Setting



Hydraulic Lock Cylinders

- Parallel Adjustment setting should be set to 8".
- Fully close harrow cylinders, then slowly open until 1-1/2" of rod is exposed.

Light Harrowing Setting



Cylinders in Float Position

- Parallel Adjustment setting should be set to 9".
- The harrow cylinders should be set to float position.

D Moving Into Transport Position

- 1) Raise the Harrow Sections up fully into transport position.
 - 2) Activate the endwheel cylinder circuit to open the latch clamp on **only one wing**.
 - 3) Drive forward until wing trails back **approximately 45°**.
 - 4) Activate the second endwheel cylinder circuit to open the latch clamp on the opposite wing.
 - 5) Drive forward slowly until both wings trail behind the center frame. Ensure end wheel cylinders are fully retracted.
- ▲ IMPORTANT:** Do not drive quickly when positioning wings or the wings may collide with each other.
- 6) Engage Transport Locks on Wing Beam connections (8) and at Endwheel locations (2).
 - 7) Ensure lights are working and SMV sign is clean. Follow all local transport laws when transporting.

strawmaster[®] **PLUS** harrow drawbar

** Reference Sheet Quick-Start Guide*

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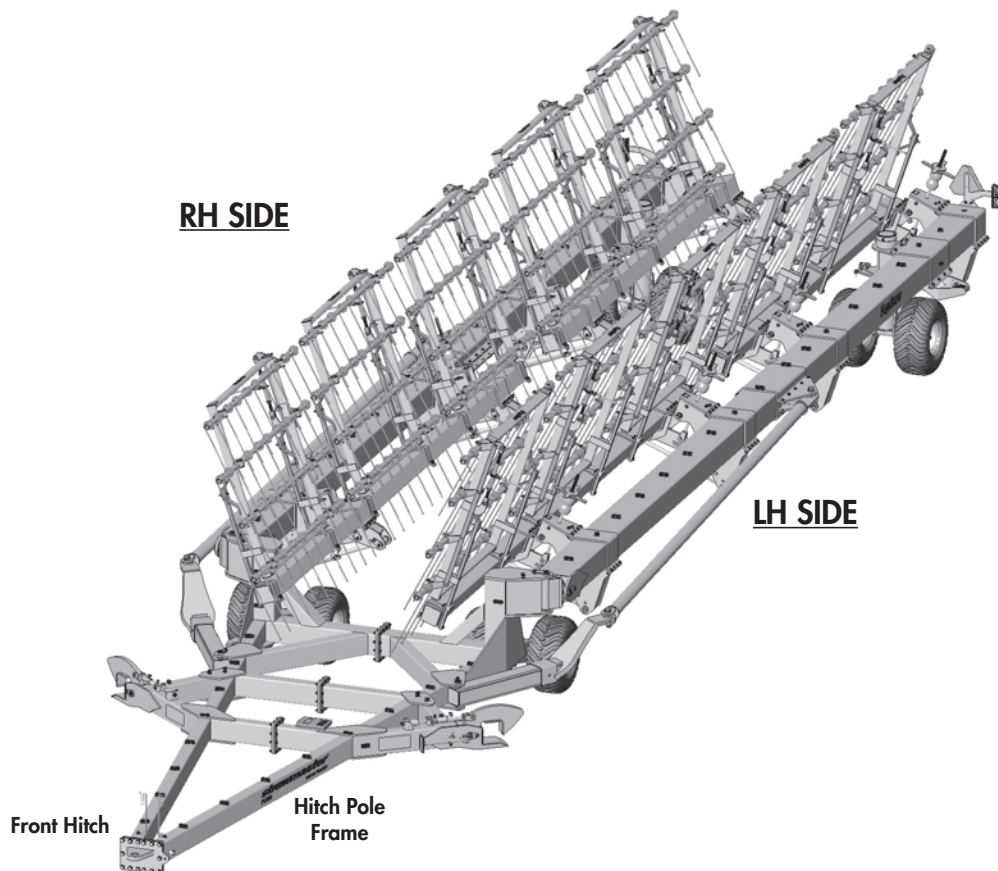
Introduction

strawmaster **PLUS** harrow drawbar

CONGRATULATIONS on your choice of a Degelman Strawmaster Plus to complement your farming operation. It has been designed and manufactured to shatter straw, control weeds, rake flax straw, and incorporate seed and chemicals. Use this manual as your first source of information about this machine.

TO THE NEW OPERATOR OR OWNER - Safe, efficient and trouble free operation of your Degelman Strawmaster Plus requires that you and anyone else who will be operating or maintaining it, read and understand the Safety, Operation, Maintenance and Troubleshooting information contained within this manual.

By following the operating instructions in conjunction with a good maintenance program your machine will provide many years of trouble-free service. Keep this manual handy for frequent reference and to pass on to new operators or owners. Call your Degelman Dealer if you need assistance, information, or additional copies of the manual.



OPERATOR ORIENTATION - The directions left, right, front and rear, as mentioned throughout the manual, are as seen from the tractor drivers' seat and facing in the direction of travel.

Why is **SAFETY** important to **YOU**?

3 **BIG** Reasons:

- Accidents Can Disable and Kill
- Accidents Are Costly
- Accidents Can Be Avoided



SAFETY ALERT SYMBOL

The Safety Alert Symbol identifies important safety messages applied to the equipment and in this manual. When you see this symbol, be alert to the possibility of **injury or death**. Follow the instructions provided on the safety messages.

The Safety Alert Symbol means:

ATTENTION!
BECOME ALERT!
YOUR SAFETY IS INVOLVED!

SIGNAL WORDS

Note the use of the Signal Words: **DANGER**, **WARNING**, and **CAUTION** with the safety messages. The appropriate Signal Word has been selected using the following guidelines:



DANGER: Indicates an imminently hazardous situation that, if not avoided, **WILL** result in death or serious injury if proper precautions are not taken.



WARNING: Indicates a potentially hazardous situation that, if not avoided, **COULD** result in death or serious injury if proper precautions are not taken.



CAUTION: Indicates a potentially hazardous situation that, if not avoided, **MAY** result in minor or moderate injury if proper practices are not taken, or, serves as a reminder to follow appropriate safety practices.

SAFETY

YOU are responsible for the safe operation and maintenance of your equipment.

YOU must ensure that you and anyone else who is going to operate, maintain or work around the equipment 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. Be certain that **EVERYONE** operating this equipment is familiar with the recommended operating and maintenance procedures and follows all the **safety** precautions.

Most accidents can be prevented. Do not risk injury or death by ignoring good safety practices.

- Equipment owners must give operating instructions to operators or employees before allowing them to operate the equipment, and at least annually thereafter per OSHA regulation 1928.51.
- The most important safety device on this equipment is a **SAFE** operator. It is the operator's responsibility to read and understand ALL Safety and Operating instructions in the manual and to follow these. All accidents can be avoided.
- A person who has not read and understood all operating and safety instructions is not qualified to operate the machine. An untrained operator exposes himself and bystanders to possible serious injury or death.
- Do not modify the equipment in any way. Unauthorized modification may impair the function and/or safety and could affect the life of the equipment.
- Think **Safety!** Work **Safely!**

GENERAL SAFETY

1. Read and understand the Operator's Manual and all safety signs before operating, maintaining or adjusting.



2. Install and properly secure all shields and guards before operating. Use hitch pin with a mechanical locking device.

3. Have a first-aid kit available for use should the need arise and know how to use it.

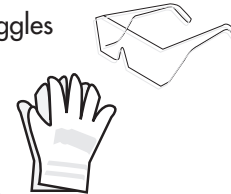


4. Have a fire extinguisher available for use should the need arise and know how to use it.



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
- Heavy gloves
- Wet weather gear
- Hearing protection
- Respirator or filter mask



6. Clear the area of people, especially small children, and remove foreign objects from the machine before starting and operating.
7. Do not allow riders.
8. Stop tractor engine, set park brake, remove ignition key and wait for all moving parts to stop before servicing, adjusting, repairing or unplugging.
9. Review safety related items with all operators annually.

Operation

TO THE NEW OPERATOR OR OWNER

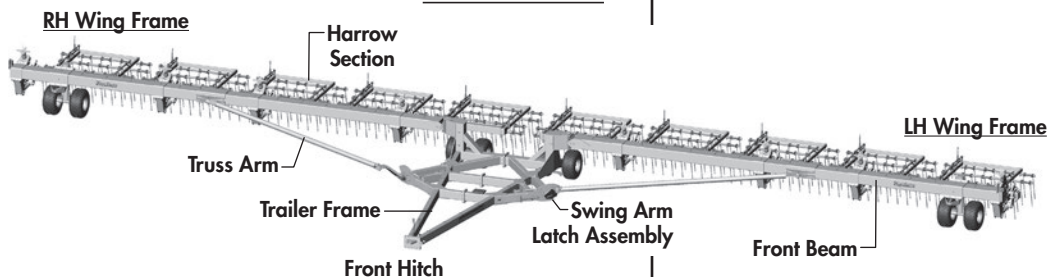
The Degelman Strawmaster Plus is designed for effective straw management, weed control, herbicide application, raking flax residue and following the ground contour.

The Strawmaster Plus is fully adjustable from tine angle to operating height with the use of gear driven jacks. The harrow sections can operate in a float position or under a variable amount of pressure with the use of hydraulics and spring bars.

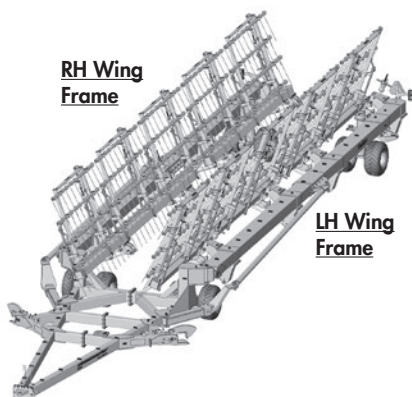
It is the responsibility of the owner or operator to read this manual carefully to learn how to operate the machine safely, and how to set it to provide maximum efficiency. Safety is everyone's business. By following safe operating practices, a safe environment is provided for the operator and bystanders.

The manual will take you step-by-step through your working day. By following the operating instructions in conjunction with a good maintenance program your machine will provide many years of trouble-free service.

