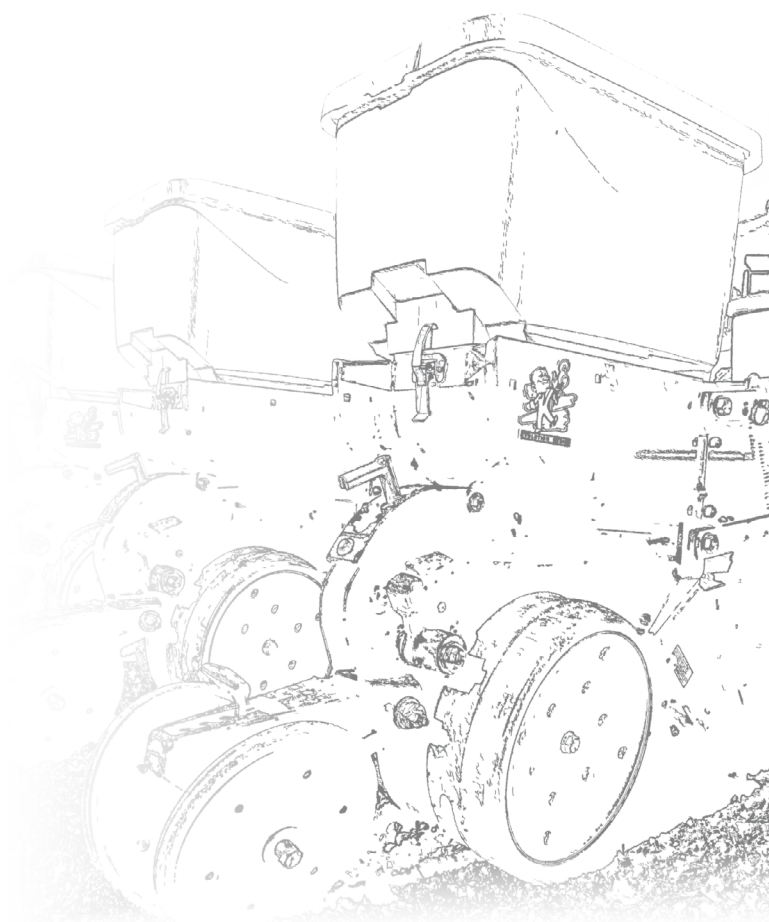


OPERATOR'S MANUAL



M0262-01

MODEL 3600 PIVOT FOLD EXPORT PLANTER

Rev. 4/19

MODEL 3600 PIVOT FOLD EXPORT PLANTER OPERATOR'S MANUAL

M0262-01

Rev. 4/19

This manual is for: Model 3600 Pivot Fold Planters
 - 12 Row 70 CM "Y" Hitch; 2016 Production Year and on
 - 16 Row 70 CM "Y" Hitch; 2015 Production Year and on

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

Model Number _____ 3600 _____

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

Record your serial number and purchase date above for quick reference.

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



**Serial number plate location - Inner R.H. Wing
(2015-2018 Production)**



**Serial number plate location - Outer R.H. Wing
(2019 Production And On)**



EUROPEAN DECLARATION OF CONFORMITY

Kinze Manufacturing
2172 M Avenue
Williamsburg, IA 53261

Kinze Europe UAB
Guopstu k., Senuju Traku sen
LT-21148 Traku r., Lithuania

We, Kinze Manufacturing and Kinze Europe UAB declare, under our sole responsibility, the following products – agricultural planter models 3000, 3110, 3140, 3200, 3500, 3600, 3700 and 4900 – to which this declaration relates, are in conformity with the following standards, other normative documents and Directives, as applicable by version and model:

2006/42/EC; EN 1037:1995+A1:2008; EN ISO 13850:2008; EN ISO 13857:2008; EN 349:1993+A1:2008; EN 547-1:1996+A1:2008; EN 547-2:1996+A1:2008; EN 547-3:1996+A1:2008; EN ISO 13732-1:2008; EN 614-1:2006+A1:2009; EN 614-2:2000+A1:2008; EN 953:1997+A1:2009; EN ISO 13849-1:2008; EN ISO 13849-2:2012; EN ISO 4254-1; EN ISO 12100:2010; EN ISO 4413:2010.

The Technical Construction File is maintained at: Kinze Manufacturing, Inc., 2172 M Avenue, Williamsburg, Iowa, USA, 52361-0806.

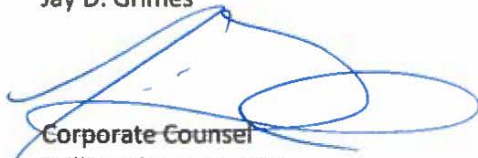
The authorized representative located within the community is: Edvardas Melys, Kinze Europe UAB, Guopstu k., Senuju Traku sen, LT-21148 Traku r., Lithuania.

Place of Issue: Kinze Manufacturing Inc., Williamsburg, Iowa, USA.

Date of Issue: 20160525 | May 25, 2016

Signed on behalf of Kinze Manufacturing Inc. and Kinze Europe UAB:

Jay D. Grimes



Corporate Counsel
Williamsburg, IA, USA



Kinze Manufacturing, Inc.



СЕРТИФИКАТ СООТВЕТСТВИЯ

№ ТС RU C-US.A301.B.01215

Серия RU № 0389450

ОРГАН ПО СЕРТИФИКАЦИИ Общество с ограниченной ответственностью «АЛЪЯНС ЮГО-ЗАПАД». Место нахождения: 117461, Россия, город Москва, улица Каховка, дом 30, помещение I, комната 13. Фактический адрес: 119049, Россия, город Москва, 1-й Добрынинский переулок, дом 15/7, помещение 27. Телефон: +7 (495) 268-13-26, факс: +7 (495) 268-13-26, адрес электронной почты: info@alliance-sw.ru. Аттестат аккредитации регистрационный № RA.RU.11A301 выдан 27.10.2015 года Федеральной службой по аккредитации

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Филиал изготовителя: KINZE Europe, UAB.

Место нахождения филиала изготовителя: ЛИТВА, Guopstu k. 1B, Senuji Traku sen., LT-21148 Traku r.
Фактический адрес филиала изготовителя: ЛИТВА, Guopstu k. 1B, Senuji Traku sen., LT-21148 Traku r.

ПРОДУКЦИЯ Машины сельскохозяйственные: сеялки, модели: 3000, 3110, 3140, 3200, 3500, 3600, 3660, 3700, 4900.
Продукция изготовлена в соответствии с Директивой 2006/42/ЕС.
Серийный выпуск

КОД ТН ВЭД ТС 8432 30 110 0

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ Технического регламента Таможенного союза ТР ТС 010/2011
"О безопасности машин и оборудования"

СЕРТИФИКАТ ВЫДАН НА ОСНОВАНИИ протокола испытаний № 1666M-LAB04/16 от 12.04.2016 года. Испытательная лаборатория Общество с ограниченной ответственностью «Инвестиционная корпорация», аттестат аккредитации регистрационный № RA.RU.21MЭ64 от 17.12.2015 года; акта анализа состояния производства от 29.03.2016 года органа по сертификации продукции Общества с ограниченной ответственностью «Альянс Юго-Запад».

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ Срок службы 10 лет согласно технической документации.
Срок и условия хранения указаны в эксплуатационной документации, приложенной к изделию.



СРОК ДЕЙСТВИЯ С

12.04.2016

ПО

11.04.2021

ВКЛЮЧИТЕЛЬНО

Руководитель (уполномоченное
лицо) органа по сертификации

(подпись)

А.А. Звягин

(инициалы, фамилия)

Эксперт (эксперт-аудитор)
(эксперты (эксперты-аудиторы))

(подпись)

К.Б. Киреенко

(инициалы, фамилия)

TO THE DEALER

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

PREDELIVERY CHECKLIST

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

- Center pivot base mounting and transport wheel spindle hex head cap screws torqued to 610 Nm.
- Row units properly spaced and optional attachments correctly assembled.
- Row marker assemblies installed and adjusted at each end of the planter.
- Vacuum is properly installed (as applicable).
- All grease fittings in place and lubricated.
- All working parts move freely, bolts are tight, and cotter pins are spread.
- Check all drive chains for proper tension and alignment.
- Check for oil leaks and proper hydraulic operation.
- Hydraulic hoses correctly routed to prevent damage.
- Inflate tires to specified air pressure and torque wheel lug bolts and lug nuts as specified in the manual.
- All safety decals correctly located and legible. Replace if damaged.
- All reflective decals and SMV sign correctly located and visible when the planter is in transport position.
- Safety/warning lights correctly installed and working properly.
- Paint all parts scratched during shipment or assembly.
- All safety lockup devices on the planter and correctly located.
- Auxiliary safety chain properly installed and hardware torqued to specification.
- Control box properly installed in tractor. All cables correctly routed and secure.

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

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

OWNER REGISTER

Name _____ Delivery Date _____

Street Address _____ Model No. 3600 Serial No. _____

City, State/Province _____ Dealer Name _____

ZIP/Postal Code _____ Dealer No. _____

DELIVERY CHECKLIST

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

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

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

(Signature Of Delivery Person/Dealer Name/Date)

AFTER DELIVERY CHECKLIST

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

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

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

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

Tear Along Perforation

OVERVIEW

| | |
|--------------------------------|-----|
| To The Owner | 1-1 |
| Warranty | 1-3 |
| General Information | 1-4 |
| Specifications | 1-5 |
| General Safety Rules | 1-6 |
| Safety Precautions | 1-7 |

MACHINE OPERATION

| | |
|--|------|
| Manual Safety Lockup | 2-1 |
| Row Marker Safety Lockup | 2-1 |
| Tongue Safety Pin | 2-2 |
| Transport Latch Locking Pin | 2-2 |
| Initial Preparation | 2-3 |
| Tractor Requirements | 2-4 |
| Tractor Mounted PTO Pump And Oil Cooler Option | 2-5 |
| Tractor Preparation and Hookup | 2-6 |
| Cylinder Information | 2-9 |
| Hydraulic Hose Information | 2-11 |
| Level Planter | 2-13 |
| Ridge Planting | 2-15 |
| Contact Wheel Drive Sprockets | 2-15 |
| Contact Wheel Spring Adjustment | 2-16 |
| Seed Rate Transmission Adjustment | 2-16 |
| Wrap Spring Wrench Operation | 2-16 |
| Shear Protection | 2-17 |
| Hydraulic/Electric Operation | 2-18 |
| Transport to Field Sequence | 2-20 |
| Field Operation | 2-23 |
| Planting Speed | 2-23 |
| Field to Transport Sequence | 2-24 |
| Vacuum System | 2-26 |
| Digital Vacuum Readout | 2-26 |
| Vacuum Fan Motor Valve Block Assembly | 2-26 |
| Bulk Fill System | 2-27 |
| Analog Vacuum or Pressure Gauge | 2-28 |
| Bulk Fill Entrainer Access | 2-28 |
| Bulk Fill Tanks - Clean Out | 2-28 |
| Bulk Fill Scale Package Option | 2-29 |
| Rock Guards | 2-31 |
| Auxiliary Work Lights Package | 2-31 |
| Ag Leader Integra Display | 2-32 |
| Ag Leader Monitoring Control Package (PMM) | 2-32 |
| Ag Leader InCommand 1200 Display | 2-32 |
| Kinze ISOBUS Option | 2-32 |
| Row Marker Operation | 2-33 |

| | |
|---|------|
| Row Marker Speed Adjustment | 2-34 |
| Even-Row Push Row Unit | 2-34 |
| Row Marker Adjustments | 2-35 |
| Row Marker Even-Row Length Adjustment | 2-36 |
| Offset Hitch Adjustment | 2-36 |
| Point Row Clutches | 2-37 |
| Two-Speed Point Row Clutches | 2-38 |
| Auxiliary Hydraulic Option | 2-39 |
| Rear Trailer Hitch | 2-40 |
| Field Test | 2-41 |
| Field Check Seed Population | 2-41 |
| Determining Kilograms Per Hectare (Brush-Type Meter) | 2-42 |
| Field Check Granular Chemical Application | 2-43 |
| Water Tank | 2-44 |

ROW UNIT OPERATION


| | |
|--|------|
| Planting Depth | 3-1 |
| “V” Closing Wheel Adjustment (Rubber or Cast Iron) | 3-1 |
| Closing Wheel Shield (Rubber or Cast Iron “V” Closing Wheels) | 3-1 |
| Drag Closing Attachment | 3-2 |
| Covering Discs/Single Press Wheel Adjustment | 3-2 |
| Seed Hoppers | 3-3 |
| Seed Meter Drive Release | 3-3 |
| Row Unit Extension Brackets | 3-3 |
| Row Unit Chain Routing | 3-4 |
| Quick Adjustable Down Force Springs Option (Standard or Heavy Duty) | 3-5 |
| Interplant Push Row Unit Clutch Sprocket | 3-6 |
| Interplant Push Row Unit Vacuum Hose Shutoff | 3-6 |
| Interplant Push Row Unit Lockups | 3-7 |
| Brush-Type Seed Meter | 3-9 |
| Finger Pickup Seed Meter | 3-10 |
| Vacuum Settings | 3-12 |
| Rapeseed Planting Section | 3-16 |
| Seed Meter Cleanout | 3-18 |
| Additives | 3-19 |
| Bayer Fluency Agent | 3-20 |
| Frame Mounted Coulter (Pull Row Only) | 3-21 |
| Residue Wheels (for Frame Mounted Coulter) | 3-21 |
| Row Unit Mounted Disc Furrower (Pull Row Only) | 3-22 |
| Row Unit Mounted Residue Wheel | 3-23 |
| Row Unit Mounted No Till Coulter | 3-24 |
| Coulter Mounted Residue Wheels | 3-24 |
| Granular Chemical Hopper and Drive | 3-26 |
| Spring Tooth Incorporator | 3-26 |
| Granular Chemical Banding Options | 3-27 |





| | | | |
|---|------------|---|------|
| Granular Chemical Bander Shield | 3-27 | Row Unit Mounted Residue Wheel | 6-23 |
| FERTILIZER | | Granular Chemical Attachment | 6-23 |
| Double Disc Fertilizer Opener | 4-1 | Spring Tooth Incorporator | 6-23 |
| Notched Single Disc Opener | 4-2 | Single and Two-Speed Point Row Clutch Maintenance | 6-25 |
| Residue Wheel Attachment for Notched Single Disc Fertilizer Opener | 4-4 | Check Valve (Lift System) | 6-27 |
| Depth/Gauge Wheel Attachment for Notched Single Disc Fertilizer Opener | 4-4 | Check Valve (Vacuum Fan) | 6-27 |
| HD Single Disc Fertilizer Opener | 4-5 | Flow Control Valve | 6-27 |
| Dry Fertilizer Attachment | 4-7 | Pressure Relief Valve | 6-27 |
| RATE CHARTS | 5-1 | Pressure Reducing Relief Valve | 6-27 |
| LUBRICATION AND MAINTENANCE | | Relief Valve Cartridge | 6-27 |
| Lubrication | 6-1 | Solenoid Valve | 6-27 |
| Lubrication Symbols | 6-1 | Row Marker Bearing Lubrication or Replacement | 6-28 |
| Sealed Bearings | 6-1 | Row Marker Transport Stand Adjustment | 6-29 |
| Wrap Spring Wrench Assembly | 6-1 | Wheel Bearing Repack or Replacement | 6-29 |
| Drive Chains | 6-2 | Wear Pad Field Replacement/Adjustment | 6-30 |
| Bushings | 6-3 | Tractor Mounted PTO Pump and Oil Cooler Option | 6-34 |
| Center Post | 6-5 | Electrical Control Console Schematic | 6-35 |
| U-Joint Slides | 6-5 | Electrical Wiring Harness Schematic (On Tractor) | 6-36 |
| PTO Pump Shaft Coupling (Tractor Mounted PTO Pump and Oil Cooler) | 6-5 | Pneumatic Down Pressure Air Compressor Tank | 6-37 |
| Wheel Bearings | 6-6 | Preparation for Storage | 6-37 |
| Grease Fittings | 6-6 | Electrical Wiring Diagram for Light Package | 6-38 |
| Mounting Bolts and Hardware | 6-10 | Electrical Wiring Harness Schematic (On Planter) | 6-39 |
| Tire Servicing | 6-11 | Valve Block - Located on Hitch | 6-40 |
| Finger Pickup Seed Meter Inspection/Adjustment | 6-12 | Valve Block - Located on Rear Center Frame | 6-41 |
| Cleaning Finger Pickup Seed Meter For Storage | 6-13 | Electrical Control Console Schematic (With Optional Two-Speed Point Row Clutches) and Wiring Harness at Two-Speed Point Row Clutch Solenoids | 6-42 |
| Brush-Type Seed Meter Maintenance | 6-14 | Hydraulic Hose Life | 6-43 |
| Cleaning Brush-Type Seed Meter For Storage | 6-15 | Hydraulic System Schematic | 6-44 |
| Vacuum Seed Meter Maintenance | 6-16 | Hydraulic Schematic - Vacuum Fan Motor System | 6-47 |
| Seed Meter Cleanout | 6-16 | Hydraulic Schematic - Optional Tractor Driven PTO Pump and Oil Cooler System | 6-47 |
| Chain Tension Adjustment | 6-17 | Wing Down Pressure Schematic (Weight Transfer Mechanism) | 6-48 |
| Drag Closing Attachment | 6-17 | PTO Pump Drive and Oil Cooler Option | 7-3 |
| Gauge Wheel Adjustment | 6-17 | | |
| Gauge Wheel Arm Bushing/Seal Replacement | 6-18 | | |
| Gauge Wheel Arm Pivot Spindle Replacement | 6-18 | | |
| 15" Seed Opener Disc Blade/Bearing Assembly | 6-19 | | |
| Seed Tube Guard/Inner Scraper | 6-21 | | |
| Frame Mounted Coulter | 6-21 | | |
| Residue Wheels (For Use With Frame Mounted Coulter) | 6-21 | | |
| Row Unit Mounted Disc Furrower | 6-22 | | |
| Row Unit Mounted No Till Coulter | 6-22 | | |
| Coulter Mounted Residue Wheels | 6-23 | | |

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

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

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

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

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

NOTE: Special point of information or machine adjustment instructions.

**WARNING**

Improperly operating or working on this equipment could result in death or serious injury. Read and follow all instructions in Operator Manual before operating or working on this equipment.

**WARNING**

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

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

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

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

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

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

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

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



Model 3600 16 Row Planter with Vacuum, Interplant, and Bulk Fill System

The Model 3600 Twin-Line Planter is available with vacuum or mechanical meters, conventional hoppers or bulk fill, Interplant, and various other options. Liquid or dry fertilizer application equipment and various row unit attachments are also available.

Information used in these instructions 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 direction machine travels in use unless otherwise stated.

TOOLS REQUIRED

| Hardware Size / Tool Required | | | |
|--------------------------------|--|---------------------------------|---------------------------------|
| $\frac{1}{4}" = \frac{7}{16}"$ | $\frac{7}{16}" = \frac{5}{8}"$ (nut for $\frac{7}{16}"$ hardware uses $\frac{1}{16}"$ tool) | $\frac{3}{4}" = 1\frac{1}{8}"$ | $1\frac{1}{4}" = 1\frac{7}{8}"$ |
| $\frac{5}{16}" = \frac{1}{2}"$ | $\frac{1}{2}" = \frac{3}{4}"$ | $\frac{7}{8}" = 1\frac{5}{16}"$ | $1\frac{1}{2}" = 2\frac{1}{4}"$ |
| $\frac{3}{8}" = \frac{9}{16}"$ | $\frac{5}{8}" = 1\frac{5}{16}"$ | $1" = 1\frac{1}{2}"$ | |

| Specification | Conventional Hoppers | |
|-----------------------|---|---|
| | 12R 70 CM Y | 16R 70 CM Y |
| Number of Rows | 12R 70 CM Y | 16R 70 CM Y |
| Base Machine (Empty)* | 12,780-13,185 lb (5795-5980 kg) | 15,730-16,210 lb (7135-7350 kg) |
| Axle Weight Empty | 10,376 lb (4707 kg) | 19,903 lb (9028 kg) |
| Tongue Weight Empty | 2,034 lb (923 kg) | 3,497 lb (1586 kg) |
| Transport Height | 11' 4" (3.50 m) | 11' 4" (3.50 m) |
| Planting Length | 21' 0" (6.40 m) | 23' 11" (7.30 m) |
| Transport Length | 34' 5" (10.50 m) | 43' 8" (13.30 m) |
| Planting Width | 29' 6" (9.00 m) | 38' 5" (11.70 m) |
| Transport Width | 10' 6" (3.20 m) | 10' 6" (3.20 m) |
| Seed Capacity | 1.75 bu (62 L)/Hopper (Vacuum); 1.90 bu (67 L)/Hopper (Mechanical) | 1.75 bu (62 L)/Hopper (Vacuum); 1.90 bu (67 L)/Hopper (Mechanical) |
| Transport Tire Size | Four 255 - 70R 22.5 radial load range 'H' tubeless rib implement w/o center groove. | |
| Field Tire Size | 7.50" x 20" 8 ply rib implement tires w/o center groove. | |
| Field Lift | Two master/two slave rephasing cylinders. | |
| Row Markers | Independently controlled, three stage, low profile, w/disk blade depth bands. | |

| Specification | Bulk Fill | |
|-----------------------|---|---------------------------------|
| | 12R 70 CM Y | 16R 70 CM Y |
| Number of Rows | 12R 70 CM Y | 16R 70 CM Y |
| Base Machine (Empty)* | 14,590-15,242 lb (6615-6915 kg) | 15,600-17,048 lb (7075-7730 kg) |
| Axle Weight Empty | 16,021 lb (7267 kg) | 21,980 lb (9970 kg) |
| Tongue Weight Empty | 3,139 lb (1424 kg) | 3860 lb (1751 kg) |
| Transport Height | 12' 5" (3.80 m) | 12' 5" (3.80 m) |
| Planting Length | 21' 0" (6.40 m) | 23' 11" (7.30 m) |
| Transport Length | 34' 5" (10.50 m) | 43' 8" (13.30 m) |
| Planting Width | 29' 6" (9.00 m) | 38' 5" (11.70 m) |
| Transport Width | 10' 6" (3.20 m) | 10' 6" (3.20 m) |
| Seed Capacity | 80 bu (2819 L) | |
| Transport Tire Size | Four 255 - 70R 22.5 radial load range 'H' tubeless rib implement w/o center groove. | |
| Field Tire Size | 7.50" x 20" 8 ply rib implement tires w/o center groove. | |
| Field Lift | Two master/two slave rephasing cylinders. | |
| Row Markers | Independently controlled, three stage, low profile, w/disk blade depth bands. | |

*Base machine weight depending on how machine is equipped (meters, drives, and hoppers).

TRACTOR HYDRAULIC REQUIREMENTS

| Configuration | No Optional Pumps | | Tractor Mounted PTO Pump | |
|--|-------------------|--------------------|--------------------------|-------------------|
| | 2 SCV | 15 gpm (57 L/min) | 2 SCV | 15 gpm (57 L/min) |
| Mechanical Meter ^{1,2} | 2 SCV | 15 gpm (57 L/min) | | |
| Vacuum Meter ^{1,2} | 3 SCV | 30 gpm (113 L/min) | 2 SCV | 15 gpm (57 L/min) |
| Bulk Fill (with Mechanical Meter) ³ | 3 SCV | 25 gpm (95 L/min) | 2 SCV | 15 gpm (57 L/min) |
| Bulk Fill (with Vacuum) ² | 4 SCV | 40 gpm (151 L/min) | 3 SCV | 25 gpm (95 L/min) |


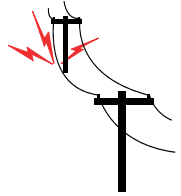
¹Hydraulic drive adds 1 SCV + 5 gpm (19 L/min) (mechanical) or 10 gpm (38 L/min) (vacuum) min. to requirements.


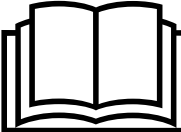
²Wing down pressure option adds 1 SCV to conventional only.



³Hydraulic drive not available for bulk fill/vacuum configuration.



1. Read and understand instructions provided in this manual and warning labels. Review these instructions frequently!
 2. This machine is designed and built with your safety in mind. Do not make any alterations or changes to this machine. Any alteration to design or construction may create safety hazards.
 3. A large portion of farm accidents happen from fatigue or carelessness. Safe and careful operation of tractor and planter will help prevent accidents.
 4. Never allow planter to be operated by anyone unfamiliar with operation of all functions of the unit. Operators must read and thoroughly understand all instructions given in this manual before operating or working on equipment.
 5. Be aware of bystanders, particularly children! Always look around to make sure it is safe to start tow vehicle engine or move planter. This is particularly important with higher noise levels and quiet cabs, as you may not hear people shouting.
 6. Make sure planter weight does not exceed towing capacity of tractor, or bridge and road limits. This is critical to maintain safe control and prevent death or injury, or property and equipment damage.
 7. Never ride or allow others to ride on planter.
 8. Store planter in an area away from human activity. DO NOT permit children to play on or around the stored unit.
 9. Keep hands, feet, and clothing away from moving parts. Do not wear loose-fitting clothing which may catch in moving parts.
 10. Always wear protective clothing, shoes, gloves, hearing, and eye protection applicable for the situation.
 11. Do not allow anyone to stand between tongue or hitch and towing vehicle when backing up to planter.
 13. Prevent electrocution, other injuries, or property and equipment damage. Watch for obstructions such as wires, tree limbs, etc. when operating machine. Be aware of clearances during turns and when folding/unfolding planter.
 14. Reinstall all guards removed for maintenance activities. Never leave guards off during operation.
 15. Use of aftermarket hydraulic, electric, or PTO drives may create serious safety hazards to you and people nearby. If you install such drives, follow all appropriate safety standards and practices to protect you and others near this planter from injury.
 16. Follow all federal, state/provincial, and local regulations when towing farm equipment on a public highway. Use safety chain (not an elastic or nylon/plastic tow strap) to retain connection between towing and towed machines in the event of primary attaching system separation.
 17. Make sure all safety/warning lights, SMV sign, and reflective decals are in place and working properly before transporting the machine on public roads.
 18. Limit towing speed to 24 km/h. Tow only with farm tractor of a minimum 90 HP. Allow for unit length when making turns.
 19. Reduce speed prior to turns to avoid the risk of overturning. Always drive at a safe speed relative to local conditions and ensure your speed is slow enough for a safe emergency stop.
 20. Chemical application is often an integral part of planting. Follow label instructions for proper chemical mixing, handling and container disposal methods.
 21. Be familiar with safety procedures for immediate first aid should you accidentally contact chemical substances.
 22. Use the proper protective clothing and safety equipment when handling chemicals.
 23. Chemicals are supplied with Material Safety Data Sheets (MSDS) that provide full information about the chemical, its effects on exposure, and first aid needs in the event of an emergency. Keep your MSDS file up-to-date and available for first responders in case of emergency.
 24. When servicing ground engaging components such as opening disks and firming points, use special care to avoid points and edges worn sharp during use.
 25. Use professional help if you are unfamiliar with working on hydraulic systems. Pressurized hydraulic fluid can penetrate body tissue and result in death, serious infection, or other injuries.
 26. Transporting planter with hoppers over half full or unevenly loaded can cause loss of control and could result in death, serious injury, or damage to property and equipment.
 27. Disposing of waste improperly can threaten the environment. To dispose of your equipment properly contact your local environmental or recycling center.
- Never pour waste onto the ground, down a drain, or into any water source.
- When disposing of waste such as oil, use leakproof containers. Be sure to use containers that do not resemble food or beverage which may mislead someone into consuming them. Dispose of oil per your local, regional requirements.
- When disposing of any fertilizer chemicals used, contact the supplier of the chemicals.
- Model 3600 planter consists of 85% recyclable metals, 10% recyclable plastic and rubber, and 5% waste.

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

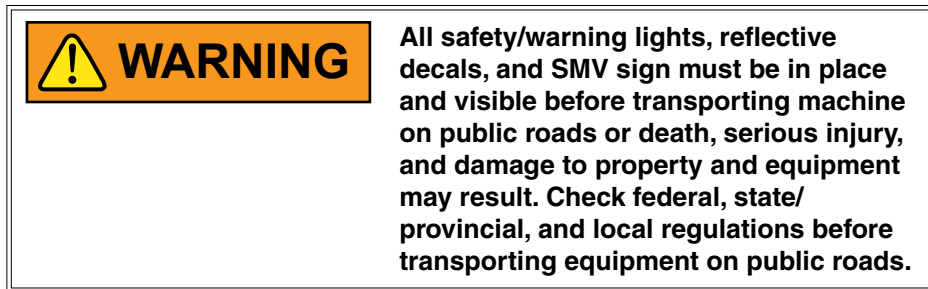
| | |
|---|---|
|  DANGER | <p>Contacting or coming close to power lines or other high energy sources will cause death or serious injury.</p> |
|  | <p>Keep away from power lines or high energy sources at all times.</p> |

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

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

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

SAFETY SIGNS AND DECALS




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

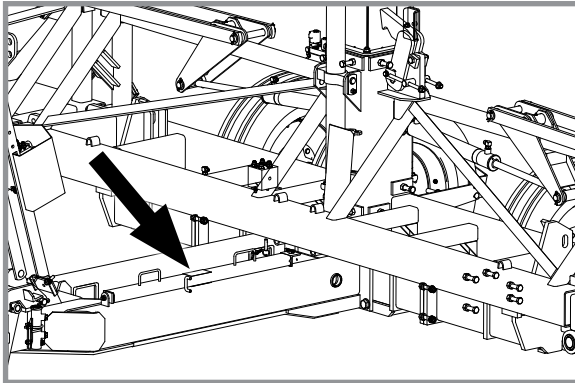
- Keep signs clean so they can be easily seen. Wash with soap and water or cleaning solution as required.
- Replace safety signs if damaged, painted over, or missing.
- Check reflective decals and SMV sign periodically. Replace if they show any loss of reflective properties.
- When replacing decals,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

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

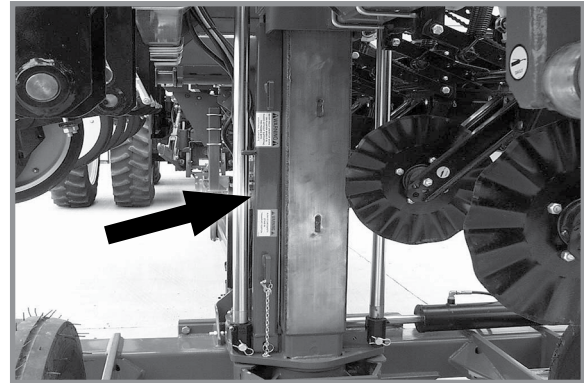
NOTE: Style and locations of SMV sign, reflective decals, and safety/warning lights conform to ANSI/ASABE S279.14 JUL 2008 and ANSI/ASABE S276.6 JAN 2005.

MANUAL SAFETY LOCKUP

| | |
|--|---|
|  WARNING | <p>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.</p> |
|--|---|





Manual safety lockup in storage position



Manual safety lockup in transport position

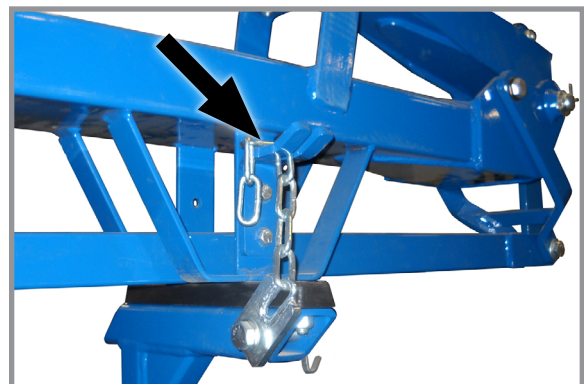
Remove manual safety lockup and store on L.H. side of hitch for field operation.

ROW MARKER SAFETY LOCKUP

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

Always install row marker lockups when working or transporting planter.

Connect chain between marker stand and second stage of marker assembly.



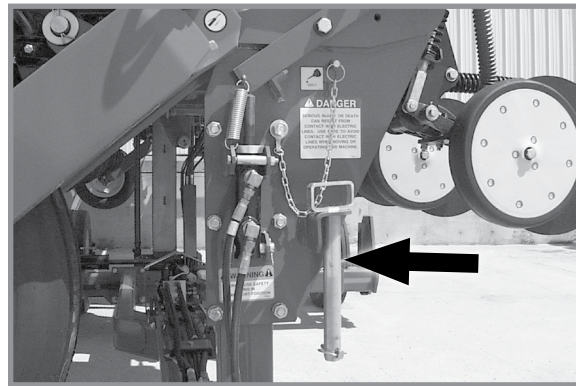
Row marker safety lockup installed

| | |
|--|--|
|  WARNING | <p>Uncontrolled movement of equipment can cause loss of control and could result in death, serious injury, or damage to property and equipment. Install all safety pins before transporting equipment.</p> |
|--|--|

TONGUE SAFETY PIN



Tongue safety pin installed for transport

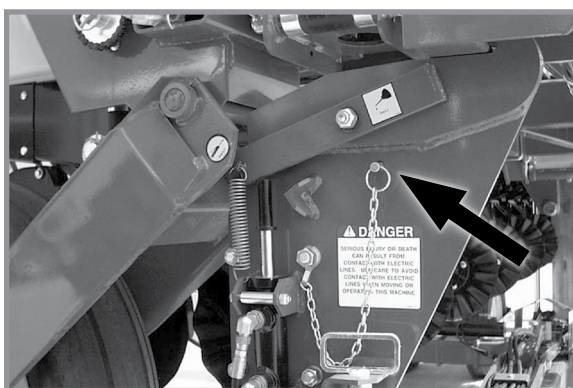


Tongue safety pin stored for field operation

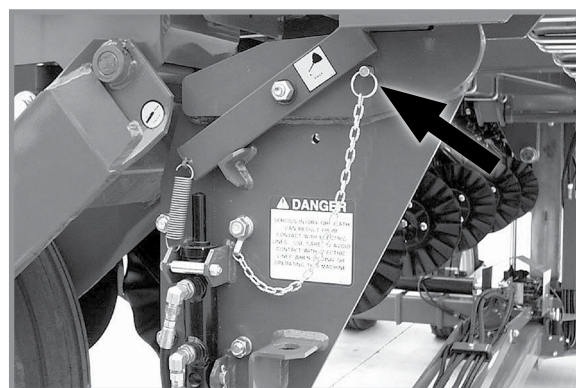
Never transport planter without installing tongue safety pin. Tongue safety pin prevents tongue cylinder from retracting should hydraulic failure occur or a sudden stop be made when transporting planter.

Remove tongue safety pin and store in bracket on transport latch post at center of planter for field operation.

TRANSPORT LATCH LOCKING PIN



Transport latch locking pin stored for field operation



Transport latch locking pin installed for transport

Never transport planter without installing transport latch locking pin. Transport latch locking pin prevents latch bar from disengaging and allowing planter frame to swing away.

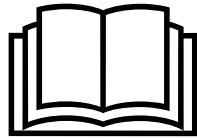
Remove transport latch locking pin and store in location provided on latch post for field operation.

INITIAL PREPARATION

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



WARNING



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

Folding or towing planter with outer transport wheel on left side of machine removed can cause death, serious injury, or damage to property and equipment. Tipping may occur because of narrow wheel base. Outer transport wheel on left side of machine is shipped removed on non-bulk fill planters (not bolted on) to allow narrower width truck shipment. **DO NOT REMOVE THIS ASSEMBLY AFTER PLANTER IS ASSEMBLED FOR USE.**



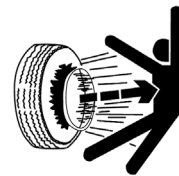
WARNING



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 $\frac{5}{8}$ " - 18 lug bolts to 244 Nm before operating planter for the first time and periodically after.



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.



WARNING

Transporting planter with hoppers over half full or unevenly loaded can cause loss of control and could result in death, serious injury, or damage to property and equipment. Properly load planter when transporting. Be aware of extra transport weight, and road conditions and limits.

1. Torque transport wheel $\frac{5}{8}$ "- 18 lug nuts to 244 Nm.

2. Inflate tires to the following specifications:

Transport (center section) 255-70R 22.5 ("224" rim)
75 PSI (517 kPa) recommended/75 PSI (517 kPa) max.

Transport (center section) 255-70R 22.5" ("276" rim)
75 PSI (517 kPa) recommended/100 PSI (689 kPa) max.

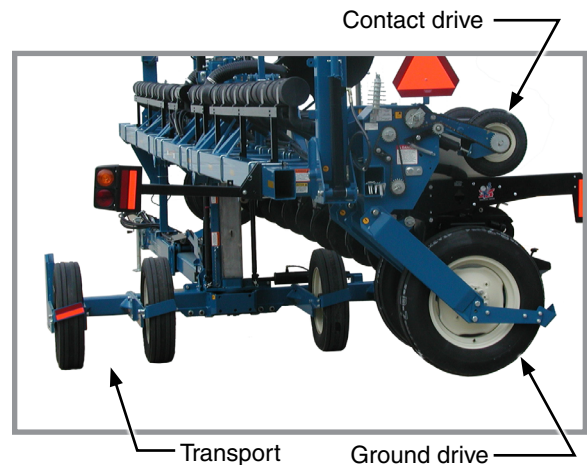
Ground drive (wings) 7.50" x 20" 40 PSI (276 kPa)

Contact drive 50 PSI (345 kPa).

Liquid fertilizer piston pump 7.60" x 15" 40 PSI (276 kPa)

3. Lubricate planter and row units following instructions in lubrication and Maintenance section of this manual.

4. Check all drive chains for proper tension, alignment, and lubrication.



Tire locations (not all tires shown)

TRACTOR REQUIREMENTS

NOTICE

All Hydraulic Requirements: Minimum Pressure 2350 PSI (16200 kPa); Maximum Pressure 3000 PSI (20700 kPa). Check tractor hydraulics to ensure that maximum pressure cannot be exceeded.

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

A 12 VDC electrical system is required on all sizes.

A minimum of two SCV remote hydraulic outlets are required on all sizes. One SCV is used for field lift and with a control console switch operates raise to transport function. A second SCV using control console operates row markers fold/unfold functions. Additional SCV's with a zero pressure case drain are needed for vacuum fan motor for seed metering system, bulk fill, Hydraulic Drive, and Wing Down Pressure (if installed without vacuum or bulk fill).

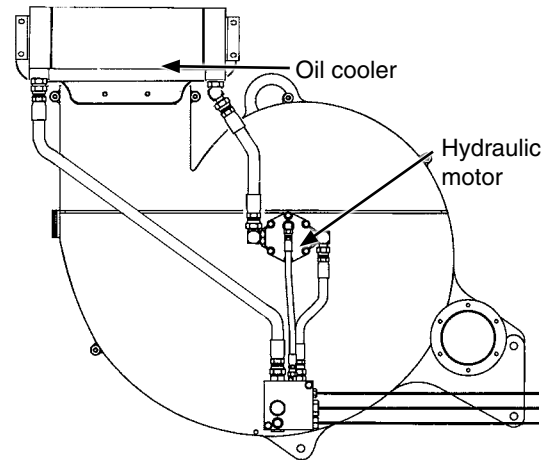
Maximum hydraulic flow rate of 49 L/min @ 2000 PSI (13800 kPa) is required to operate vacuum fan motor.

TRACTOR MOUNTED PTO PUMP AND OIL COOLER OPTION

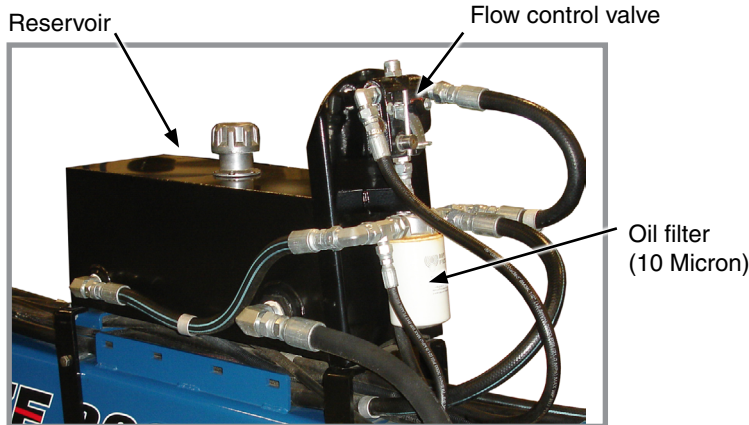
The tractor mounted PTO pump and oil cooler option is for tractors with less than required hydraulic output needed to operate hydraulic-driven vacuum fan and other planter hydraulic requirements.

A 1000 RPM PTO is required to operate the PTO-driven hydraulic pump.

PTO pump option consists of a 1 3/8"-21 or 1 1/4"-20 spline 13.5 GPM 2000 psi tractor mounted pump, planter mounted 10 gallon capacity hydraulic reservoir with spin-on 10-micron oil filter, vacuum fan mounted 15 GPM-rated oil cooler, and required hydraulic valves, fittings, and hoses.



Vacuum fan assembly



Hydraulic reservoir, flow control valve, and fittings



PTO-driven hydraulic pump (1 3/8" spline PTO pump shown)

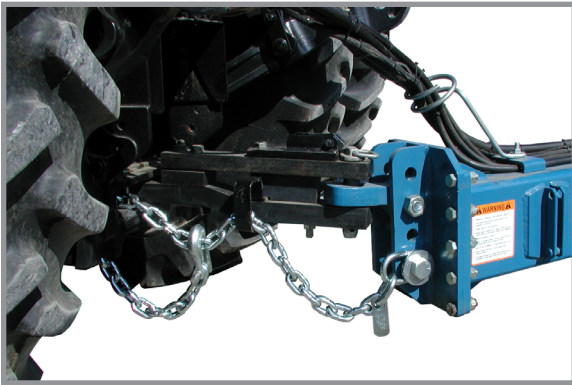
| | |
|---------------|--|
| NOTICE | Oil specification is described at Machine operation section (page 2-8). |
|---------------|--|

TRACTOR PREPARATION AND HOOKUP

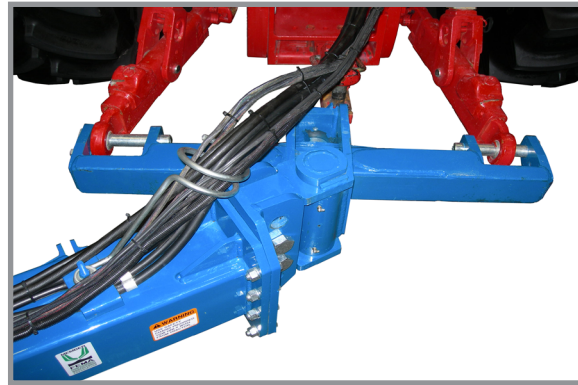
1. Adjust tractor drawbar 33-43 cm above ground with hitch pin hole directly below PTO shaft center line. Make sure drawbar is in a stationary position.
2. Install control console on tractor in a convenient location within easy reach of operator and close to hydraulic controls. Mount control console securely and route power cord to power source. Control console operates on 12 VDC only. If two 12 volt batteries are connected in series, ALWAYS make power connection on battery grounded to tractor chassis.

If two 6 volt batteries are connected in series, make sure power connection provides 12 VDC across positive terminal on one battery and negative terminal of second battery.

3. Back tractor to planter and connect with 1¼" - 1½" (32 mm - 38 mm) diameter hitch pin. If tractor is not equipped with a hitch pin locking device, make sure hitch pin is secured with a locking pin or cotter pin.



Planter/safety chain hookup to tractor





Optional 2-point hitch

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

4. 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 1140 Nm.

NOTE: A 2-Point Hitch Option converts planter from drawn to semi-mounted and is available for use with Category 3N or 3 three-point hitch designs. Safety chain is not used with 2-point hitch.

| | |
|--|--|
|  WARNING | <p>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.</p> |
|  | |

| | |
|---------------|--|
| NOTICE | <p>Wipe hose ends to remove any dirt before connecting couplers to tractor parts or contamination may cause equipment failure.</p> |
|---------------|--|

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

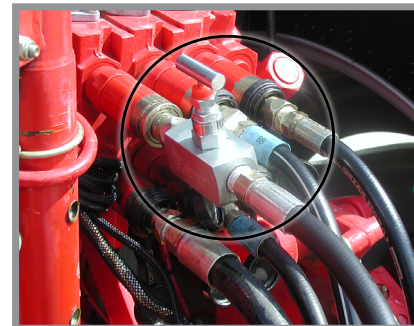
| | |
|---------------|--|
| NOTICE | <p>Connect hydraulic motor case drain to a case drain return line with zero PSI on tractor. Failure to connect to a return with zero PSI will cause hydraulic motor shaft seal damage. DO NOT connect hydraulic motor case drain to a SCV outlet or motor return circuit connection. Contact tractor manufacturer for specific details on “zero pressure return”.</p> |
|---------------|--|

| | |
|---------------|--|
| NOTICE | <p>Always connect hydraulic motor return hose to tractor motor return port. Do not connect to tractor SCV unless through a motor spool or hydraulic motor failure can occur. If a motor return port is not available on the tractor, the SCV controlling the bulk fill system MUST be in the float position before planter is moved in planting or field raised position when bulk fill system is not in use.</p> |
|---------------|--|

| PLANTER TO TRACTOR HYDRAULIC CONNECTIONS | | | |
|--|--|-----------|------------|
| Color/Label | Machine Function | Hose Size | Function |
| Red AA | Field Lift | 1/2" | Pressure |
| Red BB | | 1/2" | Return |
| Blue AA | Planter Fold & Row Marker | 3/8" | Return |
| Blue BB | | 3/8" | Pressure |
| Black RR | Seed Rate Hydraulic Drive (Vacuum) | 3/4" | Return |
| Black PP | | 1/2" | Pressure |
| Black RR | Seed Rate Hydraulic Drive (Mechanical) | 1/2" | Return |
| Black PP | | 3/8" | Pressure |
| Green RR | Vacuum Fan | 3/4" | Return |
| Green PP | | 1/2" | Pressure |
| Orange CD | | 3/8" | Case Drain |

NOTE: Set adjustable flow outlet (SCV) 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

OIL SPECIFICATION

Oil used in the planter and PTO chemical properties:

| | |
|--|--------|
| Viscosity, mm ² /s @ 100 °C. ASTM D-445 | 10,0 |
| Viscosity, mm ² /s @ 40 °C. ASTM D-445 | 63,0 |
| Viscosity Index ASTM D-2270 | 143,00 |
| TBN, mg KOH/g ASTM D-2896 | 9,0 |
| TAN, mg KOH/g (ASTM D-664) | 2,0 |
| Pour Point, °C ASTM D-5950 | -42,0 |
| Specific Gravity @ 15.6°C. ASTM D-4052 | 0,876 |
| Flash Point, COC, °C. ASTM D-92 | 220 |

NOTE: Factory filled with VALVOLINE™ UNITRAC SAE 80W.

