

MODEL 3200 WING FOLD PLANTER OPERATOR'S MANUAL

M0257-01

Rev. 6/19

This manual is applicable to: Model: 3200 Wing Fold Planters
2015 Production and on

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

Model Number 3200

Serial Number _____

Date Purchased _____

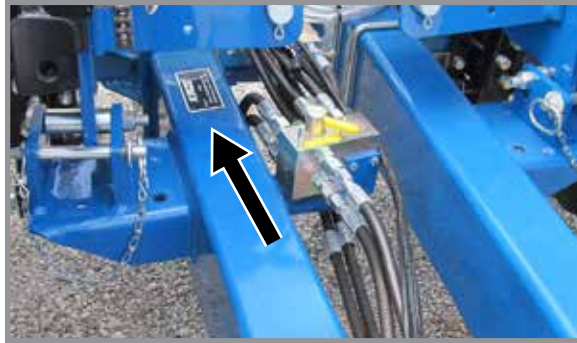
Monitor Serial Number _____

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 as shown below. The serial number provides important information about your planter and is needed to obtain correct replacement parts. Always provide model number and serial number to your Kinze Dealer when ordering parts or when contacting Kinze Manufacturing, Inc.



2015 production and on

TO THE DEALER

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

PREDELIVERY CHECKLIST

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

- Row units properly spaced and optional attachments correctly assembled.
- All grease fittings in place and lubricated.
- All working parts are moving freely. Bolts are tight and cotter pins are spread.
- All drive chains properly tensioned and aligned.
- Check for oil leaks and proper hydraulic operation.
- Hydraulic hoses are routed correctly to prevent damage to hoses.
- Inflate tires to specified air pressure. Tighten wheel lug bolts to specified torque.
- All safety decals correctly located and legible as shown in Parts Manual. Replace if damaged.
- All reflective decals and SMV sign located as shown in Parts Manual and visible when 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 are on planter and correctly located.
- Vacuum fan, analog gauge, and digital gauge correctly installed. All hoses and manifolds connected.
- Seed meters performance checked on test stand.
- Auxiliary safety chain is properly installed and hardware is torqued to specification.

Planter has been thoroughly checked and to the best of my knowledge is ready for delivery to the customer.

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

OWNER REGISTER

Name _____ Delivery Date _____

Street Address _____ Model No. 3200 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



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Kinze Manufacturing, Inc. thanks 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.

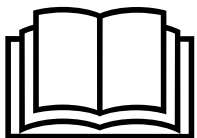
This manual has been prepared to aid you in the operation and maintenance of the planter. It should be considered a permanent part of the machine and remain with the machine when you sell it.

It is the responsibility of the user to read and understand the Operator Manual in regards to safety, operation, lubrication and maintenance before operation of this equipment. It is the user's responsibility to inspect and service the machine routinely as directed in the 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:

	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.
	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.
	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.
	Used to address safety practices not related to personal injury.

NOTE: Special point of information or machine adjustment instructions.

**WARNING**

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.

**WARNING**

Some photos in this manual may show safety covers, shields, or lockup devices removed for visual clarity. **NEVER OPERATOR OR WORK ON** machine without all safety covers, shields, and lockup device in place as required.

NOTE: Some photos in this manual may have been taken of prototype machines. Production machines may vary in appearance.

NOTE: Some photos and illustrations in this manual show optional attachments installed. Contact your Kinze Dealer for purchase of optional attachments.

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.



3200 Wing Fold Vacuum 12 row 30" with liquid fertilizer option (shown folded)

GENERAL INFORMATION

This manual covers all production years of the Model 3200 planter. 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 direction machine travels in use, unless otherwise stated.

TOOLS REQUIRED

Hardware Size / Tool Required			
1/4" = 7/16"	7/16" = 5/8" (nut for 7/16" hardware uses 11/16" tool)	3/4" = 1 1/8"	1 1/4" = 1 7/8"
5/16" = 1/2"	1/2" = 3/4"	7/8" = 1 5/16"	1 1/2" = 2 1/4"
3/8" = 9/16"	5/8" = 15/16"	1" = 1 1/2"	


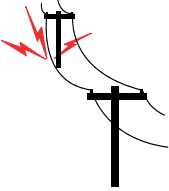






SPECIFICATIONS

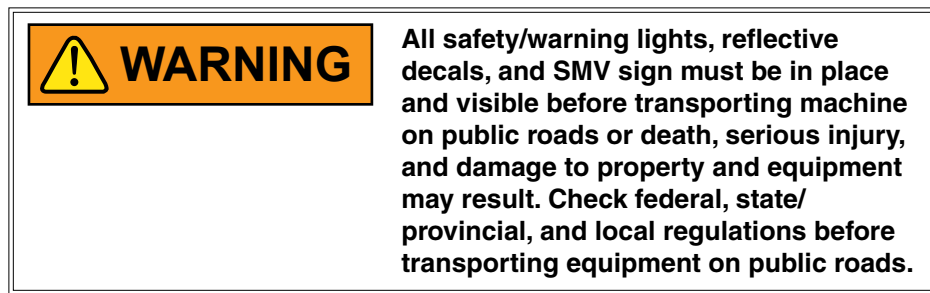
Specification		
Number of Rows	8 Row 36"/38"	12 Row 30"
Weight Empty (Mechanical)*	6,444 lbs (2,923 kg)	7,500 lbs (3,402 kg) - 8,066 lbs (3,659 kg)
Weight Empty (Vacuum)*	6,958 lbs (3,156 kg)	7,500 lbs (3,402 kg) - 8,066 lbs (3,659 kg)
*Base machine weights include planter frame including row markers, hydraulic cylinders, hoses, fittings, tires, wheels, drive and drill shafts, sprockets, chains and required drive components, parking jack, safety/warning lights, SMV sign, transport safety chain, and Kinze pull row units (closing wheel arms less closing wheels) with seed hopper, lid, and dual quick adjustable down force springs option. Vacuum includes additional weight of fan, manifolds, and hoses.		
Axle Weight Empty**	N/A	6,860 lbs (3,112 kg)
Tongue Weight Empty**	N/A	2,980 lbs (1,352 kg)
**Weight is based off a typical configuration of a complete machine.		
Transport Height	9' 1" (2.77M)	9' 1" (2.77M)
Transport Width	14' 7" (4.45M)	16' 2" (4.93M)
Length	17' 9" (5.41M)	17' 9" (5.41M)
Planting Width	27' 0" (8.23M)	31' 4" (8.23M)
Seed Capacity	1.75 bu. (Vacuum/Hopper); 1.90 bu. (Mechanical/Hopper)	
Transport Tires	Six 7.50" x 20" 8 ply rib implement tires w/center groove - Inflate to 40 psi (275.7 kPa)	
Contact Drive Tires	Two 4.10" x 6" spring-loaded contact drive tires. - Inflate to 50 psi (344.7 kPa)	
Field Lift	Two Master/slave rephasing with two assist cylinders (six cylinders)	
Row Markers	Three-fold low profile with 16" solid concave blade, cast iron hubs, and depth bands.	

TRACTOR HYDRAULIC REQUIREMENTS			
Configuration	Requirements		Description
Base machine with mechanical meters. Manual fold.	2 SCV	15 gpm (57 L)	#1 SCV: Planter lift
			#2 SCV: Markers
Base machine with mechanical meters. Hydraulic fold.	2 SCV	15 gpm (57 L)	#1 SCV: Planter lift
			#2 SCV: Markers/fold (manual selector valve)
Base machine with vacuum meters.* Manual fold.	3 SCV	30 gpm (113 L)	#1 SCV: Planter lift
			#2 SCV: Markers
			#3 SCV: Vacuum fan
Base machine with vacuum meters.* Hydraulic fold.	3 SCV	30 gpm (113 L)	#1 SCV: Planter lift
			#2 SCV: Markers/fold (manual selector valve)
			#3 SCV: Vacuum fan
*Seed meter/vacuum system - 13 gpm @ 2000 psi (49 LPM @ 13790 kPa) case drain plus one SCV (pressure and return) for vacuum fan hydraulic motor.			

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.
- 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 3200 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.

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

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.

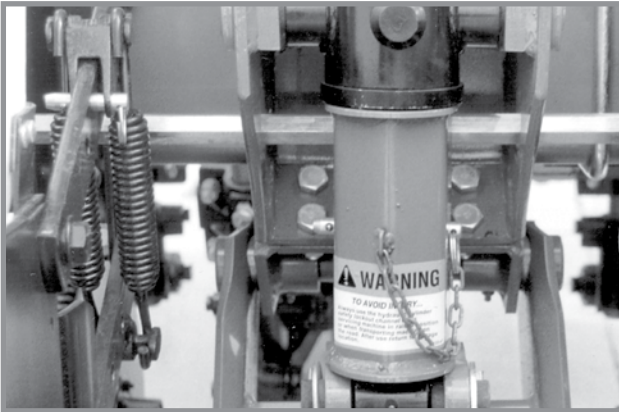
NOTICE

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

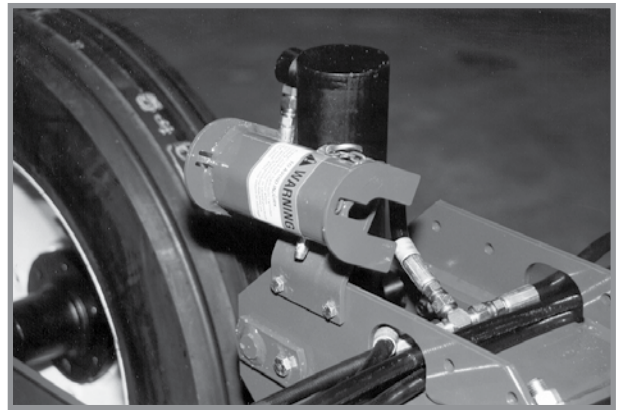
Kinze Vacuum Seed Metering System includes seed meters, seed discs and an air system consisting of a hydraulic driven vacuum fan which draws air through the manifolds and hoses and the seed meters on each row unit.

LIFT CYLINDER LOCKUPS

Install all lift cylinder lockups before transporting or working under or around planter.



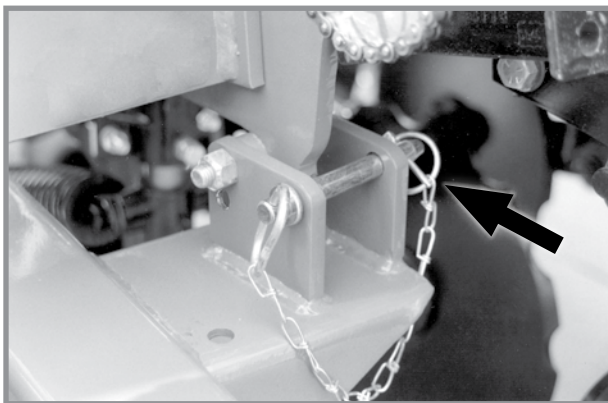
Lift cylinder lockup in transport position



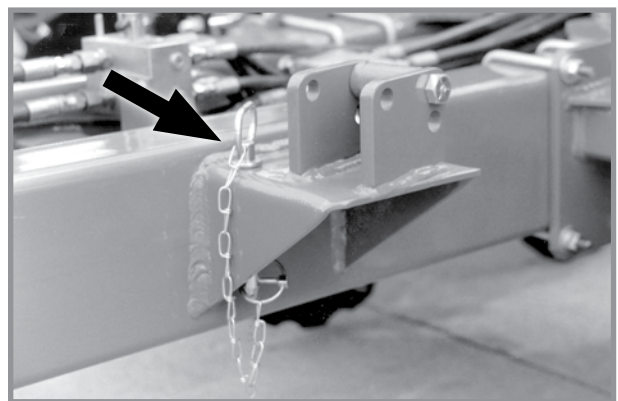
Lift cylinder lockup in storage position

WING SAFETY PINS

Secure wings with safety pins before transporting planter.

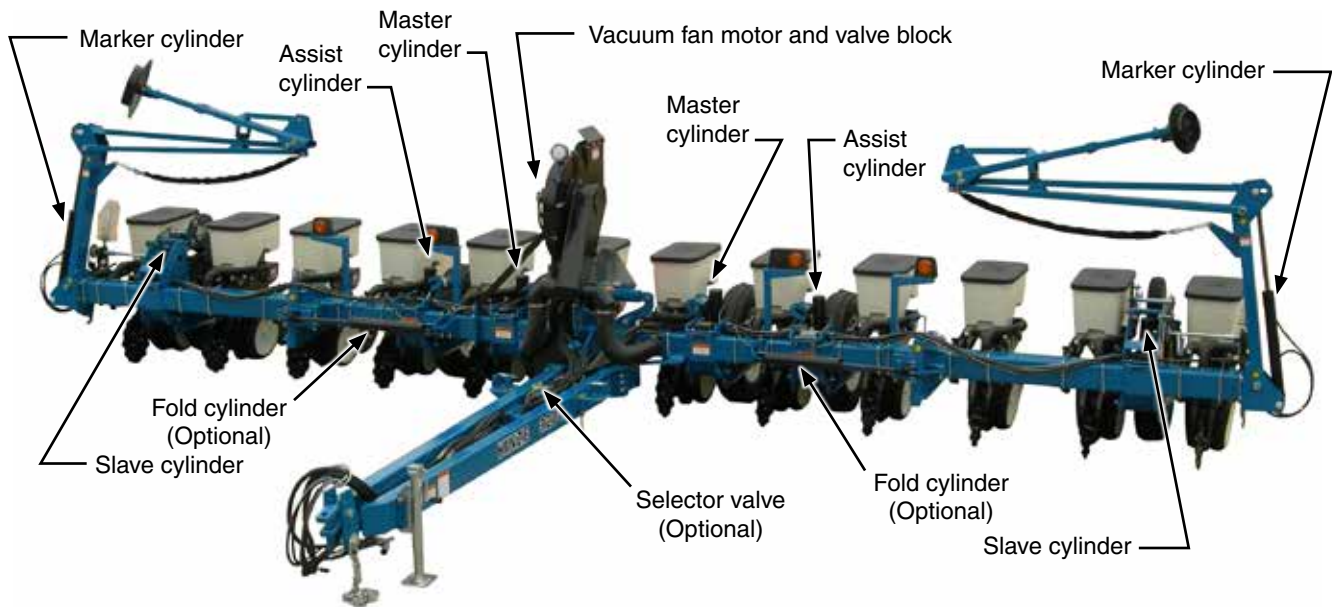


Wing safety pin in transport position




Wing safety pin in storage position


HYDRAULIC OPERATION



3200 Hydraulic component locations



WARNING



Uncontrolled movement of equipment can cause loss of control and could result in death, serious injury, or damage to property and equipment. Install all safety pins before transporting equipment.

PLANTER LIFT SYSTEM

Planter lift system consists of six cylinders with one master, one slave, and one lift assist cylinder on each half of planter.

With this master/slave hydraulic lift system, oil is forced into base end of master and lift assist cylinders when tractor hydraulic lever is moved to raise position. As master cylinder is extended, oil from rod end of master cylinder is forced into base end of slave cylinder.

Displacement on master cylinder rod end is equal to displacement on slave cylinder base end which causes cylinders to move at same rate so planter raises and lowers evenly.

NOTE: Planter lift cylinders may get out of phase causing planter to lift unevenly. A valve located in each master and slave cylinder piston allows the lift system to be rephased when cylinders are cycled by lowering planter to ground and holding hydraulic lever for 10-30 seconds. Cycle system until the planter lifts and lowers evenly.

Assist cylinders aid in lifting and supporting the planter in a raised position. Planter will lift evenly and settle evenly if an assist cylinder is leaking (or if there is a leak in a hose or tractor connection).

ROW MARKERS

All Model 3200 planters are equipped with a dual valve hydraulic system which allows row markers to be operated independently of planter lift cylinders. Row markers are controlled on alternating sides through a tractor SCV. A sequencing valve directs flow to marker on opposite side each time a row marker is raised. When lower row marker is selected, row marker on opposite side of row marker last raised is lowered. Both row markers can also be down at the same time. Lower planter and row marker.

Marker hydraulic system includes two flow control valves. One flow control valve sets lowering speed and one sets raising speed of both markers.

OPTIONAL FOLD CYLINDERS WITH SELECTOR VALVE

A hitch mounted, hand operated selector valve selects row marker or fold functions. Fold cylinders are mounted on the each side of front frame and folds wings to/from transport position. Row marker cylinders raise and lower row markers.

NOTE: Hydraulic pressure will prevent valve from moving. Release hydraulic pressure from system before attempting to move selector valve handle.



Selector valve

	<p>Operating vacuum fan with cover removed can cause serious injury from contact with high speed blades or blowing debris. never operate fan with cover removed.</p>

VACUUM FAN MOTOR AND VALVE BLOCK ASSEMBLY (If equipped)

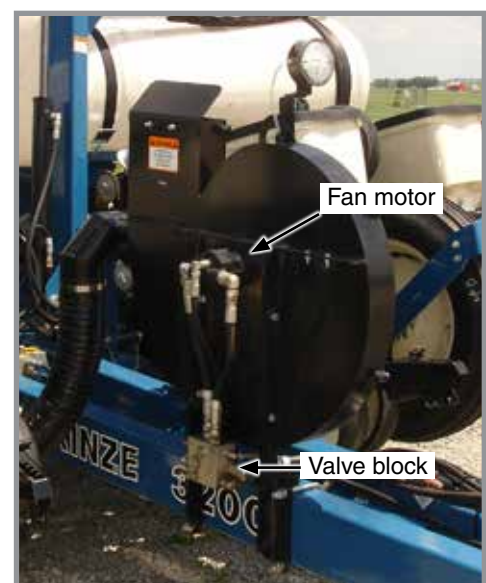
Hydraulically operated motor requires maximum flow rate of 13 GPM @ 2000 PSI to operate properly. It must be connected to a zero pressure case drain and connected to the correct pressure and return SCV's or PTO fittings.

A pressure relief valve in the valve block assembly prevents build up of oil pressure over 35 PSI (241 kPa) in case drain line when vacuum fan motor is in operation. This valve vents oil outside of valve block through a drain hole in the aluminum valve block. This can occur whenever the case drain is improperly connected or motor circuit pressure is too high.

See "Hydraulic System Schematic - Vacuum Fan Motor System" in Lubrication and Maintenance section.


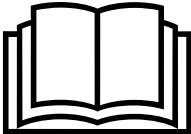
The valve block also contains a check valve that prevents vacuum fan from operating in wrong direction if pressure is applied to return side of motor and allows fan to coast to a stop when tractor hydraulic control is returned to neutral.

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







Vacuum fan assembly

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

 WARNING	<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>
	

INITIAL PREPARATION

 WARNING	<p>Loose transport wheel lug bolts can result in wheel separation from planter and cause death, serious injury, and damage to property and equipment. Torque transport wheel 5/8"- 18 lug bolts to 180 ft-lb (244 N-m) before operating planter for the first time and periodically after.</p>
	

 WARNING	<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>
	

1. Torque transport wheel 5/8"- 18 lug bolts to 90 ft-lb (122 N-m).
2. Inflate transport/ground drive tires to 40 psi (275.7 kPa).
3. Inflate contact drive tires to 50 psi (344.7 kPa).



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.

Consult your dealer for information on horsepower requirements and tractor compatibility. Requirements vary with planter options, tillage, and terrain.

A 12 volt DC electrical system is required to operate planter safety/warning lights, digital vacuum gauge, and optional pneumatic down pressure system or work lights.

Two dual remote hydraulic outlets (SCV) are required on all models. An additional SCV and zero pressure case drain, is required for vacuum equipped planters.

Hydraulic maximum flow rate of 13 GPM @ 2000 PSI (49 L/min @ 2000 PSI) is required to operate vacuum fan motor.

TRACTOR PREPARATION AND HOOKUP

1. Adjust tractor drawbar 13 to 17 inches (33-43 cm) above ground. Adjust drawbar so hitch pin hole is directly below center line of PTO shaft. Make sure drawbar is in a stationary position.
2. Back tractor to planter and connect with a minimum 3/4" diameter hitch pin. Secure with a locking or cotter pin.



2015 - 2019 Production



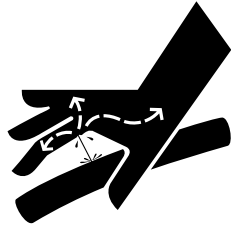
2019 Production and On

Drawbar and safety chain connection

NOTE: DO NOT install safety chain using clevis mounting hardware. Safety chain MUST be installed separately.

3. Safety chain must be used to keep planter and tractor connected in case of a hitch pin/drawbar failure. Attach safety chain at an unused clevis mounting hole on the planter hitch. Torque hardware to 840 ft-lb (1138.8 N-m).

TRACTOR PREPARATION AND HOOKUP (CONTINUED)

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.

4. Connect hydraulic hoses to tractor ports in a sequence familiar and comfortable to the operator.

NOTICE

Vacuum fan motor hydraulic hoses and case drain must be installed correctly. Motor can be damaged or equipment will not operate properly.

$\frac{3}{8}$ " hose from motor - Case Drain (CD - Orange or CD - Green)

$\frac{3}{4}$ " hose from motor - Return

$\frac{1}{2}$ " hose to motor - Pressure

NOTE: If tractor is equipped with an adjustable flow outlet (SCV), set to full flow position. For tractors not equipped with a method for finite adjustment of hydraulic flow, Flow Control Needle Valve Kit G1K426 is available from Kinze Repair Parts through your Kinze Dealer.



G1K426 needle valve kit

TRACTOR PREPARATION AND HOOKUP (CONTINUED)

5. Connect ASABE Standards 7 terminal connector for safety/warning lights on planter to ASABE Standards receptacle on tractor. If your tractor is not equipped with an ASABE Standards receptacle, check with your tractor manufacturer for availability. Check warning lights on planter work in conjunction with warning lights on tractor.

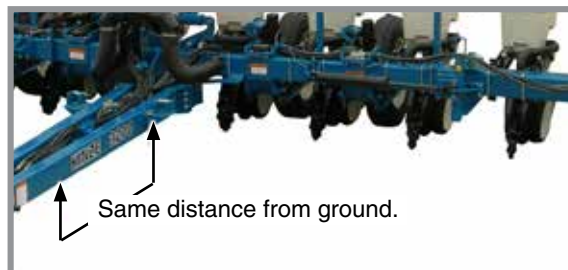
NOTE: A 12 volt battery connection is required to power the vacuum fan digital gauge. Connect “red” wire to positive (+) battery terminal and “black” wire to negative (-) battery terminal.



Jack stand in stored position

6. Raise jack stand and remount horizontally on storage bracket.

LEVEL PLANTER



Level planter

Lateral adjustment is maintained by tire pressure. Check tires are inflated to specification.

Front and rear level adjustment is maintained by hitch clevis position unless tractor drawbar is adjustable for height. Planter frame and row unit parallel arms must be level for proper planter and row unit operation. Bottom of toolbar should be 20" to 22" (50.8 to 56.88 cm) from planting surface.

1. Lower planter to planting position and check planter is level front to rear. Go to step 2 if hitch is too high or low.

NOTE: DO NOT install safety chain using clevis hardware. Move safety chain location if necessary.

2. Remove clevis hitch hex head cap screw and lock nut using a torque wrench. Replace if off-torque is below 75 ft-lb (101.6 N-m) or there is corrosion or damage.

NOTE: Clevis must be free to move on hitch. DO NOT OVERTIGHTEN hardware.

3. Align clevis to hitch holes at new location and install hex head cap screw and lock nut. Tighten lock nut until threads are fully engaged and hex head cap screw and lock nut are firmly against hitch bracket.
4. Recheck with planter in field.

CYLINDER INFORMATION

	Assist Cylinder	Row Marker Cylinder	Hydraulic Wing Fold Cylinder	Slave Lift Cylinder	Master Lift Cylinder
Intended Use	Double acting applications	Double acting applications	Double acting applications	Double Acting Applications	Double Acting Applications
Piston	Ductile iron	Ductile iron	Ductile iron	Ductile Iron	Ductile Iron
Gland	Ductile iron	Ductile iron	Ductile iron	Ductile Iron	Ductile Iron
Tube	ST 52 Dom	ST 52 Dom	ST 52 Dom	ST 52 DOM Tubing	ST 52 DOM Tubing
Rod	1045 Nitro rod	1045 Nitro rod	1045 Nitro rod	1045 Nitro Rod	1045 Nitro Rod
End Mounts	Trunnion	Sleeve	Tang	Sleeve Trunnion Mount	Sleeve Trunnion Mount
Tube Seal	O-ring with polytemp back-up	Buna O-Ring with polytemp back-up	Buna O-Ring with polytemp back-up	Buna O-Ring with Polytemp Back-up	Buna O-Ring with Polytemp Back-up
Rod Seal	Polyester alloy u-cup	Polyester alloy u-cup	Polyester alloy u-cup	Polyester Alloy U-cup	Polyester Alloy U-cup
Rod Wiper	Polyester alloy snap in	Polyester alloy snap in	Polyester alloy snap in	Polyester Alloy Snap In	Polyester Alloy Snap In
Piston Seal	T-seal HNBR	T-seal HNBR	T-seal HNBR	T-Seal HNBR	T-Seal HNBR
Specifications					
Product Category	Hydraulic Cylinder	Hydraulic Cylinder	Hydraulic Cylinder	Hydraulic Cylinder	Hydraulic Cylinder
Maximum Stroke	8" (20.32 cm)	20.062" (50.9574 cm)	16" (40.64 cm)	8" (20.32 cm)	8" (20.32 cm)
Working Pressure	3000 PSI (20684.27 kPa)	3000 PSI (20684.27 kPa)	3000 PSI (20684.27 kPa)	2350-3000 PSI (16202.68-20684.27 KPa)	2350-3000 PSI (16202.68-20684.27 KPa)
Bore Size	3" (7.62 cm)	2.5" (6.3 cm)	3" (7.62 cm)	3.25" (8.255 cm)	3.5" (8.89 cm)
Shaft Diameter	1.25" (31.75 mm)	1.25" (31.75 mm)	1.25" (31.75 mm)	1.25" (3.175 cm)	1.25" (3.175 cm)
Cylinder Configuration	Simple	Simple	Simple	Simple	Simple
Cylinder Action	Double	Double	Double	Double	Double
Material	Steel, Ductile Iron	Steel, Ductile Iron	Steel, Ductile Iron	Steel, Ductile Iron	Steel, Ductile Iron
Mounting Method	Trunnion	Sleeve	Tang	Sleeve Trunnion Mount	Sleeve Trunnion Mount
Mount Location	Barrel	End Cap	End Cap	End Cap	End Cap
Cylinder Style	Welded	Welded	Welded	Welded	Welded

HYDRAULIC HOSE INFORMATION

Part Number	A1000	A3114	A1020	A3202	A12010	A12009
Description	Hose Assembly, 3/8" x 15"	Hose Assembly, 3/8" x 156"	Hose Assembly, 3/8" x 48"	Hose Assembly, 3/8" x 172"	Hose Assembly, 3/8" x 259"	Hose Assembly, 3/8" x 244"
Product Category	Hydraulic Hose	Hydraulic Hose	Hydraulic Hose	Hydraulic Hose	Hydraulic Hose	Hydraulic Hose
Product Form	Hose; Assembly	Hose; Assembly	Hose; Assembly	Hose; Assembly	Hose; Assembly	Hose; Assembly
I.D.	3/8" (9.525 mm)	3/8" (9.525 mm)	3/8" (9.525 mm)	3/8" (9.525 mm)	3/8" (9.525 mm)	3/8" (9.525 mm)
O.D.	.63" (16.002 mm)	.63" (16.002 mm)	.63" (16.002 mm)	.63" (16.002 mm)	.63" (16.002 mm)	.63" (16.002 mm)
Minimum Bend Radius	2" (5.08 cm)	2" (5.08 cm)	2" (5.08 cm)	2" (5.08 cm)	2" (5.08 cm)	2" (5.08 cm)
Working Pressure	3250 PSI (22407.96 kPa)	3250 PSI (22407.96 kPa)	3250 PSI (22407.96 kPa)	3250 PSI (22407.96 kPa)	3250 PSI (22407.96 kPa)	3250 PSI (22407.96 kPa)
Temperature Range	-40°F - +212°F (-40°C - +100°C)	-40°F - +212°F (-40°C - +100°C)	-40°F - +212°F (-40°C - +100°C)	-40°F - +212°F (-40°C - +100°C)	-40°F - +212°F (-40°C - +100°C)	-40°F - +212°F (-40°C - +100°C)
Material	Modified Nitrile Type C2	Modified Nitrile Type C2	Modified Nitrile Type C2	Modified Nitrile Type C2	Modified Nitrile Type C2	Modified Nitrile Type C2
Specialized Construction	High tensile steel wire	High tensile steel wire	High tensile steel wire	High tensile steel wire	High tensile steel wire	High tensile steel wire
Media	Hydraulic Fluid	Hydraulic Fluid	Hydraulic Fluid	Hydraulic Fluid	Hydraulic Fluid	Hydraulic Fluid
Application	Agricultural; Construction	Agricultural; Construction	Agricultural; Construction	Agricultural; Construction	Agricultural; Construction	Agricultural; Construction

Part Number	A3130	A1010	A3176
Description	Hose Assembly, 3/8" x 173"	Hose Assembly, 3/8" x 120"	Hose Assembly, 3/8" x 86"
Product Category	Hydraulic Hose	Hydraulic Hose	Hydraulic Hose
Product Form	Hose; Assembly	Hose; Assembly	Hose; Assembly
I.D.	3/8" (9.525 mm)	3/8" (9.525 mm)	3/8" (9.525 mm)
O.D.	.63" (16.002 mm)	.63" (16.002 mm)	.63" (16.002 mm)
Minimum Bend Radius	2" (5.08 cm)	2" (5.08 cm)	2" (5.08 cm)
Working Pressure	3250 PSI (22407.96 kPa)	3250 PSI (22407.96 kPa)	3250 PSI (22407.96 kPa)
Temperature Range	-40°F - +212°F (-40°C - +100°C)	-40°F - +212°F (-40°C - +100°C)	-40°F - +212°F (-40°C - +100°C)
Material	Modified Nitrile Type C2	Modified Nitrile Type C2	Modified Nitrile Type C2
Specialized Construction	High tensile steel wire	High tensile steel wire	High tensile steel wire
Media	Hydraulic Fluid	Hydraulic Fluid	Hydraulic Fluid
Application	Agricultural; Construction	Agricultural; Construction	Agricultural; Construction

MANUAL WING FOLD TRANSPORT TO FIELD OPERATION



WARNING



Planter wings may swing suddenly and cause death or serious injury. Do not stand between wings and frame when folding or unfolding planter. Planter must be on a level surface in all directions.

SUMMARIZED TRANSPORT TO FIELD SEQUENCE

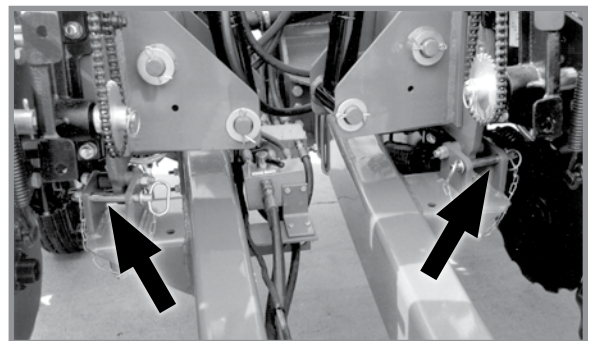
- With center lift cylinders retracted and lockups in place, remove wing lock pins and fold wings out.
- Swing wing locking eyebolts into place.
- Extend lift cylinders.
- Remove center section lift cylinder lockups.
- Lower planter.
- Tighten wing locking eyebolts.
- Release turnbuckle at center of planter.

NOTE: Read following information for detailed instructions.

NOTE: Use special wrench stored on inside of hitch for center turnbuckle and wing lock eyebolt hex nuts. Always return wrench to storage location after use.

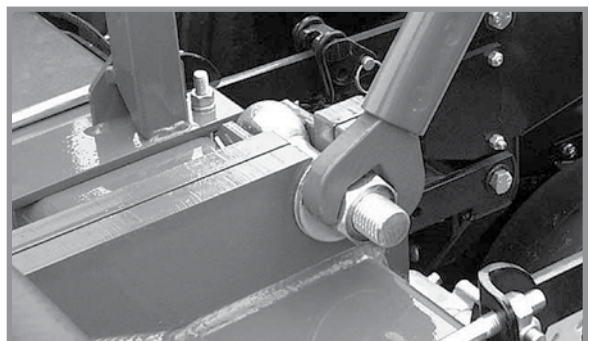
1. With planter raised and cylinder lockups in place, remove wing lock pins at marker support and hitch. Fold wings out to operating position.

NOTE: If wing lift tires are not raised, with cylinder lockups in place on four center section lift cylinders, move tractor hydraulic control to lowering position until cylinders are fully retracted and wing tires are fully raised.



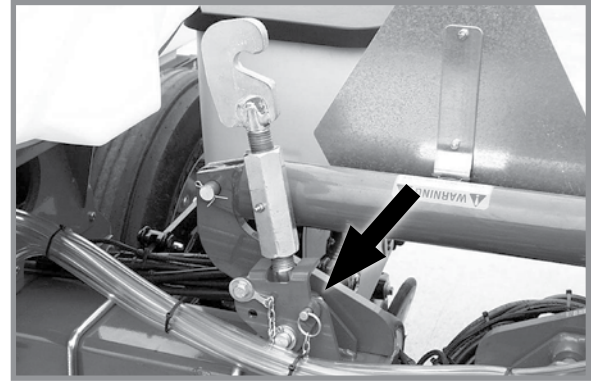
Wing lock pin locations

2. Swing wing locking eyebolts into position to lock each wing.
3. Operate hydraulic lever to extend lift cylinders. (Wing wheel cylinders may not fully extend.)
4. Remove cylinder lockups from four center section lift cylinders and place them in storage positions on wheel modules.
5. Lower planter. Hold tractor hydraulic control 5 to 10 seconds with cylinders fully retracted to rephase system.
6. Tighten wing lock 1¼" hex nuts.





Securing wing lock eyebolt

7. Release center turnbuckle and raise upright. Secure in position with lockup pin.



Center turnbuckle lockup pin

MANUAL WING FOLD FIELD OPERATION TO TRANSPORT

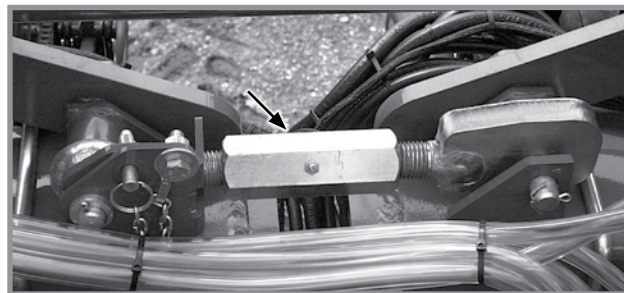
 WARNING	<p>Planter wings may swing suddenly and cause death or serious injury. Do not stand between wings and frame when folding or unfolding planter. Planter must be on a level surface in all directions.</p>
	

SUMMARIZED FIELD TO TRANSPORT SEQUENCE

- Raise row markers and lower planter.
- Position turnbuckle to hold frame in level position.
- Loosen wing locking eyebolts and swing over to unlock wings.
- Raise planter.
- Install lockups on center lift cylinders.
- Retract wing lift cylinders.
- Fold wings forward and lock in place.

NOTE: Read following information for detailed instructions.

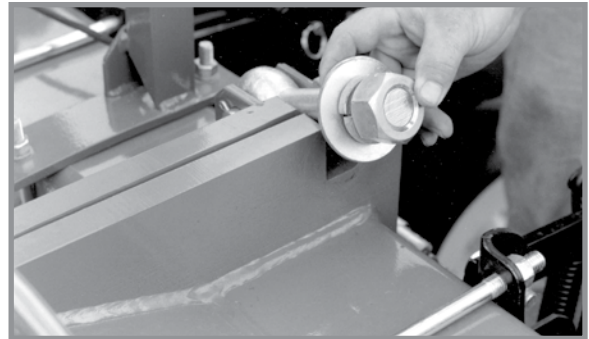
NOTE: Use special wrench stored on inside of hitch for center turnbuckle and wing lock eyebolt hex nuts. Always return wrench to storage location after use.



Center turnbuckle installation

1. Fold row markers to raised transport position and lower planter to ground.
2. Swing center turnbuckle into position to hold planter frame level and tighten slightly. Install lockup pin in storage location

3. Loosen wing lock 1 1/4" hex nuts and swing wing lock eyebolts over to release planter wings.
4. Raise planter.
5. Install cylinder lockups on four center section lift cylinders.
6. Place tractor hydraulic control in lowering position and hold until wing cylinders are fully retracted and wing tires are fully raised.

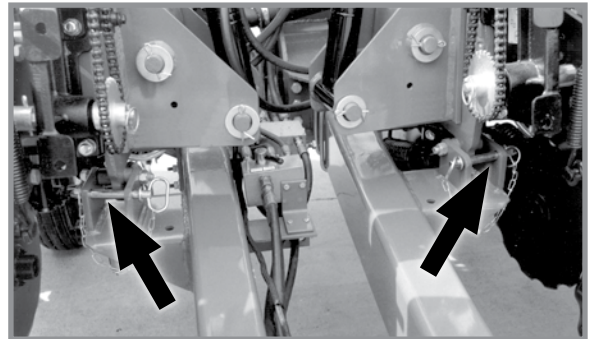


Wing lock eyebolt

WARNING

Uncontrolled wing movement can cause death, serious injury, and damage to property and equipment. Make sure wings are properly locked in place before moving planter.

7. Fold each wing forward into transport position and lock wings in place at marker support and hitch with wing safety pins.



Wing lock pin locations

HYDRAULIC WING FOLD TRANSPORT TO FIELD OPERATION

WARNING

Planter wings may swing suddenly and cause death or serious injury. Do not stand between wings and frame when folding or unfolding planter. Planter must be on a level surface in all directions.

SUMMARIZED TRANSPORT TO FIELD SEQUENCE

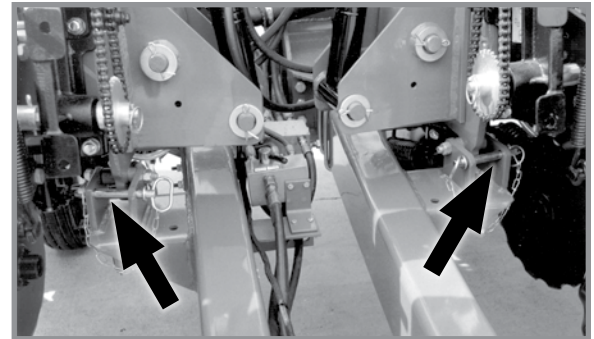
- With center lift cylinders retracted and lockups in place, remove wing lock pins.
- Move selector valve to "FOLD".
- Hydraulically fold wings out.
- Swing wing locking eyebolts into place.
- Extend lift cylinders.
- Remove center section lift cylinder lockups.
- Lower planter.
- Tighten wing locking eyebolts.
- Release turnbuckle at center of planter.
- Move selector valve to "MARKER".

