

MODEL 3145 STACK FOLD PLANTER

OPERATOR'S MANUAL

M0300-01

Rev. 6/21

This manual is applicable to: Model 3145 Stack Fold Planter
2021 Production Year and on

Record the model number and serial number of your planter along with date purchased:

Model Number _____ 3145 _____

Serial Number _____

Date Purchased _____

| |
|---|
| Monitor Serial Number _____ |
| Measured Pulses Per Mile/Km (Radar Distance Sensor) _____ |
| Measured Pulses Per Mile/ Km (Magnetic Distance Sensor) _____ |

SERIAL NUMBER

The serial number plate is located on the planter frame to be readily available. It is suggested that your serial number and purchase date also be recorded above.

The serial number provides important information about your planter and may be required to obtain the correct replacement part. Always provide the model number and serial number to your Kinze Dealer when ordering parts or anytime correspondence is made with Kinze Manufacturing, Inc.



Serial number plate location - R.H. side of 3-point mount

This page left blank intentionally.

TO THE DEALER

Predelivery service includes assembly, lubrication, adjustment, and test. This service makes sure planter is delivered to the retail customer/end user ready for field use.

PREDELIVERY CHECKLIST

Use the following checklist and inspect planter after it is completely assembled. Check off each item found satisfactory or after proper adjustment is made.

- Row units properly spaced and optional attachments correctly assembled.
- Vacuum components properly installed (as applicable).
- All grease fittings in place and lubricated.
- All working parts move freely, bolts are tight, and cotter pins are spread.
- Check all drive chains for proper tension and alignment.
- Check for oil leaks and proper hydraulic operation.
- Hydraulic hoses correctly routed to prevent damage.
- Inflate tires to specified air pressure and torque wheel lug bolts and lug nuts as specified in the manual.
- All safety decals correctly located and legible. Replace if damaged.
- All reflective decals and SMV sign correctly located and visible when the planter is in transport position.
- Safety/warning lights correctly installed and working properly.
- Paint all parts scratched in shipment or assembly.
- All safety lockup devices on the planter and correctly located.
- Auxiliary safety chain properly installed and hardware torqued to specification.

This planter has been thoroughly checked and to the best of my knowledge is ready for delivery to the retail customer/end user.

(Signature Of Set-Up Person/Dealer Name/Date)

RETAIL CUSTOMER/END USER

Name _____ Delivery Date _____
 Street Address _____ Model No. 3145 Serial No. _____
 City, State/Province _____ Dealer Name _____
 ZIP/Postal Code _____ Dealer No. _____

DELIVERY CHECKLIST

Use the following checklist at time planter is delivered as a reminder of very important information which should be conveyed to retail customer/end user. Check off each item as it is fully explained.

- Check for proper operation of vacuum fan (If applicable) with tractor to be used with planter.
- Life expectancy of this or any other machine is dependent on regular lubrication as directed in the Operator Manual.
- All applicable safety precautions.
- Along with retail customer/end user, check reflective decals and SMV sign are clearly visible with planter in transport position and attached to tractor. Check safety/warning lights are in working condition. Tell retail customer/end user to check federal, state/provincial, and local regulations before towing or transporting on a road or highway.
- Give Operator Manual, Parts Manual, and all Instruction Sheets to retail customer/end user and explain all operating adjustments.
- Read warranty to retail customer/end user.
- Complete Warranty and Delivery Report form.

To the best of my knowledge this machine has been delivered ready for field use and customer has been fully informed as to proper care and operation.

(Signature Of Delivery Person/Dealer Name/Date)

AFTER DELIVERY CHECKLIST

The following is a list of items we suggest to check during the first season of use of the equipment.

- Check planter performance with retail customer/end user.
- Check performance of vacuum or mechanical seed metering system with retail customer/end user.
- Review importance of proper maintenance and adherence to all safety precautions with retail customer/end user.
- Check for parts that may need to be adjusted or replaced.
- Check all safety decals, reflective decals, and SMV sign are correctly located as shown in the Parts Manual and that decals are legible. Replace if damaged or missing.
- Check safety/warning lights are working properly.

(Signature Of Follow-Up Person/Dealer Name/Date)

**All registrations must be submitted online at "business.kinze.com" within 5 business days of delivery.
Retain a copy of this form for auditing purposes.**

Tear Along Perforation

MACHINE OPERATION

| | |
|--|------|
| Initial Preparation of the Planter | 2-1 |
| Tractor Requirements | 2-2 |
| Tractor Preparation and Hookup | 2-2 |
| Leveling the Planter | 2-7 |
| Transporting Planter | 2-7 |
| Contact Wheel Spring Adjustment | 2-7 |
| Parking Stand Adjustment | 2-8 |
| Wheel Module Height Adjustment | 2-8 |
| Seed Rate Transmission Adjustment | 2-9 |
| Wrap Spring Wrench Operation | 2-9 |
| Contact Wheel Drive Sprockets | 2-10 |
| Shear Protection | 2-11 |
| Digital Vacuum readout | 2-11 |
| Vacuum Meter System | 2-12 |
| Analog Vacuum or Pressure Gauge | 2-12 |
| Vacuum Fan Motor Valve Block Assembly | 2-12 |
| Hydraulic Operation | 2-13 |
| Row Marker Hydraulic Operation | 2-14 |
| Row Marker Speed Adjustment | 2-15 |
| Row Marker Adjustments | 2-16 |
| Wing Flex | 2-17 |
| Wing Down Flex Cylinder | 2-18 |
| Point Row Clutches | 2-19 |
| Dual Lift Assist Wheels | 2-20 |
| Accumulator | 2-20 |
| Piston Pump Mount/Drive Spring Adjustment | 2-21 |
| Flow Control Valve Adjustment | 2-21 |
| Planting Speed | 2-21 |
| Field Test | 2-22 |
| Check Seed Population | 2-22 |
| Determining Pounds Per Acre (Brush-Type Meter) | 2-24 |
| Determining Bushels Per Acre | 2-24 |
| Field Check Granular Chemical Application | 2-25 |

ROW UNIT OPERATION

| | |
|--|------|
| Planting Depth | 3-1 |
| “V” Closing Wheel Adjustment (Rubber or Cast Iron) | 3-1 |
| Closing Wheel Shield (Rubber or Cast Iron “V” Closing Wheels) | 3-2 |
| Brush-Type Seed Meter 2.0 | 3-3 |
| Finger Pickup Seed Meter | 3-5 |
| Vacuum Settings | 3-6 |
| Seed Meter Cleanout | 3-11 |
| Additives | 3-12 |
| Bayer Fluency Agent | 3-13 |
| Seed Hoppers | 3-14 |

| | |
|--|------|
| Seed Meter Drive Release | 3-14 |
| Row Unit Extension Brackets | 3-14 |
| Row Unit Chain Routing | 3-15 |
| Quick Adjustable Down Force Springs Option | 3-16 |
| Row Unit Mounted No Till Coulter | 3-17 |
| Coulter Mounted Residue Wheels | 3-17 |
| Granular Chemical Hopper and Drive | 3-19 |
| Granular Chemical Banding Options | 3-20 |

RATE CHARTS 4-1**LUBRICATION AND MAINTENANCE**

| | |
|---|------|
| Lubrication | 5-1 |
| Lubrication Symbols | 5-1 |
| Sealed Bearings | 5-1 |
| Wrap Spring Wrench Assembly | 5-1 |
| Drive Chains | 5-2 |
| Bushings | 5-3 |
| Wheel Bearings | 5-4 |
| Grease Fittings | 5-4 |
| Mounting Bolts and Hardware | 5-7 |
| Tire Servicing | 5-8 |
| Model 3145 Operating Tire Pressure | 5-8 |
| Finger Pickup Seed Meter Inspection/Adjustment | 5-9 |
| Cleaning Finger Pickup Seed Meter For Storage | 5-10 |
| Brush-Type Seed Meter 2.0 Maintenance | 5-11 |
| Cleaning Brush-Type Seed Meter For Storage | 5-14 |
| Vacuum Manifold Maintenance | 5-14 |
| Vacuum Seed Meter Maintenance | 5-15 |
| Seed Meter Cleanout | 5-15 |
| Chain Tension Adjustment | 5-16 |
| Gauge Wheel Adjustment | 5-17 |
| Gauge Wheel Arm Bushing/Seal Replacement | 5-18 |
| Gauge Wheel Arm Pivot Spindle Replacement | 5-19 |
| 15" Seed Opener Disc Blade/Bearing Assembly | 5-20 |
| Seed Tube Guard/Inner Scraper | 5-22 |
| Row Unit Mounted No Till Coulter | 5-23 |
| Coulter Mounted Residue Wheels | 5-23 |
| Spiked Closing Wheel | 5-24 |
| Granular Chemical Attachment | 5-24 |
| Single Point Row Clutch Maintenance | 5-25 |
| Cam Follower Adjustment | 5-26 |
| Relief Valve Cartridge | 5-27 |
| Check Valve (Vacuum Fan) | 5-27 |
| Flow Control Valve | 5-27 |
| Row Marker Sequencing/Flow Control Valve Inspection | 5-28 |
| Row Marker Bearing Lubrication or Replacement | 5-29 |

Wheel Bearing Repack or Replacement 5-30

Preparation for Storage 5-31

Electrical Wiring Diagram for Light Package 5-32

Electrical Wiring Diagrams for Point Row Clutches 5-33

Hydraulic Hose Life 5-34

Hydraulic Schematic - Vacuum Fan Motor System 5-35

Hydraulic Schematic - Fold System 5-36

Hydraulic Schematic - Row Marker System 5-36

Hydraulic Schematic - Dual Lift Assist Wheel Package 5-37

Hydraulic Schematic - Dual Lift Assist Wheel Package
(Plumbed Into 3 Point Circuit) 5-37

Hydraulic Schematic -
Wing Down Flex Cylinder Package 5-38

Hydraulic Schematic - Wing Down Flex Cylinder Package
and Dual Lift Assist Wheel Package 5-38

TROUBLESHOOTING

Brush-Type Seed Meter 6-1

Closing Wheel 6-1

Vacuum Seed Meter 6-2

Finger Pickup Seed Meter 6-4


Point Row Clutch 6-5





Row Marker Operation 6-6

Kinze Manufacturing, Inc. would like to thank you for your patronage. We appreciate your confidence in Kinze farm machinery. Your Kinze planter has been carefully designed to provide dependable operation in return for your investment.

This manual has been prepared to aid you in planter operation and maintenance. It should be considered a permanent part of the machine and remain with the machine when you sell it.

It is the responsibility of the user to read and understand this Operator Manual before operating this equipment. It is the user's responsibility to inspect and service the machine routinely as directed in this Operator Manual. We have attempted to cover all areas of safety, operation, lubrication and maintenance; however, there may be times when special care must be taken to fit your conditions.

Throughout this manual the symbol  and the words **DANGER**, **WARNING**, and **CAUTION** are used to call attention to safety information that if not followed, will or could result in death or injury. **NOTICE** and **NOTE** are used to call your attention to important information. The definition of each of these terms follows:

| | |
|---|--|
|  | <p>Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations, typically for machine components which, for functional purposes, cannot be guarded.</p> |
|  | <p>Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.</p> |
|  | <p>Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.</p> |
|  | <p>Used to address safety practices not related to personal injury.</p> |

NOTE: Special point of information or machine adjustment instructions.

The Kinze Limited Warranty for your new machine is stated on the retail purchaser's copy of the Warranty And Delivery Receipt form. Additional copies of the Limited Warranty can be obtained through your Kinze Dealer.

Warranty, within the warranty period, is provided as part of Kinze's support program for registered Kinze products which have been operated and maintained as described in this manual. Evidence of equipment abuse or modification beyond original factory specifications will void the warranty. Normal maintenance, service and repair is not covered by Kinze warranty.

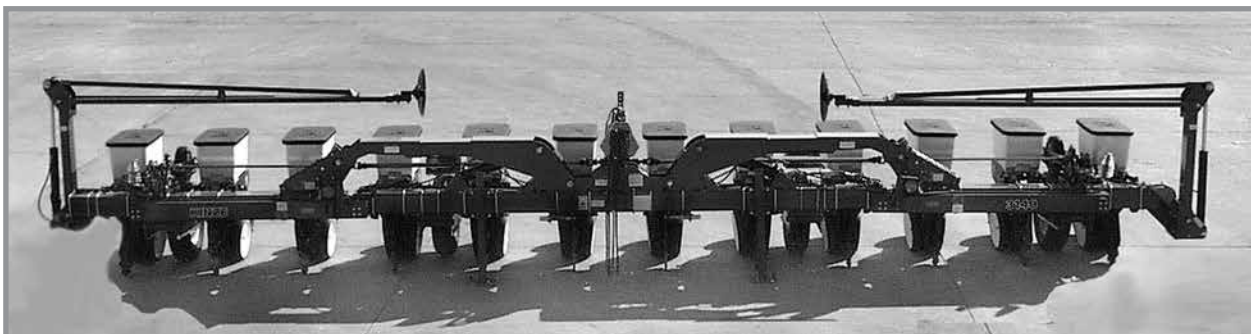
To register your Kinze product for warranty, a Warranty And Delivery Receipt form must be completed by the Kinze Dealer and signed by the retail purchaser, with copies to the Dealer, and to the retail purchaser. Registration must be completed and submitted to Kinze Manufacturing, Inc. within 5 business days of delivery of the Kinze product to the retail purchaser. Kinze Manufacturing, Inc. reserves the right to refuse warranty on serial numbered products which have not been properly registered.

If service or replacement of failed parts which are covered by the Limited Warranty are required, it is the user's responsibility to deliver the machine along with the retail purchaser's copy of the Warranty And Delivery Receipt to the Kinze Dealer for service. Kinze warranty does not include cost of travel time, mileage, hauling or labor. Any prior arrangement made between the Dealer and the retail purchaser in which the Dealer agrees to absorb all or part of this expense should be considered a courtesy to the retail purchaser.

Kinze warranty does not include cost of travel time, mileage, hauling or labor.



Model 3145 12 Row 38" Vacuum Planter (Less Optional Row Markers) Shown In Transport Position



Model 3145 12 Row 30" Mechanical Planter (With Optional Row Markers) Shown In Planting Position

GENERAL INFORMATION

The Model 3145 Mounted Planter is available with vacuum or mechanical meters, conventional hoppers, and various other options. Contact your Kinze dealer for additional options which may be available for your specific model year planter.

Information in this manual was current at time of printing. However, due to Kinze's ongoing product improvement, production changes may cause your machine to appear slightly different in detail. Kinze Manufacturing, Inc. reserves the right to change specifications or design without notice and without incurring obligation to install the same on machines previously manufactured. To obtain the most recent version of your publication, please contact your Kinze dealer.

Right hand (R.H.) and left hand (L.H.), as used throughout this manual, are determined by facing in the direction the machine will travel when in use, unless otherwise stated.

SPECIFICATIONS

| Planter Size | 12 Row 30" | 12 Row 36"/38" | 12 Row 38"/40" | 16 Row 30" |
|---|---|---|---|---|
| Length - Planting | 5' 3" (1.6M) | 5' 3" (1.6M) | 5' 3" (1.6M) | 5' 3" (1.6M) |
| Width - Transport (Without Markers) | 16'-1" (4.9M) | 18'-5" (5.6M) | 21'-1" (6.4M) | 21'-1" (6.4M) |
| Width - Transport (Includes Markers) | 17'-9" (5.4M) | 19'-6" (5.9M) | 22'-2" (6.8M) | 23'-0" (7.0M) |
| Width - Planting | 30'-0" (9.1M) | 37'-4" (11.4M) | 40'-0" (12.2M) | 40'-0" (12.2M) |
| Height - Transport (Without Markers) | 12'-6" (3.8M) | 12'-6" (3.8M) | 12'-6" (3.8M) | 12'-6" (3.8M) |
| Height - Transport (With Markers) | 15'-6" (4.7M) | 15'-6" (4.7M) | 15'-6" (4.7M) | 15'-6" (4.7M) |
| Weight - Base Machine | 6236 - 6794 lb. (2828.6 - 3081.7 kg) | 6541 - 7127 lb. (2966.9 - 3232.7 kg) | 6621 - 7214 lb. (3003.2 - 3272.2 kg) | 7480 - 8109 lb. (3392.9 - 3678.2 kg) |
| Toolbar | 7" x 7" x 3/8" toolbar | 7" x 7" x 3/8" toolbar | 7" x 7" x 3/8" toolbar | 7" x 7" x 3/8" toolbar |
| Seed Capacity | 1.75 bu. (62 liters) (Vacuum/Hopper); 1.90 bu. (67 liters) (Mechanical/Hopper) | | | |
| Tires | Four 7.60" x 15" 8 ply - adjustable height | | | |
| Drive System | Two 4.10" x 6" spring-loaded contact drive tires with no. 40 chain | | | |
| Seed Transmission | Two wheel module-mounted, quick-adjust with machined sprockets and no. 40 chain | | | |
| Drive/Drill Shafts | 7/8" hex drive/drill shafts | | | |

TRACTOR HYDRAULIC REQUIREMENTS - MECHANICAL


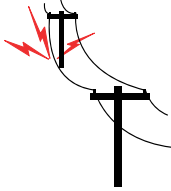
| Configuration | Requirements | | Description |
|---|--------------|----------------------|--|
| Base machine with mechanical meters | 1 SCV | 10 gpm (38 L/min) | #1 SCV: Planter fold |
| Base machine with mechanical meters and optional row marker package | 2 SCV | 20 gpm (76 L/min) | #1 SCV: Planter fold |
| | | | #2 SCV: Row markers with sequencing/flow control valve |
| Base machine with mechanical meters, optional row markers and dual lift assist package | 3 SCV | 20 gpm (76 L/min) | #1 SCV: Planter fold |
| | | | #2 SCV: Row markers with sequencing/flow control valve |
| | | | #3 SCV: Dual lift assist |
| Base machine with mechanical meters, optional row markers, dual lift assist package, and wing down flex package | 4 SCV | 20 gpm (76 L/min) | #1 SCV: Planter fold |
| | | | #2 SCV: Row markers with sequencing/flow control valve |
| | | | #3 SCV: Dual lift assist |
| | | | #4 SCV: wing down flex |



TRACTOR HYDRAULIC REQUIREMENTS - VACUUM



| Configuration | Requirements | | Description |
|---|--------------|-----------------------|--|
| Base machine with vacuum meters (external case drain required for vacuum hydraulic circuit) | 2 SCV | 25 gpm (95 L/min) | #1 SCV: Vacuum meters |
| | | | #2 SCV: Planter fold |
| Base machine with vacuum meters and optional row marker package. → External case drain required for vacuum hydraulic circuit. | 3 SCV | 35 gpm (132 L/min) | #1 SCV: Vacuum meters |
| | | | #2 SCV: Planter fold |
| | | | #3 SCV: Row markers with sequencing/flow control valve |
| Base machine with vacuum meters, optional row marker package, and dual lift assist package option. → External case drain required for vacuum hydraulic circuit. | 4 SCV | 35 gpm (132 L/min) | #1 SCV: Vacuum meters |
| | | | #2 SCV: Planter fold |
| | | | #3 SCV: Row markers with sequencing/flow control valve |
| | | | #4 SCV: Dual lift assist package |
| Base machine with vacuum meters, optional row marker package, dual lift assist package option and wing down flex package. → External case drain required for vacuum hydraulic circuit. | 5 SCV | 35 gpm (132 L/min) | #1 SCV: Vacuum meters |
| | | | #2 SCV: Planter fold |
| | | | #3 SCV: Row markers with sequencing/flow control valve |
| | | | #4 SCV: Dual lift assist package |
| | | | #5 SCV: Wing down flex package |



1. Read and understand instructions provided in this manual and warning labels. Review these instructions frequently!
 2. This machine is designed and built with your safety in mind. Do not make any alterations or changes to this machine. Any alteration to design or construction may create safety hazards.
 3. A large portion of farm accidents happen from fatigue or carelessness. Safe and careful operation of tractor and planter will help prevent accidents.
 4. Never allow planter to be operated by anyone unfamiliar with operation of all functions of the unit. Operators must read and thoroughly understand all instructions given in this manual before operating or working on equipment.
 5. Be aware of bystanders, particularly children! Always look around to make sure it is safe to start tow vehicle engine or move planter. This is particularly important with higher noise levels and quiet cabs, as you may not hear people shouting.
 6. Make sure planter weight does not exceed towing capacity of tractor, or bridge and road limits. This is critical to maintain safe control and prevent death or injury, or property and equipment damage.
 7. Never ride or allow others to ride on planter.
 8. Store planter in an area away from human activity. DO NOT permit children to play on or around the stored unit.
 9. Keep hands, feet, and clothing away from moving parts. Do not wear loose-fitting clothing which may catch in moving parts.
 10. Always wear protective clothing, shoes, gloves, hearing, and eye protection applicable for the situation.
 11. Do not allow anyone to stand between tongue or hitch and towing vehicle when backing up to planter.
 13. Prevent electrocution, other injuries, or property and equipment damage. Watch for obstructions such as wires, tree limbs, etc. when operating machine. Be aware of clearances during turns and when folding/unfolding planter.
 14. Reinstall all guards removed for maintenance activities. Never leave guards off during operation.
 15. Use of aftermarket hydraulic, electric, or PTO drives may create serious safety hazards to you and people nearby. If you install such drives, follow all appropriate safety standards and practices to protect you and others near this planter from injury.
 16. Follow all federal, state/provincial, and local regulations when towing farm equipment on a public highway. Use safety chain (not an elastic or nylon/plastic tow strap) to retain connection between towing and towed machines in the event of primary attaching system separation.
 17. Make sure all safety/warning lights, SMV sign, and reflective decals are in place and working properly before transporting the machine on public roads.
 18. Limit towing speed to 15 MPH. Tow only with farm tractor of a minimum 90 HP. Allow for unit length when making turns.
 19. Reduce speed prior to turns to avoid the risk of overturning. Always drive at a safe speed relative to local conditions and ensure your speed is slow enough for a safe emergency stop.
 20. Chemical application is often an integral part of planting. Follow label instructions for proper chemical mixing, handling and container disposal methods.
 21. Be familiar with safety procedures for immediate first aid should you accidentally contact chemical substances.
 22. Use the proper protective clothing and safety equipment when handling chemicals.
 23. Chemicals are supplied with Material Safety Data Sheets (MSDS) that provide full information about the chemical, its effects on exposure, and first aid needs in the event of an emergency. Keep your MSDS file up-to-date and available for first responders in case of emergency.
 24. When servicing ground engaging components such as opening disks and firming points, use special care to avoid points and edges worn sharp during use.
 25. Use professional help if you are unfamiliar with working on hydraulic systems. Pressurized hydraulic fluid can penetrate body tissue and result in death, serious infection, or other injuries.
 26. Disposing of waste improperly can threaten the environment. To dispose of your equipment properly contact your local environmental or recycling center.
- Never pour waste onto the ground, down a drain, or into any water source.
- When disposing of waste such as oil, use leakproof containers. Be sure to use containers that do not resemble food or beverage which may mislead someone into consuming them. Dispose of oil per your local, regional requirements.
- When disposing of any fertilizer chemicals used, contact the supplier of the chemicals.
- Model 3145 planter consists of 85% recyclable metals, 10% recyclable plastic and rubber, and 5% waste.

Following are some common hazard warnings associated with this equipment. Pay close attention to all safety, operating, and maintenance information in this manual and decals applied to your equipment.

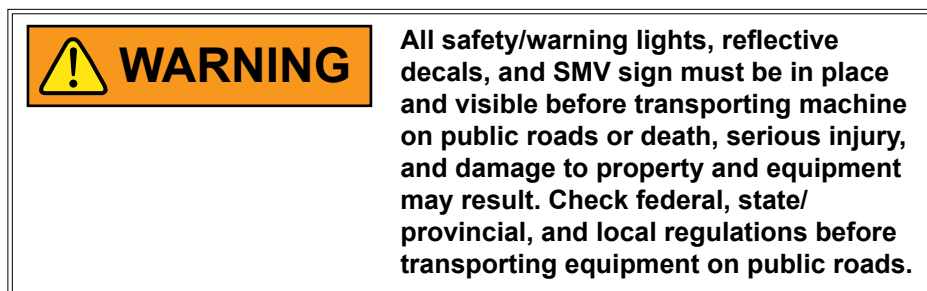
| | |
|---|--|
|  | <p>Contacting or coming close to power lines or other high energy sources will cause death or serious injury.</p> |
|  | <p>Keep away from power lines or high energy sources at all times.</p> |

| | |
|---|---|
|  | <p>Improperly operating or working on this equipment could result in death or serious injury. Read and follow all instructions in Operator Manual before operating or working on this equipment.</p> |
|  | |

| | |
|---|---|
|  | <p>Falling equipment can cause death or serious injury. Install all lockup devices or lower planter to ground before working on equipment.</p> |
|  | |

| | |
|---|---|
|  | <p>Explosive separation of rim and tire parts can cause death or serious injury. Overinflation, rim and tire servicing, improper use of rims and tires, or worn or improperly maintained tires could result in a tire explosion.</p> |
|  | |

SAFETY SIGNS AND DECALS



Safety signs and decals are placed on the machine to warn of hazards and provide important operating and maintenance instructions. Information on these signs are for your personal safety and the safety of those around you. FOLLOW ALL SAFETY INSTRUCTIONS!

- **Keep signs clean so they can be easily seen. Wash with soap and water or cleaning solution as required.**
- **Replace safety signs if damaged, painted over, or missing.**
- **Check reflective decals and SMV sign periodically. Replace if they show any loss of reflective properties.**
- **When replacing decals, clean machine surface thoroughly with soap and water or cleaning solution to remove all dirt and grease.**

NOTE: Safety sign and decal locations are shown in the Parts Manual for this machine.

NOTE: Style and locations of SMV sign, reflective decals, and safety/warning lights conform to ANSI/ASABE S279.14 JUL 2008 and ANSI/ASABE S276.6 JAN 2005.

This page left blank intentionally.

The following information is general in nature and was written to aid the operator in preparation of the tractor and planter for use, and to provide general operating procedures. The operator's experience, familiarity with the machine and the following information should combine for efficient planter operation and good working habits.

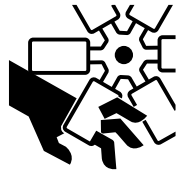
NOTICE

Always raise planter out of ground when making sharp turns or backing up or tractor and equipment may be damaged.

The Kinze Vacuum Seed Metering System includes seed meters, seed discs and an air system consisting of a hydraulic driven vacuum fan which draws air through manifolds and hoses and the seed meters on each row unit.

 **WARNING**

Moving fan blades can cause amputation or severe injury. Never operate vacuum fan with cover removed.



The dual lift assist wheel option requires a customer-supplied quick hitch to operate without the center link pin. 8 row wide planters require removal of the center section gauge wheels to accommodate dual lift assist wheels.

INITIAL PREPARATION OF THE PLANTER

Lubricate the planter and row units per the lubrication information in this manual. Make sure all tires have been properly inflated. See "Tire Servicing". Check all drive chains for proper tension, alignment and lubrication.

TRACTOR REQUIREMENTS

NOTICE

All Hydraulic Requirements: Minimum Pressure 2350 PSI (16202.6 kPa); Maximum Pressure 3000 PSI (20684.2 kPa). Check tractor hydraulics to ensure that maximum pressure cannot be exceeded.

Approximate minimum tractor horsepower (HP) required for field work is listed below:

12 Row Narrow - 150 HP And Up

12 Row Wide And 16 Row Narrow - 180 HP And Up

NOTE: Tractor must have adequate 3 point hitch lift capacity to lift weight of machine, attachments, seed and dry chemicals. Shipping weights do not include seed, dry chemicals or additional optional attachments.

Tractor front end stability is necessary for safe and efficient operation. Therefore, it may be necessary to add front ballast to your tractor for satisfactory field operation, as well as adequate transport stability. Refer to your tractor operator's manual for front ballast recommendations.

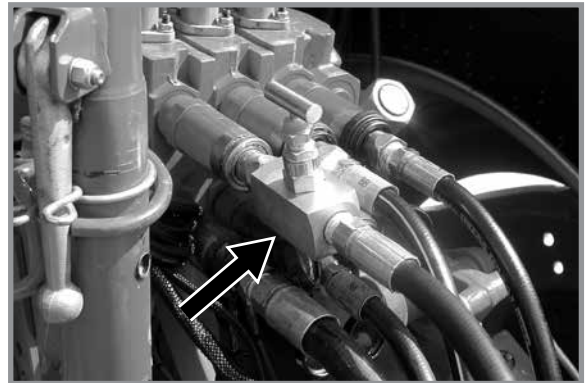
Vacuum

A 12 volt DC electrical system is required on all sizes to operate planter safety/warning lights.

One SCV remote hydraulic outlet is required to operate the row markers, one to operate planter fold and one plus a zero pressure case drain is required to operate the seed metering system vacuum fan.

Maximum hydraulic flow rate of 13 GPM (49 L/min) @ 2000 PSI (13789.5 kPa) is required to operate the seed metering system vacuum fan.

NOTE: A Flow Control Needle Valve Kit, to provide a flow control option for tractors that are not equipped with a method for finite adjustment of hydraulic flow, is available from Kinze Repair Parts through your Kinze Dealer.



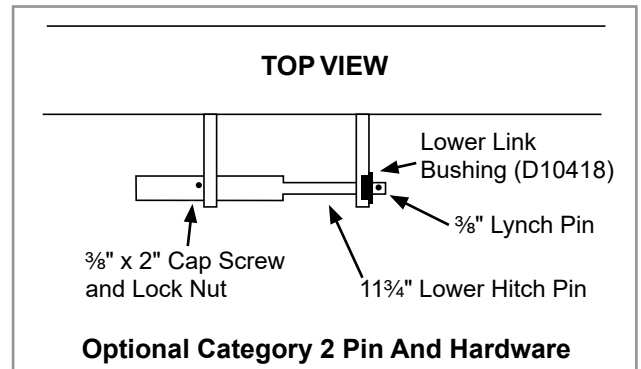
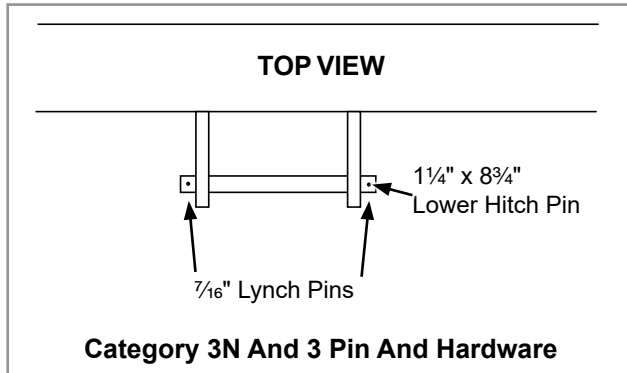
G1K426 Needle Valve Kit

TRACTOR PREPARATION AND HOOKUP

1. Set tractor rear wheel spacing at double the planter row spacing. For example: On a planter set for 38" rows, set the tractor wheel spacing at 76" (193 cm) center-to-center. On wide front end tractors set front wheel spacing equal to rear wheel spacing. Check tractor operator's manual for correct front and rear tire pressure.
2. Adjust lift links on tractor so the planter will lift level from side to side and raise high enough for planter transport clearance. Set the sway blocks on the tractor in position to prevent side sway. Be sure the individual lift link arms are in the float position.

- Back tractor up to planter. Position lower hitch pins and bushings as shown in the following diagrams for your type of tractor hitch. Line up holes and insert hitch pins and lock in place with pins provided. It may be necessary to change the length of the upper link with the adjusting handle.

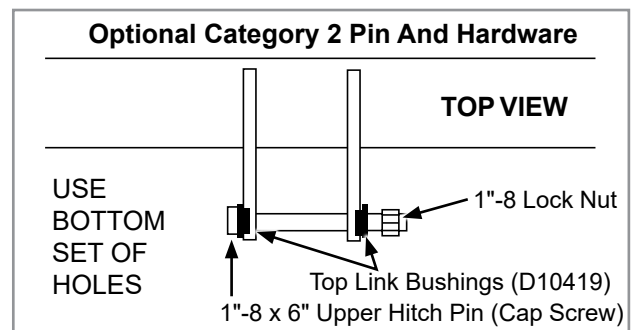
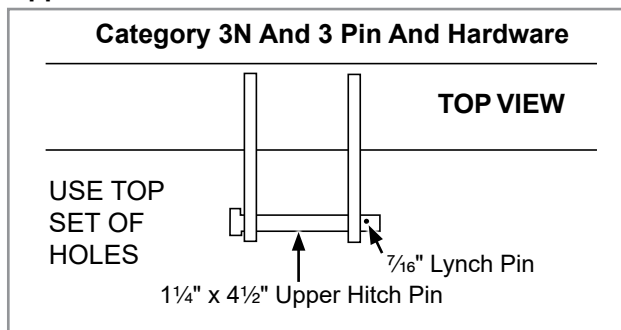
Lower Hitch Pins



The upper hitch point has two holes. The hitch pin must be positioned in the lower hole for use with tractors equipped with Category 2 quick hitch. The lower hole is also recommended for use on tractors without a quick hitch. Some Category 2 tractors without a quick hitch are designed to accommodate the upper attaching holes. Consult tractor manufacturer.

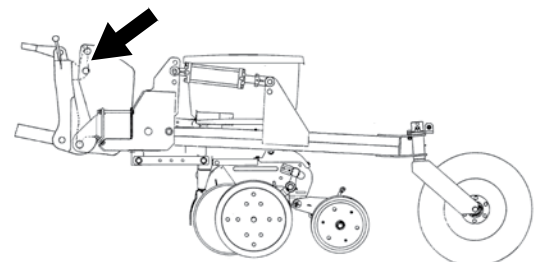
The hitch pin must be positioned in the upper hole for use with tractors equipped with Category 3N and 3 hitches.

Upper Hitch Pin



When using a quick hitch (customer-supplied), match pin location to pin spacing in the quick hitch. Adjust the tractor upper link until the quick hitch is vertical when in the planting position.

Dual lift assist wheel equipped machines require use of a quick hitch (customer-supplied) and the top link pin is not used.





Never transport machine with lift assist wheels without quick hitch. If this type of hitch is not in place, a sudden stop could allow the toolbar to rotate forward causing personal injury or damage to the equipment.

4. The planter is equipped with safety/warning lights which should be used whenever the planter is being transported. The connector is a 7 terminal breakaway connector conforming to ASAE standards. If your tractor is not equipped for safety/warning lights, check with your tractor dealer.

Vacuum

Connect harness on planter to digital vacuum gauge console on tractor. Connect power lead from digital vacuum gauge console to power source. A power lead adapter may be required.


WARNING


Pressurized hydraulic fluid can penetrate body tissue and result in death, serious infection, or other injuries. Fluid injected under skin must be **IMMEDIATELY** removed by a surgeon familiar with this type of injury. Make sure connections are tight and hoses and fittings are not damaged before applying system pressure. Leaks can be invisible. Keep away from suspected leaks. Relieve pressure before searching for leaks or performing any system maintenance.

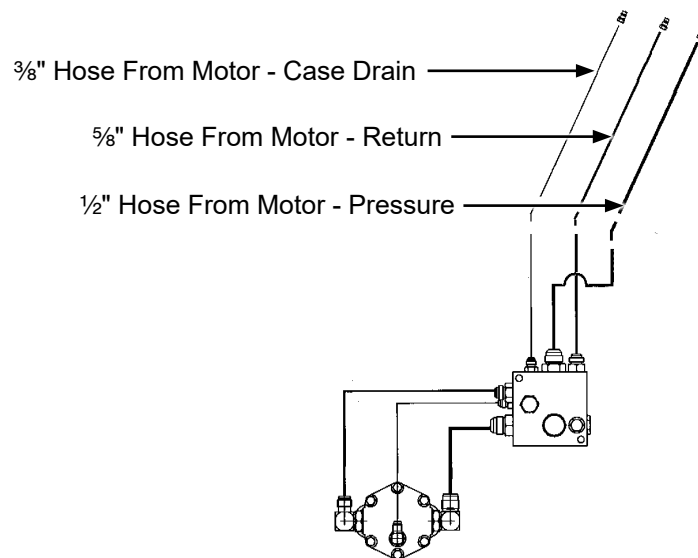
NOTICE

Wipe hose ends to remove any dirt before connecting couplers to tractor ports or contamination may cause equipment failure.

5. Connect hydraulic hoses to tractor ports in a sequence that is both familiar and comfortable to the operator. See "Hydraulic Operation".

Before attaching hoses, move tractor SCV levers back and forth to relieve any pressure in the tractor hydraulic system.

The vacuum seed metering system vacuum fan operation hydraulic hoses are as follows:



NOTICE

Before the markers are operated, make sure all marker lockups are in working position.

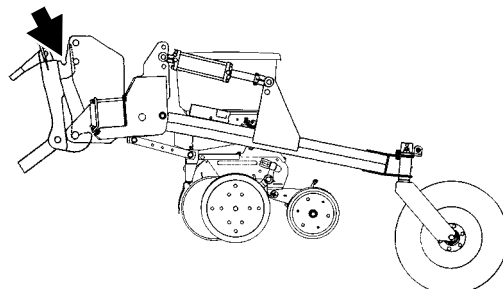
**DANGER**

Before applying pressure to the hydraulic system, make sure all connections are tight and that hoses and fittings have not been damaged. Hydraulic fluid escaping under pressure can have sufficient force to penetrate skin causing injury or infection.

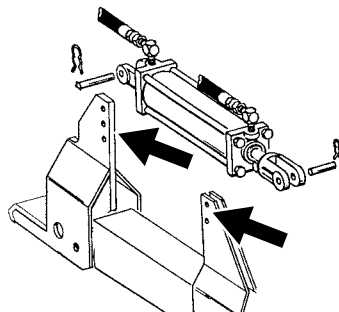
- With planter on a level surface, raise the planter slowly and watch for any interference.

When raising a planter equipped with dual lift assist wheels, the front of the planter should raise and then the back using the lift assist wheels to raise the rear of the planter. When lowering the planter, the lift assist wheels should begin to lower the rear of the planter before lowering the front of the planter. If the dual lift assist wheels are plumbed into the 3 point hitch lift circuit, adjust the flow control valve so the rear of the planter lowers before the front of the planter and the front of the planter raises before the rear of the planter. See "Flow Control Valve Adjustment". With planter lowered to planting position, adjust tractor linkage to level the toolbar. See "Leveling The Planter".

With planter (equipped with dual lift assist wheels) raised for transport, maintain a minimum of 3" (7.6 cm) clearance between planter and quick hitch.



On planters equipped with the optional Dual Lift Assist Wheel Package, adjustment holes on the lift assist cylinder mounts allow for adjustment of lift height.



- Remove pin from each parking stand and raise each to the transport position. Secure stands in raised position with pin in lowest hole.
- Lower the planter so the drive wheels rest on the ground and check to be sure planter is level. Readjust top link as required to level row units. See "Leveling The Planter".

LEVELING THE PLANTER

For proper performance of the planter and row units, it is important that the planter frame and row unit parallel arms operate approximately level. The toolbar should operate at a 20" to 22" (51-56 cm) height, measured from the planting surface to the bottom of the toolbar.

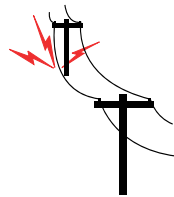
When operating the planter, make sure the right and left lower link arms on the tractor are adjusted equally before attaching the planter. After the planter has been lowered to the correct operating height, stop the tractor and stand beside the planter and check to be sure the frame is level fore and aft. If the row units angle up or down, adjust the center link on the tractor to level the machine.

It is important for the planter to operate level laterally. Tire pressure must be maintained at pressures specified and drive wheel height must be adjusted equally. See "Wheel Module Height Adjustment".

TRANSPORTING PLANTER



DANGER



Contacting or coming close to power lines or other high energy sources will cause death or serious injury.

Keep away from power lines or high energy sources at all times.



WARNING

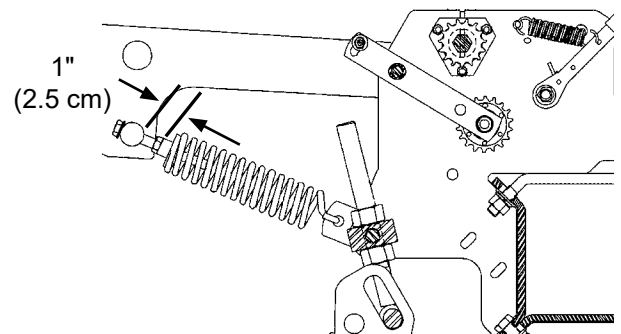
All safety/warning lights, reflective decals, and SMV sign must be in place and visible before transporting machine on public roads or death, serious injury, and damage to property and equipment may result. Check federal, state/provincial, and local regulations before transporting equipment on public roads.

- Tow only with farm tractor rated and configured for equipment.
- Know your route and be aware of any obstructions.
- Follow all road and bridge load limit restrictions.
- Never exceed maximum transport towing speed of 20 mph (32 kph).

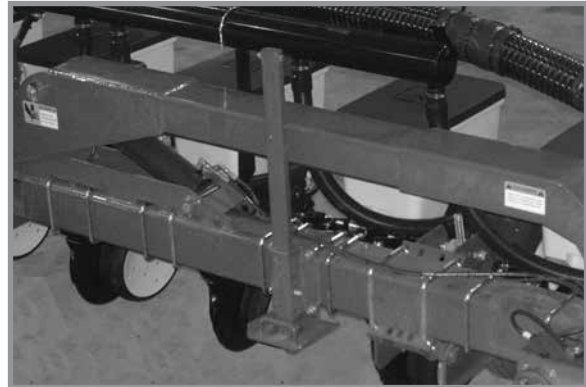
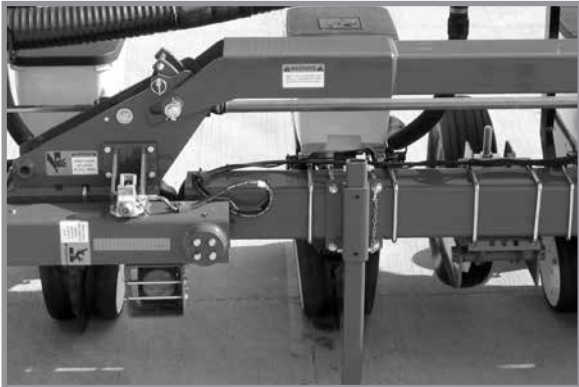
CONTACT WHEEL SPRING ADJUSTMENT

There are two down pressure springs on each contact drive wheel. The spring tension is factory preset and should require no further adjustment.

The tension is set leaving 1" (2.5 cm) between the spring plug and the mounting shaft as shown below.



PARKING STAND ADJUSTMENT



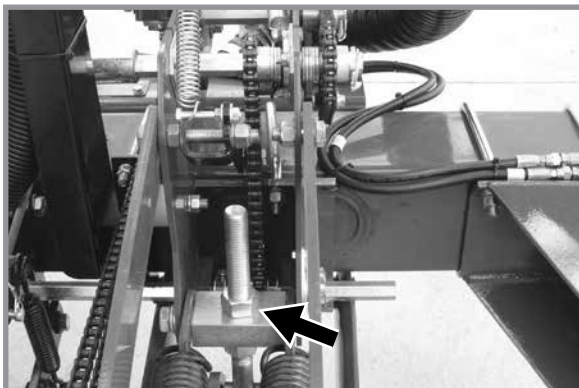
Vacuum Shown

Two parking stands, located on the front side of the main frame, are standard on all Model 3145 planters. The stands must be positioned so they are not directly behind the tractor tire or they will interfere when the planter is raised.

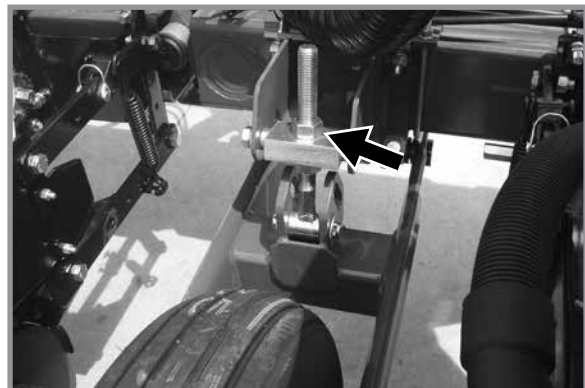
Each parking stand has six positioning holes. By using these positioning holes, you can set the main frame parking height from 19" to 25" (48 to 63.5 cm).

Raise the stands to the top position and pin when planting; lower and pin for parking and storage.

WHEEL MODULE HEIGHT ADJUSTMENT



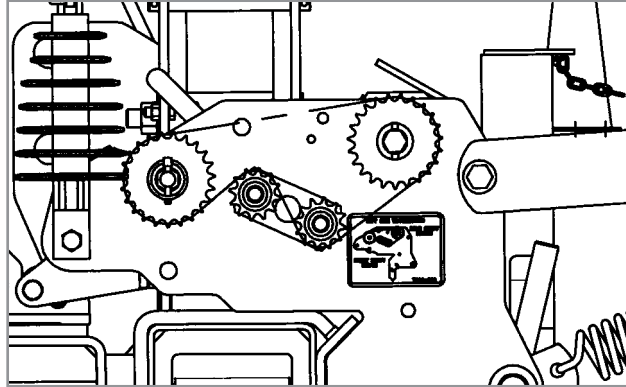
Drive Wheel Module Assembly



Center Section Gauge Wheel Assembly

The drive wheel module assembly and center section gauge wheel assembly are designed so the drive wheel height can be adjusted to maintain a frame height of 20" to 22" (51-56 cm) in all planting applications. This is particularly useful when the planter is used for ridge planting or planting on beds. The wheel module assembly has an adjustment range of 7" (18 cm). To adjust the wheel assembly, loosen the upper nut using a 1½" wrench or a 15" adjustable wrench and turn the lower nut using a 1½" wrench or 15" adjustable wrench (clockwise to decrease frame height or counterclockwise to increase frame height). Tighten the upper nut after adjustment is complete. Set all wheels equally.

SEED RATE TRANSMISSION ADJUSTMENT

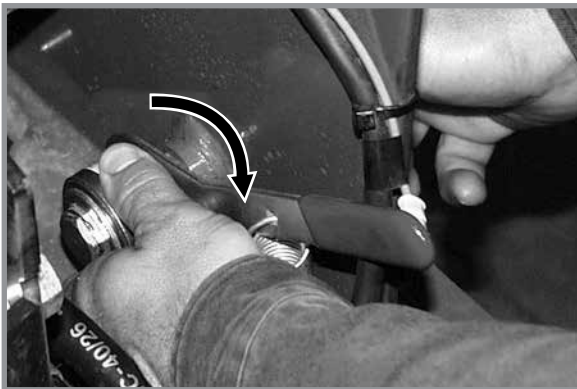


Planting population rate changes are made at the seed rate transmissions. The seed rate transmissions are designed to allow simple, rapid changes of sprockets to obtain the desired planting population. By removing the lynch pins on the hexagon shafts, sprockets can be interchanged with those from the sprocket storage rod bolted near each transmission.

Chain tension is controlled by spring-loaded, dual-sprocket idlers. The idler assembly is adjusted with a easy-release arm. This arm has a release position to remove spring tension for replacing sprockets. The amount of spring tension on the chain is controlled by the idler arm. See "Wrap Spring Wrench Operation".

A decal positioned near each transmission illustrates proper chain routing. The planting rate charts found in "Rate Charts" will aid you in selecting the correct sprocket combinations.

WRAP SPRING WRENCH OPERATION



Release Chain Tension



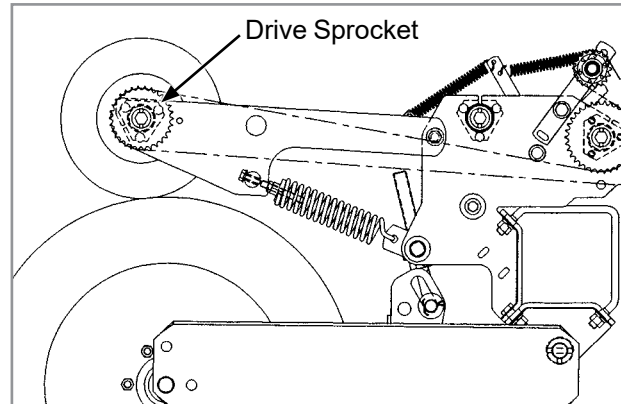
Increase Chain Tension

Chain idlers are equipped with wrap spring wrenches. L.H. wrap spring wrenches have a blue release collar and R.H. wrap spring wrenches have a grey or black release collar.

Rotate collar on wrap spring wrench and pull handle to release chain tension.

Rotate chain idler into chain and pull handle to tension idler spring.

CONTACT WHEEL DRIVE SPROCKETS



NOTE: 15 tooth, 19 tooth or 30 tooth drive sprockets at each contact drive wheel can be interchanged from the sprocket storage rod bolted near each transmission. The 15 and 19 tooth sprockets require use of a 218 pitch No. 40 chain. The 30 tooth sprocket requires use of a 224 pitch No. 40 chain.

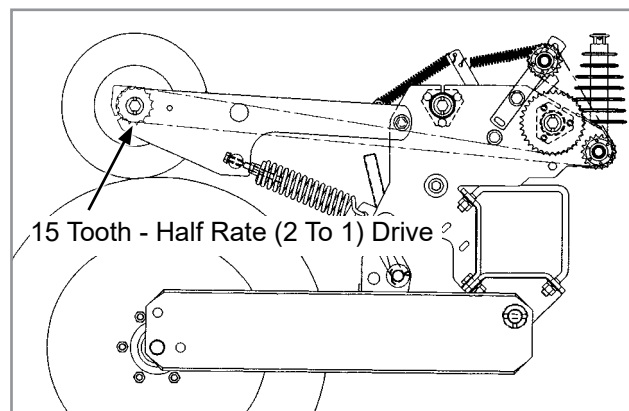
Chain tension is controlled by a spring-loaded sprocket idler. The amount of spring tension on the chain is controlled by the idler arm.

The planting rate charts found in “Rate Charts” section will aid you in selecting the correct sprocket.

NOTE: 15, 19 and 30 tooth drive sprockets are NOT applicable to all rate charts. Check chart titles to ensure the proper rate charts are selected.

NOTE: After each sprocket combination adjustment, make a field test to be sure you are planting at the desired rate.