Field Position

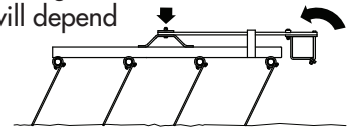


Transport Position



BRIEF OVERVIEW OF OPERATION

- Operating speed will depend on tractor horsepower, environmental conditions and each particular operation. A speed of 8 to 12 MPH. (12 to 16 KPH) is suggested to efficiently shatter and spread straw and residue.
- Operating height for the harrow will vary with the length of the tines, and the angle that the tines are set at.
- The harrow sections can be set in float position, where the section drags the ground under its own weight.
- Pressure can be applied using the hydraulics to rotate the beam further back. The spring bars will deflect to apply pressure to the harrow section and the ground. The amount of pressure to apply will depend on the application, and the operator's preference.
- Some suggested settings can be found in the "Suggested Tine Angle Settings" section. As there are only a few standard guidelines, feel free to experiment with ground clearance, tine angle and section pressure to obtain desired results for each operation.



PRINCIPLES OF OPERATION

The Strawmaster Plus harrow sections consist of four rows with ten tines per row which hold the straw. As the tines drag along the ground, they oscillate to build up a high frequency vibration and provide a shattering action which breaks up the straw allowing the residue to be spread evenly as it is released. When stood vertically the tines will rake flax residue.

Operation

BREAK-IN

Although there are no operational restrictions on the Strawmaster Plus when it is new, there are some mechanical checks that must be done to ensure the long term integrity of the unit. When using the machine for the first time, follow this procedure:

⚠ IMPORTANT: *It is important to follow the Break-In procedures especially those listed in the "Before using" section below to avoid damage:*

A. Before using:

1. Read Safety Info. & Operator's Manual.
2. Complete steps in "Pre-Operation Checklist".
3. Lubricate all grease points.
4. Check all bolt tightness.

B. After operating for 2 hours:

1. Check all hardware. Tighten as required.
2. Check all hydraulic system connections. Tighten if any are leaking.

C. After operating for 8 hours:

1. Repeat Step B.
2. Re-torque all bolts on harrow sections and mounting brackets.
3. Go to the service schedule as outlined in the "Service & Maintenance" section.

⚠ OPERATING/MAINTENANCE SAFETY

- Read and understand the Operator's Manual before starting.
- Lower to ground, stop engine, place all controls in neutral, set park brake and remove ignition key before servicing, adjusting or repairing.
- Keep hands, feet, hair and clothing away from all moving and/or rotating parts.
- Be careful when working around or maintaining a high pressure hydraulic system. Wear the proper hand and eye protection when searching for a pin hole leak in a hose or fitting.
- Place safety stands or large blocks under the frame before removing the tires or working beneath the machine.
- Do not allow riders.
- Clear the area of all bystanders, especially children.
- Stay well back from machine when operating. Keep others away.

PRE-OPERATION CHECKLIST

It is important for both personal safety and maintaining the good mechanical condition of the machine that this pre-operational checklist be followed.

Before operating the machine and each time thereafter, the following areas should be checked off: 

- ☐ Lubricate the machine per the schedule outlined in the "Maintenance Schedule".
- ☐ Use only a tractor with adequate power to pull the Strawmaster Plus under ordinary operating conditions:

	<u>Minimum</u>
100' model:	500 HP
120' model:	550 HP

- ☐ Ensure the Hitch Clevis is set at the correct height for the tractor drawbar and trailer height.
- ☐ Ensure that the machine is properly attached to the tractor using a drawbar pin with provisions for a mechanical retainer. Make sure that a retainer such as a Klik pin is installed.

NOTE: *It is important to pin the draw bar in the central location only.*

- ☐ Check tires and ensure that they are inflated to the specified pressure. **(52 PSI/358 kPa)**
- ☐ Ensure that a safety chain on the hitch is installed.
- ☐ Check oil level in the tractor hydraulic reservoir. Top up as required.
- ☐ Check all bolt tightness.
- ☐ Inspect all hydraulic lines, hoses, fittings and couplers for tightness. Tighten if there are leaks. Use a clean cloth to wipe any accumulated dirt from the couplers before connecting to the tractor's hydraulic system.
- ☐ Check all the machine settings, refer to the Adjustment sections. Perform adjustments as necessary.
- ☐ Check tines, remove entangled debris. Replace damaged tines. If tines are 20 in. or less in length, they should be replaced.
(New tine length: 30 in.)

Operation

HOOK-UP / UNHOOKING

The Strawmaster Plus should always be parked on a level, dry area that is free of debris and foreign objects. Follow this procedure to hook-up:

1. Clear the area of bystanders and remove foreign objects from the machine and working area.
2. Make sure there is enough room to back the tractor up to the trailer hitch.
3. Start the tractor and slowly back it up to the hitch point.
4. Stop the tractor engine, place all controls in neutral, set park brake and remove ignition key before dismounting.
5. Use the trailer jack to raise or lower the hitch to align with the drawbar.
6. Install a drawbar pin with provisions for a mechanical retainer such as a KLIK pin. Install the retainer.
7. Install a safety chain between the tractor and the hitch.
8. Connect the hydraulics. To connect, proceed as follows:
 - Use a clean cloth or paper towel to clean the couplers on the ends of the hoses. Also clean the area around the couplers on the tractor. Remove the plastic plugs from the couplers and insert the male ends.
 - Be sure to match the pressure and return line to one valve bank.
9. Connect lights (electrical socket plug) to tractor.
10. Raise the hitch jack and place in its stowed position.
11. When unhooking from the tractor, reverse the above procedure.

Operation

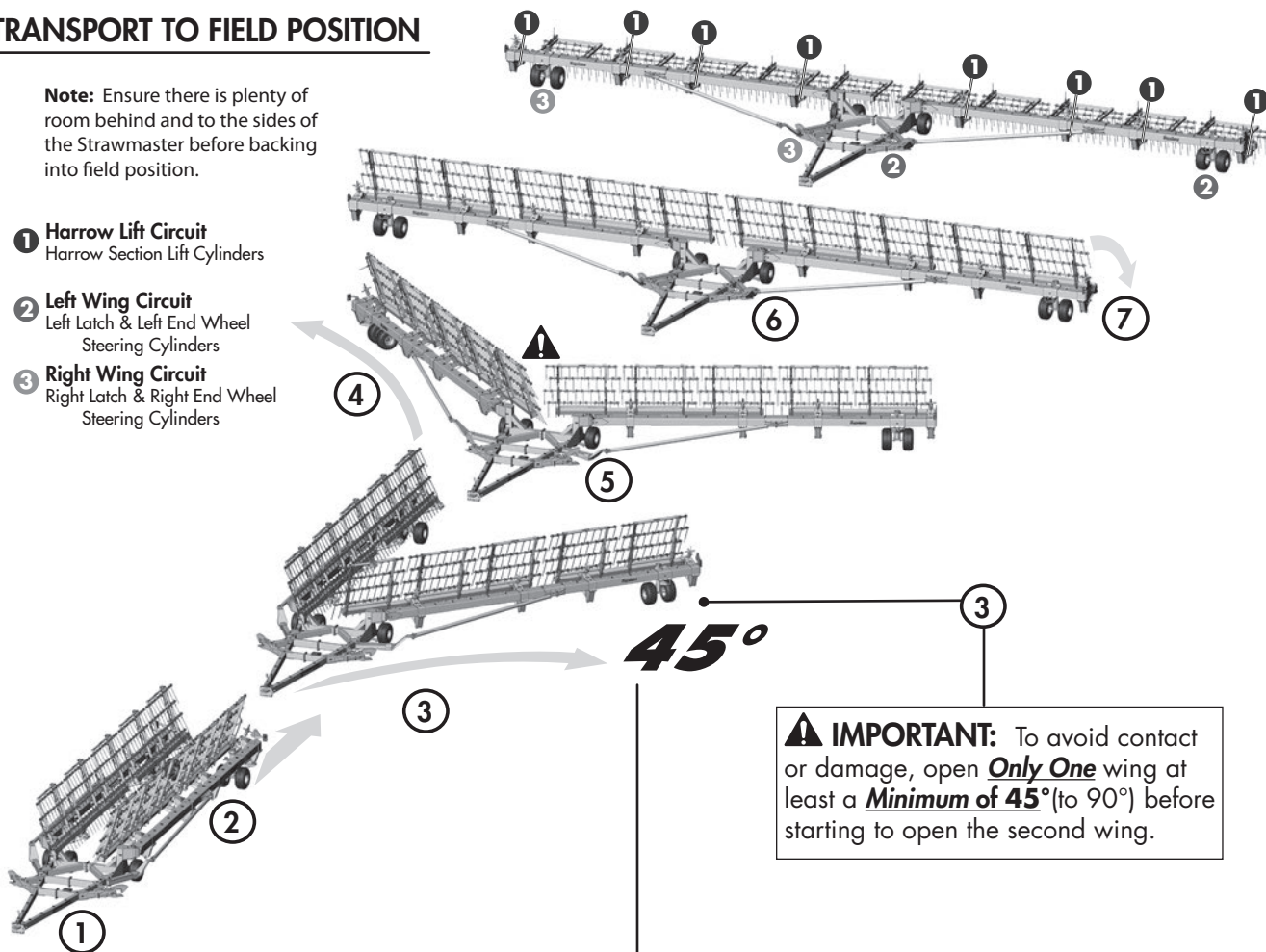
TRANSPORT TO FIELD POSITION

Note: Ensure there is plenty of room behind and to the sides of the Strawmaster before backing into field position.

1 Harrow Lift Circuit
Harrow Section Lift Cylinders

2 Left Wing Circuit
Left Latch & Left End Wheel Steering Cylinders

3 Right Wing Circuit
Right Latch & Right End Wheel Steering Cylinders



1. Drive the **Strawmaster Plus** onto an area of level ground large enough to open the wings while backing into field position. Ensure the Strawmaster is positioned straight behind the tractor.

2. Remove the **Red Transport Pins** from the 2 End Wheel locations and all of the 8 Wing Beam locations.

Place the **Red Transport Pins** onto the proper storage positions and secure with lock-pins.

NOTE: You may need to activate and slightly extend the hydraulic cylinders to allow easier removal of the cylinder Transport Bars.

3. **IMPORTANT:** This step is very important to avoid the contact of harrow sections between the left and right wing frames while unfolding.

Slowly back-up the Strawmaster Assembly while extending the **End Wheel Steering Cylinder** on **Only One** of the wings to spread that one wing partially open to a **Minimum of 45°** (to 90°).

