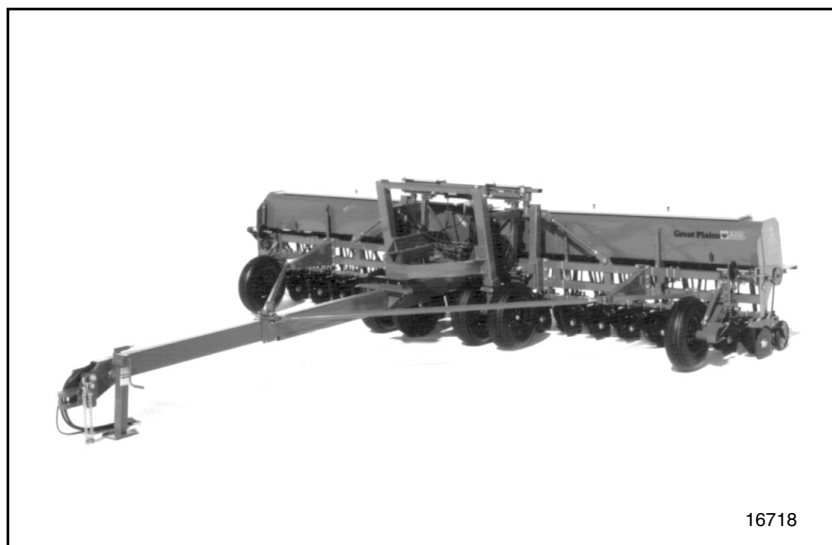

Operator's Manual

2SF24 and 2SF30
Two-Section, Folding Drill
1994+

 **Great Plains**
Manufacturing, Inc.
www.greatplainsmfg.com



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



16718

Cover illustration may show optional equipment not supplied with standard unit.

TABLE OF CONTENTS

Introduction	1
Safety Rules	2
Safety Decals	3
Safety Decal Placement	4
Decal Placement	5
Nut & Bolt Torquing Chart	6
Tire Inflation Chart	6
Assembly Instructions & Set Up	7
Tractor Requirements	10
Tractor Draw Bar Hook-up	10
Tractor Hydraulic Hook-up	11
Bleeding The Lifting Hydraulic Systems	11
Bleeding The Folding Hydraulic Systems	12
Leveling The Drill	14
Transport Wheel Adjustments For Leveling Drill	15
Gauge Wheel Adjustments For Leveling Drill	15
Box Alignment Adjustments	16
Basic Drill Operating Procedures	17
Folding	17
Lifting	18
Unfolding	18
Transporting	19
Parking	20
Seeding Adjustments	21
Seed Rate Charts for Imperial Measurement	22
Small Seeds Attachment	29
Small Seeds Attachment Seed Rate Chart	30
Fertilizer Meter Rate	31
Fertilizer Rate Chart for Imperial Measurement	32
Density Conversion Chart	32
Fertilizer Rate Chart for Metric Measurement	32
Density Conversion Chart	32
Planting Depth Adjustments	33
Drill Preparation	34
Operating Check List	35
Maintenance	36
Lubrication And Maintenance	36
Storage	37
Trouble Shooting	38
Specifications	41
Warranty	42

INTRODUCTION

Your Great Plains 2-Section Solid Stand Folding Drill is designed to give you many years of dependable service. This manual has been prepared to instruct you in the safe and efficient operation of this machine. Read and study it thoroughly. Follow all instructions and service procedures carefully.

The parts on your 2-Section Solid Stand Folding Drill have been specially designed and should only be replaced with genuine Great Plains parts. Should your drill require replacements parts, purchase them from your Great Plains Dealer.

Space has been provided below for you to record your model number and serial number of your drill. Be sure to bring this information with you to your dealer when ordering parts or attachments for your drill.

The following signal symbol and words should be clearly understood! When seen in this manual or on your equipment, this symbol and words will alert you to the seriousness of a situation. They should not be ignored or taken lightly.



The **SAFETY ALERT SYMBOL** indicates that there is a potential hazard to personal safety involved and extra safety precautions 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.

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.

WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

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.

Thank you for buying a GREAT PLAINS 2-Section Solid Stand Folding Drill.

SERIAL NUMBER _____

MODEL NUMBER _____

DATE PURCHASED _____

SAFETY RULES

The safe operation of machinery is a big concern to farmers and manufacturers. We have designed our 2-Section Solid Stand Folding Drill with many built-in safety features. However, no one should operate this drill before carefully reading this operator's manual.

1. **NEVER** permit anyone to ride on or walk beside the drill when moving.
2. **NEVER** permit anyone to ride on tractor when the drill is being moved.
3. **NEVER** allow anyone to be near the drill when performing operating functions with the drill or tractor.
4. **NEVER** load the drill without being hooked up to a tractor.
5. Extra care should be taken when transporting with seed in the box.
6. **ALWAYS** securely connect the hitch safety chain to the tractor before transporting the drill.
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.
9. When in transport, use accessory lights and devices for adequate warning to operators of other vehicles and use safety hitch chain. Comply with all federal, state and local laws when traveling on public roads.



10. Use "**Slow Moving Vehicle**" emblem for warning vehicles approaching from the rear.
11. When transporting, remember the drill is wider than your tractor and extreme care must be taken to allow for safe clearance.
12. **NEVER** back up when openers are in the ground.
13. **ALWAYS** set the drill in field position **BEFORE** lubrication, making adjustments, or servicing.
14. **DO NOT** lubricate, adjust or repair the drill while it is in operation.
15. **DO NOT** permit smoking, sparks, or an open flame where combustible lubricants or liquids are being used.
16. When using treated seed, avoid direct contact with the seed.
17. When using compressed air to clean the drill, wear safety glasses.
18. **NEVER** unhook drill from tractor when negative tongue weight is present.



19. **CAUTION!** 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!



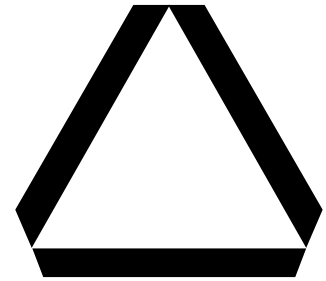
20. **CAUTION!** Escaping fluid under pressure can have sufficient force to penetrate the skin. Check all hydraulic lines and hoses **BEFORE** applying pressure. Fluid escaping from a very small hole can be almost invisible. Use paper or cardboard, **NOT BODY PARTS**, to check for suspected leaks. If injured, seek medical assistance from a doctor that is familiar with this type of injury. Foreign fluids in the tissue must be surgically removed within a few hours or gangrene will result.

SAFETY DECALS

LIFT CYLINDERS OPERATING INSTRUCTIONS

THIS MACHINE IS EQUIPPED WITH REPHASING MASTER SLAVE LIFT CYLINDERS. THESE CYLINDERS MAY AFTER A PERIOD OF TIME GET OUT OF TIME OR PHASE. THE EFFECTS OF THIS CAN BE SEEN WHEN ONE SECTION IS RUNNING TOO LOW OR TOO HIGH BECAUSE ITS LIFT CYLINDER IS EITHER OVEREXTENDED OR OVERRETRACTED 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 TO GIVE 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 IN MAINTAINING A LEVEL IMPLEMENT.

818-043C



Slow Moving Vehicle
Emblem

CAUTION
DO NOT LOWER DRILL IN FOLD-
ED POSITION - TIRE DAMAGE
MAY RESULT

818-020C

CAUTION

- Read Owner's Manual Before Operating Drill
- Stand Clear When Folding And Unfolding Drill
- Stand Clear When Raising And Lowering Drill
- Keep All Safety Shields And Devices In Place
- Keep Hands And Clothing Away From Moving Chains And Sprockets
- Never Ride On Drill
- Before Transporting, Be Sure Transport Lock Pins Are In Transport Position And Folded Boxes Are Locked In
- Hitch Drill To Tractor Before Folding, Unfolding Or Filling With Seed
- Always Lower Or Properly Support Drill Before Servicing
- Escaping Hydraulic Fluid Can Cause Serious Injury.

818-078C

WARNING

SAFETY HAZARD
USE EXTREME CAUTION
WHEN UNHITCHING DRILL
FROM TRACTOR

Negative tongue weight may cause immediate elevation of tongue resulting in damage or personal injury.

818-019C

838-267C

Reflector - Daytime

838-266C

838-265C

Reflector - Red

Reflector - Amber

--IMPORTANT--

*Your 2-Section Solid Stand Folding Drill comes equipped with all safety decals in place.

*Always keep safety decals clean and legible.

*Replace all damaged or missing safety decals. To order new safety decals go to your Great Plains Dealer and reference part numbers as shown on pages 4 & 5.

*To install new safety decals:

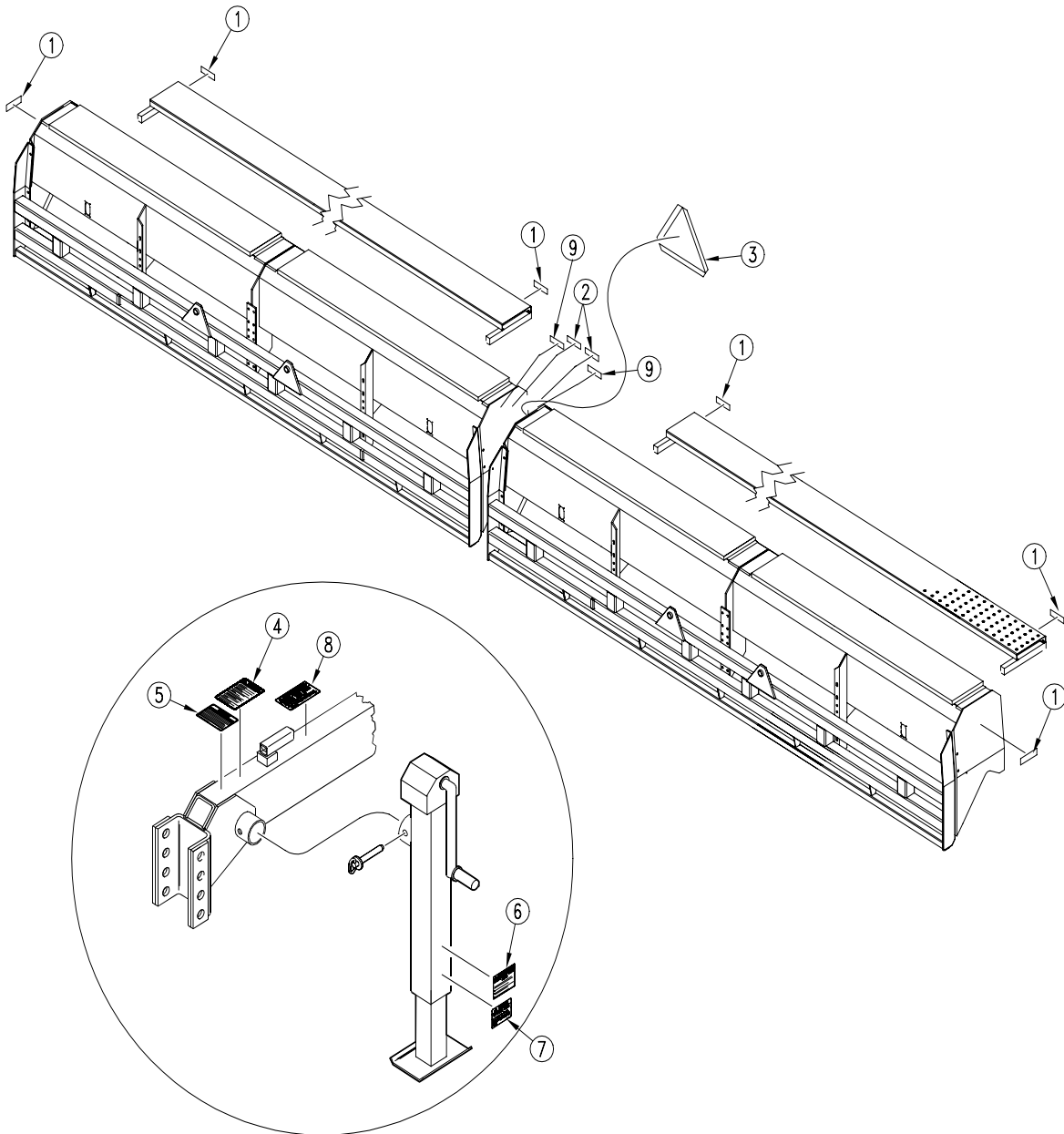
A) Clean the area the decal is to be placed. (Refer to pages 4 & 5.)

B) Peel backing from decal and press firmly onto clean surface.

SAFETY DECAL PLACEMENT {158-081A}

Includes ALL SAFETY Decals As Shown Below.

