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.
ENG  If you require a copy of this document in your native language please contact your dealer or Great Plains International (166-372M-ENG)

CZE  Požadujete-li kopii tohoto dokumentu ve svém rodném jazyce, obraťte se prosím na svého prodejce nebo na společnost Great Plains International (166-372M-CZE)

HUN  Ha szeretné ezt a leírást magyarul is megkapni, kérjük, értesítse a forgalmazóját vagy a Great Plains International (166-372M-HUN)

FRA  Pour obtenir un exemplaire du présent document dans la langue de votre choix, veuillez contacter votre représentant ou Great Plains International (166-372M-FRA)

LIT  Jei prireiktų šio dokumento kopijos Jūsų gimtajai kalba, kreipkitės į savo platintoją arba į „Great Plains International“ (166-372M-LIT)

BUL  Ако ви е необходимо копие на този документ на родния ви език, моля да се обърнете към вашия дилър или към Great Plains International (166-372M-BUL)

RUM  Dacă aveți nevoie de o copie a acestui document în limba dumneavoastră natală vă rugăm să vă contactați dealerul sau Great Plains International (166-372M-RUM)

RUS  Чтобы получить копию данного документа на вашем родном языке, обратитесь к своему дилеру или в компанию «Great Plains International» (166-372M-RUS)

GER  Wenn Sie ein Exemplar dieses Dokuments in Ihrer Muttersprache brauchen, dann wenden Sie sich bitte an Ihren Händler oder an die Great Plains International (166-372M-GER)
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.

| Model Number |  |
| Serial Number |  |
| Machine Height |  |
| Machine Length |  |
| Machine Width |  |
| Machine Weight |  |
| Year of Construction |  |
| Delivery Date |  |
| First Operation |  |
| Accessories |  |
|  |  |
|  |  |
|  |  |

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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Brand and Product Names that appear and are owned by others are trademarks of their respective owners.

Printed in the United States of America
Equipment Identification

This Operator manual applies to the following Great Plains pull-type primary vertical tillage chisels:

<table>
<thead>
<tr>
<th>Model</th>
<th>Working Width m</th>
<th>Shanks</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCN5107</td>
<td>2.7m</td>
<td>7-shank</td>
</tr>
<tr>
<td>TCN5309</td>
<td>3.43m</td>
<td>9-shank</td>
</tr>
<tr>
<td>TCN5311</td>
<td>4.19m</td>
<td>11-shank</td>
</tr>
<tr>
<td>TCN5313</td>
<td>4.95m</td>
<td>13-shank</td>
</tr>
</tbody>
</table>

See “TCN Specifications and Capacities” on page 60 for precise swath information.

Refer to Figure 1

For positive equipment identification, consult the machine label located on the top of the left hand hitch truss, near the single point depth control.

Export Models 5107-5313

Models TCN5107, TCN5309, TCN5311 and TCN5313 can be built to European regulatory and highway transport standards. The machine can also be built to North American regulatory and highway transport standards, depending on which light option package is purchased.

Refer to Figure 2 (which is NOT from an actual machine)

The machine label provides data which is specific to your machine as originally shipped from the factory.

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 no longer are accurate for your machine. Update the Record on the next page upon modifications.

See “Transporting the Turbo-Chisel” on page 31 and “TCN Specifications and Capacities” on page 60 for additional weights and measurements.
Machine Record

Machine Details
Record your machine details in the Log at right. If you replace this manual, be sure to transfer this information to the similar page of the new manual.

If you add or remove Options, update the Log. If the page cannot be legibly updated, request or print a new Operator manual.

Dealer Information

<table>
<thead>
<tr>
<th>My Customer Number / ID</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dealer Name</td>
<td></td>
</tr>
<tr>
<td>Street</td>
<td></td>
</tr>
<tr>
<td>Place</td>
<td></td>
</tr>
<tr>
<td>Post Code</td>
<td></td>
</tr>
<tr>
<td>Country</td>
<td></td>
</tr>
<tr>
<td>Voice</td>
<td></td>
</tr>
<tr>
<td>Fax</td>
<td></td>
</tr>
<tr>
<td>Web</td>
<td></td>
</tr>
<tr>
<td>Email</td>
<td></td>
</tr>
</tbody>
</table>

Great Plains Regional Agent
(If different than those on page 4)

<table>
<thead>
<tr>
<th>Agent</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Street</td>
<td></td>
</tr>
<tr>
<td>Place</td>
<td></td>
</tr>
<tr>
<td>Post Code</td>
<td></td>
</tr>
<tr>
<td>Country</td>
<td></td>
</tr>
</tbody>
</table>

Machine Log

<table>
<thead>
<tr>
<th>Machine Model</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial Number</td>
<td></td>
</tr>
<tr>
<td>Working Width</td>
<td></td>
</tr>
<tr>
<td>Transport Width</td>
<td></td>
</tr>
<tr>
<td>Maximum Gross Weight</td>
<td></td>
</tr>
<tr>
<td>Maximum Axle Load</td>
<td></td>
</tr>
<tr>
<td>Year of Manufacture</td>
<td></td>
</tr>
<tr>
<td>Date of Delivery</td>
<td></td>
</tr>
<tr>
<td>Date in Service</td>
<td></td>
</tr>
<tr>
<td>Options</td>
<td></td>
</tr>
</tbody>
</table>
Introduction

Great Plains welcomes you to its growing family of new product owners. Your Turbo-Chisel TCN5107-5313 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.

Before placing the machine into service for the first time, read and understand this manual, in particular the “Important Safety Information”, pages 5 to 8. Have all operators read this manual before allowing them to work with the machine.

Description of Unit

The TCN5107, TCN5309, TCN5311 and TCN5313 are pull-type primary vertical tillage chisels. The TCN 5107 is a one section machine for narrow (3m) transport. The TCN5309, TCN5311 and TCN5313 are three section machines that fold for narrow (3m) transport.

A row of hydraulic-adjustable Turbo coulters fractures the ground 7-15 cm directly ahead of the shanks.

Two rows of shanks on 76.2 cm centers allows for residue to flow through the machine. The effective spacing of the two rows of shanks is 38.1 cm. The shanks can fracture the ground up to 30.5 cm deep.

The TCN models offer optional shank configurations. The configurations can have heavy duty parabolic shanks, medium duty parabolic shanks and/or chisels shanks.

The chopper wheel or buster bar are the two optional TCN finishing attachments. Finishing attachments are placed behind the last row of shanks to level the soil.

An optional rear hitch is available for pulling implement/tanks that do not impose high vertical loads on the hitch, e.g., vertical load < 350kg.

Brakes are optional on TCN models. Service brakes are operated by air or hydraulic lines to the tractor. Chock blocks are provided in both brake options to prevent movement of the machine while not connected to the tractor. Chock blocks are manually placed.

Do not modify the TCN except as instructed by Great Plains. Do not use attachments other than as provided by or authorized by Great Plains.
Using This Manual
This manual will familiarize you with safety, hitching, operation, adjustments, troubleshooting, and maintenance. Read this manual and follow the recommendations to help ensure safe and efficient operation.

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

Document Family

<table>
<thead>
<tr>
<th>Document Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>566-170Q-ENG</td>
<td>Assembly Manual</td>
</tr>
<tr>
<td>566-170Q</td>
<td>Pre-Delivery Manual</td>
</tr>
<tr>
<td>566-170M</td>
<td>Operator Manual (this document)</td>
</tr>
<tr>
<td>566-170P</td>
<td>Parts Manual</td>
</tr>
</tbody>
</table>

Definitions
Safety admonishment signal words are described on page 5. The following terms are used throughout this manual.

**NOTICE**

Identifies an Economic (not a Safety) Risk:
NOTICE provides a crucial point of information related to the current topic. Read and follow the instructions to avoid damage to equipment and ensure desired field results.

This form sets off useful information related to the current topic, or forestalls possible misunderstanding.

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.

Your machine’s parts were specially designed and should only be replaced with Great Plains parts. Always use the serial and model number (page 1) when ordering parts from your Great Plains dealer.

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.

For further assistance contact Great Plains via the Agent recorded on page 2, or at:

**For U.K. and Europe**
SIMBA Great Plains
Woodbridge Road Ind. East
Sleaford
Lincolnshire NG34 7EW England

Voice:+44 (0) 1529 304654
Fax:+44 (0) 1529 413468
Email:simba.international@simba.co.uk

**For Other Regions**
Plains Manufacturing, Inc.
PO Box 5060
Salina KS 67402-5060 USA

Voice:+(800)255-9215
Fax:+1 785-822-6722
Email:gp_web_cs@greatplainsmfg.com
Important Safety Information

Look for Safety Symbol

The SAFETY ALERT SYMBOL\(^1\) 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, and the colour Safety Red, indicate an imminent hazard 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, and the colour Safety Orange, indicate a potential hazard 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, and the colour Safety Yellow, indicate a potential hazard which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Prepare for Emergencies

\(\square\)
Be prepared if a fire starts
\(\square\)
Keep a first aid kit and fire extinguisher handy.
\(\square\)
Keep emergency numbers for doctor, ambulance, hospital and fire department near phone.

Be Familiar with Safety Decals

\(\square\)
Read and understand “Safety Decals” on page 9, thoroughly.
\(\square\)
Read all instructions noted on the decals.
\(\square\)
Keep decals clean. Replace damaged, faded and illegible decals.

---

1. Symbols and colours in this manual, and on north american models, are based on ANSI standard Z535. Decals on international models are based on ISO standard 3864.
Wear Protective Equipment

▲ Wear protective clothing and equipment.
▲ Wear clothing and equipment appropriate for the job. Avoid loose-fitting clothing.
▲ Because prolonged exposure to loud noise can cause hearing impairment or hearing loss, wear suitable hearing protection such as earmuffs or earplugs.
▲ Because operating equipment safely requires your full attention, avoid wearing entertainment headphones while operating machinery.

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.
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.

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 30 kph. Some rough terrains require a slower speed. Sudden braking can cause a towed load to swerve and upset.

▲ Do not exceed 30 kph or 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.
▲ Comply with national, regional and local laws.
▲ 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 “TCN Specifications and Capacities” on page 60.
▲ Reduce speed on rough roads.
▲ 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.
Practice Safe Maintenance

▲ Understand procedure before doing work. Use proper tools and equipment. Refer to this manual. For brake work, see specific safety information beginning on page 48.
▲ Work in a clean, dry area.
▲ Unfold and lower the implement, put tractor in park, turn off engine, and remove key before performing maintenance. If work must be performed with implement raised, use centre section lift lock and gauge lock channels provided.
▲ Make sure all moving parts have stopped and all system pressure is relieved.
▲ Allow machine to cool completely.
▲ Disconnect battery ground cable (-) before servicing or adjusting electrical systems.
▲ Welding: Disconnect battery ground. Protect hydraulic lines. Avoid fumes from heated paint.
▲ 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 Turbo-Chisel 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 the 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 area.

