Read the operator’s manual entirely. When you see this symbol, the subsequent instructions and warnings are serious - follow without exception. Your life and the lives of others depend on it!

Illustrations may show optional equipment not supplied with standard unit, or may show wider or narrower models where the topic function is identical.
Machine Identification

Record your machine details in the log below. If you replace this manual, be sure to transfer this information to the new manual.

If you or the dealer have added options not originally ordered with the machine, or removed options that were originally ordered, the weights and measurements are no longer accurate for your machine. Update the record by adding the machine weight and measurements with the option(s) weight and measurements.

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Dealer Contact Information

Name: ____________________________
Street: __________________________
City/State: ________________________
Telephone: ________________________
Email: ____________________________
Dealer’s Customer No.: ____________________________

⚠️WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov
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A. Important Safety Information

Look for Safety Symbol

The SAFETY ALERT SYMBOL indicates there is a potential hazard to personal safety involved and extra safety precaution must be taken. When you see this symbol, be alert and carefully read the message that follows it. In addition to design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel involved in the operation, transport, maintenance and storage of equipment.

Be Aware of Signal Words

Signal words designate a degree or level of hazard seriousness.

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

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

Prepare for Emergencies

▲ Be prepared if a fire starts.
▲ Keep a first aid kit and fire extinguisher handy.
▲ Keep emergency numbers for doctor, ambulance, hospital and fire department near phone. Know the reporting requirement for spills or releases of the chemicals you are using. Have contact numbers available.

Be Familiar with Safety Decals

▲ Read and understand “Safety Decals” on page 5, thoroughly.
▲ Read all instructions noted on the decals.
▲ Keep decals clean. Replace damaged, faded and illegible decals.
Use Safety Chains

▲ Use safety chains to help control drawn machinery should it separate from tractor draw-bar or trailing nurse tank hitch.

▲ Use chain with a strength rating equal to or greater than the gross weight of towed machinery.

▲ Attach implement chain to tractor draw-bar support or specified anchor location. Allow only enough slack in chain for turns.

▲ Replace chain if any links or end fittings are broken, stretched or damaged.

▲ Do not use safety chain for towing.

Avoid High Pressure Fluids

Escaping fluid under pressure can penetrate the skin, causing serious injury. This flex harrow requires a Power-Beyond port, which is always under pressure when the tractor is running.

▲ Avoid the hazard by relieving pressure at other remotes, and shutting down tractor before connecting, disconnecting or inspecting hydraulic lines.

▲ Use a piece of paper or cardboard, NOT BODY PARTS, to check for suspected leaks.

▲ Wear protective gloves and safety glasses or goggles when working with hydraulic systems.

▲ If an accident occurs, seek immediate medical assistance from a physician familiar with this type of injury.

Keep Riders Off Machinery

Riders obstruct the operator’s view. Riders could be struck by foreign objects or thrown from the machine.

▲ Never allow children to operate equipment.

▲ Keep all bystanders away from machine during operation.

Use Safety Lights and Devices

Slow-moving tractors and towed implements can create a hazard when driven on public roads. They are difficult to see, especially at night.

▲ Use flashing warning lights and turn signals whenever driving on public roads.

▲ Use lights and devices provided with implement.
Transport Machinery Safely
Maximum transport speed for implement is 20 mph (32 kph), 13 mph (22 kph) in turns. Some rough terrains require a slower speed. Sudden braking can cause a towed load to swerve and upset.

▲ Do not tow an implement or nurse tank that weighs more than 1.5 times the weight of towing vehicle.
▲ Carry reflectors or flags to mark flex harrow in case of breakdown on the road.
▲ Keep clear of overhead power lines and other obstructions when transporting. Refer to transport dimensions under “Specifications and Capacities” on page 32.
▲ Do not exceed 20 mph. Never travel at a speed which does not allow adequate control of steering and stopping. Reduce speed if towed load is not equipped with brakes.
▲ Reduce speed on rough roads.
▲ Comply with national, regional and local laws.
▲ Do not fold or unfold the flex harrow while the tractor is moving.

Shutdown and Storage
▲ Lower flex harrow, put tractor in park, turn off engine, and remove the key.
▲ Secure flex harrow using parking jack provided.
▲ Detach and store flex harrow in an area where children normally do not play.

Tire Safety
Tire changing can be dangerous. Employ trained personnel using correct tools and equipment.
▲ When inflating tires, use a clip-on chuck and extension hose long enough for you to stand to one side—not in front of or over tire assembly. Use a safety cage if available.
▲ When removing and installing wheels, use wheel-handling equipment adequate for weight involved.
Practice Safe Maintenance

▲ Understand procedure before doing work. Use proper tools and equipment. Refer to this manual for additional information.
▲ Work in a clean, dry area.
▲ Lower implement, put tractor in park, turn off engine, and remove key before performing maintenance.
▲ Make sure all moving parts have stopped and all system pressure is relieved.
▲ Disconnect battery ground cable (-) before servicing or adjusting electrical systems or before welding on flex harrow.
▲ Inspect all parts. Make sure parts are in good condition and installed properly.
▲ Remove buildup of grease, oil or debris.
▲ Remove all tools and unused parts from implement before operation.

Safety At All Times

Thoroughly read and understand the instructions in this manual before operation. Read all instructions noted on the safety decals.
▲ Be familiar with all flex harrow functions.
▲ Operate machinery from the driver’s seat only.
▲ Do not leave flex harrow unattended with tractor engine running.
▲ Do not stand between tractor and implement, or implement and nurse tank, during hitching.
▲ Keep hands, feet and clothing away from power-driven parts.
▲ Wear snug-fitting clothing to avoid entanglement with moving parts.
▲ Watch out for wires, trees, etc., when folding and raising flex harrow. Make sure all persons are clear of working area.
Safety Decals

Safety Reflectors and Decals

Your implement comes equipped with all lights, safety reflectors and decals in place. They were designed to help you safely operate your implement.

▲ Read and follow decal directions.
▲ Keep lights in operating condition.
▲ Keep all safety decals clean and legible.
▲ Replace all damaged or missing decals. Order new decals from your Great Plains dealer. Refer to this section for proper decal placement.
▲ When ordering new parts or components, also request corresponding safety decals.

To install new decals:
1. Clean the area on which the decal is to be placed.
2. Peel backing from decal. Press firmly on surface, being careful not to cause air bubbles under decal.

818-055C
Slow Moving Vehicle Reflector
On cross-bars at center of center wing; 1 total

838-614C
Red Reflectors
On rear of center wing (top) when folded up (both sides); 2 total
838-615C
Amber Reflectors
On outside face of wing end arm mounts, on outside of outer arm of center and on outside of tongue, front, angle tube (both sides); 6 total

838-603C
Daytime (Orange) Reflectors
On rear of center wing (bottom) when folded up (both sides); 2 total

838-599C
Danger: Electrocution
On top face of tongue rear of manual pak (rear); 1 total
838-600C
Danger: Hitch Crush
On side face of tongue near hitch; 1 total

848-705C
Danger: Tip Over Hazard
On outside of wing end arm mount (both sides), on top face of tongue front of manual pak (front); 3 total

818-337C
Warning: Speed
On top face of tongue near hitch (rear); 1 total
838-094C
Warning: High Pressure Fluid Hazard
One on top face of tongue in front of manual pak (middle), one on rear of hitch;
2 total

838-602C
Warning: Overhead Wing
On front (when unfolded) face of wing frame near wing wheel (top and bottom of tube) (both sides); 4 total

818-398C
Caution: Tires Not a Step
On outside face of wing end arm mount (both sides);
2 total

838-598C
Caution: Read Operator’s Manual
On top face of tongue in front of manual pak (rear);
1 total
848-706C
Notice: Tip Over Hazard
On top face of tongue near hitch (front); 1 total
Great Plains welcomes you to its growing family of new product owners. The Flex Harrow (FH6000HD\(^1\) family) has been designed with care and built by skilled workers using quality materials. Proper setup, maintenance, and safe operating practices will help you get years of satisfactory use from the machine.