CYLINDER INFORMATION

| | Wing Down Pressure Cylinder | Row Marker Cylinder | Rotation Cylinder | Tongue Cylinder | Wing Lift Cylinder |
|-------------------------------|------------------------------|-----------------------------------|-----------------------------------|------------------------------|-----------------------------------|
| Intended Use | Double acting applications | Double acting applications | Double acting applications | Double acting applications | Double acting applications |
| Piston | Ductile iron | Ductile iron | Ductile iron | Ductile iron | Ductile iron |
| Gland | Ductile iron | Ductile iron | Ductile iron | Ductile iron | Ductile iron |
| Tube | ST 52 Dom | ST 52 Dom | ST 52 Dom | ST 52 Dom | ST 52 Dom |
| Rod | 1045 Nitro rod | 1045 Nitro rod | 1045 Nitro rod | 1045 Nitro rod | 1045 Nitro rod |
| End Mounts | U-bracket | Sleeve | Tang | None | Gimble |
| Tube Seal | O-ring with polytemp back-up | Buna O-Ring with polytemp back-up | Buna O-Ring with polytemp back-up | O-ring with polytemp back-up | Buna O-Ring with polytemp back-up |
| Rod Seal | Polyester alloy u-cup | Polyester alloy u-cup | Polyester alloy u-cup | Polyester alloy u-cup | Polyester alloy u-cup |
| Rod Wiper | Polyester alloy snap in | Polyester alloy snap in | Polyester alloy snap in | Polyester alloy snap in | Polyester alloy snap in |
| Piston Seal | T-seal hnbr | T-seal hnbr | PTFE | T-seal hnbr | PTFE |
| Specifications | | | | | |
| Product Category | Hydraulic Cylinder | Hydraulic Cylinder | Hydraulic Cylinder | Hydraulic Cylinder | Hydraulic Cylinder |
| Maximum Stroke | 8" (203 mm) | 20.62" (524 mm) | 16" (406 mm) | 73" (1854 mm) | 6" (152 mm) |
| Working Pressure | 3000 PSI (20700 kPa) | 3000 PSI (20700 kPa) | 3000 PSI (20700 kPa) | 3000 PSI (20700 kPa) | 3000 PSI (20700 kPa) |
| Bore Size | 3" (76 mm) | 2" (51 mm) | 4" (102 mm) | 3" (76 mm) | 4" (102 mm) |
| Shaft Diameter | 31.75" (32 mm) | 31.75" (32 mm) | 1.50" (38 mm) | 1.75" (44 mm) | 1.50" (38 mm) |
| Cylinder Configuration | Simple | Simple | Simple | Simple | Simple |
| Cylinder Action | Double | Double | Double | Double | Double |
| Material | Steel, Ductile Iron | Steel, Ductile Iron | Steel, Ductile Iron | Steel, Ductile Iron | Steel, Ductile Iron |
| Mounting Method | U-Bracket | Sleeve | Tang | None | Gimble |
| Mount Location | End Cap | End Cap | End Cap | End Cap | Side's of Barrel |
| Cylinder Style | Welded | Welded | Welded | Welded | Welded |

CYLINDER INFORMATION (Continued)

| | Center Lift Cylinder | Wing Lock Cylinder | Transport Latch Cylinder | Tongue Lock Cylinder | |
|-------------------------------|-----------------------------------|------------------------------|------------------------------|------------------------------|--|
| Intended Use | Double acting applications | Double acting applications | Double acting applications | Double acting applications | |
| Piston | Ductile iron | Ductile iron | Ductile iron | Ductile iron | |
| Gland | Ductile iron | Ductile iron | Ductile iron | Ductile iron | |
| Tube | ST 52 Dom | ST 52 Dom | Cast | Cast | |
| Rod | 1045 Nitro rod | 1045 Nitro rod | 1045 Nitro rod | 1045 Nitro rod | |
| End Mounts | Gimble | Sleeve | None | None | |
| Tube Seal | Buna O-Ring with polytemp back-up | O-Ring with polytemp back-up | O-Ring with polytemp back-up | O-Ring with polytemp back-up | |
| Rod Seal | Polyester alloy u-cup | Polyester alloy u-cup | Polyester alloy u-cup | Polyester alloy u-cup | |
| Rod Wiper | Polyester alloy snap in | Polyester alloy snap in | Polyester alloy snap in | Polyester alloy snap in | |
| Piston Seal | PTFE | T-Seal HNBR | T-Seal HNBR | T-Seal HNBR | |
| Specifications | | | | | |
| Product Category | Hydraulic Cylinder | Hydraulic Cylinder | Hydraulic Cylinder | Hydraulic Cylinder | |
| Maximum Stroke | 48" (1219 mm) | 20.062" (510 mm) | 2.5" (64 mm) | 2.5" (64 mm) | |
| Working Pressure | 3000 PSI (20700 kPa) | 3000 PSI (20700 kPa) | 3000 PSI (20700 kPa) | 3000 PSI (20700 kPa) | |
| Bore Size | 3.25" (83 mm) | 2.5" (64 mm) | 1.5" (38 mm) | 1.5" (38 mm) | |
| Shaft Diameter | 2" (51 mm) | 1.5" (38 mm) | .750" (19 mm) | .750" (19 mm) | |
| Cylinder Configuration | Simple | Simple | Simple | Simple | |
| Cylinder Action | Double | Double | Double | Double | |
| Material | Steel, Ductile Iron | Steel, Ductile Iron | Steel, Ductile Iron, Cast | Steel, Ductile Iron, Cast | |
| Mounting Method | Gimble | Sleeve | None | None | |
| Mount Location | Side's of Barrel | End Cap | End Cap | End Cap | |
| Cylinder Style | Welded | Welded | Machined | Machined | |

HYDRAULIC HOSE INFORMATION

| Part Number | A1018 | A1076 | A1110 | A1139 | A12090 | A1424 |
|---------------------------------|---|--|--|---|---|---|
| Description | Hose Assembly 3/8" x 1.02 m (40") (08F - 08F) | Hose Assembly 3/8" x 3.30 m (130") (08F - 08F) | Hose Assembly 1/4" x 3.81 m (150") (06F - 06F) | Hose Assembly 1/4" x 1.02 m (40") (06F - 06F) | Hose Assembly 3/8" x 1.60 m (63") (08F - 08F) | Hose Assembly 1/2" x 0.76 m (30") (10F - 10F) |
| Product Category | Hydraulic Hose | Hydraulic Hose | Hydraulic Hose | Hydraulic Hose | Hydraulic Hose | Hydraulic Hose |
| Product Form | Hose; Assembly | Hose; Assembly | Hose; Assembly | Hose; Assembly | Hose; Assembly | Hose; Assembly |
| I.D. | 3/8" (9.5 mm) | 3/8" (9.5 mm) | 1/4" (6.4 mm) | 1/4" (6.4 mm) | 3/8" (9.5 mm) | 1/2" (12.7 mm) |
| O.D. | 1 1/16" (17.5 mm) | 1 1/16" (17.5 mm) | 1 7/32" (13.5 mm) | 1 7/32" (13.5 mm) | 1 1/16" (17.5 mm) | 1 3/16" (20.3 mm) |
| Minimum Bend Radius | 2.5" (64 mm) | 2.5" (64 mm) | 2" (51 mm) | 4" (102 mm) | 2.5" (64 mm) | 3.5" (89 mm) |
| Working Pressure | 3000 PSI (20700 kPa) | 3000 PSI (20700 kPa) | 3250 PSI (22400 kPa) | 3275 PSI (22600 kPa) | 3000 PSI (20700 kPa) | 3000 PSI (20700 kPa) |
| Temperature Range | -40°C - +100°C | -40°C - +100°C | -40°C - +100°C | -40°C - +100°C | -40°C - +100°C | -40°C - +100°C |
| Material | Modified Nitrile Type C2 | Modified Nitrile Type C2 | Modified Nitrile Type C2 | Modified Nitrile Type C2 | Modified Nitrile Type C2 | Modified Nitrile Type C2 |
| Specialized Construction | Single Wire Braid | Single Wire Braid | Single Wire Braid | Single Wire Braid | Single Wire Braid | Single Wire Braid |
| Media | Hydraulic Fluid | Hydraulic Fluid | Hydraulic Fluid | Hydraulic Fluid | Hydraulic Fluid | Hydraulic Fluid |
| Application | Agricultural and Construction | Agricultural and Construction | Agricultural and Construction | Agricultural and Construction | Agricultural and Construction | Agricultural and Construction |

| Part Number | A1478 | A3111 | A3131 | A3158 | A1034 | A1053 |
|---------------------------------|--|--|---|---|--|---|
| Description | Hose Assembly 1/2" x 3.25 m (128") (10F - 10F) | Hose Assembly 3/8" x 5.08 m (200") (08F - 08F) | Hose Assembly 3/8" x 1.07 m (42") (08F - 08F) | Hose Assembly 3/8" x 1.17 m (46") (08F - 08F) | Hose Assembly 3/8" x 6.91 m (272") (08F - 08F) | Hose Assembly 3/8" x 1.83 m (72") (08F - 08F) |
| Product Category | Hydraulic Hose | Hydraulic Hose | Hydraulic Hose | Hydraulic Hose | Hydraulic Hose | Hydraulic Hose |
| Product Form | Hose; Assembly | Hose; Assembly | Hose; Assembly | Hose; Assembly | Hose; Assembly | Hose; Assembly |
| I.D. | 1/2" (12.7 mm) | 3/8" (9.5 mm) | 3/8" (9.5 mm) | 3/8" (9.5 mm) | 3/8" (9.5 mm) | 3/8" (9.5 mm) |
| O.D. | 1 3/16" (20.6 mm) | 1 1/16" (17.5 mm) | 1 1/16" (17.5 mm) | 1 1/16" (17.5 mm) | 1 1/16" (17.5 mm) | 1 1/16" (17.5 mm) |
| Minimum Bend Radius | 3.5" (89 mm) | 2.5" (64 mm) | 2.5" (64 mm) | 2.5" (64 mm) | 2.5" (64 mm) | 2.5" (64 mm) |
| Working Pressure | 3000 PSI (20700 kPa) | 3000 PSI (20700 kPa) | 3000 PSI (20700 kPa) | 3000 PSI (20700 kPa) | 3000 PSI (20700 kPa) | 3000 PSI (20700 kPa) |
| Temperature Range | -40°C - +100°C | -40°C - +100°C | -40°C - +100°C | -40°C - +100°C | -40°C - +100°C | -40°C - +100°C |
| Material | Modified Nitrile Type C2 | Modified Nitrile Type C2 | Modified Nitrile Type C2 | Modified Nitrile Type C2 | Modified Nitrile Type C2 | Modified Nitrile Type C2 |
| Specialized Construction | Single Wire Braid | Single Wire Braid | Single Wire Braid | Single Wire Braid | Single Wire Braid | Single Wire Braid |
| Media | Hydraulic Fluid | Hydraulic Fluid | Hydraulic Fluid | Hydraulic Fluid | Hydraulic Fluid | Hydraulic Fluid |
| Application | Agricultural; Construction | Agricultural; Construction | Agricultural; Construction | Agricultural; Construction | Agricultural; Construction | Agricultural; Construction |

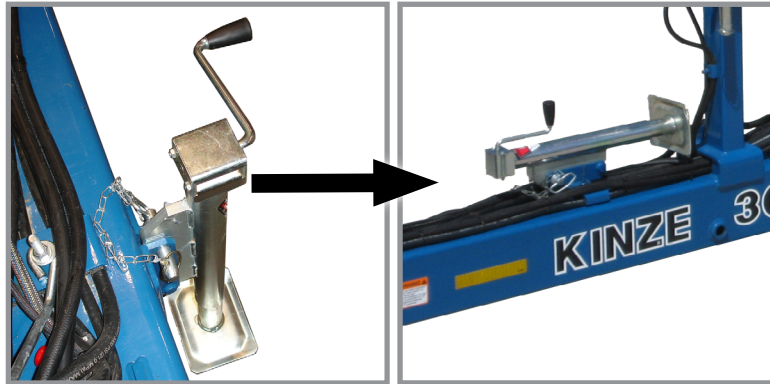
HYDRAULIC HOSE INFORMATION (Continued)

| Part Number | A1116 | A12042 | A1404 | A1444 | A18300 | A3122 |
|---------------------------------|--|--|--|--|--|---|
| Description | Hose Assembly ¼" x 3.45 m (136") (06F - 06F) | Hose Assembly ⅜" x 5.79 m (228") (08F - 08F) | Hose Assembly, ½" x 1.04 m (41") (10F - 10F) | Hose Assembly, ½" x 6.35 m (250") W/Tip (½M NPTF - 10F) | Hose Assembly, ⅜" x 6.35 m (250") W/Tip (½M NPTF - 08F) | Hose Assembly, ⅜" x 0.27 m (10½") (08F - 08F) |
| Product Category | Hydraulic Hose | Hydraulic Hose | Hydraulic Hose | Hydraulic Hose | Hydraulic Hose | Hydraulic Hose |
| Product Form | Hose; Assembly | Hose; Assembly | Hose; Assembly | Hose; Assembly | Hose; Assembly | Hose; Assembly |
| I.D. | ¼" (6.0 mm) | ⅜" (9.5 mm) | ½" (13.0 mm) | ½" (13.0 mm) | ⅜" (9.5 mm) | ⅜" (9.5 mm) |
| O.D. | 17/32" (13.5 mm) | 11/16" (17.5 mm) | 13/16" (20.6 mm) | 13/16" (20.6 mm) | 11/16" (17.5 mm) | 11/16" (17.5 mm) |
| Minimum Bend Radius | 4" (102 mm) | 2.5" (64 mm) | 3.5" (89 mm) | 3.5" (89 mm) | 2.5" (64 mm) | 2.5" (64 mm) |
| Working Pressure | 3275 PSI (22600 kPa) | 3000 PSI (20700 kPa) | 3000 PSI (20700 kPa) | 3000 PSI (20700 kPa) | 3000 PSI (20700 kPa) | 3000 PSI (20700 kPa) |
| Temperature Range | -40°C - +100°C | -40°C - +100°C | -40°C - +100°C | -40°C - +100°C | -40°C - +100°C | -40°C - +100°C |
| Material | Modified Nitrile Type C2 | Modified Nitrile Type C2 | Modified Nitrile Type C2 | Modified Nitrile Type C2 | Modified Nitrile Type C2 | Modified Nitrile Type C2 |
| Specialized Construction | Single Wire Braid | Single Wire Braid | Single Wire Braid | Single Wire Braid | Single Wire Braid | Single Wire Braid |
| Media | Hydraulic Fluid | Hydraulic Fluid | Hydraulic Fluid | Hydraulic Fluid | Hydraulic Fluid | Hydraulic Fluid |
| Application | Agricultural; Construction | Agricultural; Construction | Agricultural; Construction | Agricultural; Construction | Agricultural; Construction | Agricultural; Construction |

| Part Number | A3139 | A8267 | A1055 | | | |
|---------------------------------|---|--|--|--|--|--|
| Description | Hose Assembly, ⅜" x 6.45 m (254") (08F - 08F) | Hose Assembly, ½" x 1.47 m (58") (10F - 10F) | Hose Assembly, ⅜" x 1.68 m (66") (08F - 08F) | | | |
| Product Category | Hydraulic Hose | Hydraulic Hose | Hydraulic Hose | | | |
| Product Form | Hose; Assembly | Hose; Assembly | Hose; Assembly | | | |
| I.D. | ⅜" (9.5 mm) | ½" (13.0 mm) | ⅜" (9.5 mm) | | | |
| O.D. | 11/16" (17.5 mm) | 13/16" (20.6 mm) | 11/16" (17.5 mm) | | | |
| Minimum Bend Radius | 2.5" (64 mm) | 3.5" (89 mm) | 2.5" (64 mm) | | | |
| Working Pressure | 3000 PSI (20700 kPa) | 3000 PSI (20700 kPa) | 3000 PSI (20700 kPa) | | | |
| Temperature Range | -40°C - +100°C | -40°C - +100°C | -40°C - +100°C | | | |
| Material | Modified Nitrile Type C2 | Modified Nitrile Type C2 | Modified Nitrile Type C2 | | | |
| Specialized Construction | Single Wire Braid | Single Wire Braid | High tensile steel wire | | | |
| Media | Hydraulic Fluid | Hydraulic Fluid | Hydraulic Fluid | | | |
| Application | Agricultural; Construction | Agricultural; Construction | Agricultural; Construction | | | |

- 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.



Remove and store jack

- Raise jack stand and remount horizontally on storage bracket.

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 50 cm to 56 cm from planting surface.

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



Level planter toolbars

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

- Remove clevis hitch hex head cap screw and lock nut using a torque wrench. Replace if off-torque is below 102 Nm or there is corrosion or damage.

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

- 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.

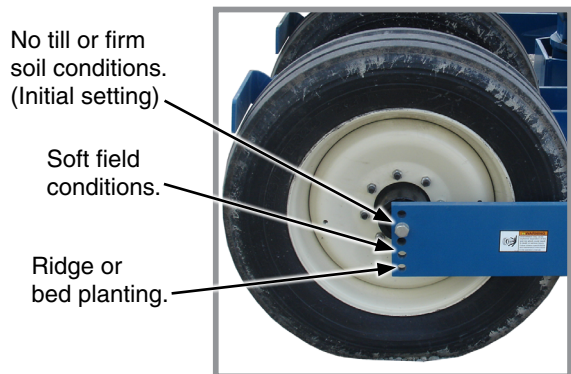
NOTE: On planters with push row units and no till coulters, uplift from down force springs or air springs in pneumatic down pressure system may cause wings to rise slightly in planting position. Problem may be compounded if static pressure is trapped in planter’s hydraulic lift system which can cause wing cylinders to extend slightly. Operating tractor’s hydraulic system in float position or moving tractor’s hydraulic lever to float position briefly to relieve pressure will help maintain proper toolbar height.

4. Field check planter.

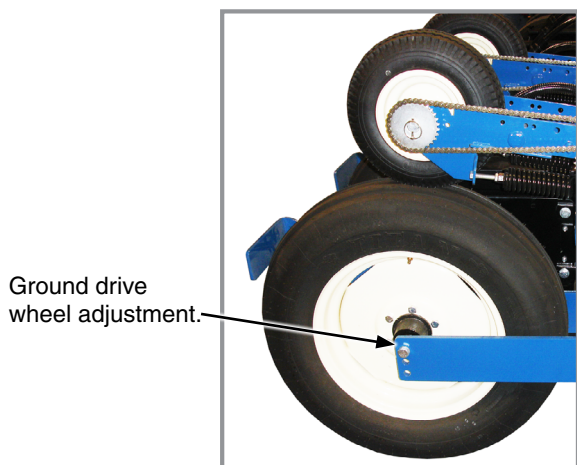
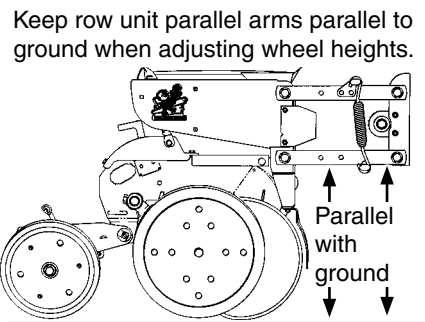
Field and actual planting conditions dictate which transport wheel setting to use so row unit parallel arms are parallel with ground. It may be necessary to lower ground drive wheels to ensure level lateral toolbar operation if transport wheels are set in one of the two lower sets of holes. Make a field check when planter is fully loaded with seed, granular chemicals, fertilizer, etc. to be sure wings are level with center frame. If wings are not level with center frame, drive wheels and/or transport wheels can be raised or lowered in wheel arms to increase or decrease planter toolbar height. Raise hitch to ensure level operation.

| | |
|---------------|--|
| NOTICE | Component interference can damage equipment. Check clearance between tires and drill shaft U-joint when using top hole setting. |
|---------------|--|

NOTE: To allow adequate drive force after lowering ground drive wheels, it may be necessary to lower contact drive wheel arms to lower sets of holes in wheel modules and lower down pressure springs to lower mounting rods on wheel modules.



Transport wheel adjustment



Ground drive wheel adjustment



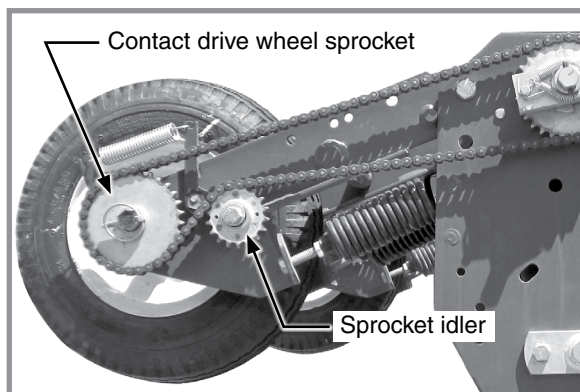
Contact drive wheel adjustment

NOTE: If setting is changed see basic adjustment procedure under “Contact Wheel Spring Adjustment”

RIDGE PLANTING

Move drive and transport wheels 5 or 10 cm to lower mounting holes in wheel arms when ridge planting to increase planter toolbar height. Contact drive tire must also be moved to lower set of holes in wheel module and down pressure springs hooked on lower rod. Raise hitch height to ensure level operation.

CONTACT WHEEL DRIVE SPROCKETS



Contact wheel drive



Optional half-rate drive sprocket

Contact wheel drive works the same for mechanical or vacuum planters except for sprocket size. Chain tension is controlled by a spring-loaded sprocket idler. Planting rate charts in "Rate Chart" section help you select correct sprockets.

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

VACUUM

22 tooth, 28 tooth or 44 tooth sprockets at each contact drive wheel can be exchanged with sprockets on storage rod bolted to wheel module on each side of planter chains.

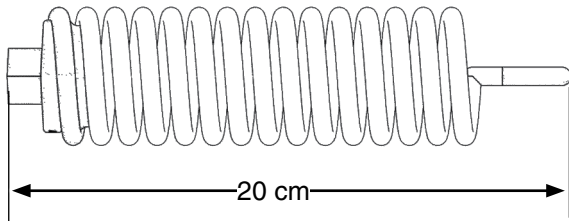
NOTE: 22, 28 and 44 tooth drive sprockets do NOT apply to all rate charts. Check chart titles to make sure proper rate chart is selected. DO NOT USE 44 tooth drive sprockets (60 cell soybean discs) with Dry Fertilizer Package or Liquid Fertilizer Squeeze Pump Package.

MECHANICAL

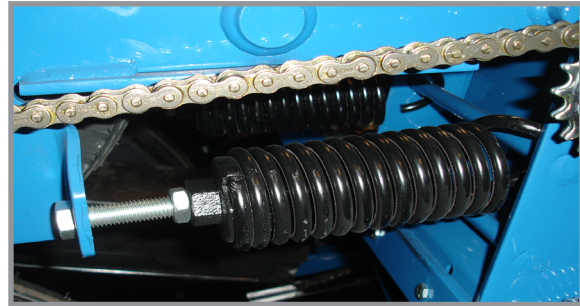
Seed planting rate charts are based on standard rate drive. Standard rate drive uses a 30 tooth sprocket and No. 40 118 pitch chain on each contact wheel.

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

CONTACT WHEEL SPRING ADJUSTMENT



Spring length measurement (Factory setting)



Contact drive springs

There are two down pressure springs on each contact drive wheel. Spring tension is factory set to approximately 90 kg of down force at tire contact point and should require no further adjustment.

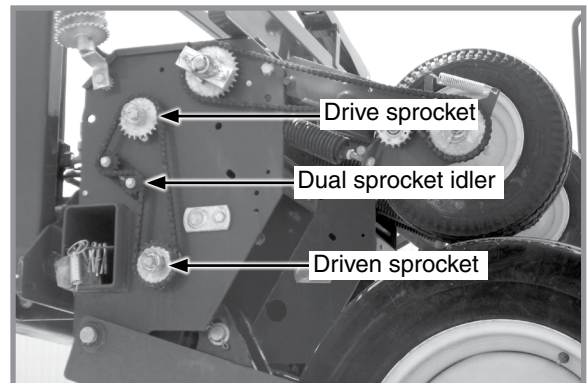
NOTE: Measurement must be taken in planting position with proper tire pressure.

SEED RATE TRANSMISSION ADJUSTMENT

Planting population rate changes are made using seed rate transmissions at each end of planter. Seed rate transmission allows quick and easy sprocket changes to obtain desired planting population. Sprockets are exchanged with those from sprocket storage rod bolted to transmission by removing lynch pins on hexagon shafts.

A decal positioned on transmission module illustrates proper chain routing. Planting rate charts found in “Rate Chart” section help you select correct sprocket combinations.

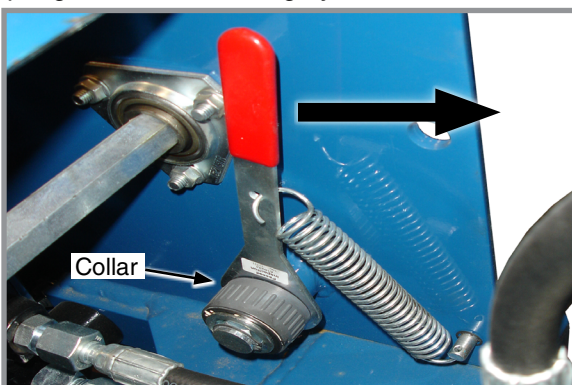
Chain tension is controlled by a spring-loaded dual-sprocket idler adjusted with an easy-release idler arm. This arm has a release position to remove spring tension for replacing sprockets. See “Wrap Spring Wrench Operation” below.



Seed rate transmission (L.H. shown)

WRAP SPRING WRENCH OPERATION

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



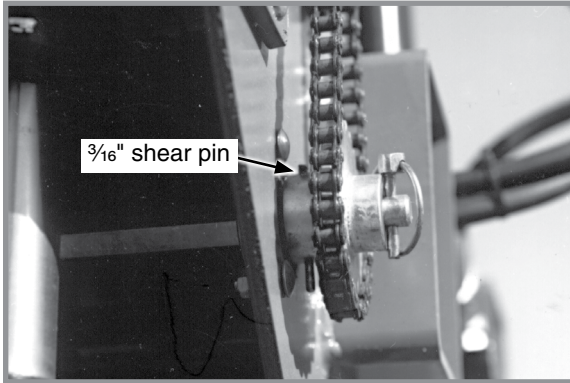
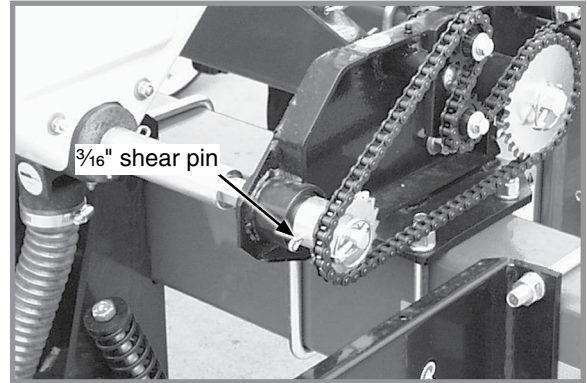
Wrap spring wrench (R.H. shown)



Chain idler tensioning

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

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

SHEAR PROTECTION**Transmission shaft****Dry fertilizer attachment transmission**

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

1. Determine where binding has occurred before replacing a pin. Turn shaft by hand (with the aid of a wrench) and check for misalignment and seized parts.
2. When shaft can be turned by hand (with the aid of a wrench) replace shear pins with same size and type. Spare shear pins are stored inside ends of rear planter frame.

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.

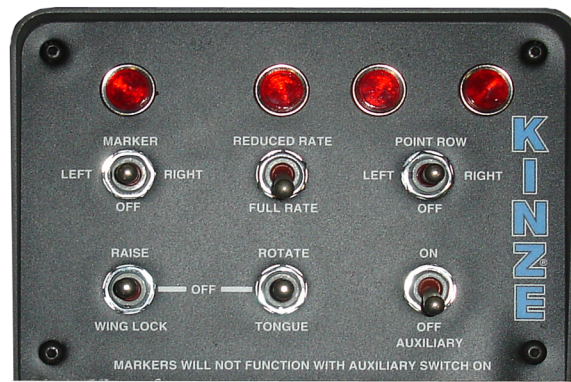
HYDRAULIC/ELECTRIC OPERATION

Control console switches and tractor's hydraulic system are used to raise planter to transport position, operate rotate and tongue extension functions, lock and release planter wings, and raise and lower row markers.

NOTE: Turn console backlighting OFF during extended periods of non-use using push button switch on back of console.



Single point row clutch control box




Two-speed point row clutch control box

Model 3600 planters operate from three dual remote (SCV) hydraulic outlets and tractor mounted control console. One SCV and a control console switch operate raise to transport function. A second SCV and control console switches operate row markers and fold/unfold functions. A third SCV operates vacuum fan motor circuit.

Marker and point row selector switches are an ON-OFF-ON type. If planter is equipped with optional Two-Speed Point Row Clutch Package, point row switch and reduced rate switch operate independently from rest of control console.

Power to marker switch is fed through auxiliary switch and two transport function switches. Operating any lower row switch disables markers and turns off marker indicator light.

Raise/wing lock and rotate/tongue (fold function) switches are MOMENTARY ON-OFF-MOMENTARY ON type and must be held in position while operating tractor hydraulic SCV control. Activating a fold function switch disables marker circuit.

| | |
|--|--|
|  WARNING | Marker selector switch must be OFF (center position) when not in use to prevent accidental extension which could result in death or serious injury, or damage to property and equipment. An indicator light on control box panel is ON whenever marker circuits or point row clutch circuits are energized. |
|--|--|

Auxiliary switch is an ON-OFF type switch used with hydraulic marker/folding functions SCV control to operate optional attachments. Auxiliary switch must be OFF to enable other functions.

NOTE: Activating auxiliary switch disables all other control console switches except point row clutch switch.

NOTE: Lift cylinders are (port type) rephasing cylinders. Cylinders must fully retract before they rephase in lowered position. Cylinder stops can not be used.

A third SCV operates the vacuum seed metering system vacuum fan. See "Digital Vacuum Gauge Operation".

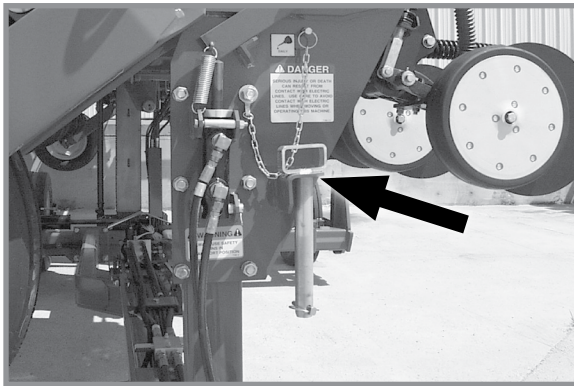
TRANSPORT TO FIELD SEQUENCE

Position planter in a relatively flat open area. Avoid an area with furrows, etc.

SUMMARIZED TRANSPORT TO FIELD SEQUENCE

- Remove tongue safety pin.
- Remove transport latch locking pin.
- Remove manual safety lockup.
- Rotate planter to planting position.
- Raise planter slightly to release safety hook at top of center section.
- Lower planter to ground.
- Release wing locks.
- Rephase planter lift cylinders.
- Raise planter to raised field position and retract tongue.
- Remove row marker lockups.

NOTE: Read following information for detailed instructions.

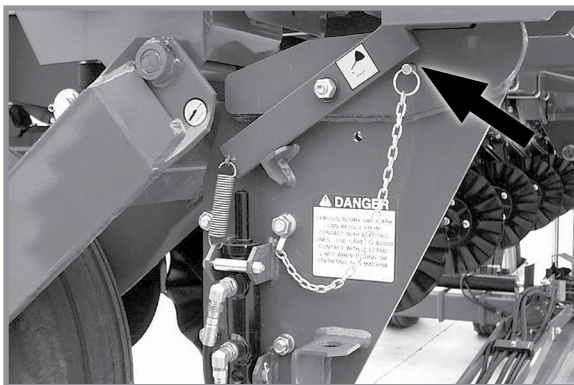


Tongue safety pin in storage position

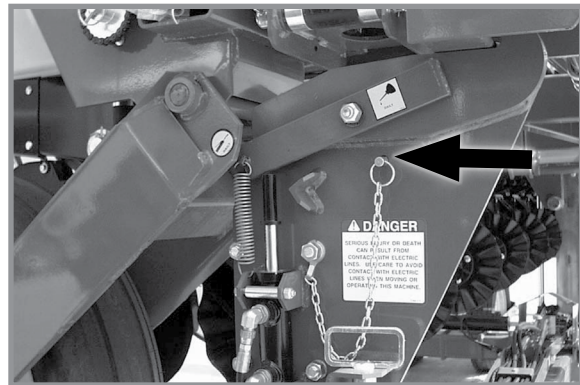


Tongue safety pin in transport position.

1. With tongue fully extended and planter in raised transport position, remove tongue safety pin and place it in storage position.



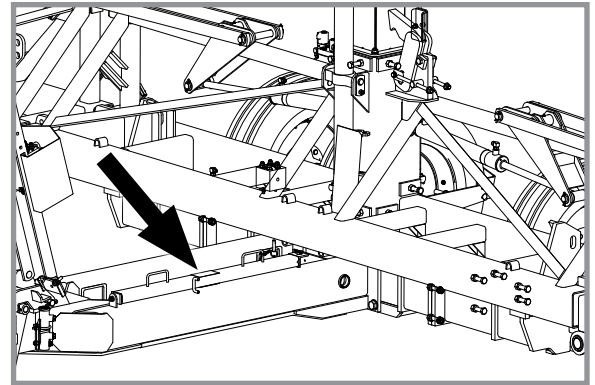
**Transport latch locking pin
Locked transport position**



**Transport latch locking pin
Storage position**

2. Remove transport latch locking pin from locked position and place it in storage location.

- Remove manual safety lockup from under front center lift cylinder and place it in storage location on left side of planter hitch.



Storage position

- Hold control console “ROTATE/TONGUE” switch in “ROTATE” and operate hydraulic control to unfold planter. Transport latch automatically releases.

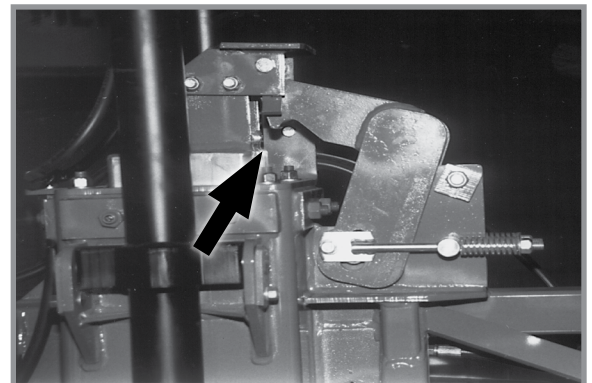


Rotate from transport to field

- Raise planter 2½ to 5 cm. Safety hook will release and snap away from catch pin on top of pivot post.

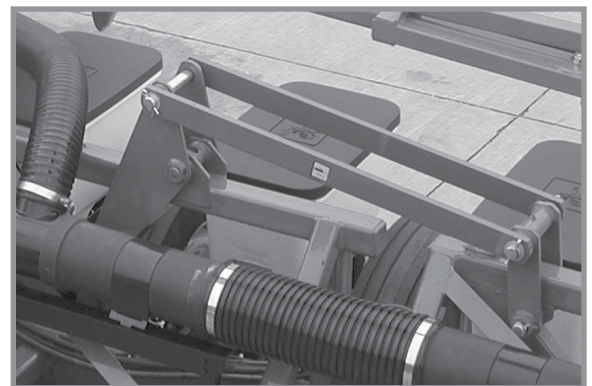
NOTE: Raising planter too high resets hook mechanism and sequence must be repeated.

- Slowly lower planter to ground.



Safety hook release

- Hold control console “RAISE/WING LOCK” switch in “WING LOCK” position and operate hydraulic control to release wing locks.



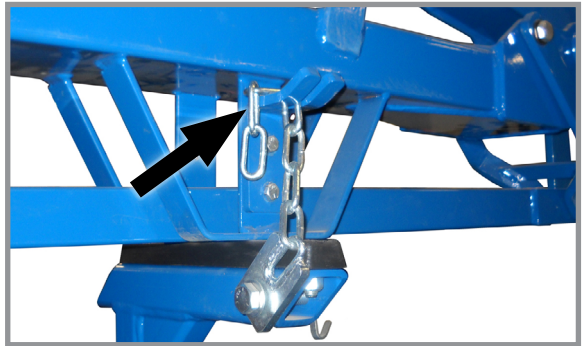
Wing lock

8. Hold hydraulic control (to lower planter) to rephase planter lift cylinders. Time to rephase system may vary due to tractor hydraulic flow and/or oil temperature. Normally 5 to 20 seconds is adequate to rephase system.
9. Raise planter to raised field position. Hold control console ROTATE/TONGUE switch in **TONGUE** and operate hydraulic control to retract tongue.




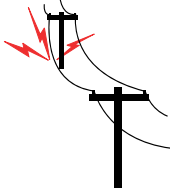
Retract tongue

10. Remove row marker lockups.



Row marker lockup

FIELD OPERATION

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

| | |
|---------------|--|
| NOTICE | <p>Raise planter out of ground when making sharp turns or backing up or equipment damage may result.</p> |
|---------------|--|

There are two raised positions on planter. Transport position is when the planter is fully raised. Raised field position is when planter wing cylinders are fully extended and center lift cylinders are at mid-stroke. In “raised field position” row units are approximately 35.5 cm off ground. This position is used in making turns or passing over waterways during field operation.

An oil bypass solenoid is located on top side of valve blocks on rear R.H. side of center frame. This solenoid is not energized in raised field position so wing cylinders cannot bypass oil preventing planter from raising any higher.



Raised field position

PLANTING SPEED

Planters are designed to operate in a speed range of 3 to 13 km/h. Higher ground speeds generally cause more variation in seed spacing. Speeds above 9 km/h are typically not recommended. See “Rate Charts”

FIELD TO TRANSPORT SEQUENCE

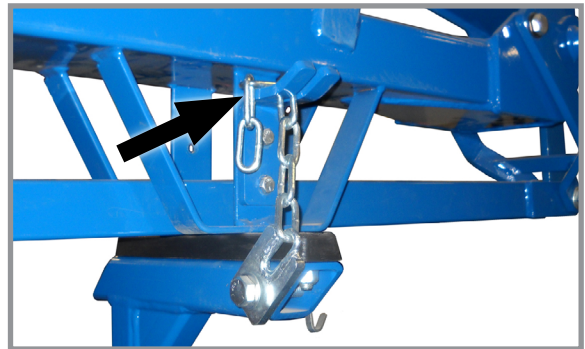
Position planter in a relatively flat area. Avoid areas with furrows, etc.

SUMMARIZED FIELD TO TRANSPORT SEQUENCE

- Install row marker lockups.
- Raise planter to raised field position.
- Extend tongue.
- Lock wings over center
- Raise planter to engage safety hook at top of center section into locking position.
- Lower planter onto safety hook.
- Rotate planter to transport position.
- Install tongue safety pin.
- Install transport latch locking pin.
- Install manual safety lockup.

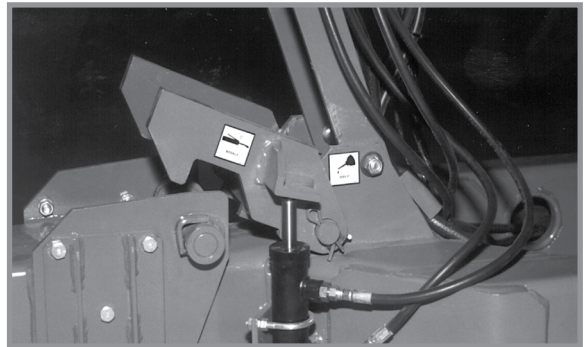
NOTE: Read following information for detailed instructions.

1. Install row marker lockups.
2. Raise planter to raised field position using hydraulic control.



Row marker lockup

3. Hold "ROTATE/TONGUE" switch in "**TONGUE**" and operate hydraulic control until tongue is fully extended. Tongue lock latch automatically releases.



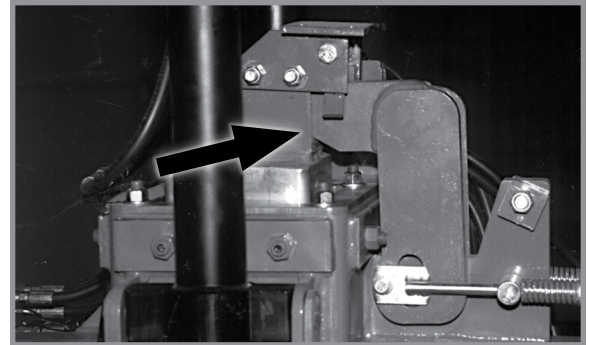
Tongue latch lock

4. Hold "RAISE/WING LOCK" switch in "**WING LOCK**" and operate hydraulic control until wing lock cylinders are fully extended and wing locks are locked over center.



Wing lock

5. Hold control console “RAISE/WING LOCK” switch in “**RAISE**” and operate hydraulic control until two center lift cylinders are fully extended and safety hook at top of center section rotates into locking position.
6. Lower planter onto safety hook using hydraulic control.



Center section safety hook



WARNING

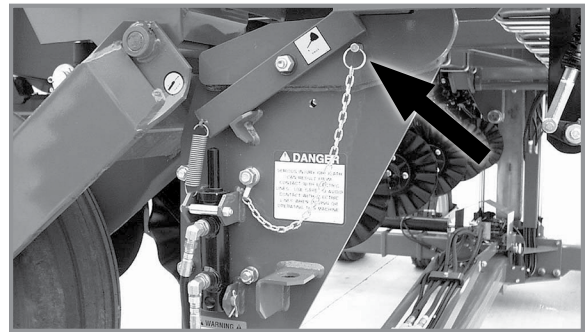
Uncontrolled movement of equipment can cause loss of control and could result in death, serious injury, or damage to property and equipment. Install all safety pins before transporting equipment.

7. Hold control console “ROTATE/TONGUE” switch in “**ROTATE**” and operate hydraulic control to rotate planter until transport latch is engaged.
8. Install tongue safety pin.



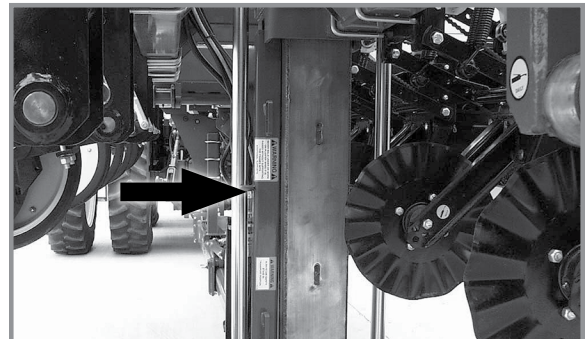
Tongue safety pin

9. Install transport latch locking pin.



Transport latch locking pin installed


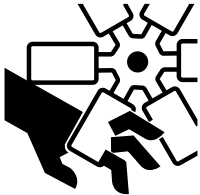
10. Remove manual safety lockup from storage location on left side of axle hitch and position it behind front center lift cylinder.



Manual safety lockup installed

VACUUM SYSTEM

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

| | |
|--|---|
|  WARNING | <p>Moving fan blades can cause amputation or severe injury. Never operate vacuum fan with cover removed.</p> |
|  | |

DIGITAL VACUUM READOUT

Digital vacuum readout is incorporated into Kinze Vision displays. Refer to their operation manuals for instructions.

VACUUM FAN MOTOR VALVE BLOCK ASSEMBLY

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

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

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

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

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

BULK FILL SYSTEM



Seed flying out of disconnected delivery tube at high velocity can cause injury. Do not disconnect delivery tubes when system is operating.

NOTICE

Foreign materials can plug system. Make sure seed is clean and free of debris when filling bulk fill hoppers.

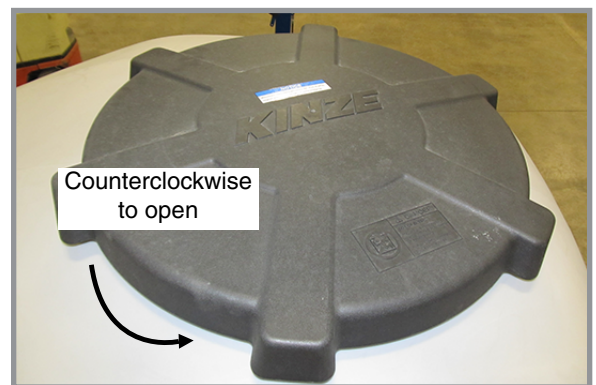
NOTICE

Do not turn on system with tractor engine at full speed or system damage may occur.

NOTICE

Do not operate bulk fill system above maximum system operating pressure of 20 inches of water (51 cm of water) or seed bridging may occur.

1. **Before filling hoppers refer to “Row Unit Operation” for additives information.** Fill hoppers with seed, latch lids, and secure with pin.
2. Start bulk fill system with tractor engine at idle.
3. Increase engine speed to full and set initial system pressure using flow control valve.
4. Allow system to warm up and adjust pressure if necessary.



Bulk fill tank lid latch

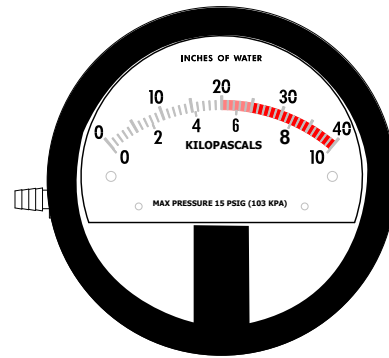
Recommended pressures:

- Corn – 12 inches of water (31 cm of water)
- Soybeans – 10 inches of water (25 cm of water)
- Actual pressure needed is affected by seed size, shape, and coating.

ANALOG VACUUM OR PRESSURE GAUGE

The analog vacuum or pressure gauge connects directly to the vacuum and is tied into the digital sending units.

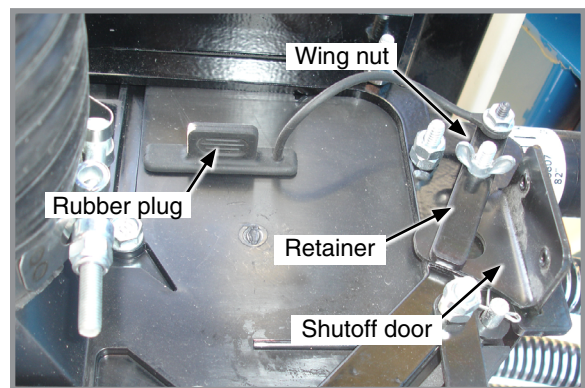
Only adjustment is to “zero” needle with no vacuum or pressure present. If there is a significant difference between gauge and a reading taken at meters, a different manifold location should be found to connect hose to gauge and digital sending unit.



Analog gauge

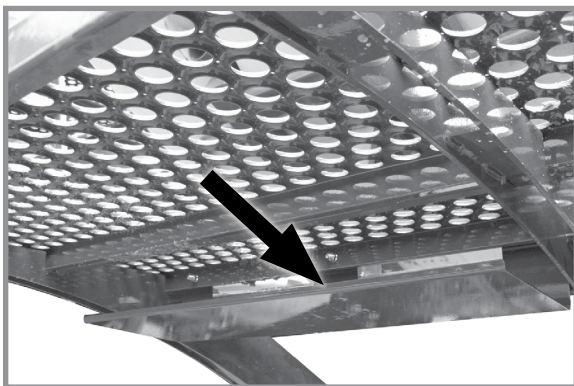
BULK FILL ENTRAINER ACCESS

1. Shut down bulk fill system.
2. Loosen wing nut and turn retainer holding shutoff door in its storage location.
3. Remove rubber plug closest to area in entrainer needing attention.
4. Insert shutoff door into open slot and push into entrainer at a slight upward angle.
5. When work is complete, remove shutoff door, return door to storage location, and plug open slot.

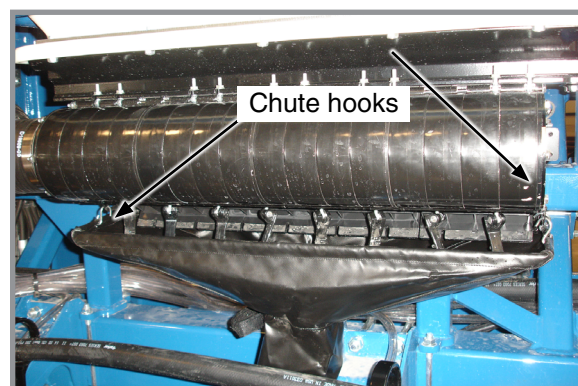


Bulk fill entrainer (end view)

BULK FILL TANKS - CLEAN OUT



Cleanout chute storage bracket



Cleanout chute installed

1. Remove bulk fill tank cleanout chute from storage location beneath catwalk.
2. Position tube of chute under entrainer and attach hooks on each end of entrainment assembly.
3. Open cleanout doors and empty tank.
4. Close all cleanout doors and return cleanout chute to storage location.

BULK FILL SCALE PACKAGE OPTION

NOTICE

High-pressure water can damage display. Remove display before power washing planter.

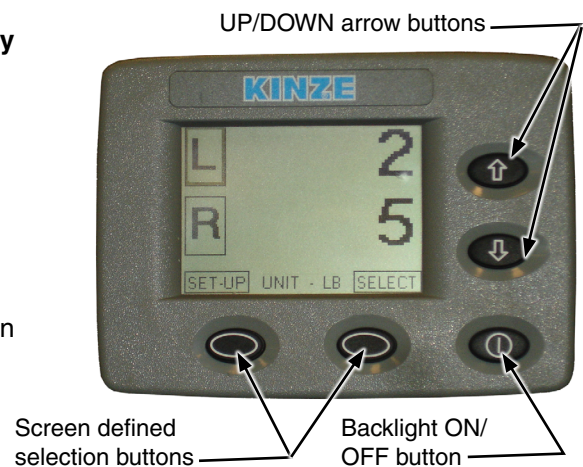
NOTICE

Remove and store display at end of planting season. Damage from sun and weather exposure may result.

- Provides seed weight or estimated acres remaining for each bulk fill hopper.
- Displays total (gross) seed weight or estimated acres remaining for both hoppers combined.
- Warns operator when seed goes below a pre-defined level (when using a Kinze Vision display).

Operation of bulk fill scale package display is controlled by buttons located on its face:

- Two screen-defined selection buttons.
- Backlight ON/OFF button.
- UP/DOWN arrow buttons.
- Screen position is changed by loosening thumb screw on mount at back of monitor and repositioning screen.



SETUP BULK FILL SCALE PACKAGE DISPLAY

1. Press SET-UP button.



2. First setup screen displays and ALARM LEVEL box is highlighted.
3. Press SELECT button.
4. Press UP or DOWN arrows to change alarm weight level. Select BACK to save changes.
5. Press UP or DOWN arrows to highlight WEIGHT/ACRE MODE box. Press SELECT button.
6. Press UP or DOWN arrow buttons to toggle between weight or acre mode. This selection affects if values are displayed as pounds or estimated acres of seed remaining. Press BACK to save changes.



7. Press DOWN arrow to select second set-up screen.

NOTE: CALIBRATION# and SETUP# are automatic and do not need to be changed.

8. Select CONTRAST or BACKLIGHT. Use UP or DOWN arrow buttons to change levels. Press BACK to save changes.
9. Select BACK to return to main screen.



MONITOR SEED LEVELS

1. Main screen displays information for left and right hoppers.
2. Select either L or R for individual hopper status information.
3. Select BACK to return to main screen.
4. Press down arrow once or twice to display GROSS screen. Combined status information for both hoppers is shown.
5. Press down arrow again to return to main screen.



ENTER SEED INFORMATION

1. Highlight and select either L (left) or R (right) for the appropriate input screen.
2. At input screen, L or R side is indicated at left side of screen and seed weight or acres remaining is on right side.



3. Press arrow keys to select desired box; press SELECT to darken and use arrow keys to change.

NOTE: Seed information entered must be accurate for remaining estimated acres to calculate correctly.

- SEEDS/ACRE is population rate.
- SEEDS/LB value comes from seed specifications.
- ZERO is selected to zero hopper that is selected.

4. Select BACK to return to main screen.



ROCK GUARDS

Transport wheel rock guards are used on both sides of each transport wheel when planter is used in rocky conditions.

Rock guards help prevent rocks from being picked up by wheels and damaging adjoining row units.



Rock guard

AUXILIARY WORK LIGHTS PACKAGE

Auxiliary work lights package includes two 50W, 3" x 5" (76 x 127 mm) halogen flood lamps, mounting hardware, and a wiring harness to plug into existing planter light harness.



Auxiliary work lights

AG LEADER INTEGRA DISPLAY

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

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

NOTE: See Integra operator manual for installation and programming.



Ag Leader Integra display

AG LEADER MONITORING CONTROL PACKAGE (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)

AG LEADER INCOMMAND 1200 DISPLAY

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

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

NOTE: See InCommand operator manual for installation and programming.

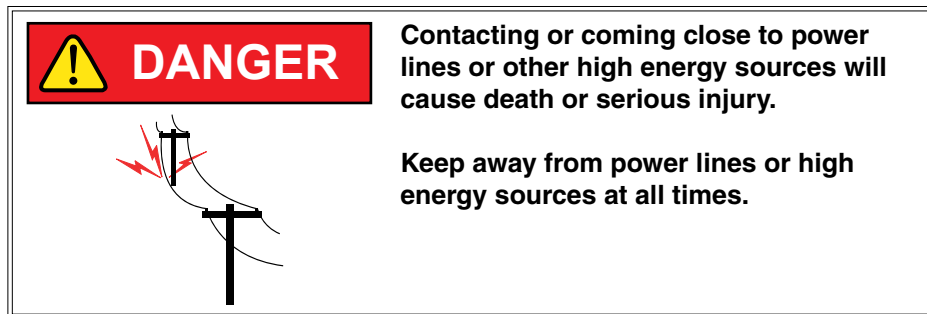


Ag Leader InCommand Display

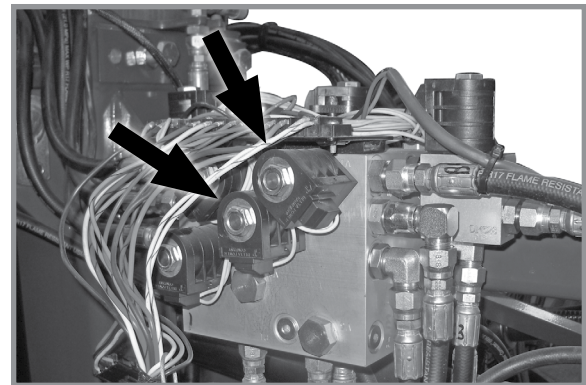
KINZE ISOBUS OPTION

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

ROW MARKER OPERATION



Marker switch



Row marker solenoid valves (Cover removed)

Two solenoid valves on valve block at rear R.H. side of center frame, and a three position selector switch on control console permit operator to lower or raise desired row marker.



See "Row Marker Speed Adjustment".

1. Select which row marker to lower on control console.
2. Operate hydraulic control to lower row marker.
3. Move control switch to other side to operate opposite row marker.
4. Raise row marker at end of field using hydraulic control.
5. After turn, using the hydraulic control, lower the pre-selected row marker.
6. Continue to follow this procedure.

NOTE: Both row markers can be lowered by operating switch in each position and hydraulic control twice. Row markers raise simultaneously with hydraulic control in raise position.

If electrical system does not operate properly:

- Check fuse.
- Check wiring connections.
- Check control switch.
- Check solenoid. SOLENOID HOUSING IS MAGNETIZED WHEN ENERGIZED.

ROW MARKER SPEED ADJUSTMENT

NOTICE

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

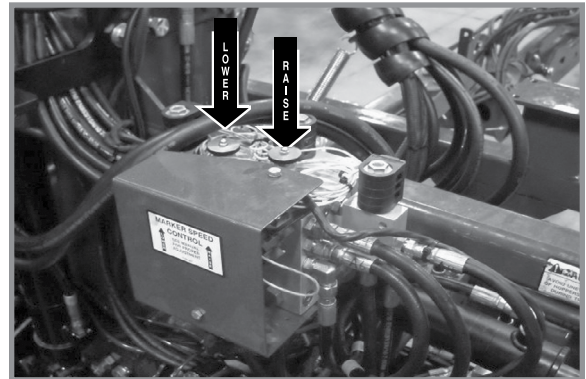
Marker hydraulic system includes two flow control valves. One flow control valve sets lowering speed and one sets raising speed of both markers. Flow controls determine amount of oil flow restriction through valves, varying marker travel speed.

Loosen jam nut and turn control clockwise, or IN to slow travel speed. Turn counterclockwise, or OUT to increase travel speed. Tighten jam nut after adjustments are complete.

NOTE: Tractors with flow control valves. Make row marker speed adjustment with tractor flow controls in maximum position. After row marker speed is set, adjust tractor flow controls to allow hydraulic control to stay in detent during marker raise or lower cycle.

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

NOTE: 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.



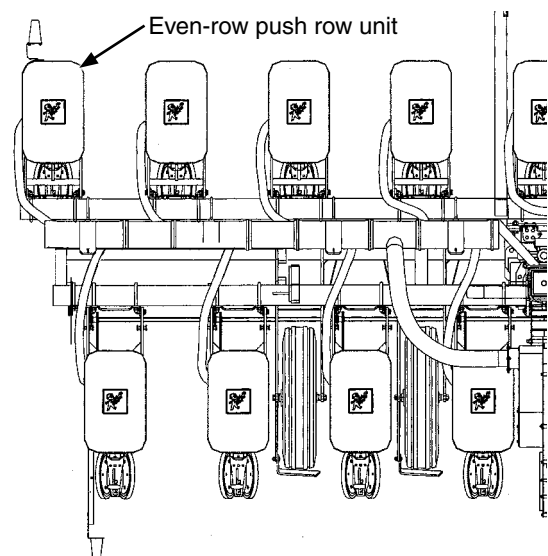
Row marker speed control adjustment

EVEN-ROW PUSH ROW UNIT

An Even-Row Push Row Unit Package is available to add one additional push row unit on outer L.H. side of front toolbar for use with Solid Row Interplant Package.

NOTE: See “Row Marker Adjustment” for determining correct length to set row marker assemblies when planting with even-row push row unit option.

NOTE: install hitch onto 2-point hitch bar using R.H. hole if 2-Point Hitch Option is used. A 19 cm offset mount is not needed. See “Offset Hitch Adjustment” for additional information.

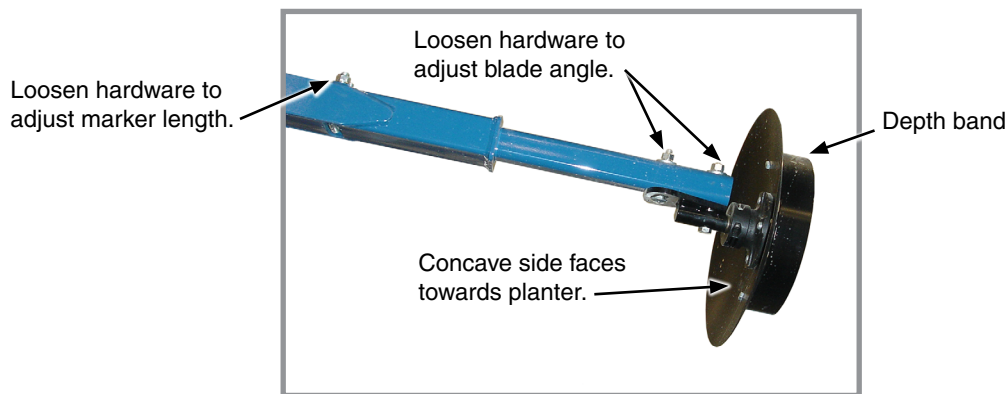


ROW MARKER ADJUSTMENTS

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

| Row Marker Lengths | |
|--------------------|---------|
| 12 Row 70 cm | 8.40 m |
| 16 Row 70 cm | 11.20 m |

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



Row marker disc blade angle adjustment

NOTICE

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

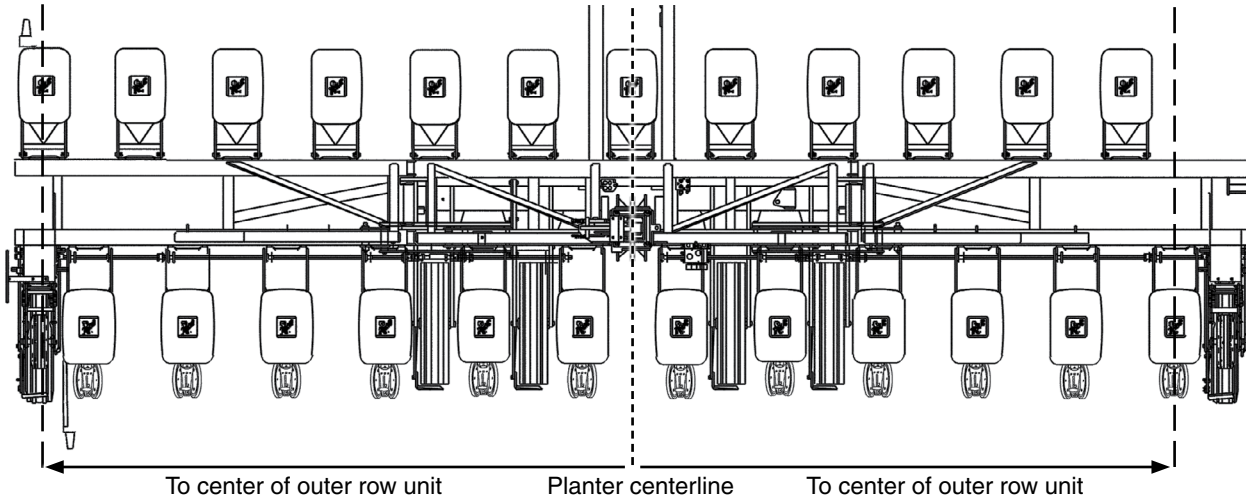
Marker disc blade is installed with concave side facing inward. Spindle assembly is slotted so hub and blade can be angled to throw more or less dirt.

