Read this 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.
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Important Safety Information

Look for Safety Symbol

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

Be Aware of Signal Words

Signal words designate a degree or level of hazard seriousness.

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

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

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

Prepare for Emergencies

Be prepared if a fire starts

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctor, ambulance, hospital and fire department near phone.

Be Familiar with Safety Decals

Read and understand “Safety Decals” on page 6, 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.

Use A Safety Chain

Use a safety chain to help control drawn machinery should it separate from tractor draw-bar.

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

Attach chain to tractor draw-bar support or other specified anchor location. Allow only enough slack in chain to permit turning.

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.

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 assistance from a physician familiar with this type of injury.

Minimize Radiation Exposure

The DICKEY-john® RVS III Radar is an intentional radiator of RF energy. Although its radiated energy level is far below the limits set by EN 61010-1:1993 A2:1995-Chapter 12.4, it is advisable not to look directly into the face of the unit.

The radar must radiate toward the ground and at least 20 cm (8 inches) away from a human during use to comply with the RF human exposure limits as called out in FCC 47 CFR Sec.2.1091. DO NOT RE-MOUNT OR USE THE RADAR IN A MANNER INCONSISTENT WITH ITS DEFINED USE.
Handle Chemicals Properly
Agricultural chemicals can be dangerous. Improper use can seriously injure persons, animals, plants, soil and property.

- Do not use liquid seed treatments with the NTA607/2007HD drill.
- 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 30m (100 feet) 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.

Confined Space
With materials loaded, or once used for hazardous fertilizers, or seeds with hazardous treatments, your hoppers may become “permit-required confined spaces” under applicable statutes, regulations, insurance rules or business policy. The vent tube structure in the hoppers has features to assist escape, and is not for routine entry.

- A hopper that is full or merely appears full can be an entrapment hazard. You can sink entirely into the material, or into an oxygen-deficient void, and suffocate in a matter of seconds. Bridges and crusts are especially dangerous.
- When hazardous fumes are present, you can be quickly overcome even with the hopper lid open.
- Do not enter a hopper for material loading, material unloading, hopper cleaning or meter maintenance.
- Clean hopper by power washing from outside hopper top.
- Perform meter maintenance by removing meters from bottom of empty hopper.
- If obstruction removal or repair requires hopper entry, have the work performed by a team trained in confined space procedures. See “Hopper Entry” on page 111.
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.

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

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 30 kph or 20 mph. 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 state and local laws.

Do not tow an implement that, when fully loaded, weighs more than 1.5 times the weight of towing vehicle.

Carry reflectors or flags to mark air drill in case of breakdown on the road.

Keep clear of overhead power lines and other obstructions when transporting. Refer to transport dimensions under “Specifications and Capacities” on page 145.

Do not fold or unfold the air drill while the tractor is moving.

Shutdown and Storage
Unfold and lower air drill.

Block tires or use optional drill parking brakes.

Detach and store air drill 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 119.

Work in a clean, dry area.

Unfold and lower the drill, put tractor in park, turn off engine, and remove key before performing maintenance. If work must be performed with implement raised, use center section lift lock and gauge lock channels provided.

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.

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 air 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 air drill functions.

Operate machinery from the driver’s seat only.

Do not leave drill unattended with tractor engine running.

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.

Watch out for wires, trees, etc., when folding and raising air drill. Make sure all persons are clear of working area.
Safety Decals

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

- Read and follow decal directions.
- Keep lights in operating condition.
- Keep all safety decals clean and legible.
- Replace all damaged or missing decals. Order new decals from your Great Plains dealer. Refer to this section for proper decal placement.

When ordering new parts or components, also request corresponding safety decals.

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

Reflector: Slow Moving Vehicle (SMV)

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<th>Placement</th>
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<td>NTA607HD: n/a</td>
<td>SMV</td>
<td>At center of rear caster sub-frame cross-tube;</td>
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<tr>
<td>NTA2007HD: 818-055C</td>
<td>SMV</td>
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See “Transport Safety Information” on page 37.

Reflectors: Red Triangles

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<td>NTA607HD: 833-399C</td>
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<tr>
<td>NTA2007HD: n/a (International models use 833-398C panels and 833-399C red reflectors)</td>
<td>Red Triangles</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See “Transport Safety Information” on page 37.
**Reflectors: Fluorescent Panels**

**NTA607HD: 833-398C**
One each side, cart front frame, one each side, rear caster light bar; 4 panels total

**NTA2007HD: 833-398C**
One each side, cart front frame; 2 panels total

See “Transport Safety Information” on page 37.

---

**Reflectors: Red**

**NTA607HD: 838-266C**
On rear face of reflector support tube under lights (outside of Daytime); 2 total

**NTA2007HD: 838-266C**
On rear face of lift assist frame tool bar (above Daytime); 2 total

See “Transport Safety Information” on page 37.
**Reflectors: Daytime**

**NTA607HD: 838-267C**

- On rear face of reflector support tube near lights (inside of Reds);
- 2 total

**NTA2007HD: 838-267C**

- On rear face of lift assist frame tool bar (below Reds);
- 2 total

See “Transport Safety Information” on page 37.

**Reflectors: Amber**

**NTA607HD: 838-265C**

- On sides of cart frame above tires,
- on front face of ladders,
- on outside face of casters,
- on bottom forward face of wing pivot weldment (faces outward when wings are folded);
- 8 total.

**NTA2007HD: 838-265C**

See “Transport Safety Information” on page 37.
Transport: Speed
NTA607HD: 848-398C

30 km/h

Centered on rear caster sub-frame cross-tube; 1 total

See “Transport Safety Information” on page 37.

Transport: Brake Roll-Away (Option)
NTA607HD: 848-518C

On rear cart frame, inside of tires, present only if brakes are installed; 0 or 2 total

See “Parking” on page 61.

Danger: Read Manual
NTA607HD: n/a

Export models rely on pictorial decals.

See also decal 848-512C on page 18.

(818-557C Text in Spanish advises non-English readers to seek translation)

On left side of tongue near hitch; 1 total
**Danger: Do Not Ride**

NTA607HD: 848-511C  
NTA2007HD: 848-583C

On each side of cart side frame at ladder top; 2 total

---

**Danger: Crush (Marker Option)**

NTA607HD: 848-513C  
NTA2007HD: 848-581C

On wing tip outside faces, preset only if markers are installed; 0 or 2 total

See “Marker Operation (Option)” on page 57.

---

**Danger: Electrocution**

NTA607HD: 848-516C  
NTA2007HD: 848-574C

On left side of tongue near hitch, on sides of cart frame above tires; 3 total

See “Transporting the Air Drill” on page 37.
Danger: Hitch Crushing

On outside rear faces of cart frame, above tires; 2 total
See “Unfolding and Folding” on page 29.
See “Lowering and Raising Air Drill” on page 34.

Danger: Marker Crush (Option)
NTA607HD: 848-528C NTA2007HD: 848-580C

On wing outside faces preset only if markers are installed; 0 or 2 total
See “Marker Safety Information” on page 58.

Danger: Chemicals
NTA607HD: 848-520C NTA2007HD: 818-323C

On each hopper, near lid, 1 or 2 total
See “Loading Material Safely” on page 46.
See “Loading Liquid Fertilizer (Option)” on page 49.
**Danger: Chemicals (Option)**

*NTA607HD: 848-529C  NTA2007HD: 818-323C*

On tank cradles, preset only if liquid fertilizer system installed; 0 or 2 total

See "Loading Liquid Fertilizer (Option)" on page 49.

---

**Danger: Wing Crushing**

*NTA607HD: 848-530C  NTA2007HD: 848-579C*

On outside faces of center frame weldment riser, on bottom face of front wing pivot arm (faces outward when wings are folded); 4 total

See "Unfolding and Folding" on page 29.

---

**Danger: Marker Pinch (Option)**

*NTA607HD: COV-2753  NTA2007HD: COV-2753*

On upper face at rear of primary marker arm (when wings are unfolded).

Note: This is a Haukaas-supplied decal and does not need to be replaced if lost, damaged or illegible. The hazards it refers to are covered by Great Plains decal part numbers 848-513C, 848-528C, 848-580C and 848-581C.
Warning: Fan Hazard

On front face of tongue cross-tube near fan; one total
See “Fan Safety Information” on page 55.

Warning: Moving Chain

On right cart frame near contact drive, on bearing plate near calibration crank shaft, on bottom of hoppers above meter input sprocket; 4 or 5 total
See “Calibration Crank, Bag and Scale” on page 51.

Warning: Wear Eye Protection
NTA607HD: 848-510C  NTA2007HD: 848-392C

On each hopper at lid, walkboard side; 1 or 2 total
See “Loading Material Safely” on page 46.
Warning: Pinch Point
NTA607HD: 848-514C  NTA2007HD: 848-582C

On front face of wing pivot links, on outside faces of rear parallel arms; 4 total
See “Unfolding and Folding” on page 29.

Warning: High Pressure Fluid
NTA607HD: 848-517C  NTA2007HD: 818-437C

On left side of tongue near hitch, at hydraulic port bulkhead on rear of cart; 2 total
See “Hydraulic Hose Hookup” on page 23.
See “Hydraulic Maintenance Safety Information” on page 115
See “Fan Safety Information” on page 55.
See “Weight Transfer Safety Information” on page 85.

Warning: Confined Space
NTA607HD: 848-519C  NTA2007HD: 818-628C

On each hopper at lid, walkboard side; 1 or 2 total
See “Hopper Lid Safety Information” on page 42.
See “Loading Material Safely” on page 46.
See “Material Clean-Outs” on page 110.
**Warning: Moving Gears**
NTA607HD: 848-522C  NTA2007HD: 848-576C

On bottom of hoppers above final Range gears; 
1 or 2 total
See “Seed Meter Final Drive Range” on page 70.

**Warning: Pinch Point**
NTA607HD: 848-525C  NTA2007HD: 848-578C

On outside faces of flex link weldment, 
on outside face of cylinder lug above wing gauge wheels; 
4 total
See “Weight Transfer Safety Information” on page 85.

**Warning: Falling Hazard**
NTA607HD: 848-527C  NTA2007HD: 848-575C

On each side of cart side frame at ladder top; 
2 total
See “Ladder Operations” on page 41.
Warning: Hand Pinch
NTA607HD: 848-531C NTA2007HD: 818-798C

On gearbox mounting plate near adjuster crank, on top outside face of cart/implement link arms; 3 or 4 total
See “Setting Material Rates” on page 64.

Caution: Read Operator Manual
NTA607HD: 848-512C NTA2007HD: 818-630C

On left side of tongue near hitch; 1 total

Caution: Radar in Use

On top side of tongue near radar transceiver, 1 total
See “Minimize Radiation Exposure” on page 2.
Caution: Tire Pressure and Torque
NTA607HD: 848-497C  NTA2007HD: 838-092C

On rims of implement gauge and lift wheels;
4 total
See “Transport Safety Information” on page 37.
See “Leveling Implement” on page 130.

Caution: Tire Pressure and Torque
NTA607HD: 848-498C  NTA2007HD: 848-102C

On outside rim each cart transport wheel;
2 total
See “Contact Drive Re-setting” on page 114.

Caution: Tire Pressure and Torque
NTA607HD: 848-499C  NTA2007HD: 848-584C

On inside face of contact drive wheel arm;
1 total
See “Transport Safety Information” on page 37.
Caution: Tires Not A Step

On rear face of lift assist frame tool bar above casters, 
rear face of cart frame near transport tires, 
on gauge wheel arms above tires; 
6 total

See “Unfold/Fold: Safety Information” on page 29.
See “Unfold/Fold: Safety Information” on page 29.
See “Weight Transfer Safety Information” on page 85.

Caution: Use Adequate Tractor
NTA607HD: n/a  NTA2007HD: 848-623C

On left side of tongue near hitch; 
1 total
Introduction

Great Plains welcomes you to its growing family of new product owners. Your 6m/20ft No-Till Heavy Duty Air Drill 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.

Models Covered

NTA607HD-3275  6m, 32-row, 19.1cm (7.5in) spacing
NTA607HD-4006  6m, 40-row, 15.0cm (5.9in) spacing
NTA2007HD-3275  20ft, 32-row, 7.5in spacing
NTA2007HD-4006  20ft, 40-row, 6in spacing

See "Specifications and Capacities" on page 145 for precise swath information.

Description of Unit

The NTA607/2007HD Drill is a pull-type integrated air drill. It has single or dual hoppers for separate or simultaneous delivery of seed and/or granulated dry fertilizer. Hydraulic weight transfer is standard.

A single-hopper configuration may have liquid fertilizer saddle tanks. Each hopper has an independent metering system with infinite ratio gearboxes. The NTA607/2007HD Drill folds for narrow (3m) transport.

The NTA607HD or NTA2007HD has double-disk Series 07HD heavy duty openers, suitable for conventional till and, minimum-till conditions. With optional coulters, the drill is suitable for moderate no-till conditions.

The NTA607/2007HD offers optional brakes. Service brakes are operated by air or hydraulic lines to the tractor. Parking brakes are manually operated at the drill. Other options include variable rate meter servo and markers.

Intended Usage

Use the NTA607/2007HD Drill to seed and fertilize production-agriculture crops only. Do not modify the air drill for use with attachments other than Great Plains options and accessories specified for use with the NTA607/2007HD Drill.

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.

Definitions

The following terms are used throughout this manual.

Document Family

166-283M  Owner’s Manual (this document)
167-085B  Seed Rate Charts
166-283P  Parts Manual
166-263M  Variable Rate Kit Installation
113-850M  Marker Installation
12-M-43  CDS-JohnBlue NGP-6055K pump
110011544  DICKEY-john® Quick Start Guide
110011375  DICKEY-john® Air Cart Control manual
110111543  DICKEY-john® Tramline Kit instructions

NOTICE

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

Note: Useful information related to the preceding topic.

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

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

Refer to Figure 2
Your machine’s parts were specially designed and should only be replaced with Great Plains parts. Always use the serial and model number when ordering parts from your Great Plains dealer. The serial-number plate is located on the left side main frame, below crank.

Record your NTA607/2007HD Drill model and serial number here for quick reference:

Model Number:__________________________
Serial Number: __________________________

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

1. Discuss the matter with your dealership service manager. Make sure they are aware of any problems so they can assist you.

2. If you are still unsatisfied, seek out the owner or general manager of the dealership.

For further assistance write to:

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

gp_web_cs@greatplainsmfg.com
785-823-3276
Preparation and Setup

This section helps you prepare your tractor and NTA607/2007HD Drill for use, and covers seasonal tasks, and task when the tractor/air drill configuration changes.

Before using the NTA607/2007HD Drill in the field, you must hitch the air drill to a suitable tractor, inspect systems and level the air drill. Before using the air drill for the first time, and periodically thereafter, certain adjustments and calibrations are required.

Initial Setup

See “Appendix B - Initial Setup” on page 163 and “Appendix C - Option Installation” on page 164 for pre-delivery items (normally completed by dealer), and first-time/infrequent setup tasks, including:

- Install seed monitor console in tractor (page 163).
- Set marker extension (page 96) and speed.

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 115).
- Wing leveling and alignment (page 130).
- Speed sensor calibration (DICKEY-john® Air Cart Control manual).
- Blow out entire air system to remove condensation. Check air flow at each row, for evidence of plugging.
- De-grease exposed cylinder rods if so protected at last storage.

Pre-Planting Setup

Complete this checklist before routine setup:

- Read and understand “Important Safety Information” on page 1.
- Check that all working parts are moving freely, bolts are tight, and cotter pins are spread.
- Check that all grease fittings are in place and lubricated. See “Lubrication and Scheduled Maintenance” on page 133.
- Check that all safety decals and reflectors are correctly located and legible. Replace if damaged. See “Safety Decals” on page 6.
- Inflate tires to pressure recommended and tighten wheel bolts as specified. See “Tire Inflation Chart” on page 148.
Hitching Tractor to Air Drill

**DANGER**

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

1. With the drill still on the parking jack ①, check that the drill cart frame is level. See “Heights and Leveling” on page 26 for details on setting level.

**NOTICE**

**Implement Lift and Speed Error Risks:**
The frame must be level both for proper operation of the implement, and to avoid frequent re-calibration of the speed radar.

Refer to Figure 3

2. Move the tractor to near hitching position. Put the tractor in Park and shut down the tractor. If the tractor draw bar height is incompatible with the drill hitch height, move and/or invert the hitch to match.

**NOTICE**

**Hitch Failure Risk:**
The hitch may be mounted inverted if necessary, but always have two (2) bolts in two holes of both tongue and hitch. See “Heights and Leveling” on page 26 for hitch adjustments.

3. Remove hitch pin.
   Back tractor to align draw bar and drill hitch.
   Shut down tractor and remove key.

4. Use parking jack to lower drill tongue onto tractor draw bar. Secure hitch to bar with pin. Secure pin with any means provided.

5. Securely attach safety chain ② to a tractor anchor of sufficient strength to control the drill in the event of a hitch failure.

6. Use crank to raise jack foot. Remove pin and jack.

Refer to Figure 4

7. Store jack on stob ③ inside right tongue tube.

8. Connect hydraulic hoses (page 23).


Hydraulic Hose Hookup

**WARNING**

*High Pressure Fluid Hazard:*
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.

*Only trained personnel should work on system hydraulics!*

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.

The fan pressure hose (yellow) must be connected to a circuit capable of continuous flow at high volume.

Note: This implement is compatible only with tractors having Closed Center hydraulics.

**Refer to Figure 5**
To distinguish hoses on the same hydraulic circuit, refer to plastic hose label. The hose under an extended-cylinder symbol feeds a cylinder base end. The hose under a retracted-cylinder symbol feeds a cylinder rod end.

For the hydraulic fan, connect the hose under the retracted cylinder symbol to the pressure side of the motor.

The fan motor further requires hookup of a (third) case drain line, which returns lubricating/cooling fluid.

Marker hoses are provided on the cart even if markers are not installed on the implement. See "Marker Hose Tips" on page 163 prior to first hitching.

**Protecting Fan Hydraulic Motor Seals**

Low Pressure (Case) Drain Connection:

11. Attach case drain hose to low pressure drain connection. See Notice at right.

12. Connect low pressure motor return hose, marked "SUMP", to a high volume low pressure return port. The sump line is distinguished by a large (1.06in/2.7cm diameter) quick coupler.

13. Connect hydraulic hoses to tractor remotes.

**NOTICE**

*Equipment Damage Risk:*
Case Drain Hose must be attached first, prior to inlet and return hoses being connected, to prevent damage to hydraulic motor seals. The case drain has the smaller 1/4in I.D. hose and small, flat-face, low-seep connector. DO NOT connect the case drain line to a power-beyond port.

Case Drain Hose must be detached last, to prevent damage to the fan motor. To allow pressure relief during temperature cycles, it is normal for this line to release small amounts of oil even when stored with the connector elevated.

---

<table>
<thead>
<tr>
<th>Color</th>
<th>Hydraulic Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange</td>
<td>Marker / Auxiliary</td>
</tr>
<tr>
<td>Blue</td>
<td>Opener Lift</td>
</tr>
<tr>
<td>Yellow</td>
<td>Wing Fold / Weight Transfer / Lock Fan (via shutoff valve)</td>
</tr>
<tr>
<td>Black</td>
<td>Sump</td>
</tr>
<tr>
<td>“BRAKES”</td>
<td>Hydraulic trailer brakes (Option)</td>
</tr>
</tbody>
</table>
Brake Hookup (Option)
Two air drill braking (trailer braking) systems are available:

- Dual-line air system (Figure 6) with independent cable-operated parking brake (Figure 8), and
- Single-line hydraulic (Figure 7) with independent cable-operated parking brake (Figure 8).

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

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 drill systems include an independent cable-operated parking brake on the drill. The tractor cannot engage or release the drill’s parking brake system.

**CAUTION**

**Braking Hazards:**
Make sure the operator understands when drill brakes are engaged and when they are released (record tractor behavior on page 40).

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 Hookup

Refer to Figure 9

Refer to Figure 10
16. Connect the “Brake”, “Service” or “Control” line first. This line is Blue-coded.
   This line operates the drill brakes.
17. Connect the “Provision” or “Supply” line. This line is Red-coded.
   The Provision line charges a reservoir tank on the drill. The Brake line operates a valve system which meters tank air to the master cylinder on the drill.

⚠️ CAUTION

Braking Hazard:
Do not use the NTA607HD with a “single-line” air brake system. This drill 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 drill brakes.

⚠️ CAUTION

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

Hydraulic Brake Hookup

Refer to Figure 11
This is a single hydraulic line, connected to the tractor “Brake” outlet.
The factory default connector is a \( \frac{3}{4} \)in 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:
\( \frac{3}{4} \)in male ORB (O-Ring Boss), or \( \frac{3}{4} \)in female JIC (Joint Industry Conference, 37° flare).
Electrical Hookup

Refer to Figure 12
Make sure tractor is shut down with accessory power off before making connections.
18. Mate lighting connector to tractor outlet.
19. Mate monitor connector to tractor harness.
20. Mate any optional or aftermarket electrical connectors.

Make connections prior to air drill movement. Some drill hydraulic circuits are under monitor control.

Heights and Leveling

All frame sections must be at the correct height and level to maintain even planting depth. The hitch height sets cart frame level, and must be at a consistent height to both maintain level, and maintain radar speed calibration.

Periodic frame-leveling adjustments should not be necessary. If you are having problems with uneven depth, check air drill levelness and follow these procedures.

<table>
<thead>
<tr>
<th>Hitch Position</th>
<th>Hitch Height Bottom to Ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>38.1 cm 15.0in</td>
</tr>
<tr>
<td>B</td>
<td>45.7 cm 18.0in</td>
</tr>
<tr>
<td>C</td>
<td>53.3 cm 21.0in</td>
</tr>
<tr>
<td>D</td>
<td>61.0 cm 24.0in</td>
</tr>
<tr>
<td>E</td>
<td>68.6 cm 27.0in</td>
</tr>
</tbody>
</table>

Set Tongue Height

Drill must be unfolded for this procedure.

Refer to Figure 13
2. Unfold the air drill fully (page 29).
3. Set the initial tongue height, tractor hitch, and changing implement hitch configuration as necessary. Distance is measured at bottom of hitch to ground level.
4. If desired height cannot be attained with normal range of hitch, hitch may be relocated in tongue bolt holes. Always have two bolts in use, through two sets of hitch holes and two sets of tongue holes.

**NOTICE**

Consistent Seeding Depth Risk:
Level frame in planting conditions. Failure to do so may result in implement not producing desired results.
Checking Air Drill Height

The air drill is designed to operate with all sections of the main tool bar nominally:
- 65cm (25\(\frac{1}{2}\)in) above the planting surface, at a planting depth of:
- 3.8cm (1\(\frac{1}{2}\)in), and a coulter (option) depth of:
- 5.1cm (2in).

Refer to Figure 14

Tool bar height is measured to the bottom of the tool bars on which the row units are mounted.

At the suggested default setting, the implement frame is level with the ground during planting, and the row units operate at their most consistent planting depth.

Your crop, soil conditions, disk wear and other factors may create a need to use a different tool bar height.

Refer to Figure 15

Tool bar height is set via combinations of spacer bushings on the rods of the master lift cylinders ahead of the implement center section, described on page 80. The wing end tool bar heights are controlled by slave cylinders that stop retracting when the master cylinders stop. Only weight transfer adjustment is usually required for wing height (although eyebolt adjustment is available).

When checking tool bar height:
1. Move the drill to representative planting soil conditions.
2. Set hitch to planting height (page 26).
3. Unfold and lower the implement (page 29).
4. Pull forward a meter or so (a few feet) to put openers in ground.
5. Check tool bar height across air drill.
6. If center section is not at desired height, see “Adjusting Tool Bar Height” on page 80.
7. If wing tool bar heights do not match center section, this usually means that wing weight transfer needs to be set or adjusted. See see “Weight Transfer Adjustments” on page 84 before considering an eyebolt adjustment (page 130).

Marker Setup

Prior to first use, set or review marker extension and tension. See:
- “Marker Adjustments” on page 95.

Prior to each planting session, check and adjust:
- “Marker Disk Adjustment” on page 97.
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 NTA607HD or NTA2007HD air drill to the field.

⚠️ WARNING

High Pressure Fluid Hazard:
Esating 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 an accident occurs, seek immediate medical assistance from a physician familiar with this type of injury.

- Review "Important Safety Information" on page 1.
- Lubricate as indicated at “Lubrication and Scheduled Maintenance” on page 133.
- Check all tires for proper inflation. See “Tire Inflation Chart” on page 148.
- Check all bolts, pins, and fasteners. Torque as shown in “Torque Values Chart” on page 149.
- Check air drill 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.

Master Switch (Option)

This switch is present only if the optional Variable Rate Kit is installed. The switch is normally located near the DICKEY-john® console terminal.

The master switch controls the optional linear actuator(s) on the variable rate gearbox(es). When the master switch is off, it also signals the seed monitor system that you are not presently planting.

The master switch and the lift switch control the linear motor that engages the contact drive, when operating in GRAN SEED CONTROL or GRAN FERT CONTROL modes. In GRAN SEED/FERT MONITOR mode, only the lift switch controls contact drive engagement.
Unfolding and Folding

Unfold/Fold: Safety Information

**DANGER**

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**

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

**WARNING**

Pinch Point and Crushing Hazards:
Keep people away from the drill 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.

**CAUTION**

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. Wing gauge wheel tires are off the ground in lift.

Unfold/Fold: About the Hydraulics

The fold/unfold (and weight transfer) functions are on a hydraulic circuit that is shared with the hydraulic fan on the air cart. The fan must be disabled during fold and unfold, but is not disabled for weight transfer.

Part of the unfold/fold operation involves the Lift circuit. To meet highway clearance requirements, the wing gauge wheels are in the Lowered configuration during fold, and are moved to the Raised configuration prior to unfold.

The seed monitor does not need to be active during unfold. When the implement is raised, with the seed monitor off, the wing solenoid valves default to Fold circuit enabled.

**NOTICE**

Wing Tilt Risk:
Fold only on hard level ground. If parked across a slope, wing lock pins could be difficult or impossible to remove or insert.

**NOTICE**

Equipment Damage Risk:
Raise implement before unfolding or folding. Folding with openers lowered causes wing inside rows to dig or drag sideways. Damage is likely.
Unfold: Summary of Steps
These steps presume a drill raised and folded for transport, such as at initial delivery. Follow the detailed instructions in step 1 through step 7, beginning on this page, until this is a familiar operation.

1. Move to level ground (this page).
2. Close fan shut-off valve (this page).
3. Press “Fold Enable” softkey (if displayed).
4. Fold wings (page 32) to free wing fold locks.
5. Remove wing fold lock pins (this page).
6. Perform a Raise operation to deploy gauge wheels (page 36).
7. Unfold wings (page 29).

Unfold: Move to Level ground
1. Move the drill to level ground with adequate overhead and lateral clearances for the fold operation.

Unfold: Close Fan Shut-Off Valve
Refer to Figure 17
2. Move the valve handle \( \text{perpendicular to valve body (fan off).} \)

This valve is located at the front of the seed cart, to the left of the hydraulic fan.

**NOTICE**

**Equipment Damage Risk:**
The fan shut-off valve must be closed during unfold and fold operations. If the valve is open, fan over-speed or seal damage may result.

Unfold: Retract Fold Cylinders
3. Press “Fold Enable” softkey (if displayed).
4. Retract the fold circuit to lift wings off wing fold lock pins. Set circuit lever to Neutral (not Float) to hold wings off pins.

Unfold: Remove Wing Locks
Refer to Figure 18
5. At each wing, remove the wing fold lock pin from the lock lugs \( 2 \), and secure it in the storage loop \( 3 \).
Unfold: Fully Raise Drill

Note: Gauge wheel cylinder locks are provided for maintenance, but are not used in typical storage or transport. Normally, they are not installed at this time, and do not need to be removed for lowering.

Refer to Figure 19

6. Extend the Lift circuit to:
   6a. deploy the wing gauge wheels, and
   6b. lift the implement frame slightly at the lock.
   Hold the circuit at Extend for a few seconds after the gauge wheels are fully deployed.

![Figure 19](image)

**NOTICE**

**Equipment Damage Risk:**
Raise before unfolding. If this operation is not performed, the wing openers contact the ground, drag, and may be damaged. The center section lift lock may also fail to release during unfold.

Unfolding: Unfold Wings

7. Unfold the wings by extending the fold cylinders.

Note: 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 gauge wheels contact the ground, to ensure that the center lock cylinder activates and disengages the lift lock. Set circuit to Float or Neutral.

Unfold: Enable Fan

Refer to Figure 17 on page 30

8. Move fan shutoff valve handle to in-line with valve body.

![Figure 20](image)
Fold: Summary of Steps
Fold the air drill for moves between fields, transport over public roads, parking and storage.
Follow the detailed instructions in step 1 through step 12 until this is a familiar operation.

Move to level ground (this page).
Check markers folded (option, page 57).
Clear wing lock lugs (this page).
Fully raise implement (page 36).
Press “Enable Fold” softkey.
Fold wings (page 32).
Install lock pins (page 33).
Lower implement to retract wing gauge wheels for transport clearance (page 35).

Fold: Check Drill Configuration
1. Make sure markers, if installed, are fully folded (page 57).

Fold: Move to Level Ground
2. Move the drill to level ground with adequate overhead and lateral clearances for the fold operation.

Refer to Figure 21
3. Locate the wing lock pins ②. Make sure they are not in the wing lock lugs ③.

Fold: Close Fan Shut-Off Valve
Refer to Figure 17 on page 30
4. Move the valve handle (① in Figure 17) perpendicular to valve body. This valve is located at the front of the seed cart, to the left of the hydraulic fan.

