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!
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.

<table>
<thead>
<tr>
<th>Model Number</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial Number</td>
<td></td>
</tr>
<tr>
<td>Machine Height</td>
<td></td>
</tr>
<tr>
<td>Machine Length</td>
<td></td>
</tr>
<tr>
<td>Machine Width</td>
<td></td>
</tr>
<tr>
<td>Machine Weight</td>
<td></td>
</tr>
<tr>
<td>Year of Construction</td>
<td></td>
</tr>
<tr>
<td>Delivery Date</td>
<td></td>
</tr>
<tr>
<td>First Operation</td>
<td></td>
</tr>
<tr>
<td>Accessories</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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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Printed in the United States of America

2019-02-25
Important Safety Information

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

Be Aware of Signal Words
Signal words designate a degree or level of hazard seriousness.

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

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

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

Prepare for Emergencies
▲ Be prepared if a fire starts
▲ Keep a first aid kit and fire extinguisher handy.
▲ Keep emergency numbers for doctor, ambulance, hospital and fire department near phone.

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

Avoid High Pressure Fluids

Escaping fluid under pressure can 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 suspected leaks.
- Wear protective gloves and safety glasses or goggles when working with hydraulic systems.
- If an accident occurs, seek immediate medical attention from a physician familiar with this type of injury.

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.

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.

Transport Machinery Safely

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

- Do not exceed 20 mph. Never travel at a speed which does not allow adequate control of steering and stopping.
- Comply with state and local laws.
- Do not tow a 3-point implement that, when loaded for transport, weighs more than the towing vehicle.
- Carry reflectors or flags to mark drill in case of breakdown on the road.
Marker Safety

▲ Keep clear of overhead power lines and other obstructions when transporting. Refer to transport dimensions under “Specifications and Capacities” on page 43.

▲ Keep all persons well clear of drill during marker operations.

Handle Chemicals Properly

Agricultural chemicals can be dangerous. Improper use can seriously injure persons, animals, plants, soil and property.

▲ Do not use liquid treatments with drill (unless using a fertilizer hitch).

▲ Read and follow chemical manufacturer’s instructions.

▲ Wear protective clothing.

▲ Handle all chemicals with care.

▲ Avoid inhaling smoke from any type of chemical fire.

▲ Never drain, rinse or wash dispensers within 100 feet (30m) of a freshwater source, nor at a car wash.

▲ Store or dispose of unused chemicals as specified by chemical manufacturer.

▲ Dispose of empty chemical containers properly. Laws generally require power rinsing or rinsing three times, followed by perforation of the container to prevent re-use.

Shutdown and Storage

▲ Lower drill, put tractor in park, turn off engine, and remove the key.

▲ Secure drill using blocks.

▲ Detach and store drill in an area where children normally do not play.

Tire Safety

Tire changing can be dangerous and should be performed by trained personnel using correct tools and equipment.

▲ When inflating tires, use a clip-on chuck and extension hose long enough for you to stand to one side—not in front of or over tire assembly. Use a safety cage if available.

▲ When removing and installing wheels, use wheel-handling equipment adequate for weight involved.
Practice Safe Maintenance

▲ Understand procedure before doing work. Use proper tools and equipment. Refer to this manual and your Parts Manual for additional information.

▲ Work in a clean, dry area.

▲ Lower the drill, put tractor in park, turn off engine, and remove key before performing maintenance.

▲ Make sure all moving parts have stopped and all system pressure is relieved.

▲ Allow drill to cool completely.

▲ Disconnect battery ground cable (-) before servicing or adjusting electrical systems or before welding on drill.

▲ 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 drill 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 drill functions.

▲ Operate machinery from the driver’s seat only.

▲ Do not leave drill unattended with tractor engine running.

▲ Do not dismount a moving tractor. Dismounting a moving tractor could cause serious injury or death.

▲ Do not stand between the tractor and drill during hitching.

▲ Keep hands, feet and clothing away from power-driven parts.

▲ Wear snug-fitting clothing to avoid entanglement with moving parts.
Safety Decals

Safety Reflectors and Decals

Your implement comes equipped with all 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.

Slow Moving Vehicle Reflector
818-003C

On back of last seedbox, near center; one total

Red Reflectors (3PNG12) Only
838-266C

Rear face, outside ends of walkboard; two total
Red Reflectors (3PNG15) Only
838-266C
Rear face of walkboard, outboard of day time reflectors; four total

Amber Reflectors
838-265C
Outside ends walkboard, front face of frame, outside corners, four total

Daytime Reflectors (3PNG12 Only)
838-267C
Rear face walkboard, inboard of red reflectors; two total
Daytime Reflectors (3PNG15 Only)
838-267C

Rear face of walkboard, inboard of red reflectors; four total

Danger: Hitch Crush Hazard
818-590C

Front of frame, inside each lower hitch point; two total

Danger: Possible Chemical Hazard
838-467C (Option)

Inside lid of optional Small Seeds boxes; two total

Warning: Excessive Speed Hazard
818-188C

On frame to left of left lower hitch; one total
Warning: High Pressure Fluid Hazard
818-339C

On frame to left of left lower hitch; one total

Warning: Hand Crushing Hazard (Option)
838-611C

Inside lid, each Native Grass seedbox; two total

Caution: Tires Not a Step
818-398C

One front frame, outside of each ground drive; two total
Caution: General Instructions

818-587C

![Safety Warning]

Front frame, left of left lower hitch; one total

Caution: Tire Inflation

858-669C

![Safety Warning]

Outside face of each wheel tire rim; two or four total

Notice: General Instructions

858-679C

![Safety Notice]

Front frame, left end; one total

Both ends of each seed box; two to six total
Great Plains’ 3PNG12 and 3PNG15 are pull-type units designed for conventional- and some minimum-till seed planting. Every drill we build is designed and built with care using only quality materials. For the best user experience, read this manual and follow all instructions carefully. These pages will guide you through the operation and contain tips for easier adjustment and maintenance.

All information in this manual is current as of publication. Information contained within is subject to change to ensure top performance.

Models Covered
3PNG12-141012-Foot, 14-Row, 10in
3PNG12-197512-Foot, 19-Row, 7.5in
3PNG15-181015-Foot, 18-Row, 10in
3PNG15-247515-Foot, 24-Row, 7.5in

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 when ordering parts from your Great Plains dealer. The serial-number plate is located on the front face of the frame.

Record your machine’s model and serial number on the inside cover of this manual for quick reference.

Document Family
202-553M Operator manual (this manual)
202-553B Seed Rate manual (2006-)
202-553P Parts manual

Further Assistance
Great Plains Manufacturing, Inc. wants you to be satisfied with your new product. If for any reason you do not understand any part of this manual or are otherwise dissatisfied, please take the following actions first:

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

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

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

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

Manual Family QRC
The QR Code (Quick Response) to the left will take you to this machine’s family of manuals. Use your smart phone or tablet to scan the QR Code with an appropriate App to begin viewing.

Dealer QRC
The QR Code (Quick Reference) to the left will take you to available dealers for Great Plains products. Refer to the Parts Manual QR Locater for detailed instructions.
Preparation and Setup

This section helps prepare the tractor and drill for use.

Initial Setup

If the drill has just been delivered, or broken down for re-shipment, these items need to be completed prior to first field use:

- "Initial Marker Setup (Option)" on page 46

You may also need to install features, options and accessories that are not factory-installed, such as Markers or Shaft Monitor.

Pre-Planting Setup

The balance of this section covers items that need to be completed or checked prior to each field use of the drill.

Pre-Setup Checklist

1. This drill requires a tractor with adequate weight and a Category II, III or IIIN 3-point hitch.
2. Read and understand "Important Safety Information" on page 1.
3. Check that all working parts are moving freely, bolts are tight, and cotter pins are spread.
4. Check that all grease fittings are in place and lubricated. Refer to “Lubrication” on page 36.
5. Check that all safety decals and reflectors are correctly located and legible. Replace if damaged. See “Safety Decals” on page 5.
6. Inflate tires to pressure recommended and tighten wheel bolts as specified. See “Torque Values” on page 44.

Hitching Tractor to Drill

You may be severely injured or killed by being crushed between the tractor and drill. Do not stand or place any part of your body between drill and moving tractor. Stop tractor engine and set park brake before installing hitch pins.

1. Raise or lower the 3-point links as needed.
2. Install the lower hitch pins.
3. Pin the top link to the drill and adjust so it remains loose in normal field conditions.
4. Check that all three-point links are securely pinned, then slowly raise the drill. Watch for cab interference.

Refer to Figure 1
5. Unpin the parking stands as shown. Rotate the stands up into field position and re-pin.

Figure 1
Parking Stand
Hydraulic Connections (Marker Option)

⚠️ **WARNING**

*High Pressure Fluid Hazard:*
Relieve pressure before disconnecting hydraulic lines. Escaping fluid under pressure can have sufficient pressure to penetrate the skin causing serious injury. 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 attention from a physician familiar with this type of injury.