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

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

ROW MARKER EVEN-ROW LENGTH ADJUSTMENT

Adjust marker extensions as shown below when using even-row push row unit option.



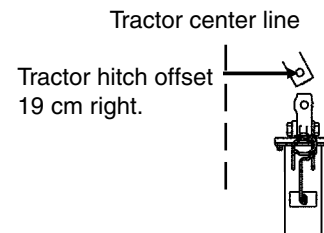
Center Of Planter To Center Of Outer Row Unit x 2 + 35 cm Row Spacing = Dimension Between Planter Center Line And Marker Blade

- 12 Row 70 cm With 12 Interplant Push Row Units
(L.H. Marker 420 cm x 2 + 35 cm = 875 cm)
(R.H. Marker 385 cm x 2 + 35 cm = 805 cm)
- 16 Row 70 cm With 16 Interplant Push Row Units
(L.H. Marker 560 cm x 2 + 35 cm = 1155 cm)
(R.H. Marker 525 cm x 2 + 35 cm = 1085 cm)

| |
|---|
| Number Of Rows x Row Spacing (centimeters) = Dimension Between Planter Center Line And Marker Blade 12 Rows x 70 cm Spacing = 840 cm Marker Dimension 16 Rows x 70 cm Spacing = 1120 cm Marker Dimension |
|---|

OFFSET HITCH ADJUSTMENT

If tractor hitch is offset 19 cm right of tractor center line, add 19 cm to marker dimension on R.H. side of planter and subtract 19 cm from marker dimension on L.H. side of planter.



POINT ROW CLUTCHES

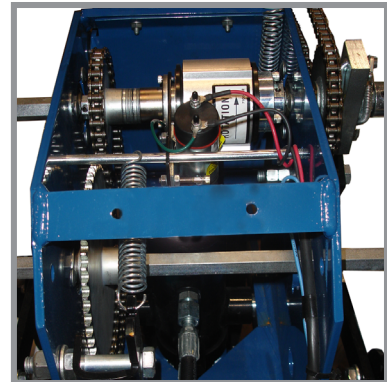
L.H. point row clutch switch
10 amp time delay fuse



Single point row clutch control box

R.H. point row clutch switch
10 amp time delay fuse

Point row
clutch switch

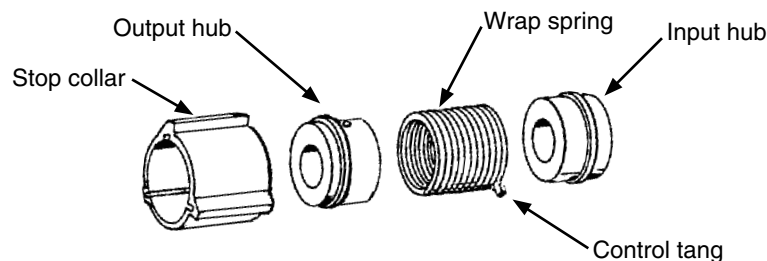


Point row clutch

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.

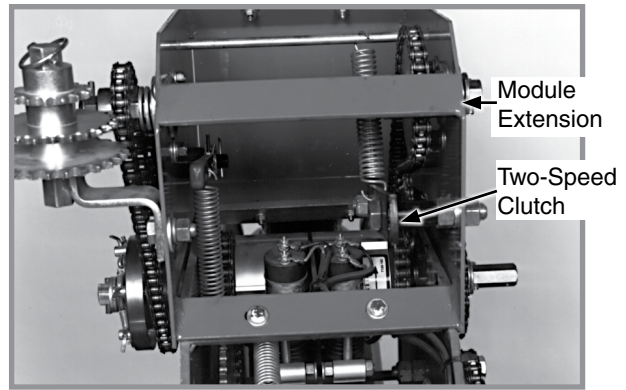
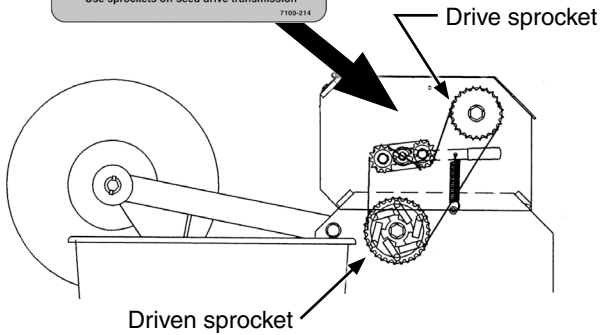
Stop collar is controlled by an electric solenoid and an actuator arm. When selector switch on tractor control box is OFF, solenoid coil is NOT ENERGIZED and actuator arm will not contact stop on stop collar, allowing it to rotate with hubs and drive planter.

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

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

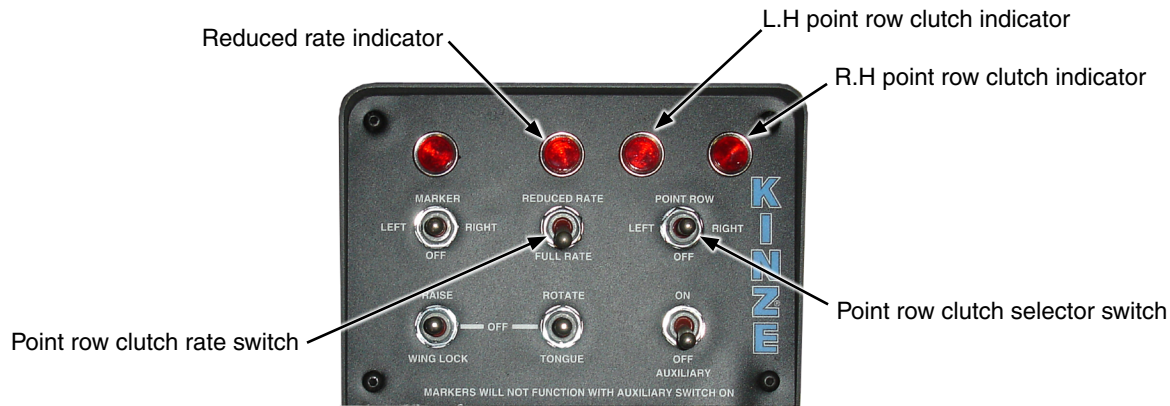
* Use sprockets off seed drive transmission
7100-214



Two-speed point row clutch

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.

Population reduction ratio is determined by sprocket ratio between wheel module extension drive and driven sprockets. A rate reduction decal similar to one shown above is located on wheel module extension.



Two-speed point row clutch control box

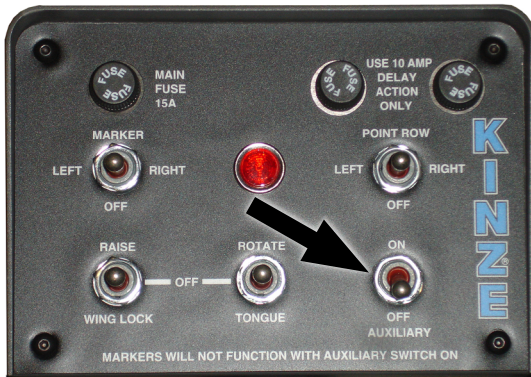
Point row clutches are controlled by control console point row clutch switches. The point row switch shuts off left or right half of planter. Activating reduced rate switch engages one solenoid on each clutch assembly and reduces planting rate for entire planter.

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

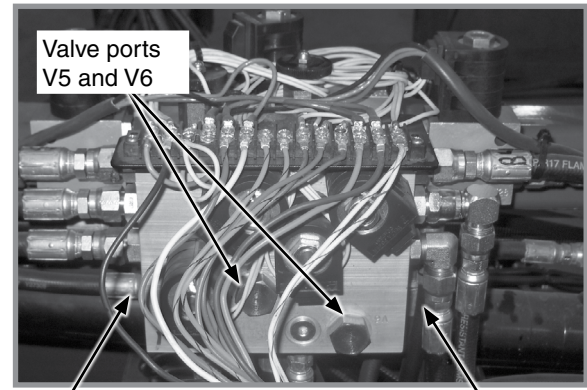
NOTE: Two-speed point row clutch is located ahead of liquid fertilizer squeeze pump and/or dry fertilizer drive. Activating two-speed point row clutch reduced rate switch causes same per cent of reduction in dry or liquid fertilizer (squeeze pump) application rates. Liquid fertilizer (piston pump) application rates are not be affected because piston pump uses a dedicated drive tire.

AUXILIARY HYDRAULIC OPTION

A customer-supplied auxiliary hydraulic option provides 38 L/min of oil flow at rear of planter for powering fertilizer attachments, bulk seed handling equipment, etc. Two customer-supplied solenoid valve kits (G1K275) are required to activate auxiliary hydraulic option with control console auxiliary switch.




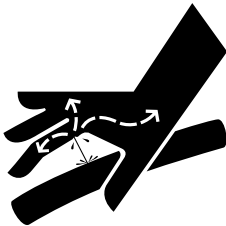
Auxiliary switch



Hydraulic ports
A9 and B9

Hydraulic ports
A8 and B8

Valve block on rear center frame (Cover removed)

| | |
|--|--|
|  WARNING | <p>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.</p> |
|  | |

NOTE: Place row markers in transport position and remove all pressure from hydraulic system.

Remove cover from valve block on rear center frame of planter. Remove plugs from ports V5 and V6 and install solenoid valve assemblies following installation instruction supplied with each kit. Connect power to solenoid assemblies to orange/black wire located in wiring harness connection to L.H. side of valve block.

Remove plugs from 3/4"-16 O-ring ports A8 and B8 on R.H. side of valve block or ports A9 and B9 on L.H. side of valve block. Connect customer supplied hydraulic hoses.

Refer to "Hydraulic System Schematics" and "Electrical Wiring Schematics" in Lubrication and Maintenance section of this manual for additional information.

NOTE: Auxiliary switch ON disables all other control console switches.

Before operating auxiliary system make sure marker switch on control console is OFF. Move auxiliary switch to ON. Operate hydraulic control (marker/folding functions) to engage auxiliary system.

REAR TRAILER HITCH

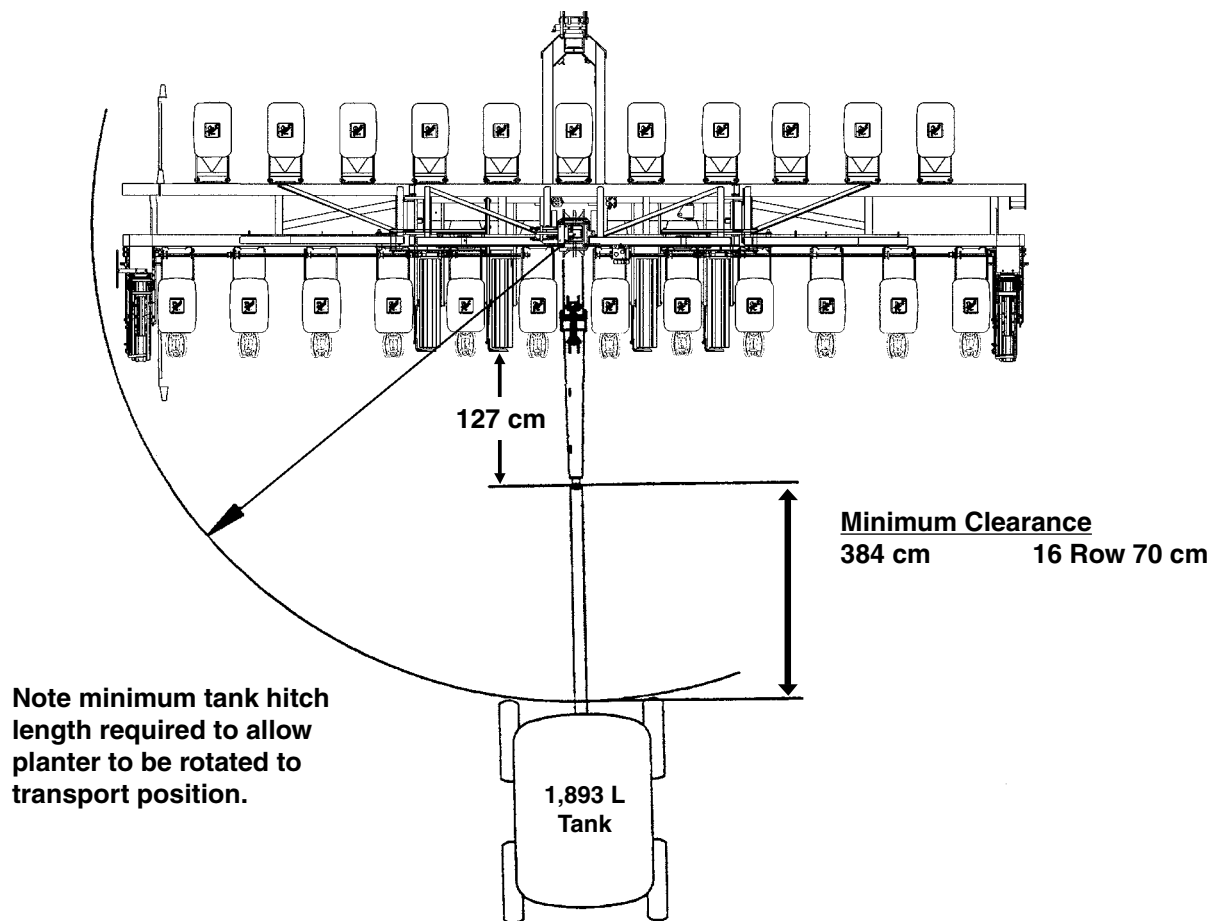
Rear trailer hitch can tow a 3 or 4 wheel wagon behind planter. A spring, chain, and mounting bracket supports a 3 cm feed hose from hitch to piston pump. This extra length or loop is required to allow for planter to move into transport position without stretching hose.



Trailer hitch

| | |
|---------------|---|
| NOTICE | <p>Rear trailer hitch is designed for use with piston pump only. Maximum allowable hitch weight is 200 lb (91 kg). Do not exceed 6000 lb (2.7 tons) gross towing weight or the equivalent of a loaded 500 gal (1893 L) tank and running gear or equipment can be damaged.</p> |
|---------------|---|

NOTE: Periodically check feed hose for kinks to prevent restricted delivery rate.



FIELD TEST

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

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

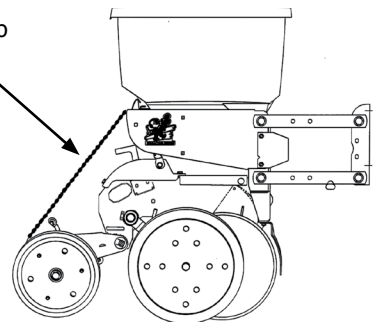
Reinspect machine after field testing.

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

FIELD CHECK SEED POPULATION

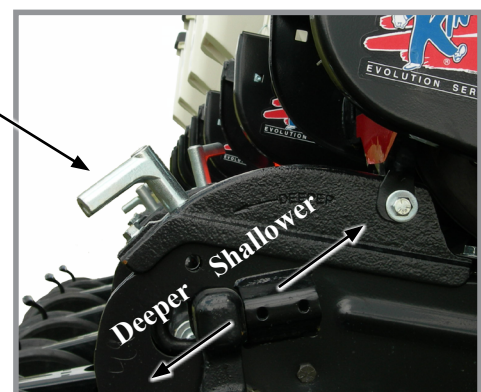
1. Tie up one or more sets of closing wheels by running a chain or rubber tarp strap between the hopper support panel and closing wheels. It may be necessary to decrease closing wheel arm spring tension.

Chain, rubber tarp strap, or similar.



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

Planting depth adjustment handle



Planting depth adjustment

3. Measure $\frac{1}{1000}$ of an hectare. See chart for correct distance for row width being planted. For example, if planting 70 cm rows $\frac{1}{1000}$ of an hectare would be 14.28 meters.

$\frac{1}{1000}$ Hectare Seed Population Count Row Width/Distance

| | | |
|-----------|---------|---------|
| Row Width | 35 cm | 70 cm |
| Distance | 28.56 m | 14.28 m |

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

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

EXAMPLE: 70 cm row spacing 14.28 meters equals $\frac{1}{1000}$ hectare.

75 seeds counted x 1000 = 75,000 seeds per hectare

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 centimeters 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 20 cm and a gap of 40 cm is observed, a finger has lost its seed and not functioned properly. If two seeds are found within a short distance of each other, finger has metered two seeds instead of one.
3. See “Seed Meter (Finger Pickup) Troubleshooting” or “Seed Meter (Brush-Type) Troubleshooting” in Troubleshooting Section of this manual.

DETERMINING KILOGRAMS PER HECTARE (BRUSH-TYPE METER)

Seeds per hectare ÷ Seeds per kilogram (from label) = Kilograms per hectare

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

- 5700 seeds per kilogram for medium size soybeans
- 33000 seeds per kilogram for medium size milo/grain sorghum
- 9900 seeds per kilogram for medium size cotton

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”.

FIELD CHECK GRANULAR CHEMICAL APPLICATION

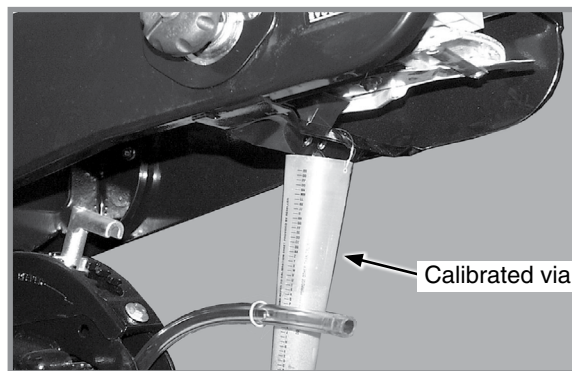
Temperature, humidity, speed, ground conditions, flowability of different material, or meter obstructions can affect granular chemical rate of delivery.



WARNING

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

Perform a field check to determine application rates.



Granular chemical field check

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

NOTE: Disengage clutch to avoid dropping seed during test.

3. Lower planter and drive 400 meters at planting speed.
4. Weigh chemical in grams caught in one vial.
5. Multiply that amount by factor shown to determine kilos per hectare.

| Kilograms Per Hectare | |
|-----------------------|--------|
| Row Width | Factor |
| 70 cm | 0.0357 |

EXAMPLE: You are planting 70 cm rows. You have planted for 400 meters at desired planting speed. You caught 337 grams of chemical in one vial. 337 grams times 0.0357 equals 12 kilograms per hectare.

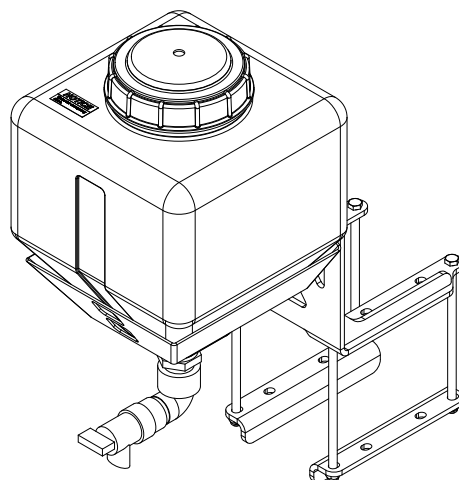
NOTE: Check calibration of all rows.

METERING GATE

Use metering gate setting as a starting point for distributing insecticide or herbicide. Charts are based on 8 km/h planting speed. Use a higher gate setting for speeds faster than 8 km/h and a lower setting for speeds slower than 8 km/h.

WATER TANK

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



NOTICE

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

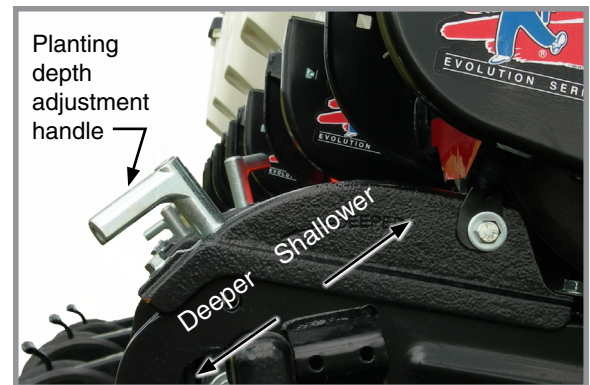
The water tank is to be used in the event of an accidental exposure to chemical. Chemicals are supplied with Material Safety Data Sheets (MSDS) that provide full information about the chemical, its effects on exposure, and first aid needs in the event of an emergency. Keep your MSDS file up-to-date and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

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

PLANTING DEPTH

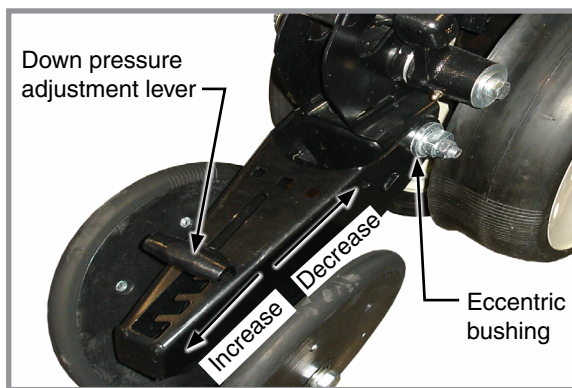
Planting depth is maintained by adjustable row unit gauge wheels. Depth adjustment range is approximately 1.2 cm to 8.9 cm.

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

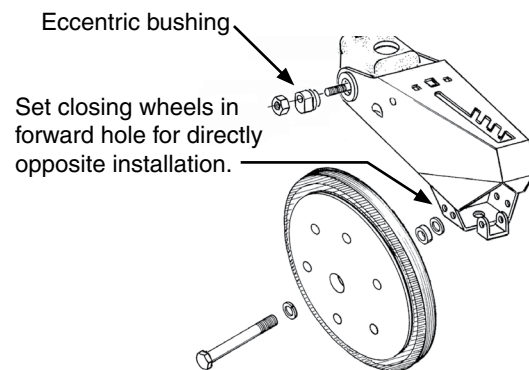


Planting depth adjustment

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



“V” Closing wheel adjustments



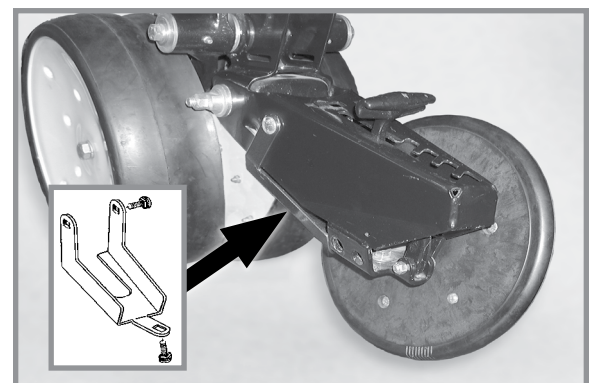
“V” closing wheels should have enough down pressure to close the seed trench and ensure good soil to seed contact. Move 5-position quick adjustable down force lever on the top of closing wheel arm to the rear to increase closing wheel spring pressure. Move lever forward to decrease pressure. Adjust all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

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

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

CLOSING WHEEL SHIELD (RUBBER OR CAST IRON “V” CLOSING WHEELS)

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



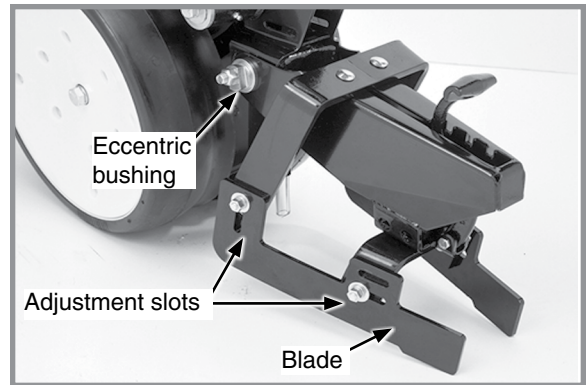
Closing wheel shield (Closing wheel removed)

DRAG CLOSING ATTACHMENT

Drag closing attachment pulls loose soil over seed trench.

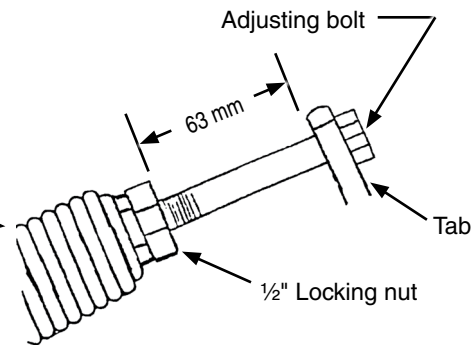
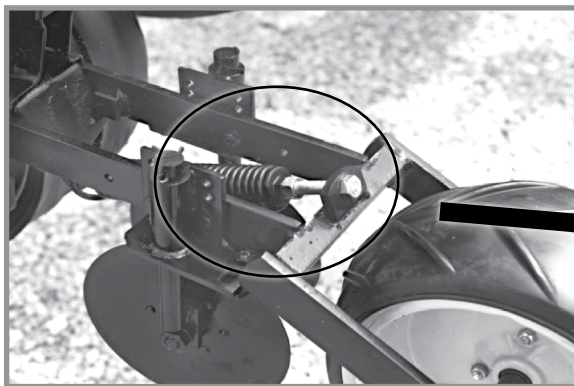
NOTE: Use of a seed firming wheel or other seed firming device is recommended with drag closing attachment.

Front and rear adjustment is made using slotted holes in blades. Adjust all rows the same. Wheel arm stop eccentric bushings provide lateral adjustment. Use a 3/4" wrench to loosen closing wheel arm to wheel arm stop hardware. Use another 3/4" wrench to turn eccentric bushings until drag closing attachment is aligned with seed trench. Tighten hardware.



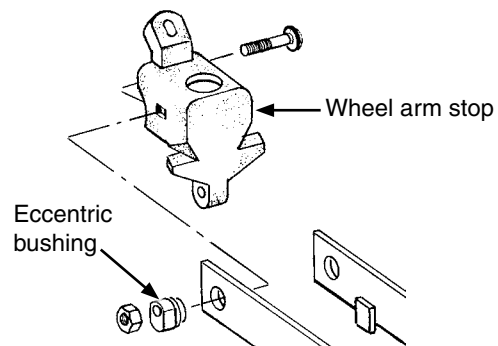
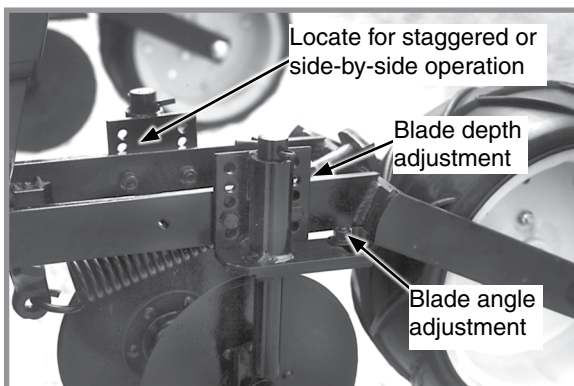
Drag closing attachment

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 63 mm between mounting arm tab and locking nut. Loosen 1/2" locking nut and turn adjusting bolt in to increase down force or out to decrease down force. 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 3/4" wrench to loosen hardware attaching closing wheel arm to wheel arm stop. Use another 3/4" 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 cm incremental blade depth adjustment. Slotted holes in disc mount and bracket allow for 0° - 15° blade angle adjustment. Adjust covering discs on all row units to similar settings.

SEED HOPPERS

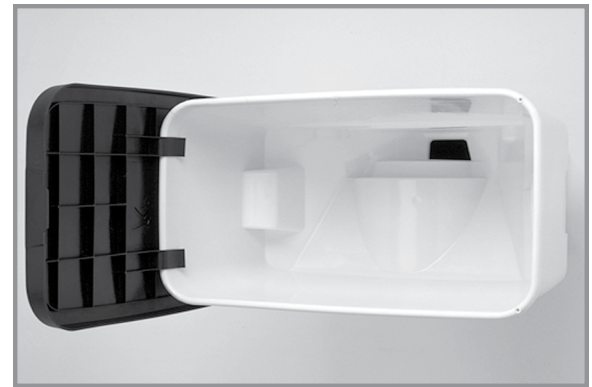
Mechanical seed hopper has a capacity of 67 L.

Vacuum seed hopper has a capacity of 62 L.

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

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

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

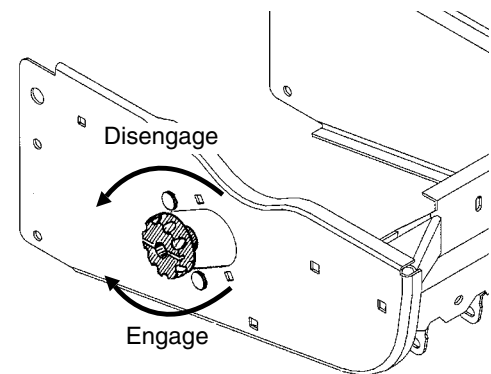


Mechanical seed hopper

SEED METER DRIVE RELEASE

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

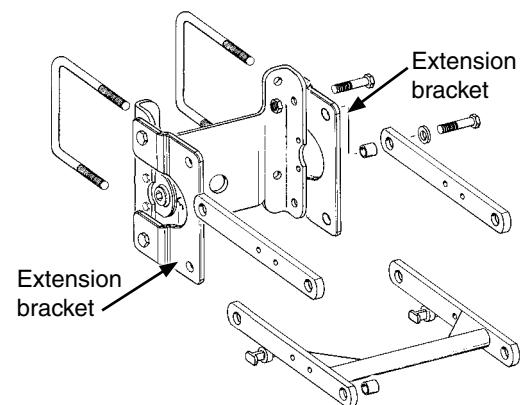
Turn knob ¼ turn counterclockwise to disengage or ¼ turn clockwise to engage.



Seed meter drive release

ROW UNIT EXTENSION BRACKETS

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

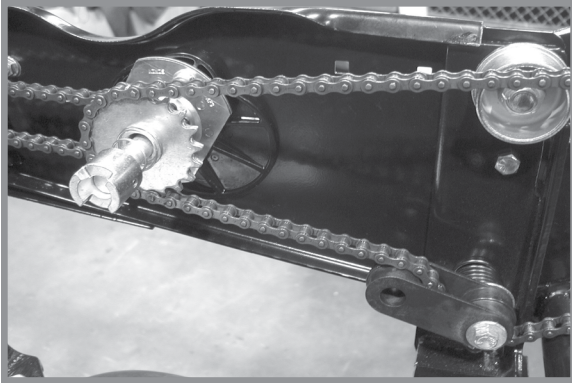


Row unit extension brackets

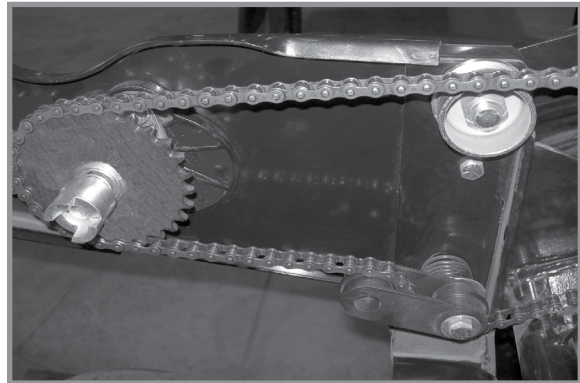
ROW UNIT CHAIN ROUTING

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.



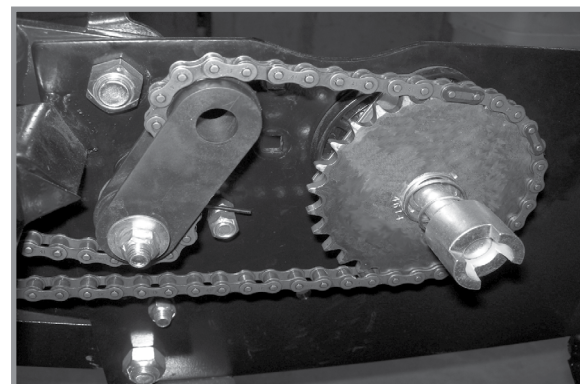
Mechanical pull row unit meter drive



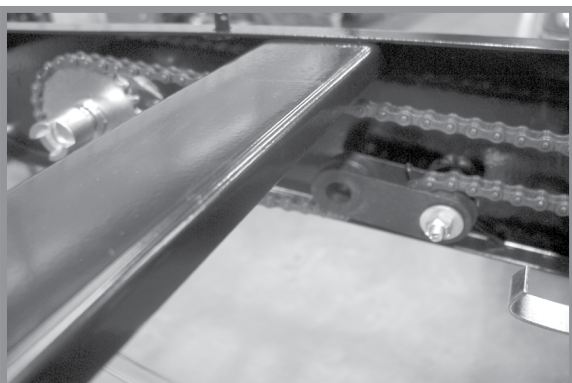
Vacuum pull row unit meter drive



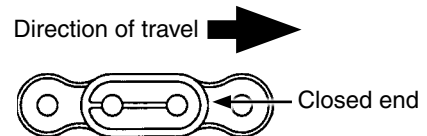
Mechanical push row unit meter drive



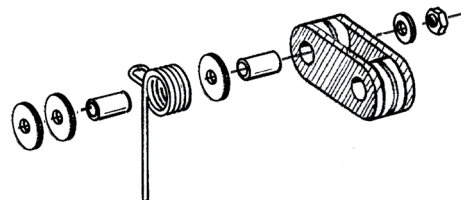
Vacuum push row unit meter drive



Row unit granular chemical drive



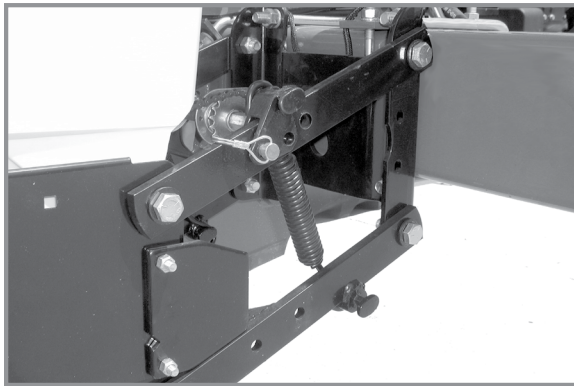
NOTE: Install connector link with closed end facing direction of travel.



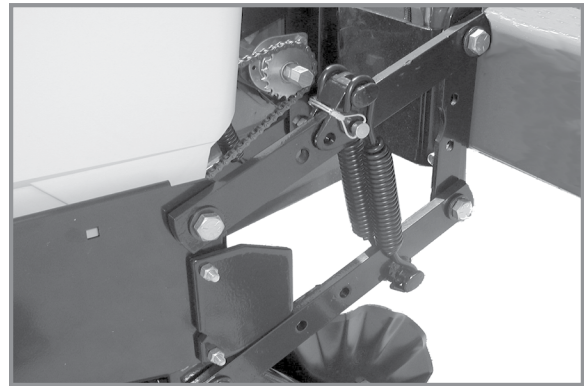
NOTE: Reverse idler when worn on one side for extended use.

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

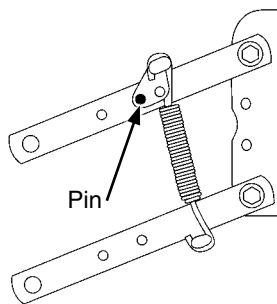
Standard and heavy duty quick adjustable down force springs are available in increase penetration in hard soil and keep row unit from bouncing in rough field conditions. Two springs per row, one on each side parallel arms, are used unless equipped with row unit mounted no till coulters. Row unit mounted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



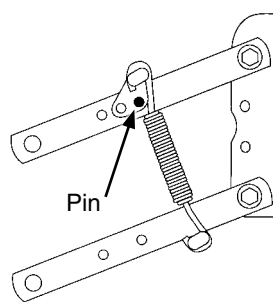
Two springs per row (Dual)



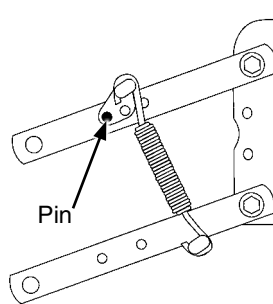
Four springs per row (Quad)



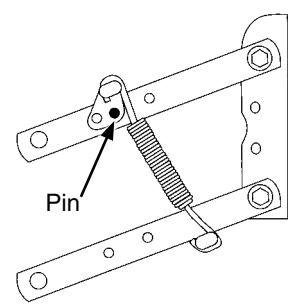
Position 1 (Least)



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* | | | | |
|---|----------------|-------------------|----------------|-------------------|
| Position | 2 Springs | | 4 Springs | |
| | Standard D8249 | Heavy Duty D21337 | Standard D8249 | Heavy Duty D21337 |
| 1 | 18.6 kg | 19.5 kg | 33.6 kg | 36.3 kg |
| 2 | 33.1 kg | 39.0 kg | 54.4 kg | 65.3 kg |
| 3 | 61.7 kg | 75.7 kg | 115.7 kg | 139.3 kg |
| 4 | 93.9 kg | 113.0 kg | 167.4 kg | 213.2 kg |

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

NOTICE

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

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

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

INTERPLANT PUSH ROW UNIT CLUTCH SPROCKET

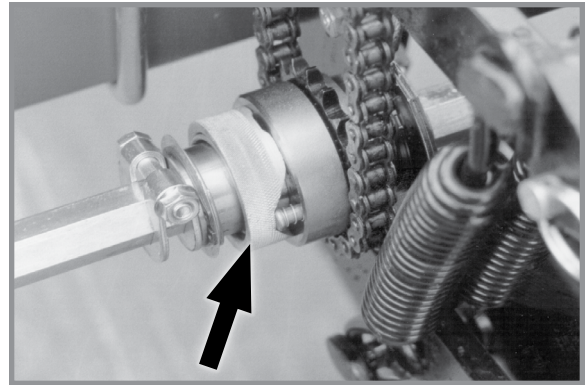
Push row unit clutch sprocket disengages interplant drive from push row unit drill shaft when only pull row units are used.

DISENGAGE

Rotate knurled collar ¼ turn. Rock drill shaft slightly using a 7/8" wrench to take pressure off of spring loaded pins in clutch to allow pins to “pop” out, disengaging drive.

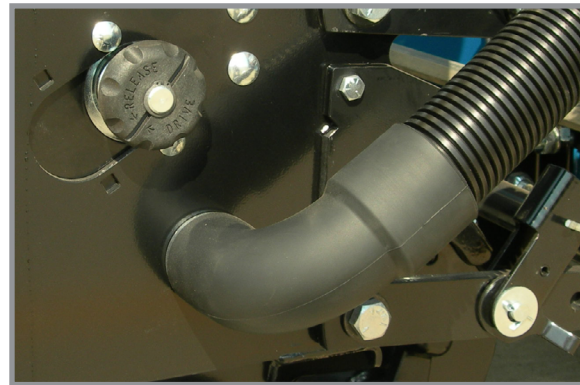
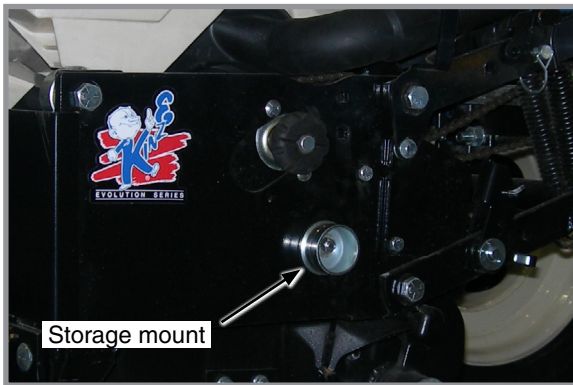
ENGAGE

Rotate knurled collar ¼ turn and turn drill shaft with a 7/8" wrench until drive pins engage drive sprocket.



Interplant clutch sprocket

INTERPLANT PUSH ROW UNIT VACUUM HOSE SHUTOFF




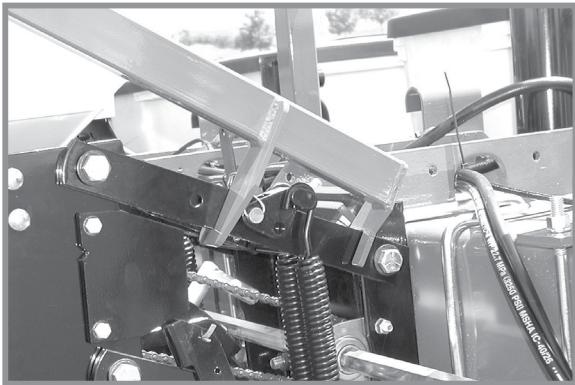
Interplant vacuum hose shutoff

When push row units are not used, move row unit end of 2" vacuum hose on each push row unit to storage mount located on side of shank.

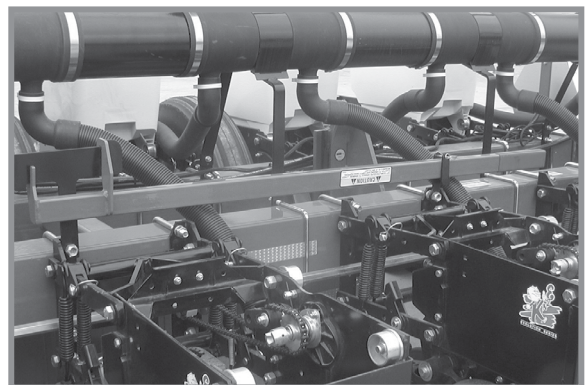
INTERPLANT PUSH ROW UNIT LOCKUPS

Push row unit lockups lock interplant row units in the raised position.

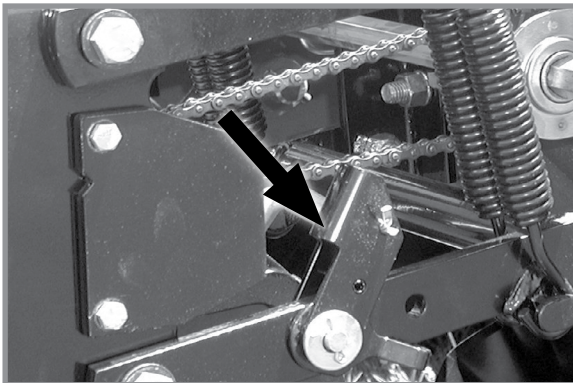
| | |
|--|---|
|  CAUTION | <p>Improper lifting of row units can cause serious injury. An empty row unit requires minimum 41 kg lift. Set down pressure springs to minimum, lower planter to ground, and empty seed hopper before attempting to lift with this lever.</p> |
|--|---|



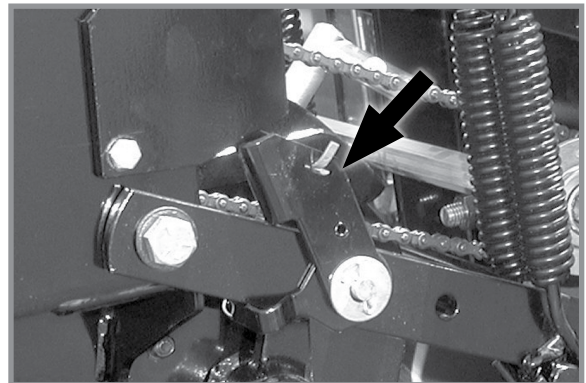
Lift lever positioned on push row unit



Lift lever in storage location



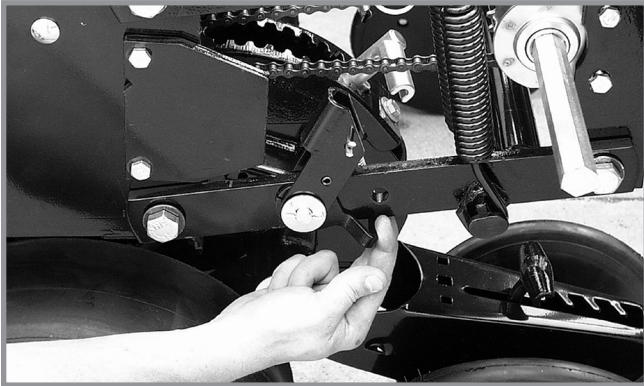
Lockup released for field operation



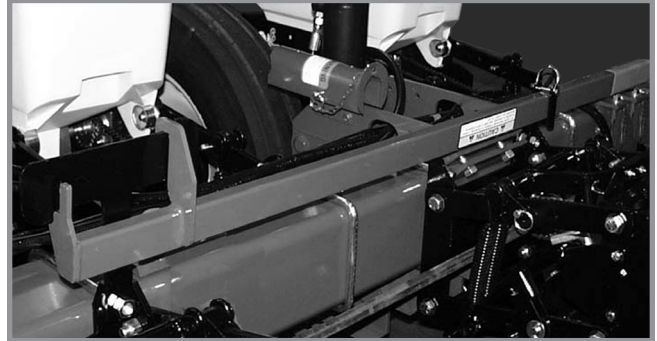
Push row unit locked in raised position

To lock in raised position:

1. Set row unit down pressure springs to minimum setting.
2. Lower the planter to the planting position.
3. Empty seed hoppers.
4. On each push row unit lockup, flip the spring tab forward.



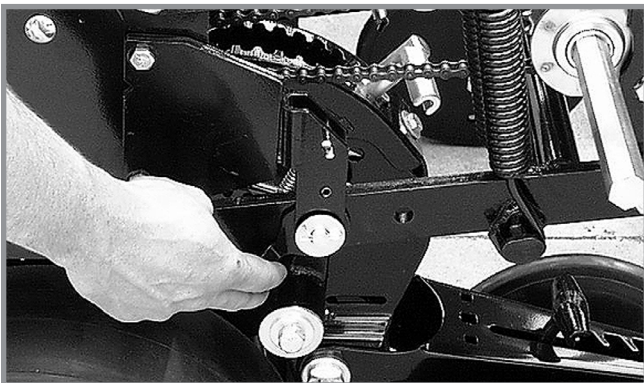
3. Using the lift lever, raise the push row unit to allow the spring loaded lockups to snap out of locked position. Lower row unit to the ground.
4. Repeat Step 3 on remaining push row units.

**Lift lever in storage location**












5. Using the lift lever, raise the push row unit to allow the spring loaded lockups to snap into locked position under the row unit stops.
6. Repeat Steps 4 and 5 on remaining push row units.

To release lockups:

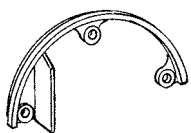
1. Lower the planter to the planting position.
2. On each push row unit lockup, flip the spring tab rearward.



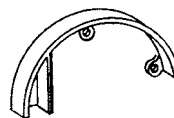
BRUSH-TYPE SEED METER

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



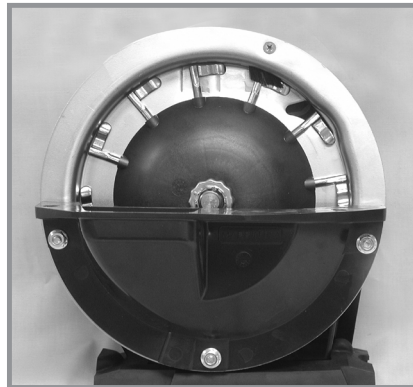
Shown without seed disc installed

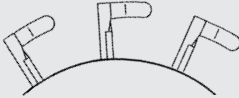
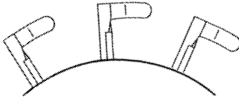
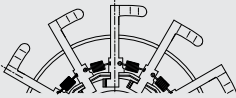

NOTICE

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.: GR2154 - Finger Assembly, Oil | Talc |
| Blank fingers replace alternate fingers to reduce planting rate by half while allowing the finger wheel to maintain a minimum of 40 RPM when planting low rates. |  Part No.: GD11787 - Half Rate Blank Finger | Graphite Talc |









*For More information on application rate see Additives section.

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

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



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VACUUM SETTINGS

| Crop | | **Seed Disc Kit | Seed Disc Part No. | Ejector Wheel (Color) | Cells | Seed Size Range | Singulator Zone Setting | Vacuum Setting Inches of Water (cm) | Lubricant |
|---|---------------------------------|-----------------|---------------------|----------------------------------|-------|--|-------------------------|-------------------------------------|---|
|  | Corn ‡ Large Sweet Corn | G9040X | B0678 (Light Blue) | 1 row 5 punches (Light Blue) | 40 | 35-70 lbs/80k (2500-5000 seeds/kg) | 2 | 18-20 (46-51) | Graphite* Talc* Bayer Fluency† (if mandated) |
|  | Soybean | G9041X | B0848 (Black) | 2 rows 6 punches (Black) | 120 | 2200-4000 seeds/lb (4850-8820 seeds/kg) | 0 | 10-14 (25-36) | Graphite* Talc* Bayer Fluency† (if mandated) |
|  | Sugar Beet | G9043X | B0683 (Dark Orange) | 1 row 6 punches (Dark Orange) | 60 | Pelletized | 2 | 15 (38) | Graphite* Talc* Bayer Fluency† (if mandated) |
|  | Milo | G9043X | B0683 (Dark Orange) | 1 row 6 punches (Dark Orange) | 60 | 10,000-20,000 seeds/lb (22000-44000 seeds/kg) | 2 | 15 (38) | Graphite* Talc* Bayer Fluency† (if mandated) |
|  | Sunflower ‡ Small Sweet Corn | G9042X | B0684 (Gray) | 1 row 5 punches (Gray) | 40 | Oil seeds #2, 3, 4 | 2 | 12-18 (30-46) | Graphite* Talc* Bayer Fluency† (if mandated) |
|  | Sunflower | G9042X | B0684 (Gray) | 1 row 5 punches (Gray) | 40 | Oil seeds #5 | 2 | 5-8 (13-20) | Graphite* Talc* Bayer Fluency† (if mandated) |
|  | Specialty Disc 1 | G9272X | B0912 (Green) | 1 row 6 punches (Green) | 60 | Cotton | 2 | 15-20 (38-51) | Graphite* Talc as needed* Bayer Fluency† (if mandated) |
|  | Specialty Disc 2 | G9273X | B0914 (Brown) | 1 row 6 punches (Green) | 60 | Black turtle & navy edible beans | 2 | 15-20 (38-51) | Graphite* Talc as needed* Bayer Fluency† (if mandated) |

Continued on next page.

VACUUM SETTINGS

| Crop | | **Seed Disc Kit | Seed Disc Part No. | Ejector Wheel (Color) | Cells | Seed Size Range | Singulator Zone Setting | Vacuum Setting Inches of Water (cm) | Lubricant |
|---|------------------|-----------------|--------------------|---------------------------------|-------|--|-------------------------|-------------------------------------|---|
|  | Specialty Disc 3 | G9308X | B0913 (Dark Blue) | 1 row 6 punches (Green) | 60 | Pinto & Great Northern edible beans & low-rate soybean | 2 | 15-20 (38-51) | Graphite* Talc as needed* Bayer Fluency [†] (if mandated) |
|  | Rapeseed | G9994X | B1188 (Dark Gray) | 1 row 10 punches (Dark Gray) | 83 | See Rapeseed Planting Section | 0 | See Rapeseed Planting Section | Kinze Brand Graphite Only |

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

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

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

[†]Bayer Fluency Agent is only required to be used in place of graphite or talc lubricants on vacuum equipped planters that are sowing neonicotinoid treated seeds in Canada. Refer to the Bayer Fluency Agent section for more information.

‡Conventional hoppers only, not applicable with bulk fill.

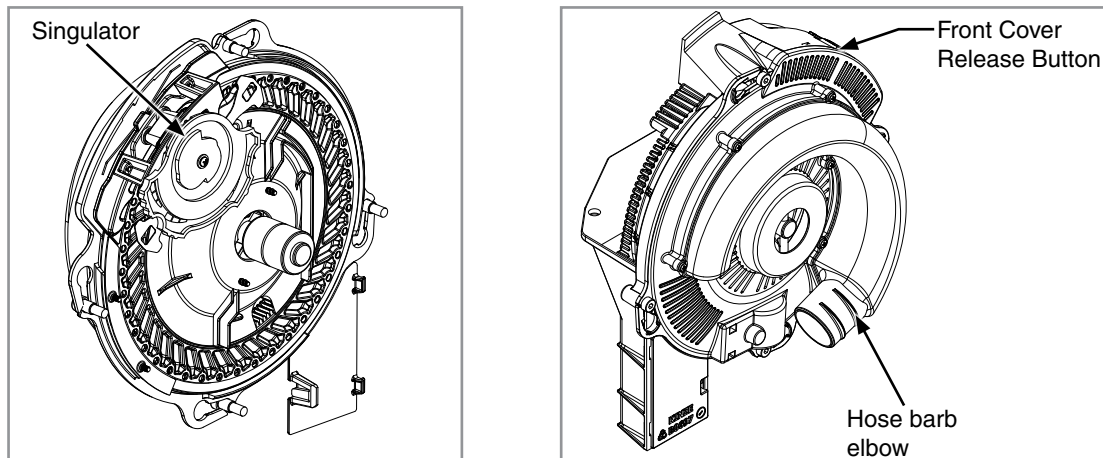
NOTE: See "[Field Check Seed Population](#)" on page 2-41 for more information. Always field check seed population to ensure planting rates are correct.

NOTE: Singulator settings are marked from 0 - 3.

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

NOTE: Use 1 tablespoon powdered graphite with standard 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 standard hopper fill of seed and mix thoroughly to coat all seeds and adjust rates as needed. Use of talc aids seed flow into meter, singulation, and disc seed drop.



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

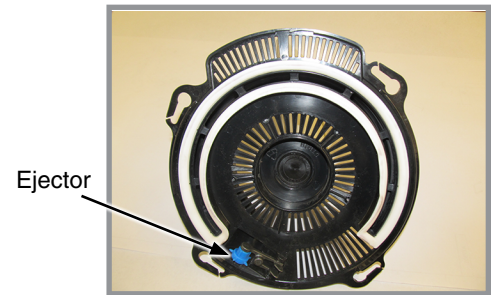
Air inlet screens allow air to enter system and aids in keeping field residue or other foreign material out of meter.

See "[Vacuum Seed Meter Maintenance](#)" on page 6-16 and "[Preparation for Storage](#)" on page 6-37 in Lubrication and Maintenance section for more information.

