

# MODEL 3650 AND 3650 SDS TWIN-LINE® PLANTERS (Mechanical Seed Metering) OPERATOR & PARTS MANUAL

**M0198**

**Rev. 2/08**

This manual is applicable to: Model: 3650 Twin-Line® Planters  
Serial Number: 655617 And On

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

Model Number \_\_\_\_\_

Serial Number \_\_\_\_\_

Date Purchased \_\_\_\_\_

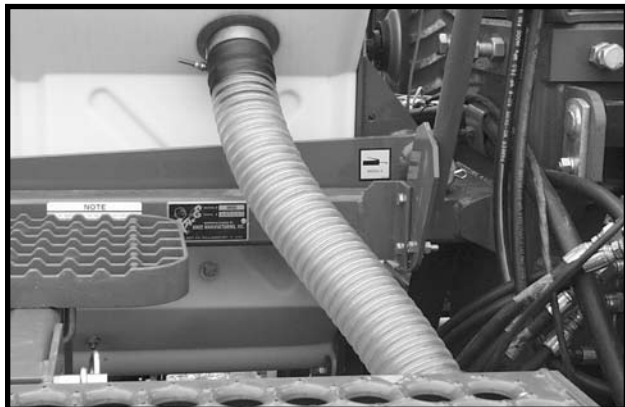
Monitor Serial Number _____
Measured Pulses Per Mile/Km (Radar Distance Sensor) _____
Measured Pulses Per Mile/Km (Magnetic Distance Sensor) _____

## SERIAL NUMBER

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

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

D071803224



Model 3650 SDS

D071603349



Model 3650 Conventional

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# PREDELIVERY/DELIVERY CHECKLIST

## TO THE DEALER

Predelivery service includes assembly, lubrication, adjustment and test. This service helps to ensure that the planter will be delivered to the customer ready for field use.

## PREDELIVERY CHECKLIST

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

- Recheck to be sure row units are properly spaced and optional attachments are correctly assembled.
- Be sure shipping stand has been removed.
- Be sure all grease fittings are in place and lubricated.
- Check planter and make sure all working parts are moving 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.
- Check to be sure hydraulic hoses are routed correctly to prevent damage to hoses.
- Inflate tires to specified PSI air pressure. Tighten wheel lug bolts and lug nuts to specified torques.
- Check to be sure all safety decals are correctly located and legible. Replace if damaged.
- Check to be sure all reflective decals and SMV sign are correctly located and visible when the planter is in transport position.
- Check to be sure safety/warning lights are installed correctly and working properly.
- Paint all parts scratched in shipment or assembly.
- Be sure all safety lockup devices are on the planter and correctly located. (If Applicable)
- Check seed meters on test stand to ensure proper performance.
- Auxiliary safety chain is properly installed and hardware is torqued to specification.

***This 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. \_\_\_\_\_ Serial No. \_\_\_\_\_  
City, State/Province \_\_\_\_\_ Dealer Name \_\_\_\_\_  
ZIP/Postal Code \_\_\_\_\_ Dealer No. \_\_\_\_\_

## DELIVERY CHECKLIST

At the time the planter is delivered, the following checklist is to be used as a reminder of very important information which should be conveyed to the customer. Check off each item as it is fully explained to the customer.

- Advise the customer that the life expectancy of this or any other machine is dependent on regular lubrication as directed in the Operator & Parts Manual.
- Tell the customer about all applicable safety precautions.
- Along with the customer, check to be sure the reflective decals and SMV sign are clearly visible with the planter in transport position and attached to the tractor. Check to be sure safety/warning lights are in working condition. Tell the customer to check federal, state/provincial and local regulations before towing or transporting on a road or highway.
- Give the Operator & Parts Manual to the customer and explain all operating adjustments.
- Read warranty to customer.
- 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.***

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(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 with the customer as to the performance of the planter.
- Review with the customer the importance of proper maintenance and adherence with all safety precautions.
- Check for parts that may need to be adjusted or replaced.
- Check to be sure all safety warning signs (decals), reflective decals and SMV sign are correctly located and that decals are legible. Replace if damaged or missing.
- Check to be sure safety/warning lights are working properly.

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

**RETURN THIS COMPLETED FORM TO KINZE® IMMEDIATELY along with Warranty And Delivery Report.  
Retain photocopy of this form at dealership for After Delivery Check.**

*Tear Along Perforation*

Rev. 11/07

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# TO THE OWNER

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

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

It is the responsibility of the user to read and understand the Operator & Parts 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 & Parts 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/or the words **NOTE, IMPORTANT, CAUTION, WARNING** or **DANGER** are used to call your attention to important information. The definition of each of these terms follows:

**NOTE:** Indicates a special point of information or addresses a machine adjustment.

**IMPORTANT:** Indicates an operation or maintenance condition which, if not corrected, could result in damage to machine, property, crops or the environment.



**CAUTION:** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate personal injury.



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



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



**WARNING:** Some photos in this manual may show safety covers, shields or lockup devices removed for visual clarity. **NEVER OPERATE** the machine without all safety covers, shields and lockup devices in place.

**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.

# WARRANTY

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The KINZE® Limited Warranty for your new machine is stated on the back of the retail purchaser's copy of the Warranty And Delivery Report 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 Report form must be completed by the KINZE® Dealer and signed by the retail purchaser, with copies to the Dealer, to the retail purchaser and to KINZE Manufacturing, Inc. Registration must be completed and sent to KINZE Manufacturing, Inc. within 30 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 Report 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.*

# INTRODUCTION

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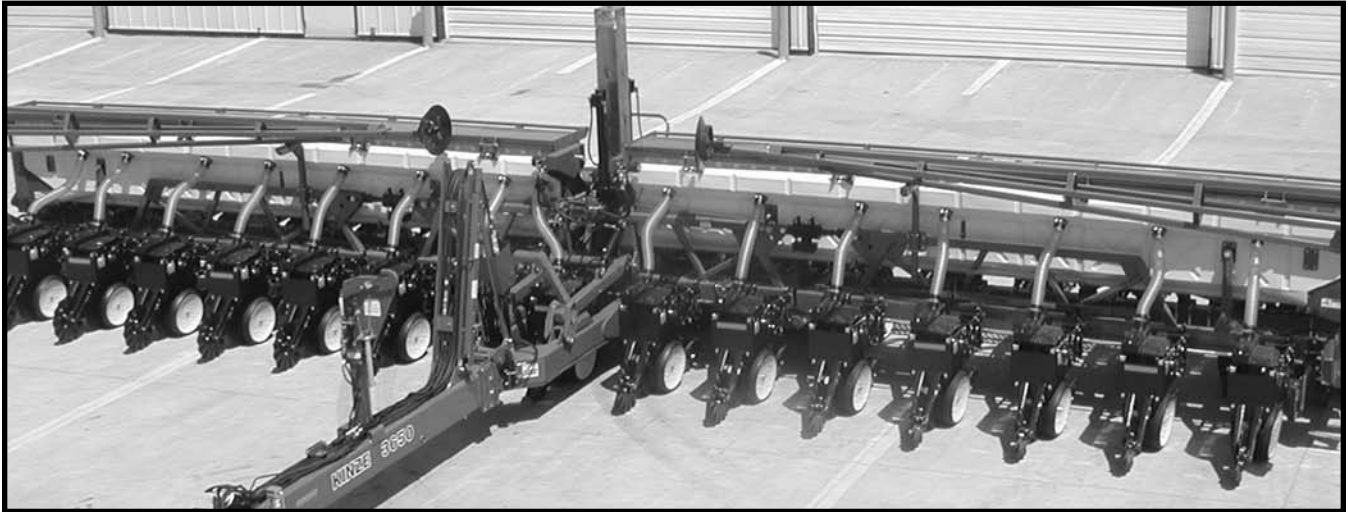
The Model 3650 Twin-Line<sup>®</sup> Planter is available in 30" row spacing configurations with a bulk seed delivery system (3650 SDS) or conventional seed hoppers. Optional Interplant<sup>®</sup> Packages and Liquid Fertilizer Attachments are available for use on Model 3650 planters.

## GENERAL INFORMATION

The information used in this manual was current at the time of printing. However, due to KINZE's continual attempts to improve its product, production changes may cause your machine to appear slightly different in detail. KINZE Manufacturing, Inc. reserves the right to change specifications or design without notice and without incurring obligation to install the same on machines previously manufactured.

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

D071603222



**Model 3650 SDS Twin-Line<sup>®</sup> 16 Row 30" Planter Shown With Bulk Seed Delivery System And Interplant<sup>®</sup> Package Option**

D071603322



**Model 3650 Conventional Twin-Line<sup>®</sup> 16 Row 30" Planter Shown With Individual Seed Hoppers And Interplant<sup>®</sup> Package, Even-Row Push Row Unit And Liquid Fertilizer Package Options**

# INTRODUCTION

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# SPECIFICATIONS

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**BASE MACHINE TYPE** - Pull Type (Hydraulically Rotates Endwise For Transport)

**SEED METER TYPE** - Mechanical Seed Metering System

**PLANTING UNIT TYPES** - Push And Pull Row Units  
- SDS Bulk Seed Delivery System Or Conventional Seed Hoppers

<b>ROW SPACING</b>	<b>Standard</b>	<b>Interplant® Package</b>
	12 Row Narrow - 30" Rows	23/24 - 15" Rows
	16 Row Narrow - 30" Rows	31/32 - 15" Rows

**DRIVE SYSTEM** - Spring-Loaded Contact Drive System  
- 7.50" x 20" Rib Implement Wing Tire - Two On 12 Row 30", Four On 16 Row 30"  
- 4.80" x 8" Contact Drive Tire - Two On 12 Row 30", Four On 16 Row 30"  
- No. 40 Chain And Spring-Loaded Idlers  
- Point Row Clutches Standard  
- 7/8" Hex Drill And Drive Shafts And End Mounted Seed Transmissions

**TRANSPORT TIRES** - Equipped With Four 41 x 11R22.5" Radial Load Range H Tubeless Rib Implement Tires  
- Adjustable Height Wheels For Ridge Planting

**TYPE LIFT** - Master/Slave Hydraulics  
- 12 Row 30" - 2 Center Lift (Master) Cylinders, 1 Cylinder (Slave) Per Wing Wheel Module (2 Cylinders)  
- 16 Row 30" - 2 Center Lift (Master) Cylinders, 2 Cylinders (Slave) Per Wing Wheel Module (4 Cylinders)

**ROW MARKERS** - Independently Controlled. Two-Fold Low Profile With Depth Band On Row Marker Blades

## **MACHINE OPTIONS**

- Electronic Seed Monitors
  - KPM I
  - KPM II Stack-Mode With Magnetic Distance Sensor Or Radar Distance Sensor (Stack-Mode Monitor (SMM) Console Package For Use With Interplant® Package)
  - KPM III With Magnetic Distance Sensor Or Radar Distance Sensor
- Stack-Mode Monitor (SMM) Console Package For Use With Interplant® Package (KPM II Only)
- Two-Speed Point Row Clutch Package - Allows Half Width Planting And Reduced Rate Planting (Available through KINZE® Repair Parts)
- Interplant® Package Options
- Even-Row Push Row Unit Package
- Auxiliary Work Lights Package
- Liquid Fertilizer With Piston Pump And Fertilizer Opener Options
- Liquid Fertilizer Low Rate Check Valve Option
- Rear Trailer Hitch
- Half Rate (2 To 1) Drive Reduction Package
- 2-Point Hitch Option

## **ROW UNIT OPTIONS/ATTACHMENTS**

- Finger Pickup Or Brush-Type Seed Meters
- Brush-Type Seed Meter Discs
- Closing Wheel Options
  - Rubber "V" Closing Wheels
  - Cast Iron "V" Closing Wheels
- Granular Chemical Application
- Hopper Panel Extension Package
- Row Unit Mounted No Till Coulter
- Coulter Mounted Residue Wheels
- Row Unit Mounted Disc Furrowers
- Row Unit Mounted Residue Wheel
- Frame Mounted Coulter
- Residue Wheel Attachment Frame Mounted Coulter

# SPECIFICATIONS

<b>BULK FILL (SDS) DIMENSIONS/WEIGHTS</b>		
<b>PLANTER SIZE</b>	<b>12 Row 30"</b>	<b>16 Row 30"</b>
OPERATING WIDTH	31' 2"	41' 2"
OPERATING LENGTH	22' 4"	25' 4"
TRANSPORT WIDTH Standard or push row units	11' 2"	11' 2"
TRANSPORT LENGTH*	36' 10"	46' 10"
TRANSPORT HEIGHT	11' 0"	11' 4"
WEIGHT**	17,220 lbs.	21,444 lbs.

\* Add 1' 6" to length in transport position when equipped with the even-row push row unit.

\*\* Base Machine weights include planter frame with row markers, drive components, tires and wheels, hydraulic cylinders and hoses, 12VDC control console, transport safety chain, Bulk Seed Delivery System, KINZE® plateless row units less closing wheels, mini-seed hoppers and dual quick-adjustable down force springs.

<b>CONVENTIONAL DIMENSIONS/WEIGHTS</b>		
<b>PLANTER SIZE</b>	<b>12 Row 30"</b>	<b>16 Row 30"</b>
OPERATING WIDTH	31' 2"	41' 2"
OPERATING LENGTH	22' 4"	25' 4"
TRANSPORT WIDTH Standard or push units	11' 2"	11' 2"
TRANSPORT LENGTH*	36' 10"	46' 10"
TRANSPORT HEIGHT	11' 0"	11' 4"
WEIGHT**	14,276 lbs.	17,620 lbs.

\* Add 1' 6" to length in transport position when equipped with the even-row push row unit.










\*\* Base Machine weights include planter frame with row markers, drive components, tires and wheels, hydraulic cylinders and hoses, 12VDC control console, transport safety chain, KINZE® plateless row units less closing wheels, seed hoppers with lids and dual quick-adjustable down force springs.




NOTE: L.H. transport wheel and axle stub assembly is removable for truck transport of base machine at 8' 6".

# SAFETY PRECAUTIONS

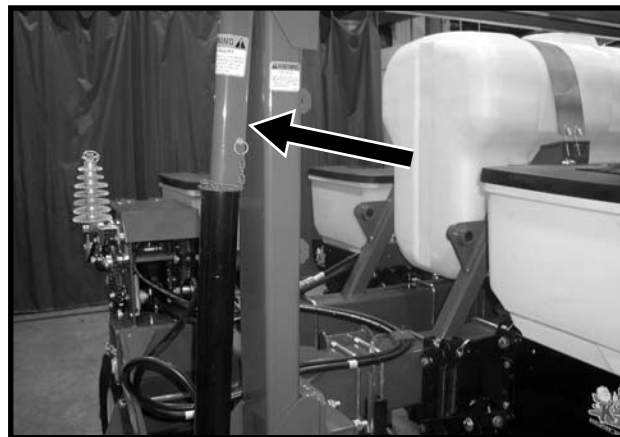
Safe and careful operation of the tractor and planter at all times will contribute significantly to the prevention of accidents.

Since a large portion of farm accidents occur as a result of fatigue or carelessness, safety practices should be of utmost concern. Read and understand the instructions provided in this manual and on the warning signs. Review these instructions frequently! Listed below are other safety suggestions that should become common practice.





-  **Never allow the planter to be operated by anyone who is unfamiliar with the operation of all functions of the unit. All operators should read and thoroughly understand the instructions given in this manual prior to moving the unit.**
-  **Never permit any persons other than the operator to ride on the tractor.**
-  **Never ride on the planter or allow others to do so.**
-  **Always make sure there are no persons near the planter when row markers are in operation or when rotating the planter.**
-  **Always keep hands, feet and clothing away from moving parts. Do not wear loose-fitting clothing which may catch in moving parts.**
-  **Always wear protective clothing, substantial shoes and suitable hearing and eye sight protectors applicable for the situation.**
-  **Do not allow anyone to stand between the tongue or hitch and the towing vehicle when backing up to the planter.**
-  **Be aware of bystanders, particularly children! Always look around to make sure it is safe to start the engine of the towing vehicle or move the planter. This is particularly important with higher noise levels and quiet cabs, as you may not hear people shouting.**
-  **Use a tractor equipped with a roll-over-protective-system and fasten your seat belt prior to starting the engine.**

-  **Before operating the planter for the first time and periodically thereafter, check to be sure the lug bolts on the transport wheels are torqued properly. This is especially important if the planter is to be transported for a long distance.**
-  **Never work under the planter while in raised position without using safety lockup devices.**
-  **Install safety lockup devices on row markers prior to transporting the planter or working around the unit.**


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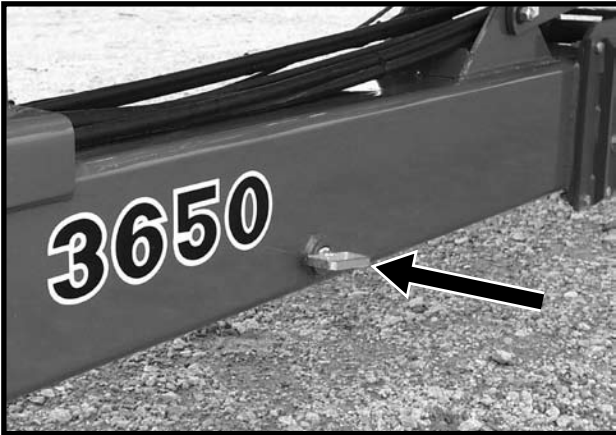
Row Marker Lockup (Conventional Planter Shown)

-  **Watch for obstructions such as wires, tree limbs, etc. when folding markers.**
-  **To avoid serious injury or death, care must be taken when operating row markers around overhead power lines.**
-  **On machines where the outer transport wheel on the left side of the planter is bolt-on to allow legal width truck shipment, always install outer transport wheel assembly prior to unloading. DO NOT REMOVE THIS ASSEMBLY AFTER PLANTER IS ASSEMBLED FOR USE. DO NOT fold planter or tow planter while the outer transport wheel is removed. Tipping may occur because of narrow wheel base.**
-  **The seed and fertilizer metering systems of this planter are designed to be driven by ground tires. Hydraulic motors power the bulk seed distribution system. The use of aftermarket hydraulic, electric or PTO drives may create serious safety hazards to you and others nearby. Always follow all appropriate safety standards and practices to protect you and others near this planter from injury.**

# SAFETY PRECAUTIONS

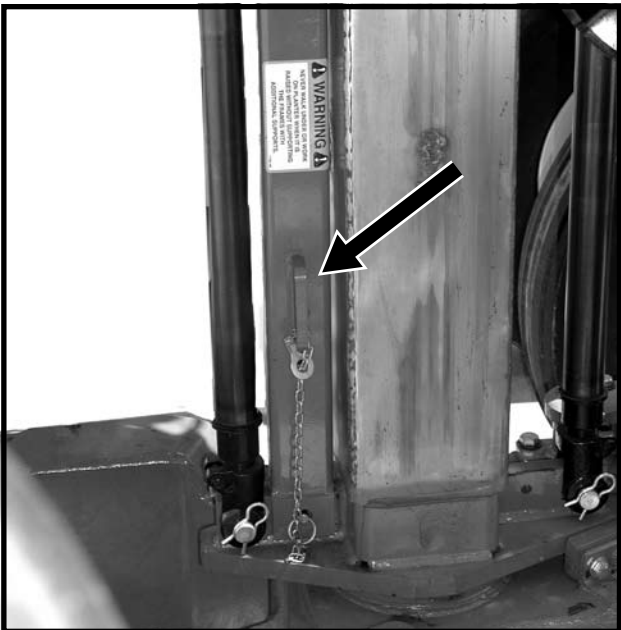
 Always install tongue safety pin, manual safety lockup and transport latch locking pin before transporting planter.

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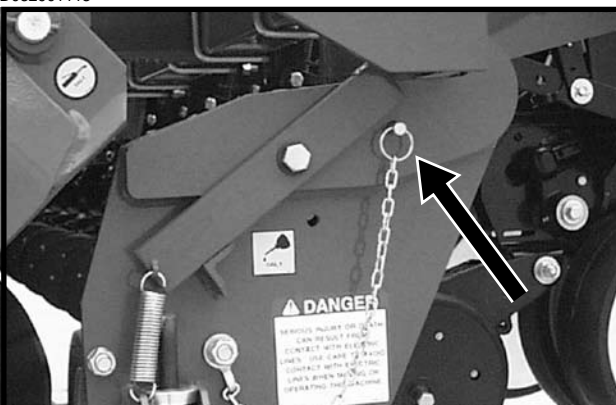
Tongue Safety Pin

D071603307





Manual Safety Lockup


D032901113





Transport Latch Locking Pin


 This machine has been designed and built with your safety in mind. Do not make any alterations or changes to this machine. Any alteration to the design or construction may create safety hazards.

 Always follow federal, state/provincial and local regulations when towing farm equipment on a public highway. Only a safety chain (not an elastic or nylon/plastic tow strap) should be used to retain the connection between the towing and towed machines in the event of separation of the primary attaching system.

 Check to be sure all safety/warning lights are working properly before transporting the machine on public roads.


 Avoid transporting loaded planter whenever possible. When it is necessary to transport the planter with the hoppers loaded, the added weight should be distributed evenly on the planter frame before rotating the planter.

 Limit towing speed to 15 MPH. Tow only with farm tractor of a minimum 90 HP.

 Always make sure safety/warning lights, reflective decals and SMV sign are in place and visible prior to transporting the machine on public roads. In this regard, check federal, state/provincial and local regulations.

 Allow for unit length when making turns.

 Always drive at a safe speed relative to local conditions and ensure your speed is low enough for an emergency stop to be safe and secure. Keep speed to a minimum.

 Reduce speed prior to turns to avoid the risk of overturning.



# SAFETY PRECAUTIONS

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Always keep the tractor in gear to provide engine braking when going downhill. Do not coast.



Avoid sudden uphill turns on steep slopes.



Be a safe and courteous driver. Always yield to oncoming traffic in all situations, including narrow bridges, intersections, etc.



Rim and tire servicing can be dangerous. Explosive separation of a tire and rim parts can cause serious injury or death.



Agricultural chemicals used with this unit can be dangerous. Improper selection or use can seriously injure persons, animals, plants, soil and other property. **BE SAFE:** Select the right chemical for the job. Handle it with care. Follow the instructions on the container label and of the equipment manufacturer.



Store the planter in an area away from human activity. **DO NOT** permit children to play on or around the stored unit.



Make sure the parked machine is on a hard, level surface. Wheel chocks may be needed to prevent unit from rolling.

# SAFETY PRECAUTIONS

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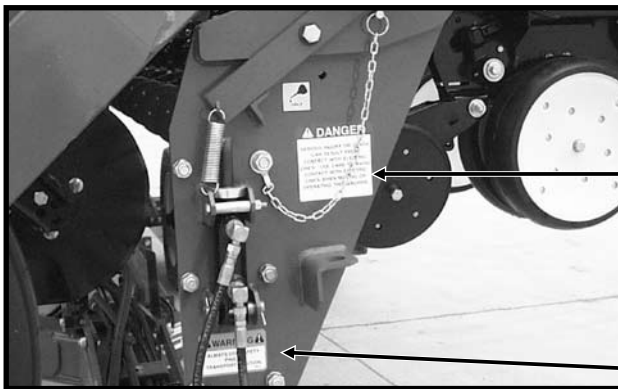
# SAFETY WARNING SIGNS

The “WARNING” signs illustrated on these pages are placed on the machine to warn of hazards. The warnings found on these signs are for your personal safety and the safety of those around you. OBSERVE THESE WARNINGS!

- Keep these signs clean so they can be readily observed. Wash with soap and water or cleaning solution as required.
- Replace “WARNING” signs should they become damaged, painted over or if they are missing.
- Check reflective decals and SMV sign periodically. Replace if they show loss of any of their reflective properties.
- When replacing decals, clean the machine surface thoroughly using soap and water or cleaning solution to remove all dirt and grease.

**NOTE:** Style and locations of SMV sign, reflective decals and safety/warning lights conform to ANSI/ASAE S279.13 DEC 2005 and ANSI/ASAE S276.6 JAN2005.

D032901113

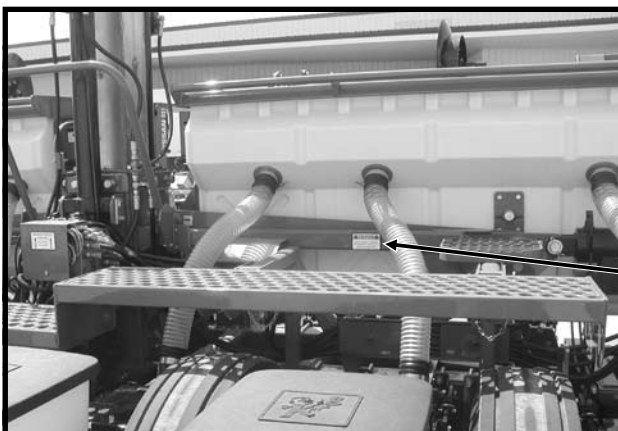


Part No. G7100-117 (Qty. 1)



Part No. G7100-02 (Qty. 1)

D071603220



Part No. G7100-75  
(Qty. 4 - Front & Rear/Left & Right)

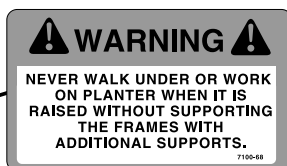
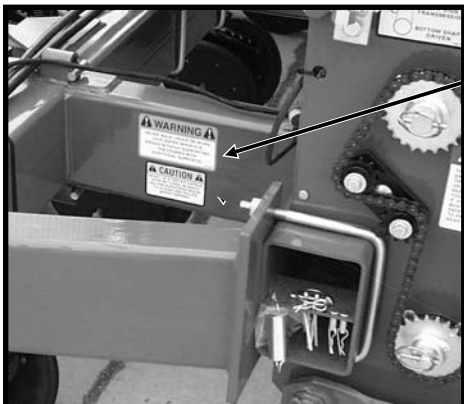
# SAFETY WARNING SIGNS

D09070434b



Part No. G7100-172  
(Qty. 2 - One On Outer End  
Of Each Bulk Seed Hopper)

D032901164



Part No. G7100-68  
(Qty. 2 - One On Each  
End Of Planter)



Part No. G7100-63  
(Qty. 2 - One On Each  
End Of Planter)

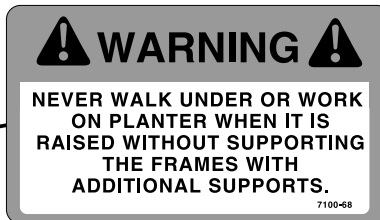
D022102107



Shown With Row Marker Mount Included With  
Optional Even-Row Push Row Unit Package

# SAFETY WARNING SIGNS

D071803204



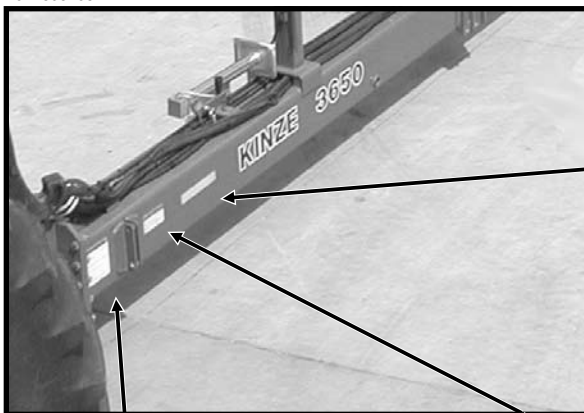
Part No. G7100-68  
(Qty. 2 - R.H. Side Of Planter - Front/Rear)

D071803203



Part No. G7100-200  
(Qty. 2 - L.H. Side Of Planter - Front/Rear)

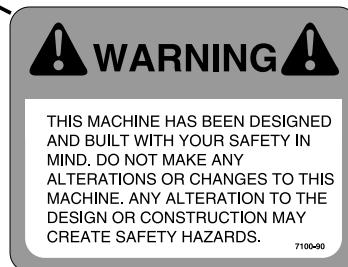
D071603205



Part No. G7100-259 Amber Reflective Decal  
(Qty. 2 - One Located On Each Side Of Hitch)



Part No. G7100-46 (Qty. 1)



Part No. G7100-90 (Qty. 1)

# SAFETY WARNING SIGNS

D12070404

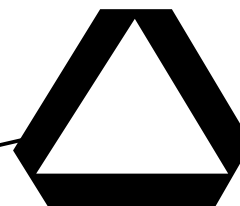
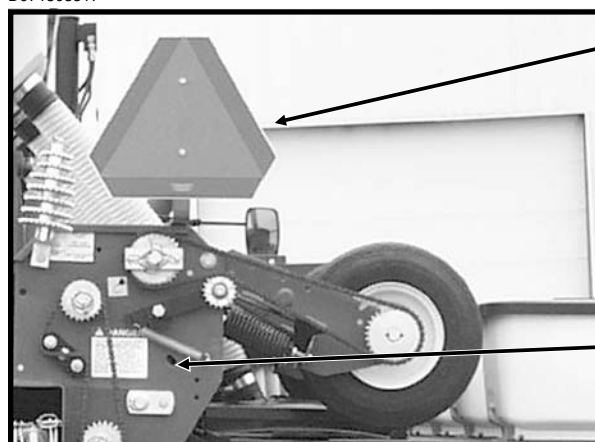


Part No. G7100-259 Amber Reflective Decal (Qty. 1)



Part No. G7100-302 (Qty. 1)

D071803317



Part No. GD2199 (Qty. 1)



Part No. G7100-89 (Qty. 2 - One Located On Wheel Module At Each End Of Planter)

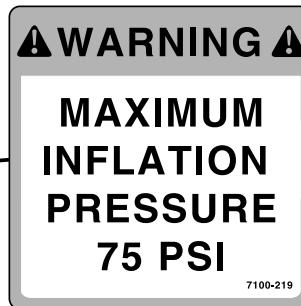
D071803305



Part No. G7100-249 (With Optional Interplant® Package) (Qty. 1 - Located On Interplant® Lift Lever)

# SAFETY WARNING SIGNS

D010704102a



Part No. G7100-219 (Qty. 1 Per 41 x 11R22.5" Transport Wheel Tire)

D010704101



Part No. G7100-215 (Qty. 1 - Located On Outside End Of Stub Axle)

D071803318



Part No. G7100-262 Amber Reflective Decal (Qty. 6 On 12 Row 30" And Qty. 8 On 16 Row 30" - Located On Every Other Row Unit Beginning On The First Row Unit On The L.H. End Of The Planter - Rear-Facing In Planting Position/Side-Facing In Transport Position)



Part No. G7100-259 Amber Reflective Decal (Qty. 6 On 12 Row 30" And Qty. 8 On 16 Row 30" - Located On Every Other Row Unit Beginning On The First Row Unit On The L.H. End Of The Planter - Rear-Facing In Planting Position/Side-Facing In Transport Position) **(With Optional Granular Chemical)**



Part No. G7100-260 Orange Reflective Decal (Qty. 2 - One Located On Bottom R.H. And L.H. Rear Sides Of Axle)



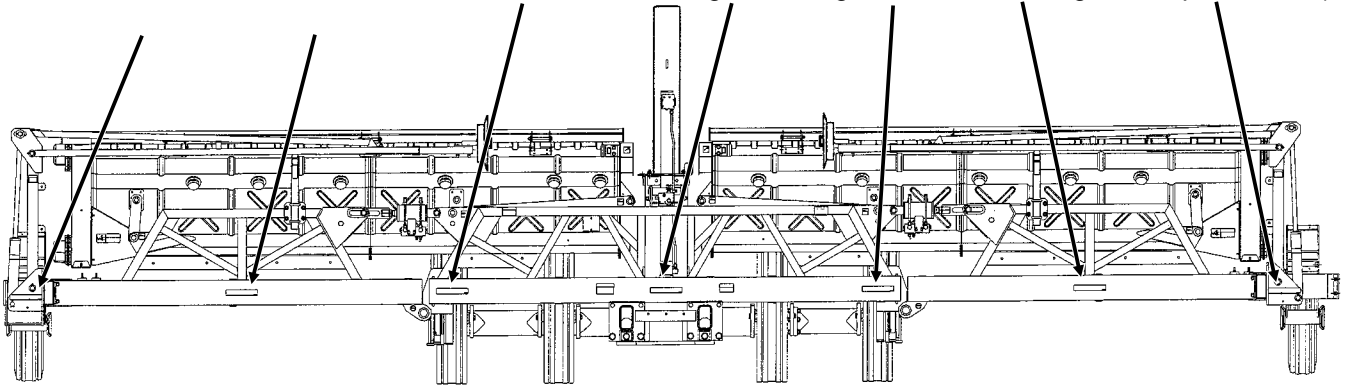
Part No. G7100-258 Red Reflective Decal (Qty. 2 - One Located On Top On R.H. And L.H. Rear Sides Of Axle)

# SAFETY WARNING SIGNS

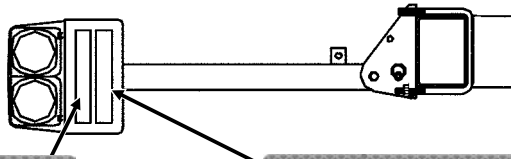
(TWL226)



Part No. G7100-259 Amber Reflective Decal (Qty. 7 On 12 Row 30" And Qty. 9 On 16 Row 30" - Located On The Front Side Of The Front Toolbar And Marker Mounts - Forward-Facing In Planting Position/Side-Facing In Transport Position)



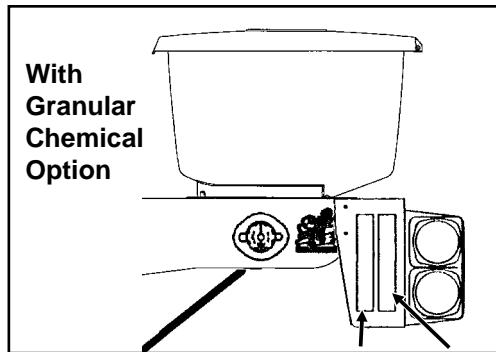
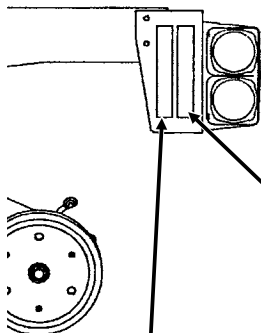
(TWL174b)



Part No. G7100-258 Red Reflective Decal (Qty. 1 - Located On The Front Light Bracket On The L.H. Wing Of The Planter - Rear-Facing In Transport Position)

Part No. G7100-260 Orange Reflective Decal (Qty. 1 - Located On The Front Light Bracket On The L.H. Wing Of The Planter - Rear-Facing In Transport Position)

(TWL174b/RU120e)



Part No. G7100-260 Orange Reflective Decal (Qty. 1 - Located On The Rear Light Bracket On The L.H. Wing Of The Planter - Rear-Facing In Transport Position)


Part No. G7100-258 Red Reflective Decal (Qty. 1 - Located On The Rear Light Bracket On The L.H. Wing Of The Planter - Rear-Facing In Transport Position)



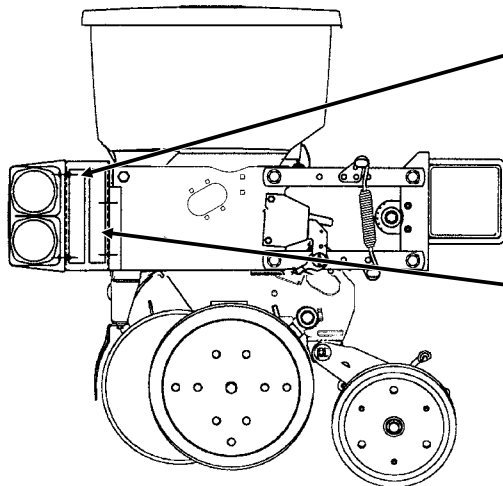
# SAFETY WARNING SIGNS

D012204101



  
Part No. G7100-260 Orange Reflective Decal  
(Qty. 6 - Located On Catwalk End Plates)  
(If Applicable)

(PLTR159)



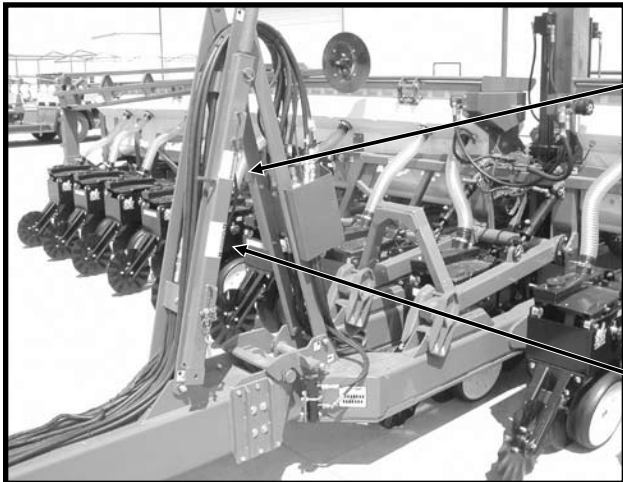
Conventional Seed Hopper Shown

  
Part No. G7100-258 Red Reflective Decal  
**(With Optional Interplant® Package)**  
(Qty. 1 - Located On Light Bracket On The  
L.H. Wing Of The Planter - Rear-Facing In  
Transport Position)

  
Part No. G7100-260 Orange Reflective Decal  
**(With Optional Interplant® Package)**  
(Qty. 1 - Located On Light Bracket On The  
L.H. Wing Of The Planter - Rear-Facing In  
Transport Position)

# SAFETY WARNING SIGNS

D071603212

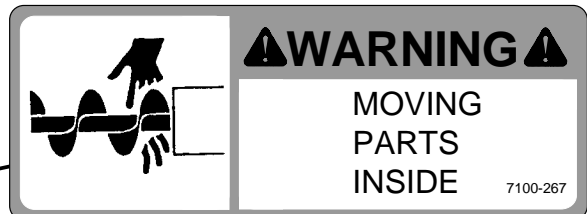
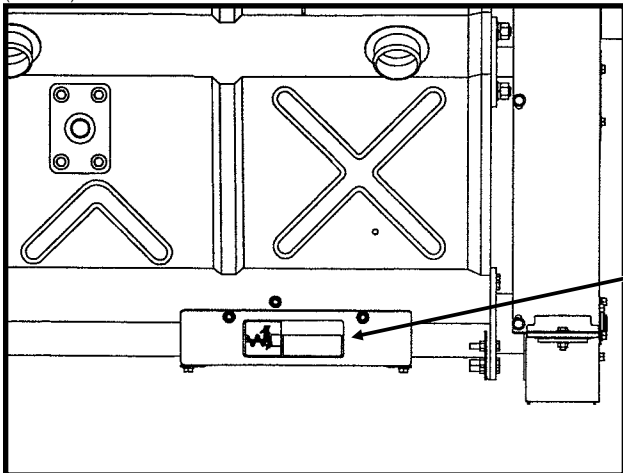


Part No. G7100-68  
(Qty. 1 - On Manual Safety Lockup)



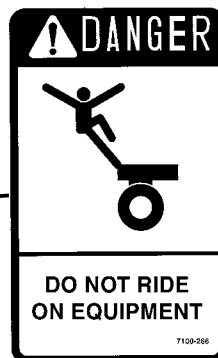
Part No. G7100-200  
(Qty. 1 - On Manual Safety Lockup)

(TWL262)



Part No. G7100-267 (Qty. 4 - One On Front And One On Rear Of Screen Assemblies Located On Outer Ends Of Bulk Seed Hoppers)

D071803222a



Part No. G7100-266 (Qty. 1)  
(SDS Planters Only)

# SAFETY WARNING SIGNS

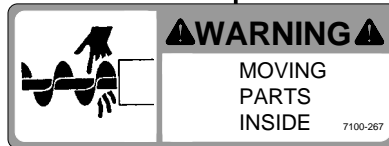
D021102216



Part No. G7100-266  
(Qty. 2 - One on Each Bulk Seed Hopper Lid)

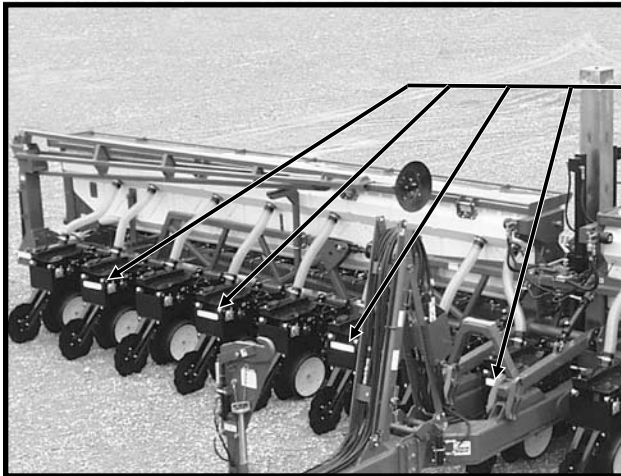


Part No. G7100-75 (Qty. 2 - One On Each Bulk Seed Hopper Lid)



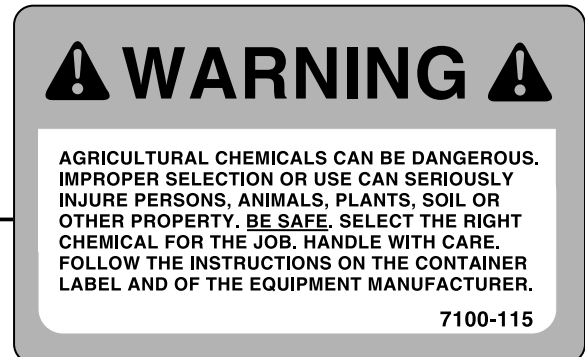
Part No. G7100-267 (Qty. 2 - One On Each Bulk Seed Hopper Lid)

D071803105



Part No. G7100-259 Amber Reflective Decal **(With Optional Interplant® Package And/Or Even-Row Push Row Unit Package)**  
(Qty. 5 On 12 Row 30" And 7 On 16 Row 30" - Located On The Front Of Every Other Interplant® Push Row Unit Beginning At The Center Of The Planter - Side-Facing In Transport Position)

06039901



Part No. G7100-115 **(With Optional Granular Chemical)** (1 Per Row Unit - Located On Underside Of Optional Granular Chemical Hopper Lid)

# SAFETY WARNING SIGNS

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D12070405



Part No. G7100-83  
(Qty. 1 Per Marker)



Part No. G7100-42  
(Qty. 2 Per Marker)


# MACHINE OPERATION

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

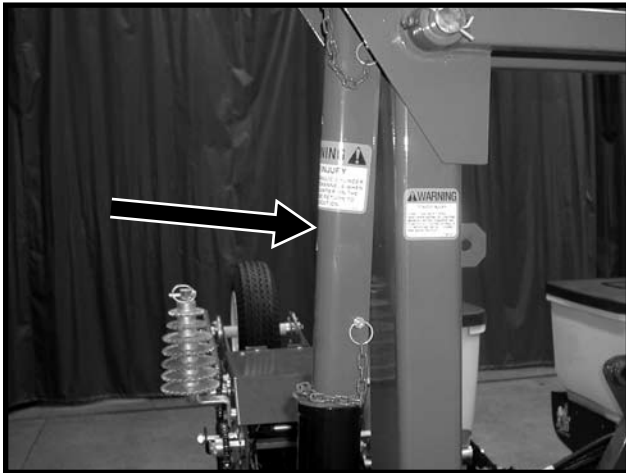
**IMPORTANT:** Always raise the planter out of the ground when making sharp turns or backing up.

## ROW MARKER SAFETY LOCKUP

Install safety lockups over marker cylinder rods when transporting the planter or working around the planter. When lockups are not in use, store in the storage position provided on the first stage marker arm.

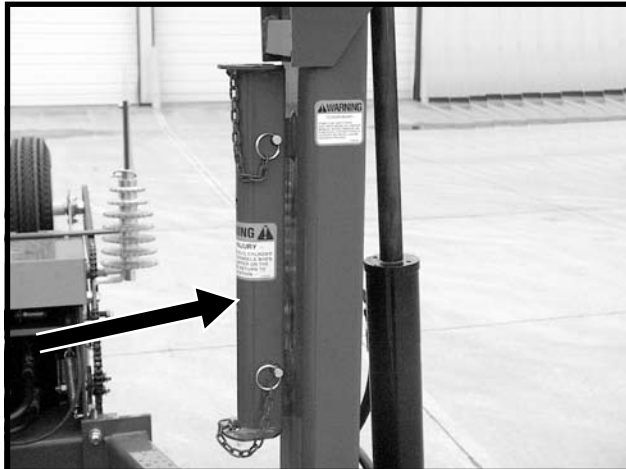
 **DANGER:** To avoid serious injury or death, keep others away when raising or lowering markers.

D120804101



Row Marker Safety Lockup In Locked Position

D032901130

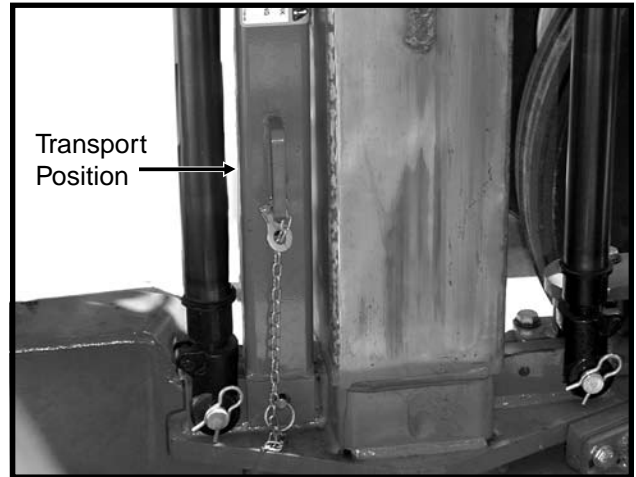


Row Marker Safety Lockup In Storage Position

## MANUAL SAFETY LOCKUP

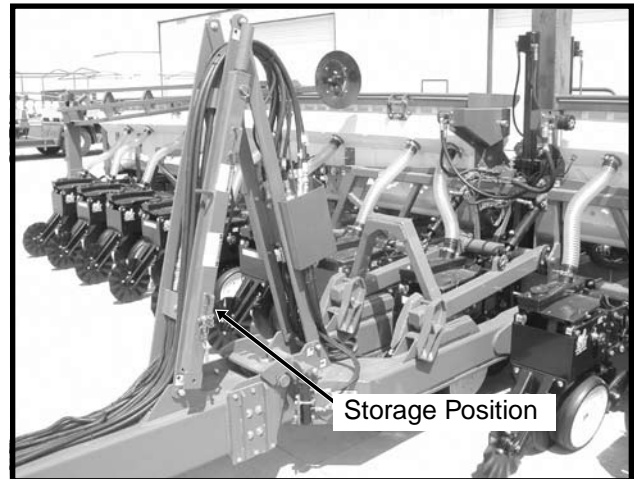
Never allow anyone to work around or under the planter without first securing the manual safety lockup in the transport position. When transporting the planter use the manual safety lockup for added safety.

D071603307



Manual Safety Lockup In Transport Position

D071603212



Manual Safety Lockup In Storage Position

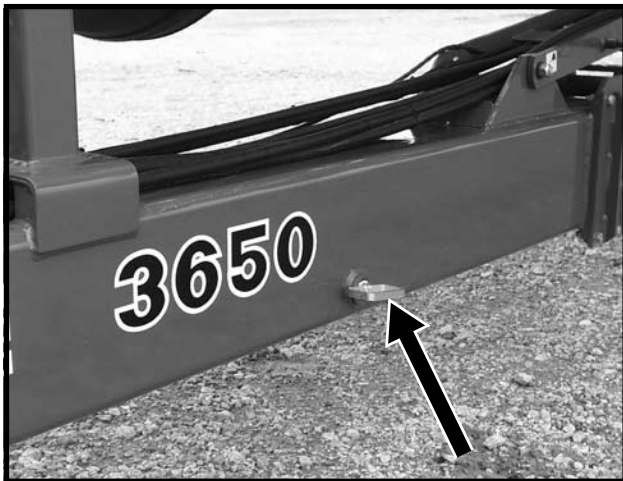
For field operation remove the manual safety lockup and store in the storage position on the L.H. side of the hose take-up on the planter hitch.

# MACHINE OPERATION

## TONGUE SAFETY PIN

The tongue safety pin when installed will prevent the tongue cylinder from retracting should hydraulic failure occur or a sudden stop be made when transporting the planter. Never transport the planter without installing the tongue safety pin.

D071803314



Tongue Safety Pin Installed For Transport

D032901120a



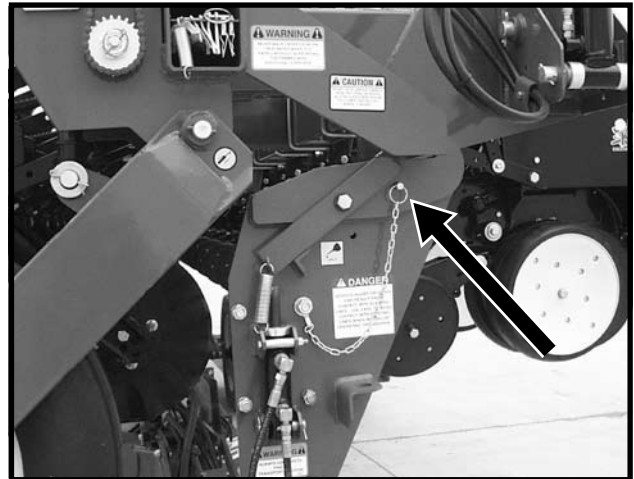
Tongue Safety Pin Stored For Field Operation

For field operation remove the tongue safety pin and store in the location provided on the transport latch post on the tongue of the planter.

## TRANSPORT LATCH LOCKING PIN

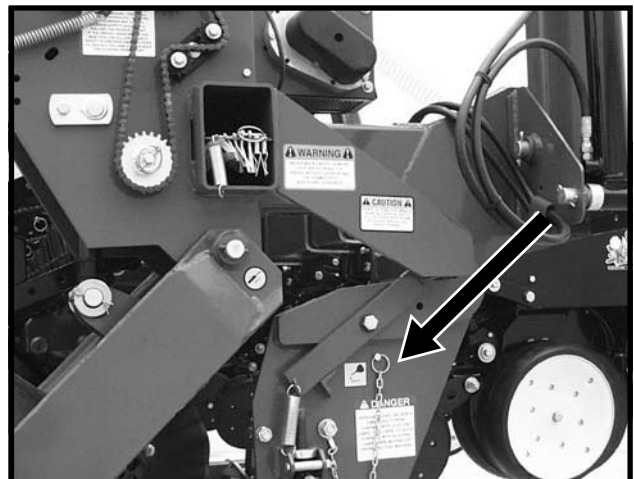
The transport latch locking pin when installed will prevent the latch bar from disengaging and allowing the planter frame to swing away. Never transport the planter without installing the transport latch locking pin.

D032901113



Transport Latch Locking Pin Installed For Transport

D032901114



Transport Latch Locking Pin Stored For Field Operation

For field operation remove the transport latch locking pin and store in the hole provided on the latch post.

# MACHINE OPERATION

## INITIAL PREPARATION OF THE PLANTER

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



**DANGER: The outer transport wheel/axle extension on the left side of the machine is shipped removed (not bolted on) to allow narrower width truck shipment. DO NOT REMOVE THIS ASSEMBLY AFTER PLANTER IS ASSEMBLED FOR USE. DO NOT fold planter or tow planter while the outer transport wheel is removed. Tipping may occur because of narrow wheel base.**

## TRACTOR REQUIREMENTS

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

Three dual remote hydraulic outlets (SCV) are required on SDS planters. Two dual remote hydraulic outlets (SCV) are required on conventional planters. A 12 volt DC electrical system is required on all 3650 planters.

## TRACTOR PREPARATION AND HOOKUP

D101602106



**NOTE: A 2-Point Hitch Option, which converts the planter from drawn to semi-mounted, is available for use with Category 3N or 3 three-point hitch designs. The safety chain is not applicable with the 2-point hitch.**

1. Adjust tractor drawbar to 13"-17" above the ground. Adjust the drawbar so the hitch pin hole is directly below the center line of the PTO shaft. Make sure the drawbar is in a stationary position. See page 6-16 when using the even-row push row unit option.
2. Install control console on tractor in a convenient location within reach of the operator and close to the hydraulic controls. Mount control console securely and route power cord to the power source.

The control console operates on 12 volt DC only. If two 12 volt batteries are connected in series, ALWAYS make power connection on the battery which is grounded to the tractor chassis.

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

3. Back tractor to planter and connect with 1 ¼" - 1 ½" diameter hitch pin. If the tractor is not equipped with a hitch pin locking device, make sure hitch pin is secured with a locking pin or cotter pin.
4. The auxiliary attaching system (transport safety chain) provided with your planter should be used to ensure the connection is retained between the planter and tractor in the event of a hitch pin/drawbar failure. The safety chain is to be attached to the planter using an unused clevis mounting hole on the planter hitch. The mounting hardware should be torqued to 840 ft. lbs. Connect hookend of the chain securely around a tractor frame member.
5. Connect hydraulic hoses to tractor ports in a sequence which is both familiar and comfortable to the operator.

The hydraulic hoses are color coded as follows:

- Red AA - Lift Functions (Return)
- Red BB - Lift Functions (Pressure)
- Blue AA - Marker And Fold/Unfold Functions (Return)
- Blue BB - Marker And Fold/Unfold Functions (Pressure)
- Green AA - Bulk Seed Delivery System Functions (Return)
- Green BB - Bulk Seed Delivery System Functions (Pressure)

**NOTE: If the tractor has a motor return hookup, its use will allow the bulk seed system to work with reduced back pressure and reduced heat generation, but is not necessary for the proper operation of the system.**



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

**IMPORTANT: Always wipe hose ends to remove any dirt before connecting couplers to tractor ports.**

6. Connect cable on planter to control console cable on tractor. Connect ASAE Standards 7 terminal connector for safety/warning lights on planter to ASAE Standards receptacle on tractor. If your tractor is not equipped with an ASAE Standards receptacle, check with your tractor manufacturer for availability. Check to be sure warning lights on planter are working in conjunction with warning lights on tractor.
7. Raise jack stand and remount horizontally on storage bracket.

# MACHINE OPERATION

- Lower planter to the planting position and check to be sure the hitch is level. If hitch slopes up or down, disconnect planter and adjust hitch clevis up or down as necessary.

## LEVELING THE PLANTER

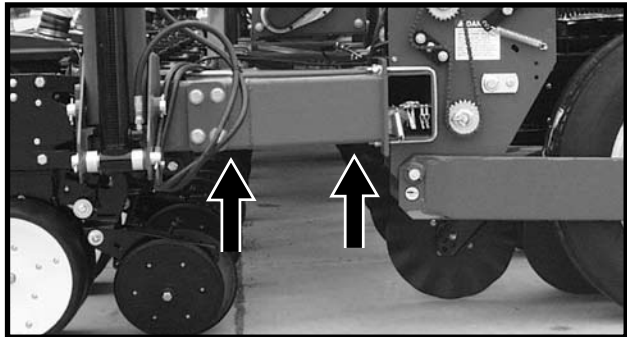
For proper performance of the planter and row units, it is important that the planter frame and row unit parallel arms operate approximately level. The toolbar should operate at a 20"-22" height, measured from the planting surface to the bottom of the toolbar.

D101602106



Four holes in the hitch bracket allow the clevis to be raised or lowered. In addition, the clevis may be turned over for a finer adjustment between mounting holes. When installing the clevis mounting bolt, make sure the lock nut is torqued to 840 ft. lbs.

D032901180a

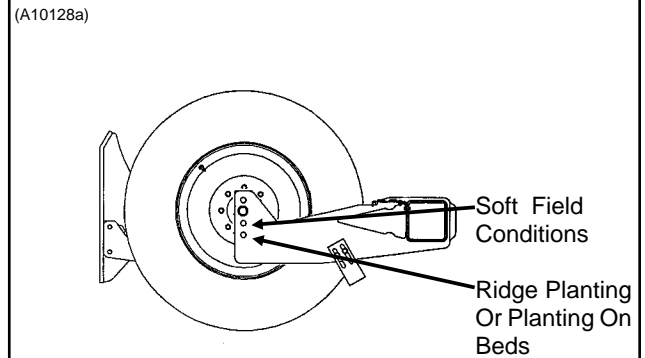
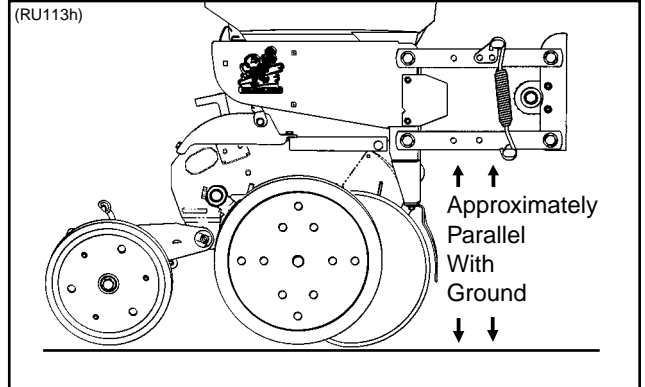


With the planter lowered to operating height, check to be sure the frame is level fore and aft. Recheck once planter is in the field.

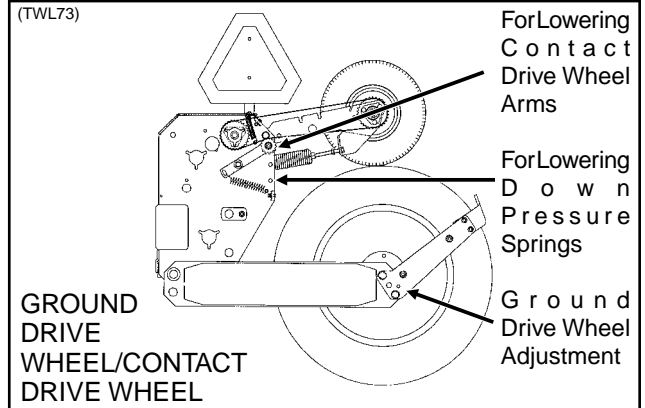
It is important for the planter to operate level laterally. Tire pressure must be maintained at pressures specified. See "Tire Pressure".

Field and actual planting conditions will dictate which of the transport wheel settings to use to ensure row unit parallel arms are approximately parallel with the planting surface. It may also be necessary to lower the ground drive wheels to ensure level lateral toolbar operation if the transport wheels are set in one of the two lower sets of holes.

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



## TRANSPORT WHEEL



When the planter has been fully loaded with seed, granular chemicals, etc.; a field check should be made to be sure the wings are level with the center frame. If the wings are not level with the center frame, the drive wheels and/or transport wheels can be raised or lowered in the wheel arms to increase or decrease planter toolbar height. Hitch height should be raised accordingly to ensure level operation.

**NOTE:** As the lift cylinders are port rephasing type, it is necessary for the cylinders to fully retract in order to rephase. Cylinder stops cannot be used.

Rev. 11/07

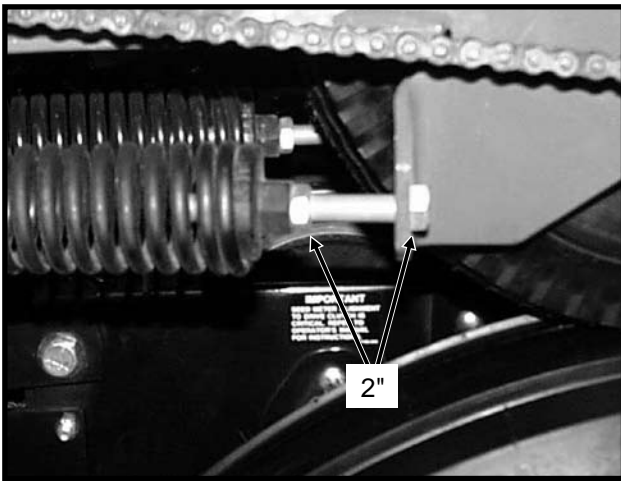


# MACHINE OPERATION

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

## CONTACT WHEEL SPRING ADJUSTMENT

D011402101

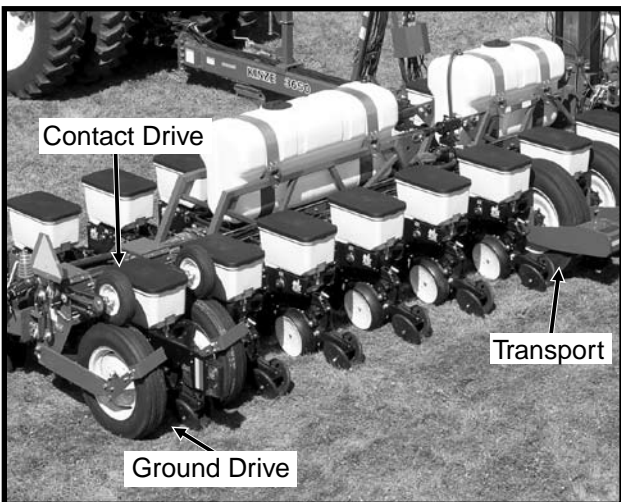


There are two down pressure springs on each contact drive wheel. The down pressure is factory preset and should require no further adjustment.

The spring tension is set leaving 2" between the spring plug and the bolt head.

## TIRE PRESSURE

LF092303107

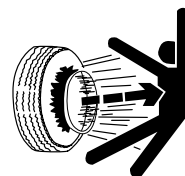


D020904101



Tire pressure should be checked regularly and maintained as follows:

41 x 11R22.5" Transport (Center Section) . . .	75 PSI
7.50" x 20" Ground Drive (Wings) . . . . .	40 PSI
4.80" x 8" Contact Drive . . . . .	50 PSI
7.60" x 15" Ground Drive (Liquid Fertilizer Piston Pump) . . . . .	40 PSI



**! DANGER:** Rim and tire servicing can be dangerous. Explosive separation of tire and rim parts can cause serious injury or death.

Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job. This should only be done by persons properly trained and equipped to do the job.

Always maintain the correct tire pressures. Do not inflate the tires above the recommended pressures.

When inflating tires, use a clip-on air chuck and extension hose long enough to allow you to stand to one side and NOT in front of or over the tire assembly. Use a safety cage to enclose the tire and rim assembly when inflating.

Inspect tires and wheels daily. Do not operate with low pressure, cuts, bubbles, damaged rims or missing lug bolts and nuts.

# MACHINE OPERATION

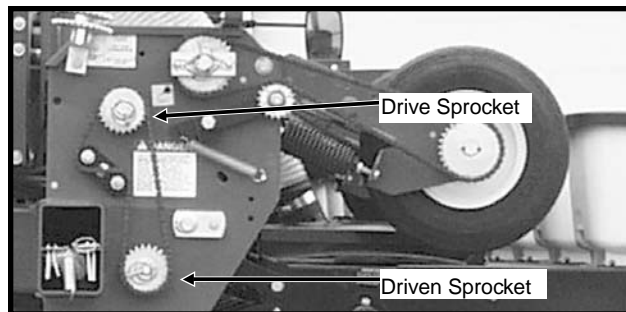
## SEED RATE TRANSMISSION ADJUSTMENT

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

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

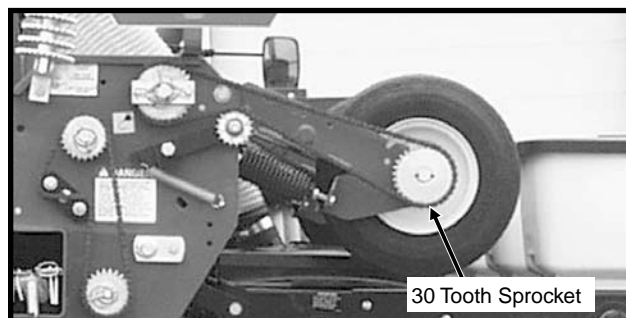
A decal positioned on the transmission module illustrates proper chain routing. The planting rate charts found at the back of this section will aid you in selecting the correct sprocket combinations.

D071803317



12 Row 30" Machine Shown

## STANDARD RATE DRIVE



12 Row 30" Machine Shown

Seed planting rate charts are based on the standard rate drive. The standard rate drive uses a 30 tooth sprocket and No. 40 118 pitch chain on each contact wheel. Using the 15 tooth reduced rate sprocket in place of the 30 tooth sprocket will reduce the planting and application rates by approximately 50%. See "Half Rate (2 To 1) Drive".

## HALF RATE (2 TO 1) DRIVE

D070699113a



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

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

## SHEAR PROTECTION

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

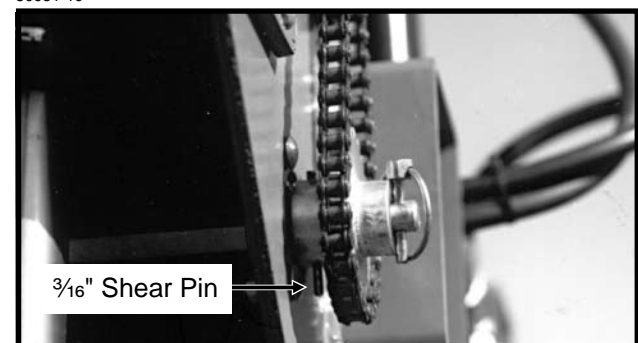
If excessive load should cause a pin to shear, it is important to determine where binding has occurred before replacing the pin. Replace shear pins with same size and type.

Additional shear pins can be found in the storage area located inside the rear planter frame.

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

**NOTE: Drill shaft/transmission coupler alignment is critical.**

50981-10



Transmission Shaft

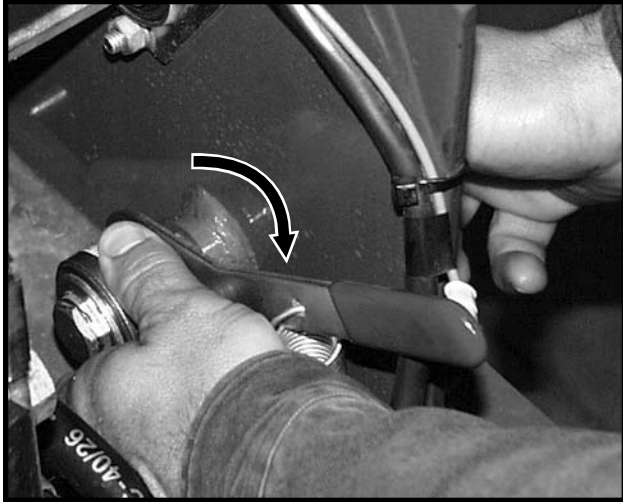
# MACHINE OPERATION

## WRAP SPRING WRENCH OPERATION

The chain idler is equipped with wrap spring wrenches. Chain tension is released and/or added as shown below.

To release chain tension, rotate the knurled collar on the wrap spring wrench while rotating the chain idler away from the chain.

D10290305



To add chain tension, rotate the chain idler into the chain while rotating the handle to tension idler spring.

D10290304



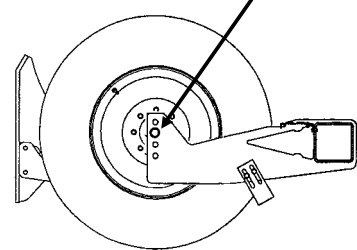
The wrap spring wrenches are made in L.H. and R.H. configurations, which can be identified by the silver or gold release collars, respectively.

## RIDGE PLANTING

When ridge planting, the drive wheels and transport wheels can be lowered 2" or 4" to the lower mounting holes in the wheel arms to increase the planter toolbar height. The contact drive tire must also be lowered to the lower set of holes in the wheel module and the down pressure springs hooked on the lower rod. Hitch height should be raised accordingly to ensure level operation.

(A10128a)

**Wheel Shown Mounted In Standard Location - Lower 2" Or 4" To Lower Mounting Holes When Ridge Planting**



**NOTE: The toolbar should operate at a 20"-22" height measured from the bottom of the toolbar to the planting surface.**

## HYDRAULIC/ELECTRIC OPERATION

76746-24



**Conventional Planters**

D12160359



**BULK SEED (SDS) Planters**

Switches on the control console located on the tractor are used to raise the planter to transport position, operate the rotate and tongue extension functions, lock and release the planter wings, and raise and lower the row markers. The control console for bulk fill planters also monitors auger speed and seed flow.

(Continued On Following Page)

# MACHINE OPERATION

**! DANGER:** To avoid serious injury or death, care must be taken when operating row markers around overhead power lines.

**NOTE:** The backlit console is equipped with a push button switch on the back of the console which may be used to turn console face off during extended periods of non-use.

3650 planters are plumbed to operate from two dual remote (SCV) hydraulic outlets and 3650 SDS planters are plumbed to operate from three dual remote hydraulic outlets. One (SCV) in conjunction with a switch on the control console, is used to operate the raise to transport function. The second (SCV) in conjunction with the switches on the control console, is used to operate the markers and fold/unfold functions. The third (SCV) is for operation of the seed delivery system hydraulic motors on SDS planters.

The marker and point row selector switches are an ON-OFF-ON type.

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

**! WARNING:** To ensure the safety of the operator and others nearby, the marker selector switch should be placed in its OFF (center) position when not in use. An indicator light on the control box panel is ON whenever the marker hydraulic circuit or point row clutch electrical circuit are energized.

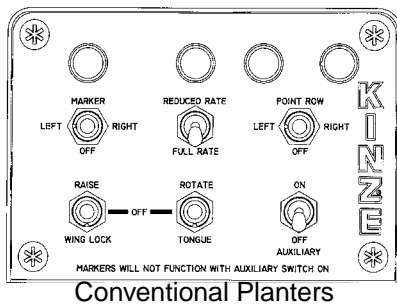
The auxiliary switch is an ON-OFF type switch which is used in conjunction with the hydraulic marker/folding functions SCV control to operate optional attachments. All 3650 planters are shipped with the auxiliary switch installed in the control console. The auxiliary switch must be in the OFF position to enable other functions.

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

**NOTE:** The lift cylinders are (port type) rephasing cylinders. It is necessary for all of the lift cylinders to fully retract before they will rephase in the lowered position. Cylinder stops cannot be used.

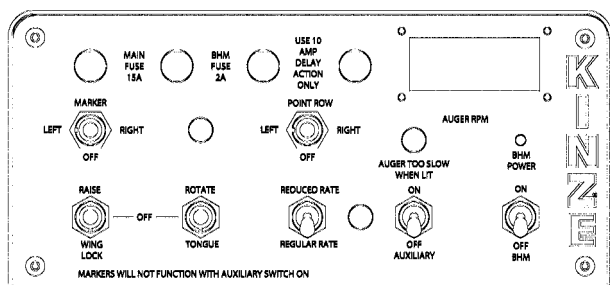
If the planter is equipped with the optional Two-Speed Point Row Clutch Package, the point row switch and reduced rate switch operate independently of the rest of the control console. Power to the marker switch is fed through the auxiliary switch and the two transport function switches. Operating any of the switches in the lower row disables the marker function and turns off the indicator light for the markers.

A7435(TWL81)



Conventional Planters

(A10189c)



SDS Planters

**! WARNING:** Never work under the planter while in raised position without installing safety lockups.

**! WARNING:** Make sure all hydraulic hoses are properly connected before operating the planter. Never connect or disconnect hydraulic hoses without first stopping the tractor engine and moving the hydraulic operating controls in both directions to relieve any pressure in the system.

# MACHINE OPERATION

## TRANSPORT TO FIELD SEQUENCE

Position the planter in a relatively flat open area. Try to 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.
- Lower planter to the ground.
- Release wing lock cylinders.
- Rephase planter lift cylinders.
- Raise planter to raised field position and retract tongue.
- Remove row marker lockups.

NOTE: Read the following information for more detailed instructions.

D071803216



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

D071803314



D032901120a



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

D032901113



D032901114



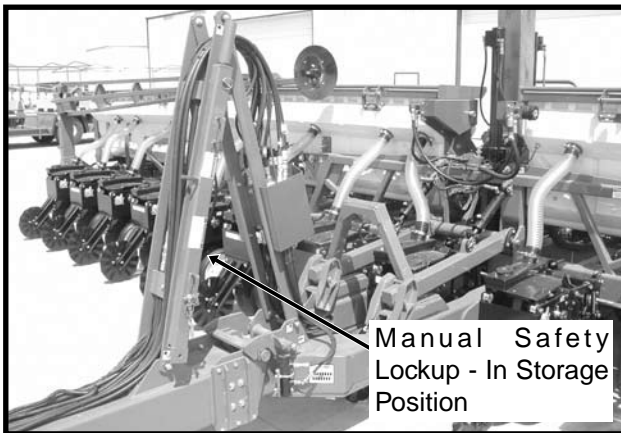
# MACHINE OPERATION

- Remove the manual safety lockup from under the front center lift cylinder and place it in the storage location on the hose take-up on the planter hitch.

D071603307

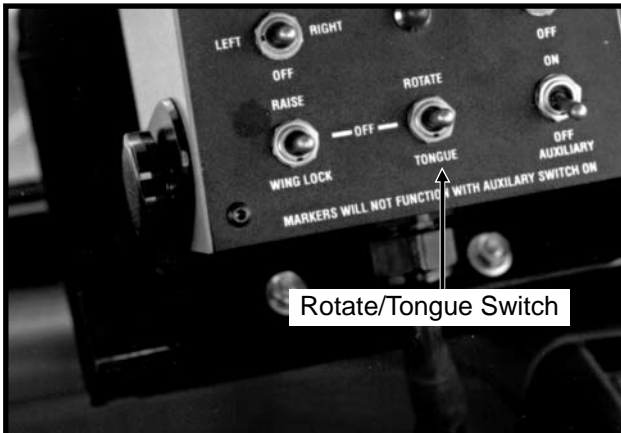


D071603212



- Hold the control console switch labeled "ROTATE/TONGUE" in "ROTATE" and operate the hydraulic control to unfold the planter. The transport latch will automatically release.

76746-24



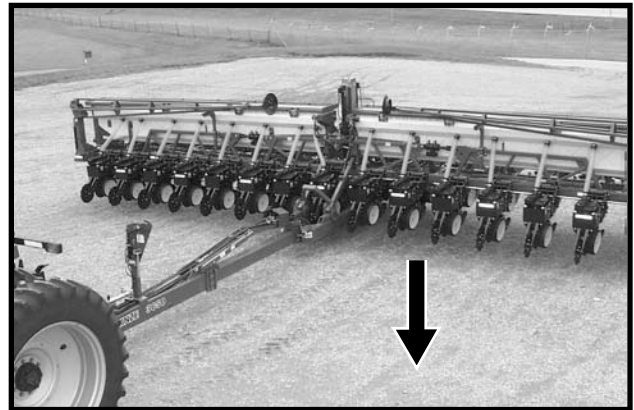
D071803214



**Rotate Planter**

- Slowly lower the planter to the ground.

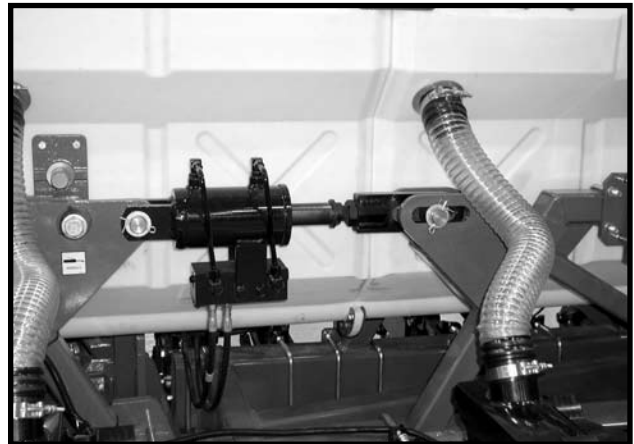
D071803210



**Lower Planter**

- Hold the control console switch labeled "RAISE/WING LOCK" in "WING LOCK" position and operate the hydraulic control to extend the wing lock cylinders.

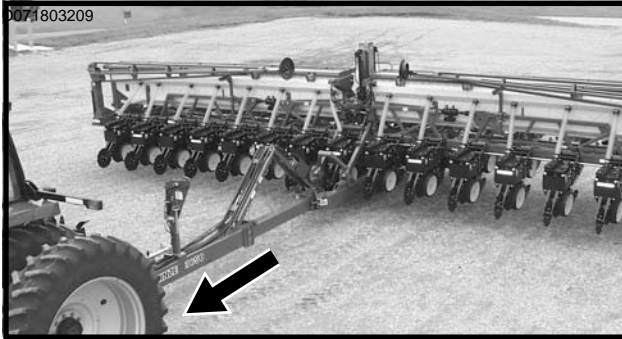
D021102257



**Wing Lock Cylinder With Counter Balance Valve**

# MACHINE OPERATION

7. Hold the hydraulic control (to lower planter) to rephase the planter lift cylinders. The length of time it takes to rephase the system may vary due to tractor hydraulic flow and/or oil temperature. Normally 5 to 20 seconds is adequate to rephase the system.
8. Raise the planter to the raised field position. Hold the control console switch labeled "ROTATE/TONGUE" in "TONGUE" and operate the hydraulic control to retract the tongue.



## Retract Tongue

9. Remove and store row marker lockups.



# FIELD OPERATION

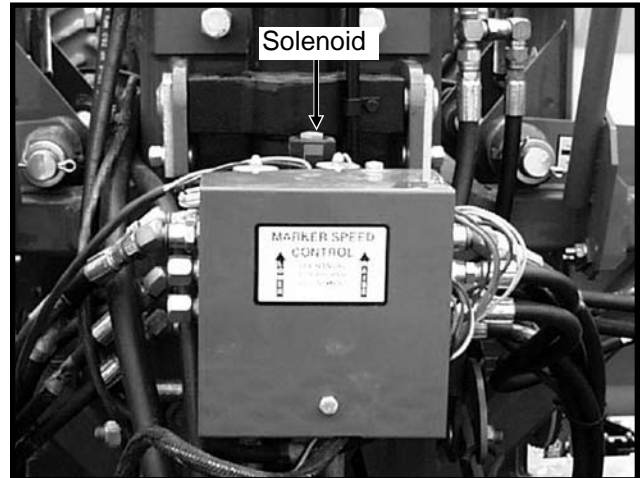
There are two raised positions on the planter. One is the "raised field position" which is when the planter wing cylinders are fully extended and the center lift cylinders are at mid-stroke. Because the solenoid, located on the top side of the valve blocks on the rear R.H. side of the center frame, is not energized, the wing cylinders cannot bypass oil preventing the planter from raising any higher. In the "raised field position" the row units are approximately 14 inches off the ground. This position is used in making turns or passing over waterways during field operation. The second raised position is the "raised transport position".

D071803208



## Raised Field Position

D071803206



## Raise Solenoid

See "Row Marker Operation" for field operation of row markers.

# MACHINE OPERATION

## FIELD TO TRANSPORT SEQUENCE

Position the planter in a relatively flat area. Try to avoid an area with furrows, etc.

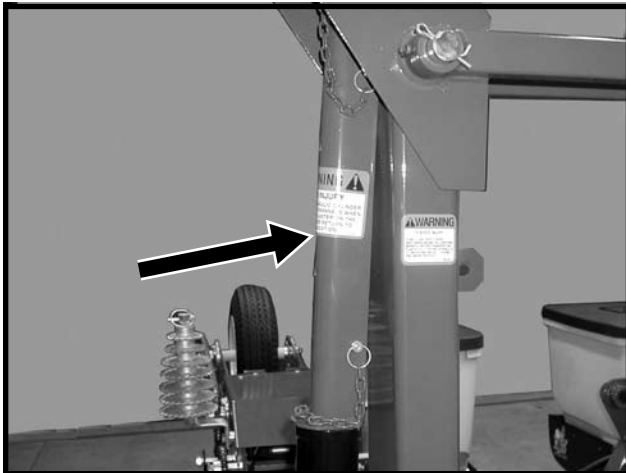
### SUMMARIZED FIELD TO TRANSPORT SEQUENCE

- Install row marker lockups.
- Raise planter to raised field position.
- Extend tongue.
- Retract wing lock cylinders.
- Raise planter to raised transport position.
- Rotate planter to transport position.
- Install tongue safety pin.
- Install transport latch locking pin.
- Install manual safety lockup.

NOTE: Read the following information for more detailed instructions.

1. Install row marker lockups.

D120804101a



2. Using the hydraulic control, raise the planter to the raised field position as shown below.

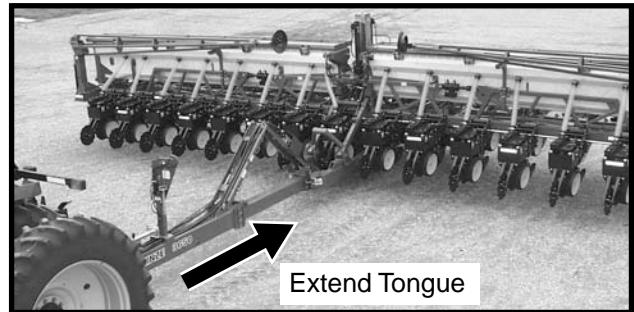
D071803208



Raised Field Position

3. Hold the control console switch labeled "ROTATE/TONGUE" in "TONGUE" and operate the hydraulic control until the tongue is fully extended. Tongue lock latch will automatically release.

D071803209



Extend Tongue

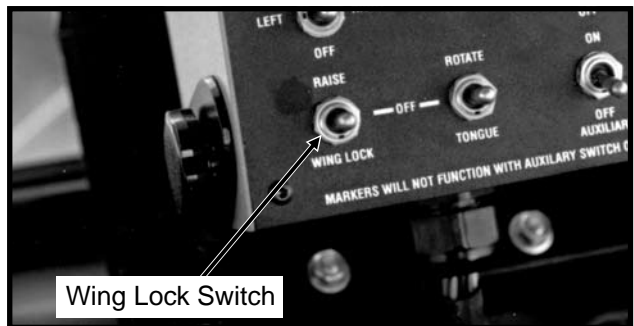
D071603212



Tongue Lock Latch Will Automatically Release

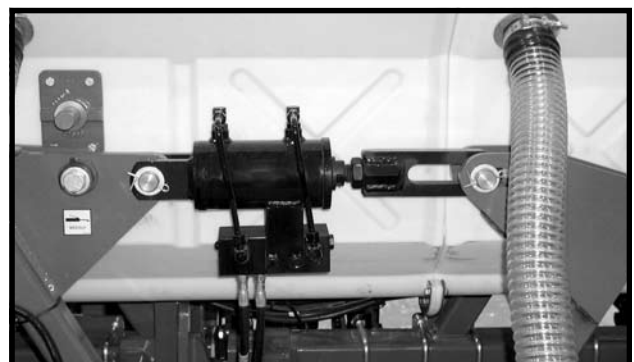
4. Hold the control console switch labeled "RAISE/WING LOCK" in "WING LOCK" and operate the hydraulic control until the wing lock cylinders are fully retracted.

76746-24



Wing Lock Switch

D021102215

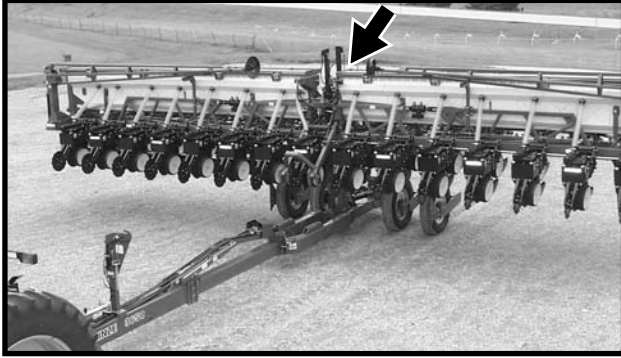




# MACHINE OPERATION

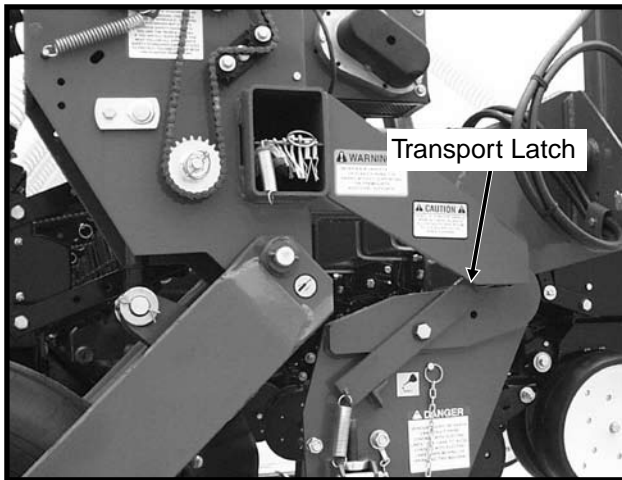
5. Hold the control console switch labeled "RAISE/WING LOCK" in "RAISE" and operate the hydraulic control until the two center lift cylinders are fully extended and the planter is fully raised.

D071803212



6. Hold the control console switch labeled "ROTATE/TONGUE" in "ROTATE" and operate the hydraulic control to rotate the planter until the transport latch is engaged.

D032901114



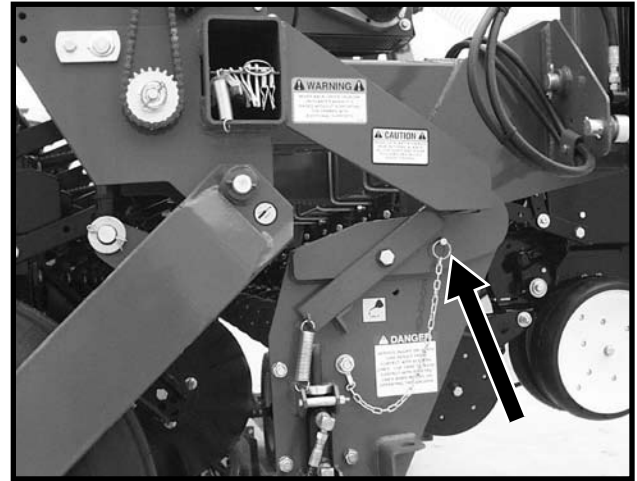
7. Install tongue safety pin.

D071803314



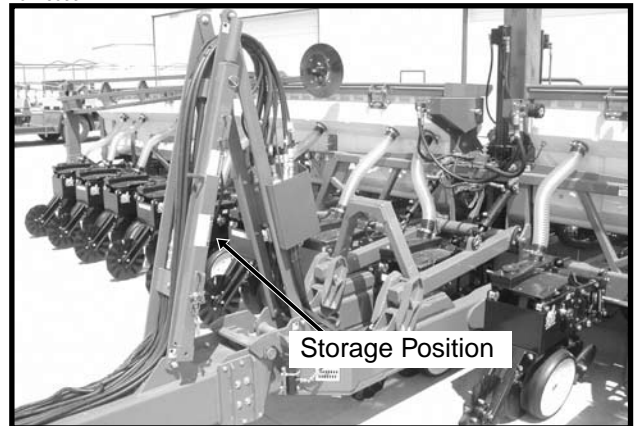
8. Install transport latch locking pin.

D032901113

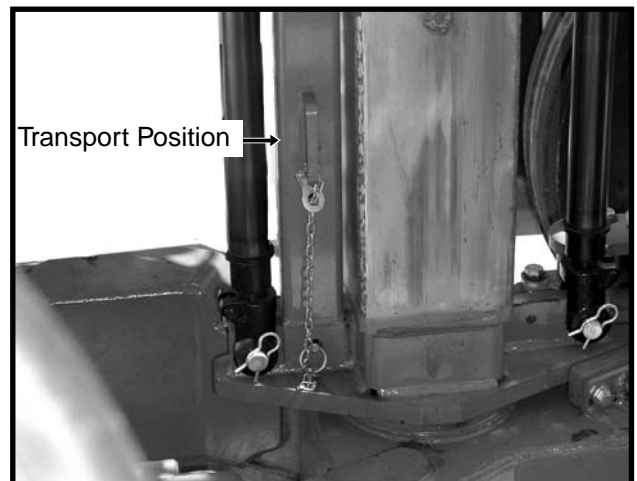


9. Remove manual safety lockup from its storage location on the hose take-up on the planter hitch and position it behind the front center lift cylinder.

D071803314



D071603307

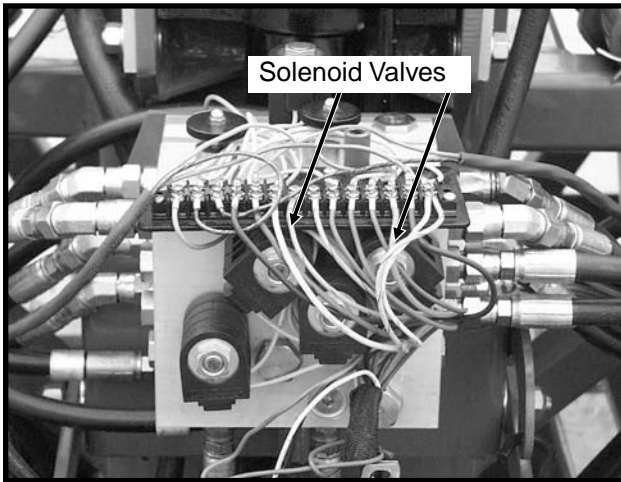


**DANGER:** Always install the manual safety lockup prior to storage, working under the planter or transporting the planter.

# MACHINE OPERATION

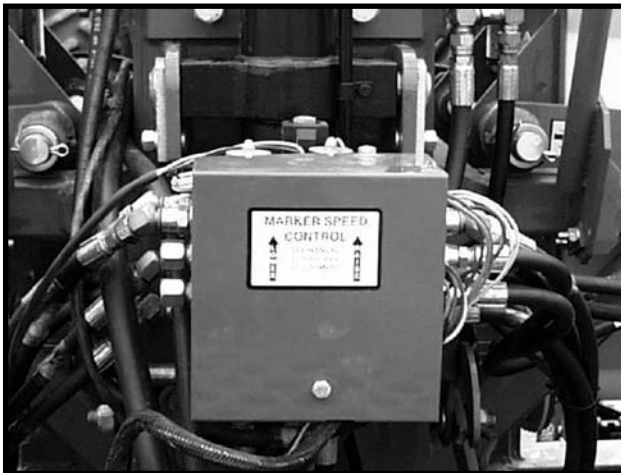
## ROW MARKER OPERATION

D032901147



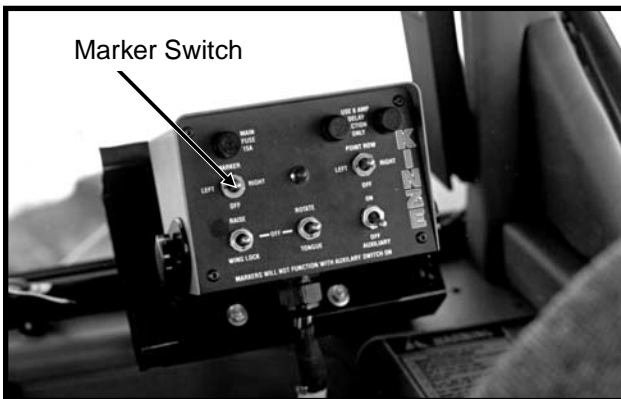
Shown With Cover Removed

D071803206



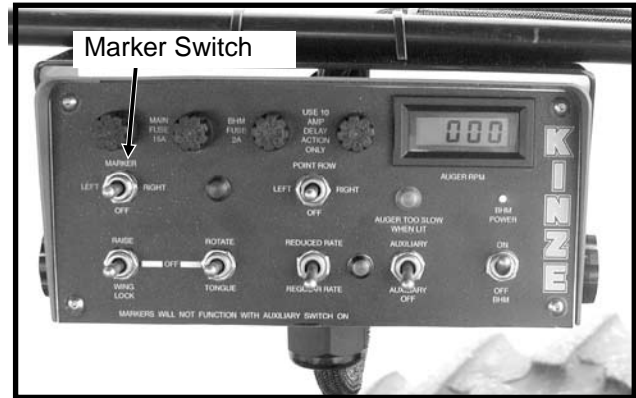
Shown With Cover Installed

76746-24



Three Position Selector Switch On Conventional Planter Control Console

D12160359



Three Position Selector Switch On SDS Planter Control Console

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

See “Row Marker Speed Adjustment”.

1. On the control console, select which marker you want to lower.
2. Operate hydraulic control to lower marker.
3. If opposite marker is to be used next, change control switch to other side.
4. At end of field, using hydraulic control, raise the down marker.
5. After making the turn, using the hydraulic lever, lower the pre-selected marker.
6. Continue to follow this procedure.

**NOTE:** Both markers can be lowered by operating the switch in each position and operating the hydraulic control twice. The markers will raise simultaneously with the hydraulic control in the raise position.

**IMPORTANT:** Switch should be left in OFF position when planter is not in use. If left in ON position, it will discharge the tractor battery.