Accident Prevention

▲ In addition to the Operating Instructions, it is important to observe the accident prevention regulations specified by agricultural trade associations. It is the Operator’s responsibility to ensure that all other persons are excluded from danger zones surrounding or on the machine during its operation.
It is the Owner’s Responsibility to Ensure;

▲ The Operator is trained and competent to use the machine and tractor.
▲ The tractor is suitable for the machine.
▲ Adequate Risk and COSHH assessments have been undertaken regarding the machine’s use. Specifically, these include issues concerning contact with the soil, crop residues, chemicals, lubricants and other compounds during operation, maintenance, and the possibility of stones being ejected at high speed during work.

⚠️ DANGER

Beware of trapping hazards when manipulating the parking jacks, shut-off valves, wheel chocks, or other moving parts. Ensure any heavy components are fully supported when removing pins/bolts.

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.
**Reflectors: Slow Moving Vehicle (SMV)**

**International**: 818-055C  
**North America**: 818-055C

On the back of SMV post;  
1 total

---

**Reflectors: Red Triangles**

**International**: 833-399C  
**North America**: n/a

(North American models use 818-055C SMV reflectors, 838-614C red reflectors & 838-615C amber reflectors.)
Reflectors: Fluorescent Panels
International: 833-398C  North America: n/a
One each side, front frame, one each side, rear; 4 panels total

Reflectors: Red
International: n/a  North America: 838-614C
On rear of light bracelets both sides (above Orange); 2 total

Reflectors: Orange
International: n/a  North America: 838-603C
On rear of light brackets, both sides (below Reds); 2 total
Reflectors: Amber
International: 838-615C  North America: 838-615C

One on outside of center frame, one on front of light bracket, plate (rear), one on outside of center frame, plate (rear), one on outside of center frame, trusses (front) (both sides), two on optional rear finishing trusses (front) (both sides), two attachment (not shown, visible), optional rear finishing from side while folded, for attachment (not shown, visible), transport; from side while folded for transport; 6 total
8 total

Transport: Speed
International: 848-398C  North America: 818-188C

30 km/h

On speed limit braced, rear of center frame; 1 total
On front of left truss (2nd from top); 1 total

To Prevent Serious Injury or Death:
EXCESSIVE SPEED HAZARD

Do Not exceed 20 mph maximum transport speed. Loss of vehicle control and/or machine can result.

41972

42325

41971

42154
Transport: Wheel Chock (Option)

International: 848-757C North America: 848-757C

Front angled tube of center frame, near wheel chocks (both sides);
2 total

Warning: Tongue Rising

International: 848-511C North America: 838-606C

Front of hitch (rear);
1 total

Danger: Crush

International: 848-513C North America: 838-600C

Front of hitch (front);
1 total
**Danger: Electrocution**  
*International: 848-516C  North America: 838-599C*  
![Danger Electrocution](image)

On front of left truss (3rd from top);  
1 total

---

**Warning: Wing Crushing**  
*International: 848-530C  North America: 838-602C*  
![Warning Wing Crushing](image)

Outside of wing stop tube; Outside center frame angle tube, front (both sides);  
4 total  
4 total

---

**Warning: High Pressure Fluid**  
*International: 848-517C  North America: 838-094C*  
![Warning High Pressure Fluid](image)

Front of hitch (middle);  
1 total
**Warning: Hand Pinch**

International: 848-531C  
North America: 838-611C

Front side of center frame (left & right side); 2 total

![Diagram of Warning: Hand Pinch]

**Caution: Read Operator Manual**

International: 848-512C  
North America: 838-598C

On front of left truss (top), outside cylinder mount bar; 3 total

![Diagram of Caution: Read Operator Manual]

**Caution: Tires Not A Step**

International: 848-507C  
North America: 818-398C

On outside of truss, and center frame angled tube (both sides); 4 total

![Diagram of Caution: Tires Not A Step]
**Notice: Transport Lock**

International: 848-512C    North America: 838-613C

Outside of cylinder mount bar (both sides);
2 total

**Danger: Cutting of Foot**

International: 848-781C    North America: 848-271C

On front of left truss (bottom);
1 total
Preparation and Setup

This section helps you prepare your tractor and TCN5107, TCN5309, TCN5311, or TCN5313 for use, and covers seasonal tasks, and tasks when the tractor/Turbo-Chisel configuration changes.

Before using the TCN5107, TCN5309, TCN5311, or TCN5313 in the field, you must hitch the Turbo-Chisel 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.

Initial Setup

See “First Time Field Adjustments” on page 37 and “Hitching a Trailing Implement (Optional)” on page 36 for pre-delivery items (normally completed by dealer), and first-time/infrequent setup tasks, including:
- Remove protective film from large highway reflectors.

Seasonal Setup

On initial delivery, use with a new tractor, and seasonally, check and as necessary, complete these items before continuing to the routine setup items:
- Bleed hydraulic system (page 30).
- Wing leveling and alignment (page 38).
- De-grease exposed cylinder rods if so protected at last storage.

Pre-Tilling Setup

Complete this checklist before routine setup:
- Read and understand “Important Safety Information” on page 5.
- 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 “Hydraulic Hose Hookup” on page 21.
- If machine is folded, open the two, lock valves on rod end of fold cylinders and 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, remove both transport locks from lift cylinders, raise and lower the Turbo-Chisel 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 and Scheduled Maintenance” on page 48. 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 9.
- Inflate tires to pressure recommended and tighten wheel bolts as specified. See “Tire Inflation Chart” on page 61.
- Put transport locks back in place on lift cylinders and re-fold the machine slowly. Close the two lock valves on rod end of fold cylinders. Always use the transport locks and close lock valves when moving from field to field. You are now ready to go to the field.
Hitching Tractor to Turbo-Chisel

⚠️ DANGER  

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

**Improper Pull Hazard:**
Severe injury or death may result if improper transport vehicle is used. Hitch to 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 of the towing tractor or implement.

For hillsides and steep slopes, set tractor wheels as wide as possible for maximum stability.

**Negative Tongue Weight Hazard:**
If the rear parking jack is not set, an unhitched Turbo-Chisel can tip over backwards during hitching and unhitching resulting in severe injury or death. If the Turbo-Chisel has a rear attachment make sure the rear parking jack is in the parking position, before attempting to hitch or unhitch from the tractor.

⚠️ NOTICE  

**Hitch Failure Risk:**
The TCN5107-5313 Turbo-Chisel’s are pull-type implements equipped with standard Category IV single tang hitch. It may be converted to a Category III or clevis hitch using supplied accessory parts. Always have two (2) bolts in two holes of both tongue and hitch.

**Tractor Oil Flow Adjustment Risk:**
As a general rule the tractor oil flow rate should be set to the lower setting before starting. Oil flow can be increased to allow the desired rate of operation as applicable. Performing the adjustment will minimise excessive oil flow and consequent power usage and heat generation.

**Extended Parking Risk:**
When the TCN5107-5313 Turbo-Chisel’s are parked for extended periods of time, it should ideally be left in the unfolded, i.e work position for stability, safety and ease of access for maintenance. However, parking the TCN5107-5313 Turbo-Chisel’s in the fold position (ensuring transport locks are engaged) is acceptable in the normal course of operation.

**Drawbar Sway Risk:**
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 35, for safe transporting.
To prevent soil compaction on rows, set tractor wheels between rows. Raise tractor three-point arms (if equipped) clear up to clear Turbo-Chisel.

1. 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.

**Clevis Hitch**

Refer to Figure 4

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 GR8
   - 803-367C NUT HEX TOP LOCK 3/4-10 PLT

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

3. **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 to allow some vertical articulation of the drawbar pin. Always use at least one cushion.

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, just forward of the vertical bolt hole. Position the V-block forward of the cushions and check the size of the resulting pinning hole. Remove a cushion if needed.

3. Add the top plate. Secure from below with Grade 5 bolt.
Refer to Figure 5
4. Rear jack ① should be lowered to ground when machine is in parking position to keep machine from tipping over backwards. Adjust rear jack up off ground to allow for front jack ② to be adjusted.
5. Use front jack ② to raise and lower turbo-chisel tongue.
6. Remove hitch pin from tractor draw-bar.
8. Secure with a locking hitch pin.
9. Secure safety chain to an anchor on the tractor ④.

Refer to Figure 6
10. Retract jack foot.
11. After hitching tractor to turbo-chisel, store front jack on storage stob ⑤ on Turbo-Chisel tongue.
12. Remove pin from rear jack ① (Figure 5), move to front outside tube of center frame storage stob (Figure 6) and re-install pin.
13. Remove pin in jack stand tube ⑥ (Figure 5) and raise tube up to top hole, re-install pin.

Electrical Hookup
Refer to Figure 7
Make sure tractor is shut down with accessory power off before making connections.
14. Mate lighting connector to tractor outlet.
15. Mate any optional or after-market electrical connectors.
16. Make connections prior to TCN5107-5313 movement.
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.

**WARNING**

*High Pressure Fluid Hazard:*
Shut down tractor before making hydraulic connections.
Only trained personnel should work on system hydraulics!
Escaping fluid under pressure can have sufficient pressure to penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting 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. If an accident occurs, seek immediate medical assistance from a physician familiar with this type of injury.

**Refer to Figure 8**
To distinguish hoses on the same hydraulic circuit, refer to handle symbols.
- 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, implement or hitch. Failure to safely route and secure hoses and cables could result in damage requiring component repair/replacement, and lost field time.
Clean all hydraulic couplings and hook hoses to tractor.

<table>
<thead>
<tr>
<th>Colour</th>
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<tbody>
<tr>
<td>Black</td>
<td>Lift (2 hoses)</td>
</tr>
<tr>
<td>Green</td>
<td>Fold (2 hoses)</td>
</tr>
<tr>
<td>Red</td>
<td>Gang (2 hoses)</td>
</tr>
<tr>
<td>“BRAKES”</td>
<td>Hydraulic trailer brakes (Option)</td>
</tr>
</tbody>
</table>

Brake Hook-up (Option)

Two TCN5107-5313 braking (trailer braking) systems are available:
- Dual-line air system (*Figure 9*) with wheel chocks (*Figure 11*) for parking and
- Single-line hydraulic (*Figure 10*) with wheel chocks (*Figure 11*).