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

Wheel-Type Ejectors

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

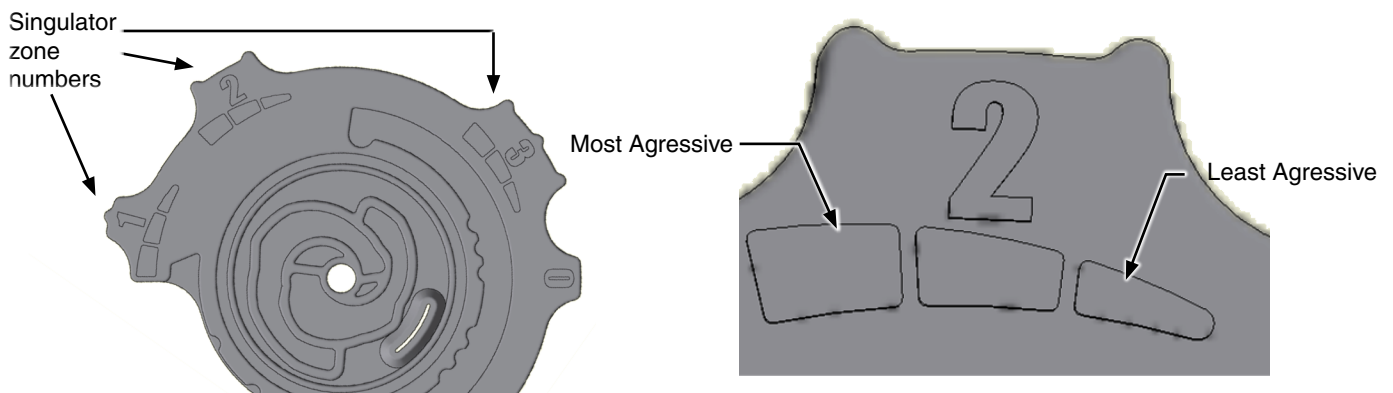


NOTICE

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

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

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



Singulator Adjustment Wheel

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

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

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

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

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

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

RAPSEED PLANTING SECTION

DUE TO POTENTIAL SEED LOSS THROUGH THE AIR DISSIPATOR SCREEN, RAPSEED PLANTING WITH BULK FILL EQUIPPED PLANTERS IS NOT RECOMMENED BY KINZE.

MONITOR SETTINGS

| KPM III | |
|-----------------|------------------|
| Meter Type: | Vacuum |
| Meter Sprocket: | 28 Tooth |
| Crop Type: | Other Small Seed |
| Seeds Per Rev: | 83 |
| Seed Size: | 1 |
| Interplant: | Enable |

See KPM III Electronic Seed Monitor Operator Manual for more details.

NOTE Set sensitivity value to 1 for Ag Leader InCommand and Integra monitors. See Monitor Operator manual for more information.

NOTE: Because of small seed size and high seeding populations, it is possible in certain planting conditions that not all seeds will be detected by the row unit seed sensor. So it is possible KPM III and Ag Leader InCommand or Integra monitors might not show correct seeding accuracy. Monitor planting accuracy alarm may be required to be adjusted to lower accuracy (or muted) due to false accuracy alarms. Frequent field checks are recommended.

VACUUM SETTINGS

Due to rapeseed size and weight variations planting settings may vary. Testing with a Kinze T4000 test stand is recommended to verify vacuum level setting and to achieve best planting accuracy. See your Kinze dealer for testing.

Set desired vacuum to value found during testing (recommended) or use preliminary values provided in chart below.

If testing is unavailable measure 20 - 50 seed samples and find average seed diameter (largest - width/length/height seed dimension).

| Target Speed (km/h) | Target Population | Target Vacuum (inches (cm) of water) | | |
|---------------------|-------------------|---|--|---|
| | | Small Seed Diameter Range: 1.2 - 2.0mm (Average: 1.6mm) | Medium Seed Diameter Range: 1.5-2.5mm (Average: 2.0mm) | Large Seed Diameter Range: 1.6-3.1mm (Average: 2.6mm) |
| 8 | 350000 | 4 (10) | 4 (10) | 6 (15) |
| 8 | 500000 | 4 (10) | 6 (15) | 8 (20) |
| 8 | 650000 | 4 (10) | 8 (20) | 12 (30) |
| 8 | 800000 | 4 (10) | 12 (30) | 16 (40) |
| 10 | 350000 | 4 (10) | 6 (15) | 8 (20) |
| 10 | 500000 | 4 (10) | 8 (20) | 12 (30) |
| 10 | 650000 | 4 (10) | 10 (25) | 14 (35) |
| 10 | 800000 | 6 (15) | 12 (30) | 16 (40) |

ADDITIVES**Rapeseed**

It is essential to use graphite to neutralize electrostatic rapeseed properties.

Mix rapeseed with Kinze graphite thoroughly in a closed container. Keep mixing until all seed becomes evenly coated. Excessive graphite will stay on the bottom of container. It is recommended to prepare an even amount of seed-graphite mix for each hopper separately. This will help to monitor each row performance while planting.

Use approximately 1Tbs (15ml) of graphite per 3-4L of seed.

NOTE: For best performance Kinze brand graphite MUST be used.

**RATE CHARTS**

For Rapeseed Rate Charts, See ["Rate Charts" on page 5-1](#) section of this manual.

SEED METER CLEANOUT

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

Thorough seed meter cleanout is important to maintain genetic purity.

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

ADDITIVES

NOTE: See Rapeseed section for special instructions.

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

CONVENTIONAL HOPPERS

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

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

Apply graphite around outer perimeter of hopper.

BULK FILL HOPPERS

Mix 450 g (1 lbs) bottle of powdered graphite each time the bulk seed hopper is filled. Graphite should be added in layers as the bulk seed hoppers are filled. Regular graphite use prolongs life of the seed meter components, improves seed spacing, and may reduce buildup of seed treatments.

| Lubricant Application Rate | |
|--|------------------------------|
| Graphite | |
| Conventional Hoppers | 15 ml/Hopper Fill |
| Bulk Fill Hoppers | 450 g (1 lbs.) Bottle/Hopper |
| Talc | |
| Conventional Hoppers | 60 ml (¼ Cup)* |
| Bulk Fill Hoppers | 1.8 kg (4 lbs)/Hopper* |
| *Double amount of talc for sunflowers. | |



Adding graphite to conventional hopper



Adding graphite bulk fill hopper

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

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

1. Fill hopper ½ full of seed, add 60 ml (¼ cup) (conventional); 900 g (2 lbs) (Bulk Fill) of talc and **mix thoroughly**.
2. Finish filling hopper, add another 60 ml (¼ cup) (conventional); 900 g (2 lbs) (Bulk Fill) of talc and **mix thoroughly**.
3. Adjust rate of talc use as needed so all seeds are coated, while avoiding a buildup of talc in bottom of hopper.

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

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

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

BAYER FLUENCY AGENT

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

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

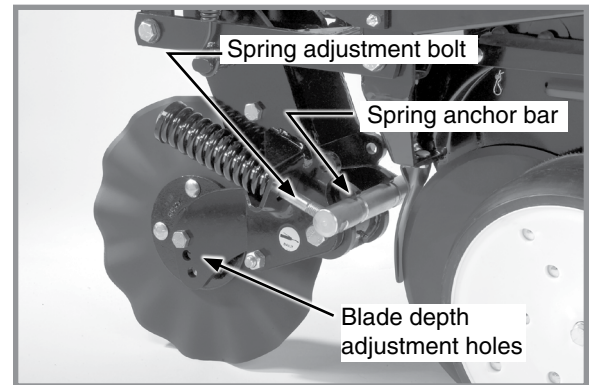
NOTE: Presently, Bayer Fluency Agent is only required to be used in Canada with Bulk Fill or Vacuum planters that plant corn or beans treated with neonicotinoids. Farms outside of Canada, farms not using seed treated with neonicotinoids, and farms not using pneumatic metering devices do not need to use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

FRAME MOUNTED COULTER (PULL ROW ONLY)

Frame mounted coulters with 1" (25 mm) bubbled, 1" (25 mm) fluted (8 flutes) or ¾" (19 mm) fluted (13 flutes) blades are used on pull row units only.

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

Initial coulters blade location is in top hole. Relocate blade to one of lower two holes (25 mm increments) as wear occurs or for deeper blade operation.



Frame mounted coulters adjustment

DOWN PRESSURE ADJUSTMENT

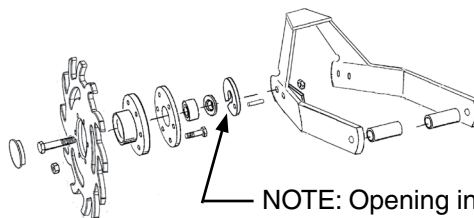
NOTICE

Excessive down pressure can damage coulters components when coulters strike 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 Coulters Spring Downpressure Settings | | |
|---|---------------------------------------|------------------|
| End flush with spring anchor bar | Extended ½" through spring anchor bar | All threads used |
| 125 kg | 181 kg | 227 kg |

RESIDUE WHEELS (FOR FRAME MOUNTED COULTER)



NOTICE

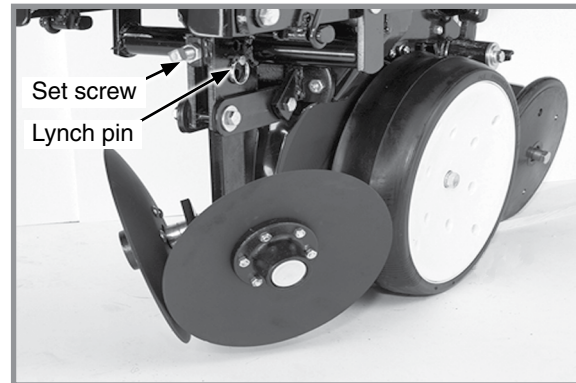
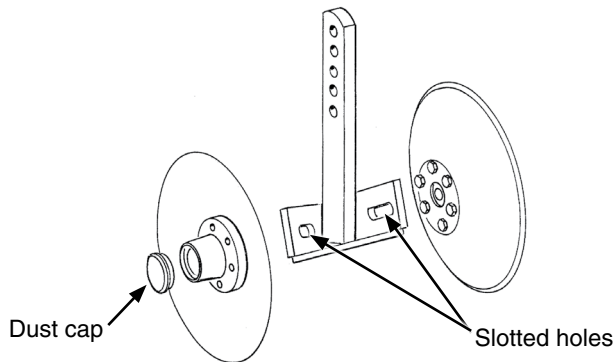
Tined wheel forward mounting positions cannot be used behind 3600 axles due to limited clearance.

Residue wheels attach to frame mounted coulters with two cap screws and sleeves allowing the unit to free-float. A 2-position spindle bolt mounting positions wheels interlocked or staggered. Depth adjustment is made with a spring-loaded cam and pin with 11 positions in 6 mm increments. A high point on the cam allows wheels to be locked up.

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

ROW UNIT MOUNTED DISC FURROWER (PULL ROW ONLY)

Disc furrowers are used to clear crop residue, dirt clods, and dry soil from in front of row units for a clean and smooth seed bed. The disc furrower may be equipped with 12" (305 mm) solid blades or 12" (305 mm) 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

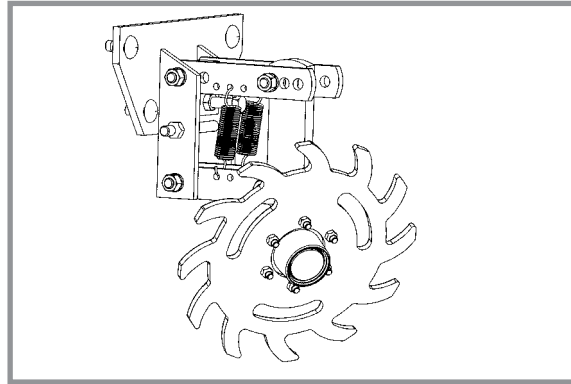
Vertical adjustment can be made in 8 mm increments. Remove lynch pin in vertical support arm and move arm up or down. Reinstall lynch pin. Finer adjustment can be made by removing lynch pin and using $\frac{5}{8}$ " x $2\frac{1}{4}$ " set screw to clamp support arm in position.

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

NOTE: Dust cap must be removed to make adjustments.

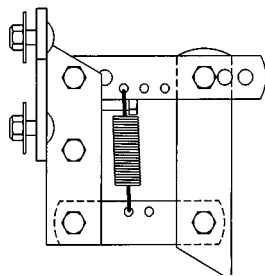
ROW UNIT MOUNTED RESIDUE WHEEL

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

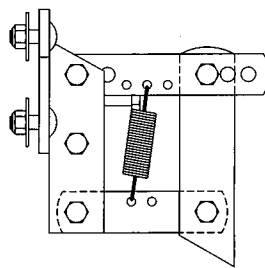


Row Unit Mounted Residue Wheel

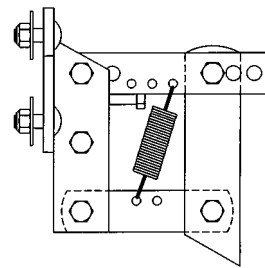
Two adjustable springs on each residue wheel parallel links provide down force adjustment. Position 1 provides minimum down pressure and position 3 maximum down pressure.



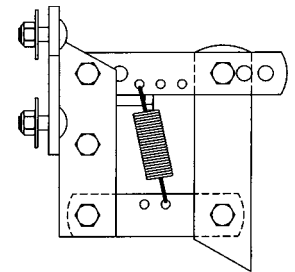
Position 1 (Least)



Position 2

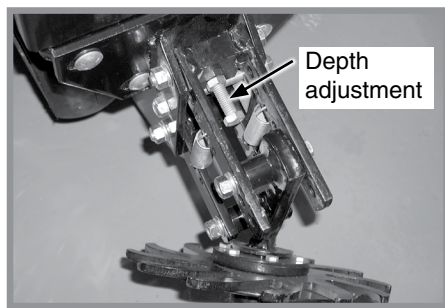


Position 3 (Most)

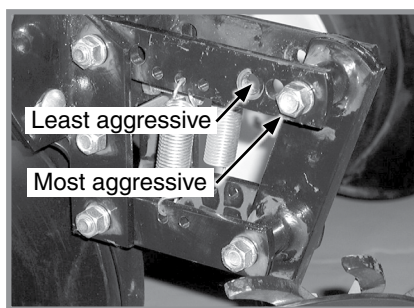


Additional uplift or float

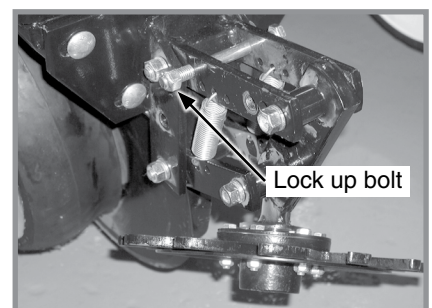
Raise row unit and reposition springs to adjust down pressure.



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 45 mm above row unit double disc opener depth.

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

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

ROW UNIT MOUNTED NO TILL COULTER

Row unit mounted no till coulters with 1" (25 mm) bubbled, 1" (25 mm) fluted (8 flutes) or ¾" (19 mm) fluted (13 flutes) blades may be used on pull row units and push row units (¾" fluted shown). Four quick adjustable down force springs are required per row when using row unit mounted no till coulters. See "Quick Adjustable Down Force Springs Options".

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

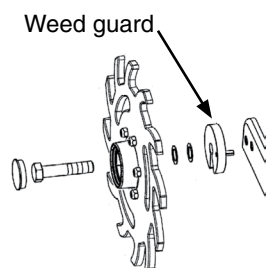
Move blade as it wears to one of the three lower holes to maintain coulters at or slightly below opener discs. Adjust coulters below depth of double disc opener blades in very hard soil conditions such as compacted wheel tracks to improve opener penetration and cutting of surface residue.

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

NOTE: Torque 5/8" spindle hardware to 163 Nm.

COULTER MOUNTED RESIDUE WHEELS

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



NOTE: Opening in weed guard must face down.



Coulters mounted residue wheels

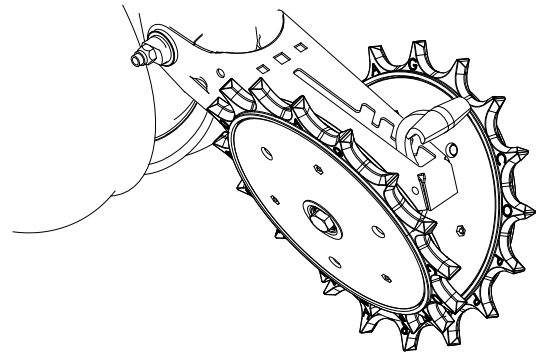
Residue wheels attach to row unit mounted coulters with two cap screws and sleeves allowing unit to free-float. A 2-position spindle bolt mounting positions wheels interlocked or staggered. Depth adjustment is made with a spring-loaded cam and pin with 11 positions in 6 mm increments. A high point on the cam allows wheels to be locked up.

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

SPIKED CLOSING WHEEL

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

Align spiked closing wheels straight across from each other, in most rearward holes on closing wheel arm. Set the wheels 25 - 32 mm apart at the closest point. If large amounts of contouring is being done, mount wheels in the forward most hole. This will reduce drifting of row unit.



Row Unit Spiked Closing Wheel

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 40L capacity.

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

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

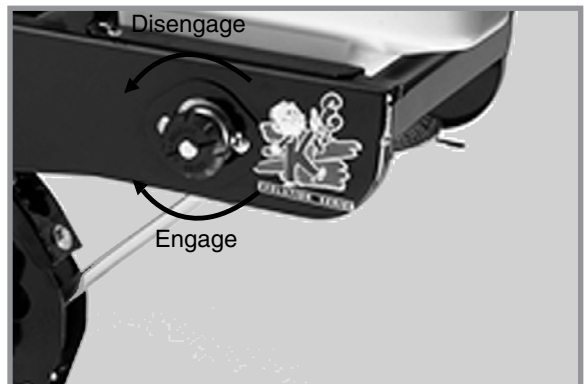


Granular chemical hopper

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

Rotate knob ¼ turn counterclockwise to disengage and ¼ turn clockwise to engage.

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



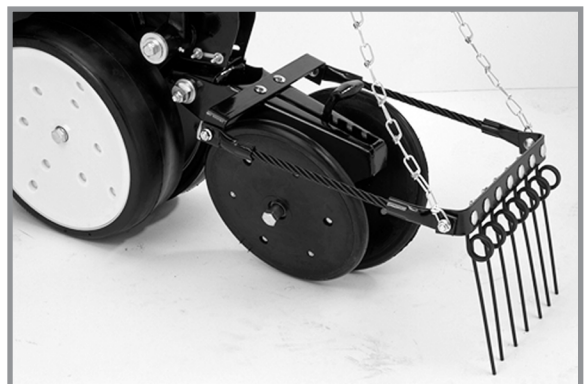
Granular chemical drive release

SPRING TOOTH INCORPORATOR

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

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

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

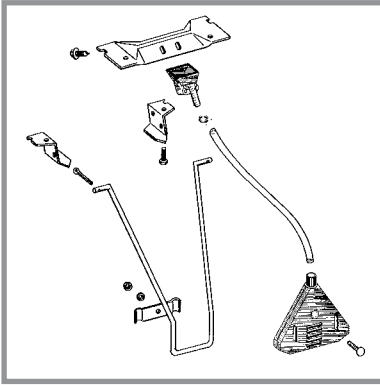


Spring tooth incorporator

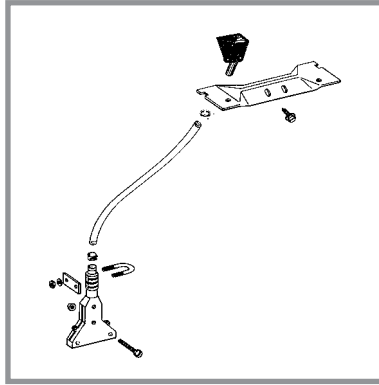
GRANULAR CHEMICAL BANDING OPTIONS

Granular chemical banding options allow 4½" (115 mm) slope-compensating banding, straight drop in-furrow placement or 14" (355 mm) rear banding.

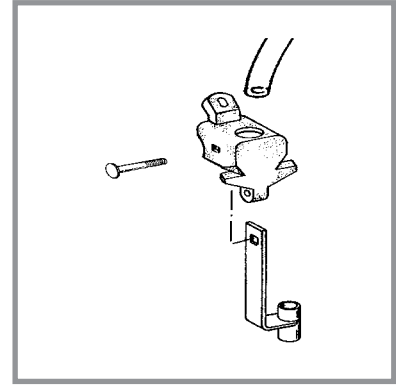
NOTE: Granular chemical rear bander is not compatible with covering discs/single press wheel option.



14" (355 mm) rear banding



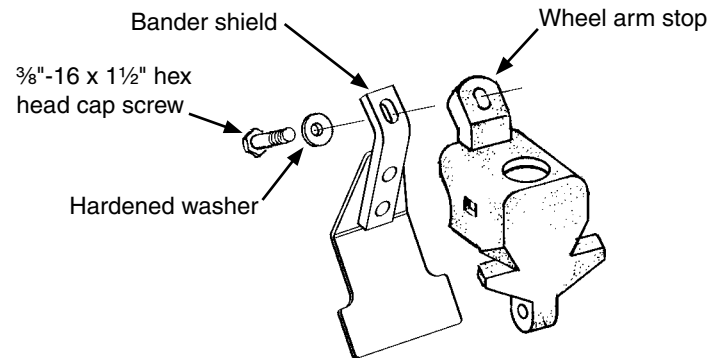
4½" (115 mm) slope-compensating bander



Straight drop in-furrow placement

GRANULAR CHEMICAL BANDER SHIELD

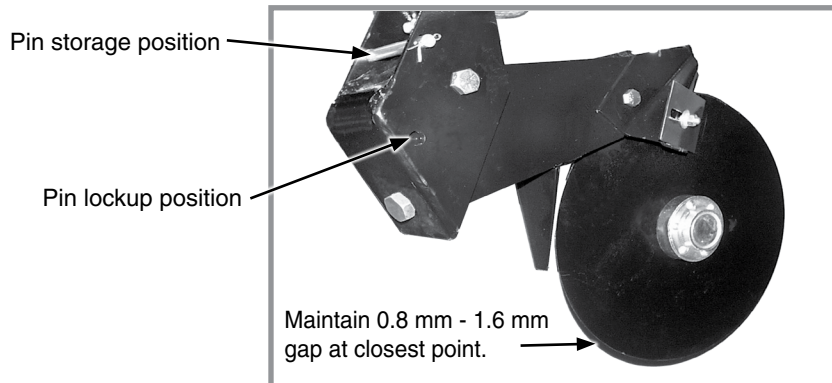
Optional granular chemical bander shield is installed on underside of wheel arm stop to shield crop residue from lodging in granular chemical bander.



Granular chemical bander shield installation

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DOUBLE DISC FERTILIZER OPENER



Double disc fertilizer opener

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

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

Down pressure spring is factory preset at 113 kg but can be adjusted for various soil conditions.

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

NOTICE

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

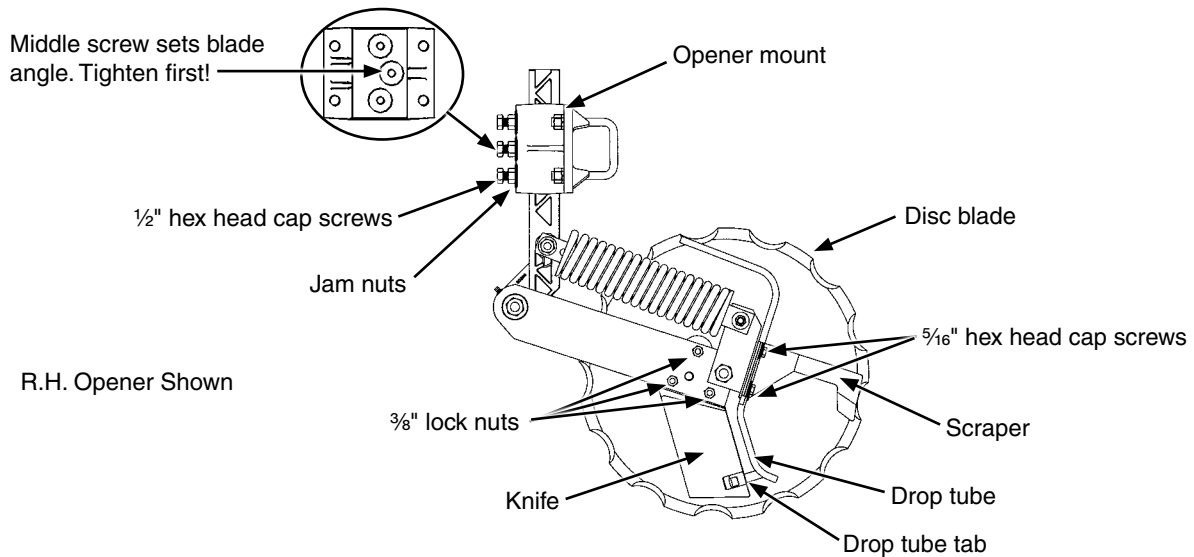
Maintain a gap of 0.8 - 1.6 mm between opener blades at the closest point. Blade adjustment is made by moving inside spacer washers to outer side of blade. Check bearing assembly rivets are not contacting shank after making adjustment.

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

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

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

NOTCHED SINGLE DISC OPENER



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.



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

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

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



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

2. Adjust scraper and drop tube. Loosen two $\frac{5}{16}$ " hex head cap screws. Adjust scraper until just touching disc blade. Adjust drop tube until it is centered between knife and disc blade. Tighten screws. Turn blade and check for slight resistance without freewheeling. Repeat as needed. Insert flat bladed pry bar or screwdriver between knife and drop tube above drop tube tab. Carefully bend tube until 6 - 10 mm from disc blade.

NOTE: Maximum disc blade depth 10 cm.

3. Adjust blade depth. Loosen three $\frac{1}{2}$ " hex head cap screws and jam nuts in opener mount. Adjust opener assembly up or down to desired blade depth. Tighten center hex head cap screw and jam nut first to set proper disc blade angle. Tighten remaining hex head cap screws and jam nuts. Torque hex head cap screws and jam nuts to 77 Nm. Check fertilizer hose clearance and adjust as necessary.

RESIDUE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER

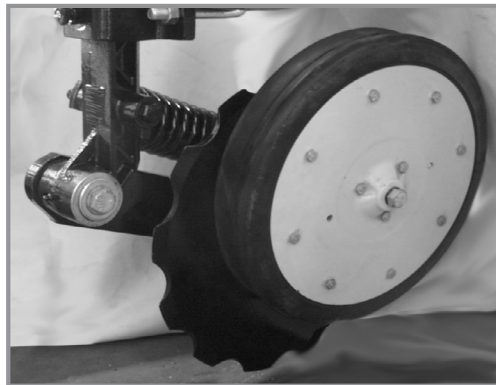


Notched single disc opener residue wheel attachment

Residue wheel attachment for notched single disc fertilizer opener is used where row unit mounted residue wheel attachments cannot be installed. Residue wheel is attached to notched single disc fertilizer opener with $\frac{5}{8}$ " x $7\frac{1}{2}$ " (L=190 mm) and $\frac{1}{2}$ " x $6\frac{1}{2}$ " (L=165 mm) hardware.

Maximum depth is set by lifting residue wheel and moving adjustment lever down to increase depth or up to decrease depth in 25 mm increments (in relation to blade depth setting). Adjust all rows the same. Residue wheel down force is maintained by a torsion spring and is not adjustable.

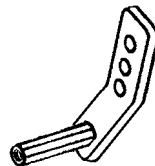
DEPTH/GAUGE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER



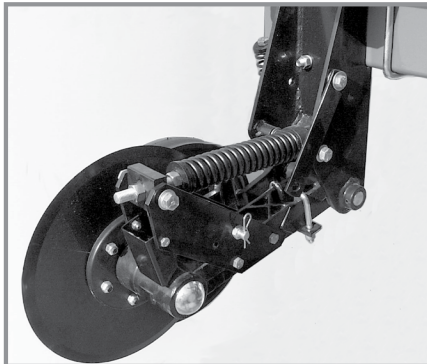
Notched single disc opener depth/gauge wheel

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

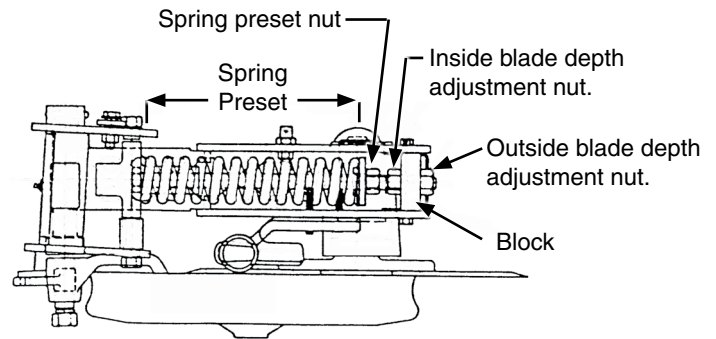
Depth adjustment is made using 3 adjustment holes in depth/gauge wheel mounting block. Moving depth/gauge wheel increases/decreases depth in approximate 25 mm increments in relation to blade depth setting made at vertical mounting post.



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 9 - 10 cm) from row.

| | |
|---------------|--|
| NOTICE | Never place fertilizer closer than 5 cm to row or seeds may be damaged. |
|---------------|--|

Maximum blade depth is approximately 13 cm with planter frame level and at 51 cm operating height. Soil conditions can affect depth slightly.

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

Fertilizer opener down pressure can be adjusted from 113 kg to 290 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 24 cm.

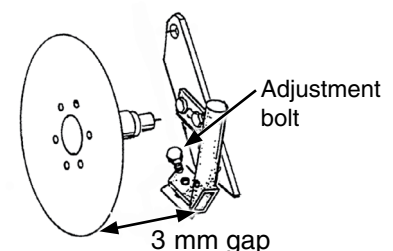
NOTE: Excessive down pressure can cause planter frame up-lift and affect machine performance. Planter frame should be 51 cm from ground in planting position. Excessive down pressure in loose soil conditions can cause openers to run too deep and push dirt ahead of opener and may stop soil press wheel and opener blade from turning.

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

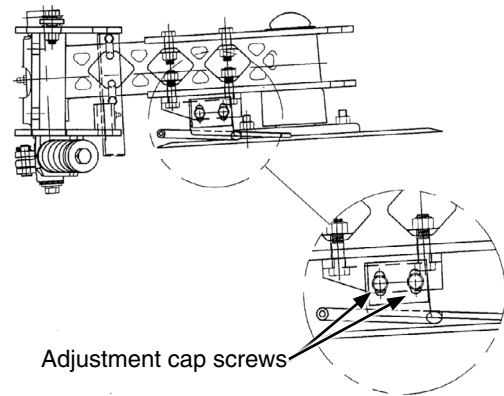
| Spring Preset | |
|------------------|---------------|
| Length | Down Pressure |
| 27.9 cm | 113 kg |
| 27.3 cm | 145 kg |
| 26.7 cm | 168 kg |
| 26.0 cm | 204 kg |
| 25.4 cm | 236 kg |
| 24.8 cm | 263 kg |
| 22.9 cm | 290 kg |
| *Initial setting | |

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

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

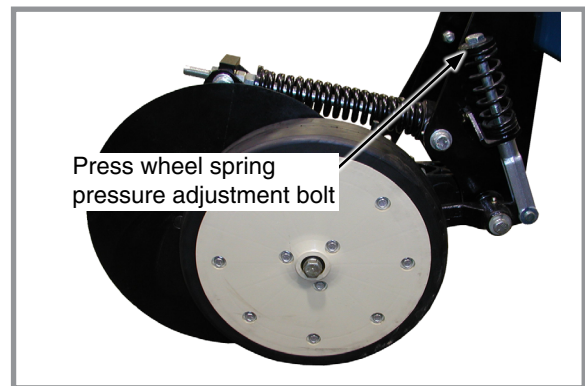


Adjust liquid drop tube/scraper so there is slight contact between blade and scraper lower leading edge, and 6 mm clearance between liquid drop tube trailing edge and blade. Blade should turn with minimum amount of drag.



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.

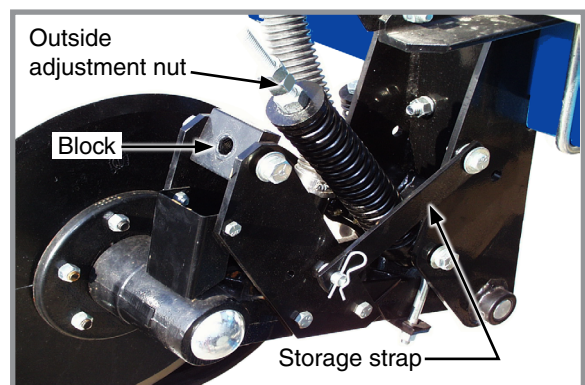


Press wheel down pressure adjustment

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

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

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



HD opener lockup

DRY FERTILIZER ATTACHMENT

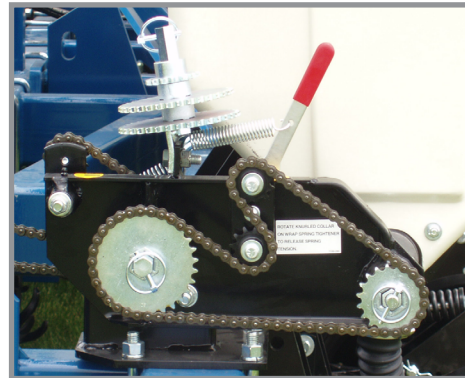


WARNING

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



Dry fertilizer option installed



Fertilizer drive rate transmission

Rate of fertilizer application is determined by drive/driven sprocket combination on fertilizer drive rate transmission and auger position in the hoppers.



Augers positioned for high rate delivery



Augers positioned for low rate delivery

NOTE: Uneven delivery of fertilizer will occur if high rate auger position is used at too low a rate setting.

Remove ¼" stainless steel cap screws holding augers in place on shaft and reposition augers to change delivery rate.

A fertilizer transmission is located directly ahead of row unit transmission on right side of planter and allows simple, rapid changes in sprockets to obtain desired fertilizer application rates. Chain tension is controlled by a spring loaded idler adjusted with a ratchet arm located to inside of transmission. Sprockets can be changed with those on the sprocket storage rod by removing hexagon shaft pins. Fertilizer rate charts in Rate Chart section will help you select correct sprocket combinations.

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

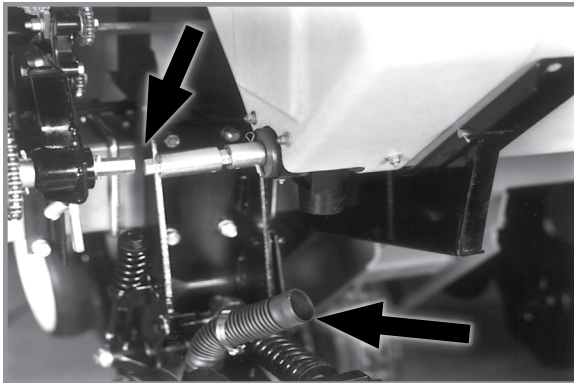
NOTICE

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.

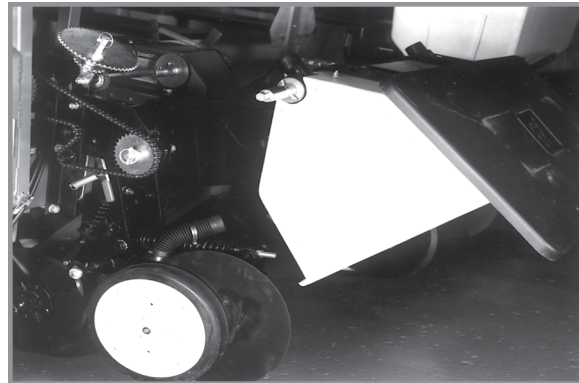
Because dry fertilizer attachment meters granules by volume rather than weight, differences in brands, and fertilizer analysis, weight metered during actual application may vary considerably. Use chart for reference only. Use a container to catch and measure application for a better estimate.

Keep fertilizer dry during use and storage since most fertilizers easily absorb moisture. In addition to waste, deposits of fertilizer left in hopper can cause metal corrosion. Empty hoppers at end of each day.

CLEANING



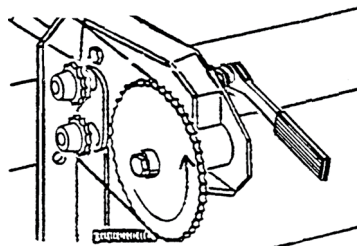
Disconnect drive shaft and hoses



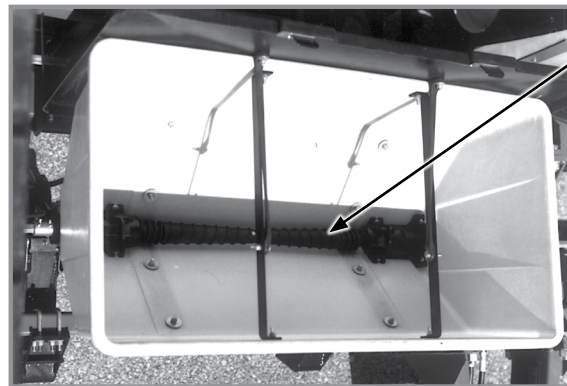
Rotate lid to back and rotate hopper forward

Dry fertilizer hoppers tip forward for dumping and ease of cleaning. Disconnect drive shaft from transmission and/or adjacent hopper. **LOOSEN HOSE CLAMPS AND REMOVE HOSES FROM EACH HOPPER.** Remove rear 1/2" x 1 1/4" cap screw from between each hopper saddle and hopper mount. Rotate each hopper lid to back side of hopper and carefully tip hopper forward. Flush all loose fertilizer from hoppers and hoses after dumping contents.

At end of planting season or when fertilizer attachment is not used for a period of time, hoppers should be disassembled, cleaned, and metal surfaces coated with a rust preventative. Remove 1/4" cotter pin and bearing from one end of shaft. Pull auger assembly from opposite end of hopper. Remove stainless steel cap screws from auger shaft and remove all auger components for cleaning. Coat all parts with rust preventative before reassembly. Reinstall auger halves in low or high rate position.



Transmission direction of rotation



Flighting must move chemicals from center to outside of hopper.

Auger installation

NOTE: Install auger assembly so the flighting moves material to outer openings in hopper when augers rotate in direction they turn during operation.

Slide auger assembly through outlet housing into hopper. Secure in place by reinstalling bearing and cotter pin. Rotating shaft in direction shown to see if flighting (spirals) on auger move toward ends of hopper. If not, remove auger assembly, turn 180°, and reinstall.

NOTE: Frequent lubrication of auger bearings is critical to ensure augers turn freely. Check lubrication section for frequency.

Be certain augers turn freely. If not, loosen 5/16" carriage bolts in outlet housings, rotate auger several times, and retighten carriage bolts. This allows housings and augers to realign.

NOTE: Do not operate fertilizer attachment without auger baffles in place.

Install auger baffles over augers and secure in place with two hair pin clips in each hopper.

GENERAL PLANTING RATE INFORMATION

These planting rate charts apply to Kinze Model 3600 70 cm planters.

NOTE: BULK FILL SYSTEM CANNOT BE USED WITH RAPESEED.

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 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 10 km/h can adversely affect seed spacing.

NOTE: Planting rates over 672,500 seeds/hectare are not recommended.

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

| |
|------------|
| MECHANICAL |
|------------|

Finger Pickup Corn Meter

Larger grades generally plant more accurately at the high end of 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 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 hectare as well as seed spacing in centimeters rounded to nearest tenth of a cm. Because of large range in seed size, pounds per hectare is not a suggested method of selecting transmission settings. Smaller size seed pounds per hectare may be below what was expected and large seed pounds per hectare may appear above expectations. To determine pounds per hectare, use formula given in "Determining Pounds Per Hectare (Brush-Type Seed Meter)" in "Check Seed Population" in Machine Operation section of this manual.

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

NOTE: Seed population per hectare with 35 cm rows double rate for 70 cm rows, at listed sprocket combination. See following pages.

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

**EXAMPLE: 70 cm row spacing using 60 cell seed discs in brush-type seed meters.
 $80,928 \div 2 = 40,464$ Population (6.5 cm Seed Spacing x 2 = 13 cm Seed Spacing)**

| |
|--------|
| VACUUM |
|--------|

NOTE: 22, 28, and 44 tooth drive sprockets are NOT applicable to all rate charts. Check chart titles to ensure proper rate chart is selected. 22 tooth sprocket requires 114 pitch No. 40 chain. 28 tooth sprocket requires 118 pitch No. 40 chain. 44 tooth sprocket requires 126 pitch No. 40 chain.

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

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

| Transmission Sprockets Drive Driven | | 70 CM Rows | Recomm. Speed Range (km/h) | Average Seed Spacing In Centimeters |
|--|----|------------|-------------------------------|--|
| 17 | 28 | 43539 | 6 to 10 | 32.7 |
| 17 | 27 | 45150 | 6 to 10 | 31.7 |
| 17 | 26 | 46888 | 6 to 10 | 30.4 |
| 19 | 28 | 48661 | 6 to 10 | 29.4 |
| 17 | 25 | 48763 | 6 to 10 | 29.2 |
| 19 | 27 | 50463 | 6 to 10 | 28.1 |
| 17 | 24 | 50794 | 6 to 10 | 28.1 |
| 19 | 26 | 52402 | 6 to 10 | 27.1 |
| 17 | 23 | 53002 | 6 to 10 | 26.9 |
| 19 | 25 | 54500 | 6 to 10 | 26.1 |
| 19 | 24 | 56768 | 6 to 10 | 25.1 |
| 23 | 28 | 58904 | 6 to 10 | 24.1 |
| 19 | 23 | 59237 | 6 to 10 | 24.1 |
| 23 | 27 | 61085 | 6 to 10 | 23.3 |
| 24 | 28 | 61465 | 6 to 10 | 23.3 |
| 23 | 26 | 63436 | 6 to 10 | 22.6 |
| 24 | 27 | 63743 | 6 to 10 | 22.3 |
| 25 | 28 | 64025 | 6 to 10 | 22.3 |
| 17 | 19 | 64163 | 6 to 10 | 22.3 |
| 23 | 25 | 65973 | 6 to 10 | 21.5 |
| 24 | 26 | 66194 | 6 to 10 | 21.5 |
| 25 | 27 | 66398 | 6 to 10 | 21.5 |
| 26 | 28 | 66589 | 6 to 10 | 21.3 |
| 23 | 24 | 68722 | 6 to 10 | 20.8 |
| 24 | 25 | 68840 | 6 to 10 | 20.8 |
| 25 | 26 | 68951 | 6 to 10 | 20.8 |
| 26 | 27 | 69053 | 6 to 10 | 20.5 |
| 27 | 28 | 69150 | 6 to 10 | 20.5 |
| 23 | 23 | 71711 | 6 to 10 | 19.8 |
| 28 | 27 | 74365 | 6 to 10 | 19.3 |
| 27 | 26 | 74468 | 6 to 10 | 19.3 |
| 25 | 24 | 74699 | 6 to 10 | 19.0 |
| 24 | 23 | 74828 | 6 to 10 | 19.0 |
| 28 | 26 | 77225 | 6 to 10 | 18.5 |
| 27 | 25 | 77445 | 6 to 10 | 18.5 |
| 25 | 23 | 77946 | 6 to 10 | 18.2 |
| 19 | 17 | 80146 | 6 to 10 | 17.7 |
| 28 | 25 | 80316 | 6 to 10 | 17.7 |
| 27 | 24 | 80673 | 6 to 10 | 17.7 |
| 26 | 23 | 81063 | 6 to 10 | 17.7 |
| 28 | 24 | 83662 | 5 to 10 | 17.0 |
| 27 | 23 | 84181 | 5 to 10 | 17.0 |
| 23 | 19 | 86806 | 3 to 9 | 16.5 |
| 28 | 23 | 87299 | 3 to 9 | 16.5 |
| 24 | 19 | 90580 | 3 to 9 | 15.7 |
| 25 | 19 | 94354 | 5 to 10 | 15.2 |
| 23 | 17 | 97020 | 5 to 12 | 14.7 |
| 26 | 19 | 98128 | 5 to 12 | 14.4 |
| 24 | 17 | 101238 | 5 to 8 | 14.2 |
| 27 | 19 | 101902 | 5 to 8 | 13.9 |
| 25 | 17 | 105456 | 5 to 7 | 13.4 |
| 28 | 19 | 105679 | 5 to 7 | 13.4 |
| 26 | 17 | 109673 | 5 to 7 | 12.9 |
| 27 | 17 | 113891 | 5 to 7 | 12.4 |
| 28 | 17 | 118109 | 5 to 7 | 12.1 |

NOTE: See “Mechanical Meter 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/HECTARE FOR 35 CM/70 CM ROW WIDTHS

| Transmission Sprockets | | 60 Cell Specialty Soybean Or High-Rate Milo/Grain Sorghum | | Average Seed Spacing In Centimeters | 48 Cell Specialty Soybean Or High-Rate Acid-Delinted Cotton | | Average Seed Spacing In Centimeters | Speed Range (km/h) |
|------------------------|--------|---|------------|-------------------------------------|---|------------|-------------------------------------|--------------------|
| Drive | Driven | 35 CM Rows | 70 CM Rows | | 35 CM Rows | 70 CM Rows | | |
| 17 | 28 | 435379 | 217690 | 6.6 | 348301 | 174151 | 8.1 | 3 to 13 |
| 17 | 27 | 451508 | 225754 | 6.3 | 361208 | 180604 | 7.8 | 3 to 13 |
| 17 | 26 | 468874 | 234437 | 6.0 | 375098 | 187549 | 7.6 | 3 to 13 |
| 19 | 28 | 486601 | 243300 | 5.8 | 389280 | 194640 | 7.3 | 3 to 13 |
| 19 | 27 | 504623 | 252312 | 5.5 | 403698 | 201849 | 7.1 | 3 to 13 |
| 17 | 24 | 507943 | 253971 | 5.5 | 406355 | 203178 | 7.1 | 3 to 13 |
| 17 | 23 | 530027 | 265013 | 5.3 | 424023 | 212011 | 6.8 | 3 to 13 |
| 19 | 25 | 544994 | 272497 | 5.3 | 435993 | 217996 | 2.6 | 3 to 13 |
| 19 | 24 | 567702 | 283851 | 2.0 | 454160 | 227080 | 6.6 | 3 to 13 |
| 23 | 28 | 589044 | 294522 | 4.8 | 471236 | 235618 | 6.0 | 3 to 13 |
| 19 | 23 | 592385 | 296192 | 4.8 | 473910 | 236955 | 6.0 | 3 to 13 |
| 24 | 28 | 614657 | 307329 | 4.5 | 491728 | 245864 | 5.8 | 3 to 13 |
| 24 | 27 | 637419 | 318710 | 4.5 | 509933 | 254967 | 5.5 | 3 to 13 |
| 17 | 19 | 641616 | 320808 | 4.5 | 513290 | 256645 | 5.5 | 3 to 13 |
| 24 | 26 | 661935 | 330968 | 4.3 | 529548 | 264774 | 5.3 | 3 to 13 |
| 26 | 28 | 665879 | 332939 | 4.3 | 532701 | 266350 | 5.3 | 3 to 13 |
| 24 | 25 | 688415 | 344207 | 4.0 | 550734 | 275367 | 5.0 | 3 to 13 |
| 26 | 27 | 690540 | 490525 | 4.0 | 552434 | 276217 | 5.0 | 3 to 13 |
| 23 | 23 | 717100 | 358550 | 4.0 | 573679 | 286839 | 5.0 | 3 to 13 |
| 27 | 26 | 744677 | 372339 | 3.8 | 595742 | 297871 | 4.8 | 3 to 13 |
| 24 | 23 | 748276 | 374138 | 3.8 | 598620 | 299310 | 4.8 | 3 to 13 |
| 25 | 23 | 779452 | 389726 | 3.5 | 623561 | 311780 | 4.5 | 3 to 13 |
| 19 | 17 | 801461 | 400731 | 3.5 | 641169 | 320584 | 4.5 | 3 to 13 |
| 27 | 24 | 806733 | 403367 | 3.5 | 645387 | 322693 | 4.3 | 3 to 13 |
| 28 | 24 | 836613 | 418307 | 3.3 | 669289 | 334645 | 4.3 | 3 to 13 |
| 23 | 19 | 868064 | 434032 | 3.3 | 694451 | 347225 | 4.0 | 3 to 13 |
| 28 | 23 | 872986 | 436493 | 3.3 | 698389 | 349194 | 4.0 | 3 to 13 |
| 24 | 19 | 905809 | 452904 | 3.0 | 724643 | 362321 | 4.0 | 3 to 13 |
| 25 | 19 | 943548 | 471774 | 3.0 | 754840 | 377420 | 3.8 | 3 to 13 |
| 23 | 17 | 970189 | 485095 | 3.0 | 776149 | 388075 | 3.8 | 3 to 13 |
| 26 | 19 | 981293 | 490647 | 2.7 | 785037 | 392518 | 3.5 | 3 to 11 |
| 27 | 19 | 1019033 | 509516 | 2.7 | 815228 | 407614 | 3.5 | 3 to 11 |
| 28 | 19 | 1056778 | 528389 | 2.7 | 845420 | 422710 | 3.3 | 3 to 11 |
| 26 | 17 | 1096739 | 548369 | 2.5 | 877392 | 438696 | 3.3 | 3 to 11 |
| 27 | 17 | 1138922 | 569461 | 2.2 | 911140 | 455570 | 3.0 | 3 to 11 |
| 28 | 17 | 1181100 | 590550 | 2.2 | 944882 | 472441 | 3.0 | 3 to 11 |

NOTE: See “Mechanical Meter General Planting Rate Information” and “Check Seed Population” pages for additional information.

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

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

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

| Transmission Sprockets | | 36 Cell Acid-Delinted Large Cotton | Average Seed Spacing In Centimeters | 30 Cell Milo/Grain Sorghum Or Acid-Delinted Cotton | Average Seed Spacing In Centimeters | Speed Range (km/h) |
|------------------------|--------|---------------------------------------|-------------------------------------|---|-------------------------------------|--------------------|
| Drive | Driven | | | | | |
| 17 | 28 | 130614 | 10.9 | 108845 | 13.2 | 3 to 13 |
| 17 | 27 | 135454 | 10.6 | 112877 | 12.7 | 3 to 13 |
| 17 | 26 | 140661 | 10.1 | 117219 | 12.1 | 3 to 13 |
| 19 | 28 | 145979 | 9.9 | 121652 | 11.6 | 3 to 13 |
| 19 | 27 | 151386 | 9.3 | 126157 | 11.4 | 3 to 13 |
| 17 | 24 | 152384 | 9.3 | 126986 | 11.1 | 3 to 13 |
| 17 | 23 | 159009 | 8.8 | 132508 | 10.6 | 3 to 13 |
| 19 | 25 | 163499 | 8.8 | 136250 | 10.4 | 3 to 13 |
| 19 | 24 | 170310 | 8.3 | 141925 | 10.1 | 3 to 13 |
| 23 | 28 | 176714 | 8.1 | 147262 | 1.5 | 3 to 13 |
| 19 | 23 | 177715 | 8.1 | 148096 | 1.5 | 3 to 13 |
| 24 | 28 | 184397 | 7.6 | 153664 | 9.3 | 3 to 13 |
| 24 | 27 | 191226 | 7.3 | 159356 | 8.8 | 3 to 13 |
| 17 | 19 | 192485 | 7.3 | 160403 | 8.8 | 3 to 13 |
| 24 | 26 | 198581 | 7.1 | 165484 | 8.6 | 3 to 13 |
| 26 | 28 | 199764 | 7.1 | 166468 | 8.6 | 3 to 13 |
| 24 | 25 | 206510 | 6.8 | 172104 | 8.3 | 3 to 13 |
| 26 | 27 | 207161 | 6.8 | 172634 | 8.3 | 3 to 13 |
| 23 | 23 | 215129 | 6.6 | 179275 | 7.8 | 3 to 13 |
| 27 | 26 | 223403 | 6.3 | 186169 | 7.6 | 3 to 13 |
| 24 | 23 | 224482 | 6.3 | 187068 | 7.6 | 3 to 13 |
| 25 | 23 | 233835 | 6.0 | 194863 | 7.3 | 3 to 13 |
| 19 | 17 | 240438 | 5.8 | 200367 | 7.1 | 3 to 13 |
| 27 | 24 | 242020 | 5.8 | 201685 | 7.1 | 3 to 13 |
| 28 | 24 | 250983 | 5.5 | 209155 | 6.8 | 3 to 13 |
| 23 | 19 | 260419 | 5.5 | 217017 | 6.6 | 3 to 13 |
| 28 | 23 | 261896 | 5.3 | 218247 | 6.6 | 3 to 13 |
| 24 | 19 | 271744 | 5.3 | 226451 | 6.3 | 3 to 13 |
| 25 | 19 | 283066 | 5.0 | 235887 | 6.0 | 3 to 13 |
| 23 | 17 | 291138 | 4.8 | 242547 | 5.8 | 3 to 13 |
| 26 | 19 | 294387 | 4.8 | 245323 | 5.8 | 3 to 11 |
| 27 | 19 | 305709 | 4.5 | 254759 | 5.5 | 3 to 11 |
| 28 | 19 | 317034 | 4.5 | 264193 | 5.3 | 3 to 11 |
| 26 | 17 | 329023 | 4.3 | 274183 | 5.3 | 3 to 11 |
| 27 | 17 | 341676 | 4.0 | 284731 | 5.0 | 3 to 11 |
| 28 | 17 | 354330 | 4.0 | 295275 | 4.8 | 3 to 11 |

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

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

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

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

Due to variations in cotton seed size, meters equipped with 12 cell acid-delinted hill-drop cotton discs 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 centimeters on the chart. To decrease population increase spacing. To increase population decrease spacing.

