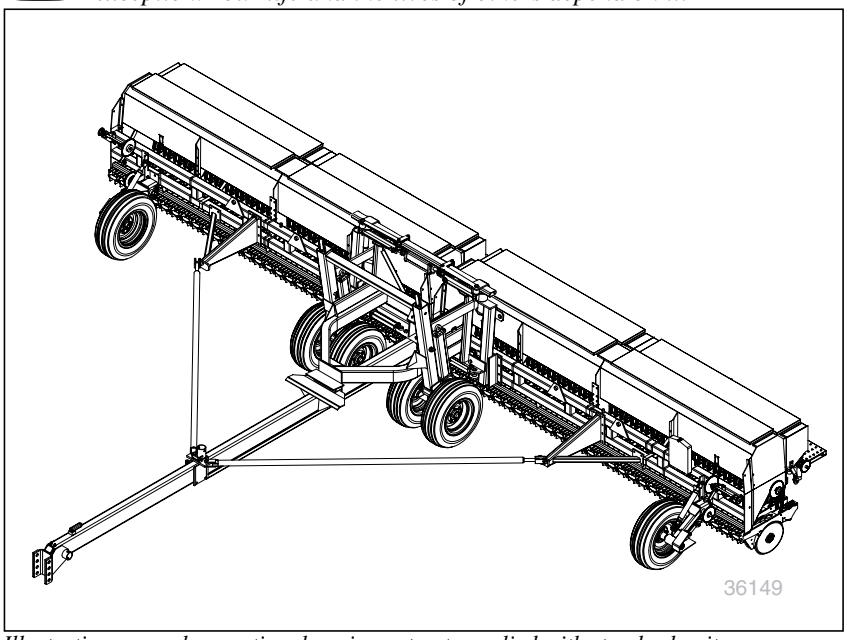
Operator/Rate Manual

2SF24 and 2SF30

Two Section Folding Drill
1994+

Great Plains
Manufacturing, Inc.
www.greatplainsmfg.com

Read the operator 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 or may depict similar models where a topic is identical.

ORIGINAL INSTRUCTIONS

EN

 Printed 2014-01-09 155-015M-A

Table of Contents

Important Safety Information

Look for Safety Symbol

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

Be Aware of Signal Words

Signal words designate a degree or level of hazard seriousness.

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

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

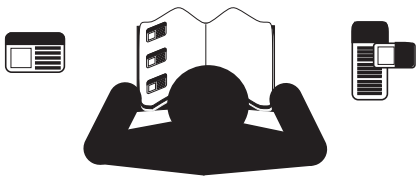
CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Prepare for Emergencies

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

Be Familiar with Safety Decals

- ▲ *Read and understand "**Safety Decals**" on page 6, thoroughly.*
- ▲ *Read all instructions noted on the decals.*
- ▲ *Keep decals clean. Replace damaged, faded and illegible decals.*



Wear Protective Equipment

▲ *Wear protective clothing and equipment.*

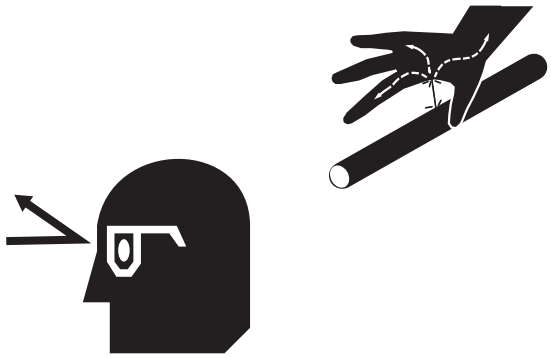
▲ *Wear clothing and equipment appropriate for the job. Avoid loose-fitting clothing.*

▲ *Because prolonged exposure to loud noise can cause hearing impairment or hearing loss, wear suitable hearing protection such as earmuffs or earplugs.*

▲ *Because operating equipment safely requires your full attention, avoid wearing entertainment headphones while operating machinery.*

Avoid High Pressure Fluids

Escaping fluid under pressure can penetrate the skin, causing serious injury. This drill requires a Power-Beyond port, which is always under pressure when the tractor is running.



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

Use A Safety Chain

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

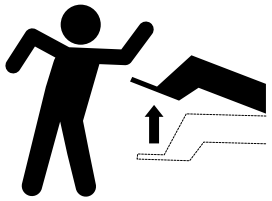
▲ *Use a chain with a strength rating equal to or greater than the gross weight of towed machinery.*

▲ *Attach chain to tractor draw-bar support or 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.*

Negative Tongue Weight



This drill can have positive and negative tongue weight, and it can change during planting. This poses a serious hazard during unhitching and it can work the hitch pin loose during transport. To avoid serious injury or death due to a rising hitch or road accident.

- ▲ *Always use a leveling hitch pin.*
- ▲ *Always use the hitch provided.*
- ▲ *Always hitch before connecting hydraulics.*
- ▲ *Always lower the openers or fold the drill and install the jackstand before unhitching.*

Keep Riders Off Machinery

Riders obstruct the operator's view. Riders could be struck by foreign objects or thrown from the machine.

- ▲ *Never allow children to operate equipment.*
- ▲ *Keep all bystanders away from machine during operation.*

Use Safety Lights and Devices

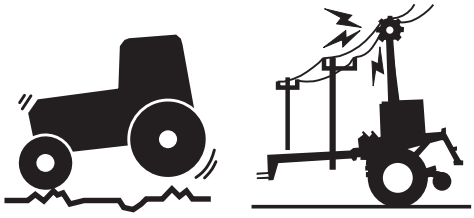
Slow-moving tractors and towed implements can create a hazard when driven on public roads. They are difficult to see, especially at night.

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

Transport Machinery Safely

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

- ▲ *Do not exceed 20 mph. Never travel at a speed which does not allow adequate control of steering and stopping. Reduce speed if towed load is not equipped with brakes.*
- ▲ *Comply with state and local laws.*
- ▲ *Do not tow an implement that, when fully loaded, weighs more than 1.5 times the weight of towing vehicle.*
- ▲ *Carry reflectors or flags to mark drill in case of breakdown on the road.*
- ▲ *Keep clear of overhead power lines and other obstructions when transporting. Refer to transport dimensions under "**Specifications and Capacities**" on page 64.*
- ▲ *Do not fold or unfold the drill while the tractor is moving.*

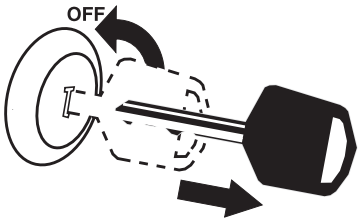


Handle Chemicals Properly

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

- ▲ *Do not use liquid treatments with drill.*
- ▲ *Read and follow chemical supplier instructions.*
- ▲ *Wear protective clothing.*
- ▲ *Handle all chemicals with care.*
- ▲ *Agricultural chemicals can be dangerous. Improper use can seriously injure persons, animals, plants, soil and property.*
- ▲ *Store or dispose of unused chemicals as specified by the chemical manufacturer.*
- ▲ *Dispose of empty chemical containers properly. By law rinsing of the used chemical container must be repeated three times. Puncture the container to prevent future use. An alternative is to jet-rinse or pressure rinse the container.*
- ▲ *Never wash out a hopper within 100 feet (30 m) of any freshwater source or in a car wash.*

Shutdown and Storage



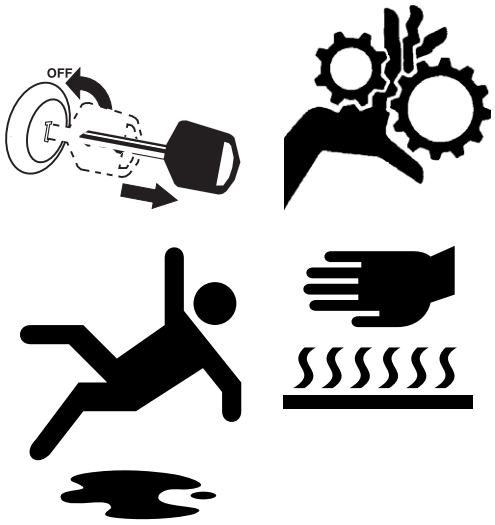
- ▲ *Lower drill, put tractor in park, turn off engine, and remove the key.*
- ▲ *Secure drill using blocks and supports provided.*
- ▲ *Detach and store drill in an area where children normally do not play.*

Tire Safety

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

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

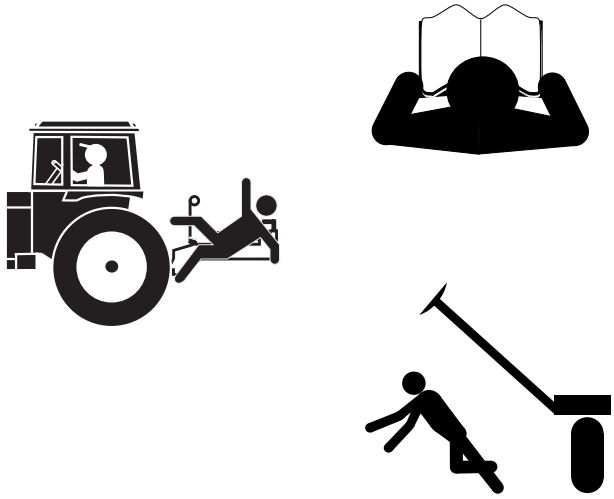
Practice Safe Maintenance



- ▲ *Understand procedure before doing work. Use proper tools and equipment. Refer to this manual for additional information.*
- ▲ *Work in a clean, dry area.*
- ▲ *Lower the drill, put tractor in park, turn off engine, and remove key before performing maintenance.*
- ▲ *Make sure all moving parts have stopped and all system pressure is relieved.*
- ▲ *Allow drill to cool completely.*
- ▲ *Disconnect battery ground cable (-) before servicing or adjusting electrical systems or before welding on drill.*
- ▲ *Inspect all parts. Make sure parts are in good condition and installed properly.*
- ▲ *Remove buildup of grease, oil or debris.*
- ▲ *Remove all tools and unused parts from drill before operation.*

Safety At All Times

Thoroughly read and understand the instructions in this manual before operation. Read all instructions noted on the safety decals.



- ▲ *Be familiar with all drill functions.*
- ▲ *Operate machinery from the driver's seat only.*
- ▲ *Do not leave drill unattended with tractor engine running.*
- ▲ *Do not stand between the tractor and drill during hitching.*
- ▲ *Keep hands, feet and clothing away from power-driven parts.*
- ▲ *Wear snug-fitting clothing to avoid entanglement with moving parts.*
- ▲ *Watch out for wires, trees, etc., when folding and raising drill. Make sure all persons are clear of working area.*

Safety Decals

Safety Reflectors and Decals

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

▲ *Read and follow decal directions.*

▲ *Keep lights in operating condition.*

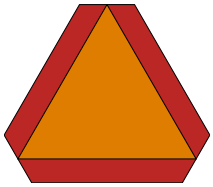
▲ *Keep all safety decals clean and legible.*

▲ *Replace all damaged or missing decals. Order new decals from your Great Plains dealer. Refer to this section for proper decal placement.*

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

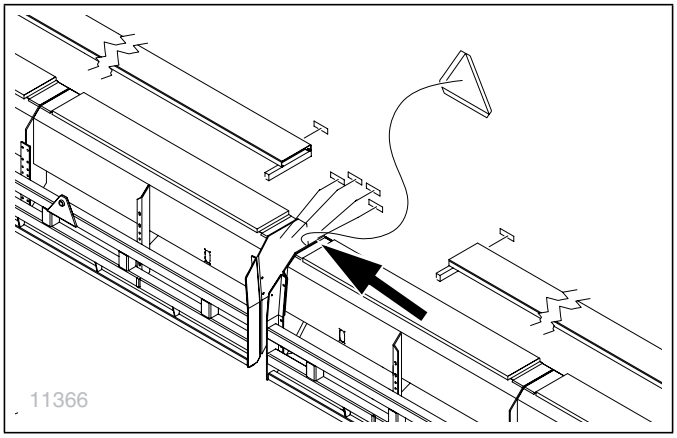
To install new decals:

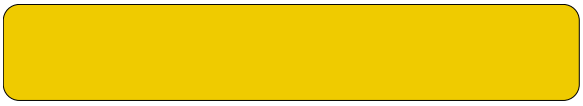
1. Clean the area on which the decal is to be placed.
2. Peel backing from decal. Press firmly on surface, being careful not to cause air bubbles under decal.



818-003C
Slow Moving Vehicle Reflector

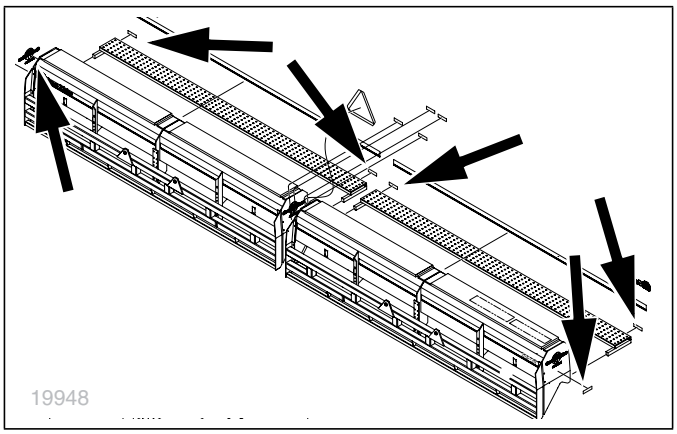
On the left end of the opener frame, facing rear in transport;
1 total





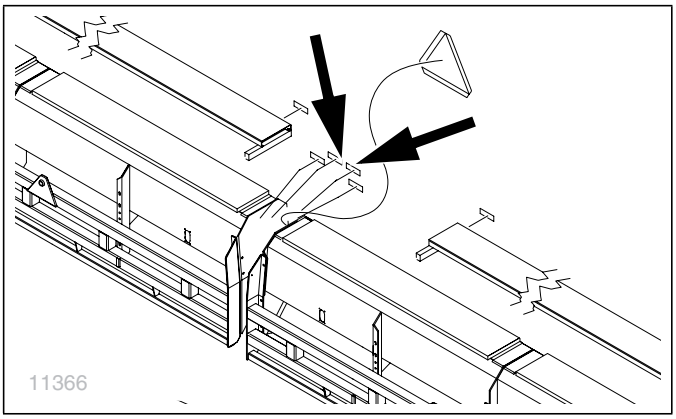
838-265C
Amber Reflectors

On the outside face of the right and left hopper, on the outward face both ends of the right and left walkboard frame;
6 total



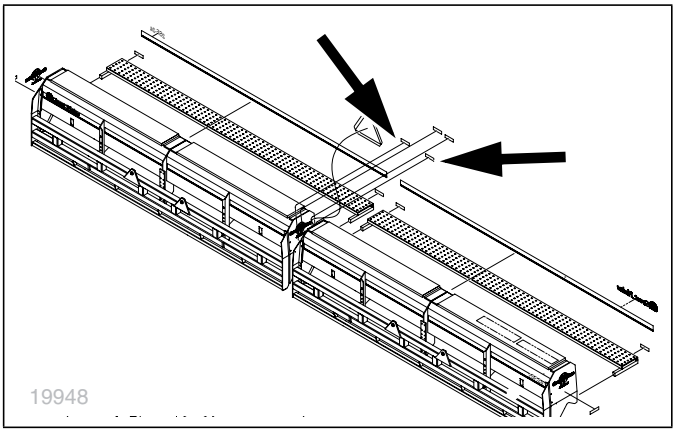
838-266C
Red Reflectors

On the inside face of the seed hoppers (facing rear in transport);
2 total



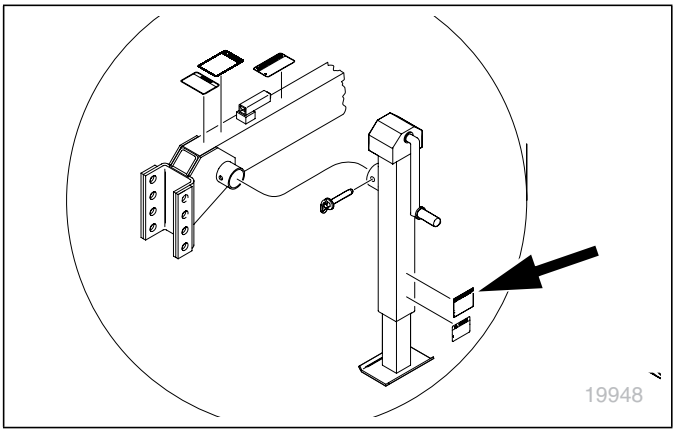
838-267C
Daytime Reflectors

On the center inside face of right and left hopper section;
2 total



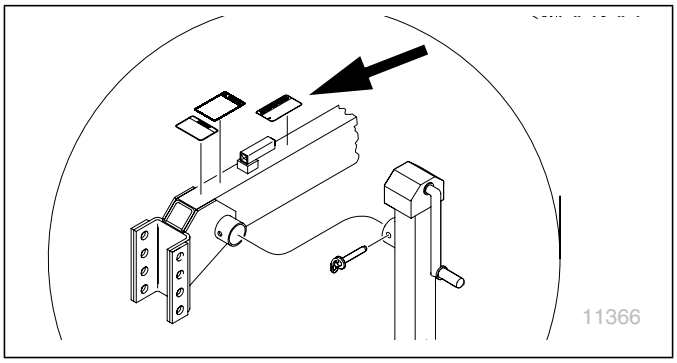
818-019C
Warning: Negative Tongue Weight

On the lower left face of the parking stand;
1 total



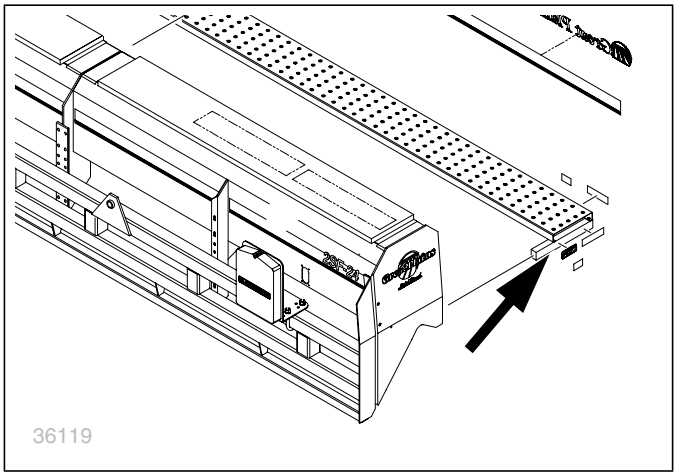
818-188C
Warning: Speed

On top face of transport lock weldment on tongue;
1 total



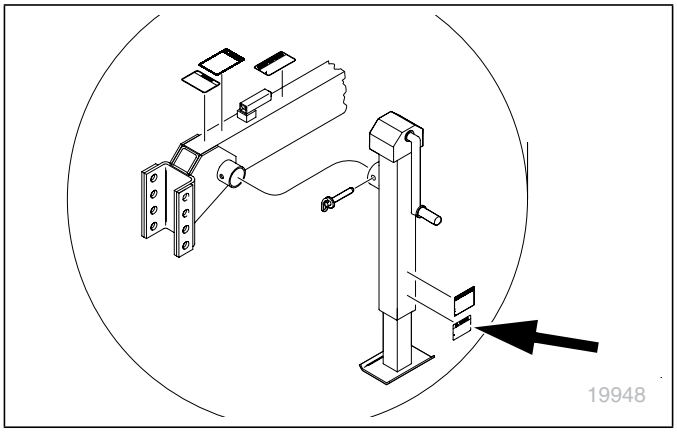
838-102C
Warning: Falling Hazard

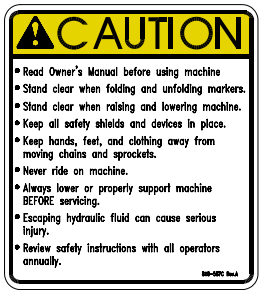
On left walkboard, left outside face;
1 total



818-020C
Caution: Tire Damage Hazard

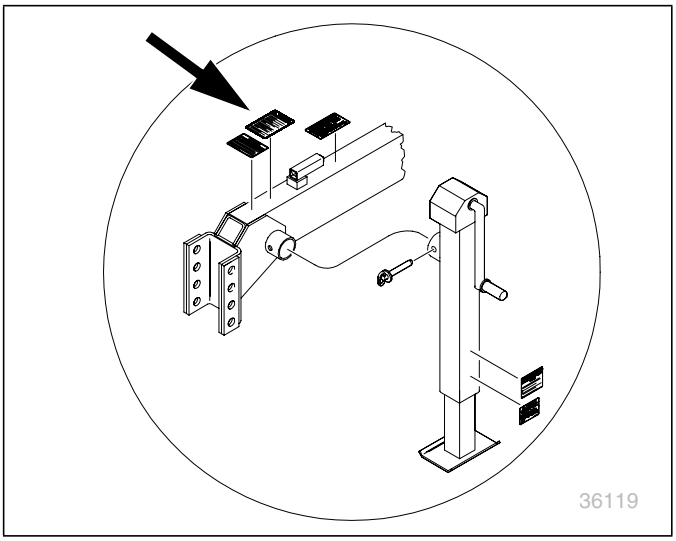
On the lower left face of the parking stand:
1 total

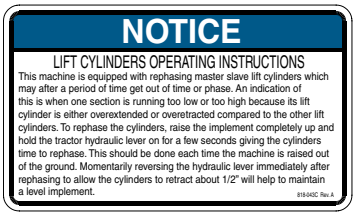




818-587C
Caution: Read Operator's Manual

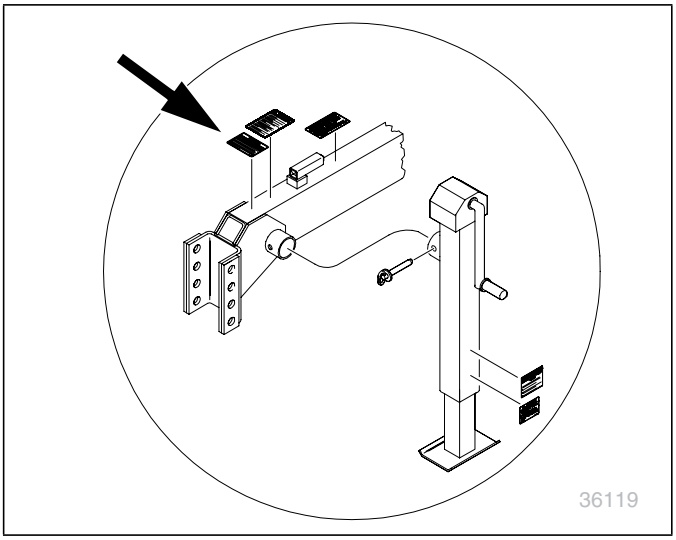
On top face of tongue near hitch;
1 total





818-043C
Notice: Lift Cylinder Operating Instructions

On top face of tongue near hitch;
1 total



Introduction

Great Plains welcomes you to its growing family of new product owners. The 2SF24 and 2SF30 have been designed with care and built by skilled workers using quality materials. Proper setup, maintenance, and safe operating practices will help you get years of satisfactory use from the machine.

Models Covered

2SF24-4806	48-Row,6 inch(15cm)
2SF24-4007	40-Row,7 inch(17.8cm)
2SF24-3875	38-Row,7.5 inch(19cm)
2SF24-3608	36-Row,8 inch(20cm)
2SF24-2810	28-Row,10 inch(25.4cm)
2SF30-6006	60-Row,6 inch(15cm)
2SF30-5207	52-Row,7 inch(17.8cm)
2SF30-4875	48-Row,7.5 inch(19cm)
2SF30-4408	44-Row,8 inch(20cm)
2SF30-3610	36-Row,10 inch(25.4cm)

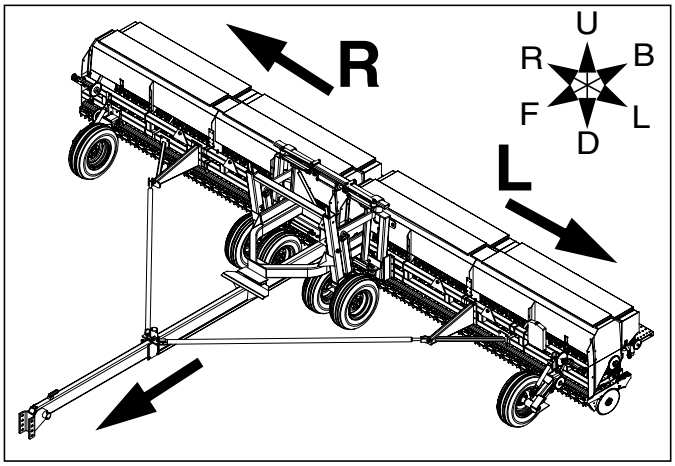


Figure 1 36149
Two Section Folding Drill

Description of Unit

The 2SF24/30 Drill is a towed precision planting implement for use in conventional till conditions. The 2SF24/30 features fluted feed cups and a ground-driven metering system to provide accurate simple seeding with offset double-disk openers that provide superior penetration.

Intended Usage

Use the 2SF24 and 2SF30 drill to seed production-agriculture crops only. Do not modify the drill for use with attachments other than Great Plains options and accessories specified for use with the 2SF24 and 2SF30.

Document Family

155-015M-A	Owner's Manual (this document)
155-015P	Parts manual

Using This Manual

This manual will familiarize you with safety, assembly, operation, adjustments, troubleshooting, and maintenance. Read this manual and follow the recommendations to help ensure safe and efficient operation.

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

Definitions

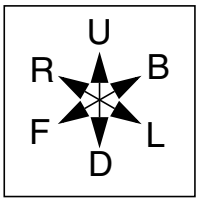
The following terms are used throughout this manual.

NOTICE

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

Note: Useful information related to the preceding topic.

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



Owner Assistance

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

Refer to Figure 2

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

Record your 2SF24 or 2SF30 drill model and serial number here for quick reference:

Model Number:_____

Serial Number: _____

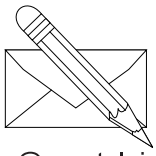
Your Great Plains dealer wants you to be satisfied with your new machine. If you do not understand any part of this manual or are not satisfied with the service received, please take the following actions.

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

Figure 2 36129
Serial Number Plate

For further assistance write to:

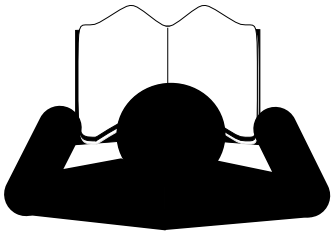
Product Support
Great Plains Mfg. Inc., Service Department
PO Box 5060
Salina, KS 67402-5060



gp_web_cs@greatplainsmfg.com

785-823-3276

Preparation and Setup



This section helps you prepare your tractor and 2SF24 or 2SF30 Drill for use, and covers tasks that need to be done seasonally, or when the tractor/drill configuration changes.

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

Initial Setup

See “**Appendix B - Assembly and Setup**” on page 69 for first-time/infrequent setup tasks.

Post-Delivery/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 18).
- De-grease exposed cylinder rods if so protected at last storage.