In both systems, the tractor’s trailer brake remote port(s) operate a hydraulic slave cylinder on the Turbo-Chisel.

Tractor trailer braking systems are normally integrated with the tractor brakes, and operate the trailer brakes when tractor brakes are used during tractor movement.

The trailer braking system may or may not be integrated with the tractor parking brake system.
Trailer brakes typically are not automatically engaged when the tractor transmission is in Park, and may not be engaged by any tractor Emergency Brake.

Both brake systems include four chock blocks to be manually installed for parking the TCN5107-5313. The tractor cannot set the implement wheel chocks.

**CAUTION**

**Braking Hazards:**
Make sure the operator understands when Turbo-Chisel brakes are engaged and when they are released (make a record of tractor behaviour on page 33).

Also understand and comply with tractor operational restrictions when trailer brakes are used. For example, it is generally necessary to inter-tie split brakes, and avoid differential (steering braking) if trailer brakes are used.

---

**Air Brake Hook-up**
Refer to Figure 12
17. Open petcock 1 at reservoir tank. Drain any water from tank. Close petcock.

Refer to Figure 13

19. Connect the “Brake”, “Service” or “Control” line first. This line is Blue-coded.

This line operates the Turbo-Chisel brakes.
20. Connect the “Provision” or “Supply” line. This line is Red-coded.

The Provision line charges a reservoir tank on the implement. The Brake line operates a valve system which meters tank air to the master cylinder on the implement.

**CAUTION**

**Braking Hazard:**
*Do not use the TCN5107-5313 with a “single-line” air brake system. This Turbo-Chisel is designed for transport speeds that require an air brake system to be “dual-line”. A single-line tractor system cannot charge the tank that powers the Turbo-Chisel brakes.*

**CAUTION**

**Roll-Away Hazard:**
*When unhitching, disconnect the red (control) line first. This sets the brakes on the implement.*

**Hydraulic Brake Hook-up**

Refer to Figure 14

This is a single hydraulic line, connected to the tractor “Brake” outlet.

The factory default connector is a 19 mm poppet-style QD (Quick Disconnect). If this is incompatible with your tractor, it may be replaced by a connector that mates to, or can be adapted to:

- 19 mm male ORB (O-Ring Boss), or
- 19 mm female JIC (Joint Industry Conference, 37° flare).
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 TCN5107-5313 Turbo-Chisel to the field.

- Carefully read “Important Safety Information” on page 5.
- Lubricate Turbo-Chisel as indicated under “Lubrication and Scheduled Maintenance” on page 48.
- Check all tires for proper inflation, “Tire Inflation Chart” on page 61.
- Check all bolts, pins, and fasteners. Torque as shown in “Torque Values Chart” on page 62.
- 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.
Unfolding and Folding

Unfold/Fold: Safety Information

Electrocution Hazard:
Keep clear of overhead power lines when unfolding, operating, folding or transporting the machine. Machine is not. At higher voltages, electrocution can occur without direct contact. Any line voltage present on implement, implement or tractor can cause severe injury or death.

Overhead crushing hazard:
Unfold and fold implement only if fold hydraulics are bled free of air and fully charged with hydraulic oil. Keep away and keep others away when unfolding or folding.

Danger crushing hazard:
An energized hydraulic circuit can activate the fold cylinder causing serious injury or death. Avoid the hazard by relieving pressure before shutting down the tractor and removing the key. Once the hydraulic circuit is de-energized, the shut-off valve may be opened. If an accident occurs, seek immediate medical assistance from a physician familiar with this type of injury.

Pinch Point and Crushing Hazards:
Keep people away from the implement and tractor during folding. Risks include pinching or crushing at pivot points and at multiple sites in pivoting assemblies.

Use wing fold locks. If a hydraulic failure occurs, or hydraulic levers are moved, unlocked wings could fall suddenly causing a major road accident, or crushing anything near the wings, resulting in death or serious injury, and property damage.

Falling Hazard - Tires Not a Step:
Do not use tires as steps or platforms. All tires can be in light ground contact, or free to spin, when implement is lowered.

Equipment Damage Risk:
Raise implement before unfolding or folding. Folding with implement lowered causes wing ground engaging components to dig or drag sideways. Damage is likely.

Wing Tilt Risk:
Fold only while parked on hard level ground. If unfolding across a slope or while moving, implement may become unstable and damage to implement components and surrounding property. Damage is likely.
Folding
Fold the Turbo-Chisel for moves between fields, transport over public roads, parking and storage.

Refer to Figure 15

Fold: Move to Level Ground
1. Move the implement to level ground with adequate overhead and lateral clearances for the fold operation. Park the tractor.
2. Ensure locking valves ① on both fold cylinders ② are open (parallel with side of cylinder), as shown.

Refer to Figure 16

Fold: Raise Implement (page 30)
3. Extend the lift cylinders to full raise implement. Hold at raised for a few seconds. Set circuit to Neutral. Do not install transport locks.

Fold: Fold Wings (page 26)
4. Activate the circuit to retract the fold cylinders.
   - One wing may reach the stop before the other. A slight asymmetry is not uncommon in folding.
5. When both wings are in contact with their stops. Set fold circuit to Neutral (not Float) to hold at folded.

Fold: Close Locking Valves (page 26)
Refer to Figure 17
6. At each wing, ensure the lock valves ① are in the closed position (90 degrees from side of cylinder ②) as shown.
Unfolding

These steps presume an implement raised and folded for transport, such as at initial delivery. Follow the detailed instructions in step 7 through step 15, beginning on this page, until this is a familiar operation.

Refer to Figure 18

Locking valves are on the wing cylinders to prevent wing movement during transport. Note the open and closed position of the valves.

7. Move the implement to level ground with adequate overhead and lateral clearances for the fold operation.

Remove Transport Locks

Refer to Figure 19

8. Extend lift circuit to lift implement off the transport locks ①.
9. Park tractor and implement. Ensure the tractor hydraulics are depressurized and in the locked or closed (not float) setting.
10. Shut down tractor and remove the key.
11. Inspect fold/lift cylinders linkages and hoses for wear. If parts are worn, the operator should have a qualified technician replace worn parts.
12. If parts are in good working order, move transport locks ② to the working position on lift mechanism link.
13. Move locking valve lever to the open position slowly on both fold cylinders.
14. Ensure all personal, e.g., children are out of the danger zones.
15. Insert key into tractor and restart the tractor.

NOTICE

Equipment Damage Risk:
Raise before unfolding. If this operation is not performed, the wing shanks contact the ground, drag, and may be damaged.

Unfolding: Unfold Wings (page 25)

16. Unfold the wings by extending the fold cylinders.

One wing may reach the ground before the other. It is not uncommon for the folding to be slightly non-symmetrical.

Refer to Figure 20

Hold the circuit at extended for several seconds after the wings engage wing stops on center frame.
Lift: Verify Transport Lock
Refer to Figure 21

⚠️ WARNING

Crush/Pinch Hazards:
Make sure the transport locks are engaged. Lift and re-lower if it is not. If the transport locks are not installed, install transport locks, in the transport position the implement will slowly lower after hydraulic power is removed. If anyone is working on or under the implement, this could result in serious injury or death.

Lowering and Raising Turbo-Chisel

Lowering/Raising Safety Information

⚠️ DANGER

Crushing Hazard During Lowering:
Stay clear of wings, coulters, shanks, and attachments during lowering and raising. Wings are extremely heavy and are driven down with hydraulic pressure. Coulter disk and chisel points are sharp. During lowering, coulters and chisel points will cut or crush anything beneath them, and can cause serious injury or death.

⚠️ CAUTION

Crushing Hazard While Raised:
Use transport locks (page 28) when working on implement.

Without transport locks, center section and wings are held up only by hydraulic pressure, and slowly lower over time. They may lower more rapidly if the hydraulic system is damaged. They lower rapidly if the hydraulics fail, or the Lift circuit is set to Float or Retract.

⚠️ CAUTION

Shoving Hazard:
Chisel length changes during raising and lowering. Injury is possible.

Implement wheels move forward during raising, and backward during lowering. Tractor may move in some circumstances.

Set brakes / use park to avoid tractor movement. Remain clear of all tires and row units during raise and lower.

⚠️ NOTICE

Equipment Damage Risk:
Do not lower while any folding or unfolding operations are under way or partially complete. Coulter disks and chisel points can dig in or drag on ground and be damaged.
Lowering

Refer to Figure 22

17. Check that the transport locks are not on lift cylinders and installed in storage position.

18. Unfold implement before lowering (page 27).

19. Make sure all persons are clear of danger zones, e.g., coulters and chisel points.

Refer to Figure 23

**CAUTION**

**Falling Hazard:**

*Do not stand on tires when implement is lowered as they may have little or no weight on them, and may turn suddenly and without warning if used as a step, resulting in serious injury.*
Raising

**NOTICE**

*Equipment Damage Risk:*
Raise the implement for folding and unfolding. If lowered, inside wing coulter disks and chisel points drag or dig sideways during fold/unfold, and damage is likely.

**NOTICE**

*Equipment Damage Risk:*
Always raise the implement for tight turns and reverse/backing operations. Backing with implement lowered causes implement plugging and damage to implement ground engaging components. Tight turns with implement lowered may damage ground engaging implement components.

20. Make sure all persons are safely clear of implement sections.


Refer to Figure 24

22. Extend cylinders until all sections are raised. Hold for a few seconds to re-phase cylinders.

23. Set circuit to Neutral to temporarily hold sections at raised.

Refer to Figure 25

![Transport locks are provided to hold a fold/unfold implement at fully raised position for transport, maintenance, or storage.](image)

**CAUTION**

*Unfolded Transport Locks: Wing Pinch and Crushing Hazards:*
The transport locks prevent the center section from lowering. Use transport locks to hold implement raised for extended periods. See page 27.
Transporting the Turbo-Chisel

Transport Safety Information

**CAUTION**

Collision Hazard:
Check lights and reflector regularly. Replace bulbs and faded/worn/missing decals as required. Use lights in transport. These features are critical to visibility, particularly with other drivers unfamiliar with farm equipment or not expecting to encounter a slow-moving vehicle.

- An installation of optional brakes on the implement does not reduce tractor capability requirements or increase allowed maximum transport speed.

**WARNING**

Excessive Speed Hazard:
Maximum transport speed is 30 kph at all times, and lower with a lighter tractor. Excess speed can result in loss of control or inability to stop. Reduce speeds if road conditions are less than ideal.

