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

Illustrations may show optional equipment not supplied with standard unit.
Machine Identification

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

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

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Dealer Contact Information

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

⚠️ WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov
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Printed in the United States of America

09/28/2020
Equipment Identification

This Operator manual applies to the following Great Plains pull-type secondary conventional tillage systems:

- 8315DVN 4.8m, 27-shank, 24 blades
- 8318DVN 5.5m, 31-shank, 28 blades
- 8321DVN 6.6m, 37-shank, 32 blades
- 8324DVN 7.3m, 41-shank, 36 blades

See “DVN Specifications and Capacities” on page 61 for precise swath information.

Refer to Figure 1

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

Machine Label

Models 8315DVN, 8318DVN, 8321DVN and 8324DVN can be built to European regulatory and highway transport standards. The machine can also be built to North American regulatory and highway transport standards, depending on which light option package is purchased.

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

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

If you, or the dealer, have added Options not originally ordered with the machine, or removed Options that were originally ordered, the weights and measurements no longer are accurate for your machine. Update the Record on the next page upon modifications.

See “Transporting the Discovator Narrow” on page 30 and “DVN Specifications and Capacities” on page 61 for additional weights and measurements.
Great Plains welcomes you to its growing family of new product owners. Your Discovator Narrow 8315-8324DVN has been designed with care and built by skilled workers using quality materials. Proper setup, maintenance, and safe operating practices will help you get years of satisfactory use from the machine.

Before placing the machine into service for the first time, read and understand this manual, in particular the “Important Safety Information”, pages 4 to 7. Have all operators read this manual before allowing them to work with the machine.

**Description of Unit**

The 8315DVN, 8318DVN, 8321DVN and 8324DVN are pull-type, field finishing, one pass tillage tool. The 8315DVN, 8318DVN, 8321DVN and 8324DVN are three section machines that fold for narrow (3m) transport.

A row of hydraulic-adjustable Turbo coulters or shallow concavity disk blades fractures the ground and size residue 3.8 cm above the sweeps.

The Max-Mix shank pattern increases chemical incorporation, reduces windrowing, and helps eliminate banding. Four rows of shanks on 71.12 cm centers allows for residue to flow through the machine using the Max-Mix shank pattern. The effective spacing of the four rows with a 22.9 cm sweep of shanks is a sweep overlap of 6.4 cm. The shanks can fracture the ground up to 30.5 cm deep.

The DVN models offer optional shank configurations. The configurations are k-flex spring with a minimum draft shank, K-Flex spring with a flat shank, heavy duty magnum spring with a minimum draft shank, or heavy-duty magnum spring with a flat shank. A 22.86 cm sweep is available with or without hard facing.

Various finishing attachments are available to customize your tillage and residue requirements for your operation.

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

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

Do not modify the DVN except as instructed by Great Plains. Do not use attachments other than as provided by or authorized by Great Plains.
Using This Manual
This manual will familiarize you with safety, hitching, operation, adjustments, troubleshooting, and maintenance. Read this manual and follow the recommendations to help ensure safe and efficient operation.
The information in this manual is current at printing. Some parts may change to assure top performance.

Document Family
550-466Q-ENG Assembly Manual
550-466Q Pre-Delivery Manual
550-466M Operator Manual (this document)
550-466P Parts Manual

Definitions
Safety admonishment signal words are described on page 4.
The following terms are used throughout this manual.

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

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

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

Owner Assistance
If you need customer service or repair parts, contact a Great Plains dealer. They have trained personnel, repair parts and equipment specially designed for Great Plains products.
Your machine’s parts were specially designed and should only be replaced with Great Plains parts. Always use the serial and model number (page 1) when ordering parts from your Great Plains dealer.
Your Great Plains dealer wants you to be satisfied with your new machine. If you do not understand any part of this manual or are not satisfied with the service received, please take the following actions.

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

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

Further Assistance
Great Plains Manufacturing, Inc. wants you to be satisfied with your new Discovator Narrow. If for any reason you do not understand any part of this manual or are otherwise dissatisfies with the product please contact:

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

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

Look for Safety Symbol

The SAFETY ALERT SYMBOL\(^1\) indicates there is a potential hazard to personal safety involved and extra safety precaution must be taken. When you see this symbol, be alert and carefully read the message that follows it. In addition to design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence and proper training of personnel involved in the operation, transport, maintenance and storage of equipment.

Be Aware of Signal Words

Signal words designate a degree or level of hazard seriousness.

DANGER, and the colour Safety Red, indicate an imminent hazard which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations, typically for machine components that, for functional purposes, cannot be guarded.

WARNING, and the colour Safety Orange, indicate a potential hazard which, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

CAUTION, and the colour Safety Yellow, indicate a potential hazard which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Prepare for Emergencies

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

Be Familiar with Safety Decals

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

---

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

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

Use Safety Chains

▲ Use safety chains to help control drawn machinery should it separate from tractor draw-bar or trailing nurse tank hitch.
▲ Use chain with a strength rating equal to or greater than the gross weight of towed machinery.
▲ Attach implement chain to tractor draw-bar support or specified anchor location. Allow only enough slack in chain for turns.
▲ Replace chain if any links or end fittings are broken, stretched or damaged.
▲ Do not use safety chain for towing.

Avoid High Pressure Fluids

Escaping fluid under pressure can penetrate the skin, causing serious injury. This Discovator Narrow requires a Power-Beyond port, which is always under pressure when the tractor is running.
▲ Avoid the hazard by relieving pressure at other remote, and shutting down tractor before connecting, disconnecting or inspecting hydraulic lines.
▲ Use a piece of paper or cardboard, NOT BODY PARTS, to check for suspected leaks.
▲ Wear protective gloves and safety glasses or goggles when working with hydraulic systems.
▲ If an accident occurs, seek immediate medical assistance from a physician familiar with this type of injury.

Keep Riders Off Machinery

Riders obstruct the operator’s view. Riders could be struck by foreign objects or thrown from the machine.
▲ Never allow children to operate equipment.
▲ Keep all bystanders away from machine during operation.
Tire Safety

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

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

Use Safety Lights and Devices

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

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

Transport Machinery Safely

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

▲ Do not exceed 30 kph or 20 mph. Never travel at a speed which does not allow adequate control of steering and stopping. Reduce speed if towed load is not equipped with brakes.
▲ Comply with national, regional and local laws.
▲ Do not tow an implement or nurse tank that weighs more than 1.5 times the weight of towing vehicle.
▲ Carry reflectors or flags to mark Discovator Narrow in case of breakdown on the road.
▲ Keep clear of overhead power lines and other obstructions when transporting. Refer to transport dimensions under “DVN Specifications and Capacities” on page 61.
▲ Reduce speed on rough roads.
▲ Do not fold or unfold the Discovator Narrow while the tractor is moving.

Shutdown and Storage

▲ Lower Discovator Narrow, put tractor in park, turn off engine, and remove the key.
▲ Secure Discovator Narrow using parking jack provided.
▲ Detach and store Discovator Narrow 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 45.

▲ Work in a clean, dry area.

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

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

▲ Allow machine to cool completely.

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

▲ Welding: Disconnect battery ground. Protect hydraulic lines. Avoid fumes from heated paint.

▲ Inspect all parts. Make sure parts are in good condition and installed properly.

▲ Remove buildup of grease, oil or debris.

▲ Remove all tools and unused parts from Discovator Narrow 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 Discovator Narrow functions.

▲ Operate machinery from the driver’s seat only.

▲ Do not leave Discovator Narrow unattended with tractor engine running.

▲ Do not stand between the tractor and implement, or implement and nurse tank during hitching.

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

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

▲ Watch out for wires, trees, etc., when folding and raising Discovator Narrow. Make sure all persons are clear of working area.

Accident Prevention

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

▲ The Operator is trained and competent to use the machine and tractor.

▲ The tractor is suitable for the machine.

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

⚠️ DANGER

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

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

On the back of smv post; 1 total

Reflectors: Red Triangles

International: 833-399C  
North America: n/a
(North American models use 818-055C SMV reflectors, 838-614C red reflectors & 838-615C amber reflectors.)

One each rear fluorescent panel; 2 total
Reflectors: Fluorescent Panels
International: 833-398C   North America: n/a

One each side, front frame, one each side, rear; 4 panels total

Reflectors: Red
International: n/a   North America: 838-614C

On rear of light bracelets both sides (above Orange); 2 total

Reflectors: Orange
International: n/a   North America: 838-603C

On rear of light brackets, both sides (below Reds); 2 total
Reflectors: Amber

International: 838-615C  North America: 838-615C

Two on outside of center frame, one on outside of brace bar (both sides), two on rear finishing attachment (not shown, visible from side while folded for transport; 8 total

Transport: Speed

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

30 km/h

On speed limit bracket, front (of center brace bar); 1 total

WARNING
EXCESSIVE SPEED HAZARD
To Prevent Serious Injury or Death
Do not exceed the notional transport speed. Loss of vehicle control and/or machine operation can result.

