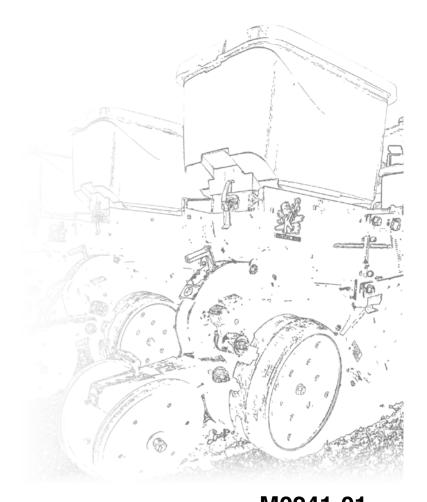
OPERATOR'S MANUAL



M0241-01
MODEL 3200 WING FOLD PLANTER
Rev. 7/14

MODEL 3200 WING FOLD PLANTER

OPERATOR'S MANUAL

M0241-01

Rev. 7/14

This manual is applicable to: Model: 3200 Wing Fold Planters

Serial Number: 680671 to 2014 Production (EdgeVac)

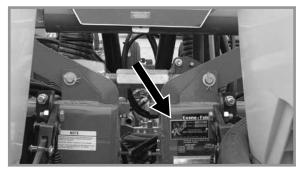
680370 to 2014 Production (Mechanical)

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

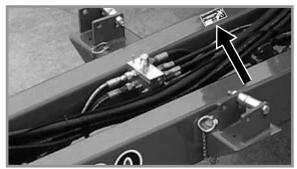
Model Number3200	
Serial Number	
Date Purchased	
Monitor Serial Number	
Measured Pulses Per Mile/Km (Radar Distance Sensor)	
Measured Pulses Per Mile/ Km (Magnetic Distance Sensor)	

SERIAL NUMBER

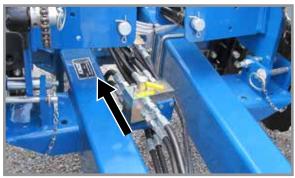
The serial number plate is located on the planter frame as shown below. The serial number provides important information about your planter and is needed to obtain correct replacement parts. Always provide model number and serial number to your Kinze Dealer when ordering parts or when contacting Kinze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



Prior to 2009 production



2009 production and later



2013 production and later

WARRANTY

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 EdgeVac 12 row 30" with liquid fertilizer option (shown folded)

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 found satisfactory or after proper adjustment is made	owing checklist and inspect the planter. Check off each item as it e.				
Row units properly spaced and optional attachments correctly assembled.					
☐ All grease fittings in place and lubricated.	All grease fittings in place and lubricated.				
☐ All working parts are moving freely. Bolts are tight	All working parts are moving freely. Bolts are tight and cotter pins are spread.				
☐ All drive chains properly tensioned and aligned.	All drive chains properly tensioned and aligned.				
☐ Check for oil leaks and proper hydraulic operation.	Check for oil leaks and proper hydraulic operation.				
☐ Hydraulic hoses are routed correctly to prevent date	Hydraulic hoses are routed correctly to prevent damage to hoses.				
☐ Inflate tires to specified air pressure. Tighten whee	Inflate tires to specified air pressure. Tighten wheel lug bolts to specified torque.				
☐ All safety decals correctly located and legible as sh	nown in Parts Manual. Replace if damaged.				
☐ All reflective decals and SMV sign located as shown	n in Parts Manual and visible when planter is in transport position.				
☐ Safety/warning lights correctly installed and working	g properly.				
☐ Paint all parts scratched in shipment or assembly.	Paint all parts scratched in shipment or assembly.				
☐ All safety lockup devices are on planter and correct	All safety lockup devices are on planter and correctly located.				
EdgeVac 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 hard	dware is torqued to specification.				
Planter has been thoroughly checked and to the be	est 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				
IP/Postal CodeDealer No					



DELIVERY CHECKLIST

	e the following checklist at time planter is delivered as a reminder of very important information which should be aveyed 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.
То	the best of my knowledge this machine has been delivered ready for field use and customer has been fully
To int	ormed as to proper care and operation.
To inf (Si	gnature Of Delivery Person/Dealer Name/Date)
To int (Si	ormed as to proper care and operation.
To int (Si	gnature Of Delivery Person/Dealer Name/Date) TER DELIVERY CHECKLIST
To int	gnature Of Delivery Person/Dealer Name/Date) TER DELIVERY CHECKLIST e following is a list of items we suggest to check during the first season of use of the equipment.
To inf	gnature Of Delivery Person/Dealer Name/Date) FTER DELIVERY CHECKLIST e 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.
To inf	gnature Of Delivery Person/Dealer Name/Date) FTER DELIVERY CHECKLIST e 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 EdgeVac or mechanical seed metering system with retail customer/end user.
To int	gnature Of Delivery Person/Dealer Name/Date) FTER DELIVERY CHECKLIST In 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 EdgeVac 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.
To int (Si AF	gnature Of Delivery Person/Dealer Name/Date) TER DELIVERY CHECKLIST e 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 EdgeVac 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

All registrations must be submitted online at "<u>business.kinze.com</u>" within 5 business days of delivery.

Retain a copy of this form for auditing purposes.

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

Tear Along Perforation



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

This manual has been prepared to aid you in 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:



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



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



CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE is used to address 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 OPERATE OR WORK ON machine without all safety covers, shields, and lockup devices in place as required.

NOTE: Photos in this manual may be 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.

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.

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.

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)	
Weight Empty (EdgeVac)*	6,958 lbs (3,156 kg)	8,066 lbs (3,659 kg)	
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. (EdgeVac/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.		

*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. EdgeVac includes additional weight of fan, manifolds, and hoses.

TRACTOR HYDRAULIC REQUIREMENTS				
Configuration Requirements Description				
Base machine with mechanical meters.	2 SCV	15 gpm	#1 SCV: Planter lift	
Manual fold.	2 300	15 gpiii	#2 SCV: Markers	
Base machine with mechanical meters.	0.007	15 gpm	#1 SCV: Planter lift	
Hydraulic fold.	2 SCV		#2 SCV: Markers/fold (manual selector valve)	
Base machine with EdgeVac meters.*		30 gpm	#1 SCV: Planter lift	
Manual fold.	3 SCV		#2 SCV: Markers	
			#3 SCV: EdgeVac fan	
Base machine with EdgeVac meters*		30 gpm	#1 SCV: Planter lift	
Hydraulic fold.	3 SCV		#2 SCV: Markers/fold (manual selector valve)	
			#3 SCV: EdgeVac fan	
*Seed meter/vacuum system - 13 GPM @ 2000- zero psi case drain plus one SCV (pressure and return) for				

^{*}Seed meter/vacuum system - 13 GPM @ 2000- zero psi 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.
- 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.

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!

Contacting or coming close to power lines or other high energy sources will cause death or serious injury. Keep away from power lines or high energy sources at all times.



WARNING

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

Falling equipment can cause death or serious injury. Install all lockup devices or lower planter to ground before working on equipment.



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.

SAFETY SIGNS AND DECALS



WARNING

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

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 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 EdgeVac 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

M0241-01

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



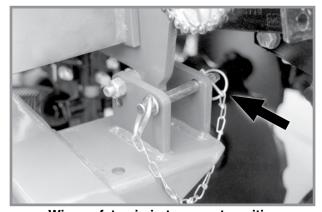
Lift cylinder lockup in transport position



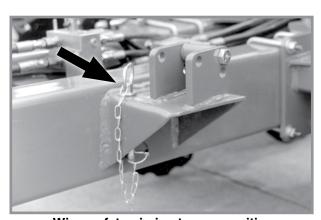
Lift cylinder lockup in storage position

WING SAFETY PINS

Secure wings with safety pins before transporting planter.

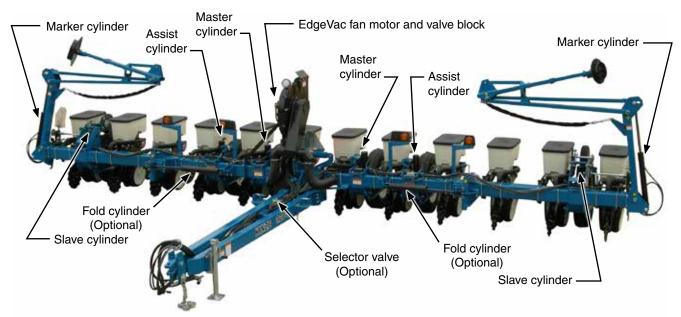


Wing safety pin in transport position



Wing safety pin in storage position

HYDRAULIC OPERATION



3200 Hydraulic component locations



Uncontrolled machine movement 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 this 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



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.

EDGEVAC 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 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 of motor return side 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.



EdgeVac 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.



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.

INITIAL PREPARATION



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 %6"- 18 lug bolts to 90 ft-lb (122 N-m) before operating planter for the first time and periodically after.



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

- 1. Torque transport wheel %6"- 18 lug bolts to 90 ft-lb (122 N-m).
- 2. Inflate transport/ground drive tires to 40 psi (275.7 kPa).
- Inflate contact drive tires to 50 psi (344.7 kPa).



TRACTOR REQUIREMENTS

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

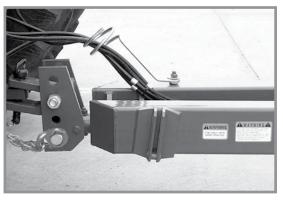
A 12 volt DC electrical system is required to operate planter safety/warning lights, digital vacuum gauge, and optional pneumatic down pressure system or work lights.

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

Hydraulic maximum flow rate of 13 GPM @ 2000 PSI is required to operate EdgeVac vacuum fan motor.

TRACTOR PREPARATION AND HOOKUP

- 1. Adjust tractor drawbar 13 to 17 inches 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 ¾" diameter hitch pin. Secure with a locking or cotter pin.



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).



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

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

3/8" hose from motor - Case Drain (CD - Orange or CD - Green)

3/4" hose from motor - Return

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.

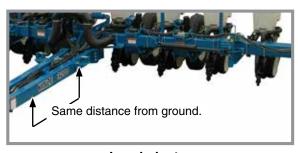
NOTE: A 12 volt battery connection is required to power the vacuum fan digital gauge. Connect "red" wire to positive (+) battery terminal and "black" wire to negative (-) battery terminal.



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" 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.

MANUAL WING FOLD TRANSPORT TO FIELD OPERATION

A 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

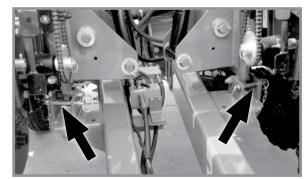
- With center lift cylinders retracted and lockups in place, remove wing lock pins and fold wings out.
- Swing wing locking eyebolts into place.
- Extend lift cylinders.
- Remove center section lift cylinder lockups.
- Lower planter.
- Tighten wing locking eyebolts.
- Release turnbuckle at center of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

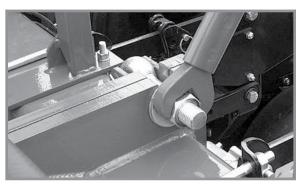
1. With planter raised and cylinder lockups in place, remove wing lock pins at marker support and hitch. Fold wings out to operating position.

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.)
- 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 11/4" 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



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.
- 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 1¼" 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.

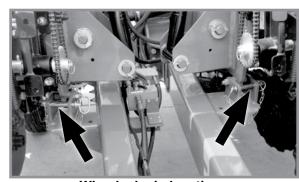


Wing lock eyebolt



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



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

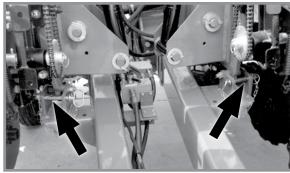
- With center lift cylinders retracted and lockups in place, remove wing lock pins.
- Move selector valve to "FOLD".
- Hydraulically fold wings out.
- Swing wing locking eyebolts into place.
- Extend lift cylinders.
- Remove center section lift cylinder lockups.
- Lower planter.
- Tighten wing locking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

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

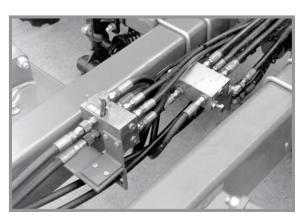
NOTE: If wing lift tires are not raised, with cylinder lockups in place on four center section lift cylinders, move tractor hydraulic control to lowering position until cylinders are fully retracted and wing tires are fully raised.



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.

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



Selector valve

- 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 11/4" 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



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.

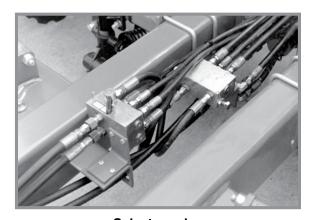


Center turnbuckle installation

- 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 11/4" 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.
- Place tractor hydraulic control in lowering position and hold until wing cylinders are fully retracted and wing tires are fully raised.

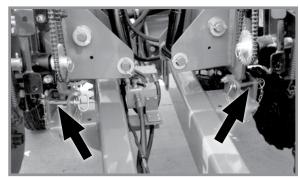


Wing lock eyebolt



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



DANGER!

Contacting or coming close to power lines or other high energy sources will cause death or serious injury. Keep away from power lines or high energy sources at all times.



Row marker can lower at any time and could cause death or serious injury. Stay away from row markers at all times.

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.

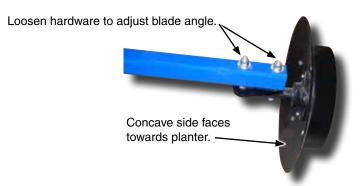
- 1. Loosen jam nut and turn control clockwise (IN) to slow speed or counterclockwise (OUT) to increase speed.
- 2. Tighten jam nut after adjustments are made.

ROW MARKER ADJUSTMENT

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

Row M	arker 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.
- 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



DANGER!

Contacting or coming close to power lines or other high energy sources will cause death or serious injury. Keep away from power lines or high energy sources at all times.

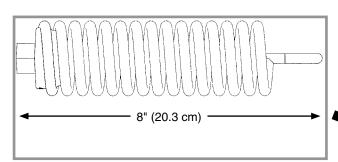


WARNING

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

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

CONTACT 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.

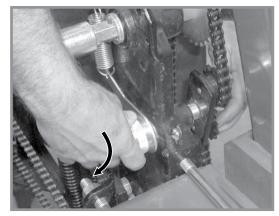
Basic setting for spring tension is approximately 200 lb (90.72 kg) of down force at tire contact point.

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

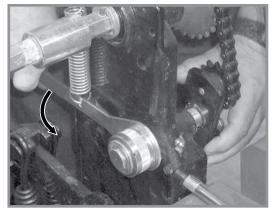
WRAP SPRING WRENCH

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.





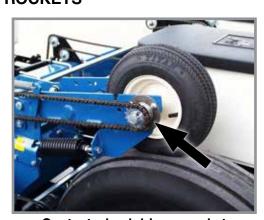


Increase chain tension

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.

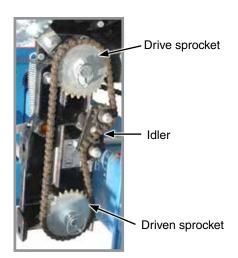
NOTE: Make a field check after each sprocket combination adjustment to be sure you are planting at desired rate.

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.

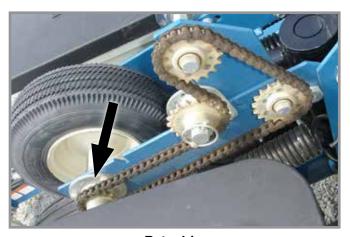
Planting rate charts in Rate Chart section will aid you in selecting correct sprocket combinations.



Model 3200

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.

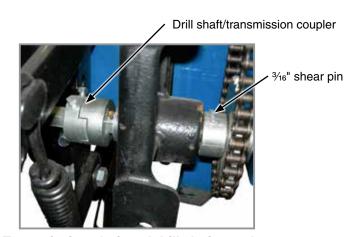
Replacing standard 17 tooth drive sprocket located on inner side of top transmission shaft, with 34 tooth half rate (2 to 1) drive reduction sprocket reduces planter transmission speed and planting and application rates by approximately 50%.

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.

- 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.
- 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.

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.



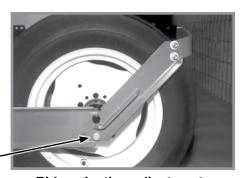
Tire scraper

RIDGE PLANTING

Planter toolbar height can be raised 3" 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

Model 3200

DIGITAL VACUUM GAUGE OPERATION



Digital vacuum gauge

The digital vacuum gauge console controls EdgeVac 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" (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" and 20" of vacuum.

ANALOG VACUUM GAUGE

The analog vacuum gauge connects directly to the manifold or is teed into the digital sending unit on newer models.

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



Analog vacuum 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

PLANTER MONITOR MODULE (PMM)

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)

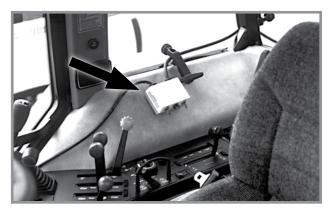
KINZE ISOBUS OPTION

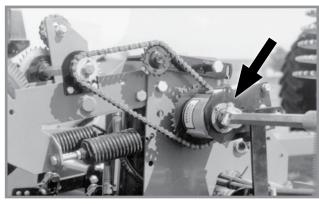
Kinze ISOBUS option consists of a virtual terminal (VT), task controller (TC), planter monitor module (PMM), and planter control module (PCM). Kinze planters will communicate directly with most ISO compatible monitors.

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

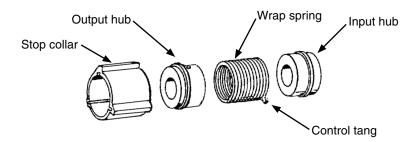
Point row clutch

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.



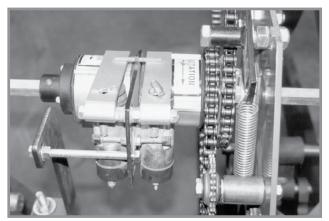
Clutch consists of a wrap spring riding on an input and output hub. Wrap spring is wrapped tightly over hubs during operation locking them together. Higher speeds create a tighter grip of spring on hubs.

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.

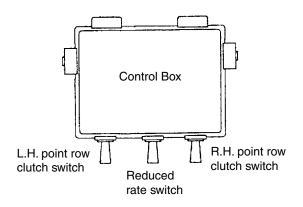
Stop collar is controlled by an electric solenoid and an actuator arm. When selector switch on tractor control box is OFF, solenoid coil is NOT ENERGIZED and actuator arm will not contact stop on stop collar, allowing it to rotate with hubs and drive planter.

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





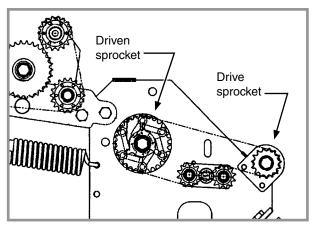


Top View Of Control Box

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.

NOTICEPoint 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.

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

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".

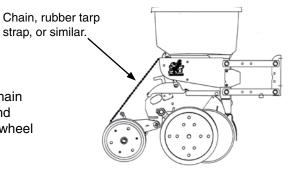
	Check planter for front to rear and lateral level operation. See "Level Planter".
	Check all row units to be certain they are running level. Row unit parallel arms should be approximately parallel to the ground when planting.
	Check row markers for proper operation and adjustment. See "Row Marker Adjustment" 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".
Re	inspect machine after field testing.
	Hoses And Fittings
	Bolts And Nuts

CHECK SEED POPULATION

Cotter Pins And Spring Pins

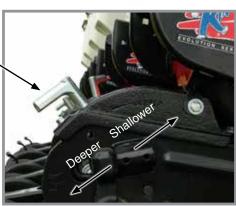
Drive Chain Alignment

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.



Planting depth adjustment handle

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



Planting depth adjustment

3. Measure ½000 of an acre. See chart for correct distance for row width being planted. For example, if planting 30" rows ½1000 of an acre would be 17' 5".

1/1000 Acre Seed Population Count Row Width/Distance			
Row Width	30"	36"	38"
Distance	17'5"	14'6"	13'10"

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

- Count seeds in measured distance.
- 5. Multiply number of seeds placed in 1/1000 of an acre by 1000. This gives total population.

EXAMPLE: 30" row spacing 17' 5" equals 1/1000 acre.

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

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

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

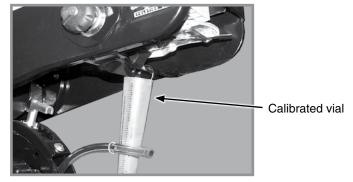
GRANULAR CHEMICAL APPLICATION FIELD CHECK

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



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

Perform a field check to determine application rates.



Granular chemical field check

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

NOTE: Disengage clutch to avoid dropping seed during test.

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

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

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



PLANTING DEPTH

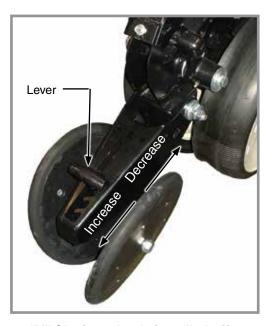
Planting depth is maintained by adjustable row unit gauge wheels. Depth adjustment range is approximately $\frac{1}{2}$ " to $3\frac{1}{2}$ ".

- 1. 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.

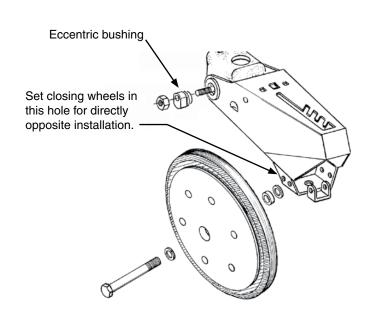


Planting depth adjustment

"V" CLOSING WHEEL ADJUSTMENT (RUBBER OR CAST IRON)







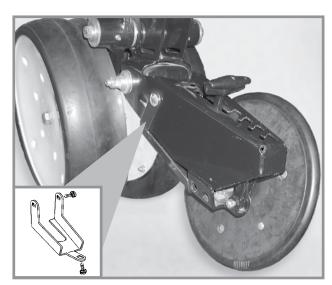
"V" closing wheels should have enough down pressure to close the seed trench and ensure good soil to seed contact. Move 5-position quick adjustable down force lever on the top of closing wheel arm to the rear to increase closing wheel spring pressure. Move lever forward to decrease pressure. Adjust all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

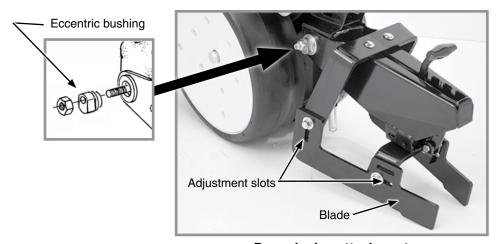
CLOSING WHEEL SHIELD (RUBBER OR CAST IRON "V" CLOSING WHEELS)

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

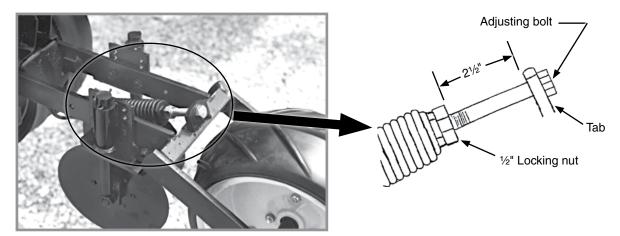
Drag closing attachment pulls loose soil over the seed trench.

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 ¾" wrench to loosen hardware attaching closing wheel arm to wheel arm stop. Use another ¾" wrench to turn eccentric bushings until drag closing attachment is aligned with seed trench. Tighten hardware.

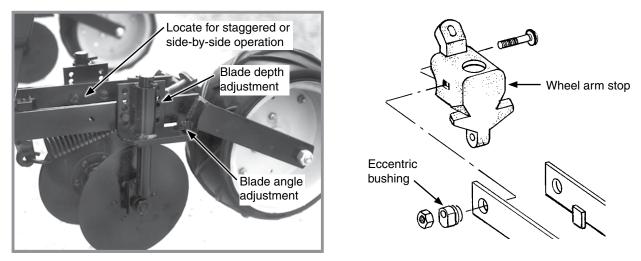
COVERING DISCS/SINGLE PRESS WHEEL ADJUSTMENT



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 21/2" between mounting arm tab and locking nut.

- 1. Loosen ½" 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 1/2" 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.

EdgeVac 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".

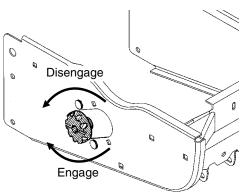


Mechanical seed hopper

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.

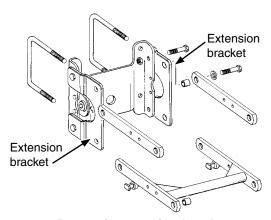
Turn knob 1/4 turn counterclockwise to disengage or 1/4 turn clockwise to engage.



Seed meter drive release

ROW UNIT EXTENSION BRACKETS

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

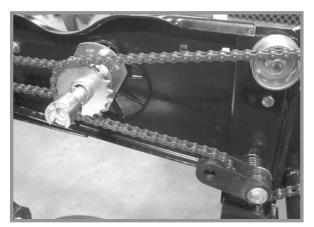


Row unit extension brackets

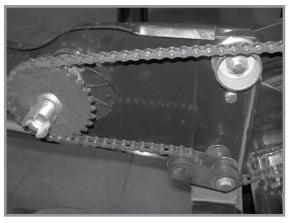
ROW UNIT CHAIN ROUTING

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

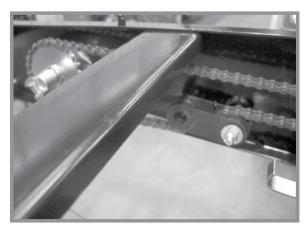
Inspect and replace weak, worn or broken springs, idlers, and idler bushings.



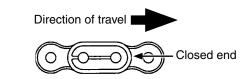
Mechanical pull row unit meter drive



EdgeVac pull row unit meter drive



Row unit granular chemical drive



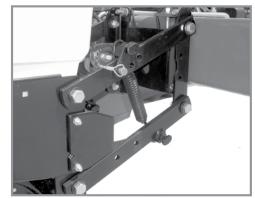
NOTE: Install connector link with closed end facing direction of travel.



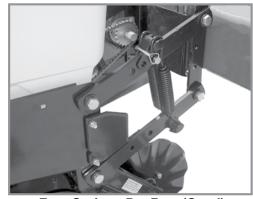
NOTE: Reverse idler when worn on one side for extended use.

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

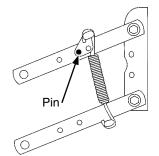
Standard and heavy duty quick adjustable down force springs are available in increase penetration in hard soil and keep row unit from bouncing in rough field conditions. Two springs per row, one on each side parallel arms, are used unless equipped with row unit mounted no till coulters. Row unit mounted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



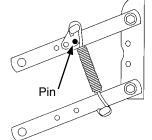
Two Springs Per Row (Dual)



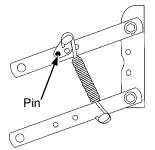
Four Springs Per Row (Quad)



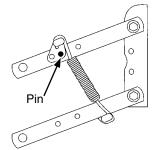
Position 1 (Least)



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 Spi	rings	4 Sp	rings						
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	*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.
- 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.



BRUSH-TYPE SEED METER

	Crop	Disc Color-Code (Disc Part No.)	Upper Brush Retainer	Cells	Seed Size Range	*Lubricant
5	Soybean	Black (GA5794)	GD11122	60	2200 to 4000 seeds/lb.	Graphite Talc
	Specialty Soybean	Dark Blue (GA6184)	GD11122	48	1400 to 2200 seeds/lb.	Graphite Talc
RA	Small Milo/Grain Sorghum	Red (GA5982)	GD8237	30	14,000 to 20,000 seeds/lb.	Talc
RR	Large Milo Grain Sorghum	Light Blue (GA6187)	GD8237	30	10,000 to 16,000 seeds/lb.	Talc
R RAIL RAIL DD	High-Rate Small Milo/Grain Sorghum	Red (GA5795)	GD8237	60	12,000 to 18,000 seeds/lb.	Talc
ALLIA	High-Rate Large Milo/Grain Sorghum	Yellow (GA6633)	GD8237	60	10,000 to 14,000 seeds/lb.	Talc
易	Cotton, Acid-Delinted	White (GA5796)	GD11122	30	4200 to 5200 seeds/lb.	Talc
台	Large Cotton, Acid Delinted	Tan (GA6168)	GD11122	36	3800 to 4400 seeds/lb.	Talc
昌	High-Rate Cotton, Acid-Delinted	Light Green (GA6478)	GD11122	48	4200 to 5200 seeds/lb.	Talc
P	Hill-Drop Cotton, Acid-Delinted	Brown (GA6182)	GD11122	12 (3 to 6 seeds/ cell)	4000 to 5200 seeds/lb.	Talc
P	Small Hill-Drop Cotton, Acid- Delinted	Dark Green (GA7255)	GD11122	12 (3 to 6 seeds/ cell)	5000 to 6200 seeds/lb.	Talc

*For More information on application rate see Additives section.



Use GD11122 upper brush retainer when using cotton and soybean discs.



Use GD8237 upper brush retainer 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

NOTICE

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

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

FINGER PICKUP SEED METER



Crop	Fingers	*Lubricant
Corn	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.: GR1897 - 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.

EDGEVAC SEED METERS

	Crop	Disc Color-Code (Disc Part No.)	Cells	Seed Size Range	Singulator Brush Setting	Vacuum Setting (H2O)	*Lubricant	See Notes
B	Corn	Light Blue		35-70 lbs./80k	5-7	18-20	Graphite Talc	4, 5
	Popcorn	(GD17049)	39	2210-4200 seeds/lb.	9	18	Graphite Talc	1, 4, 5
	Low-Rate Corn	Light Green	24	35-70 lbs./80k	5-7	18-20	Graphite Talc	4, 5
	Low-Rate Popcorn	(GD17048)	24	2210-4200 seeds/lb.	9	18	Graphite Talc	1, 4, 5
	Soybean	Black (GD14467)	60	2200-4000 seeds/lb.	5	10	Graphite Talc	1
	Soybean, High-Rate	Dark Blue (GD14468)	120	2200-4000 seeds/lb.	5	10	Graphite Talc	-
7. 8. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6.	Milo/Grain Sorghum	Yellow (GD17050)	60	10,000 - 20,000 seeds/lb.	3-6	20	Talc	1, 2
- 1900 John Jan	Hill-Drop Cotton, Acid-Delinted	Brown (GD17187)	20 (3 seeds/ cell)	3800-4400 seeds/lb.	8	23	Talc	3
8888888888	Small Hill-Drop Cotton, Acid- Delinted	Grey (GD18095)	20 (3 seeds/ cell)	4200-4400 seeds/lb.	-	-	Talc	3
	Cotton, Acid- Delinted	Dark Green	54	3800-5200 seeds/lb.	8	20	Talc	3
9 9 8	Dry Edible Bean, Small	(GD17186)	54	1200-2500 seeds/lb.	6	18	Graphite Talc	3, 5
	Dry Edible Bean, Large	Tan (GD14477)	54	800-1200 seeds/lb.	5	18	Graphite Talc	5
000000	Small Cotton/ Sunflower	White (GD18098)	54	4200-5200 seeds/lb.	5	30	Talc	3
	Sugar Beets	Dark Orange (GD24805)	80	All	5-6	15-18	Graphite	1

*For More information on application rate see Additives section.

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.

NOTES:

- 1. Requires use of seed meter baffle.
- 2. Requires use of cleanout brush.
- 3. Requires use of cleanout brush w/ball-type ejector.
- 4. Flat seeds may require higher vacuum level.
- 5. Larger seeds may require lower singulator brush setting. Smaller seeds may require higher setting.

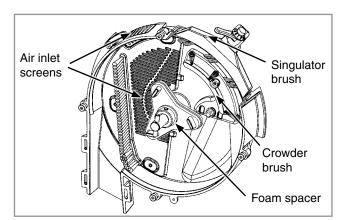
NOTE: See "EdgeVac General Planting Rate Information" and "Check Seed Population" pages for more information. Always field check seed population to ensure planting rates are correct.

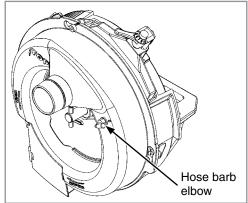
NOTE: Singulator brush settings are marked from 1 thru 11. Lower singulator brush settings are least aggressive. Higher singulator brush settings are most aggressive.

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

NOTE: Use 1 tablespoon powdered graphite with each 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 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.

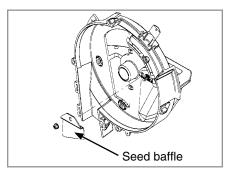
Crowder brush aids in singulation of small flat seeds by crowding seeds to outer perimeter of seed disc and orienting seeds to allow singulator brush to be more effective.

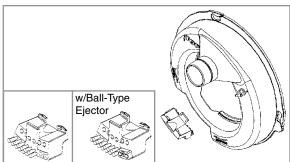
Air inlet screens allow air to enter system and aids in keeping field residue or other foreign material out of meter.

Foam spacer gently preloads seed disc against vacuum cover when no vacuum is present.

3/16" hose barb elbow on seed meter vacuum cover allows measurement of vacuum level at each meter. A customer-supplied vacuum gauge is required.

See "EdgeVac Seed Meter Maintenance" and "Preparation For Storage" 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.

SEED BAFFLE

Seed baffle prevents excessive seed in meter from restricting air flow though seed. Used with 60 Cell Milo/Grain Sorghum Disc, 60 Cell Soybean Disc, 120 Cell High-Rate Soybean Disc and 39 Cell, 24 Cell Popcorn Discs, and 80 Cell Sugar Beet Disc.

CLEANOUT BRUSH

Cleanout brush removes foreign material and seed remnants to help prevent plugging of seed disc orifices. Used with 60 Cell Milo/Grain Sorghum Disc.

CLEANOUT BRUSH W/BALL-TYPE EJECTOR

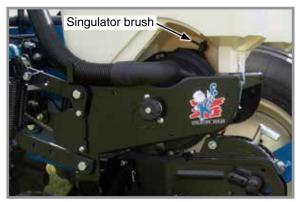
Cleanout brush w/ball-type ejector ejects seed remnants from seed disc orifices. Used with 20 Cell Hill-Drop Cotton, Acid-Delinted (3 Seeds Per Cell) Discs; 54 Cell Acid-Delinted Cotton/Small Dry Edible Bean; and Small Cotton/Sunflower Discs.

NOTICE

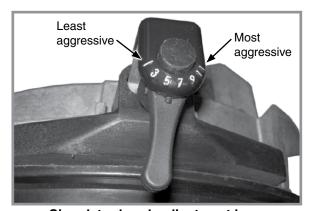
Replace hopper or tank lids after filling to prevent accumulation of dust or dirt in seed meter resulting in premature wear.

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

1. Select seed disc (and seed meter baffle, cleanout brush and/or cleanout brush w/ball-type ejector if applicable) to match crop and population.







Singulator brush adjustment lever

- 2. Adjust singulator brush 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.

5. Perform optional seed disc fill check.





Remove vacuum cover and seed disc

Check seed fill

With vacuum hose connected and vacuum fan operating, remove vacuum cover and seed disc as an assembly. Inspect seed discs for proper seed fill.

