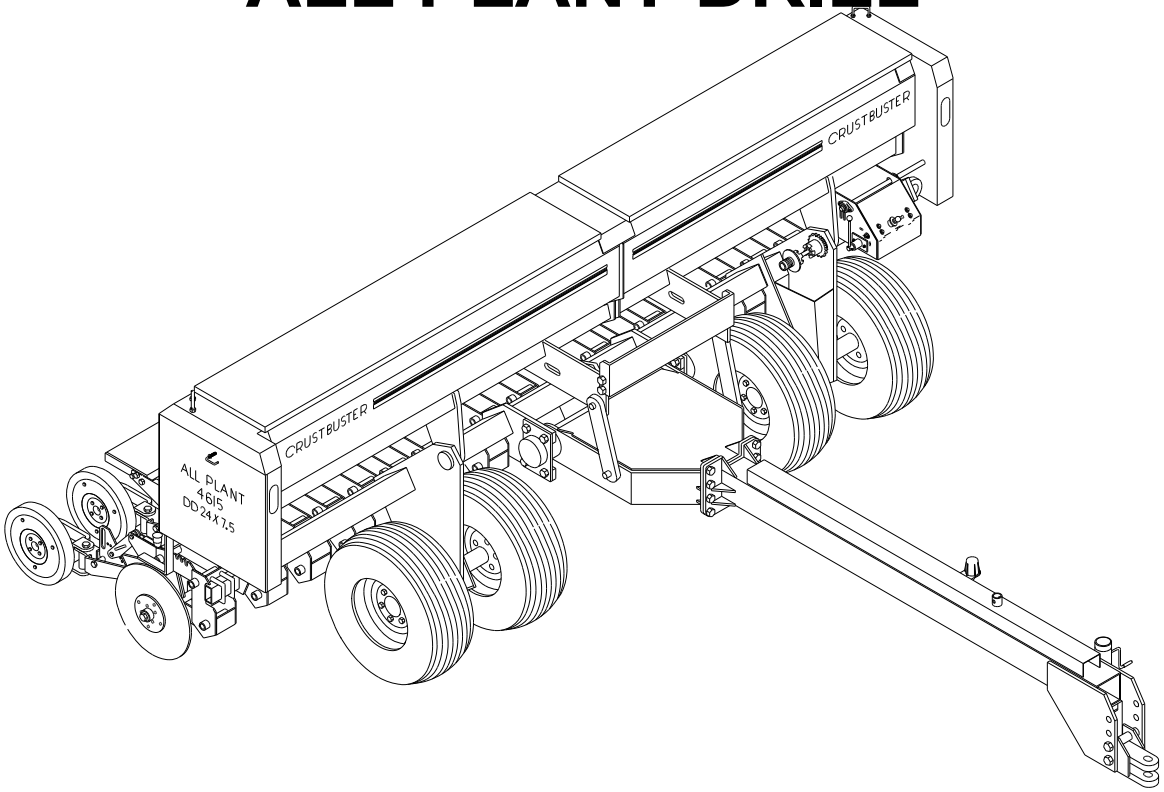
CrustBuster
SPEED KING INC.

P.O. Box 526 - Spearville, Kansas 67876 - (620) 227-7106

4600 SERIES

ALL PLANT DRILL



(2009) #605717

Identification

Your CrustBuster® drill is identified by a Serial Number and Model Number. Record these numbers in the spaces provided in this manual and refer to them when ordering parts or requesting service.

Serial Number	Model Number

Warranty

WARRANTY: In addition to the implied warranties of fitness and of merchantability, CrustBuster®/Speed King, Inc. warrants new products sold by it to be free from defects in workmanship and material for a period of 12 months, from the date of delivery to the first user customer. Warranty on purchased parts (cylinder, blades, bearings, shanks, etc.) will be the same as that offered by the appropriate manufacturer of these parts.

EXCLUSIONS: No warranty of any kind is made by CrustBuster®/Speed King, Inc. with regard to new products which have been subject to operation in excess of recommended capacities, misuse, abuse, negligence, or accident, or have been altered or repaired in any manner not authorized by CrustBuster®/Speed King, Inc. CrustBuster®/Speed King, Inc. is constantly striving to improve its products. Changes in design and improvement will be made whenever CrustBuster®/Speed King, Inc. believes the efficiency of its products will be improved thereby, but without incurring any obligation to incorporate such improvements in any products which have been shipped or are in service. No obligation exists for compensation of unauthorized repairs or modifications without prior approval. And in no event will CrustBuster®/Speed King, Inc. be liable for consequential damages, such as but not limited to: downtime, delayed or late tillage or planting, etc.

WARRANTY REGISTRATION: This warranty is not valid unless registered with CrustBuster®/Speed King, Inc. within 10 days from the date of purchase. It is the sole responsibility of the selling retail dealer to fill out the registration forms and see that they are properly filed with CrustBuster®/Speed King, Inc.

WARRANTY PROCEDURE: Should any part fail to conform with this warranty, CrustBuster®/Speed King, Inc. will repair or replace the part or parts which do not conform. If a part is defective, take it to your authorized CrustBuster® Farm Equipment Dealer immediately, along with your warranty registration, and complete the proper forms requesting a warranty adjustment. Our representative will pick up the part to be returned to the factory for examination. If the customer (first user) requests that a new part be substituted for the old part, a new part will be charged to the dealer who will in turn charge the customer. If the part is found by us to be defective, a credit for the part will be given to the dealer to be passed on to the customer. If the dealer or customer wishes to repair the part, this will be done only if authorized by CrustBuster®/Speed King, Inc. This warranty procedure is in addition to all remedies authorized by law.

CRUSTBUSTER®/SPEED KING, INC.
Box 526
Spearville, KS 67876

Table of Contents

BE A SAFE OPERATOR
BY THINKING BEFORE ACTING
AND
BY READING
YOUR OWNER'S MANUAL

Avoid Accidents

Most accidents, whether they occur in industry, on the farm, at home, or on the highway, are caused by the failure of some individual to follow simple and fundamental safety rules or precautions. For this reason most accidents can be prevented by recognizing the real cause and doing something about it before the accident occurs.

Regardless of the care used in the design and construction of any type of equipment, there are many conditions that cannot be completely safeguarded against without interfering with reasonable accessibility and efficient operation.

A CAREFUL OPERATOR
is the Best Insurance Against an Accident.
The complete observance of one simple rule would prevent many thousands of serious injuries each year.

That rule is:

Never Attempt to
Clean, Oil, or Adjust
A Machine While It Is In Motion.

To Our Customers

The following pages and illustrations are printed to help supply you with the knowledge to better operate and service your new CrustBuster equipment.

We are proud to have you as a customer and feel you will be proud to be a CrustBuster owner.

Any piece of equipment needs, and must have, a certain amount of service and maintenance to keep it in top running condition. We have attempted to cover all the adjustments required to fit most conditions; however, there may be times when special care must be taken to fit a condition.

Study this owner's manual carefully and become acquainted with all the adjustments and operating procedures before attempting to operate your new equipment. Remember, it is a machine and has been designed and tested to do an efficient job in most operating conditions and will perform in relation to the services it receives.

If special attention is required for some condition, ask your CrustBuster dealer; he will be glad to help and answer any questions on operations and service of your new machine.

TAKE TIME FOR SAFETY

Before Operating This Equipment

Read and understand this owner's manual.

Safety & Set-Up Instructions

- If your drill is delivered with a shipping bracket, DO NOT install hitch or operate hydraulics until bracket is completely removed. Damage to drill will result.

- Dealer Installation of Hitch - Be sure hitch bolts are **torqued equally.** DO NOT tighten one side completely before the other. Failure to follow these instructions could cause hitch to be off center and drill will not run straight.

- Secure implement to tractor drawbar using as large a hitch pin as will allow. A large bolt with locking nut or castle nut is recommended. DO NOT use a hairpin or wire to secure hitch pin. Residue may catch and remove these devices. ALWAYS SECURE DRILL TO TRACTOR USING THE SUPPLIED SAFETY CHAIN.

- Make sure 3-point linkages are raised completely to clear hitch.

- **DO NOT attempt to remove the hydraulic cylinder unless you have taken the precautions described on page 4 of this manual. Serious injury or death could occur if the correct procedure is not followed!**

- If your tractor does not already have a lighting receptacle, install one. Always plug in the drill lighting system to a correctly wired tractor and USE for transport safety.

- Your drill may weigh more than the towing vehicle. The drill is not equipped with brakes. **EXERCISE EXTREME CAUTION !** Maximum allowable speed - **25 mph.**

- If your drill is equipped with hydraulic markers, always attach safety chains before transporting.

- Always install transport lock to hydraulic cylinder before transporting.

- Remove transport lock from lift cylinder before attempting field operation.

- Never have more than **391 lbs.** per section on the walkboards without drill securely attached to tractor or towing vehicle.

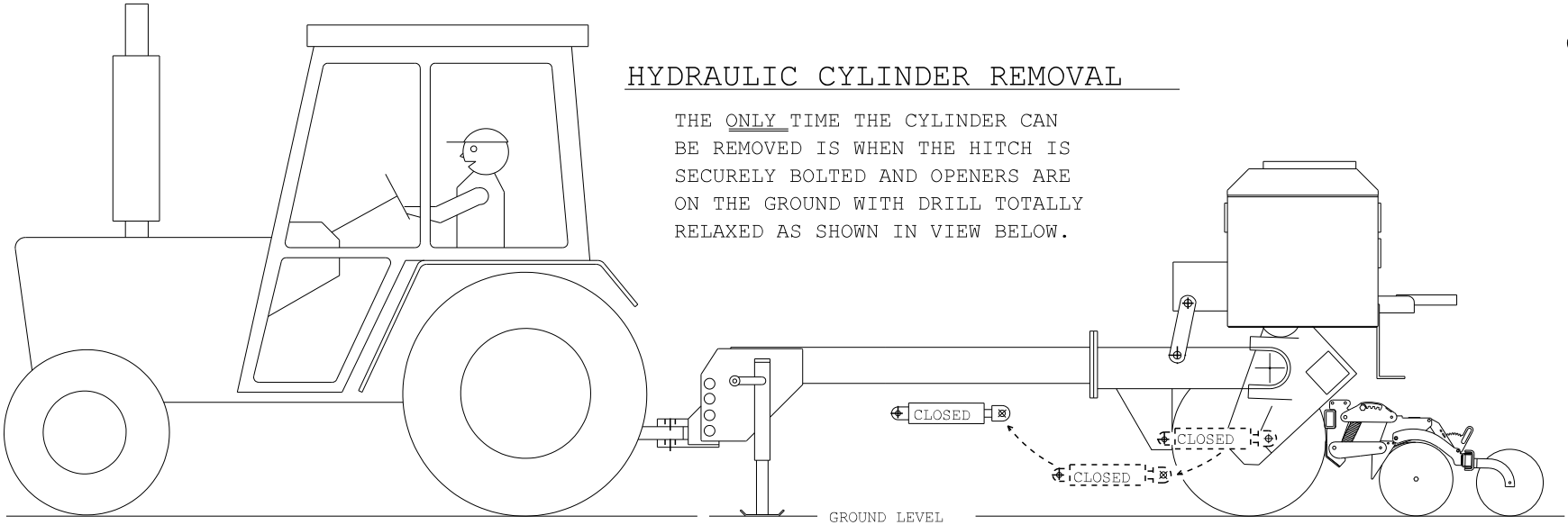
- Check lug nuts or bolts. Torque to 100 ft. lbs. after approximately one mile and periodically after.

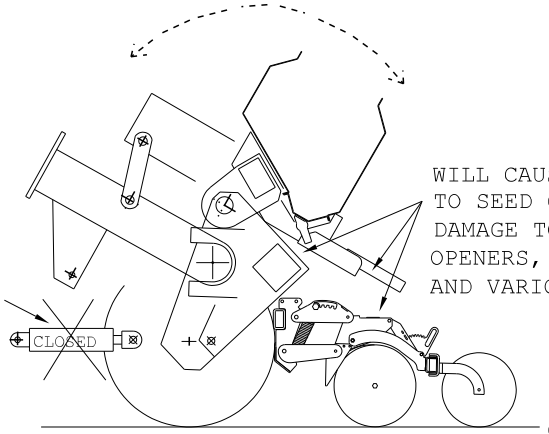
- After approximately 10 hours, make sure tool bar bolts, wheel bolts, presswheel bolts, etc. are tight. Check tool bar bolts every 10 to 15 hours. **Tool bar bolts must stay tight.** Failure to comply could cause damage to tool bar and main frame in the form of egg shaped holes.

- **NEVER ALLOW ANYONE TO RIDE THE DRILL!**

HYDRAULIC CYLINDER REMOVAL

THE ONLY TIME THE CYLINDER CAN BE REMOVED IS WHEN THE HITCH IS SECURELY BOLTED AND OPENERS ARE ON THE GROUND WITH DRILL TOTALLY RELAXED AS SHOWN IN VIEW BELOW.





WILL CAUSE SERIOUS DAMAGE TO SEED CUPS. COULD CAUSE DAMAGE TO WALKBOARDS, OPENERS, GRAIN BOX, GEAR BOX, AND VARIOUS DRIVE LINE PARTS.