**Description of Unit**

The FH6400HD, FH6600HD & FH6800HD Flex Harrow is a heavy-duty flexible-link spike harrow. It is a pull-type implement intended for towing directly behind a tractor, or behind another implement. The outer sections fold up and forward for narrow (12 ft 8 in) transport.

**Models Covered**

- FH6424HD  FH6000, 12-Bar, 24-Foot, Heavy-Duty
- FH6630HD  FH6000, 12-Bar, 30-Foot, Heavy-Duty
- FH6636HD  FH6000, 12-Bar, 36-Foot, Heavy-Duty
- FH6642HD  FH6000, 12-Bar, 42-Foot, Heavy-Duty
- FH6845HD  FH6000, 12-Bar, 45-Foot, Heavy-Duty
- FH6848HD  FH6000, 12-Bar, 48-Foot, Heavy-Duty
- FH6851HD  FH6000, 12-Bar, 41-Foot, Heavy-Duty

**Intended Usage**

Use the Flex Harrow to level soil, firm seedbeds, break up and spread residue. Do not modify Great Plains-provisioned components, or install user-provisioned components, except as authorized or recommended by Great Plains.

**Document Family**

- 564-070M  MANUAL 6424-6845HD FLEX H (this document)
- 584-070Q  PART MAN 6424-6845HD FLEX H
- 584-070Q  PRE-DELIV MAN 6424-6845HD FH
- 564-000M  MANUAL, MARTENS HARROWS FF, HD

**Using This Manual**

This manual will familiarize you with safety, assembly, operation, adjustments, troubleshooting, and maintenance. Read this manual and follow the recommendations to help ensure safe and efficient operation.

---

1. The Great Plains FH6000HD product line is based on Model HD harrows previously offered by Martens Manufacturing, Fairview OK. The present manual (564-070M) is intended for use with FH6000HD family harrows made by Great Plains. Owners of older (2010 and earlier) Martens HD harrows may rely on their existing Martens manual. The final edition of that manual is available on the Great Plains web site as Great Plains part number 564-000M. Great Plains provides continuing support for Martens HD harrows.
Further Assistance

Great Plains Manufacturing, Inc. and your Great Plains dealer want you to be satisfied with your new 8315/8318/8321/8324DVN. If for any reason you do not understand any part of this manual or are otherwise dissatisfied, please take the following actions first:

1. Discuss the matter with your dealership service manager. Make sure they are aware of any problems so they can assist you.
2. If you are still unsatisfied, seek out the owner or general manager of the dealership.

If your dealer is unable to resolve the problem or the issue is parts related, please contact:

Great Plains Service Department
1525 E. North St.
P.O. Box 5060
Salina, KS 67402-5060

Or go to www.greatplainsag.com and follow the contact information at the bottom of your screen for our service department.
Preparation and Setup

This section helps you prepare your tractor and FH6000HD Flex Harrow for use, and covers tasks that need to be done seasonally, or when the tractor/flex harrow configuration changes.

Before using the harrow in the field, you must hitch it to a suitable tractor or leading implement, inspect systems and unfold the harrow. Before using the flex harrow for the first time, and periodically thereafter, certain adjustments may be required.

Initial Setup

See “Appendix B - Initial Setup” on page 35 for first-time/infrequent setup tasks, including:

- Hitch Configuration (page 35).
- Tooth Angle (page 37).
- Install wing extensions (page 39).
- Install 4 bar drag extensions (page 40).

Post-Delivery/Seasonal Setup

On initial delivery, and seasonally, check and as necessary, complete these items before continuing to the routine setup items:

- Bleed hydraulic system (page 28).
- De-grease exposed cylinder rods if so protected at last storage.

Pre-Application Setup

Complete this checklist before routine setup:

- Read and understand “A. Important Safety Information” on page 1.
- Check that all working parts are moving freely, bolts are tight, and cotter pins are spread.
- Check that all grease fittings are in place and lubricated. See “Lubrication and Scheduled Maintenance” on page 29.
- Check that all safety decals and reflectors are correctly located and legible. Replace if damaged. See “Safety Decals” on page 5.
- Inflate tires to pressure recommended and tighten wheel bolts as specified. See “Tire Inflation & Warranty” on page 33.
Hitching Harrow to Tractor

Hitch to a tractor for highway transport or field operations. Hitch to a leading implement only for field operations. Do not transport behind another implement.

Before hitching, check the compatibility and capability of the towing tractor or implement:

- The flex harrow is a pull-type implement equipped with a standard Category IV single tang hitch. It may be converted to a Category III or clevis hitch using supplied accessory parts (see “Hitch Configuration” on page 35).
- Tongue weight varies from 500 pounds to 2300 pounds, depending on harrow model. See “Specifications and Capacities”, pages 32 to 33.
- Recommended tractor horsepower is 3 hp per foot of implement width (72 to 162 hp, depending on harrow model). This is in addition to the power required for any leading implement.
- A leading implement must pass through one hydraulic circuit.

Refer to Figure 3

1. Use jack 1 to raise and lower harrow tongue.
2. Back tractor draw bar into alignment with hitch.

CAUTION

Negative Tongue Weight Hazard:
Make certain that harrow is securely hitched to the tractor or leading implement before unfolding. An unhitched harrow can tip over backwards during folding and unfolding if the tongue is not secured.

4. Secure safety chain to an anchor on the tractor.
5. Retract jack foot. Re-orient jack to storage position.
6. After hitching tractor to harrow, store jack on storage stob 1 on flex harrow tongue.

DANGER

Crushing Hazard:
Do not stand or place any body part between harrow and moving tractor. You may be severely injured or killed by being crushed between the tractor and harrow. Stop tractor engine and set parking brake before attaching cables and hoses.
Electrical Hookup

Refer to Figure 4

Your flex harrow is equipped with lights. Plug the lighting connector into the tractor outlet. Test the lights and signalling prior to highway movement.

Hydraulic Hose Hookup

WARNING

High Pressure Fluid Hazard:
Shut down tractor before making hydraulic connections. Only trained personnel should work with system hydraulics.

Escaping fluid under pressure can have sufficient pressure to penetrate the skin causing serious injury. If an accident occurs, seek immediate medical assistance from a physician familiar with this type of injury.

Use paper or cardboard, NOT BODY PARTS, to check for leaks. Wear protective gloves and safety glasses or goggles when working with hydraulic systems.

Refer to Figure 5

To distinguish hoses on the same hydraulic circuit, refer to hose label.