**Refer to Figure 2**

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

<table>
<thead>
<tr>
<th>Color</th>
<th>Hydraulic Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>Marker Cylinders</td>
</tr>
</tbody>
</table>

To distinguish hoses on the same hydraulic circuit, refer to the symbol molded into the handle grip. Hoses with an extended-cylinder symbol feed cylinder base ends. Hoses with a retracted-cylinder symbol feed cylinder rod ends.

The standard 3PNG12 and 3PNG15 drill does not have hydraulic circuits. If equipped with marker(s), the drill requires one remote circuit for each side.

Connect each base end hose to an extend port, and the rod end hose to a retract port.

**Electrical Connections (Option)**

1. Connect lighting harness.
2. Connect any optional electrical harnesses, such as shaft monitor.

**Gauge-Wheel Adjustment**

Gauge-wheel adjustments affect the operating height of your drill, and drill height directly affects the working range of the openers. The drill must be adjusted so your openers can travel up and down and follow the ground contour.

**Refer to Figure 3**

Before using in the field, with drill level front-to-back, adjust so the opener mount tube runs 18 1/4 inches above ground. Further adjustments to compensate for field conditions are likely. See page 25.
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

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 physician familiar with this type of injury.

1. Carefully read “Important Safety Information” on page 1.
2. Lubricate drill as indicated under “Lubrication” on page 36.
3. Check all tires for proper inflation. See “Tire Inflation Chart” on page 44.
4. Check all bolts, pins and fasteners. Torque as shown in “Torque Values” on page 44.
5. Check drill for worn or damaged parts. Repair or replace parts before going to the field.
6. Check hydraulic hoses, fittings and cylinders for leaks. Repair or replace before going to the field.
7. Rotate each ground drive wheel to see that the drives and meters are working properly and free from foreign material.

Watch your step when walking on drill ladder and walkboard. Falling from drill could cause severe injury or death.

Drill Lift/Lower

Raising and lowering the drill relies on the tractor 3-point hitch.

To safely raise the drill, the tractor must weigh more than the drill, and tractor weight must be distributed so front tractor wheels remain in solid contact with the ground. Add weights at tractor front as needed (see page 14).

Lowered position is initially set to 18\(\frac{1}{4}\) inches (page 12), as adjusted per page 25. Set a stop or operate the hitch in Float.
Transporting

Before transporting with a tractor, check these items:

1. Check that tractor is sufficient for towing the drill (page 43). Use a tractor with adequate weight relative to drill. See the tables below for typical drill weights.

   You may need to add ballast to the tractor front end.

2. Check that 3-point hitch links are securing pinned to the tractor.

3. Unload drill boxes. The drill can be transported with full boxes of material (other than native Grass), but the added weight increases stopping distance, reduces steering effectiveness and generally decreases maneuverability. Unload before transporting if possible.

   Do not transport with Native Grass box loaded. Heavier mix components settle to the bottom, which can prevent drive system from operating or cause irregular seed rate and population distribution.

4. Raise drill completely (page 13).

5. Turn on lights.

Keep Clearance in Mind

Remember that the drill may be wider than the tractor. Allow safe clearance.

Observe Road Rules

Comply with all national, regional and local safety laws when traveling on public roads.

Typical[^1] 3PNG12 and 3PNG15 Weights by Configuration

<table>
<thead>
<tr>
<th>Drill Model</th>
<th>Base Drill</th>
<th>w/ Markers</th>
<th>w/ Small Seeds</th>
<th>Markers &amp; SGS</th>
<th>Empty Drill Weight in Pounds</th>
<th>Empty Drill Weight in Kilograms</th>
</tr>
</thead>
<tbody>
<tr>
<td>3PNG12-1410</td>
<td>2395</td>
<td>2857</td>
<td>3437</td>
<td>3899</td>
<td>1086</td>
<td>1296</td>
</tr>
<tr>
<td>3PNG12-1975</td>
<td>2480</td>
<td>2943</td>
<td>3851</td>
<td>4313</td>
<td>1125</td>
<td>1335</td>
</tr>
<tr>
<td>3PNG15-1810</td>
<td>3243</td>
<td>3705</td>
<td>4559</td>
<td>5021</td>
<td>1471</td>
<td>1681</td>
</tr>
<tr>
<td>3PNG15-2475</td>
<td>3335</td>
<td>3797</td>
<td>5047</td>
<td>5510</td>
<td>1513</td>
<td>1722</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Drill Model</th>
<th>Base Drill</th>
<th>w/ Markers</th>
<th>w/ Small Seeds</th>
<th>Markers &amp; SGS</th>
<th>Weight with Full Main Seed Box (Pounds)</th>
<th>Weight with Full Main Seed Box (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3PNG12-1410</td>
<td>3931</td>
<td>4393</td>
<td>4973</td>
<td>5435</td>
<td>1783</td>
<td>1993</td>
</tr>
<tr>
<td>3PNG12-1975</td>
<td>4016</td>
<td>4479</td>
<td>5387</td>
<td>5849</td>
<td>1822</td>
<td>2032</td>
</tr>
<tr>
<td>3PNG15-1810</td>
<td>5163</td>
<td>5625</td>
<td>6479</td>
<td>6941</td>
<td>2342</td>
<td>2551</td>
</tr>
<tr>
<td>3PNG15-2475</td>
<td>5255</td>
<td>5717</td>
<td>6967</td>
<td>7430</td>
<td>2383</td>
<td>2593</td>
</tr>
</tbody>
</table>

[^1]: Weights are approximate, and can vary by hundreds of pounds based on material density, press wheel options, accessories and user modifications. Weight kit figures presume dual markers (vs. single) and dual gauge wheels on 3PNG15.

Unstable Load Hazard:

Tow the drill only with a tractor with sufficient power and that weighs more than the drill, and has ample weight on steering wheels at all times.

Excessive Speed Hazard:

Towing the drill at high speeds can lead to loss of vehicle control and a serious road accident, injury and death. To reduce the hazard, do not exceed 20 mph.
Loading Seed

Fully loaded with dense seed, the drill weighs an additional 1536 or 1920 lbs (697 or 871 kg). Include this weight when checking tractor capability.

The drill must be hitched for seed loading.

Inspect all boxes before loading. Remove any previous seed or debris.

Load slightly more material than needed, because consumption rates can vary between compartments even though the furrow rates are identical.

Main Seedbox Loading

1. Check that all meter doors are positioned for the seed size, and not set for clean-out. See “Position Seed Cup Doors” in seed Rate Manual. If loading prior to transport, set them to position 1 (smallest seed).

2. Install or remove optional seed plugs as desired for the row spacing planned. See “Seed Tube Plug (Small Seeds)” on page 40.

If loading prior to transport, and calibration has not yet been done, set Seed Rate Handle to 0. At 0, and with the doors at 1, no seed can leak during transport.

3. Open the lid.

4. Load seed evenly into compartments.

Loading Native Grass Box

1. Open the lids.

2. Load seed evenly into compartments.

For Native Grass Mix Only

Powdered graphite must be mixed with the native grass seed mix to improve seed flow and metering. See page 40 for ordering information.

Recommended Usage:
Sprinkle 1/3 cup of graphite per 6 ft (260ml/meter) of seedbox on top of the native grass seed mix.

For humid planting environments, double or triple rate as needed.
Loading Small Seeds Box

1. If loading prior to transport, and calibration has not yet been done, set Seed Rate Handle to 0. At 0, no seed can leak during transport.

2. Take all necessary materials safety precautions if the seed is treated.

3. The Small Seeds lids are held closed by external rubber latches. Pull them up and to the rear to release the lids.

4. Load seed evenly into compartments.

---

**IMPORTANT!**

FOR NATIVE GRASS MIX ONLY

Powdered graphite must be mixed with the native grass seed mix for proper seed flow and metering.

*Recommended usage:
Sprinkle 1/3 cup of graphite per 6 ft. of seed box on top of the native grass seed mix.

For humid planting environments, double or triple rate as needed.

---

Seed Rates Overview

Details of seed rate setting are found in the Seed Rate Manual.

Rate setting controls are different for each box. Some boxes have more than one control.

Basic rate settings are found in the Seed Rate Manual (part number 202-579B, normally located in the manual pak enclosure at front center of drill).

All chart rates, for all boxes, are approximate. Great Plains strongly recommends calibration of each box to the material to be applied.

<table>
<thead>
<tr>
<th>Rate</th>
<th>Main Box</th>
<th>Native Grass</th>
<th>Small Seeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse Rate</td>
<td>Drive Type Sprockets</td>
<td>Drive Type Sprockets</td>
<td>Note*</td>
</tr>
<tr>
<td>Fine Rate</td>
<td>Rate Handle</td>
<td>Driver/Driven Sprockets</td>
<td>Rate Handle</td>
</tr>
<tr>
<td>Cup Adjustment</td>
<td>Door Handle</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The function of the sprocket set at the final Small Seeds drive is to compensate for Drive Type sprocket settings at drill front.
Seeding Depth Overview

Setting nominal planting depth, and achieving it consistently, is affected by multiple adjustable drill functions, which can interact. From greatest to least effect they are:

Refer to Figure 4

1. **Opener Depth** (Press Wheel Height) (page 29)
   The T-handle sets the depth of the opener discs below the ground surface (on which the press wheels ride).