WARNING

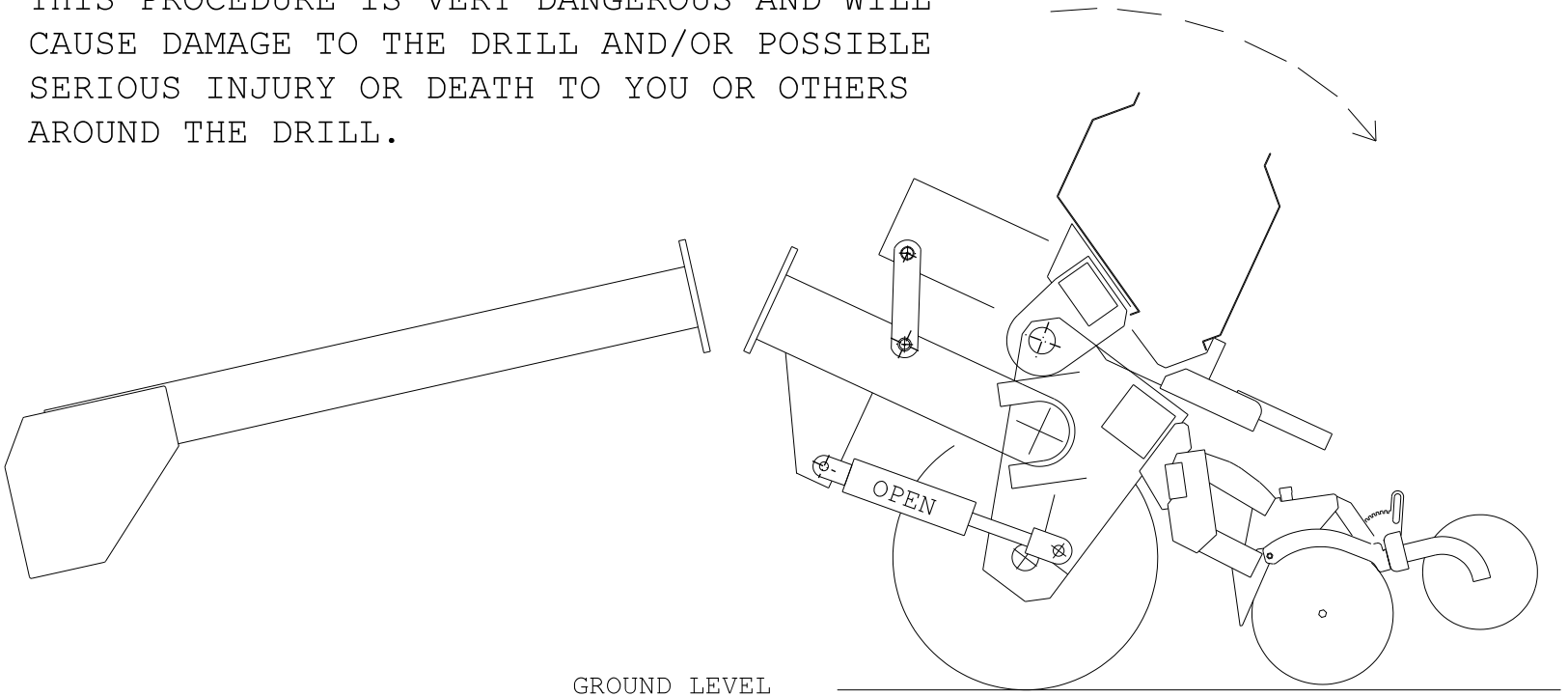
DRILL WILL ROTATE BACK.

NEVER REMOVE HYDRAULIC CYLINDER WITHOUT HITCH SECURELY BOLTED ON AND OPENERS RESTING ON THE GROUND. EVEN WITH OPENERS ON THE GROUND, THE DRILL WILL SCISSOR DANGEROUSLY FORWARD OR BACKWARDS IF THE CYLINDER IS REMOVED AND THE HITCH HAS NOT REMAINED ATTACHED AND RESTING ON THE JACK OR GROUND. FAILURE TO FOLLOW THIS PROCEDURE COULD CAUSE SERIOUS INJURY OR DEATH TO YOU OR PERSONS AROUND DRILL. FAILURE TO FOLLOW THIS PROCEDURE WILL RESULT IN SERIOUS DAMAGE TO SEED CUPS, WALKBOARDS, AND OPENERS.

WARNING

DRILL WILL FALL BACK.

DO NOT REMOVE HITCH WITHOUT OPENERS LOWERED TO THE GROUND AND THE LIFT CYLINDER INSTALLED AND CHARGED WITH OIL. FAILURE TO COMPLY WITH THIS PROCEDURE IS VERY DANGEROUS AND WILL CAUSE DAMAGE TO THE DRILL AND/OR POSSIBLE SERIOUS INJURY OR DEATH TO YOU OR OTHERS AROUND THE DRILL.



DANGER: Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING: Indicates a 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.

NOTICE: Used to address practices not related to physical injury.

Field Operating Checklist

_____ Inflate tires to recommended air pressure.
_____ Lubrication as required.
_____ Seed shafts turned manually to check for obstructions and improper chain alignment on drive sprockets.
_____ Correct sprocket selection and slot width for seed type and siz
_____ Calibration as required for accuracy.
_____ Drill adjusted at hitch for level field operation.
_____ Cylinder stop set for proper toolbar rotation.
_____ Down pressure set for soil conditions.
_____ Acre meter reset.
_____ Lower drill while moving forward to avoid plugging openers.
_____ Check seed depth and adjust accordingly.
_____ Allow no riders.
_____ After approximately 10 hours, check tool bar bolts, wheel bolts, presswheel swivel bolts, etc.. Make sure they are tight.

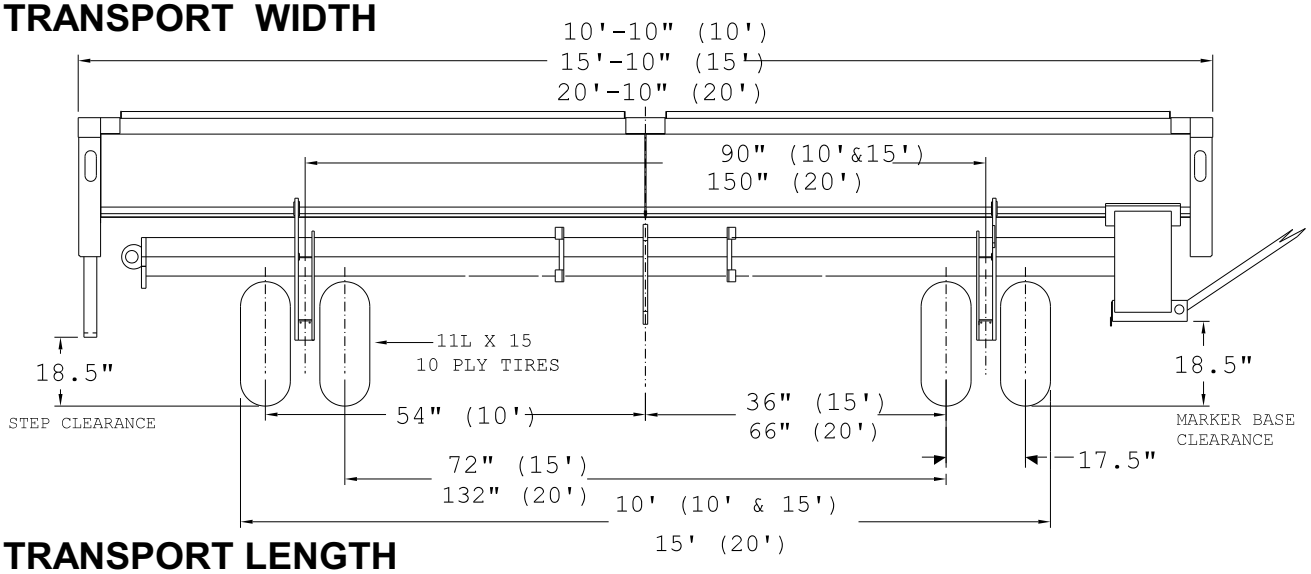
Transport Instructions

- Before attempting to operate the lift cylinder, remove transport lock. Store cylinder lock on the holder attached to the front of the weight bar bracket. When traveling long distances, it is recommended that the transport lock be installed, pressure relieved from the hydraulic hoses and hoses hooked to the tractor. If trailing behind a towing vehicle, the hydraulic hoses should be stored in the slotted storage in the tongue cover.
- **NEVER** use an unsecured pin in draw bar.
- **DO NOT** attempt to remove the cylinder at any time for transport or field operations.
- Stow the adjustable jack on top of the tongue mounting stub to avoid interference with main tractor wheels in tight turns and make sure 3-pt linkages are fully raised.
- Connect the 7 pin lighting plug to the tractor receptacle and use at all times. Confirm the correct lights are operating if your tractor is not wired by industry standard code. Standard 7 pin receptacles are available through your dealer, local truck supply stores, and auto parts facilities.
- Always attach the safety chain to the tractor drawbar system.
- Disconnect drive chain and store on the "dummy" sprocket when traveling long distances.
- If your drill is equipped with hydraulic markers, the safety chains should be attached to the marker to avoid catastrophic injury to oncoming vehicles.
- Maximum allowable speed; **25 mph**.

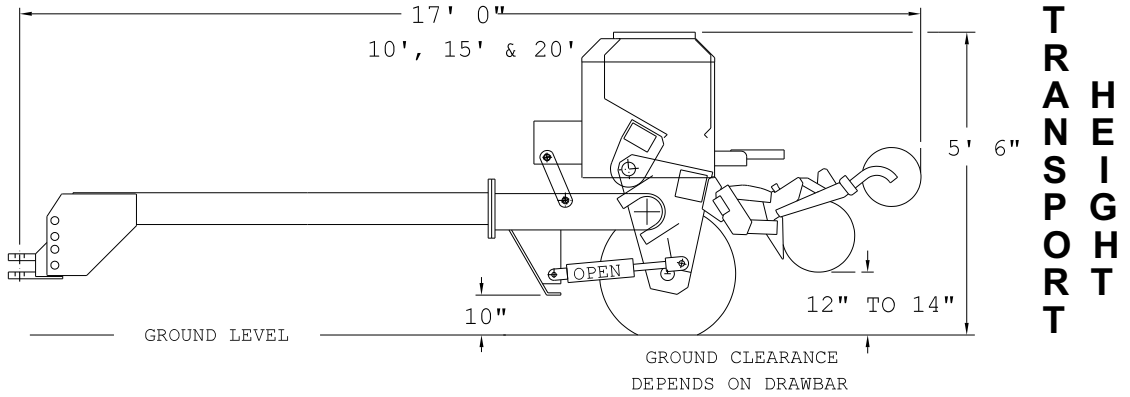
CAUTION! Your drill may weigh more than the towing vehicle. The drill is NOT equipped with brakes. Exercise extreme caution!

Dimensions & Specifications

TRANSPORT WIDTH



TRANSPORT LENGTH



10', 15' & 20' Drill Weights

Size & Spacing	Number of Openers	Presswheels				
		Single 2 x 13 Flat	Single 2 x 13 Peaked	Single 3 x 13	Single 3 x 13 Center Rib	Single 3 x 14 V-Type
10' x 7½"	16	NA		NA		NA
10' x 10"	12	NA		NA		NA
15' x 7½"	24	7600		7672		7936
15' x 8"	22	7420		7486		7728
15' x 10"	18	6890		6950		7144
20' x 7½"	32	8690		8784		9200
20' x 8"	30	8515		8574		8964
20' x 10"	24	7920		7943		8255

Field Operation

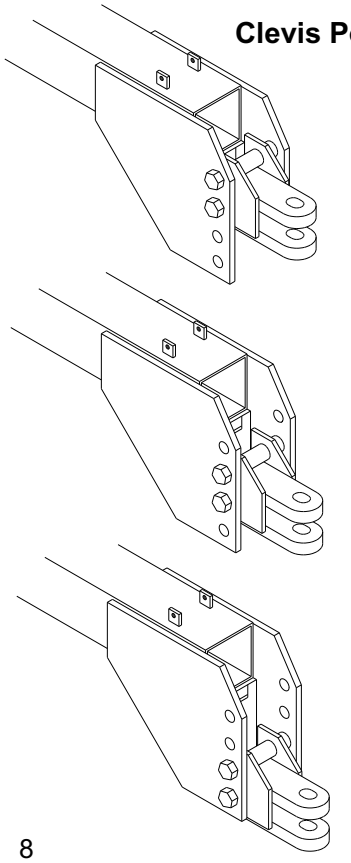
Recommended Operating Speed
Operating speeds of **4-7** mph will provide optimum results from your All Plant drill. Conventional field conditions can warrant speeds in the upper end of the range. High levels of "tough" residue due to morning dew or recent moisture, rough field conditions, rocky fields, or hard ground may require lower speeds for adequate performance.