- The hose with an extended-cylinder symbol feeds a cylinder base end.
- The hose with a retracted-cylinder symbol feeds a cylinder rod end.

Secure hoses and cables so that they have sufficient slack for hitch movements, but cannot get caught between moving parts of tractor, harrow or hitch. Failure to safely route and secure hoses and cables could result in damage requiring component repair/replacement, and lost field time.
Operating Instructions

This section covers general operating procedures. Experience, machine familiarity, and the following information will lead to efficient operation and good working habits. Always operate farm machinery with safety in mind.

Pre-Start Checklist

Perform the following steps before transporting the flex harrow to the field.

This checklist presumes that the nurse tank is not yet connected.

- Carefully read “A. Important Safety Information” on page 1.
- Lubricate flex harrow as indicated under “Lubrication and Scheduled Maintenance” on page 29.
- Check all tires for proper inflation. See “Tire Inflation & Warranty” on page 33.
- Check all bolts, pins, and fasteners. Torque as shown in “Torque Values Chart” on page 34.
- Check flex harrow for worn or damaged parts. Repair or replace parts before going to the field.
- Check hydraulic hoses, fittings, and cylinders for leaks. Repair or replace before going to the field.

WARNING

High Pressure Fluid Hazard:
Relieve pressure and shut down tractor before connecting, disconnecting or checking hydraulic lines. Use a piece of paper or cardboard, NOT BODY PARTS, to check for leaks. Wear protective gloves and safety glasses or goggles when working with hydraulic systems. Escaping fluid under pressure can have sufficient pressure to penetrate the skin causing serious injury. If an accident occurs, seek immediate medical assistance from a physician familiar with this type of injury.
Unfold Harrow

The Flex Harrow has a single hydraulic circuit that combines the lateral (wing) and vertical (harrow) unfolding operations. During unfold, the wings first fully unfold, and then the harrows lower to the ground.

1. Position the hitched and folded harrow on the field to be worked, or on suitable other ground. Unfolding brings the tines into ground contact, and some forward movement is required to lay the sections flat.

2. Double-check that the harrow is securely hitched to the tractor or leading implement.

Refer to Figure 6

3. Lift the transport chain off the wing pin ① on both wings.

4. Start the tractor. Set the brakes. Operate the engine at low rpms.

Refer to Figure 7

5. Slowly extend the fold circuit. Wings unfold (swing back). Do not move the tractor until the wings are fully unfolded.

6. As wings reach fully unfolded, release the brakes.

CAUTION

Negative Tongue Weight Hazard:
Allow no one near or especially behind the unfolding implement. During unfold the tongue weight shifts from positive to temporarily negative. If the hitch fails or there is a hydraulic failure, the harrow can tip over backwards or the harrows can fall suddenly. Anyone under them could be seriously injured or killed.

Refer to Figure 8

7. As sections begin to fold down, pull forward.

8. When the sections are on the ground, continue to extend the fold circuit until the cylinders are fully extended.
Refer to Figure 9

9. When the cylinders are at full extension on level ground, the clevis pin is approximately in the center of the slot. This allows for up and down travel over unlevel ground.

**NOTICE**

*Equipment Damage Risk:*
*Fully extend the cylinders. If they are at less than full extension, the cylinders or frame could be damaged.*

The implement is now ready for field operations (page 20).
Fold

**DANGER**

**Negative Tongue Weight Hazard:**
Allow no one near or especially behind the folding implement. During fold the tongue weight shifts from positive to temporarily negative. If the hitch fails or there is a hydraulic failure, the harrow can tip over backwards or the harrows can fall suddenly. Anyone under them could be seriously injured or killed.

**Refer to Figure 11**
1. With tractor engine at low rpms, slowly retract the fold circuit.

**NOTICE**

**Equipment Damage Risk:**
Do not move the harrow until folding is complete. Movement when partially folded can damage wings or center frame.

**Refer to Figure 12**
2. As the wings begin to fold forward, check that the spring-operated cable lift arms ① are lifting the cables ②.

Harrows smaller than 30 feet do not use cables.

**NOTICE**

**Equipment Damage Risk:**
Stop the fold if the arms are not lifting the cables. If the arms are not lifting the cables, the arms and wings may collide. The wings may also not seat correctly for transport.

3. Continue retracting cylinders until the wings are fully against the stops on the transport cross-tube. Hook transport chains ③ over pins on wings.

4. Harrow is now ready for transport (page 19), parking (page 21) or storage (page 21).
Transport

⚠️ **DANGER**

**Loss of Control Hazard:**
Do not tow the harrow behind another implement on public roads. Tow the harrow to the field with a separate vehicle. The leading implement may not provide sufficient lateral control of a trailing implement at highway speeds. The total weight of the train can also exceed the steering and/or braking capability of the tractor. The resulting accident could cause serious injury or death.

⚠️ **DANGER**

**Loss of Control Hazard:**
Use an adequate towing vehicle. Never tow an implement that weighs more than 150% of the towing vehicle (transport vehicle must weigh at least 67% of implement). Ensure that the towing vehicle is adequate for the task. Using an inadequate tow vehicle is extremely unsafe, and can result in loss of control, serious injury and death.

See tables below for harrow transport weights.

⚠️ **DANGER**

**Braking and Loss of Control Hazard:**
Do not exceed 20 mph (32 kph). Slow down on rough roads.

### Harrow Transport Weights

<table>
<thead>
<tr>
<th>Model</th>
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<th>FH6630HD</th>
<th>FH6636HD</th>
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<td>1830 - 2060 kg</td>
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<th>FH6845HD</th>
<th>FH6848HD</th>
<th>FH6851HD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight Range</td>
<td>6,250 - 7,250 lbs</td>
<td>6,700 - 7,700 lbs</td>
<td>7,100 - 8,300 lbs</td>
</tr>
<tr>
<td></td>
<td>2840 - 3280 kg</td>
<td>3030 - 3500 kg</td>
<td>3210 - 3760 kg</td>
</tr>
</tbody>
</table>

### Transport Steps

- Know your implement weight. If tractor capabilities are marginal, check actual weight of implement at a scale.
- Check that implement is securely hitched to a sufficient tractor (page 13).
- Always use a locking-style hitch pin sized to match holes in hitch and draw-bar, and rated for the load.
- Attach safety chain to tractor with enough slack to permit turning (page 13).
- Verify correct operation of lights.
- Fold flex harrow (page 18).
- Hook transport chains (page 18).
- Check that tires are properly inflated (page 33).
- Plan the route. Avoid steep hills.
- Always have lights on for highway operation.
- Do not exceed 32 kph (20 mph). Comply with all national, regional and local laws when traveling on public roads.
- Remember that the implement may be wider than the towing vehicle. Allow safe clearance.
- Transport slowly over uneven or rough terrain.
Field Operation

This implement is designed to be pulled in the field with the harrows on the ground at all times (including turns). Pulling for extended distances with sections lifted, or routine lifting for turns, is not recommended. Lifting for short distances to clear residue clogs is acceptable. Lifting for tight turns or reverse moves is required.