**CAUTION**

Unexpected Wing Tilt-Down and Lowering Hazards:
Use wing locking valves (page 26). Check that implement centre section lift lock is engaged (page 27). Failure to use these safety features can cause a major accident resulting in death, injury and equipment damage. If locks are not engaged, and a hydraulic failure occurs, or a circuit is unintentionally set to Float, wings can unfold to ground contact, or implement can settle into ground contact.

**CAUTION**

Loss of Control Hazard, Tires:
Inflate tires to factory specifications. Tighten wheel nuts to specifications. Under-inflated tires or loose nuts can cause loss of control. Over-inflated tires or overtightened nuts can fail suddenly and cause loss of control. Loss of control can cause a major accident resulting in death, injury and equipment damage.

**DANGER**

Inadequate Tractor Hazard:
Tractor must weight at least 67% of the implement as towed. 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 table on next page. Do not tow if Turbo-Chisel exceeds the load rating of the vehicle.

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.

Loss of Control Hazard, Tires:
Inflate tires to factory specifications. Tighten wheel nuts to specifications. Under-inflated tires or loose nuts can cause loss of control. Over-inflated tires or overtightened nuts can fail suddenly and cause loss of control. Loss of control can cause a major accident resulting in death, injury and equipment damage.
Tractor Requirements

The figures in the table below represent a limited number of configurations. The weight of your Turbo-Chisel can vary by hundreds of kilograms, even if it is the same base model, due to installed options and/or after-market equipment.

If your tractor weight or capability is in question, take your Turbo-Chisel to a scale and get a precise weight.

Transport Checklist

- Plan the route. Avoid steep hills. Keep clearances in mind. Folded, your TCN5107-5313 is nearly 3.12m high and is 3m wide.
- Hitch. Check that implement is securely hitched to a sufficient tractor (page 18). Always use a locking-style hitch pin sized to match holes in hitch and draw-bar, and rated for the load.
- Check that tires are properly inflated. Remember that the implement may be wider than the towing vehicle. Allow safe clearance.
- If implement is equipped with optional brakes: With tractor in Park, and with tractor parking brake set, place chock blocks in transport position (page 22).
- Always have lights on for highway operation.
- Comply with all national, regional and local safety laws when travelling on public roads.
- Release all brakes and travel with caution.

<table>
<thead>
<tr>
<th>Configuration</th>
<th>TCN5107</th>
<th>TCN5309</th>
<th>TCN5311</th>
<th>TCN5313</th>
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</table>

Weights with air brakes and EU light kit installed.
Brake Operation (option)
Implement wheel brakes are optional. There are brake shoe pairs on each of the outside transport wheels. The shoe pairs are operated by two independent systems:

1. The “service” or “trailer brake” system is controlled by the tractor. It is connected to the tractor with a single hydraulic line or two air lines.

2. The implement can be parked by manually placing chock blocks on either side of the transport tires.

See also:
page 21 - “Brake Hook-up (Option)”
page 44 - “Brake Troubleshooting (Option)”
page 48 - “Brake Maintenance (Option)”

⚠️ DANGER ⚠️

Brake Roll-Away Hazard:
Set manual chock blocks before unhitching implement. Block tires if brakes are not installed, and for extra safety in case brake system is tampered with or is not in working order. Parking jack is not sufficient restraint for a implement parked on un-level ground. An unsecured implement could roll away, causing an accident resulting in death, injury and substantial property damage.

Both versions of the trailer brake system to the tractor are spring-release on the implement. Unless the chock blocks are set, implement service braking is released shortly after unhitching the implement.

⚠️ The wheel chock system is not a true emergency brake system, as there is no safe way to set the chock blocks when the implement is in motion. This manual therefore refers to it only for parking.

Service Brake Operation
If optional brakes are installed and connected, the hydraulic/hydraulic or air/hydraulic systems automatically work in conjunction with the tractor’s own brakes.

Application and release of tractor brakes during tractor motion applies and releases the service brake system on the implement.

⚠️ CAUTION ⚠️

Know Your Tractor Systems:
Application of tractor Parking and/or Emergency brakes may or may not operate the implement service brake system, depending on the design of the tractor systems.

Consult your tractor manual for details on when remote brake ports are engaged and released. Note any variance from general behaviour in the table at right. Make sure the tractor operator knows when implement brakes are engaged and released.
Single-Line Hydraulic Brake Operation

In this system, a single hydraulic line ① from the tractor operates a de-intensifier ② cylinder on the implement, which is coupled to the implement master cylinder ③. The implement brake hydraulic lines are separate from the tractor’s line.

With the hydraulic/hydraulic system, braking is immediately available when the tractor hydraulic system is active.

Dual-Line Air/Hydraulic Brake Operation

In this system, the “supply” (yellow or blue coded) line ④ charges a reservoir air tank ⑤ on the implement. The “service” (red coded) line ⑥ meters air from the reservoir ⑤ to a booster cylinder ⑦, which operates the implement’s hydraulic brake lines ⑧.

⚠️ CAUTION

Service Air Brakes Not Instantly Available:
Prior to movement, wait for the tractor air system to reach full charge after implement hook-up. Tractor and implement reservoir tanks must be pressurized. Implement service braking may not be immediately available upon tractor hook-up with the air/hydraulic system.
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.

⚠️ **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 18).
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 18).
4. Verify correct operation of lights.
5. Instal transport locks (page 28).
6. Check that tires are properly inflated (page 61).
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.
Hitching a Trailing Implement (Optional)

Maximum rear drawbar vertical loading-350kg.

Ensure the TCN ia unfolded.

1. Raise machine to attain a suitable height to attach the trailing implement.
2. Reverse the TCN up to the implement, ensuring that the drawbars are correctly aligned allowing a slight clearance to enable the machines to be coupled together.
3. Attach the hydraulic hoses between the TCN and the implement.
4. Reverse the TCN and couple the two machines together.
5. Fully raise both machines into the road transport position. Fold the machine(s) if necessary.

CAUTION

Ensure that no fouling occurs between the TCN and the towed machine.

Any tines on the towed machine should be adjusted so that they do not engage the soil (or should be removed altogether).

Field Operation

This implement is designed to be pulled in the field with the chisel engaged (including wide 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 wide 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 chisels on the ground. If the inside tire stops or rolls backward, the turn is tight and requires lift.

Final Field Checklists

Use the following tables to develop a final checklist for your tractor/Turbo-Chisel configuration.

<table>
<thead>
<tr>
<th>Mechanical Checklist</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turbo-Chisel hitched</td>
<td>18</td>
</tr>
<tr>
<td>Hitch pin locked</td>
<td>18</td>
</tr>
<tr>
<td>Safety chain secured to tractor or leading implement</td>
<td>18</td>
</tr>
<tr>
<td>Parking jack stowed</td>
<td>18</td>
</tr>
<tr>
<td>Check all tire pressures</td>
<td>61</td>
</tr>
<tr>
<td>Transport locks and locking valves are in the field position</td>
<td>27</td>
</tr>
<tr>
<td>Implement unfolded</td>
<td>27</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>21</td>
</tr>
<tr>
<td>Inspect connections for leaks</td>
<td>-</td>
</tr>
<tr>
<td>Unfold Implement</td>
<td>27</td>
</tr>
<tr>
<td>Perform a raise and lower operation</td>
<td>25</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>20</td>
</tr>
</tbody>
</table>
Perform all steps in “Pre-Start Checklist” on page 24 and “Final Field Checklists” on page 36.

If you stop in the middle of a pass, raise the implement and back up 3m (10 ft) before resumption of tilling.

### First Pass Operation Checklist

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Implement unfolded and aligned for first pass, with coulter disks about 3m before field edge.</td>
</tr>
<tr>
<td>2.</td>
<td>Pull forward, lower Turbo-Chisel, and begin tilling for a short distance.</td>
</tr>
</tbody>
</table>
| 3.   | Stop. Assess:  
|      | • coulter depth  
|      | • shank depth  
|      | • finishing attachment operation |
| 4.   | Make necessary adjustments |

### Sharp Field Turns Checklist

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Raise Turbo-Chisel</td>
</tr>
<tr>
<td>2.</td>
<td>Make turn</td>
</tr>
<tr>
<td>3.</td>
<td>Lower Turbo-Chisel 3m before field edge</td>
</tr>
<tr>
<td>4.</td>
<td>Resume tilling.</td>
</tr>
</tbody>
</table>

### First Time Field Adjustments

#### Pre-Leveling of Machine

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

#### Front to Rear Leveling

Refer to Figure 29

1. Lower the machine until the front row of shanks are 1 to 2” above the surface. At this point, remove the snap wire pin \(\mathbb{1}\) from the turnbuckle lock \(\mathbb{2}\), swing lock off turnbuckle and adjust the hitch turnbuckle \(\mathbb{3}\) to adjust the fore and aft. The front corner of the main frame should be 1/2 to 1” lower than the rear corner.

2. Now the turnbuckle lock \(\mathbb{2}\) may be swung back onto hitch turnbuckle \(\mathbb{3}\) and the snap wire pin \(\mathbb{1}\) may be re-installed.

3. If machine needs leveled from front to rear when running in field, remove the snap wire pin \(\mathbb{1}\) from the turnbuckle lock \(\mathbb{2}\), swing lock off turnbuckle and adjust the hitch turnbuckle \(\mathbb{3}\). When done adjusting, be sure and swing turnbuckle lock back down and secure with snap wire pin.
Wing Adjustment (3-Section Wings)

Refer to Figure 30

4. Once the machine is level fore to aft, the wings may be leveled (Models 5309-5313). Start by unfolding the wings to a rigid position.

5. Completely extend the wing fold cylinders and check the wings for levelness. If machine is not level, fold wings back up, close the locking valves, and install shims as needed to level.

Extra shims are stored in manual pak. 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.

6. Remove the two 3/8 x 1 1/4 bolts and either add more shims to raise wings or take shims out to lower wings.


8. If machine is not level when fold cylinders are completely extended and running in the field, repeat same procedure to level wings.

Refer to Figure 31

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

General Operation and In-Field Adjustments

1. Remove the transport pins, see “Brake Hook-up (Option)” on page 21 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 32

3. When you have machine level and set to the desired working depth, set the depth stop \( \cap \) on the depth stop tube \( \cup \). 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 \( \odot \) will change the depth approximately 0.64cm (0.25in).

If after setting the depth stop, the detent on the tractor kicks out before the stop contacts the button \( \mathbb{D} \) 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.

Refer to Figure 33

4. 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.

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.

5. 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 3” deeper than the rear row of shanks. In certain conditions, such as spring chiseling, shallower chiseling depths are desired. The front shanks can be adjusted up 3” so they are at the same operating depth as the rear shanks. This will allow 6-8” chiseling depths with all shanks operating at the same depth.
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.