4. When the first wing has been unfolded a minimum of 45° or more (up to 90°), you can start extending the Endwheel Steering Cylinder on the second wing and continue to back into position.

5. When the **Autofold Swing Arms** are close to closing you can activate the **End Wheel Cylinder Circuit** again to open the **Latch Clamp**.

6. Then, when the **Swing Arms** are in latched position, this circuit can be activated again (fully extended) to close the clamps.

NOTE: If the latches have been left in the down position, the Swing Arms can also be engaged by allowing the Swing Arms to ride into the latches and "click" into engagement.

CAUTION: Lock hydraulic functions for both wing End Wheel Cylinder Circuits before working in field to avoid accidental operation while in use.

7. Lower the Harrow Sections down fully into field position. (Refer to the Adjustment Settings Section to make any necessary adjustments)

Operation

FIELD TO TRANSPORT POSITION

1. Drive the **Strawmaster Plus** onto an area of level ground with plenty of room to drive straight forward.
2. Fully raise the Harrow Sections into transport position.
3. Activate the End Wheel Cylinder circuit to open the latch clamp on **only one wing** ⚠️.
4. Drive forward until that **one wing** trails back approximately 45° or more.
5. Activate the second End Wheel Cylinder circuit to open the latch clamp on the opposite wing.
6. Drive forward slowly until both wings trail behind the center frame. Ensure End Wheel cylinders are **fully retracted**.

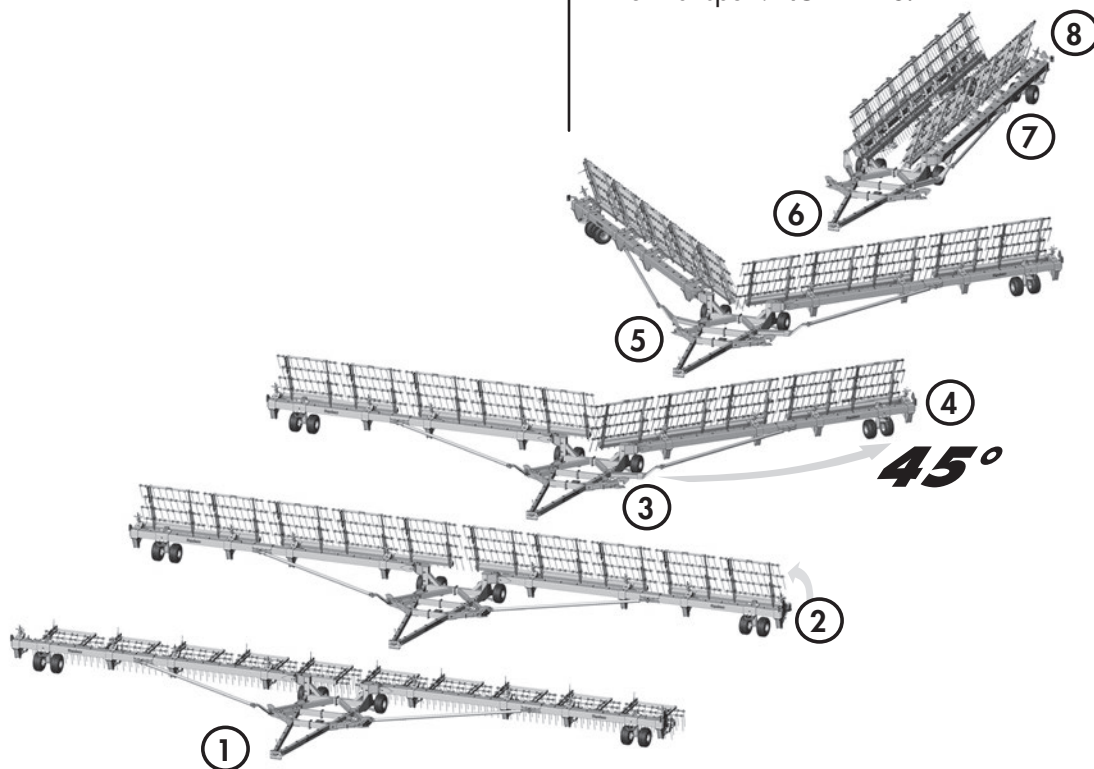
⚠️ **IMPORTANT:** When positioning wings, do not drive forward too quickly or the wings may collide with each other.

7. Place the **Red Transport Pins** on the 2 End Wheel locations and all of the 8 Wing Beam locations.
8. Ensure lights are working and SMV sign is clean. Follow all local transport laws when transporting.

⚠️ TRANSPORT SAFETY

1. Check with local authorities regarding machine transport on public roads. Obey all applicable laws and regulations.
2. Always travel at a safe speed. Use caution when making corners or meeting traffic.
3. Maximum Recommended Transport Speed: 30 km/h or 19 mph - Road Conditions (Field speeds may be lower.)
4. Make sure the SMV (Slow Moving Vehicle) emblem and all the lights and reflectors that are required by the local highway and transport authorities are in place, are clean and can be seen clearly by all overtaking and oncoming traffic.
5. Keep to the right and yield the right-of-way to allow faster traffic to pass. Drive on the road shoulder, if permitted by law.
6. Always use hazard warning flashers on tractor when transporting unless prohibited by law.
7. Always use a pin with provisions for a mechanical retainer and a safety chain when attaching to a tractor or towing vehicle.

⚠️ **IMPORTANT:** Under no circumstances should there ever be riders while the Strawmaster is in motion or transport. **NO RIDERS!**



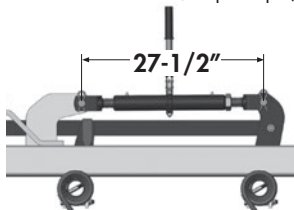
Operation - Adjustments

TINE ANGLE ADJUSTMENT

Tine angle adjustment should be made with the machine in field position. For suggested initial settings with new tines, refer to the "Suggested Tine Angle Settings" section.

(NOTE: A suggested starting setting distance is 27-1/2" pin to pin)

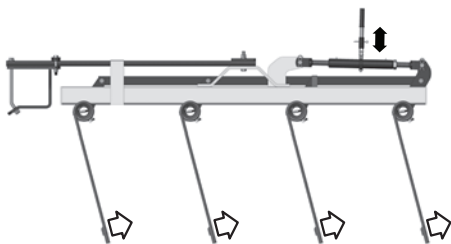
While there are no "standard" angles for running the tines, the operator may adjust the tine angles as needed to achieve desired results.



NOTE: A suggested starting setting distance is 27-1/2" pin to pin.

To adjust tine angle:

Use the ratchet jacks located on each harrow section. Start at one end, set as desired. Set all the other sections to the same setting.



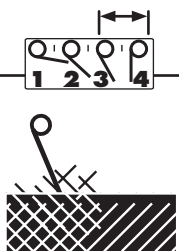
REMEMBER:

- Actual settings will vary with tine wear.
- Straw should be dry.
- Breaking down straw is much more effective in dry conditions.
- A second pass may be required in extremely heavy straw conditions.

(NOTE: Work the second pass at a 45 degree angle to how it was worked the first time).

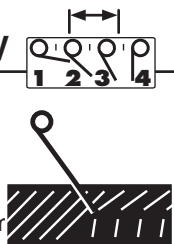
RAKING

- Work the field at 45 degrees to the seeding line.
- In order to rake flax straw some down pressure is required.
- Before built-up straw starts to spill out the back of the machine, dump straw load by lifting harrow sections.



BREAKING & SPREADING STRAW

- For best results operate at 10 to 12 mph.
- The straw built up in the harrow sections helps to achieve maximum rub action to break down straw.



TOUGH STRAW

- Advance the tine angle to a more aggressive setting. This will hold straw for a longer period of time, allowing for a more even distribution of residue.

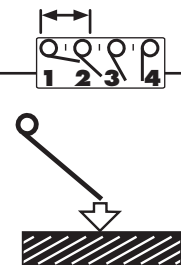
REMEMBER: Breaking down straw is much more effective in dry conditions.

- A second pass may be required in extremely heavy straw conditions.

NOTE: Work the second pass at a 45 degree angle to how it was worked the first time).

FIELD PACKING

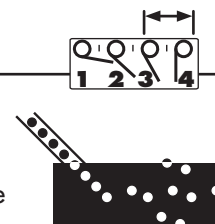
- Begin operating Strawmaster® with the hydraulics in float position, if more compaction is required, refer to the aggressive setting under harrow pressure adjustments.
- To avoid deep ridges in your field, reduce down pressure and operate at lower speeds; 5 - 6 mph.
- If packing is done after seeding, make sure to check that seed is not being disturbed.
- To prevent tine damage, avoid tight turning.



CHEMICAL INCORPORATION

If fitted with an approved chemical distribution system:

- Increasing downward pressure will help break the soil crust and place the granule in contact with moist soil.
- Avoid straw build up in the first two rows of tines. This makes for a more even granule or seed broadcast.



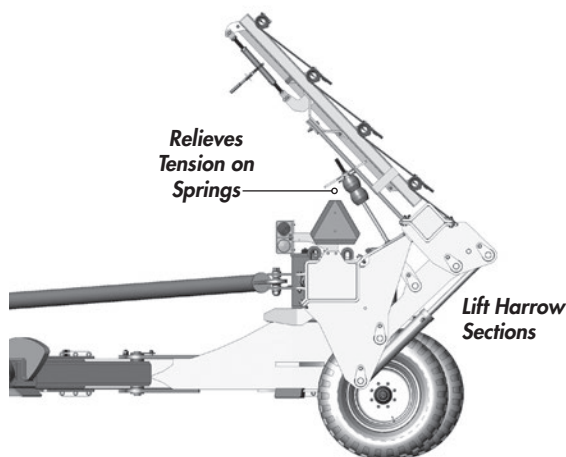
IMPORTANT: Always follow label directions for chemical herbicides.