**NOTICE**

**Equipment Damage Risk:**

*Do not pull for extended distances when partially raised. Do not routinely raise for turns. Such practices cause premature wear of cylinders, pins and frame components. Such wear is not covered by the warranty.*

**NOTICE**

**Equipment Damage Risk:**

*Lift for tight turns and reverse moves. Tight turns can result in a section moving backward. Never back up with harrows on the ground. If the inside tire stops or rolls backward, the turn is tight and requires lift.*

Field Set-Up Checklists

Use the following tables to develop a final checklist for your tractor/flex harrow configuration. Additional or fewer steps may be necessary depending on tractor features, flex harrow options and planting accessories.

<table>
<thead>
<tr>
<th>Mechanical Checklist (Tractor Hitching)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Flex Harrow hitched</td>
<td>13</td>
</tr>
<tr>
<td>☐ Hitch pin locked</td>
<td></td>
</tr>
<tr>
<td>☐ Safety chain secured to tractor or leading implement</td>
<td>13</td>
</tr>
<tr>
<td>☐ Parking jack stowed</td>
<td>13</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical Checklist</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Verify electrical hookups solid, or connector securely stowed if not using lights in field</td>
<td>14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hydraulic System Checklist</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Check tractor hydraulic reservoir full</td>
<td>-</td>
</tr>
<tr>
<td>☐ Make hydraulic connections</td>
<td>14</td>
</tr>
<tr>
<td>☐ Inspect connections for leaks</td>
<td>-</td>
</tr>
<tr>
<td>☐ Unfold Implement</td>
<td>19</td>
</tr>
</tbody>
</table>
Short-Term Parking

1. Choose an implement parking location with level firm ground. Do not unhitch on a steep slope.
2. Fold harrow (page 19).
3. Engage transport lock chains (page 16)
4. Install jack stand on tongue (page 13).
5. Use parking jack to neutralize tongue weight at tractor hitch.
6. Set hydraulic circuits to neutral.
7. Disconnect hydraulic lines. Secure them so that they do not touch the ground.
8. Disconnect lighting connector, capping where provisioned.
10. Unhitch. Restart tractor and pull away from flex harrow.

Long-Term Storage

1. Clean flex harrow of mud, dirt, excess oil and grease.
2. Lubricate all points listed in Maintenance.
3. Apply grease to exposed cylinder rods to prevent rust.
4. Inspect flex harrow for worn or damaged parts. Make repairs and service during off season.
5. Use spray paint to cover scratches, chips, and worn areas on the flex harrow to protect the metal.
6. Park implement per “Short-Term Parking” above.
Adjustments

To get full performance from your FH6000HD flex harrow, you need an understanding of all component operations. There are adjustments for optimal folding and field results.

<table>
<thead>
<tr>
<th>Adjustment</th>
<th>Page</th>
<th>The Adjustment Affects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hitch Configuration</td>
<td>35</td>
<td>Compatibility with tractor or leading implement</td>
</tr>
<tr>
<td>Tooth Angle</td>
<td>37</td>
<td>Aggressive tine setting for unusual conditions</td>
</tr>
<tr>
<td>Wing Fold Height Adjustment</td>
<td>22</td>
<td>Proper wing folding as machine ages</td>
</tr>
<tr>
<td>FH6424HD to FH6642HD</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>FH6845HD to FH6854HD</td>
<td>23</td>
<td></td>
</tr>
</tbody>
</table>

Wing Fold Height Adjustment

Refer to Figure 14

As pins seat and wear, wings may droop, and fail to slide easily onto support cross-member during fold.

Notes: Models FH6424HD (24 foot) and FH6427HD (27 foot) do not have a support cross-member.

In normal operation, the wing 1 engages at about 1 1/2 in (13mm) below the top of the ramp 2 of the wing support cross-member.

FH6424HD to FH6642HD Wing Fold Height

On 12- and 16-bar harrows up to 42-foot, wing height is adjusted by a stop bolt 3 at each wing pivot lug.

Refer to Figure 15

Adjust the fold height by rotating the stop bolt head 3 (one for each wing).

When the adjustment is complete, inhibit bolt rotation by applying silicone sealer 4 to the exposed threads.
FH6845HD to FH6851HD Wing Fold Height

Refer to Figure 16

On harrows 45-foot and wider, wing fold height is adjusted by a shim stack, on a threaded base weldment, at each wing fold pivot.

The initial (factory or dealer) adjustment does not require all of the shims provided. Extra shims are stored in the Manual-Pak® enclosure if there is sufficient room.

Refer to Figure 17

The maximum shim stack for each wing is $1\frac{7}{8}$ in. (4.76 cm), provided as:
Quantity 1 564-166D 1" SHIM FH FOLD STOP
Quantity 2 564-098D SHIM 1/4"
Quantity 1 564-099D SHIM 1/8"
Quantity 2 564-132D SHIM 1/16"

To adjust wing fold height, remove the bolts and lock washers. Add or remove shims to obtain the necessary lug stop height. Re-install bolts and washers.

Use the thickest shim at the top of the stack.

Refer to Figure 17

To adjust wing fold height, so the wing engages at the correct position on the support cross-member (approximately $\frac{1}{2}$ in (13 mm) below the top of the ramp), shims may need added or removed from the rear of the fold stop.

The maximum shim stack for each wing is $3\frac{3}{4}$ in. (19 mm), provided as:
Quantity 2 564-164D 1/4" SHIMS FH FOLD STOP
Quantity 2 564-165D 1/8" SHIMS FH FOLD STOP

Remove bolts, washers, and hex nuts, add or remove shims to obtain the necessary fold height. Re-install bolts, washers, and nuts.

**NOTICE**

**Equipment Damage Risk:**
It is critical that when folded both the left and right clevis on the center wing section are resting on the shim stack. Also the center wing section needs to rest against the rear of the fold stop.

1. Manual-Pak® is a registered trademark of Custom-Pak, Inc.
FH6636 to FH6851HD Wing Adjustment

Refer to Figure 18

On harrows 36-foot and wider, wing adjustment cables ① have been installed to keep the wings in line with the front of the center section. This is done by moving the clevis bolt ② in or out by adjusting the jam nuts ③. The clevis bolt will move towards the center section to allow the wings to move backwards, or away from the center section to bring the wings forward.

Figure 18: FH6600/6800HD Wing Adjustments
# Troubleshooting

## General Implement Troubleshooting

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trailing Chains Lifting Bars on Uneven Ground</td>
<td>Cylinders not fully extended</td>
<td>Extend cylinders</td>
</tr>
<tr>
<td>Harrow Sections Hopping</td>
<td>Tooth angle too aggressive for speed</td>
<td>Slow down or use 40- tooth angle. See “Tooth Angle” on page 37.</td>
</tr>
<tr>
<td>Wings Hang up in Fold</td>
<td>Fold height needs adjustment</td>
<td>See “Wing Fold Height Adjustment” on page 22.</td>
</tr>
<tr>
<td>Sections Gapping Inside Wings or Center</td>
<td>Chain broken or missing between trailing bars of section</td>
<td>Replace chain, and as needed, harrow teeth that secure chain.</td>
</tr>
</tbody>
</table>
Maintenance and Lubrication

Maintenance

Proper servicing and maintenance is the key to long implement life. With careful and systematic inspection, you can avoid costly maintenance, downtime, and repair. Always turn off and remove the tractor key before making any adjustments or performing any maintenance.

