

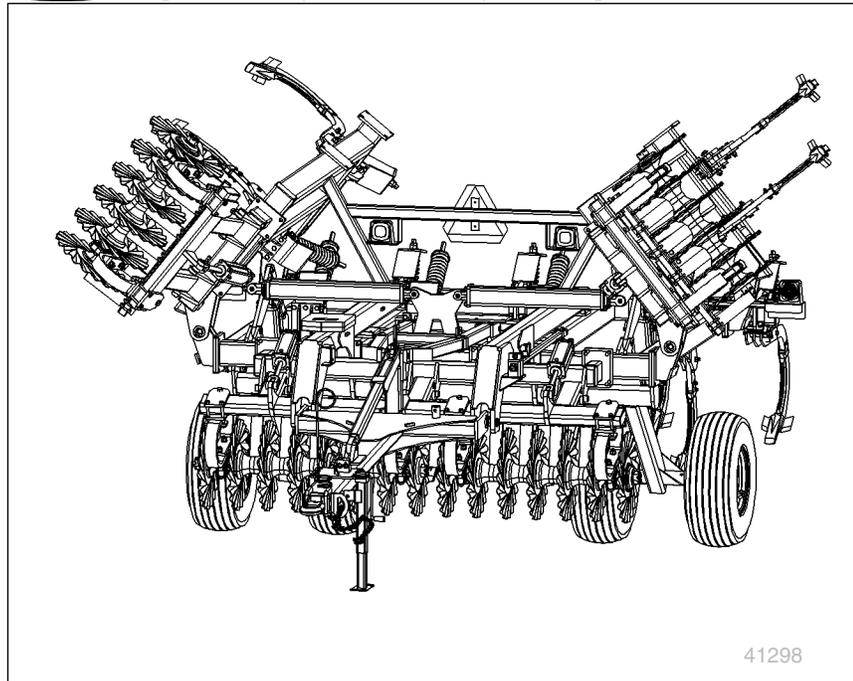
Operator Manual

5109, 5111, 5113 & 5115,
5313, 5315, 5317, 5319, 5321 & 5323
Turbo-Chisel

 **Great Plains**
Manufacturing, Inc.
www.greatplainsmfg.com



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.

ORIGINAL INSTRUCTIONS



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566-046M



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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.*



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 Turbo-Chisel requires a Power-Beyond port, which is always under pressure when the tractor is running.

- ▲ *Avoid the hazard by relieving pressure at other remote, 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.

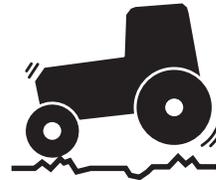
- ▲ *Use flashing warning lights and turn signals whenever driving on public roads.*
- ▲ *Use lights and devices provided with implement.*



Transport Machinery Safely

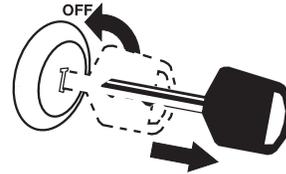
Maximum transport speed for implement is 20 mph (32 kph), 13 mph (22 kph) in turns. Some rough terrains require a slower speed. Sudden braking can cause a towed load to swerve and upset.

- ▲ *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 Turbo-Chisel in case of breakdown on the road.*
- ▲ *Keep clear of overhead power lines and other obstructions when transporting. Refer to transport dimensions under “TC Specifications and Capacities” on page 28.*
- ▲ *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 Turbo-Chisel while the tractor is moving.*



Shutdown and Storage

- ▲ *Lower Turbo-Chisel, put tractor in park, turn off engine, and remove the key.*
- ▲ *Secure Turbo-Chisel using parking jack provided.*
- ▲ *Detach and store Turbo-Chisel in an area where children normally do not play.*



Tire Safety

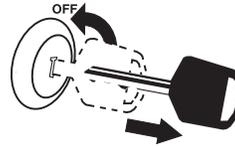
Tire changing can be dangerous. Employ trained personnel using correct tools and equipment.

- ▲ *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 Turbo-Chisel.*
- ▲ *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 Turbo-Chisel functions.*
- ▲ *Operate machinery from the driver's seat only.*
- ▲ *Do not leave Turbo-Chisel 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 Turbo-Chisel. Make sure all persons are clear of working*

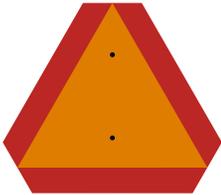


Safety Decals

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.*

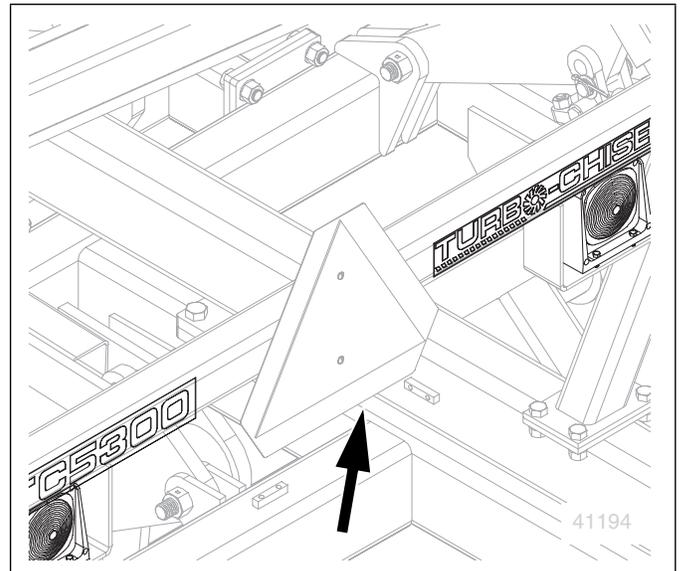


818-055C Slow Moving Vehicle Reflector

On the back of smv post on wing stop;
1 total

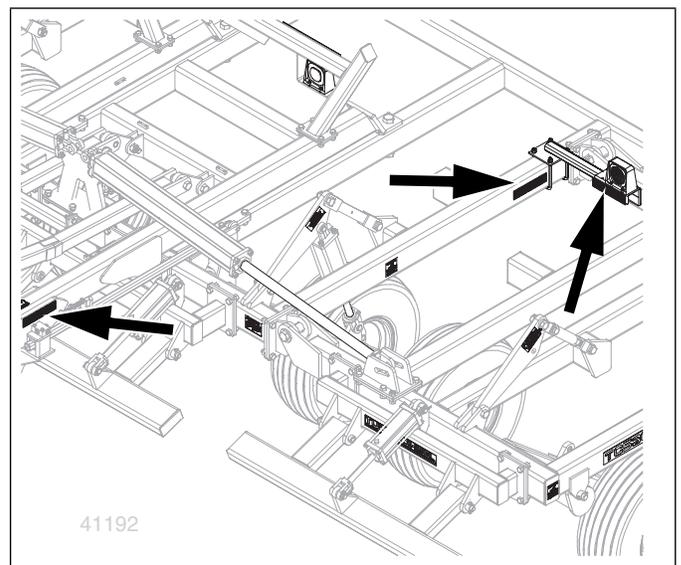
To install new decals:

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.



838-615C Amber Reflectors

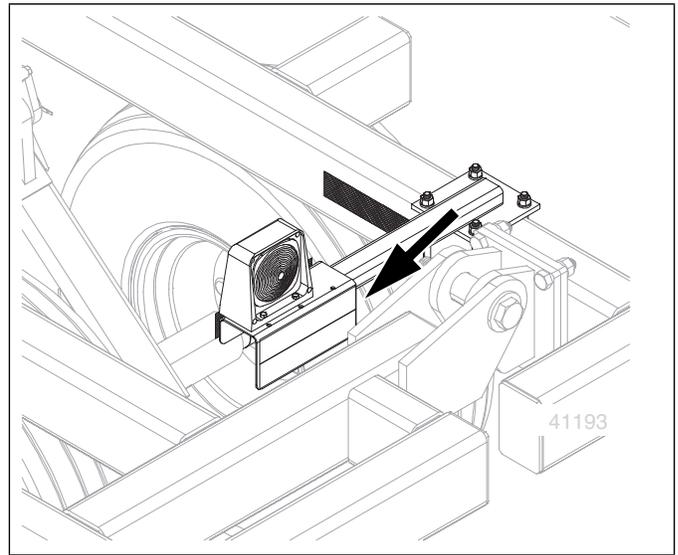
Two on front of light brackets. Two on front, outside of trusses. Two on outside, rear of center frame. Two on rear of finishing attachment (not shown), visible from side while folded for transport;
8 total





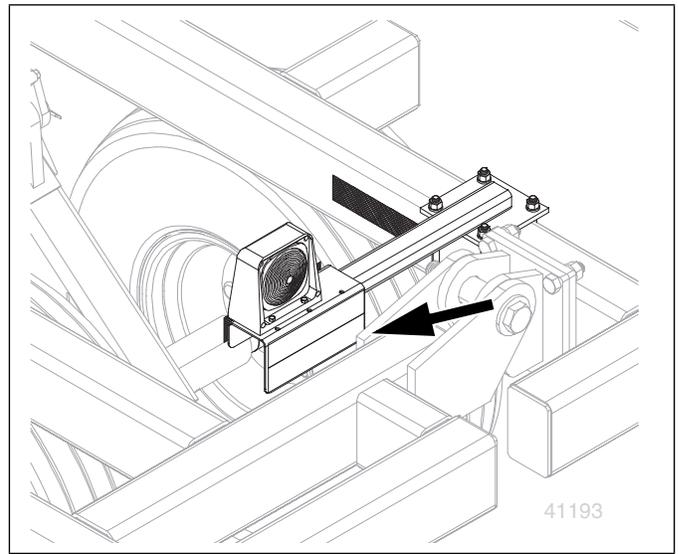
838-614C
Red Reflectors

On rear of light brackets (top);
2 total



838-603C
Orange Reflectors

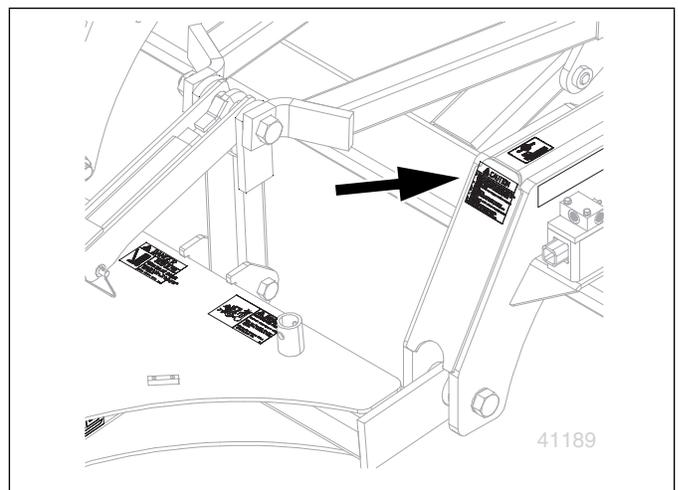
On rear of light brackets (bottom);
2 total