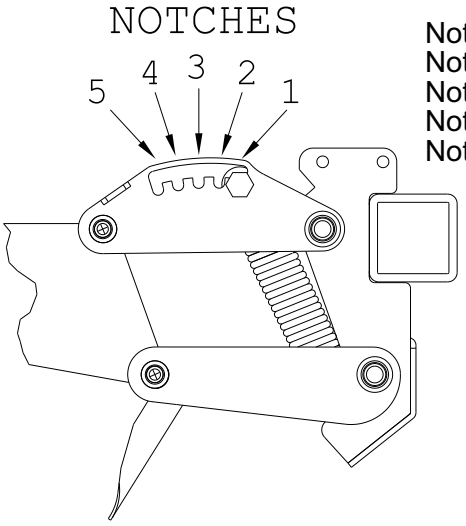
Recommended Adjustment Procedure
Setting your All Plant drill requires adjustments be made in a particular order to ensure the opener will work properly. You will find it much easier to set the drill if adjustments are made in the following order:

1. **Level the drill**
2. **Set toolbar rotation**
3. **Set down pressure**
4. **Set seed depth**

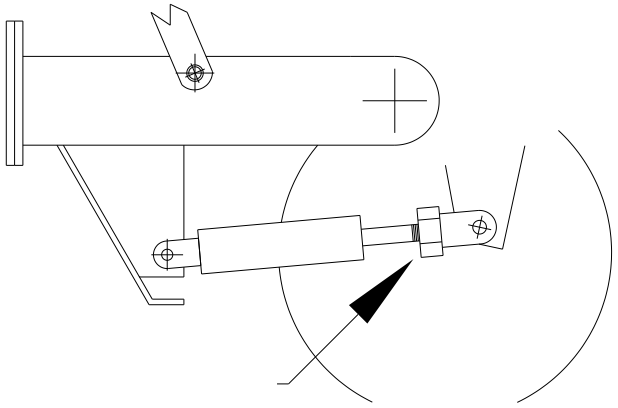
Leveling the Drill
It is important to level the drill from front to back first. The tongue and box should be as close to level as you can get it by changing the drawbar height on the tractor (on offset drawbars), or by repositioning the clevis or mono hitch mounting. Any time a different tractor is hooked to the drill you should recheck level.

Clevis Positions





Toolbar Adjustment
After the drill is leveled, rotation of the toolbar must be set. Using the screw adjustable stop on the lift cylinder, adjust rotation of the toolbar until the 2" x 4" tubing the openers are mounted on is perpendicular to the ground. Adjustment range of the presswheel depth quadrant will be affected if the toolbar does not rotate far enough or goes beyond perpendicular. If the toolbar is not set correctly, the opener travel range will not allow for penetration into low areas or provide clearance when meeting obstructions.



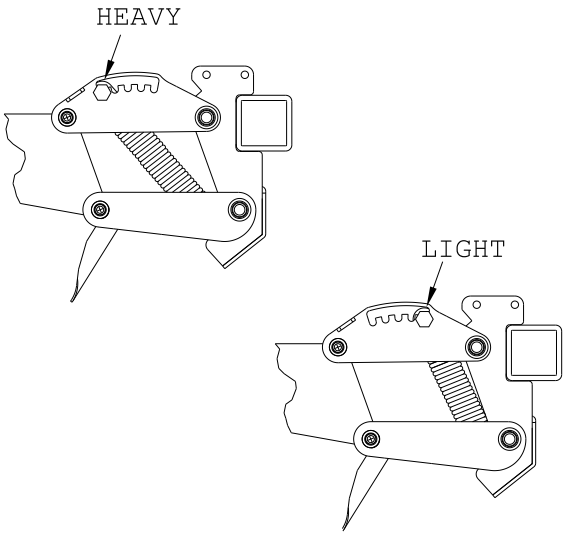
Setting Down Pressure
The parallel linkage opener design assures the operator the opener blades and presswheel operate on the same level throughout the range of up and down travel. Due to the location of the down pressure spring, the pressure applied to the opener remains relatively constant in the entire range of travel. Changing the spring position from the first (top) notch to the last (bottom) notch provides 5 different levels of force. Each notch represents approximately these amounts of down pressure:

	1 Spring	2 Springs
Notch 1 (top)	120#	200#
Notch 2	160#	260#
Notch 3	200#	330#
Notch 4	240#	400#
Notch 5	260#	500#

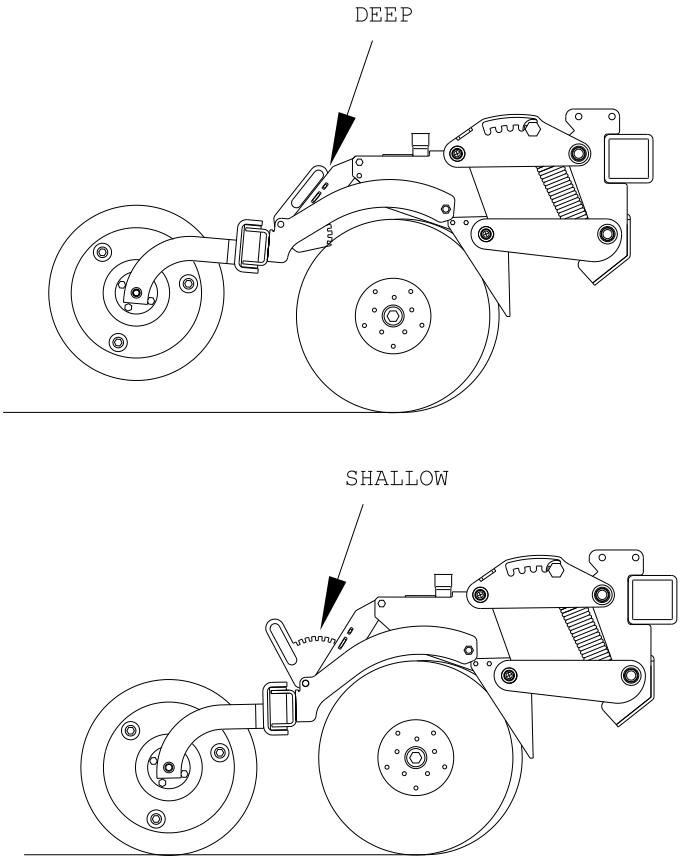
Field Operation

Setting Down Pressure - (cont.)
It may be necessary to add ballast to the drill in the third or fourth notch. In order that all the opener springs are able to achieve the down pressure selected, the total weight of the drill must equal that amount of pressure times the number of row units on the drill. The parallel linkage arms should have a "live working action" during field operation. Setting the drill for too much down pressure without adequate weight will reduce the ability of the opener to flex and give good performance.

To determine the correct amount of down pressure, begin with the unit set in the lightest setting and the presswheel adjusted all the way up (or deepest setting). Put the openers in the ground and pull forward 50-100 feet. Stop and check opener penetration. If the opener is not penetrating to the depth you wish to plant, rotate toolbar upwards until clear of the ground, and add one more notch of down pressure. Repeat the process until the opener will penetrate to at least the depth you wish to plant.



Setting Seed Depth
Depth settings are achieved by moving the depth quadrant to effect the presswheel relationship to the opener. Changes are made by releasing the spring-loaded lock handle and moving the quadrant up or down with the hand slot. **LOWERING** the quadrant will set seed depth **shallow** --**RAISING** the quadrant will set seed depth **deeper**. Irregular seed placement can be caused by excessive field speed, residue hairpinning, rocky conditions, and cloddy or wet soil conditions.



Field Operation

Conventional Field Conditions

For tilled field conditions, the lightest spring setting (top notch) is recommended. More weight will be transferred to the carrying wheels of the drill when the toolbar is rotated. Behind tractor and drill tires it may be necessary to adjust individual row units for extra down pressure or different depth setting. **Setting the drill in conventional tillage will be easier if the tillage trips are kept shallow (2" - 4").**

If the first notch presents too much down pressure, the down pressure spring assembly can be removed. With the spring assembly removed, the effective down pressure of the opener is approximately 60#.

To remove spring, rotate tool bar until openers are clear of ground. This will release tension on spring allowing the removal of ½" x 6" bolt at the top of the spring. Unhook spring from rod at bottom of opener mount. When replacing spring, make sure the long hook end of spring is down.

Minimum Tillage Conditions

The most challenging condition is often presented when a high level of residue is present in a "loose" soil environment. The opener blades will not cut residue cleanly and can often have a tendency to push or "bulldoze" residue ahead of the opener discs.

For minimum tillage operations, the lightest spring (top notch) is recommended. Firming the ground using a culti-packer or similar tool can aid in packing the residue for better cutting and blade penetration with less hairpinning.

The All Plant drill will work well in minimum tillage conditions if a "stale seedbed" is created. Soil worked at an earlier date, and allowed to firm and crust over can give the opener more resistance, allow for better cutting action, and create a firmer seed furrow. The first or second notch will usually provide enough down pressure to penetrate the soil.

No-Till Conditions

No-till presents many different conditions. Residue level and condition, previous tillage strips (ridges, plow dead furrows), soil type, soil moisture and rocky conditions all increase the demands on the no-till drill. Many variables and conditions not removed by tillage trips require greater attention to settings and speed. In some circumstances, it may be desirable to drill at a slight angle to existing rows. This will also randomize the opener disc wear and extend the maintenance interval for new blades.

As a general rule, less than ideal conditions will require slower speeds, to reduce hairpinning, improve opener penetration and residue cutting, reduce rock damage, and maintain good furrow formation and seed placement.

It is recommended you set the drill beginning with light down pressures and work your way up to heavier settings. If the presswheel presses firmly on the seed slot and control depth evenly, it is unnecessary to add more pressure. When increased down pressure does not improve penetration, or carrying wheels lose ground contact (and seed drive shaft stops), begin adding ballast with weight bars and/or suitcase weights.

Calibration, Seed Rates and Sprocket Box

Calibration/Drilling Rates

Planting the right rate can be frustrating. Sometimes the end result is not what the rate chart indicates. Seeding rate is affected by seed size, seed treatments, foreign material, test weight, and tire air pressure.

1. Always plant clean seed.
2. Check tire air pressure.
3. Seed treatments vary by type and time of application.

Some seeds are treated at the processor. Drill box treatments are common methods of application. Each of these can "gum" up the wobble slot cup halves and reduce final seeding rate. Treated seed often flows differently than non-treated seed.

A general method for checking quantities drilled is as follows:

1. Set drill for desired seeding rate.
2. Fill the box level; then pull drill for a short distance to settle seed. Refill box exactly level full.
3. Drill a calculated one acre.
4. Carefully weigh the seed required to refill the box level full.
5. Compare the amount used versus that stated on the rate chart.
6. Adjust seeding rate by changing the sprocket combination or wobble slot width.

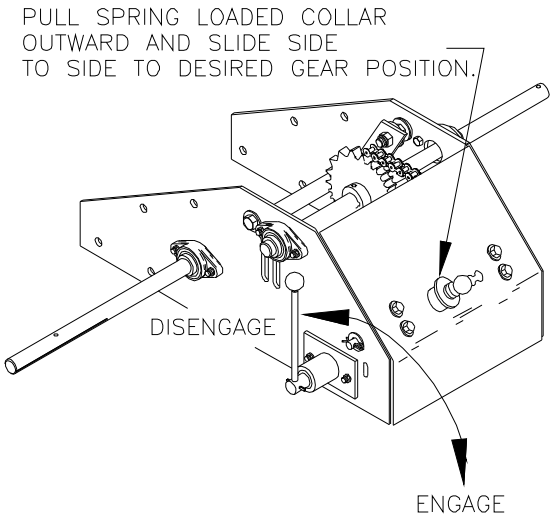
One method involves catching seed from one or more seed cups and utilizing a density scale to determine actual rates. These scales are commercially available, inexpensive and very easy to use. Information can be obtained from CrustBuster®/Speed King, Inc.

Sprocket Box Operation

The sprocket box design will enable the operator to set a wobble slot width once for a given seed size and change rates by changing the speed of the seed shaft. Choose a range of seeding rates that you wish to operate in, set the slot width as indicated by the chart and simply change knob position with the slide handle to effect seed rate. A narrow slot width will produce more even distribution and spacing in the row.

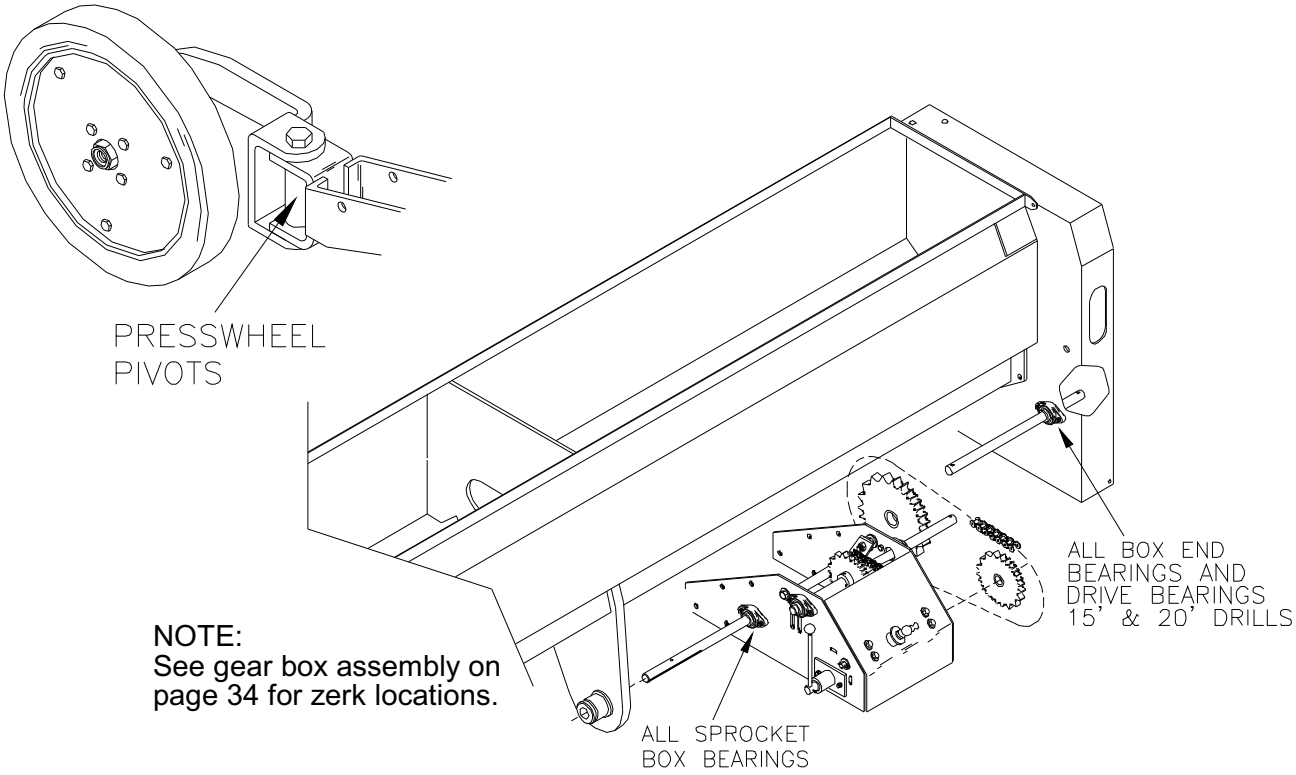
When changing derailleur, be sure openers are rotated out of ground.