See "Seed Metering System (EdgeVac) Troubleshooting" in Troubleshooting section.

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.
- (Mechanical) Disassemble seed disc by removing wing nuts.
 (EdgeVac) Lay hopper on its right side. Rotate seed meter vacuum cover clockwise to align keyhole slots with bolt heads. Lift off cover. Remove seed disc.
- 4. Empty Meter.
- 4. Thoroughly inspect brushes in meter to ensure all seed is removed.
- 5. Replace seed disc. (Mechanical) Install wing nuts. (EdgeVac) Install Vacuum cover.

ADDITIVES

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 not distribute evenly.

Apply graphite around outer perimeter of hopper.

NOTE: Additional graphite or talc 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 or talc.

Talc seed lubricant may be used instead of or in addition to graphite to reduce seed treatment buildup on seed disc and meter components.

- 1. Coat seed disc and brushes with talc before installing meter.
- 2. Fill hopper ½ full of seed, add ¼ cup of talc and mix thoroughly.
- 3. Finish filling hopper, add another 1/4 cup of talc and mix thoroughly.
- 4. 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 as much as one cup of talc per hopper to prevent seed treatment buildup on seed disc and/or brushes.

NOTE: Liquid seed treatments or innoculants 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.

Lubricant Application Rate						
Graphite						
Conventional Hoppers 1 Tbs./Hopper Fill						
Та	alc					
Conventional Hoppers 1/4 C.*						
*Sunflowers increase talc amount from 1/4 C. to 1/2 C.						



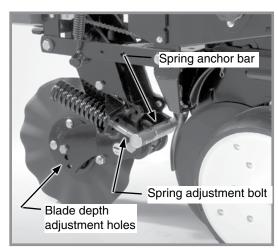
Adding graphite to conventional hopper

FRAME MOUNTED COULTER (PULL ROW ONLY)

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

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

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



Frame mounted coulter adjustment

DOWN PRESSURE ADJUSTMENT

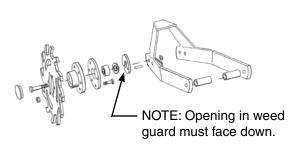
NOTICE

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

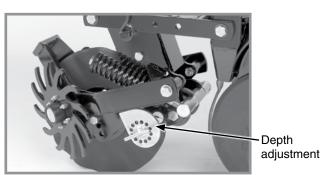
Raise planter. Turn spring adjustment bolts clockwise to increase or counterclockwise to decrease down pressure. Set both springs to specification shown in following table:

Frame Mounted Coulter Spring Downpressure Settings								
End flush with spring anchor bar	Extended ½" 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



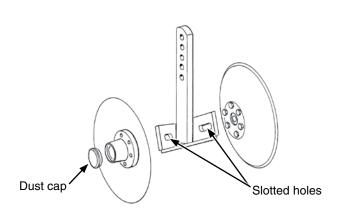
Style A residue wheel shown

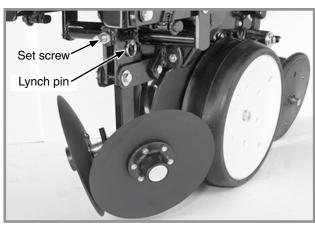
Residue wheels attach to frame mounted coulter with two cap screws and sleeves allowing the unit to free-float. A 2-position spindle bolt mounting positions wheels interlocked or staggered. Depth adjustment is made with a spring-loaded cam and pin with 11 positions in ¼" increments. A high point on the 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 $\frac{1}{3}$ " 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 $\frac{21}{4}$ " 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.

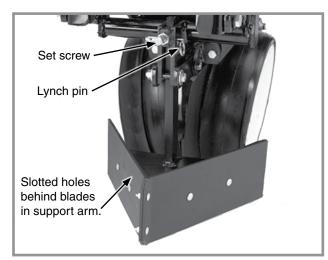
NOTE: Dust cap must be removed to make adjustments.

ROW UNIT MOUNTED BED LEVELER (PULL ROW ONLY)

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

Vertical adjustment can be made in $\frac{1}{3}$ " 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.



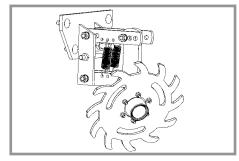
Bed leveler adjustment

ROW UNIT MOUNTED RESIDUE WHEEL

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

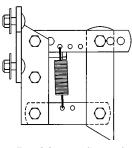


Style A

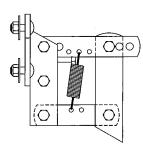


Style B

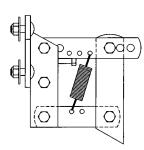
Two adjustable springs on each residue wheel parallel links provide down force adjustment. Position 1 provides minimum down pressure and position 3 maximum down pressure.



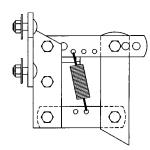
Position 1 (Least)



Position 2

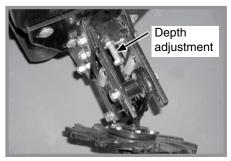


Position 3 (Most)

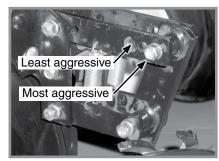


Additional uplift or float

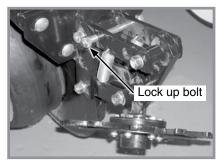
Raise row unit and reposition springs to adjust down pressure.



Wheel depth adjustment



Wheel angle adjustment



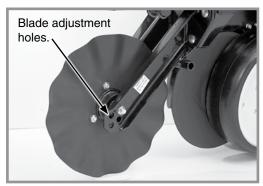
Wheel lock up

A full threaded bolt and jam nut located on the upper link sets maximum depth for loose soil conditions. Initial setting is 13/4" 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 ½" x 5" lockup bolt, raise residue wheel and install bolt.

ROW UNIT MOUNTED NO TILL COULTER



Style A (Two sleeves for installing coulter mounted residue wheels)



Style B (One sleeve for installing coulter mounted residue wheels)

Row unit mounted no till coulters with 1" bubbled, 1" fluted (8 flutes) or 3/4" fluted (13 flutes) blades may be used on pull row units and push row units (3/4" 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".

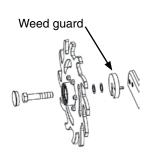
Align coulter blade in relation to row unit double disc openers. Adjust by loosening four attaching bolts, moving coulter arm, and tightening four attaching bolts. Coulter blade can be adjusted to one of four ½" incremental settings in the forked arm. Initial location is the top hole. Move blade as it wears to one of the three lower hole to maintain coulter blade at or slightly above opener discs as needed. Adjust coulter 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 coulter blade and row unit opener blade. Make sure planter is level and coulter is square with planter frame and aligned with row unit disc opener.

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

COULTER MOUNTED RESIDUE WHEELS

Coulter 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 coulter mounted residue wheels.



NOTE: Opening in weed guard must face down.



Style A (Used with Style A row unit mounted no till coulter)



Style B (Used with Style A row unit mounted no till coulter)

Residue wheels attach to row unit mounted coulter 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 ½" 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.

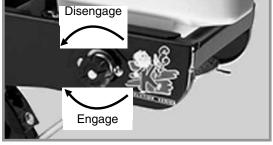


Granular chemical hopper

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

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



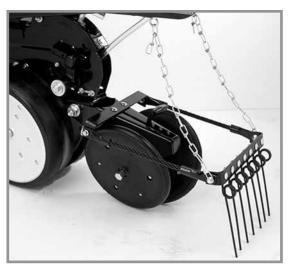
Granular chemical drive release

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 $\frac{1}{8}$ " slack in chain when unit is lowered to planting position.

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

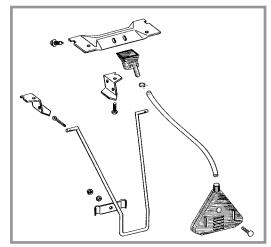


Spring tooth incorporator

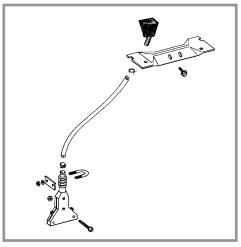
GRANULAR CHEMICAL BANDING OPTIONS

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

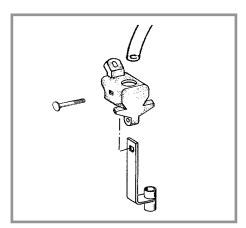
NOTE: Granular chemical rear bander is not compatible with covering discs/single press wheel option.



14" Rear Banding



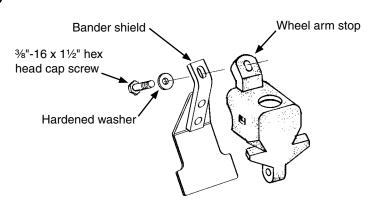
41/2" Slope-Compensating Bander



Straight Drop In-Furrow Placement

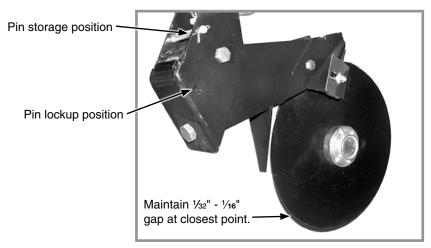
GRANULAR CHEMICAL BANDER SHIELD

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" to either side of row. Fertilizer depth is approximately 4" If planter frame is level and at proper 20" 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 15/16" 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.

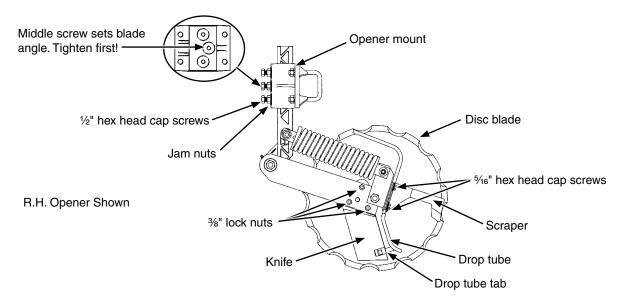
Maintain a gap of 1/32" to 1/16" between opener blades at the closest point. Blade adjustment is made by moving inside spacer washers to outer side of blade. Check bearing assembly rivets are not contacting shank after making adjustment.

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 (STYLE A & B)



Notched single disc opener adjustments



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. <u>Adjust knife to disc blade</u> contact. Loosen or tighten %" 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 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 1/4"-3/8" from disc blade.

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

3. Adjust blade depth. Loosen three ½" 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 $\frac{7}{2}$ " and $\frac{1}{2}$ " x $\frac{6}{2}$ " hardware.

Maximum depth is set by lifting residue wheel and moving adjustment lever down to increase depth or up to decrease depth in 1" 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



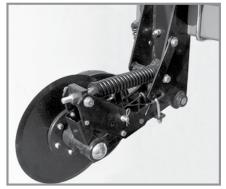
Notched single disc opener depth/gauge wheel

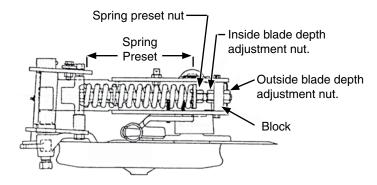
Depth/gauge wheel attachment for notched single disc fertilizer opener is used where additional gauging is required to maintain desired fertilizer opener depth. Depth/gauge wheel is attached to notched single disc fertilizer opener using a mounting block fastened to the pivot arm with 5/8" hardware through 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" 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 31/2" - 4" from row.

NOTICE

Never place fertilizer closer than 2" to row or seeds may be damaged.

Maximum blade depth is approximately 5" with planter frame level and at 20" 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 3½". 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.

NOTE: DO NOT adjust spring preset dimension less than 91/2".

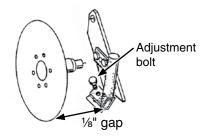
NOTE: Excessive down pressure can cause planter frame up-lift and affect machine performance. Planter frame should be 20" from ground in planting position. Excessive down pressure in loose soil conditions can cause openers to run too deep and push dirt ahead of opener and may stop soil press wheel and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

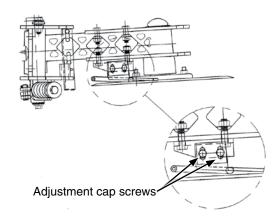
Adjust spring loaded dry fertilizer drop tube/scraper periodically to maintain 1/8" gap between drop tube and opener blade. If this dimension is not maintained fertilizer may not drop in proper location.

Loosen scraper adjustment bolt. Slotted hole in scraper allows up or down adjustment.

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)							
101/4" (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								

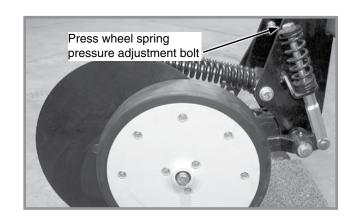


Adjust liquid drop tube/scraper so there is slight contact between blade and scraper lower leading edge, and ½" clearance between liquid drop tube trailing edge and blade. Blade should turn with minimum amount of drag.



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

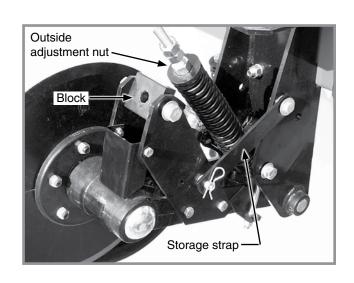
Additional press wheel down pressure may be desirable in heavy moist soils. Turn press wheel spring adjustment bolt clockwise to increase down pressure.



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.
- 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



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.

A CAUTION

Prior to 2012 production. 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.





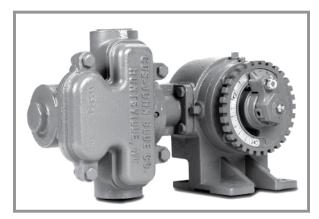
Old style non-reparable check valve

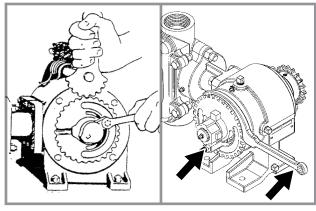
New style reparable check valve

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.

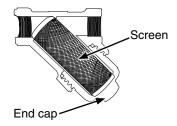
Loosen %" lock nut that secures arm with pointer and rotate scale flange with adjustment wrench until pointer is over desired scale setting. Tighten %" lock nut. DO NOT OVERTIGHTEN.

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 5.5 MPH (8.8 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 ÷ 2 = 40,464 Population (2.6" Seed Spacing x 2 = 5.2" Seed Spacing)

EDGEVAC 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 116 pitch No. 40 chain and 38 tooth sprocket requires 132 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

	1	TIL GEEDO/AG	Transmission Sprockets Recomm. Speed Aver				
30" Rows	36" Rows	38" Rows	Iransmissio	n Sprockets	Recomm. Speed Range (MPH)	Average Seed Spacing In	
			Drive	Driven	' 3' ()	Inches	
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	19,833	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	20,507	19,427	25 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: Cas "Car		Information" and					

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

Transn	smission 60 Cell Average 48 Cell		Average	Speed						
Spro	ckets	Soybean Or High-Rate Milo/		Seed	Opcolarly Coybcarr Or Ingri Hate		High-Rate	Seed Spacing	Range	
		Gı	rain Sorghu	ım	Spacing	Acid-	Acid-Delinted Cotton			(MPH)
Drive	Driven	30" Rows	36" Rows	38" Rows	In Inches	30" Rows	36" Rows	38" Rows	In Inches	
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

Transn	nission		36 Cell			30 Cell			Average	Speed
Spro	ckets	Asid Dal	Acid-Delinted Large Cotton		Seed	Milo/G	Milo/Grain Sorghum Or		Seed	Range
		Acid-Delinied Large Collon			Spacing	Acid-Delinted Cotton			Spacing	(MPH)
Drive	Drive	30" Rows	36" Rows	38" Rows	In In Inches	30" Rows	36" Rows	38" Rows	In Inches	
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.

	nission ckets		BER OF HILLS PER II-Drop Cotton, Acid		Average Hill Spacing In Inches	Speed Range (MPH)
Drive	Drive	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.

PLANTING RATES FOR (EDGEVAC) CORN/POPCORN 39 CELL DISC 15 TOOTH CONTACT WHEEL DRIVE SPROCKET (SEE PAGE 5-1) APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

	APPROXIMATES	 	ARIOUS ROW WIDTHS Transmission Sprockets		Recomm.	Average Seed
			Transmissio		Speed Range	
30" Rows	36" Rows	38" Rows	Drive	Driven	(MPH)	Inches
24,788	20,656	19,569	15	28	4 to 6	8.4
25,706	21,421	20,294	15	27	4 to 6	8.1
26,694	22,245	21,075	15	26	4 to 6	7.8
27,762	23,135	21,918	15	25	4 to 6	7.5
28,093	23,411	22,178	17	28	4 to 6	7.4
28,919	24,099	22,831	15	24	4 to 6	7.2
29,133	24,278	23,000	17	27	4 to 6	7.2
30,176	25,147	23,823	15	23	4 to 6	6.9
30,254	25,211	23,884	17	26	4 to 6	6.9
31,398	26,165	24,788	19	28	4 to 6	6.7
31,464 32,561	26,220 27,134	24,840 25,706	17 19	25 27	4 to 6	6.6 6.4
32,775	27,134	25,706	17	24	4 to 6 4 to 6	6.4
33,813	28,177	26,694	19	26	4 to 6	6.2
34,200	28,500	27,000	17	23	4 to 6	6.1
35,165	29,305	27,762	19	25	4 to 6	5.9
36,529	30,441	28,839	15	19	4 to 6	5.7
36,631	30,526	28,919	19	24	4 to 6	5.7
38,008	31,673	30,006	23	28	4 to 6	5.5
38,223	31,853	30,176	19	23	4 to 6	5.5
39,415	32,846	31,117	23	27	4 to 6	5.3
39,660	33,050	31,311	24	28	4 to 6	5.3
40,827	34,022	32,232	15	17	4 to 6	5.1
41,129	34,274	32,470	24	27	4 to 6	5.1
41,400	34,500	32,684	17	19	4 to 6	5.1
42,569	35,474	33,607	23	25	4 to 6	4.9
42,965	35,804	33,920	26	28	4 to 6	4.9
44,342	36,952	35,007	23	24	4 to 6	4.7
44,419	37,016	35,068	24 27	25	4 to 6	4.7
44,618 46,270	37,181 38,559	35,225 36,529	23	28 23	4 to 6 4 to 6	4.7 4.5
47,984	39,987	37,882	28	27	4 to 6	4.4
48,050	40,042	37,934	27	26	4 to 6	4.4
48,282	40,235	38,117	24	23	4 to 6	4.3
49,830	41,525	39,339	28	26	4 to 6	4.2
49,972	41,643	39,452	27	25	4 to 6	4.2
50,294	41,912	39,706	25	23	4 to 6	4.2
51,714	43,095	40,827	19	17	4 to 6	4.0
52,054	43,378	41,095	27	24	4 to 6	4.0
52,306	43,588	41,294	26	23	4 to 6	4.0
53,982	44,985	42,617	28	24	4 to 6	3.9
54,317	45,264	42,882	27	23	4 to 6	3.8
56,011	46,676	44,220	23	19	4 to 6	3.7
56,329	46,941	44,470	28	23	4 to 6	3.7
58,447	48,706	46,142	24	19	4 to 6	3.6
60,882	50,735	48,065	25 23	19 17	4 to 6	3.4 3.3
62,601 63,317	52,167 52,764	49,422 49,987	26	17	4 to 6 4 to 6	3.3
65,323	54,436	51,571	24	17	4 to 6	3.2
65,753	54,794	51,910	27	19	4 to 6	3.2
68,045	56.704	53,719	25	17	4 to 6	3.1
68,188	56,823	53,832	28	19	4 to 6	3.1
70,766	58,972	55,868	26	17	4 to 6	3.0
70,948	59,123	56,011	23	15	4 to 6	2.9
73,488	61,240	58,017	27	17	4 to 6	2.8

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 (EDGEVAC) CORN/POPCORN 39 CELL DISC 19 TOOTH CONTACT WHEEL DRIVE SPROCKET (SEE PAGE 5-1)

APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS							
	T		Transmission Sprockets		Recomm.	Average Seed	
				·	Speed	Spacing In	
30" Rows	36" Rows	38" Rows	Drive	Driven	Range (MPH)		
31,398	26,165	24,788	15	28	4 to 6	6.7	
32,561	27,134	25,706	15	27	4 to 6	6.4	
33,813	28,177	26,694	15	26	4 to 6	6.2	
35,165	29,305	27,762	15	25	4 to 6	5.9	
35,584	29,653	28,093	17	28	4 to 6	5.9	
36,631	30,526	28,919	15	24	4 to 6	5.7	
36,902	30,752	29,133	17	27	4 to 6	5.7	
38,223	31,853	30,176	15	23	4 to 6	5.7 5.5	
38,321	31,934	30,254	17	26	4 to 6	5.5	
39,770	33,142	31,398	19	28	4 to 6	5.3	
39,854	33,212	31,464	17	25	4 to 6	5.2	
41,243	34,370	32,561	17	25 27		5.2	
			17	24	4 to 6		
41,515	34,596	32,775			4 to 6	5.0	
42,830	35,691	33,813	19	26	4 to 6	4.9	
43,320	36,100	34,200	17	23	4 to 6	4.8	
44,543	37,119	35,165	19	25	4 to 6	4.7	
46,270	38,559	36,529	15	19	4 to 6	4.5	
46,399	38,666	36,631	19	24	4 to 6	4.5	
48,143	40,119	38,008	23	28	4 to 6	4.3	
48,416	40,347	38,223	19	23	4 to 6	4.3	
49,926	41,605	39,415	23	27	4 to 6	4.2	
50,236	41,864	39,660	24	28	4 to 6	4.2	
51,714	43,095	40,827	15	17	4 to 6	4.0	
52,097	43,414	41,129	24	27	4 to 6	4.0	
52,440	43,700	41,400	17	19	4 to 6	4.0	
53,920	44,934	42,569	23	25	4 to 6	3.9	
54,423	45,352	42,965	26	28	4 to 6	3.8	
56,167	46,806	44,342	23	24	4 to 6	3.7	
56,265	46,887	44,419	24	25	4 to 6	3.7	
56,516	47,097	44,618	27	28	4 to 6	3.7	
58,609	48,841	46,270	23	23	4 to 6	3.6	
60,780	50,650	47,984	28	27	4 to 6	3.4	
60,863	50,719	48,050	27	26	4 to 6	3.4	
61,157	50,964	48,282	24	23	4 to 6	3.4	
63,117	52,598	49,830	28	26	4 to 6	3.3	
63,298	52,748	49,972	27	25	4 to 6	3.3	
63,705	53,088	50,294	25	23	4 to 6	3.3	
65,504	54,587	51,714	19	17	4 to 6	3.2	
65,935	54,946	52,054	27	24	4 to 6	3.2	
66,254	55,211	52,306	26	23	4 to 6	3.2	
68,377	56,981	53,982	28	24	4 to 6	3.1	
68,802	57,335	54,317	27	23	4 to 6	3.0	
70,948	59,123	56,011	23	19	4 to 6	2.9	
71,350	59,458	56,329	28	23	4 to 6	2.9	
74,032	61,694	58,447	24	19	4 to 6	2.8	
77,117	64,264	60,882	25	19	4 to 6	2.7	
79,295	66,079	62,601	23	17	4 to 6	2.6	
80,202	66,835	63,317	26	19	4 to 6	2.6	
82,742	68,952	65,323	24	17	4 to 6	2.5	
83,287	69,405	65,753	27	19	4 to 6	2.5	
86,190	71,825	68,045	25	17	4 to 6	2.5	
86,371	71,823	68,188	28	17	4 to 6	2.4	
89,637	74,698	70,766	26	17	4 to 6	2.4	
	74,698	70,766					
89,867			23 27	15 17	4 to 6	2.3 2.2	
93,085	77,571	73,488	21	17	4 to 6	۷.۷	

PLANTING RATES FOR (EDGEVAC) LOW-RATE CORN/POPCORN 24 CELL DISC 15 TOOTH CONTACT WHEEL DRIVE SPROCKET (SEE PAGE 5-1) APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

	APPROXIM	ATE SEEDS/ACRE	CRE FOR VARIOUS ROW WIDTHS Transmission Sprockets Recomm. Average S				
			Transmissic	ii opiockets	Speed Range	Average Seed Spacing In	
30" Rows	36" Rows	38" Rows	Drive	Driven	(MPH)	Inches	
15,254	12,712	12,043	15	28	4 to 6	13.7	
15,819	13,182	12,489	15	27	4 to 6	13.2	
16,427	13,689	12,969	15	26	4 to 6	12.7	
17,084	14,237	13,488	15	25	4 to 6	12.2	
17,288	14,407	13,648	17	28	4 to 6	12.1	
17,796	14,830	14,050	15	24	4 to 6	11.7	
17,928	14,940	14,154	17	27	4 to 6	11.7	
18,570	15,475	14,661	15	23	4 to 6	11.3	
18,618	15,515	14,698	17	26	4 to 6	11.2	
19,322	16,101	15,254	19	28	4 to 6	10.8	
19,362	16,135	15,286	17	25	4 to 6	10.8	
20,037	16,698	15,819	19	27	4 to 6	10.4	
20,169	16,808	15,923	17	24	4 to 6	10.4	
20,808	17,340	16,427	19	26	4 to 6	10.0	
21,046	17,538	16,615	17	23	4 to 6	9.9	
21,640	18,034	17,084	19	25	4 to 6	9.7	
22,479	18,733	17,747	15	19	4 to 6	9.3	
22,542	18,785	17,796	19	24	4 to 6	9.3	
23,389	19,491	18,465	23	28	4 to 6	8.9	
23,522	19,602	18,570	19	23	4 to 6	8.9	
24,256	20,213	19,149	23	27	4 to 6	8.6	
24,406	20,339	19,268	24	28	4 to 6	8.6	
25,124	20,937	19,835	15	17	4 to 6	8.3	
25,310	21,092	19,982	24	27	4 to 6	8.3	
25,477	21,231	20,113	17	19	4 to 6	8.2	
26,196	21,830	20,681	23	25	4 to 6	8.0	
26,440	22,033	20,874	26	28	4 to 6	7.9	
27,288	22,740	21,543	23	24	4 to 6	7.7	
27,335	22,779	21,580	24	25	4 to 6	7.6	
27,457	22,881	21,677	27	28	4 to 6	7.6	
28,474	23,728	22,479	23	23	4 to 6	7.3	
29,529	24,607	23,312	28	27	4 to 6	7.1	
29,569	24,641	23,344	27	26	4 to 6	7.1	
29,712	24,760	23,457	24	23	4 to 6	7.0	
30,664	25,554	24,209	28	26	4 to 6	6.8	
30,752	25,627	24,278	27	25	4 to 6	6.8	
30,950	25,792	24,434	25	23	4 to 6	6.8	
31,824	26,520	25,124	19	17	4 to 6	6.6	
32,033	26,694	25,289	27	24	4 to 6	6.5	
32,188	26,823	25,412	26	23	4 to 6	6.5	
33,220	27,683	26,226	28	24	4 to 6	6.3	
33,426	27,855	26,389	27	23	4 to 6	6.3	
34,469	28,724	27,212	23	19	4 to 6	6.1	
34,664	28,887	27,366	28	23	4 to 6	6.0	
35,967	29,973	28,395	24	19	4 to 6	5.8	
37,466	31,222	29,578	25	19	4 to 6	5.6	
38,524	32,103	30,413	23	17	4 to 6	5.4	
38,964	32,470	30,761	26	19	4 to 6	5.4	
40,199	33,499	31,736	24	17	4 to 6	5.2	
40,463	33,719	31,945	27	19	4 to 6	5.2	
41,874	34,895	33,058	25	17	4 to 6	5.0	
41,962	34,968	33,128	28	19	4 to 6	5.0	
43,549	36,290	34,380	26	17	4 to 6	4.8	
43,660	36,383	34,469	23	15	4 to 6	4.8	
45,223	37,686	35,703	27	17	4 to 6	4.6	
10,220	1 07,000	00,700	<u> </u>		1 100	1.0	

PLANTING RATES FOR (EDGEVAC) LOW-RATE CORN/POPCORN 24 CELL DISC 19 TOOTH CONTACT WHEEL DRIVE SPROCKET (SEE PAGE 5-1) APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

	APPROXIMA	<u>TE SEEDS/ACRE I</u>			<u>S</u>	
			Transmission Sprockets		Recomm.	Average Seed
					Speed Range	Spacing In
30" Rows	36" Rows	38" Rows	Drive	Driven	(MPH)	Inches
19,322	16,101	15,254	15	28	4 to 6	10.8
20,037	16,698	15,819	15	27	4 to 6	10.4
20,808	17,340	16,427	15	26	4 to 6	10.0
21,640	18,034	17,084	15	25	4 to 6	9.7
21,898	18,248	17,288	17	28	4 to 6	9.5
22,542	18,785	17,796	15	24	4 to 6	9.3
22,709	18,924	17,928	17	27	4 to 6	9.2
23,522	19,602	18,570	15	23	4 to 6	8.9
23,582	19,652	18,618	17	26	4 to 6	8.9
24,474	20,395	19,322	19	28	4 to 6	8.5
24,526	20,438	19,362	17	25	4 to 6	8.5
25,381	21,150	20,037	19	27	4 to 6	8.2
25,548	21,290	20,169	17	24	4 to 6	8.2
26,357	21,964	20,808	19	26	4 to 6	7.9
26,658	22,215	21,046	17	23	4 to 6	7.8
27,411	22,843	21,640	19	25	4 to 6	7.6
28,474	23,728	22,479	15	19	4 to 6	7.3
28,553	23,720	22,542	19	24	4 to 6	7.3
29,627	24,689	23,389	23	28	4 to 6	7.3
29,795	24,829	23,509 23,522	19	23		7.1
30,724			23	27	4 to 6 4 to 6	
	25,603	24,256				6.8
30,915	25,762	24,406	24	28	4 to 6	6.8
31,824	26,520	25,124	15	17	4 to 6	6.6
32,060	26,716	25,310	24	27	4 to 6	6.5
32,271	26,892	25,477	17	19	4 to 6	6.5
33,182	27,651	26,196	23	25	4 to 6	6.3
33,491	27,909	26,440	26	28	4 to 6	6.2
34,564	28,804	27,288	23	24	4 to 6	6.0
34,624	28,854	27,335	24	25	4 to 6	6.0
34,779	28,982	27,457	27	28	4 to 6	6.0
36,067	30,056	28,474	23	23	4 to 6	5.8
37,403	31,169	29,529	28	27	4 to 6	5.6
37,454	31,212	29,569	27	26	4 to 6	5.6
37,635	31,363	29,712	24	23	4 to 6	5.6
38,841	32,368	30,664	28	26	4 to 6	5.4
38,952	32,460	30,752	27	25	4 to 6	5.4
39,203	32,669	30,950	25	23	4 to 6	5.3
40,310	33,592	31,824	19	17	4 to 6	5.2
40,575	33,813	32,033	27	24	4 to 6	5.2
40,772	33,976	32,188	26	23	4 to 6	5.1
42,078	35,065	33,220	28	24	4 to 6	5.0
42,340	35,283	33,426	27	23	4 to 6	4.9
43,660	36,383	34,469	23	19	4 to 6	4.8
43,908	36,590	34,664	28	23	4 to 6	4.8
45,558	37,965	35,967	24	19	4 to 6	4.6
47,457	39,547	37,466	25	19	4 to 6	4.4
48,797	40,664	38,524	23	17	4 to 6	4.3
49,355	41,129	38,964	26	19	4 to 6	4.2
50,918	42,432	40,199	24	17	4 to 6	4.1
51,253	42,711	40,463	27	19	4 to 6	4.1
53,040	44,200	41,874	25	17	4 to 6	3.9
53,152	44,293	41,962	28	19	4 to 6	3.9
55,161	45,968	43,549	26	17	4 to 6	3.8
55,303	46,086	43,660	23	15	4 to 6	3.8
57,283	47,736	45,223	27	17	4 to 6	3.7
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PLANTING RATES FOR (EDGEVAC) SOYBEAN AND MILO/GRAIN SORGHUM 60 CELL DISCS 15 TOOTH CONTACT WHEEL DRIVE SPROCKET (SEE PAGE 5-1) APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

	APPROXIMA	E SEEDS/ACRE FO				
			Transmission	Sprockets	Recomm.	Average Seed
					Speed Range	Spacing In
30" Rows	36" Rows	38" Rows	Drive	Driven	(MPH)	Inches
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	3.4
63,276	52,730	49,954	24	27	4 to 6	3.3
	53,077	50,283	17	19	4 to 6	3.3
63,692			23	25		3.2
65,490	54,575	51,703		28	4 to 6	3.2
66,100	55,084	52,185	26		4 to 6	
68,219	<u>56,849</u>	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

PLANTING RATES FOR (EDGEVAC) SOYBEAN AND MILO/GRAIN SORGHUM 60 CELL DISCS
19 TOOTH CONTACT WHEEL DRIVE SPROCKET (SEE PAGE 5-1)
APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

	APPROXIMA	ATE SEEDS/ACRE				
			Transmission	on Sprockets	Recomm.	Average Seed
					Speed Range	Spacing In
30" Rows	36" Rows	38" Rows	Drive	Driven	(MPH)	Inches
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
			17			
61,314	51,095	48,406		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
		73,923 74,280	24	23	4 to 6	2.2
94,088	78,407		28			
97,104	80,920	76,661		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
170,200	110,040	110,009			<u> </u>	1.0

PLANTING RATES FOR (EDGEVAC) SOYBEAN 60 CELL DISC 38 TOOTH CONTACT WHEEL DRIVE SPROCKET (SEE PAGE 5-1) APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

	APPROXIII	AIE SEEDS/ACHE	FOR VARIOUS ROW WIDT Transmission Sprockets		Recomm.	Average Seed
					Speed Range	Spacing In
30" Rows	36" Rows	38" Rows	Drive	Driven	(MPH)	Inches
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 15	28	4 to 6	1.4
159,120	132,600	125,621	24	17 27	4 to 6	1.3 1.3
160,298 161,353	133,582 134,461	126,551 127,384	17	19	4 to 6 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	1.3
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

PLANTING RATES FOR (EDGEVAC) HIGH-RATE SOYBEAN 120 CELL DISC 15 TOOTH CONTACT WHEEL DRIVE SPROCKET (SEE PAGE 5-1) APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

30" Rows	36" Rows	ATE SEEDS/ACRE 38" Rows		n Sprockets	Recomm.	Average Seed
	00 110110	00 110110	Tunomioon	ni oprookoto	Speed Range	Spacing In
			Drive	Driven	MPH)	Inches
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	27	4 to 6	1.4 1.4
147,846 148,560	123,205	116,720	24	26 23	4 to 6 4 to 6	1.4
′	123,800	117,284	28	26		
153,322 153.760	127,768 128,133	121,043 121,389	26 27	25 25	4 to 6 4 to 6	1.4 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

PLANTING RATES FOR (EDGEVAC) HIGH-RATE SOYBEAN 120 CELL DISC 19 TOOTH CONTACT WHEEL DRIVE SPROCKET (SEE PAGE 5-1) APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

	APPROXIM	<u>ATE SEEDS/ACRE</u>		on Sprockets	Recomm.	Average Seed
			Transmissing	on opioonolo	Speed Range	Spacing In
30" Rows	36" Rows	38" Rows	Drive	Driven	(MPH)	Inches
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