Operation - Adjustments

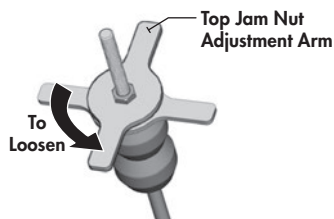
PARALLEL ADJUSTMENT

For initial setup and each time after you make adjustments to the harrow tine angles, you should check and ensure that the harrow frame sections are running parallel to the ground. (*Check that the front rows and back rows are applying equal pressure*)

1. Lift harrow sections to relieve tension on springs.



2. Loosen the top Jam-nut Arms to allow adjustment.



3. Adjust bottom arms as needed.

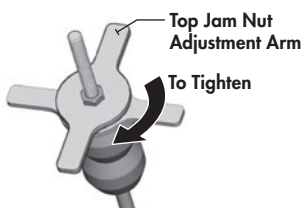
NOTE: As suggested starting distance, from top of rod to top of lock nut is:

- 9" for Light harrowing
- 8" for Aggressive harrowing

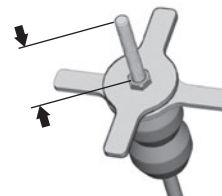
(Increasing this distance will raise front of the harrow section, decreasing the distance will lower it.)

This same distance setting should be used at all locations.

4. Re-tighten top Jam-nut Arms.

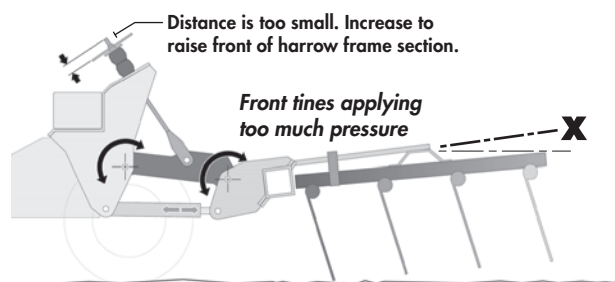
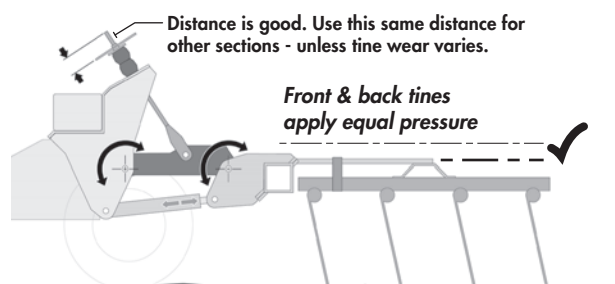
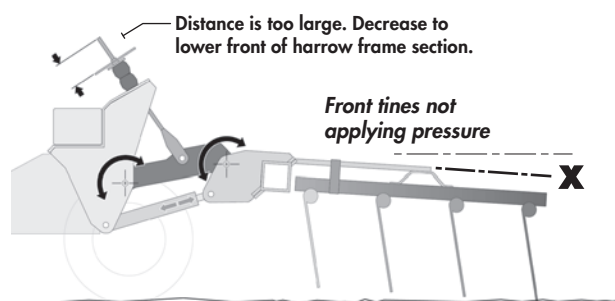


Depending on tine angle settings and tine wear, the parallel adjustment distances may need to be adjusted to ensure harrow sections are running parallel.



Remember:

- Increasing the parallel adjustment distance (Top of Threaded Rod to top of Jam-arm Nut) will raise front of the harrow section.
- Decreasing this distance will lower the front of the harrow section.



Operation - Adjustments

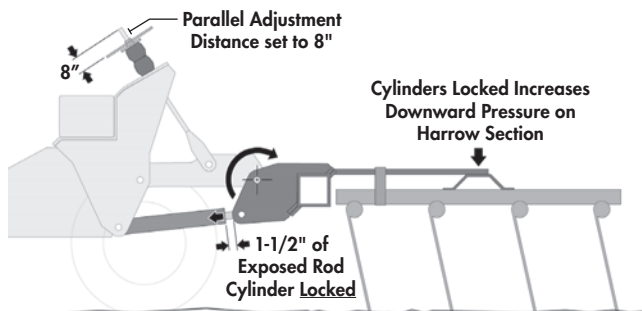
HARROW PRESSURE ADJUSTMENT

The following are suggested arrangements for either a more aggressive harrowing setting or a lighter harrowing setting.

Depending on tine angle settings and tine wear, the parallel adjustment distances specified below may need to be adjusted to ensure harrow sections are running parallel.

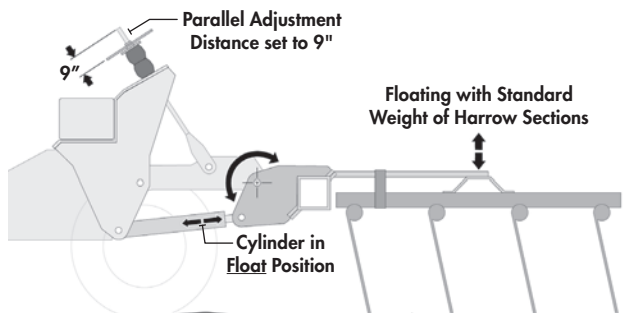
Aggressive Harrowing Setting

- Parallel Adjustment setting should be set to 8".
- Fully close harrow cylinders, then slowly open until 1-1/2" of the cylinder rod is exposed.



Light Harrowing Setting

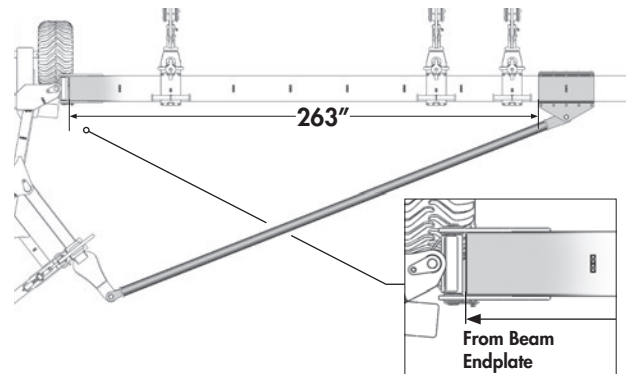
- Parallel Adjustment setting should be set to 9".
- The harrow cylinders should be set in float position.



WING BEAM SUPPORT ARM DISTANCE

If you notice that the end of the Wing Beam seems to be trailing back, it is important to confirm that the support arm setting is accurate.

The proper distance from the End Plate on the Wing Beam (located near the cross joint) to the front edge of the support arm clamp should be : **263"**



Service & Maintenance

MAINTENANCE SAFETY

- Review the Operator's Manual and all safety items before working with, maintaining or operating the Strawmaster Plus.
- Lower to ground, stop engine, place all controls in neutral, set park brake and remove ignition key before servicing, adjusting, repairing, or unplugging.
- Keep hands, feet, clothing and hair away from all moving and/or rotating parts.
- Clear the area of bystanders, especially children, when carrying out any maintenance and repairs or making any adjustments.
- Place safety stands or large blocks under the frame before removing the tires or working beneath the machine.
- Be careful when working around or maintaining a high pressure hydraulic system. Wear the proper hand and eye protection when searching for a pin hole leak in a hose or fitting.
- Always relieve pressure before disconnecting or working on hydraulic system.

MAINTENANCE CHECKLIST

After reviewing the Maintenance and Hydraulic Safety Information, use the Maintenance Checklist provided for regular service intervals and keep a record of all scheduled maintenance:

(Initial break-in review.)

A. Before using:

1. Read Safety Info. & Operator's Manual.
2. Complete "Pre-Operation Checklist"
3. Check all Bolt Tightness.

B. After operating for 2 hours:

1. Check all hardware. Tighten as required.
2. Check all hydraulic system connections. Tighten if any are leaking.

MAINTENANCE SCHEDULE

After operating for initial 2 hours:

1. Check all hardware. Tighten as required.
2. Check all hydraulic system connections. Tighten if any are leaking.

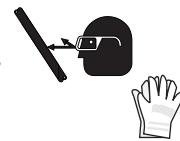
After operating for initial 8 hours:

1. Check all hardware. Tighten as required.
2. Check all hydraulic system connections. Tighten if any are leaking.
3. Re-torque all bolts on harrow sections and mounting brackets.

Daily - 8 Hours

- Hydraulic Fluid Leaks
- Damaged Hoses
- Check Tire Pressure

Tires: 400/60 x 15.5: **52 PSI** (358 kPa)



Weekly - 25 Hours

- Wheel Cylinder Pins & Pivot Bushing
- Ratchet Jack Pins 
- Check Tine Wear
- Clean Safety Signs

Annually - 200 Hours

- Bolt Tightness
- Wheel Bearings
- Latch Mechanism



Service & Maintenance

HARDWARE SPECIFICATIONS



Note: Unless stated otherwise, hardware is typically:
Hex, Plated GR5 UNC or P8.8 (metric)

TORQUE SPECIFICATIONS



TORQUE

Checking Bolt Torque

The tables below give correct torque values for various bolts and capscrews. Tighten all bolts to the torques specified in chart unless otherwise noted. Check the tightness of bolts periodically, using these bolt torque charts as a guide. Replace hardware with the same strength (Grade/Class) bolt.

IMPERIAL TORQUE SPECIFICATIONS

(Coarse Thread - based on "Zinc Plated" values)



Size	Grade 5 lb.ft (N.m)	Grade 8 lb.ft (N.m)
1/4"	7 (10)	10 (14)
5/16"	15 (20)	20 (28)
3/8"	25 (35)	35 (50)
7/16"	40 (55)	60 (80)
1/2"	65 (90)	90 (120)
9/16"	90 (125)	130 (175)
5/8"	130 (175)	180 (245)
3/4"	230 (310)	320 (435)
7/8"	365 (495)	515 (700)
1"	550 (745)	770 (1050)
1-1/8"	675 (915)	1095 (1485)
1-1/4"	950 (1290)	1545 (2095)
1-3/8"	1250 (1695)	2025 (2745)
1-1/2"	1650 (2245)	2690 (3645)

METRIC TORQUE SPECIFICATIONS

(Coarse Thread - based on "Zinc Plated" values)



Size	Class 8.8 lb.ft (N.m)	Class 10.9 lb.ft (N.m)
M6	7 (10)	10 (14)
M8	16 (22)	23 (31)
M10	30 (42)	45 (60)
M12	55 (75)	80 (108)
M14	90 (120)	125 (170)
M16	135 (185)	195 (265)
M18	190 (255)	270 (365)
M20	265 (360)	380 (515)
M22	365 (495)	520 (705)
M24	460 (625)	660 (895)
M27	675 (915)	970 (1315)
M30	915 (1240)	1310 (1780)
M33	1250 (1695)	1785 (2420)
M36	1600 (2175)	2290 (3110)

HYDRAULIC SAFETY



- Make sure that all components in the hydraulic system are kept in good condition and are clean.
- Replace any worn, cut, abraded, flattened or crimped hoses and metal lines.
- Do not attempt any makeshift repairs to the hydraulic lines, fittings or hoses by using tape, clamps or cements. The hydraulic system operates under extremely high-pressure. Such repairs will fail suddenly and create a hazardous and unsafe condition.
- Wear proper hand and eye protection when searching for a high-pressure hydraulic leak. Use a piece of wood or cardboard as a backstop instead of hands to isolate and identify a leak.
- If injured by a concentrated high-pressure stream of hydraulic fluid, seek medical attention immediately. Serious infection or toxic reaction can develop from hydraulic fluid piercing the skin surface.
- Before applying pressure to the system, make sure all components are tight and that lines, hoses and couplings are not damaged.