To change position, move throw-out lever toward the rear to disengage the chain from the lower sprocket. Pull the spring loaded collar outward with two fingers and slide side to side to the desired gear position. Pull throw-out lever forward to re-engage the chain.

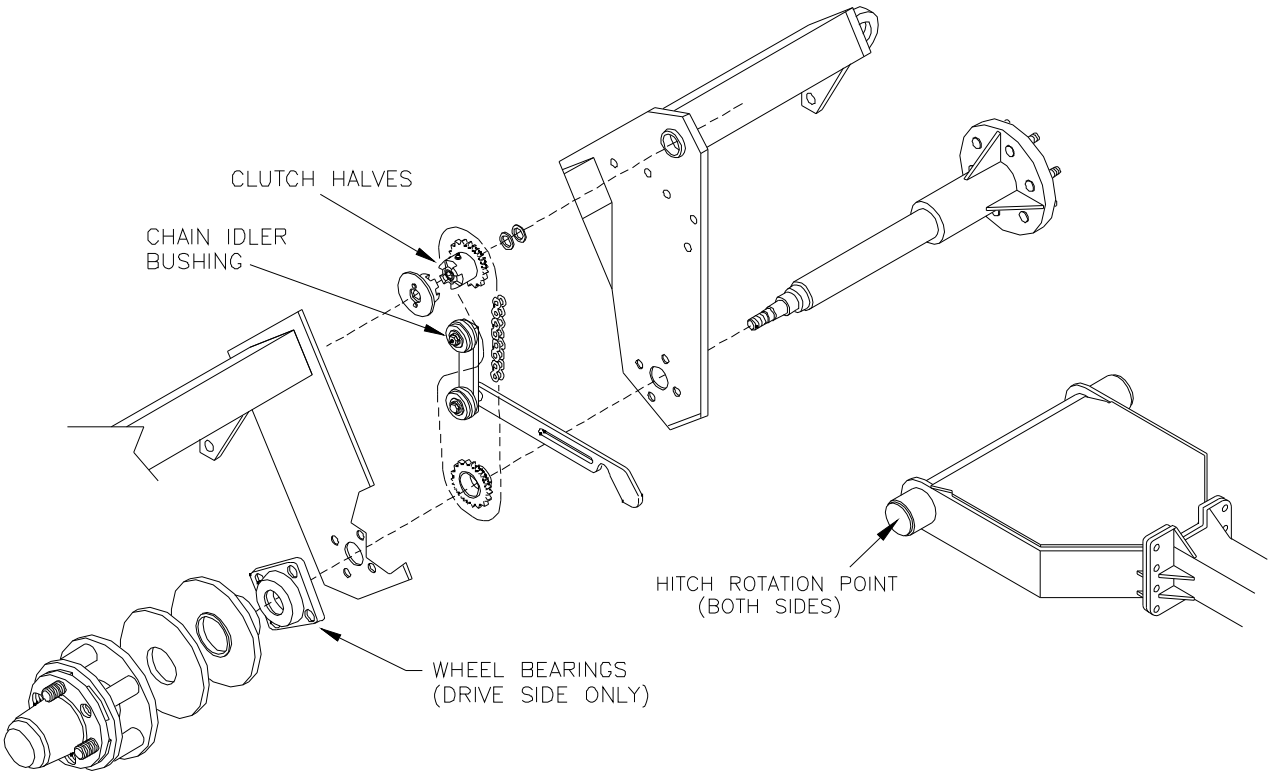


Lubrication and Service

Proper maintenance will extend the life of your drill. Refer to the drawings below for lubrication requirements. Use a high quality grease in bearings and pivot points. On greaseable sealed bearings, be careful not to over grease and destroy the dirt seal. Oil chains with a chain lube. A light penetrating oil or liquid graphite should be used on seed cups initially and at the end of each season.



NOTE:
See gear box assembly on page 34 for zerk locations.

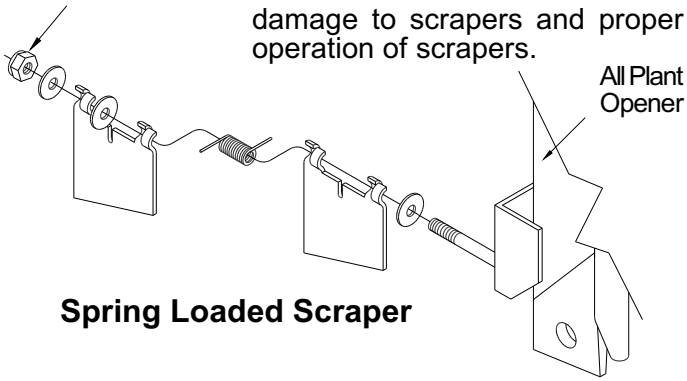


Lubrication and Service

Scraper Adjustment

Opener blade inside scrapers are spring loaded and require no adjustment. To replace the scraper blades, remove the rear lock nut and slide both blades from the stem. Assemble with new blades and replace onto stem being careful no to overtighten lock nut.

NOTE: **Do not over tighten lock nut.** Be sure scrapers move freely. Failure to do so will result in damage to scrapers and proper operation of scrapers.

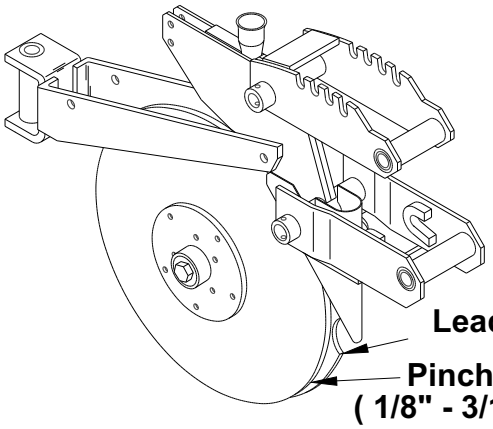


Spring Loaded Scraper

Blade Gap Adjustment

Offset blade designs form better seed furrows and penetrate and cut in tougher planting conditions. As the blades wear, the gap between blades will increase. Removing each blade from the opener bracket allows the operator to take shim washers from behind the bearing and re-adjust the blade gap for better performance. Maintain a 1/8" - 3/16" clearance between blades, measuring at the pinch point. Inadequate clearance will increase wear on the inside of the lead blade and mean quicker replacement.

NOTE: The right blade is installed with a right hand threaded bolt. The left blade is installed with a left hand threaded bolt. The lead blade is reversed on each half of the drill.



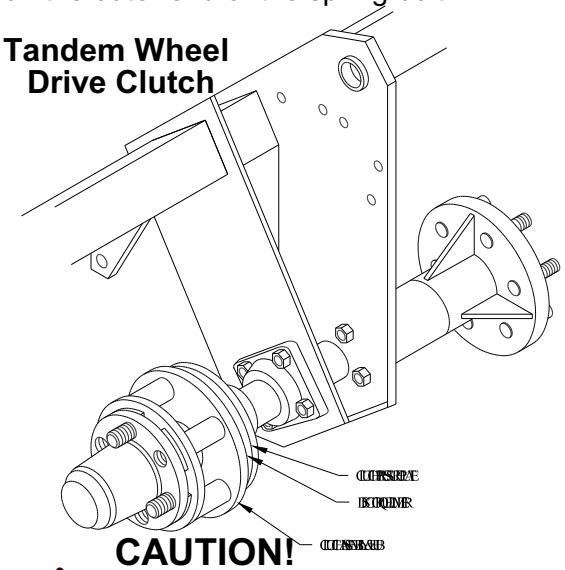
Tandem Wheel Drive Clutch

Tandem wheels that drive a seed shaft are manufactured with a friction disc type clutch. If the drive wheel encounters a hole, ridge, or other situation that may cause a delay in adequate ground contact, the other wheel will "take over" driving the seed shaft. During turns, or in the folding operation, it is necessary that the non-drive wheel can free wheel. This clutch should require no adjustment.

The tire is bolted to the hub using four stud bolts and four through bolts with tapered nuts for thread protection. If the wheel must be removed for service, tighten the four lock nuts on the rubber springs to snug. Remove the tapered nuts on the stud bolts coming through the hub, and remove all eight stud bolts to remove tire. The wheel hub may now be removed by removing dust cap and castellated nut on spindle.

After replacing wheel hub and tightening onto spindle for proper bearing drag, install longer stud bolts in hole aligning clutch and replace tapered nuts. Release spring pressure by loosening the four lock nuts, leaving two threads on the outer end of the spring bolt.

Tandem Wheel Drive Clutch



CAUTION!

At the start of a new drilling season, or anytime the drill is going to be used, especially if the drill has been stored out in the weather all winter long, make sure the clutch drive is not frozen up. Failure to do this will result in damage to the clutch assembly.

To make sure the clutch is not frozen up, tighten up the clutch bolts. This should free the disc torque limiter. If not, use a knife to free the torque limiter from one or the other. Reset clutch back to where it was. **DO NOT** use any oil or penetrating oil of any kind.

Wobble Slot Seed Cup Adjustments and Service

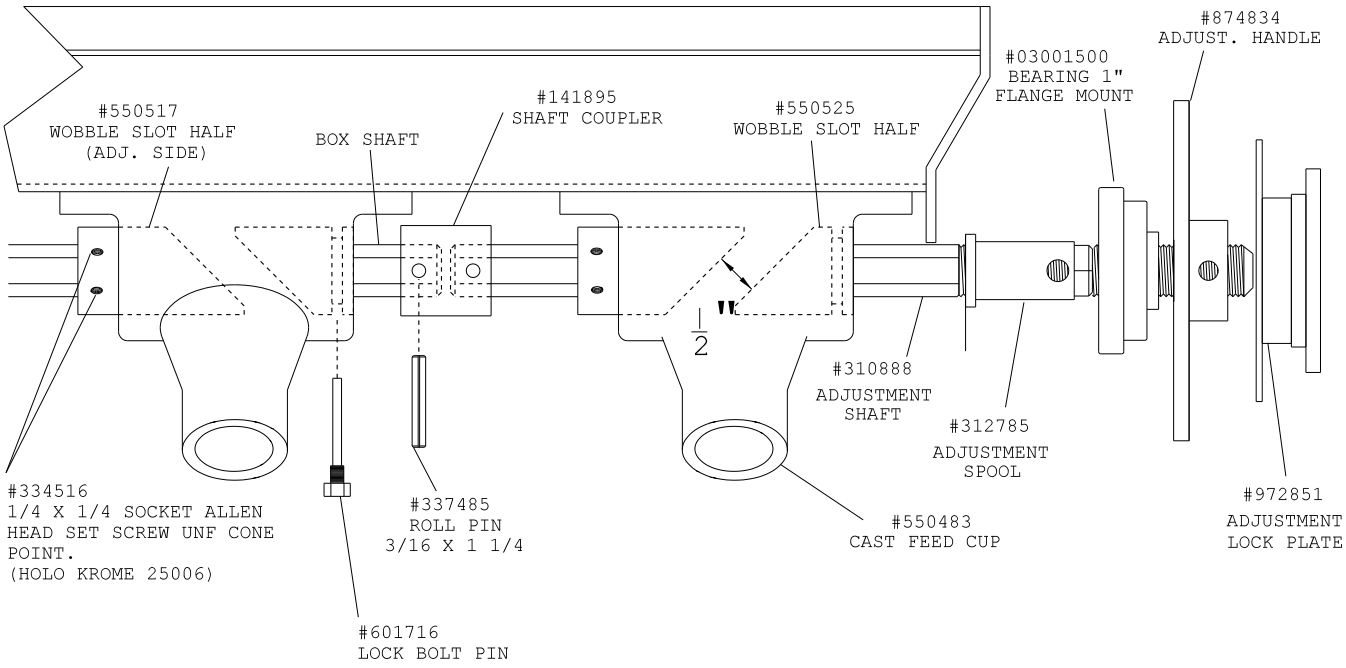
The wobble slot seed cups should be checked against the slot gauge initially and anytime service has been performed on the seed shaft or individual seed cups. Refer to the drawing below for proper adjustment if repairs have been made.

To verify that all seed cups are set the same on the shaft, start with all cups fully closed. A slight crack between the cup halves would be considered normal tolerance. If any individual cup is not "zeroed out," open the slot width using the adjusting handle, loosen allen set screws and adjust to equal others on shaft.