 CAUTION
<ol style="list-style-type: none"> 1. Read and Understand the Operator's Manual before using machine. 2. Stop tractor engine, lower machine to the ground, place all controls in neutral, set park brake, remove ignition key and wait for all moving parts to stop before servicing, adjusting, repairing, unplugging or fitting. 3. Keep hands, feet, hair and clothing away from earth-working points and blades. 4. Do not allow riders. 5. Clean reflectors, SMV and lights before transporting. 6. Install safety locks before transporting or working beneath components. 7. Add extra lights and use pilot vehicle when transporting during times of limited visibility. 8. Use hazard flashers in tractor when transporting. 9. Install safety chain when attaching to tractor. 10. Review safety instructions with all operators annually.

838-598C
Caution: Read Operator's Manual

On front of left truss;
1 total

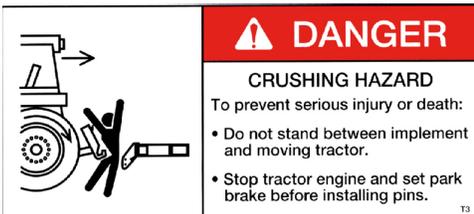
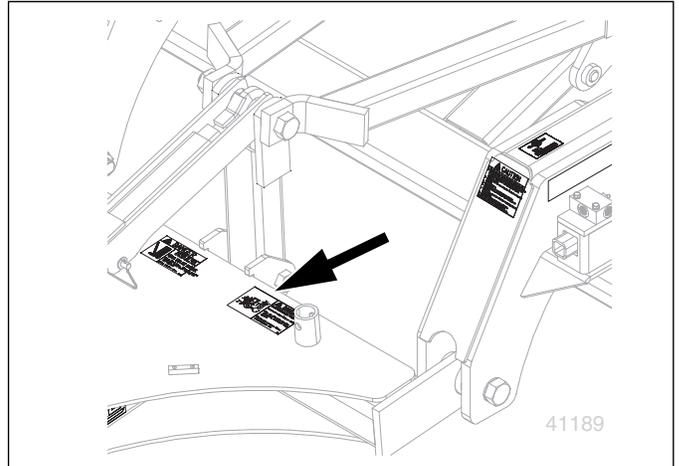




838-599C

Danger: Electrocution Hazard

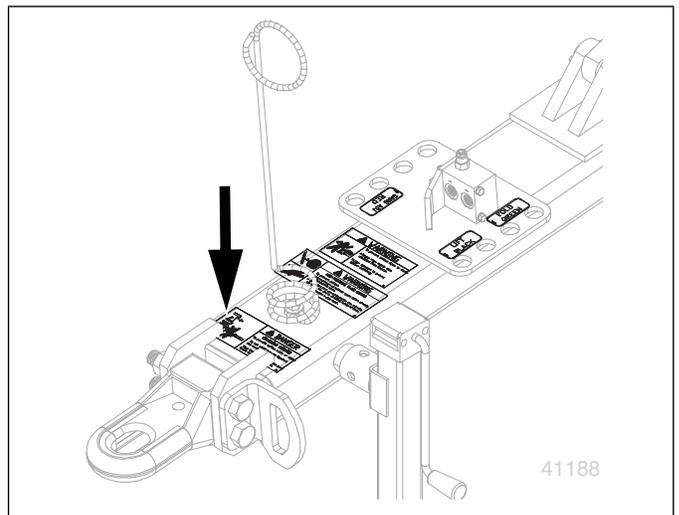
Top side of gusset on rear of hitch (left side), Models 5313-5323;
1 total



838-600C

Danger: Crushing Hazard

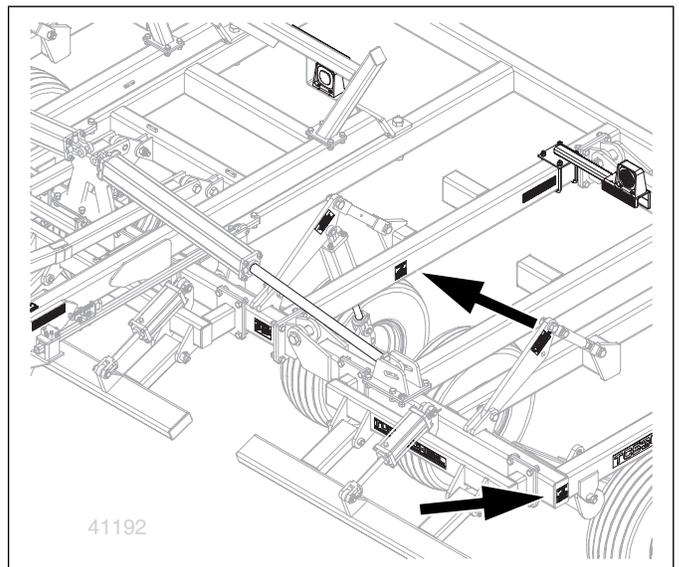
Front of hitch;
1 total



838-602C

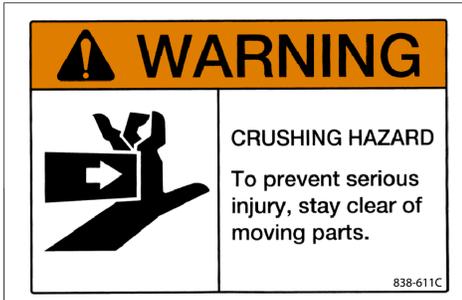
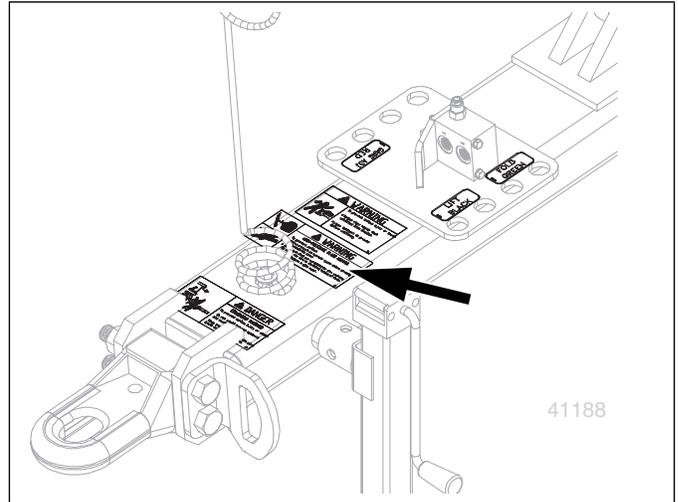
Warning: Overhead Wing Hazard

Outside, center of center frame and front, left of wing frames (both sides), Models 5313-5323;
4 total

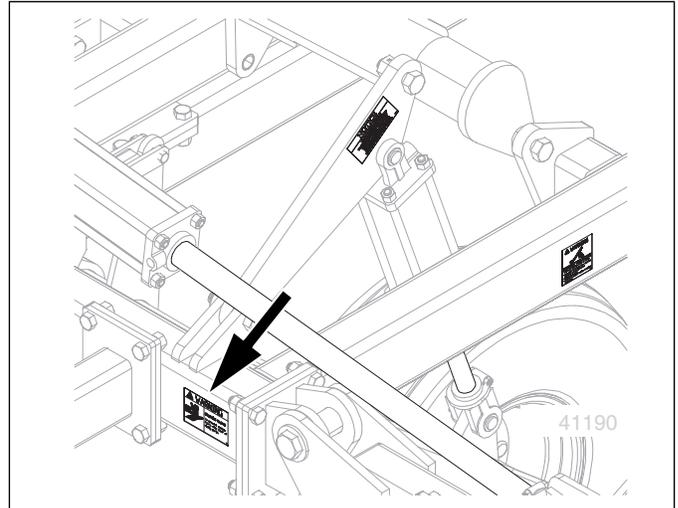




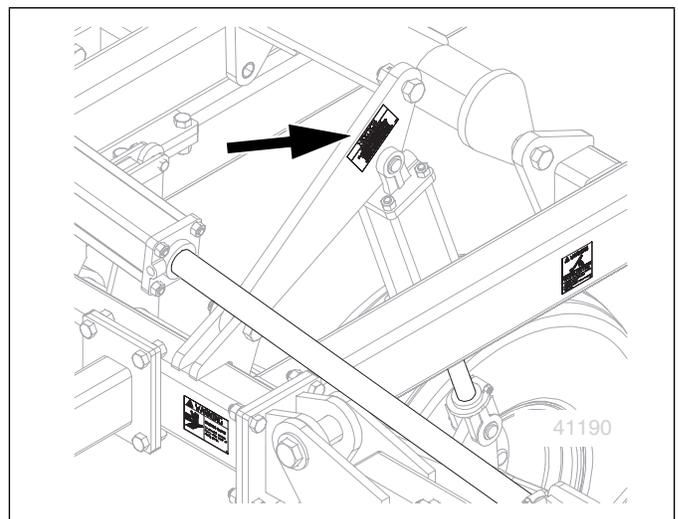
838-094C
Warning: High Pressure Fluid
 Front of hitch (middle);
 1 total