NOTE: Read following information for detailed instructions.

NOTE: Use special wrench stored on inside of hitch for center turnbuckle and wing lock eyebolt hex nuts. Always return wrench to storage location after use.

1. With planter raised and cylinder lockups in place, remove wing lock pins at marker support and hitch. Fold wings out to operating position.

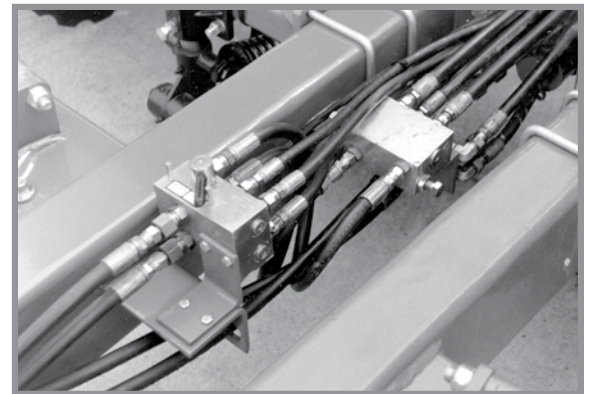
NOTE: If wing lift tires are not raised, with cylinder lockups in place on four center section lift cylinders, move tractor hydraulic control to lowering position until cylinders are fully retracted and wing tires are fully raised.



Wing lock pin locations

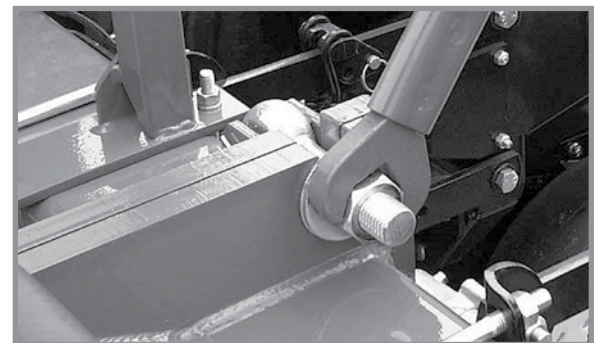
NOTE: Hydraulic pressure will prevent selector valve from moving. Release hydraulic pressure from system before attempting to move selector valve handle.

2. Move selector valve to "FOLD".
3. Move the tractor hydraulic control and fold the wings out to operating position.



Selector valve

4. Swing wing lock eyebolts into position to lock each wing.
5. Operate the hydraulic lever to extend the lift cylinders. (Wing wheel cylinders may not fully extend)
6. Remove four center section cylinder lockups from cylinders and place them in wheel module storage positions.
7. Lower planter. Hold tractor hydraulic control 5 to 10 seconds with cylinders fully retracted to rephase system.
8. Tighten wing lock 1 1/4" hex nuts.



Securing wing lock eyebolt

9. Release center turnbuckle and raise upright. Secure in position with lockup pin.

NOTE: Hydraulic pressure will prevent selector valve from moving. Release hydraulic pressure from system before attempting to move selector valve handle.

10. Move selector valve to "MARKER".



Center turnbuckle lockup pin

HYDRAULIC WING FOLD FIELD OPERATION TO TRANSPORT

WARNING



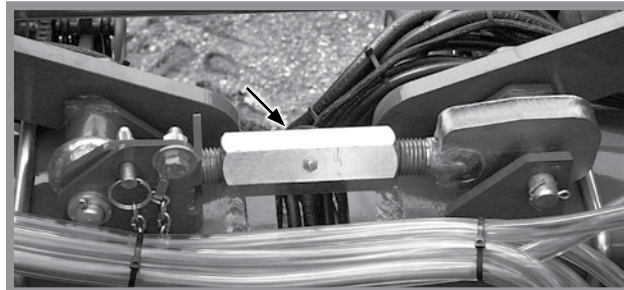
Planter wings may swing suddenly and cause death or serious injury. Do not stand between wings and frame when folding or unfolding planter. Planter must be on a level surface in all directions.

SUMMARIZED FIELD TO TRANSPORT SEQUENCE

- Raise row markers and lower planter.
- Position turnbuckle to hold frame in level position.
- Move selector valve to "FOLD".
- Loosen wing lock eyebolts and swing over to unlock wings.
- Raise planter.
- Install lockups on center lift cylinders.
- Retract wing lift cylinders.
- Hydraulically fold wings forward. Lock wings in place.
- Move selector valve to "MARKER".

NOTE: Read following information for detailed instructions.

NOTE: Use special wrench stored on inside of hitch for center turnbuckle and wing lock eyebolt hex nuts. Always return wrench to storage location after use.

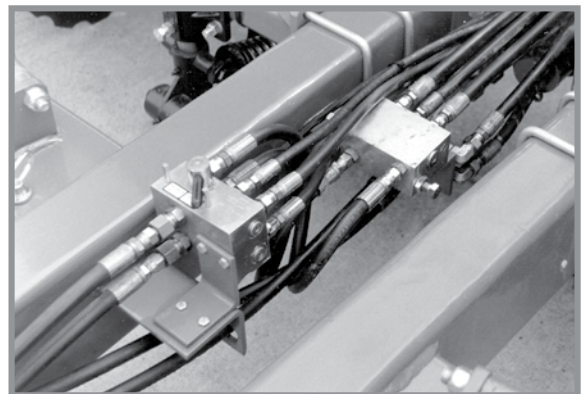


Center turnbuckle installation

1. Fold row markers to raised transport position and lower planter to ground.
2. Swing center turnbuckle into position to hold planter frame level and tighten slightly. Install lockup pin in storage location

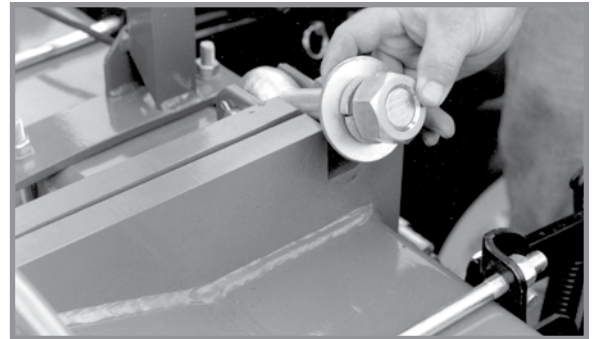
NOTE: Hydraulic pressure will prevent selector valve from moving. Release hydraulic pressure from system before attempting to move selector valve handle.

3. Move selector valve to "FOLD".



Selector valve

4. Loosen wing lock 1 1/4" hex nuts and swing wing lock eyebolts over to release planter wings.
5. Raise planter.
6. Install cylinder lockups on four center section lift cylinders.
7. Place tractor hydraulic control in lowering position and hold until wing cylinders are fully retracted and wing tires are fully raised.

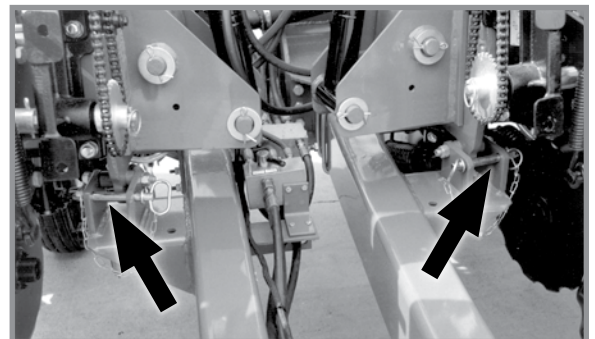


Wing lock eyebolt




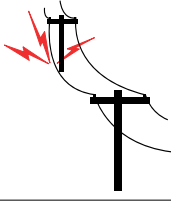
Uncontrolled wing movement can cause death, serious injury, and damage to property and equipment. Make sure wings are properly locked in place before moving planter.



8. Fold each wing forward into transport position and lock wings in place at marker support and hitch with wing safety pins.



Wing lock pin locations

HYDRAULIC ROW MARKER OPERATION

	<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>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.</p>
	

All Model 3200 planters are equipped with a dual valve hydraulic system. The dual valve system allows the row markers to be operated independently of the planter lift cylinders. Each time a marker is raised, the sequencing valve directs flow to lower the opposite marker.

Both markers can be used at the same time. Lower planter and selected marker. Move tractor control lever to raise position and immediately return it to lower position. This shifts the marker control valve and remaining marker will be lowered.

NOTE: A hand operated selector valve selects row marker or wing fold functions on machines with hydraulic wing fold option. Remove pressure from hydraulic system before attempting to move selector handle.

ROW MARKER SPEED ADJUSTMENT

NOTICE

Excessive row marker travel speed can damage row markers. Adjust flow controls before row markers are first used.



Row marker flow control valves

Two flow control valves determine amount of oil flow restriction controlling row marker travel speeds. One flow control valve controls lowering speed and one controls raising speed of both markers.

NOTE 1: Hydraulics operate slowly when oil is cold. Make all adjustments with oil warm.

NOTE 2: On a tractor where oil flow cannot be controlled, tractor flow rate may be greater than rate marker cylinder can accept. Hold tractor hydraulic control lever until cylinder reaches end of its stroke. This occurs most often on tractors with an open center hydraulic system.

NOTE 3: On tractors with a closed center hydraulic system, set hydraulic flow control so detent functions properly.

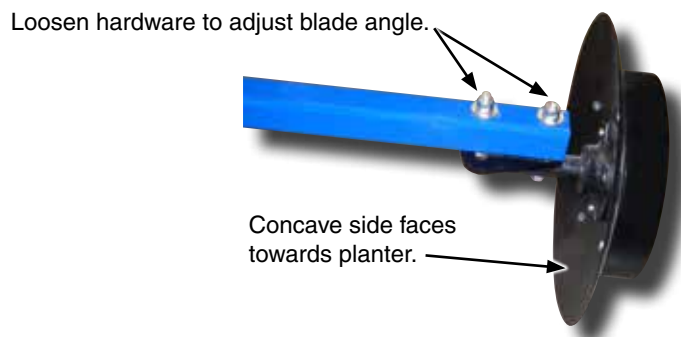
1. Loosen jam nut and turn control clockwise (IN) to slow speed or counterclockwise (OUT) to increase speed.
2. Tighten jam nut after adjustments are made.

ROW MARKER ADJUSTMENT

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

Row Marker Lengths	
8 Row 36"	288" (731.5 cm)
8 Row 38"	304" (772.2 cm)
12 Row 30"	360" (914.4 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.

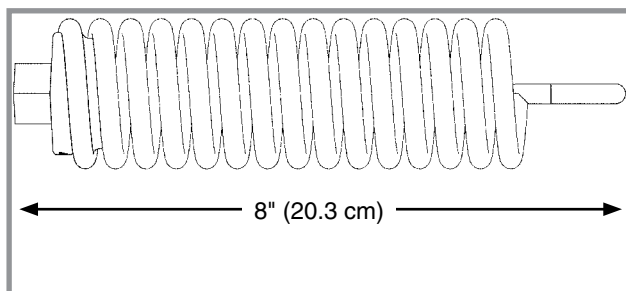
NOTE: A notched marker blade is available from Kinze through your Kinze Dealer for use in more severe no till conditions.

TRANSPORTING PLANTER

 <p>DANGER</p>	<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>WARNING</p>	<p>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.</p>

- 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 DRIVE SPRING ADJUSTMENT



Spring length measurement (Factory setting)



Down pressure spring location

There are two down pressure springs on each contact drive wheel. Spring tension is factory preset and normally requires no adjustment.

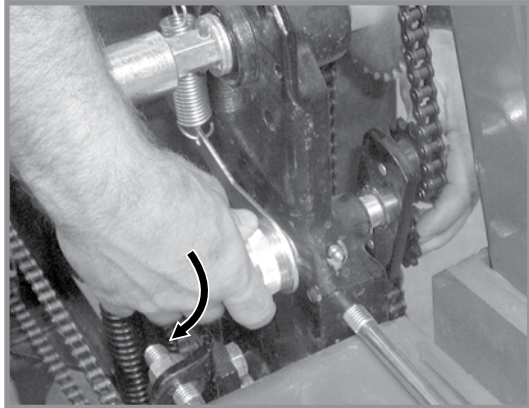
Basic setting for spring tension is approximately 200 lb (90.72 kg) of down force at tire contact point.

NOTE: Measurement must be taken in planting position with proper tire pressure.

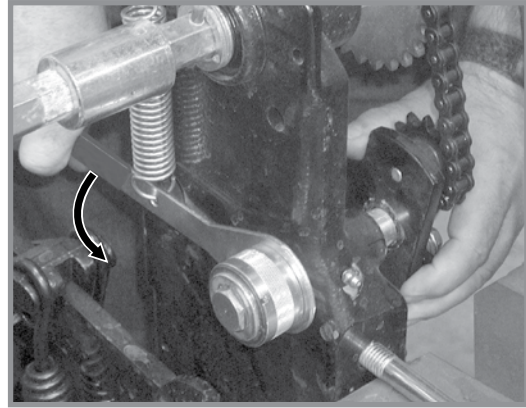
WRAP SPRING WRENCH

Chain idlers use wrap spring wrenches to release and adjust transmission chain tension.

NOTE: Wrap spring wrenches are L.H. and R.H. specific. L.H. styles have silver metal or grey plastic release collars. R.H. styles have gold metal or blue plastic release collars.



Release chain tension

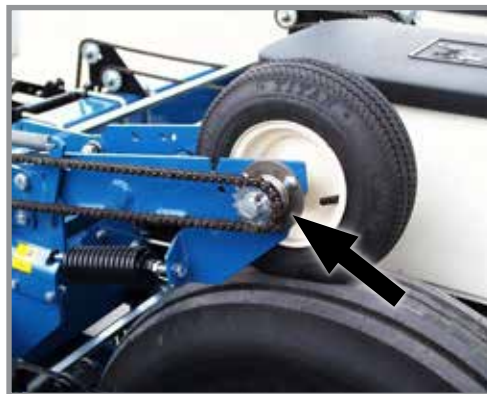


Increase chain tension

Rotate wrap spring wrench knurled collar while rotating chain idler away from chain to release chain tension.

Rotate chain idler into chain while rotating handle to tension idler spring.

CONTACT WHEEL DRIVE SPROCKETS



Contact wheel drive sprocket

NOTE: 15 tooth, 19 tooth or 30 tooth drive sprockets at each contact drive wheel can be interchanged from sprocket storage rod bolted to each transmission. 30 tooth sprockets require use of 124 pitch chains instead of standard 116 pitch No. 40 chains.

Chain tension is controlled by a spring-loaded sprocket idler. Amount of spring tension on chain is controlled by idler arm. Planting rate chart in Rate Chart section will aid you in selecting correct sprocket.

NOTE: 15, 19, and 30 tooth drive sprockets are NOT applicable to all rate charts. 23 tooth driven sprocket at reverser plate is changed to a 17 tooth sprocket when using 60 cell soybean seed disc. Check chart titles to ensure proper rate chart is selected.

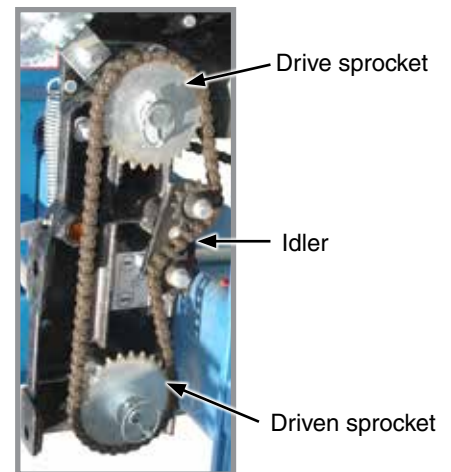
NOTE: Make a field check after each sprocket combination adjustment to be sure you are planting at desired rate.

SEED RATE TRANSMISSION ADJUSTMENT

Seed rate transmissions allow simple, rapid changes of sprockets to obtain desired planting population. By removing lynch pins on hexagon shafts, sprockets can be interchanged with those from the sprocket storage rod bolted to the transmission.

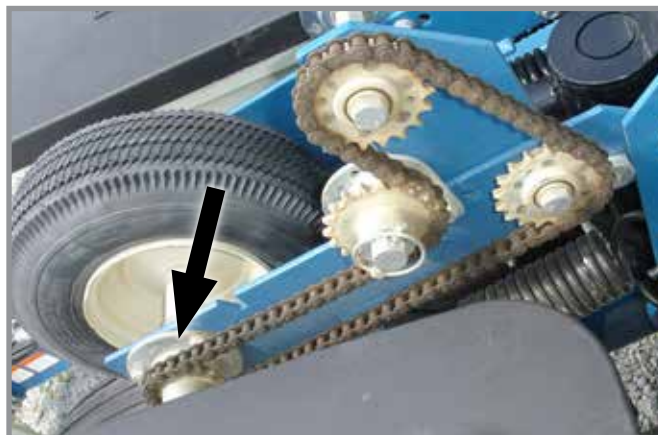
Chain tension is controlled by a spring-loaded dual-sprocket idler. The idler assembly is equipped with an easy-release idler arm to remove spring tension for replacing sprockets.

Planting rate charts in Rate Chart section will aid you in selecting correct sprocket combinations.



Seed rate transmission chain tension

STANDARD AND HALF RATE (2 TO 1) DRIVES



Rate drive

Seed planting rate charts are based on the standard rate drive using a 17 tooth sprocket unless otherwise specified.

NOTE: Half rate (2 to 1) drive is recommended only when desired population falls below that on planting rate charts.

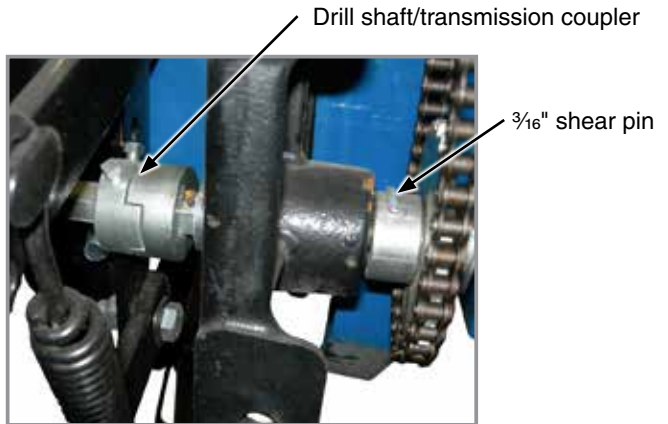
Replacing standard 17 tooth drive sprocket located on inner side of top transmission shaft, with 34 tooth half rate (2 to 1) drive reduction sprocket reduces planter transmission speed and planting and application rates by approximately 50%.

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

SHEAR PROTECTION

Shear pins protect the planter driveline and row unit components from damage.

1. Determine where binding has occurred before replacing a pin. Turn shaft by hand (with the aid of a wrench) and check for misalignment and seized parts.
2. When shaft can be turned by hand (with the aid of a wrench) replace shear pins with same size and type. Spare shear pins are in wheel module storage area.



Transmission shaft and drill shaft coupler

NOTICE	Misaligned drill shaft/transmission coupler can cause equipment damage.
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3. Check driveline alignment and follow prescribed lubrication schedules to prevent component binding or breakage.

TIRE SCRAPER

A tire scraper prevents buildup of dirt and mud between wheel arm assembly and tire.

Adjust scraper so it does not contact tire.



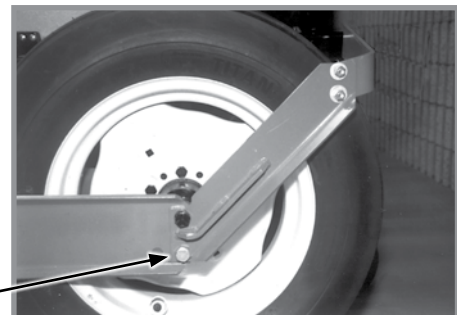
Tire scraper

RIDGE PLANTING

Planter toolbar height can be raised 3" (8 cm) for ridge planting.

Relocate 20" transport axles to lower hole in wheel arm.

Install axle here to raise bar height for ridge planting.



Ridge planting adjustment

DIGITAL VACUUM GAUGE OPERATION



Digital vacuum gauge

The digital vacuum gauge console controls vacuum fan. Use “FAN 1” setting when planter is equipped with one vacuum fan.

NOTE: Toggle switch must be OFF when planter is not in use or tractor battery will drain.

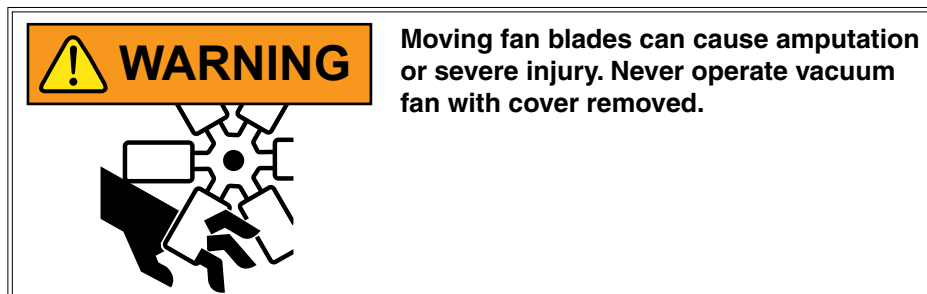
The digital vacuum gauge is factory calibrated. However, vacuum varies throughout the manifold system and it may be necessary to adjust the digital readout so it agrees with actual vacuum at the meter. With the seed discs loaded with seed, compare digital vacuum gauge readout to reading taken from analog gauge or a hand held gauge at several meters along length of planter.

Elbows at seed meter covers allow testing of meter vacuum levels without removing vacuum hoses. If there is more than 1" or 2" (2.5 cm or 5 cm) (H₂O) difference, adjust gauge by inserting a small flat bladed screwdriver into opening on back of digital gauge housing and turning potentiometer until digital gauge displays meter vacuum reading.

Compare readings at 10" (25 cm) and 20" (51 cm) of vacuum.

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.

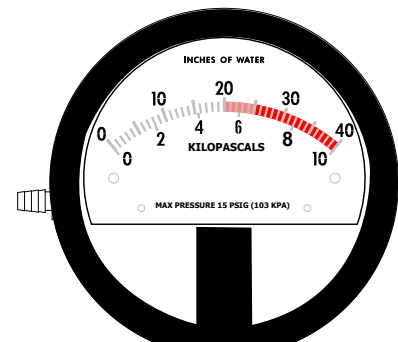


ANALOG VACUUM OR PRESSURE GAUGE

Analog vacuum or pressure gauge connects directly to vacuum meter (vacuum) or bulk fill (pressure) manifold and is tied 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.

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.



Analog Gauge

AG LEADER INTEGRA DISPLAY

Integra is a full-featured hub of any precision farming operation. A large, full-color 12.1" HD touchscreen display is easy to read and offers powerful, year-round precision farming tools. Mapping, planter and application control, yield monitoring, real-time data logging, and more – are all controlled from the cab using the Integra display.

Four video camera inputs provide operators a better view of equipment operation and safety by allowing them to view live video on the display.

NOTE: See Integra operator manual for installation and programming.



Ag Leader Integra display

AG LEADER MONITORING CONTROL PACKAGE

The PMM Magnetic Distance Sensor Package includes a planter-mounted module enclosure with cover and mounting hardware, seed tubes w/sensors, planter harness, planter monitor cable, shaft rotation sensors and magnetic distance sensor components.

Ag Leader Integra display and associated cab harnesses are also required.



Planter Monitor Module (PMM)

AG LEADER INCOMMAND 1200 DISPLAY

The InCommand 1200 is a full-featured display for any precision farming operation. A large, full-color 12.1" HD touchscreen display is easy to read and offers powerful, year-round precision farming tools. Mapping, planter and application control, yield monitoring, real-time data logging, and more – are all controlled from the cab using the InCommand display.

Four video camera inputs provide operators a better view of equipment operation and safety by allowing them to view live video on the display.

NOTE: See InCommand operator manual for installation and programming.



Ag Leader InCommand Display

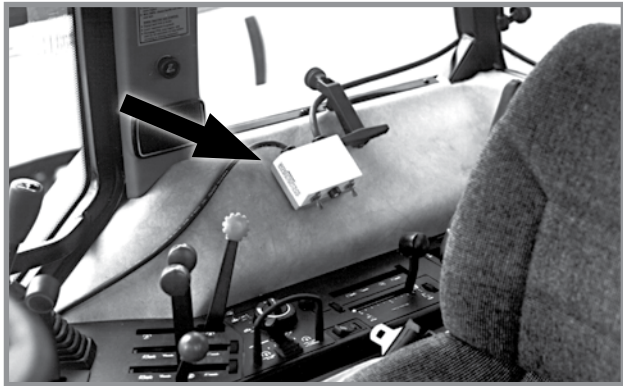
KINZE ISOBUS OPTION

Kinze ISOBUS option consists of a planter monitor module (PMM), and planter control module (PCM). Kinze planters will communicate directly with most ISO compatible monitors. See the Kinze ISOBUS manual for more information.

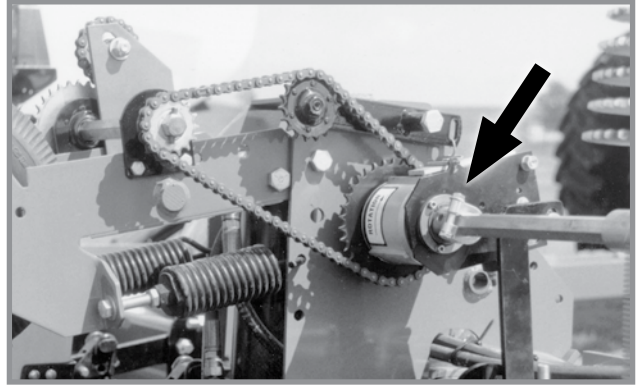
AG LEADER ELECTRIC CLUTCHES

Electric clutches along with GPS can stop seed flow by turning off seed meters (and planter sections) based on field mapping and previously planted areas.

POINT ROW CLUTCHES



Point row clutch control box



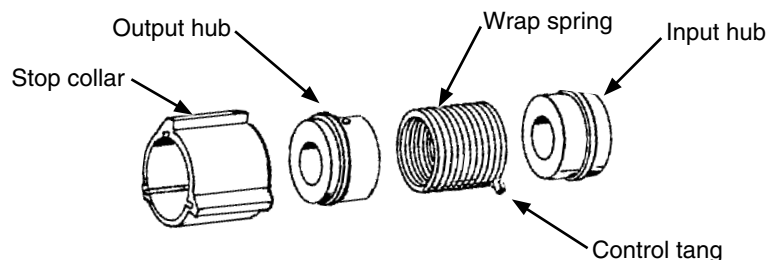
Point row clutch

Electric-activated clutches disengage drive on either half of planter for finishing up fields or for long point row situations. Clutch selector switch is located on tractor.

NOTICE

Switch must be **OFF** when planter is not in use or tractor battery will be drained.

NOTE: Liquid fertilizer piston pump has its own drive wheel and is not affected by point row clutch.



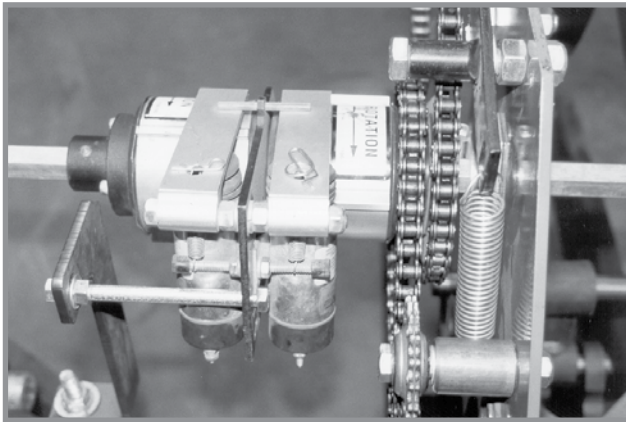
Clutch consists of a wrap spring riding on an input and output hub. Wrap spring is wrapped tightly over hubs during operation locking them together. Higher speeds create a tighter grip of spring on hubs.

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

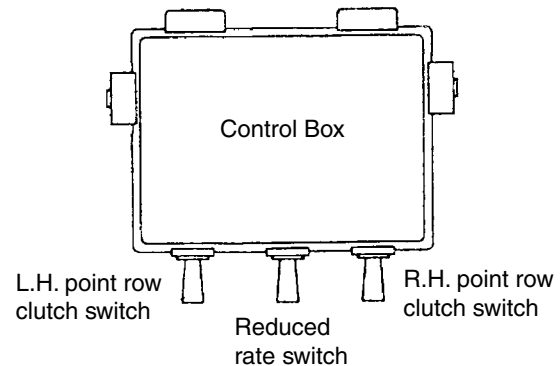
Stop collar is controlled by an electric solenoid and an actuator arm. When selector switch on tractor control box is OFF, solenoid coil is NOT ENERGIZED and actuator arm will not contact stop on stop collar, allowing it to rotate with hubs and drive planter.

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

TWO-SPEED POINT ROW CLUTCHES



Two-speed point row clutch (front view)



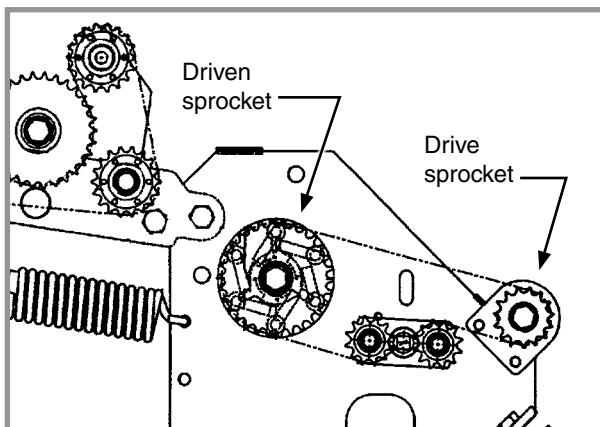
Top View Of Control Box

Optional Two-Speed Point Row Clutch Package allows on-the-go population rate adjustment and capability to shut off either half of planter for finishing up fields or for long point row situations.

Point row clutches are controlled by control console point row clutch switches. The point row switch is used to shut off either the left or right half of the planter. Activating the reduced rate switch engages one solenoid on each clutch assembly and reduces the planting rate for the entire planter.

NOTICE

Point row switch must be OFF and rate switch left in FULL RATE when planter is not in use or tractor battery will be drained.



Ratio of population reduction is determined by sprocket ratio between wheel module drive and driven sprockets.

TRANSMISSION RATE REDUCTION		
DRIVE	DRIVEN	% REDUCTION IN POPULATION
15	30	50
17	30	43
23*	30	23
24	30	20
25*	30	17
26*	30	13
27	30	10

* Use sprockets off seed drive transmission
7100-214

A rate reduction decal is located on wheel module.

NOTE: Liquid fertilizer piston pump has its own drive wheel and is not affected by point row clutch.

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. See “Rate Charts”, “Checking Seed Population” and “Granular Chemical Application Field Check”.

- Check planter for front to rear and lateral level operation. See “Level 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 Adjustment” and “Row Marker Speed Adjustment”.
- Check for proper application rates and placement of granular chemicals on **all** rows. See “Granular Chemical Application Field Check”.
- Check for desired depth placement and seed population on **all** rows. See “Check Seed Population”.
- Check for proper application rates of fertilizer on **all** rows. See proper “Fertilizer Application Rate Chart”.

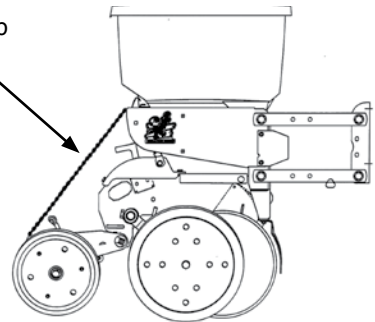
Reinspect machine after field testing.

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

CHECK SEED POPULATION

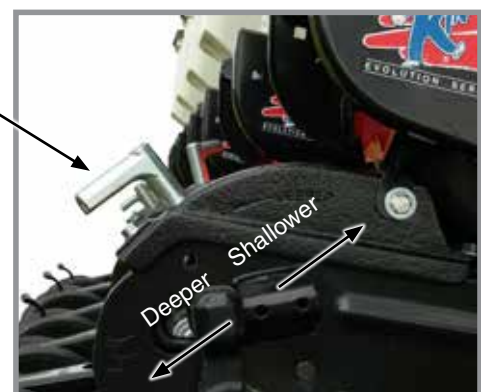
1. Tie up one or more sets of closing wheels by running a chain or rubber tarp strap between the hopper support panel and closing wheels. It may be necessary to decrease closing wheel arm spring tension.

Chain, rubber tarp strap, or similar.



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 handle



Planting depth adjustment

3. Measure $\frac{1}{1000}$ of an acre (hectare). See chart for correct distance for row width being planted. For example, if planting 30" (76 cm) rows $\frac{1}{1000}$ of an acre (hectare) would be 17' 5" (13.12 m).

$\frac{1}{1000}$ Acre (Hectare) Seed Population Count Row Width/Distance			
Row Width	30" (70 cm)	36" (91 cm)	38" (97 cm)
Distance	17'5" (14.28 m)	14'6" (10.93 m)	13'10" (10.36 m)

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 (hectare) by 1000. This gives total population.

EXAMPLE: 30" (70 cm) row spacing 17' 5" (14.28 m) 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" (20 cm) and a gap of 16" (40 cm) 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

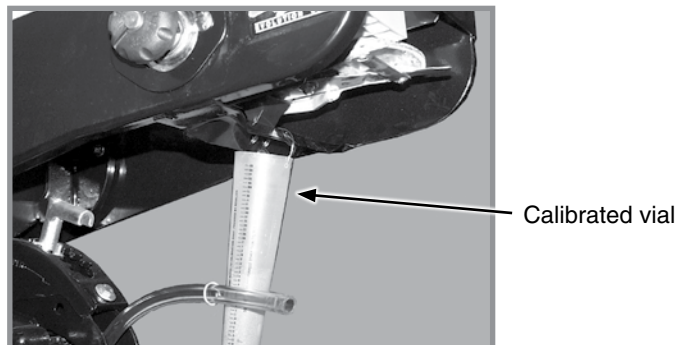
If seed population check shows planting rate is significantly different than seed rate chart shows or if a particular meter is not planting accurately, see "Brush-Type Seed Meter Maintenance" and "Brush-Type Seed Meter Troubleshooting".

GRANULAR CHEMICAL APPLICATION FIELD CHECK

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

 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>
	

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 (kilograms) per acre (hectare).

Pounds (Kilograms) Per Acre (Hectare)	
Row Width	Factor
30"	0.83 (0.0328 kg)
36"	0.69 (0.0272 kg)
38"	0.65 (0.0256 kg)

EXAMPLE: You are planting 30" rows. You have planted for 1320 feet at the 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.

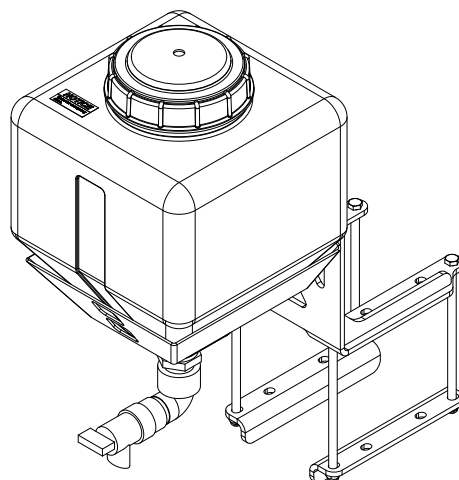
NOTE: Check calibration of all rows.

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).

WATER TANK

The water tank is to only be filled with clean water or preferably potable water (water meeting local standards for drinking). The tank holds 4 gallons (15 L) of water. Be sure to check for regulations pertaining to this use. Tank should be filled with new water at the beginning of each planting season and drained at the end of each planting season.



NOTICE

Drain tank if environmental conditions are 32° Fahrenheit (0° Celsius) or below to prevent tank from cracking.

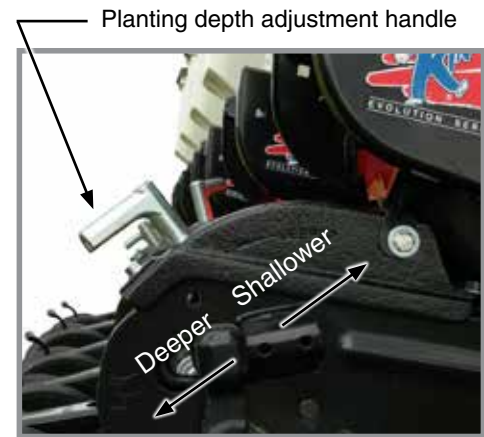
The water tank is to be used in the event of an accidental exposure to chemical. Chemicals are supplied with Material Safety Data Sheets (MSDS) that provide full information about the chemical, its effects on exposure, and first aid needs in the event of an emergency. Keep your MSDS file up-to-date and available for first responders in case of emergency.

If the water tank is used seek medical assistance immediately for further treatment.

PLANTING DEPTH

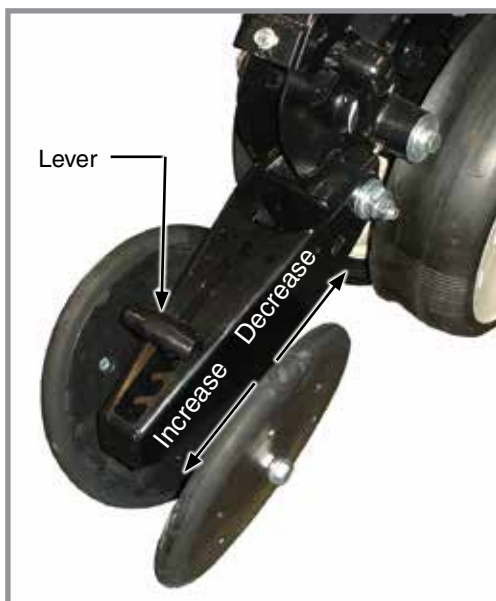
Planting depth is maintained by adjustable row unit gauge wheels. Depth adjustment range is approximately ½" to 3½" (1.27 to 8.89 cm).

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.