Fold: Raise Drill
5. Extend the lift cylinders to full raise drill. Hold at raised for a few seconds. Set circuit to Neutral. Do not install cylinder lock channels.

Fold: Press Softkey
6. If the “Enable Fold” softkey appears on the seed monitor console, press it. Depending on recent machine operations, this key may or may not appear. If it does not appear, Fold is already enabled.

Fold: Fold Wings
7. Activate the fold/tilt/marker circuit to retract the fold cylinders.

Note: One wing may reach the stop before the other. A slight asymmetry is not uncommon in folding.
8. When both wings are in contact with their stops, hold circuit in extend for a few seconds to engage center section lock cylinder. Set fold/fan circuit to Neutral (not Float) to hold at folded.
Fold: Insert Lock Pins

*Refer to Figure 23*

9. At each wing, remove the wing lock pin ① from the storage loop, and secure it in the lock lugs ②.

![Insert Wing Lock Pin](31152)

Fold: Verify Lift Lock

*Refer to Figure 24*

10. Inspect the center section lift lock to ensure that:
   10a. lock cylinder ③ is extended, and
   10b. lock lug ④ is below the lock plate post tops ⑤.

   If the cylinder is extended, but the lock lug is not fully engaged, Extend the lift circuit to allow the lock lug to snap into position.

**WARNING**

*Crush/Pinch Hazards:*
Make sure the lift lock is engaged. Lift and re-lower if it is not. If the lock lug is not fully seated in the lock plate slots, it may not engage the pull link lug ⑥, and 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.

![Lift Lock Engaged](31248)

Fold: Tuck Gauge Wheels

*Refer to Figure 25*

11. Retract the Lift circuit to retract gauge wheels for transport clearance. Set circuit to neutral to hold gauge wheels for transport.

Fold: Float Lift Circuit

12. Set Lift circuit to float for transport, parking or storage. Leave Fan/Fold circuit in Neutral.

![Tuck (Raise) Gauge Wheels](31144)
Lowering and Raising Air Drill

Lowering/Raising Safety Information

**DANGER**

**Crushing Hazard During Lowering:**
Stay clear of wings and openers during lowering and raising. Wings are extremely heavy and are driven down with hydraulic pressure. Coulter and opener disks are sharp. During lowering, openers will cut or crush anything beneath them, and can cause serious injury or death.

**CAUTION**

**Crushing Hazard While Raised:**
Use lift lock (page 33) and gauge wheel lock channels when working above or beside openers.

Without 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:**
Air drill length changes by 56 cm (22in) during raising and lowering. Injury is possible.

Implement casters and row units move forward during raising, and backward during lowering. Gauge wheels move forward during lowering. Casters may swivel. 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 underway or partially complete. Openers can dig in or drag on ground and be damaged.

Note: Gauge wheel lock channels are provided to hold the wings of an unfolded implement at the fully raised position, for maintenance only. These channels are an important safety feature for maintenance, but are not used in normal operations.
Lowering

Refer to Figure 26

1. Check that maintenance lock channels are not installed on gauge wheel lift cylinders.

2. Check that center section lift lock is disengaged. If not:
   - If lock cylinder is extended, check that the fan shut-off valve is closed (page 30), then perform a brief unfold operation (Extend the Fold/Fan circuit) to retract the lock cylinder.
   - If the lock cylinder will not retract, perform a brief Lift operation (Extend the Lift circuit) to free the pawl. If this fails to disengage the lock, see “Lift Lock Troubleshooting” on page 101.

3. Unfold drill before lowering (page 29).

4. Make sure all persons are clear of opener sections.

Refer to Figure 27

5. Activate dedicated lift circuit (normally Retract).

**CAUTION**

Falling Hazard:

Do not stand on tires when implement is lowered. Wing gauge wheels, caster wheels, and seed cart wheels, 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 openers 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 openers lowered causes row unit plugging, and may cause opener damage. Tight turns with openers lowered may damage openers near the turn center.

1. Make sure all persons are clear of opener sections.
2. Activate dedicated Lift circuit (normally Extend).

Refer to Figure 28

3. Extend cylinders until all sections are raised. Hold for a few seconds to re-phase cylinders.
4. Set circuit to Neutral to temporarily hold sections at raised.

Raising: Center Lift Lock

For convenience during field turns, the center section lift lock does not automatically engage during lift. The lock does automatically engage during full fold. To engage the lock without folding, follow these additional steps:

Refer to Figure 29

5. Verify that all persons are safely clear of implement sections.
6. Close the fan shut-off valve (page 30).
7. Have an observer stand where the observer can see the lock cylinder, and the tractor operator can see the observer.
8. Press “Enable Fold” softkey on seed monitor.
9. Activate the Fold/Fan circuit for folding (typically Retract). Hold at fold until the observer signals that the lock cylinder has extended. The lock cylinder normally extends early in the fold cycle.
10. Gradually move the Fold circuit to neutral, to allow any wing folding to reverse, by not cause the lock cylinder to retract.
11. Lower the implement until stopped by the lock. This also prevents the lock from releasing. Set the Lift circuit to neutral.

Note: Gauge wheel lock channels are provided to hold an unfolded implement at the fully raised position, for maintenance only. These channels are an important safety feature for maintenance, but are not used in normal operations.

**NOTICE**

**Equipment Damage Risk:**
On tractors with electronic timer controls for hydraulic circuits, lift timers must be set to no more than 2 seconds longer than needed to fully raise air drill. To reduce oil heating and system wear, Do Not Set for Continuous Mode.

**NOTICE**

**Regulatory Requirement:**
Unless the gauge wheels are in the lowered (tucked) positions when the drill is folded, the air drill may not meet transport clearance requirements that apply to your operations.

**CAUTION**

**Unfolded Lift Lock: Wing Pinch and Crushing Hazards:**
The lift lock prevents the center section from lowering, but only hydraulic oil prevents wings from lowering at the tips. Use maintenance locks to hold wings raised for extended periods. See page 106.
Transporting the Air Drill

Transport Safety Information

**Inadequate Tractor Hazard:**
Tractor must weigh at least 67% of the drill 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 air drill exceeds the load rating of the vehicle.

**Check Bridge Loads:**
A loaded air drill can exceed the load ratings of bridges you must cross.

**Excessive Speed Hazard:**
Maximum transport speed is 30 kph or 20 mph at all times, and lower with a lighter tractor. Excess speed can result in loss of control or inability to stop. Reduce speeds with materials loaded, or if road conditions are less than ideal.

**Unexpected Wing Tilt-Down and Lowering Hazards:**
Use wing fold locks (page 33). Check that implement center section lift lock is engaged (page 33). 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.

**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 overt-tightened nuts can fail suddenly and cause loss of control. Loss of control can cause a major accident resulting in death, injury and equipment damage.

**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.

**Note:** An installation of optional brakes on the drill does not reduce tractor capability requirements or increase allowed maximum transport speed.
Tractor Requirements

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

If your tractor weight or capability is in question, take your empty air drill to a scale and get a precise weight.

Transport Checklist

Plan the route. Avoid steep hills. Keep clearances in mind. Folded, your NTA607/2007HD Drill is nearly 4m (13ft) high and is 3m (9.75ft) wide.

Hitch.
Make hydraulic, electrical and optional braking connections. See “Hitching Tractor to Air Drill” on page 22.

Close hopper lids (page 42).
Check that ladders (page 41) and markers (page 57) are stowed.

If unfolded, raise, fold and lock.
See “Fold: Summary of Steps” on page 32.

If drill is equipped with optional brakes:
With tractor in Park, and with tractor parking brake set, release drill parking brakes (page 39).

Always have lights on for highway operation.
Comply with all national, regional and local safety laws when traveling on public roads.
Release all brakes and travel with caution.

Typical NTA607/2007HD DrillWeights

<table>
<thead>
<tr>
<th>Configuration</th>
<th>NTA607HD</th>
<th>NTA2007HD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-3275</td>
<td>-4006</td>
</tr>
<tr>
<td>Typical¹ single 150bu, empty</td>
<td>9800 kg</td>
<td>10500 kg</td>
</tr>
<tr>
<td>Typical¹ single 150bu, full seed load</td>
<td>13900 kg</td>
<td>14600 kg</td>
</tr>
<tr>
<td>Typical¹ single 82bu, liquid fertilizer, empty</td>
<td>10000 kg</td>
<td>10600 kg</td>
</tr>
<tr>
<td>Typical¹ single 82bu, liquid fertilizer, full</td>
<td>14400 kg</td>
<td>15000 kg</td>
</tr>
<tr>
<td>Typical¹ dual 82bu, empty</td>
<td>10000 kg</td>
<td>10600 kg</td>
</tr>
<tr>
<td>Typical¹ dual 82bu, full seed &amp; dry fertilizer</td>
<td>15000 kg</td>
<td>15600 kg</td>
</tr>
</tbody>
</table>

¹ Includes: Markers, Coulters, Standard Flex, Single-shoot, 2x13 Openers, 3 sets of ballast weights.

Material may be loaded prior to travel, but increases stopping distance, increases the need for caution in turns and braking, and increases tire and brake wear.
Brake Operation (option)

Cart wheel brakes are optional. There are brake shoe pairs on each of the two cart 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 “parking” or “emergency” brake system is controlled by latching handles on either side, connected by cables to the brake shoes for that drill side.

See also:
page 24 - “Brake Hookup (Option)"
page 102 - “Brake Troubleshooting (Option)"
page 119 - “Brake Maintenance (Option)"

⚠️ DANGER

Brake Roll-Away Hazard:
Set manual drill parking brake handle before unhitching drill. 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 drill parked on unlevel ground. An unsecured drill 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 cart. Unless the cart parking brake is set, cart service braking is released shortly after unhitching the cart.

Parking Brakes

Cable-operated parking brakes engage and release independently of the service brake system. There is one operating handle inboard of each cart transport wheel.

The parking brakes themselves are independent systems for each side of the cart. None of these three braking systems can engage or release any of the others.

Refer to Figure 30 and Figure 31
To engage cart parking brakes, pull each handle, on each side, up, until the over-center action holds the brake engaged.

To release cart parking brakes, first make sure tractor brakes are set (or wheels are blocked, or implement is lowered), then pull the handle, on each side, downward, and release forward.

If a handle fails to remain in the engaged position, there may be insufficient tension on the brake cable. See “Hand Brake Maintenance” on page 119.

a. The parking brake system is not a true emergency brake system, as there is no safe way to set the cable-operated brakes when the cart is in motion. This manual therefore refers to it only as a Parking brake system.
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 drill.

**CAUTION**

Know Your Tractor Systems:
Application of tractor Parking and/or Emergency brakes may or may not operate the drill 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 behavior in the table at right. Make sure the tractor operator knows when drill 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 drill, which is coupled to the drill master cylinder 3. The drill 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 drill. The “service” (red coded) line 6 meters air from the reservoir 5 to a booster cylinder 7, which operates the drill’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 drill hookup. Tractor and drill reservoir tanks must be pressurized. Drill service braking may not be immediately available upon tractor hookup with the air/hydraulic system.
Ladder Operations

Ladders are provided on the left and right ends of the cart walkboard for material loading and routine lid/hopper maintenance. These ladders pivot vertically, and are held in the raised position by a spring-loaded pin.

Ladder Safety Information

**CAUTION**

**Falling Hazard:**
Never allow riders on the walkboard. Use only the ladders to ascend the cart. Always face the cart when ascending or descending the ladder. Use the handrails. If only one side of the cart is used for access, leave the other ladder in the raised position (as a railing). Make sure raised ladders are latched. A fall from the ladder or walkboard could result in serious injury or death.

**NOTICE**

**Regulatory Requirement:**
Raise and latch ladders for transport. Lowered ladders may not meet highway clearance requirements that apply to your operations.

Deploying Ladder

Refer to Figure 35
1. Use one hand to hold the ladder up, while pulling horizontal pin ① to the right.

Refer to Figure 34
2. Carefully swing ladder out and down.

Using Ladder
1. Ascend and descend the ladder while facing the drill.
2. Use the handrails when on the higher steps.

Raising Ladder
1. Swing the ladder up. The pin engages automatically, and does not need to be held open.
2. Check that the tip of the pin ① is visible at the outside of the ladder frame.

**CAUTION**

**Overhead Ladder Hazard:**
Make sure horizontal pin at ladder left, near pivot, is fully engaged when ladder is in the raised position. If the ladder is not pinned in the raised position, it could swing down and strike someone, or pinch a hand or arm, resulting in serious injury. Always check the horizontal capture pin if you did not personally set it when raising the ladder.
Hopper and Tank Lid Operations

Hopper Lid Operation begin on this page.
Tank Lid Operation begins on page 44.

Related Topics
"Loading Materials" on page 46
"Unloading Materials" on page 109
"Material Clean-Outs" on page 110

Hopper Lid Safety Information

**DANGER**

**Entrapment and Rapid Suffocation Hazard:**
Never enter a hopper for loading, unloading or routine maintenance. Leave strainer in place except when instructed to remove it. Keep lid tightly closed during operations. Keep lid locked closed or, during storage, locked slightly open. Store ladder to discourage access to lid area. Keep children away from drill.

A hopper that is full, or merely appears full, can be an entrapment hazard. You can sink entirely into the grain, or into an oxygen-deficient void, and suffocate in a matter of seconds. Grain bridges and crusts are especially dangerous.

When hazardous fumes or low oxygen levels are present, you can be quickly overcome even in an empty hopper with the lid open. There may be no odors to alert you to the hazard.

**CAUTION**

**Blowing Debris and Inhalation Hazards:**
Turn off fan before opening hopper lids. Wear eye protection and dust mask or respirator. Hoppers are mildly pressurized and air is circulating in the hopper when the fan is running. Opening a lid with the fan running can expose you to blowing seed, fertilizer and treatment chemicals. Even with the fan off, adding seed or fertilizer will create a dust cloud. Risks include exposure to hazardous chemicals, lung and eye irritation.

**NOTICE**

**Planting Consistency Risk:**
Check lid seals for damage at frequent intervals. Check that latch closes lid tightly. Check hopper pressure reported by the seed monitor. Avoid metering problems caused by air leaks. Air leaks can cause irregular metering of materials.

**Hopper Lid Operation**
Keep lids closed. Keep tightly closed for operations. Keep loosely closed for storage. Open only for material loading, hopper clean-out and exceptional maintenance.
Hopper Lid Opening

Refer to Figure 36
1. Lift handle ①.

Refer to Figure 36 and Figure 37
2. Swing handle ① out until hook ② releases from U-bolt shackle ③.
3. Move hook ② clear of U-bolt and re-close handle.

Refer to Figure 37
4. Lift lid slightly at pivot end to clear strainer ④.
5. Swing lid away from strainer. Open only enough to accomplish the present task.

Inspect Strainer and Hopper

Each hopper is equipped with a strainer intended to:

- capture large foreign matter in seed and materials,
- prevent entry by animals if lid left open, and;
- discourage hopper entry by children.

Leave the strainer in place except during strainer and hopper cleaning.

Refer to Figure 37
6. Each time the lid is opened, inspect the strainer for debris, and if clear, inspect the hopper itself.
7. If the strainer needs to be removed for cleaning, do not perform these steps until immediately ready to clean the strainer and return it to the hopper:
   - Wear gloves suitable for protection against recent fertilizers or seed treatments.
   - Fully open the hopper lid.
   - Lift the strainer out of the hopper.
   - Immediately close and latch the lid (below).
   - Clean and dry the strainer.
   - Return it to the hopper.

Lid Closing

Refer to Figure 37
1. Swing lid over opening until capture hook ② is centered on U-bolt ③ shackle.
2. Open handle ① and engage hook ② on shackle ③.
3. Close handle ① for operations or short-term parking.
   For long-term storage, do not engage hook or latch handle, to avoid deforming the seal.
4. For storage, particularly unlatched, a padlock through both U-bolts deters unauthorized entry by persons unaware of possible confined space risks, and prevents entry of pests, debris and precipitation.
Tank Lid Operation

Liquid fertilizer is customarily loaded from below the tank via the quick-fill inlet, but may also be loaded from above with the lid removed.

Do not open the lid while a quick-fill operation is already in progress. The lid is vented, and will be releasing vapor from the tank. At higher inlet rates, the tank may also be mildly pressurized, and removing the lid could expose you to sudden high concentrations of vapor.

*Refer to Figure 38*

Wear chemical gloves. The underside of the lid is likely to be damp or wet, and coated with whatever chemicals have been used.

Wear a mask or respirator. Consult the MSDS\(^a\) for the materials recently used, or material to be loaded.

---

\(a\). MSDS - Material Safety Data Sheet, available from the material supplier.
Meter Doors

Refer to Figure 39 and Figure 40

Each meter box has two distinct access doors on the bottom:

- ① On the air outlet (rear) side: Clean-Out
  (for emptying hopper)
- ② On the air inlet (front) side: Calibration
  (for meter sampling and meter clean-out)

The doors are closed during transport, loading and planting. They may be open slightly in storage to allow drainage of condensation.

The doors need to close and seal tightly during planting. Periodically inspect the lever clamps for proper tension, and inspect the elastomer seals for integrity and resiliency.

Meter Door Opening

1. Lower the meter chute. Push the latch ④ back (toward cart center). Pull the outside end of the chute to the outside and down.
2. There are two clamp handles on each door. Pull out on a clamp handle ③ just until it is loose.
3. Pull out on the other clamp handle. The door normally will swing down on its own. If not, pull it open by hand.

Meter Door Closing

Make sure the clamp handles are out or down (not up), or it will not be possible to close the door.

1. Use a clean rag to wipe any residual material from the face of the elastomer seals on the door, and from the bottom face of the meter box.
2. Swing the door up into closed position.
3. While holding the door closed, swing one clamp handle up, past vertical.
4. Swing the other clamp handle up past vertical.
5. Inspect the door closure for possible air leaks. Replace any deformed elastomer seal or damaged latch clamp.
6. Raise the meter chute. Pull it away from cart center. Engage the latch handle under the washer.

Material Loss / Air leak Risks:
Do not open the clean-out door (the rear door at the air outlet side) until preparations have been made to capture any material to be re-used. Any material present will flow immediately, possibly in large volume, as soon as the door is open. It may be impossible to close the door, with an adequate air seal, until the hopper is empty.
Loading Materials

1. Take appropriate precautions for handling materials. Whether using auger or hand-loading, dust is likely. Review Materials Safety Data Sheets (MSDS).

2. Review hopper lid safety information on page 42.

3. The implement does not need to be in any particular configuration for material loading. Raising it, however, does reduce the hitch load.

Loading Material Safely

**DANGER**

Cargo and Rapid Suffocation Hazard:
Never enter a hopper for loading or unloading.

A hopper that is full or merely appears full can be an entrapment hazard. You can sink entirely into the grain, or into an oxygen-deficient void, and suffocate in a matter of seconds. Grain bridges and crusts are especially dangerous.

When hazardous fumes or low oxygen levels are present, you can be quickly overcome even in an empty hopper with the hopper lid open.

**WARNING**

Agricultural chemicals can be dangerous, including treatments on seeds and components of fertilizers. Improper use can seriously injure persons, animals, plants, soil and property.

*Read and follow chemical manufacturer’s instructions.*

*Wear protective clothing.*

*Handle all chemicals with care.*

*Avoid inhaling smoke from any type of chemical fire.*

*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.*

**Loading: Do Not Enter Hoppers**

With material present, and once used for hazardous fertilizers, or seeds with hazardous treatments, your hoppers may become “permit-required confined spaces” under applicable statutes, regulations, insurance rules or business policy. The venting tube structure in the hoppers has rungs for escape, and is not an entry ladder.

**Loading: Check Strap Tension**

4. Check hopper strap tension prior to every material load on a new drill, and again after material is loaded. See page 107.
Loading Seed or Dry Fertilizer

Loading: Use a Tractor
5. Securely hitch drill to a tractor with adequate weight and power. Park drill on solid, level ground. See Tractor Requirements, "Specifications and Capacities" on page 145. If a suitable tractor is not available, ensure that the tongue jack is on solid ground, and block multiple tires.

6. Lower the ladder on one side (page 41).

Loading: Select Hoppers to Use

Refer to Figure 41

Single-Hopper Configuration
For single-hopper drills, all materials are delivered to the row unit seed tubes, and are placed in furrow.

Dual-Hopper Single-Shoot Configuration
On a dual-hopper "single-shoot" drill, either hopper may be used for seed and/or fertilizer. All materials are delivered to the row unit seed tubes, and are placed in furrow.

If applying the same material from both hoppers, you can meter from both simultaneously, or from one at a time, sequentially. For sequential metering, the unused hopper is disabled by removing a final Range gear.

Simultaneous metering avoids weight imbalance and eliminates stopping before the halfway point for meter change-over. However, avoid simultaneous metering if it would result in a Low Range variable rate gearbox setting below a scale value of 20.

If metering simultaneously, set each meter for one half the chart (or calibrated) rate. Do not merely use half the single-meter scale setting, as this is usually not half the rate. See “Setting Material Rates” on page 64, and the Seed Rate Manual for more details.

Dual-Hopper Double-Shoot Configuration

<table>
<thead>
<tr>
<th>Hopper</th>
<th>Intended Hopper Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>I (Left)</td>
<td>Seed or In-Furrow Dry Fertilizer</td>
</tr>
<tr>
<td>II (Right)</td>
<td>Dry Fertilizer or Broadcast Seed</td>
</tr>
</tbody>
</table>

On a dual-hopper "double-shoot" drill, the factory default configuration is that the hoppers and delivery hose routing are optimized for specific uses. See table above.

Augering Heights

<table>
<thead>
<tr>
<th>Hopper</th>
<th>Elevation to Flange</th>
</tr>
</thead>
<tbody>
<tr>
<td>2890 liter (82 bu)</td>
<td>2.83m (9 ft. 0 in.)</td>
</tr>
<tr>
<td>5290 liter (150 bu)</td>
<td>2.97m (9 ft. 1 in.)</td>
</tr>
</tbody>
</table>

**NOTICE**

Variable Hitch Load:
Loading materials increases the hitch load. With the implement lowered, and its circuits in Float, a full material load results in a hitch load of nearly 1900 kg (4200 pounds). This results in a jack load of up to 25 kg/cm² (350 psi). Even if current dry ground supports the jack, sudden wet weather could result in the jack becoming mired.

Figure 41
Hopper Material Delivery

Note: Towers are omitted from illustrations.
Loading: Air-Out System

Refer to Figure 42

7. At each empty hopper to be loaded, if meter box clean-out door or calibration was completely closed, open it. See “Meter Doors” on page 45.

8. If any doors are fully or partially open, wipe seals and bottom flanges clean. Close and latch doors.

9. If the drill has been parked for more than a day, condensation may have caused moisture to accumulate. Whether or not meter doors are opened, run the fan system for several minutes to blow moisture out of the meters, primary and secondary seed hoses.

10. With the fan running, check hopper-lid and meter-box seals carefully for air leaks. Adjust bin latch or replace seals to prevent leakage.

Loading: Prepare Hopper(s)

11. Shut off all hydraulic power to the drill (unless using a tractor or cart circuit for an auger).

12. Open lid of hopper to be loaded (page 42).

13. Check that the strainer basket is in place in the top of the bin. Remove any foreign material from basket.

Loading: Load Seed or Dry Fertilizer

14. Load material at open hopper lid.

15. Check the strainer periodically for foreign matter.

If markers are not installed on the implement, circuits A&B are available at the left rear of the cart, and may be used for auxiliary purposes, such as a user-provisioned auger. Auger height required is:

- 3.0m (9.8 ft) for 5290 liter (150 bu) hopper, and
- 2.8m (9.3 ft) for 2890 liter (82 bu) hoppers

Loading: Close-Out

16. Remove any foreign matter from the strainer basket.

17. Wipe any grain or foreign matter from lid-seal area on top of hopper bin. Close lid(s) and latch securely.

18. Return ladder to storage/transport position (page 41).

Planning Re-Loads

The seed monitor has a level sensor in each hopper to warn when seed box is empty. Alerts occur at these approximate levels of remaining material:

- 82bu hopper: 25 liters (0.7 bu)
- 150bu hopper: 25 liters (0.7 bu).

---

**Material Mis-Application Risk:**
Before filling the drill for the first time, and at the beginning of each season, check the entire bin for leaks. A small air leak can cause large variations in seeding rates.

---

**Entanglement and High Pressure Fluid Hazards:**
Never operate an auger without guards. Wear gloves and eye protection when making/breaking auger hydraulic connections. Follow all auger manufacturer instructions for safe auger operation.
Loading Liquid Fertilizer (Option)

**DANGER**

**Agricultural Chemical Hazards:**
Avoid contact with skin or eyes. Wear proper protective equipment as required by chemical manufacturer. Avoid prolonged breathing of chemical fumes. Wear respirator as required by chemical manufacturer. Some chemicals will cause serious burns, lung damage and death. Seek medical assistance immediately if accident occurs. Know what to do in case of an accident.

**NOTICE**

**Tongue Weight Hazard:**
Hitch to tractor, or ensure that tongue jack is on an adequate surface. Filling the liquid fertilizer tanks adds nearly 2200 kg (4800 pounds) to the cart, much of which may be borne by the tongue. On soft ground, or in the event of sudden rain, the parking jack could sink into the ground.

**NOTICE**

**Inconsistent Rate Risk:**
Use only pre-mixed liquid fertilizers. If using a pre-mixed fertilizer that tends to separate, sediment or stratify, load only immediately before use. The tanks of the optional liquid fertilizer system do not include agitators.

**Tank Loading: All Methods**

Tank fill level is reported by a sight gauge on each tank. The table at right converts the scale levels to liters.

Refer to Figure 44 on page 50 and Figure 146 on page 162

1. Hitch cart and set tractor parking brakes. If filling unhitched, make sure that tongue jack is on an adequate surface. Block cart tires or set optional cart brakes.

2. Close quick-fill shutoff valve 12 at cart right.

3. Close cart outlet valve 22 at cart rear.

4. Determine the desired application rate. Select and installed suggest drop-line orifice plates 26 (see Seed and Fertilizer Rate Manual).

5. Close shut-off valve 16 at pump.

6. If the strainer 17 has not been serviced recently, perform that maintenance before loading material (page 108).

7. Open both tank discharge valves 13, unless filling only one tank at a time, in which case close the valve for the tank not being filled.

Note: With both tank valves open, any type of filling operation fills both tanks. At high fill rates, or if the drill is parked across a slope, tank filling may be uneven.
Tank Loading: Quick-Fill
Complete step 1 through step 7 on page 49.
8. Check that tank lids are secure.
9. Connect the source supply line to the quick-fill inlet 11.
10. Open any shut-off valve at the source outlet line.
11. If the source is pumped, start the pump.
12. Open the cart inlet valve 12.
13. Observe the sight gauge 15 (not shown) on the tank(s) being filled. Do not fill above the “200” (gallon) mark.
14. Close the source outlet shut-off valve, and if none, close the cart inlet shut-off valve 12.
15. Stop the source pump (if any). Close the cart inlet shut-off valve 12 if not already closed.
16. Unless already at the field, close both tank discharge valves 13 to prevent tank-to-tank transfers during transport.

Tank Loading: Top-Fill
Complete step 1 through step 7 on page 49.
17. Deploy the ladder(s) as needed for access to the tanks (page 41).

Refer to Figure 45
18. Unscrew the lid 1 on the tank to be filled.
19. Fill the tank. If filling both tanks from one tank, allow time for the levels to balance.
20. Observe the sight gauge on the tank(s) being filled. Do not fill above the “200” (gallon) mark.
Calibration Crank, Bag and Scale

Refer to Figure 46
Under the right end of the walkboard, the drill includes a calibration crank ①, calibration bag, and digital scale. The bag and scale are stored in a compartment ②, held closed by the crank. A hook ③ is provided for weighing.

The hand crank is provided for manual operation of the meters (the meters otherwise turn only when the drill is lowered and in motion). The crank is used for two common tasks:

• calibration of the meter setting for planting, and
• clean-out of the meter flute chamber.

Calibration Crank Safety Information

⚠️ WARNING

Moving Chain Hazard:
Keep all persons except operator away from drill mainframe during crank operations. Body parts and clothing can get caught in chains, sprockets and gears, causing serious injury. When operating the crank, all parts of the contact drive system are in motion, including parts out of sight of the operator.

⚠️ NOTICE

Machine Damage / Invalid Results Risk:
Rotate the hand crank only in the counter-clockwise direction. Operating in reverse can damage the meter gear box, and produces low sample sizes leading to incorrect calibration and excessively high field rates.

Operating the Hand Crank
1. Turn on the seed monitor. This step is required if the Variable Rate option is installed.
2. Raise drill (page 36). This prevents the contact drive wheel from engaging the transport tire.

Note: Although the crank can be operated with the contact drive engaged, it requires extra effort to override a ratchet coupling.

Refer to Figure 47 (note: Figure 47 exaggerates size of cranking directional decal)
3. Un-pin crank from storage location, and place over hex shaft at cranking location (right side of cart, between rear-most gearbox and transport wheel).
4. For meter clean-out, set both meters 80 or higher (LOW range), or 10 or higher (HIGH RANGE).

For calibration, set the final Range gears, and the meter under test per the instructions in the Seed Rate Manual, and remove a DRIVER or DRIVEN final Range gear on the other meter.

Note: During clean-out, if a variable rate gearbox is set to “0”, operating the hand crank may fail to clear the meters of seed.
Refer to Figure 48
5. Lower the meter chute. Push the latch (4) back (toward cart center). Pull the outside end of the chute to the outside and down.

6. Open calibration door (5) (front door, at air inlet side) on meter(s) being calibrated. See page 45 for door operations.