<table>
<thead>
<tr>
<th>Front Row</th>
<th>Rear Row</th>
<th>Fracture</th>
<th>Bury Residue</th>
<th>Smoothness</th>
<th>Trash Clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toggle Trip 7” Point</td>
<td>Auto Reset/ Parabolic w/ 7” Finned Point</td>
<td>Very Good</td>
<td>Good</td>
<td>Very Good</td>
<td>Very Good</td>
</tr>
<tr>
<td>Toggle Trip 7” Point</td>
<td>Auto Reset/ Chisel w/ 7” Winged Point</td>
<td>Very Good</td>
<td>Very Good</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>7” Point</td>
<td>Auto Reset/ Chisel w/ 2” Winged Point</td>
<td>Good</td>
<td>Very Good</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Auto Reset/Chisel w/ 2” Straight Point</td>
<td>Auto Reset/ Chisel w/ 2” Winged Point</td>
<td>Average</td>
<td>Good</td>
<td>Poor</td>
<td>Good</td>
</tr>
<tr>
<td>Auto Reset/Chisel w/ 3” or 4” Twisted Point</td>
<td>Auto Reset/Chisel w/ 3” or 4” Twisted Point</td>
<td>Poor</td>
<td>Very Good</td>
<td>Very Poor</td>
<td>Average</td>
</tr>
</tbody>
</table>

Rear Attachment Settings

Rear Chopper Reel

6. 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 34

7. In order to raise or lower the chopper reel assembly, adjust the eyebolt \( \odot \) by loosening the jam nuts \( \odot \). Extend eyebolt to lower the assembly, retract eyebolt to raise assembly.

8. Tighten jam nuts securely.

9. To adjust the chopper reels fore and aft, remove bolt \( \odot \) 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.

Refer to Figure 35

10. The down pressure can be adjusted two ways. For slight down pressure, loosen set screw \( \odot \) from collar \( \odot \) and slide collar up for more pressure. Tighten set screw to secure.

11. For added down pressure, tighten lock nut \( \odot \) 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.

**Buster Bar**

Refer to Figure 36

12. 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.
Parking

Follow these steps when parking the implement for periods of less than 36 hours. For longer periods, see Storage, the next topic.

1. Position the implement on firm, level ground.
2. Raise, fold and lock implement (page 28 and page 25).

⚠️ Static tongue weight of a loaded, lowered, and unhitched implement can be as much as 225 kg.

⚠️ **Negative Tongue Weight Hazard:**
If the rear parking jack is not set, an unhitched Turbo-Chisel can tip over backwards during hitching and unhitching resulting in severe injury or death. If the Turbo-Chisel has a rear attachment, make sure the rear parking jack is in the parking position, before attempting to hitch or unhitch from tractor.

Refer to Figure 37

3. Remove jack from storage position and pin securely to lifting stob on outside of implement tongue ①. See “Hitching Tractor to Turbo-Chisel” on page 18.
4. If an attachment is installed, remove rear jack from storage position and pin securely to rear jack stand on the rear of the implement ②. Adjust the jack stand to allow the jack to engage the ground.
5. If ground is soft, place a wide block or plate under the jack or jacks to increase contact area.
6. Securely install chock blocks to prevent jack from digging or sliding off plate.
7. For dual line air brakes, disconnect the red (control) gladhand connector first, at the tractor, then the blue supply connector, and store each connector in its matching colour-coded gladhand holder on the implement.
8. Un-hook electrical lines and protect with any plugs or caps provided.
9. Release pressure on hydraulic system, then disconnect hydraulic lines and pull all lines back onto implement tongue. Store hoses ends in keyholes of hose holder bracket.
10. Disconnect hydraulic brake line (option).
11. Disconnect the safety chain.
12. Unhitch from tractor or leading implement.
Storage
Store the implement where children do not play. If possible, store inside for longer life.

1. Raise, fold and lock implement (page 28 and page 25).
   For unfolded storage, see steps at right.
2. Perform Parking checklist (page 42).
3. If equipped with optional air/hydraulic brake system, drain water from reservoir (page 48).
4. Lubricate the implement at all points listed under “Lubrication and Scheduled Maintenance” on page 48.
5. Check all bolts, pins, fittings and hoses. Tighten, repair or replace parts as needed.
6. Check all moving parts for wear or damage. Make notes of any parts needing repair or replacement before the next season.
7. Lubricate all points listed in Maintenance to prevent rust.
8. Clean Turbo-Chisel of mud, dirt, excess oil and grease.
9. Grease exposed cylinder rods to prevent rust.
10. Use touch-up paint to cover scratches, chips and worn areas to prevent rust.

Unfolded Storage
See page 28 for details on maintenance lock.

1a. Raise implement.
1b. Verify the transport locks are in the transport position.
1c. Be sure hydraulics are depressurized. Adjust locking valves to the open position. Unfold wings until wing is resting on shims.
1d. Lower implement onto lock channels.
1e. Set all hydraulic remotes to Float.
# Troubleshooting

## Brake Troubleshooting (Option)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Causes</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoke or odd burning odour from axle area</td>
<td>Overheated brakes, typically on long steep hills</td>
<td>Stop immediately. Wait for brakes to cool completely. Moderate downhill speed by using lower gear and frequent full stops. Check brake components for heat distortion.</td>
</tr>
<tr>
<td></td>
<td>New brakes may exhibit slight smoking or odours until linings seat on drums.</td>
<td>Check brakes if problem persists, or braking action is insufficient.</td>
</tr>
<tr>
<td>Braking insufficient, one wheel</td>
<td>Tire under-inflated.</td>
<td>Inflate all tires to specification.</td>
</tr>
<tr>
<td></td>
<td>Worn brake linings and/or drum</td>
<td>Service brakes.</td>
</tr>
<tr>
<td></td>
<td>Worn or leaking brake cylinder</td>
<td>Rebuild or replace cylinder.</td>
</tr>
<tr>
<td></td>
<td>Grease or oil on linings</td>
<td>Correct problem causing contamination. Service brakes.</td>
</tr>
<tr>
<td></td>
<td>Brake adjuster not adjusting</td>
<td>Ice or dried mud can freeze mechanism. Check for damage seizing movement. Check for worn and inoperative pawl, or weak/damaged/missing pawl spring.</td>
</tr>
<tr>
<td>Braking insufficient, all wheels</td>
<td>Air in machine brake lines</td>
<td>Check for loose fittings. Check for damaged fittings and lines. Check for damage or worn operating components. Correct source of leak. Recharge and bleed system.</td>
</tr>
<tr>
<td></td>
<td>Air/Hydraulic system: damaged diaphragm in booster chamber</td>
<td>Replace booster.</td>
</tr>
<tr>
<td></td>
<td>Air/Hydraulic system: leaks in air system</td>
<td>Repair leaks.</td>
</tr>
<tr>
<td></td>
<td>Air/Hydraulic system: clogged filters</td>
<td>Clean filters (page 50).</td>
</tr>
<tr>
<td></td>
<td>Air/Hydraulic system: valve open</td>
<td>Close dump valve (page 53).</td>
</tr>
<tr>
<td></td>
<td>Hydraulic/Hydraulic system: air in brake line from tractor</td>
<td>Close petcock (page 22).</td>
</tr>
<tr>
<td></td>
<td>Brake linings and/or drums worn</td>
<td>Service brakes.</td>
</tr>
<tr>
<td></td>
<td>Brake linings replaced with un-approved parts having inadequate friction rating</td>
<td>Replace shoes with approved parts.</td>
</tr>
<tr>
<td></td>
<td>Pressure supplied by tractor insufficient</td>
<td>55 kPa minimum for air system.</td>
</tr>
<tr>
<td>No braking, one wheel</td>
<td>Bleed port open</td>
<td>Close port. Re-charge and bleed system.</td>
</tr>
<tr>
<td></td>
<td>Brake lining worn or missing</td>
<td>Inspect and repair as needed.</td>
</tr>
<tr>
<td></td>
<td>Brake cylinder frozen</td>
<td>Inspect and repair as needed.</td>
</tr>
<tr>
<td></td>
<td>Brake parts broken or missing</td>
<td>Inspect and repair as needed.</td>
</tr>
<tr>
<td>No braking, all wheels</td>
<td>Rule out problems at brake assemblies</td>
<td>Check parking brake system. If doesn’t work either, the problem is likely in the hubs. If parking brakes do work, the problem is likely above the hubs.</td>
</tr>
<tr>
<td></td>
<td>Loss of fluid in implement brake lines</td>
<td>Check for fluid loss at all fittings and bleed ports. Close/repair, recharge and bleed.</td>
</tr>
<tr>
<td></td>
<td>Line(s) to tractor improperly connected</td>
<td>Check connections.</td>
</tr>
<tr>
<td></td>
<td>Trailer brake system disabled or malfunctioning in tractor</td>
<td>Check function with another trailer.</td>
</tr>
<tr>
<td></td>
<td>Tractor line pressure insufficient</td>
<td>Have dealer check pressure at port.</td>
</tr>
<tr>
<td>Problem</td>
<td>Causes</td>
<td>Solutions</td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Turbo-Chisel pulling to one side</td>
<td>Parking brakes partially or fully engaged on that side</td>
<td>Release parking brakes on both sides prior to movement.</td>
</tr>
<tr>
<td></td>
<td>See “Dragging brake” topic.</td>
<td></td>
</tr>
<tr>
<td>Brakes always engaged, all wheels</td>
<td>Implement parking brakes on during movement</td>
<td>Release parking brakes prior to movement.</td>
</tr>
<tr>
<td></td>
<td>Over-extended adjuster</td>
<td>Reset adjuster pawls and allow system to self-adjust.</td>
</tr>
<tr>
<td></td>
<td>Air/Hydraulic system: Tractor air brake lines reversed, and Supply line is causing brakes to be always on</td>
<td>Reverse air line connections at hitch.</td>
</tr>
<tr>
<td></td>
<td>Hydraulic/Hydraulic system: implement brake line connected to incorrect always-on remote</td>
<td>Connect implement brake line to correct remote.</td>
</tr>
<tr>
<td></td>
<td>Pressure supplied by tractor brake line is always too high (hydraulic), or too low (air brake)</td>
<td>Maximum allowed hydraulic pressure is: 150 bar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minimum required air pressure is: 550 kPa</td>
</tr>
<tr>
<td>Dragging brake</td>
<td>Over-extended adjuster</td>
<td>Reset adjuster. Inspect to discover why it over-extended.</td>
</tr>
<tr>
<td></td>
<td>Debris in brakes</td>
<td>Remove brake shoes. Clean and dry.</td>
</tr>
<tr>
<td></td>
<td>Distorted brake parts scraping</td>
<td>Replace damaged parts.</td>
</tr>
<tr>
<td></td>
<td>Weak return spring</td>
<td>Replace all springs.</td>
</tr>
<tr>
<td></td>
<td>Piston seized in brake cylinder</td>
<td>Rebuild or replace cylinder.</td>
</tr>
<tr>
<td></td>
<td>Ice in parking brake lines</td>
<td>Warm and release lines. Check lines for damage. Avoid cold weather movements until cables are replaced.</td>
</tr>
<tr>
<td>Brakes grab, chatter or rattle</td>
<td>Weak return springs</td>
<td>Replace all springs.</td>
</tr>
<tr>
<td></td>
<td>Drum worn, distorted or out of round</td>
<td>Re-surface drum if run-out is within specification, otherwise replace.</td>
</tr>
<tr>
<td></td>
<td>Under-inflated or undersize tire in pair</td>
<td>Replace tire if inflation to specification does not solve unequal contact problem.</td>
</tr>
<tr>
<td></td>
<td>Loose, worn, damaged or missing brake components in hub</td>
<td>Inspect brakes.</td>
</tr>
<tr>
<td></td>
<td>Loose or worn wheel bearings</td>
<td>Replace bearings.</td>
</tr>
<tr>
<td>Flat spots on tires</td>
<td>See “Brakes always engaged, all wheels”</td>
<td></td>
</tr>
<tr>
<td>Squealing from brakes</td>
<td>Worn brake linings</td>
<td>Check brakes. Replace worn linings (page 53).</td>
</tr>
<tr>
<td></td>
<td>Distorted brake parts scraping</td>
<td>Check brakes. Replace damaged parts.</td>
</tr>
</tbody>
</table>
Maintenance and Lubrication