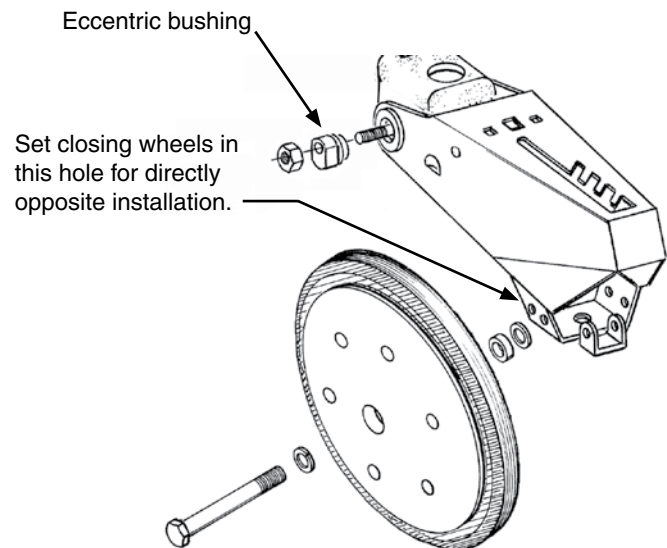


Planting depth adjustment

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



“V” Closing wheels installed offset



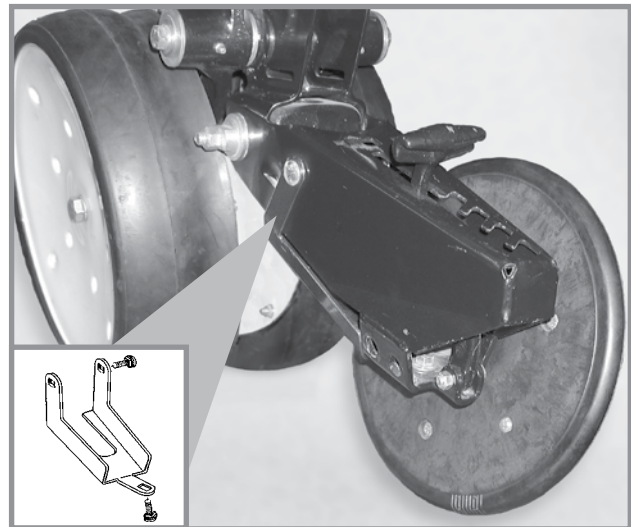
“V” closing wheels should have enough down pressure to close the seed trench and ensure good soil to seed contact. Move 5-position quick adjustable down force lever on the top of closing wheel arm to the rear to increase closing wheel spring pressure. Move lever forward to decrease pressure. Adjust all 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 ¾" wrench to loosen hardware attaching closing wheel arm to wheel arm stop. Use another ¾" 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.

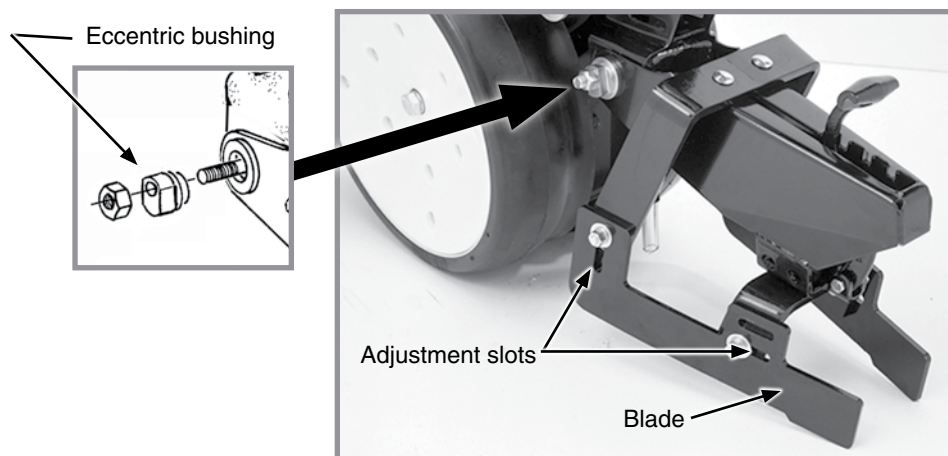
CLOSING WHEEL SHIELD (RUBBER OR CAST IRON "V" CLOSING WHEELS)

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)

DRAG CLOSING ATTACHMENT



Drag closing attachment

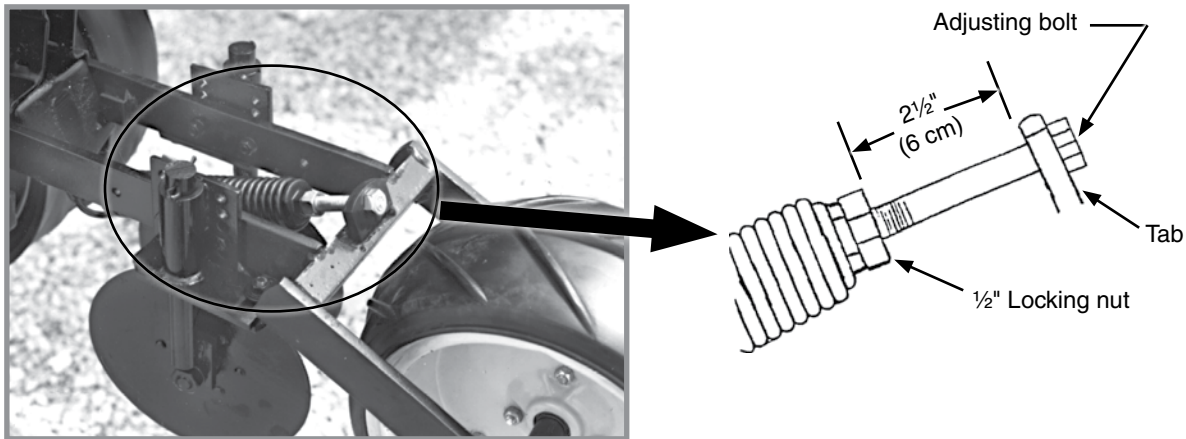
Drag closing attachment pulls loose soil over the seed trench.

NOTE: Use of a seed firming wheel or other seed firming device is recommended with drag closing attachment.

Front and rear adjustment is made using the slotted holes in the blades. Adjust all rows the same.

Eccentric bushings in the wheel arm stop allow for lateral adjustment of the drag closing attachment. 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 drag closing attachment is aligned with seed trench. Tighten hardware.

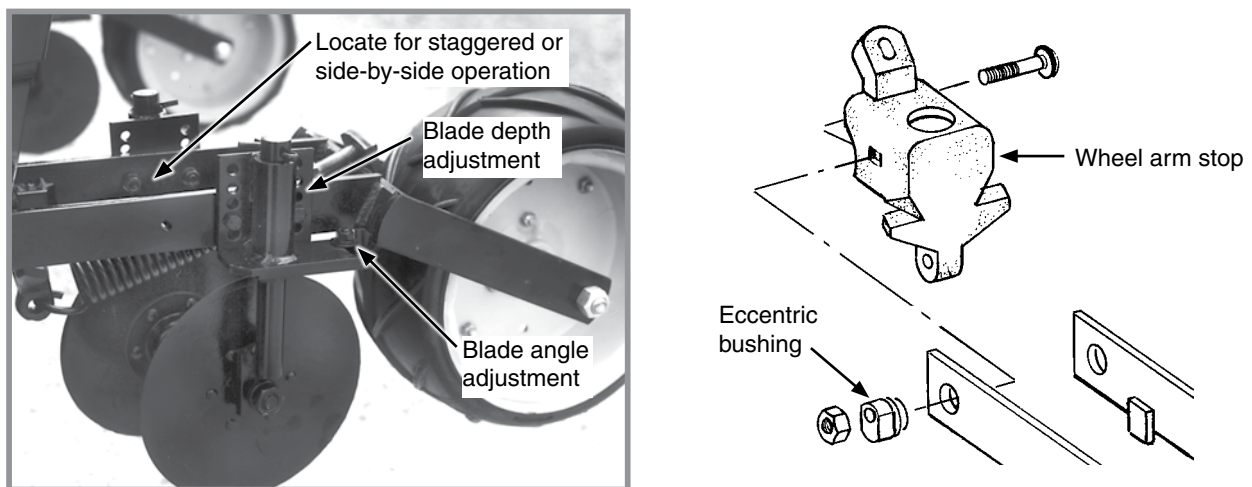
COVERING DISCS/SINGLE PRESS WHEEL ADJUSTMENT



Press wheel down force adjustment

Check operation of covering discs/single press wheels after adjusting planting depth. Initial press wheel down force spring setting is 2½" (6.3 cm) between mounting arm tab and locking nut.

1. Loosen ½" (1.27 cm) locking nut and turn adjusting bolt in to increase down force or out to decrease down force.
2. Tighten locking nut against spring plug. Adjust all row units to a similar setting.



Covering disc adjustments

Eccentric bushings in the wheel arm stop allow for lateral adjustment of covering discs/single press wheel assembly. Use a ¾" wrench to loosen hardware attaching closing wheel arm to wheel arm stop. Use another ¾" wrench to turn eccentric bushings until covering discs/single press wheel assembly is aligned with seed trench. Tighten hardware.

Two sets of holes in mounting arm locate covering discs for staggered or side-by-side operation.

Five sets of holes in each disc bracket allow ½" (1.27 cm) incremental blade depth adjustment.

Slotted holes in disc mount and bracket allow for 0° - 15° blade angle adjustment.

Adjust covering discs on all row units to similar settings.

SEED HOPPERS

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.**

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

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

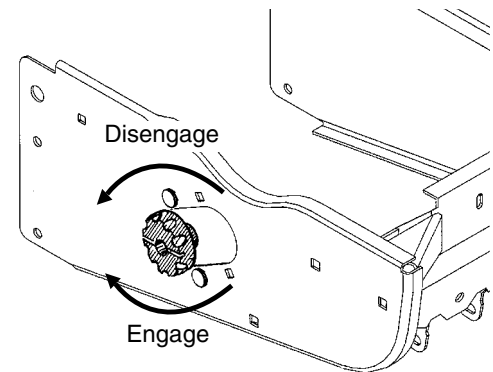


Mechanical seed hopper

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.

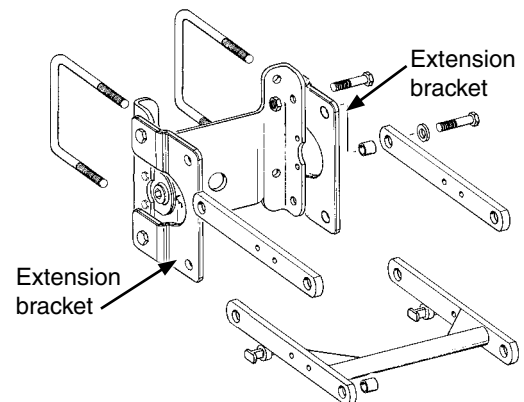
Turn knob ¼ turn counterclockwise to disengage or ¼ turn clockwise to engage.



Seed meter drive release

ROW UNIT EXTENSION BRACKETS

Row unit extension brackets extend row units rearward 4" (10.2 cm) to provide clearance for coulters mounted residue wheels and HD single disc fertilizer openers.

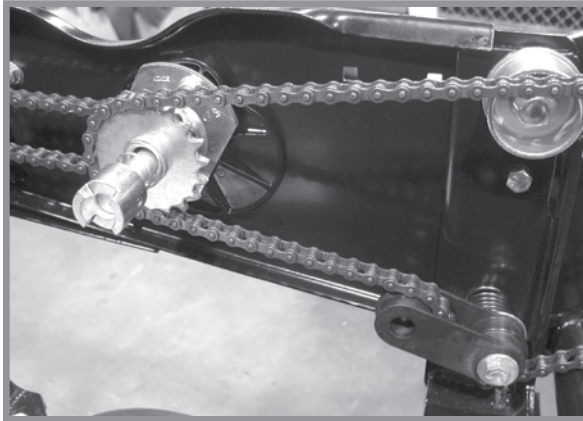


Row unit extension brackets

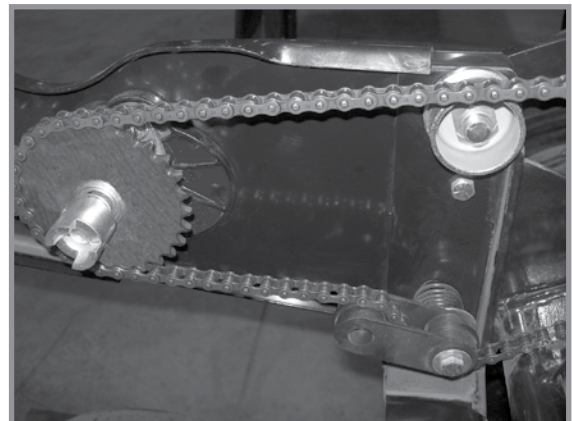
ROW UNIT CHAIN ROUTING

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

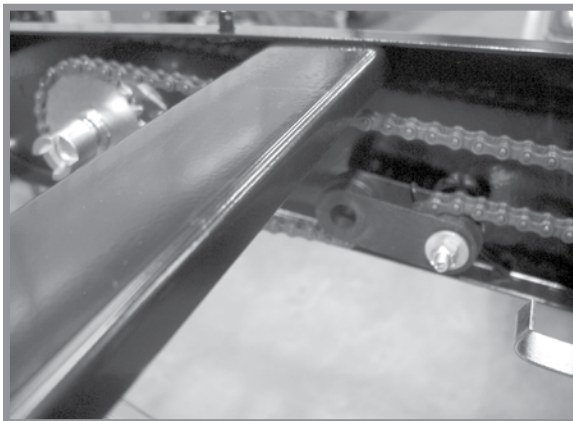
Inspect and replace weak, worn or broken springs, idlers, and idler bushings.



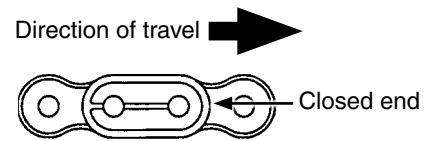
Mechanical pull row unit meter drive



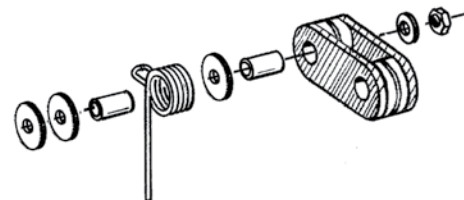
Vacuum pull row unit meter drive



Row unit granular chemical drive



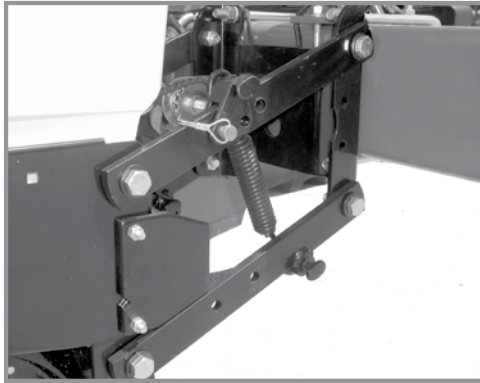
NOTE: Install connector link with closed end facing direction of travel.



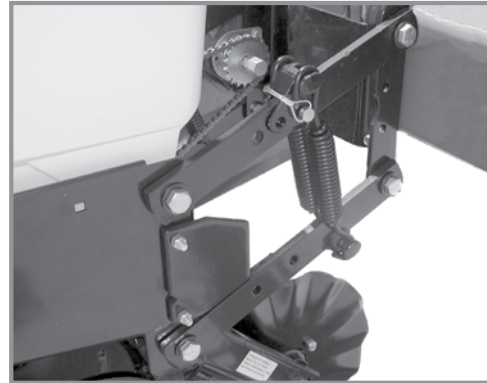
NOTE: Reverse idler when worn on one side for extended use.

QUICK ADJUSTABLE DOWN FORCE SPRINGS OPTION (STANDARD OR HEAVY DUTY)

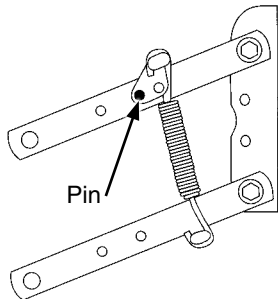
Standard and heavy duty quick adjustable down force springs are available in increase penetration in hard soil and keep row unit from bouncing in rough field conditions. Two springs per row, one on each side parallel arms, are used unless equipped with row unit mounted no till coulters. Row unit mounted no till coulters require four springs per row.



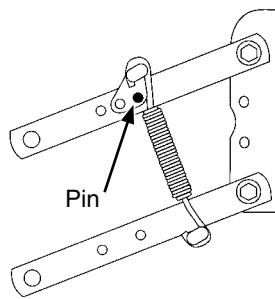
Two Springs Per Row (Dual)



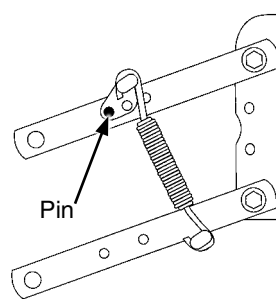
Four Springs Per Row (Quad)



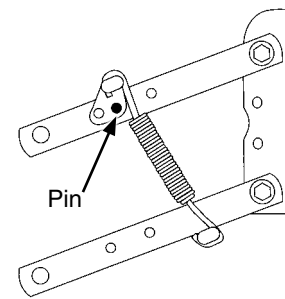
Position 1 (Least)



Position 2



Position 3



Position 4 (Most)

There are four positions to set down pressure spring tension.

Standard and Heavy Duty Spring Down Force Pressure*				
	2 Springs		4 Springs	
Position	Standard D8249	Heavy Duty D21337	Standard D8249	Heavy Duty D21337
1	41lb (18.6 kg)	43 lb (19.5 kg)	74 lb (33.6 kg)	80 lb (36.3 kg)
2	73 lb (33.1 kg)	86 lb (39.0 kg)	120 lb (54.4 kg)	144 lb (65.3 kg)
3	136 lb (61.7 kg)	167 lb (75.7 kg)	255 lb (115.7 kg)	307 lb (139.3 kg)
4	207 lb (93.9 kg)	249 lb (113.0 kg)	369 lb (167.4 kg)	470 lb (213.2 kg)

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








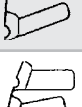
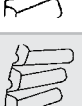


NOTICE	Springs must be installed with open side of spring hooks toward seed hoppers to prevent binding on spring mount adjustment pins.
---------------	---

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.

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







BRUSH-TYPE SEED METER

	Crop	Disc Color-Code (Disc Part No.)	Upper Brush Retainer	Cells	Seed Size Range	*Lubricant
	Soybean	Black (GA5794)	GD11122	60	2200 to 4000 seeds/lb. (4,840 to 8,800 seeds/kg)	Graphite Talc
	Specialty Soybean	Dark Blue (GA6184)	GD11122	48	1400 to 2200 seeds/lb. (3,080 to 4,840 seeds/kg)	Graphite Talc
	Small Milo/Grain Sorghum	Red (GA5982)	GD8237	30	14,000 to 20,000 seeds/lb. (30,800 to 44,000 seeds/kg)	Talc
	Large Milo Grain Sorghum	Light Blue (GA6187)	GD8237	30	10,000 to 16,000 seeds/lb. (22,000 to 35,200 seeds/kg)	Talc
	High-Rate Small Milo/Grain Sorghum	Red (GA5795)	GD8237	60	12,000 to 18,000 seeds/lb. (26,400 to 39,600 seeds/kg)	Talc
	High-Rate Large Milo/Grain Sorghum	Yellow (GA6633)	GD8237	60	10,000 to 14,000 seeds/lb. (22,000 to 30,800 seeds/kg)	Talc
	Cotton, Acid-Delinted	White (GA5796)	GD11122	30	4200 to 5200 seeds/lb. (9,240 to 11,440 seeds/kg)	Talc
	Large Cotton, Acid Delinted	Tan (GA6168)	GD11122	36	3800 to 4400 seeds/lb. (8,360 to 9,680 seeds/kg)	Talc
	High-Rate Cotton, Acid-Delinted	Light Green (GA6478)	GD11122	48	4200 to 5200 seeds/lb. (9,240 to 11,440 seeds/kg)	Talc
	Hill-Drop Cotton, Acid-Delinted	Brown (GA6182)	GD11122	12 (3 to 6 seeds/ cell)	4000 to 5200 seeds/lb. (8,800 to 11,400 seeds/kg)	Talc
	Small Hill-Drop Cotton, Acid-Delinted	Dark Green (GA7255)	GD11122	12 (3 to 6 seeds/ cell)	5000 to 6200 seeds/lb. (11,000 to 13,640 seeds/kg)	Talc

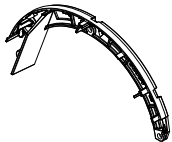
*For More information on application rate see Additives section.

	<p>Use GD11122 upper brush retainer when using cotton and soybean discs.</p>		<p>Use GD8237 upper brush retainer when using milo/grain sorghum discs.</p>
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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 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

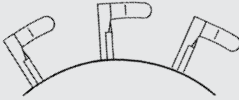
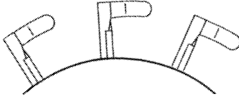
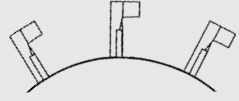

NOTE: Clean seed is required to ensure accurate seed metering from brush-type seed meters. Remove seed discs daily and check seed meter or brushes for buildup of foreign material, such as hulls, stems, etc.

NOTICE

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

FINGER PICKUP SEED METER











Crop	Fingers	*Lubricant
Corn	 Part No.: GR1848 - Finger Assembly, Corn	Graphite Talc
No. 1 and/or No. 2 size Confectionery Sunflower Seeds	 Part No.: GR1848 - Finger Assembly, Corn	Talc
No. 3 and/or No. 4 size Oil Sunflower Seeds	 Part No.: GR2154 - Finger Assembly, Oil	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.	 Part No.: GD11787 - Half Rate Blank Finger	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	G9040X	B0678 (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	G9041X	B0848 (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	---	GB1174 (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	G9043X	B0683 (Dark Orange)	1 row 6 punches (Dark Orange)	60	Pelletized	2	15 (3.75)	Graphite* Talc* Bayer Fluency† (if mandated)
	Milo	G9043X	B0683 (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	G9042X	B0684 (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	G9042X	B0684 (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	G9272X	B0912 (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	G9273X	B0914 (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	G9308X	B0913 (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	G10050X	GB1170 (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 section.

**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 the Bayer Fluency Agent section for more information.

‡Conventional hoppers only, not applicable with bulk fill.

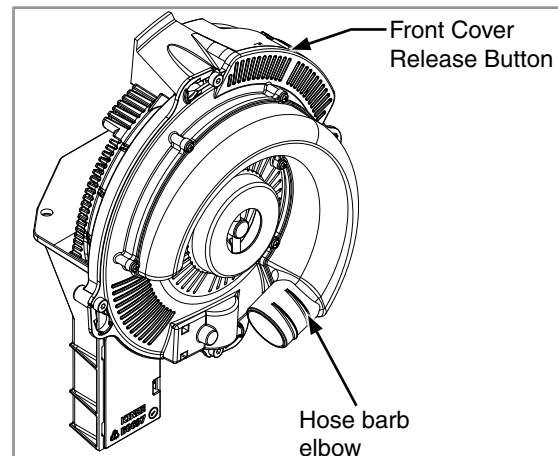
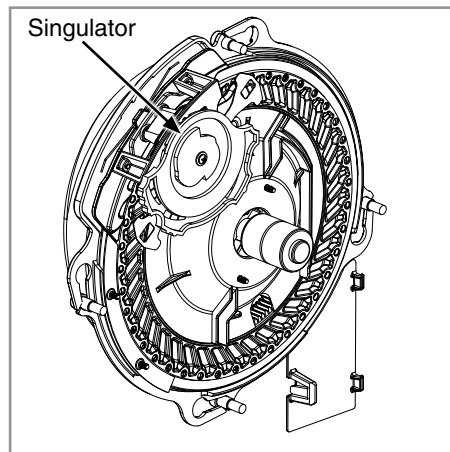
NOTE: See ["Check Seed Population" on page 2-27](#) for more information. Always field check seed population to ensure planting rates are correct.

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" pages for more information.

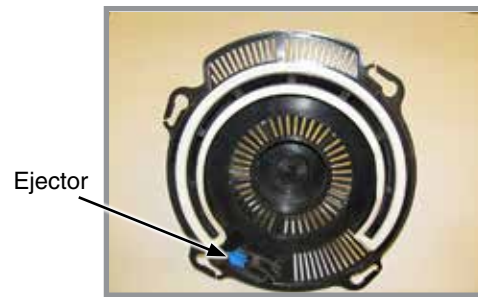
NOTE: Excessive seed treatment, humidity, and light-weight seed can affect meter performance. Use ½ cup of talc with each standard hopper fill of seed and mix thoroughly to coat all seeds and adjust rates as needed. Use of talc aids seed flow into meter, singulation, and disc seed drop.



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 6-15](#) and ["Preparing Planter for Storage" on page 6-30](#) in Lubrication and Maintenance section for more information.



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

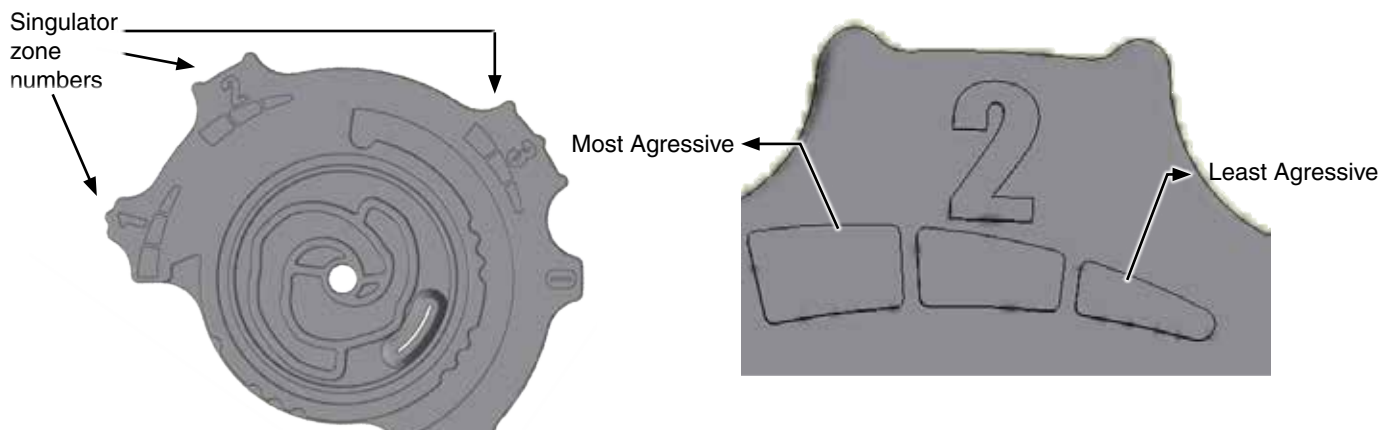
Wheel-type ejectors expel seed remnants from seed disc orifices. These ejectors are disc specific and colored coded to match disc.

NOTICE

Replace hopper or tank lids after filling to prevent accumulation of dust or dirt in seed meter resulting in 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.

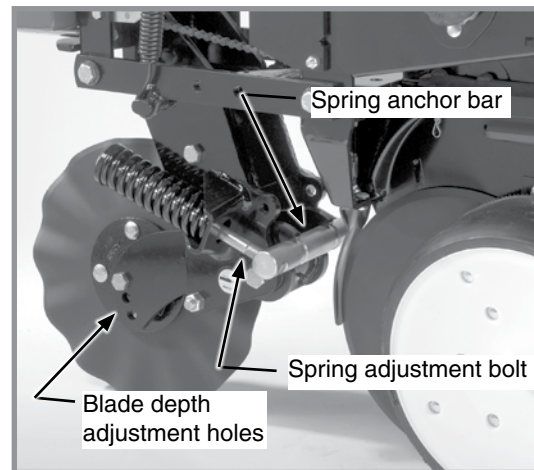
NOTE: Presently, Bayer Fluency Agent is only required to be used in Canada with Bulk Fill or Vacuum planters that plant corn or beans treated with neonicotinoids. Farms outside of Canada, farms not using seed treated with neonicotinoids, and farms not using pneumatic metering devices do not need to use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

FRAME MOUNTED COULTER (PULL ROW ONLY)

Frame mounted coulters with 1" bubbled, 1" fluted (8 flutes) or 3/4" fluted (13 flutes) blades are used on pull row units only.

Springs provide down pressure on coulters for maximum penetration while exerting less shock load on row unit.

Initial coulters blade location is in top hole. Relocate blade to one of lower two holes (1" (2.5 cm) increments) as wear occurs or for deeper blade operation.



Frame mounted coulters adjustment

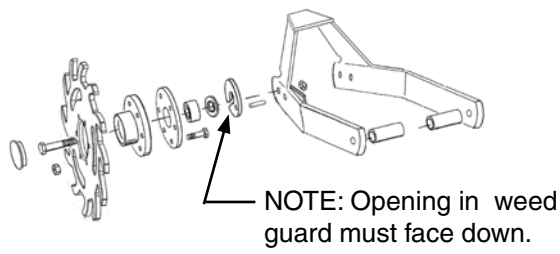
DOWN PRESSURE ADJUSTMENT

Raise planter. Turn spring adjustment bolts clockwise to increase or counterclockwise to decrease down pressure. Set both springs to specification shown in following table:

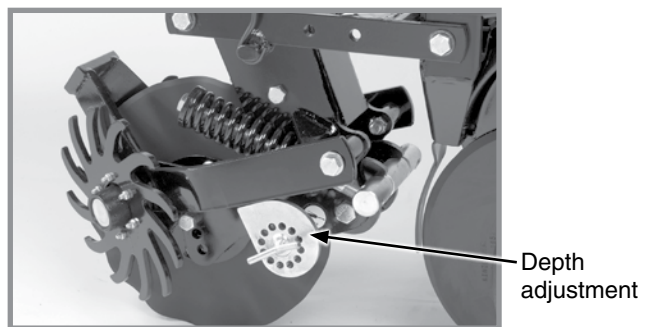
NOTICE	Excessive down pressure can damage coulters components when coulters strikes an obstacle. Do not set down pressure higher than needed for consistent soil penetration.
---------------	---

Frame Mounted Coulters Spring Downpressure Settings		
End flush with spring anchor bar	Extended 1/2" (1 cm) through spring anchor bar	All threads used
275 lb (124.7 kg)	400 lb (181.4 kg)	500 lb (226.8 kg)

RESIDUE WHEELS (FOR FRAME MOUNTED COULTER)



Style B residue wheel shown



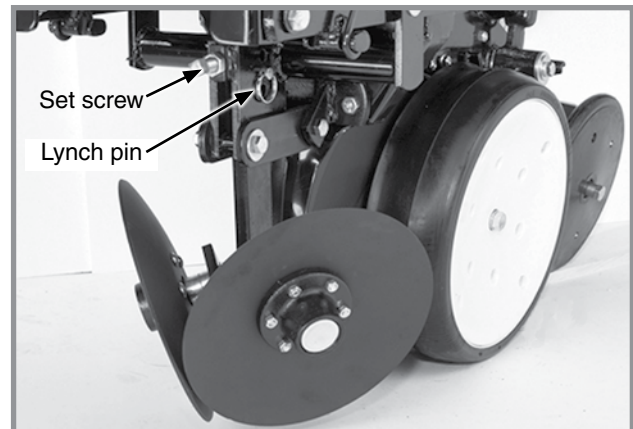
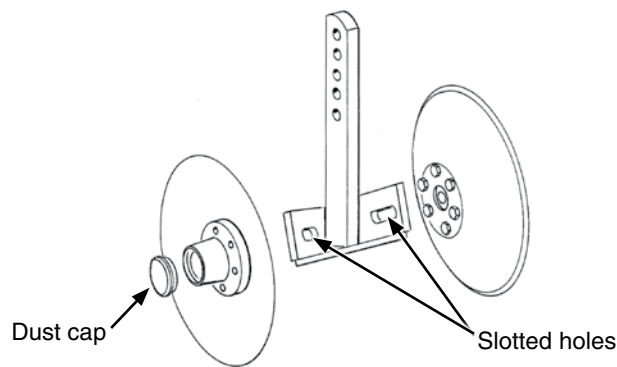
Style A residue wheel shown

Residue wheels attach to frame mounted coulters with two cap screws and sleeves allowing the 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 11 positions in 1/4" (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.

ROW UNIT MOUNTED DISC FURROWER (PULL ROW ONLY)

Disc furrowers are used to clear crop residue, dirt clods, and dry soil from in front of row units for a clean and smooth seed bed. The disc furrower may be equipped with 12" solid blades or 12" notched blades. Notched blades are for heavier residue conditions and cut crop residue and move it aside to prevent plugging or pushing.



Disc furrower adjustment

Vertical adjustment can be made in $\frac{1}{8}$ " (8 mm) increments. Remove lynch pin in vertical support arm and move arm up or down. Reinstall lynch pin. Finer adjustment can be made by removing lynch pin and using $\frac{5}{8}$ " x $2\frac{1}{4}$ " set screw to clamp support arm in position.

Slotted holes in support arm allow front to rear disc blade adjustment. Blades can be adjusted so front edges meet or cutting edge of one blade overlaps edge of other blade.

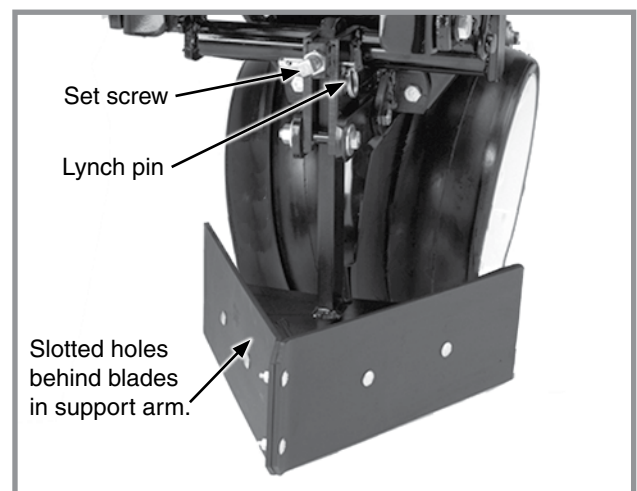
NOTE: Dust cap must be removed to make adjustments.

ROW UNIT MOUNTED BED LEVELER (PULL ROW ONLY)

NOTE: Row unit mounted bed leveler is not compatible with row spacings less than 36" (91 cm).

Vertical adjustment can be made in $\frac{1}{8}$ " (8 mm) increments. Remove lynch pin in vertical support arm and move arm up or down. Reinstall lynch pin. Finer adjustment can be made by removing lynch pin and using $\frac{5}{8}$ " x $2\frac{1}{4}$ " set screw to clamp support arm in position.

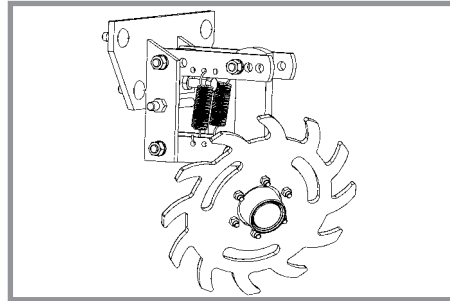
Slotted holes in support arm allow blade adjustment. Blades can be tilted up or down.



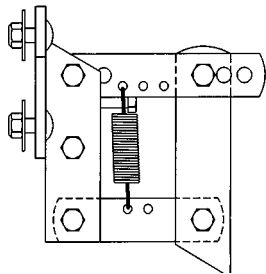
Bed leveler adjustment

ROW UNIT MOUNTED RESIDUE WHEEL

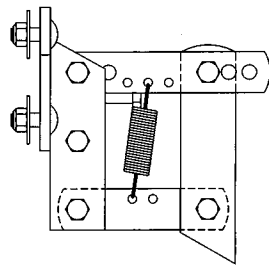
Row unit mounted residue wheel are used on pull and push row units.



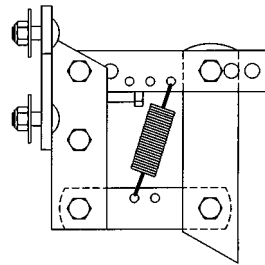
Two adjustable springs on each residue wheel parallel links provide down force adjustment. Position 1 provides minimum down pressure and position 3 maximum down pressure.



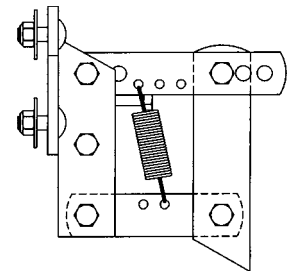
Position 1 (*Least*)



Position 2

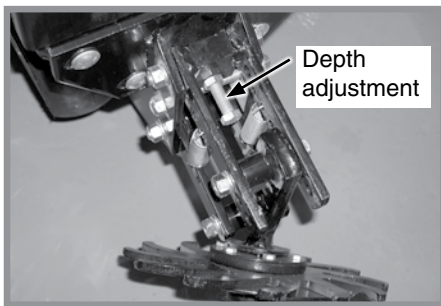


Position 3 (*Most*)

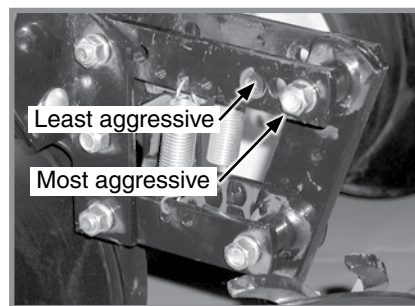


Additional uplift or float

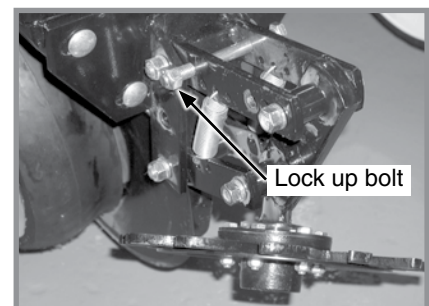
Raise row unit and reposition springs to adjust down pressure.



Wheel depth adjustment



Wheel angle adjustment



Wheel lock up

A full threaded bolt and jam nut located on the upper link sets maximum depth for loose soil conditions. Initial setting is 1 3/4" (4 cm) above row unit double disc opener depth.

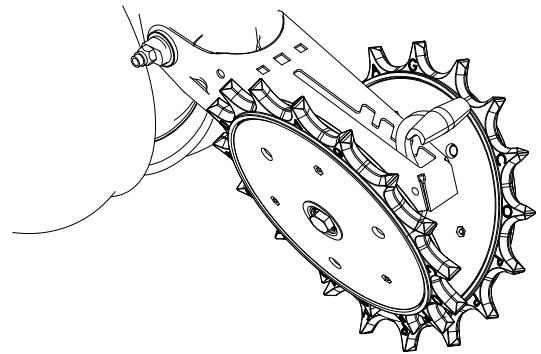
Three holes in upper link adjust wheel angle. With wheel mount in most vertical position, using the rear hole in the upper link, the residue wheel is most aggressive. Moving wheel mount to a forward hole reduces aggressiveness of residue wheel for use in mulch till applications where soil is loose.