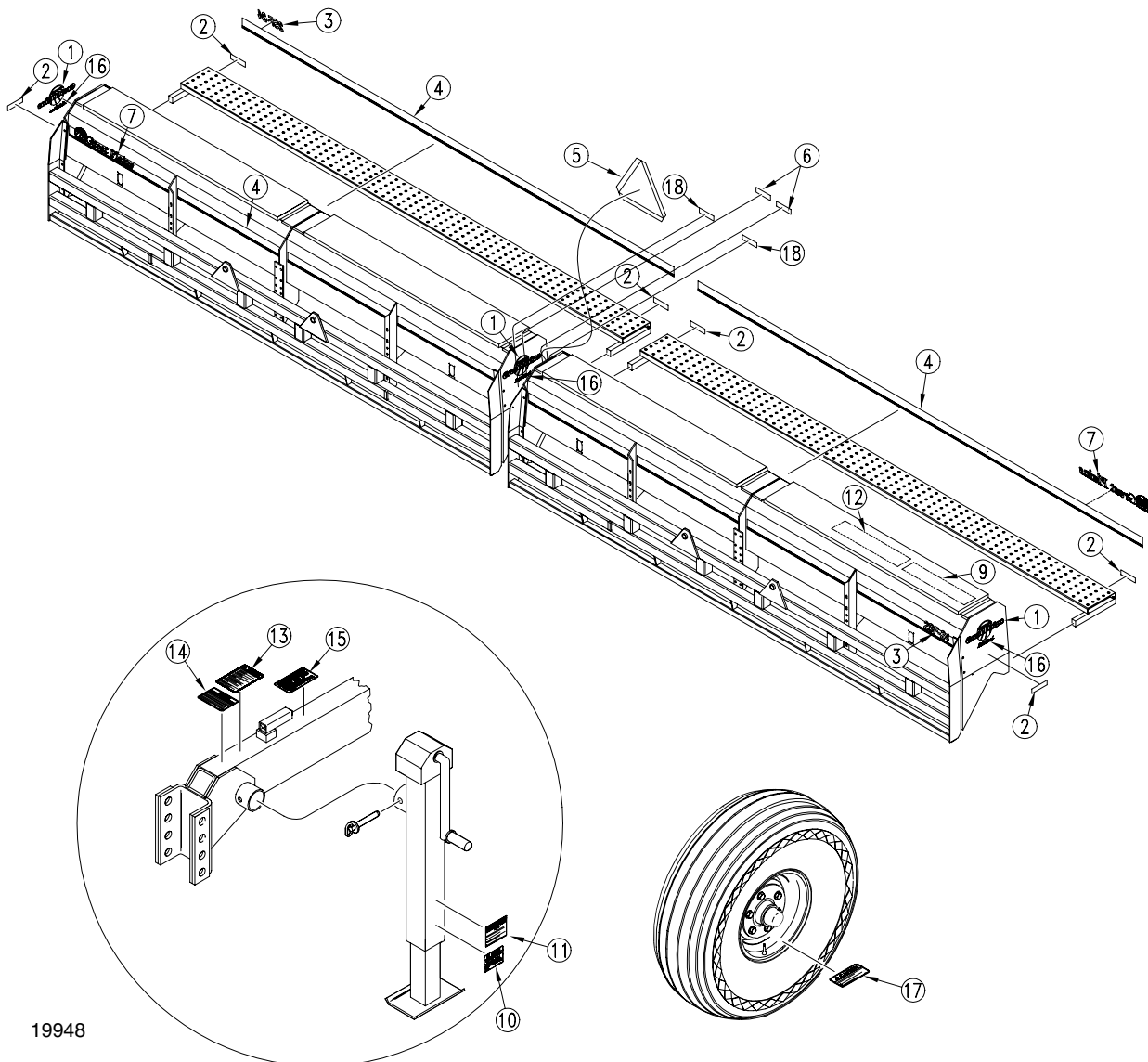
- | | | |
|----|----------|--------------------------------|
| 1. | 838-265C | DECAL AMBER REFLECTOR |
| 2. | 838-266C | DECAL RED REFLECTOR |
| 3. | 818-055C | DECAL SLOW MOVING-GALV. BACKED |
| 4. | 818-078C | DECAL CAUTION FP-HC-MF-24&30 |
| 5. | 818-043C | DECAL LIFT CYL OPERATING INSTR |
| 6. | 818-019C | DECAL WARNING NEG TONGUE WT |
| 7. | 818-020C | DECAL CAUTION TIRE DAMAGE HAZ |
| 8. | 818-188C | DECAL WARNING 20 MPH TRANS LR |
| 9. | 818-267C | DECAL DAYTIME REFLECTOR |



11366

DECAL PLACEMENT {158-079A 24' DRILL} {158-080A 30' DRILL}**Includes ALL Decals As Shown Below.**

- | | | |
|-----|----------|--------------------------------|
| 1. | 818-013C | DECAL SOLID STAND 24' |
| 1 | 818-014C | DECAL SOLID STAND 30' |
| 2. | 838-265C | DECAL AMBER REFLECTOR |
| 3. | 818-061C | DECAL SOLID STAND FOLDING DRIL |
| 4. | 818-064C | DECAL BUCKSKIN W/STRIPES/FT |
| 5. | 818-055C | DECAL SLOW MOVING-GALV. BACKED |
| 6. | 838-266C | DECAL RED REFLECTOR |
| 7. | 818-052C | DECAL GREAT PLAINS W/LOGO |
| 8. | 818-048C | DECAL GP SOLID STAND W/LOGO |
| 9. | 818-070C | DECAL SEED RATE & ADJ SS & FP |
| 10. | 818-020C | DECAL CAUTION TIRE DAMAGE HAZ |
| 11. | 818-019C | DECAL WARNING NEG TONGUE WT |
| 12. | 818-280C | DECAL SOLID STAND PEA |
| 13. | 818-078C | DECAL CAUTION FP-HC-MF-24&30 |
| 14. | 818-043C | DECAL LIFT CYL OPERATING INSTR |
| 15. | 818-188C | DECAL WARNING 20 MPH TRANS LR |
| 16. | 838-158C | DECAL SCRIPT SOLID STAND SMALL |
| 17. | 818-752C | DECAL CAUTION TIRE 52 PSI |
| 18. | 838-267C | DECAL DAYTIME REFLECTOR |



19948

NUT & BOLT TORQUING CHART

This chart is based on torque requirements in foot pounds for grade 5 bolts.

BOLT DIAMETER	MINIMUM TORQUE	MAXIMUM TORQUE	BOLT DIAMETER	MINIMUM TORQUE	MAXIMUM TORQUE
1/4"	9	11	3/4"	270	324
5/16"	17	20	7/8"	400	480
3/8"	35	42	1"	580	696
7/16"	54	64	1 1/8"	800	880
1/2"	80	96	1 1/4"	1120	1240
9/16"	110	132	1 3/8"	1460	1680
5/8"	150	180	1 1/2"	1940	2200

NOTE: Torque requirements listed above do not apply to self-locking nuts. For self-locking nuts increase the torque requirements listed above by 15%.

TIRE INFLATION CHART

TIRE SIZE	INFLATION PSI
7.50 x 20" 4 Ply Drill Rib	28
9.0 x 24" 8 Ply Rib Implement	40
9.5L x 15" 6 Ply Rib Implement	32
9.5L x 15" 8 Ply Rib Implement	44
9.5L x 15" 12 Ply Rib Implement	60
11L x 15" 6 Ply Rib Implement	28
11L x 15" 12 Ply Rib Implement	52
12.5L x 15" 8 Ply Rib Implement	36
12.5L x 15" 10 Ply Rib Implement	44
16.5L x 16.1" 10 Ply Rib Implement	36

NOTE: All tires are warranted by the original manufacturer of the tire. Tire warranty information can be found in the brochures included with your Operator's and Parts Manuals or online at the manufacturer's websites. For service assistance or information, contact your nearest Authorized Farm Tire Retailer.

Manufacturer

Titan
Goodyear
Firestone

Website

www.titan-intl.com
www.goodyearag.com
www.firestoneag.com

ASSEMBLY INSTRUCTIONS & SET UP

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

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.

ASSEMBLING THE DRILL

FOR THE FOLLOWING ASSEMBLY INSTRUCTIONS, REFER TO ILLUSTRATION ON PAGE 2-9:

1. Read and understand the previous section **BEFORE YOU START**.
2. Read "**Safety Rules**," page 2, before assembling drill.
3. Set the tongue (#1) approximately 21" 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" 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.

ASSEMBLY INSTRUCTIONS & SET UP (CON'T.)

1. 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 your tractor has plenty of hydraulic fluid. This system requires approximately 3.3 gallons.) When your drill frame raises 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 your 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 your 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 "**Tractor Hydraulic Hook-Up**," page 11, for additional information.
2. Attach the gauge-wheel turnbuckle (#5) to the gauge-wheel arm (#6) on each drill and then mount the wheel (#7) and tire.
3. Position the two drill boxes in line, end to end, with the end chain drive sprockets outboard and approximately 3" between the drill boxes. Drills on 8" row spacing and narrower will have 8" spacing at disks between boxes.
4. 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" 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.
5. 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".
6. Locate drill transport stabilizer frame (#16) 86 1/2" from the outside edge of each box frame. (Figure 1) Using 5/8" u-bolts (#17), lock washers (#18) and nuts (#19), mount stabilizer to box frame. Repeat for other side.
7. 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".
8. 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.
9. 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.
10. 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.
11. 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" clearance and lock the jam nut. This pin prevents the drill from unfolding when in transport. **DO NOT LOWER DRILL WHILE IN FOLDED POSITION.**
12. Check to see that all nuts are tightened. See the "**Nut & Bolt Torquing Chart**," page 6, for torque specifications.

ASSEMBLY INSTRUCTIONS & SET UP (CON'T.)

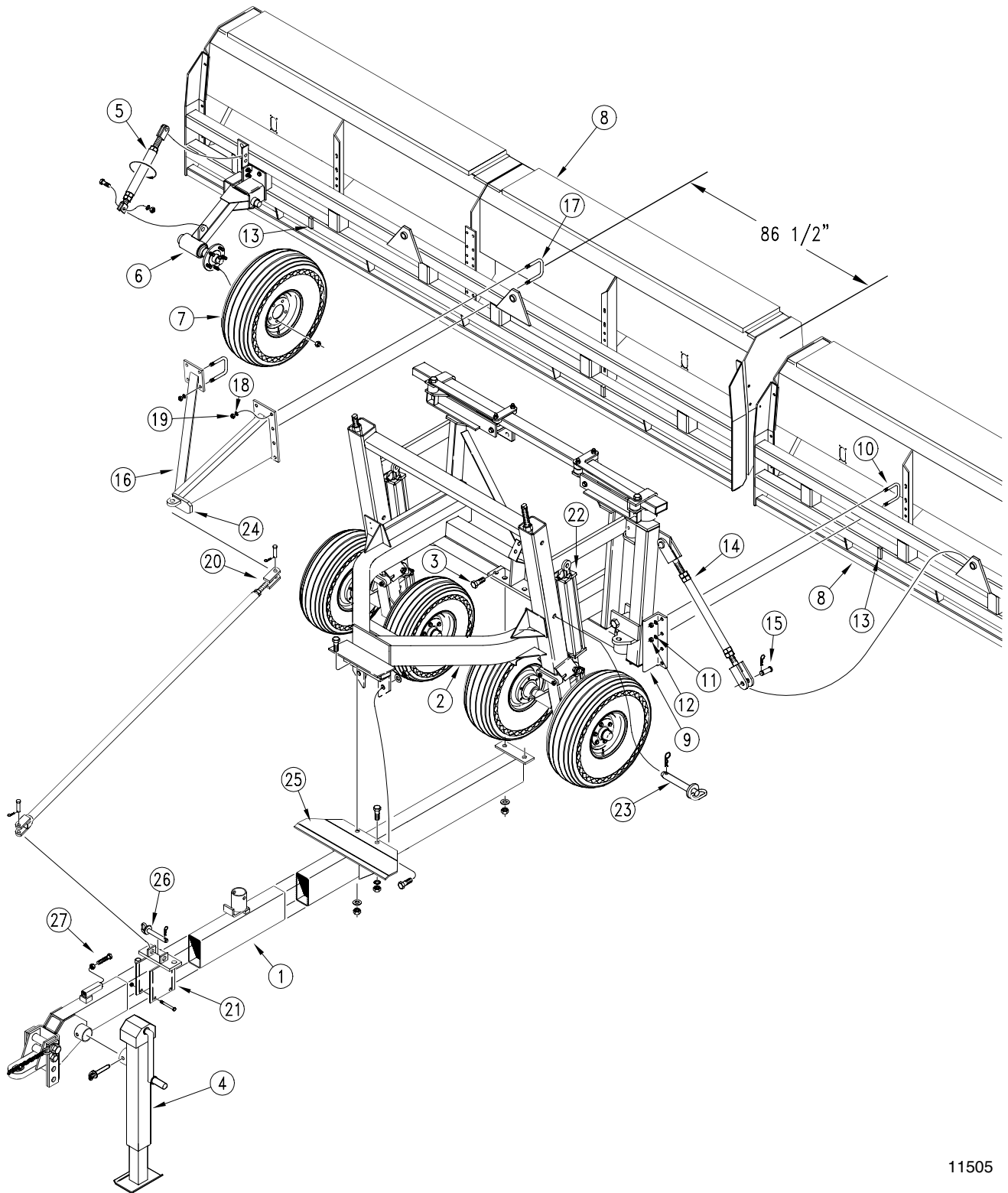


Figure 1
Assembly Instruction Illustration

11505

TRACTOR REQUIREMENTS

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' drills and 150 minimum horsepower for 30' drills should be used.