PLANTING RATES FOR (EDGEVAC) ACID-DELINTED HILL-DROP COTTON, 3 SEEDS PER CELL, 20 CELL DISC 15 TOOTH CONTACT WHEEL DRIVE SPROCKET (SEE PAGE 5-1)

	APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS							
			Transmission	on Sprockets	Recomm.	Average		
						Seed Spacing		
30" Rows	36" Rows	38" Rows	Drive	Driven	(MPH)	In Inches		
12,712	10,593	10,035	15	28	4 to 6	16.4		
13,182	10,985	10,407	15	27	4 to 6	15.9		
13,689	11,408	10,807	15	26	4 to 6	15.3		
14,237	11,864	11,240	15	25	4 to 6	14.7		
14,407	12,005	11,374	17	28	4 to 6	14.5		
14,830	12,359	11,708	15	24	4 to 6	14.1		
14,940	12,450	11,795	17	27	4 to 6	14.0		
15,475	12,896	12,217	15	23	4 to 6	13.5		
15,515	12,929	12,248	17	26	4 to 6	13.5		
16,101	13,418	12,712	19	28	4 to 6	13.0		
16,135	13,446	12,738	17	25	4 to 6	13.0		
16,698	13,915	13,182	19	27	4 to 6	12.5		
16,808	14,006	13,269	17	24	4 to 6	12.4		
17,340	14,450	13,689	19	26	4 to 6	12.1		
17,538	14,615	13,846	17	23	4 to 6	11.9		
18,034	15,028	14,237	19	25	4 to 6	11.6		
18,733	15,611	14,789	15	19	4 to 6	11.2		
18,785	15,654	14,830	19	24	4 to 6	11.1		
19,491	16,243	15,388	23	28	4 to 6	10.7		
19,602	16,335	15,475	19	23	4 to 6	10.7		
20,213	16,844	15,958	23	27	4 to 6	10.7		
20,339	16,949	16,057	24	28	4 to 6	10.3		
20,937	17,447	16,529	15	17	4 to 6	10.0		
20,990	17,447	16,571	23	26	4 to 6	10.0		
21,092	17,492	16,651	24	27	4 to 6	9.9		
21,186	17,655	16,726	25	28		9.9		
21,100	17,692	16,761	17	19	4 to 6 4 to 6	9.8		
21,830	18,192	17,234	23	25	4 to 6	9.6		
	18,253	17,292	24	26		9.5		
21,903 21,971	18,309	17,292	25	27	4 to 6	9.5		
22,033	18,361	17,345	26	28	4 to 6 4 to 6	9.5		
22,740	18,950	17,952	23	24	4 to 6	9.2		
22,740	18,983	17,984	24	25	4 to 6	9.2		
22,779	19,013	18,012	25	26		9.2		
					4 to 6			
22,850	19,041	18,039	26	27	4 to 6	9.2		
22,881	19,067 19,774	18,064	27 23	28	4 to 6	9.1		
23,728		18,733		23	4 to 6	8.8		
24,607	20,506	19,427	28 27	27 26	4 to 6	8.5		
24,641	20,534	19,453			4 to 6	8.5		
24,717 24,760	20,598	19,513 10,547	25 24	24	4 to 6	8.5		
24,760 25,554	20,633	19,547		_	4 to 6 4 to 6	8.4 8.2		
25,554 25,627	21,295	20,174	28	26				
25,627	21,356	20,232	27	25	4 to 6	8.2		
25,792	21,493	20,362	25	23	4 to 6	8.1		
26,520	22,100	20,937	19	17	4 to 6	7.9		
26,576	22,146	20,981	28	25	4 to 6	7.9		
26,694	22,245	21,075	27	24	4 to 6	7.8		
26,823	22,353	21,176	26	23	4 to 6	7.8		
27,683	23,069	21,855	28	24	4 to 6	7.6		
27,855	23,213	21,991	27	23	4 to 6	7.5		
28,724	23,937	22,677	23	19	4 to 6	7.3		
28,887	24,072	22,805	28	23	4 to 6	7.2		
29,973	24,977	23,663	24	19	4 to 6	7.0		
31,222	26,018	24,649	25	19	4 to 6	6.7		
32,103	26,753	25,345	23	17	5 to 6	6.5		

PLANTING RATES FOR (EDGEVAC) ACID-DELINTED HILL-DROP COTTON, 3 SEEDS PER CELL, 20 CELL DISC 19 TOOTH CONTACT WHEEL DRIVE SPROCKET (SEE PAGE 5-1) APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

	APPROXIMAT	E SEEDS/ACRE FO				
			Transmission Sprockets		Recomm.	Average Hill
		00" 5			Speed Range	•
30" Rows	36" Rows	38" Rows	Drive	Driven	(MPH)	Inches
16,101	13,418	12,712	15	28	4 to 6	13.0
16,698	13,915	13,182	15	27	4 to 6	12.5
17,340	14,450	13,689	15	26	4 to 6	12.1
18,034	15,028	14,237	15	25	4 to 6	11.6
18,248	15,207	14,407	17	28	4 to 6	11.5
18,785	15,654	14,830	15	24	4 to 6	11.1
18,924	15,770	14,940	17	27	4 to 6	11.0
19,602	16,335	15,475	15	23	4 to 6	10.7
19,652	16,377	15,515	17	26	4 to 6	10.6
20,395	16,996	16,101	19	28 25	4 to 6	10.3
20,438	17,032 17,625	16,135 16,698	17 19		4 to 6	10.2 9.9
21,150 21,290	17,625	16,808	17	27 24	4 to 6 4 to 6	9.8
21,290	18,303	17,340	19	24 26	4 to 6	9.5
22,215	18,513	17,538	17	23	4 to 6	9.4
22,213		18,034	17	25 25	4 to 6	9.4 9.2
23,728	19,035 19,774	18,733	15	19	4 to 6	8.8
						8.8
23,794	19,829	18,785	19 23	24 28	4 to 6	8.5
24,689	20,574	19,491	19	28 23	4 to 6	
24,829	20,691	19,602			4 to 6	8.4
25,603	21,336	20,213	23	27	4 to 6	8.2
25,762	21,469	20,339	24	28	4 to 6	8.1
26,520	22,100	20,937	15 23	17	4 to 6	7.9
26,588	22,157	20,990		26	4 to 6	7.9
26,716	22,264	21,092	24	27	4 to 6	7.8
26,836	22,363	21,186	25	28	4 to 6	7.8
26,892	22,410	21,231	17	19	4 to 6	7.8
27,651 27,744	23,043	21,830	23 24	25 26	4 to 6	7.6 7.5
27,744	23,120 23,191	21,903 21,971	24 25	26 27	4 to 6 4 to 6	
27,909	23,258	22,033	26	28	4 to 6	7.5 7.5
28,804	23,256	22,033 22,740	23	24		7.3 7.3
28,854	24,003	22,740	24	25	4 to 6 4 to 6	7.3
28,900		22,779 22,816	24 25	25 26		7.2 7.2
28,943	24,083 24,119	22,850	26	26 27	4 to 6 4 to 6	7.2 7.2
28,982	24,119	22,830 22,881	27	28	4 to 6	7.2 7.2
30,056	25,047	23,728	23	23	4 to 6	7.0
31,169	25,047	23,726 24,607	28	23 27	4 to 6	7.0 6.7
31,212	26,010	24,607	27	26	4 to 6	6.7
31,308	26,090	24,717	25 25	26 24	4 to 6	6.7
31,363	26,136	24,717	24	23	4 to 6	6.7
32,368	26,973	25,554	28	26	4 to 6	6.5
32,460	27,050	25,627	27	25	4 to 6	6.4
32,669	27,030	25,792	25	23	4 to 6	6.4
33,592	27,993	26,520	19	17	4 to 6	6.2
33,663	28,052	26,576	28	25	4 to 6	6.2
33,813	28,177	26,694	27	24	4 to 6	6.2
33,976	28,314	26,823	26	23	4 to 6	6.2
35,065	29,221	27,683	28	24	4 to 6	6.0
35,283	29,403	27,855	27	23	4 to 6	5.9
36,383	30,320	28,724	23	19	4 to 6	5.7
36,590	30,492	28,887	28	23	4 to 6	5.7 5.7
37,965	31,638	29,973	24	19	4 to 6	5.5
39,547	32,956	31,222	25	19	4 to 6	5.3
40,664	33,887	32,103	23	17	5 to 6	5.1
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PLANTING RATES FOR (EDGEVAC) ACID-DELINTED COTTON/SMALL DRY EDIBLE BEAN/SMALL COTTON/SUNFLOWER 54 CELL DISC 15 TOOTH CONTACT WHEEL DRIVE SPROCKET (SEE PAGE 5-1) APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

			Transmission Sprockets		Recomm.	Average Hill
					Speed Range	Spacing In
30" Rows	36" Rows	38" Rows	Drive	Driven	(MPH)	Inches
34,321	28,601	27,096	15	28	4 to 6	6.1
35,593	29,660	28,099	15	27	4 to 6	5.9
36,961	30,801	29,180	15	26	4 to 6	5.7
38,440	32,033	30,347	15	25	4 to 6	5.4
38,898	32,415	30,709	17	28	4 to 6	5.4
40,042	33,368	31,612	15	24	4 to 6	5.2
40,338	33,615	31,846	17	27	4 to 6	5.2
41,783	34,819	32,986	15	23	4 to 6	5.0
41,890	34,908	33,071	17	26	4 to 6	5.0
43,474	36,228	34,321	19	28	4 to 6	4.8
43,565	36,304	34,394	17	25	4 to 6	4.8
45,084	37,570	35,593	19	27	4 to 6	4.6
45,380	37,817	35,827	17	24	4 to 6	4.6
46,818	39,015	36,961	19	26	4 to 6	4.5
47,354	39,461	37,384	17	23	4 to 6	4.4
48,691	40,575	38,440	19	25	4 to 6	4.3
50,579	42,149	39,931	15	19	4 to 6	4.1
50,719	42,266	40,042	19	24	4 to 6	4.1
52,626	43,855	41,547	23	28	4 to 6	4.0
52,925	44,104	41,783	19	23	4 to 6	4.0
54,575	45,479	43,086	23	27	4 to 6	3.8
54,914	45,762	43,353	24	28	4 to 6	3.8
56,529	47,108	44,628	15	17	4 to 6	3.7
56,948	47,457	44,959	24	27	4 to 6	3.7
57,323	47,769	45,255	17	19	4 to 6	3.6
58,941	49,118	46,533	23	25	4 to 6	3.5
59,490	49,575	46,966	26	28	4 to 6	3.5
61,397	51,164	48,471	23	24	4 to 6	3.4
61,504	51,253	48,556	24	25	4 to 6	3.4
61,778	51,482	48,772	27	28	4 to 6	3.4
64,067	53,389	50,579	23	23	4 to 6	3.3
66,439	55,366	52,452	28	27	4 to 6	3.1
66,531	55,442	52,524	27	26	4 to 6	3.1
66,852	55,710	52,778	24	23	4 to 6	3.1
68,995	57,496	54,470	28	26	4 to 6	3.0
69,192	57,660	54,625	27	25	4 to 6	3.0
69,638	58,031	54,977	25	23	4 to 6	3.0
71,604	59,670	56,529	19	17	4 to 6	2.9
72,075	60,062	56,901	27	24	4 to 6	2.9
72,423	60,353	57,176	26	23	4 to 6	2.9
74,744	62,287	59,009	28	24	4 to 6	2.8
75,209	62,674	59,375	27	23	4 to 6	2.8
	64,629	61,227	23	19	4 to 6	2.7
77,554 77,994	64,995	61,574	28	23	4 to 6	2.7
80,926	67,438	63,889	24	19	4 to 6	2.6
84,298		66,551	25	19	4 to 6	2.5
86,678	70,248 72,232	68,430	23	17	4 to 6	2.5
87,670	72,232 73,058	69,213	23 26	17	4 to 6	2.4 2.4
90,447	75,372	71,405	24	17	4 to 6	2.3
91,042	75,868 79,512	71,875	27	19	4 to 6	2.3
94,216	78,513	74,381	25	17	4 to 6	2.2
94,414	78,678	74,537	28	19	4 to 6	2.2
97,984	81,653	77,356	26	17	4 to 6	2.1
98,235	81,863	77,554	23	15	4 to 6	2.1
101,753	84,794	80,331	27	17	4 to 6	2.1

PLANTING RATES FOR (EDGEVAC) ACID-DELINTED COTTON/SMALL DRY EDIBLE BEAN/SMALL COTTON/SUNFLOWER 54 CELL DISC 19 TOOTH CONTACT WHEEL DRIVE SPROCKET (SEE PAGE 5-1)

APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

	APPROXIM	AIE SEEDS/ACKE			Recomm.	A
			Iransmissio	Transmission Sprockets		Average Seed
					Speed Range	Spacing In
30" Rows	36" Rows	38" Rows	Drive	Driven	(MPH)	Inches
43,474	36,228	34,321	15	28	4 to 6	4.8
45,084	37,570	35,593	15	27	4 to 6	4.6
46,818	39,015	36,961	15	26	4 to 6	4.5
48,691	40,575	38,440	15	25	4 to 6	4.3
49,270	41,059	38,898	17	28	4 to 6	4.2
50,719	42,266	40,042	15	24	4 to 6	4.1
51,095	42,579	40,338	17	27	4 to 6	4.1
52,925	44,104	41,783	15	23	4 to 6	4.0
53,060	44,217	41,890	17	26	4 to 6	3.9
55,067	45,889	43,474	19	28	4 to 6	3.8
55,183	45,986	43,565	17	25	4 to 6	3.8
57,106	47,589	45,084	19	27	4 to 6	3.7
57,482	47,902	45,380	17	24	4 to 6	3.6
59,303	49,419	46,818	19	26	4 to 6	3.5
			17	23		3.5
59,981	49,984	47,354			4 to 6	
61,675	51,396	48,691	19	25	4 to 6	3.4
64,067	53,389	50,579	15	19	4 to 6	3.3
64,245	53,537	50,719	19	24	4 to 6	3.3
66,660	55,550	52,626	23	28	4 to 6	3.1
67,038	55,865	52,925	19	23	4 to 6	3.1
69,129	57,607	54,575	23	27	4 to 6	3.0
69,558	57,965	54,914	24	28	4 to 6	3.0
71,604	59,670	56,529	15	17	4 to 6	2.9
72,134	60,112	56,948	24	27	4 to 6	2.9
72,609	60,507	57,323	17	19	4 to 6	2.9
74,659	62,216	58,941	23	25	4 to 6	2.8
75,354	62,795	59,490	26	28	4 to 6	2.8
77,770	64,808	61,397	23	24	4 to 6	2.7
77,905	64,921	61,504	24	25	4 to 6	2.7
78,253	65,211	61,778	27	28	4 to 6	2.7
81,151	67,626	64,067	23	23	4 to 6	2.6
84,157	70,130	66,439	28	27	4 to 6	2.5
84,272	70,227	66,531	27	26	4 to 6	2.5
84,679	70,566	66,852	24	23	4 to 6	2.5
87,393	72,828	68,995	28	26	4 to 6	2.4
87,643	73,036	69,192	27	25	4 to 6	2.4
88,208	73,506	69,638	25	23	4 to 6	2.4
90,698	75,582	71,604	19	17	4 to 6	2.3
	76,079		27	24		
91,295		72,075			4 to 6	2.3
91,736	76,447	72,423	26	23	4 to 6	2.3
94,676	78,897	74,744	28	24	4 to 6	2.2
95,264	79,387	75,209	27	23	4 to 6	2.2
98,235	81,863	77,554	23	19	4 to 6	2.1
98,793	82,327	77,994	28	23	4 to 6	2.1
102,507	85,422	80,926	24	19	4 to 6	2.0
106,778	88,981	84,298	25	19	4 to 6	2.0
109,793	91,494	86,678	23	17	4 to 6	1.9
111,049	92,541	87,670	26	19	4 to 6	1.9
114,566	95,472	90,447	24	17	4 to 6	1.8
115,320	96,100	91,042	27	19	4 to 6	1.8
119,340	99,450	94,216	25	17	4 to 6	1.8
119,591	99,659	94,414	28	19	4 to 6	1.7
124,113	103,428	97,984	26	17	4 to 6	1.7
124,432	103,693	98,235	23	15	4 to 6	1.7
128,887	107,406	101,753	27	17	4 to 6	1.6
5,557	,	, ,				

PLANTING RATES FOR (EDGEVAC) LARGE DRY EDIBLE BEAN 54 CELL DISC 15 TOOTH CONTACT WHEEL DRIVE SPROCKET (SEE PAGE 5-1)

	APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS					
			Transmission	on Sprockets	Recomm.	Average Seed
					Speed Range	Spacing In
30" Rows	36" Rows	38" Rows	Drive	Driven	(MPH)	Inches
34,321	28,601	27,096	15	28	4 to 6	6.1
35,593	29,660	28,099	15	27	4 to 6	5.9
36,961	30,801	29,180	15	26	4 to 6	5.7
38,440	32,033	30,347	15	25	4 to 6	5.4
38,898	32,415	30,709	17	28	4 to 6	5.4
40,042	33,368	31,612	15	24	4 to 6	5.2
40,338	33,615	31,846	17	27	4 to 6	5.2
41,783	34,819	32,986	15	23	4 to 6	5.0
41,890	34,908	33,071	17	26	4 to 6	5.0
43,474	36,228	34,321	19	28	4 to 6	4.8
43,565	36,304	34,394	17	25	4 to 6	4.8
45,084	37,570	35,593	19	27	4 to 6	4.6
45,380	37,817	35,827	17	24	4 to 6	4.6
			17			
46,818	39,015	36,961		26	4 to 6	4.5
47,354	39,461	37,384	17	23	4 to 6	4.4
48,691	40,575	38,440	19	25	4 to 6	4.3
50,579	42,149	39,931	15	19	4 to 6	4.1
50,719	42,266	40,042	19	24	4 to 6	4.1
52,626	43,855	41,547	23	28	4 to 6	4.0
52,925	44,104	41,783	19	23	4 to 6	4.0
54,575	45,479	43,086	23	27	4 to 6	3.8
54,914	45,762	43,353	24	28	4 to 6	3.8
56,529	47,108	44,628	15	17	4 to 6	3.7
56,948	47,457	44,959	24	27	4 to 6	3.7
57,323	47,769	45,255	17	19	4 to 6	3.6
58,941	49,118	46,533	23	25	4 to 6	3.5
59,490	49,575	46,966	26	28	4 to 6	3.5
61,397	51,164	48,471	23	24	4 to 6	3.4
61,504	51,253	48,556	24	25	4 to 6	3.4
61,778	51,482	48,772	27	28	4 to 6	3.4
64,067	53,389	50,579	23	23	4 to 6	3.3
66,439	55,366	52,452	28	27	4 to 6	3.1
66,531	55,442	52,524	27	26	4 to 6	3.1
66,852	55,710	52,778	24	23	4 to 6	3.1
68,995	57,496	54,470	28	26	4 to 6	3.0
69,192	57,660	54,625	27	25	4 to 6	3.0
69,638	58,031	54,977	25	23	4 to 6	3.0
71,604	59,670	56,529	19	17	4 to 6	2.9
72,075	60,062	56,901	27	24	4 to 6	2.9
72,423	60,353	57,176	26	23	4 to 6	2.9
74,744	62,287	59,009	28	24	4 to 6	2.8
75,209	62,267	59,375	27	23	4 to 6	2.8
					4 to 6	
77,554	64,629	61,227	23	19		2.7
77,994	64,995	61,574	28	23	4 to 6	2.7
80,926	67,438	63,889	24	19	4 to 6	2.6
84,298	70,248	66,551	25	19	4 to 6	2.5
86,678	72,232	68,430	23	17	4 to 6	2.4
87,670	73,058	69,213	26	19	4 to 6	2.4
90,447	75,372	71,405	24	17	4 to 6	2.3
91,042	75,868	71,875	27	19	4 to 6	2.3
94,216	78,513	74,381	25	17	4 to 6	2.2
94,414	78,678	74,537	28	19	4 to 6	2.2
97,984	81,653	77,356	26	17	4 to 6	2.1
98,235	81,863	77,554	23	15	4 to 6	2.1
101,753	84,794	80,331	27	17	4 to 6	2.1

PLANTING RATES FOR (EDGEVAC) LARGE DRY EDIBLE BEAN 54 CELL DISC 19 TOOTH CONTACT WHEEL DRIVE SPROCKET (SEE PAGE 5-1) APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

	APPOLIN	ATE SEEDS/ACRE				
			Transmissio	on Sprockets	Recomm.	Average Seed
					Speed Range	Spacing In
30" Rows	36" Rows	38" Rows	Drive	Driven	(MPH)	Inches
43,474	36,228	34,321	15	28	4 to 6	4.8
45,084	37,570	35,593	15	27	4 to 6	4.6
46,818	39,015	36,961	15	26	4 to 6	4.5
48,691	40,575	38,440	15	25	4 to 6	4.3
49,270	41,059	38,898	17	28	4 to 6	4.2
50,719	42,266	40,042	15	24	4 to 6	4.1
51,095	42,579	40,338	17	27	4 to 6	4.1
52,925	44,104	41,783	15	23	4 to 6	4.0
53,060	44,217	41,890	17	26	4 to 6	3.9
55,067	45,889	43,474	19	28	4 to 6	3.8
55,183	45,986	43,565	17	25	4 to 6	3.8
57,106	47,589	45,084	19	27	4 to 6	3.7
57,100	47,902	45,380	17	24	4 to 6	3.6
59,303			19	26		3.5
	49,419	46,818			4 to 6	
59,981	49,984	47,354	17	23	4 to 6	3.5
61,675	51,396	48,691	19	25	4 to 6	3.4
64,067	53,389	50,579	15	19	4 to 6	3.3
64,245	53,537	50,719	19	24	4 to 6	3.3
66,660	55,550	52,626	23	28	4 to 6	3.1
67,038	55,865	52,925	19	23	4 to 6	3.1
69,129	57,607	54,575	23	27	4 to 6	3.0
69,558	57,965	54,914	24	28	4 to 6	3.0
71,604	59,670	56,529	15	17	4 to 6	2.9
72,134	60,112	56,948	24	27	4 to 6	2.9
72,609	60,507	57,323	17	19	4 to 6	2.9
74,659	62,216	58,941	23	25	4 to 6	2.8
75,354	62,795	59,490	26	28	4 to 6	2.8
77,770	64,808	61,397	23	24	4 to 6	2.7
77,905	64,921	61,504	24	25	4 to 6	2.7
78,253	65,211	61,778	27	28	4 to 6	2.7
81,151	67,626	64,067	23	23	4 to 6	2.6
84,157	70,130	66,439	28	27	4 to 6	2.5
84,272	70,100	66,531	27	26	4 to 6	2.5
84,679	70,566	66,852	24	23	4 to 6	2.5
87,393	70,300	68,995	28	26	4 to 6	2.4
87,643	73,036	69,192	27	25	4 to 6	2.4
88,208	73,506	69,638	25	23		2.4
90,698	75,582	71,604	19	17	4 to 6	2.3
					4 to 6	
91,295	76,079	72,075	27	24	4 to 6	2.3
91,736	76,447	72,423	26	23	4 to 6	2.3
94,676	78,897	74,744	28	24	4 to 6	2.2
95,264	79,387	75,209	27	23	4 to 6	2.2
98,235	81,863	77,554	23	19	4 to 6	2.1
98,793	82,327	77,994	28	23	4 to 6	2.1
102,507	85,422	80,926	24	19	4 to 6	2.0
106,778	88,981	84,298	25	19	4 to 6	2.0
109,793	91,494	86,678	23	17	4 to 6	1.9
111,049	92,541	87,670	26	19	4 to 6	1.9
114,566	95,472	90,447	24	17	4 to 6	1.8
115,320	96,100	91,042	27	19	4 to 6	1.8
119,340	99,450	94,216	25	17	4 to 6	1.8
119,591	99,659	94,414	28	19	4 to 6	1.7
124,113	103,428	97,984	26	17	4 to 6	1.7
124,432	103,693	98,235	23	15	4 to 6	1.7
128,887	107,406	101,753	27	17	4 to 6	1.6

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 GF	RANULES			
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.

Model 3200 Rate Charts
M0241-01

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:

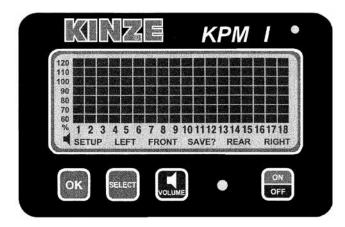
36" multiply by 0.83

38" multiply by 0.79

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



KPM I ELECTRONIC SEED MONITOR



The KPM I electronic seed monitor system consists of a tractor mounted console, seed tubes with computerized sensors installed in each planter row unit, a primary harness* connecting the console to the planter harness, and a planter harness (junction Y-harness and/or harness extension where applicable), connected to individual seed tube sensors.

Seed flow for up to 36 rows, in two 18 row sections (left/right or rear/front), may be monitored with one monitor. For less complicated applications (18 rows or less), all rows may be programmed in one section and the other section left disabled.

The monitor system is powered by the tractor battery (requires 12 volts DC). The console receives information from each of the sensors and translates this information.

The single backlit Liquid Crystal Display (LCD) shows the active section, number of monitored rows per section, relative seed rate for each row (using a bargraph display) and scrolls various alarm and warning messages. A continuous audible alarm sounds upon system malfunction or underflow conditions for any monitored row. Alarms must be acknowledged by the user.

The monitor powers down if no activity is detected within one hour. No activity means there is no new seed flow and no operator push key input. (If Applicable)

NOTE: All 3000 Series primary harnesses are hard-wired into the safety/warning light harness or control console harness included as standard equipment with the planter.

MONITOR KEY FUNCTIONS

Each key press is acknowledged with a short beep.

OK

- · Ends and saves the new setup during installation.
- · Acknowledges and silences alarms in the operation mode.

SELECT

- Selects <u>application mode</u> (rear/front or left/right) at the beginning of installation setup.
- Selects <u>active section(s)</u> (rear, rear/front, left, right or left/right) in operation mode.
- Has no affect on a system configured to monitor only one section.

VOLUME

- Pressing the key turns the audible alarm on.
- Holding the key for periods of 2 seconds increases volume until it reaches the maximum, at which time it rolls over to the minimum level.

ON/OFF

Powers unit on and off.

Changing Audible Alarm Volume 6-2	
Field Operation 6-3	
LCD Functions 6-2	
Monitor Key Functions 6-1	
Programming/Connecting Seed Tubes 6-4	
Replacing a Faulty Sensor 6-3	
Warnings and Alarms 6-2	

LCD FUNCTIONS

The monitor collects planting rate data from all active rows and calculates an average. This average determines the 100% mark. Seed rate for each row is compared to the average value and the result is displayed on the bargraph.

Information about each section is displayed alternately every 5 seconds. While operating a system with two sections programmed, one or both sections may be selected any time. When only one section is selected, the monitor calculates the average based on the remaining active rows from that section.

STEP 1 Press SELECT key once to show one section. The flashing icon shows the section not selected. The selected section continuously displays on the LCD.

EXAMPLE: System is setup to display rear/front sections. Press SELECT key. FRONT icon flashes and REAR section displays on the bargraph. After 1 minute FRONT icon stops flashing. The monitor stays in REAR only display through power down and power up. Each time the monitor is turned on while in REAR only mode, FRONT icon flashes for 1 minute. If seed flow is sensed in the FRONT section while planting, FRONT icon resumes flashing.

STEP 2 Press SELECT key again to activate both sections.

EXAMPLE: Press SELECT key a second time. Information about each section displays alternately every 5 seconds.

For simple applications, where only one section is programmed, the display automatically locks on that section. Pressing SELECT key has no affect.

NOTE: When alternating between two sections, the display will lock on the section containing the first recognized alarm until the alarm is acknowledged by pressing the OK key or the alarm condition is removed.

CHANGING AUDIBLE ALARM VOLUME

- STEP 1 Press and hold down the VOLUME key.
- STEP 2 SETUP and VOLUME icons turn on and alarm sounds continuously. Sound intensity changes every 2 seconds. After maximum volume is reached, the next change sets the volume to minimum and continues to get louder every 2 seconds. When desired volume is reached, release the key.

WARNINGS AND ALARMS

1. System Alarms - A system alarm is activated when the monitor detects a faulty sensor or one of several other communication faults.

The corresponding row number starts flashing and the alarm sounds. All segments on the corresponding bargraph are turned off. Pushing the OK key to acknowledge the warning turns audible alarm off. The row number continues to flash until the alarm condition is removed. If the monitor detects a faulty sensor and there is no planting activity present, the monitor will scroll "CHECK CONNECTION".

Another type of system alarm occurs when the monitor detects a data communication bus error. Three data communication bus errors are:

LCD Display	Error Condition
SYS HI	Data communication lead (green) is shorted to power lead (white).
SYS LO	Data communication lead (green) is shorted to ground lead (black).
SYS EC	An internal error has been detected.

2. Under Flow Alarms - If seed rate for one or more rows is less than 55% of the calculated average, the corresponding 60% segment stays on, the corresponding row number starts flashing and the alarm sounds. Pushing the OK key to acknowledge the alarm will turn the alarm off. The 60% segment of the bargraph remains on and the row number continues to flash until the alarm condition is corrected.

NOTE: All alarms present within a short time before planting stops, are frozen on the screen and the text LOW or FAIL displays. If the under flow is between 0% and 10%, this warrants a "FAIL" condition. If the under flow is between 10% and 55%, a "LOW" condition is generated. If multiple rows have an under flow condition, "FAIL" displays if any one or more rows is between 0% and 10%. This allows the user to identify and fix problem rows.

NOTE: This warning will not trigger unless a minimum time of continuous planting has passed.

NOTE: If all rows show a seed rate of zero, the condition will not generate an alarm. It is assumed the planter has stopped. Row numbers and the bottom 60% segment remains on for all selected rows.

- 3. Multiple Alarms If more than one alarm condition occurs at the same time, pushing the OK key acknowledges all alarms currently displayed. For example, if one row on front and one row on rear are alarming, pushing OK key only acknowledges one of them. However, if there are two alarms on front, both alarms would be acknowledged with one push of OK key.
- 4. Section Not Selected Warning If monitor was programmed for two sections and only one is currently selected for display (by pressing SELECT key), icon of disabled section will flash for a period of 1 minute, then turn off at each power up. If seed flow is sensed in disabled section, icon for that section (front, left or right) will begin to flash.
- 5. Seed Planting Stopped Warning When monitor detects no seed flow on all rows, monitor will emit 3 short beeps to alert user. This warning will occur each time planter is stopped, each time planter is raised at end of a row or if mechanical drive fails while planting.

NOTE: This warning will not trigger unless a minimum time of continuous planting has passed.

- 6. Seed Counting Sensor In Calibration Warning All seed counting sensors run a self-calibration sequence on power up. While in calibration the bottom segment of each corresponding bargraph will flash if the monitor detects movement or planting activity. If monitor does not detect this, the message "WAIT CALIBRATION" will be scrolled.
- 7. Seed Counting Sensor Too Dirty Warning After seed counting sensors end their internal self-calibration, monitor may detect one or more sensors are either too dirty or blocked. If monitor detects planting or movement, the corresponding bargraph remains flashing. The monitor will display "CLEAN SENSORS" on LCD if no movement or planting is detected, prompting the user to clean tubes. If tubes are dirty, they will still show seed flow with less accuracy. If tubes are blocked user will get an alarm as soon as planting starts. The corresponding bargraph will remain flashing until problem is corrected and monitor is powered down and then powered back up.
- 8. Low Battery Warning Monitor is constantly monitoring its input voltage to quickly detect low power conditions. If monitor detects that input voltage has dropped below 11.0V, it will display "LOW POWER" on LCD, provided that the monitor does not detect planting.

NOTE: After alarms are acknowledged and if alarm condition is still present, LCD continues to display alarm condition.

REPLACING A FAULTY SENSOR

(a) Disconnect faulty sensor and check monitor to be sure correct sensor was disconnected, (b) <u>turn monitor off.</u> (c) after a few seconds, <u>turn monitor back on and (d) plug in replacement sensor. Monitor will chirp twice to acknowledge new sensor was learned and saved.</u>

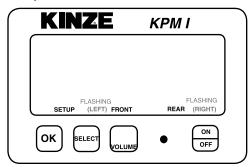
To replace more than one faulty sensor, proceed as stated above beginning with lowest numbered row in rear or left section and continue to replace sensors in increasing order. Then move on to front or right section and continue in ascending row number order.

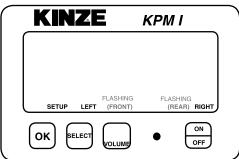
NOTE: If monitor is not turned off and then on, replacement sensor(s) will be ignored untilnext power on, at which point they will be randomly learned by the monitor.

FIELD OPERATION	
Press ON/OFF key to turn monitor on and off.	ON OFF
Information regarding each section is displayed alternately every 5 seconds.	
 REAR/FRONT CONFIGURATION Press SELECT key once to show REAR section only. Press SELECT key a second time to return to each section being displayed alternately every 5 seconds. Press SELECT key a third time to show REAR section only again. 	SELECT
 LEFT/RIGHT CONFIGURATION Press SELECT key once to show LEFT section only. Press SELECT key a second time to show RIGHT section only. Press SELECT key a third time to return to each section being displayed alternately every 5 seconds. 	SELECT
NOTE: SELECT key has no function when only a single section is being used.	
Press VOLUME key to increase or decrease volume. See "Changing The Audible Alarm Volume".	VOLUME
Press the OK key to silence alarms. See "Warnings And Alarms".	ОК

PROGRAMMING/CONNECTING SEED TUBES

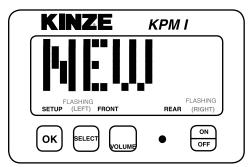
- STEP 1 All seed tubes w/sensors must be disconnected from the harness and monitor must be off.
- STEP 2 Press ON key. The monitor automatically enters the setup procedure. If the monitor was accidentally powered on with no sensors attached, the user can turn the monitor off at this point and the previous configuration is not lost.
- STEP 3 Press SELECT key. Each time you press the SELECT key the mode toggles between rear/front and left/ right. The selected display will be solid and the configuration not currently selected will be flashing. By default the monitor starts in rear/front mode.

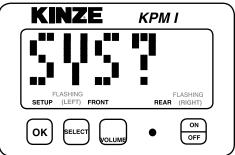




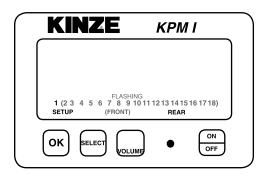
NOTE: Model 3000 planters use rear configuration only. When Interplant Package rows are in use, select rear/front configurations. When all rows can be viewed on a single display (rear), pressing the select key has no function.

STEP 4 Press and hold the OK key to confirm selection and continue holding until row numbers display. During confirmation, the display alternates between "NEW" and "SYS" to alert the user that the previous configuration will be lost. With rear/front mode selected, the monitor automatically starts with the rear section. The REAR icon shows solid and the FRONT icon starts to flash. With the left/right mode selected, the monitor automatically starts with the left section. The LEFT icon shows solid and the RIGHT icon starts to flash.