If the electrical system fails to operate properly:

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



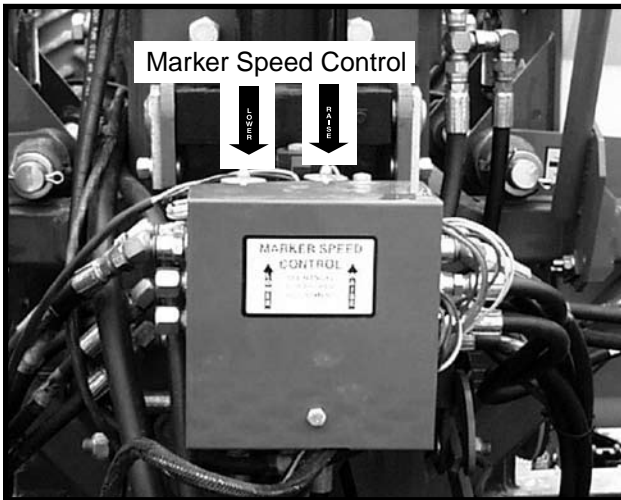
**DANGER:** To avoid serious injury or death, care must be taken when operating row markers around overhead power lines.

# MACHINE OPERATION

## ROW MARKER SPEED ADJUSTMENT

The marker hydraulic system includes two flow control valves. One flow control valve sets the lowering speed of both markers and one sets the raising speed of both markers. To adjust marker speed, loosen the jam nut and turn the control(s) clockwise, or IN, to slow the travel speed and counterclockwise, or OUT, to increase the travel speed. The flow control(s) determines the amount of oil flow restriction through the valve(s), therefore varying travel speed of the markers. Tighten jam nut after adjustments are complete.

D071803206



**IMPORTANT:** The flow controls should be properly adjusted before the marker assembly is first put into use. Excessive travel speed of the markers can damage the marker assembly.

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

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

On tractors equipped with flow control valves, row marker speed adjustment should be made with the tractor flow controls in maximum position. After marker speed is set, the tractor flow controls can be adjusted to allow the hydraulic control to stay in detent during the marker raise or lower cycle.

**⚠ DANGER:** To avoid serious injury or death, care must be taken when operating row markers around overhead power lines.

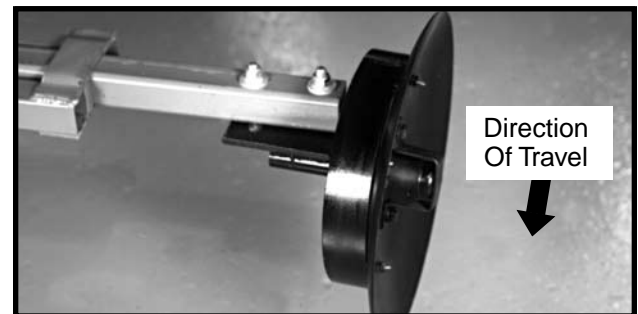
## ROW MARKER LENGTH ADJUSTMENT

To determine the correct length at which to set the row marker assemblies, multiply the number of rows by the average row spacing in inches. This provides the total planting width. Adjust the marker extension so the distance from the marker disc blade to the center line of the planter is equal to the total planting width previously obtained. Both the planter and row marker assembly should be lowered to the ground when measurements are being taken. The measurement should be taken from the point where the blade contacts the ground. Adjust right and left row marker assemblies equally and securely tighten clamping bolts. An example of marker length adjustment follows:

Number	Row	Dimension Between
Of Rows	x Spacing	Planter Center Line
	(Inches)	And Marker Disc Blade

$12 \text{ Rows} \times 30" \text{ Spacing} = 360" \text{ Marker Dimension}$ or $23 \text{ Rows} \times 15" \text{ Spacing} = 345" \text{ Marker Dimension}$
--

60569-53



Row Marker Disc Blade Shown With Depth Band.

The marker disc blade should be installed so the concave side of the blade is outward to throw dirt away from the grease seals. The spindle assembly is slotted so the hub and blade can be angled to throw more or less dirt. To adjust the hub and spindle, loosen the 1/2" hardware and move the assembly as required. Tighten bolts to the specified torque.

**IMPORTANT:** A marker disc blade assembly that is set at a sharper angle than necessary will add unnecessary stress to the complete row marker assembly and shorten the life of bearings and blades. Set the blade angle only as needed to leave a clear mark.

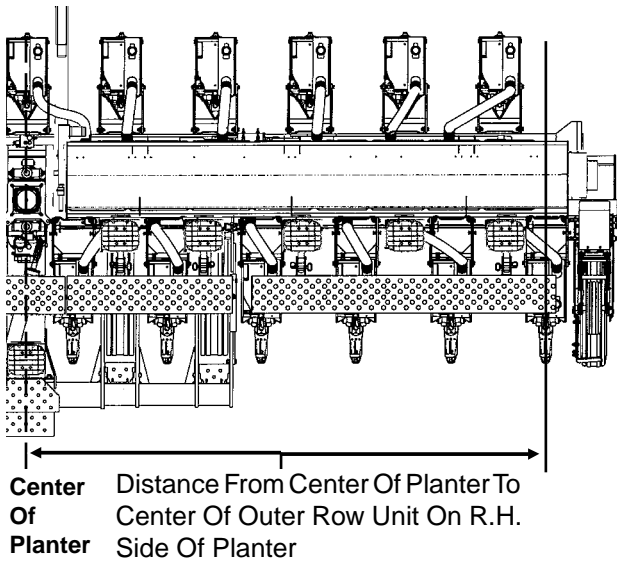
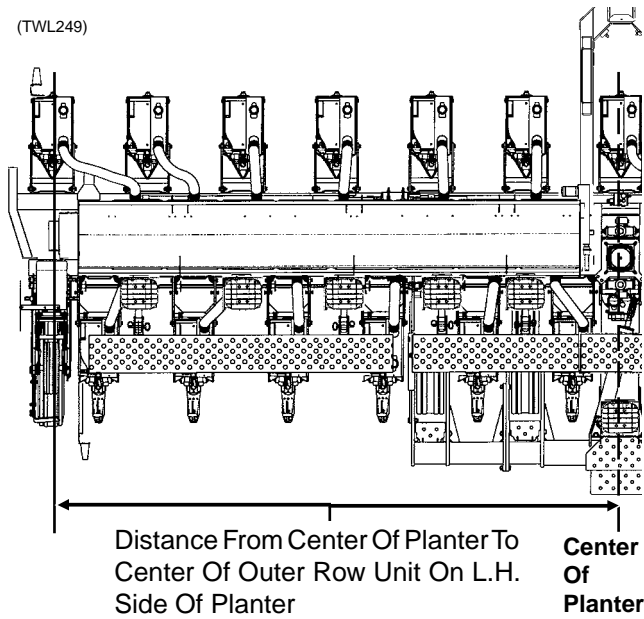
A field test is recommended to ensure the markers are properly adjusted. After the field test is made, make any minor adjustments as necessary.

Notched marker blades, for use in more severe no till conditions, are available from KINZE® Repair Parts through your KINZE® Dealer. (Continued On Following Page)

# MACHINE OPERATION

When using the even-row push row unit option, adjust row marker extensions as shown below.

(TWL249)

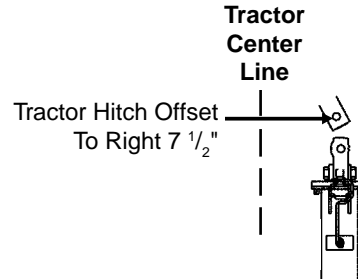


Center Of Planter To Center Of Outer Row Unit	x	2	+	15"	=	Dimension Between Planter Center Line And Row Marker Disc Blade
				Row Spacing		

12 Row 30" With 12 Interplant® Push Row Units  
 (L.H. Row Marker 180" x 2 + 15" = 375")  
 (R.H. Row Marker 165" x 2 + 15" = 345")

16 Row 30" With 16 Interplant® Push Row Units  
 (L.H. Row Marker 240" x 2 + 15" = 495")  
 (R.H. Row Marker 225" x 2 + 15" = 465")

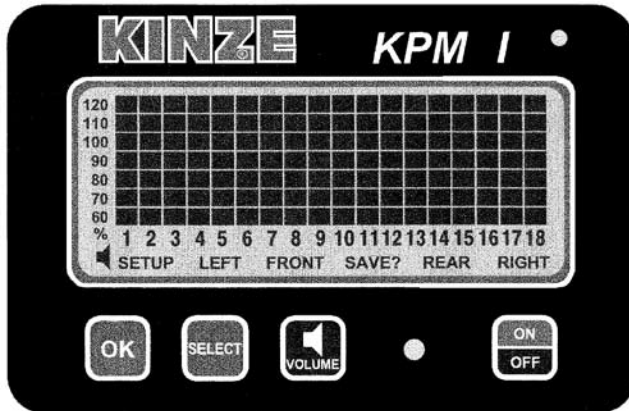
**NOTE:** If tractor hitch is offset 7 1/2" to the right of the center line of the tractor, add 7 1/2" to the row marker dimension on the R.H. side of the planter and subtract 7 1/2" from the row marker dimension on the L.H. side of the planter.



**NOTE:** Readjust row markers when planting 30" rows.

## KPM I ELECTRONIC SEED MONITOR

(MTR28)



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

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

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

The single backlit Liquid Crystal Display (LCD) shows the active section, the number of monitored rows per section, the relative seed rate for each row (using a bar graph display) and scrolls various alarm and warning messages when an alarm condition exists. A continuous audible alarm will sound upon system malfunction or underflow conditions for any monitored row. Alarms must be acknowledged by the user. Various warnings may sound the alarm or flash one or more icons.

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

\* **NOTE: The primary harness, on all 3000 Series Planters, is hard-wired into the safety/warning light harness or control console harness included as standard equipment with the planter.**

Monitor Key Functions.....	6-17
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Replacing A Faulty Sensor .....	6-19
Field Operation .....	6-20
Programming/Connecting Seed Tubes .....	6-20

### MONITOR KEY FUNCTIONS

Each key press is acknowledged by the monitor with a short beep.

#### OK

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

#### SELECT

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

#### VOLUME

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

#### ON/OFF

- Powers the unit on and off.

### LCD FUNCTIONS

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

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

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

**EXAMPLE:**The system is setup to display rear/front sections. Press SELECT key. The FRONT icon will be flashing and the REAR section will be displayed on the bar graph. After 1 minute the FRONT icon will stop flashing. The monitor will stay in this REAR only display through power down and power up. Each time the monitor is turned on while in REAR only mode, the FRONT icon will flash for 1 minute. Also if seed flow is sensed in the FRONT section while planting, the FRONT icon will resume flashing.

**STEP 2** Press SELECT key again to activate both sections.

**EXAMPLE:** Press SELECT key a second time. The information regarding each section will display alternately every 5 seconds.

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

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

## CHANGING THE AUDIBLE ALARM VOLUME

**STEP 1** Press and hold down the VOLUME key.

**STEP 2** The SETUP and VOLUME icons will turn on and the alarm will sound continuously. The intensity of the sound will change every 2 seconds. After the maximum volume is reached, the next change will set the volume to minimum and will continue to get louder every 2 seconds. When the desired volume is reached, release the key.

## WARNINGS AND ALARMS

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

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

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

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

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

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

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

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

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

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

6. **Seed Counting Sensor In Calibration Warning** - All seed counting sensors run a self-calibration sequence on power up. While in calibration the bottom segment of each corresponding bar graph will flash if the monitor detects movement or planting activity. If the monitor does not detect this, the message "WAIT CALIBRATION" will be scrolled.

7. **Seed Counting Sensor Too Dirty Warning** - After the seed counting sensors end their internal self-calibration, the monitor may detect one or more sensors are either too dirty or blocked. If the monitor detects planting or movement, the corresponding bar graph remains flashing. The monitor will display "CLEAN SENSORS" on the LCD if no movement or planting is detected, prompting the user to clean the tubes. If the tubes are dirty, they will still show seed flow with less accuracy. If the tubes are blocked the user will get an alarm as soon as planting starts. The corresponding bar graph will remain flashing until the problem is corrected and the monitor is powered down and then powered back up.
8. **Low Battery Warning** - The monitor is constantly monitoring its input voltage to quickly detect low power conditions. If the monitor detects that the input voltage has dropped below 11.0V, it will display "LOW POWER" on the LCD, provided that the monitor does not detect planting.

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

## REPLACING A FAULTY SENSOR

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

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

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

## FIELD OPERATION

(MTR28e/MTR28c/MTR28d/MTR28b)

Press the ON/OFF key to turn the monitor on and off.



Information regarding each section is displayed alternately every 5 seconds.

### REAR/FRONT CONFIGURATION

- Press the SELECT key once to show REAR section only.
- Press the SELECT key a second time to return to each section being displayed alternately every 5 seconds.
- Press the SELECT key a third time to show REAR section only again.



### LEFT/RIGHT CONFIGURATION

- Press the SELECT key once to show LEFT section only.
- Press the SELECT key a second time to show RIGHT section only.
- Press the SELECT key a third time to return to each section being displayed alternately every 5 seconds.



**NOTE: SELECT key has no function when only a single section is being used.**

Press the VOLUME key to increase or decrease volume. See “Changing The Audible Alarm Volume”.



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



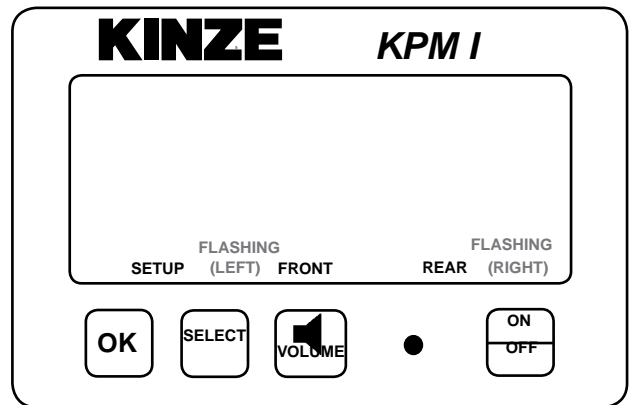
## PROGRAMMING/CONNECTING SEED TUBES

**STEP 1** All the seed tubes w/sensors must be disconnected from the harness and the monitor must be off.

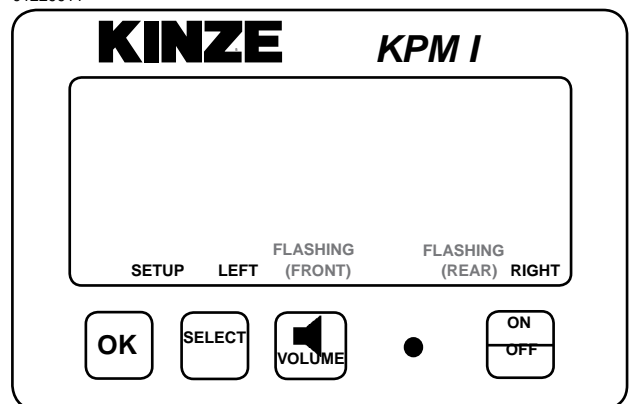
**STEP 2** Press the ON key. The monitor automatically enters the setup procedure. If the monitor was accidentally powered on with no sensors attached, the user can turn the monitor off at this point and the previous configuration is not lost.

**STEP 3** Press the SELECT key. Each time you press the SELECT key the mode will toggle between rear/front and left/right. The selected display will be solid and the configuration not currently selected will be flashing. By default the monitor starts in rear/front mode.

01229910



01229911



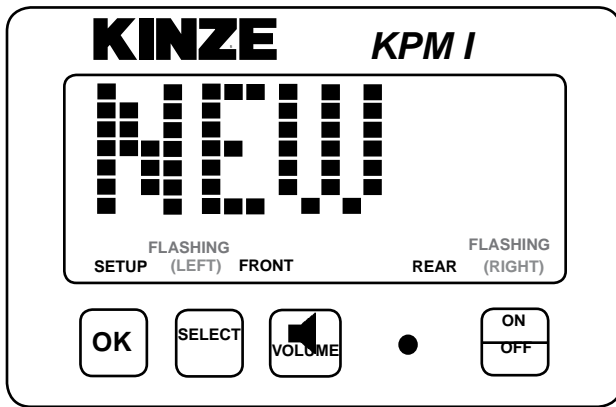
**NOTE: Model 3650 planters will use the rear configuration only. When Interplant® Package rows are in use, select the rear/front configurations. When all rows can be viewed on a single display (rear), pressing the select key has no function.**



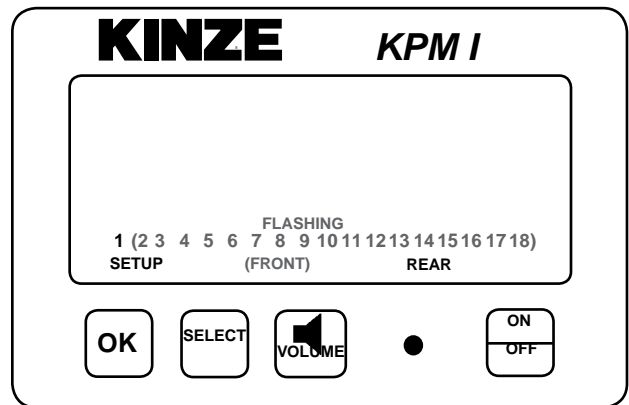
**STEP 4** Press and hold the OK key to confirm the selection and continue holding until the row numbers appear on the display. During confirmation, the display will alternate between “NEW” and “SYS” to alert the user that the previous configuration will be lost. With the rear/front mode selected, the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

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

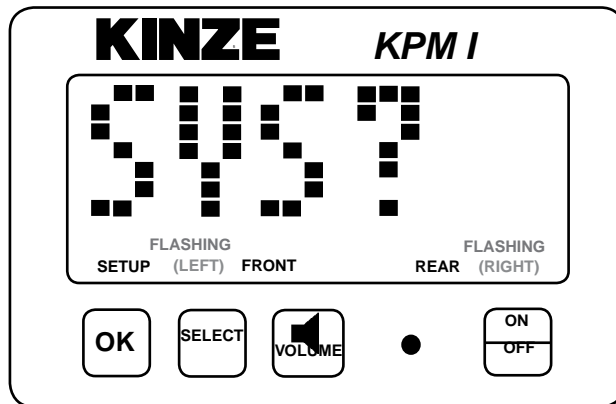
01229912



01229915

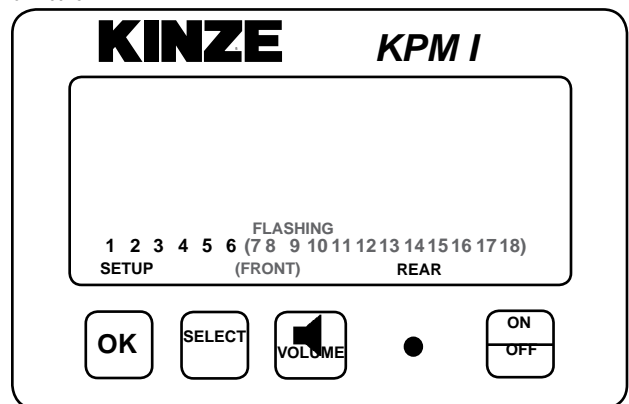


01229912a



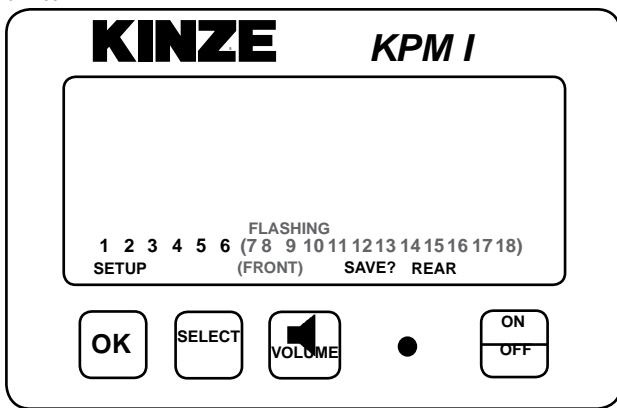
**STEP 6** When all the seed tubes w/sensors for the current section are installed, check to be sure the monitor displays solid numbers for the number of sensors connected.

01229916

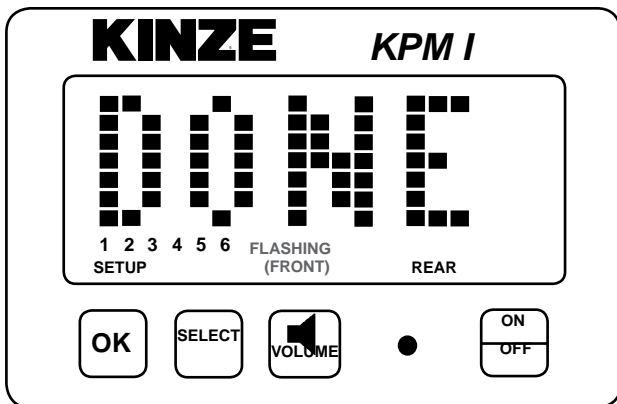


**STEP 7** If this condition is satisfied, press and hold the OK key to save the setup for the current section. The SAVE? icon will show followed by continuous short beeps indicating the monitor is preparing to save. The installer has 5 seconds to decide if he wants to save the current configuration.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

01229917

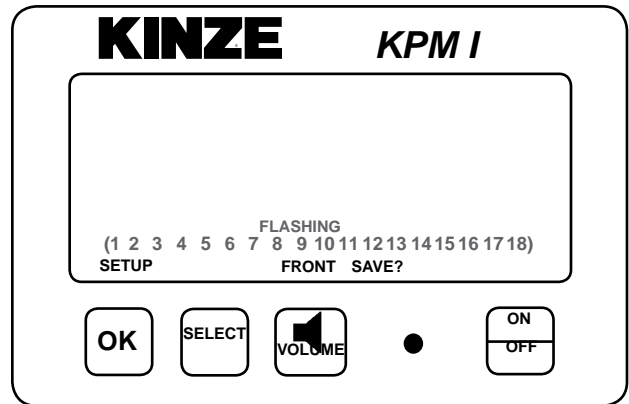


01229918

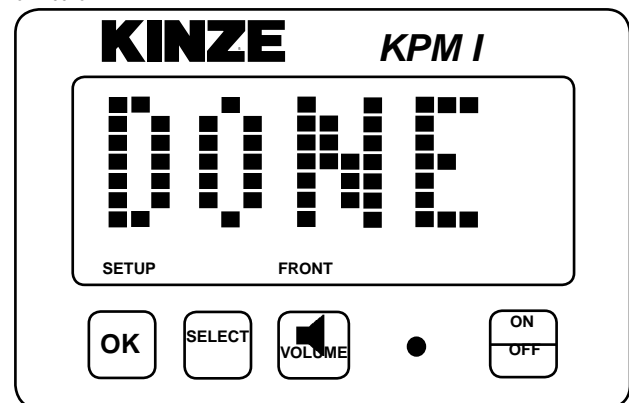


**STEP 8** Follow STEPS 5 through 7 to install the second section. If no seed tubes are installed on the second section, press and hold the OK key until the word “DONE” shows on the screen followed by a long beep and the SAVE? icon turns off.

01229919



01229920

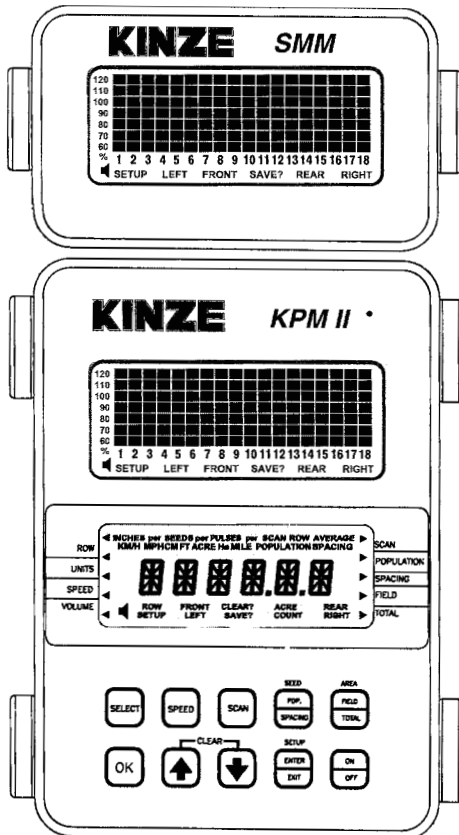


**NOTE:** Individual seed tubes may be unplugged for special situations. An alarm will sound which can be silenced by touching the OK key. The monitor will recognize each seed tube when reconnected.

**See “KPM I/KPM II Stack-Mode Electronic Seed Monitors Troubleshooting” in the Maintenance Section.**

## KPM II STACK-MODE ELECTRONIC SEED MONITOR

(MTR41e)



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

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

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

The SMM console is available as a separate package for use when 3650 planters are equipped with Interplant® Package rows.

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

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

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

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

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## MONITOR KEY FUNCTIONS

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

### SELECT

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

### SPEED

- Immediately displays the current ground speed.

### SCAN

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

### SEED POPULATION/SEED SPACING

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

### AREA FIELD/AREA TOTAL

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

### OK

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

### UP ARROW AND DOWN ARROW

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

### SETUP ENTER/SETUP EXIT

- Enters and exits the programming mode.

### ON/OFF

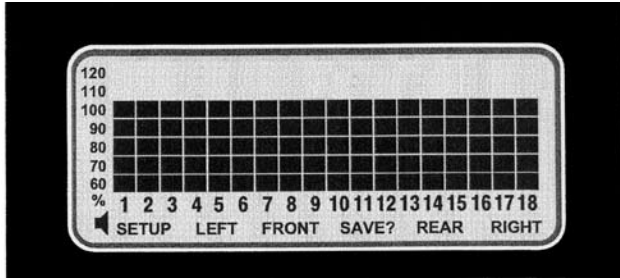
- Powers the unit on and off.

# MACHINE OPERATION

# KPM II STACK-MODE

## UPPER LCD FUNCTIONS

(MTR29h)



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

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

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

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

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

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

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

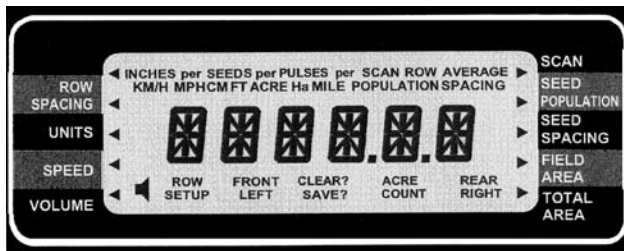
**STEP 2** Press SELECT key again to activate both sections.

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

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

## LOWER LCD FUNCTIONS

(MTR29g)



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

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

### UNITS

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

### SPEED

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

### VOLUME

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

### SCAN

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

# MACHINE OPERATION

# KPM II STACK-MODE

## SEED POPULATION/SEED SPACING

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

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

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

## FIELD AREA/TOTAL AREA

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

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

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

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

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

**EXAMPLE: On a 12 Row 30" planter with Interplant® Package, the display would appear as follows:**



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

## PROGRAMMING - Changing The Audible Alarm Volume

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

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

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

**STEP 3** Press the OK key and the flashing arrow becomes solid and the audible alarm will sound.

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

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

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

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

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



# MACHINE OPERATION

# KPM II STACK-MODE

## PROGRAMMING - Units (Metric Or English)

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

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

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

**STEP 3** Press the OK key and the flashing arrow becomes solid and the audible alarm will sound.

**NOTE: The lower LCD will alternately display all Metric icons or all English icons, indicating the Metric or English mode respectively.**

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

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

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

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

## PROGRAMMING - Row Spacing

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

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

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

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

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

**STEP 3** Press the UP or DOWN arrow keys to move the flashing arrow to ROW SPACING. As the arrow icon moves, the lower LCD will display the current setting of the item selected.

**STEP 4** Press the OK key and the flashing arrow becomes solid and the audible alarm will sound.

**NOTE: The lower LCD will display the current row spacing (in inches or centimeters) and ROW SPACING icon is turned on.**

- The least significant digit of the displayed value will be blinking.
- This value can be changed by pressing either the UP or DOWN arrow keys.
- Once this digit is correct, press the MODE SELECT key and the blinking digit will move to the next significant digit, where the process can be repeated.

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

**STEP 5** To exit without saving, press and release the OK key. The monitor will restore the lower LCD to show the setting of the item and the arrow icon will flash, allowing the user to select another item to program.

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

To exit setup mode, press the SETUP key.

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

# MACHINE OPERATION

# KPM II STACK-MODE

## PROGRAMMING - Speed

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

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

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

**STEP 3** Press the OK key and the flashing arrow becomes solid and the audible alarm will sound. The R.H. digit on the display will be blinking.

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

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

**NOTE: On new system installations, the monitor will default to 500 PPM (310 PPKM). This will have to be changed to obtain accurate readings from the monitor.**

- In field conditions, measure 330 feet ( $\frac{1}{16}$  mile) or 100 meters, depending on the unit of measurement selected.

- Pull the tractor up to the starting line.

- Press the UP and DOWN arrow keys at the same time and hold them down until the CLEAR? icon is displayed and the monitor beeps several times. When the data is actually cleared, the monitor will emit a long beep and the number of pulses is cleared.

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

- Drive the tractor for 330 feet ( $\frac{1}{16}$  mile) or 100 meters and stop.

- The monitor will count the number of pulses and display them.

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

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

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

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

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

The monitor limits the entry of pulses per mile or kilometer to a minimum of 500 PPM (310 PPKM), and to a maximum of 500,000 PPM (310,686 PPKM).

KEY Action	Flashing Digit	Display Value
Press The UP Key	Right Most Digit	2031, 2032, 2033
Press The SELECT Key	Second Digit From Right	2033
Press The DOWN Key	Second Digit From Right	2023, 2013, 2003, 2093, 2083
Press The SELECT Key Twice	Left Most Digit	2083
Press The DOWN Key	Left Most Digit	1083, 0500 (Min. Value), 9500, 8500

## PROGRAMMING - Clearing Total Area

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

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

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

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

**STEP 3** Press the OK key and the flashing arrow becomes solid and the audible alarm will sound.

- The lower LCD will display the total area and the ACRE (or Ha) icon turns on.
- With the flashing arrow on TOTAL AREA, press the OK key.

• To reset the counter, press the UP and DOWN arrow keys at the same time and hold them down for a short period of time to clear the data. The CLEAR? icon will be displayed and the monitor will beep several times. When the data is actually cleared, the monitor will emit a long beep, and the total area is reset to zeros. After the long beep, the previous recorded total area is not retrievable. Once cleared, the user **may not** choose to exit programming mode without saving as described in STEP 4.

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

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

## AREA COUNTER/SPEEDOMETER MODE

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

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

## WARNINGS AND ALARMS

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

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

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

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

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

The four possible data communication bus errors are:

LCD Display	Error Condition
SYS HI	The data communication lead (green) has been shorted to the power lead (white).
SYS LO	The data communication lead (green) has been shorted to the ground lead (black).
SYS EC	An internal error has been detected.
COP	Cycled power ON/OFF to quickly.

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

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

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

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

- 3. Multiple Alarms** - If more than one alarm condition occurs at the same time, pushing the OK key will acknowledge all alarms that are currently displayed. For example, if one row on the front and one row on the rear are alarming, pushing the OK key will only acknowledge one of them. However, if there are two alarms on the front, both alarms would be acknowledged with one push of the OK key.

4. **Section Not Selected Warning** - If the monitor was programmed for two sections and only one is currently selected for display (by pressing the SELECT key), the icon of the disabled section will flash for a period of 1 minute, then turn off at each power up. If seed flow is sensed in the disabled section, the icon for that section (front, left or right) will begin to flash.
5. **Seed Planting Stopped Warning** - When the monitor detects no seed flow on all rows, the monitor will emit 3 short beeps to alert the user. This warning will occur each time the planter is stopped, each time the planter is raised at the end of a row or if the mechanical drive fails while planting.

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

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

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

## REPLACING A FAULTY SENSOR

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

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

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

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

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

# MACHINE OPERATION

# KPM II STACK-MODE

## FIELD OPERATION

Press the ON/OFF key to turn the monitor on.



(MTR28e)

Information regarding each section is displayed alternately every 5 seconds.

### REAR/FRONT CONFIGURATION (Without SMM Console Installed)

- Press the SELECT key once to show REAR section only. (Monitor sets correct row spacing.)
- Press the SELECT key a second time to return to each section being displayed alternately every 5 seconds on KPM II Stack-Mode console. (Monitor sets correct row spacing.)
- Press the SELECT key a third time to show REAR section only again.



(MTR28c)

### REAR/FRONT CONFIGURATION (With SMM Console Installed)

- Press the SELECT key once to show REAR section only on KPM II Stack-Mode console. (Monitor sets correct row spacing.)
- Press the SELECT key a second time to show FRONT section on SMM console and REAR section on KPM II Stack-Mode console. (Monitor sets correct row spacing.)
- Press the SELECT key a third time to show REAR section only again.



(MTR28c)

### FOUR SECTION CONFIGURATION (With SMM Console Installed)

- Press the SELECT key once to show REAR and LEFT sections on KPM II Stack-Mode console and REAR and RIGHT sections on SMM console. (Monitor sets correct row spacing.)
- Press the SELECT key a second time to return to all four sections, alternating right front and right rear on SMM console and alternating left front and left rear on KPM II Stack-Mode console. (Monitor sets correct row spacing.)
- Press the SELECT key a third time to show REAR and LEFT sections on KPM II Stack-Mode console and REAR and RIGHT sections on SMM console again.

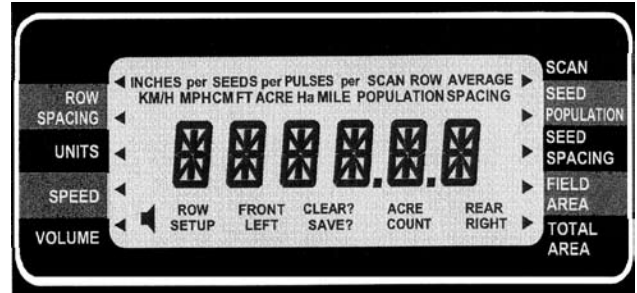


(MTR28c)

**NOTE: SELECT key has no function when only a single section is being used.**

At power up, the lower LCD will show speed (MPH or KM/H).

(MTR29g/MTR29b/MTR29a/MTR29c/MTR29f/MTR29c/MTR29f)



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



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



(MTR29c/MTR29d/MTR29b/MTR29c)

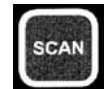
Press the SEED POPULATION/SEED SPACING or AREA FIELD/TOTAL keys to alternate between the two functions assigned to that key.



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



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



Press the SCAN key again to lock on current row.

Press the SCAN key again to resume scrolling.

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



Press the SEED POPULATION/SEED SPACING key to go back to planter average.



## CLEARING FIELD AREA

(MTR29n/MTR28b)

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



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



**NOTE: Clearing the field area counter will not clear the total area counter. See “Programming-Clearing Total Area” for clearing total area.**

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





# MACHINE OPERATION

# KPM II STACK-MODE

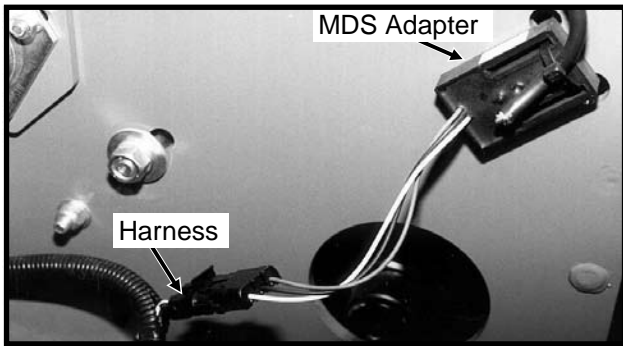
**PROGRAMMING/CONNECTING SMM CONSOLE, SHAFT ROTATION SENSORS, SEED TUBES AND/OR RADAR/MAGNETIC DISTANCE SENSORS**

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

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

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

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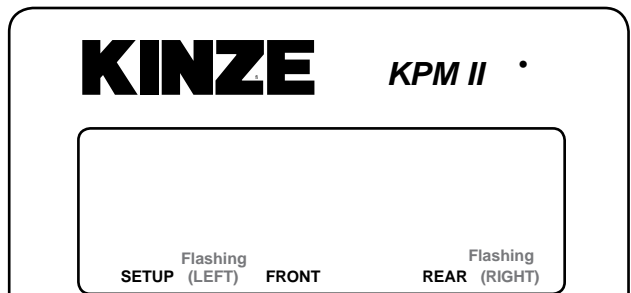
01189910



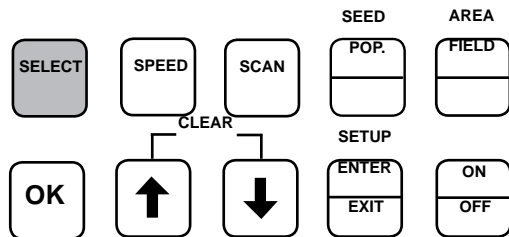
**STEP 2** Press the ON key. The monitor automatically enters the setup procedure. Monitor will scroll “NO SENSOR” on top LCD of KPM II Stack-Mode console.

**STEP 3** The monitor automatically defaults to rear/front. Press the SELECT key once for left/right and twice for four sections (front right/front left/rear right/rear left). The selected display will be solid and the configuration not currently selected will be flashing.

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ROW	SETUP	SCAN
UNITS		SEED
SPEED		SEED
VOLUME		FIELD
		TOTAL

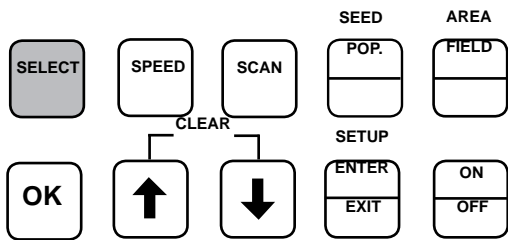
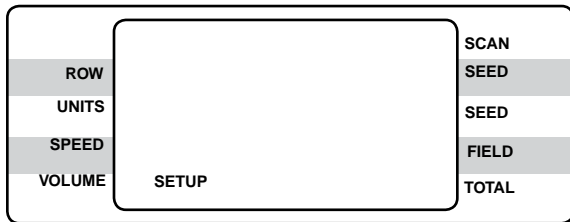
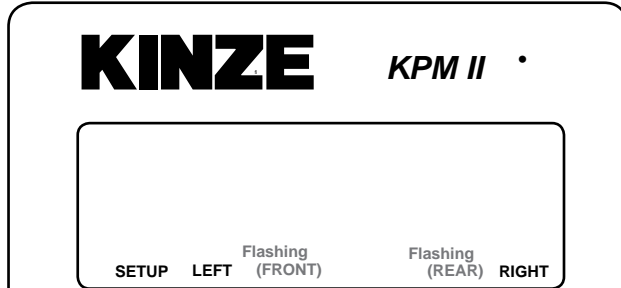


**NOTE:** SMM console may not be applicable to all models.

# MACHINE OPERATION

# KPM II STACK-MODE

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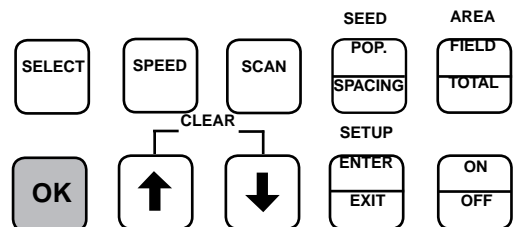
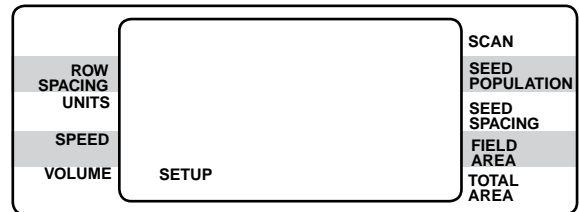
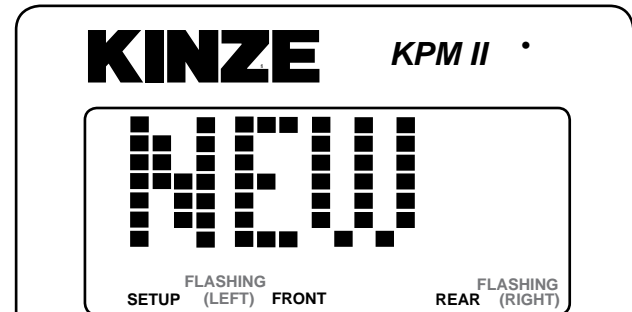
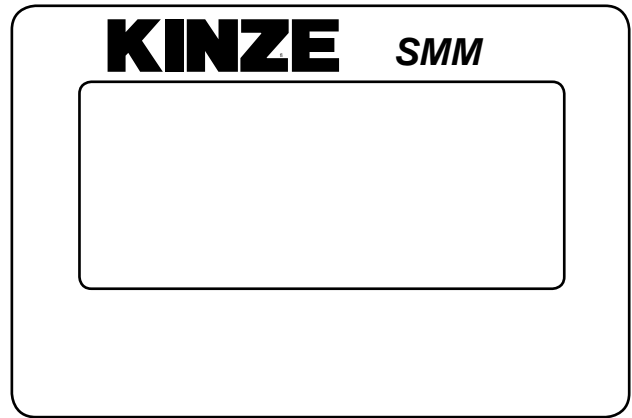
**NOTE: SMM console may not be applicable to all models.**

**NOTE: Model 3650 planters select the rear configuration only. When Interplant® Package rows are in use, select the rear/front configuration.**

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

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

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

# MACHINE OPERATION

# KPM II STACK-MODE

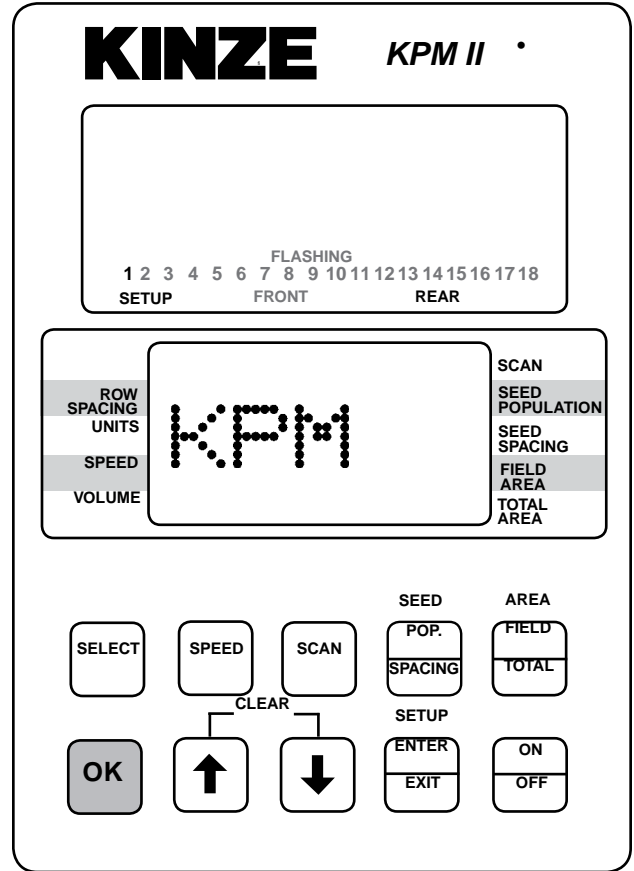
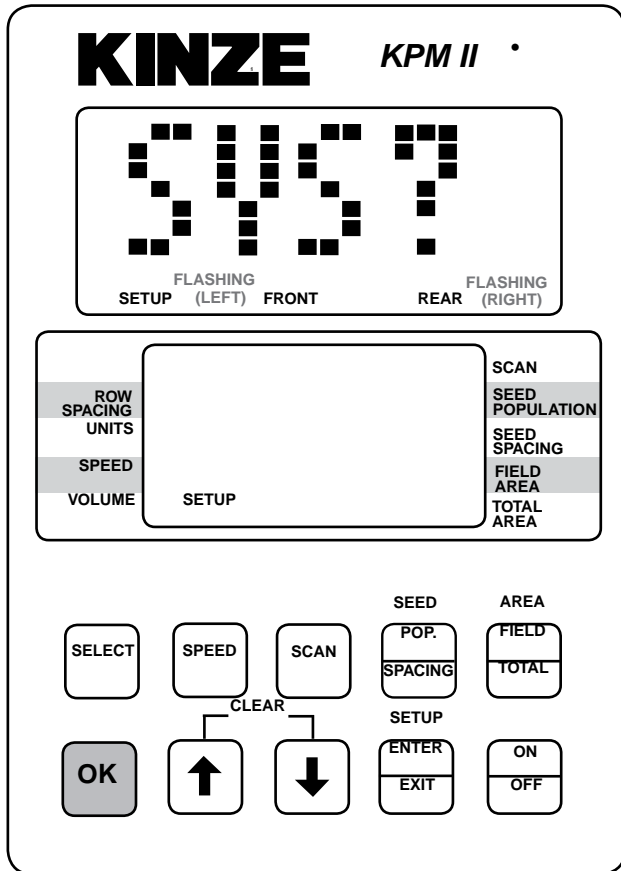
**NOTE: Illustrated using rear/front configuration.** The KPM II Stack-Mode console shows LEFT in the left/right configuration, REAR in the rear/front configuration and FRONT LEFT/REAR LEFT in the four sections configuration.

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

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

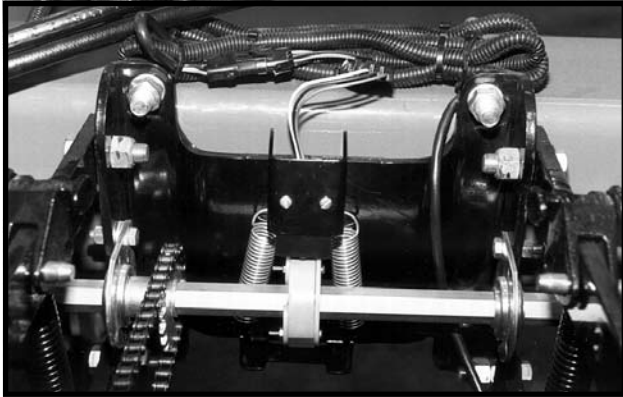
**NOTE: SMM console may not be applicable to all models.**

# MACHINE OPERATION

# KPM II STACK-MODE

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

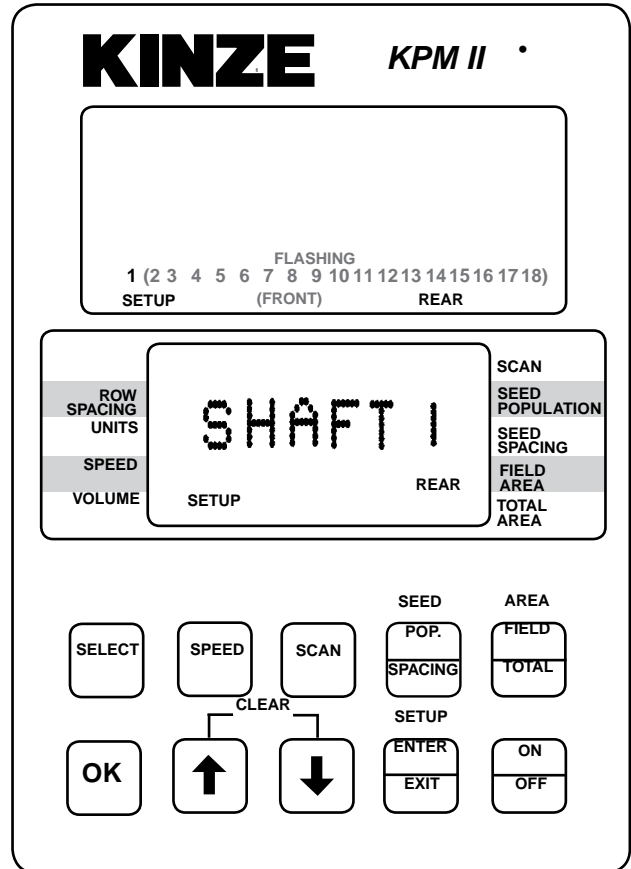
01189906



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

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

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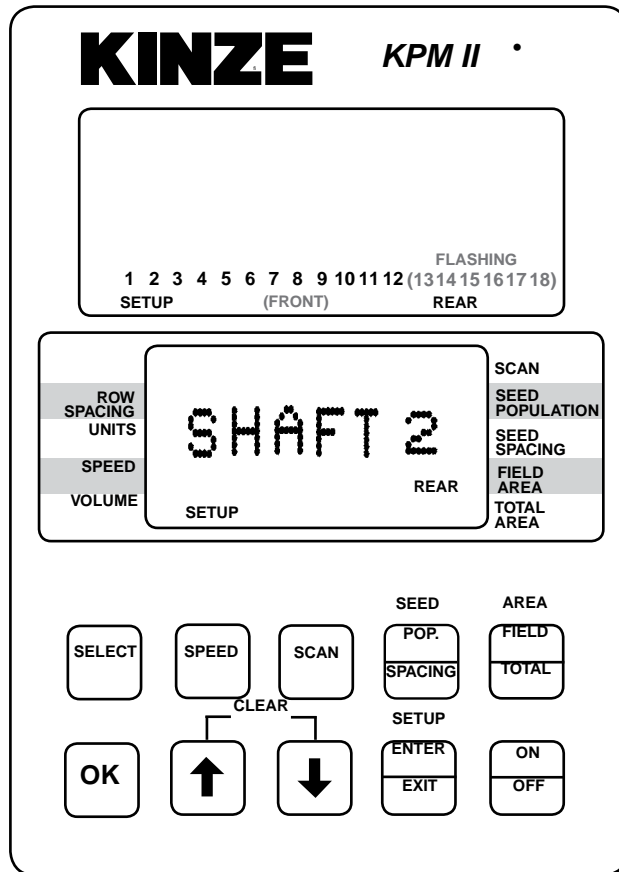
**NOTE:** SMM console may not be applicable to all models.

# MACHINE OPERATION

# KPM II STACK-MODE

## STEP 6 (Continued)

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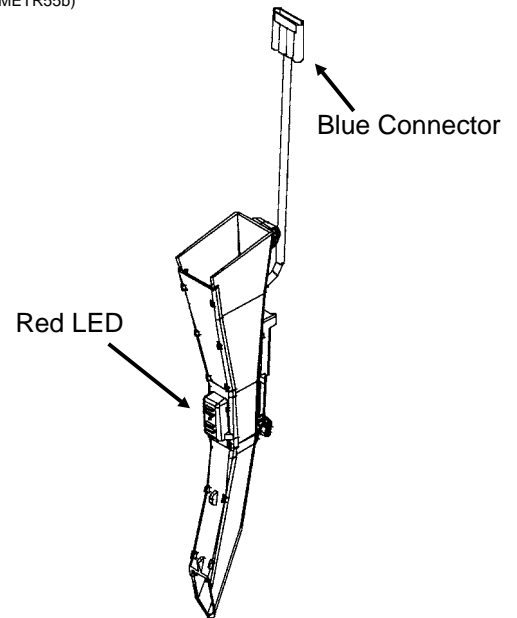


**NOTE: SMM console may not be applicable to all models.**

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

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

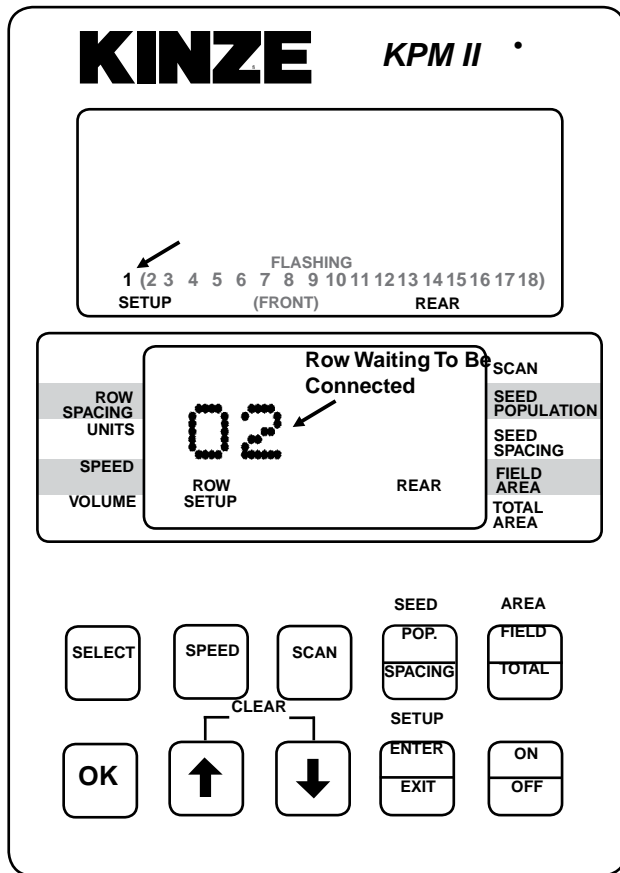
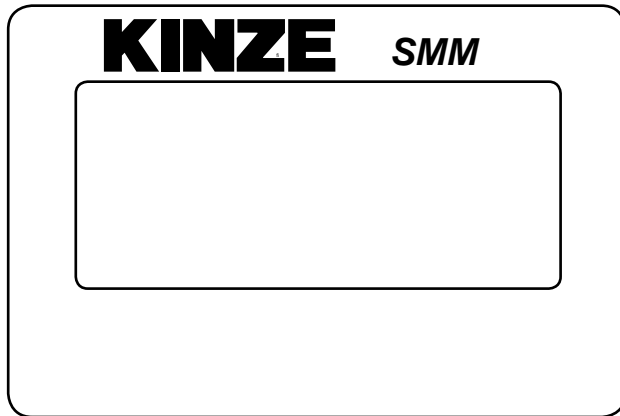
(METR55b)



## STEP 7 (Continued)

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

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

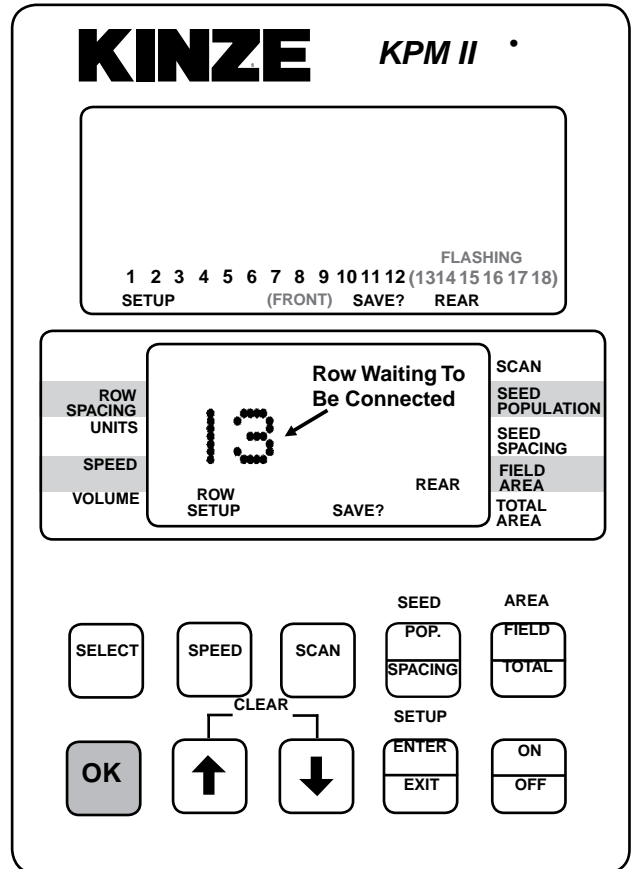
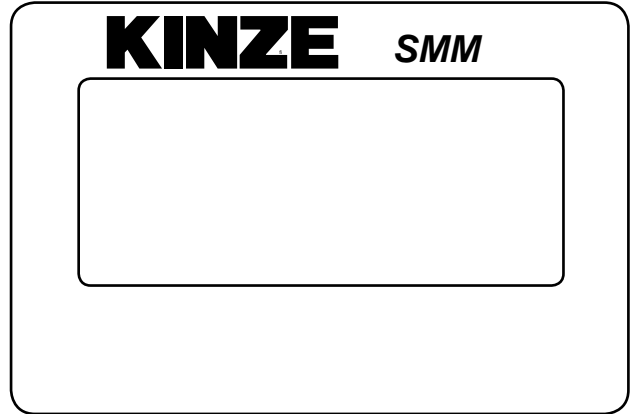
# MACHINE OPERATION

# KPM II STACK-MODE

**STEP 8** When all the seed tubes for the current section (rear/front, left/right or four section) are installed, check to be sure the upper LCD on the KPM II Stack-Mode console displays solid numbers for the number of seed tubes connected. Press and hold the OK key to save the setup for the current section. The SAVE? icon will display followed by continuous short beeps indicating the monitor is preparing to save. The installer has 5 seconds to decide to save the current configuration. During this time, four short beeps will sound followed by a long beep and the SAVE? icon will turn off and the word "DONE" shows on the screen. The monitor will continue to the second section installation (If Applicable).

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

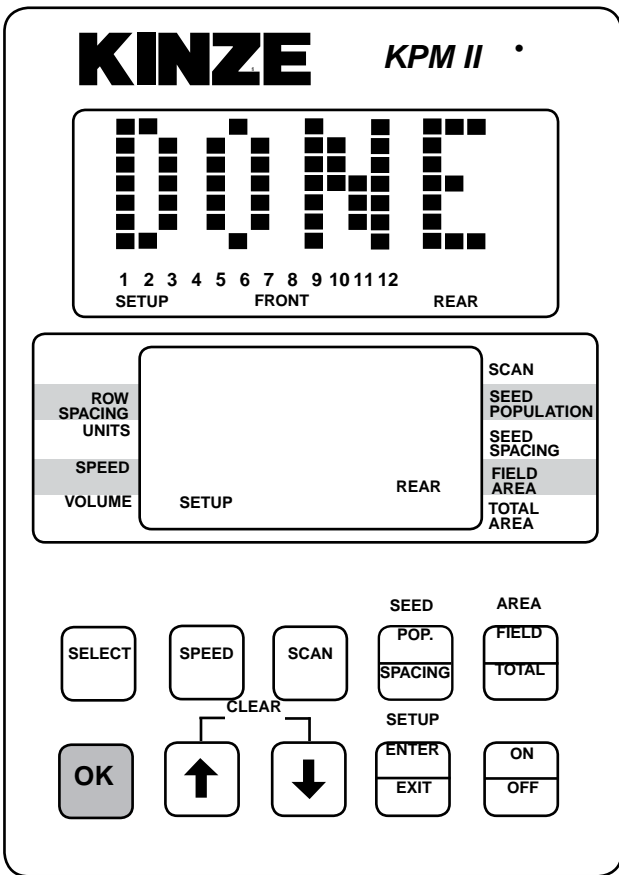
12060211



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

## STEP 8 (Continued)

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



# MACHINE OPERATION

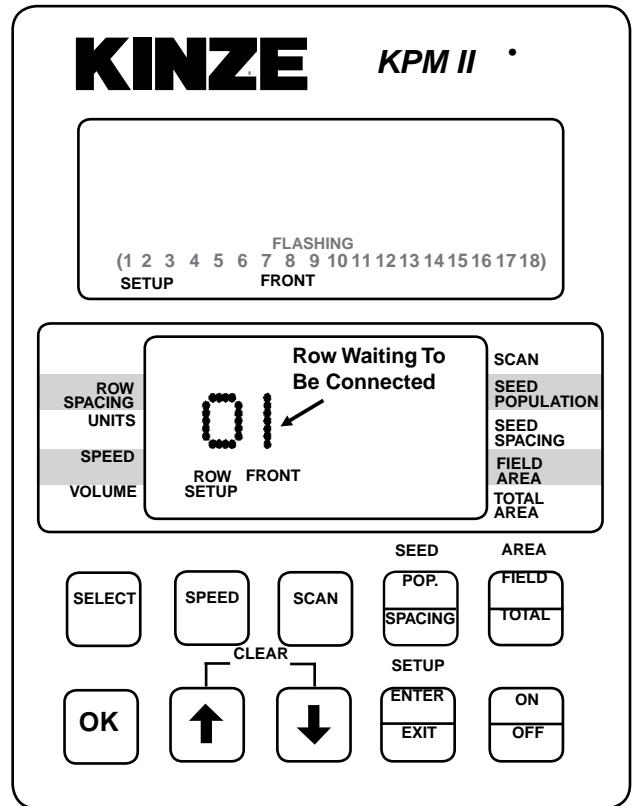
# KPM II STACK-MODE

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

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

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

12060212



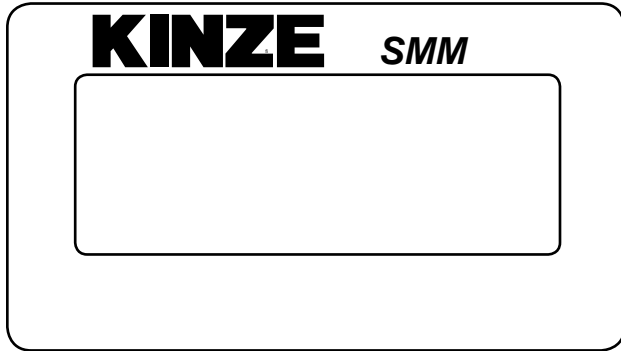
**NOTE:** SMM console may not be applicable to all models.

# MACHINE OPERATION

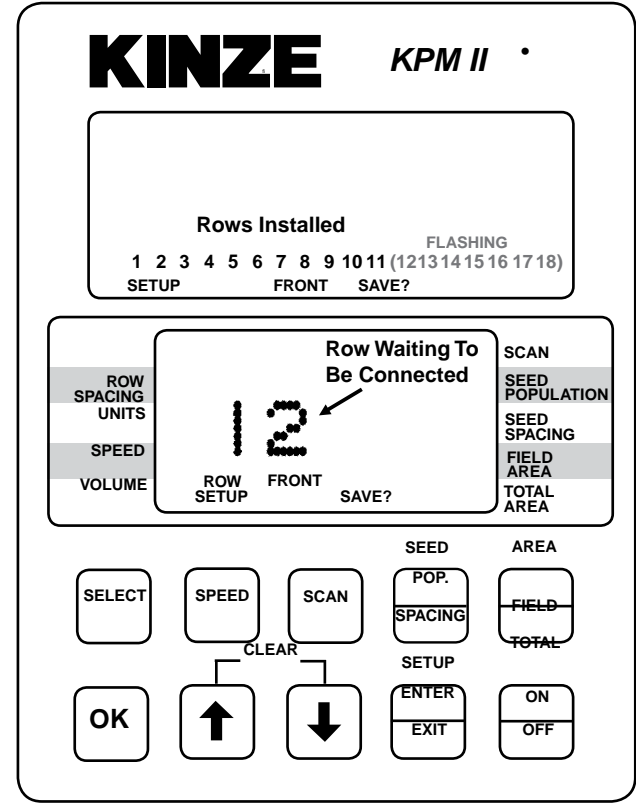
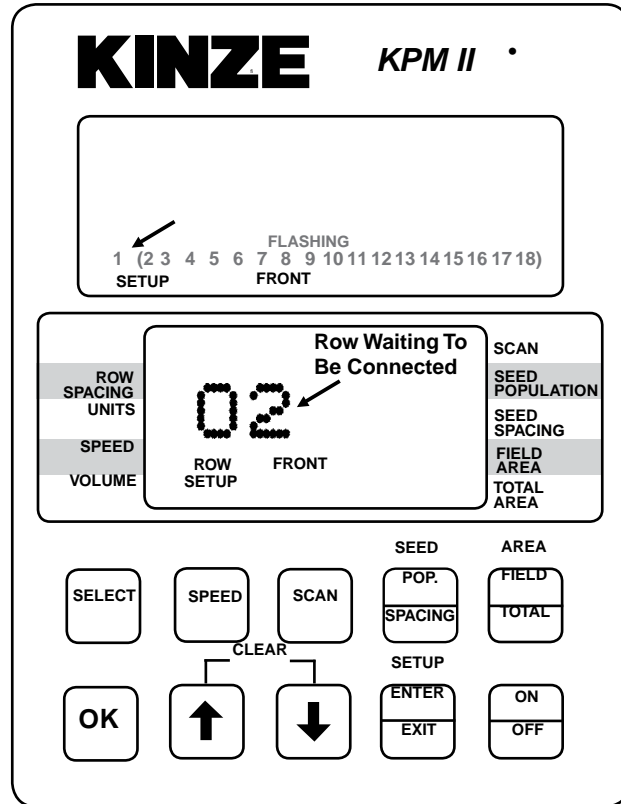
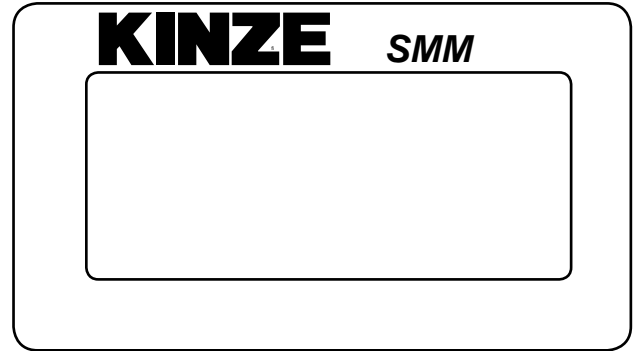
# KPM II STACK-MODE

## STEP 9 (Continued)

12060213



12060214



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

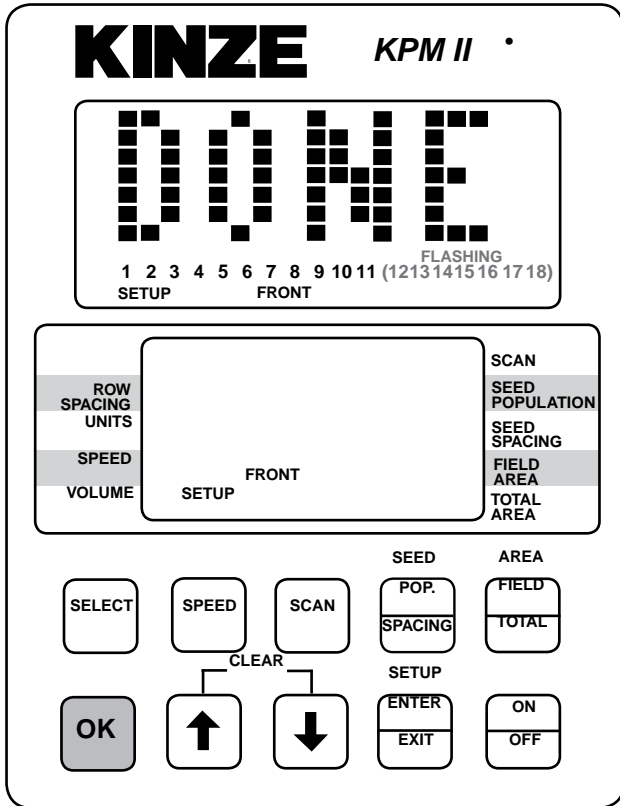
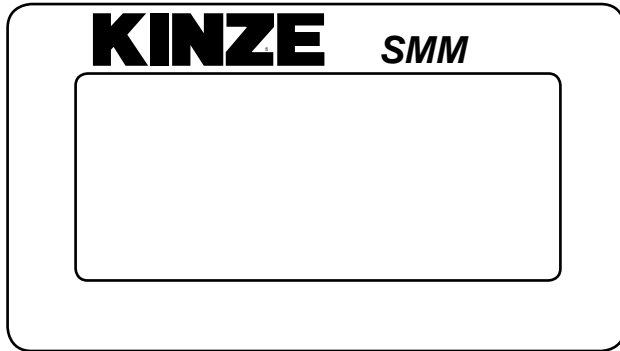
**NOTE: SMM console may not be applicable to all models.**

# MACHINE OPERATION

# KPM II STACK-MODE

## STEP 9 (Continued)

12060215



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

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

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

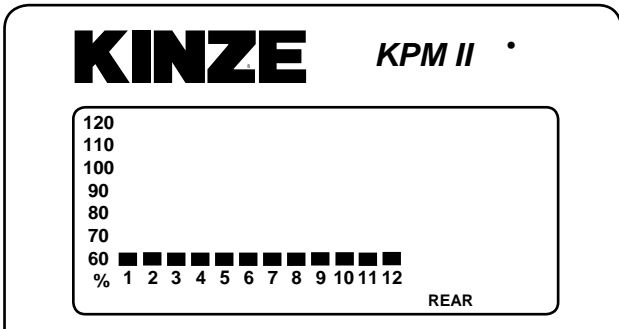
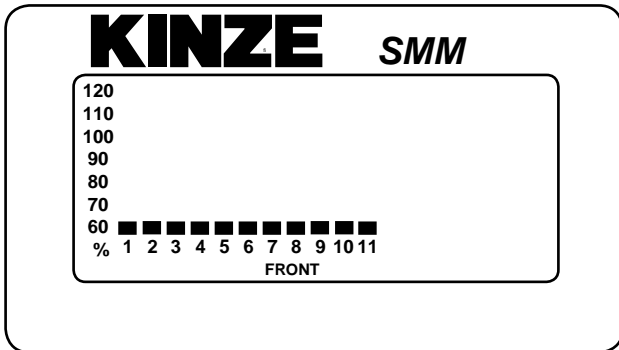
# MACHINE OPERATION

# KPM II STACK-MODE

## STEP 10 (Continued)

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

12060216



ROW SPACING UNITS	GNDSPD		SCAN	SEED POPULATION
SPEED	REAR		SEED SPACING	FIELD AREA
VOLUME			TOTAL AREA	

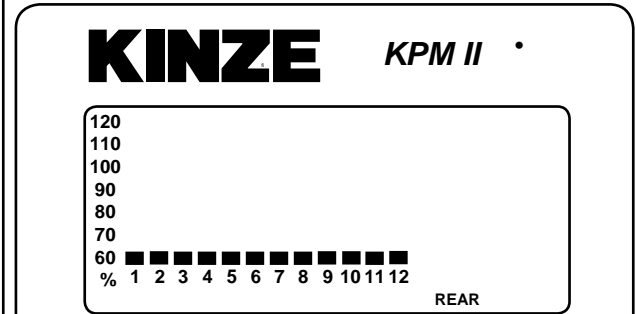
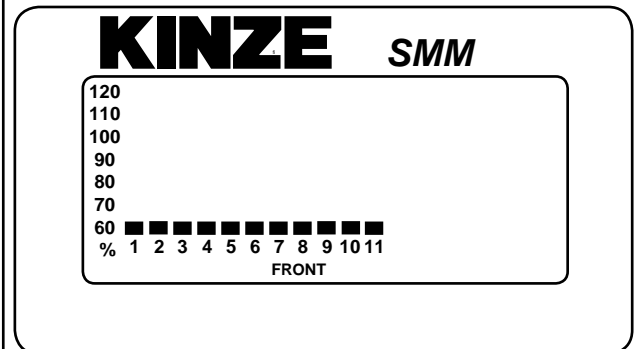
SELECT	SPEED	SCAN	SEED POP. SPACING	AREA FIELD TOTAL
OK	CLEAR		SETUP	ON OFF
	↑	↓	ENTER EXIT	

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

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

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

12060217



ROW SPACING UNITS	MPH		SCAN	SEED POPULATION
SPEED	0.0		SEED SPACING	FIELD AREA
VOLUME			TOTAL AREA	

SELECT	SPEED	SCAN	SEED POP. SPACING	AREA FIELD TOTAL
OK	CLEAR		SETUP	ON OFF
	↑	↓	ENTER EXIT	

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

# MACHINE OPERATION

# KPM II STACK-MODE

ROW-BY-ROW ALARM LEVEL SETTING  
 (Requires Version V2.05 Or Higher Software -  
 KPM II Stack-Mode Monitors Only)

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

**NOTE: The system should be programmed to monitor all planter rows prior to performing these steps.**

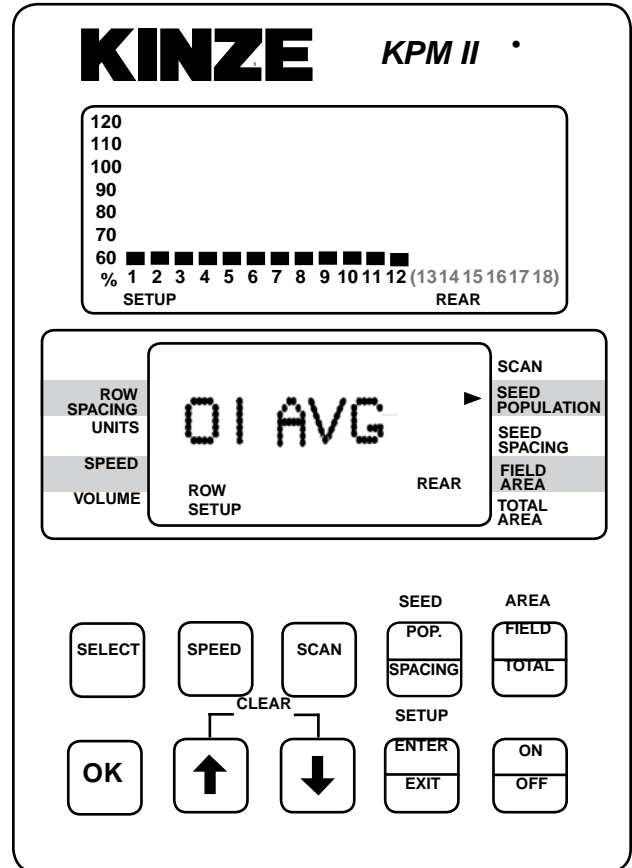
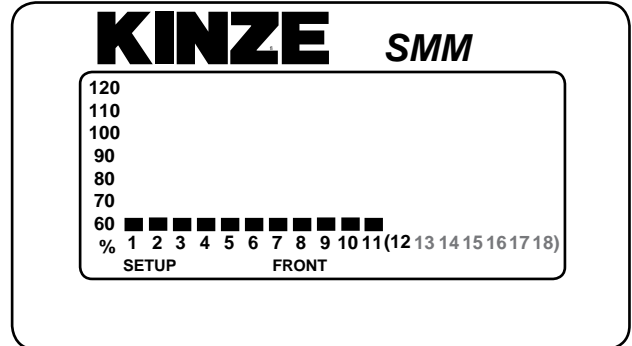
**STEP 1** Enter the programming mode by pressing and holding the SETUP key. The monitor will emit several short beeps, followed by a long beep. On the lower LCD, the SETUP icon will turn on and the arrow head icon will flash, indicating the user can select an item to program.

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

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

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

12060218



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

**STEP 3** Press the OK key. Row number starts flashing.

**STEP 4** Arrow UP or DOWN to desired row.

**STEP 5** Press SELECT key. "AVG" starts flashing.

**STEP 6** Arrow UP or DOWN to choose one of the following options.

HIGH - For Early Alarm (70%)  
AVG - For Standard Alarm Setting (55%)  
LOW - For Failed Alarm Only (25%)  
OFF - To Disable Row Alarm

**STEP 7** Press and hold the OK key to save alarm setting. There will be four short beeps, one long beep and the word "DONE" will appear when the save is completed.

**STEP 8** Repeat STEPS 3 through 7 for each row on which you wish to adjust the alarm setting.

**STEP 9** When finished, press the SETUP key to exit setup mode.

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

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

**NOTE:**

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

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

## KPM III ELECTRONIC SEED MONITOR

D10190501



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

The software design of the KPM III console allows simultaneous viewing of seed flow bargraphs for standard and/or Interplant® System rows (up to 36 rows).

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

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

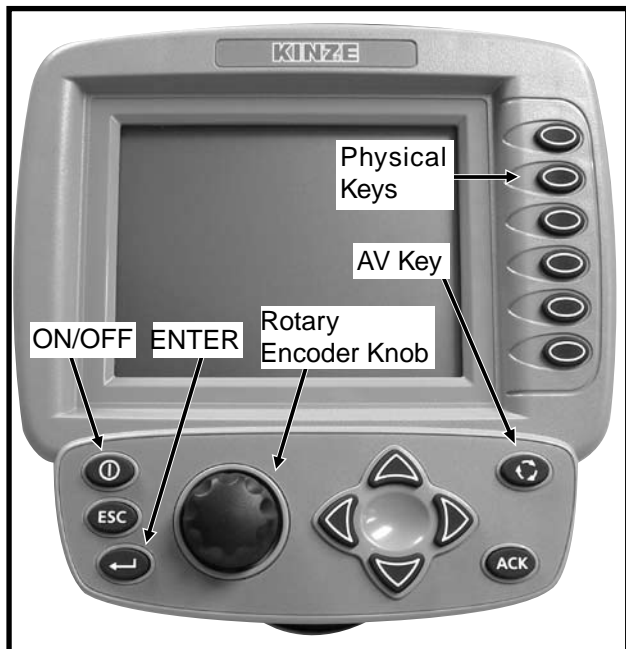
The monitor system will power down if no activity is detected within one hour. No activity means there has been no new seed flow and no operator push key input.

<b>Monitor Key Functions.....</b>	<b>6-52</b>
<b>Configuring Planter Monitor .....</b>	<b>6-53</b>
<b>Programming/Connecting Seed Tubes, Shaft Rotation Sensors And/Or Radar/Magnetic Distance Sensors.....</b>	<b>6-55</b>
<b>Changing Volume, Contrast And Backlighting .....</b>	<b>6-57</b>
<b>Programming Interplant® Condition, Row Spacing And Units (Metric Or English) .....</b>	<b>6-58</b>
<b>Programming Row Unit Alarms Levels .....</b>	<b>6-59</b>
<b>Speed Sensor Calibration/Programming .....</b>	<b>6-60</b>
<b>Reprogramming Speed Sensor.....</b>	<b>6-61</b>
<b>Adding Interplant® Rows (If Rear Rows Have Previously Been Programmed).....</b>	<b>6-65</b>
<b>Adding Even-Row Package (If Front Rows Have Previously Been Programmed).....</b>	<b>6-67</b>
<b>Enabling/Disabling Interplant® Rows.....</b>	<b>6-69</b>
<b>Warnings And Alarms .....</b>	<b>6-72</b>
<b>Field Operation .....</b>	<b>6-74</b>
<b>Area Management.....</b>	<b>6-75</b>
<b>Area Counters.....</b>	<b>6-77</b>
<b>Clearing Field Area.....</b>	<b>6-78</b>
<b>Acre Count Mode.....</b>	<b>6-78</b>
<b>Replacing Faulty Sensor(s) .....</b>	<b>6-80</b>

## MONITOR KEY FUNCTIONS

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

D10190501



### PHYSICAL KEYS

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



### ON/OFF KEY

- Powers the unit on and off.



### ESC KEY

- Used as the CANCEL (escape) key.



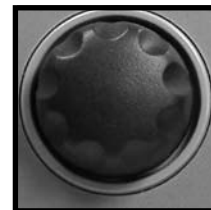
### ENTER KEY

- Confirms or accepts the highlighted selection.



### ROTARY ENCODER KNOB

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



### AV (AUDIO/VIDEO) KEY

- Set alarm volume.
- Adjust the contrast.
- Adjust backlighting of the LCD display.



### ACK (ACKNOWLEDGE) KEY

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

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



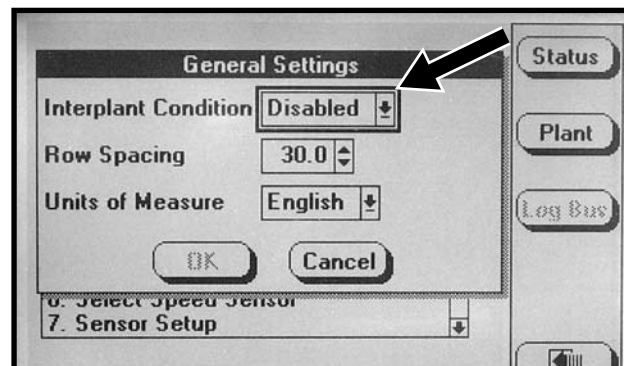
### ARROW KEYS

- UP arrow key is used to increase the value of an item by one or to scroll up.
- DOWN arrow key is used to decrease the value of an item by one or to scroll down.
- LEFT arrow key multiplies the numeric value of the item by 10.
- RIGHT arrow key divides the numeric value of the item by 10.



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

D02140616



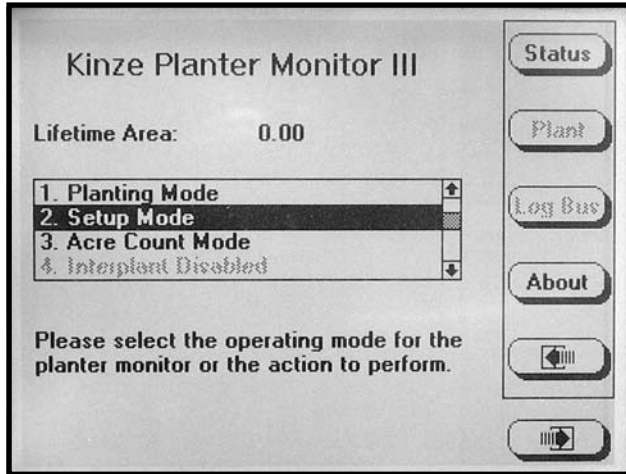


## CONFIGURING PLANTER MONITOR

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

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

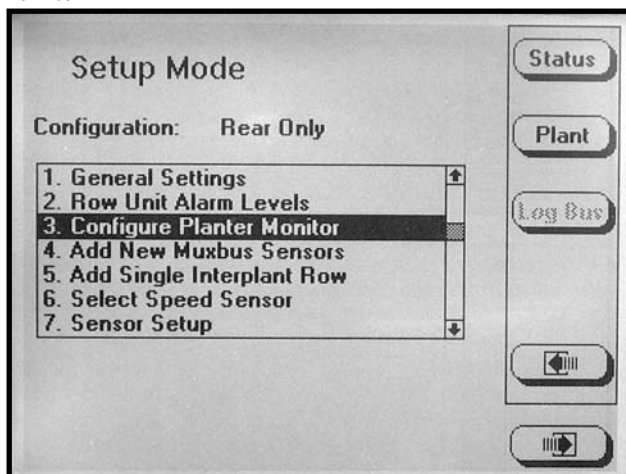
D02140614



**STEP 2** Select “Setup Mode” by turning the rotary encoder knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to display highlighted item.

**STEP 3** Select “Configure Planter Monitor” by turning the knob or using the UP and DOWN arrow keys. Press the knob or the ENTER key to display the highlighted item.

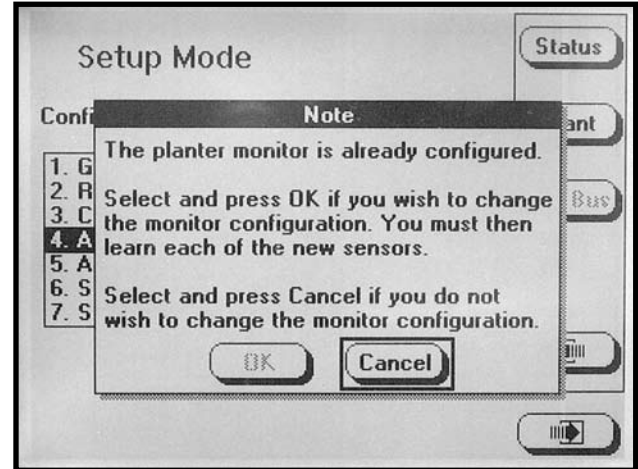
D02140624



**NOTE:** The planter monitor cannot be reconfigured while planting.

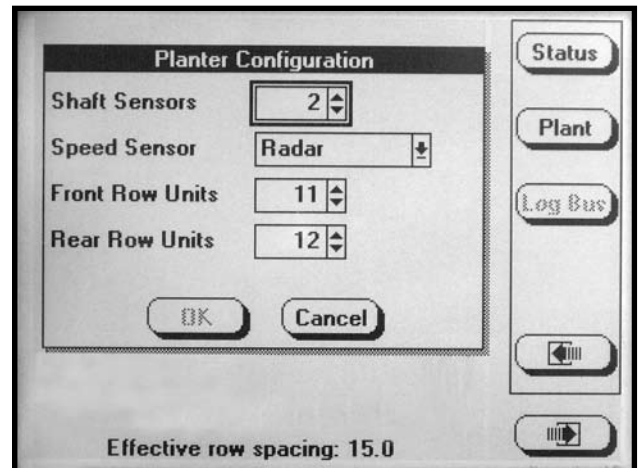
**NOTE:** If the monitor has already been configured the message shown below will appear.

D02140634



**STEP 4** Press the knob or ENTER key, to highlight the “Shaft Sensors” field. Enter the number of “Shaft Sensors” by turning the knob or using the UP or DOWN arrow keys. When the correct value is displayed press the knob or ENTER key. The black box will advance to “Speed Sensor” field.

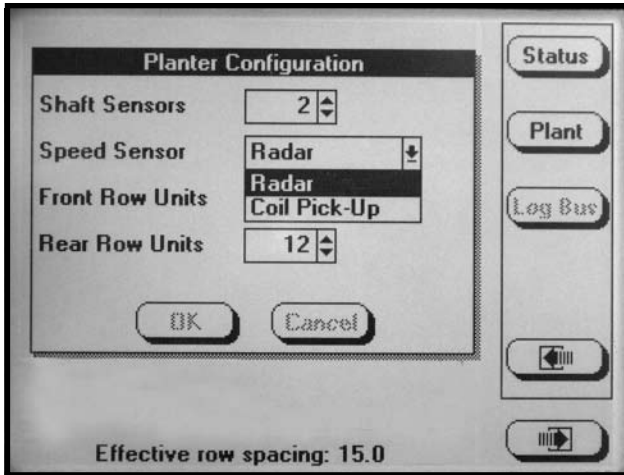
D05310601



**NOTE:** The numeric value may be changed only if the item is highlighted. Turning the rotary encoder knob increases or decreases the value of the item. The UP arrow key may be used to increase the value of the item by one and the DOWN arrow key may be used to decrease the value of the field by one.

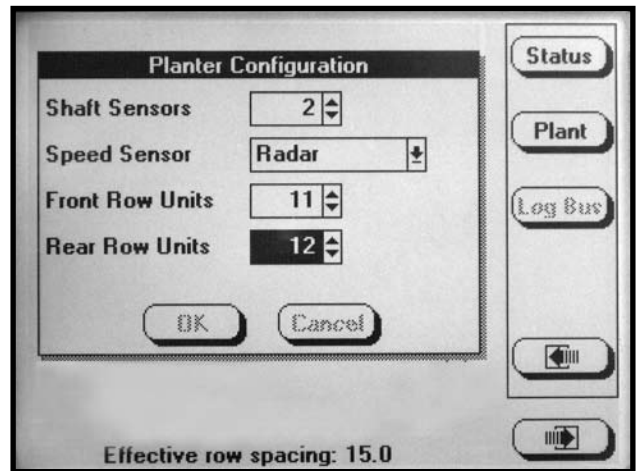
**STEP 5** Press the knob or ENTER key and a drop down menu will appear; select either “Radar” or “Coil Pick-Up” (MDS) by turning the knob or using the UP or DOWN arrow keys. When the desired selection is highlighted press the knob or ENTER key. The black box will advance to “Front Row Units” field.

D05310604



**STEP 7** Press the knob or ENTER key to highlight the “Rear Row Units” field. Turn the knob or use the UP or DOWN arrow keys to obtain correct number of pull row units. Press the knob or ENTER key when desired quantity is displayed. The black box will advance to the OK key.

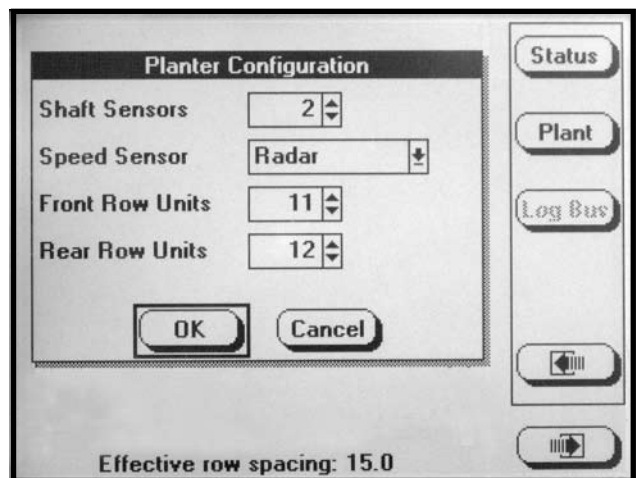
D05310606



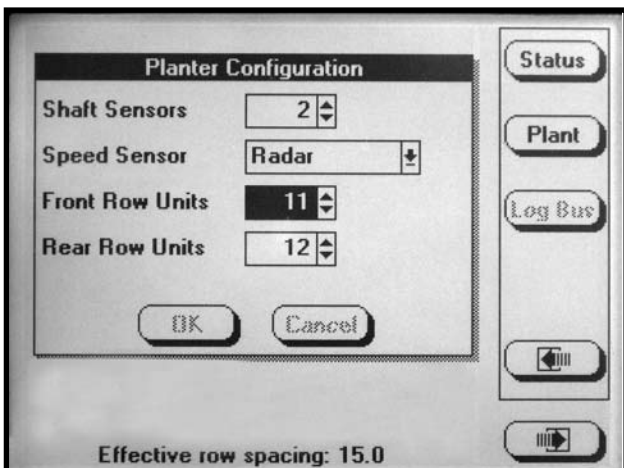
**STEP 6** If there are front rows on the planter, press the knob or ENTER key to highlight the “Front Row Units” field. Turn the knob or use the UP or DOWN arrow keys to obtain correct number of push row units. Press the knob or ENTER key when desired quantity is displayed. The black box will advance to “Rear Row Units” field. If no front rows need to be entered simply turn the knob or press the DOWN arrow key to advance to “Rear Row Units”.

**STEP 8** Press the knob or the ENTER key to save the information.

D05310607



D05310605



**NOTE:** To prevent the configuration from being saved press ESC or select the CANCEL button, then press the rotary encoder knob or ENTER key.

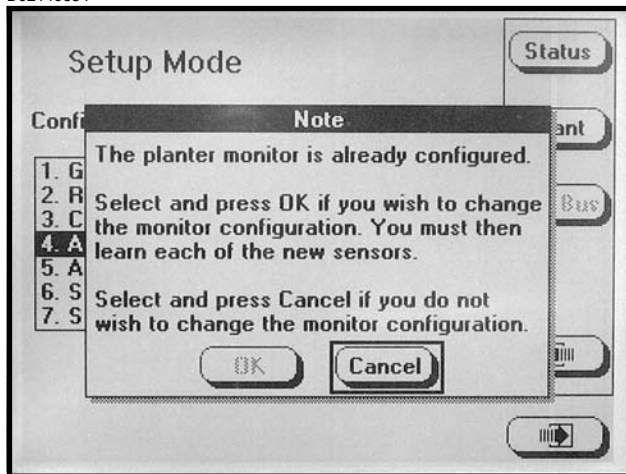
**STEP 9** The monitor screen shown below will appear.

If the new planter configuration is to be saved turn the knob or press the UP or DOWN arrow keys to select the OK button then press the knob or ENTER key to save the planter configuration. If the monitor configuration is not to be changed select the CANCEL key, press the knob or ENTER key to CANCEL or press the ESC key.

If OK is selected the monitor will advance to "Sensor Setup" (STEP 4 in PROGRAMMING/CONNECTING SEED TUBES, SHAFT ROTATION SENSORS AND/OR RADAR/MAGNETIC DISTANCE SENSORS section).

**NOTE: STEP 9 does not apply if configuring the monitor for the first time.**

D02140634



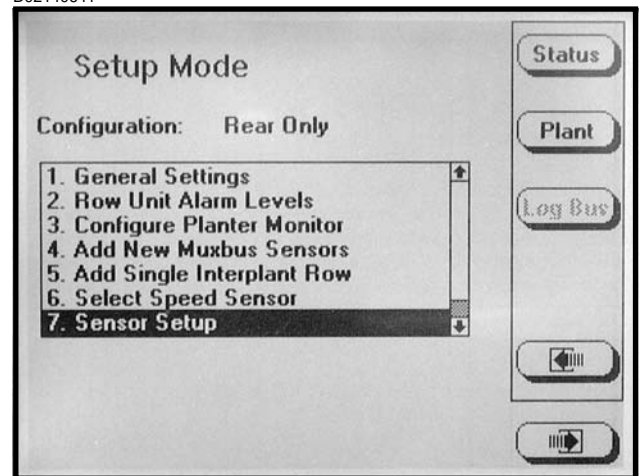
**PROGRAMMING/CONNECTING SEED TUBES, SHAFT ROTATION SENSORS AND/OR RADAR/MAGNETIC DISTANCE SENSORS**

**STEP 1** To enter "Mode Selection", press F6 key until the "Mode Selection" screen appears.

**STEP 2** Select "Setup Mode" by turning the rotary encoder knob or press the UP or DOWN arrow keys. Press the knob or ENTER key to display the highlighted item.