TRACTOR DRAW BAR HOOK-UP

1. The hitch can be used as either a single strap, clevis, or combination hitch as shown in Figure 2 Single Strap Hitch, Figure 3 Clevis Hitch and Figure 4 Combination Hitch.

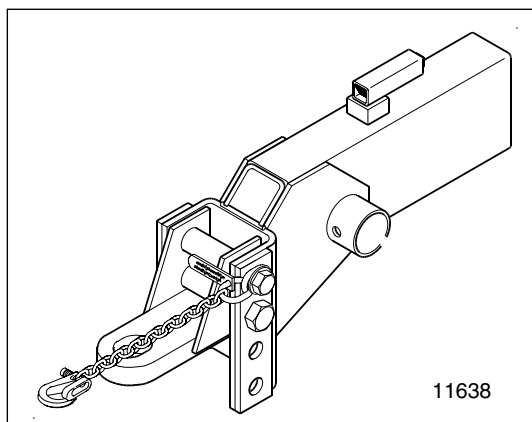


Figure 2
Single Strap Hitch

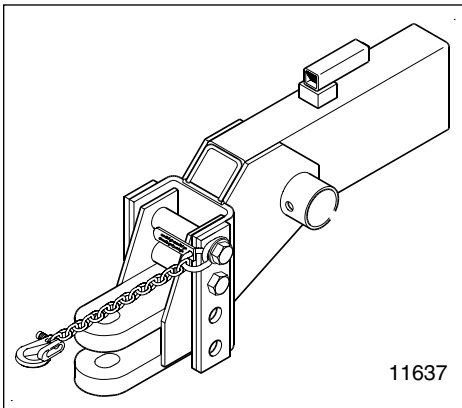


Figure 3
Clevis Hitch

CAUTION

THIS DRILL HAS BOTH POSITIVE AND NEGATIVE TONGUE WEIGHT. NEVER UNHOOK FROM TRACTOR WITH BOXES UNFOLDED AND RAISED OFF THE GROUND.

2. When using the combination hitch, remove lower strap when hooking up to a clevis-type tractor draw-

bar. 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.

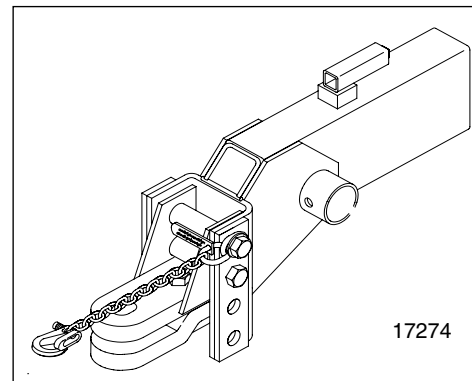


Figure 4
Combination Hitch

Two hitch sizes are available: The small hole hitch with or without the hammer strap (1 1/4" maximum pin diameter) and the large hole hitch without a hammer strap (up to 1 1/2" 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. 2. 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. 3. 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.

TRACTOR HYDRAULIC HOOK-UP

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.



CAUTION

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 THAT IS FAMILIAR WITH THIS KIND OF INJURY. FOREIGN FLUIDS IN THE TISSUE MUST BE SURGICALLY REMOVED WITHIN A FEW HOURS OR GANGRENE WILL RESULT.

BLEEDING THE HYDRAULIC SYSTEMS

GENERAL NOTES AND CAUTIONS

NOTE: 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.

IMPORTANT: 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

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 Folding Drill 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. **DO NOT** crack hose fittings in order to bleed air from this system.

NOTE: 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" 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 HYDRAULICS (CON'T.)

THE FOLLOWING SECTIONS DESCRIBE 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

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 THAT IS FAMILIAR WITH THIS KIND OF INJURY. FOREIGN FLUIDS IN THE TISSUE MUST BE SURGICALLY REMOVED WITHIN A FEW HOURS OR GANGRENE WILL RESULT.

BLEEDING FOLDING HYDRAULICS

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 5 on page 13.

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.

BLEEDING HYDRAULICS (CON'T.)

BLEEDING FOLDING HYDRAULICS (CON'T.)

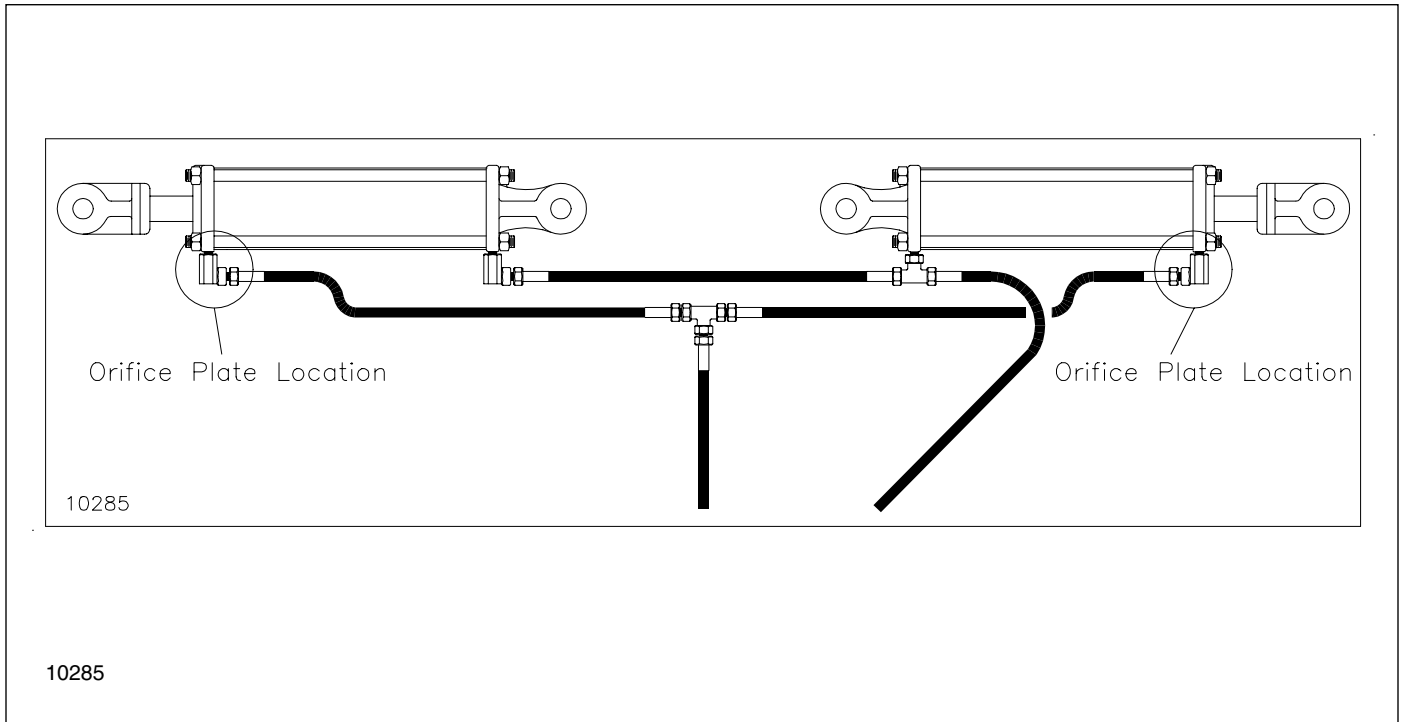


Figure 5
Wing Fold Hydraulics

LEVELING THE DRILL

NOTE: 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 uneven, 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.** See "Tractor Draw Bar Hook-Up," page 10. 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," page 33). If you require more downward float of your openers you may want to increase this dimen-

sion. 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

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," page 15. 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 15.

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.

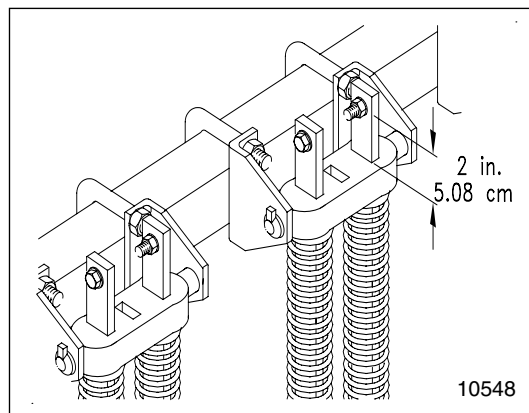


Figure 6
Opener Spring Rods

TRANSPORT WHEEL ADJUSTMENTS FOR LEVELING DRILL

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 16 Figure 11, 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. Now, lower your drill and both cylinders will be in sequence with one another and your two drill boxes should be at the same level again.

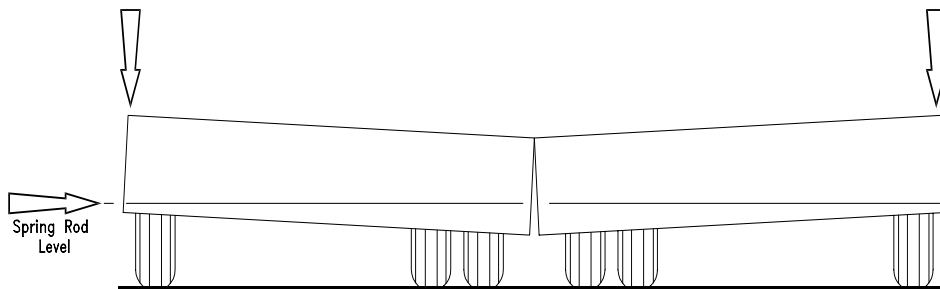


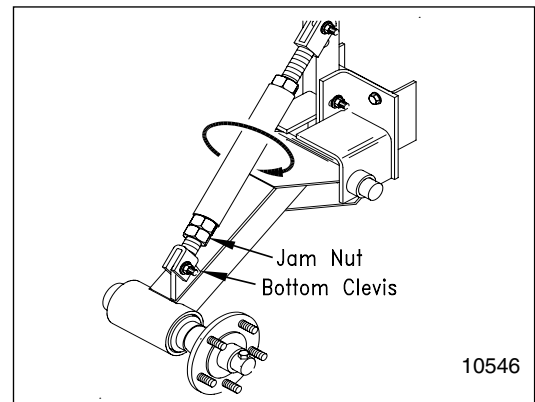
Figure 7

11504

GAUGE WHEEL ADJUSTMENTS FOR LEVELING DRILL

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, Figure 8 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.



10546

Figure 8
Gauge Wheel Turnbuckle

Shortening the gauge wheel turnbuckle will level the ends of the drill with the center. Refer to Figure 9.

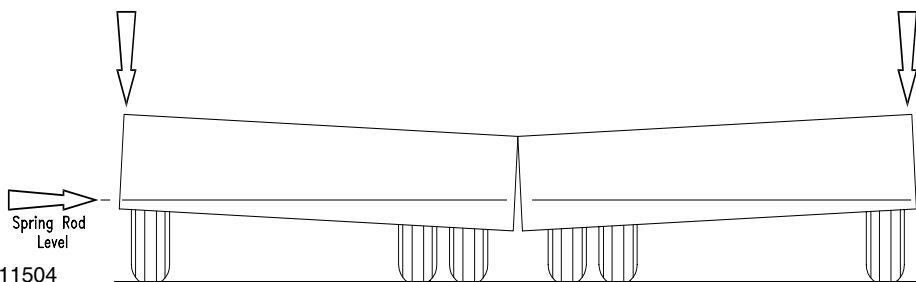


Figure 9

11504

BOX ALIGNMENT ADJUSTMENTS

PULL BAR ADJUSTMENTS

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.