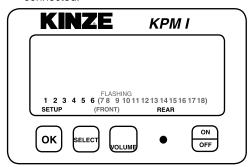




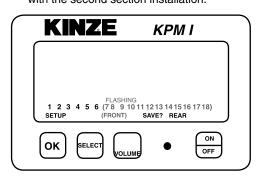
STEP 5 Plug each seed tube w/sensor into the harness in a predetermined order. Row 1 first, row 2 second and so on up to 18 rows. When a sensor is plugged in, the corresponding row number on the LCD display will stay solid, the monitor will chirp twice and the LED (Light Emitting Diode) on the seed tube sensor will turn on for approximately 30 seconds to show connection is made. NOTE: Unless there is a faulty sensor, the installer should just have to connect the sensors in the proper order without checking the monitor is acknowledging each sensor.

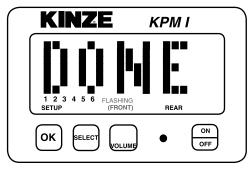


STEP 6 When all the seed tubes w/sensors for the current section are installed, <u>check to be sure the monitor displays solid numbers</u> for the number of sensors connected.

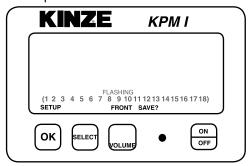


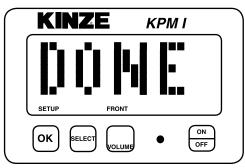
STEP 7 If this condition is satisfied, press and hold the OK key to save the setup for the current section. The SAVE? icon shows followed by continuous short beeps indicating monitor is preparing to save. The installer has 5 seconds to decide to save the current configuration. During this time the short beeps will sound. To complete the save, hold the OK key pressed until the word "DONE" shows on the screen followed by a long beep and the SAVE? icon turns off. When the OK key is released the monitor continues with the second section installation.





STEP 8 Follow STEPS 5 through 7 to install the second section. If no seed tubes are installed on the second section, press and hold the OK key until "DONE" shows on the screen followed by a long beep and the SAVE? icon turns off.

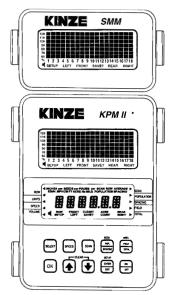




NOTE: Individual seed tubes may be unplugged for special situations. An alarm sounds which can be silenced by touching the OK key. The monitor recognizes each seed tube when reconnected.

See "KPM I/KPM II Stack-Mode Electronic Seed Monitor Troubleshooting" in the Troubleshooting section of this manual.

KPM II STACK-MODE ELECTRONIC SEED MONITOR



NOTE: SMM console may not be applicable to all models.

The KPM II Stack-Mode electronic seed monitor system consists of (a) a tractor mounted KPM II Stack-Mode console; (b) seed tubes with sensors installed in each row unit; (c) a magnetic distance sensor installed on the planter, or a radar distance sensor installed on the tractor; (d) shaft rotation sensors installed on drill shafts; and (e) a planter harness (junction Y-harness and/or extension harness where applicable), connected to individual seed tube sensors. The primary harness connecting the monitor console to the planter harness is hard-wired into the safety/warning light harness or control console harness included as standard equipment with the planter.

The monitor system is powered by the tractor battery (requires 12 volts DC). The console receives information from each of the sensors and translates this information.

The software design of the KPM II Stack-Mode console allows use of an add-on SMM console for simultaneous viewing of seed flow bargraphs for standard and/or Interplant System rows (up to 36 rows in two sections). A total of 72 rows may be displayed in multiple sections (rear/front, left/right or four sections). The SMM console must be used to allow utilization of the four section feature.

The KPM II Stack-Mode console has two backlit Liquid Crystal Displays (LCD). The <u>upper display</u> shows the active section, the number of monitored rows per section, the relative seed rate for each row (using a bargraph display) and scrolls various alarm and warning messages when an alarm condition exists. A continuous audible alarm will sound upon system malfunction or underflow conditions for any monitored row. Alarms must be acknowledged by the user. Various warnings may sound the alarm or flash one or more icons. The <u>lower display</u> is used to display alphanumeric data such as row spacing, units (Metric or English), speed, volume, seed population, seed spacing, field area, total area and distance sensor pulses per mile/kilometer.

The SMM console has one backlit Liquid Crystal Display (LCD) which functions the same as the upper display on the KPM II Stack-Mode console except it does not scroll alarm and warning messages. The SMM console must be programmed into the system before printed text will display on the LCD.

The monitor system powers down if no activity is detected within one hour. No activity means there has been no new seed flow and no operator push key input.

Area Counter/Speedometer Mode 6-13	Programming - Row Spacing 6-11
Clearing Field Area 6-16	Programming - Speed 6-12
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Lower LCD Functions 6-9	Replacing a Faulty Sensor 6-15
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Programming - Changing Audible Alarm Volume 6-10	Upper LCD Functions 6-8
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Programming/Connecting SMM Console,	
Shaft Rotation Sensors, Seed Tubes and/or	
Radar/Magnetic Distance Sensors 6-17	

MONITOR KEY FUNCTIONS

Push keys allow user to select or change operating mode, active displays or current configuration. Depending on operating mode or current display selected, some keys are valid while some are not. Each key press, if valid, is acknowledged by a short beep and an action is taken. If the key press has no action associated, the key press is considered invalid, and user will not get any feedback.

SELECT

- Selects application mode (rear/front, left/right or four sections up to a maximum of 72 rows) at the beginning of installation in setup mode.
- Selects the active section(s) (rear, rear/front, left, right or left/right) in operation mode.
- Has no affect on a system configured to monitor only one section.
- · While programming monitor, the key will select the digit to change.

SPEED

· Immediately displays current ground speed.

SCAN

- · If the current average population or average spacing is displayed, this key sequentially displays seed population/spacing on each row.
- If display shows functions other than average seed population or spacing, pressing SCAN sequentially displays speed, average seed population and average seed spacing.
- Pressing a second time freezes display on current row.
- · Pressing a third time restarts sequential display.

SEED POPULATION/SEED SPACING

- · Immediately displays the average seed POPULATION and average seed SPACING of all active rows.
- Each press alternates between seed spacing and seed population.

AREA FIELD/AREA TOTAL

- Immediately displays the field or total area planted since the field/total area was last cleared.
- Each press alternates between field area and total area.

OK

- Ends and saves the new setup during installation.
- · Acknowledges and silences alarms in the operation mode.

UP ARROW AND DOWN ARROW

- · Scrolls sequentially through the display options on lower LCD display.
- · Freezes on current row in scan mode.
- · Scrolls sequentially through rows when population scan is frozen.
- Used to enter programmable values in programming mode.
- The UP and DOWN Arrow keys can be pressed at same time to start the CLEAR function.

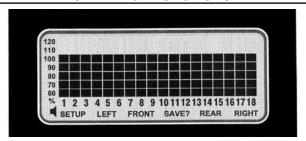
SETUP ENTER/SETUP EXIT

· Enters and exits programming mode.

ON/OFF

Powers unit on and off.

UPPER LCD FUNCTIONS



The monitor collects data on the planting rates from all active rows and calculates an average. This average will determine the 100% mark. Seed rate for each row is then compared to the average value and the result is displayed on the bargraph.

With only the KPM II Stack-Mode console programmed into the system, the information regarding each section is displayed alternately every 5 seconds. While operating a system with two sections programmed, one or both sections may be selected any time. When only one section is selected, the monitor calculates the average based on the remaining active rows from that section.

With the SMM console programmed into the system, two sections are viewed at the same time. If the system configuration is for four sections, the display alternates every 5 seconds between a pair of sections. The select key locks the display on rear sections. The SMM console shows RIGHT in the left/right configuration, FRONT in the rear/front configuration and FRONT RIGHT/REAR RIGHT in four sections configuration. The KPM II Stack-Mode console shows LEFT in the left/right configuration, REAR in the rear/front configuration and FRONT LEFT/REAR LEFT in four sections configuration.

STEP 1 Press SELECT key once to show one section. The flashing icon shows the section that is not selected. The selected section icon is continuously displayed on the LCD.

EXAMPLE: System is setup to display rear section on KPM II Stack-Mode console and front section on SMM console. Press SELECT key. The FRONT icon will be flashing and REAR section will be displayed on bargraph. The SMM console is only backlit. After 1 minute front row icon will stop flashing. Monitor will stay in this REAR only display through power down and power up. Each time monitor is turned on while in REAR only mode, FRONT icon will flash for 1 minute.

If seed flow is sensed in FRONT section while planting, FRONT icon will resume flashing.

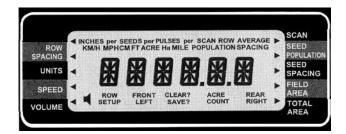
When front section is disabled, the row spacing will automatically double to maintain proper implement width in monitor. A 23 or 24 row 15" configuration changes to a 12 row 30" configuration with a touch of SELECT key.

STEP 2 Press SELECT key again to activate both sections.

For simple applications, where only one section is programmed, display automatically locks on that section. Pressing SELECT key has no affect.

NOTE: When alternating between two sections, the display locks on section containing first recognized alarm until the alarm is acknowledged by pressing OK key or alarm condition is removed.

LOWER LCD FUNCTIONS



- <u>UP and DOWN arrow keys</u> sequentially change what is displayed on lower LCD. Pressing UP or DOWN arrow keys move arrow head icon (on left and right hand side of display) to another item. For example, if arrow icon is pointing to SPEED, ground speed is displayed on LCD. Pressing UP arrow key moves icon to UNITS. The display changes to display all icons used to represent current (English or Metric) measurement system.
- Shortcut keys SPEED, SEED POPULATION/SPACING and AREA FIELD/TOTAL allow direct access to their respective displays. For
 example, no matter what is currently being displayed on lower LCD, pressing SPEED key will change display to current speed. Pressing
 SEED POPULATION/SPACING or AREA FIELD/TOTAL keys will alternate between the two functions assigned to those keys.
- <u>Pressing SCAN key</u> while displaying seed spacing or population causes a sequential display of each individual row. Pressing SCAN key a second time freezes display on currently displayed row. UP or DOWN arrow keys can be used to change currently displayed row. Pressing SCAN key restarts automatic advancing of scan function.
- <u>Pressing SCAN key</u> while displaying speed causes a sequential display of speed, average planter population, and average seed spacing. Pressing SCAN key a second time freezes display on currently displayed reading.

ROW SPACING

Press arrow keys to ROW SPACING to display current spacing between rows in inches or centimeters. ROW SPACING icons turn on, displaying a 3 digit, one decimal place format. In area count mode, this function displays implement width in feet or meters, using a 3 digit, no decimal places format.

UNITS

Press arrow keys to UNITS to display all icons from the currently selected English or Metric measurement system. For the English system, icons are: INCH, MPH, FT, ACRE and MILE. For Metric system, icons are: CM, KM/H and Ha.

SPEED

Press SPEED key to display current speed in MPH or KM/H, using a 3 digit, one decimal place format.

VOLUME

Press arrow keys to VOLUME to display the presently selected audible alarm volume. The SPEAKER icon turns on.

SCAN

Press SCAN key to display <u>seed spacing or seed population</u> (see Steps 1-3 following) of each individual row. (1)Pressing SCAN key while displaying any other function will cause monitor to sequentially display speed, average seed population and average seed spacing. (2) Pressing SCAN key a second time will freeze display. (3)Pressing SCAN key a third time restarts sequential display. UP and DOWN arrow keys can be used to change current display.

SEED POPULATION/SEED SPACING

Each SEED POP/SPACING key press alternates between seed population and seed spacing.

Seed population displays average number of seeds or the row average number of seeds per acre or seeds per hectare for all the active rows. The average is displayed using a 6 digits, no decimal places format. The AVERAGE POPULATION icon will turn on. When in scan mode, the scan arrow and SCAN ROW POPULATION will appear. The ROW number icon and current row will be displayed on left and population will be displayed on right in 1000's using 3 digits, one decimal place (e.g. 32.9 means 32,900). When in scan freeze mode, scan arrow and ROW POPULATION will turn on (scan arrow may be flashing). The UP and DOWN keys may be used to lock on desired row.

<u>Seed spacing</u> displays average distance or the row average distance between seeds for all active rows in inches per seed or centimeters per seed using a 3 digit, one decimal place format. When average is displayed the AVERAGE SPACING icons are turned on. When in scan mode, the <u>scan arrow</u> and SCAN ROW SPACING icons will appear. The ROW number icon and current row will be displayed on left and spacing will be displayed on right. The display will sequence to the next row every 5 seconds. When in scan freeze mode, the <u>scan arrow</u> and SPACING will turn on (scan arrow may be flashing). The UP and DOWN keys may be used to lock on desired row.

FIELD AREA/TOTAL AREA

Each AREA FIELD/TOTAL key press alternates between field area and total area.

Field area displays total number of acres or hectares using a 6 digit, one decimal place format.

NOTE: When FIELD AREA is selected, the UP or DOWN key must be held in slightly longer than normal so monitor will not mistake this action with a CLEAR, which consists of the UP and DOWN arrow keys pressed simultaneously. A beep will sound when the function activates.

<u>Total area</u> displays total number of acres or hectares using a 6 digit, one decimal place format. The total area counter updates every time the field area counter increments. Clearing total area counter will also clear field area counter.

When the monitor is programmed as a rear only or rear/front configuration and shaft rotation sensors are installed, pressing UP arrow to move beyond row spacing lights an arrow on an unlabeled area above ROW SPACING. This is the automatically set division line between L.H. shaft sensor and R.H. shaft sensor. The display shows first row on rear section and front section assigned to R.H. shaft rotation sensor.

EXAMPLE: On a 12 Row 30" planter with Interplant Package, the display appears as follows:



THIS DISPLAY IS NOT ACCESSIBLE ON LEFT/RIGHT CONFIGURATIONS OR SYSTEMS WITHOUT SHAFT ROTATION SENSORS.

PROGRAMMING - CHANGING AUDIBLE ALARM VOLUME

STEP 1 To enter programming mode, press and hold the SETUP key. The monitor emit s several short beeps, followed by a long beep. On the lower LCD, the SETUP icon turns on and the arrow head icon will flash, indicating that the user can select an item to program.

NOTE: Monitor must be in a programmable function (row spacing, units, speed, volume or area) to enter setup. The monitor will not enter setup in seed population or seed spacing.

- STEP 2 Press UP or DOWN arrow keys to move the flashing arrow to VOLUME. As the arrow icon moves, the lower LCD displays the current setting of the selected item.
- STEP 3 Press the OK key and the flashing arrow becomes solid and the audible alarm will sound.

NOTE: The lower LCD displays the current volume and the SPEAKER icon is turned on. Settings are from 0 to 9.

•Use UP or DOWN arrow keys to change the setting. With every UP arrow key push, the alarm will increment by one step between the minimum and the maximum. If the maximum level (9) is reached the volume rolls over to the minimum level (0).

•Pressing the DOWN arrow key lowers the volume

until the minimum level (0) is reached, at which point the volume rolls over to the maximum level (9).

STEP 4 To exit without saving, press and release the OK key.

<u>Io exit without saving</u>, press and release the OK key. The monitor restores the lower LCD to show the item setting and the arrow icon flashes, allowing the user to select another item to program.

To exit and save, press and hold the OK key. The monitor emits several short beeps and SAVE? icon is turned on. After a short time a long beep is heard, and the lower LCD displays "DONE". Release the OK key. If the OK key is released BEFORE "DONE" is displayed, changes WILL NOT BE SAVED. "DONE" MUST be displayed in order for the save to have occurred.

NOTE: Programming mode may be exited at any time, by pressing the SETUP key. Pressing this key returns the monitor to its normal operation. All items changed and saved will come into effect immediately. Any items changed, but not saved will revert to the original programmed value.

PROGRAMMING - UNITS (METRIC OR ENGLISH)

STEP 1 Press and hold SETUP key to enter programming mode. The monitor emits several short beeps, followed by a long beep. On the lower LCD, the SETUP icon turns on and the arrow head icon will flash, indicating that the user can select an item to program.

NOTE: The monitor must be in a programmable function (row spacing, units, speed, volume or area) to enter setup. The monitor will not enter setup in seed population or seed spacing.

- STEP 2 Press UP or DOWN arrow keys to move the flashing arrow to UNITS. As the arrow icon moves, the lower LCD will display the current setting of the item selected.
- STEP 3 Press the OK key and the flashing arrow becomes solid and audible alarm sounds.

NOTE: Lower LCD alternately displays Metric or English icons, indicating Metric or English mode.

•Use UP or DOWN arrow keys to change the setting.

STEP 4 Press and release the OK key to exit without saving. The monitor restores lower LCD to show item setting, and the arrow icon flashes, allowing user to select another item to program.

Press and hold OK key to exit and save. The monitor emits several short beeps and SAVE? icon is turned on. After a short time a long beep is heard, and the lower LCD displays "DONE". Release the OK key. If the OK key is released BEFORE "DONE" displays, changes WILL NOT BE SAVED. "DONE" MUST be displayed for the save to have occurred.

NOTE: Programming mode may be exited at any time, by pressing the SETUP key. Pressing this key returns the monitor to its normal operation. All items changed and saved come into effect immediately. Any items changed, but not saved revert to original programmed value.

PROGRAMMING - ROW SPACING

STEP 1 Application mode (rear/front, left/right or four sections) must be active before entering programming mode. If monitor is programmed in a rear/front configuration, both sections are active (alternating every 5 seconds if the SMM console is not used). You can then set row spacing to Interplant System row spacing.

EXAMPLE: On a 12 Row 30" with Interplant Package set row spacing to 15.0 with front active.

When monitor is in normal field operation mode, disabling front section automatically changes row spacing to 30".

STEP 2 To enter programming mode, press and hold SETUP key. Monitor will emit several short beeps, followed by a long beep. On lower LCD, the SETUP icon turns on and arrow head icon will flash, indicating that user can select an item to program.

NOTE: Monitor must be in a programmable function (row spacing, units, speed, volume or area) to enter setup. Monitor will not enter setup in seed population or seed spacing.

- STEP 3 Press UP or DOWN arrow keys to move flashing arrow to ROW SPACING. As arrow icon moves, lower LCD displays current setting of selected item.
- STEP 4 Press OK key and flashing arrow becomes solid and the audible alarm sounds.

NOTE: Lower LCD displays current row spacing (in inches or centimeters) and ROW SPACING icon is turned on.

- ·Least significant digit of displayed value blinks.
- •This value can be changed by pressing UP or DOWN arrow keys.
- •Once digit is correct, press MODE SELECT key and blinking digit moves to next significant digit, where process can be repeated.

NOTE: Monitor limits entry of row spacing from 10.0 inches (25.4 cm) to 99.9 inches (253.7 cm). If monitor is configured to a rear/front configuration, limits change to a minimum of 5.0 inches (12.7 cm) and a maximum of 49.9 inches (126.8 cm).

STEP 5 To exit without saving, press and release OK key.

Monitor restores lower LCD to show setting of the item and arrow icon will flash, allowing user to select another item to program.

To exit and save, press and hold OK key. Monitor will emit several short beeps and SAVE? icon is turned on. After a short time a long beep is heard, and lower LCD will display the word "DONE". Release OK key. If OK key is released BEFORE the word "DONE" is displayed, changes WILL NOT BE SAVED. The word "DONE" MUST be displayed in order for the save to have occurred.

To exit setup mode, press SETUP key.

NOTE: Programming mode may be exited at any time, by pressing SETUP key. Pressing this key will return monitor to its normal operation. All items changed and saved will come into effect immediately. Any items changed, but not saved revert to original programmed value.

PROGRAMMING - SPEED

STEP 1 Press and hold SETUP key to enter programming mode. Monitor emits several short beeps, followed by a long beep. On the lower LCD, the SETUP icon turns on and the arrow head icon will flash, indicating the user can select an item to program.

NOTE: Monitor must be in a programmable function (row spacing, units, speed, volume or area) to enter setup. The monitor will not enter setup in seed population or seed spacing.

- STEP 2 Press UP or DOWN arrow keys to move flashing arrow to SPEED. As arrow icon moves, lower LCD displays selected item current setting.
- STEP 3 Press the OK key and the flashing arrow becomes solid and the audible alarm will sound. The R.H. digit on the display will be blinking.

The speed constant is used to record how many pulses are generated per mile (or kilometer) from the ground speed sensor. The lower LCD will display the current pulses per mile (or kilometer) using a 6 digit, no decimal place format. The PULSES per MILE (or PULSES per KM) icons are turned on.

NOTE: It is highly recommended that a field calibration be done to establish the PPM/PPKM (Pulses Per Mile/Kilometer) number on a new machine installation. Several factors can affect this value such as wheel slip on the magnetic distance sensor, mounting angle and height on the radar distance sensor, etc. IT IS NOT UNCOMMON FOR THE SPEED ON THE MONITOR TO VARY SLIGHTLY FROM THE TRACTOR SPEEDOMETER. Adjusting PPM/PPKM in the monitor to make speed agree can cause serious errors in acre/hectare and population counts. Do field checks to verify populations and seed spacings.

NOTE: Monitor defaults to 500 PPM (310 PPKM) on new system installations. This must be changed to obtain accurate readings.

- In field conditions, measure 330 feet (¹/16 mile) or 100 meters, depending on the unit of measurement selected.
- Pull the tractor up to the starting line.
- Press UP and DOWN arrow keys at the same time and hold them down until CLEAR? icon displays and monitor beeps several times. Monitor emits a long beep and number of pulses is cleared.

NOTE: If the PPM/PPKM number starts to count pulses with the tractor not moving, check the radar for vibration or other kinds of interference.

- \bullet Drive the tractor for 330 feet (½ mile) or 100 meters and stop.
- The monitor will count the number of pulses and display them.

STEP 4 To exit without saving, press and release the OK key. The monitor will restore the lower LCD to show the previous setting of the item, and the arrow icon will flash, allowing the user to select another item to program.

To exit and save, press and hold the OK key. The monitor emits several short beeps and SAVE? icon is turned on. After a short time a long beep is heard, and the lower LCD displays "DONE". Release the OK key. If the OK key is released BEFORE "DONE" is displayed, changes WILL NOT BE SAVED. "DONE" MUST be displayed for save to have occurred.

NOTE: Programming mode may be exited at any time by pressing the SETUP key. Pressing this key returns monitor normal operation. All items changed and saved come into effect immediately. Any items changed, but not saved revert to original programmed value.

NOTE: If a discrepancy occurs and digits must be changed, follow STEPS 1 and 2 to enter the programming mode and proceed as follows:

- •Press the OK key and the flashing arrow becomes solid. The least significant digit of the displayed value will be blinking.
- •This value can be changed by pressing UP or DOWN arrow keys.
- •Once digit is correct, press the SELECT key and the blinking digit moves to the next significant digit, where the process can be repeated.

Pulses per mile or kilometer are limited to a range from 500 PPM (310 PPKM) to 500,000 PPM (310,686 PPKM).

KEY Action	Flashing Digit	Display Value
Press The UP Key	Right Most Digit	203 1 , 203 2 , 203 3
Press The SELECT Key	Second Digit From Right	20 3 3
Press The DOWN Key	Second Digit From Right	20 2 3, 20 1 3, 20 0 3, 20 9 3, 20 8 3
Press The SELECT Key Twice	Left Most Digit	2 083
Press The DOWN Key	Left Most Digit	1083, 0 500 (Min. Value), 9 500, 8 500

PROGRAMMING - CLEARING TOTAL AREA

NOTE: Clearing the total area counter will also clear the field area counter.

STEP 1 To enter the programming mode, press and hold the SETUP key. The monitor will emit several short beeps followed by a long beep. On the lower LCD, the SETUP icon turns on and the arrow head icon will flash, indicating that the user can select an item to program.

NOTE: Monitor must be in a programmable function (row spacing, units, speed, volume or area) to enter setup. The monitor will not enter setup in seed population or seed spacing.

- STEP 2 Press tUP or DOWN arrow keys to move flashing arrow to TOTAL AREA. As the arrow icon moves, the lower LCD will display the current setting of the item selected.
- **STEP 3** Press the OK key and flashing arrow becomes solid and audible alarm sounds.
 - •The lower LCD will display the total area and the ACRE (or Ha) icon turns on.
 - •With the flashing arrow on TOTAL AREA, press the OK key.
 - •To reset counter, press the UP and DOWN arrow keys at the same time and hold them down for a short period of time to clear the data. The CLEAR? icon will be displayed and the monitor will beep several times. When the data is actually cleared, the monitor will emit a long beep, and the total area is reset to zeros. After the long beep, the previous recorded total area is not retrievable. Once cleared, the user may not choose to exit programming mode without saving as described in STEP 4.

STEP 4 To exit and save, press and hold the OK key. The monitor emits several short beeps and SAVE? icon is turned on. After a short time a long beep is heard, and the lower LCD will display the word "DONE". Release the OK key. If the OK key is released BEFORE the word "DONE" is displayed, the changes WILL NOT BE SAVED. The word "DONE" MUST be displayed in order for the save to have occurred.

NOTE: Programming mode may be exited at any tim by pressing the SETUP key. Pressing this key returns the monitor to its normal operation. All items changed and saved come into effect immediately. Any items changed, but not saved revert to original programmed value.

AREA COUNTER/SPEEDOMETER MODE

If the monitor is installed with only a radar distance sensor (no seed tubes attached), the monitor becomes a speedometer. If (a) the monitor is connected to a radar distance sensor, (b) signal cable from back of console is connected to a sensing switch (Part No. G1K249 Acre Counter Switch Kit) instead of seed tubes and (c) implement width in feet (or meters) is programmed into monitor, monitor functions as an area counter.

Seed spacing and seed population functions are not available in this mode. If the monitor is powered down, the seed tubes connected and the monitor powered up, the monitor again shows seed population and seed spacing in inches or centimeters. Row spacing reverts back to its programmed setting.

WARNINGS AND ALARMS

 System Alarms - A system alarm is activated when the monitor detects a faulty sensor or one of several other communication faults.

The corresponding row number starts flashing and the audible alarm sounds. All segments on the corresponding bargraph are turned off. Pushing the OK key to acknowledge the warning will turn the alarm off. The row number will continue to flash until the alarm condition is removed. If the monitor detects a faulty sensor and there is no planting activity present, the monitor will scroll "CHECK CONNECTION".

If the distance sensor is detected as faulty, the monitor displays "PICKUP" or "RADAR", depending on type of sensor installed, and the audible alarm sounds. The user can push the OK key to acknowledge the alarm. When the distance sensor is faulty, the monitor changes to a bargraph only mode where rows are still displayed relative to each other. No area related information (speed, field area, total area, seed spacing or seed population) will be accumulated or displayed.

If a rotation shaft sensor is faulty, "LSHAFT", "RSHAFT" or "SHAFTS" displays.

Another type of system alarm occurs when the monitor detects a data communication bus error.

The four possible data communication bus errors are:

LCD Display	Error Condition
SYS HI	Data communication lead (green) is shorted to power lead (white).
SYS LO	Data communication lead (green) is shorted to ground lead (black).
SYS EC	An internal error has been detected.
COP	Power cycled ON/OFF too quickly.

2. Under Flow Alarms - If seed rate for one or more rows is less than 55% of calculated average, corresponding 60% segment will stay on, the corresponding row number starts flashing and the alarm sounds. Pushing the OK key to acknowledge the warning will turn the alarm off. The 60% segment of the bargraph remains on and the row number continues to flash until the alarm condition is corrected.

NOTE: Alarms present before planting stops are frozen on screen and LOW or FAIL displays on the LCD. If under flow is between 0% and 10%, this warrants a "FAIL" condition. If under flow is between 10% and 55%, a "LOW" condition is generated. If multiple rows have an under flow condition, "FAIL" displays if one or more rows is between 0% and 10%. This allows the user to identify and fix problem rows.

NOTE: Warning will not trigger unless a minimum time of continuous planting has passed.

NOTE: If all the rows show a seed rate of zero, the condition will not generate an alarm. It will be assumed the planter has stopped. The row numbers and the bottom 60% segment will remain on for all selected rows.

- 3. Multiple Alarms If more than one alarm condition occurs at the same time, pushing the OK key acknowledges all alarms. For example, if one row on the front and one row on the rear are alarming, pushing the OK key only acknowledges one of them. However, if there are two alarms on the front, both alarms would be acknowledged with one push of the OK key.
- 4. Section Not Selected Warning If the monitor was programmed for two sections and only one is currently selected for display (by pressing the SELECT key), the icon of the disabled section will flash for a period of 1 minute, then turn off at each power up. If seed flow is sensed in the disabled section, the icon for that section (front, left or right) will begin to flash.
- 5. Seed Planting Stopped Warning When the monitor detects no seed flow on all rows, the monitor will emit 3 short beeps to alert the user. This warning will occur each time the planter is stopped, each time the planter is raised at the end of a row or if the mechanical drive fails while planting.

NOTE: This warning will not trigger unless a minimum time of continuous planting has passed.

- 6. Seed Counting Sensor In Calibration Warning All seed counting sensors run a self-calibration sequence on power up. While in calibration the bottom segment of each corresponding bargraph will flash if the monitor detects movement or planting activity. If the monitor does not detect this, the message "WAIT CALIBRATION" will be scrolled.
- 7. Seed Counting Sensor Too Dirty Warning After the seed counting sensors end their internal self-calibration, the monitor may detect one or more sensors are either too dirty or blocked. If the monitor detects planting or movement, the corresponding bargraph remains flashing. The monitor will display "CLEAN SENSORS" on the top LCD if no movement or planting is detected, prompting the user to clean the tubes. If the tubes are dirty, they will still show seed flow with less accuracy. If the tubes are blocked the user will get an alarm as soon as planting starts. The corresponding bargraph will remain flashing until the problem is corrected and the monitor is powered down and then powered back up.
- 8. Low Battery Warning The monitor is constantly monitoring its input voltage to quickly detect low power conditions. If the monitor detects that the input voltage has dropped below 11.0V, it will display "LO SYS" on the lower LCD on the KPM II Stack-Mode console, provided that the monitor does not detect speed or planting.

NOTE: After the alarms have been acknowledged and if the alarm condition is still present, the LCD will continue to display the alarm condition.

REPLACING A FAULTY SENSOR

NOTE: Stack-Mode Seed Sensors are identified by a blue 3-pin connector. Replace Stack-Mode Seed Sensors with like components only.

To replace a faulty sensor; (a) disconnect the faulty sensor and check the monitor to be sure the correct sensor was disconnected, (b) <u>turn the monitor off.</u> (c) after a few seconds, <u>turn the monitor back on</u> and (d) plug in the replacement sensor. The monitor will chirp twice to acknowledge the new sensor was learned and saved.

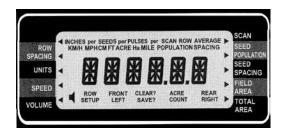
To replace more than one faulty sensor, proceed as stated above for <u>rear/front or left/right configurations</u> beginning with the lowest numbered row in the rear or left section and continue to replace sensors in ascending order. Then move on to the front or right section and continue in ascending order. For <u>four section configurations</u>, begin with rear/left and continue to rear/right, then front/left and ending with front/right.

If the monitor detects a faulty distance sensor, the lower LCD will immediately move to the speed display, show the word "PICKUP" or "RADAR" depending on the distance sensor installed, and the alarm will sound.

NOTE: If the monitor is not turned off and then on, the replacement sensor(s) will be ignored until the next power on, at which point the sensors will be randomly learned by the monitor.

FIELD OPERATION				
Press ON/OFF key to turn monitor on. Information regarding each section is displayed alternately every 5 seconds.	ON OFF			
REAR/FRONT CONFIGURATION (Without SMM Console Installed) Press SELECT key once to show REAR section only. (Monitor sets correct row spacing.) Press SELECT key a second time to return to each section being displayed alternately every 5 seconds on KPM II Stack-Mode console. (Monitor sets correct row spacing.) Press SELECT key a third time to show REAR section only.	SELECT			
REAR/FRONT CONFIGURATION (With SMM Console Installed) Press SELECT key once to show REAR section only on KPM II Stack-Mode console. (Monitor sets correct row spacing.) Press SELECT key a second time to show FRONT section on SMM console and REAR section on KPM II Stack-Mode console. (Monitor sets correct row spacing.) Press SELECT key a third time to show REAR section only again.	SELECT			
FOUR SECTION CONFIGURATION (With SMM Console Installed) Press SELECT key once to show REAR and LEFT sections on KPM II Stack-Mode console and REAR and RIGHT sections on SMM console. (Monitor sets correct row spacing.) Press SELECT key a second time to return to all four sections, alternating right front and right rear on SMM console and alternating left front and left rear on KPM II Stack-Mode console. (Monitor sets correct row spacing.) Press SELECT key a third time to show REAR and LEFT sections on KPM II Stack-Mode console and REAR and RIGHT sections on SMM console again.	SELECT			
NOTE: SELECT key has no function when a single section is used.				

Lower LCD shows speed (MPH or KM/H) at power up.



Press UP or DOWN arrow keys to move flashing arrow on lower LCD to change what is displayed.



Press the shortcut keys SPEED, SEED POPULATION/ SEED SPACING or AREA FIELD/TOTAL for direct access to these displays.







Press SEED POPULATION/SEED SPACING or AREA FIELD/TOTAL keys to alternate between the two functions assigned to that key.



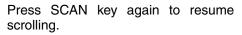


Press SEED POPULATION/SEED SPACING key to choose average seed spacing/population per acre.

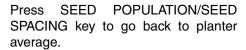


Press SCAN key to display individual rows starting at row 1.

Press SCAN key again to lock on current row.



Use UP or DOWN arrow keys to move to a particular row.









CLEARING FIELD AREA

(MTR29n/MTR28b)

To reset the counter, press the UP or DOWN arrow keys to move the arrow in the lower display to FIELD AREA.



Press UP and DOWN arrow keys at the same time and hold them down for a short period of time to clear data. The CLEAR? icon displays and the monitor beeps several times. When data is actually cleared, the monitor emits a long beep and the field area is reset to zero. After the long beep, the previous field area recorded is not retrievable.



NOTE: Clearing the field area counter <u>will not</u> clear the total area counter. See "Programming-Clearing Total Area" for clearing total area.

Press the OK key to silence alarms. See "Warnings And Alarms".

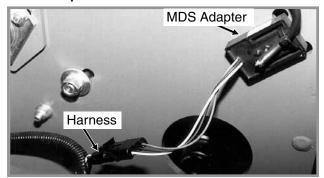


PROGRAMMING/CONNECTING SMM CONSOLE, SHAFT ROTATION SENSORS, SEED TUBES AND/OR RADAR/ MAGNETIC DISTANCE SENSORS

STEP 1 All sensors (including seed tubes w/sensors, radar, magnetic distance, SMM console and shaft rotation sensors) must be unplugged from the harness and/or console and the monitor must be off.

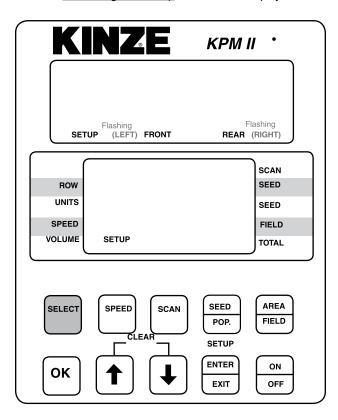
NOTE: If the monitor detects a radar sensor but no seed tubes at power up, it automatically goes into AREA COUNT mode. See "Area Counter/Speedometer Mode".