To determine population per hectare, determine average seeds per hill and hills per hectare by doing a field check. Measure $\frac{1}{1000}$ of an hectare (1/1000 hectare = Length of row 14.3 m for 70 cm row widths). Multiply average seeds per hill by hills per hectare. **EXAMPLE:** 4 seeds per hill x (43 hills x 1000) = 172,000

| Transmission Sprockets | | NUMBER OF HILLS PER HECTARE 12 Cell Hill-Drop Cotton, Acid-Delinted | Average Hill Spacing In Centimeters | Speed Range (km/h) |
|------------------------|--------|--|-------------------------------------|--------------------|
| Drive | Driven | | | |
| | | 70cm Rows | | |
| 17 | 28 | 43539 | 32.7 | 3 to 13 |
| 17 | 27 | 45150 | 31.7 | 3 to 13 |
| 17 | 26 | 46888 | 30.4 | 3 to 13 |
| 19 | 28 | 48661 | 29.4 | 3 to 13 |
| 19 | 27 | 50463 | 28.1 | 3 to 13 |
| 17 | 24 | 50794 | 28.1 | 3 to 13 |
| 17 | 23 | 53002 | 26.9 | 3 to 13 |
| 19 | 25 | 54500 | 26.1 | 3 to 13 |
| 19 | 24 | 56771 | 25.1 | 3 to 13 |
| 23 | 28 | 58904 | 24.1 | 3 to 13 |
| 19 | 23 | 59237 | 24.1 | 3 to 13 |
| 24 | 28 | 61465 | 23.3 | 3 to 13 |
| 24 | 27 | 63743 | 22.3 | 3 to 13 |
| 17 | 19 | 64163 | 22.3 | 3 to 13 |
| 24 | 26 | 66194 | 21.5 | 3 to 13 |
| 26 | 28 | 66589 | 21.3 | 3 to 13 |
| 24 | 25 | 68840 | 20.8 | 3 to 13 |
| 26 | 27 | 69053 | 20.5 | 3 to 13 |
| 23 | 23 | 71711 | 19.8 | 3 to 13 |
| 27 | 26 | 74468 | 19.3 | 3 to 13 |
| 24 | 23 | 74828 | 19.0 | 3 to 13 |
| 25 | 23 | 77946 | 18.2 | 3 to 13 |
| 19 | 17 | 80146 | 17.7 | 3 to 13 |
| 27 | 24 | 80673 | 17.7 | 3 to 13 |
| 28 | 24 | 83662 | 17.0 | 3 to 13 |
| 23 | 19 | 86806 | 16.5 | 3 to 13 |
| 28 | 23 | 87299 | 16.5 | 3 to 13 |
| 24 | 19 | 90580 | 15.7 | 3 to 13 |
| 25 | 19 | 94354 | 15.2 | 3 to 13 |
| 23 | 17 | 97020 | 14.7 | 3 to 13 |
| 26 | 19 | 98128 | 14.4 | 3 to 11 |
| 27 | 19 | 101902 | 13.9 | 3 to 11 |
| 28 | 19 | 105679 | 13.4 | 3 to 11 |
| 26 | 17 | 109673 | 12.9 | 3 to 11 |
| 27 | 17 | 113891 | 12.4 | 3 to 11 |
| 28 | 17 | 118109 | 12.1 | 3 to 11 |

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

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

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

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

| 70cm | Transmission Sprockets | | Recomm. Speed (km/h) | Average Spacing (cm) |
|--------|------------------------|--------|-------------------------|-------------------------|
| | Drive | Driven | | |
| 63720 | 15 | 28 | 6 to 10 | 22.4 |
| 66080 | 15 | 27 | 6 to 10 | 21.6 |
| 68621 | 15 | 26 | 6 to 10 | 20.8 |
| 71367 | 15 | 25 | 6 to 10 | 20.0 |
| 72217 | 17 | 28 | 6 to 10 | 19.8 |
| 74339 | 15 | 24 | 6 to 10 | 19.2 |
| 74892 | 17 | 27 | 6 to 10 | 19.1 |
| 77573 | 15 | 23 | 6 to 10 | 18.4 |
| 77771 | 17 | 26 | 6 to 10 | 18.4 |
| 80712 | 19 | 28 | 6 to 10 | 17.7 |
| 80881 | 17 | 25 | 6 to 10 | 17.7 |
| 83701 | 19 | 27 | 6 to 10 | 17.1 |
| 84252 | 17 | 24 | 6 to 10 | 17.0 |
| 86920 | 19 | 26 | 6 to 10 | 16.4 |
| 87915 | 17 | 23 | 6 to 10 | 16.2 |
| 90397 | 19 | 25 | 6 to 10 | 15.8 |
| 93903 | 15 | 19 | 6 to 10 | 15.2 |
| 94165 | 19 | 24 | 6 to 10 | 15.2 |
| 97705 | 23 | 28 | 6 to 10 | 14.6 |
| 98258 | 19 | 23 | 6 to 10 | 14.5 |
| 101323 | 23 | 27 | 6 to 10 | 14.1 |
| 101951 | 24 | 28 | 6 to 10 | 14.0 |
| 104951 | 15 | 17 | 6 to 10 | 13.6 |
| 105727 | 24 | 27 | 6 to 10 | 13.5 |
| 106423 | 17 | 19 | 6 to 10 | 13.4 |
| 109428 | 23 | 25 | 6 to 10 | 13.1 |
| 110449 | 26 | 28 | 6 to 10 | 12.9 |
| 113989 | 23 | 24 | 6 to 10 | 12.5 |
| 114186 | 24 | 25 | 6 to 10 | 12.5 |
| 114695 | 27 | 28 | 6 to 10 | 12.5 |
| 118944 | 23 | 23 | 6 to 10 | 12.0 |
| 123349 | 28 | 27 | 6 to 10 | 11.6 |
| 123520 | 27 | 26 | 6 to 10 | 11.6 |
| 124116 | 24 | 23 | 6 to 10 | 11.5 |
| 128094 | 28 | 26 | 6 to 10 | 11.2 |
| 128460 | 27 | 25 | 6 to 10 | 11.1 |
| 129288 | 25 | 23 | 6 to 10 | 11.0 |
| 132939 | 19 | 17 | 6 to 10 | 10.7 |
| 133812 | 27 | 24 | 6 to 10 | 10.7 |
| 134458 | 26 | 23 | 6 to 10 | 10.6 |
| 138767 | 28 | 24 | 6 to 10 | 10.3 |
| 139630 | 27 | 23 | 6 to 10 | 10.2 |
| 143985 | 23 | 19 | 6 to 10 | 9.9 |
| 144802 | 28 | 23 | 6 to 10 | 9.9 |
| 150245 | 24 | 19 | 6 to 10 | 9.5 |
| 156506 | 25 | 19 | 6 to 10 | 9.1 |
| 160924 | 23 | 17 | 6 to 10 | 8.9 |
| 162766 | 26 | 19 | 6 to 10 | 8.8 |
| 167921 | 24 | 17 | 6 to 10 | 8.5 |
| 169026 | 27 | 19 | 6 to 10 | 8.5 |
| 174918 | 25 | 17 | 6 to 10 | 8.2 |
| 175287 | 28 | 19 | 6 to 10 | 8.1 |
| 181916 | 26 | 17 | 6 to 10 | 7.9 |
| 182382 | 23 | 15 | 6 to 10 | 7.8 |
| 188911 | 27 | 17 | 6 to 10 | 7.6 |

NOTE: See "General Planting Rate Information" and "Checking Seed Population" (located in operator's manual) pages for additional information. Always check seed population in the field to ensure planting rates are correct.

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

| 70cm | Transmission Sprockets | | Recomm. Speed (km/h) | Average Spacing (cm) |
|--------|------------------------|--------|-------------------------|-------------------------|
| | Drive | Driven | | |
| 81098 | 15 | 28 | 6 to 10 | 17.6 |
| 84102 | 15 | 27 | 6 to 10 | 17.0 |
| 87335 | 15 | 26 | 6 to 10 | 16.4 |
| 90831 | 15 | 25 | 6 to 10 | 15.7 |
| 91912 | 17 | 28 | 6 to 10 | 15.5 |
| 94613 | 15 | 24 | 6 to 10 | 15.1 |
| 95317 | 17 | 27 | 6 to 10 | 15.0 |
| 98730 | 15 | 23 | 6 to 10 | 14.5 |
| 98981 | 17 | 26 | 6 to 10 | 14.4 |
| 102725 | 19 | 28 | 6 to 10 | 13.9 |
| 102940 | 17 | 25 | 6 to 10 | 13.9 |
| 106529 | 19 | 27 | 6 to 10 | 13.4 |
| 107230 | 17 | 24 | 6 to 10 | 13.3 |
| 110626 | 19 | 26 | 6 to 10 | 12.9 |
| 111892 | 17 | 23 | 6 to 10 | 12.8 |
| 115051 | 19 | 25 | 6 to 10 | 12.4 |
| 119512 | 15 | 19 | 6 to 10 | 12.0 |
| 119846 | 19 | 24 | 6 to 10 | 11.9 |
| 124351 | 23 | 28 | 6 to 10 | 11.5 |
| 125055 | 19 | 23 | 6 to 10 | 11.4 |
| 128956 | 23 | 27 | 6 to 10 | 11.1 |
| 129756 | 24 | 28 | 6 to 10 | 11.0 |
| 133574 | 15 | 17 | 6 to 10 | 10.7 |
| 134562 | 24 | 27 | 6 to 10 | 10.6 |
| 135448 | 17 | 19 | 6 to 10 | 10.5 |
| 139272 | 23 | 25 | 6 to 10 | 10.3 |
| 140571 | 26 | 28 | 6 to 10 | 10.2 |
| 145076 | 23 | 24 | 6 to 10 | 9.8 |
| 145327 | 24 | 25 | 6 to 10 | 9.8 |
| 145976 | 27 | 28 | 6 to 10 | 9.8 |
| 151383 | 23 | 23 | 6 to 10 | 9.4 |
| 156989 | 28 | 27 | 6 to 10 | 9.1 |
| 157207 | 27 | 26 | 6 to 10 | 9.1 |
| 157966 | 24 | 23 | 6 to 10 | 9.0 |
| 163028 | 28 | 26 | 6 to 10 | 8.8 |
| 163495 | 27 | 25 | 6 to 10 | 8.7 |
| 164549 | 25 | 23 | 6 to 10 | 8.7 |
| 169194 | 19 | 17 | 6 to 10 | 8.4 |
| 170306 | 27 | 24 | 6 to 10 | 8.4 |
| 171128 | 26 | 23 | 6 to 10 | 8.3 |
| 176613 | 28 | 24 | 6 to 10 | 8.1 |
| 177711 | 27 | 23 | 6 to 10 | 8.0 |
| 183254 | 23 | 19 | 6 to 10 | 7.8 |
| 184294 | 28 | 23 | 6 to 10 | 7.8 |
| 191221 | 24 | 19 | 6 to 10 | 7.5 |
| 199189 | 25 | 19 | 6 to 10 | 7.2 |
| 204812 | 23 | 17 | 6 to 10 | 7.0 |
| 207157 | 26 | 19 | 6 to 10 | 6.9 |
| 213717 | 24 | 17 | 6 to 10 | 6.7 |
| 215125 | 27 | 19 | 6 to 10 | 6.6 |
| 222623 | 25 | 17 | 6 to 10 | 6.4 |
| 223092 | 28 | 19 | 6 to 10 | 6.4 |
| 231529 | 26 | 17 | 6 to 10 | 6.2 |
| 232122 | 23 | 15 | 6 to 10 | 6.2 |
| 240432 | 27 | 17 | 6 to 10 | 5.9 |

NOTE: See "General Planting Rate Information" and "Checking Seed Population" (located in operator's manual) pages for additional information. Always check seed population in the field to ensure planting rates are correct.

**PLANTING RATES FOR (VACUUM) MILO/SUGARBEET/SPECIALTY 60 CELL DISCS
22 TOOTH CONTACT WHEEL DRIVE SPROCKET
APPROXIMATE SEEDS/HECTARE FOR VARIOUS ROW WIDTHS**

| 35cm | 70cm | Transmission Sprockets | | Recomm. Speed (km/h) | Average Spacing (cm) |
|--------|--------|------------------------|--------|----------------------|----------------------|
| | | Drive | Driven | | |
| 191160 | 95580 | 15 | 28 | 6 to 10 | 14.9 |
| 198240 | 99120 | 15 | 27 | 6 to 10 | 14.4 |
| 205865 | 102932 | 15 | 26 | 6 to 10 | 13.9 |
| 214099 | 107050 | 15 | 25 | 6 to 10 | 13.3 |
| 216648 | 108324 | 17 | 28 | 6 to 10 | 13.2 |
| 223020 | 111510 | 15 | 24 | 6 to 10 | 12.8 |
| 224672 | 112336 | 17 | 27 | 6 to 10 | 12.7 |
| 232717 | 116358 | 15 | 23 | 6 to 10 | 12.3 |
| 233314 | 116657 | 17 | 26 | 6 to 10 | 12.2 |
| 242136 | 121068 | 19 | 28 | 6 to 10 | 11.8 |
| 242646 | 121323 | 17 | 25 | 6 to 10 | 11.8 |
| 251104 | 125552 | 19 | 27 | 6 to 10 | 11.4 |
| 252756 | 126378 | 17 | 24 | 6 to 10 | 11.3 |
| 260762 | 130381 | 19 | 26 | 6 to 10 | 11.0 |
| 263746 | 131873 | 17 | 23 | 6 to 10 | 10.8 |
| 271193 | 135596 | 19 | 25 | 6 to 10 | 10.5 |
| 281710 | 140855 | 15 | 19 | 6 to 10 | 10.1 |
| 282492 | 141246 | 19 | 24 | 6 to 10 | 10.1 |
| 293112 | 146556 | 23 | 28 | 6 to 10 | 9.7 |
| 294775 | 147387 | 19 | 23 | 6 to 10 | 9.7 |
| 303968 | 151984 | 23 | 27 | 6 to 10 | 9.4 |
| 305856 | 152928 | 24 | 28 | 6 to 10 | 9.3 |
| 314852 | 157426 | 15 | 17 | 6 to 10 | 9.1 |
| 317184 | 158592 | 24 | 27 | 6 to 10 | 9.0 |
| 319271 | 159636 | 17 | 19 | 6 to 10 | 8.9 |
| 328286 | 164143 | 23 | 25 | 6 to 10 | 8.7 |
| 331344 | 165672 | 26 | 28 | 6 to 10 | 8.6 |
| 341964 | 170982 | 23 | 24 | 6 to 10 | 8.4 |
| 342559 | 171280 | 24 | 25 | 6 to 10 | 8.3 |
| 344088 | 172044 | 27 | 28 | 6 to 10 | 8.3 |
| 356832 | 178416 | 23 | 23 | 6 to 10 | 8.0 |
| 370049 | 185024 | 28 | 27 | 6 to 10 | 7.7 |
| 370557 | 185278 | 27 | 26 | 6 to 10 | 7.7 |
| 372347 | 186173 | 24 | 23 | 6 to 10 | 7.7 |
| 384281 | 192141 | 28 | 26 | 6 to 10 | 7.4 |
| 385379 | 192690 | 27 | 25 | 6 to 10 | 7.4 |
| 387861 | 193931 | 25 | 23 | 6 to 10 | 7.4 |
| 398813 | 199406 | 19 | 17 | 6 to 10 | 7.2 |
| 401437 | 200718 | 27 | 24 | 6 to 10 | 7.1 |
| 403376 | 201688 | 26 | 23 | 6 to 10 | 7.1 |
| 416305 | 208152 | 28 | 24 | 6 to 10 | 6.9 |
| 418890 | 209445 | 27 | 23 | 6 to 10 | 6.8 |
| 431955 | 215978 | 23 | 19 | 6 to 10 | 6.6 |
| 434405 | 217202 | 28 | 23 | 6 to 10 | 6.6 |
| 450736 | 225368 | 24 | 19 | 6 to 10 | 6.3 |
| 469516 | 234758 | 25 | 19 | 6 to 10 | 6.1 |
| 482773 | 241387 | 23 | 17 | 6 to 10 | 5.9 |
| 488297 | 244149 | 26 | 19 | 6 to 10 | 5.9 |
| 503764 | 251882 | 24 | 17 | 6 to 10 | 5.7 |
| 507078 | 253539 | 27 | 19 | 6 to 10 | 5.6 |
| 524754 | 262377 | 25 | 17 | 6 to 10 | 5.4 |
| 525858 | 262929 | 28 | 19 | 6 to 10 | 5.4 |
| 545744 | 272872 | 26 | 17 | 6 to 10 | 5.2 |
| 547143 | 273572 | 23 | 15 | 6 to 10 | 5.2 |
| 566734 | 283367 | 27 | 17 | 6 to 10 | 5.0 |

NOTE: See "General Planting Rate Information" and "Checking Seed Population" (located in operator's manual) pages for additional information. Always check seed population in the field to ensure planting rates are correct.

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

| 35cm | 70cm | Transmission Sprockets | | Recomm. Speed (km/h) | Average Spacing (cm) |
|--------|--------|------------------------|--------|----------------------|----------------------|
| | | Drive | Driven | | |
| 243295 | 121647 | 15 | 28 | 6 to 10 | 11.7 |
| 252306 | 126153 | 15 | 27 | 6 to 10 | 11.3 |
| 262010 | 131005 | 15 | 26 | 6 to 10 | 10.9 |
| 272490 | 136245 | 15 | 25 | 6 to 10 | 10.5 |
| 275734 | 137867 | 17 | 28 | 6 to 10 | 10.4 |
| 283844 | 141922 | 15 | 24 | 6 to 10 | 10.1 |
| 285947 | 142973 | 17 | 27 | 6 to 10 | 10.0 |
| 296185 | 148093 | 15 | 23 | 6 to 10 | 9.6 |
| 296945 | 148472 | 17 | 26 | 6 to 10 | 9.6 |
| 308174 | 154087 | 19 | 28 | 6 to 10 | 9.3 |
| 308822 | 154411 | 17 | 25 | 6 to 10 | 9.3 |
| 319587 | 159794 | 19 | 27 | 6 to 10 | 8.9 |
| 321690 | 160845 | 17 | 24 | 6 to 10 | 8.9 |
| 331879 | 165940 | 19 | 26 | 6 to 10 | 8.6 |
| 335676 | 167838 | 17 | 23 | 6 to 10 | 8.5 |
| 345154 | 172577 | 19 | 25 | 6 to 10 | 8.3 |
| 358540 | 179270 | 15 | 19 | 6 to 10 | 8.0 |
| 359536 | 179768 | 19 | 24 | 6 to 10 | 7.9 |
| 373052 | 186526 | 23 | 28 | 6 to 10 | 7.7 |
| 375168 | 187584 | 19 | 23 | 6 to 10 | 7.6 |
| 386869 | 193434 | 23 | 27 | 6 to 10 | 7.4 |
| 389272 | 194636 | 24 | 28 | 6 to 10 | 7.3 |
| 400721 | 200360 | 15 | 17 | 6 to 10 | 7.1 |
| 403689 | 201845 | 24 | 27 | 6 to 10 | 7.1 |
| 406345 | 203173 | 17 | 19 | 6 to 10 | 7.0 |
| 417818 | 208909 | 23 | 25 | 6 to 10 | 6.8 |
| 421711 | 210856 | 26 | 28 | 6 to 10 | 6.8 |
| 435228 | 217614 | 23 | 24 | 6 to 10 | 6.6 |
| 435984 | 217992 | 24 | 25 | 6 to 10 | 6.6 |
| 437931 | 218965 | 27 | 28 | 6 to 10 | 6.5 |
| 454150 | 227075 | 23 | 23 | 6 to 10 | 6.3 |
| 470971 | 235485 | 28 | 27 | 6 to 10 | 6.1 |
| 471618 | 235809 | 27 | 26 | 6 to 10 | 6.1 |
| 473896 | 236948 | 24 | 23 | 6 to 10 | 6.0 |
| 489085 | 244543 | 28 | 26 | 6 to 10 | 5.8 |
| 490482 | 245241 | 27 | 25 | 6 to 10 | 5.8 |
| 493642 | 246821 | 25 | 23 | 6 to 10 | 5.8 |
| 507580 | 253790 | 19 | 17 | 6 to 10 | 5.6 |
| 510919 | 255460 | 27 | 24 | 6 to 10 | 5.6 |
| 513387 | 256694 | 26 | 23 | 6 to 10 | 5.6 |
| 529842 | 264921 | 28 | 24 | 6 to 10 | 5.4 |
| 533133 | 266567 | 27 | 23 | 6 to 10 | 5.4 |
| 549761 | 274881 | 23 | 19 | 6 to 10 | 5.2 |
| 552879 | 276439 | 28 | 23 | 6 to 10 | 5.2 |
| 573664 | 286832 | 24 | 19 | 6 to 10 | 5.0 |
| 597566 | 298783 | 25 | 19 | 6 to 10 | 4.8 |
| 614439 | 307219 | 23 | 17 | 6 to 10 | 4.7 |
| 621469 | 310735 | 26 | 19 | 6 to 10 | 4.6 |
| 641154 | 320577 | 24 | 17 | 6 to 10 | 4.5 |
| 645372 | 322686 | 27 | 19 | 6 to 10 | 4.4 |
| 667868 | 333934 | 25 | 17 | 6 to 10 | 4.3 |
| 669274 | 334637 | 28 | 19 | 6 to 10 | 4.3 |
| | 347292 | 26 | 17 | 6 to 10 | 4.1 |
| | 348182 | 23 | 15 | 6 to 10 | 4.1 |
| | 360649 | 27 | 17 | 6 to 10 | 4.0 |

NOTE: See "General Planting Rate Information" and "Checking Seed Population" (located in operator's manual) pages for additional information. Always check seed population in the field to ensure planting rates are correct.

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

| 35cm | 70cm | Transmission Sprockets | | Recomm. Speed (km/h) | Average Spacing (cm) |
|--------|--------|------------------------|--------|----------------------|----------------------|
| | | Drive | Driven | | |
| 382321 | 191160 | 15 | 28 | 6 to 10 | 7.5 |
| 396481 | 198240 | 15 | 27 | 6 to 10 | 7.2 |
| 411730 | 205865 | 15 | 26 | 6 to 10 | 6.9 |
| 428199 | 214099 | 15 | 25 | 6 to 10 | 6.7 |
| 433297 | 216648 | 17 | 28 | 6 to 10 | 6.6 |
| 446041 | 223020 | 15 | 24 | 6 to 10 | 6.4 |
| 449345 | 224672 | 17 | 27 | 6 to 10 | 6.4 |
| 465434 | 232717 | 15 | 23 | 6 to 10 | 6.1 |
| 466627 | 233314 | 17 | 26 | 6 to 10 | 6.1 |
| 484273 | 242136 | 19 | 28 | 6 to 10 | 5.9 |
| 485292 | 242646 | 17 | 25 | 6 to 10 | 5.9 |
| 502209 | 251104 | 19 | 27 | 6 to 10 | 5.7 |
| 505513 | 252756 | 17 | 24 | 6 to 10 | 5.7 |
| 521524 | 260762 | 19 | 26 | 6 to 10 | 5.5 |
| 527492 | 263746 | 17 | 23 | 6 to 10 | 5.4 |
| 542385 | 271193 | 19 | 25 | 6 to 10 | 5.3 |
| 563420 | 281710 | 15 | 19 | 6 to 10 | 5.1 |
| 564985 | 282492 | 19 | 24 | 6 to 10 | 5.1 |
| 586225 | 293112 | 23 | 28 | 6 to 10 | 4.9 |
| 589549 | 294775 | 19 | 23 | 6 to 10 | 4.8 |
| 607937 | 303968 | 23 | 27 | 6 to 10 | 4.7 |
| 611713 | 305856 | 24 | 28 | 6 to 10 | 4.7 |
| 629704 | 314852 | 15 | 17 | 6 to 10 | 4.5 |
| 634369 | 317184 | 24 | 27 | 6 to 10 | 4.5 |
| 638542 | 319271 | 17 | 19 | 6 to 10 | 4.5 |
| 656572 | 328286 | 23 | 25 | 6 to 10 | 4.4 |
| 662689 | 331344 | 26 | 28 | 6 to 10 | 4.3 |
| | 341964 | 23 | 24 | 6 to 10 | 4.2 |
| | 342559 | 24 | 25 | 6 to 10 | 4.2 |
| | 344088 | 27 | 28 | 6 to 10 | 4.2 |
| | 356832 | 23 | 23 | 6 to 10 | 4.0 |
| | 370049 | 28 | 27 | 6 to 10 | 3.9 |
| | 370557 | 27 | 26 | 6 to 10 | 3.9 |
| | 372347 | 24 | 23 | 6 to 10 | 3.8 |
| | 384281 | 28 | 26 | 6 to 10 | 3.7 |
| | 385379 | 27 | 25 | 6 to 10 | 3.7 |
| | 387861 | 25 | 23 | 6 to 10 | 3.7 |
| | 398813 | 19 | 17 | 6 to 10 | 3.6 |
| | 401437 | 27 | 24 | 6 to 10 | 3.6 |
| | 403376 | 26 | 23 | 6 to 10 | 3.5 |
| | 416305 | 28 | 24 | 6 to 10 | 3.4 |
| | 418890 | 27 | 23 | 6 to 10 | 3.4 |
| | 431955 | 23 | 19 | 6 to 10 | 3.3 |
| | 434405 | 28 | 23 | 6 to 10 | 3.3 |
| | 450736 | 24 | 19 | 6 to 10 | 3.2 |
| | 469516 | 25 | 19 | 6 to 10 | 3.0 |
| | 482773 | 23 | 17 | 6 to 10 | 3.0 |
| | 488297 | 26 | 19 | 6 to 10 | 2.9 |
| | 503764 | 24 | 17 | 6 to 10 | 2.8 |
| | 507078 | 27 | 19 | 6 to 10 | 2.8 |
| | 524754 | 25 | 17 | 6 to 10 | 2.7 |
| | 525858 | 28 | 19 | 6 to 10 | 2.7 |
| | 545744 | 26 | 17 | 6 to 10 | 2.6 |
| | 547143 | 23 | 15 | 6 to 10 | 2.6 |
| | 566734 | 27 | 17 | 6 to 10 | 2.5 |

NOTE: See "General Planting Rate Information" and "Checking Seed Population" (located in operator's manual) pages for additional information. Always check seed population in the field to ensure planting rates are correct.

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

| 35cm | 70cm | Transmission Sprockets | | Recomm. Speed (km/h) | Average Spacing (cm) |
|--------|--------|------------------------|--------|----------------------|----------------------|
| | | Drive | Driven | | |
| 382321 | 191160 | 15 | 28 | 6 to 10 | 7.5 |
| 396481 | 198240 | 15 | 27 | 6 to 10 | 7.2 |
| 411730 | 205865 | 15 | 26 | 6 to 10 | 6.9 |
| 428199 | 214099 | 15 | 25 | 6 to 10 | 6.7 |
| 433297 | 216648 | 17 | 28 | 6 to 10 | 6.6 |
| 446041 | 223020 | 15 | 24 | 6 to 10 | 6.4 |
| 449345 | 224672 | 17 | 27 | 6 to 10 | 6.4 |
| 465434 | 232717 | 15 | 23 | 6 to 10 | 6.1 |
| 466627 | 233314 | 17 | 26 | 6 to 10 | 6.1 |
| 484273 | 242136 | 19 | 28 | 6 to 10 | 5.9 |
| 485292 | 242646 | 17 | 25 | 6 to 10 | 5.9 |
| 502209 | 251104 | 19 | 27 | 6 to 10 | 5.7 |
| 505513 | 252756 | 17 | 24 | 6 to 10 | 5.7 |
| 521524 | 260762 | 19 | 26 | 6 to 10 | 5.5 |
| 527492 | 263746 | 17 | 23 | 6 to 10 | 5.4 |
| 542385 | 271193 | 19 | 25 | 6 to 10 | 5.3 |
| 563420 | 281710 | 15 | 19 | 6 to 10 | 5.1 |
| 564985 | 282492 | 19 | 24 | 6 to 10 | 5.1 |
| 586225 | 293112 | 23 | 28 | 6 to 10 | 4.9 |
| 589549 | 294775 | 19 | 23 | 6 to 10 | 4.8 |
| 607937 | 303968 | 23 | 27 | 6 to 10 | 4.7 |
| 611713 | 305856 | 24 | 28 | 6 to 10 | 4.7 |
| 629704 | 314852 | 15 | 17 | 6 to 10 | 4.5 |
| 634369 | 317184 | 24 | 27 | 6 to 10 | 4.5 |
| 638542 | 319271 | 17 | 19 | 6 to 10 | 4.5 |
| 656572 | 328286 | 23 | 25 | 6 to 10 | 4.4 |
| 662689 | 331344 | 26 | 28 | 6 to 10 | 4.3 |
| | 341964 | 23 | 24 | 6 to 10 | 4.2 |
| | 342559 | 24 | 25 | 6 to 10 | 4.2 |
| | 344088 | 27 | 28 | 6 to 10 | 4.2 |
| | 356832 | 23 | 23 | 6 to 10 | 4.0 |
| | 370049 | 28 | 27 | 6 to 10 | 3.9 |
| | 370557 | 27 | 26 | 6 to 10 | 3.9 |
| | 372347 | 24 | 23 | 6 to 10 | 3.8 |
| | 384281 | 28 | 26 | 6 to 10 | 3.7 |
| | 385379 | 27 | 25 | 6 to 10 | 3.7 |
| | 387861 | 25 | 23 | 6 to 10 | 3.7 |
| | 398813 | 19 | 17 | 6 to 10 | 3.6 |
| | 401437 | 27 | 24 | 6 to 10 | 3.6 |
| | 403376 | 26 | 23 | 6 to 10 | 3.5 |
| | 416305 | 28 | 24 | 6 to 10 | 3.4 |
| | 418890 | 27 | 23 | 6 to 10 | 3.4 |
| | 431955 | 23 | 19 | 6 to 10 | 3.3 |
| | 434405 | 28 | 23 | 6 to 10 | 3.3 |
| | 450736 | 24 | 19 | 6 to 10 | 3.2 |
| | 469516 | 25 | 19 | 6 to 10 | 3.0 |
| | 482773 | 23 | 17 | 6 to 10 | 3.0 |
| | 488297 | 26 | 19 | 6 to 10 | 2.9 |
| | 503764 | 24 | 17 | 6 to 10 | 2.8 |
| | 507078 | 27 | 19 | 6 to 10 | 2.8 |
| | 524754 | 25 | 17 | 6 to 10 | 2.7 |
| | 525858 | 28 | 19 | 6 to 10 | 2.7 |
| | 545744 | 26 | 17 | 6 to 10 | 2.6 |
| | 547143 | 23 | 15 | 6 to 10 | 2.6 |
| | 566734 | 27 | 17 | 6 to 10 | 2.5 |

NOTE: See "General Planting Rate Information" and "Checking Seed Population" (located in operator's manual) pages for additional information. Always check seed population in the field to ensure planting rates are correct.

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

| 35cm | 70cm | Transmission Sprockets | | Recomm. Speed (km/h) | Average Spacing (cm) |
|--------|--------|------------------------|--------|----------------------|----------------------|
| | | Drive | Driven | | |
| 486590 | 243295 | 15 | 28 | 6 to 10 | 5.9 |
| 504612 | 252306 | 15 | 27 | 6 to 10 | 5.7 |
| 524020 | 262010 | 15 | 26 | 6 to 10 | 5.5 |
| 544981 | 272490 | 15 | 25 | 6 to 10 | 5.2 |
| 551468 | 275734 | 17 | 28 | 6 to 10 | 5.2 |
| 567688 | 283844 | 15 | 24 | 6 to 10 | 5.0 |
| 571893 | 285947 | 17 | 27 | 6 to 10 | 5.0 |
| 592370 | 296185 | 15 | 23 | 6 to 10 | 4.8 |
| 593889 | 296945 | 17 | 26 | 6 to 10 | 4.8 |
| 616347 | 308174 | 19 | 28 | 6 to 10 | 4.6 |
| 617645 | 308822 | 17 | 25 | 6 to 10 | 4.6 |
| 639175 | 319587 | 19 | 27 | 6 to 10 | 4.5 |
| 643380 | 321690 | 17 | 24 | 6 to 10 | 4.4 |
| 663758 | 331879 | 19 | 26 | 6 to 10 | 4.3 |
| 671353 | 335676 | 17 | 23 | 6 to 10 | 4.3 |
| | 345154 | 19 | 25 | 6 to 10 | 4.1 |
| | 358540 | 15 | 19 | 6 to 10 | 4.0 |
| | 359536 | 19 | 24 | 6 to 10 | 4.0 |
| | 373052 | 23 | 28 | 6 to 10 | 3.8 |
| | 375168 | 19 | 23 | 6 to 10 | 3.8 |
| | 386869 | 23 | 27 | 6 to 10 | 3.7 |
| | 389272 | 24 | 28 | 6 to 10 | 3.7 |
| | 400721 | 15 | 17 | 6 to 10 | 3.6 |
| | 403689 | 24 | 27 | 6 to 10 | 3.5 |
| | 406345 | 17 | 19 | 6 to 10 | 3.5 |
| | 417818 | 23 | 25 | 6 to 10 | 3.4 |
| | 421711 | 26 | 28 | 6 to 10 | 3.4 |
| | 435228 | 23 | 24 | 6 to 10 | 3.3 |
| | 435984 | 24 | 25 | 6 to 10 | 3.3 |
| | 437931 | 27 | 28 | 6 to 10 | 3.3 |
| | 454150 | 23 | 23 | 6 to 10 | 3.1 |
| | 470971 | 28 | 27 | 6 to 10 | 3.0 |
| | 471618 | 27 | 26 | 6 to 10 | 3.0 |
| | 473896 | 24 | 23 | 6 to 10 | 3.0 |
| | 489085 | 28 | 26 | 6 to 10 | 2.9 |
| | 490482 | 27 | 25 | 6 to 10 | 2.9 |
| | 493642 | 25 | 23 | 6 to 10 | 2.9 |
| | 507580 | 19 | 17 | 6 to 10 | 2.8 |
| | 510919 | 27 | 24 | 6 to 10 | 2.8 |
| | 513387 | 26 | 23 | 6 to 10 | 2.8 |
| | 529842 | 28 | 24 | 6 to 10 | 2.7 |
| | 533133 | 27 | 23 | 6 to 10 | 2.7 |
| | 549761 | 23 | 19 | 6 to 10 | 2.6 |
| | 552879 | 28 | 23 | 6 to 10 | 2.6 |
| | 573664 | 24 | 19 | 6 to 10 | 2.5 |
| | 597566 | 25 | 19 | 6 to 10 | 2.4 |
| | 614439 | 23 | 17 | 6 to 10 | 2.3 |
| | 621469 | 26 | 19 | 6 to 10 | 2.3 |
| | 641154 | 24 | 17 | 6 to 10 | 2.2 |
| | 645372 | 27 | 19 | 6 to 10 | 2.2 |
| | 667868 | 25 | 17 | 6 to 10 | 2.1 |
| | 669274 | 28 | 19 | 6 to 10 | 2.1 |

NOTE: See "General Planting Rate Information" and "Checking Seed Population" (located in operator's manual) pages for additional information. Always check seed population in the field to ensure planting rates are correct.

**PLANTING RATES FOR (VACUUM) RAPESEED 83 CELL DISC
22 TOOTH CONTACT WHEEL DRIVE SPROCKET
APPROXIMATE SEEDS/HECTARE FOR VARIOUS ROW WIDTHS**

| 35cm | Transmission Sprockets | | Recomm. Speed (km/h) | Average Spacing (cm) |
|--------|------------------------|--------|----------------------|----------------------|
| | Drive | Driven | | |
| 349646 | 17 | 24 | 6 to 10 | 8.2 |
| 360721 | 19 | 26 | 6 to 10 | 7.9 |
| 364849 | 17 | 23 | 6 to 10 | 7.8 |
| 375149 | 19 | 25 | 6 to 10 | 7.6 |
| 389699 | 15 | 19 | 6 to 10 | 7.3 |
| 390781 | 19 | 24 | 6 to 10 | 7.3 |
| 405472 | 23 | 28 | 6 to 10 | 7.0 |
| 407771 | 19 | 23 | 6 to 10 | 7.0 |
| 420489 | 23 | 27 | 6 to 10 | 6.8 |
| 423101 | 24 | 28 | 6 to 10 | 6.8 |
| 435545 | 15 | 17 | 6 to 10 | 6.6 |
| 438771 | 24 | 27 | 6 to 10 | 6.5 |
| 441660 | 17 | 19 | 6 to 10 | 6.5 |
| 454129 | 23 | 25 | 6 to 10 | 6.3 |
| 458359 | 26 | 28 | 6 to 10 | 6.2 |
| 473050 | 23 | 24 | 6 to 10 | 6.0 |
| 473875 | 24 | 25 | 6 to 10 | 6.0 |
| 475988 | 27 | 28 | 6 to 10 | 6.0 |
| 493618 | 23 | 23 | 6 to 10 | 5.8 |
| 511900 | 28 | 27 | 6 to 10 | 5.6 |
| 512602 | 27 | 26 | 6 to 10 | 5.6 |
| 515079 | 24 | 23 | 6 to 10 | 5.5 |
| 531590 | 28 | 26 | 6 to 10 | 5.4 |
| 533109 | 27 | 25 | 6 to 10 | 5.4 |
| 536542 | 25 | 23 | 6 to 10 | 5.3 |
| 551690 | 19 | 17 | 6 to 10 | 5.2 |
| 555320 | 27 | 24 | 6 to 10 | 5.1 |
| 558003 | 26 | 23 | 6 to 10 | 5.1 |
| 575887 | 28 | 24 | 6 to 10 | 5.0 |
| 579465 | 27 | 23 | 6 to 10 | 4.9 |
| 597539 | 23 | 19 | 6 to 10 | 4.8 |
| 600926 | 28 | 23 | 6 to 10 | 4.8 |
| 623518 | 24 | 19 | 6 to 10 | 4.6 |
| 649497 | 25 | 19 | 6 to 10 | 4.4 |
| 667837 | 23 | 17 | 6 to 10 | 4.3 |
| 675479 | 26 | 19 | 6 to 10 | 4.2 |
| 696874 | 24 | 17 | 6 to 10 | 4.1 |
| 701458 | 27 | 19 | 6 to 10 | 4.1 |
| 725910 | 25 | 17 | 6 to 10 | 3.9 |
| 727437 | 28 | 19 | 6 to 10 | 3.9 |
| 754946 | 26 | 17 | 6 to 10 | 3.8 |
| 756883 | 23 | 15 | 6 to 10 | 3.8 |
| 783982 | 27 | 17 | 6 to 10 | 3.6 |

NOTE: See "General Planting Rate Information" and "Checking Seed Population" (located in operator's manual) pages for additional information. Always check seed population in the field to ensure planting rates are correct.

**PLANTING RATES FOR (VACUUM) RAPESEED 83 CELL DISC
28 TOOTH CONTACT WHEEL DRIVE SPROCKET
APPROXIMATE SEEDS/HECTARE FOR VARIOUS ROW WIDTHS**

| 35cm | Transmission Sprockets | | Recomm. Speed (km/h) | Average Spacing (cm) |
|--------|------------------------|--------|----------------------|----------------------|
| | Drive | Driven | | |
| 349023 | 15 | 27 | 6 to 10 | 8.2 |
| 362447 | 15 | 26 | 6 to 10 | 7.9 |
| 376945 | 15 | 25 | 6 to 10 | 7.6 |
| 381432 | 17 | 28 | 6 to 10 | 7.5 |
| 392651 | 15 | 24 | 6 to 10 | 7.3 |
| 395559 | 17 | 27 | 6 to 10 | 7.2 |
| 409724 | 15 | 23 | 6 to 10 | 7.0 |
| 410773 | 17 | 26 | 6 to 10 | 7.0 |
| 426307 | 19 | 28 | 6 to 10 | 6.7 |
| 427204 | 17 | 25 | 6 to 10 | 6.7 |
| 442097 | 19 | 27 | 6 to 10 | 6.5 |
| 445005 | 17 | 24 | 6 to 10 | 6.4 |
| 459101 | 19 | 26 | 6 to 10 | 6.2 |
| 464352 | 17 | 23 | 6 to 10 | 6.2 |
| 477463 | 19 | 25 | 6 to 10 | 6.0 |
| 495980 | 15 | 19 | 6 to 10 | 5.8 |
| 497358 | 19 | 24 | 6 to 10 | 5.7 |
| 516055 | 23 | 28 | 6 to 10 | 5.5 |
| 518982 | 19 | 23 | 6 to 10 | 5.5 |
| 535167 | 23 | 27 | 6 to 10 | 5.3 |
| 538493 | 24 | 28 | 6 to 10 | 5.3 |
| 554329 | 15 | 17 | 6 to 10 | 5.2 |
| 558438 | 24 | 27 | 6 to 10 | 5.1 |
| 562112 | 17 | 19 | 6 to 10 | 5.1 |
| 577982 | 23 | 25 | 6 to 10 | 4.9 |
| 583368 | 26 | 28 | 6 to 10 | 4.9 |
| 602065 | 23 | 24 | 6 to 10 | 4.7 |
| 603111 | 24 | 25 | 6 to 10 | 4.7 |
| 605803 | 27 | 28 | 6 to 10 | 4.7 |
| 628241 | 23 | 23 | 6 to 10 | 4.5 |
| 651509 | 28 | 27 | 6 to 10 | 4.4 |
| 652405 | 27 | 26 | 6 to 10 | 4.4 |
| 655556 | 24 | 23 | 6 to 10 | 4.4 |
| 676569 | 28 | 26 | 6 to 10 | 4.2 |
| 678500 | 27 | 25 | 6 to 10 | 4.2 |
| 682871 | 25 | 23 | 6 to 10 | 4.2 |
| 702152 | 19 | 17 | 6 to 10 | 4.1 |
| 706773 | 27 | 24 | 6 to 10 | 4.0 |
| 710187 | 26 | 23 | 6 to 10 | 4.0 |
| 732948 | 28 | 24 | 6 to 10 | 3.9 |
| 737502 | 27 | 23 | 6 to 10 | 3.9 |
| 760504 | 23 | 19 | 6 to 10 | 3.8 |
| 764815 | 28 | 23 | 6 to 10 | 3.7 |
| 793569 | 24 | 19 | 6 to 10 | 3.6 |
| 826633 | 25 | 19 | 6 to 10 | 3.5 |

NOTE: See "General Planting Rate Information" and "Checking Seed Population" (located in operator's manual) pages for additional information. Always check seed population in the field to ensure planting rates are correct.

DRY FERTILIZER APPLICATION RATES (MECHANICAL)
APPROXIMATE RATE IN KILOGRAMS PER HECTARE

| Drive Sprocket | Driven Sprocket | Low Rate Position | High Rate Position |
|----------------|-----------------|-------------------|--------------------|
| | | 70cm Rows | 70cm Rows |
| 15 | 35 | 35 | 105 |
| 15 | 33 | 40 | 120 |
| 15 | 30 | 44 | 133 |
| 19 | 33 | 50 | 151 |
| 19 | 30 | 55 | 168 |
| 15 | 19 | 63 | 193 |
| 30 | 35 | 68 | 210 |
| 30 | 33 | 73 | 222 |
| 33 | 35 | 77 | 231 |
| 35 | 33 | 85 | 259 |
| 33 | 30 | 89 | 268 |
| 19 | 15 | 102 | 332 |
| 30 | 19 | 127 | 386 |
| 33 | 19 | 140 | 423 |
| 35 | 19 | 149 | 449 |
| 30 | 15 | 161 | 488 |
| 33 | 15 | 177 | 537 |
| 35 | 15 | 188 | 570 |

See notes on following page.

DRY FERTILIZER APPLICATION RATES (VACUUM)
22 TOOTH CONTACT WHEEL DRIVE SPROCKET
APPROXIMATE RATE IN KILOGRAMS PER HECTARE

| Drive Sprocket | Driven Sprocket | Low Rate Position | High Rate Position |
|----------------|-----------------|-------------------|--------------------|
| | | 70cm Rows | 70cm Rows |
| 15 | 35 | 35 | 105 |
| 15 | 33 | 40 | 120 |
| 15 | 30 | 44 | 133 |
| 19 | 33 | 50 | 151 |
| 19 | 30 | 55 | 168 |
| 15 | 19 | 63 | 193 |
| 30 | 35 | 68 | 210 |
| 30 | 33 | 73 | 222 |
| 33 | 35 | 77 | 231 |
| 35 | 33 | 85 | 259 |
| 33 | 30 | 89 | 268 |
| 19 | 15 | 102 | 332 |
| 30 | 19 | 127 | 386 |
| 33 | 19 | 140 | 423 |
| 35 | 19 | 149 | 449 |
| 30 | 15 | 161 | 488 |
| 33 | 15 | 176 | 537 |
| 35 | 15 | 188 | 570 |

See notes on following page.

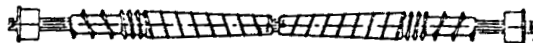
**DRY FERTILIZER APPLICATION RATES (VACUUM)
28 TOOTH CONTACT WHEEL DRIVE SPROCKET
APPROXIMATE RATE IN KILOGRAMS PER HECTARE**

| Drive Sprocket | Driven Sprocket | Low Rate Position | High Rate Position |
|----------------|-----------------|-------------------|--------------------|
| | | 70cm Rows | 70cm Rows |
| 15 | 35 | 45 | 133 |
| 15 | 33 | 51 | 151 |
| 15 | 30 | 56 | 168 |
| 19 | 33 | 63 | 192 |
| 19 | 30 | 70 | 214 |
| 15 | 19 | 81 | 244 |
| 30 | 35 | 87 | 266 |
| 30 | 33 | 93 | 282 |
| 33 | 35 | 98 | 292 |
| 35 | 33 | 109 | 328 |
| 33 | 30 | 112 | 340 |
| 19 | 15 | 129 | 421 |
| 30 | 19 | 161 | 488 |
| 33 | 19 | 178 | 537 |
| 35 | 19 | 189 | 569 |
| 30 | 15 | 204 | 619 |
| 33 | 15 | 225 | 680 |
| 35 | 15 | 238 | 722 |

NOTE: (VACUUM ONLY) 22, 28 and 44 tooth drive sprockets are NOT applicable to all rate charts. Check title to ensure proper rate chart is selected. DO NOT USE 44 tooth drive sprockets (60 cell soybean discs) with Dry Fertilizer Package.

NOTE: Uneven delivery may result from attempting to use rates lower than indicated by chart.

**Direction
Of Rotation**



High Rate Position



Low Rate Position

Chart is for planters equipped with contact drive. See "Tire Pressure" for recommended tire pressures.

Chart calculated with a bulk density of 1.04 kg per liter.

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

NOTE: Optional two-speed point row clutch is located ahead of dry fertilizer drive. Activating two-speed point row clutch reduced rate switch will cause same percent of reduction in dry fertilizer application rates.

To check exact number of kilograms your fertilizer attachment actually delivers on a 70 cm row spacing, remove one spout from one fertilizer hopper and attach a container under opening. Engage fertilizer attachment and drive forward for 47.6 m. Weigh amount of fertilizer caught in container and multiply that by 300. Result is kilograms of fertilizer per acre when planting in 70 cm rows.

**LIQUID FERTILIZER PISTON PUMP APPLICATION RATES
LITERS PER HECTARE**

**Applies To Model NGP-7055 Pumps With 18 Tooth Sprocket
And 7.60" x 15" Ground Drive Tire**

| Pump Setting | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--------------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| 12 Row 70cm | 75.2 | 112.8 | 150.4 | 188.0 | 224.6 | 262.2 | 299.8 | 337.4 | 375.0 |
| 16 Row 70cm | 56.0 | 84.5 | 113.0 | 141.5 | 169.0 | 197.5 | 226.0 | 253.5 | 282.0 |

Chart is for planters equipped with 7.60" x 15" ground drive tire, based on 2.3 meters forward travel per wheel revolution, 48 tooth drive sprocket and 18 tooth driven sprocket on metering pump. Check tires for correct operating pressure.

Chart calculated based on a solution weighing 1.2 kilograms per liter.

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 liters your fertilizer attachment will actually deliver on a 70 cm 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 14.3 m.
3. Measure fluid milliliters caught in container. Result is liters of fertilizer delivered per hectare when planting in 70 cm rows (e.g. 2ml = 2 L ; 5ml= 5L; 10ml = 10L).
4. Rinse collection container and repeat test on other rows if necessary.

DRY INSECTICIDE APPLICATION RATES
APPROXIMATE Kg/HECTARE AT 8 km/h FOR VARIOUS ROW WIDTHS

| Meter Setting | 70cm Rows |
|----------------------|-----------|
| CLAY GRANULES | |
| 10 | 6.0 |
| 11 | 6.6 |
| 12 | 7.4 |
| 13 | 8.4 |
| 14 | 9.4 |
| 15 | 10.4 |
| 16 | 11.7 |
| 17 | 13.1 |
| 18 | 13.9 |
| 19 | 16.0 |
| 20 | 17.3 |
| 21 | 18.9 |
| 22 | 20.0 |
| 23 | 21.0 |
| 24 | 22.9 |
| 25 | 25.5 |
| 26 | 28.1 |
| 27 | 29.4 |
| 28 | 31.0 |
| 29 | 33.9 |
| 30 | 36.1 |
| SAND GRANULES | |
| 5 | 3.5 |
| 6 | 6.0 |
| 7 | 6.5 |
| 8 | 7.7 |
| 9 | 9.5 |
| 10 | 10.9 |
| 11 | 12.4 |
| 12 | 13.7 |
| 13 | 15.4 |
| 14 | 17.6 |
| 15 | 18.9 |
| 16 | 21.4 |
| 17 | 23.7 |
| 18 | 26.6 |
| 19 | 29.6 |
| 20 | 31.4 |
| 21 | 33.7 |
| 22 | 36.1 |
| 23 | 39.0 |
| 24 | 42.0 |
| 25 | 45.0 |

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

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

DRY HERBICIDE APPLICATION RATES
APPROXIMATE Kg/HECTARE AT 8 km/h FOR VARIOUS ROW WIDTHS

CLAY GRANULES

| Meter Setting | 70cm Rows |
|---------------|-----------|
| 10 | 5.7 |
| 11 | 6.3 |
| 12 | 7.1 |
| 13 | 7.9 |
| 14 | 8.9 |
| 15 | 10.0 |
| 16 | 11.0 |
| 17 | 12.1 |
| 18 | 13.1 |
| 19 | 14.2 |
| 20 | 15.4 |
| 21 | 16.6 |
| 22 | 17.8 |
| 23 | 19.2 |
| 24 | 20.7 |
| 25 | 22.1 |
| 26 | 23.7 |
| 27 | 25.5 |
| 28 | 27.6 |
| 29 | 29.6 |
| 30 | 32.6 |

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.

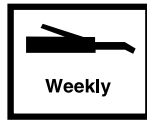
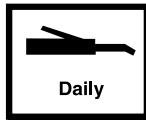
Field check your actual rate with herbicide you are using at speed and population you will be planting. See "Checking Granular Chemical Application Rate" in Machine Operation section for more information.

Page intentionally blank.

LUBRICATION

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

LUBRICATION SYMBOLS



Lubricate at frequency indicated with SAE multipurpose grease.

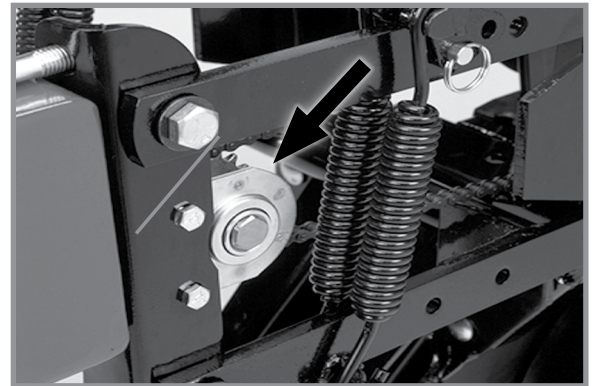


Lubricate at frequency indicated with high quality SAE 10 weight oil or spray lubricant.