To lock residue wheel up, remove 1/2" x 5" lockup bolt, raise residue wheel and install bolt.

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 rearward holes on closing wheel arm. Set the wheels 1" - 1¼" (2.5 - 3.1 cm) apart at the closest point. If large amounts of contouring is being done, mount wheels in the forward most hole. This will reduce drifting of row unit.



Row Unit Spiked Closing Wheel

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 Option".

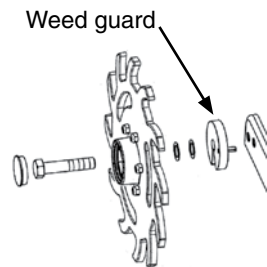
Align coulters in relation to row unit double disc openers. Adjust by loosening four attaching bolts, moving coulters arm, and tightening four attaching bolts. Coulters blade can be adjusted to one of four ½" (13 mm) incremental settings in the forked arm. Initial location is the top hole. Move blade as it wears to one of the three lower hole to maintain coulters blade 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 blade and row unit opener blade. Make sure planter is level and coulters is 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).

COULTERS 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.




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 11 positions in ¼" (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.

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.

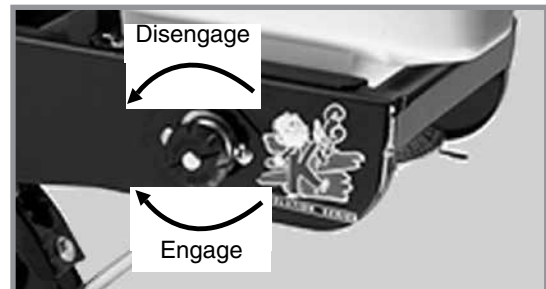


Granular chemical hopper

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 ¼ turn counterclockwise to disengage and ¼ 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

SPRING TOOTH INCORPORATOR

Spring tooth incorporator smooths soil behind row unit and incorporates granular chemicals.

Adjust two mounting chains on each spring tooth incorporator so there is approximately ⅛" (3 mm) slack in chain when unit is lowered to planting position.

NOTE: Spring tooth incorporator is not compatible with covering discs/single press wheel option.

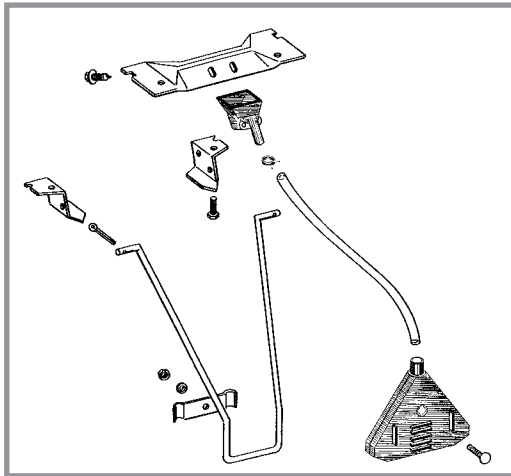


Spring tooth incorporator

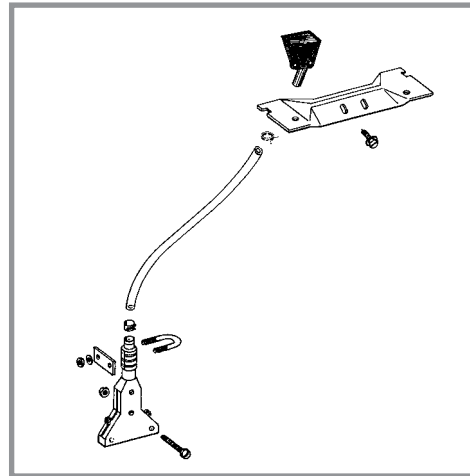
GRANULAR CHEMICAL BANDING OPTIONS

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

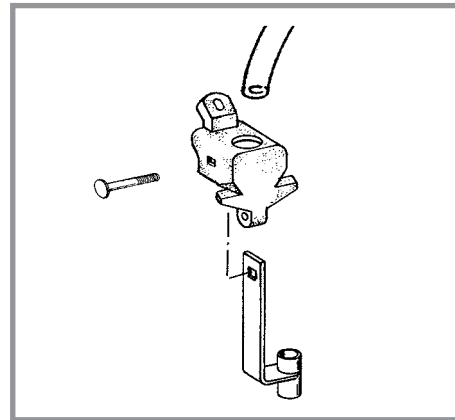
NOTE: Granular chemical rear bander is not compatible with covering discs/single press wheel option.



14" Rear Banding



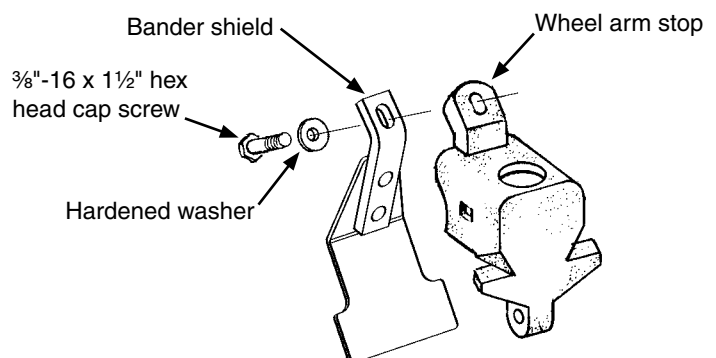
4½" Slope-Compensating Bander



Straight Drop In-Furrow Placement

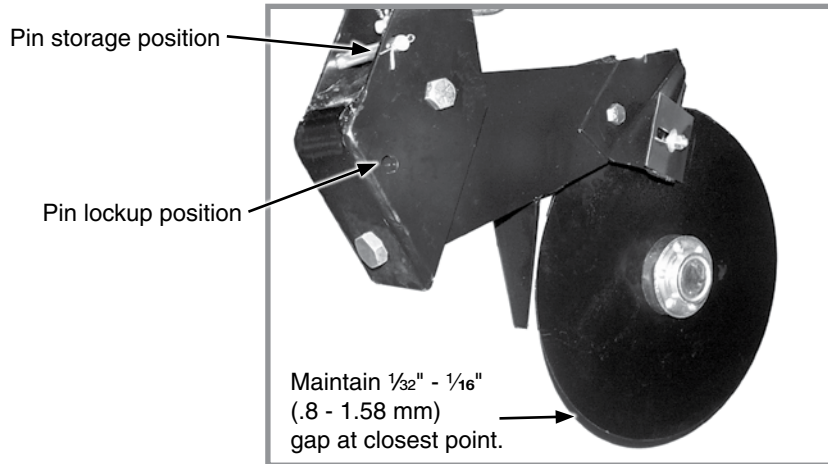
GRANULAR CHEMICAL BANDER SHIELD

Optional granular chemical bander shield is installed on underside of wheel arm stop to shield crop residue from lodging in granular chemical bander.



Granular chemical bander shield installation

DOUBLE DISC FERTILIZER OPENER



Double disc fertilizer opener

Position double disc fertilizer openers **to place fertilizer no closer than 2" (5 cm) to either side of row.** Fertilizer depth is approximately 4" (10 cm) If planter frame is level and at proper 20" (51 cm) operating height. Soil conditions can affect depth slightly.

NOTE: Do not set opener depth with spring pressure. Opener is designed to operate against a depth stop and spring up when encountering a foreign object or hard ground.

Down pressure spring is factory preset at 250 lb (113.4 kg) but can be adjusted for various soil conditions.

1. Loosen jam nut with a $1\frac{5}{16}$ " wrench.
2. Use a 1" wrench to turn adjustment bolt clockwise to increase tension or counterclockwise to decrease tension.
3. Tighten jam nut.

NOTICE

Do not operate double disc openers at full down pressure tension on rocky ground or disc blades will chip.

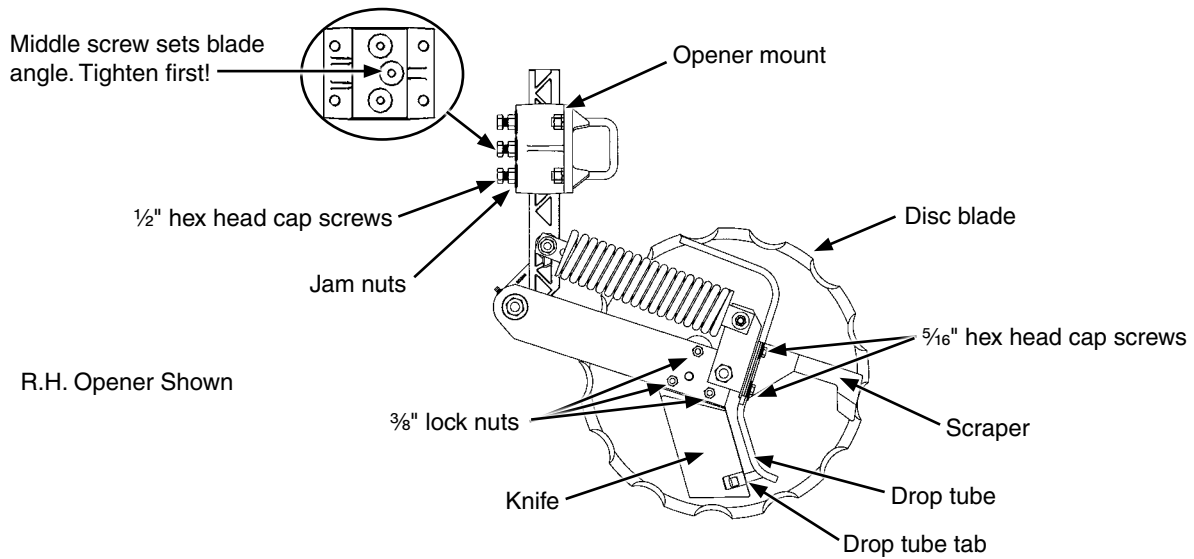
Maintain a gap of $\frac{1}{32}$ " to $\frac{1}{16}$ " (.8 - 1.58 mm) between opener blades at the closest point. Blade adjustment is made by moving inside spacer washers to outer side of blade. Check bearing assembly rivets are not contacting shank after making adjustment.

Outer scrapers on each disc blade can be adjusted for wear. Make sure scrapers are adjusted to allow only slight blade contact.

Opener assembly is designed to be locked in a raised position when fertilizer attachment is not in use or during storage.

1. Raise planter and place blocks under openers.
2. Lower planter until pivot section hole aligns with mounting bracket hole.
3. Remove lockup pin from mounting bracket storage position and install through lockup hole.
4. Secure with cotter pins.

NOTCHED SINGLE DISC OPENERS



Notched single disc opener adjustments



CAUTION Compressed spring may fly out of this assembly if attempting to disassemble and cause injury. Do not take apart this assembly.

Disc blades are sharp and can cut causing serious injury. Wear gloves when working on or turning disc blades by hand.



NOTICE Never strike knife with heavy object. Damage to knife will occur.

If knife to disc blade clearance is too large, soil or residue can wedge between knife and blade, and blade will not turn.

1. Adjust knife to disc blade contact. Loosen or tighten $\frac{3}{8}$ " lock nuts to adjust knife's entire leading edge against disc blade. Turn blade and check for slight resistance without freewheeling. Readjust knife to blade's tight spot as needed.

NOTICE

Adjust liquid drop tube out of path of soil flow across knife. Drop tube and tab wear quickly if not correctly adjusted.

2. Adjust scraper and drop tube. Loosen two $\frac{5}{16}$ " hex head cap screws. Adjust scraper until just touching disc blade. Adjust drop tube until it is centered between knife and disc blade. Tighten screws. Turn blade and check for slight resistance without freewheeling. Repeat as needed. Insert flat bladed pry bar or screwdriver between knife and drop tube above drop tube tab. Carefully bend tube until $\frac{1}{4}$ "- $\frac{3}{8}$ " (6.35 - 9.5 mm) from disc blade.

NOTE: Maximum disc blade depth 4" (10.2 cm).

3. Adjust blade depth. Loosen three $\frac{1}{2}$ " hex head cap screws and jam nuts in opener mount. Adjust opener assembly up or down to desired blade depth. Tighten center hex head cap screw and jam nut first to set proper disc blade angle. Tighten remaining hex head cap screws and jam nuts. Torque hex head cap screws and jam nuts to 57 ft-lb (77.29 N-m). Check fertilizer hose clearance and adjust as necessary.

RESIDUE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER

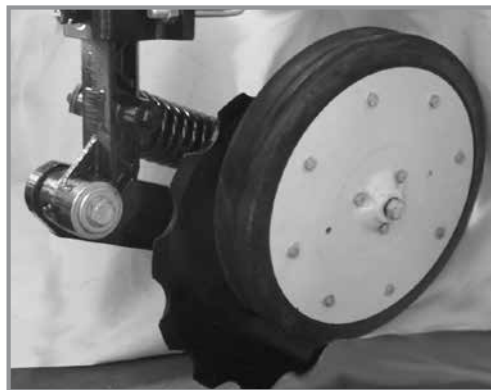


Notched single disc opener residue wheel attachment

Residue wheel attachment for notched single disc fertilizer opener is used where row unit mounted residue wheel attachments cannot be installed. Residue wheel is attached to notched single disc fertilizer opener with $\frac{5}{8}$ " x $7\frac{1}{2}$ " and $\frac{1}{2}$ " x $6\frac{1}{2}$ " hardware.

Maximum depth is set by lifting residue wheel and moving adjustment lever down to increase depth or up to decrease depth in 1" (2.5 cm) increments (in relation to blade depth setting). Adjust all rows the same. Residue wheel down force is maintained by a torsion spring and is not adjustable.

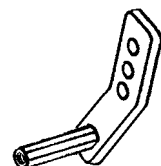
DEPTH/GAUGE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER



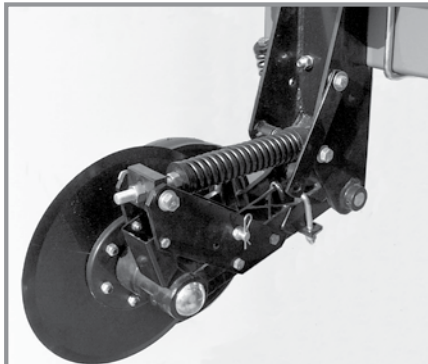
Notched single disc opener depth/gauge wheel

Depth/gauge wheel attachment for notched single disc fertilizer opener is used where additional gauging is required to maintain desired fertilizer opener depth. Depth/gauge wheel is attached to notched single disc fertilizer opener using a mounting block fastened to the pivot arm with $\frac{5}{8}$ " hardware through disc blade bearing.

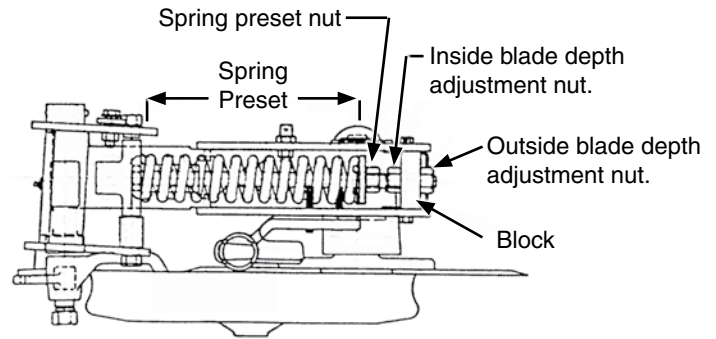
Depth adjustment is made using 3 adjustment holes in depth/gauge wheel mounting block. Moving depth/gauge wheel increases/decreases depth in approximate 1" (2.5 cm) increments in relation to blade depth setting made at vertical mounting post.



HD SINGLE DISC FERTILIZER OPENER



HD single disc opener



R.H. configuration shown (Overhead view)

Recommended placement of fertilizer with HD single disc fertilizer opener is 3½" - 4" (8.8 - 10.1 cm) from row.

NOTICE	Never place fertilizer closer than 2" (5 cm) to row or seeds may be damaged.
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Maximum blade depth is approximately 5" (12.7 cm) with planter frame level and at 20" (50.8 cm) operating height. Soil conditions can affect depth slightly.

Raise planter to remove weight from fertilizer opener. Loosen inside adjustment nut with 1½" wrench. Turn outside nut clockwise to decrease or counterclockwise to increase blade depth. One full turn of blade depth adjustment nut changes blade depth ⅜". Tighten inside nut tight against block. Adjust all fertilizer openers to same depth.

Fertilizer opener down pressure can be adjusted from 250 lb (113.4 kg) to 640 lb (290.3 kg).

NOTICE	Do not operate HD single disc fertilizer openers at full down pressure tension on rocky ground or disc blades will chip.
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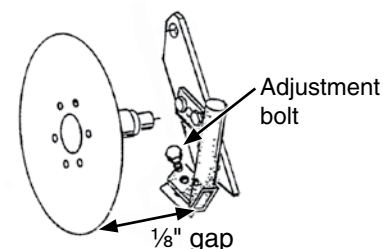
NOTE: DO NOT adjust spring preset dimension less than 9½" (24.13 cm).

NOTE: Excessive down pressure can cause planter frame up-lift and affect machine performance. Planter frame should be 20" (50.8 cm) from ground in planting position. Excessive down pressure in loose soil conditions can cause openers to run too deep and push dirt ahead of opener and may stop soil press wheel and opener blade from turning.

Raise planter to remove weight from fertilizer opener. Turn spring preset nut clockwise to increase and counterclockwise to decrease down pressure. Adjust all rows to a similar setting. Minimal spring pressure for acceptable operation is recommended. See chart for spring length setting specifications.

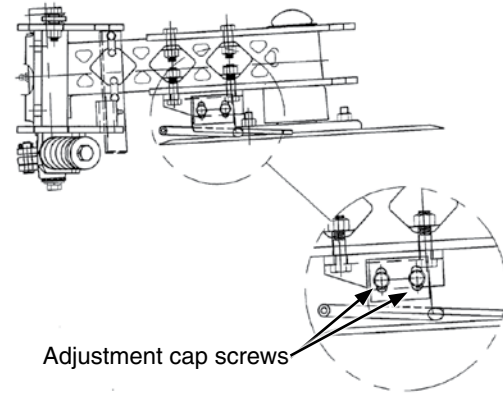
Spring Preset	
Length	Down Pressure
11" (27.9 cm)	250 lb (113.4 kg)
10¾" (27.3 cm)	320 lb (145.1 kg)
*10½" (26.7 cm)	370 lb (167.8 kg)
10¼" (26 cm)	450 lb (204.1 kg)
10" (25.4 cm)	520 lb (235.8 kg)
9¾" (24.8 cm)	580 lb (263.1 kg)
9½" (24.1 cm)	640 lb (290.3 kg)
*Initial setting	

Adjust spring loaded dry fertilizer drop tube/scrapper periodically to maintain ⅛" (3 mm) gap between drop tube and opener blade. If this dimension is not maintained fertilizer may not drop in proper location.



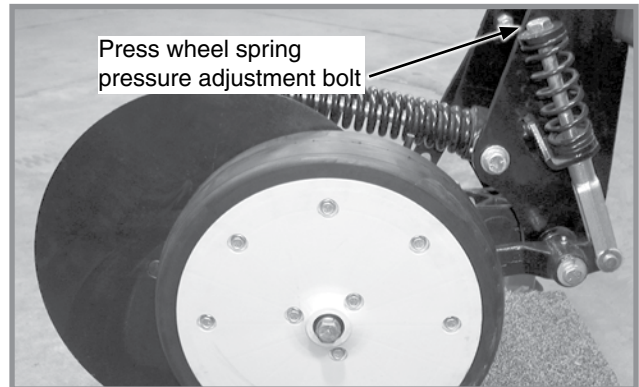
Loosen scraper adjustment bolt. Slotted hole in scraper allows up or down adjustment.
Rev. 9/17

Adjust liquid drop tube/scraper so there is slight contact between blade and scraper lower leading edge, and 1/4" (0.6 cm) clearance between liquid drop tube trailing edge and blade. Blade should turn with minimum amount of drag.



NOTE: Soil press wheel is not for gauging fertilizer opener operating depth.

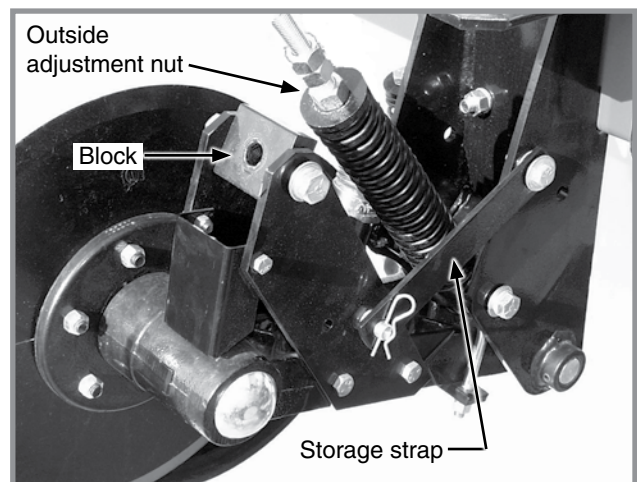
Additional press wheel down pressure may be desirable in heavy moist soils. Turn press wheel spring adjustment bolt clockwise to increase down pressure.



HD single disc fertilizer opener can be raised and locked up when fertilizer attachment is not used or during storage.

NOTE: A lockup bar automatically raises and locks soil press wheel when blade assembly is raised.

1. Place planter in planting position.
2. Remove outside blade depth adjustment.
3. Raise planter until adjustment bolt clears adjustment block.
4. Raise spring to clear blade assembly and raise blade assembly until storage strap can be positioned on lockup pin. Install hair pin clip.
5. Reinstall depth adjustment nut and tighten



LIQUID FERTILIZER ATTACHMENT**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.

**CAUTION**

Overfilling tank can cause siphoning, tank collapse, personal injury, and damage to property and equipment. Do not overfill tank. Do not leave planter unattended when filling tank. Close fill valve and open tank lid if siphoning occurs. Follow all chemical manufacturers first aid, cleanup, and handling instructions.



Liquid fertilizer option installed

NOTICE

Placing fertilizer too close to seeds or in excessive amounts can cause germination or seedling damage. Check with your fertilizer dealer or manufacturer for correct amount and placement.



Old style non-reparable check valve

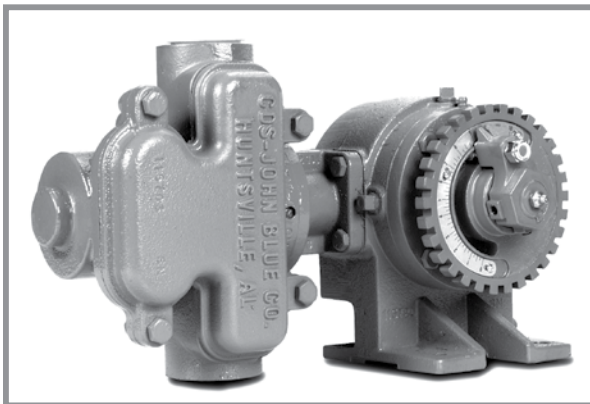


New style reparable check valve

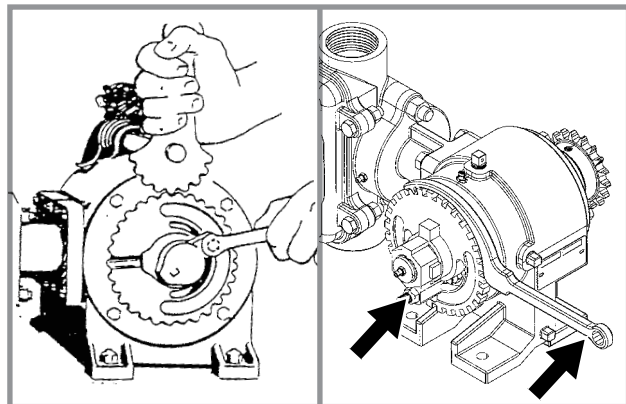
Optional low rate check valves are available for in-line installation between liquid fertilizer squeeze or piston pump and openers to ensure equal distribution of product at low rates. Check valves also eliminate anti-siphon loops.

OPTIONAL PISTON PUMP

NOTE: Keep manuals shipped with pump and flow divider with this manual.



Piston pump



Adjusting delivery rate

NOTE: Delivery rate chart in Rate Chart section of this manual provides approximate application rate only. Delivery varies with temperature and fertilizer.

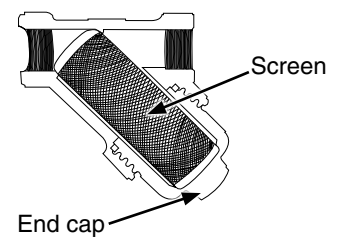
Loosen 3/8" lock nut that secures arm with pointer and rotate scale flange with adjustment wrench until pointer is over desired scale setting. Tighten 3/8" lock nut. **DO NOT OVERTIGHTEN.**

NOTE: Periodically check flow to all rows. Set rate is delivered to remaining rows if one or more lines are plugged.

CLEANING

Clean tanks, hoses, and metering pump thoroughly with water at end of planting season or prior to an extended period of non-use. Do not allow fertilizer to crystallize from cold temperature or evaporation.

On machines equipped with piston pump, take apart and clean strainer located between piston pump and ball valve daily. Remove the end cap to clean the screen. See Piston Pump Storage in Maintenance Section of this manual.



GENERAL PLANTING RATE INFORMATION

These planting rate charts are applicable to KINZE Model 3200 Twin-Line 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 SEED METERING

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 the nearest tenth of an inch. Because of the 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 the 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.

Standard Rate (1 To 1) 30 Tooth Drive Sprocket

When planting 30"/36"/38" rows with brush-type seed meters using 30 tooth standard rate (1 to 1) sprocket, use charts on page 5-2 to 5-5.

Half Rate (2 To 1) 15 Tooth Drive Sprocket

When using 15 tooth half rate (2 to 1) sprocket with brush-type seed meters, seeding rate is approximately 50% of chart readings.

NOTE: Use of the Half Rate (2 To 1) Drive Reduction Package with brush-type seed meters will reduce planter transmission speed. Seeding rate will be approximately 50% of the 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 SEED METERING

NOTE: 15, 19, and 38 tooth drive sprockets are NOT applicable to all rate charts. Check chart titles to ensure proper rate chart is selected. 15 and 19 tooth sprockets requires 91 pitch No. 40 chain and 38 tooth sprocket requires 104 pitch No. 40 chain.

NOTE: Planting rates over 250,000 seeds/acre are not recommended.

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

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

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

NOTE: See "General Planting Rate Information" and "Check Seed Population" pages for more information. Always field check seed population to verify planting rates.

**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		30" Rows	36" Rows	38" Rows		
17	28	80,928	67,440	63,891	2.6	64,742	53,952	51,113	3.2	2 to 8
17	27	83,926	69,938	66,257	2.5	67,141	55,950	53,006	3.1	2 to 8
17	26	87,154	72,628	68,805	2.4	69,723	58,102	55,044	3.0	2 to 8
19	28	90,449	75,374	71,407	2.3	72,359	60,299	57,126	2.9	2 to 8
19	27	93,799	78,166	74,052	2.2	75,039	62,533	59,242	2.8	2 to 8
17	24	94,416	78,680	74,539	2.2	75,533	62,944	59,631	2.8	2 to 8
17	23	98,521	82,101	77,780	2.1	78,817	65,681	62,224	2.7	2 to 8
19	25	101,303	84,419	79,976	2.1	81,042	67,535	63,981	2.6	2 to 8
19	24	105,524	87,937	83,309	2.0	84,419	70,350	66,647	2.5	2 to 8
23	28	109,491	91,243	86,440	1.9	87,593	72,994	69,152	2.4	2 to 8
19	23	110,112	91,760	86,931	1.9	88,090	73,408	69,545	2.4	2 to 8
24	28	114,252	95,210	90,199	1.8	91,402	76,168	72,159	2.3	2 to 8
24	27	118,483	98,736	93,539	1.8	94,786	78,989	74,831	2.2	2 to 8
17	19	119,263	99,386	94,155	1.8	95,410	79,509	75,324	2.2	2 to 8
24	26	123,040	102,534	97,137	1.7	98,432	82,027	77,710	2.1	2 to 8
26	28	123,773	103,144	97,715	1.7	99,018	82,515	78,172	2.1	2 to 8
24	25	127,962	106,635	101,023	1.6	102,370	85,308	80,818	2.0	2 to 8
26	27	128,357	106,964	101,334	1.6	102,686	85,571	81,067	2.0	2 to 8
23	23	133,294	111,078	105,232	1.6	106,635	88,862	84,186	2.0	2 to 8
27	26	138,420	115,350	109,279	1.5	110,736	92,280	87,423	1.9	2 to 8
24	23	139,089	115,907	109,807	1.5	111,271	92,726	87,846	1.9	2 to 8
25	23	144,884	120,737	114,382	1.4	115,907	96,590	91,506	1.8	2 to 8
19	17	148,975	124,146	117,612	1.4	119,180	99,317	94,090	1.8	2 to 8
27	24	149,955	124,963	118,386	1.4	119,964	99,970	94,709	1.7	2 to 8
28	24	155,509	129,591	122,770	1.3	124,407	103,673	98,216	1.7	2 to 8
23	19	161,355	134,463	127,386	1.3	129,084	107,570	101,909	1.6	2 to 8
28	23	162,270	135,225	128,108	1.3	129,816	108,180	102,486	1.6	2 to 8
24	19	168,371	140,309	132,924	1.2	134,696	112,247	106,339	1.6	2 to 8
25	19	175,386	146,155	138,463	1.2	140,309	116,924	110,770	1.5	2 to 8
23	17	180,338	150,282	142,372	1.2	144,270	120,226	113,898	1.5	2 to 8
26	19	182,402	152,001	144,001	1.1	145,922	121,601	115,201	1.4	2 to 7
27	19	189,417	157,848	148,540	1.1	151,534	126,278	118,832	1.4	2 to 7
28	19	196,433	163,694	155,078	1.1	157,146	130,955	124,062	1.3	2 to 7
26	17	203,861	169,884	160,943	1.0	163,089	135,907	128,754	1.3	2 to 7
27	17	211,702	176,418	167,133	0.9	169,362	141,134	133,706	1.2	2 to 7
28	17	219,542	182,952	173,323	0.9	175,634	146,362	138,658	1.2	2 to 7

NOTE: See "General Planting Rate Information" and "Check Seed Population" 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 field 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	Drive	30" Rows	36" Rows	38" Rows		30" Rows	36" Rows	38" Rows		
17	28	48,557	40,464	38,335	4.3	40,464	33,720	31,945	5.2	2 to 8
17	27	50,356	41,963	39,754	4.2	41,963	34,969	33,129	5.0	2 to 8
17	26	52,292	43,577	41,283	4.0	43,577	36,314	34,403	4.8	2 to 8
19	28	54,269	45,224	42,844	3.9	45,225	37,687	35,704	4.6	2 to 8
19	27	56,279	46,900	44,431	3.7	46,900	39,083	37,026	4.5	2 to 8
17	24	56,650	47,208	44,723	3.7	47,208	39,340	37,270	4.4	2 to 8
17	23	59,113	49,261	46,668	3.5	49,261	41,051	38,890	4.2	2 to 8
19	25	60,782	50,651	47,986	3.4	50,652	42,210	39,988	4.1	2 to 8
19	24	63,314	52,762	49,985	3.3	52,762	43,968	41,654	4.0	2 to 8
23	28	65,695	54,746	51,864	3.2	54,746	45,621	43,220	3.8	2 to 8
19	23	66,067	55,056	52,159	3.2	55,056	45,880	43,465	3.8	2 to 8
24	28	68,551	57,126	54,119	3.0	57,126	47,605	45,099	3.7	2 to 8
24	27	71,090	59,242	56,123	2.9	59,242	49,368	46,770	3.5	2 to 8
17	19	71,558	59,632	56,493	2.9	59,631	49,693	47,077	3.5	2 to 8
24	26	73,824	61,520	58,282	2.8	61,520	51,267	48,569	3.4	2 to 8
26	28	74,264	61,886	58,629	2.8	61,886	51,572	48,858	3.4	2 to 8
24	25	76,772	63,981	60,614	2.7	63,981	53,317	50,511	3.3	2 to 8
26	27	77,014	64,178	60,800	2.7	64,178	53,482	50,667	3.3	2 to 8
23	23	79,976	66,647	63,139	2.6	66,647	55,539	52,616	3.1	2 to 8
27	26	83,052	69,210	65,567	2.5	69,210	57,675	54,640	3.0	2 to 8
24	23	83,453	69,544	65,884	2.5	69,544	57,954	54,904	3.0	2 to 8
25	23	86,930	72,442	68,629	2.4	72,442	60,368	57,191	2.9	2 to 8
19	17	89,385	74,488	70,567	2.3	74,488	62,073	58,806	2.8	2 to 8
27	24	89,973	74,978	71,032	2.3	74,978	62,481	59,193	2.8	2 to 8
28	24	93,305	77,755	73,662	2.2	77,755	64,796	61,385	2.7	2 to 8
23	19	96,813	80,678	76,432	2.2	80,678	67,231	63,693	2.6	2 to 8
28	23	97,362	81,135	76,864	2.1	81,135	67,613	64,054	2.6	2 to 8
24	19	101,023	84,185	79,754	2.1	84,185	70,155	66,462	2.5	2 to 8
25	19	105,232	87,693	83,078	2.0	87,693	73,078	69,231	2.4	2 to 8
23	17	108,233	90,169	85,423	1.9	90,169	75,141	71,186	2.3	2 to 8
26	19	109,441	91,201	86,401	1.9	91,201	76,001	72,001	2.3	2 to 7
27	19	113,650	94,709	89,124	1.8	94,709	78,924	74,770	2.2	2 to 7
28	19	117,860	98,216	93,047	1.8	98,216	81,847	77,539	2.1	2 to 7
26	17	122,317	101,930	96,566	1.7	101,930	84,942	80,471	2.1	2 to 7
27	17	127,021	105,851	100,280	1.6	105,851	88,209	83,566	2.0	2 to 7
28	17	131,725	109,771	103,994	1.6	109,771	91,476	86,661	1.9	2 to 7

NOTE: See "General Planting Rate Information" and "Check Seed Population" pages for more information.

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

NOTE: Always field check seed population to verify planting rates.

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

Due to variations in cotton seed size, meters equipped with the 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, 14' 6" for 36" row widths and 13' 10" for 38" 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		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		
17	28	16,186	13,488	12,778	12.9	2 to 8
17	27	16,785	13,988	13,251	12.5	2 to 8
17	26	17,431	14,526	13,761	12.0	2 to 8
19	28	18,090	15,075	14,281	11.6	2 to 8
19	27	18,760	15,633	14,810	11.1	2 to 8
17	24	18,883	15,736	14,908	11.1	2 to 8
17	23	19,704	16,420	15,556	10.6	2 to 8
19	25	20,261	16,884	15,995	10.3	2 to 8
19	24	21,105	17,587	16,662	9.9	2 to 8
23	28	21,898	18,249	17,288	9.5	2 to 8
19	23	22,022	18,352	17,386	9.5	2 to 8
24	28	22,850	19,042	18,040	9.2	2 to 8
24	27	23,697	19,747	18,708	8.8	2 to 8
17	19	23,853	19,877	18,831	8.8	2 to 8
24	26	24,608	20,507	19,427	8.5	2 to 8
26	28	24,755	20,629	19,543	8.4	2 to 8
24	25	25,592	21,327	20,205	8.2	2 to 8
26	27	25,671	21,393	20,267	8.1	2 to 8
23	23	26,659	22,216	21,046	7.8	2 to 8
27	26	27,684	23,070	21,856	7.6	2 to 8
24	23	27,818	23,181	21,961	7.5	2 to 8
25	23	28,977	24,147	22,876	7.2	2 to 8
19	17	29,795	24,829	23,522	7.0	2 to 8
27	24	29,991	24,993	23,677	7.0	2 to 8
28	24	31,102	25,918	24,554	6.7	2 to 8
23	19	32,271	26,893	25,477	6.5	2 to 8
28	23	32,454	27,045	25,622	6.5	2 to 8
24	19	33,674	28,062	26,585	6.2	2 to 8
25	19	35,077	29,231	27,693	6.0	2 to 8
23	17	36,068	30,056	28,474	5.8	2 to 8
26	19	36,480	30,400	28,800	5.7	2 to 7
27	19	37,883	31,570	29,908	5.5	2 to 7
28	19	39,287	32,739	31,016	5.3	2 to 7
26	17	40,772	33,977	32,189	5.1	2 to 7
27	17	42,340	35,284	33,427	4.9	2 to 7
28	17	43,908	36,590	34,665	4.8	2 to 7

NOTE: See "General Planting Rate Information" and "Check Seed Population" pages for more information.

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

NOTE: Always field check seed population to verify planting rates.