North America: 818-188C Rev. C

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

To Prevent Serious Injury or Death:

WARNING
Transport: Wheel Chock (Option)
International: 848-757C  North America: 848-757C

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

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

Front of hitch, rear of manual pack (front); 1 total

Danger: Electrocution
International: 848-516C  North America: 838-599C

On front of brace bar (left side); 1 total

Caution: Tire Pressure & Torque
International: 838-890C  North America: 838-890C

Outside, center transport wheel (both sides); 2 total, models 8315 & 8318 only
Warning: Wing Crushing
International: 848-530C North America: 838-602C

Outside of wing stop tube, Top outside of center frame top of brace bar and wing and wing (both sides); (both sides); 4 total 6 total

Warning: High Pressure Fluid
International: 848-517C North America: 838-094C

Front of brace bar; 1 total

Warning: Hand Pinch
International: 848-531C North America: 838-611C

Front side of brace bar wing hinge plate (both sides); 2 total
Caution: Read Operator Manual
International: 848-512C  North America: 838-598C

Front of hitch; 1 total

Caution: Tires Not A Step
International: 848-507C  North America: 818-398C

On top center of center frame and wing frame (both sides); 4 total

Notice: Transport Lock
International: 848-512C  North America: 838-613C

Outside, center of center frame (both sides); 2 total

Danger: Cutting of Foot
International: 848-781C  North America: 848-271C

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

This section helps you prepare your tractor and 8315, 8318, 8321 & 8324DVN for use, and covers seasonal tasks, and tasks when the tractor/Discovator Narrow configuration changes.

Before using the 8315, 8318, 8321 & 8324DVN in the field, you must hitch the Discovator Narrow to a suitable tractor, inspect systems and level the Discovator Narrow. Before using the Discovator Narrow for the first time, and periodically thereafter, certain adjustments and calibrations are required.

Initial Setup

See “First Time Field Adjustments” on page 36 and “Hitching a Trailing Implement (Optional)” on page 35 for pre-delivery items (normally completed by dealer), and first-time/infrequent setup tasks, including:

- Remove protective film from large highway reflectors.

Seasonal Setup

On initial delivery, use with a new tractor, and seasonally, check and as necessary, complete these items before continuing to the routine setup items:

- Bleed hydraulic system (page 29).
- Wing levelling and alignment (page 37).
- De-grease exposed cylinder rods if so protected at last storage.

Pre-Tilling Setup

Complete this checklist before routine setup:

- Read and understand “Important Safety Information” on page 4.
- Check that all working parts are moving freely, bolts are tight, and cotter pins are spread.
- Make sure your tractor horsepower matches the implement you are pulling. This is important so the implement can do the best possible job.
- Clean all hydraulic couplings and connect to tractor as shown on page “Hydraulic Hose Hookup” on page 19.
- If machine is folded, be sure the wing lock valve is locked. Remove wing locking pins. Open the lock valve on front of brace bar and slowly unfold the unit. Make sure no one is under the wings during the unfolding process.
- Check again for hydraulic leaks and watch that hoses do not get pinched in hinges, wing stops, etc.
- After the machine is completely unfolded, remove both transport locks from lift cylinders, raise and lower the Discovator Narrow several times to purge air from the hydraulic system. Again check for hydraulic leaks and tighten or replace if necessary.
- Check safety chain hookup. Make sure all warning lights are hooked up and functioning correctly.
- Put transport locks back in place on lift cylinders.
- Check that all grease fittings are in place and lubricated. See “Lubrication and Scheduled Maintenance” on page 44. The hubs will come pre-greased and will not need greased at this time.
- Check that all safety decals and reflectors are correctly located and legible. Replace if damaged. See “Safety Decals and Lights” on page 9.
- Inflate tires to pressure recommended and tighten wheel bolts as specified. See “Tire Inflation Chart” on page 63.
- Re-fold the machine slowly. Close the lock valve on the front of the brace bar. Always use the transport locks and close lock valve when moving from field to field. You are now ready to go to the field.
Hitching Tractor to Discovator Narrow

⚠️ DANGER ⚠️

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

Improper Pull Hazard:
Severe injury or death may result if improper transport vehicle is used. Hitch to tractor for highway transport or field operations. Hitch to a leading implement only for field operations. Do not transport behind another implement.

Before hitching, check the compatibility of the towing tractor or implement.
For hillsides and steep slopes, set tractor wheels as wide as possible for maximum stability.

⚠️ NOTICE ⚠️

Hitch Failure Risk:
The 8315/8318/8321/8324DVN Discovator Narrow are pull-type implements equipped with standard Category IV single tang hitch. It may be converted to a Category III or clevis hitch using supplied accessory parts. Always have two (2) bolts in two holes of both tongue and hitch.

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

To prevent soil compaction on rows, set tractor wheels between rows. Raise tractor three-point arms (if equipped) clear up to clear Discovator Narrow.

1. For TWO-WHEEL DRIVE and MFWD tractors, pin drawbar in fixed center position for field and transport. For FOUR-WHEEL DRIVE and TRAC-DRIVE tractors, leave one hole clearance on each side of drawbar for field position, hitch damage may occur if pinned solid. Pin in center position for transport to maintain maximum steering control.

Extended Parking Risk:
When the 8315/8318/8321/8324DVN Discovator Narrow are parked for extended periods of time, it should ideally be left in the unfolded, i.e. work position for stability, safety and ease of access for maintenance. However, parking the 8315/8318/8321/8324DVN Discovator Narrow in the fold position (ensuring transport locks are engaged) is acceptable in the normal course of operation.

Drawbar Sway Risk:
Lock drawbar swing to center position to minimize any side-to-side sway to assure proper tracking in the field, and safe road travel. See “Transporting the Discovator Narrow” on page 30, for safe transporting.
Clevis Hitch

Refer to Figure 4

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

1. Select one each:
   - [82] 890-798C HITCH CLEVIS
   - [48] 802-487C HHCS 3/4-10X6 GR8
   - [62] 803-367C NUT HEX TOP LOCK 3/4-10 PLT
2. With the square-shouldered end of the clevis up, fully seat the clevis in the upright base hitch.
   Insert the Grade 8 bolt from below. Secure with lock nut.

**CAUTION**

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

Category III Hitch

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

1. Select one each:
   - [69] PPI-302V TOP PLATE - CAT 3
   - [87] PPI-203VR V-BLOCK
   - [47] 802-383C HHCS 3/4-10X3 GR5
   and two:
   - [88] PPI-205H CUSHION
2. Set the cushions inside the hitch recess, just forward of the vertical bolt hole. Position the V-block forward of the cushions and check the size of the resulting pinning hole. Remove a cushion if needed.
3. Add the top plate. Secure from below with Grade 5 bolt.
Refer to Figure 5
4. Use parking jack ① to raise and lower Discovator Narrow tongue.
5. Remove hitch pin from tractor draw-bar.
   Set tractor parking break.
7. Secure with a locking hitch pin.
8. Secure safety chain ③ to an anchor on the tractor.
9. Retract jack foot.
10. After hitching tractor to implement, store parking jack on storage stab ④ on Discovator Narrow tongue.
11. Connect hydraulic hoses (page 19).

Electrical Hookup
Refer to Figure 6
Make sure tractor is shut down with accessory power off before making connections.
14. Mate lighting connector to tractor outlet.
15. Mate any optional or after-market electrical connectors.
16. Make connections prior to 8315-8324DVN movement.
Hydraulic Hose Hookup

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

**WARNING**

*High Pressure Fluid Hazard:*

Shut down tractor before making hydraulic connections.

Only trained personnel should work on system hydraulics!

Escaping fluid under pressure can have sufficient pressure to penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic lines. Use a piece of paper or cardboard, NOT BODY PARTS, to check for leaks. Wear protective gloves and safety glasses or goggles when working with hydraulic systems. If an accident occurs, seek immediate medical assistance from a physician familiar with this type of injury.

*Refer to Figure 7*

To distinguish hoses on the same hydraulic circuit, refer to handle symbols.

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

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

Clean all hydraulic couplings and hook hoses to tractor.

Brake Hook-up (Option)

Two 8315-8324DVN braking (trailer braking) systems are available:

- Dual-line air system (*Figure 8*) with wheel chocks (*Figure 10*) for parking and
- Single-line hydraulic (*Figure 9*) with wheel chocks (*Figure 10*).