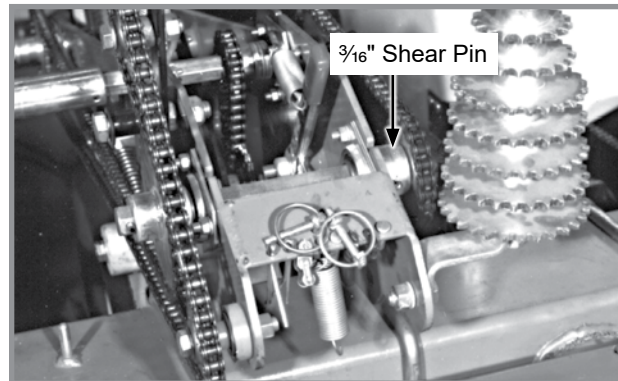
HALF RATE (2 TO 1) DRIVE



Half rate (2 to 1) drive is recommended only when the desired population falls below that shown on the planting rate charts. Replace the 30 tooth drive sprocket and shorter No. 40 110 pitch chain on each contact wheel with a 15 tooth sprocket. This will reduce the planter transmission speed and reduce planting and application rates by approximately 50%.

NOTE: After each sprocket combination adjustment, make a field check to be sure you are planting at the desired rate.

SHEAR PROTECTION



Transmission Shaft

The planter driveline and seed and granular chemical drivelines are protected from damage by shear pins.

If excessive load should cause a pin to shear, it is important to determine where binding has occurred before replacing the pin. Replace shear pins with same size and type.

To prevent future binding or breakage of components, check driveline alignment and follow prescribed lubrication schedules.

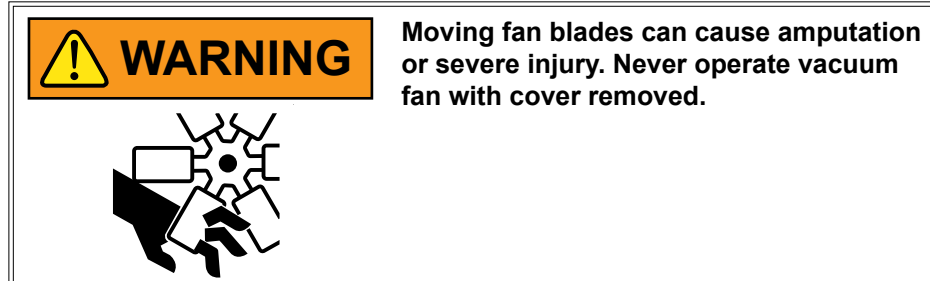
NOTE: Drill shaft/transmission coupler alignment is critical.

DIGITAL VACUUM READOUT

Digital vacuum readout is incorporated into in-cab display. Refer to the display operation manual for instructions.

VACUUM METER SYSTEM

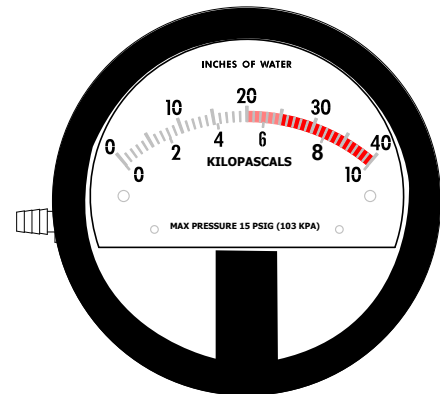
Kinze vacuum meter seed metering system includes seed meters, seed discs, and an air system consisting of a hydraulic driven vacuum fan which draws air through manifolds, hoses, and seed meters on each row unit.



ANALOG VACUUM OR PRESSURE GAUGE

Analog vacuum or pressure gauge connects directly to vacuum meter (vacuum) or bulk fill (pressure) manifold and is teed into digital sending units.

Only adjustment is to “zero” needle with no vacuum or pressure present. If there is a significant difference between gauge and a reading taken at meters, a different manifold location should be found to connect hose to gauge and digital sending unit.



Analog Gauge

NOTE: Analog gauges are identical EXCEPT for plug and hose barb locations in side of gauge housing. DO NOT connect vacuum meter or bulk fill hose to wrong gauge. Check plug and hose barb installation if readout is erratic or appears inaccurate.

VACUUM FAN MOTOR VALVE BLOCK ASSEMBLY

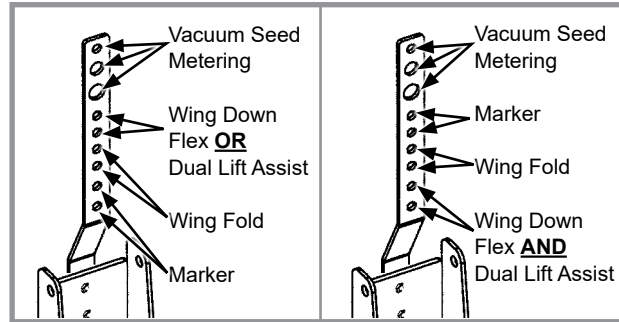
A pressure relief valve in the hydraulic circuit prevents build up of oil pressure over 35 PSI in case drain line when vacuum fan motor is operating. This valve will vent oil outside valve block through a drain hole in the aluminum valve block. This can occur whenever case drain is improperly connected or pressure in motor circuit builds.

See “Hydraulic Diagram - Vacuum Fan Motor System” in Lubrication and Maintenance section.

Valve block contains a check valve that prevents vacuum fan from operating in wrong direction if pressure is applied to return side of motor and allows fan to coast to a stop when tractor hydraulic control is returned to neutral position.

NOTE: Fan turns at a reduced speed if reverse pressure is applied.

HYDRAULIC OPERATION



Vacuum

Planter may require up to four selective control valves (SCV). A single SCV is needed to fold the wings; a second SCV and case drain is required for operation of the vacuum seed metering system; a third SCV is required for the Row Marker Package; and a fourth SCV is required for the Dual Lift Assist Wheel Package and/or the Wing Down Flex Cylinder Package unless these are connected into the tractor 3 point lift system.

Mechanical

Planter requires a single control valve for folding the wings. A second control valve is required for the Row Marker Package. A third valve is required for the Dual Lift Assist Wheel Package and/or the Wing Down Flex Cylinder Package unless these are connected into the tractor 3 point lift system.

DANGER

Contacting or coming close to power lines or other high energy sources will cause death or serious injury.

Keep away from power lines or high energy sources at all times.



NOTE: If a cylinder has been disconnected or removed for any reason, do not attach the rod end of the cylinder until the cylinder is cycled several times to remove any air that may be trapped in the system.


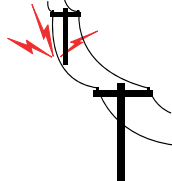
The wings are folded and unfolded using a single hydraulic control valve. When the wings are unfolded, the spring-actuated hydraulic latches lock the wings to the fold links so they pivot as one unit.

NOTICE

Always be sure planter is in the fully raised position before folding the planter wings to ensure wing row units do not collide with center section seed hoppers.

ROW MARKER HYDRAULIC OPERATION

| | |
|--|--|
|  WARNING | Row marker can lower at any time and could cause death or serious injury. Stay away from row markers! Install safety lockup device when not in use. |
|  | |

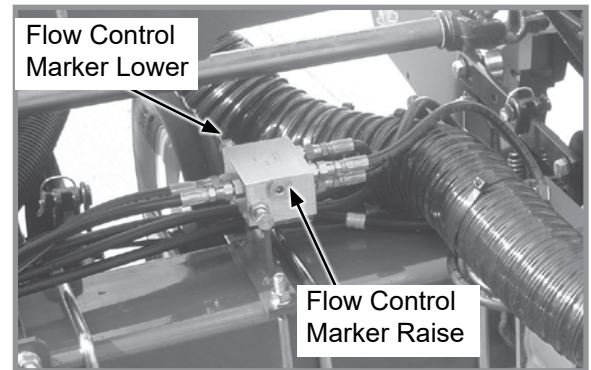
| | |
|---|---|
|  DANGER | Contacting or coming close to power lines or other high energy sources will cause death or serious injury. |
|  | |

The single valve marker system uses a sequencing valve which directs hydraulic flow to operate the markers alternately. Each time a marker is raised, the sequencing valve will direct flow to lower the opposite marker.

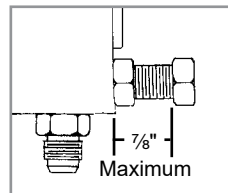
Both markers can be used at the same time if desired. To do this, lower the planter and the marker that has been selected. Move the tractor SCV control to the raise position and immediately return it to the lower position. This will shift the marker control valve and the remaining marker will be lowered.

ROW MARKER SPEED ADJUSTMENT

Flow control valves located in the marker sequencing/flow control valve assembly control lowering and raising speed of markers. One flow control valve sets lowering speed of both markers and one sets raising speed of both markers. To adjust marker speed, loosen jam nut and turn control(s) clockwise, or IN to slow travel speed and counterclockwise, or OUT, to increase travel speed. Flow control(s) determine amount of oil flow restriction through valves, therefore varying travel speed of markers. Tighten jam nut after adjustments are complete.



NOTE: Backing flow control valve out too far can cause the o-ring seal on valve to fail when hydraulics are operated.



NOTICE

The flow controls should be properly adjusted before the marker assemblies are first put into use. Excessive marker travel speed can damage the marker assembly.

WARNING



Row marker can lower at any time and could cause death or serious injury. Stay away from row markers! Install safety lockup device when not in use.

NOTE: When oil is cold, hydraulics operate slowly. Make sure all adjustments are made with warm oil. Do not overtighten lock nut.

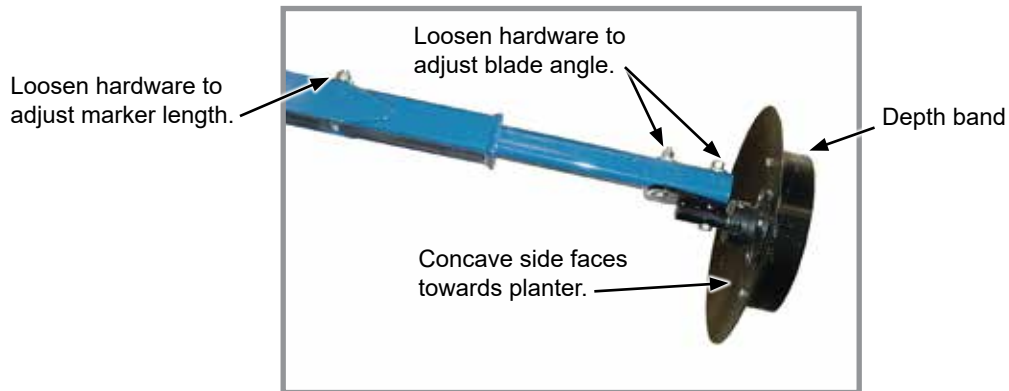
NOTE: On a tractor where oil flow can not be controlled, the rate of flow of oil from tractor may be greater than rate at which the marker cylinder can accept oil. Tractor hydraulic control lever will have to be held until cylinder reaches end of its stroke. This occurs most often on tractors with open center hydraulic systems. On tractors with closed center hydraulic systems, the tractor's hydraulic flow control can be set so the tractor's detent will function properly.

ROW MARKER ADJUSTMENTS

1. Multiply number of rows by the average row spacing in inches to determine total planting width.

| Row Marker Lengths | |
|--------------------|------------------|
| 12 Row 30" | 360" (914.4 cm) |
| 12 Row 36" | 432" (1097.3 cm) |
| 12 Row 38" | 456" (1158.2 cm) |
| 12 Row 40" | 480" (1219.2 cm) |
| 16 Row 30" | 480" (1219.2 cm) |

2. Lower planter and row marker assembly to ground.
3. Measure from planter center line to a point where blade contacts ground.
4. Adjust row marker extension so distance from marker disc blade to center line of planter is equal to total planting width. Adjust right and left row marker assemblies equally and securely tighten clamping bolts.



Row marker disc blade angle adjustment


NOTICE

Setting marker disc blade assembly at a sharper angle than needed adds stress to row marker assembly and shortens bearing and blade life. Set blade angle only as needed to leave a clear mark.

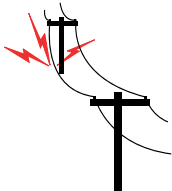
Marker disc blade is installed with concave side facing inward. Spindle assembly is slotted so hub and blade can be angled to throw more or less dirt.

5. Loosen hardware and move assembly as required.
6. Tighten bolts to specified torque.
7. Do a field test to ensure markers are properly adjusted.

NOTE: A notched marker blade is available from Kinze through your Kinze Dealer for use in more severe no till conditions.


DANGER


Contacting or coming close to power lines or other high energy sources will cause death or serious injury.



Keep away from power lines or high energy sources at all times.


DANGER

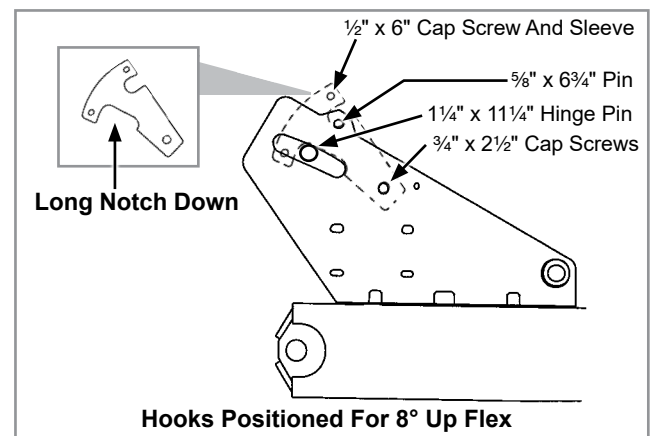
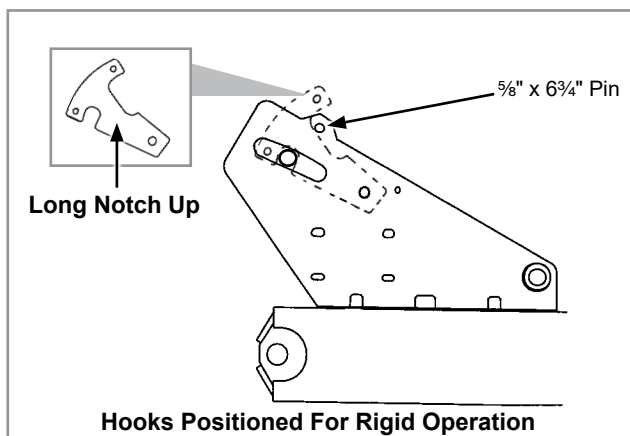
Wings must be unfolded before detaching machine from tractor.


WARNING

Always install hydraulic cylinder safety lockups when servicing the machine in raised position or when transporting the machine on the road.

WING FLEX

Two hooks located over each wing hinge area can be positioned so toolbar (a) is locked rigid, (b) so planter wings have 8° up flex or (c) with Wing Down Flex Cylinder Package (See "Wing Down Flex Cylinder") installed, so planter wings have 8° up flex and 8° down flex.



To change the hook from one position to the other:

1. Lower the planter to the ground so weight is off of the toolbar and relieve hydraulic pressure in the wing fold cylinders.
2. Remove lynch pin and 6³/₄" pin.
3. Loosen ³/₄" hook mounting hardware and rotate the hooks back off of the hinge pin. (It may be necessary to raise the outer end of the wing up several inches to take pressure off of the hooks to allow them to rotate.)
4. Remove ¹/₂" x 6" cap screw and sleeve.

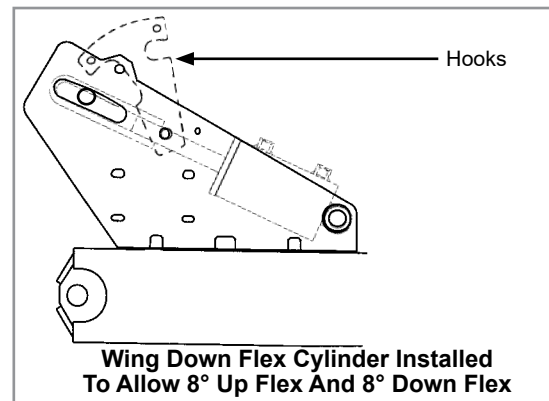
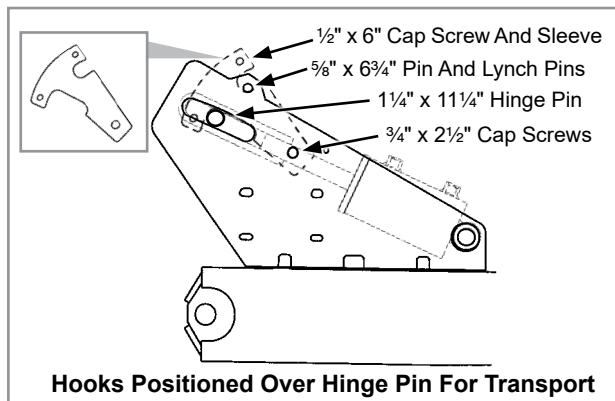
(Continued on next page)

WING FLEX (CONTINUED)

5. Remove $\frac{3}{4}$ " hook mounting hardware.
6. Install hooks in new position. Tighten $\frac{3}{4}$ " hardware.
7. Install sleeve and $\frac{1}{2}$ " cap screw in opposite hole.

NOTE: The $\frac{3}{4}$ " hook mounting hardware should be snug, yet loose enough to allow the hooks to be rotated by hand.

8. Install $6\frac{3}{4}$ " pin and lynch pins.

WING DOWN FLEX CYLINDER

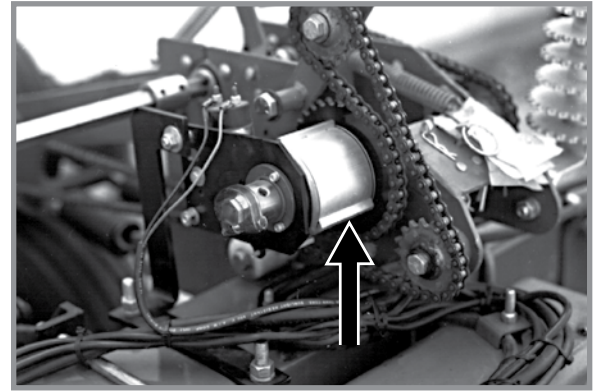
To prevent the planter wings from sagging during transport should hydraulic pressure be lost, the hooks located over each hinge area should be repositioned prior to folding the planter. Apply hydraulic pressure to the wing down flex cylinders until they are completely retracted and the wings are rotated up slightly. (**$\frac{3}{4}$ " hook mounting hardware should be snug, yet loose enough to allow the hooks to be rotated by hand.**) Remove lynch pin and $6\frac{3}{4}$ " pin, rotate hooks to hook over hinge pin as shown below and reinstall $6\frac{3}{4}$ " pin above hooks. Relieve hydraulic pressure on down flex cylinders and allow wings to come back to level. Fold planter and install lockups on wing fold cylinders. Reverse procedure to unfold planter.

NOTICE

Always be sure planter is in the fully raised position before folding the planter wings to ensure wing row units do not collide with center section seed hoppers.

POINT ROW CLUTCHES

With the use of electric-activated clutches, which disengage the drive, either half of the planter may be shut off for finishing up fields or for long point row situations.



L.H. Side Of Planter Shown

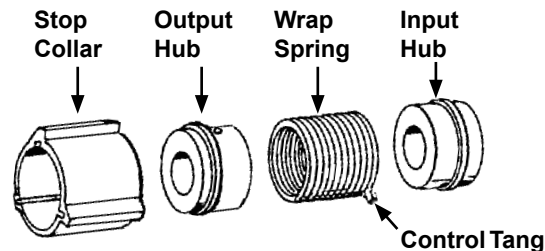
The selector switch for the clutches is located in the point row clutch control box which is installed on the tractor.

NOTE: Switch should be left in OFF position when planter is not in use. If left in ON (left or right) position, the tractor battery will be discharged.



Point Row Clutch Control Box

NOTE: Since the liquid fertilizer piston pump have their own drive wheels, liquid fertilizer application will not be affected by use of the point row clutch.



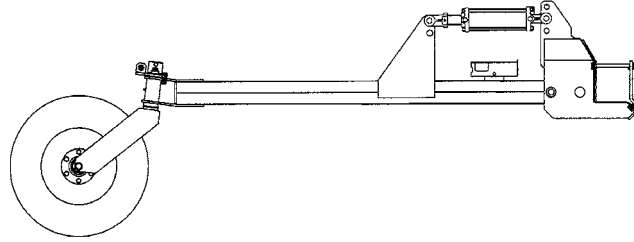
The point row clutch consists of a wrap spring riding on an input hub and an output hub. During operation the wrap spring is wrapped tightly over the hubs connecting them in a positive engagement. The greater the force of rotation the tighter the grip of the spring on the hubs. Rotation in the opposite direction or stopping the spring from rotating prevents the transmission of torque from the input hub to the output hub stopping the planter drive.

The input end of the spring is bent outward and is referred to as the control tang. The control tang fits into a slot in the stop collar that is located between the input and output hubs and over the wrap spring. If the stop collar is allowed to rotate with the input hub, the clutch is engaged. If the stop collar is stopped from rotating the control tang connected to it is forced back and the spring opens. This allows the input hub to continue rotating without transmitting torque to the output hub; therefore, stopping the planter drive.

The stop collar is controlled by the use of an electric solenoid and an actuator arm. When the selector switch on the tractor control box is in the OFF position the solenoid coil is NOT ENERGIZED and the actuator arm will not contact the stop on the stop collar allowing it to rotate with the hubs and drive the planter.

When the operational switch is in the "DISENGAGE" (right or left) position the solenoid coil IS ENERGIZED and the plunger in the solenoid coil pulls the actuator arm against the stop on the stop collar, disengaging the wrap spring and stopping the planter drive.

DUAL LIFT ASSIST WHEELS



Dual lift assist wheel equipped machines require use of a quick hitch (customer-supplied) and the top link pin is not used.

A single control valve operates the dual lift assist wheels.

When raising a planter equipped with dual lift assist wheels, the front of the planter should raise and then the back using the lift assist wheels to raise the rear of the planter. When lowering the planter, the lift assist wheels should begin to lower the rear of the planter before lowering the front of the planter.

If the machine is equipped with both the Dual Lift Assist Wheel Package and Wing Down Flex Cylinder Package, a single control valve operates both options. As the dual lift assist wheel cylinders extend to raise the toolbar, the wing down flex cylinders retract to flex the wings up 5° for added clearance when turning.

The flow control valve must be adjusted so that the wing down flex cylinders start to retract before the lift assist cylinders start to raise the toolbar. This will prevent the wings from drooping as the toolbar is raised.

Dual lift assist wheels hydraulics can also be plumbed into the 3 point lift circuit. A flow control valve determines the correct sequence of events to allow the dual lift assist wheel cylinders to operate at the correct time in conjunction with the 3 point hitch lift circuit. See "Flow Control Valve Adjustment".

See "Tractor Preparation And Hookup" for additional information.

ACCUMULATOR

An accumulator is standard in Dual Lift Assist Wheel Packages for Model 3145 Stack Folding 16 Row 30" Planters to absorb shock loads to the lift assist wheel arms during transport.

After initial dealer installation no maintenance should be necessary on the sealed system.

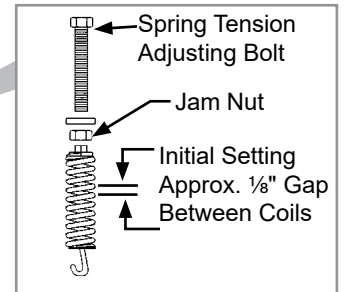
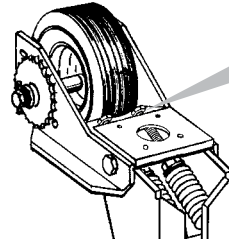


WARNING

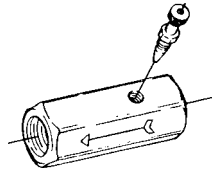
Do not disassemble accumulator. See dealer for service. Note manufacturer's caution decal on accumulator.

PISTON PUMP MOUNT/DRIVE SPRING ADJUSTMENT

Adjust the pump drive tension springs by tightening the hex head adjustment bolts to maintain positive tire contact. The initial setting should result in a $\frac{1}{8}$ " gap between coils. Tighten jam nut against spring plug to hold setting.



FLOW CONTROL VALVE ADJUSTMENT



The flow control valve determines the amount of oil flow to the lift assist cylinders.

To adjust oil flow, loosen the jam nut and turn the control clockwise or "in" to restrict flow and counterclockwise or "out" to increase the flow.

PLANTING SPEED

Planters are designed to operate within a speed range of 2 to 8 mph (3.2 - 12.8 kph). See "Rate Charts". Variations in ground speed produce variations in rates. Finger pickup seed meter populations tend to be disproportionately higher at high ground speeds.

NOTE: Seed spacing can be adversely affected at speeds above 5.5 mph (8.8 kph).

FIELD TEST

Perform a field test with any change of field and/or planting conditions, seed size or planter adjustment to ensure proper seed placement and operation of row units.

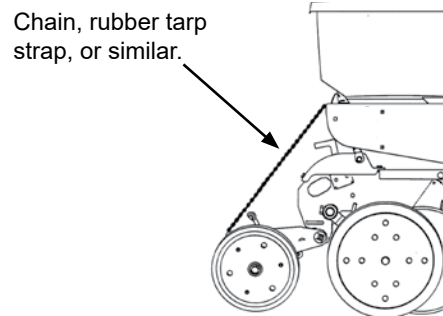
- Check planter for front to rear and lateral level operation. See “Leveling the Planter”.
- Check **all** row units to be certain they are running level. Row unit parallel arms should be approximately parallel to the ground when planting.
- Check row markers for proper operation and adjustment. See “Row Marker Adjustments” and “Row Marker Speed Adjustment”.
- Check for proper application rates and placement of granular chemicals on **all** rows. See “Field Check Granular Chemical Application”.
- Check for desired depth placement and seed population on **all** rows. See “Check Seed Population” and appropriate Rate Chart.
- Check for proper application rates of fertilizer on **all** rows. See proper “Fertilizer Application Rate Chart”.

Reinspect machine after field testing.

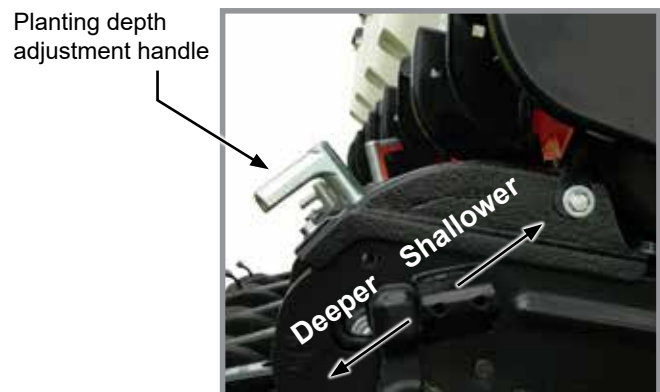
- Hoses And Fittings
- Bolts And Nuts
- Cotter Pins And Spring Pins
- Drive Chain Alignment

CHECK SEED POPULATION

1. Tie up one or more sets of closing wheels by running a chain or rubber tarp strap between the hopper support panel and closing wheels. It may be necessary to decrease closing wheel arm spring tension.



2. Plant a short distance and check to see if seed is visible in the seed trench. Adjust planting depth to a shallower setting if seed is not visible and recheck.



Planting depth adjustment

3. Measure $\frac{1}{1000}$ of an acre. See chart for correct distance for row width being planted. For example, if planting 30" rows $\frac{1}{1000}$ of an acre would be 17' 5".

| $\frac{1}{1000}$ Acre Seed Population Count Row Width/Distance | | | | | | |
|--|--------|-------|-------|-------|-------|--------|
| Row Width | 15" | 18" | 19" | 30" | 36" | 38" |
| Distance | 34'10" | 29'0" | 27'8" | 17'5" | 14'6" | 13'10" |

NOTE: Seeds may bounce or roll when planting with closing wheels raised and planting depth set shallow affecting seed spacing accuracy.

4. Count seeds in measured distance.
5. Multiply number of seeds placed in $\frac{1}{1000}$ of an acre by 1000. This gives total population.

EXAMPLE: 30" row spacing 17' 5" equals $\frac{1}{1000}$ acre.

26 seeds counted x 1000 = 26,000 seeds per acre

Seed count can be affected by drive wheel and seed meter drive ratio, tire pressure, and/or seed meter malfunction.

1. If seed check shows average distance between seeds in inches is significantly different than seed rate chart indicates, first check drive ratio between drive wheel and seed meter. Check drive wheel air pressure, check for incorrect sprocket(s) in driveline and check drive and driven sprockets on transmission(s) for proper selection.
2. Check for seed meter malfunction. For example, if spacing between kernels of corn at the transmission setting being used is 8" and a gap of 16" is observed, a finger has lost its seed and not functioned properly. If two seeds are found within a short distance of each other, the finger has metered two seeds instead of one.
3. See "Finger Pickup Seed Meter Troubleshooting" and/or "Brush-Type Seed Meter Troubleshooting" in the Troubleshooting Section of this manual.

DETERMINING POUNDS PER ACRE (BRUSH-TYPE METER)

Seeds per acre ÷ Seeds per pound (from label) = Pounds per acre

If seeds per pound information is not available use the following averages:

2,600 seeds per pound for medium size soybeans

15,000 seeds per pound for medium size milo/grain sorghum

4,500 seeds per pound for medium size cotton

DETERMINING BUSHELS PER ACRE

Pounds per acre ÷ Seed unit weight = Bushels per acre

Average Unit Weight of:

1 Bushel Soybeans = 60 Pounds


1 Bushel Milo/Grain Sorghum = 56 Pounds

1 Bushel Cotton = 32 Pounds


If seed population check shows planting rate is significantly different than seed rate chart shows or if a particular meter is not planting accurately, see "Brush-Type Seed Meter Maintenance" and "Brush-Type Seed Meter Troubleshooting".

FIELD CHECK GRANULAR CHEMICAL APPLICATION

Temperature, humidity, speed, ground conditions, flowability of different material, or meter obstructions can affect granular chemical rate of delivery.

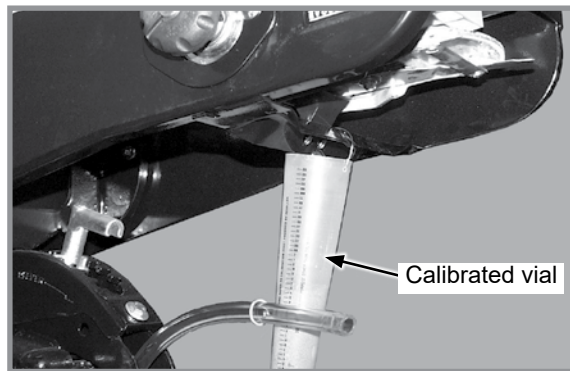


WARNING



Agricultural chemicals can cause death or serious injury to persons, animals, and plants or seriously damage soil, equipment, or property. Read and follow all chemical and equipment manufacturers labels and instructions.

Perform a field check to determine application rates.



Granular chemical field check

1. Fill insecticide and/or herbicide hoppers.
2. Attach a calibrated vial to each granular chemical meter.

NOTE: Disengage clutch to avoid dropping seed during test.

3. Lower planter and drive 1320 feet at planting speed.
4. Weigh chemical in ounces caught in one vial.
5. Multiply that amount by factor shown to determine pounds per acre.

| Pounds Per Acre | |
|-----------------|--------|
| Row Width | Factor |
| 30" | .83 |
| 36" | .69 |
| 38" | .65 |

EXAMPLE: You are planting 30" rows. You have planted for 1320 feet at desired planting speed. You caught 12.0 ounces of chemical in one vial. 12.0 ounces times 0.83 equals 9.96 pounds per acre.

NOTE: Check calibration of all rows.

METERING GATE

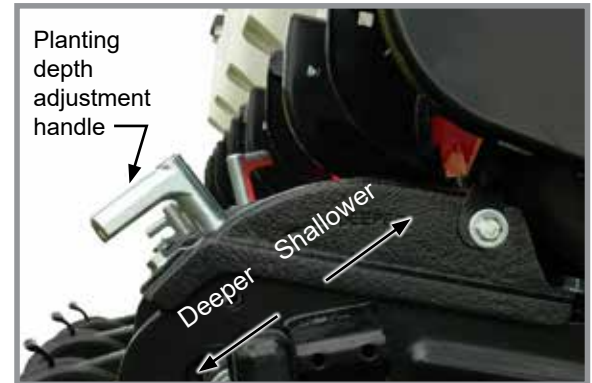
Use metering gate setting as a starting point for distributing insecticide or herbicide. Charts are based on 5 mph (8 kph) planting speed. Use a higher gate setting for speeds faster than 5 mph (8 kph) and a lower setting for speeds slower than 5 mph (8 kph).

This page left blank intentionally.

PLANTING DEPTH

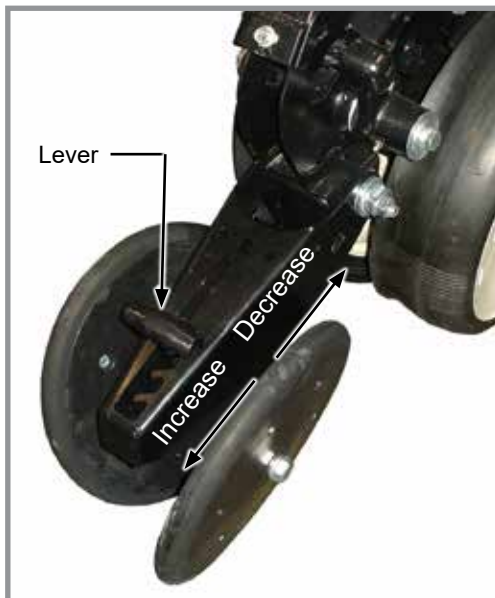
Planting depth is maintained by adjustable row unit gauge wheels. Depth adjustment range is approximately $\frac{1}{2}$ " to $3\frac{1}{2}$ " (1.27 to 8.89 cm).

1. Raise planter to remove weight from wheels.
2. Push down on depth adjustment handle and reposition it forward to decrease or rearward to increase planting depth. Initially adjust all units to the same setting.
3. Lower planter and check operation and planting depth of all row units. Readjust individual rows as needed for uniform operation.

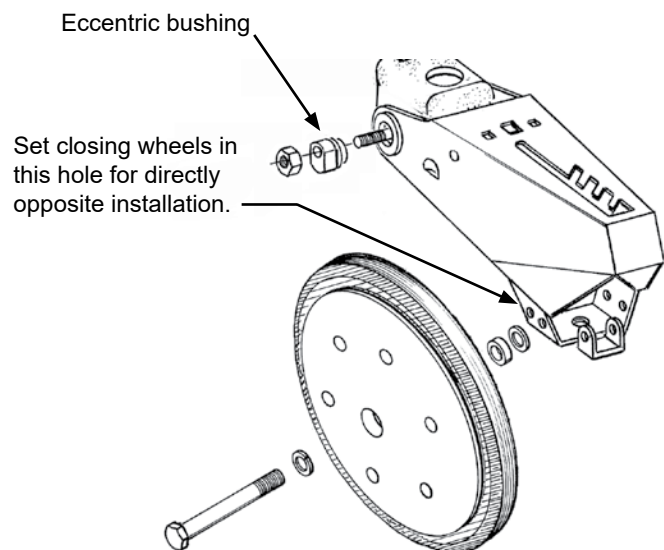


Planting depth adjustment

“V” CLOSING WHEEL ADJUSTMENT (RUBBER OR CAST IRON)



“V” Closing wheels installed offset



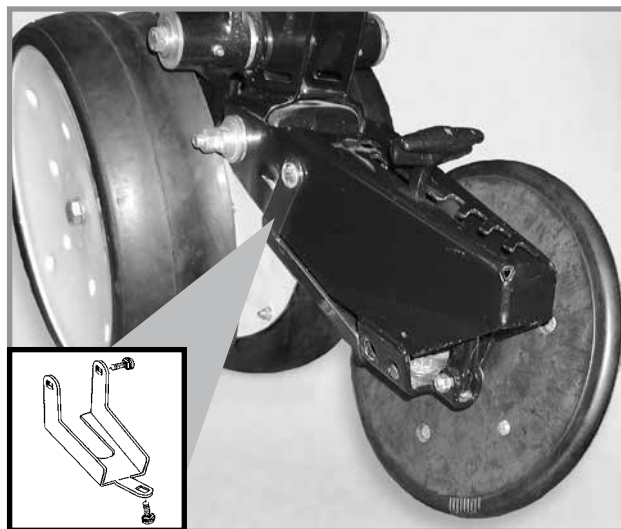
“V” closing wheels should have enough down pressure to close the seed trench and ensure good soil to seed contact. Move 5-position quick adjustable down force lever on the top of closing wheel arm to the rear to increase closing wheel spring pressure. Move lever forward to decrease pressure. Adjust all row units to a similar setting. Light soil usually requires less down force at average depth, approximately 2" (5 cm), while heavy soil requires increased down force.

Eccentric bushings in the wheel arm stop allow for lateral adjustment of the “V” closing wheel assembly. Use a $\frac{3}{4}$ " wrench to loosen hardware attaching closing wheel arm to wheel arm stop. Use another $\frac{3}{4}$ " wrench to turn eccentric bushings until **closing wheels are aligned with seed trench**. Tighten hardware.

Closing wheels can be installed “offset” (to improve residue flow) or “directly” opposite. Use forward installation holes if set “directly” opposite.





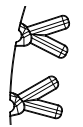



CLOSING WHEEL SHIELD (RUBBER OR CAST IRON "V" CLOSING WHEELS)

Optional closing wheel shield is installed on underside of closing wheel arm to help prevent root balls and stalks from clogging closing wheels.

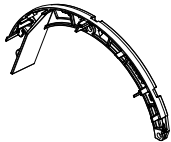


**Closing wheel shield
(Shown with closing wheel removed)**

BRUSH-TYPE SEED METER 2.0

| | Crop | Disc Color-Code (Disc Part No.) | Upper Brush Retainer | Cells | Seed Size Range | *Lubricant |
|---|------------------------------------|--|-------------------------------------|--------------|----------------------------------|-------------------------|
|  | Soybean | Black (GB1123) | GB1084 | 60 | 2200 to 4000 seeds/lb. | Graphite Talc |
|  | Soybean | Dark Gray (GB1171) | GB1084 | 54 | 2000 to 3000 seeds/lb. | Graphite Talc |
|  | Specialty Soybean | Dark Blue (GB1124) | GB1084 | 48 | 1400 to 2200 seeds/lb. | Graphite Talc |
|  | Small Milo/Grain Sorghum | Orange (GB1130) | GB1107 | 30 | 14,000 to 20,000 seeds/lb. | Talc |
|  | Large Milo Grain Sorghum | Light Blue (GB1131) | GB1107 | 30 | 10,000 to 16,000 seeds/lb. | Talc |
|  | High-Rate Small Milo/Grain Sorghum | Red (GB1132) | GB1107 | 60 | 12,000 to 18,000 seeds/lb. | Talc |
|  | High-Rate Large Milo/Grain Sorghum | Yellow (GB1133) | GD8237 | 60 | 10,000 to 14,000 seeds/lb. | Talc |
|  | Wheat | Purple (GB1134) | GB1084 | 54 | N/A Volumetric | Graphite Talc |

***For More information on application rate see Additives section.**



Use GB1084 upper brush retainer when using wheat and soybean discs.



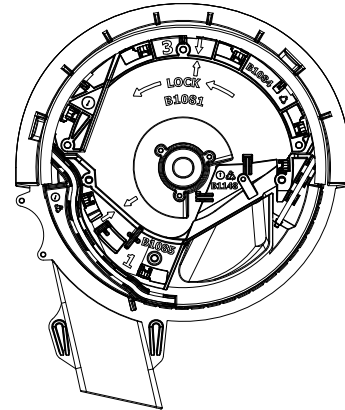
Use GB1107 milo insert when using milo/ grain sorghum discs.

Turn seed disc counterclockwise when installing on meter hub while tightening two wing nuts that retain disc. Seed disc should have slight resistance when rotated counterclockwise after wing nuts are tight.

Brush-type seed meter attaches to seed hopper same as finger pickup seed meter. Secure to bottom of seed hopper with two $\frac{5}{16}$ " thumbscrews. Tighten thumbscrews slightly with pliers. **DO NOT OVER TIGHTEN.**

Misalignment between drive coupler and seed meter input shaft may cause erratic seed spacing from momentary stoppage of seed disc. Check alignment and adjust as needed.

Refer to planting rate charts in this manual for recommended seed drive transmission sprocket combinations.



Shown without seed disc installed

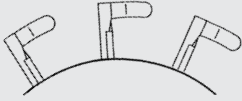
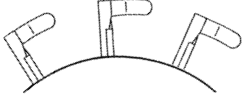
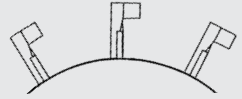

NOTICE

Replace hopper lids after hoppers are filled to prevent accumulation of dust or dirt in seed meter which will cause premature wear.









NOTE: Clean seed is required to ensure accurate seed metering from brush-type seed meters. Remove seed discs daily and check seed meter or brushes for buildup of foreign material, such as hulls, stems, etc.

FINGER PICKUP SEED METER






| Crop | Fingers | *Lubricant |
|--|--|---------------|
| Corn |  <p>Part No.: GR1848 - Finger Assembly, Corn</p> | Graphite Talc |
| No. 1 and/or No. 2 size Confectionery Sunflower Seeds |  <p>Part No.: GR1848 - Finger Assembly, Corn</p> | Talc |
| No. 3 and/or No. 4 size Oil Sunflower Seeds |  <p>Part No.: GR2154 - Finger Assembly, Oil</p> | Talc |
| Blank fingers replace alternate fingers to reduce planting rate by half while allowing the finger wheel to maintain a minimum of 40 RPM when planting low rates. |  <p>Part No.: GD11787 - Half Rate Blank Finger</p> | Graphite Talc |
| *For More information on application rate see Additives section. | | |
| NOTE: Always field check seed population to verify planting rates. | | |
| NOTE: Refer to planting rate charts in this manual for recommended seed drive transmission sprocket combinations. | | |

VACUUM SETTINGS

| Crop | | **Seed Disc Kit | Seed Disc Part No. | Ejector Wheel (Color) | Cells | Seed Size Range | Singulator Zone Setting | Vacuum Setting Inches of Water (kPa) | Lubricant |
|---|---------------------------------|-----------------|---------------------|----------------------------------|-------|---|-------------------------|--------------------------------------|--|
|  | Corn ‡ Large Sweet Corn | G10276X | B1219 (Light Blue) | 1 row 5 punches (Light Blue) | 40 | 35-70 lbs/80k (2500-5000 seeds/kg) | 2 | 18-20 (4.5-5.0) | Graphite* Talc* Bayer Fluency† (if mandated) |
|  | Soybean | G10277X | B1232 (Black) | 2 rows 6 punches (Black) | 120 | 2200-4000 seeds/lb (4850-8820 seeds/kg) | 0 | 10-14 (2.5-3.5) | Graphite* Talc* Bayer Fluency† (if mandated) |
|  | Soybean Disc | G10275X | B1238 (Black) | 1 row 6 punches (Green) | 60 | 2200-4000 seeds/lb (4850-8820 seeds/kg) | 0 | 10-14 (2.5-3.5) | Graphite* Talc* Bayer Fluency† (if mandated) |
|  | Sugar Beet | G10279X | B1229 (Dark Orange) | 1 row 6 punches (Dark Orange) | 60 | Pelletized | 2 | 15 (3.75) | Graphite* Talc* Bayer Fluency† (if mandated) |
|  | Milo | G10279X | B1229 (Dark Orange) | 1 row 6 punches (Dark Orange) | 60 | 10,000-20,000 seeds/lb (22000-44000 seeds/kg) | 2 | 15 (3.75) | Graphite* Talc* Bayer Fluency† (if mandated) |
|  | Sunflower ‡ Small Sweet Corn | G10278X | B1230 (Gray) | 1 row 5 punches (Gray) | 40 | Oil seeds #2, 3, 4 | 2 | 12-18 (3.0-4.5) | Graphite* Talc* Bayer Fluency† (if mandated) |
|  | Sunflower | G10278X | B1230 (Gray) | 1 row 5 punches (Gray) | 40 | Oil seeds #5 | 2 | 5-8 (1.25-2.0) | Graphite* Talc* Bayer Fluency† (if mandated) |
|  | Specialty Disc 1 | G10280X | B1233 (Green) | 1 row 6 punches (Green) | 60 | Cotton | 2 | 15-20 (3.75-5.0) | Graphite* Talc as needed* Bayer Fluency† (if mandated) |

Continued on next page.

VACUUM SETTINGS

| Crop | **Seed Disc Kit | Seed Disc Part No. | Ejector Wheel (Color) | Cells | Seed Size Range | Singulator Zone Setting | Vacuum Setting Inches of Water (kPa) | Lubricant |
|--|-----------------|--------------------|-------------------------------|-------|--|-------------------------|--------------------------------------|---|
|  Specialty Disc 2 | G10281X | B1235 (Brown) | 1 row 6 punches (Green) | 60 | Black turtle & navy edible beans | 2 | 15-20 (3.75-5.0) | Graphite* Talc as needed* Bayer Fluency [†] (if mandated) |
|  Specialty Disc 3 | G10282X | B1234 (Dark Blue) | 1 row 6 punches (Green) | 60 | Pinto & Great Northern edible beans & low-rate soybean | 2 | 15-20 (3.75-5.0) | Graphite* Talc as needed* Bayer Fluency [†] (if mandated) |
|  Wheat Disc | G10274X | B1236 (Purple) | Brush Type | 54 | N/A Volumetric | 0 | 6-16 (15-41) | Graphite* Talc as needed* Bayer Fluency [†] (if mandated) |

Install selected seed disc. Position vacuum cover on meter by aligning keyhole slots over bolt heads. Push cover on meter and turn counter clockwise to lock in place.

*For More information on application rate, see [“Additives” on page 3-12](#).

**Includes seed disc, ejector wheel, and spring.

[†]Bayer Fluency Agent is only required to be used in place of graphite or talc lubricants on vacuum equipped planters that are sowing neonicotinoid treated seeds in Canada. Refer to [“Bayer Fluency Agent” on page 3-13](#) section for more information.

‡Conventional hoppers only, not applicable with bulk fill.

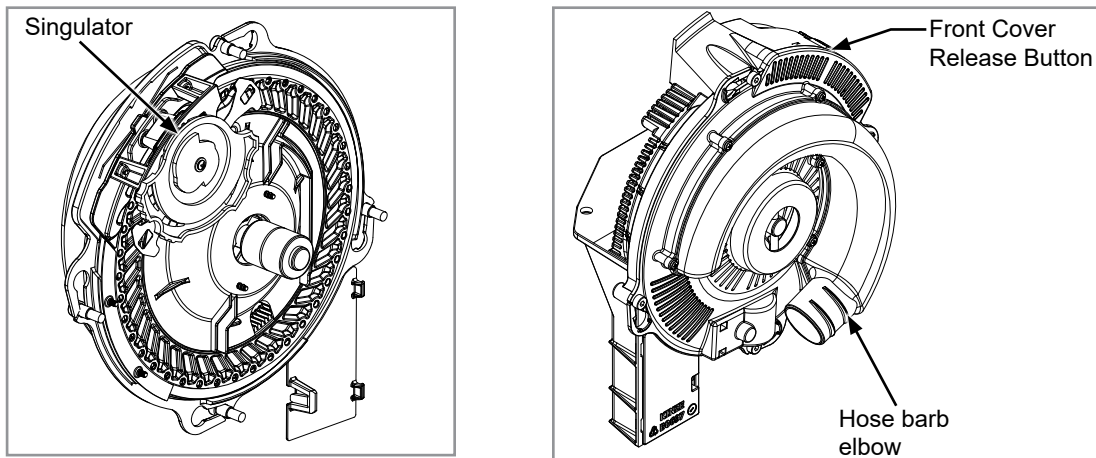
NOTE: See [“Check Seed Population” on page 2-22](#) for more information. Always field check seed population to ensure planting rates are correct.

NOTE: Singulator settings are marked from 0 - 3.

NOTE: Mixing seed sizes and shapes affects meter performance. Use consistent seed size and shape.

NOTE: Use 1 tablespoon powdered graphite with each standard hopper fill of seed. Seed treatment, foreign material, dirt or seed chaff may cause gradual reduction of seed disc fill (population). See [“Additives” on page 3-12](#) for more information.

NOTE: Excessive seed treatment, humidity, and light-weight seed can affect meter performance. Use ½ cup of talc with each standard hopper fill of seed and mix thoroughly to coat all seeds and adjust rates as needed. Use of talc aids seed flow into meter, singulation, and disc seed drop.

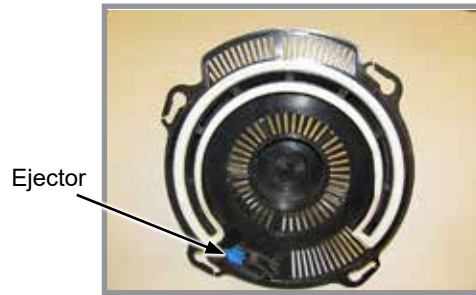


NOTE: Foreign material in seed disc orifices, such as seed chips, hulls, stems, etc., may affect seed delivery. Clean seed ensures accurate seed metering from vacuum seed meter. Remove Seed discs daily to check for buildup of foreign material in seed disc orifices.

Air inlet screens allow air to enter system and aids in keeping field residue or other foreign material out of meter.

See [“Vacuum Seed Meter Maintenance” on page 5-15](#) and [“Preparation for Storage” on page 5-31](#) in Lubrication and Maintenance section for more information.

This page left blank intentionally.



NOTE: Damaged seed or seed containing foreign material will cause plugging of seed disc orifices and require more frequent seed meter cleanout to prevent underplanting.

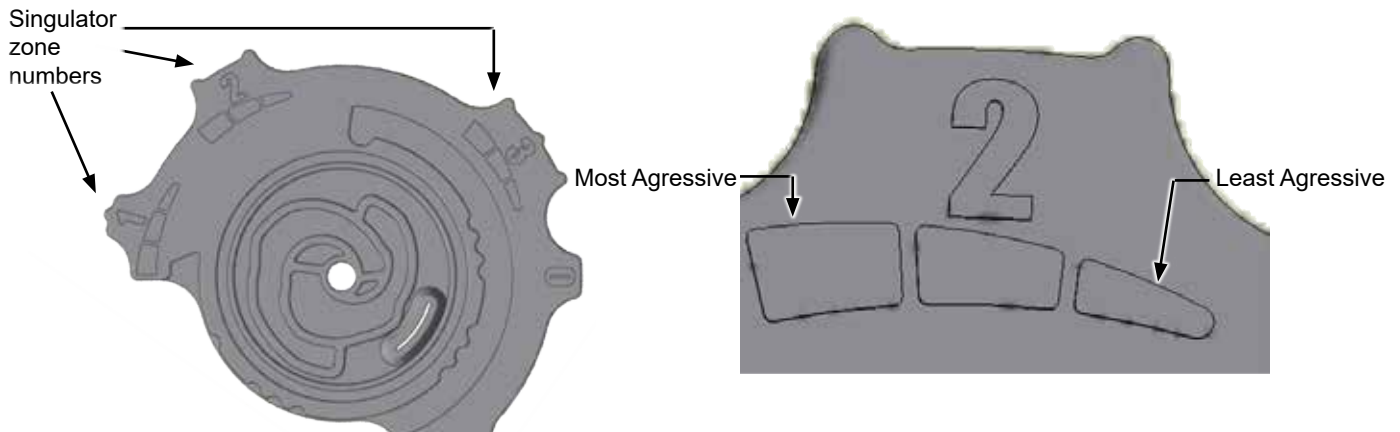
Wheel-Type Ejectors

Wheel-type ejectors expel seed remnants from seed disc orifices. These ejectors are disc specific and colored coded to match disc.

| | |
|---------------|--|
| NOTICE | Replace hopper lids after hoppers are filled to prevent accumulation of dust or dirt in seed meter which will cause premature wear. |
|---------------|--|

NOTE: Seed size, seed shape, seed treatments, travel speed, and planting rate affect meter performance.