838-611C
Warning: Hand Crushing
 Front side of center frame (left & right side);
 2 total



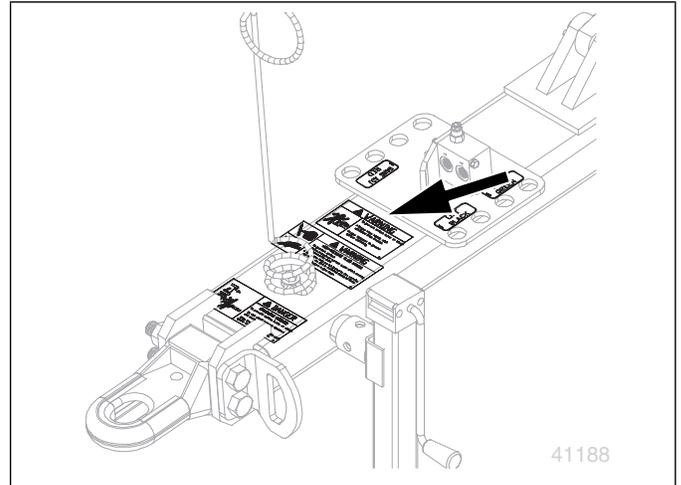
838-613C
Notice: Transport Lock
 Outside of cylinder mount bar (both sides);
 2 total





838-606C
Warning: Tongue Rising

Front of hitch (rear);
1 total

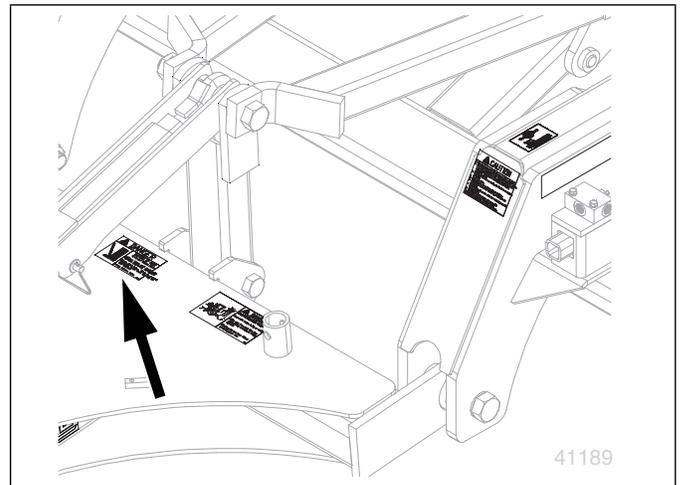


41188



848-271C
Danger: Cutting Of Foot

Top side of gusset on rear of hitch (middle);
1 total



41189

Introduction

Great Plains welcomes you to our growing family of new product owners. The TC5109-5323 have 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.

Models Covered

TC5109	11-Foot	1-section
TC5111	14-Foot	1-section
TC5113	16-Foot	1-section
TC5115	19-Foot	1-section
TC5313	16-Foot	3-section
TC5315	19-Foot	3-section
TC5317	21-Foot	3-section
TC5319	24-Foot	3-section
TC5321	26-Foot	3-section
TC5323	29-Foot	3-section

Description of Unit

The TC5109-5323 is a one or three-section “vertical” tillage tool. Working width ranges from 11 to 29 feet. The implement is designed to cut, size and bury residue. It can work up to 11” deep, will dislodge rootballs and leave the field smooth enough for “one pass” finishing in Spring. For optimum leveling of your machine, it should be equipped with either a Chopper Reel or Buster Bar attachment.

Document Family

566-046E	Assembly Manual
566-046Q	Pre-Delivery Manual
566-046M	Operator Manual (this document)
566-046P	Parts Manual

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.

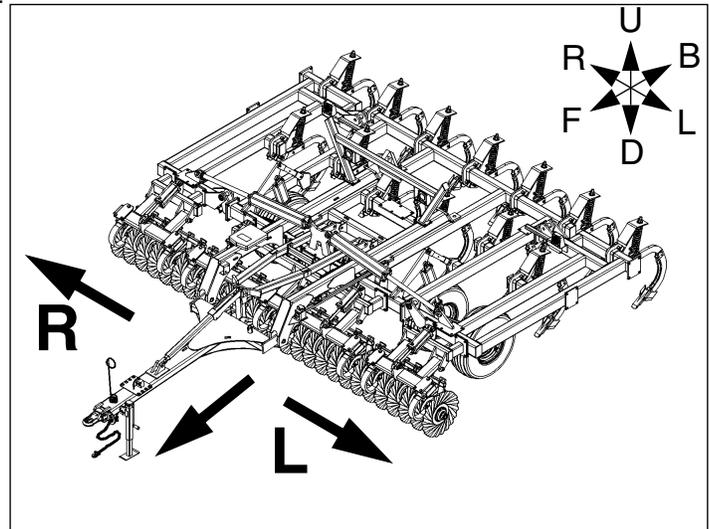


Figure 1
Turbo Max

41977

The information in this manual is current at printing. Some parts may change to assure top performance.

Definitions

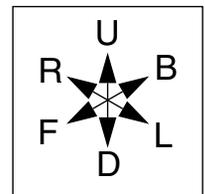
The following terms are used throughout this manual.

NOTICE

A crucial point of information related to the preceding topic. Read and follow the directions to remain safe, avoid serious damage to equipment and ensure desired field results.

Note: Useful information related to the preceding topic.

Right-hand and left-hand as used in this manual are determined by facing the direction the machine will travel while in use unless otherwise stated. An orientation rose in some line art illustrations shows the directions of: Up, Back, Left, Down, Front, Right.



Owner Assistance

If you need customer service or repair parts, contact a Great Plains dealer. They have trained personnel, repair parts and equipment specially designed for Great Plains products.

Refer to Figure 2

Your machine's parts were specially designed and should only be replaced with Great Plains parts. Always use the serial and model number when ordering parts from your Great Plains dealer. The serial-number plate is located on the left end of the top front tool bar.

Record your Turbo-Chisel model and serial number here for quick reference:

Model Number: _____

Serial Number: _____

Your Great Plains dealer wants you to be satisfied with your new machine. If you do not understand any part of this manual or are not satisfied with the service received, please take the following actions.

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.

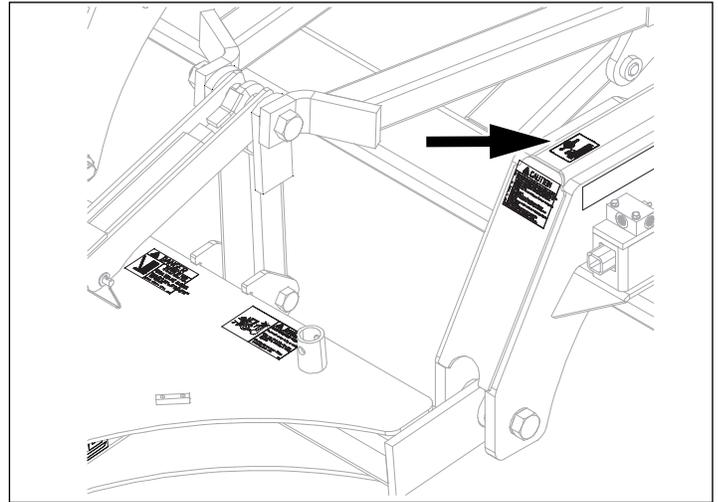
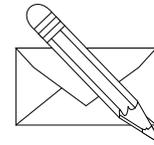


Figure 2
Serial Number Plate

41189

For further assistance write to:

Product Support
 Great Plains Mfg. Inc., Service Department
 PO Box 5060
 Salina, KS 67402-5060



gp_web_cs@greatplainsmfg.com

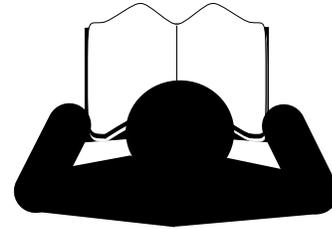
(800)255-9215



Preparation and Setup

This section helps you prepare your tractor and TC5109-5323 Turbo-Chisel for use, and covers tasks that need to be done seasonally, or when the tractor/Turbo-Chisel configuration changes.

Before using the Turbo-Chisel in the field, you must hitch it to a suitable tractor, inspect systems and level the Turbo-Chisel. Before using the Turbo-Chisel for the first time, and periodically thereafter, certain adjustments and calibrations are required.



Prior to Going to the Field Checklist

Complete this checklist before routine setup:

- Read and understand “**Important Safety Information**” on page 1.
- Check that all working parts are moving freely, bolts are tight, and cotter pins are spread.
- Make sure your tractor horsepower matches the implement you are pulling. This is important so the implement can do the best possible job.
- Clean all hydraulic couplings and connect to tractor as shown on page 13 and 14.
- If machine is folded, remove the transport pins from wing stops. (DO NOT remove pins if the wing is leaning against the pins or putting pressure on the pins. Use the hydraulics to pull the wings in completely before unpinning them.) Once the pins are removed, slowly untold the unit. Make sure no one is under the wings during the unfolding process.
- Check again for hydraulic leaks and watch that hoses do not get pinched in hinges, wing stops, etc.
- After the machine is completely unfolded, raise and lower the Turbo Max several times to purge air from the hydraulic system. Again check for hydraulic leaks and tighten or replace if necessary.
- Check safety chain hookup. Make sure all warning lights are hooked up and functioning correctly.
- Check that all grease fittings are in place and lubricated. See “**Lubrication**” on page 26. The hubs will come pre-greased and will not need greased at this time.
- 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 “**Torque Values Chart**” on page 30.
- Put transport locks in place and refold the machine slowly. Put wing stop pins in place. Always use the transport pins when moving from field to field. You are now ready to go to the field.

Hitching Turbo-Chisel 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 TC5109-5323 Turbo-Chisel 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.

To prevent soil compaction on rows, set tractor wheels between rows. For hillsides and steep slopes, set tractor wheels as wide as possible for maximum stability.