**NOTICE**

Material Loss Risk:
Open only the calibration door (front, meter air inlet side). Do not open the clean-out door (rear door, meter air outlet side) or material will flow in large quantities. It is generally not possible to re-close the clean-out door, with sufficient air seal, until the hopper is empty.

Refer to Figure 49
7. For calibration, remove calibration bag (5) and scale (7) from storage compartment.

Note: The empty bag weighs 0.91 kg (2.00 pounds).

Refer to Figure 50
8. Hook bag to chute of meter under test. Place loops over ears at outside end of chute. Place hooks in chute latching slots.

9. Turn the crank until material is flowing to the bag. Stop. Sweep any material in the chute into the bag. Empty the bag.

10. Turn the hand crank, counter-clockwise, to simulate meter operation for 1/10 ha or 1/10 ac.

Specific recommendations may be made in applicable manual sections. See:
see "Meter Calibration" in the Seed Rate manual,
see "Unloading Materials" on page 109, and see "Storage" on page 62.

In general, you may operate the crank as fast as is comfortable. For reference, at a field speed of 10 kph (6.2 mph), the jackshaft rotates at 90 rpm (1 1/2 turns per second).

11. Sweep chute contents into bag.

12. Weigh sample:
   Attach scale to hook (3) in Figure 46 on page 51.
   Zero scale.
   Attach bag to scale.
   Weight bag.
   Subtract bag weight from result.

13. Wipe the meter calibration door seal and flanges. Close the calibration door.

14. Return scale and bag to storage compartment at task completion. Secure compartment door closed with calibration crank and pin.
Air System Operation

Figure 51
Single-Hopper Air System

Figure 52
Dual-Hopper (Double-Shoot) Air System
Air Systems Overview

1. **Hydraulic Fan** (page 55)
The fan generates the air flow required to deliver material to the rows. Speed is adjusted via the tractor circuit. Output is monitored via rpm (2), pressure gauge (5), and pressure sensor (8).

2. **Fan RPM Sensor** (page 81)
The seed monitor reports fan rpm based on this sensor. Although it is accurate for rate, it cannot detect a fan running in reverse.

3. **Diverter Vane** (page 83)
Present only on dual-hopper drills, this controls airflow balance between the meters. This may need adjustment with dissimilar material metering.

4. **Manifold Pressure Gauge(s)** (page 81)
There is one gauge per hopper, mounted for ease of observation from the tractor cab. These report whether or not the air system is within recommended limits. On dual-hopper systems, the gauges assist in setting the diverter vane (3).

5. **Meter Inlet Manifold** (page 83)
Fan air is divided (or further divided) into equal flows for each meter inlet port (5).

6. **Hopper** (page 47)
Material (seed or fertilizer) flows into the top of the seed meter (9).

7. **Pressure Balance Lines**
Each hopper contains an internal pressure-balancing system to equalize pressure above and at the base of the material.

8. **Hopper Pressure Sensor**
This sensor signals the seed monitor, which can alarm if the hopper pressure goes out of limits. A dual hopper drill has two sensors.

9. **Seed Meter**
The meter combines material with air flow. It also has features for rate Range, calibration and clean-out.

10. **Flute Shaft** (page 164)
Two (and optionally; three or four) sets of flute “stars” control the flow of seed from the hopper into the air streams.

11. **Flute Shaft RPM Sensor** (page 70)
This shaft encoder provides metering rate data, stoppage alarms, and is used by the optional Variable Rate Kit to control metering rate.

12. **Meter Outlet Ports**
Material falls from the meter flutes (10) into the air streams flowing from inlet manifold to outlet ports. Each port is a separate compartment.

13. **Single-Shoot Y-Tube**
A two-hopper drill may optionally have the output of both meters combined into a single stream to a single set of towers. The flows combine at Y-tubes behind the meters.

14. **Primary Seed Hose**
Four (single-hopper/shoot) or eight (double-shoot) hoses deliver seed from the meters (9) to the towers (15).

15. **Distribution Tower**
The riser tube and distribution rings have features to evenly divide the primary hose material flow into multiple secondary hose (17) flows. There are four towers on single-hopper and single-shoot drills, and eight towers on double-shoot drills.

16. **Blockage Sensor**
Each tower outlet port has a sensor that detects material passage and signals the seed monitor. The primary function of this sensor is to trigger an alarm on flow stoppage.

17. **Secondary Seed Hose**
These hoses deliver material from a tower outlet port to a seed tube (19) or fertilizer tube (20).

18. **Tramline Diverter** (Option, page 143)

19. **Opener Seed Tube**
Seed from hopper I (and hopper II on single-shoot drills) is delivered in-furrow ahead of the seed firmer.

20. **Opener Fertilizer Tube** (page 94)
On a dual-hopper double-shoot drill, the material from hopper II is delivered to this tube above the seed firmer and furrow.
Fan Operation

Fan Safety Information

**DANGER**

Rotating Fan Blade Hazard:
Do not operate fan with guard screen removed. Fan accelerates instantly and with high torque. Body parts and clothing can be drawn into fan, resulting in death or serious injury. Disconnect fan circuit at hitch when working on fan.

**WARNING**

High Pressure Fluid Hazard, Fan Hydraulic Motor:
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 assistance from a physician familiar with this type of injury.

**NOTICE**

Machine Damage Risk: Protect Motor Seals:
Fan circuit has three hoses. All must be correctly connected. Make sure that “SUMP” line is connected to a tractor port capable of accepting high volume low pressure return oil. Connect Case Drain line to a low volume case drain return.

Avoid sudden circuit changes. Motor seals may be damaged by rapid starts and stops, or by circuit reversals. Engage fan circuit lever slowly, while observing fan rpm on seed monitor.

**NOTICE**

Dust, Noise and Startle Risks:
Avoid unexpected fan operation. Set fan shut-off valve to OFF (drill fold) when no fan operations are intended. Set valve to ON before activating fan hydraulic circuit. If fan does not start when slowly moving fan/fold circuit lever, set lever to Float or Neutral and check shutoff valve.

Note: Avoid fan direction reversal. A fan running in reverse cannot generate sufficient airflow for planting. If fan cannot reach target rpm, check for reversed circuit connections or improper drain connection.
Fan General Information
The hydraulic fan supplies the air stream that carries materials from the meters, through the primary hoses to the towers, then to the secondary hoses to the rows.

The fan needs to be running in the correct direction, and within a narrow speed range, to reliably deliver material at your calibrated rates.

The fan shares its hydraulic circuit with the implement fold/down-pressure/weight-transfer system. This has several considerations:

- (see decal left panel) The fan is on during field operations, with the down-pressure and weight transfer circuits active. If planting on very uneven ground, you may observe some minor fluctuation in fan rpm, as the implement circuits demand oil.
- (see decal right panel) The fan must be shut off during fold and unfold operations (page 29).
- The fan must be off for calibration (page 51).
- The fan may be on when the implement is folded and locked (page 32), for air system clean-out (page 110).

NOTICE
Machine Damage Risk:
Always engage the fan with the tractor at a low engine speed. Engaging the fan when the tractor is at high speed may cause fan damage.

Do not reverse hydraulic flow with the fan running.

Note: If the fan plumbing or hitch hookup is reversed, air flow rate will be very low or zero. If you are unable to reach 3000 rpm, check hose connections.

Note: Fan speed is monitored and reported by the seed monitor, but is manually controlled. The optimum rate depends on the seed type and any treatments. “Fan Speed Suggestions” on page 81 for further information.
Fan Field Operation
1. Unfold the implement (page 29).
2. Set the Fan/Fold circuit lever to neutral.

Refer to Figure 54
3. Set the fan shut-off valve to ON/open.
4. With the tractor engine at low rpm, slowly Extend the lever for the Fan/Fold circuit. Bring the fan up to recommended speed (page 81). Let the fan warm up for 15 minutes before planting.
5. Lower the drill 1.5 - 3m (5-10ft) before planting is to begin. It takes a few seconds for seed to travel from the meters to the rows.
6. Leave the fan running during field turns. Meter drive is shut off when the openers are raised.
7. At the end of application, raise openers. Stop material flow before shutting off the fan.
8. Shut off the fan by carefully moving the circuit lever to Float or Neutral. Avoid moving the lever into Retract. The fan does not stop instantly. A check valve in the fan circuit locally recirculates oil until the blades coast to a stop.

Machine Damage Risk:
Always engage the fan with the tractor at a low engine speed. Engaging the fan when the tractor is at high speed may cause fan damage.

Do not reverse hydraulic flow with the fan running.

Note: If the fan plumbing or hitch hookup is reversed, air flow rate will be very low or zero. If you are unable to reach 3000 rpm, check hose connections.

Note: Fan speed is monitored and reported by the seed monitor, but is manually controlled. The optimum rate depends on the seed type, any treatments. “Fan Speed Suggestions” on page 81 for further information.

Marker Operation (Option)
Dual markers are optional on the NTA607/2007HD. See “Markers” on page 143 for ordering information.

Additional Marker Topics
See also:
“Marker Adjustments” on page 95, and;
“Marker Maintenance (Option)” on page 131.

Dual markers are on a dedicated hydraulic circuit which contains an adjustable automatic sequence valve.

Marker circuits must be fully charged with oil and free of air before operation. Before first use / after maintenance, perform “Marker Hydraulic Bleeding”, page 131.
Marker Safety Information

**DANGER**

Electrocution Hazard / Machine Damage Risk:
Never fold implement with a marker extended. Never extend a marker with implement folded. Operate markers only with drill completely unfolded. A marker extended when folded is a major overhead electrocution hazard, overhead clearance hazard, and may damage drill systems.

**WARNING**

Sweep and Pinch/Crush Marker Hazards:
Do not allow anyone to stand near or beyond the end of the wings during marker operations. A folding marker can cause serious or fatal crushing injuries. Marker disk is sharp. A folding or unfolding marker can cause serious lacerations and cause falls.

Marker Unfold and Fold

1. Clear the area within 4m (12ft) of marker arms on both sides of the drill.
2. Carefully move the circuit lever to extend and observe which marker side is extending.

Refer to Figure 55

3. If the marker extending is not on the desired side, reverse the lever (to retract) until the marker returns to the cradle ①. Set the control to Neutral briefly, then to Extend again. This cycles the sequence valve and extends the alternate marker.
4. When marker is fully extended, set circuit to Neutral.
5. To fold marker, set circuit to Retract until marker is in cradle.
6. To extend other side, Extend once more, as at step 3.

Special Dual-Marker Operations
Passes with same marker side:
- Retract (raise) the marker and make the turn.
- Begin to extend the opposite marker.
- Retract it, and extend the original marker.

Both markers unfolded:
- Fully extend one side.
- Momentarily Retract, then Extend to deploy opposite side.

Note: Which marker side extends at circuit activation is somewhat unpredictable, as it depends on the final state of the sequence valve at last use.
Field Operations

Final Field Checklists

Use the following tables to develop a final checklist for your tractor/air drill configuration.

### Mechanical Checklist

<table>
<thead>
<tr>
<th>Task</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check all tire pressures</td>
<td>148</td>
</tr>
<tr>
<td>Tongue height preset</td>
<td>26</td>
</tr>
<tr>
<td>Implement unfolded</td>
<td>29</td>
</tr>
<tr>
<td>Marker extension set</td>
<td>96</td>
</tr>
<tr>
<td>Marker disk angle set</td>
<td>97</td>
</tr>
<tr>
<td>Check ladders stowed.</td>
<td>41</td>
</tr>
</tbody>
</table>

### Electrical Checklist

<table>
<thead>
<tr>
<th>Task</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verify electrical hookups solid</td>
<td>26</td>
</tr>
<tr>
<td>Check seed monitor terminal and observe any diagnostic messages</td>
<td>a</td>
</tr>
<tr>
<td>Configure monitor for crop and population</td>
<td>a</td>
</tr>
<tr>
<td>a. Refer to DICKEY-john® Air Cart Control manual.</td>
<td></td>
</tr>
</tbody>
</table>

### Hopper and Air System Checklist

<table>
<thead>
<tr>
<th>Task</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meter doors closed</td>
<td>45</td>
</tr>
<tr>
<td>Manifold to hopper seal</td>
<td></td>
</tr>
<tr>
<td>Materials loaded</td>
<td>46</td>
</tr>
<tr>
<td>Hose routings - no sags, no pinches (check wing-folded &amp; field positions)</td>
<td>-</td>
</tr>
<tr>
<td>Hoses fully connected to meters, towers and openers</td>
<td>-</td>
</tr>
</tbody>
</table>

### Row Units Checklist

<table>
<thead>
<tr>
<th>Task</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preset depth handles alike.</td>
<td>94</td>
</tr>
<tr>
<td>Preset down force springs alike, except in tracks.</td>
<td>91</td>
</tr>
<tr>
<td>Check wheel scraper gaps (if installed)</td>
<td>92</td>
</tr>
</tbody>
</table>

### Hydraulic System Checklist

<table>
<thead>
<tr>
<th>Task</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check tractor hydraulic reservoir full</td>
<td>-</td>
</tr>
<tr>
<td>Inspect connections for leaks</td>
<td>-</td>
</tr>
<tr>
<td>Perform a raise and lower operation</td>
<td>34</td>
</tr>
<tr>
<td>Set fan shut-off valve ON</td>
<td>57</td>
</tr>
<tr>
<td>Check fan operation</td>
<td>55</td>
</tr>
</tbody>
</table>

### Frame Mounted Coulter Checklist

<table>
<thead>
<tr>
<th>Task</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coulter blade wear</td>
<td>88</td>
</tr>
<tr>
<td>Coulter to row alignment</td>
<td>88</td>
</tr>
<tr>
<td>Coulter down-force</td>
<td>89</td>
</tr>
</tbody>
</table>

### Meters and Drive Checklist

<table>
<thead>
<tr>
<th>Task</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unused meter disabled by removing gear</td>
<td>70</td>
</tr>
<tr>
<td>Correct DRIVER/DRIVEN rate Range gears installed on meter(s) in use</td>
<td>70</td>
</tr>
<tr>
<td>Correct optional flutes for rate Range</td>
<td>a</td>
</tr>
<tr>
<td>Variable rate gearbox set per calibration</td>
<td>71</td>
</tr>
<tr>
<td>Check contact tire inflation</td>
<td>148</td>
</tr>
<tr>
<td>Check chain tension. Re-connect any loose idler tensioning springs.</td>
<td>150</td>
</tr>
<tr>
<td>Master Switch ON</td>
<td>28</td>
</tr>
<tr>
<td>(Variable Rate Kit option)</td>
<td></td>
</tr>
<tr>
<td>a. Refer to Seed Rate manual.</td>
<td></td>
</tr>
</tbody>
</table>
Field Operation
Perform all steps in "Pre-Start Checklist" on page 28 and "Final Field Checklists" on page 59.

**NOTICE**

**Equipment Damage Risk:**
On a new drill, check and adjust hopper strap tension before and after each material load on the first day, then daily thereafter. Loose straps can result in excess meter oscillation as hoppers near empty.

**First Pass Operation Checklist**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Drill unfolded and aligned for first pass, with opener disks about 3m (10ft) before field edge.</td>
</tr>
<tr>
<td>2.</td>
<td>Run fan for at least 15 minutes before planting.</td>
</tr>
<tr>
<td>4.</td>
<td>Set fan hydraulic circuit to low flow, engage circuit. Gradually adjust fan hydraulic flow to obtain 3800 rpm.</td>
</tr>
<tr>
<td>5.</td>
<td>Check seed monitor for alerts.</td>
</tr>
<tr>
<td>6.</td>
<td>Pull forward, lower air drill, and begin planting for a short distance.</td>
</tr>
</tbody>
</table>
| 7.   | Stop. Assess:  
  - coulter depth  
  - planting depth  
  - press wheel operation |
| 8.   | Make necessary adjustments  
  a. Refer to Seed Rate manual. |

**Seed Monitor**
The seed monitor performs the following functions:
- Drill lift switch monitoring
- Seed flow blockage
- Fan Speed monitoring
- Hopper material level monitoring
- Hopper air pressure monitoring
- Meter rate monitoring (seed rate control, optional)
- Ground speed monitoring

Consult the DICKEY-john® Air Cart Control manual for how to configure reporting and alerts.

**Sharp Field Turns Checklist**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Fold marker</td>
</tr>
<tr>
<td>2.</td>
<td>Raise air drill</td>
</tr>
<tr>
<td>3.</td>
<td>Make turn</td>
</tr>
<tr>
<td>4.</td>
<td>Unfold marker on next-row side.</td>
</tr>
<tr>
<td>5.</td>
<td>3m (10ft) before field edge, lower pneumatic drill</td>
</tr>
<tr>
<td>6.</td>
<td>Resume planting.</td>
</tr>
</tbody>
</table>

**NOTICE**

Do not make short radius turns with the drill in the ground.

**Suspending Planting Checklist**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Stop tractor</td>
</tr>
<tr>
<td>2.</td>
<td>Fan hydraulic circuit to Float or Neutral</td>
</tr>
<tr>
<td>3.</td>
<td>Fold Marker</td>
</tr>
<tr>
<td>4.</td>
<td>Raise air drill</td>
</tr>
</tbody>
</table>

Note: If you stop in the middle of a pass, raise the drill and back up 3m (10 ft) before resumption of seeding.

**Ending Planting Checklist**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Suspend operations as above, then</td>
</tr>
<tr>
<td>2.</td>
<td>Lift implement</td>
</tr>
<tr>
<td>3.</td>
<td>Set tractor for fold</td>
</tr>
<tr>
<td>4.</td>
<td>Fold wings</td>
</tr>
<tr>
<td>5.</td>
<td>Lower implement to obtain lock</td>
</tr>
<tr>
<td>6.</td>
<td>Lights ON for transport</td>
</tr>
</tbody>
</table>
Parking
Follow these steps when parking the drill for periods of less than 36 hours. For longer periods, see Storage, the next topic.

1. Position the drill on firm, level ground.
2. To reduce tongue weight, raise, fold and lock implement (page 34 and page 29).

Note: Static tongue weight of a loaded, lowered, and unhitched drill can be as much as 1500 kg (3300 pounds).

3. Check that hopper lids are latched, and secure the hopper lids with security cable or padlock and chain to prevent entry by children. See “Lid Closing” on page 43.

4. Remove jack from storage position and pin securely to lifting stob on outside of drill tongue. See “Hitching Tractor to Air Drill” on page 22.

5. If ground is soft, place a wide block or plate under the jack to increase contact area.

6. Securely block drill tires to prevent jack from digging or sliding off plate.

7. If drill is equipped with optional brakes, set the parking brake handle on each side of the drill.
   
   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 color-coded gladhand holder on the drill.

8. Unhook 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 drill tongue. Store hoses ends in keyholes of hose holder bracket. Largest hole is reserved for sump line.

10. Disconnect hydraulic brake line (option).

11. Disconnect the safety chain.

12. Unhitch from tractor or leading implement.
Storage
Store the drill where children do not play. If possible, store inside for longer life.

2. Raise, fold and lock implement (page 34 and page 29). For unfolded storage, see steps at right.
3. Unlatch the hopper lids so that the seals are not in compression during storage. Route a chain or security cable through the hold-down U-bolt and the latch handle to prevent unauthorized entry, and prevent high winds from opening the lid.
4. Empty the hoppers completely. Hand crank the meters several turns to empty completely. See “Calibration Crank, Bag and Scale” on page 51. Blow out the meters with air to remove all material.
5. Perform Parking checklist (page 61), except for step 3.
6. If equipped with optional air/hydraulic brake system, drain water from reservoir (page 122).
7. Remove the drive chains and store in oil.
8. Lubricate the drill at all points listed under “Lubrication and Scheduled Maintenance” on page 133.
9. Check all bolts, pins, fittings and hoses. Tighten, repair or replace parts as needed.
10. Check all moving parts for wear or damage. Make notes of any parts needing repair or replacement before the next season.
11. Open the meter-box doors completely to release seal pressure and allow rinse water to exit.
12. Thoroughly wash the hoppers with water to prevent corrosion from fertilizer or seed treatments.
13. Set doors to slightly open, but not wide enough for animals to enter the meters. Wire doors in place if needed. Do not store the drill with seals compressed.
14. Raise and latch the ladders, to discourage climbers.
15. Lubricate all points listed in Maintenance to prevent rust.
16. Clean air drill of mud, dirt, excess oil and grease.
17. Grease exposed cylinder rods to prevent rust.
18. Use touch-up paint to cover scratches, chips and worn areas to prevent rust.

Unfolded Storage
See page 106 for details on maintenance lock.
2a. Raise and unfold implement.
2b. Install gauge wheel lock channels.
2c. Initiate a fold, just until center lock engages.
2d. Lower implement onto lock channels.
2e. Set all hydraulic remotes to Float.
Adjustments

Adjustments Summary
To get full performance from your NTA607/2007HD drill, you need an understanding of all component operations, and many provide adjustments for optimal field results. Even if your planting conditions rarely change, some of these items need periodic adjustment due to normal wear.

<table>
<thead>
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<th>Adjustment</th>
<th>Page</th>
<th>The Adjustment Affects</th>
</tr>
</thead>
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</tr>
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<td>Contact Drive Re-setting</td>
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<tr>
<td>Monitor Configuration</td>
<td>-</td>
<td>Primary source is DICKEY-john® manual 110011375</td>
</tr>
<tr>
<td>Air System</td>
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<td>Fan RPM</td>
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<td>Material Rates</td>
<td>-</td>
<td>Primary source is Seed Rate manual 167-085B</td>
</tr>
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<td>Correcting chart rate to your specific materials</td>
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<td>Marker Adjustments</td>
<td></td>
<td></td>
</tr>
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<td>96</td>
<td>Intended swath spacing</td>
</tr>
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<td>Marking weight. Correct folding.</td>
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<td>Marker Disk Angle and Direction</td>
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<td>97</td>
<td>Reliable marker operation</td>
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<td>Cart Weight Transfer Adjustment</td>
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<td>Frame-Mounted Coulters</td>
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<td>Planting Depth Adjustments</td>
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<td>Row Unit Adjustments for Series...</td>
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<td>Opener Depth (Press Wheel Height)</td>
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<td>Planting depth</td>
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<td>Row Unit Down Pressure (Individual)</td>
<td>91</td>
<td>Planting depth uniformity in tire tracks</td>
</tr>
<tr>
<td>Opener Disk Adjustments</td>
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<td>Seed depth, seed-to-soil contact</td>
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<td>Inside Scrapers</td>
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<td>Reliable disk operation</td>
</tr>
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<td>Seed Firmer Adjustments (Option)</td>
<td>93</td>
<td>Seed-soil contact</td>
</tr>
<tr>
<td>Press Wheel Adjustment</td>
<td>94</td>
<td>Effective soil coverage</td>
</tr>
</tbody>
</table>
Setting Material Rates
Rate setting details are covered in the Seed Rate manual 167-085B, which also contains seed and fertilizer rate charts. The topic is covered only in summary form in the present manual.

The NTA607/2007HD drill is a volumetric implement. For a given metering setup, rates vary for materials with different density and granularity. The charts provide a starting point, but calibration is essential for accurate application (even using both meters for the same material at the same rate). Material rates are set independently for each hopper/meter. The seed monitor reports, and can optionally control, seed and dry fertilizer rates.

Liquid fertilizer rates are set at the pump. The seed monitor does not report or control any aspect of liquid rates.

Check Contact Tire
Reliable material rates are only achieved if the ground drive system is working properly. The transport tires and contact drive tire must be the correct size, and must be inflated to factory specifications. Check tire pressures, particularly the contact tire pressure, whenever loading seed or fertilizer. See page 148.

Always replace worn tires with the correct size.

Check Flute Shaft Configuration
For some unusual rate applications, Great Plains offers optional meter flute shafts (page 142) that can increase rates to 150% or 200% of factory standard.

Refer to Figure 58 (which depicts a single flute “star” with its halves, a single star mated, two stars staggered, and a filler)
Know your “stars” setup. If your drill has never been changed from factory standard, you have meter flute shafts with 2 “stars” (4 halves) per outlet. How many “stars” you have determines which rate chart to use.

Refer to Figure 59 (depicting an inspection from below meter)
If the configuration is not known, inspect the flute shaft from the hopper lid (if hopper empty), or from below the meter, with the calibration door fully open. It is not necessary to remove the shaft. Inspect the flutes ①, and filler rings ② at active outlets.

On a standard “2 star” shaft, each seed drop outlet contains two flute sets (4 halves), each pair staggered slightly from the next. Unused outlets are fully blocked by filler rings ③.

On a “3 star” shaft, each outlet contains 3 flute sets.
On a “4 star” shaft, each outlet contains 4 flute sets, with no fillers between adjacent drops.

To change meter flutes, see “Changing Meter Flutes” on page 164.
Find Your Chart and Rate

Standard “2 star” rates are in the main section of the Seed Rate manual. “3 star” and “4 star” rates are in the Appendix.

If you are planning to operate both hoppers, perform the setup steps separately for each hopper, as the configurations (including stars) may be completely different.

1. Confirm that the chart is for the material and star configuration you have.
2. Find your target population or application rate.

Note: If you have a choice of charts, for most consistent results, pick one that results in a variable rate gearbox value between 30 and 70.

Dual Hopper Considerations

If you are applying the same material from both hoppers, what chart rate to start with depends on whether you will run both meters simultaneously, or sequentially (run one, then the other).

The charts do not account for “twin” hopper operation. If both hoppers are metering the same material, at the same rate, and at the same time, the output is twice the chart rate. If run sequentially, or metering different materials at the same time, treat them as single-hopper operation.

High Rate Flute Considerations

“High Rate” charts are provided for some seeds, but the charts do not cover all possible combinations of high-rate flutes. You can use any standard-rate single-hopper chart.

Adjustment for Dual Metering / High Rate Flutes

To find the initial chart rate for dual hopper and/or alternate flutes:

\[ \text{ChartRate} = \text{FieldRate} \times \text{LookupFactor} \]

To find the rate to check at calibration:

\[ \text{CalRate} = \text{FieldRate} \times \text{TwinFactor} \]

Target Rate Adjustments

<table>
<thead>
<tr>
<th>Hoppers for This Material</th>
<th>Single or Sequential</th>
<th>Dual Simultaneous</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Stars (std.)</td>
<td>Chart would be 1x rate LookupFactor = 1.0 TwinFactor = 1.0</td>
<td>Chart would be 2x rate LookupFactor = 0.5 TwinFactor = 0.5</td>
</tr>
<tr>
<td>3 Stars</td>
<td>Chart would be 1.5x rate LookupFactor = 0.67 TwinFactor = 1.0</td>
<td>Chart would be 3x rate LookupFactor = 0.33 TwinFactor = 0.5</td>
</tr>
<tr>
<td>4 Stars</td>
<td>Chart would be 2x rate LookupFactor = 0.5 TwinFactor = 1.0</td>
<td>Chart would be 4x rate LookupFactor = 0.25 TwinFactor = 0.5</td>
</tr>
</tbody>
</table>

For Example:

Drill: NTA607HD-3275
Crop: Barley (no high rate flute chart available)
Field rate: 500 kg/ha (above 2 flute chart coverage)
Flutes: 3 star
Metering: simultaneous dual hopper
165 = 500 x 0.33
Lookup the settings for 165 kg/ha

Continuing the example:
Field rate: 500 kg/ha
250 = 500 x 0.5
Calibrate each meter to 250 kg/ha
Monitor Material Configuration

The DICKEY-john® IntelliAG® monitor reads meter shaft speeds and can report kg/ha (or pounds/acre) planted.

The standard drill operates in GRAN SEED MONITOR and GRAN FERT MONITOR modes (described starting on this page).

With the optional Variable Rate Kit, the seed monitor can also control the variable rate gearboxes. With this kit, the GRAN SEED CONTROL and GRAN FERT CONTROL modes are also available (described starting page 67).

In order to report/control accurately, the monitor requires several inputs. Inputs that rarely change were entered during drill setup. Inputs specific to particular materials (seed or fertilizer) need to be entered when those materials are first used, and when changed.

GRAN SEED MONITOR
GRAN FERT MONITOR

Material Configuration Setup Screen for Seeds

“Type” - This must be set to “Gran Seed Monitor” to configure for seeds.

Density Units” - In metric mode this is always kg/liter. If configured for “U.S.” mode (U.S. customary units), this is pounds-per-bushel or pounds-per-cubic-foot.

“Density” - This is the density of seed being planted. Obtain this information from the material container/supplier. If unknown, use the value from the rate chart.

“Number of Outlets per Meter” or “Total Number of Towers” - This is the number of primary hoses coming off a single meter box (this is always 4 for NTA607/2007HD, whether single- or double-shoot).

“Calibration Constant” - This is the number listed in the seed rate charts for the rate you are planting or the number obtained by calibration for your specific seed.

Material Configuration Setup Screen for Dry Fertilizer

“Type” - This must be set to “Gran Fert Monitor” to configure for fertilizer.

“Density” - Enter the density of Fertilizer being applied, in kilograms-per-liter (pounds-per-cubic-foot). Obtain this information from the material container/supplier. If unknown, use the value specified in the rate chart.

“Number of Outlets per Meter” or “Total Number of Towers” - This is the number of primary hoses coming off a single meter box (this is always 4 for NTA607/2007HD, whether single- or double-shoot).

“Calibration Constant” - This is the number listed in the seed rate charts for the rate you are planting or the number obtained from running the calibration routine for your specific fertilizer.
Channel Setup Screen

Channel 1 setups are for hopper I (left hopper, or the only hopper, if a single-hopper cart). Channel 2 setups are for hopper II (right hopper).

"Type" - Set this to either "Gran Seed Monitor" or "Gran Fert Monitor" based on the type of material in each hopper.

"Material Name" - Choose the name of the material configured for each channel in steps 1 and 2 above.