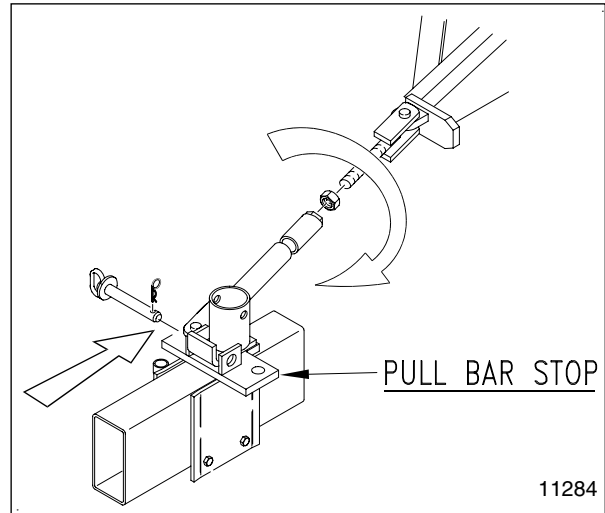


Figure 10
Pull Bar Adjustment

DRILL ADJUSTMENTS

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 equal firm contact with the soil.

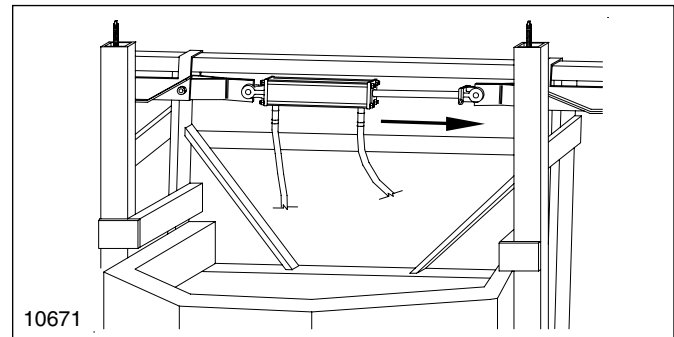


Figure 11
Top Slide Cylinder

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, Figure 12, Threaded Stud. Make sure both studs have approximately the same length of threads extending above the jam nut (approximately 3") for most planting conditions. Adjustments may be required.

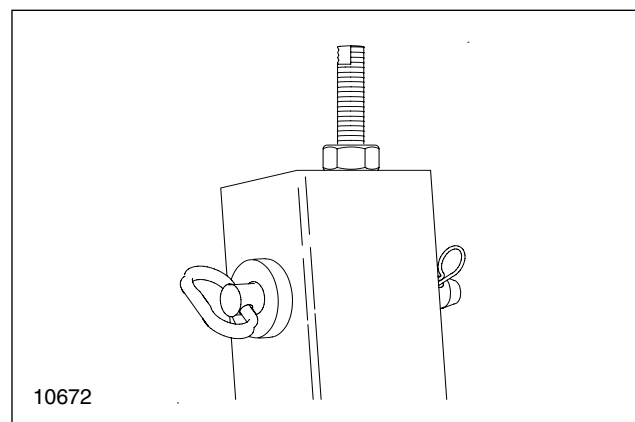


Figure 12
Threaded Stud

BASIC DRILL OPERATING PROCEDURES

FOLDING

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.
3. When folding the drill, the drill transport stabilizer frame should line up with the nest on the front of the main frame, Figure 13, Transport Stabilizers In Road Position. If they scrape the wing on the tongue, the boxes can be raised or lowered by adjusting the wing adjustment turnbuckle, Figure 14, Wing Adjustment Turnbuckle.
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 as shown in Figure 15, Transport Lock Pin in Transport Position.
5. Fold boxes using hydraulic cylinders. Do this very slowly and carefully. Serious damage could occur if done fast and carelessly.
6. Place the pin in the pull-bar transport lock as shown in Figure 16, Pull-Bar Pin Locked in Transport Position. This must always be used when transporting the drill in the folded position.

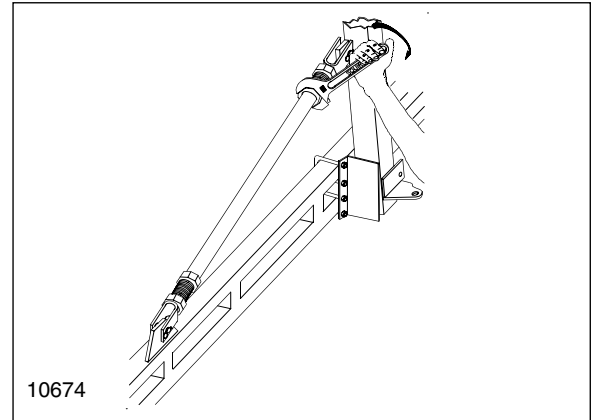


Figure 14
Wing Adjustment Turnbuckle

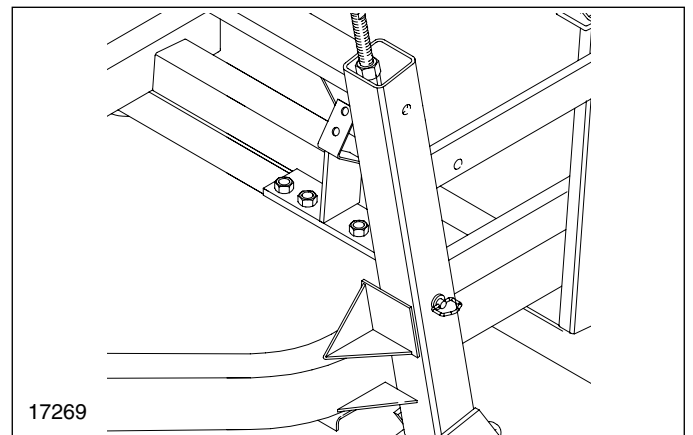


Figure 15
Transport Lock Pin in Transport Position

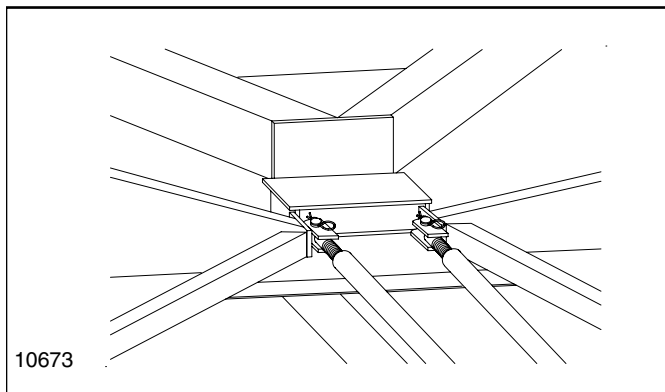


Figure 13
Transport Stabilizers In Road Position

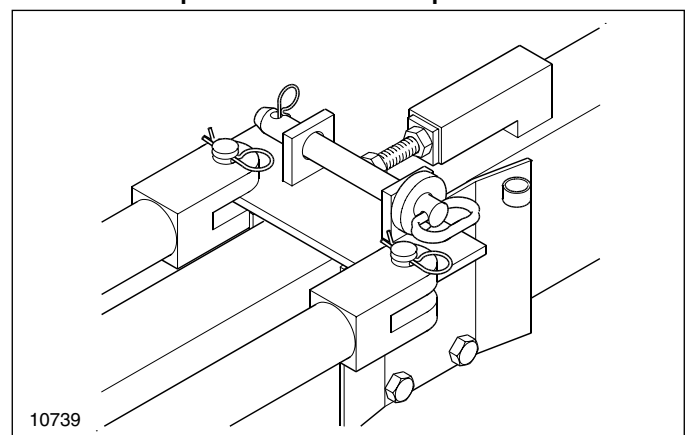


Figure 16
Pull-Bar Pin Locked in Transport Position



CAUTION

DO NOT LOWER DRILL WHILE IN FOLDED POSITION!

BASIC DRILL OPERATING PROCEDURES (CON'T.)

LIFTING

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" 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



CAUTION

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 AT-

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.
3. Remove pin from pull-bar transport lock, Figure 17, Pull-Bar Lock Pin InField Position.
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, .

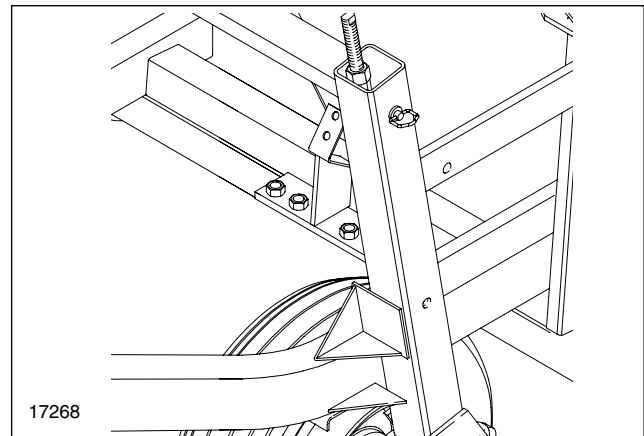


Figure 18
Transport Lock Pin in Field Position

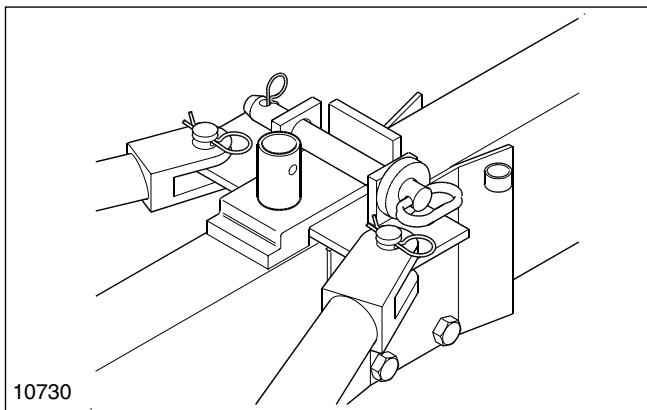


Figure 17
Pull-Bar Lock Pin in Field Position


TRANSPORTING



CAUTION

THIS DRILL SHOULD NEVER BE PULLED FASTER THAN 20 MILES PER HOUR!

BEFORE TRANSPORTING THE DRILL, FOLLOW AND CHECK THE 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, Figure 19, Transport Lock Pin in Transport Position.
3. Check to be sure the pull-bar transport lock pin is in position as shown in Figure 20, Pull-Bar Lock Pin in Transport Position.
4. Check to see if you have the required air pressure in your transport tires for proper inflation see "**Tire Inflation Chart**," page 6.
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. See "**Folding**," page 17.
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 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.

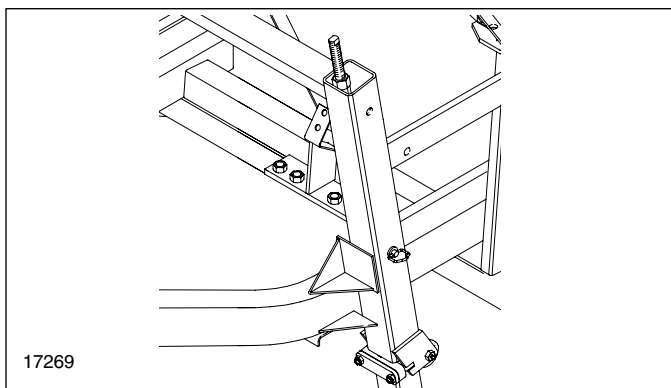


Figure 19
Transport Lock Pin in Transport Position

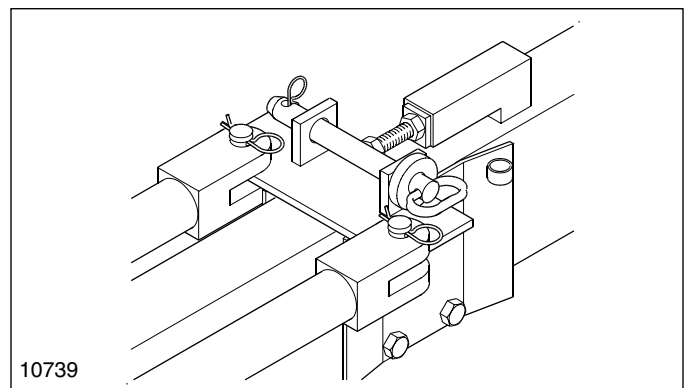


Figure 20
Pull-Bar Lock Pin in Transport Position

PARKING

The following steps should be done when preparing to store the drill or unhitch it from the tractor. See also "**Storage**," page 37, for additional information on the long-term storage of your drill.

1. Raise and fold the drill and place the transport lock pins in the transport position.
2. Park the drill on a level, solid area.
3. Remove the jack from its storage post and pin it on the post located on the left side of the main tongue, see .
4. If the ground is soft, place a board or plate under the jack to widen the ground contact area.
5. Extend the jack until the weight of the tongue is on the jack and has been removed from the tractor drawbar.
6. Unplug the drill hydraulic lines from the tractor.
7. Remove the hitch pin and safety chain from the tractor drawbar.