1. Raise tractor three-point arms (if equipped) clear up to clear Turbo-Chisel.
2. For TWO-WHEEL DRIVE and MFWD tractors, pin drawbar in fixed center position for field and transport. For FOUR-WHEEL DRIVE and TRAC-DRIVE tractors, leave one hole clearance on each side of drawbar for field position, hitch damage may occur if pinned solid. Pin in center position for transport to maintain maximum steering control.

Refer to Figure 3

3. Use jack ① to raise and lower turbo-chisel tongue.
4. Back tractor draw bar into alignment with hitch ②.
5. Secure with a locking hitch pin.

CAUTION

Negative Tongue Weight Hazard:

Make certain that turbo-chisel is securely hitched to the tractor or leading implement before unfolding. An unhitched turbo-chisel can tip over backwards during folding and unfolding if the tongue is not secured.

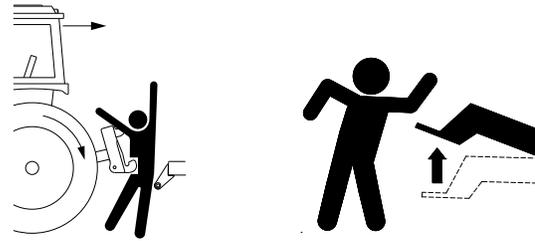
6. Secure safety chain to an anchor on the tractor.

Refer to Figure 4

7. Retract jack foot. Re-orient jack to storage position.
8. After hitching tractor to turbo-chisel, store jack on storage stob ③ on Turbo-Chisel tongue.

Load Sway Hazard:

9. Lock drawbar swing to center position to minimize any side-to-side sway to assure proper tracking in the field, and safe road travel. See "Transport" on page 19, for safe transporting.



! DANGER

Crushing Hazard:

Do not stand or place any body part between turbo-chisel and moving tractor. You may be severely injured or killed by being crushed between the tractor and turbo-chisel. Stop tractor engine and set parking brake before attaching cables and hoses.

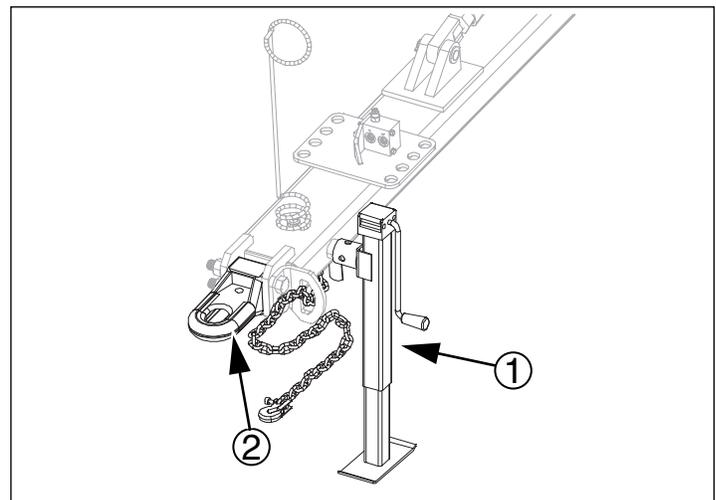


Figure 3
Jack & Hitch Clevis

41993

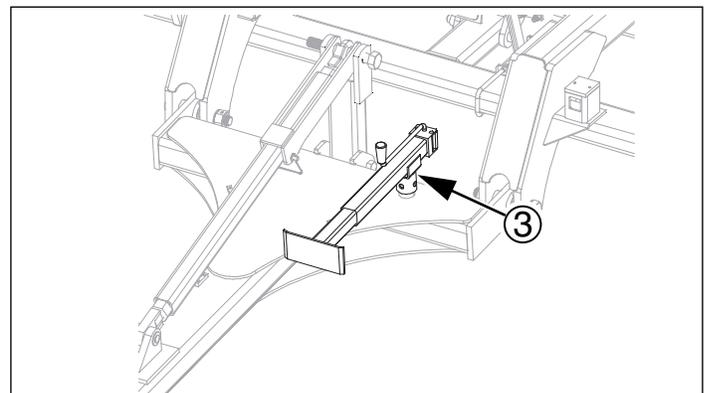


Figure 4
Jack in Storage

41994

Electrical Hookup

Refer to Figure 5

Your Turbo-Chisel is equipped with either North American lights.

Plug the lighting connector into the tractor outlet.

Test the lights and signalling prior to highway movement.

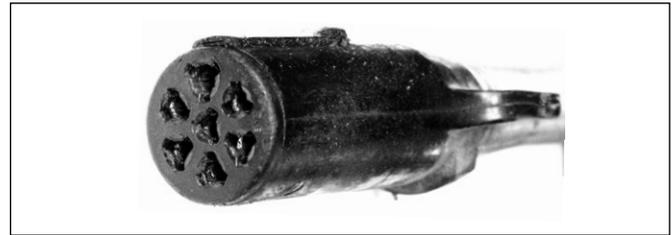


Figure 5
North American Connector

25236

Hydraulic Hose Hookup

Great Plains hydraulic hoses are color coded to help you hookup hoses to your tractor outlets. Hoses that go to the same remote valve are marked with the same color.

Color	Hydraulic Function
Black	Lift (2 hoses)
Green	Fold (2 hoses)
Red	Gang (2 hoses)

Hydraulic Hose Hookup



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 6

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, turbo-chisel or hitch. Failure to safely route and secure hoses and cables could result in damage requiring component repair/ replacement, and lost field time.

To distinguish hoses on the same hydraulic circuit, refer to, “**Hydraulic Hose Hookup**” on page 14. Clean all hydraulic couplings and hook hoses to tractor.

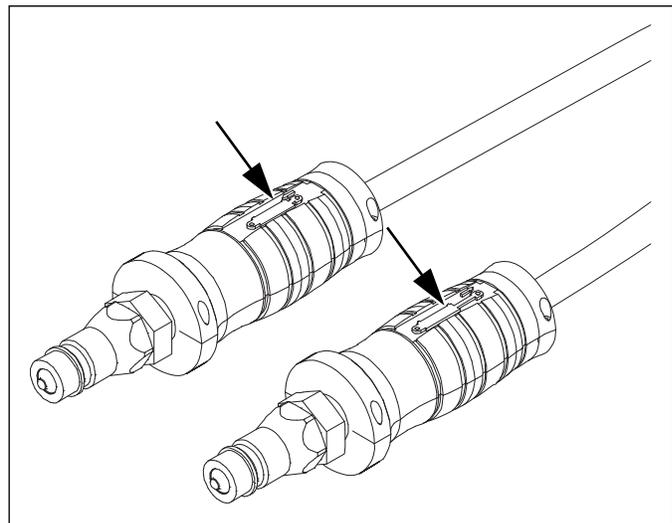


Figure 6
Hose Handles

31733

Transport Locks

Refer to Figure 7

- Once the cylinders are connected, raise the unit completely. If the transport locks ① are in place, remove them at this time.



Figure 7
Transport Locks

41805

Refer to Figure 8

- Store the transport locks ② on the lift mechanism link as shown.
- Once the locks are removed, unfold the wings (if folding unit).

Note: Make sure no one is under the wings during the unfolding process. Watch for leaks and make sure hoses do not get pinched during the initial unfolding process.

- Once the machine is unfolded, raise and lower the machine several times to purge air from the lift system. Again, watch for any leaks and tighten if necessary.
- Check the tire pressure for proper inflation and check the tightness of lug bolts.



Figure 8
Transport Locks Storage

41805

First Time Field Adjustments

Pre-Leveling of Machine

Note: Pre-leveling of machine should be done on a good level surface.

Front to Rear Leveling

Refer to Figure 9

- Lower the machine until the front row of shanks are 1 to 2" above the surface. At this point, remove the snap wire pin ① from the turnbuckle lock ②, swing lock off turnbuckle and adjust the hitch turnbuckle ③ to adjust the fore and aft. The front corner of the main frame should be 1/2 to 1" lower than the rear corner.
- Now the turnbuckle lock ② may be swung back onto hitch turnbuckle ③ and the snap wire pin ① may be re-installed.

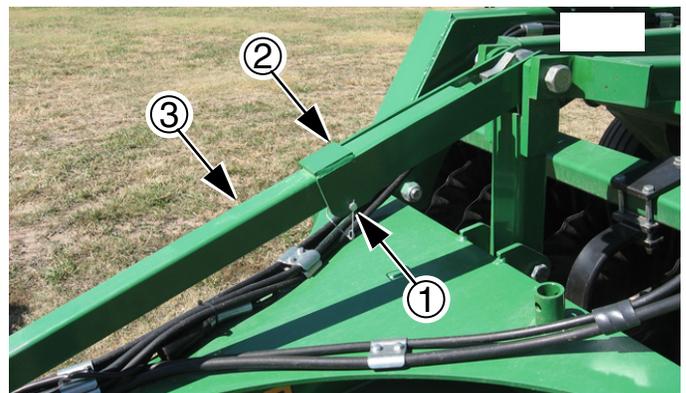


Figure 9
Hitch Turnbuckle Adjustment

41805

Wing Adjustment (5313-5315)

Refer to Figure 10

17. Once the machine is level fore to aft, the wings may be leveled (Models 5313-5315). Start by unfolding the wings to a rigid position.
 18. Completely extend the wing fold cylinders and check the wings for levelness. If machine is not level, fold wings back up and instal shims as needed to level.
- Note: Extra shims ② are stored on back side of tube plate, facing towards ground. The extra shims may be needed in the future if the hinge holes or bolts begin to wear. There are two different thickness of shims, you may use multiple shims to level wings.
19. Remove the two 3/8 x 1 1/2 bolts ① and either add more shims ② to raise wings or take shims out to lower wings.
 20. Re-instal bolts and tighten to specs, see “**Torque Values Chart**” on page 30.