"Sensor Constant" - [ 360 ]

"Gear Ratio" - [ 1.0 ]

"Channel Width" - is your Implement Width (swath) in inches (cm). Precise row/swath data is found on page 145 (for NTA607HD) and page 146 (NTA2007HD).

If the monitor inputs are correctly entered, the monitor is a handy tool for fine tuning the variable rate gearbox setting. If the rate reported by the monitor does not match the desired planting rate, rotate the crank to adjust the variable rate gearbox control arm slightly so as to achieve the desired planting rate.

GRAN SEED CONTROL
GRAN FERT CONTROL

Update Material Library

In order to correlate actuator output with desired seed rate (meter shaft rate), the system requires a Calibration Constant for each material to be used.

If you already had a material library, re-load it from an SD card or via the menus. Otherwise revise a default material name as the first Control setup.

• The example at right shows sample materials:
  Wheat HRW, renamed from SEED 1
  and
  11-52-0 renamed from FERT 1
  to be used for the first Control setup.

<table>
<thead>
<tr>
<th>CH1</th>
<th>Wheat HRW</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH2</td>
<td>11-52-0</td>
</tr>
<tr>
<td>CH3</td>
<td>DISABLED</td>
</tr>
<tr>
<td>CH4</td>
<td>DISABLED</td>
</tr>
</tbody>
</table>

Example Material Library:

- Wheat HRW
- 11-52-0
- SEED 2
- FERT 2
- SEED 3
- FERT 3
- ...
- ...

Wheat HRW 11-52-0
Create a Controlled Material
Re-define at least one material. Otherwise, create at least one material. Some key steps:

1. **Type** must be set to GRAN SEED CONTROL or GRAN FERT CONTROL.
2. Select or Disable: **Preset Method**
   
   If using preset method, select initial rate increments that are only a few percent, so as to have fine control of the meter scale indicator. These can be changed to coarser increments after calibration.
3. **Density** must be accurately entered.
4. **#Outlets** or **#Towers** is the number of outlets per meter, and is always "4" for NTA607/2007HD, whether single- or double-shoot.
5. Enter the **Cal Const** if one is available for your seed type. This value does not affect the calibration process, and is replaced during calibration, but is useful for comparison. The calibration constant developed during calibration should be similar to the chart number.
6. Set **Variable Cal Const** if one is available for your seed. This is from a list of names pre-programmed into the monitor software. It is usually not the same name as the material name setup on page 67. In this example, “Wheat 2S”, the “2S” refers to the (factory standard) “2 star” meter flute configuration.

   Pick a seed constant closest to yours in terms of physical seed characteristics and meter flute configuration.

   If a suitable Variable Cal Const is available, the system can more accurately compensate for manual calibration cranking speeds that differ from field rate.

   If no suitable Variable Cal Const is available, set to Disabled, and crank at an rpm near field speed at step 36.

<table>
<thead>
<tr>
<th>Example Non-Preset Material Setup:</th>
<th>1-16</th>
<th>CH Wheat HRW</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHANNEL</td>
<td>1 or 2</td>
<td></td>
<td>Per meter being configured</td>
</tr>
<tr>
<td><strong>Type</strong></td>
<td>GRAN SEED CONTROL or GRAN FERT CONTROL</td>
<td><strong>Units</strong></td>
<td>Lb/ac with Rev/ac</td>
</tr>
<tr>
<td><strong>Units</strong></td>
<td>Lb/ac with Rev/ac</td>
<td><strong>Max Rate</strong></td>
<td>78.0 LB/AC</td>
</tr>
<tr>
<td><strong>Target Rate</strong></td>
<td>60.0 LB/AC</td>
<td><strong>Min Rate</strong></td>
<td>48.0 LB/AC</td>
</tr>
<tr>
<td><strong>Inc/Dec %</strong></td>
<td>1.0 %</td>
<td><strong>Density</strong></td>
<td>60.00 LBS/BU</td>
</tr>
<tr>
<td><strong>#Towers</strong></td>
<td>4</td>
<td><strong>Cal Const</strong></td>
<td>77591</td>
</tr>
<tr>
<td><strong>Variable Cal Const</strong></td>
<td>Wheat 2S</td>
<td><strong>Shaft RPM</strong></td>
<td>Low 10 High 50 RPM</td>
</tr>
<tr>
<td><strong>Prod Level Alarm</strong></td>
<td>0</td>
<td><strong>Seeds per Pound</strong></td>
<td>3000 S/LB</td>
</tr>
<tr>
<td><strong>High Pop Alarm</strong></td>
<td>20.0 %</td>
<td><strong>Low Pop Alarm</strong></td>
<td>20.0 %</td>
</tr>
<tr>
<td><strong>ROW WIDTH</strong></td>
<td>—</td>
<td><strong>ON(-)/OFF(X) PATTERN</strong></td>
<td>—</td>
</tr>
<tr>
<td><strong>Row Fail Rate</strong></td>
<td>2 / 1</td>
<td><strong>Seeds per Pound</strong></td>
<td>—</td>
</tr>
</tbody>
</table>
Actuator Channel Setup
1. Assign material.
2. Type must be set to GRAN SEED CONTROL or GRAN FERT CONTROL.
3. Check that other setting are as Required, and reflect the actual configuration of the implement.

Calibrate
Variable Rate kit calibrate begins on page 77.

Example Channel Setup:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel</td>
<td>1 or 2</td>
<td>Per meter being configured</td>
</tr>
<tr>
<td>Type</td>
<td>GRAN SEED CONTROL or GRAN FERT CONTROL</td>
<td>One of these Required</td>
</tr>
<tr>
<td>Material Name</td>
<td>Wheat HRW or 11-52-0</td>
<td>Example user-specified names</td>
</tr>
<tr>
<td>Control Mode</td>
<td>Auto</td>
<td>Required</td>
</tr>
<tr>
<td>Drive Type</td>
<td>Zero Max 1 or 2</td>
<td>Required</td>
</tr>
<tr>
<td>Drive Freq.</td>
<td>40 Hz</td>
<td>Required</td>
</tr>
<tr>
<td>Input Filter</td>
<td>50 %</td>
<td>Required</td>
</tr>
<tr>
<td>Sensor Constant</td>
<td>360 PUL/REV</td>
<td>Required</td>
</tr>
<tr>
<td>Gear Ratio</td>
<td>1.0</td>
<td>Required</td>
</tr>
<tr>
<td>Meter Gear Range</td>
<td>LOW or HIGH</td>
<td>One of these Required</td>
</tr>
<tr>
<td># Seed Rows</td>
<td>32, 36, 40, 48, 50, 60, 65, 66, 80</td>
<td>read-only, per implement or drill model</td>
</tr>
<tr>
<td>Channel Width</td>
<td>(set to swath of implement or drill, in inches or cm)</td>
<td>Required</td>
</tr>
<tr>
<td>Flush Enable</td>
<td>Disabled</td>
<td>Data not used</td>
</tr>
<tr>
<td>Pre-charge(+)/Delay(-)</td>
<td>0.0 SEC</td>
<td>Data not used</td>
</tr>
</tbody>
</table>
**Meter Rate Adjustment**

Seed rate is determined by:

- Flute shafts (covered on page 64): standard 2-star/1x rate, or optional 3-star/1.5x or 4-star/2x rates
- Single/twin hopper metering (covered on page 65).
- Seed meter Final Drive Range gearing
- Variable Rate Gearbox setting

The Seed Rate Manual charts are based on cleaned untreated seed of average size and test weight. Many factors affect meter rates including foreign material, seed treatment, seed size, field conditions, and test weight. Minor adjustments will be needed to compensate for these factors. Initially set the rates according to the charts, then calibrate for your material and conditions. Calibration is also required to set up the monitor Calibration Constant. With the correct Calibration Constant and material density the monitor can be used to help fine tune the variable rate gearbox setting.

**Seed Meter Final Drive Range**

Refer to Figure 60

The meter flute shaft ① is driven by the agitator shaft ② through a pair of interchangeable gears ③, ④. The positioning of these gears creates two final drive ranges.

Each seed rate chart is based on a specific Final Drive Range. The Ranges are:

- “High” range, which is used for larger seeds and higher seeding rates
- “Low” range, which is used for smaller seeds and lower seeding rates

The meter shafts are DRIVING” and “DRIVEN”. The “DRIVING“ shaft is the upper (agitator) shaft. The “DRIVEN” shaft is the lower (flute) shaft.

Refer to the Seed Rate chart (or Fertilizer Rate chart), the table at right, and Figure 60 for setting the seed meter final drive range.

1. Remove the nut and bolt (⑤, not visible) securing the application rate sensor ⑥ to the restraining straps at the meter sensor mount.
2. Loosen the thumbscrew ⑦.
3. Remove the pins ⑧ from both shafts. Move the rpm sensor clear of the flute shaft.
4. Remove and position the gears as shown in the table at right.
5. Secure the DRIVING gear on the agitator shaft with a pin.
6. Secure the DRIVEN gear with the rpm sensor and a pin.
7. Use the thumbscrew to eliminate any rotational play in the sensor-to-shaft coupling.
8. Using the nut and bolt, secure the rpm sensor to the restraining straps at the meter sensor mount.

<table>
<thead>
<tr>
<th>FINAL DRIVE RANGE</th>
<th>DRIVING</th>
<th>DRIVEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW RANGE</td>
<td>17 Tooth Small</td>
<td>54 Tooth Large</td>
</tr>
<tr>
<td>HIGH RANGE</td>
<td>54 Tooth Large</td>
<td>17 Tooth Small</td>
</tr>
</tbody>
</table>

**Disable a Seed Meter**

To avoid operating a meter:

1. Remove a final range gear and leave it off.
2. Set the variable rate gearbox to zero.

These steps are recommended even when the unused hopper is empty, to:

- reduce gearbox and meter wear
- during calibration, to avoid clogging air tubes at the meter not under test, and;
- avoid metering undesired material in the field.
Setting Variable Rate Gearbox

Refer to Figure 61

The variable rate gearbox lets you infinitely vary meter drive speed to attain a wide range of seeding rates. The ratio of gearbox input speed to output speed is controlled by the position of a gearbox control arm. The control arm has an indicator that points to a scale marked in degrees. The Seed Rate and Fertilizer Rate charts show the rate for each degree of the control arm rotation.

- **Manual**: On the standard NTA607/2007HD drill, the control arm is manually positioned with a crank. The initial setting is based on the seed rate chart, and refined via calibration.

- **Servo**: With the optional Variable Rate Kit, the control arm is positioned by a linear actuator. The setting is commanded by the seed monitor, based on the rate entered on the seed rate chart, and the current Calibration Constant. The initial “Cal. Const.” is found in the seed rate charts, and refined via calibration.

**Manual Rate Setting**
1. Consult the seed rate chart for your crop, flute stars and rate Range. Note the gearbox setting.
2. Remove the hairpin cotter securing the gearbox adjustment crank.
3. Rotate crank until the control arm indicator points to the scale setting that matches the rate from the Seed Rate chart or determined by calibration.
4. Reinsert the hairpin cotter.

**Variable Rate (Servo) Rate Setting**
1. Consult the seed rate chart for your crop, flute stars and rate Range. Note the “Cal. Const.”
2. Enter the chart Calibration Constant on the seed monitor (for the Channel associated with the hopper and gearbox). If you have calibrated this seed, use the recorded Cal. Const. developed from that calibration.
3. Enter the desired material rate on the seed monitor (for the Channel associated with the hopper and gearbox).

Note: The variable rate gearbox operates optimally between 30 and 70. If a seed has charts for both HIGH Range and LOW Range, the most consistent results are obtained when the gearbox control arm is set between 30 and 70. Settings below 20 degrees are not recommended. When the control arm is set above 70 degrees, large movements of the arm result in small changes in seeding rate.

Note: If you will be metering the same material from both bins at the same time, use the Seed Rate chart entry for half the desired application rate. Do not use a half scale setting - the effect of the variable rate gearbox control arm is not linear - a half scale setting is usually not half the rate.

Note: The hand crank is present on both manual drills, and (servo) drills with the Variable Rate Kit. On servo drills, the crank is disconnected from the control arm. To revert to manual control, move the coupler pin from the servo control arm to the manual control arm.
Meter Calibration

The Seed Rate charts are based on cleaned untreated seed of average size and test weight. Many factors affect meter rates including foreign material, seed treatment, seed size, field conditions, and test weight. The Dry Fertilizer Rate chart is based on a representative granular fertilizer.

Great Plains recommends calibrating for the exact materials you intend to apply. Calibration determines two very important settings for achieving accurate rates:

- The kilograms per hectare (or pounds per acre) of the meter at the current variable rate gearbox setting for your particular seed or fertilizer.
- The Calibration Constant for the monitor to accurately report (or control) the planting rate of your particular seed or dry fertilizer.

The seed monitor must be setup for the drill, and if a variable rate kit is installed, there is additional setup for that. See: "Monitor Material Configuration" on page 66.

The seed monitor must also be correctly set up for the material(s), or the calibration will not result in useful monitor displays, and may cause incorrect application rates if a variable rate kit is installed.

Calibration: Common First Steps

The calibration is different for manual (crank-adjusted) and servo (variable rate kit) gearboxes. These first steps are common to both gearbox types.

The right column contains an example for the following steps.

1. Raise drill (page 36): This prevents the contact drive wheel from engaging the transport tire.
2. Turn on the seed monitor.
3. Determine the Range and gearbox settings from the rate charts.
4. If your material has a density that is significantly different from that used to generate the chart, you may want to adjust the density before choosing the initial gearbox setting and Range.

Agricultural Chemical Hazards:
Obey manufacturer or grower recommendations for safety equipment and protective gear when using treated seeds.

See the Seed Rate manual for an example in U.S. customary units.

Seeding Example; Calibration Targets:
Drill: NTA607HD-4006
Crop: Wheat
Flutes: 2 Stars
Target Seed Rate: 200 kg/ha

Chart Data:
Range: High
Closest Chart Rate: 201.3 kg/ha
Initial Variable Rate Gearbox setting: 62
Initial Calibration Constant: 79197

Fertilizer Example; Density Compensation:
Material: Dry Fertilizer
Material Density: 0.82 kg/liter
Target Rate: 200 kg/ha

Chart Data:
Chart Density: 0.96 kg/liter
Range: High
Closest Chart Rate: 199.6 kg/ha
Initial Variable Rate Gearbox setting: 60
Initial Calibration Constant: 88063

Adjustment Factor:
\[ \text{Factor} = 0.96 \div 0.82, \text{ which is:} \]
\[ 1.17 \]
\[ \text{Adjusted Rate} = 200 \times 1.17, \text{ which is:} \]
\[ 234 \text{ kg/ha} \]

Chart Rate After Density Adjustment:
Range: High
Closest Chart Rate: 235.5 kg/ha
Initial Variable Rate Gearbox setting: 66
Initial Calibration Constant: 90509

\[ \text{Factor Chart Density} \div \text{Material Density} \]
\[ = \]
\[ \text{Adjusted Rate} \times \text{Target Rate Factor} \]
5. Set Range (page 70): Set the Final Drive Range gears per the seed chart or dry fertilizer chart.

6. Load material (page 46): Make sure there is enough material in the hopper(s) for at least \( \frac{1}{10} \) hectare (or \( \frac{1}{10} \) acre) plus an extra 35 to 45 kg (75 to 100 lbs.).

Refer to Figure 62

7. Since only one calibration bag (page 52) is provided, remove one of the final range gears \( \overrightarrow{1} \) from the meter that is NOT being tested, to disable it.

8. Deploy meter chute (page 52).

9. Open the calibration door \( \overrightarrow{2} \) of the meter being calibrated (page 45). The calibration door is the bottom doors under the lower (flute) shaft.

NOTICE

Material Loss Risk:
Do not open clean-out door (the door under the upper/agitator) shaft. Opening this door drains the hopper. Once this door is open it is difficult to stop seed flow until the hopper is empty, and it may be impossible to close with an adequate air seal.

Refer to Figure 63 (note: Figure exaggerates size of cranking directional decal)

10. Attach crank (page 51): Un-pin crank from storage location, and place over hex shaft at cranking location (right side of cart, between rear-most gearbox and transport wheel).

11. Weigh bag (page 52): Obtain the calibration sample bag and digital scale from the storage compartment. Zero the scale and weight the empty bag, or set “tare” using the empty bag. There is a hook for weighing at the left side of the right ladder mount (the ladder must be raised for convenient access).

Note: The empty bag weighs 0.91 kg (2.00 pounds) as shipped from the factory.

12. Wipe all material off the flanges around the meter door.

Refer to Figure 64

13. Hook bag to chute of meter under test. Place loops over ears at outside end of chute. Place hooks in chute latching slots.

For a manual gearbox, continue at step 14 on page 74.
For a servo (variable rate kit) gearbox, continue at step 34 on page 77.
## Calibration for Manual Gearbox

Note: For drills with Variable Rate Kit installed, continue at "Variable Rate (Servo) Calibration" on page 77.

Complete step 1 through step 13 beginning on page 72.

14. Set gearbox (page 71): Remove the hairpin cotter securing the gearbox adjustment crank. Rotate crank until the control arm indicator points to the scale setting that matches the rate from the Seed Rate chart or as determined by any previous calibration of a similar material for the same rate.

15. Reinsert the hairpin cotter.

16. Turn the calibration crank, counter-clockwise, for enough turns to be sure the meter flutes are full and the system is metering.

17. Stop cranking. Wipe meter doors. Sweep any material in the chute into the bag. Empty the bag.

18. Push and then and then to get to meter calibration.

19. On the seed monitor terminal, set the monitor to Calibration mode, enter [ 5 ] for the "# Meter Revs", and press the Start softkey. This "# Meter Revs" parameter does not affect the monitor calibration because the monitor counts actual meter shaft revolutions and uses that count to compute the Calibration Constant.

The "# Meter Revs" parameter is used for a progress bar displayed during calibration.

20. Turn the hand crank, counter-clockwise, to simulate meter operation for ½ha or ½ac. See table at right.

Note: It is important to turn the calibration crank rapidly. Use a comfortable speed of 1 to 1½ revolutions per second, which simulates a planting speed range of 6.7-11.8 kph (4.2-7.3 mph). A longer calibration is always more accurate, especially for low rates and small seeds. ½ hectare is easy to calculate with and is a minimum calibration run.

Note: For more accurate results, crank for a full hectare or acre. With two people, the second person can observe the revolution count on the seed monitor.

### Machine Damage / Invalid Results Risks:

Rotate the hand crank only in the counter-clockwise direction. Operating in reverse can damage the meter gear box, and produces low sample sizes leading to incorrect calibration and excessively high field rates.

Note: The rate of the arm adjusting crank is more than one scale degree per turn, and the crank can only be pinned at quarter turns. Pin it when the indicator is closest to the desired setting.

### Calibration Crank Revolutions

<table>
<thead>
<tr>
<th>Limited Flex</th>
<th>NTA607HD</th>
<th>NTA2007HD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revolutions per Hectare</td>
<td>862</td>
<td>349</td>
</tr>
<tr>
<td>Revolutions per 1/10th hectare</td>
<td>86.2</td>
<td>34.9</td>
</tr>
</tbody>
</table>
21. Wipe all the material off the flanges around the meter doors, on the chute, and capture that material in the calibration bag.

22. Accurately weigh the calibration bag plus material. If you set a “tare” on the scale, the reading is the sample net weight, so skip step 23.

23. Subtract the empty container weight to determine the application rate for \( \frac{1}{10} \) hectare (or \( \frac{1}{10} \) acre).

\[
\text{SampleWeight} = \text{TotalWeight} - \text{BagWeight}
\]

24. Press the Stop softkey on the monitor and enter the sample net weight (SampleWeight). The monitor responds with a Calibration Constant.

Push the Save softkey to accept this value.

25. If the sample was based on \( \frac{1}{10} \) hectare (or \( \frac{1}{10} \) acre), multiply the sample size by 10 to determine application rate per acre (hectare) at the current variable rate gearbox setting.

\[
\text{CalibratedRate} = \text{SampleWeight} \times 10
\]

If the calibrated rate matches the target rate, skip to step 31. Otherwise...

26. Subtract the calibrated rate per acre (or hectare) from the target rate to determine a correction difference.

\[
\text{RateDifference} = \text{TargetRate} - \text{CalibratedRate}
\]

27. Refer to the seed rate chart for Seed Rate gearbox setting values for the target rate.

### Manual Seeding Example; Net Weight (step 23):
1. **TotalWeight** is 20.96 kg for bag plus sample
2. **BagWeight** is 0.91 kg
3. **SampleWeight** is 20.96 - 0.91, which is: 20.96 kg

If the calibrated rate turns out to match the desired target rate, record the material details and final Calibration Constant for future reference.

### Manual Seeding Example; Calibrated Rate:
- **CalibratedRate** = 20.96 x 10, which is: 209.6 kg/ha
- This is 4.8% higher than our target rate of 200 kg/ha. However, because the gearbox actuator effect is not linear, we cannot simply adjust the control arm by 4.8%.

### USc Example:
- **TargetRate** = 67.6
- **RateDifference** = 67.6 - 75.8, which is: -8 pounds

The calibration run metered too much. You must lower the gearbox setting to compensate.

### Metric Example:
- **TargetRate** = 200
- **RateDifference** = 200 - 217, which is: -17 kg

### USc Example:
<table>
<thead>
<tr>
<th>Initial Variable Rate Gearbox Setting: 38</th>
<th>TargetRate</th>
</tr>
</thead>
<tbody>
<tr>
<td>60.4</td>
<td>67.6</td>
</tr>
<tr>
<td>63.9</td>
<td>71.7</td>
</tr>
<tr>
<td>67.6</td>
<td>75.8</td>
</tr>
<tr>
<td>71.4</td>
<td>80.0</td>
</tr>
<tr>
<td>75.2</td>
<td>84.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TargetRate</th>
<th>36</th>
<th>37</th>
<th>38</th>
<th>39</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>77591</td>
<td>77640</td>
<td>77683</td>
<td>77723</td>
<td>77760</td>
<td></td>
</tr>
</tbody>
</table>
28. Determine the amount of rate change for each degree of control arm rotation from the target setting.

   If the calibrated rate was higher than target (as in our example), examine lower gearbox setting values.

   If the calibrated rate was lower than target, examine higher gearbox setting values.

29. Adjust the control arm by the number of degrees needed to adjust for the calibration difference.

   The rate of the arm adjusting crank is more than one scale degree per turn, and the crank can only be pinned at quarter turns. Pin it when the indicator is closest to the corrected setting.

30. To validate the adjustment, run the calibration again, starting at step 14 on page 74, using the new Variable Rate Gearbox scale setting.

   This validates the gearbox adjustment, and will generate a new, more precise Calibration Constant.

31. With the present meter satisfactorily calibrated, re-mount the final drive gear removed (if any) from the meter on the other hopper.

32. Repeat the calibration procedure for the other hopper, starting at step 1 on page 72.

33. Continue at “Calibration Closeout” on page 78.

<table>
<thead>
<tr>
<th>Metric Example:</th>
<th>USc Example:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Variable Rate Gearbox Setting: 62</td>
<td>The calibration difference was: 8 pounds. Adjusting down 2 degrees would correct by 7.2 pounds, but adjusting by 3 would over-correct to 10.7 lbs. So adjust the gearbox setting to just over 2 degrees lower, to a final scale setting: slightly below 36</td>
</tr>
<tr>
<td>TargetRate</td>
<td>Adjusting down 3 degrees would slightly over-correct, at a difference of 17.8 kg. So adjust the gearbox setting to just under 3 degrees lower, to a final scale setting of: slightly above 59</td>
</tr>
<tr>
<td>163.7</td>
<td>201.3</td>
</tr>
<tr>
<td>169.0</td>
<td>195.4, or 5.9 kg</td>
</tr>
<tr>
<td>174.3</td>
<td>201.3 - 195.4, or 5.9 kg</td>
</tr>
<tr>
<td>179.6</td>
<td>201.3 - 189.4, or 11.9 kg</td>
</tr>
<tr>
<td>185.0</td>
<td>201.3 - 183.5, or 17.8 kg</td>
</tr>
<tr>
<td>163.7</td>
<td>201.3</td>
</tr>
<tr>
<td>169.0</td>
<td>195.4, or 5.9 kg</td>
</tr>
<tr>
<td>174.3</td>
<td>201.3 - 195.4, or 5.9 kg</td>
</tr>
<tr>
<td>179.6</td>
<td>201.3 - 189.4, or 11.9 kg</td>
</tr>
<tr>
<td>185.0</td>
<td>201.3 - 183.5, or 17.8 kg</td>
</tr>
<tr>
<td>163.7</td>
<td>201.3</td>
</tr>
<tr>
<td>169.0</td>
<td>195.4, or 5.9 kg</td>
</tr>
<tr>
<td>174.3</td>
<td>201.3 - 195.4, or 5.9 kg</td>
</tr>
<tr>
<td>179.6</td>
<td>201.3 - 189.4, or 11.9 kg</td>
</tr>
<tr>
<td>185.0</td>
<td>201.3 - 183.5, or 17.8 kg</td>
</tr>
</tbody>
</table>
Variable Rate (Servo) Calibration

Note: For drills with manual (crank set) gearboxes, use the instructions at “Calibration for Manual Gearbox” on page 74.

Complete step 1 through step 13 beginning on page 72, and “ACC Re-Configuration” from the Variable Rate Kit manual 166-263M. You must have created or selected a Material that matches the material you are about to calibrate.

34. Check that final Range gear pairing is the same on:
   • the chart,
   • the meter, and
   • the Meter gear Range in the Channel Setup.

35. Enter the calibration screen for the Channel assigned to the meter to be calibrated.

   At this time, the linear actuator for that meter’s gearbox becomes active. The scale indicator moves to approximately mid-scale, then stops.

   Pointing to a specific value is not required, but it needs to be in the range 30° to 95°. Great Plains recommends using a scale setting that is close to your expected target rate.

   Use the Inc+/Dec- softkeys on the monitor console to adjust the indicator to the seed rate chart Gearbox Setting value, or at least to within the 30°-95° range.

36. Manually crank the meter for at least the number of turns shown in the table at right for $\frac{1}{10}$ha or $\frac{1}{10}$ac.

   The exact number of revolutions, cranking rate, and precise starting and stopping handle angles are not critical, as the system reads meter revolutions accurately, and can compensate for shaft speed, seed size and partial turns.

   What matters is getting a large sample, to reduce errors and increase confidence in the calibration.

Note: By calibrating at or near target rate, and for $\frac{1}{10}$ha, you establish a comfort level that the drill is set up correctly, in particular, that you are in the correct gear Range for the desired application rate.

Note: If no “Variable Cal Const” was selected during material setup, crank at $1 \frac{1}{2}$ revolutions per second (90 rpm) for most accurate results.

Servo Seeding Example: Calibration Targets:
Crop: Wheat
Flutes: 2 Stars
Target Seed Rate: 200 kg/ha

Chart Data:
Range: High
Closest Chart Rate: 201.3 kg/ha
Initial Variable Rate Gearbox setting: 62
Initial Calibration Constant: 79197

Seeding Example; Initial Calibration Screen:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHANNEL</td>
<td>1</td>
<td>Example</td>
</tr>
<tr>
<td>Material</td>
<td>Wheat HRW</td>
<td>Example</td>
</tr>
<tr>
<td>Density</td>
<td>0.79</td>
<td>Example</td>
</tr>
<tr>
<td>Calibration Constant</td>
<td>77591</td>
<td>From chart</td>
</tr>
<tr>
<td>Target Meter rpm</td>
<td>20</td>
<td>RPM</td>
</tr>
<tr>
<td># Meter Revs</td>
<td>30</td>
<td>REV</td>
</tr>
<tr>
<td>Pulse Count</td>
<td>0</td>
<td>PUL</td>
</tr>
<tr>
<td>New Calib Const</td>
<td>______</td>
<td>PUL/FT</td>
</tr>
<tr>
<td>Total # Towers</td>
<td>4</td>
<td>Per Imple-</td>
</tr>
<tr>
<td>Amount Dispensed</td>
<td>______</td>
<td>LBS</td>
</tr>
</tbody>
</table>

Null4:
Seeding Example; Initial Calibration Screen:
Servo Seeding Example: Calibration Targets:
Crop: Wheat
Flutes: 2 Stars
Target Seed Rate: 200 kg/ha

Chart Data:
Range: High
Closest Chart Rate: 201.3 kg/ha
Initial Variable Rate Gearbox setting: 62
Initial Calibration Constant: 79197

Seeding Example; Initial Calibration Screen:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHANNEL</td>
<td>1</td>
<td>Example</td>
</tr>
<tr>
<td>Material</td>
<td>Wheat HRW</td>
<td>Example</td>
</tr>
<tr>
<td>Density</td>
<td>0.79</td>
<td>Example</td>
</tr>
<tr>
<td>Calibration Constant</td>
<td>77591</td>
<td>From chart</td>
</tr>
<tr>
<td>Target Meter rpm</td>
<td>20</td>
<td>RPM</td>
</tr>
<tr>
<td># Meter Revs</td>
<td>30</td>
<td>REV</td>
</tr>
<tr>
<td>Pulse Count</td>
<td>0</td>
<td>PUL</td>
</tr>
<tr>
<td>New Calib Const</td>
<td>______</td>
<td>PUL/FT</td>
</tr>
<tr>
<td>Total # Towers</td>
<td>4</td>
<td>Per Imple-</td>
</tr>
<tr>
<td>Amount Dispensed</td>
<td>______</td>
<td>LBS</td>
</tr>
</tbody>
</table>

Calibration Crank Revolutions

<table>
<thead>
<tr>
<th>Limited Flex</th>
<th>NTA607HD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revolutions per Hectare</td>
<td>862</td>
</tr>
<tr>
<td>Revolutions per 1/10th hectare</td>
<td>86.2</td>
</tr>
</tbody>
</table>

Calibration Crank Revolutions

<table>
<thead>
<tr>
<th>Limited Flex</th>
<th>NTA2007HD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revolutions per Acre</td>
<td>349</td>
</tr>
<tr>
<td>Revolutions per 1/10th acre</td>
<td>34.9</td>
</tr>
</tbody>
</table>
37. Wipe all the material off the flanges around the meter doors, on the chute, and capture that material in the calibration bag.