HYDRAULIC HOSE SPECIFICATIONS



Note: Unless otherwise stated, Hydraulic Hoses are either 3/8 or 1/2 with 3/4 JIC female swivel ends.

HYDRAULIC HOSE INSTALLATION TIPS



The following tips are to help you identify some possible problem areas in the installation of hydraulic hoses.

1. Ensure hoses are not twisted during installation as this may weaken the hose. Also, the pressure in a twisted hose may loosen fittings or connections.
2. Allow sufficient bend radius in hoses when installing to prevent lines from collapsing and flow becoming restricted.
3. When installing hoses in an area of movement or flexing, allow enough free length for motion and to ensure fitting connections are not stressed.
4. Ensure hoses are properly clamped and secured in position after routing is complete to provide a cleaner installation and prevent possible damage or hazards.

Service & Maintenance

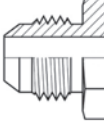
HYDRAULIC FITTING INSTALLATION



The following info is to help you identify and properly install some of our standard hydraulic fittings.

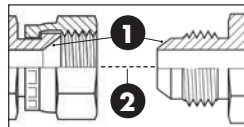
SAE (JIC) 37° Flare

JIC fittings - Metal-to-metal sealing type fittings featuring a 37° flare (angle of sealing surface) and straight UNF (United National Fine) Threads.

(Lubricated Values)	Dash	Thread Size	Torque - lb.ft (N.m)
	-4	7/16 - 20	9-12 (12-16)
	-6	9/16 - 18	14-20 (19-27)
	-8	3/4 - 16	27-39 (37-53)
	-10	7/8 - 14	36-63 (50-85)
	-12	1-1/16 - 12	65-88 (90-119)

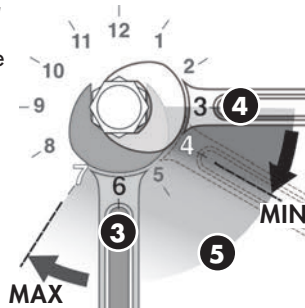
Tightening JIC 37° Flare Type Fittings

1. Check flare and flare seat for defects that might cause leakage.
2. Align fittings before tightening. Lubricate connections & hand tighten swivel nut until snug.
3. Using two wrenches, torque to values shown in table.



Alternate Installation Method

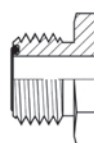
3. Using two wrenches. Place one wrench on the fixed connector body at a clock position of 6 o'clock.
4. Place the second wrench on the second connection as close to the 3 o'clock position as possible.
5. Tighten by rotating the second connection firmly to at least the 4 o'clock position, but no more than the 7 o'clock position. Typically, the larger the fitting size the less rotation required.



ORFS (O-Ring Face Seal)

ORFS fittings use an O-ring compression method to seal. This method offers a high level of sealing along with good vibration resistance. Male fittings include an O-ring located in a groove on the flat face. Female fittings feature a flat face and UNF straight threaded swivel nut.

The **Torque** method is recommended for ORFS installation.

	Dash	Thread Size	Torque - lb.ft (N.m)
	-4	9/16 - 18	18 (25)
	-6	11/16 - 16	30 (40)
	-8	13/16 - 16	40 (55)
	-10	1 - 14	60 (80)
	-12	1-3/16 - 12	85 (115)

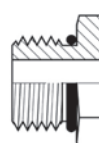
Tightening ORFS (O-Ring Face Seal) Fittings

1. Inspect components and ensure the O-Ring seal is undamaged and properly installed in the groove of the face seal. Replacing the O-Ring may be necessary.
2. Align, thread into place and hand tighten.
3. Tighten to proper torque from the table shown above.

Note: A **DASH** size refers to a diameter of a hose (*inside*) or of a tube (*outside*) measured in 1/16" increments. For example, a **Hose** specified as **dash 8** or **-8** would have an **inside** diameter of 8/16" or 1/2". Alternatively, a **Tube** specified as **dash 8** or **-8** would have an **outside** diameter of 8/16" or 1/2".

ORB (O-Ring Boss)

Male ORB fittings have straight UNF threads, a sealing face and an O-ring. The female fittings are generally found in the ports of machines and feature straight threads, a machined surface, and a chamfer to accept the O-ring. Sealing is achieved through the compression of the male O-ring against the chamfered sealing face of the female fitting.

(Lubricated Values)	Dash	Thread Size	Torque Non-Adjustable lb.ft (N.m)	Torque Adjustable lb.ft (N.m)
	-4	7/16 - 20	30 (40)	15 (20)
	-6	9/16 - 18	35 (46)	35 (46)
	-8	3/4 - 16	60 (80)	60 (80)
	-10	7/8 - 14	100 (135)	100 (135)
	-12	1-1/16 - 12	135 (185)	135 (185)

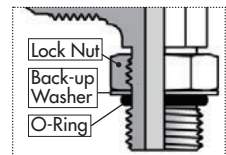
Tightening ORB (O-Ring Boss) Fittings

Non-adjustable Port End Assembly

1. Inspect the components to ensure that male and female threads and sealing surfaces are free of nicks, burrs, scratches, or any foreign material.
2. Ensure O-Ring seal is properly installed and undamaged.
3. Lubricate threads and O-ring to help the O-ring slide past the port entrance corner and avoid damaging it.
4. Screw the fitting into position tighten to proper torque value from the table shown above.

Adjustable Port End Assembly

1. Inspect the components to ensure male & female threads and sealing surfaces are free of nicks, burrs, scratches, or any foreign material.
2. Ensure O-Ring seal is properly installed and undamaged.
3. Lubricate threads and O-ring to help the O-ring slide smoothly into the port and avoid damage.
4. Loosen back the lock nut as far as possible. Make sure back-up washer is not loose and is pushed up as far as possible.
5. Screw the fitting into port until the back-up washer or the retaining ring contacts face of the port. Light wrenching may be necessary. Over tightening may damage washer.
6. To align the end of the fitting to accept incoming tube or hose assembly, unscrew the fitting by the required amount, but not more than one full turn.
7. Using two wrenches, hold the fitting in desired position and tighten the locknut to the proper torque value from the table located above.
8. Inspect to ensure that O-ring is not pinched and that washer is seated flat on the face of the port.



Service & Maintenance

HYDRAULIC CYLINDER REPAIR

PREPARATION

When cylinder repair is required, clean off unit, disconnect hoses and plug ports before removing cylinder.

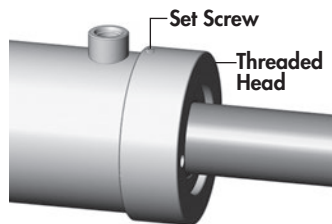
When removed, open the cylinder ports and drain the cylinder's hydraulic fluid.

Examine the type of cylinder. Make sure you have the correct tools for the job.

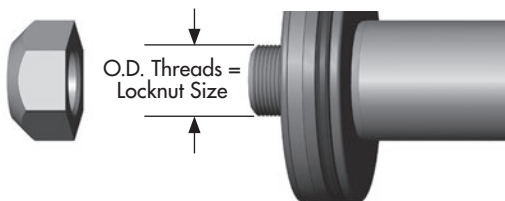
You may require the following tools:

- Proper **Seal Kit**
- Allen Key Set
- Emery cloth
- Torque Wrench

Threaded Head Cylinder (Monarch)



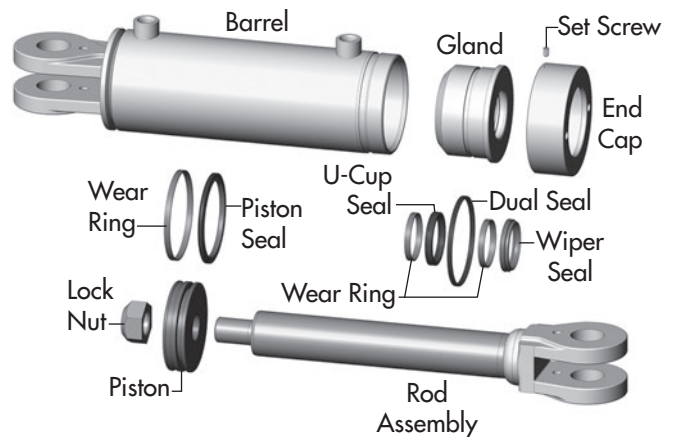
CYLINDER ROD LOCKNUT TORQUE VALUES



LOCKNUT SIZE (PISTON)	TORQUE VALUE
3/8 - 24 UNF	25-30 lb.ft (35-42 N.m)
1/2 - 20 UNF	40-60 lb.ft (55-80 N.m)
5/8 - 18 UNF	95-105 lb.ft (130-140 N.m)
3/4 - 16 UNF	175-225 lb.ft (240-305 N.m)
7/8 - 14 UNF	200-275 lb.ft (270-370 N.m)
1 - 14 UNF	300-380 lb.ft (405-515 N.m)
1 1/8 - 12 UNF	400-500 lb.ft (540-675 N.m)
1 1/4 - 12 UNF	500-600 lb.ft (675-810 N.m)
1 1/2 - 12 UNF	700-800 lb.ft (950-1085 N.m)
1 3/4 - 12 UNF	800-900 lb.ft (1085-1220 N.m)

REPAIRING A THREADED HEAD CYLINDER

Set Screw Style



DISASSEMBLY

1. Loosen Set Screw and turn off end cap.
2. Carefully remove piston/rod/gland assemblies.
3. Disassemble the piston from the rod assembly by removing lock nut.

NOTE: DO NOT clamp rod by chrome surface.