SEALED BEARINGS

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

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



Sealed bearing (Typical)

WRAP SPRING WRENCH ASSEMBLY

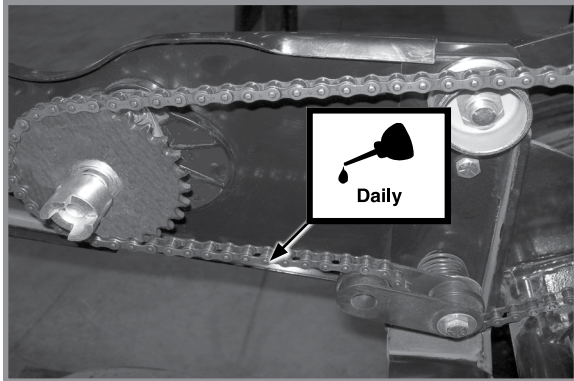
1. Remove ¼"-20 x ½" cap screw securing idler assembly to wrap spring wrench tightener shaft and
2. Remove wrap spring wrench from planter.
3. Tip wrap spring wrench on its side and lubricate with a high quality spray lubricant. Lubricant must be absorbed into wrap spring area.
4. Reinstall wrap spring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



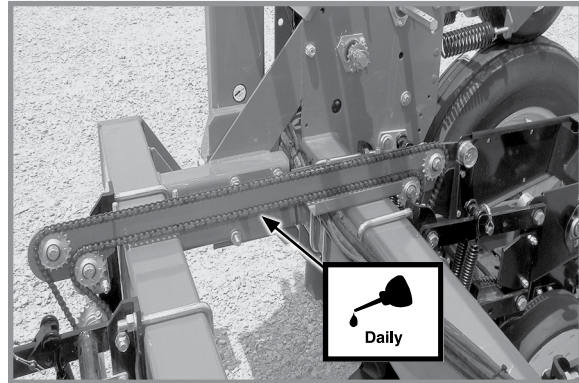
Wrap spring wrench lubrication

DRIVE CHAINS

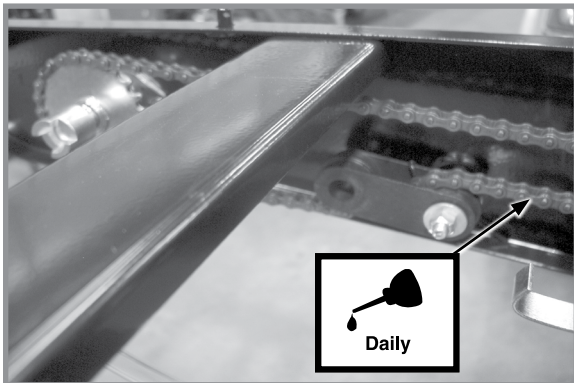
Lubricate all transmission and drive chains daily with a high quality chain lubricant. Extreme operating conditions such as dirt, temperature, or speed may require more frequent lubrication. If a chain becomes stiff, it should be removed, soaked, and washed in solvent to loosen and remove dirt from joints.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



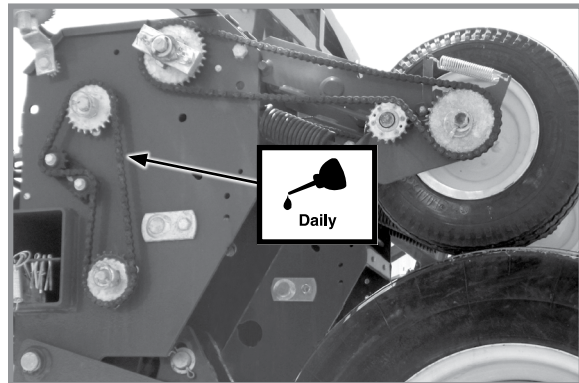
Pull row unit drive chains



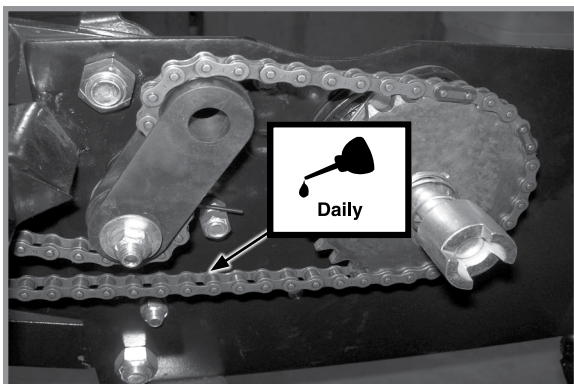
Interplant package drive chains



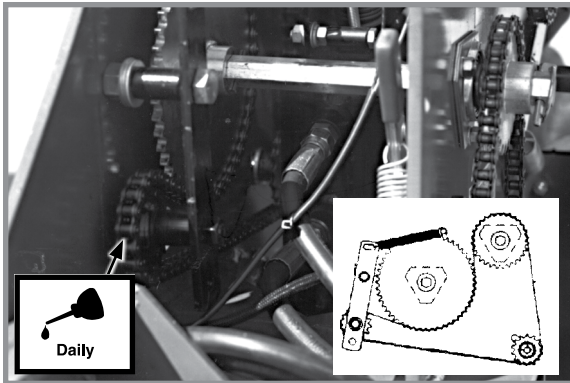
Row unit granular chemical drive chains



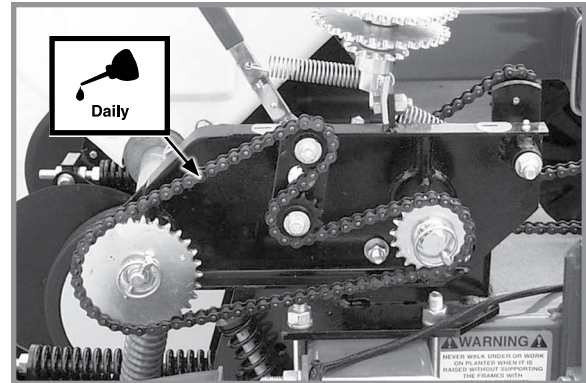
**Contact wheel drive chains
Seed rate transmission drive chains**



Push row unit drive chains



Inner wheel module drive chains

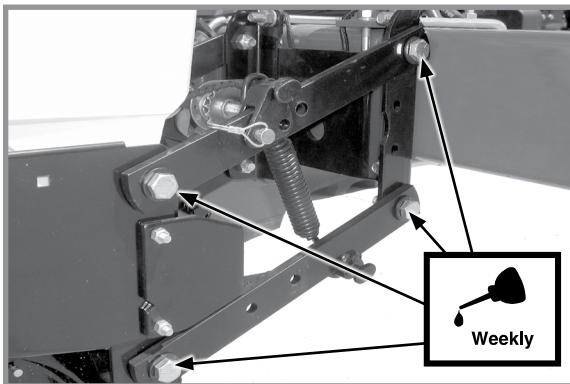


Dry fertilizer drive chains

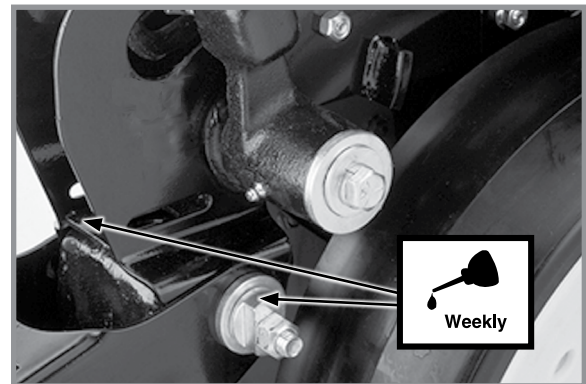
BUSHINGS

Lubricate bushings at frequency indicated.

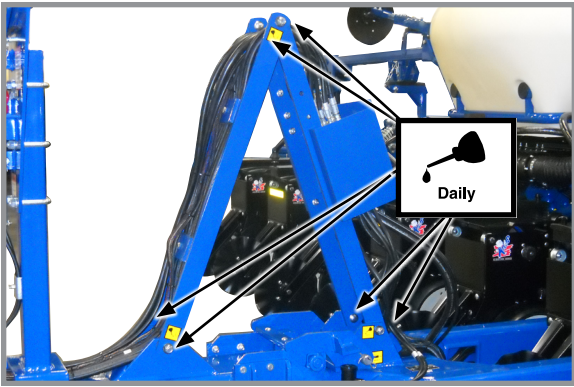
Check each bolt for proper torque. If bolt is loose, removed it and inspect bushing for cracks and wear. Replace bushing if necessary. Use **only hardened flat washers**. Replace damaged flat washers with proper part. Torque hardware to 176 Nm.



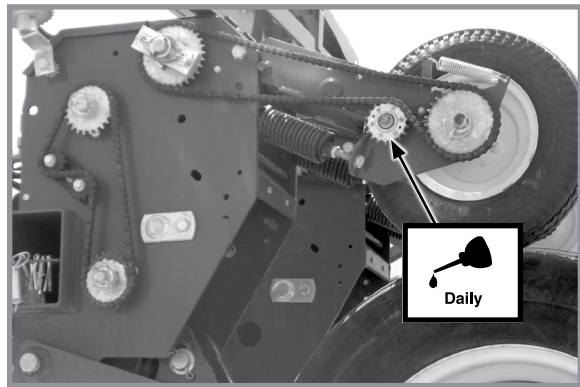
Pull row unit and/or push row unit parallel linkages (8 per row)



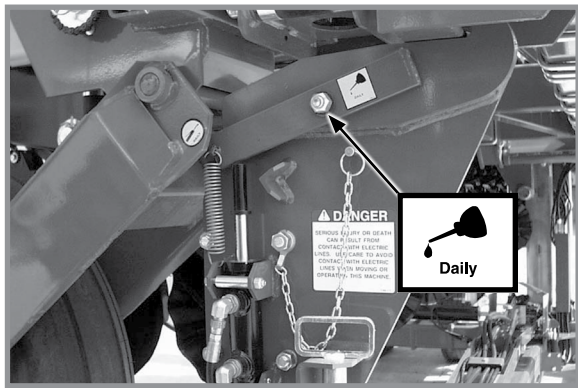
Row unit "v" closing wheel, covering discs/ single press wheel and/or drag closing wheel eccentric bushings (2 per row)



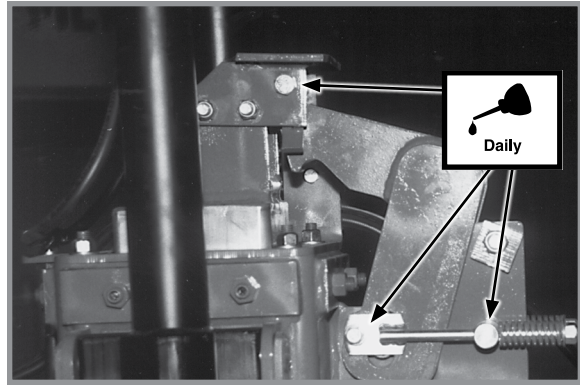
Hose take-up (6 locations)



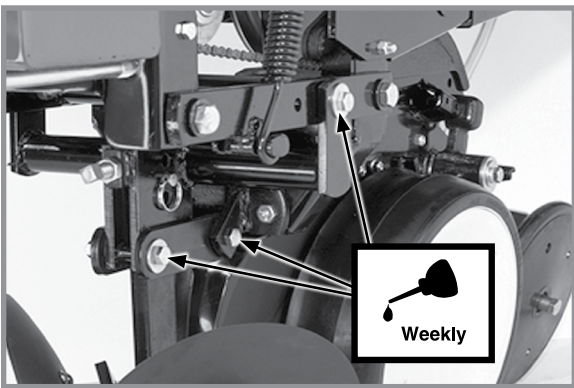
Contact wheel arm (2 per wheel assembly)



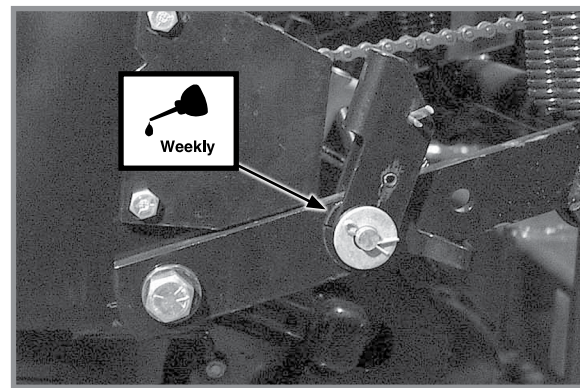
Transport latch (1 location)



Safety hook at top of center section



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



Interplant push row unit lockups - 2 per row

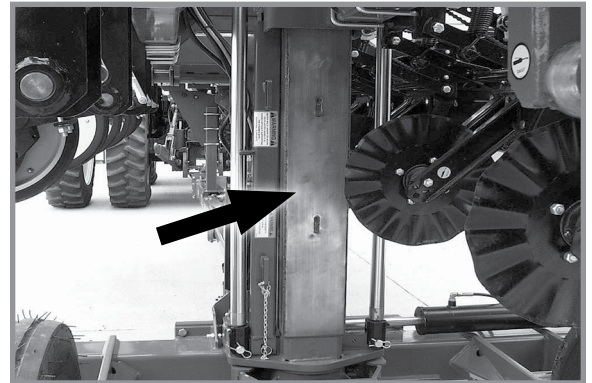
CENTER POST

NOTICE

Any oil or grease on center post and poly wear pads will attract dirt and accelerate wear. Do not lubricate center post and poly wear pads.

Center post is clad with stainless steel. Keep stainless steel surface clean and free of any lubrication to prolong service life.

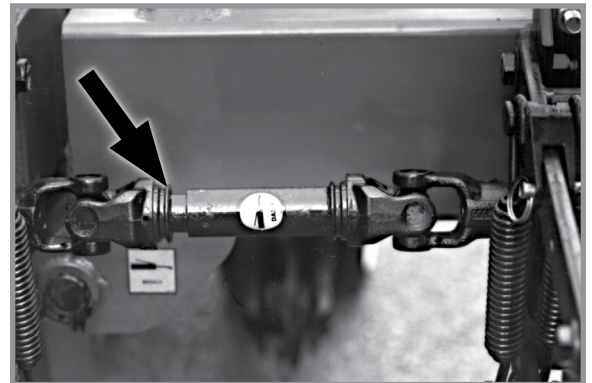
See "Wear Pad Adjustment/Replacement" for more information.



Center post

U-JOINT SLIDES

Lubricate all U-joint slides daily with a high quality lubricant.



U-joint slide

PTO PUMP SHAFT COUPLING (TRACTOR MOUNTED PTO PUMP AND OIL COOLER)

NOTE: Clean and grease PTO shaft coupling each time pump is installed.

NOTE: Apply coating of high-speed industrial coupling grease, such as Chevron® Coupling Grease, that meets AGMA CG-1 and CG-2 Standards to extend shaft spline life.

Chevron® trademark is owned by Chevron Products Company. AGMA is the acronym for the American Gear Manufacturers Association.



1 $\frac{3}{8}$ "-21 spline PTO pump shown

WHEEL BEARINGS

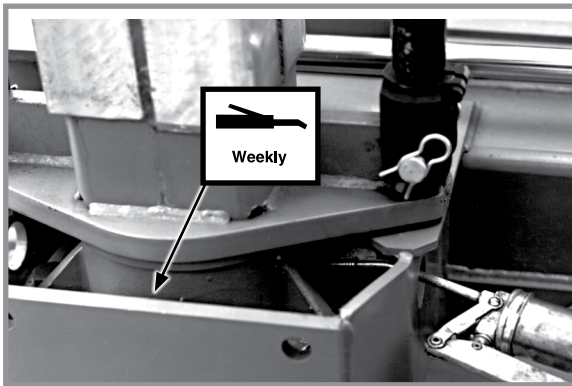
All drive, transport, and marker hub wheel bearings should be repacked annually and checked for wear.

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

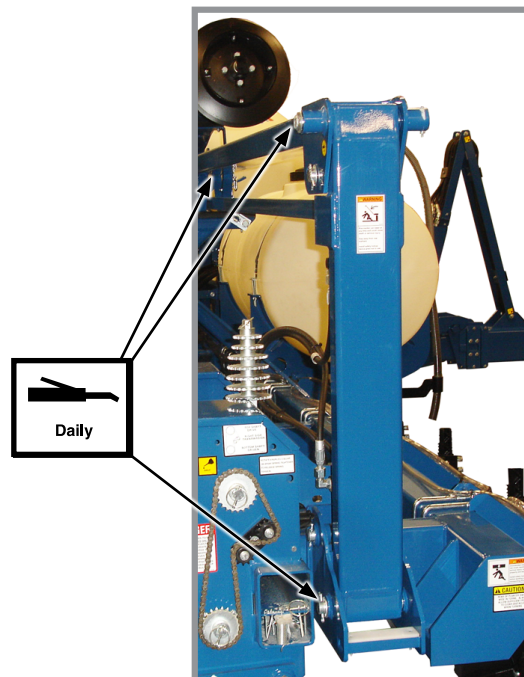
NOTE: To repack wheel hubs, follow procedure outlined for wheel bearing replacement except bearings and bearing cups are reused.

GREASE FITTINGS

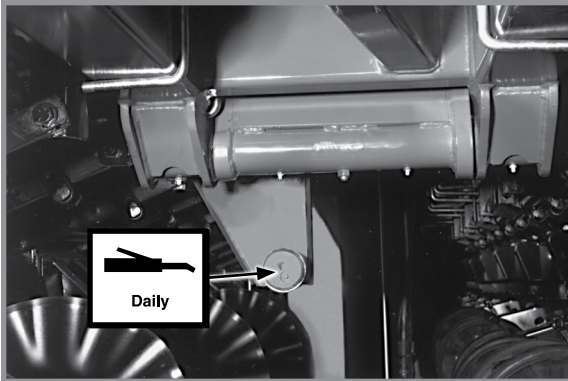
Parts equipped with grease fittings should be lubricated at frequency indicated with an SAE multipurpose grease. Clean fitting thoroughly before using grease gun. Frequency of lubrication recommended is based on normal operating conditions. Severe or unusual conditions may require more frequent attention.



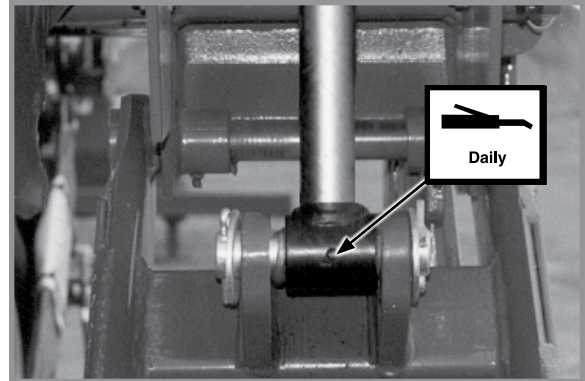
Center Pivot - 1



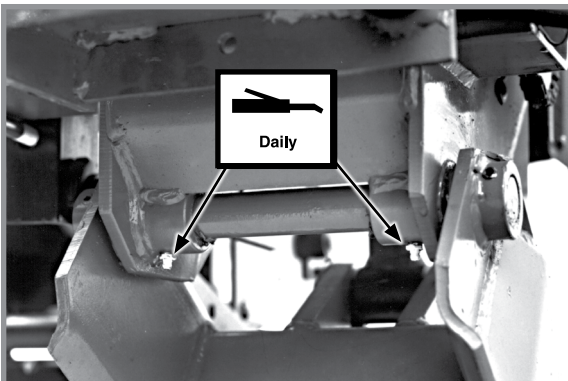
Row marker assemblies - 3 per assembly



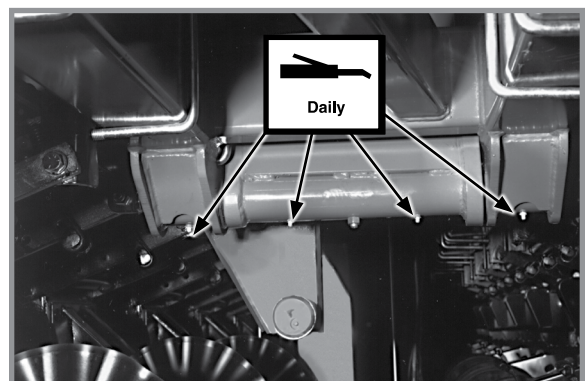
Cam follower - 1 per follower



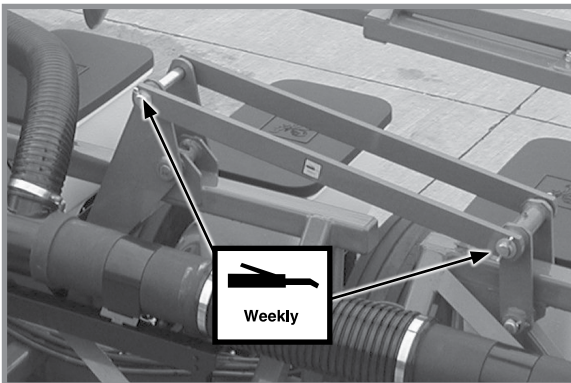
Wing lift cylinders - 1 per cylinder



Wing wheel pivot - 2 per wheel module



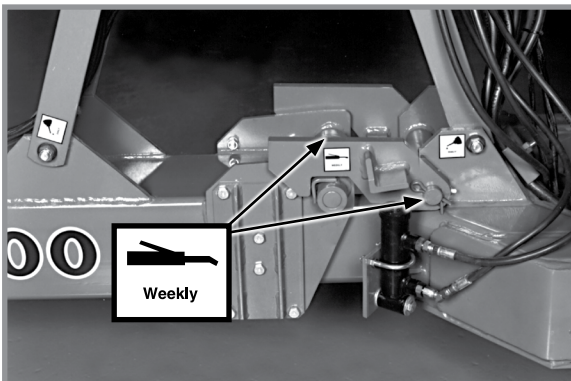
Wing hinges - 4 per wing



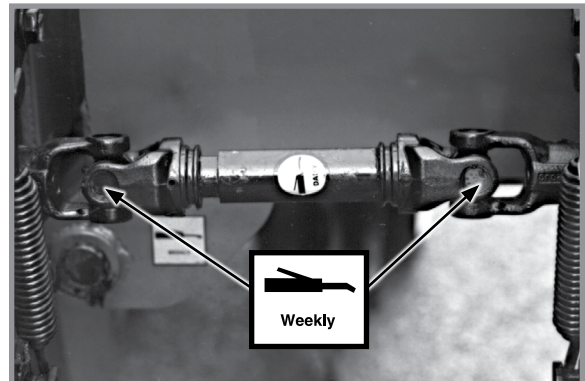
Wing locks - 3 per wing



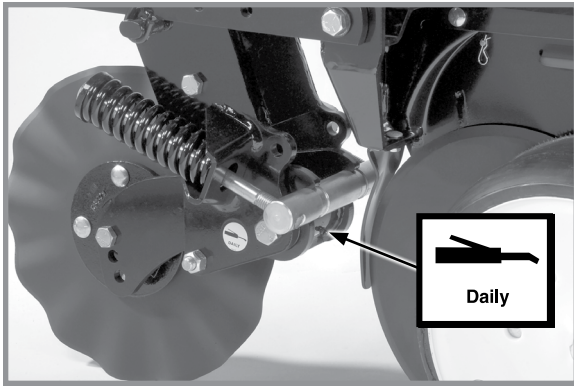
Transport wheel bearings - 1 per hub



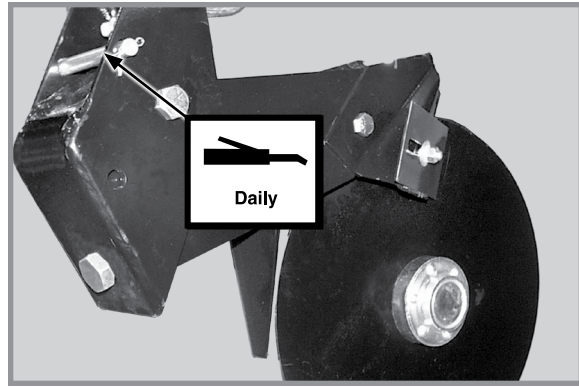
Tongue hook - 2



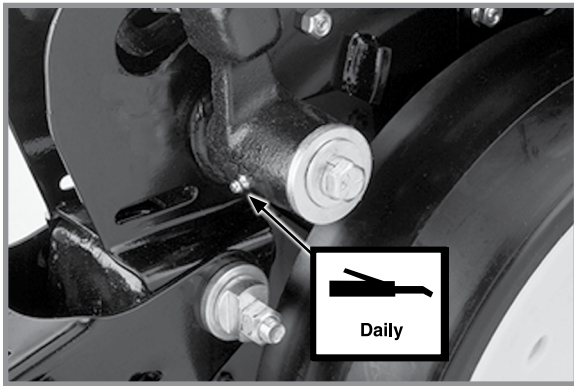
U-joints - 2 per hinge area



Frame mounted Coulter - 1 Per Arm

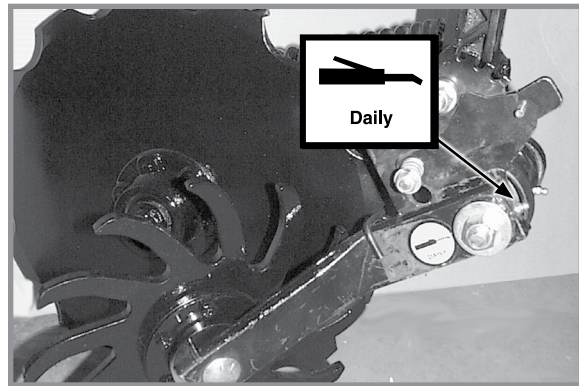


Double disc fertilizer opener - 1

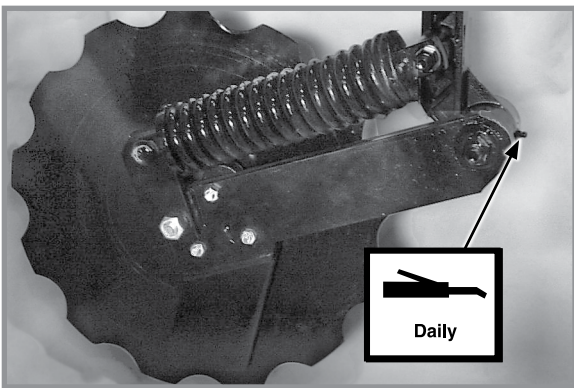


Gauge wheel arms - 1 per arm

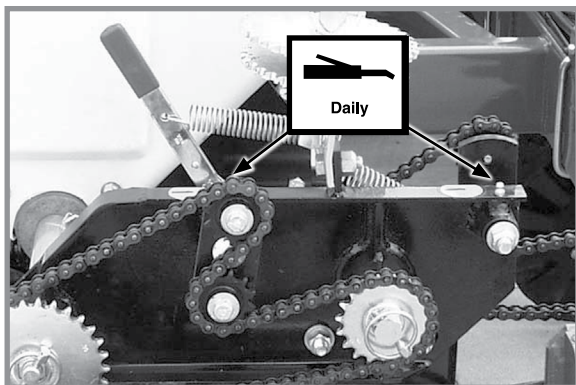
(Seals in gauge wheel arm are installed with lip facing out to allow grease to purge dirt away from seal. Pump grease into arm until fresh grease appears between washers and arm.)



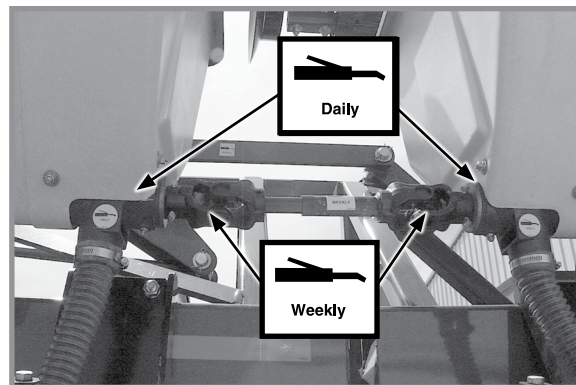
Residue wheel attachment for use with notched single disc fertilizer opener - 1



Notched single disc fertilizer opener - 1



Dry fertilizer transmission - 2 per transmission



Dry fertilizer hopper - 2 per hopper
U-joint - 1 per hinge area

MOUNTING BOLTS AND HARDWARE



WARNING

Parts separation can result in death, serious injury, and damage to property and equipment. Check all hardware is tight before operating planter the first time. Check all hardware again after first 50 hours of operation and beginning of each planting season.






NOTICE

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

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

TORQUE VALUES CHART - PLATED HARDWARE

| Diameter | Grade 2 (No marks)  | | Grade 5 (3 marks)  | | Grade 8 (6 marks)  | |
|----------|--|--------|--|---------|---|---------|
| | Coarse | Fine | Coarse | Fine | Coarse | Fine |
| 1/4" | 5.6 Nm | 6.3 Nm | 8.6 Nm | 9.8 Nm | 12 Nm | 14 Nm |
| 5/16" | 11 Nm | 12 Nm | 18 Nm | 19 Nm | 24 Nm | 27 Nm |
| 3/8" | 20 Nm | 23 Nm | 31 Nm | 35 Nm | 45 Nm | 50 Nm |
| 7/16" | 34 Nm | 37 Nm | 50 Nm | 56 Nm | 71 Nm | 79 Nm |
| 1/2" | 48 Nm | 54 Nm | 77 Nm | 87 Nm | 108 Nm | 122 Nm |
| 9/16" | 68 Nm | 81 Nm | 108 Nm | 122 Nm | 156 Nm | 176 Nm |
| 5/8" | 95 Nm | 108 Nm | 149 Nm | 169 Nm | 217 Nm | 244 Nm |
| 3/4" | 176 Nm | 197 Nm | 271 Nm | 298 Nm | 380 Nm | 427 Nm |
| 7/8" | 169 Nm | 190 Nm | 434 Nm | 475 Nm | 610 Nm | 678 Nm |
| 1" | 258 Nm | 278 Nm | 651 Nm | 719 Nm | 915 Nm | 1017 Nm |
| 1 1/8" | 359 Nm | 407 Nm | 814 Nm | 908 Nm | 1302 Nm | 1458 Nm |
| 1 1/4" | 508 Nm | 563 Nm | 1139 Nm | 1261 Nm | 1844 Nm | 2034 Nm |
| 1 3/8" | 664 Nm | 759 Nm | 1491 Nm | 1695 Nm | 2413 Nm | 2752 Nm |
| 1 1/2" | 881 Nm | 990 Nm | 1966 Nm | 2237 Nm | 3128 Nm | 3620 Nm |

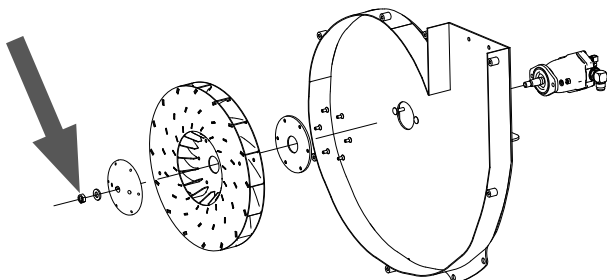
NOTE: Torque unplated hardware and bolts with lock nuts approximately 1/3 higher than above values. Torque bolts lubricated prior to installation to 70% of value shown in chart.

SPECIAL TORQUE VALUES

| | |
|--|--------|
| Row unit parallel linkage bushing hardware | 176 Nm |
| 5/8" No till coultter spindle hardware | 162 Nm |
| Center section transport tire lug nuts | 244 Nm |
| Wing ground drive tire lug bolts | 122 Nm |

CYLINDER TORQUE VALUES

| | |
|-----------|------------|
| 1/2"-20 | 75-95 Nm |
| 3/4"-16 | 156-169 Nm |
| 7/8"-14 | 203-244 Nm |
| 1"-14 | 373-447 Nm |
| 1 1/8"-12 | 407-508 Nm |
| 1 1/4"-12 | 407-508 Nm |




NOTE: Torque vacuum fan impeller assembly to motor shaft 5/8"-18 hex jam nut 68 Nm.

TIRE SERVICING

WARNING

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




To prevent tire explosions:

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

INFLATION SPECIFICATIONS

WARNING

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



Do not exceed the following maximum pressures:

- Rims stamped with “224”: 75 PSI (517 kPa) maximum pressure.
- Rims stamped with “276”: 100 PSI (689 kPa) maximum pressure.

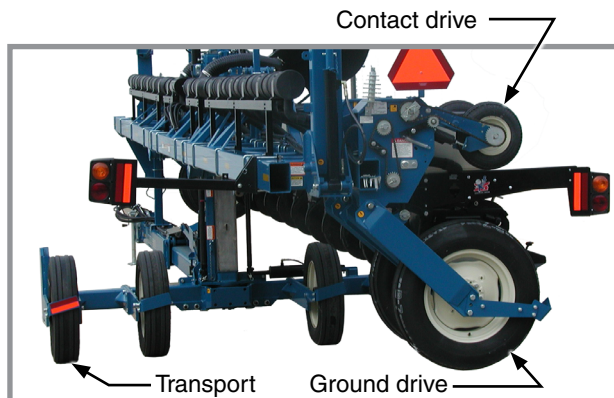
Transport (center section) 255-70R 22.5 (“224” rim)
 75 PSI (517 kPa) recommended/75 PSI (517 kPa) max.

Transport (center section) 255-70R 22.5” (“276” rim)
 75 PSI (517 kPa) recommended/100 PSI (689 kPa) max.

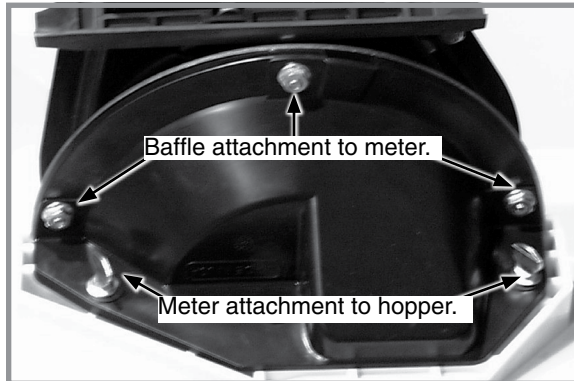
Ground drive (wings) 7.50" x 20"40 PSI (276 kPa)

Contact drive - 4.80" x 8"50 PSI (345 kPa)

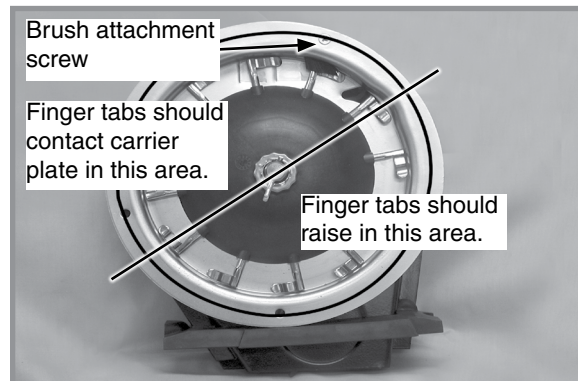
Liquid fertilizer piston pump 7.60" x 15"40 PSI (276 kPa)



FINGER PICKUP SEED METER INSPECTION/ADJUSTMENT

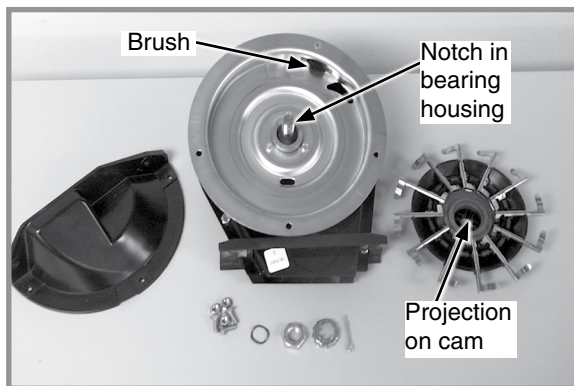


Removing meter and baffle

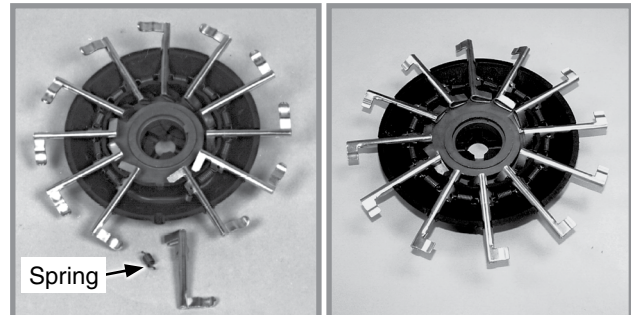


Proper finger operation

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



Finger pickup meter parts



Corn Finger Assembly
(Position Spring Opening
Toward Holder)

**Oil Sunflower Finger
Assembly**

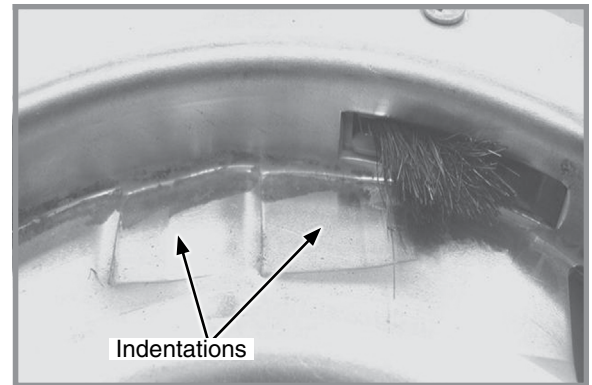
Buildup of debris or chaff may prevent proper finger operation and requires disassembly and cleaning of finger pickup meter.

1. Remove cotter pin, cover nut and adjusting nut and wave washer (If applicable) from drive shaft.
2. Carefully lift finger holder with fingers and cam off shaft and clean.
3. Check brush for wear and replace if necessary or after every 40 hectares per row of operation (Approximately 320 hectares of corn or sunflowers on a 8 row machine or 490 hectares on an 12 row machine).

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

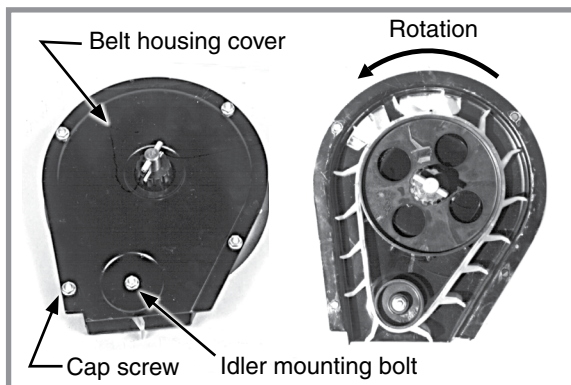
4. Remove springs from fingers and remove finger from holder by lifting it out of friction fit slot. Life expectancy of these parts is about 240-360 hectares per row of operation under average conditions.
5. Reassemble meter in reverse order after cleaning and replacing defective parts. Make sure open end of spring loop is toward inside of finger holder when replacing fingers.
6. Install fingers in holder so holder is flush with carrier plate when assembled. A cam projection aligns with a mating notch in bearing housing to ensure proper operation when assembled.

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

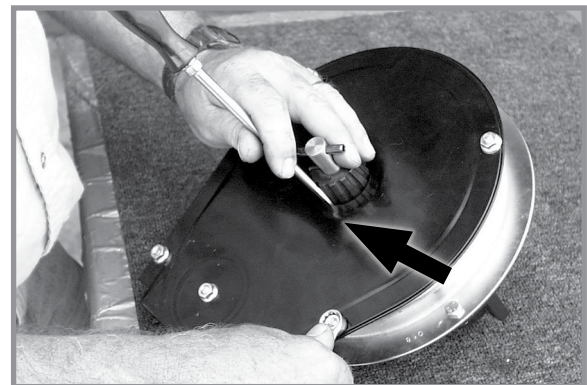


Worn carrier plate

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



Belt idler



Centering belt housing cover

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

NOTICE

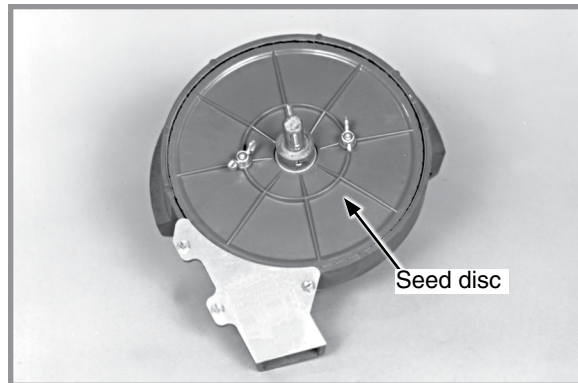
Do not over-tighten hardware or components may be damaged.

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.

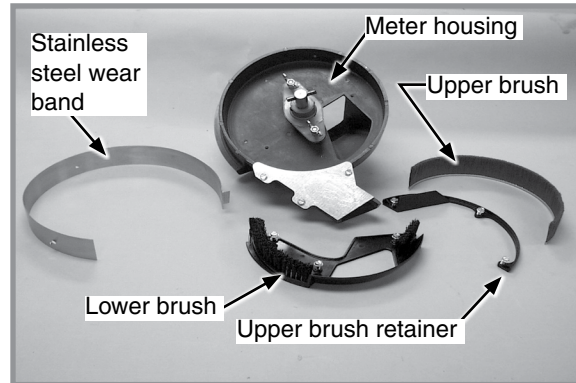
CLEANING FINGER PICKUP SEED METER FOR STORAGE

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 inhibitor.
4. Rotate finger assembly so finger does not touch brush.
5. Reassemble and store in a dry, rodent-free location.

BRUSH-TYPE SEED METER MAINTENANCE



Brush-type seed meter seed disc installed

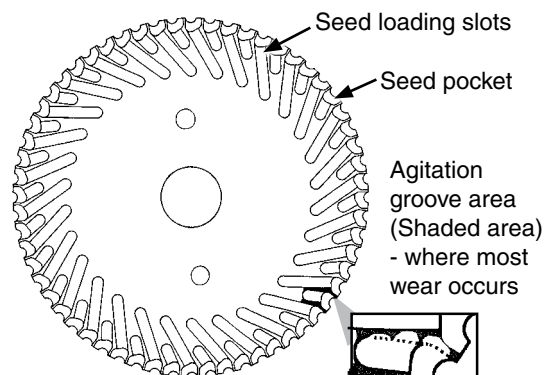


Brush-type seed meter parts

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

SEED DISC WEAR

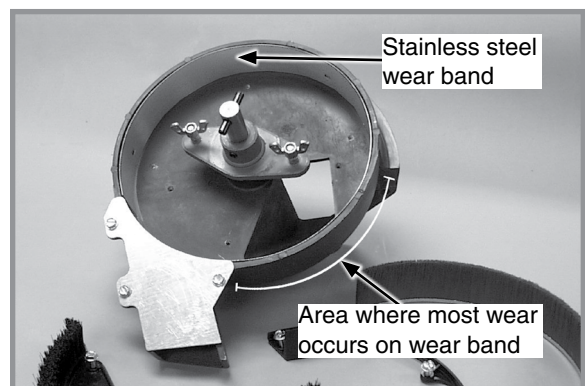
Most seed disc wear is found in the agitation groove area (area between seed loading slots). Wear affects planting accuracy at high RPM. Lay a straight edge across disc surface at agitation groove area and measure gap between disc and straight edge. If agitation groove areas are worn in excess of 0.76 mm and accuracy starts to drop off at higher meter RPM, replace seed disc. Estimated seed disc life expectancy under normal operating conditions is approximately 80 hectares per row. Severe operating conditions such as dust, lack of lubrication or abrasive seed coating could reduce seed disc life expectancy to under 40 hectares per row.



STAINLESS STEEL WEAR BAND

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

Stainless steel wear band protects meter housing from wear and is 0.76 mm thick. Replace wear band when there is approximately 0.5 mm of wear in primary wear area. Estimated life expectancy of stainless steel wear band is 100-325 hectares per row.



Stainless steel wear band

UPPER BRUSH

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

Replace upper brush at 50-160 hectares per row of use or sooner if damage or excessive wear is found. Position upper brush into inner perimeter of seed retention area. Make sure base of brush is tight against bottom of meter housing. Install brush retainer and three hex head screws. Tighten screws in sequence shown in photo at right.

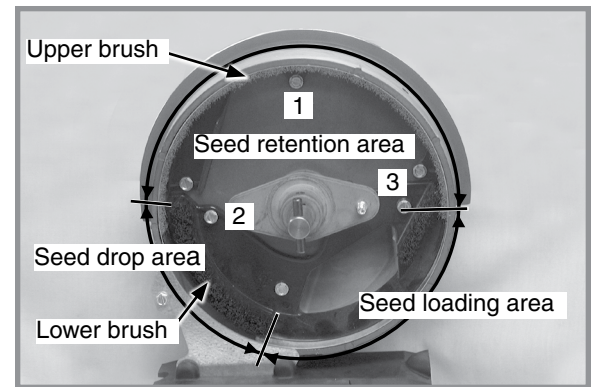
NOTE: Use GD11122 upper brush retainer for soybean and cotton discs. Use GD8237 upper brush retainer for milo/grain sorghum discs.

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 100-325 hectares per row. Replace lower brush if bristles are deformed or missing, or if there are cracks in brush retainer.

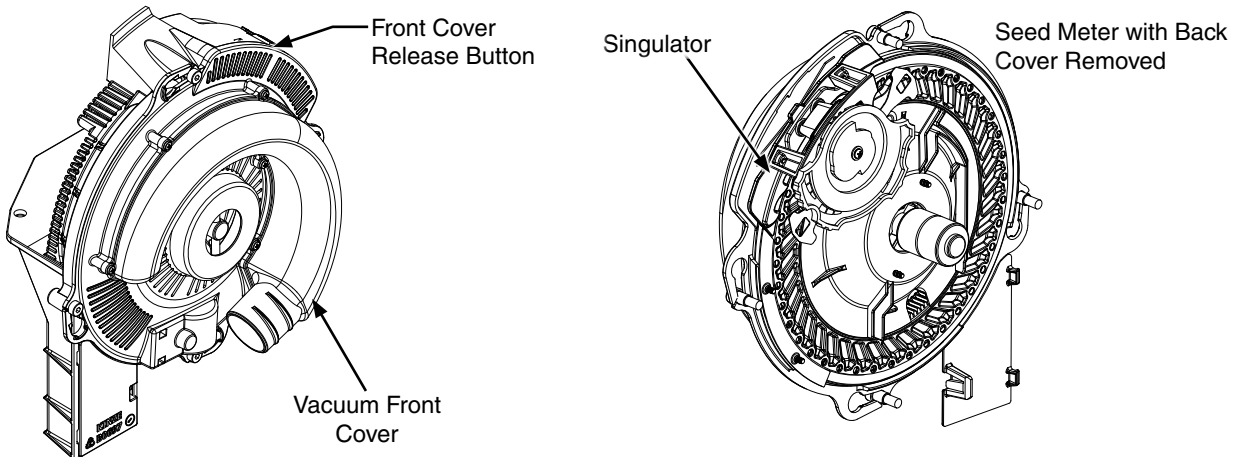
CLEANING BRUSH-TYPE SEED METER FOR STORAGE

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



Upper brush installation

VACUUM SEED METER MAINTENANCE



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

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

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

Inspect singulator blades and guide for wear after every 80 hectares per row of operation. If adjustment of singulator blade does not affect meter performance or if blades appear worn, singulator blade may need to be replaced.

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

See ["Preparation for Storage" on page 6-37](#) for additional Vacuum Seed Metering System maintenance.

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

SEED METER CLEANOUT

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

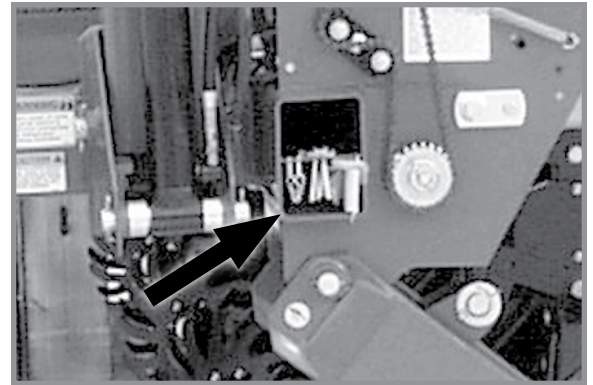
Thorough seed meter cleanout is important to maintain genetic purity.

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

CHAIN TENSION ADJUSTMENT

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

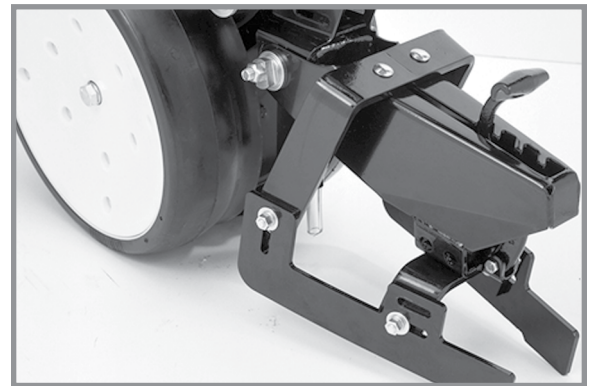
Additional chain links are stored inside planter frame.



Additional chain links

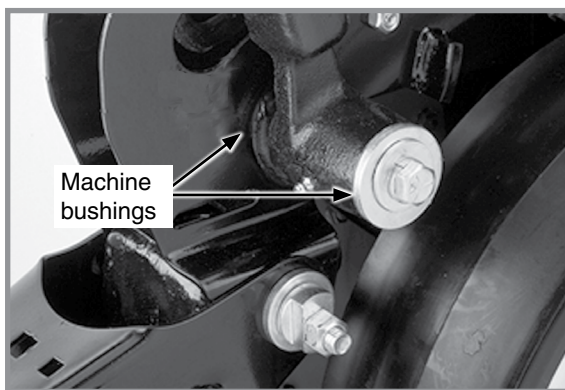
DRAG CLOSING ATTACHMENT

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

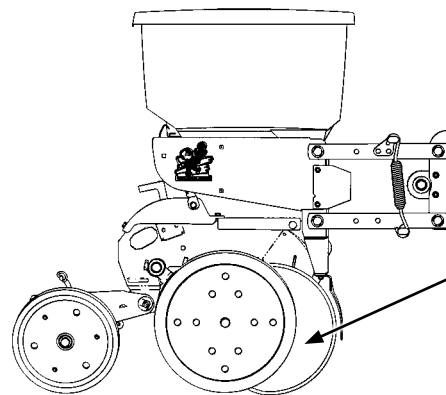


Drag Closing Attachment

GAUGE WHEEL ADJUSTMENT



Machine bushings



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

Gauge wheel adjustment

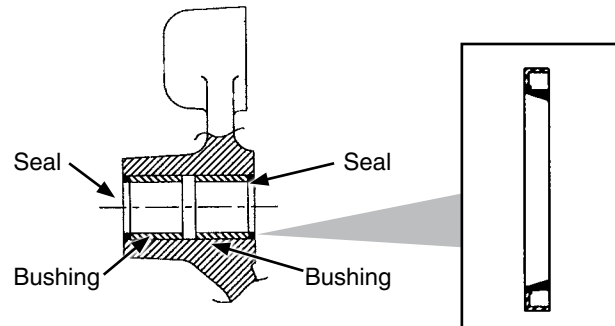
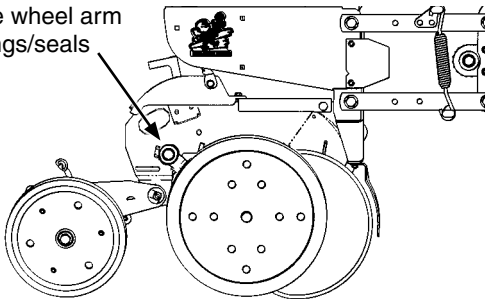
Gauge wheels should lightly contact opener blades to prevent accumulation of dirt or trash. Gauge wheels and opener blades should turn with only slight resistance.

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

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

GAUGE WHEEL ARM BUSHING/SEAL REPLACEMENT

Gauge wheel arm
bushings/seals



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

1. Remove gauge wheel from arm.
2. Remove gauge wheel arm from shank assembly.
3. Remove seal and bushing and discard. Clean and dry inner bore.
4. Drive/press replacement bushing inside bore of arm to a depth of 3.2 mm (.125") below flush.
5. Coat wiping edge of seal with grease.
6. Drive/press seal into place with lip to outside.

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

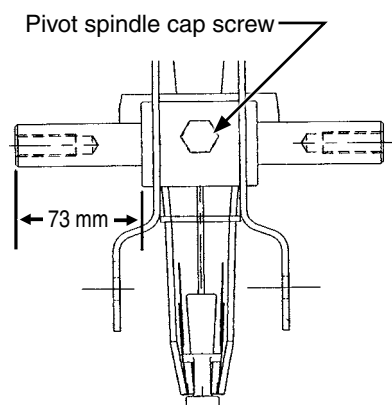
7. Inspect gauge wheel pivot spindle.
8. Reinstall gauge wheel arm assembly and gauge wheel.

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

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

GAUGE WHEEL ARM PIVOT SPINDLE REPLACEMENT

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



15" SEED OPENER DISC BLADE/BEARING ASSEMBLY

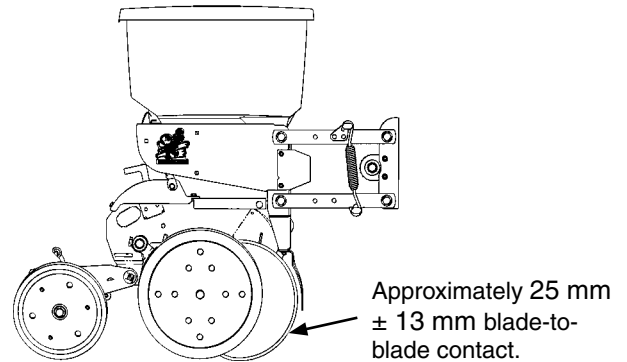
NOTICE

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

Maintain approximately 25 mm \pm 13 mm 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 25 mm \pm 13 mm of contact.

NOTE: Proper blade clearance is critical. Blades should have 25 mm \pm 13 mm contact in this area. When blades are turned by hand in opposite directions against each other, there should be only light resistance to turning. Re-adjust blade scraper if necessary to center it between the blades.

NOTE: Replace blades if proper blade-to-blade contact cannot be maintained after relocating machine bushings or if blade diameter wears below 37 cm.



REPLACE DISC BLADE/BEARING ASSEMBLY

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

1. Remove gauge wheel, scraper, and bearing dust cap.
2. Remove cap screw, washer and disc blade/bearing assembly. Machine bushings between shank and disc blade are used to maintain approximate 25 mm \pm 13 mm of blade-to-blade contact.

NOTICE

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

3. Install machine bushing(s), new disc blade bearing assembly, washer and cap screw. Torque $\frac{5}{8}$ "-11 Grade 5 cap screw to 150 Nm.

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

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

REPLACE BEARING ONLY

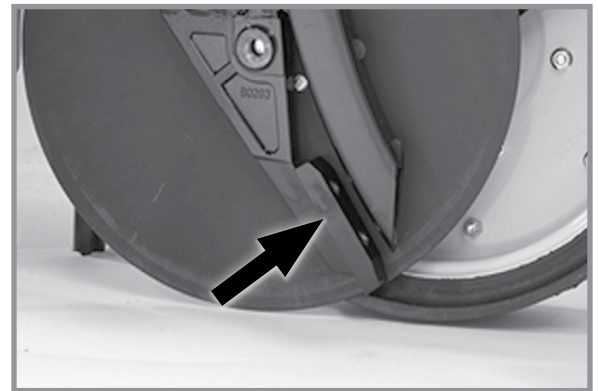
1. Remove gauge wheel, scraper, bearing cap, cap screw, washer and disc blade/bearing assembly.
2. Remove $\frac{1}{4}$ " rivets from bearing housing to expose bearing.
3. Installing new bearing. install three evenly spaced $\frac{1}{4}$ " cap screws into three of six holes in bearing housing to hold bearing and bearing housing in place. Install rivets in other three holes. Remove $\frac{1}{4}$ " cap screws and install rivets in those three holes.
4. Reinstall disc blade/bearing assembly, washer and cap screw. Torque $\frac{5}{8}$ "-11 cap screw to 150 Nm.
5. Install bearing dust cap, scraper, and gauge wheel.

SEED TUBE GUARD/INNER SCRAPER

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

Remove seed tube and check for wear. Excessive wear on seed tube indicates a worn seed tube guard. Replace seed tube guard if it measures 16 mm or less at lower end. A new seed tube guard measures approximately 22 mm.

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



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

NOTICE

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

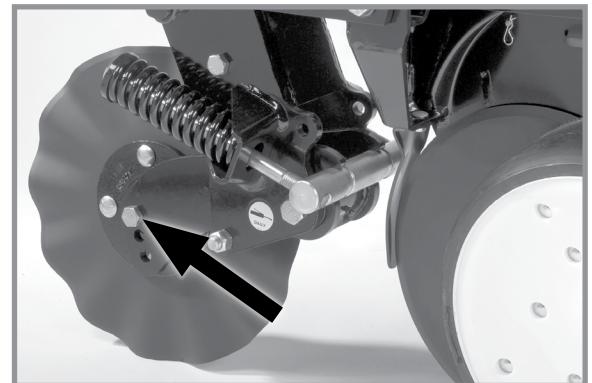
Remove seed tube and two hex socket head cap screws that attach seed tube guard. Hold replacement seed tube guard centered between seed opener disc blades. Install hex socket head cap screws. **DO NOT TIGHTEN.** Using a clamp or vise-grip, squeeze opener blades together in front of seed tube guard. Tighten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

FRAME MOUNTED COULTER

NOTE: Torque 5/8" spindle hardware to 163 Nm

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

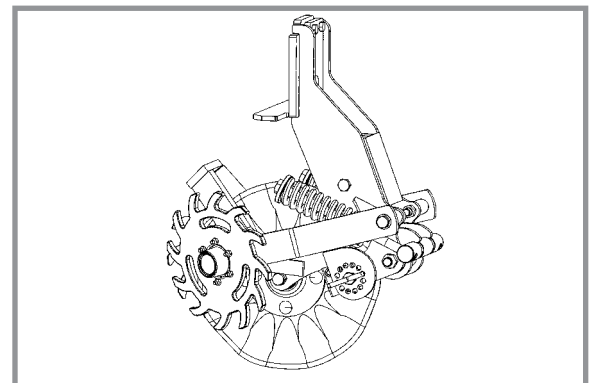
Replace 16" (40.6 cm) diameter coulters blade (1" fluted, 1" bubbled or 3/4" fluted) when worn to 37 cm (maximum allowable wear).