To determine if the gauge is reflecting the correct seed cup slot width, open the seed cups using the adjusting handle. Notice that wobble slot halves are positioned differently on the hex shaft. Identify a cup that will accept a piece of ½" keystock or other measuring device comfortably and give solid contact against each half. It may be necessary to turn the hex shaft slightly to position the particular seed cup correctly. Close the slot width firmly against the measuring device. At the cup next to the wobble slot adjusting handle, position the gauge to equal the slot width you have just measured with the keystock by loosening with a screwdriver and sliding in or out.

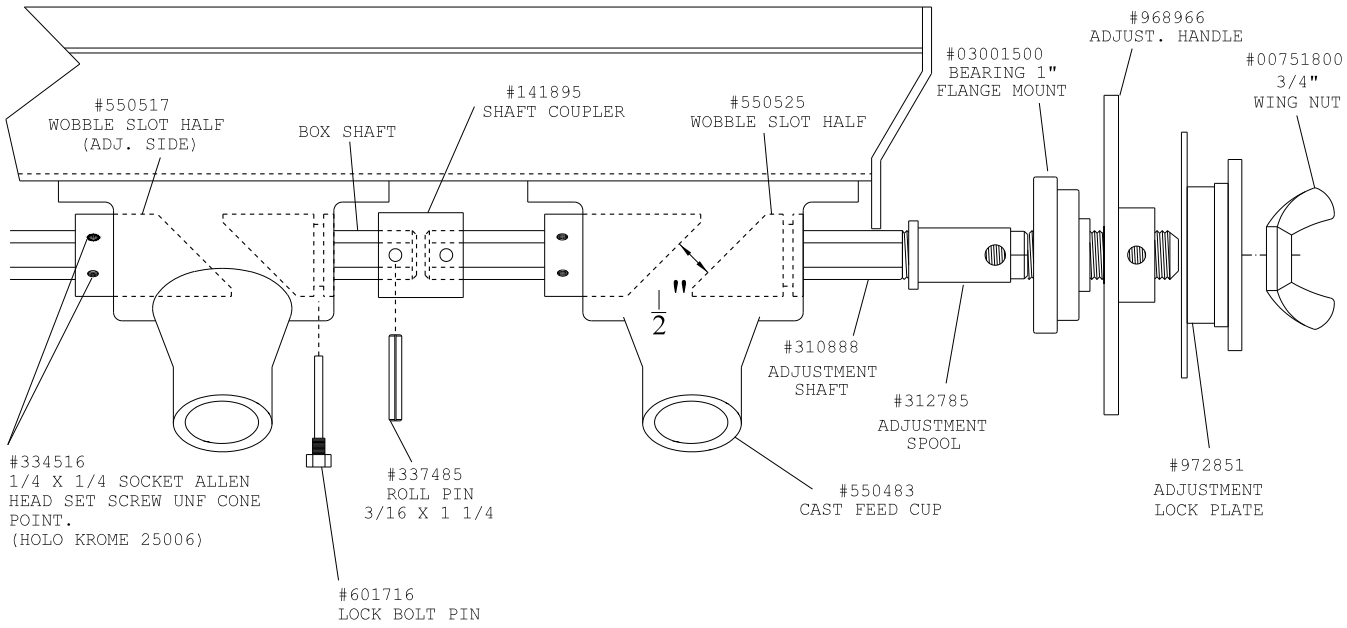
Small changes in rate can be made by opening or closing slot width. To close the slot width with grain in the box, close the slot down a maximum of 1/8" and then rotate the shaft on turn to clear the slot. Repeat this process until the desired slot width is selected.

Seeding rate is affected by seed size, seed treatments, foreign material, and test weight. Refer to seed rate charts as guidelines for desired seeding rates.



Wobble Slot Seed Cup Adjustments and Service

For Legume Boxes



Chain Tension on Drive Shaft
When making sprocket changes to the seed shaft, tighten chain to leave approximately 1/2" of flex. The final sprocket must be allowed to slide on the shaft when the adjusting lever is moved. If the chain is too tight, the spring will not keep the sprocket in the proper location and chain misalignment will occur. Lightly lubricate the shaft where the sprocket will slide. **DO NOT OVERTIGHTEN CHAIN.**

Meter Man Acreage Counter (Option)

Calibration
Use the formulas below to determine your implement calibration factor or refer to the predetermined factors listed when using CrustBuster drills.

DT = Distance traveled with one counter shaft rotation (when using two magnets, divide DT by 2).

WW = Working Width of implement (in inches).

$$\frac{WW \times DT/2}{6272640} = \text{Calibration factor}$$

NOTE: Whenever a gear change is made on the shaft being monitored, you will need to enter a new calibration factor.

Entering Calibration Factor
1. Depress ON/C
2. Round off factor to 5 digits
3. Enter factor (remember decimal point)
4. Depress **+** key
5. Depress **=** key
6. Depress decimal point (screen display 0)

CrustBuster Drill Meter Man Factors by Model

4615 Drill / 3400 Drills

Spacing	10'	15'	30'	42'
6"				
7 ½"	.00095	.00143	.00286	.00399
8"	.00091	.00126	.00257	.00360
10"	.00069	.00103	.00206	.00274

4620 Drill / 4000 Drills

Spacing	25' Drill	20' Drill
6"	.00307	.00265
7 ½"	.00246	.00212
8"	.00224	.00191
10"	.00177	.00152

Sprocket Box Adjustment

The sprocket box design will enable the operator to set a wobble slot width once for a given seed size and change rates by changing the speed of the seed shaft.

Choose a range of seeding rates that you wish to operate in, set the slot width as indicated by the chart and simply change knob position with the slide handle to select seed rate.

A narrow slot width will produce more even distribution and spacing in the row.

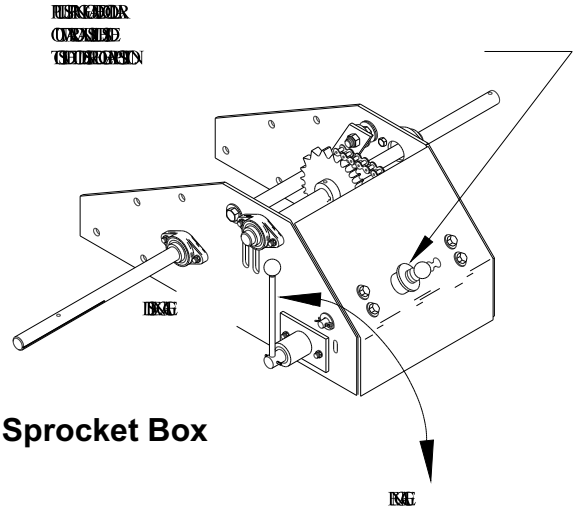
For round seeds, the ideal slot width can be determined by measuring seed size. To attain singular file flow of seeds from the wobble slot seed cup, the slot width should be greater than one and one half (1 ½) times the average seed size, but less than two (2) times the average size.
Ideal Slot Width =
Greater than (>) 1½ times seed size
Less than (<) 2 times seed size

To determine average seed size, lay out 20-30 seeds in single file, each seed touching each other. A short piece of angle iron can help align the seeds evenly. Measure distance from end to end with a ruler. Divide that measurement by the number of seeds to equal the average seed size. Multiply average seed size times 1½ to find the minimum width. Multiply average seed size times 2 to find the maximum width. The slot width should be ideal when set between these values.

Example: 30 seeds measure 9 inches.
9 " divided by 30 seeds = .30"
.30" times 1.5 = .45"
.30 times 2 = .60"
Ideal slot width is greater than .45",less than .60"
Ideal slot width = ½"

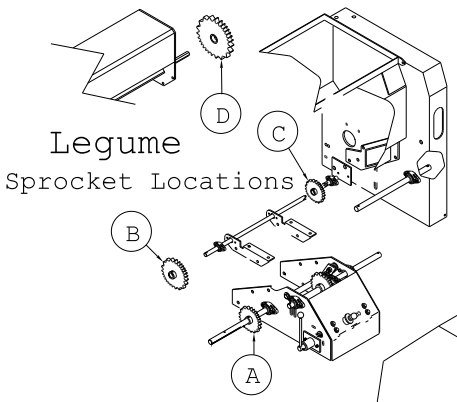
Refer to seed chart ½" column as a starting point for setting final seed rate.

To change position, move throw-out lever toward the rear to disengage the chain from the lower sprocket. Pull the spring loaded collar outward with two fingers and slide side to side to the desired gear position. Pull throw-out lever forward to re-engage the chain.



Sprocket Box

Sprocket Locations



SPROCKET OF CLUTCH.
6" SPACING - 25 TOOTH.
7 1/2" SPACING - 20 TOOTH.
8" SPACING - 18 TOOTH.
10" SPACING - 20 TOOTH.

PART NUMBERS.
25 TOOTH - #863803
20 TOOTH - #863795
18 TOOTH - #863787

GEARBOX CHAIN.

30-25 27 LINKS 2050 CHAIN W/
(1) 2050 OFFSET & (1) 2050 CONN.

18-44 27 LINKS 2050 CHAIN W/
(1) 2050 3 LINK CHAIN & (2) 2050 CONN.

25-44 27 LINKS 2050 CHAIN W/
(1) 2050 3 LINK CHAIN,
(1) 2050 OFFSET & (2) 2050 CONN.

30-44 27 LINKS 2050 CHAIN W/
(1) 2050 3 LINK CHAIN,
(2) 2050 OFFSET & (2) 2050 CONN.

PART NUMBERS.
2050 CHAIN - 27 LINKS #431239

NOTE: 2050 LINKS, 2050 OFFSETS,2050 CONNECTORS & 2050 CHAIN-3 LINKS ARE FOUND IN CHAIN PARTS BAG - #860841

NOTE: EXTRA SPROCKETS (DEPENDING ON SET-UP) RIDE ON SPROCKET CARRIER.

2050 CHAIN-CLUTCH TO WHEEL.
6" SPACING - 57-2050 LINKS W/2050 CONN.
7 1/2" SPACING - 55-2050 LINKS W/2050 OFFSET &2050 CONN.
8" SPACING - 55-2050 LINKS W/2050 CONN.
10" SPACING - 57-2050 LINKS W/2050 OFFSET & 2050 CONN.

2050 CHAIN PART NUMBERS.
2050 CHAIN-55 LINKS - #432666

NOTE: 2050 LINKS, 2050 OFFSET LINKS, 2050 CONN., & 2050 CHAIN-3 LINKS ARE FOUND IN CHAIN PARTS BAG - #860841

SHAFT TO GRAIN BOX CHAIN.
25-44 33 LINKS 2050 CHAIN W/(4) 2050 OFFSET LINKS & (1) 2050 CONN.
30-44 33 LINKS 2050 CHAIN W/(5) 2050 OFFSET LINKS & (1) 2050 CONN.
25-30 33 LINKS 2050 CHAIN W/(1) 2050 CONN.
44-18 33 LINKS 2050 CHAIN W/(2) 2050 OFFSET LINKS & (1) 2050 CONN.

PART NUMBERS.
2050 CHAIN - 33 LINKS #431569

NOTE:2050 LINKS, 2050 OFFSET LINKS,2050 CONNECTORS & 2050 CHAIN-3 LINKS ARE FOUND IN CHAIN PARTS BAG - #860841

SPROCKET ON WHEEL
6" SPACING - 18 TOOTH
7 1/2" SPACING - 18 TOOTH
8" SPACING - 18 TOOTH
10" SPACING - 25 TOOTH

PART NUMBERS
18 TOOTH - #954370
25 TOOTH - #953216

Seed Rate Charts

ALFALFA

Sprockets						Slot Width	
		Derailleur		Box End		Pounds/Acre	
C	D	E	F	G	H	1/8"	1/4"
18	44	16	30	25	44	5	8
18	44	17	30	25	44	5	9
18	44	18	30	25	44	5	9
18	44	19	30	25	44	6	10
18	44	20	30	25	44	6	11
18	44	21	30	25	44	6	11
18	44	22	30	25	44	7	12
18	44	23	30	25	44	7	12
25	44	16	30	25	44	7	12
25	44	17	30	25	44	7	12
25	44	18	30	25	44	8	13
25	44	19	30	25	44	8	14
25	44	20	30	25	44	8	15
25	44	21	30	25	44	9	15
25	44	22	30	25	44	9	16
25	44	23	30	25	44	10	17
30	44	16	30	30	44	10	17
30	44	17	30	30	44	10	18
30	44	18	30	30	44	11	19
30	44	19	30	30	44	12	20
30	44	20	30	30	44	12	21
30	44	21	30	30	44	13	22
30	44	22	30	30	44	13	23
30	44	23	30	30	44	14	24
30	25	16	30	25	44	14	25
30	25	17	30	25	44	15	26
30	25	18	30	25	44	16	28
30	25	19	30	25	44	17	29
30	25	20	30	25	44	18	31
30	25	21	30	25	44	19	32
30	25	22	30	25	44	20	34
30	25	23	30	25	44	21	35
30	25	16	30	25	30	21	36
30	25	17	30	25	30	22	38
30	25	18	30	25	30	24	41
30	25	19	30	25	30	25	43
30	25	20	30	25	30	26	45
30	25	21	30	25	30	28	48
30	25	22	30	25	30	29	50
30	25	23	30	25	30	30	52