1. Select seed disc and ejector to match crop and population.



Singulator Adjustment Wheel

2. Adjust singulator wheel to initial setting. Seed size, seed shape, seed treatments, travel speed and planting rate all affect meter performance.
3. With vacuum fan running, lower planter to planting position and drive forward a short distance to load seed into seed disc cells.
4. Adjust vacuum level to initial setting according to tables on page.

NOTE: Vacuum reading will be much lower when seed disc cells are empty. Load all seed cells before setting vacuum level.

NOTE: Operate vacuum fan 3-5 minutes to bring oil up to normal operating temperature prior to making final vacuum level adjustment.

4. Adjust vacuum level to initial setting according to tables on page.

NOTE: Vacuum reading will be much lower when seed disc cells are empty. Load all seed cells before setting vacuum level.

NOTE: Operate vacuum fan 3-5 minutes to bring oil up to normal operating temperature prior to making final vacuum level adjustment.

SEED METER CLEANOUT

NOTE: Use of damaged seed or seed containing foreign material will cause plugging of seed cell orifices and require more frequent seed meter cleanout to prevent underplanting.

Thorough seed meter cleanout is important to maintain genetic purity.

1. Disengage seed drive and remove seed hopper and meter.
2. Dump seed from right rear corner of hopper into a container.
3. Lay hopper on its right side. Push release button and rotate seed meter vacuum cover clockwise to align keyhole slots with bolt heads. Lift off cover.
4. Rotate seed disc hub clockwise to unlock and remove seed disc.
5. Empty meter.
6. Thoroughly inspect meter to ensure all seed is removed.
7. Replace seed disc. Install vacuum cover.

ADDITIVES

| Lubricant Application Rate | |
|--|--------------------|
| Graphite | |
| Conventional Hoppers | 1 Tbs./Hopper Fill |
| 80/20 Talc-Graphite | |
| Conventional Hoppers | ½ C.** |
| **Must be evenly mixed during fill. | |
| Talc | |
| Conventional Hoppers | ¼ C.* |
| *Double amount of talc for sunflowers. | |

GRAPHITE

The use of graphite is the primary recommendation to promote seed flow, provide lubrication for the seed meter and to help dissipate static charge buildup. Among the available dry seed lubricants graphite is the most effective and easiest to use and it requires no mechanical agitation

Conventional Hoppers

Mix one tablespoon of **powdered graphite** with seed each time hoppers are filled. Regular graphite use prolongs life of the seed meter components, improves seed spacing, and may reduce buildup of seed treatments.

NOTE: DO NOT apply graphite only in center of hopper. It will filter too quickly through the seed and not distribute as evenly as desired.

Apply graphite around outer perimeter of hopper.



Adding graphite to conventional hopper

NOTE: Additional graphite may be required to retard buildup of seed treatments on meter components. More frequent cleaning of monitor seed tubes may be necessary due to use of additional graphite.

80/20 TALC-GRAPHITE

Talc-Graphite lubricant is to be used for treated seed, providing benefits of both talc and graphite. It absorbs moisture to prevent bridging, minimizes static electricity for improved seed flow, and lubricates seed and meters.

Conventional Hoppers

Mix ½ C. of 80/20 talc-graphite evenly with seed each time hoppers are filled. Regular graphite use prolongs life of the seed meter components, improves seed spacing, and may reduce buildup of seed treatments.

NOTE: Talc-Graphite lubricant MUST be mixed evenly during fill.

TALC

Talc seed lubricant may be used as a drying agent in addition to graphite lubrication. The drying agent may improve seed release and/or **to retard buildup of seed treatments on meter components.**

1. Fill hopper ½ full of seed, add ¼ cup (conventional) of talc and **mix thoroughly.**
2. Finish filling hopper, add another ¼ cup (conventional) of talc and **mix thoroughly.**
3. Adjust rate of talc use as needed so all seeds are coated, while avoiding a buildup of talc in bottom of hopper.

Humid conditions and/or small sized seeds with extra seed treatment may require additional talc to maintain meter performance.

NOTE: Liquid seed treatments or inoculants may create buildup on the seed disc or brushes. Check frequently for proper population and/or seed delivery when using any liquid seed treatment.

Completely mix all treatments with seed following manufacturers' recommendations. Seed treatment dumped on top of seed after hopper is filled may not mix properly and cause seed bridging, reducing population or stopping meter from planting.

BAYER FLUENCY AGENT

Bayer Fluency Agent is an alternate seed lubricant by Bayer Crop Science. The intent of this product is to replace graphite and talc lubricants and to lower the amount of dust emissions from planter vacuum fans.

This product, as tested by Kinze, is compatible with Kinze's bulk fill system and vacuum meters. Due to limited testing, wear life characteristics of meters and bulk fill systems that use Bayer Fluency Agent are not yet known. Please follow Bayer Fluency Agent instructions for rates and mixing directions.

NOTE: Presently, Bayer Fluency Agent is only required to be used in Canada with Bulk Fill or Vacuum planters that plant corn or beans treated with neonicotinoids. Farms outside of Canada, farms not using seed treated with neonicotinoids, and farms not using pneumatic metering devices do not need to use Bayer Fluency Agent. All planters not equipped with vacuums or fans are exempt from using Bayer Fluency Agent.

SEED HOPPERS



CAUTION

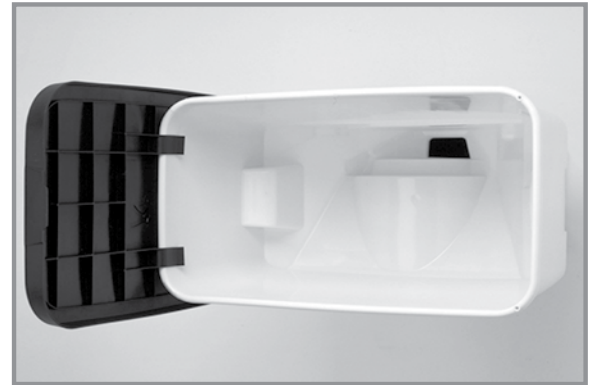
Seed hopper is retained by an over-center latch. Wear gloves to prevent injury to hands while releasing the latch.

Mechanical seed hopper has a capacity of 1.9 bushels.

Vacuum seed hopper has a capacity of 1.75 bushels.

Use clean seed and make certain there are no foreign objects inside when filling seed hopper. **Replace hopper lids after hoppers are filled to prevent accumulation of dust or dirt in seed meter which can cause premature wear.** See “Finger Pickup Seed Meter” and/or “Brush-Type Seed Meter”.

Periodically empty hoppers completely to remove any foreign objects and to ensure proper seed meter operation.



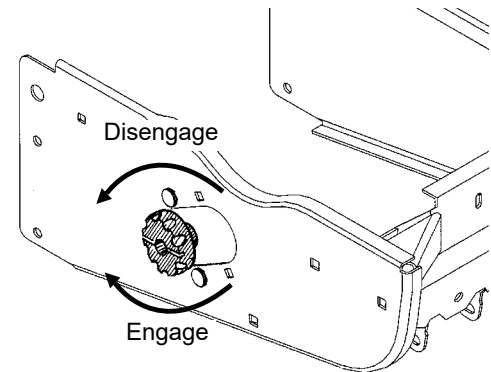
Mechanical seed hopper

Disengage meter drive and hopper latch and lift hopper off hopper support. See “Seed Meter Drive Release”.

SEED METER DRIVE RELEASE

A clutch release mechanism disengages seed meter drive from seed meter to remove seed hopper. Disconnecting drive allows operator to check granular chemical application rates without dropping seed. It also allows one or more rows to be disconnected when finishing fields.

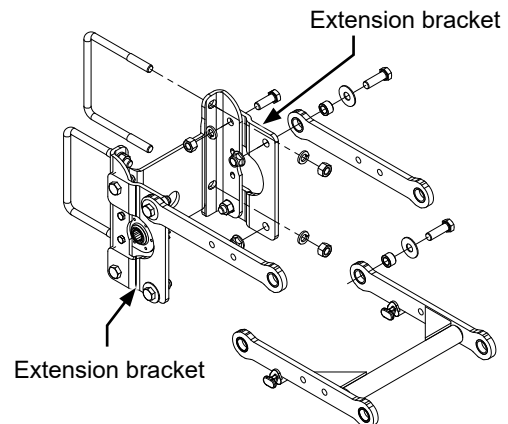
Turn knob ¼ turn counterclockwise to disengage or ¼ turn clockwise to engage.



Seed meter drive release

ROW UNIT EXTENSION BRACKETS

Row unit extension brackets extend row units rearward 4" to provide clearance for coulter mounted residue wheels and HD single disc fertilizer openers.

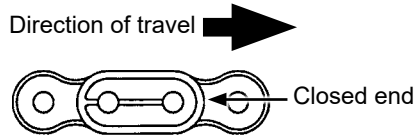


Row unit extension brackets

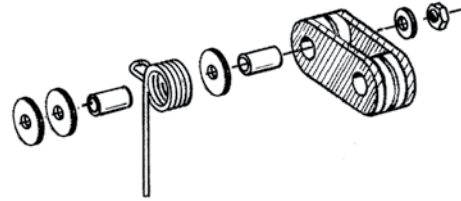
ROW UNIT CHAIN ROUTING

Row unit drive chains must be properly tensioned and aligned for proper operation and to minimize wear.

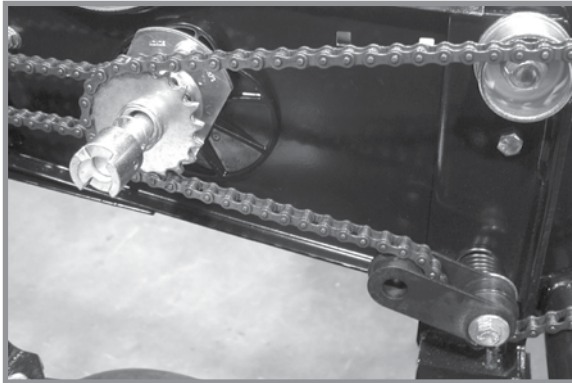
Inspect and replace weak, worn or broken springs, idlers, and idler bushings.



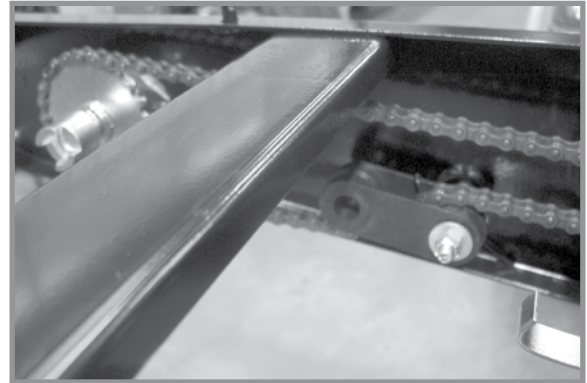
NOTE: Install connector link with closed end facing direction of travel.



NOTE: Reverse idler when worn on one side for extended use.



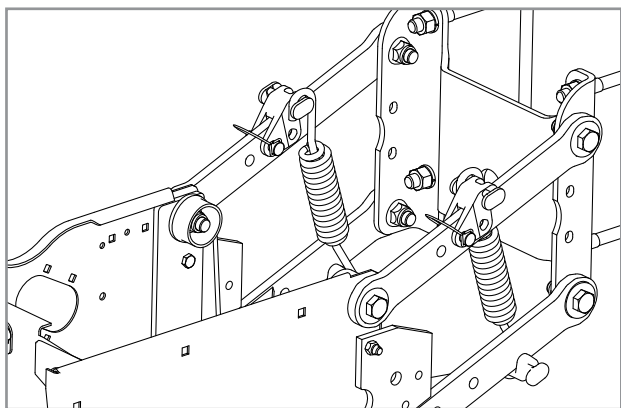
Mechanical Pull Row Unit Meter Drive



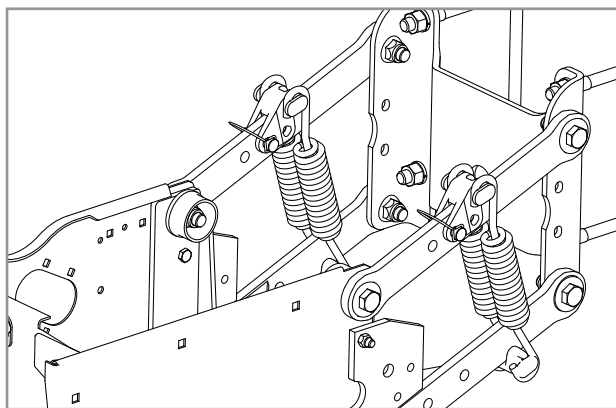
Row Unit Granular Chemical Drive

QUICK ADJUSTABLE DOWN FORCE SPRINGS OPTION

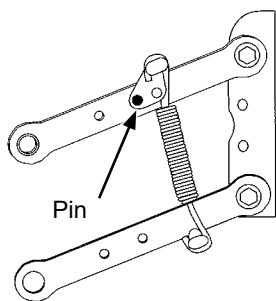
Quick adjustable down force springs increase penetration in hard soil and keep row unit from bouncing in rough field conditions. Two springs per row, one on each side parallel arms, are used unless equipped with row unit mounted no till coulters. Four springs per row are used with row unit mounted no till coulters.



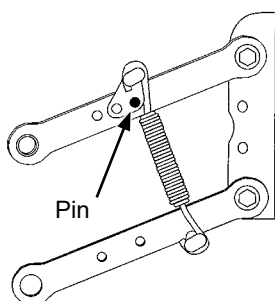
Two Springs Per Row (Dual)



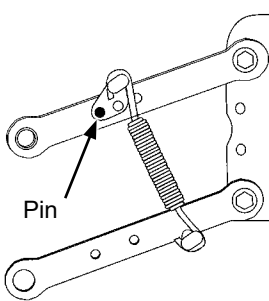
**Four Springs Per Row (Quad)
(Row Unit Mounted No Till Coulters Only)**



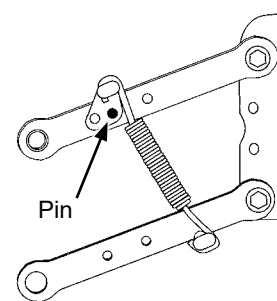
Position 1 (Least)



Position 2



Position 3



Position 4 (Most)

There are four positions to set down pressure spring tension.

NOTICE

Springs must be installed with open side of spring hooks toward seed hoppers to prevent binding on spring mount adjustment pins.

1. Raise planter and remove spring mount pin at top of spring.
2. Slide mount to desired position and install pin.

NOTE: Adjust springs for field conditions. Too much down pressure in hard field conditions can cause row units to lift planter and keep drive wheels from making contact. Too much down pressure in soft field conditions can cause row unit to run too deep.

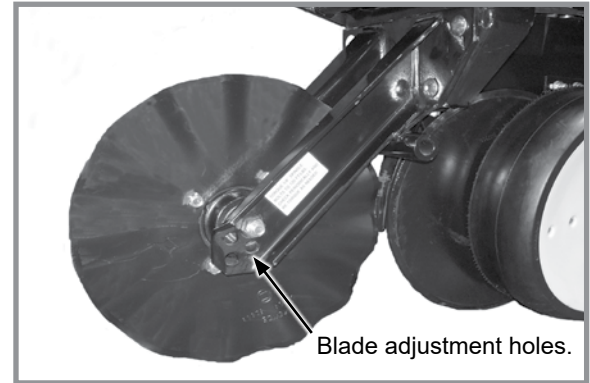
| Heavy Duty Spring Down Force Pressure* | | |
|--|---------------------------|---------------------------|
| | 2 Springs | 4 Springs |
| Position | Heavy Duty P/N: D21337 | Heavy Duty P/N: D21337 |
| 1 | 43 lb (19.5 kg) | 80 lb (36.3 kg) |
| 2 | 86 lb (39.0 kg) | 144 lb (65.3 kg) |
| 3 | 167 lb (75.7 kg) | 307 lb (139.3 kg) |
| 4 | 249 lb (113.0 kg) | 470 lb (213.2 kg) |

*Pressure does not include weight of row unit, seed, or options.

ROW UNIT MOUNTED NO TILL COULTER

Row unit mounted no till coulters with 1" bubbled, 1" fluted (8 flutes) or ¾" fluted (13 flutes) blades may be used on pull row units and push row units (¾" fluted shown). Four quick adjustable down force springs are required per row when using row unit mounted no till coulters. See "Quick Adjustable Down Force Springs Options".

Align coulters to row unit double disc openers. Adjust by loosening four attaching bolts, moving coulters, and tightening four attaching bolts. Coulters can be adjusted to one of four ½" (13 mm) incremental settings in the forked arm. Initial location is the top hole.



Row Unit Mounted No Till Coulters

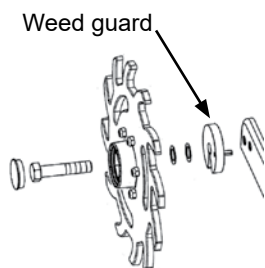
Move blade as it wears to one of the three lower holes to maintain coulters at or slightly above opener discs as needed. Adjust coulters below depth of double disc opener blades in very hard soil conditions such as compacted wheel tracks to improve opener penetration and cutting of surface residue.

Check operating depth by setting planter down on a level concrete floor and checking relationship between coulters and row unit opener blades. Make sure planter is level and coulters are square with planter frame and aligned with row unit disc opener.

NOTE: Torque 5/8" spindle hardware to 120 ft-lb (162.7 N-m).

COULTER MOUNTED RESIDUE WHEELS

Coulters mounted residue wheels are designed for use on pull row units and push row units. Row unit extension brackets are required on the four center pull row units if the planter is equipped with coulters mounted residue wheels.



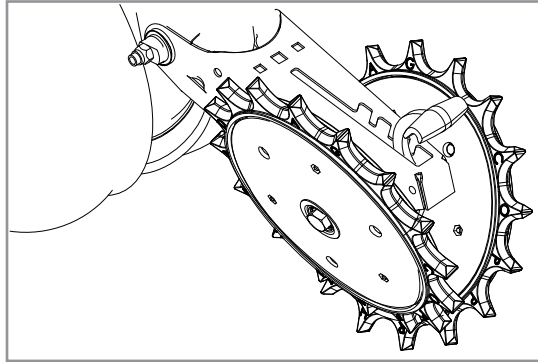
NOTE: Opening in weed guard must face down.



Coulters mounted residue wheels

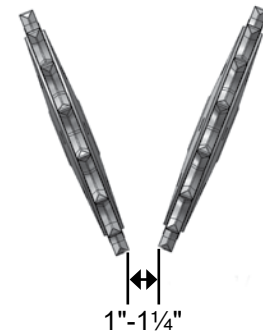
Residue wheels attach to row unit mounted coulters with two cap screws and sleeves allowing unit to free-float. A 2-position spindle bolt mounting positions wheels interlocked or staggered. Depth adjustment is made with a spring-loaded cam and pin with 8 positions in 7/16" (6 mm) increments. A high point on the cam allows wheels to be locked up.

A weed guard on the inboard side of each wheel helps prevent weed wrap which can cause premature bearing failure.


SPIKED CLOSING WHEEL**Row Unit Spiked Closing Wheel**

Spiked closing wheels crumble the sidewall, allowing roots to penetrate soil. They can be used on pull row units and push row units.

Align spiked closing wheels straight across from each other, in most forward holes on closing wheel arm. Set the wheels 1" - 1¼" (2.5 - 3.1 cm) apart at the closest point.




GRANULAR CHEMICAL HOPPER AND DRIVE



WARNING

Agricultural chemicals can cause death or serious injury to persons, animals, and plants or seriously damage soil, equipment, or property. Read and follow all chemical and equipment manufacturers labels and instructions.



The granular chemical hopper has a 1.4 cubic feet capacity.

Make sure no foreign objects get into hopper when it is being filled. Replace hopper lids after filling to prevent accumulation of dirt and moisture.

A metering gate on bottom of hopper regulates the application rate. See “Dry Insecticide and Dry Herbicide Application Rate Charts” in this manual. Calibrate using chemical manufacturers’ instructions.

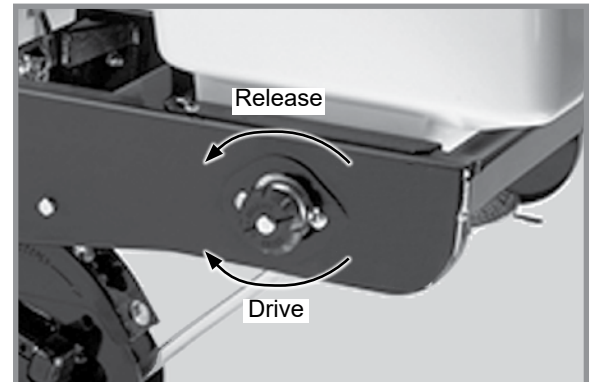


Granular chemical hopper

Granular chemical clutch drive coupler and meter shaft can be disengaged and engaged by turning throwout knob at rear of hopper support panel.

Rotate knob $\frac{1}{4}$ turn counterclockwise to disengage and $\frac{1}{4}$ turn clockwise to engage.

Slotted holes in hopper support panel and clutch housing allow for alignment adjustment between clutch drive coupler and meter shaft.

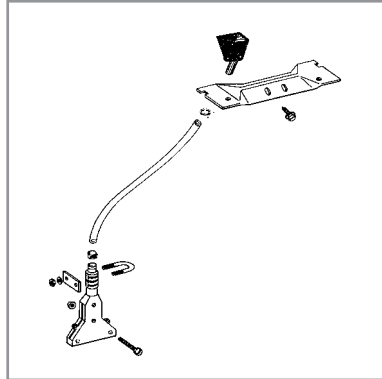


Granular chemical drive release

GRANULAR CHEMICAL BANDING OPTIONS

Granular chemical banding options allow 4½" slope-compensating banding, straight drop in-furrow placement or 14" rear banding.

NOTE: Granular chemical rear bander is not compatible with covering discs/single press wheel option.



4½" slope-compensating bander

GENERAL PLANTING RATE INFORMATION

These planting rate charts apply to Kinze Model 3145 planters.

NOTICE

Sprocket combinations in these charts are for average conditions. Changes in sprocket combinations may be required for desired planting population. **ALWAYS MAKE FIELD CHECKS TO BE SURE YOU ARE PLANTING AT THE DESIRED RATE.**

NOTICE

Seed additives added in the hopper may affect finger pickup seed meter performance and accelerate wear.

NOTE: Seed size and shape may affect planting rate.

NOTE: Not all row spacings listed apply to all size planters.

NOTE: Speeds above 6.0 MPH (10 KPH) can adversely affect seed spacing.

MECHANICAL

Finger Pickup Corn Meter

Larger grades generally plant more accurately at the high end of the ground speed range than smaller grades. Higher than optimum speeds may result in population rate increase or higher incidence of doubles, particularly with small seed. Medium round corn seed is most desirable for planting accuracy at optimum speed.

Finger Pickup Oil Sunflower Meter

Larger grades generally plant more accurately at the high end of the ground speed range than smaller grades. Higher than optimum speeds may result in population rate increase or higher incidence of doubles, particularly with small seed. No. 3 and/or No. 4 size oil sunflower seeds are recommended for use in finger pickup seed meters equipped with oil sunflower fingers. No. 1 and/or No. 2 size confectionery sunflower seeds are recommended for use in finger pickup seed meters equipped with corn fingers.

Brush-Type Seed Meter (Soybean, Milo/Grain Sorghum, Acid-Delinted Cotton)

Rate charts are given in seeds per acre as well as seed spacing in inches rounded to nearest tenth of an inch. Because of large range in seed size, pounds per acre is not a suggested method of selecting transmission settings. Smaller size seed pounds per acre may be below what was expected and large seed pounds per acre may appear above expectations. To determine pounds per acre, use formula given in "Determining Pounds Per Acre (Brush-Type Seed Meter)" in "Check Seed Population" in Machine Operation section of this manual.

NOTE: Planting speed can affect actual seeding rate. Make a field check and adjust transmission setting to obtain desired seed drop.

NOTE: Seed population per acre with 15" rows double rate for 30" rows, as well as 18" rows versus 36" rows and 19" rows versus 38" rows, at listed sprocket combination. See following pages.

NOTE: Half Rate (2 to 1) Drive Reduction Package may be required to obtain desired population and seed spacing when planting 15" row soybeans or other crops. Half Rate Drive with brush-type seed meters reduces planter transmission speed. Seeding rate will be approximately 50% of chart reading when using Half Rate (2 To 1) Drive Reduction Package.

EXAMPLE: 30" row spacing using 60 cell seed discs in brush-type seed meters.
 $80,928 \div 2 = 40,464$ Population (2.6" Seed Spacing x 2 = 5.2" Seed Spacing)

VACUUM

NOTE: Contact wheel drive sprocket references are located in each rate chart title.

NOTE: 15, 19, and 30 tooth drive sprockets are NOT applicable to all rate charts. Check chart titles to ensure proper rate chart is selected. 15 tooth sprocket requires 218 pitch No. 40 chain. 19 tooth sprocket requires 218 pitch No. 40 chain. 30 tooth sprocket requires 224 pitch No. 40 chain.

NOTE: DO NOT USE 44 tooth sprockets (60 cell soybean discs) with Liquid Fertilizer Package.

**PLANTING RATES FOR FINGER PICKUP SEED METERS (STANDARD DRIVE)
APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS**

| 30" Rows | 36" Rows | 38" Rows | 40" Rows | Transmission Sprocket | | Recomm. Speed Range (MPH) | Average Seed Spacing in Inches |
|----------|----------|----------|----------|-----------------------|--------|---------------------------|--------------------------------|
| | | | | Drive | Driven | | |
| 16,186 | 13,488 | 12,778 | 12,139 | 17 | 28 | 4 to 6 | 12.9 |
| 16,785 | 13,988 | 13,251 | 12,589 | 17 | 27 | 4 to 6 | 12.5 |
| 17,431 | 14,526 | 13,761 | 13,073 | 17 | 26 | 4 to 6 | 12.0 |
| 18,090 | 15,075 | 14,281 | 13,567 | 19 | 28 | 4 to 6 | 11.6 |
| 18,128 | 15,107 | 14,312 | 13,596 | 17 | 25 | 4 to 6 | 11.5 |
| 18,760 | 15,633 | 14,810 | 14,070 | 19 | 27 | 4 to 6 | 11.1 |
| 18,883 | 15,736 | 14,908 | 14,162 | 17 | 24 | 4 to 6 | 11.1 |
| 19,481 | 16,234 | 15,380 | 14,611 | 19 | 26 | 4 to 6 | 10.7 |
| 19,704 | 16,420 | 15,556 | 14,778 | 17 | 23 | 4 to 6 | 10.6 |
| 20,261 | 16,884 | 15,995 | 15,195 | 19 | 25 | 4 to 6 | 10.3 |
| 21,104 | 17,587 | 16,662 | 15,829 | 19 | 24 | 4 to 6 | 9.9 |
| 21,898 | 18,249 | 17,288 | 16,424 | 23 | 28 | 4 to 6 | 9.5 |
| 22,022 | 18,352 | 17,386 | 16,517 | 19 | 23 | 4 to 6 | 9.5 |
| 22,709 | 18,924 | 17,928 | 17,032 | 23 | 27 | 4 to 6 | 9.2 |
| 22,850 | 19,042 | 18,040 | 17,138 | 24 | 28 | 4 to 6 | 9.2 |
| 23,583 | 19,652 | 18,618 | 17,687 | 23 | 26 | 4 to 6 | 8.9 |
| 23,697 | 19,747 | 18,708 | 17,772 | 24 | 27 | 4 to 6 | 8.8 |
| 23,802 | 19,835 | 18,791 | 17,852 | 25 | 28 | 4 to 6 | 8.8 |
| 23,853 | 19,877 | 18,831 | 17,889 | 17 | 19 | 4 to 6 | 8.8 |
| 24,526 | 20,438 | 19,363 | 18,395 | 23 | 25 | 4 to 6 | 8.5 |
| 24,608 | 20,507 | 19,427 | 18,456 | 24 | 26 | 4 to 6 | 8.5 |
| 24,684 | 20,570 | 19,487 | 18,513 | 25 | 27 | 4 to 6 | 8.5 |
| 24,755 | 20,629 | 19,543 | 18,566 | 26 | 28 | 4 to 6 | 8.4 |
| 25,548 | 21,290 | 20,169 | 19,161 | 23 | 24 | 4 to 6 | 8.2 |
| 25,592 | 21,327 | 20,205 | 19,194 | 24 | 25 | 4 to 6 | 8.2 |
| 25,633 | 21,361 | 20,237 | 19,225 | 25 | 26 | 4 to 6 | 8.2 |
| 25,671 | 21,393 | 20,267 | 19,254 | 26 | 27 | 4 to 6 | 8.1 |
| 25,707 | 21,422 | 20,295 | 19,280 | 27 | 28 | 4 to 6 | 8.1 |
| 26,659 | 22,216 | 21,046 | 19,994 | 23 | 23 | 4 to 6 | 7.8 |
| 27,646 | 23,038 | 21,826 | 20,735 | 28 | 27 | 4 to 6 | 7.6 |
| 27,684 | 23,070 | 21,856 | 20,763 | 27 | 26 | 4 to 6 | 7.6 |
| 27,770 | 23,141 | 21,923 | 20,827 | 25 | 24 | 4 to 6 | 7.5 |
| 27,818 | 23,181 | 21,961 | 20,863 | 24 | 23 | 4 to 6 | 7.5 |
| 28,709 | 23,924 | 22,665 | 21,532 | 28 | 26 | 4 to 6 | 7.3 |
| 28,791 | 23,993 | 22,730 | 21,594 | 27 | 25 | 4 to 6 | 7.3 |
| 28,977 | 24,147 | 22,876 | 21,733 | 25 | 23 | 4 to 6 | 7.2 |
| 29,795 | 24,829 | 23,522 | 22,346 | 19 | 17 | 4 to 6 | 7.0 |
| 29,858 | 24,881 | 23,572 | 22,393 | 28 | 25 | 4 to 6 | 7.0 |
| 29,991 | 24,993 | 23,677 | 22,493 | 27 | 24 | 4 to 6 | 7.0 |
| 30,136 | 25,113 | 23,792 | 22,602 | 26 | 23 | 4 to 6 | 7.0 |
| 31,102 | 25,918 | 24,554 | 23,326 | 28 | 24 | 3 to 6 | 6.7 |
| 31,295 | 26,079 | 24,707 | 23,471 | 27 | 23 | 3 to 6 | 6.7 |
| 32,271 | 26,893 | 25,477 | 24,203 | 23 | 19 | 3 to 5.5 | 6.5 |
| 32,454 | 27,045 | 25,622 | 24,341 | 28 | 23 | 3 to 5.5 | 6.5 |
| 33,674 | 28,062 | 26,585 | 25,256 | 24 | 19 | 3 to 5.5 | 6.2 |
| 35,077 | 29,231 | 27,693 | 26,308 | 25 | 19 | 3 to 5 | 6.0 |
| 36,068 | 30,056 | 28,474 | 27,051 | 23 | 17 | 2 to 5 | 5.8 |
| 36,480 | 30,400 | 28,800 | 27,360 | 26 | 19 | 3 to 5 | 5.7 |
| 37,636 | 31,363 | 29,713 | 28,227 | 24 | 17 | 3 to 5 | 5.6 |
| 37,883 | 31,570 | 29,908 | 28,413 | 27 | 19 | 3 to 5 | 5.5 |
| 39,204 | 32,670 | 30,951 | 29,403 | 25 | 17 | 3 to 4.5 | 5.3 |
| 39,287 | 32,739 | 31,016 | 29,465 | 28 | 19 | 3 to 4.5 | 5.3 |
| 40,772 | 33,977 | 32,189 | 30,579 | 26 | 17 | 3 to 4.5 | 5.1 |
| 42,340 | 35,284 | 33,427 | 31,755 | 27 | 17 | 3 to 4.5 | 4.9 |
| 43,908 | 36,590 | 34,665 | 32,931 | 28 | 17 | 3 to 4.5 | 4.8 |

NOTE: See ["General Planting Rate Information"](#) on page 4-1 and ["Check Seed Population"](#) on page 2-22 for additional information. Always check seed population in the field to ensure planting rates are correct.

**PLANTING RATES FOR BRUSH-TYPE SEED METERS (STANDARD DRIVE)
APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS**

| Transmission Sprockets | | 60 Cell Soybean or High-Rate Milo/Grain Sorghum | | | | Average Seed Spacing in Inches | 48 Cell Specialty Soybean or High-Rate Acid-Delinted Cotton | | | | Average Seed Spacing in Inches | Speed Range (MPH) |
|------------------------|--------|---|----------|----------|----------|--------------------------------|---|----------|----------|----------|--------------------------------|-------------------|
| Drive | Driven | 30" Rows | 36" Rows | 38" Rows | 40" Rows | | 30" Rows | 36" Rows | 38" Rows | 40" Rows | | |
| 17 | 28 | 80,928 | 67,440 | 63,891 | 60,696 | 2.6 | 64,742 | 53,952 | 51,113 | 48,557 | 3.2 | 2 to 8 |
| 17 | 27 | 83,926 | 69,938 | 66,257 | 62,944 | 2.5 | 67,141 | 55,950 | 53,006 | 50,355 | 3.1 | 2 to 8 |
| 17 | 26 | 87,154 | 72,628 | 68,805 | 65,365 | 2.4 | 69,723 | 58,102 | 55,044 | 52,292 | 3.0 | 2 to 8 |
| 19 | 28 | 90,449 | 75,374 | 71,407 | 67,837 | 2.3 | 72,359 | 60,299 | 57,126 | 54,270 | 2.9 | 2 to 8 |
| 19 | 27 | 93,799 | 78,166 | 74,052 | 70,349 | 2.2 | 75,039 | 62,533 | 59,242 | 56,279 | 2.8 | 2 to 8 |
| 17 | 24 | 94,416 | 78,680 | 74,539 | 70,812 | 2.2 | 75,533 | 62,944 | 59,631 | 56,650 | 2.8 | 2 to 8 |
| 17 | 23 | 98,521 | 82,101 | 77,780 | 73,891 | 2.1 | 78,817 | 65,681 | 62,224 | 59,113 | 2.7 | 2 to 8 |
| 19 | 25 | 101,303 | 84,419 | 79,976 | 75,977 | 2.1 | 81,042 | 67,535 | 63,981 | 60,782 | 2.6 | 2 to 8 |
| 19 | 24 | 105,524 | 87,937 | 83,309 | 79,143 | 2.0 | 84,419 | 70,350 | 66,647 | 63,314 | 2.5 | 2 to 8 |
| 23 | 28 | 109,491 | 91,243 | 86,440 | 82,118 | 1.9 | 87,593 | 72,994 | 69,152 | 65,694 | 2.4 | 2 to 8 |
| 19 | 23 | 110,112 | 91,760 | 86,931 | 82,584 | 1.9 | 88,090 | 73,408 | 69,545 | 66,067 | 2.4 | 2 to 8 |
| 24 | 28 | 114,252 | 95,210 | 90,199 | 85,689 | 1.8 | 91,402 | 76,168 | 72,159 | 68,551 | 2.3 | 2 to 8 |
| 24 | 27 | 118,483 | 98,736 | 93,539 | 88,862 | 1.8 | 94,786 | 78,989 | 74,831 | 71,090 | 2.2 | 2 to 8 |
| 17 | 19 | 119,263 | 99,386 | 94,155 | 89,447 | 1.8 | 95,410 | 79,509 | 75,324 | 71,558 | 2.2 | 2 to 8 |
| 24 | 26 | 123,040 | 102,534 | 97,137 | 92,280 | 1.7 | 98,432 | 82,027 | 77,710 | 73,824 | 2.1 | 2 to 8 |
| 26 | 28 | 123,773 | 103,144 | 97,715 | 92,829 | 1.7 | 99,018 | 82,515 | 78,172 | 74,263 | 2.1 | 2 to 8 |
| 24 | 25 | 127,962 | 106,635 | 101,023 | 95,971 | 1.6 | 102,370 | 85,308 | 80,818 | 76,777 | 2.0 | 2 to 8 |
| 26 | 27 | 128,357 | 106,964 | 101,334 | 96,268 | 1.6 | 102,686 | 85,571 | 81,067 | 77,014 | 2.0 | 2 to 8 |
| 23 | 23 | 133,294 | 111,078 | 105,232 | 99,970 | 1.6 | 106,635 | 88,862 | 84,186 | 79,976 | 2.0 | 2 to 8 |
| 27 | 26 | 138,420 | 115,350 | 109,279 | 103,815 | 1.5 | 110,736 | 92,280 | 87,423 | 83,052 | 1.9 | 2 to 8 |
| 24 | 23 | 139,089 | 115,907 | 109,807 | 104,317 | 1.5 | 111,271 | 92,726 | 87,846 | 83,454 | 1.9 | 2 to 8 |
| 25 | 23 | 144,884 | 120,737 | 114,382 | 108,663 | 1.4 | 115,907 | 96,590 | 91,506 | 86,930 | 1.8 | 2 to 8 |
| 19 | 17 | 148,975 | 124,146 | 117,612 | 111,731 | 1.4 | 119,180 | 99,317 | 94,090 | 89,385 | 1.8 | 2 to 8 |
| 27 | 24 | 149,955 | 124,963 | 118,386 | 112,466 | 1.4 | 119,964 | 99,970 | 94,709 | 89,973 | 1.7 | 2 to 8 |
| 28 | 24 | 155,509 | 129,591 | 122,770 | 116,632 | 1.3 | 124,407 | 103,673 | 98,216 | 93,306 | 1.7 | 2 to 8 |
| 23 | 19 | 161,355 | 134,463 | 127,386 | 121,017 | 1.3 | 129,084 | 107,570 | 101,909 | 96,814 | 1.6 | 2 to 8 |
| 28 | 23 | 162,270 | 135,225 | 128,108 | 121,703 | 1.3 | 129,816 | 108,180 | 102,483 | 97,362 | 1.6 | 2 to 8 |
| 24 | 19 | 168,371 | 140,309 | 132,924 | 126,278 | 1.2 | 134,696 | 112,247 | 106,339 | 101,022 | 1.6 | 2 to 8 |
| 25 | 19 | 175,386 | 146,155 | 138,463 | 131,540 | 1.2 | 140,309 | 116,924 | 110,770 | 105,232 | 1.5 | 2 to 8 |
| 23 | 17 | 180,338 | 150,282 | 142,372 | 135,254 | 1.2 | 144,270 | 120,226 | 113,898 | 108,203 | 1.5 | 2 to 8 |
| 26 | 19 | 182,402 | 152,001 | 144,001 | 136,801 | 1.1 | 145,922 | 121,601 | 115,201 | 109,441 | 1.4 | 2 to 7 |
| 27 | 19 | 189,417 | 157,848 | 148,540 | 142,063 | 1.1 | 151,534 | 126,278 | 118,832 | 113,650 | 1.4 | 2 to 7 |
| 28 | 19 | 196,433 | 163,694 | 155,078 | 147,325 | 1.1 | 157,146 | 130,955 | 124,062 | 117,860 | 1.3 | 2 to 7 |
| 26 | 17 | 203,861 | 169,884 | 160,943 | 152,896 | 1.0 | 163,089 | 135,907 | 128,754 | 122,317 | 1.3 | 2 to 7 |
| 27 | 17 | 211,702 | 176,418 | 167,133 | 158,776 | 0.9 | 169,362 | 141,134 | 133,706 | 127,021 | 1.2 | 2 to 7 |
| 28 | 17 | 219,542 | 182,952 | 173,323 | 164,657 | 0.9 | 175,634 | 146,362 | 138,658 | 131,726 | 1.2 | 2 to 7 |

NOTE: See [“General Planting Rate Information” on page 4-1](#) and [“Check Seed Population” on page 2-22](#) for additional information.

NOTE: When using the Half Rate (2 to 1) Drive Reduction Package, rates will be approximately 50% of given numbers.

NOTE: Always check seed population in the field to ensure planting rates are correct.

**PLANTING RATES FOR BRUSH-TYPE SEED METERS (STANDARD DRIVE)
APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS**

| Transmission Sprockets | | 36 Cell Acid-Delinted Large Cotton | | | | Average Seed Spacing In Inches | 30 Cell Milo/Grain Sorghum Or Acid-Delinted Cotton | | | | Average Seed Spacing In Inches | Speed Range (MPH) |
|------------------------|--------|------------------------------------|----------|----------|----------|--------------------------------|--|----------|----------|----------|--------------------------------|-------------------|
| Drive | Driven | 30" Rows | 36" Rows | 38" Rows | 40" Rows | | 30" Rows | 36" Rows | 38" Rows | 40" Rows | | |
| 17 | 28 | 48,557 | 40,464 | 38,335 | 36,418 | 4.3 | 40,464 | 33,720 | 31,945 | 30,348 | 5.2 | 2 to 8 |
| 17 | 27 | 50,356 | 41,963 | 39,754 | 37,766 | 4.2 | 41,963 | 34,969 | 33,129 | 31,472 | 5.0 | 2 to 8 |
| 17 | 26 | 52,292 | 43,577 | 41,283 | 39,219 | 4.0 | 43,577 | 36,314 | 34,403 | 32,683 | 4.8 | 2 to 8 |
| 19 | 28 | 54,269 | 45,224 | 42,844 | 40,702 | 3.9 | 45,225 | 37,687 | 35,704 | 33,918 | 4.6 | 2 to 8 |
| 19 | 27 | 56,279 | 46,900 | 44,431 | 42,209 | 3.7 | 46,900 | 39,083 | 37,026 | 35,175 | 4.5 | 2 to 8 |
| 17 | 24 | 56,650 | 47,208 | 44,723 | 42,487 | 3.7 | 47,208 | 39,340 | 37,270 | 35,406 | 4.4 | 2 to 8 |
| 17 | 23 | 59,113 | 49,261 | 46,668 | 44,335 | 3.5 | 49,261 | 41,051 | 38,890 | 36,946 | 4.2 | 2 to 8 |
| 19 | 25 | 60,782 | 50,651 | 47,986 | 45,586 | 3.5 | 50,652 | 42,210 | 39,988 | 37,989 | 4.1 | 2 to 8 |
| 19 | 24 | 63,314 | 52,762 | 49,985 | 47,486 | 3.3 | 52,762 | 43,968 | 41,654 | 39,572 | 4.0 | 2 to 8 |
| 23 | 28 | 65,695 | 54,746 | 51,864 | 49,271 | 3.2 | 54,746 | 45,621 | 43,220 | 41,059 | 3.8 | 2 to 8 |
| 19 | 23 | 66,067 | 55,056 | 52,159 | 49,550 | 3.2 | 55,056 | 45,880 | 43,465 | 41,292 | 3.8 | 2 to 8 |
| 24 | 28 | 68,551 | 57,126 | 54,119 | 51,413 | 3.0 | 57,126 | 47,605 | 45,099 | 42,844 | 3.7 | 2 to 8 |
| 24 | 27 | 71,090 | 59,242 | 56,123 | 53,317 | 2.9 | 59,242 | 49,368 | 46,770 | 44,431 | 3.5 | 2 to 8 |
| 17 | 19 | 71,558 | 59,632 | 56,493 | 53,668 | 2.9 | 59,631 | 49,693 | 47,077 | 44,724 | 3.5 | 2 to 8 |
| 24 | 26 | 73,824 | 61,520 | 58,282 | 55,368 | 2.8 | 61,520 | 51,267 | 48,569 | 46,140 | 3.4 | 2 to 8 |
| 26 | 28 | 74,264 | 61,886 | 58,629 | 55,697 | 2.8 | 61,886 | 51,572 | 48,858 | 46,415 | 3.4 | 2 to 8 |
| 24 | 25 | 76,772 | 63,981 | 60,614 | 57,583 | 2.7 | 63,981 | 53,317 | 50,511 | 47,986 | 3.3 | 2 to 8 |
| 26 | 27 | 77,014 | 64,178 | 60,800 | 57,761 | 2.7 | 64,178 | 53,482 | 50,667 | 48,134 | 3.3 | 2 to 8 |
| 23 | 23 | 79,976 | 66,647 | 63,139 | 59,982 | 2.6 | 66,647 | 55,539 | 52,616 | 49,985 | 3.1 | 2 to 8 |
| 27 | 26 | 83,052 | 69,210 | 65,567 | 62,289 | 2.5 | 69,210 | 57,675 | 54,640 | 51,908 | 3.0 | 2 to 8 |
| 24 | 23 | 83,453 | 69,544 | 65,884 | 62,590 | 2.5 | 69,544 | 57,954 | 54,904 | 52,158 | 3.0 | 2 to 8 |
| 25 | 23 | 86,930 | 72,442 | 68,629 | 65,198 | 2.4 | 72,442 | 60,368 | 57,191 | 54,332 | 2.9 | 2 to 8 |
| 19 | 17 | 89,385 | 74,488 | 70,567 | 67,039 | 2.3 | 74,488 | 62,073 | 58,809 | 55,866 | 2.8 | 2 to 8 |
| 27 | 24 | 89,973 | 74,978 | 71,032 | 67,480 | 2.3 | 74,978 | 62,481 | 59,193 | 56,233 | 2.8 | 2 to 8 |
| 28 | 24 | 93,305 | 77,755 | 73,662 | 69,979 | 2.2 | 77,755 | 64,796 | 61,385 | 58,316 | 2.7 | 2 to 8 |
| 23 | 19 | 96,813 | 80,678 | 76,432 | 72,610 | 2.2 | 80,678 | 67,231 | 63,693 | 60,508 | 2.6 | 2 to 8 |
| 28 | 23 | 97,362 | 81,135 | 76,864 | 73,022 | 2.1 | 81,135 | 67,613 | 64,054 | 60,851 | 2.6 | 2 to 8 |
| 24 | 19 | 101,023 | 84,185 | 79,754 | 75,767 | 2.1 | 84,185 | 70,155 | 66,462 | 63,139 | 2.5 | 2 to 8 |
| 25 | 19 | 105,232 | 87,693 | 83,078 | 78,924 | 2.0 | 87,693 | 73,078 | 69,231 | 65,770 | 2.4 | 2 to 8 |
| 23 | 17 | 108,233 | 90,169 | 85,423 | 81,152 | 1.9 | 90,169 | 75,141 | 71,186 | 67,627 | 2.3 | 2 to 8 |
| 26 | 19 | 109,441 | 91,201 | 86,401 | 82,081 | 1.9 | 91,201 | 76,001 | 72,001 | 68,401 | 2.3 | 2 to 7 |
| 27 | 19 | 113,650 | 94,709 | 89,124 | 85,238 | 1.8 | 94,709 | 78,924 | 74,770 | 71,031 | 2.2 | 2 to 7 |
| 28 | 19 | 117,860 | 98,216 | 93,047 | 88,395 | 1.8 | 98,216 | 81,847 | 77,539 | 73,662 | 2.1 | 2 to 7 |
| 26 | 17 | 122,317 | 101,930 | 96,566 | 91,738 | 1.7 | 101,930 | 84,942 | 80,471 | 76,448 | 2.1 | 2 to 7 |
| 27 | 17 | 127,021 | 105,851 | 100,280 | 95,266 | 1.6 | 105,851 | 88,209 | 83,566 | 79,388 | 2.0 | 2 to 7 |
| 28 | 17 | 131,725 | 109,771 | 103,994 | 98,794 | 1.6 | 109,771 | 91,476 | 86,661 | 82,328 | 1.9 | 2 to 7 |

NOTE: See ["General Planting Rate Information"](#) on page 4-1 and ["Check Seed Population"](#) on page 2-22 for additional information.

NOTE: When using the Half Rate (2 to 1) Drive Reduction Package, rates will be approximately 50% of given numbers.

NOTE: Always check seed population in the field to ensure planting rates are correct.

**PLANTING RATES FOR BRUSH-TYPE SEED METERS (STANDARD DRIVE)
APPROXIMATE HILLS/ACRE FOR VARIOUS ROW WIDTHS**

Due to variations in cotton seed size, meters equipped with 12 cell acid-delinted hill-drop cotton discs will plant from 3 to 6 seeds per cell. Select proper disc for seed size range to be planted.

To determine planter transmission setting, determine desired hill spacing and select the transmission ratio closest to the hill spacing in inches on the chart. To decrease population increase spacing. To increase population decrease spacing.