38. Accurately weigh the calibration bag plus material. If you set a “tare” on the scale, the reading is the sample net weight, so skip step 39.

39. Subtract the empty container weight to determine the application rate for \( \frac{1}{10} \) hectare (or \( \frac{1}{10} \) acre).

\[
SampleWeight = TotalWeight - BagWeight
\]

40. Press the Stop softkey on the monitor and enter the sample net weight (\( SampleWeight \)). The monitor responds with a Calibration Constant.

Push the Save softkey to accept this value.

**Calibration Closeout**

41. Wipe the calibration door seals. Close the calibration door(s). Raise and latch the chute. See page 45.

42. Re-install any removed final Range gears.

43. Remove and store the calibration crank.

---

**Servo Seeding Example; Net Weight (step 39):**

- TotalWeight is 20.96 kg for bag plus sample
- BagWeight is 0.91 kg

- SampleWeight is 20.96 - 0.91, which is: 20.96 kg
Planting Depth Adjustments

Planting depth is affected by several adjustments, summarized here:

Refer to Figure 65

1. **Soil Conditions:**
   Changes in field conditions can require changes to several of the adjustments below.

2. **Row Unit Opener Depth:** (page 94)
   The T-handle directly controls opener depth by setting the press wheel height.

3. **Tool Bar Height:** (page 80)
   Spacers at the center section (master) lift cylinders control the center section tool bar height when the implement is lowered.

   Wings must also be level (page 130) for this adjustment to accurately set wing gauge wheel height.

   In more challenging conditions, increased cart weight transfer (page 84) may be required to prevent openers from lifting tool bar.

4. **Wing Weight Transfer:** (page 84)
   If the wings are not operating at desired planting depth, more center section weight may need to be transferred to wings.

5. **Coulter Depth:** (option, page 88)
   Optional coulters prepare the furrow ahead of the openers. If coulters are running too shallow or too deep, the openers may not operate at the desired depth.

6. **Row Unit Spring Adjustment:** (page 91)
   Several rows (in tire tracks) may need to be set to higher down-force in challenging conditions.

7. **Opener Wear:** (page 91)
   Over time, opener disk wear can cause established T-handle settings to become too shallow.
Adjusting Tool Bar Height

Refer to Figure 66

See “Heights and Leveling” on page 26 for how to check tool bar height. To change the tool bar height, add or remove master lift cylinder rod spacers (1), in the combinations shown in the chart at the bottom of this page.

To change spacers:

1. Perform a Lift operation (page 35).

2. Add or remove spacers. Unused spacers are stored on rods loops welded to the cart-implement link (not visible in figure). If you store spacers on hoses, make sure they cannot slide into locations where they interfere with implement operation.

Note: Chart values are approximate. Press wheel settings, disk wear and manufacturing tolerances can cause actual heights and depths to vary from chart values. Choose spacer combinations based on actual field measurements.

Note: The cylinder has 5.7 cm (2 1/4in) of exposed rod when fully retracted, for a minimum tool bar height of 58.4 cm (23.0in). All spacer combinations that increase tool bar height above the minimum must be a stack of at least 5.7 cm in height.

Note: Each full (1) cm or (1) inch of spacer stack height change changes the tool bar height by 2 cm or 2 in.

Note: Do not use a spacer stack taller than 10.2 cm (4.0 in), or the furrow will be too shallow, or there will be no furrow at all.

<table>
<thead>
<tr>
<th>Maximum Opener Depth</th>
<th>Maximum Coulter Depth</th>
<th>Tool Bar Height</th>
<th>Spacer Stack Height</th>
<th>Spacers Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.2 cm (4.00 in)</td>
<td>11.4 cm (4.50 in)</td>
<td>58.4 cm (23.0 in)</td>
<td>5.7 cm (2.25 in)</td>
<td>X X</td>
</tr>
<tr>
<td>8.9 cm (3.50 in)</td>
<td>10.2 cm (4.00 in)</td>
<td>59.7 cm (23.5 in)</td>
<td>6.4 cm (2.50 in)</td>
<td>X X</td>
</tr>
<tr>
<td>7.6 cm (3.00 in)</td>
<td>8.9 cm (3.50 in)</td>
<td>61.0 cm (24.0 in)</td>
<td>7.0 cm (2.75 in)</td>
<td>X</td>
</tr>
<tr>
<td>6.4 cm (2.50 in)</td>
<td>7.6 cm (3.00 in)</td>
<td>62.2 cm (24.5 in)</td>
<td>7.6 cm (3.00 in)</td>
<td>X X X</td>
</tr>
<tr>
<td>5.1 cm (2.00 in)</td>
<td>6.4 cm (2.50 in)</td>
<td>63.5 cm (25.0 in)</td>
<td>8.3 cm (3.25 in)</td>
<td>X X X</td>
</tr>
<tr>
<td>3.8 cm (1.50 in)</td>
<td>5.1 cm (2.00 in)</td>
<td>64.8 cm (25.5 in)</td>
<td>8.9 cm (3.50 in)</td>
<td>X X X</td>
</tr>
<tr>
<td>2.5 cm (1.00 in)</td>
<td>3.8 cm (1.50 in)</td>
<td>66.0 cm (26.0 in)</td>
<td>9.5 cm (3.75 in)</td>
<td>X X</td>
</tr>
<tr>
<td>1.3 cm (0.50 in)</td>
<td>2.5 cm (1.00 in)</td>
<td>67.3 cm (26.5 in)</td>
<td>10.2 cm (4.00 in)</td>
<td>X X X</td>
</tr>
</tbody>
</table>
Air System Adjustments

There are two adjustments for the air system:

1. Fan rpm (this page), which controls manifold air pressure, hopper air pressure, and material delivery velocity.

2. Inlet Manifold Diverter angle (page 83), which controls the balance of air flow to each meter on dual-hopper drills (whether single- or double-shoot). This adjustment is not present on single-hopper drills.

There is no direct adjustment for hopper pressure. The table figures are included for setting alarm limits in the seed monitor. If a pressure alarm occurs, do not adjust the fan or diverter to compensate. The cause is usually a leak or a major blockage.

Fan Speed Suggestions

The specific fan rpm required varies considerably with drill configuration, material density, application rate, field speed and material properties. Develop and record settings that are suitable for your operations.

**NOTICE**

*Machine Damage Risk:*

Always engage the fan with the tractor at a low engine speed. Engaging the fan when the tractor is at high speed may cause fan damage. **Do not reverse hydraulic flow with the fan running.**

At ideal fan speed:

- flow is more than high enough to avoid blockages (from both meters on dual-hopper drills),
- flow is even across all hoses from each meter; and,
- flow is low enough to minimize seed cracking and bounce.

Fan speed is monitored and reported by the seed monitor, but is manually controlled.

If the fan cannot reach 3000 rpm, one or more hoses may be mis-connected. Air moves toward the air box in either rotation direction, but reverse spinning airflow is too low to operate the system.

If the fan is operating properly, and at desired rpms, and the diverter is correctly adjusted, but the pressure gauge is out of limits, see "Magnehelic® Gauge Troubleshooting" on page 104.

### Air System Settings

<table>
<thead>
<tr>
<th>Fan RPM</th>
<th>Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>Maximum</td>
</tr>
<tr>
<td>2000 rpm</td>
<td>4500 rpm</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Typical Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
</tr>
<tr>
<td>Milo: 3250 rpm to 4000 rpm</td>
</tr>
<tr>
<td>Soybeans: 2750 rpm to 3500 rpm</td>
</tr>
<tr>
<td>Sunflower: 2250 rpm to 3000 rpm</td>
</tr>
<tr>
<td>Wheat: 3250 rpm to 4000 rpm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manifold Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
</tr>
<tr>
<td>12 in H2O to 25 in H2O</td>
</tr>
<tr>
<td>30 cm H2O to 64 cm H2O</td>
</tr>
<tr>
<td>30 kPa to 64 kPa</td>
</tr>
<tr>
<td>3050 bar to 6350 bar</td>
</tr>
<tr>
<td>4.4 psi to 9.2 psi</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hopper Pressure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
</tr>
<tr>
<td>1.3 kPa to 8.6 kPa</td>
</tr>
<tr>
<td>130 bar to 860 bar</td>
</tr>
<tr>
<td>13 cm H2O to 88 cm H2O</td>
</tr>
<tr>
<td>0.19 psi to 1.25 psi</td>
</tr>
<tr>
<td>5 in H2O to 35 in H2O</td>
</tr>
</tbody>
</table>
Adjusting Fan Speed

Start with the rpm settings in the table on page 81. Adjust for your situation.

Start with flow on low setting. 30-45 liters/min (8-12 gpm) is average flow.

Run fan for at least 15 minutes before seeding. Hydraulic fluid must be warm before fan and wing pressure systems operate properly.

1. Check bin-lid and meter-box seals for air leaks. Adjust the latch or replace the seals to prevent leakage.

Note: It only takes a very small air leak to cause large variations in the seeding rate and pattern.

2. Watch the manifold pressure gauge(s) and seed monitor, and adjust fan speed by increasing or decreasing hydraulic flow from the tractor. Use the guidelines and the fan speed chart on page 81 to properly adjust fan speed.

Fan Speed Tips

- Higher fan speeds improve seed distribution, but high fan speeds also increase the chance of seed damage and bounce.

- At first, adjust fan speed to the high end of the range suggested in the chart on page 81. Watch for excessive seed cracking and seed bounce from the furrow, then reduce fan speed if necessary.

- Follow the chart at right as a guide. Actual fan speeds vary with implement width, row spacing, seeding rates, seed weights and seed size. Increase fan speed for heavier seeding rates or seed. Reduce fan speed for lighter seeding rates and seed more prone to cracking.
Diverter Vane Adjustments

Refer to Figure 68 (and Figure 52 on page 53)

On dual-hopper drills, where the material in each hopper may differ substantially, the meters may require substantially different air flows. Dual pressure gauges, and a diverter vane are provided for setting unequal flows.

An example of a situation likely to need unequal flow is: small light seeds in hopper I, and dense dry fertilizer in hopper II.

The need for unequal flows may be observed only during actual field operation, as material must be entering the airflow and generating air demand.

Diverter Operation

The vane (not shown) inside manifold is attached to a rod with a handle on the bottom end, and a nut (not shown) at the other end of the rod on top of the manifold.

The factory setting for the handle is pointing straight forward, providing balanced flow to each meter. Decals, on manifold top and bottom, show the approximate angle of maximum effect.

To adjust the vane:

- Loosen the top nut.
- Turn the handle to point toward the side where reduced flow is desired, and away from the side where increased flow is desired.
- Tighten the top nut.

Diverter Tuning Steps

1. Start with:
   - moderate fan speeds (see page 81)
   - balanced manifold air flow - set/leave the diverter vane handle straight forward.

2. Begin field operations. Watch for delivery issues that might be remedied by an uneven flow, such as blockage, pressure alarms and seed cracking/bounce.

3. Adjust fan rpm up and down until you discover the upper and lower rpms that represent the optimal working range for each meter. Note the upper and lower the manifold pressures for that operating range. The ideal (median) pressures for each meter are likely to be different.

4. If there is no single fan speed that puts both meters comfortably within their ideal operating range, set the fan to an averaged median rpm, and begin adjusting the diverter vane. The goal is to bring both pressure gauges to levels within their optimal range similar to those determined at step 3.

5. After the final vane setting is made, some fan rpm adjustment may be needed to bring both gauges to the median readings in the optimal range.

Note: Vane is not present on single-hopper drills.

Note: If applying a single material on a single-shoot drill, Great Plains recommends loading the material into both hoppers and using half rate (see Seed Rate manual for details). Set vane for equal pressures to each meter.

Note: If applying a single material on a double-shoot drill, use a single hopper. Set the vane to divert the maximum flow to the used side (this does not completely shut off air flow to the unused hopper, which needs some airflow to avoid nuisance alarms).
Weight Transfer Adjustments
Weight Transfer Safety Information

⚠️ DANGER

**Crushing Hazards:**
This adjustment requires working near the unfolded and lowered drill with the hydraulic system active. Assign two people to this task, one in the tractor cab, ready to shut the tractor down on hand signal from adjuster or any unplanned event. Keep body parts clear of wings and openers while adjusting. Keep all bystanders well away. You will be seriously injured or killed if you are caught between lowering openers and ground, or raising openers and drill frame.

⚠️ WARNING

**High Pressure Fluid Hazard:**
Escaping fluid under pressure can penetrate the skin causing serious injury. 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.

⚠️ CAUTION

**Falling Hazard - Tires Not a Step:**
Do not use tires as steps or platforms. At higher transfers, cylinders can lift cart wheels sufficiently for them to spin.
Weight Transfer Bypass Valve Adjustment

**NOTICE**

*The weight transfer bypass valve must be adjusted before adjusting the weight transfer circuit.*

**Refer to Figure 70**

A bypass valve is plumbed into the weight transfer circuit. Tractors with load-sensing, closed-center hydraulics require this bypass valve to protect the tractor hydraulic system.

If you are unsure what type of hydraulic system is on your tractor, contact your tractor manufacturer.

**Tractors with Pressure Compensating Closed Center Hydraulics (PC Closed)**

Close bypass valve for no oil flow by turning knob on valve clockwise completely. Always operate the drill with the bypass valve closed.

**Tractors with Load Sensing Closed Center Hydraulics (LS Closed) or Pressure Flow Compensating (PFC) Systems**

The weight transfer bypass valve must be adjusted to protect the tractor. Do the following procedure.

**NOTICE**

*Equipment Damage Risk:*

Failure to use the bypass valve on load-sensing tractors may cause major tractor damage.

1. Release lock ring ① on bypass valve ②.
2. Turn the knob on the bypass valve ③ all the way clockwise to the closed position.
3. Tighten the lock ring.
4. On the tractor, turn the flow on this circuit down to no more than 45.5 L/min (12 gpm).
5. Engage tractor hydraulics to weight transfer circuit. Lock hydraulic lever on tractor for continuous operation.

---

![Figure 70 Bypass Valve](null)
Refer to Figure 71

6. Adjust both weight transfer circuits so gauges are at 1800 psi.

7. While watching gauges on drill, slowly turn knob on bypass valve counterclockwise. Adjust bypass valve just until needles on gauges begin to move down from 1800 psi. Lock bypass valve at this setting. (Also see note below.)

**NOTICE**

As the pressure increases, the cart will raise off the ground.

8. Adjust pressure-control valves on drill to desired weight transfer circuit pressure as explained under “Weight Transfer Operation” on page 86.

Note: Set the bypass valve as low as possible while staying at least 300 psi above the weight transfer circuit setting. The higher the bypass pressure, the greater the potential for oil heating and premature tractor damage.

While 1800 psi is a good starting point for setting the bypass valve, if you consistently operate the drill with low weight transfer circuit pressure you can set the bypass valve below 1800 psi. If you consistently operate the drill with very high weight transfer circuit pressure, you may need a bypass-valve setting above 1800 psi.

**Weight Transfer Operation**

Refer to Figure 72 on page 86

During field operations, the fold cylinders distribute center section weight to the wings. The wings are much lighter than the center section, so some weight needs to be transferred. The wing-transfer valve controls the amount of weight transferred.

The wing transfer valve needs an initial setting and possible later adjustment. If insufficient weight is transferred, the wings run higher than the center section. If excess weight is transferred, the center runs higher.

The center section lift lock and cart-transfer functions share a hydraulic circuit. There needs to be some circuit pressure for a pilot-operated check valve to switch between functions. Also, at higher row unit down-forces, there may be insufficient total implement weight. A pair of cylinders between the cart and implement allow some of the cart weight to be transferred to the implement. The cart-transfer valve controls the transfer.

The cart transfer valve may often be left at the nominal 100 psi value.

---

**Material Rate Risk:**

If too much weight is transferred off the cart, the cart wheels can lift off the ground.

---

a. Treat the scale reading as a relative arbitrary number. The scales are marked for PSI (Pounds per Square Inch), but the absolute pressure value is immaterial as long as it is not off-scale to the high side.
Weight Transfer Preparation

**NOTICE**
The weight transfer bypass valve must be adjusted before adjusting the weight transfer circuit.

See

1. Hitch drill to suitable tractor (page 22). Hydraulic power must be available for this adjustment.
2. Unfold implement (page 39). The wing transfer adjustment cannot be made with the wings folded. Set circuit to Neutral.
3. Lower drill (page 35) in representative level field conditions. Pull forward to put openers in ground.

Refer to Figure 74

**Wing Weight Transfer Adjustment**

1. Release lock ring ① on wing-transfer valve ②. Adjust knob ③ while observing gauge ④.
2. Increase weight transfer to wings by turning knob clockwise. Reduce weight transfer to wings by turning knob counter-clockwise.
3. Set pressure to at least 250 psi.
4. Secure setting with lock ring.

**Cart Weight Transfer Adjustment**

1. Release lock ring ⑤ on cart-transfer valve ⑥. Adjust knob ⑦ while observing gauge ⑧.
2. Increase weight transfer from cart by turning knob clockwise. Reduce weight transfer from cart by turning knob counter-clockwise.
3. Set pressure to at least 100 psi.
4. Secure setting with lock ring.

**Testing Weight Transfer Adjustments**

1. Pull forward in ground. Assess opener penetration, and coulter (option) penetration. Compare wings to center section.
2. During field operations, monitor coulter and opener depth of wings and center section. Adjust weight transfer as required for consistent depth across drill.

---

a. Wing operating height is also affected by a leveling eye bolt adjustment (page 130).
Frame-Mounted Coulters

Frame-mounted coulters are used “in row” and not “zone”. They are intended to prepare the soil directly ahead of the seed furrow.

The factory suggested default setting, with new coulter blades, at:
3.8cm (1 3/8in) opener (planting) depth 
is a coulter depth of:
5.1cm (2in), or
13mm (1 1/2in) below opener depth.

Frame-Mounted Coulter Adjustments

There are several frame-mounted coulter adjustments:

Refer to Figure 74
1. Frame (tool bar) height:
   Frame height directly controls group coulter depth ④.
   If the center frame is not running at the correct height, coulter depth is also incorrect. See “Adjusting Tool Bar Height” on page 80.

Wing frame height is controlled by center frame height, and is affected by wing weight transfer. See “Wing Weight Transfer Adjustment” on page 86.

Refer to Figure 75
2. Individual row unit height:
   A few individual rows may be lowered by loosening nuts ⑥ at tool bar U-bolts, sliding the spring bar ⑦ down and re-tightening. Do not lower more than about 1in (2.5cm) Keep the top edge of the spring bar at or above the top of the upper bolt holes.

3. Individual coulter down-force (page 89):
   This is a spring adjustment for rows in tracks, or all rows - in unusually light or heavy no-till conditions.

4. Coulters-to-row alignment:
   Coulters are factory aligned so that the coulter disk prepares the furrow directly ahead of the opener disks.

   After any coulter or row maintenance, check that these components are still aligned. Adjust at the coulter mounting clamp at the tool bar. Re-check coulter height if any adjustments are made.

In regular or heavy no-till conditions, adjust opener depth to set:
④ the coulter depth to about 13mm (1/2in) deeper than ⑤ seeding depth.

In addition to checking depths at setup, be sure to check actual seeding results while planting.

Replace the 43.2cm (17in) coulter blades when their diameter is worn to less than 40cm (15 3/4in).
Frame-Mounted Coulter Force

In normal operation at target running depth, the spring is at full extension or only slightly compressed. It compresses briefly as obstructions and denser soil are encountered.

Coulter springs are set to 181 kg (400 lbs). In normal operation at target running depth, the spring is at full extension. It compresses briefly as obstructions are encountered.

- In heavy no-till conditions, you may observe the springs in compression most of the time. This means that the blades are not reaching the desired coulter depth. If drill weight is available, you can increase the spring down-force to compensate.
- In light but rocky conditions, the factory spring setting may be higher than needed. You can extend blade life by reducing the force at which the blades ride up over obstructions.

To adjust the coulter spring:

Refer to Figure 76


2. Determine the new spring length desired. See the table at right.

3. Measure the current length of the spring(s) to be changed. If already shorter than 24.8 cm (9.75 in), or longer than 26 cm (10.25 in), do not further adjust them.

4. Loosen the jam nut.

5. Rotate the adjuster nut until the spring is at the new length. Tighten the jam nut.

Note: If all springs are continuously in compression, the coulters can lift the wing frames off the ground (at the gauge wheels), resulting in uneven coulter depth and/or uneven seed depth. If the drill is already operating at maximum down-pressure, reduce coulter depth.

<table>
<thead>
<tr>
<th>Spring Length</th>
<th>Force at Blade</th>
</tr>
</thead>
<tbody>
<tr>
<td>26.0 cm (10.25 in)</td>
<td>136 kg (300 lbs.)</td>
</tr>
<tr>
<td>25.4 cm (10.0 in)</td>
<td>181 kg (400 lbs.)</td>
</tr>
<tr>
<td>24.8 cm (9.75 in)</td>
<td>238 kg (525 lbs.)</td>
</tr>
</tbody>
</table>

Machine Damage Risk:
Do not use spring lengths shorter than 24.8 cm (9.75 in). It may contribute to premature parts failure not covered by warranty.
07HD Row Unit Adjustments

Refer to Figure 77 (which depicts a row unit fully populated with all optional accessories supported for use with the NTA607HD or NTA2007HD)

From front to back, a Great Plains 07HD Series row unit can include the following capabilities (some optional):

1. Frame-Mount Coulter: optional
   See “Frame-Mounted Coulter Adjustments” on page 88.

2. HD Down Pressure Spring: standard
   Each row unit is mounted on the NTA607/2007HD drill via arms which allow the row unit to independently move up and down. The adjustable spring sets the force at which the opener rides up over obstructions. See “Row Unit Spring Adjustment” on page 91.

3. Disk Blades: standard, 2 per row unit
   Double disk blades open a furrow, creating the seed bed. Spacers adjust the blades for a clean furrow. See “Disk Blade Adjustments” on page 91.

4. Seed delivery tube: standard
   This tube delivers material from hopper I on single-hopper or double-shoot drills. It delivers material from both hopper I and hopper II on single-shoot drills. No adjustments are necessary.

5. Inside Scraper: optional
   Helps prevent clogging between disk blades. See “Disk Scraper Adjustments” on page 92.

6. Liquid Fertilizer Tube: optional
   This is present only if both a liquid fertilizer system and Keeton seed firmers are installed. It requires no adjustment.

7. Seed firmer: seed flap (not shown) standard:
   A seed flap requires no adjustment, other than replacement (page 132) when worn.

   Keeton seed firmer (shown)
   Improves seed-soil contact, and provides a stable arm for a low-rate liquid fertilizer delivery tube. See “Keeton Seed Firmer Adjustment” on page 93.

   Seed-Lok™ firming wheel (not shown)
   Improves seed-soil contact. See “Seed-Lok™ Seed Firmer Lock-Up” on page 93.

8. Fertilizer Tube: optional
   This tube delivers material from hopper II on double-shoot drills. The delivery angle is adjustable (page 94).

9. Press wheels: standard (choice of types)
   These close the seed trench.

   The press wheels also support the free end of the row unit, and provide the primary control over seeding depth via the T-handle. See “Opener Depth (Press Wheel Height)” on page 94.

---

Machine Damage Risk:
Do not back up with row units in the ground. To do so causes severe damage and row unit plugging.
Row Unit Spring Adjustment

Row unit springs normally require no adjustment. The factory setting for the row unit springs is:

1. Spring length  32.4 cm (12\frac{3}{4} in)
2. Assembly length  56.2 cm (22\frac{1}{8} in)

In some unusual conditions, rows in tire tracks may need to be set heavier.

1. Make adjustments with the wings unfolded and the rows lifted off the ground, so that the springs are at full extension.
2. Loosen the jam nut 3. Rotate the adjuster nut 4. Shorten spring to increase down-force; lengthen spring to reduce down-force.

For each turn of the adjuster nut, the down force at the opener disk changes by approximately:

1.7 kg/turn (3.7 lbs/turn)

3. Re-tighten jam nut after setting force.

Disk Blade Adjustments

Opener disk angle and stagger is not adjustable, but disk-to-disk spacing is, and may need attention as disks experience normal wear. Spacers will need to be reset when blades are replaced.

Refer to Figure 79

The ideal spacing causes the blades to be in contact for about 2.5cm (1 inch). If you insert two pieces of paper between the blades, the gap between them should be 0 to 4.4cm (0 to 1.75in).

If the contact region is significantly larger or smaller (or there is no contact at all), 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.

NOTICE

Machine Damage Risk:
Do not use spring lengths shorter than 29.8 cm (11\frac{3}{4} in). It may contribute to premature parts failure not covered by warranty.
Adjusting Disk Contact

⚠️ **CAUTION**

**Sharp Object Hazard:**
Use caution when making adjustments in this area.
Row unit disk blades may be sharp.

**Refer to Figure 80**
2. Remove the bolt ① retaining the opener disk on one side. Carefully remove the blade ②, noting how many spacers ③ are outside the disk and how many are inside the disk. Do not lose the hub components and spacers.
3. To reduce the spacing between the disks (the normal case), move one spacer washer from the inside to the outside.

Note: When installing new blades, it is generally necessary to move outside spacers back inside after both disks are mounted.

4. Re-assemble and check disk contact.

Disk Scraper Adjustments

Disk scrapers are optional. See page 144 ordering information and page 165 for installation. To keep opener disks turning freely, dirt scrapers are mounted between disks to clean as disks rotate.

⚠️ **CAUTION**

**Sharp Object Hazard:**
Use caution when making adjustments in this area.
Row unit disk blades may be sharp.

**Refer to Figure 81**
As field conditions vary, scrapers may need to be adjusted. In damp conditions, lower scrapers. If openers are not turning freely, raise scrapers. To adjust, loosen bolt and move scraper as needed.
Seed Firmer Adjustments

07HD Series row units include a seed flap, and accept one of two optional seed firmers.

The seed flap requires no adjustment, but may need to be replaced if worn (page 132), and may need to be shortened if an optional seed firmer is added after initial delivery.

**CAUTION**

*Row unit disk blades may be sharp. Use caution when making adjustments in this area. To adjust the Keeton Seed Firmer, lower the drill until the disks of the row units are resting on the ground.*

**Keeton Seed Firmer Adjustment**

The optional Keeton Seed Firmer is an engineered polymer shape that slides down the seed trench. It traps seeds as they exit the seed tube and firms them into the bottom of the “V”.

*Refer to Figure 82*

The Firmer is provided with a preset tension which is recommended for using the first year. The tension screw ① can be tightened in subsequent years according to your needs. Firmers should provide just enough tension to push seeds to the bottom of the trench.

**Seed-Lok™ Seed Firmer 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 83*

To lock up Seed-Lock wheels:

1. Raise lever ①.
2. Pull up on Seed-Lok™ arm ②.
Fertilizer Tube Adjustment

Refer to Figure 84
On a double-shoot drill, deeper dry fertilizer placement may be achieved by rotating the fertilizer tube 1 to face forward.

This orientation is suggested only if the seed firmer is a seed flap 2. If a Keeton or Seed-Lok™ is present, fertilizer falls on the firmer and may be scattered rather than placed deeper.

Opener Depth (Press Wheel Height)

Refer to Figure 85
Set opener seeding depth 3 by adjusting press-wheel height 4.

To adjust, first raise openers slightly, then lift and slide T handles 4 on top of openers Adjust all press wheels to the same height.

- Each increment of the handle adjusts the seeding depth by approximately 6.3mm (1/8 in). The range is approximately 0-8.9cm (0 to 3 1/2 in) seeding depth.
- For more shallow seeding, slide T handles forward F toward implement.
- For deeper seeding, slide T handles backward G away from implement.

If moving the T handle backward doesn’t cause the opener to achieve desired depth, lower the coulters by lowering the frame height (page 80), and increase weight transfer pressures if necessary (page 84).

If coulters are installed, set coulter depth with tool bar height (page 80). Adjust opener depth to be 13mm (1/2 in) shallower.

If no coulters are installed, adjust tool bar height (page 80) so that opener frame runs level at desired seeding depth.
Marker Adjustments

Review "Marker Safety Information" on page 58 before adjusting markers. There are four operating adjustments for markers:

- **Marker Extension**: (page 96)
  Once set for a specific row spacing, this only needs periodic checking to ensure the clamp is secure.

- **Marker Tension**: (below)
  You may want to adjust the spring tension to ensure the markers track uneven ground, and do not drag excessively when markers are folded.

- **Disk Angle**: (page 97)
  (below) Even if your row spacing rarely changes, you may need to adjust disk angle for soil conditions and planting speed.

- **Marker Speed**: (page 97)
  Once initially set by your dealer, this rarely needs modification.

There are also two maintenance items for markers:

- "Marker Hydraulic Bleeding" on page 131
- "Marker Shear Bolt" on page 131

Marker Tension Adjustment

Refer to Figure 86

The strength of the mark is a function of marker arm weight at the disk. A spring behind the pivot assembly acts against some of that weight. The spring is adjustable, and may be used to increase or decrease force at the marker disk.

The suggested initial marking force is 23 kg (50 lbs.). For marking forces up to this value, use the scale included with the drill to lift the extended marker disk.