Frame mounted coulters spindle

RESIDUE WHEELS (FOR USE WITH FRAME MOUNTED COULTER)

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



Frame mounted coulters residue wheels

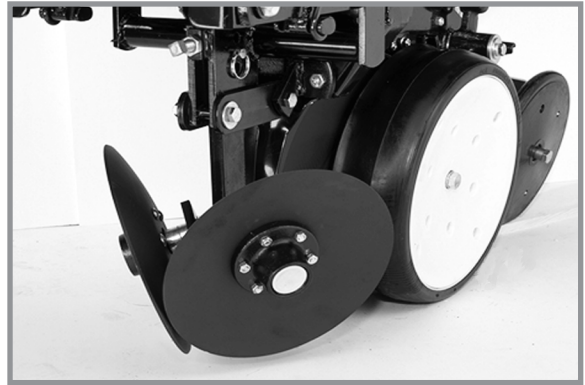
ROW UNIT MOUNTED DISC FURROWER

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 176 Nm.

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" (30.5 cm) diameter blades when worn to 28 cm.



Row unit mounted disc furrower

ROW UNIT MOUNTED NO TILL COULTER

Check nuts and hardware periodically for proper torque. Be sure coulters are positioned square with row unit and aligned in front of row unit disc opener.

NOTE: Torque 5/8" spindle hardware to 162 Nm.

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" (40.6 cm) diameter coulters when worn to 37 cm.



Row unit mounted no till coulters

COULTER MOUNTED RESIDUE WHEELS

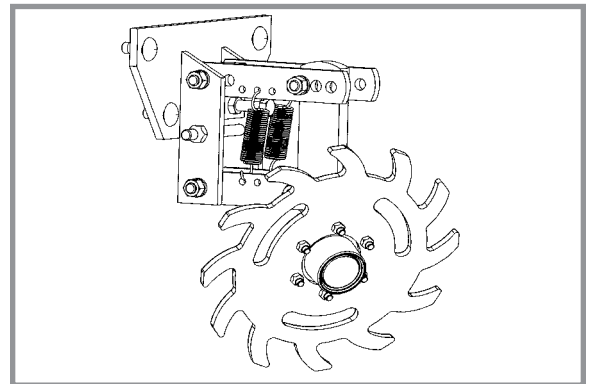
Wheel hubs are equipped with sealed bearings. If bearings sound or feel rough when wheel is rotated, replace them.



Coultter mounted residue wheels

ROW UNIT MOUNTED RESIDUE WHEEL

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

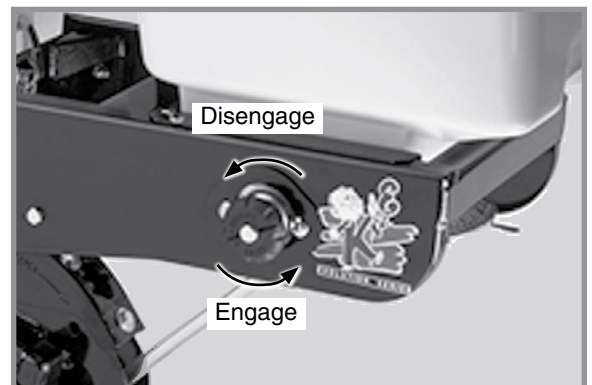


Row unit mounted residue wheels

GRANULAR CHEMICAL ATTACHMENT

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

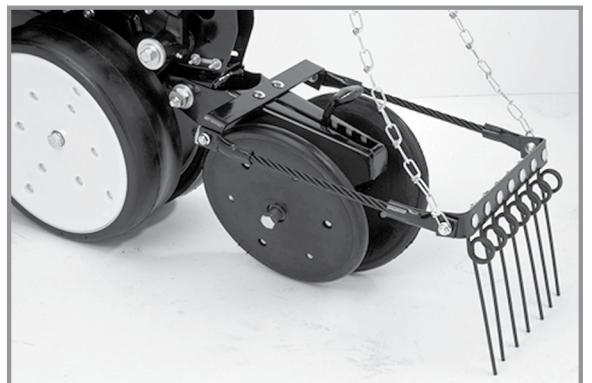
Install hoppers and chains. Check chain alignment.



Granular chemical throwout knob

SPRING TOOTH INCORPORATOR

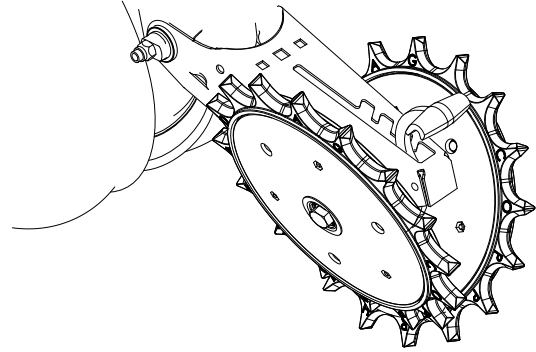
Before storing planter, inspect each spring tooth incorporator and replace worn or broken parts. Check for loose hardware and tighten as needed.



Spring tooth incorporator

SPIKED CLOSING WHEEL

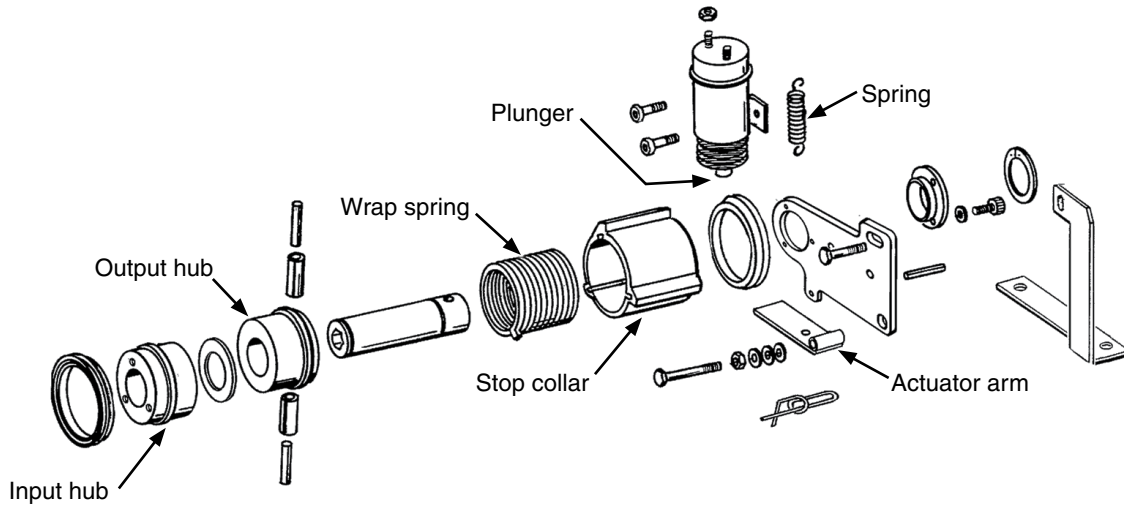
Inner parts of spiked closing wheel will begin to wear at approximately 70% of life. Flip/reverse wheel to utilize remaining life of wheel.



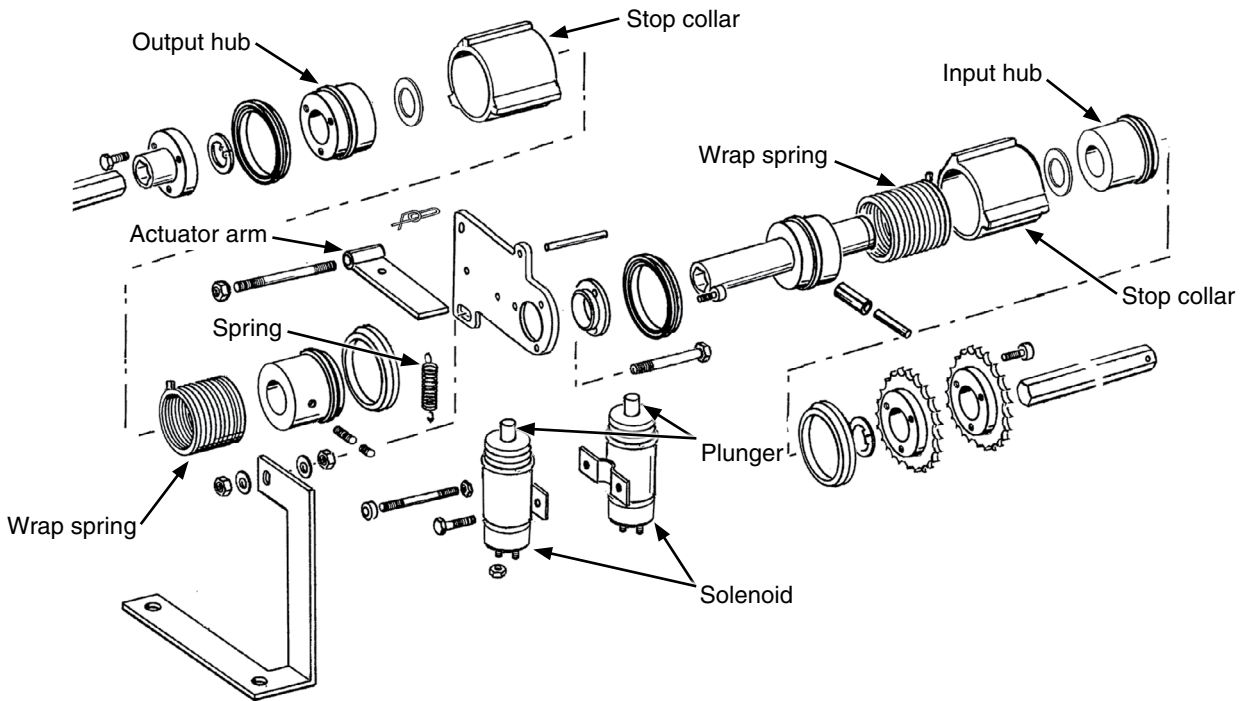
Row Unit Spiked Closing Wheel

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.

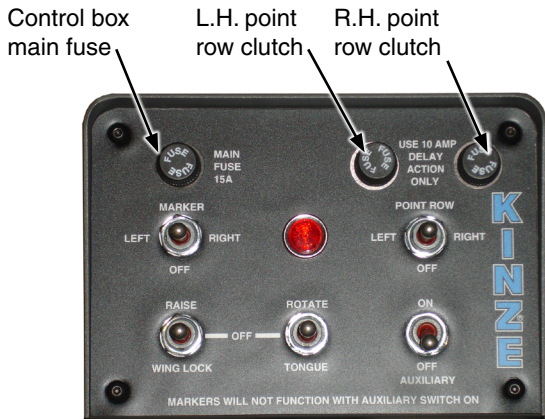


Single point row clutch main parts

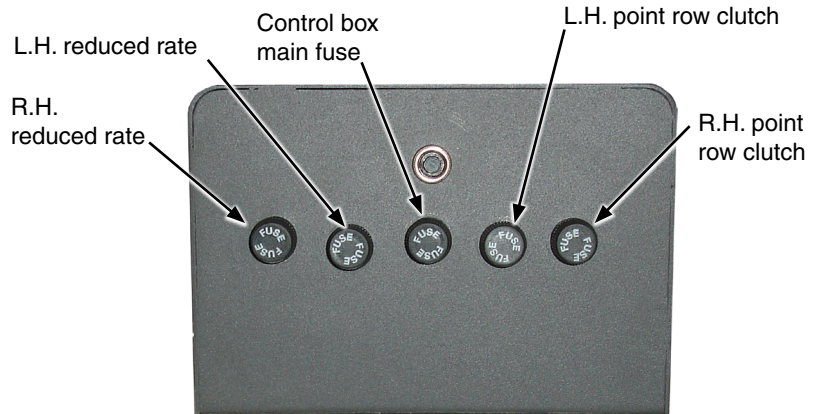


Two-speed point row clutch main parts

TESTING AND FUSE REPLACEMENT



Single speed point row clutch control box (Front View)



Two-speed point row clutch control box (Rear view)

NOTE: Replace all point row fuses with MDL 10 amp slow blow fuses.

If the clutch or clutches fail to operate, first 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.

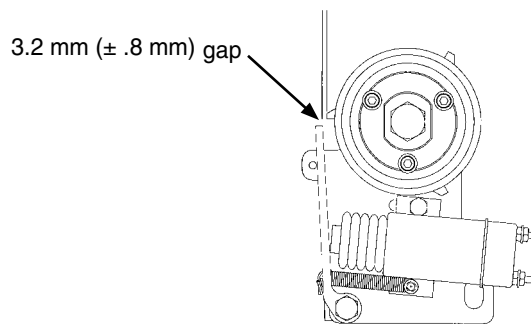
NOTE: R.H. clutch operates clockwise and L.H. clutch operates counterclockwise. Clutch parts such as the wrap spring are side specific. Use correct repair part if a clutch must be repaired.

Also see "Point Row Clutch Troubleshooting" in Troubleshooting section.

ACTUATOR ARM ADJUSTMENT

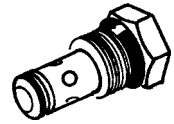
Gap between actuator arm and stop on stop collar should be 3.2 mm (± .8 mm) when solenoid is NOT engaged.

Loosen nut on mounting pin and move pin in slot until there is a 3.2 mm (± .8 mm) gap between arm and stop on stop collar. Retighten nut.



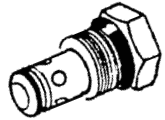
CHECK VALVE (LIFT SYSTEM)

Check valves, located in valve block on right side of center post, trap oil flow in planter's lift system to keep toolbar level during field operation. Consult your Kinze Dealer for service.



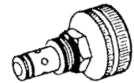
CHECK VALVE (VACUUM FAN)

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



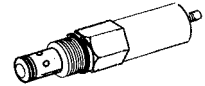
FLOW CONTROL VALVE

Flow control valves should be adjusted for row marker raise and lower speed as part of assembly procedure or upon initial operation. If valve fails to function properly or requires frequent adjustment, it should be removed for inspection. Check for foreign material and contamination on valve and seating areas of valve body. Replace defective components.



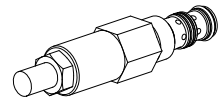
PRESSURE RELIEF VALVE

If pressure relief valve does not release tongue lock or function properly, remove valve from valve block and check for foreign material or if O-ring is leaking internally. Replace if defective.



PRESSURE REDUCING RELIEF VALVE

If wings do not properly stay to ground, plumb into butt end of cylinder to test PSI. Proper setting is 750 PSI (5171 kPa).

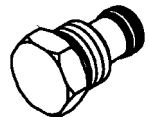


NOTICE

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

RELIEF VALVE CARTRIDGE

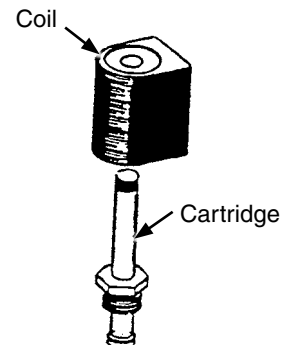
Pressure relief valve located in valve block below vacuum fan motor assembly helps prevent damage to vacuum fan motor by limiting pressure in the motor case drain line. It is set to open at 35 PSI (241 kPa). If valve fails to function properly, it should be removed for inspection. Check for foreign material and contamination on valve and the seating area of valve body. Replace if defective.



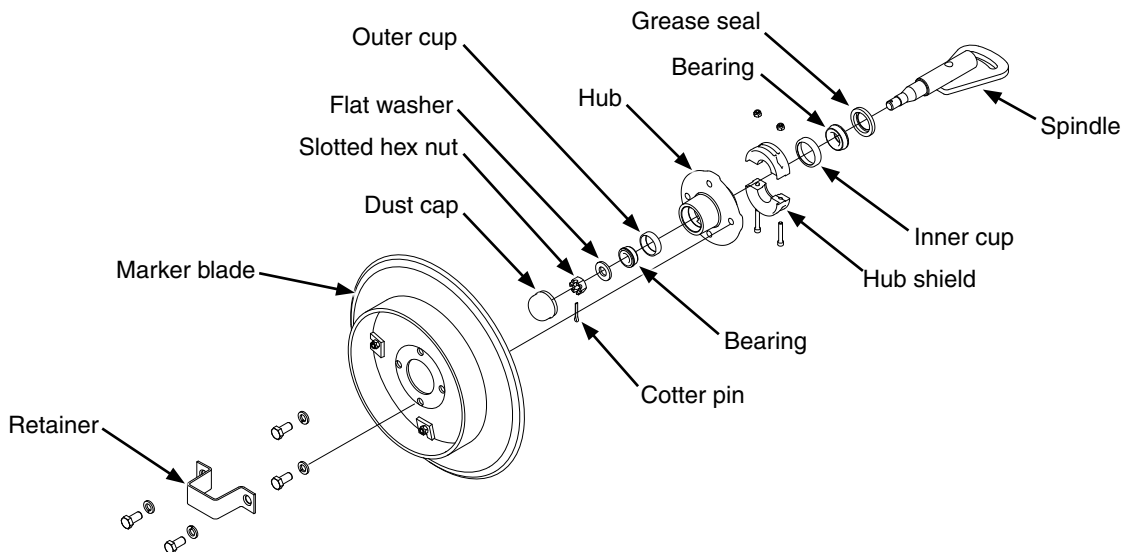
SOLENOID VALVE

Solenoid valve consists of a chambered body with an electric coil actuated cartridge valve.

If solenoid or solenoids fail to operate, first determine if problem is electrical or hydraulic. If valve is working properly, a click will be heard when solenoid coil is energized and valve stem opens. If no sound is heard, check solenoid coil by touching top of coil housing with a metallic object such as a pliers or screwdriver. If coil is working properly, coil housing will be strongly magnetized when energized. If voltage to coil is low it will be weakly magnetized when energized and no click will be heard.



ROW MARKER BEARING LUBRICATION OR REPLACEMENT

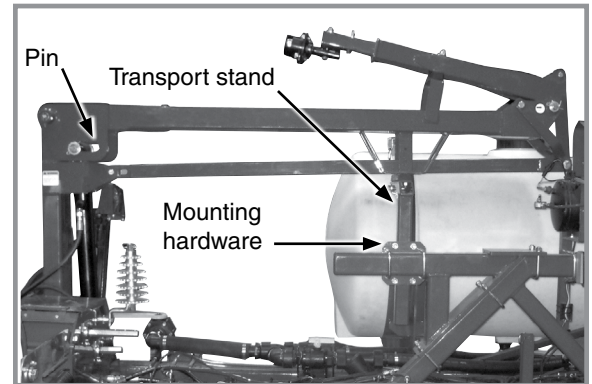


1. Remove retainer and marker blade.
2. Remove dust cap from hub.
2. Remove hub shield. Note direction of installation.
3. Remove cotter pin, slotted hex nut, and washer.
4. Slide hub from spindle.
5. Remove bearings and cups and discard if bearings are being replaced. Clean hub and dry. Remove bearings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

ROW MARKER TRANSPORT STAND ADJUSTMENT

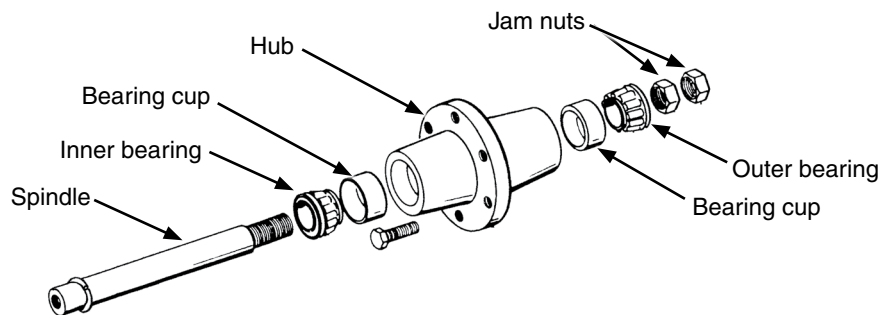
Row marker transport stands must be correctly adjusted to allow marker cushion cylinders to function properly.

1. Raise markers to transport position.
2. Loosen mounting hardware to allow transport stands to drop down or remove transport stands.
3. With tractor engine shutoff, release hydraulic pressure on marker cylinders.
4. Locate transport stands so marker arm rests lightly on transport stand. When transport stands are correctly adjusted pin at rod end of cylinder should be loose enough to rotate and move back and forth in mounting slot.



Row marker transport stand

WHEEL BEARING REPACK OR REPLACEMENT

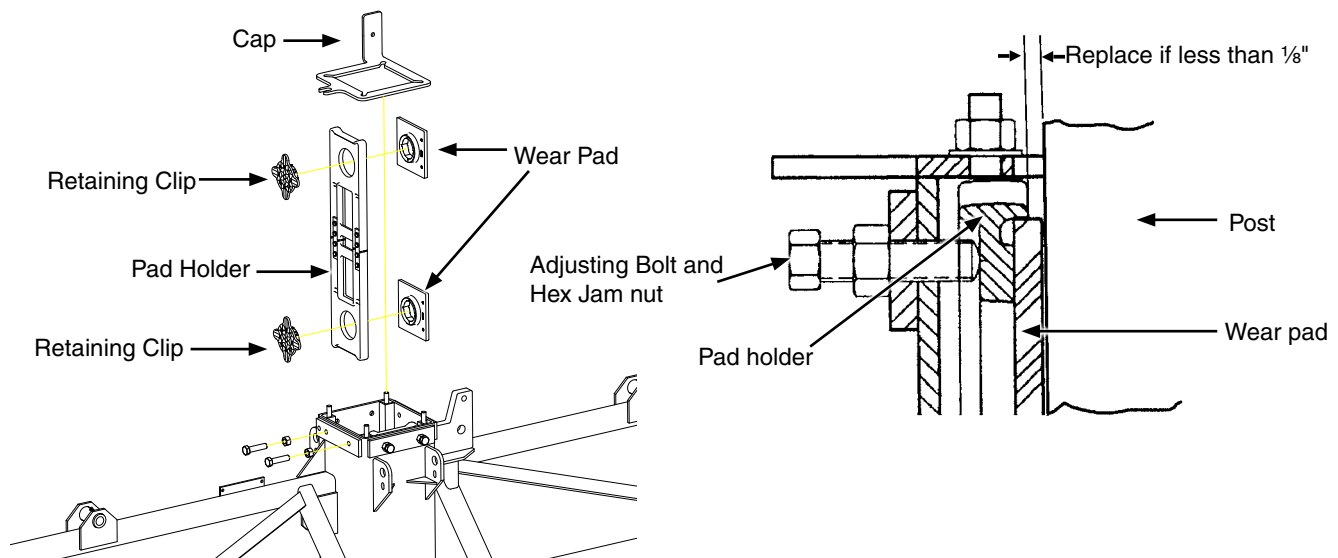


1. Raise tire clear of ground and remove wheel.
2. Remove double jam nuts and slide hub from spindle.
3. Remove bearings and cups and discard if bearings are being replaced. Clean hub and dry. Remove bearings only and not cups if repacking.
4. Press in new bearing cups with thickest edge facing in. (Bearing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

WEAR PAD FIELD REPLACEMENT/ADJUSTMENT

NOTICE

Over tightening wear pads will cause premature wear and excessive hydraulic lift pressures. Torque wear pads to 14 Nm. Do not over tighten wear pads.



Planter center section is constructed around a steel tubular frame with four wear pad assemblies riding against a stainless steel clad center post. Two wear pads and retaining clips are held by a pad holder and locked in place by $\frac{3}{4}$ " adjusting bolts and hex jam nuts. Inspect pads for wear and adjustment annually to ensure center section is stabilized and planter tracks properly. Pads should make full light contact with center post when properly adjusted. Too much preload on pads will cause hydraulic lift pressure to be higher than necessary or will not allow planter to raise when loaded.

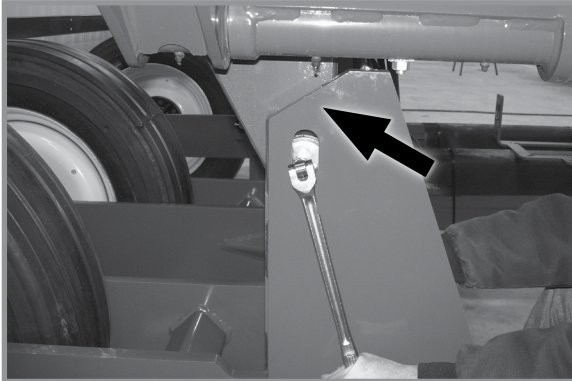
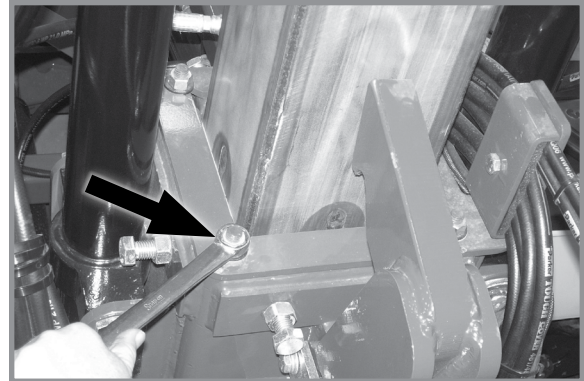
1. Position planter on a level surface and place in raised field position.

NOTE: Replace wear pad when worn to less than $\frac{1}{8}$ ".

2. Visually check four upper wear pads. Each wear pad should lightly contact stainless steel clad center post.
3. Place planter in raised transport position, install all safety lockups and visually check four lower wear pads for light contact.
4. Remove lockup and lower planter to field operation position. Loosen cap mounting nuts to allow wear pad adjustment. Loosen hex jam nuts as needed.

NOTE: Cap mounting nuts MUST be loosened before adjusting wear pads.

5. Tighten pad adjusting bolts, back off, and then torque wear pads to 14 Nm. Hold adjusting bolt from turning and torque hex jam nuts to 271 Nm.
6. Operate to full height on post and recheck for zero clearance.

MAJOR PAD ADJUSTMENT**Loosen cam rollers****Loosen four cap mounting nuts**

1. Loosen cam rollers so they move freely.
2. Lower planter to field operation position and release wing locks. Eliminate all uplift on planter frame by backing off row unit down pressure springs and uplift on any other planter attachments.
3. Check position of center frame to axle cam roller guides. Gap between guides and frame should be the same side to side. Gap on back sides of roller guide should be equal on both sides. Final adjustment will be done later.
4. Loosen four cap mounting nuts.


NOTE: Cap mounting nuts MUST be loosened before adjusting wear pads.

5. Loosen hex jam nuts and use pad adjusting bolts to position frame to center correctly.

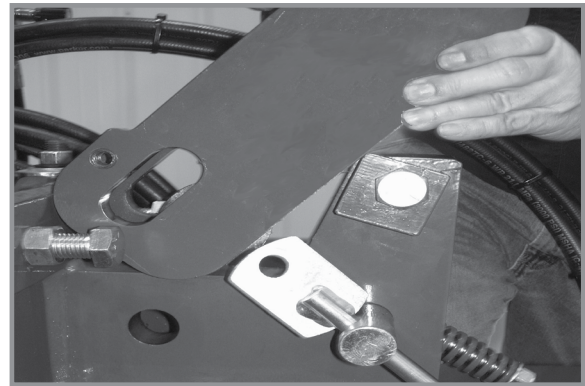
| | |
|---------------|---|
| NOTICE | <p>Over tightening wear pads will cause premature wear and excessive hydraulic lift pressures. Torque wear pads to 14 Nm. Do not over tighten wear pads.</p> |
|---------------|---|

6. Tighten pad adjusting bolts, back off, and then torque wear pads to 14 Nm. Hold adjusting bolt from turning and torque hex jam nuts to 271 Nm.
7. Tighten cap mounting nuts.
8. Reset row unit down pressure and other attachments.

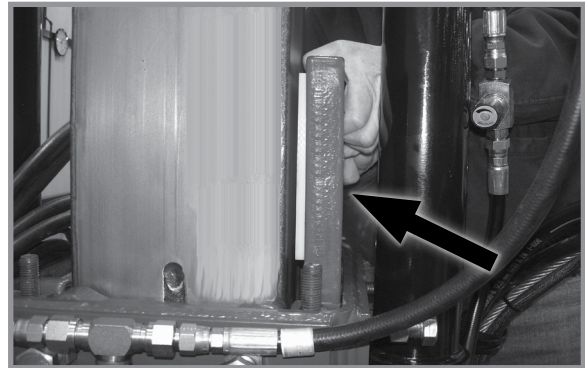
PAD REPLACEMENT

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

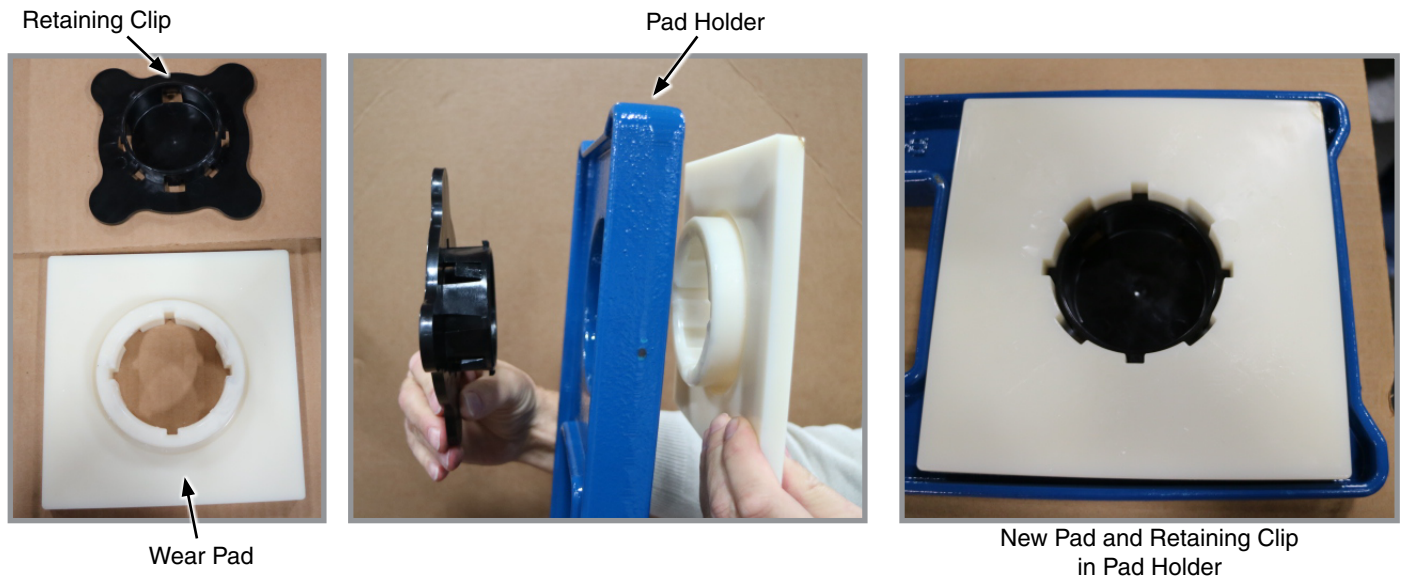
- a. Loosen cam rollers so they move freely as shown.
- b. Lower planter to field operation position and release wing locks.
- c. Eliminate all uplift on planter frame by backing off row unit down pressure springs and uplift on any attachments.
- d. Remove safety hook.
- e. Disconnect hydraulic hose, remove nut on bulkhead fitting, and remove fitting from cap.
- f. Loosen four cap mounting nuts and remove pad holder cap.
- g. Loosen pad hex jam nuts, back pad bolts out, and remove four pad holder assemblies. Remove and discard old pads.



Removing safety hook



Removing Pad Holder Assembly

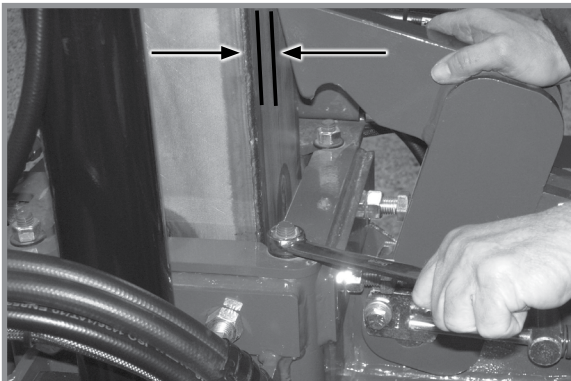


- h. Install new pad using retaining clip. Repeat for other side of pad holder.
- i. Reinstall pad holder in center section.

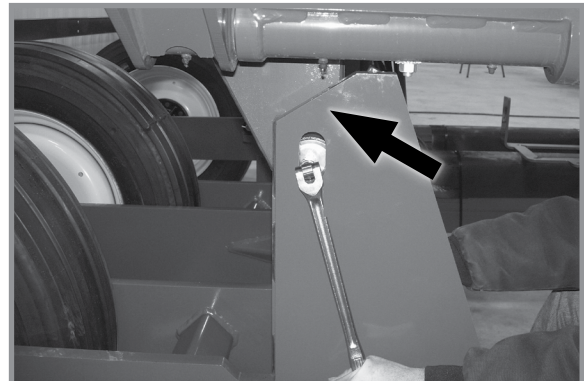
NOTICE

Over tightening wear pads will cause premature wear and excessive hydraulic lift pressures. Torque wear pads to 14 Nm. Do not over tighten wear pads.

- j. Tighten pad adjusting bolts, back off, and then torque wear pads to 14 Nm. Hold adjusting bolt from turning and torque hex jam nuts to 271 Nm.
- k. Reinstall cap and tighten cap mounting nuts.
- l. Reinstall hydraulic hose, fittings, and safety hook.



Adjust safety hook clearance to 6.4 mm - 9.5 mm



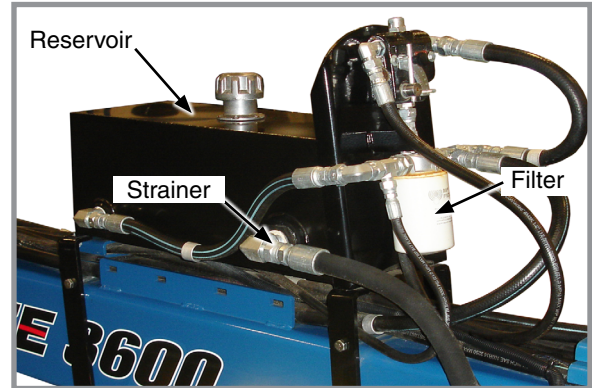
Adjust and tighten cam roller

- m. Adjust stop on safety hook to 6.4 mm- 9.5 mm clearance.
- n. Rotate cam roller against front guide and tighten to 149 Nm. Make sure gap between roller guide and center frame are equal on both sides. Raise planter out of roller guides and lower back down into roller guides to be sure roller guides operate smoothly. Adjust rotation cylinder rod as needed.
- o. Reset row unit down pressure and other attachments.

TRACTOR MOUNTED PTO PUMP AND OIL COOLER OPTION

Drain reservoir, clean strainer and change filter annually.

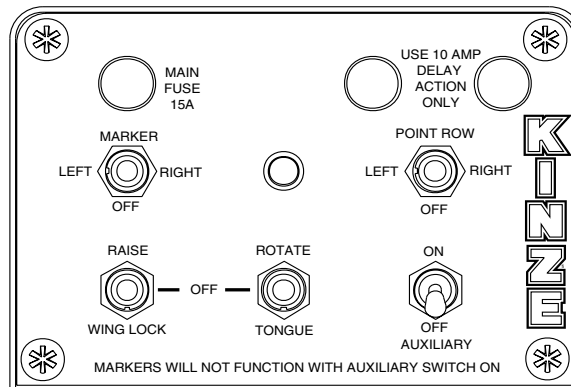
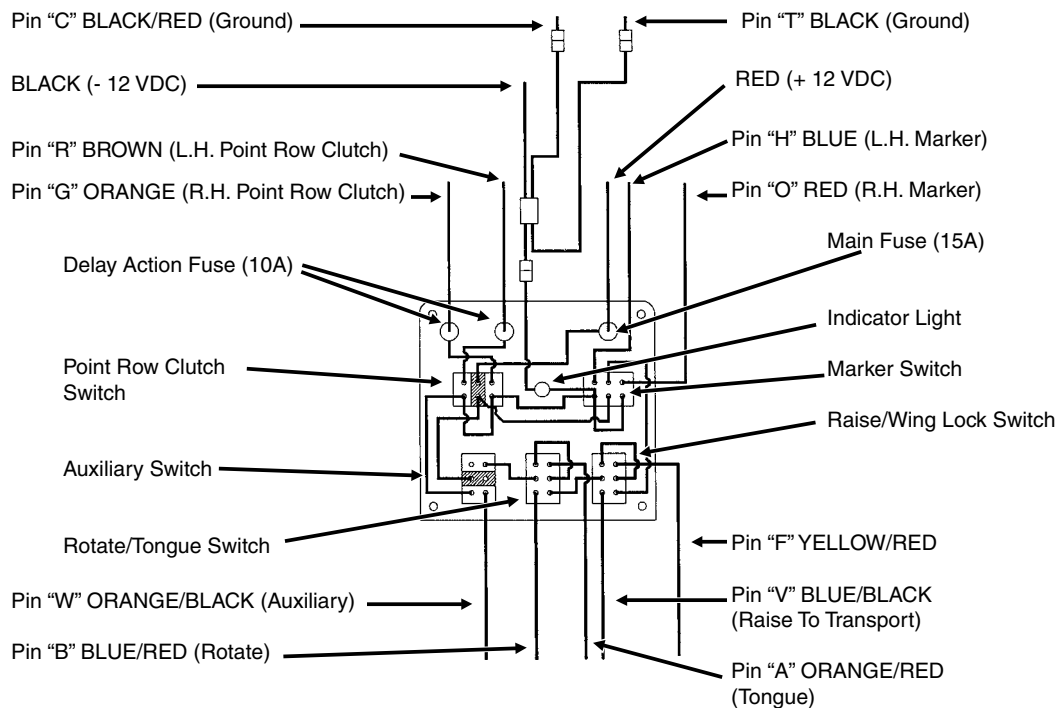
1. Disconnect suction line (hose between reservoir and pump) from reservoir and drain. To fully drain tank, raise
2. Replace filter with good quality 10 micron filter.
3. Fill system with SAE 10W-20 multigrade wide temperature range transmission hydraulic fluid. Reservoir capacity is approximately 10 gallons.
4. Start system and run with tractor at idle and fan turned off for 1-2 minutes. Switch fan to full speed and run with tractor at idle for 1-2 minutes.
5. Check reservoir fluid level and fill as required. Hydraulic fluid level should be within 1"-2" from top of reservoir after pump has run and hydraulic hoses have been primed to allow fluid to expand when heated.
6. Bring tractor to PTO speed and adjust flow control to the desired vacuum level using the flow control valve lever.



Hydraulic reservoir

ELECTRICAL CONTROL CONSOLE SCHEMATIC

NOTE: Disconnect control console from tractor battery before doing any electrical work. Keep wiring harnesses away from high temperature areas or sharp edges. DO NOT route wiring harnesses along battery cables. Use cable ties to keep wire harness away from moving parts on tractor and planter. Be sure tractor frame ground connections are clean to provide good electrical contact.



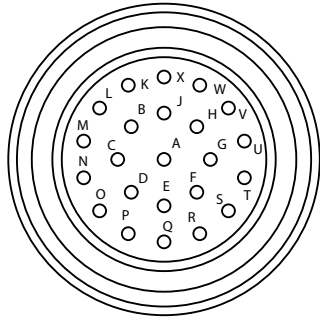
NOTE 1. Operating marker or point row switch in either direction lights panel light.

NOTE 2. Point row clutch switch operates independently from rest of control box.

NOTE 3. Power to marker switch is fed through auxiliary switch and two transport function switches. Operating any switch in lower row disables marker function and turns off panel light. (If point row clutch switch is OFF.)

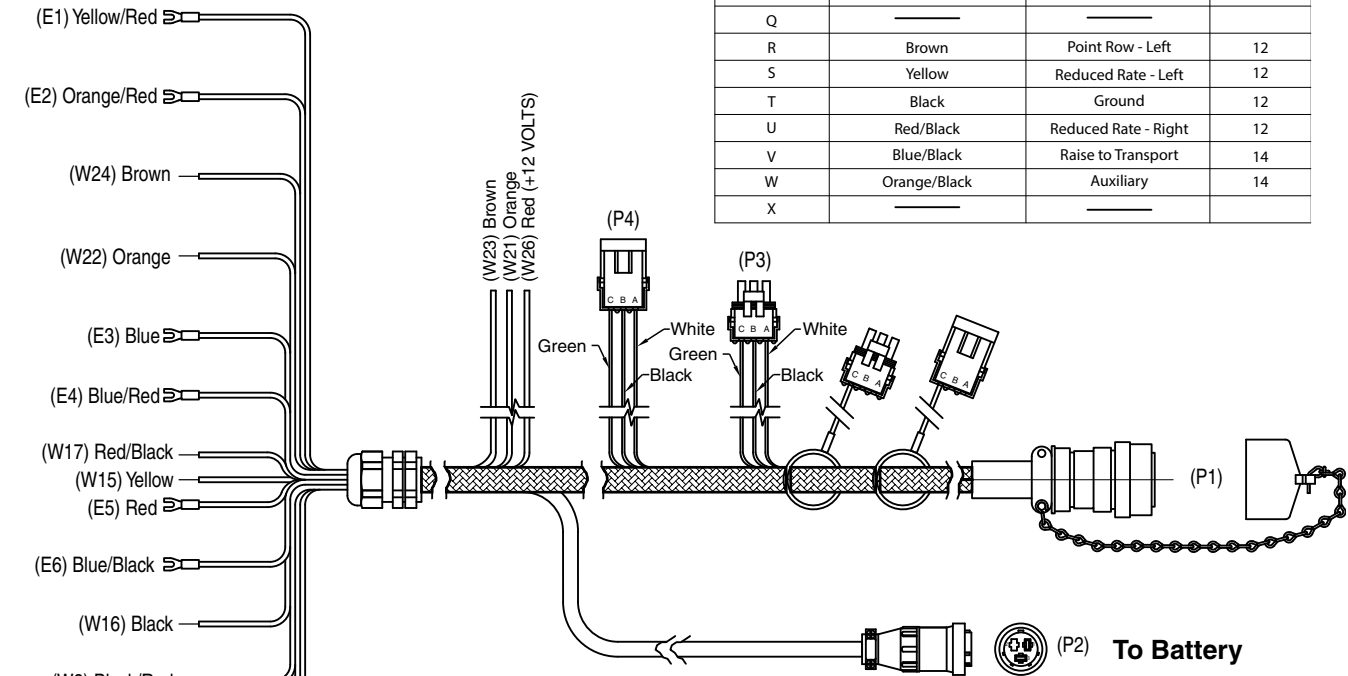
See electrical control console schematic and wiring harness at two-speed point row clutch solenoids for planter equipped with optional Two-Speed Point Row Clutch Package in this section.

ELECTRICAL WIRING HARNESS SCHEMATIC (On Tractor)



23 Socket Capacity

| Pin No. | Wire Color | Function | Wire Ga. |
|---------|--------------|----------------------|----------|
| A | Orange/Red | Tongue Raise | 14 |
| B | Blue/Red | Fold | 14 |
| C | Black/Red | Ground | 14 |
| D | White | Monitor B 12V | 14 |
| E | Green | Monitor B DATA | 14 |
| F | Yellow/Red | Wing Lock | 14 |
| G | Orange | Point Row - Right | 12 |
| H | Blue | Marker - Left | 14 |
| J | Black | Monitor B Ground | 14 |
| K | White | Monitor A 12V | 14 |
| L | Green | Monitor A Data | 14 |
| M | Black | Monitor A Ground | 14 |
| N | --- | --- | --- |
| O | Red | Marker - Right | 14 |
| P | --- | --- | --- |
| Q | --- | --- | --- |
| R | Brown | Point Row - Left | 12 |
| S | Yellow | Reduced Rate - Left | 12 |
| T | Black | Ground | 12 |
| U | Red/Black | Reduced Rate - Right | 12 |
| V | Blue/Black | Raise to Transport | 14 |
| W | Orange/Black | Auxiliary | 14 |
| X | --- | --- | --- |



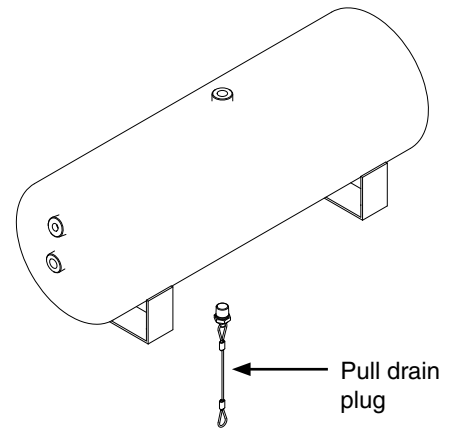
| Wire No. | From | Used W/Item | To | Used W/Item | Gauge | Color | Function |
|----------|------|-------------|------|-------------|-------|--------------|---------------------|
| W1 | P1-A | 3 | E2 | | 14 | Orange/Red | Tongue Raise |
| W2 | P1-B | 3 | E4 | | 14 | Blue/Red | Fold |
| W3 | P1-C | 3 | --- | | 14 | Black/Red | Ground |
| W4 | P1-D | 3 | P3-A | | 14 | White | Monitor B 12V |
| W5 | P1-E | 3 | P3-C | | 14 | Green | Monitor B Data |
| W6 | P1-F | 3 | E1 | | 14 | Yellow/Red | Wing Lock |
| W7 | P1-G | 3 | SP1 | | 12 | Orange | Point Row - R.H. |
| W8 | P1-H | 3 | E3 | | 14 | Blue | Marker - L.H. |
| W9 | P1-J | 3 | P3-B | | 14 | Black | Monitor B Ground |
| W10 | P1-K | 3 | P4-A | | 14 | White | Monitor A 12V |
| W11 | P1-L | 3 | P4-C | | 14 | Green | Monitor A Data |
| W12 | P1-M | 3 | P4-B | | 14 | Black | Monitor A Ground |
| W13 | P1-O | 3 | E5 | | 14 | Red | Marker - R.H. |
| W14 | P1-R | 3 | SP2 | | 12 | Brown | Point Row - L.H. |
| W15 | P1-S | 3 | --- | | 12 | Yellow | Reduced Rate - L.H. |
| W16 | P1-T | 3 | --- | | 12 | Black | Ground |
| W17 | P1-U | 3 | --- | | 12 | Red/Black | Reduced Rate - R.H. |
| W18 | P1-V | 3 | E6 | | 14 | Blue/Black | Raise to Transport |
| W19 | P1-W | 3 | E7 | | 14 | Orange/Black | Auxiliary |
| W20W1 | P2-1 | --- | SP3 | | 12 | Red | 12 VDC+ |
| W20W2 | P2-3 | --- | --- | | 12 | Black | 12 VDC- |
| W21 | SP1 | --- | --- | | 12 | Orange | Point Row - R.H. |
| W22 | SP1 | --- | --- | | 12 | Orange | Point Row - R.H. |
| W23 | SP2 | --- | --- | | 12 | Brown | Point Row - L.H. |
| W24 | SP2 | --- | --- | | 12 | Brown | Point Row - L.H. |
| W25 | SP3 | --- | --- | | 12 | Red | 12 VDC+ |
| W26 | SP3 | --- | --- | | 12 | Red | 12 VDC- |

PNEUMATIC DOWN PRESSURE AIR COMPRESSOR TANK

Moisture should be drained daily from the tank. Tank should be drained completely for storage.

To drain tank, locate drain plug on the bottom of tank. Stand off to the side of tank and pull cable attached to drain.

NOTE: If moisture is not drained from tank rust particles will form inside tank.



PREPARATION FOR STORAGE

Store planter in a dry sheltered area if possible.

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

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

Lubricate planter and row units at all lubrication points.

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

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

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

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

Clean breather on analog vacuum and pressure gauges.

Disassemble, clean and grease all U-joint slides.

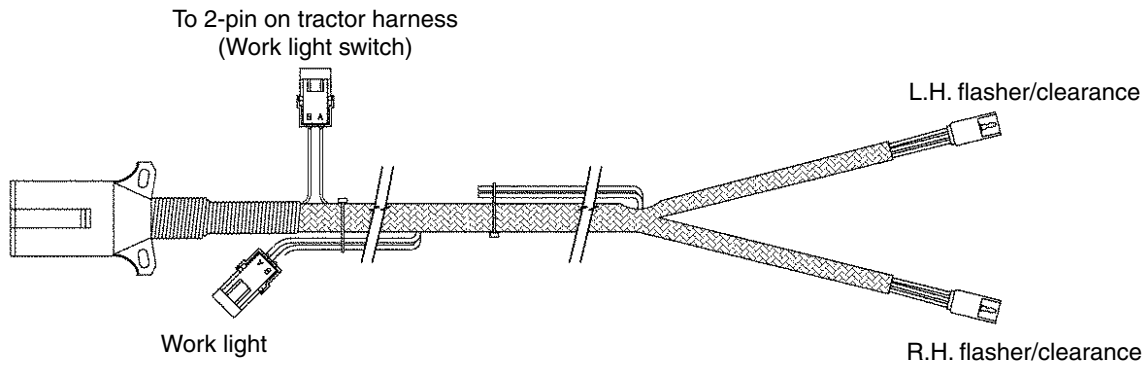
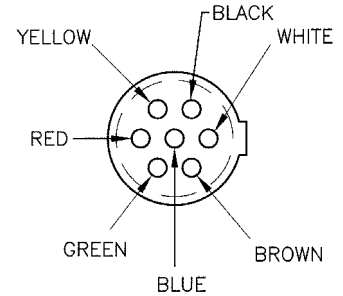
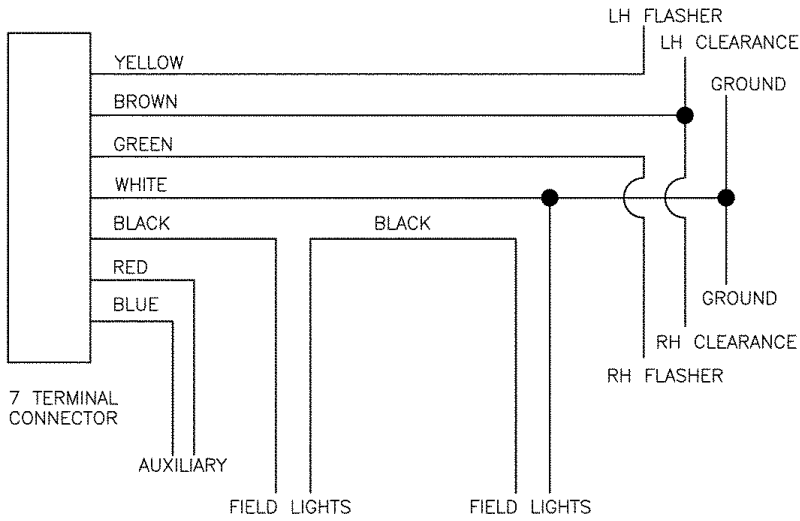
Grease or paint disc openers/blades and row marker disc blades to prevent rust.

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

Empty dry fertilizer hoppers. Clean hoppers. Disassemble and clean metering augers. Reassemble, coating all metal parts with rust preventative.

ELECTRICAL WIRING DIAGRAM FOR LIGHT PACKAGE

Machines with double light assemblies

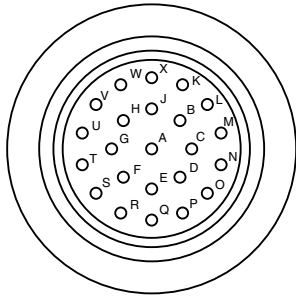


*** Optional customer-supplied auxiliary lights and wires may be wired into existing plug terminals.**

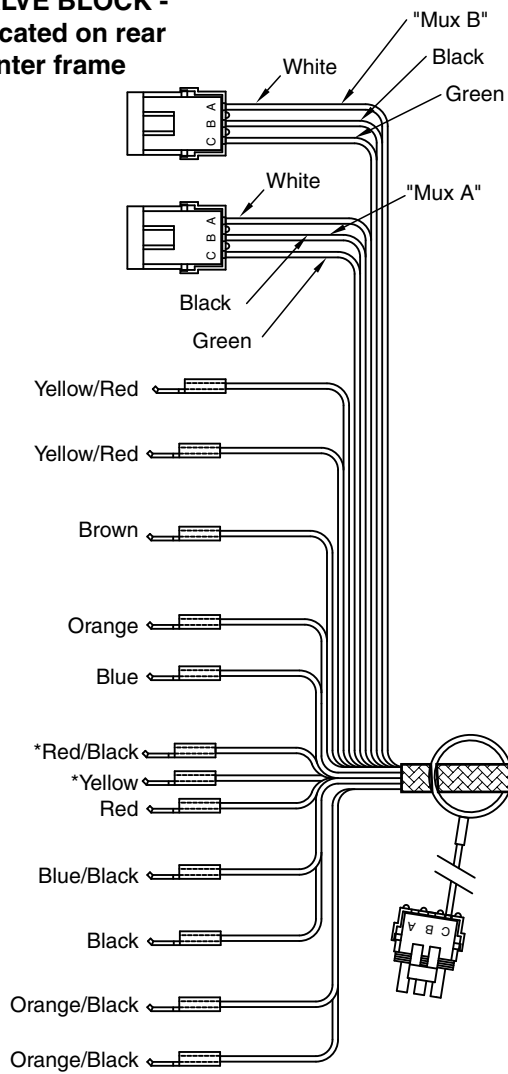
Model 3600 Twin-Line Planter safety light package meets ASAE Standards. Check with your tractor manufacturer for proper connection to your tractor.