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

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

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

Both brake systems include four chock blocks to be manually installed for parking the 8315-8324DVN. The tractor cannot set the implement wheel chocks.

**CAUTION**

**Braking Hazards:**
Make sure the operator understands when Discovator Narrow brakes are engaged and when they are released (make a record of tractor behaviour on page 32).

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

---

**Air Brake Hook-up**

*Refer to Figure 11*

17. Open petcock ① at reservoir tank. Drain any water from tank. Close petcock.

*Refer to Figure 12*


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

This line operates the Discovator Narrow brakes.
Refer to Figure 12

20. Connect the “Provision” or “Supply” line. This line is Red-coded.

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

⚠️ CAUTION

Braking Hazard:
Do not use the 8315/8318/8321/8324DVN with a “single-line” air brake system. This Discovator Narrow 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 Discovator Narrow brakes.

⚠️ CAUTION

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

Hydraulic Brake Hook-up

Refer to Figure 13

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

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

- 19 mm male ORB (O-Ring Boss), or
- 19 mm female JIC (Joint Industry Conference, 37-flare).
Operating Instructions

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

Pre-Start Checklist

Perform the following steps before transporting the 8315/8318/8321/8324DVN Discovator Narrow to the field.

- Lubricate Discovator Narrow as indicated under “Lubrication and Scheduled Maintenance” on page 44.
- Check all tires for proper inflation, “Tire Inflation Chart” on page 63.
- Check all bolts, pins, and fasteners. Torque as shown in “Torque Values Chart” on page 62.
- Check Discovator Narrow for worn or damaged parts. Repair or replace parts before going to the field.
- Check hydraulic hoses, fittings, and cylinders for leaks. Repair or replace before going to the field.

**WARNING**

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

⚠️ DANGER

Electrocution Hazard:
Keep clear of overhead power lines when unfolding, operating, folding or transporting the machine. At higher voltages, electrocution can occur without direct contact. Any line voltage present on implement, accessory implement or tractor can cause severe injury or death.

⚠️ 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

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

⚠️ WARNING

Pinch Point and Crushing Hazards:
Keep people away from the implement and tractor during folding and unfolding. 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.

⚠️ NOTICE

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

⚠️ 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.

⚠️ NOTICE

Wing Tilt Risk:
Fold only while parked on hard level ground. If unfolding across a slope or while moving, implement may become unstable and damage to implement components and surrounding property. Damage is likely.
Folding

Fold the Discovator Narrow for moves between fields, transport over public roads, parking and storage. The following steps presume an implement raised and unfolded for field work, such as after working a field. Follow the detailed instructions in steps 1 through 6, beginning on this page, until familiar with operation.

Refer to Figure 14

Fold: Move to Level Ground

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

2. Ensure hydraulic lock valve ① is closed. Check that the wing lock pins are in the field position. Ensure no one is in the danger zone of the wings. Open locking valve ②.

Refer to Figure 15

Fold: Raise Implement (page 29)

3. Extend the lift cylinders to full raise implement. Hold at raised for a few seconds. Set circuit to Neutral. Do not install transport locks.

Fold: Fold Wings (page 24)

4. Activate the circuit to retract the fold cylinders.

One wing may reach the stop before the other. A slight asymmetry is not uncommon in folding.

5. When both wings are in contact with their stops. Set fold circuit to Neutral (not Float) to hold at folded.
Fold: Close Locking Valves (page 25)

CAUTION

Cutting Hazard - Sweeps are sharp:
Be careful of sweeps while installing locking pins. Sweeps’ points and wings are sharp. Injury could occur if near a sweep.

Refer to Figure 16
6. Ensure the lock valve 1 is in the closed position (90 degrees from hose) as shown. Place locking pins 2 in the transport position.

Unfolding
These steps presume a implement raised and folded for transport, such as at initial delivery. Follow the detailed instructions in step 7 through step 16, beginning on this page, until this is a familiar operation.

Refer to Figure 17
Locking valve is on the front of the center brace bar to prevent wing movement during transport and maintenance. Note the open 1 and closed 2 position of the valves.

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

Remove Transport Locks

Refer to Figure 18
8. Extend lift circuit to lift implement off the transport locks 1.
9. Park tractor and implement. Ensure the tractor hydraulics are depressurized and in the locked or closed (not float) setting position,
10. Shut down tractor and remove the key.
11. Check that lock valve is in the locked position. Check that the wing lock pins are in the transport position. Inspect fold/lift cylinders, linkages, and hoses for wear. If parts are worn, the operator should have a qualified technician replace worn parts.

CAUTION

Cutting Hazard - Sweeps are sharp:
Be careful of sweeps while installing locking pins. Sweeps’ points and wings are sharp. Injury could occur if near a sweep.

12. If parts are in good working order, move transport lock 1 to the field position on the frame 2.
13. Place locking pins in the field position.
14. Move locking valve lever to the open position slowly on front of center bar.
15. Ensure all personal, e.g., children are out of the danger zones.
16. Insert key into tractor and restart the tractor.
**NOTICE**

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

**Unfolding: Unfold Wings (page 23)**
17. Unfold the wings by extending the fold cylinders.

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

*Refer to Figure 19*
Hold the circuit at extended for several seconds after the wings engage wing stops on center frame.

---

**Lift: Verify Transport Lock**

*Refer to Figure 20*

**WARNING**

*Crush/Pinch Hazards:*
Make sure the transport locks ① are engaged. Lift and re-lower if it is not. If the transport locks are not installed, install transport locks, in the transport position the implement will slowly lower after hydraulic power is removed. If anyone is working on or under the implement, this could result in serious injury or death.

---

*Figure 19*
Wing Unfold Progression

*Figure 20*
Lift Lock Engaged
Lowering and Raising Discovator Narrow

Lowering/Raising Safety Information

⚠️ DANGER

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

⚠️ CAUTION

**Crushing Hazard While Raised:**
Use transport locks (page 26) when working on implement.

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

⚠️ CAUTION

**Shoving Hazard:**
Discovator Narrow length changes during raising and lowering. Injury is possible.

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

Set brakes / use park to avoid tractor movement. Remain clear of all tires and ground engaging components during raise and lower.

⚠️ NOTICE

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

Refer to Figure 21
18. Check that the danger zones are clear of personal.
20. Make sure all persons are clear of danger zones, e.g., coulters and sweeps. Retract lift circuit to lower implement.

Refer to Figure 22

CAUTION

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

**NOTICE**

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

**NOTICE**

Equipment Damage Risk:
Always raise the implement for tight turns and reverse/backing operations. Backing with implement lowered causes implement plugging and damage to implement ground engaging components. Tight turns with implement lowered may damage ground engaging implement components. The following steps presume an implement lowered and unfolded for working a field. Follow the detailed instructions in steps 21 through 24, beginning on this page, until familiar with operation.

21. Make sure all persons are safely clear of implement sections and out of danger zones.
22. Activate dedicated Lift circuit (normally Extend).

*Refer to Figure 23*

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

*Refer to Figure 24*

Transport locks are provided to hold a fold/unfold implement at fully raised position for transport, maintenance, or storage.

---

Unfolded Transport Locks: Wing Pinch and Crushing Hazards:
The transport locks prevents the center section from lowering. Use transport locks to hold implement raised for extended periods. See page 25.
Transporting the Discovator Narrow

Transport Safety Information

⚠️ DANGER ⚠️

Inadequate Tractor Hazard:
Tractor must weight at least 67% of the implement as towed. Ensure that the towing vehicle is adequate for the task. Using an inadequate tow vehicle is extremely unsafe, and can result in loss of control, serious injury and death. See table on next page. Do not tow if Discovator Narrow exceeds the load rating of the vehicle.

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

⚠️ CAUTION ⚠️

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

⚠️ WARNING ⚠️

Unexpected Wing Tilt-Down and Lowering Hazards:
Use wing lock valve and wing locking pins (page 25). Check that implement centre section lift lock is engaged (page 25). Failure to use these safety features can cause a major accident resulting in death, injury and equipment damage. If locks are not engaged, and a hydraulic failure occurs, or a circuit is unintentionally set to Float, wings can unfold to ground contact, or implement can settle into ground contact.

⚠️ CAUTION ⚠️

Loss of Control Hazard, Tires:
Inflate tires to factory specifications. Tighten wheel nuts to specifications. Under-inflated tires or loose nuts can cause loss of control. Over-inflated tires or overtightened nuts can fail suddenly and cause loss of control. Loss of control can cause a major accident resulting in death, injury and equipment damage. Be sure all transport/maintenance locks are engaged before checking tire pressure and wheel nut torque values.

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

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

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

If your tractor weight or capability is in question, take your Discovator Narrow to a scale and get a precise weight.