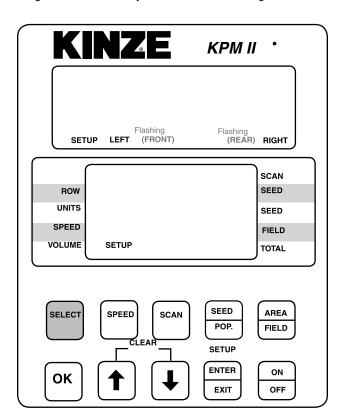
NOTE: Disconnect magnetic distance sensor between MDS adapter and planter harness. DO NOT disconnect between MDS and MDS adapter.





- STEP 2 Press ON key. Monitor automatically enters setup procedure. Monitor scrolls "NO SENSOR" on top LCD of KPM II Stack-Mode console.
- The monitor automatically defaults to rear/front. Press SELECT key once for left/right and twice for four sections (front right/front left/rear right/rear left). The selected display will be solid and configuration not currently selected will be flashing.

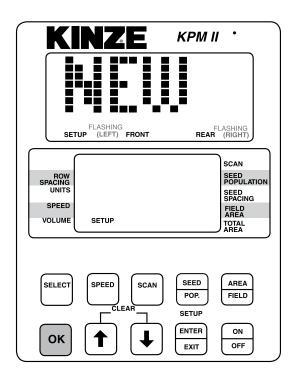


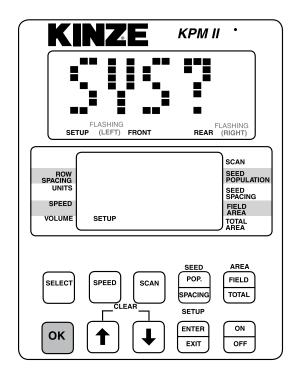


STEP 4 Press and hold the OK key to confirm selection. The upper display will alternate between "NEW" and "SYS?".

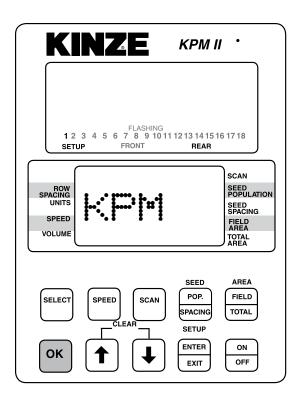
The alarm will sound four short beeps followed by one long beep. At this point your selection has been saved and row numbers will appear flashing on the upper display of the KPM II.

NOTE: <u>Illustrated using rear/front configuration</u>. The KPM II Stack-Mode console shows LEFT in the left/right configuration, REAR in the rear/front configuration and FRONT LEFT/REAR LEFT in the four sections configuration.

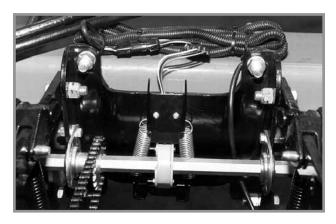




STEP 5 (If Applicable) Connect SMM console into junction Y-harness which was installed between the KPM II Stack-Mode console and the primary harness. The SMM console will show a lighted screen and KPM will show on the lower LCD.



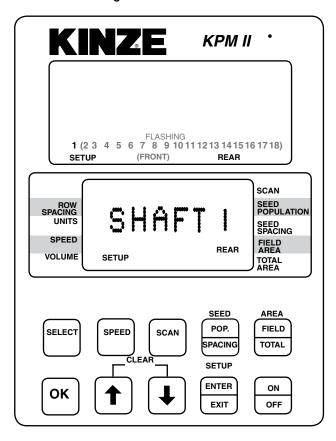
STEP 6 If the monitor system includes <u>shaft rotation sensors</u>, these should be installed at this time. Plug in the L.H. shaft first, then the R.H. shaft. L.H. and R.H. is determined by facing in the direction the machine will travel when in use.

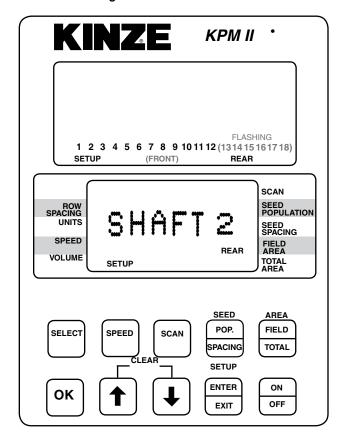




"LSHAFT" or "SHAFT 1" will display on the lower LCD when the first shaft rotation sensor is installed. "RSHAFT" or "SHAFT 2" will display when the second shaft rotation sensor is installed.

NOTE: <u>Illustrated using rear/front configuration</u>. The KPM II Stack-Mode console shows LEFT in the left/right configuration, REAR in the rear/front configuration and FRONT LEFT/REAR LEFT in the four sections configuration.

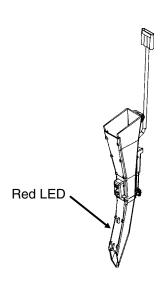


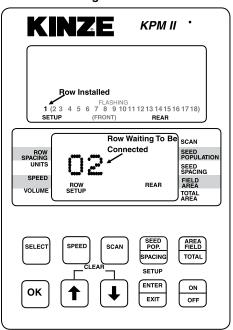


STEP 7 Determine which row you want as number one and plug seed tube w/sensor into harness.

Continue plugging in sensors along with shaft rotation sensors if so equipped. Row 1 first, row 2 second and so on up to 18 rows. When a sensor is plugged in, the corresponding row number on upper LCD display will stay solid, monitor will chirp twice and a red LED (Light Emitting Diode) on the seed tube sensor will turn on for approximately 30 seconds to show connection is made.

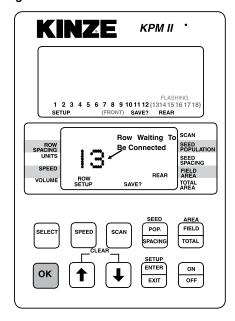
NOTE: <u>Illustrated using rear/front configuration</u>. The KPM II Stack-Mode console shows LEFT in the left/right configuration, REAR in the rear/front configuration and REAR LEFT/FRONT LEFT in the four sections configuration.

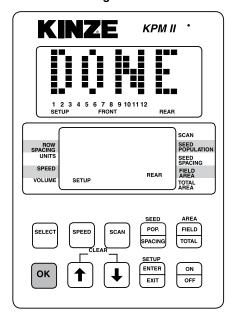




When all seed tubes for the current section (rear/front, left/right or four section) are installed, check to be sure the upper LCD on KPM II Stack-Mode console displays solid numbers for the number of seed tubes connected. Press and hold OK key to save current section setup. The SAVE? icon will display followed by continuous short beeps indicating the monitor is preparing to save. The installer has 5 seconds to decide to save the current configuration. During this time, four short beeps will sound followed by a long beep and the SAVE? icon will turn off and the word "DONE" shows on the screen. The monitor will continue to the second section installation (If Applicable).

NOTE: <u>Illustrated using rear/front configuration</u>. The KPM II Stack-Mode console shows LEFT in the left/right configuration, REAR in the rear/front configuration and FRONT LEFT/REAR LEFT in the four sections configuration.

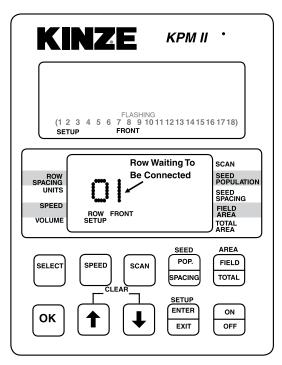


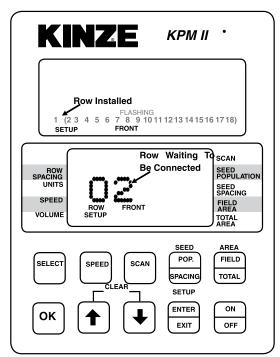


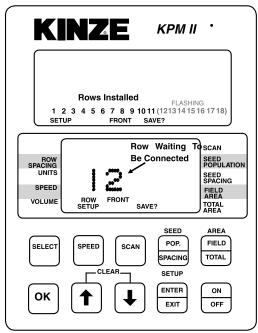
STEP 9 Follow STEPS 6, 7 and 8 to install the second, third and fourth sections (If Applicable). If no seed tubes are installed on the additional sections, press and hold the OK key. "DONE" appears on upper display. Alarm sounds four short beeps followed by one long beep and SAVE? icon turns off. The monitor has exited the setup mode. When you release the OK key upper display scrolls "WAITING CALIBRATION". Lower display shows "GNDSPD" and alarm sounds continually until distance sensor is connected. See STEP 10.

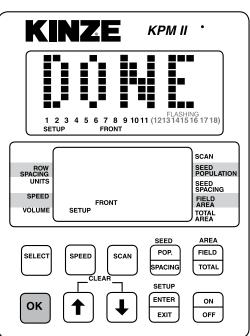
NOTE: SMM console LCD remains blank (except the backlighted screen) until entire system is saved.

NOTE: <u>Illustrated using rear/front configuration</u>. The KPM II Stack-Mode console shows LEFT in the left/right configuration, REAR in the rear/front configuration and FRONT LEFT/REAR LEFT in the four sections configuration. The SMM console shows RIGHT in the left/right configuration, FRONT in the front/rear configuration and FRONT RIGHT/REAR RIGHT in four sections configuration.





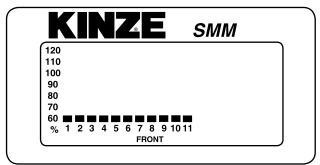


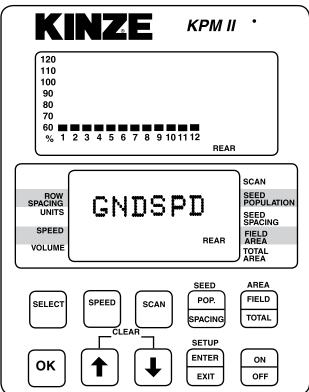


STEP 10 With the lower display showing "GNDSPD", connect the distance sensor. The monitor will display "PICKUP" if a <u>magnetic distance sensor</u> is connected or "RADAR" if a <u>radar distance sensor</u> is installed. Only one distance sensor can be connected at a time.

NOTE: To connect the radar distance sensor, install the 10" monitor/radar adapter between the console and radar distance sensor to adapt the monitor system to various tractor radar systems. DO NOT CONNECT 10" MONITOR/RADAR ADAPTER PRIOR TO THIS STEP

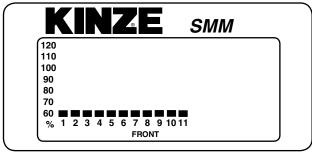
NOTE: <u>Illustrated using rear/front configuration</u>. The KPM II Stack-Mode console shows LEFT in the left/right configuration, REAR in the rear/front configuration and FRONT LEFT/REAR LEFT in the four sections configuration. The SMM console shows RIGHT in the left/right configuration, FRONT in the rear/front configuration and FRONT RIGHT/REAR RIGHT in four sections configuration.

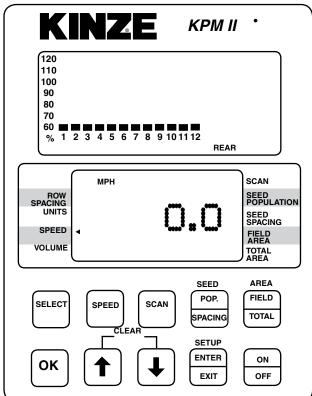




NOTE: To reprogram the system to monitor more or less rows (up to the maximum of 18 per section, 72 total in four section configuration), all sensors must be unplugged, followed by the complete setup procedure.

NOTE: Individual seed tubes may be unplugged for special situations. An alarm will sound which can be silenced by touching the OK key. The monitor will recognize the seed tube(s) when reconnected.





NOTE: SMM console may not be applicable to all models.

ROW-BY-ROW ALARM LEVEL SETTING

(Requires Version V2.05 Or Higher Software - KPM II Stack-Mode Monitors Only)

This feature allows the audio alarm to be disabled on selected rows in applications such as planting seed corn.

NOTE: Program system to monitor all planter rows before performing these steps.

STEP 1 Enter programming mode by pressing and holding SETUP key. Monitor emits several short beeps, followed by a long beep. On lower LCD, SETUP icon turns on and arrow head icon flashes, indicating the user can select an item to program.

NOTE: Monitor must be in a programmable function (row spacing, unit, speed, volume or area) to enter setup. Monitor will not enter setup in seed population or seed spacing.

STEP 2 Press UP or DOWN arrow keys to move flashing arrow to SEED POPULATION. As arrow icon moves, the lower LCD will display current setting of each item selected.

NOTE: Illustrated using rear/front configuration. The KPM II Stack-Mode console shows LEFT in the left/right configuration, REAR in the rear/front configuration and FRONT LEFT/REAR LEFT in the four sections configuration. The SMM console shows RIGHT in the left/right configuration, FRONT in the rear/front configuration and FRONT RIGHT/REAR RIGHT in four sections configuration.

- **STEP 3** Press the OK key. Row number starts flashing.
- STEP 4 Arrow UP or DOWN to desired row.
- STEP 5 Press SELECT key. "AVG" starts flashing.
- **STEP 6** Arrow UP or DOWN to choose one of the following options.

HIGH - For Early Alarm (70%)

AVG - For Standard Alarm Setting (55%)

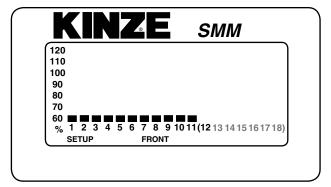
LOW - For Failed Alarm Only (25%)

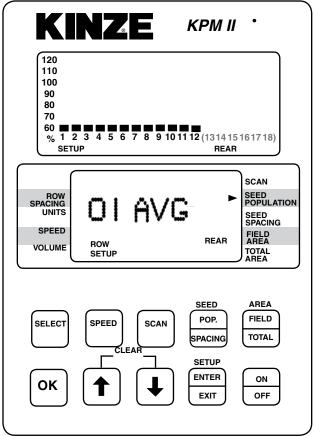
OFF - To Disable Row Alarm

- STEP 7 Press and hold the OK key to save alarm setting.
 There will be four short beeps, one long beep and the word "DONE" will appear when the save is completed.
- **STEP 8** Repeat STEPS 3 through 7 for each row on which you wish to adjust the alarm setting.
- **STEP 9** When finished, press SETUP key to exit setup mode.

NOTE: Programming mode may be exited at any time by pressing SETUP key. Pressing this key will return monitor to its normal operation. All items changed and saved will come into effect immediately. Any items changed, but not saved will revert to the original programmed value.

NOTE: Repeat STEPS 3 through 7 to change seed monitor back to original settings when special row-by-row alarm level settings are no longer required.





NOTE: SMM console may not be applicable to all models.

NOTE: See "Programming - Row Spacing" for programming applicable row spacing.

See "KPM I/KPM II Stack-Mode Electronic Seed Monitors Troubleshooting" in the Troubleshooting Section.

KPM III ELECTRONIC SEED MONITOR VER. 3.1

INTRODUCTION

Model 3200



The KPM III electronic seed monitor system consists of:

- A tractor mounted KPM III console powered by tractor 12 VDC battery receives and displays information from planter mounted sensors.
- Seed tube and sensor installed in each planter row unit.
- A magnetic distance sensor installed on planter or a radar distance sensor installed on tractor.
- Shaft rotation sensors (if applicable) installed on planter drill shafts.
- Vacuum, pneumatic down pressure, ASD, and hydraulic level/temperature (If applicable), installed on planter.
- Planter harnesses (junction Y-harness and extension harness where applicable), to which the individual seed tube sensors connect. The primary harness, which connects the monitor console to the planter harness, is hard-wired into the safety/warning light harness or control console harness included as standard equipment with the planter.

The KPM III console uses a backlit Liquid Crystal Display (LCD) to show number of monitored rows, relative seed rate for each row (using bargraph displays), and alarm and warning messages. A continuous audible alarm sounds upon system malfunction or underflow conditions for any monitored row. Alarms must be acknowledged. Various warnings also sound an alarm or flash one or more messages. The LCD displays row spacing, units (Metric or English), speed (MPH or KM/H), volume, seed population, seed spacing, field area, and total area.

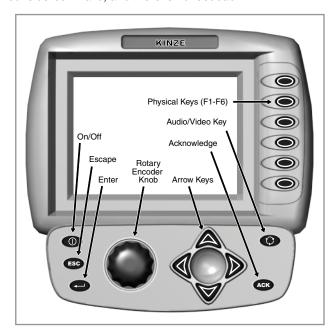
KPM III software allows simultaneous viewing of seed flow bargraphs for standard and Interplant System rows (up to 36 rows).

The monitor system powers down if there is no new seed flow or operator push key input within one hour.

Acre Count Mode		General Settings (Programming Interplant condition, row spacing and units) (Metric or English) 6-28
Adding Interplant Rows		Monitor Key Functions 6-25
(Rear Rows Previously Programmed Only)	6-32	Programming/Connecting Seed Tubes,
Area Counters	6-48	Shaft Rotation Sensors, and/or Radar/Magnetic
Area Management	6-47	Distance Sensors 6-36
Changing Volume, Contrast, and		Programming Row Unit Alarm Levels 6-30
Backlighting with AV Key	6-26	Replacing Faulty Sensor(s) 6-49
Clearing Field Area	6-49	Reprogramming Speed Sensor 6-34
Configuring Planter Monitor		Seed Meter Settings 6-29
Data Logging Mode		Speed Sensor Calibration/Programming 6-37
Enabling/Disabling Interplant Rows		Test Mode
Field Operation		Warnings and Alarms 6-44

MONITOR KEY FUNCTIONS

Push keys select or change operating mode, active displays, or the current configuration. Depending on operating mode or current display selected, some keys may not be active. Each valid key press is acknowledged by a short beep and an action is taken. If a key press has no action associated, it is considered invalid, and there is no feedback.



PHYSICAL KEYS

- Located on R.H. side of console and referred to as F1, F2, F3, F4, F5 and F6
- Keys are referenced in descending order with F1 at the top and F6 at the bottom.

ON/OFF KEY

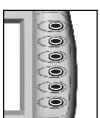
· Powers the unit on and off.

ESC KEY

· Used as the CANCEL (escape) key.

ENTER KEY

Confirms or accepts the highlighted selection



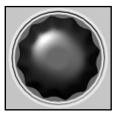






ROTARY ENCODER KNOB

- Turn knob clockwise to increase or counterclockwise to decrease value of item.
- Turn knob clockwise to scroll up or counterclockwise to scroll down.
- · Press knob to enter selection.



AV (AUDIO/VIDEO) KEY

- Set alarm volume.
- · Adjust the contrast.
- Adjust backlighting of the LCD display.
 Can be used at any time.



ACK (ACKNOWLEDGE) KEY

 Used to silence (acknowledge) the warning alarm when various error conditions occur.

NOTE: Alarms can be viewed by pressing the STATUS key.

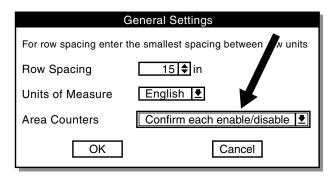


ARROW KEYS

- UP arrow key is used to move up.
- DOWN arrow key is used to move down.
- LEFT arrow key is used to move to the left.
- RIGHT arrow key is used to move to the right.



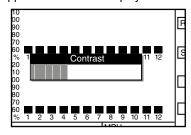
NOTE: Within the LCD, the black box around the smaller box as shown below indicates which field is selected/ highlighted. Turning the rotary encoder knob or pressing the UP or DOWN arrow keys moves the black box. When the black box is positioned on a programmable item, such as Shaft Sensors, Speed Sensor, Front Row Units or Rear Row Units, pressing the knob or ENTER key will highlight the programmable item. A programmable item may only be changed when it is highlighted.



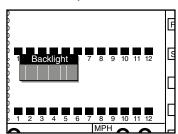
CHANGING VOLUME, CONTRAST, AND BACKLIGHTING WITH AV KEY

Alarm, volume, LCD screen contrast, and backlighting may be adjusted at any time, regardless of what is displayed on screen.

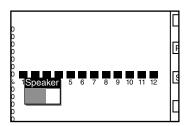
STEP 1 Press AV key. Contrast adjustment dialog box appears in center of display.



- STEP 2 Use arrow keys or turn rotary encoder knob to adjust contrast. Adjustment will be visible on the screen.
- STEP 3 To adjust speaker or backlight, go to STEP 4. If finished press Enter key to save and exit.
- STEP 4 Press AV button a second time. The Backlight adjustment dialog box will appear in center of the display.
- STEP 5 Use arrow keys or turn knob to adjust backlighting. The effect of the adjustment will be visible on display.



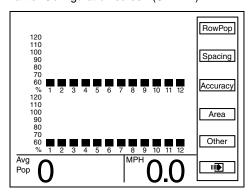
- STEP 6 To adjust speaker go to STEP 7. If finished press Enter key to save and exit.
- STEP 7 Press AV button a third time. Speaker adjustment dialog box will appear in center of display.



- STEP 8 Use arrow keys or turn knob to adjust speaker volume. Volume of sound emitted from speaker changes as adjustment is made.
- STEP 9 Press knob, Enter key or press AV button a fourth time to save volume, contrast, and backlight settings.

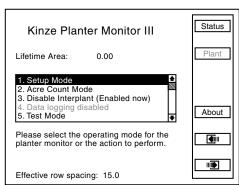
CONFIGURING PLANTER MONITOR

When the KPM III is powered on for the first time it will go directly into the Planter Configuration screen (STEP 4).



NOTE: Planter Configuration screen displays planter rows as programmed into KPM III software. The above screen shows 12 front (Interplant) rows and 12 rear rows. If the KPM III were programmed for 8 front (Interplant) rows and 8 rear rows the screen would display 8 front and 8 rear rows.

STEP 1 Press the F6 key until Mode Selection screen appears.



NOTE: There are 5 choices on the Mode Selection screen;

- 1. Setup mode
- 2. Acre count mode
- 3. Disable Interplant (Enabled now) mode
- 4. Data logging mode
- Test mode

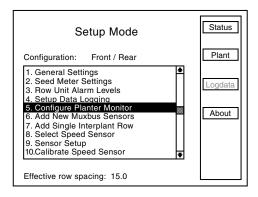
STEP 2 Select "1. Setup Mode" by turning the rotary encoder knob or using the arrow keys. Press the knob or Enter key to display the highlighted item.

NOTE: There are 10 choices on the Setup Mode screen;

- 1. General Settings
- 2. Seed Meter Settings
- 3. Row Unit Alarm Levels
- 4. Setup Data Logging
- 5. Configure Planter Monitor
- 6. Add New Muxbus Sensors
 7. Add Single Interplant® Row
- 8. Select Speed Sensor
- 9. Sensor Setup
- 10. Calibrate Speed Sensor

STEP 3 Select "5. Configure Planter Monitor" by turning the knob or using the arrow keys. Press the knob or the Enter key to display the highlighted item.

NOTE: Press F2 key next to Plant any time Plant option is available to return to Planter Configuration screen.



NOTE: Planter monitor cannot be reconfigured while planting.

STEP 4 If there are front rows (Interplant) on planter, press knob or Enter key to highlight "Front Rows" field. A drop down number pad appears. Turn knob or use arrow keys to highlight correct value then press tknob to select number. For numbers containing more than one digit select one digit at a time. When desired quantity is displayed above number pad press Enter key to return to "Kinze Planter Configuration" screen. If planter has no front rows turn knob or press arrow keys to advance to "Rear Rows".

Kinze Planter Configuration				
Planter Type	Sensors Installed			
Front Rows 0 🕏	Speed Radar <u>₹</u>			
Rear Rows 1 2 3 C	Vacuum 0♦			
Shafts 789→	SDS 0₹			
There should be one sensor for each Bow and each Shaft.	Hydraulic Level/Temp			
for each flow and each chart.	Downpressure Level			
	SDS = Seed Delivery System			
OK	Cancel			

STEP 5 Press knob or Enter key to select "Rear Rows" field.
A drop down number pad appears. Turn knob or use arrow keys to highlight correct value then press knob to select number. For numbers containing more than one digit select one digit at a time. When desired quantity is displayed above number pad, press Enter key to return to "Kinze Planter Configuration"

Kinze Planter Configuration		
Planter Type	Sensors Installed	
Front Rows 11	Speed Radar <u>▼</u>	
Rear Rows 0 🗢	Vacuum 0♦	
Shafts 1 2 3 C 4 5 6 C	SDS 0₹	
There should be 7 8 9 → for each Row and 0 -	☐ Hydraulic Level/Temp	
or each flow and	Downpressure Level	
	SDS = Seed Delivery System	
OK	Cancel	

STEP 6 Rotate knob or use arrow keys to advance to "Shafts" field. Press knob or Enter key to select "Shaft" field. A drop down menu appears. Turn knob or use arrow keys to highlight number of "Shafts". When correct value is displayed, press knob or Enter key to return to "Kinze Planter Configuration" screen.

Kinze Planter Configuration		
Planter Type	Sensors Installed	
Front Rows 114	Speed Radar <u>▼</u>	
Rear Rows 12 \$	Vacuum 0♦	
Shafts 2₹	SDS 0₹	
There should be 1 isor for each Row and 2 Shaft.	Hydraulic Level/Temp	
4	Downpressure Level	
	SDS = Seed Delivery System	
ОК	Cancel	

STEP 7 Turn knob or use arrow keys to move to "Speed" field. Press knob or Enter key and a drop down menu displays. Select "Radar" or "Coil Pick-Up" (MDS) by turning knob or using arrow keys. When desired selection is highlighted press knob or Enter key.

Kinze Planter Configuration			
Planter Type	Sensors Installed		
Front Rows 114	Speed Radar <u>▼</u>		
Rear Rows 12	Vacuum Coil Pick-Up		
Shafts 2₹	SDS 0₹		
There should be one sensor for each Bow and each Shaft.	Hydraulic Level/Temp		
	Downpressure Level		
	SDS = Seed Delivery System		
OK	Cancel		

- STEP 8 If applicable, turn knob or use arrow keys to advance to "Vacuum". Press knob or Enter key and a drop down menu will appear. Select correct number of vacuum sensors by turning knob or using arrow keys. Confirm selection by pressing knob or Enter key.
- STEP 9 If applicable, turn knob or use arrow keys to advance to "SDS" (Seed Delivery System), Press knob or Enter key. A drop down menu will appear. Select correct number of SDS Sensors by turning knob or using arrow keys. Press knob or Enter key to confirm selection.
- STEP 10 If applicable, turn knob or use arrow keys to advance to "Hydraulic Level/Temp". Press knob or Enter key to select or deselect. When selected, a check mark will appear in the box.
- STEP 11 If applicable, turn knob or use arrow keys to advance to "Downpressure Level". Press knob or Enter key to select or deselect. When selected, a check mark will appear in the box.
- STEP 12 Advance to "OK" by using knob or arrow keys. Press knob or the Enter key to save information.

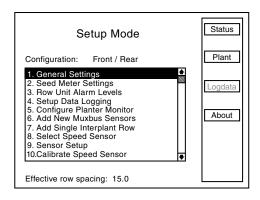
Kinze Planter Configuration			
Planter Type	Sensors Installed		
Front Rows 114	Speed Radar <u>▼</u>		
Rear Rows 12\$	Vacuum 0♦		
Shafts 2 ₹	SDS 0₹		
There should be one sensor for each Bow and each Shaft.	☐ Hydraulic Level/Temp		
lor sacrificm and sacrificman	Downpressure Level		
	SDS = Seed Delivery System		
ОК	Cancel		

NOTE: To prevent configuration from being saved select "Cancel" and press rotary encoder knob or Enter key. Display will return to "Setup Mode" screen without saving any changes.

NOTE: When OK is selected monitor automatically advances to Sensor Setup screen. Sensor Setup can also be selected from Setup Mode screen. Go to page 6-13 (PROGRAMMING/CONNECTING SEED TUBES, SHAFT ROTATION SENSORS AND/OR RADAR/MAGNETIC DISTANCE SENSORS)

GENERAL SETTINGS (PROGRAMMING INTERPLANT CONDITION, ROW SPACING AND UNITS) (METRIC OR ENGLISH)

STEP 1 Turn knob or use arrow keys to highlight "1. General Settings". Press knob or Enter key to display highlighted item



NOTE: When English is selected inches are displayed, if Metric is selected centimeters are displayed.

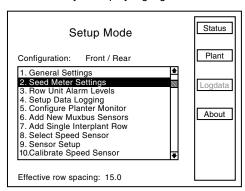
STEP 2 Press knob or Enter key to enter correct value for "Row Spacing". A drop down number pad will appear. Turn knob or use arrow keys to highlight first digit of desired number and press knob. The number will appear in "Row Spacing" line. Turn knob or arrow keys to highlight next digit of number and press knob. Number will appear in "Row Spacing" line. When correct number is displayed in "Row Spacing" line, press Enter key to return to "General Settings" screen.

NOTE: Enter narrowest row spacing planter is equipped to plant for "Row Spacing". Example: 12 Row 30 with Interplant, row spacing would be set to 15.

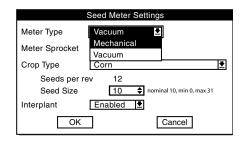
- STEP 3 Turn knob or use arrow keys to highlight "Units of Measure" field. Select "Units of Measure" field by pressing knob or Enter key, a drop down menu will appear. Highlight "English" or "Metric" by turning knob or using arrow keys. When correct entry is highlighted, press knob or Enter key to accept unit of measure entry and return to "General Settings" screen.
- STEP 4 Turn knob or use arrow keys to highlight "Area Counters" field. Select "Area Counters" field by pressing knob or Enter key, a drop down menu will appear. Turn knob or use arrow keys to highlight "Confirm each enable/disable", "Don't confirm again today", or "Don't confirm enable/disable". When desired selection is highlighted, press knob or Enter key to accept selection and return to "General Settings" screen.
- STEP 5 Once correct values are inputed into "General Settings" screen "OK" button can be selected to save changes, or "Cancel" button can be selected to discard changes. Turn knob or use arrow keys to highlight either "OK" or "Cancel" and press knob or Enter key to return to "Setup Mode" screen.

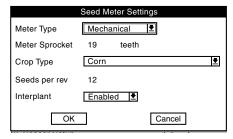
SEED METER SETTINGS

STEP 1 Scroll to "2. Seed Meter Settings" by turning rotary encoder knob or using arrow keys. Press knob or Enter key to display highlighted item.

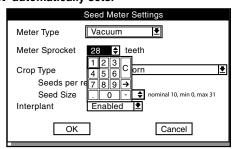


STEP 2 Select meter type by highlighting "Meter Type" and pressing knob or Enter key, then highlight "Mechanical" or "Vacuum" and press knob or enter key.





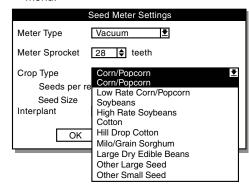
NOTE: When Mechanical "Meter Type" is selected "Meter Sprocket" automatically sets.



NOTE: When Vacuum "Meter Type" is selected "Meter Sprocket" automatically defaults to 28 teeth. To change "Meter Sprocket" select "Meter Sprocket" by turning knob or using arrow keys. Press knob or enter key, a drop down number pad displays. Turn knob or use arrow keys to highlight first digit of desired number and press knob. When correct number is obtain press knob or enter key.

STEP 3 Turn knob or use arrow keys to highlight "Crop Type".

Press knob or Enter key to display crop drop down



STEP 4 Turn knob or use arrows keys to highlight a crop for planting then press knob or Enter key. Once crop type is entered, "Seeds per rev" is automatically set .

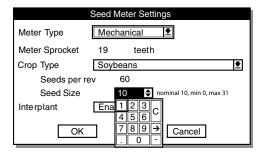
A sensitivity threshold (Seed Size) ensures dust and other debris are filtered out and only actual seeds are counted. Sensitivity threshold is set to a default for a selected crop which is adequate for most conditions.

Sensitivity can be set between 0 and 31, 0 being most sensitive (counts smallest particles) and 31 least sensitive (counts large particles). Adjust threshold one value at a time until desired result is achieved. Once value is changed it becomes default for that crop.

NOTE: Adjusting threshold too high can cause monitor to miss seeds and provide inaccurate information. Always do a ground check to ensure monitor is reading accurately.

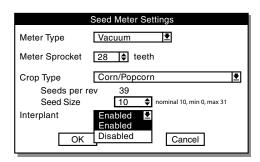
- STEP 5 Select "Seed Size" and press ENTER key. A drop down number pad displays.
- STEP 6 Turn knob or use arrow keys to highlight first digit of desired number. Press knob. When correct number is obtained, press knob or Enter key.
- STEP 7 Turn knob or use arrow keys to highlight "Crop Type".

 Press knob or Enter key to display the crop drop down menu.



STEP 8 Turn knob or use arrows keys to highlight a crop for planting then press knob or Enter key. Once crop type is entered, the "Seeds per rev" is set automatically.

STEP 9 (If Applicable) Turn knob or use arrow keys to highlight "Interplant". Press knob or Enter key to display Interplant drop down menu.



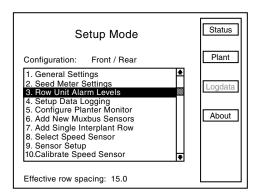
STEP 10 Turn knob or use arrow keys to highlight "enable" or "disable" and press the knob or Enter key.

STEP 11 When all changes have been made, highlight "OK" and press knob or Enter key to return to "Setup Mode" screen.

PROGRAMMING ROW UNIT ALARM LEVELS

Row Unit Alarm Levels allow thresholds for seed rate alarms to be set. Default is 50% or Average. If average population drops below 50% for a given row a seed rate alarm is generated for that row unit. The alarm threshold can be set to 70%, 50%, 0% or disabled, or any custom percentage for any row.

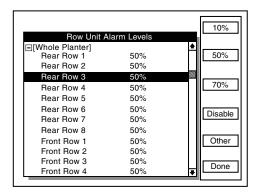
NOTE: When alarm threshold is disabled for any row no seed rate alarm will be generated.



Alarm thresholds can be set for whole planter, any planter section, or individual rows.

NOTE: A section is a set of rows driven by one or more shafts, designated to a single shaft sensor.

STEP 1 Select "3. Row Unit Alarm Levels" by turning knob or using arrow keys. Press knob or Enter key to display highlighted item.



STEP 2 To set alarm thresholds for whole planter, turn knob or use arrow keys to highlight "[Whole Planter]" line. Press key next to desired threshold. When desired threshold is specified for all row units, press F6 key next to "Done".

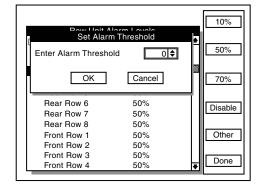
NOTE: Only configured rows appear on screen.

To set alarm thresholds for all rows in one section, highlight desired section. Press key next to desired threshold. When desired threshold is specified for all row units, press F6 key next to "Done".

To set alarm thresholds for individual rows, highlight desired row. Press key next to desired threshold. When desired threshold is specified for all row units, press F6 key next to "Done".