To determine population per acre, determine average seeds per hill and hills per acre by doing a field check. Measure $\frac{1}{1000}$ of an acre ($\frac{1}{1000}$ acre = Length of row 17' 5" for 30" row widths, 13' 10" for 38" row widths and 13' 1" for 40" row widths). Multiply average seeds per hill by hills per acre. EXAMPLE: 4 seeds per hill x (13 hills x 1000) = 52,000

| Transmission Sprockets Drive Driven | | NUMBER OF HILLS PER ACRE 12 Cell Hill-Drop Cotton, Acid-Delinted | | | | Average Hill Spacing in Inches | Speed Range (MPH) |
|-------------------------------------|----|---|----------|----------|----------|--------------------------------|-------------------|
| | | 30" Rows | 36" Rows | 38" Rows | 40" Rows | | |
| 17 | 28 | 16,186 | 13,488 | 12,778 | 12,139 | 12.9 | 2 to 8 |
| 17 | 27 | 16,785 | 13,988 | 13,251 | 12,588 | 12.5 | 2 to 8 |
| 17 | 26 | 17,431 | 14,526 | 13,761 | 13,073 | 12.0 | 2 to 8 |
| 19 | 28 | 18,090 | 15,075 | 14,281 | 13,568 | 11.6 | 2 to 8 |
| 19 | 27 | 18,760 | 15,633 | 14,810 | 14,070 | 11.1 | 2 to 8 |
| 17 | 24 | 18,883 | 15,736 | 14,908 | 14,163 | 11.1 | 2 to 8 |
| 17 | 23 | 19,704 | 16,420 | 15,556 | 14,778 | 10.6 | 2 to 8 |
| 19 | 25 | 20,261 | 16,884 | 15,995 | 15,196 | 10.3 | 2 to 8 |
| 19 | 24 | 21,105 | 17,587 | 16,662 | 15,829 | 9.9 | 2 to 8 |
| 23 | 28 | 21,898 | 18,249 | 17,288 | 16,424 | 9.5 | 2 to 8 |
| 19 | 23 | 22,022 | 18,352 | 17,386 | 16,517 | 9.5 | 2 to 8 |
| 24 | 28 | 22,850 | 19,042 | 18,040 | 17,138 | 9.2 | 2 to 8 |
| 24 | 27 | 23,697 | 19,747 | 18,708 | 17,773 | 8.8 | 2 to 8 |
| 17 | 19 | 23,853 | 19,877 | 18,831 | 17,890 | 8.8 | 2 to 8 |
| 24 | 26 | 24,608 | 20,507 | 19,427 | 18,456 | 8.5 | 2 to 8 |
| 26 | 28 | 24,755 | 20,629 | 19,543 | 18,566 | 8.4 | 2 to 8 |
| 24 | 25 | 25,592 | 21,327 | 20,205 | 19,194 | 8.2 | 2 to 8 |
| 26 | 27 | 25,671 | 21,393 | 20,267 | 19,254 | 8.1 | 2 to 8 |
| 23 | 23 | 26,659 | 22,216 | 21,046 | 19,994 | 7.8 | 2 to 8 |
| 27 | 26 | 27,684 | 23,070 | 21,856 | 20,763 | 7.6 | 2 to 8 |
| 24 | 23 | 27,818 | 23,181 | 21,961 | 20,864 | 7.5 | 2 to 8 |
| 25 | 23 | 28,977 | 24,147 | 22,876 | 21,733 | 7.2 | 2 to 8 |
| 19 | 17 | 29,795 | 24,829 | 23,522 | 22,346 | 7.0 | 2 to 8 |
| 27 | 24 | 29,991 | 24,993 | 23,677 | 22,493 | 7.0 | 2 to 8 |
| 28 | 24 | 31,102 | 25,918 | 24,554 | 23,327 | 6.7 | 2 to 8 |
| 23 | 19 | 32,271 | 26,893 | 25,477 | 24,204 | 6.5 | 2 to 8 |
| 28 | 23 | 32,454 | 27,045 | 25,622 | 24,408 | 6.5 | 2 to 8 |
| 24 | 19 | 33,674 | 28,062 | 26,585 | 25,256 | 6.2 | 2 to 8 |
| 25 | 19 | 35,077 | 29,231 | 27,693 | 26,308 | 6.0 | 2 to 8 |
| 23 | 17 | 36,068 | 30,056 | 28,474 | 27,051 | 5.8 | 2 to 8 |
| 26 | 19 | 36,480 | 30,400 | 28,800 | 27,360 | 5.7 | 2 to 7 |
| 27 | 19 | 37,883 | 31,570 | 29,908 | 28,413 | 5.5 | 2 to 7 |
| 28 | 19 | 39,287 | 32,739 | 31,016 | 29,465 | 5.3 | 2 to 7 |
| 26 | 17 | 40,772 | 33,977 | 32,189 | 30,579 | 5.1 | 2 to 7 |
| 27 | 17 | 42,340 | 35,284 | 33,427 | 31,755 | 4.9 | 2 to 7 |
| 28 | 17 | 43,908 | 36,590 | 34,665 | 32,932 | 4.8 | 2 to 7 |

NOTE: See ["General Planting Rate Information"](#) on page 4-1 and ["Check Seed Population"](#) on page 2-22 pages for additional information.

NOTE: When using the Half Rate (2 to 1) Drive Reduction Package, rates will be approximately 50% of given numbers.

NOTE: Always check seed population in the field to ensure planting rates are correct.

**PLANTING RATES FOR BRUSH-TYPE SEED METERS (STANDARD DRIVE)
APPROXIMATE SEEDS/ACRE FOR 15"/18"/19"/30"/36"/38" ROW WIDTHS**

| Transmission Sprockets | | 54 Cell Soybean | | | | | | Average Seed Spacing In Inches | Speed Range (MPH) |
|------------------------|--------|-----------------------|----------|----------|----------|----------|----------|--------------------------------|-------------------|
| Drive | Driven | 7.5" Rows or 15" Rows | 18" Rows | 19" Rows | 30" Rows | 36" Rows | 38" Rows | | |
| 15 | 28 | 128,529 | 107,107 | 101,470 | 64,264 | 53,554 | 50,735 | 3.3 | 2 to 8 |
| 15 | 27 | 133,289 | 111,074 | 105,228 | 66,644 | 55,537 | 52,614 | 3.1 | 2 to 8 |
| 15 | 26 | 138,415 | 115,346 | 109,275 | 69,208 | 57,673 | 54,638 | 3 | 2 to 8 |
| 15 | 25 | 143,952 | 119,960 | 113,646 | 71,976 | 59,980 | 56,823 | 2.9 | 2 to 8 |
| 17 | 28 | 145,666 | 121,388 | 114,999 | 72,833 | 60,694 | 57,500 | 2.9 | 2 to 8 |
| 17 | 27 | 151,061 | 125,884 | 119,258 | 75,530 | 62,942 | 59,629 | 2.8 | 2 to 8 |
| 17 | 26 | 156,871 | 130,726 | 123,845 | 78,435 | 65,363 | 61,923 | 2.7 | 2 to 8 |
| 19 | 28 | 162,803 | 135,669 | 128,529 | 81,401 | 67,835 | 64,264 | 2.6 | 2 to 8 |
| 19 | 27 | 168,833 | 140,694 | 133,289 | 84,416 | 70,347 | 66,644 | 2.5 | 2 to 8 |
| 17 | 24 | 169,943 | 141,619 | 134,166 | 84,972 | 70,810 | 67,083 | 2.5 | 2 to 8 |
| 17 | 23 | 177,332 | 147,777 | 139,999 | 88,666 | 73,888 | 70,000 | 2.4 | 2 to 8 |
| 19 | 25 | 182,339 | 151,949 | 143,952 | 91,170 | 75,975 | 71,976 | 2.3 | 2 to 8 |
| 19 | 24 | 189,937 | 158,281 | 149,950 | 94,968 | 79,140 | 74,975 | 2.2 | 2 to 8 |
| 23 | 28 | 197,077 | 164,231 | 155,587 | 98,539 | 82,115 | 77,794 | 2.1 | 2 to 8 |
| 19 | 23 | 198,195 | 165,162 | 156,470 | 99,097 | 82,581 | 78,235 | 2.1 | 2 to 8 |
| 24 | 28 | 205,646 | 171,371 | 162,352 | 102,823 | 85,686 | 81,176 | 2 | 2 to 8 |
| 24 | 27 | 213,262 | 177,718 | 168,365 | 106,631 | 88,859 | 84,182 | 2 | 2 to 8 |
| 17 | 19 | 214,665 | 178,888 | 169,473 | 107,333 | 89,444 | 84,736 | 1.9 | 2 to 8 |
| 24 | 26 | 221,465 | 184,554 | 174,840 | 110,732 | 92,277 | 87,420 | 1.9 | 2 to 8 |
| 26 | 28 | 222,783 | 185,652 | 175,881 | 111,391 | 92,826 | 87,941 | 1.9 | 2 to 8 |
| 24 | 25 | 230,323 | 191,936 | 181,834 | 115,162 | 95,968 | 90,917 | 1.8 | 2 to 8 |
| 26 | 27 | 231,034 | 192,528 | 182,395 | 115,517 | 96,264 | 91,198 | 1.8 | 2 to 8 |
| 23 | 23 | 239,920 | 199,933 | 189,410 | 119,960 | 99,967 | 94,705 | 1.7 | 2 to 8 |
| 27 | 26 | 249,148 | 207,623 | 196,695 | 124,574 | 103,812 | 98,348 | 1.7 | 2 to 8 |
| 24 | 23 | 250,351 | 208,626 | 197,646 | 125,176 | 104,313 | 98,823 | 1.7 | 2 to 8 |
| 25 | 23 | 260,783 | 217,319 | 205,881 | 130,391 | 108,659 | 102,940 | 1.6 | 2 to 8 |
| 19 | 17 | 268,146 | 223,455 | 211,694 | 134,073 | 111,727 | 105,847 | 1.6 | 2 to 8 |
| 27 | 24 | 269,910 | 224,925 | 213,087 | 134,955 | 112,462 | 106,543 | 1.5 | 2 to 8 |
| 28 | 24 | 279,907 | 233,255 | 220,979 | 139,953 | 116,628 | 110,489 | 1.5 | 2 to 8 |
| 23 | 19 | 290,429 | 242,024 | 229,286 | 145,215 | 121,012 | 114,643 | 1.4 | 2 to 8 |
| 28 | 23 | 292,076 | 243,397 | 230,587 | 146,038 | 121,699 | 115,293 | 1.4 | 2 to 8 |
| 24 | 19 | 303,057 | 252,547 | 239,255 | 151,528 | 126,274 | 119,628 | 1.4 | 2 to 8 |
| 25 | 19 | 315,684 | 263,070 | 249,224 | 157,842 | 131,535 | 124,612 | 1.3 | 2 to 8 |
| 23 | 17 | 324,598 | 270,498 | 256,261 | 162,299 | 135,249 | 128,131 | 1.3 | 2 to 8 |
| 26 | 19 | 328,311 | 273,593 | 259,193 | 164,156 | 136,796 | 129,597 | 1.3 | 2 to 8 |
| 27 | 19 | 340,939 | 284,116 | 269,162 | 170,469 | 142,058 | 134,581 | 1.2 | 2 to 8 |
| 28 | 19 | 353,566 | 294,639 | 279,131 | 176,783 | 147,319 | 139,566 | 1.2 | 2 to 8 |
| 26 | 17 | 366,936 | 305,780 | 289,687 | 183,468 | 152,890 | 144,843 | 1.1 | 2 to 8 |
| 27 | 17 | 381,049 | 317,541 | 300,828 | 190,525 | 158,771 | 150,414 | 1.1 | 2 to 8 |
| 28 | 17 | 395,162 | 329,302 | 311,970 | 197,581 | 164,651 | 155,985 | 1.1 | 2 to 8 |

NOTE: See ["General Planting Rate Information" on page 4-1](#) and ["Check Seed Population" on page 2-22](#) for additional information.

NOTE: When using Half Rate (2 To 1) Drive Reduction Package, rates are approximately 50% of given numbers.

NOTE: Always field check seed population to ensure planting rates are correct.

**PLANTING RATES FOR BRUSH-TYPE SEED METERS (HALF RATE DRIVE)
APPROXIMATE SEEDS/ACRE FOR 15" ROW WIDTH**

| Transmission Sprockets | | Population Factor | Rye 400 SDS/REV, 35.9 SDS/GRAM | | Wheat 465 SDS/REV, 39.6 SDS/GRAM | | Speed Range (MPH) |
|------------------------|--------|-------------------|-----------------------------------|-----------------------|-------------------------------------|-----------------------|-------------------|
| Drive | Driven | | Population (sds/acre) | Population (lbs/acre) | Population (sds/acre) | Population (lbs/acre) | |
| 15 | 28 | 1190.12 | 476,159 | 29 | 553,656 | 31 | 4 to 6 |
| 15 | 27 | 1234.20 | 493,795 | 30 | 574,163 | 32 | 4 to 6 |
| 15 | 26 | 1281.67 | 512,787 | 32 | 596,245 | 33 | 4 to 6 |
| 15 | 25 | 1332.94 | 533,298 | 33 | 620,095 | 35 | 4 to 6 |
| 17 | 28 | 1348.80 | 539,647 | 33 | 627,477 | 35 | 4 to 6 |
| 15 | 24 | 1388.48 | 555,519 | 34 | 645,932 | 36 | 4 to 6 |
| 17 | 27 | 1398.76 | 559,634 | 34 | 650,718 | 36 | 4 to 6 |
| 15 | 23 | 1448.84 | 579,672 | 36 | 674,017 | 38 | 4 to 6 |
| 17 | 26 | 1452.56 | 581,158 | 36 | 675,745 | 38 | 4 to 6 |
| 19 | 28 | 1507.49 | 603,134 | 37 | 701,298 | 39 | 4 to 6 |
| 17 | 25 | 1510.66 | 604,405 | 37 | 702,775 | 39 | 4 to 6 |
| 19 | 27 | 1563.32 | 625,473 | 38 | 727,272 | 41 | 4 to 6 |
| 17 | 24 | 1573.60 | 629,588 | 39 | 732,056 | 41 | 4 to 6 |
| 19 | 26 | 1623.45 | 649,530 | 40 | 755,244 | 42 | 4 to 6 |
| 17 | 23 | 1642.02 | 656,961 | 40 | 763,885 | 43 | 4 to 6 |
| 19 | 25 | 1688.39 | 675,511 | 42 | 785,454 | 44 | 4 to 6 |
| 15 | 19 | 1753.86 | 701,708 | 43 | 815,915 | 45 | 4 to 6 |
| 19 | 24 | 1758.74 | 703,658 | 43 | 818,181 | 46 | 4 to 6 |
| 23 | 28 | 1824.85 | 730,111 | 45 | 848,940 | 47 | 4 to 6 |
| 19 | 23 | 1835.20 | 734,251 | 45 | 853,754 | 48 | 4 to 6 |
| 23 | 27 | 1892.44 | 757,152 | 47 | 880,382 | 49 | 4 to 6 |
| 24 | 28 | 1904.19 | 761,855 | 47 | 885,850 | 49 | 4 to 6 |
| 15 | 17 | 1960.20 | 784,262 | 48 | 911,905 | 51 | 4 to 6 |
| 23 | 26 | 1965.23 | 786,273 | 48 | 914,242 | 51 | 4 to 6 |
| 24 | 27 | 1974.72 | 790,071 | 49 | 918,660 | 51 | 4 to 6 |
| 25 | 28 | 1983.54 | 793,598 | 49 | 922,761 | 51 | 4 to 6 |
| 17 | 19 | 1987.71 | 795,269 | 49 | 924,703 | 52 | 4 to 6 |
| 23 | 25 | 2043.84 | 817,724 | 50 | 950,813 | 53 | 4 to 6 |
| 24 | 26 | 2050.67 | 820,459 | 50 | 953,993 | 53 | 4 to 6 |
| 25 | 27 | 2057.00 | 822,991 | 51 | 956,937 | 53 | 4 to 6 |
| 26 | 28 | 2062.88 | 825,342 | 51 | 959,671 | 53 | 4 to 6 |
| 23 | 24 | 2128.99 | 851,795 | 52 | 990,429 | 55 | 4 to 6 |
| 24 | 25 | 2132.70 | 853,277 | 52 | 992,152 | 55 | 4 to 6 |
| 25 | 26 | 2136.11 | 854,644 | 53 | 993,742 | 55 | 4 to 6 |
| 26 | 27 | 2139.28 | 855,911 | 53 | 995,215 | 55 | 4 to 6 |
| 27 | 28 | 2142.22 | 857,087 | 53 | 996,582 | 56 | 4 to 6 |
| 15 | 15 | 2221.56 | 888,830 | 55 | 1,033,492 | 58 | 4 to 6 |
| 28 | 27 | 2303.84 | 921,750 | 57 | 1,071,769 | 60 | 4 to 6 |
| 27 | 26 | 2307.01 | 923,016 | 57 | 1,073,242 | 60 | 4 to 6 |
| 26 | 25 | 2310.42 | 924,384 | 57 | 1,074,832 | 60 | 4 to 6 |
| 25 | 24 | 2314.13 | 925,865 | 57 | 1,076,554 | 60 | 4 to 6 |
| 24 | 23 | 2318.15 | 927,475 | 57 | 1,078,426 | 60 | 4 to 6 |
| 28 | 26 | 2392.45 | 957,202 | 59 | 1,112,991 | 62 | 4 to 6 |
| 27 | 25 | 2399.28 | 959,937 | 59 | 1,116,171 | 62 | 4 to 6 |
| 26 | 24 | 2406.69 | 962,899 | 59 | 1,119,616 | 62 | 4 to 6 |

Continued on the next page.

**PLANTING RATES FOR BRUSH-TYPE SEED METERS (HALF RATE DRIVE)
APPROXIMATE SEEDS/ACRE FOR 15" ROW WIDTH**

| Transmission Sprockets | | Population Factor | Rye 400 SDS/REV, 35.9 SDS/GRAM | | Wheat 465 SDS/REV, 39.6 SDS/GRAM | | Speed Range (MPH) |
|------------------------|--------|-------------------|-----------------------------------|-----------------------|-------------------------------------|-----------------------|-------------------|
| Drive | Driven | | Population (sds/acre) | Population (lbs/acre) | Population (sds/acre) | Population (lbs/acre) | |
| 25 | 23 | 2414.74 | 966,120 | 59 | 1,123,361 | 63 | 4 to 6 |
| 19 | 17 | 2482.92 | 993,399 | 61 | 1,155,079 | 64 | 4 to 6 |
| 28 | 25 | 2488.15 | 995,490 | 61 | 1,157,511 | 64 | 4 to 6 |
| 27 | 24 | 2499.26 | 999,934 | 61 | 1,162,678 | 65 | 4 to 6 |
| 26 | 23 | 2511.33 | 1,004,765 | 62 | 1,168,295 | 65 | 4 to 6 |
| 17 | 15 | 2517.77 | 1,007,341 | 62 | 1,171,291 | 65 | 4 to 6 |
| 28 | 24 | 2591.82 | 1,036,969 | 64 | 1,205,741 | 67 | 4 to 6 |
| 27 | 23 | 2607.92 | 1,043,409 | 64 | 1,213,230 | 68 | 4 to 6 |
| 23 | 19 | 2689.26 | 1,075,952 | 66 | 1,251,069 | 70 | 4 to 6 |
| 28 | 23 | 2704.51 | 1,082,054 | 67 | 1,258,164 | 70 | 4 to 6 |
| 24 | 19 | 2806.18 | 1,122,733 | 69 | 1,305,464 | 73 | 4 to 6 |
| 19 | 15 | 2813.98 | 1,125,852 | 69 | 1,309,090 | 73 | 4 to 6 |
| 25 | 19 | 2923.10 | 1,169,513 | 72 | 1,359,857 | 76 | 4 to 6 |
| 23 | 17 | 3005.64 | 1,202,535 | 74 | 1,398,254 | 78 | 4 to 6 |
| 26 | 19 | 3040.03 | 1,216,294 | 75 | 1,414,252 | 79 | 4 to 6 |
| 24 | 17 | 3136.32 | 1,254,820 | 77 | 1,459,048 | 81 | 4 to 6 |
| 27 | 19 | 3156.95 | 1,263,075 | 78 | 1,468,647 | 82 | 4 to 6 |
| 25 | 17 | 3267.00 | 1,307,103 | 80 | 1,519,841 | 85 | 4 to 6 |
| 28 | 19 | 3273.88 | 1,309,855 | 81 | 1,523,041 | 85 | 4 to 6 |
| 26 | 17 | 3397.68 | 1,359,388 | 84 | 1,580,635 | 88 | 4 to 6 |
| 23 | 15 | 3406.39 | 1,362,873 | 84 | 1,584,687 | 88 | 4 to 6 |
| 27 | 17 | 3528.36 | 1,411,671 | 87 | 1,641,428 | 91 | 4 to 6 |
| 24 | 15 | 3554.50 | 1,422,128 | 87 | 1,653,587 | 92 | 4 to 6 |
| 28 | 17 | 3659.04 | 1,463,956 | 90 | 1,702,222 | 95 | 4 to 6 |
| 25 | 15 | 3702.60 | 1,481,384 | 91 | 1,722,487 | 96 | 4 to 6 |
| 26 | 15 | 3850.70 | 1,540,639 | 95 | 1,791,386 | 100 | 4 to 6 |
| 27 | 15 | 3998.81 | 1,599,895 | 98 | 1,860,286 | 104 | 4 to 6 |
| 28 | 15 | 4146.91 | 1,659,150 | 102 | 1,929,185 | 107 | 4 to 6 |

NOTE: Seed size and type affect the output rate of the meter. For a method to improve the population accuracy with your desired seed, please see the following pages.

NOTE: See "Mechanical Meter" in ["General Planting Rate Information" on page 4-1](#) and ["Check Seed Population" on page 2-22](#) for additional information.

NOTE: When using Half Rate (2 To 1) Drive Reduction Package, rates are approximately 50% of given numbers.

NOTE: Always field check seed population to ensure planting rates are correct.

To more accurately predict population when using the 54 Cell Wheat disc, two things are needed:

1. Seeds/gram
2. Grams/revolution of seed disc

Seeds per gram can be found by weighing a small sample of desired seed (a cup or less) and counting number of seeds in sample.

$$\frac{\text{Seeds}}{\text{Grams}} = \frac{\text{number of seeds in sample}}{\text{weight of sample in grams}} \quad \frac{396 \text{ Seeds}}{10 \text{ Grams}} = 39.6 \frac{\text{seeds}}{\text{gram}}$$

To find grams/revolution a gram scale, a stopwatch, a small container to catch seed, and a method for spinning the meter at a constant, known rpm (see your local Kinze dealer with a T4000 Seed Meter Test Stand) are needed.

1. Zero gram scale with the small container on it.
2. Load meter with correct disc.
3. Load meter with desired seed.
4. Start spinning meter at a known, constant rpm.
5. Start stopwatch as you place container under meter.
6. Catch seed with container for 10-30 seconds.
7. Stop the stopwatch as you remove container from underneath meter.
8. Weigh container.
9. Enter meter rpm, weight of sample, and duration of sample collection into the equation below:

$$\frac{\text{Grams}}{\text{Rev}} = \frac{\text{Sample Weight} * 60}{\text{Disc RPM} * \text{Sample Duration}}$$

EX: For a sample taken for 30 seconds with meter spinning at 50rpm and weighs 293 grams

$$\frac{293 \text{ Grams} * 60}{50 \text{ RPM} * 30 \text{ Seconds}} = 11.7 \frac{\text{Grams}}{\text{Rev}}$$

10. Find desired output rate. For seeds per acre, use seeds/rev. For pounds per acre, use lbs/rev.

1. Seeds/rev:

$$\frac{\text{Seeds}}{\text{Rev}} = \frac{\text{Seeds}}{\text{Grams}} * \frac{\text{Grams}}{\text{Rev}} \quad \left| \quad 39.6 \frac{\text{Seeds}}{\text{Grams}} * 11.7 \frac{\text{Grams}}{\text{Rev}} = 465 \frac{\text{Seeds}}{\text{Rev}} \right.$$

2. Lbs./rev:

$$\frac{\text{Pounds}}{\text{Rev}} = \frac{\frac{\text{Grams}}{\text{Rev}}}{453.6 \frac{\text{Grams}}{\text{Pound}}} \quad \left| \quad \frac{11.7 \frac{\text{Grams}}{\text{Rev}}}{453.6 \frac{\text{Grams}}{\text{Pound}}} = 0.0258 \frac{\text{Pounds}}{\text{Rev}} \right.$$

11. Find the correct population factor by dividing the desired population by the measured output rate.

Seeds/acre:

$$\frac{\text{Target Population}}{\text{Output Rate}} = \text{Population Factor} \quad \left| \quad \frac{1,000,000 \frac{\text{Seeds}}{\text{Acre}}}{465 \frac{\text{Seeds}}{\text{Rev.}}} = 2150.54$$

pounds/acre:

$$\frac{\text{Target Population}}{\text{Output Rate}} = \text{Population Factor} \quad \left| \quad \frac{56 \frac{\text{lbs}}{\text{Acre}}}{0.0258 \frac{\text{lbs}}{\text{rev}}} = 2170.54$$

12. Find the closest Population Factor in the Rate Chart to identify the correct transmission sprockets. For the examples list above, the closest Population Factor is 2142.22 which corresponds to a 27 tooth Drive sprocket and 28 tooth Driven sprocket.

NOTE: Multiple trials are recommended to increase the accuracy of the predicted rate.

**PLANTING RATES FOR (VACUUM) CORN/POPCORN/SUNFLOWER 40 CELL DISC
15 TOOTH CONTACT WHEEL DRIVE SPROCKET
APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS**

| 30" Rows | 36" Rows | 38" Rows | 40" Rows | Transmission Sprockets | | Recomm. Speed (MPH) | Average Spacing in Inches |
|----------|----------|----------|----------|------------------------|--------|---------------------|---------------------------|
| | | | | Drive | Driven | | |
| 23,802 | 19,835 | 18,791 | 17,851 | 15 | 28 | 4 to 6 | 8.8 |
| 24,683 | 20,569 | 19,487 | 18,513 | 15 | 27 | 4 to 6 | 8.5 |
| 25,633 | 21,361 | 20,236 | 19,225 | 15 | 26 | 4 to 6 | 8.2 |
| 26,658 | 22,215 | 21,046 | 19,994 | 15 | 25 | 4 to 6 | 7.8 |
| 26,975 | 22,480 | 21,296 | 20,232 | 17 | 28 | 4 to 6 | 7.7 |
| 27,769 | 23,141 | 21,923 | 20,827 | 15 | 24 | 4 to 6 | 7.5 |
| 27,974 | 23,312 | 22,085 | 20,981 | 17 | 27 | 4 to 6 | 7.5 |
| 28,976 | 24,147 | 22,876 | 21,732 | 15 | 23 | 4 to 6 | 7.2 |
| 29,050 | 24,208 | 22,934 | 21,788 | 17 | 26 | 4 to 6 | 7.2 |
| 30,149 | 25,124 | 23,802 | 22,611 | 19 | 28 | 4 to 6 | 6.9 |
| 30,212 | 25,177 | 23,852 | 22,659 | 17 | 25 | 4 to 6 | 6.9 |
| 31,266 | 26,054 | 24,683 | 23,449 | 19 | 27 | 4 to 6 | 6.7 |
| 31,472 | 26,226 | 24,846 | 23,603 | 17 | 24 | 4 to 6 | 6.6 |
| 32,468 | 27,056 | 25,633 | 24,351 | 19 | 26 | 4 to 6 | 6.4 |
| 32,840 | 27,366 | 25,926 | 24,630 | 17 | 23 | 4 to 6 | 6.3 |
| 33,767 | 28,139 | 26,658 | 25,325 | 19 | 25 | 4 to 6 | 6.2 |
| 35,076 | 29,231 | 27,692 | 26,308 | 15 | 19 | 4 to 6 | 5.9 |
| 35,173 | 29,312 | 27,769 | 26,381 | 19 | 24 | 4 to 6 | 5.9 |
| 36,496 | 30,413 | 28,812 | 27,372 | 23 | 28 | 4 to 6 | 5.8 |
| 36,704 | 30,586 | 28,976 | 27,527 | 19 | 23 | 4 to 6 | 5.7 |
| 37,848 | 31,539 | 29,880 | 28,386 | 23 | 27 | 4 to 6 | 5.6 |
| 38,083 | 31,735 | 30,066 | 28,562 | 24 | 28 | 4 to 6 | 5.5 |
| 39,203 | 32,669 | 30,950 | 29,402 | 15 | 17 | 4 to 6 | 5.4 |
| 39,493 | 32,911 | 31,179 | 29,621 | 24 | 27 | 4 to 6 | 5.3 |
| 39,753 | 33,128 | 31,385 | 29,815 | 17 | 19 | 4 to 6 | 5.3 |
| 40,876 | 34,063 | 32,271 | 30,656 | 23 | 25 | 4 to 6 | 5.1 |
| 41,256 | 34,381 | 32,571 | 30,943 | 26 | 28 | 4 to 6 | 5.1 |
| 42,578 | 35,482 | 33,615 | 31,934 | 23 | 24 | 4 to 6 | 4.9 |
| 42,653 | 35,544 | 33,674 | 31,990 | 24 | 25 | 4 to 6 | 4.9 |
| 42,843 | 35,703 | 33,824 | 32,132 | 27 | 28 | 4 to 6 | 4.9 |
| 44,430 | 37,025 | 35,076 | 33,323 | 23 | 23 | 4 to 6 | 4.7 |
| 46,076 | 38,396 | 36,375 | 34,557 | 28 | 27 | 4 to 6 | 4.6 |
| 46,138 | 38,449 | 36,426 | 34,604 | 27 | 26 | 4 to 6 | 4.5 |
| 46,362 | 38,635 | 36,601 | 34,771 | 24 | 23 | 4 to 6 | 4.5 |
| 47,848 | 39,873 | 37,774 | 35,886 | 28 | 26 | 4 to 6 | 4.4 |
| 47,985 | 39,987 | 37,882 | 35,989 | 27 | 25 | 4 to 6 | 4.4 |
| 48,293 | 40,245 | 38,126 | 36,221 | 25 | 23 | 4 to 6 | 4.3 |
| 49,657 | 41,381 | 39,203 | 37,243 | 19 | 17 | 4 to 6 | 4.2 |
| 49,984 | 41,653 | 39,461 | 37,488 | 27 | 24 | 4 to 6 | 4.3 |
| 50,226 | 41,854 | 39,651 | 37,669 | 26 | 23 | 4 to 6 | 4.2 |
| 51,835 | 43,196 | 40,922 | 38,876 | 28 | 24 | 4 to 6 | 4.0 |
| 52,157 | 43,465 | 41,176 | 39,118 | 27 | 23 | 4 to 6 | 4.0 |
| 53,784 | 44,819 | 42,461 | 40,337 | 23 | 19 | 4 to 6 | 3.9 |
| 54,089 | 45,074 | 42,702 | 40,566 | 28 | 23 | 4 to 6 | 3.9 |
| 56,122 | 46,768 | 44,307 | 42,091 | 24 | 19 | 4 to 6 | 3.7 |
| 58,461 | 48,717 | 46,153 | 43,845 | 25 | 19 | 4 to 6 | 3.6 |
| 60,112 | 50,092 | 47,456 | 45,083 | 23 | 17 | 4 to 6 | 3.5 |
| 60,799 | 50,666 | 47,999 | 45,599 | 26 | 19 | 4 to 6 | 3.4 |
| 62,725 | 52,271 | 49,520 | 47,044 | 24 | 17 | 4 to 6 | 3.3 |
| 63,137 | 52,614 | 49,845 | 47,353 | 27 | 19 | 4 to 6 | 3.3 |
| 65,338 | 54,448 | 51,583 | 49,004 | 25 | 17 | 4 to 6 | 3.2 |
| 65,476 | 54,563 | 51,691 | 49,107 | 28 | 19 | 4 to 6 | 3.2 |
| 67,952 | 56,627 | 53,646 | 50,964 | 26 | 17 | 4 to 6 | 3.2 |
| 68,126 | 56,771 | 53,784 | 51,094 | 23 | 15 | 4 to 6 | 3.0 |
| 70,565 | 58,804 | 55,710 | 52,924 | 27 | 17 | 4 to 6 | 2.9 |

NOTE: See "General Planting Rate Information" on page 4-1 and "Check Seed Population" on page 2-22 for additional information. Always check seed population in the field to ensure planting rates are correct.

**PLANTING RATES FOR (VACUUM) CORN/POPCORN/SUNFLOWER 40 CELL DISC
19 TOOTH CONTACT WHEEL DRIVE SPROCKET
APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS**

| 30" Rows | 36" Rows | 38" Rows | 40" Rows | Transmission Sprockets | | Recomm. Speed (MPH) | Average Spacing In Inches |
|----------|----------|----------|----------|------------------------|--------|---------------------|---------------------------|
| | | | | Drive | Driven | | |
| 30,149 | 25,124 | 23,802 | 22,611 | 15 | 28 | 4 to 6 | 6.9 |
| 31,266 | 26,054 | 24,683 | 23,449 | 15 | 27 | 4 to 6 | 6.7 |
| 32,468 | 27,056 | 25,633 | 24,351 | 15 | 26 | 4 to 6 | 6.4 |
| 33,767 | 28,139 | 26,658 | 25,325 | 15 | 25 | 4 to 6 | 6.2 |
| 34,169 | 28,474 | 26,975 | 25,627 | 17 | 28 | 4 to 6 | 6.1 |
| 35,173 | 29,312 | 27,769 | 26,381 | 15 | 24 | 4 to 6 | 5.9 |
| 35,435 | 29,528 | 27,974 | 26,575 | 17 | 27 | 4 to 6 | 5.9 |
| 36,704 | 30,586 | 28,976 | 27,527 | 15 | 23 | 4 to 6 | 5.7 |
| 36,797 | 30,665 | 29,050 | 27,598 | 17 | 26 | 4 to 6 | 5.7 |
| 38,189 | 31,824 | 30,149 | 28,642 | 19 | 28 | 4 to 6 | 5.5 |
| 38,269 | 31,891 | 30,212 | 28,702 | 17 | 25 | 4 to 6 | 5.5 |
| 39,603 | 33,003 | 31,266 | 29,703 | 19 | 27 | 4 to 6 | 5.3 |
| 39,864 | 33,219 | 31,472 | 29,897 | 17 | 24 | 4 to 6 | 5.3 |
| 41,126 | 34,272 | 32,468 | 30,845 | 19 | 26 | 4 to 6 | 5.1 |
| 41,597 | 34,664 | 32,840 | 31,198 | 17 | 23 | 4 to 6 | 5.1 |
| 42,771 | 35,643 | 33,767 | 32,079 | 19 | 25 | 4 to 6 | 4.9 |
| 44,430 | 37,025 | 35,076 | 33,323 | 15 | 19 | 4 to 6 | 4.7 |
| 44,554 | 37,128 | 35,173 | 33,415 | 19 | 24 | 4 to 6 | 4.7 |
| 46,229 | 38,524 | 36,496 | 34,672 | 23 | 28 | 4 to 6 | 4.5 |
| 46,490 | 38,743 | 36,704 | 34,868 | 19 | 23 | 4 to 6 | 4.5 |
| 47,941 | 39,951 | 37,848 | 35,956 | 23 | 27 | 4 to 6 | 4.4 |
| 48,238 | 40,199 | 38,083 | 36,178 | 24 | 28 | 4 to 6 | 4.3 |
| 49,657 | 41,381 | 39,203 | 37,243 | 15 | 17 | 4 to 6 | 4.2 |
| 50,025 | 41,687 | 39,493 | 37,519 | 24 | 27 | 4 to 6 | 4.2 |
| 50,354 | 41,962 | 39,753 | 37,765 | 17 | 19 | 4 to 6 | 4.2 |
| 51,775 | 43,147 | 40,876 | 38,832 | 23 | 25 | 4 to 6 | 4.0 |
| 52,258 | 43,549 | 41,256 | 39,194 | 26 | 28 | 4 to 6 | 4.0 |
| 53,933 | 44,945 | 42,578 | 40,450 | 23 | 24 | 4 to 6 | 3.9 |
| 54,027 | 45,023 | 42,653 | 40,520 | 24 | 25 | 4 to 6 | 3.9 |
| 54,268 | 45,224 | 42,843 | 40,702 | 27 | 28 | 4 to 6 | 3.9 |
| 56,278 | 46,898 | 44,430 | 42,208 | 23 | 23 | 4 to 6 | 3.7 |
| 58,362 | 48,636 | 46,076 | 43,772 | 28 | 27 | 4 to 6 | 3.6 |
| 58,443 | 48,703 | 46,138 | 43,832 | 27 | 26 | 4 to 6 | 3.6 |
| 58,725 | 48,937 | 46,362 | 44,044 | 24 | 23 | 4 to 6 | 3.6 |
| 60,607 | 50,506 | 47,848 | 45,455 | 28 | 26 | 4 to 6 | 3.4 |
| 60,781 | 50,650 | 47,985 | 45,586 | 27 | 25 | 4 to 6 | 3.4 |
| 61,172 | 50,976 | 48,293 | 45,879 | 25 | 23 | 4 to 6 | 3.4 |
| 62,899 | 52,415 | 49,657 | 47,174 | 19 | 17 | 4 to 6 | 3.3 |
| 63,313 | 52,761 | 49,984 | 47,485 | 27 | 24 | 4 to 6 | 3.3 |
| 63,618 | 53,015 | 50,226 | 47,714 | 26 | 23 | 4 to 6 | 3.3 |
| 65,657 | 54,715 | 51,835 | 49,243 | 28 | 24 | 4 to 6 | 3.2 |
| 66,066 | 55,054 | 52,157 | 49,549 | 27 | 23 | 4 to 6 | 3.1 |
| 68,126 | 56,771 | 53,784 | 51,094 | 23 | 19 | 4 to 6 | 3.0 |
| 68,513 | 57,093 | 54,089 | 51,385 | 28 | 23 | 4 to 6 | 3.0 |
| 71,088 | 59,240 | 56,122 | 53,316 | 24 | 19 | 4 to 6 | 2.9 |
| 74,050 | 61,709 | 58,461 | 55,537 | 25 | 19 | 4 to 6 | 2.8 |
| 76,141 | 63,451 | 60,112 | 57,106 | 23 | 17 | 4 to 6 | 2.7 |
| 77,012 | 64,176 | 60,799 | 57,759 | 26 | 19 | 4 to 6 | 2.7 |
| 79,451 | 66,209 | 62,725 | 59,589 | 24 | 17 | 4 to 6 | 2.6 |
| 79,974 | 66,645 | 63,137 | 59,981 | 27 | 19 | 4 to 6 | 2.6 |
| 82,762 | 68,968 | 65,338 | 62,072 | 25 | 17 | 4 to 6 | 2.5 |
| 82,936 | 69,114 | 65,476 | 62,202 | 28 | 19 | 4 to 6 | 2.5 |
| 86,073 | 71,727 | 67,952 | 64,554 | 26 | 17 | 4 to 6 | 2.4 |
| 86,293 | 71,911 | 68,126 | 64,720 | 23 | 15 | 4 to 6 | 2.4 |
| 89,383 | 74,486 | 70,565 | 67,037 | 27 | 17 | 4 to 6 | 2.3 |

NOTE: See ["General Planting Rate Information"](#) on page 4-1 and ["Check Seed Population"](#) on page 2-22 for additional information. Always check seed population in the field to ensure planting rates are correct.

**PLANTING RATES FOR (VACUUM) MILO / SUGAR BEET / SPECIALTY / SOYBEANS 60 CELL DISCS
15 TOOTH CONTACT WHEEL DRIVE SPROCKET**

APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

| 30" Rows | 36" Rows | 38" Rows | 40" Rows | Transmission Sprockets | | Recomm. Speed (MPH) | Average Spacing in Inches |
|----------|----------|----------|----------|------------------------|--------|---------------------|---------------------------|
| | | | | Drive | Driven | | |
| 35,703 | 29,752 | 28,186 | 26,777 | 15 | 28 | 4 to 6 | 5.9 |
| 37,025 | 30,854 | 29,230 | 27,769 | 15 | 27 | 4 to 6 | 5.6 |
| 38,449 | 32,041 | 30,355 | 28,837 | 15 | 26 | 4 to 6 | 5.4 |
| 39,987 | 33,323 | 31,569 | 29,990 | 15 | 25 | 4 to 6 | 5.2 |
| 40,463 | 33,719 | 31,945 | 30,347 | 17 | 28 | 4 to 6 | 5.2 |
| 41,653 | 34,711 | 32,884 | 31,240 | 15 | 24 | 4 to 6 | 5.0 |
| 41,962 | 34,968 | 33,128 | 31,471 | 17 | 27 | 4 to 6 | 5.0 |
| 43,464 | 36,220 | 34,314 | 32,598 | 15 | 23 | 4 to 6 | 4.8 |
| 43,576 | 36,313 | 34,402 | 32,682 | 17 | 26 | 4 to 6 | 4.8 |
| 45,223 | 37,686 | 35,703 | 33,918 | 19 | 28 | 4 to 6 | 4.6 |
| 45,319 | 37,766 | 35,778 | 33,989 | 17 | 25 | 4 to 6 | 4.6 |
| 46,898 | 39,082 | 37,025 | 35,174 | 19 | 27 | 4 to 6 | 4.5 |
| 47,207 | 39,339 | 37,269 | 35,405 | 17 | 24 | 4 to 6 | 4.4 |
| 48,702 | 40,585 | 38,449 | 36,527 | 19 | 26 | 4 to 6 | 4.3 |
| 49,259 | 41,050 | 38,889 | 36,945 | 17 | 23 | 4 to 6 | 4.2 |
| 50,650 | 42,209 | 39,987 | 37,988 | 19 | 25 | 4 to 6 | 4.1 |
| 52,615 | 43,845 | 41,538 | 39,461 | 15 | 19 | 4 to 6 | 4.0 |
| 52,761 | 43,967 | 41,653 | 39,571 | 19 | 24 | 4 to 6 | 4.0 |
| 54,744 | 45,620 | 43,219 | 41,058 | 23 | 28 | 4 to 6 | 3.8 |
| 55,055 | 45,879 | 43,464 | 41,291 | 19 | 23 | 4 to 6 | 3.8 |
| 56,772 | 47,310 | 44,820 | 42,579 | 23 | 27 | 4 to 6 | 3.7 |
| 57,124 | 47,604 | 45,098 | 42,843 | 24 | 28 | 4 to 6 | 3.7 |
| 58,805 | 49,004 | 46,425 | 44,103 | 15 | 17 | 4 to 6 | 3.6 |
| 59,240 | 49,367 | 46,769 | 44,430 | 24 | 27 | 4 to 6 | 3.5 |
| 59,630 | 49,692 | 47,076 | 44,722 | 17 | 19 | 4 to 6 | 3.5 |
| 61,314 | 51,095 | 48,405 | 45,985 | 23 | 25 | 4 to 6 | 3.4 |
| 61,885 | 51,571 | 48,856 | 46,414 | 26 | 28 | 4 to 6 | 3.4 |
| 63,868 | 53,224 | 50,422 | 47,901 | 23 | 24 | 4 to 6 | 3.3 |
| 63,979 | 53,316 | 50,510 | 47,985 | 24 | 25 | 4 to 6 | 3.3 |
| 64,265 | 53,554 | 50,735 | 48,199 | 27 | 28 | 4 to 6 | 3.3 |
| 66,645 | 55,538 | 52,615 | 49,984 | 23 | 23 | 4 to 6 | 3.1 |
| 69,113 | 57,595 | 54,563 | 51,835 | 28 | 27 | 4 to 6 | 3.0 |
| 69,208 | 57,674 | 54,638 | 51,906 | 27 | 26 | 4 to 6 | 3.0 |
| 69,543 | 57,952 | 54,902 | 52,157 | 24 | 23 | 4 to 6 | 3.0 |
| 71,772 | 59,810 | 56,662 | 53,829 | 28 | 26 | 4 to 6 | 2.9 |
| 71,977 | 59,981 | 56,824 | 53,983 | 27 | 25 | 4 to 6 | 2.9 |
| 72,440 | 60,367 | 57,190 | 54,330 | 25 | 23 | 4 to 6 | 2.9 |
| 74,486 | 62,071 | 58,805 | 55,864 | 19 | 17 | 4 to 6 | 2.8 |
| 74,976 | 62,480 | 59,191 | 56,232 | 27 | 24 | 4 to 6 | 2.8 |
| 75,338 | 62,782 | 59,477 | 56,503 | 26 | 23 | 4 to 6 | 2.8 |
| 77,753 | 64,794 | 61,384 | 58,314 | 28 | 24 | 4 to 6 | 2.7 |
| 78,236 | 65,196 | 61,765 | 58,677 | 27 | 23 | 4 to 6 | 2.7 |
| 80,676 | 67,230 | 63,691 | 60,507 | 23 | 19 | 4 to 6 | 2.6 |
| 81,133 | 67,611 | 64,053 | 60,850 | 28 | 23 | 4 to 6 | 2.6 |
| 84,183 | 70,153 | 66,461 | 63,138 | 24 | 19 | 4 to 6 | 2.5 |
| 87,691 | 73,076 | 69,230 | 65,768 | 25 | 19 | 4 to 6 | 2.4 |
| 90,167 | 75,139 | 71,184 | 67,625 | 23 | 17 | 4 to 6 | 2.3 |
| 91,199 | 75,999 | 71,999 | 68,399 | 26 | 19 | 4 to 6 | 2.3 |
| 94,087 | 78,406 | 74,279 | 70,565 | 24 | 17 | 4 to 6 | 2.2 |
| 94,706 | 78,922 | 74,768 | 71,030 | 27 | 19 | 4 to 6 | 2.2 |
| 98,008 | 81,673 | 77,374 | 73,506 | 25 | 17 | 4 to 6 | 2.1 |
| 98,214 | 81,845 | 77,537 | 73,660 | 28 | 19 | 4 to 6 | 2.1 |
| 101,928 | 84,940 | 80,469 | 76,446 | 26 | 17 | 4 to 6 | 2.1 |
| 102,189 | 85,158 | 80,676 | 76,642 | 23 | 15 | 4 to 6 | 2.0 |
| 105,848 | 88,207 | 83,564 | 79,386 | 27 | 17 | 4 to 6 | 2.0 |

NOTE: See "General Planting Rate Information" on page 4-1 and "Check Seed Population" on page 2-22 additional information. Always check seed population in the field to ensure planting rates are correct.

**PLANTING RATES FOR (VACUUM) MILO / SUGAR BEET / SPECIALTY / SOYBEANS 60 CELL DISCS
19 TOOTH CONTACT WHEEL DRIVE SPROCKET
APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS**

| 30" Rows | 36" Rows | 38" Rows | 40" Rows | Transmission Sprockets | | Recomm. Speed (MPH) | Average Spacing in Inches |
|----------|----------|----------|----------|------------------------|--------|---------------------|---------------------------|
| | | | | Drive | Driven | | |
| 45,223 | 37,686 | 35,703 | 33,918 | 15 | 28 | 4 to 6 | 4.6 |
| 46,898 | 39,082 | 37,025 | 35,174 | 15 | 27 | 4 to 6 | 4.5 |
| 48,702 | 40,585 | 38,449 | 36,527 | 15 | 26 | 4 to 6 | 4.3 |
| 50,650 | 42,209 | 39,987 | 37,988 | 15 | 25 | 4 to 6 | 4.1 |
| 51,253 | 42,711 | 40,463 | 38,440 | 17 | 28 | 4 to 6 | 4.1 |
| 52,761 | 43,967 | 41,653 | 39,571 | 15 | 24 | 4 to 6 | 4.0 |
| 53,152 | 44,293 | 41,962 | 39,864 | 17 | 27 | 4 to 6 | 3.9 |
| 55,055 | 45,879 | 43,464 | 41,291 | 15 | 23 | 4 to 6 | 3.8 |
| 55,196 | 45,997 | 43,576 | 41,397 | 17 | 26 | 4 to 6 | 3.8 |
| 57,283 | 47,736 | 45,223 | 42,962 | 19 | 28 | 4 to 6 | 3.7 |
| 57,404 | 47,836 | 45,319 | 43,053 | 17 | 25 | 4 to 6 | 3.6 |
| 59,405 | 49,504 | 46,898 | 44,554 | 19 | 27 | 4 to 6 | 3.5 |
| 59,796 | 49,830 | 47,207 | 44,847 | 17 | 24 | 4 to 6 | 3.5 |
| 61,689 | 51,408 | 48,702 | 46,267 | 19 | 26 | 4 to 6 | 3.4 |
| 62,395 | 51,996 | 49,259 | 46,796 | 17 | 23 | 4 to 6 | 3.4 |
| 64,157 | 53,464 | 50,650 | 48,118 | 19 | 25 | 4 to 6 | 3.3 |
| 66,645 | 55,538 | 52,615 | 49,984 | 15 | 19 | 4 to 6 | 3.1 |
| 66,830 | 55,692 | 52,761 | 50,123 | 19 | 24 | 4 to 6 | 3.1 |
| 69,343 | 57,786 | 54,744 | 52,007 | 23 | 28 | 4 to 6 | 3.0 |
| 69,736 | 58,113 | 55,055 | 52,302 | 19 | 23 | 4 to 6 | 3.0 |
| 71,911 | 59,926 | 56,772 | 53,933 | 23 | 27 | 4 to 6 | 2.9 |
| 72,358 | 60,298 | 57,124 | 54,268 | 24 | 28 | 4 to 6 | 2.9 |
| 74,486 | 62,071 | 58,805 | 55,864 | 15 | 17 | 4 to 6 | 2.8 |
| 75,037 | 62,531 | 59,240 | 56,278 | 24 | 27 | 4 to 6 | 2.8 |
| 75,531 | 62,943 | 59,630 | 56,648 | 17 | 19 | 4 to 6 | 2.8 |
| 77,664 | 64,720 | 61,314 | 58,248 | 23 | 25 | 4 to 6 | 2.7 |
| 78,387 | 65,323 | 61,885 | 58,791 | 26 | 28 | 4 to 6 | 2.7 |
| 80,900 | 67,416 | 63,868 | 60,675 | 23 | 24 | 4 to 6 | 2.6 |
| 81,040 | 67,534 | 63,979 | 60,780 | 24 | 25 | 4 to 6 | 2.6 |
| 81,402 | 67,835 | 64,265 | 61,052 | 27 | 28 | 4 to 6 | 2.6 |
| 84,417 | 70,348 | 66,645 | 63,313 | 23 | 23 | 4 to 6 | 2.5 |
| 87,544 | 72,953 | 69,113 | 65,658 | 28 | 27 | 4 to 6 | 2.4 |
| 87,664 | 73,053 | 69,208 | 65,748 | 27 | 26 | 4 to 6 | 2.4 |
| 88,087 | 73,406 | 69,543 | 66,066 | 24 | 23 | 4 to 6 | 2.4 |
| 90,911 | 75,759 | 71,772 | 68,183 | 28 | 26 | 4 to 6 | 2.3 |
| 91,171 | 75,975 | 71,977 | 68,378 | 27 | 25 | 4 to 6 | 2.3 |
| 91,758 | 76,465 | 72,440 | 68,818 | 25 | 23 | 4 to 6 | 2.3 |
| 94,349 | 78,624 | 74,486 | 70,761 | 19 | 17 | 4 to 6 | 2.2 |
| 94,969 | 79,141 | 74,976 | 71,227 | 27 | 24 | 4 to 6 | 2.2 |
| 95,428 | 79,523 | 75,338 | 71,571 | 26 | 23 | 4 to 6 | 2.2 |
| 98,487 | 82,072 | 77,753 | 73,865 | 28 | 24 | 4 to 6 | 2.1 |
| 99,098 | 82,582 | 78,236 | 74,324 | 27 | 23 | 4 to 6 | 2.1 |
| 102,189 | 85,158 | 80,676 | 76,642 | 23 | 19 | 4 to 6 | 2.0 |
| 102,769 | 85,641 | 81,133 | 77,077 | 28 | 23 | 4 to 6 | 2.0 |
| 106,632 | 88,860 | 84,183 | 79,974 | 24 | 19 | 4 to 6 | 2.0 |
| 111,075 | 92,563 | 87,691 | 83,306 | 25 | 19 | 4 to 6 | 1.9 |
| 114,211 | 95,176 | 90,167 | 85,659 | 23 | 17 | 4 to 6 | 1.8 |
| 115,518 | 96,265 | 91,199 | 86,639 | 26 | 19 | 4 to 6 | 1.8 |
| 119,177 | 99,314 | 94,087 | 89,383 | 24 | 17 | 4 to 6 | 1.8 |
| 119,961 | 99,968 | 94,706 | 89,971 | 27 | 19 | 4 to 6 | 1.7 |
| 124,143 | 103,452 | 98,008 | 93,107 | 25 | 17 | 4 to 6 | 1.7 |
| 124,404 | 103,670 | 98,214 | 93,303 | 28 | 19 | 4 to 6 | 1.7 |
| 129,109 | 107,591 | 101,928 | 96,831 | 26 | 17 | 4 to 6 | 1.6 |
| 129,440 | 107,866 | 102,189 | 97,080 | 23 | 15 | 4 to 6 | 1.6 |
| 134,074 | 111,729 | 105,848 | 100,556 | 27 | 17 | 4 to 6 | 1.6 |

NOTE: See ["General Planting Rate Information" on page 4-1](#) and ["Check Seed Population" on page 2-22](#) for additional information. Always check seed population in the field to ensure planting rates are correct.