Transport Checklist

- Plan the route. Avoid steep hills. Keep clearances in mind. Folded, your 8315-8324DVN is nearly 3.12m high and is 3m wide.
- Hitch. Check that implement is securely hitched to a sufficient tractor (page 16). Always use a locking-style hitch pin sized to match holes in hitch and draw-bar, and rated for the load.
- Check that tires are properly inflated. Remember that the implement may be wider than the towing vehicle. Allow safe clearance.
- If implement is equipped with optional brakes: With tractor in Park, and with tractor parking brake set, place chock blocks in transport position (page 20).
- Always have lights on for highway operation.
- Comply with all national, regional and local safety laws when travelling on public roads.
- Release all brakes and travel with caution.

<table>
<thead>
<tr>
<th>Configuration</th>
<th>8315DVN</th>
<th>8318DVN</th>
<th>8321DVN</th>
<th>8324DVN</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASE MACHINE, NO ATTACHMENT</td>
<td>3016kg (6635lbs)</td>
<td>3629kg (7984lbs)</td>
<td>4174kg (9183lbs)</td>
<td>4990kg (10,978lbs)</td>
</tr>
<tr>
<td>4 ROW COIL TINE DRAG</td>
<td>3468kg (7629lbs)</td>
<td>4134kg (9094lbs)</td>
<td>4758kg (10,468lbs)</td>
<td>5627kg (12,379lbs)</td>
</tr>
<tr>
<td>3 ROW COIL TINE AND REEL</td>
<td>3612kg (7947lbs)</td>
<td>4299kg (9548lbs)</td>
<td>4955kg (10,902lbs)</td>
<td>5845kg (12,860lbs)</td>
</tr>
<tr>
<td>4 ROW SPIKE AND REEL</td>
<td>3684kg (8105lbs)</td>
<td>4382kg (9640lbs)</td>
<td>5054kg (11,119lbs)</td>
<td>5955kg (13,100lbs)</td>
</tr>
<tr>
<td>7 ROW SPIKE DRAG</td>
<td>3648kg (8026lbs)</td>
<td>4341kg (9549lbs)</td>
<td>5005kg (11,010lbs)</td>
<td>5900kg (12,980lbs)</td>
</tr>
<tr>
<td>5 ROW HIGH RESIDUE SPIKE DRAG</td>
<td>3612kg (7947lbs)</td>
<td>4299kg (9458lbs)</td>
<td>4955kg (10,902lbs)</td>
<td>5845kg (12,860lbs)</td>
</tr>
</tbody>
</table>

Weights may change without notice.
Brake Operation (option)

Implement wheel brakes are optional. There are brake shoe pairs on each of the outside transport wheels. The shoe pairs are operated by two independent systems:

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

Refer to Figure 25

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

See also:
page 36 - "Front to Rear Leveling"
page 55 - "Troubleshooting"
page 45 - "Brake Maintenance (Option)"

**DANGER**

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

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

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

**Service Brake Operation**

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

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

**CAUTION**

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

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

<table>
<thead>
<tr>
<th>Tractor Braking-Related Event</th>
<th>Typical Trailer Brake Port Response</th>
<th>Record How Your Tractor Operates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal tractor braking</td>
<td>Activates trailer brakes</td>
<td></td>
</tr>
<tr>
<td>Differential tractor braking</td>
<td>Reduced trailer braking</td>
<td></td>
</tr>
<tr>
<td>Tractor Parking Brake</td>
<td>Activates trailer brakes</td>
<td></td>
</tr>
<tr>
<td>Tractor Emergency Brake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tractor transmission to Park</td>
<td>No effect on trailer brakes</td>
<td></td>
</tr>
</tbody>
</table>
Single-Line Hydraulic Brake Operation

Refer to Figure 26

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

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

Dual-Line Air/Hydraulic Brake Operation

Refer to Figure 27

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

**CAUTION**

Service Air Brakes Not Instantly Available:

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

Figure 26
Hydraulic/Hydraulic Brakes

Figure 27
Air/Hydraulic Brakes
Transport

⚠️ DANGER

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

⚠️ DANGER

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

⚠️ DANGER

Braking and Loss of Control Hazard:
Do not exceed 30 kph (20 mph). Slow down on rough roads.

Transport Steps

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

1. Check that implement is securely hitched to a sufficient tractor (page 16).
2. Always use a locking-style hitch pin sized to match holes in hitch and draw-bar, and rated for the load.
3. Attach safety chain to tractor with enough slack to permit turning (page 16).
4. Verify correct operation of lights.
5. Install transport locks (page 26).
6. Check that tires are properly inflated (page 63).
7. Plan the route. Avoid steep hills.
8. Always have lights on for highway operation.
9. Do not exceed 32 kph (20 mph). Comply with all national, regional and local laws when traveling on public roads.
10. Remember that the implement may be wider than the towing vehicle. Allow safe clearance.
Hitching a Trailing Implement (Optional)

Maximum rear drawbar vertical loading-350kg.

Ensure the 8315, 8318, 8321 & 8324DVN is unfolded.

1. Raise machine to attain a suitable height to attach the trailing implement.
2. Reverse the 8315, 8318, 8321 & 8324DVN up to the implement, ensuring that the drawbars are correctly aligned allowing a slight clearance to enable the machines to be coupled together.
3. Attach the hydraulic hoses between the 8315, 8318, 8321 & 8324DVN and the implement.
4. Reverse the 8315, 8318, 8321 & 8324DVN and couple the two machines together.
5. Fully raise both machines into the road transport position. Fold the machine(s) if necessary.

**CAUTION**

Ensure that no fouling occurs between the 8315, 8318, 8321 & 8324DVN and the towed machine.

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

Field Operation

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

**NOTICE**

**Equipment Damage Risk:**

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

**NOTICE**

**Equipment Damage Risk:**

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

Final Field Checklists

Use the following tables to develop a final checklist for your tractor/Discovator Narrow configuration.

<table>
<thead>
<tr>
<th>Mechanical Checklist</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discovator Narrow hitched</td>
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</tr>
<tr>
<td>Hitch pin locked</td>
<td></td>
</tr>
<tr>
<td>Safety chain secured to tractor or leading implement</td>
<td>16</td>
</tr>
<tr>
<td>Parking jack stowed</td>
<td>18</td>
</tr>
<tr>
<td>Check all tire pressures</td>
<td>63</td>
</tr>
<tr>
<td>Transport locks and locking valves are in the field position</td>
<td>25</td>
</tr>
<tr>
<td>Implement unfolded</td>
<td>25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hydraulic System Checklist</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check tractor hydraulic reservoir full</td>
<td>-</td>
</tr>
<tr>
<td>Make hydraulic connections</td>
<td>19</td>
</tr>
<tr>
<td>Inspect connections for leaks</td>
<td>-</td>
</tr>
<tr>
<td>Unfold Implement</td>
<td>25</td>
</tr>
<tr>
<td>Perform a raise and lower operation</td>
<td>27</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical Checklist</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verify electrical hookups solid, or connector securely stowed if not using lights in field.</td>
<td>18</td>
</tr>
</tbody>
</table>
Perform all steps in “Pre-Start Checklist” on page 22 and “Final Field Checklists” on page 35.

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

**NOTICE**

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

### First Time Field Adjustments

#### Pre-Leveling of Machine

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

#### Front to Rear Leveling

**Refer to Figure 28**

1. Pre-leveling of machine can be done on a concrete slab or level surface. Lower machine so sweeps are 5.0-7.5 cm (2-3 in) off of ground on the center frame. Adjust turnbuckle at the front of machine to level it from front to back. (Shorten to bring front down, extend to bring front up). Level machine with the front roe just slightly deeper or lower than the back.

![Figure 28](https://example.com/f28.png)

**Figure 28**

Hitch Turnbuckle Adjustment
Side to Side Leveling

Refer to Figure 29

2. Set the wings to match the depth of the center. This is done by adjusting the lift cylinder eye-bolt on each wing. Lengthen the bolt to run shallower, shorten the bolt to run deeper.

Refer to Figure 30

Disc Gang Depth Calibration

3. Be sure the pre-load is set at 22.23 cm (8.75 in) on the spring assemblies. Calibrate the depth gauge pointer by extending cylinder until the under frame clearance of the 50.8 cm (20 in) blades is 11.43 cm (4.5in). Place the decal on the stand with the pointer at ‘0’.
Refer to Figure 31

Field Operation of Disc Gangs

4. Adjust the disc or coulter gangs to run 1.27-2.54 cm (0.5-1 in) shallower than the cultivator sweeps by using the gang cylinders. The pointer on the gauge should read +1/2" to +1". Running the disc gangs slightly above the sweeps allows the sweeps to work in firm ground which improves trash flow and incorporation as well as leaving a smoother, more level seed bed.