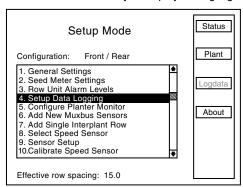
<u>To disable row unit alarm</u>, highlight desired section or individual row. Press F4 key next to "Disable". When alarm is desired again highlight disabled section or row. Press key next to desired threshold.

To enter threshold not listed, highlight desired section or individual row. Press F5 key next to "Other". Press knob or Enter key and a drop down key pad appears. Turn knob or use arrow keys to highlight first digit of desired number and press knob. Number displays in "Enter Alarm Threshold" line. Highlight next digit of the number and press knob. Number displays in the line. When correct number is displayed, press Enter key to return to "Set Alarm Threshold" screen. Turn knob or use arrow keys to advance to "OK". Press knob or Enter key to accept threshold levels.



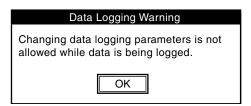
DATA LOGGING MODE

STEP 1 Scroll to "4. Setup Data Logging" by turning the rotary encoder knob or using the arrow keys. Press the knob or Enter key to display the highlighted item.

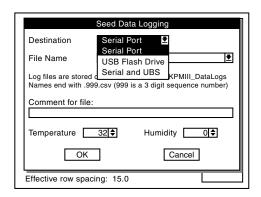


NOTE: Data logging changes cannot be made while data is being logged. If the monitor is logging data the following warning will appear. To stop data logging and continue.

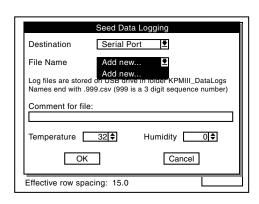
- Press the knob or Enter key to close the warning.
- Then in the "Setup Mode" press the F3 key next to "StopLog".



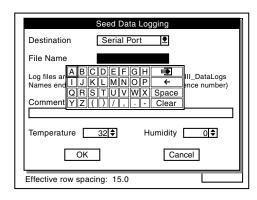
STEP 2 Turn the knob or use the arrow keys to highlight the "Destination" box then press the knob or Enter key. Highlight the desired option either "Serial Port", "USB Flash Drive", or "Serial and USB" and press the knob or Enter key.



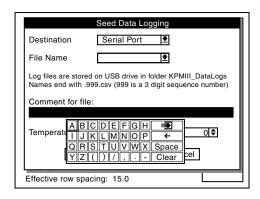
STEP 3 Use the knob or arrow keys to highlight the "File Name" box. Press the knob or Enter key and a drop down list of the files will be displayed. Select "Add new..." to enter a file name and press the knob or enter key to display a keyboard.



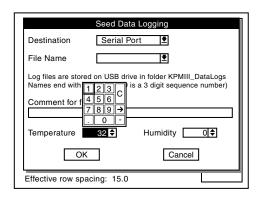
- STEP 4 Select "Add new..." to enter a file name and press the knob or enter key to display a keyboard.
- STEP 5 Add a new file name by using the drop down keyboard. Spell out the file name by highlighting each letter and pressing the knob or Enter key.



STEP 6 Use knob or arrow keys to scroll to "Comment for file" box. Press knob or Enter key to display drop down keyboard. Use keyboard to enter a Comment for the file then press Enter key.



- STEP 7 Use knob or arrow keys to scroll to Temperature box. Press knob or Enter key to display drop down keyboard. Use keyboard to enter temperature then press Enter key.
- STEP 8 Use knob or arrow keys to scroll to Humidity box. Press knob or Enter key to display drop down keyboard. Use keyboard to enter humidity then press Enter key.



STEP 9 Use knob or arrow keys to scroll to the "OK" button and press knob or Enter key. Display returns to Setup Mode screen.

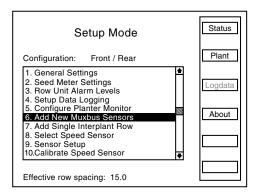
	Seed Data	a Logging	
Destination	Serial P	ort 	
File Name		₹	
Log files are store Names end with .: Comment for file	999.csv (999 i		II_DataLogs 1 2 3 C 4 5 6 C 7 8 9 →
Temperature [32 🕏	Humidity	00
Ok		Cano	el
Effective row spa	acing: 15.0		

- STEP 10 Press F2 key next to Plant to return to Planter configuration screen.
- STEP 11 Press F3 key next to "Logdata" to begin logging.
- STEP 12 Press F3 key next to "Stoplog" to end logging.

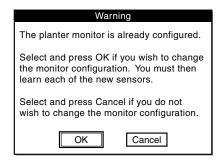
ADDING INTERPLANT ROWS (REAR ROWS PREVIOUSLY PROGRAMMED ONLY)

NOTE: Planter monitor configuration must contain an odd number of front rows before single Interplant® row unit can be added.

STEP 1 Highlight "6. Add New Muxbus Sensors" by turning knob or using arrow keys. Press knob or Enter key to display highlighted item.



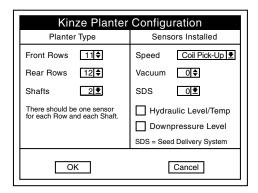
STEP 2 Note shown below displays. Highlight "OK" by turning knob or using the arrow keys. Press knob or Enter key to make selection.



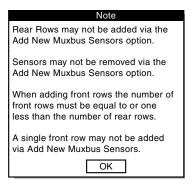
NOTE: To prevent configuration from being changed, select Cancel, then press the knob, Enter key or ESC key.

- STEP 3 Turn knob or use arrow keys to highlight "Front Rows" field and press knob or Enter key. A drop down number pad appears.
- STEP 4 Turn knob or use arrow keys to highlight first digit of desired number and press knob to select the number. For numbers containing more than one digit select one digit at a time. The number will appear in the "Front Rows" line. When correct number is displayed on "Front Rows" line, press Enter key to return to "Kinze Planter Configuration" screen.

NOTE: To prevent configuration from being changed select Cancel, then press knob, Enter key or ESC key.



NOTE: Attempting to add rear rows while adding new Muxbus sensors will cause the following note to appear.



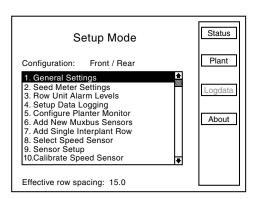
STEP 5 Sensor configuration screen displays. With "[Auto Detect]" highlighted press F1 key next to "Install". Install sensors from left to right the same way rear unit sensors were installed.

Auto Learn Mode
Looking for first
Plug in sensors one at a time, any kind, but do same type in order 1, 2, 3,
Done press to end Auto Learn Mode

- STEP 6 When all sensors are learned select F1 to end installation. "Auto Learn Mode" box displays. Press F6 key next to "Done".
- STEP 7 Scroll down to verify front rows are learned. Select "OK" by pressing knob or Enter key. Press F6 key next to "Done". Display returns to "Setup Mode Screen".

NOTE: "OK" displays next to each sensor if no errors are detected.

STEP 8 Turn knob or use arrow keys to highlight "1. General Settings". Press knob or use Enter key to make selection.



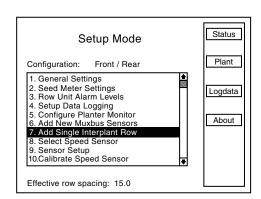
STEP 9 Turn the knob or use the arrow keys to highlight the "Row Spacing" field. Press the knob or Enter key to make the selection. A drop down number pad will appear. Adjust the row spacing to Interplant spacing by turning the knob or use the arrow keys to highlight the correct value then press the knob to select the number, for numbers containing more than one digit select one digit at a time.

NOTE: To prevent configuration from being changed select Cancel, then press knob, Enter key, or ESC key.

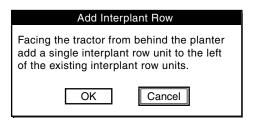
STEP 10 Turn knob or use arrow keys to advance to "OK" button. Press knob or Enter key to save the row spacing and return to "Setup Mode" screen.

ADDING EVEN-ROW PACKAGE (FRONT ROWS PREVIOUSLY PROGRAMMED)

STEP 1 Turn the knob or use the arrow keys to highlight "7.
Add Single Interplant Row". Press the knob or the
Enter key to display the highlighted item.

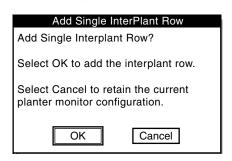


STEP 2 To confirm note below turn knob or use arrow keys to highlight "OK" button, then press knob or Enter key to confirm. If single Interplant row is not to be added select "Cancel" key and press knob or Enter key to cancel or press ESC key.

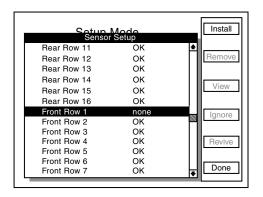


STEP 3 To "Add Single Interplant Row" following screen displays.

If single Interplant row is to be added turn knob or use arrow keys to highlight "OK" button and then press knob or Enter key to add Interplant row. If single Interplant row is not to be added select Cancel key and press knob or Enter key to cancel or press ESC key.



STEP 4 "Sensor Setup" screen displays. Plug in new sensor then scroll down to highlight "Front Row 1" by turning knob or using arrow keys. Press F1 key next to Install to learn new sensor.



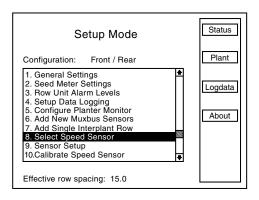
REPROGRAMMING SPEED SENSOR

This setting must be specified when monitor is first configured. It must be reprogrammed to use an alternate speed sensor.

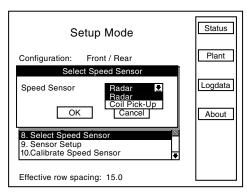
NOTE: Speed sensors may not be changed while planting.

RADAR TO MAGNETIC DISTANCE SENSOR

STEP 1 Turn knob or use arrow keys to highlight "8. Select Speed Sensor". Press knob or Enter key to display highlighted item.



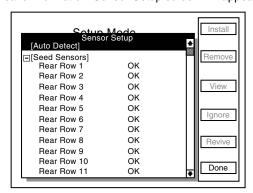
STEP 2 Press knob or Enter key, a drop down menu appears. Highlight "Coil Pick-Up" and press knob or Enter key.



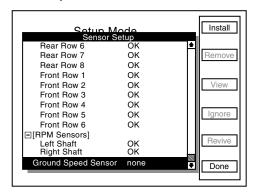
- STEP 3 Turn knob or use arrow keys to highlight "OK" button and press knob or Enter key to return to "Setup Mode" screen.
- STEP 4 Turn knob or use arrow keys to highlight "9. Sensor Setup" and press knob or Enter key.
- STEP 5 Unplug radar from tractor.

NOTE: To prevent configuration from being changed select Cancel, then press rotary encoder knob, Enter key, or ESC key.

STEP 6 Plug in Magnetic Distance Sensor (MDS) and press F1 key next to Install. Press knob or Enter key to save information. Sensor Setup screen will appear.



STEP 7 Turn knob or use arrow keys to scroll down to "Ground Speed Sensor".



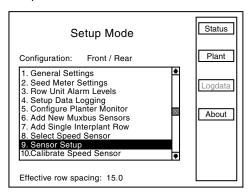
- STEP 8 Press F1 key next to Install. Monitor beeps twice to confirm selection.
- STEP 9 Press F6 key next to Done. Display will return to Setup Mode screen.
- STEP 10 Press F2 key by "Plant" to return to Planter Configuration screen.

NOTE: , verify distance pulse count is correct for chosen sensor. There will be significant distance pulse count variation between radar and coil pickup sensors.

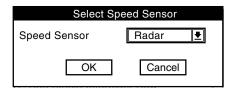
MAGNETIC DISTANCE SENSOR (MDS) TO RADAR

STEP 1 Turn knob or use arrow keys to choose "9.
Sensor Setup". Turn knob or use arrow keys to highlight
"Ground Speed Sensor". Press F2 key next to Remove
to remove Ground speed Sensor.

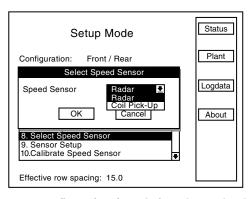
STEP 2 Press F6 key next to Done. Display will return to Setup Mode screen.



STEP 3 Turn knob or use arrow keys to highlight "8. Select Speed Sensor" and press knob or Enter key.



STEP 4 Press knob or Enter key to select "Speed Sensor" field. A drop down menu appears.



NOTE: To prevent configuration from being changed select Cancel, then press rotary encoder knob, Enter key or ESC key.

- STEP 5 Turn knob or use arrow keys to highlight "Radar" and press knob or Enter key.
- STEP 6 Turn knob or use arrow keys to highlight "OK" button and press knob or Enter key.
- STEP 7 Plug in Radar, turn knob, or use arrow keys to advance to "OK". Press knob or Enter key to save the information. Display will return to Setup Mode screen.
- STEP 8 Press F2 key next to Plant to return to Planter Configuration screen.

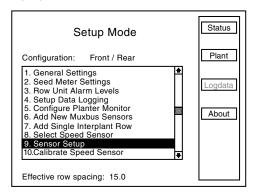
NOTE: Verify distance pulse count is correct for chosen sensor when switching between speed sensors. There is a significant distance pulse count variation between radar and magnetic distance sensors.

PROGRAMMING/CONNECTING SEED TUBES, SHAFT ROTATION SENSORS, AND/OR RADAR/MAGNETIC DISTANCE SENSORS

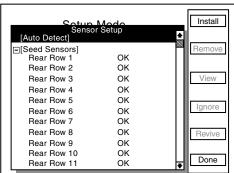
NOTE: Sensor Setup screen automatically displays after Planter Monitor is configured in Configure Planter Monitor selection in Setup Mode screen.

IMPORTANT: All sensors MUST be unplugged before programming begins.

- STEP 1 To access Mode Selection, press F6 key until Mode Selection screen appears.
- STEP 2 Select "1. Setup Mode" by turning rotary encoder knob or press arrow keys. Press knob or Enter key to display highlighted item.
- STEP 3 Select "9. Sensor Setup" by turning knob or using arrow keys. Press knob or Enter key to display highlighted item.



STEP 4 Attach planter harness to KPM III. Do NOT connect any sensors to planter harness. With [Auto Detect] selected press F1 key next to Install.



STEP 5 Plug in first pull row unit seed sensor (row 1), working from left to right across planter. Connect interplant unit sensors after all pull row unit sensors have been connected following the same pattern. When a sensor is connected to planter harness wait for monitor to acknowledge sensor with two beeps.

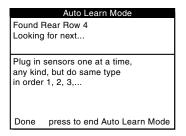
NOTE: If monitor fails to acknowledge a sensor disconnect sensor temporarily then reconnect sensor and wait for monitor to acknowledge sensor with two beeps. If monitor still fails to acknowledge sensor try connecting a different sensor in this location.

Connect shaft rotation sensors or speed sensors the same way seed sensors were connected, making sure to work from left to right across planter.

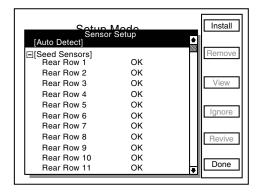
(If applicable) plug in SDS, vacuum or PDP (pneumatic down pressure) sensors the same way seed sensors were connected.

Progress is displayed on LCD screen as sensors are connected. Example below indicates last seed sensor found was Rear Row 4 and monitor is looking for next sensor.

When all sensors are installed press F6 key to end installation and return to "Setup Mode" screen.

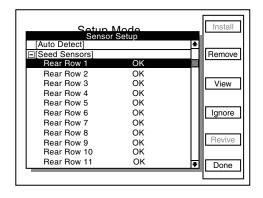


NOTE: After each sensor has been installed "OK" appears after sensor name on LCD screen.



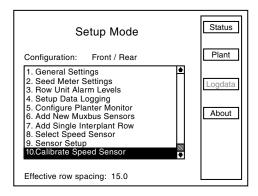
STEP 6 When "OK" appears behind ALL sensors, press F6 key next to Done. 'Setup Mode" menu displays.

NOTE: If "OK slow" appears after a sensor, sensor is able to communicate but at a slower speed. For system to run at top speed of 9600 baud slow sensor must be replaced.



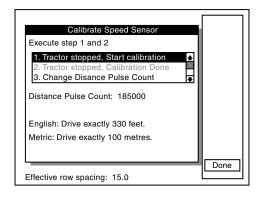
SPEED SENSOR CALIBRATION/PROGRAMMING

STEP 1 Turn knob or use arrow keys to highlight "10. Calibrate Speed Sensor" and press knob or Enter key.

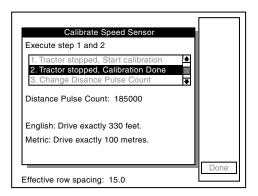


Distance Pulse Count records how many pulses are generated per mile/kilometer from the ground speed sensor.

NOTE: A field calibration must be performed to establish Distance Pulse Count number. Several factors can affect this value, such as wheel slip on the magnetic distance sensor. IT IS NOT UNCOMMON FOR MONITOR SPEED TO VARY SLIGHTLY FROM TRACTOR SPEEDOMETER. Adjusting Distance Pulse Count in the monitor to make speed agree with tractor can cause serious errors in acre/hectare and population/spacing readings. Do field checks to verify populations and seed spacing.



- In field conditions, measure 330 feet or 100 meters, depending on the unit of measurement selected. Place a marker at the start point and end point.
 - Pull tractor up to starting point.
- Turn knob or use arrow keys to highlight "1. Tractor stopped, Start calibration" and press knob or Enter key.
- Drive tractor for 330 feet or 100 meters.
- · Monitor will count number of pulses and display them.
- Stop tractor at end point.
- Turn knob or use arrow keys to highlight "2. Tractor stopped, Calibration Done" and press knob or Enter key.



NOTE: If warning box below appears, click OK and repeat procedure.

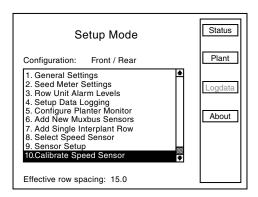


NOTE: Repeat above steps multiple times. Record and average values. Use average for Distance Pulse Count number constant.

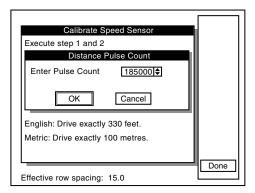
NOTE: Distance Pulse Count will vary from above example.

When correct distance pulse count is known, calibration is not needed and the following steps may be used.

STEP 1 Turn knob or use arrow keys to highlight "10. Calibrate Speed Sensor" and press knob or Enter key



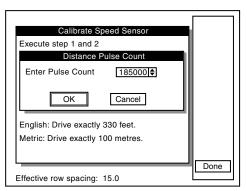
STEP 2 Turn knob or use arrow keys to highlight "3. Change Distance Pulse Count" and press knob or Enter key. Highlight "Enter Pulse Count" line and press knob or Enter key and a drop down key pad will appear.



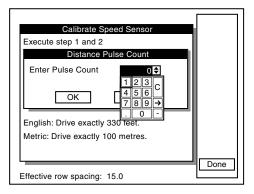
NOTE: Distance Pulse Count will vary from above example.

- STEP 3 Turn knob or use arrow keys to highlight the first digit of the average pulse count and press the knob. The number will appear in the "Enter Pulse Count" line. Highlight the next digit of the number and press the knob. Repeat this procedure until the entire number is entered then press Enter key.
- STEP 4 Turn knob or use arrow keys to highlight "OK" then press knob or Enter key to return to the "Calibrate Speed Sensor" screen.
- STEP 5 Press F6 key next to "Done" to return to "Setup Mode" screen.

Monitor will display current pulses per mile/kilometer using a 6 digit, no decimal place format labeled "Distance Pulse Count". Turn knob or use arrow keys to highlight "Change Pulse Count" then press knob or Enter key. The "Distance Pulse Count" box will appear.



When "Enter Pulse Count" value is highlighted press knob or Enter key and a drop down key pad will appear. Turn knob or use arrow keys to highlight "0", zero, and press knob or Enter key. Turn knob or use arrow keys to highlight "OK" and press knob or Enter key to return to the "Calibrate Speed Sensor" screen.



NOTE: If Distance Pulse Count number starts to count pulses with the tractor not moving, check radar distance sensor for vibration or other interference.

ACRE COUNT MODE

NOTE: When a tractor is equipped with a radar distance sensor, accumulating area without a planter attached is possible.

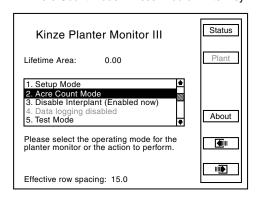
STEP 1 Install an "Acre Count Switch Kit".

STEP 2 Enter into "Acre Count Mode".

Acre Count Switch Kit

STEP 1 With monitor OFF, attach an Acre Count Switch Kit to Muxbus connector, then turn monitor "ON".

STEP 2 Press F6 key until Mode Selection screen appears.
Turn rotary encoder knob or use arrow keys to highlight
"2. Acre Count Mode". Press knob or Enter key.

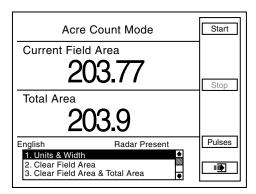


NOTE: If radar unit is not detected a warning displays.

NOTE: When using the acre count mode option, area (acres or hectares) is accumulated in "Lifetime Area Counter".

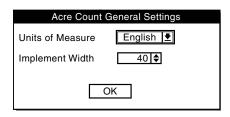
NOTE: DO NOT BEGIN ACCUMULATING AREA IF RADAR UNIT HAS NOT BEEN CALIBRATED. Always check distance pulse count value immediately after entering acre count mode and before pressing start.

STEP 3 Turn knob or use arrow keys to highlight "Units & Width" and press knob or Enter key.



STEP 4 A box named "Acre Count General Settings" will appear. Highlight "English" or "Metric" by turning knob or using arrow keys. Press knob or Enter key to make selection.

STEP 5 Turn knob or use arrow keys to highlight "Implement Width" box and press knob or Enter key and a drop down number pad displays.



STEP 6 Turn knob or use arrow keys to highlight correct value then press knob to select number. For numbers containing more than one digit select one digit at a time. When desired quantity is displayed above number pad, press Enter key.

STEP 7 Turn knob or use arrow keys to highlight "OK" button. Press knob or Enter key to save changes.

NOTE: Implement width entered in acre count mode has no effect on planting mode settings.

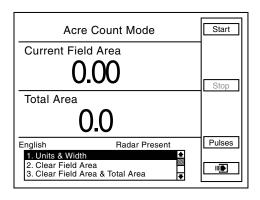
NOTE: Tractor should be at a complete stop before starting.

STEP 8 To begin accumulating area press F1 key next to Start.

STEP 9 To stop accumulating area or to move to a different location, press F3 key next to Stop.

There are two counters in the Acre Count Mode (Field Area Counter and Total Area Counter). The "Field Area" counter can be cleared independent of the "Total Area" counter, however clearing "Total Area" counter also clears "Field Area" counter.

• <u>To Clear Field Area</u>. Highlight "Clear Field Area" and press knob or Enter key. A note will appear verifying decision to reset field area to zero. Highlight "OK" and press knob or Enter key to clear field. Highlight "Cancel" and press knob or Enter key to retain current field value.

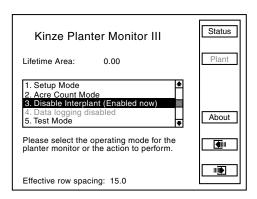


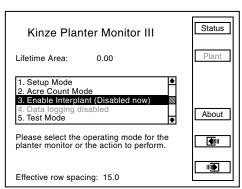
• <u>To Clear Field Area And Total Area</u>, highlight "Clear Field Area & Total Area" and press knob or Enter key. A note will appear to verify decision to reset field area and total area to zero. Highlight "OK" and press knob or Enter key to clear field. Highlight "Cancel" and press knob or Enter key to retain current field values.

ENABLING/DISABLING INTERPLANT ROWS

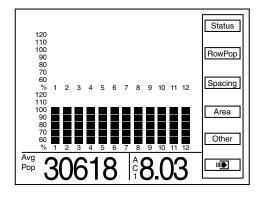
To Enable or Disable Interplant

- STEP 1 Return to "Planter Configuration" screen by pressing F2 key next to "Plant".
- STEP 2 Press F6 key until "Kinze Planter Monitor III" screen appears.
- STEP 3 Turn rotary encoder knob or use arrow keys to highlight "3. Disable Interplant (Enabled now)" or Enable Interplant (Disabled now).
- STEP 4 Press knob or Enter key to "Disable" or "Enable" Interplant. Row spacing is displayed on bottom of screen to verify selection.



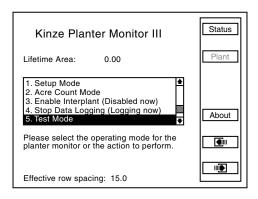


Press F6 to return to Plant screen.

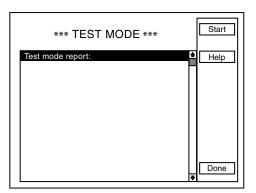


TEST MODE

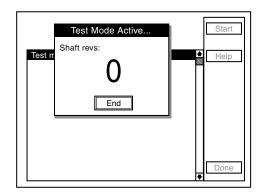
- STEP 1 Press F6 key until Mode Selection screen appears.
- STEP 2 Select "5. Test Mode" by turning rotary encoder knob or using arrow keys. Press knob or Enter key to display highlighted item.



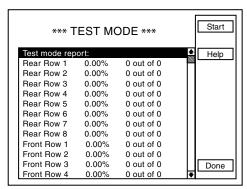
STEP 3 Press F1 key next to Start.



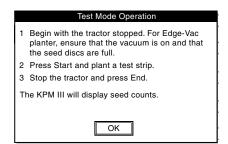
STEP 4 "Test Mode Active" box displays showing number of shaft revolutions. "End" box is highlighted. Press knob or Enter key. "Test Mode Active" box displays showing drill shaft revolutions.



STEP 5 TEST MODE screen displays test run data (seed count) for each row.



- STEP 6 Begin test with tractor stopped. For EdgeVac planters, ensure vacuum is on and seed discs are full.
- STEP 7 Press F1 key next to Start and plant a test strip.
- STEP 8 Stop tractor and press "End". KPM III displays seed counts by row and percentage.

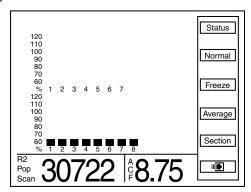


NOTE: Above instructions display on screen when F2 key next to "Help" is pressed.

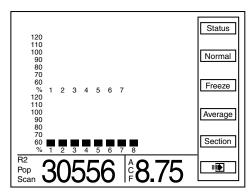
STEP 9 Press F6 key next to Done. Display returns to Mode Selection screen.

ROW POPULATION

Press F1 key next to "RowPop" to display row population. Average planter population is shown in lower L.H. corner of display.

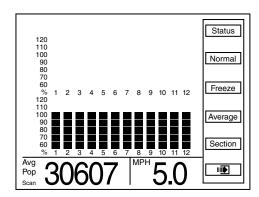


• Press F3 key next to Scan. Monitor scans through each row in ascending order displaying average seed population for each row. After all rows have been scanned, average population displays and scan function continues with first rear row.



• Press F3 key next to Freeze to stop scanning. Left display item will be frozen on a particular row. "Frzn" appears in lower L.H. corner to indicate display is frozen. To resume scan press F3 key next to Scan.

EXAMPLE: When average individual row population is shown, R3 indicates rear row 3, F2 indicates front row 2, etc.

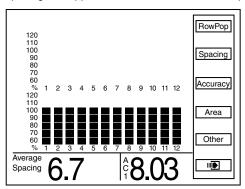


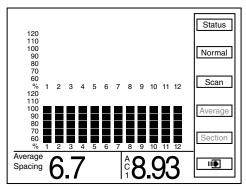
- When "Scan" or "Frzn" is displayed in L.H. corner, Section and arrow keys function as follows:
- Section, Right arrow key, or Left arrow key advances to the first rear row.
- Up arrow key moves forward to the next row of the planter, wrapping around to the first row when moving past the last row.
- Down arrow key moves backward to the previous row of the planter, wrapping around to the last row of the planter when moving past the first row.
- Press F4 key next to Average to display average population in bottom L.H. corner.
- Press F2 key next to Normal to display normal screen for Planter Configuration screen.

NOTE: If rows are being scanned and F4 key next to Average is pressed, scan function stops.

ROW SPACING

Press F2 key next to Spacing to display seed spacing keys.
 "Average Spacing" will appear in bottom L.H. corner of display.





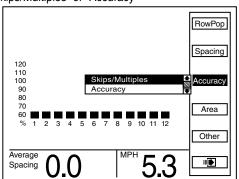
- Press F3 key next to Scan and monitor scans through each row in ascending order displaying average seed spacing for each row. Scan appears in L.H. corner to indicate display is scanning. After all rows are scanned average population is displayed and scanning continues with first rear row.
- Press F3 key next to Freeze to stop scanning, left display item will be frozen on a particular row. "Frzn" appears in lower L.H. corner to indicate display is frozen. To resume scan press F3 key next to Scan.
- When "Scan" or "Frzn" is displayed in left display item, Section and arrow keys function as follows:
- Section, Right arrow key, or Left arrow key advance to first rear row.
- Up arrow key moves forward to next row of planter, wrapping around to first row when moving past last row.
- Down arrow key moves backward to previous row of planter, wrapping around to last row of the planter when moving past the first row.
- Press F4 key next to Average to display average seed spacing in bottom L.H. corner.
- Press F2 key next to Normal to display Planter Configuration screen.

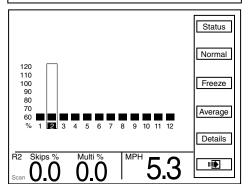
NOTE: If rows are being scanned and F4 key next to Average is selected, scan function stops.

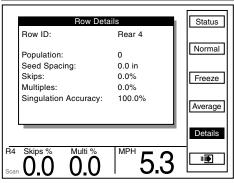
ACCURACY

NOTE: Soybeans will not show Skips/Multiples.

 Press F3 key next to Accuracy to display drop down menu. Select either "Skips/Multiples" or "Accuracy"





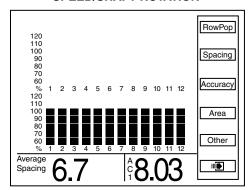


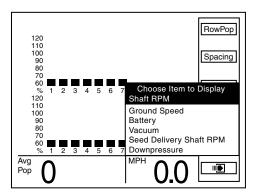
- When "Skips/Multiples" is selected average "Skips" and "Multiples" appears in the bottom L.H. corner.
- When "Accuracy" is selected average "Average Accuracy %" appears in the bottom L.H. corner.

Example: When average individual row accuracy is shown, R3 indicates rear row 3, F2 indicates front row 2, etc.

- Press F3 key next to Scan. Montior scans through each row in ascending order displaying average Skips and Multiples for each row. "Scan" appears in lower L.H. corner to indicate display is scanning.
- Press F3 key next to Freeze to stop scanning. Left display item will be frozen on a particular row. "Frzn" appear in lower L.H. corner to indicated display is frozen. To resume scan press F3 key next to Scan.
- Press F5 key next to Details to display "Row Details".

SPEED/SHAFT ROTATION





• Press F5 key next to Other for items available to display in bottom R.H. corner. Turn knob or use arrow keys to highlight "Shaft RPM". Value appears in bottom R.H. corner of display as "RPM".

NOTE: Applies to planters with shaft rotation sensors installed.

• Press F5 key next to "Other" for items available to display in bottom R.H. corner. Turn knob or use arrow keys to select "Ground Speed". Value appears in bottom R.H. corner of display as "MPH" or "Km Per Hr".

NOTE: Selected units of measure display as (English or Metric).

- Press F5 key next to "Other" for items available to display in bottom R.H. corner. Turn knob or use arrows keys to advance to "Battery" to view battery condition. Value appears in bottom R.H. corner of display as "Bat V".
- Press F5 key next to "Other" for items available to display in bottom R.H. corner. Turn knob or use arrows keys to advance to "Vacuum" to view vacuum. Inches of vacuum appears in bottom R.H. corner of display as "VAC".
- Press F5 key next to "Other" for items available to display in the bottom R.H. corner. Turn knob or use arrows keys to advance to "Seed Delivery Shaft RPM" to view shaft RPM. Shaft RPM appears in bottom R.H. corner of display as "RPM SDS".
- Press F5 key next to "Other" for items available to display in bottom R.H. corner. Turn knob or use arrows keys to advance to "Downpressure" to view lbs. of down pressure. Lbs. of down pressure appears in bottom R.H. corner of the display as "LBS".

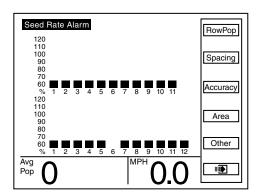
WARNINGS AND ALARMS

STEP 1 Seed Rate Alarm - A seed rate alarm is activated whenever row average seed population drops below threshold set for that row.

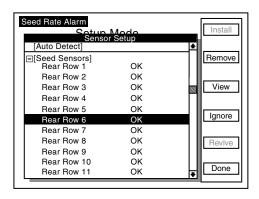
Corresponding row on bargraph starts flashing and monitor emits a series of beeps that persist until alarm is cleared or ACK button is pressed. "Seed Rate Alarm" appears in upper left corner of screen. Bargraph for row drops down based on threshold set for alarm.

EXAMPLE: If threshold is 70%, lower two bargraph segments are shown. If threshold is 50% or 10%, lowest bargraph segment is shown.

Status message associated with an alarm contains more information about the alarm. To view "Status Message" for a seed rate alarm, press F1 key next to Status.



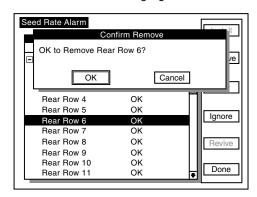
If sensor detects no seed flow it displays which row is not functioning. Alarm may be caused by a mechanical problem reducing seed flow or an electrical problem causing an incorrect seed count.



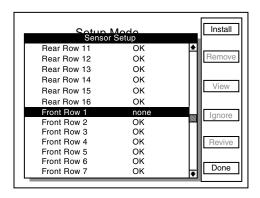
NOTE: Only way to remove an alarm is to find problem and correct it. Alarms are not reported for rows with seed rate alarm thresholds disabled.

NOTE: Percentage shown in alarm message is percentage at time alarm occurred.

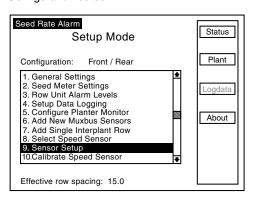
Row can be removed by pressing F2 key next to Remove. A box appears asking for confirmation to remove row. "OK" box is highlighted in box.



Press knob or Enter key to confirm removal. Sensor Setup screen displays "none" next to the row that was removed. Press F6 key next to "Done". The setup mode screen will appear.



Press F2 key next to Plant to return to Planter Configuration screen.

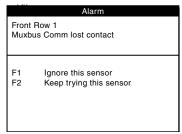


Section Not Planting - If monitor detects an entire section not planting, three beeps sound. Affected section bargraph flashes and is reduced to lowest segment. An alarm message is added to list of "Status Messages". Press F1 key next to Status to view alarm message.

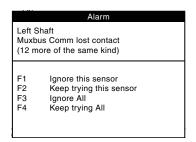
STEP 2

STEP 3 Counting Sensors Not Communicatining With Monitor - If monitor detects a communication error between sensor and monitor, monitor beeps twice.