**WARNING**

Crushing Hazard:
Always fully unfold or use stands when working on implement. You may be severely injured or killed by being crushed under a falling implement.

**WARNING**

High Pressure Fluid Hazard:
Check all hydraulic lines and fittings before applying pressure. Fluid escaping from a very small hole can be almost invisible. Use paper or cardboard, not body parts, and wear heavy gloves to check for suspected leaks. Escaping fluid under pressure can have sufficient pressure to penetrate the skin. If an accident occurs, seek immediate medical assistance from a physician familiar with this type of injury.

1. After using your flex harrow for several hours, check all bolts to be sure they are tight.
2. Maintain proper air pressure in tires.
3. Clean flex harrow on a regular basis. Regular and thorough cleaning will lengthen equipment life and reduce maintenance and repair.
4. Lubricate areas listed under “Lubrication and Scheduled Maintenance” on page 29.
5. Replace any worn, damaged, or illegible safety labels by obtaining new labels from your Great Plains dealer.
Hydraulic Maintenance
As with any hydraulic system, contamination is the most common cause of performance problems and premature wear. Make a special effort to properly clean quick couplers prior to attaching the hoses to tractor, and never let them fall to the ground.

**WARNING**

*High Pressure Fluid Hazard:*
Relieve pressure before disconnecting hydraulic lines. Wear protective gloves and safety glasses or goggles when working with hydraulic systems. Use a piece of paper or cardboard, NOT BODY PARTS, to check for suspected leaks. Escaping fluid under pressure can penetrate the skin, causing serious injury. If an accident occurs, seek immediate medical assistance from a physician familiar with this type of injury.

Bleed only at JIC and NPT fittings.
Never try to bleed a QD (Quick Disconnect) fitting.
Avoid bleeding at ORB fittings. The O-ring is likely to be torn if any pressure remains in the circuit.

**CAUTION**

*Crushing Hazard:*
When reconnecting fittings at fold cylinder ports, verify that a 0.063in (1/16in, 1.6mm) orifice plate (Great Plains part number 196-430D) is installed at each port. A missing plate could result in a dangerously fast unfold, which might result in equipment damage, injury or death.

**NOTICE**

*System Contamination Risk:*
Always use liquid pipe sealant when adding or replacing NPT (National Pipe Thread, tapered thread) pipe-thread fittings. To avoid cracking hydraulic fittings from over tightening, and to keep tape fragments from clogging filters, do not use plastic sealant tape.

**NOTICE**

*Over-Torque and Leak Risks:*
JIC (Joint Industry Conference 37-Flare) fittings do not require high torque. Excess torque causes leaks. JIC and ORB (O-Ring Boss) fittings do not require sealant.
Bleeding Hydraulics

Normally the hydraulics are bled during final pre-delivery, and bleeding should not be required prior to first use. Bleeding may be required after hydraulic maintenance, or if the hydraulic system is in an uncertain state.

1. Hitch the harrow to a tractor.
2. If the harrow is folded, verify that the wing lock chains are engaged (page 16).
3. Connect the hydraulics to a hydraulic source, such as a tractor remote.
4. Set the source circuit to Float to relieve any pressure in the lines.
5. Disconnect both base and rod ends of all fold cylinders.
6. Support the cylinders with ports facing up, and with cylinders oriented so that rods cannot strike implement parts when at full extension.
7. Orient cylinders with base ends higher than rod ends. Set circuit to Neutral.

One cylinder at a time:
8. Crack (slightly loosen) a JIC connection at a cylinder base end.
9. Extend the circuit slowly until fluid appears at the fitting.
10. Set the circuit to Neutral. Tighten the fitting.
11. Repeat step 8 through step 10 for the remaining cylinders.
12. Retract the cylinders. Set circuit to Neutral.
13. Orient cylinders with rod ends higher than base ends.

One cylinder at a time:
14. Crack (slightly loosen) a JIC connection at a cylinder rod end.
15. Extend the circuit slowly until fluid appears at the fitting.
16. Set the circuit to Neutral. Tighten the fitting.
17. Repeat step 14 through step 16 for the remaining cylinders.
18. Set circuit to Float.
19. Re-pin base and rod ends of cylinders to center section and wing lugs.
20. Test fold function carefully (page 16).

---

**CAUTION**

**Negative Tongue Weight Hazard:**
Make certain that harrow is securely hitched to a tractor before unfolding. An unhitched harrow can tip over backwards during folding and unfolding if the tongue is not secured.

---

**WARNING**

**Crushing and Equipment Damage Hazards:**
Bleed after servicing cylinders or their hoses. Air in the system makes it hazardous to fold the implement. If it is necessary to service hydraulics while folded, the first unfold is especially dangerous. Wing motion can be uneven or jerky in fold. Unfolding wings could fall suddenly. Anyone nearby could be seriously injured or killed. Equipment damage is likely.

---

**WARNING**

**High Pressure Fluid Hazard:**
Wear safety goggles and gloves. The bleed procedure requires partially opening pressurized hydraulic lines. Escaping fluid under pressure can penetrate the skin, causing serious injury. If an accident occurs, seek immediate medical assistance from a physician familiar with this type of injury.
Lubrication and Scheduled Maintenance

Wing Hinges

4 zerks each pin, 
1 pin per wing; 
8 zerks total 
Type of Lubrication: Grease 
Quantity: Until grease emerges

Wing Pivots

3 zerks each pin, 
6 zerks total 
Type of Lubrication: Grease 
Quantity: Until grease emerges

Tire Pressures

4 tires in two sizes
See page 33 for tire pressures. 
Check tire pressures more frequently on a new implement, and with new tires. Check tire pressures before making any level adjustments, and whenever there are application problems.
Wheel Hubs, Transport

(pull-type implements only)
1 zerk each hub,
4 hubs per implement;
4 zerk total
Type of Lubrication: Grease
Quantity: Until resistance is felt

Wheel Hubs, Wing

(pull-type implements only)
1 zerk each hub,
4 hubs per implement;
4 zerk total
Type of Lubrication: Grease
Quantity: Until resistance is felt
Wing Extensions

These kits add a one tooth extension assembly to each side of the harrow, increasing the total working width by 1 1/2 ft (18in, 46cm). The 12 row (bar) kit (for standard harrows) includes 24 extension assemblies. The 16 row (bar) kit (for harrows with row extensions) includes 32.

Order one kit per harrow. These extensions are field-installed. See instructions on page 40.

Row Extensions

These kits add a 4 bar extension to every section of the intended harrow model. Kits are specific to individual harrow models, as bar length combinations are different for each model. Kits include fasteners for connection to the rear end of the existing 12th bar.