5. Do not run the disc or coulter gangs in the RED ZONE. Running the disc gangs too deep will cause plugging of trash as well as excessive wear on the gangs, gang springs and Discovator Narrow frame. Running disc gangs too deep may also tend to hold the front of the entire machine out of the ground. (The disc gangs should only be run in the RED ZONE when using 45.7 cm (18 in) blades that are nearing the end of their wear life).

6. You are ready to operate the machine in the field at this point. You should have someone observe the machine during operation for levelness, front to rear and side to side. When you lower the machine to the desired working depth, set the cylinder stop at the front of the front of the unit to maintain a constant depth after raising and lowering.

7. Make any fine tuning adjustments on the leveling of the machine.

Scraper Settings

The scrapers are set at the factory but should be checked periodically and may need re-adjusted as follows:

- Disc scrapers will need the bolts (rigid scraper) or u-bolts (spring scraper) loosened up and slid into blade until they just touch the blade, and torqued to specs.
- Coulter scrapers u-bolts will need loosened and scrapers centered between coulter blades, and torqued to specs.
Rear Attachment Settings

Spike Drag Settings

Refer to Figure 32

a. On the spike drag, start with 5 links hanging from the chain in drag arm bottom slot. (This is the starting point for worst conditions). The cleaner the ground, the shorter the pull chain may be pulled up. On the spike drag, one of the links in the first row of angles is turned over. This allows the trash to start flowing through the drag easier by changing the angle of the first row of teeth. Always make sure that the drag is never pulling off of the hang chains. If so, shorten pull chains.

HD Spike & Reel Settings

Refer to Figure 33

8. On the hd spike drag, start with 5 links hanging from the chain  in drag arm bottom slot. (This is the starting point for worst conditions). The cleaner the ground, the shorter the pull chain may be pulled up. Always make sure that the drag is never pulling off of the hang chains 2. If so, shorten pull chains.

9. Adjust nut 3 to where spring 5 is just making contact with front plate 8.

10. Turn nut 3 another 1” further on spring rod 6 to set pre-load on spring 8.

11. Lengthen turnbuckle 7 to adjust front mini shank 8 to run more aggressive and shorten to run more passive.
Coil Tine Settings

Refer to Figure 34

b. On coil tine drags start with the top eyebolt (1) centered. Then level drag mainframe (2) by changing position of leveling bolts (3). There are two holes in the arm and four in the mainframe. One of these will get you where you need to be to be level. To lay teeth back, remove the clip pin (4) on each end and move strap adjustment by pushing the handle (5) forward. The strap has 5 holes arm will let you lay the teeth back several degrees. If it is desired to set one row, usually the first, different than the rest as far as the angle is concerned, it can be adjusted individually by loosening the u-bolt and sel-screw on each end of the drag bar. Down pressure on the drag is achieved by lengthening the eyebolt (1) on the top bracket. Depending on the amount of down pressure, you may need to re-level the mainframe.

Reel Settings

c. If a reel is added, adjust the amount of down pressure by either shortening the eyebolt for less pressure or lengthening for more pressure.

Parking

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

1. Position the implement on firm, level ground.
2. Raise, fold and lock implement (page 27 and page 23).
3. Remove jack from storage position ① and pin securely to lifting stob on outside of implement tongue ②. See "Hitching Tractor to Discovator Narrow" on page 16.
4. If ground is soft, place a wide block or plate under the jack to increase contact area.
5. Securely install chock blocks to prevent jack from digging or sliding off plate.
6. 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 implement.
7. Un-hook electrical lines and protect with any plugs or caps provided.
8. Release pressure on hydraulic system, then disconnect hydraulic lines and pull all lines back onto implement tongue. Store hoses ends in keyholes of hose holder bracket.
9. Disconnect hydraulic brake line (option).
10. Disconnect the safety chain.
11. Unhitch from tractor or leading implement.
Storage

Store the implement where children do not play. If possible, store inside for longer life.

12. Raise, fold and lock implement (page 27 and page 23). For unfolded storage, see steps at right.
14. If equipped with optional air/hydraulic brake system, drain water from reservoir (page 45).
15. Lubricate the implement at all points listed under “Lubrication and Scheduled Maintenance” on page 44.
16. Check all bolts, pins, fittings and hoses. Tighten, repair or replace parts as needed.
17. Check all moving parts for wear or damage. Make notes of any parts needing repair or replacement before the next season.
18. Lubricate all points listed in Maintenance to prevent rust.
19. Clean Discovator Narrow of mud, dirt, excess oil and grease.
20. Grease exposed cylinder rods to prevent rust.
21. Use touch-up paint to cover scratches, chips and worn areas to prevent rust.

Unfolded Storage

See page 26 for details on maintenance lock.

12a. Raise implement.
12b. Verify the transport locks are in the transport position.
12c. Be sure hydraulics are depressurized. Adjust locking valves to the open position. Unfold wings until wing is resting on shims.
12d. Lower implement onto lock channels.
12e. Set all hydraulic remotes to Float.
Maintenance and Lubrication

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

**WARNING**

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

**WARNING**

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

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

1. Securely lock up implement before working on it.
2. Lubricate areas listed under “Lubrication and Scheduled Maintenance” on page 44.
3. Check for air leaks at hose connections.
4. Check and tighten or replace any hydraulic leaks. Check hoses for any leaks. It is important that there are no leaks on the equipment.
5. Inflate tires as specified on “Tire Inflation Chart” on page 63.
7. During the first season of operation, and periodically after that, check your bolts for tightness. Check shank pivot bolts for tightness. Check shank pivot bolts on the spring-loaded shank, these must remain tight to prevent excessive wear on the shank assembly.
8. Replace or rotate worn parts as needed -- hinge bolts, clevis pins, bearings, sweeps, shanks, etc. Boron disc blades cannot be rolled to sharpened, they must be ground. Cracks and breakage will occur if rolled.
9. Grease wheel bearings and walking beams sparingly. Over greasing may cause damage to seals and reduce the life of the bearing. Grease hinge points periodically.
10. Check drag bolts for looseness or excessive wear. Replace broken or bent teeth. Your drag is an important part of the tillage operation.
11. If machine is stored outdoors over the winter months, it is a good idea to fold the machine then set it down on the ground so all the cylinders are retracted to protect the cylinder rods. This will extend the life of the cylinder seals and reduce internal and external leaks.
Maintenance Lift Lock

**WARNING**

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

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

Steps to install locks presume a starting configuration of implement unfolded and lowered:
1. Raise the unfolded implement.

Refer to Figure 36
2. Install the transport locks. Remove the transport locks ① from the tube on inside of center frame and pin to cylinder rods ②.

Maintenance Lift Unlock
1. Raise the implement.
2. Remove the transport locks ②. Return them to storage ①.
3. To fold, see folding (page 24).
4. Lower the implement.

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

Further Assistance
Great Plains Manufacturing, Inc. wants you to be satisfied with your new YP425A/625A/825A Air Planter. If for any reason you do not understand any part of this manual or are otherwise dissatisfied with the product please contact:

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

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

<table>
<thead>
<tr>
<th>Multipurpose spray lube</th>
<th>Multipurpose grease lube</th>
<th>Multipurpose oil lube</th>
<th>Intervals (service hours) at which lubrication is required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multipurpose spray lube</td>
<td>Multipurpose grease lube</td>
<td>Multipurpose oil lube</td>
<td>50</td>
</tr>
</tbody>
</table>

**Wheel Bearing Hub**

1 zerk on each hub; 4 total
Type of Lubrication: Grease
Quantity: Sparingly, Do Not Over Grease, nay cause damage seal. Newer Units will may not have a grease zerk on the wheel hubs.
Repack wheel bearings annually or every 2500 acres.

**All Hinge Points**

On all hinge points
Type of Lubrication: Grease
Quantity: Until grease emerges
Brake Maintenance (Option)

Brakes are self-adjusting, but there are several maintenance items:
page 45 - Brake Line Charge and Bleed
page 47 - Air Brake Filter Cleaning
page 47 - Brake Drum and Liner Maintenance

Brake Line Charge and Bleed

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

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

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

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

Refer to Figure 37 (which depicts air brake system - reservoir for hydraulic brake system is similar)

4. Clean and dry top of master cylinder reservoir.

5. Remove cap and keep free of contaminants.

Drain Hydraulic Brake Lines

6. If draining brake system:
   A. Remove drain plug at rear of reservoir and empty reservoir. Re-secure plug.
   B. Start at an outside hub for the following steps.
   C. Connect recovery tubing to the bleeder valve, Refer to Figure 38, above the brake line. Unscrew valve to open line.
   D. Operate tractor brakes to cycle machine system. Continue until no fluid flows at hub.
   E. Close valve, and repeat step C and step D for the other outside hub, then the inside hubs.