Pre-Planting Setup

Complete this checklist before routine setup:

- ❑ Read and understand “**Important Safety Information**” on page 1.
- ❑ Check that all working parts are moving freely, bolts are tight, and cotter pins are spread.
- ❑ Check that all grease fittings are in place and lubricated. See “**Lubrication and Scheduled Maintenance**” on page 58.
- ❑ Check that all safety decals and reflectors are correctly located and legible. Replace if damaged. See “**Safety Decals**” on page 6.
- ❑ Inflate tires to pressure recommended and tighten wheel bolts as specified. See “**Tire Inflation Chart**” on page 68.

Hitching Tractor to Drill

DANGER

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

CAUTION

Elevating Mass Hazard: *This drill can have both positive and Negative Tongue Weight and it can change during planting. This poses a serious hazard during unhitching and it can work the hitch pin loose during transport. Never unhook from tractor with boxes unfolded and raised off the ground.*

Great Plains 2-Section Folding Drills are engineered to be used with tractors having a standard drawbar. To operate your Great Plains Folding Drill in most field conditions, a tractor of 125 minimum horsepower for 24 foot drills and 150 minimum horsepower for 30 foot drills should be used.

The tractor will need six remote outlets (three pairs). If your tractor is equipped with only two pairs of remote outlets and a marker circuit is required, a marker sequence valve with double selector is available through your Great Plains dealer.

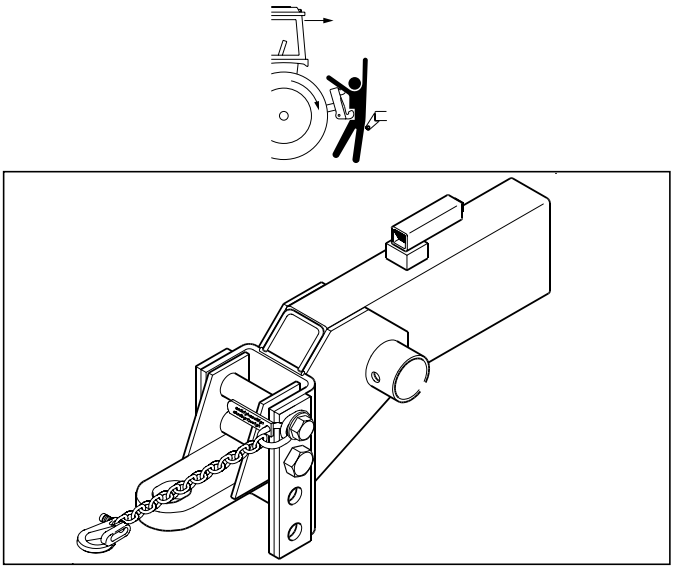
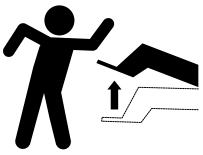


Figure 3
Single Strap Hitch

11638



Tractor Draw Bar Hook-Up

Refer to Figure 3, Figure 4 and Figure 5

1. The hitch can be used as either a single strap, clevis, or combination hitch.

Refer to Figure 4

2. When using the combination hitch, remove lower strap when hooking up to a clevis-type tractor drawbar. Spacers between the drawbar and hitch may be added to eliminate some of the movement of the tongue caused from positive to negative tongue weight.

Two hitch sizes are available:

- the small hole hitch with or without the hammer strap ($1\frac{1}{4}$ inch maximum pin diameter) and
- the large hole hitch without a hammer strap (up to $1\frac{1}{2}$ inch diameter pin). The small-hole hitch is sold as standard equipment.

The mounting holes in the hitch have been offset so the hitch can be turned over and bolted on in three different positions giving you six different hitch heights.

On the clevis-type hitch, always mount the thinner strap on the bottom. SET HITCH SO TONGUE OF DRILL IS PARALLEL TO GROUND WHEN DRILL IS IN PLANTING POSITION. Use tongue jack to level tongue, then find closest setting of hitch to match your tractor drawbar height.

3. Attach safety chain on tongue hitch to tractor and lock hook securely on chain. Adjust chain length to remove all slack except what is necessary to permit turning of the drill and tractor.
4. The tongue jack makes it possible to raise or lower the hitch for tractor unhooking and reconnecting. Always return jack to its horizontal position on top of the tongue at the pull bar slide stop.

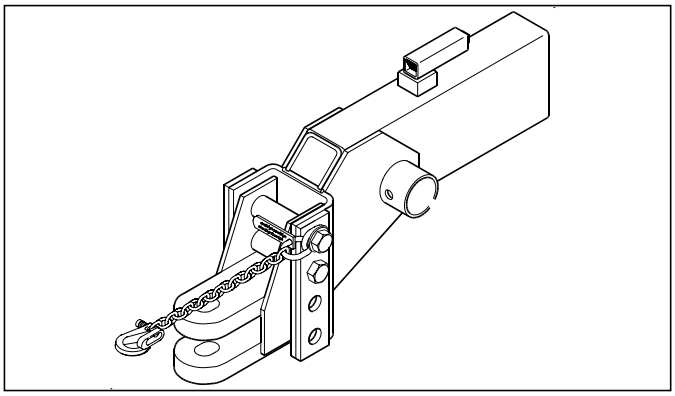


Figure 4 11637
Clevis Hitch

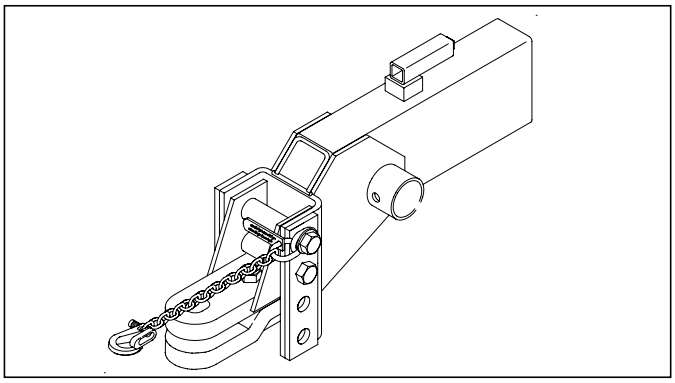


Figure 5 17274
Combination Hitch

Preparation for Field Operations

Most of the procedures described in this section require the use of a tractor with hydraulic remotes. Before proceeding with the first time setup, or before making any adjustments mentioned in this section, make every effort to obtain and hitch a tractor to the drill.

24foot drill: minimum of 125 horsepower

30foot drill: minimum of 150 horsepower

Be certain that the drill tires have the proper inflation as listed in the "**Tire Inflation Chart**" on page 68.

Load seed box with seed. Use clean seed to get the best results. Always have the drill hitched securely to a tractor with safety chain connected. Lower the drill before loading.

This drill can be transported with a full box of grain. It is best NOT to do this unless necessary because the increased weight does increase the chances for problems on the road. DO NOT exceed 20 miles per hour.

Calibrate each seed box for a proper rate based on the seed that you are drilling. Calibration information is located on the inside of your box lid or under "Seeding Adjustments," page 21. Make sure the seed rate is adjusted the same across the entire drill.

If your drill comes equipped with an acremeter, it should be mounted on the left gauge wheel axle on the outboard side. It will accumulate the total acres drilled with the drill. In order to find out the acres covered, write down the beginning reading and subtract it from the ending reading for the total acres planted.

This drill is offered in different row spacings; therefore, some of the drill boxes do not have the same number of seed cups between each internal box divider. The section with the largest number of cups will tend to empty sooner.

Make sure that the seed-cup-door adjustment handles are set the same across the drill.

If you notice excessive cracking on large-grain seeds, adjust all seed cup door handles to a wider setting.

NOTICE

Machine Damage Risk:
Never back up with openers in the ground. If you do, check all openers to be sure none are clogged.

After lowering the drill into planting position, observe the drill from the side. Check to see that the tongue is level to the ground. If it is not, a hitch height adjustment is needed. See "**Tractor Draw Bar Hook-Up**" on page 14. It is especially important to check for this if the drill has been hitched to a different tractor.

This drill is not designed to be turned sharply in the field. ALWAYS lift the drill COMPLETELY out of the ground when turning at ends of field rows and other short-radius turns. If the drill is not completely raised, the lift hydraulics will be out of sequence. Refer to "**Lift Cylinders**" on page 26.

⚠ WARNING

Crushing Hazard:
Never allow anyone to ride on the drill.

Maximum seeding speed will vary according to soil conditions.

You can adjust the tension on each disk spring. This is especially useful in applying more pressure in tractor tire tracks.

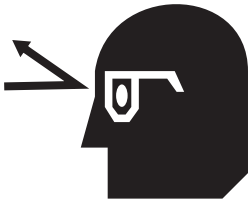
Hydraulic Hose Hookup

WARNING

High Pressure Fluid Hazard:
Shut down tractor before making hydraulic connections. Only trained personnel should work with system hydraulics.

Escaping fluid under pressure can have sufficient pressure to penetrate the skin causing serious injury. If an accident occurs, seek immediate medical assistance from a physician familiar with this type of injury.

Use paper or cardboard, NOT BODY PARTS, to check for leaks. Wear protective gloves and safety glasses or goggles when working with hydraulic systems.



For ease of operation, your tractor should be equipped with six remote hydraulic outlets (three pairs). This will allow you to connect one pair to the drill lift circuit, one pair to your drill fold circuit and one pair remaining for connection of optional markers. If your tractor has only four remote outlets (two pairs) and a marker circuit is required, a marker sequences valve with double selector is available through your GREAT PLAINS DEALER.

Refer to Figure 6
Great Plains hydraulic hoses have color coded handle grips to help you hookup hoses to your tractor outlets. Hoses that go to the same remote valve are marked with the same color.

Color Coded Hose Handles

Color	Hydraulic Function
Blue	Lift
Gray	Fold
Green	Marker (Optional)

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

For hydraulic fan and drive motors, connect the hose under the retracted cylinder symbol to the pressure side of the motor. Connect the hose under the extended cylinder symbol to the return side of the motor.

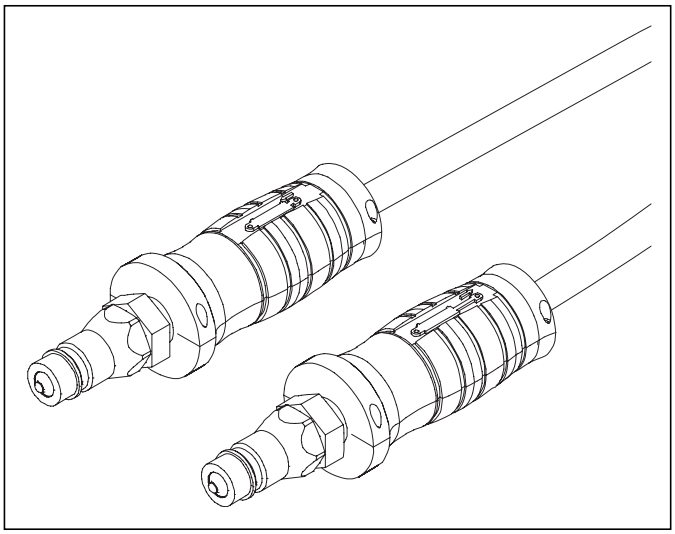


Figure 6
Color Coded Hose Handles
31733

Older Style Hoses with Color Ties

Refer to Figure 7

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 tie.

Color	Hydraulic Function
Blue	Lift
White	Fold
Orange	Marker (Optional)

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

For hydraulic fan and drive motors, connect the hose under the retracted cylinder symbol to the pressure side of the motor. Connect the hose under the extended cylinder symbol to the return side of the motor.

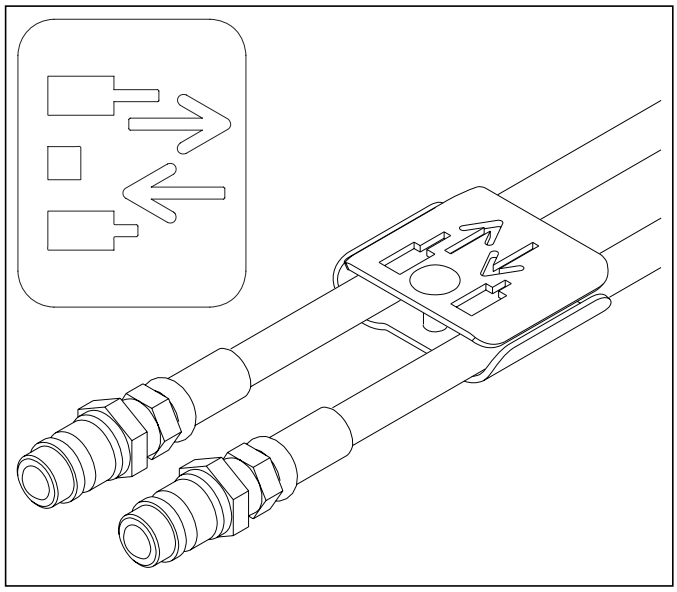


Figure 7 27270
Older Style Hoses w/Label

Bleeding The Hydraulic Systems

NOTICE

Equipment Damage Risk:
The SAE O-RING and JIC 37˚ FLARE type hose connections DO NOT require sealant for reconnecting. They DO NOT require high torque for a good seal.

When using sealant on pipe threads the friction between the threads is reduced; therefore, be certain not to over tighten, causing damage to a valve, cylinder port or fitting.

⚠ CAUTION

Elevating Mass Hazard:
This drill has a Negative Tongue Weight when unfolded and raised. Be certain that the drill is hitched securely to your tractor draw bar and be certain the hitch safety chain is securely attached to the drill hitch and tractor before raising or unfolding the drill!

Bleeding the Lifting Hydraulic System

This 2SF24/30 is equipped with rephasing type hydraulic lift cylinders that require a special procedure for bleeding air from the hydraulic system. If your dealer has not already prepared the cylinders for transport use, read the following information carefully. The rephasing cylinders will not function properly if this bleeding procedure is not followed.

Note: DO NOT crack hose fittings in order to bleed air from this system.

NOTICE

Equipment Damage Risk:
Check the hydraulic fluid level in the tractor reservoir and fill to the proper level before starting this procedure. If the bleeding is performed with a low reservoir supply, there is a chance of drawing air into the system. System capacity is approximately 3.3 gallons and requires one pair of remote outlets.

1. If required, raise your drill 1 inch in order to extend your lift cylinders a little. Loosen the jam nuts on top of the transport vertical tubes and screw the adjustment screw in until it bottoms. Lower the drill until the cylinders become loose.
2. Unpin the cylinders from the mainframe and turn the cylinders upside down to a position where the rod end is higher than the base end. Support the cylinders in a safe location. One transport tire may have to be removed in order to unpin the master cylinder.
3. Start the tractor and run the engine at idle. With the rod end of the cylinders higher than the base end, hydraulically extend the cylinders and hold the tractor control lever in position for sixty seconds after the cylinders have extended to their maximum stroke.
4. Hydraulically retract the cylinders, then repeat the extending procedure several more times until both cylinders are free of air and operate together.
5. Repin the cylinders to the main frame and axle with the rod end down. If air is tapped in either cylinder, the affected cylinder will have a spongy, erratic movement and the machine will not raise evenly. Refill the tractor hydraulic fluid reservoir to its proper level.

Note: After drill is raised, a slight settling will occur due to the action of the rephasing cylinder.

Note: In order to prevent trapped air pockets, the port on the rod end must be higher than any other port of the cylinder during the bleeding operation.

Note: The folding and transport/wing lift cylinders are not rephasing type cylinders and do not require this bleeding procedure.

Bleeding Folding Hydraulics

The following section describes a bleeding procedure that requires you to crack (loosen) a hydraulic fitting. Be aware that these lines may be under pressure even with the tractor shut off. Never allow anyone under the drill when fittings are opened. Escaping fluid may allow the drill to suddenly drop. Be aware of the following medical alert.

⚠ CAUTION

High Pressure Fluid Hazard:

Escaping fluid under pressure can have sufficient force to penetrate the skin. Check all hydraulic lines and hoses before applying pressure. Fluid escaping from a very small hole can be almost invisible. Use paper or cardboard, not body parts, to check for suspected leaks. If injured, seek medical assistance from a doctor familiar with this kind of injury.

Note: The drill transport lift systems should be completely operational BEFORE attempting to work with the folding hydraulic circuit.

Note: The cylinders are double acting but are not the rephasing type.

1. The first step in charging the fold hydraulic circuit is to make sure the tractor hydraulic fluid reservoir is filled to the proper level. System capacity is approximately 2 gallons and requires one pair of remote outlets. If optional selector is used, rotate to the wing lift position.
2. With the drill fully raised and in the folded position, disconnect the rod end pin on each fold cylinder and block the cylinders in a location where they are free to extend and retract without contacting anything.
3. Cycle the fold cylinders in and out several times to work the air out of the system.

Note: If the wing fold cylinders do not operate properly, clean out the small hole in the elbow fitting on fold cylinders. These orifice are located in the cylinder elbow as circled in Figure 8.

4. Retract the hydraulic cylinder and repin the rod ends.
5. Recheck the tractor reservoir level and add clean fluid as necessary.
6. It is advisable to fold and unfold the drill several times. The majority of the air should now be expelled from this system. The remaining air will gradually be pushed to the tractor during day to day operations.

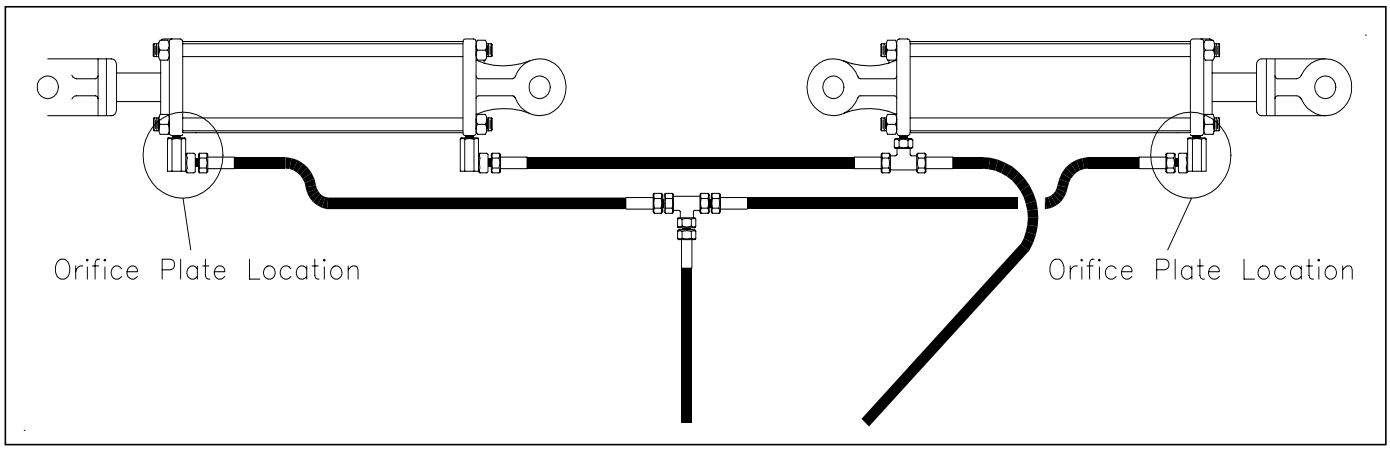


Figure 8
Wing Fold Hydraulics

10285

Leveling Drill

This section describes procedures for leveling the drill on its initial setup. This should be a one-time adjustment and will not be needed during day-to-day operation.

If while using the drill, it appears to be lifting or planting unevenly, check the following before re-leveling the drill.

- First, make sure the tongue is running level to the ground while running in the field. Be sure to check this if the drill has been switched to a different tractor.
- Second, check the lift cylinders. Be sure they are properly bled, are operating correctly, and do not have internal oil leaks before using this section to re-level the drill.

The opener spring rods located along the back of the drill boxes are indicators of the level of the drill because they show the amount of down-pressure exerted on the disk openers and press wheels. A level drill will have equal opener down-pressure from end to end.

Check the spring rod cross bolts at the top of the spring rods to see that they are all extended about 2 inches above their spring rod castings. This is a general dimension and may vary with the spring down-pressure you require for different soil conditions and planting depths, see “**Planting Depth Adjustments**” on page 33.

If you require more downward float of your openers you may want to increase this dimension. Keep in mind when this dimension is increased your upward motion is decreased, limiting the vertical travel of the openers for running over rocks and other foreign objects.

⚠ CAUTION

Opener Damage Hazard:
If your openers’ vertical travel is decreased, considerable damage will occur to your openers.

If all the spring rods along the drill extend the same distance above their castings, the drill is level and you should tighten down the threaded studs as described in “**Transport Wheel Adjustments for Leveling Drill**” on page 21. If the spring-rod extensions vary in length, the drill can be leveled with transport wheel and gauge wheel adjustments. These are described on page 21.

To summarize: After leveling your drill, it should have the same dimension from the ground to the box frame at both ends of each box. These adjustments may have to be fine tuned after observing the drill in the field in actual planting conditions.

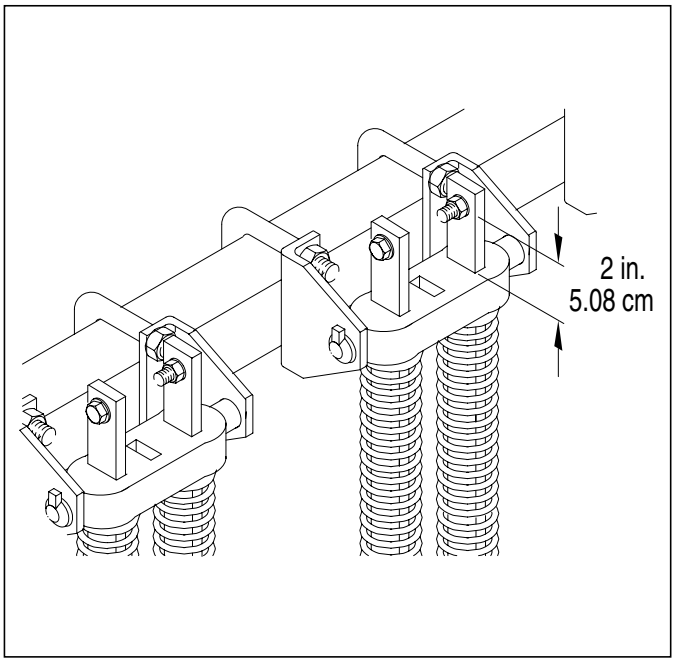


Figure 9
Opener Spring Rods
10548

Transport Wheel Adjustments for Leveling Drill

Refer to Figure 10

When leveling your drill, opener spring rods near the center of the drill that extend higher above their spring rod castings than desired can be adjusted by raising the transport frame. This is done by raising the drill with the hydraulic lift cylinders.

Spring rods near the center that do not extend high enough are adjusted by lowering the transport frame by retracting the cylinders. *Once the spring rods are at the desired setting*, screw the threaded studs on top of the vertical tubes (page 22 Figure 13) down as far as possible and secure them with the jam nuts. This adjustment will stop the lift cylinder travel at the same point each time the boxes are lowered for drilling and assures accurate seed depth control.

Note: If it is noticed that one drill box spring rod extension is different from the other drill box at the center of your drill, this is a sign that your lift hydraulic master and slave cylinders are out of sequence with one another.

In order to get them back in sequence, simply raise your drill all the way up and hold your tractor hydraulic control valve lever on for a few seconds. Lower your drill and both cylinders will be in sequence with one another and the two drill boxes should be at the same level again.

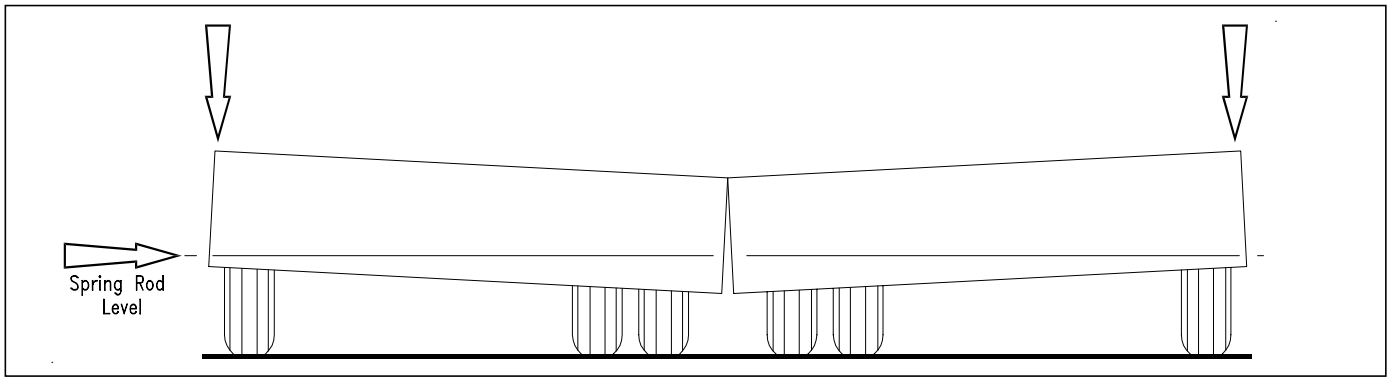


Figure 10
Wing Fold Hydraulics

11504

Gauge Wheel Adjustments for Leveling Drill

Refer to Figure 10 and Figure 11

The openers near the outside of the drill are adjusted by raising or lowering the gauge wheels.

Raise the drill out of the ground and loosen the jam nut located near the bottom clevis of the gauge wheel turnbuckle. This turnbuckle is threaded to allow easy gauge wheel adjustment. By lengthening the turnbuckle the gauge wheel is lowered, causing less spring rod extension through the spring rod casting. By shortening the turnbuckle the gauge wheel is raised, causing less spring rod to protrude through the spring rod casting. After adjusting, be sure the turnbuckle on both gauge wheel arms have the same pin center dimension.

Shortening the gauge wheel turnbuckle will level the ends of the drill with the center.

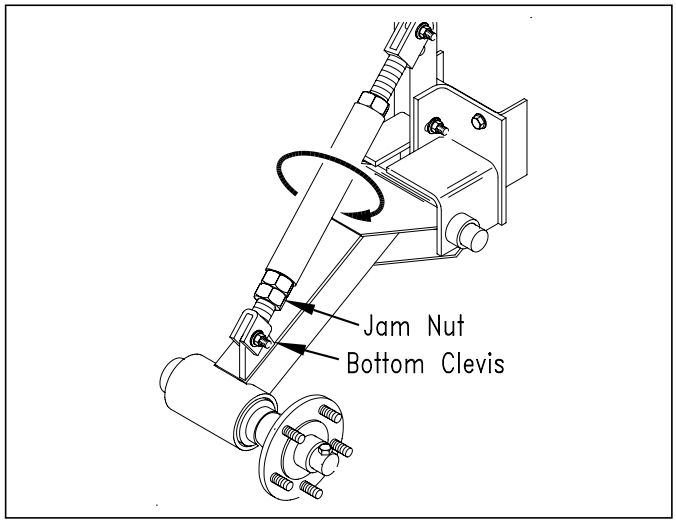


Figure 11
Gauge Wheel Turnbuckle

10546

Box Alignment Adjustments

Pull Bar Adjustments

Refer to Figure 12

With the drill lowered to the ground and completely unfolded the tongue slide on the tongue should be back against the stop on the tongue. Adjust the pull bars length so drill boxes are in line with one another and parallel to the back edge of the main frame.