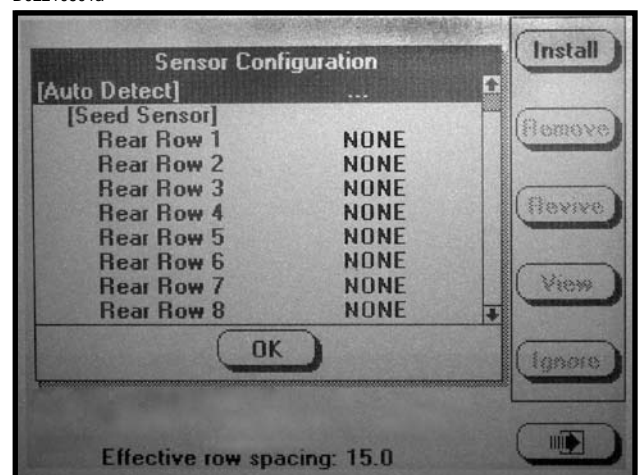
**STEP 3** Select "Sensor Setup" by turning the knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to display the highlighted item.

D02140641



**STEP 4** Attach the planter harness to the KPM III. Do NOT connect any of the sensors to the planter harness. With [Auto Detect] selected press the INSTALL key.

D02210601a

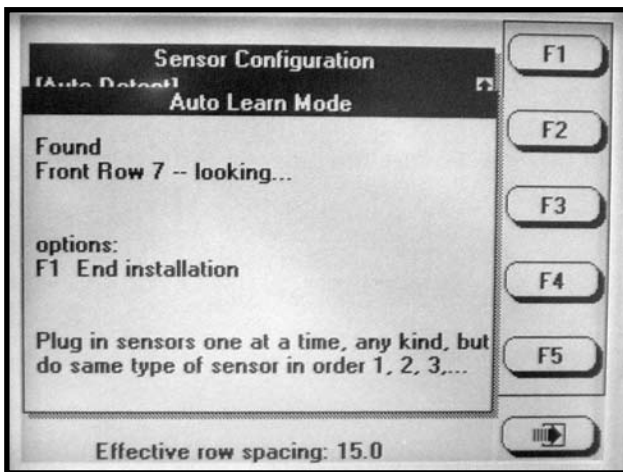


**STEP 5** Plug in the first seed sensor (row 1), working from left to right (rear row units and front next if applicable). When a sensor is connected to the planter harness wait for the monitor to acknowledge with two beeps.

Continue connecting seed sensors along with shaft rotation sensors or speed sensors. Progress will reflect on the LCD screen. The example below indicates that the last seed sensor found was Front Row 7 and the monitor is looking for the next sensor.

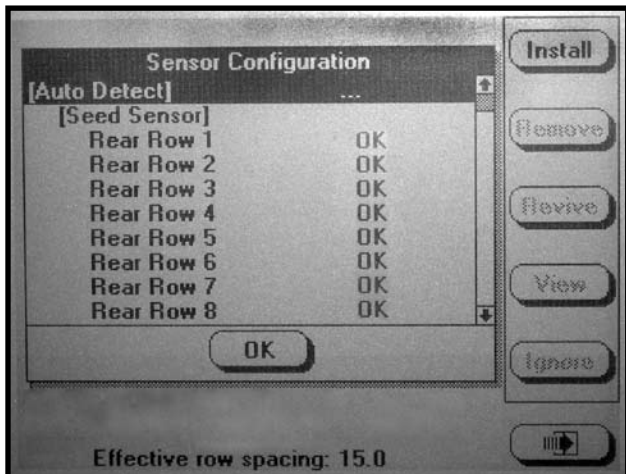
When all sensors are installed press the F1 key to end the installation.

D02170617



**NOTE:** After each sensor has been installed “OK” will appear after the sensor name.

D02210601b

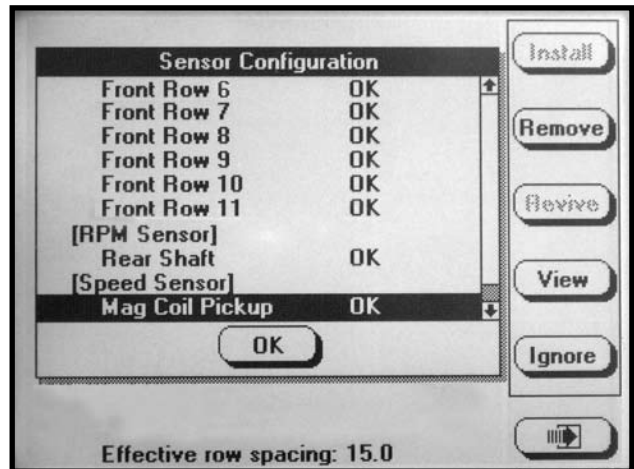


**STEP 6** If “OK” appears behind ALL sensors, press the knob or the ENTER key to save the configuration. The “Setup Mode” menu will then appear.

**NOTE:** If “NONE” appears after a sensor, the sensor was not recognized. All sensors must be disconnected from the planter harness and reconnected as described in STEP 5.

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

D05310609



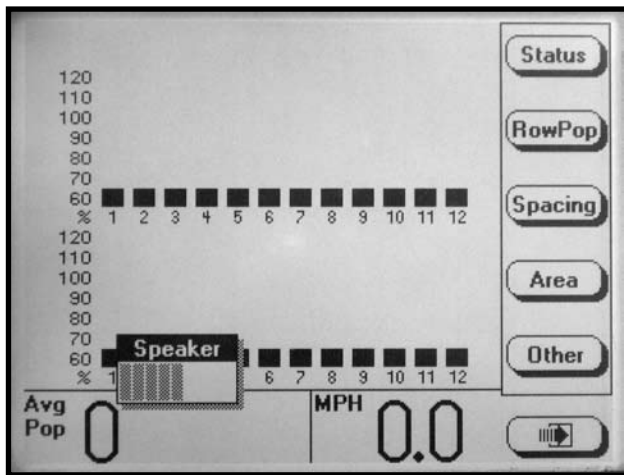
**STEP 7** To return to “Planting Mode” select the PLANT key or press the F6 key until “Planting Mode” screen appears.

## CHANGING VOLUME, CONTRAST AND BACKLIGHTING

The alarm volume and LCD screen contrast and backlighting may be adjusted at anytime, regardless of what is displayed on the screen.

**STEP 1** Press the AV key. The speaker adjustment dialog box will appear in the lower L.H. corner of the display.

D05310610

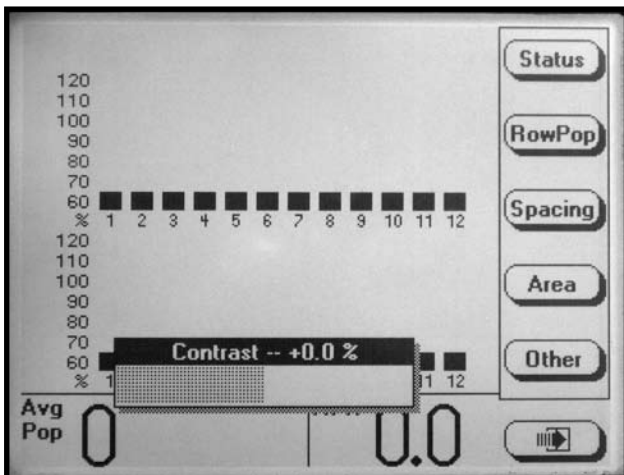


**STEP 2** Use the LEFT and RIGHT arrows or turn the rotary encoder knob to adjust the volume. The volume of the sound emitted from the speaker changes as the adjustment is being made.

**STEP 3** To adjust contrast or backlight, go to STEP 4. If finished press ENTER to save and exit.

**STEP 4** Press the AV button a second time. The contrast adjustment dialog box will appear in the lower portion of the display.

D05310611

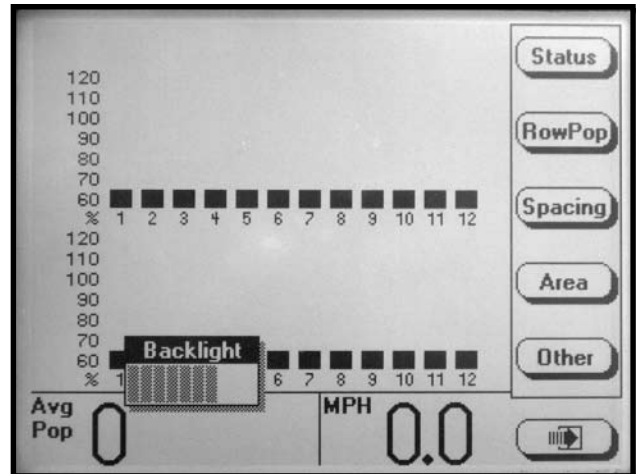


**STEP 5** Use the LEFT and RIGHT arrows or turn the knob to adjust contrast. The effect of the adjustment will be visible on the display.

**STEP 6** To adjust backlighting go to STEP 7. If finished press ENTER to save and exit.

**STEP 7** Press the AV button a third time. The backlight adjustment dialog box will appear in the lower L.H. corner of the display.

D05310612



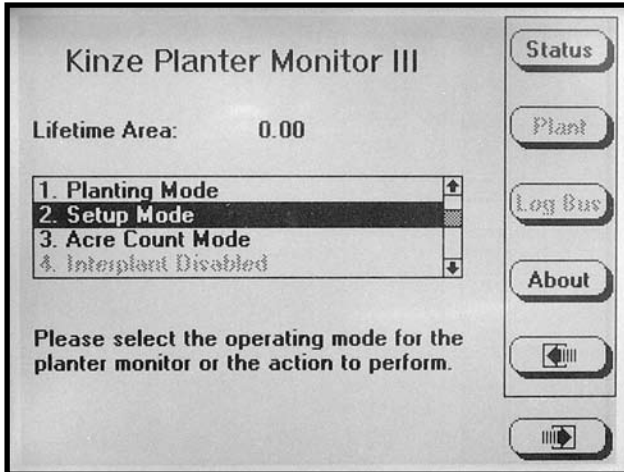
**STEP 8** Use the LEFT and RIGHT arrows or turn the knob to adjust backlighting. The effect of the adjustment will be visible on the display.

**STEP 9** Press the knob, ENTER or press the AV button a fourth time to save the volume, contrast and backlight settings. The backlight adjustment dialog box will disappear.

PROGRAMMING INTERPLANT® CONDITION,  
ROW SPACING AND UNITS (Metric Or English)

**STEP 1** To enter “Mode Selection” screen press the F6 key until “Mode Selection” screen appears.

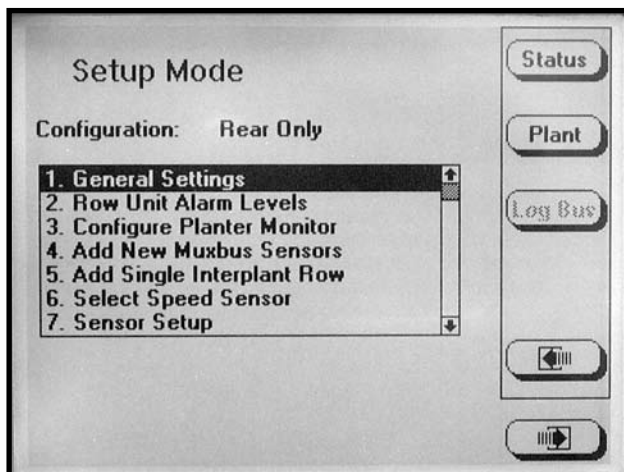
D02140614



**STEP 2** Select “Setup Mode” by turning the rotary encoder knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to display the highlighted item.

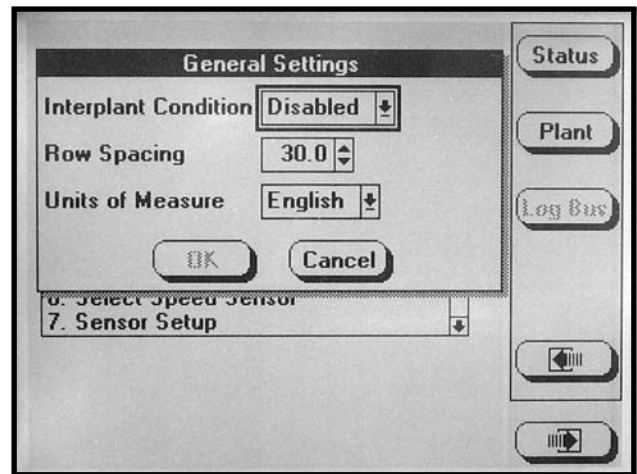
**STEP 3** Select “General Settings” by turning the knob or using the UP or DOWN arrow keys. Press the knob or the ENTER key to display the highlighted item.

D02140615



**STEP 4** Press the knob or ENTER key and a drop down menu will appear. Select either “Enabled” (push row units are being used for planting) or “Disabled” (push row units are not being used for planting and no seed rate alarms will be generated for the front rows; no bargraphs are to be displayed for the front rows and the front rows do not contribute to the average population and spacing or acre counts). Use the knob or UP or DOWN arrow keys to make selection. Press the knob or ENTER key to select highlighted item. The black box will advance to “Row Spacing” field.

D02140616



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

**STEP 5** Press the knob or ENTER key to enter the correct value for “Row Spacing”. Turn the knob to increase or decrease the number. The UP arrow key is used to increase the value of the item by one and the DOWN arrow key is used to decrease the value of the field by one. The LEFT arrow key multiplies the value of the item by 10 and the RIGHT arrow key divides the value of the item by 10. When the correct number has been entered press the knob or ENTER key. The black box will advance to “Units of Measure” field.

**NOTE:** The narrowest row spacing the planter is equipped to plant should be entered for “Row Spacing”. Example: 12 Row 30" with Interplant, row spacing would be set to 15".

**STEP 6** Select “Units Of Measure” field by pressing the knob or ENTER key and a drop down menu will appear. Select either “English” or “Metric” by turning the knob or using the UP or DOWN arrow keys. Press the knob or the ENTER key. The black box will advance to OK.

**STEP 7** Press the knob or ENTER key, when correct values are entered.

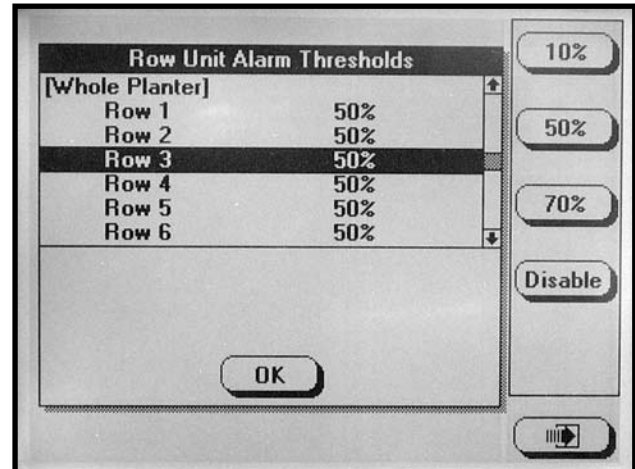
**STEP 8** To return to “Planting Mode” press the PLANT key.

## PROGRAMMING ROW UNIT ALARM LEVELS

The Row Unit Alarm Levels allow the thresholds for the seed rate alarms to be set. The default is 50% or Average. If the average population drops below 50% for a given row a seed rate alarm will be generated for that row unit. The alarm threshold can be set to 70%, 50%, 10% or disabled for any row.

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

D02140623



The alarm thresholds can be set for the whole planter, any planter section or individual rows.

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

**STEP 1** To enter “Mode Selection”, press F6 key until the “Mode Selection” screen appears.

**STEP 2** Select “Setup Mode” by turning the rotary encoder knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to display the highlighted item.

**STEP 3** Select “Row Unit Alarm Levels” by turning the knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to display the highlighted item.

**STEP 4** To set alarm thresholds for whole planter, select “Whole Planter”. Press the key next to the desired threshold. When the desired threshold has been specified for all row units, press the knob or ENTER key.

To set alarm thresholds for all the rows in one section, select rear section or front section. Press the key next to the desired threshold. When the desired threshold has been specified for all row units, press the knob or ENTER key.

To set alarm thresholds for individual rows, select the desired row. Press the key next to the desired threshold. When the desired threshold has been specified for all row units, press the knob or ENTER key.

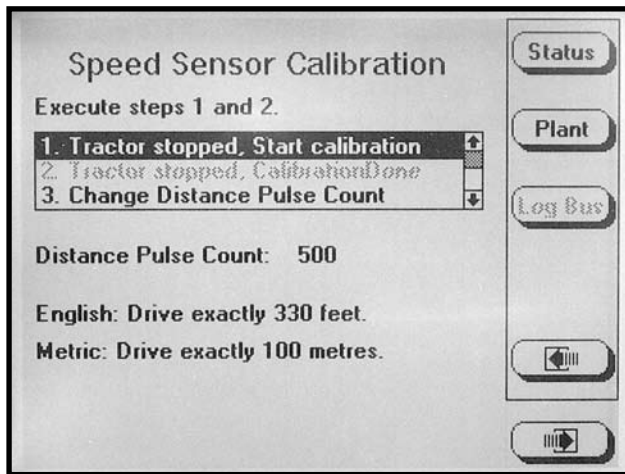
**STEP 5** To return to “Planting Mode” press the PLANT key.

## SPEED SENSOR CALIBRATION/PROGRAMMING

**STEP 1** To enter the “Speed Sensor Calibration” mode, press F6 until the “Mode Selection” screen appears. (If Applicable) Select “Setup Mode” and press the rotary encoder knob or ENTER key. Press F6 to advance to the “Speed Sensor Calibration” screen.

The Distance Pulse Count is used to record how many pulses are generated per mile/kilometer from the ground speed sensor. The monitor will display the current pulses per mile/kilometer using a 6 digit, no decimal place format.

D02140643



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

- In field conditions, measure 330 feet or 100 meters, depending on the unit of measurement selected. Place a marker at the start point and end point.
- Pull the tractor up to the starting point.
- Select “Tractor stopped. Start calibration”.
- Press the rotary encoder knob or ENTER key to change the Distance Pulse Count on the display to 0.

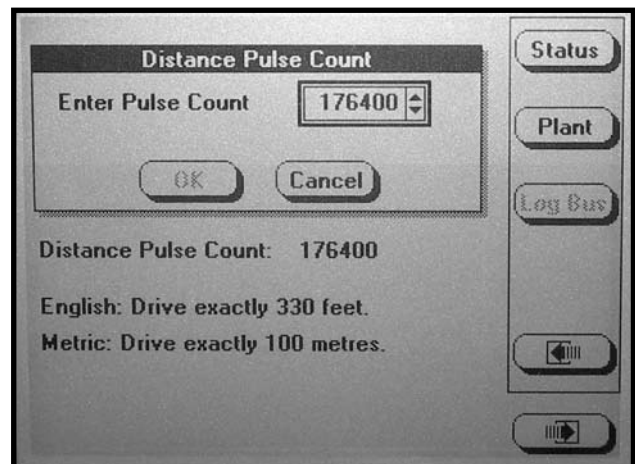
**NOTE:** If the Distance Pulse Count number starts to count pulses with the tractor not moving, check radar distance sensor for vibration or other interference.

- Drive the tractor for 330 feet or 100 meters.
- The monitor will count the number of pulses and display them.
- Stop the tractor at the end point.
- Select “Tractor stopped. Calibration Done”.
- Press the knob or ENTER key.

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

**STEP 2** Select “Change Distance Pulse Count” by turning the knob or using the DOWN arrow key. Press the knob or ENTER key.

D02200605



**NOTE:** The Distance Pulse Count will vary from the above example.

**STEP 3** To return to “Planting Mode” press the PLANT key.

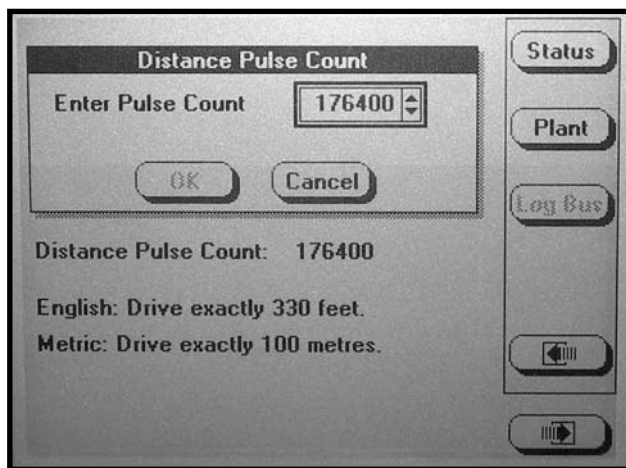


WHEN THE CORRECT DISTANCE PULSE COUNT IS KNOWN, CALIBRATION IS NOT NEEDED AND THE FOLLOWING STEPS MAY BE USED.

**STEP 1** To enter the “Speed Sensor Calibration” screen, press F6 key until the “Mode Selection” screen appears. (If Applicable) Select “Setup Mode” and press the rotary encoder knob or ENTER key. Press F6 key to advance to the “Speed Sensor Calibration” screen.

**STEP 2** Select “Change Distance Pulse” field by turning the knob or using the UP or DOWN arrow keys. Press the knob or ENTER key.

D02200605



**NOTE:** The Distance Pulse Count will vary from the above example.

**STEP 3** With the “Enter Pulse Count” field selected press the knob or ENTER key.

**STEP 4** Change the Pulse Count to the desired value using the UP or DOWN arrow keys or turn the knob until the desired value is obtained. Press the knob or ENTER key.

**NOTE:** The LEFT arrow key multiplies the value of the item by 10 and the RIGHT arrow key divides the value of the item by 10.

**STEP 5** Select OK by pressing the knob or ENTER key to save the new count. Select CANCEL to retain the old value of the Distance Pulse Count.

**STEP 6** Press PLANT key to return to main planting screen.

## REPROGRAMMING SPEED SENSOR

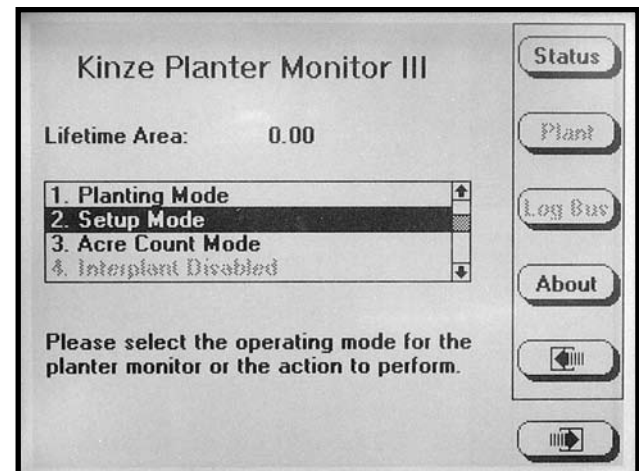
This setting must be specified when the monitor is first configured. It will be necessary to reprogram to use an alternate speed sensor.

**NOTE:** Speed sensors may not be changed while planting.

## RADAR TO MAGNETIC DISTANCE SENSOR

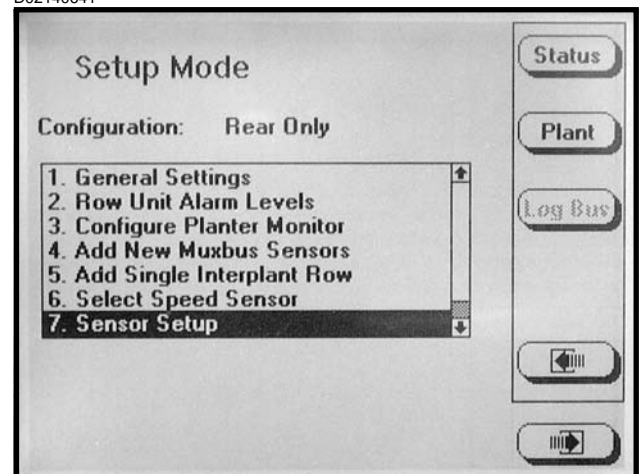
**STEP 1** Press the F6 key until the “Mode Selection” screen appears. Select “Setup Mode” by turning the rotary encoder knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to display the highlighted item.

D02140614



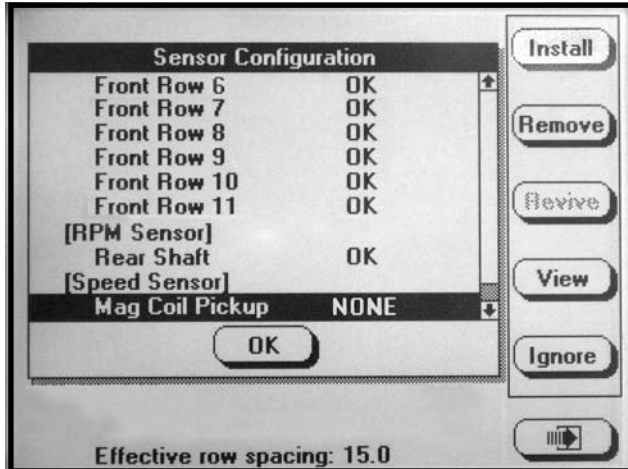
**STEP 2** Turn the knob or use the UP or DOWN arrow keys to choose “Sensor Setup”. Press the knob or ENTER key to display the highlighted item.

D02140641



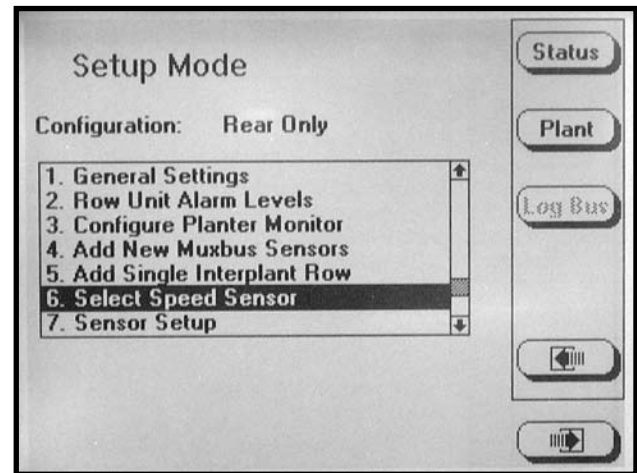
**STEP 3** Turn the knob or use the UP or DOWN arrow keys to highlight “Mag Coil Pickup”. Plug in Magnetic Distance Sensor and press the INSTALL key. Press the knob or ENTER key to save information.

D05310609a

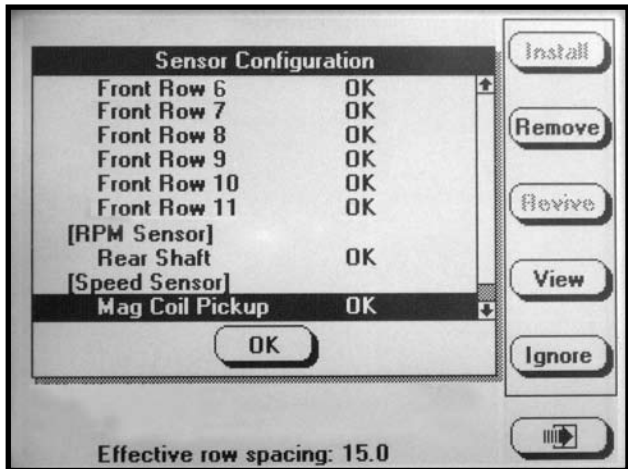


**STEP 4** Turn the knob or use the UP or DOWN arrow keys to select “Select Speed Sensor” and press the knob or ENTER key. Press the knob or ENTER key to select the “Speed Sensor” field and a drop down menu will appear. Turn the knob or use the UP or DOWN arrow keys to select “Coil Pick-Up” and press the knob or ENTER key to make selection. The black box will advance to OK press the knob or ENTER key to save the information.

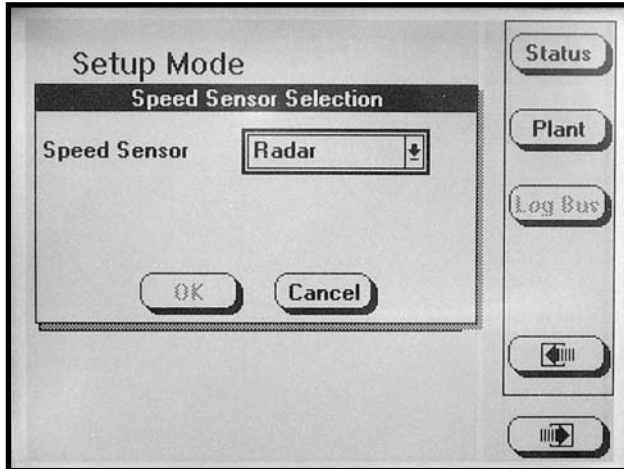
D02140639



D05310609

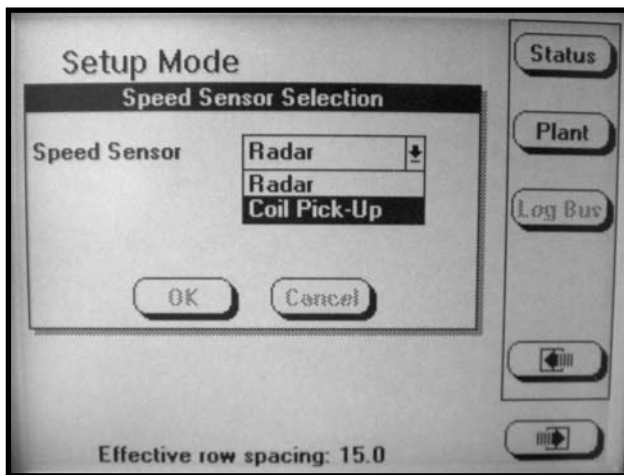


D02140639



**NOTE:** To prevent the configuration from being changed select CANCEL, then press the rotary encoder knob, ENTER key or ESC key.

D06210601



**STEP 5** Unplug the radar from the tractor.

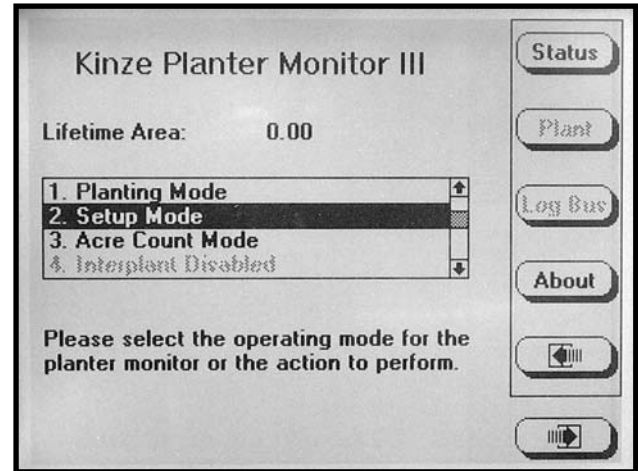
**STEP 6** Press the PLANT key to return to main planting screen.

**NOTE:** When switching between speed sensors, verify the distance pulse count is correct for the chosen sensor. There will be significant distance pulse count variation between radar and coil pick-up sensors.

## MAGNETIC DISTANCE SENSOR TO RADAR

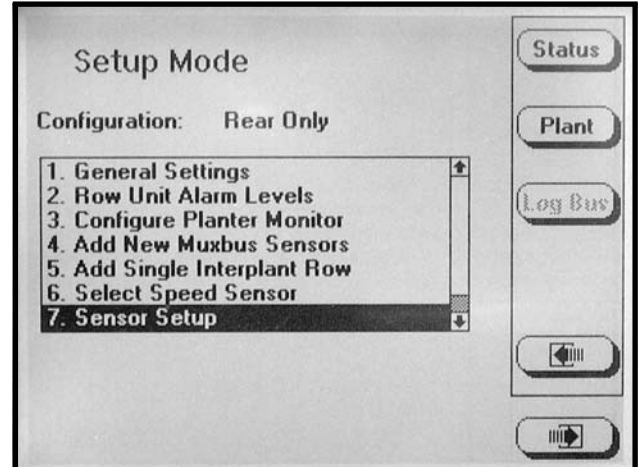
**STEP 1** Press the F6 key until the “Mode Selection” screen appears. Select “Setup Mode” by turning the rotary encoder knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to display the highlighted item.

D02140614

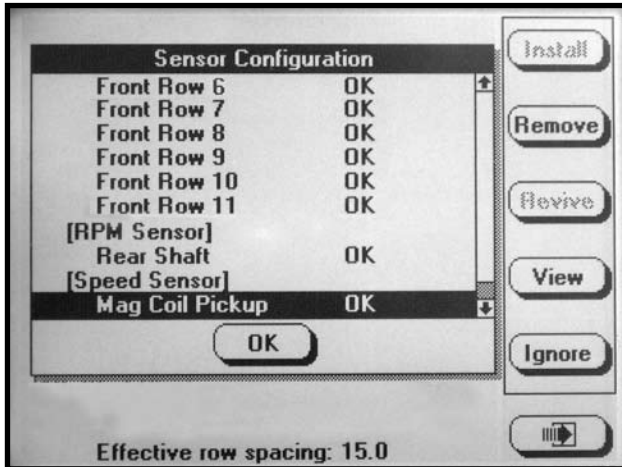


**STEP 2** Turn the knob or use the UP or DOWN arrow keys to choose “Sensor Setup”. Turn the knob or use the UP or DOWN arrow keys to highlight “Mag Coil Pickup”. Press the REMOVE key, a note will appear for confirmation select as appropriate. Unplug Magnetic Distance Sensor and press the knob or ENTER key to save the information.

D02140641



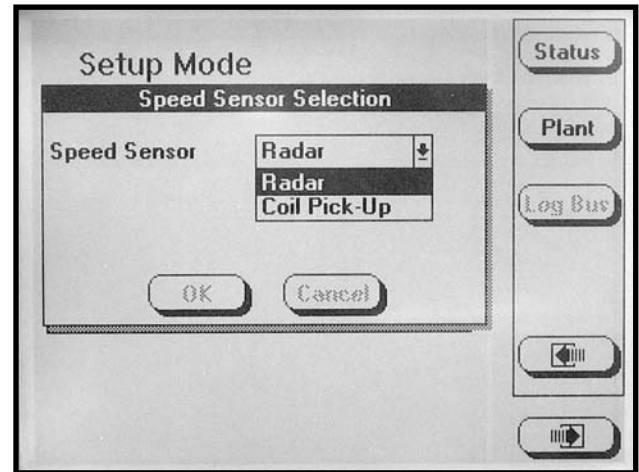
D05310609



**STEP 3** Turn the knob or use the UP or DOWN arrow keys to select “Select Speed Sensor” and press the knob or ENTER key. Press the knob or ENTER key to select the “Speed Sensor” field and a drop down menu will appear. Turn the knob or use the UP or DOWN arrow keys to select “Radar” and press the knob or ENTER key to make selection.

**NOTE:** To prevent the configuration from being changed select CANCEL, then press the knob, ENTER key or ESC key.

D02140640

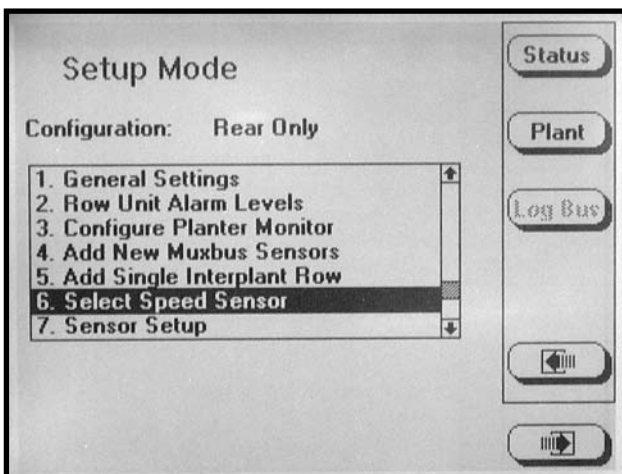


**STEP 4** Plug in the Radar and the black box will advance to OK. Press the knob or ENTER key to save the information.

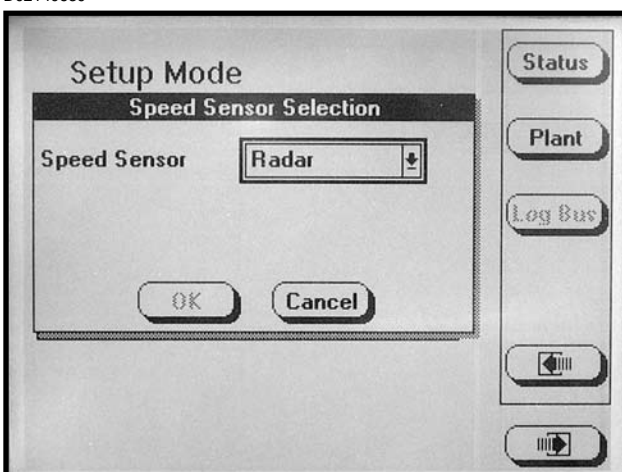
**STEP 5** Press the PLANT key to return to main planting screen.

**NOTE:** When switching between speed sensors, verify the distance pulse count is correct for the chosen sensor. There will be significant distance pulse count variation between radar and magnetic distance sensors.

D02140639



D02140639

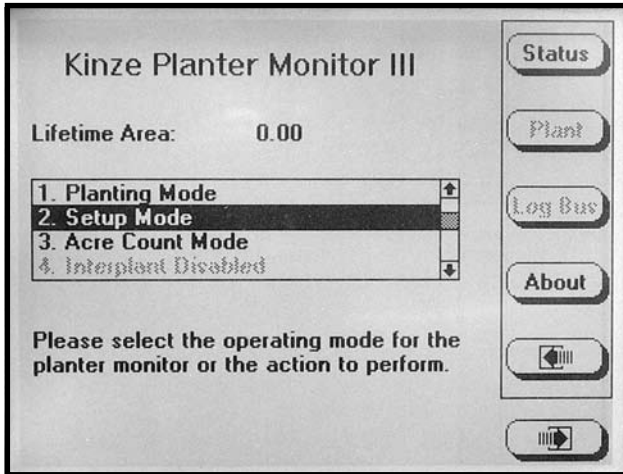


**ADDING INTERPLANT® ROWS (If Rear Rows Have Previously Been Programmed)**

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

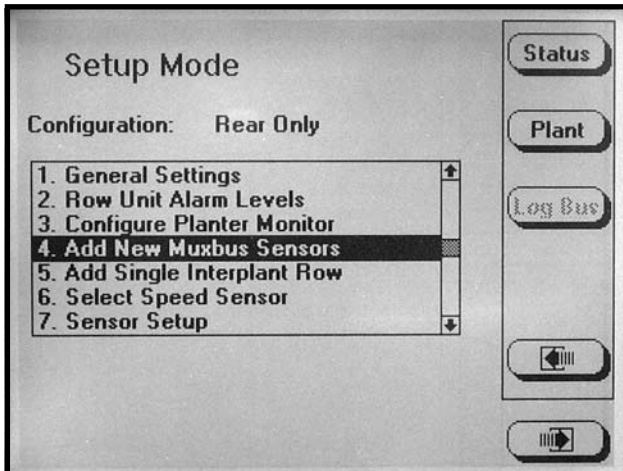
**STEP 2** Select “Setup Mode” by turning the rotary encoder knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to display the highlighted item.

D02140614



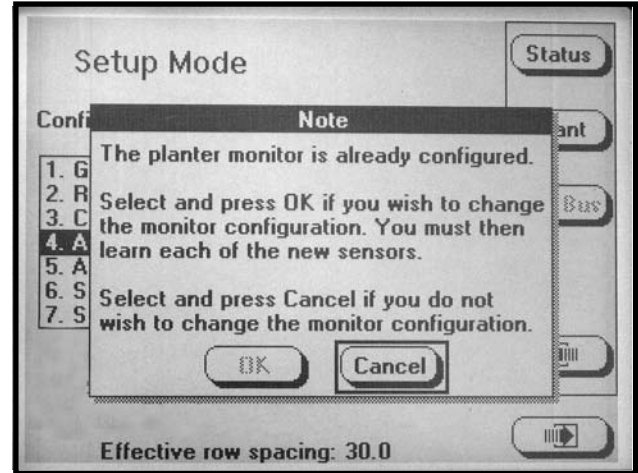
**STEP 3** Select “Add New Muxbus Sensors” by turning the knob or using the UP and DOWN arrow keys. Press the knob or ENTER key to display the highlighted item.

D02140633



**STEP 4** The note shown below will appear. Select OK by turning the knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to make the selection.

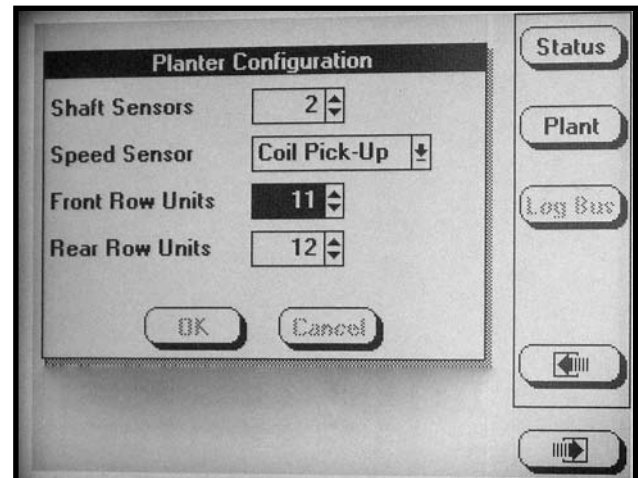
D03010601



**STEP 5** Turn the knob or use the UP or DOWN arrow keys to select the “Front Row Units” field and press the knob or ENTER key to highlight the field. Turn the knob or use the UP or DOWN arrow keys to obtain the desired number of rows. When the correct value has been entered press the knob or ENTER key. The black box will advance to the OK key. Press the knob or ENTER key to save the information.

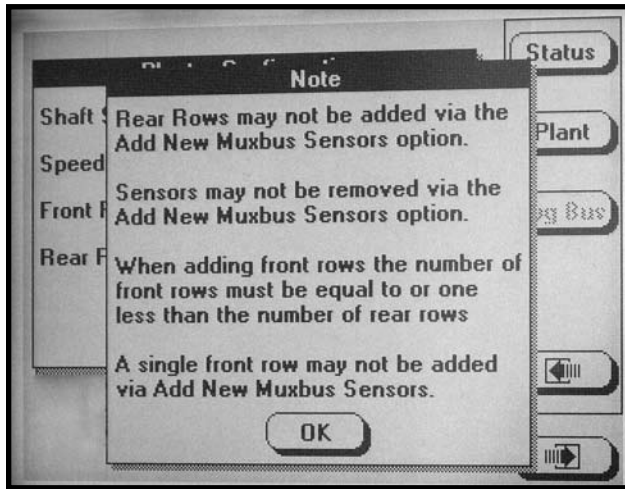
**NOTE: To prevent the configuration from being changed select CANCEL, then press the knob, ENTER key or ESC key.**

D02220674



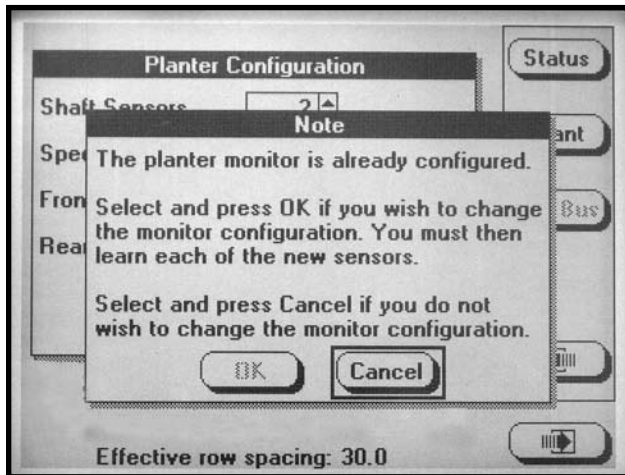
**NOTE:** Attempting to add rear rows while adding new muxbus sensors will cause the following note to appear.

D02220675



**STEP 6** The note shown below will appear. Select OK by turning the knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to make the selection.

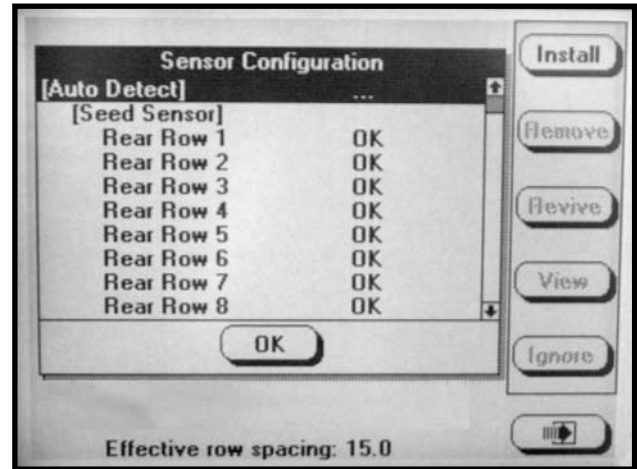
D03010603



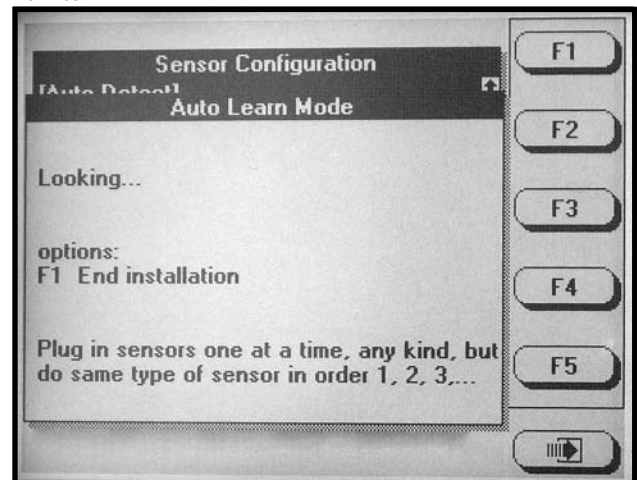
**NOTE:** To prevent the configuration from being changed select CANCEL, then press the knob, ENTER key or ESC key.

**STEP 7** The sensor configuration screen will appear. With [Auto Detect] highlighted select INSTALL. Begin to install sensors from left to right.

D02230604a



D02220672

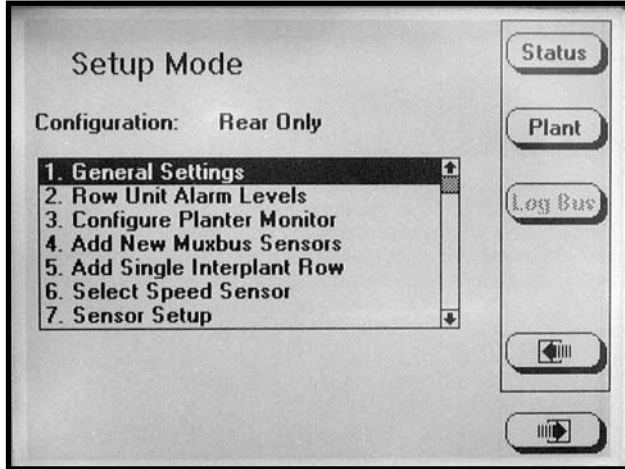


**STEP 8** When all sensors are learned select F1 to end installation. Scroll down to verify the front rows are learned. Select OK by pressing the knob or ENTER key.

**NOTE:** "OK" will appear next to each sensor if no errors are detected.

**STEP 9** Select “General Settings”, by turning the knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to make the selection.

D02140615



**STEP 10** Select the “Row Spacing” field by turning the knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to highlight field. Adjust the row spacing to Interplant spacing by turning the knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to enter the value. Then turn the knob or use the UP or DOWN arrow keys to advance to OK. Press the knob or enter key to save row spacing.

**NOTE:** To prevent the configuration from being changed select CANCEL, then press the knob, ENTER key or ESC key.

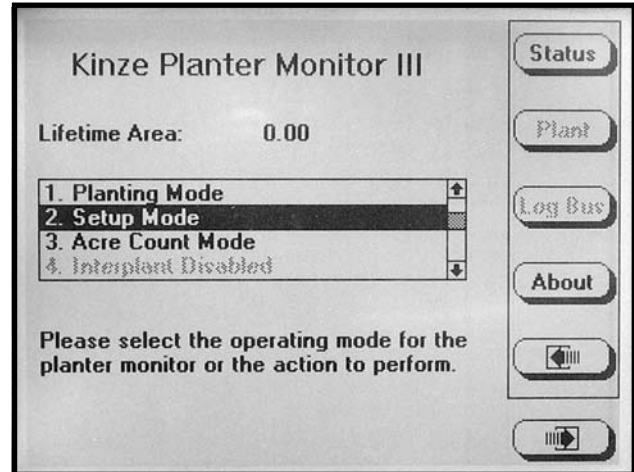
**STEP 11** To return to “Planting Mode” press the PLANT key.

## ADDING EVEN-ROW PACKAGE (If Front Rows Have Previously Been Programmed)

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

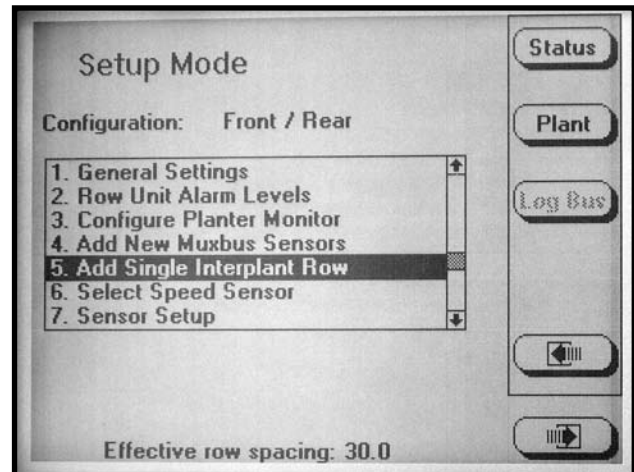
**STEP 2** Select “Setup Mode” by turning the rotary encoder knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to display the highlighted item.

D02140614



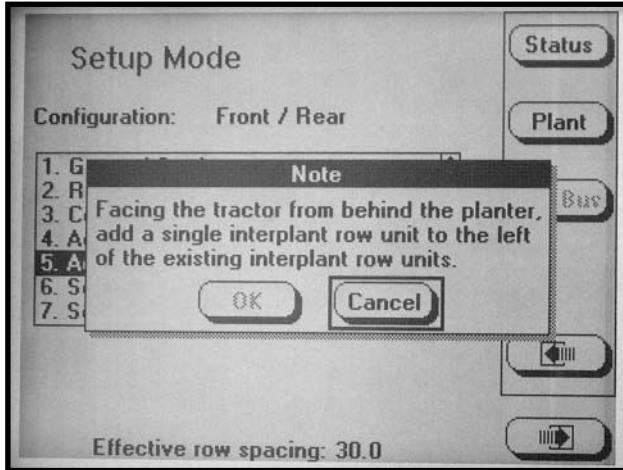
**STEP 3** Select “Add Single Interplant Row” by turning the knob or using the UP and DOWN arrow keys. Press the knob or the ENTER key to display the highlighted item.

D022206200



**STEP 4** To confirm the following note turn the knob or use the UP or DOWN arrow keys to select OK and then press the knob or ENTER key to confirm. If the single Interplant row is not to be added select the CANCEL key and press the knob or ENTER key to cancel or press the ESC key.

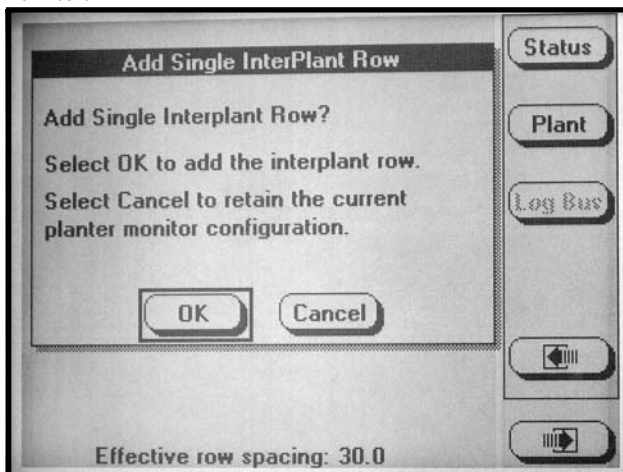
D022206201



**STEP 5** To “Add Single Interplant Row” the following screen will appear.

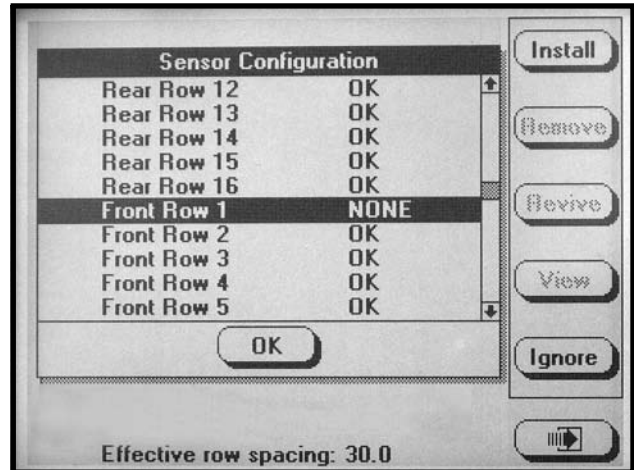
If the single Interplant row is to be added turn the knob or use the UP or DOWN arrow keys to select OK and then press the knob or ENTER key to add the Interplant row. If the single Interplant row is not to be added select the CANCEL key and press the knob or ENTER key to cancel or press the ESC key.

D022206202



**STEP 6** The “Sensor Configuration” screen will appear. Plug in the new sensor then scroll down to highlight “Front Row 1” by turning the knob or using the UP or DOWN arrow keys. Select INSTALL to learn the new sensor. Press the knob or ENTER key to return to setup mode.

D02220670



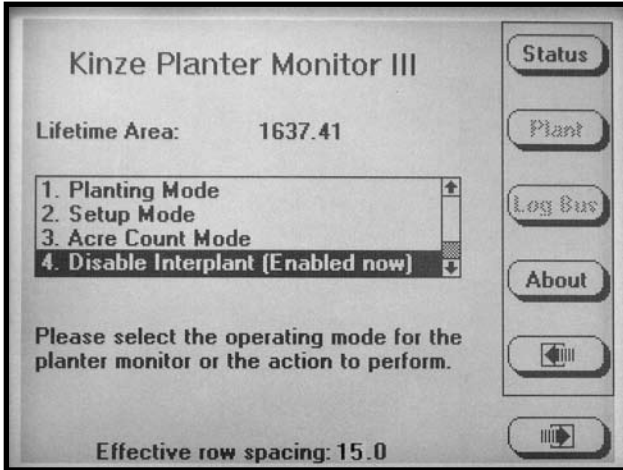
**STEP 7** To return to “Planting Mode” press the PLANT key.



## ENABLING/DISABLING INTERPLANT® ROWS

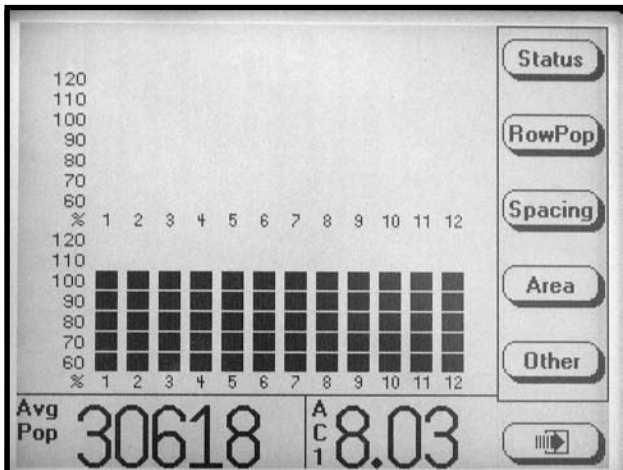
To Enable or Disable Interplant (a) press the F6 key until the “Mode Selection” screen appears, (b) turn the rotary encoder knob or use the UP or DOWN arrow keys to highlight “Disable/Enable Interplant”, (c) press the knob or ENTER key to “Disable” or “Enable” Interplant. To verify selection, the row spacing is displayed on the bottom of the screen.

D03010605a



Either select the “Planting Mode” by turning the knob or using the UP arrow key and press the knob or ENTER key or press F6 to return to the “Planting Mode”.

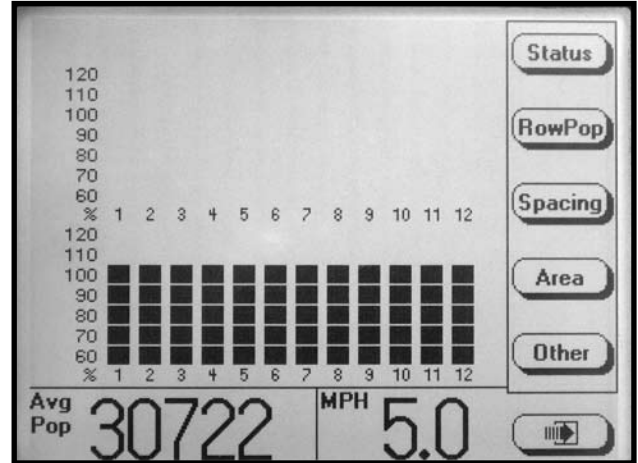
D02240602



## ROW POPULATION

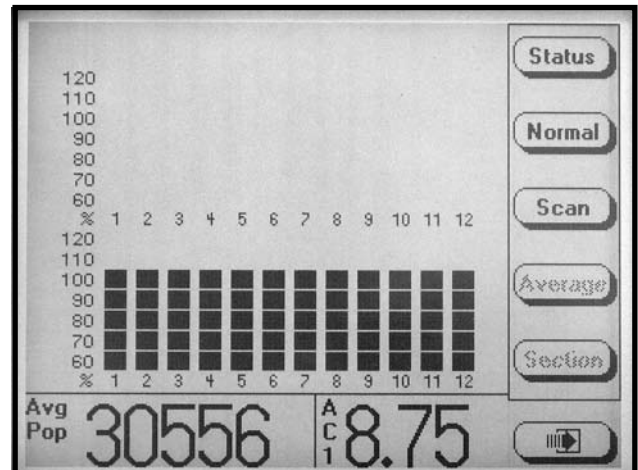
- Press the ROW POP key to display row population. Average planter population will be shown in the lower L.H. corner of the display.

D05310614



- Press the SCAN key and the monitor will scan through each row in ascending order displaying the average seed population for each row. After all rows have been scanned the average population is displayed and scan function will continue with the first rear row.

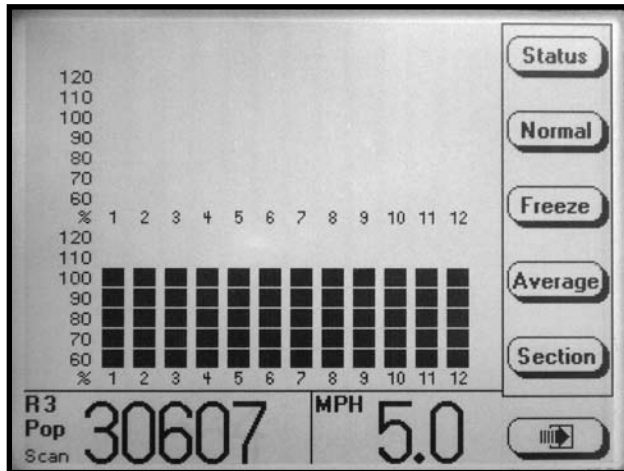
D02240604



- Press the FREEZE key to stop scanning, the left display item will be frozen on a particular row. "Frzn" appears in the lower L.H. corner to indicate the display is frozen. To resume scan press the SCAN key.

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

D05310615



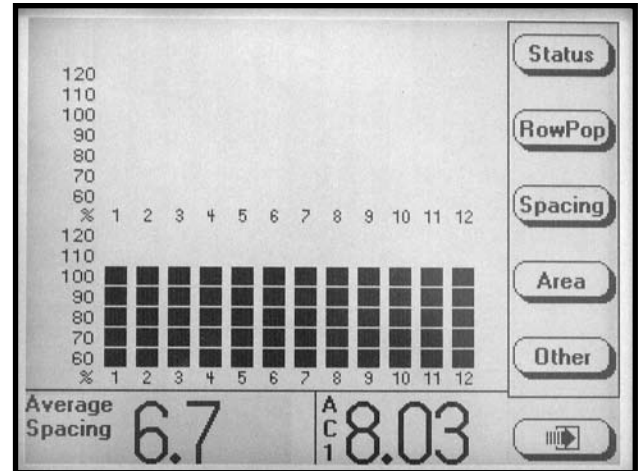
- When either Scan or Frzn is displayed in the L.H. corner the SECTION and arrow keys function as follows: (a) SECTION or RIGHT arrow key advances to the first row of the next section; (b) SECTION or LEFT arrow key selects the first row of the previous section, wrapping around to the first row of the last section when moving past the first section; (c) UP arrow key moves forward to the next row of the planter, wrapping around to the first row when moving past the last row; (d) DOWN arrow key moves backward to the previous row of the planter, wrapping around to the last row of the planter when moving past the first row.
- Press the AVERAGE key to display the average population in the bottom L.H. corner.
- Press the NORMAL key to display the normal screen for planting mode.

**NOTE: If the rows are being scanned and the AVERAGE key is selected the scan function will stop.**

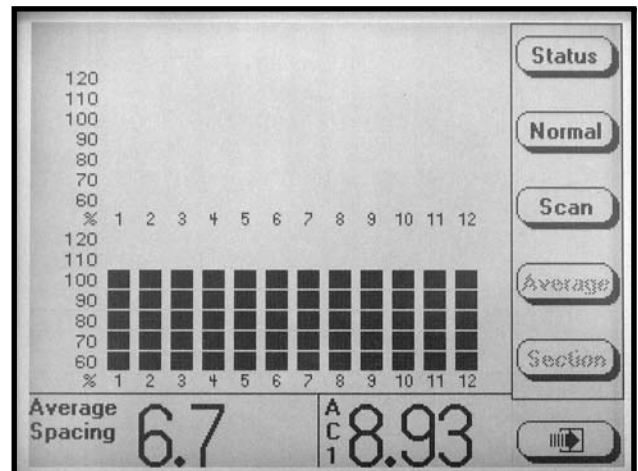
## ROW SPACING

- Press the SPACING key to display seed spacing keys. Seed spacing will appear in the bottom L.H. corner of the display.

D02240602



D02240605



- Press the SCAN key and the monitor will scan through each row in ascending order displaying the average seed spacing for each row. Scan appears in the L.H. corner to indicate the display is scanning. After all rows have been scanned the average population is displayed and scanning will continue with the first rear row.
- Press the FREEZE key to stop scanning and the left display item will be frozen on a particular row. "Frzn" appears to indicate the display is frozen. To resume scan press the SCAN key.

- When either "Scan" or "Frzn" is displayed in the left display item the SECTION and arrow keys function as follows: (a) SECTION and RIGHT arrow key advances to the first row of the next section; (b) LEFT arrow key selects the first row of the previous section, wrapping around to the first row of the last section when moving past the first section; (c) UP arrow key moves forward to the next row of the planter, wrapping around to the first row when moving past the last row; (d) DOWN arrow key moves backward to the previous row of the planter, wrapping around to the last row of the planter when moving past the first row.

- Press the AVERAGE key to display the average seed spacing in the bottom L.H. corner.

- Press the NORMAL key to display the main planting mode.

**NOTE: If the rows are being scanned and the AVERAGE key is selected the scan function will stop.**

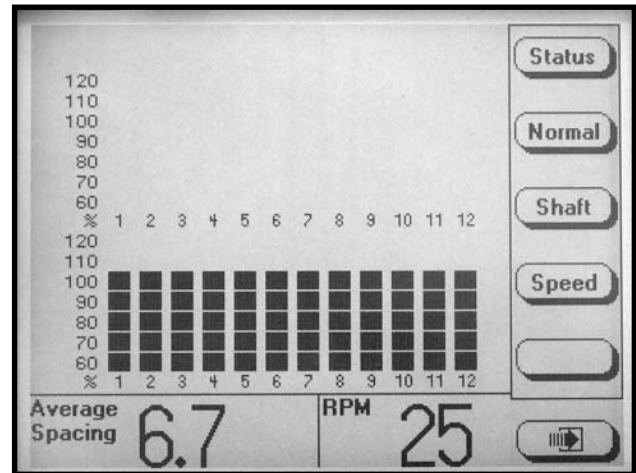
### SPEED/SHAFT ROTATION

- Press the OTHER key to display items available to display in the bottom R.H. corner.

- Press the SHAFT key to view the average meter shaft RPM. The value will appear in the bottom R.H. corner of the display.

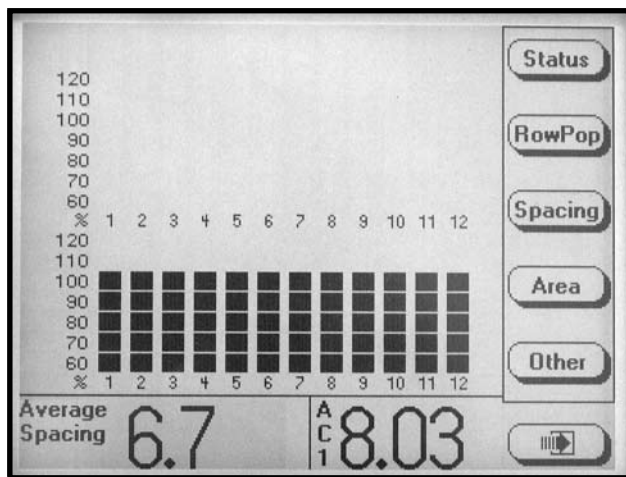
**NOTE: Applicable to planters with shaft rotation sensors installed.**

D02240607

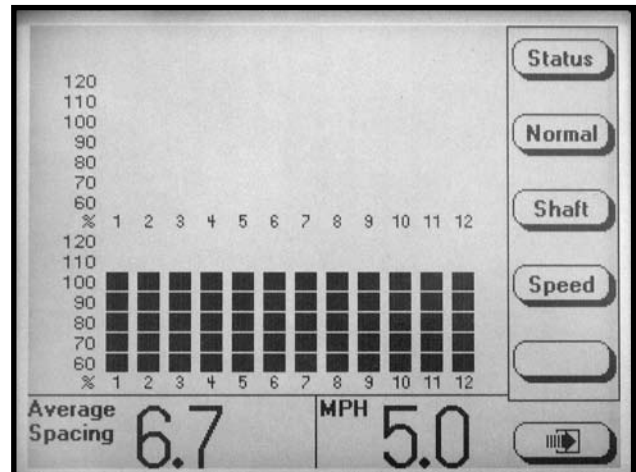


- Press the SPEED key to view the ground speed. The value will appear in the bottom R.H. corner of the display.

D02240602



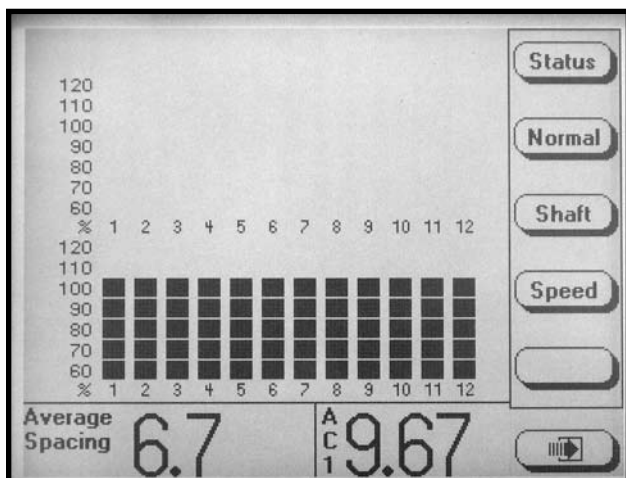
D02240608



**NOTE: The appropriate units of measure will be displayed (English or Metric).**

- Press NORMAL to bring back the standard key labels.

D02240606



## WARNINGS AND ALARMS

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

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

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

The status message associated with an alarm contains more information about the alarm. To view the "Status Message" for a seed rate alarm, press the STATUS key.

If the sensor is detecting no seed flow it will display which row is not functioning. The alarm may be indicating a mechanical problem that is reducing the seed flow or an electrical problem causing the seed counts to be incorrect.

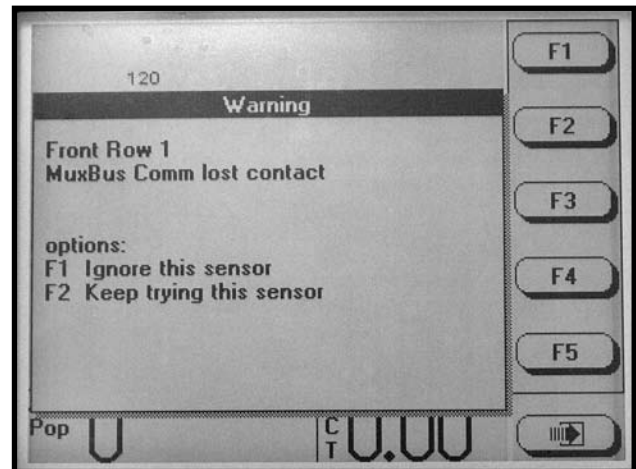
**NOTE: The only way to remove an alarm is to find and correct the problem. Alarms are not reported for rows that seed rate alarm thresholds have been disabled.**

**NOTE: The percentage shown in the alarm message is the percentage at the time the alarm occurred.**

2. **Section Not Planting** - When the monitor detects an entire section not planting, the monitor will emit three beeps to alert the user. The bargraph for the affected section flashes and is reduced to the lowest segment. An alarm message is added to the list of "Status Messages". Press the STATUS key to view the alarm message.

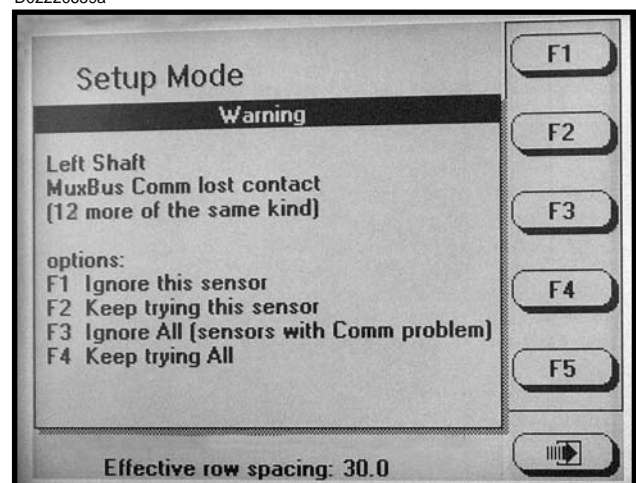
3. **Seed Counting Sensors Not Communicating With Monitor** - When the monitor detects a communication error between the sensor and the monitor, the monitor will emit two beeps to alert the user. Try to reestablish communication with sensor(s) by pressing F2. If the monitor is unable to establish communication there may be (a) a faulty sensor, (b) a poor electrical connection or (c) a cut or pinched wire harness.

D02220687



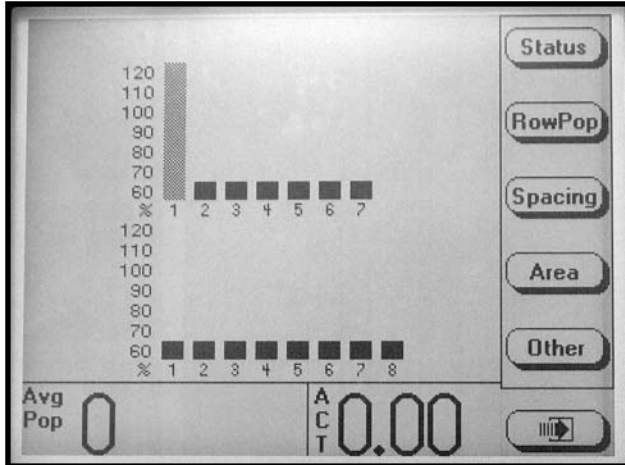
If multiple sensors have lost contact, the message will indicate which sensors have lost contact.

D02220659a



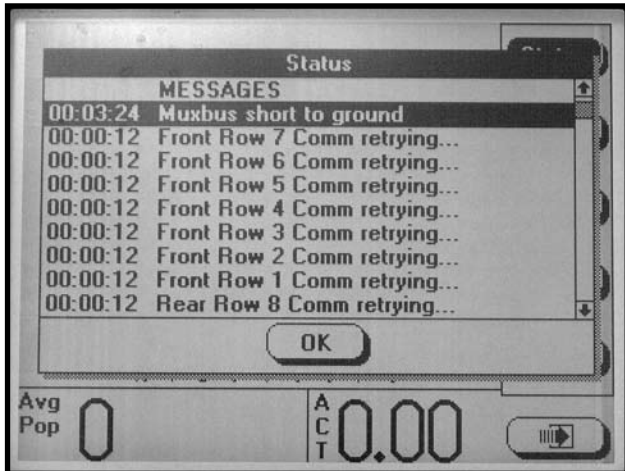
**NOTE: When it is known that a sensor or a group of sensors are faulty, F1 or F3 should be pressed. The monitor will no longer try to communicate with the sensor(s). In the planting mode the corresponding bargraphs will be grayed out in the main screen.**

D02220691



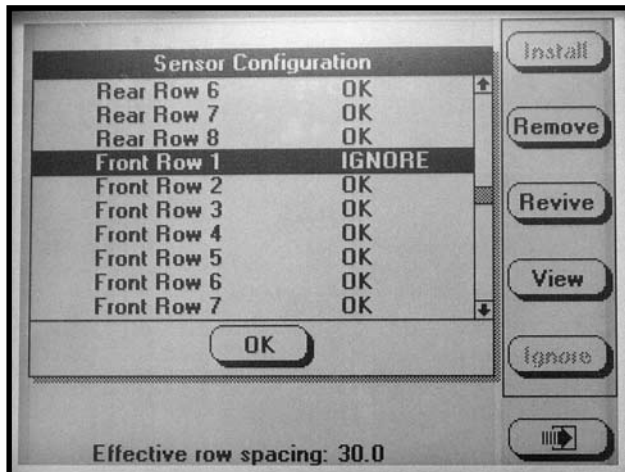
**NOTE:** If the sensors are not faulty, F2 or F4 should be pressed and the message shown below will appear when the STATUS key is pressed.

D02220685



**NOTE:** If a sensor has been ignored, the sensor configuration screen will display as shown below.

D02220692

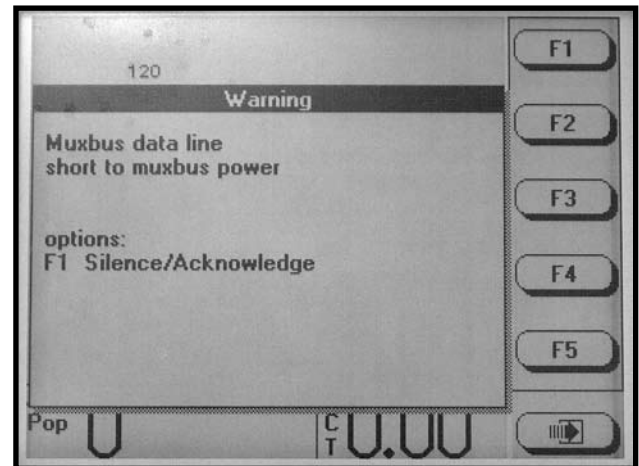


- Seed Counting Sensors Too Dirty Warning** - When powering on the KPM III, each of the seed sensors will do a self check. If a seed tube is too dirty, the message “Clean Or Replace Sensor As Necessary” will be displayed and the bargraph for that row will flash. The LED on the seed tube sensor will not flash. The sensor will not function until the problem is corrected.

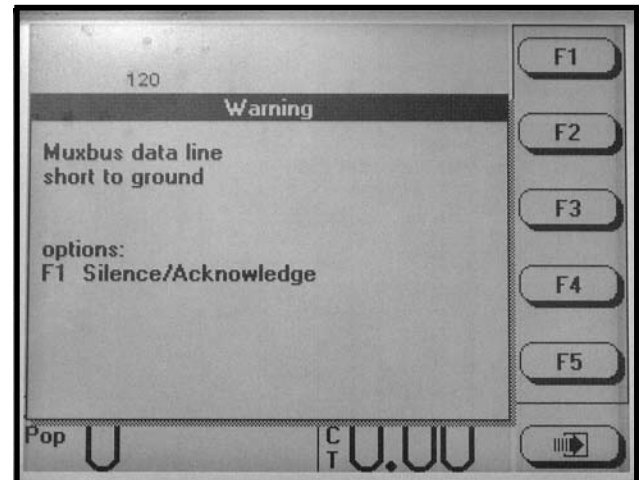
**NOTE:** After the alarms have been acknowledged and if the alarm condition is still present, the LCD screen will continue to display the alarm condition.

- Wire Shorts** - When a wire is shorted any one of the messages shown below will appear, stating which wires are shorted. The short must be located and fixed to continue planting. Cycle the power on the monitor to clear the alarm.

D02220683



D02220684

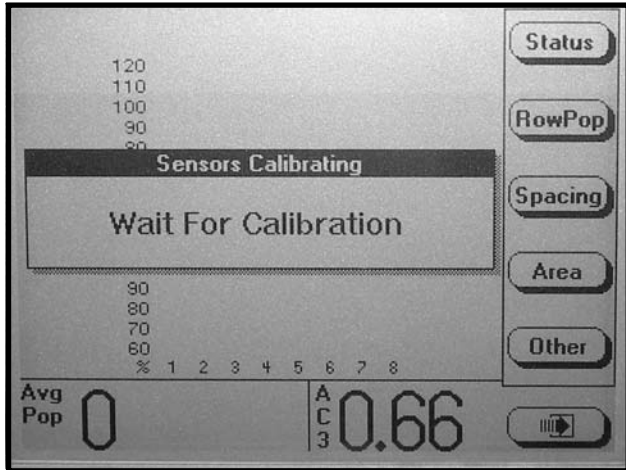


## FIELD OPERATION

Press the ON/OFF key to turn the monitor ON.

If the monitor has been configured, it will enter the normal planting mode and attempt to communicate with the seed sensors.

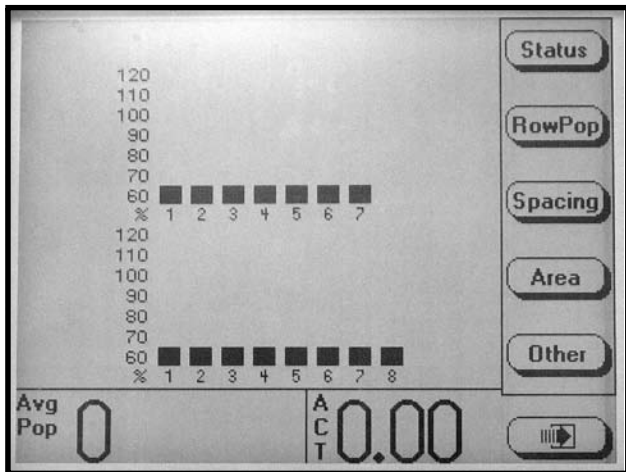
D02200606



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

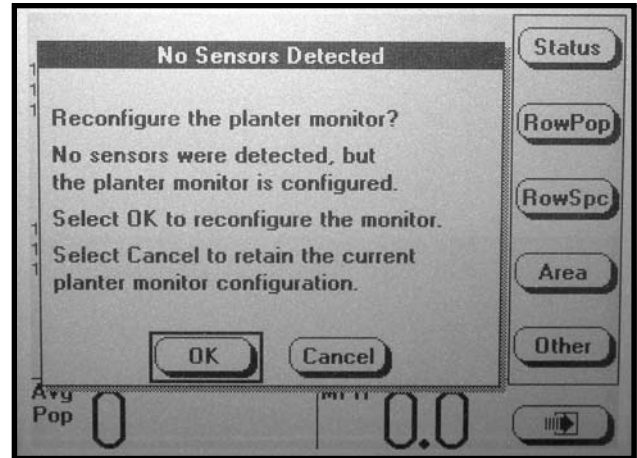
**NOTE:** If the monitor can communicate with the sensors the normal planting mode screen will be displayed.

D02220689a



If the monitor does not detect any sensors the message shown below will appear.

D02200627



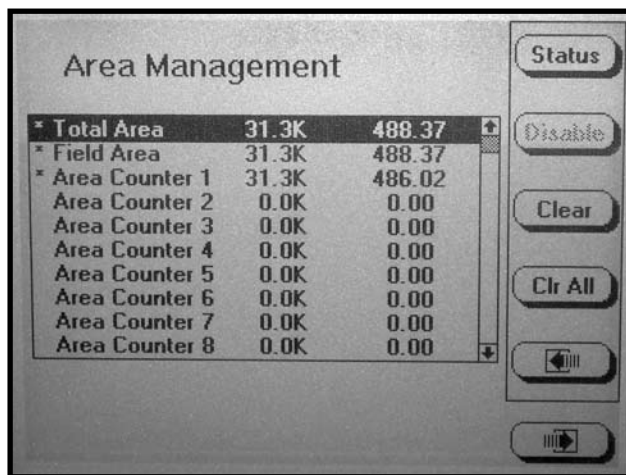
**NOTE:** Selecting OK will reconfigure the monitor requiring all sensors to be re-learned. Selecting CANCEL will maintain the current configuration and the monitor will continue trying to communicate with the sensors.

## AREA MANAGEMENT

There are 10 area counters: Total Area, Field Area and area counters 1 through 8. The Total Area is always active but may be cleared. If it is cleared, the Field Area is also cleared. Field Area and Area Counters 1 through 8 may be cleared independent of each other. They may also be started or stopped at anytime. In addition, there is a Lifetime Area Counter (located on the Mode Selection Screen) which can not be disabled or cleared by the user.

To enter the "Area Management" screen, press the F6 key until the "Area Management" screen appears.

D02210626a



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

- The asterisk next to the name of the area counter indicates the area counter is enabled and accumulating area.

**EXAMPLE:** In the photo shown above, 31.3K indicates the average seed population for the accumulated area is 31,300 seeds per unit area (acre/hectare). This number has been rounded off. The actual seed population ranges anywhere from 30,500 to 31,499 per unit area. The last column of numbers is the area accumulated (acres/hectares).

- Turn the knob or use the UP or DOWN arrow keys to highlight the desired "Area Counter".
- Press the ENABLE or DISABLE key.

**NOTE:** Up to four area counters can be enabled at one time (two area counters in addition to Total Area and Field Area). If four area counters are already enabled, disable one active area counter in order to enable a new area counter. To disable or enable area counters see next column.

**NOTE:** When a key is dimmed it does not perform any operation on the highlighted area counter.

### ENABLE AREA COUNTER

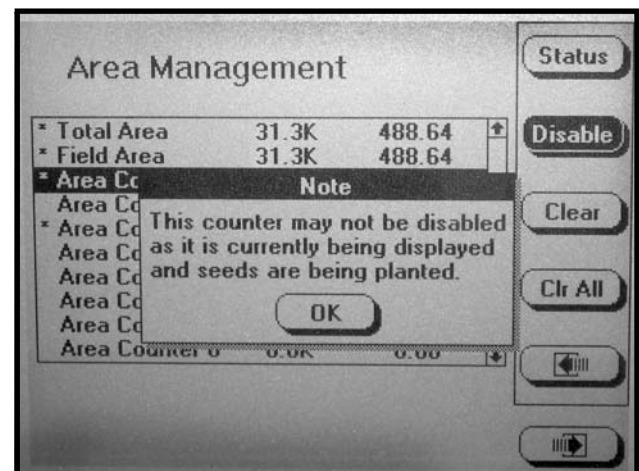
Each of the "Disabled Area Counters" may be enabled up to a total of four "Area Counters". To Enable a Disabled "Area Counter": (a) highlight the desired "Area Counter" by turning the rotary encoder knob or using the UP or DOWN arrow keys; (b) press the ENABLE key or press the knob or ENTER key and an asterisk will appear next to the "Area Counter". The Enabled "Area Counter" starts accumulating area.

### DISABLE AREA COUNTER

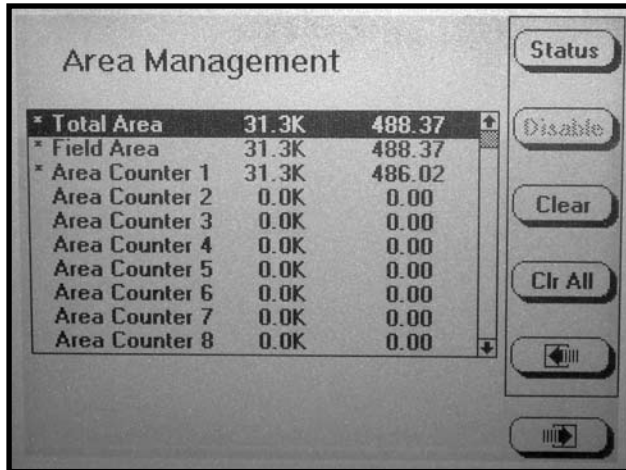
Each of the Enabled Area Counters may be disabled, with the exception of the Total Area Counter. To disable an enabled area counter: (a) highlight that "Area Counter"; (b) press the DISABLE key or press the rotary encoder knob or ENTER key and the asterisk next to the "Area Counter" will disappear. The "Disabled Area Counter" will no longer accumulate area.

**NOTE:** Attempts to disable an Area Counter that is currently being displayed while planting will cause the following alarm.

D02210627a

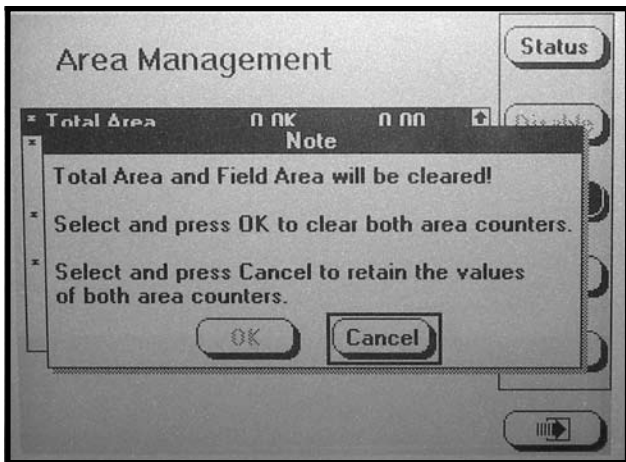


D02210626a



**NOTE:** If the total area is highlighted and the CLEAR key is pressed the following request for confirmation will appear.

D02200612



## CLEAR AREA COUNTER

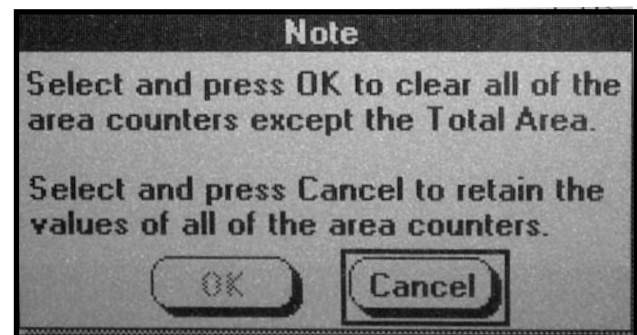
Total Area, Field Area and Area Counters 1 through 8 can be cleared, whether they are Enabled or Disabled. Clearing the “Total Area” counter forces the “Field Area” counter to also be cleared. Clearing any other “Area Counter” including the “Field Area” counter clears only that counter.

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

To clear an Area Counter: (a) highlight the desired area counter, by turning the rotary encoder knob or using the UP or DOWN arrow keys, (b) press the CLEAR key, (c) the request for confirmation shown below will appear, (d) turn the knob or use the UP or DOWN arrow keys to select OK or CANCEL, (e) press the knob or ENTER key to make selection.

To Clear All Area Counters except the “Total Area Counter”: (a) select the CLR ALL key; (b) a request for confirmation will appear; (c) turn the knob or use the UP or DOWN arrow keys to select either OK or CANCEL; (d) press the knob or ENTER key to confirm

D02210628

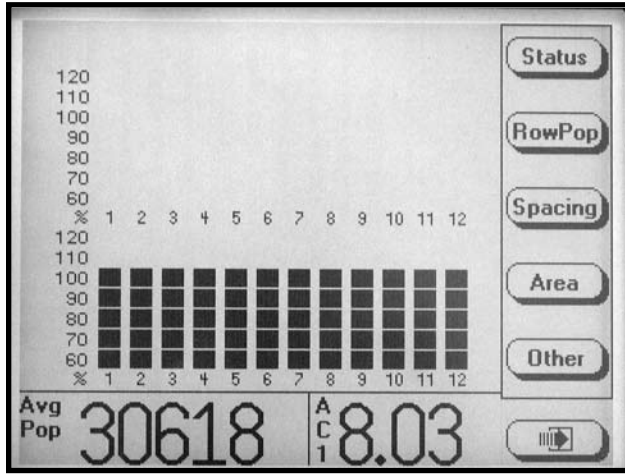




## AREA COUNTERS

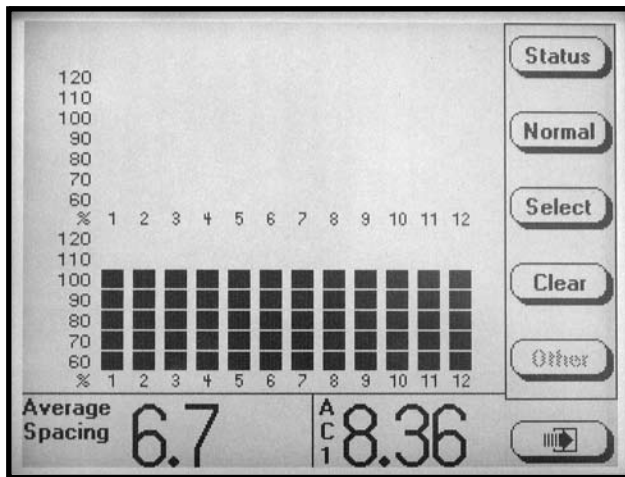
**STEP 1** On the main planting screen press the AREA key.

D02240602



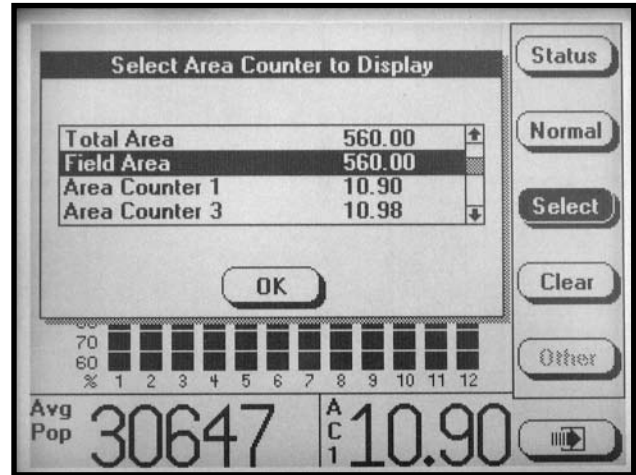
**STEP 2** Press the SELECT key to display the list of the Enabled Area Counters.

D02240603



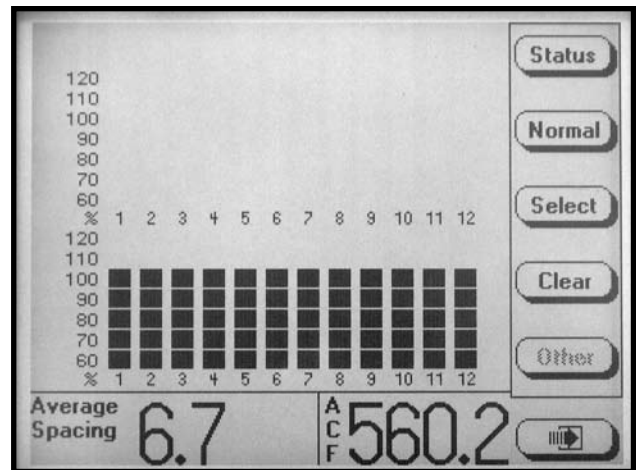
**STEP 3** To select the desired active "Area Counter" turn the knob or use the UP or DOWN arrows to highlight the desired "Area Counter".

D02240609



**STEP 4** Press the knob or ENTER key to select OK. The planting screen will then be displayed. Press NORMAL to display main planting screen.

D02240610

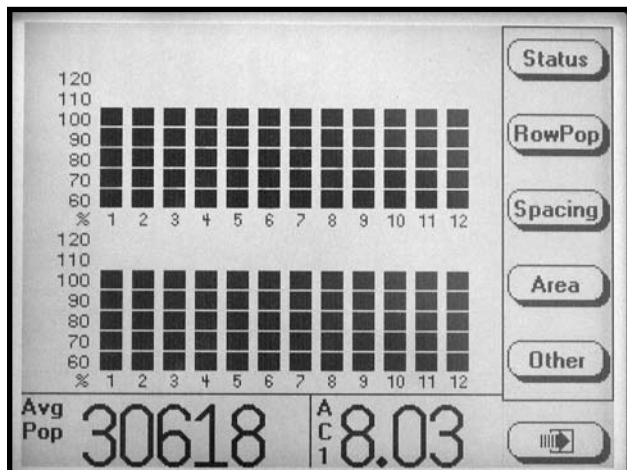


**NOTE:** The abbreviation for the selected area counter numerical value will appear in the bottom R.H. corner of the screen. In the above photo "ACF" represents "Area Counter Field".