4. Slide off gland assembly & end cap.
5. Remove seals and inspect all parts for damage.
6. Install new seals and replace damaged parts with new components.
7. Inspect the inside of the cylinder barrel, piston, rod and other polished parts for burrs and scratches. Smooth areas as needed with an emery cloth.

REASSEMBLY

1. Reinstall rod through end cap & gland assembly.
2. Secure piston to rod with lock nut. Torque lock nut to proper value (refer to chart for proper torque value).
3. Lube inside of barrel, piston seals, and gland seals with hydraulic oil.
4. With cylinder body held gently in a vise, insert piston, gland, end cap and rod combination using a slight rocking motion.
5. Apply Loctite anti-seize before installing cylinder end cap.
6. Torque cylinder end cap to 440 lb.ft (600 N.m).
7. Tighten Set Screw on end cap to 6 lb.ft (8 N.m).

Service & Maintenance

WHEEL HUB REPAIR

DISASSEMBLY

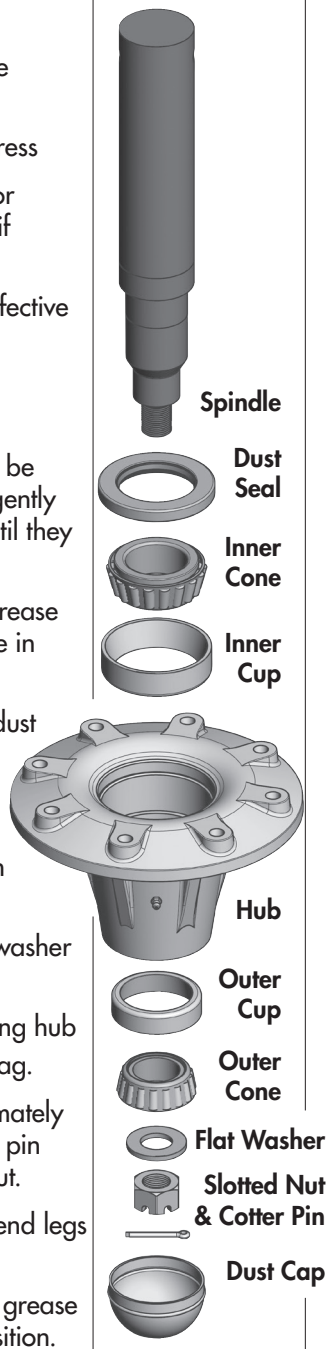
1. Remove dust cap.
2. Remove cotter pin from nut.
3. Remove nut and washer.
4. Pull hub off spindle.
5. Dislodge the inner cone bearing and dust seal.
6. Inspect cups that are press fitted into hub for pits or corrosion and remove if necessary.
7. Inspect and replace defective parts with new ones.

ASSEMBLY

1. If cups need replacing, be careful to install them gently and evenly into hub until they are fully seated.
2. Apply a thick wall of grease inside hub. Pack grease in cones.
3. Install inner cone and dust seal as illustrated.
4. Position hub onto spindle and fill surrounding cavity with grease.
5. Assemble outer cone, washer and nut.
6. Tighten nut while rotating hub until there is a slight drag.
7. Turn nut back approximately 1/2 turn to align cotter pin hole with notches on nut.
8. Install cotter pin and bend legs sideways over nut.
9. Fill dust cap half full of grease and gently tap into position.
10. Pump grease into hub through grease fitting until lubricant can be seen from dust seal.

IMPORTANT: Be sure to block up unit securely before removing tires.

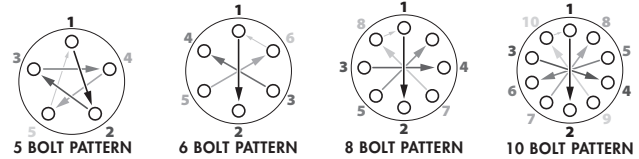
COMMON HUB & SPINDLE COMPONENTS



WHEEL NUT & WHEEL BOLT TORQUE



BOLT PATTERNS



Wheel Nut/Bolt Torque

Size	lb.ft (N.m)
9/16	120-130 (165-175)
5/8	185-190 (250-260)
3/4	280-300 (380-405)

Wheel Tightening Procedure

1. Install and **hand tighten** nuts/bolts.
2. Tighten to approx. **20% Torque** value using the Bolt **Star or CrissCross** patterns shown above.
3. Tighten to **Full Torque** value using the **Star or CrissCross** pattern.
4. If applicable, install **Rear Locknuts** using **Wheel Torque Values**.

WHEEL NUT / BOLT TORQUE

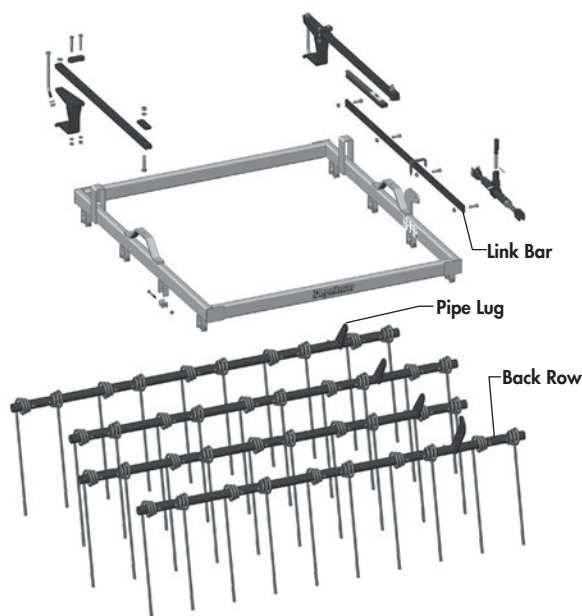
1. The Recommended 5/8 wheel nut/bolt torque for this implement is 185-190 lb.ft (250-260 N.m)
2. When attaching the wheel, tighten to this specifications. Check again after approximately 500 revolutions and re-tighten as required.
3. Check wheel bolts twice annually to ensure proper bolt torque.

Service & Maintenance - Tine Replacement

TINE REPLACEMENT


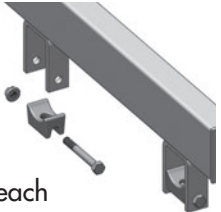
Note: Tines **must** be replaced when worn down to 20 in. or less in length. Tines may be replaced while the machine is in transport position, or field position.

NOTE: Avoid replacing one tine at a time, unless wear is minimal. Tines should be replaced all at once whenever possible so there is even wear to all the tines. In some instances, (raking operations) the front row of tines will wear sooner. If this is the case, replace the front row. Check that wear is minimal on the other tines.




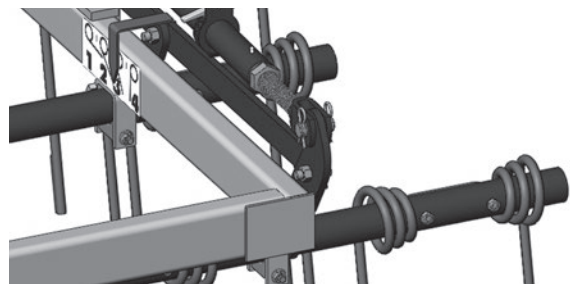
DISASSEMBLY:

Follow this procedure one pipe row at a time so pipes do not get mixed up, or number each pipe before disassembly.

1. Remove the bolt from the link bar to pipe lug, so pipe will rotate freely. 
2. Remove the pin from the back end of the jack if the back row is being replaced. (Not Shown)
3. Remove the bolts and spacer from the bracket on the sides of the frame. The row will drop out. 
4. Remove the bolts holding the tines on the pipe. (Starting at each end and working in)
5. Slide the tines off the pipe.

ASSEMBLY:

1. Slide the tines onto the pipe. (Make sure all tines are installed facing the same direction) 
2. Position tines centred over bolt holes as shown in the diagram. Install bolts and nuts.
3. Position pipe between the brackets on the sides of the frame, with the lug on the outside of the frame. Install the spacer and bolt, secure with locknut. Ensure pipe turns freely when tightening.



4. Line up hole on lug with hole on link bar, install bolt and secure with nut.
5. Back row: Install pin through the jack and lug. Secure with hair clip.
6. See the adjustments section and adjust as required.

Troubleshooting

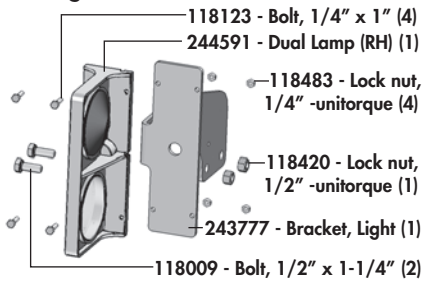
GENERAL TROUBLESHOOTING

In the following section, we have listed some of the problems, causes, and solutions that you may encounter. If you encounter a problem that is difficult to solve, even after having read through this troubleshooting section, please call your local dealer or distributor. Before you call, have this manual and the serial number from your unit ready.

SYMPTOM	PROBLEM	SOLUTION
Hydraulics creep down during operation.	Damaged hose or loose fittings.	Search for leaks with a piece of paper (not by hand) and repair.
	Hydraulic cylinder leak.	Replace seals or damaged components.
	Tractor hydraulic leak.	To verify, raise sections half way up, disconnect at tractor. Observe if sections creeps down. If not repair tractor hydraulics.
Harrow sections raise too slowly.	Hydraulic pressure from tractor too low.	Check pressure, should be 2500 psi.
	Restriction in hose.	Disconnect & blow out lines with compressed air.
	External hydraulic leak.	Repair as needed.
Oil accumulation on cylinder shaft.	Hydraulic cylinder leak.	Replace seals or damaged components.
	Oil bypassing seals.	Seal manufacturer advises that small amounts of oil getting past seals is desirable. If problem becomes excessive, replace seals.
Auto-Fold latch will not close for field position.	Truss clamp has slid on wing frame.	With machine in field position and sections raised up, adjust the wing beam support arm distance (refer to maintenance section).
Auto-Fold latch will not open for transport position.	External hydraulic leak.	Search for leaks with a piece of paper (not by hand) and repair.
	Hydraulic cylinder leak.	Replace seals or damaged components.
One wing seems to fall back, not straight with the other wing.	The Wing Beam Truss Arm Clamps may have shifted or slid slightly on the wing beam.	With machine in field position and sections raised up, adjust the wing beam support arm distance (refer to maintenance section).