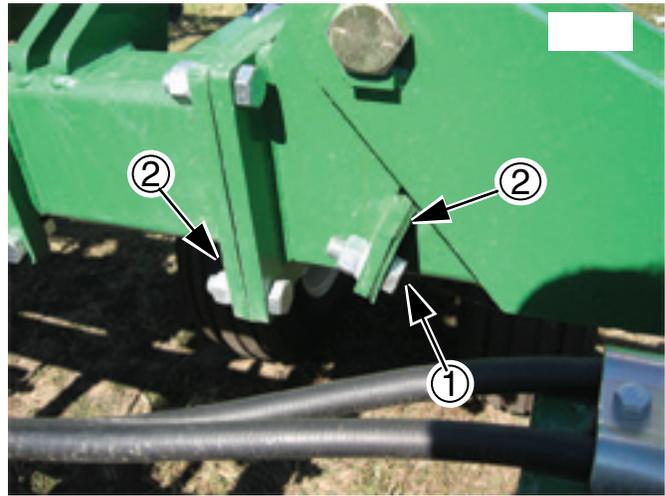


Figure 10
5313-5315 Wing Adjustment

42061

Wing Adjustment (5317-5323)

Refer to Figure 11

21. The wings are to be leveled with the turnbuckle ① on the wing cylinder mount ②.
22. Loosen jam nut ③ and either shorten turnbuckle to raise the wings or lengthen the turnbuckle to lower the wings.
23. Re-tighten the jam nut ③ to specs, see “**Torque Values Chart**” on page 30

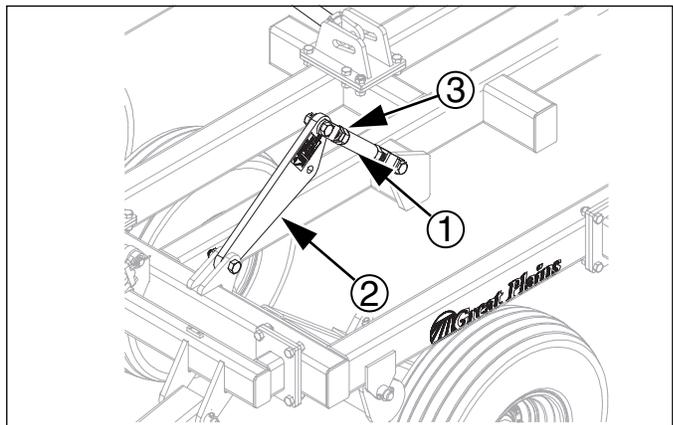


Figure 11
5317-5323 Wing Adjustment

41729

Refer to Figure 12

24. Once machine is pre-leveled, raise and lower the gangs completely to cycle and purge air from these cylinders ①.

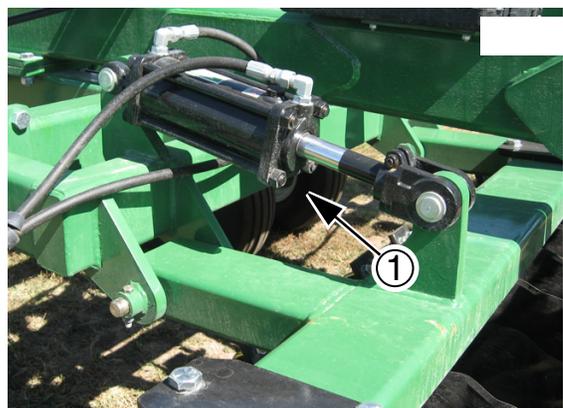


Figure 12
Gang Cylinder Purging

41729

5317-5323 Hydraulic Down Pressure

Refer to Figure 13

Note: This setup procedure is for tractors with closed-center or pressure compensated flow hydraulic systems. Open center hydraulics not supported. Adjust down pressure valve as shown on decal ④ (located on front right hand truss), Refer to Figure 14.

CAUTION

Never leave tractor valve centered when unfolded with machine in motion. Machine damage may occur when wings flex up or down

CAUTION

This machine is designed for continuous hydraulic flow to the wing fold cylinders during field operations. It is for use on tractors having CLOSED CENTER hydraulics only. If your tractor has an OPEN CENTER hydraulics, please consult your dealer for operating instructions.

25. Adjust the bypass/pressure reducing valve by turning knob ① clockwise all the way in and then backing out 1 full turn.

26. On tractor, adjust flow-control valve to low side of flow rate.

Note: The faster the flow of oil through the system the greater the potential for oil heating, premature wear or tractor damage.

27. Lock the fold hydraulic lever for continuous downward oil flow.

28. Adjust bypass/pressure reducing valve knob ② on implement so the pressure gauge ③ reads 1200 psi. Never exceed 1400 psi.

29. While watching pressure gauge ③, slowly open knob ① until gauge reads 1100psi. Pressure might rise and then fall off as knob is opened. If pressure exceeds 1400 psi during this step, the tractor flow is too high, reduce tractor flow. Lock valve knob ① at 1100 psi.

30. Finally adjust valve ② to the desired wing down pressure setting. Never exceed 900 psi.

31. In field operation, lock the fold hydraulic lever for continuous downward oil flow. If wings are running too high, increase pressure setting, knob ②, to level machine. If center is too high, decrease pressure setting with knob ② on valve.

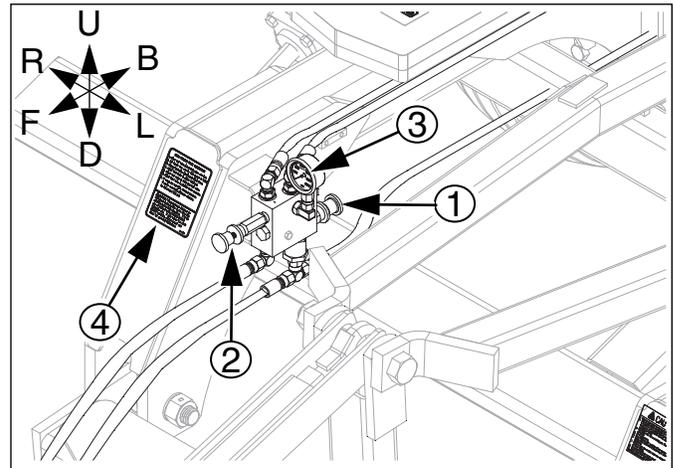


Figure 13
5317-5323 Down Pressure

848-390C

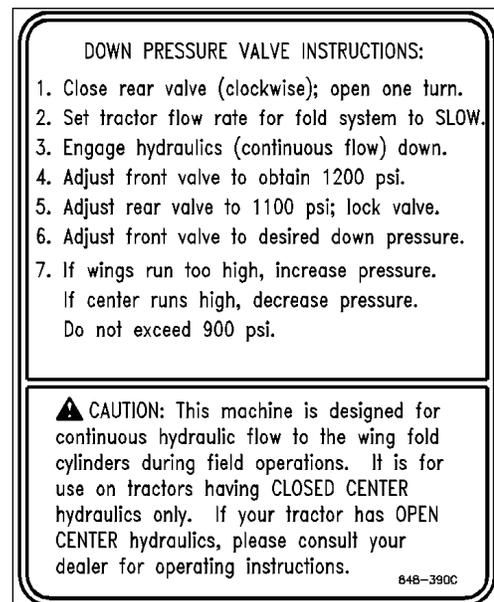


Figure 14
Down Pressure Decal

848-390C

Operating Instructions

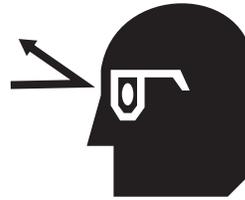
This section covers general operating procedures. Experience, machine familiarity, and the following information will lead to efficient operation and good working habits. Always operate farm machinery with safety in mind.

Pre-Start Checklist

Perform the following steps before transporting the 8315/8318/8321/8324DVN Turbo-Chisel to the field.

- Carefully read “**Important Safety Information**” on page 1.
- Lubricate Turbo-Chisel as indicated under “**Lubrication**” on page 26.
- Check all tires for proper inflation, “**Tire Inflation Chart**” on page 29.
- Check all bolts, pins, and fasteners. Torque as shown in “**Torque Values Chart**” on page 30.
- Check Turbo-Chisel for worn or damaged parts. Repair or replace parts before going to the field.

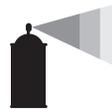
Check hydraulic hoses, fittings, and cylinders for leaks. Repair or replace before going to the field.



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.



Transport

⚠ DANGER

Loss of Control Hazard:

Do not tow the turbo-chisel behind another implement on public roads. Tow the turbo-chisel 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:

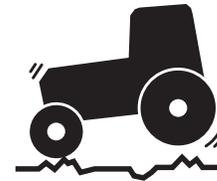
Use an adequate towing vehicle. Never tow an implement that weighs more than 150% of the towing vehicle (transport vehicle must weigh at least 67% of implement). Ensure that the towing vehicle is adequate for the task. Using an inadequate tow vehicle is extremely unsafe, and can result in loss of control,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



Transport Steps

Know your implement weight. If tractor capabilities are marginal, check actual weight of implement at a scale.

1. Check that implement is securely hitched to a sufficient tractor (page 13).
2. Always use a locking-style hitch pin sized to match holes in hitch and draw-bar, and rated for the load.
3. Attach safety chain to tractor with enough slack to permit turning (page 13).
4. Verify correct operation of lights.
5. Instal transport locks (page 15).
6. Check that tires are properly inflated (page 29).
7. Plan the route. Avoid steep hills.
8. Always have lights on for highway operation.
9. Do not exceed 32 kph (20 mph). Comply with all national, regional and local laws when traveling on public roads.
10. Remember that the implement may be wider than the towing vehicle. Allow safe clearance.

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/Turbo-Chisel configuration. Additional or fewer steps may be necessary depending on tractor features, Turbo-Chisel options and planting accessories.