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:**
You may be severely injured or killed by being crushed under a falling implement. Always use transport locks when working near or under a raised implement.

**WARNING**

**High Pressure Fluid Hazard:**
Escaping fluid under pressure can have sufficient pressure to penetrate the skin. 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. If injured, seek immediate medical attention from a health care provider familiar with this type of injury.

After using implement for several hours, check all bolts to be sure they are tight.

1. Securely lock up implement before working on it.
2. Lubricate areas listed under “Lubrication and Scheduled Maintenance” on page 48.
3. Check for air leaks at hose connections.
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. Inflate tires as specified on “Tire Inflation Chart” on page 61.
7. 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.
8. Replace or rotate worn parts as needed -- hinge bolts, clevis pins, bearings, sweeps, shanks, etc.
9. 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.
10. Check drag bolts for looseness or excessive wear. Replace broken or bent teeth. Your drag is an important part of the tillage operation.
11. 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.
Maintenance Lift Lock

**WARNING**

**Crush and Pinch Hazards; Equipment Damage Risk:**
Do not rely on hydraulics to hold the implement at lift. Use the transport locks provided. Unlocked lift cylinders settle over time. Implement sections can crush anyone working under them. Implement links can pinch or crush anyone working near them.

Locks are provided to hold all implement in raised position for maintenance, and for raised unfolded storage. The transport locks are used for routine transport.

Steps to install locks presume a starting configuration of implement unfolded and lowered:
1. Raise the unfolded implement.
2. Install the transport locks. Remove the transport locks ① from the lift mechanism links ② and pin to cylinder rods ③.

**Maintenance Lift Unlock**
1. Raise the implement.
2. Remove the transport locks ①. Return them to storage ②.
3. To fold, see folding (page 26).
4. Lower the implement.

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 and Scheduled Maintenance

Wheel Bearing Hub

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.

Brake Maintenance (Option)

Brakes are self-adjusting, but there are several maintenance items:
page 48 - Brake Line Charge and Bleed
page 50 - Air Brake Filter Cleaning
page 51 - Brake Drum and Liner Maintenance

Brake Line Charge and Bleed

Prior to first use, and after replacing any components that carry brake fluid, and during periodic flushing of the brake system, the brake lines need to be bled.

1. Spot the machine on a level surface at a safe distance from any ignition sources (brake fluid is flammable). Unless conditions are dry and calm, use a sheltered area, to keep moisture and contaminants out of brake fluid. Leave the tractor hitched to provide braking action to systems.

2. Unfold the machine and block the machine tires to prevent movement. Do not set the machine’s own parking brakes, as this restricts cylinder movement.

3. Put tractor in Park. Do not set tractor parking brake if it also operates trailer brakes.

Notice

Never re-use brake fluid. It is hygroscopic (formulated to absorb water, which can damage system components if not removed). Dispose of brake fluid per supplier instructions.
Refer to Figure 39 (which depicts air brake system - reservoir for hydraulic brake system is similar)

4. Clean and dry top of master cylinder reservoir ①.
5. Remove cap and keep free of contaminants.

**Drain Hydraulic Brake Lines**

6. If draining brake system:

   A. Remove drain plug at rear of reservoir and empty reservoir. Re-secure plug.
   
   B. Start at an outside hub for the following steps.
   
   C. Connect recovery tubing to the bleeder valve ②, Refer to Figure 40, above the brake line. Unscrew valve to open line.
   
   D. Operate tractor brakes to cycle machine system. Continue until no fluid flows at hub.
   
   E. Close valve, and repeat step C and step D for the other outside hub, then the inside hubs.
   
   Refer to Figure 41 (which depicts air brake system - tee for hydraulic brake system is similar)

   F. Disconnect center port of brake line tee ③. Cycle brakes until no fluid flows. Re-secure tee.

**Charge and Bleed System**

Refer to Figure 42

7. Fill the reservoir ① with brake fluid, grade:
   DOT3 / SAE J1703, or
   DOT4 / SAE J1704 / FMVSS 116, or
   DOT5.1
   
   System capacity: less than 1 liter

**NOTICE**

*Do not use brake fluid:
DOT5 / SAE J1705

DOT5 and DOT5.1 are completely different fluids.
DOT5.1 is compatible with the braking system.
DOT5 is not.
If there is any chance of confusion in your shop, use DOT3 or DOT4.*

Refer to Figure 43

9. Unscrew bleeder valve ② above brake to open line.

10. Cycle brakes on tractor. Close valve near end of brake pedal stroke to prevent air from entering at valve. Check fluid level at reservoir. Top-off as needed to keep full.

11. When fluid appears at valve, close valve.

12. Repeat step 9 through step 11 for the other outside hub, then the inside hubs.

Refer to Figure 44

13. At brake line tee ③, loosen center port connection just enough to allow air to escape when system is pressurized, but not enough to allow air to enter.


15. Top off master cylinder reservoir.

---

**Air Brake Maintenance**

**Reservoir Draining**

*Refer to Figure 45*

Prior to storage, or daily in humid operations, drain water from the air brake reservoir tank ① to prevent rust inside the tank, and rust contamination of the brake valve system.

1. Set the machine hand brakes.

2. Hold the petcock ② open until no water flows. Close petcock.

**Air Brake Filter Cleaning**

Refer to Figure 46 and Figure 47

The air brake system includes filters ② on both the supply and service lines, to trap any debris introduced during connection and disconnection.
Clean filters seasonally; more often in dusty conditions.

1. Move the machine to a sheltered area, to prevent unfiltered dust from entering the opened air system.

**NOTICE**

Do not remove the valve system to clean filters. Caps must be on bottom of filter when removed.

2. Use a 33mm (1\(\frac{9}{32}\)in) open-end or adjustable wrench to loosen both red filter caps.

There is generally insufficient clearance between the filters for a socket or box-end wrench.

3. Carefully remove the cap from one filter. Be ready to catch the filter screen when it falls free.

**NOTICE**

Handle the filter screen element very gently. Great Plains offers only complete replacement filters, and not screen elements.

The inside diameter of the screen is the inlet side. The screen is entirely welded stainless steel.

4. Using gentle compressed air, or a soft brush and compatible cleaning fluid, remove debris from the screen. Dry thoroughly.

5. The cap is a debris sump. Clean it with air, or water and mild detergent. Clean and inspect the O-ring. Dry the cap if wetted.

6. Center the filter screen on the cap. Carefully re-insert in filter body. Screw cap in, checking for mis-alignment or binding of filter element. Tighten cap gently with wrench.

7. Repeat step 3 through step 6 for the other filter.

**Brake Drum and Liner Maintenance**

Great Plains recommends having brakes serviced by trained and fully equipped brake technicians.

**WARNING**

Non-Asbestos Fibers Hazard:

Most recently manufactured brake linings are asbestos-free. However, non-asbestos brake linings may contain one or more of a variety of ingredients, including glass fibers, mineral wool, aramid fibers, ceramic fibers and silica that can be health risks if inhaled.

Scientists disagree on the extent of the risks from exposure to these substances. Exposure to silica dust can cause silicosis, a non-cancerous lung disease. Silicosis gradually reduces lung capacity and efficiency and can result in serious breathing difficulty. Some scientists believe other types of non-asbestos fibers, when inhaled, can cause similar diseases of the lung. Silica dust and ceramic fiber dust are known to the State of California to cause lung cancer. U.S. and international agencies have also determined that dust from mineral wool, ceramic fibers and silica are potential causes of cancer.

For silica, OSHA has set a maximum allowable level of exposure of 0.1 mg/m\(^3\), 8-hour time-weighted average. Some manufacturers of non-asbestos brake linings recommend that exposures to other ingredients be kept below 1.0 f/cc, 8-hour time-weighted average.

Scientists disagree, however, to what extent adherence to these maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling non-asbestos dust.

The following procedures for servicing brakes are recommended to reduce exposure to non-asbestos fiber dust, a cancer and lung disease hazard. A Material Safety Data Sheet (MSDS) is available from Federal Mogul Friction Products, U.S. telephone (540) 662-3871. Request MSDS WNRE-05-155-4.
Use caution to avoid creating, breathing or ingesting dust when servicing brakes. Check for applicable laws, regulations and insurance/enterprise policies prior to commencing work.

**Recommended Work Practices**

**Separate Work Area** - Service brakes in an area where these precautions are always taken for all work. Wear clothes used only for brake work.

**Respiratory Protection** - Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA for brake work.

Wear respiratory protection at all times during brake servicing (including grinding or machining brake drums), beginning with the removal of the wheels, through shop cleanup after completion of brake work (including emptying vacuums, changing HEPA filters and rag disposal).

**Procedures for Servicing Brakes**

- Service the removed brake assembly in a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from brake parts.