2. **Row Unit Down Pressure** (Springs) (page 28)
   In most conditions, the factory spring setting is sufficient to make a consistent furrow in conventionally tilled soil. In extremely heavy conditions, the openers may be making a furrow of inconsistent depth. You can increase opener down force at the row unit springs.

3. **Disc Blade Adjustments** (as blades wear) (page 27)
   As blades wear, the diameter of the discs, and their contact gap, changes. Seeding depth will also change (or become irregular), unless adjustments are made to blade spacing and the T-handle setting. Generally, the blades need to be replaced completely before the T-handle adjustment is exhausted.

Never back up with openers in the ground. To do so may cause damage or opener plugging.

Acremeter Operation

The acremeter counts shaft rotations whenever the shaft is rotating - this is with the drill lowered and in motion or during crank operation. The meter is programmed to display rotations as acres or hectares, when using all rows, factory-specified tires and tire inflations.

Note: Unusual conditions and/or non-standard row spacings can cause the acremeter tally to vary from actual acres planted.

Normal Operating Sequence

Note: The acremeter counts rotations during drill calibration (and if so, can be useful for calibration, although the meter must be on, or moved to, the shaft being cranked).

1. Record the acremeter reading at the start of planting (and after calibration). The large “12345.6” format display is the grand total area planted since meter installation. If the display is blank, see “Dormant Display” below.

2. Lower drill and plant. Acremeter counts shaft rotations, calculates acres or hectares, and adds to the running grand total.

3. During planting (drill lowered and moving forward), the display blanks (goes dormant), but area tally continues.
4. When raised for turns, obstructions and transport, the drive wheel stops, and the meter counts no additional (non-planting) rotations.

5. Whenever shaft rotation stops, the LCD display activates after 30 to 60 seconds, and remains visible for 30 to 45 minutes.

6. At the completion of planting, record the final reading or the grand total. If the display goes dormant before you can read it, see “Dormant Display”.

7. Subtract the reading at Step 1 from the reading at Step 6 for the total planted in the present session.

Dormant Display

Refer to Figure 6

To conserve power, the LCD display blanks itself most of the time. If you need to read the display after it has “timed out” and gone dormant:

- use the calibration crank to turn the jackshaft once, or
- gently tap or wave a magnet at either of the Great Plains logo spots on the lower region of the display.

Be careful not to scratch the window.

When active the lower left corner displays the revolutions per acre for which the meter is factory-programmed.

Field Operation

1. Hitch drill to a suitable tractor (page 11). Check depth and level (page 11).
2. Set initial seed population from Seed Rate manual.
3. Calibrate rate for boxes to be used (Seed Rate Manual).
4. Load materials (page 15).
5. Rotate ground drive wheels. Check that feed cups, seed tubes and drives are working properly and free from foreign material.
6. Record initial acremeter reading (page 17).
7. Set hitch for depth control mode.
8. Pull forward, lower drill, and begin seeding.
9. When turning at row ends and for other short-radius turns, always raise drill. Seeding automatically stops when ground drive wheel loses contact.

Figure 6

You may be severely injured or killed by being crushed between the tractor and drill. Do not stand or place any part of your body between drill and moving tractor. Stop tractor engine and set park brake before installing pins.

Never back up with openers in the ground. Opener plugging is likely. Severe damage is possible.
Marker Operation

Optional marker attachments are available from your Great Plains dealer. Before operating markers, make sure hydraulics are properly bled as described under “Charge Hydraulic System” on page 46.

Set hydraulic circuit lever to neutral when folding or unfolding is complete. When extended, Great Plains markers are self-floating over uneven ground. When folded, neutral locks the marker in the transport cradle.

Supply oil to the cylinder base end of the marker you wish to extend. When fully extended, set the circuit lever to neutral.

Reverse the circuit to fold the marker. When fully resting in the transport cradle, set the circuit lever to neutral.

![WARNING]

To prevent serious injury or death from pinching or crushing:
- Stay away from markers when they are in motion.
- Keep others away.
Shaft Monitor Operation

The optional shaft monitor generates an alarm if the main seedbox meter shaft on the drill stops turning for more than 30 seconds. On the 3PNG15, the shaft has two coupled sections. In the event of coupler failure, it is possible for one section to independently stop turning.

*Refer to Figure 7*

Turn system on by activating on-off switch 1 on monitor head. If seed-cup shafts are turning, both indicator lights 2 are illuminated and no alarm sounds.

If any seed-cup shaft stops for 30 seconds, an alarm sounds and the indicator for that section flashes on the monitor, designating the failed shaft.

Note: The 30-second delay is to prevent nuisance alarms when turning at the end of the field.

Note: If a failure does occur and an alarm sounds, remember you have traveled for 30 seconds without planting under the stopped shaft. If due to wheel lift or low tire pressure, you may have been planting at progressively lower populations before that.

Parking

Perform the following if parking for 36 hours or less. Refer to "Storage" to prepare for longer-term storage.

1. Position drill on a level, solid area.

*Refer to Figure 7*

2. Unpin and rotate the parking stands down into the parking position. Replace pins as shown. If the ground is soft, place a board under the parking stand to increase ground contact area.

3. Lower drill to ground.

4. Set marker circuit(s) (optional) to float, and disconnect hydraulic lines.

5. Disconnect lighting harness and shaft monitor harness (optional).

6. Extend or retract the top link until the top 3-point pin is free. Remove the pin.

7. Remove pins from the lower links.
Storage

Store drill where children do not play.

1. Hitch tractor (page 11) as needed for raising and clean-out.

2. Unload seedboxes (page 33).

3. Thoroughly clean seed and seed-treatment residue from boxes and feeder cups.

4. Perform Parking steps (above).

5. Remove any dirt and debris that can hold moisture and cause corrosion.

6. Disconnect seed hoses from openers.

7. Cap or plug seed tubes to prevent pest entry.

8. Lubricate and adjust all roller chains.

9. Take special care to oil feed cup drive sprocket in its square bore.

10. Lubricate areas per "Lubrication" on page 36.

11. Grease exposed cylinder rods to prevent rust. Be sure to remove grease at next use, to prevent damage to cylinder seals.

12. Inspect drill for worn or damaged parts. Make repairs and service during the off season.

13. Use spray paint to cover scratches, chips and worn areas on the drill to protect the metal.

14. Cover with a tarp if stored outside.
Adjustments

To get full performance from your drill, you need an understanding of all component operations, and many provide adjustments for optimal field results.

The 3PNG12 and 3PNG15 has double-disc 00 Series openers with depth-controlling press wheels mounted on floating opener frames. Opener bodies are staggered for easy soil flow. All openers pivot on a common axis to maintain consistent depth as the opener frame follows contours. Springs provide the down pressure necessary for double discs to open a seed furrow. The spring allows openers to float into depressions and over obstructions. Individual openers can be adjusted to account for tire tracks.

Even if your planting conditions rarely change, some of these adjustment items need periodic attention due to normal wear.

Seed Rate

Seeds are applied by fluted feed meters driven by the ground wheels. Independent mechanisms drive main seed, native grass and small seeds application.

Main Box Seed rate is controlled by adjustments for:

- Drive Type sprockets
- Seed Rate Handle at box (drill front)
- Feed Cup Door (one each seed tube)

**Native Grass rate** is controlled by:

- Drive Type sprockets
- Driving/Driven sprockets at Native Grass Seedbox

**Small Seeds rate** is controlled by:

- Final Drive sprocket to match Drive Type
- Rate Handle at box (drill rear)

Planting Depth

Setting nominal planting depth, and achieving it consistently, is affected by multiple adjustable drill functions, from greatest to least effect they are:

- Correct Opener Frame Height,
- Opener Depth (Press Wheel Height),
- Opener Down Pressure, and;
- Disc Blade Adjustments (as blades wear).

<table>
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<th>Page</th>
<th>The Adjustment Affects</th>
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<td>Front-to-Back Level</td>
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<td>Setting Native Grass Rate</td>
<td>R</td>
<td></td>
</tr>
<tr>
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<td>Small seeds population</td>
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</tr>
<tr>
<td>Opener Depth (Press Wheel Height)</td>
<td>29</td>
<td>Seeding depth.</td>
</tr>
</tbody>
</table>

R Rate setting details are in the Seed Rate Manual (see page 10 for part number), normally located in the Manual Pak enclosure at the front of the drill.
Calibration Overview
Detailed calibration steps vary with each box. Details are found in the Seed Rate Manual.
Some general information applies to all boxes.

Calibrate with Drill Raised
Perform the calibration with the drill hitched and raised.