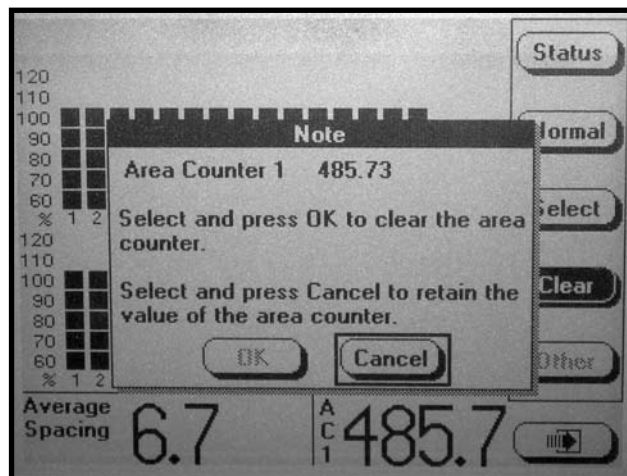
## CLEARING FIELD AREA

To reset the counter, display the main planting screen by pressing the F6 key until it appears. Press the AREA key then select the CLEAR key, a dialog box will appear requesting confirmation to clear. Select OK or CANCEL key by turning the rotary encoder knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to verify the selection.

D02210625



D02210625



**NOTE:** Only the displayed Area Counter can be disabled.

## ACRE COUNT MODE

When a tractor is equipped with a radar distance sensor, accumulating area without a planter attached is possible. Two routes are provided to enter acre count mode: (a) Installation of an Acre Count Switch Kit or (b) entry into Acre Count Mode.

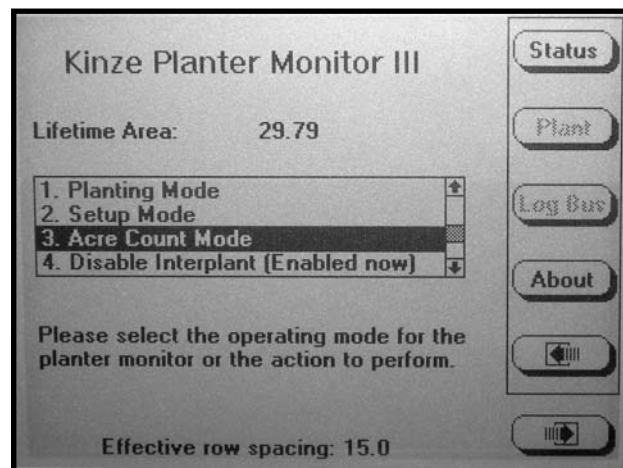
### Acre Count Switch Kit

**STEP 1** With the monitor OFF, attach an Acre Count Switch Kit to the Muxbus connector and then turn monitor ON and advance to STEP 2.

### Acre Count Mode

**STEP 1** Press the F6 key until the “Mode Selection” screen appears. Turn the rotary encoder knob or use the UP or DOWN arrow keys to select “Acre Count Mode”. Press the knob or ENTER key.

D02200618



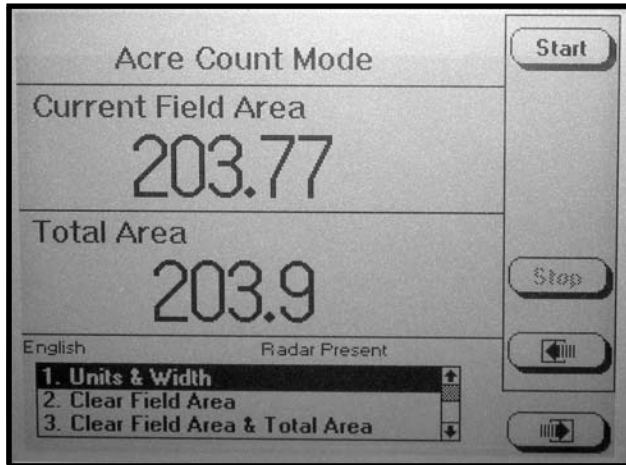
**NOTE:** If no radar unit is detected a warning will appear.

**NOTE:** If using acre count mode, area (acres or hectares) is accumulated in “Lifetime Area Counter”.

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

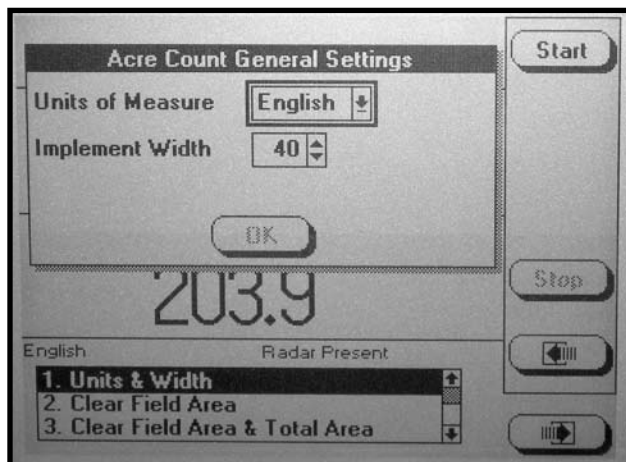
**STEP 2** In the menu, “Units & Width” will be highlighted. Press the knob or ENTER key.

D02200619



**STEP 3** A drop down menu will appear. Select the correct units of measure “English” or “Metric” by turning the knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to make the selection. The black box will advance to “Implement Width” field showing implement width in feet.

D02200621



**STEP 4** Press the knob or ENTER key to highlight the field. Turn the knob or use the UP or DOWN arrow keys to select desired number in feet. When desired number is obtained press the knob or ENTER key. The black box will advance to OK key.

**NOTE: The implement width entered in acre count mode has no effect on planting mode settings.**

**STEP 5** Press the knob or ENTER key when done.

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

**STEP 6** To begin accumulating area press the START key.

**STEP 7** To stop accumulating area or to move to a different location, press the STOP key.

There are two counters in the Acre Count Mode (Field Area Counter and Total Area Counter). The “Field Area” counter can be cleared independent of the “Total Area” counter. Clearing the “Total Area” counter causes the “Field Area” counter to also be cleared.

- To Clear Field Area. Highlight “Clear Field Area” and press the knob or ENTER key. A note will appear verifying the decision to reset the field area to zero. Select OK and press the knob or ENTER key to clear the field to zero. Select Cancel and press the knob or the ENTER key to retain the current field value.

- To Clear Both Field Area And Total Area. Highlight the “Clear Field Area & Total Area” and press the knob or ENTER key. A note will appear to verify the decision to reset the field area and the total area to zero. Select OK and press the knob or ENTER key to clear the field to zero. Select CANCEL and press the knob or ENTER key to retain the current field value.

With planter reconnected to monitor return to normal plant screen by pressing the F6 key until the “Mode Selection” screen appears. Select “Planting Mode” by turning the knob or using the UP or DOWN arrow keys, press the knob or ENTER key.

## REPLACING FAULTY SENSOR(S)

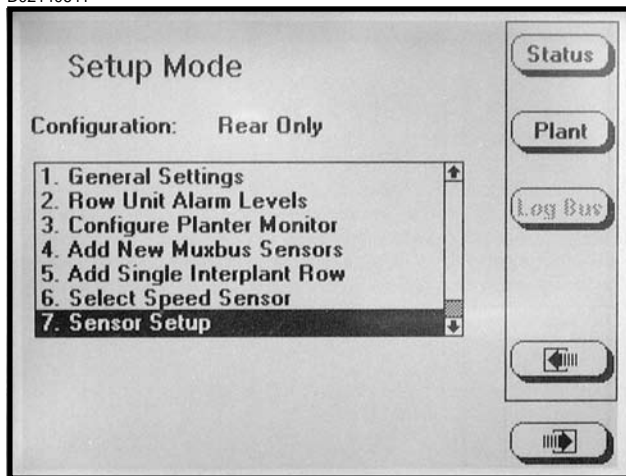
To replace a single faulty sensor: (a) turn OFF the monitor, (b) replace the sensor, (c) turn monitor ON. It will then recognize that a single sensor has been replaced.

**NOTE:** Monitor will beep twice when the new sensor(s) is learned.

To replace more than one faulty sensor:

- STEP 1** Press F6 key until the “Mode Selection” screen appears.
- STEP 2** Select “Setup Mode” by turning the knob or press the UP or DOWN arrow keys. Press the knob or ENTER key to display the highlighted item.
- STEP 3** Select “Sensor Setup” by turning the knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to display the highlighted item.

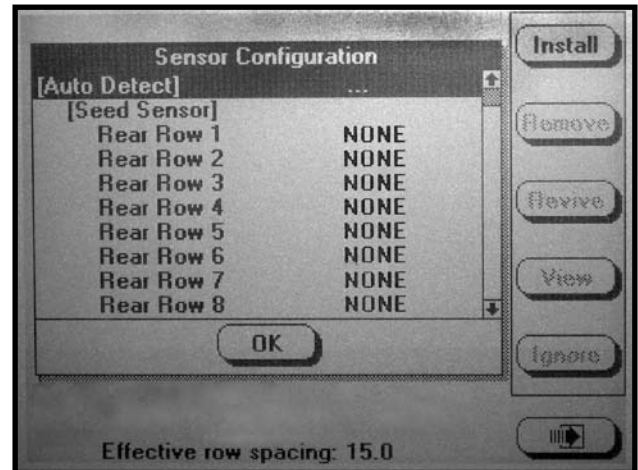
D02140641



- STEP 4** Highlight faulty sensor. Press REMOVE key and unplug sensor. Plug in new sensor and press INSTALL key.

Repeat above procedure for each faulty sensor being replaced.

D02210601a



**NOTE:** Highlighting a sensor and pressing VIEW gives additional information when troubleshooting a problem. If a faulty sensor has been ignored it may be highlighted in the list of sensors, press REVIVE. The monitor will try to communicate with the sensor. If successful, “OK” will appear next to the sensor.

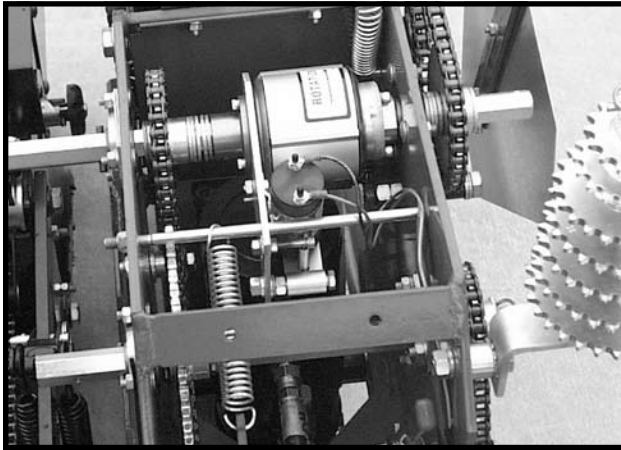
- STEP 5** Press the knob or ENTER key to return to “Setup Mode” screen.
- STEP 6** To return to “Planting Mode” press the PLANT key.

**See “KPM III Electronic Seed Monitor Troubleshooting” in the Maintenance Section.**

# MACHINE OPERATION

## POINT ROW CLUTCHES

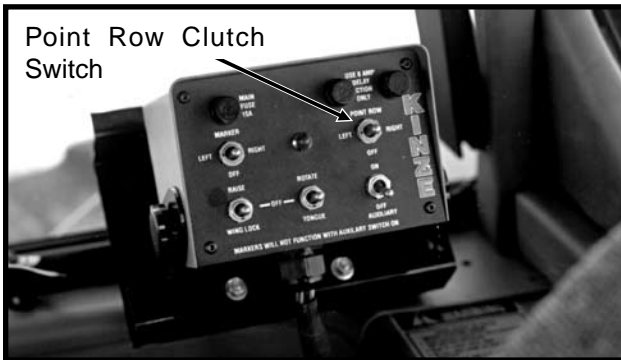
D032901166



12 Row 30" Machine Shown

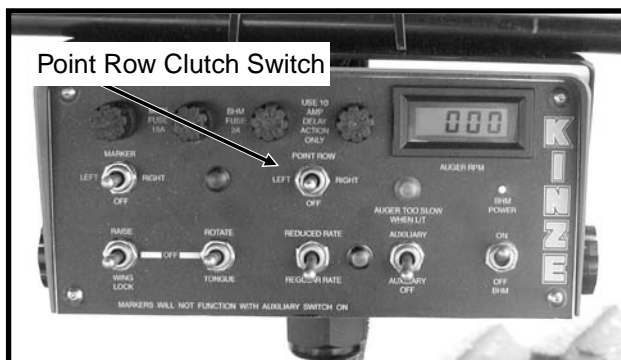
With the use of electric-activated clutches, which disengage the drive, either half of the planter may be shut off for finishing up fields or for long point row situations.

76746-24



Conventional Planter Control Console

D12160359

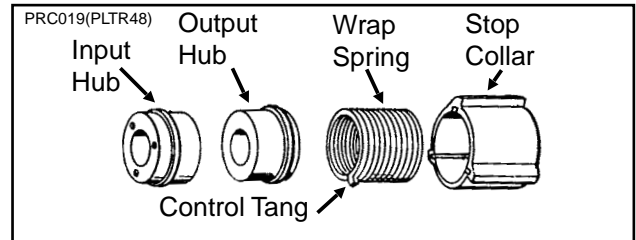


SDS Planter Control Console

The selector switch for the clutches is located on the planter control console.

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

**NOTE:** Since the liquid fertilizer piston pump has its own drive wheel, liquid fertilizer application will not be affected by use of the point row clutch.



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

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

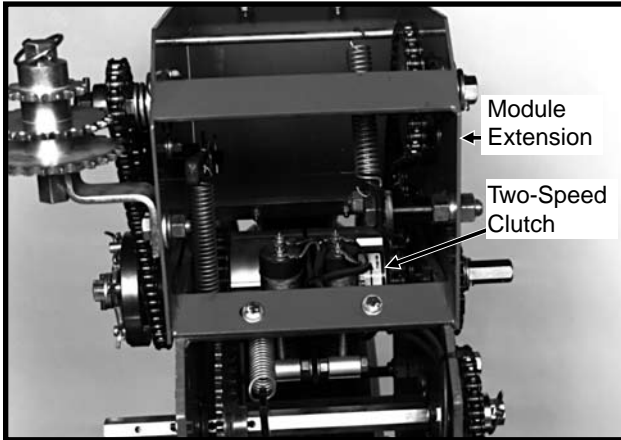
The stop collar is controlled by the use of an electric solenoid and an actuator arm. When the selector switch on the tractor control console is in the OFF position the solenoid coil is NOT ENERGIZED and the actuator arm will not contact the stop on the stop collar allowing it to rotate with the hubs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

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

# MACHINE OPERATION

## TWO-SPEED POINT ROW CLUTCHES

81826-8

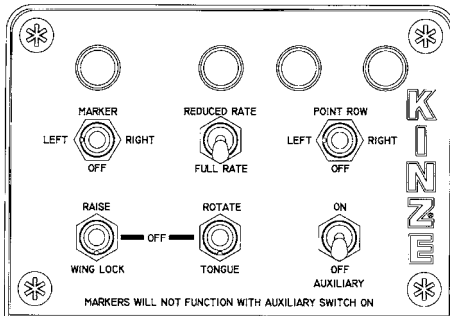


The optional Two-Speed Point Row Clutch Package is designed to allow on-the-go population rate adjustment as well as the capability to shut off either half of the planter for finishing up fields or for long point row situations.

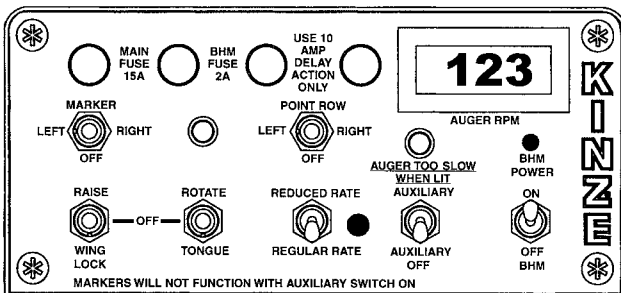
The point row clutches are controlled by the point row clutch switch on the control console. The point row switch is used to shut off either the left or right half of the planter. Activating the reduced rate switch engages one solenoid on each clutch assembly and reduces the planting rate for the entire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

**NOTE: Point row switch should be left in OFF position and rate switch should be left in FULL RATE position when planter is not in use. If left in ON and/or REDUCED RATE positions, the tractor battery will be discharged.**

A7435(TWL81/ELC41)



Conventional Planter Control Console



SDS Planter Control Console

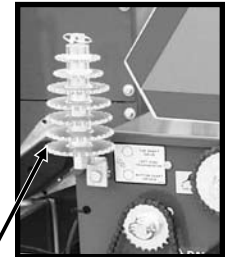
The ratio of population reduction is determined by the sprocket ratio between the drive and driven sprockets on the wheel module extension. A rate reduction decal like the one shown below is located on the wheel module extension.

(7100-214)D032901165

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

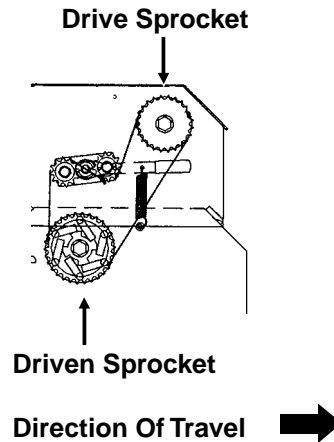
\* Use sprockets off seed drive transmission

7100-214



Full rate transmission shown. Two-speed clutch wheel module extension

(TWL80)

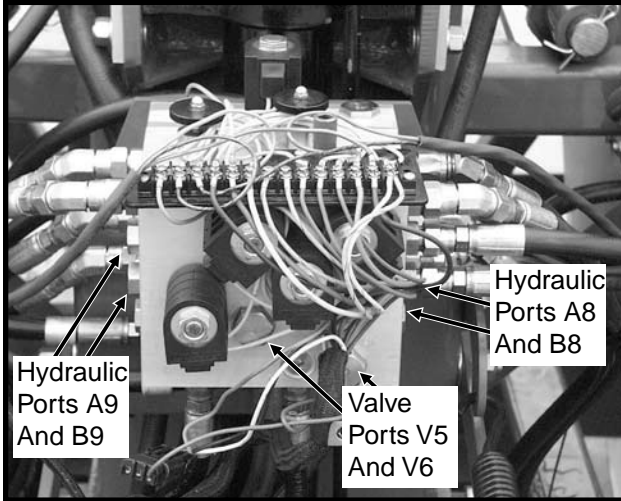


# MACHINE OPERATION

## AUXILIARY HYDRAULIC OPTION

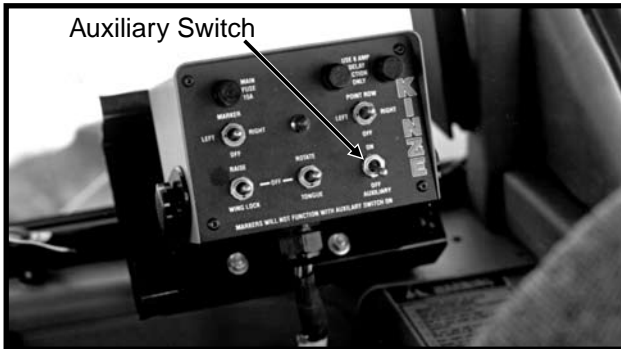
A customer-supplied auxiliary hydraulic option may be added to provide up to 10 GPM of oil flow at the rear of the planter. This option may be used for powering fertilizer or seed fill attachments, etc. Two customer-supplied solenoid valve kits (G1K275) are required to activate the auxiliary hydraulic option using the auxiliary switch on the control console.

D032901147



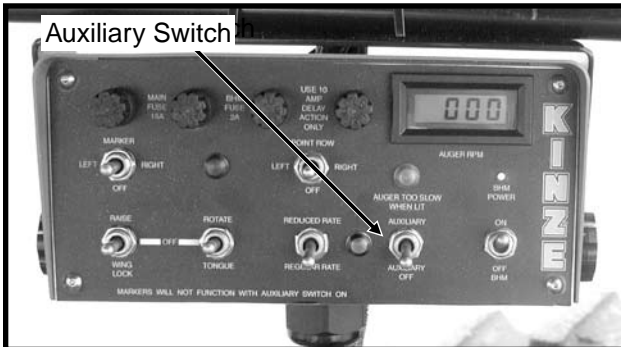
Valve Block Located On Rear Center Frame (Shown With Cover Removed)

76746-24



Conventional Planter Control Console

D12160359



SDS Planter Control Console

**NOTE:** Be sure markers are in transport position and all pressure is removed from the hydraulic system.

Remove the cover from the valve block, located on the rear center frame of the planter. Remove plugs from ports V5 and V6 and install the solenoid valve assemblies following the installation instruction supplied with each kit. Power to the solenoid assemblies should be connected to the orange/black wires located in the wiring harness connection to the L.H. side of the 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 the Maintenance section of this manual for additional information.



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

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

**NOTE:** Auxiliary switch left in ON position disables all other control console switches.

# MACHINE OPERATION

## AUXILIARY WORK LIGHTS PACKAGE

D05160505a



The optional Auxiliary Work Lights Package includes two 50 watt, 3" x 5" halogen flood lamps, hardware to mount lights at the top of one of the lift cylinders and a wiring harness to plug into the existing planter light harness.

## EVEN-ROW PUSH ROW UNIT OPTION

The even-row push row unit may be installed on the L.H. end of the forward toolbar to increase planting width.

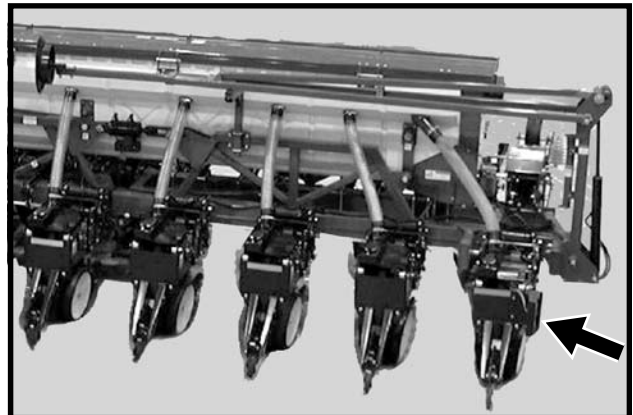
If markers are set for 30" rows, the R.H. marker extension will need to be moved in 15" when using the even-row push row unit. The L.H. marker extension will need to be moved out 15". See "Row Marker Length Adjustment" for additional information.

To plant two 15" rows between last year's 30" rows and avoid tire damage from stalks by driving off the row, shift the planter off-center as shown in the illustration on the following page.

**NOTE:** If tractor hitch is offset 7 1/2" to the right of the center line of the tractor, add 7 1/2" to the marker dimension on the R.H. side of the planter and subtract 7 1/2" from the marker dimension on the L. H. side of the planter.

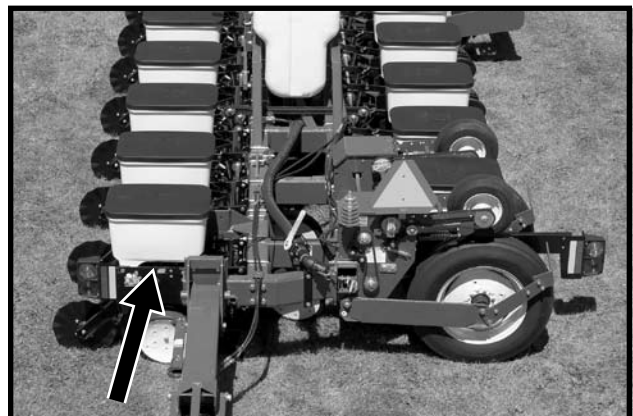
See "Seed Distribution Manifold" in SDS Seed Delivery System Operation for closing off seed flow to the even-row push row unit. (If Applicable)

D021102248a



SDS Planter Shown

LF091903101



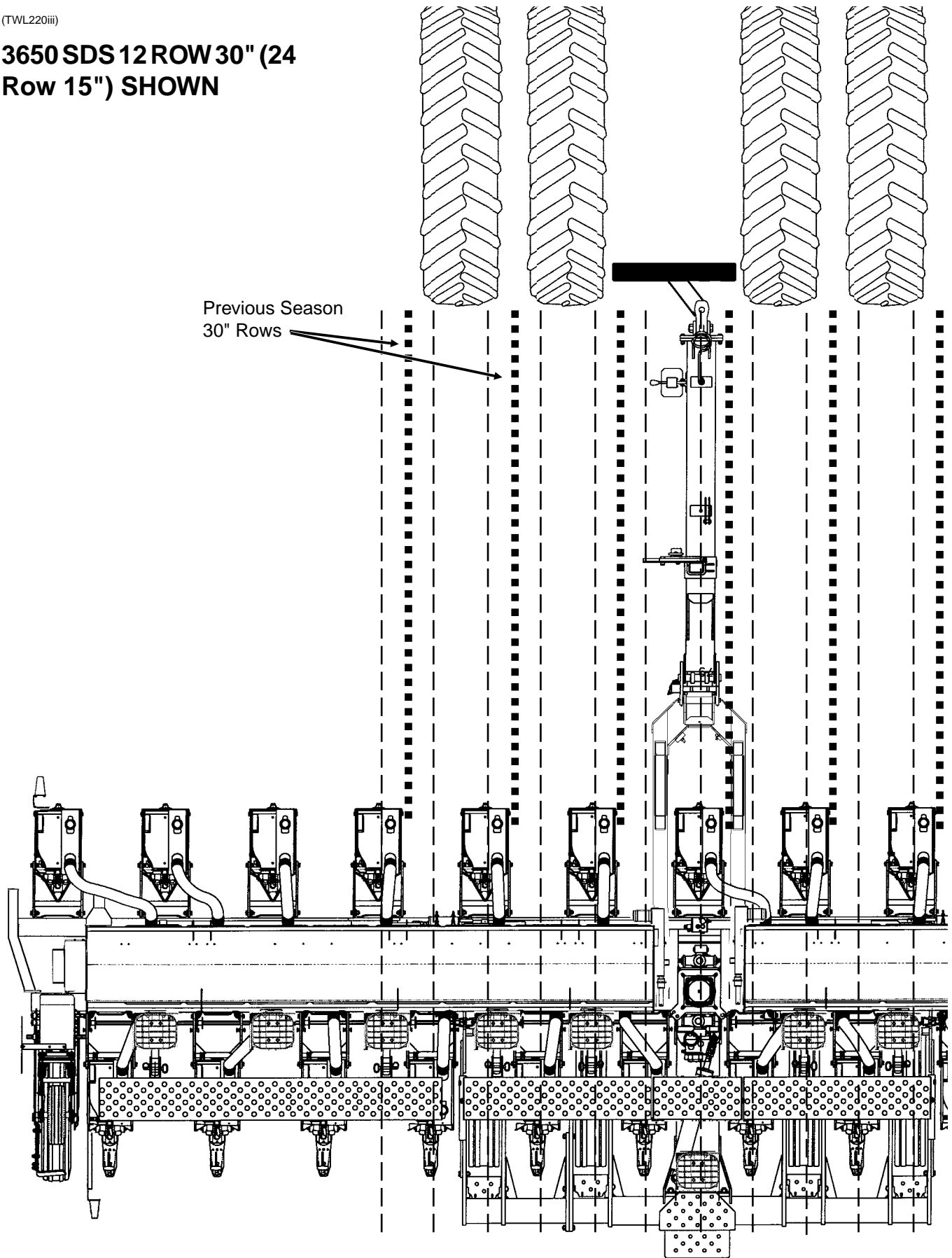
Conventional Planter Shown



# MACHINE OPERATION

(TWL220iii)

**3650 SDS 12 ROW 30" (24  
Row 15") SHOWN**



# MACHINE OPERATION

## DOUBLE DISC FERTILIZER OPENER

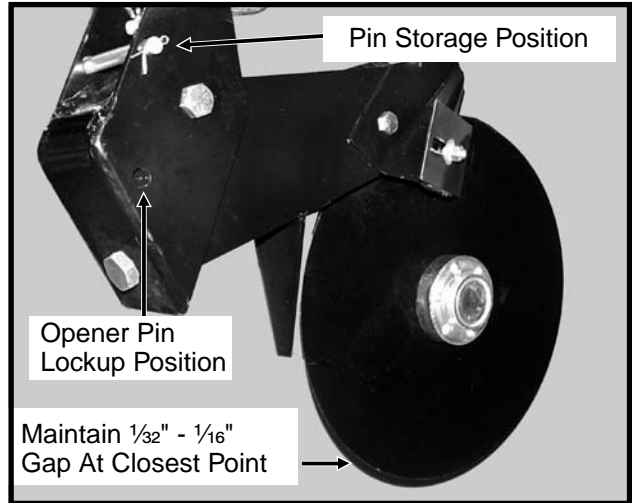
The double disc fertilizer openers should be positioned during assembly **to place fertilizer no closer than 2" to either side of the row.** If the planter frame is level and at proper 20" operating height, fertilizer depth will be approximately 4". Soil conditions can affect depth slightly.

The down pressure spring is factory preset at 250 lbs. down pressure but may be adjusted for various soil conditions. To adjust spring tension, loosen the jam nut with a  $1\frac{5}{16}$ " wrench and use a 1" wrench to turn the adjustment bolt clockwise to increase tension or counterclockwise to decrease tension. Securely tighten the jam nut upon completion of tension adjustment. Do not attempt to set opener depth with spring pressure. The opener is designed to operate against a depth stop and spring up when encountering a foreign object or hard ground.

**IMPORTANT: Do not operate the double disc openers at full down pressure tension when planting in rocky ground. Chipping of the disc blades will occur.**

A gap of  $\frac{1}{32}$ " to  $\frac{1}{16}$ " should be maintained between the opener blades at the closest point. Blade adjustment is made by moving inside spacer washers to the outer side of the blade. After making this adjustment, check to be sure bearing assembly rivets are not contacting the shank.

D06259919



The outer scrapers on each disc blade may also be adjusted to make up for wear that may occur. Make sure the scrapers are adjusted to allow only slight contact with the blades.

The opener assembly is designed to be locked in a raised position when the fertilizer attachment is not in use or during storage. To lock the opener up, first raise the planter and place blocks under the openers. Then lower the planter until the hole in the pivot section aligns with the hole in the mounting bracket. Remove the lockup pin from the storage position in the mounting bracket and install it through the lockup hole and secure with cotter pins.



**WARNING: Always install all cylinder lockup devices before working under the unit.**

# MACHINE OPERATION

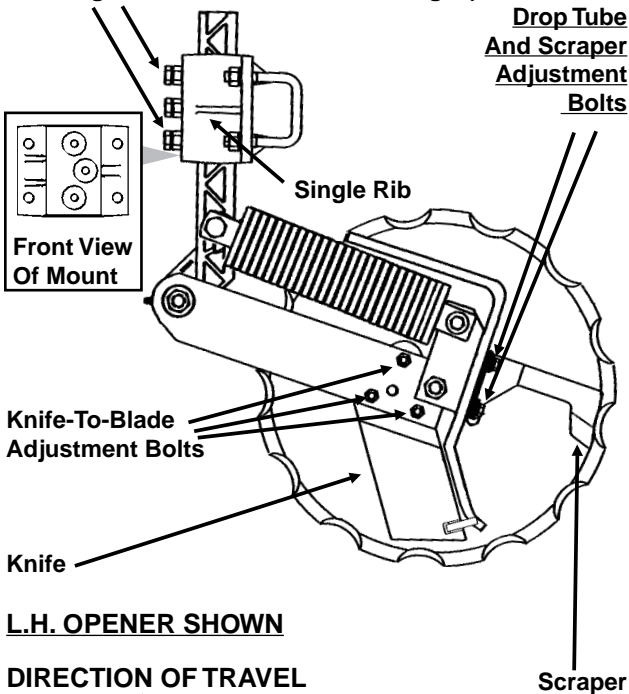
## NOTCHED SINGLE DISC FERTILIZER OPENER (Style A)

The notched single disc fertilizer opener is designed for use in minimum and no till planting conditions. Placement of fertilizer with the 16 3/4" diameter notched single disc fertilizer opener is recommended at 2 1/2"- 3" from the row. The opener is designed to hold the blade at a set-angle so the knife and drop tube operate in the shadow of the blade. **Never locate the opener to place fertilizer closer than 2".**

**! WARNING: Spring under pressure. DO NOT disassemble.**

(FRTZ210q/B0297)

**Depth Adjustment Cap Screws - Recommended Maximum Operating Depth 4" (Middle Cap Screw Holds Blade Angle But Must Be Loosened To Adjust Depth And Tightened First To Set Blade Angle.)**



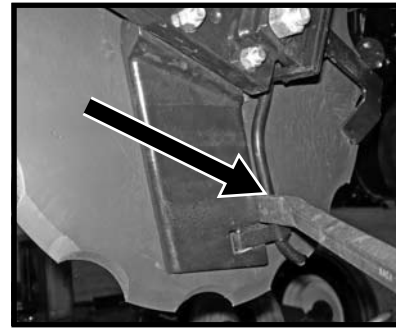
**L.H. OPENER SHOWN**

**DIRECTION OF TRAVEL**

**Adjust knife-to-blade** contact on each fertilizer opener so blade will turn by hand with slight resistance, but will not coast or freewheel. In dry, loose soil the knife adjustment is critical. If adjustment is not maintained, soil or residue may wedge between knife and blade, resulting in the blade not turning. If the knife is adjusted too tight, the blade will not turn causing the blade to push soil and residue. **Knife adjustment is made using the three 3/8" mounting carriage bolts** and pivot pad on the knife. Because of blade runout, rotate blade one full revolution after adjustment. Readjust knife to the blade's tight spot as needed. **Never strike the knife with a heavy object or damage may occur.**

Using the slotted mounting holes in the drop tube mount, **adjust fertilizer drop tube** behind the knife so it is protected from soil contact and wear. The liquid drop tube should be adjusted 1/4"-3/8" from the opener blade while keeping it behind the knife. Insert a flat bladed pry bar between the knife and drop tube just above the drop tube tab as shown below. Bend the tube inward toward the disc blade to obtain the desired 1/4"-3/8" adjustment.

D01040702



**NOTE: Adjusting the liquid drop tube will ensure it is out of the path of the soil flow across the knife. Drop tube and tab will wear quickly if not adjusted correctly.**

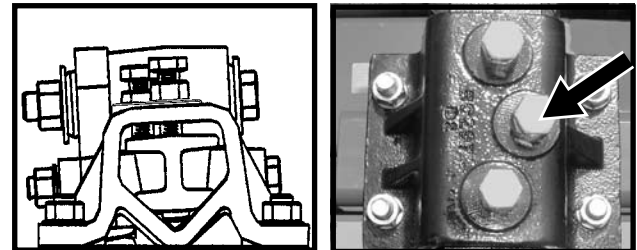
**Adjust scraper** to just touch the opener blade. As the mounting hardware is tightened, the scraper is drawn tighter to the blade. After adjustment, rotate opener blade to be sure blade will turn by hand with slight resistance, but will not coast or freewheel.

**Adjust blade depth** on each row using the cap screws and jam nuts located on the opener mount. The blade can be adjusted to allow a maximum 4" blade depth. Check fertilizer hose clearance (If Applicable) after adjusting opener depth. Torque cap screws and jam nuts to 57 ft. lbs.

**NOTE: The blade cuts through the soil at an angle relative to the direction of travel. For this reason and to ensure proper operation, the cast mount should be oriented so the single rib is on the same side of the blade as the drop tube.**

FRTZ296

D070103100



**NOTE: Recommended maximum operating depth is 4". To adjust depth: (a) Loosen depth adjustment cap screws. (b) Adjust depth to desired setting. (c) Tighten upper and lower cap screws slightly to hold opener arm in place. (d) Tighten middle cap screw to set the opener arm angle. (e) Tighten upper and lower cap screws and all jam nuts.**

# MACHINE OPERATION

## NOTCHED SINGLE DISC FERTILIZER OPENER (Style B)

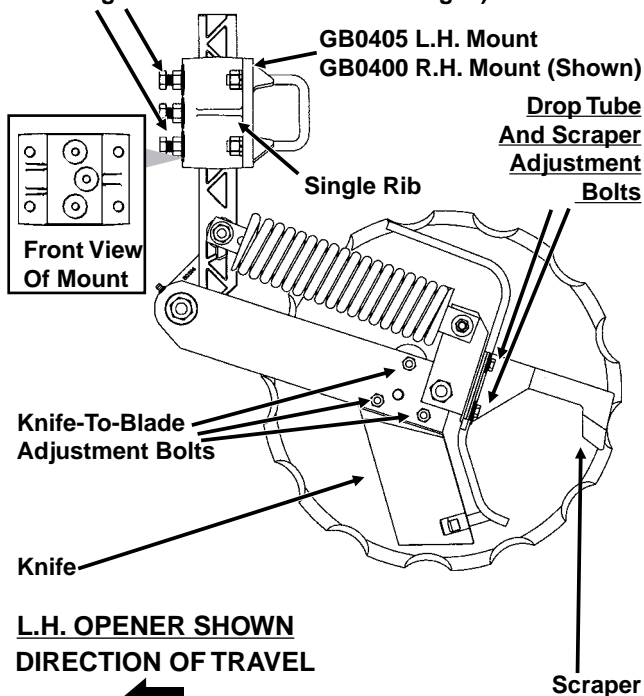
The notched single disc fertilizer opener is designed for use in minimum and no till planting conditions. Placement of fertilizer with the 16 3/4" diameter notched single disc fertilizer opener is recommended at 2 1/2" - 3" from the row. The opener is designed to hold the blade at a set-angle so the knife and drop tube operate in the shadow of the blade. **Never locate the opener to place fertilizer closer than 2".**



**WARNING: Spring under pressure. DO NOT disassemble.**

(A12429a/B0297)

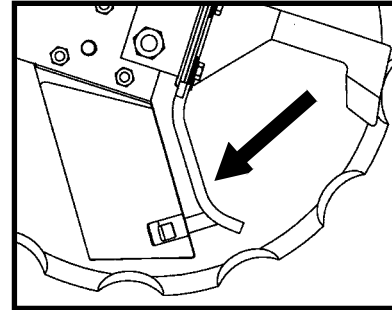
**Depth Adjustment Cap Screws - Recommended Maximum Operating Depth 4" (Middle Cap Screw Holds Blade Angle But Must Be Loosened To Adjust Depth And Tightened First To Set Blade Angle.)**



**Adjust knife-to-blade** contact on each fertilizer opener so blade will turn by hand with slight resistance, but will not coast or freewheel. In dry, loose soil the knife adjustment is critical. If adjustment is not maintained, soil or residue may wedge between knife and blade, resulting in the blade not turning. If the knife is adjusted too tight, the blade will not turn causing the blade to push soil and residue. **Knife adjustment is made using the three 3/8" mounting carriage bolts** and pivot pad on the knife. Because of blade runout, rotate blade one full revolution after adjustment. Readjust knife to the blade's tight spot as needed. **Never strike the knife with a heavy object or damage may occur.**

Using the slotted mounting holes in the drop tube mount, **adjust fertilizer drop tube** behind the knife so it is protected from soil contact and wear. The liquid drop tube should be adjusted 1/4"-3/8" from the opener blade while keeping it behind the knife. Insert a flat bladed pry bar between the knife and drop tube just above the drop tube tab as shown below. Bend the tube inward toward the disc blade to obtain the desired 1/4"-3/8" adjustment.

D01040702

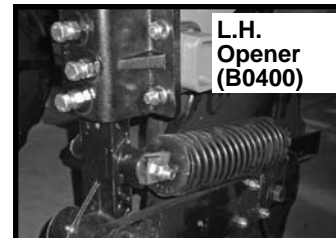


**NOTE: Adjusting the liquid drop tube will ensure it is out of the path of the soil flow across the knife. Drop tube and tab will wear quickly if not adjusted correctly.**

**Adjust scraper** to just touch the opener blade. As the mounting hardware is tightened, the scraper is drawn tighter to the blade. After adjustment, rotate opener blade to be sure blade will turn by hand with slight resistance, but will not coast or freewheel.

**Adjust blade depth** on each row using the cap screws and jam nuts located on the opener mount. The blade can be adjusted to allow a maximum 4" blade depth. Check fertilizer hose clearance (If Applicable) after adjusting opener depth. Torque cap screws and jam nuts to 57 ft. lbs.

D01160802



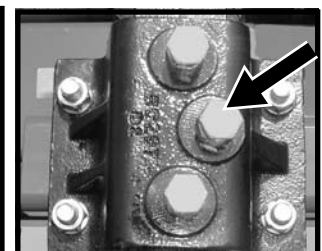
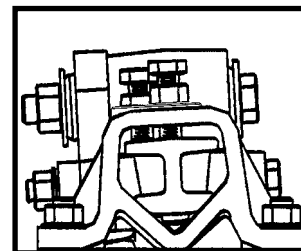
**NOTE: The blade cuts through the soil at an angle relative to the direction of travel. For this reason and to ensure proper operation, the cast mount should be oriented so the single rib is on the same side of the blade as the drop tube.**

D01160801



FRTZ296

D070103100



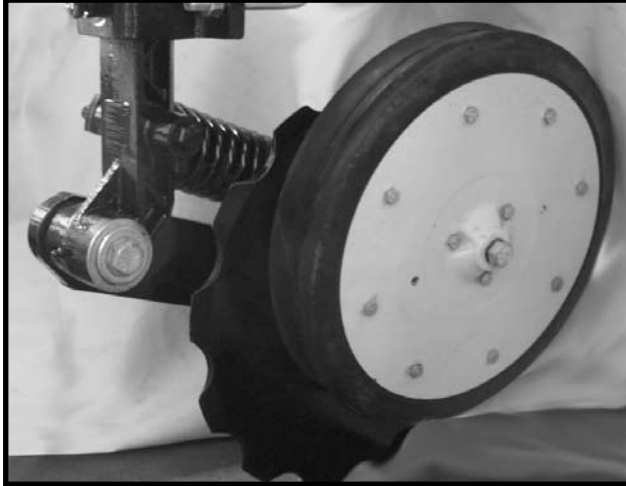
**NOTE: Recommended maximum operating depth is 4". To adjust depth: (a) Loosen depth adjustment cap screws. (b) Adjust depth to desired setting. (c) Tighten upper and lower cap screws slightly to hold opener arm in place. (d) Tighten middle cap screw to set the opener arm angle. (e) Tighten upper and lower cap screws and all jam nuts.**

# MACHINE OPERATION

## DEPTH/GAUGE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER

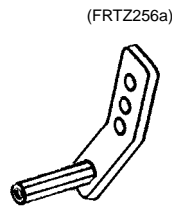
Due to space restrictions, the depth/gauge wheel attachment for the notched single disc fertilizer opener is not applicable to Model 3650 planters equipped with row unit coulter mounted residue wheels.

D061101202a



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

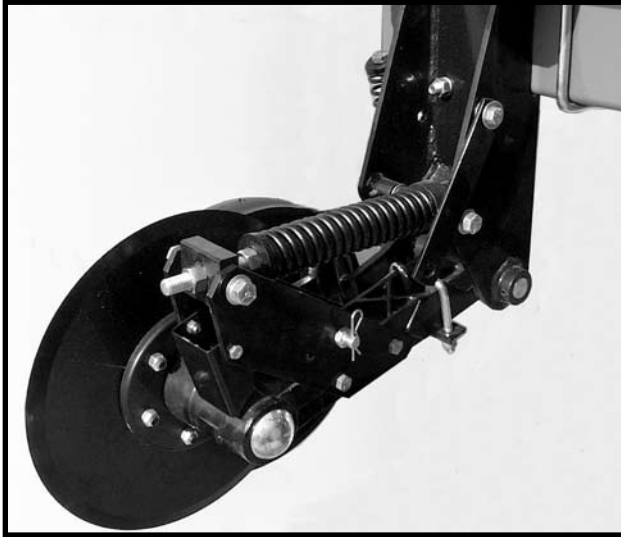
Depth adjustment is made by using the 3 adjustment holes in the depth/gauge wheel mounting block. Moving the depth/gauge wheel increases/decreases depth in approximate 1" increments in relation to the blade depth setting made at the vertical mounting post.



# MACHINE OPERATION

## HD SINGLE DISC FERTILIZER OPENER

D062601103



Placement of fertilizer with the HD single disc fertilizer opener is recommended at 3 1/2" - 4" from the row. **Never locate the opener to place fertilizer closer than 2".**

If planter frame is level and at 20" operating height, maximum blade depth for placement of fertilizer is approximately 5". Soil conditions can affect depth slightly.

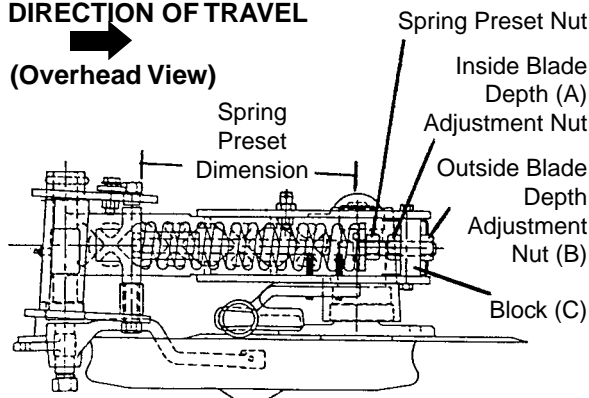
**To adjust blade depth**, raise the planter to remove weight from the fertilizer opener. Loosen inside adjustment nut (A) with 1 1/8" wrench. Turn outside nut (B) clockwise to decrease blade depth or counterclockwise to increase blade depth. One full turn of the blade depth adjustment nut changes blade depth 3/8". Tighten inside nut tight against block (C). Adjust all fertilizer openers to the same depth.

L0114(PLTR3)

### DIRECTION OF TRAVEL



(Overhead View)



R.H. Configuration Shown

Fertilizer opener down pressure can be adjusted from 250 lbs. to 640 lbs. **To make down pressure adjustments**, raise planter to remove weight from the fertilizer opener and turn spring preset nut clockwise to increase down pressure 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 DIMENSION	DOWN PRESSURE (LBS.)
11"	250
10 3/4"	320
<b>*10 1/2"</b>	<b>370</b>
10 1/4"	450
10"	520
9 3/4"	580
9 1/2"	640

\* Suggested initial setting.

**NOTE: DO NOT adjust spring preset dimension to less than 9 1/2".**

**NOTE: Excessive down pressure can cause up-lift on the planter frame and affect performance of the machine. When lowered to planting position, planter frame should be at a height of approximately 20". In loose soil conditions, excessive down pressure can cause openers to run too deep and push dirt ahead of opener and may stop soil press wheel and/or opener blade from turning.**



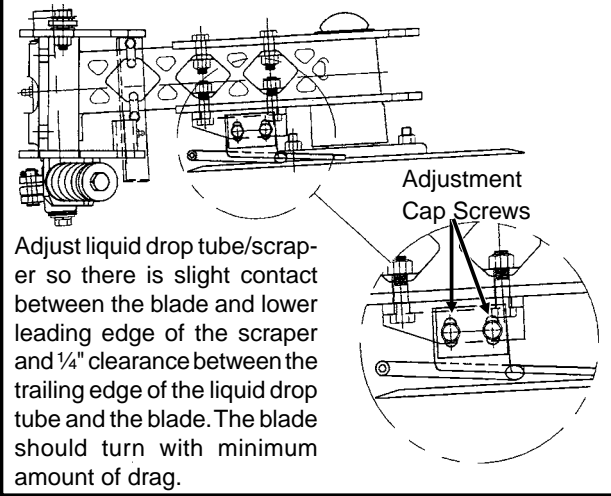
**WARNING: Always install all safety lockup devices before working under the machine.**

**IMPORTANT: Do not operate HD single disc openers at full down pressure tension when planting in rocky ground. Chipping or breakage of the blades will occur.**

# MACHINE OPERATION

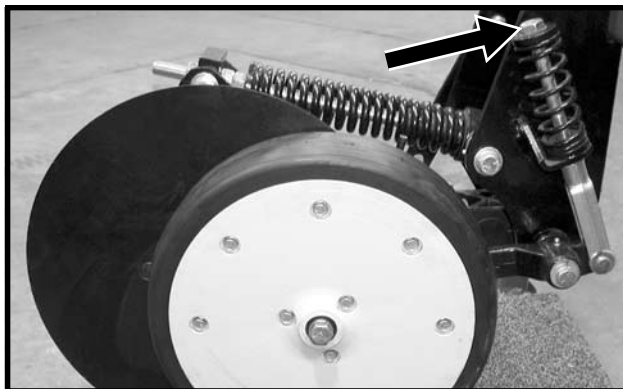
**Maintain liquid fertilizer drop tube/scraper adjustment** as shown below.

(INS16a)



Additional press wheel down pressure may be desirable in heavy moist soils. **To increase press wheel spring pressure** turn press wheel spring adjustment bolt clockwise.

D121202101



**NOTE: The soil press wheel is not intended to be used for gauging fertilizer opener operating depth.**

The HD single disc fertilizer opener is designed to be locked in a raised position when the fertilizer attachment is not in use or during storage.

To lock the HD single disc fertilizer opener in the raised position, proceed as follows:

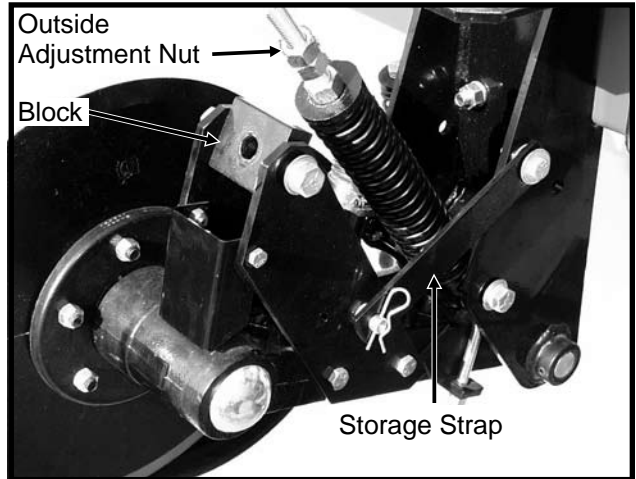
**STEP 1** With the planter in the planting position, remove outside blade depth adjustment nut. ("B" in illustration on previous page.)

**STEP 2** Raise planter until adjustment bolt clears adjustment block.

**STEP 3** Raise spring to clear blade assembly and at the same time raise blade assembly until storage strap can be positioned onto lockup pin and install hair pin clip.

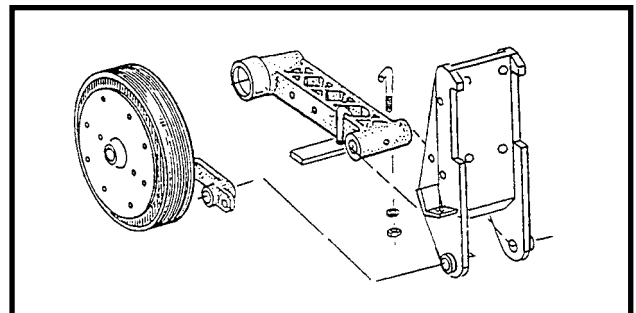
**STEP 4** Reinstall depth adjustment nut and tighten.

D062601102



**NOTE: The HD single disc fertilizer opener is equipped with a lockup bar that automatically raises and locks the soil press wheel when the blade assembly is raised.**

FOC016(PLTR5b)



# MACHINE OPERATION

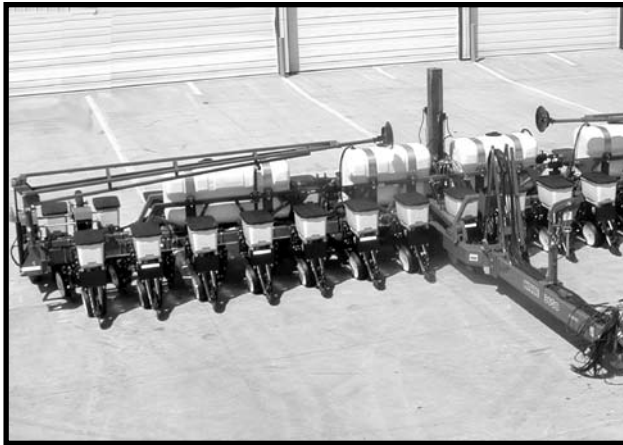
## LIQUID FERTILIZER ATTACHMENT

D11070360



Model 3650 SDS 16 Row 30" Planter

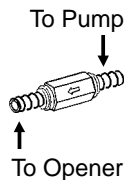
D071603322



Model 3650 Conventional 16 Row 30" Planter

**NOTE:** An optional low rate check valve is available for installation in-line between the liquid fertilizer piston pump and the liquid fertilizer openers to ensure equal distribution of product at low rates. The check valves also eliminate the need for anti-siphon loops if the valves are installed as close as possible to the fertilizer opener drop tubes.

(FRTZ208)



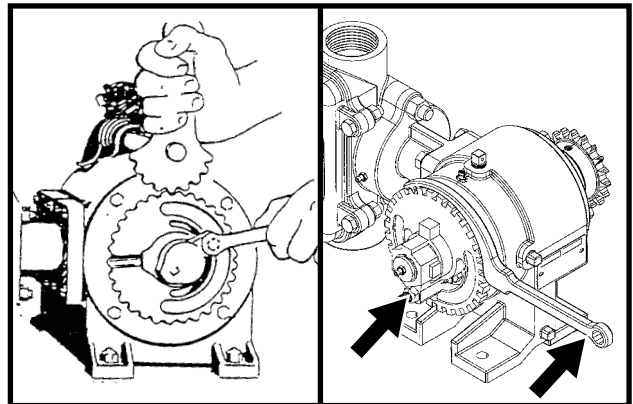
## PISTON PUMP

If the machine is equipped with the piston pump option, the rate of liquid fertilizer application is determined by the piston pump settings.

The delivery rate chart found at the end of this section provides an approximate application rate only. Actual delivery will vary with temperature and the particular fertilizer being used.

To adjust delivery rate, loosen the  $\frac{3}{8}$ " lock nut that secures the arm with the pointer and rotate the scale flange until the pointer is over the desired scale setting. The adjustment wrench will facilitate rotation of the scale flange. Tighten the  $\frac{3}{8}$ " lock nut being careful not to over tighten.

(PLTR9/12330b)



The operator and instruction manual shipped with the pump and flow divider should be kept and stored with this manual for future reference.

**NOTE:** Periodically check flow to all rows. If one or more lines are plugged, set rate will be delivered to remaining rows.

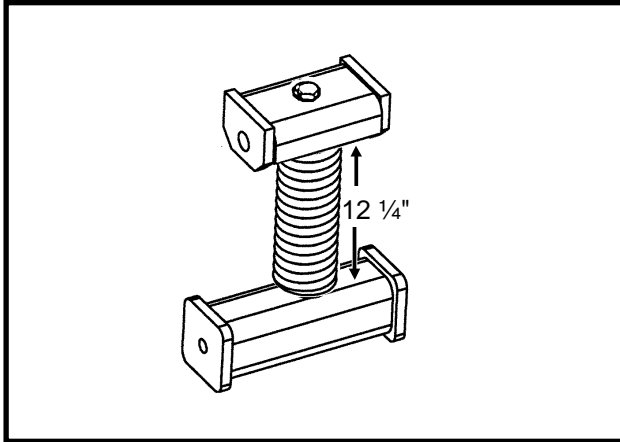


# MACHINE OPERATION

## PISTON PUMP GROUND DRIVE WHEEL SPRING ADJUSTMENT

Initial spring tension of the down pressure spring on the piston pump ground drive wheel is set leaving 12 1/4" between the bottom of the mounting plate and the plug on top of the spring. This dimension is taken with the planter in raised position (tire not contacting the ground). Further adjustment can be made to fit conditions.

(TWL219tt)



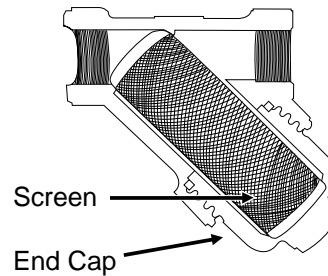
**NOTE:** The piston pump ground drive wheel assembly is designed to allow the assembly to be locked in raised position when not in use. Remove the two cap screws that attach the upper end of the spring to the spring mount. Reattach the spring using the upper holes in the spring mount. Reverse procedure to reset for field use.

## CLEANING

The tanks and all hoses are made of sturdy plastic and rubber to resist corrosion. However, the tanks, hoses and metering pump should be thoroughly cleaned with water at the end of the planting season or prior to an extended period of non-use. Do not allow fertilizer to crystalize due to cold temperature or evaporation.

The strainer, located between the piston pump and ball valve (On machines equipped with the piston pump.), should be taken apart and cleaned daily. Remove the end cap to clean the screen.

(INS220)



See "Piston Pump Storage" (If Applicable) in the Maintenance section of this manual.

# MACHINE OPERATION

## REAR TRAILER HITCH

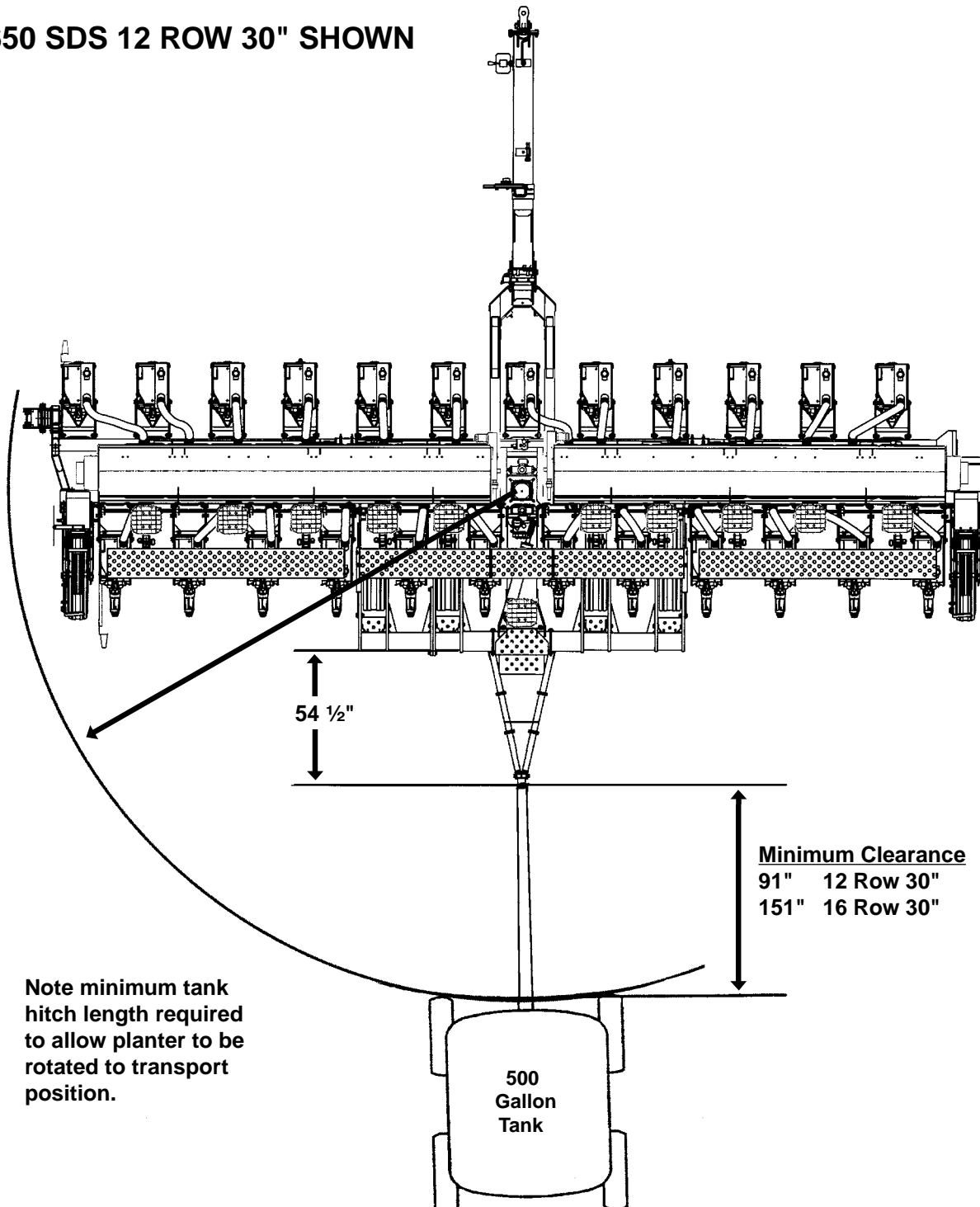
The Rear Trailer Hitch is used to tow a 3 or 4 wheel wagon behind the planter. Any hoses routed to the rear trailer hitch should follow hydraulic hose routings on the planter to allow the planter to be raised and rotated to and from the transport position without stretching the hoses.

**IMPORTANT:** Maximum allowable hitch weight is 200 lbs. Gross towing weight should not exceed 6000 lbs. or the equivalent of a loaded 500 gallon tank and running gear.

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

(TWL231aaa)

## 3650 SDS 12 ROW 30" SHOWN



# MACHINE OPERATION

## TRANSPORTING THE PLANTER



**WARNING:** Always make sure safety/warning lights, reflective decals and SMV sign are in place and visible prior to transporting the machine on public roads. In this regard, check federal, state/provincial and local regulations.

**IMPORTANT:** Avoid transporting planter with bulk seed hoppers loaded whenever possible. When it is necessary to transport the planter with the bulk seed hoppers loaded, the added weight should be distributed evenly on the planter frame before rotating the planter.



**WARNING:** Always install all safety lockup devices before transporting the planter.

## METRIC CONVERSION TABLE

MULTIPLY	BY	TO GET
Inches (in.)	x 2.54	= centimeters (cm)
Inches (in.)	x 25.4	= millimeters (mm)
Feet (ft.)	x 30.48	= centimeters (cm)
Acres	x 0.405	= hectares (ha)
Miles per hour (mph)	x 1.609	= kilometers per hour (Km/h)
Pounds (lbs.)	x 0.453	= kilograms (kg)
Bushels (bu.)	x 35.238	= liters (l)
Gallons (gal.)	x 3.785	= liters (l)
Pounds per square inch (psi)	x 6.894	= kilopascals (kPa) (100 kPa = 1 bar)
Inch pounds (in. lbs.)	x 0.113	= newtons-meters (N•m)
Foot pounds (ft. lbs.)	x 1.356	= newtons-meters (N•m)
Centimeters (cm)	x .394	= inches (in.)
Millimeters (mm)	x .0394	= inches (in.)
Centimeters (cm)	x .0328	= feet (ft.)
Hectares (ha)	x 2.469	= acres
Kilometers per hour (Km/h)	x 0.621	= miles per hour (mph)
Kilograms (kg)	x 2.208	= pounds (lbs.)
Liters (l)	x 0.028	= bushels (bu.)
Liters (l)	x 0.264	= gallons (gal.)
Kilopascals (kPa) (100 kPa = 1 bar)	x 0.145	= pounds per square inch (psi)
Newtons-meters (N•m)	x 8.85	= inch pounds (in. lbs.)
Newtons-meters (N•m)	x 0.738	= foot pounds (ft. lbs.)

## PLANTING SPEED

Planters are designed to operate within a speed range of 2 to 8 MPH. See “Planting And Application Rate Charts”. Variations in ground speed will produce variations in rates. Finger pickup seed meter populations will tend to be disproportionately higher at high ground speeds.

**NOTE:** Due to a multitude of variables, seed spacing can be adversely affected at speeds above 5.5 MPH.

## FIELD TEST

With any change of field and/or planting conditions, seed size or planter adjustment, we recommend a field test be made to ensure proper seed placement and operation of row units. See “Rate Charts”, “Checking Seed Population” and “Checking Granular Chemical Application Rate” at end of this section.

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

After the planter has been field tested, reinspect the machine.

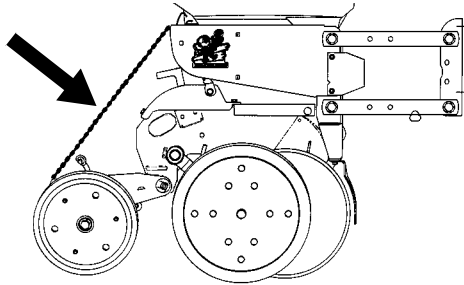
- Hoses And Fittings
- Bolts And Nuts
- Cotter Pins And Spring Pins
- Drive Chain Alignment

# MACHINE OPERATION

## CHECKING SEED POPULATION

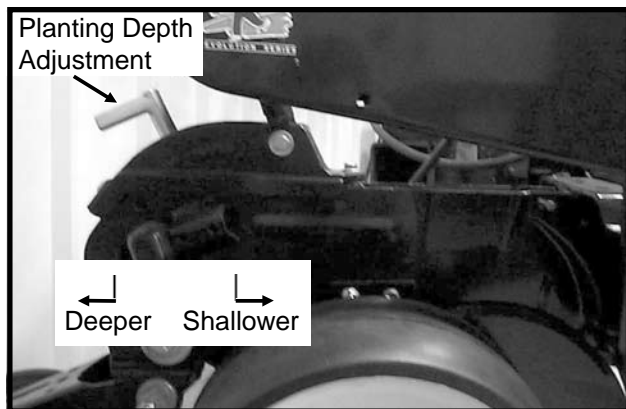
1. Tie up one or more sets of closing wheels by running a light chain or rubber tarp strap between the hopper support panel and closing wheels. It may be necessary to decrease closing wheel arm spring tension.

(RU113g)



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.

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

LENGTH OF ROW IN FEET AND INCHES		
Fraction Of Acre	Row Width	
	15"	30"
$\frac{1}{1000}$	34' 10"	17' 5"

**NOTE: When planting with closing wheels raised and planting depth set shallow, seeds may bounce or roll affecting seed spacing accuracy.**

- Count seeds in measured distance.
- Multiply the number of seeds placed in  $\frac{1}{1000}$  of an acre by 1000. This will give you total population.

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

26 Seeds Counted	x	1000	=	26,000 Seeds Per Acre
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Seed count can be affected by drive ratio between drive wheel and seed meter, tire pressure and/or seed meter malfunction.

If seed check shows the average distance between seeds in inches is significantly different than the 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 in transmission for proper selection.

Second, check for seed meter performance. For example, if spacing between kernels of corn at the transmission setting being used is 8" and a gap of 16" is observed, a finger has lost its seed. If two seeds are found within a short distance of each other, the finger has metered two seeds instead of one.

See "Finger Pickup Seed Meter Troubleshooting" and/or "Brush-Type Seed Meter Troubleshooting" in the Maintenance section of this manual.

### Determining Pounds Per Acre (Brush-Type Seed Meter)

To determine pounds per acre:

Seeds Per Acre On Chart	÷	Seeds Per Pound From Seed Tag On Bag	=	Pounds Per Acre
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To determine bushels per acre:

Pounds Per Acre	÷	Unit Weight Of Seed	=	Bushels Per Acre
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The unit weight of:

- 1 Bushel Soybeans = 60 Pounds
- 1 Bushel Milo/Grain Sorghum = 56 Pounds
- 1 Bushel Cotton = 32 Pounds

If seeds per pound information is not available the following is an average:

- 2,600 seeds per pound for medium size soybeans
- 15,000 seeds per pound for medium size milo/grain sorghum
- 4,500 seeds per pound for medium size cotton

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

# MACHINE OPERATION

## CHECKING GRANULAR CHEMICAL APPLICATION RATE

Many things can affect the rate of delivery of granular chemicals such as temperature, humidity, speed, ground conditions, flowability of different material or any obstruction in the meter.



**WARNING: Agricultural chemicals can be dangerous if not selected and handled with care. Always read and follow directions supplied by the chemical manufacturer.**

A field check is important to determine correct application rates.

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To check, fill insecticide and/or herbicide hoppers. Attach a calibrated vial to each granular chemical meter. Lower the planter and proceed as follows.

**NOTE: It is not necessary for seed meter clutch to be engaged during test. Disengage clutch to avoid dropping seed.**

Drive 1320 feet at planting speed. Weigh the chemical in ounces that was caught in one vial. Multiply that amount by the factor shown to determine pounds per acre.

POUNDS PER ACRE FACTOR FOR GIVEN ROW WIDTH	
Row Width	Factor
30"	0.83

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

**NOTE: It is important to check calibration of all rows.**

### Metering Gate

Use the metering gate setting for distributing insecticide or herbicide as a starting point. The charts are based on a 5 miles per hour planting speed. For speeds faster than 5 miles per hour a higher gate setting should be used. For speeds slower than 5 miles per hour a lower gate setting should be used.

# MACHINE OPERATION

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# MACHINE OPERATION

## GENERAL PLANTING RATE INFORMATION

These planting rate charts are applicable to KINZE® Model 3650 Twin-Line® Planters. See “Tire Pressure” for recommended tire pressures.

**IMPORTANT: The sprocket combinations listed in these charts are best for average conditions. Changes in sprocket combinations may be required to obtain desired planting population. TO PREVENT PLANTING MISCALCULATIONS, MAKE FIELD CHECKS TO ENSURE YOU ARE PLANTING AT THE DESIRED RATE.**

The size and shape of seed may affect the planting rate.

### Finger Pickup Corn Meter

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

### Finger Pickup Oil Sunflower Meter

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

**NOTE: Seed additives, added to the seed in the hopper, may adversely affect performance of the finger pickup seed meter and accelerate wear. See “Finger Pickup Seed Meter” in the Row Unit Operation section.**

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

Rate charts are given in seeds per acre as well as seed spacing in inches rounded to the nearest tenth of an inch. Because of the large range in seed size, pounds per acre is not a suggested method of selecting transmission settings. When using smaller size seeds it may appear the pounds per acre is below what was expected and vice versa on large seed. To determine pounds per acre, use the formula given in “Determining Pounds Per Acre (Brush-Type Seed Meter)” in the “Checking Seed Population” section of this manual.

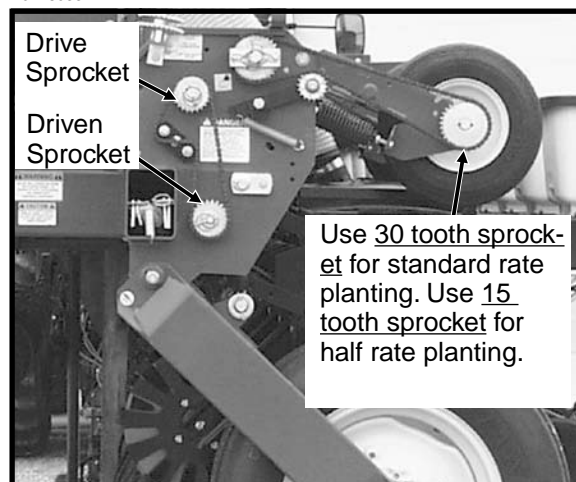
**NOTE: Due to a multitude of variables, seed spacing can be adversely affected at speeds above 5.5 MPH.**

Seed population per acre with 15" rows will be double the rate for 30" rows. See pages 6-100 and 6-101.

In some cases when planting 15" row soybeans or other crops, a **Half Rate (2 To 1) Drive Reduction Package** may be required to obtain the desired population and seed spacing.

**NOTE: Use of the Half Rate (2 To 1) Drive Reduction Package will reduce the planter transmission speed. The seeding rate will be approximately 50% of the chart reading when using the Half Rate (2 To 1) Drive Reduction Package. Planting speed can affect actual seeding rate. Make a field check and adjust setting in the transmissions as needed to obtain the desired seed drop.**

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# MACHINE OPERATION

Z202

## PLANTING RATES FOR FINGER PICKUP SEED METERS (STANDARD DRIVE) APPROXIMATE SEEDS/ACRE FOR 30" ROW WIDTH

30" Rows	Transmission Sprockets		Recommended Speed Range (MPH)	Average Seed Spacing In Inches
	Drive	Driven		
16,186	17	28	4 to 6	12.9
16,785	17	27	4 to 6	12.5
17,431	17	26	4 to 6	12.0
18,090	19	28	4 to 6	11.6
18,128	17	25	4 to 6	11.5
18,760	19	27	4 to 6	11.1
18,883	17	24	4 to 6	11.1
19,481	19	26	4 to 6	10.7
19,704	17	23	4 to 6	10.6
20,261	19	25	4 to 6	10.3
21,104	19	24	4 to 6	9.9
21,898	23	28	4 to 6	9.5
22,022	19	23	4 to 6	9.5
22,709	23	27	4 to 6	9.2
22,850	24	28	4 to 6	9.2
23,583	23	26	4 to 6	8.9
23,697	24	27	4 to 6	8.8
23,802	25	28	4 to 6	8.8
23,853	17	19	4 to 6	8.8
24,526	23	25	4 to 6	8.5
24,608	24	26	4 to 6	8.5
24,684	25	27	4 to 6	8.5
24,755	26	28	4 to 6	8.4
25,548	23	24	4 to 6	8.2
25,592	24	25	4 to 6	8.2
25,633	25	26	4 to 6	8.2
25,671	26	27	4 to 6	8.1
25,707	27	28	4 to 6	8.1
26,659	23	23	4 to 6	7.8
27,646	28	27	4 to 6	7.6
27,684	27	26	4 to 6	7.6
27,770	25	24	4 to 6	7.5
27,818	24	23	4 to 6	7.5
28,709	28	26	4 to 6	7.3
28,791	27	25	4 to 6	7.3
28,977	25	23	4 to 6	7.2
29,795	19	17	4 to 6	7.0
29,858	28	25	4 to 6	7.0
29,991	27	24	4 to 6	7.0
30,136	26	23	4 to 6	7.0
31,102	28	24	3 to 6	6.7
31,295	27	23	3 to 6	6.7
32,271	23	19	3 to 5.5	6.5
32,454	28	23	3 to 5.5	6.5
33,674	24	19	3 to 5.5	6.2
35,077	25	19	3 to 5	6.0
36,068	23	17	3 to 5	5.8
36,480	26	19	3 to 5	5.7
37,636	24	17	3 to 5	5.6
37,883	27	19	3 to 5	5.5
39,204	25	17	3 to 4.5	5.3
39,287	28	19	3 to 4.5	5.3
40,772	26	17	3 to 4.5	5.1
42,340	27	17	3 to 4.5	4.9
43,908	28	17	3 to 4.5	4.8

**NOTE:** See "General Planting Rate Information" and "Checking Seed Population" pages for additional information. Always check seed population in the field to ensure planting rates are correct.



# MACHINE OPERATION

Z214/RH

## PLANTING RATES FOR BRUSH-TYPE SEED METERS (STANDARD DRIVE)

### APPROXIMATE SEEDS/ACRE FOR 30" ROW WIDTH

Transmission Sprockets		60 Cell Soybean Or High-Rate Milo/ Grain Sorghum	Average Seed Spacing In Inches	48 Cell Specialty Soybean Or High-Rate Acid-Delinted Cotton	Average Seed Spacing In Inches	Speed Range (MPH)
Drive	Driven	30" Rows		30" Rows		
17	28	80,928	2.6	64,742	3.2	2 to 8
17	27	83,926	2.5	67,141	3.1	2 to 8
17	26	87,154	2.4	69,723	3.0	2 to 8
19	28	90,449	2.3	72,359	2.9	2 to 8
19	27	93,799	2.2	75,039	2.8	2 to 8
17	24	94,416	2.2	75,533	2.8	2 to 8
17	23	98,521	2.1	78,817	2.7	2 to 8
19	25	101,303	2.1	81,042	2.6	2 to 8
19	24	105,524	2.0	84,419	2.5	2 to 8
23	28	109,491	1.9	87,593	2.4	2 to 8
19	23	110,112	1.9	88,090	2.4	2 to 8
24	28	114,252	1.8	91,402	2.3	2 to 8
24	27	118,483	1.8	94,786	2.2	2 to 8
17	19	119,263	1.8	95,410	2.2	2 to 8
24	26	123,040	1.7	98,432	2.1	2 to 8
26	28	123,773	1.7	99,018	2.1	2 to 8
24	25	127,962	1.6	102,370	2.0	2 to 8
26	27	128,357	1.6	102,686	2.0	2 to 8
23	23	133,294	1.6	106,635	2.0	2 to 8
27	26	138,420	1.5	110,736	1.9	2 to 8
24	23	139,089	1.5	111,271	1.9	2 to 8
25	23	144,884	1.4	115,907	1.8	2 to 8
19	17	148,975	1.4	119,180	1.8	2 to 8
27	24	149,955	1.4	119,964	1.7	2 to 8
28	24	155,509	1.3	124,407	1.7	2 to 8
23	19	161,355	1.3	129,084	1.6	2 to 8
28	23	162,270	1.3	129,816	1.6	2 to 8
24	19	168,371	1.2	134,696	1.6	2 to 8
25	19	175,386	1.2	140,309	1.5	2 to 8
23	17	180,338	1.2	144,270	1.5	2 to 8
26	19	182,402	1.1	145,922	1.4	2 to 7
27	19	189,417	1.1	151,534	1.4	2 to 7
28	19	196,433	1.1	157,146	1.3	2 to 7
26	17	203,861	1.0	163,089	1.3	2 to 7
27	17	211,702	0.9	169,362	1.2	2 to 7
28	17	219,542	0.9	175,634	1.2	2 to 7

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

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

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

# MACHINE OPERATION

Z214/RH

## PLANTING RATES FOR BRUSH-TYPE SEED METERS (STANDARD DRIVE)

### APPROXIMATE SEEDS/ACRE FOR 15" ROW WIDTH

Transmission Sprockets		60 Cell Soybean Or High-Rate Milo/ Grain Sorghum	Average Seed Spacing In Inches	48 Cell Specialty Soybean Or High-Rate Acid-Delinted Cotton	Average Seed Spacing In Inches	Speed Range (MPH)
Drive	Driven	15" Rows		15" Rows		
17	28	161,856	2.6	129,484	3.2	2 to 8
17	27	167,852	2.5	134,282	3.1	2 to 8
17	26	174,308	2.4	139,446	3.0	2 to 8
19	28	180,898	2.3	144,718	2.9	2 to 8
19	27	187,598	2.2	150,078	2.8	2 to 8
17	24	188,832	2.2	151,066	2.8	2 to 8
17	23	197,042	2.1	157,634	2.7	2 to 8
19	25	202,606	2.1	162,084	2.6	2 to 8
19	24	211,048	2.0	168,838	2.5	2 to 8
23	28	218,982	1.9	175,186	2.4	2 to 8
19	23	220,224	1.9	176,180	2.4	2 to 8
24	28	228,504	1.8	182,804	2.3	2 to 8
24	27	236,966	1.8	189,572	2.2	2 to 8
17	19	238,526	1.8	190,820	2.2	2 to 8
24	26	246,080	1.7	196,864	2.1	2 to 8
26	28	247,546	1.7	198,036	2.1	2 to 8
24	25	255,924	1.6	204,740	2.0	2 to 8
26	27	256,714	1.6	205,372	2.0	2 to 8
23	23	266,588	1.6	213,270	2.0	2 to 8
27	26	276,840	1.5	221,472	1.9	2 to 8
24	23	278,178	1.5	222,542	1.9	2 to 8
25	23	289,768	1.4	231,814	1.8	2 to 8
19	17	297,950	1.4	238,360	1.8	2 to 8
27	24	299,910	1.4	239,928	1.7	2 to 8
28	24	311,018	1.3	248,814	1.7	2 to 8
23	19	322,710	1.3	258,168	1.6	2 to 8
28	23	324,540	1.3	259,632	1.6	2 to 8
24	19	336,742	1.2	269,392	1.6	2 to 8
25	19	350,772	1.2	280,618	1.5	2 to 8
23	17	360,676	1.2	288,540	1.5	2 to 8
26	19	364,804	1.1	291,844	1.4	2 to 7
27	19	378,834	1.1	303,068	1.4	2 to 7
28	19	392,866	1.1	314,292	1.3	2 to 7
26	17	407,722	1.0	326,178	1.3	2 to 7
27	17	423,404	0.9	338,724	1.2	2 to 7
28	17	439,084	0.9	351,268	1.2	2 to 7

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

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

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

# MACHINE OPERATION

Z214/RH

## PLANTING RATES FOR BRUSH-TYPE SEED METERS (STANDARD DRIVE)

### APPROXIMATE SEEDS/ACRE FOR 30" ROW WIDTH

Transmission Sprockets		36 Cell Acid-Delinted Large Cotton	Average Seed Spacing In	30 Cell Milo/Grain Sorghum Or Acid-Delinted Cotton	Average Seed Spacing In	Speed Range (MPH)
Drive	Driven	30" Rows	Inches	30" Rows	Inches	
17	28	48,557	4.3	40,464	5.2	2 to 8
17	27	50,356	4.2	41,963	5.0	2 to 8
17	26	52,292	4.0	43,577	4.8	2 to 8
19	28	54,269	3.9	45,225	4.6	2 to 8
19	27	56,279	3.7	46,900	4.5	2 to 8
17	24	56,650	3.7	47,208	4.4	2 to 8
17	23	59,113	3.5	49,261	4.2	2 to 8
19	25	60,782	3.4	50,652	4.1	2 to 8
19	24	63,314	3.3	52,762	4.0	2 to 8
23	28	65,695	3.2	54,746	3.8	2 to 8
19	23	66,067	3.2	55,056	3.8	2 to 8
24	28	68,551	3.0	57,126	3.7	2 to 8
24	27	71,090	2.9	59,242	3.5	2 to 8
17	19	71,558	2.9	59,631	3.5	2 to 8
24	26	73,824	2.8	61,520	3.4	2 to 8
26	28	74,264	2.8	61,886	3.4	2 to 8
24	25	76,772	2.7	63,981	3.3	2 to 8
26	27	77,014	2.7	64,178	3.3	2 to 8
23	23	79,976	2.6	66,647	3.1	2 to 8
27	26	83,052	2.5	69,210	3.0	2 to 8
24	23	83,453	2.5	69,544	3.0	2 to 8
25	23	86,930	2.4	72,442	2.9	2 to 8
19	17	89,385	2.3	74,488	2.8	2 to 8
27	24	89,973	2.3	74,978	2.8	2 to 8
28	24	93,305	2.2	77,755	2.7	2 to 8
23	19	96,813	2.2	80,678	2.6	2 to 8
28	23	97,362	2.1	81,135	2.6	2 to 8
24	19	101,023	2.1	84,185	2.5	2 to 8
25	19	105,232	2.0	87,693	2.4	2 to 8
23	17	108,233	1.9	90,169	2.3	2 to 8
26	19	109,441	1.9	91,201	2.3	2 to 7
27	19	113,650	1.8	94,709	2.2	2 to 7
28	19	117,860	1.8	98,216	2.1	2 to 7
26	17	122,317	1.7	101,930	2.1	2 to 7
27	17	127,021	1.6	105,851	2.0	2 to 7
28	17	131,725	1.6	109,771	1.9	2 to 7

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

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

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

# MACHINE OPERATION

Z202

## PLANTING RATES FOR BRUSH-TYPE SEED METERS (STANDARD DRIVE) APPROXIMATE HILLS/ACRE FOR 30" ROW WIDTH

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

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

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

Transmission Sprockets		NUMBER OF HILLS PER ACRE 12 Cell Hill-Drop Cotton, Acid-Delinted 30" Rows	Average Hill Spacing In Inches	Speed Range (MPH)
Drive	Drive			
17	28	16,186	12.9	2 to 8
17	27	16,785	12.5	2 to 8
17	26	17,431	12.0	2 to 8
19	28	18,090	11.6	2 to 8
19	27	18,760	11.1	2 to 8
17	24	18,883	11.1	2 to 8
17	23	19,704	10.6	2 to 8
19	25	20,261	10.3	2 to 8
19	24	21,105	9.9	2 to 8
23	28	21,898	9.5	2 to 8
19	23	22,022	9.5	2 to 8
24	28	22,850	9.2	2 to 8
24	27	23,697	8.8	2 to 8
17	19	23,853	8.8	2 to 8
24	26	24,608	8.5	2 to 8
26	28	24,755	8.4	2 to 8
24	25	25,592	8.2	2 to 8
26	27	25,671	8.1	2 to 8
23	23	26,659	7.8	2 to 8
27	26	27,684	7.6	2 to 8
24	23	27,818	7.5	2 to 8
25	23	28,977	7.2	2 to 8
19	17	29,795	7.0	2 to 8
27	24	29,991	7.0	2 to 8
28	24	31,102	6.7	2 to 8
23	19	32,271	6.5	2 to 8
28	23	32,454	6.5	2 to 8
24	19	33,674	6.2	2 to 8
25	19	35,077	6.0	2 to 8
23	17	36,068	5.8	2 to 8
26	19	36,480	5.7	2 to 7
27	19	37,883	5.5	2 to 7
28	19	39,287	5.3	2 to 7
26	17	40,772	5.1	2 to 7
27	17	42,340	4.9	2 to 7
28	17	43,908	4.8	2 to 7

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

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

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

# MACHINE OPERATION

## DRY INSECTICIDE APPLICATION RATES APPROXIMATE POUNDS/ACRE AT 5 MPH FOR 30" ROW WIDTH

Meter Setting	30" Rows
<b>CLAY GRANULES</b>	
10	4.9
11	5.4
12	6.1
13	6.9
14	7.7
15	8.5
16	9.6
17	10.7
18	11.4
19	13.1
20	14.2
21	15.5
22	16.4
23	17.2
24	18.8
25	20.9
26	23.0
27	24.1
28	25.4
29	27.8
30	29.6
<b>SAND GRANULES</b>	
5	2.9
6	4.9
7	5.3
8	6.3
9	7.8
10	8.9
11	10.2
12	11.2
13	12.6
14	14.1
15	15.5
16	17.5
17	19.4
18	21.8
19	24.3
20	25.7
21	27.6
22	29.6
23	32.0
24	34.4
25	36.9

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

Your actual rate must be checked in the field with the actual insecticide that you are using and at the speed and population at which you will be planting. See "Checking Granular Chemical Application Rate" page for additional information.



**WARNING:** Agricultural chemicals can be dangerous if not selected and handled with care. Always read and follow directions supplied by the chemical manufacturer.

# MACHINE OPERATION

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## DRY HERBICIDE APPLICATION RATES

APPROXIMATE POUNDS/ACRE AT 5 MPH FOR 30" ROW WIDTH

### CLAY GRANULES

Meter Setting	30" Rows
10	4.7
11	5.2
12	5.8
13	6.5
14	7.3
15	8.2
16	9.0
17	9.9
18	10.7
19	11.6
20	12.6
21	13.6
22	14.6
23	15.7
24	17.0
25	18.1
26	19.4
27	20.9
28	22.6
29	24.3
30	26.7

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

Your actual rate must be checked in the field with the actual herbicide that you are using and at the speed and population at which you will be planting. See "Checking Granular Chemical Application Rate" page for additional information.



**WARNING:** Agricultural chemicals can be dangerous if not selected and handled with care. Always read and follow directions supplied by the chemical manufacturer.

# MACHINE OPERATION

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## LIQUID FERTILIZER PISTON PUMP APPLICATION RATES GALLONS PER ACRE

Applies To Model LM-4405 And NGP-7055 Pumps With 18 Tooth Sprocket

Pump Setting	1	2	3	4	5	6	7	8	9	10
12 Row 30"	3.7	7.4	11.1	14.8	18.5	22.1	25.8	29.5	33.2	36.9
16 Row 30"	2.8	5.5	8.3	11.1	13.9	16.6	19.4	22.2	24.9	27.7

The chart above is for planters equipped with 7.60" x 15" drive wheel, based on 91" forward travel per wheel revolution, 48 tooth drive sprocket and 18 tooth driven sprocket on metering pump. Chart is based on average wheel slippage and liquid viscosities.

Measure and weigh one gallon of actual fertilizer solution to determine exact application rate. This chart was calculated based on a solution weighing ten pounds per gallon.

**NOTE:** Fertilizer application rates can vary from the above chart. To prevent application miscalculations, make field checks to be sure you are applying fertilizer to all rows at the desired rate.

**NOTE:** Flow to all rows should be checked periodically. If one or more lines are plugged, the desired rate will be delivered to the remaining rows keeping total application rate at desired rate.

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

Remove the hose from one of the fertilizer openers and insert it into a collection container which has been secured to the planter frame. Engage the fertilizer attachment and drive forward for 174'. Measure the fluid ounces caught in the container and multiply that amount by 100. Divide that amount by 128. The result will be the gallons of fertilizer delivered per acre when planting in 30" rows. Rinse the collection container and repeat test on other rows if necessary.

# MACHINE OPERATION

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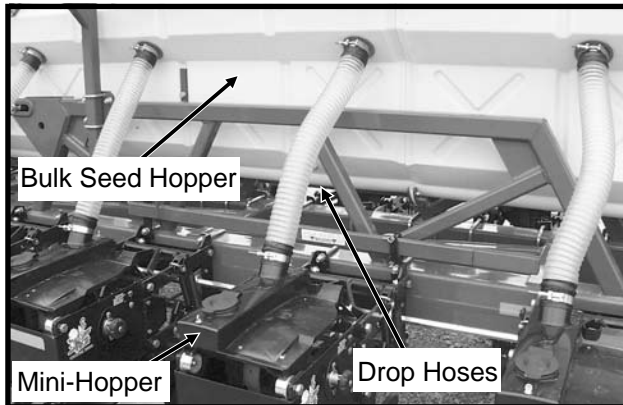


# SDS SEED DELIVERY SYSTEM OPERATION

## INTRODUCTION

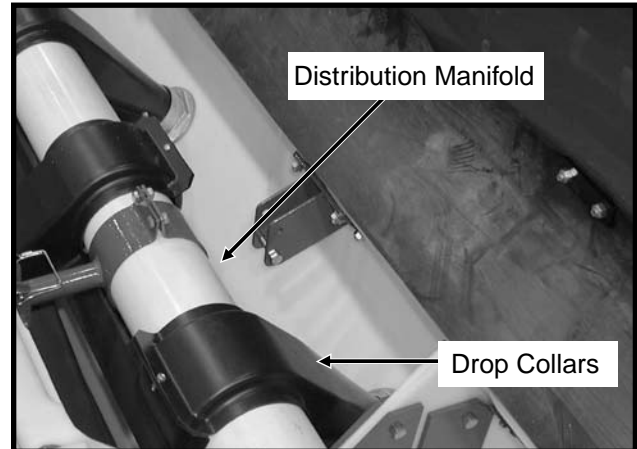
The seed delivery system consists of two bulk seed hopper assemblies with drop hoses to direct seed to row unit mini-hoppers. Each bulk seed hopper feeds half of the planter. The mini-hoppers replace the standard 1.9 bushel seed hoppers. The row units and seed meters are the same as used on other KINZE® planters.

D0718030305



The seed delivery system is designed to evenly distribute seed to each row to assure all seed meters are provided a ready supply of seed. Seed placed in the bulk seed hopper is delivered to the outboard end of the hopper by a slow speed, bristle-tipped auger. An elevator system with 36 rubber-coated, ¼ cup capacity buckets delivers the seed to the brush auger located in the distribution manifold at the top of the bulk seed hopper. Drop collars attached to the distribution manifold direct seed through a drop hose to a mini-hopper on each row unit. At initial fill, as one mini-hopper and drop hose is filled to capacity the auger inside the distribution manifold carries seed on to the next row until all active row outlets are filled to capacity.

D021102218



**NOTE:** After all row outlets are filled to capacity, seed will continue to be evenly distributed to all rows until the bulk seed hopper is empty. When the bulk seed hopper is empty or the auger system is shut off, all drop hoses will “plant out” equally and all rows should run out of seed at approximately the same time.

## CAPACITIES

Hopper capacity is approximately 55 bushels for the 12 Row 30" planter and 85 bushels for the 16 Row 30" planter.

Each drop hose/mini-hopper combination has a capacity of 16 pounds of seed (approximately ¼ bushel). Example: At 16 pounds per row, a 50 pound bag of soybeans will fill 3 rows. It will take 5 to 6 bags (3 per bulk seed hopper) of seed to charge all rows on a 16 row planter or 11 to 12 bags (6 per bulk seed hopper) to charge all rows on an Interplant® Package equipped 16 row planter (31 or 32 rows).