To adjust the marking force:

1. Fold the markers (page 57). This minimizes spring tension for adjustment.
2. Set the marker hydraulic circuit to Neutral. Shut off the tractor.
3. Loosen the eyebolt jam nut (on the top side of the bracket).
4. Turn the adjust nut to change marking force:
   - Loosen this nut (relaxing the spring) to increase marking force.
   - Tighten this nut (tensioning the spring) to decrease marking force.
5. Tighten the jam nut to secure the new setting.
Marker Extension Adjustment

At delivery, marker extension is typically still set for shipment (arm fully retracted), and needs to be set. Marker extension needs to be checked periodically thereafter, and needs to be checked and adjusted when:

- tool bar height is changed,
- marker disk angle is changed, or;
- marker disk throw direction is changed.

Refer to Figure 87

Measure marker extension \( \odot \) in representative field conditions, with openers in ground, after adjusting tool bar height (page 80) and wing weight transfer (page 84). If openers are not at planting depth when setting extension, the pass gap will be too large during planting.

Marker extension \( \odot \) is measured on the ground, from the centerline of the outside row unit to the disk mark.

For limited down-flex drills, setting marker extension is straightforward. On these drills the row spacing does not change at wing gaps. The marker extension is simply one half the span (distance between end rows) plus a pass gap of one row space.

For standard drills, with higher down-flex, marker extension is the same, but row spacing at the wing gap is 21.6cm (8.5in), for all models. This increases the swath by one or two percent, or put another way, increases the swath-averaged row spacing of the drill.

The table at right presumes that the pass gap is set to the nominal row spacing for all models. It shows the actual swath for both wing types, and effective row spacing for higher down-flex drills. For most accurate seed monitoring, use the Swath and Avg. Spc.g. data at right.

To change marker extension, on a lowered drill:

Refer to Figure 87 and Figure 88

1. Fully extend a marker.
2. Pull forward approximately 2m (7 ft.), to leave a mark and a furrow.
3. Loosen the jam nuts \( \odot \) and set screw bolts \( \odot \) securing the outer marker arm.
4. Slide the outer arm in or out until the disk is at the desired extension distance.
5. Re-secure the set screws and jam nuts.
6. Fold the marker.

\[ \text{CAUTION} \]

*Sharp Object Hazard:*

Marker disks may be sharp. Use caution when making adjustments in this area. If removed, always re-install guard above marker disk.
Marker Speed

There is one adjustment screw for unfolding speed ① and one for folding speed ②. You can identify adjustment screws by markings stamped in valve body. The screw marked “Raise” controls the folding speed. The screw marked “Lower” controls unfolding speed.

Turn adjustment screws clockwise (Ｓ: slower) to decrease [un]folding speed and counterclockwise (Ｆ: faster) to increase [un]folding speed.

With tractor idling at a normal operating speed, adjust marker folding to a safe speed. Excessive [un]folding speed could damage markers and void the warranty.

After adjusting the folding speed, tighten jam nuts on hex adjustment screws to hold settings.

Marker Disk Adjustment

There are four adjustments for marks:

Refer to Figure 90

1. Loosen the nuts ④ securing the guard ⑤ and bracket ⑥. Change the angle of mark by shifting the bracket, which has slotted holes. Re-align the guard with the disk edge. Tighten the nuts. Re-check marker extension.

2. For a larger change in mark angle, the bracket has a choice of small slotted holes on one side. Loosen both nuts. Remove the bolt on the two-hole side. Re-insert the bolt in the alternate hole. Re-align the guard with the disk edge. Tighten the nuts. Re-check marker extension.

3. Mark visibility may be enhance by inverting the disk ⑦ on the disk axle. Remove the outer axle nuts (not shown). Invert the disk and depth gauge. Re-secure with nuts.

Notice

Bout/Pass Overlap or Excess Gap Risk:
Check marker extension after adjusting. These adjustments may cause minor or major changes to marker extension, which could result in incorrect gaps between bouts/passes, or bout/pass overlaps.

Sharp Object Hazard:
Marker disks may be sharp. Use caution when making adjustments in this area. If removed, always re-install guard above marker disk.
# Troubleshooting

See also:
“Lift Lock Troubleshooting” on page 101,  
“Brake Troubleshooting (Option)” on page 102 and  
“Troubleshooting and Alarms” topic in DICKEY-john® Air Cart Control manual.

## General Troubleshooting

<table>
<thead>
<tr>
<th>Problem</th>
<th>Causes</th>
<th>Solutions</th>
</tr>
</thead>
</table>
| **No material flow**  
(all rows) | Tire problems at contact drive | Check transport and contact tire sizes and inflation (page 148). |
| | Broken or removed chain(s) in drive system | Check chains against “Chain Routing” on page 150. |
| | Removed final rate Range gear(s); for example, single hopper operation with incorrect meter disabled | Re-install gear(s) per chart and calibration for affected meter. |
| | Variable rate gearbox set to zero, or too low | Re-set gearbox per calibration. |
| | Empty hopper | Load material. |
| | Meter in use clogged | Clean-out meter (page 110). |
| | Fan speed too low | Check pulses-per-rev setting for fan in seed monitor (page 163). Increase fan speed to recommended range (page 81). |
| | Fan running backward | Reverse fan circuit hoses at hitch. |
| **No material flow**  
(multiple rows) | Primary seed hose blocked | Check seed hoses for kinks, congealed materials at low spots, nests and pests. |
| | Tower inlet or turret blocked | |
| **No material flow**  
(one or two rows) | Seed tube blocked at row | Inspect and clear seed tube. |
| | Tower port blocked for affected row | Disassemble distribution ring and clear blockage. |
| | False alarm - seed tube sensor disconnected or failed | Run monitor self-test. Swap sensor with a working row to verify failure. Replace sensor. |
| **Material is flowing, but is not detected by seed monitor** | This is normal during the first few meters/feet of planting, as it takes some time for material to reach rows. | Lower openers 3m/10ft before planting is to begin. Monitor does not check for blockage during first 5 seconds. |
| | Lift switch mis-adjusted, failed or mis-wired. | Check, adjust or replace switch (page 113). |
| | Seed monitor disconnected at hitch | Connect seed monitor. |
| **Planting too little**  
(some rows) | Partial blockage in meter chamber, seed hoses, towers, seed tubes | Treat as blockage. See “No material flow (multiple rows)” on page 98 and “No material flow (one or two rows)” on page 98. |
<table>
<thead>
<tr>
<th>Problem</th>
<th>Causes</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Planting too little</strong></td>
<td>Incorrect seed rate, meter flutes, rate range or gearbox setting.</td>
<td>Check seed rate information beginning on page 64.</td>
</tr>
<tr>
<td>(all rows)</td>
<td>Excessive field speed. Excessive field speed: chart rates were developed at 10.5 kph (6.5 mph)</td>
<td>Reduce field speed.</td>
</tr>
<tr>
<td></td>
<td>Air system leaks retarding material flow above meters</td>
<td>Check hopper lids, meter seals, manifold caps and seed hose connections. Adjust latch and/or replace seals as needed.</td>
</tr>
<tr>
<td></td>
<td>Seed size and weight or fertilizer density and granularity vary from chart</td>
<td>Calibrate. Adjust rate to compensate.</td>
</tr>
<tr>
<td></td>
<td>Seed or fertilizer density and granularity may vary from season to season, batch to batch and between different suppliers.</td>
<td>Re-calibrate if materials might have changed since last calibration.</td>
</tr>
<tr>
<td></td>
<td>Low material level in hopper</td>
<td>Re-fill hopper.</td>
</tr>
<tr>
<td></td>
<td>Oversized contact drive tire, or low air pressure in contact or front transport tires, can decrease rates.</td>
<td>Correct tire size and air pressure, page 148.</td>
</tr>
<tr>
<td></td>
<td>Contact tire slipping. If due to moisture, conditions may be too wet to plant.</td>
<td>Check tire sizes, condition and inflation. Replace incorrect tires and worn tires. Inflate low tires.</td>
</tr>
<tr>
<td></td>
<td>Fan speed too low</td>
<td>Increase fan speed (page 81).</td>
</tr>
<tr>
<td></td>
<td>Fan won’t run fast enough</td>
<td>Tractor must be able to supply 18 gallons/minute at 200 psi.</td>
</tr>
<tr>
<td></td>
<td>Fan won’t run fast enough</td>
<td>Check that hydraulic fan check valve is not installed backward.</td>
</tr>
<tr>
<td></td>
<td>Actual field size is different.</td>
<td>Verify field size.</td>
</tr>
<tr>
<td></td>
<td>Excessive bout/pass gaps.</td>
<td>Adjust marker, page 96.</td>
</tr>
<tr>
<td></td>
<td>Irregular shaped field.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Build-up of treatment or debris in seed meter.</td>
<td>Clean out seed meter, page 110.</td>
</tr>
<tr>
<td></td>
<td>Plugged opener seed tube.</td>
<td>Lift drill, expose bottom of seed tube and clean out.</td>
</tr>
<tr>
<td></td>
<td>Thrown or worn drive chains skipping.</td>
<td>Check drive chains, sprockets and idlers.</td>
</tr>
<tr>
<td></td>
<td>Meter sprocket damaged</td>
<td>Replace worn or damaged “stars” on meter shaft.</td>
</tr>
<tr>
<td><strong>Planting too much</strong></td>
<td>Incorrect seed rate, meter flutes, rate range or gearbox setting.</td>
<td>Check seed rate information beginning on page 64.</td>
</tr>
<tr>
<td>(all rows)</td>
<td>Seed size and weight or fertilizer density and granularity vary from chart</td>
<td>Calibrate. Adjust rate to compensate.</td>
</tr>
<tr>
<td></td>
<td>Seed or fertilizer density and granularity may vary from season to season, batch to batch and between different suppliers.</td>
<td>Re-calibrate if materials might have changed since last calibration (page 74).</td>
</tr>
<tr>
<td></td>
<td>Actual field size is different.</td>
<td>Verify field size.</td>
</tr>
<tr>
<td></td>
<td>Excessive bout/pass overlap.</td>
<td>Adjust marker, page 96.</td>
</tr>
<tr>
<td></td>
<td>Irregular shaped field.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Undersized contact drive tire, or excess air pressure, can increase rates.</td>
<td>Use correct tire size and air pressure, page 148.</td>
</tr>
<tr>
<td>Problem</td>
<td>Causes</td>
<td>Solutions</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-------------------------------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>Planting too much (some rows)</td>
<td>Dividers damaged or missing in towers.</td>
<td>Disassemble tower turrets. Replaced damaged or worn parts.</td>
</tr>
<tr>
<td></td>
<td>Worn/damaged flute “stars” in meter.</td>
<td>Inspect empty meter from above. Remove meter from below and repair.</td>
</tr>
<tr>
<td>Uneven seed depth</td>
<td>Excessive field speed</td>
<td>Slow down. Check Seeding Rate Chart for correct maximum field speed.</td>
</tr>
<tr>
<td></td>
<td>Air drill not level</td>
<td>Check leveling instructions, page 130.</td>
</tr>
<tr>
<td></td>
<td>Planting conditions too wet</td>
<td>Wait until drier weather.</td>
</tr>
<tr>
<td>Uneven seed spacing</td>
<td>Excessive field speed</td>
<td>Reduce field speed.</td>
</tr>
<tr>
<td></td>
<td>Drill not level</td>
<td>Check level (page 130) and weight transfer (page 84).</td>
</tr>
<tr>
<td></td>
<td>Planting conditions too wet</td>
<td>Wait until drier weather.</td>
</tr>
<tr>
<td></td>
<td>Seed-Lok™ building up with dirt.</td>
<td>Lock up Seed-Lok™, page 93.</td>
</tr>
<tr>
<td></td>
<td>Damaged or missing seed flaps.</td>
<td>Replace seed flaps.</td>
</tr>
<tr>
<td></td>
<td>Partially plugged opener seed tube.</td>
<td>Expose bottom of seed tube and clean out.</td>
</tr>
<tr>
<td>Opener disks not turning freely</td>
<td>Opener plugged with dirt.</td>
<td>Clean opener.</td>
</tr>
<tr>
<td></td>
<td>Planting conditions too wet.</td>
<td>Wait until drier weather.</td>
</tr>
<tr>
<td></td>
<td>Seed-Lok™ is plugging opener.</td>
<td>Lock up Seed-Lok™, page 93.</td>
</tr>
<tr>
<td></td>
<td>Failed disk bearings.</td>
<td>Replace disk bearings.</td>
</tr>
<tr>
<td></td>
<td>Bent or twisted opener frame.</td>
<td>Replace opener frame.</td>
</tr>
<tr>
<td></td>
<td>Partially plugged opener seed tube.</td>
<td>Lift up drill, expose bottom of seed tube and clean out.</td>
</tr>
<tr>
<td>Hectares or acres planted not correctly reported (Area tally is most accurate when seeding back and forth with markers with few headlands and curves)</td>
<td>Incorrect tire size or air pressure.</td>
<td>Correct tire size or air pressure, page 148.</td>
</tr>
<tr>
<td></td>
<td>Excessive overlap or gaps between passes.</td>
<td>Avoid overlap or gaps. Adjust marker.</td>
</tr>
<tr>
<td></td>
<td>Soil conditions.</td>
<td>Loose soil and slippage will cause variations in acres registered.</td>
</tr>
<tr>
<td></td>
<td>Actual field size different.</td>
<td>Verify field size.</td>
</tr>
<tr>
<td>Press wheels not compacting the soil as desired</td>
<td>Too wet or cloddy.</td>
<td>Wait until drier weather or rework ground.</td>
</tr>
<tr>
<td></td>
<td>Inadequate or incorrect Weight Transfer adjustment</td>
<td>Adjust weight transfer (page 84)</td>
</tr>
<tr>
<td></td>
<td>Incorrect press wheel depth.</td>
<td>Reset press wheel depth, page 94.</td>
</tr>
<tr>
<td>Excessive seed cracking</td>
<td>Excessive field speed</td>
<td>Reduce field speed.</td>
</tr>
<tr>
<td></td>
<td>Unclean seed.</td>
<td>Use clean seed.</td>
</tr>
<tr>
<td></td>
<td>Damaged, old or dry seed.</td>
<td>Use clean, new seed.</td>
</tr>
<tr>
<td></td>
<td>Fan speed too high</td>
<td>Use only enough speed for accurate delivery to all rows.</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>Backed up with drill in the ground.</td>
<td>Clean out and check for damage.</td>
</tr>
<tr>
<td></td>
<td>Failed disk bearings.</td>
<td>Replace disk bearings.</td>
</tr>
<tr>
<td></td>
<td>Disk blades worn.</td>
<td>Replace disk blades.</td>
</tr>
<tr>
<td></td>
<td>Scraper worn or damaged.</td>
<td>Replace scraper.</td>
</tr>
<tr>
<td>Openers drill too deep (Bulldozing)</td>
<td>Coulters set too deep</td>
<td>Raise opener frame (page 80).</td>
</tr>
</tbody>
</table>
### Lift Lock Troubleshooting

<table>
<thead>
<tr>
<th>Problem</th>
<th>Causes</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pawl Engaged After Unfold</td>
<td>Lock cylinder not retracted.</td>
<td>Perform an unfold operation (page 30) to retract lock cylinder.</td>
</tr>
<tr>
<td></td>
<td>Pawl held by lift lug.</td>
<td>Perform a lift operation (page 36) to move lug and free pawl.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Extend Lift circuit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Extend Fold circuit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Temporarily increase pressure in both down-pressure and weight transfer circuits.</td>
</tr>
<tr>
<td>Implement Lowered After Folding; Pawl Not Engaged</td>
<td>Implement was not fully raised prior to lowering</td>
<td></td>
</tr>
</tbody>
</table>

---

### Troubleshooting

<table>
<thead>
<tr>
<th>Problem</th>
<th>Causes</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front of openers dropping too low in hard or minimum-till conditions</td>
<td>Coulters set too deep</td>
<td>Raise opener frame (page 80).</td>
</tr>
<tr>
<td>Pressure gauges show pressure when openers are raised</td>
<td>Hydraulic hoses not routed correctly between pressure control valves and opener lift cylinders.</td>
<td>See hose routing diagrams beginning on page 154.</td>
</tr>
<tr>
<td>Hydraulic marker functioning improperly</td>
<td>Air or oil leaks in hose fittings or connections.</td>
<td>Check all hose fittings and connections for air or oil leaks.</td>
</tr>
<tr>
<td></td>
<td>Low tractor hydraulic oil level.</td>
<td>Check tractor hydraulic oil level.</td>
</tr>
<tr>
<td></td>
<td>Loose or missing bolts or fasteners.</td>
<td>Check all bolts and fasteners.</td>
</tr>
<tr>
<td>Marker disk does not mark</td>
<td>Marker counterbalance spring set too high, and not allowing disk to drop into field depressions (or mark on flat ground at extreme spring settings)</td>
<td>Reduce counterbalance spring force.</td>
</tr>
<tr>
<td></td>
<td>Disk orientation not ideal for conditions</td>
<td>Reverse marker disk to pull or throw dirt.</td>
</tr>
<tr>
<td>Chain Skipping or Excess Wear</td>
<td>Debris/no retainer clip</td>
<td>Be sure retainer clip is facing in opposite direction of chain travel (page 107).</td>
</tr>
<tr>
<td></td>
<td>Excess slack</td>
<td>Adjust chain slack (page 107)</td>
</tr>
<tr>
<td></td>
<td>Sprockets not aligned</td>
<td>Adjust sprockets on shafts.</td>
</tr>
</tbody>
</table>
## Brake Troubleshooting (Option)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Causes</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Smoke or odd burning odor from axle area</strong></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>New brakes may exhibit slight smoking or odors until linings seat on drums.</td>
<td>Check brakes if problem persists, or braking action is insufficient.</td>
<td></td>
</tr>
<tr>
<td><strong>Braking insufficient, one wheel</strong></td>
<td>Tire under-inflated.</td>
<td>Inflate all tires to specification.</td>
</tr>
<tr>
<td>Worn brake linings and/or drum</td>
<td>Service brakes.</td>
<td></td>
</tr>
<tr>
<td>Worn or leaking brake cylinder</td>
<td>Rebuild or replace cylinder.</td>
<td></td>
</tr>
<tr>
<td>Grease or oil on linings</td>
<td>Correct problem causing contamination. Service brakes.</td>
<td></td>
</tr>
<tr>
<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>
<td></td>
</tr>
<tr>
<td><strong>Braking insufficient, all wheels</strong></td>
<td>Air in drill 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>Air/Hydraulic system: damaged diaphragm in booster chamber</td>
<td>Replace booster.</td>
<td></td>
</tr>
<tr>
<td>Air/Hydraulic system: leaks in air system</td>
<td>Repair leaks.</td>
<td></td>
</tr>
<tr>
<td>Air/Hydraulic system: clogged filters</td>
<td>Clean filters (page 122).</td>
<td></td>
</tr>
<tr>
<td>Hydraulic/Hydraulic system: air in brake line from tractor</td>
<td>Bleed and recharge brake line.</td>
<td></td>
</tr>
<tr>
<td>Brake linings and/or drums worn</td>
<td>Service brakes.</td>
<td></td>
</tr>
<tr>
<td>Brake linings replaced with unapproved parts having inadequate friction rating</td>
<td>Replace shoes with approved parts.</td>
<td></td>
</tr>
<tr>
<td>Pressure supplied by tractor insufficient</td>
<td>80 psi / 55 kPa minimum for air system.</td>
<td></td>
</tr>
<tr>
<td><strong>No braking, one wheel</strong></td>
<td>Bleed port open</td>
<td>Close port. Re-charge and bleed system.</td>
</tr>
<tr>
<td>Brake lining worn or missing</td>
<td>Inspect and repair as needed.</td>
<td></td>
</tr>
<tr>
<td>Brake cylinder frozen</td>
<td>Inspect and repair as needed.</td>
<td></td>
</tr>
<tr>
<td>Brake parts broken or missing</td>
<td>Inspect and repair as needed.</td>
<td></td>
</tr>
<tr>
<td><strong>No braking, all wheels</strong></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>Loss of fluid in drill brake lines</td>
<td>Check for fluid loss at all fittings and bleed ports. Close/repair, recharge and bleed.</td>
<td></td>
</tr>
<tr>
<td>Line(s) to tractor improperly connected</td>
<td>Check connections.</td>
<td></td>
</tr>
<tr>
<td>Trailer brake system disabled or malfunctioning in tractor</td>
<td>Check function with another trailer.</td>
<td></td>
</tr>
<tr>
<td>Tractor line pressure insufficient</td>
<td>Have dealer check pressure at port.</td>
<td></td>
</tr>
<tr>
<td>Problem</td>
<td>Causes</td>
<td>Solutions</td>
</tr>
<tr>
<td>------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Drill 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 &quot;Dragging brake&quot; topic.</td>
<td>Check &quot;wheel lockup&quot; causes before flat spots develop on tires.</td>
</tr>
<tr>
<td>Brakes always engaged, all wheels</td>
<td>Drill 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>Hydraul/Hydraulic system: Drill brake line connected to incorrect always-on remote</td>
<td>Connect drill 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 / 2175 psi. Minimum required air pressure is: 550 kPa / 80 psi</td>
</tr>
<tr>
<td>Dragging brake</td>
<td>Over-extended adjuster</td>
<td>Reset adjuster. Inspect to discover why it overextended.</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 &quot;Brakes always engaged, all wheels&quot;</td>
<td></td>
</tr>
<tr>
<td>Squealing from brakes</td>
<td>Worn brake linings</td>
<td>Check brakes. Replace worn linings (page 124).</td>
</tr>
<tr>
<td></td>
<td>Distorted brake parts scraping</td>
<td>Check brakes. Replace damaged parts.</td>
</tr>
</tbody>
</table>
**Magnehelic® Gauge Troubleshooting**

If a Magnehelic® gauge does not read zero with the fan off, inspect the gauge, and re-zero as needed.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-zero with fan off</td>
<td>Zero drift</td>
<td>Re-zero per instructions below</td>
</tr>
<tr>
<td>Gauge reading lower than</td>
<td>Relieve port plug</td>
<td>Replace plug</td>
</tr>
<tr>
<td>expected</td>
<td>missing/damaged</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Breather line blocked or</td>
<td>Clear breather line</td>
</tr>
<tr>
<td></td>
<td>kinked</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Leak in sensing line</td>
<td>Check line to chamber</td>
</tr>
<tr>
<td></td>
<td>Gauge damaged</td>
<td>Check for loose cover, damaged O-ring</td>
</tr>
</tbody>
</table>

Check for chamber and breather line problems before re-zero. Re-zero cannot accurately compensate for leaks and blockages.

Re-zero the Magnehelic® gauge on level ground with the fan off, and if possible, under no-wind conditions. Turn the set screw ① on the meter face until it reads zero from the tractor driver’s viewing position.

Winter testing/maintenance advisory:
Gauge readings may be inaccurate or sluggish below -7°C (+20°F)

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**Figure 91**
Magnehelic® Gauge

Port ID for Troubleshooting:
① Over-pressure relief port (with plug in place)
② Low-pressure port (breather/atmospheric pressure)
③ High-pressure port (from manifold chamber)
Alternate high/lowl ports are plugged.
## 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.

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**WARNING**

**Crushing Hazard:**
You may be severely injured or killed by being crushed under a falling implement. Always use center section and gauge wheel lift locks when working near or under a raised implement.

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**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 drill for several hours, check all bolts to be sure they are tight.

1. Securely lock up drill before working on it.
2. Lubricate areas listed under “Lubrication and Scheduled Maintenance” on page 133.
3. Adjust idlers to remove excess slack from chains. Clean and use chain lube on all roller chains as needed.
4. Check for air leaks at lids, doors, seals, caps and hose connections.
5. Inflate tires as specified on “Tire Inflation Chart” on page 148.
Maintenance Lift Lock

**WARNING**

Crush and Pinch Hazards; Equipment Damage Risk:
Do not rely on hydraulics to hold the implement at lift. Use the maintenance lift 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.

Do not rely on the transport lift lock to hold the wings at raised. Use the gauge wheel lock channels provided. Unlocked gauge wheel cylinders settle over time. Outer wing openers can crush anyone working under them. Openers at wing gaps can pinch anyone working between them. Opener damage is also possible.

Locks, including gauge wheel cylinder locks, are provided to hold all implement sections at raised for maintenance, and for raised unfolded storage. The gauge wheel lock channels are not used in routine operations (field or transport).

Steps to engage maintenance lift lock presume a starting configuration of implement unfolded and lowered:

1. Raise the unfolded implement.
2. Install the gauge wheel lock channels. Remove the channels ① from the wing lugs ② and pin to cylinder rods ③.
3. With the implement still fully raised, begin a fold operation (page 32) just long enough to cause the center lock cylinder ④ to extend and engage the center lock lug ①.
4. Lower the implement.

**Maintenance Lift Unlock**

1. Raise the implement.
2. Remove the gauge wheel lock channels. Return them to storage.
3. To lower, Perform an unfold operation (page 30) just long enough to disengage the center lock.

To fold, leave the center lock engaged, and complete a fold operation (page 32).
Hopper Strap Maintenance

Refer to Figure 94
A new drill requires frequent attention to the hopper straps, as the hoppers seat, and periodic attention thereafter, due to continued hopper seating and strap stretching.

Check tension before and after filling a hopper, and at the end of each day. Seasonally inspect the straps for wear and damage. Replace any that are frayed or torn.

Tighten nuts on tensioning bolts 1 until straps cannot slide side to side on hopper face 2, then tighten nuts two additional turns.

Chain Maintenance

Initially check the drive chains after the first 10 hours of drill use. The slack of new chains tends to increase during the first few hours of operation due to seating. Thereafter, check the chains every 100 hours.

Lubricate chains any time there is a chance of moisture, and when being stored at the end of the planting season.

Chain Slack

Refer to Figure 95, 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).

2. Determine the ideal slack:
   Long chains (over 91cm/36in): 2.1cm/m (1/4in per ft)
   Vertical short chains: 2.1cm/m (1/4in per foot)
   Horizontal short chains: 4.2cm/m (1/2in per foot).

3. 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.

4. 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 96 (arrow shows chain direction)
Install clip with open end facing away from direction of chain travel (shown by gray or striped arrows in chain routing diagrams).
Fertilizer System Maintenance

With proper attention to maintenance, end of day clean-out, end of season clean-out and winterization, you can substantially increase the life and reliability of your liquid fertilizer system. Protect the pump, clean the tanks, strainers, lines and nozzles, and you can avoid costly and time-consuming repairs at the next season.

Fertilizers are usually highly corrosive to metals other than stainless steel. Suspension fertilizers can clog system components in storage.

1. Flush entire system with clean water.
2. Remove end caps from booms and flush booms out with water. Drain and replace end caps.
3. Remove strainer and drain it out. Drain all lines and tanks completely to prevent freezing damage.
5. Wash all spilled fertilizer off the air drill.

Liquid Fertilizer Strainer

Refer to Figure 97

The fertilizer system uses an in-line strainer to keep damaging particulates out of the pump. The strainer becomes clogged over time, reducing pump rate. Plan to clean the strainer several times per season. Don’t wait for application rates to fall below target. Higher quality liquid fertilizers may require less frequent cleaning.

Disassemble and clean the strainer prior to storage to prevent caking.

In Season Filter Cleaning

1. Shut off the ball valve at the filter.
2. Unscrew and remove the bottom canister. It is generally not necessary to remove the plug, although doing so may ease cleaning of the canister. Make sure the plug is tight when re-installing.
3. Wash the filter cartridge with water, or replace with new cartridge if necessary. Inspect the screen and O-rings for damage. A new cartridge includes O-rings.
4. Inspect the large O-ring on the canister. Replace as necessary.
5. Reinstall the cartridge, canister. Turn on ball valve.

End of Season Filter Cleaning

1. Load 10 to 15 gallons (40 to 60 liters) of clean water in each supply tank.
2. Pump most of it through the system. If doing this by hand-turning the ground drive wheel, first install the largest drop-line orifice size, and set the pump adjuster to maximum, to increase flow.

Possible Chemical Hazard:
Wear proper protective equipment as required by chemical supplier. Avoid prolonged breathing of chemical fumes. Wear respirator as required by chemical manufacturer. Some chemicals will cause serious burns, lung damage, and death. Avoid contact with skin or eyes. Seek medical assistance immediately if accident occurs. Know what to do in case of an accident.

Equipment Damage Risk:
Do not leave fertilizer or fertilizer residue in pump. Do not allow air to enter pump. Even for short periods, air in pump causes RAPID and SEVERE CORROSION.
Unloading Materials

Unloading Safety Information
Unloading materials has the same risks as loading material. Review the advisories on page 46.

1. Raise implement (page 36) to ensure free operation of calibration crank. Fold is optional.


   If using an auger, unloading is a two-person operation.

3. Shut off tractor unless using tractor hydraulics for auger operations.

4. Place tarp or auger inlet under outside face of meter to be emptied.

5. If unloading fertilizer or treated seed, take same materials safety precautions as for loading.


Refer to Figure 98

7. Open Calibration door ① first. A small amount of material may fall into the chute and onto the collection area.

8. If using an auger, have everyone stand clear, and test auger controls.

9. Have one person open Clean-Out door ② second, and if using an auger, have a second person start the auger as soon as the first person is clear.

   Expect material to flow in significant volume until the hopper is empty. Inspect the hopper from the lid to confirm that it is empty.

10. Install the calibration crank (page 51). Rotate it until no material flows from the calibration door.

11. Shut down and withdraw auger, if used.

12. If the drill will not be used again for an extended period, complete the steps at "Material Clean-Outs" on page 110.

13. Move drill from collection area and recover materials.

14. Wipe down doors and bottom of meter.

15. Close doors. For temporary parking or transport, fully close doors. For storage, close doors only until elastomer seals begin to touch meter housing, so that condensation can drain. Do not leave doors open wide enough for pest entry.