Calibrate for 1/10th Acre or Hectare
The number of revolutions per area depends on whether rotating the gauge wheel, or the crank, and if the crank, what current Drive Type. See table at bottom of page.

Calibration Crank Storage
2007 and later 3PNG drills include a calibration crank. Earlier models rely on gauge wheel rotation.
Refer to Figure 9
The calibration crank 1 is stored at a stob 2 on the top of the front frame. It is secured by a pin.

Using Calibration Crank
Refer to Figure 10

Remove the cotter pin from the drive cover at the left end of the drill.

Remove the crank from the storage stob, and use its pin to secure it to the exposed shaft end at the forward left end of the drill.

Use the handle to rotate the shaft counter-clockwise.

A wide range of cranking speeds produce accurate calibrations. For reference, at 6 mph (10 kph) field speed, tire rpm is about 60 (about 1 revolution per second).

Calibration Rotations

<table>
<thead>
<tr>
<th>Drill Model</th>
<th>Gauge Wheel</th>
<th>DT 1</th>
<th>DT 1A</th>
<th>DT 2</th>
<th>DT 2A</th>
</tr>
</thead>
<tbody>
<tr>
<td>3PNG12</td>
<td>450.0</td>
<td>302.9</td>
<td>621.7</td>
<td>98.9</td>
<td>203.0</td>
</tr>
<tr>
<td>3PNG15</td>
<td>364.0</td>
<td>245.0</td>
<td>502.9</td>
<td>80.0</td>
<td>164.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Drill Model</th>
<th>Gauge Wheel</th>
<th>DT 1</th>
<th>DT 1A</th>
<th>DT 2</th>
<th>DT 2A</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1112.0</td>
<td>748.5</td>
<td>1536.3</td>
<td>244.4</td>
<td>501.7</td>
</tr>
<tr>
<td></td>
<td>899.5</td>
<td>605.4</td>
<td>1242.7</td>
<td>197.7</td>
<td>405.8</td>
</tr>
</tbody>
</table>
Marker Adjustments

See other sections for these marker items:

**Marker Setup:**
"Marker Extension Setup" on page 46

**Marker Maintenance:**
"Charge Hydraulic System" on page 46

Marker Disk Angle

*Refer to Figure 11*

To change angle of cut, and the width of the mark:

1. Loosen 1/2-inch bolts 1 holding the disk assembly.

   For a wider mark 2, increase the angle of the marker with respect to the tube 1. For a narrower mark 3, reduce the angle.

   To change direction of cut (throw dirt out vs. in), invert disk blade on hub, or invert disk assembly on tube.

2. Tighten bolts 2.

Marker Speed

The folding speed of independent markers (on separate hydraulic circuits) is controlled by needle valves at the cylinders.

The folding speed of sequenced dual markers is controlled by an adjustment at the sequence valve.

Excessive folding speed can damage markers and void the warranty.

**Folding Speed with Needle Valves**

This applies only to markers plumbed separately (left and right are each on their own tractor hydraulic circuit).

*Refer to Figure 12*

A needle valve controls the folding speed. The needle valve is near the rod end of the marker cylinder. With tractor idling at a normal operating speed, adjust marker folding to a safe speed.

*Do not adjust needle valve while marker is in motion.*
Leveling Drill

Drill height directly affects the working range of the openers. The initial opener tool bar height of 18 1/4 in (46.4 cm), recommended on page 12, provides the maximum range of opener vertical motion for following terrain and riding up over obstructions.

As the 3-point hitch is normally free to float up, the drill gauge wheels must be adjusted to maintain the tool bar height.

To keep the openers level, the drill must be level front-to-back.

Make these adjustments in the field or on ground with similar conditions, so that the openers can penetrate. Lower the drill and pull forward before making height adjustments.

Gauge-Wheel Adjustment

To adjust drill height:

Refer to Figure 13

1. Loosen the jam nut near the bottom clevis of each gauge-wheel turnbuckle.

Note: The lower clevis is slotted. Measurement and adjustment must be made with the drill lowered.

2. Bolt the upper clevis in the upper mounting hole.

3. Set the turnbuckle length. Turn the turnbuckle to shorten or lengthen as necessary. Initially set the length to 20 3/8 in (51.75 cm) between pin centers to achieve the 18 1/4 in recommended tool bar height. When adjusting the turnbuckle, remember:

   Lengthening the turnbuckle raises the drill and allows less downward float of the openers.

   Shortening the turnbuckle lowers the drill and allows less upward float of the openers.

Note: Remember that lowering the drill increases the risk of opener damage on rocks or obstructions.

4. After adjusting both turnbuckles, be certain they are the same length, then tighten the jam nuts.

Refer to Figure 14

5. After setting the turnbuckles, level the drill from front-to-back with the top hitch link. When the drill is level, the gap between the spring-rod casting and the cross bolt will be about 2 inches. This is a general dimension that will vary with the amount of down pressure required for your planting conditions.
Row Unit Adjustments

Refer to Figure 15 (which depicts an 00 series row unit fully populated with all optional accessories [except Seed-Lok] supported for use with the 3PNG12 and 3PNG15 drill)

From front to back, a Great Plains 00 Series row unit can include the following capabilities (some optional):

1. Disc Blades: standard, 2 per row unit
   Double disc blades open a furrow, creating the seed bed. Spacers adjust the blades for a clean furrow. See “Disc Blade Adjustments” on page 27.

2. Dual Down Pressure Springs: standard
   The adjustable springs provides the force to get the row unit and attachments into the soil. See “Opener Down Pressure” on page 28.

3. Main Box Seed Delivery tube: standard
   No adjustments are necessary.

4. Seed firmer: seed flap (shown) standard
   No adjustments required. The flap may need to be shortened if Seed-Lok is field-installed. See “Seed Flap Replacement” on page 35 for maintenance.

   Seed-Lok™ firming wheel (optional)
   Improves seed-soil contact. See “Seed-Lok™ Lock-Up” on page 29.

5. Disc Scraper: standard
   In sticky soils, a scraper helps keep the opener discs operating freely. A slotted scraper is standard. See “Disc Scraper Adjustment” on page 28

   A spring-loaded carbide scraper is optional. See “Carbide Disc Scraper” on page 41.

6. Native Grass Box Seed Delivery tube: standard
   No adjustments are necessary.

7. Small Seeds Box Seed Delivery tube: optional
   No adjustments are necessary.

8. Press wheels: standard (choice of types)
   The T-Handle controls press wheel height and opener depth. The wheels close the seed trench. See “Opener Depth (Press Wheel Height)” on page 29.

Do not back up with row units in the ground. To do so will cause severe damage and row unit plugging.
Disc Blade Adjustments
Opener disc angle and stagger is not adjustable, but disc-to-disc spacing is, and may need attention as discs experience normal wear. Spacers must be reset when blades are replaced.

Refer to Figure 16
The ideal spacing causes the blades to be in contact for about one inch. If you insert two pieces of paper between the blades, the gap between them should be 0 to 1.75in (0-4.4cm). If the blades do not touch, they should at least be close enough so that a business card\(^1\) encounters some friction when passing between them.

If the contact region is significantly larger or the gap too wide, it needs to be adjusted by moving one or more spacer washers. If the contact region varies with blade rotation, one or both blades is likely bent and in need of replacement. If removing all spacers cannot bring the blades into contact, they are worn out and need replacing.

Adjusting Disc Contact
Row unit disc blades may be sharp. Use caution when making adjustments in this area.

Refer to Figure 17
1. Raise the drill and lock the lift cylinders.
2. Remove the bolt \(\text{①}\) retaining the opener disc on one side. Carefully remove the disc, noting how many spacers \(\text{②}\) are outside the disc and inside the disc. Do not lose the hub components and spacer washers \(\text{③}\).
3. To reduce the spacing between the discs (the normal case), move one spacer washer from the inside to the outside of the disc.
4. Re-assemble and check disc contact.

---

1. The cover of this manual is about the same thickness, 0.008in or 0.2mm.
Opener Adjustments

Opener Down Pressure

Opener springs provide the down pressure necessary for opener discs to open a seed trench. The springs allow the openers to float down into depressions and up over obstructions.

Each opener spring can be adjusted for down pressure. This is useful when planting in tractor tire tracks.

Refer to Figure 18
To adjust the pressure, remove "W" clip at bottom of spring. Place "W" clip in a higher hole in spring rod for more pressure or in a lower hole for less pressure.

Use this adjustment only for a few rows, typically in tire tracks.

Re-check drill level front-to-back (page 25) after adjusting row force.

<table>
<thead>
<tr>
<th>&quot;W&quot; Clip Hole</th>
<th>Row Down Force Added</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pounds   kg</td>
</tr>
<tr>
<td>Highest</td>
<td>+60      +27</td>
</tr>
<tr>
<td>Middle</td>
<td>+30      +14</td>
</tr>
<tr>
<td>Lowest</td>
<td>Factory Setting</td>
</tr>
</tbody>
</table>

Disc Scraper Adjustment

To keep opener discs turning freely, dirt scrapers are mounted between discs to clean as the discs rotate. As field conditions vary, scrapers may need to be adjusted. In damp conditions, scrapers may need to be lowered. If openers are not turning freely, scrapers may need to be raised.