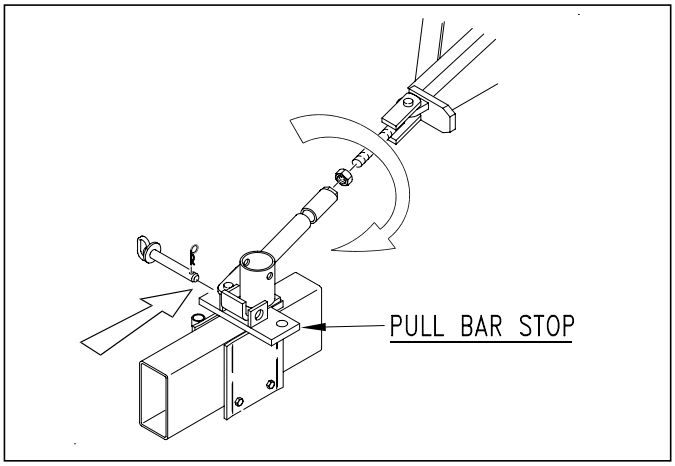


Figure 12 11284
Opener Spring Rods

Drill Adjustments

Refer to Figure 13

Put the transport pins in storage position. Slowly lower the drill until it is on the ground and the main frame top slide cylinder is fully extended. Pull the drill forward a few feet to make sure that the transport and the gauge wheel tires have equally firm contact with the soil.

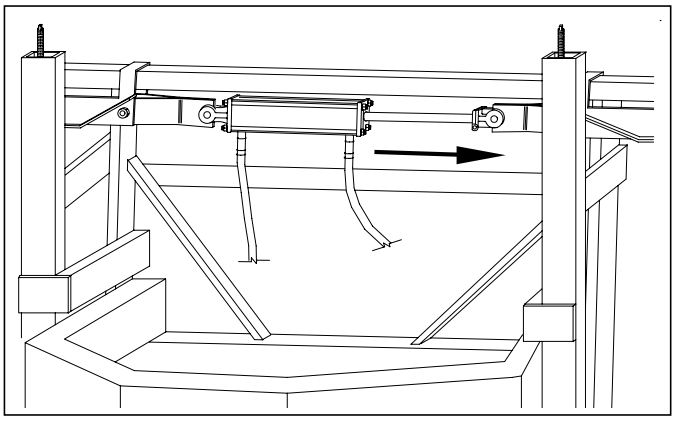


Figure 13 10671
Top Slide Cylinder

Refer to Figure 14

Unfold the drill on a level seedbed typical to your soil conditions.

At the top of both vertical tubes on the transport frame is a threaded stud and jam nut. Make sure both studs have approximately the same length of threads extending above the jam nut (approximately 3 inches for most planting conditions). Adjustments may be required.

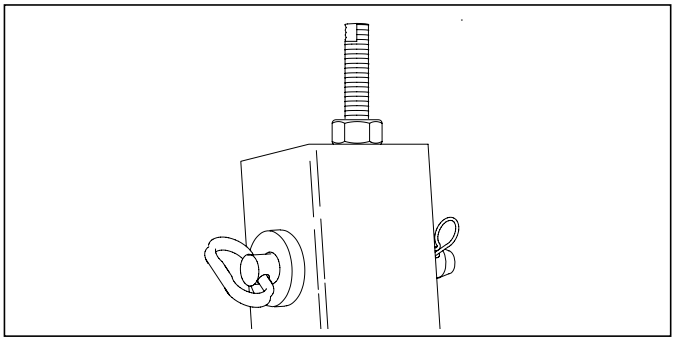


Figure 14 10672
Threaded Stud

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.

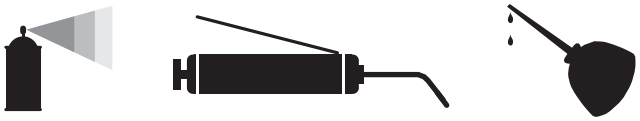
Pre-Start Checklist

Perform the following steps before transporting the two section folding drill to the field.

- ❑ Carefully read "**Important Safety Information**" on page 1.
- ❑ Fertilizer Option: Review the application instructions and Material Safety Data Sheet (MSDS) for the fertilizer(s).
- ❑ Lubricate drill as indicated under "**Lubrication and Scheduled Maintenance**" on page 58.
- ❑ Check all tires for proper inflation. See "**Tire Inflation Chart**" on page 68.
- ❑ Check all bolts, pins, and fasteners. Torque as shown in "**Torque Values Chart**" on page 67.
- ❑ Check drill for worn or damaged parts. Repair or replace parts before going to the field.
- ❑ Check hydraulic hoses, fittings, and cylinders for leaks. Repair or replace before going to the field.

⚠ 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.



NOTICE

LIFT CYLINDERS OPERATING INSTRUCTIONS

This machine is equipped with rephasing master slave lift cylinders which may after a period of time get out of time or phase. An indication of this is when one section is running too low or too high because its lift cylinder is either overextended or overetracted compared to the other lift cylinders. To rephase the cylinders, raise the implement completely up and hold the tractor hydraulic lever on for a few seconds giving the cylinders time to rephase. This should be done each time the machine is raised out of the ground. Momentarily reversing the hydraulic lever immediately after rephasing to allow the cylinders to retract about 1/2" will help to maintain a level implement.

818-043C Rev. A

Folding the Drill

NOTICE

Equipment Damage Risk:
Do not lower drill while in folded position, certain equipment damage will occur.

1. Folding is best achieved on level ground with the tractor transmission in neutral. Be aware of the clearance required to fold the drill.
2. NEVER allow anyone near the drill during folding operations.

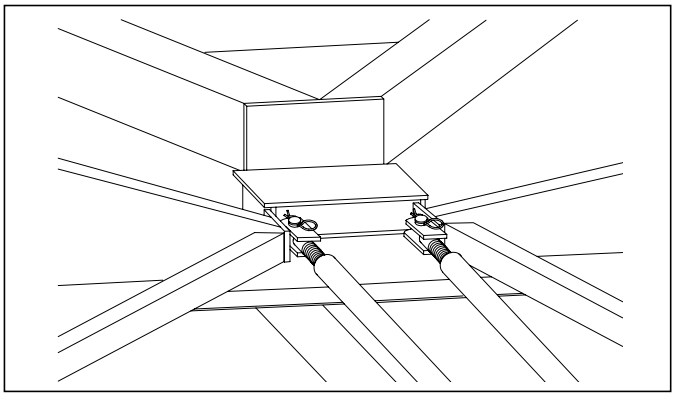


Figure 15 10673
Transport Stabilizers in Road Position

Refer to Figure 15 and Figure 16

3. When folding the drill, the drill transport stabilizer frame should line up with the nest on the front of the main frame,

   If they scrape the wing on the tongue, the boxes can be raised or lowered by adjusting the wing adjustment turnbuckle.

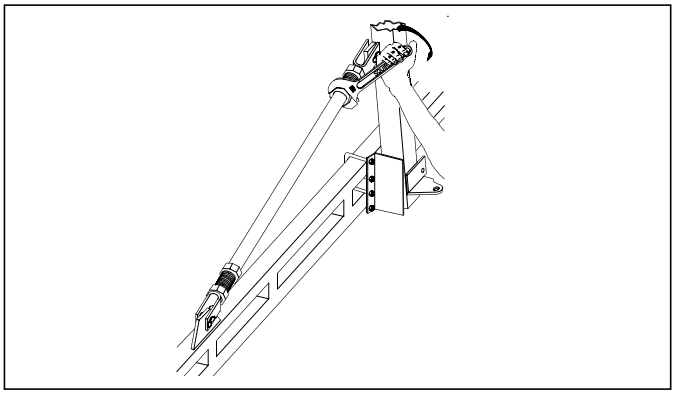


Figure 16 10674
Wing Adjustment Turnbuckle

Refer to Figure 17

4. Apply hydraulic pressure to the raising and lowering system. Raising the drill may be required to free up the transport lock pins in the vertical tubes for removal. Place pins into transport position.
5. Fold boxes using hydraulic cylinders. Do this very slowly and carefully. Serious damage could occur if done fast and carelessly.

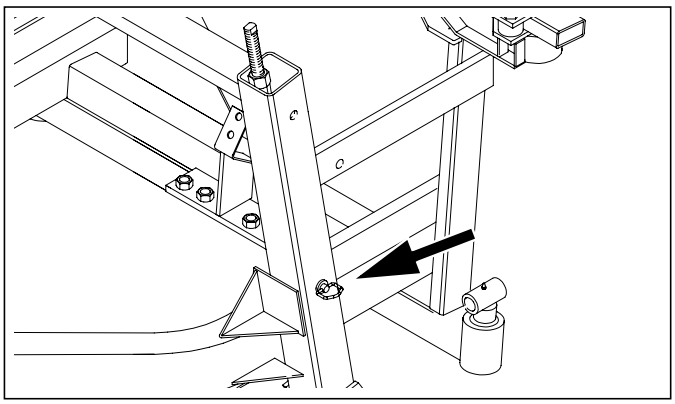
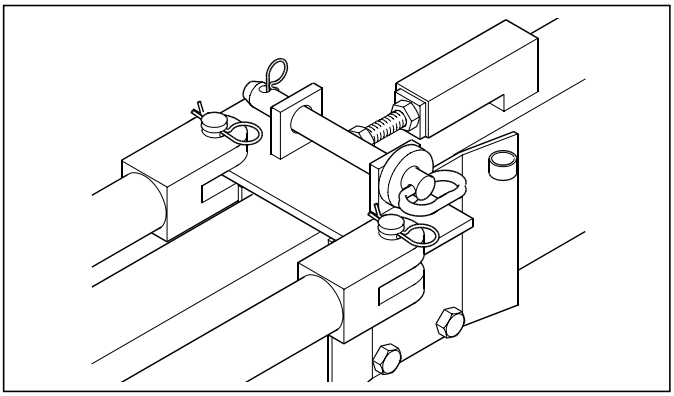


Figure 17 17269
Transport Lock Pin in Transport Position

Refer to Figure 18

6. Place the pin in the pull-bar transport lock. This must always be used when transporting the drill in the folded position.



10739

Figure 18
Pull Bar Pin Locked in Transport Position

Lifting and UnFolding the Drill

Lift Cylinders

The lift cylinders may after a period of time get out of time or phase. The effects of this can be seen when one side of the drill is running too low or too high because its lift cylinder is either overextended or not retracted compared to the other lift cylinders.

To rephase the cylinders, raise the drill completely up and hold the tractor hydraulic lever on for a few seconds to give the cylinders time to rephase. This should be done each time the drill is raised out of the ground. Momentarily reversing the hydraulic lever immediately after rephasing to allow the cylinders to retract about $^1/_2$ inch will help in maintaining a level drill.

Note: Understand that having the cylinders become gradually out of time is different than having air trapped in the system from improper bleeding. Each condition is corrected differently.

Unfolding the Drill

⚠ CAUTION

Crushing Hazard:
This drill has a negative tongue weight when unfolded and raised. Be certain that the drill is hitched securely to your tractor drawbar and be certain the hitch safety chain is securely attached to the drill hitch and tractor before raising or unfolding the drill!

1. Unfolding the drill is best achieved on level ground with the tractor transmission in neutral.
2. Be aware of the clearance requirements of the unfolding drill. Allow plenty of room to unfold and DO NOT allow anyone in the area of the drill when unfolding.

Refer to Figure 20

3. Remove pin from pull-bar transport lock.
4. SLOWLY unfold the drill using the hydraulic cylinders. For the first time, watch to be sure the hydraulic hoses do not get pinched or kinked. Serious damage could occur if the drill is unfolded carelessly.
5. Apply hydraulic pressure to the raising and lowering system. Lowering the drill may be required to free up the transport lock pins in the vertical tubes for removal. Place pins into storage position.

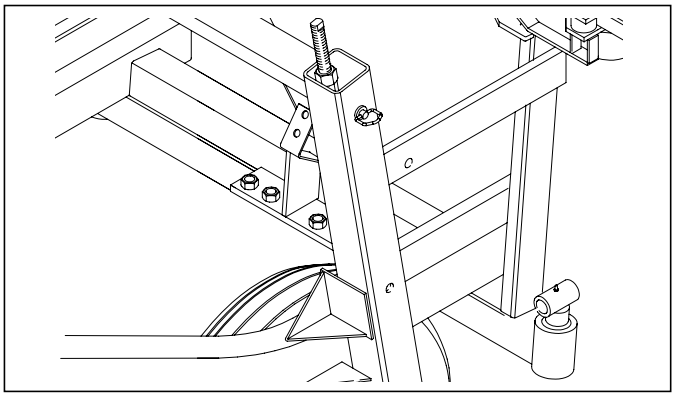


Figure 19 17268
Transport Lock Pin in Field Position

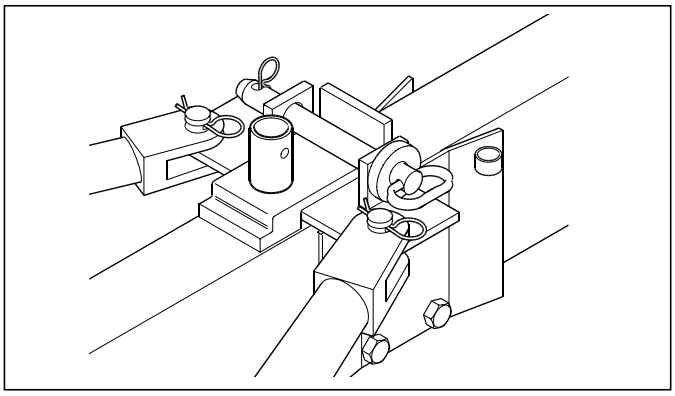
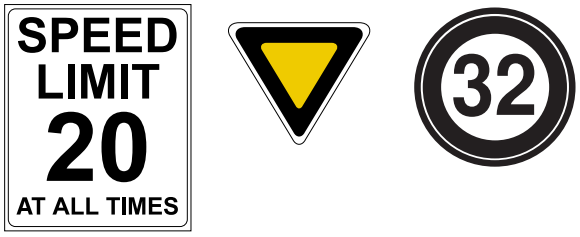


Figure 20 10730
Pull Bar Lock Pin in Field Position

Transporting the Drill



DANGER

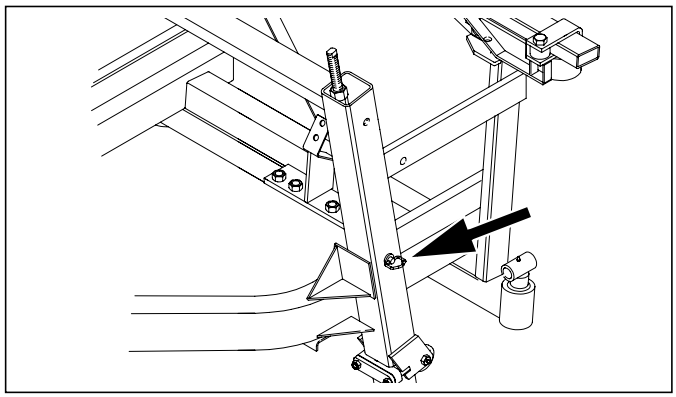
Loss of Control Hazard:
Never tow an implement that weighs more than 150% of the tractor. Check your numbers. This drill is quite heavy for its size. Ensure that the towing vehicle is adequate for the task. Using an inadequate tow vehicle is extremely unsafe, and can result in loss of control, serious injury and death.

The drill can weigh nearly 23000 pounds (10500 kg), depending on configuration and material load. The tractor MUST be rated for the load and must weigh at least 67% of the load. If the tractor is not rated for at least 23000 lbs, calculate or obtain a scale weight of the drill. See chart below for typical configuration weights.

Do not tow if drill exceeds the load rating of the vehicle.

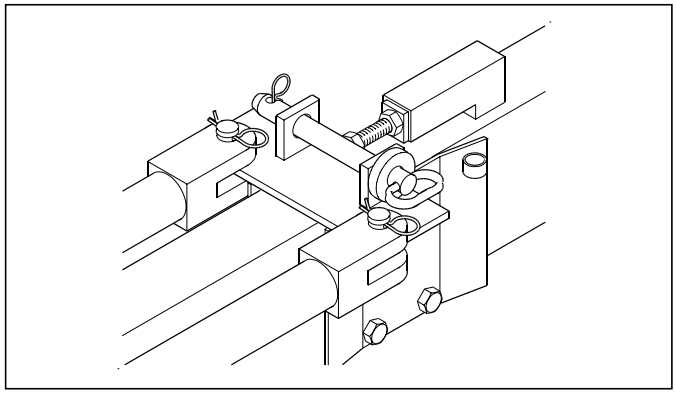
Before transporting check following items

1. Make sure that hitch is securely attached to the draw bar of the tractor and that the hitch safety chain has been securely attached.
2. To prevent possible damage in case of hydraulic failure during transport, ALWAYS insert transport lock pins when transporting.
3. Check to be sure the pull-bar transport lock pin is in position.
4. Check to see if you have the required air pressure in your transport tires for proper inflation see “**Tire Inflation Chart**” on page 68.
5. When in transport, use warning lights and safety hitch chain. Comply with all federal, state and local laws when traveling on public roads.
6. Be sure that the drill is properly folded. The drill boxes must be correctly supported in the folded position. “**Folding the Drill**” on page 24.
7. Reduce speed of the tractor when transporting over uneven or rough terrain. Avoid all chuck holes and washboard areas in roads.
8. Reduce speed of the tractor when transporting over hills or steep slopes. NEVER exceed 20 miles per hour.
9. Use "Slow Moving Vehicle" emblem (page 6) for warning vehicles approaching from the rear.
10. When transporting, remember the drill is wider than your tractor and extreme care must be taken to allow for safe clearance.
11. Extra care should be taken when transporting with seed in the box.



17269

Figure 21
Transport Lock Pin in Transport Position



10739

Figure 22
Pull Bar Lock Pin in Transport Position

Marker Operations

It is not possible to operate the markers other than during a field lift or field lower. If the Lift/Lower steps are followed, one marker alternately folds on one side at each lift, and the other unfolds at each lower.

Dual Marker Operations

It is possible to deploy markers on both sides. This might be needed for special field passes, but can also occur inadvertently if a lift/lower is interrupted.

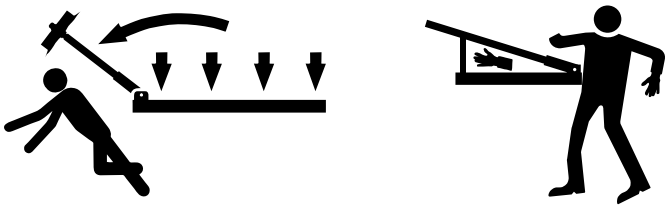
Two Markers Out

1. Perform a normal field lower/marker deploy (previous topic).
2. When the lowering stops, with the marker fully unfolded, briefly reverse the lever to Extend (lift), then back to Retract (lower).
3. The marker on the opposing side deploys. Hold at Retract until the marker is fully unfolded.

Folding From Two Markers Out

With two markers out, the next lift operation folds only one of them (the second one deployed). To fold the other marker, use either of two techniques:

- Perform a second lower, then a lift, or
- At full fold of the first marker, perform a brief Extend, then a Retract, to fold the other marker (and continue frame lift).



WARNING

Overhead, Crushing and Sharp Object Hazards:
Do not allow anyone to stand under, near or beyond the end of opener frame during marker operations. There is risk of serious injury or death for anyone under the frame or in the path of a marker. Marker arms are heavy, are under tremendous hydraulic power, and may move suddenly if the hydraulic system is damaged or needs bleeding. Marker discs may be sharp.

Acremeter Installation

Refer to Figure 23

The acremeter is factory installed. It is located on the left end of the left main drive shaft.

If the acremeter has been removed, screw the threaded end of the meter into the $\frac{1}{2}$-20 tapped hole in the left end of center main drive shaft.

Tighten the threaded end only enough to prevent it from working loose from normal vibration. In use, there is no torque or tension that might tend to unscrew it.

The acremeter counts shaft rotations whenever the shaft is rotating - normally this is only with the drill unfolded, the opener sub-frame lowered, and the drill in motion. The meter is geared to display rotations as acres, when using factory-specified tires and inflations.

Tally field acres by noting the meter reading prior to, and after planting. Subtract the starting from the ending readings.

“**Acremeter Operation**” on page 29

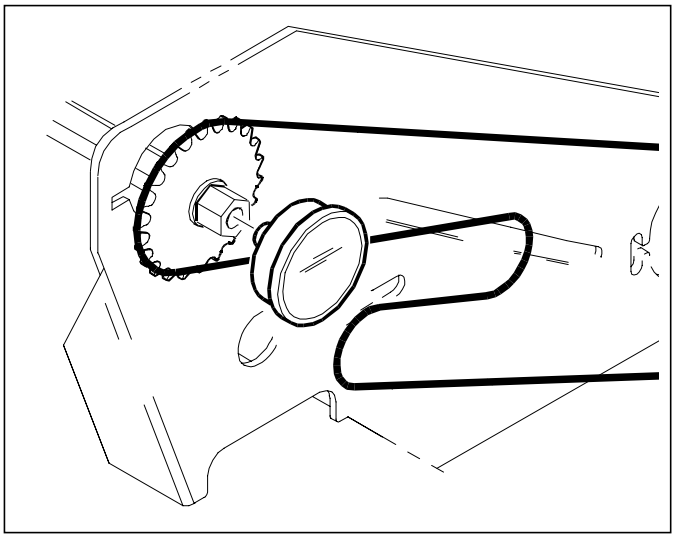


Figure 23 27000
Electronic Acremeter Installation

Acremeter Operation

Refer to Figure 24

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

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

Figure 24 27378
Electronic Acremeter

Normal Operating Sequence

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

1. Record the acremeter reading at the start of planting (and after calibration). The large "12345.6" format display is the grand total area planted since meter installation. The smaller number in the lower left corner is the number of revolutions per acre for which the meter was factory-programmed. If the display is blank, see "Dormant Display" below.
2. Lower drill and plant. Acremeter counts shaft rotations, calculates acres or hectares, and adds to the running grand total.
3. During planting (drill lowered and moving forward), the display blanks (goes dormant), but area tally continues.
4. When raised for turns, obstructions and transport, the drill's ground drive wheel, contact wheel or clutch disengages the drive shaft, and the meter counts no additional (non-planting) rotations.
5. Whenever shaft rotation stops, the LCD display activates after 30 to 60 seconds, and remains visible for 30 to 45 minutes.
6. At the completion of planting, record the final reading of the grand total. If the display goes dormant before you can read it, see "Dormant Display".
7. Subtract the reading at Step 1 from the reading at Step 6 for the total planted in the present session.

Dormant Display

Refer to Figure 25

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

- use the calibration crank to turn the jackshaft once, or
- gently tap or wave a magnet at either of the Great Plains logo spots on the lower region of the display. Be careful not to scratch the window.

Figure 25 36139
Meter Display

DataTrac Acremeter

The DataTrac acremeter is factory installed on new units (effective July 1, 2013). The meter is supplied with a decal located on its side indicating the number of programmed wheel revolutions.

Reading the Display

Refer to Figure 26

The numbers automatically orient to read upright.

The acremeter always shows “REV” ① on the face of the display. The meter is programmed to count ***acres*** if the drill is for domestic use and is programmed for ***hectares*** if the drill is for export use.

Normal Operating Sequence

Refer to Figure 26

To display the number of revolutions per acre or hectare programmed into the meter simply cover the round bump on the face of the unit (light sensor) ② with the palm of your hand and leave it there for at least $^1/_2$ second before removing it. A screen that shows “rEV ###” will be displayed. The ### is the number of revolutions that is programmed into the unit.

1. The acremeter may count rotations during drill calibration (and if so, can be useful for calibration).
2. Record the acremeter reading at the start of planting (and after calibration). The large “123456” format display is the grand total area planted since meter installation.
3. Lower drill and plant. The acremeter counts shaft rotations, calculates acres or hectares, and adds to the running grand total.
4. When raised for turns, obstructions and transport, the drill’s ground drive wheel, contact wheel or clutch disengages the drive shaft, and the meter counts no additional (non-planting) rotations.
5. At the completion of planting, record the final reading of the grand total.
6. Subtract the reading at Step 2 from the reading at Step 5 for the total planted in the present session.

Dormant Display

If the display is totally blank and never displays anything, the battery may be dead. Expected life is 5 to10 years. The battery is not user-replaceable.

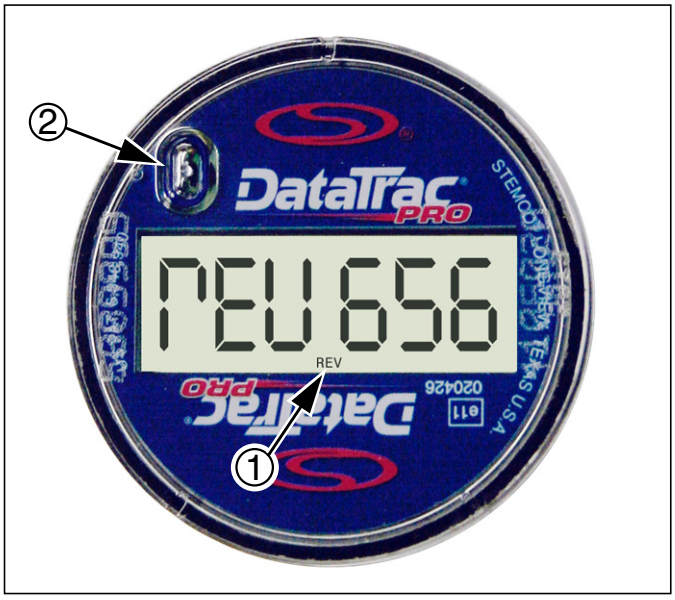


Figure 26 34938
Check Program

Figure 27 34939
Typical Area Display

Short-Term Parking

1. Choose a location with level firm ground. Do not unhitch on a steep slope.
2. Fold drill (page 24).
3. Set hydraulic circuits to neutral.
4. Disconnect hydraulic lines. Secure them so that they do not touch the ground.
5. Disconnect electrical cables, capping where provisioned.
6. Move jack from storage position to side of tongue.
7. Slightly raise tongue with jack.
8. Unhitch.Restart tractor and pull away from drill.

Long-Term Storage

1. Clean the drill as necessary. Be sure that the seed boxes, fertilizer box and all feed systems are completely cleaned out before storing.
2. Lube chain and adjust all roller chains.
3. Lubricate all fittings as indicated in “**Maintenance and Lubrication**” on page 55.
4. When storing in transport position, use all locking devices as described under “**Transporting the Drill**” on page 27 and “**Operating Instructions**” on page 23.
5. Apply a light coat of grease to all exposed hydraulic cylinder rods.
6. Seed cup drive sprocket hub should be oiled in its square bore. Squirt oil on to the square seed cup shaft and move seed cup adjustment lever back and forth in order to get the oil back into the square. This is most important before putting the drill in storage.
7. Always maintain proper pounds of air pressure in gauge wheel tires and in transport tires see “**Tire Inflation Chart**” on page 68.
8. Store the drill inside if possible. Inside storage will reduce maintenance and make for a longer drill life.