16. Raise and latch chute.
Material Clean-Outs

For normal unloading of residual materials at completion of planting, see “Unloading Materials” on page 109.

The present section covers completely cleaning out hopper and air system, when residues need to be minimized.

1. Perform normal material unloading (page 109), then fold and lock the drill (page 32) in preparation for a move to a site suitable for wash-out.

2. Reposition drill to a suitable site with rinse water and hose available. This may be two different sites if each hopper contained different materials.

   If no otherwise suitable location is available, perform a fertilizer or treated seed clean-out on an up-hill portion of the field last planted or treated.

3. Leave the tractor hitched, in Park with parking brake set. If tractor cannot be left hitched, block drill tires or set optional parking brakes.

4. Deploy a ladder (page 41). Remove strainer (page 43). Clean strainer. While strainer is removed, inspect hopper for signs of problems that may prevent normal clean-out, such as objects or congealed masses too large to exit through meter (see “Problem Clean-Outs” on page 111).

5. Install the calibration crank. Open both calibration and clean-out doors on the meter of the hopper to be cleaned out.

6. Power wash the interior of the hopper while a second person cranks the meters (page 51).

7. Re-install strainer. Close lid tight and secure handle.

8. After cleaning out the last hopper, close all doors. Run air system for 10 minutes to blow moisture out of meters and lines.

9. Open all hopper meter doors. Run air for 5 minutes.

10. Shut off air. Clean door seals and meter box faces.

11. Close meter doors as for parking or storage. Move drill to parking or storage site.

12. Follow normal Parking (page 61) or Storage (page 62) instructions.
Problem Clean-Outs

For normal unloading of residual materials at completion of planting, see “Unloading Materials” on page 109. For normal clean-out of residue, see “Material Clean-Outs” on page 110.

If, however, parking and storage recommendations have not been followed, or material is defective, it is possible to have hard-to-remove material present.

If the material fails to pass through the clean-out door, take the following steps to remove it. Do not consider entering the hopper until first completing these tasks.

Open the clean-out door.

Remove the strainer and evaluate the problem, for example:

- If the problem is a single moveable large object, such as a dead animal, fishing out from above may be the solution.
- If the problem is congealed materials, scoop out a sample from above and see if the mass dissolves in water. If so, and there is a small amount of the material involved, rinsing, or rinsing and pumping the hopper from above may be the solution.

For small amounts of residual materials, poking with a long pole may suffice to push it through the clean-out.

If poking doesn’t produce satisfactory results, and you intend to try wash-out, poke at least one hole down to the meter clean-out, so that water can flow out.

If wash-out is contemplated, start by introducing a small amount of water, and make sure that it appears at the clean-out within 15 minutes. If not, you will just be adding water to the problem. The hopper is not designed to hold water at full capacity. Add no more water.

Hopper Entry

Normal use of the hopper and routine maintenance do not require entry.

The hopper vent tube structure includes features to aid emergency egress. It is not intended for routine entry.

However, do not remove the vent tube structure, as it is required for pressure-balancing the air space above the material.

Depending on their use, the NTA607HD or NTA2007HD material hoppers may be or become “permit-required confined spaces” under U.S. OSHA regulations (29 CFR 1910.146) and similar regulations, statutes, insurance agreements and local business policy. A written policy and permitting process may be required for any hopper entry.

Rapid Suffocation Hazard:

Encrusted grain may be loose and flowing beneath the crust. Any hollow spaces are highly likely to have insufficient oxygen and/or toxic gases from microbial action. Falling through a crust in either case can result in death in a matter of seconds. Never enter a hopper to dislodge a crust or bridge.

A hopper that is full or merely appears full can be an entrapment hazard. You can sink entirely into the grain, or into a void, and suffocate in a matter of seconds. Grain bridges and crusts are especially dangerous.

You can be overcome by hazardous fumes very quickly even in an empty hopper with the lid open.

A partially full hopper, even with no bridging present, is a suffocation risk. Oxygen levels may be insufficient and/or dust levels may be too high for breathing.

Do not enter a hopper for loading material.
Do not enter a hopper for unloading material.
Do not enter a hopper for routine cleaning.
Do not enter a hopper for any meter maintenance.

Never enter a hopper without at least one trained and equipped attendant present.

Never enter a hopper for any reason unless you fully comply with applicable laws, regulations, rules, agreements, and the instructions in this section. Where applicable laws, regulations, rules, agreements contradict an instruction below, do not follow that instruction.
Hopper entry may be necessary in some unusual circumstances, such as:

- hopper level or pressure sensor replacement; or,
- removal of obstructions too difficult to pull out with the meter box removed and not susceptible to fishing or pumping out from the open lid.

Should such a situation arise, observe the following precautions:

1. **Evaluate the hazards**
   Review the material safety data sheets (MSDS) for any treatments and/or fertilizers used in the hopper since it was last thoroughly cleaned, and the most recent materials even if the hopper was subsequently cleaned. Retain the MSDS information for any medical treatment that might be required.

2. **Designate or engage a team**
   Hopper entry is never a single-person activity. At least one attendant/observer is necessary. Give priority to individuals already trained in confined space operations. Designate a leader (who will not be the entrant) with authority to terminate the activity.

3. **Protect the team**
   Obtain the necessary safety equipment specified for confined space exposure to those materials, paying particular attention to safety harness/line, and respiratory support and protection. This may include contaminant detection equipment and positive ventilation to refresh air in the hopper.

4. **Equip the team**
   At least one attendant must be equipped with communications capability, to summon outside aid in the event that the hopper worker is overcome. Equip the entrant with a safety harness and safety line.

5. **Train the team**
   Review the hazards. Review the procedures. Understand the use of the protective equipment. Know the steps to take in emergencies. Practice them. Train the observer to summon aid, and not attempt hopper entry if the entrant is overcome.

6. **Secure the drill**
   Set optional brakes or block the drill wheels to prevent movement.

7. **Disrupt crusting or bridging**
   From outside the hopper, break up any hard surfacing on top of the material, or forming layers within the material. Such layers are extremely dangerous to stand on.

8. **Empty the hopper**
   Follow the steps at “Unloading Materials” on page 109. If a blockage makes this impossible, use an external pump line to remove as much material as possible without performing a hopper entry. Pump until at least some material is exiting the clean-out door. Leave the clean-out door open.

9. **Clean the hopper**
   From the outside at the walkboard, power-wash the inside of the hopper. Use a mild detergent sprayer. Rinse thoroughly.

10. **Air the hopper**
    Leave the hopper lid and clean-out door open, and do not commence work until the rinse water has completely evaporated.

11. **Plan the work. Work the plan.**
    Postpone the work if any team members, equipment or other resources are missing, or weather/lighting conditions are not favorable. Terminate and evacuate if any unexpected situations arise.
Implement Lift Switch Adjustment

Refer to Figure 99 and Figure 100

An implement lift switch ① on the drill turns seed metering off when the implement is raised, by commanding a linear motor to retract the ground drive arm. To adjust the switch activation height, first locate the lift switch on the implement (center section, right rear parallel arms).

If changes have been made to tool bar height (page 26), or if the switch was removed for any reason, it needs to be adjusted for activation height.

![Figure 99](image1)

Lift Switch Location

![Figure 100](image2)

Lift Switch Adjustment

**CAUTION**

**Pinch / Crush Hazards:**

Shut off tractor and remove key while adjusting switch. Do not place any part of body under implement or near moving parts while checking adjustments.

Wings must be unfolded to prevent lift lock from engaging. Lower the openers until at a height where seeding should start (usually just above ground). Turn off the tractor and remove the key. Securely support center section tool bar at this height with jack stands or blocks.

Loosen switch pivot screws ②. Adjust switch angle so that toggle ③ is level, or slightly tilted up to the right.

Loosen bracket bolts ④ and slide switch ① up or down until the flexible switch toggle ③ is just past the point at which the switch is activated (flexible switch toggle deflected up).

Note: The implement lift switch has three wires (black, red and green). In order for the switch to work properly, the correct two leads must be connected to the lift switch extension cable.

The extension cable black lead always connects to the switch black wire. The extension cable red lead must connect to the switch green wire.

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a. The contact drive also disengages on Master SW Time-out (master switch ON, but ground speed 0 for a period of time greater than specified in the configuration menus). If the variable Rate Kit option is installed, and the seed monitor is in either of GRAN SEED CONTROL or GRAN FERT CONTROL, the Master Switch must also be ON for ground drive to engage.
Contact Drive Re-setting

Refer to Figure 101 and Figure 102
There is one contract drive tension spring ① on the single contact drive. The contact drive tire ② is held in contact with the main transport tire ③ by the tension of the spring. A linear actuator ④, under control of the seed monitor, raises the arm and tire out of contact as commanded by the implement lift switch.

If there seems to be:
- insufficient traction between the contact drive tire ② and the main transport tire ③, or
- excess spring force at contact tire,
check tire sizes and inflation (page 148). Use tire sizes specified by Great Plains, at recommended pressures.

Do not attempt to compensate for worn, under-inflated or incorrect tires by adjusting spring tension.

If any spring assembly components are replaced, the factory settings for spring assembly length are:

⑤ 10.0 cm (3\(\frac{15}{16}\)in)
   cup position: measured from the center-line of the rear clevis pin to the base of the spring cup
⑥ 43.8cm (17\(\frac{1}{4}\)in)
   overall length: measured between pin centers
Hydraulic Maintenance

To function properly, the hydraulic systems must be free of contaminants, free of air and fully charged with oil.

Hydraulic Maintenance Safety Information

**WARNING**

**High Pressure Fluid Hazard:**
Do not loosen (“crack”) fittings with a circuit engaged. With a circuit in Neutral or Float, crack hydraulic lines carefully. There may still be pressure in lines even with the circuit in Float or Neutral. Wear gloves and eye protection. Crack fittings slowly. Supply fluid slowly. When circuit is energized, watch for fluid emergence at a safe distance.

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.

**CAUTION**

**Two or More Persons Required:**
Bleeding is not a single-person operation. Establish a signaling protocol between the tractor cab operator and the observer at the bleed points. Establish an emergency stop signal. Determine the safest stop mode for each bleed. Where components cannot move down suddenly, setting the circuit to Float can relieve pressure in lines (depending on valve settings). Where components represent a crush or shear hazard, set circuit to Neutral.

Bleeding Hydraulics

If hydraulics have not been bled, they will operate with jerky, uneven motions and could cause wings to drop rapidly during unfold. If hydraulics were not bled during initial implement setup or if you replace a part in hydraulic system during the life of the drill, complete the bleeding procedures in the next few pages.

See also “Brake Line Charge and Bleed” on page 120 and “Marker Hydraulic Bleeding” on page 131.

Check hydraulic fluid level in tractor reservoir and fill to proper level. Add fluid to system as needed.

Note: System capacity for the entire drill is about 38 liters (10 U.S. gallons).

**NOTICE**

**Fitting Damage Risk:**
Bleed only at:
- JIC (Joint Industry Conference, 37° flare) or
- NPT (National Pipe Thread, tapered thread) fittings.

Avoid bleeding at:
- ORB (O-Ring Boss) fittings.
- Never bleed at:
- QD (Quick Disconnect coupler) fittings.
**Bleeding Lift Hydraulics**

Move the drill to a hard surface area, so that the implement cannot fully lower.

If the systems have sufficient fluid for safe operation, prior to bleeding, perform an unfold (page 29). Leave the implement raised.

1. Review safety advisories and operational advice on page 115, and on this page, before performing bleed.

Note: A complete Lift system re-charge requires about 10 liters (2.6 gallons) of oil.

*Refer to Figure 103 and Figure 104*

2. Record the number of spacers \( \mathbf{1} \) on the rods of each Master cylinder \( \mathbf{2} \). Remove and save the spacers (to prevent the cylinders from resting on the spacers).

3. Lower the implement.

If the lift cylinders bottom-out on the rod ends, it will be necessary to use jacks or stands under the tool bar. Raise the implement. Lower it on the supports.

4. Set the Lift circuit to Float. Shut off tractor. Remove key.

5. Unpin the rod ends of both center section lift cylinders \( \mathbf{3} \), and both wing gauge wheel lift cylinders \( \mathbf{3} \).

6. Orient the lift cylinder rod ends so that they are pointing up (at least slightly above horizontal) and cannot strike drill parts at full extension. Fully extend the lift cylinders. Hold for several seconds.

Bleeding Fold/Lock/Down-Pressure Hydraulics
If the systems have sufficient fluid for safe operation, prior to bleeding, perform an unfold (page 29) operation and a lower (page 34) operation.

1. Review safety advisories and operational advice on page 115, and on this page, before performing bleed.

Note: A complete Fan/Fold system re-charge requires about 20 liters (5.4 gallons) of oil.

Refer to Figure 105 and Figure 106
2. Turn fan shut-off valve off (page 57). Set fan circuit to Float.


4. Un-pin the wing fold rod ends ②. Un-pin the cart-transfer cylinder rod ends ③. Un-pin the lock cylinder base end ④. Block up or wire cylinders so that free ends may extend without striking drill parts.

5. If extended, completely retract fold and cart transfer cylinders. Fully extend center lock cylinder rod.

6. Loosen the JIC fittings at the base end of both fold cylinders ⑤, the base end of both transfer cylinders ⑥, and at the rod end of the lock cylinder ⑦.

7. Slowly extend the circuit (same direction as fan operation) until fluid appears at each loosened fitting. Set circuit to Neutral and secure each fitting in turn. Repeat until all five fittings are secured.

8. Continue to Extend circuit until the fold and transfer cylinders are fully extended, and the lock cylinder is fully retracted. Set circuit to Neutral.

9. Loosen the JIC fittings at the rod end of both fold cylinders ⑧, the rod end of both cart transfer cylinders ⑨, and at the base end of the lock cylinder ④.

10. Slowly retract the circuit until fluid appears at a fitting. Set circuit to Neutral and secure fitting. Repeat until all five fittings are secured.

11. Cycle cylinders full stroke several times.

12. Use tractor circuit to re-position rod ends and re-pin.

13. If no other bleeding is required, adjust the transfer control valves back to their most recent settings (or to the suggested default settings). See page 84.
In-Line Filter

If folding/unfolding times slow noticeably, check the in-line filter and clean if needed. The filter is located at the inlet port of each pressure valve (page 156).

1. Move drill to typical field conditions. Unfold drill (page 29). Lower openers (page 35). Turn on fan (page 57) and bring up to normal field rpm.

2. Set Fan/Fold circuit to Float.

3. Shut down tractor and remove key.

Refer to Figure 107

4. Slowly loosen filter and relieve any residual pressure in line. When disconnecting hose, support the end to minimize fluid loss.

5. To disassemble unscrew end cap of filter. Remove top retaining washer and screen.

6. Clean filter screen with solvent and compressed air, or replace if needed.

7. When reassembling put screen into filter. Place retaining washer on top of filter and screw on end cap.

8. Re-install filter.

9. Activate the Fan/Fold circuit. Cycle the lift and fold systems several times. Check for leaks.

10. If there is any sign of air in the system, perform a bleed operation (page 117).
Brake Maintenance (Option)

Brakes are self-adjusting, but there are several maintenance items:
page 119 - Hand Brake Maintenance
page 120 - Brake Line Charge and Bleed
page 122 - Air Brake Filter Cleaning
page 123 - Brake Drum and Liner Maintenance

Hand Brake Maintenance

Refer to Figure 108

Periodically adjust the setting of the handle knob ① so that the handle snaps firmly into place as brakes are engaged.

If the handle runs out of adjustment, or is close to running out of adjustment, loosen jam nuts and re-position the brake-end barrel ② on the cable casing.

Further adjustment is available at the barrel ③ on the handle end of the cable casing.

If all three adjustments are at or near their limits, service the brakes.

Figure 108
Hand Brake Adjustments
Brake Line Charge and Bleed

**NOTICE**

**Equipment Damage Risk:**
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.

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 drill 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 and lower the drill to prevent movement. Do not set the cart’s parking brakes, as this restricts cylinder movement.

3. Put tractor in **Park**.

**NOTICE**

**Disassembly Impediment Risk:**
Do not set tractor parking brake if it also operates trailer brakes.

Refer to Figure 109 (which depicts hydraulic brake system - reservoir for air brake system is similar)

4. Clean and dry top of master cylinder reservoir.

5. Remove cap 1 and keep free of contaminants.

**Drain Hydraulic Brake Lines**

6. If draining brake system:
   
   A. Remove drain plug 2 at rear of reservoir and empty reservoir. Re-secure plug.

   B. Start the left hub for the following steps.

   C. Connect recovery tubing to the bleeder valve 3 above the brake line. Unscrew valve to open line.

   D. Operate tractor brakes to cycle cart brake system. Continue until no fluid flows at hub.

   E. Close valve, and repeat step C and step D for the other hub.

Refer to Figure 111 (which depicts hydraulic brake system - tee for air brake system is similar)

Charge and Bleed System

Refer to Figure 112

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**

   **Equipment Damage Risk:**
   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.

8. Screw cap on master cylinder reservoir. Start at left
   hub for step 9.

Refer to Figure 113

9. Unscrew bleeder valve ③ 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 right hub.

Refer to Figure 114

13. At brake line tee ④, loosen center port connection
    just enough to allow air to escape when system is
    pressurized, but not enough to allow air to enter.

14. Cycle tractor brakes until no air bubble appear at
    connection. Tighten connection.

15. Top off master cylinder reservoir.
Air Brake Maintenance

Reservoir Draining
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 cart hand brakes.
2. Hold the petcock ② open until no water flows. Close petcock.

Air Brake Filter Cleaning
Refer to Figure 116 and Figure 117
The air brake system includes filters ④ 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 drill to a sheltered area, to prevent unfiltered dust from entering the opened air system.
2. Use a 33mm (1 9/32 in) open-end or adjustable wrench to loosen both red filter caps ⑤.

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

Note: 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 ⑥ when it falls free.

NOTICE
Equipment Damage Risk:
Handle the filter screen element very gently. Great Plains offers only complete replacement filters, and not screen elements.

Note: 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 ⑦. 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.

**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/m³, 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 Disposable** - Dispose of discarded linings, used rags, clothes 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 123. 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 at a time, so that there is a fully-assembled wheel to use as an assembly reference.

3. Spot the drill on a level surface. Unfold and lower the drill.

4. Block the implement wing and rear tires to prevent movement. Do not set the cart's parking brakes. The drums cannot be removed with the brakes set.

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.

6. If unhitched, release air brakes by opening dump valve ①. Pull down on cap to release. Push up.

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 directional.

10. Remove hub/drum assembly:
    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 128).

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

**WARNING**

Possible Asbestos Hazard:
If you are unable to confirm that you are removing and installing Great Plains approved parts, you may have linings that contain asbestos. Some aftermarket brake shoes may contain asbestos, and require strict, complex and costly safety procedures not covered in this manual.

**NOTICE**

Equipment Malfunction Risks:
If shoe replacement is indicated, use only parts supplied or recommended by Great Plains. Unapproved parts may appear to fit, but will not function correctly.

Note: 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).
14. Inspect brake shoe 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. Check for 1.6mm (1/16in) minimum thickness (exclude thickness of shoe pad). Check for 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.

Note: 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 121


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.

⚠️ CAUTION

Brake Slippage Hazard:
Do not allow any lubricants to come in contact with new brake linings.

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

23. Loosen nuts 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 at the clevis pin (not shown).

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

26. Remove hand brake arm assembly. Place spring with it.
Refer to Figure 125

27. Remove five $\frac{1}{2}$-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 ⑥ on the two shoe hold down bolts ⑦.

Note: 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 re-installed 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 ⑤ and brake shoes ⑥.

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 cart.

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.

Note: 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 123
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 ①. 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 ④.

37. Loosely secure shoe to backing plate ⑤ with shoe hold down bolt ⑥, large flat washer ⑦, two spring washers ⑧, and castellated nut ⑨. Do not install the cotter pin at this time.

Note: The spring washers ⑧ are slightly cupped. Place them on the bolt with the concave (dished-in) sides facing each other ⑨.

38. Tighten the castle nuts ⑩ until the spring washers ⑧ 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 ⑪.

39. Insert five backing plate studs through dust cover ⑬ and spindle weldment. Secure with lock washers ⑭ and 1/2-13 nuts ⑮.

Re-Install Springs

Refer to Figure 124
40. With link arm ① toward front of cart, 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 ⑨. The adjuster pawl ⑩ is up and to the right as you face the spindle. Secure with cotter pins ⑪.

45. Tighten pivot bolts ⑫ to 5/8-18 torque specification.

---

NOTICE

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

Refer to Figure 125

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 126

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.

Equipment Damage Risk:

When installing seals, 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). Seals are hollow metal structures and are somewhat fragile. They are not intended to be in contact with the bearings.

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 ⅓ 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

Non-Asbestos Fibers and Metal Dust Hazards:

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

Brake Failure Hazards:

Remove chips. Do not re-use heavily damaged or worn-out drums. Failure to remove chips can cause bearing failure, brake failure or wheel/spindle separation. 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.
Mounting Wheels

56. Position a wheel on the hub from which it was dis-mounted.

Refer to Figure 127

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)

Note: This staging and ordering of tightening is strongly recommended to ensure proper seating of wheel against hub.

59. Repeat step 57 and step 58 for the other wheel.

Test and Adjust Brakes

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

60. Hitch a tractor equipped with trailer brake remotes. 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 cart 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 the other cart wheel. Stop it with the tractor brakes. Check braking action. The self-adjusters may already be seated for this wheel.

65. Release all tractor braking that engages cart braking.

66. Spin the first wheel again. Engage the cart 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. Repeat step 66 for the other side of the cart.

68. Check tire inflation, set parking brakes, and lower cart onto its wheels.
Leveling Implement

Refer to Figure 128

When fully raised, the opener tool bars of all three sections should be at the same height. This measurement is most accurately made on a flat paved surface.

Implement operating height/level is controlled at several points:

- Center frame tool bar height is controlled by spacers on the lift cylinder rods. See page 80.
- Front-to-back level is automatic. User adjustment of the lift link is not recommended. In the event of dismount during maintenance or repair, factory link length is 202.0cm (79¹⁷/₃₂in) center-to-center.
- Wing tip tool bar height is primarily controlled by gauge wheel cylinders.
- Wing tilt is controlled by wing weight transfer. The weight transfer adjustment necessary varies with field conditions. See page 86.

Wing Leveling (Eyebolts)

Wing tip tool bar height is normally set by the wing lift cylinders. These are re-phasing cylinders operating as slaves to the center section (master) lift cylinders. The master cylinder lowering limit is set by spacers.

If wing tip tool bar height is not the same as the center section tool bar height, make these checks before considering any adjustment to the eyebolts:

1. Page 116: Is the lift system charged and bled? If there is any air in the system, the wing heights may not track the center height (or each other).
2. Page 116: Is the lift system re-phased? If the wing cylinders are not tracking the center cylinders, perform a re-phase.
4. Page 86: Is weight transfer properly set for conditions? If the wing gauge wheels are off the ground (or nearly so), there may be too little weight transfer. If the center section is running high, and the wing ends are low, there may be too much transfer.

Refer to Figure 129

5. Check the current eyebolt setting. Prior to any adjustment, make sure that it was at the factory-recommended setting. The distance ① from the base of the cylinder lug tube ② to the flat top of the eyebolt lug ③ is factory-set to:
   ① 5.7 cm (2.25 in)

To adjust the gauge wheel height:

6. Unfold the implement on flat ground. Fully raise the implement.

7. Loosen the jam nut ④.
8. Set the gauge wheel height with the adjust nut ⑤. Adjust until opener tool bar height at wing tip is the same as center opener tool bar height.
9. Tighten the jam nut.

Note: If the left and right wing cylinders are not operating identically, the problem is hydraulic, and not a mechanical adjustment.
Marker Maintenance (Option)

Review “Marker Safety Information” on page 58 before performing maintenance on markers.

See also:
“Marker Operation (Option)” on page 57 and “Marker Adjustments” on page 95.

Marker Shear Bolt

Refer to Figure 130

The marker arm is attached to the pivot sleeve with a shear bolt ①, which is intended to fail if the marker strikes an obstruction, allowing the marker to swing back around a normally stationary pivot ②.

If the shear bolt breaks, replace it with an equivalent: 5/16"-16x4-in. Grade 5 bolt (Great Plains part 802-223C). If that size is not immediately available in your area, temporarily substitute an M10x10.0 Class 8.8 metric bolt. Use two nuts ③ on the shear bolt.

Note: Replacing the bolt with a lower grade, or smaller size, or using a single nut, can result in nuisance shears.

Machine Damage Risk:
Replacing the bolt with a higher grade can result in marker damage.

Marker Hydraulic Bleeding

1. Review warnings, bleeding notes and system information on page 115.

Refer to Figure 131

2. With markers unfolded in field position, crack hydraulic-hose JIC fittings at base ④ and rod ends ⑤ of each marker cylinder.

3. With tractor at idle speed, activate tractor hydraulic valve forward until oil appears at a fitting. When oil begins to seep out around a fitting, tighten that fitting. Reverse the tractor hydraulic valve until oil appears at opposite hose fitting. Tighten that fitting.

4. Activate tractor hydraulic valve forward again until oil seeps out around a fitting on the other marker cylinder. Tighten that fitting. Reverse tractor hydraulic valve until oil seeps out around remaining hose fitting and tighten it.

5. Fold and unfold markers slowly to work out all air.

Note: Use caution when folding and unfolding markers for the first time, checking for pinching and kinking of hoses.
Seed Flap Replacement

Refer to Figure 132
To replace a seed flap ①, use a needle nose pliers or similar tool to grasp “T” top of flap. Pull upward to pull flap up out of metal bracket ②.

Push new seed flap ① down through metal bracket ② until flap snaps into place with “T” top resting on top of bracket.

Figure 132
Seed Tube Flap
Lubrication and Scheduled Maintenance

### Hopper Straps

| 0, 1, 10, 50 |

2 straps each hopper

See "Hopper Strap Maintenance" on page 107 for inspection intervals and adjustment.

### Wing Flex Pivots

| 8 |

1 zerk each wing pivot arm,
2 arms per wing;
4 zerks total

Lubrication: multi-purpose grease
Amount: until grease emerges

### Marker Tilt Bearings (Option)

| 8 |

2 zerk each marker pivot frame;
4 zerk total.

Lubrication: multi-purpose grease
Amount: until grease emerges
Cart-Implement Link

1 zerk at each arm tube end; 4 total.
Service rear zerks from access ports under tubes.

Rear Lower Parallel Arms

1 zerk at each arm tube end; 4 total.
Service rear zerks from access ports under tubes.
Rear Upper Parallel Arms

1 zerk at each arm tube end; 4 total.
Service front zerks from access ports under tubes.

Coulter Pivots

Multiple zerks per grease bank, 3 grease banks per implement; 32 or 40 zerks total
Lubrication: multi-purpose grease
Amount: until grease emerges
Note: These zerks only serve the coulter pivots. Coulter hubs are lubricated at the hubs.

Fertilizer Pump Bearings (Option)

4 zerks total
Lubrication: multi-purpose grease
Amount: until grease emerges
Refer to CDS-JohnBlue pump manual for pump maintenance.
Fertilizer Pump Crankshaft (Option)

1 breather/fill port plug ①
1 inspection port plug ②
Lubrication: SAE 90 EP Gear Oil
Amount: until oil visible at inspection port
Refer to CDS-JohnBlue pump manual for pump maintenance.

Tire Pressures

1 contact drive tire
2 cart tires
4 gauge wheels
Check tire pressures more frequently on a new drill, and with new tires. Check tire pressures whenever there are planting problems.

Contact Drive Chains

2 chains; remove cover for access to wheel arm
Lubrication: multi-purpose spray lube
Amount: coat thoroughly
Drive Chains (Single-Hopper)

As Required

1 gearbox input chain,
1 gearbox output chain,
1 meter input chain;
3 chains total (see also Contact Drive Chains)
Lubricant: multi-purpose spray lube
Quantity: coat thoroughly

Drive Chains (Dual Hopper)

As Required

1 gearbox input chain,
1 gearbox-to-meter chain,
1 gearbox output chain,
1 meter input chain;
4 chains total (see also Contact Drive Chains)
Lubricant: multi-purpose spray lube
Quantity: coat thoroughly
Drive Chains (w/Liquid Fertilizer, Option)

- As Required

1 gearbox input chain,
1 pump input chain,
1 gearbox output chain,
1 meter input chain;
4 chains total (see also Contact Drive Chains)

Lubricant: multi-purpose spray lube
Quantity: coat thoroughly

Hopper Lid Pivot Bar and Clamps

- As Required

4 pivot and 1 swivel point per lid,
1 or 2 lids per cart.

Lubricant: multi-purpose oil lube
Quantity: coat thoroughly

Meter Box Door Clamps

- As Required

2 clamps each of 4 doors,
2 or 4 doors per cart;
4 or 8 clamps total

Type of Lubrication: multi-purpose oil lube
Quantity: coat thoroughly
Caster Pivots

1 zerk each caster pivot;
2 zerk total
Lubrication: multi-purpose grease
Amount: until grease emerges

Caster Brakes

One UHMW brake piston each caster;
2 total.
Replace UHMW piston ② if its length is less than 3.2cm (1 1/4 in). Also replace piston if missing, damaged, tilted, or top of piston is visible.
Set bolt reveal ① (brake spring tension) to 5.4cm (2 1/8 in) for a new piston, as measured from beneath the bolt head to the top of the weldment. Use more tension as needed to eliminate caster vibration during highway transport.