Refer to Figure 19
To adjust scrapers, loosen 3/8 inch bolt ① shown in and move scraper as needed.

The standard scraper is shown. Optional spring-loaded carbide scrapers are available (see page 41). They require no adjustment.
Seed-Lok™ Lock-Up
Optional Seed-Lok firming wheels provide additional seed-to-soil contact. The wheels are spring loaded and do not require adjusting. In some wet and sticky conditions the wheels may accumulate soil. To avoid problems associated with this, you can lock-up the firmers.

*Refer to Figure 20 (shown with an opener disc removed for clarity - this task can be performed with discs mounted)*

To lock up Seed-Lock wheels:

1. Pull catch wire aside ①.
2. Pull firming-wheel arm ② up and release wire to catch arm.

Opener Depth (Press Wheel Height)
A press wheel attached to each opener body controls seeding depth. To maintain consistent depth, the relationship between the bottom of the opener discs and press wheel is fixed upwardly by an adjustable stop on each opener.

The press wheels also close the seed trench and gently press soil over seed. To provide consistent soil firming, press wheels are free to move down from normal operating position. This maintains pressing action even if opener discs encounter obstructions or hard soil.

*Refer to Figure 21*

Set opener seeding depth by adjusting press-wheel height. To adjust, first raise drill slightly, then lift and slide T-handles on top of openers.

- For shallower seeding, slide T-handles toward drill.
- For deeper seeding, slide T-handles away from drill.
## Troubleshooting

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<th>Solution</th>
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<td>Reduce field speed.</td>
</tr>
<tr>
<td></td>
<td>Feed cups plugging.</td>
<td>Clean out feed cups.</td>
</tr>
<tr>
<td></td>
<td>Seed tubes plugging.</td>
<td>Clean out seed tubes.</td>
</tr>
<tr>
<td></td>
<td>Opener discs not turning freely.</td>
<td>See “Opener discs not turning freely” in this Troubleshooting section.</td>
</tr>
<tr>
<td></td>
<td>Ground drive wheel slippage</td>
<td>Check tire size/pressure, then frame height. Solution may require drier conditions.</td>
</tr>
<tr>
<td></td>
<td>Seed cups too wide</td>
<td>Use faster Drive Type speed and close feed cup flutes to a more narrow position.</td>
</tr>
<tr>
<td></td>
<td>Chain skipping.</td>
<td>Check chain slack and wear.</td>
</tr>
<tr>
<td></td>
<td>Mud build-up on Seed-Lok wheel</td>
<td>Lock-up Seed-Lok (page 29) or wait for drier conditions.</td>
</tr>
<tr>
<td><strong>Uneven seed depth</strong></td>
<td>Excessive field speed.</td>
<td>Reduce field speed.</td>
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<td></td>
<td>Planting conditions too wet.</td>
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<td></td>
<td>Scraper adjusted too tight, restricting movement</td>
<td>Adjust scraper, page 28.</td>
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<td></td>
<td>Failed disc bearings.</td>
<td>Replace disc bearings.</td>
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<tr>
<td></td>
<td>Bent or twisted opener frame.</td>
<td>Replace opener frame.</td>
</tr>
<tr>
<td></td>
<td>Planting conditions too wet.</td>
<td>Wait until drier weather.</td>
</tr>
<tr>
<td></td>
<td>Too much opener down pressure.</td>
<td>If opener discs turn freely by hand but not in field, reduce down pressure, page 28.</td>
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<td><strong>Actual material rate different than desired</strong></td>
<td>Incorrect frame height</td>
<td>Check frame height (page 25).</td>
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<td></td>
<td>Incorrect tire pressure or size.</td>
<td>Check tire inflation and tire size.</td>
</tr>
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<td>Build up of seed treatment in feed cup.</td>
<td>Clean out seed treatment from feed cups.</td>
</tr>
<tr>
<td></td>
<td>Incorrect rate adjustment.</td>
<td>Check gearbox, sprocket, seed-rate handle and seed door settings. Perform calibration if not already done.</td>
</tr>
<tr>
<td><strong>Excessive seed cracking</strong></td>
<td>Seed cup too narrow.</td>
<td>Use lower Drive Type and higher scale.</td>
</tr>
<tr>
<td></td>
<td>Excessive field speed.</td>
<td>Reduce field speed.</td>
</tr>
<tr>
<td></td>
<td>Feed cup flutes not open enough.</td>
<td>Open feed cups to a wider position.</td>
</tr>
<tr>
<td></td>
<td>Feed cup door handle not open enough.</td>
<td>Open feed cup door handle to a lower position.</td>
</tr>
<tr>
<td><strong>Press wheels not compacting soil as desired</strong></td>
<td>Too wet or clody.</td>
<td>Wait until drier weather or rework ground.</td>
</tr>
<tr>
<td></td>
<td>Not enough down pressure on disc openers.</td>
<td>Increase down pressure on openers, page 28.</td>
</tr>
<tr>
<td>Problem</td>
<td>Cause</td>
<td>Solution</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Boxes not emptying evenly</td>
<td>Some boxes do not have same number of feed cups between each divider of bulkhead.</td>
<td>Load more material than required. Re-distribute when re-loading.</td>
</tr>
<tr>
<td></td>
<td>Main box seed cup door setting</td>
<td>Set all doors the same, per seed size.</td>
</tr>
<tr>
<td></td>
<td>Seed plug(s) installed</td>
<td>Remove seed plug(s).</td>
</tr>
<tr>
<td></td>
<td>Meter or tube blocked.</td>
<td>Clear blockage.</td>
</tr>
<tr>
<td>Press wheel or openers plugging</td>
<td>Planting conditions too wet.</td>
<td>Wait until drier weather.</td>
</tr>
<tr>
<td></td>
<td>Too much down pressure on openers.</td>
<td>Reduce down pressure on openers, page 28.</td>
</tr>
<tr>
<td></td>
<td>Backed up with drill in the ground</td>
<td>Clean out and check for damage.</td>
</tr>
<tr>
<td></td>
<td>Failed disc bearings.</td>
<td>Replace disc bearings.</td>
</tr>
<tr>
<td></td>
<td>Scraper worn or damaged.</td>
<td>Replace scraper.</td>
</tr>
<tr>
<td>Feed cup sprockets locked up or twisted</td>
<td>Foreign matter lodged in one or more feed cup sprockets.</td>
<td>Clean out feed cup sprockets. Use clean seed.</td>
</tr>
<tr>
<td>feed cup drive shaft</td>
<td>Dried liquid insecticide inside feed cups.</td>
<td>Remove build up by disassembling each feed cup and scraping foreign substance from turn surfaces.</td>
</tr>
<tr>
<td>Small seeds box not emptying evenly</td>
<td>Adjustable divider not set evenly.</td>
<td>Move adjustable divider to create more volume in areas that run out first.</td>
</tr>
<tr>
<td>Gauge wheel leans to left or right</td>
<td>U-bolts misaligned</td>
<td>Realign brackets.</td>
</tr>
<tr>
<td></td>
<td>Axle bearings loose</td>
<td>Tighten axles at gauge wheel arms.</td>
</tr>
<tr>
<td>Chain</td>
<td>Debris, retainer clip</td>
<td>Be sure retainer clip is facing opposite way of chain travel. See page 35.</td>
</tr>
<tr>
<td>Marker malfunctions</td>
<td>Hydraulic leak</td>
<td>Check hoses for leaks.</td>
</tr>
<tr>
<td></td>
<td>No oil</td>
<td>Check tractor hydraulic reservoir.</td>
</tr>
<tr>
<td>Marker not marking clearly</td>
<td>Blade angle or direction not ideal</td>
<td>Change angle or reverse blade, page 24.</td>
</tr>
<tr>
<td>Acremeter inaccurate</td>
<td>Excess wheel slippage</td>
<td>Check tire size, pressure and frame height. If correct, solution may be to wait for drier conditions.</td>
</tr>
<tr>
<td></td>
<td>Passes misaligned</td>
<td>Check that planting passes are not leaving gaps (under-reporting area) or causing overlap (over-reporting area).</td>
</tr>
<tr>
<td></td>
<td>Wheel slippage is varying from nominal</td>
<td>If variance is consistent, develop a correction factor for your conditions.</td>
</tr>
<tr>
<td></td>
<td>Check that acremeter is for your drill.</td>
<td>Activate display. Lower left corner must be: 450.0 rev/ac or 1112.0 rev/ha for 3PNG12 or 364.0 rev/ac or 899.5 rev/ha for 3PNG15. Contact dealer if otherwise.</td>
</tr>
<tr>
<td></td>
<td>Acremeter battery failing</td>
<td>Replace acremeter (unit is sealed and battery is not replaceable). See page 42.</td>
</tr>
</tbody>
</table>
Maintenance

Proper servicing and maintenance is the key to long implement life. With careful and systematic inspection, you can avoid costly maintenance, downtime and repair.