Adjustments

To get full performance from the 2SF24 or 2SF30 drill, you need an understanding of all component operations, and many provide adjustments for optimal field results. Some of these have been covered earlier in this manual.

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

Adjustment	Page	The Adjustment Affects
Planting Depth Adjustment	33	
Press Wheel-Opener Linkage Depth Adjustment	33	Consistent seed firming and planting depth
Seeding Adjustments	34	Seeding rate and size
Small Seeds Attachment	42	Small seeds population
Fertilizer Meter Rate	45	Control of application rate
Marker Adjustments	47	Correctly offset and visible pass marks
Disk Scraper Adjustments	50	Keep opener disks turning freely
Seed Firmer Adjustments	50	Consistent seed placement and coverage
Leveling		
Opener Spring Rods	20	Uniform down pressure on press wheels and openers
Transport Wheels	21	Controls lift cylinder travel for accurate seed depth
Gauge Wheels	21	Levels ends of drill with the center
Box Adjustments	22	
Pull Bar	22	Ensure drill boxes are in line with one another and parallel to the main frame for uniform seeding
Top Slide	22	Helps to make adjustments to the pull bars
Seeding Adjustments		
Main Box Rate	34	Correct sprocket arrangement for seed type
Seed Cup Handle	35	Correct position of handle for seed size
Fertilizer Rate	45	Proper metering rate for field conditions
Small Seeds Rate	42	Match sprocket arrangement with drive type

Planting Depth Adjustments

Press Wheel-Opener Linkage Depth Adjustment

Refer to Figure 28

Attached to the rear of each these openers is one of several optional press wheels. The press wheel and its mechanism provide two important functions:

1. The press wheel closes the furrow and gently presses the soil over the seed.

To provide consistent seed firming, the press wheel is free to move downward from its normal operation position. This system maintains pressing action even if the opener body is lifted as a result of the opener disks encountering an obstruction or hard soil.

2. The press wheel rolls on the ground providing depth control to the opener and seed.To maintain a consistent planting depth, the relationship between the bottom of the opener disk-blades and the press wheel is upwardly fixed. The upward stop is independently adjustable on each opener. The position of the adjustable stop determines how deep the seed will be placed.

To change the height of the press wheel, which automatically changes the seeding depth of the opener, simply lift the "T" handle located on top of the opener at the rear and slide forward or rearward until the seeding depth is correct as shown in the inset in. A spring loaded pin holds the "T" handle at your setting to maintain the proper depth.

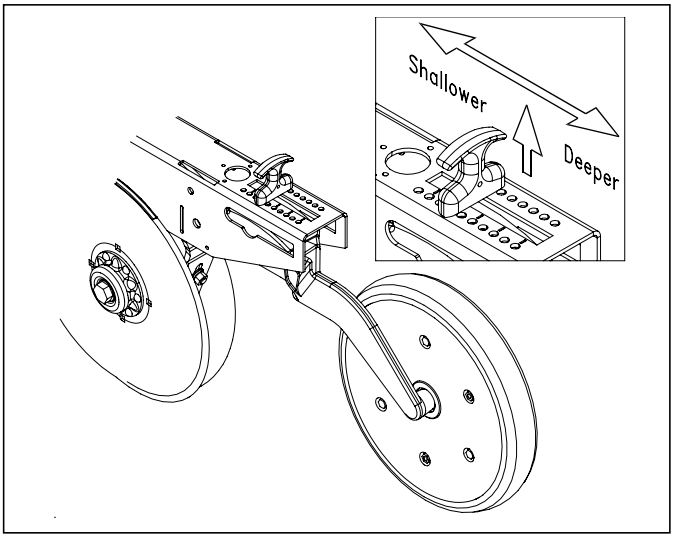


Figure 28 12100
Direct Link Press Wheel Adjustment

Disk Opener Spring Pressure Setting

Refer to Figure 29

Each opener spring can be adjusted for down pressure. This is useful when penetrating hard soil and for planting in tractor tire tracks. To adjust the pressure, remove the "W" clip at the bottom of the spring and place it in a higher hole in the spring rod for more pressure, and in a lower hole for less pressure.

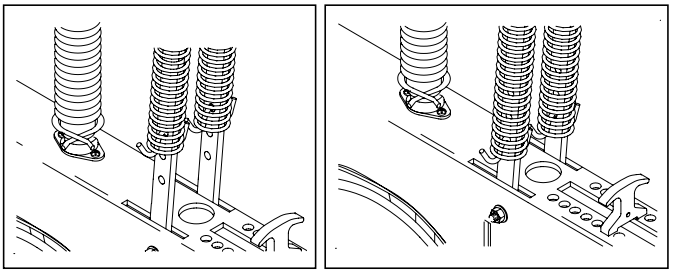


Figure 29 12102 12103
Maximum (left) and Minimum (right) Pressure

Seeding Adjustments

1. Raise outboard ends of drill boxes high enough to lift the end wheels off the ground. Rotate gauge wheel to see that seed cups and drive are working properly, not binding and free from foreign material.
2. To adjust your seeding rate, first you must decide which sprocket arrangement you need (see seeding charts on next pages). To change sprockets, remove nut on the double speed change sprocket and turn sprocket over. Loosen the idler arm bolt, put chains on and tighten both bolts. (The lengths of the chains will need to be adjusted in order to make this change.)
3. There are many factors which will affect seeding rates, including seed treatment, weight of seed, size of seed, surface condition of seed, and tire configuration, pressure and slippage. Minor adjustments will probably be needed to compensate for these factors.
4. The pounds-per-acre in the seed charts are based on drills having 9.5L X 15 inch implement gauge wheel tires.
5. The large differences in seed size and treatment can cause a wide variation in actual seeding rates. The seed rate charts on the following pages are based on average size seed. This may differ from the seed you are using. Use the seed rate chart as a guide. Set the pounds-per-acre desired at the indicator number for your row spacing and complete the following procedure to calibrate the drill for your specific seed.
   a. Place several pounds of seed over three of the seed cups at the outboard end of the drill box.
   b. Pull the seed tubes off of these three disk openers
   c. Raise the drill off the ground.
   d. Place a container under the three seed tubes to gather the seed as it is metered.
   e. Rotate the drive gauge wheel until one acre has been tallied on the acremeter. This will be approximately 225 rotations on a 24 foot drill and approximately 182 rotations on a 30 foot drill. Be sure to check the three seed cups to make sure each cup has plenty of seed coming into it.
   f. Weigh the seed which has been metered. Divide by three. This will give you the ounces/pounds metered by each seed cup. Multiply by the number of openers on your drill to arrive at the total pounds-per-acre your drill would meter at that setting. If the seeding rate is different than desired, set your seed cup adjustment lever accordingly.

Repeat procedures (a) through (f) on each drill section.

6. You may want to repeat the calibration procedure if the results of your calibration vary greatly from the suggested setting contained in this manual.

Tire size and field conditions will also affect seeding rates. Be certain that your drill tires are 9.5L x 15" and that they have the proper inflation. When drilling, check the amount of seed you are using by noting acres drilled, amount of seed added to drill, and level of seed in drill box. If you suspect that you are drilling more or less than desired, and you have accurately calibrated the drill to your seed, you may need to adjust the seeding rate slightly to compensate for your field conditions.

Note: This drill is equipped with four-position feed cup door on each feed cup. The highest handle position is for wheat and other small grain seeds, the second handle position is for soybean and other large grain seeds. Should excessive cracking occur to the large seeds, drop the handle to the third position. The wide-open position will allow complete clean out of the feed cup. MAKE SURE all handles are in the same position before drilling.

Note: DO NOT open the cup up to the wide-open position with seed in the box unless complete clean out is desired.

Main Box Seed Rate Handle

Refer to Figure 30
There are main box seed rate handles for each section of the drill (2 handles total). Generally, they need to be set identically, and you need to calibrate only one section.

The seed rate handle controls the percent engagement of the seed sprocket in each seed cup. The initial setting of the handle is given by the Seed Rate Chart.

You can temporarily stop seed flow to a drill section by setting a handle to zero.

To set a handle:

1. Loosen wing nut ① under handle.
2. Move indicator ② from current setting to about 10 past the new desired value from calibration or the Seed Rate Chart, then move it back to the new desired value.
3. Tighten wing nut.

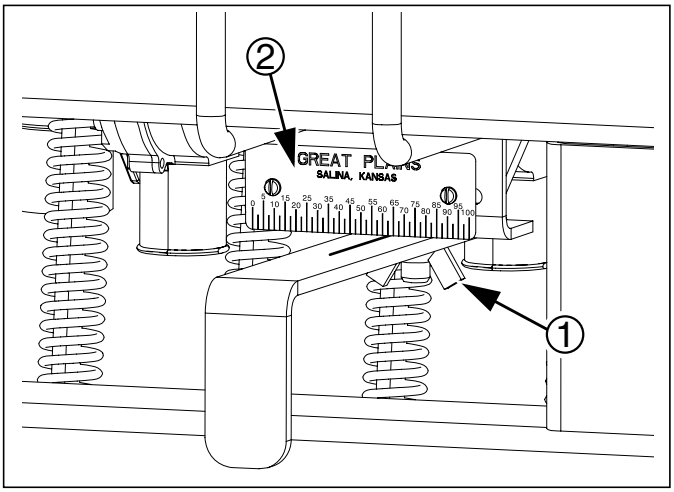


Figure 30 36150
Seed Rate Handle

Position Seed Cup Doors

Refer to Figure 31
which depicts the seed cup door handle in position ③.

At each main seed box seed tube, adjust the seed cup door handle ④ for the seed size.

The handle has three normal operating position detents:

① (top detent) is for the smallest seeds.
Use it for wheat and similar small seeds.

② (middle detent) is for larger seeds.
Use it for soybeans and similar larger seeds.

③ (bottom detent) is for oversize or fragile seeds.
If you experience excessive cracking with setting ②, use setting ③.

Note: Handle position ⑤ is used for cleanout, not planting. If set to this position with seed loaded, it may be difficult to reset it to a normal operating position.

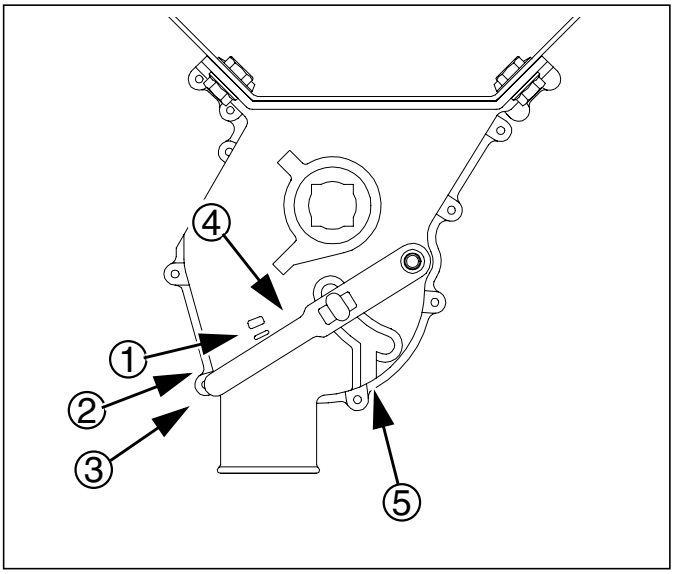


Figure 31 ?????
Seed Cup Door Handle

Seed Rate Charts: U.S. Customary Units

ALFALFA OR RAPE	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre																				
6 in.	0	4	6	8	11	14	17	20	23	26	29	32	35	37	40	42	45	47	50	52	54
7 in.	0	3	5	7	10	13	15	18	20	23	25	28	30	32	34	37	39	41	43	45	46
7 1/2 in.	0	3	5	7	9	12	14	16	18	21	23	26	28	30	32	34	36	38	40	41	43
8 in.	0	3	4	6	8	11	13	15	17	19	22	24	26	27	29	31	33	35	36	38	39
10 in.	0	2	3	5	7	9	10	12	14	16	18	19	21	22	24	25	27	28	30	31	32

BARLEY	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 1	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre*																				
6 in.	0	0	7	14	20	27	33	39	44	50	55	62	68	75	82	88	93	99	102	105	107
7'	0	0	6	12	18	23	28	34	38	44	48	54	59	65	71	76	81	86	88	91	93
7 1/2 in.	0	0	6	11	16	21	26	31	36	40	44	50	55	60	66	70	75	79	81	84	86
8 in.	0	0	5	10	15	20	24	28	33	37	40	46	50	55	60	64	68	73	75	77	79
10 in.	0	0	4	8	12	16	20	23	27	30	33	37	41	45	49	53	56	59	61	63	64

* Based on 46.4 pounds per bushel

BUCKWHEAT	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 1	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre																				
6 in.	0	8	14	20	26	33	40	47	55	62	70	77	85	94	102	111	118	124	128	134	138
7 in.	0	7	12	17	22	29	34	40	47	54	61	67	73	81	88	97	102	107	111	116	120
7 1/2 in.	0	6	11	16	21	26	32	37	44	50	56	62	68	75	82	89	94	99	102	107	111
8 in.	0	6	10	15	19	24	29	34	40	45	51	57	62	69	75	82	86	91	94	98	101
10 in.	0	5	8	12	15	20	24	28	33	37	42	46	51	56	61	67	71	74	77	80	83

FLAX OR SUDAN	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre																				
6 in.	0	2	4	6	9	12	14	16	19	21	24	26	29	32	35	38	42	45	47	47	48
7 in.	0	2	3	5	8	10	12	14	16	18	21	23	25	28	30	33	36	39	41	41	41
7 1/2 in.	0	2	3	5	7	9	11	13	15	17	19	21	23	26	28	30	33	36	37	38	38
8 in.	0	1	3	5	7	9	10	12	14	16	17	19	21	23	26	28	31	33	34	35	35
10 in.	0	1	2	4	5	7	8	10	11	13	14	16	18	19	21	23	25	27	28	28	29

MILLET	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre																				
6 in.	0	3	5	7	10	12	15	18	21	24	26	30	32	36	39	43	47	50	52	53	53
7 in.	0	2	4	6	8	11	13	16	18	21	23	26	28	31	34	37	40	43	45	46	46
7 1/2 in.	0	2	4	6	8	10	12	14	17	19	21	24	26	29	31	34	37	40	42	42	42
8 in.	0	2	3	5	7	9	11	13	15	17	19	22	24	26	29	31	34	36	38	39	39
10 in.	0	2	3	4	6	7	9	11	13	14	16	18	19	21	23	26	28	30	31	32	32

MILO	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre*																				
6 in.	0	3	5	8	12	15	18	21	24	27	30	34	37	41	45	49	54	57	60	60	61
7 in.	0	2	4	7	10	12	15	18	21	24	26	29	32	36	39	42	46	50	52	52	53
7 1/2 in.	0	2	4	6	9	11	14	16	19	22	24	27	30	33	36	39	43	46	48	48	49
8 in.	0	2	3	6	8	10	13	15	18	20	22	25	27	30	33	36	39	42	44	44	45
10 in.	0	2	3	5	7	9	11	12	14	16	18	20	22	25	27	29	32	34	36	36	37

* Based on 62.4 pounds per bushel

OATS OR SAFFLOWER	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 1	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre*																				
6 in.	0	4	8	14	19	25	31	37	44	51	57	64	71	76	83	90	96	102	107	112	116
7 in.	0	4	7	12	16	22	27	32	38	44	49	55	61	66	72	78	83	88	93	97	100
7 1/2 in.	0	3	7	11	15	20	25	29	35	41	45	51	57	61	67	72	77	81	85	89	93
8 in.	0	3	6	10	14	19	23	27	32	37	41	47	52	56	61	66	70	75	78	82	85
10 in.	0	3	5	8	11	15	19	22	26	31	34	38	42	46	50	54	58	61	64	67	70

* Based on 39 pounds per bushel

PEAS	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 1	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre																				
6 in.	0	0	10	26	41	55	70	82	95	110	123	135	150	163	176	189	204	215	227	235	241
7 in.	0	0	8	23	35	48	61	71	82	96	107	117	130	141	152	164	177	186	197	204	209
7 1/2 in.	0	0	8	21	33	44	56	66	76	88	99	108	120	130	140	151	163	172	182	188	193
8 in.	0	0	7	19	30	40	51	60	69	81	90	99	110	120	129	139	149	158	167	172	177
10 in.	0	0	6	16	24	33	42	49	57	66	74	81	90	98	105	113	122	129	136	141	145

PINTO BEANS	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre*																				
6 in.	0	0	0	4	7	12	16	20	24	28	32	36	41	44	48	53	56	60	63	64	65
7 in.	0	0	0	3	6	10	14	18	21	24	27	31	35	38	42	46	49	52	55	55	56
7 1/2 in.	0	0	0	3	6	9	13	16	19	22	25	29	32	35	39	42	45	48	50	51	52
8 in.	0	0	0	3	5	9	12	15	18	20	23	27	30	32	35	39	41	44	46	47	47
10 in.	0	0	0	2	4	7	10	12	14	17	19	22	24	27	29	32	34	36	38	38	39

* Based on 60.35 pounds per bushel

RICE LONG GRAIN	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 1	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre																				
6 in.	0	6	10	15	20	25	29	34	39	44	49	54	58	64	73	79	85	91	93	97	100
7 in.	0	5	9	13	17	21	25	30	34	38	42	47	50	56	63	69	74	78	81	84	87
7 1/2 in.	0	5	8	12	16	20	23	28	31	35	39	43	46	51	59	63	98	72	74	78	80
8 in.	0	4	8	11	14	18	21	25	29	32	36	40	42	47	54	58	63	66	68	71	74
10 in.	0	4	6	9	12	15	17	21	23	26	29	32	35	39	44	47	51	54	56	58	60

RICE LONG GRAIN	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 1A	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre																				
6 in.	0	12	21	31	40	50	60	71	80	91	100	110	119	132	150	162	175	185	191	200	206
7 in.	0	11	19	27	35	44	52	61	69	78	87	96	103	114	130	141	152	160	165	173	179
7 1/2 in.	0	10	17	25	32	40	48	57	64	72	80	89	95	105	120	130	140	148	153	160	165
8 in.	0	9	16	23	29	37	44	52	59	66	74	81	87	97	110	119	129	135	140	146	151
10 in.	0	7	13	18	24	30	36	42	48	54	60	66	71	79	90	97	105	111	115	120	124

RICE SHORT GRAIN	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 1	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre																				
6 in.	0	7	13	18	23	30	35	42	46	51	57	62	66	74	83	90	98	103	107	112	115
7 in.	0	6	11	16	20	26	31	36	39	44	49	54	57	64	72	78	85	90	93	97	100
7 1/2 in.	0	6	10	14	19	24	28	33	36	41	45	50	53	59	66	72	78	83	85	90	92
8 in.	0	5	9	13	17	22	26	31	33	37	41	46	49	55	61	66	72	76	78	82	85
10 in.	0	4	8	11	14	18	21	25	27	31	34	37	40	45	50	54	59	62	64	67	69

RICE SHORT GRAIN	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 1A	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre																				
6 in.	0	15	26	37	48	61	73	85	93	104	116	128	136	153	169	185	201	212	219	230	237
7 in.	0	13	23	32	42	53	63	74	81	91	101	111	118	132	147	160	175	184	190	199	205
7 1/2 in.	0	12	21	30	39	49	58	68	75	84	93	103	109	122	136	148	161	170	175	184	189
8 in.	0	11	19	27	35	45	53	63	69	77	85	94	100	112	124	136	148	156	161	169	174
10 in.	0	9	16	22	29	37	44	51	56	63	70	77	81	92	102	111	121	127	132	138	142

RYE	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre																				
6 in.	0	3	6	8	11	14	16	18	20	23	25	28	30	33	36	38	40	42	43	46	47
7 in.	0	3	5	7	9	12	13	16	18	20	22	24	26	29	31	33	35	36	38	40	41
7 1/2 in.	0	3	5	7	9	11	12	14	16	18	20	22	24	27	29	31	32	34	35	36	38
8 in.	0	2	4	6	8	10	11	13	15	17	19	20	22	24	26	28	29	31	32	33	34
10 in.	0	2	4	5	7	8	9	11	12	14	15	17	18	20	21	23	24	25	26	27	28

SOYBEANS	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 1	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre*																				
6 in.	0	0	0	0	30	40	55	70	84	98	113	127	140	154	166	176	188	200	204	207	209
7 in.	0	0	0	0	26	35	48	61	72	85	98	110	122	133	144	153	163	173	177	180	181
7 1/2 in.	0	0	0	0	24	32	44	56	67	79	91	101	112	123	132	141	150	160	164	166	167
8 in.	0	0	0	0	22	30	40	51	61	72	83	93	103	113	121	129	138	147	150	152	153
10 in.	0	0	0	0	18	24	33	42	50	59	68	76	84	92	99	106	113	120	123	124	125

* Based on 59.1 pounds per bushel

SOYBEANS	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre*																				
6 in.	0	0	0	0	10	13	18	23	27	32	37	41	46	50	54	57	61	65	67	68	68
7 in.	0	0	0	0	8	11	16	20	24	28	32	36	40	43	47	50	53	57	58	59	59
7 1/2 in.	0	0	0	0	8	11	14	18	22	26	30	33	37	40	43	46	49	52	53	54	55
8 in.	0	0	0	0	7	10	13	17	20	24	27	30	34	37	40	42	45	48	49	50	50
10 in.	0	0	0	0	6	8	11	14	16	19	22	25	27	30	32	34	37	39	40	41	41

* Based on 59.1 pounds per bushel

SOYBEANS	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2A	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre*																				
6 in.	0	0	0	0	20	27	37	47	56	66	76	85	94	103	111	118	126	134	137	139	140
7 in.	0	0	0	0	17	23	32	41	49	57	66	73	81	89	96	103	110	116	119	121	122
7 1/2 in.	0	0	0	0	16	22	30	37	45	53	61	68	75	82	89	95	101	107	110	111	112
8 in.	0	0	0	0	15	20	27	34	41	48	56	62	69	75	82	87	93	98	101	102	103
10 in.	0	0	0	0	12	16	22	28	34	40	45	51	56	62	67	71	76	80	82	84	84

* Based on 59.1 pounds per bushel. Setting the feed cup adjustment lever between 50 & 80 allows for optimum seeding of soybeans.

SUNFLOWERS	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre*																				
6 in.	0	0	0	2	3	4	6	8	9	11	14	15	17	19	20	23	24	26	27	28	29
7 in.	0	0	0	2	3	3	5	7	8	10	12	13	15	16	18	20	21	22	23	24	25
7 1/2 in.	0	0	0	1	3	3	5	6	8	9	11	12	14	15	16	18	19	21	21	22	23
8 in.	0	0	0	1	2	3	5	6	7	8	10	11	12	14	15	17	18	19	20	20	21
10 in.	0	0	0	1	2	3	4	5	6	7	8	9	10	11	12	14	14	15	16	17	17

* Based on 28.9 pounds per bushel

WHEAT	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 1	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre*																				
6 in.	0	11	20	28	37	47	55	65	75	85	96	106	116	129	140	153	161	170	175	184	189
7 in.	0	10	17	24	32	40	48	56	65	73	83	92	100	111	121	132	140	147	152	159	164
7 1/2 in.	0	9	16	23	29	37	44	52	60	68	77	85	93	103	112	122	129	136	140	147	152
8 in.	0	8	15	21	27	34	40	48	55	62	70	78	85	94	103	112	118	124	129	135	139
10 in.	0	7	12	17	22	28	33	39	45	51	58	64	70	77	84	92	97	102	105	110	114

* Based on 60 pounds per bushel

WHEAT	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2A	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre*																				
6 in.	0	8	13	19	25	31	37	44	50	57	64	71	78	86	94	102	108	114	117	123	127
7 in.	0	7	11	16	21	27	32	38	44	46	56	62	67	75	81	89	94	99	102	107	110
7 1/2 in.	0	6	11	15	20	25	30	35	40	45	52	57	62	69	75	82	86	91	94	99	102
8 in.	0	6	10	14	18	23	27	32	37	42	47	52	57	63	69	75	79	83	86	90	93
10 in.	0	5	8	11	15	19	22	26	30	34	39	43	47	52	56	61	65	68	70	74	76

* Based on 60 pounds per bushel

WHEAT GRASS	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Pounds Per Acre																				
6 in.	0	1	2	2	3	4	4	5	6	7	8	9	9	10	11	12	13	14	14	15	15
7 in.	0	1	1	2	3	3	4	5	5	6	7	8	8	9	10	11	11	12	12	13	13
7 1/2 in.	0	1	1	2	2	3	4	4	5	6	6	7	8	8	9	10	10	11	11	12	12
8 in.	0	1	1	2	2	3	3	4	4	5	6	6	7	8	8	9	10	10	10	11	11
10 in.	0	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	9

Small Seeds Attachment

To calibrate the seeding rate on the optional small seeds attachment, follow these steps.

Refer to Figure 32

1. The proper small-seeds sprocket arrangement given different drive types on the main drill box. Arrange the sprockets on the small-seeds attachment according to which drive type you will use on the main drill box.

Note: For accurate metering on the small seeds attachment, the main drill box sprockets must be set to drive type 1, 2 or 2A.

2. Set the seed-rate adjustment handle on the small seeds attachment as indicated by the charts, "**Small Grass Seed Charts**" beginning on page 43.
3. Calibrate the small seeds attachment to your material by following the steps under "**Seeding Adjustments**" on page 34.