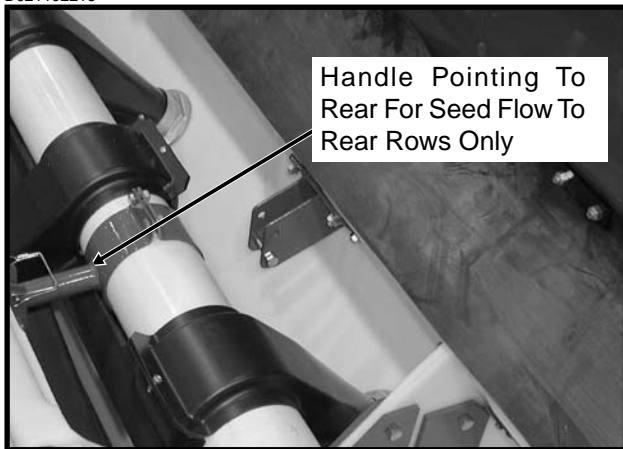
The capacity of the mini-hopper and seed meter only is 8.75 pounds (approximately 5 quarts) of seed. When planting seed variety plots, it may be desirable to fill mini-hoppers using the access hole provided on each mini-hopper.

# SDS SEED DELIVERY SYSTEM OPERATION

## SEED DISTRIBUTION MANIFOLD

A handle and lock pin located inside each bulk seed hopper allows the seed distribution manifold to be rotated to direct seed to front and rear rows or to rear rows only. When the handle is pointing to the rear, seed flows to the rear rows only as the manifold is rotated to close off seed from the forward pointing drop collars. When the handle is pointing toward the front, seed flows to the front and rear rows equally as all outlets are enabled.

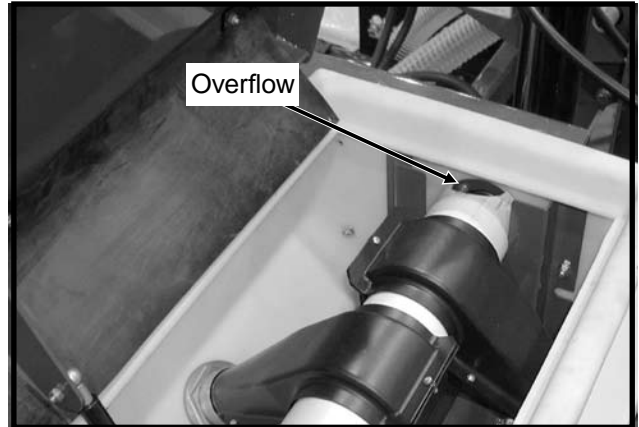
D021102218



## OVERFLOW

An overflow is provided so seed not used to charge drop hoses/mini-hoppers, can return to the seed reservoir to be picked up by the horizontal floor auger and recirculated through the system.

D021102222

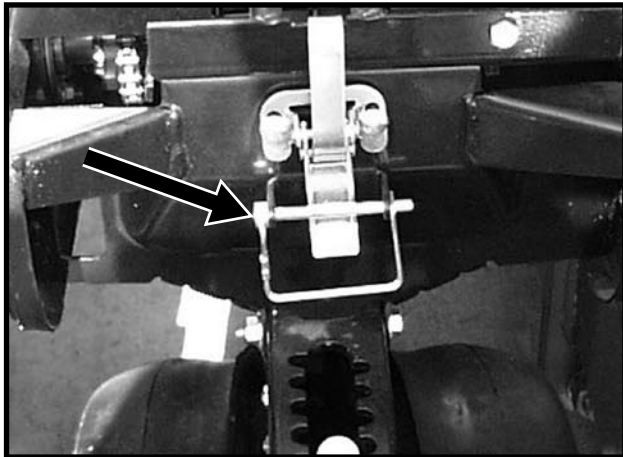


# SDS SEED DELIVERY SYSTEM OPERATION

## MINI-HOPPER LATCH

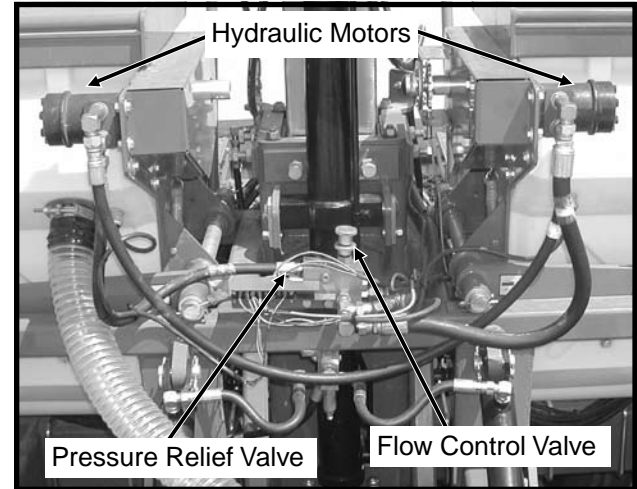
Due to the pull exerted by the drop hose on the mini-hopper as the row unit moves up and down, a pin is provided to secure the mini-hopper latch.

D041801101



## HYDRAULIC SYSTEM

D071603219



The hydraulic system includes two centrally-mounted hydraulic motors plumbed in series, hydraulic hoses and fittings, a pressure relief valve, a check valve and an adjustable flow control valve. The flow control allows auger speed to be varied to meet seed demand.

The hydraulic system operates from one selective control valve. A separate (third) remote SCV is required on the tractor, in addition to the two remotes required to operate the lift and row marker/rotate functions.

If the tractor has a motor return circuit, its use will allow the system to work with reduced back pressure and reduced heat generation, but is not required for the proper operation of the system.

If the tractor has cab mounted flow controls, open the needle type flow control on the planter and use the flow control valve on the tractor to adjust auger speed. Adjust accordingly. See "Auger Speed Adjustment" and the tractor's operators manual.

The hydraulic motor circuit will use 1.5 to 4.0 gallons per minute (GPM) at 700 PSI to operate a fully loaded seed delivery system.

An in-line check valve in the return line prevents reverse operation of the auger system.

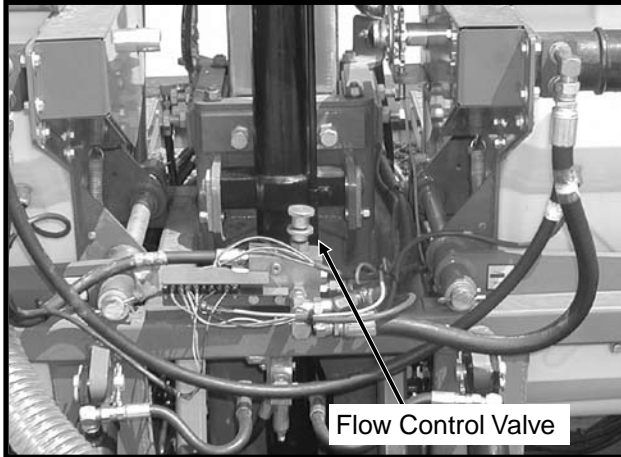
**IMPORTANT: The proper auger speed when planting is critical. Excess auger speed will cause more seed than necessary to be drawn into the system which may cause wear on mechanical components and potential damage to the seed.**

# SDS SEED DELIVERY SYSTEM OPERATION

## AUGER SPEED ADJUSTMENT

Auger speed should be adjusted to deliver seed to the row units at a rate equal to the planting rate. This keeps all the drop hoses, mini-hoppers and seed meters filled equally but will not cause seed to be recirculated through the system excessively.

D071603219



SDS auger speed should be controlled using the tractor's flow control (SCV). Set the flow control valve, on the SDS valve block located on the front center frame of the planter, at full flow. To adjust auger speed when the tractor does not have a responsive flow control valve, loosen the jam nut on the flow control valve on the SDS valve block and turn the control clockwise, or IN, to decrease auger speed and counterclockwise, or OUT, to increase auger speed. When adjusting auger speed using the flow control valve on the SDS valve block, check to be sure adequate oil is supplied to all planter functions.

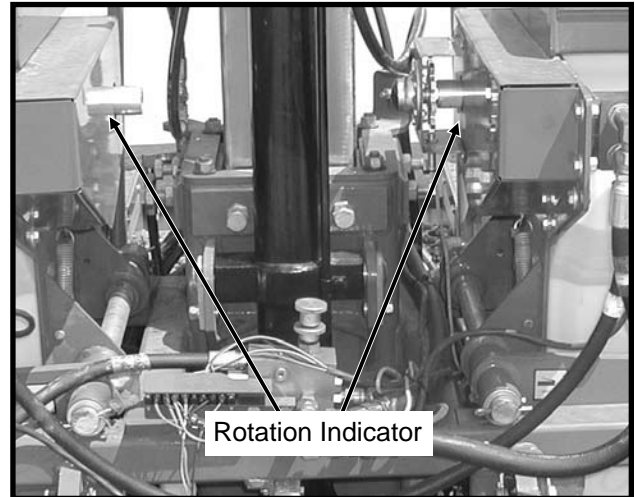
**IMPORTANT:** The proper auger speed when planting is critical. Excess auger speed will cause more seed than necessary to be drawn into the system which may cause wear on mechanical components or increase the potential for damage to the seed.

When set correctly, the system will keep all hoppers and hoses full with minimum overflow out of the top auger. The fine tuning of the auger speeds can be accomplished by slowing the auger speed until the system is starved, indicated by a center row running low on seed. Adjust auger RPM upward to keep up with planting rate.

It is suggested that the top distribution manifold auger speed be set at 20 to 25 RPM for planting seeds such as corn and 80 to 100 RPM for planting seeds such as soybeans. These speeds are approximate depending on the number of rows on the planter, and planting speed and population.

A rotation indicator is provided on the upper inboard end of each bulk seed hopper that allows the operator to monitor shaft rotation.

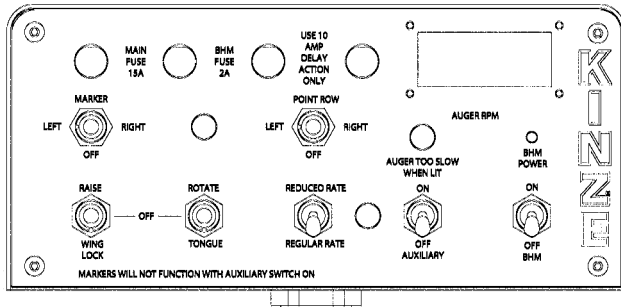
D071603219



# SDS SEED DELIVERY SYSTEM OPERATION

## BULK SEED HOPPER MONITOR

(A10189c)



The bulk seed hopper monitor system consists of a speed sensor, which is located over the rotation indicator on the L.H. bulk seed hopper; and two seed flow sensor assemblies. One sensor is installed in each bulk seed hopper in the inner-most pull row unit drop funnel.

The bulk seed hopper monitor system is powered by the tractor battery (requires 12 volts DC). If connected to the convenience outlet provided on the tractor, the bulk seed hopper monitor system powers down when the tractor is powered down. If the system is wired directly to the tractor battery, use the push button switch on the back of the console to turn the console backlight off and the toggle switch in the lower R.H. corner to power off the console.

D121802102



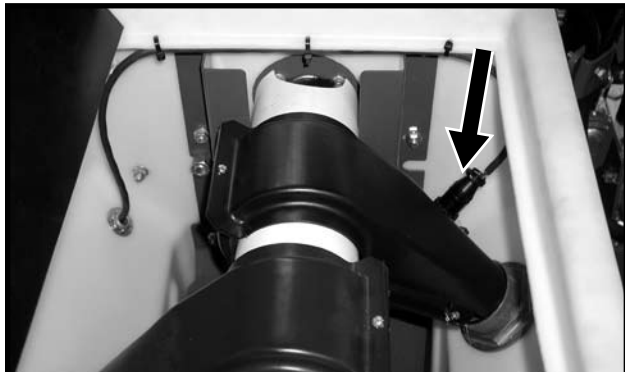
**Auger Speed Sensor**

The planter control console displays auger RPM to assist in fine tuning and monitoring the auger speed.

A warning light, incorporating a 100 second delay, turns ON when no seed flow is sensed in either drop funnel in which the sensors are installed.

See "Auger Speed Adjustment" and "Operation" for additional information.

D121802116



**Seed Flow Sensor**

# SDS SEED DELIVERY SYSTEM OPERATION

## FILLING

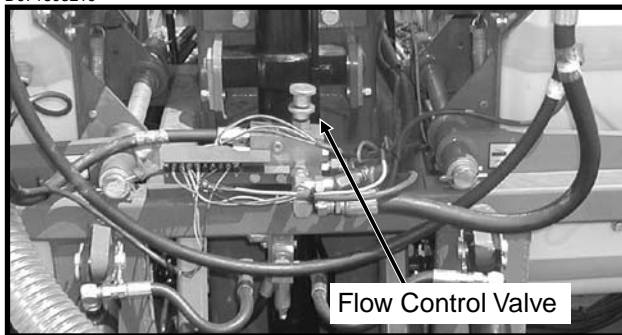
Use clean seed and make certain there are no foreign objects in the hopper. Always close hopper lids during field operation to prevent the accumulation of dust or dirt in the seed meters which will cause premature wear.

**⚠ CAUTION: Be sure all shields and covers are in place before operating system.**

When filling an empty planter, it is recommended that the auger system be operated so the drop hoses will begin to fill as seed is loaded into the bulk seed hoppers. Open the flow control valve so the top distribution manifold auger (system speed) turns at 100 to 150 RPM for faster filling. Fill the bulk seed hoppers with the desired amount of seed. When all drop hoses are filled, shut off the system and return the flow control to its planting operation setting. See “Auger Speed Adjustment”.

**NOTE: Maximum system speed is 150 RPM.**

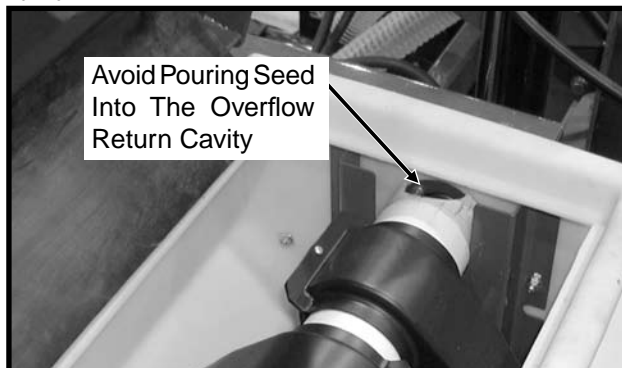
D071603219



When all drop hoses are filled, seed can be placed in any location in the bulk seed hopper and it will be distributed evenly to all rows.

When starting a new system, switching to a different type of seed (i.e. corn to soybeans) or using an unfamiliar type of seed treatment, it is very important to test the operation of the system with a small amount of seed before completely filling the bulk seed hoppers.

D021102222



**NOTE: When filling the bulk seed hoppers, avoid pouring seed into the overflow return cavity.**

## SEED LUBRICATION

The use of powdered graphite is recommended. In addition to the benefits graphite provides the seed meters, graphite will also aid seed flow through the bulk seed delivery system. If seed treatments or inoculants that add moisture to the seed are used, talc is recommended along with the graphite. Be sure to test unfamiliar combinations before completely filling the system. Apply any seed treatments, graphite and/or talc alternately in layers with the seed while filling the bulk seed hopper. The auger system will mix the seed, seed treatments, graphite and/or talc, so pre-mixing may not be as critical as with planters equipped with individual seed hoppers.

As new seed is added to the bulk seed hopper, and seed from a previous fill is still present, some mixing will occur. Generally the seed in the bulk seed hopper closest to the inboard end of the hopper will be planted first before the seed is circulated through the auger lift system. Be certain this seed is treated as it would not have had a chance to mix with the seed treatments, graphite and/or talc.

82354-1e



See “Finger Pickup Seed Meter” and “Brush-Type Seed Meter” in the Row Unit Operation section for additional information.

# SDS SEED DELIVERY SYSTEM OPERATION

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## OPERATION

After seed is distributed to all rows, adjust the speed of the auger hydraulic motors as necessary to maintain an adequate supply of seed without excessive seed movement. Elevator chain speed is preset to deliver seed at proper amount to feed the upper auger and is not adjustable. The tension on the elevator chain must be maintained correctly. See "Bulk Seed Hopper Elevator Chain Adjustment" in the Maintenance section. See "Row Unit Operation" section for operation of seed meters and various row unit optional equipment.

Seed will be delivered equally to all rows until the bulk seed hopper supplying those rows is empty. When the bulk seed hopper is empty, the drop hoses and mini-hoppers will each contain approximately 16 pounds of seed. This information can be used to determine the area that can be planted as the system empties.

**EXAMPLE:** Planting population is 32,000 seeds/acre. You are planting corn that weighs 50 pounds per 80,000 kernels. 16 pounds of seed in drop hoses/mini-hoppers will equal approximately 25,600 seeds. This will be enough seed to plant 0.8 acres per row (9.6 acres with a 12 Row 30" planter or 12.8 acres with a 16 Row 30" planter).

See "Checking Seed Population" in Machine Operation section for additional information.

The planting range can be tested by filling the entire system, turning off the auger drive and planting until the hoses/mini-hoppers are empty. Trial runs like this will give you a good idea as to how much seed to place in the bulk seed hoppers at the end of the planting season or when planning to switch varieties of seed, etc.

Many factors affect the seed demand rate including planter operating speed, population rate, number of rows, length of rows and size of seed. The suggested method when starting the season is to fill the system and then observe the seed level in the drop hoses during planting passes. Increase or decrease the auger speed as necessary to maintain a constant supply of seed to the meters.

The system is designed to run continuously and will not plug if allowed to operate without planting. If left running continuously for an extended period of time (15-20 minutes) with no planting activity, the overflow return cavity on the inboard end of the bulk seed hopper will fill with seed and seed will begin to boil out to the top of the overflow. This excess seed will fall back into the main part of the bulk seed hopper. No damage to the auger system will occur.

**NOTE:** If the system is operated for an excessive period without planting activity, and depending on how much seed is in the bulk seed hopper around the overflow return, seed falling back into the main bulk seed hopper could eventually collect under the lid, push the lid upward and overflow onto the ground.

**NOTE:** Avoid allowing the system to run continuously when no seed is being planted as seed will recirculate through the auger system multiple times and seed damage may occur.

# SDS SEED DELIVERY SYSTEM OPERATION

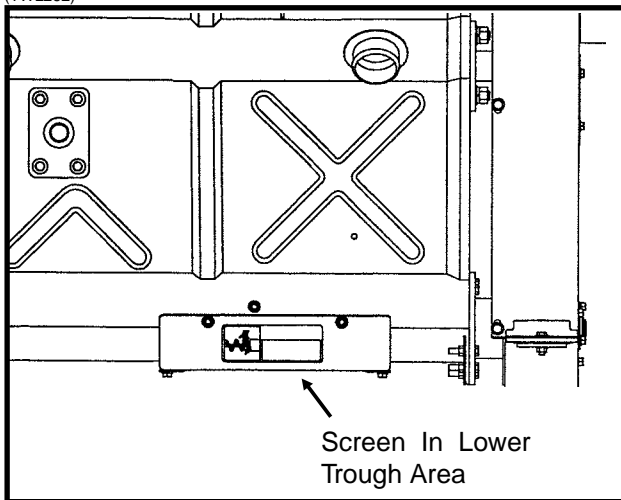
## CLEANOUT

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

When changing seed varieties or switching crops, a small amount of seed and fines will remain in the lower trough area of the bulk seed hoppers. To clean, remove the screen in the lower auger transfer area at the outer end of each bulk seed hopper. Starting at the center of the planter, hydraulically operate the auger system while using compressed air or a leaf blower to move remaining seed/fines toward the discharge hole.

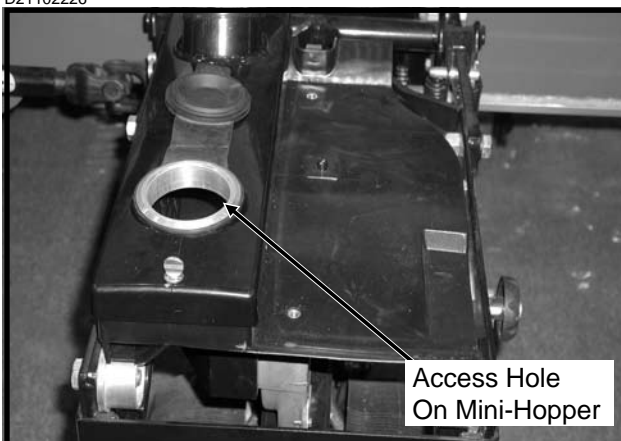
**⚠ WARNING:** Always keep hands, feet and clothing away from moving parts. Do not wear loose-fitting clothing which may catch in moving parts.

(TWL262)



A small amount of seed may be left in the mini-hoppers. Empty these by removing the mini-hoppers and mini-hopper lids and dumping or by vacuuming the remaining seed out.

D21102226



## BULK SEED HOPPER COVERS

D021102229a



**NOTE:** The bulk seed hoppers are not water tight. Store the planter inside when possible. Fitted covers, for use if the planter must be stored outside, are available from KINZE® Repair Parts. Secure covers using grommets in covers and customer-supplied rubber tarp straps as needed.



# ROW UNIT OPERATION

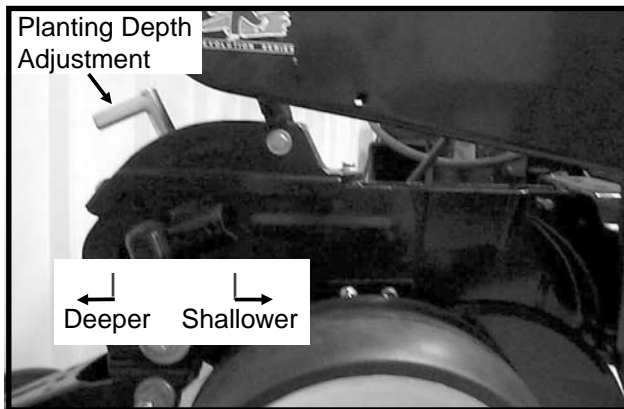
## PLANTING DEPTH

Planting depth is maintained by the row unit gauge wheels. To increase or decrease the planting depth, first raise the planter to remove weight from the wheels. Then push down on the depth adjustment handle and reposition it forward to decrease depth or rearward to increase planting depth. Adjust all units to the same setting initially. Then lower the planter and check operation and planting depth of all row units. It may be necessary to readjust some rows to obtain uniform operation. Available depth adjustment range is approximately 1/2" to 3 1/2".



**WARNING: Never work under the planter while in raised position without using safety lockup devices.**

D020705102



## "V" CLOSING WHEEL ADJUSTMENT (Rubber And Cast Iron)

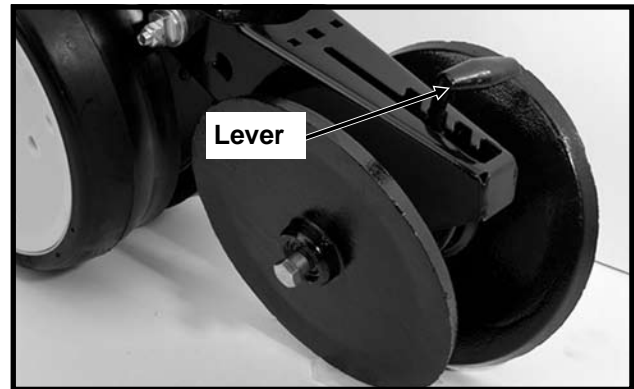


**WARNING: Raise planter and install safety lockup devices before making closing wheel adjustments.**

After adjusting planting depth, check the operation of the "V" closing wheels. The "V" closing wheels should have enough down pressure to close the seed trench and ensure good soil to seed contact. To increase spring pressure on the closing wheels, move the 5-position quick adjustable down force lever located on the top of the closing wheel arm to the rear. Moving the lever forward decreases spring tension.

Adjust all row units to a similar setting.

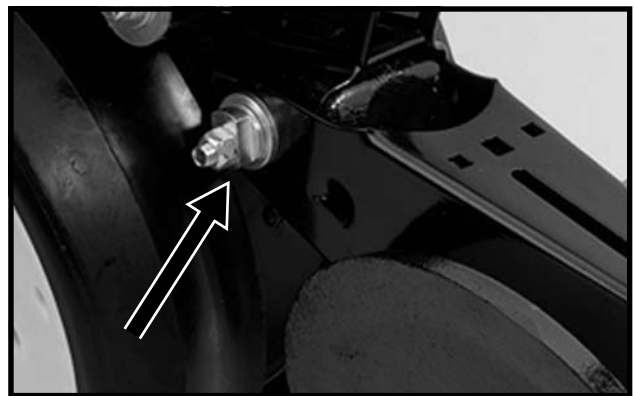
LF212299-15



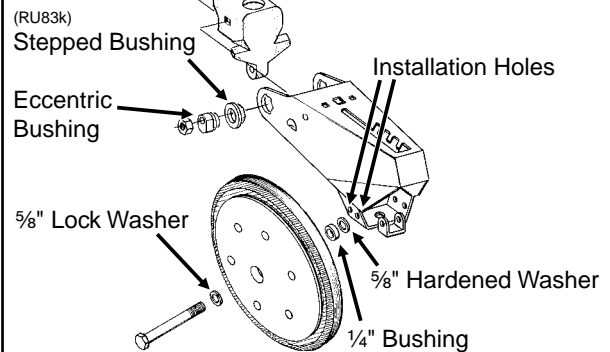
Light soil usually requires less down force at average depth (approximately 2") while heavy soil requires increased down force.

Eccentric bushings in the wheel arm stop allow for lateral adjustment of the "V" closing wheel assembly. Using a 3/4" wrench, loosen the hardware which attaches the closing wheel arm to the wheel arm stop. Using another 3/4" wrench turn the eccentric bushings until the **closing wheels are aligned with the seed trench**. Tighten hardware.

LF2122299-15



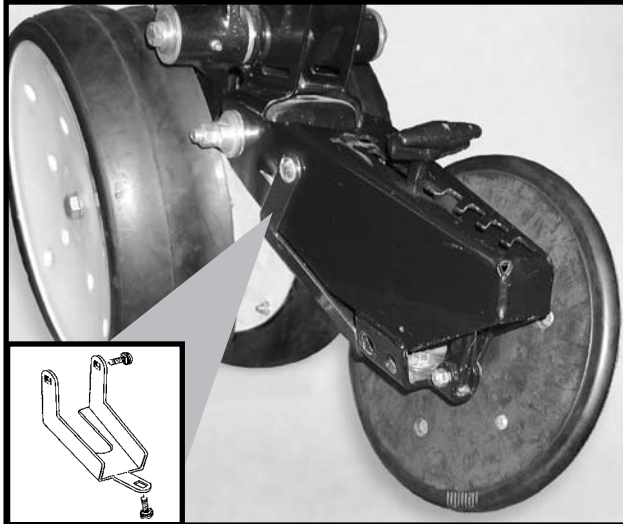
The closing wheels can be installed in two locations either "offset" (to improve residue flow) or "directly" opposite. If set "directly" opposite, the forward installation holes should be used.



# ROW UNIT OPERATION

## CLOSING WHEEL SHIELD (Rubber And Cast Iron "V" Closing Wheels)

D11090208a



Shown With Closing Wheel Removed For Visual Clarity

The optional closing wheel shield is designed to be installed onto the underside of the closing wheel arm to help prevent root balls and stalks from plugging the closing wheels.

## FINGER PICKUP SEED METER

Refer to the planting rate chart for recommended seed drive transmission sprocket combinations.

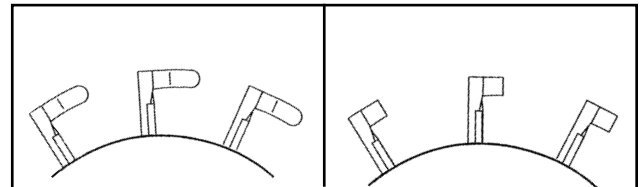
D12220401



Shown With Corn Fingers Installed

The following seed fingers are available for use with the finger pickup seed meter:

(PLTR91/PLTR92/PLTR91a)

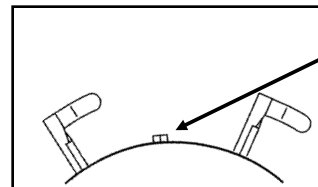


Corn Fingers

Oil Sunflower Fingers

No. 3 and/or No. 4 size oil sunflower seeds are recommended for use in the finger pickup seed meter equipped with oil sunflower fingers.

No. 1 and/or No. 2 size confectionery sunflower seeds are recommended for use in the finger pickup seed meter equipped with corn fingers.



Half Rate Blank Finger

Blank fingers are used to replace alternate fingers in the finger wheel to reduce the planting rate by half while allowing the finger wheel to maintain a minimum of 40 RPM when planting low rates.

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

# ROW UNIT OPERATION

## SDS SEED DELIVERY SYSTEM

**NOTE:** To ensure efficient operation of the finger pickup seed meter and extend the life of its components, powdered graphite should be mixed with the seed twice daily. Mix  $\frac{1}{3}$  cup per bulk hopper for 12 row machines or  $\frac{1}{2}$  cup per bulk hopper for 16 row machines. Even distribution of the graphite with the seed is critical with newer seed coatings to provide lubrication for the finger pickup mechanism. Graphite application frequency may need to be increased if using additional seed additives.

**NOTE:** See “Seed Lubrication” in SDS Seed Delivery System Operation section for additional information.



**NOTE:** Follow manufacturer's recommendations when applying and mixing other seed treatments.

## CONVENTIONAL SEED HOPPERS

**NOTE:** Powdered graphite is recommended for finger pickup seed meter lubrication to ensure efficient operation of the mechanism and to extend the life of its components. Mix one teaspoon of powdered graphite with the seed twice daily. Apply graphite on top of seed around the outer perimeter of the hopper as shown below. Graphite application frequency and volume may need to be increased if using additional seed treatments.

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

D05230121b



**NOTE:** Follow manufacturer's recommendations when applying and mixing other seed treatments. If the additive is to be applied on top of the seed, apply around the outer perimeter of the hopper as with graphite.

See “General Planting Rate Information”, “Finger Pickup Seed Meter Troubleshooting” and “Finger Pickup Seed Meter Inspection/Adjustment” for additional information.

## CLEANOUT

To maintain genetic purity, thorough seed meter cleanout is important.

To clean the seed meter, disengage the seed drive and remove the seed hopper and meter. Dump the seed from the right rear corner of the hopper into a container. Turn the seed drive several times. Invert hopper to dump seed again. Shake the hopper and listen for any remaining seed. Turn seed drive and shake and dump hopper until all seed is removed.

See “General Planting Rate Information”, “Finger Pickup Seed Meter Troubleshooting” and “Finger Pickup Seed Meter Inspection/Adjustment” for additional information.

# ROW UNIT OPERATION

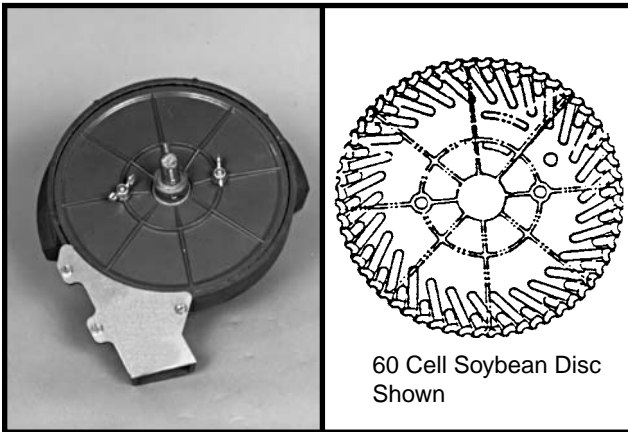
## BRUSH-TYPE SEED METER

D12220403



Shown Without Seed Disc Installed

60607-40a(PLTR13)

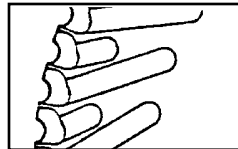


60 Cell Soybean Disc Shown

The following seed discs are available for use with the brush-type seed meter:

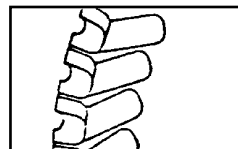
**Soybean:** 60 cells to meter seed sizes from 2200 to 4000 seeds per pound (Black color-coded).

(PLTR14)



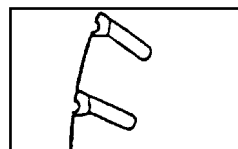
**Specialty soybean:** 48 cells to meter seed sizes from 1400 to 2200 seeds per pound (Dark blue color-coded).

(PLTR15)



**Small milo/grain sorghum:** 30 cells to meter seed sizes from 14,000 to 20,000 seeds per pound (Red color-coded).

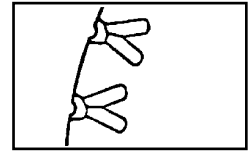
(PLTR16)



**Large milo/grain sorghum:**

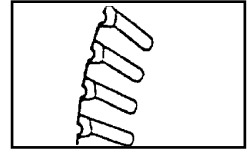
30 cells to meter seed sizes from 10,000 to 16,000 seeds per pound (Light blue color-coded).

(PLTR17)



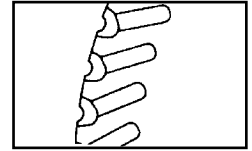
**High-rate small milo/grain sorghum:**

60 cells to meter seed sizes from 12,000 to 18,000 seeds per pound (Red color-coded). (PLTR18)



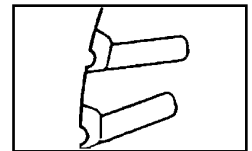
**High-rate large milo/grain sorghum:**

60 cells to meter seed sizes from 10,000 to 14,000 seeds per pound (Yellow color-coded). (PLTR19)



**Cotton, acid-delinted:** 30 cells to meter seed sizes from 4200 to 5200 seeds per pound (White color-coded).

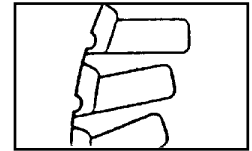
(PLTR20)



**Large cotton, acid-delinted:**

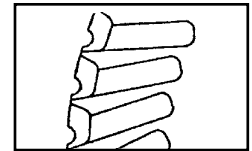
36 cells to meter seed sizes from 3800 to 4400 seeds per pound (Tan color-coded).

(PLTR21)

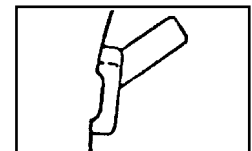


**High-rate cotton, acid-delinted:** 48 cells to meter seed sizes from 4200 to 5200 seeds per pound (Light green color-coded).

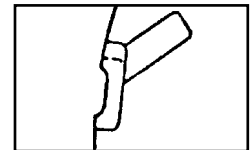
(PLTR22)



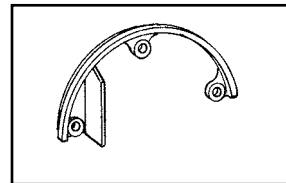
**Hill-drop cotton, acid-delinted:** 12 cells, 3 to 6 seeds/cell, to meter seed sizes from 4000 to 5200 seeds per pound (Brown color-coded). (PLTR23)



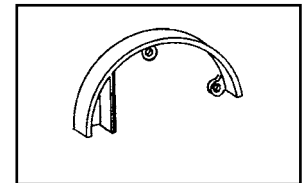
**Small hill-drop cotton, acid-delinted:** 12 cells, 3 to 6 seeds/cell, to meter seed sizes from 5000 to 6200 seeds per pound (Dark green color-coded). (PLTR23)



(RU14c)



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



Use GD8237 upper brush retainer when using milo/grain sorghum discs.

# ROW UNIT OPERATION

When installing the seed disc onto the meter hub, turn the disc counterclockwise while tightening the two wing nuts that retain the disc. The seed disc should have only slight resistance when rotated counterclockwise after wing nuts are tight.

The brush-type seed meter attaches to the mini-hopper in the same manner as the finger pickup seed meter. Secure to bottom of mini-hopper/seed hopper with two 5/16" thumbscrews. Tighten thumbscrews slightly with pliers. **DO NOT OVER TIGHTEN.**

Erratic seed spacing may result from misalignment between the drive coupler and seed meter input shaft. Misalignment may cause momentary stoppage of seed disc. Check alignment after initial installation. If adjustment is required, refer to "Meter Drive Adjustment" for correct procedure.

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

**NOTE: Foreign material, such as hulls, stems, etc., may affect seed delivery. Clean seed is required to ensure accurate seed metering from the brush-type seed meter. Seed discs should be removed daily to check for buildup of foreign material, such as hulls, in the seed meter or the brushes.**

## SDS SEED DELIVERY SYSTEM

**IMPORTANT: Use powdered graphite or talc with each fill of seed. Additional graphite or talc may be required to retard buildup of seed treatments on meter components. Frequency of monitor seed tube cleaning may be affected due to use of additional graphite or talc.**

82354-1e



## SDS SEED DELIVERY SYSTEM (Continued)

Powdered graphite should be added with the seed each time the bulk seed hopper is filled. Use 1 cup per hopper fill for 12 row planters and 1 1/2 cup per hopper fill for 16 row planters. Graphite should be added in layers as the bulk seed hoppers are filled. The use of powdered graphite will prolong the life of the brush-type seed meter components, reduce buildup of seed treatment on components in the meter and improve seed spacing.

**Talc seed lubricant** may be used in lieu of or in addition to graphite to reduce seed treatment buildup on bulk fill auger system components, seed discs and meter components and will improve meter performance. Coat seed discs and brushes with talc before installing meters. Fill each bulk hopper 1/2 full of seed, add 4 1/4 cups of talc for 12 row planters or 6 1/2 cups of talc for 16 row planters and mix thoroughly. Finish filling the bulk hoppers, add another 4 1/4 cups of talc for 12 row planters or 6 1/2 cups of talc for 16 row planters. Adjust rate of talc use as needed so all seeds are coated, while avoiding a buildup of talc in the bottom of the hopper. Humid conditions and/or small sized seeds with extra seed treatment may require additional talc to prevent seed treatment buildup on auger bristles, seed discs and/or meter brushes.

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

All seed treatment should be thoroughly mixed with the seed per the manufacturers' recommendations. Seed treatment dumped on top of the seed after the hopper is filled, and not mixed properly will cause bridging of the seed in the meter, reducing population or stopping the meter from planting. Additional graphite or talc may be required to retard buildup of seed treatments on meter components.

**NOTE: See "Seed Lubrication" in SDS Seed Delivery System Operation section for additional information.**

# ROW UNIT OPERATION

## CONVENTIONAL SEED HOPPERS

One tablespoon of **powdered graphite** should be mixed with the seed each time the hoppers are filled. Regular graphite use will prolong the life of the brush-type seed meter components, improve seed spacing, and may reduce buildup of seed treatments. Apply graphite around the outer perimeter of the hopper as shown below.

D05300104b



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

**NOTE: Additional graphite or talc may be required to retard buildup of seed treatments on meter components. Frequency of monitor seed tube cleaning may be affected due to use of additional graphite or talc.**

**Talc seed lubricant** may be used in lieu of or in addition to graphite to reduce seed treatment buildup on seed disc and meter components. Coat seed disc and brushes with talc before installing meter. Fill hopper  $\frac{1}{2}$  full of seed, add  $\frac{1}{4}$  cup of talc and **mix thoroughly**. Finish filling hopper, add another  $\frac{1}{4}$  cup of talc and **mix thoroughly**. Adjust rate of talc use as needed so all seeds are coated, while avoiding a buildup of talc in the bottom of the hopper. Humid conditions and/or small sized seeds with extra seed treatment may require as much as one cup of talc per hopper to prevent seed treatment buildup on seed disc and/or brushes.

## CONVENTIONAL SEED HOPPERS (Continued)

**NOTE: Some 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.** All seed treatment should be thoroughly mixed with the seed per the manufacturers' recommendations. Seed treatment dumped on top of the seed after the hopper is filled, and not mixed properly may cause bridging of the seed in the meter, reducing population or stopping the meter from planting.

## SEED METER CLEANOUT (Conventional Seed Hoppers)

To maintain genetic purity, thorough seed meter cleanout is important.

To clean the seed meter, disengage the seed drive and remove the seed hopper and meter. Dump the seed from the right rear corner of the hopper into a container. Disassemble seed disc by removing wing nuts. Empty the meter. Thoroughly inspect brushes in meter to ensure all seed is removed. Replace seed disc and install wing nuts.

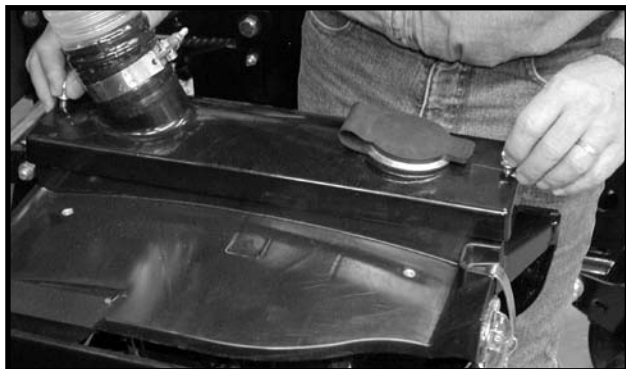
# ROW UNIT OPERATION

## SEED METER CLEANOUT (SDS Seed Delivery System)

To maintain genetic purity, thorough seed meter cleanout is important.

To clean the seed meter, remove the thumbscrews on top of the mini-hopper lid and remove the mini-hopper lid.

D051402103



D051402103



Disengage the seed drive and remove the seed mini-hopper and meter.

Dump the seed from the right rear corner of the mini-hopper into a container.

D05170201



Remove seed disc by loosening wing nuts. Empty the meter. Thoroughly inspect brushes to ensure all seed is removed. Replace seed disc and install wing nuts.

## SEED HOPPER (Conventional Seed Hoppers)

LF212199-7a



Seed hopper capacity is 1.9 bushels.

When filling the seed hopper use clean seed and make certain there are no foreign objects in the hopper. **Replace hopper lids after hoppers are filled to prevent the accumulation of dust or dirt in the seed meter which will cause premature wear.** See "Finger Pickup Seed Meter" and/or "Brush-Type Seed Meter".

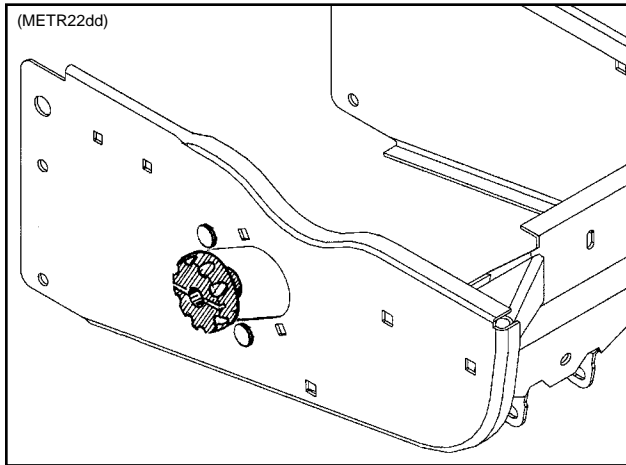
Periodically empty the hoppers completely to remove any foreign material and to ensure proper seed meter operation. To empty hopper, disengage meter drive and hopper latch and lift hopper off the hopper support. See "Seed Meter Drive Release".

# ROW UNIT OPERATION

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## SEED METER DRIVE RELEASE

The seed meter drive is equipped with a clutch release mechanism that allows the drive to be disengaged from the seed metering unit for removal of the seed hopper. Disconnecting the drive allows the operator to check granular chemical application rates without dropping seed. It also allows one or more of the rows to be disconnected when finishing fields.



To disengage the drive, turn the knob  $\frac{1}{4}$  turn counter-clockwise. To engage the drive, turn the knob  $\frac{1}{4}$  turn clockwise.



# ROW UNIT OPERATION

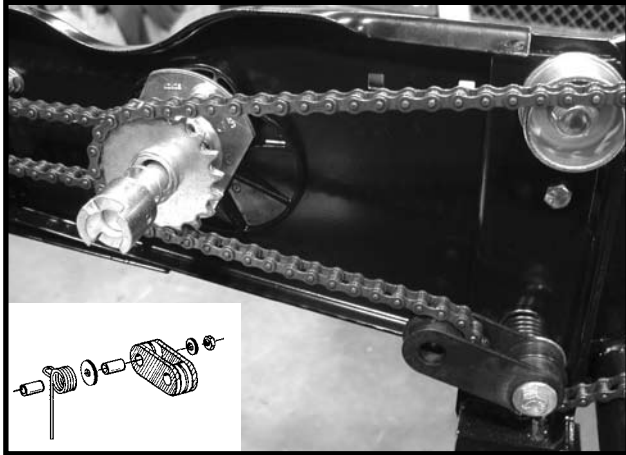
## ROW UNIT CHAIN ROUTING

For proper operation and to minimize wear, the row unit drive chains must be properly tensioned and aligned.

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

**NOTE: When idler shows signs of wear, it can be reversed for prolonged use.**

D051705103



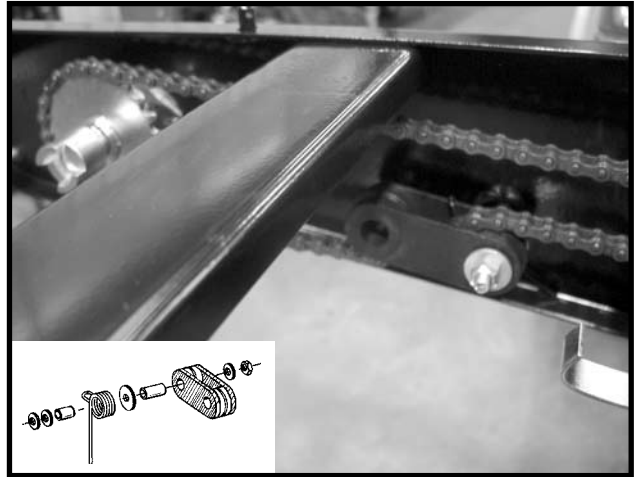
**Pull Row Unit Meter Drive**

D042905101(RU80g)



**Push Row Unit Meter Drive**

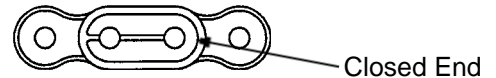
D051705102



**Row Unit Granular Chemical Drive**

**NOTE: Make sure connector link is installed with closed end oriented properly as shown below.**

(PLTR24)



**Direction Of Chain Travel** →

# ROW UNIT OPERATION

## QUICK ADJUSTABLE DOWN FORCE SPRINGS

Quick adjustable down force springs are designed to increase penetration in hard soil and keep the row unit from bouncing in rough field conditions.

Two springs per row, one on the L.H. parallel arms and one on the R.H. parallel arms, are used unless equipped with row unit mounted no till coulters. Four springs per row are used with row unit mounted no till coulters.

D06300305



Two Springs Per Row (Dual)

D07010301

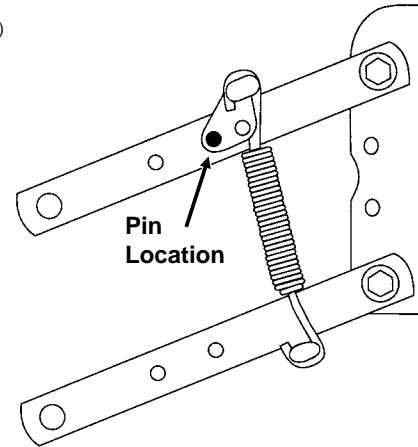


Four Springs Per Row (Quad)  
(Used Only In Conjunction With Row Unit Mounted No Till Coulters)

**NOTE:** Four springs per row are to be used with row unit mounted no till coulters only.

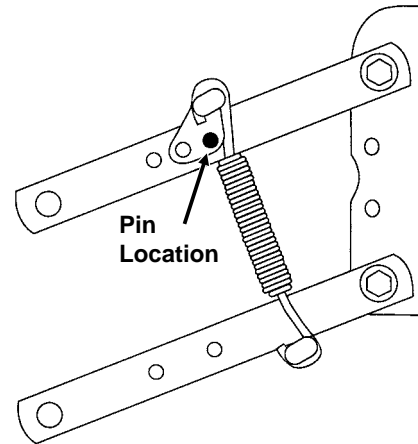
There are four positions for spring tension adjustment. Position 1 allows for minimum down pressure and position 4 for maximum down pressure.

L0096(PLTR27e)



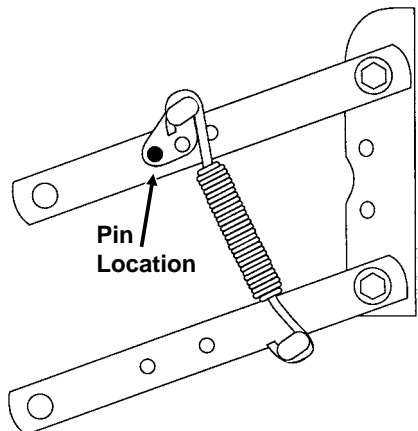
Position 1 (Minimum)

(PLTR28e)



Position 2

(PLTR29e)



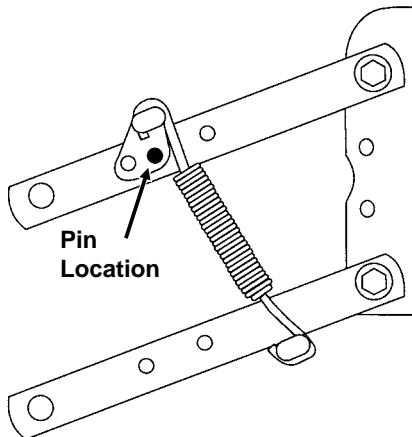
Position 3

(Continued On Following Page)

# ROW UNIT OPERATION

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(PLTR30e)



## Position 4 (Maximum)

To adjust spring tension, raise planter and remove spring mount pin at top of spring. Slide mount to desired position and install pin.

**NOTE:** It is necessary for the operator to adjust springs according to field conditions. If springs are adjusted for too much down pressure for field conditions, it is possible for the row units to lift the planter to the extent that the drive wheels do not make sufficient contact. Too much down pressure in soft field conditions can cause the row unit to run too deep.



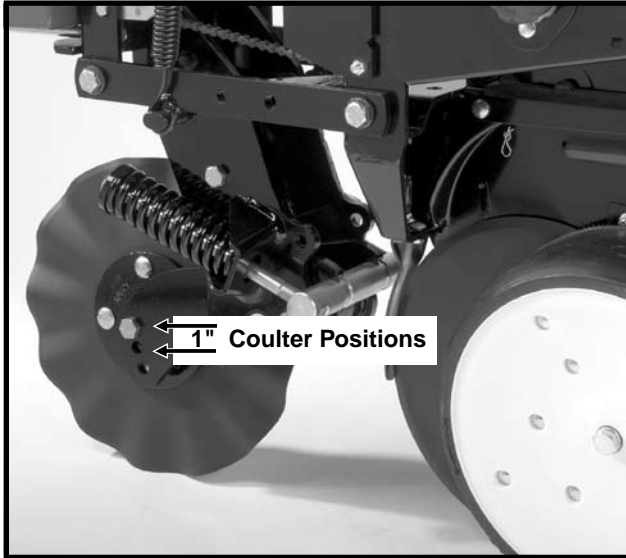
**WARNING:** Always install safety lockup devices or lower machine to the ground before working under or around the machine.

**IMPORTANT:** Springs must always be installed with open side of spring hooks toward seed hopper to prevent binding on spring mount adjustment pins.

# ROW UNIT OPERATION

## FRAME MOUNTED COULTER

LF083002101

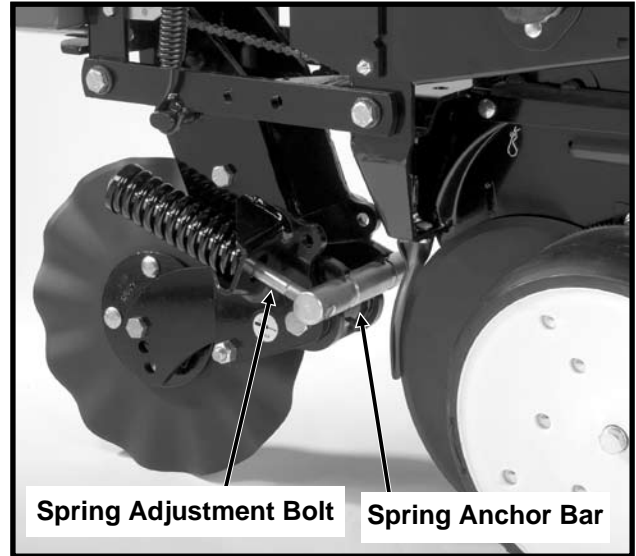


Frame mounted coulters with 1" bubbled, 1" fluted (8 flutes) or 3/4" fluted (13 flutes) blades may be used on pull row units only. (Not compatible with push row units.)

The frame mounted coulters is designed to apply necessary spring down pressure on the coulters for maximum penetration while exerting less shock load on the row unit.

The initial location of the coulters blade is in the top hole. The blade can be relocated to one of the lower two holes (1" increments) as wear occurs or if deeper operation of the blade is desired.

LF083002101



### DOWN PRESSURE ADJUSTMENT

Down force adjustment is made by tightening or loosening the two spring adjustment bolts. With the planter in raised position, turn the bolts clockwise to increase down pressure or counterclockwise to decrease down force. Set both springs the same.

Down force on the blade is shown below in lbs.

End Of Spring Adjustment Bolt Flush With Spring Anchor Bar (Shown Above)	End Of Spring Adjustment Bolt Extended 1/2" Through Spring Anchor Bar	All Threads Used (Maximum)
275 lbs.	400 lbs.	500 lbs.

**NOTE: Avoid setting down pressure higher than is required for consistent soil penetration. Excessive pressure will increase the chances of damage to coulters components when the coulters strikes an obstacle.**

# ROW UNIT OPERATION

## RESIDUE WHEELS (For Use With Frame Mounted Coulter)

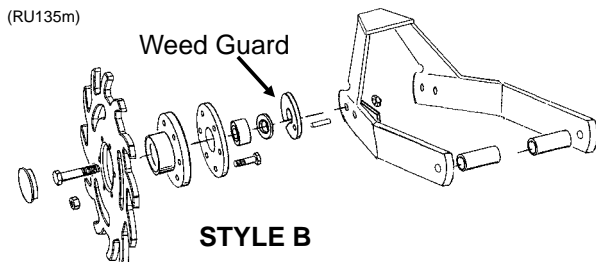
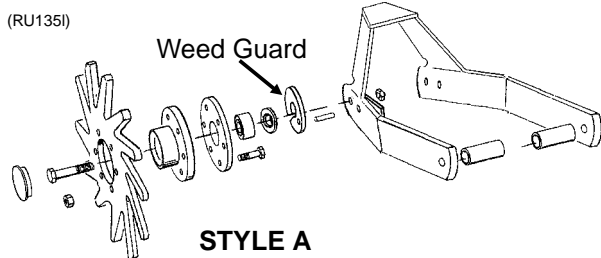
The residue wheels for use with the frame mounted coulter may be used on pull row units only.

LF083002102



**STYLE A Shown**

The residue wheels are attached to the frame mounted coulter with two cap screws and sleeves allowing the unit to free-float. A 2-position spindle bolt mounting allows the tined wheels to be mounted interlocked or staggered. Depth adjustment is made using a spring-loaded cam and pin with 11 positions in 1/4" increments. A high point on the cam allows the wheels to be locked up so they do not contact the ground. A weed guard, located on the inboard side of each wheel, aids in the prevention of weed wrap which can cause premature bearing failure.



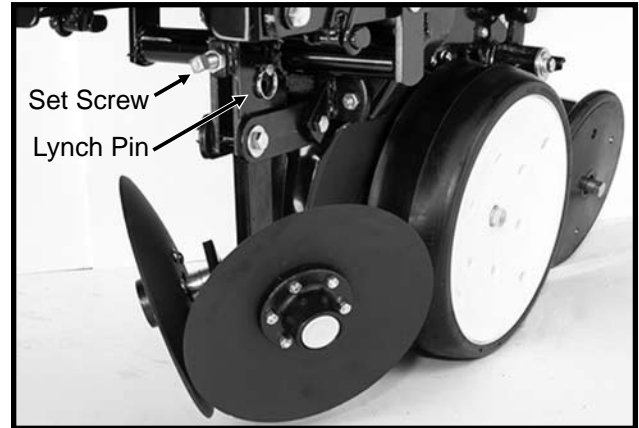
**NOTE: Opening in weed guard must point down.**

## ROW UNIT MOUNTED DISC FURROWER

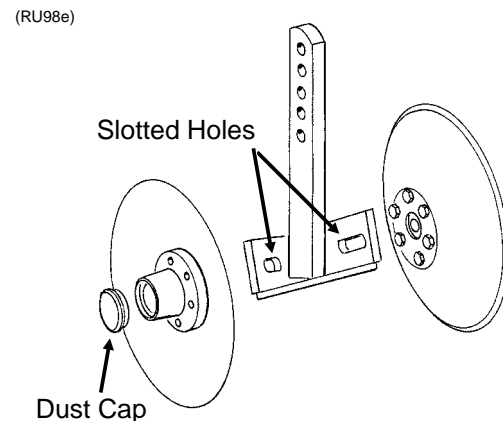
The row unit mounted disc furrower is for use on pull row units only (not compatible with Interplant® push row units). The disc furrower may be equipped with either 12" solid blades or 12" notched blades.

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

LF212299-22



Vertical adjustment in 1/3" increments is possible by removing the lynch pin which secures the vertical support arm and moving the support arm up or down as required. Reinstall lynch pin. Finer adjustment can be attained by removing the lynch pin and using the 5/8" x 2 1/4" set screw to clamp the support arm in the required position.



Slotted holes in the support arm where the blades are mounted allow fore and aft adjustment of the disc blades. Blades can be adjusted so the front edges meet or one blade can be moved to the rear and the other to the front of the slot so the cutting edge of one blade overlaps the edge of the other blade. The dust cap must be removed to make these adjustments.

# ROW UNIT OPERATION

## ROW UNIT MOUNTED RESIDUE WHEEL

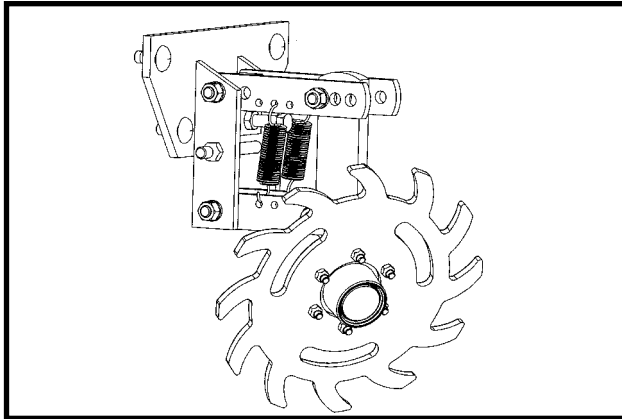
The row unit mounted residue wheel may be used on pull row units and push row units.

D101701113



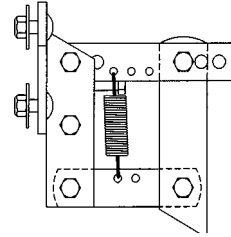
**STYLE A**

(A12685)

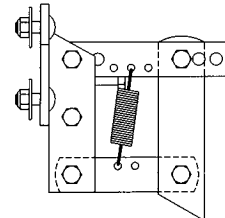


**STYLE B**

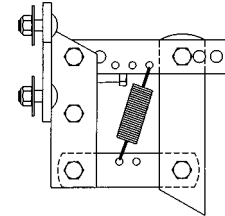
Two adjustable springs on the parallel links on each residue wheel allow for down force adjustment. Position 1 as shown at right provides minimum down pressure and position 3 maximum down pressure.



**Position 1 (Minimum)** (PLTR31a)



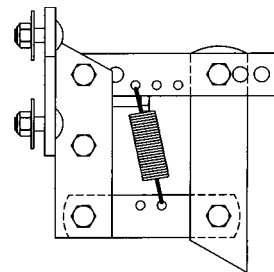
**Position 2** (PLTR32a)



**Position 3 (Maximum)** (PLTR33a)

For additional uplift or float, position springs as shown below.

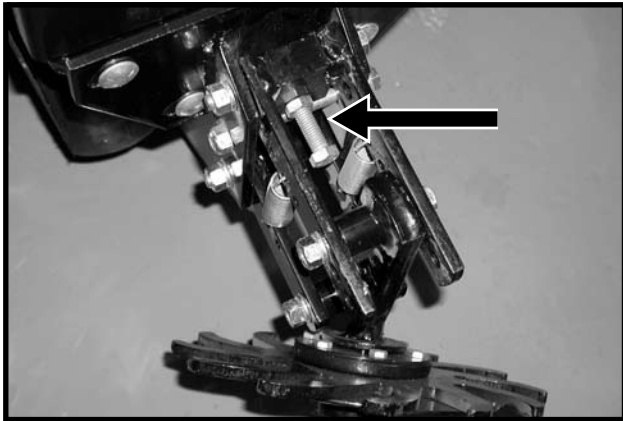
(PLTR34a)



To adjust down force springs, raise the row unit out of the ground and reposition springs as shown for the desired down pressure.

# ROW UNIT OPERATION

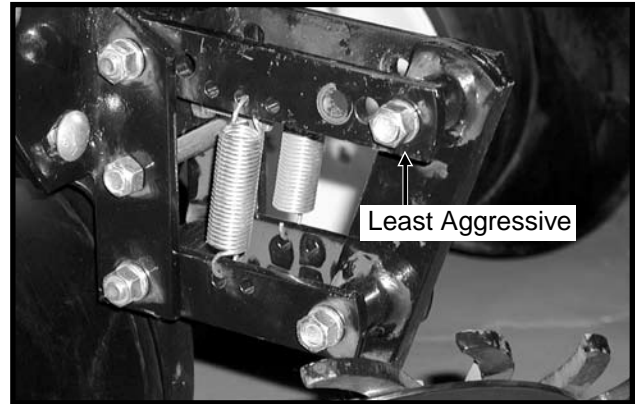
D101701112



A full threaded bolt and jam nut located on the upper link allows maximum depth to be set for loose soil conditions. Initial setting should be 1 3/4" above the depth of the row unit double disc opener.

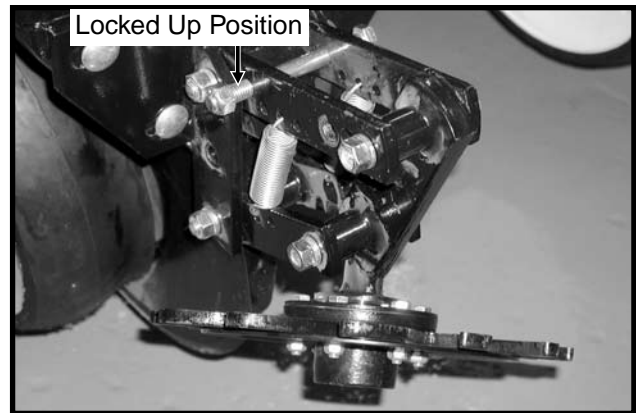
Three holes in the upper link allow for wheel angle adjustment. With the wheel mount in the most vertical position, using the rear hole in the upper link, the residue wheel is most aggressive. Moving the wheel mount to one of the forward holes reduces the aggressiveness of the wheel for use in mulch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

D101701202



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

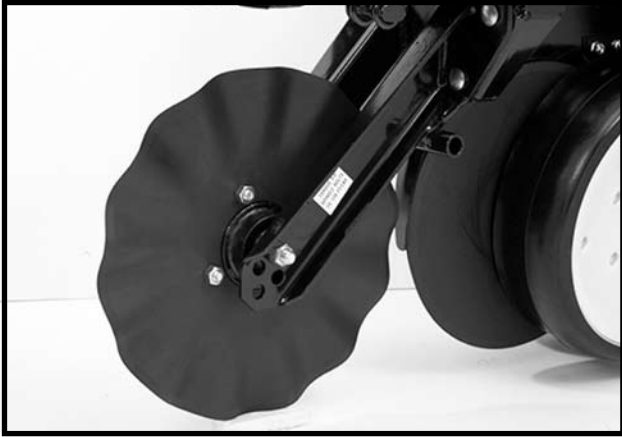
D011701203



# ROW UNIT OPERATION

## ROW UNIT MOUNTED NO TILL COULTER

LF212299-19a



**STYLE A (Two Sleeves For Installing Coulters Mounted Residue Wheels)**

D05170706a



**STYLE B (One Sleeve For Installing Coulters Mounted Residue Wheels)**

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

Four quick adjustable down force springs are required per row when using row unit mounted no till coulters. See "Quick Adjustable Down Force Springs".

For proper operation, the coulters should be aligned in relation to the row unit double disc openers. The coulters assembly can be adjusted by loosening the four attaching bolts, moving coulters arm to align and tightening the four attaching bolts.

The coulters blade can be adjusted to one of four  $\frac{1}{2}$ " incremental settings in the forked arm. Initial location of the coulters is in the top hole. As the coulters blade wears, the blade should be adjusted downward to one of the three lower settings to maintain the coulters blade at or slightly below the opener discs. In very hard soil conditions such as compacted wheel tracks, opener penetration and cutting of surface residue may be improved by adjusting the coulters to operate below the depth of the double disc opener blades.

Operating depth can be checked by setting the planter down on a level concrete floor and checking the relationship between the coulters blade and row unit opener blade. Make sure the planter is level and coulters is square with the planter frame and aligned with the row unit disc opener.

**NOTE: Torque  $\frac{5}{8}$ " spindle hardware to 120 ft. lbs.**



# ROW UNIT OPERATION

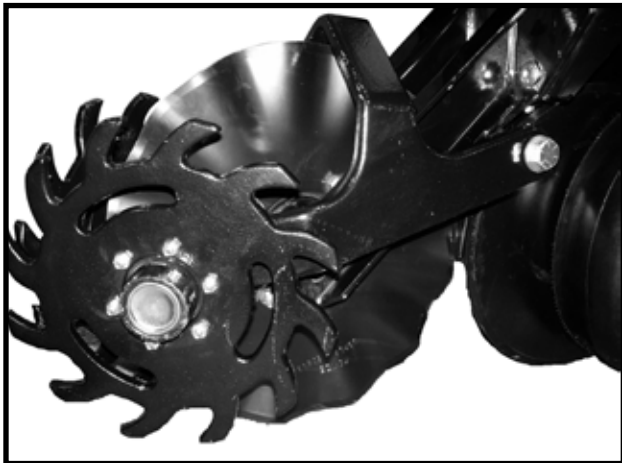
## COULTER MOUNTED RESIDUE WHEELS

LF212299-23



**STYLE A - Used With Style A Row Unit Mounted No Till Coulters**

D05170708a

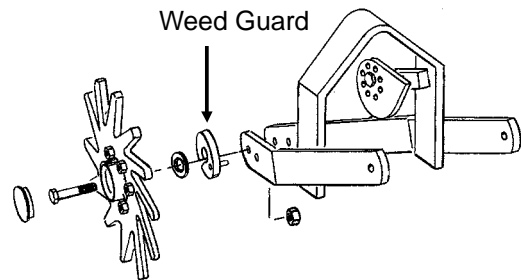


**STYLE B - Used With Style B Row Unit Mounted No Till Coulters**

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.

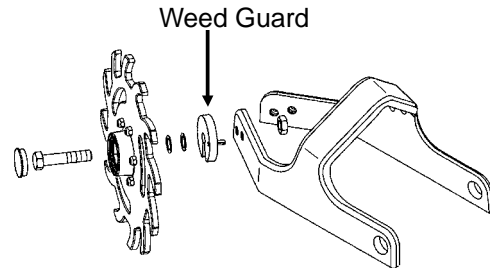
The coulters mounted residue wheels are attached to the row unit mounted no till coulters with one cap screw and sleeve allowing the unit to free-float. A 2-position spindle bolt mounting allows the tined wheels to be mounted interlocked or staggered. A lock nut on the inside of the mount locks the spindle cap screw. Depth adjustment is made using a spring-loaded cam and pin with 11 positions in 1/4" increments. A high point on the cam allows the wheels to be locked up so they do not contact the ground. A weed guard, located on the inboard side of each wheel, aids in the prevention of weed wrap which can cause premature bearing failure.

(RU104tt)



**STYLE A**

(RU153a)



**STYLE B**

**NOTE: Opening in weed guard must point down.**

# ROW UNIT OPERATION

## GRANULAR CHEMICAL HOPPER AND DRIVE

LF212299-6



The granular chemical hopper has a 1.4 cubic feet capacity.

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

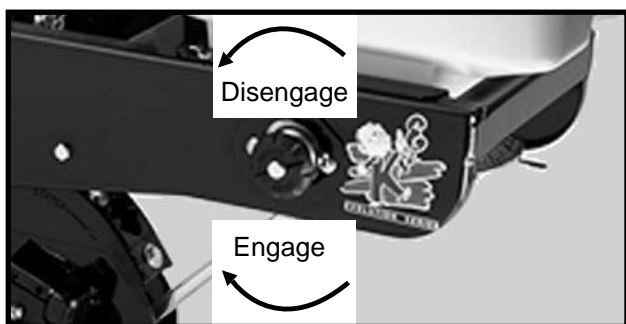
The metering gate located on the bottom of the hopper regulates the application rate. See “Dry Insecticide And Dry Herbicide Application Rate Charts” in this manual. Calibrate using the chemical manufacturers’ instructions.



**WARNING: Agricultural chemicals can be dangerous. Improper selection or use can seriously injure persons, animals, plants, soil or other property. BE SAFE: Select the right chemical for the job. Handle it with care. Follow the instructions on the container label and of the equipment manufacturer.**

The granular chemical clutch drive coupler and meter shaft can be disengaged and engaged by turning the throwout knob located at the rear of the hopper support panel. To engage the drive, turn the knob  $\frac{1}{4}$  turn clockwise. To disengage the drive, turn the knob  $\frac{1}{4}$  turn counterclockwise. Slotted holes in the hopper support panel and clutch housing allow for alignment adjustment between the clutch drive coupler and meter shaft.

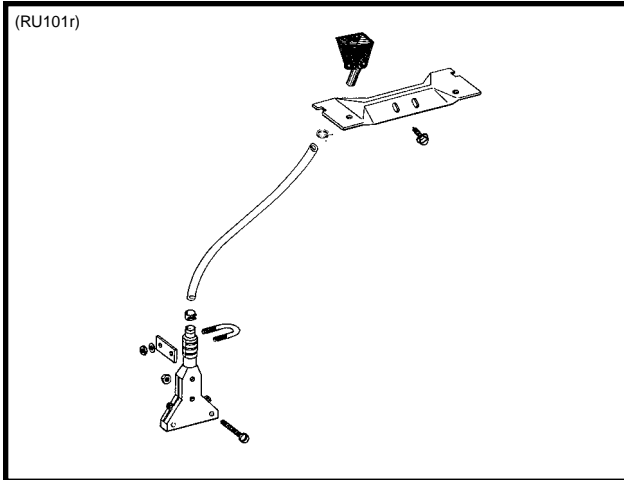
LF212299-4



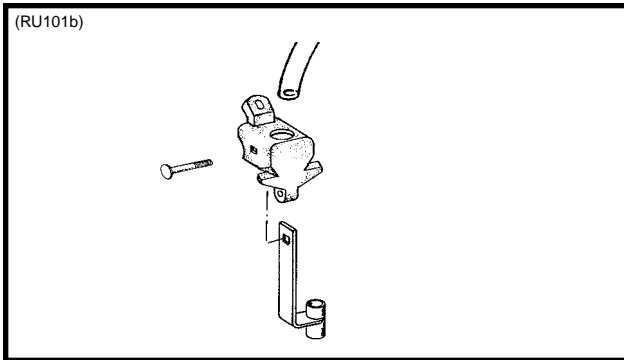
# ROW UNIT OPERATION

## GRANULAR CHEMICAL BANDING OPTIONS

Granular chemical banding options allow 4 1/2" slope-compensating banding or straight drop in-furrow placement.



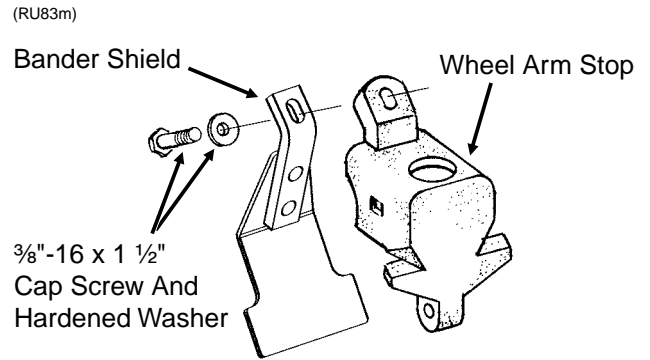
**4 1/2" Slope-Compensating Bander**



**Straight Drop In-Furrow Placement**

## GRANULAR CHEMICAL BANDER SHIELD

The optional granular chemical bander shield is designed to be installed onto the underside of the wheel arm stop to shield crop residue from lodging in the granular chemical bander.



# ROW UNIT OPERATION

## INTERPLANT® PUSH ROW UNIT LOCKUPS

Push row unit lockups are designed to allow the push row units to be locked in the raised position.



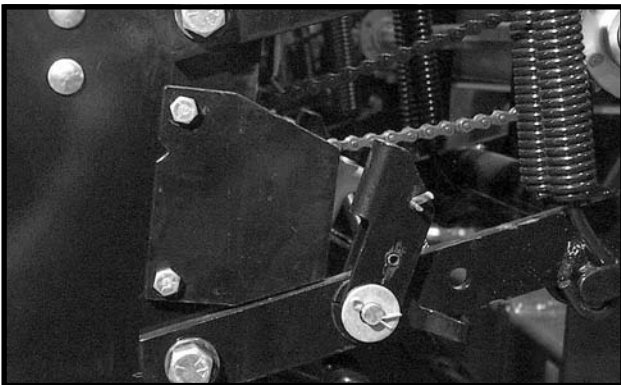
**WARNING:** Always install all safety lockup devices or lower planter to the ground before working under or around the machine.

D06099904



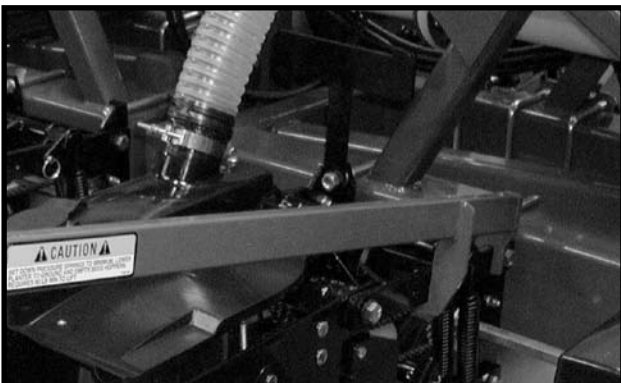
**Push Row Unit Locked In Raised Position**

D06099906



**Lockup Released For Field Operation**

D051502103a

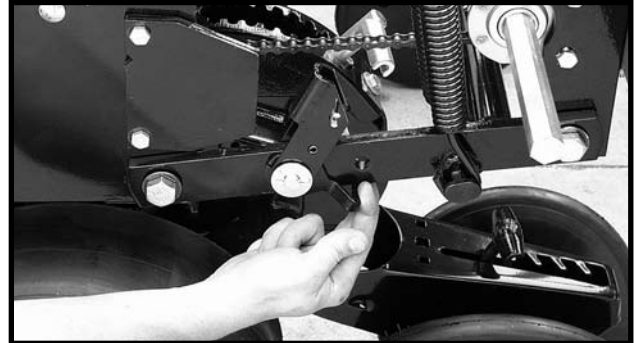


**Lift Lever Positioned To Lift Push Row Unit**

### 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.

D060499108

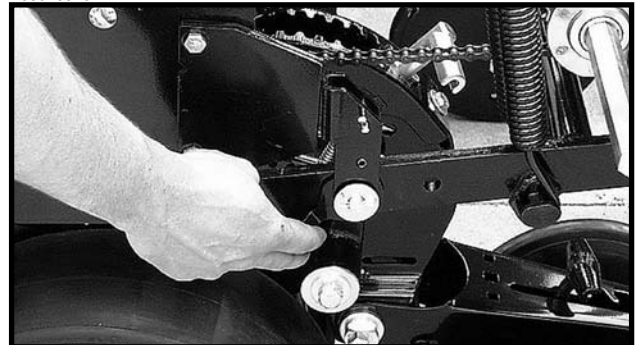


5. Using the lift lever, raise the push row unit to allow the spring loaded lockups to snap into locked position under the row unit stops.
6. Repeat Steps 4 and 5 on remaining push row units.

### To release lockups:

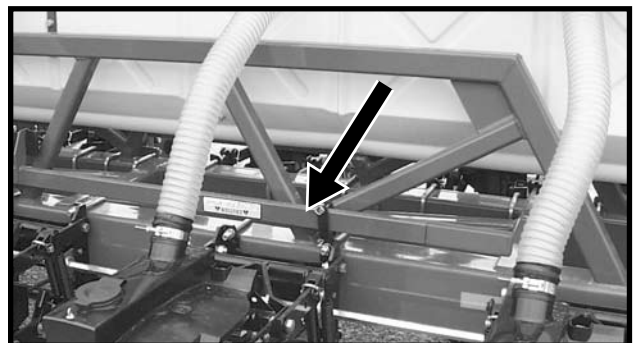
1. Lower the planter to the planting position.
2. On each push row unit lockup, flip the spring tab rearward.

D060499107



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.

D021102204



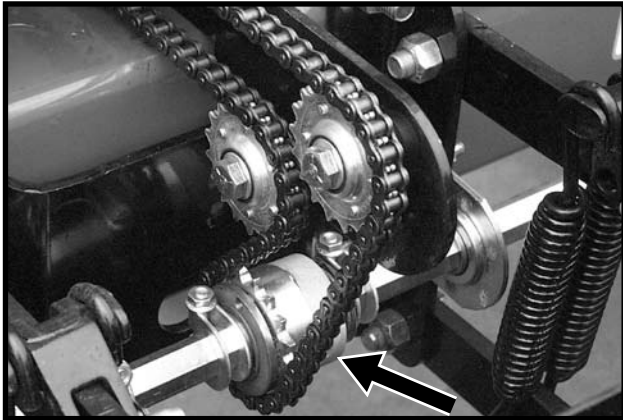
**Lift Lever In Storage Location**

# ROW UNIT OPERATION

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## INTERPLANT® PUSH ROW UNIT CLUTCH SPROCKETS

D032901171



The push row unit clutch sprockets are designed to allow the push row unit drill shafts to be disengaged when only the pull row units are being used.

To disengage the push row unit drill shaft using the clutch sprocket, rotate the knurled collar on the clutch sprocket  $\frac{1}{4}$  turn. Then using a  $\frac{7}{8}$ " wrench on the drill shaft, rock the drill shaft slightly to take pressure off of the spring loaded pins in the clutch to allow the pins to "pop" out, disengaging the drive. To engage the drive, rotate the knurled collar  $\frac{1}{4}$  turn and turn the drill shaft with a  $\frac{7}{8}$ " wrench until the drive pins engage the drive sprocket.



**WARNING:** Always install all safety lockup devices or lower planter to the ground before working under or around the machine.

# ROW UNIT OPERATION

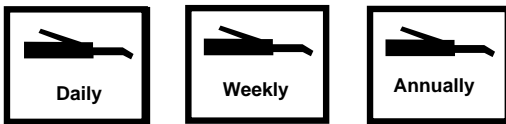
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# LUBRICATION

The following pages show the locations of all lubrication points. Proper lubrication of all moving parts will help ensure efficient operation of your KINZE® planter and prolong the life of friction producing parts.

**⚠ WARNING:** Always install safety lockup devices or lower the machine to the ground before working under or around the machine.

## LUBRICATION SYMBOLS



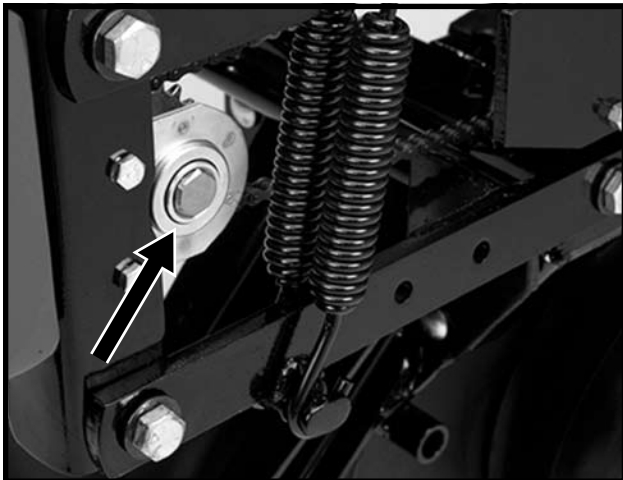
Lubricate at frequency indicated with an SAE multipurpose grease.



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

## SEALED BEARINGS

LF212199-3

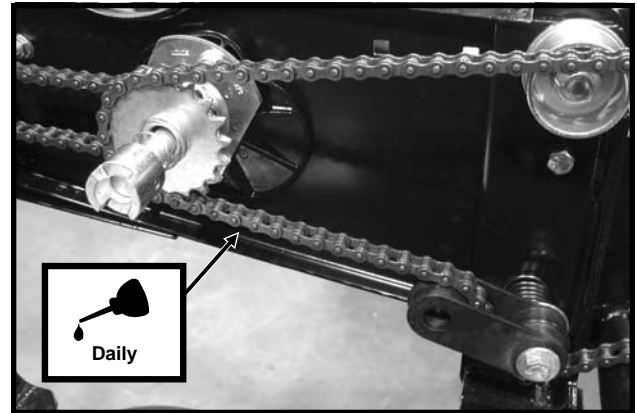


A number of sealed bearings are used on your KINZE® planter to provide trouble free operation. These are located in such areas as the drive shaft, row units and transmission bearings. Sealed bearings are lubricated for life. Due to the seals, relubrication is not practical.

## DRIVE CHAINS

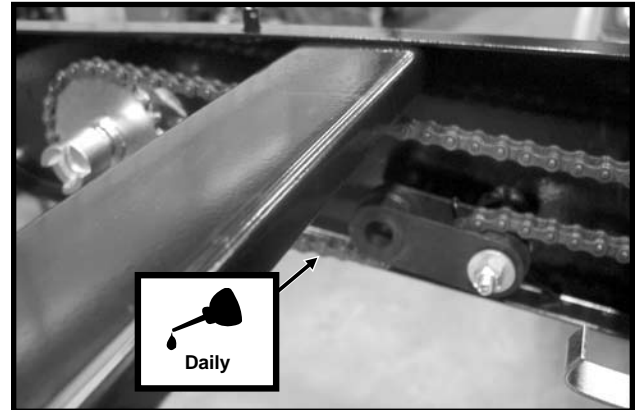
All transmission and drive chains should be lubricated daily with a high quality chain lubricant. Extreme operating conditions such as dirt, temperature or speed may require more frequent lubrication. If a chain becomes stiff, it should be removed, soaked and washed in solvent to loosen and remove dirt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

D051705103



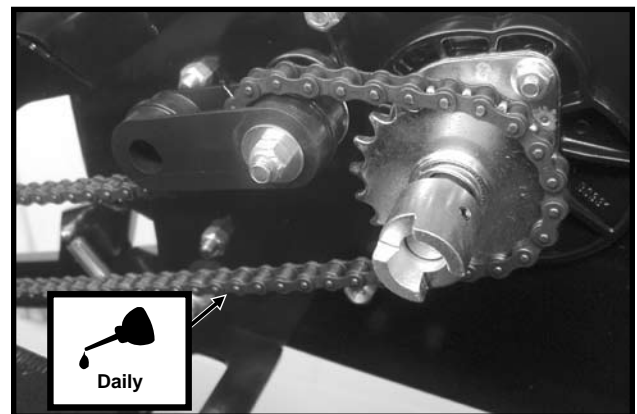
**Pull Row Unit Drive Chains**

D051705102



**Row Unit Granular Chemical Drive Chains**

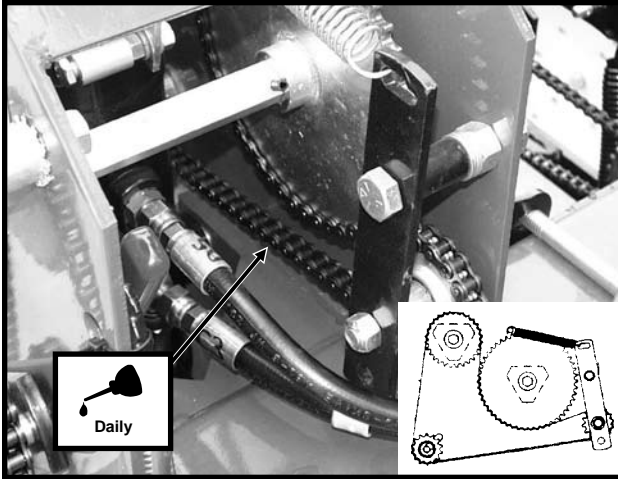
D042905101



**Push Row Unit Drive Chains**

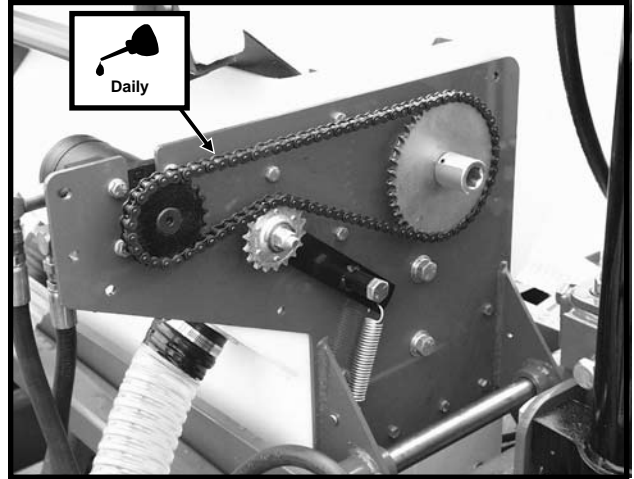
# LUBRICATION

D032901153(PLTR52a)



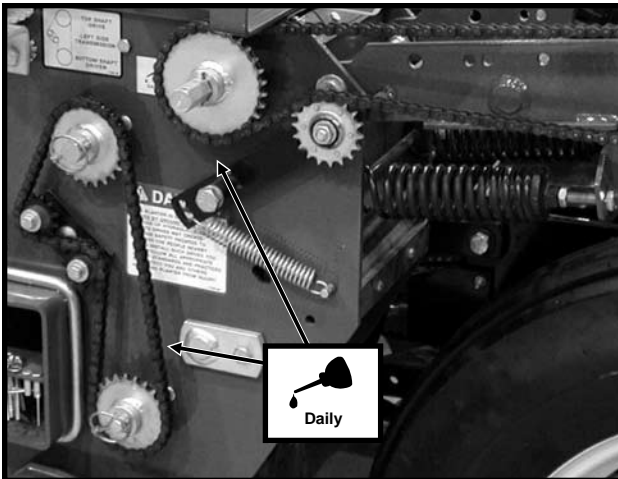
**Inner Wheel Drive Chains**

D032901150



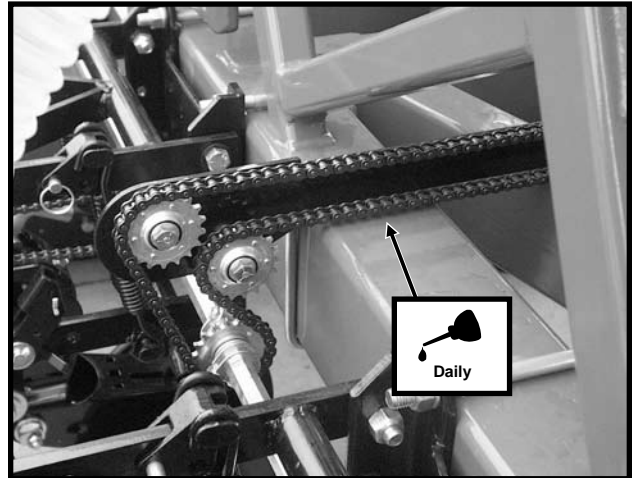
**Seed Delivery System Hydraulic Motor Drive Chains**  
**NOTE: Shown With Cover Removed - Slots in rear of covers allow chains to be oiled without removing covers.**

D021102206



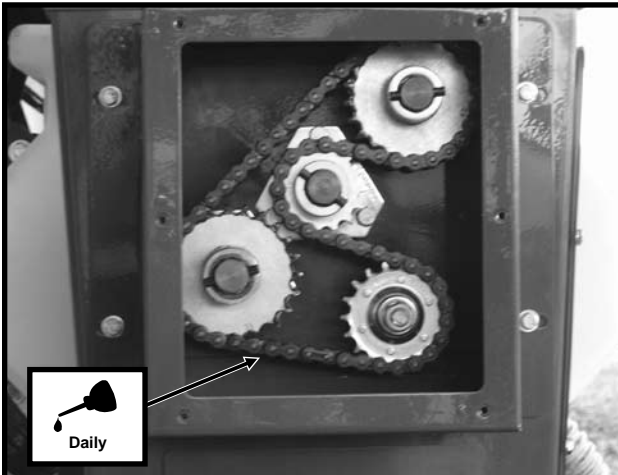
**Contact Wheel Drive Chains**  
**Planter Seed Rate Transmission Drive Chains**

D032901148



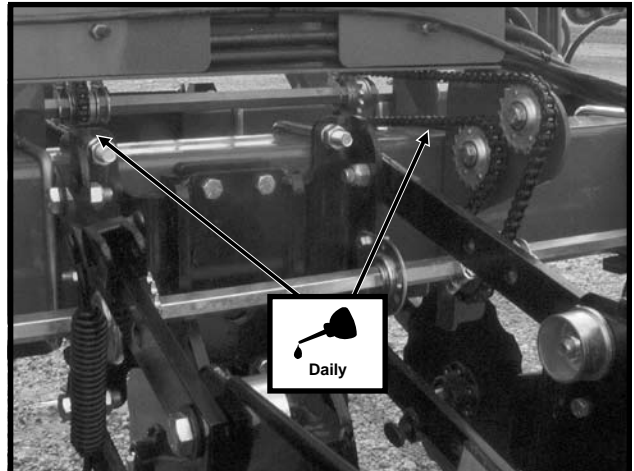
**Interplant® System Drive Chains**

D09070423



**Seed Delivery System Drive Chains**  
**NOTE: Shown With Non-Production Cover For Visual Clarity**

D070204110

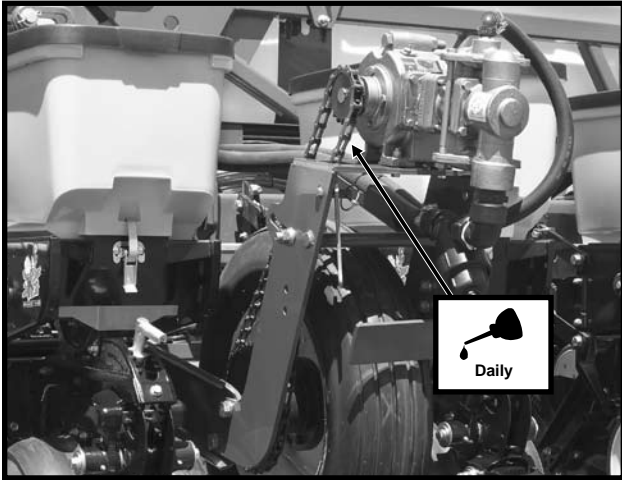


**Special Interplant® System Drive Chains**  
**(Frame Mounted Coulters)**



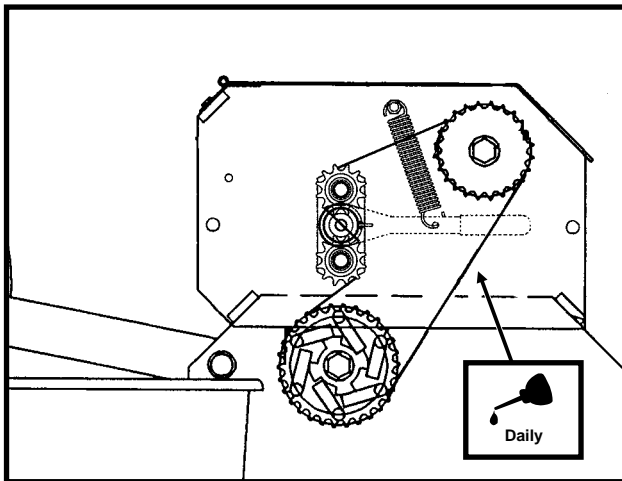
# LUBRICATION

LF092303103



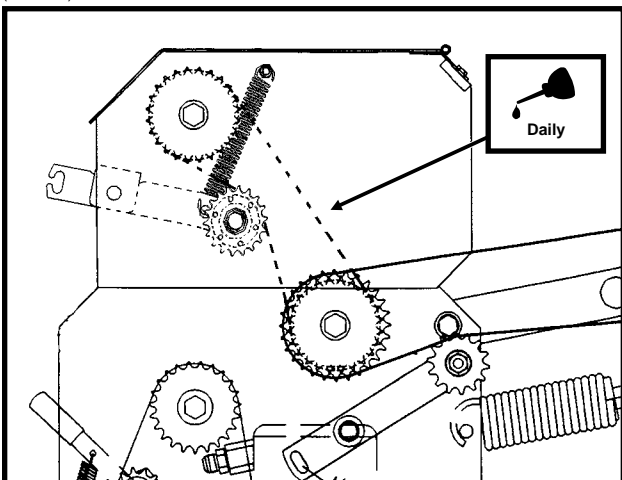
**Liquid Fertilizer Piston Pump Ground Drive Wheel Chain**

(TWL80b)



**Two-Speed Point Row Clutch Module Drive Chain**

(TWL84b)



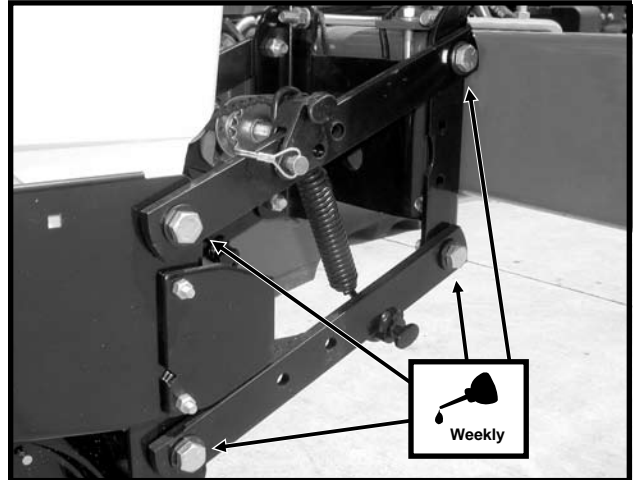
**Two-Speed Point Row Clutch Inner Module Drive Chain**

## BUSHINGS

Lubricate bushings at the frequency indicated.