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**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" and "Check Seed Population" pages 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
25	23	2414.74	966,120	59	1,123,361	63	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)	
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 General Planting Rate Information” and “Check Seed Population” pages 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/SUNFLOWER 40 CELL DISC
15 TOOTH CONTACT WHEEL DRIVE SPROCKET
APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS**

30" Rows	36" Rows	38" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
			Drive	Driven		
25,424	21,186	20,071	15	28	4 to 6	8.2
26,365	21,970	20,814	15	27	4 to 6	7.9
27,378	22,815	21,615	15	26	4 to 6	7.6
28,474	23,728	22,480	15	25	4 to 6	7.3
28,813	24,011	22,747	17	28	4 to 6	7.2
29,661	24,717	23,416	15	24	4 to 6	7.0
29,880	24,901	23,590	17	27	4 to 6	7.0
30,950	25,792	24,434	15	23	4 to 6	6.7
31,030	25,857	24,496	17	26	4 to 6	6.7
32,203	26,836	25,424	19	28	4 to 6	6.5
32,271	26,892	25,477	17	25	4 to 6	6.4
33,396	27,830	26,365	19	27	4 to 6	6.2
33,615	28,012	26,538	17	24	4 to 6	6.2
34,680	28,899	27,378	19	26	4 to 6	6.0
35,077	29,231	27,692	17	23	4 to 6	5.9
36,067	30,056	28,474	19	25	4 to 6	5.8
37,466	31,222	29,578	15	19	4 to 6	5.6
37,570	31,309	29,661	19	24	4 to 6	5.6
38,983	32,485	30,775	23	28	4 to 6	5.4
39,203	32,670	30,950	19	23	4 to 6	5.4
40,426	33,688	31,915	23	27	4 to 6	5.2
40,677	33,897	32,114	24	28	4 to 6	5.2
41,874	34,894	33,058	15	17	4 to 6	5.0
42,184	35,153	33,303	24	27	4 to 6	5.0
42,462	35,385	33,522	17	19	4 to 6	5.0
43,661	36,384	34,469	23	25	4 to 6	4.8
44,067	36,722	34,790	26	28	4 to 6	4.8
45,479	37,899	35,905	23	24	4 to 6	4.6
45,558	37,965	35,967	24	25	4 to 6	4.6
45,762	38,134	36,128	27	28	4 to 6	4.6
47,456	39,548	37,466	23	23	4 to 6	4.4
49,214	41,012	38,853	28	27	4 to 6	4.3
49,282	41,069	38,907	27	26	4 to 6	4.3
49,520	41,267	39,094	24	23	4 to 6	4.2
51,108	42,590	40,348	28	26	4 to 6	4.1
51,253	42,711	40,464	27	25	4 to 6	4.1
51,584	42,987	40,724	25	23	4 to 6	4.1
53,040	44,200	41,874	19	17	4 to 6	3.9
53,389	44,490	42,149	27	24	4 to 6	3.9
53,647	44,706	42,353	26	23	4 to 6	3.9
55,366	46,138	43,710	28	24	4 to 6	3.8
55,710	46,425	43,982	27	23	4 to 6	3.7
57,447	47,873	45,354	23	19	4 to 6	3.6
57,773	48,145	45,610	28	23	4 to 6	3.6
59,946	49,955	47,325	24	19	4 to 6	3.5
62,443	52,036	49,297	25	19	4 to 6	3.3
64,206	53,505	50,689	23	17	4 to 6	3.2
64,941	54,117	51,269	26	19	4 to 6	3.2
66,998	55,832	52,893	24	17	4 to 6	3.1
67,439	56,168	53,241	27	19	4 to 6	3.1
69,790	58,158	55,096	25	17	4 to 6	3.0
69,936	58,280	55,212	28	19	4 to 6	3.0
72,581	60,484	57,301	26	17	4 to 6	2.9
72,767	60,639	57,447	23	15	4 to 6	2.8
75,372	62,810	59,505	27	17	4 to 6	2.7

NOTE: See "General Planting Rate Information" and "Check Seed Population" pages for more information. Always field check seed population to verify planting rates.

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

30" Rows	36" Rows	38" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
			Drive	Driven		
32,203	26,836	25,424	15	28	4 to 6	6.5
33,396	27,830	26,365	15	27	4 to 6	6.2
34,680	28,899	27,378	15	26	4 to 6	6.0
36,067	30,056	28,474	15	25	4 to 6	5.8
36,496	30,413	28,813	17	28	4 to 6	5.8
37,570	31,309	29,661	15	24	4 to 6	5.6
37,848	31,541	29,880	17	27	4 to 6	5.6
39,203	32,670	30,950	15	23	4 to 6	5.4
39,304	32,753	31,030	17	26	4 to 6	5.4
40,790	33,992	32,203	19	28	4 to 6	5.2
40,876	34,064	32,271	17	25	4 to 6	5.1
42,301	35,251	33,396	19	27	4 to 6	5.0
42,579	35,483	33,615	17	24	4 to 6	4.9
43,928	36,606	34,680	19	26	4 to 6	4.8
4,431	37,026	35,077	17	23	4 to 6	4.7
45,685	38,071	36,067	19	25	4 to 6	4.6
47,456	39,548	37,466	15	19	4 to 6	4.4
47,589	39,657	37,570	19	24	4 to 6	4.4
49,377	41,148	38,983	23	28	4 to 6	4.2
49,657	41,382	39,203	19	23	4 to 6	4.2
51,206	42,672	40,426	23	27	4 to 6	4.1
51,524	42,937	40,677	24	28	4 to 6	4.1
53,040	44,200	41,874	15	17	4 to 6	3.9
53,433	44,527	42,184	24	27	4 to 6	3.9
53,785	44,821	42,462	17	19	4 to 6	3.9
55,303	46,086	43,661	23	25	4 to 6	3.8
55,818	46,515	44,067	26	28	4 to 6	3.7
57,607	48,006	45,479	23	24	4 to 6	3.6
57,708	48,089	45,558	24	25	4 to 6	3.6
57,965	48,305	45,762	27	28	4 to 6	3.6
60,112	50,093	47,456	23	23	4 to 6	3.5
62,338	51,949	49,214	28	27	4 to 6	3.3
62,424	52,019	49,282	27	26	4 to 6	3.3
62,725	52,271	49,520	24	23	4 to 6	3.3
64,735	53,947	51,108	28	26	4 to 6	3.2
64,921	54,101	51,253	27	25	4 to 6	3.2
65,338	54,449	51,584	25	23	4 to 6	3.2
67,184	55,987	53,040	19	17	4 to 6	3.1
67,626	56,355	53,389	27	24	4 to 6	3.1
67,953	56,627	53,647	26	23	4 to 6	3.1
70,130	58,442	55,366	28	24	4 to 6	3.0
70,566	58,805	55,710	27	23	4 to 6	2.9
72,767	60,639	57,447	23	19	4 to 6	2.8
73,179	60,983	57,773	28	23	4 to 6	2.8
75,930	63,276	59,946	24	19	4 to 6	2.7
79,094	65,912	62,443	25	19	4 to 6	2.6
81,328	67,773	64,206	23	17	4 to 6	2.5
82,258	68,549	64,941	26	19	4 to 6	2.5
84,864	70,720	66,998	24	17	4 to 6	2.4
85,423	71,185	67,439	27	19	4 to 6	2.4
88,400	73,667	69,790	25	17	4 to 6	2.3
88,586	73,822	69,936	28	19	4 to 6	2.3
91,935	76,613	72,581	26	17	4 to 6	2.2
92,171	76,809	72,767	23	15	4 to 6	2.2
95,472	79,560	75,372	27	17	4 to 6	2.1

NOTE: See "General Planting Rate Information" and "Check Seed Population" pages for more information. Always field check seed population to verify planting rates.

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

30" Rows	36" Rows	38" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
			Drive	Driven		
38,135	31,779	30,106	15	28	4 to 6	5.5
39,547	32,956	31,222	15	27	4 to 6	5.3
41,068	34,224	32,422	15	26	4 to 6	5.1
42,711	35,593	33,719	15	25	4 to 6	4.9
43,220	36,016	34,121	17	28	4 to 6	4.8
44,491	37,076	35,124	15	24	4 to 6	4.7
44,820	37,350	35,384	17	27	4 to 6	4.7
46,425	38,688	36,651	15	23	4 to 6	4.5
46,544	38,787	36,745	17	26	4 to 6	4.5
48,304	40,253	38,135	19	28	4 to 6	4.3
48,406	40,338	38,215	17	25	4 to 6	4.3
50,093	41,744	39,547	19	27	4 to 6	4.2
50,423	42,019	39,807	17	24	4 to 6	4.1
52,020	43,350	41,068	19	26	4 to 6	4.0
52,615	43,846	41,538	17	23	4 to 6	4.0
54,101	45,084	42,711	19	25	4 to 6	3.9
56,199	46,832	44,367	15	19	4 to 6	3.7
56,355	46,962	44,491	19	24	4 to 6	3.7
58,473	48,728	46,163	23	28	4 to 6	3.6
58,805	49,004	46,425	19	23	4 to 6	3.6
60,639	50,533	47,873	23	27	4 to 6	3.4
61,016	50,846	48,170	24	28	4 to 6	3.4
62,810	52,342	49,587	15	17	4 to 6	3.3
63,276	52,730	49,954	24	27	4 to 6	3.3
63,692	53,077	50,283	17	19	4 to 6	3.3
65,490	54,575	51,703	23	25	4 to 6	3.2
66,100	55,084	52,185	26	28	4 to 6	3.2
68,219	56,849	53,857	23	24	4 to 6	3.1
68,338	56,948	53,951	24	25	4 to 6	3.1
68,643	57,202	54,192	27	28	4 to 6	3.0
71,185	59,321	56,199	23	23	4 to 6	2.9
73,822	61,518	58,280	28	27	4 to 6	2.8
73,923	61,602	58,360	27	26	4 to 6	2.8
74,280	61,900	58,642	24	23	4 to 6	2.8
76,661	63,884	60,522	28	26	4 to 6	2.7
76,880	64,067	60,695	27	25	4 to 6	2.7
77,375	64,479	61,086	25	23	4 to 6	2.7
79,560	66,300	62,810	19	17	4 to 6	2.6
80,083	66,736	63,224	27	24	4 to 6	2.6
80,470	67,058	63,529	26	23	4 to 6	2.6
83,049	69,208	65,565	28	24	4 to 6	2.5
83,565	69,638	65,972	27	23	4 to 6	2.5
86,171	71,810	68,030	23	19	4 to 6	2.4
86,660	72,217	68,416	28	23	4 to 6	2.4
89,918	74,932	70,988	24	19	4 to 6	2.3
93,665	78,054	73,946	25	19	4 to 6	2.2
96,309	80,258	76,034	23	17	4 to 6	2.2
97,411	81,176	76,904	26	19	4 to 6	2.1
100,497	83,747	79,339	24	17	4 to 6	2.1
101,158	84,298	79,861	27	19	4 to 6	2.1
104,684	87,237	82,645	25	17	4 to 6	2.0
104,904	87,420	82,819	28	19	4 to 6	2.0
108,871	90,726	85,951	26	17	4 to 6	1.9
109,150	90,959	86,171	23	15	4 to 6	1.9
113,059	94,216	89,257	27	17	4 to 6	1.8

NOTE: See "General Planting Rate Information" and "Check Seed Population" pages for more information. Always field check seed population to verify planting rates.

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

30" Rows	36" Rows	38" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
			Drive	Driven		
48,304	40,253	38,135	15	28	4 to 6	4.3
50,093	41,744	39,547	15	27	4 to 6	4.2
52,020	43,350	41,068	15	26	4 to 6	4.0
54,101	45,084	42,711	15	25	4 to 6	3.9
54,745	45,621	43,220	17	28	4 to 6	3.8
56,355	46,962	44,491	15	24	4 to 6	3.7
56,772	47,310	44,820	17	27	4 to 6	3.7
58,805	49,004	46,425	15	23	4 to 6	3.6
58,956	49,130	46,544	17	26	4 to 6	3.5
61,185	50,988	48,304	19	28	4 to 6	3.4
61,314	51,095	48,406	17	25	4 to 6	3.4
63,451	52,876	50,093	19	27	4 to 6	3.3
63,869	53,224	50,423	17	24	4 to 6	3.3
65,892	54,910	52,020	19	26	4 to 6	3.2
66,646	55,538	52,615	17	23	4 to 6	3.1
68,528	57,106	54,101	19	25	4 to 6	3.1
71,185	59,321	56,199	15	19	4 to 6	2.9
71,383	59,486	56,355	19	24	4 to 6	2.9
74,066	61,722	58,473	23	28	4 to 6	2.8
74,486	62,072	58,805	19	23	4 to 6	2.8
76,810	64,008	60,639	23	27	4 to 6	2.7
77,287	64,406	61,016	24	28	4 to 6	2.7
79,560	66,300	62,810	15	17	4 to 6	2.6
80,149	66,791	63,276	24	27	4 to 6	2.6
80,676	67,230	63,692	17	19	4 to 6	2.6
82,954	69,129	65,490	23	25	4 to 6	2.5
83,727	69,773	66,100	26	28	4 to 6	2.5
86,411	72,009	68,219	23	24	4 to 6	2.4
86,561	72,134	68,338	24	25	4 to 6	2.4
86,947	72,456	68,643	27	28	4 to 6	2.4
90,168	75,140	71,185	23	23	4 to 6	2.3
93,507	77,923	73,822	28	27	4 to 6	2.2
93,636	78,030	73,923	27	26	4 to 6	2.2
94,088	78,407	74,280	24	23	4 to 6	2.2
97,104	80,920	76,661	28	26	4 to 6	2.2
97,381	81,151	76,880	27	25	4 to 6	2.1
98,008	81,674	77,375	25	23	4 to 6	2.1
100,776	83,980	79,560	19	17	4 to 6	2.1
101,439	84,532	80,083	27	24	4 to 6	2.1
101,929	84,941	80,470	26	23	4 to 6	2.1
105,196	87,663	83,049	28	24	4 to 6	2.0
105,849	88,208	83,565	27	23	4 to 6	2.0
109,150	90,959	86,171	23	19	4 to 6	1.9
109,769	91,475	86,660	28	23	4 to 6	1.9
113,896	94,913	89,918	24	19	4 to 6	1.8
118,642	98,868	93,665	25	19	4 to 6	1.8
121,992	101,660	96,309	23	17	4 to 6	1.7
123,387	102,823	97,411	26	19	4 to 6	1.7
127,296	106,080	100,497	24	17	4 to 6	1.6
128,133	106,778	101,158	27	19	4 to 6	1.6
132,600	110,500	104,684	25	17	4 to 6	1.6
132,879	110,732	104,904	28	19	4 to 6	1.6
137,904	114,920	108,871	26	17	4 to 6	1.5
138,257	115,214	109,150	23	15	4 to 6	1.5
143,208	119,340	113,059	27	17	4 to 6	1.5

NOTE: See "General Planting Rate Information" and "Check Seed Population" pages for more information. Always field check seed population to verify planting rates.

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

30" Rows	36" Rows	38" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
			Drive	Driven		
96,608	80,507	76,270	15	28	4 to 6	2.2
100,186	83,489	79,095	15	27	4 to 6	2.1
104,040	86,700	82,137	15	26	4 to 6	2.0
108,201	90,168	85,422	15	25	4 to 6	1.9
109,489	91,241	86,439	17	28	4 to 6	1.9
112,710	93,925	88,981	15	24	4 to 6	1.9
113,545	94,620	89,640	17	27	4 to 6	1.8
117,610	98,008	92,850	15	23	4 to 6	1.8
117,912	98,260	93,088	17	26	4 to 6	1.8
122,371	101,975	96,608	19	28	4 to 6	1.7
122,628	102,190	96,812	17	25	4 to 6	1.7
126,903	105,752	100,186	19	27	4 to 6	1.6
127,738	106,448	100,846	17	24	4 to 6	1.6
131,784	109,820	104,040	19	26	4 to 6	1.6
133,291	111,076	105,230	17	23	4 to 6	1.6
137,055	114,213	108,201	19	25	4 to 6	1.5
142,370	118,642	112,397	15	19	4 to 6	1.5
142,766	118,971	112,710	19	24	4 to 6	1.5
148,133	123,444	116,947	23	28	4 to 6	1.4
148,973	124,144	117,610	19	23	4 to 6	1.4
153,619	128,016	121,278	23	27	4 to 6	1.4
154,573	128,811	122,032	24	28	4 to 6	1.4
159,120	132,600	125,621	15	17	4 to 6	1.3
160,298	133,582	126,551	24	27	4 to 6	1.3
161,353	134,461	127,384	17	19	4 to 6	1.3
165,909	138,257	130,981	23	25	4 to 6	1.3
167,454	139,545	132,201	26	28	4 to 6	1.2
172,822	144,018	136,438	23	24	4 to 6	1.2
173,122	144,268	136,675	24	25	4 to 6	1.2
173,895	144,912	137,286	27	28	4 to 6	1.2
180,336	150,280	142,370	23	23	4 to 6	1.2
187,015	155,846	147,643	28	27	4 to 6	1.1
187,272	156,060	147,846	27	26	4 to 6	1.1
188,176	156,814	148,560	24	23	4 to 6	1.1
194,207	161,840	153,322	28	26	4 to 6	1.1
194,762	162,302	153,760	27	25	4 to 6	1.1
196,017	163,347	154,750	25	23	4 to 6	1.1
201,551	167,960	159,120	19	17	4 to 6	1.0
202,877	169,065	160,166	27	24	4 to 6	1.0
203,858	169,881	160,940	26	23	4 to 6	1.0
210,391	175,326	166,099	28	24	4 to 6	1.0
211,698	176,415	167,130	27	23	4 to 6	1.0
218,301	181,917	172,343	23	19	4 to 6	1.0
219,539	182,949	173,320	28	23	4 to 6	1.0
227,792	189,827	179,836	24	19	4 to 6	0.9
237,284	197,736	187,329	25	19	4 to 6	0.9
243,983	203,319	192,618	23	17	4 to 6	0.9
246,775	205,646	194,822	26	19	4 to 6	0.8
	212,159	200,993	24	17	4 to 6	0.8
	213,555	202,315	27	19	4 to 6	0.8
	220,999	209,368	25	17	4 to 6	0.8
	221,465	209,809	28	19	4 to 6	0.8
	229,839	217,743	26	17	4 to 6	0.8
	230,429	218,301	23	15	4 to 6	0.8
	238,679	226,117	27	17	4 to 6	0.7

NOTE: See "General Planting Rate Information" and "Check Seed Population" pages for more information. Always field check seed population to verify planting rates.

**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	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
			Drive	Driven		
76,270	63,558	60,213	15	28	4 to 6	2.7
79,095	65,912	62,443	15	27	4 to 6	2.6
82,137	68,447	64,845	15	26	4 to 6	2.5
85,422	71,185	67,438	15	25	4 to 6	2.4
86,439	72,033	68,241	17	28	4 to 6	2.4
88,981	74,151	70,248	15	24	4 to 6	2.3
89,640	74,700	70,769	17	27	4 to 6	2.3
92,850	77,375	73,303	15	23	4 to 6	2.3
93,088	77,573	73,491	17	26	4 to 6	2.2
96,608	80,507	76,270	19	28	4 to 6	2.2
96,812	80,676	76,430	17	25	4 to 6	2.2
100,186	83,489	79,095	19	27	4 to 6	2.1
100,846	84,038	79,615	17	24	4 to 6	2.1
104,040	86,700	82,137	19	26	4 to 6	2.0
105,230	87,692	83,076	17	23	4 to 6	2.0
108,201	90,168	85,422	19	25	4 to 6	1.9
112,397	93,665	88,735	15	19	4 to 6	1.9
112,710	93,925	88,981	19	24	4 to 6	1.9
116,947	97,456	92,327	23	28	4 to 6	1.8
117,610	98,008	92,850	19	23	4 to 6	1.8
121,278	101,065	95,746	23	27	4 to 6	1.7
122,032	101,693	96,341	24	28	4 to 6	1.7
125,621	104,684	99,174	15	17	4 to 6	1.7
126,551	105,459	99,909	24	27	4 to 6	1.7
127,384	106,153	100,566	17	19	4 to 6	1.6
130,981	109,150	103,406	23	25	4 to 6	1.6
132,201	110,167	104,369	26	28	4 to 6	1.6
136,438	113,698	107,714	23	24	4 to 6	1.5
136,675	113,896	107,902	24	25	4 to 6	1.5
137,286	114,405	108,383	27	28	4 to 6	1.5
142,370	118,642	112,397	23	23	4 to 6	1.5
147,643	123,036	116,560	28	27	4 to 6	1.4
147,846	123,205	116,720	27	26	4 to 6	1.4
148,560	123,800	117,284	24	23	4 to 6	1.4
153,322	127,768	121,043	28	26	4 to 6	1.4
153,760	128,133	121,389	27	25	4 to 6	1.4
154,750	128,958	122,171	25	23	4 to 6	1.4
159,120	132,600	125,621	19	17	4 to 6	1.3
160,166	133,472	126,447	27	24	4 to 6	1.3
160,940	134,117	127,058	26	23	4 to 6	1.3
166,099	138,415	131,130	28	24	4 to 6	1.3
167,130	139,275	131,945	27	23	4 to 6	1.3
172,343	143,619	136,060	23	19	4 to 6	1.2
173,320	144,433	136,832	28	23	4 to 6	1.2
179,836	149,863	141,976	24	19	4 to 6	1.2
187,329	156,108	147,891	25	19	4 to 6	1.1
192,618	160,515	152,067	23	17	4 to 6	1.1
194,822	162,352	153,807	26	19	4 to 6	1.1
200,993	167,494	158,679	24	17	4 to 6	1.0
202,315	168,596	159,723	27	19	4 to 6	1.0
209,368	174,473	165,290	25	17	4 to 6	1.0
209,809	174,841	165,638	28	19	4 to 6	1.0
217,743	181,452	171,902	26	17	4 to 6	1.0
218,301	181,917	172,343	23	15	4 to 6	1.0
226,117	188,431	178,514	27	17	4 to 6	0.9

NOTE: See "General Planting Rate Information" and "Check Seed Population" pages for more information. Always field check seed population to verify planting rates.

**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	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
			Drive	Driven		
96,608	80,507	76,270	15	28	4 to 6	2.2
100,186	83,489	79,095	15	27	4 to 6	2.1
104,040	86,700	82,137	15	26	4 to 6	2.0
108,201	90,168	85,422	15	25	4 to 6	1.9
109,489	91,241	86,439	17	28	4 to 6	1.9
112,710	93,925	88,981	15	24	4 to 6	1.9
113,545	94,620	89,640	17	27	4 to 6	1.8
117,610	98,008	92,850	15	23	4 to 6	1.8
117,912	98,260	93,088	17	26	4 to 6	1.8
122,371	101,975	96,608	19	28	4 to 6	1.7
122,628	102,190	96,812	17	25	4 to 6	1.7
126,903	105,752	100,186	19	27	4 to 6	1.6
127,738	106,448	100,846	17	24	4 to 6	1.6
131,784	109,820	104,040	19	26	4 to 6	1.6
133,291	111,076	105,230	17	23	4 to 6	1.6
137,055	114,213	108,201	19	25	4 to 6	1.5
142,370	118,642	112,397	15	19	4 to 6	1.5
142,766	118,971	112,710	19	24	4 to 6	1.5
148,133	123,444	116,947	23	28	4 to 6	1.4
148,973	124,144	117,610	19	23	4 to 6	1.4
153,619	128,016	121,278	23	27	4 to 6	1.4
154,573	128,811	122,032	24	28	4 to 6	1.4
159,120	132,600	125,621	15	17	4 to 6	1.3
160,298	133,582	126,551	24	27	4 to 6	1.3
161,353	134,461	127,384	17	19	4 to 6	1.3
165,909	138,257	130,981	23	25	4 to 6	1.3
167,454	139,545	132,201	26	28	4 to 6	1.2
172,822	144,018	136,438	23	24	4 to 6	1.2
173,122	144,268	136,675	24	25	4 to 6	1.2
173,895	144,912	137,286	27	28	4 to 6	1.2
180,336	150,280	142,370	23	23	4 to 6	1.2
187,015	155,846	147,643	28	27	4 to 6	1.1
187,272	156,060	147,846	27	26	4 to 6	1.1
188,176	156,814	148,560	24	23	4 to 6	1.1
194,207	161,840	153,322	28	26	4 to 6	1.1
194,762	162,302	153,760	27	25	4 to 6	1.1
196,017	163,347	154,750	25	23	4 to 6	1.1
201,551	167,960	159,120	19	17	4 to 6	1.0
202,877	169,065	160,166	27	24	4 to 6	1.0
203,858	169,881	160,940	26	23	4 to 6	1.0
210,391	175,326	166,099	28	24	4 to 6	1.0
211,698	176,415	167,130	27	23	4 to 6	1.0
218,301	181,917	172,343	23	19	4 to 6	1.0
219,539	182,949	173,320	28	23	4 to 6	1.0
227,792	189,827	179,836	24	19	4 to 6	0.9
237,284	197,736	187,329	25	19	4 to 6	0.9
243,983	203,319	192,618	23	17	4 to 6	0.9
246,775	205,646	194,822	26	19	4 to 6	0.8
	212,159	200,993	24	17	4 to 6	0.8
	213,555	202,315	27	19	4 to 6	0.8
	220,999	209,368	25	17	4 to 6	0.8
	221,465	209,809	28	19	4 to 6	0.8
	229,839	217,743	26	17	4 to 6	0.8
	230,429	218,301	23	15	4 to 6	0.8
	238,679	226,117	27	17	4 to 6	0.7

NOTE: See "General Planting Rate Information" and "Check Seed Population" pages for more information. Always field check seed population to verify planting rates.

**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

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

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

NOTE: Chart represents average values and should be used only as a starting point. Granular chemical flows through meter opening at a nearly uniform rate regardless of roller speed. Your actual rate will vary depending on insecticide, planting speed, and plant population. Planting speed/ground speed has the greatest effect on application rate.

Field check your actual rate with insecticide you are using at speed and population you will be planting. See "Checking Granular Chemical Application Rate" in Machine Operation section for more 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
10	4.7	3.9	3.7
11	5.2	4.4	4.1
12	5.8	4.9	4.6
13	6.5	5.4	5.1
14	7.3	6.1	5.7
15	8.2	6.9	6.5
16	9.0	7.5	7.1
17	9.9	8.2	7.8
18	10.7	8.9	8.4
19	11.6	9.7	9.2
20	12.6	10.5	10.0
21	13.6	11.3	10.7
22	14.6	12.1	11.5
23	15.7	13.1	12.4
24	17.0	14.1	13.4
25	18.1	15.1	14.3
26	19.4	16.2	15.3
27	20.9	17.4	16.5
28	22.6	18.8	17.8
29	24.3	20.2	19.1
30	26.7	22.2	21.1

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

Field check your actual rate with herbicide you are using at speed and population you will be planting. See "Granular Chemical Application Field Check" in Machine Operation section for more information.

LIQUID FERTILIZER PISTON PUMP APPLICATION RATES GALLONS PER ACRE

Applies To Model LM-2455-R And Model NGP-6055 Piston Pumps
With 18 Tooth Sprockets

Pump Setting	2	3	4	5	6	7	8	9	10
8 Row 36"	13.0	19.5	25.9	32.3	38.8	45.2	51.7	58.1	64.6
8 Row 38"	12.3	18.3	24.5	30.6	36.7	42.8	48.9	55.1	61.2
12 Row 30"	10.4	15.5	20.6	25.8	31.0	36.2	41.3	46.5	51.7

Chart is for planters equipped with contact drive. Check tires for correct operating pressure.

Chart calculated based on a solution weighing ten pounds per gallon.

NOTE: Fertilizer application rates can vary from weights calculated in above chart. Make field checks to be sure you are applying fertilizer at desired rate.

To check the exact number of gallons your fertilizer attachment will actually deliver on a 30" row spacing:

1. Remove hose from one fertilizer opener and insert it into a collection container secured planter frame.
2. Engage fertilizer attachment and drive forward for 174'.
3. Measure fluid ounces caught in container and multiply by 100. Divide that amount by 128. Result is gallons of fertilizer delivered per acre when planting in 30" rows. To convert this delivery rate for wider rows, multiply by the following conversion factors:

36" multiply by 0.83


38" multiply by 0.79

4. Rinse collection container and repeat test on other rows if necessary.


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LUBRICATION

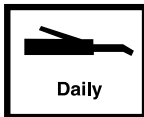
Following pages show locations of all lubrication points. Proper lubrication of moving parts helps ensure efficient operation of your Kinze planter and prolongs the life of friction producing parts.


WARNING

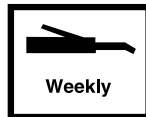
Uncontrolled machine can crush or cause loss of control resulting in death, serious injury, or damage to property and equipment. Install all safety lockup devices before working under or transporting equipment.



LUBRICATION SYMBOLS



Lubricate at frequency indicated with an SAE multipurpose grease.



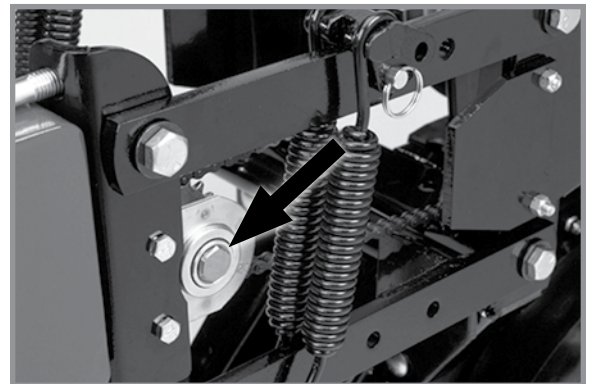
Lubricate at frequency indicated with a high quality SAE 10 weight oil or a quality spray lubricant.



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 not serviceable.



WRAP SPRING WRENCH ASSEMBLY

Components may require occasional lubrication to operate correctly. Disassembly is required to lubricate.

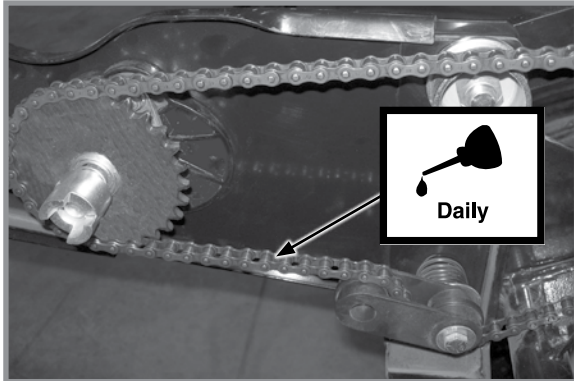
1. Remove ¼"-20 x ½" cap screw that secures idler assembly to wrap spring wrench tightener shaft.
2. Remove wrap spring wrench from planter.
3. Tip wrap spring wrench on its side and lubricate with a high quality spray lubricant. Lubricant must be absorbed into wrap spring area.
4. Reinstall wrap spring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



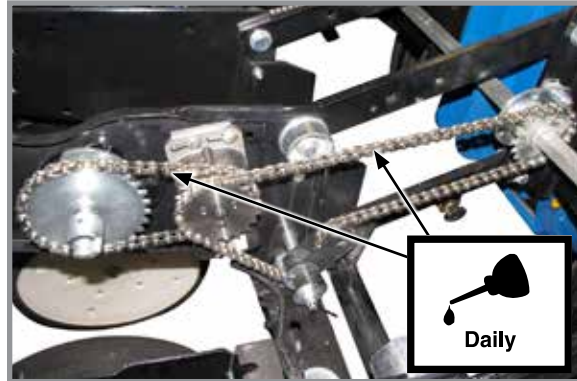
Wrap Spring Wrench Lubrication

DRIVE CHAINS

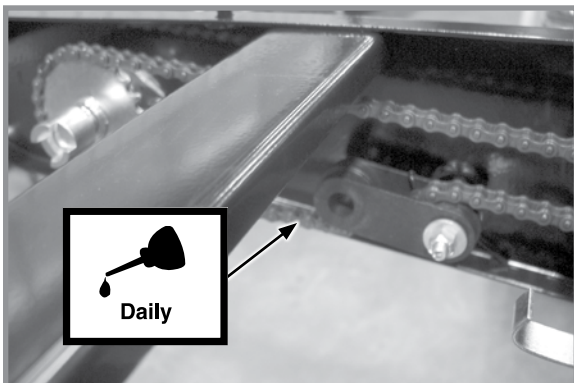
Lubricate all transmission and drive chains daily with a high quality chain lubricant. Extreme operating conditions such as dirt, temperature, or speed may require more frequent lubrication. If a chain becomes stiff, it should be removed, soaked, and washed in solvent to loosen and remove dirt from joints.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



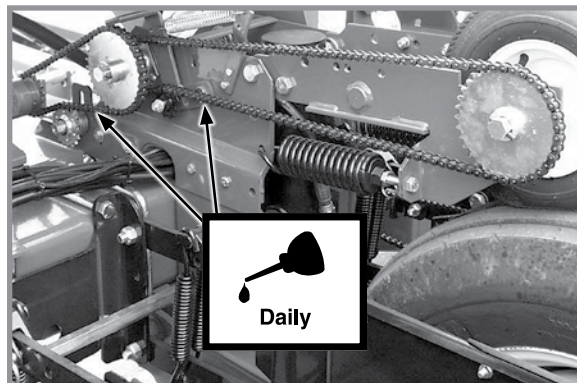
Row Unit Drive Chains



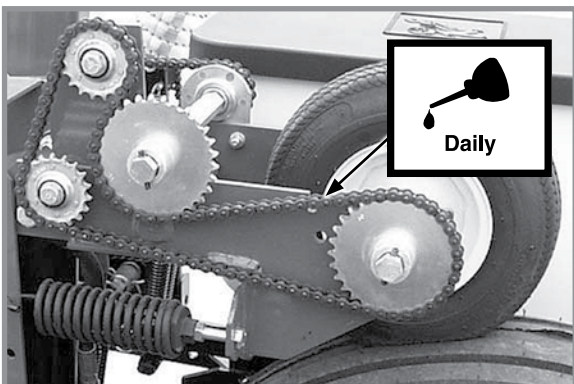
Row Unit Electric Clutches



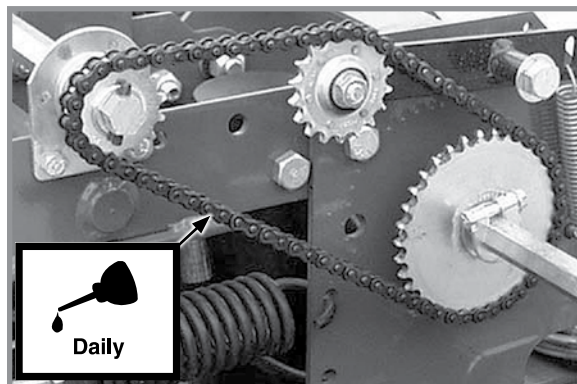
Row Unit Granular Chemical Drive Chains



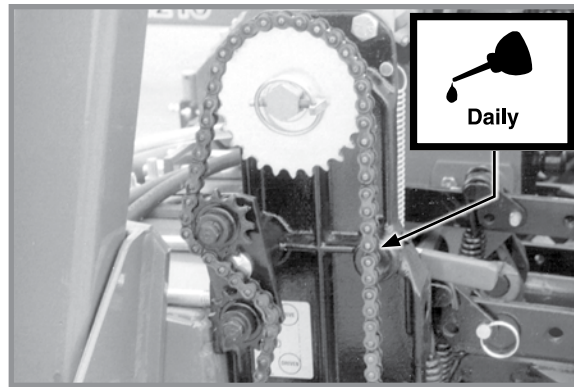
Liquid Fertilizer Piston Pump Drive Chains



Contact Wheel Drive Chains



Jack Shaft (Reverser) Chains

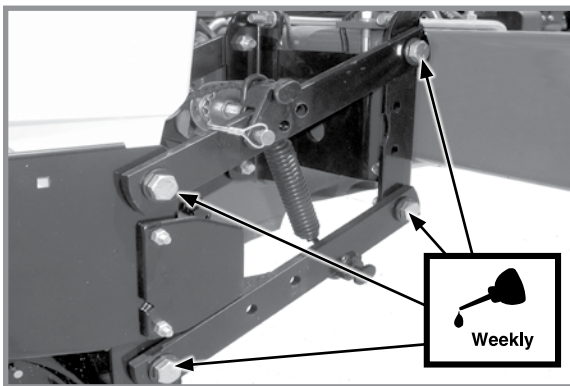


Seed Rate Transmission Chains

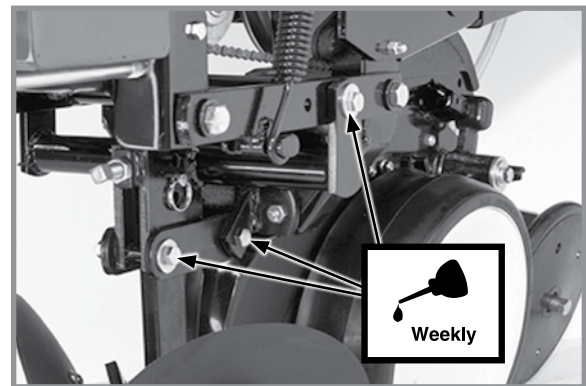
BUSHINGS

Lubricate bushings at frequency indicated.

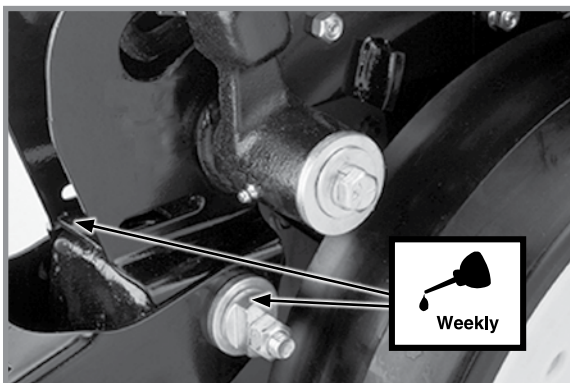
Check each bolt for proper torque. If bolt is loose, removed it and inspect bushing for cracks and wear. Replace bushing if necessary. Use **only hardened flat washers**. Replace damaged flat washers with proper part. Torque hardware to 130 ft-lb (176.2 N-m).