**PLANTING RATES FOR (VACUUM) SPECIALTY 60 CELL DISC
30 TOOTH CONTACT WHEEL DRIVE SPROCKET
APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS**

| 30" Rows | 36" Rows | 38" Rows | 40" Rows | Transmission Sprockets | | Recomm. Speed (MPH) | Average Spacing in Inches |
|----------|----------|----------|----------|------------------------|--------|---------------------|---------------------------|
| | | | | Drive | Driven | | |
| 71,406 | 59,505 | 56,373 | 53,554 | 15 | 28 | 4 to 6 | 2.9 |
| 74,050 | 61,708 | 58,461 | 55,538 | 15 | 27 | 4 to 6 | 2.8 |
| 76,898 | 64,082 | 60,709 | 57,674 | 15 | 26 | 4 to 6 | 2.7 |
| 79,974 | 66,645 | 63,138 | 59,981 | 15 | 25 | 4 to 6 | 2.6 |
| 80,926 | 67,439 | 63,889 | 60,695 | 17 | 28 | 4 to 6 | 2.6 |
| 83,306 | 69,422 | 65,768 | 62,480 | 15 | 24 | 4 to 6 | 2.5 |
| 83,924 | 69,936 | 66,255 | 62,943 | 17 | 27 | 4 to 6 | 2.5 |
| 86,928 | 72,440 | 68,628 | 65,196 | 15 | 23 | 4 to 6 | 2.4 |
| 87,151 | 72,626 | 68,804 | 65,364 | 17 | 26 | 4 to 6 | 2.4 |
| 90,447 | 75,372 | 71,406 | 67,835 | 19 | 28 | 4 to 6 | 2.3 |
| 90,637 | 75,531 | 71,556 | 67,978 | 17 | 25 | 4 to 6 | 2.3 |
| 93,797 | 78,164 | 74,050 | 70,348 | 19 | 27 | 4 to 6 | 2.2 |
| 94,414 | 78,678 | 74,537 | 70,810 | 17 | 24 | 4 to 6 | 2.2 |
| 97,404 | 81,170 | 76,898 | 73,053 | 19 | 26 | 4 to 6 | 2.1 |
| 98,519 | 82,099 | 77,778 | 73,889 | 17 | 23 | 4 to 6 | 2.1 |
| 101,301 | 84,417 | 79,974 | 75,975 | 19 | 25 | 4 to 6 | 2.1 |
| 105,229 | 87,691 | 83,076 | 78,922 | 15 | 19 | 4 to 6 | 2.0 |
| 105,521 | 87,935 | 83,306 | 79,141 | 19 | 24 | 4 to 6 | 2.0 |
| 109,488 | 91,240 | 86,438 | 82,116 | 23 | 28 | 4 to 6 | 1.9 |
| 110,109 | 91,758 | 86,928 | 82,582 | 19 | 23 | 4 to 6 | 1.9 |
| 113,544 | 94,620 | 89,640 | 85,158 | 23 | 27 | 4 to 6 | 1.8 |
| 114,249 | 95,207 | 90,196 | 85,687 | 24 | 28 | 4 to 6 | 1.8 |
| 117,609 | 98,008 | 92,849 | 88,207 | 15 | 17 | 4 to 6 | 1.8 |
| 118,480 | 98,734 | 93,537 | 88,860 | 24 | 27 | 4 to 6 | 1.8 |
| 119,260 | 99,383 | 94,152 | 89,445 | 17 | 19 | 4 to 6 | 1.8 |
| 122,627 | 102,189 | 96,811 | 91,970 | 23 | 25 | 4 to 6 | 1.7 |
| 123,770 | 103,141 | 97,713 | 92,827 | 26 | 28 | 4 to 6 | 1.7 |
| 127,737 | 106,447 | 100,845 | 95,802 | 23 | 24 | 4 to 6 | 1.6 |
| 127,959 | 106,632 | 101,020 | 95,969 | 24 | 25 | 4 to 6 | 1.6 |
| 128,530 | 107,108 | 101,471 | 96,397 | 27 | 28 | 4 to 6 | 1.6 |
| 133,290 | 111,075 | 105,229 | 99,968 | 23 | 23 | 4 to 6 | 1.6 |
| 138,227 | 115,189 | 109,127 | 103,670 | 28 | 27 | 4 to 6 | 1.5 |
| 138,417 | 115,347 | 109,276 | 103,813 | 27 | 26 | 4 to 6 | 1.5 |
| 139,086 | 115,905 | 109,804 | 104,314 | 24 | 23 | 4 to 6 | 1.5 |
| 143,543 | 119,619 | 113,324 | 107,658 | 28 | 26 | 4 to 6 | 1.5 |
| 143,954 | 119,961 | 113,648 | 107,965 | 27 | 25 | 4 to 6 | 1.5 |
| 144,881 | 120,734 | 114,380 | 108,661 | 25 | 23 | 4 to 6 | 1.4 |
| 148,971 | 124,143 | 117,609 | 111,729 | 19 | 17 | 4 to 6 | 1.4 |
| 149,952 | 124,960 | 118,383 | 112,464 | 27 | 24 | 4 to 6 | 1.4 |
| 150,676 | 125,563 | 118,955 | 113,007 | 26 | 23 | 4 to 6 | 1.4 |
| 155,505 | 129,588 | 122,767 | 116,629 | 28 | 24 | 4 to 6 | 1.3 |
| 156,471 | 130,393 | 123,530 | 117,353 | 27 | 23 | 4 to 6 | 1.3 |
| 161,351 | 134,459 | 127,383 | 121,014 | 23 | 19 | 4 to 6 | 1.3 |
| 162,266 | 135,222 | 128,105 | 121,700 | 28 | 23 | 4 to 6 | 1.3 |
| 168,367 | 140,306 | 132,921 | 126,275 | 24 | 19 | 4 to 6 | 1.2 |
| 175,382 | 146,152 | 138,459 | 131,536 | 25 | 19 | 4 to 6 | 1.2 |
| 180,334 | 150,278 | 142,369 | 135,250 | 23 | 17 | 4 to 6 | 1.2 |
| 182,397 | 151,998 | 143,998 | 136,798 | 26 | 19 | 4 to 6 | 1.1 |
| 188,175 | 156,812 | 148,559 | 141,131 | 24 | 17 | 4 to 6 | 1.1 |
| 189,413 | 157,844 | 149,536 | 142,059 | 27 | 19 | 4 to 6 | 1.1 |
| 196,015 | 163,346 | 154,749 | 147,011 | 25 | 17 | 4 to 6 | 1.1 |
| 196,428 | 163,690 | 155,075 | 147,321 | 28 | 19 | 4 to 6 | 1.1 |
| 203,856 | 169,880 | 160,939 | 152,892 | 26 | 17 | 4 to 6 | 1.0 |
| 204,378 | 170,315 | 161,351 | 153,284 | 23 | 15 | 4 to 6 | 1.0 |
| 211,696 | 176,414 | 167,129 | 158,772 | 27 | 17 | 4 to 6 | 1.0 |

NOTE: See ["General Planting Rate Information"](#) on page 4-1 and ["Check Seed Population"](#) on page 2-22 for additional information. Always check seed population in the field to ensure planting rates are correct.

**PLANTING RATES FOR (VACUUM) SOYBEAN 120 CELL DISC
15 TOOTH CONTACT WHEEL DRIVE SPROCKET
APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS**

| 30" Rows | 36" Rows | 38" Rows | 40" Rows | Transmission Sprockets | | Recomm. Speed (MPH) | Average Spacing in Inches |
|----------|----------|----------|----------|------------------------|--------|---------------------|---------------------------|
| | | | | Drive | Driven | | |
| 71,406 | 59,505 | 56,373 | 53,554 | 15 | 28 | 4 to 6 | 2.9 |
| 74,050 | 61,708 | 58,461 | 55,538 | 15 | 27 | 4 to 6 | 2.8 |
| 76,898 | 64,082 | 60,709 | 57,674 | 15 | 26 | 4 to 6 | 2.7 |
| 79,974 | 66,645 | 63,138 | 59,981 | 15 | 25 | 4 to 6 | 2.6 |
| 80,926 | 67,439 | 63,889 | 60,695 | 17 | 28 | 4 to 6 | 2.6 |
| 83,306 | 69,422 | 65,768 | 62,480 | 15 | 24 | 4 to 6 | 2.5 |
| 83,924 | 69,936 | 66,255 | 62,943 | 17 | 27 | 4 to 6 | 2.5 |
| 86,928 | 72,440 | 68,628 | 65,196 | 15 | 23 | 4 to 6 | 2.4 |
| 87,151 | 72,626 | 68,804 | 65,364 | 17 | 26 | 4 to 6 | 2.4 |
| 90,447 | 75,372 | 71,406 | 67,835 | 19 | 28 | 4 to 6 | 2.3 |
| 90,637 | 75,531 | 71,556 | 67,978 | 17 | 25 | 4 to 6 | 2.3 |
| 93,797 | 78,164 | 74,050 | 70,348 | 19 | 27 | 4 to 6 | 2.2 |
| 94,414 | 78,678 | 74,537 | 70,810 | 17 | 24 | 4 to 6 | 2.2 |
| 97,404 | 81,170 | 76,898 | 73,053 | 19 | 26 | 4 to 6 | 2.1 |
| 98,519 | 82,099 | 77,778 | 73,889 | 17 | 23 | 4 to 6 | 2.1 |
| 101,301 | 84,417 | 79,974 | 75,975 | 19 | 25 | 4 to 6 | 2.1 |
| 105,229 | 87,691 | 83,076 | 78,922 | 15 | 19 | 4 to 6 | 2.0 |
| 105,521 | 87,935 | 83,306 | 79,141 | 19 | 24 | 4 to 6 | 2.0 |
| 109,488 | 91,240 | 86,438 | 82,116 | 23 | 28 | 4 to 6 | 1.9 |
| 110,109 | 91,758 | 86,928 | 82,582 | 19 | 23 | 4 to 6 | 1.9 |
| 113,544 | 94,620 | 89,640 | 85,158 | 23 | 27 | 4 to 6 | 1.8 |
| 114,249 | 95,207 | 90,196 | 85,687 | 24 | 28 | 4 to 6 | 1.8 |
| 117,609 | 98,008 | 92,849 | 88,207 | 15 | 17 | 4 to 6 | 1.8 |
| 118,480 | 98,734 | 93,537 | 88,860 | 24 | 27 | 4 to 6 | 1.8 |
| 119,260 | 99,383 | 94,152 | 89,445 | 17 | 19 | 4 to 6 | 1.8 |
| 122,627 | 102,189 | 96,811 | 91,970 | 23 | 25 | 4 to 6 | 1.7 |
| 123,770 | 103,141 | 97,713 | 92,827 | 26 | 28 | 4 to 6 | 1.7 |
| 127,737 | 106,447 | 100,845 | 95,802 | 23 | 24 | 4 to 6 | 1.6 |
| 127,959 | 106,632 | 101,020 | 95,969 | 24 | 25 | 4 to 6 | 1.6 |
| 128,530 | 107,108 | 101,471 | 96,397 | 27 | 28 | 4 to 6 | 1.6 |
| 133,290 | 111,075 | 105,229 | 99,968 | 23 | 23 | 4 to 6 | 1.6 |
| 138,227 | 115,189 | 109,127 | 103,670 | 28 | 27 | 4 to 6 | 1.5 |
| 138,417 | 115,347 | 109,276 | 103,813 | 27 | 26 | 4 to 6 | 1.5 |
| 139,086 | 115,905 | 109,804 | 104,314 | 24 | 23 | 4 to 6 | 1.5 |
| 143,543 | 119,619 | 113,324 | 107,658 | 28 | 26 | 4 to 6 | 1.5 |
| 143,954 | 119,961 | 113,648 | 107,965 | 27 | 25 | 4 to 6 | 1.5 |
| 144,881 | 120,734 | 114,380 | 108,661 | 25 | 23 | 4 to 6 | 1.4 |
| 148,971 | 124,143 | 117,609 | 111,729 | 19 | 17 | 4 to 6 | 1.4 |
| 149,952 | 124,960 | 118,383 | 112,464 | 27 | 24 | 4 to 6 | 1.4 |
| 150,676 | 125,563 | 118,955 | 113,007 | 26 | 23 | 4 to 6 | 1.4 |
| 155,505 | 129,588 | 122,767 | 116,629 | 28 | 24 | 4 to 6 | 1.3 |
| 156,471 | 130,393 | 123,530 | 117,353 | 27 | 23 | 4 to 6 | 1.3 |
| 161,351 | 134,459 | 127,383 | 121,014 | 23 | 19 | 4 to 6 | 1.3 |
| 162,266 | 135,222 | 128,105 | 121,700 | 28 | 23 | 4 to 6 | 1.3 |
| 168,367 | 140,306 | 132,921 | 126,275 | 24 | 19 | 4 to 6 | 1.2 |
| 175,382 | 146,152 | 138,459 | 131,536 | 25 | 19 | 4 to 6 | 1.2 |
| 180,334 | 150,278 | 142,369 | 135,250 | 23 | 17 | 4 to 6 | 1.2 |
| 182,397 | 151,998 | 143,998 | 136,798 | 26 | 19 | 4 to 6 | 1.1 |
| 188,175 | 156,812 | 148,559 | 141,131 | 24 | 17 | 4 to 6 | 1.1 |
| 189,413 | 157,844 | 149,536 | 142,059 | 27 | 19 | 4 to 6 | 1.1 |
| 196,015 | 163,346 | 154,749 | 147,011 | 25 | 17 | 4 to 6 | 1.1 |
| 196,428 | 163,690 | 155,075 | 147,321 | 28 | 19 | 4 to 6 | 1.1 |
| 203,856 | 169,880 | 160,939 | 152,892 | 26 | 17 | 4 to 6 | 1.0 |
| 204,378 | 170,315 | 161,351 | 153,284 | 23 | 15 | 4 to 6 | 1.0 |
| 211,696 | 176,414 | 167,129 | 158,772 | 27 | 17 | 4 to 6 | 1.0 |

NOTE: See ["General Planting Rate Information" on page 4-1](#) and ["Check Seed Population" on page 2-22](#) for additional information. Always check seed population in the field to ensure planting rates are correct.

**PLANTING RATES FOR (VACUUM) SOYBEAN 120 CELL DISC
19 TOOTH CONTACT WHEEL DRIVE SPROCKET
APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS**

| 30" Rows | 36" Rows | 38" Rows | 40" Rows | Transmission Sprockets | | Recomm. Speed (MPH) | Average Spacing in Inches |
|----------|----------|----------|----------|------------------------|--------|---------------------|---------------------------|
| | | | | Drive | Driven | | |
| 90,447 | 75,372 | 71,406 | 67,835 | 15 | 28 | 4 to 6 | 2.3 |
| 93,797 | 78,164 | 74,050 | 70,348 | 15 | 27 | 4 to 6 | 2.2 |
| 97,404 | 81,170 | 76,898 | 73,053 | 15 | 26 | 4 to 6 | 2.1 |
| 101,301 | 84,417 | 79,974 | 75,975 | 15 | 25 | 4 to 6 | 2.1 |
| 102,507 | 85,422 | 80,926 | 76,880 | 17 | 28 | 4 to 6 | 2.0 |
| 105,521 | 87,935 | 83,306 | 79,141 | 15 | 24 | 4 to 6 | 2.0 |
| 106,303 | 88,586 | 83,924 | 79,727 | 17 | 27 | 4 to 6 | 2.0 |
| 110,109 | 91,758 | 86,928 | 82,582 | 15 | 23 | 4 to 6 | 1.9 |
| 110,392 | 91,993 | 87,151 | 82,794 | 17 | 26 | 4 to 6 | 1.9 |
| 114,566 | 95,472 | 90,447 | 85,925 | 19 | 28 | 4 to 6 | 1.8 |
| 114,807 | 95,673 | 90,637 | 86,106 | 17 | 25 | 4 to 6 | 1.8 |
| 118,809 | 99,008 | 93,797 | 89,107 | 19 | 27 | 4 to 6 | 1.8 |
| 119,591 | 99,659 | 94,414 | 89,693 | 17 | 24 | 4 to 6 | 1.7 |
| 123,379 | 102,816 | 97,404 | 92,534 | 19 | 26 | 4 to 6 | 1.7 |
| 124,791 | 103,992 | 98,519 | 93,593 | 17 | 23 | 4 to 6 | 1.7 |
| 128,314 | 106,928 | 101,301 | 96,236 | 19 | 25 | 4 to 6 | 1.6 |
| 133,290 | 111,075 | 105,229 | 99,968 | 15 | 19 | 4 to 6 | 1.6 |
| 133,661 | 111,384 | 105,521 | 100,245 | 19 | 24 | 4 to 6 | 1.6 |
| 138,685 | 115,571 | 109,488 | 104,014 | 23 | 28 | 4 to 6 | 1.5 |
| 139,472 | 116,227 | 110,109 | 104,604 | 19 | 23 | 4 to 6 | 1.5 |
| 143,822 | 119,852 | 113,544 | 107,866 | 23 | 27 | 4 to 6 | 1.5 |
| 144,715 | 120,596 | 114,249 | 108,536 | 24 | 28 | 4 to 6 | 1.4 |
| 148,971 | 124,143 | 117,609 | 111,729 | 15 | 17 | 4 to 6 | 1.4 |
| 150,075 | 125,062 | 118,480 | 112,556 | 24 | 27 | 4 to 6 | 1.4 |
| 151,062 | 125,885 | 119,260 | 113,297 | 17 | 19 | 4 to 6 | 1.4 |
| 155,328 | 129,440 | 122,627 | 116,496 | 23 | 25 | 4 to 6 | 1.3 |
| 156,775 | 130,646 | 123,770 | 117,581 | 26 | 28 | 4 to 6 | 1.3 |
| 161,800 | 134,833 | 127,737 | 121,350 | 23 | 24 | 4 to 6 | 1.3 |
| 162,081 | 135,067 | 127,959 | 121,561 | 24 | 25 | 4 to 6 | 1.3 |
| 162,805 | 135,670 | 128,530 | 122,103 | 27 | 28 | 4 to 6 | 1.3 |
| 168,834 | 140,695 | 133,290 | 126,626 | 23 | 23 | 4 to 6 | 1.2 |
| 175,087 | 145,906 | 138,227 | 131,316 | 28 | 27 | 4 to 6 | 1.2 |
| 175,328 | 146,107 | 138,417 | 131,496 | 27 | 26 | 4 to 6 | 1.2 |
| 176,175 | 146,812 | 139,086 | 132,131 | 24 | 23 | 4 to 6 | 1.2 |
| 181,822 | 151,518 | 143,543 | 136,366 | 28 | 26 | 4 to 6 | 1.1 |
| 182,341 | 151,951 | 143,954 | 136,756 | 27 | 25 | 4 to 6 | 1.1 |
| 183,516 | 152,930 | 144,881 | 137,637 | 25 | 23 | 4 to 6 | 1.1 |
| 188,697 | 157,248 | 148,971 | 141,523 | 19 | 17 | 4 to 6 | 1.1 |
| 189,939 | 158,282 | 149,952 | 142,454 | 27 | 24 | 4 to 6 | 1.1 |
| 190,856 | 159,047 | 150,676 | 143,142 | 26 | 23 | 4 to 6 | 1.1 |
| 196,973 | 164,145 | 155,505 | 147,730 | 28 | 24 | 4 to 6 | 1.1 |
| 198,197 | 165,164 | 156,471 | 148,648 | 27 | 23 | 4 to 6 | 1.1 |
| 204,378 | 170,315 | 161,351 | 153,284 | 23 | 19 | 4 to 6 | 1.0 |
| 205,537 | 171,281 | 162,266 | 154,153 | 28 | 23 | 4 to 6 | 1.0 |
| 213,264 | 177,720 | 168,367 | 159,948 | 24 | 19 | 4 to 6 | 1.0 |
| 222,150 | 185,125 | 175,382 | 166,613 | 25 | 19 | 4 to 6 | 0.9 |
| 228,423 | 190,352 | 180,334 | 171,317 | 23 | 17 | 4 to 6 | 0.9 |
| 231,036 | 192,530 | 182,397 | 173,277 | 26 | 19 | 4 to 6 | 0.9 |
| 238,354 | 198,629 | 188,175 | 178,766 | 24 | 17 | 4 to 6 | 0.9 |
| 239,923 | 199,935 | 189,413 | 179,942 | 27 | 19 | 4 to 6 | 0.9 |
| 248,286 | 206,905 | 196,015 | 186,214 | 25 | 17 | 4 to 6 | 0.8 |
| 248,809 | 207,340 | 196,428 | 186,606 | 28 | 19 | 4 to 6 | 0.8 |
| | 215,181 | 203,856 | 193,663 | 26 | 17 | 4 to 6 | 0.8 |
| | 215,733 | 204,378 | 194,160 | 23 | 15 | 4 to 6 | 0.8 |
| | 223,457 | 211,696 | 201,112 | 27 | 17 | 4 to 6 | 0.8 |

NOTE: See ["General Planting Rate Information"](#) on page 4-1 and ["Check Seed Population"](#) on page 2-22 for additional information. Always check seed population in the field to ensure planting rates are correct.

Wheat Disc Section

| Drive | Driven | RPM/GS |
|-------|--------|--------|
| 27 | 28 | 3.671 |
| 15 | 15 | 3.807 |
| 28 | 27 | 3.948 |
| 27 | 26 | 3.953 |

Use a 28 tooth Drive sprocket and a 27 tooth Driven sprocket

FOR HYDRAULIC DRIVE (BRUSH-TYPE AND VACUUM) AND ELECTRIC DRIVE (VACUUM)

1. Brush-Type: use the instructions found on page 5 to find the seeds per revolution (SDS/REV). The SDS/REV will be relatively constant at all speeds for the Brush-Type Meter
2. Vacuum: use the instructions found on page 5 to find the seeds per revolution (SDS/REV) or look it up in Rate Chart on pages 3-4. The SDS/REV will decrease as the disc speed increases (less SDS/REV as ground speed increases) for the True Rate Vacuum Meter.
3. Divide the SDS/REV by the number of Cells to get the SDS/CELL. Some display may not support 54 cells as an option for number of cells on a seed disc, in that case, substitute a useable number of cells (60 or 40) and use that Cell number in the calculation. **DO NOT PHYSICALLY CHANGE THE DISC, THE CELL COUNT IS FOR THE MONITOR ONLY.**
4. Divide your target population by the SDS/CELL to get your Monitor Population.

| Seed Meter Type | Target Population | SDS/REV | Cells | SDS/CELL | Monitor Population |
|-----------------|-------------------|---------|-------|----------|--------------------|
| Brush | 800,000 | 465 | 54 | 8.611 | 92,903 |
| Brush | 1,200,000 | 465 | 54 | 8.611 | 139,355 |
| Vacuum | 808,755 | 891 | 54 | 16.500 | 49,015 |
| Vacuum | 1,195,655 | 771 | 54 | 14.278 | 83,742 |
| Vacuum | 808,755 | 891 | 60 | 14.85 | 54,461 |
| Vacuum | 1,195,655 | 771 | 60 | 12.85 | 93,047 |

PLANTING RATES FOR BRUSH-TYPE SEED METERS (HALF RATE DRIVE)
APPROXIMATE SEEDS/ACRE FOR 15" ROW WIDTH

| Transmission Sprockets | | Population Factor | Rye 400 SDS/REV, 35.9 SDS/GRAM | | Wheat 465 SDS/REV, 39.6 SDS/GRAM | | Speed Range (MPH) |
|------------------------|--------|-------------------|-----------------------------------|-----------------------|-------------------------------------|-----------------------|-------------------|
| Drive | Driven | | Population (sds/acre) | Population (lbs/acre) | Population (sds/acre) | Population (lbs/acre) | |
| 15 | 28 | 1190.12 | 476,159 | 29 | 553,656 | 31 | 4 to 6 |
| 15 | 27 | 1234.20 | 493,795 | 30 | 574,163 | 32 | 4 to 6 |
| 15 | 26 | 1281.67 | 512,787 | 32 | 596,245 | 33 | 4 to 6 |
| 15 | 25 | 1332.94 | 533,298 | 33 | 620,095 | 35 | 4 to 6 |
| 17 | 28 | 1348.80 | 539,647 | 33 | 627,477 | 35 | 4 to 6 |
| 15 | 24 | 1388.48 | 555,519 | 34 | 645,932 | 36 | 4 to 6 |
| 17 | 27 | 1398.76 | 559,634 | 34 | 650,718 | 36 | 4 to 6 |
| 15 | 23 | 1448.84 | 579,672 | 36 | 674,017 | 38 | 4 to 6 |
| 17 | 26 | 1452.56 | 581,158 | 36 | 675,745 | 38 | 4 to 6 |
| 19 | 28 | 1507.49 | 603,134 | 37 | 701,298 | 39 | 4 to 6 |
| 17 | 25 | 1510.66 | 604,405 | 37 | 702,775 | 39 | 4 to 6 |
| 19 | 27 | 1563.32 | 625,473 | 38 | 727,272 | 41 | 4 to 6 |
| 17 | 24 | 1573.60 | 629,588 | 39 | 732,056 | 41 | 4 to 6 |
| 19 | 26 | 1623.45 | 649,530 | 40 | 755,244 | 42 | 4 to 6 |
| 17 | 23 | 1642.02 | 656,961 | 40 | 763,885 | 43 | 4 to 6 |
| 19 | 25 | 1688.39 | 675,511 | 42 | 785,454 | 44 | 4 to 6 |
| 15 | 19 | 1753.86 | 701,708 | 43 | 815,915 | 45 | 4 to 6 |
| 19 | 24 | 1758.74 | 703,658 | 43 | 818,181 | 46 | 4 to 6 |
| 23 | 28 | 1824.85 | 730,111 | 45 | 848,940 | 47 | 4 to 6 |
| 19 | 23 | 1835.20 | 734,251 | 45 | 853,754 | 48 | 4 to 6 |
| 23 | 27 | 1892.44 | 757,152 | 47 | 880,382 | 49 | 4 to 6 |
| 24 | 28 | 1904.19 | 761,855 | 47 | 885,850 | 49 | 4 to 6 |
| 15 | 17 | 1960.20 | 784,262 | 48 | 911,905 | 51 | 4 to 6 |
| 23 | 26 | 1965.23 | 786,273 | 48 | 914,242 | 51 | 4 to 6 |
| 24 | 27 | 1974.72 | 790,071 | 49 | 918,660 | 51 | 4 to 6 |
| 25 | 28 | 1983.54 | 793,598 | 49 | 922,761 | 51 | 4 to 6 |
| 17 | 19 | 1987.71 | 795,269 | 49 | 924,703 | 52 | 4 to 6 |
| 23 | 25 | 2043.84 | 817,724 | 50 | 950,813 | 53 | 4 to 6 |
| 24 | 26 | 2050.67 | 820,459 | 50 | 953,993 | 53 | 4 to 6 |
| 25 | 27 | 2057.00 | 822,991 | 51 | 956,937 | 53 | 4 to 6 |
| 26 | 28 | 2062.88 | 825,342 | 51 | 959,671 | 53 | 4 to 6 |
| 23 | 24 | 2128.99 | 851,795 | 52 | 990,429 | 55 | 4 to 6 |
| 24 | 25 | 2132.70 | 853,277 | 52 | 992,152 | 55 | 4 to 6 |
| 25 | 26 | 2136.11 | 854,644 | 53 | 993,742 | 55 | 4 to 6 |
| 26 | 27 | 2139.28 | 855,911 | 53 | 995,215 | 55 | 4 to 6 |
| 27 | 28 | 2142.22 | 857,087 | 53 | 996,582 | 56 | 4 to 6 |
| 15 | 15 | 2221.56 | 888,830 | 55 | 1,033,492 | 58 | 4 to 6 |
| 28 | 27 | 2303.84 | 921,750 | 57 | 1,071,769 | 60 | 4 to 6 |
| 27 | 26 | 2307.01 | 923,016 | 57 | 1,073,242 | 60 | 4 to 6 |
| 26 | 25 | 2310.42 | 924,384 | 57 | 1,074,832 | 60 | 4 to 6 |
| 25 | 24 | 2314.13 | 925,865 | 57 | 1,076,554 | 60 | 4 to 6 |
| 24 | 23 | 2318.15 | 927,475 | 57 | 1,078,426 | 60 | 4 to 6 |
| 28 | 26 | 2392.45 | 957,202 | 59 | 1,112,991 | 62 | 4 to 6 |
| 27 | 25 | 2399.28 | 959,937 | 59 | 1,116,171 | 62 | 4 to 6 |
| 26 | 24 | 2406.69 | 962,899 | 59 | 1,119,616 | 62 | 4 to 6 |
| 25 | 23 | 2414.74 | 966,120 | 59 | 1,123,361 | 63 | 4 to 6 |
| 19 | 17 | 2482.92 | 993,399 | 61 | 1,155,079 | 64 | 4 to 6 |

Continued on the next page.

**PLANTING RATES FOR BRUSH-TYPE SEED METERS (HALF RATE DRIVE)
APPROXIMATE SEEDS/ACRE FOR 15" ROW WIDTH**

| Transmission Sprockets | | Population Factor | Rye 400 SDS/REV, 35.9 SDS/GRAM | | Wheat 465 SDS/REV, 39.6 SDS/GRAM | | Speed Range (MPH) |
|------------------------|--------|-------------------|-----------------------------------|-----------------------|-------------------------------------|-----------------------|-------------------|
| Drive | Driven | | Population (sds/acre) | Population (lbs/acre) | Population (sds/acre) | Population (lbs/acre) | |
| 28 | 25 | 2488.15 | 995,490 | 61 | 1,157,511 | 64 | 4 to 6 |
| 27 | 24 | 2499.26 | 999,934 | 61 | 1,162,678 | 65 | 4 to 6 |
| 26 | 23 | 2511.33 | 1,004,765 | 62 | 1,168,295 | 65 | 4 to 6 |
| 17 | 15 | 2517.77 | 1,007,341 | 62 | 1,171,291 | 65 | 4 to 6 |
| 28 | 24 | 2591.82 | 1,036,969 | 64 | 1,205,741 | 67 | 4 to 6 |
| 27 | 23 | 2607.92 | 1,043,409 | 64 | 1,213,230 | 68 | 4 to 6 |
| 23 | 19 | 2689.26 | 1,075,952 | 66 | 1,251,069 | 70 | 4 to 6 |
| 28 | 23 | 2704.51 | 1,082,054 | 67 | 1,258,164 | 70 | 4 to 6 |
| 24 | 19 | 2806.18 | 1,122,733 | 69 | 1,305,464 | 73 | 4 to 6 |
| 19 | 15 | 2813.98 | 1,125,852 | 69 | 1,309,090 | 73 | 4 to 6 |
| 25 | 19 | 2923.10 | 1,169,513 | 72 | 1,359,857 | 76 | 4 to 6 |
| 23 | 17 | 3005.64 | 1,202,535 | 74 | 1,398,254 | 78 | 4 to 6 |
| 26 | 19 | 3040.03 | 1,216,294 | 75 | 1,414,252 | 79 | 4 to 6 |
| 24 | 17 | 3136.32 | 1,254,820 | 77 | 1,459,048 | 81 | 4 to 6 |
| 27 | 19 | 3156.95 | 1,263,075 | 78 | 1,468,647 | 82 | 4 to 6 |
| 25 | 17 | 3267.00 | 1,307,103 | 80 | 1,519,841 | 85 | 4 to 6 |
| 28 | 19 | 3273.88 | 1,309,855 | 81 | 1,523,041 | 85 | 4 to 6 |
| 26 | 17 | 3397.68 | 1,359,388 | 84 | 1,580,635 | 88 | 4 to 6 |
| 23 | 15 | 3406.39 | 1,362,873 | 84 | 1,584,687 | 88 | 4 to 6 |
| 27 | 17 | 3528.36 | 1,411,671 | 87 | 1,641,428 | 91 | 4 to 6 |
| 24 | 15 | 3554.50 | 1,422,128 | 87 | 1,653,587 | 92 | 4 to 6 |
| 28 | 17 | 3659.04 | 1,463,956 | 90 | 1,702,222 | 95 | 4 to 6 |
| 25 | 15 | 3702.60 | 1,481,384 | 91 | 1,722,487 | 96 | 4 to 6 |
| 26 | 15 | 3850.70 | 1,540,639 | 95 | 1,791,386 | 100 | 4 to 6 |
| 27 | 15 | 3998.81 | 1,599,895 | 98 | 1,860,286 | 104 | 4 to 6 |
| 28 | 15 | 4146.91 | 1,659,150 | 102 | 1,929,185 | 107 | 4 to 6 |

NOTE: Seed size and type affect the output rate of the meter. For a method to improve the population accuracy with your desired seed, please see the following pages.

NOTE: See "Mechanical Meter" in ["General Planting Rate Information" on page 4-1](#) and ["Check Seed Population" on page 2-22](#) for additional information.

NOTE: When using Half Rate (2 To 1) Drive Reduction Package, rates are approximately 50% of given numbers.

NOTE: Always field check seed population to ensure planting rates are correct.

To more accurately predict population when using the 54 Cell Wheat disc, two things are needed:

1. Seeds/gram
2. Grams/revolution of seed disc

Seeds per gram can be found by weighing a small sample of desired seed (a cup or less) and counting number of seeds in sample.

$$\frac{\text{Seeds}}{\text{Grams}} = \frac{\text{number of seeds in sample}}{\text{weight of sample in grams}} \quad \frac{396 \text{ Seeds}}{10 \text{ Grams}} = 39.6 \frac{\text{seeds}}{\text{gram}}$$

To find grams/revolution a gram scale, a stopwatch, a small container to catch seed, and a method for spinning the meter at a constant, known rpm (see your local Kinze dealer with a T4000 Seed Meter Test Stand) are needed.

1. Zero gram scale with the small container on it.
2. Load meter with correct disc.
3. Load meter with desired seed.
4. Start spinning meter at a known, constant rpm.
5. Start stopwatch as you place container under meter.
6. Catch seed with container for 10-30 seconds.
7. Stop the stopwatch as you remove container from underneath meter.
8. Weigh container.
9. Enter meter rpm, weight of sample, and duration of sample collection into the equation below:

$$\frac{\text{Grams}}{\text{Rev}} = \frac{\text{Sample Weight} * 60}{\text{Disc RPM} * \text{Sample Duration}}$$

EX: For a sample taken for 30 seconds with meter spinning at 50rpm and weighs 293 grams

$$\frac{293 \text{ Grams} * 60}{50 \text{ RPM} * 30 \text{ Seconds}} = 11.7 \frac{\text{Grams}}{\text{Rev}}$$

10. Find desired output rate. For seeds per acre, use seeds/rev. For pounds per acre, use lbs/rev.

1. Seeds/rev:

$$\frac{\text{Seeds}}{\text{Rev}} = \frac{\text{Seeds}}{\text{Grams}} * \frac{\text{Grams}}{\text{Rev}} \quad \left| \quad 39.6 \frac{\text{Seeds}}{\text{Grams}} * 11.7 \frac{\text{Grams}}{\text{Rev}} = 465 \frac{\text{Seeds}}{\text{Rev}} \right.$$

2. Lbs./rev:

$$\frac{\text{Pounds}}{\text{Rev}} = \frac{\frac{\text{Grams}}{\text{Rev}}}{453.6 \frac{\text{Grams}}{\text{Pound}}} \quad \left| \quad \frac{11.7 \frac{\text{Grams}}{\text{Rev}}}{453.6 \frac{\text{Grams}}{\text{Pound}}} = 0.0258 \frac{\text{Pounds}}{\text{Rev}} \right.$$

11. Find the correct population factor by dividing the desired population by the measured output rate.

Seeds/acre:

$$\frac{\text{Target Population}}{\text{Output Rate}} = \text{Population Factor} \quad \left| \quad \frac{1,000,000 \frac{\text{Seeds}}{\text{Acre}}}{465 \frac{\text{Seeds}}{\text{Rev.}}} = 2150.54$$

pounds/acre:

$$\frac{\text{Target Population}}{\text{Output Rate}} = \text{Population Factor} \quad \left| \quad \frac{56 \frac{\text{lbs}}{\text{Acre}}}{0.0258 \frac{\text{lbs}}{\text{rev}}} = 2170.54$$

12. Find the closest Population Factor in the Rate Chart to identify the correct transmission sprockets. For the examples list above, the closest Population Factor is 2142.22 which corresponds to a 27 tooth Drive sprocket and 28 tooth Driven sprocket.

NOTE: Multiple trials are recommended to increase the accuracy of the predicted rate.

**PLANTING RATES FOR (VACUUM) WHEAT 54 CELL DISC
(HALF RATE DRIVE [15 TOOTH])
APPROXIMATE SEEDS/ACRE FOR 15" ROW WIDTH**

| Transmission Sprockets | | RPM/GS (Seed Disc RPM To Ground Speed (MPH)) | 8INH2O, no sigulator | | 8INH2O, sigulator 3.3 | | Speed Range (MPH) |
|------------------------|--------|---|----------------------|------------|-----------------------|------------|-------------------|
| Drive | Driven | | SDS/REV | Population | SDS/REV | Population | |
| 15 | 28 | 2.039 | 909 | 744,562 | 554 | 453,298 | 5 to 7 |
| 15 | 27 | 2.115 | 903 | 764,594 | 551 | 465,585 | 5 to 7 |
| 15 | 26 | 2.196 | 897 | 785,948 | 547 | 478,707 | 5 to 7 |
| 15 | 25 | 2.284 | 891 | 808,755 | 543 | 492,751 | 5 to 7 |
| 17 | 28 | 2.311 | 888 | 815,760 | 542 | 497,071 | 5 to 7 |
| 15 | 24 | 2.379 | 883 | 833,164 | 539 | 507,816 | 5 to 7 |
| 17 | 27 | 2.397 | 882 | 837,650 | 539 | 510,588 | 5 to 7 |
| 15 | 23 | 2.483 | 876 | 859,343 | 535 | 524,013 | 5 to 7 |
| 17 | 26 | 2.489 | 875 | 860,943 | 535 | 525,004 | 5 to 7 |
| 19 | 28 | 2.583 | 868 | 884,424 | 531 | 539,571 | 5 to 7 |
| 17 | 25 | 2.589 | 868 | 885,771 | 530 | 540,408 | 5 to 7 |
| 19 | 27 | 2.679 | 861 | 907,980 | 527 | 554,221 | 5 to 7 |
| 17 | 24 | 2.697 | 860 | 912,286 | 526 | 556,903 | 5 to 7 |
| 19 | 26 | 2.782 | 854 | 932,998 | 522 | 569,822 | 5 to 7 |
| 17 | 23 | 2.814 | 852 | 940,653 | 521 | 574,605 | 5 to 7 |
| 19 | 25 | 2.893 | 846 | 959,608 | 518 | 586,466 | 5 to 7 |
| 15 | 19 | 3.006 | 838 | 986,010 | 513 | 603,032 | 5 to 7 |
| 19 | 24 | 3.014 | 837 | 987,957 | 513 | 604,256 | 5 to 7 |
| 23 | 28 | 3.127 | 829 | 1,014,147 | 508 | 620,748 | 5 to 7 |
| 19 | 23 | 3.145 | 828 | 1,018,206 | 508 | 623,310 | 5 to 7 |
| 23 | 27 | 3.243 | 821 | 1,040,464 | 504 | 637,378 | 5 to 7 |
| 24 | 28 | 3.263 | 819 | 1,044,993 | 503 | 640,247 | 5 to 7 |
| 15 | 17 | 3.359 | 813 | 1,066,386 | 499 | 653,818 | 5 to 7 |
| 23 | 26 | 3.368 | 812 | 1,068,291 | 499 | 655,029 | 5 to 7 |
| 24 | 27 | 3.384 | 811 | 1,071,881 | 498 | 657,311 | 5 to 7 |
| 25 | 28 | 3.399 | 810 | 1,075,206 | 497 | 659,426 | 5 to 7 |
| 17 | 19 | 3.406 | 809 | 1,076,779 | 497 | 660,427 | 5 to 7 |
| 23 | 25 | 3.502 | 803 | 1,097,745 | 493 | 673,790 | 5 to 7 |
| 24 | 26 | 3.514 | 802 | 1,100,276 | 493 | 675,407 | 5 to 7 |
| 25 | 27 | 3.525 | 801 | 1,102,616 | 493 | 676,902 | 5 to 7 |
| 26 | 28 | 3.535 | 801 | 1,104,786 | 492 | 678,288 | 5 to 7 |
| 23 | 24 | 3.648 | 793 | 1,128,951 | 488 | 693,762 | 5 to 7 |
| 24 | 25 | 3.655 | 792 | 1,130,291 | 487 | 694,622 | 5 to 7 |
| 25 | 26 | 3.661 | 792 | 1,131,527 | 487 | 695,416 | 5 to 7 |
| 26 | 27 | 3.666 | 792 | 1,132,671 | 487 | 696,150 | 5 to 7 |
| 27 | 28 | 3.671 | 791 | 1,133,732 | 487 | 696,831 | 5 to 7 |
| 15 | 15 | 3.807 | 782 | 1,162,044 | 482 | 715,055 | 5 to 7 |
| 28 | 27 | 3.948 | 772 | 1,190,735 | 476 | 733,619 | 5 to 7 |
| 27 | 26 | 3.953 | 772 | 1,191,825 | 476 | 734,326 | 5 to 7 |
| 26 | 25 | 3.959 | 772 | 1,193,001 | 476 | 735,089 | 5 to 7 |
| 25 | 24 | 3.966 | 771 | 1,194,273 | 476 | 735,915 | 5 to 7 |
| 24 | 23 | 3.973 | 771 | 1,195,655 | 475 | 736,812 | 5 to 7 |
| 28 | 26 | 4.100 | 762 | 1,220,871 | 471 | 753,227 | 5 to 7 |
| 27 | 25 | 4.112 | 762 | 1,223,163 | 470 | 754,723 | 5 to 7 |
| 26 | 24 | 4.124 | 761 | 1,225,641 | 470 | 756,341 | 5 to 7 |
| 25 | 23 | 4.138 | 760 | 1,228,328 | 469 | 758,097 | 5 to 7 |
| 19 | 17 | 4.255 | 752 | 1,250,825 | 465 | 772,837 | 5 to 7 |
| 28 | 25 | 4.264 | 752 | 1,252,531 | 465 | 773,957 | 5 to 7 |
| 27 | 24 | 4.283 | 750 | 1,256,146 | 464 | 776,334 | 5 to 7 |
| 26 | 23 | 4.304 | 749 | 1,260,061 | 463 | 778,909 | 5 to 7 |
| 17 | 15 | 4.315 | 748 | 1,262,143 | 463 | 780,280 | 5 to 7 |
| 28 | 24 | 4.442 | 740 | 1,285,788 | 458 | 795,893 | 5 to 7 |

Continued on next page.

**PLANTING RATES FOR (VACUUM) WHEAT 54 CELL DISC
(HALF RATE DRIVE [15 TOOTH])
APPROXIMATE SEEDS/ACRE FOR 15" ROW WIDTH**

| Transmission Sprockets | | RPM/GS (Seed Disc RPM To Ground Speed (MPH)) | 8INH2O, no sigulator | | 8INH2O, sigulator 3.3 | | Speed Range (MPH) |
|------------------------|--------|---|----------------------|------------|-----------------------|------------|----------------------|
| Drive | Driven | | SDS/REV | Population | SDS/REV | Population | |
| 27 | 23 | 4.469 | 738 | 1,290,855 | 457 | 799,250 | 5 to 7 |
| 23 | 19 | 4.609 | 729 | 1,316,059 | 452 | 816,013 | 5 to 7 |
| 28 | 23 | 4.635 | 728 | 1,320,711 | 451 | 819,119 | 5 to 7 |
| 24 | 19 | 4.809 | 717 | 1,351,123 | 445 | 839,524 | 5 to 7 |
| 19 | 15 | 4.822 | 716 | 1,353,411 | 445 | 841,067 | 5 to 7 |
| 25 | 19 | 5.009 | 704 | 1,384,810 | 438 | 862,343 | 5 to 7 |
| 23 | 17 | 5.151 | 695 | 1,407,761 | 433 | 878,034 | 5 to 7 |
| 26 | 19 | 5.210 | 692 | 1,417,121 | 431 | 884,470 | 5 to 7 |
| 24 | 17 | 5.375 | 682 | 1,442,697 | 426 | 902,174 | 5 to 7 |
| 27 | 19 | 5.410 | 680 | 1,448,057 | 425 | 905,906 | 5 to 7 |
| 25 | 17 | 5.599 | 668 | 1,475,915 | 419 | 925,450 | 5 to 7 |
| 28 | 19 | 5.610 | 668 | 1,477,616 | 418 | 926,651 | 5 to 7 |
| 26 | 17 | 5.823 | 655 | 1,507,414 | 412 | 947,862 | 5 to 7 |
| 23 | 15 | 5.837 | 654 | 1,509,452 | 411 | 949,325 | 5 to 7 |
| 27 | 17 | 6.046 | 642 | 1,537,193 | 405 | 969,410 | 5 to 7 |
| 24 | 15 | 6.091 | 640 | 1,542,943 | 403 | 973,616 | 5 to 7 |
| 28 | 17 | 6.270 | 630 | 1,565,254 | 398 | 990,094 | 5 to 7 |
| 25 | 15 | 6.345 | 625 | 1,574,226 | 395 | 996,797 | 5 to 7 |
| 26 | 15 | 6.599 | 611 | 1,603,300 | 388 | 1,018,868 | 5 to 7 |
| 27 | 15 | 6.853 | 598 | 1,630,167 | 381 | 1,039,830 | 5 to 7 |
| 28 | 15 | 7.106 | 584 | 1,654,826 | 374 | 1,059,683 | 5 to 7 |

1. Identify planting parameters and record in Table #1.
2. Weigh small sample of seeds and complete Table #2.
3. Use a device to spin the meter at a constant, measured RPM (Seed Meter Test Stand T4000). Set the RPM to settings in the table below (15, 20, 25, 30) and collect a sample of seed coming out of the meter. It is recommended to start with a Vacuum pressure of 8INH2O and removing the singulator. Increasing the vacuum pressure will increase the SDS/REV while using the singulator will decrease the SDS/REV. Weigh the sample of seed and record the length of time the sample was collected in Table #3.
4. Complete Table #3 for each RPM setting using information from Tables 1 and 2. Variables with the subscript “ $[\text{RPM}]$ ” uses the values in the same row in Table #3.
5. Choose the 2 closest populations to your desired target population and add them to Table #4 with their respective seeds per rev.
6. Complete Table #4 and calculate the approximate seeds per rev.
7. Calculate Seed Disc RPM/Ground Speed Ratio in Table #5.
8. Select the closest RPM/GS (Seed Disc RPM to Ground Speed (mph)) in the rate chart and use that Drive and Driven pair.

| Table #1 | | | | Table #2 | |
|---|----------|--|---|----------------------------------|--|
| Target Population [seeds/acre] (Pop_{TAR}) | | | | Number of Seeds (N) | |
| Ideal Planting Ground Speed [mph] (GS) | | | | Weight of sample [grams] (W) | |
| Planter Row Spacing [in] (RS) | | | | Seeds/ Gram = N/W (SG) | |
| Table #3 | | | | | |
| | | | $SR_{RPM} = \frac{W_{RPM}}{t_{RPM}} \times \left(\frac{60}{RPM}\right) \times SG$ | | $Pop_{RPM} = \frac{SR_{RPM} \times RPM \times 5940}{GS \times RS}$ |
| Vacuum Pressure | Disc RPM | Weight [grams] (W_{RPM}) | Time [sec.] (t_{RPM}) | Seeds/ Rev (SR_{RPM}) | Population (Pop_{RPM}) |
| | 15 | | | | |
| Sing. Setting | 20 | | | | |
| | 25 | | | | |
| | 30 | | | | |
| Table #4 | | | | | |
| Pop_1 | | Pop_2 | | Pop_{TAR} | |
| SR_1 | | SR_2 | | | |
| $SR_{TAR} = \left(\frac{SR_2 - SR_1}{Pop_2 - Pop_1}\right) \times (Pop_{TAR} - Pop_1) + SR_1$ | | | | | |
| Table #5 | | | | | |
| GS | | $RPM_{TAR} = \frac{Pop_{TAR} \times GS \times RS}{5940 \times SR_{TAR}}$ | | | |
| RS | | | | | |
| Pop_{TAR} | | $\frac{RPM_{Tar}}{GS}$ | | | |
| SR_{TAR} | | | | | |

NOTE: Additional worksheets can be found [“Additional Worksheet” on page 4-27](#)

Example.

| Table #1 | | | | Table #2 | |
|---|-----------|---|--|--|---|
| Target Population [seeds/acre] (Pop_{TAR}) | | 1,200,000 | | Number of Seeds (N) | |
| Ideal Planting Ground Speed [mph] (GS) | | 6mph | | Weight of sample [grams] (W) | |
| Planter Row Spacing [in] (RS) | | 15 in. | | Seeds/ Gram = N/W (SG) | |
| | | | | 25.88 | |
| Table #3 | | | | | |
| | | $SR_{RPM} = \frac{W_{RPM}}{t_{RPM}} \times \left(\frac{60}{RPM}\right) \times SG$ | | $Pop_{RPM} = \frac{SR_{RPM} \times RPM \times 5940}{GS \times RS}$ | |
| Vacuum Pressure | Disc RPM | Weight [grams] (W_{RPM}) | Time [sec.] (t_{RPM}) | Seeds/ Rev (SR_{RPM}) | Population (Pop_{RPM}) |
| 8 | 15 | $\frac{765}{90.43} \times \left(\frac{60}{15}\right) \times 25.88 = 875.7$ | | | $\frac{875.7 \times 15 \times 5940}{6 \times 15} = 866,943$ |
| | | 765 | 90.43 | 875.7 | 866,943 |
| Sing. Setting | 20 | $\frac{640}{60.55} \times \left(\frac{60}{20}\right) \times 25.88 = 820.6$ | | | $\frac{820.6 \times 20 \times 5940}{6 \times 20} = 1,083,192$ |
| | | 640 | 60.55 | 820.6 | 1,083,192 |
| removed | 25 | $\frac{1101}{90.1} \times \left(\frac{60}{25}\right) \times 25.88 = 759$ | | | $\frac{759 \times 25 \times 5940}{6 \times 25} = 1,252,350$ |
| | | 1101 | 90.1 | 759 | 1,252,350 |
| removed | 30 | $\frac{840}{60.58} \times \left(\frac{60}{30}\right) \times 25.88 = 717.7$ | | | $\frac{717.7 \times 30 \times 5940}{6 \times 30} = 1,252,350$ |
| | | 840 | 60.58 | 717.7 | 1,421,046 |
| Table #4 | | | | | |
| Pop₁ | 1,083,192 | Pop₂ | 1,252,350 | Pop_{TAR} | 1,200,000 |
| SR₁ | 820.6 | SR₂ | 756 | | |
| $SR_{TAR} = \left(\frac{SR_2 - SR_1}{Pop_2 - Pop_1}\right) \times (Pop_{TAR} - Pop_1) + SR_1$ | | | | | 776.0 |
| $\left(\frac{756 - 820.6}{1,252,350 - 1,083,192}\right) \times (1,200,000 - 1,083,192) + 820.6 = 776.0$ | | | | | |
| Table #5 | | | | | |
| GS | 6mph | $RPM_{TAR} = \frac{Pop_{TAR} \times GS \times RS}{5940 \times SR_{TAR}}$ | | | 23.4 |
| RS | 15 in | | | | |
| Pop_{TAR} | 1,200,000 | $\frac{1,200,000 \times 6 \times 15}{5940 \times 776} = 23.4$ | | | |
| SR_{TAR} | 776.0 | $\frac{RPM_{Tar}}{GS} = \frac{23.4}{6} = 3.905$ | | | 3.905 |

Additional Worksheet

| Table #1 | | | | Table #2 | |
|---|----------|--|---|--|--|
| Target Population [seeds/acre] (Pop_{TAR}) | | | | Number of Seeds (N) | |
| Ideal Planting Ground Speed [mph] (GS) | | | | Weight of sample [grams] (W) | |
| Planter Row Spacing [in] (RS) | | | | Seeds/ Gram = N/W (SG) | |
| Table #3 | | | | | |
| | | | $SR_{RPM} = \frac{W_{RPM}}{t_{RPM}} \times \left(\frac{60}{RPM}\right) \times SG$ | | $Pop_{RPM} = \frac{SR_{RPM} \times RPM \times 5940}{GS \times RS}$ |
| Vacuum Pressure | Disc RPM | Weight [grams] (W_{RPM}) | Time [sec.] (t_{RPM}) | Seeds/ Rev (SR_{RPM}) | Population (Pop_{RPM}) |
| | 15 | | | | |
| Sing. Setting | 20 | | | | |
| | 25 | | | | |
| | 30 | | | | |
| Table #4 | | | | | |
| <i>Pop₁</i> | | <i>Pop₂</i> | | <i>Pop_{TAR}</i> | |
| <i>SR₁</i> | | <i>SR₂</i> | | | |
| $SR_{TAR} = \left(\frac{SR_2 - SR_1}{Pop_2 - Pop_1}\right) \times (Pop_{TAR} - Pop_1) + SR_1$ | | | | | |
| Table #5 | | | | | |
| GS | | $RPM_{TAR} = \frac{Pop_{TAR} \times GS \times RS}{5940 \times SR_{TAR}}$ | | | |
| RS | | | | | |
| <i>Pop_{TAR}</i> | | $\frac{RPM_{Tar}}{GS}$ | | | |
| <i>SR_{TAR}</i> | | | | | |

This page left blank intentionally.