Refer to Figure 39 (which depicts air brake system - tee for hydraulic brake system is similar)

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

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.
Charge and Bleed System

Refer to Figure 40

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

**NOTICE**

Do not use brake fluid:
DOT5 / SAE J1705

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


Refer to Figure 41

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

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

11. When fluid appears at valve, close valve.

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

Refer to Figure 42

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


15. Top off master cylinder reservoir.
Air Brake Maintenance

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

1. Set the machine hand brakes.
2. Hold the petcock open until no water flows. Close petcock.

Air Brake Filter Cleaning
Refer to Figure 44 and Figure 45

The air brake system includes filters on both the supply and service lines, to trap any debris introduced during connection and disconnection.

Clean filters seasonally; more often in dusty conditions.

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

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

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

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

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

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

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

6. Center the filter screen on the cap. Carefully re-insert in filter body. Screw cap in, checking for misalignment 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.

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

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

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

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

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

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

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

Regulatory Guidance - OSHA, NIOSH, MSHA, and EPA, are regulatory agencies in the United States. These references are to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.
Brake Shoe Replacement

Check brakes for wear, contamination and damage seasonally or every 9600 km (6000 miles).

1. Prior to commencing work, review the safety information on page 47. Have necessary safety equipment and tools on hand. Make sure workers understand the hazards and how to avoid them.

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

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

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

Refer to Figure 46

5. If left hitched, put the tractor transmission in Park, release tractor service and parking breaks, and disconnect the trailer brakes at the hitch. Set tractor parking brake only after trailer brake disconnection.

If unhitched, release air brakes by opening dump valve 1. Pull down on cap to release. Push up.

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

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

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

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

Refer to Figure 47

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

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

12. Inspect inner seal 8, bearings, hub and drum for wear and damage - for drum, see “Brake Drum Maintenance” on page 53).

13. Keep inner and outer bearing components separated. They are different parts.
Refer to Figure 48

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), and absence of grease, contamination, deep scores, chipping, or excessive heat fractures. Hairline heat fissures are not unusual and do not require shoe replacement.

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

Sound practice is to replace springs when replacing brake shoes.

18. Check wheel cylinder for evidence of leaks.

If no parts need replacing, skip to step 48.

Refer to Figure 49


20. As necessary, disassemble adjuster for cleaning. Inspect adjust pawl and rack for wear and damage. Great Plains recommends replacing the entire adjuster if any parts are worn or damaged.

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

NOTICE

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

22. Release upper spring 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.

WARNING

Part Failure Hazard:
Do not substitute parts. Incorrect or substandard parts can cause brake malfunction or failure, resulting in death, serious injury or property damage. Always re-assemble brakes with either the removed parts (if serviceable) or Great Plains parts as specified in the Parts Manual (550-466P).
Refer to Figure 50

27. Remove five \( \frac{1}{2}-13 \) nuts 1 and lock washers 2 behind dust shield.

28. Pull backing plate assembly 3 far enough out on spindle, away from dust cover 4, to allow access to nuts 5 on the two shoe hold down bolts 6.

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

29. Remove hold down cotter pins 7 and castellated nuts 8.

30. Remove spring washers 9.

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.


32. Remove hold down bolts 11 and brake shoes 12.

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

34. Replace any shoes contaminated with oil.

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

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

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

Refer to Figure 51

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.

The spring washers ⑧ are slightly cupped. Place them on the bolt with the concave (dished-in) sides facing each other “∀”.

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 ⑫ and spindle weldment. Secure with lock washers ⑬ and 1/2-13 nuts ⑭.

Re-Install Springs

Refer to Figure 52

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

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

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

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

44. Place adjuster assembly ⑧ on adjuster lugs ⑩. 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 53

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.

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

Re-Mount Hub and Drum

Refer to Figure 54

48. Repack any bearings removed.

49. 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.

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.

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

NOTICE

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

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

51. Insert re-packed outer bearing 4.

52. Add spindle washer 5 and castle nut 6.

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


WARNING

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.
Mounting Wheels

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

Refer to Figure 55

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

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

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

58. Repeat step 56 and step 57 for each wheel.

Test and Adjust Brakes

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

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

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

61. 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.

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

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

64. Release all tractor braking that engages machine braking.

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

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

67. Repeat step 65 and step 66 for the other side of the machine.

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

#### General Performance

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rear Shanks Leaving Groove</strong></td>
<td>Rear of machine running too deep.</td>
<td>Level machine from front to rear with turn-buckle, See “Front to Rear Leveling” on page 36</td>
</tr>
<tr>
<td></td>
<td>Operating machine too fast.</td>
<td>Level machine from front to rear with turn-buckle, See “Front to Rear Leveling” on page 36</td>
</tr>
<tr>
<td></td>
<td>Operating machine too fast.</td>
<td>Level machine from front to rear with turn-buckle, See “Front to Rear Leveling” on page 36</td>
</tr>
<tr>
<td><strong>Leaving Ridges On The Outside</strong></td>
<td>Wings not level.</td>
<td>Adjust eye-bolt at rear of wing cylinders to level wings. See “Side to Side Leveling” on page 37.</td>
</tr>
<tr>
<td></td>
<td>Lift cylinders out of phase.</td>
<td>Rephase lift cylinders. Repair or replace leaky cylinder, See pages 34-37 of “Parts Manual”.</td>
</tr>
<tr>
<td></td>
<td>Leaking wing lift cylinder.</td>
<td>Repair or replace leaky cylinder, See pages 34-37 of “Parts Manual”.</td>
</tr>
<tr>
<td></td>
<td>Drag set Incorrectly.</td>
<td>Repair or replace leaky cylinder, See pages 26-27 of “Parts Manual”.</td>
</tr>
<tr>
<td></td>
<td>Operating machine too fast.</td>
<td>Level machine from front to rear with turn-buckle, See “Front to Rear Leveling” on page 36</td>
</tr>
<tr>
<td><strong>Wings Not Penetrating</strong></td>
<td>Wings not level.</td>
<td>Adjust eye-bolt at rear of wing cylinders to level wings. See “Side to Side Leveling” on page 37.</td>
</tr>
<tr>
<td></td>
<td>Wing gangs deeper than center gangs.</td>
<td>Adjust eye-bolt at rear of wing cylinders to level wings. See “Side to Side Leveling” on page 37.</td>
</tr>
<tr>
<td><strong>One Wing Running Deeper Than The Other</strong></td>
<td>Wings not level.</td>
<td>Adjust eye-bolt at rear of wing cylinders to level wings. See “Side to Side Leveling” on page 37.</td>
</tr>
<tr>
<td></td>
<td>Leaking wing lift cylinder.</td>
<td>Repair or replace leaky cylinder, See pages 34-37 of “Parts Manual”.</td>
</tr>
<tr>
<td></td>
<td>Wing cylinder in wrong sequence.</td>
<td>Repair or replace leaky cylinder, See pages 26-27 of “Parts Manual”.</td>
</tr>
<tr>
<td></td>
<td>Improper tire pressure.</td>
<td>Set air pressure, See “Tire Inflation Chart” on page 63.</td>
</tr>
<tr>
<td><strong>Both Wings Running Too Deep</strong></td>
<td>Wings not level.</td>
<td>Adjust eye-bolt at rear of wing cylinders to level wings. See “Side to Side Leveling” on page 37.</td>
</tr>
<tr>
<td></td>
<td>Improper tire pressure.</td>
<td>Set air pressure, See “Tire Inflation Chart” on page 63.</td>
</tr>
<tr>
<td><strong>Whole Machine Runs Deeper</strong></td>
<td>Leaking depth stop cartridge.</td>
<td>Replace cartridge. Repair or replace leaky cylinder, See pages 26-27 of “Parts Manual”.</td>
</tr>
<tr>
<td><strong>Center &amp; One Wing Run Deeper</strong></td>
<td>Leaking master lift cylinder.</td>
<td>Repair or replace leaky cylinder, See pages 26-27 of “Parts Manual”.</td>
</tr>
</tbody>
</table>
## General Performance