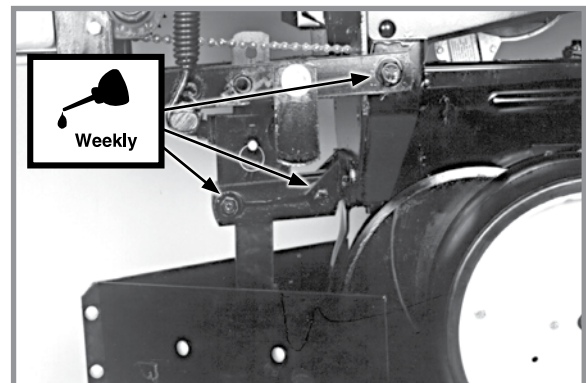
Pull row unit and/or push row unit parallel linkages (8 per row)



Row unit mounted disc furrower parallel linkages (6 per row)



Row unit “v” closing wheel, covering discs/ single press wheel and/or drag closing wheel eccentric bushings (2 per row)



Bed leveler parallel linkages (6 per row)

WHEEL BEARINGS

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

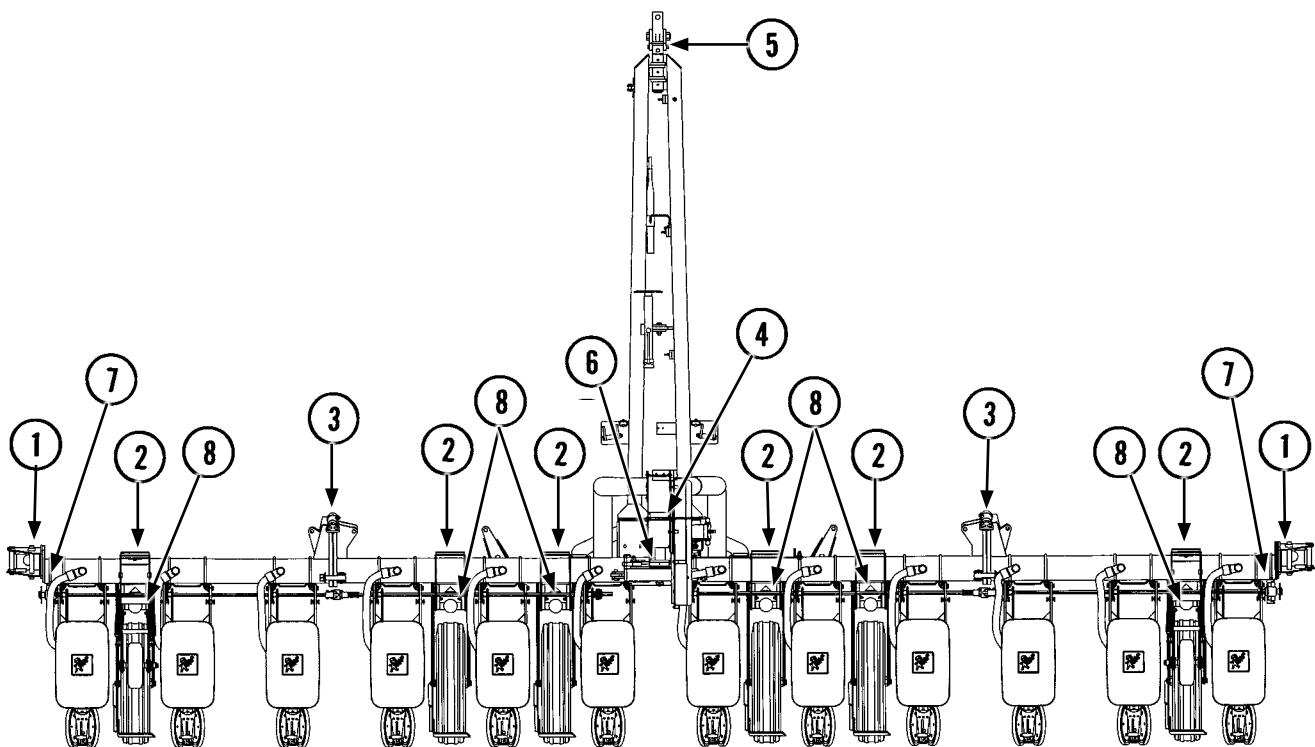
1. Raise wheel off ground.
2. Check for bearing endplay by moving wheel side to side.
3. Rotate wheel to check for bearing roughness. If bearings sound rough, remove hub and inspect bearings.

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

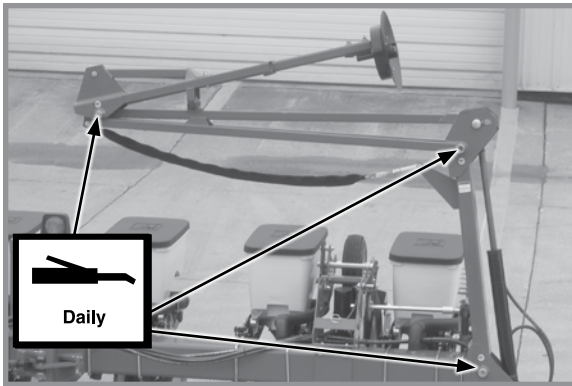
GREASE FITTINGS

Lubricate parts equipped with grease fittings 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.

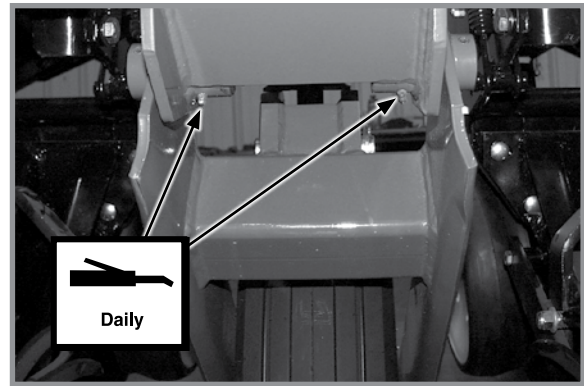
NOTE: Numbers on illustration below correspond to photos on following pages showing lubrication frequencies.



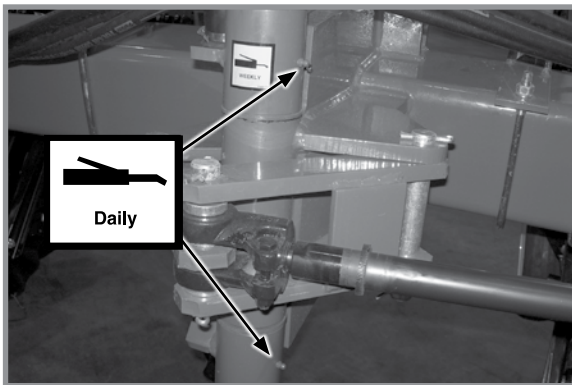
Model 3200 12 row 30" planter shown



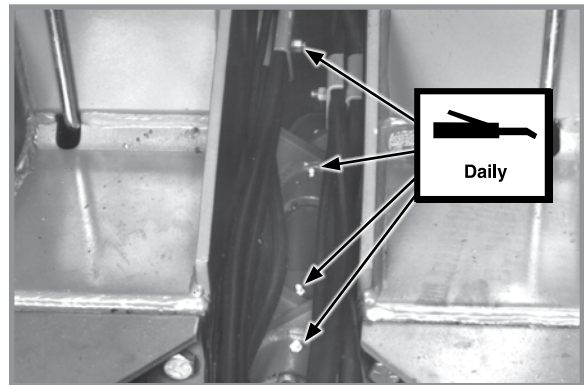
1. Row marker assemblies - 3 per assembly



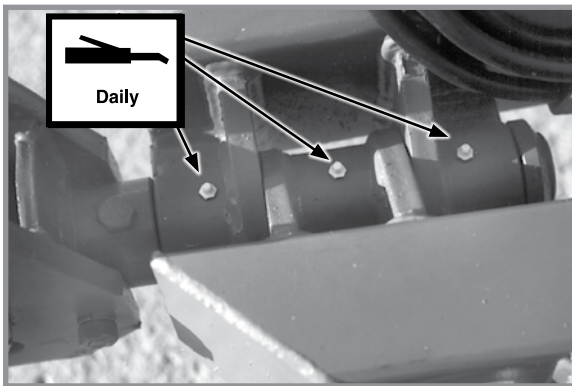
2. Wheel pivots - 2 per wheel module



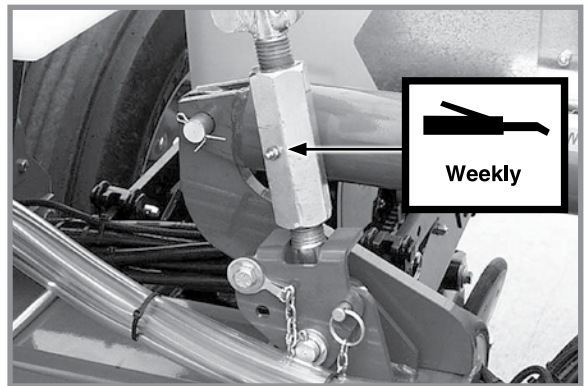
3. Wing hinges - 2 per wing



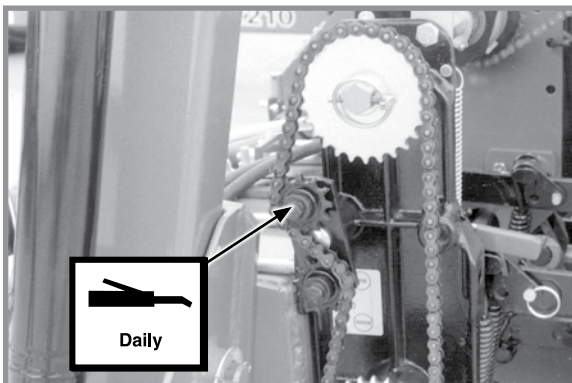
4. Center frame flex pin - 4



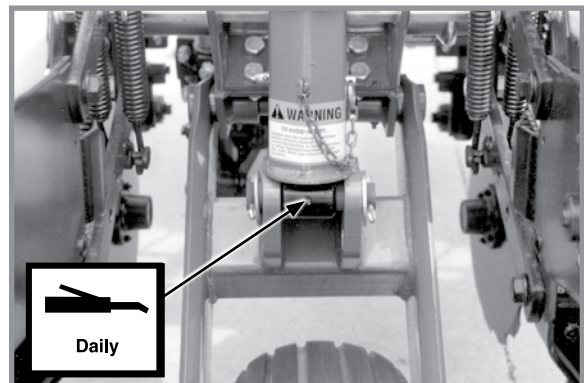
5. Hitch flex pin - 3



6. Turnbuckle - 1

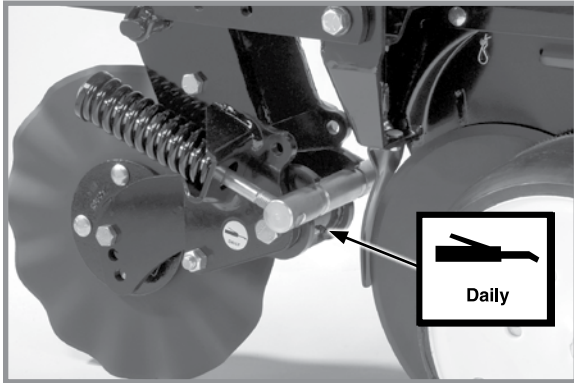


7. Seed rate transmission idler - 1 per transmission

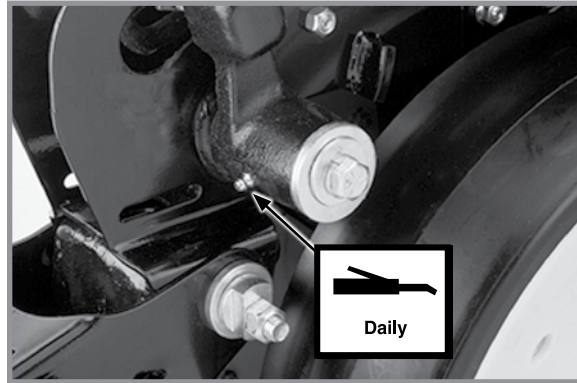


8. Planter lift cylinders (master, slave, and assist) - 1 per cylinder

ROW UNIT



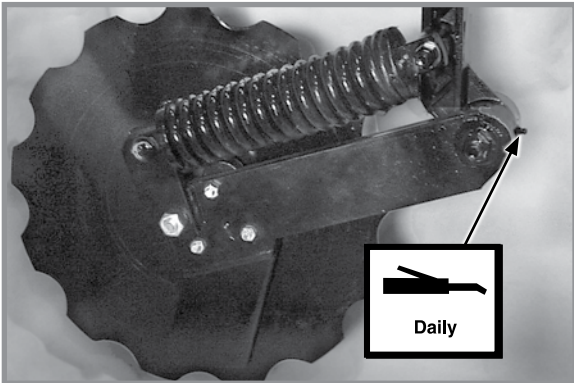
Frame mounted Coulter - 1 Per Arm



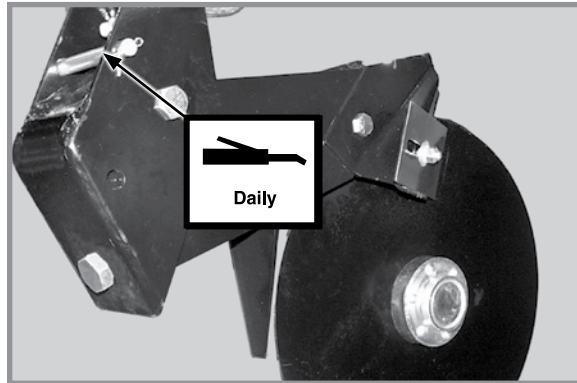
Gauge wheel arms - 1 per arm

(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.)

FERTILIZER OPENERS

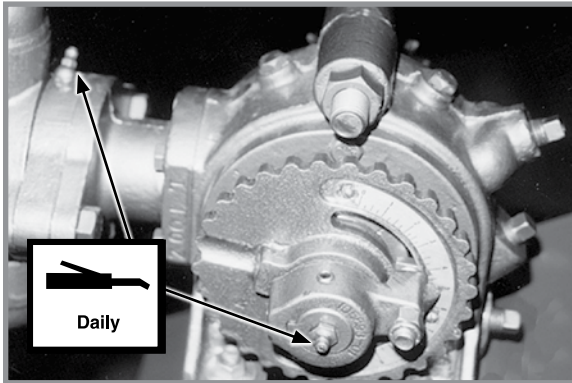


Notched single disc fertilizer opener - 1

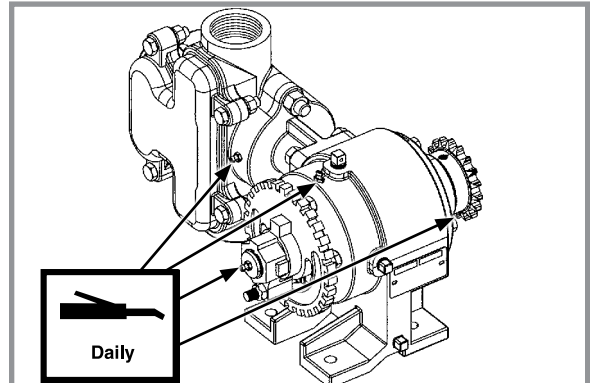


Double disc fertilizer opener - 1

LIQUID FERTILIZER



Liquid fertilizer piston pump - 2
 (Fill fitting on outboard stuffing box until lubricant seeps out of drain hole in bottom.)

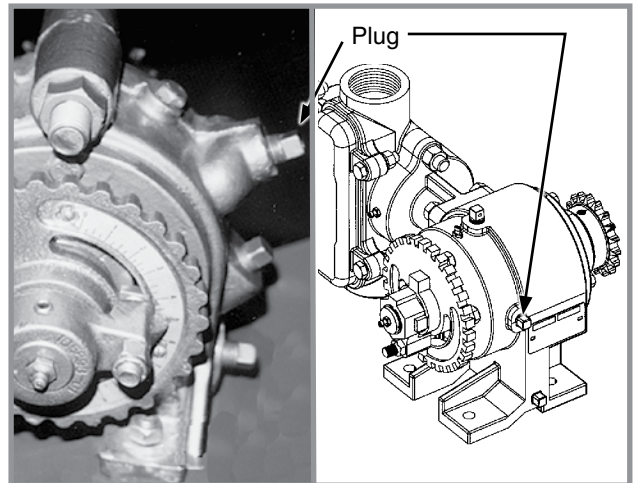


Liquid fertilizer piston pump - 4
 (Fill fitting on outboard stuffing box until lubricant seeps out of drain hole in bottom.)

LIQUID FERTILIZER PISTON PUMP CRANKCASE OIL LEVEL

Check crankcase oil daily and maintain at plug level. Fill as needed with EP 90 weight gear oil. Total oil capacity is approximately 3/4 pint.

Refer to operator and instruction manual supplied with pump and flow divider for additional information.



MOUNTING BOLTS AND HARDWARE

Before operating planter for the first time, check all hardware is tight. Check all hardware again after first 50 hours of operation and beginning of each planting season.

All hardware used on the Kinze planter is 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.

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.

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.

**Transport/ground drive lug bolts
90 ft-lb (122 N-m).**

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

Special Torque Value & Instructions

Row unit parallel linkage bushing hardware	130 ft-lb (176 Nm)
5/8" No till coultter spindle hardware	120 ft-lb (162 Nm)
Row Unit Disc Opener Blade Bolt**	110 ft-lb (149 Nm)
	**Left hand side is left hand thread.
5/8" - 18 Wheel Lug Nuts and Lug Bolts	200 ft-lb (271 Nm)
9/16" - 18 Wheel Lug Nuts and Lug Bolts	125 ft-lb (169 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 PRESSURE

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 explosion:

- **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 any tire with cuts or bubbles. Replace any damaged rims. Replace missing lug bolts and nuts.**
- **Do not weld or heat wheel assembly. Heating increases tire pressure.**

MODEL 3200 OPERATING TIRE PRESSURE

Transport/ground drive - 7.50" x 20" Inflate to 40 psi (275.7 kPa)

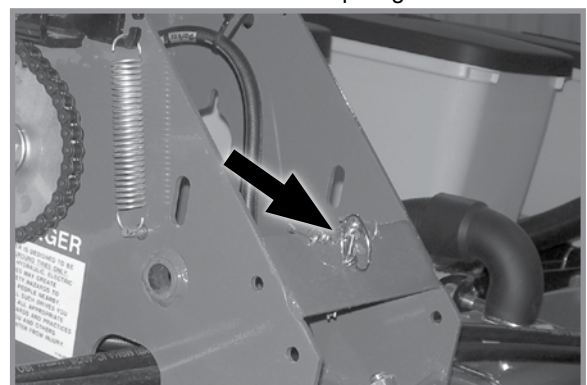
Contact drive - 4.10" x 6" Inflate to 50 psi (344.7 kPa)



CHAIN TENSION ADJUSTMENT

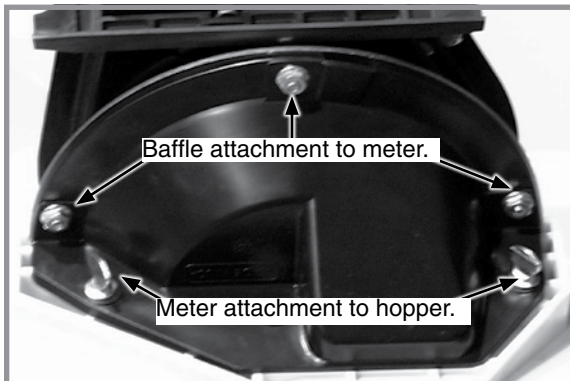
Drive chains are equipped with spring loaded idlers and are self-adjusting. The only adjustment is to shorten chains if wear stretches a chain and reduces spring tension. Check idler pivot points periodically to ensure they rotate freely. See "Wrap Spring Wrench Assembly" (on applicable idler assemblies) in this section for additional information.

Additional chain links are in storage area inside wheel module.

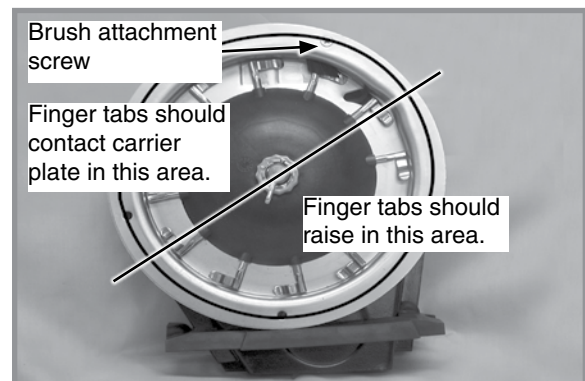


Chain link storage

FINGER PICKUP SEED METER INSPECTION/ADJUSTMENT

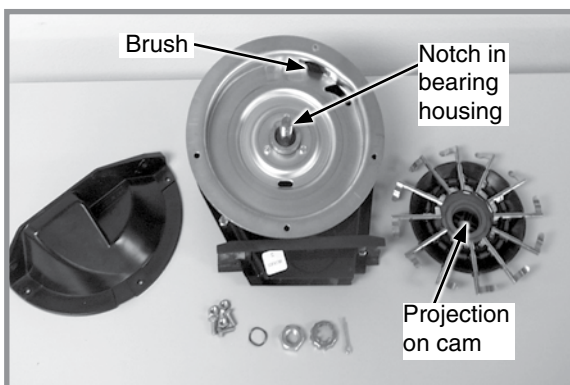


Removing meter and baffle

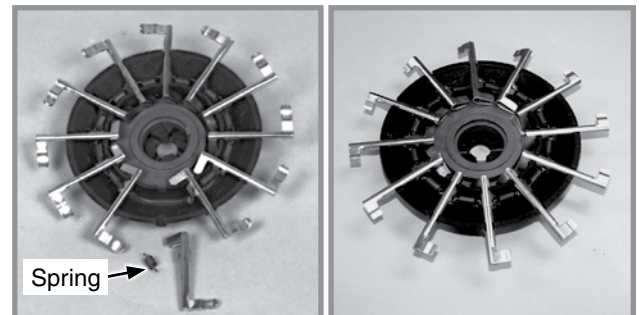


Proper finger operation

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**

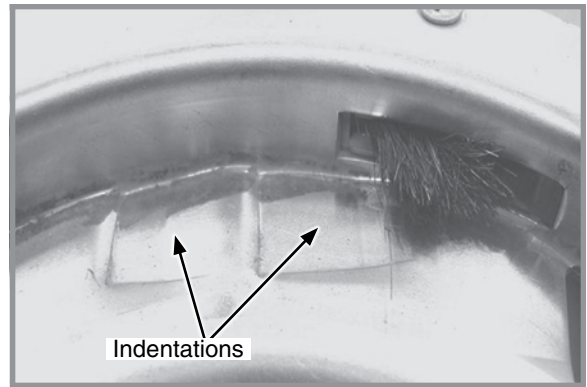
Buildup of debris or chaff may prevent proper finger operation and requires disassembly and cleaning of finger pickup meter.

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.

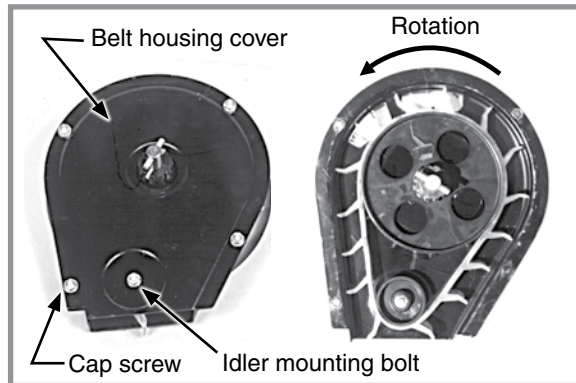
4. Remove springs from fingers and remove finger from holder by lifting it out of friction fit slot. Life expectancy of these parts is about 600-900 acres (243-364 hectares) per row of operation under average conditions.
5. Reassemble meter in reverse order after cleaning and replacing defective parts. 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.

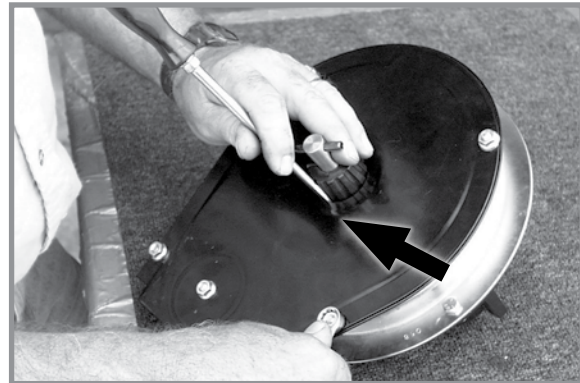


Worn carrier plate

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

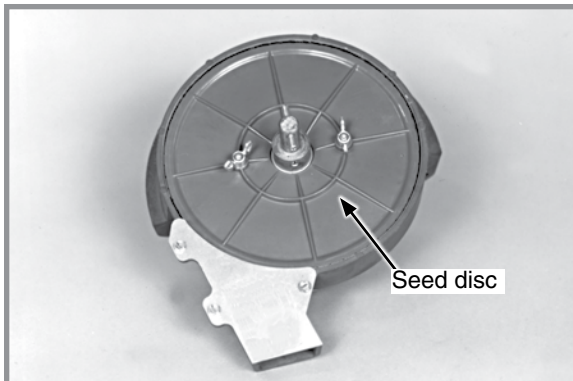
Do not overtighten hardware or components may be damaged.

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.

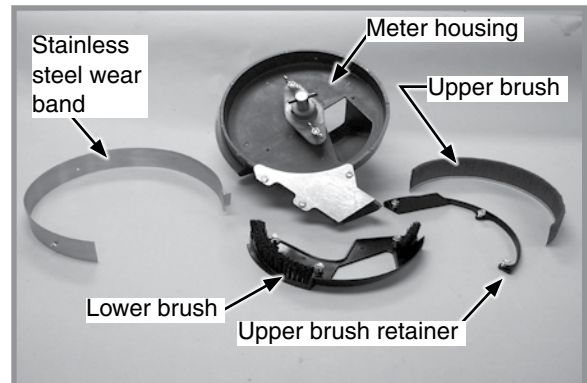
CLEANING FINGER PICKUP SEED METER FOR STORAGE

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 MAINTENANCE



Brush-type seed meter seed disc installed

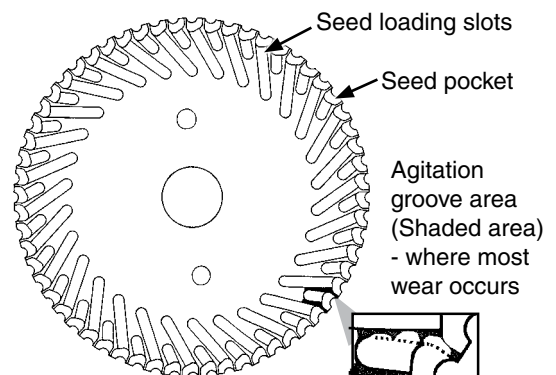


Brush-type seed meter parts

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

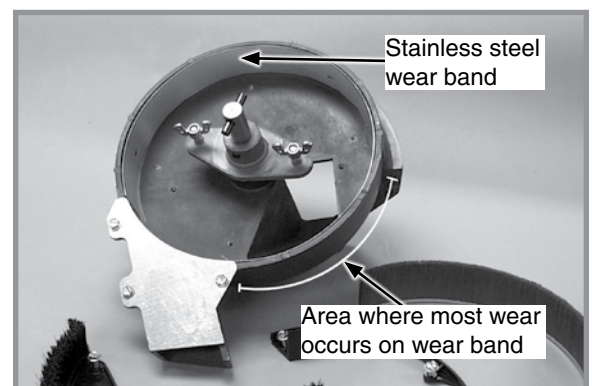
Most seed disc wear is found in the agitation groove area (area between seed loading slots). Wear affects planting accuracy at high RPM. Lay a straight edge across disc surface at agitation groove area and measure gap between disc and straight edge. If agitation groove areas are worn in excess of .030" (7.6 mm) 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 (81 hectares) 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 (40.5 hectares) 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.
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Stainless steel wear band protects meter housing from wear and is .030" (.076 cm) thick. Replace wear band when there is approximately .020" (.050 cm) of wear in primary wear area. Estimated life expectancy of stainless steel wear band is 240-800 acres (97-324 hectares) per row.

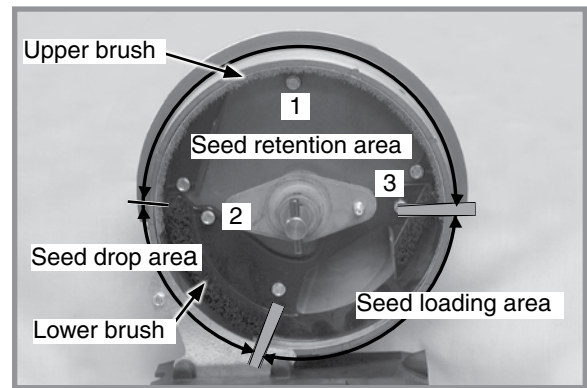


Stainless steel wear band

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 (49-162 hectares) 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 and three hex head screws. Tighten screws in sequence shown in photo at right.



Upper brush installation

NOTE: Use GD11122 upper brush retainer for soybean and cotton discs. Use GD8237 upper brush retainer for milo/grain sorghum discs.

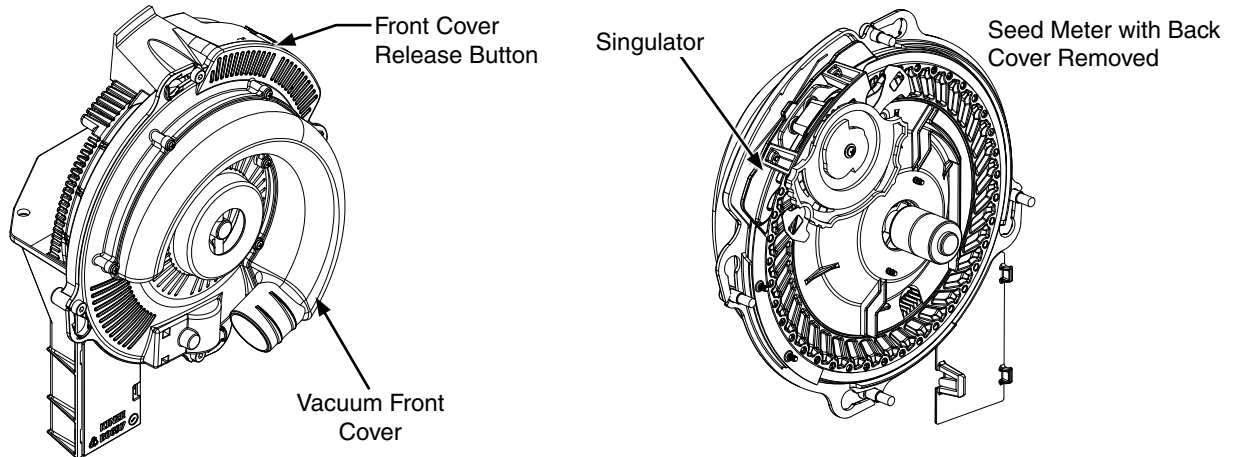
LOWER BRUSH

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 (97-324 hectares) per row. Replace lower brush if bristles are deformed or missing, or if there are cracks in brush retainer.

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 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 ["Preparing Planter for Storage" on page 6-30](#) 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

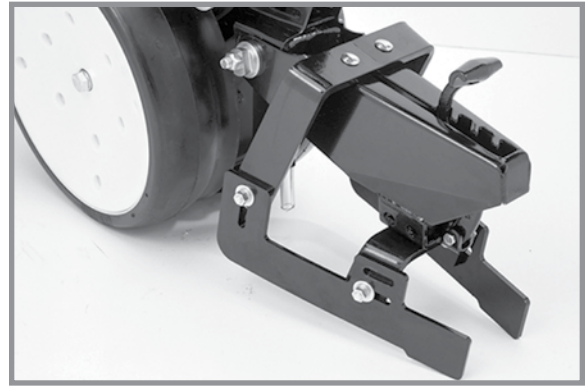
NOTE: Use of damaged seed or seed containing foreign material will cause plugging of seed cell orifices and require more frequent seed meter cleanout to prevent underplanting.

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.

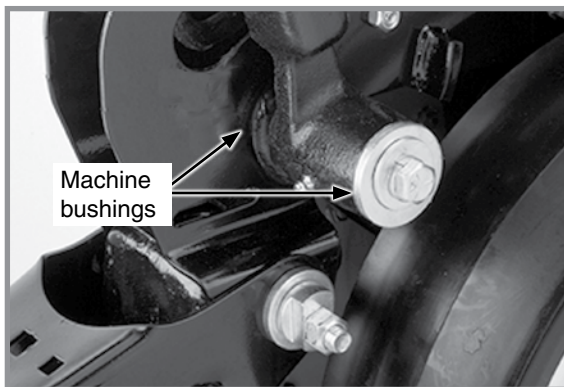
DRAG CLOSING ATTACHMENT

Inspect each drag closing attachment and replace any worn or broken parts before storing planter. Check for loose hardware and tighten as needed.

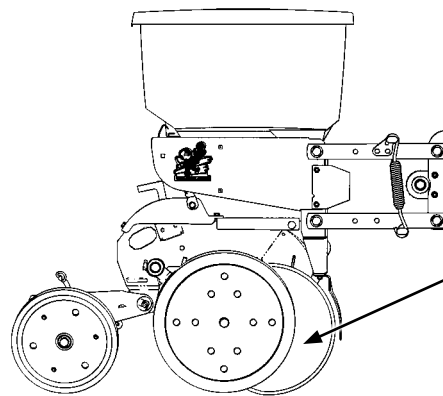


Drag Closing Attachment

GAUGE WHEEL ADJUSTMENT



Machine bushings



Shim gauge wheel to lightly contact opener disc blade. Check adjustment in field position.

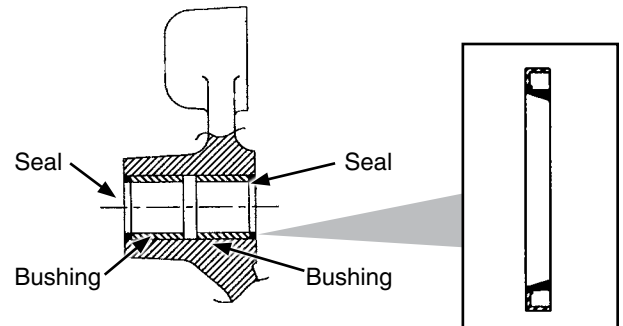
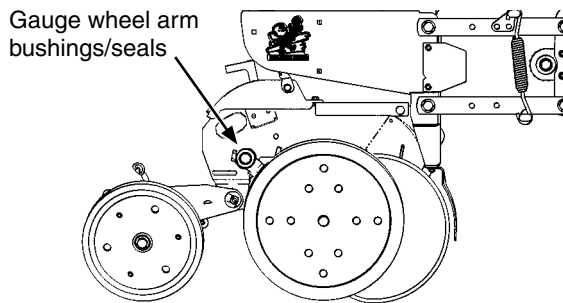
Gauge wheel adjustment

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.

Add or remove machine bushings between shank and gauge wheel arm to adjust clearance between gauge wheels and opener blades. Store remaining machine bushings between gauge wheel arm and flat washer on outer side of gauge wheel arm.

NOTE: It may be desirable to space gauge wheel further from blade when operating in sticky soils.

GAUGE WHEEL ARM BUSHING/SEAL REPLACEMENT



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" (3.2 mm) 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.

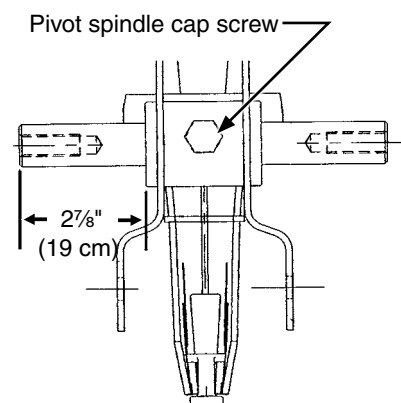
7. Inspect gauge wheel pivot spindle.
8. Reinstall gauge wheel arm assembly and gauge wheel.

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

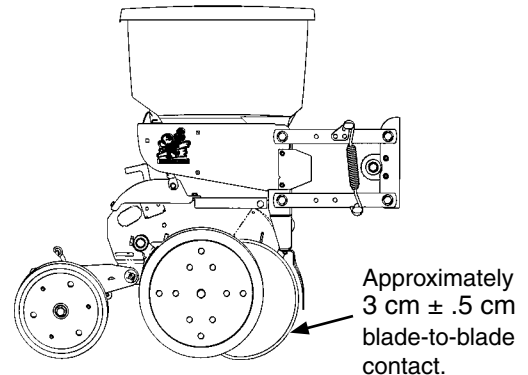
1. Remove gauge wheel and arm assemblies from shank assembly.
2. Remove 1/2" x 3/4" cap screw that locks pivot spindle in place and remove spindle.
3. Install replacement spindle and position as shown. Exact centering is critical.
4. Install 1/2" x 3/4" cap screw and torque to lock pivot spindle in place.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



15" SEED OPENER DISC BLADE/BEARING ASSEMBLY

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.



Maintain approximately $1" \pm \frac{1}{2}"$ ($3 \pm .5$ cm) of blade-to-blade contact 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: Replace blades 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).

REPLACE DISC BLADE/BEARING ASSEMBLY

NOTE: Only bearing may need to be replaced if there is excessive endplay or if bearing sounds or feels rough when disc blade is rotated.

1. Remove gauge wheel, scraper, and bearing dust cap.
2. 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.

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.

3. Install machine bushing(s), new disc blade bearing assembly, washer and cap screw. Torque $\frac{5}{8}"$ -11 Grade 5 cap screw to 110 ft-lb (149.14 N-m).

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

4. Install bearing dust cap, scraper, and gauge wheel.

REPLACE BEARING ONLY

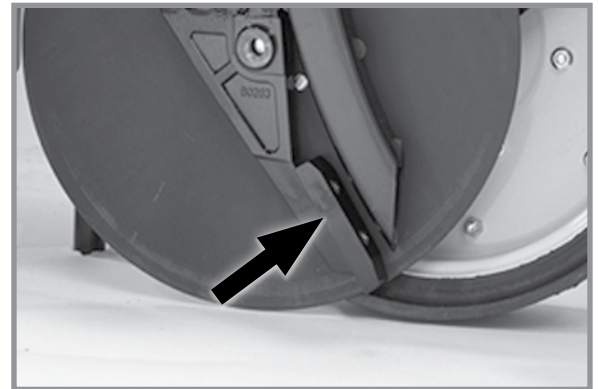
1. Remove gauge wheel, scraper, bearing cap, cap screw, washer and disc blade/bearing assembly.
2. Remove $\frac{1}{4}"$ rivets from bearing housing to expose bearing.
3. Installing new bearing. install three evenly spaced $\frac{1}{4}"$ cap screws into three of six holes in bearing housing to hold bearing and bearing housing in place. Install rivets in other three holes. Remove $\frac{1}{4}"$ cap screws and install rivets in those three holes.
4. Reinstall disc blade/bearing assembly, washer and cap screw. Torque $\frac{5}{8}"$ -11 cap screw to 110 ft-lb (149.14 N-m).
5. Install bearing dust cap, 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.

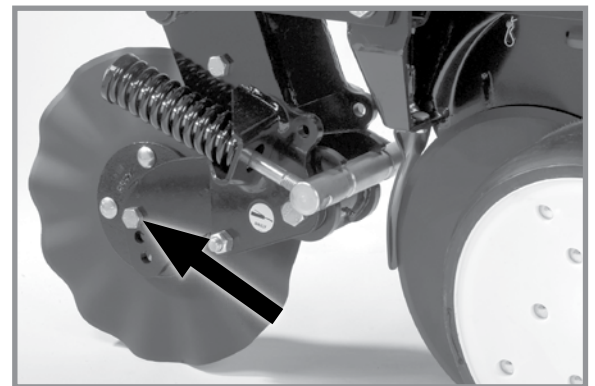
Remove seed tube and two hex socket head cap screws that attach seed tube guard. Hold replacement seed tube guard centered between seed opener disc blades. Install hex socket head cap screws. **DO NOT TIGHTEN**. Using a clamp or vise-grip, squeeze opener blades together in front of seed tube guard. Tighten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

FRAME MOUNTED COULTER

NOTE: Torque $\frac{5}{8}$ " spindle hardware to 120 ft-lb (162.7 N-m)

See "Frame Mounted Coulters" in Row Unit Operation section of this manual for depth and spring adjustment.