Order one Option or kit per harrow. If ordered with the original harrow purchase (Option), these extensions are factory- or dealer-installed. For field installation, see page 39.
## Specifications and Capacities

### Model FH6400HD Specifications and Capacities

<table>
<thead>
<tr>
<th>Feature</th>
<th>FH6424HD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working Width (Swath)</td>
<td>24ft. 0in. (7.32 m)</td>
</tr>
<tr>
<td>Tooth Size</td>
<td>6 inch (15.2 cm), plus 2½in (6.4 cm) thread, diamond-shaped forge-hardened</td>
</tr>
<tr>
<td>Tooth Spacing</td>
<td>9 in. tooth-to-tooth, 11 in. bar-to-bar, 12 bars standard (16 optional)</td>
</tr>
<tr>
<td>Teeth Per Foot of Width</td>
<td>16.0 (Standard 12 bar), 21.3 (Optional 16 bar)</td>
</tr>
<tr>
<td>Field Length</td>
<td>38ft. 0in. (11.58 m)</td>
</tr>
<tr>
<td>Field Width (Span)</td>
<td>25ft. 6in. (7.77 m)</td>
</tr>
<tr>
<td>Transport Height (Folded)</td>
<td>10ft. 10in. (3.30 m)</td>
</tr>
<tr>
<td>Transport Width</td>
<td>12ft. 8in. (3.86 m)</td>
</tr>
<tr>
<td>Transport Length</td>
<td>22ft. 0in. (6.71 m)</td>
</tr>
<tr>
<td>Transport Clearance</td>
<td>11.3 in. (28.6 cm)</td>
</tr>
<tr>
<td>Weight Range</td>
<td>4,050 - 4,550 lbs (1830 - 2060 kg)</td>
</tr>
<tr>
<td>Tongue Weight</td>
<td>480 lbs (220 kg)</td>
</tr>
<tr>
<td>Hitch</td>
<td>Category IV; Category III or Clevis with included accessories</td>
</tr>
</tbody>
</table>

Tractor Power Required¹

### Model FH6600HD Specifications and Capacities

<table>
<thead>
<tr>
<th>Feature</th>
<th>FH6630HD</th>
<th>FH6636HD</th>
<th>FH6642HD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working Width (Swath)</td>
<td>30ft. 0in. (9.14 m)</td>
<td>36ft. 0in. (10.97 m)</td>
<td>42ft. 0in. (12.80 m)</td>
</tr>
<tr>
<td>Tooth Size</td>
<td>6 inch (15.2 cm), plus 2½in (6.4 cm) thread, diamond-shaped forge-hardened</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tooth Spacing</td>
<td>9 in. tooth-to-tooth, 11 in. bar-to-bar, 12 bars standard (16 optional)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teeth Per Foot of Width</td>
<td>16.0 (Standard 12 bar), 21.3 (Optional 16 bar)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field Length</td>
<td>38ft. 0in. (11.58 m)</td>
<td>38ft. 0in. (11.58 m)</td>
<td>38ft. 0in. (11.58 m)</td>
</tr>
<tr>
<td>Field Width (Span)</td>
<td>31ft. 6in. (9.60 m)</td>
<td>37ft. 6in. (11.34 m)</td>
<td>43ft. 6in. (13.26 m)</td>
</tr>
<tr>
<td>Transport Height (Folded)</td>
<td>10ft. 10in. (3.30 m)</td>
<td>10ft. 10in. (3.30 m)</td>
<td>10ft. 10in. (3.30 m)</td>
</tr>
<tr>
<td>Transport Width</td>
<td>12ft. 8in. (3.86 m)</td>
<td>12ft. 8in. (3.86 m)</td>
<td>12ft. 8in. (3.86 m)</td>
</tr>
<tr>
<td>Transport Length</td>
<td>22ft. 0in. (6.71 m)</td>
<td>22ft. 0in. (6.71 m)</td>
<td>22ft. 0in. (6.71 m)</td>
</tr>
<tr>
<td>Transport Clearance</td>
<td>11.3 in. (28.6 cm)</td>
<td>11.3 in. (28.6 cm)</td>
<td>11.3 in. (28.6 cm)</td>
</tr>
<tr>
<td>Weight Range</td>
<td>5,000 - 5,650 lbs</td>
<td>6,000 - 6,450 lbs</td>
<td>6,200 - 6,700 lbs</td>
</tr>
<tr>
<td></td>
<td>2,270 - 2,570 kg</td>
<td>2,720 - 2,930 kg</td>
<td>2,810 - 3,040 kg</td>
</tr>
<tr>
<td>Tongue Weight</td>
<td>600 lbs (270 kg)</td>
<td>820 lbs (370 kg)</td>
<td>1,200 lbs (540 kg)</td>
</tr>
<tr>
<td>Hitch</td>
<td>Category IV; Category III or Clevis with included accessories</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tractor Power Required¹

1. Power requirements vary significantly with conditions and practices.
Model FH6800HD Specifications and Capacities

<table>
<thead>
<tr>
<th>Model</th>
<th>FH6845HD</th>
<th>FH6848HD</th>
<th>FH6851HD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working Width (Swath)</td>
<td>45ft. 0in. (13.72 m)</td>
<td>48ft. 0in. (14.63 m)</td>
<td>51ft. 0in. (15.54 m)</td>
</tr>
<tr>
<td>Tooth Size</td>
<td>6 inch (15.2 cm), plus 2½in (6.4 cm) thread, diamond-shaped forge-hardened</td>
<td>6 inch (15.2 cm), plus 2½in (6.4 cm) thread, diamond-shaped forge-hardened</td>
<td>6 inch (15.2 cm), plus 2½in (6.4 cm) thread, diamond-shaped forge-hardened</td>
</tr>
<tr>
<td>Tooth Spacing</td>
<td>9 in. tooth-to-tooth, 11 in. bar-to-bar, 12 bars standard (16 optional)</td>
<td>9 in. tooth-to-tooth, 11 in. bar-to-bar, 12 bars standard (16 optional)</td>
<td>9 in. tooth-to-tooth, 11 in. bar-to-bar, 12 bars standard (16 optional)</td>
</tr>
<tr>
<td>Teeth Per Foot of Width</td>
<td>16.0 (Standard 12 bar), 21.3 (Optional 16 bar)</td>
<td>16.0 (Standard 12 bar), 21.3 (Optional 16 bar)</td>
<td>16.0 (Standard 12 bar), 21.3 (Optional 16 bar)</td>
</tr>
<tr>
<td>Field Length</td>
<td>42ft. 0in. (12.80 m)</td>
<td>42ft. 0in. (12.80 m)</td>
<td>42ft. 0in. (12.80 m)</td>
</tr>
<tr>
<td>Field Width (Span)</td>
<td>46ft. 6in. (14.17 m)</td>
<td>49ft. 6in. (15.09 m)</td>
<td>52ft. 6in. (16.00 m)</td>
</tr>
<tr>
<td>Transport Height (Folded)</td>
<td>10ft. 10in. (3.30 m)</td>
<td>10ft. 10in. (3.30 m)</td>
<td>10ft. 10in. (3.30 m)</td>
</tr>
<tr>
<td>Transport Width</td>
<td>12ft. 8in. (3.86 m)</td>
<td>12ft. 8in. (3.86 m)</td>
<td>12ft. 8in. (3.86 m)</td>
</tr>
<tr>
<td>Transport Length</td>
<td>26ft. 0in. (7.92 m)</td>
<td>26ft. 0in. (7.92 m)</td>
<td>26ft. 0in. (7.92 m)</td>
</tr>
<tr>
<td>Transport Clearance</td>
<td>11.3 in. (28.6 cm)</td>
<td>11.3 in. (28.6 cm)</td>
<td>11.3 in. (28.6 cm)</td>
</tr>
<tr>
<td>Weight Range</td>
<td>6,250 - 7,250 lbs 2840 - 3280 kg</td>
<td>6,700 - 7,700 lbs 3030 - 3500 kg</td>
<td>7,100 - 8,300 lbs 3210 - 3760 kg</td>
</tr>
<tr>
<td>Tongue Weight</td>
<td>1,580 lbs (710 kg)</td>
<td>1,680 lbs (760 kg)</td>
<td>2,180 lbs (990 kg)</td>
</tr>
<tr>
<td>Hitch</td>
<td>Category IV; Category III or Clevis with included accessories</td>
<td>Category IV; Category III or Clevis with included accessories</td>
<td>Category IV; Category III or Clevis with included accessories</td>
</tr>
</tbody>
</table>