Mechanical Checklist (Tractor Hitching)	Page
<input type="checkbox"/> Turbo-Chisel hitched	13
<input type="checkbox"/> Hitch pin locked	
<input type="checkbox"/> Safety chain secured to tractor or leading implement	13
<input type="checkbox"/> Parking jack stowed	13

Electrical Checklist	Page
<input type="checkbox"/> Verify electrical hookups solid, or connector securely stowed if not using lights in field.	14

Hydraulic System Checklist	Page
<input type="checkbox"/> Check tractor hydraulic reservoir full	-
<input type="checkbox"/> Make hydraulic connections	14
<input type="checkbox"/> Inspect connections for leaks	-
<input type="checkbox"/> Unfold Implement	

General Operation and In-Field Adjustments

1. Remove the transport pins, see “**Transport Locks**” on page 15 and unfold machine. Make sure the fold cylinders are fully extended to allow the wings to fully flex in the field.
2. If possible have someone observe the machine during first time operation for levelness, front to rear and wings to center frame.

Refer to Figure 15

3. If machine needs leveled from front to rear, remove the snap wire pin ① from the turnbuckle lock ②, swing lock off turnbuckle and adjust the hitch turnbuckle ③. When done adjusting, be sure and swing turnbuckle lock back down and secure with snap wire pin.

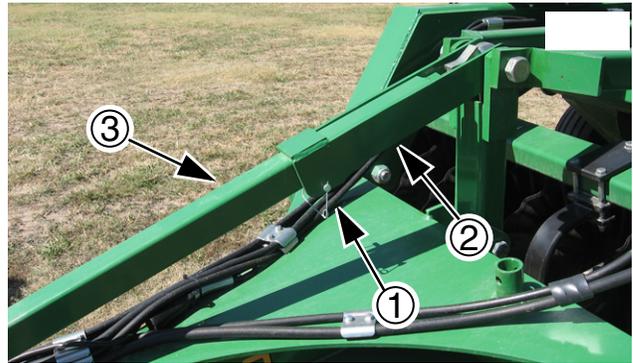


Figure 15
Turnbuckle Adjustment

41987

Refer to Figure 16

4. If machine is not level when fold cylinders are completely extended, fold wings back up and instal shims as needed to level.

Note: Extra shims ② are stored on back side of tube plate, facing towards ground. The extra shims may be needed in the future if the hinge holes or bolts begin to wear. There are two different thickness of shims, you may use multiple shims to level wings.

5. Remove the two 3/8 x 1 1/4 bolts ① and either add more shims ② to raise wings or take shims out to lower wings.
6. Re-install bolts and tighten to specs, “**Torque Values Chart**” on page 30.
7. For best results, if at all possible, run machine at a slight angle to the rows. This will improve trash flow and allow for better dislodging of rootballs and will help spread the residue more evenly across the field.

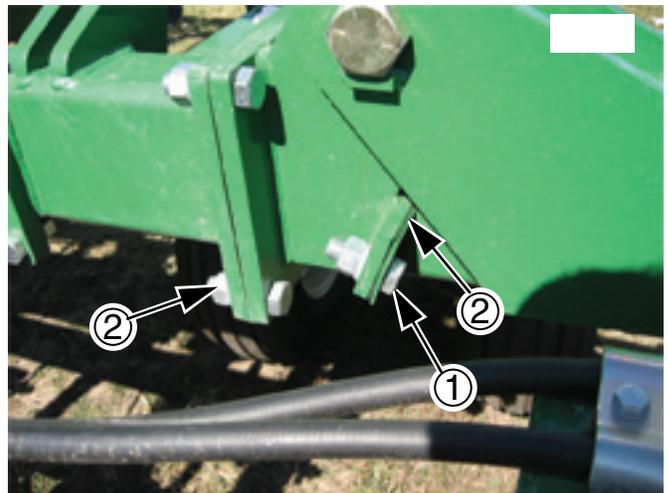


Figure 16
Wing Adjustment

41774

Refer to Figure 17

8. When you have machine level and set to the desired working depth, set the depth stop ① on the depth stop tube ②. This is located at the front of the machine. This will maintain a constant depth each time after raising and lowering machine. One full turn of the handle ③ will change the depth approximately 1/4".

Note: If after setting the depth stop, the detent on the tractor kicks out before the stop contacts the button ④ on the depth stop, slow the hydraulic flow speed down. If this problem exists, contact the factory service representative for other possible adjustments. On tractors with a timed detent setting, set the detent so when you raise the machine, the pump will run for 1/2 to 1 full second after full raise. If it runs longer than this, damage to the seals of the lift cylinders may result.

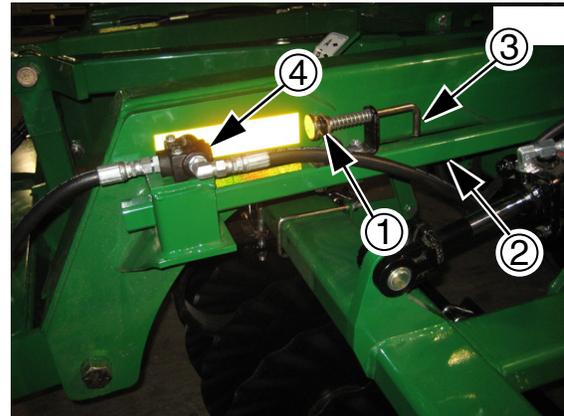


Figure 17
Depth Stop Adjustment

41984

Refer to Figure 18

9. Once the machine is set, running level both fore and aft, from side to side you are ready to run. The first part of the machine that makes contact with the soil is the turbo coulters. These can be adjusted hydraulically from the seat of the tractor. These coulters are designed to cut and size, they will also help with burying residue as the aggressive turbo blades will pick up and roll the soil.

Note: These coulters should not be run at a depth deeper than 5". Also, in very hard ground, be careful to try not to force the coulters too deep as it may try to raise the front of the machine out of the ground as this will affect the overall performance of the machine.



Figure 18
Turbo Coulters Adjustment

41984

10. The machine can be equipped with several different shank options. It is important to understand these options and how they affect the soil. See a and b for description.
- a. Toggle Trip Shanks with 7" winged point. These can run up to 11" deep and with winged points, they do an excellent job of fracturing the soil. These shanks run 2" deeper than the rear row of shanks.

- b. Spring Reset Mounts can be equipped with several different shank and point configurations. The most popular is the Parabolic Shank with a 7" winged point. This point is similar to the ones on the toggle trip shank except it has a "fin" on it that helps minimize shank "blow out". The combination of these shank assemblies and the Toggle Trip shanks provide the best combination for fracturing the ground completely while leaving the surface in a relatively "smooth" condition. By following the combination with a Chopper Reel or Buster Bar, one pass finishing in the Spring is attainable. Spring Reset Mounts can also be equipped with a Standard Chisel Shank which supports many point options. See chart below for a detailed analysis of the varying point options.

Front Row	Rear Row	Fracture	Bury Residue	Smoothness	Trash Clearance
Toggle Trip 7" Point	Auto Reset/ Parabolic w/ 7" Finned Point	Very Good	Good	Very Good	Very Good
Toggle Trip 7" Point	Auto Reset/ Chisel w/ 7" Winged Point	Very Good	Very Good	Good	Good
7" Point	Auto Reset/ Chisel w/ 2" Winged Point	Good	Very Good	Good	Good
Auto Reset/Chisel w/ 2" Straight Point	Auto Reset/ Chisel w/ 2" Straight Point	Average	Good	Poor	Good
Auto Reset/Chisel w/ 3" or 4" Twisted Point	Auto Reset/Chisel w/ 3" or 4" Twisted Point	Poor	Very Good	Very Poor	Average

Rear Attachment Settings

Rear Chopper Reel

11. The chopper reel attachment is designed to help size the soil and residue coming out of the back of the machine and level the soil surface. The reels should be run as far forward as possible without causing plugging of the reel assemblies or the machine. In wetter conditions, they may need to be moved back some to allow the soil to “settle” before coming in contact with the reels. Also in wet conditions, it is not advisable to apply down pressure on the reels as this will cause them to plug with mud.

Refer to Figure 19

12. In order to raise or lower the chopper reel assembly, adjust the eyebolt ① by loosening the jam nuts ②. Extend eyebolt to lower the assembly, retract eyebolt to raise assembly.
13. Tighten jam nuts securely.
14. To adjust the chopper reels fore and aft, remove bolt ③ and slide tubes in or out. Adjustment is 3” for each hole. The bolt may need to move from the back hole to the front hole or vice versa, depending on the amount of adjustment needed. Because of weight concerns, the choppers should run as far forward as possible while still allowing soil and residue to flow freely from the rear shanks.

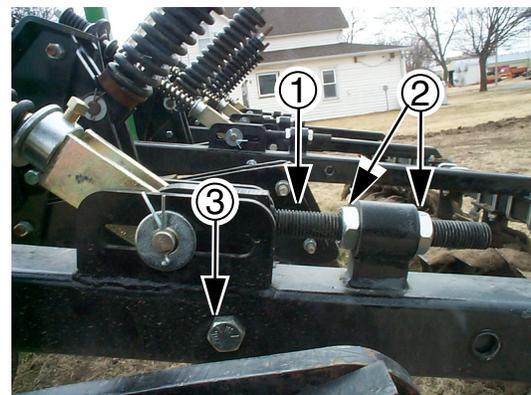


Figure 19
Chopper Reel Adjustment

4141985

Refer to Figure 20

15. The down pressure can be adjusted two ways. For slight down pressure, loosen set screw ④ from collar ⑤ and slide collar up for more pressure. Tighten set screw to secure.
16. For added down pressure, tighten lock nut ⑥ on top of spring. This will compress the bottom of the spring, increasing down pressure. This will also raise the chopper reel so you will also need to re-adjust eyebolt at the bottom of the spring bolt accordingly.