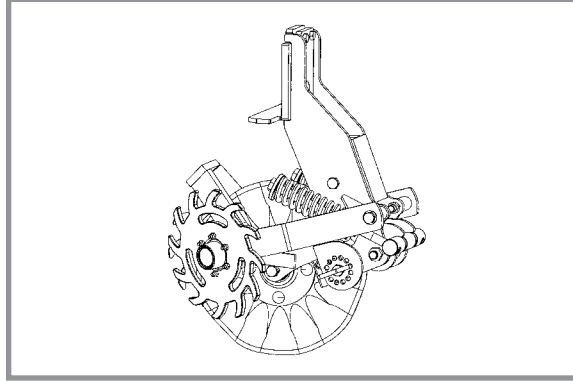
Replace 16" diameter coulters blade (1" fluted, 1" bubbled or $\frac{3}{4}$ " fluted) when worn to 14 $\frac{1}{2}$ " (37 cm) (maximum allowable wear).



Frame mounted coulters spindle

RESIDUE WHEELS (FOR USE WITH FRAME MOUNTED COULTER)

Wheel hub is equipped with sealed bearings. Replace bearings if a bearing sounds or feels rough when wheel is rotated.



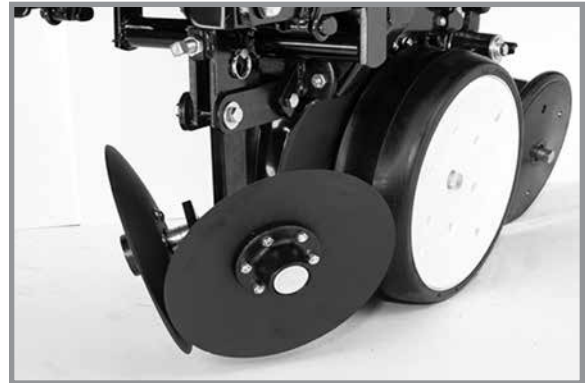
ROW UNIT MOUNTED DISC FURROWER

Lubricate bushings in support arm mounting bracket at frequency indicated in Lubrication of this section. Check each bolt for proper torque. If bolt is loose, it should be removed and bushing inspected for cracks and wear. Replace bushings as necessary.

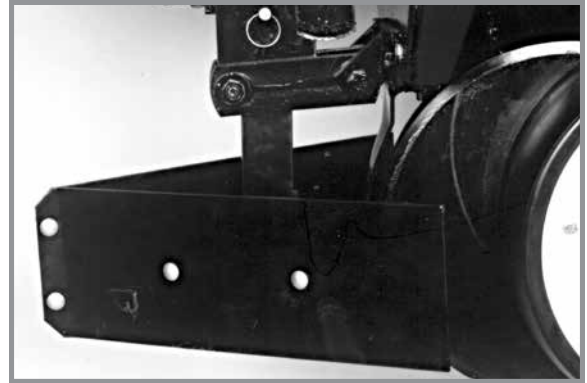
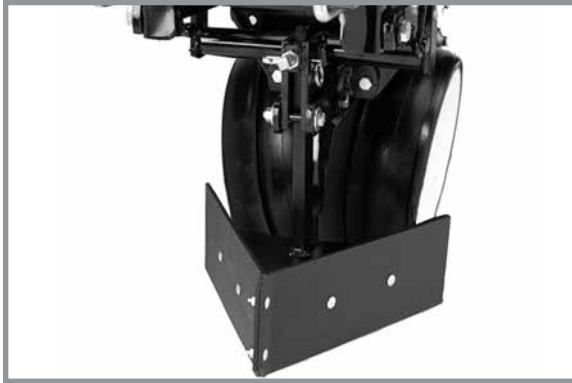
NOTE: Use only hardened flat washers. Replace damaged flat washers with proper part. Torque bolts to 130 ft-lb (176.2 N-m).

Blade hubs are equipped with sealed bearings. Replace bearings if a bearing sounds or feels rough when wheel is rotated.

Replace solid or notched 12" diameter blades when worn to 11" (28 cm).

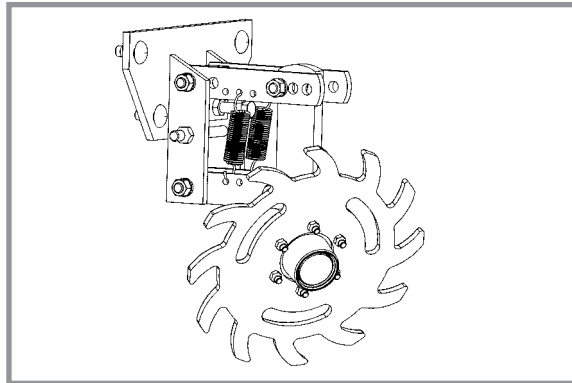


Row unit mounted disc furrower

ROW UNIT MOUNTED BED LEVELER

Lubricate bushings in mounting bracket and links at frequency indicated in Lubrication of this section. Check each bolt for proper torque. If bolt is loose, it should be removed and bushing inspected for cracks and wear. Replace bushing if necessary.

NOTE: Use only hardened flat washers. Replace damaged flat washers with proper part. Torque bolts to 130 ft. lbs (176.3 N-m).

ROW UNIT MOUNTED RESIDUE WHEEL

Wheel hub is equipped with sealed bearings. If a bearing sounds or feels rough when wheel is rotated, replace them.

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).

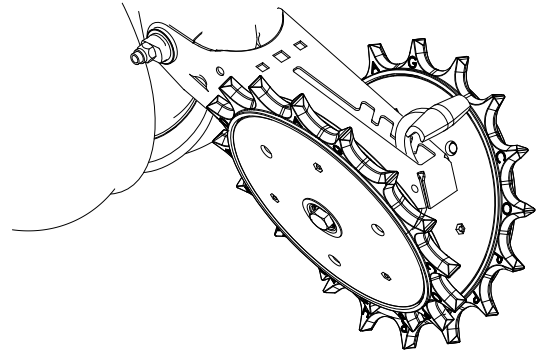
COULTERS MOUNTED RESIDUE WHEELS



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

SPIKED CLOSING WHEEL

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

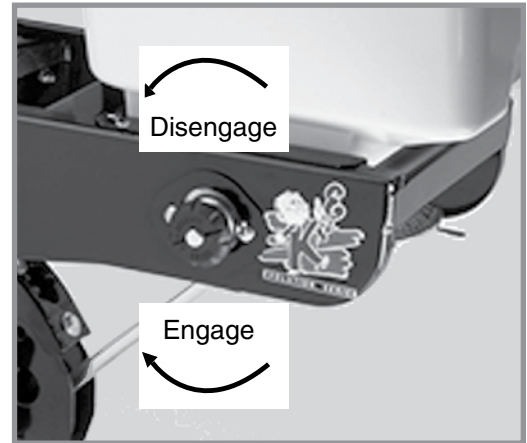


Row Unit Spiked Closing Wheel

GRANULAR CHEMICAL ATTACHMENT

Before storing planter, disengage granular chemical drive by rotating throwout knob ¼ 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.

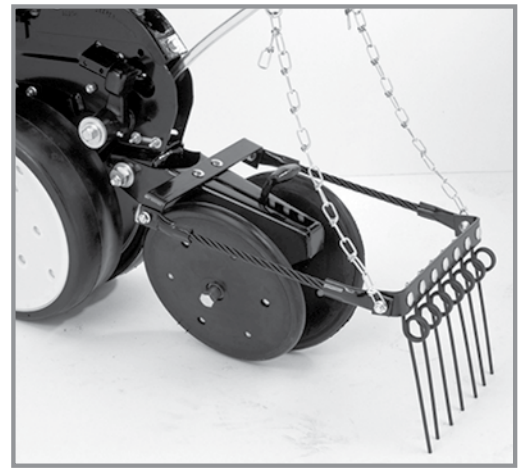
Install hoppers and chains. Check chain alignment.



Granular chemical throwout knob

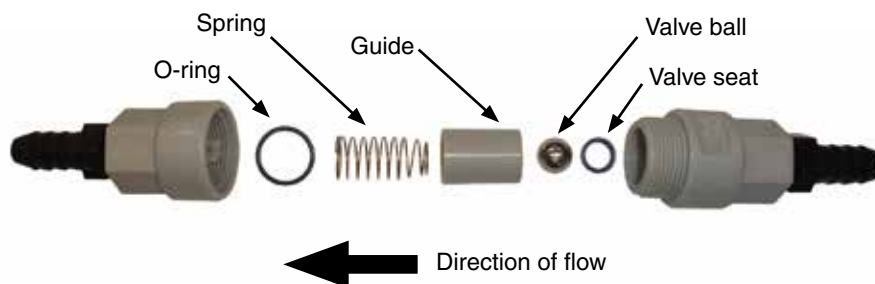
SPRING TOOTH INCORPORATOR

Before storing planter, inspect each spring tooth incorporator and replace worn or broken parts. Check for loose hardware and tighten as needed.




Spring tooth incorporator

FERTILIZER CHECK VALVE CLEANING AND REPAIR

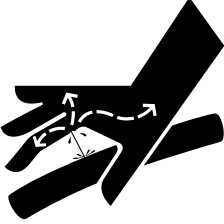


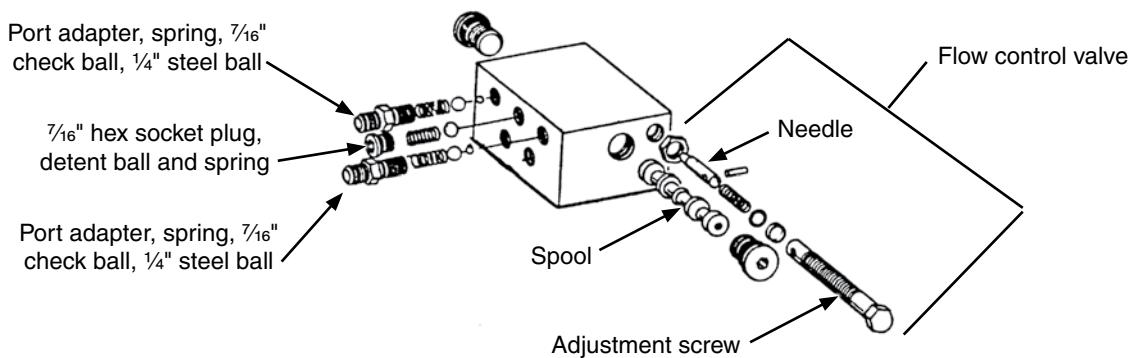
1. Unscrew valve body and separate halves. Note direction and location of parts.
2. Clean and inspect parts. Flush with clean water. Replace damaged parts.
3. Reassemble exactly as shown. O-ring and valve seat must be firmly in place inside each half of valve body.

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.

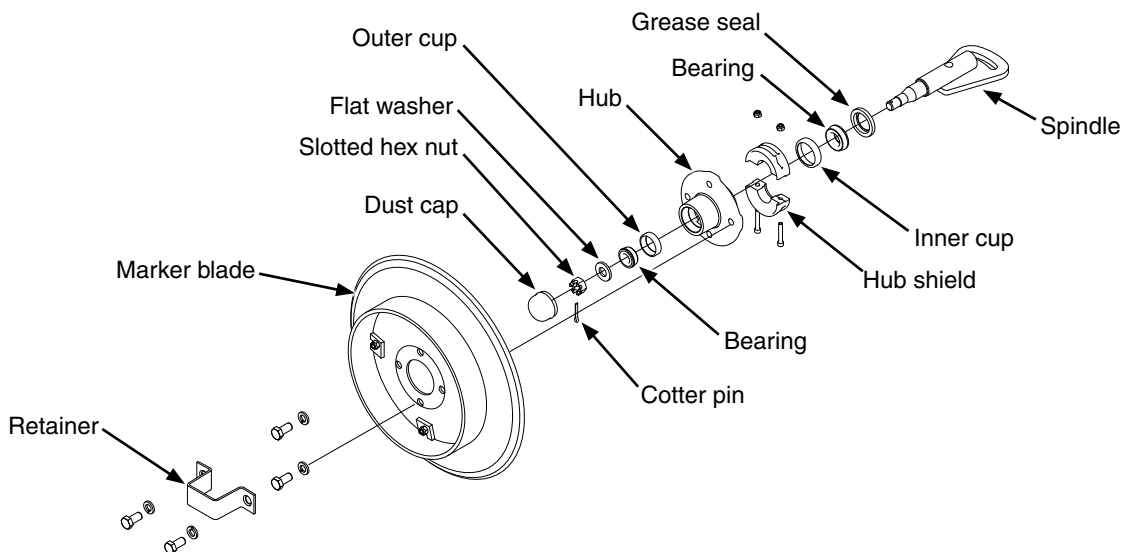
3. Remove plug from both sides of valve block and remove spool.
4. Inspect all parts for pitting, contamination, or foreign material. Check seating surfaces inside valve. Replace defective parts.
5. Lubricate spool with a light oil and reinstall. Check spool moves freely in valve body.

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.

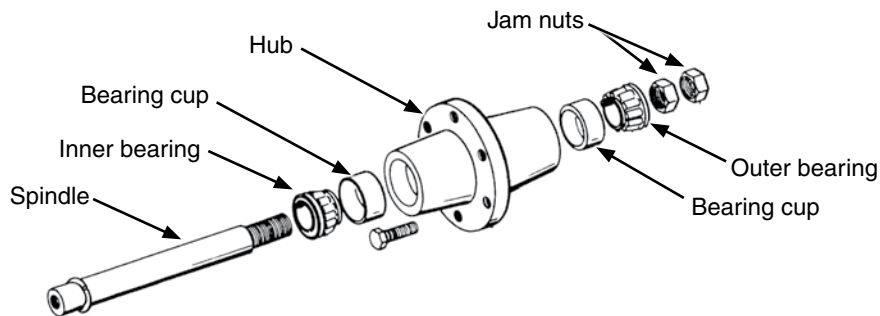
NOTE: Hydraulics operate slowly when oil is cold. Make all adjustments with warm oil.

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.

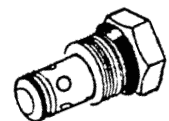
WHEEL BEARING REPACK OR REPLACEMENT



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 ¼ 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.

VACUUM CHECK VALVE INSPECTION (In valve block below vacuum fan motor assembly)

Check valve return prevents reverse operation of vacuum fan motor. Remove and check for foreign material or if O-ring is leaking internally. Clean or replace if defective.



VACUUM RELIEF VALVE CARTRIDGE INSPECTION (In valve block below vacuum fan motor assembly)

NOTICE

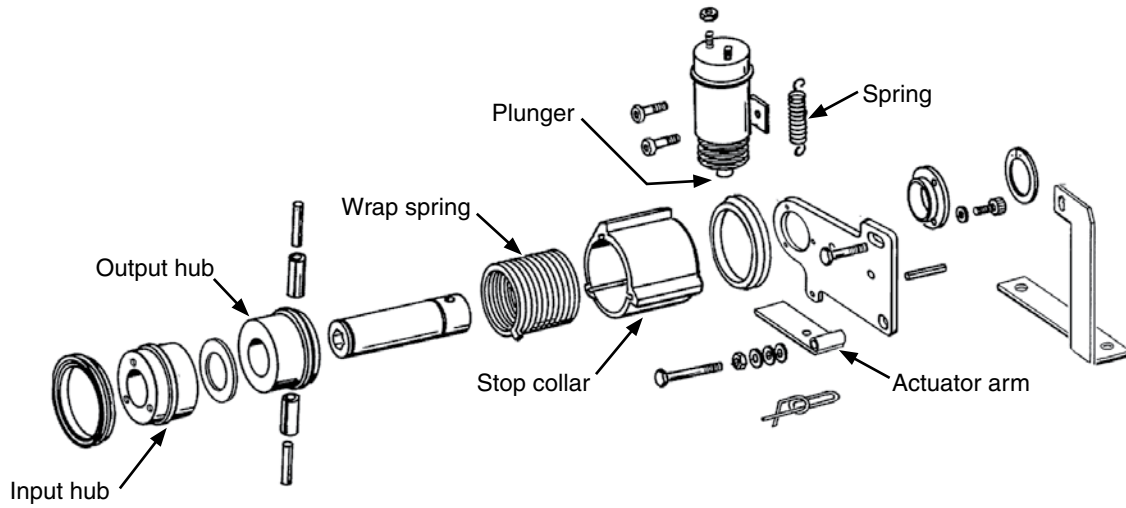
Connect hydraulic motor case drain to a case drain return line with zero pressure on tractor or hydraulic motor will be damaged. DO NOT connect hydraulic motor case drain to SCV outlet. Contact tractor manufacturer for specific details on "zero pressure return".



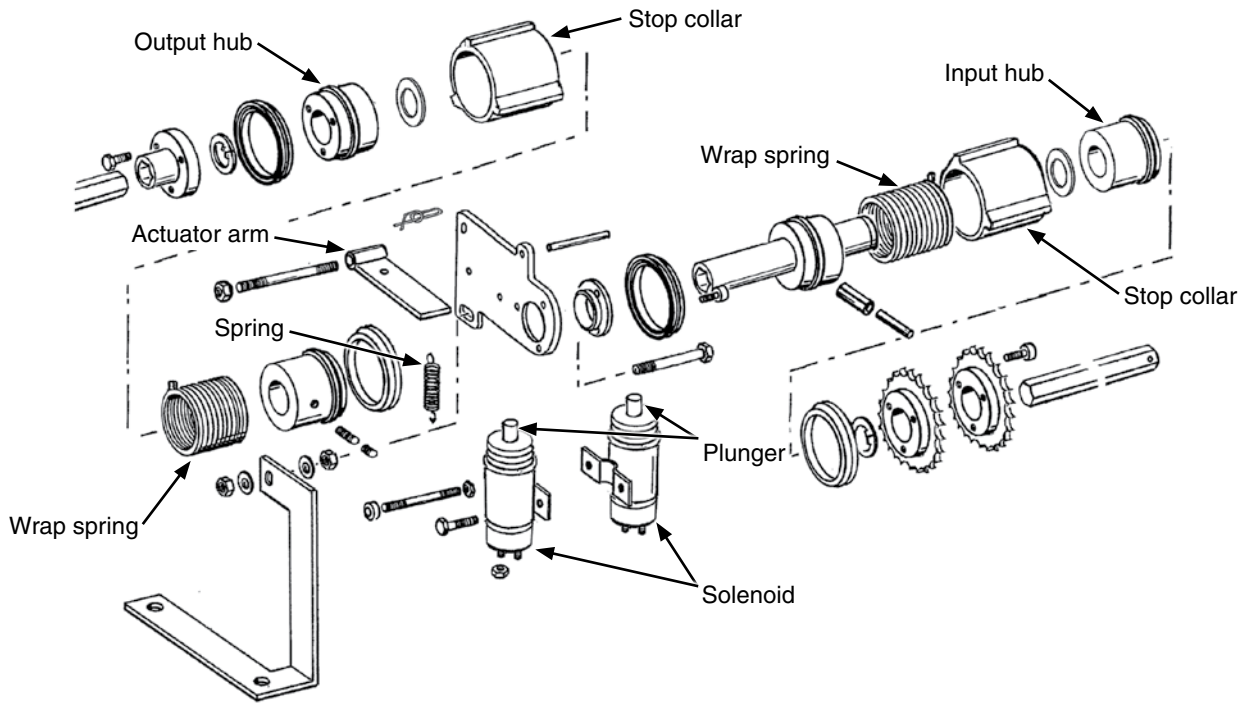
Pressure relief valve helps prevent damage to vacuum fan motor by limiting pressure in motor case drain line. It is set to open at 35 PSI (241.21 kPa). Remove and check for foreign material and contamination on valve or seating area of valve body. Clean or replace if defective.

SINGLE AND TWO-SPEED 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.

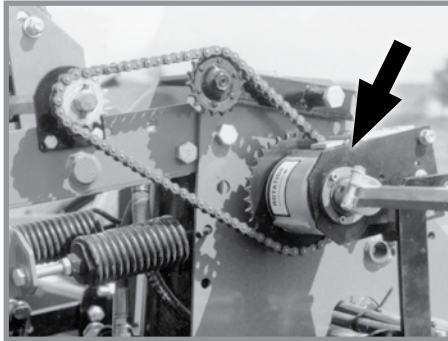


Single point row clutch main parts

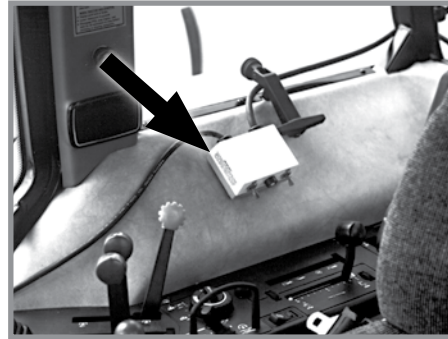


Two-speed point row clutch main parts

TESTING



Point row clutch (single shown)



Point row clutch control box

Control box is equipped with a circuit breaker. Press red button on circuit breaker to reset. If circuit breaker continues to trip, see "Point Row Clutch Troubleshooting" in Troubleshooting section.

If control box circuit breaker is not tripped, determine if problem is electrical or mechanical.

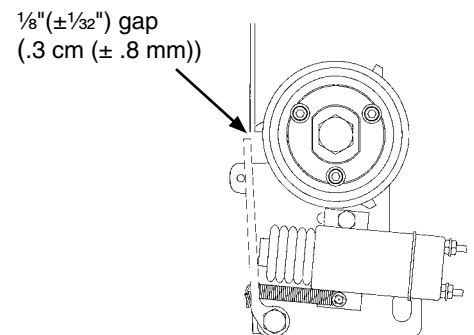
Place operation switch in RIGHT or LEFT position. Solenoid plunger will retract causing a clicking sound if it is operating properly. Touch plunger with a metal object to check if it is electrically magnetized. Check clutch and wiring harness for power with a test light or volt meter.

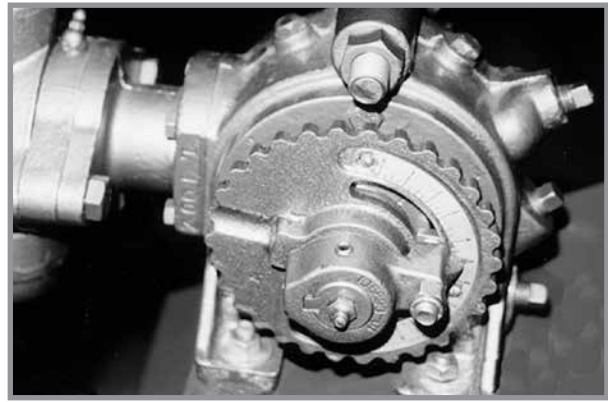
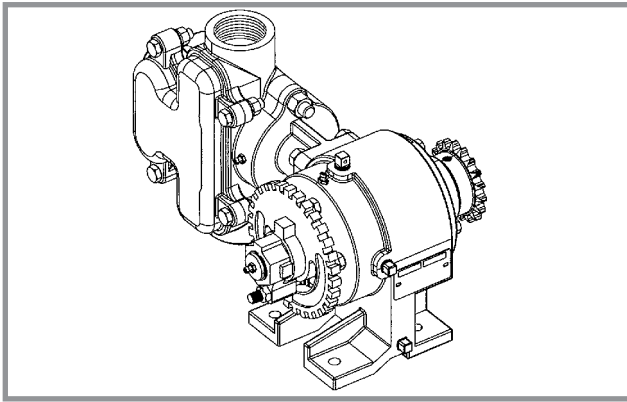
NOTE: R.H. clutch operates clockwise and L.H. clutch operates counterclockwise. Clutch parts such as the wrap spring are side specific. Use correct repair part if a clutch must be repaired.

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.





Liquid fertilizer piston pump

PISTON PUMP STORAGE

NOTICE

Entrance of air into pump will cause rapid and severe corrosion. KEEP AIR OUT OF PUMP!

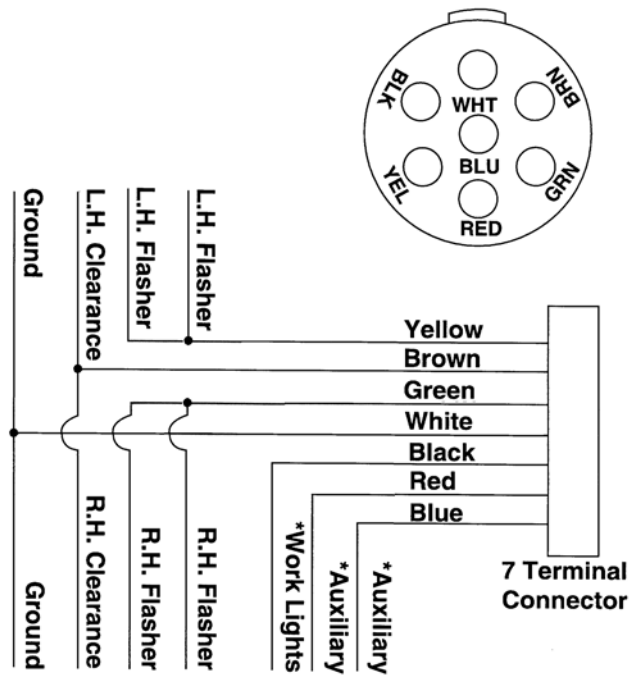
NOTE: SUSPENSION FERTILIZER must be flushed from pump for ANY storage period.

1. Flush pump with 5 to 10 gallons (19 to 38 liters) of fresh water and circulate until all corrosive salts are dissolved in pump.
2. Set pump on 10. Draw in a mixture of half diesel fuel and 10 weight oil until discharge is clean. Plug inlet and outlet.

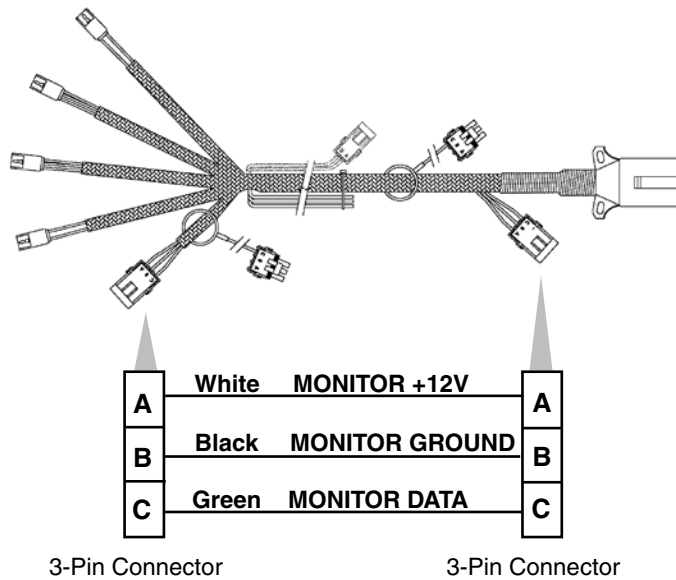
PREPARING PLANTER FOR STORAGE

- Store planter in a dry sheltered area if possible. Refer to “Safety Lockups” in Machine Operation section for proper safety lockup installation during storage.
- Remove all trash that may be 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 are in need of replacement and order during “off” season.
- Make sure seed and granular chemical hoppers are empty and clean.
- Clean seed meters and store in a dry, rodent-free area.
- Remove seed discs from brush-type seed meters, clean and store meters with discs removed.
- 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.
- Empty and clean dry fertilizer hoppers. Disassemble and clean metering augers. Reassemble and coat all metal parts with rust preventative.

ELECTRICAL WIRING DIAGRAM FOR LIGHT PACKAGE

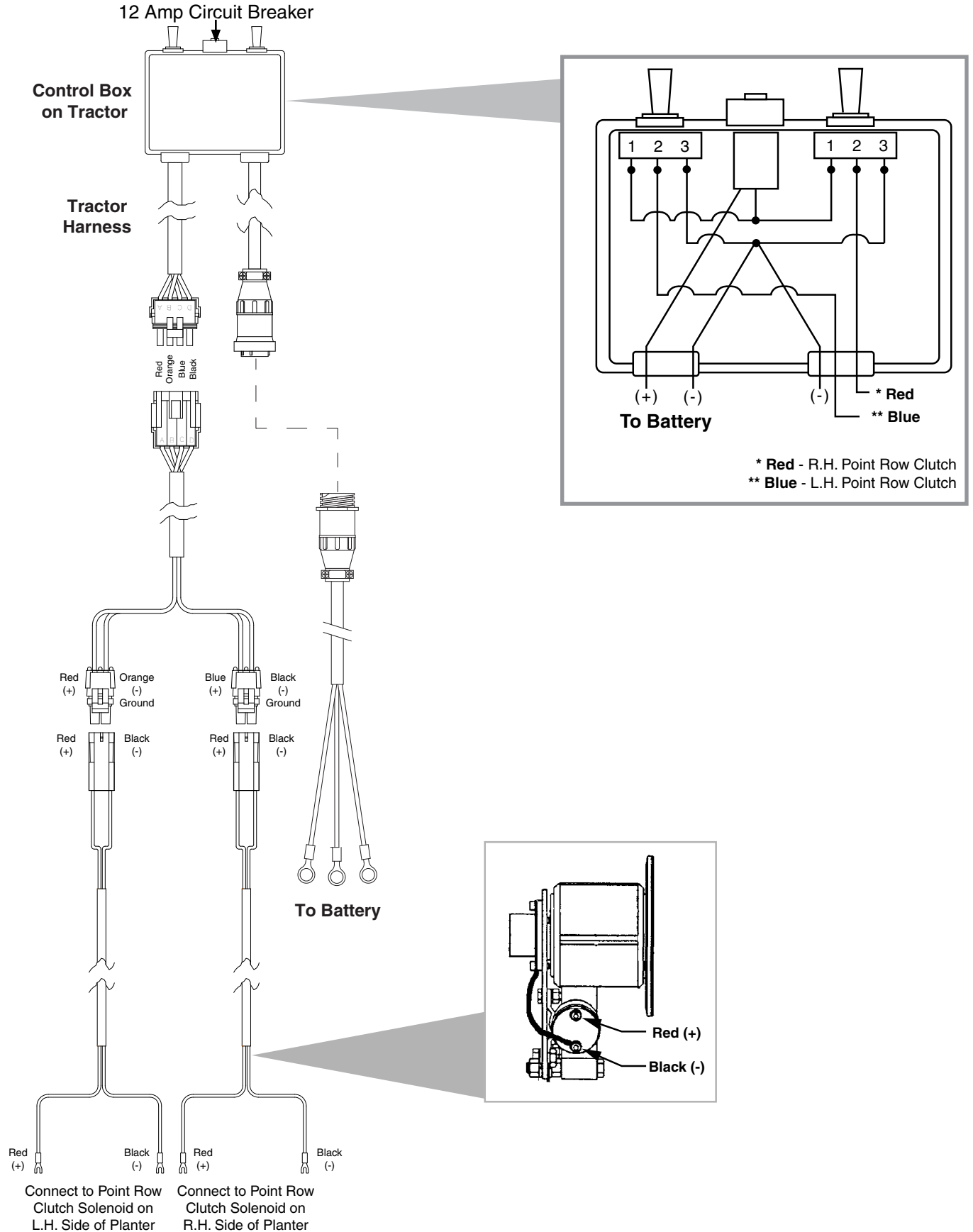


* Optional customer-supplied auxiliary lights and wires may be wired into existing plug terminals.

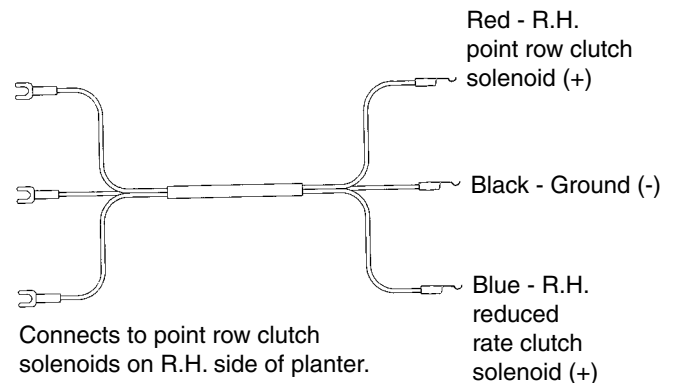
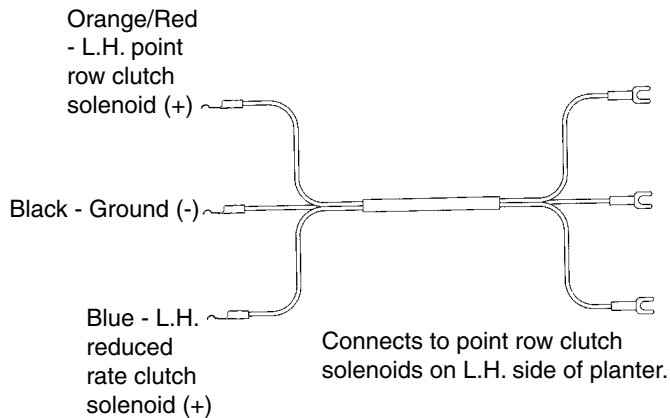
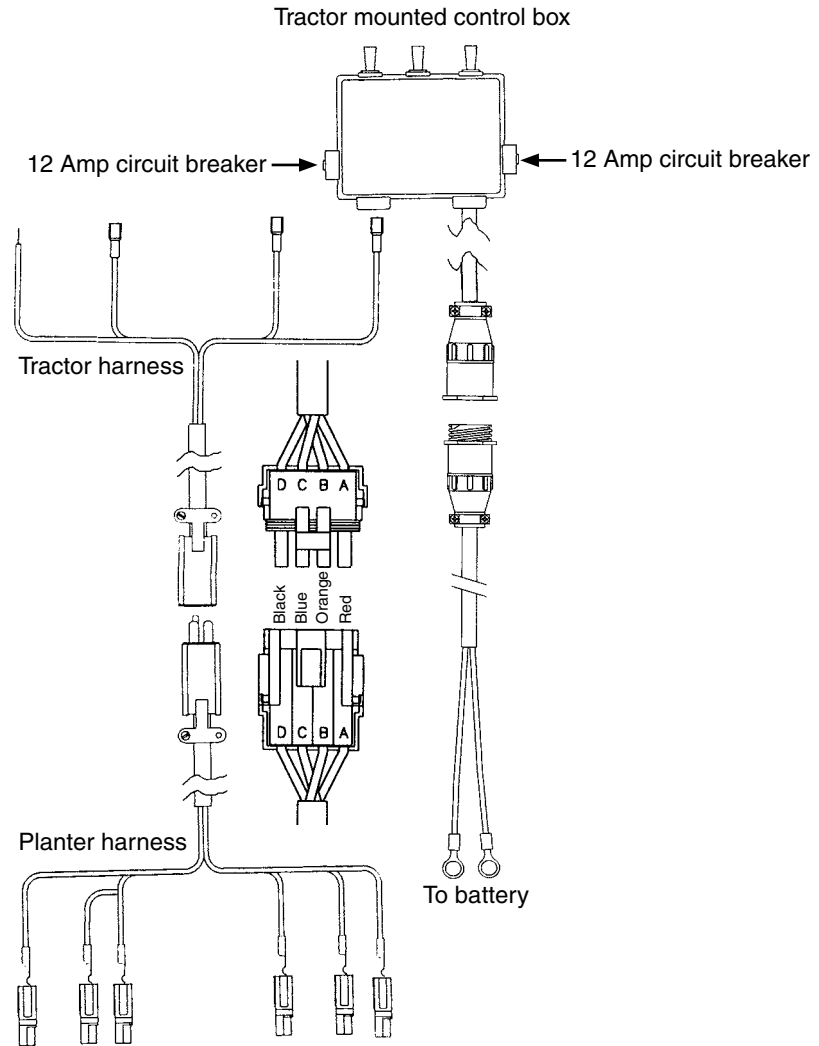


Light package meets ASABE Standards. Check with your tractor manufacturer for correct wiring harness connection to lights on your tractor.