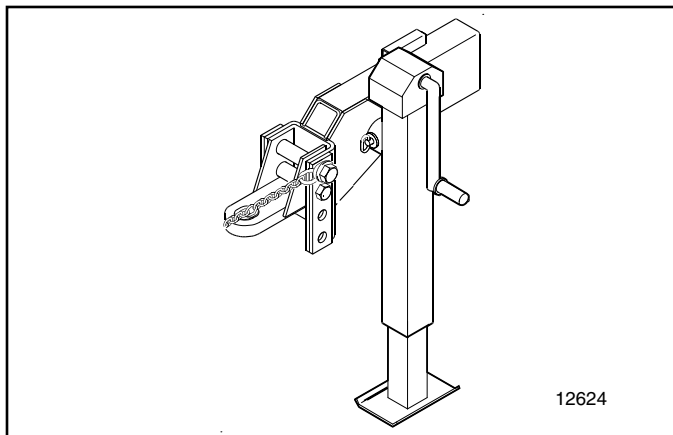


Figure 21
Jack in Vertical Position

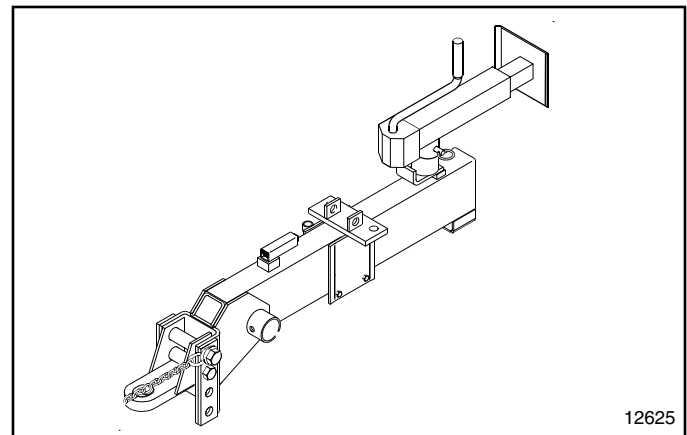


Figure 22
Jack in Transport Position

The following steps should be done when preparing to hitch the drill to the tractor.

1. Raise or lower the drill tongue as needed and hitch the drill to the tractor draw bar. Always use a safety chain. Refer to "**Tractor Drawbar Hook-Up**," page 10.
2. Plug the drill hydraulic lines into the tractor remotes.
3. Retract the jack until the weight of the tongue is resting on the tractor drawbar and install a minimum 1 1/8" long drawbar pin with safety clip.
4. Remove the jack from the side of the tongue and pin it on the storage post located on top of the main tongue Figure 22, Jack in Transport Position.

NOTE: If the drill is being hitched up and operated for the first time, it is important to follow the safety, setup, adjustment, bleeding and operating information in the front of this manual.

SEEDING ADJUSTMENTS

NOTE: SEEDING RATES WILL VARY GREATLY WITH VARIATIONS IN SIZES OF THE SEEDS. ALTHOUGH THE SEEDING RATES LISTED IN THIS MANUAL ARE BASED ON AN AVERAGE SEED SIZE, WE RECOMMEND THAT YOU TEST AND ADJUST YOUR DRILL USING THE PROCEDURES LISTED BELOW TO HELP ENSURE AN ACCURATE SEEDING RATE.

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" 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 charts 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' drill and approximately 182 rotations on a 30' 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.

REMEMBER: 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. Refer to Figure 23, Feed Cup Handle Adjustment on page 28.

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

SEED RATE CHARTS FOR IMPERIAL MEASUREMENT

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"	0	11	20	28	37	47	55	65	75	85	96	106	116	129	140	153	161	170	175	184	189
7"	0	10	17	24	32	40	48	56	65	73	83	92	100	111	121	132	140	147	152	159	164
7 1/2"	0	9	16	23	29	37	44	52	60	68	77	85	93	103	112	122	129	136	140	147	152
8"	0	8	15	21	27	34	40	48	55	62	70	78	85	94	103	112	118	124	129	135	139
10"	0	7	12	17	22	28	33	39	45	51	58	64	70	77	84	92	97	102	105	110	114

*Based On 60#/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"	0	8	13	19	25	31	37	44	50	57	64	71	78	86	94	102	108	114	117	123	127
7"	0	7	11	16	21	27	32	38	44	46	56	62	67	75	81	89	94	99	102	107	110
7 1/2"	0	6	11	15	20	25	30	35	40	45	52	57	62	69	75	82	86	91	94	99	102
8"	0	6	10	14	18	23	27	32	37	42	47	52	57	63	69	75	79	83	86	90	93
10"	0	5	8	11	15	19	22	26	30	34	39	43	47	52	56	61	65	68	70	74	76

*Based On 60#/Bushel

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"	0	7	13	18	23	30	35	42	46	51	57	62	66	74	83	90	98	103	107	112	115
7"	0	6	11	16	20	26	31	36	39	44	49	54	57	64	72	78	85	90	93	97	100
7 1/2"	0	6	10	14	19	24	28	33	36	41	45	50	53	59	66	72	78	83	85	90	92
8"	0	5	9	13	17	22	26	31	33	37	41	46	49	55	61	66	72	76	78	82	85
10"	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"	0	15	26	37	48	61	73	85	93	104	116	128	136	153	169	185	201	212	219	230	237
7"	0	13	23	32	42	53	63	74	81	91	101	111	118	132	147	160	175	184	190	199	205
7 1/2"	0	12	21	30	39	49	58	68	75	84	93	103	109	122	136	148	161	170	175	184	189
8"	0	11	19	27	35	45	53	63	69	77	85	94	100	112	124	136	148	156	161	169	174
10"	0	9	16	22	29	37	44	51	56	63	70	77	81	92	102	111	121	127	132	138	142

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"	0	6	10	15	20	25	29	34	39	44	49	54	58	64	73	79	85	91	93	97	100
7"	0	5	9	13	17	21	25	30	34	38	42	47	50	56	63	69	74	78	81	84	87
7 1/2"	0	5	8	12	16	20	23	28	31	35	39	43	46	51	59	63	68	72	74	78	80
8"	0	4	8	11	14	18	21	25	29	32	36	40	42	47	54	58	63	66	68	71	74
10"	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"	0	12	21	31	40	50	60	71	80	91	100	110	119	132	150	162	175	185	191	200	206
7"	0	11	19	27	35	44	52	61	69	78	87	96	103	114	130	141	152	160	165	173	179
7 1/2"	0	10	17	25	32	40	48	57	64	72	80	89	95	105	120	130	140	148	153	160	165
8"	0	9	16	23	29	37	44	52	59	66	74	81	87	97	110	119	129	135	140	146	151
10'	0	7	13	18	24	30	36	42	48	54	60	66	71	79	90	97	105	111	115	120	124

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"	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"	0	0	6	11	16	21	26	31	36	40	44	50	55	60	66	70	75	79	81	84	86
8"	0	0	5	10	15	20	24	28	33	37	40	46	50	55	60	64	68	73	75	77	79
10"	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#/Bushel

SEED RATE CHARTS FOR IMPERIAL MEASUREMENT (CON'T.)

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"	0	4	8	14	19	25	31	37	44	51	57	64	71	76	83	90	96	102	107	112	116
7"	0	4	7	12	16	22	27	32	38	44	49	55	61	66	72	78	83	88	93	97	100
7 1/2"	0	3	7	11	15	20	25	29	35	41	45	51	57	61	67	72	77	81	85	89	93
8"	0	3	6	10	14	19	23	27	32	37	41	47	52	56	61	66	70	75	78	82	85
10"	0	3	5	8	11	15	19	22	26	31	34	38	42	46	50	54	58	61	64	67	70

*Based On 39#/Bushel

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"	0	3	6	8	11	14	16	18	20	23	25	28	30	33	36	38	40	42	43	46	47
7"	0	3	5	7	9	12	13	16	18	20	22	24	26	29	31	33	35	36	38	40	41
7 1/2"	0	3	5	7	9	11	12	14	16	18	20	22	24	27	29	31	32	34	35	36	38
8"	0	2	4	6	8	10	11	13	15	17	19	20	22	24	26	28	29	31	32	33	34
10"	0	2	4	5	7	8	9	11	12	14	15	17	18	20	21	23	24	25	26	27	28

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"	0	3	5	7	10	12	15	18	21	24	26	30	32	36	39	43	47	50	52	53	53
7"	0	2	4	6	8	11	13	16	18	21	23	26	28	31	34	37	40	43	45	46	46
7 1/2"	0	2	4	6	8	10	12	14	17	19	21	24	26	29	31	34	37	40	42	42	42
8"	0	2	3	5	7	9	11	13	15	17	19	22	24	26	29	31	34	36	38	39	39
10"	0	2	3	4	6	7	9	11	13	14	16	18	19	21	23	26	28	30	31	32	32

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"	0	8	14	20	26	33	40	47	55	62	70	77	85	94	102	111	118	124	128	134	138
7"	0	7	12	17	22	29	34	40	47	54	61	67	73	81	88	97	102	107	111	116	120
7 1/2"	0	6	11	16	21	26	32	37	44	50	56	62	68	75	82	89	94	99	102	107	111
8"	0	6	10	15	19	24	29	34	40	45	51	57	62	69	75	82	86	91	94	98	101
10"	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"	0	2	4	6	9	12	14	16	19	21	24	26	29	32	35	38	42	45	47	47	48
7"	0	2	3	5	8	10	12	14	16	18	21	23	25	28	30	33	36	39	41	41	41
7 1/2"	0	2	3	5	7	9	11	13	15	17	19	21	23	26	28	30	33	36	37	38	38
8"	0	1	3	5	7	9	10	12	14	16	17	19	21	23	26	28	31	33	34	35	35
10"	0	1	2	4	5	7	8	10	11	13	14	16	18	19	21	23	25	27	28	28	29

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"	0	0	0	2	3	4	6	8	9	11	14	15	17	19	20	23	24	26	27	28	29
7"	0	0	0	2	3	3	5	7	8	10	12	13	15	16	18	20	21	22	23	24	25
7 1/2"	0	0	0	1	3	3	5	6	8	9	11	12	14	15	16	18	19	21	21	22	23
8"	0	0	0	1	2	3	5	6	7	8	10	11	12	14	15	17	18	19	20	20	21
10"	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#/Bushel

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"	0	0	0	0	30	40	55	70	84	98	113	127	140	154	166	176	188	200	204	207	209
7"	0	0	0	0	26	35	48	61	72	85	98	110	122	133	144	153	163	173	177	180	181
7 1/2"	0	0	0	0	24	32	44	56	67	79	91	101	112	123	132	141	150	160	164	166	167
8"	0	0	0	0	22	30	40	51	61	72	83	93	103	113	121	129	138	147	150	152	153
10"	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#/Bushel

SEED RATE CHARTS FOR IMPERIAL MEASUREMENT (CON'T.)

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"	0	0	0	0	10	13	18	23	27	32	37	41	46	50	54	57	61	65	67	68	68
7"	0	0	0	0	8	11	16	20	24	28	32	36	40	43	47	50	53	57	58	59	59
7 1/2"	0	0	0	0	8	11	14	18	22	26	30	33	37	40	43	46	49	52	53	54	55
8"	0	0	0	0	7	10	13	17	20	24	27	30	34	37	40	42	45	48	49	50	50
10"	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#/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"	0	0	0	0	20	27	37	47	56	66	76	85	94	103	111	118	126	134	137	139	140
7"	0	0	0	0	17	23	32	41	49	57	66	73	81	89	96	103	110	116	119	121	122
7 1/2"	0	0	0	0	16	22	30	37	45	53	61	68	75	82	89	95	101	107	110	111	112
8"	0	0	0	0	15	20	27	34	41	48	56	62	69	75	82	87	93	98	101	102	103
10"	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#/Bushel. Setting the feed cup adjustment lever between 50 & 80 allows for optimum seeding of soybeans.