Using a torque wrench, check each bolt for proper torque. If bolt is loose, it should be removed and the bushing inspected for cracks and wear. Replace bushing if necessary. **Only hardened flat washers should be used. Replace damaged flat washers with proper part. Torque hardware to 130 ft. lbs.**

D06300305



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

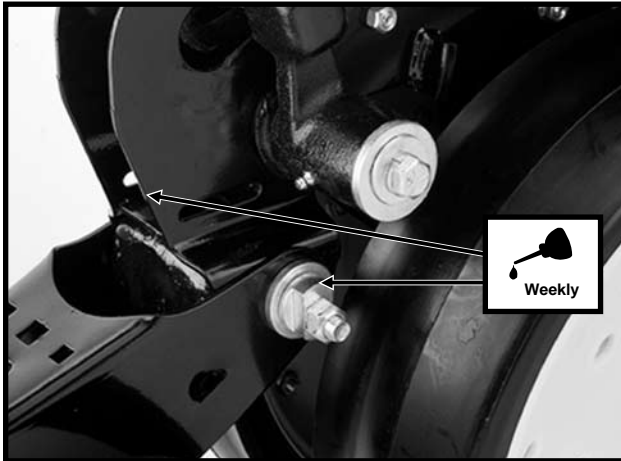
LF212299-22



**Row Unit Mounted Disc Furrower Parallel Linkages (6 Per Row)**

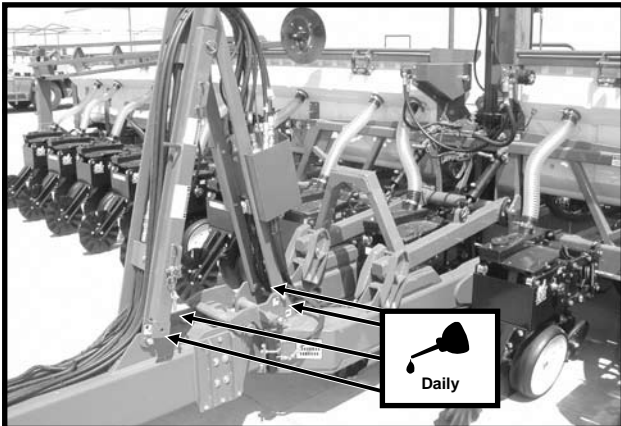
# LUBRICATION

LF212199-2



**Row Unit "V" Closing Wheel Eccentric Bushings (2 Per Row)**

D071603212



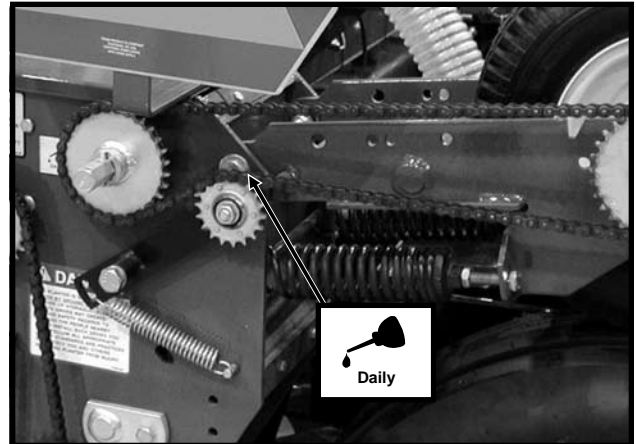
**Hose Take-Up (6 Locations)**

D032901120



**Transport Latch (1 Location)**

D021102206



**Contact Drive Wheel Arm (2 Per Wheel Assembly)**

**IMPORTANT: CENTER POST AND POLY WEAR PADS REQUIRE NO LUBRICATION. ANY OIL OR GREASE WILL ATTRACT DIRT AND ACCELERATE WEAR ON THE CENTER POST AND ON THE POLY WEAR PADS.**

## BULK SEED HOPPER SYSTEM ELEVATOR CHAIN

Seed graphite used with each fill of seed will automatically lubricate the elevator chain. No additional lubrication is needed.

## WRAP SPRING WRENCH ASSEMBLY

The chain idler is equipped with a wrap spring wrench. The wrench components may require occasional lubrication to operate correctly. Disassembly is required to lubricate. (a) Remove the 1/4"-20 x 1/2" cap screw that secures the idler with sprockets to the wrench tightener shaft. (b) Remove the wrap spring wrench from the planter. (c) Tip the wrap spring wrench on its side and lubricate using a high quality spray lubricant. Lubricant must be absorbed into the wrap spring area. (d) Reinstall wrench on planter.

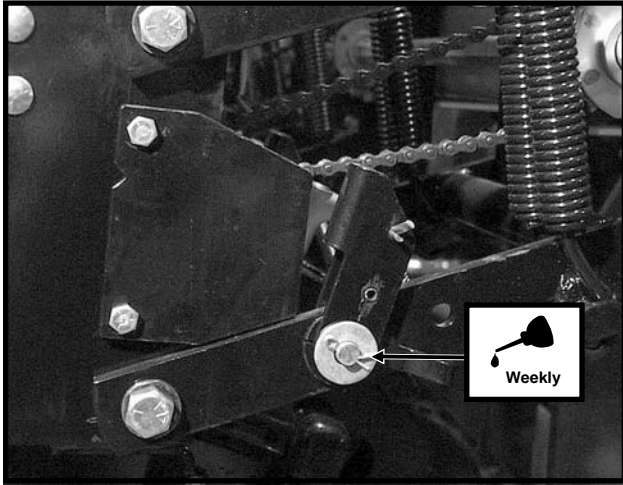
D101303102



# LUBRICATION

## INTERPLANT® PUSH ROW UNIT LOCKUPS

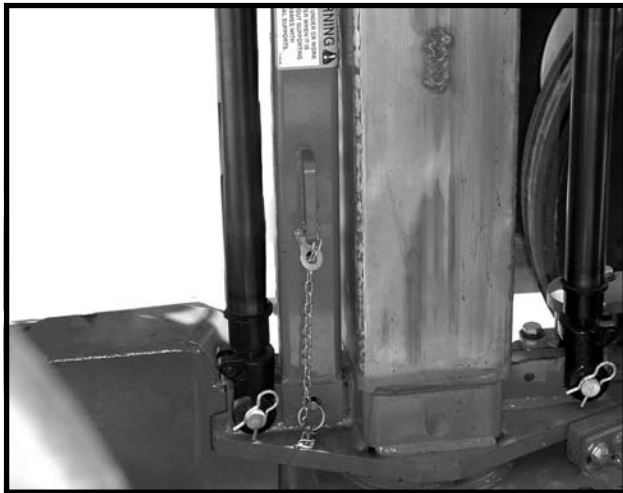
D06099906



2 Per Row

## CENTER POST

d071603307



The center post is clad with stainless steel. To prolong service life keep stainless steel surface clean and free of any lubrication.

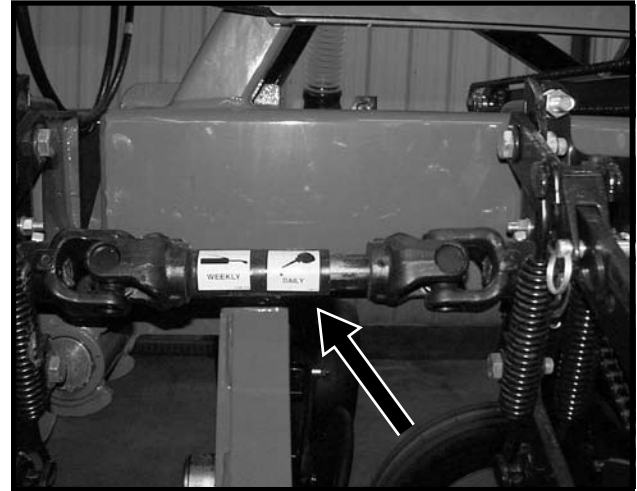
**IMPORTANT: CENTER POST AND POLY WEAR PADS REQUIRE NO LUBRICATION. ANY OIL OR GREASE WILL ATTRACT DIRT AND ACCELERATE WEAR ON THE CENTER POST AND ON THE POLY WEAR PADS.**

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

## U-JOINT SLIDES

Lubricate all U-joint slides daily with a high quality SAE 10 weight oil or a quality spray lubricant.

D040301107



## WHEEL BEARINGS

The transport wheel hubs are equipped with grease fittings. Pump grease into the hub until grease comes out around the seals. See "Grease Fittings" for lubrication frequency.

All wheel bearings should be repaced annually and checked for wear. This applies to all drive wheels, transport wheels and marker hubs.

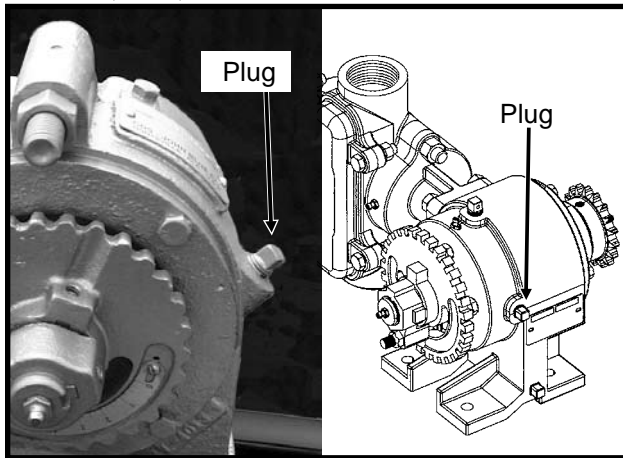
To check for wear, lift the wheel off the ground. Check for endplay in the bearings by moving the tire side to side. Rotate the tire to check for roughness in the bearings. If bearings sound rough, the hub should be removed and the bearings inspected and replaced if necessary. See Maintenance section.

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

# LUBRICATION

## LIQUID FERTILIZER PISTON PUMP CRANKCASE OIL LEVEL

D071504102a/(A12330a)



Check crankcase oil daily and maintain at plug level. Fill as needed with EP 90 weight gear oil. Total oil capacity is approximately ¾ pint.

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

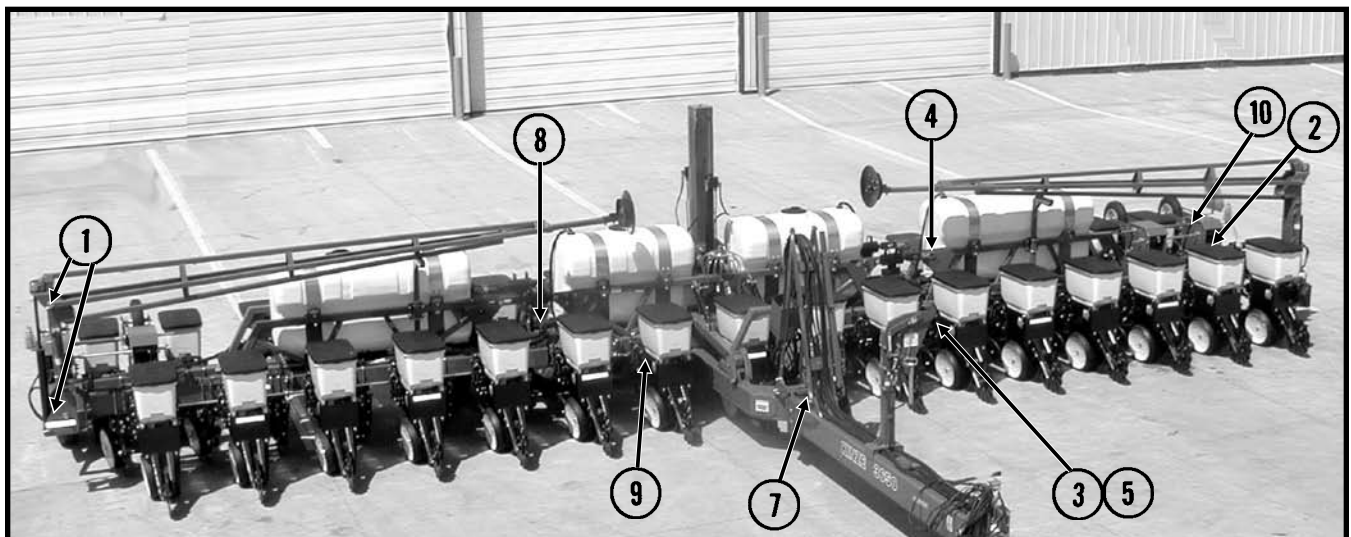
## GREASE FITTINGS

Those parts equipped with grease fittings should be lubricated at the frequency indicated with an SAE multipurpose grease. Be sure to clean the fitting thoroughly before using grease gun. The frequency of lubrication recommended is based on normal operating conditions. Severe or unusual conditions may require more frequent attention.

**! WARNING:** Always install safety lockup devices or lower the planter to the ground before working under or around the machine.

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

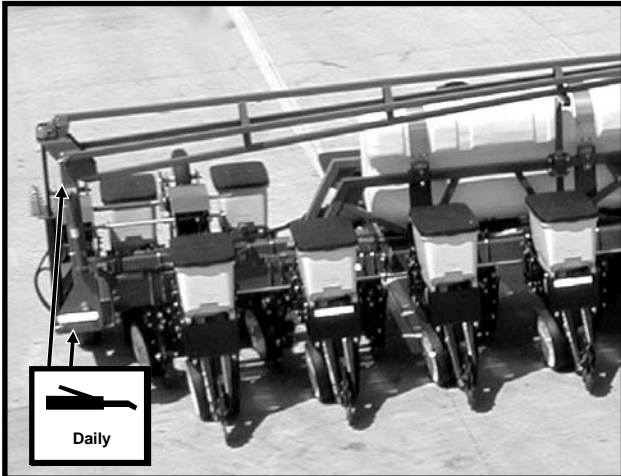
D07160322



Model 3650 Conventional 16 Row 30" With Interplant® Package/Even-Row Push Row Unit And Liquid Fertilizer Package Shown

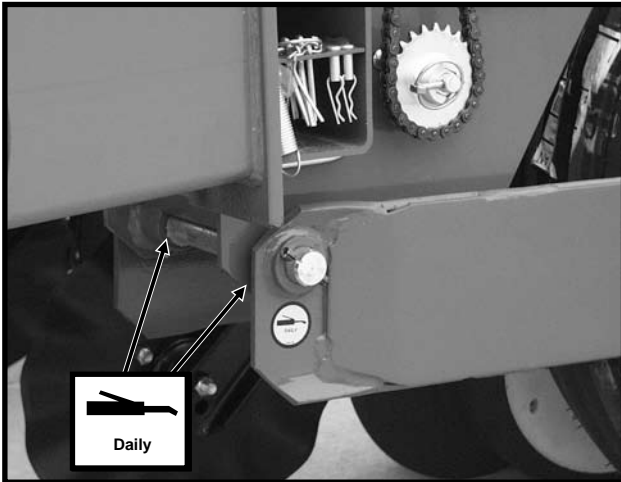
# LUBRICATION

D071803218



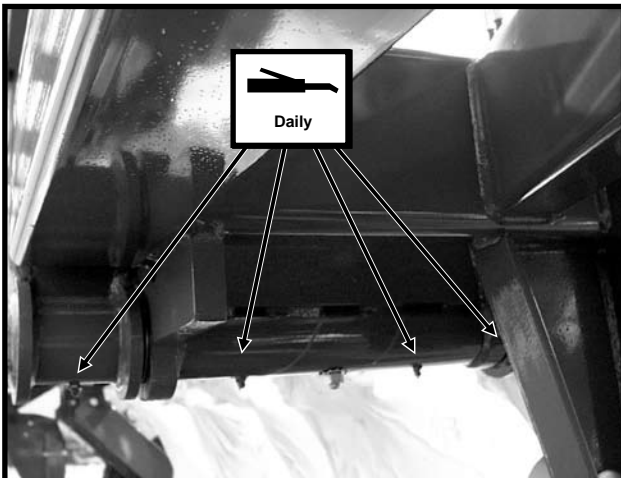
1. Row Marker Assemblies - 4 Zerks Per Assembly On 12 Row 30"; 2 Zerks Per Assembly On 16 Row 30".

D032901181



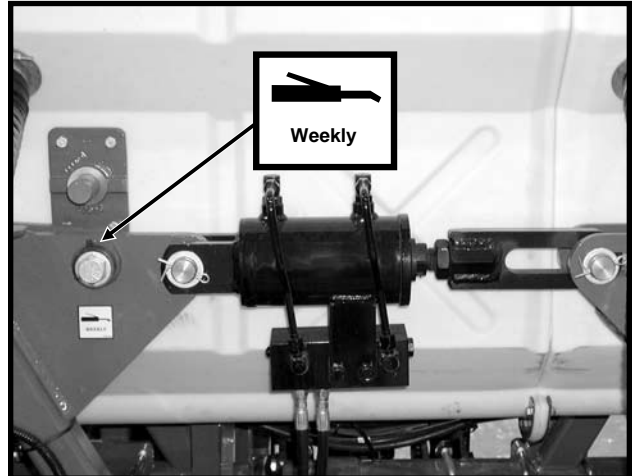
2. Wing Wheel Pivot - 2 Zerks Per Wheel Module

D030502105



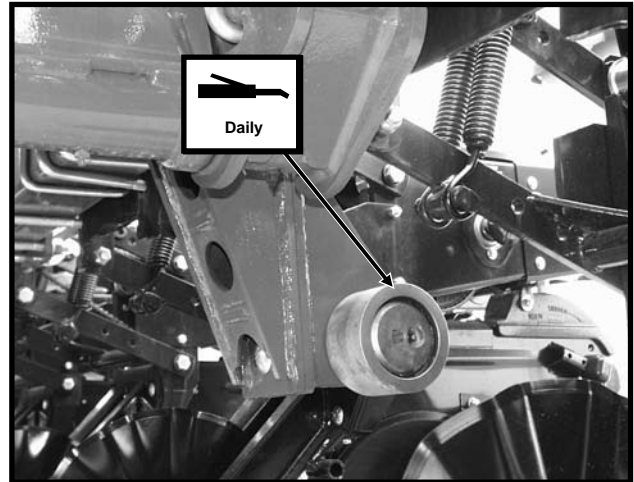
3. Wing Hinges - 4 Zerks Per Wing

D021102215



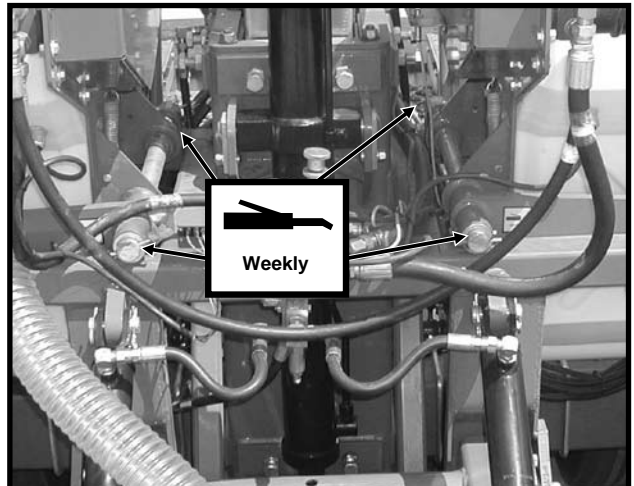
4. Link Pivot - 2 Zerks Per Wing

D071803307



5. Cam Follower - 1 Zerk Per Follower

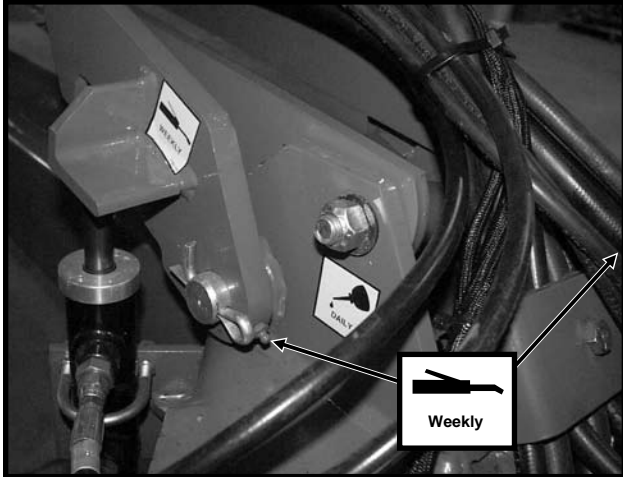
D121802120



6. Inside Bulk Seed Hopper Pivot - 2 Zerks Per Pivot

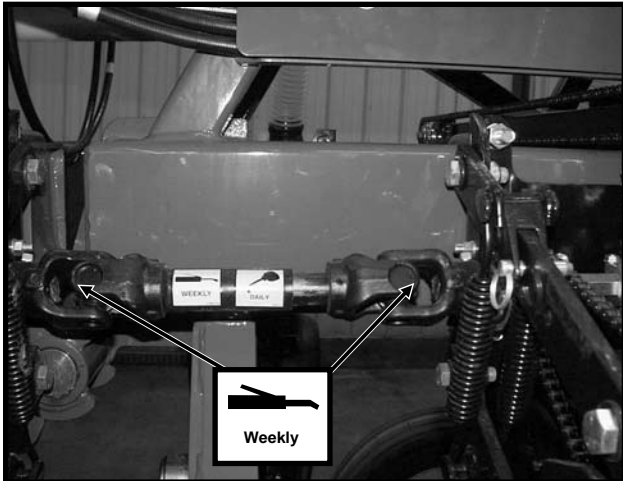
# LUBRICATION

D040301105



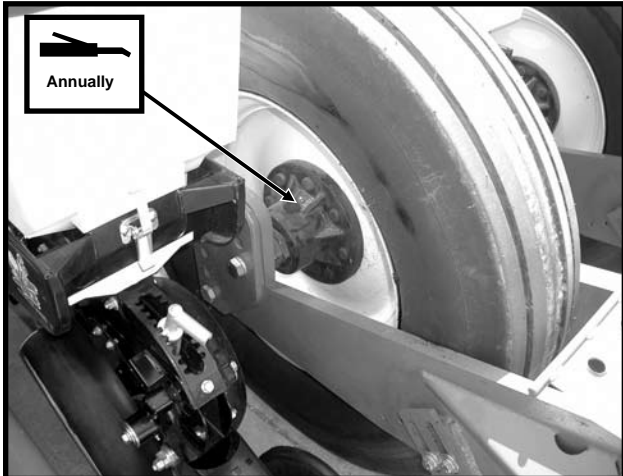
7. Tongue Hook - 2 Zerks

D040301107



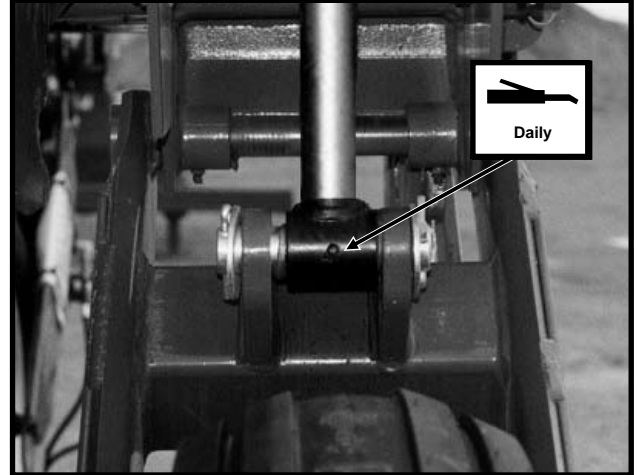
8. U-Joints - 2 Zerks Per Hinge Area

D071603344



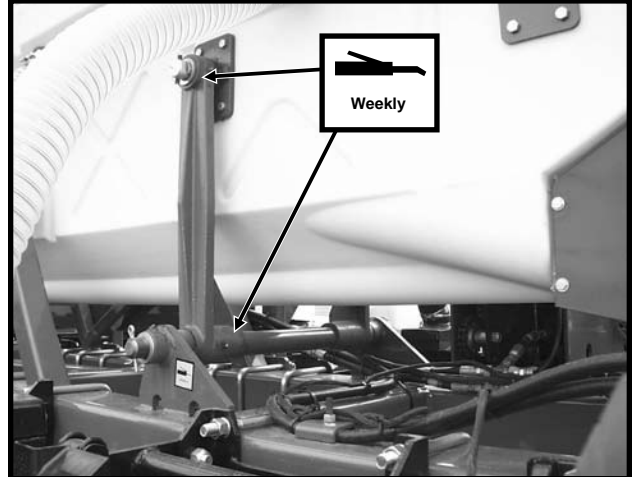
9. Transport Wheel Bearings - 1 Zerk Per Hub

05199819a



10. Wing Lift Cylinders - 1 Zerk Per Cylinder

D071803304

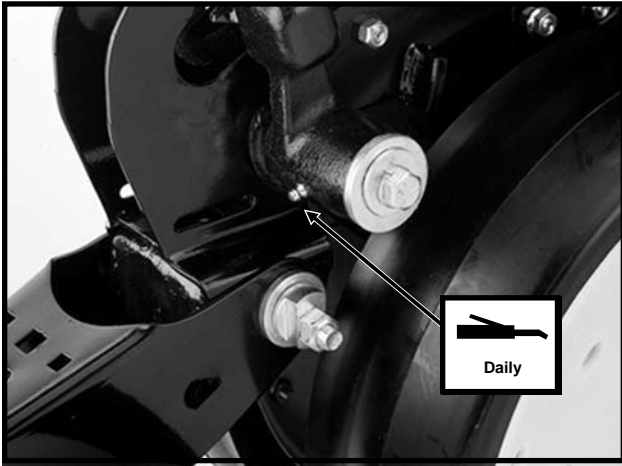


11. Outside Bulk Seed Hopper Link - 2 Zerks Per Link

# LUBRICATION

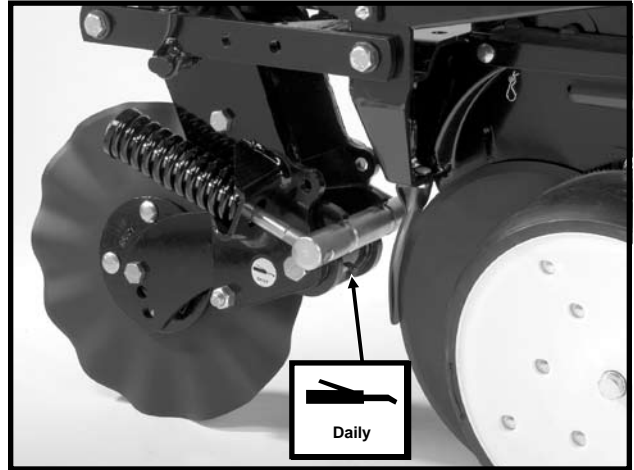
## Row Unit

LF212199-2



Gauge Wheel Arms - 1 Zerk 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.)**

LF083002101

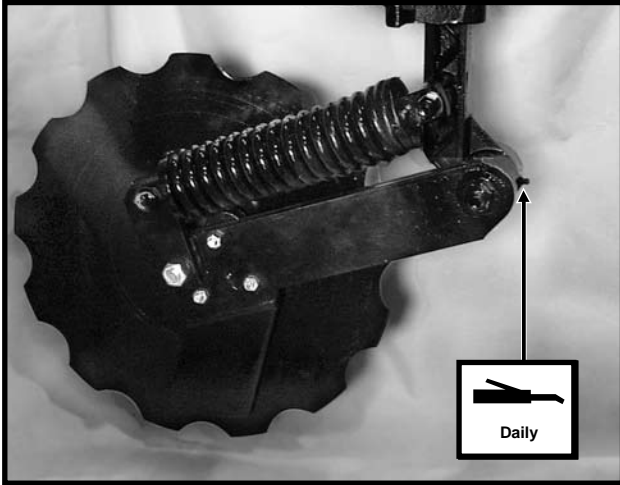


Frame Mounted Coulter - 1 Zerk Per Arm

# LUBRICATION

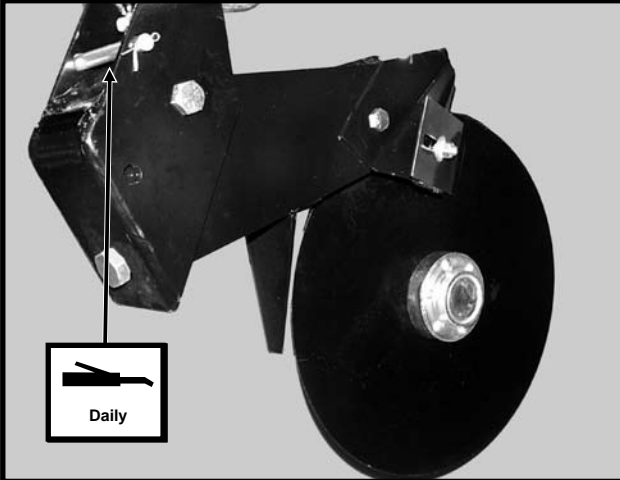
## Fertilizer Openers

D060801304

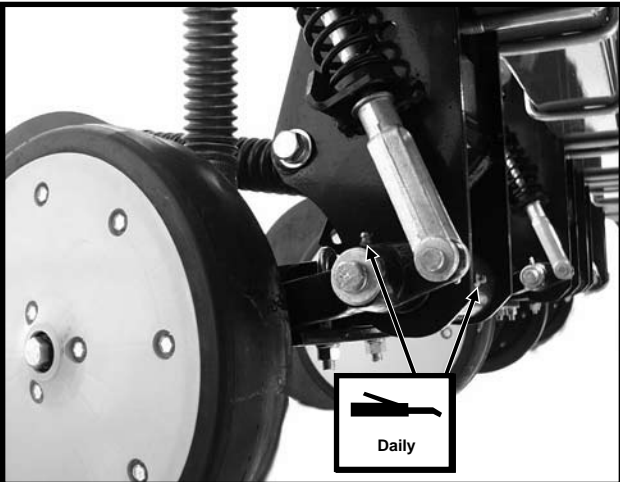


Notched Single Disc Fertilizer Opener - 1 Zerk

D06259919

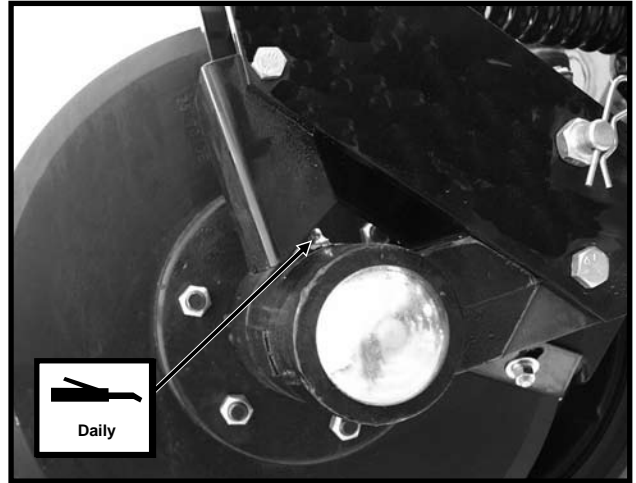


Double Disc Fertilizer Opener - 1 Zerk



HD Single Disc Fertilizer Opener - 2 Zerks  
(Located On Wheel Arm And Opener Mount)

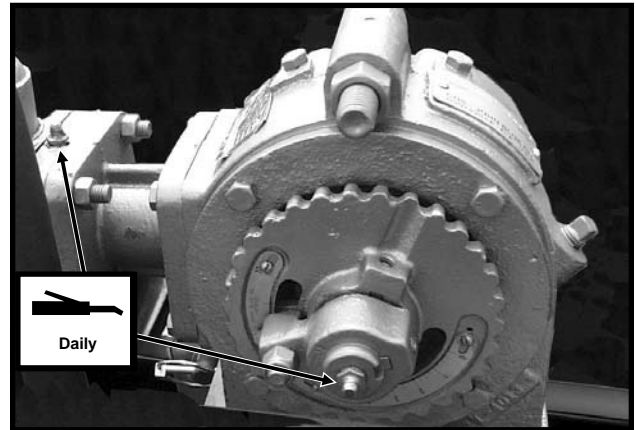
D060801303



HD Single Disc Fertilizer Opener - 1 Zerk  
(Located On Disc Opener Spindle Hub)

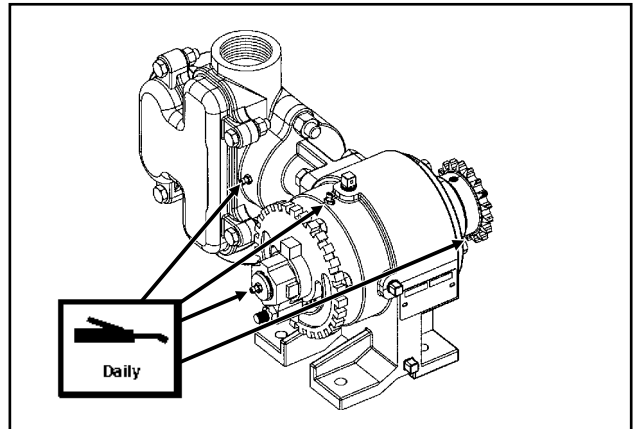
## Liquid Fertilizer Attachment

D071504102a



Piston Pump - 2 Zerks (**Fill zerk on outboard stuffing box until lubricant seeps out of drain hole in bottom.**)

(A12330a)



Liquid Fertilizer Piston Pump - 4 Zerks (**Fill zerk on outboard stuffing box until lubricant seeps out of drain hole in bottom.**)



# MAINTENANCE

## MOUNTING BOLTS AND HARDWARE

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

All hardware used on the KINZE® planter are Grade 5 (high strength) unless otherwise noted. Grade 5 cap screws are marked with three radial lines on the head. If hardware must be replaced, be sure to replace it with hardware of equal size, strength and thread type. Refer to the torque values chart when tightening hardware.

**IMPORTANT: Over tightening hardware can cause as much damage as under tightening. Tightening hardware beyond the recommended range can reduce its shock load capacity.**



**WARNING:** Before operating the planter for the first time and periodically thereafter, check to be sure the lug nuts on the transport wheels are tight. This is especially important if the planter is to be transported for a long distance.

Center Section Transport Tire Lug Nuts - 125 Ft. Lbs.

Wing Ground Drive Tire Lug Bolts - 90 Ft. Lbs.

5/8" No Till Coulter Spindle Hardware - 120 Ft. Lbs.

Row Unit Parallel Linkage Bushing Hardware - 130 Ft. Lbs. (See "Bushings" in the Lubrication section of this manual.)

**TORQUE VALUES CHART - PLATED HARDWARE**

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

**NOTE:** Unplated hardware and bolts with lock nuts should be torqued approximately 1/3 higher than the above values. Bolts lubricated prior to installation should be torqued to 70% of value shown in chart.



**GRADE 2**  
No Marks



**GRADE 5**  
3 Marks



**GRADE 8**  
6 Marks

# MAINTENANCE

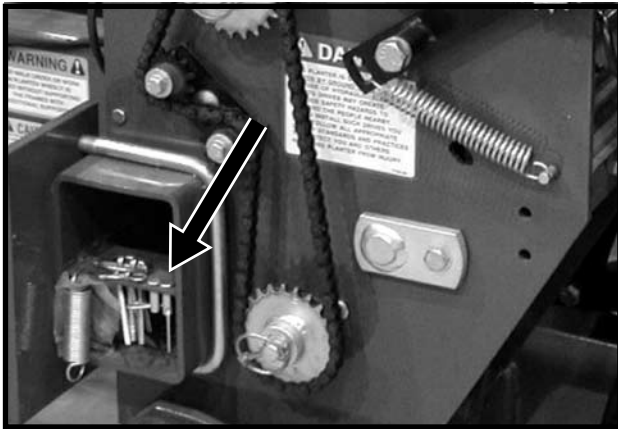
## CHAIN TENSION ADJUSTMENT

Drive chains are equipped with spring loaded idlers and are self-adjusting. The only adjustment needed is to shorten the chains if wear stretches a chain and reduces spring tension. The pivot point of these idlers should be checked periodically to ensure they rotate freely.

Interplant® push row unit drive chain adjustment is made by loosening the idler sprocket mounting hardware and sliding in the slotted mounting holes.

Additional chain links can be found in the storage box located inside the planter frame.

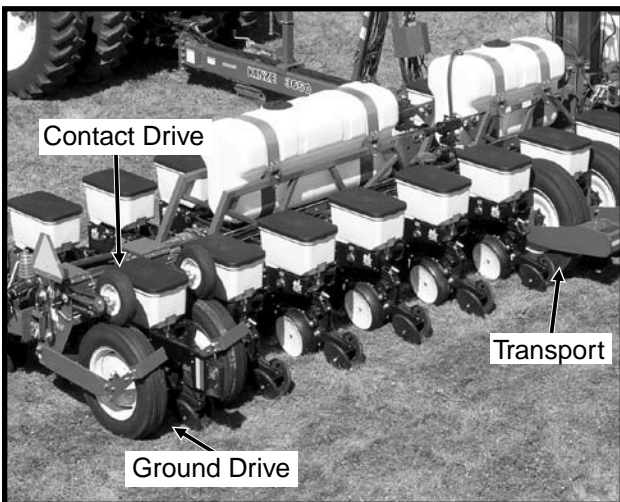
D021102206



See "Wrap Spring Wrench Assembly" in Lubrication section for additional information.

## TIRE PRESSURE

LF092303107

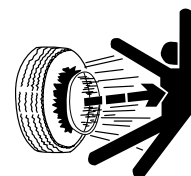


D020904101



Tire pressure should be checked regularly and maintained as follows:

41 x 11R22.5" Transport (Center Section) . . .	75 PSI
7.50" x 20" Ground Drive (Wings) . . . . .	40 PSI
4.80" x 8" Contact Drive . . . . .	50 PSI
7.60" x 15" Ground Drive (Liquid Fertilizer Piston Pump) . . . . .	40 PSI



**! DANGER:** Rim and tire servicing can be dangerous. Explosive separation of tire and rim parts can cause serious injury or death.

Do not attempt to mount a tire unless you have the proper equipment and experience to perform the job. This should only be done by persons properly trained and equipped to do the job.

Always maintain the correct tire pressures. Do not inflate the tires above the recommended pressures.

When inflating tires, use a clip-on air chuck and extension hose long enough to allow you to stand to one side and NOT in front of or over the tire assembly. Use a safety cage to enclose the tire and rim assembly when inflating.

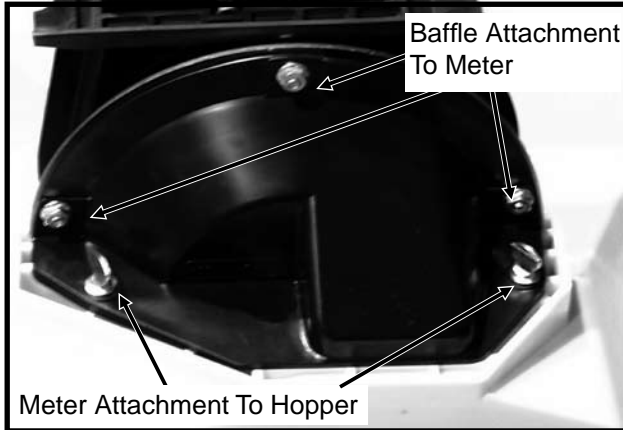
Inspect tires and wheels daily. Do not operate with low pressure, cuts, bubbles, damaged rims or missing lug bolts and nuts.

# MAINTENANCE

## FINGER PICKUP SEED METER INSPECTION/ADJUSTMENT

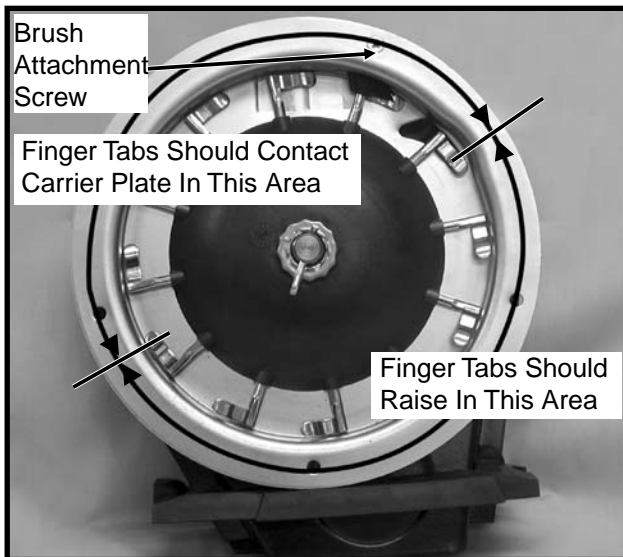
To inspect or service the finger pickup seed meter, remove the meter from the seed hopper by removing the two thumbscrews which secure the mechanism to the hopper. Remove the baffle from the meter assembly by removing three cap screws. This will permit access to the finger pickup.

D04229901



Rotate the seed meter drive by hand to ensure that the springs are holding the tabs of the fingers against the carrier plate where indicated in the photo and that the fingers are being raised in the correct area.

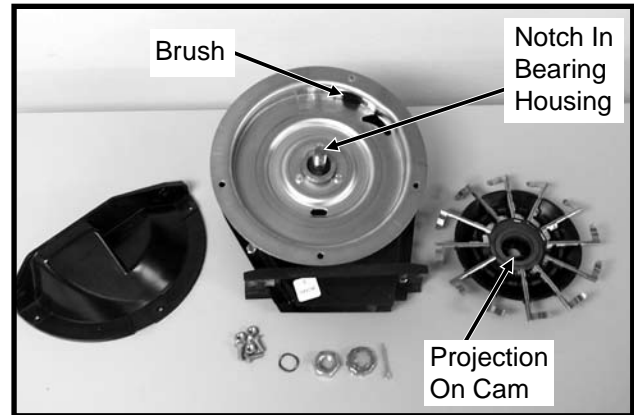
D1220402a



A buildup of debris or chaff may prevent proper finger operation and will require disassembly and cleaning of the finger pickup meter as follows:

1. Remove cotter pin, cover nut and adjusting nut and wave washer (If Applicable) from drive shaft.
2. Carefully lift finger holder, along with fingers and cam, off of the shaft. Clean.

D092004102



3. Check brush for wear and replace if necessary or following every 100 acres per row of operation.

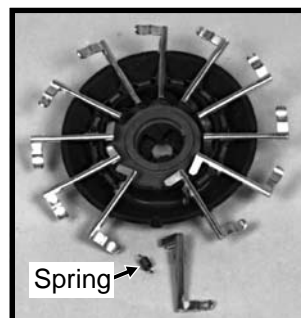
EXAMPLE: Approximately 800 acres of corn or sunflowers on a 8 row machine or 1200 acres on an 12 row machine.

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

4. To replace fingers or springs, remove springs from fingers and remove finger from holder by lifting it out of the friction fit slot. Under average conditions, life expectancy of these parts should be 600-900 acres per row of operation.

5. After cleaning and/or replacing defective parts, reassemble the meter in the reverse order. When replacing fingers, make sure the open end of the spring loop is toward the inside of the finger holder.

60620-22



**Corn Finger Assembly**  
(Position Spring Opening Toward Holder)

D07299902

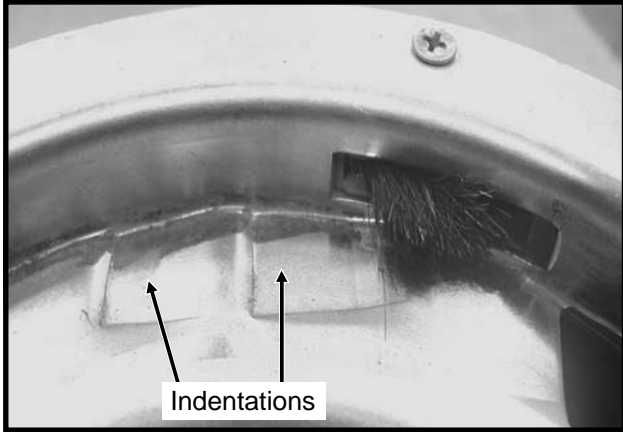


**Oil Sunflower Finger Assembly**

6. Make sure fingers are installed in holder so that holder will be positioned flush with the carrier plate when assembled. A projection on the cam is designed to align with a mating notch in the bearing housing to ensure proper operation when assembled.

# MAINTENANCE

D021506100



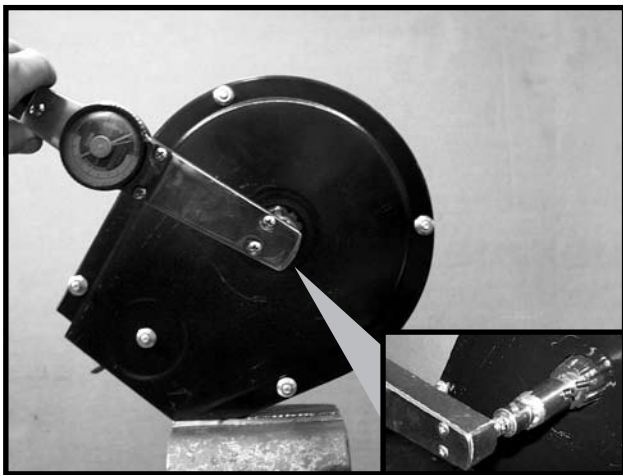
**Photo Shows Worn Carrier Plate**

- Before installing the finger holder on the carrier plate, check the indentations on the carrier plate for wear. Excessive wear of the carrier plate at the indentations will cause over planting especially when using small sizes of seed.

Inspect the carrier plate annually. Under average conditions, the life expectancy of the carrier plate should be 250-300 acres per row of operation.

- With finger holder flush against the carrier, install wave washer and adjusting nut. Tighten adjusting nut to fully compress wave washer. Then back off nut  $\frac{1}{2}$  to 2 flats ( $\frac{1}{12}$  to  $\frac{1}{3}$  turn) to obtain rolling torque of 22 to 25 inch pounds.

D07299903/D07309912

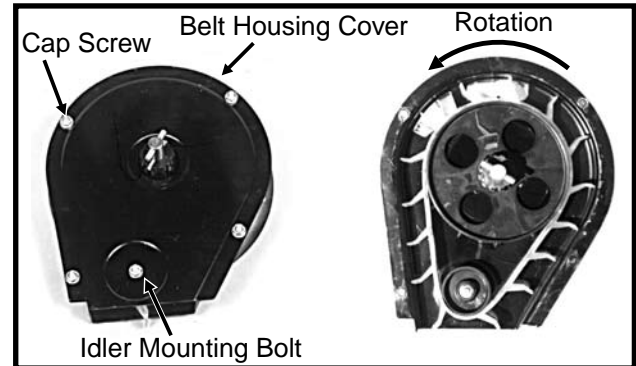


- Turn finger holder by hand to make sure it is positioned firmly against the carrier plate, but is not over tightened and can be rotated with moderate force.
- Install cover nut and cotter pin and reinstall baffle.

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

To inspect or replace the seed belt, remove the four cap screws around the edge of the housing cover and the nut from the belt idler mounting bolt.

60620-13a/60887-97



If the belt is being replaced, make sure it is installed to correctly orient the paddles as shown. A diagram molded into the drive sprocket also illustrates the correct orientation.

Reinstall the housing cover. **DO NOT TIGHTEN** hardware at this time. Wedge a screwdriver between the sprocket hub and housing cover as shown below. Pry cover down until it is centered on the belt housing and tighten hardware. Check idler alignment by rotating meter drive shaft. The seed belt should "run" centered on the idler or with only slight contact with the belt housing or cover.

**IMPORTANT: Do not over tighten hardware.**

D06200030



## FINGER PICKUP SEED METER CLEANING

- Disassemble meter.
- Blow out any foreign material present in the meter mechanism.
- Wash in mild soap and water. **DO NOT USE GASOLINE, KEROSENE OR ANY OTHER PETROLEUM BASED PRODUCT.**
- Dry thoroughly.
- Coat lightly with a rust inhibitor.
- Rotate finger assembly so finger does not touch brush.
- Reassemble and store in a dry rodent-free place.

# MAINTENANCE

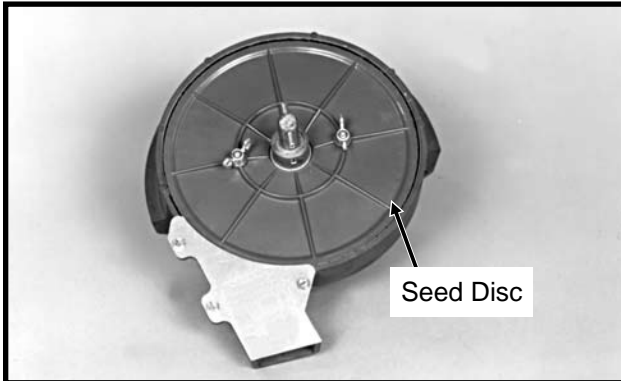
## FINGER PICKUP SEED METER TROUBLESHOOTING

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

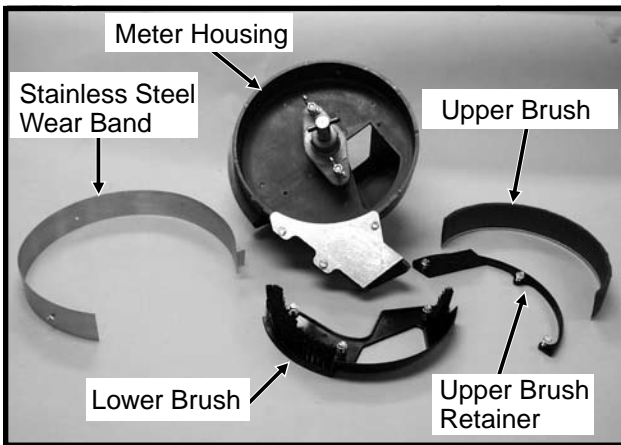
# MAINTENANCE

## BRUSH-TYPE SEED METER MAINTENANCE

60607-10a



D04239911



Only clean, high quality seed should be used for maximum meter accuracy. Damaged or cracked seed, hulls or foreign materials may become lodged in the upper brush and greatly reduce meter accuracy. It is suggested that the seed disc be removed daily, inspected and cleaned. Check for buildup of foreign material on the seed disc, particularly in the seed loading slots. Clean the disc by washing it with soap and water. Check for cracked seed, hulls, etc. lodged between the brush retainer and stainless steel wear band which can greatly reduce the accuracy of the meter because the upper brush will not be able to retain the seed in the seed disc pocket. Clean the brush areas of the meter housing thoroughly.

D04239912a



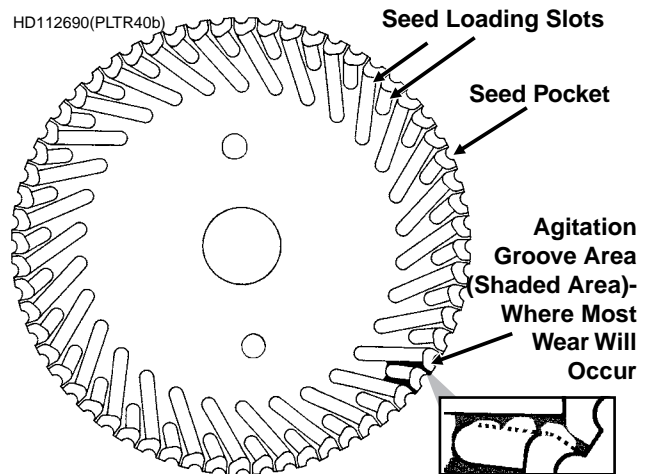
**IMPORTANT:** Close bulk seed hopper lids after hoppers are filled to prevent accumulation of dust or dirt in the seed meter which will cause premature wear.

### Cleaning brush-type seed meter for storage:

1. Remove meter from mini-hopper by removing the two thumbscrews which secure the meter to the mini-hopper.
2. Remove seed disc and wash with soap and water and dry thoroughly.
3. Remove upper brush by removing the three hex head screws from the brush retainer and removing brush retainer and upper brush.
4. Remove the three hex head screws from the lower brush and 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 for wear and replace worn parts.
7. Reassemble meter except for seed disc. **Meter should be stored in a rodent-free space with seed disc removed.**

### Seed Disc Wear

HD112690(PLTR40b)



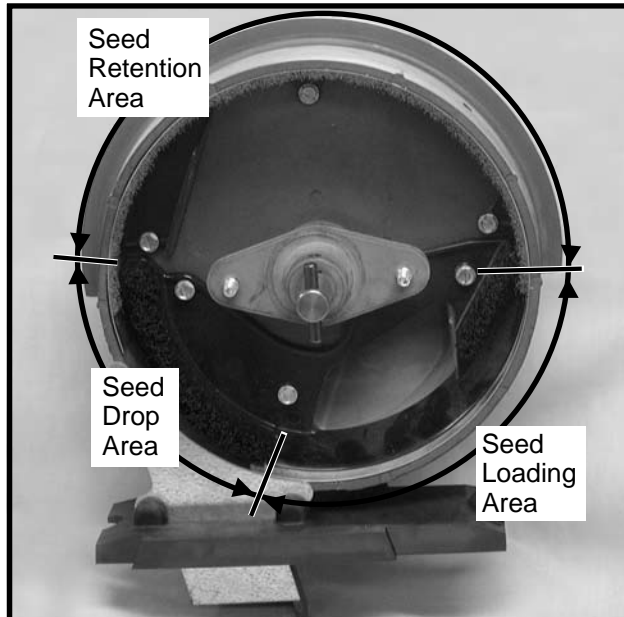
Most wear on the seed disc will be found in the agitation groove area (area between the seed loading slots). Wear will affect planting accuracy at high RPM. To measure for wear, lay a straight edge across the surface of the disc and measure the gap between the disc (at the agitation groove area) and the straight edge. If the agitation groove areas are worn in excess of .030" and accuracy starts to drop off at higher meter RPM, the seed disc should be replaced.

Estimated life expectancy of the seed disc under normal operating conditions should be approximately 200 acres per row. Severe operating conditions such as dust, lack of lubrication or abrasive seed coating could reduce life expectancy of the seed disc to under 100 acres per row.

# MAINTENANCE

## Upper Brush

D12220403



The upper brush holds seed in the seed disc pocket in the seed retention area.

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

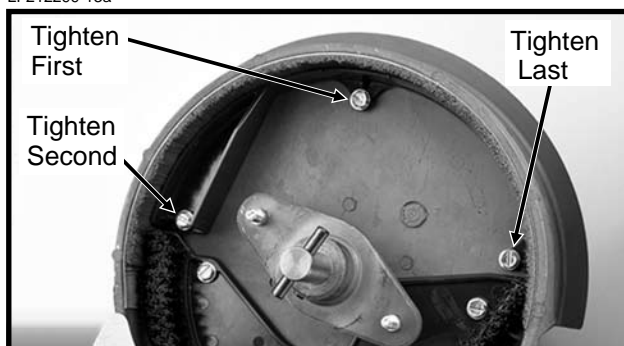
The upper brush should be replaced at approximately 120-400 acres per row of use or sooner if damage or excessive wear is found.

### Installation Of Upper Brush

Position upper brush into inner perimeter of seed retention area. Make sure the base of the brush is tight against the bottom of the meter housing. Install brush retainer and three hex head screws. Tighten center screw first, left screw second and right screw last.

**NOTE: Use GD11122 upper brush retainer when using soybean and cotton discs. Use GD8237 upper brush retainer when using milo/grain sorghum discs. GD11122 upper brush retainer shown.**

LF212299-13a



## Stainless Steel Wear Band

D04239917a

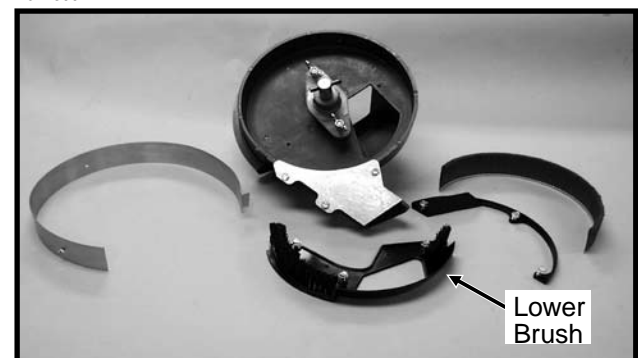


The purpose of the stainless steel wear band is to protect the meter housing from wear. The band is .030" thick and should be replaced when approximately .020" of wear is found in the primary area of wear. If the wear band is allowed to wear through or if the meter is used without the wear band in place, damage to the meter housing may occur.

Estimated life expectancy of the stainless steel wear band is 240-800 acres per row.

## Lower Brush

D04239911



The lower brush has several functions. One function is to move seed down the seed loading slots to the seed pockets. The second function is to isolate seed in the reservoir from entering the seed tube and a third is to clean the seed loading slots.

Estimated life expectancy of the lower brush is 240-800 acres per row. The lower brush should be replaced if the bristles are deformed or missing or if there are cracks in the brush retainer.

# MAINTENANCE

## BRUSH-TYPE SEED METER TROUBLESHOOTING

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



# MAINTENANCE

## CLOSING WHEEL TROUBLESHOOTING

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

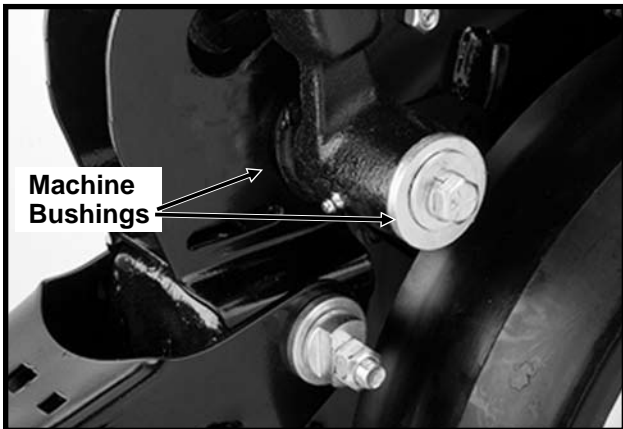
## GAUGE WHEEL ADJUSTMENT

To prevent an accumulation of dirt or trash, gauge wheels should lightly contact the opener blades. Gauge wheels and opener blades should turn with only slight resistance.

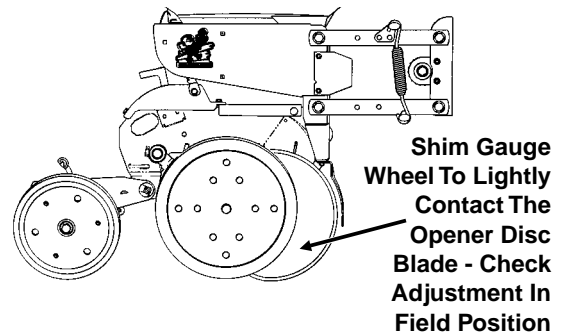
To adjust clearance between gauge wheels and opener blades, add or remove machine bushings between the shank and gauge wheel arm. Store remaining machine bushings between gauge wheel arm and flat washer on outer side of gauge wheel arm.

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

LF212199-2



(RU113g)

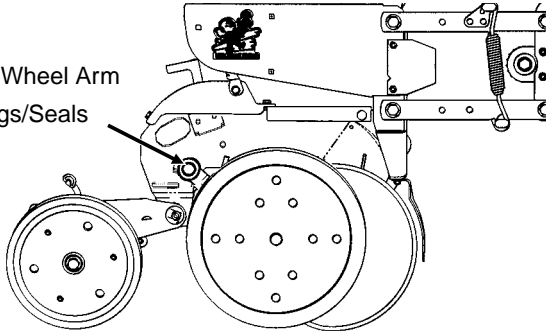


# MAINTENANCE

## GAUGE WHEEL ARM BUSHING AND/OR SEAL REPLACEMENT

(RU113g)

Gauge Wheel Arm Bushings/Seals

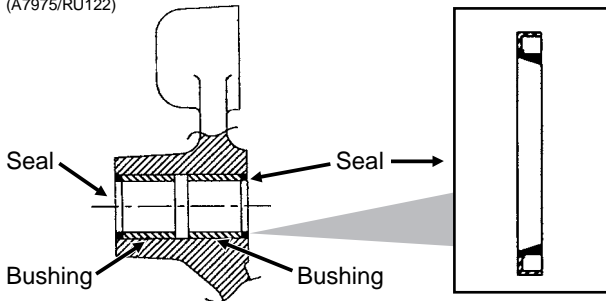


**NOTE: A Gauge Wheel Arm Bushing And Seal Driver Kit (G1K296), for use in bushing and seal replacement, is available through your KINZE® Dealer.**

**To replace gauge wheel arm assembly bushing(s) and/or seal(s):**

1. Remove gauge wheel from arm.
2. Remove the gauge wheel arm assembly from the shank assembly.
3. Remove seal and bushing and discard. Clean and dry inner bore.

(A7975/RU122)



4. Drive/press replacement bushing inside bore of arm to a depth of .125" below flush.
5. Coat wiping edge of seal with grease.
6. Drive/press seal into place with lip to the outside as shown above.

**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.

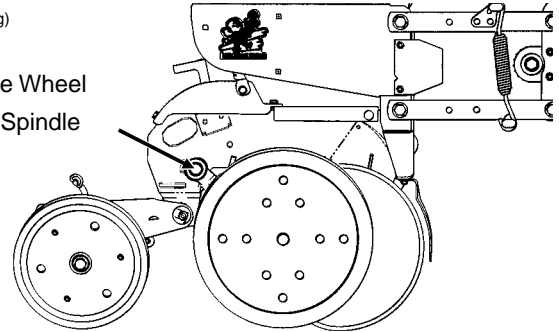
**NOTE: Special machine bushing between gauge wheel arm and gauge wheel.**

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

## GAUGE WHEEL ARM PIVOT SPINDLE REPLACEMENT

(RU113g)

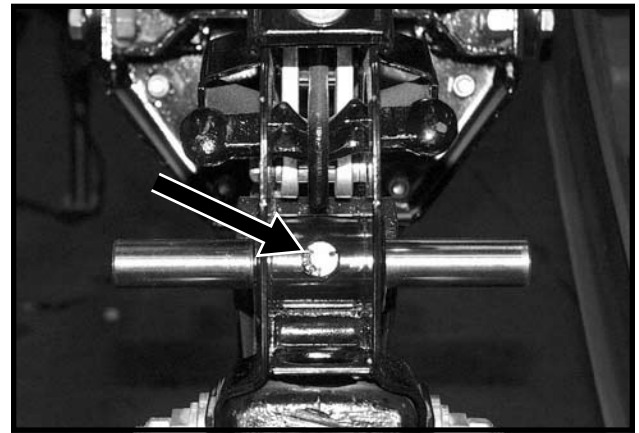
Gauge Wheel Pivot Spindle



**To replace gauge wheel pivot spindle:**

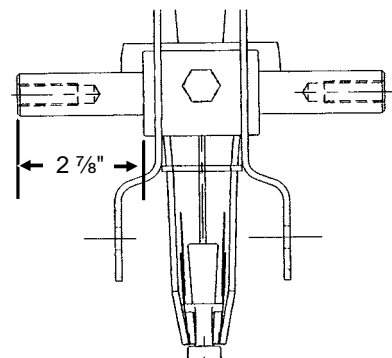
1. Remove the gauge wheel and arm assemblies from the shank assembly.
2. Remove 1/2" x 3/4" cap screw that locks the pivot spindle in place and remove the spindle.

D06189902



3. Install the replacement spindle and position as shown below. Exact centering is critical.

(A7966)



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.

# MAINTENANCE

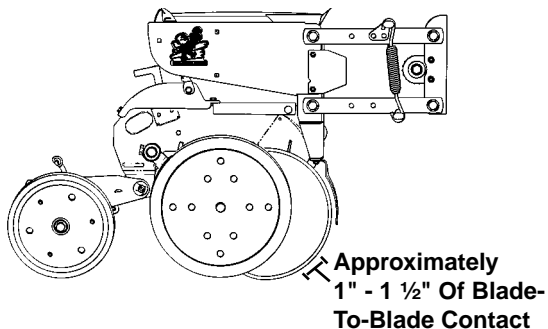
## 15" SEED OPENER DISC BLADE/ BEARING ASSEMBLY

Approximately 1" - 1 ½" of blade-to-blade contact should be maintained to properly open and form the seed trench. As the blade diameter decreases, due to wear, it will be necessary to relocate machine bushings from inside to outside to maintain approximately 1" - 1 ½" of contact.

**NOTE: If proper blade-to-blade contact cannot be maintained after relocating machine bushings or if blade diameter wears below 14 ½", the blades should be replaced.**

**IMPORTANT: 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, the opposite blade should be able to be rotated with minimal force (Less than 5 pounds force at outer edge of blade).**

(RU113g)



### To replace disc blade/bearing assembly:

1. Remove gauge wheel.
2. Remove scraper.
3. Remove bearing dust cap.
4. Remove cap screw, washer and disc blade/bearing assembly. The machine bushings between the shank and disc blade are used to maintain the approximate 1" - 1 ½" of blade-to-blade contact.

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

5. Install machine bushing(s), new disc blade/bearing assembly, washer and cap screw. Torque ⅝"-11 Grade 5 cap screw to value shown in "Torque Values Chart".

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

6. Replace bearing dust cap.
7. Install scraper.
8. Install gauge wheel.

It may be necessary to replace only the bearing if there is excessive endplay or if the bearing sounds or feels rough when the disc blade is rotated.

### To replace bearing:

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

# MAINTENANCE

## SEED TUBE GUARD/INNER SCRAPER

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

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

LF212199-12



Shown With Gauge Wheel And Seed Opener Disc Blade Removed For Visual Clarity

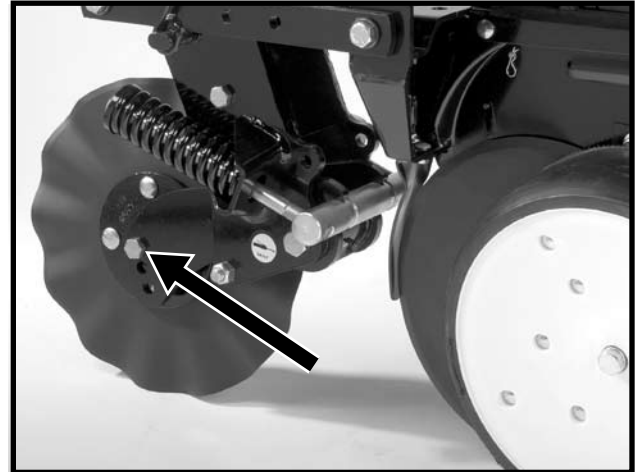
**IMPORTANT: No till planting or planting in hard ground conditions, especially when the planter is not equipped with no till coulters, and/or excessive blade-to-blade contact will increase seed tube guard wear and necessitate more frequent inspection and/or replacement.**

To replace the seed tube guard, remove the seed tube and the two hex socket head cap screws which attach the seed tube guard. Hold the replacement seed tube guard centered between the seed opener disc blades. Install, but DO NOT tighten, the hex socket head cap screws. Using a clamp or vise-grip, squeeze the opener blades together in front of the seed tube guard. Tighten the seed tube guard retaining screws. Remove the clamps. The distance between the seed tube guard and opener blades should be equal on both sides. Reinstall seed tube.

**IMPORTANT: Over tightening the hex socket head cap screws may damage the threads in the shank and require replacement of the shank. A seed tube guard that is worn excessively may allow the blades to wear into the row unit shank, also requiring replacement of the shank.**

## FRAME MOUNTED COULTER

LF083002101



**NOTE: Torque  $\frac{5}{8}$ " spindle hardware to 120 ft. lbs.**

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

When the 16" diameter coulters blade (1" fluted, 1" bubbled or  $\frac{3}{4}$ " fluted) is worn to 14  $\frac{1}{2}$ " (maximum allowable wear), it should be replaced.

# MAINTENANCE

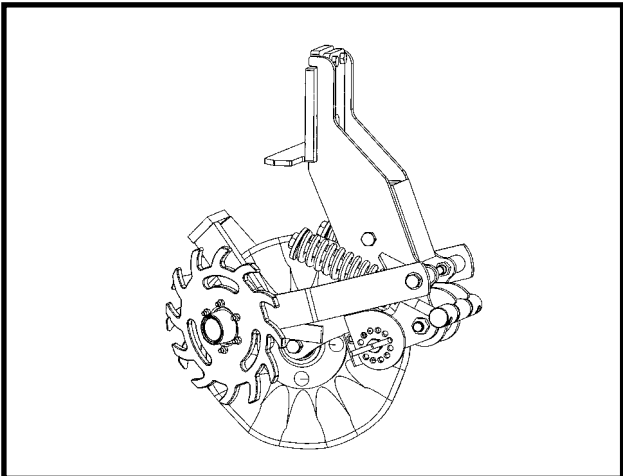
## RESIDUE WHEELS (For Use With Frame Mounted Coulter)

LF083002102



STYLE A

(RU154)

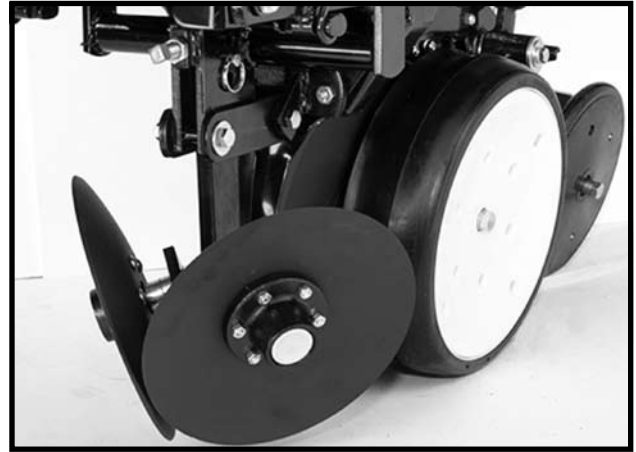


STYLE B

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

## ROW UNIT MOUNTED DISC FURROWER

LF212299-22



Lubricate the bushings in the support arm and mounting bracket at the frequency indicated in the Lubrication Section of this manual. Using a torque wrench, check each bolt for proper torque. If the bolt is loose, it should be removed and the bushing inspected for cracks and wear. Replace bushings as necessary. **Only hardened flat washers should be used. Replace damaged flat washers with proper part. Torque cap screws to 57 ft. lbs.**

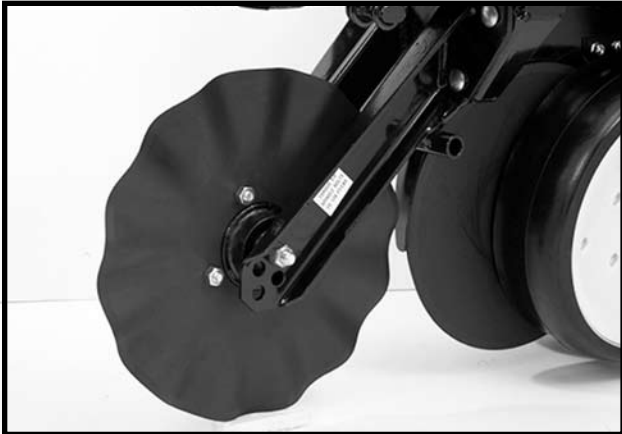
The blade hubs are equipped with sealed bearings. If bearings sound or feel rough when the blade is rotated, replace the bearings.

When the 12" diameter blades (solid or notched) are worn to 11", they should be replaced.

# MAINTENANCE

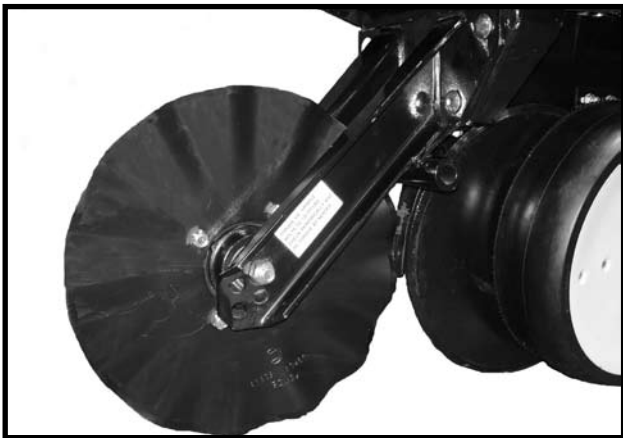
## ROW UNIT MOUNTED NO TILL COULTER

LF212299-19a



**STYLE A (Two Sleeves For Installing Coulters Mounted Residue Wheels)**

D05170706a



**STYLE B (One Sleeve For Installing Coulters Mounted Residue Wheels)**

Check periodically to be sure nuts and hardware are tightened to proper torque specification.

**NOTE: Torque  $\frac{5}{8}$ " spindle hardware to 120 ft. lbs.**

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

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

When the 16" diameter coulters blade is worn to 14  $\frac{1}{2}$ " (maximum allowable wear), it should be replaced.

## COULTER MOUNTED RESIDUE WHEELS

LF212299-23



**STYLE A - Used With Style A Row Unit Mounted No Till Coulters**

D05170708a



**STYLE B - Used With Style B Row Unit Mounted No Till Coulters**

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

# MAINTENANCE

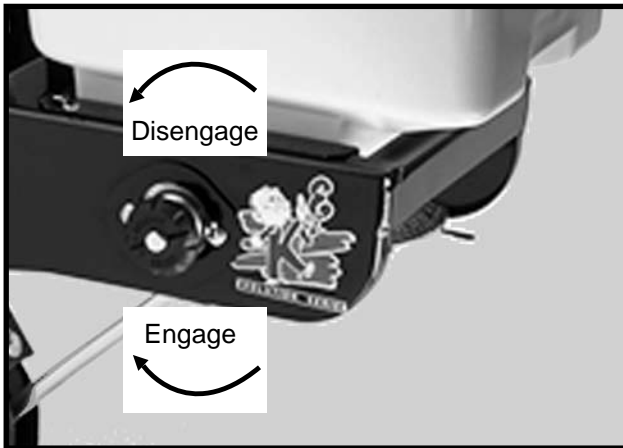
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## GRANULAR CHEMICAL ATTACHMENT

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

Install hoppers and chains. Check chain alignment.

LF212299-4



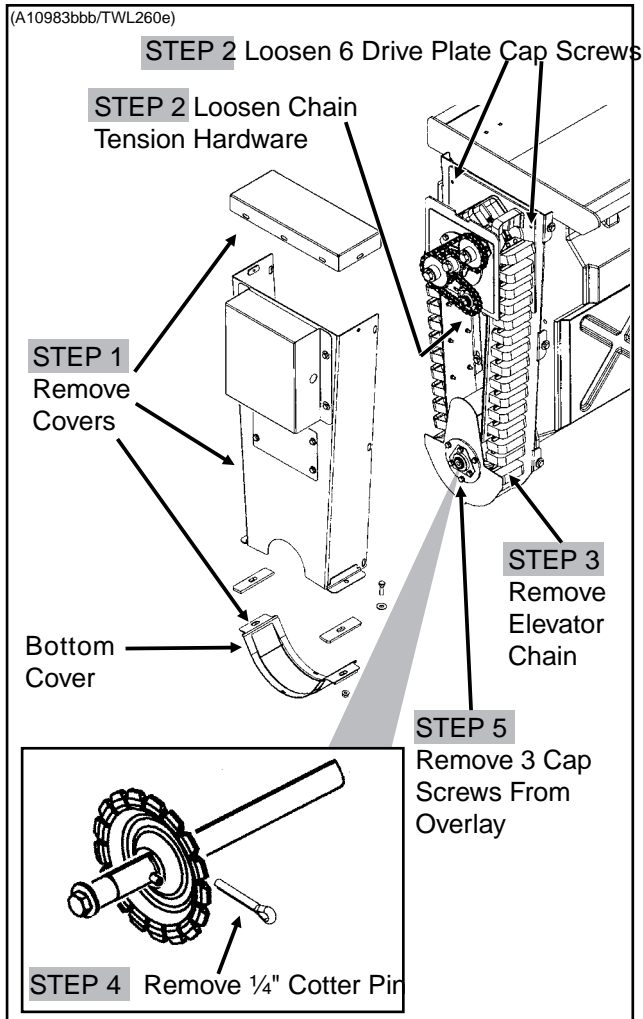
# MAINTENANCE

## SDS SEED DELIVERY SYSTEM AUGER REMOVAL

Augers are removed through the outer ends of the bulk seed hoppers.

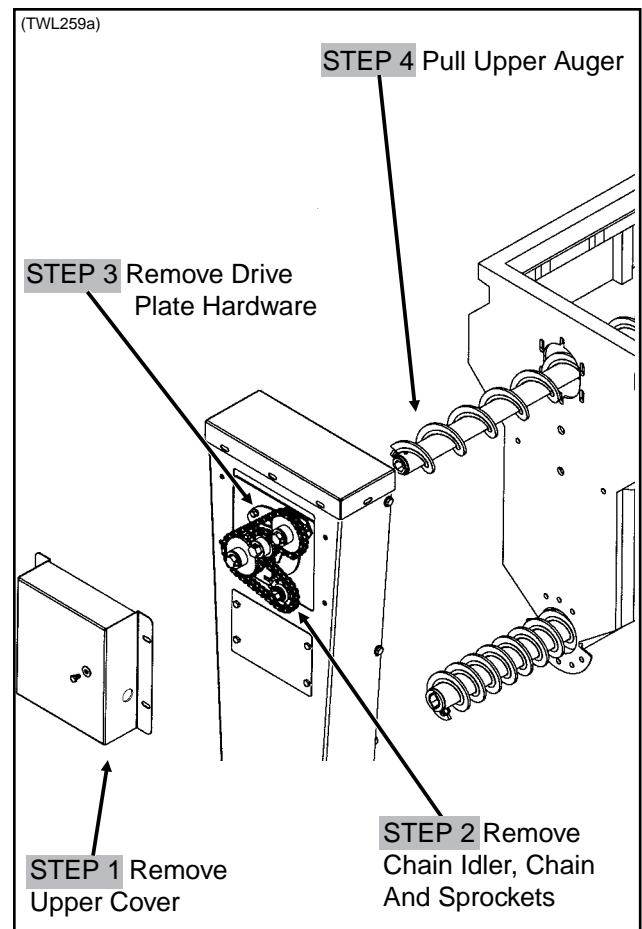
To remove lower auger:

- STEP 1** Remove top, bottom and end covers.
- STEP 2** Loosen the six drive plate cap screws. Loosen jam nut and 1/2" x 4" adjustment bolt to remove all chain tension.
- STEP 3** Remove elevator chain connector link and remove chain.
- STEP 4** Remove 1/4" cotter pin from inner profile.
- STEP 5** Remove three screws from overlay. Remove overlay, bearing assembly and inner profile (shaft).
- STEP 6** Remove lower auger.
- STEP 7** Reassemble in reverse order.



To remove upper bulk seed hopper auger:

- STEP 1** Remove upper cover.
- STEP 2** Remove chain idler, 72 pitch chain and both drive sprockets.
- STEP 3** Remove the three 5/16" cap screws at the drive plate assembly.
- STEP 4** Slide access overlay and auger assembly out of the hopper.





# MAINTENANCE

## BULK SEED HOPPER ELEVATOR CHAIN ADJUSTMENT

To adjust elevator chain tension:

**STEP 1** Remove cover.

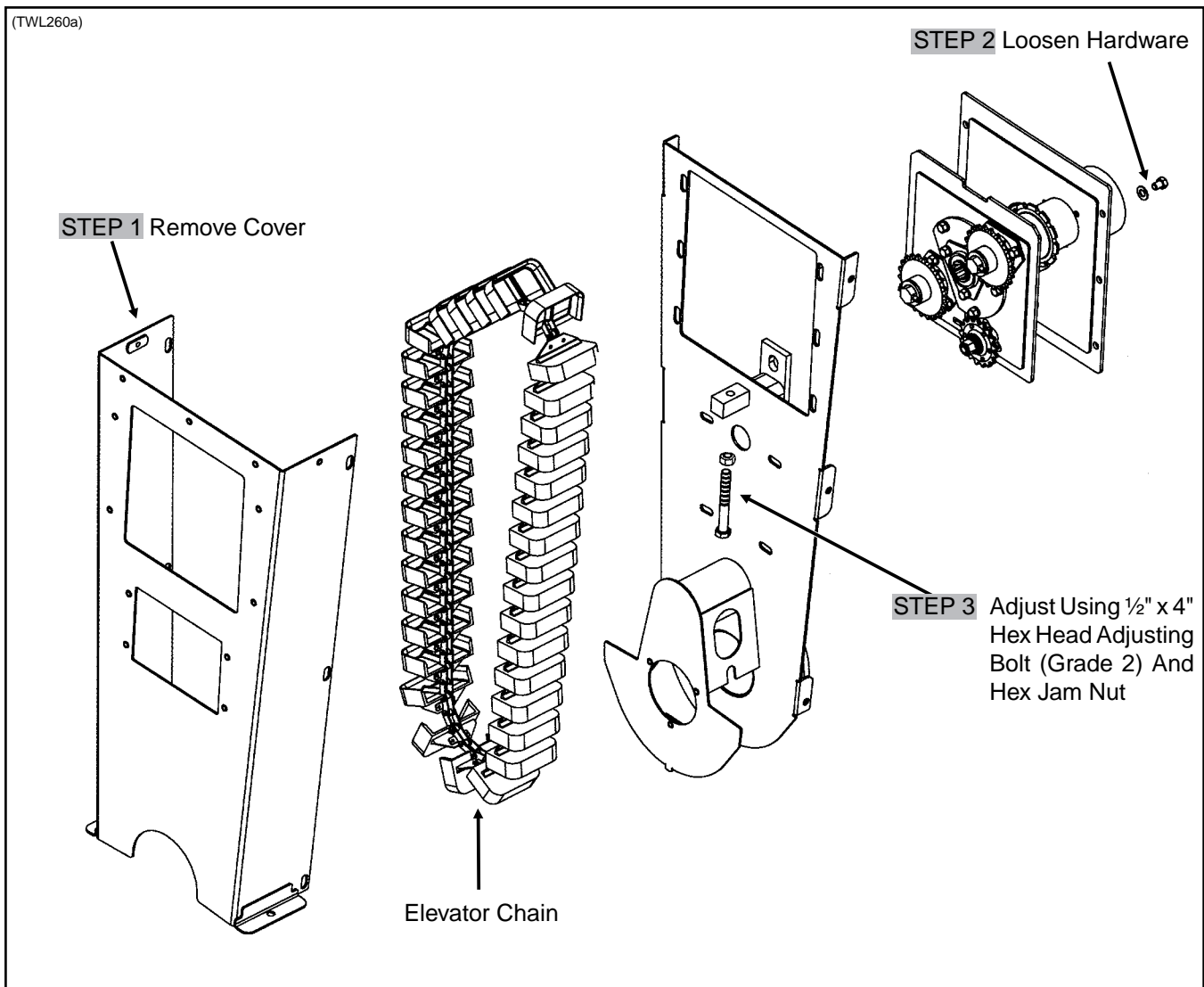
**STEP 2** Loosen the six cap screws that attach the drive plate assembly.

**STEP 3** Loosen jam nut and use the 1/2" x 4" hex head adjusting bolt to adjust elevator chain tension. Remove all slack from the chain.

**NOTE: DO NOT OVERTIGHTEN THE CHAIN.** There should be light to no contact between the chain and chain guides.

**STEP 4** After adjustment is made, tighten six cap screws and replace cover.

**NOTE: Adjust elevator chain after first 10 hours of operation.**



# MAINTENANCE

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

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

# MAINTENANCE

## KPM III ELECTRONIC SEED MONITOR TROUBLESHOOTING

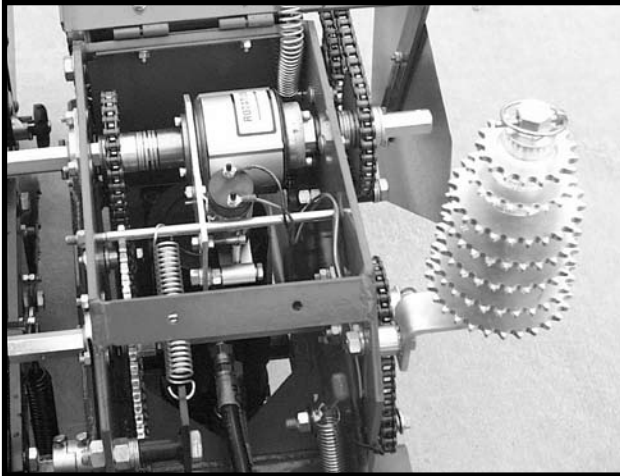
PROBLEM	POSSIBLE CAUSE	SOLUTION
Single sensor communication alarm comes on.	Faulty seed tube sensor.	Replace sensor.
	Break in the harness just before the seed tube sensor.	Inspect for break in harness and repair. If break can't be found, replace harness section.
	Dirty or corroded connector.	Clean connector.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

# MAINTENANCE

## POINT ROW CLUTCH INSPECTION

The point row clutch is permanently lubricated and sealed and requires no periodic maintenance.

D032901166

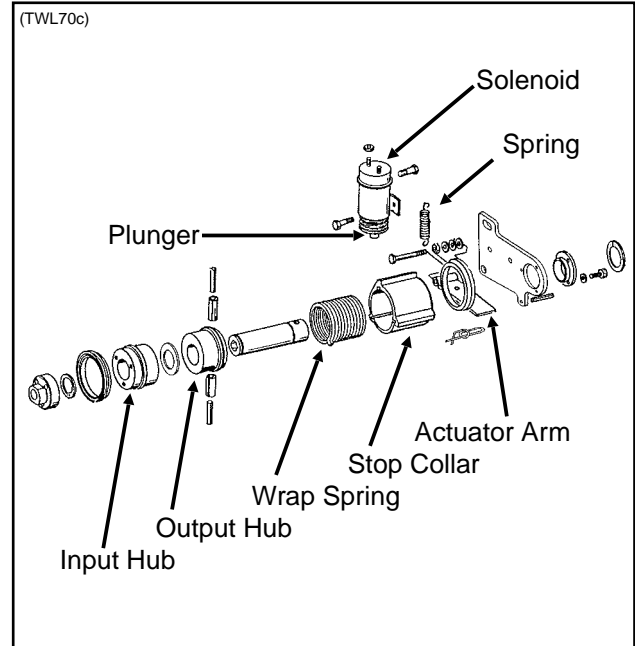


The right hand clutch operates clockwise and the left hand clutch operates counterclockwise. Therefore, some of the parts of the clutch such as the wrap spring differ from one side of the planter to the other. Be sure to use the correct repair part if a clutch must be repaired.

**NOTE: The point row clutch input shaft on the R.H. side of the machine will have an "L" stamped on it and the shaft on the L.H. side of the machine will have an "R" stamped on it.**

If the clutch or clutches fail to operate, first determine if the problem is electrical or mechanical. Place the operational switch in the RIGHT or LEFT position. When the switch is in the RIGHT or LEFT position and the fuse on the rear of the control console is in working condition, the red indicator light on the control console should be lighted. If light does not come on, check the fuses on the front of the control console. See "Point Row Clutch Troubleshooting" chart. If fuses are not blown, check the clutch and wiring harness for power with a test light or volt meter. If the solenoid is operating properly, the plunger on the solenoid will retract causing a clicking sound. The plunger will also be magnetized which can be checked by touching the plunger with a metal object.

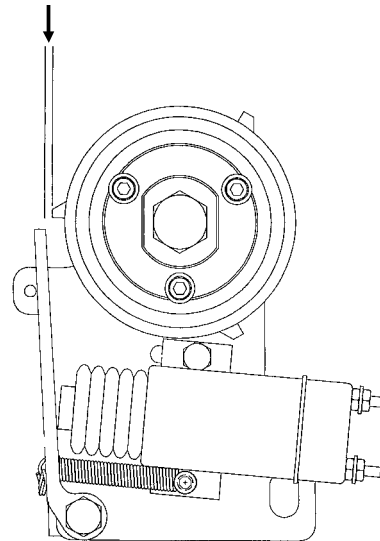
**NOTE: Always replace fuse with proper size and type when replacing fuse. Use MDL 10 amp slow blow fuse on front of control console.**



(A7110)

## ACTUATOR ARM ADJUSTMENT

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



**NOTE: To adjust gap between actuator arm and stop, loosen nut on mounting pin and move pin in slot until there is  $\frac{1}{8}$ " ( $\pm \frac{1}{32}$ ") gap between arm and stop on stop collar. Retighten nut.**

# MAINTENANCE

## POINT ROW CLUTCH TROUBLESHOOTING

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

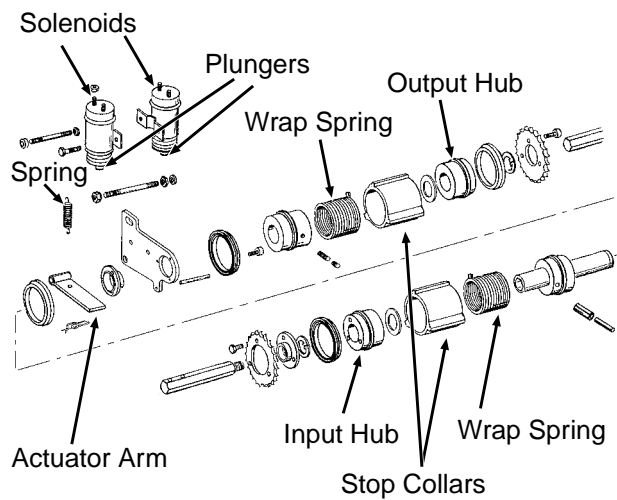
# MAINTENANCE

## TWO-SPEED POINT ROW CLUTCHES

The two-speed point row clutch is similar in design and operation to the standard point row clutch except for the two-speed function. If a two-speed clutch or clutches fail to operate properly, refer to "Point Row Clutch Inspection" and "Point Row Clutch Troubleshooting" for additional information.

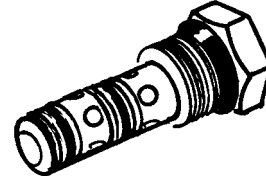
**NOTE:** If the "Reduced Rate/Full Rate" functions fail to engage or disengage, see troubleshooting chart for possible cause.

(FF47c)



## PILOT OPERATED CHECK VALVE INSPECTION (Located In Valve Block On R.H. Side Of Center Pivot)

(TWL30b)



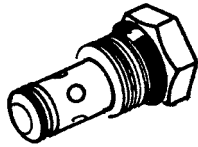
The pilot operated check valve prevents the wing lock cylinders from retracting without applied hydraulic pressure. The wing lock cylinders become the wing flex upper stop during field operation. If the valve fails to function properly, remove the valve from the valve block and check for foreign material or check to see if the o-ring is leaking internally. Replace if found to be defective.

# MAINTENANCE

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## CHECK VALVE (Located In Valve Block On Rear Center Frame)

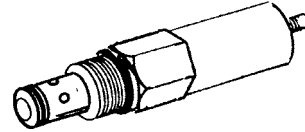
(TWL30)



The check valves, located in the valve block on the rear side of the center post, trap oil flow in the planter's lift system to keep the toolbar level during field operation. Consult your KINZE® Dealer for service.