- Alternatively, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum and other brake parts. Apply the solution with low pressure to prevent dust from becoming airborne. Allow the solution to flow between brake drum and brake support. Thoroughly wet the wheel hub and brake assembly components to control dust, prior to removal of brake shoes. Wipe parts clean with a cloth.

- If an enclosed vacuum system or brake washing equipment is not available, carefully clean the brake parts in open air. Use a fine mist from a pump spray bottle to wet parts. Use a solution containing water, and, if available, a biodegradable, non-phosphate, water-based detergent. Thoroughly wet the wheel hub and brake assembly components to control dust, prior to removal of brake shoes. Wipe parts clean with a cloth.

**Dust Control** - Use only HEPA-equipped vacuum cleaners. Never blow dust with an air gun. Do not dry brush parts.

**Cleaning Fluids** - NEVER use carcinogenic solvents, flammable solvents, or solvents that can damage brake components as wetting agents.

**Work Area** - Clean work areas with a HEPA-equipped vacuum cleaner or by damp wiping. NEVER use an ordinary shop vac, compressed air or dry sweepers.

When replacing a HEPA filter, wet the used filter with a fine water mist. Bag and carefully dispose of the used filter.

**Hygiene** - Wash hands immediately after brake work, and before eating, drinking or smoking. Clean clothes with a HEPA-equipped vacuum before removing them. Keep food and drink out of the work area.

Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA filter to vacuum work clothes after they are worn. Launder them separately.

**Waste Disposal** - Dispose of discarded linings, used rags, cloths and HEPA filters with care, such as in sealed and labeled plastic bags. Consult applicable EPA, national, regional and local regulations on waste disposal.

**Regulatory Guidance** - OSHA, NIOSH, MSHA, and EPA, are regulatory agencies in the United States. These references are to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.
Brake Shoe Replacement
Check brakes for wear, contamination and damage seasonally or every 9600 km (6000 miles).

1. Prior to commencing work, review the safety information on page 51. Have necessary safety equipment and tools on hand. Make sure workers understand the hazards and how to avoid them.

2. Review the entire procedure. Great Plains suggests performing a complete operation on one wheel, or one pair of wheels, at a time, so that there are fully-assembled wheels to use as an assembly reference.

3. Spot the machine on a level surface. Unfold the machine.

4. Block the wing and rear machine tires to prevent movement. Do not set the machine’s own parking brakes, as the drums cannot be removed with the brakes.

5. If left hitched, put the tractor transmission in Park, release tractor service and parking brakes, and disconnect the trailer brakes at the hitch. Set tractor parking brake only after trailer brake disconnection
If unhitched, release air brakes by opening dump valve ①. Pull down on cap to release. Push up.

6. Jack up and support one or both machine transport axles.

7. Be wearing and using recommended safety equipment for the remainder of these procedures.

8. Spin the wheels, checking for evidence of excess run-out at the braking surface of the drums.

9. Remove wheels. If you have more than one wheel removed at a time, mark on them where they came from (L/R and inside/outside), as the tire tread pattern is direct.

Refer to Figure 48

Inspection of the brakes may also reveal a need to refinish drums and/or replace other brake parts. Although not strictly part of brake maintenance, you may need to repack bearings (generally the outer), and it may be necessary to replace a worn or damaged inner seal (and repack the inner bearing).
Refer to Figure 49

10. Remove hub/drum assemblies:
   - Remove the dust cap ②.
   - Remove the spindle cotter pin ③.
   - Remove the spindle nut ④.
   - Remove the spindle washer ⑤.

11. Carefully pull hub and drum ⑥ assembly from spindle. Outer bearing ⑦ may fall loose.

12. Inspect inner seal ⑧, bearings, hub and drum for wear and damage - for drum, see “Brake Drum Maintenance” on page 58).

13. Keep inner and outer bearing components separated. They are different parts.

Refer to Figure 50

14. Inspect brake shoe ⑨ origin. See Warning at right. Great Plains supplied shoes are stamped “AL-KO” on the web face and have bonded linings.

15. Clean brake dust from assembled parts, and from individual parts as removed.

16. Inspect brake linings ⑩. Check for 1.6mm (1/16in) minimum thickness (exclude thickness of shoe pad), and absence of grease, contamination, deep scores, chipping, or excessive heat fractures. Hairline heat fissures are not unusual and do not require shoe replacement.

17. Inspect brake shoe retaining and operating hardware. Check for wear or damage to holes, pins and springs. Check for weak springs. Springs must completely retract shoes when brakes are released.

   Sound practice is to replace springs when replacing brake shoes.

18. Check wheel cylinder for evidence of leaks.

   If no parts need replacing, skip to step 49.

Refer to Figure 51


**WARNING**

Part Failure Hazard:
Do not substitute parts. Incorrect or substandard parts can cause brake malfunction or failure, resulting in death, serious injury or property damage. Always re-assemble brakes with either the removed parts (if serviceable) or Great Plains parts as specified in the Parts Manual (550-466P).
20. As necessary, disassemble adjuster for cleaning. Inspect adjust pawl and rack for wear and damage. Great Plains recommends replacing the entire adjuster if any parts are worn or damaged.

21. Apply thin film of Lubriplate® 110 or similar to self-adjuster.

**NOTICE**

*Do not allow any lubricants to come in contact with new brake linings.*

22. Release upper spring ④ between shoes (was under self-adjuster), and release lower spring ⑤ between shoes.

23. Loosen nuts ⑥ on lower shoulder bolts. Push brake shoes outward at bottom (to allow removal of hand brake arms).

24. Disconnect hand brake line by uncoupling the brake arm link ⑦ at the clevis pin (not shown).

25. Release lower spring ⑧ between hand brake arms. If this spring differs from the shoe springs, set the parking brake spring aside.

26. Remove hand brake arm assembly ⑨. Place spring ⑧ with it.
Refer to Figure 52

27. Remove five ½-13 nuts ① and lock washers ② behind dust shield.

28. Pull backing plate assembly ⑤ far enough out on spindle, away from dust cover ④, to allow access to nuts ⑤ on the two shoe hold down bolts ⑥.

If you prefer to perform a bench repair on the brakes, and wish to avoid opening the hydraulic system, remove the bolts holding the wheel cylinder. This allows complete removal of the backing plate.

29. Remove hold down cotter pins ⑦ and castellated nuts ⑤.

30. Remove spring washers ⑧.

Note the orientation of these washers. They must be reinstalled in the same relationship to each other, and to the nut/washer, in order to provide correct spring force.

31. Remove large flat washer ⑨.

32. Remove hold down bolts ⑧ and brake shoes ⑤.

33. Inspect brake shoes. Check that web is flat and at a right angle to table. Check welds for cracks. Check operating holes for wear and peening. If any defect or damage is noted, replace shoes regardless of lining status.

34. Replace any shoes contaminated with oil.

35. If replacing one shoe set due to normal wear, Great Plains recommends replacing all shoes on the machine.

WARNING

Braking Malfunction Hazard:
Always replace brake shoes in pairs - both shoes on the same drum. Replacing only one shoe of each set can lead to reduced braking performance, or loss of braking, with the risk of an accident resulting in death, serious injury or property damage.

Cannot Re-Line:
Original and replacement brake shoes supplied or recommended by Great Plains have bonded linings. They cannot be re-lined. Replace entire shoes, in pairs.
Install New Brake Shoes
Refer to Figure 53

Brake shoe orientation is with square hold-down bolt hole ② on top, and “L”-shaped adjuster mount lugs ③ facing away from spindle.

36. Engage bottom web notch of shoe with backing plate pivot bolt ④. Apply a thin film of Lubriplate® 110 or similar to that part of the web which is near and under the plate held by the pivot bolts. Engage top web notch of shoe with cylinder rod clevis ⑤.

37. Loosely secure shoe to backing plate ⑤ with shoe hold down bolt ⑤, large flat washer ⑥, two spring washers ⑦, and castellated nut ⑧. Do not install the cotter pin at this time.

The spring washers ⑦ are slightly cupped. Place them on the bolt with the concave (dished-in) sides facing each other “Ω”.

38. Tighten the castle nuts ⑨ until the spring washers ⑦ are flattened. Back the nut off 1/6 turn, plus enough to align the bolt’s hole with notches in the nut. Secure castle nuts with cotter pin ⑥.

39. Insert five backing plate studs through dust cover ⑤ and spindle weldment. Secure with lock washers ⑥ and 1/2-13 nuts ⑥.

Re-Install Springs
Refer to Figure 54

40. With link arm ① toward front of machine, insert parking brake arm assembly ② from spindle side of backing plate, through lower slots in brake shoes.

41. Insert double-bend end of parking brake spring ③ in hole at rear end of parking brake arm. Hook single-bend end at small notch in forward arm.

42. At adjuster lugs ④ (top of shoes), insert the double-bend end of a brake shoe spring ⑤ through the hole closer to the shoe web. Hook the single-bend end through the matching hole on the other shoe.

43. Hook the double-bend end of the remaining spring ⑥ through a lower round hole ⑦ in a shoe web. Hook the single-bend end through the matching hole in the other shoe.

44. Place adjuster assembly ⑧ on adjuster lugs ④. The adjuster pawl ⑨ is up and to the right as you face the spindle. Secure with cotter pins ⑥.

45. Tighten pivot bolts ⑥ to 5/8-18 torque specification.

NOTICE

Leave self-adjuster relaxed. It self-adjusts at first use.
Brake Drum Maintenance

Refer to Figure 55

46. Inspect the shoe surface (the inside rim). Normal appearance is dull gray, with no more than light scoring and light wear.

One or two light score marks are not cause for resurfacing or replacement. If there are any questions concerning the condition of a drum, consult an expert.

Replace or resurface a drum that is heavily scored, worn to more than 0.51mm (0.020in) oversize, or has 0.38mm (0.015in) or greater run-out.

Brake Drum Resurfacing

47. A standard drum lathe is suitable for machining the shoe surface.

When removing surface, do not exceed the maximum diameter cast in the brake drum.

48. Be sure to remove any metallic chips and contamination resulting from drum machining.

Re-Mount Hub and Drum

Refer to Figure 56

49. Repack any bearings removed.

50. If replacing inner bearing seal ①, orient it with the seam side out (away from bearing). Seat the seal so that it is completely inside the narrow diameter of the hub, and close to, but not touching the bearing cup ②.

NOTICE

Seals are hollow metal structures and are somewhat fragile. They are not intended to be in contact with the bearings. When installing them, carefully align them so they are concentric with the shaft hole. Apply insertion force across the entire face, or at least equally along the entire outside diameter (as close to the seal O.D. as possible).