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"	0	0	10	26	41	55	70	82	95	110	123	135	150	163	176	189	204	215	227	235	241
7"	0	0	8	23	35	48	61	71	82	96	107	117	130	141	152	164	177	186	197	204	209
7 1/2"	0	0	8	21	33	44	56	66	76	88	99	108	120	130	140	151	163	172	182	188	193
8"	0	0	7	19	30	40	51	60	69	81	90	99	110	120	129	139	149	158	167	172	177
10"	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"	0	0	0	4	7	12	16	20	24	28	32	36	41	44	48	53	56	60	63	64	65
7"	0	0	0	3	6	10	14	18	21	24	27	31	35	38	42	46	49	52	55	55	56
7 1/2"	0	0	0	3	6	9	13	16	19	22	25	29	32	35	39	42	45	48	50	51	52
8"	0	0	0	3	5	9	12	15	18	20	23	27	30	32	35	39	41	44	46	47	47
10"	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#/Bushel

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"	0	4	6	8	11	14	17	20	23	26	29	32	35	37	40	42	45	47	50	52	54
7"	0	3	5	7	10	13	15	18	20	23	25	28	30	32	34	37	39	41	43	45	46
7 1/2"	0	3	5	7	9	12	14	16	18	21	23	26	28	30	32	34	36	38	40	41	43
8"	0	3	4	6	8	11	13	15	17	19	22	24	26	27	29	31	33	35	36	38	39
10"	0	2	3	5	7	9	10	12	14	16	18	19	21	22	24	25	27	28	30	31	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"	0	3	5	8	12	15	18	21	24	27	30	34	37	41	45	49	54	57	60	60	61
7"	0	2	4	7	10	12	15	18	21	24	26	29	32	36	39	42	46	50	52	52	53
7 1/2"	0	2	4	6	9	11	14	16	19	22	24	27	30	33	36	39	43	46	48	48	49
8"	0	2	3	6	8	10	13	15	18	20	22	25	27	30	33	36	39	42	44	44	45
10"	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#/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"	0	1	2	2	3	4	4	5	6	7	8	9	9	10	11	12	13	14	14	15	15
7"	0	1	1	2	3	3	4	5	5	6	7	8	8	9	10	11	11	12	12	13	13
7 1/2"	0	1	1	2	2	3	4	4	5	6	6	7	8	8	9	10	10	11	11	12	12
8"	0	1	1	2	2	3	3	4	4	5	6	6	7	8	8	9	10	10	10	11	11
10"	0	1	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	9

SEED RATE CHARTS FOR METRIC MEASUREMENT

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																				
6"	0	12	22	31	41	53	62	73	84	95	108	119	130	145	157	171	180	191	196	206	212
7"	0	11	19	27	36	45	54	63	73	82	93	103	112	124	136	148	157	165	170	178	184
7 1/2"	0	10	18	26	33	41	49	58	67	76	86	95	104	115	126	137	145	152	157	165	170
8"	0	9	17	24	30	38	45	54	62	69	78	87	95	104	115	126	132	139	145	151	156
10"	0	8	13	19	25	31	37	44	50	57	65	72	78	86	94	103	109	114	118	123	128

*Based On 60#/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	Kilograms Per Hectare																				
6"	0	9	15	21	28	35	41	49	56	64	72	80	87	96	105	114	121	128	131	138	142
7"	0	8	12	18	24	30	36	43	49	52	63	69	75	84	91	100	105	111	114	120	123
7 1/2"	0	7	12	17	22	28	34	39	45	50	58	64	69	77	84	92	96	102	105	111	114
8"	0	7	11	16	20	26	30	36	41	47	53	58	64	71	77	84	89	93	96	101	104
10"	0	6	9	12	17	21	25	29	34	38	44	48	53	58	63	68	73	76	78	83	85

*Based On 60#/Bushel

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																				
6"	0	8	15	20	26	34	39	47	52	57	64	69	74	83	93	101	110	115	120	126	129
7"	0	7	12	18	22	29	35	40	44	49	55	61	64	72	81	87	95	101	104	109	112
7 1/2"	0	7	11	16	21	27	31	37	40	46	50	56	59	66	74	81	87	93	95	101	103
8"	0	6	10	15	19	25	29	35	37	41	46	52	55	62	68	74	81	85	87	92	95
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																				
6"	0	17	29	41	54	68	82	95	104	117	130	143	152	171	189	207	225	238	245	258	266
7"	0	15	26	36	47	59	71	83	91	102	113	124	132	148	165	179	196	206	213	223	230
7 1/2"	0	13	24	34	44	55	65	76	84	94	104	115	122	137	152	166	180	196	206	212	103
8"	0	6	10	15	19	25	29	35	37	41	46	52	55	62	68	74	81	85	87	92	95
10"	0	4	9	12	16	20	24	28	30	35	38	41	45	50	56	61	66	69	72	75	77

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																				
6"	0	7	11	17	22	28	33	38	44	49	55	61	65	72	82	89	95	102	104	109	112
7"	0	6	10	15	19	24	28	34	38	43	47	53	56	63	71	77	83	87	91	94	98
7 1/2"	0	6	9	13	18	22	26	31	35	39	44	48	52	57	66	71	76	81	83	87	90
8"	0	4	9	12	16	20	24	28	33	36	40	45	47	53	61	65	71	74	76	80	83
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																				
6"	0	13	24	35	45	56	67	80	90	102	112	123	133	148	168	182	196	207	214	224	231
7"	0	12	21	30	39	49	58	68	77	87	98	108	115	128	146	158	170	179	185	194	201
7 1/2"	0	11	19	28	36	45	54	64	72	81	90	100	106	118	135	146	157	166	171	179	185
8"	0	10	18	26	33	41	49	58	66	74	83	91	98	109	123	133	145	151	157	164	169
10'	0	8	15	20	27	34	40	47	54	61	67	74	80	89	101	109	118	124	129	135	139

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																				
6"	0	0	8	16	22	30	37	44	49	56	62	69	76	84	92	99	104	111	114	118	120
7"	0	0	7	13	20	26	31	38	43	49	54	61	66	73	80	85	91	96	99	102	104
7 1/2"	0	0	7	12	18	24	29	35	40	45	49	56	62	67	74	78	84	89	91	94	96
8"	0	0	6	11	17	22	27	31	37	41	45	52	56	62	67	72	76	82	84	86	89
10"	0	0	4	9	13	18	22	26	30	34	37	41	46	50	55	59	63	66	68	71	72

Based On 46.4#/Bushel

SEED RATE CHART FOR METRIC MEASUREMENT (CONT.)

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																				
6"	0	4	9	16	21	28	35	41	49	57	64	72	80	85	93	101	108	114	120	126	130
7"	0	4	8	13	18	25	30	36	43	49	55	62	68	74	81	87	93	99	104	109	112
7 1/2"	0	3	8	12	17	22	28	33	39	46	50	57	64	68	75	81	86	91	95	100	104
8"	0	3	7	11	16	21	26	30	36	41	46	53	58	63	68	74	78	84	87	92	95
10"	0	3	6	9	12	17	21	25	29	35	38	43	47	52	56	61	65	68	72	75	78

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																				
6"	0	3	7	9	12	16	18	20	22	26	28	31	34	37	40	43	45	47	48	52	53
7"	0	3	6	8	10	13	15	18	20	22	25	27	29	33	35	37	39	40	43	45	46
7 1/2"	0	3	6	8	10	12	13	16	18	20	22	25	27	30	33	35	36	38	39	40	43
8"	0	2	4	7	9	11	12	15	17	19	21	22	25	27	29	31	33	35	36	37	38
10"	0	2	4	6	8	9	10	12	13	16	17	19	20	22	24	26	27	28	29	30	31

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																				
6"	0	3	6	8	11	13	17	20	24	27	29	34	36	40	44	48	53	56	58	59	59
7"	0	2	4	7	9	12	15	18	20	24	26	29	31	35	38	41	45	48	50	52	52
7 1/2"	0	2	4	7	9	11	13	16	19	21	24	27	29	33	35	38	41	45	47	58	47
8"	0	2	3	6	8	10	12	15	17	19	21	25	27	29	33	35	38	40	43	44	44
10"	0	2	3	4	7	8	10	12	15	16	18	20	21	24	26	29	31	34	35	36	36

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																				
6"	0	9	16	22	33	37	45	53	62	69	78	86	95	105	114	124	132	139	143	150	155
7"	0	8	13	19	25	33	38	45	53	61	68	75	82	91	99	109	114	120	124	130	135
7 1/2"	0	7	12	18	24	29	36	41	49	56	63	69	76	84	92	100	105	111	114	120	124
8"	0	7	11	17	21	27	33	38	45	50	57	64	69	77	84	92	96	102	105	110	113
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																				
6"	0	2	4	7	10	13	16	18	21	24	27	29	33	36	39	43	47	50	53	53	54
7"	0	2	3	6	9	11	13	16	18	20	24	26	28	31	34	37	40	44	46	46	46
7 1/2"	0	2	3	6	8	10	12	15	17	19	21	24	26	29	31	34	37	40	41	43	43
8"	0	1	3	6	8	10	11	13	16	18	19	21	24	26	29	31	35	37	38	39	39
10"	0	1	2	4	6	8	9	11	12	15	16	18	20	21	24	26	28	30	31	31	33

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																				
6"	0	0	0	2	3	4	7	9	10	12	16	17	19	21	22	26	27	29	30	31	33
7"	0	0	0	2	3	3	6	8	9	11	13	15	17	18	20	22	24	25	26	27	28
7 1/2"	0	0	0	1	3	3	6	7	9	10	12	13	16	17	18	20	21	24	24	25	26
8"	0	0	0	1	2	3	6	7	8	9	11	12	13	16	17	19	20	21	22	22	24
10'	0	0	0	1	2	3	4	6	7	8	9	10	11	12	13	16	16	17	18	19	19

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																				
6"	0	0	0	0	34	45	62	78	94	110	127	142	157	173	186	197	211	224	229	232	234
7"	0	0	0	0	29	39	54	68	81	95	110	123	137	149	161	171	183	194	198	202	203
7 1/2"	0	0	0	0	27	36	49	63	75	89	102	113	126	138	148	158	168	179	184	186	187
8"	0	0	0	0	25	34	45	57	68	81	93	104	115	127	136	145	155	165	168	170	171
10"	0	0	0	0	20	27	37	47	56	66	76	85	94	103	111	119	127	135	138	139	140

SEED RATE CHART FOR METRIC MEASUREMENT (CONT.)

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																				
6"	0	0	0	0	11	15	20	26	30	36	41	46	52	56	61	64	68	73	75	76	76
7"	0	0	0	0	9	12	18	22	27	31	36	40	45	48	53	56	59	64	65	66	66
7 1/2"	0	0	0	0	9	12	16	20	25	29	34	37	41	45	48	52	55	69	59	61	62
8"	0	0	0	0	8	11	15	19	22	27	30	34	38	41	45	47	50	54	55	56	56
10"	0	0	0	0	7	9	12	16	18	21	25	28	30	34	36	38	41	44	45	46	46

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																				
6"	0	0	0	0	22	30	41	53	63	74	85	95	105	115	124	132	141	150	154	156	157
7"	0	0	0	0	19	26	36	46	55	64	74	82	91	100	108	115	123	130	133	136	137
7 1/2"	0	0	0	0	18	25	34	41	50	59	68	76	84	92	100	106	113	120	123	124	126
8"	0	0	0	0	17	22	30	38	46	54	63	69	77	84	92	98	104	110	113	114	115
10"	0	0	0	0	13	18	25	31	38	45	50	57	63	69	75	80	85	90	92	94	94

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																				
6"	0	0	11	29	46	62	78	92	106	123	138	151	168	183	197	212	229	241	254	263	270
7"	0	0	9	26	39	54	68	80	92	108	120	131	146	158	170	184	198	208	221	229	234
7 1/2"	0	0	9	24	37	49	63	74	85	99	111	121	135	146	157	169	183	193	204	211	216
8"	0	0	8	21	34	45	57	67	77	91	101	111	123	135	145	156	167	177	187	193	198
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																				
6"	0	0	0	4	8	13	18	22	27	31	36	40	46	49	54	59	63	67	71	72	73
7"	0	0	0	3	7	11	16	20	24	27	30	35	39	43	47	52	55	58	62	62	63
7 1/2"	0	0	0	3	7	10	15	18	21	25	28	33	36	39	44	47	50	54	56	57	58
8"	0	0	0	3	6	10	13	17	20	22	26	30	34	36	39	44	46	49	52	53	53
10"	0	0	0	2	4	8	11	13	16	19	21	25	27	30	33	36	38	40	43	43	44

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																				
6"	0	4	7	9	12	16	19	22	26	29	33	36	39	41	45	47	50	53	56	58	61
7"	0	3	6	8	11	15	17	20	22	26	28	31	34	36	38	41	44	46	48	50	52
7 1/2"	0	3	6	8	10	13	16	18	20	24	26	29	31	34	36	38	40	43	45	46	48
8"	0	3	4	7	9	12	15	17	19	21	25	27	29	30	33	35	37	39	40	43	44
10"	0	2	3	6	8	10	11	13	16	18	20	21	24	25	27	28	30	31	34	35	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																				
6"	0	3	6	9	13	17	20	24	27	30	34	38	41	46	50	55	61	64	67	67	68
7"	0	2	4	8	11	13	17	20	24	27	29	33	36	40	44	47	52	56	58	58	59
7 1/2"	0	2	4	7	10	12	16	18	21	25	27	30	34	37	40	44	48	52	54	54	55
8"	0	2	3	7	9	11	15	17	20	22	25	28	30	34	37	40	44	47	49	49	50
10'	0	2	3	6	8	10	12	13	16	18	20	22	25	28	30	33	36	38	40	40	41

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																				
6"	0	1	2	2	3	4	4	6	7	8	9	10	11	12	13	15	16	16	17	17	17
7"	0	1	1	2	3	3	4	6	6	7	8	9	9	10	11	12	12	13	13	15	15
7 1/2"	0	1	1	2	3	3	4	4	6	7	7	8	9	9	10	11	11	12	12	13	13
8"	0	1	1	2	2	3	3	4	4	6	7	7	8	9	9	10	11	11	11	12	12
10"	0	1	1	1	2	2	3	3	4	4	6	6	7	7	8	8	9	9	10	10	10

SOLID STAND FOLDING DRILL SEED RATE CHART (CON'T.)