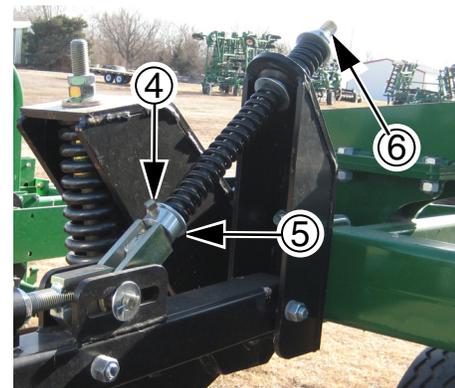


Figure 20
Chopper Reel Down Pressure

42005

Buster Bar

Refer to Figure 21

17. The buster bar attachment is designed to knock the tops of the ridges and to help fill the valleys behind the chisel shanks. The down pressure can be set by the 1/2" bolt under the arm. To adjust the pressure, loosen the jam nut on the back side and then adjust the 1/2" bolt. To increase down pressure, loosen the bolt. In some instances, especially when you are running the chisel very deep, the bolt head will not be in contact with the ball joint when the unit is out of the ground. Once the unit is lowered into the ground, the bolt head will come in contact with the ball joint and pressure will be applied. Once the proper tension is set, retighten the jam nut. There are no other adjustments to this attachment.



Figure 21
Buster Bar Settings

41989

Maintenance and Lubrication

Maintenance

1. Always use the transport lock when working on or doing maintenance to the Turbo-Chisel. If folded, be sure your wing stop pins are in place. Read and understand all safety decals on your equipment.
2. During the first season of operation, and periodically after that, check your bolts for tightness. Check shank pivot bolts for tightness. Check shank pivot bolts on the spring-loaded shank, these must remain tight to prevent excessive wear on the shank assembly.
3. Replace or rotate worn parts as needed -- hinge bolts, clevis pins, bearings, sweeps, shanks, etc.
4. Check and tighten or replace any hydraulic leaks. Check hoses for any leaks. It is important that there are no leaks on the equipment.
5. Grease wheel bearings and walking beams sparingly. Over greasing may cause damage to seals and reduce the life of the bearing. Grease hinge points periodically.
6. Check drag bolts for looseness or excessive wear. Replace broken or bent teeth. Your drag is an important part of the tillage operation.
7. If machine is stored outdoors over the winter months, it is a good idea to fold the machine then set it down

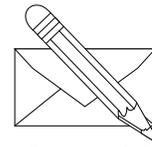
on the ground so all the cylinders are retracted to protect the cylinder rods. This will extend the life of the cylinder seals and reduce internal and external leaks.

By following and maintaining a routine service and lubrication program, your tillage equipment will give you many years of service.

For the most current manual information, visit Great Plains website listed below. For more information on operating, adjusting or maintaining your Great Plains Discovator, assistance is available. Contact:

Product Support

Great Plains Mfg. Inc., Service Department
 PO Box 5060
 Salina, KS 67402-5060



gp_web_cs@greatplainsmfg.com

(800)255-9215

Lubrication

 Multipurpose spray lube	 Multipurpose grease lube	 Multipurpose oil lube	 50	Intervals (service hours) at which lubrication is required
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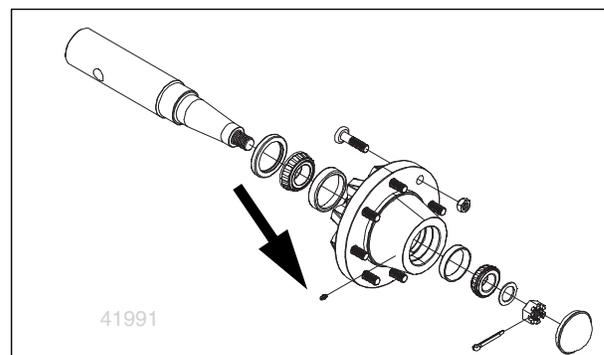
Wheel Bearing Hub

	 50
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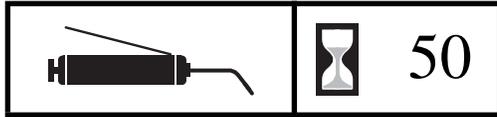
1 zerk on each hub;
 4 total

Type of Lubrication: Grease
 Quantity: Sparingly, Do Not Over Grease, may cause damage to seal.

Repack wheel bearings annually or every 2500 acres.



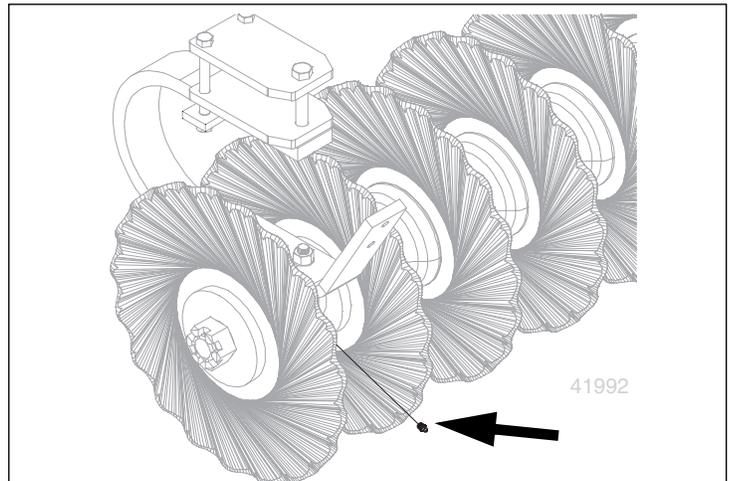
Coulter Bearings



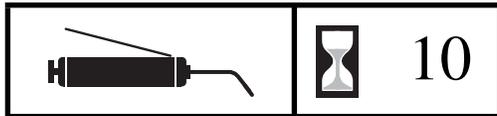
One on rear of each c-flex bearing.

Type of Lubrication: Grease

Quantity: Grease every 50 hours. In heavy conditions grease every 10 hours or daily;



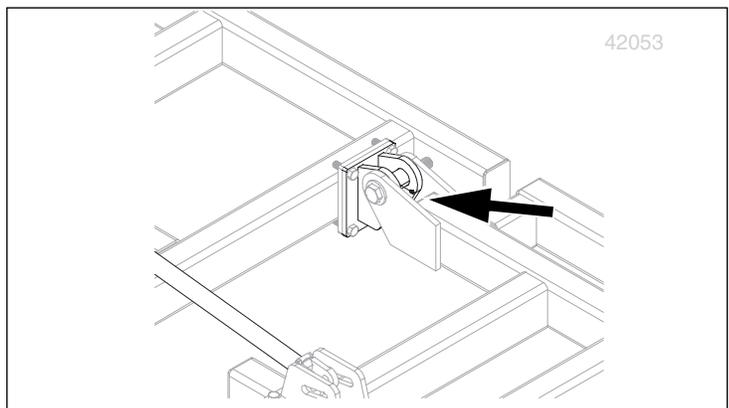
Wing Hinge



One on each wing hinge (3-Section)

Type of Lubrication: Grease

Quantity: Sparingly or 2 pumps



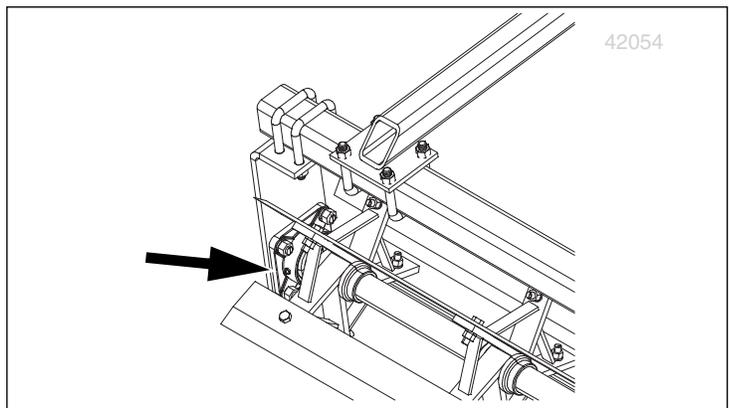
Chopper Reel (S/N A1012X-)



One on every bearing

Type of Lubrication: Grease

Quantity: Sparingly or 2 pumps





Appendix

TC Specifications and Capacities

Model No.	TC5109	TC5111	TC5113	TC5115
Tillage Width	11' 3" (3.43 m)	13' 9" (4.20 m)	16' 3" (4.95 m)	18' 9" (5.72 m)
Center Section	10' (3.05 m)	10' (3.05 m)	10' (3.05 m)	10' (3.05 m)
Wing	N/A	2' 6" (.076 m)	3' 6" (1.07)	4' 9" (1.45)
Number of Shanks	9	11	13	15
Shank Spacing	15" (.38 m)	15" (.38 m)	15" (.38 m)	15" (.38 m)
Number of Coulters	19	23	27	31
Blade Spacing	7.5" (.19 m)	7.5" (.19 m)	7.5" (.19 m)	7.5" (.19 m)
Weight (base machine)	8,080 lbs. (3665 kg)	9,835 lbs. (4461 kg)	11,240 lbs. (5098 kg)	12,600 lbs. (5715 kg)
Transport Width	11' 6" (3.50 m)	14' 3" (4.4 m)	16' 6" (5 m)	19' (5.80 m)
Transport Height	N/A	N/A	N/A	N/A
Length (w/o attachment)	22' 10" (6.95 m)	22' 10" (6.95 m)	22' 10" (6.95 m)	22' 10" (6.95 m)
Tire Size Center	12.5L x 15" 12-ply	12.5L x 15" 12-ply	12.5L x 15" 12-ply	12.5L x 15" 12-ply
Tire Size Wing	N/A	N/A	N/A	N/A
Horsepower (PTO) Chisel Shanks*	200-250	230-285	270-329	315-385
Kilowatt Chisel Shanks	150-185	170-210	200-245	235-290
Horsepower (PTO) Parabolic Shanks**	230-260	255-315	315-385	355-440
Kilowatt Parabolic Shanks	170-190	190-235	235-290	260-330