**PLANTING RATES FOR (VACUUM) WHEAT 54 CELL DISC
(HALF RATE DRIVE [15 TOOTH])
APPROXIMATE SEEDS/ACRE FOR 15" ROW WIDTH**

| Transmission Sprockets | | RPM/GS (Seed Disc RPM To Ground Speed (MPH)) | 8INH2O, no sigulator | | 8INH2O, sigulator 3.3 | | Speed Range (MPH) |
|------------------------|--------|---|----------------------|------------|-----------------------|------------|-------------------|
| Drive | Driven | | SDS/REV | Population | SDS/REV | Population | |
| 15 | 28 | 2.039 | 909 | 744,562 | 554 | 453,298 | 5 to 7 |
| 15 | 27 | 2.115 | 903 | 764,594 | 551 | 465,585 | 5 to 7 |
| 15 | 26 | 2.196 | 897 | 785,948 | 547 | 478,707 | 5 to 7 |
| 15 | 25 | 2.284 | 891 | 808,755 | 543 | 492,751 | 5 to 7 |
| 17 | 28 | 2.311 | 888 | 815,760 | 542 | 497,071 | 5 to 7 |
| 15 | 24 | 2.379 | 883 | 833,164 | 539 | 507,816 | 5 to 7 |
| 17 | 27 | 2.397 | 882 | 837,650 | 539 | 510,588 | 5 to 7 |
| 15 | 23 | 2.483 | 876 | 859,343 | 535 | 524,013 | 5 to 7 |
| 17 | 26 | 2.489 | 875 | 860,943 | 535 | 525,004 | 5 to 7 |
| 19 | 28 | 2.583 | 868 | 884,424 | 531 | 539,571 | 5 to 7 |
| 17 | 25 | 2.589 | 868 | 885,771 | 530 | 540,408 | 5 to 7 |
| 19 | 27 | 2.679 | 861 | 907,980 | 527 | 554,221 | 5 to 7 |
| 17 | 24 | 2.697 | 860 | 912,286 | 526 | 556,903 | 5 to 7 |
| 19 | 26 | 2.782 | 854 | 932,998 | 522 | 569,822 | 5 to 7 |
| 17 | 23 | 2.814 | 852 | 940,653 | 521 | 574,605 | 5 to 7 |
| 19 | 25 | 2.893 | 846 | 959,608 | 518 | 586,466 | 5 to 7 |
| 15 | 19 | 3.006 | 838 | 986,010 | 513 | 603,032 | 5 to 7 |
| 19 | 24 | 3.014 | 837 | 987,957 | 513 | 604,256 | 5 to 7 |
| 23 | 28 | 3.127 | 829 | 1,014,147 | 508 | 620,748 | 5 to 7 |
| 19 | 23 | 3.145 | 828 | 1,018,206 | 508 | 623,310 | 5 to 7 |
| 23 | 27 | 3.243 | 821 | 1,040,464 | 504 | 637,378 | 5 to 7 |
| 24 | 28 | 3.263 | 819 | 1,044,993 | 503 | 640,247 | 5 to 7 |
| 15 | 17 | 3.359 | 813 | 1,066,386 | 499 | 653,818 | 5 to 7 |
| 23 | 26 | 3.368 | 812 | 1,068,291 | 499 | 655,029 | 5 to 7 |
| 24 | 27 | 3.384 | 811 | 1,071,881 | 498 | 657,311 | 5 to 7 |
| 25 | 28 | 3.399 | 810 | 1,075,206 | 497 | 659,426 | 5 to 7 |
| 17 | 19 | 3.406 | 809 | 1,076,779 | 497 | 660,427 | 5 to 7 |
| 23 | 25 | 3.502 | 803 | 1,097,745 | 493 | 673,790 | 5 to 7 |
| 24 | 26 | 3.514 | 802 | 1,100,276 | 493 | 675,407 | 5 to 7 |
| 25 | 27 | 3.525 | 801 | 1,102,616 | 493 | 676,902 | 5 to 7 |
| 26 | 28 | 3.535 | 801 | 1,104,786 | 492 | 678,288 | 5 to 7 |
| 23 | 24 | 3.648 | 793 | 1,128,951 | 488 | 693,762 | 5 to 7 |
| 24 | 25 | 3.655 | 792 | 1,130,291 | 487 | 694,622 | 5 to 7 |
| 25 | 26 | 3.661 | 792 | 1,131,527 | 487 | 695,416 | 5 to 7 |
| 26 | 27 | 3.666 | 792 | 1,132,671 | 487 | 696,150 | 5 to 7 |
| 27 | 28 | 3.671 | 791 | 1,133,732 | 487 | 696,831 | 5 to 7 |
| 15 | 15 | 3.807 | 782 | 1,162,044 | 482 | 715,055 | 5 to 7 |
| 28 | 27 | 3.948 | 772 | 1,190,735 | 476 | 733,619 | 5 to 7 |
| 27 | 26 | 3.953 | 772 | 1,191,825 | 476 | 734,326 | 5 to 7 |
| 26 | 25 | 3.959 | 772 | 1,193,001 | 476 | 735,089 | 5 to 7 |
| 25 | 24 | 3.966 | 771 | 1,194,273 | 476 | 735,915 | 5 to 7 |
| 24 | 23 | 3.973 | 771 | 1,195,655 | 475 | 736,812 | 5 to 7 |
| 28 | 26 | 4.100 | 762 | 1,220,871 | 471 | 753,227 | 5 to 7 |
| 27 | 25 | 4.112 | 762 | 1,223,163 | 470 | 754,723 | 5 to 7 |
| 26 | 24 | 4.124 | 761 | 1,225,641 | 470 | 756,341 | 5 to 7 |
| 25 | 23 | 4.138 | 760 | 1,228,328 | 469 | 758,097 | 5 to 7 |
| 19 | 17 | 4.255 | 752 | 1,250,825 | 465 | 772,837 | 5 to 7 |
| 28 | 25 | 4.264 | 752 | 1,252,531 | 465 | 773,957 | 5 to 7 |
| 27 | 24 | 4.283 | 750 | 1,256,146 | 464 | 776,334 | 5 to 7 |
| 26 | 23 | 4.304 | 749 | 1,260,061 | 463 | 778,909 | 5 to 7 |
| 17 | 15 | 4.315 | 748 | 1,262,143 | 463 | 780,280 | 5 to 7 |
| 28 | 24 | 4.442 | 740 | 1,285,788 | 458 | 795,893 | 5 to 7 |
| 27 | 23 | 4.469 | 738 | 1,290,855 | 457 | 799,250 | 5 to 7 |
| 23 | 19 | 4.609 | 729 | 1,316,059 | 452 | 816,013 | 5 to 7 |

Continued on next page.

**PLANTING RATES FOR (VACUUM) WHEAT 54 CELL DISC
(HALF RATE DRIVE [15 TOOTH])
APPROXIMATE SEEDS/ACRE FOR 15" ROW WIDTH**

| Transmission Sprockets | | RPM/GS (Seed Disc RPM To Ground Speed (MPH)) | 8INH2O, no sigulator | | 8INH2O, sigulator 3.3 | | Speed Range (MPH) |
|------------------------|--------|---|----------------------|------------|-----------------------|------------|-------------------|
| Drive | Driven | | SDS/REV | Population | SDS/REV | Population | |
| 28 | 23 | 4.635 | 728 | 1,320,711 | 451 | 819,119 | 5 to 7 |
| 24 | 19 | 4.809 | 717 | 1,351,123 | 445 | 839,524 | 5 to 7 |
| 19 | 15 | 4.822 | 716 | 1,353,411 | 445 | 841,067 | 5 to 7 |
| 25 | 19 | 5.009 | 704 | 1,384,810 | 438 | 862,343 | 5 to 7 |
| 23 | 17 | 5.151 | 695 | 1,407,761 | 433 | 878,034 | 5 to 7 |
| 26 | 19 | 5.210 | 692 | 1,417,121 | 431 | 884,470 | 5 to 7 |
| 24 | 17 | 5.375 | 682 | 1,442,697 | 426 | 902,174 | 5 to 7 |
| 27 | 19 | 5.410 | 680 | 1,448,057 | 425 | 905,906 | 5 to 7 |
| 25 | 17 | 5.599 | 668 | 1,475,915 | 419 | 925,450 | 5 to 7 |
| 28 | 19 | 5.610 | 668 | 1,477,616 | 418 | 926,651 | 5 to 7 |
| 26 | 17 | 5.823 | 655 | 1,507,414 | 412 | 947,862 | 5 to 7 |
| 23 | 15 | 5.837 | 654 | 1,509,452 | 411 | 949,325 | 5 to 7 |
| 27 | 17 | 6.046 | 642 | 1,537,193 | 405 | 969,410 | 5 to 7 |
| 24 | 15 | 6.091 | 640 | 1,542,943 | 403 | 973,616 | 5 to 7 |
| 28 | 17 | 6.270 | 630 | 1,565,254 | 398 | 990,094 | 5 to 7 |
| 25 | 15 | 6.345 | 625 | 1,574,226 | 395 | 996,797 | 5 to 7 |
| 26 | 15 | 6.599 | 611 | 1,603,300 | 388 | 1,018,868 | 5 to 7 |
| 27 | 15 | 6.853 | 598 | 1,630,167 | 381 | 1,039,830 | 5 to 7 |
| 28 | 15 | 7.106 | 584 | 1,654,826 | 374 | 1,059,683 | 5 to 7 |

**DRY INSECTICIDE APPLICATION RATE APPROXIMATE POUNDS/ACRE
AT 5 MPH FOR VARIOUS ROW WIDTHS**

| Meter Setting | 30" Rows | 36" Rows | 38" Rows | 40" Rows |
|----------------------|----------|----------|----------|----------|
| CLAY GRANULES | | | | |
| 10 | 4.9 | 4.1 | 3.9 | 3.7 |
| 11 | 5.4 | 4.5 | 4.3 | 4.1 |
| 12 | 6.1 | 5.1 | 4.8 | 4.6 |
| 13 | 6.9 | 5.7 | 5.4 | 5.2 |
| 14 | 7.7 | 6.4 | 6.0 | 5.8 |
| 15 | 8.5 | 7.1 | 6.7 | 6.4 |
| 16 | 9.6 | 8.0 | 7.6 | 7.2 |
| 17 | 10.7 | 8.9 | 8.4 | 8.0 |
| 18 | 11.4 | 9.5 | 9.0 | 8.6 |
| 19 | 13.1 | 10.9 | 10.3 | 9.8 |
| 20 | 14.2 | 11.8 | 11.2 | 10.7 |
| 21 | 15.5 | 12.9 | 12.3 | 11.6 |
| 22 | 16.4 | 13.7 | 12.9 | 12.3 |
| 23 | 17.2 | 14.3 | 13.6 | 12.9 |
| 24 | 18.8 | 15.7 | 14.9 | 14.1 |
| 25 | 20.9 | 17.4 | 16.5 | 15.7 |
| 26 | 23.0 | 19.2 | 18.1 | 17.3 |
| 27 | 24.1 | 20.0 | 19.0 | 18.1 |
| 28 | 25.4 | 21.2 | 20.1 | 19.1 |
| 29 | 27.8 | 23.2 | 22.0 | 20.9 |
| 30 | 29.6 | 24.7 | 23.4 | 22.2 |
| SAND GRANULES | | | | |
| 5 | 2.9 | 2.4 | 2.3 | 2.2 |
| 6 | 4.9 | 4.0 | 3.8 | 3.7 |
| 7 | 5.3 | 4.4 | 4.2 | 3.9 |
| 8 | 6.3 | 5.3 | 5.0 | 4.8 |
| 9 | 7.8 | 6.5 | 6.1 | 5.9 |
| 10 | 8.9 | 7.4 | 7.0 | 6.7 |
| 11 | 10.2 | 8.5 | 8.0 | 7.7 |
| 12 | 11.2 | 9.3 | 8.8 | 8.4 |
| 13 | 12.6 | 10.5 | 10.0 | 9.5 |
| 14 | 14.1 | 11.7 | 11.1 | 10.6 |
| 15 | 15.5 | 12.9 | 12.3 | 11.6 |
| 16 | 17.5 | 14.6 | 13.8 | 13.1 |
| 17 | 19.4 | 16.2 | 15.3 | 14.6 |
| 18 | 21.8 | 18.2 | 17.2 | 16.4 |
| 19 | 24.3 | 20.2 | 19.1 | 18.2 |
| 20 | 25.7 | 21.4 | 20.3 | 19.3 |
| 21 | 27.6 | 23.0 | 21.8 | 20.7 |
| 22 | 29.6 | 24.7 | 23.4 | 22.2 |
| 23 | 32.0 | 26.7 | 25.3 | 24.0 |
| 24 | 34.4 | 28.7 | 27.2 | 25.8 |
| 25 | 36.9 | 30.7 | 29.1 | 26.7 |

NOTE: The chart above represents average values and should be used only as a starting point. The granular chemical flows through the given meter opening at a nearly uniform rate regardless of roller speed. Your actual rate will vary depending upon the insecticide you are using, your planting speed and your plant population. Planting speed/ground speed has the greatest effect on application rate.



Your actual rate must be checked in the field with the actual insecticide that you are using and at the speed and population at which you will be planting. See ["Field Check Granular Chemical Application" on page 2-25](#) for additional information.

**DRY HERBICIDE APPLICATION RATES
APPROXIMATE POUNDS/ACRE AT 5 MPH FOR VARIOUS ROW WIDTHS
CLAY GRANULES**

| Meter Setting | 30" Rows | 36" Rows | 38" Rows | 40" Rows |
|---------------|----------|----------|----------|----------|
| 10 | 4.7 | 3.9 | 3.7 | 3.5 |
| 11 | 5.2 | 4.4 | 4.1 | 3.9 |
| 12 | 5.8 | 4.9 | 4.6 | 4.4 |
| 13 | 6.5 | 5.4 | 5.1 | 4.9 |
| 14 | 7.3 | 6.1 | 5.7 | 5.5 |
| 15 | 8.2 | 6.9 | 6.5 | 6.2 |
| 16 | 9.0 | 7.5 | 7.1 | 6.8 |
| 17 | 9.9 | 8.2 | 7.8 | 7.4 |
| 18 | 10.7 | 8.9 | 8.4 | 8.0 |
| 19 | 11.6 | 9.7 | 9.2 | 8.7 |
| 20 | 12.6 | 10.5 | 10.0 | 9.5 |
| 21 | 13.6 | 11.3 | 10.7 | 10.2 |
| 22 | 14.6 | 12.1 | 11.5 | 11.0 |
| 23 | 15.7 | 13.1 | 12.4 | 11.8 |
| 24 | 17.0 | 14.1 | 13.4 | 12.8 |
| 25 | 18.1 | 15.1 | 14.3 | 13.6 |
| 26 | 19.4 | 16.2 | 15.3 | 14.6 |
| 27 | 20.9 | 17.4 | 16.5 | 15.7 |
| 28 | 22.6 | 18.8 | 17.8 | 17.0 |
| 29 | 24.3 | 20.2 | 19.1 | 18.2 |
| 30 | 26.7 | 22.2 | 21.1 | 20.0 |

NOTE: The chart above represents average values and should be used only as a starting point. The granular chemical flows through the given meter opening at a nearly uniform rate regardless of roller speed. Your actual rate will vary depending upon the herbicide you are using, your planting speed and your plant population. Planting speed/ground speed has the greatest effect on application rate.

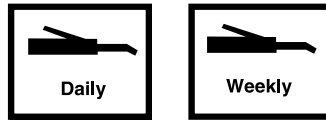
Your actual rate must be checked in the field with the actual herbicide that you are using and at the speed and population at which you will be planting. See [“Field Check Granular Chemical Application” on page 2-25](#) for additional information.

| | |
|--|---|
|  WARNING | <p>Agricultural chemicals can cause death or serious injury to persons, animals, and plants or seriously damage soil, equipment, or property. Read and follow all chemical and equipment manufacturers labels and instructions.</p> |
|  | |

LUBRICATION

Following pages show locations of all lubrication points. Proper lubrication of moving parts helps ensure efficient operation of your Kinze planter and prolongs the life of friction producing parts.

LUBRICATION SYMBOLS



Lubricate at frequency indicated with SAE multipurpose grease.

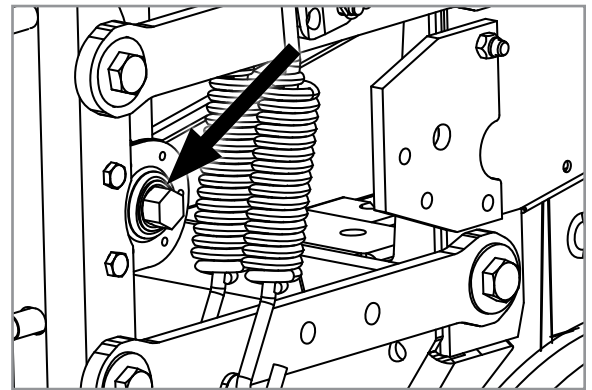


Lubricate at frequency indicated with high quality SAE 10 weight oil or spray lubricant.

SEALED BEARINGS

Sealed bearings are used on your Kinze planter to provide trouble free operation.

These are located on drive shafts, row units, and transmission bearings. Sealed bearings are lubricated for life and are not serviceable.



Sealed bearing (Typical)

WRAP SPRING WRENCH ASSEMBLY

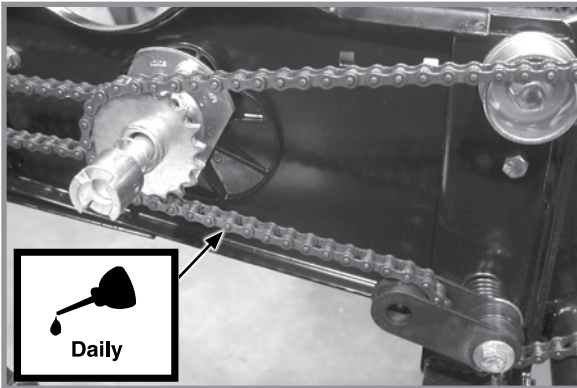
1. Remove ¼"-20 x ½" cap screw securing idler assembly to wrap spring wrench tightener shaft and
2. Remove wrap spring wrench from planter.
3. Tip wrap spring wrench on its side and lubricate with a high quality spray lubricant. Lubricant must be absorbed into wrap spring area.
4. Reinstall wrap spring wrench on planter.



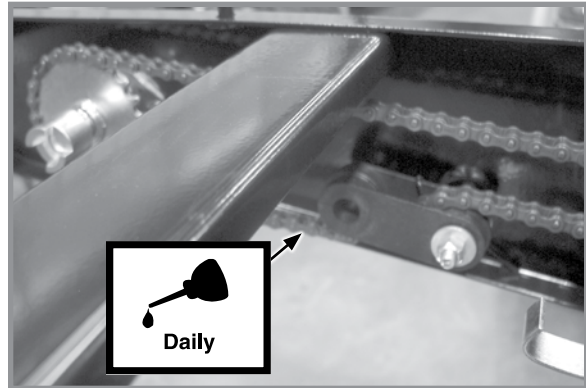
Wrap spring wrench lubrication

DRIVE CHAINS

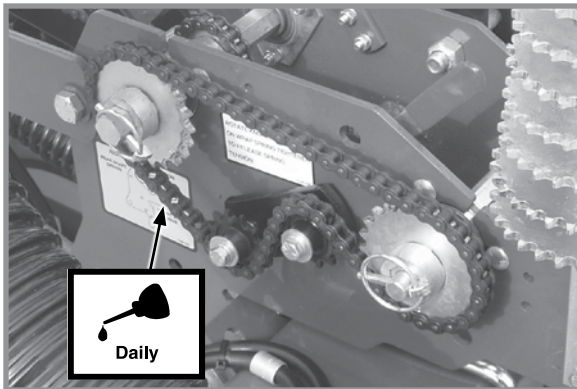
Lubricate all transmission and drive chains daily with a high quality chain lubricant. Extreme operating conditions such as dirt, temperature, or speed may require more frequent lubrication. If a chain becomes stiff, it should be removed, soaked, and washed in solvent to loosen and remove dirt from joints. Soak chain in oil so lubricant can penetrate between rollers and bushings.



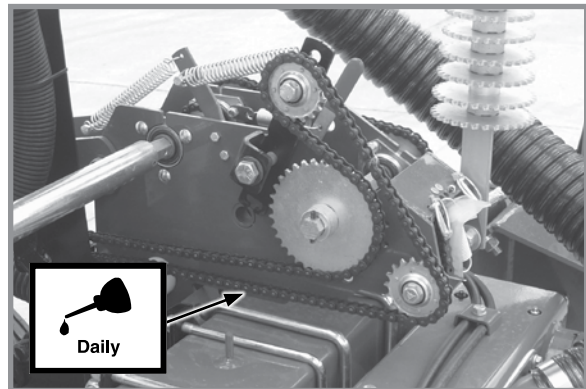
Row Unit Drive Chains (Mechanical Shown)



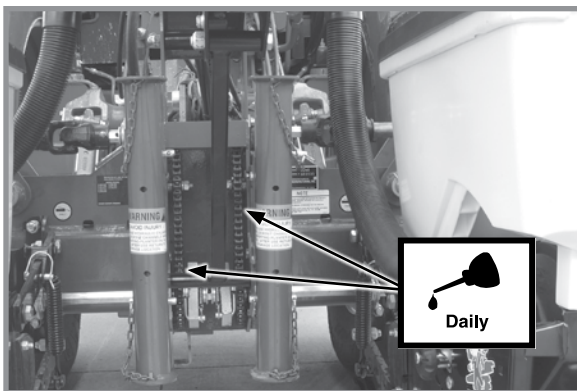
Row Unit Granular Chemical Drive Chains



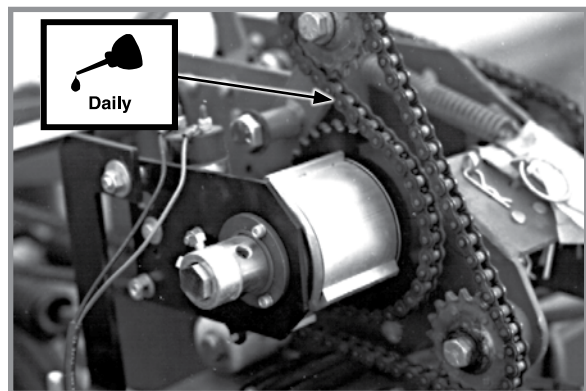
Seed Rate Transmission Drive Chains



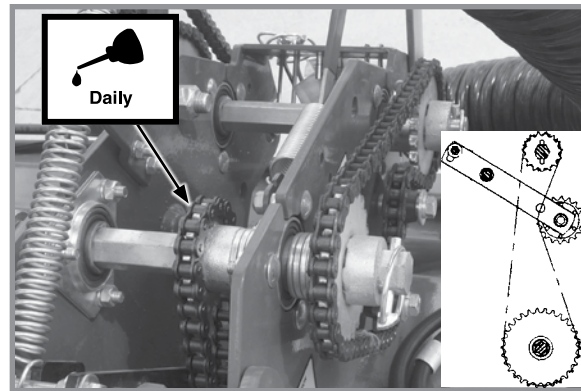
Contact Wheel Drive Chains
(Without Point Row Clutches)



Center Drop Assembly Drive Chains



Contact Wheel Drive Chains
(With Point Row Clutches)

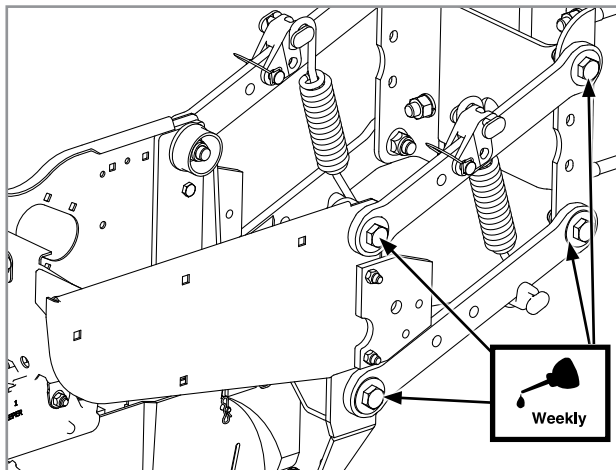


Inner Wheel Module Drive Chains

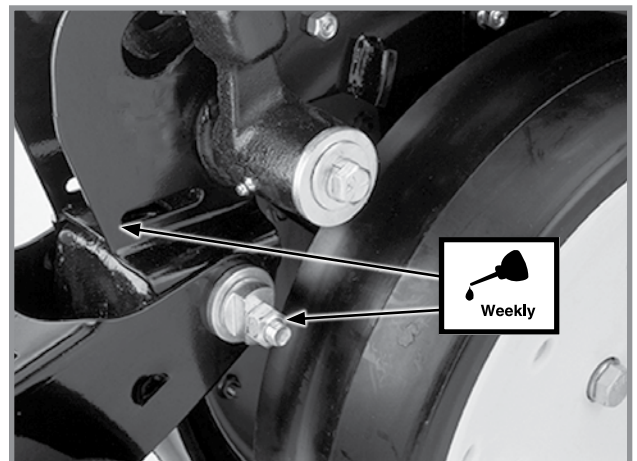
BUSHINGS

Lubricate bushings at frequency indicated.

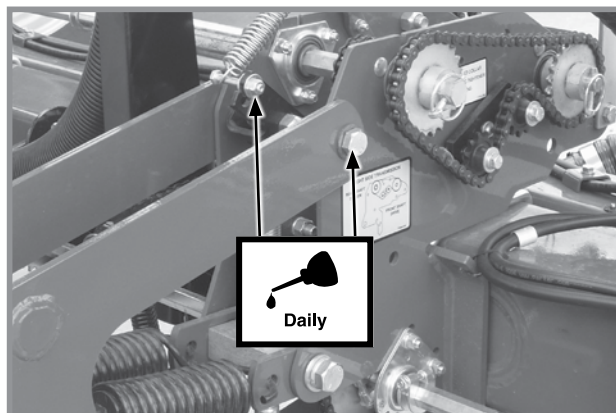
Check each bolt for proper torque. If bolt is loose, removed it and inspect bushing for cracks and wear. Replace bushing if necessary. Use **only hardened flat washers**. Replace damaged flat washers with proper part. Torque hardware to 130 ft-lb (176.2 N-m).



Pull Row Unit And/Or Push Row Unit Parallel Linkages (8 Per Row)



Row Unit "V" Closing Wheel, Covering Discs/ Single Press Wheel And/Or Drag Closing Wheel Eccentric Bushings (2 Per Row)



Contact Wheel Arm (2 Per Wheel Assembly)

WHEEL BEARINGS

All drive, transport, and marker hub wheel bearings should be repacked annually and checked for wear.

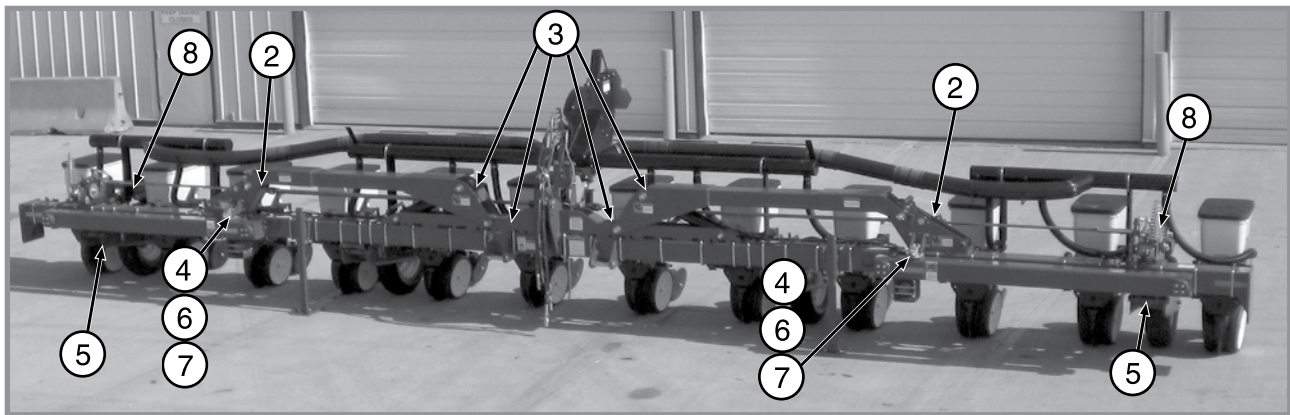
1. Raise wheel off ground.
2. Check for bearing endplay by moving wheel side to side.
3. Rotate wheel to check for bearing roughness. If bearings sound rough, remove hub and inspect bearings.

NOTE: To repack wheel hubs, follow procedure outlined for wheel bearing replacement except bearings and bearing cups are reused.

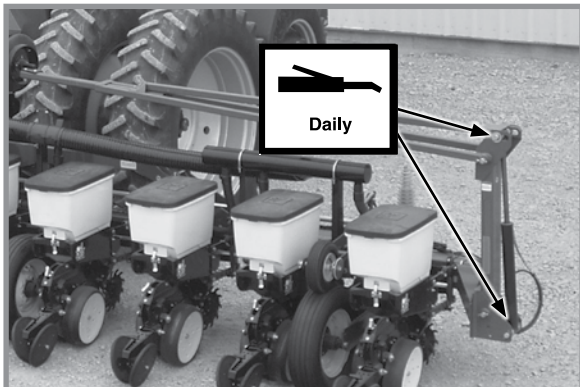
GREASE FITTINGS

Parts equipped with grease fittings should be lubricated at frequency indicated with an SAE multipurpose grease. Clean fitting thoroughly before using grease gun. Frequency of lubrication recommended is based on normal operating conditions. Severe or unusual conditions may require more frequent attention.

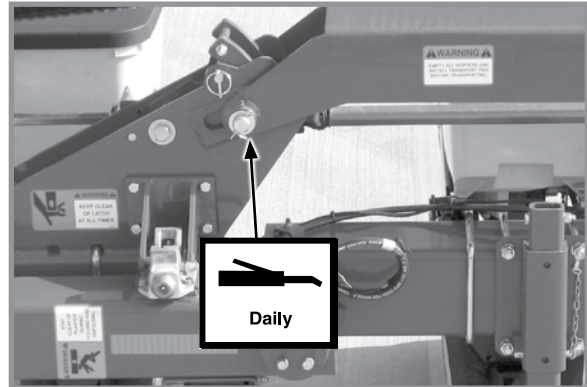
NOTE: Numbers on photo below correspond to photos on following pages showing lubrication frequencies.



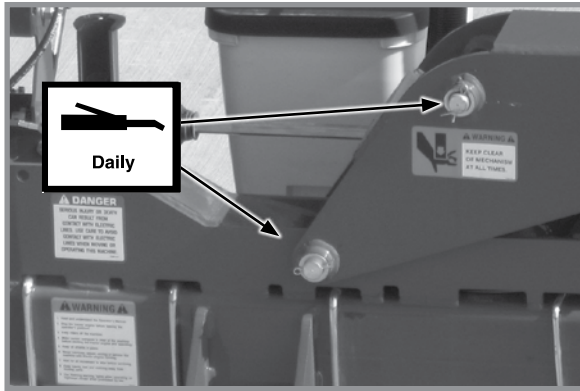
12 Row 38" Shown



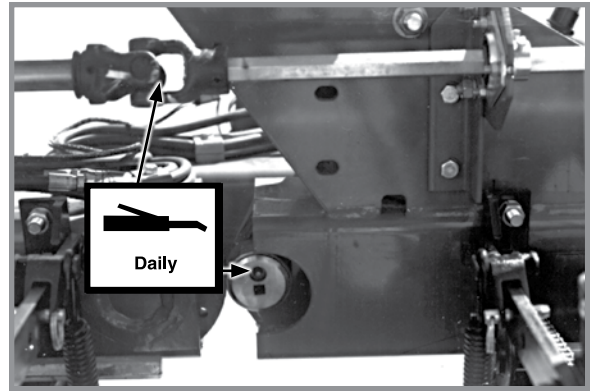
1. Row Markers - 4 Zerks Per Assembly On 8 Row 38"/40" And 12 Row 30" Sizes. 2 Zerks Per Assembly On 12 Row 36"/38", 12 Row 38"/40" And 16 Row 30" Sizes.



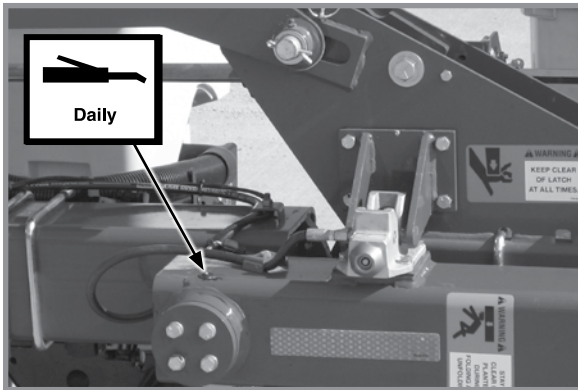
2. Wing Hinge - 2 Zerks Per Hinge Area



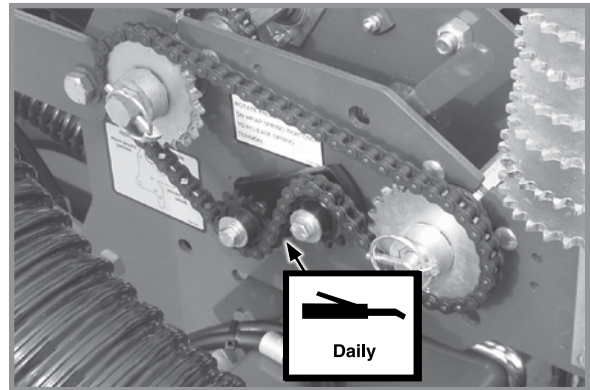
3. Center Hinge - 4 Zerks Per Hinge Area



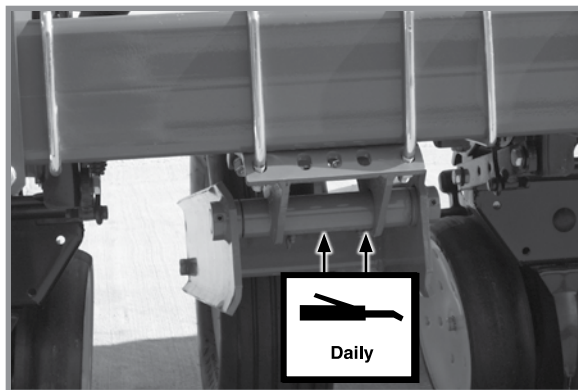
6. Cam Follower - 1 Zerk Per Cam
7. U-Joint Assembly - 1 Zerk Per Assembly



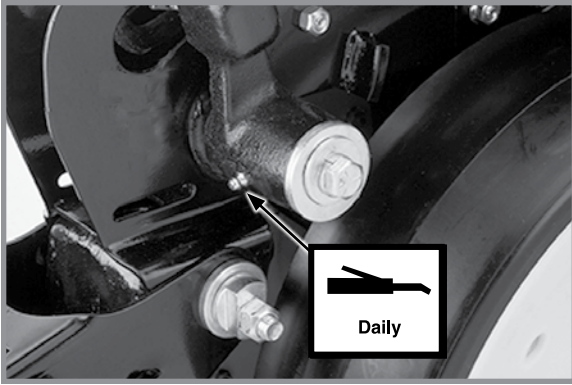
4. Link Assembly - 4 Zerks Per Link



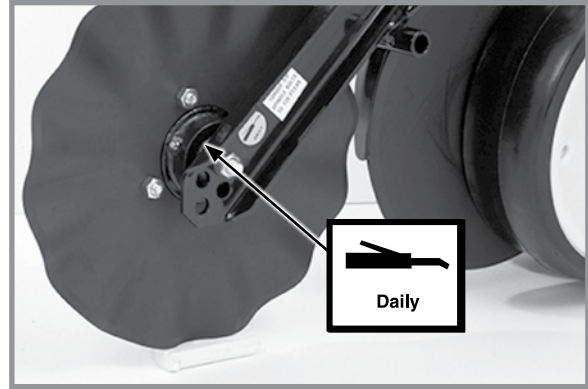
8. Seed Rate Transmission Assemblies - Zerk (Idler)



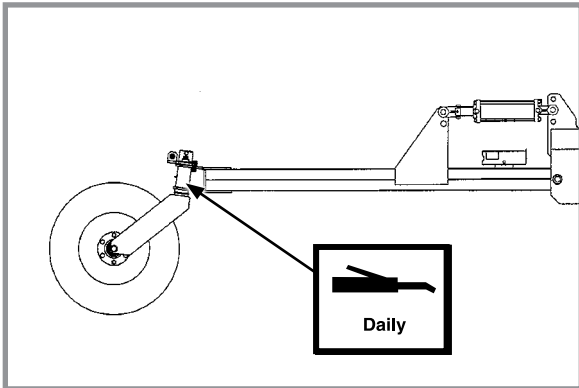
5. Drive Wheel Arm Pivot - 2 Zerks Per Pivot



Gauge wheel arms - 1 per arm
(Seals in gauge wheel arm are installed with lip facing out to allow grease to purge dirt away from seal. Pump grease into arm until fresh grease appears between washers and arm.)



(If Applicable) Row Unit Mounted No Till Coulter Hubs- 1 Zerk Per Hub
(Pump grease into hub until grease comes out around the seals. Spin hub while filling with grease.)



Lift Assist Arm - 1 Zerk Per Arm

MOUNTING BOLTS AND HARDWARE

WARNING

Loose transport wheel lug bolts can result in wheel separation from planter and result in death, serious injury, and damage to property and equipment. Check transport wheel lug nut torque before operating planter for the first time and periodically thereafter.

NOTICE

Over-tightening hardware can reduce its shock load capacity and cause equipment failure.

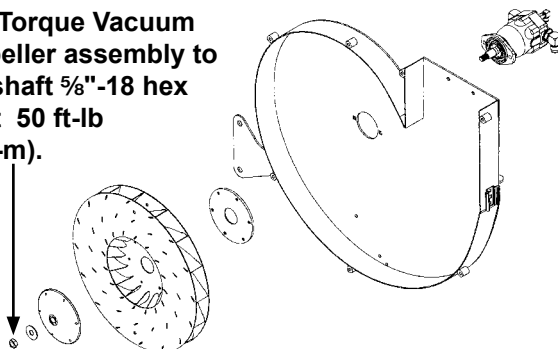
Hardware used on Kinze planters are Grade 5 (high strength) unless otherwise noted. Grade 5 cap screws are marked with three radial lines on the head. Hardware must be replaced with equal size, strength, and thread type.

TORQUE VALUES CHART - PLATED HARDWARE

| Diameter | Grade 2 (No marks) | | Grade 5 (3 marks) | | Grade 8 (6 marks) | |
|----------|---------------------|---------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | Coarse | Fine | Coarse | Fine | Coarse | Fine |
| 1/4" | 50 in-lb | 56 in-lb | 76 in-lb | 87 in-lb | 9 ft-lb (12 N-m) | 10 ft-lb (14 N-m) |
| 5/16" | 8 ft-lb (11 N-m) | 9 ft-lb (12 N-m) | 13 ft-lb (18 N-m) | 14 ft-lb (19 N-m) | 18 ft-lb (24 N-m) | 20 ft-lb (27 N-m) |
| 3/8" | 15 ft-lb (20 N-m) | 17 ft-lb (23 N-m) | 23 ft-lb (31 N-m) | 26 ft-lb (35 N-m) | 33 ft-lb (45 N-m) | 37 ft-lb (50 N-m) |
| 7/16" | 25 ft-lb (34 N-m) | 27 ft-lb (37 N-m) | 37 ft-lb (50 N-m) | 41 ft-lb (56 N-m) | 52 ft-lb (71 N-m) | 58 ft-lb (79 N-m) |
| 1/2" | 35 ft-lb (48 N-m) | 40 ft-lb (54 N-m) | 57 ft-lb (77 N-m) | 64 ft-lb (87 N-m) | 80 ft-lb (108 N-m) | 90 ft-lb (122 N-m) |
| 9/16" | 50 ft-lb (68 N-m) | 60 ft-lb (81 N-m) | 80 ft-lb (108 N-m) | 90 ft-lb (122 N-m) | 115 ft-lb (156 N-m) | 130 ft-lb (176 N-m) |
| 5/8" | 70 ft-lb (95 N-m) | 80 ft-lb (108 N-m) | 110 ft-lb (149 N-m) | 125 ft-lb (169 N-m) | 160 ft-lb (217 N-m) | 180 ft-lb (244 N-m) |
| 3/4" | 130 ft-lb (176 N-m) | 145 ft-lb (197 N-m) | 200 ft-lb (271 N-m) | 220 ft-lb (298 N-m) | 280 ft-lb (380 N-m) | 315 ft-lb (427 N-m) |
| 7/8" | 125 ft-lb (169 N-m) | 140 ft-lb (190 N-m) | 320 ft-lb (434 N-m) | 350 ft-lb (475 N-m) | 450 ft-lb (610 N-m) | 500 ft-lb (678 N-m) |
| 1" | 190 ft-lb (258 N-m) | 205 ft-lb (278 N-m) | 480 ft-lb (651 N-m) | 530 ft-lb (719 N-m) | 675 ft-lb (915 N-m) | 750 ft-lb (1017 N-m) |
| 1 1/8" | 265 ft-lb (359 N-m) | 300 ft-lb (407 N-m) | 600 ft-lb (814 N-m) | 670 ft-lb (908 N-m) | 960 ft-lb (1302 N-m) | 1075 ft-lb (1458 N-m) |
| 1 1/4" | 375 ft-lb (508 N-m) | 415 ft-lb (563 N-m) | 840 ft-lb (1139 N-m) | 930 ft-lb (1261 N-m) | 1360 ft-lb (1844 N-m) | 1500 ft-lb (2034 N-m) |
| 1 3/8" | 490 ft-lb (664 N-m) | 560 ft-lb (759 N-m) | 1100 ft-lb (1491 N-m) | 1250 ft-lb (1695 N-m) | 1780 ft-lb (2413 N-m) | 2030 ft-lb (2752 N-m) |
| 1 1/2" | 650 ft-lb (881 N-m) | 730 ft-lb (990 N-m) | 1450 ft-lb (1966 N-m) | 1650 ft-lb (2237 N-m) | 2307 ft-lb (3128 N-m) | 2670 ft-lb (3620 N-m) |

NOTE: Torque unplated hardware and bolts with lock nuts approximately 1/3 higher than above values. Torque bolts lubricated prior to installation to 70% of value shown in chart.

NOTE: Torque Vacuum fan impeller assembly to motor shaft 5/8"-18 hex jam nut 50 ft-lb (67.8 N-m).




SPECIAL TORQUE VALUES & INSTRUCTIONS

| | |
|--|--------------------|
| Row unit parallel linkage bushing hardware | 130 ft-lb (176 Nm) |
| 5/8" No till coultter spindle hardware | 120 ft-lb (162 Nm) |
| Ground Drive Tire Lug Bolts | 90 ft-lb (122 Nm) |

CYLINDER ROD PISTON RETAINING NUT TORQUE CHART


| | Non-Nylock Nut | Nylock Nut |
|-----------|--------------------------------|----------------------------------|
| 1/2"-20 | 55-70 ft-lb (75-95 N-m) | 45-55 ft-lb (61-75 N-m) |
| 3/4"-16 | 115-125 ft-lb (156-169 N-m) | 100-115 ft-lb (136-156 N-m) |
| 7/8"-14 | 150-180 ft-lb (203-244 N-m) | 130-150 ft-lb (176-203 N-m) |
| 1"-14 | 275-330 ft-lb (373-447 N-m) | 250-275 ft-lb (339-373 ft-lb) |
| 1 1/8"-12 | 300-375 ft-lb (407-508 N-m) | 275-300 ft-lb (373-407 N-m) |
| 1 1/4"-12 | 300-375 ft-lb (407-508 N-m) | 275-300 ft-lb (373-407 N-m) |

TIRE SERVICING



WARNING


Explosive separation of rim and tire parts can cause death or serious injury. Overinflation, rim and tire servicing, improper use of rims and tires, or worn or improperly maintained tires could result in a tire explosion.



To prevent tire explosions:


- Maintain proper tire pressure. Inflating a tire above or below the recommended pressure can cause tire damage.
- Mount tires only by properly trained personnel using proper equipment.
- Replace tires with cuts or bubbles. Replace damaged rims. Replace missing lug bolts and nuts.
- Do not weld or heat wheel assembly. Heating increases tire pressure.

INFLATION SPECIFICATIONS



WARNING

Overinflation of tires can result in explosive separation of rim and tire and cause death or serious injury. Different size rims are designed for different tire pressures. Inflate to correct pressure for specific rim size.

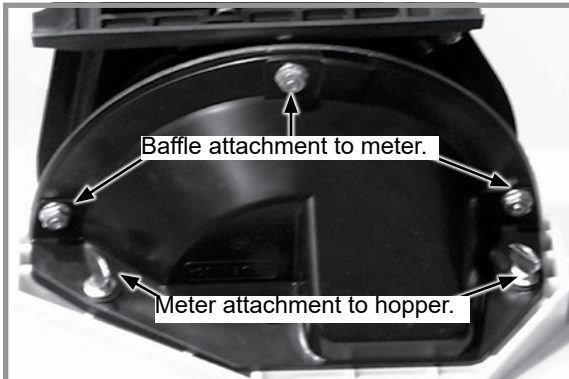


MODEL 3145 OPERATING TIRE PRESSURE

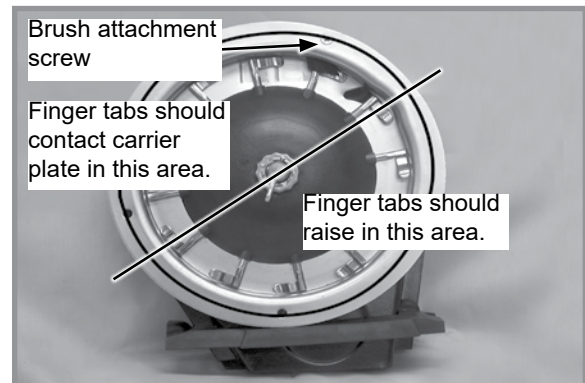
- Ground Drive/Gauge 7.60" x 15" 40 psi (275.7 kPa)
- Contact drive - 4.10" x 6" 50 psi (344.7 kPa)



FINGER PICKUP SEED METER INSPECTION/ADJUSTMENT

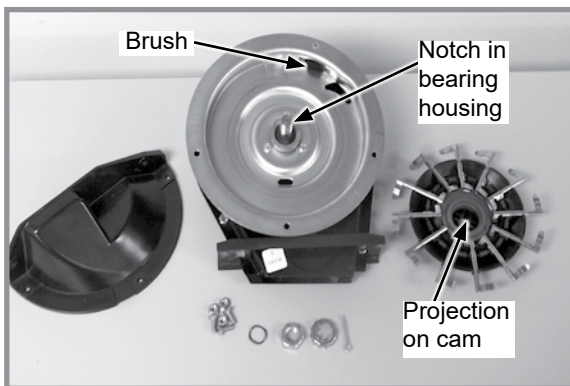


Removing meter and baffle

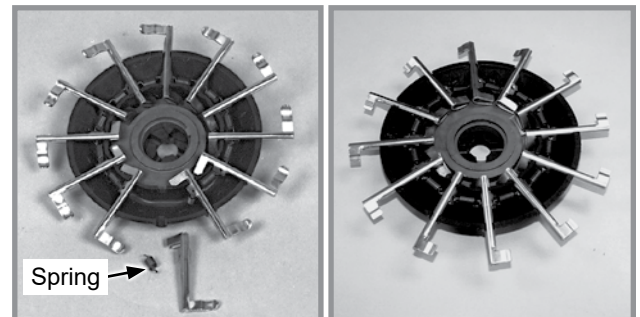


Proper finger operation

1. Remove two thumbscrews and meter from seed hopper and remove three cap screws and baffle from meter assembly.
2. Rotate seed meter drive by hand to ensure springs are holding tabs of fingers against carrier plate and fingers raise in correct area as shown in above photo.