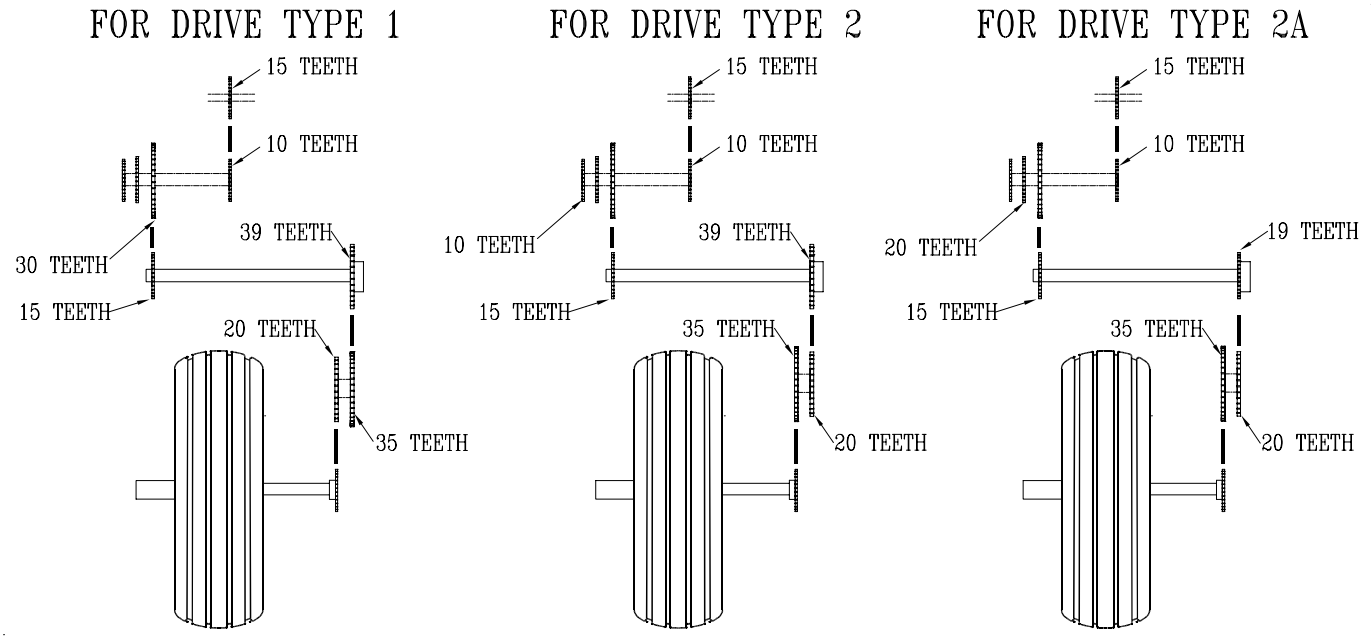


Figure 32
Small Seeds Sprocket Arrangements

Small Grass Seed Charts

Alfalfa, Red Alsike, Crimson Clover

Row Spacing	Rate Adjuster Setting																			
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	Seed Rate in Pounds per Acre																			
6 inch	0	2.2	3.5	4.8	6.0	7.5	8.7	9.8	11.2	12.5	13.8	15.1	16.4	17.5	18.6	20	21	23	24	25
7 inch	0	1.9	3.0	4.1	5.1	6.4	7.5	8.4	9.5	10.8	11.8	12.9	14.0	15.0	16.3	17.3	18.3	20	21	22
7.5 inch	0	1.8	2.8	3.9	4.8	6.0	7.0	7.9	9.0	10.0	11.1	12.1	13.2	14.0	15.3	16.2	17.2	18.3	19.3	20
8 inch	0	1.6	2.6	3.6	4.5	5.6	6.6	7.4	8.4	9.4	10.3	11.3	12.3	13.0	13.1	15.2	16.1	17.1	18.0	18.9
10 inch	0	1.3	2.1	2.8	3.5	4.4	5.1	5.8	6.6	7.4	8.1	8.9	9.7	10.3	11.2	11.9	12.6	13.4	14.2	14.9

Bermuda, Red Top, Unhulled Lespedeza, Sercia, Sand & Weeping Love Grass

Row Spacing	Rate Adjuster Setting																			
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	Seed Rate in Pounds per Acre																			
6 inch	0	0.7	1.1	1.7	2.6	3.3	4.1	5.0	5.9	6.6	7.2	7.8	8.4	9.0	9.5	10.2	10.9	11.6	12.2	12.9
7 inch	0	0.6	0.9	1.5	2.2	2.8	3.6	4.3	5.1	5.6	6.2	6.7	7.1	7.7	8.1	8.7	9.4	10.0	10.5	11.0
7.5 inch	0	0.5	0.9	1.4	2.1	2.6	3.3	4.0	4.7	5.3	5.8	6.3	6.7	7.2	7.6	8.2	8.8	9.3	9.8	10.4
8 inch	0	0.5	0.8	1.3	2.0	2.5	3.1	3.8	4.4	4.9	5.4	5.9	6.5	6.7	7.1	7.6	8.2	8.7	9.2	9.7
10 inch	0	0.4	0.6	1.0	1.5	1.9	2.4	3.0	3.5	3.9	4.2	4.6	4.9	5.3	5.6	6.0	6.4	6.8	7.2	7.6

Birdsfoot, Trefoil, Sudan

Row Spacing	Rate Adjuster Setting																			
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	Seed Rate in Pounds per Acre																			
6 inch	0	1.7	3.3	5.2	6.8	8.7	10.7	12.7	14.7	16.8	19.2	21	23	26	28	30	32	34	36	38
7 inch	0	1.5	2.8	4.5	5.8	7.5	9.2	10.9	12.5	14.4	16.5	18.2	20	22	24	26	28	29	31	33
7.5 inch	0	1.4	2.6	4.2	5.4	7.0	8.6	10.2	11.9	13.5	15.4	17.0	18.8	21	23	24	26	28	29	31
8 inch	0	1.3	2.5	3.9	5.1	6.6	8.1	9.5	11.0	12.6	14.4	15.9	17.5	19.2	21	22	24	26	27	29
10 inch	0	1.0	1.9	3.1	4.0	5.1	6.3	7.5	8.6	9.9	11.3	12.5	13.8	15.1	16.5	17.6	18.9	20	21	23

Canola, Ladino Clover, Canary Grass, Timothy

Row Spacing	Rate Adjuster Setting																			
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	Seed Rate in Pounds per Acre																			
6 inch	0	1.1	2.1	3.3	4.7	6.1	7.6	9.2	10.7	12.2	13.8	15.5	17.0	18.5	20	22	23	25	27	29
7 inch	0	0.9	1.7	2.8	4.1	5.2	6.6	7.9	9.2	10.5	11.8	13.3	14.6	15.9	17.4	18.7	20	22	23	25
7.5 inch	0	0.9	1.6	2.6	3.9	4.9	6.1	7.4	8.6	9.8	11.1	12.5	13.7	14.9	16.3	17.6	18.8	20	22	24
8 inch	0	0.8	1.5	2.5	3.6	4.6	5.7	6.9	8.0	9.2	10.3	11.6	12.8	13.9	15.2	16.4	17.5	19.0	21	22
10 inch	0	0.6	1.5	1.9	2.5	3.6	4.5	5.4	6.3	7.2	8.1	9.1	10.0	10.9	12.0	12.9	13.8	14.9	16.1	17.2

Red & Sweet Clover, Lespedeza Hulled

Row Spacing	Rate Adjuster Setting																			
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	Seed Rate in Pounds per Acre																			
6 inch	0	1.5	3.4	5.2	7.1	9.0	11.3	13.2	15.3	17.0	19.0	21	23	25	26	28	30	32	34	36
7 inch	0	1.3	2.9	4.5	6.1	7.7	9.7	11.3	13.1	14.6	16.3	17.8	19.3	21	23	25	26	28	29	31
7.5 inch	0	1.2	2.7	4.2	5.7	7.2	9.1	10.6	12.3	13.7	15.3	16.7	18.1	19.7	21	23	24	26	27	29
8 inch	0	1.1	2.5	3.9	5.3	6.7	8.5	9.9	11.5	12.8	14.3	15.6	16.9	18.3	19.8	21	23	24	25	27
10 inch	0	0.9	2.0	3.1	4.2	5.3	6.7	7.8	9.0	10.0	11.2	12.2	13.3	14.4	15.6	16.6	17.8	18.9	19.9	21

Kentucky Blue Grass, Fescue, Annual Rye Grass

Row Spacing	Rate Adjuster Setting																			
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	Seed Rate in Pounds per Acre																			
6 inch	0	0.2	1.2	1.9	2.7	3.3	4.1	4.6	5.2	5.8	6.3	6.8	7.3	7.8	8.3	8.8	9.2	9.7	10.0	10.5
7 inch	0	0.2	1.0	1.6	2.3	2.8	3.5	4.0	4.5	5.0	5.4	5.9	6.3	6.7	7.1	7.5	7.9	8.0	8.6	9.0
7.5 inch	0	0.2	0.9	1.5	2.2	2.7	3.3	3.7	4.2	4.6	5.1	5.5	5.9	6.3	6.7	7.0	7.4	7.7	8.1	8.4
8 inch	0	0.2	0.9	1.4	2.0	2.5	3.0	3.5	3.9	4.3	4.8	5.1	5.5	5.9	6.2	6.6	6.9	7.5	7.5	7.9
10 inch	0	0.1	0.7	1.1	1.6	2.0	2.4	2.7	3.1	3.4	3.7	4.0	4.3	4.6	4.9	5.2	5.4	5.7	5.9	6.2

Millet, Reed Canary

Row Spacing	Rate Adjuster Setting																			
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	Seed Rate in Pounds per Acre																			
6 inch	0.4	1.4	2.4	3.5	4.4	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.6	14.6	15.6	16.6	17.6	18.5	19.0
7 inch	0.4	1.2	2.1	3.0	3.8	4.7	5.6	6.4	7.3	8.1	9.0	9.9	10.7	11.6	12.5	13.3	14.2	15.1	15.9	16.1
7.5 inch	0.3	1.2	2.0	2.8	3.6	4.4	5.2	6.0	6.8	7.6	8.4	9.3	10.1	10.9	11.7	12.5	13.3	14.1	14.9	15.1
8 inch	0.3	1.1	1.8	2.6	3.3	4.1	4.9	5.6	6.4	7.1	7.9	8.6	9.4	10.2	10.9	11.7	12.4	13.2	13.9	14.1
10 inch	0.3	0.8	1.4	2.0	2.6	3.2	3.8	4.4	5.0	5.6	6.2	6.8	7.4	8.0	8.6	9.2	9.8	10.4	10.9	11.5

Orchard Grass

Row Spacing	Rate Adjuster Setting																			
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	Seed Rate in Pounds per Acre																			
6 inch	0	0	0.3	0.7	0.9	1.3	1.5	2.0	2.4	2.8	3.3	3.5	3.9	4.4	4.8	5.0	5.5	5.7	6.1	6.3
7 inch	0	0	0.2	0.6	0.7	1.1	1.3	1.7	2.1	2.4	2.8	3.0	3.4	3.7	4.1	4.3	4.7	5.0	5.2	5.4
7.5 inch	0	0	0.2	0.5	0.7	1.1	1.2	1.6	1.9	2.3	2.6	2.8	3.2	3.5	3.9	4.0	4.4	4.6	4.9	5.1
8 inch	0	0	0.2	0.5	0.7	1.0	1.1	1.5	1.8	2.1	2.5	2.6	2.9	3.3	3.6	3.8	4.1	4.3	4.6	4.8
10 inch	0	0	0.1	0.4	0.5	0.8	0.9	1.2	1.4	1.7	1.9	2.1	2.3	2.6	2.8	3.0	3.2	3.3	3.6	3.7

Fertilizer Meter Rate

Application rates will vary with fertilizer type, density and particle size. Relative humidity and field conditions can also affect application rates. The chart on the page 46 is based on material with a density of 65 pounds per cubic foot (1.04 kg/L) and average particle size. Initially set the rate according to the charts, then calibrate the drill to your material as described below.

If your drill has two boxes, remember to repeat the following steps for each drill box.

1. Raise the drill with the tractor hydraulics so the drive wheels are off the ground. Rotate the drive wheels to see that the metering system is working properly and free from foreign material.
2. From the chart, find the setting number for your row spacing and desired application rate. Rotate the gate adjustment knob to the number obtained from the chart.
3. Check that your gauge-wheel tires are the correct size 9.5L x 15 inches and properly inflated. See "**Tire Inflation Chart**" on page 68.
4. Record the weight of an empty container large enough to hold the fertilizer metered for one acre.
5. Place several pounds of fertilizer over three fertilizer feed cups on the outside end of the drill box. Pull the fertilizer tubes off of these three openers.
6. Turn the gauge wheels a few turns to fill the feed cups with material. Continue to turn until fertilizer drops to the ground from all three tubes.
7. Place a container under the three tubes to gather metered fertilizer.
8. Turn the gauge wheel until for one acre (approximately 225 tire rotations on a 24-foot drill and 182 rotations on a 30-foot drill). Check that the three feed cups have plenty of fertilizer coming into them.
9. Weigh the metered material. Subtract the initial weight of the empty container. Divide by three. Multiply by the number of openers on your drill to determine total pounds-per-acre metered. If this figure is different than desired, reset adjustment knob accordingly.

Note: You may want to repeat the calibration procedure if your results vary greatly from the chart.

10. When drilling, check the rate by noting acres drilled, amount of fertilizer added to drill and level of material in drill box. If you are applying more or less than desired, adjust the metering rate slightly to compensate for field conditions.

Seeding Drive Speeds

Refer to Figure 33

Note: When changing seeding drive speed for faster or slower seeding, the fertilizer drive sprocket must also be changed in order for the fertilizer rotor to maintain consistent speed. The drawings below illustrate the proper sprocket arrangement when using both types of seeding drive speeds.

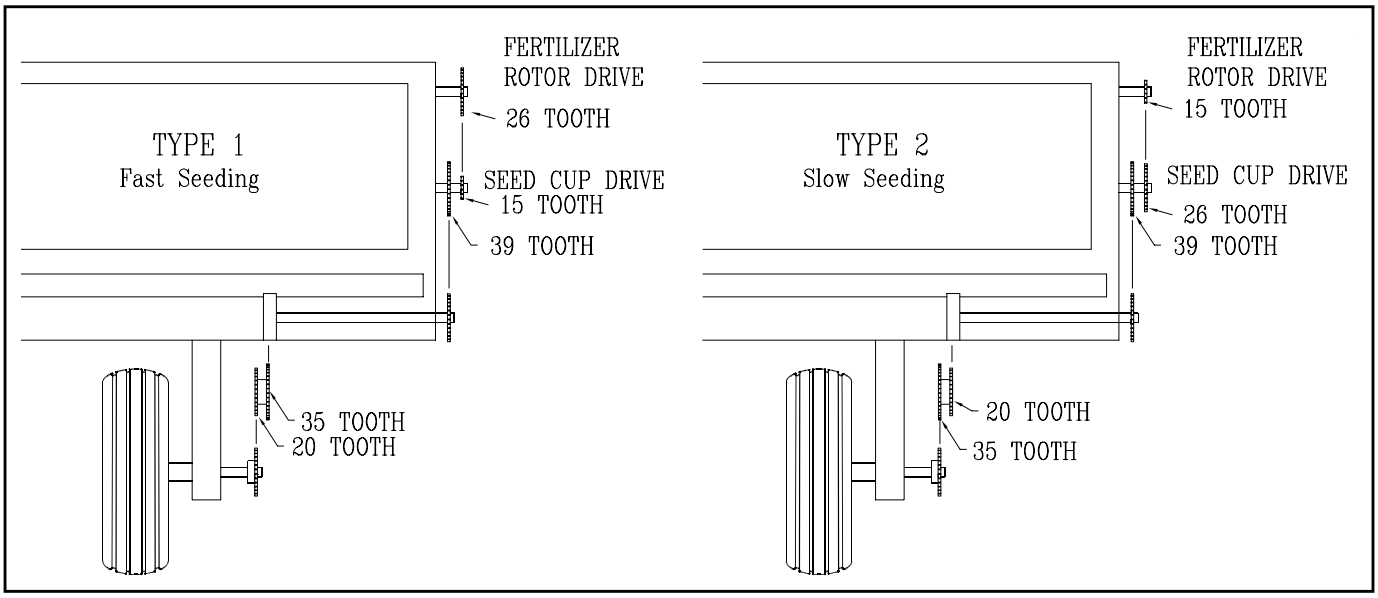


Figure 33
Sprocket Arrangements

11504

Fertilizer Rate Charts U.S. Customary Units

Fertilizer	Rate Adjuster Setting																		
2014+	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Application Rate - Pounds per Acre*																		
6 inch	9	13	25	48	67	89	112	131	154	173	197	218	234	261	279	292	303	306	308
7 inch	9	13	23	41	57	78	95	111	131	148	165	184	199	221	235	246	256	259	261
7.5 inch	7	11	20	38	54	72	89	105	123	138	157	174	187	209	223	234	242	245	247
8 inch	7	11	20	36	50	69	84	98	115	130	146	163	176	195	207	219	226	228	231
10 inch	5	8	16	29	40	54	67	79	92	104	118	131	140	157	167	175	182	183	185

* Based on 65 pounds per cubic foot.

Fertilizer	Rate Adjuster Setting																		
2013-	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Application Rate - Pounds per Acre*																		
6 inch	15	23	31	48	64	87	109	125	140	168	195	210	225	248	270	295	320	345	369
7 inch	13	20	26	38	54	74	93	106	119	143	166	179	191	211	230	251	272	293	314
7.5 inch	12	18	24	37	51	68	87	100	112	134	156	168	180	198	216	236	256	276	295
8 inch	11	17	23	36	48	62	82	94	105	126	146	158	169	186	203	221	240	259	277
10 inch	9	14	19	29	38	52	66	75	84	101	117	126	135	149	162	177	192	207	221

* Based on 65 pounds per cubic foot.

Density Conversion Chart

The fertilizer meter rate charts are based on fertilizer with a density of 65 pounds per cubic foot (1.04 kilograms per liter). If you are applying fertilizer of a different density, use the following table to convert application rate.

Dry Fertilizer Density Adjustment				
Pounds/Cubic-Foot	45	50	55	60
Kilograms/Liter	0.72	0.80	0.88	0.96
Conversion Factor	1.44	1.30	1.18	1.08

Pounds/Cubic-Foot	65	70	75	80
Kilograms/Liter	1.04	1.12	1.20	1.28
Conversion Factor	1.00	0.93	0.87	0.81

34755

Example: Your fertilizer has a density of 75 pounds per cubic foot, and you want to apply 100 pounds per acre. Multiply the desired application rate by the conversion factor.

100 x 0.87 = 87

Adjust drill to the setting closest to 87 pounds per acre.

Marker Adjustments

Speed Adjustment

Refer to Figure 34

Adjust folding speed for dual markers with hex adjustment screws on the sequence-valve body. There is one adjustment screw for raising (fold) speed ① and one for lowering (extend) speed ②. You can identify adjustment screws by markings stamped in valve body.

Turn adjustment screws clockwise to decrease folding speed and counterclockwise to increase folding speed. With tractor idling at a normal operating speed, adjust marker folding to a safe speed. Excessive folding speed could damage markers and void the warranty.

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

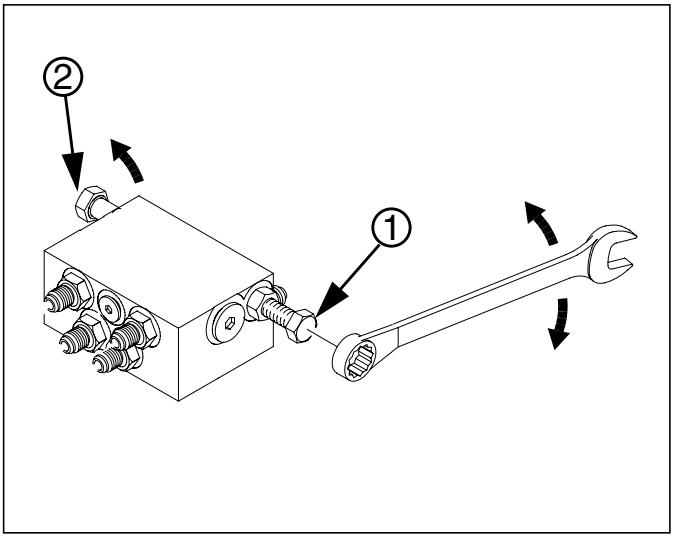


Figure 34 14048
Speed Adjustment, Dual Markers

Refer to Figure 35

The hydraulic system for a single marker has a needle valve to control folding speed. The needle valve is in the hydraulic hose at rod end of marker cylinder.

Turn adjustment knob clockwise to reduce folding speed or counterclockwise to increase folding speed. With tractor idling at a normal operating speed, adjust marker folding to a safe speed. Excessive folding speed could damage markers and void the warranty.

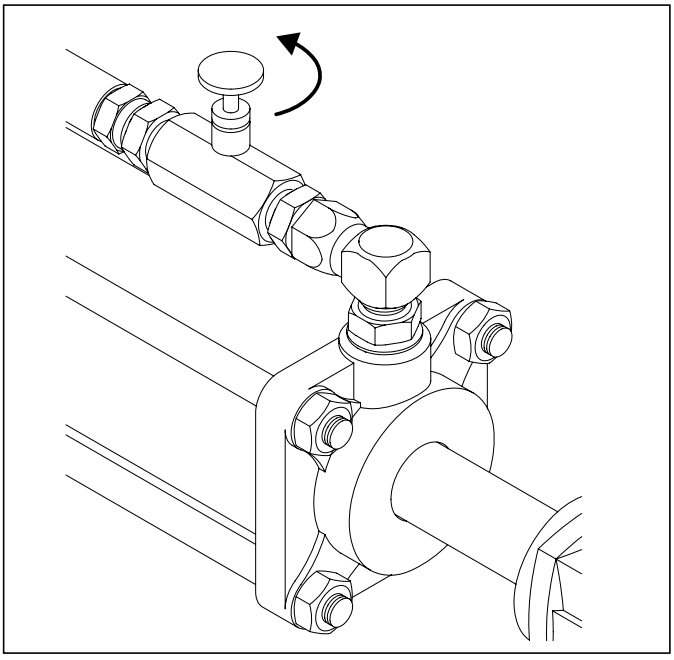


Figure 35 15625
Single Marker Speed Adjustment

Transport Carrier

Refer to Figure 36

When marker is folded, the second section should be centered in transport-carrier saddle and parallel with top of drill box.

To adjust front-to-rear position of saddle, loosen ½ X 6 inch U-bolts ① that fasten transport-carrier mount onto box frame. Slide transport-carrier assembly forward or back as needed.

To adjust height of saddle, loosen ½ X 2 inch U-bolts ② that hold carrier tube to mounting bracket. Slide carrier tube up or down as needed.

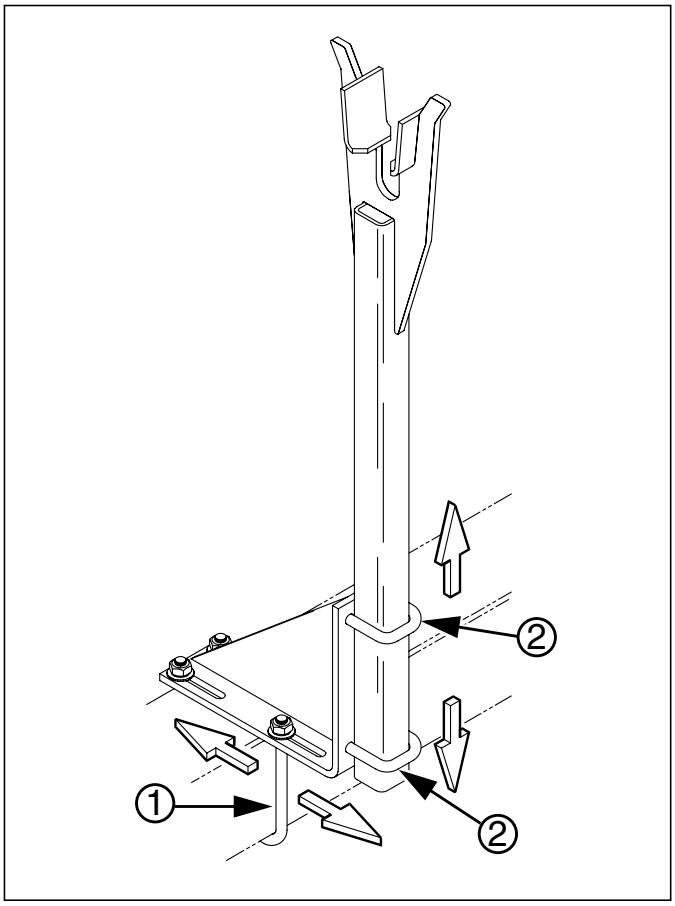


Figure 36 15632
Marker Transport Carrier Adjustment

Marker Chain

Refer to Figure 37

There are two, interrelated adjustments for the marker chain. Make these adjustments in the following order.

Lifting Slack. With marker unfolded, back full-threaded adjustment bolt ① down until head extends as little as possible. Slowly fold marker while observing disk. If marker disk slides across ground more than a foot before chain and linkage lifts it up, the chain is too long.

Shorten chain one or two links by moving clevis ②. Check adjustment by repeating folding process.

If chain is too short when marker is unfolded, it will prevent end of marker from dropping into field depressions, causing skips in your marker line. Correct this condition by lengthening chain one or two links at clevis ②.

Folding Slack. Fold marker. Use full-threaded adjustment bolt ① to take slack out of chain while marker is folded. Extend bolt until there is no chain slack. Lock bolt in this position by tightening nuts ③ on either side of upright channel ④.

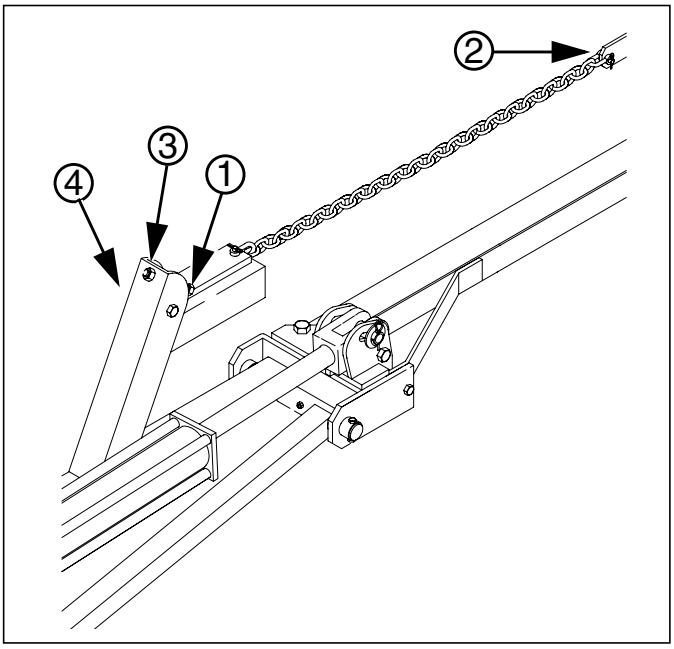


Figure 37 15669
Marker Chain Adjustment

Marker Disk Adjustment

⚠ CAUTION

Sharp Object Hazard:
Use caution when making adjustments in this area. Marker disks may be sharp.

Refer to Figure 38

There are two ways you can change the mark left by the marker disk.

Disk Angle

1. To change angle of cut, and the width of the mark, loosen ½ inch bolts ② holding the disk assembly.

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

Note: Do not set a marker angle wider than need to make a useful mark. Excess angle increases wear on all marker components.

2. Tighten bolts ②.

Direction of Cut

To change direction of cut and throw dirt either in or out:

Reverse blade and depth band by remounting lug bolts on disk hub.

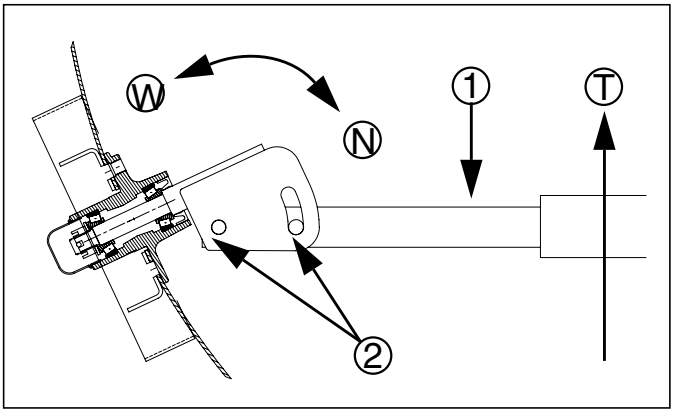


Figure 38 11757
Marker Disk Angle

Disk Scraper Adjustments

CAUTION

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

Refer to Figure 39
Disk scrapers are optional. To keep opener disks turning freely, dirt scrapers are mounted between disks to clean as disks rotate.