NOTE: This drill is equipped with four-position seed cup door on each seed 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 large seeds, drop the handle to the third position. The wide-open position will allow complete clean out of the seed cup. **MAKE SURE** all handles are in the same position before drilling.

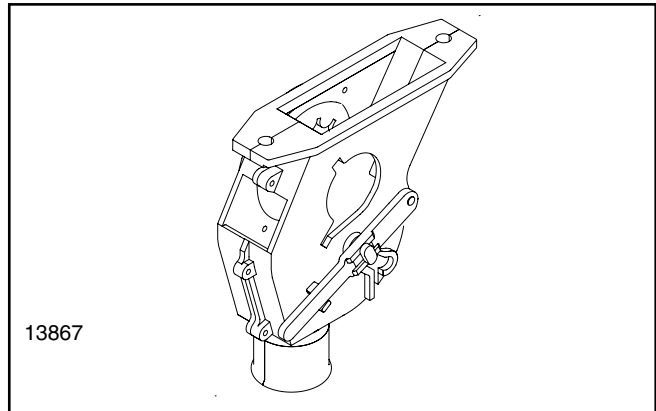


Figure 23
Seed Cup Handle Adjustment

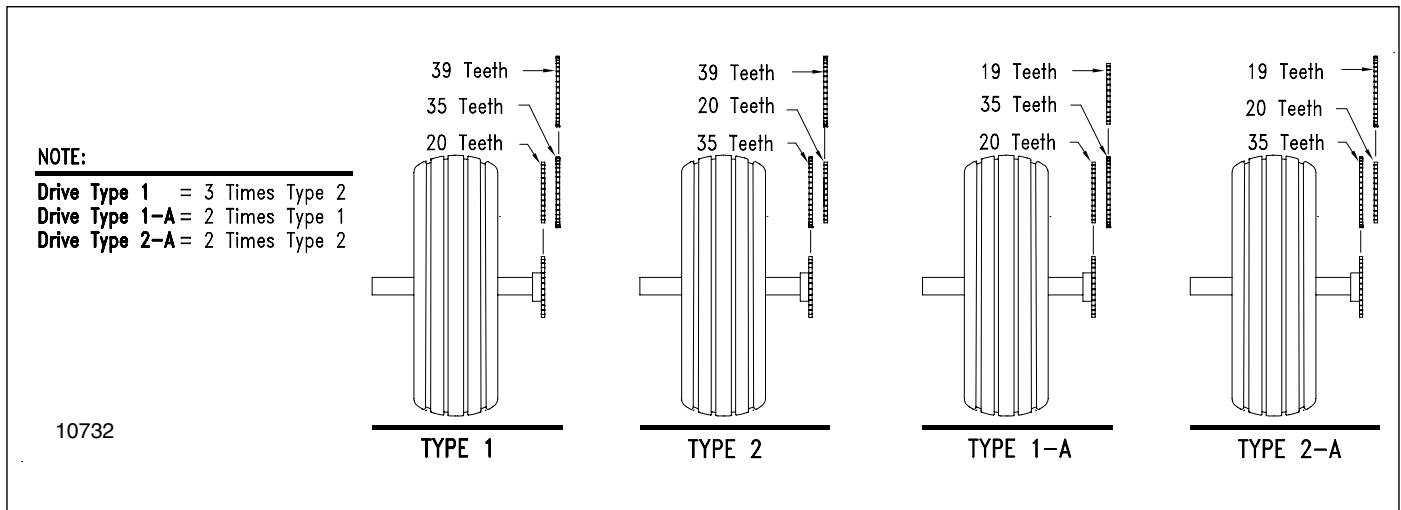


Figure 24
Drive Types

Small Seeds Attachment

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

Refer to Figure 25

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 chart on *Small Seeds Attachment Seed Rate Chart*, page 30.
3. Calibrate the small seeds attachment to your material by following the steps under *Seeding Adjustments*, page 21.

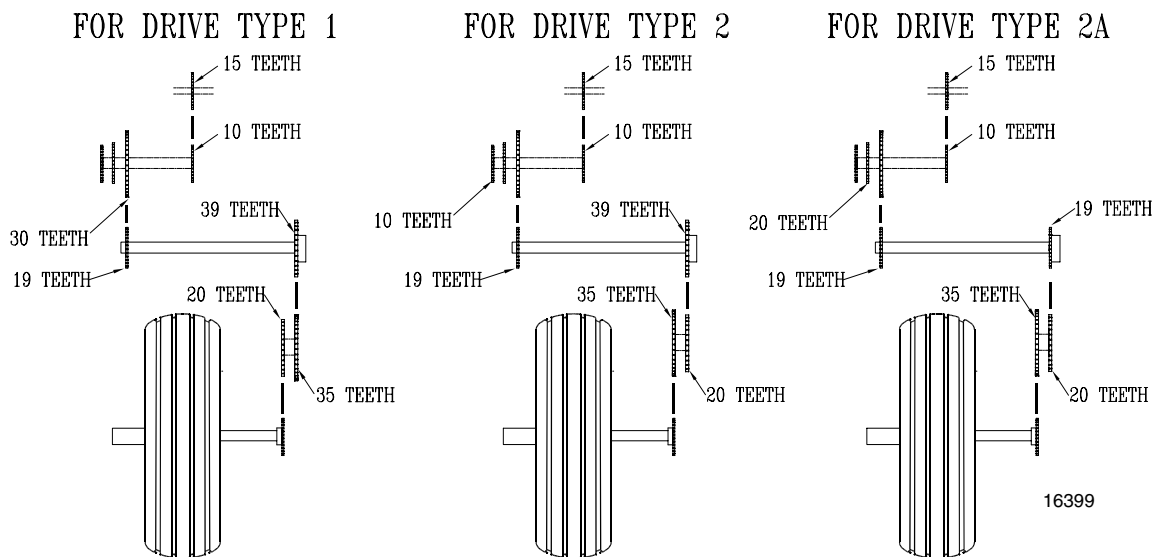


Figure 25
Small Seeds Sprocket Arrangements

Small Seeds Attachment Seed Rate Chart (pounds per acre)

Setting number		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
Kentucky Blue Grass, Fescue, Annual Rye Grass	Row Space	6"	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"	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"	0	.2	.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"	0	.2	.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"	0	.1	.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
Ladino Clover, Canary Grass, Timothy, Canola	Row Space	6"	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	20.3	21.7	23.4	25.4	27.3	29.2
		7"	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	20.0	22.0	23.4	25.1
		7.5"	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	20.4	21.9	23.5
		8"	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	20.5	21.9
		10"	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
Bermuda, Red Top, Unhulled Lespedeza, Sercia, Sand & Weeping Love Grass	Row Space	6"	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"	0	.6	.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"	0	.5	.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"	0	.5	.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"	0	.4	.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
Red & Sweet Clover, Lespedeza Hulled	Row Space	6"	0	1.5	3.4	5.2	7.1	9.0	11.3	13.2	15.3	17.0	19.0	20.8	22.5	24.5	26.4	28.3	30.1	32.1	33.8	35.6
		7"	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	21.0	22.7	24.6	25.8	27.5	29.0	30.5
		7.5"	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	21.2	22.7	24.2	25.8	27.2	28.6
		8"	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	21.2	22.6	24.1	25.4	26.7
		10"	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	20.9
Bird's-foot Trefoil, Sudan	Row Space	6"	0	1.7	3.3	5.2	6.8	8.7	10.7	12.7	14.7	16.8	19.2	21.2	23.4	25.6	28.0	29.9	32.1	34.2	36.3	38.4
		7"	0	1.5	2.8	4.5	5.8	7.5	9.2	10.9	12.5	14.4	16.5	18.2	20.0	21.9	24.0	25.6	27.5	29.0	31.1	32.9
		7.5"	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	20.5	22.5	24.0	25.8	27.6	29.1	30.9
		8"	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	21.0	22.4	24.1	25.7	27.2	28.8
		10"	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	20.2	21.4	22.7
Orchard Grass	Row Space	6"	0	0	.3	.7	.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"	0	0	.2	.6	.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"	0	0	.2	.5	.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"	0	0	.2	.5	.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"	0	0	.1	.4	.5	.8	.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
Millet, Reed Canary	Row Space	6"	.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"	.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"	.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"	.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"	.3	.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
Alfalfa, Red Alsike, Crimson Clover	Row Space	6"	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	20.2	21.4	22.9	24.0	25.2
		7"	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	20.0	20.6	21.6
		7.5"	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	20.3
		8"	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"	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

Fertilizer Meter Rate

Fertilizer 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 next page 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.

IMPORTANT: The fertilizer rate chart is for granular fertilizer with a density of 65 pounds per cubic foot (1.04 kg/L). If you are applying fertilizer with a different density, use the density conversion chart.

3. Check that your gauge-wheel tires are the correct size 9.5L x 15 and properly inflated. Refer to *Tire Inflation Chart*, page 6.
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 26

Important: 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.

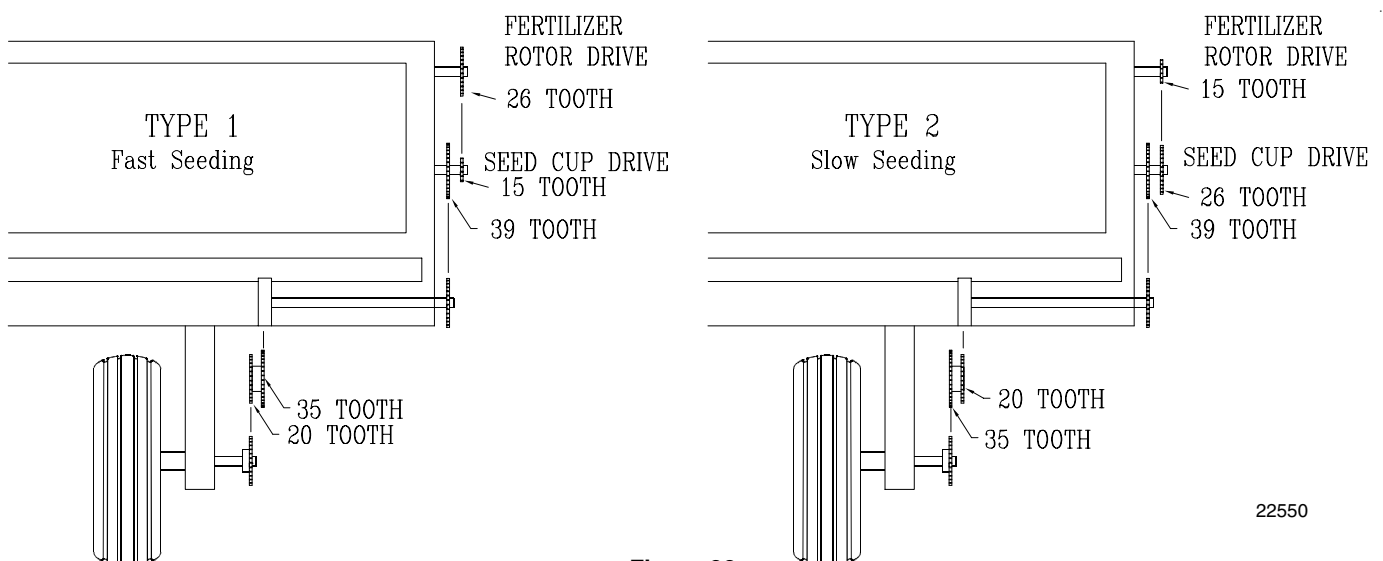


Figure 26
Sprocket Arrangements

22550

Fertilizer Rate Chart For Imperial Measurement (pounds per acre)

Setting number	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
Row Spacing	6"	15	23	31	48	64	87	109	125	140	168	195	210	225	248	270	295	320	345	369
	7"	13	20	26	38	54	74	93	106	119	143	166	179	191	211	230	251	272	293	314
	7.5"	12	18	24	37	51	68	87	100	112	134	156	168	180	198	216	236	256	276	295
	8"	11	17	23	36	48	62	82	94	105	126	146	158	169	186	203	221	240	259	277
	10"	9	14	19	29	38	52	66	75	84	101	117	126	135	149	162	177	192	207	221
	12"	8	12	16	24	32	44	55	63	70	84	98	105	113	124	135	148	160	173	185

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.