Finger pickup meter parts



Corn Finger Assembly
(Position Spring Opening
Toward Holder)

**Oil Sunflower Finger
Assembly**

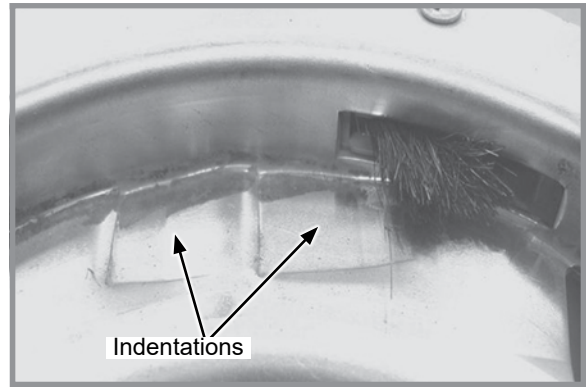
Buildup of debris or chaff may prevent proper finger operation and requires disassembly and cleaning of finger pickup meter.

1. Remove cotter pin, cover nut and adjusting nut and wave washer (if applicable) from drive shaft.
2. Carefully lift finger holder with fingers and cam off shaft and clean.
3. Check brush for wear and replace if necessary or after every 100 acres (41 hectares) per row of operation (Approximately 800 acres (324 hectares) of corn or sunflowers on a 8 row machine or 1200 acres (486 hectares) on an 12 row machine).

NOTE: It is not necessary to remove finger holder to replace brush.

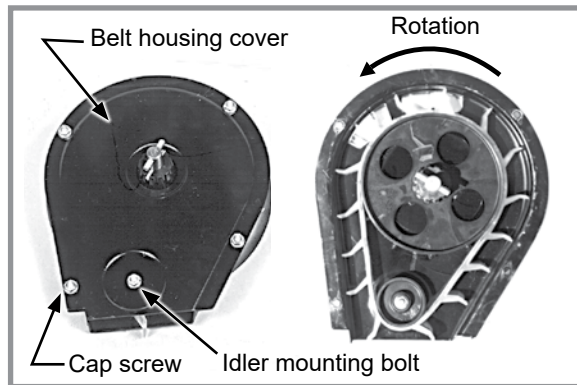
4. Remove springs from fingers and remove finger from holder by lifting it out of friction fit slot. Life expectancy of these parts is about 600-900 acres (243-364 hectares) per row of operation under average conditions.
5. Reassemble meter in reverse order after cleaning and replacing defective parts. Make sure open end of spring loop is toward inside of finger holder when replacing fingers.
6. Install fingers in holder so holder is flush with carrier plate when assembled. A cam projection aligns with a mating notch in bearing housing to ensure proper operation when assembled.

7. Check indentations on carrier plate for wear before installing finger holder on carrier plate. Excessive wear of carrier plate at indentations will cause over planting especially with small sizes of seed. Inspect carrier plate annually. Life expectancy should be 250-300 acres (100-125 hectares) per row of operation under average conditions.
8. Install wave washer and adjusting nut with finger holder flush against carrier. Tighten adjusting nut to fully compress wave washer. Back off nut 1/2 to 2 flats to obtain rolling torque of 22 to 25 inch pounds (2.5 N-m to 2.8 N-m).
9. Turn finger holder by hand to make sure it is firmly against carrier plate, but can be rotated with moderate force.
10. Install cover nut and cotter pin. Reinstall baffle.

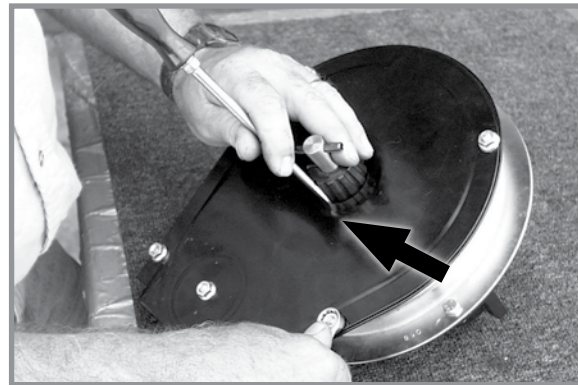


Worn carrier plate

NOTE: Check adjusting nut tightness on each unit after first day of use and periodically thereafter.



Belt idler



Centering belt housing cover

Remove four cap screws around edge of housing cover and nut from belt idler mounting bolt. Paddles must be correctly oriented as shown above. If belt is replaced. A diagram molded into drive sprocket shows correct orientation.

NOTICE

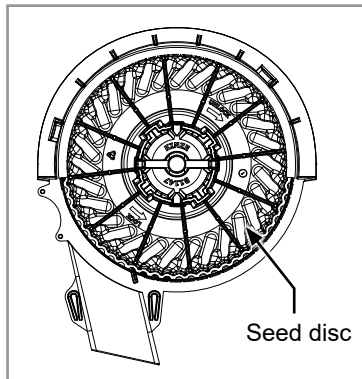
Do not overtighten hardware or components may be damaged.

Reinstall housing cover. **DO NOT TIGHTEN** hardware. Wedge a screwdriver between sprocket hub and housing cover as shown above. Pry cover down until centered on belt housing and tighten hardware. Rotate meter drive shaft and check idler alignment. Seed belt should "run" centered on idler or with only slight contact with belt housing or cover.

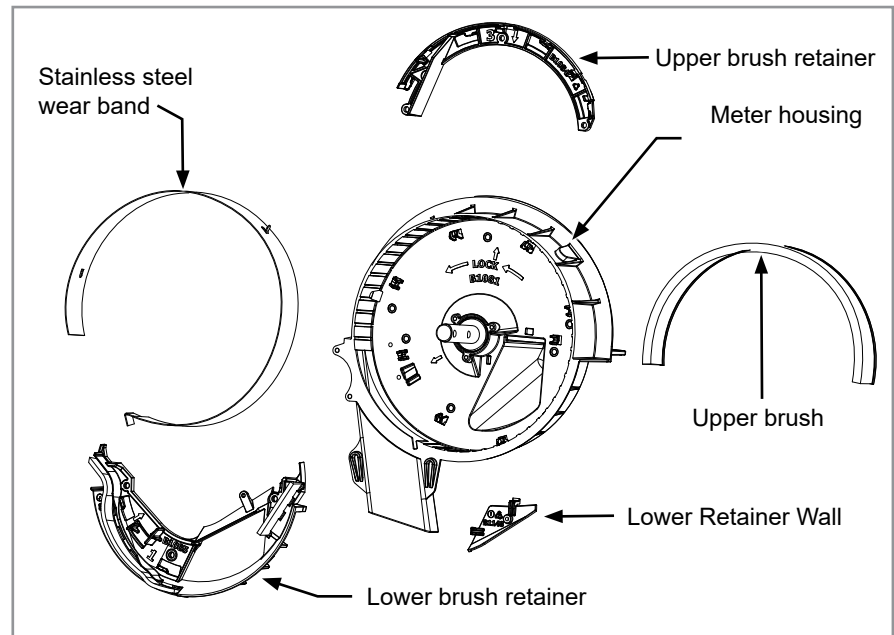
CLEANING FINGER PICKUP SEED METER FOR STORAGE

1. Disassemble meter and blow out any foreign material.
2. Wash **ONLY** in mild soap and water. Do not use gasoline, kerosene, or any other petroleum based product. Dry thoroughly.
3. Coat lightly with a rust inhibitor.
4. Rotate finger assembly so finger does not touch brush.
5. Reassemble and store in a dry, rodent-free location.

BRUSH-TYPE SEED METER 2.0 MAINTENANCE

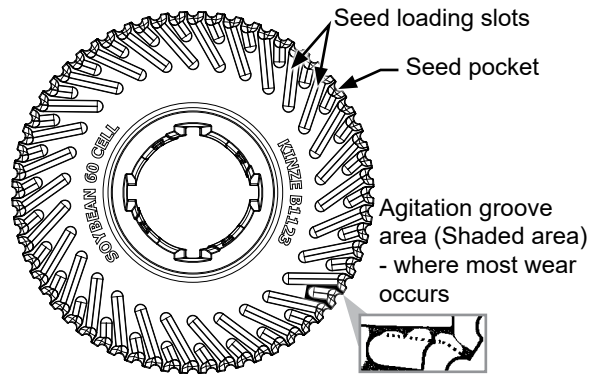


Brush-type seed meter seed disc installed



Brush-type seed meter 2.0 parts

Use clean, high quality seed. Damaged or cracked seed, hulls, or foreign materials can become lodged in upper brush and greatly reduce meter accuracy. Remove seed disc daily and check for buildup of foreign material on seed disc, particularly in seed loading slots. Clean disc by washing it with soap and water. Check for cracked seed, hulls, etc. lodged between brush retainer and stainless steel wear band which can greatly reduce accuracy of the meter because upper brush will not be able to retain seed in seed disc pocket. Thoroughly clean brush areas of meter housing.

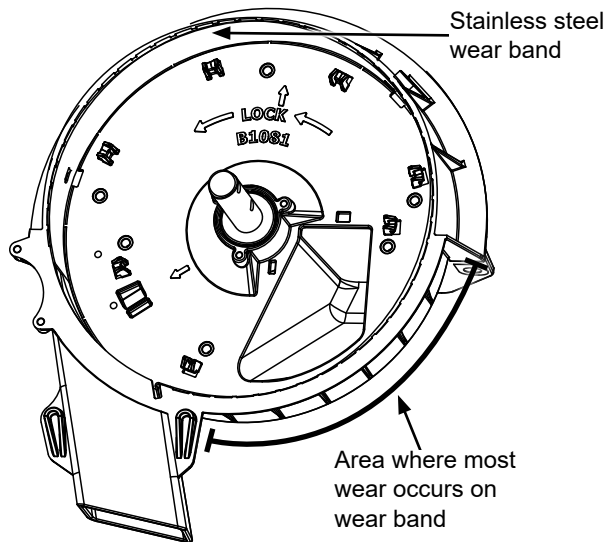


SEED DISC WEAR

Most seed disc wear is found in the agitation groove area (area between seed loading slots). Wear affects planting accuracy at high RPM. Lay a straight edge across disc surface at agitation groove area and measure gap between disc and straight edge. If agitation groove areas are worn in excess of .030" and accuracy starts to drop off at higher meter RPM, replace seed disc. Estimated seed disc life expectancy under normal operating conditions is approximately 200 acres per row. Severe operating conditions such as dust, lack of lubrication or abrasive seed coating could reduce seed disc life expectancy to under 100 acres per row.

STAINLESS STEEL WEAR BAND

| | |
|---------------|---|
| NOTICE | If wear band wears through or if meter is used without wear band in place, meter housing may be damaged. |
|---------------|---|



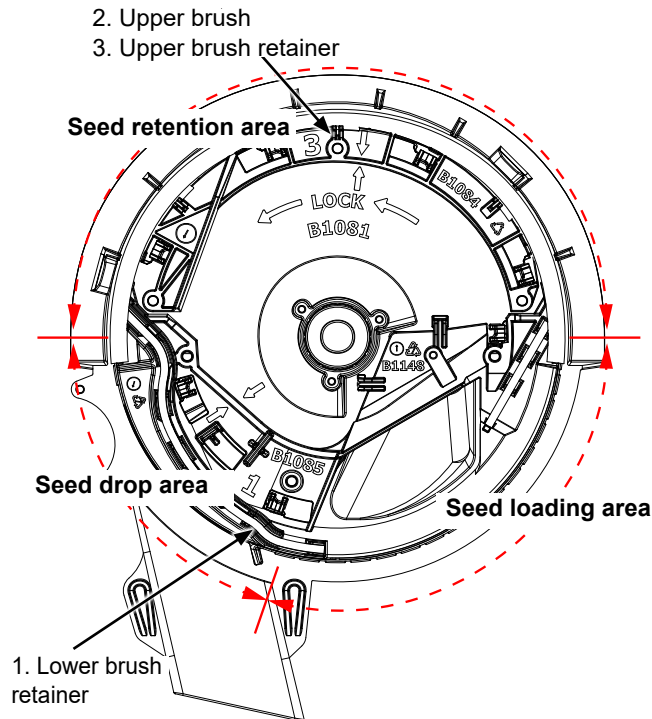
Stainless steel wear band

Stainless steel wear band protects meter housing from wear and is .030" thick. Replace wear band when there is approximately .020" of wear in primary wear area. Estimated life expectancy of stainless steel wear band is 240-800 acres per row.

ASSEMBLY

Assemble meter by putting parts back in the housing in the order they are numbered:

1. Lower brush retainer
2. Upper brush
3. Upper brush retainer



LOWER BRUSH

Lower brush moves seed down seed loading slots to seed pockets, isolates seed in reservoir from entering seed tube, and cleans seed loading slots. Estimated lower brush life expectancy is 240-800 acres per row. Replace lower brush if bristles are deformed or missing, or if there are cracks in brush retainer. Once all parts are properly in place, rotate to lock position.

UPPER BRUSH

Upper brush holds seed in seed disc pocket in seed retention area. Brush must apply enough pressure against seed in seed disc pocket as disc rotates through seed retention area to prevent seed from dropping out of disc pocket. A damaged spot, excessive brush wear, or foreign material lodged in brush may greatly reduce meter performance.

Replace upper brush at 120-400 acres per row of use or sooner if damage or excessive wear is found. Position upper brush into inner perimeter of seed retention area. Make sure base of brush is tight against bottom of meter housing. Install brush retainer. Once all parts are properly in place, rotate to lock position.

NOTE: Use P/N: GB1084 upper brush retainer for all seed discs. It is recommended for milo/grain sorghum to use P/N: GB1107 milo retainer for additional brush retention.

CLEANING BRUSH-TYPE SEED METER FOR STORAGE

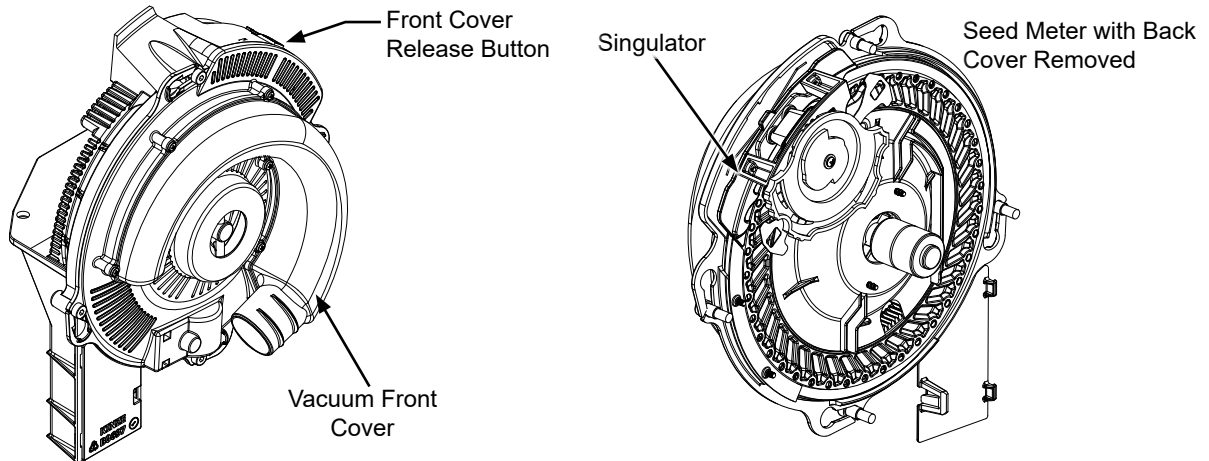
1. Remove meter from seed hopper by removing two thumbscrews securing meter to hopper.
2. Remove seed disc and wash with soap and water and dry thoroughly.
3. Remove three hex head screws from brush retainer. Remove brush retainer and upper brush.
4. Remove three hex head screws from lower brush. Remove lower brush and stainless steel wear band.
5. Wash all parts and meter housing with soap and water and dry thoroughly.
6. Inspect all parts and replace worn parts.
7. Reassemble meter except for seed disc. Store meter in a dry, rodent-free space with seed disc removed.

VACUUM MANIFOLD MAINTENANCE

Dust accumulates in manifolds and hoses during normal operation. Clean manifolds annually. Abnormally dusty planting conditions may require more frequent cleaning.

1. Remove vacuum hose from each seed meter.
2. Operate vacuum fan at full hydraulic flow from tractor for two minutes to clear manifolds, hoses, and fittings of dust and debris.
3. Shut down fan and replace hoses

VACUUM SEED METER MAINTENANCE



Before each planting season inspect seed discs and singulator and clean or replace as needed.

Use clean, high quality seed for maximum meter accuracy. Damaged or cracked seed, hulls, and foreign material may become lodged in seed disc orifices and greatly reduce meter accuracy.

Inspect and clean seed discs daily checking for any buildup of foreign material and blocked orifices. If seed disc orifices are plugged frequently with seed remnants, remnants ejector wheel may need to be replaced. Clean seed disc by washing it with soap and water. Dry thoroughly.

Inspect singulator blades and guide for wear after every 200 acres (81 hectares) per row of operation. If adjustment of singulator blade does not affect meter performance or if blades appear worn, singulator blade may need to be replaced.

Replace seed disc or vacuum seal if abnormally high vacuum is required or if consistent operation cannot be achieved.

See ["Preparation for Storage" on page 5-31](#) for additional Vacuum Seed Metering System maintenance.

NOTE: Remove seed discs from meters for annual storage and store them vertically on a dowel or pipe.

SEED METER CLEANOUT

NOTE: Use of damaged seed or seed containing foreign material will cause plugging of seed cell orifices and require more frequent seed meter cleanout to prevent underplanting.

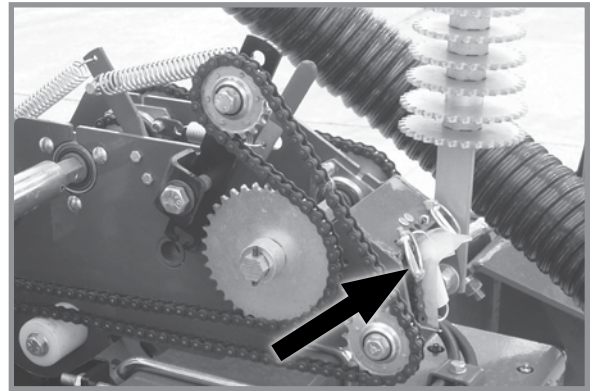
Thorough seed meter cleanout is important to maintain genetic purity.

1. Disengage seed drive and remove seed hopper and meter.
2. Dump seed from right rear corner of hopper into a container.
3. Lay hopper on its right side. Push release button and rotate seed meter vacuum cover clockwise to align keyhole slots with bolt heads. Lift off cover.
4. Rotate seed disc hub clockwise to unlock and remove seed disc.
5. Empty meter.
6. Thoroughly inspect meter to ensure all seed is removed.
7. Replace seed disc. Install vacuum cover.

CHAIN TENSION ADJUSTMENT

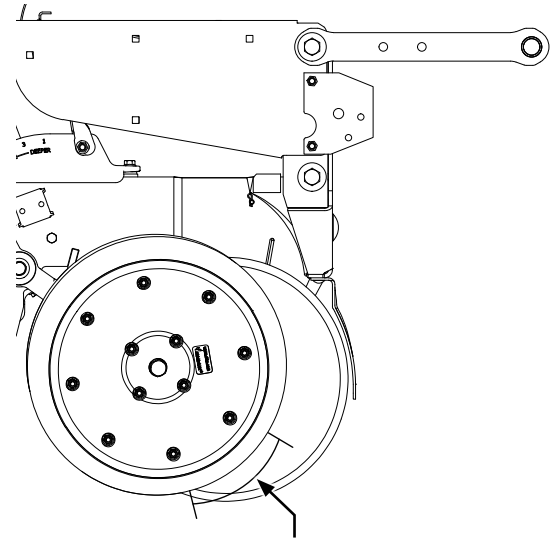
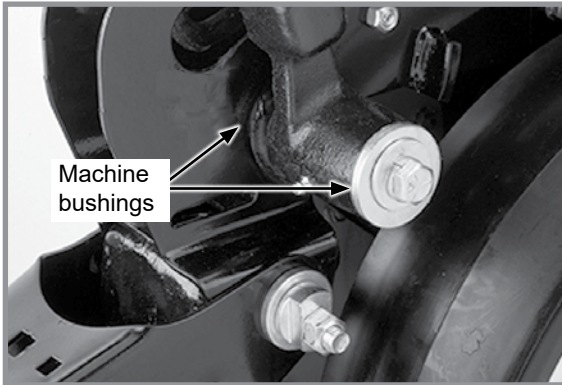
Drive chains have spring loaded idlers and are self-adjusting. Remove link to shorten chain if wear stretches chain and reduces spring tension. Check idler pivot points to make sure they rotate freely. See "Wrap Spring Wrench Assembly" in this section for additional information.

Additional chain links are stored inside planter frame.



Additional chain links

GAUGE WHEEL ADJUSTMENT



Shim gauge wheel to lightly contact opener disc blade in this area for 4" to 6". Check adjustment in operating position.

Gauge Wheel Adjustment

Add or remove machine bushings between shank and gauge wheel arm to adjust contact between gauge wheels and opener blades. Gauge wheels should lightly contact opener blades to prevent accumulation of dirt or trash. Gauge wheels and opener blades should turn with only slight resistance.

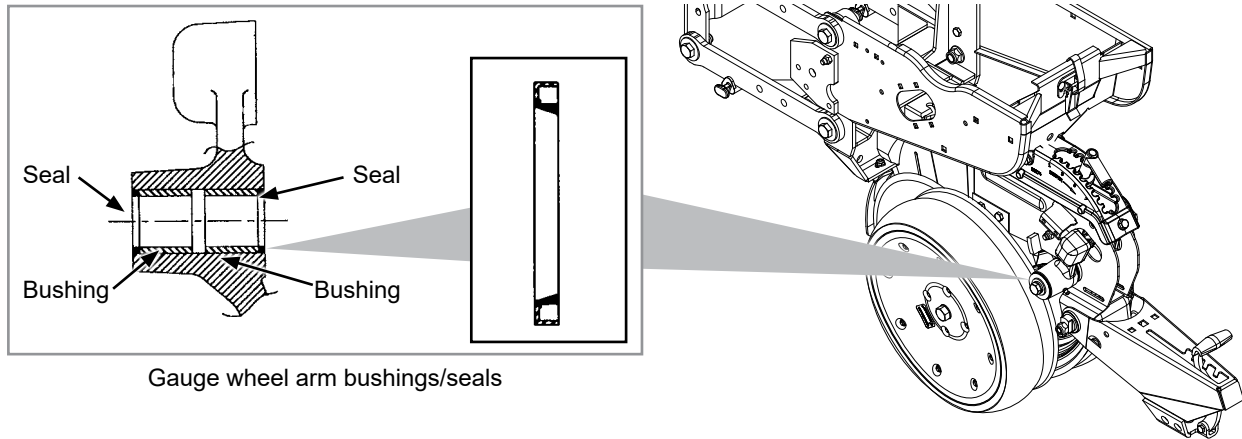
Store remaining machine bushings between gauge wheel arm and flat washer on outer side of gauge wheel arm.

Use the following guidelines:

NOTE: Set depth adjustment handle at 3x2 position and lift gauge wheel to stop one side at a time.

Contact should be no less than one half of the rotation of the wheel, while not sticking in any position (it does not have to be continuous). Wheel should rotate in the direction of travel of the row unit. Wheel can be held in position by supporting the spindle bolt head.

GAUGE WHEEL ARM BUSHING/SEAL REPLACEMENT



Gauge wheel arm bushings/seals

NOTE: Gauge Wheel Arm Bushing and Seal Driver Kit (G1K296) is available through your Kinze Dealer.

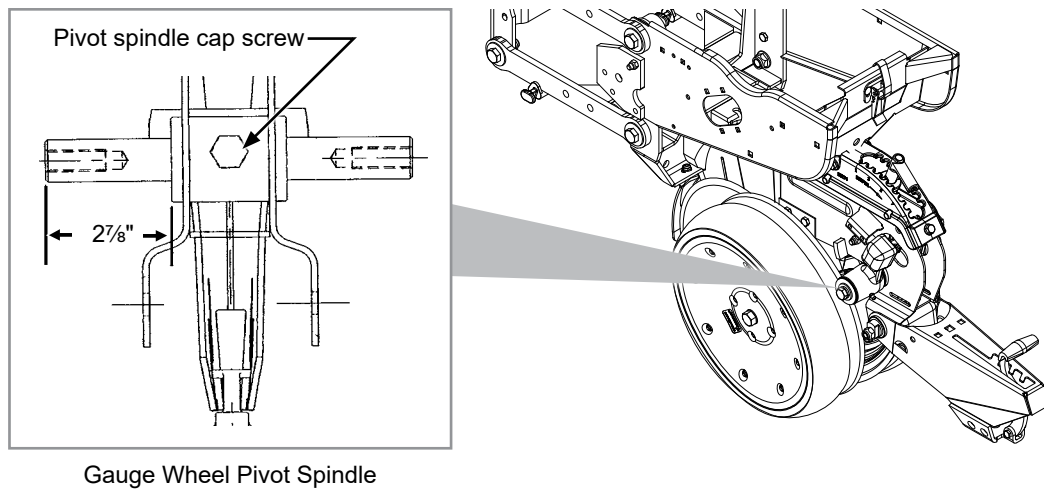
1. Remove gauge wheel from arm.
2. Remove gauge wheel arm from shank assembly.
3. Remove seal and bushing and discard. Clean and dry inner bore.
4. Drive/press replacement bushing inside bore of arm to a depth of .125" below flush.
5. Coat wiping edge of seal with grease.
6. Drive/press seal into place with lip to outside.

NOTE: Use extra care to protect the sealing lip during installation. Apply uniform pressure to assemble the seal into the bore of the arm. Never apply a direct hammer blow to the seal surface.

7. Inspect gauge wheel pivot spindle.
8. Reinstall gauge wheel arm assembly and gauge wheel.

NOTE: Use special machine bushing between gauge wheel arm and gauge wheel.

9. Shim for proper gauge wheel tire/disc blade clearance.
10. Lubricate with an SAE multipurpose grease.

GAUGE WHEEL ARM PIVOT SPINDLE REPLACEMENT

1. Remove gauge wheel and arm assemblies from shank assembly.
2. Remove $\frac{1}{2}$ " x $\frac{3}{4}$ " cap screw that locks pivot spindle in place and remove spindle.
3. Install replacement spindle and position as shown. Exact centering is critical.
4. Install $\frac{1}{2}$ " x $\frac{3}{4}$ " cap screw and torque to lock pivot spindle in place.
5. Install gauge wheel and arm assemblies. Shim for proper gauge wheel tire/disc blade clearance.

15" SEED OPENER DISC BLADE/BEARING ASSEMBLY

Approximately $1" \pm \frac{1}{2}"$ ($3 \pm .5$ cm) of blade-to-blade contact should be maintained to properly open and form seed trench. As blade diameter decreases due to wear, it is necessary to relocate machine bushings from inside to outside to maintain $1" \pm \frac{1}{2}"$ ($3 \pm .5$ cm) of contact.

NOTE: Proper blade clearance is critical. Blades should have $1" \pm \frac{1}{2}"$ ($3 \pm .5$ cm) contact in this area. When blades are turned by hand in opposite directions against each other, there should be only light resistance to turning. Re-adjust blade scraper if necessary to center it between the blades.

NOTE: If proper blade-to-blade contact cannot be maintained after relocating machine bushings or if blade diameter wears below $14\frac{1}{2}"$ (37 cm), blades should be replaced.

NOTICE

Excessive blade contact may result in premature disc opener bearing/hub failures and excessive wear on seed tube guard/inner scraper. When properly adjusted, if one blade is held in fixed position, opposite blade should rotate with less than 5 pounds force (22 newtons) at outer edge of blade.

NOTICE

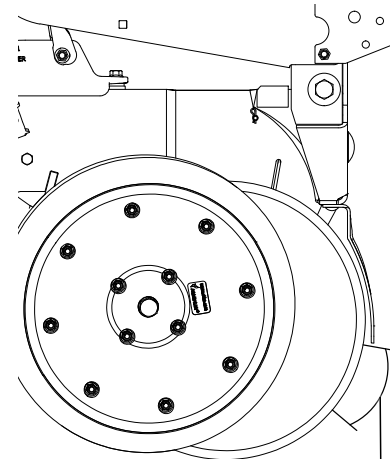
Left hand side of opener uses a left hand threaded cap screw. **DO NOT OVER TIGHTEN.** Damage to shank threads require replacement of row unit shank assembly.

REPLACE DISC BLADE/BEARING ASSEMBLY

1. Remove gauge wheel.
2. Remove scraper.
3. Remove bearing dust cap.
4. Remove cap screw, washer and disc blade/bearing assembly. Machine bushings between shank and disc blade are used to maintain approximate $1" \pm \frac{1}{2}"$ ($3 \pm .5$ cm) of blade-to-blade contact.
5. Install machine bushing(s), new disc blade bearing assembly, washer and cap screw. Torque $\frac{5}{8}"$ -11 Grade 5 cap screw to value shown in "Torque Values Chart".

NOTE: Replace disc blades only with disc blades of equal thickness.

6. Replace bearing dust cap.
7. Install scraper.
8. Install gauge wheel. It may be necessary to replace bearing only if there is excessive endplay or if bearing sounds or feels rough when disc blade is rotated.



Approximately $1" \pm \frac{1}{2}"$ ($3 \pm .5$ cm) of blade-to-blade contact.

REPLACE BEARING ONLY

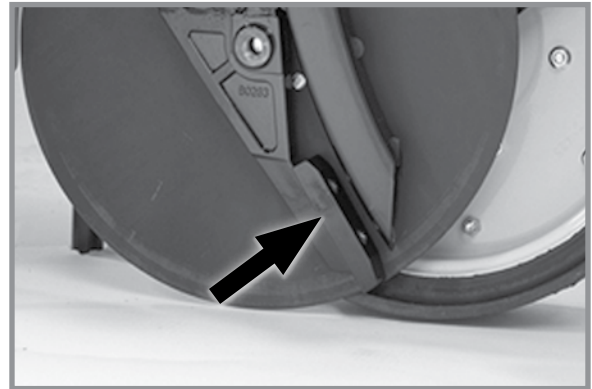
1. Remove gauge wheel, scraper, bearing cap, cap screw, washer and disc blade/bearing assembly.
2. Remove ¼" rivets from bearing housing to expose bearing.
3. After installing new bearing, install three evenly spaced ¼" cap screws into three of six holes in bearing housing to hold bearing and bearing housing in place. Install rivets in other three holes. Remove ¼" cap screws and install rivets in those three holes.
4. Reinstall disc blade/bearing assembly, washer and cap screw. Torque ⅝"-11 cap screw to value shown in "Torque Values Chart" at the beginning of this section.
5. Replace bearing dust cap.
6. Install scraper and gauge wheel.

SEED TUBE GUARD/INNER SCRAPER

Seed tube guard protects seed tube and acts as inner scraper for seed opener disc blades.

Remove seed tube and check for wear. Excessive wear on seed tube indicates a worn seed tube guard. Replace seed tube guard if it measures $\frac{5}{8}$ " (16 mm) or less at lower end. A new seed tube guard measures approximately $\frac{7}{8}$ " (22.2 mm).

NOTE: No till planting or planting in hard ground conditions, especially when planter is not equipped with no till coulters, and/or excessive blade-to-blade contact increases seed tube guard wear and requires more frequent inspection and/or replacement.



Seed tube guard/inner scraper
(Gauge wheel/seed opener disc blade removed)

NOTICE

Over tightening hex socket head cap screws may damage shank threads and require replacement of shank. An excessively worn seed tube guard may allow blades to wear into row unit shank, also requiring replacement of shank.

Remove seed tube and two hex socket head cap screws that attach seed tube guard. Hold replacement seed tube guard centered between seed opener disc blades. Install hex socket head cap screws. **DO NOT TIGHTEN.** Using a clamp or vise-grip, squeeze opener blades together in front of seed tube guard. Tighten seed tube guard retaining screws. Remove clamps. Distance between seed tube guard and opener blades should be equal on both sides. Reinstall seed tube.

ROW UNIT MOUNTED NO TILL COULTER



Check nuts and hardware periodically for proper torque.

NOTE: Torque $\frac{5}{8}$ " spindle hardware to 120 ft-lb (162 N-m).

Be sure coulters is positioned square with row unit and aligned in front of row unit disc opener.

Coulters blade can be adjusted to one of four settings. Initially blade is set in highest position. As blade wears it can be adjusted to one of three lower settings. See "Row Unit Mounted No Till Coulters" in Row Unit Operation section of this manual.

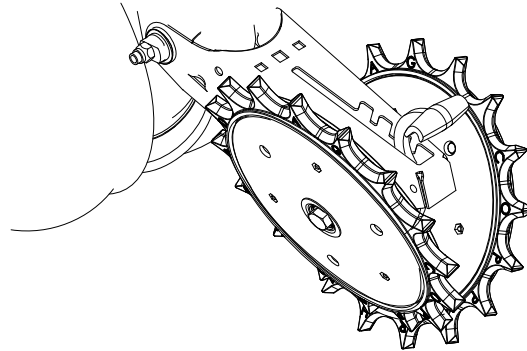
Replace 16" diameter coulters blade when worn to 14½" (37 cm).

COULTERS MOUNTED RESIDUE WHEELS



Wheel hubs are equipped with sealed bearings. If bearings sound or feel rough when wheel is rotated, replace them.

SPIKED CLOSING WHEEL



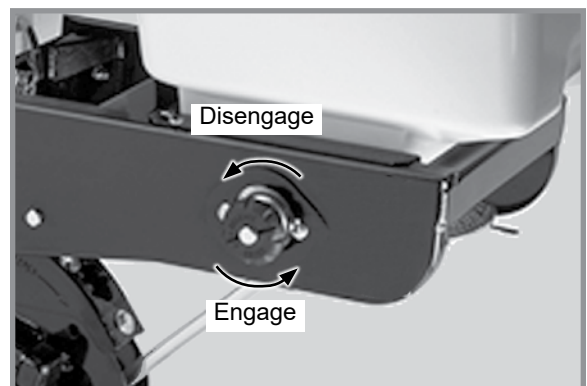
Row Unit Spiked Closing Wheel

Inner parts of spiked closing wheel will begin to wear at approximately 70% of life. Flip/reverse wheel to utilize remaining life of wheel.

GRANULAR CHEMICAL ATTACHMENT

Before storing planter, disengage granular chemical drive by rotating throwout knob $\frac{1}{4}$ turn counterclockwise. Remove drive chain and empty and clean all granular chemical hoppers. Clean drive chains and coat them with a rust preventive spray or submerge chains in oil. Inspect and replace worn or broken parts.

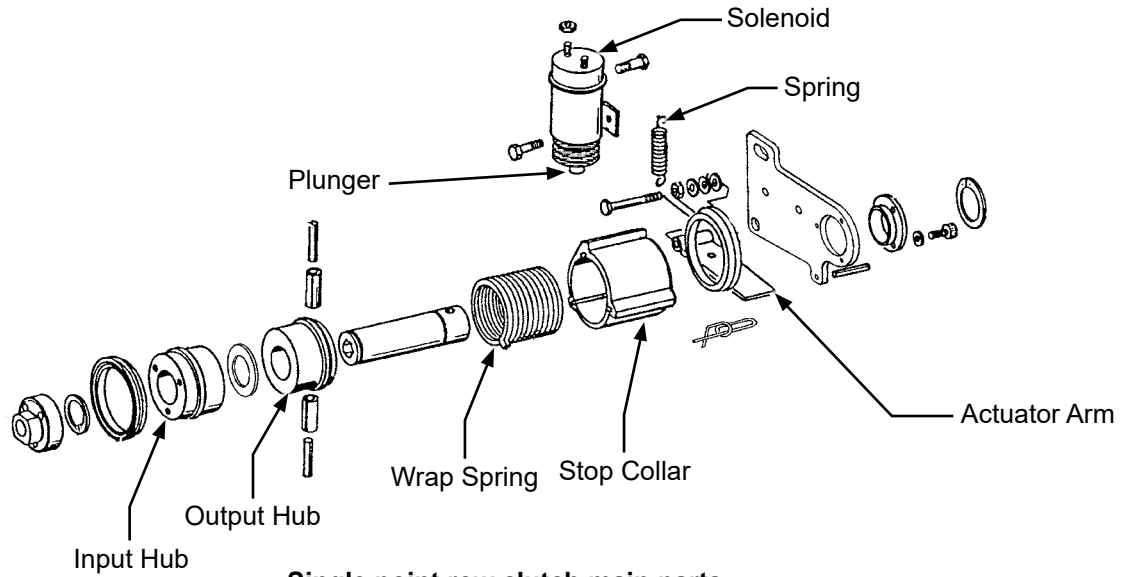
Install hoppers and chains. Check chain alignment.



Granular chemical throwout knob

SINGLE POINT ROW CLUTCH MAINTENANCE

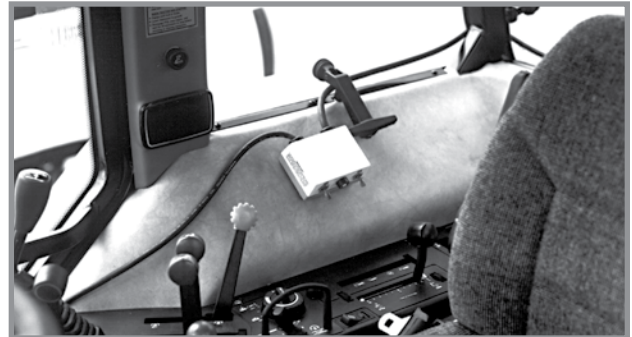
Point row clutch is permanently lubricated and sealed and requires no periodic maintenance. Two-speed point row clutch is similar in design and operation to standard point row clutch except for two-speed function.



Single point row clutch main parts

The right hand clutch operates clockwise and the left hand clutch operates counterclockwise. Therefore, some of the parts of the clutch such as the wrap spring differ from one side of the planter to the other. Be sure to use the correct repair part if a clutch must be repaired.

The control box is equipped with a resettable circuit breaker. To reset the circuit breaker, press the red button on the circuit breaker until it snaps into place. If the circuit breaker continues to trip, check to see what is causing it to trip. See "Point Row Clutch Troubleshooting".

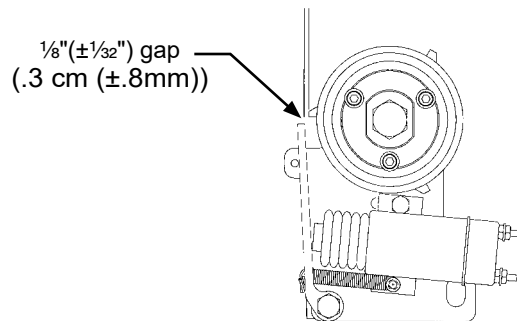


If the circuit breaker on the control box is not tripped, determine if the problem is electrical or mechanical. Place the operational switch in the RIGHT or LEFT position. Check the clutch and wiring harness for power with a test light or volt meter. If the solenoid is operating properly, the plunger on the solenoid will retract causing a clicking sound. The plunger will also be magnetized which can be checked by touching the plunger with a metal object.

ACTUATOR ARM ADJUSTMENT

Gap between actuator arm and stop on stop collar should be $\frac{1}{8}$ " ($\pm\frac{1}{32}$ ") (.3 cm ($\pm.8$ mm)) when solenoid is NOT engaged.

Loosen nut on mounting pin and move pin in slot until there is a $\frac{1}{8}$ " ($\pm\frac{1}{32}$ ") (.3 cm ($\pm.8$ mm)) gap between arm and stop on stop collar. Retighten nut.



NOTE: If the "Reduced Rate/Full Rate" functions fail to engage or disengage, see troubleshooting chart for possible cause

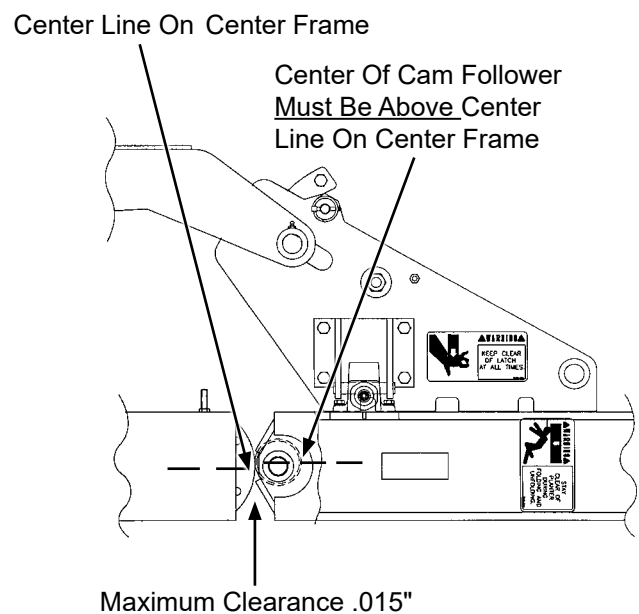
CAM FOLLOWER ADJUSTMENT

Each wing hinge is equipped with a cam follower which floats against a curved guide on the center frame. Check cam followers periodically and maintain adjustment as shown below.

NOTE: Always check cam follower adjustment and make cam follower adjustments with the planter on a flat surface and lowered to the planting position.

To adjust cam followers:

1. Loosen $\frac{3}{4}$ " cap screw on cam follower.
2. Using a $\frac{1}{2}$ " ratchet extension, rotate and hold cam follower in place.
3. Torque $\frac{3}{4}$ " cap screw to 150 ft. lbs. (203 Nm)



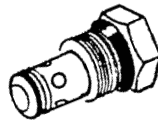
NOTICE

Connect hydraulic motor case drain to a case drain return line with zero pressure on tractor or hydraulic motor will be damaged. **DO NOT** connect hydraulic motor case drain to SCV outlet. Contact tractor manufacturer for specific details on “zero pressure return”.

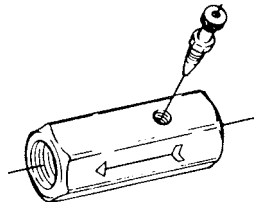
RELIEF VALVE CARTRIDGE

Pressure relief valve located in valve block below vacuum fan motor assembly helps prevent damage to vacuum fan motor by limiting pressure in the motor case drain line. It is set to open at 35 PSI (241.21 kPa). If valve fails to function properly, it should be removed for inspection. Check for foreign material and contamination on valve and the seating area of valve body. Replace if defective.

NOTE: Case drain pressure will build if the case drain hose to the tractor is connected where pressure is present.

CHECK VALVE (VACUUM FAN)

Check valve located in valve block below vacuum fan motor assembly operates as a return line check to prevent vacuum fan motor reverse operation. Remove and inspect valve if it does not operate properly. Check for foreign material and if O-ring is leaking internally. Replace if defective.

FLOW CONTROL VALVE


The optional dual lift assist wheels flow control valve should be adjusted as part of the assembly procedure or upon initial operation.

If the valve fails to function properly or requires frequent adjustment, the needle valve should be removed for inspection. Check for foreign material and contamination on both the valve and the seating area of the valve body. Replace any components found to be defective.


NOTE: The flow control valve must be installed with the arrow pointed toward the planter.

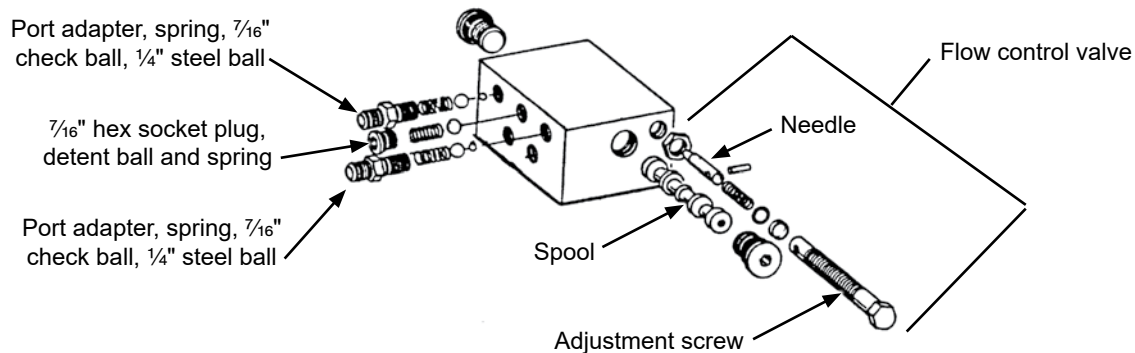
NOTE: When oil is cold, hydraulics operate slowly. Make sure all adjustments are made with warm oil.

ROW MARKER SEQUENCING/FLOW CONTROL VALVE INSPECTION


WARNING

Pressurized hydraulic fluid can penetrate body tissue and result in death, serious infection, or other injuries. Fluid injected under skin must be **IMMEDIATELY** removed by a surgeon familiar with this type of injury. Make sure connections are tight and hoses and fittings are not damaged before applying system pressure. Leaks can be invisible. Keep away from suspected leaks. Relieve pressure before searching for leaks or performing any system maintenance.





The valve block assembly consists of the row marker sequencing and flow control valves in one assembly. Sequencing valve portion consists of a chambered body containing a spool and series of check valves to direct hydraulic oil flow.

1. Remove valve block assembly from planter.
2. Remove detent assembly and port adapter assemblies from rear of valve block.

NOTICE

Damage to spool may occur if detent assembly and port adapter assemblies are not removed prior to removal of spool.

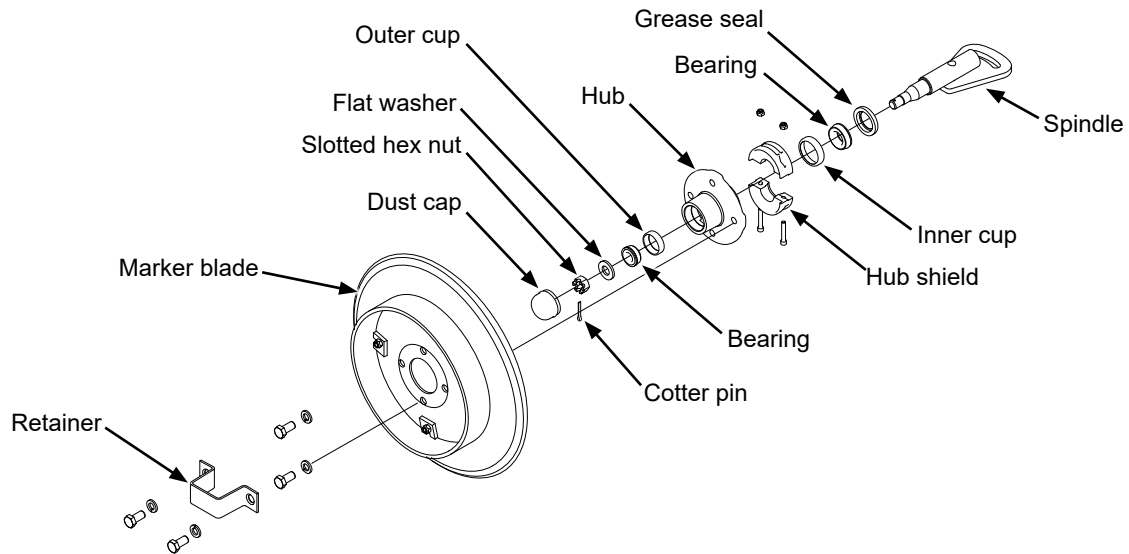
3. Remove plug from both sides of valve block and remove spool.
4. Inspect all parts for pitting, contamination, or foreign material. Check seating surfaces inside valve. Replace defective parts.
5. Lubricate spool with a light oil and reinstall. Check spool moves freely in valve body.

NOTE: Make sure correct check ball(s) and spring are installed in each valve bore upon reassembly.

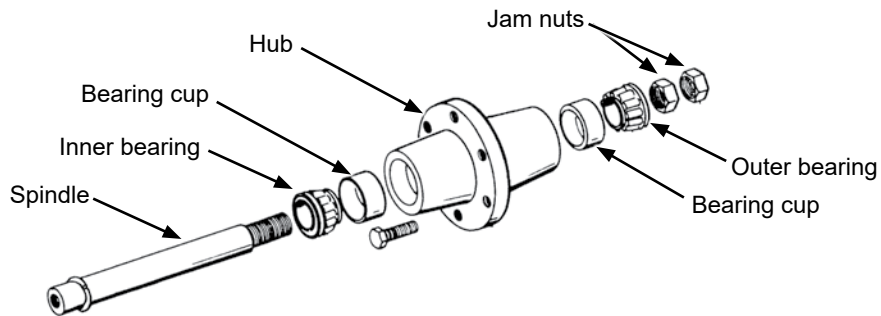
A flow control valve is located on each side of block assembly. Adjust flow control valves for raise and lower speed as part of assembly procedure or upon initial operation. If valve fails to function properly or requires frequent adjustment, remove needle valve for inspection. Check for foreign material and contamination. Make sure needle moves freely in adjustment screw. Replace defective components.

NOTE: Hydraulics operate slowly when oil is cold. Make all adjustments with warm oil.

ROW MARKER BEARING LUBRICATION OR REPLACEMENT



1. Remove retainer and marker blade.
2. Remove dust cap from hub.
2. Remove hub shield. Note direction of installation.
3. Remove cotter pin, slotted hex nut, and washer.
4. Slide hub from spindle.
5. Remove bearings and cups and discard if bearings are being replaced. Clean hub and dry. Remove bearings only and not cups if repacking.
6. Press in new bearing cups with thickest edge facing in. (Bearing replacement procedure only.)
7. Pack bearings with heavy duty wheel bearing grease thoroughly forcing grease between roller cone and bearing cage. Fill the space between the bearing cups in the hub with grease.
8. Install rubber seal into grease seal. Place inner bearing in place and press in new rubber seal/grease seal.
9. Clean spindle and install hub.
10. Install outer bearing, washer and slotted hex nut. Tighten slotted hex nut while rotating hub until there is some drag. This ensures all bearing surfaces are in contact. Back off slotted nut to nearest locking slot and install cotter pin.
11. Fill dust caps approximately $\frac{3}{4}$ full of wheel bearing grease and install on hub.
12. Install hub shield.
13. Install marker blade and retainer on hub. Tighten hardware evenly.