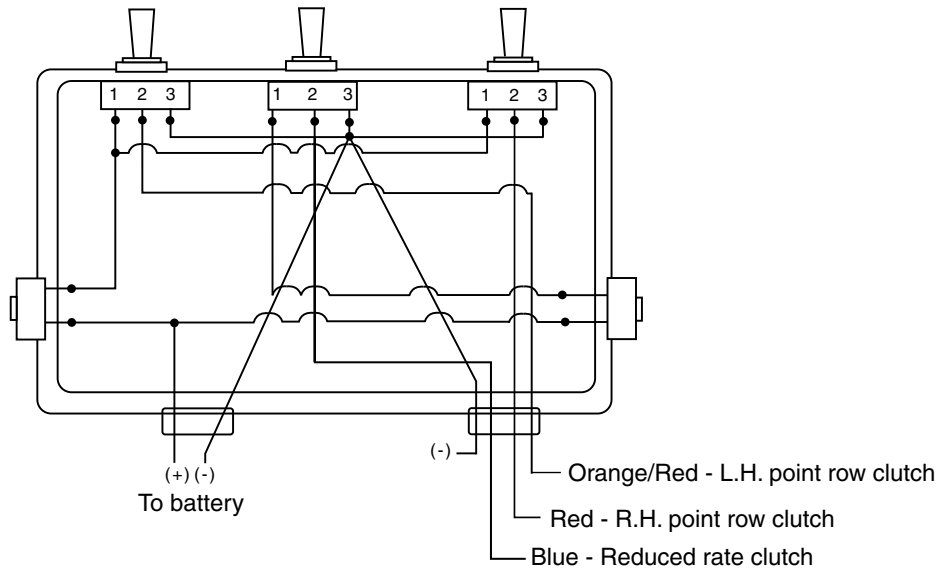
ELECTRICAL WIRING DIAGRAMS FOR POINT ROW CLUTCHES



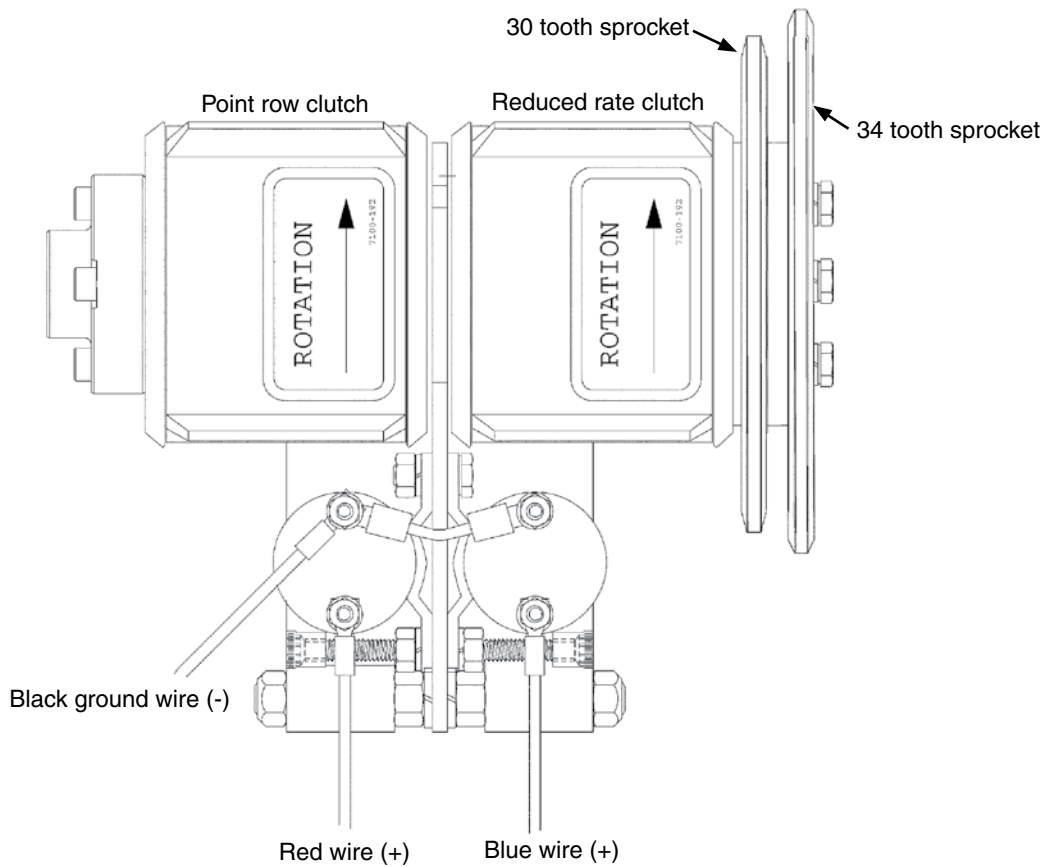
TWO-SPEED POINT ROW CLUTCH ELECTRICAL WIRING DIAGRAMS



TWO-SPEED POINT ROW CLUTCHES ELECTRICAL WIRING DIAGRAMS





Tractor mounted control box



Two-speed point row clutch (Clutch for L.H. side of planter shown)

HYDRAULIC HOSE LIFE

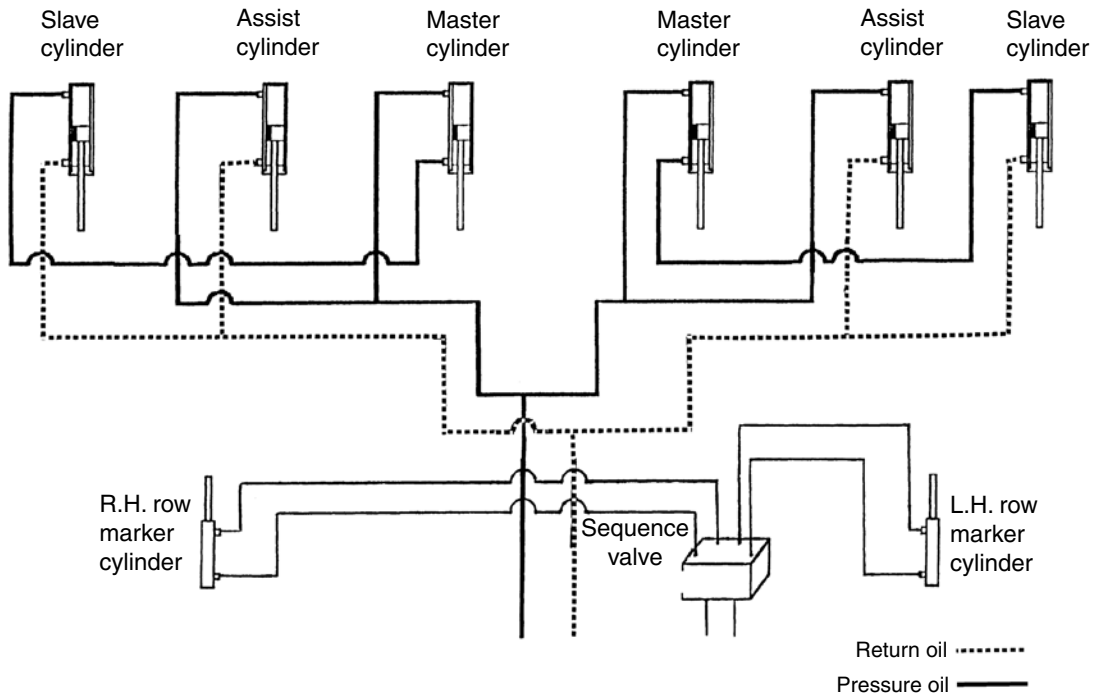
 WARNING	Pressurized hydraulic fluid can penetrate body tissue and result in death, serious infection, or other injuries. Fluid injected under skin must be IMMEDIATELY removed by a surgeon familiar with this type of injury. Make sure connections are tight and hoses and fittings are not damaged before 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.

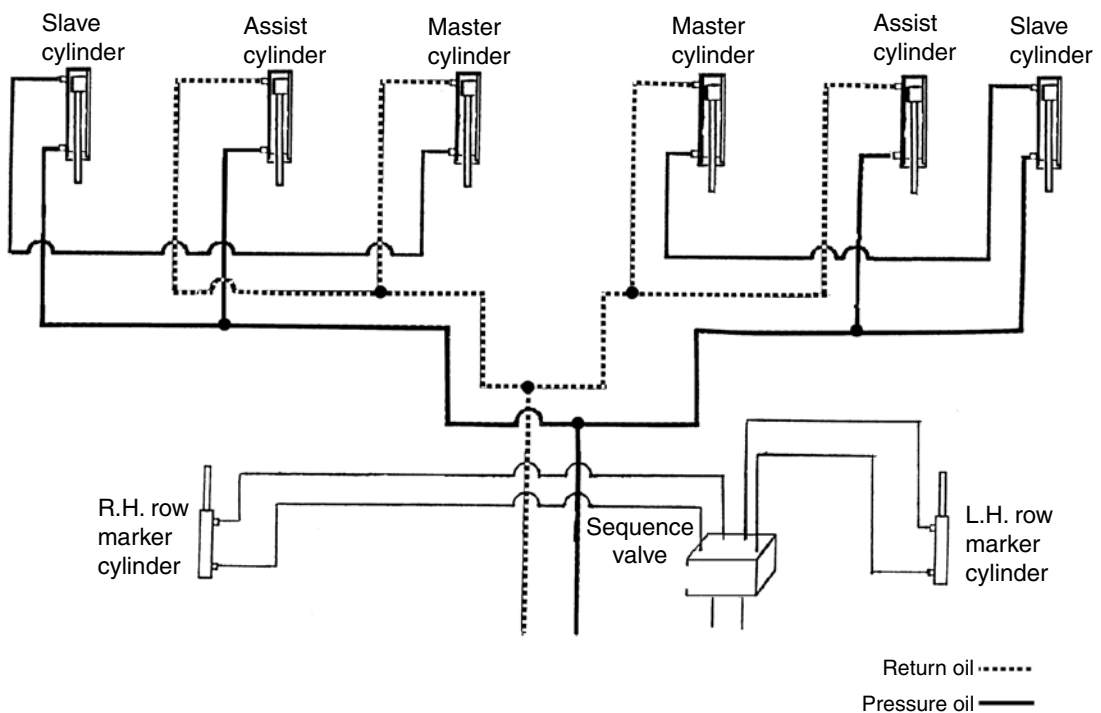
- Store in a clean, cool and dry area
- Avoid direct sunlight or moisture
- Do not store near high power electrical equipment
- Avoid contact with corrosive chemicals
- Avoid ultraviolet light
- Avoid areas with obvious signs of insects or rodents

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.

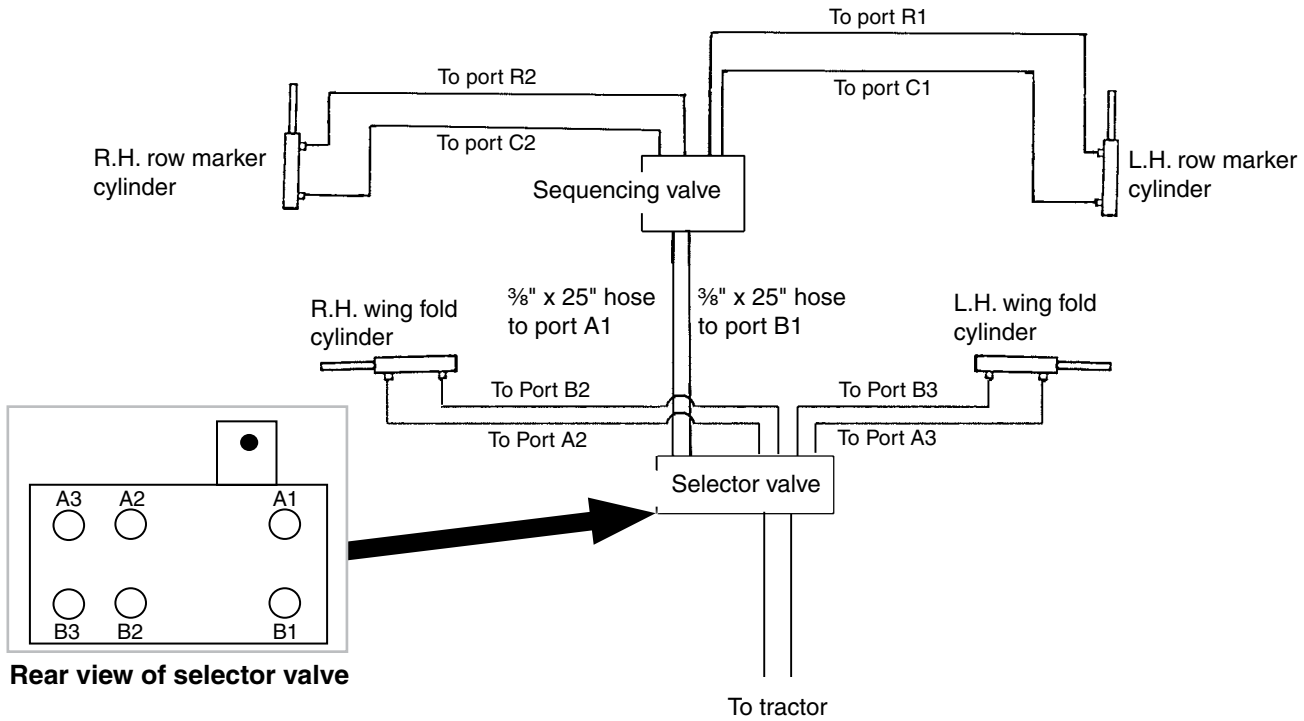
HYDRAULIC SYSTEM SCHEMATIC - PLANTER RAISING



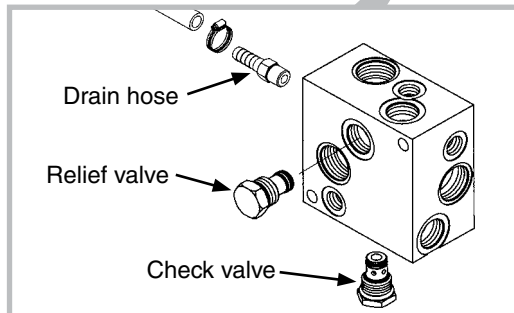
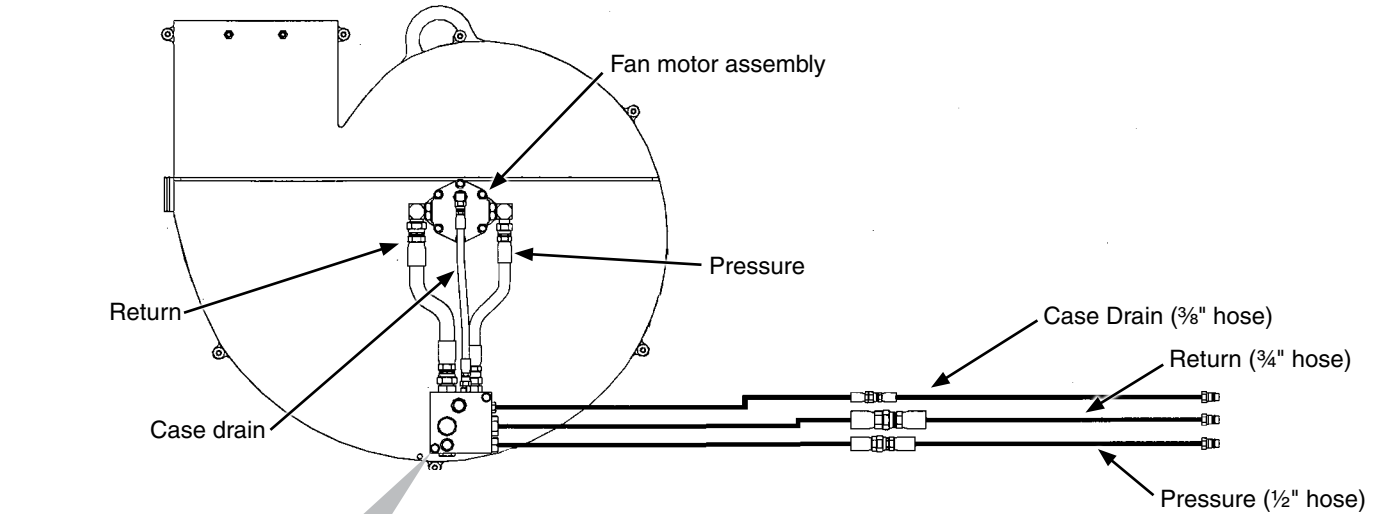
HYDRAULIC SYSTEM SCHEMATIC - PLANTER LOWERING



HYDRAULIC SYSTEM SCHEMATIC - OPTIONAL HYDRAULIC WING FOLD



HYDRAULIC SYSTEM SCHEMATIC - VACUUM FAN MOTOR SYSTEM

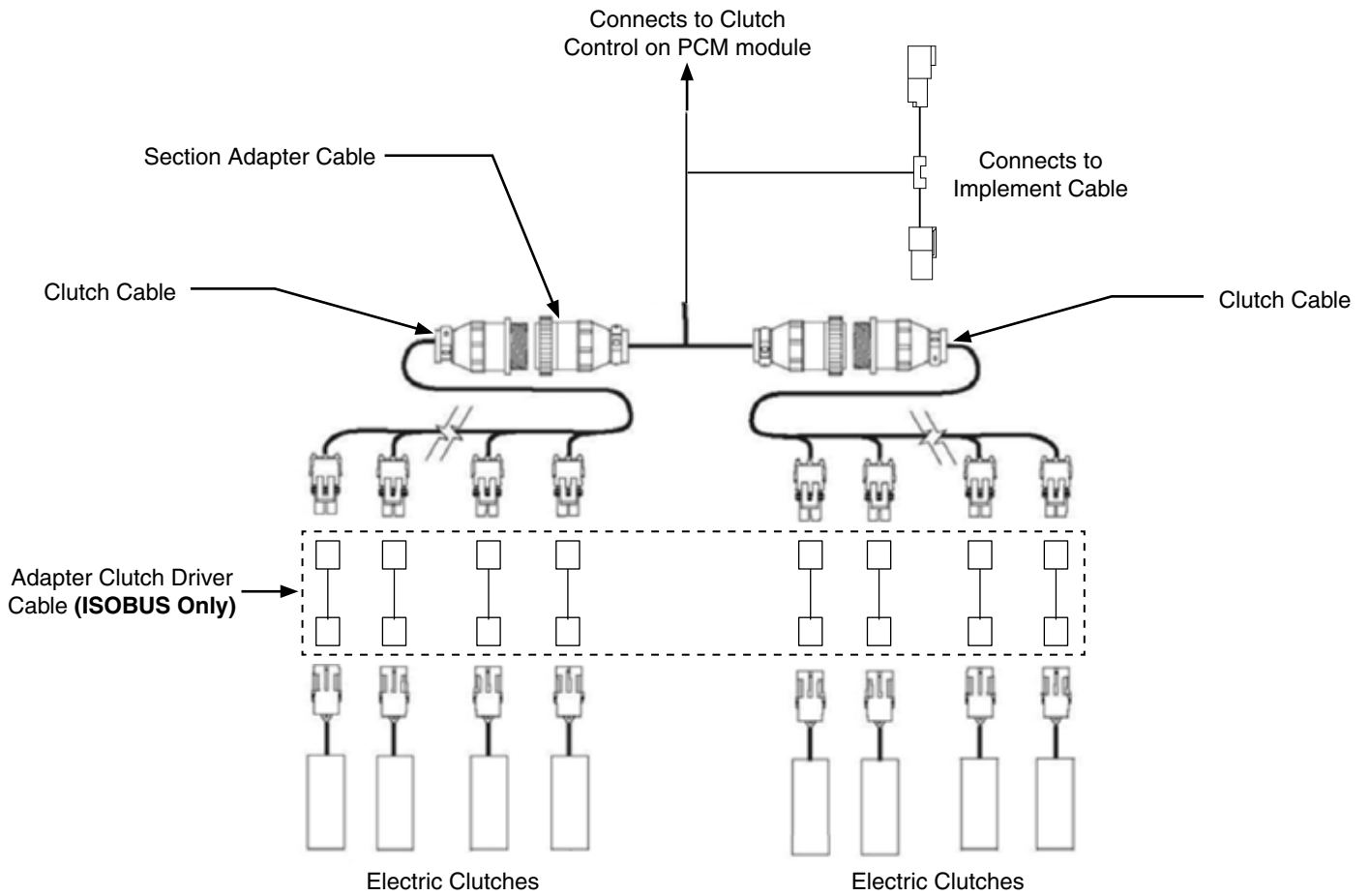


**Vacuum fan motor valve block assembly
(See machine operation section)**

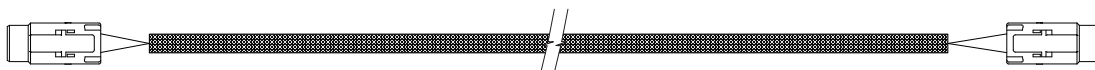
NOTICE

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".

ELECTRIC CLUTCH SCHEMATIC

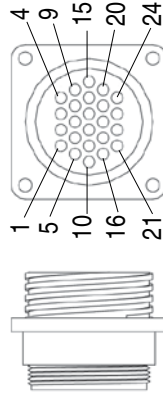
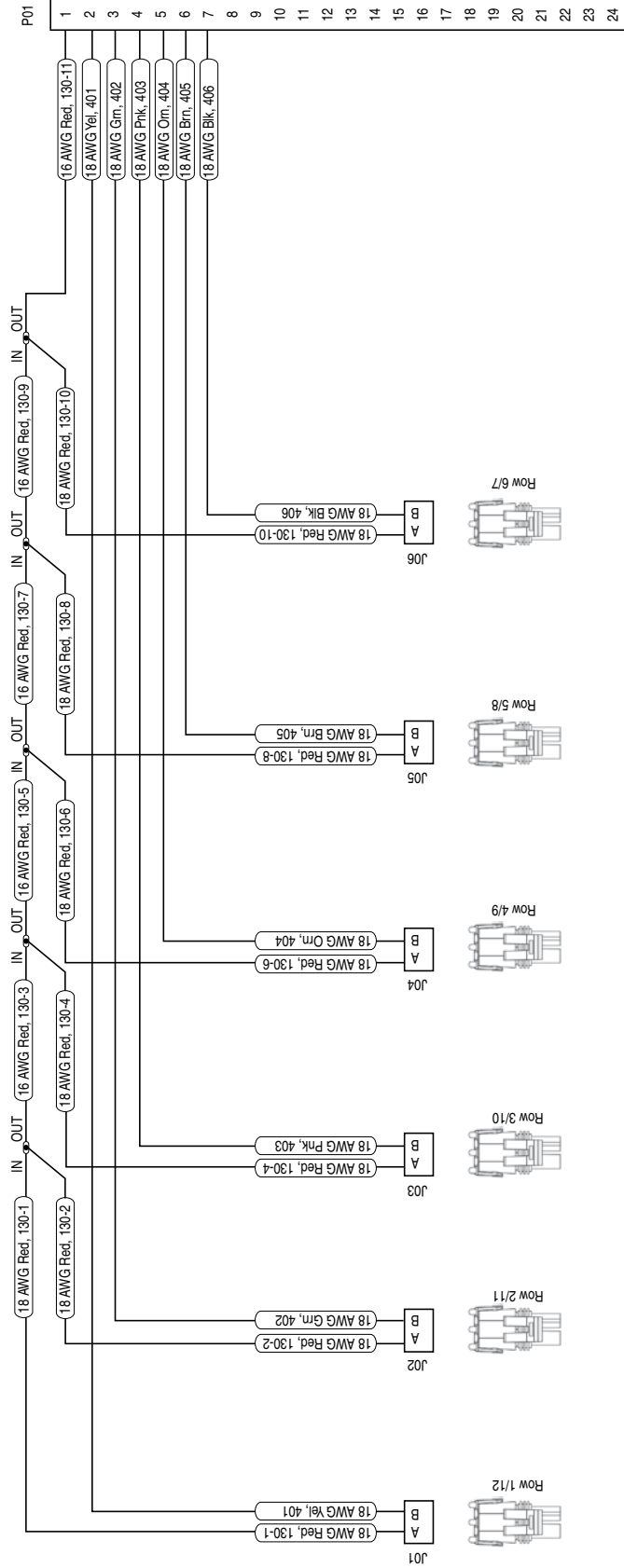


ISOBUS CAN JUMPER CABLE



SIGNAL	CAN	WIRE/COLOR
CAN H	1	Twisted Pair Yellow
CAN L	2	Twisted Pair Green

ISOBUS CLUTCH CABLE



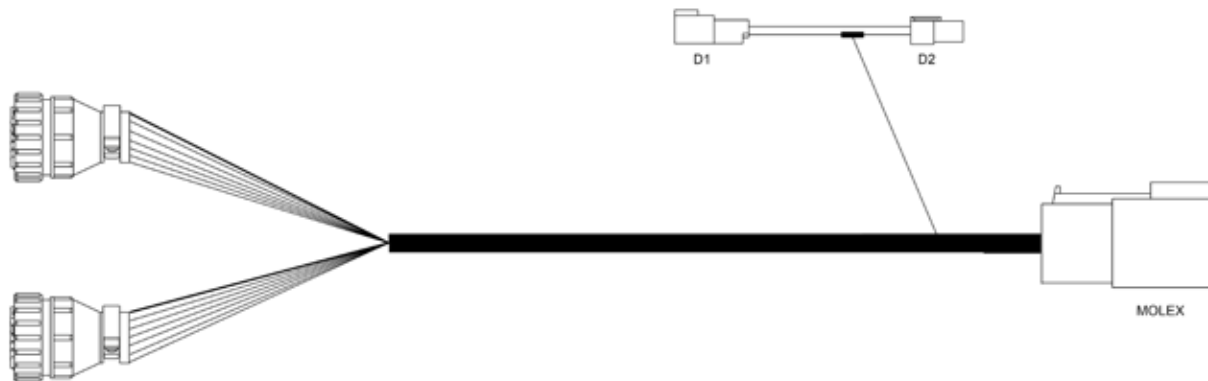
Signal	Clutch Cable	Row 8/9	Row 7/10	Row 6/11	Row 5/12	Row 4/13	Row 3/14	Row 2/15	Row 1/16
Power	1	A	A	A	A	A	A	A	A
Row 1/16	2	-	-	-	-	-	-	-	B
Row 2/15	3	-	-	-	-	-	B	-	-
Row 3/14	4	-	-	-	-	B	-	-	-
Row 4/13	5	-	-	-	B	-	-	-	-
Row 5/12	6	-	-	-	B	-	-	-	-
Row 6/11	7	-	-	B	-	-	-	-	-
Row 7/10	8	-	B	-	-	-	-	-	-
Row 8/9	9	B	-	-	-	-	-	-	-

ISOBUS IMPLEMENT CABLE



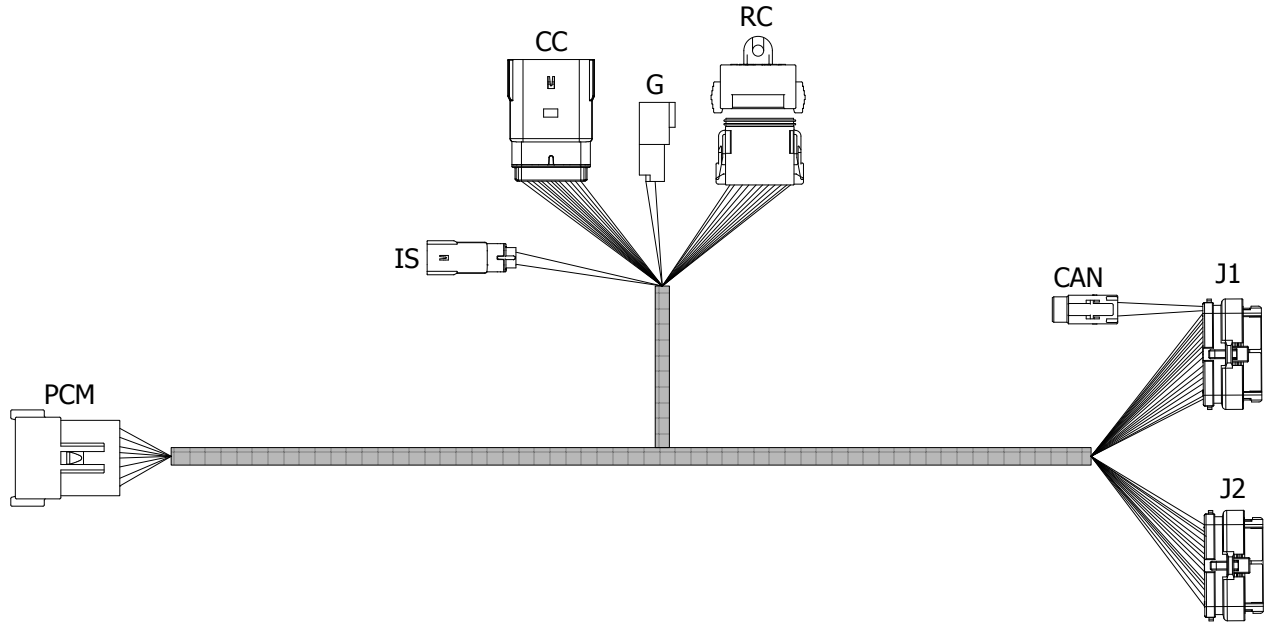
Signal	ISO	Wire/Color	PMM	TBC	PCM	CAN	Mux A	Mux B
TBC Power	6	Twisted Quad Red	-	B	-	-	-	-
TBC Ground	7	Twisted Quad Black	-	D	-	-	-	-
ISO CAN H	8	Twisted Quad Yellow	31	E	-	-	-	-
ISO CAN L	9	Twisted Quad Green	32	F	-	-	-	-
ECU Power	4	Red	4, 5, 8	-	11	-	-	-
ECU Ground	2	Black	14, 15	-	12	-	-	-
LOAD Power	3	Red	-	-	1, 2, 3, 4	-	-	-
LOAD Ground	1	Black	-	-	5, 6, 7, 8	-	-	-
MUX A Power	-	Jacketed 3-Cond White	12	-	-	-	A	-
MUX A Ground	-	Jacketed 3-Cond Black	3	-	-	-	B	-
MUX A Signal	-	Jacketed 3-Cond Green	28	-	-	-	C	-
PROP CAN H	-	Twisted Pair Yellow	34	-	-	1	-	-
PROP CAN L	-	Twisted Pair Green	35	-	-	2	-	-
MUX B Power	-	Jacketed 3-Cond White	23	-	-	-	-	A
MUX B Ground	-	Jacketed 3-Cond Black	26	-	-	-	-	B
MUX B Signal	-	Jacketed 3-Cond Green	7	-	-	-	-	C

SECTION ADAPTER CABLE



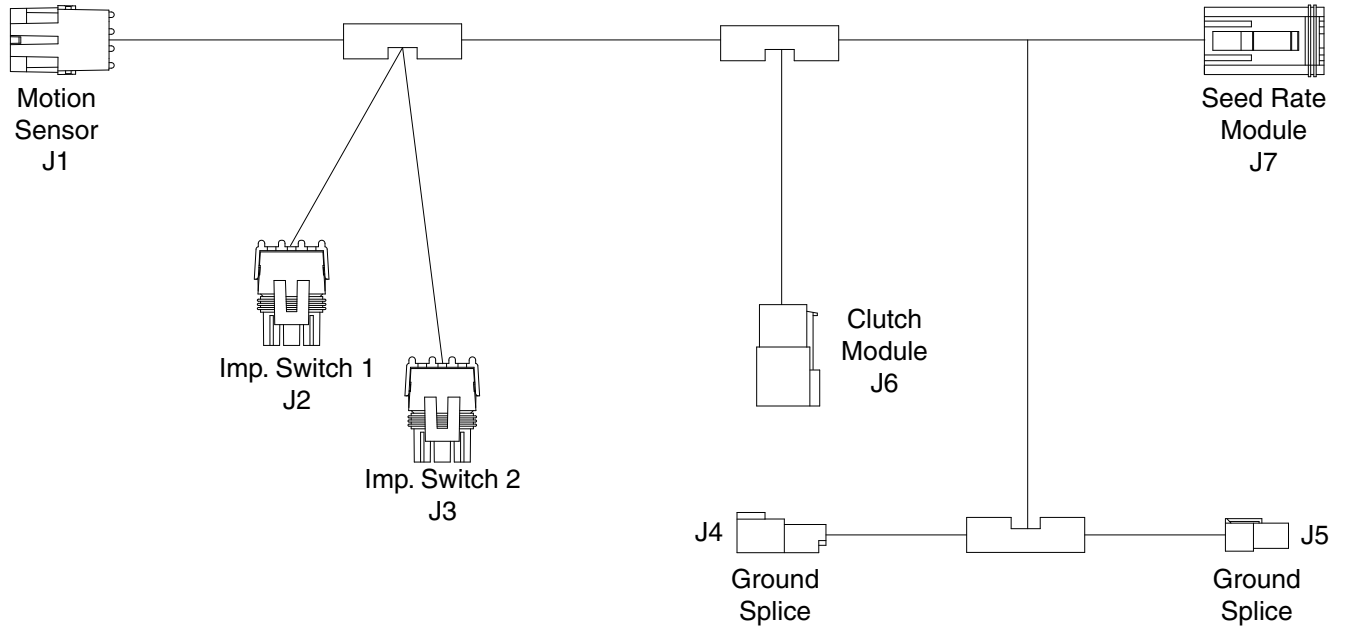
Signal	Color	AMP 1 (Left)	AMP 2 (Right)	Molex	D1	D2
High Current Power	Red	1 (16 Gauge)	1 (16 Gauge)	-	1 (12 Gauge)	1 (12 Gauge)
Ground	Black	-	-	-	2	2
Row 1, 2	Black	2, 3	-	1	-	-
Row 3, 4	Brown	4, 5	-	2	-	-
Row 5, 6	Orange	6, 7	-	3	-	-
Row 7, 8	Pink	-	6, 7	4	-	-
Row 9, 10	Green	-	4, 5	5	-	-
Row 11, 12	Yellow	-	2, 3	6	-	-

PRODUCT CONTROL MODULE CABLE



Signal	PCM	Wire/Color	J1	J2	CAN	RC	CC	IS	G
Load Power	1	Red	2	-	-	-	-	-	-
Load Power	2	Red	3	-	-	1	-	-	-
Load Power	3	Red	4	-	-	-	-	-	-
Load Power	4	Red	5	-	-	-	-	1	-
Load Ground	5	Black	-	-	-	-	-	-	1, 2
Load Ground	6	Black	14, 15	-	-	-	-	-	-
Load Ground	7	Black	16	-	-	2	-	-	-
Load Ground	8	Black	17	-	-	-	-	-	-
ECU Power	11	White/Red	11	-	-	-	-	-	-
CAN H	-	Twisted Pair Yellow	34	-	1	-	-	-	-
CAN L	-	Twisted Pair Green	33	-	2	-	-	-	-
Switch In	-	Red/Green	10	-	-	-	-	2	-
Section 1	-	White	24	-	-	-	1	-	-
Section 2	-	Green	25	-	-	-	2	-	-
Section 3	-	Orange	26	-	-	-	3	-	-
Section 4	-	Blue	27	-	-	-	4	-	-
Section 5	-	Brown	-	11	-	-	5	-	-
Section 6	-	Yellow	-	10	-	-	6	-	-
Section 7	-	Violet	-	9	-	-	7	-	-
Section 8	-	Gray	-	8	-	-	8	-	-
Section 9	-	Pink	-	7	-	-	9	-	-
Section 10	-	Tan	-	6	-	-	10	-	-
Section 11	-	Red/Green	-	5	-	-	11	-	-
Section 12	-	Black/Red	-	4	-	-	12	-	-
PWM 1 Power	-	Red/White	-	23	-	3	-	-	-
PWM 1 Ground	-	Black/White	35	-	-	4	-	-	-
PWM 2 Power	-	Red/Yellow	-	12	-	5	-	-	-
PWM 2 Ground	-	Black/Yellow	12	-	-	6	-	-	-
PWM 3 Power	-	Red/Blue	1	-	-	7	-	-	-
PWM 3 Ground	-	Black/Blue	-	24	-	8	-	-	-
Meter Speed 1	-	Green	30	-	-	9	-	-	-
Meter Speed 2	-	Green/White	29	-	-	10	-	-	-
Meter Speed 3	-	Green/Red	-	33	-	11	-	-	-

IMPLEMENT SWITCH EXTENSION CABLE



Signal	Imp. Switch 1 WP Tower 1	Imp. Switch 2 WP Tower 2	Motion Sensor WP Shroud	Color	Clutch Module Molex Recept	Seed Rate Module Deutsch Plug	Ground Splice 1	Ground Splice 2	Gauge
12V+ Power	A	A	-	Brown	1	12	-	-	16
Switch Signal	B	B	-	Green	2	10	-	-	16
Motion Signal	-	-	C	White	-	11	-	-	16
Ground	-	-	B	Black	-	6	-	-	16
12V+ Power	-	-	A	Red	-	1	-	-	16
Ground	C (Blue 16 AWG)	C (Blue 16 AWG)	-	Black	-	-	2	2	12
12V+ Power	-	-	-	Red	-	-	1	1	12

CLOSING WHEEL TROUBLESHOOTING

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".

LIFT CIRCUIT OPERATION TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	TROUBLESHOOTING*	SOLUTION
Planter raising uneven.	Master cylinder is leaking.	With turnbuckle off, raise planter slowly until master cylinder reaches end of stroke. If master cylinder is leaking it will lag behind the slave cylinder, causing the tire to squat less. If planter settles when hydraulic lever is released, check assist cylinders.	Check for contamination in rephasing valve in piston. Prior to removing rephasing valve, measure the set screw setting by turning the set screw clockwise and counting the revolutions until it bottoms out. After cleaning rephasing valve, bottom the screw out and back it out the same number of revolutions as the original setting. Replace rephasing valve and adjust as stated above or replace piston. Install seal kit. Consult your Kinze Dealer for leak testing and rephasing valve adjustment if necessary.
	Slave cylinder is leaking.	With turnbuckle off, raise and lower planter. As planter lowers, the side with leaking slave cylinder will drop rapidly. With turnbuckle on, install wheel lockups on master and assist cylinders. Retract slave cylinder and observe which tire settles. If planter settles when hydraulic lever is released, check assist cylinders.	Check for contamination in rephasing valve in piston. Prior to removing rephasing valve, measure the set screw setting by turning the set screw clockwise and counting the revolutions until it bottoms out. After cleaning rephasing valve, bottom the screw out and back it out the same number of revolutions as the original setting. Replace rephasing valve and adjust as stated above or replace piston. Install seal kit. Consult your Kinze Dealer for leak testing and rephasing valve adjustment if necessary.
Planter raising even; however, planter settles when hydraulic lever is released.	Assist cylinder is leaking.	With turnbuckle on, install lockups on the master cylinder and slave cylinders. Retract assist cylinder and observe which tire settles.	Seal on piston is leaking. Install seal kit.
*Operate hydraulics slowly to accentuate the problem. Rephase after each lowering cycle.			

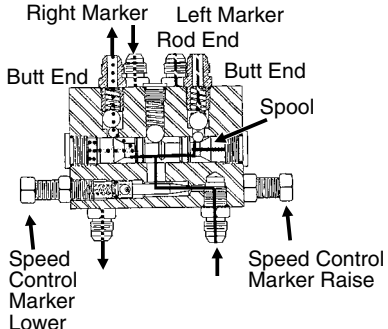
PISTON PUMP TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Pump hard or impossible to prime.	Valves fouled or in wrong place.	Inspect and clean valves.
	Air leak in suction line.	Repair leak.
	Pump set too low.	Adjust pump setting.
	Packing washers worn out.	Replace.
Low metering.	Valves fouled or in wrong place.	Inspect and clean valves.
	Air leak in suction line.	Repair leak.
	Pump set too low.	Adjust pump setting.
	Broken valve spring.	Replace spring.
Over metering.	Broken discharge valve spring.	Replace spring.
	Trash under valves.	Inspect and clean valves.
	Improper rate setting.	Adjust pump setting.
Leaks through when stopped.	Broken discharge valve spring.	Replace spring.
	Trash under valves.	Inspect and clean valves.
Fertilizer solution leaking under stuffing box.	Packing washers worn out.	Replace.
Pump using excessive oil.	Oil seals or o-ring worn and leaking.	Replace.
Pump operates noisily.	Crankcase components worn excessively.	Inspect and replace if necessary.

POINT ROW CLUTCH TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Neither clutch will disengage.	Circuit breaker tripped.	Press red button on control box.
	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 side of planter will not re-engage.	Shear pin in seed drive transmission sheared.	Replace with one of equal size and grade.
One clutch will not engage.	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 as shown in "Point Row Wrap Spring Clutch Inspection".
	Wrap spring broken or stretched.	Disassemble clutch and replace spring.
	Foreign substance such as oil or grease on the input or output hubs.	Disassemble clutch. Clean hubs and spring and reassemble.
	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 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 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 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 TROUBLESHOOTING

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

SEED METER (BRUSH-TYPE) TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Low count.	Meter RPM too high.	Reduce planting speed.
	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.	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.	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.

SEED METER (FINGER PICKUP) TROUBLESHOOTING

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.
Drive release does not engage properly.	Drive release shaft is not aligned properly with meter drive shaft.	Align drive mechanism.
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.	Perform 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.

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.
	Faulty vacuum gauge.	Check gauge line for dirt/obstruction. Repair/replace vacuum gauge.
Poor seed spacing.	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.

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