Cart Wheel Bearings

2 races each wheel,
2 cart wheels;
4 races total
Lubrication: bearing grease
Amount: re-pack
**Gauge Wheel Bearings**

2 races each wheel,  
2 wing gauge wheels,  
2 rear caster gauge wheels;  
8 races total  

Lubrication: bearing grease  
Amount: re-pack

Note: These hubs are also provisioned with a grease zerk. If you choose to add grease via the zerk, pump gently and only until resistance is felt. Excess pressures or grease volume can damage seals.

---

**Coulter Hub Bearings**

1 zerk each coulter;  
32 or 40 total  

Lubrication: multi-purpose grease  
Amount: until resistance is felt

Note: These zerks only serve the coulter hubs. Coulter arm pivots are lubricated from the grease banks.

---

**Hopper Lid Seals**

1 seal per hopper lid (underneath lid);  
1 or 2 per implement.  

Inspect seasonally. Inspect if air leaks are detected. Replace if missing, torn, permanently compressed, or otherwise damaged. Do not tightly close lids for extended periods.
**Meter Door Seals**

| 1 seal per door,  
| 2 doors per meter;  
| 2 or 4 seals per cart.  

Inspect seasonally. Inspect if air leaks are detected. Replace if missing, torn, permanently compressed, or otherwise damaged. Do not tightly close doors for extended periods.
**Options**

### Variable Rate Kit

The variable rate actuator kit places the material rate under the control of the seed monitor. This allows convenient rate setting and adjustment from the tractor cab, as well as GPS control of rates. The manual adjuster crank is de-coupled, and left in place.

<table>
<thead>
<tr>
<th>Variable Rate Kit</th>
<th>Part Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Hopper</td>
<td>166-328A</td>
</tr>
<tr>
<td>Dual Hopper</td>
<td>166-339A</td>
</tr>
</tbody>
</table>

Installation is described in the 166-263M manual included with the kit.

See "Variable Rate (Servo) Calibration" on page 77.

### High Rate Flute Sets

The standard NTA607/2007HD Drill meter has two fluted wheels ("stars") and two filler rings in each meter compartment.

If your seeding rates need to be higher than those listed in the Seed Rate manual, these accessories replace the existing shaft assembly with one having more stars. See "Changing Meter Flutes" on page 164 for installation instructions.

Replacing the standard 2-star shafts ② with 3-star shafts ③ increases the seeding rate by approximately 50% (150% of standard rate). Replacing standard 2-star shafts with 4-star shafts ④ increases the seeding rate by approximately double (200% of standard rate).

The kit required depends on the number of stars desired. Order one kit per meter (two per drill if changing both meters).

<table>
<thead>
<tr>
<th>Stars per Outlet</th>
<th>Part Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>② Standard Stars: 2 per outlet</td>
<td>166-308S</td>
</tr>
<tr>
<td>③ Standard Stars: 3 per outlet</td>
<td>166-320S</td>
</tr>
<tr>
<td>④ Standard Stars: 4 per outlet</td>
<td>166-321S</td>
</tr>
<tr>
<td>⑤ Small Seed Stars: 2 half-width shallow stars per outlet</td>
<td>166-399S</td>
</tr>
</tbody>
</table>
Tramline
Tramline kits configure one or more row units to cease seeding during specific bouts (passes), creating unplanted rows for transit of equipment post-emergence. Seed intended for an unplanted row is diverted to the neighboring row.

Kits are provided for 2 or 6 rows (6-row kit shown at right). The seed monitor supports a maximum of 8 outputs (rows) that may be controlled. Pre-defined and user-programmable bout patterns are available.

<table>
<thead>
<tr>
<th>Kit Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3007NT / 907 TRAMLINE KT 2 ACT</td>
<td>168-427A</td>
</tr>
<tr>
<td>3007NT / 907 TRAMLINE KT 6 ACT</td>
<td>168-428A</td>
</tr>
</tbody>
</table>

Markers
Hydraulically-operated swing-arm markers leave a visible groove to use as centerline for the next bout or pass.

These dual markers mount on both sides, and include an automatic sequence valve for operating alternate sides on each bout/pass. The kit includes an installation manual (166-263M).

Each kit equips one NTA607/2007HD drill.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>MARKER, NTA2007 &amp; NTA607</td>
<td>113-817A</td>
</tr>
</tbody>
</table>

See “Marker Adjustments” on page 95, “Marker Operation (Option)” on page 57, and “Marker Maintenance (Option)” on page 131.

Row Options
17in Coulter Blades
Part ordering number includes one blade.

<table>
<thead>
<tr>
<th>Blade</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>17x5/16in Fluted Blade</td>
<td>820-018C</td>
</tr>
<tr>
<td>17x3/4in Wavy Blade</td>
<td>820-082C</td>
</tr>
<tr>
<td>17x5/8in Turbo Blade</td>
<td>820-156C</td>
</tr>
</tbody>
</table>
Opener Disk Scraper

Optional disk scrapers help clear any soil and debris not removed by the standard disk spreaders at the seed tube. Scrapers cannot be mounted if optional seed firmers are used. Scrapers are compatible with the standard seed flap.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>00HD Scraper Assembly</td>
<td>122-015A</td>
</tr>
<tr>
<td>(Order one per row)</td>
<td></td>
</tr>
</tbody>
</table>

See “Scraper Installation” on page 165, and “Disk Scraper Adjustments” on page 92.

Seed Firmers

The standard NTA607/2007HD 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>122-009K</td>
</tr>
</tbody>
</table>

For operations, see “Seed Firmer Adjustments” on page 93.

Keeton Seed Firmer

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keeton seed firmer (per opener)</td>
<td>890-902C</td>
</tr>
</tbody>
</table>

For operations, see “Seed Firmer Adjustments” on page 93.
## Specifications and Capacities

### NTA607HD Export Models

<table>
<thead>
<tr>
<th></th>
<th>NTA607HD-3275</th>
<th>NTA607HD-4006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Openers</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td>Row Spacing (Nominal)</td>
<td>19.1 cm (7.5 inches)</td>
<td>15.2 cm (6.0 inches)</td>
</tr>
<tr>
<td>Wing Flex</td>
<td>Standard: 10° Down; Unlimited Up Limited: 2.5° Down; Unlimited Up</td>
<td>Standard: 10° Down; Unlimited Up Limited: 2.5° Down; Unlimited Up</td>
</tr>
<tr>
<td>Spacing at Wing Gaps</td>
<td>Standard: 21.6 cm (8.5 inches)</td>
<td>Standard: 21.6 cm (8.5 inches)</td>
</tr>
<tr>
<td></td>
<td>Limited: 19.1 cm (7.5 inches)</td>
<td>Limited: 15.2 cm (6.0 inches)</td>
</tr>
<tr>
<td>Span¹</td>
<td>Standard: 595.6 cm (234.5 inches)</td>
<td>Standard: 607.1 cm (239.0 inches)</td>
</tr>
<tr>
<td></td>
<td>Limited: 590.6 cm (232.5 inches)</td>
<td>Limited: 594.4 cm (234.0 inches)</td>
</tr>
<tr>
<td>Swath²</td>
<td>Standard: 614.7 cm (242.0 inches)</td>
<td>Standard: 622.3 cm (245.0 inches)</td>
</tr>
<tr>
<td></td>
<td>Limited: 609.6 cm (240.0 inches)</td>
<td>Limited: 609.6 cm (240.0 inches)</td>
</tr>
<tr>
<td>Swath-Averaged Row Spacing²³</td>
<td>Standard: 19.2 cm (7.56 inches)</td>
<td>Standard: 15.6 cm (6.13 inches)</td>
</tr>
<tr>
<td></td>
<td>Limited: 19.1 cm (7.5 inches)</td>
<td>Limited: 15.2 cm (6.0 inches)</td>
</tr>
<tr>
<td>Hopper Capacities</td>
<td>Single 5290 liter (150 bu.) or</td>
<td>Single or Dual 2890 liter (82 bu.)</td>
</tr>
<tr>
<td></td>
<td>Total: 1510 liter (400 gal.)</td>
<td></td>
</tr>
<tr>
<td>Tank Capacities (Option)</td>
<td>Dual 760 liter (200 gal.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total: 1510 liter (400 gal.)</td>
<td></td>
</tr>
<tr>
<td>Tractor Power Required</td>
<td>130 kw (170 hp)</td>
<td>130 kw (170 hp)</td>
</tr>
<tr>
<td>Hydraulic Circuits</td>
<td>3 Closed Center, 155 bar (2,250 psi), 95 liters/min (25 gpm)</td>
<td></td>
</tr>
<tr>
<td>Working Width</td>
<td>6.10 m (20ft 0in)</td>
<td>6.10 m (20ft 0in)</td>
</tr>
<tr>
<td>Transport Width</td>
<td>2.97 m (9ft 9in)</td>
<td></td>
</tr>
<tr>
<td>Transport Length</td>
<td>9.07 m (29ft 9in)</td>
<td></td>
</tr>
<tr>
<td>Working Length</td>
<td>9.63 m (31ft 7in)</td>
<td></td>
</tr>
<tr>
<td>Transport Height</td>
<td>3.96 m (13ft 0in)</td>
<td></td>
</tr>
<tr>
<td>Working Height</td>
<td>3.15 m (10ft 4in)</td>
<td></td>
</tr>
<tr>
<td>Hitch Load in Transport</td>
<td>500 to 1590kg (1,100 to 3,500 lbs)</td>
<td></td>
</tr>
<tr>
<td>Hitch to Opener Distance</td>
<td>711.2 cm (280.0in)</td>
<td></td>
</tr>
<tr>
<td>Opener Travel</td>
<td>+18 to -5cm (+7 to -2 in.)</td>
<td></td>
</tr>
<tr>
<td>Opener Depth Range</td>
<td>0 to 10cm (0 to 4 in.)</td>
<td></td>
</tr>
<tr>
<td>Coulter Down Pressure</td>
<td>180 to 250 kg (397 to 551 lbs.)</td>
<td></td>
</tr>
<tr>
<td>Weight Range</td>
<td>10 024 to 15 014 kg (22,100 - 33,100 lbs.)</td>
<td>10 659 to 16 649 kg (23,500 - 34,500 lbs.)</td>
</tr>
<tr>
<td>Tire Sizes</td>
<td>Cart(2): 23.5/55-26 12-Ply R1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Implement(4): 265/70B16.5 HS 8-Ply Skid Steer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contact Drive(1): 20x8.00-10 NHS 4-Ply Turf</td>
<td></td>
</tr>
</tbody>
</table>

¹ Dimension across implement between end row center-lines.

² Assumes bout / pass gap is one nominal row space.

³ Effective row spacing for Standard Down-Flex. Same as “Row Spacing” for Limited Down-Flex.

See page 38 for weights of representative configurations.
## NTA2007HD North America Models

<table>
<thead>
<tr>
<th></th>
<th>NTA2007HD-3275</th>
<th>NTA2007HD-4006</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Openers</strong></td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td><strong>Row Spacing (Nominal)</strong></td>
<td>7.5 inches (19.1 cm)</td>
<td>15 cm (6.0 inches)</td>
</tr>
<tr>
<td><strong>Wing Flex</strong></td>
<td>Standard: 10° Down; Unlimited Up</td>
<td>Standard: 10° Down; Unlimited Up</td>
</tr>
<tr>
<td></td>
<td>Limited: 2.5° Down; Unlimited Up</td>
<td>Limited: 2.5° Down; Unlimited Up</td>
</tr>
<tr>
<td><strong>Spacing at Wing Gaps</strong></td>
<td>Standard: 21.6 cm (8.5 inches)</td>
<td>Standard: 21.6 cm (8.5 inches)</td>
</tr>
<tr>
<td></td>
<td>Limited: 19.1 cm (7.5 inches)</td>
<td>Limited: 15.2 cm (6.0 inches)</td>
</tr>
<tr>
<td><strong>Span¹</strong></td>
<td>Standard: 595.6 cm (234.5 inches)</td>
<td>Standard: 607.1 cm (239.0 inches)</td>
</tr>
<tr>
<td></td>
<td>Limited: 590.6 cm (232.5 inches)</td>
<td>Limited: 594.4 cm (234.0 inches)</td>
</tr>
<tr>
<td><strong>Swath²</strong></td>
<td>Standard: 614.7 cm (242.0 inches)</td>
<td>Standard: 622.3 cm (245.0 inches)</td>
</tr>
<tr>
<td></td>
<td>Limited: 609.6 cm (240.0 inches)</td>
<td>Limited: 609.6 cm (240.0 inches)</td>
</tr>
<tr>
<td><strong>Swath-Averaged Row Spacing²³</strong></td>
<td>Standard: 19.2 cm (7.56 inches)</td>
<td>Standard: 15.6 cm (6.13 inches)</td>
</tr>
<tr>
<td></td>
<td>Limited: 19.1 cm (7.5 inches)</td>
<td>Limited: 15.2 cm (6.0 inches)</td>
</tr>
<tr>
<td><strong>Hopper Capacities</strong></td>
<td>Single 150 bu. (5290 liter) or</td>
<td>Single or Dual 82 bu. (2890 liter)</td>
</tr>
<tr>
<td></td>
<td>Hopper Capacities (Option)</td>
<td>Tank Capacities (Option)</td>
</tr>
<tr>
<td></td>
<td>Total: 400 gal. (1510 liter)</td>
<td>Dual 200 gal. (760 liter)</td>
</tr>
<tr>
<td><strong>Tractor Power Required</strong></td>
<td>170 hp (130 kw)</td>
<td>170 hp (130 kw)</td>
</tr>
<tr>
<td><strong>Hydraulic Circuits</strong></td>
<td>3 Closed Center, 2,250 psi (155 bar), 25 gpm (95 liters/min)</td>
<td></td>
</tr>
<tr>
<td><strong>Working Width</strong></td>
<td>20ft 0in (6.10 m)</td>
<td>20ft 0in (6.10 m)</td>
</tr>
<tr>
<td><strong>Transport Width</strong></td>
<td>9ft 9in (2.97 m)</td>
<td></td>
</tr>
<tr>
<td><strong>Transport Length</strong></td>
<td>29ft 9in (9.07 m)</td>
<td></td>
</tr>
<tr>
<td><strong>Working Length</strong></td>
<td>31ft 7in (9.63 m)</td>
<td></td>
</tr>
<tr>
<td><strong>Transport Height</strong></td>
<td>13ft 0in (3.96 m)</td>
<td></td>
</tr>
<tr>
<td><strong>Working Height</strong></td>
<td>10ft 4in (3.15 m)</td>
<td></td>
</tr>
<tr>
<td><strong>Hitch Load in Transport</strong></td>
<td>1,100 to 3,500 lbs (500 to 1590kg)</td>
<td></td>
</tr>
<tr>
<td><strong>Hitch to Opener Distance</strong></td>
<td>280.0in (711.2 m)</td>
<td></td>
</tr>
<tr>
<td><strong>Opener Travel</strong></td>
<td>+7 to -2 in. (+18 to -5cm)</td>
<td></td>
</tr>
<tr>
<td><strong>Opener Depth Range</strong></td>
<td>0 to 4 in. (0 to 10cm)</td>
<td></td>
</tr>
<tr>
<td><strong>Coulter Down Pressure</strong></td>
<td>397 to 551 lbs. (180 to 250 kg)</td>
<td></td>
</tr>
<tr>
<td><strong>Weight Range</strong></td>
<td>22,100 to 33,100 lbs. (10 024 - 15 014 kg)</td>
<td>23,500 to 34,500 lbs. (10 659 to 15 649 kg)</td>
</tr>
<tr>
<td><strong>Tire Sizes</strong></td>
<td>Cart(2): 23.5/55-26 12-Ply R1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Implement(4): 265/70B16.5 HS 8-Ply Skid Steer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contact Drive(1): 20x8.00-10 NHS 4-Ply Turf</td>
<td></td>
</tr>
</tbody>
</table>

¹ Dimension across implement between end row center-lines.
² Assumes bout / pass gap is one nominal row space.
³ Effective row spacing for Standard Down-Flex. Same as “Row Spacing” for Limited Down-Flex.
Dimensions (Transport) NTA607HD Export Model

- **Transport Height**: 156.80in (398.27cm)
- **Transport Width**: 115.92in (294.44cm)
- **Transport Length**: 370.48in (941.10cm)
- **Transport Clearance**: 11.70in (29.72cm)
- **Transport Width**: 188.44in (478.64cm)
Tire Inflation Chart

<table>
<thead>
<tr>
<th>Tire Size</th>
<th>Inflation</th>
</tr>
</thead>
<tbody>
<tr>
<td>265/70B16.5 (10-16.5) 8-Ply SKID STEER NHS</td>
<td>414 kPa</td>
</tr>
<tr>
<td></td>
<td>60 psi</td>
</tr>
<tr>
<td>15-19.5 12-Ply SKID STEER NHS</td>
<td>276 kPa</td>
</tr>
<tr>
<td></td>
<td>40 psi</td>
</tr>
<tr>
<td>13-5x6 4-Ply TURF SAVER</td>
<td>110 kPa</td>
</tr>
<tr>
<td></td>
<td>16 psi</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 web sites listed below. For assistance or information, contact your nearest Authorized Farm Tire Retailer.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Web site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firestone</td>
<td><a href="http://www.firestoneag.com">www.firestoneag.com</a></td>
</tr>
<tr>
<td>Gleason</td>
<td><a href="http://www.gleasonwheel.com">www.gleasonwheel.com</a></td>
</tr>
<tr>
<td>Titan</td>
<td><a href="http://www.titan-intl.com">www.titan-intl.com</a></td>
</tr>
</tbody>
</table>

Hydraulic Connectors and Torque

Refer to Figure 133 (a hypothetical fitting)

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

1. **NPT** - National Pipe Thread
   - Note tapered threads, no cone/flare, and no O-ring.
   - Apply liquid pipe sealant for hydraulic applications. Do not use tape sealant, which can clog a filter and/or plug an orifice.

2. **JIC** - Joint Industry Conference (SAE J514)
   - Note straight threads and the 37° cone on “M” fittings (or 37° flare on “F” fittings).
   - Use no sealants (tape or liquid) on JIC fittings.

3. **ORB** - O-Ring Boss (SAE J514)
   - Note straight threads and elastomer O-Ring.
   - Prior to installation, to prevent abrasion during tightening, lubricate O-Ring with clean hydraulic fluid. Use no sealants (tape or liquid) on ORB fittings.
   - ORB fittings that need orientation, such as the ell depicted, also have a washer and jam nut (“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.

Fittings Torque Values

<table>
<thead>
<tr>
<th>Fitting</th>
<th>Ft-Lbs</th>
<th>N-m</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4 NPT</td>
<td>1.5-3.0 turns past finger tight</td>
<td></td>
</tr>
<tr>
<td>9/16 JIC</td>
<td>18-20</td>
<td>24-27</td>
</tr>
<tr>
<td>9/16 ORB w/jam nut</td>
<td>12-16</td>
<td>16-22</td>
</tr>
<tr>
<td>9/16 ORB straight</td>
<td>18-24</td>
<td>24-32</td>
</tr>
<tr>
<td>3/4 JIC</td>
<td>27-39</td>
<td>37-53</td>
</tr>
<tr>
<td>3/4 ORB w/jam nut</td>
<td>20-30</td>
<td>27-41</td>
</tr>
<tr>
<td>3/4 ORB straight</td>
<td>27-43</td>
<td>37-58</td>
</tr>
</tbody>
</table>
# Torque Values Chart

<table>
<thead>
<tr>
<th>Bolt Size</th>
<th>Grade 2</th>
<th>Grade 5</th>
<th>Grade 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>in-tpi(^a)</td>
<td>N-m(^b)</td>
<td>ft-lb(^d)</td>
<td>N-m</td>
</tr>
<tr>
<td>(\frac{7}{16})-20</td>
<td>7.4</td>
<td>5.6</td>
<td>11</td>
</tr>
<tr>
<td>(\frac{1}{4})-28</td>
<td>8.5</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>(\frac{5}{16})-18</td>
<td>15</td>
<td>11</td>
<td>24</td>
</tr>
<tr>
<td>(\frac{5}{16})-24</td>
<td>17</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td>(\frac{3}{8})-16</td>
<td>27</td>
<td>20</td>
<td>42</td>
</tr>
<tr>
<td>(\frac{3}{8})-24</td>
<td>31</td>
<td>22</td>
<td>47</td>
</tr>
<tr>
<td>(\frac{7}{16})-14</td>
<td>43</td>
<td>32</td>
<td>67</td>
</tr>
<tr>
<td>(\frac{7}{16})-20</td>
<td>49</td>
<td>36</td>
<td>75</td>
</tr>
<tr>
<td>(\frac{1}{2})-13</td>
<td>66</td>
<td>49</td>
<td>105</td>
</tr>
<tr>
<td>(\frac{1}{2})-20</td>
<td>75</td>
<td>55</td>
<td>115</td>
</tr>
<tr>
<td>(\frac{5}{8})-12</td>
<td>95</td>
<td>70</td>
<td>150</td>
</tr>
<tr>
<td>(\frac{9}{16})-18</td>
<td>105</td>
<td>79</td>
<td>165</td>
</tr>
<tr>
<td>(\frac{5}{8})-11</td>
<td>130</td>
<td>97</td>
<td>205</td>
</tr>
<tr>
<td>(\frac{5}{8})-16</td>
<td>150</td>
<td>110</td>
<td>230</td>
</tr>
<tr>
<td>(\frac{3}{4})-10</td>
<td>235</td>
<td>170</td>
<td>360</td>
</tr>
<tr>
<td>(\frac{3}{4})-16</td>
<td>260</td>
<td>190</td>
<td>405</td>
</tr>
<tr>
<td>(\frac{7}{8})-9</td>
<td>225</td>
<td>165</td>
<td>585</td>
</tr>
<tr>
<td>(\frac{7}{8})-14</td>
<td>250</td>
<td>185</td>
<td>640</td>
</tr>
<tr>
<td>1-8</td>
<td>340</td>
<td>250</td>
<td>875</td>
</tr>
<tr>
<td>1-12</td>
<td>370</td>
<td>275</td>
<td>955</td>
</tr>
<tr>
<td>1(\frac{1}{8})-7</td>
<td>480</td>
<td>355</td>
<td>1080</td>
</tr>
<tr>
<td>1(\frac{1}{8})-12</td>
<td>540</td>
<td>395</td>
<td>1210</td>
</tr>
<tr>
<td>1(\frac{1}{2})-7</td>
<td>680</td>
<td>500</td>
<td>1520</td>
</tr>
<tr>
<td>1(\frac{1}{4})-12</td>
<td>750</td>
<td>555</td>
<td>1680</td>
</tr>
<tr>
<td>1(\frac{3}{8})-6</td>
<td>890</td>
<td>655</td>
<td>1990</td>
</tr>
<tr>
<td>1(\frac{3}{8})-12</td>
<td>1010</td>
<td>745</td>
<td>2270</td>
</tr>
<tr>
<td>1(\frac{1}{2})-6</td>
<td>1180</td>
<td>870</td>
<td>2640</td>
</tr>
<tr>
<td>1(\frac{1}{2})-12</td>
<td>1330</td>
<td>980</td>
<td>2970</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bolt Size</th>
<th>Class 5.8</th>
<th>Class 8.8</th>
<th>Class 10.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm x pitch(^c)</td>
<td>N-m</td>
<td>ft-lb</td>
<td>N-m</td>
</tr>
<tr>
<td>(\frac{5}{32})</td>
<td>4</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>(\frac{7}{32})</td>
<td>7</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>(\frac{1}{4})</td>
<td>17</td>
<td>12</td>
<td>26</td>
</tr>
<tr>
<td>(\frac{9}{32})</td>
<td>18</td>
<td>13</td>
<td>28</td>
</tr>
<tr>
<td>(\frac{5}{16})</td>
<td>33</td>
<td>24</td>
<td>52</td>
</tr>
<tr>
<td>(\frac{3}{8})</td>
<td>39</td>
<td>29</td>
<td>61</td>
</tr>
<tr>
<td>(\frac{7}{16})</td>
<td>58</td>
<td>42</td>
<td>91</td>
</tr>
<tr>
<td>(\frac{1}{2})</td>
<td>60</td>
<td>44</td>
<td>95</td>
</tr>
<tr>
<td>(\frac{5}{8})</td>
<td>90</td>
<td>66</td>
<td>105</td>
</tr>
<tr>
<td>(\frac{3}{4})</td>
<td>92</td>
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a. in-tpi = nominal thread diameter in inches-threads per inch  
b. N· m = newton-meters  
c. mm x pitch = nominal thread diameter in mm x thread pitch  
d. ft-lb = foot pounds

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

Contact Drive Chains

Figure 134
Contact Drive Chains
Chain Routing: Single Hopper & Pump
Chain Routing: Dual 2890 Liter Hoppers

Figure 136
Chain Routing: Dual 82bu Hoppers
Chain Routing: Single 5290 Liter Hopper

Figure 137
Chain Routing: Single 150bu Hopper
Hydraulic Diagrams

Cart Hydraulics

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Figure 138
Cart Hydraulics
Cart Hydraulic Schematic

Figure 139
Cart Hydraulic Schematic
Fold/Weight/Lock Hydraulics

Figure 140
Fold, Weight Transfer and Lock Hydraulics
Implement Hydraulic Schematic

Figure 141
Implement Hydraulic Schematic (excluding markers)
Lift Hydraulics

Figure 142
Lift Hydraulics
Marker Hydraulics (Option)

Figure 143
Marker (Option) Hydraulics
Air Over Hydraulic Brakes (Option)

Figure 144
Air Over Hydraulic Brakes
Hydraulic Brakes (Option)

Figure 145
Hydraulic Brakes
Fertilizer Plumbing (Option)

Figure 146
Fertilizer Plumbing
Appendix B - Initial Setup

Marker Hose Tips

If markers are not installed on the implement, perform this check before hitching the air drill for the first time.

Inspect ports A and B at the hydraulic bulkhead at the rear of the seed cart. If Female ORB to male QD couplers are present in these ports, remove them and save them for possible future use.

**NOTICE**

*Fluid Spill Risk:*
Do not connect or power the Marker hoses at the hitch if these couplers are installed, or hydraulic fluid will be lost. The couplers are provided for possible field installation of markers, or for use with auxiliary implements such as augers.

Console Installation

The air drill's standard seed monitor system includes a virtual terminal that must be mounted in the tractor cab. As supplied by DICKEY-john®, the kit includes a flat bracket, and ball swivel.

The ball swivel includes four 10-32 screws. You or your dealer must provide the mounting holes for the screws. Your dealer may have alternate suction cup or clamping brackets available if you prefer to avoid drilling holes.

Refer to the included DICKEY-john® manual for harness connections.

**CAUTION**

*Visibility Hazard:*
Mount the console so that it is easy to monitor during planting, but does not interfere with safe operation of the tractor in the field or on public roads.

Monitor Setup Data

Refer to the DICKEY-john® Quick Start Guide (G.P. part number 110011544).

Weight Transfer Setup

Prior to first folding operation, adjust the wing and cart weight transfer circuits for nominal pressures. These circuits require some transfer pressure in order to operate correctly in Fold and lift lock.

See “Weight Transfer Adjustments” on page 84.
Set the wing-transfer circuit to 250 psi.
Set the cart-transfer circuit to 100 psi.
Appendix C - Option Installation

Changing Meter Flutes

To order high rate flute shafts, see “High Rate Flute Sets” on page 142. To install a set of these shafts (or re-install the standard shafts), start with the front meter, as the task is a bit easier there. Save all parts for re-use.

Hopper must be empty for this procedure. see “Unloading Materials” on page 109.

Refer to Figure 150
1. On the left end of the meter box, release the anti-rotation strap ①, and loosen the thumbscrew ②.
2. Remove and save the pins ③ from the final range gears ④, and then remove and save the gears.

Refer to Figure 151
3. Remove and save the outer ring of six (6) self-tapping hex head bolts ⑤, that secure the outer flange to the meter box.

Note: Do not remove the six bolts ⑥ that secure the bearing flangette to the outer flange. The shaft to be installed includes its own flange.

Refer to Figure 152 (Shown with meter box off and various components removed for clarity. It is not necessary to dismount or further disassemble meters to swap flute shafts).

4. From the left end of the meter box, carefully withdraw the current flute shaft ⑦. It is likely that the flange has a bead of silicone gasket. You may need to carefully pry the flange loose from the box.

5. Store the old shaft in the carton in which the new shaft was supplied. Mark the carton with the number of active hoses (towers) and the number of stars (factory standard is 2). This will reduce the risk of mistaking the carton/contents in the future.

6. Apply a bead of silicone sealant to the inside face of the outer flange, just inside the bolt hole pattern.

7. Carefully insert the new shaft ⑧ in the meter box.

8. When the flange on the left end is fully seated against the box, secure it with the 6 saved bolts. Give the shaft a few turns.

9. Re-mount the gears. Refer to the Seed Rate manual for the gear assignments for the agitator and flute shafts. Note the pin hole orientation on the shaft and on the gears. The gears can only be pinned in 2 of the 6 possible ways they can be placed on the shafts.
Scraper Installation

Optional disk scrapers (page 144) are not factory installed. To install them in the field:

1. Remove one or both disk blades to gain safe access to the mount. Note the position of bushings and spacers for correct re-assembly (page 91).

Refer to Figure 153

2. Position the inside scraper mount ① to the rear of the seed firmer mount ② on the opener weldment.

   Secure it with two HHCS \( \frac{3}{8} \)-16x1in hex head bolts, lock washers and nuts. Insert the bolts from the front.

3. Position the scraper blade ③ below and behind the inside scraper mount ①, with the notch on top to machine right.

   Secure it loosely with one RHSNB \( \frac{3}{8} \)-16x1 round head square neck bolt, flat washer, lock washer and nut.

4. Re-mount the removed disk blade.

5. Adjust the scraper blade per “Disk Scraper Adjustments” on page 92.
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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