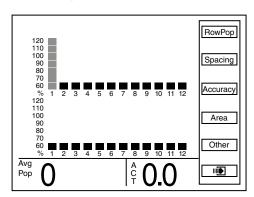
- Try to reestablish communication with sensor(s) by pressing F2.
- If monitor is unable to establish communication there may be a faulty sensor, poor electrical connection, or a cut or pinched wire harness.



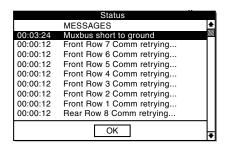
Message below shows multiple sensors with lost contact.



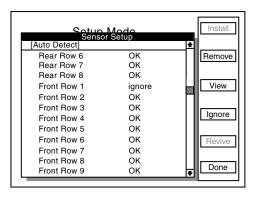
NOTE: When a known sensor or group of sensors are faulty, press F1 or F3. Monitor stops communication with affected sensors and corresponding bargraphs are grayed out on main "Planter Configuration" screen.



NOTE: Press F2 or F4 if sensors are not faulty. After pressing F2 or F4 a message similar to the one below appears when "Status" button F1 is pressed.



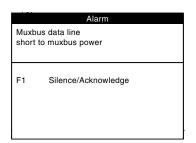
NOTE: If a sensor has been ignored, sensor configuration screen displays as shown below.

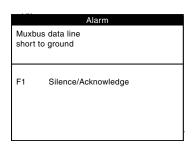


STEP 4 Seed Counting Sensors Too Dirty Warning - When powering on KPM III, seed sensor performs a self check. If a seed tube is too dirty, the message "Clean or Replace Sensor as Necessary" displays and bargraph for that row will flash.. Sensor will not function until problem is corrected.

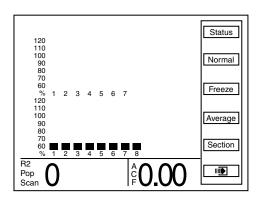
NOTE: LCD screen continues to display alarm condition after alarms are acknowledged if alarm condition is still present.

STEP 5 Wire Shorts - When a wire is shorted, one of the messages below displays, indicating which wires are shorted. Short must be located and repaired to continue planting. Turn off and restart monitor to clear alarm.

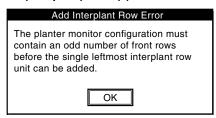




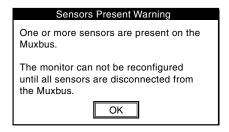
STEP 6 Add Interplant Row Error – Planter monitor configuration must contain an odd number of front rows before single Interplant row unit can be added.



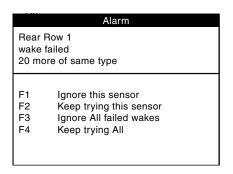
NOTE: Planter monitor configuration above has an even number of front (Interplant) rows (8).



STEP 7 Sensor Present Warning – One or more sensors are present on Muxbus.



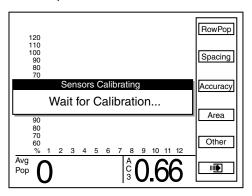
STEP 8 Alarm: Rear Row 1 wake failed – Select an option from warning box and press key next to selection.



FIELD OPERATION

Press ON/OFF key to turn monitor ON.

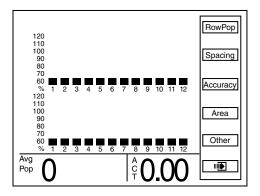
If monitor has been configured, it will show Planter Configuration screen and attempt to communicate with seed sensors.

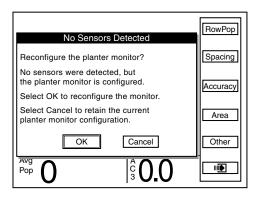


NOTE: Do not attempt planting before "Wait For Calibration" message disappears. If planter is moving while sensors are calibrating alarms will be generated.

NOTE: If monitor can communicate with sensors Planter Configuration screen displays.

If monitor does not detect sensors message below displays.





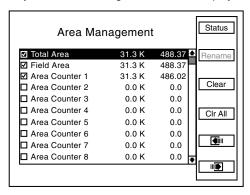
NOTE: Selecting OK reconfigures monitor requiring all sensors to be re-learned. Selecting Cancel keeps current configuration and monitor continues trying to communicate with sensors.

AREA MANAGEMENT

There are 42 area counters: Total Area, Field Area and Area Counters 1 through 40. Total Area is always active but may be cleared. If cleared, Field Area is also cleared. Field Area and Area Counters 1 through 40 may be cleared, started or stopped separate from each other.

In addition, there is a Lifetime Area Counter (located on Mode Selection Screen) which can not be disabled or cleared by user.

Press F6 key until "Area Management" screen displays.

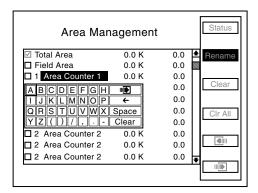


NOTE: Total Area counter can never be disabled, but can be reset to zero (cleared).

 Check mark (✓) in box next to name of area counter indicates area counter is enabled and accumulating area.

EXAMPLE: In above illustration, 31.3K indicates average seed population per unit area (either acre or hectare). This number has been rounded off. Actual seed population ranges anywhere from 30,500 to 31,499 per unit area. Last column of numbers is area accumulated (acre or hectare).

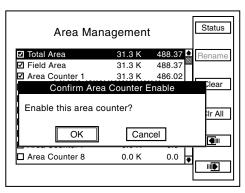
- Turn knob or use arrow keys to highlight desired area counter.
- Press F2 key next to Rename to name area. A drop down keyboard displays. Use keyboard to enter area name. Press knob or enter key to save information.



NOTE: When a key is dimmed it does not perform any operation on highlighted area counter. • Use knob or arrow keys to highlight the "OK" button, press knob or Enter key.

Enable Area Counter

- Highlight desired "Area Counter" by turning rotary encoder knob or using arrow keys.
- Press knob or Enter key. A "Confirm Area Counter Enable" box displays.

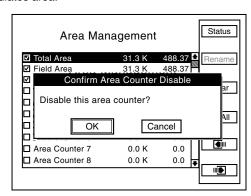


• Use knob or arrow keys to highlight "OK" button and press knob or Enter key. Enabled "Area Counter" starts accumulating area.

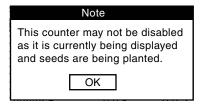
Disable Area Counter

All area counters may be disabled, except Total Area Counter.

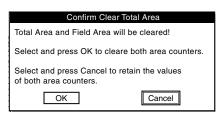
- Highlight desired "Area Counter" by turning rotary encoder knob or using arrow keys.
- Press knob or Enter key. A "Confirm Area Counter Disable" box displays. Use knob or arrow keys to highlight "OK" button and press knob or Enter key. Disabled "Area Counter" no longer accumulates area.



NOTE: Attempts to disable an Area Counter that is planting will cause the following alarm.



NOTE: If "Total area" is highlighted and F3 key next to Clear is pressed the following request for confirmation displays.



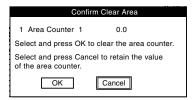
Clear Area Counter

Total Area, Field Area, and Area Counters 1 through 40 can be cleared, whether enabled or disabled. Clearing "Total Area" counter forces "Field Area" counter to be cleared. However, clearing an "Area Counter" including "Field Area" clears only that individual counter.

NOTE: Lifetime Area Counter can never be cleared or disabled.

Clearing an Area Counter

- STEP 1 Turn knob or use arrow keys to highlight desired area counter.
- STEP 2 Press F3 key next to "Clear". Request for confirmation shown below displays

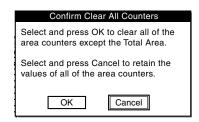


STEP 3 Turn knob or use arrow keys to highlight "OK" or "Cancel" and press knob or Enter key to confirm selection.

Clearing All Area Counters

NOTE: This clears all area counters except the "Total Area Counter"

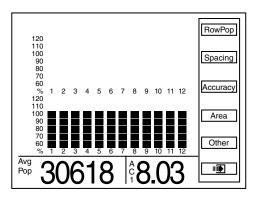
STEP 1 Press F4 key next to "CLR All". A request for confirmation displays.



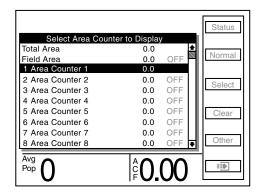
STEP 2 Turn knob or use arrow keys to select "OK" or "Cancel" and press knob or Enter key to confirm selection.

AREA COUNTERS

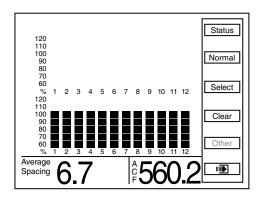
STEP 1 On Planter Configuration screen press F4 key next to "Area".



STEP 2 Press F3 key next to "Select" to display list of area counters.



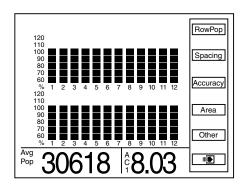
- STEP 3 Use arrow keys to highlight desired area counter to be displayed.
- STEP 4 Press knob or Enter key and "Planter Configuration" screen displays.



NOTE: Abbreviation for selected area counter appears in bottom R.H. corner of the screen. In above illustration "ACF" stands for Area Counter Field.

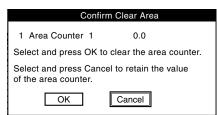
CLEARING FIELD AREA

STEP 1 Display Plant screen to reset counter.



NOTE: If "Area" is not displayed next to F4, press F2 next to "Normal".

STEP 2 Press F4 key next to Area then press F4 key next to Clear. A dialog box displays requesting confirmation to clear.



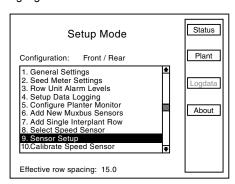
STEP 3 Highlight "OK" or "Cancel" by turning knob or using arrow keys. Press knob or Enter key to verify selection.

NOTE: Only displayed area counter can be cleared.

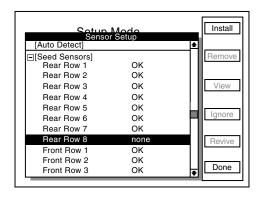
REPLACING FAULTY SENSOR(S)

NOTE: Monitor beeps twice when new sensors are learned.

- STEP 1 Press F6 key until Mode Selection screen appears.
- STEP 2 Highlight "1. Setup Mode" by turning knob or using arrow keys. Press knob or Enter key to display highlighted item.
- STEP 3 Highlight "9. Sensor Setup" by turning knob or using arrow keys. Press knob or Enter key to display highlighted item.



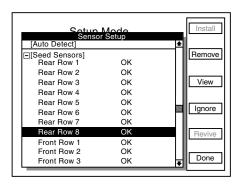
STEP 4 Turn knob or use arrow keys to highlight faulty sensor and press F2 key next to Remove.



STEP 5 The following message displays. Select OK to confirm by pressing knob or Enter key. Select Cancel to exit.



STEP 6 Unplug sensor and plug in new sensor. Press F1 key next to Install.



NOTE: Monitor beeps twice when new sensors are learned.

Repeat STEPS 1 through 6 for each faulty sensor being replaced.

NOTE: Highlighting a sensor and pressing F4 key next to View displays additional information for troubleshooting a problem. If a faulty sensor has been ignored it may be highlighted in list of sensors. Press F3 key next to Revive. Monitor will try to communicate with sensor. If successful, "OK" displays next to sensor.



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 movement 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 this 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.

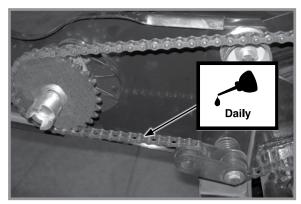
- 1. Remove $\frac{1}{4}$ "-20 x $\frac{1}{2}$ " cap screw that secures idler assembly to wrap spring wrench tightener shaft.
- 2. Remove wrap spring wrench from planter.
- 3. Tip wrap spring wrench on its side and lubricate with a high quality spray lubricant. Lubricant must be absorbed into wrap spring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



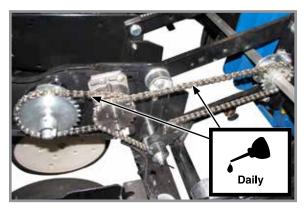
Wrap Spring Wrench Lubrication

DRIVE CHAINS

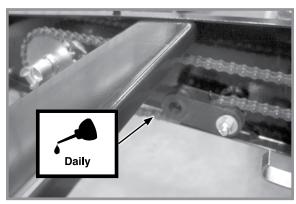
Lubricate all transmission and drive chains daily with a high quality chain lubricant. Extreme operating conditions such as dirt, temperature, or speed may require more frequent lubrication. If a chain becomes stiff, it should be removed, soaked, and washed in solvent to loosen and remove dirt from joints.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



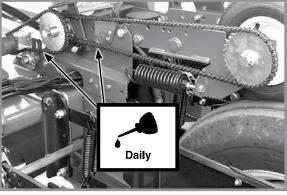
Row Unit Drive Chains



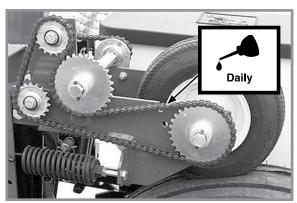
Row Unit Electric Clutches



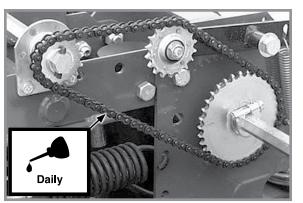
Row Unit Granular Chemical Drive Chains



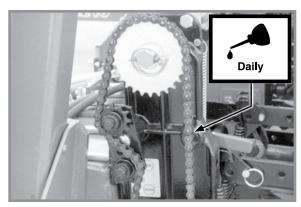
Liquid Fertilizer Piston Pump Drive Chains



Contact Wheel Drive Chains



Jack Shaft (Reverser) Chains

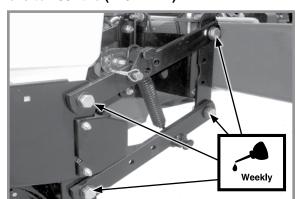


Seed Rate Transmission Chains

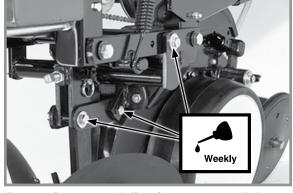
BUSHINGS

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)**.



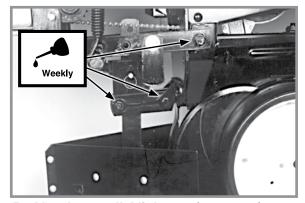
Pull row unit and/or push row unit parallel linkages (8 per row)



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.

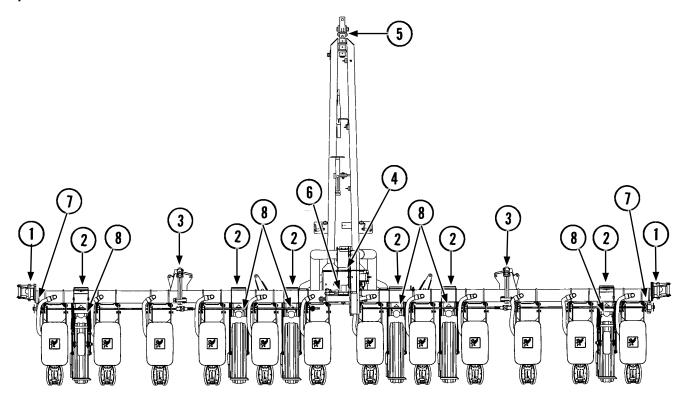
- 1. Raise wheel off ground.
- 2. Check for bearing endplay by moving wheel side to side.
- 3. Rotate wheel to check for bearing roughness. If bearings sound rough, remove hub and inspect bearings.

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

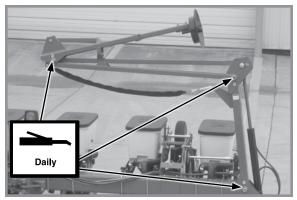
GREASE FITTINGS

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.

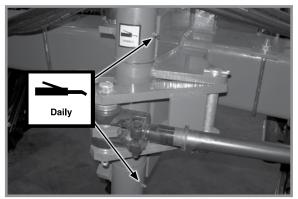
NOTE: Numbers on illustration below correspond to photos on following pages showing lubrication frequencies.



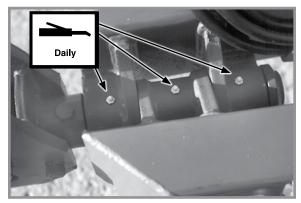
Model 3200 12 row 30" planter shown



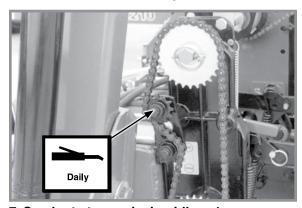
1. Row marker assemblies - 3 per assembly



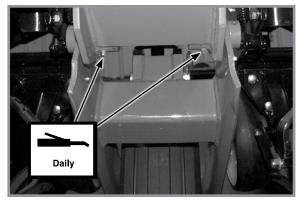
3. Wing hinges - 2 per wing



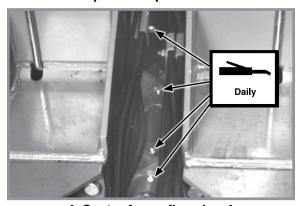
5. Hitch flex pin - 3



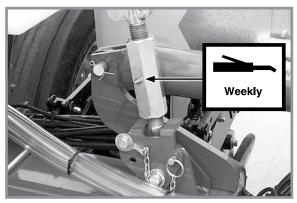
7. Seed rate transmission idler - 1 per transmission



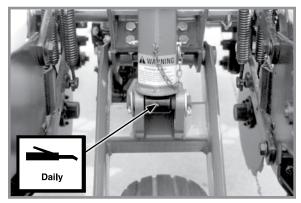
2. Wheel pivots - 2 per wheel module



4. Center frame flex pin - 4

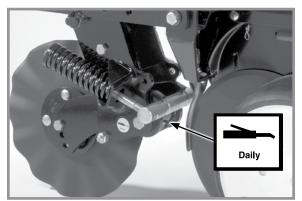


6. Turnbuckle - 1

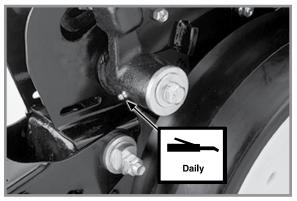


8. Planter lift cylinders (master, slave, and assist) - 1 per cylinder

ROW UNIT

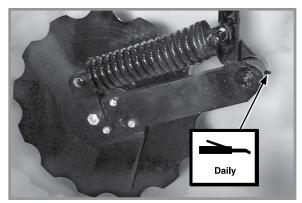


Frame mounted Coulter - 1 Per Arm

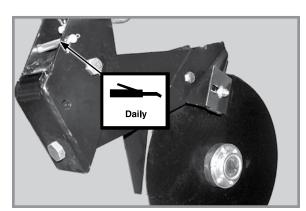


Gauge wheel arms - 1 per arm
(Seals in gauge wheel arm are installed with
lip facing out to allow grease to purge dirt away
from seal. Pump grease into arm until fresh
grease appears between washers and arm.)

FERTILIZER OPENERS

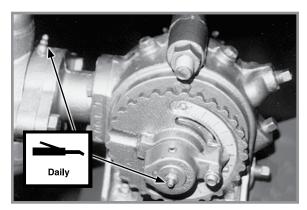


Notched single disc fertilizer opener - 1

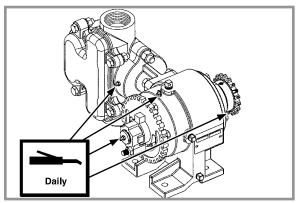


Double disc fertilizer opener - 1

LIQUID FERTILIZER



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

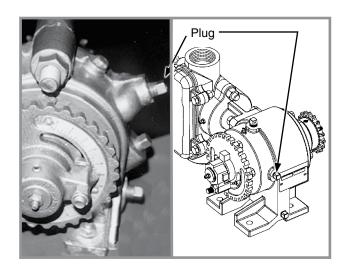


Liquid fertilizer piston pump - 4 (Fill fitting on outboard stuffing box until lubricant seeps out of drain hole in bottom.)

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 $\frac{3}{4}$ 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 nuts can result in wheel separation from planter and can 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.



GRADE 2 No Marks



GRADE 5 3 Marks



GRADE 8 6 Marks

TORQUE VALUES CHART - PLATED HARDWARE

	Gra	de 2	Gra	de 5	Grade 8		
Diameter	Coarse	Fine	Coarse Fine		Coarse	Fine	
1/4"	50 in-lb	56 in-lb	76 in-lb	87 in-lb	9 ft-lb	10 ft-lb	
5/16"	8 ft-lb	9 ft-lb	13 ft-lb	14 ft-lb	18 ft-lb	20 ft-lb	
3/8"	15 ft-lb	17 ft-lb	23 ft-lb	26 ft-lb	33 ft-lb	37 ft-lb	
7/16"	25 ft-lb	27 ft-lb	37 ft-lb	41 ft-lb	52 ft-lb	58 ft-lb	
1/2"	35 ft-lb	40 ft-lb	57 ft-lb	64 ft-lb	80 ft-lb	90 ft-lb	
9/16"	50 ft-lb	60 ft-lb	80 ft-lb	90 ft-lb	115 ft-lb	130 ft-lb	
5/8"	70 ft-lb	80 ft-lb	110 ft-lb	125 ft-lb	160 ft-lb	180 ft-lb	
3/4"	130 ft-lb	145 ft-lb	200 ft-lb	220 ft-lb	280 ft-lb	315 ft-lb	
7/8"	125 ft-lb	140 ft-lb	320 ft-lb	350 ft-lb	450 ft-lb	500 ft-lb	
1"	190 ft-lb	205 ft-lb	480 ft-lb	530 ft-lb	675 ft-lb	750 ft-lb	
11/8"	265 ft-lb	300 ft-lb	600 ft-lb	670 ft-lb	960 ft-lb	1075 ft-lb	
11/4"	375 ft-lb	415 ft-lb	840 ft-lb	930 ft-lb	1360 ft-lb	1500 ft-lb	
13/8"	490 ft-lb	560 ft-lb	1100 ft-lb	1250 ft-lb	1780 ft-lb	2030 ft-lb	
1½"	650 ft-lb	730 ft-lb	1450 ft-lb	1650 ft-lb	2307 ft-lb	2670 ft-lb	

NOTE: Torque unplated hardware and bolts with lock nuts approximately $\frac{1}{3}$ 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).

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

SPECIAL TORQUE VALUES & INSTRUCTIONS

Row unit parallel linkage bushing hardware	130 ft-lb (176 Nm)
%" No till coulter 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.
%" - 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	45-55 ft-lb
½ - 20	(75-95 N-m)	(61-75 N-m)
³ ⁄ ₄ "-16	115-125 ft-lb	100-115 ft-lb
94 - 10	(156-169 N-m)	(136-156 N-m)
⁷ ⁄ ₈ "-14	150-180 ft-lb	130-150 ft-lb
78 - 14	(203-244 N-m)	(176-203 N-m)
1"-14	275-330 ft-lb	250-275 ft-lb
1 -14	(373-447 N-m)	(339-373 ft-lb)
11/8"-12	300-375 ft-lb	275-300 ft-lb
178 - 12	(407-508 N-m)	(373-407 N-m)
1¼"-12	300-375 ft-lb	275-300 ft-lb
174 -12	(407-508 N-m)	(373-407 N-m)

TIRE PRESSURE



WARNING

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

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)

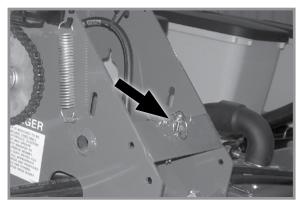


- Transport/ground drive

CHAIN TENSION ADJUSTMENT

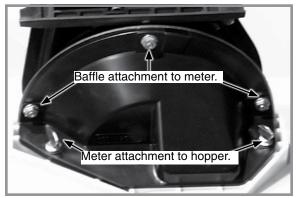
Drive chains are equipped with spring loaded idlers and are self-adjusting. The only adjustment is to shorten chains if wear stretches a chain and reduces spring tension. Check idler pivot points periodically to ensure they rotate freely. See "Wrap Spring Wrench Assembly" (on applicable idler assemblies)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

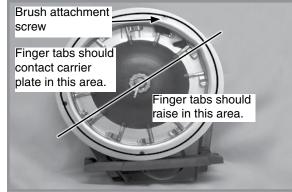
Additional chain links are in storage area inside wheel module.



Chain link storage

FINGER PICKUP SEED METER INSPECTION/ADJUSTMENT

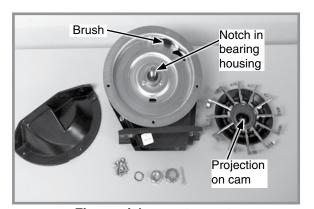




Removing meter and baffle

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 plat 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

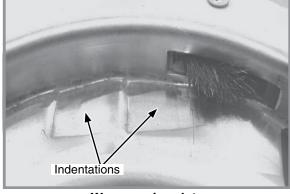
Buildup of debris or chaff may prevent proper finger operation and requires disassembly and cleaning of finger pickup meter.

- 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 per row of operation (Approximately 800 acres of corn or sunflowers on a 8 row machine or 1200 acres 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 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.

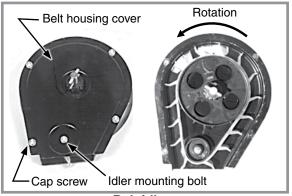
- 7. Check indentations on carrier plate for wear before installing finger holder on carrier plate. Excessive wear of carrier plate at indentations will cause over planting especially with small sizes of seed. Inspect carrier plate annually. Life expectancy should be 250-300 acres per row of operation 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 ½ to 2 flats to obtain rolling torque of 22 to 25 inch pounds.
- 9. Turn finger holder by hand to make sure it is firmly against carrier plate, but can be rotated with moderate force.



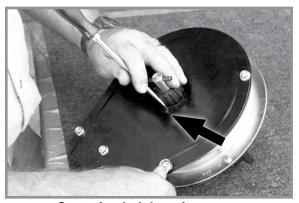
Worn carrier plate

10. Install cover nut and cotter pin. Reinstall baffle.

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







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

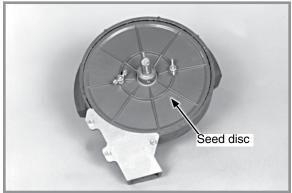
Do not over-tighten hardware or components may be damaged.

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.

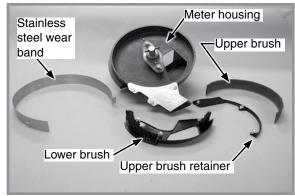
CLEANING FINGER PICKUP SEED METER FOR STORAGE

- 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 inhibiter.
- 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





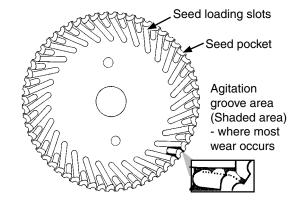


Brush-type seed meter parts

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

SEED DISC WEAR

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

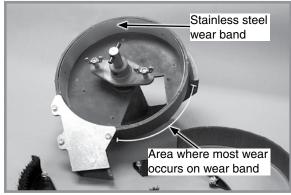


STAINLESS STEEL WEAR BAND

NOTICE

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

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

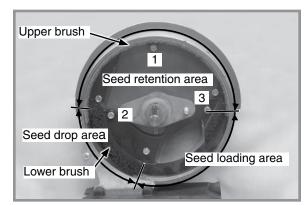


Stainless steel wear band

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 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 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

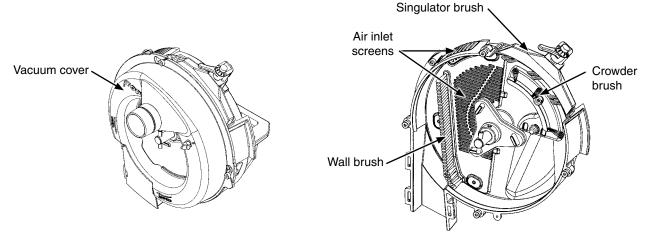
- Remove meter from seed hopper by removing two thumbscrews securing meter to hopper.
- 2. Remove seed disc and wash with soap and water and dry thoroughly.
- 3. Remove three hex head screws from brush retainer. Remove brush retainer and upper brush.
- 4. Remove three hex head screws from lower brush.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

VACUUM MANIFOLD MAINTENANCE

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

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

EDGEVAC SEED METER MAINTENANCE



Before each planting season inspect seed discs, singulator brush, crowder brush, wall brush, and air inlet screens 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, cleanout brush or cleanout brush with ball-type ejector (if applicable) may need to be replaced. Clean seed disc by washing it with soap and water. Dry thoroughly.

Inspect singulator brush for wear after every 200 acres per row of operation. If adjustment of singulator brush does not affect meter performance or if brushes appear frayed, singulator brush may need to be replaced.

Replace seed disc or vacuum cover if abnormally high vacuum is required or if consistent operation can not be achieved.

See "Preparation For Storage" for additional EdgeVac Seed Metering System maintenance.

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

EDGEVAC SEED METER CLEANOUT

Thorough seed meter cleanout is important to maintain genetic purity.

- 1. Disengage seed drive and remove seed hopper and meter. Lay hopper on its right side.
- Rotate vacuum cover clockwise to align key hole slots with bolt heads. Lift off cover.
- Remove seed disc.
- 4. Empty meter and hopper by allowing seed to run out of meter.
- 5. Inspect brushes in meter to ensure all seed is removed.
- 6. Replace seed disc and install vacuum cover.

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.

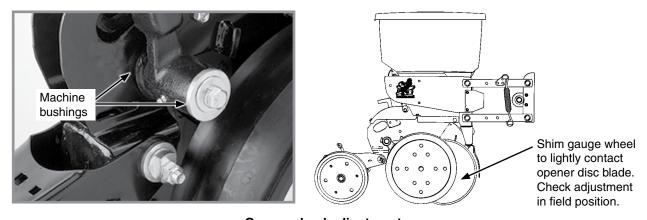
DRAG CLOSING ATTACHMENT

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



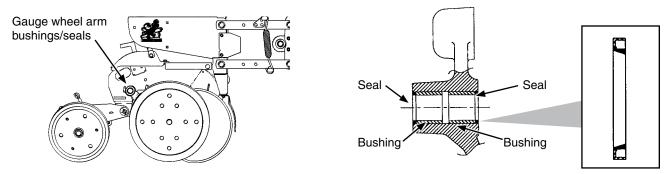
Gauge wheel adjustment

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" 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.

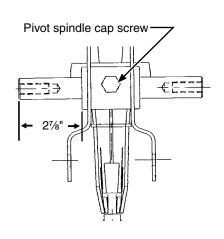
- 7. Inspect gauge wheel pivot spindle.
- 8. Reinstall gauge wheel arm assembly and gauge wheel.

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

- Remove gauge wheel and arm assemblies from shank assembly.
- 2. Remove ½" x ¾" cap screw that locks pivot spindle in place and remove spindle.
- 3. Install replacement spindle and position as shown. Exact centering is critical.
- 4. Install $\frac{1}{2}$ " x $\frac{3}{4}$ " cap screw and torque to lock pivot spindle in place.
- 5. Install gauge wheel and arm assemblies. Shim for proper gauge wheel tire/disc blade clearance.

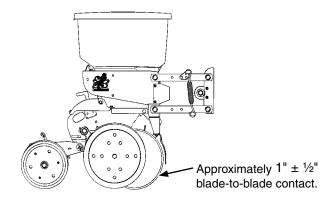


15" SEED OPENER DISC BLADE/BEARING ASSEMBLY

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 at outer edge of blade.

Maintain approximately 1" \pm ½" 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 ½" of contact.



NOTE: Proper blade clearance is critical. Blades should have 1" $\pm \frac{1}{2}$ " contact in this area. When blades are turned by hand in opposite directions against each other, there should be only light resistance to turning. Readjust 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 14½".

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" ± ½" 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 %"-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

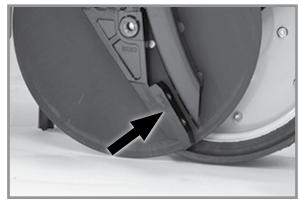
- 1. Remove gauge wheel, scraper, bearing cap, cap screw, washer and disc blade/bearing assembly.
- 2. Remove 1/4" rivets from bearing housing to expose bearing.
- 3. Installing new bearing install three evenly spaced ¼" cap screws into three of six holes in bearing housing to hold bearing and bearing housing in place. Install rivets in other three holes. Remove ¼" cap screws and install rivets in those three holes.
- 4. Reinstall disc blade/bearing assembly, washer and cap screw. Torque %"-11 cap screw to 110 ft-lb (149.14 N-m).
- 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 5%" or less at lower end. A new seed tube guard measures approximately 7%".

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.

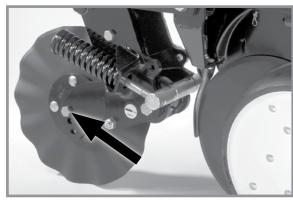
Remove seed tube and two hex socket head cap screws that attach seed tube guard. Hold replacement seed tube guard centered between seed opener disc blades. Install hex socket head cap screws. DO NOT TIGHTEN. Using a clamp or vise-grip, squeeze opener blades together in front of seed tube guard. Tighten 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 %" spindle hardware to 120 ft-lb (162.7 N-m)

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

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



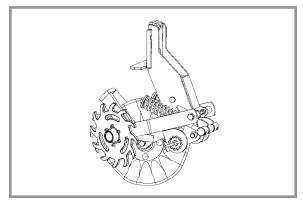
Frame mounted coulter spindle

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.







Style B

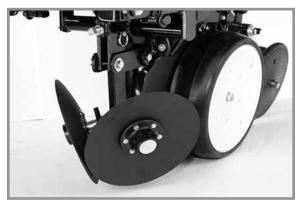
ROW UNIT MOUNTED DISC FURROWER

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).

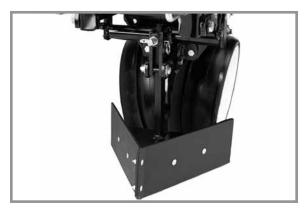
Blade hubs are equipped with sealed bearings. Replace bearings if a bearing sounds or feels rough when wheel is rotated.

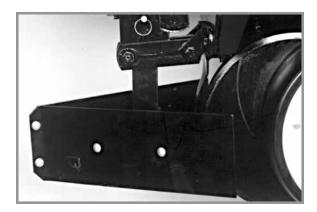
Replace solid or notched 12" diameter blades when worn to 11".



Row unit mounted disc furrower

ROW UNIT MOUNTED BED LEVELER





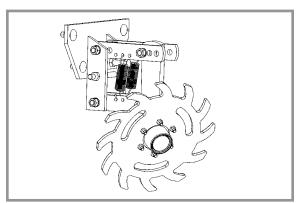
Lubricate bushings in mounting bracket and links at frequency indicated in Lubrication of this section. Check each bolt for proper torque. If bolt is loose, it should be removed and bushing inspected for cracks and wear. Replace bushing if necessary.

NOTE: Use only hardened flat washers. Replace damaged flat washers with proper part. Torque bolts to 130 ft. lbs.