1. Power requirements vary significantly with conditions and practices.

Tire Inflation & Warranty

<table>
<thead>
<tr>
<th>Tire Size</th>
<th>Inflation</th>
<th>Wheel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport 12.5Lx15 SL 12-Ply</td>
<td>52 psi (360 kPa)</td>
<td>12.5Lx15 SL 12-Ply</td>
</tr>
<tr>
<td>Wing 30x8.8x15 16-Ply Aircraft</td>
<td>60 psi (415 kPa)</td>
<td>Wing 30x8.8x15 16-Ply Aircraft</td>
</tr>
</tbody>
</table>

Tire Warranty Information

All tires are warranted by the original manufacturer of the tire. Tire warranty information is found in the brochures included with your Operator’s and Parts Manuals or online at the manufacturer’s web sites listed below. For assistance or information, contact your nearest Authorized Farm Tire Retailer.

Manufacturer Web site
Firestone www.firestoneag.com
Gleason www.gleasonwheel.com
Titan www.titan-intl.com
BKT www.bkt-tire.com
Galaxy www.atgtire.com
## Torque Values Chart

<table>
<thead>
<tr>
<th>Bolt Size</th>
<th>Grade 2</th>
<th>Grade 5</th>
<th>Grade 8</th>
</tr>
</thead>
<tbody>
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Torque tolerance + 0%, -15% of torquing values. Unless otherwise specified use torque values listed above.

Wheel Bolt Torque Values

1/2"-20 (75-85 ft-lbs) 9/16"-18 (80-90 ft-lbs) 5/8"-18 (85-100 ft-lbs)
Appendix B - Initial Setup

This Appendix covers setup tasks performed only once, or at infrequent intervals. Routine setup tasks are covered in “Preparation and Setup” on page 12. Perform Appendix B tasks first. Some of these items may already have been done by your Great Plains dealer:

a. Configure hitch (below and page 36)
b. Configure tine angle (page 37).
c. Install options not dealer-installed:
   - Install Row Extensions (page 39)
   - Install Wing Extensions (page 40)

Hitch Configuration

The standard FH6000HD hitch is a Category IV single tang. The FH6000HD includes components for converting the hitch to clevis or to Category III.

Great Plains recommends operating with the tongue level with the ground. Machine operation is relatively unaffected by hitch height, but the hitch must be matched to the tractor or towing implement.

Each hitch configuration (Category IV, Category III and clevis) requires a specific orientation of the base hitch.

Hitch Height or Hitch Inversion

1. Remove and save two sets of:
   - 803-031C NUT HEX 1-8 PLT
   - 804-027C WASHER LOCK SPRING 1 PLT
   - 802-877C HHCS 1-8X9 GR8 SPTHD
   and one each:
   - 891-189C HITCH BASE - CAT IV
   - 556-236D SAFETY CHAIN SUPPORT
2. Orient the hitch as required for the hitch type (upright, recessed notch down for Category IV), and position it at the height desired.
3. Re-secure the chain support and hitch with both bolts. Use both bolts. Secure through 2 holes in chain support, 4 holes in tongue lugs and 2 holes in hitch casting.

Post-Delivery Checklist

1. Read and understand “A. Important Safety Information” on page 1.
2. Check that all working parts are moving freely, bolts are tight, and cotter pins are spread.
3. Check that all grease fittings are in place and lubricated. See “Lubrication and Scheduled Maintenance” on page 29.
4. Check that all safety decals and reflectors are correctly located and legible. Replace if damaged. See “Safety Decals” on page 5.
5. Inflate tires to pressure recommended and tighten wheel bolts as specified. See “Tire Inflation & Warranty” on page 33.

Hitch Failure Risk:

Verify that there are TWO grade 8 bolts through:
   - TWO holes in chain support
   - FOUR holes in tongue lugs, and
   - TWO holes in hitch casting

If any of these components is secured by only a single bolt, machine damage is likely. The hitch could fail entirely, causing a highway accident resulting in serious injury or death.
Clevis Hitch

Refer to Figure 20

The base hitch must be upright (with the recessed notch on the bottom) for this configuration. This places the tongue weight on the base hitch, and not the clevis.

1. Select one each:
   - 890-798C HITCH CLEVIS
   - 802-487C HHCS 3/4-10X6 GR5
   - 803-367C NUT HEX TOP LOCK 3/4-10 PLT

2. With the square-shouldered end of the clevis 92 up, fully seat the clevis in the upright base hitch 93. Insert the Grade 8 bolt 58 from below. Secure with lock nut 72.

⚠️ CAUTION ⚠️

Hitch Failure Hazard:
Install the hitch base and assemble the clevis parts as shown. Incorrect installation or assembly may result in failure of the clevis bolt, leading to hitch failure. This could result in a serious highway accident or severe machine damage.

Category III Hitch

The base hitch must be inverted (with the recessed notch on the top) for this configuration. Set the V-block 72 to allow some vertical articulation of the draw bar pin. Always use at least one cushion 98.

1. Select one each:
   - PPI-302V TOP PLATE - CAT 3
   - PPI-203VR V-BLOCK
   - 802-383C HHCS 3/4-10X3 GR5
   and two:
   - PPI-205H CUSHION

2. Set the cushions inside the hitch recess 98, just forward of the vertical bolt hole. Position the V-block 72 forward of the cushions and check the size of the resulting pinning hole. Remove a cushion if needed.

3. Add the top plate 99. Secure from below with Grade 5 bolt 57.

Figure 20
Configure Hitch
Tooth Angle

Refer to Figure 21

Tine tooth angle is set by the tooth angle plate (38).
The tine teeth are factory-set with the sharp break side (1) toward the direction of motion (→ - - - -). This pulls the teeth at 40° off vertical (50° relative to the ground). This angle is suitable for most conditions, has no speed restrictions, usually creates a more optimal seedbed, and provides easier residue flow.

For a more aggressive tine angle of 22° off vertical (68° relative to the ground), reverse all harrow sections at their chain connection to the arms.

**NOTICE**

**Excess Wear / Irregular Results Risks:**
Do not exceed 4 1/2 mph (7.2 kph) with tines at 22°.

Machine loads are much higher.

Tine sections may also hop on the ground.

To change tine angle:

**Spot Implement**

1. With the harrow directly hitched to a tractor (not to another implement), fully unfold the implement in field conditions (page 16). Allow enough room for the tractor to approach either end of the harrow sections. Pull forward to lay the sections flat on the ground.