Always turn off and remove the tractor key before making any adjustments or performing any maintenance.

You may be severely injured or killed by being crushed under the falling implement. Always have transport locks in place and frame sufficiently blocked up when working on implement.

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 physician familiar with this type of injury.

1. After using the drill for several hours, check all bolts to be sure they are tight.
2. Lubricate areas listed under “Lubrication” on page 36.
3. Adjust idlers to remove excess slack from chains. Clean and use chain lube on all roller chains as needed.
4. Inflate tires as specified in “Tire Inflation Chart” on page 44.
5. Clean out build up of seed treatment in feed cups.
6. Replace any worn, damaged or illegible safety decals. Order new decals from your Great Plains dealer. See “Safety Decals” on page 5.
Marker Shear Bolt

If a marker arm encounters an obstruction, a bolt: 802-253C HHCS 3/8-16X1 3/4 GR2 at the outer hinge is designed to fail, allowing the arm to swing back.

Replace this bolt with an identical Grade 2 bolt. Using a higher grade bolt can lead to equipment damage. Using a lower grade bolt may result in nuisance shears.

If a Grade 2 bolt is not immediately available in your region, substitute a metric M8X1 Class 8.8 bolt and nut.

Seed Clean-Out

Main Box Clean-Out

Refer to Figure 23, which depicts the seed cup door handle in a normal operating position.

1. Set the Seed Rate Handle to zero (0). This moves the seed cup sprockets out of the seed path.
2. Position a tarp or bucket under each row or set of rows to be cleaned out.
3. At the seed cup for that row, pull the door handle out of the operating detent range, and swing it down to position.
4. Open the main seedbox and use a small brush to sweep seed toward seed cups set to clean-out. If seed does not flow freely, inspect seed cup, hose and seed tubes for obstructions.
5. Wash out the seedbox with high pressure water.

It is not necessary to operate the seed meter drive shaft for clean-out. With the Seed Rate set to zero, nothing moves inside the seed cups; however, an inspection of the flutes for excess wear and damage does require shaft rotation.

Set the Seed Rate Handle to 100. Raise and lock-up the drill. Turn the seed meter drive with the calibration crank, while another person inspects the flutes from the open seedboxes.
Native Grass Box Clean-Out
If a suitable vacuum is available, open the Native Grass box lid, and vacuum out remaining seed.
If too much seed remains for the vacuum, or no vacuum is available:
1. Raise and lock up the drill. Place a tarp under the Native Grass seed tubes.
2. Set the Native Grass (right gearbox) Drive Type to 4. Optionally install the smallest final Driven sprocket.
3. Install the calibration crank, and turn the drive system until no seed flows from Native Grass tubes.
4. Vacuum out any residual material from above.
   Water wash-out is not recommended for the Native Grass box, particularly if seed lubricants have been used. Water may cause build-up of solidified residue. Filler material used in native grass mixes can also present problems.

Small Seeds Box Clean-Out
1. Open lid of each box and scoop out as much seed as possible.
2. To recover remaining seed, place a collection tarp under the small seeds tubes at the openers.
3. Raise drill.
4. Set seed rate handle to 100.
5. At left gearbox, rotate calibration crank or ground drive wheel until no seed flows.
6. If a vacuum cleaner is available, remove any residual seed from top of meters.

Disc Maintenance
Opener disc blades wear in normal service, becoming smaller in diameter. Periodically check blade diameter, and replace when below the recommended limits. Discs can also be dented by unusual field hazards, or bent. Replace damaged blades immediately.

Opener Disc Replacement
Replace 15in (38.1cm) opener discs when re-positioning spacers no longer brings both blades into the contact as recommended at “Disc Blade Adjustments” on page 27.
Consult updated Parts Manual for latest disc, or disc assembly part number.
Chain Maintenance

Inspect and lubricate chains regularly. The slack of new chains tends to increase during the first few hours of operation due to seating.

All chains are #40 roller chains.

Chain Slack

Check slack within the first 8 hours of operation and tighten idlers as necessary.

Refer to Figure 24, which, for clarity, greatly exaggerates slack, and omits the idlers.

1. Measure the span 1 for allowable slack:
   Locate the longest span of each chain (usually the span which does not run through the idlers). The ideal slack is $\frac{1}{2}$ in per foot of span between sprocket centers. For example:
   A slack of 1 in is correct for a 24 in span.

2. Measure the current slack 2:
   Acting at a right angle to the chain span at the center of the span, deflect the chain in both directions. The slack is the distance of the movement.

3. Adjust the idlers for ideal slack.

Whenever mounting a chain, make sure the clip at the removable link is oriented to minimize snags.

Refer to Figure 25
Install clip with open end facing away from direction of chain travel (shown by gray or striped arrows in chain routing diagrams).

Seed Flap Replacement

Refer to Figure 26
To replace a seed flap 1 use a needle nose or similar tool and squeeze the tabs 2 together. Pull plastic seed flap 1 down out of metal bracket 3.

Push new seed flap 1 up through metal bracket 3 until tabs 2 on seed flap snap in place.
Lubrication

Small Seeds Shaft Bearing (Option)

1 grease fitting total
Type of Lubrication: Grease
Quantity: Until grease emerges

Jackshaft Bearings

1 grease fitting per bearing; two total
Type of Lubrication: Grease
Quantity: Until grease emerges

Marker Hinges (Option)

2 grease fitting per marker arm; 2 or 4 total
Type of Lubrication: Grease
Quantity: Until grease emerges
Seed Cup Drive Shaft Sprocket

1 sliding sprocket
Type of Lubrication: Oil
Quantity: Coat thoroughly
Move the Seed Rate adjustment handle back and forth to get oil into the square bore. Perform this with seedbox empty, or handle may be difficult to set to 100.

Drive Chains

Type of Lubrication: Chain Lube
Quantity = Coat thoroughly.

Marker Disc Bearings (Option)

2 bearings per disc
Type of Lubrication: Grease
Quantity: Repack
Accessory Hitches

Accessory hitches convert a 3-point drill to a pull-type drill. In addition to any other capabilities of the hitch, this allows use of the drill with a tractor that can pull the drill but not lift it, or a tractor that is not 3-point.

The hitch also increases the weight available for use as row unit down force, and may accept additional weights to increase force further.

Depending on model, accessory hitches also include or support these capabilities:

- Wet fertilizer distribution.
- Frame-mounted coulters for more severe no-till conditions.
- Frame weights.
- Hitch-mounted markers.

Center Pivot Hitch model CPH-15 may be used with 3PNG15 drills.

Precision Fertilizer Hitch model PFH-15 may be used with 3PNG15 drills.

The Sub-Soiler Hitch, model SSH, may be used with any 3PNG drill.

The Pull Hitch Package (part number 124-025A) provides basic conversion of a 12- or 15-foot 3-point drill to pull configuration.

Note: PFH and Pull Hitch are not compatible with dual-gauge wheel drills, unless a Hitch Setback kit is installed.

Note: PFH hitches with tanks are not compatible with drill-mounted markers, unless a Hitch Setback kit is installed. Or use hitch-mounted markers.

Hitches are a separate product line, with options of their own. Consult your Great Plains dealer for detailed configuration and ordering information. Operations are described in the Hitch Operator’s manual.

Hitch Setback Kit

This accessory extends the 3-point hitch to eliminate interference with CPH, PFH and SSH auxiliary hitches.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 SERIES PFH SETBACK KIT</td>
<td>118-130A</td>
</tr>
</tbody>
</table>
Markers

Dual independent markers are available for all 3PNG models.

Drill-mounted markers may be incompatible with a PFH accessory hitch. For those PFH configurations, use a hitch-mounted marker (not described in this manual), or a Hitch Setback kit (page 38).

<table>
<thead>
<tr>
<th>Marker Package</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual flat-Fold Markers</td>
<td>113-212A</td>
</tr>
</tbody>
</table>

For operations, see:

Seed Tube Plug (Main Seeds)

This plug stops seed flow from the main seedbox above the meter. Order one per row to be set inactive.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluted Feed Meter Plug</td>
<td>817-087C</td>
</tr>
</tbody>
</table>

See “Main Seed Row Shutoff” in Seed Rate Manual.

Shaft Monitor

The shaft monitor sounds an alarm if the seed shaft stops turning for more than 30 seconds during planting. Order one per drill.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-Channel Shaft Monitor</td>
<td>116-120A</td>
</tr>
</tbody>
</table>

The kit includes an installation manual. See “Shaft Monitor Operation” on page 20.
Seed Lubricants
Use seed lubricants only in Native Grass planting.

<table>
<thead>
<tr>
<th>Description</th>
<th>Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphite (1 lb / 0.45 kg bottle)</td>
<td>821-042C</td>
</tr>
<tr>
<td>Graphite (5 pound / 2.3 kg jug)</td>
<td>821-060C</td>
</tr>
<tr>
<td>Talc (5 gallon / 18.9 liter container)</td>
<td>821-048C</td>
</tr>
</tbody>
</table>

See page 15 for use.