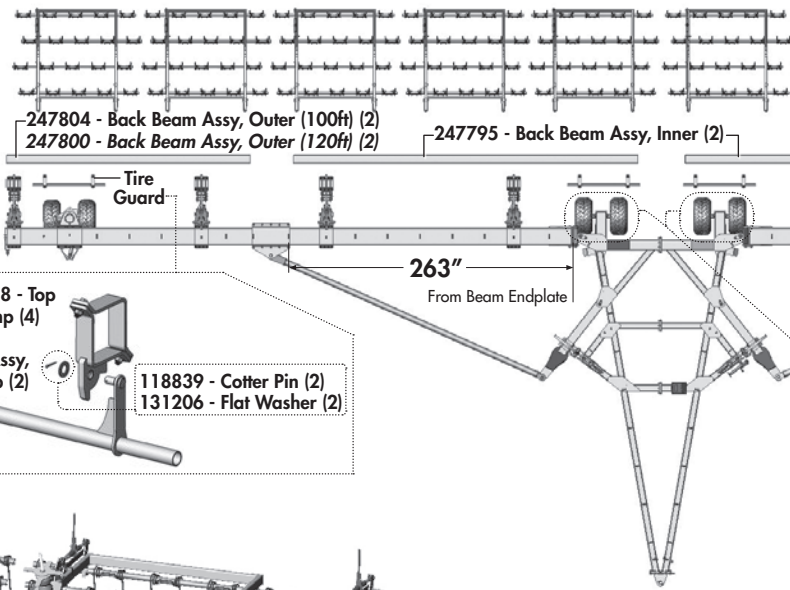
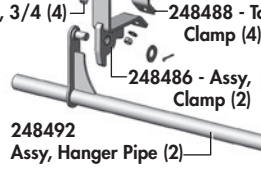
Strawmaster Plus Parts Overview

RH Light Overview

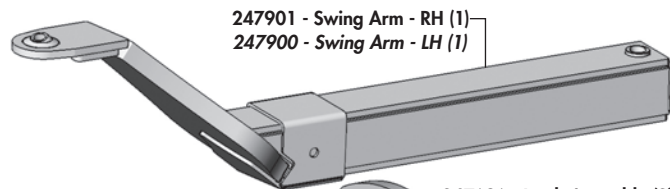


248485 - Tire Guard Bundle (4)

118047 - Bolt, 3/4 x 2-1/2 (4)
 118775 - Flat washer, 3/4 F436 (8)
 118422 - Lock nut, 3/4 (4)



Swing Arm & Latch Overview



247810 - Pin Assembly, 1-15/16 x 9-1/4 (1)
 118024 - Bolt, 5/8" x 1-1/2" (1)
 118508 - Lock washer, 5/8" (1)
 118537 - Flat washer, 5/8 F436 (1)

247446 - Pin Assembly, 1-15/16 x 13-1/4 (4)
 118024 - Bolt, 5/8" x 1-1/2" (1)
 118508 - Lock washer, 5/8" (1)
 118537 - Flat washer, 5/8 F436 (1)

247901 - Swing Arm - RH (1)

247605 - Pole Assembly - RH (1)

143111 - Hose Holder (1)
 118514 - Flat washer, 5/8" (2)
 118447 - Lock nut, 5/8" (2)

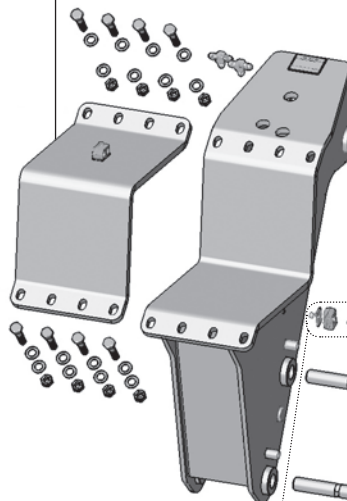
247650 - Front Hitch Plate (1)
 118073 - Bolt, 1" x 3-1/2" GR8 (14)
 131020 - Flat washer, 1" F436 (28)
 118456 - Lock nut, 1" (14)

247606 - Pole Assembly - LH (1)

Beam Link Arm Assembly Overview

247750 - Link Unit Holder (1)
 118501 - Bolt, 3/4" x 3" GR8 (8)
 118775 - Flat washer, 3/4 F436 (16)
 118422 - Lock nut, 3/4" (8)

247765 - Link Unit Clamp (1)



118427 - Nut, 5/16" (1)
 780273 - Hose Clamp Assy, 3/8 (1)
 118144 - Bolt, 5/16" x 2-1/4" (1)

118549 - Lock washer, 1-1/4 (1)

247791 - Lock Plate Assy (2)

133131 - Rubber Spring (2)

243500 - Lock Pin, 5/16 (1)

247820 - Pin Assy, Red 1-1/2" (1)

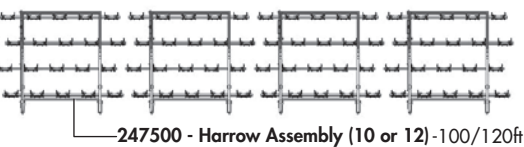
118501 - Bolt, 3/4" x 3" GR8 (8)
 118775 - Flat washer, 3/4 F436 (16)
 118422 - Lock nut, 3/4" (8)

247777 - Clamp Plate (1)

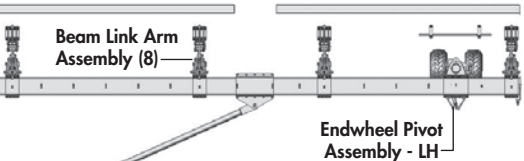
118024 - Bolt, 5/8" x 1-1/2" (1)
 118508 - Lock washer, 5/8" (1)
 118537 - Flat washer, 5/8 F436 (1)

247814 - Pin Assembly, 1-7/16 x 9-1/4 (4)

247770 - Link Unit Holder, Back Beam (1)



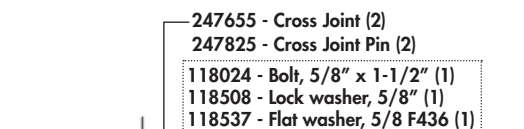
247500 - Harrow Assembly (10 or 12)-100/120ft



Beam Link Arm Assembly (8)

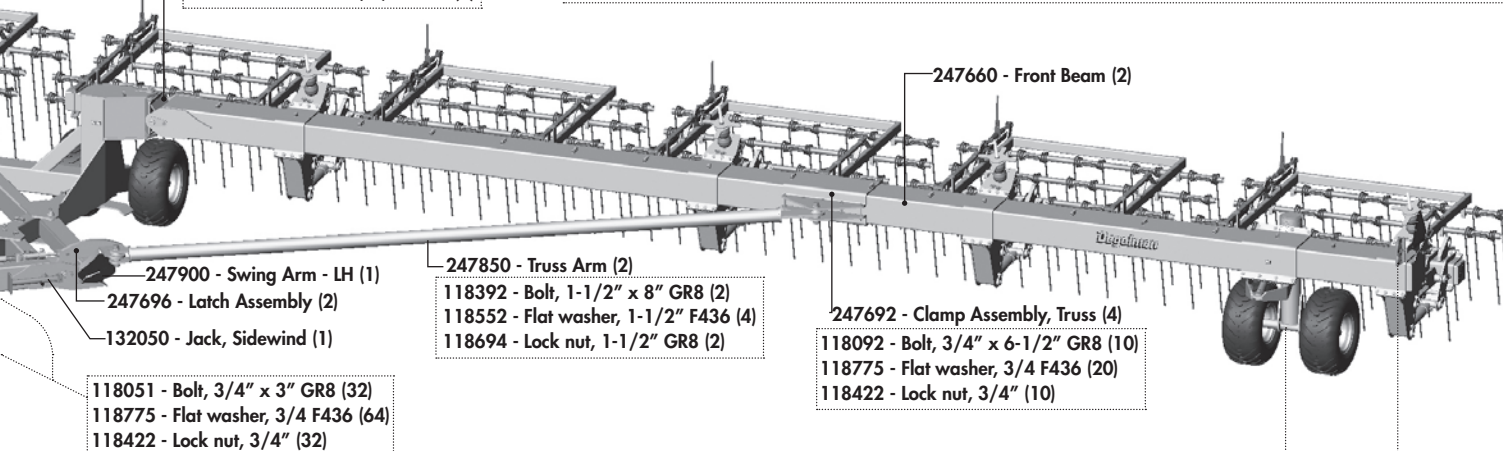
Endwheel Pivot Assembly - LH

Same Wheel and Hub/Spindle components as used on Endwheels (See Detail)



247655 - Cross Joint (2)
247825 - Cross Joint Pin (2)

118024 - Bolt, 5/8" x 1-1/2" (1)
118508 - Lock washer, 5/8" (1)
118537 - Flat washer, 5/8 F436 (1)



247900 - Swing Arm - LH (1)

247696 - Latch Assembly (2)

132050 - Jack, Sidewind (1)

118051 - Bolt, 3/4" x 3" GR8 (32)
118775 - Flat washer, 3/4 F436 (64)
118422 - Lock nut, 3/4" (32)

247850 - Truss Arm (2)

118392 - Bolt, 1-1/2" x 8" GR8 (2)
118552 - Flat washer, 1-1/2" F436 (4)
118694 - Lock nut, 1-1/2" GR8 (2)

247660 - Front Beam (2)

247692 - Clamp Assembly, Truss (4)

118092 - Bolt, 3/4" x 6-1/2" GR8 (10)
118775 - Flat washer, 3/4 F436 (20)
118422 - Lock nut, 3/4" (10)

247500 - Harrow Assembly Complete, 10'/4 Row

118410 - Nut, 3/4" (1)
118509 - Lock washer, 3/4" (1)
243061 - Bar, Back-up (1)
118119 - Bolt, 3/4" x 4" (1)

243333 - Bar, Spring Steel (1)

118094 - Bolt, 5/8" x 4" (2)
650250 - Cast Shank Bolt Bar (1)

118630 - Bolt, Bent - 3/4" x 12-1/2" (1)
118516 - Flat washer, 3/4" (2)
118422 - Lock nut, 3/4" (1)

243055 - Frame holder (1)
118508 - Lock washer, 5/8" (1)
118407 - Nut, 5/8" (1)

Note: When tightening, ensure pipe turns freely.