**Disconnect/Move Leading Chains**

Refer to Figure 22

2. Disconnect the trailing end of the leading chains (40) from the harrow sections. Remove and save only the lock nut:

   64 803-019C NUT LOCK 1/2-13 PLT

   it is re-installed at step 6.

**Refer to Figure 22 and Figure 23**

3. Disconnect the leading ends of the leading chains (40) from the section frame. Remove fasteners:

   61 802-722C HHCS 9/16-12X3 1/2 GR5 ZNYCR

   70 803-319C NUT HEX TOP LOCK 9/16-12 ZNYCR

   Re-attach them at the other frame hole.

   Use the upper hole for the 22° tooth angle.

   Use the lower hole for the [standard] 40° tooth angle.

   Tighten nuts only until bolt does not rotate freely.
Disconnect Trailing Chains

Refer to Figure 24

4. Exchange bolts and move jam nut at pull tabs between the front and middle section (bars 4 / 5), and between middle and rear section (bars 6 / 8).

Move the longer bolt and jam nut:
- 802-128C HHCS 1/2-13X2 GR5
- 803-036C NUT HEX JAM 1/2-13 PLT

from the current chain position to the tabs at 4 / 5.
Insert bolt from below at 4 / 5 tabs and secure with jam nut only.

Move the shorter bolt:
- 802-091C HHCS 1/2-13X1 1/2 GR5

from the tabs at 4 / 5 to the tabs at 6 / 8.
Insert bolt from above and secure with lock nut:
- 803-019C NUT LOCK 1/2-13 PLT

Save one lock nut for chain attachment at step 7.

5. When all harrow sections are disconnected, reposition the implement (without harrows) at the other end of the harrows.

Reconnect Leading Chains

Refer to Figure 25

6. Place free chain bolt 54 through top of now-leading tab 95. Pull chain forward and secure with saved lock nut:
- 803-019C NUT LOCK 1/2-13 PLT

Reconnect Trailing Chains

Refer to Figure 26

7. Place the trailing link of the trailing chain 39 over the new bar 6 / 8 bolt 54. Pull chain forward and secure with saved lock nut:
- 803-019C NUT LOCK 1/2-13 PLT
Install Row Extensions

Refer to Figure 27 (depicting 4.5ft drags)

A complete kit of 4 bar drag extensions may include a combination of up to three different widths of drag assemblies:

14 564-042L 4 1/2 FT 4 ROW DRAG EXT
16 564-044L 6 FT 4 ROW DRAG EXT
18 564-046L 7 1/2 FT 4 ROW DRAG EXT

See Pre-Delivery manual for drag identification.

1. Set a drag extension (14, 16 or 18) that is the same width as an existing 12 row drag on the implement.

2. Remove and save two sets of bolts and nuts from the drag extension:
   - 803-019C NUT LOCK 1/2-13 PLT
   - 802-091C HHCS 1/2-13X1 1/2 GR5

3. Align the pull tabs of the extension under the trailing tabs of the rear-most drag bar. Make sure that the tooth angle plates are in the same orientation on the drag extension as on the main drag. See Figure 21 on page 37 for details on tooth angle.

4. Secure pull tabs with bolts and nuts.

5. Repeat step 1 through step 4 for all drag sections.

Refer to Figure 28

Move linking chains starting with the center wing.

6. At bar 12 of the linked drags, remove the teeth:
   - 803-342C NUT HEX TOP LOCK 1/2-13 PLT
   - 891-238C HARROW TOOTH - 8 1/2" DIAMOND securing the linking chain
   - 564-092D CHAIN 5/16 HIGH TEST 8 LINKS between the drag sections.

7. Re-install the teeth at row 12 without the chain. Tighten nuts only to Grade 2 torque specification, to avoid crushing the tubes.

8. Re-install the chain between the same drag sections at row 16.

9. To make a chain connection, remove the end set of:
   - 803-342C NUT HEX TOP LOCK 1/2-13 PLT
   - 891-238C HARROW TOOTH - 8 1/2" DIAMOND

10. Insert an end link of the chain in the trailing tube. On one end, twist the chain 1/4 turn to align the end link with the tube hole.

11. Reinstall the tooth. Tighten nut only to Grade 2 torque specification, to avoid crushing tube.

12. Repeat step 6 through step 11 for all other drag sections with linking chains. Some configurations have only center wing linking chains.

Notice

Machine Damage Risk:
Do NOT link drag sections from wing to wing. The chains are not long enough to accommodate the distance required for wing folding.
Install Wing Extensions

Refer to Figure 29

Two kits are available that extend the working width of the harrow by 18in:
564-048A 1 1/2 FT 12 ROW EXT KIT
564-049A 1 1/2 FT 16 ROW EXT KIT

These kits contain, respectively, 24 or 32 sets of:
564-047K 1 1/2 FT EXTENSION ASSY

These mount to the outside ends of the wing bar tubes.

Repeat for all 24 or 32 wing end bar tubes:

1. Remove and save one set:
   803-342C NUT HEX TOP LOCK 1/2-13 PLT
   891-238C HARROW TOOTH - 8 1/2" DIAMOND

2. Select one:
   564-047K 1 1/2 FT EXTENSION ASSY
   Insert the vacant end of the extension tube into the bar tube, and align the holes, with the tooth pointing down.

3. Re-install the removed tooth and nut, using them to secure the extension tube. Tighten nut only to Grade 2 torque specification.
WARRANTY

Great Plains (a division of Great Plains Manufacturing, Inc.) warrants to the original purchaser that this Great Plains machine will be free from defects in material and workmanship for a period of one year (Parts & Labor) from the first use date when used as intended for personal use; ninety days for custom/commercial or rental use.

Second year limited warranty covers Parts ONLY (personal usage only, excluding labor and wear items). This warranty is limited to the replacement of any defective part by Great Plains. Great Plains reserves the right to inspect any equipment or part which are claimed to have been defective in material or workmanship.

The following items and/or conditions are NOT COVERED UNDER WARRANTY: Failures resulting from the abuse or misuse of the equipment, failures occurring as a result of accidental damage or Force Majeure, failures resulting from alterations or modifications, failures caused by lack of normal maintenance as outlined in the operator's manual, repairs made by non-authorized personnel, items replaced or repaired due to normal wear (such as wear items and ground-engaging components including, but not limited to, disc blades, chisel points, tires, bushings, and scrapers), repeat repair due to improper diagnosis or improper repair by the dealer, temporary repairs, service calls and/or mileage to and from customer location, overtime premium, or unit hauling expenses. The warranty may be voided if the unit is towed at speeds in excess of 20 miles per hour (32 kilometers per hour), or failures occurring from soils with rocks, stumps, or other obstructions.

Great Plains reserves the right to make changes in materials or design of the product at any time without notice. The warranty shall not be interpreted to render Great Plains liable for damages of any kind, direct or consequential or contingent to property. Furthermore, Great Plains shall not be liable for damages resulting from any cause beyond its control. This warranty does not extend to crop loss, losses caused by planting or harvest delays or any expense or loss of labor, supplies, rental machinery, or for any other reason.

No other warranty of any kind whatsoever expressed 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 warranty is not valid unless registered by a certified Great Plains dealer.

Effective July 15, 2020
FH6000HD

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