## PRESSURE RELIEF VALVE INSPECTION (Located In Valve Block On Hitch)

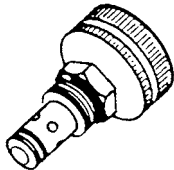
VVB020(TWL29)



If the pressure relief valve fails to release the tongue lock or function properly, remove the valve from the valve block and check for foreign material or check to see if the o-ring is leaking internally. Replace if found to be defective.

## FLOW CONTROL VALVE INSPECTION (Located In Valve Block On Rear Center Frame)

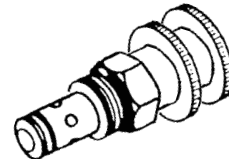
VVB020(TWL28)



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

## FLOW CONTROL VALVE INSPECTION (Located In Valve Block On Front Center Frame)

(TWL28a)

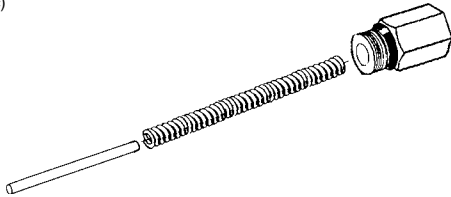


The flow control valve allows auger speed to be varied to meet seed demand. If the valve fails to function properly or requires frequent adjustment, it should be removed for inspection. Check for foreign material and contamination on both the valve and the seating area of the valve body. Replace any components found to be defective.

# MAINTENANCE

## PRESSURE RELIEF VALVE INSPECTION (Located In Valve Block On Front Center Frame)

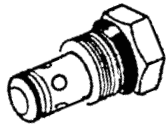
(TWL24c)



The pressure relief valve limits the applied pressure to the hydraulic auger drive motors to prevent mechanical damage to the motors. If the valve fails to function properly, it should be removed for inspection. Check for foreign material and contamination on both the valve and the seating area of the valve body. Replace any components found to be defective.

## CHECK VALVE INSPECTION (Located In Valve Block On Front Center Frame)

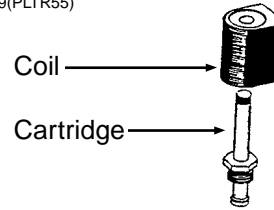
(TWL24b)



The check valve operates as an in-line check in the return line to prevent reverse operation of the auger system. If the valve fails to function properly, it should be removed for inspection. Check for foreign material or check to see if the o-ring is leaking internally. Replace if found to be defective.

## SOLENOID VALVE INSPECTION

VVB019(PLTR55)



The solenoid valve consists of a chambered body containing a cartridge valve which is activated by an electrical coil.

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

## SOLENOID VALVE TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
None of the solenoids will operate.	Low voltage.	Must be connected to 12 volt DC only. Negative ground.
	Blown fuse.	Replace fuse in control console on tractor with AGC-15 amp only.
	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 cartridge and clean.



# MAINTENANCE

## LIFT CIRCUIT TROUBLESHOOTING

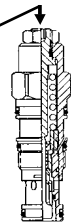
PROBLEM	POSSIBLE CAUSE	SOLUTION
Right wing raises faster than left wing. The right wing may even raise completely before the center frame and left wing start to raise. If the planter is loaded, the center frame and left wing may not be able to raise at all.	Master cylinder, located on front side of center post, leaking internally. NOTE: Make sure the lift system is completely rephased.	Repair or replace master cylinder.
Left wing raises faster than right wing. The 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 or replace master cylinder.
Center frame will raise, but wings do not.	Planter hydraulic circuit out of phase. Usually occurs when the planter is lowered from transport position.	Hold hydraulic lever in lowering position to give the hydraulic circuit more time to rephase.
Center frame will continue to raise after the wing cylinders have reached full stroke when going to raised field position.	Solenoid valve in port V16 leaking.	Replace solenoid valve cartridge.
Planter will raise to raise field position, but will 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, the left wing cylinder will attempt 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.

(Continued On Following Page)

# MAINTENANCE

## LIFT CIRCUIT TROUBLESHOOTING (Continued)

PROBLEM	POSSIBLE CAUSE	SOLUTION
Right wing lowering slower than center frame and left wing. If hydraulic lever is held in lowering position, the right wing cylinder will attempt 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 will not raise.	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 non-KINZE® approved attachments.	Remove weight.
	Center pivot wear pads may be adjusted too tight and are now binding on the post.	Adjust pads.
	Relief valves on hitch leaking. Valves should hold 2500 PSI ( $\pm 50$ ).	Remove and inspect relief valve cartridge. Check for blown O-rings. Replace bad cartridge.
Planter will not rephase.	Piston seal expanded into barrel rephasing grooves. (Only cylinders with rephasing groove in barrel.)	Consult your KINZE® Dealer.
	All cylinders not completely retracted. Caused by mechanical interference on or between planter frame and wheel lift module.	Remove interference.
	One or more cylinders are completely retracted but not bypassing oil and not allowing remaining cylinders to retract.	Move tractor hydraulic lever to the raise position briefly and down again. Slow down the lowering of the planter from the raised transport position to the planting position. This will slow the flow of oil that passes by the rephasing groove in the wing cylinders.
Planter will not lower or lowers too slow.	Lift cylinder counter balance valve pilot pressure set too high.	Adjust pilot pressure on valve.  Turn screw clockwise to reduce setting and release load. Complete adjustment range is 3 turns.



# MAINTENANCE

## TONGUE CYLINDER CIRCUIT TROUBLESHOOTING

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 counterclockwise 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 the switch off.	Solenoid valve cartridge in port V10 and V14 stuck open.	Replace solenoid valve cartridge.
Tongue retracts with the switch off.	Solenoid valve cartridge in port V13 stuck open.	Replace solenoid valve cartridge.

# MAINTENANCE

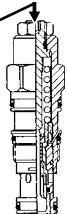
## ROTATION CYLINDER CIRCUIT TROUBLESHOOTING

<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>SOLUTION</b>
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 is 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 is 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.

# MAINTENANCE

## WING LOCK CYLINDER CIRCUIT TROUBLESHOOTING

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 V4 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 V4 stuck closed.	Switch cartridge in port V3 with cartridge in port V4. If cylinders extend but will not retract, replace defective cartridge.
	Pilot pressure on counter balance valve port S1 set too high.	*Adjust pilot pressure on valve.  Turn screw clockwise to reduce setting and release load. Complete adjustment range is 3 turns.
Cylinders will not retract.	Solenoid valve coil in port V3 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 V3 stuck closed.	Switch cartridge in port V4 with cartridge in port V3. If cylinders retract but will not extend, replace defective cartridge.
	Pilot operated check valve in port D10 stuck closed.	Replace pilot operated check valve.
Cylinders retract with the switch off.	Solenoid valve cartridge in port V3 stuck open.	Replace solenoid valve cartridge.
Cylinders extend with the switch off.	Solenoid valve cartridge in port V4 stuck open.	Replace solenoid valve cartridge.
Cylinder leaks down. Will not hold weight of wing in transport.	Counter balance valve leaking or stuck open.	*Switch valves with another cylinder. If this resolves the problem, replace defective valve. If it does not, check for internal leak in cylinder.



\*Adjustment or replacement of wing cylinder counter balance valves must be made with the planter lowered to planting position, tractor off and system hydraulic pressure relieved.

# MAINTENANCE

## ROW MARKER OPERATION TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Right marker lowering slower than left marker.	Solenoid valve cartridge in port V1 not opening completely.	Switch cartridge with one in port V2. If problem follows cartridge, 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 cartridge with one in port V1. If problem follows cartridge, replace cartridge.
	Hose pinched or collapsed.	Inspect hose routing. Replace or repair hoses as required.
Both markers lowering.	Solenoid valve cartridge stuck open. If marker switch is in the left marker position, the right cartridge (V1) is defective. If the marker switch is in the right marker position, the left cartridge (V2) is defective.	Replace solenoid valve cartridge.
Neither marker will lower.	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 out of adjustment.	See Operation section for adjustment.

# MAINTENANCE

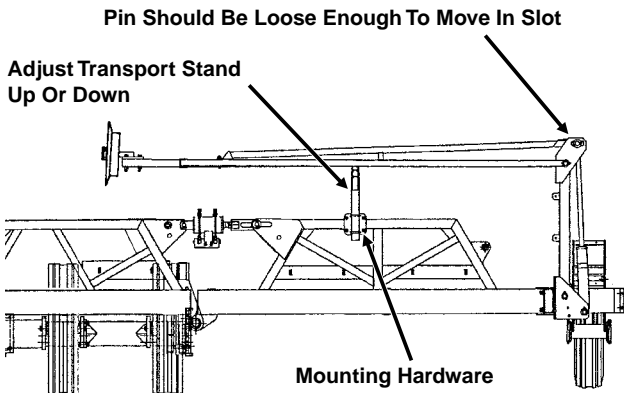
## ROW MARKER TRANSPORT STAND ADJUSTMENT

It is critical that the row marker transport stands are adjusted correctly to allow the row marker cushion cylinders to function properly.

To adjust the transport stands:

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

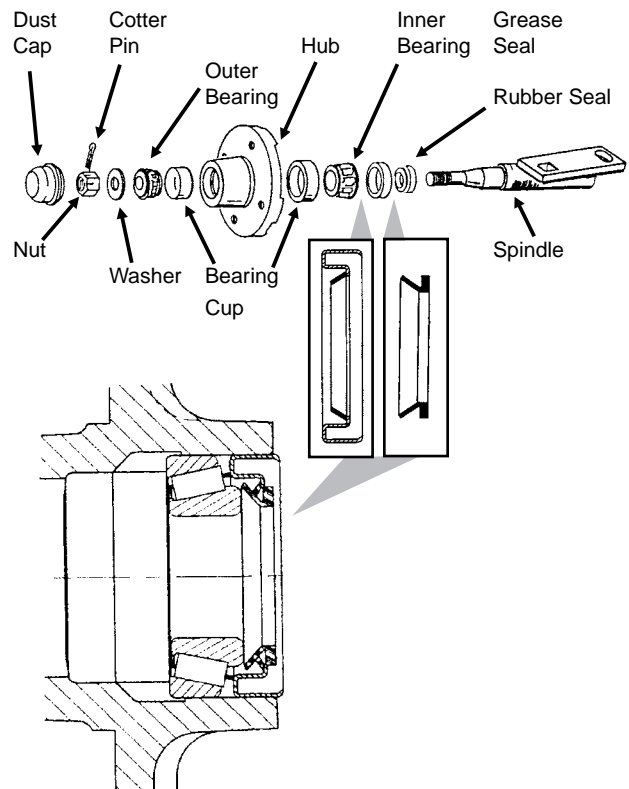
(TWL200a)



## ROW MARKER BEARING LUBRICATION OR REPLACEMENT

1. Remove row marker blade.
2. Remove dust cap from hub.
3. Remove cotter pin, 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. Also 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 assures that 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 blade and dust cap retainer on hub and tighten evenly and securely.

(PLTR45/PLTR99/PLTR98/PLTR102)



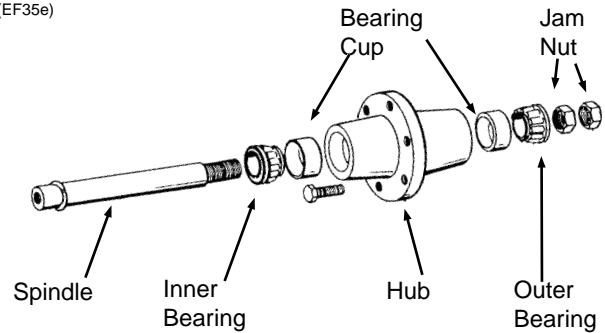
# MAINTENANCE

## WHEEL BEARING LUBRICATION OR REPLACEMENT

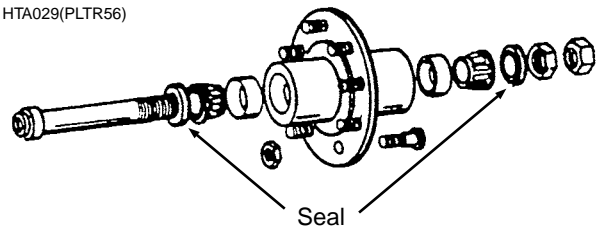
**NOTE: Each transport wheel hub is equipped with a grease fitting for lubrication. The below procedure is used only for bearing replacement.**

1. Raise tire clear of ground and remove wheel.
2. Remove double jam nuts and slide hub from spindle.
3. Remove bearings, seals (Where Applicable) 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. Also fill the space between the bearing cups in the hub with grease.
6. Place inner bearing and seal (Where Applicable) in place.
7. Clean spindle and install hub.
8. Install outer bearing, seal (Where Applicable) and stepped nut. Tighten jam nut while rotating hub until there is some drag. This assures that all bearing surfaces are in contact. Back off jam nut  $\frac{1}{4}$  turn or until there is only slight drag when rotating the hub. Install second jam nut to lock against first.
9. Install wheel on hub and tighten evenly and securely. Torque wheel bolts to specified torque.

(EF35e)



HTA029(PLTR56)

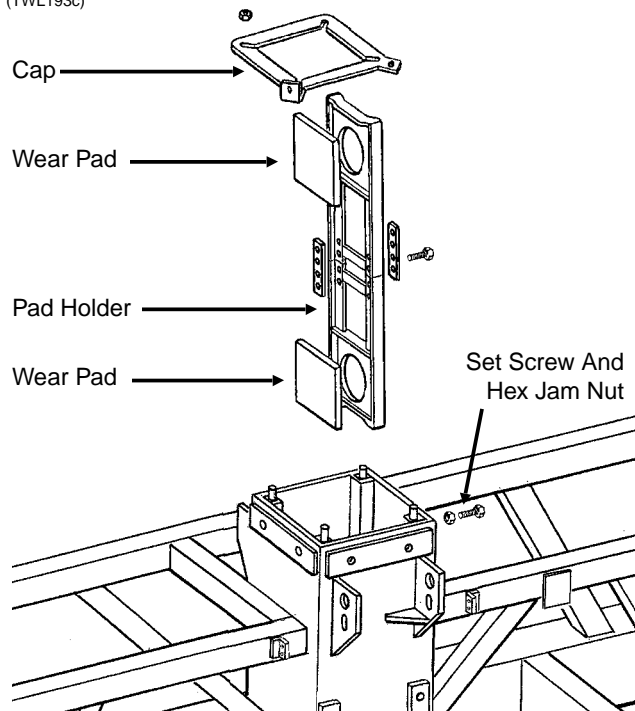




# MAINTENANCE

## WEAR PAD REPLACEMENT AND ADJUSTMENT

(TWL193c)



The center section of the planter is constructed around a steel tubular frame with four wear pad assemblies that ride against a stainless steel clad center post. Each wear pad assembly includes a pad holder and two wear pads. The wear pads are held by the pad holder and locked in place by  $\frac{3}{4}$ " set screws and hex jam nuts.

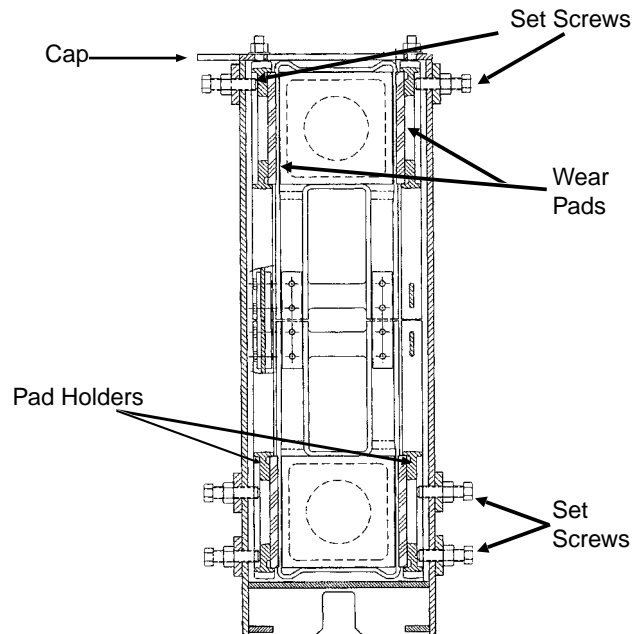
Inspect for wear and check pad adjustment annually to ensure the center section is stabilized and the planter tracks properly. Replace any broken or missing adjustment set screws. When properly adjusted the pads should make full contact with the center post with light contact. Too much preload on the pads will cause the hydraulic lift pressure to be higher than necessary or will not allow the planter to raise when the planter is loaded.



**WARNING: Always install all safety lockup devices before working under the unit.**

To check adjustment and wear, position the planter on a level surface. Raise the planter to the raised field position. Visually check the four upper wear pads. Each wear pad should lightly contact the stainless steel clad center post. The maximum allowable gap between the plastic wear pad and the stainless steel post, when checked using a thickness gauge, should be no more than .060". Raise the planter to the raised transport position, install all safety lockups and visually check the four lower wear pads. Maximum allowable gap on the lower pads is .060".

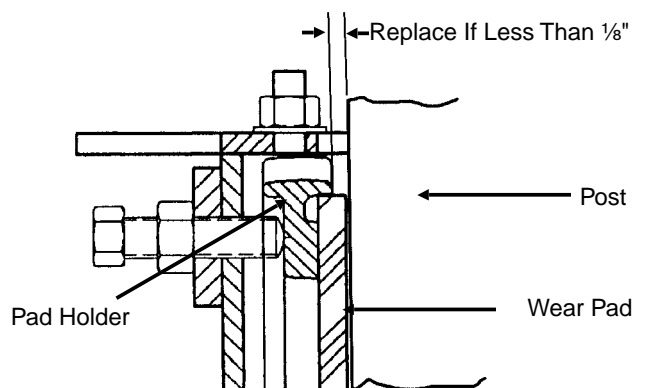
(TWL109b)



If adjustment is necessary proceed as follows: (a) Lower the planter to field operation position. It may be necessary to the loosen cap mounting nuts to allow wear pad adjustment. (b) Loosen the necessary hex jam nuts. (c) Tighten set screws until the wear pad lightly contacts the stainless steel clad center post. DO NOT OVERTIGHTEN. (d) Tighten hex jam nuts. (e) Recheck clearance. If clearance is not to specifications, repeat adjustment steps. (f) Torque hex jam nuts to 200 ft. lbs. Tighten cap mounting bolts if applicable.

**NOTE: If exposed portion of wear pad is worn to less than  $\frac{1}{8}$ " as shown below, replace the wear pad.**

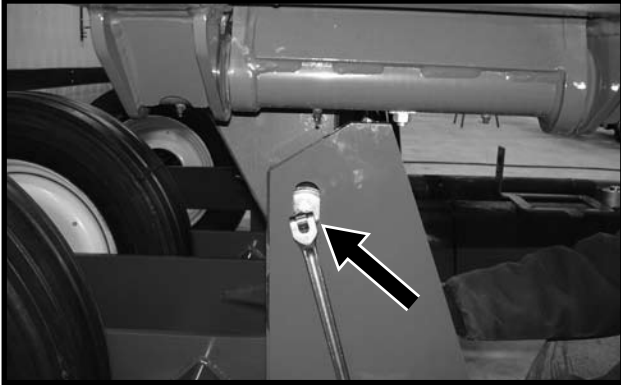
(TWL149a)



# MAINTENANCE

**If major adjustment or replacement is necessary** proceed as follows: (a) Loosen cam rollers as shown below so they move freely. (b) Lower the 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 other planter attachments.

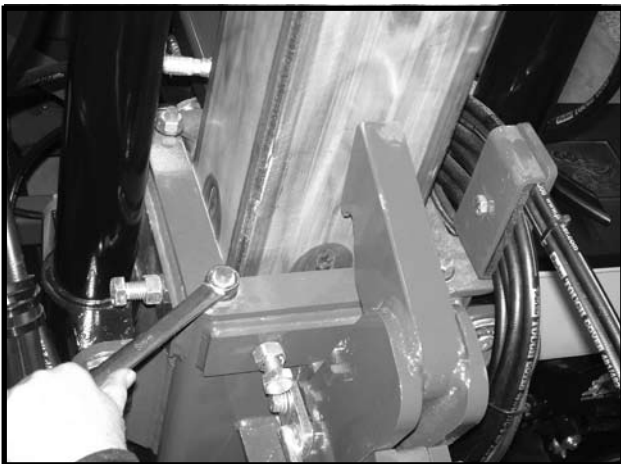
D01190716



**For pad adjustment only** (d) Check position of center frame to axle cam roller guides. Gap between guides and frame should be the same side to side. Gap on the back sides of the roller guide should be equal on both sides. Final adjustment will be done later. (e) Loosen the four cap mounting nuts as shown below. (f) Loosen the hex jam nuts and use the pad set screws to position the frame to center correctly. (g) To adjust the pads, the pad set screws should be drawn tight, backed off and turned in until there is light contact with the pad holder. (h) Tighten hex jam nuts. (i) Torque hex jam nuts to 200 ft. lbs. (j) Tighten cap mounting nuts. (k) Reset row unit down pressure and other attachments from STEP c.

**IMPORTANT: DO NOT OVERTIGHTEN WEAR PADS. OVERTIGHTENING WILL CAUSE PREMATURE WEAR AND EXCESSIVE HYDRAULIC LIFT PRESSURES.**

D01190745

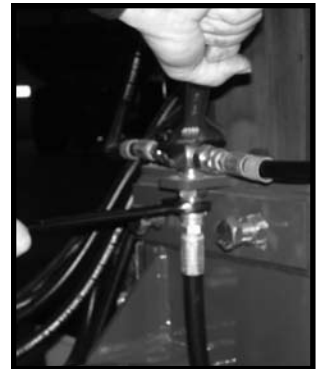


**For pad replacement** (d) As shown below, remove safety hook, disconnect hydraulic hose, remove nut on bulkhead fitting and remove fitting from cap..

D01190729



D01190725



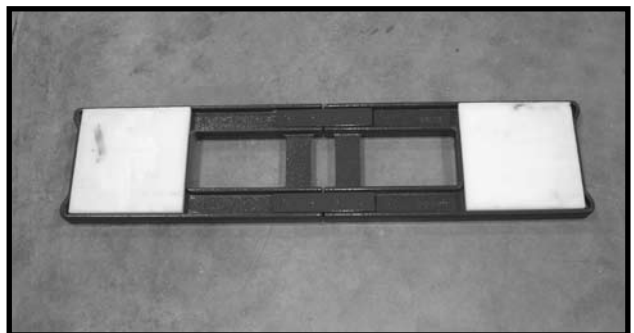
(e) Loosen the four cap mounting nuts and remove pad holder cap. (f) Loosen the pad hex jam nuts, back the pad screws out and remove the four pad holder assemblies as shown below.

D01190737



(g) Remove old pads and install new pads. NOTE: Apply a small amount of weather stripping adhesive to hold the pads in place while the pad holder is being reinstalled.

D01190739



# MAINTENANCE

(h) To adjust the pads, the pad set screws should be drawn tight, backed off and turned in until there is light contact with the pad holder. (i) Tighten hex jam nuts. (j) Torque hex jam nuts to 200 ft. lbs.

**IMPORTANT: DO NOT OVERTIGHTEN WEAR PADS. OVER TIGHTENING WILL CAUSE PREMATURE WEAR AND EXCESSIVE HYDRAULIC LIFT PRESSURES.**

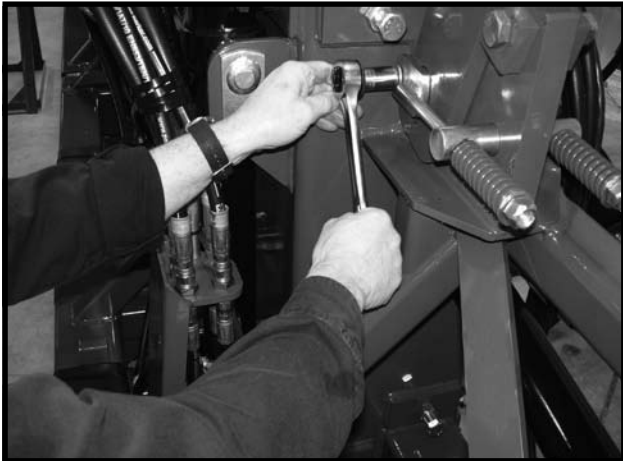
(k) Reinstall cap and tighten cap mounting nuts. (l) Reinstall hydraulic hose, fittings and safety hook.

D01190744



(m) Adjust stop on safety hook. Maximum clearance should be  $\frac{1}{2}$ " and minimum clearance  $\frac{1}{8}$ " as shown above.

D01190727

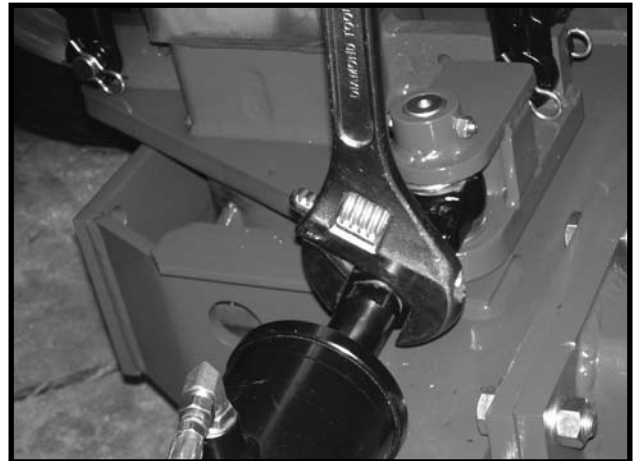


(n) Rotate cam roller against front guide and tighten to 200 ft. lbs. Make sure gap between roller guide and center frame are equal on both sides. (o) Raise planter out of the roller guides and lower back down into roller guides to be sure the roller guides operate smoothly. If not, adjust the rotation cylinder rod as shown below.

D01190731



D01190732



(p) Reset row unit down pressure and other attachments from STEP c.

# MAINTENANCE

## PISTON PUMP STORAGE

**IMPORTANT: KEEP AIR OUT OF PUMP! This is the only way to prevent corrosion. Even for short periods of storage, the entrance of air into the pump, will cause RAPID AND SEVERE CORROSION.**

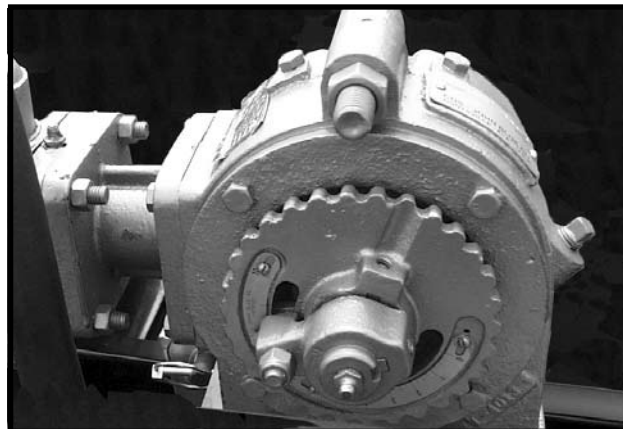
### Overnight Storage

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

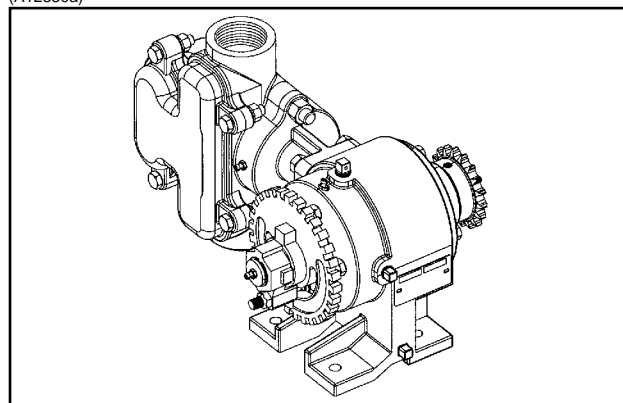
### Winter Storage

1. Flush pump thoroughly with 5 to 10 gallons of fresh water and circulate until all corrosive salts are dissolved in the pump.
2. With the pump set on 10, draw in a mixture of half diesel fuel and half 10 weight oil until the discharge is clean. Then plug inlet and outlet.

D071504102a



(A12330a)



## PISTON PUMP TROUBLESHOOTING

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

# MAINTENANCE

## PREPARATION FOR STORAGE

Store the planter in a dry sheltered area if possible.

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

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

Lubricate planter and row units at all lubrication points.

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

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

Clean seed meters and store in a rodent-free, dry area.

Remove seed discs from brush-type seed meters, clean and store meters with discs removed.

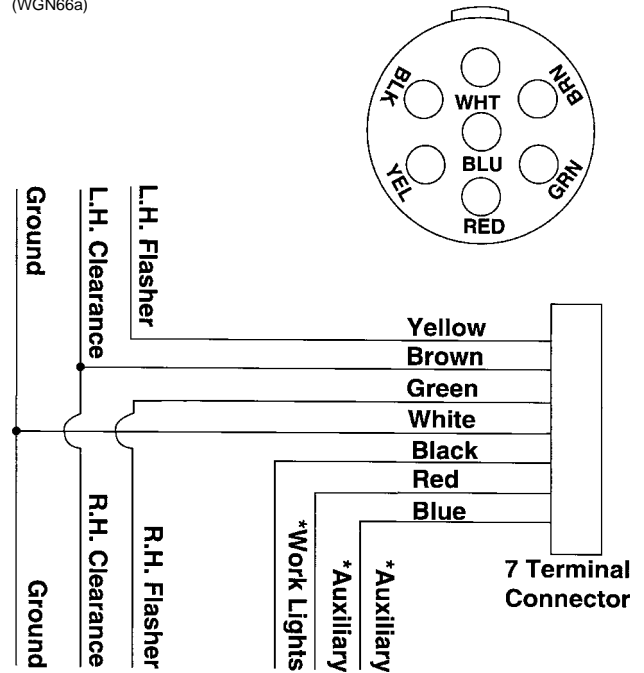
Disassemble, clean and grease all U-joint slides.

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

Flush liquid fertilizer metering pump with clean water. See "Piston Pump Storage".

## ELECTRICAL WIRING DIAGRAM FOR LIGHT PACKAGE

(WGN66a)



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

The light package supplied on the Model 3650 Twin-Line® Planter meets ASAE Standards. For the correct wiring harness to be wired into the lights on your tractor, check with the tractor manufacturer.

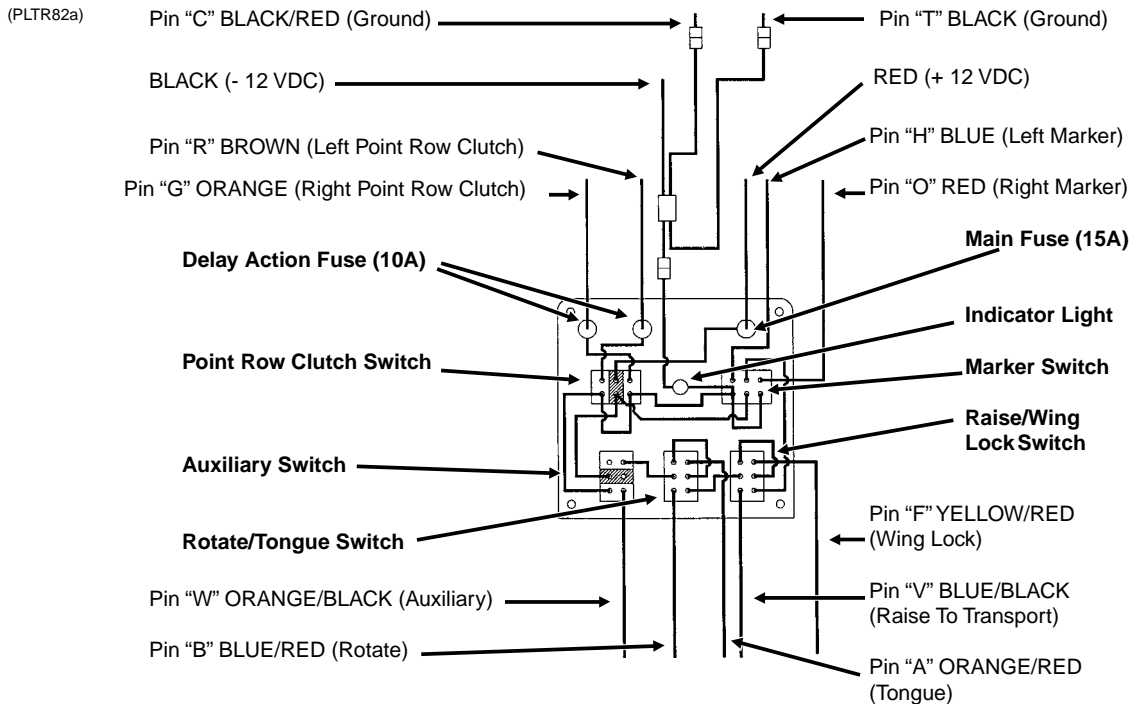
69922-35



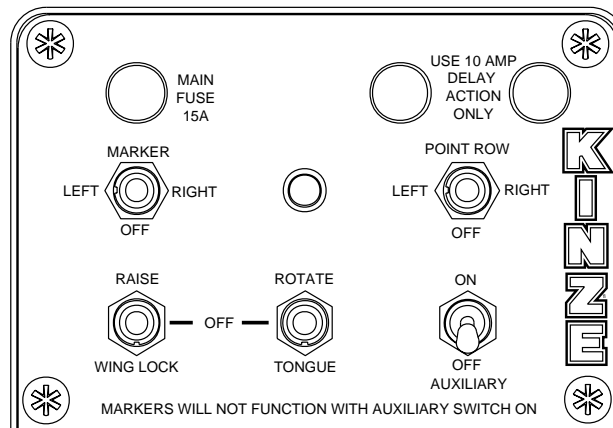
# MAINTENANCE

## ELECTRICAL CONTROL CONSOLE SCHEMATIC (Conventional Planter)

**IMPORTANT:** Before doing any electrical work, disconnect the control console from the tractor battery. 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 the tractor frame are clean to provide good electrical contact.



(INS238)



### NOTE:

1. Operating marker or point row switch in either direction lights panel light.
2. Point row clutch switch operates independently of the rest of the control box.
3. Power to the marker switch is fed through the auxiliary switch and the two transport function switches. Operating any of the switches in the lower row disables the marker function and turns off the panel light. (If the point row clutch switch is in the "off" position.)

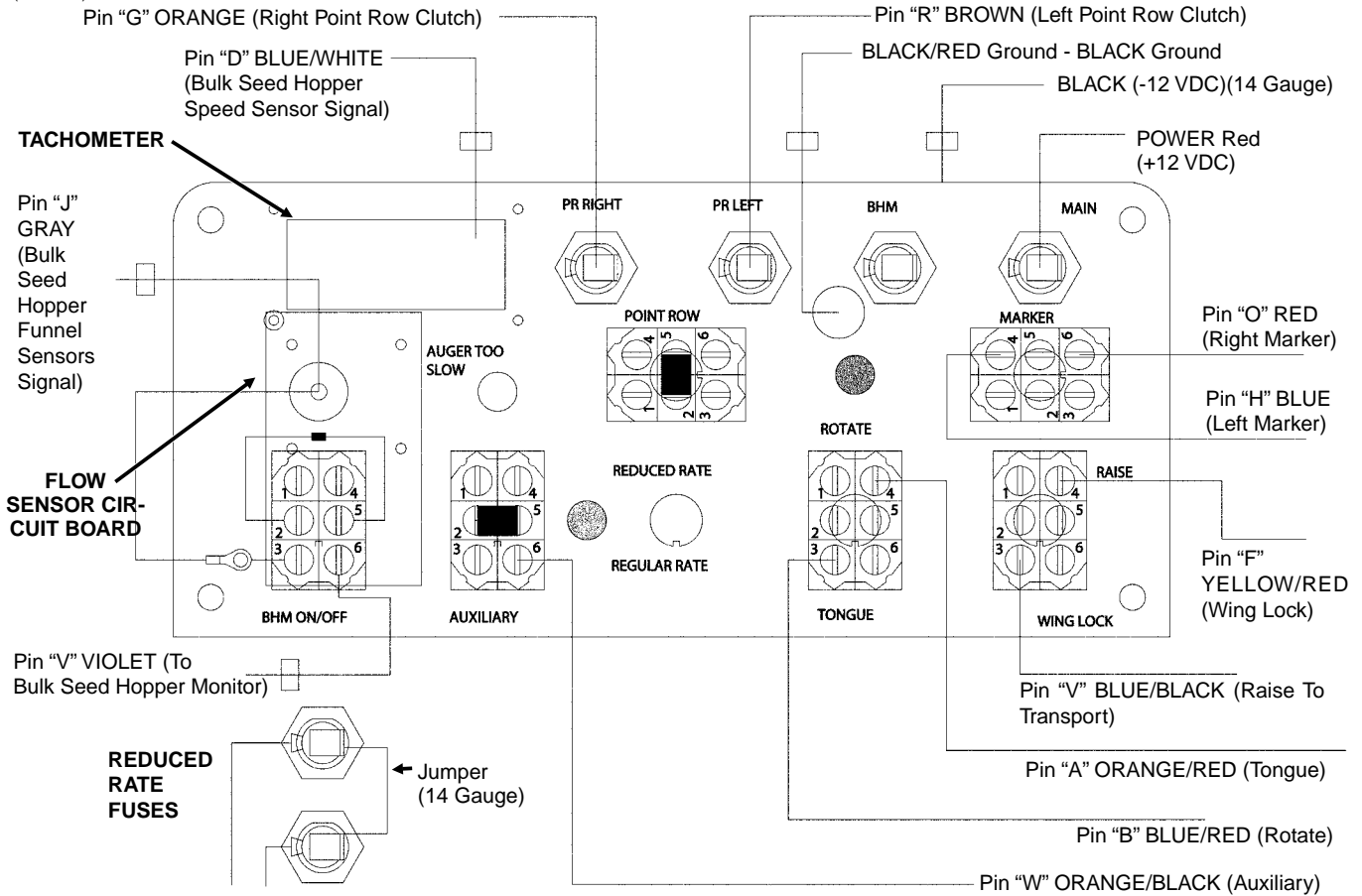
See pages 10-48 and 10-49 for electrical control console schematic and wiring harness to two-speed point row clutch solenoids for planter equipped with the optional Two-Speed Point Row Clutch Package.

# MAINTENANCE

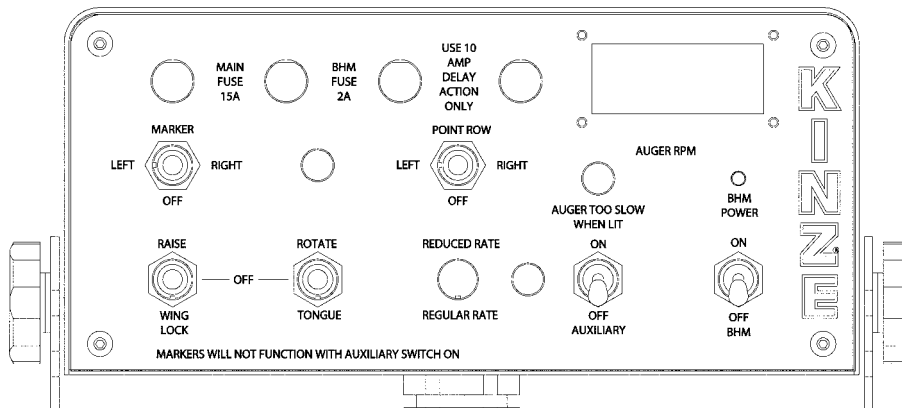
## ELECTRICAL CONTROL CONSOLE SCHEMATIC (SDS Planter)

**IMPORTANT:** Before doing any electrical work, disconnect the control console from the tractor battery. 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 the tractor frame are clean to provide good electrical contact.

(A10189a)



(A10189b)



### NOTE:

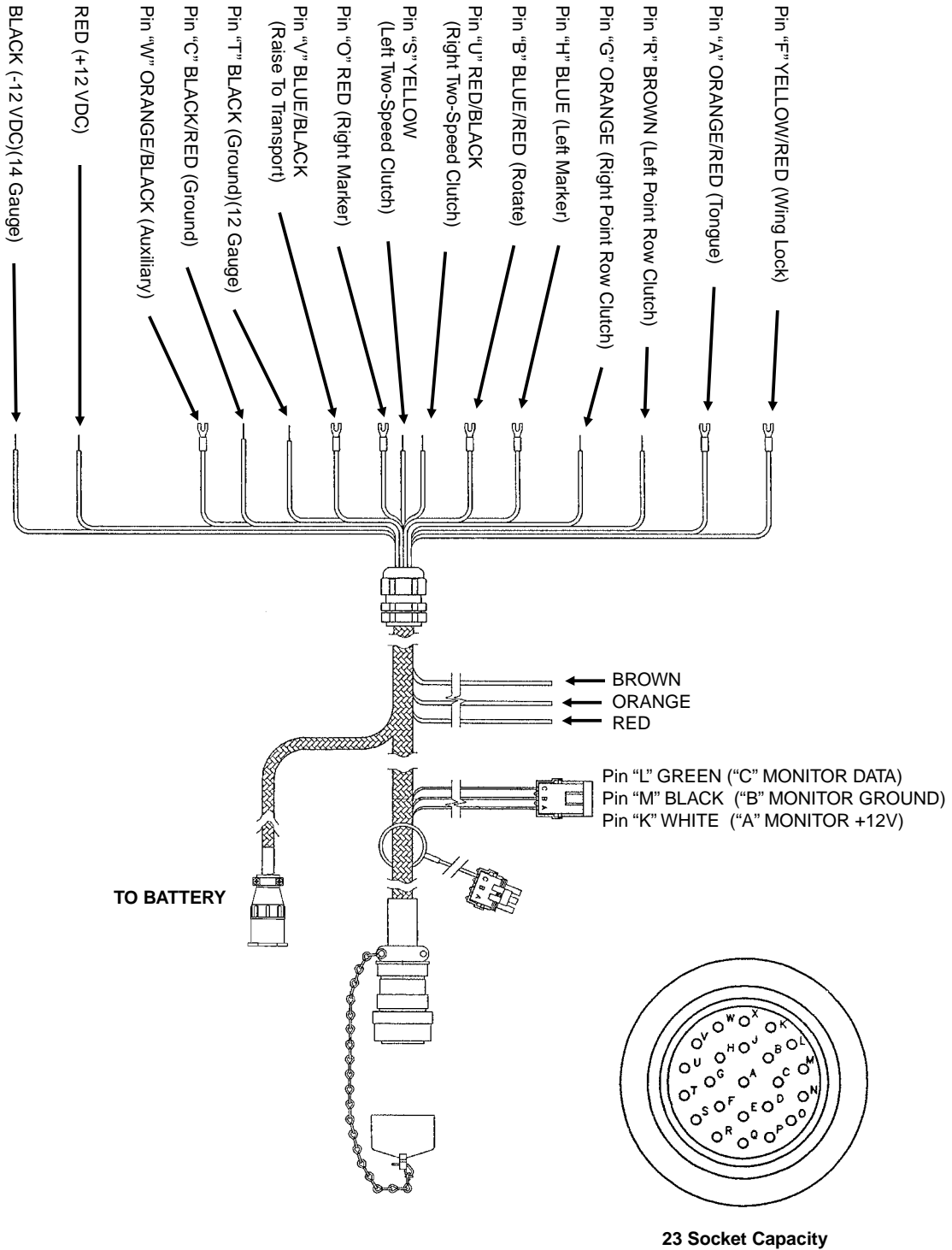
1. Operating marker or point row switch in either direction lights panel light.
2. Point row clutch switch operates independently of the rest of the control box.
3. Power to the marker switch is fed through the auxiliary switch and the two transport function switches. Operating any of the switches in the lower row disables the marker function and turns off the panel light. (If the point row clutch switch is in the "off" position.)

See pages 10-46 and 10-47 for electrical control console schematic and wiring harness to two-speed point row clutch solenoids for planter equipped with the optional Two-Speed Point Row Clutch Package.

# MAINTENANCE

## ELECTRICAL WIRING HARNESS SCHEMATIC (On Tractor - Conventional Planter)

(ELC10c/ELC13)

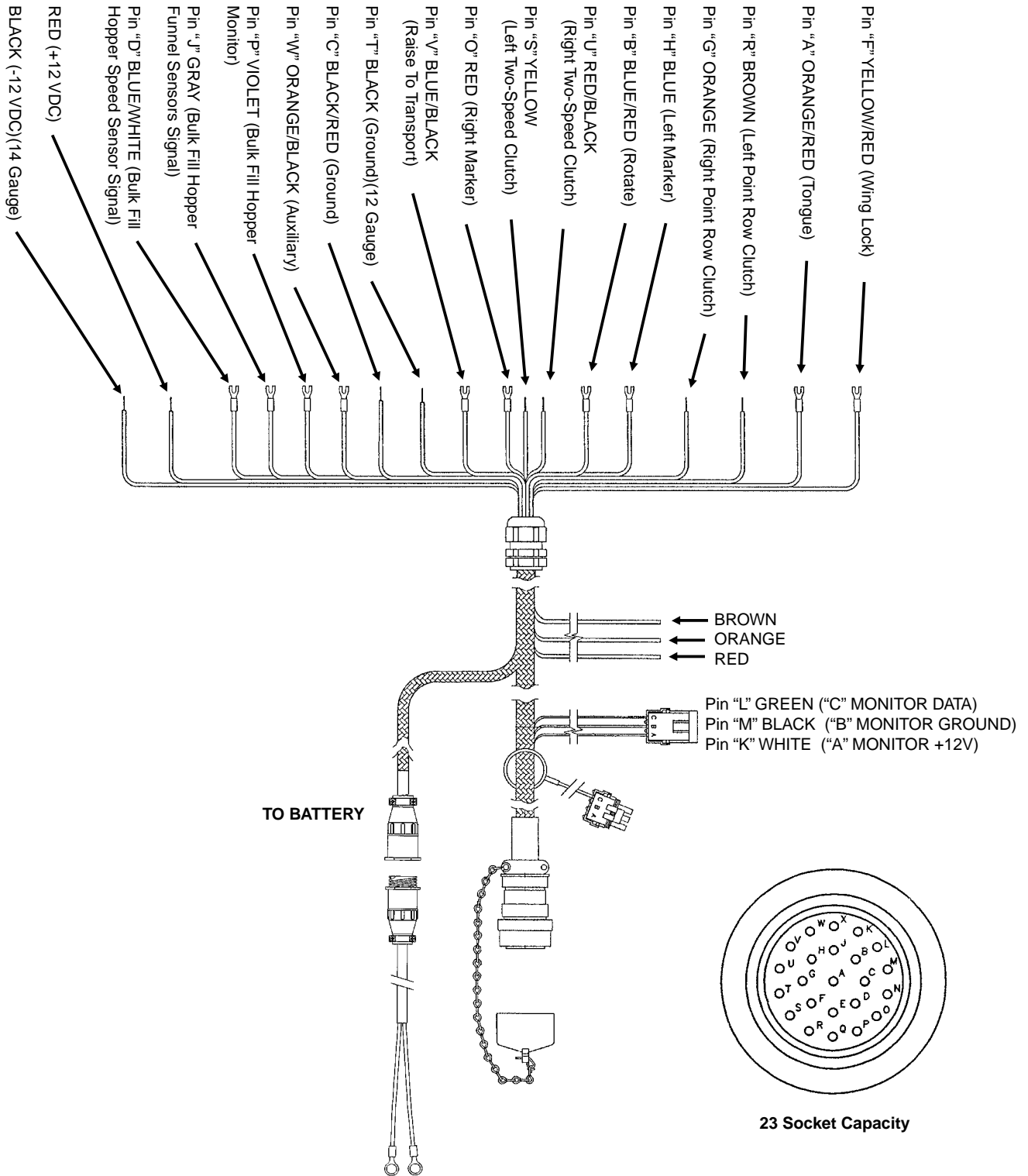




# MAINTENANCE

## ELECTRICAL WIRING HARNESS SCHEMATIC (On Tractor - SDS Planter)

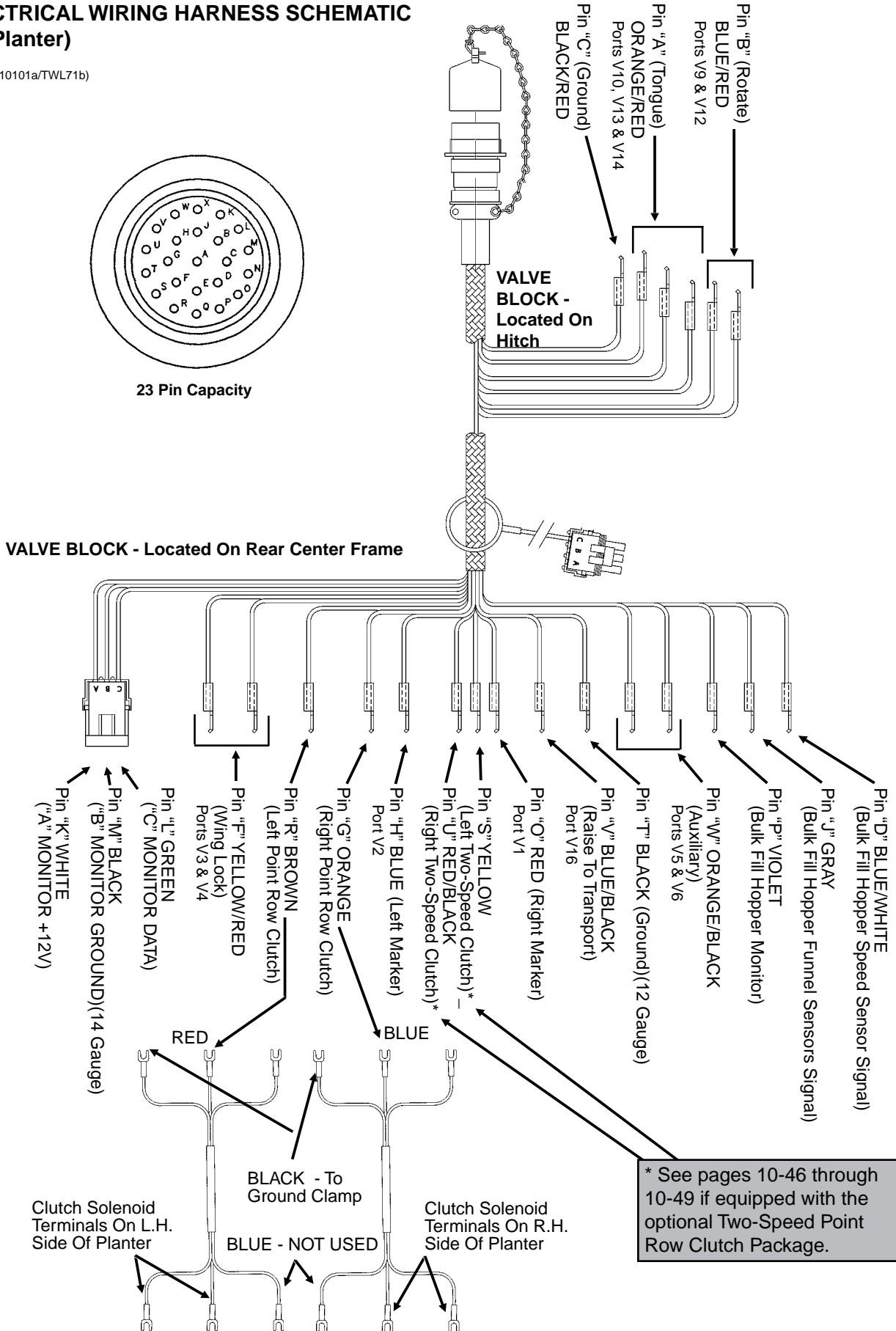
(ELC10d/ELC13)



# MAINTENANCE

## ELECTRICAL WIRING HARNESS SCHEMATIC (On Planter)

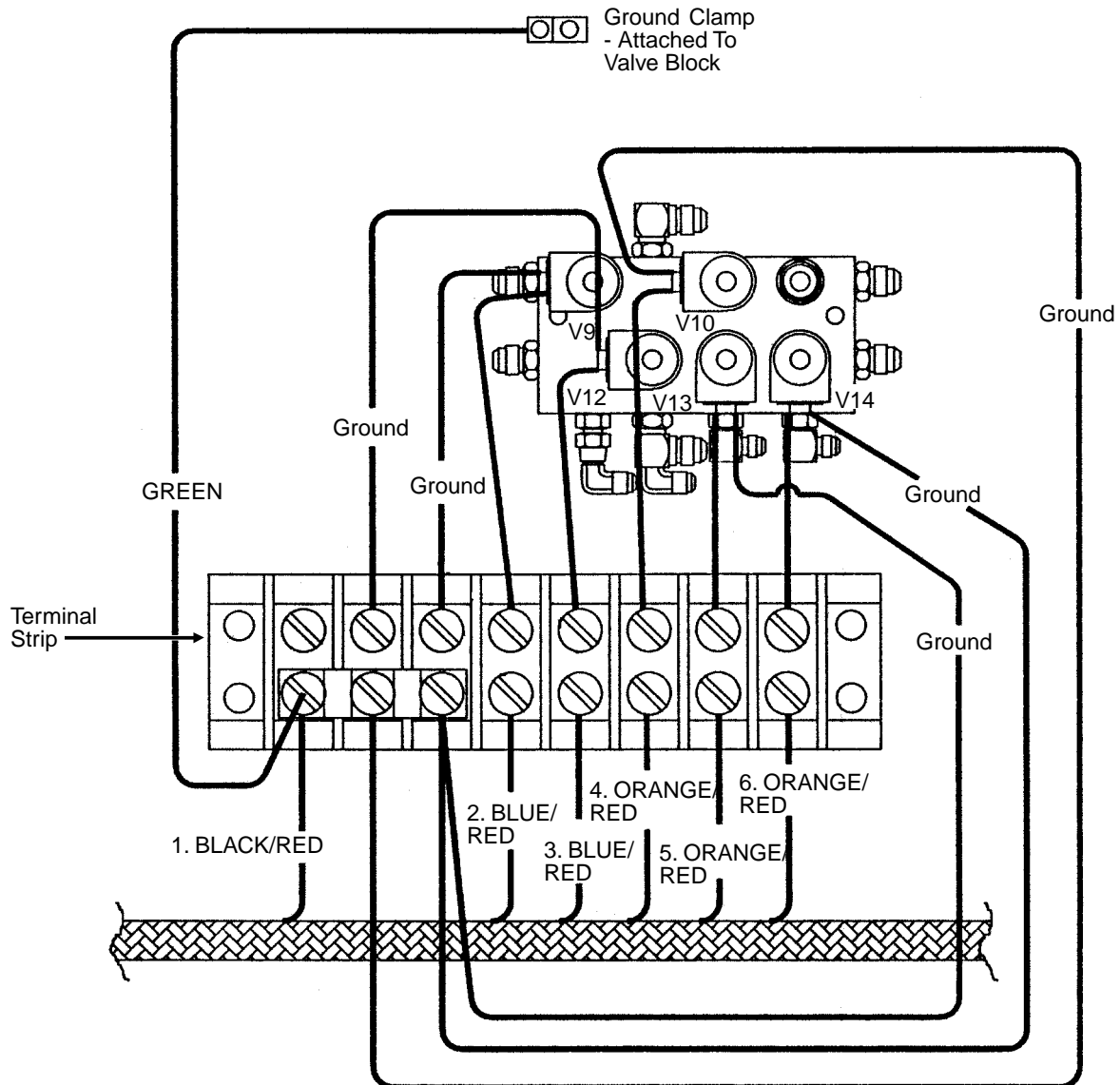
(ELC13/A10101a/TWL71b)



# MAINTENANCE

(A7012a)

## VALVE BLOCK - Located On Hitch

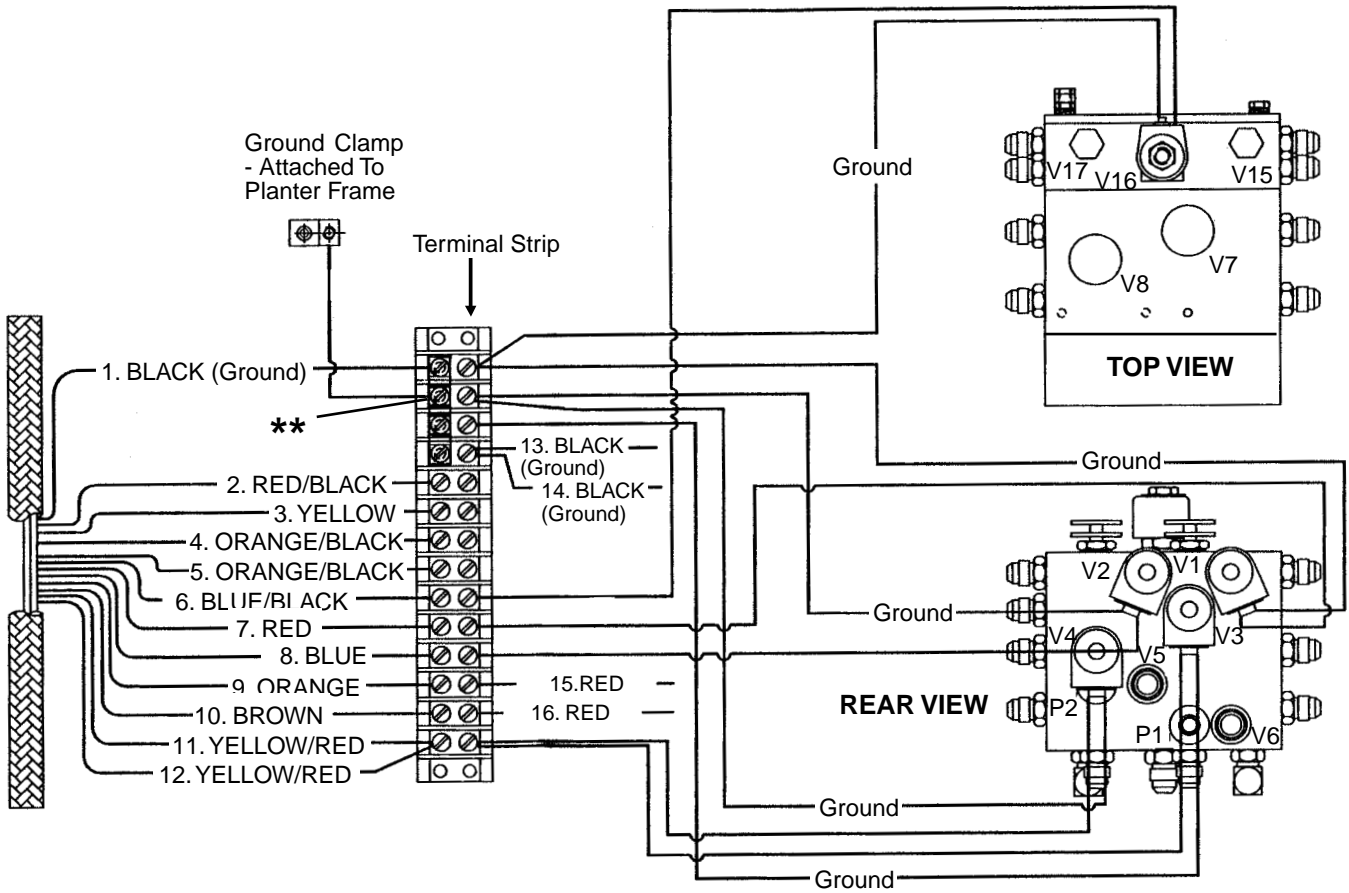


1. BLACK/RED - Pin "C" (Ground)
2. BLUE/RED - Pin "B" (Rotate) - Port V9
3. BLUE/RED - Pin "B" (Rotate) - Port V12
4. ORANGE/RED - Pin "A" (Tongue) - Port V10
5. ORANGE/RED - Pin "A" (Tongue) - Port V13
6. ORANGE/RED - Pin "A" (Tongue) - Port V14

# MAINTENANCE

(A7102a)

## VALVE BLOCK - Located On Rear Center Frame



1. BLACK - Pin "T" (Ground)
2. RED/BLACK - Pin "U" (Right Two-Speed Clutch)\*
3. YELLOW - Pin "S" (Left 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" (Right Marker) - Port V1
8. BLUE - Pin "H" (Left Marker) - Port V2
9. ORANGE - Pin "G" (Right Point Row Clutch)
10. BROWN - Pin "R" (Left 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 pages 10-46 through 10-49 if equipped with the optional Two-Speed Point Row Clutch Package.

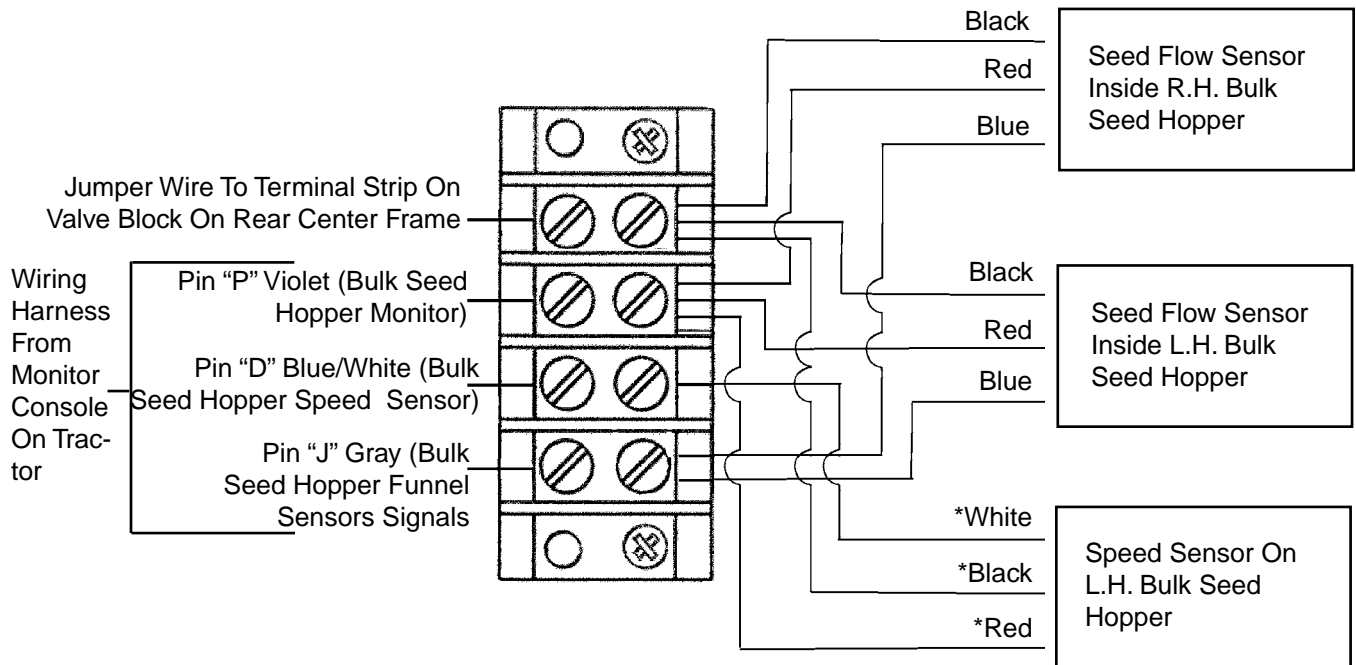
\*\* 3650 SDS Only - Jumper wire to terminal strip on rear center frame valve block cover.

# MAINTENANCE

## BULK SEED HOPPER MONITOR SYSTEM WIRING SCHEMATIC (SDS Planter)

(ELC43)

TERMINAL STRIP - Located On Rear Center Frame Valve Block Cover

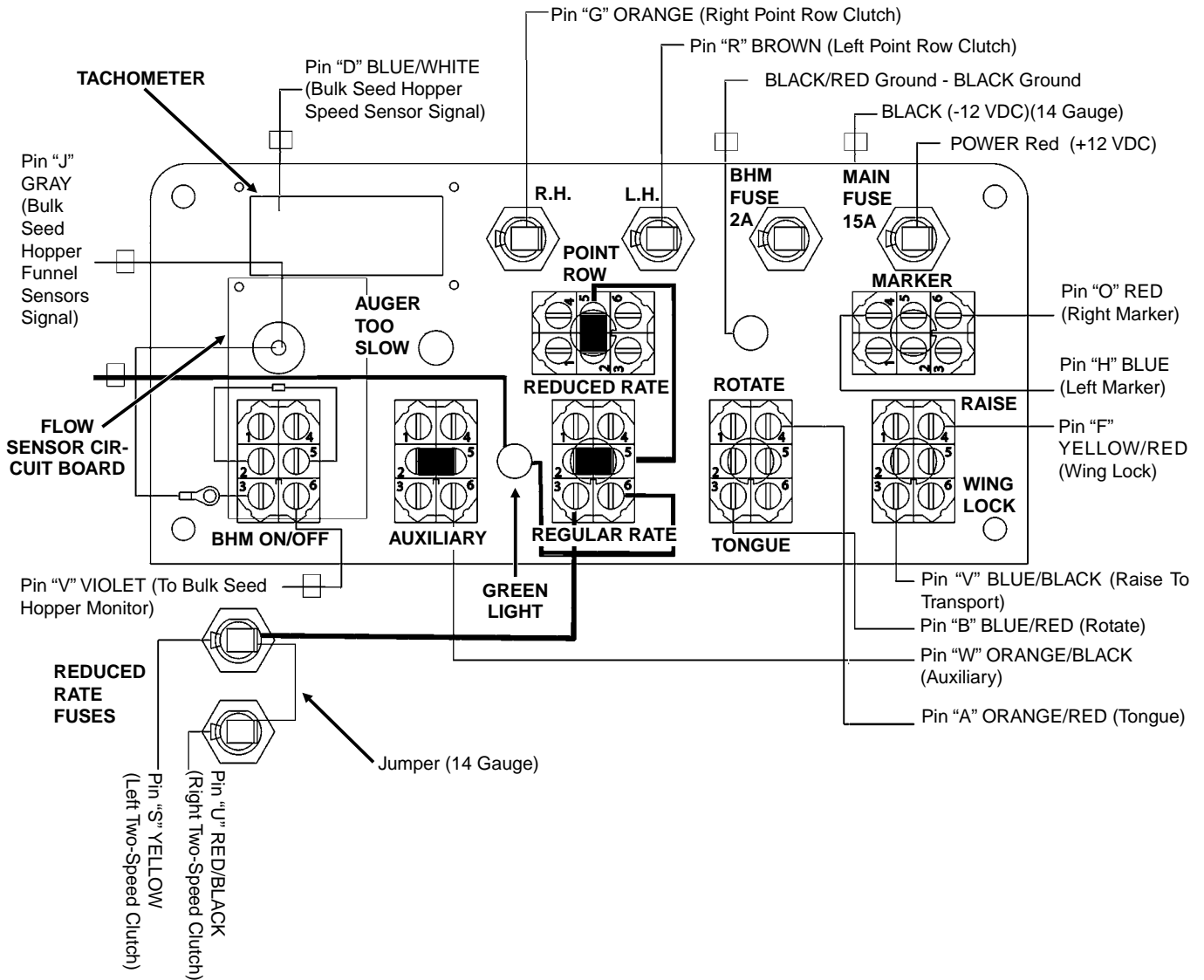


\* Speed sensor wire colors are identified by heat shrink tape.

# MAINTENANCE

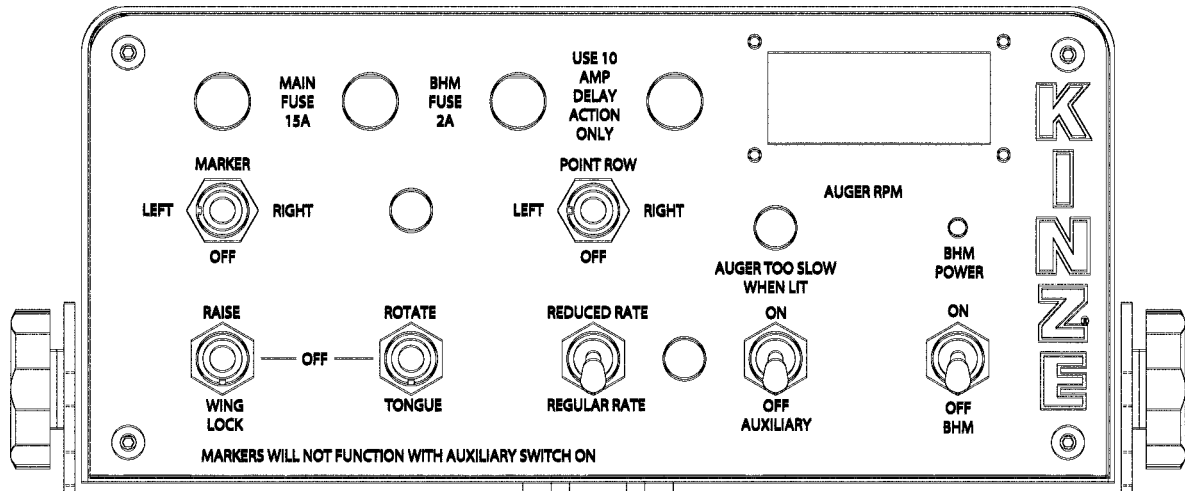
## ELECTRICAL CONTROL CONSOLE SCHEMATIC (With Optional Two-Speed Point Row Clutches) (SDS Planter)

(ELC42b/A10189c)



# MAINTENANCE

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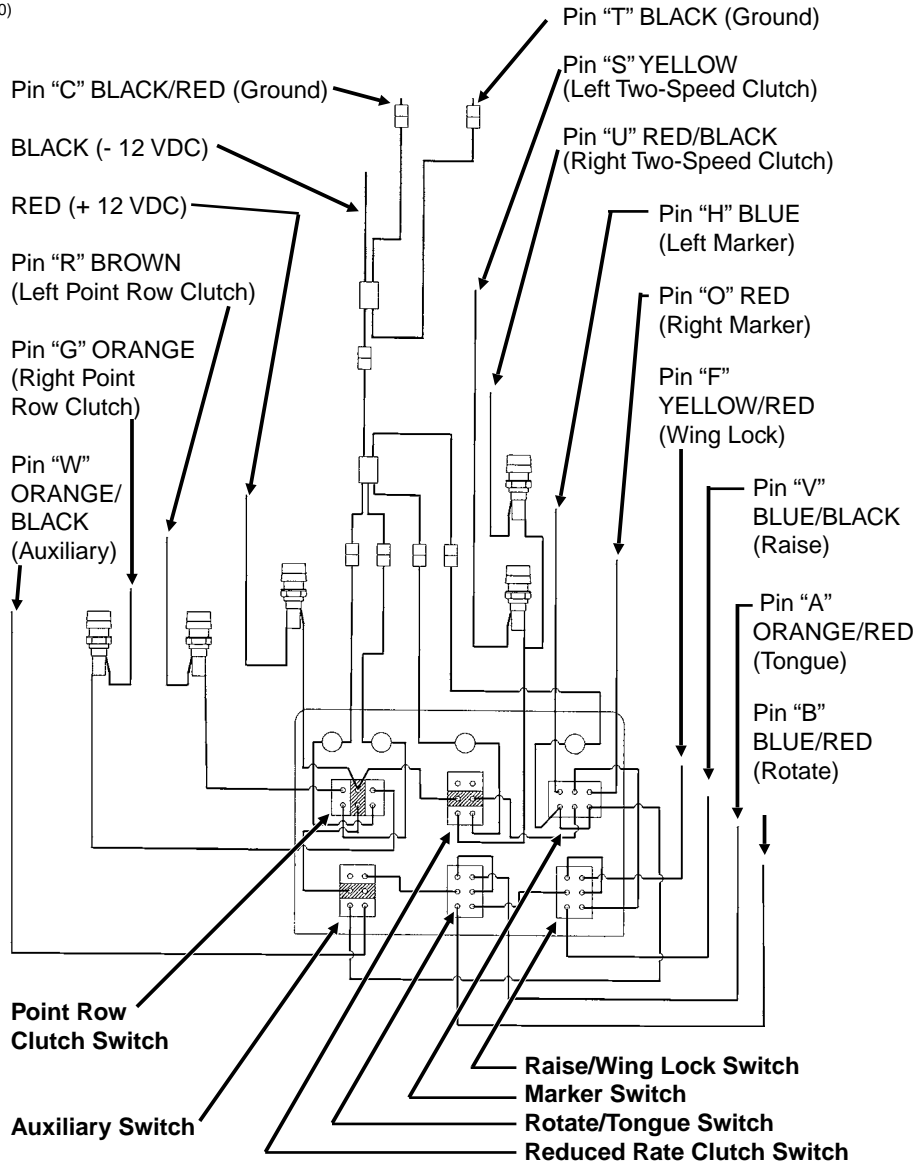
**NOTE:**

1. Point row and reduced rate clutch switches operate independently of the rest of the control console.
2. Power to the marker switch is fed through the auxiliary switch and the two transport function switches. Operating any of the switches in the lower row disables the marker function and turns off the panel light for the markers.

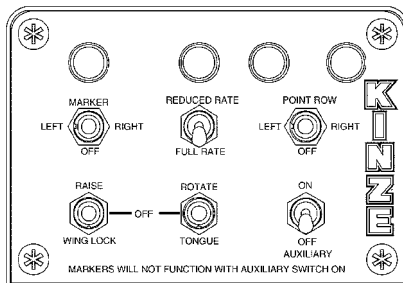
# MAINTENANCE

## ELECTRICAL CONTROL CONSOLE SCHEMATIC (With Optional Two-Speed Point Row Clutches) (Conventional Planter)

(PLTR90a/TWL71d/INS70)



(INS260)



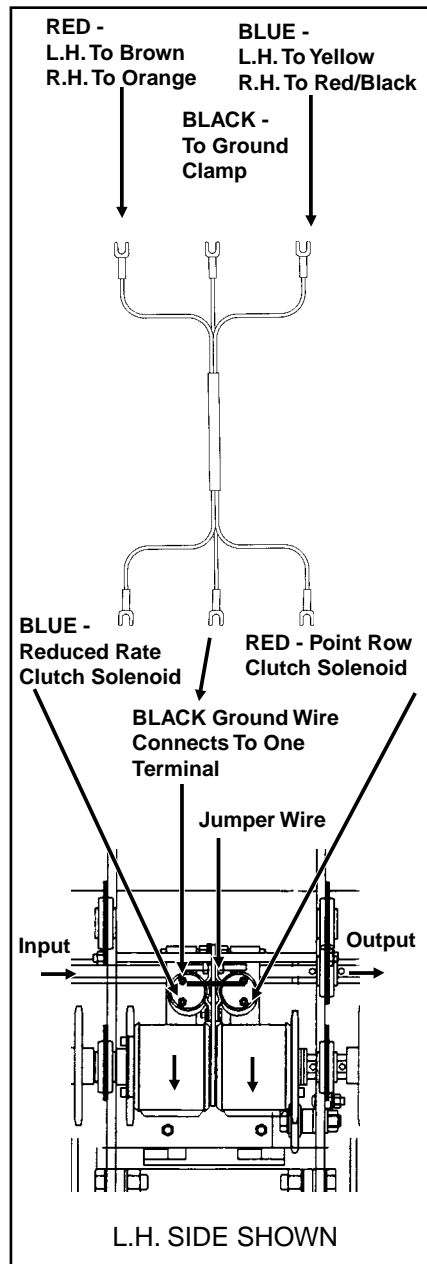
### NOTE:

1. Point row and reduced rate clutch switches operate independently of the rest of the control console.
2. Power to the marker switch is fed through the auxiliary switch and the two transport function switches. Operating any of the switches in the lower row disables the marker function and turns off the panel light for the markers.



# MAINTENANCE

## ELECTRICAL WIRING HARNESS AT TWO-SPEED POINT ROW CLUTCHES (SDS And Conventional Planters)

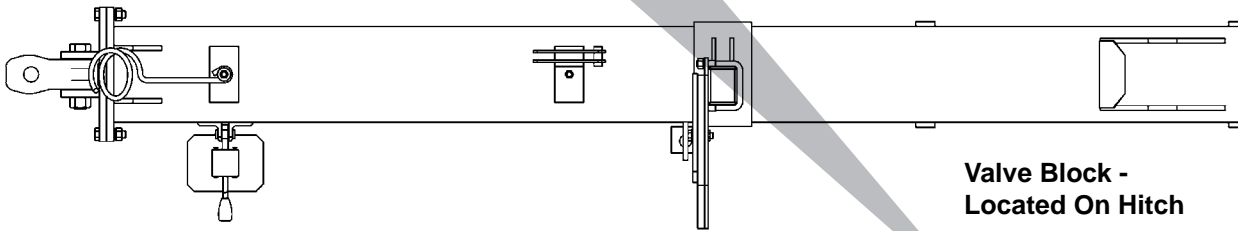
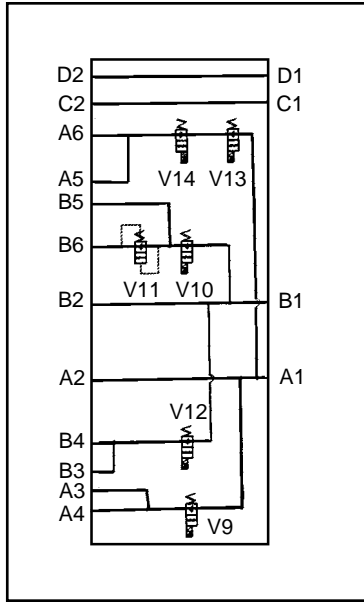


**NOTE:** Before doing any electrical work, disconnect the control console from the tractor battery. Keep wiring harnesses away from high temperature areas or sharp edges. DO NOT route the wiring harnesses along battery cables. Use tie straps to keep wire harness away from moving parts on tractor and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

# MAINTENANCE

## HYDRAULIC SYSTEM SCHEMATIC (Conventional And SDS Planters)

(TWL206c/A10125a)



Markers, Wing Lock And Fold

**Blue BB (Pressure)**

**Blue AA (Return)**

**Red BB (Pressure)**

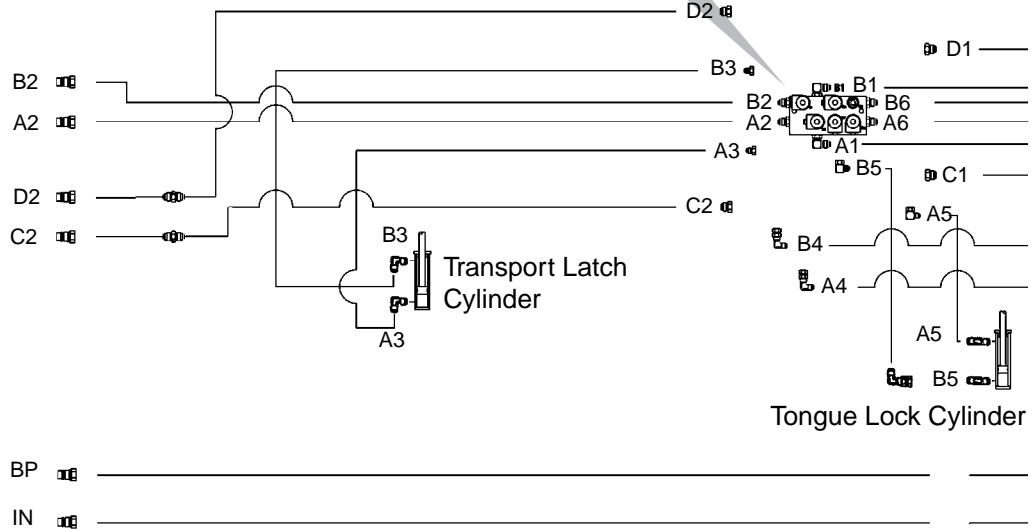
**Red AA (Return)**

Planter Lift

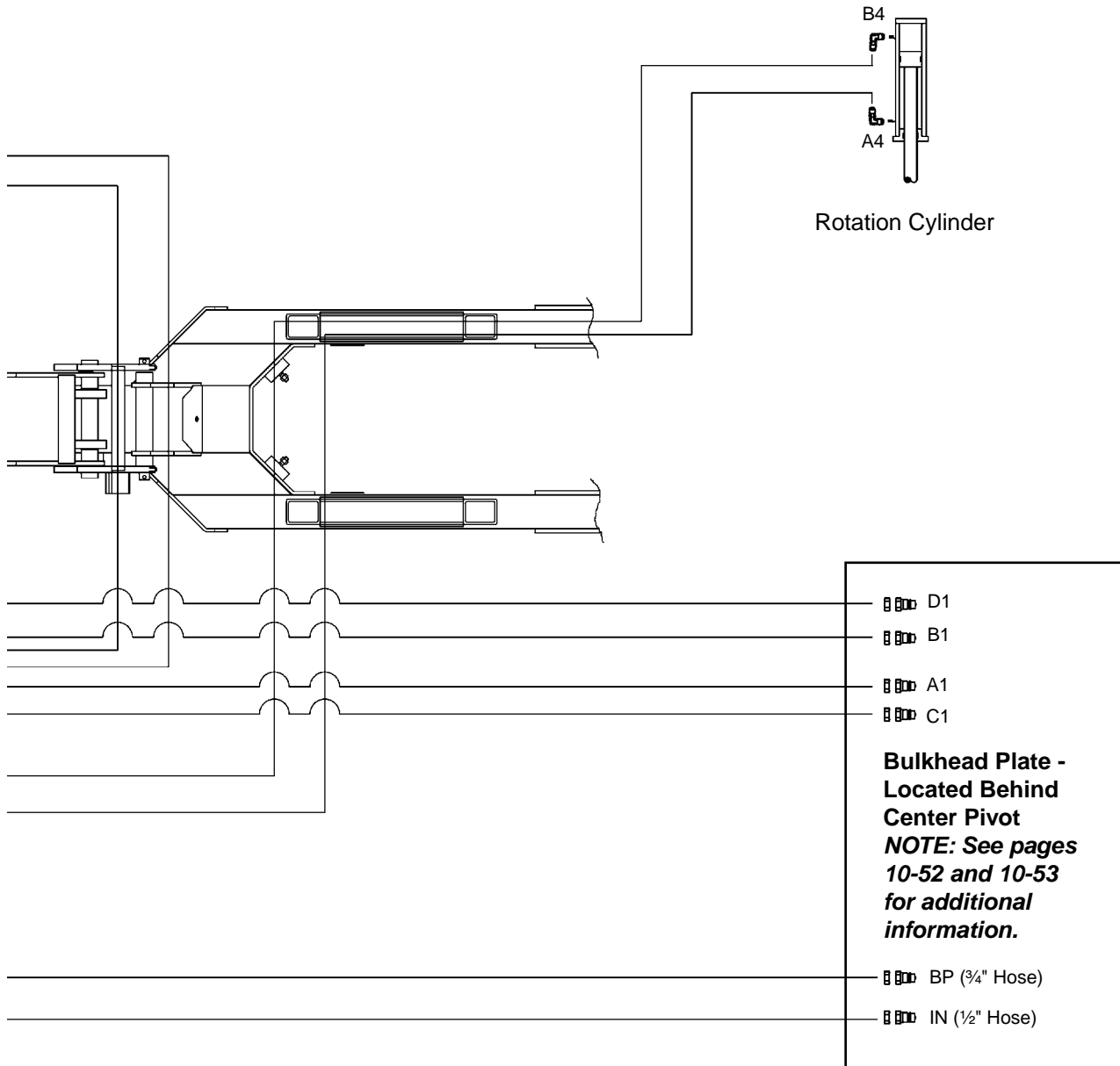
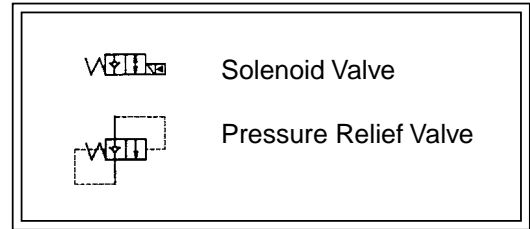
Hydraulic Motor (SDS Only)

**Green AA (Return)**

**Green BB (Pressure)**



# MAINTENANCE



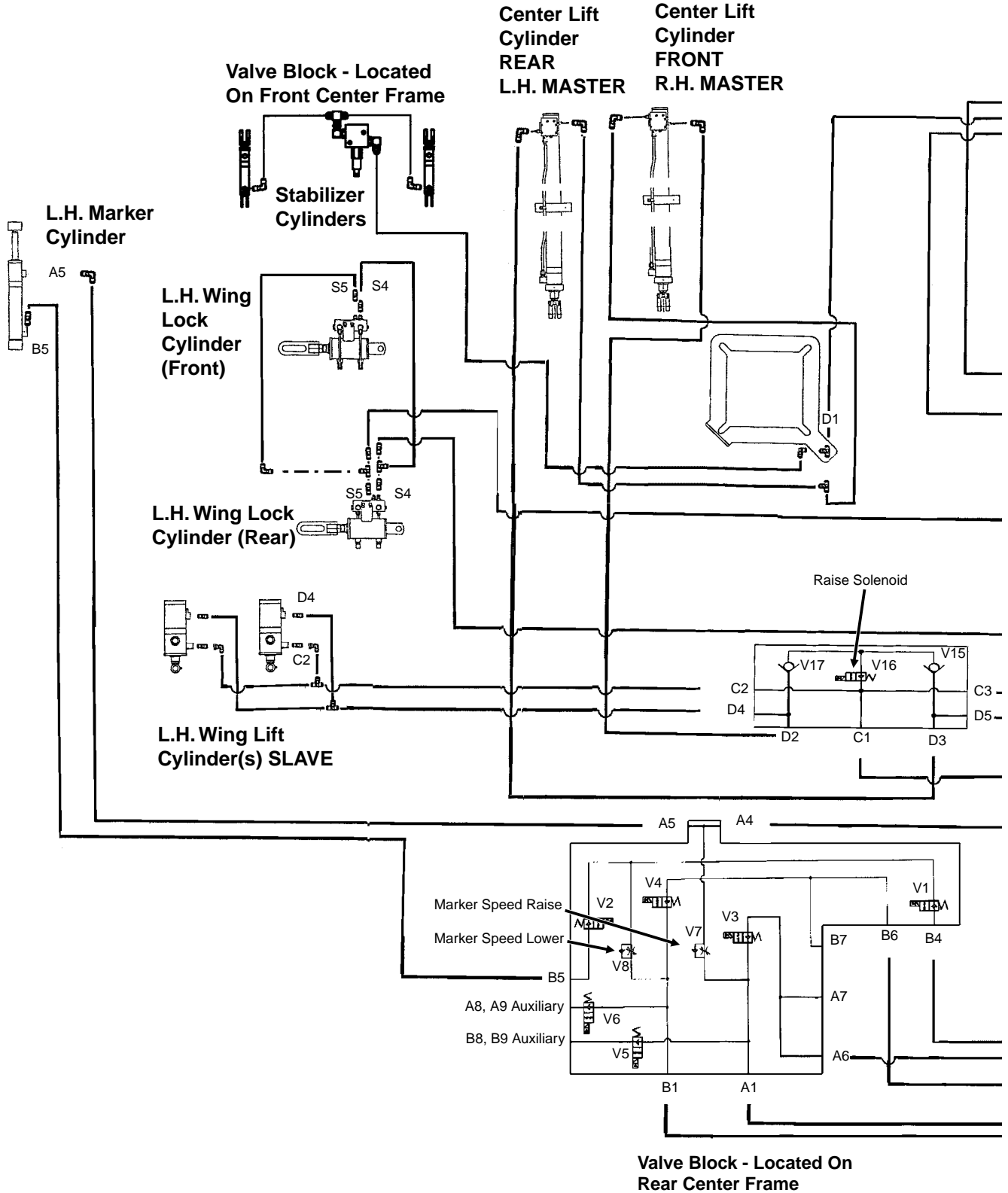
# MAINTENANCE

## HYDRAULIC SYSTEM SCHEMATIC (Conventional And SDS Planters)

12 Row 30" (One Wing Lift Cylinder Per Wing)

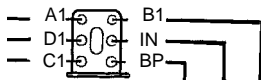
16 Row 30" Shown (Two Wing Lift Cylinders Per Wing)

(TWL207e)



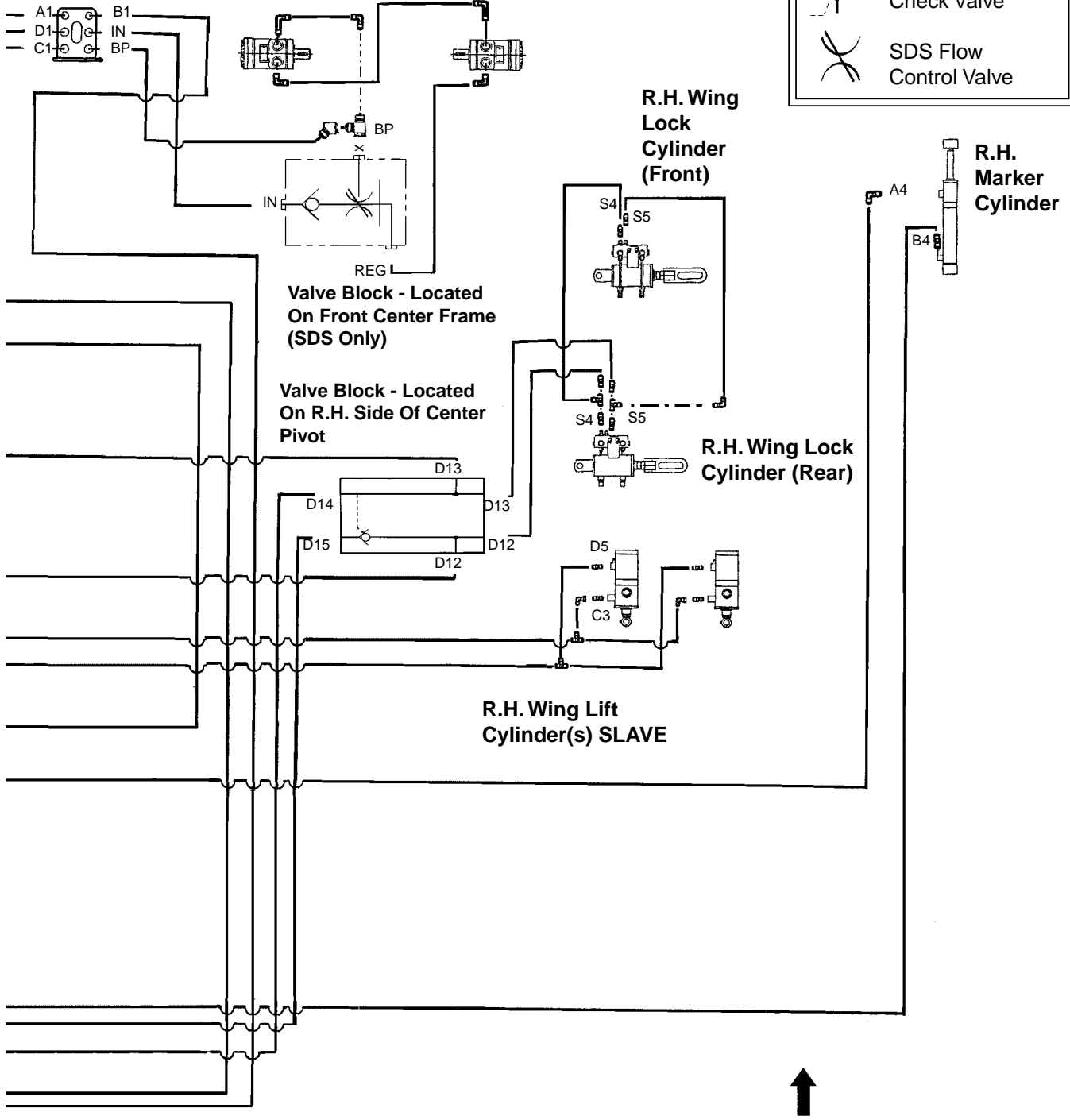
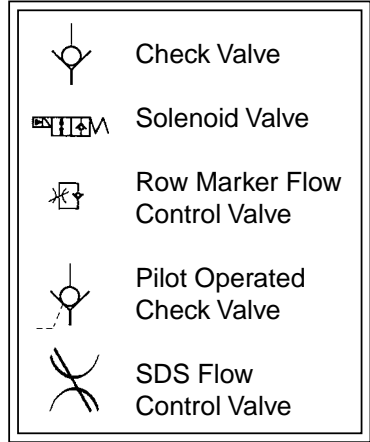
# MAINTENANCE