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

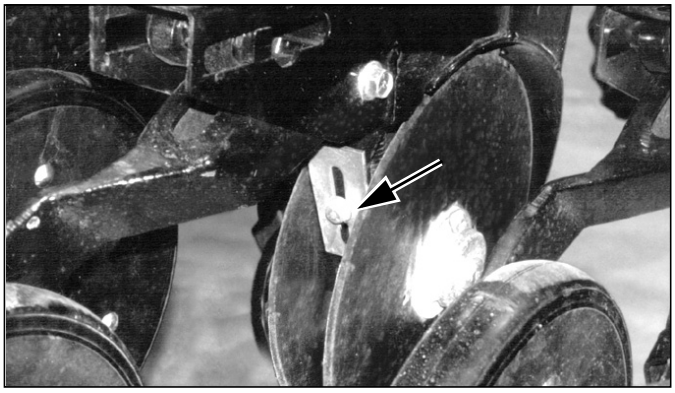


Figure 39 26463
Opener Disk Scraper

Seed Firmer Adjustments

CAUTION

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

Keeton® Seed Firmer Adjustment

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

Refer to Figure 40
The Firmer is provided with a preset tension which is recommended for using the first year. The tension screw can be tightened in subsequent years according to your needs. Firmers should provide just enough tension to push seeds to the bottom of the trench.

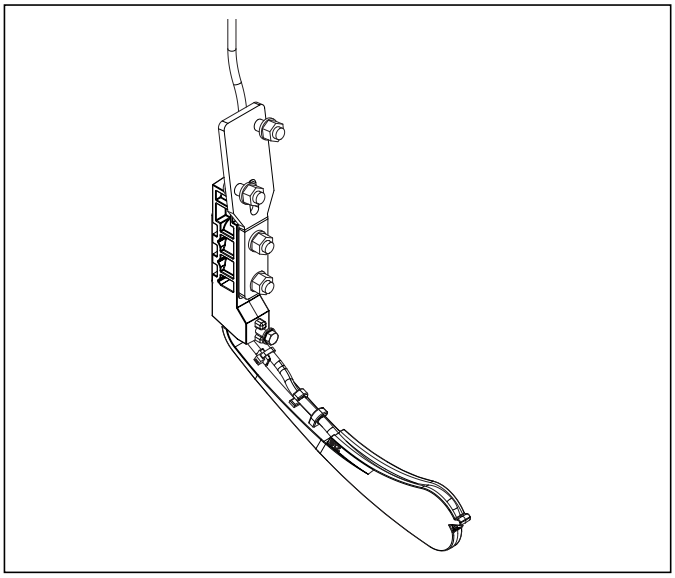


Figure 40 26443
Keeton® Seed Firmer

Seed-Lok® Seed Firmer Lock-Up

Refer to Figure 41

Optional Seed-Lok® firming wheels provide additional seed-to-soil contact. The wheels are spring loaded and do not require adjusting. In some wet and sticky conditions the wheels may accumulate soil. To avoid problems associated with this, you can lock-up the firmers.

To lock up Seed-Lok® wheels:

Pull up on Seed-Lok® arm ①.

Raise lever ②.

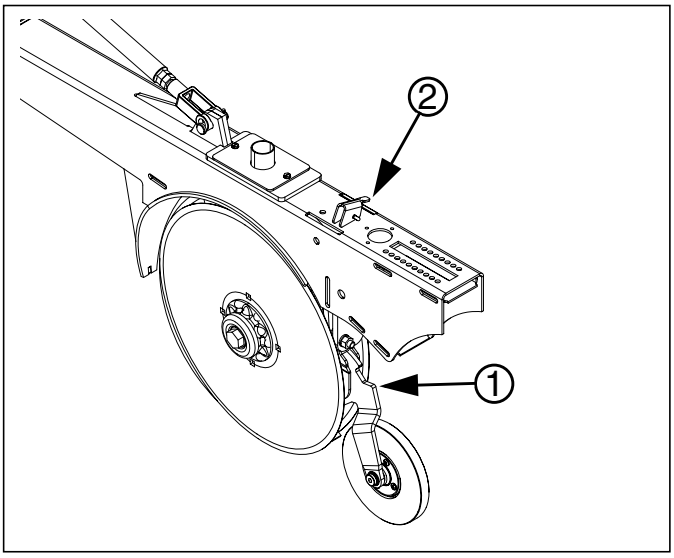


Figure 41 26443
Seed-Lok® Lock-Up

Troubleshooting Charts

General Troubleshooting

Problem	Solution
Uneven Seed Spacing or Uneven Stand	Check for plugging in seed cup.
	Check to see if seed tubes are plugged.
	Reduce ground speed.
	Check opener disks to see they turn freely.
	Use faster drive speed and close seed cup flutes to a more narrow position.
	Spring pressure on openers could be improperly adjusted causing opener to not penetrate low spots.
	Check for trash or mud build-up on Seed-Lok® wheel.
Opener Disks Not Turning Freely	Check for trash or mud build-up on disk scraper. Re-adjust scraper.
	Check to see if scraper is adjusted too tightly and is restricting disk movement.
	Check disk bearings.
	Check opener frame for possible damage.
	If opener disks turn freely by hand but not in field, reduce down pressure on disk opener.
	Check press wheel adjustment for seeding depth.
Actual Seeding Rate Is Different than Desired	Check tire pressure. For proper inflation see “**Tire Inflation Chart**” on page 68.
	Check gauge wheel size. Proper size is 9.5L x 15.
	Seed treatment will affect seeding rate if the chemicals build up in seed cup. Unless cleaned regularly, this build up can cause breakage of the seed-cup shaft.
	Check speed change box setting.
	For instructions on calculating seed rate see “**Seeding Adjustments**” on page 34.
Excessive Seed Cracking	Use slower drive speed and open flutes in seed cup to a wider position.
	Position seed-cup handles to a lower notch.
Acremeter Doesn’t Measure Accurately	Check tire pressure. For proper inflation see “**Tire Inflation Chart**” on page 68.
	Check end gauge wheel tire size. proper size is 9.5L x 15.
	Check planting operation for excessive overlap or gaps between passes.
	Loose soil conditions and slippage will cause variations in acres registered.
	To check accuracy of acremeter, see “**Acremeter Operation**” on page 29.
	Check to be sure your acremeter is for your width of drill.
Uneven Seeding Depth	See “**Planting Depth Adjustments**” on page 33.
	See “**Hitching Tractor to Drill**” on page 13 and “**Leveling Drill**” on page 20.
Press Wheels Not Compacting Soil As Desired	Refer to “**Planting Depth Adjustments**” on page 33.
	Re-adjust press wheel depth to match coulter depth.
	Increase down pressure on disk openers.
Grain Box Not Emptying Evenly	Certain models do not have the same number of seed cups between each divider of bulkhead. The section with the larger number of cups will empty sooner.
	Seed cups close to the ends of box tend to empty sooner due to amount of seed available.
	Check adjustment levers on each box to see that they are set on the same indicator number.

General Troubleshooting

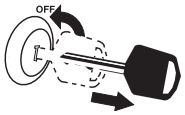
Problem	Solution
Press Wheel or Openers Plugging	Drilling in damp or wet conditions may increase this problem.
	Openers may be moved from a staggered to an in-line position to reduce trash thrown from front openers into rear openers.
	Reduce down pressure on openers.
	Do not back up drill in the field, or stop and allow drill to roll backwards with openers in the ground.
	If using double “V” press wheels, adjust angle bar.
	Check **Seed-Lok®** wheel.
Rubber Tire Depth Control Wheels Becoming Packed With Mud	Install scrapers.
	Reduce spring tension on openers.
Improper Folding of Drills	Adjust post frame adjusting links.
	Check hydraulic system for air and oil leaks.
	Clean out small orifice fittings in wing cylinders.
	Make sure that the wing boxes unfold to a straight line. check to see that both pull bars are attached to the boxes at exactly the same distance inboard from the inboard edge of the drill box (90”) and both are exactly the same length.
Hydraulic Adaptors Cracking	JIC fittings do not require high torque.
	ALWAYS use liquid pipe sealant when adding or replacing pipe thread hydraulic fittings. Plastic sealant tape can crack fittings and plug hydraulic lines. JIC and O-Ring fittings DO NOT require sealant. O-ring fittings require a thin coat of oil on the O-Ring. IMPORTANT: When using sealant on pipe threads, the friction between the threads is reduced, therefore, be certain not to overtighten causing damage to the cylinders, valves or fittings.
Seed Cup Sprockets Locked up or Twisted Seed-Drive Shaft	Check for foreign matter lodged in one or more seed cup sprockets.
	Liquid insecticide from seed has dried within the seed cup. Remove the build up by disassembling each seed cup and scrape the foreign substance from the turning surfaces. NOTE: Liquid inoculant should be applied with caution and care should be taken to clean the seeding system after drilling treated seeds.
Raising and Lowering Drill is Rough and Uneven	Lubricate lower rollers of vertical transport tubes located between the transport tires.
	Check hydraulic fittings for leaks.
	Rephasing cylinders not properly bled. See “**Hydraulic Hose Hookup**” on page 16. When raising drill at end of field, the lifting cylinders should be fully extended to ensure that they are always rephased. If machine is only raised enough to lift openers out of the ground, lift cylinders may eventually get out of sequence and cause uneven seeding depth.

General Troubleshooting

Problem	Solution
Hydraulic Marker Functioning Improperly	Check all hose fittings and connections for air and oil leaks.
	The chain on the folding 3-section marker should be slack when the marker is both fully extended and fully raised.
	Check tractor hydraulic oil level.
	Check all bolts and fasteners.
	Double selector valve positioned for wing fold. Shift valve to marker sequence position.
	Open needle valve, cycle markers slowly and reset needle valve if plugged.
Chain-Debris/Retainer Clip	Be sure retainer clip open end is facing opposite way of chain travel.

Maintenance and Lubrication

Maintenance



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

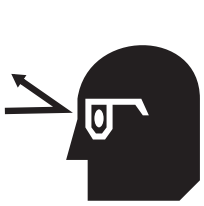
Always turn off and remove the tractor key before making any adjustments or performing any maintenance.

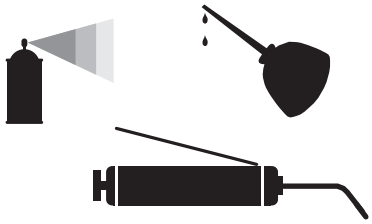
WARNING

Crushing Hazard:
Always have transport locks in place when working on implement. You may be severely injured or killed by being crushed under a falling implement.

WARNING

High Pressure Fluid Hazard:
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. Escaping fluid under pressure can have sufficient pressure to penetrate the skin. If an accident occurs, seek immediate medical assistance from a physician familiar with this type of injury.





1. After using your drill for several hours, check all bolts to be sure they are tight.
2. Remove excess slack from chains. Clean and use chain lube on all roller chains as needed.
3. Maintain proper air pressure in drill tires.
4. Keep disk scrapers properly adjusted.
5. Clean drill on a regular basis. Regular and thorough cleaning will lengthen equipment life and reduce maintenance and repair.
6. Lubricate areas listed under “**Lubrication and Scheduled Maintenance**” on page 58.
7. Replace any worn, damaged, or illegible safety labels by obtaining new labels from your Great Plains dealer.

Seed Flap Replacement

Refer to Figure 42

To replace a seed flap ①, use a needle nose pliers or similar tool to grasp “T” top of flap. Pull upward to pull flap up out of metal bracket ②.

Push new seed flap ① down through metal bracket ② until flap snaps into place with “T” top resting on top of bracket.

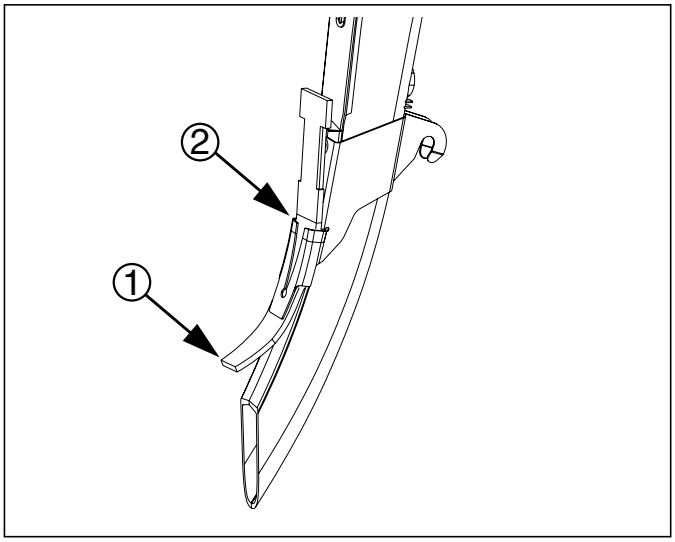


Figure 42 31047
816-302C Seed Tube Flap

Seed Flap Replacement Older Style

Refer to Figure 43

1. Remove one disk for easier seed flap replacement.
2. To replace, pull the seed flap ① up out of metal bracket ②.
3. Push new seed flap ① down through metal bracket until seed flap is in place.

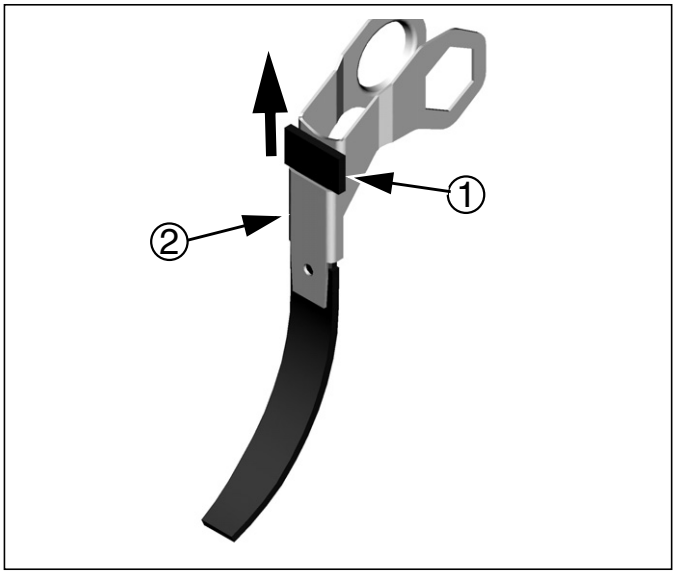


Figure 43 18398
817-349C Seed Tube Flap

Marker Maintenance (Option)

Marker Shear Bolt Replacement

Refer to Figure 44

If a marker gets caught or hits an obstruction, it is designed to fail a shear bolt ③ at the fold, pivot on a second bolt (not visible in Figure), and swing back.

The shear bolt is a hex head cap screw,
③ $^{5}/_{16}$-18 × $1^{1}/_{2}$ inch Grade 5,
Great Plains part number 802-012C, plus a
④ $^{5}/_{16}$-18 lock nut, Great Plains part number 803-011C.

Note: If an exact replacement is not immediately available, temporarily substitute an M8×1.25 Class 8.8 bolt and nut.

Install a replacement shear bolt on the vertical face on the side opposite from the pivot bolt. Do not use a higher grade bolt, or marker hang-ups may result in machine damage. Do not use a lower grade bolt, or you may experience nuisance shears.

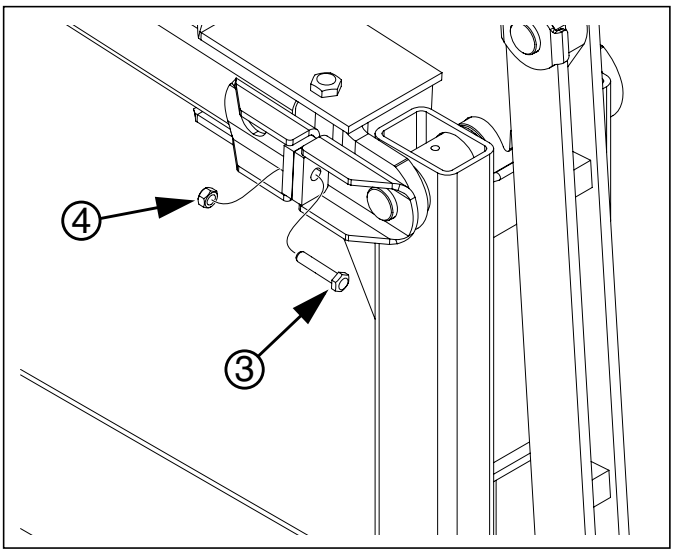
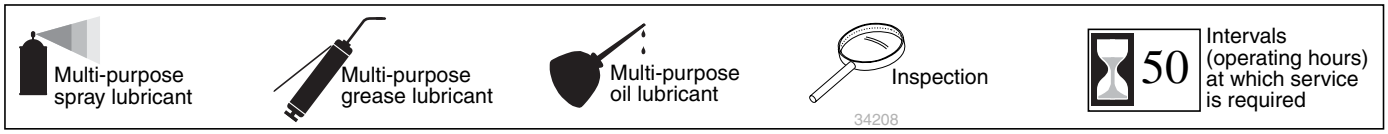


Figure 44 34718
Marker Shear Bolt

Marker Grease Seal Cap

If grease seal cap for marker-disk-hub bearings is damaged or missing, disassemble and clean hub. Repack with grease and install new seal or grease cap.

Lubrication and Scheduled Maintenance

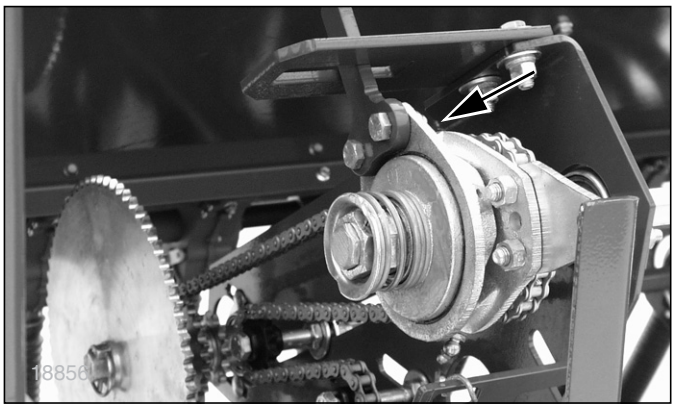


Drive Shaft Clutches

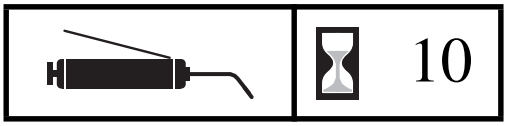
2 zerks each of 2 clutches; 4 total

Type of Lubrication: Grease
Quantity: Until grease emerges

Also smear grease on clutch engagement.

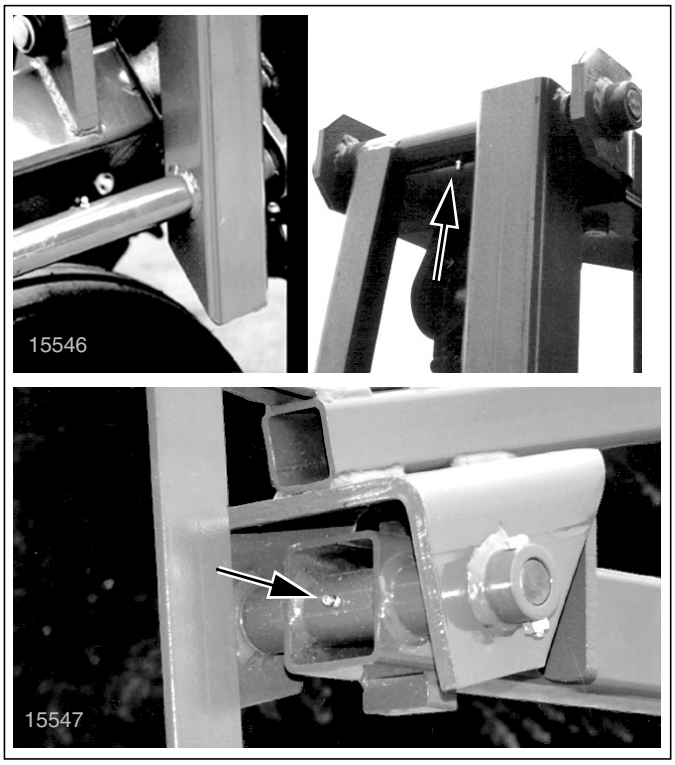


Marker Hinge Pivots

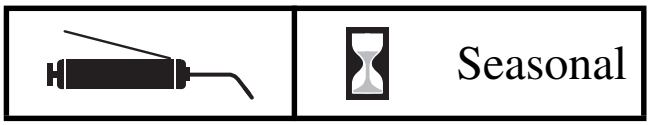


1 zerk at mount pivot,
1 zerk and 1st to 2nd section pivot,
1 zerk at 2nd section to arm pivot;
3 or 6 total

Type of Lubrication: Grease
Quantity: Until grease emerges at pivot ends

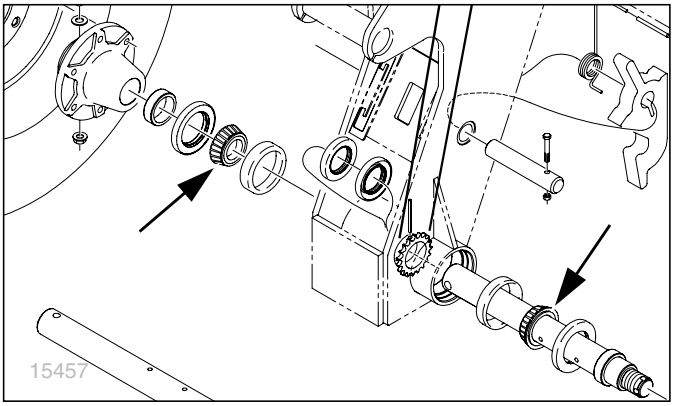


Gauge Wheel Bearings

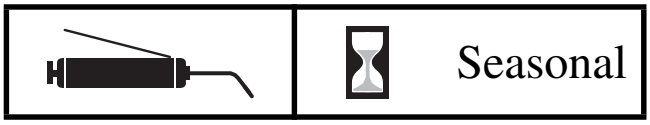


2 races each of 4 wheels; 8 total

Type of Lubrication: Grease
Quantity: Repack

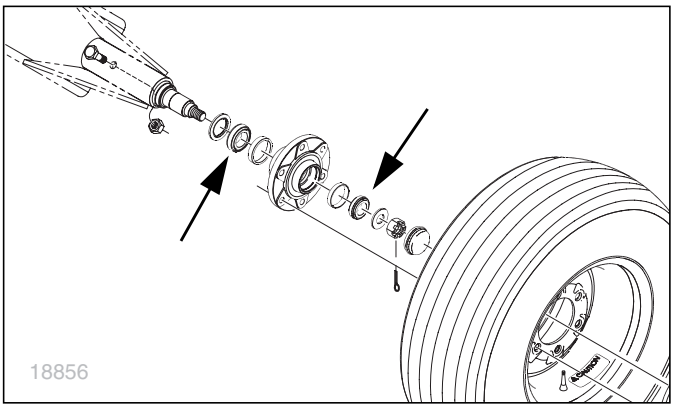


Transport Wheel Bearings

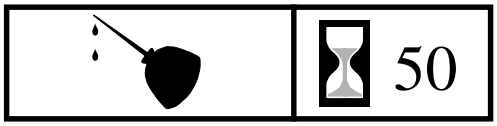


2 races each of 4 wheels; 8 total

Type of Lubrication: Grease
Quantity: Repack

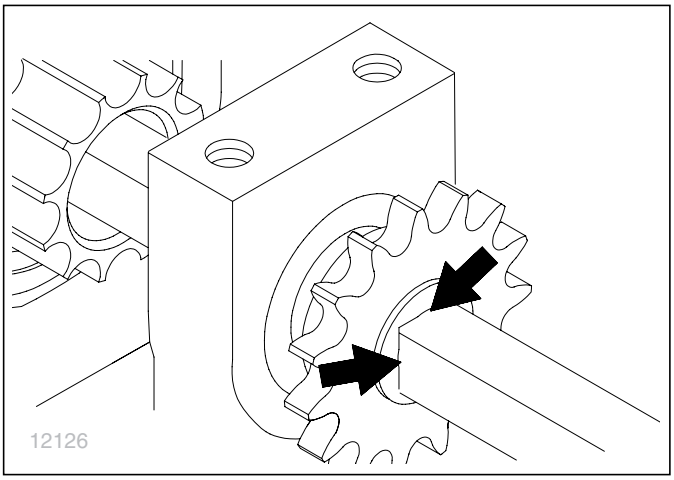


Seed Cup Drive Shaft Sprocket

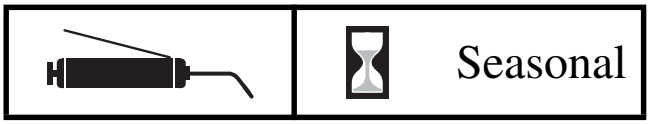


2 sliding sprockets; one each side
Type of Lubrication: Oil
Quantity: Coat thoroughly

Move the Seed Rate adjustment handle back and forth to get oil into the square bore. Perform this with seed box empty, or handle may be difficult to set to100.

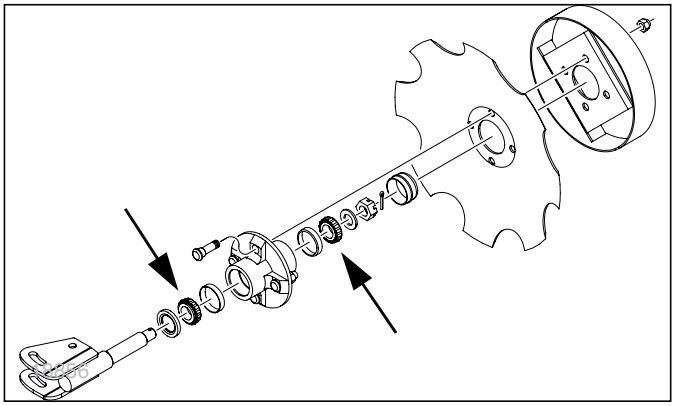


Marker Disk Bearings



2 races each marker; 2 or 4 total

Type of Lubrication: Grease
Quantity: Repack

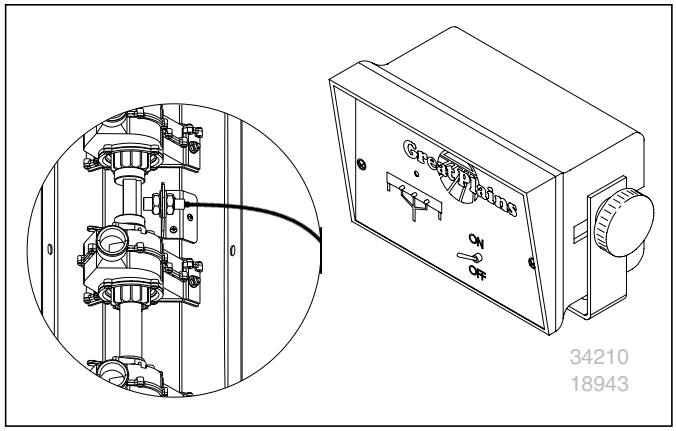


Options

Shaft Monitor

This kit provides a cab alarm in the event that a main box seed meter shaft stops turning (which might result from excess down-pressure lifting a gauge wheel, low tire pressure/flat tire, chain break or clutch malfunction). Order one kit per drill.