Small Seeds Attachment
The Small Seeds (SGS) attachment is designed to meter various small seeds in row. It is driven independently of other boxes on the drill. The standard attachment includes a drive system, boxes, meters and seed tubes.

Consult your Great Plains dealer for ordering information.

For operation, see:
“Loading Seed” on page 15,
“Small Seeds Rate” in Seed Rate Manual, and;
“Small Seeds Box Clean-Out” on page 34.

Seed Tube Plug (Small Seeds)
This plug stops seed flow from the small seeds box above the meter. Order one per row to set inactive.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>SML SDS CUP PLUG</td>
<td>133-315H</td>
</tr>
</tbody>
</table>
Removable Partition
This partition reduces side-to-side seed flow in the Small Seeds box. This can prevent seed pile-up when drilling across slopes and in other situations where the seed is particularly fluid. Order one per partition.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMVBL SMALL SEEDBOX PARTITION</td>
<td>123-409D</td>
</tr>
</tbody>
</table>

![Small Seeds Box Partition](image1)

Carbide Disc Scraper
Slotted scrapers are standard.
Optional carbide disc scrapers are spring-loaded and require no periodic adjustment. Scrapers are compatible with the standard seed flap and Seed-Lok, but not Keeton.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPRING SCRAPER ASSEMBLY</td>
<td>121-781A</td>
</tr>
</tbody>
</table>

See “Scraper Installation” on page 48.

![Carbide Scraper](image2)

Seed Firmers
The standard 3PNG12 and 3PNG15 drill includes seed flaps. A choice of firmers is an option in the product bundles, or may be field-installed as kits. Only one type of seed firmer may be installed at the same time. Order one firmer kit per opener.

**Seed-Lok® Seed Firmer**

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series Seed-Lok® kit</td>
<td>122-193K</td>
</tr>
</tbody>
</table>

For operations, see “Seed-Lok™ Lock-Up” on page 29.

![Seed-Lok Seed Firmer](image3)

Press Wheels
A variety of single and dual press wheels are available, as bundle options at the time of initial drill order. Kits are not presently available to convert these in the field. Parts may be ordered to do so.
Acremeter

One or two digital electronic acremeters are standard on the 3PNG12 and 3PNG15 drill. If you require a replacement, or alternate units of measure, order one of the parts below.

<table>
<thead>
<tr>
<th>Units of Measure</th>
<th>Acremeter Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3PNG12</td>
</tr>
<tr>
<td></td>
<td>3PNG15</td>
</tr>
<tr>
<td>U.S. Customary</td>
<td>891-027C</td>
</tr>
<tr>
<td></td>
<td>891-033C</td>
</tr>
<tr>
<td>Metric</td>
<td>891-028C</td>
</tr>
<tr>
<td></td>
<td>891-034C</td>
</tr>
</tbody>
</table>

See “Acremeter Operation” on page 17.

Figure 35
Electronic Acremeter
# Appendix A

## Specifications and Capacities

<table>
<thead>
<tr>
<th></th>
<th>3PNG12-</th>
<th>3PNG15-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-1410</td>
<td>-1975</td>
</tr>
<tr>
<td>Row Spacing</td>
<td>10 in (25.4 cm)</td>
<td>7.5 in (19.1 cm)</td>
</tr>
<tr>
<td>Rows per drill</td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td>Swath</td>
<td>140.0 in (355.6 cm)</td>
<td>142.5 in (362.0 cm)</td>
</tr>
<tr>
<td>Weight, empty</td>
<td>2395-3899 lbs, (1086-1769 kg)*</td>
<td>2480-4313 lbs, (1125-1956 kg)</td>
</tr>
<tr>
<td>Transport Width</td>
<td>12ft (3.66m)</td>
<td>15ft (4.57m)</td>
</tr>
<tr>
<td>Main Seedbox Capacity</td>
<td>24 bu (846 liters)</td>
<td>30 bu (1057 liters)</td>
</tr>
<tr>
<td>Native Grass Box Capacity</td>
<td>12 bu (423 liters)</td>
<td>15 bu (529 liters)</td>
</tr>
<tr>
<td>Small Seeds Box Capacity</td>
<td>2.88 bu (102 liters)</td>
<td>3.6 bu (127 liters)</td>
</tr>
<tr>
<td>Opener Range</td>
<td>6(\frac{1}{2})in (16.5cm) travel, 0-(\frac{3}{2})in (0-9cm) depth</td>
<td></td>
</tr>
<tr>
<td>Gauge Wheels</td>
<td>9.5Lx15, 15-5 6-bolt rim (two)</td>
<td>9.5Lx15, 15-5 6-bolt rim (two or four)</td>
</tr>
<tr>
<td>Tractor Requirements</td>
<td>85 hp (63 kW), 3-point, Cat II, III, IIIIN</td>
<td>110 hp (82 kW), 3-point, Cat II, III, IIIIN</td>
</tr>
<tr>
<td>Hydraulic Circuit</td>
<td>None required for standard drill. 2 circuits for dual markers.</td>
<td></td>
</tr>
</tbody>
</table>

* See page 14 for weights of representative transport and field configurations.
# Torque Values

<table>
<thead>
<tr>
<th>Bolt Size</th>
<th>Bolt Head Identification</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grade 2</td>
<td>Grade 5</td>
<td>Grade 8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N-m&lt;sup&gt;b&lt;/sup&gt;</td>
<td>ft-lb&lt;sup&gt;d&lt;/sup&gt;</td>
<td>N-m</td>
<td>ft-lb</td>
</tr>
<tr>
<td>1/4 IN-20</td>
<td>7.4</td>
<td>5.6</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>1/4 IN-28</td>
<td>8.5</td>
<td>6</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>5/16 IN-18</td>
<td>15</td>
<td>11</td>
<td>24</td>
<td>17</td>
</tr>
<tr>
<td>5/16 IN-24</td>
<td>17</td>
<td>13</td>
<td>26</td>
<td>19</td>
</tr>
<tr>
<td>3/16 IN-16</td>
<td>27</td>
<td>20</td>
<td>42</td>
<td>31</td>
</tr>
<tr>
<td>3/16 IN-24</td>
<td>31</td>
<td>22</td>
<td>47</td>
<td>35</td>
</tr>
<tr>
<td>7/16 IN-14</td>
<td>43</td>
<td>32</td>
<td>67</td>
<td>49</td>
</tr>
<tr>
<td>7/16 IN-20</td>
<td>49</td>
<td>36</td>
<td>75</td>
<td>55</td>
</tr>
<tr>
<td>1/2 IN-13</td>
<td>66</td>
<td>49</td>
<td>105</td>
<td>76</td>
</tr>
<tr>
<td>1/2 IN-20</td>
<td>75</td>
<td>55</td>
<td>115</td>
<td>85</td>
</tr>
<tr>
<td>9/16 IN-12</td>
<td>95</td>
<td>70</td>
<td>150</td>
<td>110</td>
</tr>
<tr>
<td>9/16 IN-18</td>
<td>105</td>
<td>79</td>
<td>165</td>
<td>120</td>
</tr>
<tr>
<td>5/8 IN-11</td>
<td>130</td>
<td>97</td>
<td>205</td>
<td>150</td>
</tr>
<tr>
<td>5/8 IN-18</td>
<td>150</td>
<td>110</td>
<td>230</td>
<td>170</td>
</tr>
<tr>
<td>3/4 IN-10</td>
<td>235</td>
<td>170</td>
<td>360</td>
<td>265</td>
</tr>
<tr>
<td>3/4 IN-16</td>
<td>260</td>
<td>190</td>
<td>405</td>
<td>295</td>
</tr>
<tr>
<td>7/8 IN-9</td>
<td>225</td>
<td>165</td>
<td>585</td>
<td>430</td>
</tr>
<tr>
<td>7/8 IN-14</td>
<td>250</td>
<td>185</td>
<td>640</td>
<td>475</td>
</tr>
<tr>
<td>1 IN-8</td>
<td>340</td>
<td>250</td>
<td>875</td>
<td>645</td>
</tr>
<tr>
<td>1-1/2</td>
<td>370</td>
<td>275</td>
<td>955</td>
<td>705</td>
</tr>
<tr>
<td>1-1/4</td>
<td>480</td>
<td>355</td>
<td>1080</td>
<td>795</td>
</tr>
<tr>
<td>1-1/2 IN-7</td>
<td>540</td>
<td>395</td>
<td>1210</td>
<td>890</td>
</tr>
<tr>
<td>1-1/4 IN-7</td>
<td>680</td>
<td>500</td>
<td>1520</td>
<td>1120</td>
</tr>
<tr>
<td>1-1/2 IN-12</td>
<td>750</td>
<td>555</td>
<td>1680</td>
<td>1240</td>
</tr>
<tr>
<td>1-5/8</td>
<td>890</td>
<td>655</td>
<td>1990</td>
<td>1470</td>
</tr>
<tr>
<td>1-7/8</td>
<td>1010</td>
<td>745</td>
<td>2270</td>
<td>1670</td>
</tr>
<tr>
<td>1-1/2 IN-12</td>
<td>1180</td>
<td>870</td>
<td>2640</td>
<td>1950</td>
</tr>
<tr>
<td>1-1/2-12</td>
<td>1330</td>
<td>980</td>
<td>2970</td>
<td>2190</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bolt Size</th>
<th>Bolt Head Identification</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Five 8</td>
<td>Eight 8</td>
<td>Ten 9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N-m</td>
<td>ft-lb</td>
<td>N-m</td>
<td>ft-lb</td>
</tr>
<tr>
<td>M 5 X 0.8</td>
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- **a. in-tpi** = nominal thread diameter in inches-throughs per inch
- **b. N.m** = newton-meters
- **c. mm x pitch** = nominal thread diameter in mm x thread pitch
- **d. ft-lb** = foot pounds