BARLEY

Sprockets						Slot Width		
		Derailleur		Box End		Pounds/Acre		
C	D	E	F	G	H	1/2"	5/8"	3/4"
30	25	16	30	25	44	31	38	45
30	25	17	30	25	44	33	40	48
30	25	18	30	25	44	34	43	51
30	25	19	30	25	44	36	45	54
30	25	20	30	25	44	38	47	57
30	25	21	30	25	44	40	50	60
30	25	22	30	25	44	42	52	63
30	25	23	30	25	44	44	54	65
30	25	16	30	25	30	45	56	67
30	25	17	30	25	30	48	59	71
30	25	18	30	25	30	51	63	75
30	25	19	30	25	30	53	66	79
30	25	20	30	25	30	56	69	83
30	25	21	30	25	30	59	73	88
30	25	22	30	25	30	62	76	92
30	25	23	30	25	30	65	80	96
30	25	16	30	30	25	65	80	96
30	25	17	30	30	25	69	85	102
30	25	18	30	30	25	73	90	108
30	25	19	30	30	25	77	95	114
30	25	20	30	30	25	81	100	120
30	25	21	30	30	25	85	105	126
30	25	22	30	30	25	89	110	132
30	25	23	30	30	25	93	115	138
25	30	16	30	44	18	92	113	136
25	30	17	30	44	18	97	120	144
25	30	18	30	44	18	103	127	153
25	30	19	30	44	18	109	134	161
25	30	20	30	44	18	114	141	170
25	30	21	30	44	18	120	149	178
25	30	22	30	44	18	126	156	187
25	30	23	30	44	18	132	163	195

Seed Rate Charts

CANOLA

Sprockets						Slot Width		
		Derailleur		Box End		Pounds/Acre		
C	D	E	F	G	H	3/16"	1/4"	3/8"
18	44	16	30	25	44	5	7	10
18	44	17	30	25	44	5	8	11
18	44	18	30	25	44	5	8	11
18	44	19	30	25	44	6	8	12
18	44	20	30	25	44	6	9	13
18	44	21	30	25	44	6	9	13
18	44	22	30	25	44	7	10	14
18	44	23	30	25	44	7	10	14
25	44	16	30	25	44	7	10	14
25	44	17	30	25	44	7	10	15
25	44	18	30	25	44	8	11	16
25	44	19	30	25	44	8	12	17
25	44	20	30	25	44	8	12	17
25	44	21	30	25	44	9	13	18
25	44	22	30	25	44	9	13	19
25	44	23	30	25	44	10	14	20
30	44	16	30	30	44	10	14	20
30	44	17	30	30	44	10	15	21
30	44	18	30	30	44	11	16	23
30	44	19	30	30	44	12	17	24
30	44	20	30	30	44	12	18	25
30	44	21	30	30	44	13	19	26
30	44	22	30	30	44	13	19	28
30	44	23	30	30	44	14	20	29
30	25	16	30	25	44	14	21	29
30	25	17	30	25	44	15	22	31
30	25	18	30	25	44	16	23	33
30	25	19	30	25	44	17	25	35
30	25	20	30	25	44	18	26	37
30	25	21	30	25	44	19	27	39
30	25	22	30	25	44	20	28	41
30	25	23	30	25	44	21	30	42
30	25	16	30	25	30	21	30	43
30	25	17	30	25	30	22	32	46
30	25	18	30	25	30	24	34	49
30	25	19	30	25	30	25	36	51
30	25	20	30	25	30	26	38	54
30	25	21	30	25	30	28	40	57
30	25	22	30	25	30	29	42	59
30	25	23	30	25	30	30	44	62
30	25	16	30	30	25	30	44	62
30	25	17	30	30	25	32	46	66
30	25	18	30	30	25	34	49	70
30	25	19	30	30	25	36	52	74
30	25	20	30	30	25	38	55	78
30	25	21	30	30	25	40	57	82
30	25	22	30	30	25	42	60	86
30	25	23	30	30	25	44	63	89

CORN

Sprockets						Slot Width		
		Derailleur		Box End		Pounds/Acre		
C	D	E	F	G	H	1/2"	5/8"	3/4"
18	44	16	30	25	44	6	8	10
18	44	17	30	25	44	6	8	10
18	44	18	30	25	44	6	9	11
18	44	19	30	25	44	7	9	11
18	44	20	30	25	44	7	10	12
18	44	21	30	25	44	7	10	13
18	44	22	30	25	44	8	11	13
18	44	23	30	25	44	8	11	14
25	44	16	30	25	44	8	11	13
25	44	17	30	25	44	8	12	14
25	44	18	30	25	44	9	12	15
25	44	19	30	25	44	9	13	16
25	44	20	30	25	44	10	14	17
25	44	21	30	25	44	10	14	18
25	44	22	30	25	44	11	15	18
25	44	23	30	25	44	11	16	19
30	44	16	30	30	44	11	16	19
30	44	17	30	30	44	12	17	20
30	44	18	30	30	44	13	18	22
30	44	19	30	30	44	13	19	23
30	44	20	30	30	44	14	20	24
30	44	21	30	30	44	15	21	25
30	44	22	30	30	44	15	22	26
30	44	23	30	30	44	16	23	28
30	25	16	30	25	44	17	23	28
30	25	17	30	25	44	18	25	30
30	25	18	30	25	44	19	26	32
30	25	19	30	25	44	20	27	34
30	25	20	30	25	44	21	29	35
30	25	21	30	25	44	22	30	37
30	25	22	30	25	44	23	32	39
30	25	23	30	25	44	24	33	41
30	25	16	30	25	30	26	34	42
30	25	17	30	25	30	27	36	44
30	25	18	30	25	30	28	38	47
30	25	19	30	25	30	29	40	50
30	25	20	30	25	30	31	42	52
30	25	21	30	25	30	32	44	55
30	25	22	30	25	30	34	46	58
30	25	23	30	25	30	35	48	60
30	25	16	30	30	25	35	48	60
30	25	17	30	30	25	37	52	64
30	25	18	30	30	25	40	55	68
30	25	19	30	30	25	42	58	72
30	25	20	30	30	25	44	61	75
30	25	21	30	30	25	46	64	79
30	25	22	30	30	25	48	67	83
30	25	23	30	30	25	51	70	87

Seed Rate Charts

COTTON

Sprockets						Slot Width		
		Derailleur		Box End		Pounds/Acre		
C	D	E	F	G	H	1/2"	5/8"	3/4"
18	44	16	30	25	44	8	9	12
18	44	17	30	25	44	8	10	12
18	44	18	30	25	44	9	10	13
18	44	19	30	25	44	9	11	14
18	44	20	30	25	44	10	12	14
18	44	21	30	25	44	10	12	15
18	44	22	30	25	44	11	13	16
18	44	23	30	25	44	11	13	17
25	44	16	30	25	44	11	13	16
25	44	17	30	25	44	11	14	17
25	44	18	30	25	44	12	14	18
25	44	19	30	25	44	13	15	19
25	44	20	30	25	44	13	16	20
25	44	21	30	25	44	14	17	21
25	44	22	30	25	44	15	18	22
25	44	23	30	25	44	15	19	23
30	44	16	30	30	44	15	19	23
30	44	17	30	30	44	16	20	24
30	44	18	30	30	44	17	21	26
30	44	19	30	30	44	18	22	27
30	44	20	30	30	44	19	23	29
30	44	21	30	30	44	20	24	30
30	44	22	30	30	44	21	26	32
30	44	23	30	30	44	22	27	33
30	25	16	30	25	44	23	27	34
30	25	17	30	25	44	24	29	36
30	25	18	30	25	44	26	31	38
30	25	19	30	25	44	27	32	40
30	25	20	30	25	44	28	34	42
30	25	21	30	25	44	30	36	44
30	25	22	30	25	44	31	37	46
30	25	23	30	25	44	33	39	49

FESCUE

Sprockets						Slot Width		
		Derailleur		Box End		Pounds/Acre		
C	D	E	F	G	H	3/8"	1/2"	5/8"
18	44	16	30	25	44	4	6	7
18	44	17	30	25	44	5	6	8
18	44	18	30	25	44	5	6	8
18	44	19	30	25	44	5	7	9
18	44	20	30	25	44	5	7	9
18	44	21	30	25	44	6	7	10
18	44	22	30	25	44	6	8	10
18	44	23	30	25	44	6	8	11
25	44	16	30	25	44	6	8	10
25	44	17	30	25	44	6	8	11
25	44	18	30	25	44	7	9	11
25	44	19	30	25	44	7	9	12
25	44	20	30	25	44	8	10	13
25	44	21	30	25	44	8	10	13
25	44	22	30	25	44	8	11	14
25	44	23	30	25	44	9	11	15
30	44	16	30	30	44	9	11	15
30	44	17	30	30	44	9	12	16
30	44	18	30	30	44	10	13	16
30	44	19	30	30	44	10	14	17
30	44	20	30	30	44	11	14	18
30	44	21	30	30	44	11	15	19
30	44	22	30	30	44	12	16	20
30	44	23	30	30	44	12	16	21
30	25	16	30	25	44	13	17	22
30	25	17	30	25	44	14	18	23
30	25	18	30	25	44	14	19	24
30	25	19	30	25	44	15	20	26
30	25	20	30	25	44	16	21	27
30	25	21	30	25	44	17	22	28
30	25	22	30	25	44	18	23	30
30	25	23	30	25	44	18	24	31
30	25	16	30	25	30	19	25	32
30	25	17	30	25	30	20	26	34
30	25	18	30	25	30	21	28	35
30	25	19	30	25	30	22	29	37
30	25	20	30	25	30	23	31	39
30	25	21	30	25	30	25	32	41
30	25	22	30	25	30	26	34	43
30	25	23	30	25	30	27	35	45
30	25	16	30	30	25	27	35	45
30	25	17	30	30	25	29	38	48
30	25	18	30	30	25	30	40	51
30	25	19	30	30	25	32	42	54
30	25	20	30	30	25	34	44	57
30	25	21	30	30	25	35	46	60
30	25	22	30	30	25	37	49	62
30	25	23	30	30	25	39	51	65

Seed Rate Charts

MILLET

Sprockets						Slot Width		
		Derailleur		Box End		Pounds/Acre		
C	D	E	F	G	H	3/16"	1/4"	3/8"
18	44	16	30	25	44	4	6	8
18	44	17	30	25	44	4	6	8
18	44	18	30	25	44	4	7	9
18	44	19	30	25	44	4	7	9
18	44	20	30	25	44	5	7	10
18	44	21	30	25	44	5	8	10
18	44	22	30	25	44	5	8	11
18	44	23	30	25	44	5	8	11
25	44	16	30	25	44	5	8	11
25	44	17	30	25	44	5	9	12
25	44	18	30	25	44	6	9	12
25	44	19	30	25	44	6	10	13
25	44	20	30	25	44	6	10	14
25	44	21	30	25	44	7	11	15
25	44	22	30	25	44	7	11	15
25	44	23	30	25	44	7	12	16
30	44	16	30	30	44	7	12	16
30	44	17	30	30	44	8	12	17
30	44	18	30	30	44	8	13	18
30	44	19	30	30	44	9	14	19
30	44	20	30	30	44	9	14	20
30	44	21	30	30	44	10	15	21
30	44	22	30	30	44	10	16	22
30	44	23	30	30	44	11	17	23
30	25	16	30	25	44	11	17	23
30	25	17	30	25	44	11	18	25
30	25	18	30	25	44	12	19	26
30	25	19	30	25	44	13	20	28
30	25	20	30	25	44	13	21	29
30	25	21	30	25	44	14	22	31
30	25	22	30	25	44	15	23	32
30	25	23	30	25	44	15	24	34
30	25	16	30	25	30	16	25	34
30	25	17	30	25	30	17	26	36
30	25	18	30	25	30	18	28	39
30	25	19	30	25	30	19	30	41
30	25	20	30	25	30	20	31	43
30	25	21	30	25	30	21	33	45
30	25	22	30	25	30	22	34	47
30	25	23	30	25	30	23	36	49
30	25	16	30	30	25	23	36	49
30	25	17	30	30	25	24	38	53
30	25	18	30	30	25	26	40	56
30	25	19	30	30	25	27	43	59
30	25	20	30	30	25	28	45	62
30	25	21	30	30	25	30	47	65
30	25	22	30	30	25	31	49	68
30	25	23	30	30	25	33	52	71

MILO

Sprockets						Slot Width		
		Derailleur		Box End		Pounds/Acre		
C	D	E	F	G	H	3/16"	1/4"	3/8"
18	44	16	30	25	44	4	6	11
18	44	17	30	25	44	5	6	12
18	44	18	30	25	44	5	7	13
18	44	19	30	25	44	5	7	14
18	44	20	30	25	44	5	8	14
18	44	21	30	25	44	6	8	15
18	44	22	30	25	44	6	8	16
18	44	23	30	25	44	6	9	16
25	44	16	30	25	44	6	8	16
25	44	17	30	25	44	6	9	17
25	44	18	30	25	44	7	10	18
25	44	19	30	25	44	7	10	19
25	44	20	30	25	44	8	11	20
25	44	21	30	25	44	8	11	21
25	44	22	30	25	44	8	12	22
25	44	23	30	25	44	9	12	23
30	44	16	30	30	44	9	12	23
30	44	17	30	30	44	9	13	24
30	44	18	30	30	44	10	14	26
30	44	19	30	30	44	10	14	27
30	44	20	30	30	44	11	15	29
30	44	21	30	30	44	11	16	30
30	44	22	30	30	44	12	17	32
30	44	23	30	30	44	12	18	33
30	25	16	30	25	44	13	18	34
30	25	17	30	25	44	13	19	36
30	25	18	30	25	44	14	20	38
30	25	19	30	25	44	15	21	40
30	25	20	30	25	44	16	22	42
30	25	21	30	25	44	17	23	44
30	25	22	30	25	44	17	25	46
30	25	23	30	25	44	18	26	48