118468 - Nut, Top Lock Flange 1/2" (1)
110050 - Pipe Spacer, CSTG (1)
118126 - Bolt, 1/2" x 4" (1)

244217 - Link bar, 4 hole (1)
244017 - Indicator pointer (1)
118625 - Bolt, 5/8" x 2" UNF (5)
118700 - Lock nut, 5/8" UNF (5)

132016 - Jack, Ratchet (1)

247502 - Harrow Section Frame - 10'

Quantity of Tines Required	
100'	120'
200	240

143509 - Spring Tine, 5/8" - Atom Jet Tip

143509 - Tine, 5/8" - Atom Jet Tip (20)

118420 - Lock nut, 1/2" (40)
118706 - Bolt, 1/2" x 2-3/4" HHHD (40)

244212 - Pipe, 17.5" offset (1)
244213 - Pipe, 23.25" offset (1)
244214 - Pipe, 14.75" offset (1)
244215 - Pipe, 20.5" offset (1)

780273 - Hose Clamp Assy, 3/8 (116)

118144 - Bolt, 5/16" x 1-1/2" (1)
780279 - Top Plate (1)
780278 - Hose Clamps, 3/8 (1)

118501 - Bolt, 3/4" x 3" GR8 (8)
118775 - Flat washer, 3/4 F436 (16)
118422 - Lock nut, 3/4" (8)

131850 RH (131851 LH) - Wheel Assembly (2)

131852 - Tire 400/60-15.5 Alliance HS (1)
131853 - Rim - 13 DC, 8H (1)
131521 - Valve Stem TR501 (1)

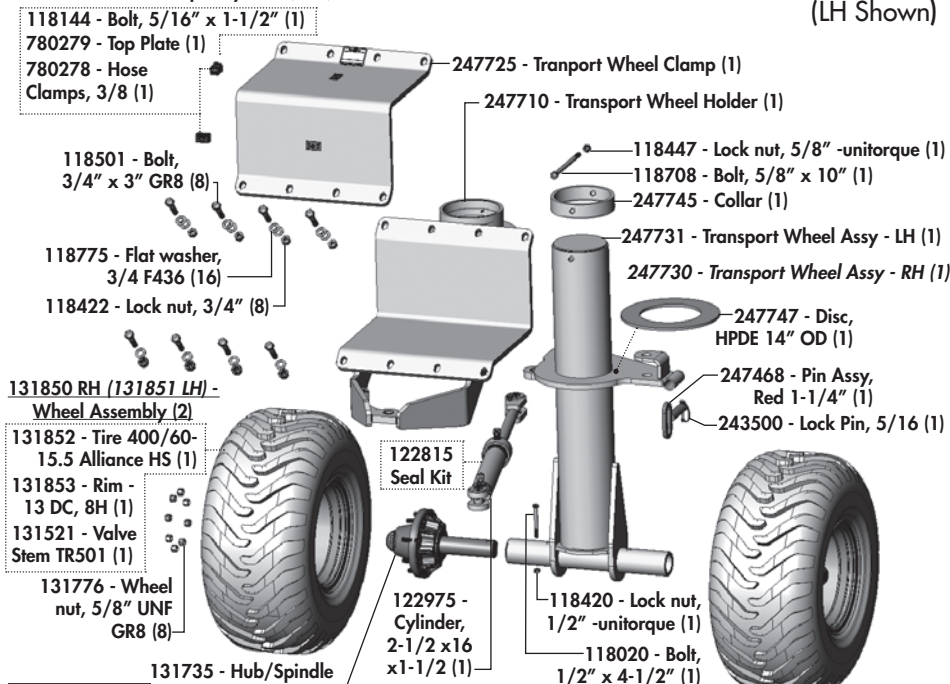
131776 - Wheel nut, 5/8" UNF GR8 (8)

131735 - Hub/Spindle Assy - HA817 (1)

Tire Pressure
52 PSI (358 kPa)

Endwheel Pivot Assembly Overview

(LH Shown)



247725 - Transport Wheel Clamp (1)

247710 - Transport Wheel Holder (1)

118447 - Lock nut, 5/8" - unitorque (1)

118708 - Bolt, 5/8" x 10" (1)

247745 - Collar (1)

247731 - Transport Wheel Assy - LH (1)

247730 - Transport Wheel Assy - RH (1)

247747 - Disc, HPDE 14" OD (1)

247468 - Pin Assy, Red 1-1/4" (1)

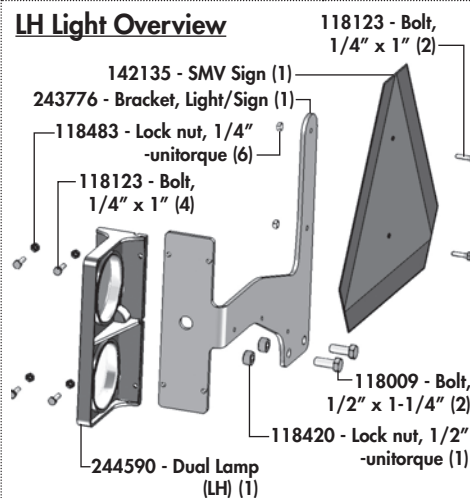
243500 - Lock Pin, 5/16 (1)

122815 Seal Kit

122975 - Cylinder, 2-1/2 x 16 x 1-1/2 (1)

118420 - Lock nut, 1/2" - unitorque (1)
118020 - Bolt, 1/2" x 4-1/2" (1)

LH Light Overview



118123 - Bolt, 1/4" x 1" (2)

142135 - SMV Sign (1)

243776 - Bracket, Light/Sign (1)

118483 - Lock nut, 1/4" - unitorque (6)

118123 - Bolt, 1/4" x 1" (4)

118009 - Bolt, 1/2" x 1-1/4" (2)

118420 - Lock nut, 1/2" - unitorque (1)

244590 - Dual Lamp (LH) (1)

STRAWMASTER® PLUS 100' & 120'

Serial Numbers: SM7157-7160 (100')
SM7207-7212 (120')

Warranty

2 Year **Limited Warranty - Agricultural Products**

Degelman Industries Ltd. ("Degelman") warrants to the original purchaser of any new Degelman equipment, purchased from an authorized Degelman dealer, that the equipment will be free from defects in material and workmanship for a period of two (2) years from the date of delivery, for non-commercial use (including farm, institutional, government, and municipality) and (1) year from the date of delivery for commercial use. The obligation of Degelman to the purchaser under this warranty is limited to the repair or replacement of defective parts in the first year and to the provision, but not the installation of replacement parts in the second year. Degelman reserves the right to inspect any equipment or parts which are claimed to have been defective in material or workmanship.

This warranty limits its replacement or repair coverage to what is consistent with the warranty of Degelman's suppliers of purchased components.

Replacement or repair parts installed in the equipment covered by this limited warranty are warranted for ninety (90) days from the date of delivery of such part or the expiration of the applicable new equipment warranty period, whichever occurs later. Warranted parts shall be provided at no cost to the user at an authorized Degelman dealer during regular working hours. Warranted replacement parts will either be replaced or rebuilt at Degelman's discretion.

Disclaimer of implied warranties & consequential damages

This warranty shall not be interpreted to render Degelman Industries Ltd. liable for injury, death, property damage or damages of any kind, whether direct, consequential, or contingent to property. Without limiting the generality of the foregoing, Degelman shall not be liable for damages resulting from any cause beyond its reasonable control, including, without limitation, loss of crops, any expense or loss of labour, supplies, rental machinery or loss of use.

No other warranty of any kind whatsoever, express or implied is made with respect to this sale; and all implied warranties of merchantability and fitness for a particular purpose which exceed the obligations set forth in this written warranty are hereby disclaimed and excluded from this sale. This exclusion shall not apply in any jurisdiction where it is not permitted by law.

This limited warranty shall not apply:

1. If, in the sole opinion of Degelman, the unit has been subjected to misapplication, abuse, misuse, negligence accident or incorrect off-site machine set-up.
2. To any goods that have sustained damage or deterioration attributable to a lack of routine maintenance (eg. Check and Re-torque of fastening hardware, Hydraulic fluid purities, drive train alignments, and clutch operation)
3. If parts not made or supplied by Degelman have been used in the connection with the unit, if, in the sole judgement of Degelman such use affects its performance, safety, stability or reliability.
4. If the unit has been altered or repaired outside of an authorized Degelman dealership in a manner which, in the sole judgement of Degelman, affects its performance, safety, stability or reliability.
5. To expendable or wear items such as (eg. Harrow tines, Rock Picker and Rock Rake wear teeth and replaceable bushings and pins.) and any other items that in the company's sole judgement are a wear item.

No employee or representative of Degelman Industries Ltd. is authorized to change this limited warranty in any way or grant any other warranty unless such change is made in writing and signed by the Degelman Service Manager.

This limited warranty is subject to any future availability of supply, which may directly affect Degelman's ability to obtain materials or manufacture replacement parts.

Degelman reserves the right to make improvements in design or changes in specifications at any time, without incurring obligations to owners of equipment previously delivered.

This limited warranty is subject to compliance by the customer to the enclosed *Retail Customer's Responsibility Under Degelman Warranty*.

Warranty

Retail Customer's Responsibility Under Degelman Warranty.

It is the retail customer and/or Operator's responsibility to read the Operator's Manual, to operate, lubricate, maintain and store the equipment in accordance with all instructions and safety procedures. Failure of the operator to read the operators manual is a misuse of this equipment.

It is the retail customer and/or operators responsibility to inspect the product and to have any part(s) repaired or replaced when continued operation would cause damage or excessive wear to other parts or cause safety hazard.

It is the retail customer's responsibility to deliver the product to the authorized Degelman dealer, from whom he purchased it, for service or replacement of defective parts, which are covered by warranty. Repairs to be submitted for warranty consideration must be made within forty-five days of failure.

It is the Retail Customer's responsibility for any cost incurred by the dealer for hauling of the product for the purpose of performing a warranty obligation or inspection.

WARRANTY INFORMATION

Make certain the warranty registration card has been forwarded to:

**Degelman Industries Ltd.
Box 830 -272 Industrial Dr.
Regina, SK, Canada
S4P 3B1**

Always give your dealer the serial number of your Degelman product when ordering parts or requesting service or other information.

The serial number is located on the machine as shown in the diagram below. In the space provided record the model number, the serial number and the date of purchase to assist your dealer in providing you with prompt and efficient service.

SERIAL NUMBER: _____

MODEL NUMBER: _____

DATE OF PURCHASE: _____