ROW UNIT MOUNTED RESIDUE WHEEL



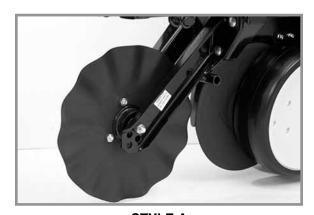




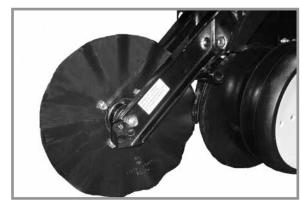
STYLE B

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



STYLE A (Two sleeves for coulter mounted residue wheels)



STYLE B (One sleeve for coulter mounted residue wheels)

Check nuts and hardware periodically for proper torque.

NOTE: Torque %" spindle hardware to 120 ft-lb (162 N-m).

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

Coulter 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 Coulter" in Row Unit Operation section of this manual.

Replace 16" diameter coulter blade when worn to 141/2".

COULTER MOUNTED RESIDUE WHEELS



STYLE A - Used With Style A Row Unit Mounted No Till Coulter



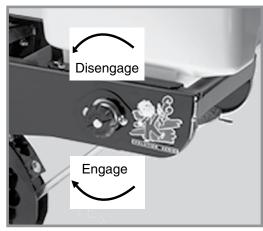
STYLE B - Used With Style B Row Unit Mounted No Till Coulter

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

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.

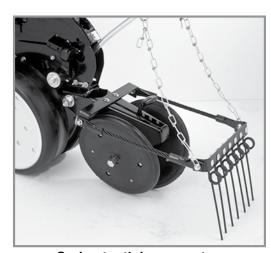
Install hoppers and chains. Check chain alignment.



Granular chemical throwout knob

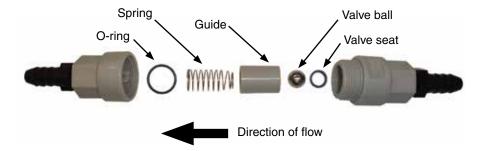
SPRING TOOTH INCORPORATOR

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

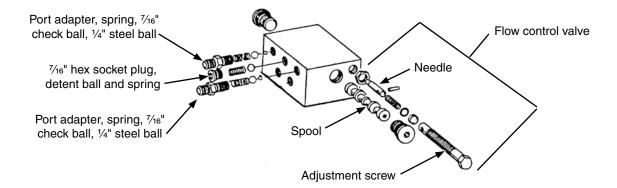


- 1. Unscrew valve body and separate halves. Note direction and location of parts.
- 2. Clean and inspect parts. Flush with clean water. Replace damaged parts.
- 3. Reassemble exactly as shown. O-ring and valve seat must be firmly in place inside each half of valve body.

ROW MARKER SEQUENCING/FLOW CONTROL VALVE INSPECTION



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.

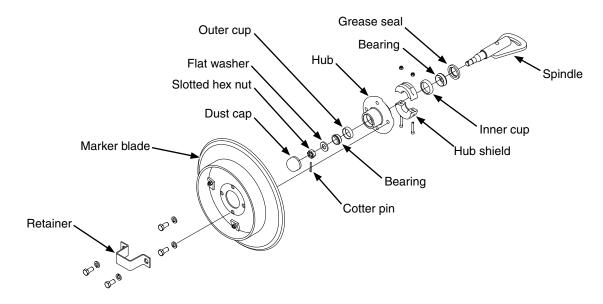
- 3. Remove plug from both sides of valve block and remove spool.
- 4. Inspect all parts for pitting, contamination, or foreign material. Check seating surfaces inside valve. Replace defective parts.
- 5. Lubricate spool with a light oil and reinstall. Check spool moves freely in valve body.

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.

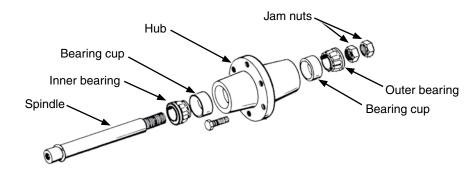
NOTE: Hydraulics operate slowly when oil is cold. Make all adjustments with warm oil.

ROW MARKER BEARING LUBRICATION OR REPLACEMENT



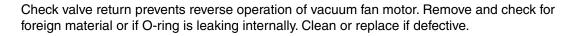
- 1. Remove retainer and marker blade.
- 2. Remove dust cap from hub.
- 2. Remove hub shield. Note direction of installation.
- 3. Remove cotter pin, slotted hex nut, and washer.
- 4. Slide hub from spindle.
- 5. Remove bearings and cups and discard if bearings are being replaced. Clean hub and dry. 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 ¾ 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.)
- 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.

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





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

NOTICE

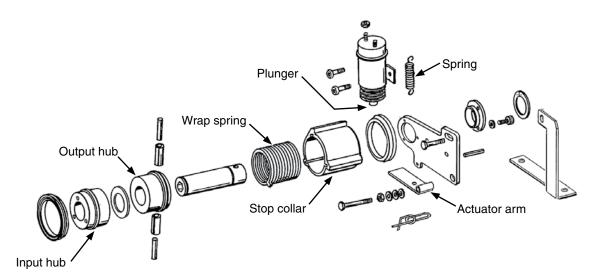
Connect hydraulic motor case drain to a case drain return line with zero pressure on tractor or hydraulic motor will be damaged. DO NOT connect hydraulic motor case drain to SCV outlet. Contact tractor manufacturer for specific details on "zero pressure return".



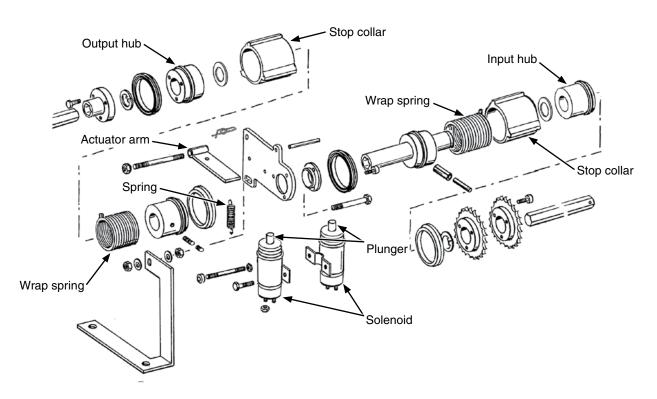
Pressure relief valve helps prevent damage to vacuum fan motor by limiting pressure in motor case drain line. It is set to open at 35 PSI (241.21 kPa). Remove and check for foreign material and contamination on valve or seating area of valve body. Clean or replace if defective.

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.

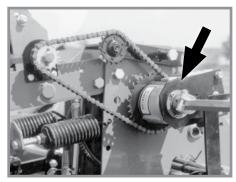


Single point row clutch main parts

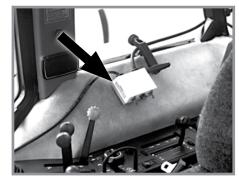


Two-speed point row clutch main parts

TESTING







Point row clutch 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.

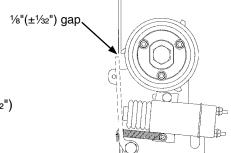
Place operation switch in RIGHT or LEFT position. Solenoid plunger will retract causing a clicking sound if it is operating properly. Touch plunger with a metal object to check if it is electrically magnetized. Check clutch and wiring harness for power with a test light or volt meter.

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.

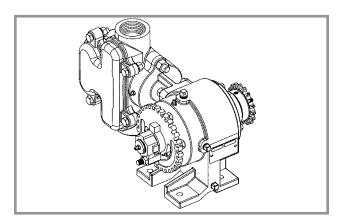
ACTUATOR ARM ADJUSTMENT

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

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



PISTON PUMP STORAGE





Liquid fertilizer piston pump

NOTICE

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

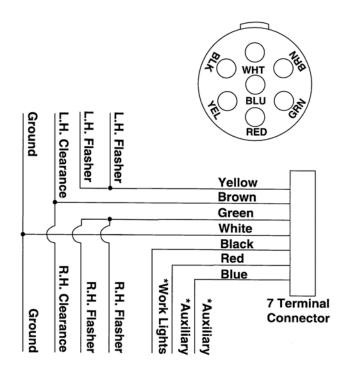
NOTE: SUSPENSION FERTILIZER must be flushed from pump for ANY storage period.

- 1. Flush pump with 5 to 10 gallons 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.

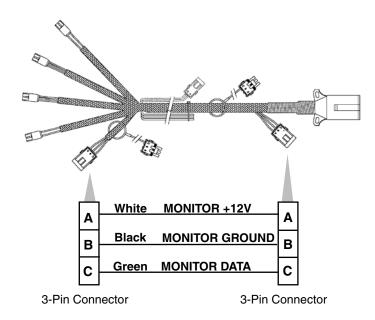
PREPARING PLANTER FOR STORAGE

- Store planter in a dry sheltered area if possible.
- 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.

ELECTRICAL WIRING DIAGRAM FOR LIGHT PACKAGE

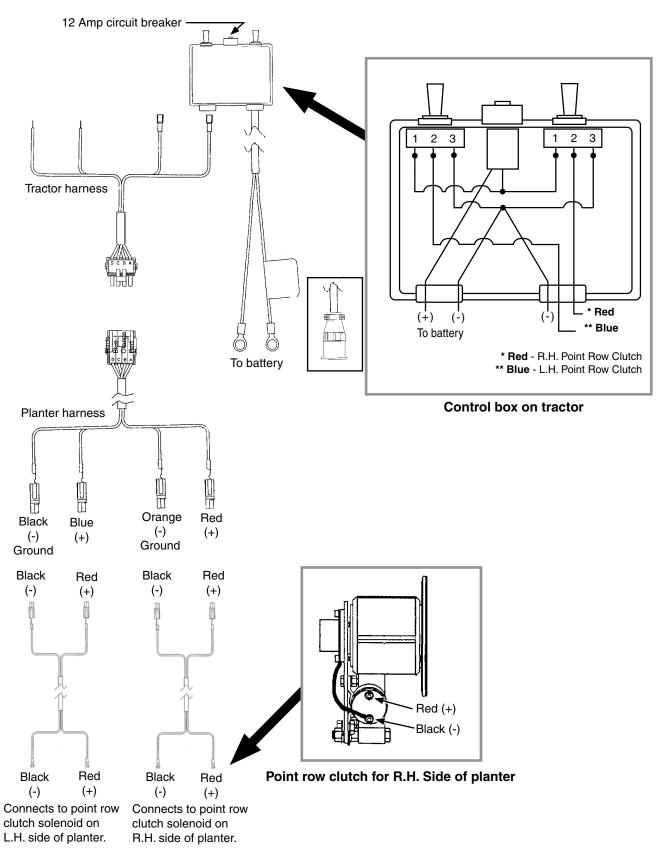


* Optional customer-supplied auxiliary lights and wires may be wired into existing plug terminals.

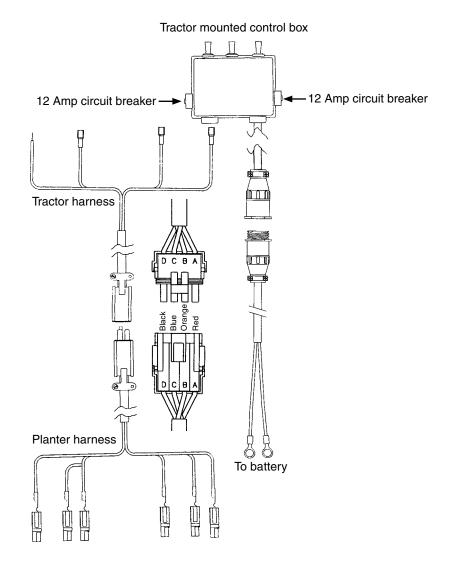


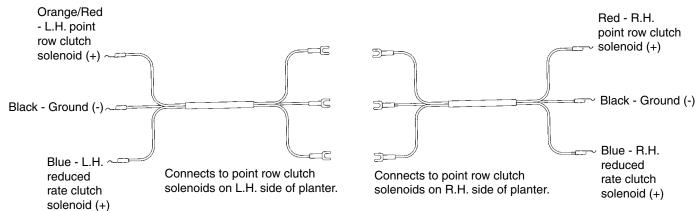
Light package meets ASABE Standards. Check with your tractor manufacturer for correct wiring harness connection to lights on your tractor.

POINT ROW CLUTCH ELECTRICAL WIRING DIAGRAMS

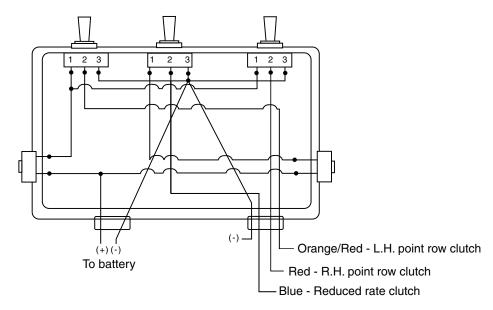


TWO-SPEED POINT ROW CLUTCH ELECTRICAL WIRING DIAGRAMS

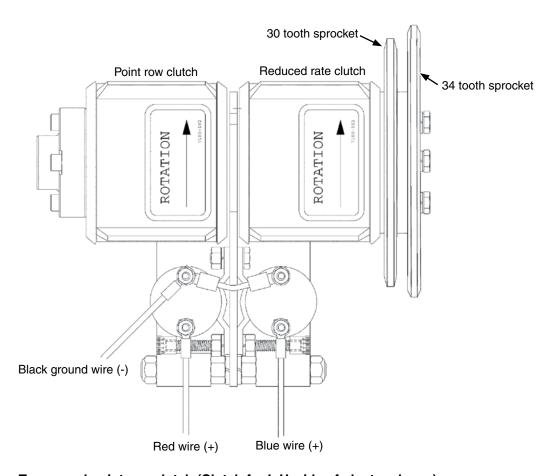




TWO-SPEED POINT ROW CLUTCHES ELECTRICAL WIRING DIAGRAMS

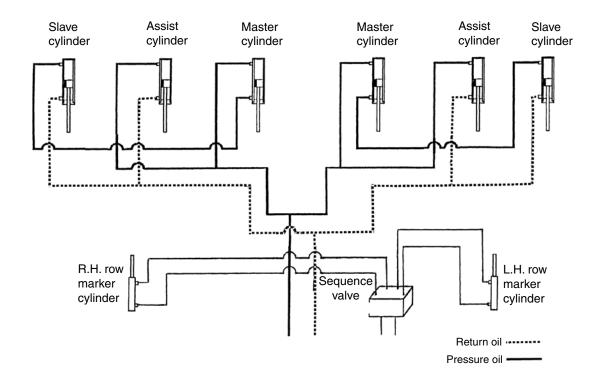


Tractor mounted control box

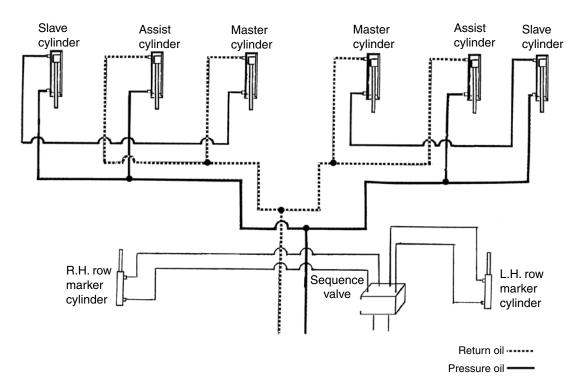


Two-speed point row clutch (Clutch for L.H. side of planter shown)

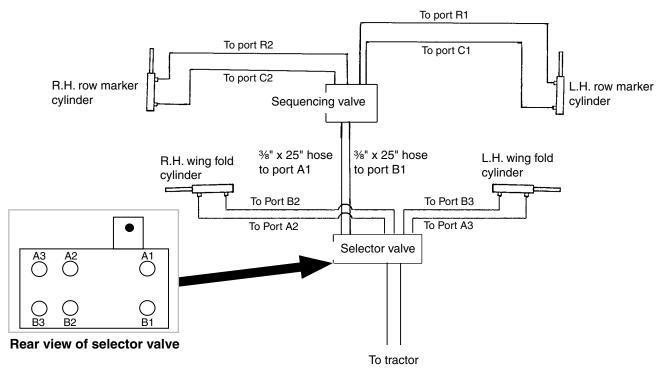
HYDRAULIC SYSTEM SCHEMATIC - PLANTER RAISING



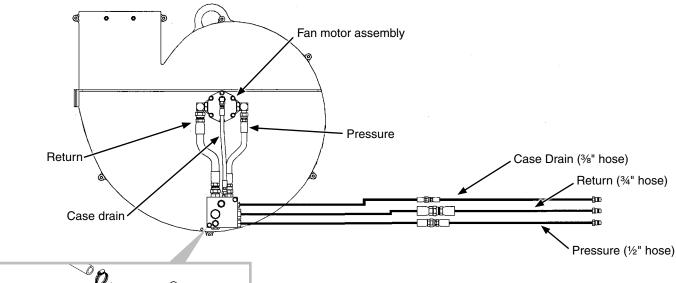
HYDRAULIC SYSTEM SCHEMATIC - PLANTER LOWERING

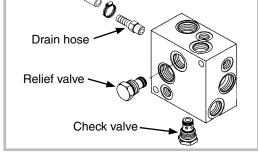


HYDRAULIC SYSTEM SCHEMATIC - OPTIONAL HYDRAULIC WING FOLD



HYDRAULIC SYSTEM SCHEMATIC - VACUUM FAN MOTOR SYSTEM



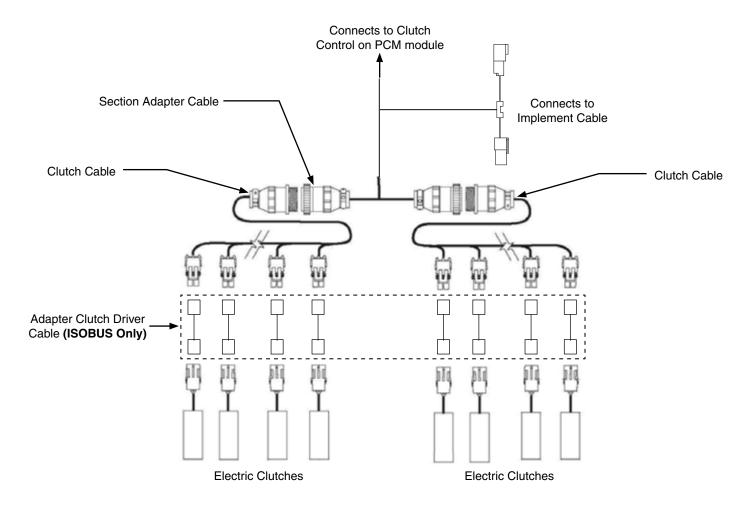


Vacuum fan motor valve block assembly (See machine operation section)

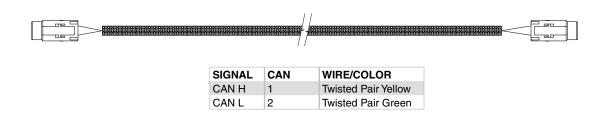
NOTICE

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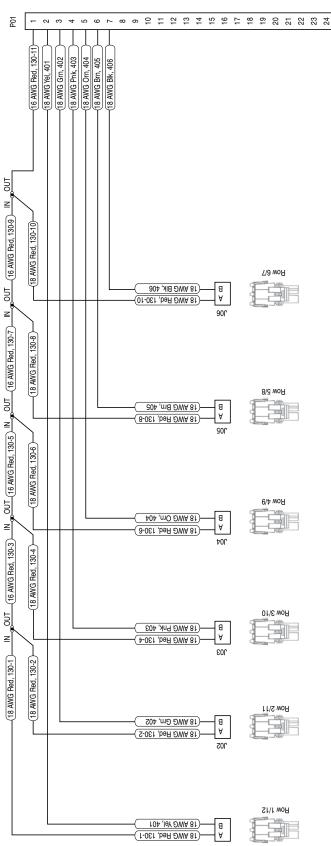
ELECTRIC CLUTCH SCHEMATIC

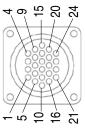


ISOBUS CAN JUMPER CABLE



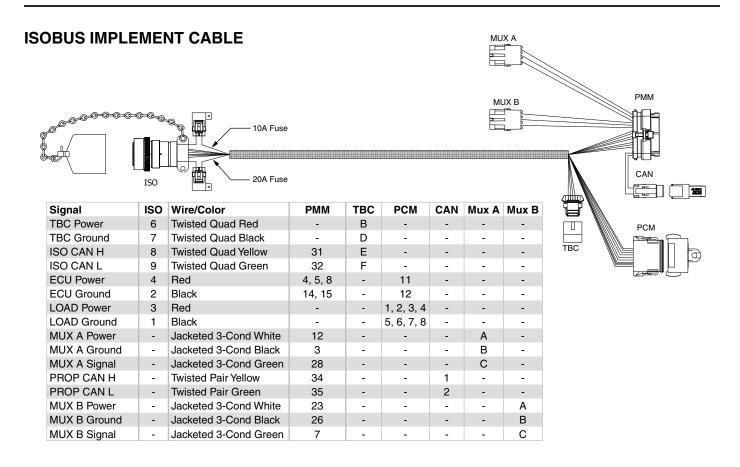
ISOBUS CLUTCH CABLE



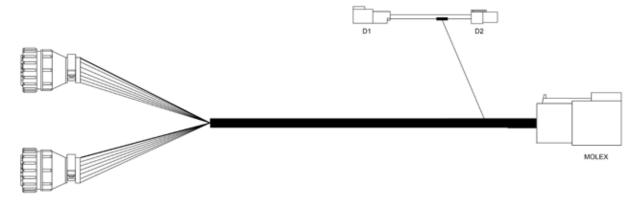




Signal	Clutch Cable Row 8/9	Row 8/9	Row 7/10 Row 6/11	Row 6/11	Row 5/12	Row 5/12 Row 4/13	Row 3/14 Row 2/15 Row 1/16	Row 2/15	Row 1/16
Power	-	∢	∢	∢	∢	∢	∢	∢	∢
Row 1/16	7		ı		ı	1	ı	ı	В
w 2/15	က				1			В	r
Row 3/14	4		ı		ı	ı	В		ı
w 4/13	2				ı	В	,		ı
Row 5/12	9	ı	ı	ı	В	ı	ı	ı	ı
w 6/11	7			В	ı				ı
Row 7/10	80		В	ı	ı	ı	ı	ı	ı
Row 8/9	O	В		•	1	1	ı	•	ı

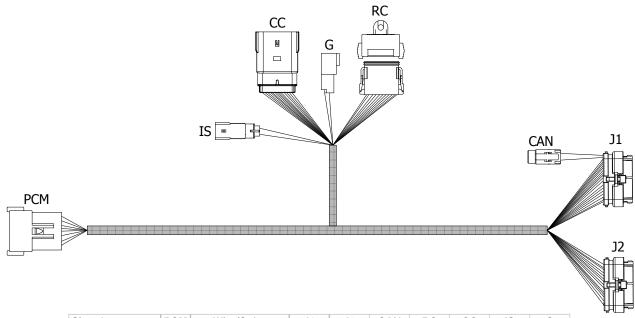


SECTION ADAPTER CABLE



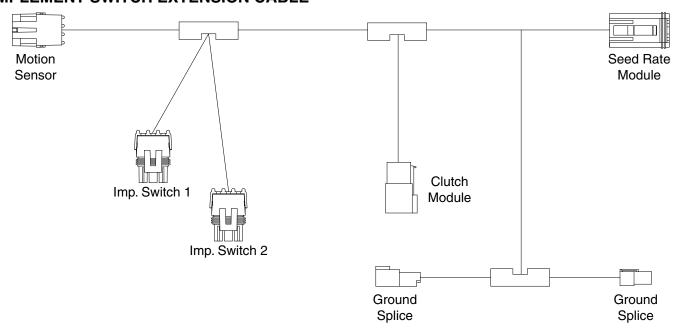
Signal	Color	AMP 1 (Left)	AMP 2 (Right)	Molex	D1	D2
High Current Power	Red	1 (16 Gauge)	1 (16 Gauge)	-	1 (12 Gauge)	1 (12 Gauge)
Ground	Black	-	-	-	2	2
Row 1, 2	Black	2, 3	-	1	-	-
Row 3, 4	Brown	4, 5	-	2	-	-
Row 5, 6	Orange	6, 7	-	3	-	-
Row 7, 8	Pink	-	6, 7	4	-	-
Row 9, 10	Green	-	4, 5	5	-	-
Row 11, 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 Deutcsch Plug	Ground Splice 1	Ground Splice 2	
12V+ Power	Α	Α	-	Brown	1	12	-	-	16
Switch Signal	В	В	-	Green	2	10	-	-	16
Motion Signal	-	-	С	White	-	11	-	-	16
Ground	-	-	В	Black	-	6	-	-	16
12V+ Power	-	-	Α	Red	-	1	-	-	16
Ground	C (Blue 16 AWG)	C (Blue 16 AWG)	-	Black	-	-	2	2	12
12V+ Power	-	<u>-</u>	-	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".

KPM I/KPM II STACK-MODE ELECTRONIC SEED MONITORS TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Single sensor communication alarm	Faulty seed tube sensor.	Replace sensor.
comes on (alarm on with no bargraph and a flashing row number on a single row).	Break in the harness just before seed tube sensor.	Inspect for break in harness and repair. If break can't be found, replace harness section.
	Dirty or corroded connector.	Clean connector.
Sensor communication alarms	Faulty monitor.	Repair/replace monitor.
come on for all sensors (alarm on with no bargraphs and flashing row numbers on all rows).	Break in harness just after monitor.	Inspect for break in harness and repair. If no break found, replace harness section.
	Dirty or corroded connector.	Clean connector.
Sensor communication alarms come on for some sensors (alarm on with no bargraphs and flashing	Break in harness.	Inspect for break in harness and repair. If no break found, replace section with alarming sensors.
row numbers on all rows).	Dirty or corroded connector.	Clean connector.
Faulty monitor values (such as speed, area, etc.) displayed.	Incorrect monitor settings.	Change settings to properly correspond to the system.
(KPM II Stack-Mode Only)	Faulty radar/magnetic distance sensor.	Replace sensor.
	Improperly mounted radar sensor.	Properly mount sensor.
Underplanting or no planting alarm	Seed tube sensor is blocked.	Clean sensor.
on a single sensor when planting (alarm on with a single bargraph	Faulty seed tube sensor.	Replace sensor.
segment on and a flashing row	Meter not planting or underplanting.	Repair/replace meter.
number on a single row).	Chain broken or off sprocket.	Repair as necessary.
Seed tube sensor dirty or blocked	Seed tube sensor is dirty.	Clean sensor.
warning comes on (after calibration, bargraph keeps flashing for a single row).	Faulty seed tube sensor.	Replace sensor.
LED on seed tube sensor will not	Faulty seed tube sensor.	Replace sensor.
come on.	Dirty or corroded connector.	Clean connector.
	Break in harness just before sensor.	Repair harness.
Erroneous MPH readings at idle. (Radar Distance Sensor Only)	Radar sensor not located in stable location.	Relocate to a stable location.

KPM III ELECTRONIC SEED MONITOR TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Single sensor communication alarm	Faulty seed tube sensor.	Replace sensor.
comes on.	Break in harness just before seed tube sensor.	Inspect for break in harness and repair. If break can't be found, replace harness section.
	Dirty or corroded connector.	Clean connector.
Sensor communication alarms	Faulty monitor.	Repair/replace monitor.
come on for all sensors.	Break in harness just after monitor.	Inspect for break in harness and repair. If break can't be found, replace harness section.
	Dirty or corroded connector.	Clean connector.
Sensor communication alarms come on for some sensors.	Break in harness.	Inspect for break in harness and repair. If break can't be found, replace harness section with alarming sensors.
	Dirty or corroded connector.	Clean connector.
Faulty monitor values (such as speed, area, etc.) displayed.	Incorrect monitor settings.	Change settings to properly correspond to the system.
	Faulty radar/magnetic distance sensor.	Replace sensor.
	Improperly mounted radar sensor.	Properly mount sensor.
Underplanting or no planting alarm	Seed tube sensor is blocked.	Clean sensor.
on a single sensor when planting (alarm on with a single bargraph	Faulty seed tube sensor.	Replace sensor.
segment on and a flashing row	Meter not planting or underplanting.	Repair/replace meter.
number on a single row.	Chain broken or off sprocket.	Repair as necessary.
Seed tube sensor dirty or blocked	Seed tube sensor is dirty.	Clean sensor.
warning comes on.	Faulty seed tube sensor.	Replace sensor.
LED on seed tube sensor will not	Faulty seed tube sensor.	Replace sensor.
come on.	Dirty or corroded connector.	Clean connector.
	Break in harness just before sensor.	Repair harness.
Erroneous MPH readings at idle. (Radar Distance Sensor Only)	Radar sensor not located in a stable location.	Relocate to a more stable location.

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. Rep	phase after each lowering cycl	е.

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

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 One row not planting seed. Drive release not engaged. Foreign material in hopper. Seed hopper empty. Fill seed hopper and finger carrier mechanism. Foreign material in hopper. Seed hopper empty. Fill seed hopper and finger carrier mechanism. Fill seed hopper. Drive release does not engage properly. Unit is skipping. Foreign material or obstruction in meter. Foreign material or obstruction or obstruction in meter. Foreign material or obstruction or obstruction in meter. Planting too fast. Loose finger holder. Adjust to specifications. (22 to 25 in. lbs. rolling torque) Worn brush in carrier plate. Inspect and replace if necessary. Underplanting. Seed belt installed backwards. Weak or broken springs. Replace brush. Foreign not properly installed. Seed belt catching or dragging. Foreign not properly installed. Seed belt catching or dragging. Foreign not properly installed. Foreign not properly installed. Foreign field check and		SEED WETER (FINGER PICKUP) TROUBLESHOUTING			
Foreign material in hopper. Clean hopper and finger carrier mechanism.	PROBLEM	POSSIBLE CAUSE	SOLUTION		
Seed hopper empty. Fill seed hopper.	One row not planting seed.	<u> </u>			
Row unit drive chain off of sprocket or broken.					
Drive release does not engage properly. Unit is skipping. Foreign material or obstruction in meter. Finger holder improperly adjusted. Broken fingers. Planting too many doubles. Planting too many doubles. Planting too fast. Loose finger holder. Worn brush in carrier plate. Underplanting. Seed hopper additive being used. Seed belt catching or dragging. Brush dislodging seed. Pregular or incorrect seed spacing. Wron grockes. Drive release shaft is not aligned properly with meter drive shaft. Vern brush in carrier plate. Seed spacing. Planting too fast. Loose finger holder. Worn brush in carrier plate. Seed hopper additive being used. Seed hopper additive being used. Seed belt installed backwards. Weak or broken springs. Spring not properly installed. Seed belt catching or dragging. Brush dislodging seed. Prive wheels slipping. Wrong sprockets. Check chart for correct speed. Wrong tire pressure. Drive wheels slipping. Wrong sprockets. Check chart for correct air pressure. Incharts. Seed tubes and/or openers planting speed. Seed tube sand/or speeds. Planting too fast. Wrong sprockets. Check chart for correct air pressure. Inconsistent seed size. Check chart for correct air pressure. Inconsistent seed size. Check chart for correct air pressure. Inconsistent seed size. Check chart for correct air pressure. Inconsistent seed size. Check chart for correct air pressure. Inconsistent seed size. Check chart for correct air pressure. Inconsistent seed size. Check chart for correct sprocket combinations. Stiff or worn drive chains. Seed tube worn or damaged. Seed tube worn or damaged. Seed tube worn or damaged. Adjust down pressure springs. Reduce planting speed. Adjust down pressure springs. Reduce planting speed. Loose fingers and/or springs. Reduce planting speed. Looked tube sand/or speeds. Red					
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Reduce planting speed. Partially plugged seed tube. Inspect and clean.			Lower planter only when tractor is moving forward.		
Partially plugged seed tube. Inspect and clean.		Rough seed bed.			
		Partially plugged seed tube.	·		
			Install properly.		

SEED METERING SYSTEM (EDGEVAC) TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Low seed count.	Meter RPM too high.	Reduce planting rate or planting speed.
	Singulator brush setting too	Adjust singulator brush.
	aggressive.	
	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	Reduce amount of treatment used and or mix
	disc recesses.	thoroughly. Add talc.
	Seed size too large for disc used.	Use appropriate disc for seed size.
	Wrong transmission setting.	Change transmission to desired rate.
	Wrong seed disc.	Use appropriate disc for seed type and size.
	Drive wheel slipage.	Compensate by adjusting transmission sprockets.
	Low tire pressure.	Adjust tire pressure to correct level.
	Failed/worn drive components.	Inspect and replace parts as required.
	Plugged orifices in seed disc.	Inspect and clean disc. Check cleanout
		brush. (If Applicable)
	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	Thoroughly mix talc to coat all seeds.
	allowing seed flow due to seed	Remove seed baffle. See "Seed Meter" in
	bridging.	Seed Meter Operation/Maintenance section.
	60 cell soybean disc not filling properly due to excessive RPM.	Replace with 120 cell soybean disc.
	Seed disc worn.	Replace.
	Vacuum cover 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 brush setting too aggressive.	Adjust singulator brush.
	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.
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Continued on next page.

SEED METERING SYSTEM (EDGEVAC) TROUBLESHOOTING (CONTINUED)

	SEED METERING SYSTEM (EDGEVAC) TROUBLESHOOTING (CONTINUED)				
PROBLEM	POSSIBLE CAUSE	SOLUTION			
Not planting seed.	Seed baffle (If Applicable) not	Thoroughly mix talc to coat all seeds. Re-			
(Continued)	allowing seed flow due to seed	move seed baffle. See "Seed Meter" in Seed			
	bridging.	Meter Operation/Maintenance section.			
	60 cell soybean disc not filling properly due to excessive RPM.	Replace with 120 cell soybean disc.			
High seed count.	Wrong transmission setting.	Change transmission to desired rate.			
	High vacuum.	Adjust vacuum level to appropriate level.			
	Wrong seed disc.	Replace seed disc.			
	Singulator brush setting not	Adjust singulator brush.			
	aggressive enough.				
	Worn singulator brush.	Inspect brush and replace as required.			
	Seed leaking past wall brush.	Inspect wall brush condition and installation.			
		Replace as necessary.			
	Faulty vacuum gauge.	Check gauge line for dirt/obstruction. Repair/replace vacuum gauge.			
Poor seed spacing.	Obstruction in seed tube.	Clean seed tube.			
1 oor seed spacing.	Dirty/damaged seed disc.	Inspect seed disc for damage, foreign			
	Dirty/damaged seed dise.	material in orifices or seed treatment buildup			
		in recesses. Clean or replace as required.			
	Wrong vacuum setting.	Adjust vacuum to appropriate level.			
	Excess foreign material in seed.	Inspect and clean meter and seed discs. Use			
	Zacoco iorolgir material in occur	clean, undamaged seed.			
	Incorrect singulator brush setting.	Adjust singulator brush to appropriate setting.			
	Inconsistent driveline.	Inspect drive components for rust, misalign-			
		ment, 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.			
	Drive wheels slipping.	Reduce speed. Decrease row unit down			
		pressure spring settings.			
Unable to achieve desired	Tractor hydraulic flow set too low.	Increase flow to fan motor.			
vacuum level.	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/	Inspect air lines for any damage or			
	blocked.	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.			