Seed Rate Charts

OATS

Sprockets						Slot Width		
		Derailleur		Box End		Pounds/Acre		
C	D	E	F	G	H	1/2"	5/8"	3/4"
30	25	16	30	25	44	15	20	27
30	25	17	30	25	44	16	21	28
30	25	18	30	25	44	17	23	30
30	25	19	30	25	44	18	24	32
30	25	20	30	25	44	19	25	33
30	25	21	30	25	44	20	26	35
30	25	22	30	25	44	21	28	37
30	25	23	30	25	44	22	29	38
30	25	16	30	25	30	22	29	39
30	25	17	30	25	30	23	31	42
30	25	18	30	25	30	25	33	44
30	25	19	30	25	30	26	35	47
30	25	20	30	25	30	28	37	49
30	25	21	30	25	30	29	39	51
30	25	22	30	25	30	30	40	54
30	25	23	30	25	30	32	42	56
30	25	16	30	30	25	32	42	56
30	25	17	30	30	25	34	45	60
30	25	18	30	30	25	36	48	64
30	25	19	30	30	25	38	50	67
30	25	20	30	30	25	40	53	71
30	25	21	30	30	25	42	56	74
30	25	22	30	30	25	44	58	78
30	25	23	30	30	25	46	61	81
25	30	16	30	44	18	45	60	80
25	30	17	30	44	18	48	64	85
25	30	18	30	44	18	51	67	90
25	30	19	30	44	18	53	71	95
25	30	20	30	44	18	56	75	100
25	30	21	30	44	18	59	79	105
25	30	22	30	44	18	62	82	110
25	30	23	30	44	18	65	86	115
30	25	16	30	44	18	65	86	115
30	25	17	30	44	18	69	92	122
30	25	18	30	44	18	73	97	129
30	25	19	30	44	18	77	102	137
30	25	20	30	44	18	81	108	144
30	25	21	30	44	18	85	113	151
30	25	22	30	44	18	89	119	158
30	25	23	30	44	18	93	124	165

PINTO BEANS

Sprockets						Slot Width		
		Derailleur		Box End		Pounds/Acre		
C	D	E	F	G	H	1/2"	5/8"	3/4"
30	25	16	30	25	44	20	27	32
30	25	17	30	25	44	21	28	34
30	25	18	30	25	44	22	30	36
30	25	19	30	25	44	24	31	38
30	25	20	30	25	44	25	33	40
30	25	21	30	25	44	26	35	42
30	25	22	30	25	44	27	36	44
30	25	23	30	25	44	29	38	46
30	25	16	30	25	30	29	39	46
30	25	17	30	25	30	31	41	49
30	25	18	30	25	30	33	44	52
30	25	19	30	25	30	35	46	55
30	25	20	30	25	30	37	49	58
30	25	21	30	25	30	38	51	61
30	25	22	30	25	30	40	53	64
30	25	23	30	25	30	42	56	67
30	25	16	30	30	25	42	56	67
30	25	17	30	30	25	45	60	71
30	25	18	30	30	25	47	63	75
30	25	19	30	30	25	50	67	79
30	25	20	30	30	25	53	70	84
30	25	21	30	30	25	55	74	88
30	25	22	30	30	25	58	77	92
30	25	23	30	30	25	61	81	96
25	30	16	30	44	18	60	79	95
25	30	17	30	44	18	63	84	101
25	30	18	30	44	18	67	89	107
25	30	19	30	44	18	71	94	112
25	30	20	30	44	18	75	99	118
25	30	21	30	44	18	78	104	124
25	30	22	30	44	18	82	109	130
25	30	23	30	44	18	86	114	136
30	25	16	30	44	18	86	114	136
30	25	17	30	44	18	91	121	145
30	25	18	30	44	18	97	128	153
30	25	19	30	44	18	102	135	162
30	25	20	30	44	18	107	143	170
30	25	21	30	44	18	113	150	179
30	25	22	30	44	18	118	157	187
30	25	23	30	44	18	124	164	196
44	25	16	30	44	18	126	167	200
44	25	17	30	44	18	134	178	212
44	25	18	30	44	18	142	188	225
44	25	19	30	44	18	150	199	237
44	25	20	30	44	18	158	209	250
44	25	21	30	44	18	165	220	262
44	25	22	30	44	18	173	230	275
44	25	23	30	44	18	181	241	287

Seed Rate Charts

RICE

Sprockets						Slot Width		
		Derailleur		Box End		Pounds/Acre		
C	D	E	F	G	H	1/2"	5/8"	3/4"
30	25	16	30	25	44	27	34	40
30	25	17	30	25	44	29	36	42
30	25	18	30	25	44	31	38	45
30	25	19	30	25	44	32	40	47
30	25	20	30	25	44	34	43	50
30	25	21	30	25	44	36	45	52
30	25	22	30	25	44	37	47	54
30	25	23	30	25	44	39	49	57
30	25	16	30	25	30	40	50	58
30	25	17	30	25	30	42	53	62
30	25	18	30	25	30	45	56	65
30	25	19	30	25	30	47	59	69
30	25	20	30	25	30	50	63	73
30	25	21	30	25	30	52	66	76
30	25	22	30	25	30	55	69	80
30	25	23	30	25	30	57	72	84
30	25	16	30	30	25	57	72	84
30	25	17	30	30	25	61	77	89
30	25	18	30	30	25	65	81	94
30	25	19	30	30	25	68	86	99
30	25	20	30	30	25	72	90	105
30	25	21	30	30	25	75	95	110
30	25	22	30	30	25	79	99	115
30	25	23	30	30	25	83	104	120
25	30	16	30	44	18	81	102	118
25	30	17	30	44	18	86	108	126
25	30	18	30	44	18	91	115	133
25	30	19	30	44	18	97	121	141
25	30	20	30	44	18	102	127	148
25	30	21	30	44	18	107	134	155
25	30	22	30	44	18	112	140	163
25	30	23	30	44	18	117	146	170
30	25	16	30	44	18	117	146	170
30	25	17	30	44	18	125	155	181
30	25	18	30	44	18	131	164	191
30	25	19	30	44	18	139	174	202
30	25	20	30	44	18	147	183	213
30	25	21	30	44	18	154	192	224
30	25	22	30	44	18	161	201	234
30	25	23	30	44	18	168	210	245

RYE

Sprockets						Slot Width		
		Derailleur		Box End		Pounds/Acre		
C	D	E	F	G	H	1/2"	5/8"	3/4"
30	44	16	30	30	44	27	34	44
30	44	17	30	30	44	28	36	46
30	44	18	30	30	44	30	38	49
30	44	19	30	30	44	32	40	52
30	44	20	30	30	44	33	43	55
30	44	21	30	30	44	35	45	57
30	44	22	30	30	44	36	47	60
30	44	23	30	30	44	38	49	63
30	25	16	30	25	44	39	50	64
30	25	17	30	25	44	41	53	68
30	25	18	30	25	44	44	56	72
30	25	19	30	25	44	46	59	76
30	25	20	30	25	44	49	62	80
30	25	21	30	25	44	51	66	84
30	25	22	30	25	44	54	69	88
30	25	23	30	25	44	56	72	92
30	25	16	30	25	30	57	73	94
30	25	17	30	25	30	61	78	100
30	25	18	30	25	30	64	82	106
30	25	19	30	25	30	68	87	112
30	25	20	30	25	30	71	92	117
30	25	21	30	25	30	75	96	123
30	25	22	30	25	30	78	101	129
30	25	23	30	25	30	82	105	135
30	30	16	30	30	25	82	105	135
30	30	17	30	30	25	87	112	144
30	30	18	30	30	25	92	119	152
30	30	19	30	30	25	98	125	161
30	30	20	30	30	25	103	132	169
30	30	21	30	30	25	108	138	178
30	30	22	30	30	25	113	145	186
30	30	23	30	30	25	118	152	195

Seed Rate Charts

SOYBEANS

Sprockets						Slot Width			
		Derailleur		Box End		Pounds/Acre			
C	D	E	F	G	H	3/8"	1/2"	5/8"	3/4"
30	25	16	30	25	44	18	26	34	43
30	25	17	30	25	44	19	27	37	45
30	25	18	30	25	44	20	29	39	48
30	25	19	30	25	44	21	31	41	51
30	25	20	30	25	44	22	32	43	53
30	25	21	30	25	44	23	34	45	56
30	25	22	30	25	44	24	36	47	59
30	25	23	30	25	44	25	37	50	61
30	25	16	30	25	30	26	38	51	63
30	25	17	30	25	30	27	40	54	67
30	25	18	30	25	30	29	43	57	71
30	25	19	30	25	30	31	45	60	75
30	25	20	30	25	30	32	47	63	78
30	25	21	30	25	30	34	50	66	82
30	25	22	30	25	30	35	52	70	86
30	25	23	30	25	30	37	55	73	90
30	25	16	30	30	25	37	55	73	90
30	25	17	30	30	25	39	58	77	96
30	25	18	30	30	25	42	61	82	102
30	25	19	30	30	25	44	65	87	107
30	25	20	30	30	25	46	68	91	113
30	25	21	30	30	25	49	72	96	119
30	25	22	30	30	25	51	75	100	124
30	25	23	30	30	25	53	79	105	130
25	30	16	30	44	18	52	77	103	128
25	30	17	30	44	18	56	82	109	136
25	30	18	30	44	18	59	87	116	144
25	30	19	30	44	18	62	92	122	152
25	30	20	30	44	18	65	97	129	160
25	30	21	30	44	18	69	101	135	168
25	30	22	30	44	18	72	106	142	176
25	30	23	30	44	18	75	111	148	184
30	25	16	30	44	18	75	111	148	184
30	25	17	30	44	18	80	118	158	196
30	25	18	30	44	18	84	124	166	206
30	25	19	30	44	18	89	132	176	219
30	25	20	30	44	18	94	139	185	230
30	25	21	30	44	18	99	146	195	242
30	25	22	30	44	18	103	153	204	253
30	25	23	30	44	18	108	160	213	265

SUNFLOWERS

Sprockets						Slot Width		
		Derailleur		Box End		Pounds/Acre		
C	D	E	F	G	H	1/2"	5/8"	3/4"
18	44	16	30	25	44	5	7	8
18	44	17	30	25	44	5	7	9
18	44	18	30	25	44	6	8	9
18	44	19	30	25	44	6	8	10
18	44	20	30	25	44	6	8	10
18	44	21	30	25	44	7	9	11
18	44	22	30	25	44	7	9	11
18	44	23	30	25	44	7	10	12
25	44	16	30	25	44	7	9	11
25	44	17	30	25	44	8	10	12
25	44	18	30	25	44	8	11	13
25	44	19	30	25	44	9	11	13
25	44	20	30	25	44	9	12	14
25	44	21	30	25	44	9	12	15
25	44	22	30	25	44	10	13	16
25	44	23	30	25	44	10	14	16
30	44	16	30	30	44	10	14	16
30	44	17	30	30	44	11	14	17
30	44	18	30	30	44	12	15	18
30	44	19	30	30	44	12	16	19
30	44	20	30	30	44	13	17	20
30	44	21	30	30	44	14	18	21
30	44	22	30	30	44	14	19	22
30	44	23	30	30	44	15	20	23
30	25	16	30	25	44	15	20	24
30	25	17	30	25	44	16	21	25
30	25	18	30	25	44	17	22	27
30	25	19	30	25	44	18	24	28
30	25	20	30	25	44	19	25	30
30	25	21	30	25	44	20	26	31
30	25	22	30	25	44	21	27	33
30	25	23	30	25	44	22	29	34
30	25	16	30	25	30	22	29	35
30	25	17	30	25	30	24	31	37
30	25	18	30	25	30	25	33	39
30	25	19	30	25	30	26	35	42
30	25	20	30	25	30	28	37	44
30	25	21	30	25	30	29	38	46
30	25	22	30	25	30	31	40	48
30	25	23	30	25	30	32	42	50

Seed Rate Charts

WHEAT

Sprockets						Slot Width		
		Derailleur		Box End		Pounds/Acre		
C	D	E	F	G	H	1/2"	5/8"	3/4"
25	44	16	30	25	44	21	26	31
25	44	17	30	25	44	22	27	33
25	44	18	30	25	44	23	29	35
25	44	19	30	25	44	25	31	37
25	44	20	30	25	44	26	32	39
25	44	21	30	25	44	27	34	41
25	44	22	30	25	44	28	36	43
25	44	23	30	25	44	30	37	45
30	44	16	30	30	44	30	37	45
30	44	17	30	30	44	32	40	47
30	44	18	30	30	44	33	42	50
30	44	19	30	30	44	35	44	53
30	44	20	30	30	44	37	47	56
30	44	21	30	30	44	39	49	59
30	44	22	30	30	44	41	51	61
30	44	23	30	30	44	43	53	64
30	25	16	30	25	44	44	55	65
30	25	17	30	25	44	46	58	70
30	25	18	30	25	44	49	61	74
30	25	19	30	25	44	52	65	78
30	25	20	30	25	44	55	68	82
30	25	21	30	25	44	57	72	86
30	25	22	30	25	44	60	75	90
30	25	23	30	25	44	63	78	94
30	25	16	30	25	30	64	80	96
30	25	17	30	25	30	68	85	102
30	25	18	30	25	30	72	90	108
30	25	19	30	25	30	76	95	114
30	25	20	30	25	30	80	100	120
30	25	21	30	25	30	84	105	126
30	25	22	30	25	30	88	110	132
30	25	23	30	25	30	92	115	138
30	25	16	30	30	25	92	115	138
30	25	17	30	30	25	98	122	147
30	25	18	30	30	25	104	130	156
30	25	19	30	30	25	109	137	164
30	25	20	30	30	25	115	144	173
30	25	21	30	30	25	121	151	182
30	25	22	30	30	25	127	158	190
30	25	23	30	30	25	133	166	199