Density, lb/ft ³ (kg/l)	45.0 (0.72)	50.0 (0.80)	55.0 (0.88)	60.0 (0.96)	65.0 (1.04)	70.0 (1.12)	75.0 (0.87)	80.0 (0.81)
Conversion Factor	1.45	1.30	1.20	1.10	1.00	0.93	0.87	0.81

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.

$$100 \times 0.87 = 87$$

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

Fertilizer Rate Chart for Metric Measurement (kilograms per hectare)

Setting number	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
Row Spacing	6"	17	26	35	54	72	98	122	140	157	188	219	235	252	278	303	331	359	387	414
	7"	15	22	29	43	61	83	104	119	133	160	186	201	214	236	258	281	305	328	352
	7.5"	13	20	27	41	57	76	98	112	126	150	175	188	202	222	242	265	287	309	331
	8"	12	19	26	40	54	69	92	105	118	141	164	177	189	208	228	248	269	290	310
	10"	10	16	21	33	43	58	74	84	94	113	131	141	151	167	182	198	217	232	248
	12"	9	13	18	27	36	49	62	71	78	94	110	118	127	139	151	166	179	194	207

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.

Density, lb/ft ³ (kg/l)	45.0 (0.72)	50.0 (0.80)	55.0 (0.88)	60.0 (0.96)	65.0 (1.04)	70.0 (1.12)	75.0 (0.87)	80.0 (0.81)
Conversion Factor	1.45	1.30	1.20	1.10	1.00	0.93	0.87	0.81

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.

$$100 \times 0.87 = 87$$

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

PLANTING DEPTH ADJUSTMENTS

PRESS WHEEL - OPENER LINKAGE DEPTH ADJUSTMENT

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 consis-

tent 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.

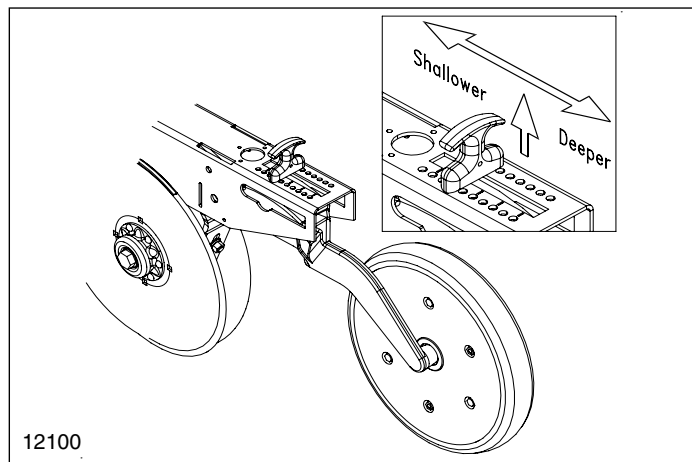


Figure 27
Direct Link Press Wheel Adjustment

DISK OPENER SPRING PRESSURE SETTING

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, Minimum Pressure.

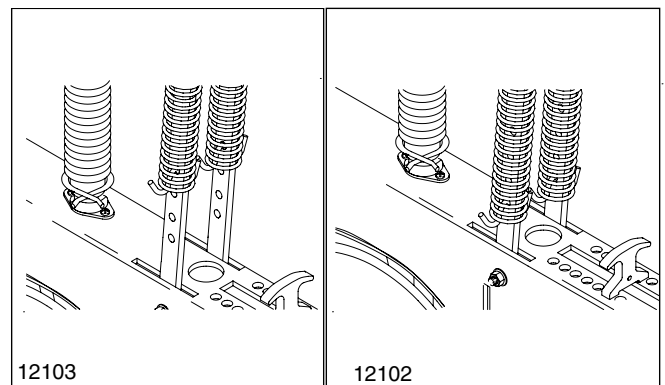


Figure 28
Maximum Pressure



Figure 29
Minimum Pressure

DRILL PREPARATION

GENERAL NOTES 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.

24' DRILL	minimum of 125 horsepower
30' DRILL	minimum of 150 horsepower

1. Be certain that the drill tires have the proper inflation as listed in the "**Tire Inflation Chart**," page 6.
2. 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.
3. 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.**
4. 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.
5. 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.
6. 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.
7. Make sure that the seed-cup-door adjustment handles are set the same across the drill.
8. If you notice excessive cracking on large-grain seeds, adjust all seed cup door handles to a wider setting.
9. **NEVER** back up with openers in ground. If you do, check all openers to be sure none are clogged.
10. 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**," page 10. It is especially important to check for this if the drill has been hitched to a different tractor.
11. 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 "**Hydraulic Hook-Up**," page 11.
12. **NEVER** allow anyone to ride on the drill.
13. Maximum seeding speed will vary according to soil conditions.
14. You can adjust the tension on each disk spring. This is especially useful in applying more pressure in tractor tire tracks.
15.  **NEVER** unhook drill from tractor with boxes unfolded and raised off the ground. **NEGATIVE TONGUE WEIGHT** is present in this position.
16.  **NEVER** attempt to lower the drill while in folded position.

OPERATING CHECK LIST

BEFORE OPERATING YOUR DRILL FOR THE FIRST TIME, MAKE SURE YOU HAVE CHECKED THE FOLLOWING ITEMS:

1. Read and follow the "**Safety Rules**," page 2, carefully.
2. Read all the "**Basic Operation Procedures**," page 17.
3. Check tire pressure. Proper inflation is listed in the "**Tire Inflation Chart**," page 6.
4. Inspect the seed cups and seed tubes for foreign matter.
5. Rotate each gauge wheel to see that the drive system is operating smoothly.
6. Set drive sprockets for the desired drive type.
7. Set seed rate. For calibrating seed rate see "**Seeding Adjustments**," page 21.
8. Check disk opener scrapers for proper adjustment in order for disk blades to rotate freely.
9. Lubricate the drill as needed.
10. Read and follow the "**Drill Preparations**," page 34.
11. Check the drill initially and periodically for loose bolts, pins and chains.
12. Check for leaks in the hydraulic system. **ALWAYS** use the procedure listed below!



CAUTION

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 that is familiar with this type of injury. Foreign fluids in the tissue must be surgically removed within a few hours or gangrene will result.

MAINTENANCE

GENERAL

1. After using your drill for several hours, check all bolts to be sure they are tight.
2. After using or transporting your drill for several hours, check all wheel lug bolts and nuts. Be sure they are tight.
3. Disk scrapers should be kept properly adjusted.
4. Always maintain the proper air pressure in the gauge wheel and transport tires.
5. Before the drill is transported and regularly during normal operation, check the hitch safety chain. Make sure the chain is properly attached to both the drill and the tractor draw bar. Inspect the chain and hardware for wear or other damage. Replace immediately if needed.
6. After a period of time, the drill boxes may gradually become out of line with each other. To correct this condition, refer to " **Box Alignment Adjustments**," page 16.

MAINTENANCE & LUBRICATION

PROPER SERVICING AND ADJUSTMENT IS THE KEY TO THE LONG LIFE OF ANY FARM IMPLEMENT. WITH CAREFUL AND SYSTEMATIC INSPECTION, YOU CAN AVOID COSTLY MAINTENANCE, TIME AND REPAIR.

1. After using your drill for several hours, check all bolts to be sure they are tight.
2. Listed below are the items you need to lubricate **every 20 to 25 hours** of operation:
 - a. Marker body hinges.
 - b. Jack shaft bearings.
 - c. Feeder cup drive sprocket bearings.
 - d. Post top roller shaft.
 - e. Box post lower spindles and cross tubes on main frame.
 - f. Telescoping axle tube lower roller between transport tires.
3. Listed below are the items you need to lubricate **before storing** the drill:
 - a. Clean and oil all roller chains.
 - b. Seed cup drive sprocket should be oiled in its square bore. Move seed cup adjustment lever away from the sprocket as far as possible in order to get the oil back into the square.
 - c. Oil knob adjustment trunnion lower pivot tube on press wheels.
4. Disk scrapers should be kept properly adjusted.
5. Always maintain 32 pounds of air pressure in gauge wheel tires and 60 pounds in the transport tires.

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 & Lubrication**" on page 36.
4. When storing in transport position, use all locking devices as described under "**Transporting**," page 19 and "**Basic Drill Operating Procedures**," page 18.
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. Store the drill inside if possible. Inside storage will reduce maintenance and make for a longer drill life.

TROUBLE SHOOTING

38 | 2SF24 and 2SF30

PROBLEM

SOLUTION

-
- | | |
|--|--|
| 1. Uneven seed spacing or uneven stand | <ul style="list-style-type: none">a. Check for plugging in seed cup.b. Check to see if seed tubes are plugged.c. Reduce ground speed.d. Check opener disks to see they turn freely.e. Use faster drive speed and close seed cup flutes to a more narrow position.f. Spring pressure on openers could be improperly adjusted causing opener to not penetrate low spots.g. Check for trash or mud build-up on Seed-Lok Wheel. |
| <hr/> | |
| 2. Opener disks not turning freely | <ul style="list-style-type: none">a. Check for trash or mud build-up on disk scraper. Re-adjust scraper.b. Check to see if scraper is adjusted too tightly and is restricting disk movement.c. Check disk bearings.d. Check opener frame for possible damage.e. If opener disks turn freely by hand but not in field, reduce down pressure on disk opener.f. Check press wheel adjustment for seeding depth. |
| <hr/> | |
| 3. Actual seeding rate is different than desired | <ul style="list-style-type: none">a. Check tire pressure. Proper inflation is listed in "Tire Inflation Chart," page 6.b. Check gauge wheel size. Proper size is 9.5L x 15.c. 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.d. Check speed change box setting.e. See "Seeding Adjustments," page 21, for instructions on calculating seed rate. |
| <hr/> | |
| 4. Excessive seed cracking | <ul style="list-style-type: none">a. Use slower drive speed and open flutes in seed cup to a wider position.b. Position seed-cup handles to a lower notch. |
| <hr/> | |
| 5. Acremeter doesn't measure accurately | <ul style="list-style-type: none">a. Check tire pressure. Proper inflation is listed on "Tire Inflation Chart," page 6.b. Check end gauge wheel tire size. Proper size is 9.5L x 15.c. Check planting operation for excessive overlap or gaps between passes.d. Loose soil conditions and slippage will cause variations in acres registered.e. To check accuracy of acremeter, see "Seeding Adjustments," page 21.f. Check to be sure your acremeter is for your width of drill. |
| <hr/> | |
| 6. Uneven seeding depth | <ul style="list-style-type: none">a. See "Planting Depth Adjustments," page 33.b. See "Tractor Draw Bar Hook-Up," page 10, and "Leveling the Drill," page 14. |
| <hr/> | |
| 7. Press wheels not compacting soil as desired | <ul style="list-style-type: none">a. Refer to "Planting Depth Adjustments," page 33. adjustments sections.b. Re-adjust press wheel depth to match coulter depth.c. Increase down pressure on disk openers. |
-

TROUBLE SHOOTING (CON'T.)

PROBLEM	SOLUTION
8. Grain box not emptying evenly	<ul style="list-style-type: none"> a. 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. b. Seed cups close to the ends of box tend to empty sooner due to amount of seed available. c. Check adjustment levers on each box to see that they are set on the same indicator number.
9. Press wheel or openers plugging	<ul style="list-style-type: none"> a. Drilling in damp or wet conditions may increase this problem. b. Openers may be moved from a staggered to an in-line position to reduce trash thrown from front openers into rear openers. c. Reduce down pressure on openers. d. Do not back up drill in the field, or stop and allow drill to roll backwards with openers in the ground. e. If using double "V" press wheels, adjust angle bar. f. Check Seed-Lok Wheel.
10. Rubber tire depth control wheels becoming packed with mud.	<ul style="list-style-type: none"> a. Install scrapers. b. Reduce spring tension on openers.
11. Improper folding of drills	<ul style="list-style-type: none"> a. Adjust post frame adjusting links. b. Check hydraulic system for air and oil leaks. c. Clean out small orifice fittings in wing cylinders. d. 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.
12. Hydraulic adaptors cracking	<ul style="list-style-type: none"> a. JIC fittings do not require high torque. b. 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 over-tighten causing damage to the cylinders, valves or fittings.
13. Seed-cup sprockets locked up or twisted seed-drive shaft	<ul style="list-style-type: none"> a. Check for foreign matter lodged in one or more seed cup sprockets. b. 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.

TROUBLE SHOOTING (CON'T.)

PROBLEM	SOLUTION
14. Raising and lowering drill is rough and uneven	<ol style="list-style-type: none">Lubricate lower rollers of vertical transport tubes located between the transport tires.Check hydraulic fittings for leaks.Rephasing cylinders not properly bled. See "Hydraulic Hook-Up," page 11. 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.
15. Hydraulic marker functioning improperly	<ol style="list-style-type: none">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.
16. Chain-debris/retainer clip	<ol style="list-style-type: none">Be sure retainer clip open end is facing opposite way of chain travel.

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 be made through such dealer. Great Plains reserves the right to make changes in materials or design of the product at any time without notice.

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

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

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

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