WHEEL BEARING REPACK OR REPLACEMENT

1. Raise tire clear of ground and remove wheel.
2. Remove double jam nuts and slide hub from spindle.
3. Remove bearings and cups and discard if bearings are being replaced. Clean hub and dry. Remove bearings only and not cups if repacking.
4. Press in new bearing cups with thickest edge facing in. (Bearing replacement procedure only.)
5. Pack bearings with heavy duty wheel bearing grease thoroughly forcing grease between roller cone and bearing cage. Fill space between bearing cups and hub with grease.
6. Place inner bearing in place.
7. Clean spindle and install hub.
8. Install outer bearing and jam nut. Tighten jam nut while rotating hub until there is some drag. This ensures all bearing surfaces are in contact. Back off jam nut $\frac{1}{4}$ turn or until there is only slight drag when rotating hub. Install second jam nut to lock against first.
9. Install wheel on hub. Tighten hardware evenly.

PREPARATION FOR STORAGE

Store planter in a dry sheltered area if possible.

Remove all trash wrapped on sprockets or shafts and remove dirt that can draw and hold moisture.

Clean all drive chains and coat with a rust preventative spray, or remove chains and submerge in oil.

Lubricate planter and row units at all lubrication points.

Inspect planter for parts that in need of replacement and order during "off" season.

Make sure all seed and granular chemical hoppers are empty and clean.

Remove seed discs from seed meters, clean and store meters in a rodent-free, dry area with discs removed. Store seed discs vertically on a dowel or pipe.

Remove vacuum hose from each seed meter. Operate vacuum fan at full hydraulic flow from tractor for two minutes to clear manifolds, hoses and fittings of dust and debris.

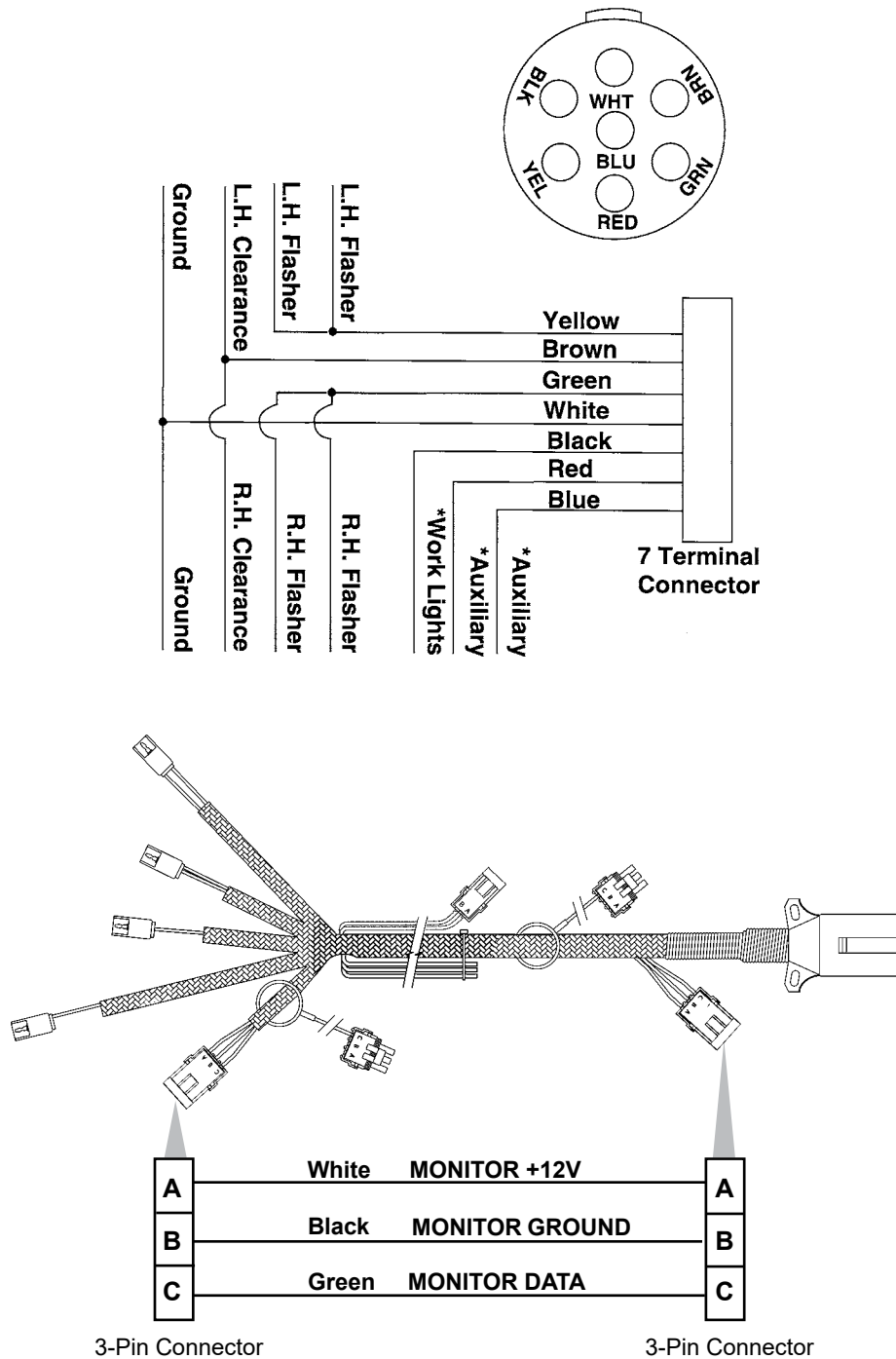
Clean breather on analog vacuum and pressure gauges.

Disassemble, clean and grease all U-joint slides.

Grease or paint disc openers/blades and row marker disc blades to prevent rust.

Flush liquid fertilizer tanks, hoses and metering pump with clean water. See "Piston Pump Storage" if applicable.

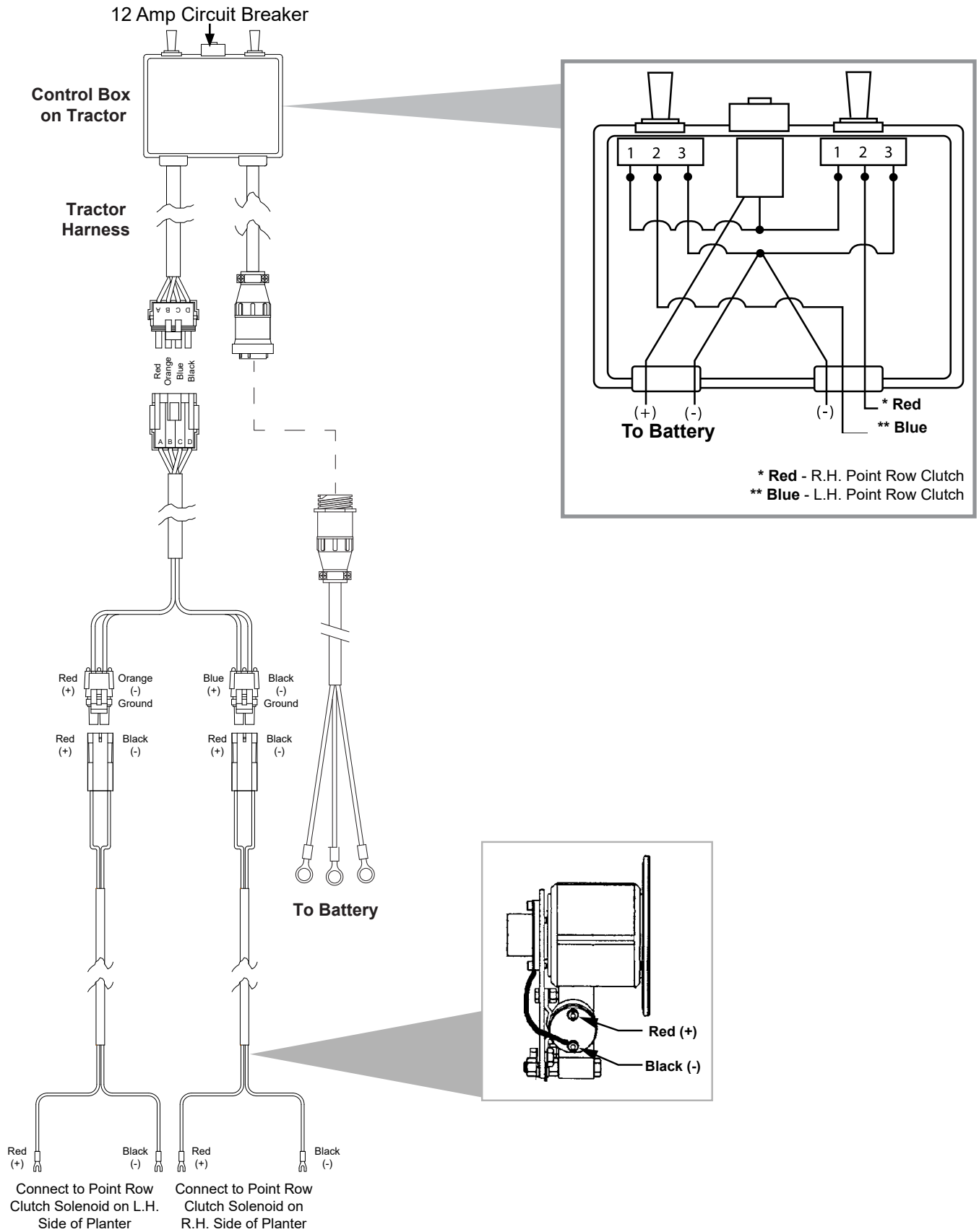
ELECTRICAL WIRING DIAGRAM FOR LIGHT PACKAGE




* Optional customer-supplied auxiliary lights and wires may be wired into existing plug terminals.

The light package supplied on the Model 3145 planter meets ASAE Standards. For the correct wiring harness to be wired into the lights on your tractor, check with the tractor manufacturer.


ELECTRICAL WIRING DIAGRAMS FOR POINT ROW CLUTCHES



HYDRAULIC HOSE LIFE

**WARNING**

Pressurized hydraulic fluid can penetrate body tissue and result in death, serious infection, or other injuries. Fluid injected under skin must be IMMEDIATELY removed by a surgeon familiar with this type of injury. Make sure connections are tight and hoses and fittings are not damaged before applying system pressure. Leaks can be invisible. Keep away from suspected leaks. Relieve pressure before searching for leaks or performing any system maintenance.



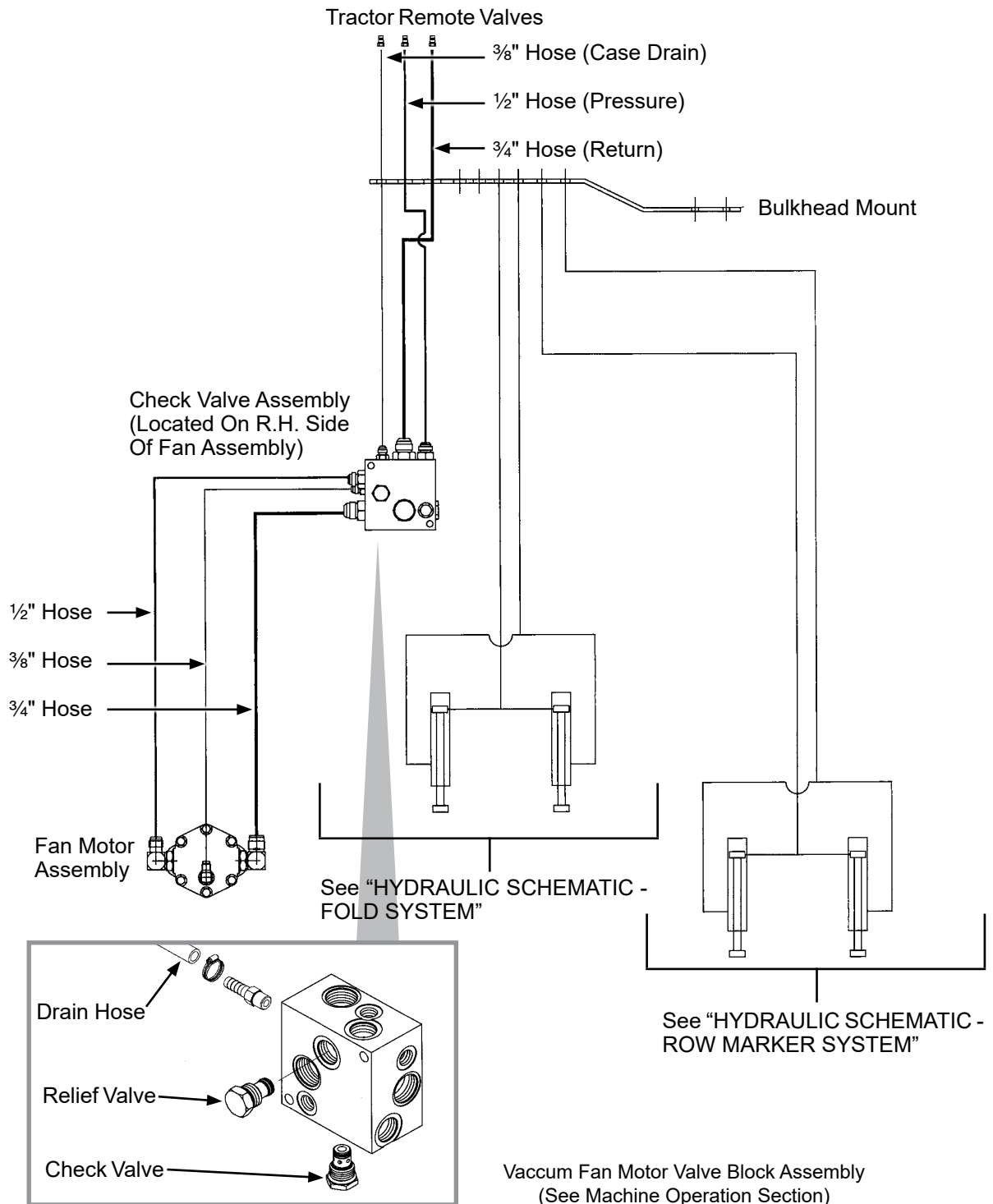
Proper storage of hydraulic hoses can significantly increase the life of the hoses, for a period of three to five years. After this period, service life of hoses may decrease, depending on variables such as variances in rubber materials and storage environment. Refer to the guidelines below for best practices when storing.

- Store in a clean, cool and dry area
- Avoid direct sunlight or moisture
- Do not store near high power electrical equipment
- Avoid contact with corrosive chemicals
- Avoid ultraviolet light
- Avoid areas with obvious signs of insects or rodents

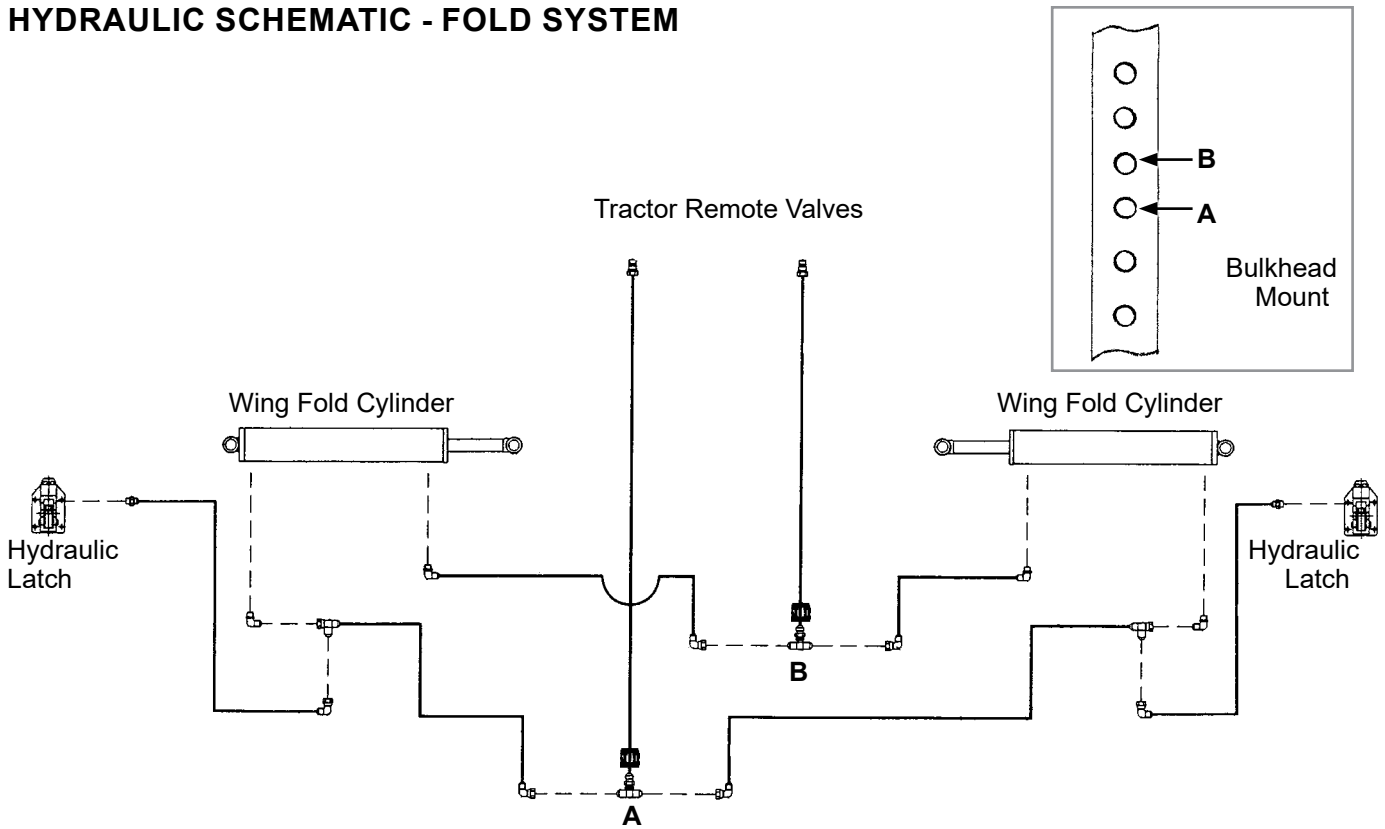
Unusually long periods of storage or poor storage environment may lead to performance issues or premature failure. Always inspect all hoses prior to use for extensive wear, cuts, or holes. If such flaws are identified, replace immediately to avoid potential failure, property damage or bodily injury.

HYDRAULIC SCHEMATIC - VACUUM FAN MOTOR SYSTEM

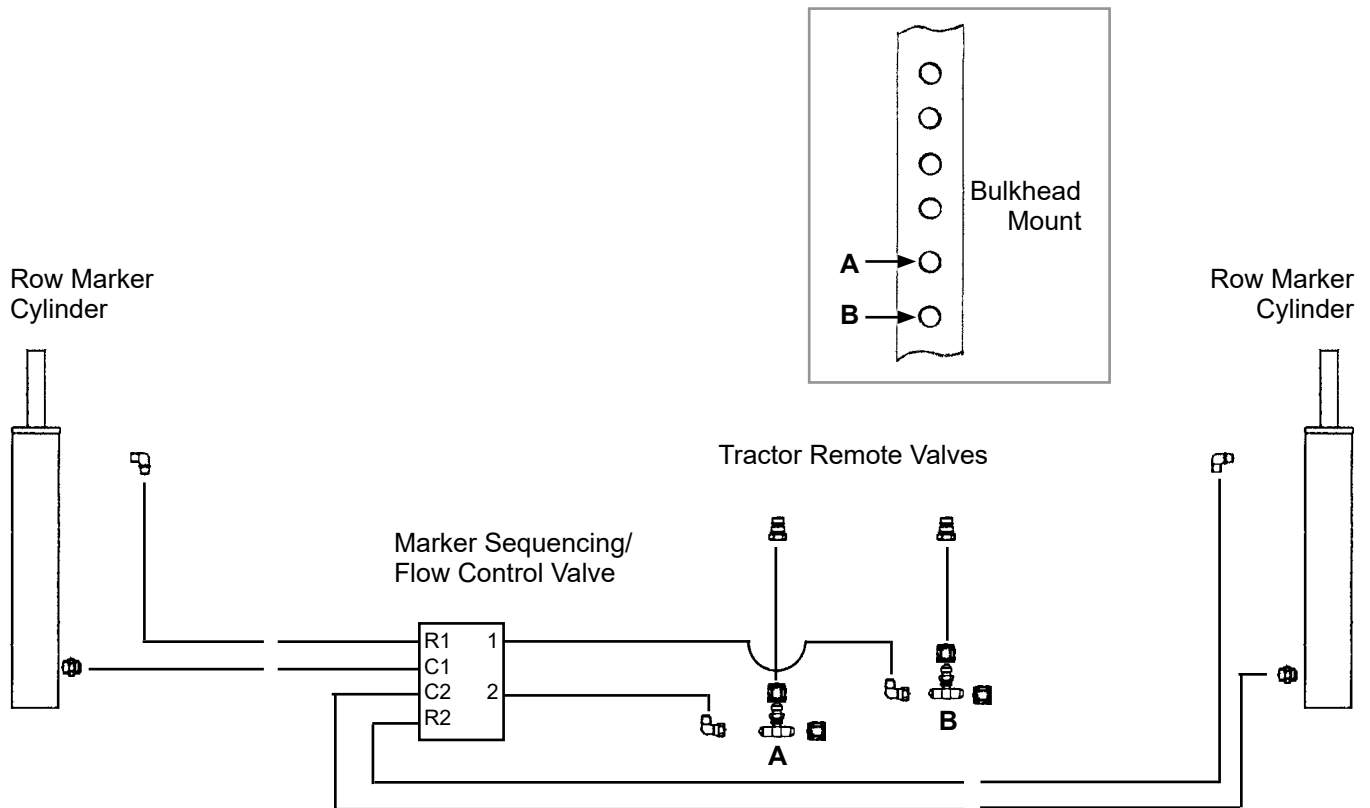
NOTICE Connect hydraulic motor case drain to a case drain return line with zero pressure on tractor or hydraulic motor will be damaged. DO NOT connect hydraulic motor case drain to SCV outlet. Contact tractor manufacturer for specific details on "zero pressure return".



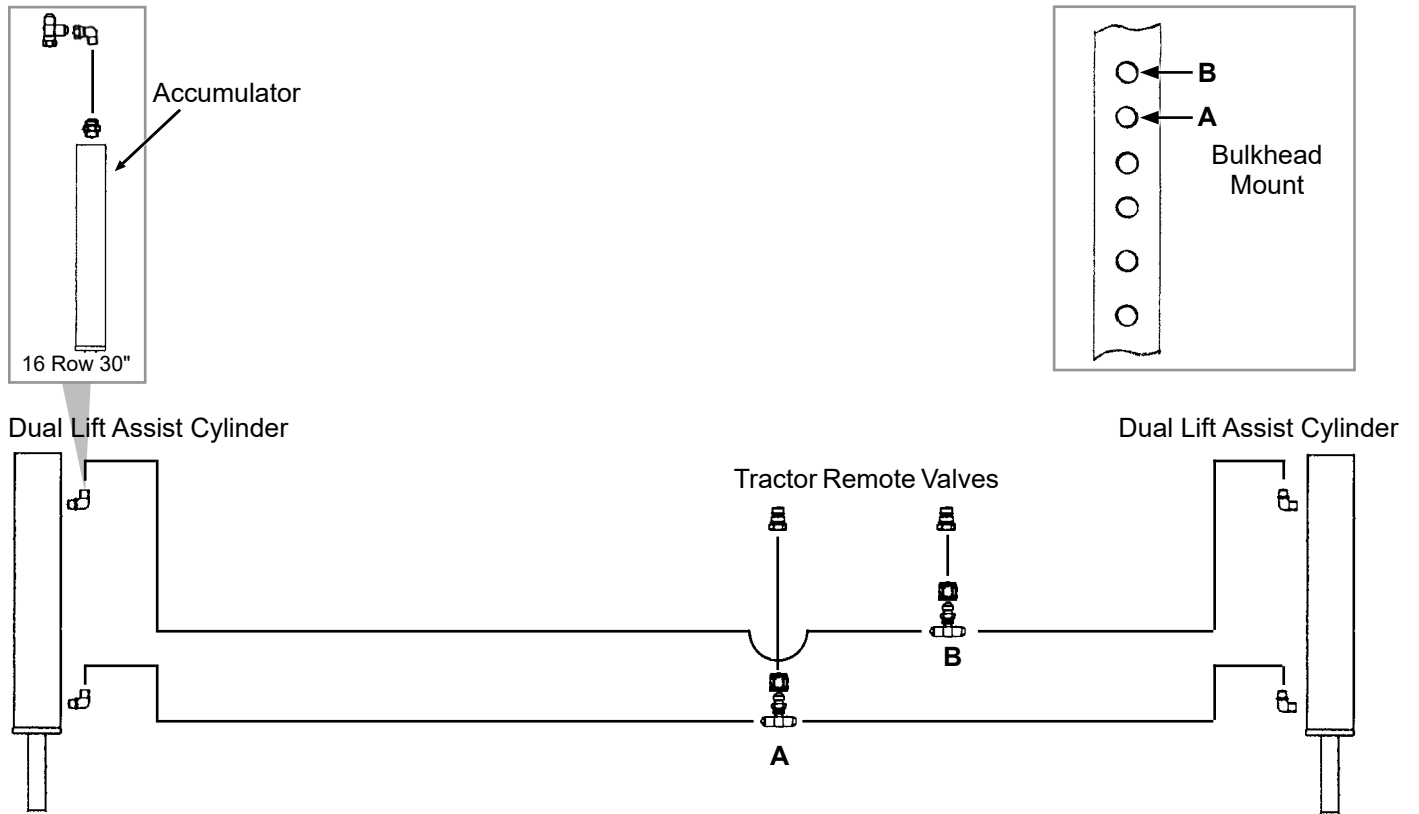
HYDRAULIC SCHEMATIC - FOLD SYSTEM



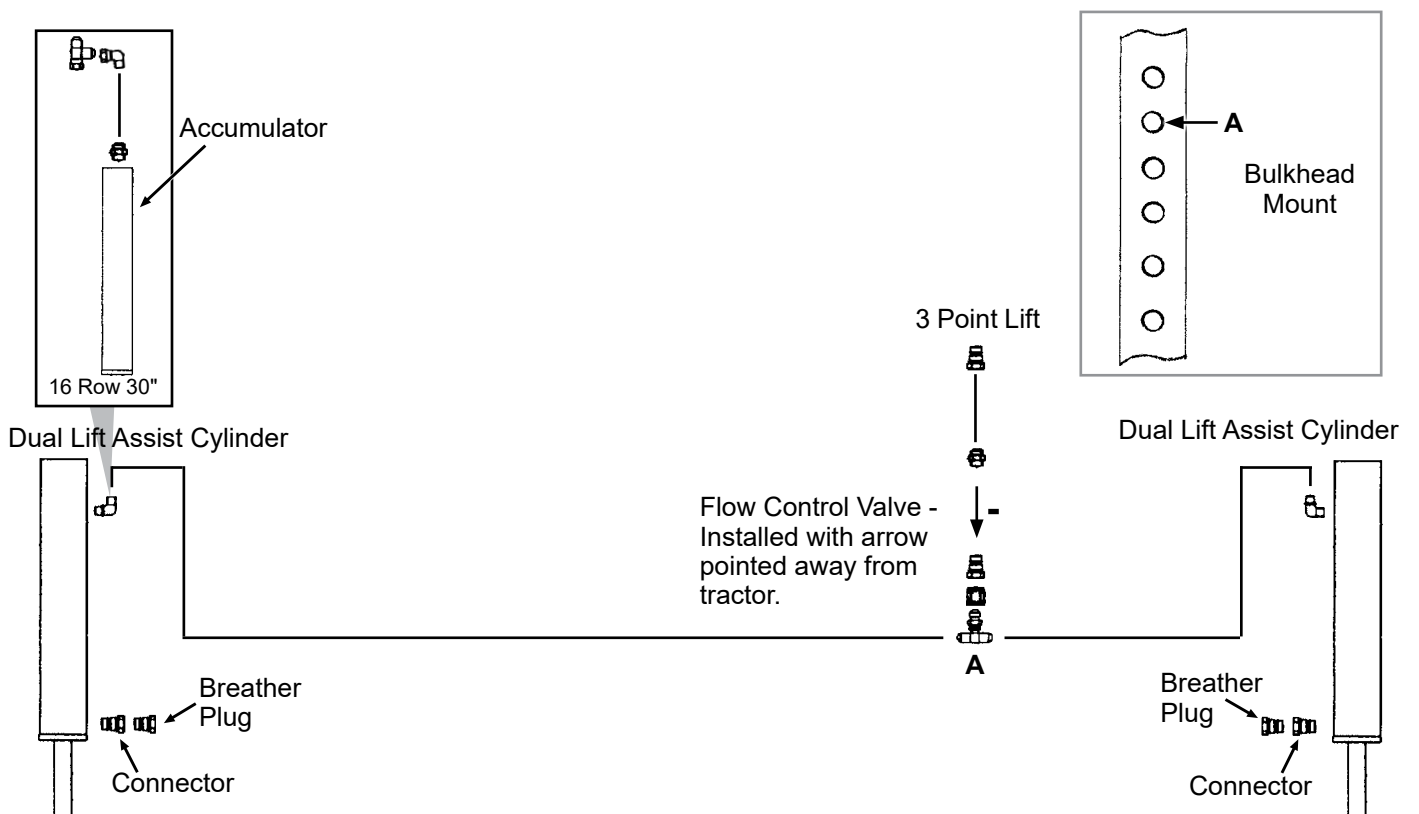
HYDRAULIC SCHEMATIC - ROW MARKER SYSTEM



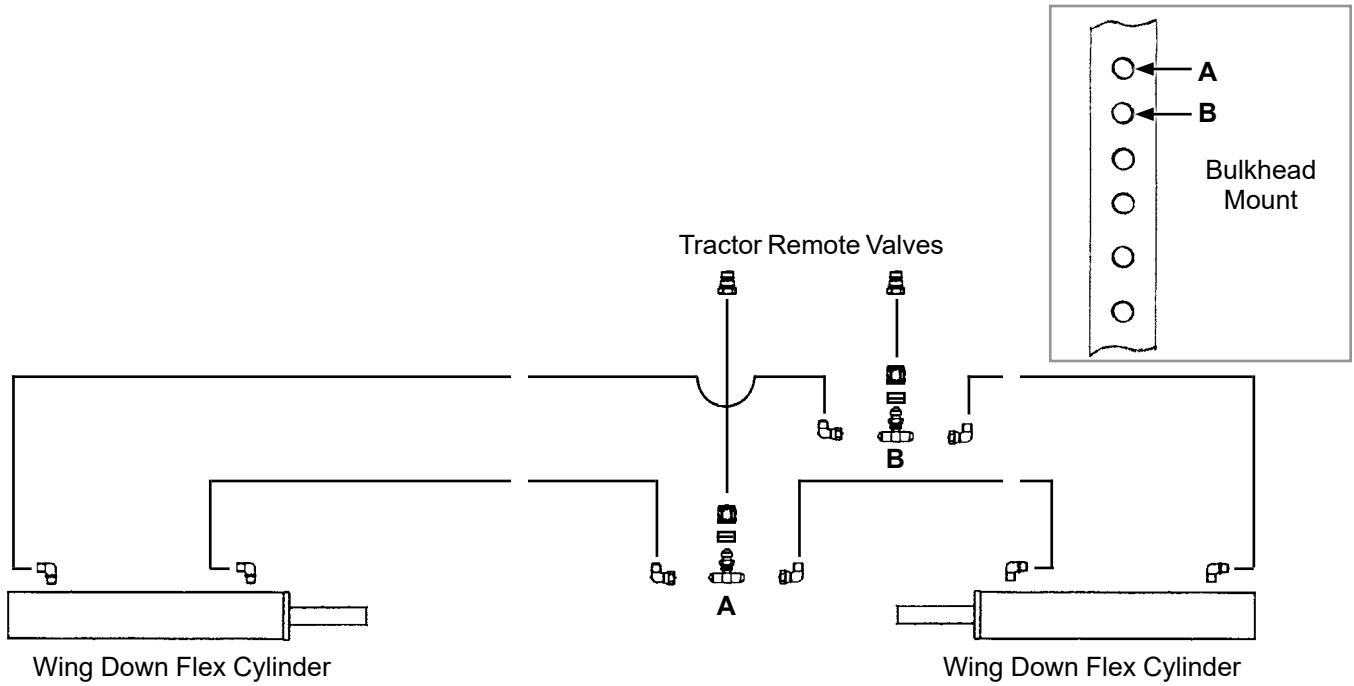
HYDRAULIC SCHEMATIC - DUAL LIFT ASSIST WHEEL PACKAGE



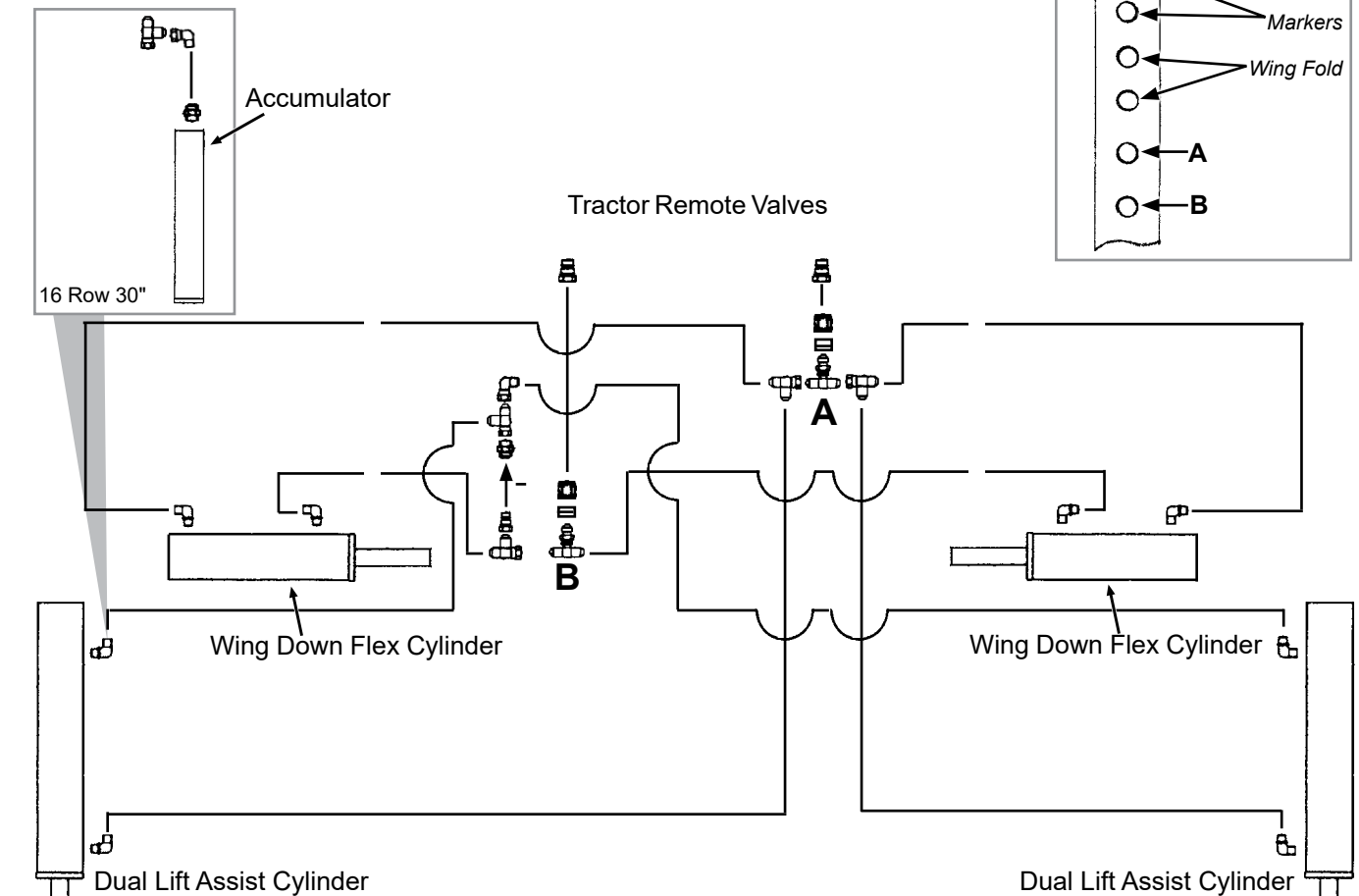
HYDRAULIC SCHEMATIC - DUAL LIFT ASSIST WHEEL PACKAGE (PLUMBED INTO 3 POINT CIRCUIT)



HYDRAULIC SCHEMATIC - WING DOWN FLEX CYLINDER PACKAGE



HYDRAULIC SCHEMATIC - WING DOWN FLEX CYLINDER PACKAGE AND DUAL LIFT ASSIST WHEEL PACKAGE



BRUSH-TYPE SEED METER

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|--|--|--|
| Low count. | Meter RPM too high. | Reduce planting speed. |
| | Misalignment between drive clutch and meter. | See "Seed Meter Drive Adjustment". |
| | Seed sensor not picking up all seeds dropped. | Clean seed tube. Switch meter to different row. If problem stays with same row, replace sensor. |
| | Lack of lubrication causing seeds not to release from disc properly. | Use graphite or talc as recommended. |
| | Seed size too large for seed disc being used. | Switch to smaller seed or appropriate seed disc. See "Brush-Type Seed Meter" for proper seed disc for size of seed being used. |
| | Seed treatment buildup in meter. | Reduce amount of treatment used and/or thoroughly mix treatment with seed. Add talc. |
| Low count at low RPM and higher count at higher RPM. | Foreign material lodged in upper brush. | Remove seed disc and remove foreign material from between brush retainer and bristles. Clean thoroughly. |
| | Worn upper brush. | Replace. See "Maintenance". |
| Low count at higher RPM and normal count at low RPM. | Seed disc worn in the agitation groove area. | Replace disc. See "Maintenance". |
| High count. | Seed size too small for seed disc. | Switch to larger seed or appropriate seed disc. |
| | Incorrect seed rate transmission setting. | Reset transmission. Refer to proper rate chart in "Machine Operation" section of manual. |
| | Upper brush too wide (fanned out) for small seed size. | Replace upper brush. |
| High count. (Milo/Grain Sorghum) | Incorrect brush retainer being used. | Make sure GD8237 brush retainer is installed to keep upper brush from fanning out. |
| Upper brush laid back. | Seed treatment buildup on brush. | Remove brush. Wash with soap and water. Dry thoroughly before reinstalling. See "Maintenance". |
| | Buildup of foreign material at base of brush. | Remove brush retainer and brush. Clean thoroughly. Reinstall. |

CLOSING WHEEL

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|--|---|--|
| Closing wheel(s) leave severe imprint in soil. | Too much closing wheel down pressure. | Adjust closing wheel pressure. |
| Closing wheel(s) not firming soil around seed. | Insufficient closing wheel down pressure. | Adjust closing wheel pressure. Severe no till conditions may require use of cast iron closing wheels. |
| "V" closing wheel running on top of seed furrow. | Improper centering. | Align. See "V Closing Wheel Adjustment". |
| Single closing wheel not directly over seed. | Improper centering. | Align. See "Covering Discs/Single Press Wheel Adjustment". |

VACUUM SEED METER

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|--------------------|---|--|
| Low seed count. | Meter RPM too high. | Reduce planting rate or planting speed. |
| | Singulator blade setting too aggressive. | Adjust singulator blade. |
| | Vacuum level too low. | Increase fan speed. |
| | Seed sensor not picking up all seeds dropped. | Clean seed tube. Move meter to different row. |
| | Seeds sticking to seed disc. | Use graphite or talc to aid release. |
| | Seed treatment buildup in seed disc recesses. | Reduce amount of treatment used and or mix thoroughly. Add talc. |
| | Seed size too large for disc used. | Use appropriate disc for seed size. |
| | Wrong seed disc. | Use appropriate disc for seed type and size. |
| | Failed/worn drive components. | Inspect and replace parts as required. |
| | Plugged orifices in seed disc. | Inspect and clean disc. Check remnant ejector. |
| | Loss of vacuum at meter. | Check for foreign material between vacuum cover and disc. Inspect parts for wear/damage. Clean or replace as required. |
| | Seed bridging in hopper. | Add graphite to improve seed flow. |
| | Faulty vacuum gauge reading. | Repair/replace gauge. |
| | Dirt in vacuum manifold. | Check vacuum manifold for dirt and clean. |
| | Seed baffle (If applicable) not allowing seed flow due to bridging of seed. | Mix talc thoroughly to coat all seeds. Remove seed baffle. See Row Unit Operation section. |
| | Seed disc worn. | Replace. |
| Vacuum seal worn. | Replace. | |
| Not planting seed. | Seed hoppers empty. | Fill seed hopper. |
| | Seed tube plugged/damaged. | Clean or replace tube. |
| | Meter drive damaged. | Repair/replace drive components. |
| | Low/no vacuum. | Inspect vacuum system and repair as necessary. |
| | Singulator blade setting too aggressive. | Adjust singulator blade. |
| | Faulty vacuum gauge. | Repair/replace vacuum gauge. |
| | Seed bridging in hopper. | Add graphite to improve seed flow. |
| | Loss of vacuum at meter. | Check for foreign material between vacuum cover and disc. Inspect parts for wear/ damage. Clean and/ or replace as required. |
| | Wrong seed disc. | Use appropriate disc for seed type and size. |
| | Meter drive clutch not engaged. | Engage drive clutch. |
| | Fan not running. | Start fan. |
| | Dirt in vacuum manifold. | Check vacuum manifold for dirt and clean. |

Continued on next page.

VACUUM SEED METER - Continued

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|---|---|--|
| Not planting seed. (Continued) | Seed baffle (if applicable) not allowing seed flow due to bridging of seed. | Mix talc thoroughly to coat all seeds. Remove seed baffle. Row Unit Operation section. |
| | High vacuum. | Adjust vacuum level to appropriate level. |
| | Wrong seed disc. | Replace seed disc. |
| | Singulator setting not aggressive enough. | Adjust singulator. |
| Poor seed spacing. | Faulty vacuum gauge. | Check gauge line for dirt/obstruction. Repair/replace vacuum gauge. |
| | Obstruction in seed tube. | Clean seed tube. |
| | Dirty/damaged seed disc. | Inspect seed disc for damage, foreign material in orifices or seed treatment buildup in recesses. Clean or replace. |
| | Wrong vacuum setting. | Adjust vacuum to appropriate level. |
| | Excess foreign material in seed. | Inspect and clean meter and seed discs. Use clean, undamaged seed. |
| | Incorrect singulator setting. | Adjust singulator to appropriate setting. |
| | Inconsistent driveline. | Inspect drive components for rust, misalignment, worn or damaged parts. Replace/repair as required. |
| | Toolbar not level or wrong height. | Adjust hitch to level toolbar and row units. |
| | Planting too fast for conditions. | Reduce speed. |
| Rough field conditions. | Reduce speed. | |
| Irregular seed population. | Driving too fast. | Reduce speed. |
| Unable to achieve desired vacuum level. | Tractor hydraulic flow set too low. | Increase flow to fan motor. |
| | Incorrect hydraulic connections. | Check all hydraulic connections and hose routings. |
| | Damaged fan components. | Inspect motor and impeller for wear/damage and repair/replace as necessary. |
| | Vacuum hose pinched/kinked/blocked. | Inspect air lines for any damage or obstruction. Clean air lines and manifold by removing end cap from manifold and running fan at high speed. |
| | Vacuum hose loose/disconnected. | Inspect and reattach all air hoses. |
| | Tractor not producing required hydraulic flow/pressure. | Have tractor serviced by qualified technician. |
| | Dirt in vacuum gauge line. | Check gauge line for dirt/obstruction and clean. |

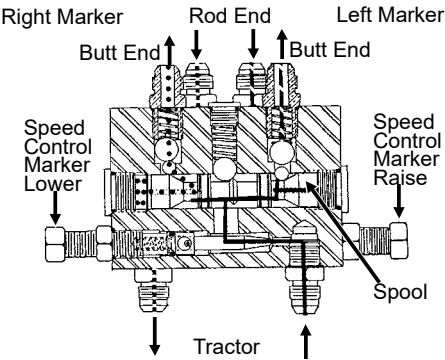
FINGER PICKUP SEED METER

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|--|--|--|
| One row not planting seed. | Drive release not engaged. | Engage drive release mechanism. |
| | Foreign material in hopper. | Clean hopper and finger carrier mechanism. |
| | Seed hopper empty. | Fill seed hopper. |
| | Row unit drive chain off of sprocket or broken. | Check drive chain. |
| Unit is skipping. | Foreign material or obstruction in meter. | Clean and inspect. |
| | Finger holder improperly adjusted. | Adjust to specifications. (22 to 25 in. lbs. rolling torque) |
| | Broken fingers. | Replace fingers and/or springs as required. |
| | Planting too slowly. | Increase planting speed to within recommended range. |
| Planting too many doubles. | Planting too fast. | Stay within recommended speed range. |
| | Loose finger holder. | Adjust to specifications. (22 to 25 in. lbs. rolling torque) |
| | Worn brush in carrier plate. | Inspect and replace if necessary. |
| Overplanting. | Worn carrier plate. | Inspect and replace if necessary. |
| | Seed hopper additive being used. | Reduce or eliminate additive or increase graphite. |
| Underplanting. | Seed belt installed backwards. | Remove and install correctly. |
| | Weak or broken springs. | Replace. |
| | Spring not properly installed. | Remove finger holder and correct. |
| | Seed belt catching or dragging. | Replace belt. |
| | Brush dislodging seed. | Replace brush. |
| Irregular or incorrect seed spacing. | Driving too fast. | Check chart for correct speed. |
| | Wrong tire pressure. | Inflate tires to correct air pressure. |
| | Drive wheels slipping. | Reduce down pressure on row unit down force springs. |
| | Wrong sprockets. | Check seed rate charts for correct sprocket combinations. |
| Seed spacing not as indicated in charts. | Wrong tire pressure. | Inflate tires to correct air pressure. |
| | Inconsistent seed size. | Do field check and adjust sprockets accordingly. |
| | Wrong sprockets. | Check chart for correct sprocket combination. |
| | Charts are approximate. | Slight variations due to wear in meter components and tire slippage due to field conditions may produce seed spacing variations. |
| | Stiff or worn drive chains. | Replace chains. |
| Scattering of seeds. | Planting too fast. | Reduce planting speed. |
| | Seed tube improperly installed. | Check seed tube installation. |
| | Seed tube worn or damaged. | Replace seed tube. |
| Seed tubes and/or openers plugging. | Allowing planter to roll backward when lowering. | Lower planter only when tractor is moving forward. |
| Inconsistent seed depth. | Rough seed bed. | Adjust down pressure springs. Reduce planting speed. |
| | Partially plugged seed tube. | Inspect and clean. |
| | Seed tube improperly installed. | Install properly. |

POINT ROW CLUTCH

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|---|--|--|
| None of the clutches will disengage. | Main fuse blown in control console. | Replace defective fuse. |
| | Poor terminal connection in wiring harness. | Repair or replace. |
| | Wiring damage in wiring harness. | Repair or replace. |
| | Low voltage at coil. (12 volts required) | Check battery connections. |
| One section of planter will not re-engage. | Shear pin at seed drive transmission(s) sheared. | Replace pin with one of equal size and grade. |
| One clutch will not engage. | Fuses blown. | Replace defective fuses. |
| | Actuator arm and plunger stuck in disengaged position. | Remove, free up and reinstall. |
| | Actuator arm out of adjustment. | Adjust actuator arm mounting pin in slot so that actuator arm clears stop on stop collar by approximately 1/8" when clutch is rotated. |
| | Wrap spring broken or stretched. | Disassemble clutch and replace spring. |
| | Something touching the stop collar. | Check to ensure collar is free to turn with clutch. |
| | Clutch assembled incorrectly. | Check clutch and diagram for correct assembly. |
| Clutch slipping. | Wrap spring stretched. | "Lock" clutch output shaft from turning. Place torque wrench on input shaft and rotate in direction of drive. After input shaft has rotated a short distance the wrap spring should tighten onto the input hub. If slippage occurs at less than 100 ft. lbs. replace spring. If spring still slips after installing new spring, replace input hub. |
| Planter section will not re-engage while planter is moving forward. | Spring in actuator arm not strong enough to push arm away from stop collar when operational switch is turned to the ON position. | Remove spring from inside solenoid and stretch spring slightly or replace. Reinstall spring. If that fails, file the stop on the stop collar slightly so that the stop is not as aggressive. |
| Frequent solenoid burnout. | Fuses too large. | Replace fuses on front panel with 10 amp slow blow fuses. |
| Frequent fuse burnout. | Low voltage (12 volts required). | Check power source voltage for partially discharged battery, etc. |
| | Damage to wiring harness. | Locate damage and repair or replace harness. |
| Clutch or clutches will not disengage. | Input and output shafts out of alignment. | Align input and output shafts to prevent drag. |
| | Input or output shaft is pushed in too far creating a coupler. | Reposition input and output shafts. |

ROW MARKER OPERATION

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|---|--|--|
| Both markers lowering and only one raising at a time. | Hoses from cylinders to valve connected backwards. | Check to ensure proper hose routing. (See illustration below.) |
| Same marker always operating. | Spool in sequencing valve not shifting.  | Remove spool, inspect for foreign material, making sure all ports in spool are open. Clean and re-install. |
| Both markers lower and raise at same time. | Foreign material under check ball in sequencing valve. | Remove hose fitting, spring and balls and clean. May be desirable to remove spool and clean as well. |
| | Check ball missing or installed incorrectly in sequencing valve. | Disassemble and correct. See illustration in Parts Section. |
| Marker (in raised position) settling down. | Damaged o-ring in marker cylinder or cracked piston. | Disassemble cylinder and inspect for damage and repair. |
| | Spool in sequencing valve not shifting completely because detent ball or spring is missing. | Check valve assembly and install parts as needed. |
| | Spool in sequencing valve shifting back toward center position. | Restrict flow of hydraulic oil from tractor to sequencing valve. |
| Neither marker will move. | Flow control closed too far. | Loosen locking nut and turn flow control adjustment bolt out or counterclockwise until desired speed is set. |
| Markers moving too fast. | Flow control open too far. | Loosen locking nut and turn flow control adjustment bolt in or clockwise until desired speed is set. |
| Sporadic marker operation speed. | Needle sticking open in flow control valve. | Remove flow control, inspect and repair or replace. |