Legume Box Charts

ALFALFA

Sprockets				Slot Width	
Gear Box		Box End		Pounds/Acre	
A	B	C	D	1/8"	1/4"
16	30	18	44	8	15
16	25	18	44	10	18
16	20	18	44	13	22
16	18	18	44	14	25

CANOLA

Sprockets				Slot Width		
Gear Box		Box End		Pounds/Acre		
A	B	C	D	3/16"	1/4"	3/8"
16	30	18	44	8	12	17
16	25	18	44	10	15	21
16	20	18	44	13	19	26
16	18	18	44	14	21	29

FESCUE

Sprockets				Slot Width		
Gear Box		Box End		Pounds/Acre		
A	B	C	D	3/8"	1/2"	5/8"
16	30	18	44	8	10	13
16	25	18	44	9	12	16
16	20	18	44	11	15	19
16	18	18	44	13	17	22

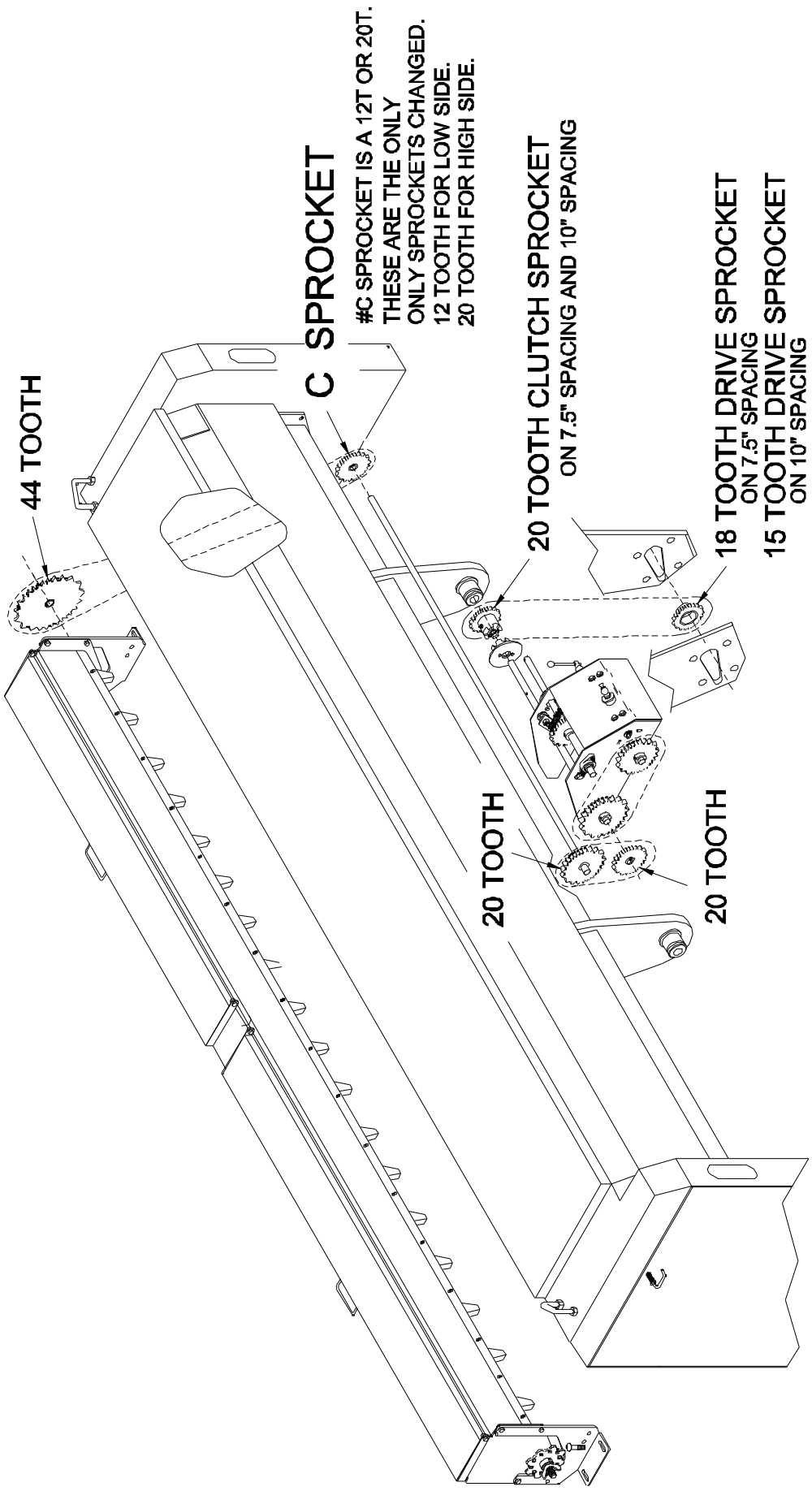
MILLET

Sprockets				Slot Width		
Gear Box		Box End		Pounds/Acre		
A	B	C	D	3/16"	1/4"	3/8"
16	30	18	44	6	10	14
16	25	18	44	8	12	17
16	20	18	44	10	15	21
16	18	18	44	11	17	23

MILO

Sprockets				Slot Width		
Gear Box		Box End		Pounds/Acre		
A	B	C	D	3/16"	1/4"	3/8"
16	30	18	44	8	11	20
16	25	18	44	9	13	24
16	20	18	44	11	16	30
16	18	18	44	13	18	34

Sprocket Locations for Small Seed Hopper

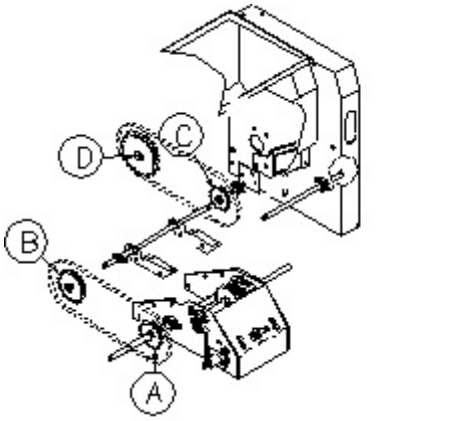


Seed Rate Charts for Small Seed Hopper Row Spacing 7½" & 10"

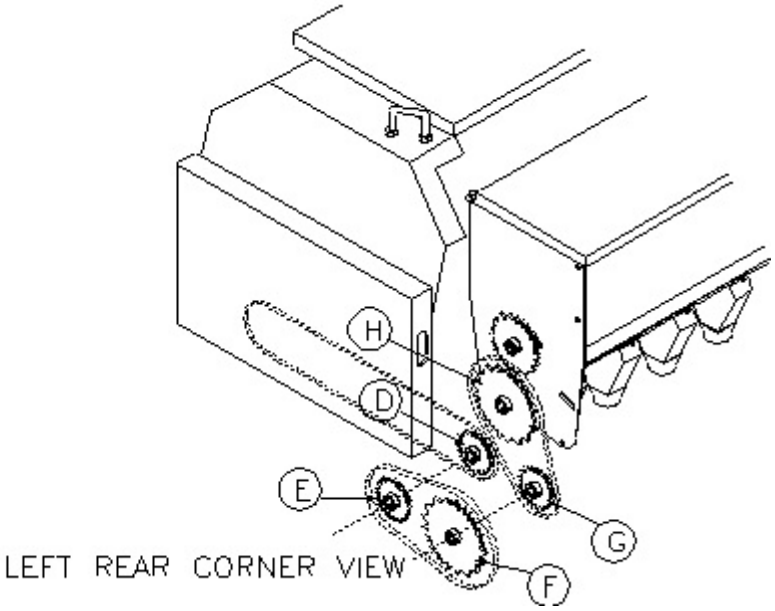
Rate Chart for reference only. Use calibration for exact seed rate.

Seed Type	Seed Rate	C Sprocket Teeth #	Turns of Adjusting Handle / Meter Opening															
			5/8	1 1/4	2	2 1/2	3 1/8	3 3/4	4 3/8	5	5 3/8	6 1/4	7	7 1/2	8 1/8	8 3/4	9 3/8	10
			1/16"	1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	11/16"	3/4"	13/16"	7/8"	15/16"	1"
Alfalfa	Low	12		2	3	5	6	8	9	11	12	14	15	17	19	21	23	24
	High	20		3	5	8	11	13	16	19	21	24	27	29	33	37	40	43
Alfalfa Coated	Low	12		2	4	6	8	9	11	12	14	17	17	18	20	23	24	26
	High	20		3	7	11	13	16	19	21	25	29	31	32	36	40	43	45
Bahia Grass	Low	12	1	2	2	3	5	6	8	9	10	11	12	14	14	15	17	18
	High	20	1	3	4	5	8	11	13	16	17	19	21	24	25	27	29	32
Bentgrass	Low	12	1	1	2	2	3	4	4	5	5	6	6	7	7	8	8	9
	High	20	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	15
Bermuda Grass	Low	12		2	4	6	8	9	11	12	14	15	17	20	21	23	24	26
	High	20		3	7	11	13	16	19	21	24	27	31	35	37	40	43	45
Canola	Low	12		1	3	4	6	7	9	10	11	13	14	16	17	18	20	21
	High	20		2	5	8	10	13	15	18	20	22	25	28	30	32	35	37
Centipede	Low	12		2	3	5	7	9	11	12	14	15	17	18	20	21	23	24
	High	20		3	5	8	12	16	19	21	24	27	29	32	35	37	40	43
Clover Alsike	Low	12	1	2	4	5	7	8	10	11	13	15	16	18	19	21	22	24
	High	20	1	4	6	9	12	15	17	20	23	26	29	32	34	37	39	42
Clover Red	Low	12	1	2	4	6	7	9	11	13	15	17	18	20	22	24	25	27
	High	20	1	4	7	10	13	16	19	23	26	29	32	36	39	42	45	48
Kentucky Bluegrass	Low	12		1	1	2	2	3	4	4	5	6	6	7	8	8	9	10
	High	20		1	2	3	4	5	6	7	9	10	11	12	13	15	16	17
KY31 Fescue	Low	12				2	2	3	3	4	4	5	5	5	6	6	7	7
	High	20				3	4	5	6	7	7	8	9	9	10	11	12	13
Love Grass	Low	12	2	3	5	6	8	9	11	12	14	15	16	17	18	20	20	21
	High	20	3	5	8	11	13	16	19	21	24	27	28	29	32	35	36	37
Lespedeza	Low	12	1	2	2	3	4	5	5	6	7	8	8	9	10	11	11	12
	High	20	1	3	4	5	7	8	9	11	12	13	15	16	17	19	20	21
Lespedeza Unhulled	Low	12		2	4	6	8	9	11	14	16	18	20	23	25	27	29	32
	High	20		3	7	11	13	16	20	24	28	32	36	40	44	48	52	56
Millet	Low	12		2	3	5	5	6	8	9	11	12	13	14	15	17	17	18
	High	20		3	5	8	9	11	13	16	19	21	23	24	27	29	31	32
Rape Seed	Low	12		3	5	6	7	8	9	11	12	14	15	17	19	21	23	26
	High	20		5	8	11	12	14	17	19	21	24	27	30	33	37	41	46
Ryegrass Annual	Low	12		1	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	High	20		1	2	4	5	7	9	11	12	14	16	18	19	21	23	24
Ryegrass Perenial	Low	12		1	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	High	20		1	2	4	6	7	9	11	13	15	16	18	20	21	23	24
Sudan Grass	Low	12	1	3	4	6	8	10	12	14	15	17	19	20	22	24	26	28
	High	20	1	5	8	11	14	17	21	24	27	31	33	36	39	43	46	49
Switchgrass	Low	12		2	3	4	5	6	8	11	12	14	15	16	18	20	22	24
	High	20		3	5	7	9	11	15	19	21	24	26	28	31	35	39	43
Wheatgrass Tall	Low	12						1	1	2	2	2	2	2	3	3	4	5
	High	20						1	2	3	3	4	4	4	5	6	7	9

Sprocket Locations for Native Grass



FRONT LEFT CORNER VIEW



LEFT REAR CORNER VIEW

A	B	C	D	E	F	G	H			
20	30	20	20	12	44	16	44	.07	SLOWEST RATIO	
20	30	20	20	12	30	16	44	.10	1.43	x FASTER
20	30	20	20	20	44	16	44	.111	1.58	x FASTER
20	30	20	20	20	30	16	44	.161	2.3	x FASTER
20	30	20	20	20	30	16	30	.237	3.39	x FASTER
20	30	20	20	20	30	16	20	.356	5.09	x FASTER
20	30	20	20	20	20	16	20	.533	7.61	x FASTER
20	30	20	20	30	20	16	20	.799	11.4	x FASTER

A	B	C	D	E	F	G	H			
20	30	12	20	12	44	16	44	.04	SLOWEST RATIO	
20	30	12	20	12	30	16	44	.06	1.50	x FASTER
20	30	12	20	20	44	16	44	.07	1.75	x FASTER
20	30	12	20	20	30	16	44	.10	2.50	x FASTER
20	30	12	20	20	30	16	30	.14	3.50	x FASTER
20	30	12	20	20	30	16	20	.21	5.25	x FASTER
20	30	12	20	20	20	16	20	.32	8.00	x FASTER
20	30	12	20	30	20	16	20	.48	12.00	x FASTER