ELECTRICAL WIRING HARNESS SCHEMATIC (On Planter)

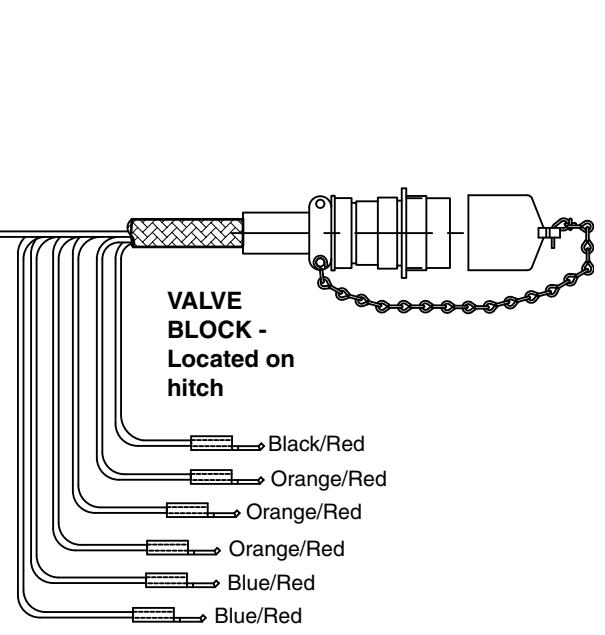
23 Socket Capacity



**VALVE BLOCK -
Located on rear
center frame**

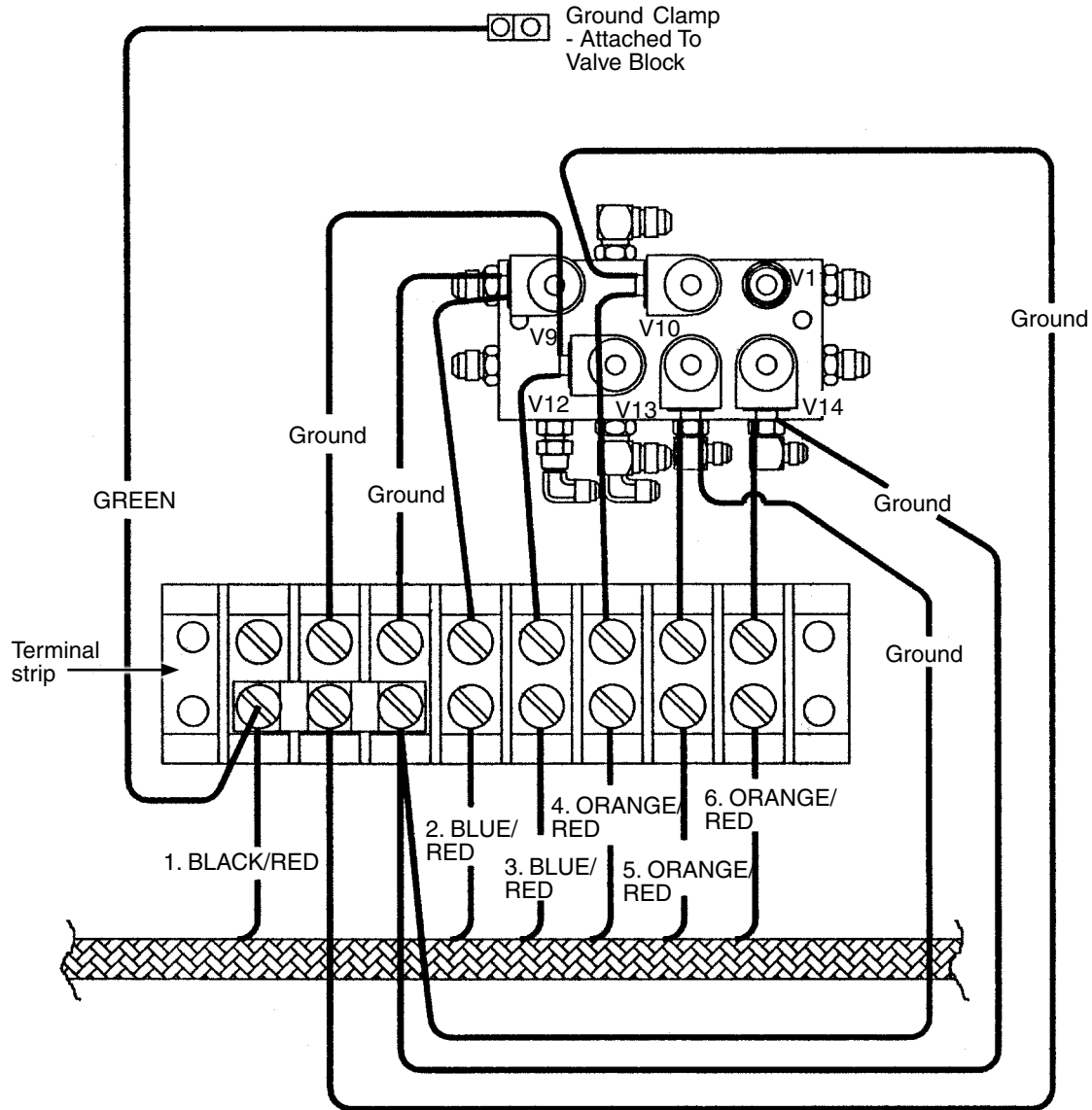


| Pin No. | Wire Color | Function | Wire Ga. |
|---------|--------------|-----------------------|----------|
| A | Orange/Red | Tongue Retract/Extend | 14 |
| B | Blue/Red | Fold | 14 |
| C | Black/Red | Ground | 14 |
| D | White | Monitor B 12V | 14 |
| E | Green | Monitor B Data | 14 |
| F | Yellow/Red | Wing lock | 14 |
| G | Orange | PT. Row - Right | 12 |
| H | Blue | Marker - Left | 14 |
| J | Black | Monitor B Ground | 14 |
| K | White | Monitor A 12V | 14 |
| L | Green | Monitor A Data | 14 |
| M | Black | Monitor A Ground | 14 |
| N | --- | --- | --- |
| O | Red | Marker - Right | 14 |
| P | --- | --- | --- |
| Q | --- | --- | --- |
| R | Brown | PT. Row - Left | 12 |
| *S | Yellow | Reduced Rate - Left | 12 |
| T | Black | Ground | 12 |
| *U | Red/Black | Reduced Rate - Right | 12 |
| V | Blue/Black | Raise to Transport | 14 |
| W | Orange/Black | Auxiliary | 14 |
| X | --- | --- | --- |



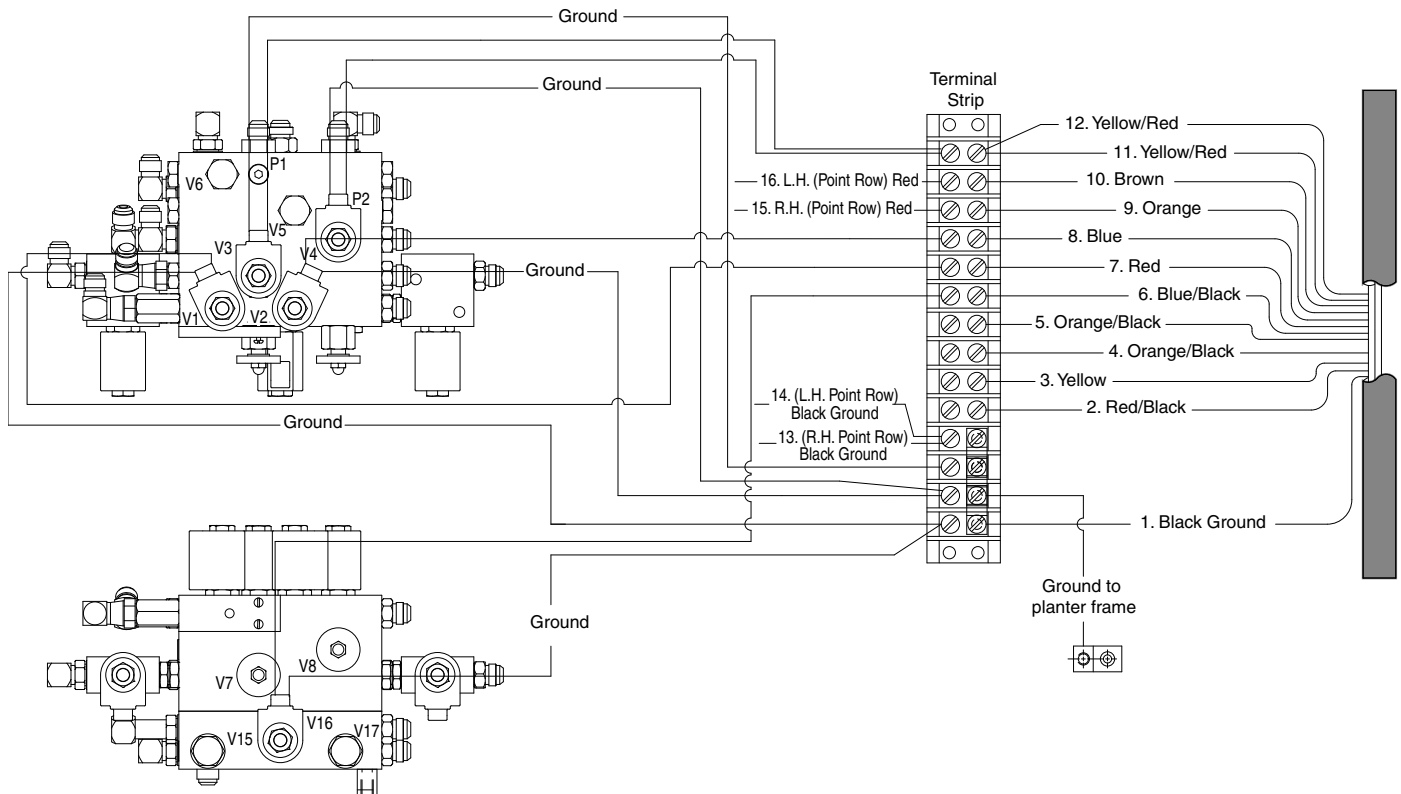
* See page 7-40 if equipped with optional two-speed point row clutch package.

VALVE BLOCK - LOCATED ON HITCH



- 1. BLACK/RED - Pin "C" (Ground)
- 2. BLUE/RED - Pin "B" (Rotate) - Port V9
- 3. BLUE/RED - Pin "B" (Rotate) - Port V12
- 4. ORANGE/RED - Pin "A" (Tongue) - Port V10
- 5. ORANGE/RED - Pin "A" (Tongue) - Port V13
- 6. ORANGE/RED - Pin "A" (Tongue) - Port V14

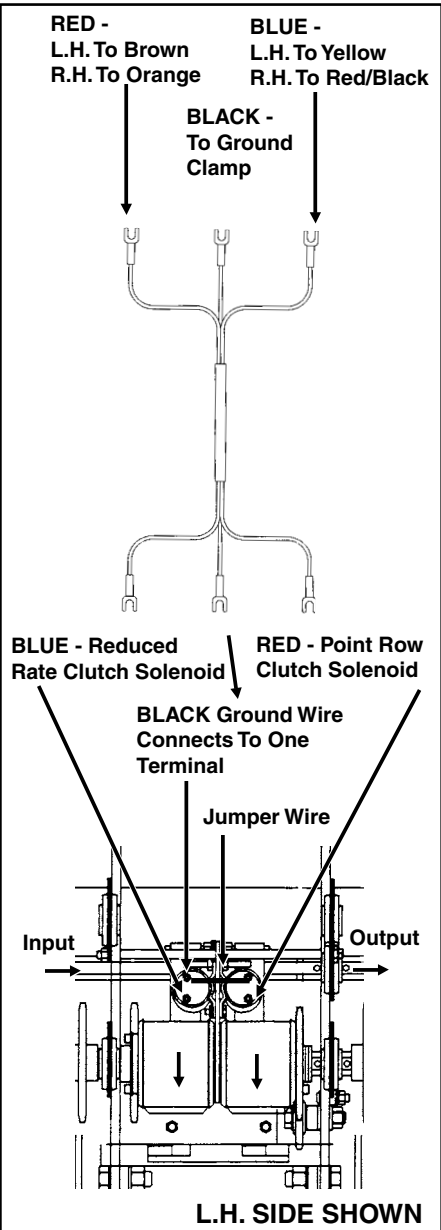
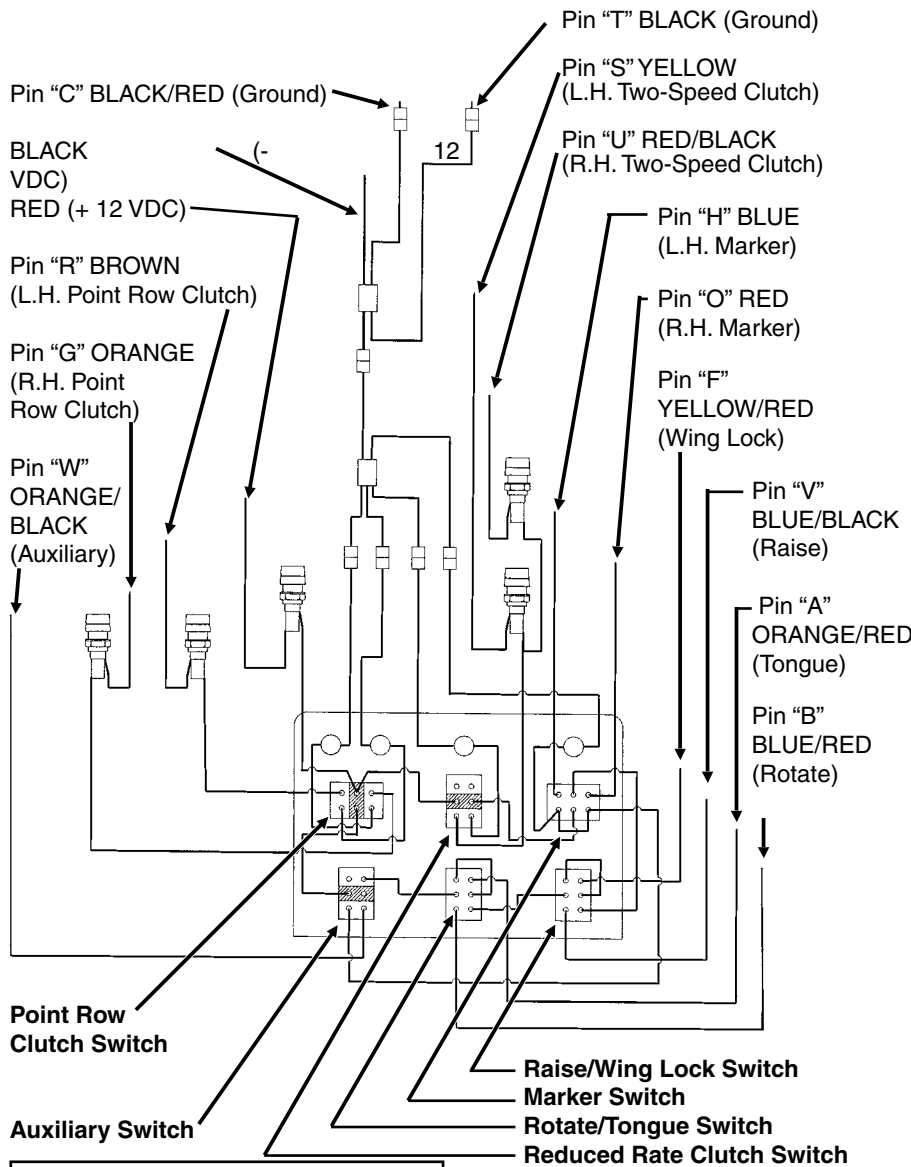
VALVE BLOCK - LOCATED ON REAR CENTER FRAME



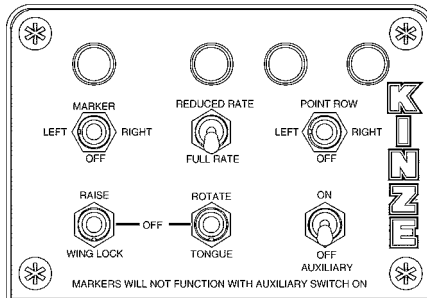
1. BLACK - Pin "T" (Ground)
2. RED/BLACK - Pin "U" (R.H. Two-Speed Clutch)*
3. YELLOW - Pin "S" (Le.H. Two-Speed Clutch)*
4. ORANGE/BLACK - Pin "W" (Auxiliary) - Ports V5 & V6
5. ORANGE/BLACK - Pin "W" (Auxiliary) - Ports V5 & V6
6. BLUE/BLACK - Pin "V" (Raise To Transport) - Port V16
7. RED - Pin "O" (R.H. Marker) - Port V1
8. BLUE - Pin "H" (L.H. Marker) - Port V2
9. ORANGE - Pin "G" (R.H. Point Row Clutch)
10. BROWN - Pin "R" (L.H. Point Row Clutch)
11. YELLOW/RED - Pin "F" (Wing Lock) - Ports V3 & V4
12. YELLOW/RED - Pin "F" (Wing Lock) - Ports V3 & V4
13. BLACK - (R.H. Point Row Ground)
14. BLACK - (L.H. Point Row Ground)
15. RED - (R.H. Point Row)
16. RED - (L.H. Point Row)

* See page 7-40 if equipped with optional Two-Speed Point Row Clutch Package.

ELECTRICAL CONTROL CONSOLE SCHEMATIC (With Optional Two-Speed Point Row Clutches) AND WIRING HARNESS AT TWO-SPEED POINT ROW CLUTCH SOLENOIDS





NOTE: Disconnect control console from tractor battery before doing any electrical work. Keep wiring harnesses away from high temperature areas or sharp edges. DO NOT route the wiring harnesses along battery cables. Use tie straps to keep wire harness away from moving parts on tractor and planter. Be sure ground connections to tractor frame are clean to provide good electrical contact.



- NOTE:**
1. Point row and reduced rate clutch switches operate independently from rest of control console.
 2. Marker switch power is fed through auxiliary switch and two transport function switches. Operating any switches in lower row disables marker function and turns marker panel light off.

HYDRAULIC HOSE LIFE

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

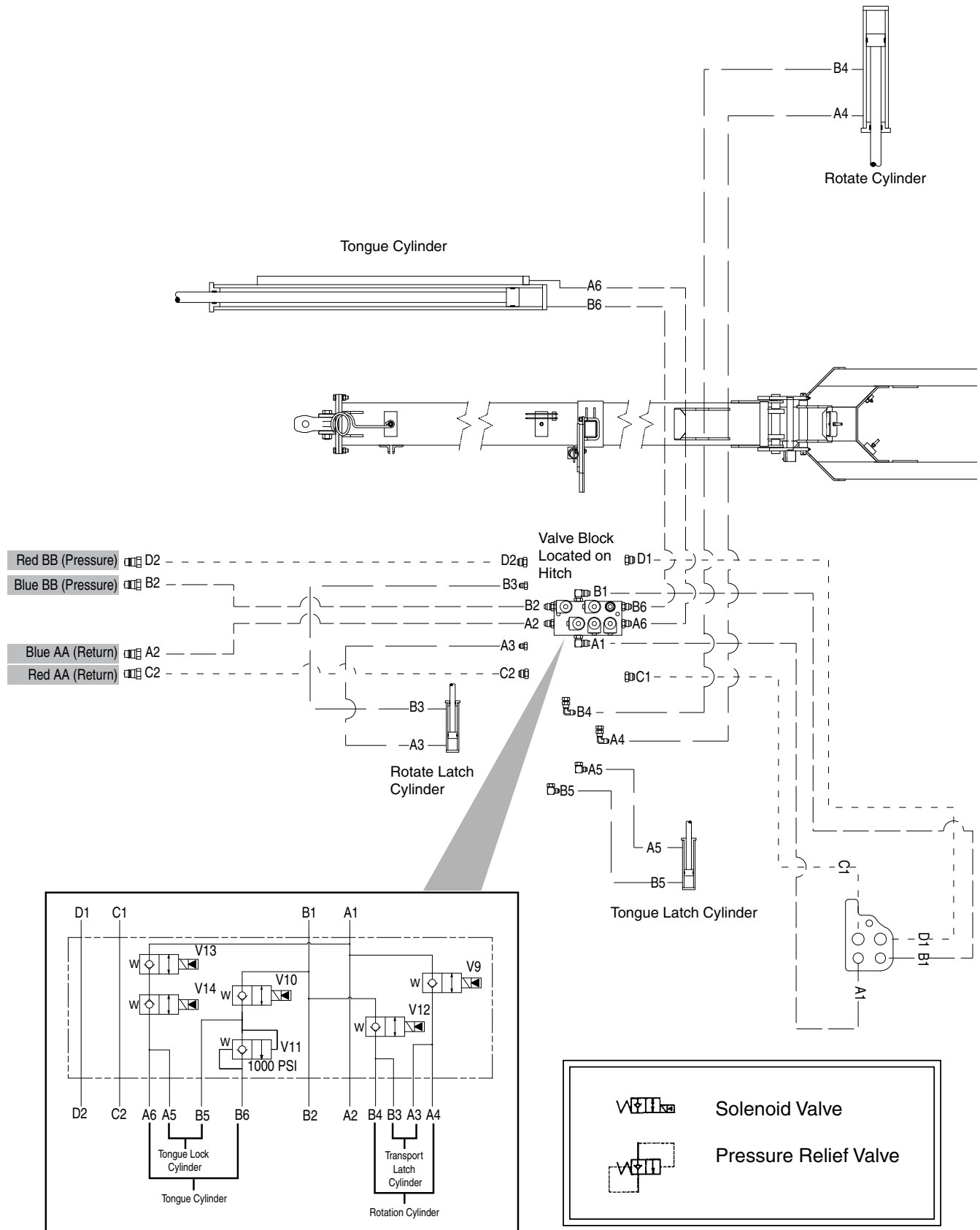


Proper storage of hydraulic hoses can significantly increase the life of the hoses, for a period of three to five years. After this period, service life of hoses may decrease, depending on variables such as variances in rubber materials and storage environment. Refer to the guidelines below for best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

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

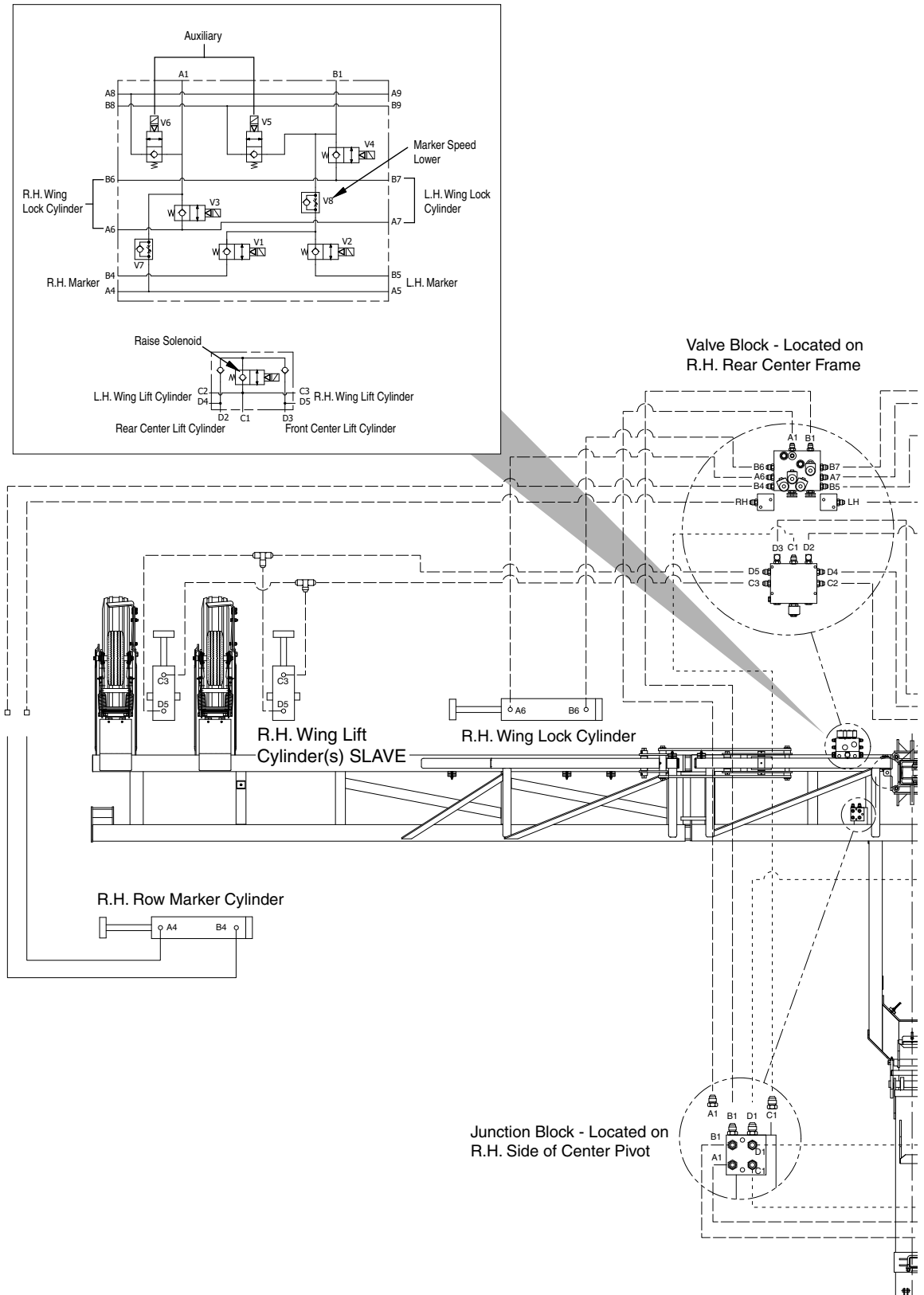
Unusually long periods of storage or poor storage environment may lead to performance issues or premature failure. Always inspect all hoses prior to use for extensive wear, cuts, or holes. If such flaws are identified, replace immediately to avoid potential failure, property damage or bodily injury.

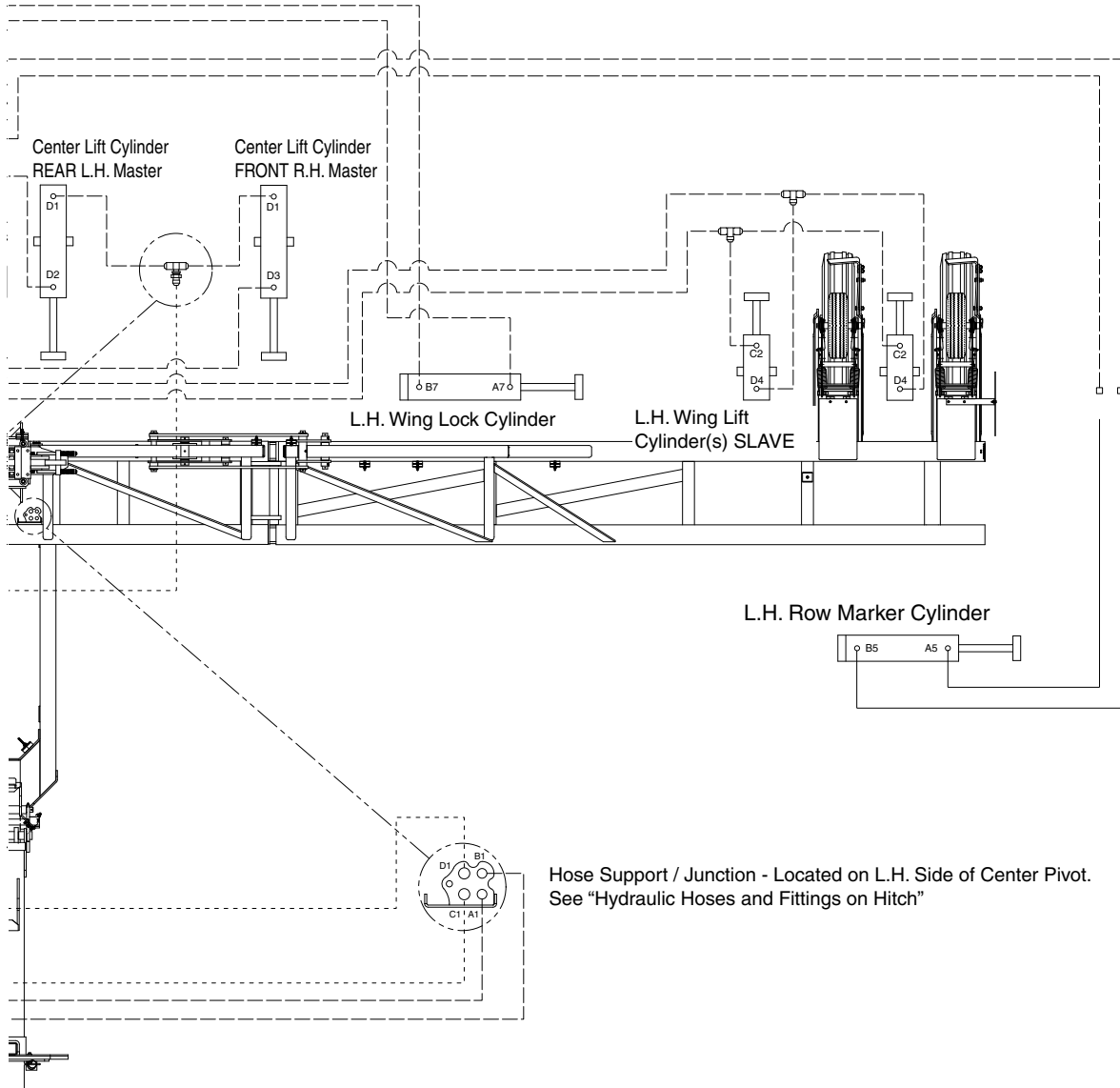
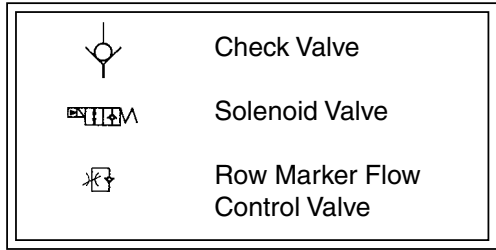
HYDRAULIC SYSTEM SCHEMATIC



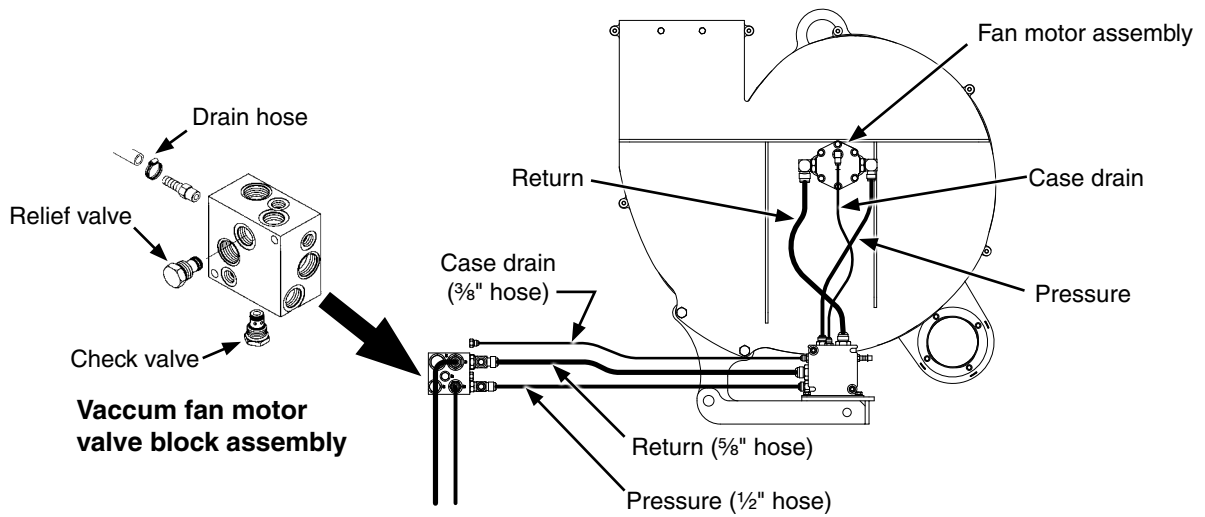
Hydraulic System Schematic

12 Row (One Wing Lift Cylinder Per Wing) and 16 Row Shown (Two Wing Lift Cylinders Per Wing)

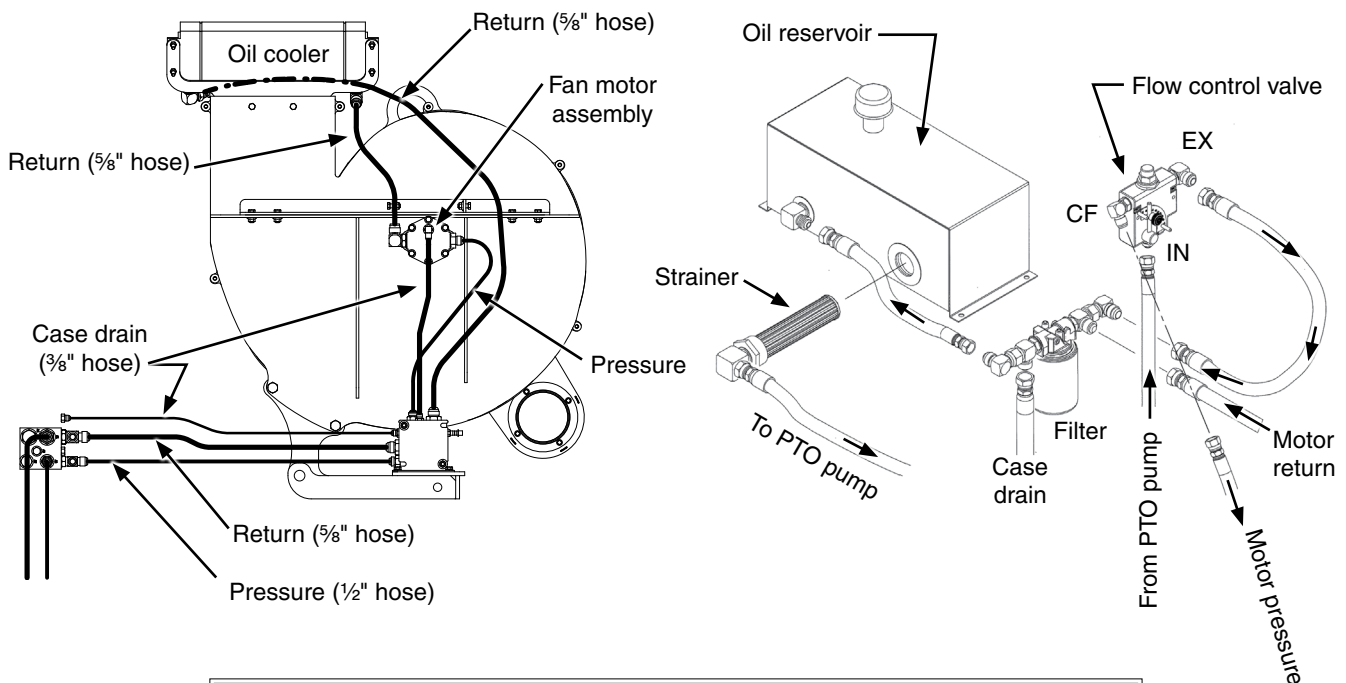




HYDRAULIC SCHEMATIC - VACUUM FAN MOTOR SYSTEM

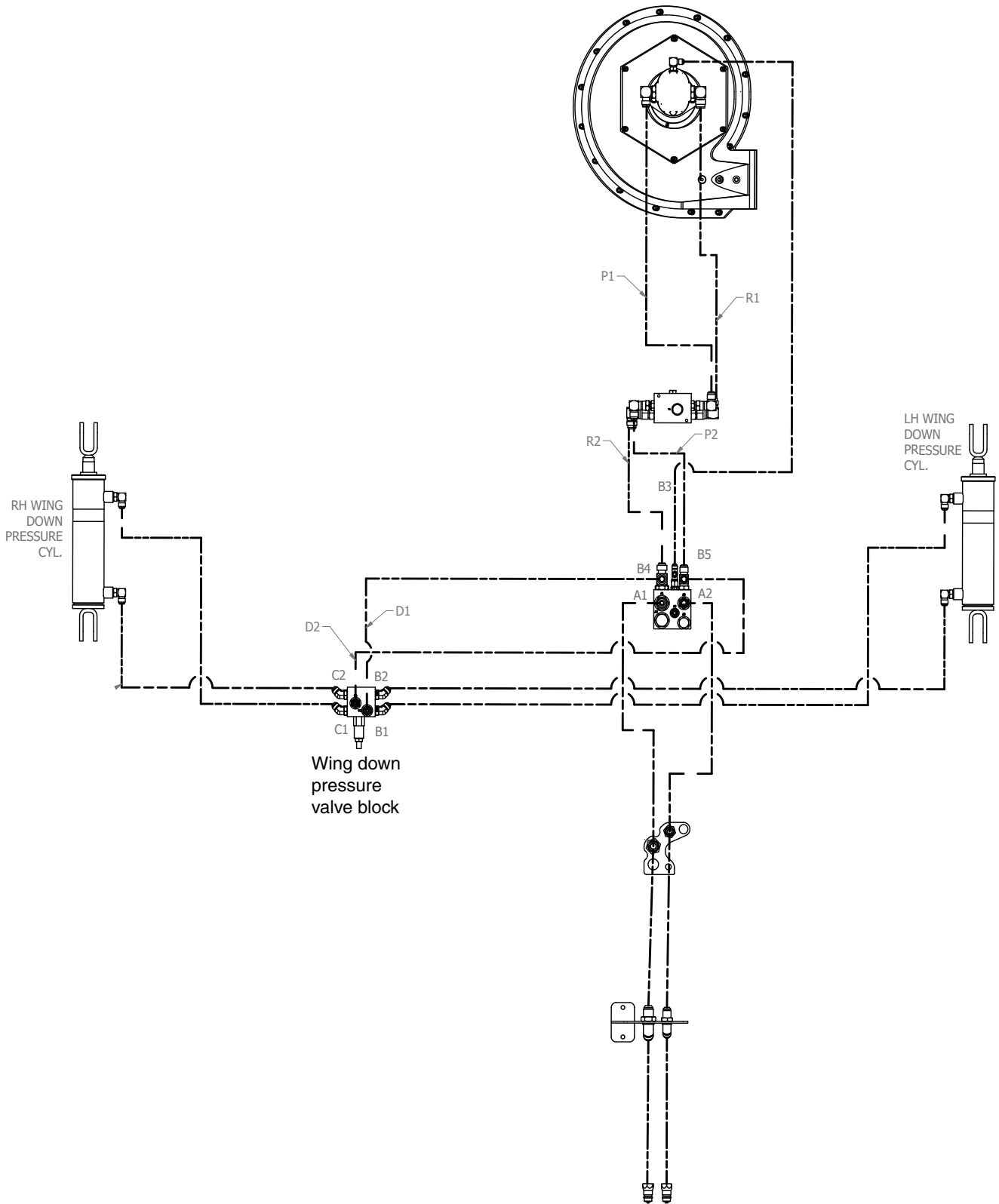


HYDRAULIC SCHEMATIC - OPTIONAL TRACTOR DRIVEN PTO PUMP AND OIL COOLER SYSTEM



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

WING DOWN PRESSURE SCHEMATIC (WEIGHT TRANSFER MECHANISM)



BULK FILL

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|---|------------------------------|---|
| Seed does not travel through delivery tubes. | System pressure set too low. | Increase system pressure. |
| Seed stops flowing to row unit during planting. | Seed surging. | Shut down bulk fill system and restart system from idle; seed should start flowing. |
| | Debris in system. | Insert shutoff door, open cleanout door. remove plug. |
| Seed does not move from entrainer at startup after exposure to water. | Seed swelled in entrainer. | Insert shutoff door, open cleanout door. remove swelled seed. |

CLOSING WHEEL

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

LIFT CIRCUIT

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|--|--|--|
| Right wing raises faster than left wing. Right wing may even raise completely before the center frame and left wing start to raise. If planter is loaded, the center frame and left wing may not be able to raise at all. | Master cylinder, located on front side of center post, leaking internally. NOTE: Make sure lift system is completely rephased. | Repair master cylinder. |
| Left wing raises faster than right wing. Left wing may even raise completely before the center frame and right wing start to raise. If the planter is loaded, the center frame and right wing may not be able to raise at all. | Master cylinder, located on rear side of center post, leaking internally. NOTE: Make sure the lift system is completely rephased. | Repair master cylinder. |
| Center frame raises, but wings do not. | Planter hydraulic circuit out of phase. Usually occurs when the planter is lowered from transport position. Solenoid valve in port V16 leaking. | Hold hydraulic control in lowering position to give the hydraulic circuit more time to rephase. Replace solenoid valve cartridge. |
| Center frame continues to raise after wing cylinders have reached full stroke when going to raised field position. | Solenoid valve in port V16 leaking. | Replace solenoid valve cartridge. |
| Planter raises to raised field position, but does not raise to transport position. | Solenoid valve coil in port V16 is not energized. | Be sure control console switch is in "raise" position to energize solenoid coil in port V16. Check control console fuse by moving auxiliary switch to ON position. If red light comes on the fuse is OK. Return auxiliary to OFF position. Check for poor wire connection or damaged wire and repair. Solenoid valve coil is defective. All solenoid valves used on the planter are the same. Switch the solenoid coil with one you know is working. If this cures the problem, replace defective coil. |
| | Solenoid valve cartridge in port V16 is stuck closed. | All solenoid valves used on the planter are the same. Switch the solenoid cartridge with one you know is working. If this cures the problem, replace defective cartridge. |
| Left wing lowering slower than center frame and right wing. If hydraulic lever is held in lowering position, left wing cylinder attempts to extend. | Check valve in port V17 leaking internally. | Remove check valve in port V17 and inspect for foreign material in valve and remove if possible. Replace check valve. If above fails, switch check valve in port V17 with check valve in port V15. If problem moves or switches to right wing, replace defective check valve. |
| Right wing lowering slower than center frame and left wing. If hydraulic control is held in lowering position, right wing cylinder attempts to extend. | Check valve in port V15 leaking internally. | Remove check valve in port V15 and inspect for foreign material in valve and remove if possible. Replace check valve. If above fails, switch check valve in port V15 with check valve in port V17. If problem moves or switches to right wing, replace defective check valve. |
| Planter does not raise or raises slowly. | Tractor may have hydraulic problem. | Switch remote outlets being used. Repair tractor hydraulics. |
| | Planter may be overloaded with hopper extensions and/or extra fertilizer tanks, coulters or other non-Kinze attachments. | Remove weight. |
| | Center pivot wear pads may be adjusted too tight and are binding on the post. | Adjust pads. |
| Planter will not rephase. | All cylinders not completely retracted. Caused by mechanical interference on or between planter frame and wheel lift module. | Remove interference. |
| | Center cylinders not retracting completely. | Lower planter and hold hydraulic lever in lower position to rephase system. Lower cylinder pins must be free to rotate in this position. If pins are tight, adjust cylinder clevises. |

PTO PUMP DRIVE AND OIL COOLER OPTION

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|---------------------------------------|----------------------|---|
| Pump is squealing. | Lack of oil to pump. | Check for plugged suction strainer. Check oil level. |
| Oil temperature is high. | Low oil level. | Check oil level and add as required. |
| Desired fan speed cannot be achieved. | Low oil level. | Check oil level and add as required. |
| | Plugged filter. | Check and change as required. |

POINT ROW CLUTCH

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|---|---|--|
| No clutches disengage. | Main fuse blown in control console. | Replace defective fuse. |
| | Poor terminal connection in wiring harness. | Repair or replace. |
| | Wiring damage in wiring harness. | Repair or replace. |
| | Low voltage at coil. (12 volts required) | Check battery connections. |
| One section of planter will not re-engage. | Shear pin at seed drive transmission(s) sheared. | Replace pin with one of equal size and grade. |
| One clutch will not engage. | Fuses blown. | Replace defective fuses. |
| | Actuator arm and plunger stuck in disengaged position. | Remove, free up, and reinstall. |
| | Actuator arm out of adjustment. | Adjust actuator arm mounting pin in slot so that actuator arm clears stop on stop collar by approximately 1/8" when clutch is rotated. |
| | Wrap spring broken or stretched. | Disassemble clutch and replace spring. |
| | Something touching the stop collar. | Check to ensure collar is free to turn with clutch. |
| | Clutch assembled incorrectly. | Check clutch and diagram for correct assembly. |
| Clutch slipping. | Wrap spring stretched. | "Lock" clutch output shaft from turning. Place torque wrench on input shaft and rotate in direction of drive. After input shaft has rotated a short distance the wrap spring should tighten onto the input hub. If slippage occurs at less than 100 ft. lbs. replace spring. If spring still slips after installing new spring, replace input hub. |
| Planter section does not re-engage while planter is moving forward. | Spring in actuator arm not strong enough to push arm operational switch is turned to the ON position. | Remove spring from inside solenoid and stretch spring slightly or replace. Reinstall spring. If that fails, file the away from stop collar when stop on the stop collar slightly so that the stop is not as aggressive. |
| Frequent solenoid burnout. | Fuses too large. | Replace fuses on front panel with 10 amp slow blow fuses. |
| Frequent fuse burnout. | Low voltage (12 volts required). | Check power source voltage for partially discharged battery, etc. |
| | Damage to wiring harness. | Repair or replace harness. |
| Clutch or clutches will not disengage. | Input and output shafts out of alignment. | Align input and output shafts to prevent drag. |
| | Input or output shaft is pushed in too far creating a coupler. | Reposition input and output shafts. |

ROTATION CIRCUIT

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|---|--|--|
| Cylinder does not extend, but will retract. | Solenoid valve coil in port V12 defective. | Switch coil from port V12 with coil in port V9. If cylinder extends but will not retract, replace defective coil from port V12. |
| | Solenoid valve cartridge in port V12 stuck closed. | Switch cartridge from port V12 with cartridge in port V9. If cylinder extends but will not retract, replace defective cartridge from port V12. |
| Cylinder does not retract, but will extend. | Solenoid valve coil in port V9 defective. | Switch coil from port V9 with coil in port V12. If cylinder extends but will not retract, replace defective coil from port V9. |
| | Solenoid valve cartridge in port V9 stuck closed. | Switch cartridge from port V9 with cartridge in port V12. If cylinder extends but will not retract, replace defective cartridge from port V9. |

ROW MARKER OPERATION

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|---|--|--|
| Right marker lowering slower than left marker. | Solenoid valve cartridge in port V1 not opening completely. | Switch with cartridge in port V2. If problem repeats, replace cartridge. |
| | Hose pinched or collapsed. | Inspect hose routing. Replace or repair hoses as required. |
| Left marker lowering slower than right marker. | Solenoid valve cartridge in port V2 not opening completely. | Switch with cartridge in port V1. If problem repeats, replace cartridge. |
| | Hose pinched or collapsed. | Inspect hose routing. Replace or repair hoses as required. |
| Both markers lowering. | Solenoid valve cartridge stuck open. If left marker switch is selected, right cartridge (V1) is defective. If right marker switch is selected, left cartridge (V2) is defective. | Replace solenoid valve cartridge. |
| Neither marker lowers. | Blown fuse. | Check red light on control console. It should be on if switch is on. If light is not on, switch to opposite marker position. If light comes on, switch may be defective. Replace switch. Otherwise replace fuse. |
| | Coils at V1 and V2 not energized. | Poor ground on wire, bad wire connection or damaged wire. Repair as required. |
| | Marker flow control valve closed too far. | See Operation Section for adjustment. |
| Neither marker will raise. | Marker flow control valve closed too far. | See Operation Section for adjustment. |
| Right marker will not lower. | Solenoid coil in port V1 not energized. | Check switch on control console. Replace if defective. Check coil ground wire. Check for poor connection or damaged wire. |
| | Solenoid cartridge in port V1 stuck closed. | Switch cartridge with one on the planter you know is operating properly. If right marker lowers, replace defective cartridge. |
| Left marker will not lower. | Solenoid coil in port V2 not energized. | Check switch on control console. Replace if defective. Check coil ground wire. Check for poor connection or damaged wire. |
| | Solenoid cartridge in port V2 stuck closed. | Switch cartridge with one on the planter you know is operating properly. If left marker lowers, replace defective cartridge. |
| Markers traveling too fast and damaging rubber stop on transport stands and/or damaging pivot at rod end of marker cylinders. | Marker transport stand not adjusted correctly to allow marker cushion cylinders to operate as designed. | See "Row Marker Transport Stand Adjustment". |
| | Marker flow control valve needs adjustment. | See Operation Section for adjustment. |

SEED METER (BRUSH-TYPE)

| 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 in same row, replace sensor. |
| | Lack of lubrication causing seeds not to release from disc properly. | Use graphite or talc as recommended. |
| | Seed size too large for seed disc being used. | Switch to smaller seed or appropriate seed disc. See "Brush-Type Seed Meter" for proper seed disc for size of seed being used. |
| | Seed treatment buildup in meter. | Reduce treatment amount used. 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 agitation groove area. | Replace disc. See "Maintenance". |
| High count. | Seed size too small for seed disc. | Switch to larger or appropriate seed disc. |
| | Incorrect seed rate transmission setting. | Reset transmission. Refer to rate charts. |
| | Upper brush too wide (fanned out) for small seed size. | Replace upper brush. |
| High count. (Milo/Grain Sorghum) | Incorrect brush retainer being used. | Make sure GD8237 brush retainer is used 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. |
| | Foreign material buildup at base of brush. | Remove brush retainer and brush. Clean thoroughly. Reinstall. |

SEED METER (VACUUM)

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|--------------------|---|--|
| Low seed count. | Meter RPM too high. | Reduce planting rate or planting speed. |
| | Singulator brush setting too aggressive. | Adjust singulator brush. |
| | Vacuum level too low. | Increase fan speed. |
| | Seed sensor not picking up all seeds dropped. | Clean seed tube. Move meter to different row. |
| | Seeds sticking to seed disc. | Use graphite or talc to aid release. |
| | Seed treatment buildup in seed disc recesses. | Reduce amount of treatment used and or mix thoroughly. Add talc. |
| | Seed size too large for disc used. | Use appropriate disc for seed size. |
| | Wrong transmission setting. | Change transmission to desired rate. |
| | Wrong seed disc. | Use appropriate disc for seed type and size. |
| | Drive wheel slippage. | 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 allowing seed flow due to bridging of seed. | Thoroughly mix talc to coat all seeds. Remove seed baffle. See "Seed Meter" in 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. |

Continued on next page.

SEED METER (VACUUM) - Continued

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

SEED METER (FINGER PICKUP)

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

SOLENOID VALVE

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|--------------------------------------|--------------------------------|---|
| No solenoids operate. | Low voltage. | Must be connected to 12 volt DC only. Negative ground. |
| | Blown fuse. | Replace control console fuse with AGC-15 amp. |
| | Battery connection. | Clean and tighten. |
| | Wiring harness damaged. | Repair or replace. |
| One solenoid valve will not operate. | Bad switch. | Replace on control panel. |
| | Cut wire in harness. | Locate and repair. |
| | Bad coil. | Replace. |
| | Poor connection at coil. | Check. |
| Valve operating when not energized. | Valve stem stuck open. | Replace cartridge. |
| | O-ring leaking. | Install new O-ring kit. |
| | Foreign material under poppet. | Remove and clean cartridge. |

TONGUE CYLINDER CIRCUIT

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|---|--|---|
| Tongue cylinder will not extend, but will retract. | No power to solenoid valve coil in port V10 and/or V14. Both must be energized. | Check wiring between control console and solenoid coils looking for damaged wires and poor connections. |
| | Solenoid valve coil defective. | Switch coil from port V13 with V10. If tongue still will not extend, switch coil from V14 with V13. It will not be necessary to remove any of the wire connections to the solenoid. All three of these solenoids are normally energized when the tongue switch is energized. Replace defective coil. |
| | Solenoid valve cartridges in port V10 and/or V14 stuck closed. | Switch cartridge from port V10 with cartridge in port V13. If tongue cylinder retracts, replace defective cartridge from port V10. If problem continues, switch cartridge from port V14 with cartridge in port V13. Replace defective cartridge. |
| Tongue cylinder will not extend but tongue lock cylinder extends. | Pressure relief valve in port V11 stuck closed or pressure setting too high. (Valve is factory set to open at 1000 PSI.) | Replace or adjust pressure relief valve. To adjust, loosen lock nut and turn counter clockwise to decrease pressure. |
| Tongue hook does not release before the tongue starts to extend. | Solenoid valve cartridge in port V11 stuck open or pressure setting too low. (Valve is factory set to open at 1000 PSI.) | Replace or adjust pressure relief valve. To adjust, loosen lock nut and turn clockwise to increase pressure. |
| Tongue cylinder will not retract, but will extend. | Solenoid valve coil in port V13 defective. | Switch coil from port V13 with coil from port V14. If coil from port V13 is bad, the tongue will extend but not retract. Replace defective coil. |
| | Solenoid valve cartridge in port V13 stuck closed. | Switch cartridge from port V13 with cartridge from port V14. If cartridge is bad, the tongue will extend but not retract. Replace defective cartridge. |
| Tongue extends with switch off. | Solenoid valve cartridge in port V10 and V14 stuck open. | Replace solenoid valve cartridge. |
| Tongue retracts with switch off. | Solenoid valve cartridge in port V13 stuck open. | Replace solenoid valve cartridge. |
| Tongue latch releases. Tongue extends slowly while planting. | Latch cylinder or tongue cylinder leaking internally. | Pressure check latch and tongue cylinders. Repair leaking cylinder(s). |

WING LOCK CYLINDER CIRCUIT

| PROBLEM | POSSIBLE CAUSE | SOLUTION |
|--|---|---|
| Cylinders will not extend or retract. | No power to the solenoid valve coils. | Auxiliary switch may be in the ON position. Must be in OFF position. Check fuse at control console. Replace fuse with 15 amp type AGC if blown. Check for poor wire connection or damaged wire. Repair as required. |
| Cylinders will not extend. | Solenoid valve coil in port V3 not energized. | Check for power to coil. Check coil ground wire. If OK, switch coil from port V3 with coil from port V4. If cylinders extend but will not retract, replace defective coil. |
| | Solenoid valve cartridge in port V3 stuck closed. | Switch cartridge in port V3 with cartridge in port V4. If cylinders extend but will not retract, replace defective cartridge. |
| Cylinders will not retract. | Solenoid valve coil in port V4 not energized. | Check for power to coil. Check coil ground wire. If OK, switch coil from port V4 with coil from port V3. If cylinders retract but will not extend, replace defective coil. |
| | Solenoid valve cartridge in port V4 stuck closed. | Switch cartridge in port V4 with cartridge in port V3. If cylinders retract but will not extend, replace defective cartridge. |
| Cylinders retract with the switch off. | Solenoid valve cartridge in port V4 stuck open. | Replace solenoid valve cartridge. |
| Cylinders extend with the switch off. | Solenoid valve cartridge in port V3 stuck open. | Replace solenoid valve cartridge. |

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