## Torque Information Chart

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<th>Tire Size</th>
<th>Inflation</th>
<th>Torque</th>
</tr>
</thead>
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<tr>
<td>Gauge Wheel: 9.5lx15</td>
<td>44 psi (303 kPa)</td>
<td>85 lb ft (115 N·m)</td>
</tr>
</tbody>
</table>

## Tire Warranty Information

All tires are warranted by the original manufacturer of the tire. Tire warranty information is found online at the manufacturer's websites listed below. For assistance or information, contact your nearest Authorized Farm Tire Retailer.

- **Manufacturer Website**
  - Firestone: www.firestoneag.com
  - Goodyear: www.goodyearag.com
  - BKT: www.bkt-tires.com/en
  - Titan: www.titan-intl.com
  - Gleason: www.gleasonwheel.com

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2019-02-25
Hydraulic Diagram

Figure 36
Marker Hydraulic System (one side)
Appendix B

Initial Marker Setup (Option)
Install marker(s) per manual supplied with markers.

Terminate Marker Hoses
Feed-line hoses terminate in ½in male NPT fittings. The marker kits do not include couplers. See hydraulic diagram on page 45.

1. Adapt the NPT fittings to the style and size of coupler required to connect the drill to a hydraulic source for system charging.

2. If fitting the final couplers for the tractor to be used with this drill in the field, apply liquid sealant to the threads before making the connections. Do not use plastic tape sealant.

Charge Hydraulic System
The hydraulic system is typically shipped without hydraulic fluid (due to the open hose ends).

3. Be sure tractor hydraulic reservoir is full.

4. With the markers unfolded, crack the hydraulic hose fittings at the base end of the cylinders. With your tractor at an idle speed, activate your tractor hydraulic valve until oil seeps out around the hose ends. Tighten the fittings.

5. Repeat step 4 for the hose-end fittings at the rod end of the cylinders.

6. Fold and unfold the markers slowly to work all the air out of your marker hydraulics. Use caution when folding and unfolding the marker for the first time and check for pinching and kinking of hoses.

Marker Extension Setup
Check the marker extension, even if already dealer-installed. The marker’s own installation instructions may not have covered setting the correct marker arm length, or may have specified a length not optimal for your initial planting.

Refer to Figure 37
Set the initial marker extension © to the value for your drill and row spacing from the table on the next page.

Measure from the centerline of the end row unit (outer unit of a twin pair), whether that row is used or not, to the mark left in the ground when the drill is lowered.

![Figure 37 Marker Extension](image-url)
Marker Extensions

<table>
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<tr>
<th>Drill Model</th>
<th>3PNG12-1410</th>
<th>3PNG12-1975</th>
<th>3PNG15-1810</th>
<th>3PNG15-2475</th>
</tr>
</thead>
<tbody>
<tr>
<td>Row Spacing</td>
<td>10.0 in (25.4 cm)</td>
<td>7.5 in (19.1 cm)</td>
<td>10.0 in (25.4 cm)</td>
<td>7.5 in (19.1 cm)</td>
</tr>
<tr>
<td>Span</td>
<td>130.0 in (330.2 cm)</td>
<td>135.0 in (342.9 cm)</td>
<td>170.0 in (431.8 cm)</td>
<td>172.5 in (438.2 cm)</td>
</tr>
<tr>
<td>Swath</td>
<td>140.0 in (355.6 cm)</td>
<td>142.5 in (362.0 cm)</td>
<td>180.0 in (457.2 cm)</td>
<td>180.0 in (457.2 cm)</td>
</tr>
<tr>
<td>Marker Extension</td>
<td>75.0 in (190.5 cm)</td>
<td>75.0 in (190.5 cm)</td>
<td>95.0 in (241.3 cm)</td>
<td>93.8 in (238.1 cm)</td>
</tr>
</tbody>
</table>

If you modify your row spacing, this can change the marker extension required. Some custom row spacing changes result in an asymmetric row spacing about machine centerline. This usually causes the marker extension to be different for left and right sides, depending on the direction of planting for each successive pass.

Make short practice passes to confirm correct marker extension.

**Marker Extension Adjustment**

*Refer to Figure 38*

To adjust a marker width or disk pivot orientation:

1. Lower drill to field position and extend the marker side to be adjusted.
2. If disk angle or direction is to be changed, make that change before adjusting extension.
3. Pull forward to fully settle drill and leave a mark to check.
4. On telescoping outer marker tubes, loosen both jam nuts ① and both ½ in set screws ②.
5. Move marker disk tube in or out to get the desired mark placement.
6. To change throw direction of marker, remove inner tube completely, and reinsert at desired orientation.
7. Tighten both ½ in set screws ② and then both jam nuts ①.
8. Pull forward to check actual results and fold marker.

Other marker topics in this manual include:
"Marker Operation" on page 19
"Marker Disk Angle" on page 24
"Marker Speed" on page 24
Scraper Installation

Optional carbide disc scrapers are not factory installed. Start with row 1 (left-most row unit):

1. Remove one or both disc blades to gain safe access to the mount ①. Note the position of bushings and spacers for correct re-assembly (page 34).

2. Remove the existing slotted scraper.

Refer to Figure 39

3. Select one:
   ① 802-079C HHCS 3/8-16X1 1/4 GR5
   If Seed-Lok is present, or also being mounted, also select one:
   ⑤ 804-013C WASHER LOCK SPRING 3/8 PLT
   Place the lock washer ⑤ on the bolt.

4. Select one:
   ⑤ 804-012C WASHER FLAT 3/8 SAE PLT
   Place this flat washer on the bolt.

5. Select one:
   ⑮ 890-357C SCRAPER-SPRING LOAD-AIR DES
   If the blades were not completely pre-assembled, select one each:
   ⑱ K7090 AIR DESIGN SCRAPER LH SIDE
   ⑰ K7091 AIR DESIGN SCRAPER RH SIDE
   ⑰ K7092 AIR DESIGN SCRAPER SPACER
   ⑲ K7093 AIR DESIGN SCRAPER 15LB SPRING
   Nest one side (⑱, ⑰) behind the other. Connect the spring ⑳ between the sides, using the small top holes. Insert the spacer ⑰ from the front, with the narrow raised center to the rear (in the large blade holes).

6. Insert the bolt through the scraper blades (⑰, ⑱) and spacer ⑰.

7. If no Seed-Lok is present, select one each:
   ① 804-013C WASHER LOCK SPRING 3/8 PLT
   ⑰ 803-014C NUT HEX 3/8-16 PLT
   Secure the scraper assembly to the scraper mount ① using the lock washer ⑤ and nut ⑩.

8. If a Seed-Lok is present (not shown), secure the scraper assembly to the Seed-Lok, using a threaded hole present in the Seed-Lok. The hex nut is ⑩ unused.

9. Re-mount the removed disc blade.
Warranty

Great Plains (a division of Great Plains Manufacturing, Inc.) warrants to the original purchaser that this Great Plains unit will be free from defects in material and workmanship for a period of one year from the first use date when used as intended and under normal service and conditions for personal use; ninety days for custom/commercial or rental use. This Warranty is limited to the replacement of any defective part by Great Plains 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.

The following items and/or conditions are **not covered under warranty**: failures resulting from abuse or misuse of the equipment, failures occurring as a result of accidental damage or acts of God, failures resulting from alterations or modifications, failures caused by lack of normal maintenance as outlined in the operator’s manual, repairs made by non-authorized personnel, items replaced or repaired due to normal wear (such as wear items and ground engaging components), repeat repair due to improper diagnosis or repair by the dealer, temporary repairs, service calls and/or mileage to and from customer location, overtime premium, or unit hauling expenses. The warranty may be voided if the unit is towed at speeds in excess of 20 miles per hour (32 kilometers per hour), or is used in soils with rocks, stumps, or other obstructions.

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

No other warranty of any kind whatsoever 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 the unit is registered with Great Plains within 10 days from the date of the original purchase.
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