Description	Part Number
2-Channel Shaft Monitor	116-282A



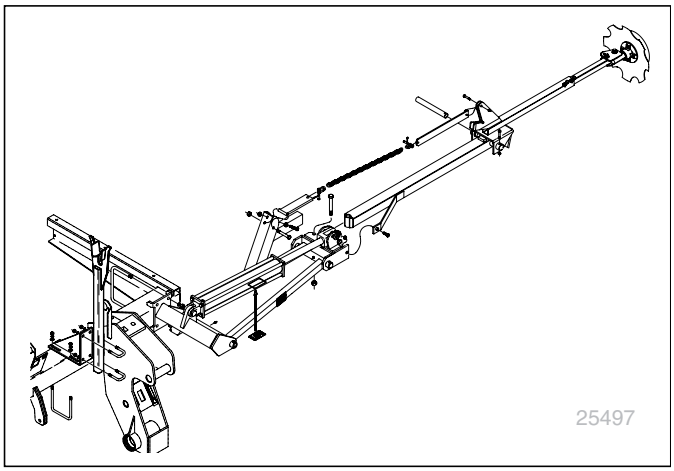
Flat Folding Markers

Hydraulically operated markers provide precise pass-to-pass spacing by leaving a user-controlled visible score mark to one side.

The single marker is left-side mounted. Dual markers are operated through an automatic sequence valve. After each fold operation, the next unfold extends the other marker. Order one kit per drill.

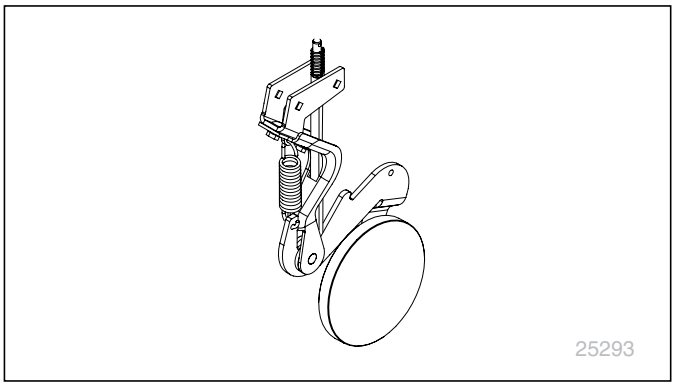
Description	Part Number
Single Flat Fold Marker 24 foot	113-200A
Single Flat Fold Marker 30 foot	113-196A
Dual Flat Fold Marker 24 foot	113-201A
Dual Flat Fold Marker 30 foot	113-197A

Dual gauge wheels and markers not compatible on 2SF24.



Seed Firmers

The base 2SF24 and 2SF30 drill requires a choice of row unit bundles which include one of three firmers: seed flap, Keeton®, or Seed-Lok®. Only one type of seed firmer may be installed at the same time. Order one per row.

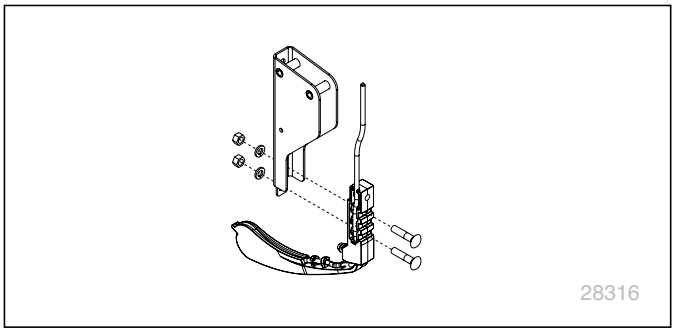


Seed-Lok® Seed Firmer

Description	Part Number
00 Series 5 inch Seed-Lok®	122-193K
00 Series 6 inch Seed-Lok®	122-266K

Keeton® Seed Firmer

The Keeton® seed firmer supports low-rate fertilizer delivery.



Description	Part Number
Keeton® seed firmer (per opener)	890-810C

Acremeter

Should a mechanical acremeter fail, or an electronic acremeter's battery life be exceeded, replace it with our current electronic meter.

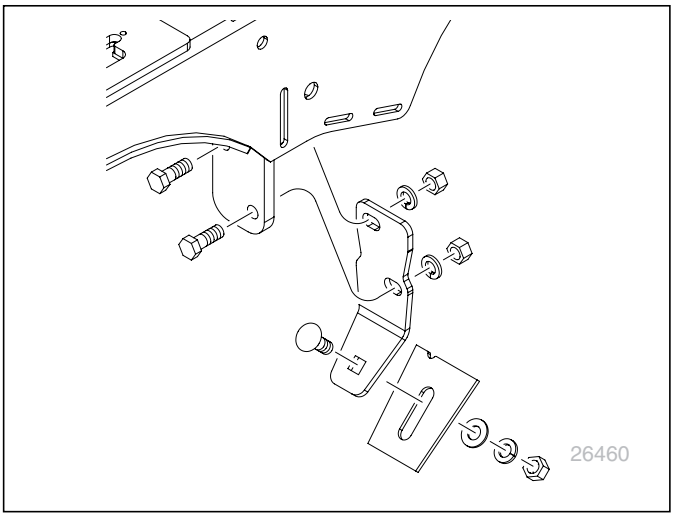
Description	Part Number
24 foot Acremeter	891-107C
24 foot Hectare Meter	891-108C
30 foot Acremeter	891-041C
30 foot Hectare Meter	891-042C

Air Design Spring Loaded Scrapers

Optional disk scrapers help clear any soil and debris not removed by the standard disk spreaders at the seed tube. Scraper cannot be mounted if optional seed firmers are used. Scrapers are compatible with the standard seed flap.

Description	Part Number
Spring Scraper Assembly	121-781A

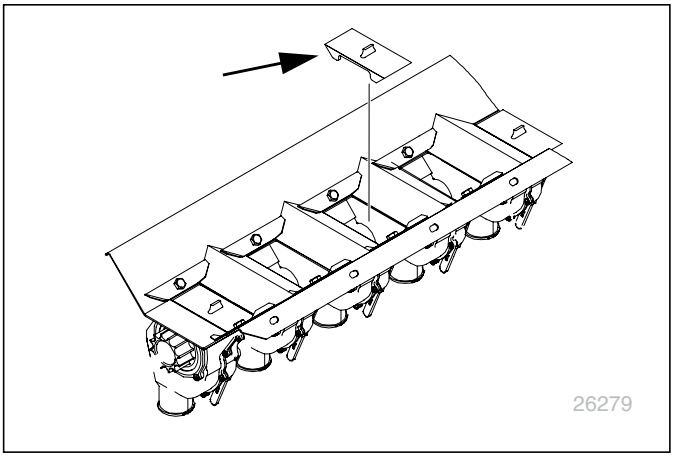
Not compatible with Keeton® seed firmers.



Feeder Cup Plugs

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

Description	Part Number
1 1/4 Wide Feeder Cup Plug	817-200C



Appendix A - Reference Information

Specifications and Capacities

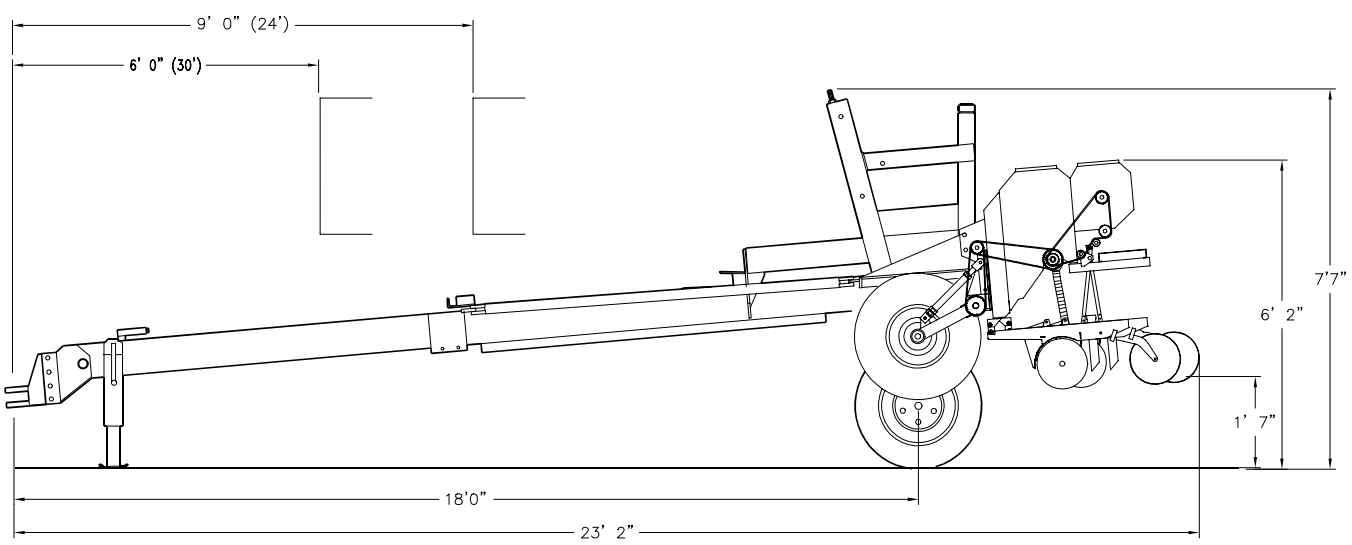
2SF24 Specifications and Capacities

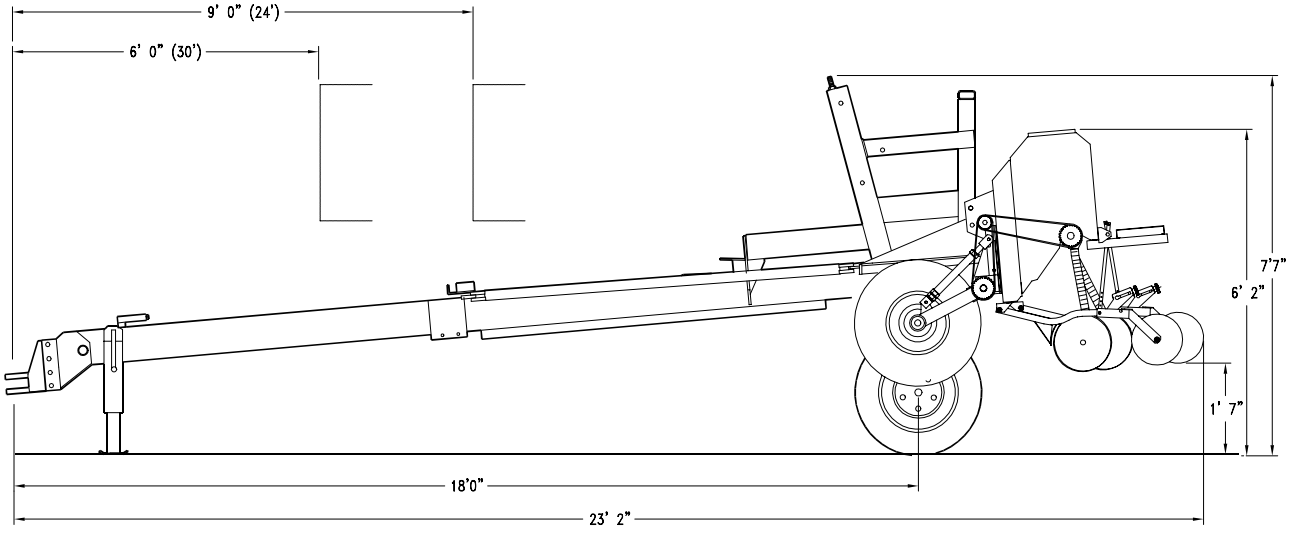
24-Foot (7.2 m) Models Model	2SF24-2810	2SF24-3608	2SF24-3875	2SF24-4007	2SF24-4806
Row Count	28	36	38	40	48
Row Spacing	10 inches (25.4 cm)	20 cm (8.0 inches)	19 cm (7.5 inches)	7 inches (17.8 cm)	6 inches (15.2 cm)
Working Width	24 feet 9 inches (7.54 m)				
Swath (Channel Width)	280 inches (711.2 cm)	288 inches (731.5 cm)	285 inches (723.9 cm)	280 inches (711.2 cm)	288 inches (731.5 cm)
Seed Capacity	48 cubic feet (1690 liters)				
Fertilizer Capacity	24 cubic feet (800 liters)				
Small Seed Capacity	6.8 bushels (240 liters)				
Transport Width	14 feet 0 inches (4.27 m)				
Working Length	23 feet 2 inches (7.06 m)				
Transport Length	19 feet 4 inches (5.89 m)				
Working Height	6 feet 4 inches (1.92 m)				
Transport Height	7 feet 7 inches (231 cm)				
Transport Clearance	19 inches (48 cm)				
Minimum Tractor Requirement	125 hp (93 kW)				
Hitch	Pull Type, Large Diameter, Small Clevis or Small Strap				
Hydraulic Circuits Required	Closed or Open Center, 2 or 3 Remotes				
Hydraulic Power Required	2250 psi (155 bar) at 5 gallons/minute (19 liters/minute)				
Weight (minimum, empty)	7,500 pounds (3400 kg)	8,000 pounds (3600 kg)	8,200 pounds (3700 kg)	8,300 pounds (3800 kg)	8,800 pounds (4000 kg)
Weight (maximum, full)	15,100 pounds (6800 kg)	15,600 pounds (7100 kg)	15,700 pounds (7100 kg)	15,900 pounds (7200 kg)	16,400 pounds (7400 kg)
Transport Tire Size	9.5Lx15 12 Ply Tubeless				
Wing Gauge Wheel Tire Size	9.5L-15SL 8 Ply				
Opener Down Pressure	90 to 180 pounds (40 to 80 kg)				
Opener Depth Range	4 inches (8.9 cm) in 1/4 inch (6.4 mm) increments				

2SF30 Specifications and Capacities

24-Foot (7.2 m) Models Model	2SF30-3610	2SF30-4408	2SF30-4875	2SF30-5207	2SF30-6006
Row Count	36	44	48	52	60
Row Spacing	10 inches (25.4 cm)	20 cm (8.0 inches)	19 cm (7.5 inches)	7 inches (17.8 cm)	6 inches (15.2 cm)
Working Width	24 feet 9 inches (7.54 m)				
Swath (Channel Width)	360 inches (914.4 cm)	352 inches (894.1 cm)	360 inches (914.4 cm)	364 inches (924.6 cm)	360 inches (914.4 cm)
Seed Capacity	60 cubic feet (2110 liters)				
Fertilizer Capacity	30 cubic feet (1060 liters)				
Small Seed Capacity	7.2 bushels (250 liters)				
Transport Width	14 feet 0 inches (4.27 m)				
Working Length	23 feet 2 inches (7.06 m)				
Transport Length	19 feet 4 inches (5.89 m)				
Working Height	6 feet 4 inches (1.92 m)				
Transport Height	7 feet 7 inches (231 cm)				
Transport Clearance	19 inches (48 cm)				
Minimum Tractor Requirement	140 hp (104 kW)				
Hitch	Pull Type, Large Diameter, Small Clevis or Small Strap				
Hydraulic Circuits Required	Closed or Open Center, 2 or 3 Remotes				
Hydraulic Power Required	2250 psi (155 bar) at 5 gallons/minute (19 liters/minute)				
Weight (minimum, empty)	8,300 pounds (3800 kg)	8,600 pounds (3900 kg)	8,800 pounds (4000 kg)	9,100 pounds (4100 kg)	9,600 pounds (4400 kg)
Weight (maximum, full)	17,700 pounds (8000 kg)	17,900 pounds (8100 kg)	18,100 pounds (8200 kg)	18,400 pounds (8300 kg)	18,900 pounds (8600 kg)
Transport Tire Size	9.5Lx15 12 Ply Tubeless				
Wing Gauge Wheel Tire Size	9.5L-15SL 8 Ply				
Opener Down Pressure	90 to 180 pounds (40 to 80 kg)				
Opener Depth Range	4 inches (8.9 cm) in 1/4 inch (6.4 mm) increments				

Dimensions Transport





10242

Torque Values Chart

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

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

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

Torque tolerance + 0%, -15% of torquing values. Unless otherwise specified use torque values listed above. 25199

Tire Inflation Chart

Tire Size	Inflation
7.5 x 20” 4 Ply Drill Rib 9.0 x 24” 8 Ply Rib Implement	28 psi (193 kPa) 40 psi (276 kPa)
9.5L x 15” 8 Ply Rib Implement (SV) 9.5L x 15” 12 Ply Rib Implement	44 psi (303 kPa) 60 psi (414 kPa)
11L x 15” 6 Ply Rib Implement 11L x 15” 12 Ply Rib Implement	28 psi (193 kPa) 52 psi (359 kPa)
12.5L x 15” 8 Ply Rib Implement 12.5L x 15” 10 Ply Rib Implement	36 psi (248 kPa) 44 psi (303 kPa)
16.5L x 16.1” 10 Ply Rib Implement	36 psi (248 kPa)

Tire Warranty Information

All tires are warranted by the original manufacturer of the tire. Tire warranty information is found in the brochures included with your Operator’s and Parts Manuals or online at the manufacturer’s web sites listed below. For assistance or information, contact your nearest Authorized Farm Tire Retailer.

Manufacturer	Web site
Firestone	www.firestoneag.com
Gleason	www.gleasonwheel.com
Titan	www.titan-intl.com

Appendix B - Assembly and Setup

Before You Start

- ❑ Read and understand the operator's manual for your drill. A basic understanding of how the drill works will aid in the assembly and setup of your drill.
- ❑ Before attempting to assemble the drill use the following as a check list. Having all the needed parts and equipment readily at hand will speed up your assembly task and will make the job as safe as possible.
- ❑ Check for all major frame components.
- ❑ Check for fasteners and pins that were shipped with the drill. NOTE: All hardware coming from the factory has been installed in the location where it will be used. If a part or fastener is temporarily removed for assembly reasons, remember where it goes. Keep the parts separated.
- ❑ If a pin, bolt or other part has been removed and you are unsure where it is used, use the parts section of this manual to identify it. Be sure the part gets used in the correct location.By double checking while you assemble, you will lessen the chance of using a bolt incorrectly that may be needed later.
- ❑ Have a forklift or loader along with chains and safety stands that are sized for the job ready for the assembly task.
- ❑ Have a tractor with remote hydraulics ready to attach to the tongue. The tongue must be anchored to a large enough tractor to overcome the negative tongue weight that will be present when the boxes are attached to the frame. The hydraulics will aid in raising and lowering the drill to align pins and bolts during assembly.

⚠ CAUTION

Crushing Hazard:
Be familiar with the term NEGATIVE TONGUE WEIGHT. Be aware of the special precautions you should take when working with an implement that can develop Negative Tongue Weight.

- ❑ Have a minimum of two people on hand while assembling the drill.

Refer to Figure 45

1. Read and understand the previous section titled: BEFORE YOU START.
2. Read "**Important Safety Information**" on page 1, before assembling drill.
3. Set the tongue ① approximately 21 inches off the ground in a horizontal position with stable blocking for support.
4. Raise the mainframe ② up, keeping the side members horizontal. Position the mainframe ② over the tongue ① and lower into position.
5. Secure tongue ① to main frame ② with six 1 X $2^{1}/_{2}$ inch long bolts ③, lock washers and nuts.
6. Attach the tongue screw jack ④ in a vertical position and remove blocking so the unit is on the ground.
7. Remove the safety wires from each hydraulic cylinder rod clevis between the tires.
8. Slide the hydraulic hoses from the mainframe through the tongue and pull them out at the tractor end. Attach tractor male couplers to the hydraulic hoses.
9. Hook tractor up to the tongue and plug hydraulic connectors into the tractor. With tractor running at an idle speed charge the drill hydraulic system. (Be sure tractor has plenty of hydraulic fluid. This system requires approximately 3.3 gallons.) When the drill frame is raised for the first time, one lift cylinder will extend fully before the other one begins to move. Once the first cylinder is fully extended continue to hold the tractor valve in the same position for at least 60 seconds after the second lift cylinder has fully extended. The reason for the unevenness of raising for the first time is because the drill is equipped with master and slave rephasing cylinders. Raise and lower the frame several times to be sure there is no binding or problems with your lift system. Refer to "**Hitching Tractor to Drill**" on page 13, for additional information.
10. Attach the gauge-wheel turnbuckle ⑤ to the gauge-wheel arm ⑥ on each drill and then mount the wheel ⑦ and tire.
11. Position the two drill boxes in line, end to end, with the end chain drive sprockets outboard and approximately 3 inches between the drill boxes. Drills on 8 inch row spacing and narrower will have 8 inch spacing at disks between boxes.
12. Using the tractor, back the drill main frame up to the center of the two drill boxes ⑧. When close, position the posts ⑨ on each side of the main frame so the face of the post mounting angles are toward the drill frames. Attach the post ⑨ to the drill frames ⑧ using eight 5/8 X $3^{1}/_{2}$ X 5 inch long U-bolts ⑩, lock washers ⑪ and nuts ⑫. With the U-bolts ⑩ left

loose, slide the drill frames ⑧ inward so that the lugs ⑬ welded to the drill frames are up tight against the post angles. Tighten all the nuts on the U-bolts.

13. Attach frame adjustment link ⑭ from the drill frame to the pivot post using the clevis pin ⑮ with hairpin cotters. Pin to pin should be approximately 37 inches.
14. Locate drill transport stabilizer frame ⑯ 86 1/2 inches from the outside edge of each box frame see Figure 45. Using 5/8 inch U-bolts ⑰, lock washers ⑱ and nuts ⑲, mount stabilizer to box frame. Repeat for other side.
15. Adjust clevis end of pull bars ⑳ so that the distance from the center line to center line of pull bar pin holes is approximately 134 1/4 inches.
16. Mount pull bars to drill transport stabilizer frames ⑯ and tongue slide ㉑. With the tongue slide in the back position against its stop, adjust pull bar lengths so boxes are in line with one another and parallel to the back edge of the mainframe.
17. Extend the main lift cylinder ㉒ and place the transport lock pins ㉓ in the transport position through the holes in the mainframe axle side tube.
18. Fold the drill making sure that the tongue slide ㉑ moves smoothly up the tongue. When drill boxes are almost folding in, stop and adjust the post-frame adjustment links on each box so that the tang ㉔ on each drill transport stabilizer frame lines up with the nest ㉕ on the front of the main frame. Fold drill completely closed.
19. With tongue slide ㉑ forward on the tongue and drill folded completely, position the pull bar lock pin ㉖ across the top of the tongue slide. Adjust the transport lock bolt ㉗ on top and front of tongue up against lock pin with 1/16 inch clearance and lock the jam nut. This pin prevents the drill from unfolding when in transport. DO NOT LOWER DRILL WHILE IN FOLDED POSITION.
20. Check to see that all nuts are tightened. See “**Torque Values Chart**” on page 67, for torque specifications.