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Machine not level front to back.</td>
<td>Level machine front to rear with turnbuckle,</td>
</tr>
<tr>
<td></td>
<td>Too much residue in the rows.</td>
<td>See “Front to Rear Leveling” on page 36.</td>
</tr>
<tr>
<td></td>
<td>Disc gangs not cutting residue.</td>
<td>Run at a slight angle to the rows.</td>
</tr>
<tr>
<td></td>
<td>Improperly spaced shanks.</td>
<td>Check for sharpness.</td>
</tr>
<tr>
<td></td>
<td>Running too low.</td>
<td>Check shank layout for proper shank placement.</td>
</tr>
<tr>
<td></td>
<td>Ground too wet.</td>
<td>Speed up (9-11 km/h)/(6-7 m/h).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Allow ground to dry some.</td>
</tr>
<tr>
<td>Machine Bouncing</td>
<td>Operating speed too fast.</td>
<td>Slow down (9-11 km/h)/(6-7 m/h)</td>
</tr>
<tr>
<td>Depth</td>
<td>Timed detent not set correctly.</td>
<td>Set flow for 0.5 after machine is raised.</td>
</tr>
<tr>
<td></td>
<td>Timed detent not allowing depth stop to engage.</td>
<td>Adjust detent timer to allow for depth stop to engage.</td>
</tr>
<tr>
<td>Overheating</td>
<td>Flow set to continuous.</td>
<td>Disengage continuous flow.</td>
</tr>
<tr>
<td>Hydraulic System</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Coulter/Disc Gang Performance

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coulter/Disc Gangs Are Plugging</td>
<td>Scrapers are not set properly.</td>
<td>Set scraper according to specs, See &quot;Scraper Settings&quot; on page 38.</td>
</tr>
<tr>
<td></td>
<td>Gangs are running too shallow.</td>
<td>Increase gang depth or raise completely.</td>
</tr>
<tr>
<td></td>
<td>Ground too wet.</td>
<td>Fix leaking gang cylinder, See pages 30-31 of “Parts Manual”.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Allow ground to dry some.</td>
</tr>
<tr>
<td>Entire Coulter/Disc Gang Depth Changes</td>
<td>Gang circuit leak in tractor</td>
<td>Completely extend/re phase cylinders periodically.</td>
</tr>
<tr>
<td>Wing Coulter/Disc Gangs Coming Out Of Ground</td>
<td>Leaking slave cylinder on same side as wing.</td>
<td>Repair or replace leaky cylinder, See pages 30-31 of “Parts Manual”.</td>
</tr>
<tr>
<td>Center Gang Section &amp; One Wing Gang Section</td>
<td>Leaking master cylinder opposite of the wing gang section.</td>
<td>Repair or replace leaky cylinder, See pages 26-27 of “Parts Manual”.</td>
</tr>
</tbody>
</table>
## Sweep/Shank Performance

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uneven Sweep Depth Across Working Width</td>
<td>Wings not level.</td>
<td>Adjust eye-bolt at rear of wing cylinders to level wings. See “Side to Side Leveling” on page 37.</td>
</tr>
<tr>
<td></td>
<td>Leaking lift cylinder.</td>
<td>Repair or replace leaky cylinder, See pages 26-27 of “Parts Manual”.</td>
</tr>
<tr>
<td></td>
<td>Improper tire pressure.</td>
<td>Set air pressure, See “Tire Inflation Chart” on page 63.</td>
</tr>
<tr>
<td>Sweep’s Front Wearing Faster Than Rear</td>
<td>Machine nose down front to rear.</td>
<td>Level machine front to rear with turnbuckle, See “Front to Rear Leveling” on page 36.</td>
</tr>
<tr>
<td>Sweep’s Rear Wearing Faster Than Front</td>
<td>Machine nose up front to rear.</td>
<td>Level machine front to rear with turnbuckle, See “Front to Rear Leveling” on page 36.</td>
</tr>
<tr>
<td>Twisted K-Flex</td>
<td>Turning while machine in the ground.</td>
<td>Raise the machine out of the ground when turning.</td>
</tr>
<tr>
<td>Opening K-Flex Shank</td>
<td>Turning while in the ground. Backing up while in the ground.</td>
<td>Raise the machine out of the ground. Raise the machine out of the ground.</td>
</tr>
</tbody>
</table>

## Transport

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wings Fail To Fold</td>
<td>Hydraulic hose disconnected. Failed hydraulic hose tip. Low hydraulic pressure.</td>
<td>Connect hydraulic hose. Replace tip. Increase pressure to be&gt;1500psi (10.3x10^6 Pa).</td>
</tr>
<tr>
<td>Folds/Unfolds Too Slow</td>
<td>Failed hydraulic hose tip.</td>
<td>Replace tip.</td>
</tr>
<tr>
<td>Folds/Unfolds Too Fast</td>
<td>Cylinder orffices removed.</td>
<td>Replace orffices in cylinder ports.</td>
</tr>
<tr>
<td>Lift Circuit immobilized</td>
<td>Rebound valve locked.</td>
<td>See dealer.</td>
</tr>
<tr>
<td>Machine Bouncing During Transport</td>
<td>Excessive speed.</td>
<td>Slow down (30 km/h)/(18 m/h).</td>
</tr>
</tbody>
</table>
### Brakes (Option)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Causes</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoke or odd burning odor from axle area</td>
<td>Overheated brakes, typically on long steep hills</td>
<td>Stop immediately. Wait for brakes to cool completely. Moderate downhill speed by using lower gear and frequent full stops. Check brake components for heat distortion.</td>
</tr>
<tr>
<td></td>
<td>New brakes may exhibit slight smoking or odors until linings seat on drums.</td>
<td>Check brakes if problem persists, or braking action is insufficient.</td>
</tr>
<tr>
<td>Braking insufficient, one wheel</td>
<td>Tire under-inflated.</td>
<td>Inflate all tires to specification.</td>
</tr>
<tr>
<td></td>
<td>Worn brake linings and/or drum</td>
<td>Service brakes.</td>
</tr>
<tr>
<td></td>
<td>Worn or leaking brake cylinder</td>
<td>Rebuild or replace cylinder.</td>
</tr>
<tr>
<td></td>
<td>Grease or oil on linings</td>
<td>Correct problem causing contamination. Service brakes.</td>
</tr>
<tr>
<td></td>
<td>Brake adjuster not adjusting</td>
<td>Ice or dried mud can freeze mechanism. Check for damage seizing movement. Check for worn and inoperative pawl, or weak/damaged/missing pawl spring.</td>
</tr>
<tr>
<td>Braking insufficient, all wheels</td>
<td>Air in machine brake lines</td>
<td>Check for loose fittings. Check for damaged fittings and lines. Check for damage or worn operating components. Correct source of leak. Recharge and bleed system.</td>
</tr>
<tr>
<td></td>
<td>Air/Hydraulic system: damaged diaphragm in booster chamber</td>
<td>Replace booster.</td>
</tr>
<tr>
<td></td>
<td>Air/Hydraulic system: leaks in air system</td>
<td>Repair leaks.</td>
</tr>
<tr>
<td></td>
<td>Air/Hydraulic system: clogged filters</td>
<td>Clean filters (page 47).</td>
</tr>
<tr>
<td></td>
<td>Hydraulic/Hydraulic system: air in brake line from tractor</td>
<td>Bleed and recharge brake line.</td>
</tr>
<tr>
<td></td>
<td>Brake linings and/or drums worn</td>
<td>Service brakes.</td>
</tr>
<tr>
<td></td>
<td>Brake linings replaced with unapproved parts having inadequate friction rating</td>
<td>Replace shoes with approved parts.</td>
</tr>
<tr>
<td></td>
<td>Pressure supplied by tractor insufficient</td>
<td>80 psi / 55 kPa minimum for air system.</td>
</tr>
<tr>
<td></td>
<td>Bleed port open</td>
<td>Close port. Re-charge and bleed system.</td>
</tr>
<tr>
<td></td>
<td>Brake lining worn or missing</td>
<td>Inspect and repair as needed.</td>
</tr>
<tr>
<td></td>
<td>Brake cylinder frozen</td>
<td>Inspect and repair as needed.</td>
</tr>
<tr>
<td></td>
<td>Brake parts broken or missing</td>
<td>Inspect and repair as needed.</td>
</tr>
<tr>
<td>No braking, one wheel</td>
<td>Rule out problems at brake assemblies</td>
<td>Check parking brake system. If doesn’t work either, the problem is likely in the hubs. If parking brakes do work, the problem is likely above the hubs.</td>
</tr>
<tr>
<td></td>
<td>Loss of fluid in machine brake lines</td>
<td>Check for fluid loss at all fittings and bleed ports. Close/repair, recharge and bleed.</td>
</tr>
<tr>
<td></td>
<td>Line(s) to tractor improperly connected</td>
<td>Check connections.</td>
</tr>
<tr>
<td></td>
<td>Trailer brake system disabled or malfunctioning in tractor</td>
<td>Check function with another trailer.</td>
</tr>
<tr>
<td></td>
<td>Tractor line pressure insufficient</td>
<td>Have dealer check pressure at port.</td>
</tr>
<tr>
<td>Problem</td>
<td>Causes</td>
<td>Solutions</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Machine pulling to one side</td>
<td>Parking brakes partially or fully engaged on that side</td>
<td>Release parking brakes on both sides prior to movement.</td>
</tr>
<tr>
<td></td>
<td>See “Dragging brake” topic.</td>
<td>Check “wheel lockup” causes before flat spots develop on tires.</td>
</tr>
<tr>
<td>Brakes always engaged, all wheels</td>
<td>Machine parking brakes on during movement</td>
<td>Release parking brakes prior to movement.</td>
</tr>
<tr>
<td></td>
<td>Over-extended adjuster</td>
<td>Reset adjuster pawls and allow system to self-adjust.</td>
</tr>
<tr>
<td></td>
<td>Air/Hydraulic system: Tractor air brake lines reversed, and Supply line is causing brakes to be always on</td>
<td>Reverse air line connections at hitch.</td>
</tr>
<tr>
<td></td>
<td>Hydraulic/Hydraulic system: machine brake line connected to incorrect always-on remote.</td>
<td>Connect machine 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. 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 “Brakes always engaged, all wheels”</td>
<td></td>
</tr>
<tr>
<td>Squealing from brakes</td>
<td>Worn brake linings</td>
<td>Check brakes. Replace worn linings (page 49).</td>
</tr>
<tr>
<td></td>
<td>Distorted brake parts scraping</td>
<td>Check brakes. Replace damaged parts.</td>
</tr>
</tbody>
</table>
## Retract Kit (Option)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Causes</th>
<th>Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wing wheels not retracting or extending</td>
<td>If retract not working.</td>
<td>Check that the inline fuse is not blown.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check that the retract wiring harness is plugged into keyed power.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Checked that hydraulic lines are connected properly.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check that valves and switch are plugged into appropriate electrical connections.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check that whisker switch is in the correct location. See “Assembly Manual” page 49 for correct placement.</td>
</tr>
</tbody>
</table>
# Appendix