51. Carefully place drum/hub assembly ③ on spindle.

52. Insert re-packed outer bearing ④.

53. Add spindle washer ⑤ and castle nut ⑥.

54. Tighten nut until drum/hub does not turn freely. Loosen nut 1/6 turn, and as much looser as needed to align hole in spindle (not shown) with notches in nut.

55. Secure nut with cotter pin ⑦. Install dust cap ⑧.

CAUTION

Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA when grinding or machining brake drums. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.

WARNING

Heavily scored, worn or oversized drums can reduce brake performance or cause loss of braking. This could result in death, serious personal injury, or property damage.

WARNING

Failure to remove chips can cause bearing failure, brake failure or wheel/spindle separation. This could result in death, serious personal injury, or property damage.
Mounting Wheels

56. Position a wheel on the hub from which it was dismounted.

Refer to Figure 57

57. Start all lug nuts by hand. Choose a bolt stud to designate position #1.

58. Torque in stages, setting each lug nut to the specified torque in the order shown in the figure:
   Stage 1: 27-33 N-M (20-25 ft-lbs)
   Stage 2: 74-80 N-M (55-60 ft-lbs)
   Stage 3: 114-127 N-M (85-95 ft-lbs)

This staging and ordering of tightening is strongly recommended to ensure that the drum is not driven out-of-round.

59. Repeat step 57 and step 58 for each wheel.

Test and Adjust Brakes

While the machine axle is still elevated, test both the service and the parking brake systems.

60. Hitch a tractor equipped with trailer brake remote. Connect the braking systems. Put the tractor in Park, but release any brakes that operate the trailer service brakes.

61. Have someone spin one brake-equipped machine wheel, and stand clear.

62. Slowly engage the tractor service brakes. If the wheel does not stop spinning, this may merely indicate that the self-adjusters have not yet seated. Cycle a second time.

63. Check for unusual noises and failure to brake. Check that the wheel spins freely with brakes released.

64. Spin another machine wheel. Stop it with the tractor brakes. Check braking action. The self-adjusters may already be seated for this and the remaining wheels.

65. Release all tractor braking that engages machine braking.

66. Spin the first wheel again. Engage the machine parking brake for that side. With fresh brake linings, it may be necessary to adjust the hand brake handle to achieve over-center brake-set detent with acceptable effort.

67. Spin and test brake the other wheel on that side.

68. Repeat step 66 and step 67 for the other side of the machine.

69. Check tire inflation, set parking brakes, and lower machine onto its own wheels.
## Appendix

### TCN Specifications and Capacities

<table>
<thead>
<tr>
<th>Model No.</th>
<th>TCN5107</th>
<th>TCN5309</th>
<th>TCN5311</th>
<th>TCN5313</th>
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<tbody>
<tr>
<td>Tillage Width</td>
<td>267cm (8’ 9”)</td>
<td>343cm (11’ 3”)</td>
<td>420cm (13’ 9”)</td>
<td>495cm (16’ 3”)</td>
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<td>Center Section</td>
<td>274cm (9”)</td>
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<td>274cm (9”)</td>
<td>274cm (9”)</td>
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<td>Wing</td>
<td>N/A</td>
<td>53cm (1’ 9”)</td>
<td>76cm (2’ 6”)</td>
<td>114cm (3’ 9”)</td>
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<td>Number of Shanks</td>
<td>7</td>
<td>9</td>
<td>11</td>
<td>13</td>
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<td>Shank Spacing</td>
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<td>27</td>
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<td>Blade Spacing</td>
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<td>19cm (7.5”)</td>
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<tr>
<td>Weight (total)*</td>
<td>4526kg (9970lbs)</td>
<td>6000kg (13,215lbs)</td>
<td>6774kg (14,920lbs)</td>
<td>7289kg (16,055lbs)</td>
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<td>Weight (tongue)**</td>
<td>113kg (249lbs)</td>
<td>150kg (330lbs,)</td>
<td>169kg (373lbs)</td>
<td>182kg (401lbs)</td>
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<td>Weight (axle)**</td>
<td>4413kg (9721lbs)</td>
<td>5850kg (12,885lbs)</td>
<td>6604kg (14,547lbs)</td>
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<td>Transport Width</td>
<td>274cm (9”)</td>
<td>299cm (9’ 10”)</td>
<td>299cm (9’ 10”)</td>
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<tr>
<td>Transport Height</td>
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<td>287cm (9’ 5”)</td>
<td>299cm (9’ 10”)</td>
<td>312cm (10’ 3”)</td>
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<td>Length (w/o attachment)</td>
<td>695cm (22’ 10”)</td>
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<td>Tire Size Center</td>
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<td>Kilowatt  Chisel Shanks</td>
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<td>Kilowatt  Parabolic Shanks</td>
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<td>Horsepower (PTO) Parabolic Shanks****</td>
<td>200-240</td>
<td>230-260</td>
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<td>315-385</td>
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</table>

* Weight (values change due to installed options and/or after-market equipment), see weight configuration table (page 32) for option packages included with machine.

** Weight values change depending on hitch position from ground

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

**** Equipped with 7” winged points on parabolic shanks

The maximum hydraulic system operating pressure should be 207 bar (3000 psi).

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

<table>
<thead>
<tr>
<th>Wheel</th>
<th>Tire Size</th>
<th>Inflation</th>
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<tbody>
<tr>
<td>Center/Transport</td>
<td>12.5L x 15” 12-Ply</td>
<td>379 kPa 55 psi</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 websites. For assistance or information, contact your nearest Authorized Farm Tire Retailer.
Manufacturer Web site
Firestonewww.firestoneag.com
Gleasonwww.gleasonwheel.com
Titanwww.titan-intl.com
BKTwww.bkt-tire.com
Galaxywww.atgtire.com

Hydraulic Connectors and Torque
Refer to Figure 58 (a hypothetical fitting)
Leave any protective caps in place until immediately prior to making a connection.

NPT - National Pipe Thread
Note tapered threads, no cone/flare, and no O-ring.

1. Apply liquid pipe sealant for hydraulic applications.
2. Do not use tape sealant, which can clog a filter and/or plug an orifice.

JIC - Joint Industry Conference (SAE J514)
Note straight threads (1) and the 37° cone (2) on “M” fittings (or 37° flare on “F” fittings).

3. Use no sealants (tape or liquid) on JIC fittings.

ORB - O-Ring Boss (SAE J514)
Note straight threads (1) and elastomer O-Ring (2).

4. Prior to installation, to prevent abrasion during tightening, lubricate O-Ring with clean hydraulic fluid.

5. Use no sealants (tape or liquid) on ORB fittings.

ORB fittings that need orientation, such as the ell depicted, also have a washer (3) and jam nut (4) (“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 58
Hydraulic Connector ID

<table>
<thead>
<tr>
<th>Dash Size</th>
<th>Fitting</th>
<th>N-m</th>
<th>Ft-Lbs</th>
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<tbody>
<tr>
<td>-4</td>
<td>4-18 NPT</td>
<td>1.5-3.0 turns past finger tight</td>
<td></td>
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<tr>
<td>-5</td>
<td>2-20 JIC</td>
<td>19-20</td>
<td>14-15</td>
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<tr>
<td>-5</td>
<td>2-20 ORB w/jam nut</td>
<td>12-16</td>
<td>9-12</td>
</tr>
<tr>
<td>-5</td>
<td>2-20 ORB straight</td>
<td>19-26</td>
<td>14-19</td>
</tr>
<tr>
<td>-6</td>
<td>16-18 JIC</td>
<td>24-27</td>
<td>18-20</td>
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<tr>
<td>-6</td>
<td>16-18 ORB w/jam nut</td>
<td>16-22</td>
<td>12-16</td>
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<tr>
<td>-6</td>
<td>16-18 ORB straight</td>
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<td>27-39</td>
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<td>-8</td>
<td>4-16 JIC</td>
<td>37-58</td>
<td>27-43</td>
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<td>-8</td>
<td>4-16 ORB w/jam nut</td>
<td>27-41</td>
<td>20-30</td>
</tr>
<tr>
<td>-8</td>
<td>4-16 ORB straight</td>
<td>37-58</td>
<td>27-43</td>
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<table>
<thead>
<tr>
<th>Bolt Size</th>
<th>Grade 2</th>
<th>Grade 5</th>
<th>Grade 8</th>
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<tbody>
<tr>
<td>in-tpia</td>
<td>N-m x pitch c</td>
<td>N-m x pitch c</td>
<td>N-m x pitch c</td>
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<tr>
<td>1/4-20</td>
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<td>7.4 ft-lb</td>
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<tr>
<td>1/4-28</td>
<td>8.5 ft-lb</td>
<td>8.5 ft-lb</td>
<td>8.5 ft-lb</td>
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<tr>
<td>5/16-18</td>
<td>15 ft-lb</td>
<td>15 ft-lb</td>
<td>15 ft-lb</td>
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<tr>
<td>5/16-24</td>
<td>17 ft-lb</td>
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<td>17 ft-lb</td>
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<tr>
<td>3/8-16</td>
<td>27 ft-lb</td>
<td>27 ft-lb</td>
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<td>3/8-24</td>
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<td>7/16-13</td>
<td>66 ft-lb</td>
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<td>9/16-12</td>
<td>95 ft-lb</td>
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<td>1 1/8-7</td>
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<td>N-m x pitch c</td>
<td>N-m x pitch c</td>
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<tr>
<td>M 5 X 0.8</td>
<td>4 ft-lb</td>
<td>4 ft-lb</td>
<td>4 ft-lb</td>
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<td>M 6 X 1</td>
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<td>7 ft-lb</td>
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<tr>
<td>M 8 X 1.25</td>
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<td>17 ft-lb</td>
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<td>M 8 X 1</td>
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</tr>
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<td>M 10 X 0.75</td>
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<td>90 ft-lb</td>
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<td>M 14 X 2</td>
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<td>M 30 X 3.5</td>
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<table>
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<tr>
<th>Torque tolerance</th>
<th>+0%, -15% of torquing values. Unless otherwise specified use torque values listed above.</th>
</tr>
</thead>
</table>

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
Dimensions (Transport) TCN5107
Dimensions (Transport) TCN5309
Dimensions (Transport) TCN5311

[Diagram of Dimensions (Transport) TCN5311]

- 299 cm (117.6 in) Transport Height
- 35 cm (13.8 in) Transport Clearance
- 779 mm (30.6 in) Transport Length
- 295 cm (116.1 in) Transport Width
Dimensions (Transport) TCN5313
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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