Assembly Diagram

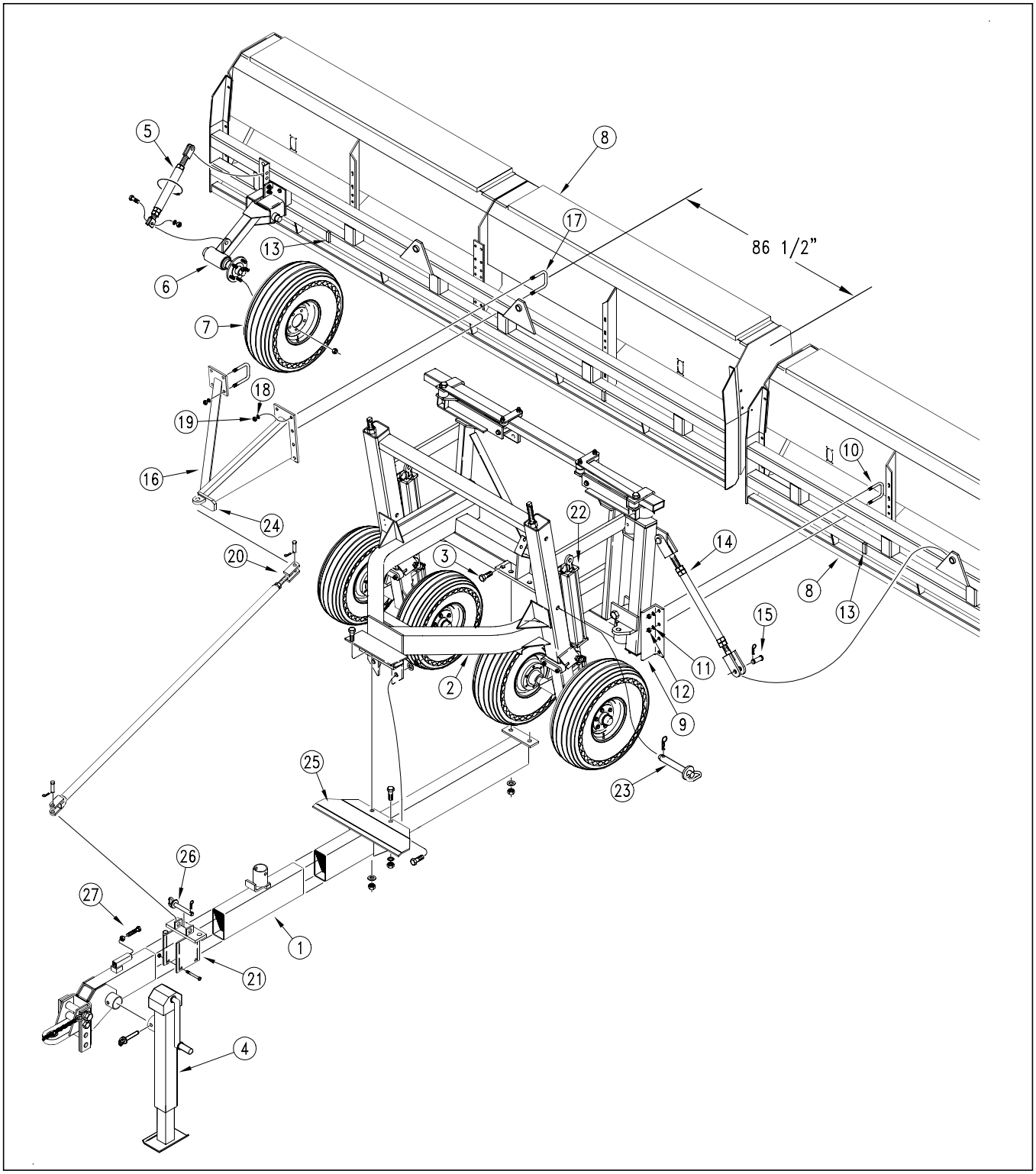


Figure 45
Assembly Diagram

11505

Appendix M - Metric Charts

Metric Seed Rate Charts

ALFALFA OR RAPE	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare																				
15.2 cm (6”)	0	4	7	9	12	16	19	22	26	29	33	36	39	41	45	47	50	53	56	58	61
17.8 cm (7”)	0	3	6	8	11	15	17	20	22	26	28	31	34	36	38	41	44	46	48	50	52
19.1 cm (7.5”)	0	3	6	8	10	13	16	18	20	24	26	29	31	34	36	38	40	43	45	46	48
20.3 cm (8”)	0	3	4	7	9	12	15	17	19	21	25	27	29	30	33	35	37	39	40	43	44
25.4 cm (10”)	0	2	3	6	8	10	11	13	16	18	20	21	24	25	27	28	30	31	34	35	36

BARLEY	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 1	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare*																				
15.2 cm (6”)	0	0	8	16	22	30	37	44	49	56	62	69	76	84	92	99	104	111	114	118	120
17.8 cm (7”)	0	0	7	13	20	26	31	38	43	49	54	61	66	73	80	85	91	96	99	102	104
19.1 cm (7.5”)	0	0	7	12	18	24	29	35	40	45	49	56	62	67	74	78	84	89	91	94	96
20.3 cm (8”)	0	0	6	11	17	22	27	31	37	41	45	52	56	62	67	72	76	82	84	86	89
25.4 cm (10”)	0	0	4	9	13	18	22	26	30	34	37	41	46	50	55	59	63	66	68	71	72

* Based on 0.6 kg/liter

BUCKWHEAT	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 1	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare																				
15.2 cm (6”)	0	9	16	22	33	37	45	53	62	69	78	86	95	105	114	124	132	139	143	150	155
17.8 cm (7”)	0	8	13	19	25	33	38	45	53	61	68	75	82	91	99	109	114	120	124	130	135
19.1 cm (7.5”)	0	7	12	18	24	29	36	41	49	56	63	69	76	84	92	100	105	111	114	120	124
20.3 cm (8”)	0	7	11	17	21	27	33	38	45	50	57	64	69	77	84	92	96	102	105	110	113
25.4 cm (10”)	0	6	9	13	17	22	27	31	37	41	47	52	57	63	68	75	80	83	86	90	93

FLAX OR SUDAN	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare																				
15.2 cm (6”)	0	2	4	7	10	13	16	18	21	24	27	29	33	36	39	43	47	50	53	53	54
17.8 cm (7”)	0	2	3	6	9	11	13	16	18	20	24	26	28	31	34	37	40	44	46	46	46
19.1 cm (7.5”)	0	2	3	6	8	10	12	15	17	19	21	24	26	29	31	34	37	40	41	43	43
20.3 cm (8”)	0	1	3	6	8	10	11	13	16	18	19	21	24	26	29	31	35	37	38	39	39
25.4 cm (10”)	0	1	2	4	6	8	9	11	12	15	16	18	20	21	24	26	28	30	31	31	33

MILLET	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare																				
15.2 cm (6”)	0	3	6	8	11	13	17	20	24	27	29	34	36	40	44	48	53	56	58	59	59
17.8 cm (7”)	0	2	4	7	9	12	15	18	20	24	26	29	31	35	38	41	45	48	50	52	52
19.1 cm (7.5”)	0	2	4	7	9	11	13	16	19	21	24	27	29	33	35	38	41	45	47	58	47
20.3 cm (8”)	0	2	3	6	8	10	12	15	17	19	21	25	27	29	33	35	38	40	43	44	44
25.4 cm (10”)	0	2	3	4	7	8	10	12	15	16	18	20	21	24	26	29	31	34	35	36	36

MILO	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare*																				
15.2 cm (6”)	0	3	6	9	13	17	20	24	27	30	34	38	41	46	50	55	61	64	67	67	68
17.8 cm (7”)	0	2	4	8	11	13	17	20	24	27	29	33	36	40	44	47	52	56	58	58	59
19.1 cm (7.5”)	0	2	4	7	10	12	16	18	21	25	27	30	34	37	40	44	48	52	54	54	55
20.3 cm (8”)	0	2	3	7	9	11	15	17	20	22	25	28	30	34	37	40	44	47	49	49	50
25.4 cm (10”)	0	2	3	6	8	10	12	13	16	18	20	22	25	28	30	33	36	38	40	40	41

* Based on 0.8 kg/liter

OATS OR SAFFLOWER	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 1	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare*																				
15.2 cm (6”)	0	4	9	16	21	28	35	41	49	57	64	72	80	85	93	101	108	114	120	126	130
17.8 cm (7”)	0	4	8	13	18	25	30	36	43	49	55	62	68	74	81	87	93	99	104	109	112
19.1 cm (7.5”)	0	3	8	12	17	22	28	33	39	46	50	57	64	68	75	81	86	91	95	100	104
20.3 cm (8”)	0	3	7	11	16	21	26	30	36	41	46	53	58	63	68	74	78	84	87	92	95
25.4 cm (10”)	0	3	6	9	12	17	21	25	29	35	38	43	47	52	56	61	65	68	72	75	78

* Based on 0.46 kg/liter

PEAS	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 1	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare																				
15.2 cm (6”)	0	0	11	29	46	62	78	92	106	123	138	151	168	183	197	212	229	241	254	263	270
17.8 cm (7”)	0	0	9	26	39	54	68	80	92	108	120	131	146	158	170	184	198	208	221	229	234
19.1 cm (7.5”)	0	0	9	24	37	49	63	74	85	99	111	121	135	146	157	169	183	193	204	211	216
20.3 cm (8”)	0	0	8	21	34	45	57	67	77	91	101	111	123	135	145	156	167	177	187	193	198
25.4 cm (10”)	0	0	7	18	27	37	47	55	64	74	83	91	101	110	118	127	137	145	152	158	163

PINTO BEANS	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare*																				
15.2 cm (6”)	0	0	0	4	8	13	18	22	27	31	36	40	46	49	54	59	63	67	71	72	73
17.8 cm (7”)	0	0	0	3	7	11	16	20	24	27	30	35	39	43	47	52	55	58	62	62	63
19.1 cm (7.5”)	0	0	0	3	7	10	15	18	21	25	28	33	36	39	44	47	50	54	56	57	58
20.3 cm (8”)	0	0	0	3	6	10	13	17	20	22	26	30	34	36	39	44	46	49	52	53	53
25.4 cm (10”)	0	0	0	2	4	8	11	13	16	19	21	25	27	30	33	36	38	40	43	43	44

* Based on 0.77 kg/liter

RICE LONG GRAIN	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 1	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare																				
15.2 cm (6”)	0	7	11	17	22	28	33	38	44	49	55	61	65	72	82	89	95	102	104	109	112
17.8 cm (7”)	0	6	10	15	19	24	28	34	38	43	47	53	56	63	71	77	83	87	91	94	98
19.1 cm (7.5”)	0	6	9	13	18	22	26	31	35	39	44	48	52	57	66	71	76	81	83	87	90
20.3 cm (8”)	0	4	9	12	16	20	24	28	33	36	40	45	47	53	61	65	71	74	76	80	83
25.4 cm (10”)	0	4	7	10	13	17	19	24	26	29	33	36	39	44	49	53	57	61	63	65	67

RICE LONG GRAIN	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 1A	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare																				
15.2 cm (6”)	0	13	24	35	45	56	67	80	90	102	112	123	133	148	168	182	196	207	214	224	231
17.8 cm (7”)	0	12	21	30	39	49	58	68	77	87	98	108	115	128	146	158	170	179	185	194	201
19.1 cm (7.5”)	0	11	19	28	36	45	54	64	72	81	90	100	106	118	135	146	157	166	171	179	185
20.3 cm (8”)	0	10	18	26	33	41	49	58	66	74	83	91	98	109	123	133	145	151	157	164	169
25.4 cm (10”)	0	8	15	20	27	34	40	47	54	61	67	74	80	89	101	109	118	124	129	135	139

RICE SHORT GRAIN	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 1	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare																				
15.2 cm (6”)	0	8	15	20	26	34	39	47	52	57	64	69	74	83	93	101	110	115	120	126	129
17.8 cm (7”)	0	7	12	18	22	29	35	40	44	49	55	61	64	72	81	87	95	101	104	109	112
19.1 cm (7.5”)	0	7	11	16	21	27	31	37	40	46	50	56	59	66	74	81	87	93	95	101	103
20.3 cm (8”)	0	6	10	15	19	25	29	35	37	41	46	52	55	62	68	74	81	85	87	92	95
25.4 cm (10”)	0	4	9	12	16	20	24	28	30	35	38	41	45	50	56	61	66	69	72	75	77

RICE SHORT GRAIN	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 1A	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare																				
15.2 cm (6”)	0	17	29	41	54	68	82	95	104	117	130	143	152	171	189	207	225	238	245	258	266
17.8 cm (7”)	0	15	26	36	47	59	71	83	91	102	113	124	132	148	165	179	196	206	213	223	230
19.1 cm (7.5”)	0	13	24	34	44	55	65	76	84	94	104	115	122	137	152	166	180	196	206	212	103
20.3 cm (8”)	0	6	10	15	19	25	29	35	37	41	46	52	55	62	68	74	81	85	87	92	95
25.4 cm (10”)	0	4	9	12	16	20	24	28	30	35	38	41	45	50	56	61	66	69	72	75	77

RYE	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare																				
15.2 cm (6”)	0	3	7	9	12	16	18	20	22	26	28	31	34	37	40	43	45	47	48	52	53
17.8 cm (7”)	0	3	6	8	10	13	15	18	20	22	25	27	29	33	35	37	39	40	43	45	46
19.1 cm (7.5”)	0	3	6	8	10	12	13	16	18	20	22	25	27	30	33	35	36	38	39	40	43
20.3 cm (8”)	0	2	4	7	9	11	12	15	17	19	21	22	25	27	29	31	33	35	36	37	38
25.4 cm (10”)	0	2	4	6	8	9	10	12	13	16	17	19	20	22	24	26	27	28	29	30	31

SOYBEANS	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 1	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare*																				
15.2 cm (6”)	0	0	0	0	34	45	62	78	94	110	127	142	157	173	186	197	211	224	229	232	234
17.8 cm (7”)	0	0	0	0	29	39	54	68	81	95	110	123	137	149	161	171	183	194	198	202	203
19.1 cm (7.5”)	0	0	0	0	27	36	49	63	75	89	102	113	126	138	148	158	168	179	184	186	187
20.3 cm (8”)	0	0	0	0	25	34	45	57	68	81	93	104	115	127	136	145	155	165	168	170	171
25.4 cm (10”)	0	0	0	0	20	27	37	47	56	66	76	85	94	103	111	119	127	135	138	139	140

* Based on 0.76 kg/liter

SOYBEANS	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare*																				
15.2 cm (6”)	0	0	0	0	11	15	20	26	30	36	41	46	52	56	61	64	68	73	75	76	76
17.8 cm (7”)	0	0	0	0	9	12	18	22	27	31	36	40	45	48	53	56	59	64	65	66	66
19.1 cm (7.5”)	0	0	0	0	9	12	16	20	25	29	34	37	41	45	48	52	55	69	59	61	62
20.3 cm (8”)	0	0	0	0	8	11	15	19	22	27	30	34	38	41	45	47	50	54	55	56	56
25.4 cm (10”)	0	0	0	0	7	9	12	16	18	21	25	28	30	34	36	38	41	44	45	46	46

* Based on 0.76 kg/liter

SOYBEANS	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2A	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare*																				
15.2 cm (6”)	0	0	0	0	22	30	41	53	63	74	85	95	105	115	124	132	141	150	154	156	157
17.8 cm (7”)	0	0	0	0	19	26	36	46	55	64	74	82	91	100	108	115	123	130	133	136	137
19.1 cm (7.5”)	0	0	0	0	18	25	34	41	50	59	68	76	84	92	100	106	113	120	123	124	126
20.3 cm (8”)	0	0	0	0	17	22	30	38	46	54	63	69	77	84	92	98	104	110	113	114	115
25.4 cm (10”)	0	0	0	0	13	18	25	31	38	45	50	57	63	69	75	80	85	90	92	94	94

* Based on 0.76 kg/liter. Setting the feed cup adjustment lever between 50 & 80 allows for optimum seeding of soybeans.

SUNFLOWERS	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare*																				
15.2 cm (6”)	0	0	0	2	3	4	7	9	10	12	16	17	19	21	22	26	27	29	30	31	33
17.8 cm (7”)	0	0	0	2	3	3	6	8	9	11	13	15	17	18	20	22	24	25	26	27	28
19.1 cm (7.5”)	0	0	0	1	3	3	6	7	9	10	12	13	16	17	18	20	21	24	24	25	26
20.3 cm (8”)	0	0	0	1	2	3	6	7	8	9	11	12	13	16	17	19	20	21	22	22	24
25.4 cm (10”)	0	0	0	1	2	3	4	6	7	8	9	10	11	12	13	16	16	17	18	19	19

* Based on 0.37 kg/liter

WHEAT	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 1	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare*																				
15.2 cm (6”)	0	12	22	31	41	53	62	73	84	95	108	119	130	145	157	171	180	191	196	206	212
17.8 cm (7”)	0	11	19	27	36	45	54	63	73	82	93	103	112	124	136	148	157	165	170	178	184
19.1 cm (7.5”)	0	10	18	26	33	41	49	58	67	76	86	95	104	115	126	137	145	152	157	165	170
20.3 cm (8”)	0	9	17	24	30	38	45	54	62	69	78	87	95	104	115	126	132	139	145	151	156
25.4 cm (10”)	0	8	13	19	25	31	37	44	50	57	65	72	78	86	94	103	109	114	118	123	128

* Based on 0.77 kg/liter

WHEAT	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2A	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare*																				
15.2 cm (6”)	0	9	15	21	28	35	41	49	56	64	72	80	87	96	105	114	121	128	131	138	142
17.8 cm (7”)	0	8	12	18	24	30	36	43	49	52	63	69	75	84	91	100	105	111	114	120	123
19.1 cm (7.5”)	0	7	12	17	22	28	34	39	45	50	58	64	69	77	84	92	96	102	105	111	114
20.3 cm (8”)	0	7	11	16	20	26	30	36	41	47	53	58	64	71	77	84	89	93	96	101	104
25.4 cm (10”)	0	6	9	12	17	21	25	29	34	38	44	48	53	58	63	68	73	76	78	83	85

* Based on 0.77 kg/liter

WHEAT GRASS	SEED RATE INDICATOR SETTING NUMBER																				
DRIVE TYPE 2	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Kilograms Per Hectare																				
15.2 cm (6”)	0	1	2	2	3	4	4	6	7	8	9	10	10	11	12	13	15	16	16	17	17
17.8 cm (7”)	0	1	1	2	3	3	4	6	6	7	8	9	9	10	11	12	12	13	13	15	15
19.1 cm (7.5”)	0	1	1	2	3	3	4	4	6	7	7	8	9	9	10	11	11	12	12	13	13
20.3 cm (8”)	0	1	1	2	2	3	3	4	4	6	7	7	8	9	9	10	11	11	11	12	12
25.4 cm (10”)	0	1	1	1	2	2	3	3	4	4	6	6	7	7	8	8	9	9	10	10	10

Metric Small Grass Seed Charts

Alfalfa, Red Alsike, Crimson Clover

Row Spacing	Rate Adjuster Setting																			
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	Seed Rate in Kilograms per Hectare																			
15.2 cm (6”)	0	2.5	3.9	5.4	6.7	8.4	9.8	11.0	12.6	14.0	15.5	16.9	18.4	19.6	21	23	24	26	27	28
17.8 cm (7”)	0	2.1	3.4	4.6	5.7	7.2	8.4	9.4	10.6	12.1	13.2	14.5	15.7	16.8	18.3	19.4	21	22	23	24
19.1 cm (7½”)	0	2.0	3.1	4.4	5.4	6.7	7.8	8.9	10.1	11.2	12.4	13.6	14.8	15.7	17.1	18.2	19.3	21	22	23
20.3 cm (8”)	0	1.8	2.9	4.0	5.0	6.3	7.4	8.3	9.4	10.5	11.5	12.7	13.8	14.6	14.7	17.0	18.0	19.2	20	21
25.4 cm (10”)	0	1.5	2.4	3.1	3.9	4.9	5.7	6.5	7.4	8.3	9.1	10.0	10.9	11.5	12.6	13.3	14.1	15.0	15.9	16.7

Bermuda, Red Top, Unhulled Lespedeza, Sercia, Sand & Weeping Love Grass

Row Spacing	Rate Adjuster Setting																			
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	Seed Rate in Kilograms per Hectare																			
15.2 cm (6”)	0	0.8	1.2	1.9	2.9	3.7	4.6	5.6	6.6	7.4	8.1	8.7	9.4	10.1	10.6	11.4	12.2	13.0	13.7	14.5
17.8 cm (7”)	0	0.7	1.0	1.7	2.5	3.1	4.0	4.8	5.7	6.3	6.9	7.5	8.0	8.6	9.1	9.8	10.5	11.2	11.8	12.3
19.1 cm (7½”)	0	0.6	1.0	1.6	2.4	2.9	3.7	4.5	5.3	5.9	6.5	7.1	7.5	8.1	8.5	9.2	9.9	10.4	11.0	11.7
20.3 cm (8”)	0	0.6	0.9	1.5	2.2	2.8	3.5	4.3	4.9	5.5	6.1	6.6	7.3	7.5	8.0	8.5	9.2	9.8	10.3	10.9
25.4 cm (10”)	0	0.4	0.7	1.1	1.7	2.1	2.7	3.4	3.9	4.4	4.7	5.2	5.5	5.9	6.3	6.7	7.2	7.6	8.1	8.5

Birdsfoot, Trefoil, Sudan

Row Spacing	Rate Adjuster Setting																			
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	Seed Rate in Kilograms per Hectare																			
15.2 cm (6”)	0	1.9	3.7	5.8	7.6	9.8	12.0	14.2	16.5	18.8	22	24	26	29	31	34	36	38	41	43
17.8 cm (7”)	0	1.7	3.1	5.0	6.5	8.4	10.3	12.2	14.0	16.1	18.5	20	22	25	27	29	31	33	35	37
19.1 cm (7½”)	0	1.6	2.9	4.7	6.1	7.8	9.6	11.4	13.3	15.1	17.3	19.1	21	23	25	27	29	31	33	35
20.3 cm (8”)	0	1.5	2.8	4.4	5.7	7.4	9.1	10.6	12.3	14.1	16.1	17.8	19.6	22	24	25	27	29	30	32
25.4 cm (10”)	0	1.1	2.1	3.5	4.5	5.7	7.1	8.4	9.6	11.1	12.7	14.0	15.5	16.9	18.5	19.7	21	23	24	25

Canola, Ladino Clover, Canary Grass, Timothy

Row Spacing	Rate Adjuster Setting																			
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	Seed Rate in Kilograms per Hectare																			
15.2 cm (6”)	0	1.2	2.4	3.7	5.3	6.8	8.5	10.3	12.0	13.7	15.5	17.4	19.1	21	23	24	26	28	31	33
17.8 cm (7”)	0	1.0	1.9	3.1	4.6	5.8	7.4	8.9	10.3	11.8	13.2	14.9	16.4	17.8	19.5	21	22	25	26	28
19.1 cm (7½”)	0	1.0	1.8	2.9	4.4	5.5	6.8	8.3	9.6	11.0	12.4	14.0	15.4	16.7	18.3	19.7	21	23	25	26
20.3 cm (8”)	0	0.9	1.7	2.8	4.0	5.2	6.4	7.7	9.0	10.3	11.5	13.0	14.3	15.6	17.0	18.4	19.6	21	23	25
25.4 cm (10”)	0	0.7	1.7	2.1	2.8	4.0	5.0	6.1	7.1	8.1	9.1	10.2	11.2	12.2	13.5	14.5	15.5	16.7	18.0	19.3

Red & Sweet Clover, Lespedeza Hulled

Row Spacing	Rate Adjuster Setting																			
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	Seed Rate in Kilograms per Hectare																			
15.2 cm (6”)	0	1.7	3.8	5.8	8.0	10.1	12.7	14.8	17.1	19.1	21	23	25	27	30	32	34	36	38	40
17.8 cm (7”)	0	1.5	3.3	5.0	6.8	8.6	10.9	12.7	14.7	16.4	18.3	20	22	24	25	28	29	31	33	34
19.1 cm (7½”)	0	1.3	3.0	4.7	6.4	8.1	10.2	11.9	13.8	15.4	17.1	18.7	20	22	24	25	27	29	30	32
20.3 cm (8”)	0	1.2	2.8	4.4	5.9	7.5	9.5	11.1	12.9	14.3	16.0	17.5	18.9	21	22	24	25	27	28	30
25.4 cm (10”)	0	1.0	2.2	3.5	4.7	5.9	7.5	8.7	10.1	11.2	12.6	13.7	14.9	16.1	17.5	18.6	20	21	22	23

Kentucky Blue Grass, Fescue, Annual Rye Grass

Row Spacing	Rate Adjuster Setting																			
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	Seed Rate in Kilograms per Hectare																			
15.2 cm (6”)	0	0.2	1.3	2.1	3.0	3.7	4.6	5.2	5.8	6.5	7.1	7.6	8.2	8.7	9.3	9.9	10.3	10.9	11.2	11.8
17.8 cm (7”)	0	0.2	1.1	1.8	2.6	3.1	3.9	4.5	5.0	5.6	6.1	6.6	7.1	7.5	8.0	8.4	8.9	9.0	9.6	10.1
19.1 cm (7½”)	0	0.2	1.0	1.7	2.5	3.0	3.7	4.1	4.7	5.2	5.7	6.2	6.6	7.1	7.5	7.8	8.3	8.6	9.1	9.4
20.3 cm (8”)	0	0.2	1.0	1.6	2.2	2.8	3.4	3.9	4.4	4.8	5.4	5.7	6.2	6.6	6.9	7.4	7.7	8.4	8.4	8.9
25.4 cm (10”)	0	0.1	0.8	1.2	1.8	2.2	2.7	3.0	3.5	3.8	4.1	4.5	4.8	5.2	5.5	5.8	6.1	6.4	6.6	6.9

Millet, Reed Canary

Row Spacing	Rate Adjuster Setting																			
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	Seed Rate in Kilograms per Hectare																			
15.2 cm (6”)	0.4	1.6	2.7	3.9	4.9	6.2	7.3	8.4	9.5	10.6	11.8	12.9	14.0	15.2	16.4	17.5	18.6	19.7	21	21
17.8 cm (7”)	0.4	1.3	2.4	3.4	4.3	5.3	6.3	7.2	8.2	9.1	10.1	11.1	12.0	13.0	14.0	14.9	15.9	16.9	17.8	18.0
19.1 cm (7½”)	0.3	1.3	2.2	3.1	4.0	4.9	5.8	6.7	7.6	8.5	9.4	10.4	11.3	12.2	13.1	14.0	14.9	15.8	16.7	16.9
20.3 cm (8”)	0.3	1.2	2.0	2.9	3.7	4.6	5.5	6.3	7.2	8.0	8.9	9.6	10.5	11.4	12.2	13.1	13.9	14.8	15.6	15.8
25.4 cm (10”)	0.3	0.9	1.6	2.2	2.9	3.6	4.3	4.9	5.6	6.3	6.9	7.6	8.3	9.0	9.6	10.3	11.0	11.7	12.2	12.9

Orchard Grass

Row Spacing	Rate Adjuster Setting																			
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
	Seed Rate in Kilograms per Hectare																			
15.2 cm (6”)	0	0	0.3	0.8	1.0	1.5	1.7	2.2	2.7	3.1	3.7	3.9	4.4	4.9	5.4	5.6	6.2	6.4	6.8	7.1
17.8 cm (7”)	0	0	0.2	0.7	0.8	1.2	1.5	1.9	2.4	2.7	3.1	3.4	3.8	4.1	4.6	4.8	5.3	5.6	5.8	6.1
19.1 cm (7½”)	0	0	0.2	0.6	0.8	1.2	1.3	1.8	2.1	2.6	2.9	3.1	3.6	3.9	4.4	4.5	4.9	5.2	5.5	5.7
20.3 cm (8”)	0	0	0.2	0.6	0.8	1.1	1.2	1.7	2.0	2.4	2.8	2.9	3.3	3.7	4.0	4.3	4.6	4.8	5.2	5.4
25.4 cm (10”)	0	0	0.1	0.4	0.6	0.9	1.0	1.3	1.6	1.9	2.1	2.4	2.6	2.9	3.1	3.4	3.6	3.7	4.0	4.1

Metric Fertilizer Rate Charts

Fertilizer	Rate Adjuster Setting																		
2014+	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Application Rate - Kilograms per Hectare*																		
15.2 cm (6 in.)	10	15	28	54	75	100	126	147	173	194	221	244	262	293	313	327	340	343	345
17.8 cm (7 in.)	10	15	26	46	64	87	106	124	147	166	185	206	223	248	263	276	287	290	293
19.1 cm (7.5 in.)	8	12	22	43	61	81	100	118	138	155	176	195	210	234	250	262	271	275	277
20.3 cm (8 in.)	8	12	22	40	56	77	94	110	129	146	164	183	197	219	232	245	253	256	259
25.4 cm (10 in.)	6	9	18	33	45	61	75	89	103	117	132	147	157	176	187	196	204	205	207

*Based on 1.04 kg/liter.

Fertilizer	Rate Adjuster Setting																		
2013-	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
Row Spacing	Application Rate - Kilograms per Hectare*																		
15.2 cm (6 in.)	17	26	35	54	72	98	122	140	157	188	219	235	252	278	303	331	359	387	414
17.8 cm (7 in.)	15	22	29	43	61	83	104	119	133	160	186	201	214	236	258	281	305	328	352
19.1 cm (7.5 in.)	13	20	27	41	57	76	98	112	126	150	175	188	202	222	242	265	287	309	331
20.3 cm (8 in.)	12	19	26	40	54	69	92	105	118	141	164	177	189	208	228	248	269	290	310
25.4 cm (10 in.)	10	16	21	33	43	58	74	84	94	113	131	141	151	167	182	198	217	232	248

*Based on 1.04 kg/liter.

Density Conversion Chart

The fertilizer meter rate charts are based on fertilizer with a density of 65 pounds per cubic foot (1.04 kilograms per liter). If you are applying fertilizer of a different density, use the following table to convert application rate.

Dry Fertilizer Density Adjustment				
Pounds/Cubic-Foot	45	50	55	60
Kilograms/Liter	0.72	0.80	0.88	0.96
Conversion Factor	1.44	1.30	1.18	1.08

Pounds/Cubic-Foot	65	70	75	80
Kilograms/Liter	1.04	1.12	1.20	1.28
Conversion Factor	1.00	0.93	0.87	0.81

34755

Example: Your fertilizer has a density of 75 pounds per cubic foot, and you want to apply 100 pounds per acre. Multiply the desired application rate by the conversion factor.

100 x 0.87 = 87

Adjust drill to the setting closest to 87 pounds per acre.

Warranty

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

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

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

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

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

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

11285 29634

Index

Great Plains Manufacturing, Inc.
Corporate Office: P.O. Box 5060
Salina, Kansas 67402-5060 USA