## DVN Specifications and Capacities

<table>
<thead>
<tr>
<th>Model No.</th>
<th>8315DVN</th>
<th>8318DVN</th>
<th>8321DVN</th>
<th>8324DVN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sweep Width</strong></td>
<td>485cm (15’ 11&quot;)</td>
<td>554cm (18’ 3&quot;)</td>
<td>663cm (21’ 9&quot;)</td>
<td>734cm (24’ 1&quot;)</td>
</tr>
<tr>
<td><strong>Coulter/Disc Width</strong></td>
<td>480cm (15’ 9&quot;)</td>
<td>544cm (17’ 10&quot;)</td>
<td>658cm (21’ 7&quot;)</td>
<td>724cm (23’ 9&quot;)</td>
</tr>
<tr>
<td><strong>Number of Sweeps</strong></td>
<td>27</td>
<td>31</td>
<td>37</td>
<td>41</td>
</tr>
<tr>
<td><strong>Number of Coulter/Disc</strong></td>
<td>24</td>
<td>28</td>
<td>32</td>
<td>36</td>
</tr>
<tr>
<td><strong>Transport Width w/Retract</strong></td>
<td>300cm (9’ 10&quot;)</td>
<td>300cm (9’ 10&quot;)</td>
<td>300cm (9’ 10&quot;)</td>
<td>300cm (9’ 10&quot;)</td>
</tr>
<tr>
<td><strong>Transport Width wo/Retract</strong></td>
<td>350cm (11’ 6&quot;)</td>
<td>325cm (10’ 8&quot;)</td>
<td>307cm (10’ 1&quot;)</td>
<td>300cm (9’ 10&quot;)</td>
</tr>
<tr>
<td><strong>Height</strong></td>
<td>259cm (8’ 6&quot;)</td>
<td>290cm (9’ 6&quot;)</td>
<td>328cm (10’ 9&quot;)</td>
<td>375cm (12’ 3&quot;)</td>
</tr>
<tr>
<td><strong>Weight (total)</strong></td>
<td>3016kg (6650lbs)</td>
<td>3629kg (8000lbs)</td>
<td>4174kg (9200lbs)</td>
<td>4990kg (11000 lbs)</td>
</tr>
<tr>
<td><strong>Weight (tongue)</strong></td>
<td>302kg (665lbs)</td>
<td>363kg (800lbs)</td>
<td>417kg (920lbs)</td>
<td>499kg (1100lbs)</td>
</tr>
<tr>
<td><strong>Weight (axle)</strong></td>
<td>2714kg (5985 lbs)</td>
<td>3266kg (7200lbs)</td>
<td>3756kg (8280lbs)</td>
<td>4490kg (9900lbs)</td>
</tr>
<tr>
<td><strong>Tire Size Center</strong></td>
<td>12.5LX16.5/G</td>
<td>12.5LX16.5/G</td>
<td>15.5x16.5/G</td>
<td>15.5x16.5/G</td>
</tr>
<tr>
<td><strong>Tire Size Wing</strong></td>
<td>12.5LX16.5/G</td>
<td>12.5LX16.5/G</td>
<td>12.5LX16.5/G</td>
<td>12.5LX16.5/G</td>
</tr>
<tr>
<td><strong>Kilowatt</strong></td>
<td>85-100</td>
<td>100-115</td>
<td>115-138</td>
<td>138-150</td>
</tr>
<tr>
<td><strong>Horsepower</strong></td>
<td>115-135</td>
<td>135-155</td>
<td>155-185</td>
<td>185-200</td>
</tr>
</tbody>
</table>

* Weight (values change due to installed options and/or after-market equipment)

** Weight values change depending on hitch position from ground

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

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

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

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

- **Disc or Coulter Gang Bolt Torque 1 1/2"-6** 650-750 Foot-pounds (175 lbs on 4' cheater).
Tire Inflation Chart

<table>
<thead>
<tr>
<th>Tire Size</th>
<th>Inflation</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.70 x 15” 4-Ply</td>
<td>221 kPa</td>
</tr>
<tr>
<td>12.5L x 16.5” Load G Galaxy</td>
<td>724 kPa</td>
</tr>
<tr>
<td>32-15.5 x 16.5” Load G Galaxy</td>
<td>793 kPa</td>
</tr>
<tr>
<td>380/55R x 16.5” Load F RI</td>
<td>503 kPa</td>
</tr>
</tbody>
</table>

Hydraulic Connectors and Torque

Refer to Figure 56 (a hypothetical fitting)

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

NPT - National Pipe Thread
- Note threaded pipes, 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.

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.

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.

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>

Fittings Torque Values

<table>
<thead>
<tr>
<th>Dash Size</th>
<th>Fitting</th>
<th>N-m</th>
<th>Ft-Lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>-4</td>
<td>⅛&quot;-18 NPT</td>
<td>1.5-3.0 turns past finger tight</td>
<td></td>
</tr>
<tr>
<td>-5</td>
<td>⅜&quot;-20 JIC</td>
<td>19-20</td>
<td>14-15</td>
</tr>
<tr>
<td>-5</td>
<td>⅜&quot;-20 ORB w/jam nut</td>
<td>12-16</td>
<td>9-12</td>
</tr>
<tr>
<td>-5</td>
<td>⅜&quot;-20 ORB straight</td>
<td>19-26</td>
<td>14-19</td>
</tr>
<tr>
<td>-6</td>
<td>⅜&quot;-18 JIC</td>
<td>24-27</td>
<td>18-20</td>
</tr>
<tr>
<td>-6</td>
<td>⅜&quot;-18 ORB w/jam nut</td>
<td>16-22</td>
<td>12-16</td>
</tr>
<tr>
<td>-6</td>
<td>⅜&quot;-18 ORB straight</td>
<td>24-33</td>
<td>18-24</td>
</tr>
<tr>
<td>-8</td>
<td>⅜&quot;-16 JIC</td>
<td>37-53</td>
<td>27-39</td>
</tr>
<tr>
<td>-8</td>
<td>⅜&quot;-16 ORB w/jam nut</td>
<td>27-41</td>
<td>20-30</td>
</tr>
<tr>
<td>-8</td>
<td>⅜&quot;-16 ORB straight</td>
<td>37-58</td>
<td>27-43</td>
</tr>
</tbody>
</table>
Dimensions (Transport) 8315DVN
Dimensions (Transport) 8318DVN
Dimensions (Transport) 8321DVN
Dimensions (Transport) 8324DVN

[Diagrams showing the transport dimensions of the 8324DVN tractor, with various measurements marked in centimeters and inches.]
WARRANTY

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

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

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

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

No other warranty of any kind whatsoever expressed or implied, is made with respect to this sale; and all implied warranties of merchantability and fitness for a particular purpose which exceed the obligations set forth in this written warranty are hereby disclaimed and excluded from this sale.

This warranty is not valid unless registered by a certified Great Plains dealer.

Effective July 15, 2020
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