Model No.	TC5313	TC5315	TC5317	TC5319	TC5321	TC5323
Tillage Width	16' 3" (4.95 m)	18' 9" (5.72 m)	21' 3" (6.48 m)	23' 9" (7.24 m)	26' 3" (8.00 m)	28' 9" (8.76 m)
Center Section	10' (3.05 m)					
Wing	3' 6" (1.07)	4' 9" (1.45)	6' (1.83 m)	7' 3" (2.21 m)	8' 9" (2.67 m)	9' 6" (2.90 m)
Number of Shanks	13	15	17	19	21	23
Shank Spacing	15" (.38 m)					
Number of Coulters	27	31	35	39	43	47
Blade Spacing	7.5" (.19 m)					
Weight (base machine)	11,280 lbs. (5117 kg)	12,900 lbs. (5851 kg)	13,700 lbs. (6214 kg)	14,200 lbs. (6441 kg)	15,650 lbs. (7099 kg)	16,250 lbs. (7371 kg)
Transport Width	14' 6" (4.42 m)	14' 6" (4.42 m)	14' 9" (4.50 m)			
Transport Height	9' 6" (2.90 m)	10' 3" (3.12 m)	11' (3.35 m)	12' 3" (3.73 m)	13' 6" (4.11 m)	14' 6" (4.42 m)
Length (w/o attachment)	22' 10" (6.95 m)					
Tire Size Center	12.5L x 15" 12-ply	12.5L x 15" 12-ply	12.5L x 15" F-ply			
Tire Size Wing	N/A	N/A	12.5L x 15" 12-ply			
Horsepower (PTO) Chisel Shanks*	270-329	315-385	355-440	397-468	440-510	497+
Kilowatt Chisel Shanks	200-245	235-290	260-330	295-350	325-380	370+
Horsepower (PTO) Parabolic Shanks**	315-385	355-440	425-500	450-530	568+	N/A
Kilowatt Parabolic Shanks	235-290	260-330	320-370	335-395	425+	N/A

* Available with 2" straight or 3" twisted points on chisel shanks

** Equipped with 7" winged points on parabolic shanks

With a continued commitment to constantly improving our products, these specifications are subject to change without notice.

Tire Inflation Chart

Tire Inflation Chart		
Wheel	Tire Size	Inflation
Transport	12.5L x 15" F-Ply	620 kPa 90 psi
Transport/ Wings	12.5L x 15" 12-Ply	379 kPa 55 psi

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
Galaxy	www.atgtire.com
BKT	www.bkt-tire.com

Hydraulic Connectors and Torque

Refer to Figure 22 (a hypothetical fitting)

Leave any protective caps in place until immediately prior to making a connection.

- ① **NPT** - National Pipe Thread
Note tapered threads, no cone/flare, and no O-ring.
Apply liquid pipe sealant for hydraulic applications.
Do not use tape sealant, which can clog a filter and/or plug an orifice.
- ② **JIC** - Joint Industry Conference (SAE J514)
Note straight threads ④ and the 37° cone ⑤ on "M" fittings (or 37° flare on "F" fittings).
Use no sealants (tape or liquid) on JIC fittings.
- ③ **ORB** - O-Ring Boss (SAE J514)
Note straight threads ⑤ and elastomer O-Ring ⑦.
Prior to installation, to prevent abrasion during tightening, lubricate O-Ring with clean hydraulic fluid.
Use no sealants (tape or liquid) on ORB fittings.
ORB fittings that need orientation, such as the ell depicted, also have a washer ⑧ and jam nut ⑨ ("adjustable thread port stud"). Back jam nut away from washer. Thread fitting into receptacle until O-Ring contacts seat. Unscrew fitting to desired orientation. Tighten jam nut to torque specification.

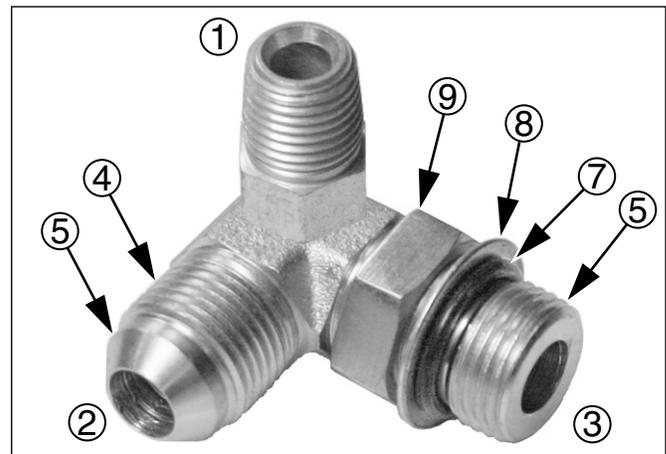


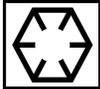
Figure 22
Hydraulic Connector ID

31282

Fittings Torque Values

Dash Size	Fitting	N-m	Ft-Lbs
-4	1/4"-18 NPT	1.5-3.0 turns past finger tight	
-5	1/2"-20 JIC	19-20	14-15
-5	1/2"-20 ORB w/jam nut	12-16	9-12
-5	1/2"-20 ORB straight	19-26	14-19
-6	5/16"-18 JIC	24-27	18-20
-6	5/16"-18 ORB w/jam nut	16-22	12-16
-6	5/16"-18 ORB straight	24-33	18-24
-8	3/4"-16 JIC	37-53	27-39
-8	3/4"-16 ORB w/jam nut	27-41	20-30
-8	3/4"-16 ORB straight	37-58	27-43

Torque Values Chart

Bolt Size in-tpi ^a	Bolt Head Identification					
						
	Grade 2		Grade 5		Grade 8	
	N-m ^b	ft-lb ^d	N-m	ft-lb	N-m	ft-lb
1/4-20	7.4	5.6	11	8	16	12
1/4-28	8.5	6	13	10	18	14
5/16-18	15	11	24	17	33	25
5/16-24	17	13	26	19	37	27
3/8-16	27	20	42	31	59	44
3/8-24	31	22	47	35	67	49
7/16-14	43	32	67	49	95	70
7/16-20	49	36	75	55	105	78
1/2-13	66	49	105	76	145	105
1/2-20	75	55	115	85	165	120
9/16-12	95	70	150	110	210	155
9/16-18	105	79	165	120	235	170
5/8-11	130	97	205	150	285	210
5/8-18	150	110	230	170	325	240
3/4-10	235	170	360	265	510	375
3/4-16	260	190	405	295	570	420
7/8-9	225	165	585	430	820	605
7/8-14	250	185	640	475	905	670
1-8	340	250	875	645	1230	910
1-12	370	275	955	705	1350	995
1 1/8-7	480	355	1080	795	1750	1290
1 1/8-12	540	395	1210	890	1960	1440
1 1/4-7	680	500	1520	1120	2460	1820
1 1/4-12	750	555	1680	1240	2730	2010
1 3/8-6	890	655	1990	1470	3230	2380
1 3/8-12	1010	745	2270	1670	3680	2710
1 1/2-6	1180	870	2640	1950	4290	3160
1 1/2-12	1330	980	2970	2190	4820	3560

Bolt Size mm x pitch ^c	Bolt Head Identification					
						
	Class 5.8		Class 8.8		Class 10.9	
	N-m	ft-lb	N-m	ft-lb	N-m	ft-lb
M 5 X 0.8	4	3	6	5	9	7
M 6 X 1	7	5	11	8	15	11
M 8 X 1.25	17	12	26	19	36	27
M 8 X 1	18	13	28	21	39	29
M10 X 1.5	33	24	52	39	72	53
M10 X 0.75	39	29	61	45	85	62
M12 X 1.75	58	42	91	67	125	93
M12 X 1.5	60	44	95	70	130	97
M12 X 1	90	66	105	77	145	105
M14 X 2	92	68	145	105	200	150
M14 X 1.5	99	73	155	115	215	160
M16 X 2	145	105	225	165	315	230
M16 X 1.5	155	115	240	180	335	245
M18 X 2.5	195	145	310	230	405	300
M18 X 1.5	220	165	350	260	485	355
M20 X 2.5	280	205	440	325	610	450
M20 X 1.5	310	230	650	480	900	665
M24 X 3	480	355	760	560	1050	780
M24 X 2	525	390	830	610	1150	845
M30 X 3.5	960	705	1510	1120	2100	1550
M30 X 2	1060	785	1680	1240	2320	1710
M36 X 3.5	1730	1270	2650	1950	3660	2700
M36 X 2	1880	1380	2960	2190	4100	3220

- a. in-tpi = nominal thread diameter in inches-threads per inch
- b. N-m = newton-meters
- c. mm x pitch = nominal thread diameter in mm x thread pitch
- d. ft-lb = foot pounds

Torque tolerance + 0%, -15% of torquing values. Unless otherwise specified use torque values listed above.

25199

Gang Bolt Torque 1 3/4"-5 1288 N-m (850 ft-lb (165 lbs on 5' cheater).
 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)
 Chopper Hub Spindle Torque 7/8-9 350 ft-lbs

Warranty

Great Plains Manufacturing, Incorporated warrants to the original purchaser that this tillage equipment will be free from defects in material and workmanship for a period of one year from the date of original purchase when used as intended and under normal service and conditions for personal use; 90 days for commercial or rental purposes. This Warranty is limited to the replacement of any defective part by Great Plains Manufacturing, Incorporated and the installation by the dealer of any such replacement part. Great Plains reserves the right to inspect any equipment or part which are claimed to have been defective in material or workmanship.

This Warranty does not apply to any part or product which in Great Plains' judgement shall have been misused or damaged by accident or lack of normal maintenance or care, or which has been repaired or altered in a way which adversely affects its performance or reliability, or which has been used for a purpose for which the product is not designed. This Warranty shall not apply if the product is towed at a speed in excess of 20 miles per hour.

Claims under this Warranty must be made to the dealer which originally sold the product and all warranty adjustments must be made through such dealer. Great Plains reserves the right to make changes in materials or design of the product at any time without notice.

This Warranty shall not be interpreted to render Great Plains liable for damages of any kind, direct, consequential, or contingent, to property. Furthermore, Great Plains shall not be liable for damages resulting from any cause beyond its reasonable control. This Warranty does not extend to loss of crops, losses caused by harvest delays or any expense or loss for labor, supplies, rental machinery or for any other reason.

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 Warranty is not valid unless registered with Great Plains Manufacturing, Incorporated within 10 days from the date of original purchase.

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