**Bulkhead Plate - Located Behind Center Pivot**  
**NOTE: See pages 10-50 and 10-51 for additional information.**



**Hydraulic Motor - Left Side Of Planter (SDS Only)**

**Hydraulic Motor - Right Side Of Planter (SDS Only)**



**↑**  
**DIRECTION OF TRAVEL**

# MAINTENANCE

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## FERTILIZER

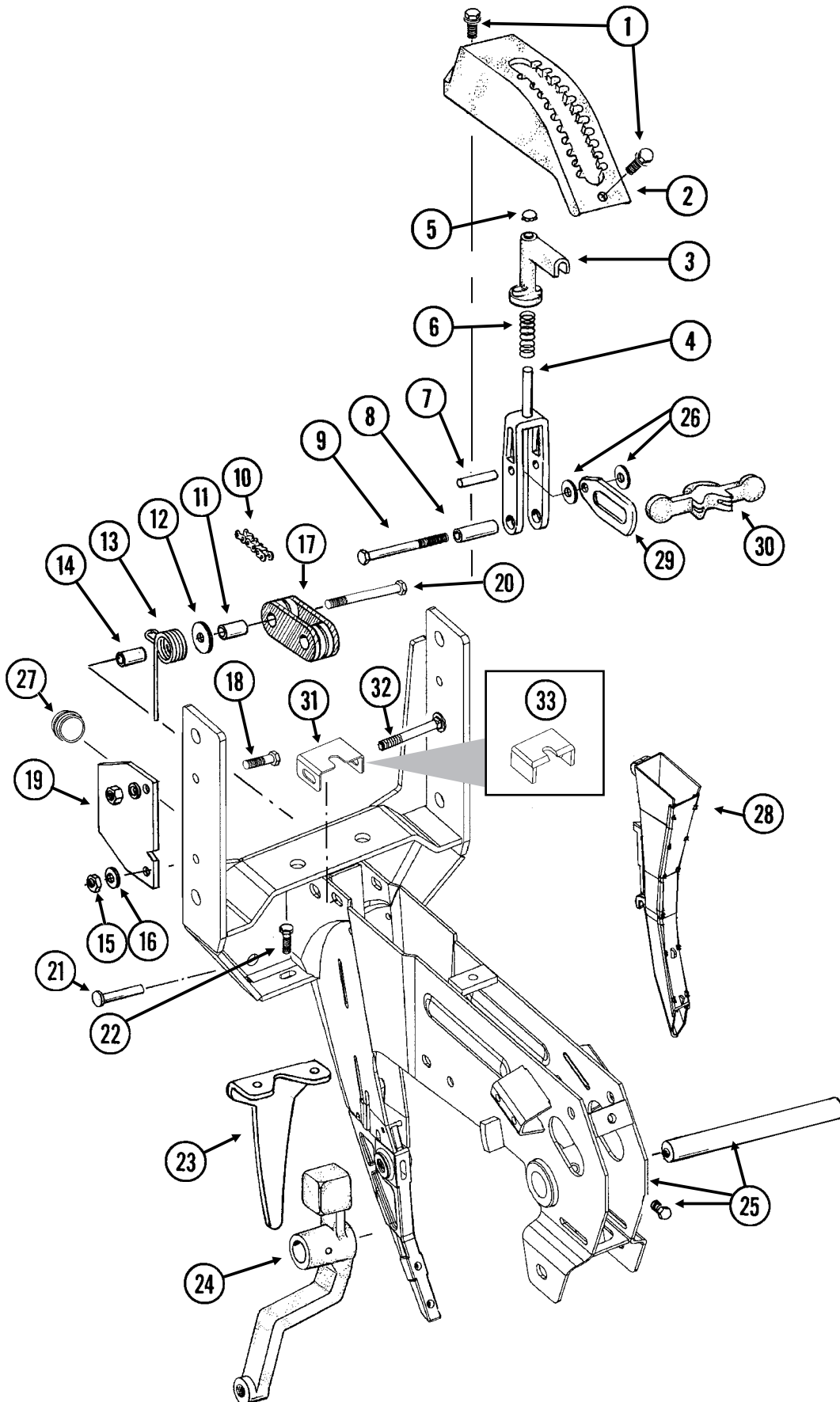
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# SHANK ASSEMBLY, SEED TUBE AND DEPTH ADJUSTMENT

(METR29cc)





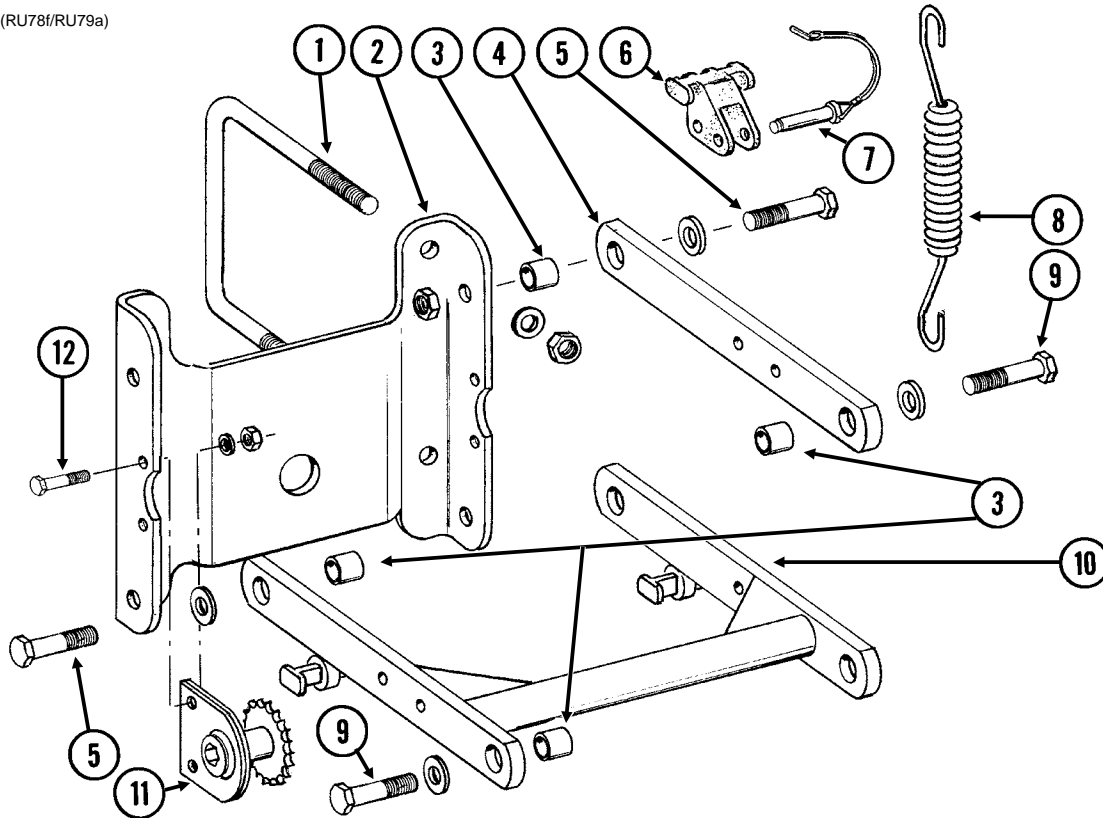
# SHANK ASSEMBLY, SEED TUBE AND DEPTH ADJUSTMENT

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ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G11015	2	Hex Washer Head Cap Screw, 3/8"-16 x 1 1/4"
2.	GB0274	1	Cover, Depth Adjustment
3.	GB0266	1	Handle, Depth Adjustment
4.	GB0267	1	Lever, Depth Adjustment
5.	GD3612	1	Cap Plug
6.	GD10993	1	Spring
7.	GD13361	1	Pin, 3/8" x 1 2/3"
8.	GD11259	1	Sleeve, 3/8" I.D. x 5/8" O.D. x 1 25/32" Long
9.	G11008	1	Hex Head Cap Screw, 3/8"-24 x 2 1/2", Grade 8
	G11007	1	Lock Nut, 3/8"-24, Grade C
10.	G3303-98	1	Chain, No. 41, 98 Pitch Including Connector Link
	GR0196	1	Connector Link, No. 41
11.	GD1026	1	Sleeve, 1 3/16" Long
12.	G10201	1	Special Washer, 3/8" x 1 1/2" O.D.
13.	GD1065	1	Idler Spring
14.	GD7318	1	Sleeve, 1" Long
15.	G10108	1	Lock Nut, 3/8"-16
16.	G10210	1	Washer, 3/8" USS
17.	GD11962	1	Idler
18.	G10003	3	Hex Head Cap Screw, 3/8"-16 x 1 1/2"
	G10108	3	Lock Nut, 3/8"-16
19.	GD10867	2	Stop
20.	G10326	1	Hex Head Cap Screw, 3/8"-16 x 3 3/4"
21.	G10551	1	Clevis Pin, 1/4" x 2 1/2"
	G10669	1	Hair Pin Clip, No. 22
22.	G10312	2	Carriage Bolt, 5/16"-18 x 3/4"
	G10620	2	Serrated Flange Nut, 5/16"-18
23.	GD1033	1	Shield
24.		-	See "Gauge Wheels", Pages P6 And P7
25.	GA10157	1	Shank W/Gauge Wheel Pivot Spindle And Set Screw
	GD11001	-	Spindle
	G10438	-	Hex Head Cap Screw, 1/2"-13 x 3/4"
26.	G10207	2	Washer, 7/8" O.D. x 1 3/32" I.D. x .134" (If Applicable)
27.	GD11845	1	Dust Cap
28.			See "KPM I Electronic Seed Monitor And KPM II Stack-Mode/KPM III Electronic Seed Monitors", Pages P110-P113
29.	GB0285	1	Collar, Depth Adjustment
30.	GB0265	1	Pivot Link, Depth Adjustment
31.	GD15970	1	Sun Shade
32.	G10304	1	Carriage Bolt, 3/8"-16 x 3"
	G10108	1	Lock Nut, 3/8"-16
33.	GD16245	-	Sun Shade (Rubber)

# PARALLEL ARMS, MOUNTING SUPPORT PLATE AND QUICK ADJUSTABLE DOWN FORCE SPRINGS

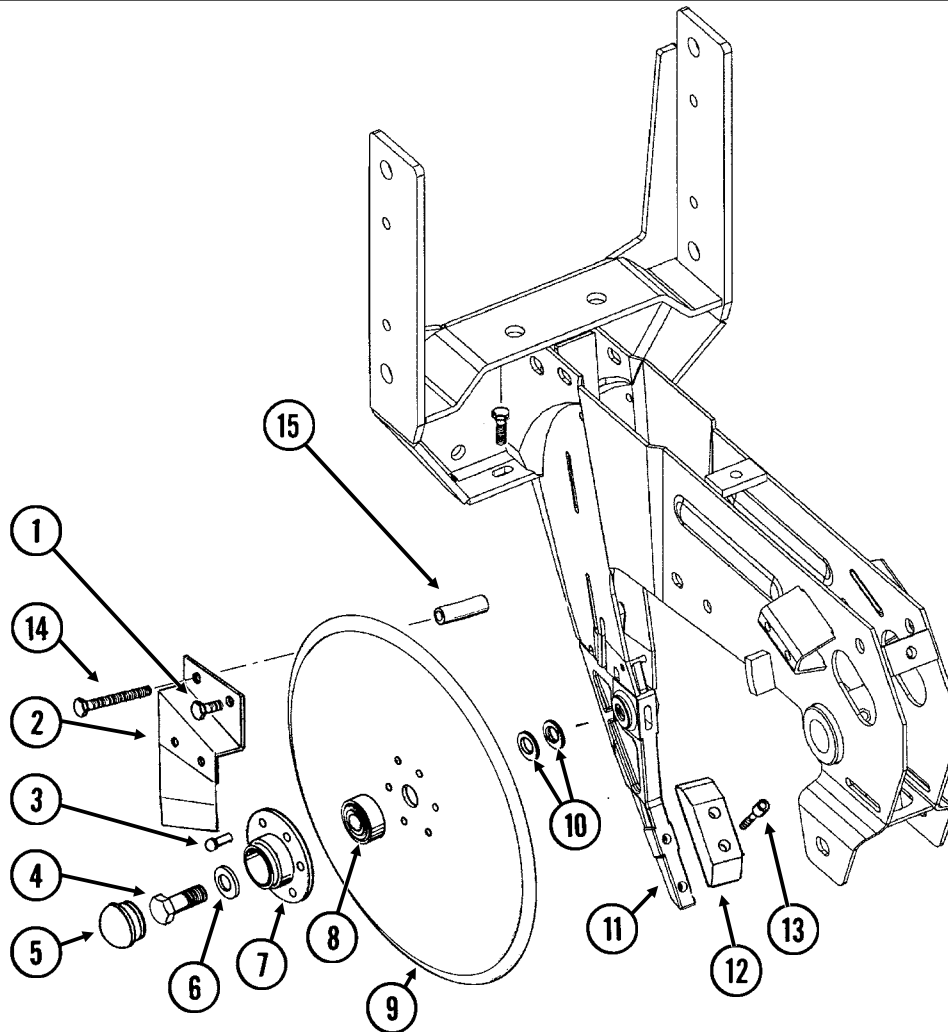
RUB021/RUB022(RU78f/RU79a)



ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GD1113	2	U-Bolt, 5" x 7" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
2.	GD10036	1	Mounting Support Plate
3.	GB0218	4	Bushing, 2 1/32" I.D. x 7/8" O.D. x 1 9/32" Long
4.	GD11422	2	Upper Parallel Arm
5.	G10732	4	Hex Head Cap Screw, 5/8"-18 x 2"
	GD7805	4	Special Washer, 5/8", Hardened
	G10412	4	Lock Nut, 5/8"-18
6.	GB0186	2	Spring Anchor
7.	GD14217	2	Tab Lock Pin, 7/16" x 1 1/2"
8.	GD8249	2-4	Spring
9.		-	See "Hopper Support And Meter Drive", Page P9
10.	GA5651	1	Lower Parallel Arm
11.	GA1720	1	Bearing/Sprocket, 7/8" Hex Bore
12.	G10001	2	Hex Head Cap Screw, 3/8"-16 x 1"
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
A.	G6325X	-	U-Bolt Package For 5" x 7" Toolbar, Includes: (2) GD1113, (4) G10230, (4) G10104

# 15" SEED OPENER DISC BLADE/BEARING ASSEMBLY AND SCRAPERS

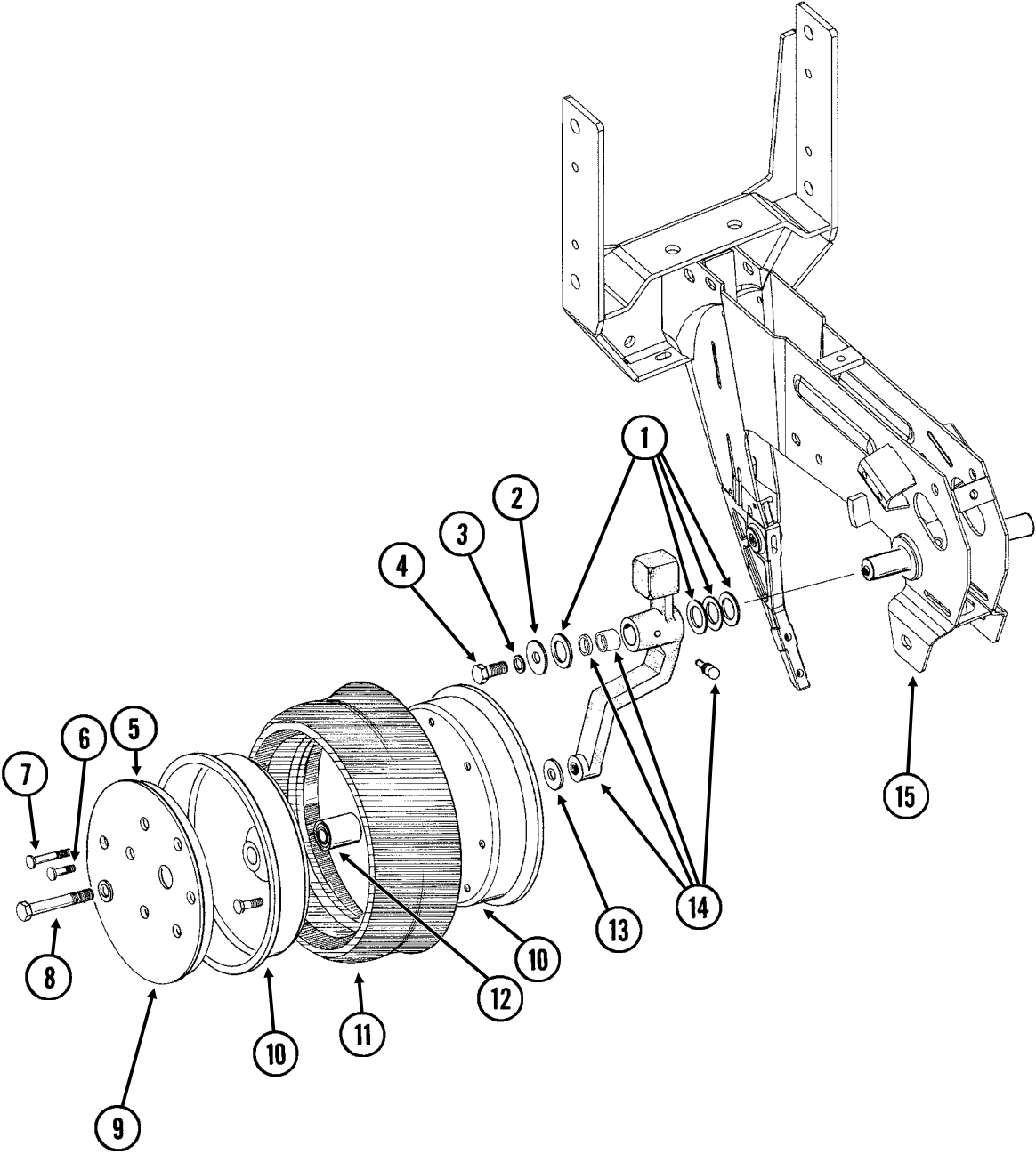
(RU139)



ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10328	2	Hex Head Cap Screw, 3/8"-16 x 5/8"
	G10622	2	Serrated Flange Nut, 3/8"-16
2.	GA2012R	1	Disc Scraper, R.H.
	GA2012L	-	Disc Scraper, L.H. (Shown)
3.	G10427	12	Rivet, 1/4" x 1/2"
4.	GD11017	1	Special Hex Head Cap Screw, 5/8"-11 x 1 1/2", L.H. Threads
	G10007	1	Hex Head Cap Screw, 5/8"-11 x 1 1/2"
5.	GD11845	2	Dust Cap
6.	G10204	2	Special Machine Bushing, 5/8" x 1" O.D.
7.	GD10473	2	Bearing Housing
8.	GA2014	2	Bearing
9.	GD11306	2	Disc Blade, 3.5 mm x 15"
10.	G10213	-	Machine Bushing, 5/8" (.030" Thick)(As Required)
11.		-	See "Shank Assembly", Pages P2 And P3
12.	GB0301	1	Seed Tube Guard/Inner Scraper
13.	G10912	2	Hex Socket Head Cap Screw, 5/16"-18 x 1", Grade 8
14.	G10325	1	Hex Head Cap Screw, 3/8"-16 x 2 3/4"
	G10622	1	Serrated Flange Nut, 3/8"-16
15.	GD11259	1	Sleeve, 3/8" I.D. x 5/8" O.D. x 1 25/32" Long
A.	GA8324	-	Disc Blade/Bearing Assembly, Less Dust Cap (Items 3 And 7-9)

# GAUGE WHEELS

(RU140)

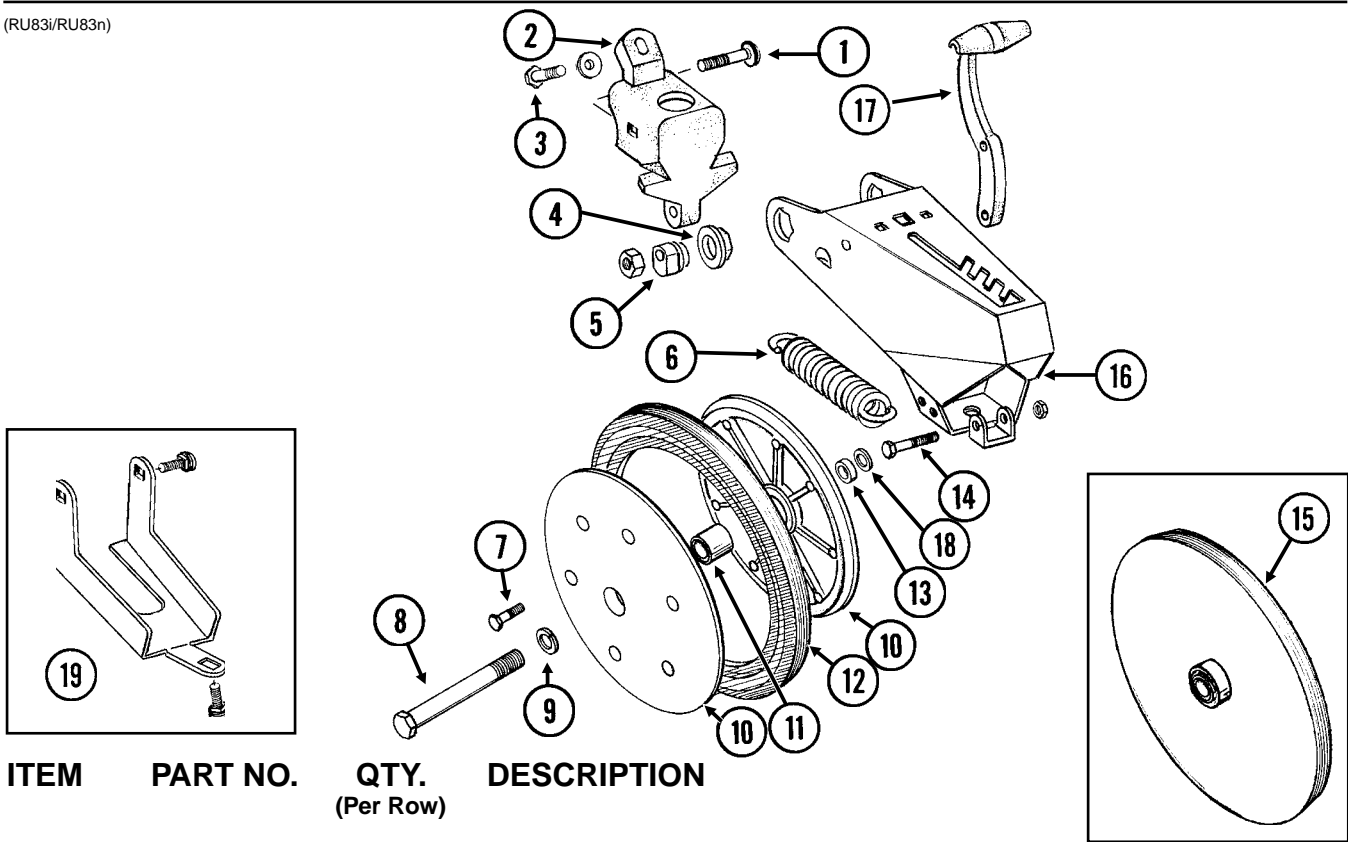


# GAUGE WHEELS

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10940	-	Machine Bushing, 1" (.048" Thick)
2.	G10216	2	Washer, 1/2" USS
3.	G10228	2	Lock Washer, 1/2"
4.	G10014	1	Hex Head Cap Screw, 1/2"-13 x 1"
5.	GD11453	2	Cover
6.	G10338	12	Carriage Bolt, 5/16"-18 x 1 1/4"
	G10620	12	Serrated Flange Nut, 5/16"-18
7.	G10924	8	Carriage Bolt, 5/16"-18 x 1 3/4"
	G10620	8	Serrated Flange Nut, 5/16"-18
8.	G10010	2	Hex Head Cap Screw, 5/8"-11 x 3"
	G10230	2	Lock Washer, 5/8"
9.	G10018	14	Hex Head Cap Screw, 5/16"-18 x 5/8"
	G10109	14	Lock Nut, 5/16"-18, Grade 8
10.	GD11423	4	Half Wheel
11.	GD1086	2	Tire
12.	GA6171	2	Bearing
13.	G10204	2	Special Machine Bushing, 5/8" x 1" O.D.
14.	GA7975	1	Wheel Arm W/Grease Fitting, Bushings And Seals, L.H. (Shown)
	GA7976	1	Wheel Arm W/Grease Fitting, Bushings And Seals, R.H.
	G10640	1	Grease Fitting, 1/4"-28 (Per Arm)
	GB0276	2	Bushing, 1" I.D. x 1 1/4" O.D. x 1" Long (Per Arm)
	GD10991	2	Seal (Per Arm)
15.		-	See "Shank Assembly", Pages P2 And P3
A.	GA7949	-	Gauge Wheel Complete (Items 5-7 And 9-12)
B.	G1K296	-	Gauge Wheel Arm Bushing And Seal Driver Kit , Includes: (1) Seal Driver, (1) Bushing Driver, (1) Instruction

# "V" CLOSING WHEELS

(RU83i/RU83n)

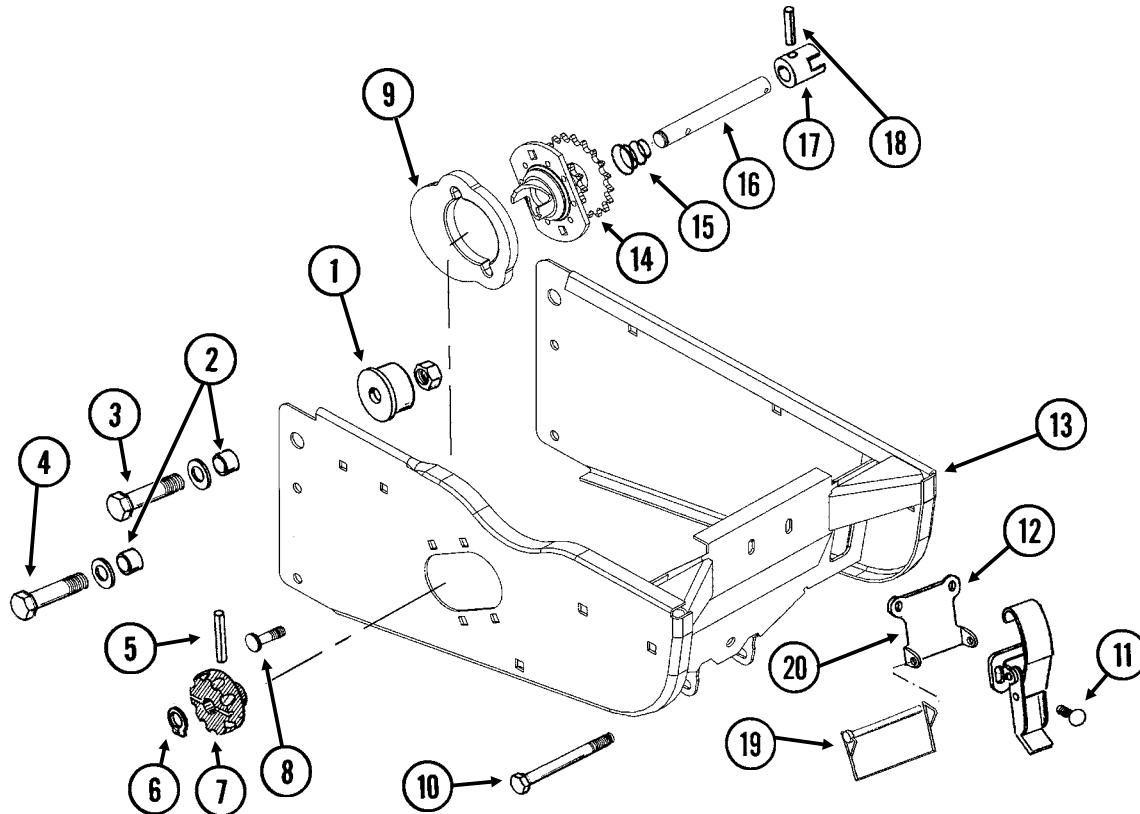


ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10801	2	Carriage Bolt, 1/2"-13 x 2 1/4"
	G10315	-	Carriage Bolt, 1/2"-13 x 2 1/2" (Used W/Straight Drop In-Furrow Granular Chemical Bracket)
	G10111	2	Lock Nut, 1/2"-13
2.	GB0268	1	Wheel Arm Stop
3.	G10001	1	Hex Head Cap Screw, 3/8"-16 x 1"
	G10210	1	Washer, 3/8" USS
4.	GB0282	2	Stepped Bushing
5.	GB0239	2	Eccentric Bushing
6.	GD8460	1	Spring
7.	G10064	6	Hex Head Cap Screw, 1/4"-20 x 1"
8.	G10013	2	Hex Head Cap Screw, 5/8"-11 x 3 1/2"
	G10107	2	Lock Nut, 5/8"-11
9.	G10230	2	Lock Washer, 5/8"
10.	GD9120	4	Nylon Half Wheel
11.	GA6171	2	Bearing
12.	GD1085	2	Rubber Tire, 1" x 12"
13.	GD1109	2	Bushing, 4 1/64" I.D. x 7/8" O.D. x 1/4" Long
14.	G10133	1	Hex Head Cap Screw, 5/16"-18 x 1 1/2"
	G10109	1	Lock Nut, 5/16"-18, Grade 8
15.	GA6597	-	Cast Iron Closing Wheel W/Bearing
	GA6171	-	Bearing
16.	GA8322	1	Arm
17.	GB0254	1	Lever
18.	GD7805	2	Special Washer, 5/8", Hardened
19.	G1K345	-	Closing Wheel Shield Kit W/Hardware And Instruction
	G10308	2	Carriage Bolt, 3/8"-16 x 3/4"
	G10599	1	Carriage Bolt, 3/8"-16 x 1 1/4"
	G10210	1	Washer, 3/8" USS
	G10229	3	Lock Washer, 3/8"
	G10101	3	Hex Nut, 3/8"-16

A. GA6434 - Rubber Closing Wheel Complete W/Bearing (Items 7 And 10-12)

# HOPPER SUPPORT AND METER DRIVE

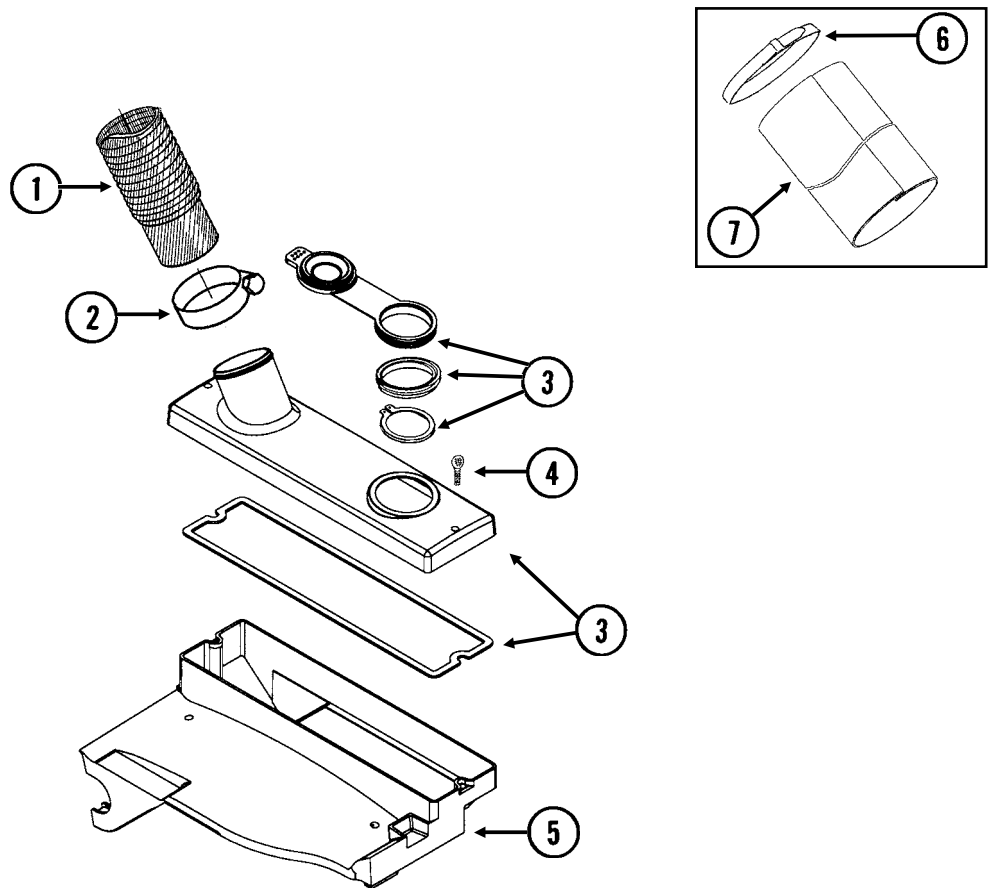
(METR22f)



ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GB0314	2	Hopper Mount
2.	GB0218	4	Bushing, $2\frac{1}{32}$ " I.D. x $\frac{7}{8}$ " O.D. x $1\frac{19}{32}$ " Long
3.	G10752	2	Hex Head Cap Screw, $\frac{5}{8}$ "-18 x $2\frac{1}{4}$ "
	GD7805	2	Special Washer, $\frac{5}{8}$ ", Hardened
	G10412	2	Lock Nut, $\frac{5}{8}$ "-18
4.	G10751	2	Hex Head Cap Screw, $\frac{5}{8}$ "-18 x $1\frac{3}{4}$ "
	GD7805	2	Special Washer, $\frac{5}{8}$ ", Hardened
	G10412	2	Lock Nut, $\frac{5}{8}$ "-18
5.	G10602	1	Spring Pin, $\frac{1}{4}$ " x $1\frac{1}{2}$ "
6.	G10567	1	External Retaining Ring, $\frac{5}{8}$ "
7.	GD11239	1	Knob
8.	G10338	2	Carriage Bolt, $\frac{5}{16}$ "-18 x $1\frac{1}{4}$ "
	G10620	2	Serrated Flange Nut, $\frac{5}{16}$ "-18
9.	GB0331	1	Clutch Adapter Plate
10.	G10061	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x $3\frac{1}{2}$ "
	G10210	2	Washer, $\frac{3}{8}$ " USS
	G10108	1	Lock Nut, $\frac{3}{8}$ "-16
11.	G10309	2	Carriage Bolt, $\frac{1}{4}$ "-20 x $\frac{5}{8}$ ", Grade 2
	G10621	2	Serrated Flange Nut, $\frac{1}{4}$ "-20
12.	GA2007	1	Hopper Hold Down Latch
13.	GA10155	1	Hopper Support
14.	GA10137	1	Double Sprocket And Bearing, Drive Clutch, 11/19 Tooth
15.	GD11413	1	Spring
16.	GD15747	1	Shaft
17.	GB0278	1	Coupler
18.	G10546	1	Spring Pin, $\frac{3}{16}$ " x $1\frac{1}{4}$ "
19.	GD10705	1	Locking Clip Pin, $\frac{1}{4}$ " x $2\frac{1}{2}$ " (SDS Only)
20.	GD13110	1	Retainer (SDS Only)
A.	GA10151	-	Meter Drive Assembly, 11/19 Tooth (Items 5-7 And 14-18)

# MINI-HOPPER AND DROP HOSES (SDS Planters)

RUB031(TWL189c)



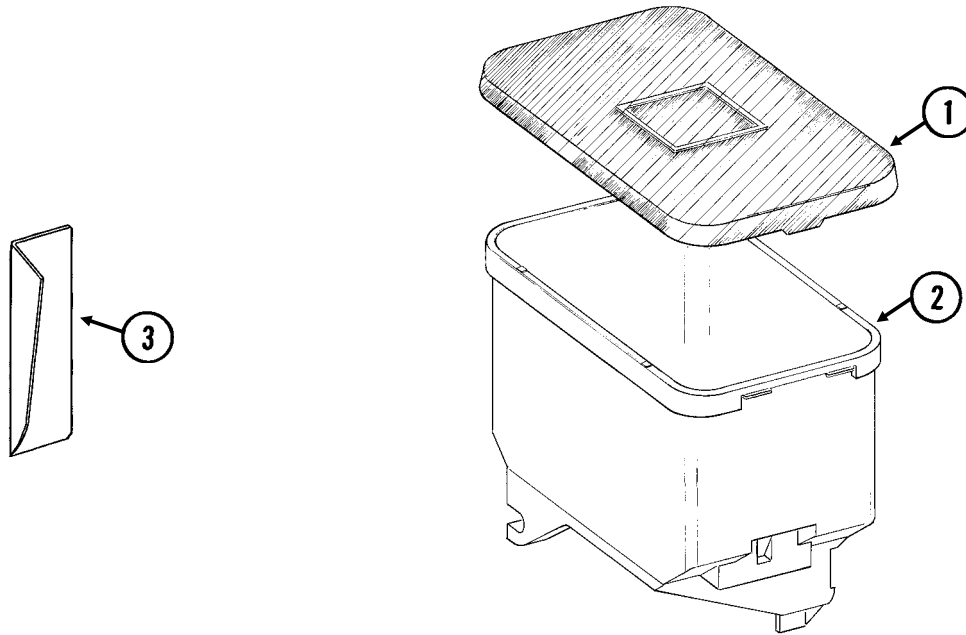
ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GD12797-01	1	Drop Hose, 3 1/4" x 34"
	GD12797-02	-	Drop Hose, 3 1/4" x 30"
	GD12797-05	-	Drop Hose, 3 1/4" x 36"
	GD12797-08	-	Drop Hose, 3 1/4" x 37"
	GD12797-09	-	Drop Hose, 3 1/4" x 39"
2.	G10999	2	T-Bolt Hose Clamp, 3 1/4"
3.	GA9623	1	Lid W/Gasket And View Cap
	GD13530	-	Gasket
	G11037	-	External Retaining Ring, 2 7/8" (If Applicable)
	GD13645	-	View Port Support (If Applicable)
	GD13412	-	View Cap
4.	G11033	2	Thumbscrew, 5/16"-18 x 1"
	GD12132	2	Seal
5.	GA9547	1	Mini-Hopper
6.	GD2117	-	Tie Strap, 14 1/2"
7.	GD16399-01	-	Sleeve, 3" x 10"

**NOTE: See "Bulk Seed Hopper Auger Manifold Assembly", Pages P20 and P21, for additional information.**



# SEED HOPPER AND LID (Conventional Planters)

(RU87a/RU87e)

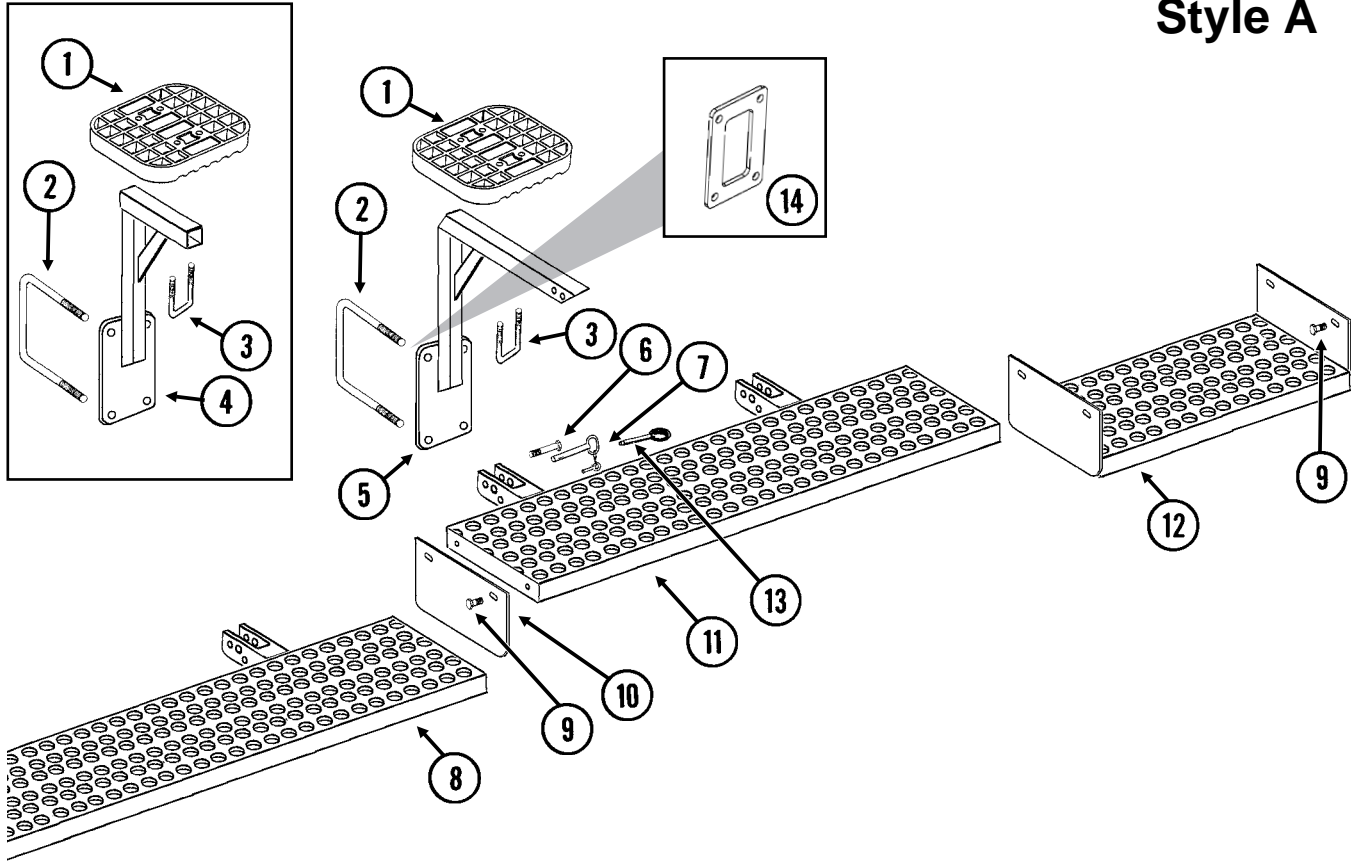


ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GD11279	1	Lid
2.	GA9714	1	Seed Hopper, Reinforced
3.	GD11747	1	Seed Reserve Baffle (Optional)

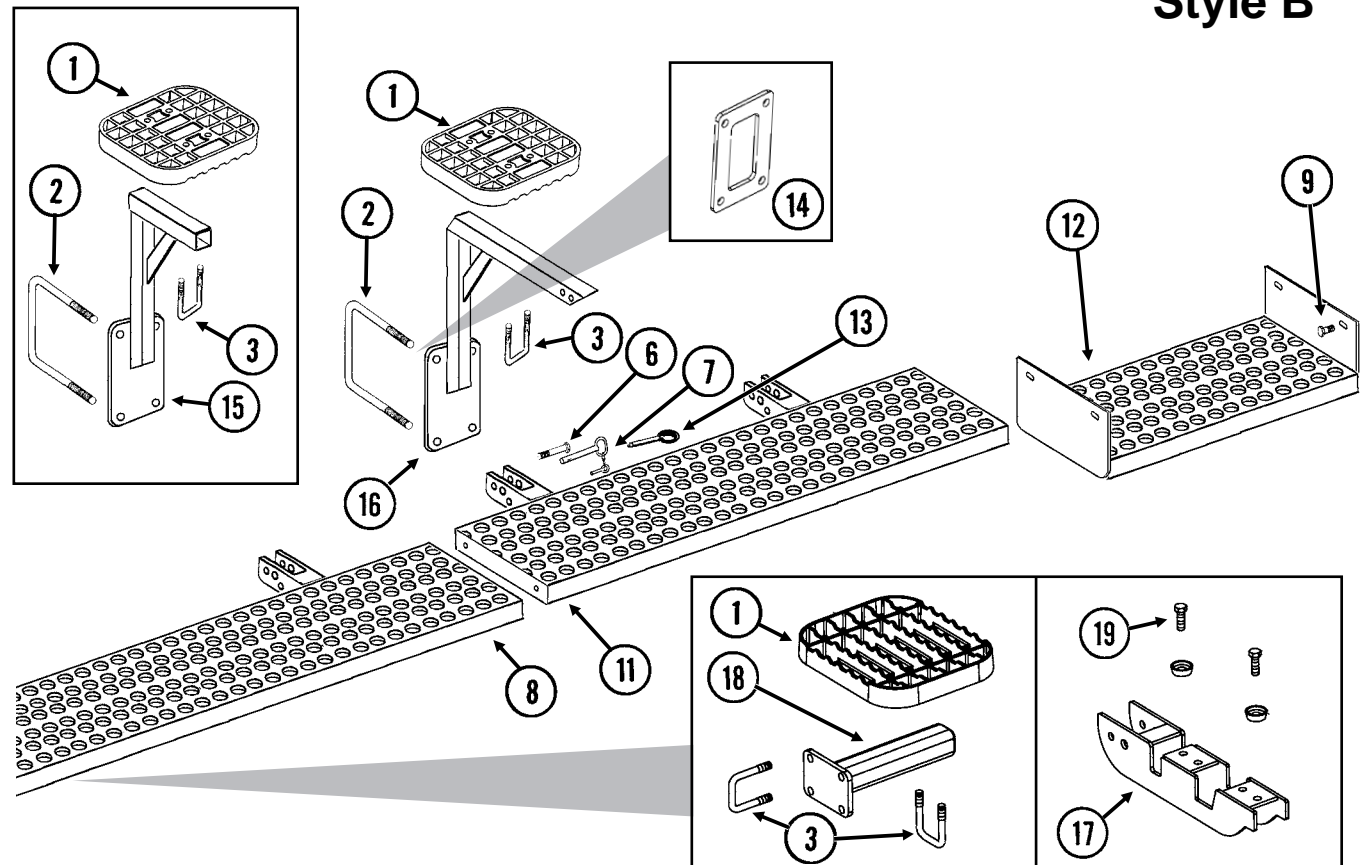
# BULK SEED HOPPER CATWALK

(TWL189f/D16509/TWL189ff/TWL189g)

## Style A



## Style B



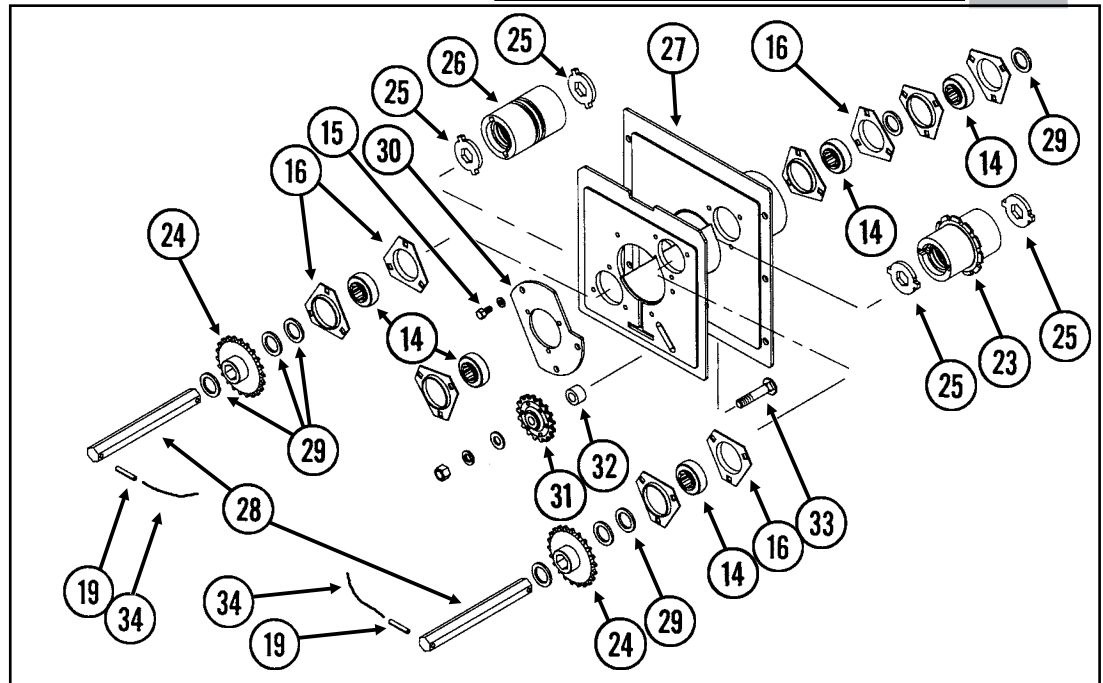
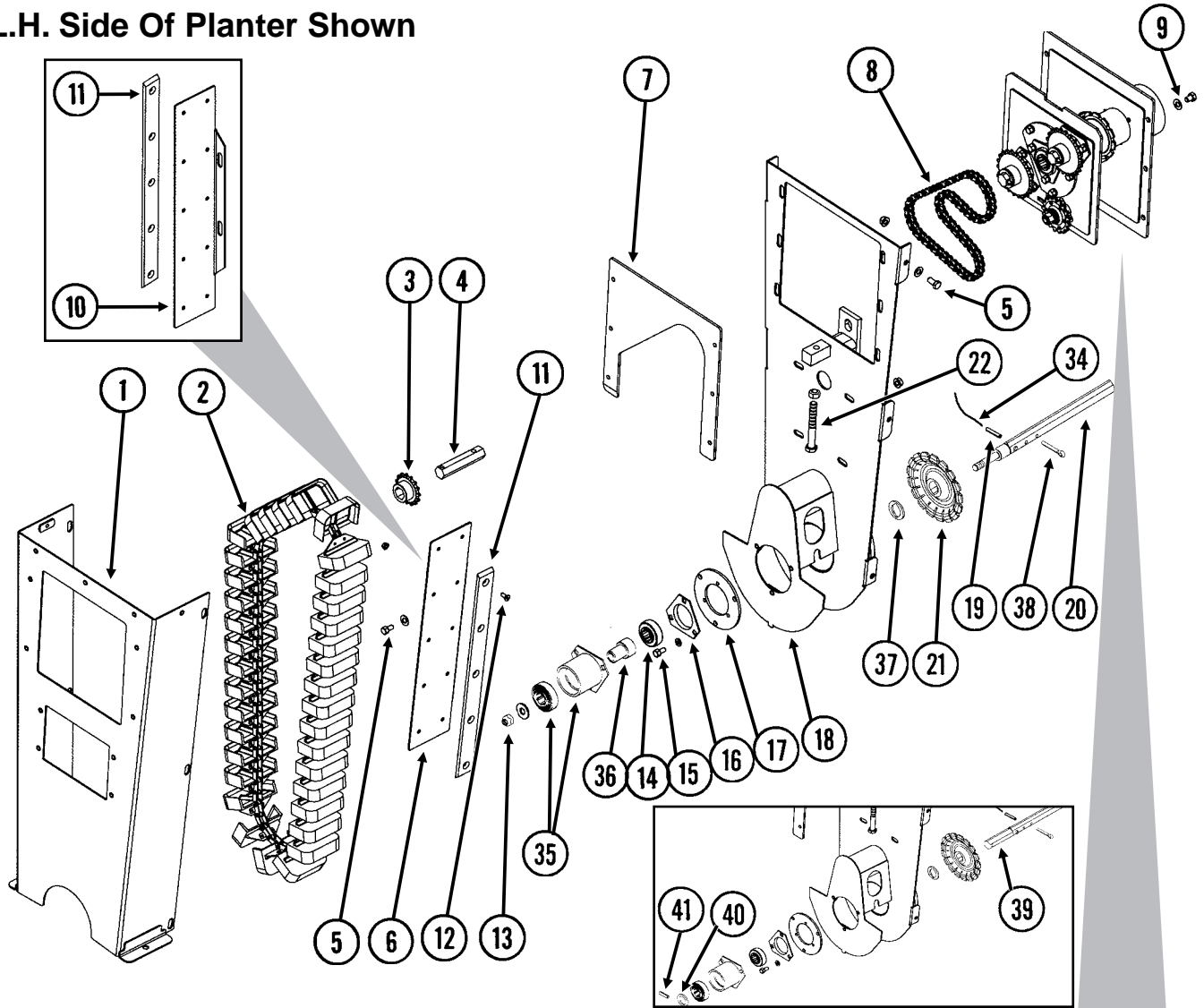
# BULK SEED HOPPER CATWALK

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GB0315	9-11	Step
2.	GD1113	-	U-Bolt, 5" x 7" x 5/8"-11
	G10230	-	Lock Washer, 5/8"
	G10104	-	Hex Nut, 5/8"-11
3.	GD2721	-	U-Bolt, 2" x 2" x 1/2"-13
	G10206	-	Washer, 1/2" SAE
	G10111	-	Lock Nut, 1/2"-13
4.	GA10065	2-2	Step Support, 20 1/2", 12 Row 30" Only
5.	GA10066	4-8	Step Support, 20 1/2", 12 Row 30" And 16 Row 30"
	GA10067	4-4	Step Support, 26 1/2", 12 Row 30" And 16 Row 30"
6.	G10033	8-12	Hex Head Cap Screw, 1/2"-13 x 3 1/2"
	G10111	8-12	Lock Nut, 1/2"-13
7.	GA6189	8-12	Hitch Pin
8.	GA9684	2	Catwalk, 96", 12 Row 30"
	GA9685	4	Catwalk, 61", 16 Row 30"
9.	G10338	-	Carriage Bolt, 5/16"-18 x 1 1/4"
	G10219	-	Washer, 5/16" USS
	G10232	-	Lock Washer, 5/16"
	G10106	-	Hex Nut, 5/16"-18
10.	GD14520	2	Plate, 6 1/2" x 11 7/8", 12 Row 30" And 16 Row 30"
11.	GA9682	1	Catwalk, 53", R.H., 12 Row 30" And 16 Row 30"
	GA9683	1	Catwalk, 53", L.H., 12 Row 30" And 16 Row 30" (Shown)
12.	GA10111	1	Center Catwalk, 25", 12 Row 30" And 16 Row 30"
13.	G10874	8-12	Detent Pin, 1/2" x 3 1/2" Grip
14.	GD16509	10-12	Plate
15.	GA12201	3	Step Support, 26 1/2", 12 Row 30" Only
16.	GA10067	8-12	Step Support, 26 1/2", 12 Row 30" And 16 Row 30"
17.	GA12208	1	Hinge Weld, 12 Row 30" Only
18.	GA12207	1	Step Support Weld
19.	G10017	2	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	GD17304	2	Washer
	G10111	2	Lock Nut, 1/2"-13

# BULK SEED HOPPER ELEVATOR LIFT ASSEMBLY

(TWL299/TWL299b/TWL258a)

L.H. Side Of Planter Shown



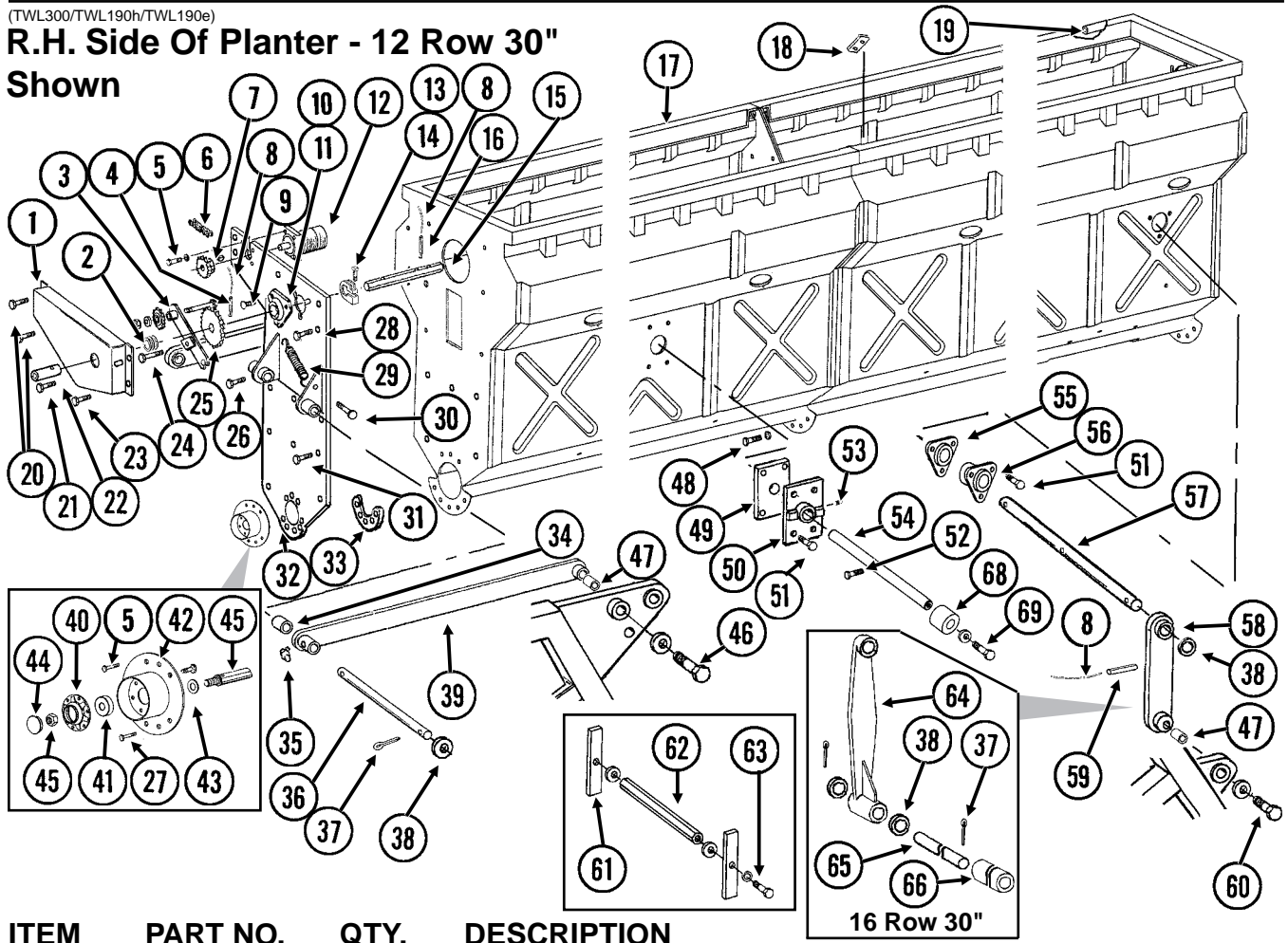
# BULK SEED HOPPER ELEVATOR LIFT ASSEMBLY

ITEM	PART NO.	QTY. (Per Hopper)	DESCRIPTION
1.	GA10590	1	Outer Cover
2.	GA10671	1	Elevator Chain Assembly
	G1K398	-	Elevator Bucket W/Connector Links
	GR0194	-	Connector Link, No. 2040
3.	GA5105	1	Sprocket, 15 Tooth
4.	GD15559	1	Hex Shaft, 7/8" x 4 1/4" (2 Holes)
5.	G10002	8	Hex Head Cap Screw, 3/8"-16 x 3/4"
	G10210	20	Washer, 3/8" USS
	G10622	8	Serrated Flange Nut, 3/8"-16
6.	GD15692	1	Guide (R.H. Side Only)(Shown)
7.	GD15689	1	Mount, L.H. (Shown)
	GD15528	-	Mount, R.H.
8.	G3310-72	1	Chain, No. 40, 72 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
9.	G10028	6	Hex Head Cap Screw, 3/4"-16 x 5/8"
	G10210	6	Washer, 3/8" USS
10.	GD15691	1	Guide (L.H. Side Only)
11.	GD15693	2	Wear Pad
12.	G11127	10	Hex Socket Head Cap Screw, 1/4"-20 x 1/2"
	G10621	10	Serrated Flange Nut, 1/4"-20
13.	G10111	1	Lock Nut, 1/2"-13
	G10216	1	Washer, 1/2" USS
14.	GA7841	6	Bearing, 7/8" Hex Bore
15.	G10018	21	Hex Head Cap Screw, 5/16"-18 x 5/8"
	G10232	21	Lock Washer, 5/16"
16.	G3400-01	11	Flangette
17.	GD15694	1	Overlay
18.	GA10985	1	Inner Cover
19.	G10602	7	Spring Pin, 1/4" x 1 1/2"
20.	GA11916	1	Inner Profile, 14 5/8"
21.	GD15746	1	Special Sprocket, 17 Tooth
22.	G10890	1	Hex Head Adjusting Bolt, 1/2"-13 x 4", Grade 2
	G10501	1	Hex Jam Nut, 1/2"-13, Grade 2
23.	GB0352	1	Sprocket, 11 Tooth
24.	GA5108	2	Sprocket, 23 Tooth
25.	GD15733	4	Drive Plate
26.	GB0353	1	Idler
27.	GA10591	1	Drive Plate, L.H. (Shown)
	GA10592	-	Drive Plate, R.H.
28.	GD15526	2	Hex Shaft, 7/8" x 8 3/8" (2 Holes)
29.	G10233	8	Machine Bushing, 1", 10 Gauge
30.	GD15695	1	Access Overlay
31.	GA7154	1	Sprocket W/Bearing, 18 Tooth
32.	GD4887-01	1	Sleeve, 1/2" I.D. x 5/8" Long
33.	G10315	1	Carriage Bolt, 1/2"-13 x 2 1/2"
	G10206	1	Washer, 1/2" SAE
	G10228	1	Lock Washer, 1/2"
	G10102	1	Hex Nut, 1/2"-13
34.	GD13524-01	7	Lock Wire, 10", Stainless Steel
35.	GA5223	1	Spacer W/Bearing
	GA5116	-	Bearing, 7/8" Hex Bore, Cylindrical
36.	GD16120	1	Spacer
37.	GD16397	1	Special Washer
38.	G10463	1	Cotter Pin, 1/4" x 1 1/2"
39.	GA12510	1	Shaft Assembly W/Spring Pin, 14 1/2"
	G10473	-	Spring Pin, 5/16" x 1 1/4"
40.	G10233	1	Machine Bushing, 1", 10 Gauge
41.	G10473	1	Spring Pin, 5/16" x 1 1/4"

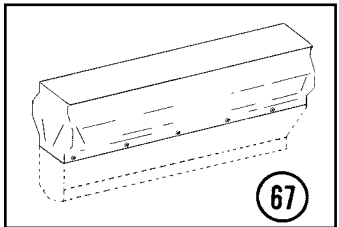
# BULK SEED HOPPER AND HYDRAULIC MOTOR DRIVE

(TWL300/TWL190h/TWL190e)

## R.H. Side Of Planter - 12 Row 30" Shown



ITEM	PART NO.	QTY. (Per Hopper)	DESCRIPTION
1.	GD13122	1	Cover, R.H.
	GD13123	-	Cover, L.H.
2.	G10233	3	Machine Bushing, 1", 10 Gauge
3.	GA9554	1	Idler W/Sprocket And Hardware (Shown)
	GA9553	-	Idler W/Sprocket And Hardware
	GA7154	-	Sprocket W/Bearing, 18 Tooth
	G10017	-	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10128	-	Machine Bushing, 1/2", 14 Gauge
	G10501	-	Hex Jam Nut, 1/2"-13, Grade 2
4.	G10602	1	Spring Pin, 1/4" x 1 1/2"
5.	G10001	7	Hex Head Cap Screw, 3/8"-16 x 1"
	G10229	7	Lock Washer, 3/8"
6.	G3310-88	1	Chain, No. 40, 88 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
7.	GA9625	1	Sprocket, 20 Tooth
8.	GD13524-01	-	Lock Wire, 10", Stainless Steel
9.	G10312	3	Carriage Bolt, 5/16"-18 x 3/4"
	G10923	3	Flange Nut, 5/16"-18, No Serration
10.	G3400-01	2	Flangette
11.	GA7841	1	Bearing, 7/8" Hex Bore
12.	GA9395	1	Hydraulic Motor
	GR1558	-	Seal Kit (Eaton), Includes: (6) Seals, (1) BU Ring, (3) O-Rings, (7) Seal Washers
	GR1637	-	Seal Kit (TCI), Includes: (2) Seals, (1) Ring, (4) O-Rings
13.	GD11045	1	Lock Clamp
14.	G10130	1	Square Head Machine Bolt, 5/16"-18 x 1 3/4"
	G10923	1	Flange Nut, 5/16"-18, No Serration
15.	GD13460	1	Hex Shaft, 7/8" x 7 3/4" (2 Holes)
16.	G10606	2	Spring Pin, 1/4" x 2"
17.	-	-	See "Bulk Seed Hopper And Auger Assemblies", Pages P22 And P23
18.	GD13570	2	Plate, 1 1/2" x 2 1/2"
19.	GD13575-04	2	Tube, 1" O.D. x 137", 12 Row 30"
	GD13575-03	2	Tube, 1" O.D. x 207 1/2", 16 Row 30"
20.	G10001	3	Hex Head Cap Screw, 3/8"-16 x 1"
	G10622	3	Serrated Flange Nut, 3/8"-16



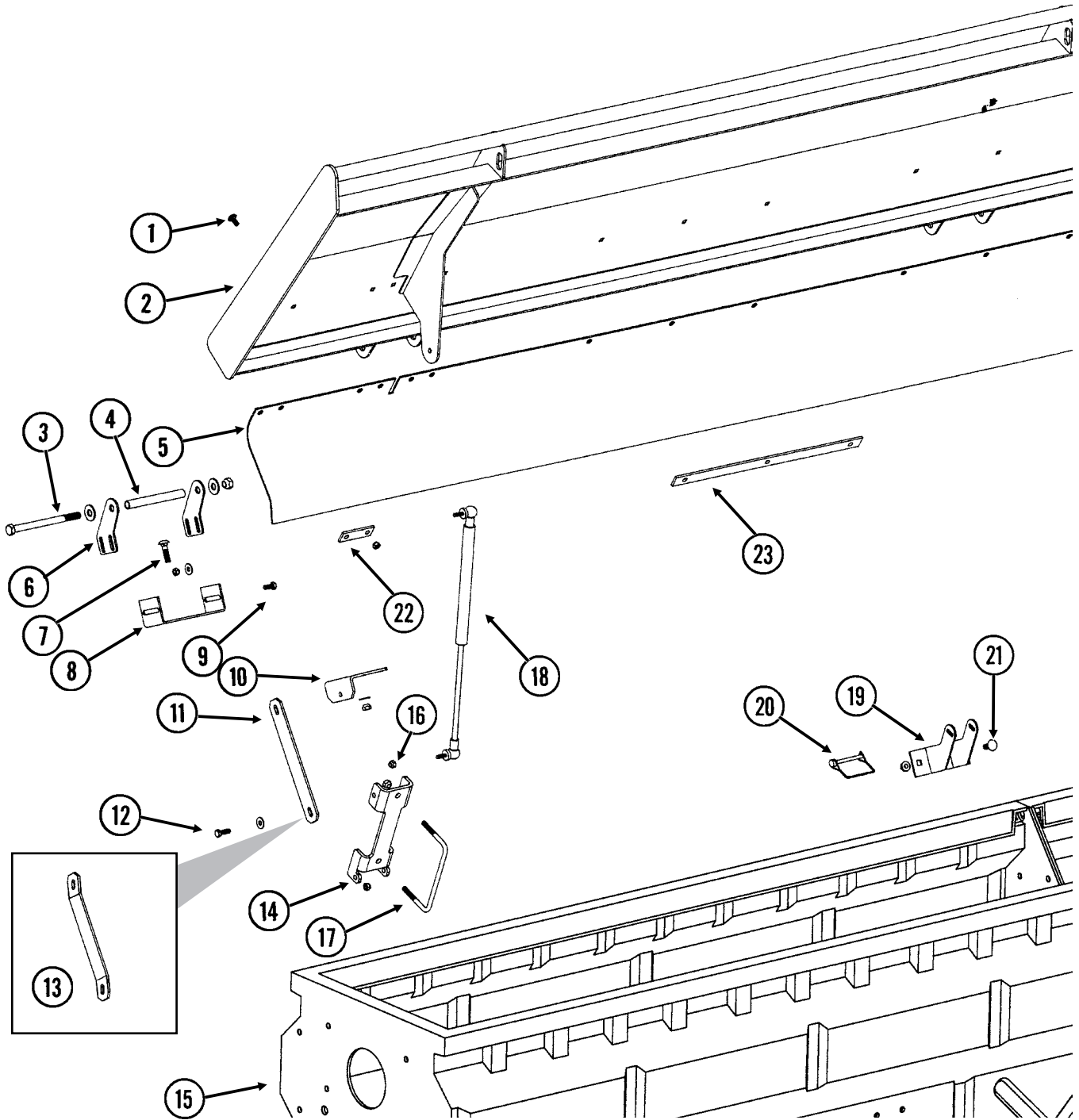
# BULK SEED HOPPER AND HYDRAULIC MOTOR DRIVE

ITEM	PART NO.	QTY. (Per Hopper)	DESCRIPTION
21.	G10004	1	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G11017	1	Flange Nut, 3/8"-16
22.	GD13554	1	Coupler, 3 1/4"
23.	G10004	2	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10622	2	Serrated Flange Nut, 3/8"-16
24.	G10036	1	Hex Head Cap Screw, 5/8"-11 x 4"
	G10104	1	Hex Nut, 5/8"-11
	G10107	1	Lock Nut, 5/8"-11
25.	GA7180	1	Sprocket, 40 Tooth
26.	G10004	2	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10201	2	Special Washer, 3/8" x 1 1/2" O.D.
	G10622	2	Serrated Flange Nut, 3/8"-16
27.	G10003	5	Hex Head Cap Screw, 3/8"-16 x 1 1/2"
	G10108	5	Lock Nut, 3/8"-16
28.	G10001	4	Hex Head Cap Screw, 3/8"-16 x 1"
	G10622	4	Serrated Flange Nut, 3/8"-16
29.	GD5857	1	Spring
30.	G10870	1	Clevis Pin, 3/8" x 1"
	G10860	1	Retaining Ring, 3/8"
31.	G11017	8	Flange Nut, 3/8"-16
	G10001	8	Hex Head Cap Screw, 3/8"-16 x 1"
32.	GA9157	1	Hopper Mount, L.H.
	GA9158	-	Hopper Mount, R.H.
33.	GD13555	3	Tie Plate
34.	GD0752-41	2	Sleeve, 1"
35.	G10779	2	Grease Fitting, 90°, 1/4"-28
36.	GD13143	1	Pin, 1 1/4" x 26"
37.	G10460	4	Cotter Pin, 1/4" x 2"
38.	G10979	8	Special Washer, 1 1/4"
39.	GA9160	2	Link, 52"
40.	GD10473	1	Bearing Housing
41.	GA2014	1	Bearing
42.	GA9848	1	End Cap
43.	G10020	6	Hex Head Cap Screw, 1/4"-20 x 5/8"
	G10110	6	Lock Nut, 1/4"-20, Grade B
44.	GD11845	1	Dust Cap
45.	GA11962	1	Inner Profile, 5 1/2"
	G10205	1	Washer, 5/8" SAE
	G10107	1	Lock Nut, 5/8"-11
46.	G11027	2	Hex Head Cap Screw, 7/8"-9 x 4"
	G10659	2	Washer, 7/8" USS
47.	GD2734-13	4	Sleeve, 1 1/4" O.D. x 3 1/8" Long
48.	G10047	-	Hex Head Cap Screw, 3/8"-16 x 1 3/4"
	G10108	-	Lock Nut, 3/8"-16
49.	GD13227	2	Plate, 4" x 6"
50.	GB0307	-	Plate
51.	G10003	-	Hex Head Cap Screw, 3/8"-16 x 1 1/2"
	G10622	-	Serrated Flange Nut, 3/8"-16
52.	G10049	1	Hex Head Cap Screw, 3/8"-16 x 2 1/2"
	G10108	1	Lock Nut, 3/8"-16
53.	G10640	-	Grease Fitting, 1/4"-28
54.	GD15888	1	Pin, 1 1/4" x 20"
55.	GD15743	-	Plate
56.	GA10699	1	Mount
57.	GD13144	1	Pin, 1 1/4" x 20 1/2"
58.	GA10731	2	Link, 15", 12 Row 30"
59.	G10600	2	Spring Pin, 5/16" x 2 1/4"
60.	G10417	4	Hex Head Cap Screw, 7/8"-9 x 4 1/2"
	G10659	4	Washer, 7/8" USS
61.	GD14056	4	Bar, 1" x 8"
62.	GD14057	2	Hex Shaft, 7/8" x 12"
63.	G10016	4	Hex Head Cap Screw, 1/2"-13 x 2"
	G10228	4	Lock Washer, 1/2"
	G10216	4	Washer, 1/2" USS
64.	GB0308	2	Link, 18", 16 Row 30"
65.	GD14500	1	Pin, 1 1/4" x 26 1/2"
66.	GD2725-09	1	Pipe, 1 1/4" x 10"
67.	G1K338	1	Hopper Cover Kit, 12 Row 30", Includes: (1) L.H. Bulk Seed Hopper Cover, (1) R.H. Bulk Seed Hopper Cover
	G1K339	1	Hopper Cover Kit, 16 Row 30", Includes: (1) L.H. Bulk Seed Hopper Cover, (1) R.H. Bulk Seed Hopper Cover
68.	GD15887	2	Sleeve, 2 1/4" Long
69.	G10007	2	Hex Head Cap Screw, 5/8"-11 x 1 1/2"
	G10217	2	Washer, 5/8" USS
A.	GA9859	-	Bearing Cap Assembly (Items 40-45)

# BULK SEED HOPPER LID

(TWL257)

L.H. Side Of Planter Shown





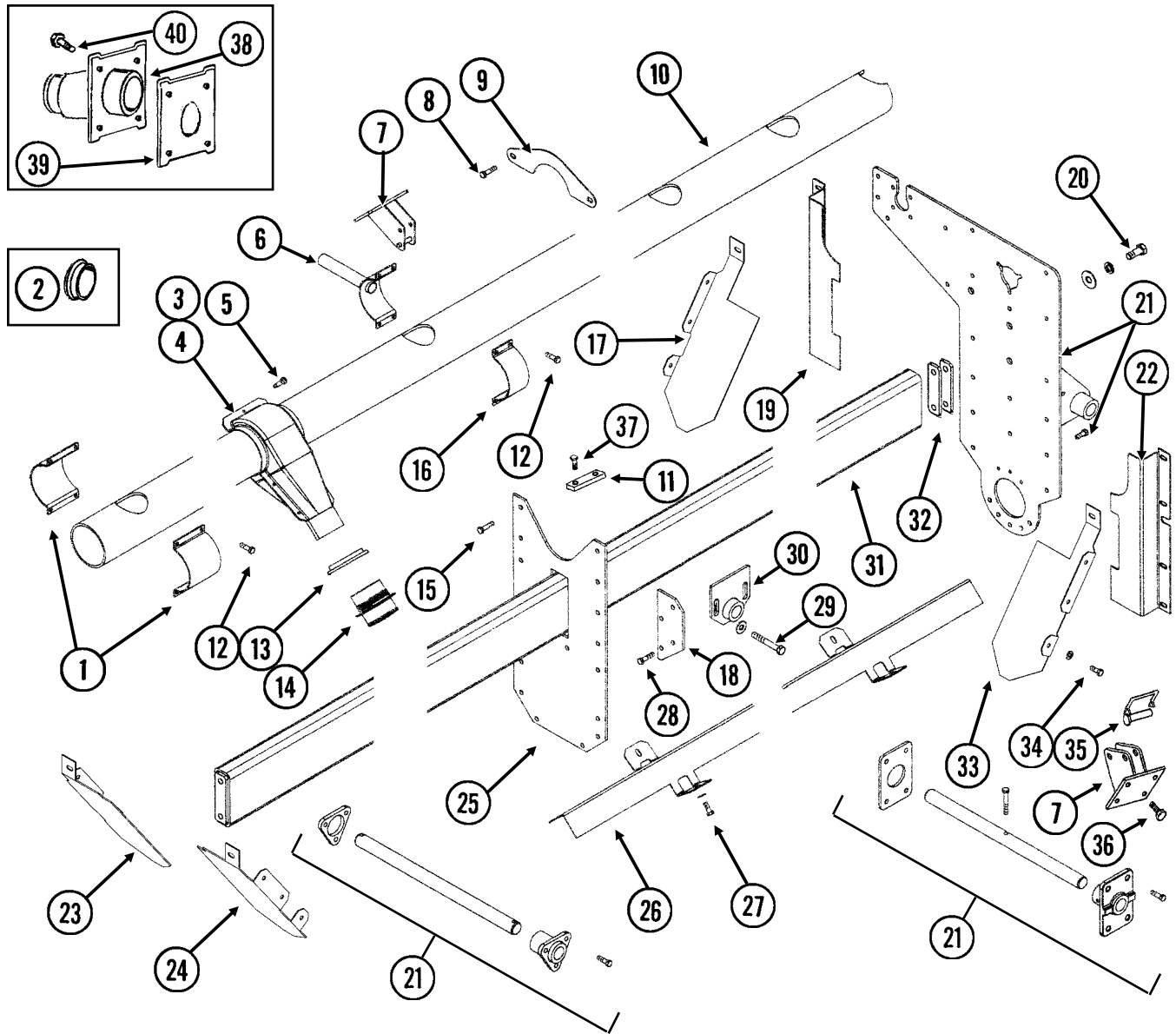
# BULK SEED HOPPER LID

ITEM	PART NO.	QTY. (Per Hopper)	DESCRIPTION
1.	G10312	-	Carriage Bolt, 5/16"-18 x 3/4"
	G10109	-	Lock Nut, 5/16"-18, Grade 8
2.	GA10722	1	Hopper Lid, R.H., 12 Row 30"
	GA10721	1	Hopper Lid, L.H., 12 Row 30"
	GA10580	-	Hopper Lid, R.H., 16 Row 30"
	GA10581	-	Hopper Lid, L.H., 16 Row 30"
3.	G10829	3-4	Hex Head Cap Screw, 1/2"-13 x 6 1/2"
	G10216	6-8	Washer, 1/2" USS
	G10217	8	Washer, 5/8" USS
	G10111	3-4	Lock Nut, 1/2"-13
4.	GD7904-05	3	Sleeve, 5 3/8" Long
5.	GD15766	1	Splash Guard Strip, 12 Row 30"
	GD15482	-	Splash Guard Strip, 16 Row 30"
6.	GD13595	6-8	Hinge Tab
7.	G10301	12	Carriage Bolt, 3/8"-16 x 1 1/2"
	G10210	12	Washer, 3/8" USS
	G10108	12	Lock Nut, 3/8"-16
8.	GD15737	3-4	Hinge Plate
9.	G10043	12-16	Hex Head Cap Screw, 5/16"-18 x 3/4"
	G10219	24-32	Washer, 5/16" USS
	G10109	12-16	Lock Nut, 5/16"-18, Grade 8
10.	GD15738	2	Bracket
11.	GD13152	1-2	Brace
12.	G10019	4	Hex Head Cap Screw, 5/16"-18 x 1"
	G10219	4	Washer, 5/16" USS
	G10923	4	Flange Nut, 5/16"-18, No Serration
13.	GD15748	1	Brace, 16 Row 30" Only
14.	GD13198	2	Spring Anchor
15.		-	See "Bulk Seed Hopper And Auger Assemblies", Pages P22 And P23
16.	G10109	-	Lock Nut, 5/16"-18, Grade 8
17.	GD13491	2	U-Bolt, 2" x 6" x 3/8"-16
	G10108	4	Lock Nut, 3/8"-16
18.	GA9404	2	Gas Spring, 134 Pounds
19.	GA9588	1	Latch
20.	GD10705	1	Locking Clip Pin, 1/4" x 2 1/2"
21.	G10305	2	Carriage Bolt, 3/8"-16 x 1"
	G11017	2	Flange Nut, 3/8"-16
22.	GD13470	8	Retainer, 1" x 3"
23.	GD12847	2	Retainer, 1" x 18"

# BULK SEED HOPPER AUGER MANIFOLD ASSEMBLY

## L.H. Side Of Planter Shown

(TWL261aa)



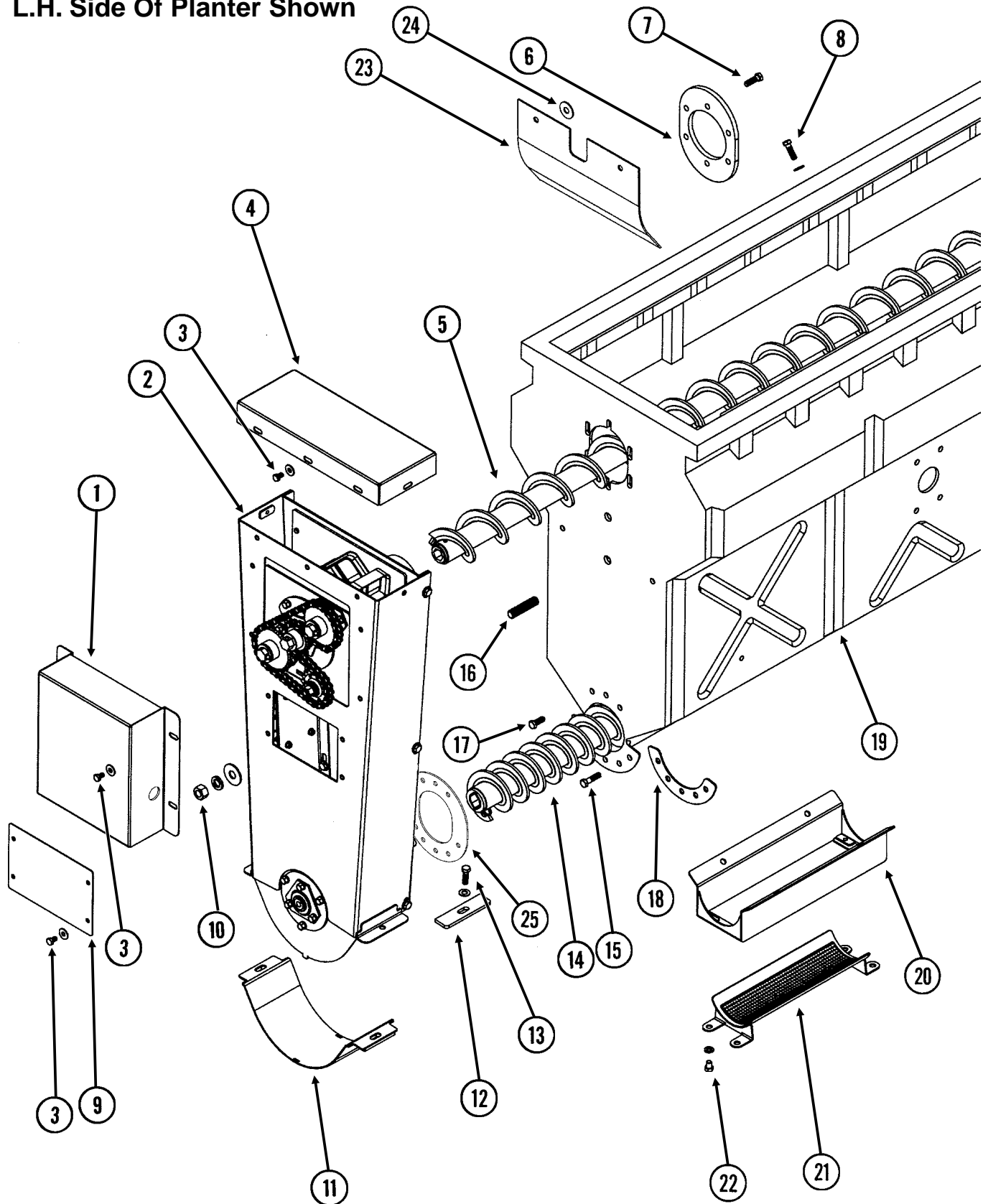
# BULK SEED HOPPER AUGER MANIFOLD ASSEMBLY

ITEM	PART NO.	QTY. (Per Hopper)	DESCRIPTION
1.	GD15757	2	Clamp
2.	G11000	-	Cap, 3"
3.	GD11968	-	Funnel, Top
4.	GA9621	-	Funnel, Bottom
5.	G11020	1	Phillips Pan Head Machine Screw, No. 10-24
6.	GA9159	1	Handle
7.	GA9196	2	Latch
8.	G10003	2	Hex Head Cap Screw, 3/8"-16 x 1 1/2"
	G10622	2	Serrated Flange Nut, 3/8"-16
9.	GD14058	1-2	Bracket
10.	GD16173	1	Distribution Manifold, 140", L.H., 12 Row 30"
	GD15744	-	Distribution Manifold, 140", R.H., 12 Row 30"
	GD15471	-	Distribution Manifold, 210 1/2", L.H., 16 Row 30"
	GD15470	-	Distribution Manifold, 189", R.H., 16 Row 30"
11.	GD13628	1	Tap Block, 1" x 4"
12.	G10043	4	Hex Head Cap Screw, 5/16"-18 x 3/4"
	G10109	4	Lock Nut, 5/16"-18, Grade 8
13.	GB0313	12-16	Nut, 3 1/4"-12
14.	GB0312	12-16	Nipple
15.	G10003	13	Hex Head Cap Screw, 3/8"-16 x 1 1/2"
	G11017	13	Flange Nut, 3/8"-16
16.	GD13183	1	Clamp
17.	GD13125	1	Baffle, L.H.
18.	GD13120	4	Tie Bar
19.	GD13126	1	Baffle, R.H.
20.	G10010	2	Hex Head Cap Screw, 5/8"-11 x 3"
	G10217	2	Washer, 5/8" USS
	G10230	2	Lock Washer, 5/8"
21.		-	See "Bulk Seed Hopper And Hydraulic Motor Drive", Pages P16 And P17
22.	GD13127	1	Baffle, L.H.
23.	GD15535	1	Baffle
24.	GD15534	1	Baffle
25.	GD13571	2	Tie Plate, 16 Row 30"
26.	GD13138	2	Tunnel Cover
27.	G10001	-	Hex Head Cap Screw, 3/8"-16 x 1"
	G10210	-	Washer, 3/8" USS
	G11017	-	Flange Nut, 3/8"-16
28.	G10003	-	Hex Head Cap Screw, 3/8"-16 x 1 1/2"
	G10622	-	Serrated Flange Nut, 3/8"-16
29.	G10033	-	Hex Head Cap Screw, 1/2"-13 x 3 1/2"
	G10216	-	Washer, 1/2" USS
	G10111	-	Lock Nut, 1/2"-13
30.	GA9175	2	Support
31.	GA10725	1	Support Tube, 140 1/2", 12 Row 30"
	GA10579	-	Support Tube, 211", 16 Row 30"
32.	GD13576	-	Shim, 1 3/8" x 5 3/8", 10 Gauge (As Required)
	GD13577	-	Shim, 1 3/8" x 5 3/8", 1/4" Thick (As Required)
33.	GD13124	-	Baffle Plate, R.H.
34.	G10001	8	Hex Head Cap Screw, 3/8"-16 x 1"
	G10210	8	Washer, 3/8" USS
	G10622	8	Serrated Flange Nut, 3/8"-16
35.	GD10705	2	Locking Clip Pin, 1/4" x 2 1/2"
36.	G10001	8	Hex Head Cap Screw, 3/8"-16 x 1"
	G10210	8	Washer, 3/8" USS
	G11017	8	Flange Nut, 3/8"-16
37.	G10017	2	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10102	2	Hex Nut, 1/2"-13
38.	GA10764	1	Drop Tube
39.	GD15812	1	Plate
40.	G10019	4	Hex Head Cap Screw, 5/16"-18 x 1"
	G10923	4	Flange Nut, 5/16"-18, No Serration

# BULK SEED HOPPER AND AUGER ASSEMBLIES

(TWL259b)

L.H. Side Of Planter Shown

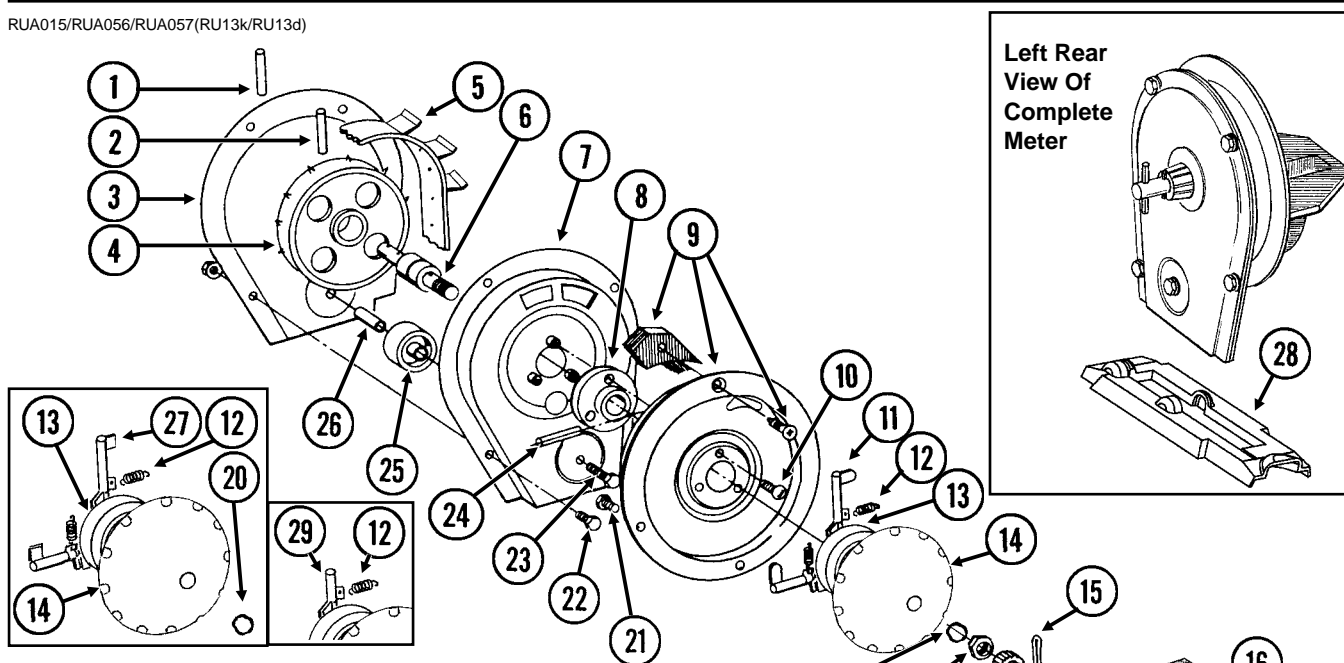


# BULK SEED HOPPER AND AUGER ASSEMBLIES

ITEM	PART NO.	QTY. (Per Hopper)	DESCRIPTION
1.	GD15530	1	Cover
2.		-	See "Bulk Seed Hopper Elevator Lift Assembly", Pages P14 And P15
3.	G10054	13	Hex Head Cap Screw, 5/16"-18 x 1/2"
	G10219	13	Washer, 5/16" USS
4.	GD15529	1	Cover
5.	GA9191	1	Top Auger, L.H., 147 1/2", 12 Row 30"
	GA9192	-	Top Auger, R.H., 147 1/2", 12 Row 30"
	GA9193	-	Top Auger, L.H., 217 1/2", 16 Row 30"
	GA9194	-	Top Auger, R.H., 217 1/2", 16 Row 30"
6.	GD15525	1	Flange
7.	G10004	6	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
8.	G10004	4	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10210	8	Washer, 3/8" USS
	G10108	4	Lock Nut, 3/8"-16
9.	GD15531	1	Cover
10.	G10217	2	Washer, 5/8" USS
	G10230	2	Lock Washer, 5/8"
	G10104	2	Hex Nut, 5/8"-11
11.	GA10688	1	Cover
12.	GD15735	2	Plate, 1 1/4" x 4 3/4"
13.	G10004	2	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10210	2	Washer, 3/8" USS
	G10622	2	Serrated Flange Nut, 3/8"-16
14.	GA10971	1	Floor Auger, L.H., 144 3/4", 12 Row 30"
	GA10972	-	Floor Auger, R.H., 144 3/4", 12 Row 30"
	GA10969	-	Floor Auger, L.H., 215 1/4", 16 Row 30"
	GA10964	-	Floor Auger, R.H., 215 1/4", 16 Row 30"
15.	G10003	5	Hex Head Cap Screw, 3/8"-16 x 1 1/2"
	G10108	5	Lock Nut, 3/8"-16
16.	GD15756	2	Stud, 5/8"-11 x 2 3/4"
17.	G10001	3	Hex Head Cap Screw, 3/8"-16 x 1"
	G11017	3	Flange Nut, 3/8"-16
18.	GD13555	1	Tie Plate
19.	GD15466	1	Inner Hopper Section, R.H., 12 Row 30" And 16 Row 30"
	GD16162	1	Outer Hopper Section, R.H., 12 Row 30" And 16 Row 30"
	GD15467	1	Inner Hopper Section, L.H., 12 Row 30" And 16 Row 30"
	GD16163	1	Outer Hopper Section, L.H., 12 Row 30" And 16 Row 30"
	GD15465	1	Center Hopper Section, R.H. And L.H., 16 Row 30"
20.	GA10583	1	Mount
21.	GA10587	1	Screen
22.	G10018	4	Hex Head Cap Screw, 5/16"-18 x 5/8"
	G10229	4	Lock Washer, 3/8"
23.	GD16193	1	Rubber Baffle
24.		-	See Item 26 On Pages P16 And P17
25.	GD16174	1	Flange

# FINGER PICKUP SEED METER

RUA015/RUA056/RUA057(RU13k/RU13d)

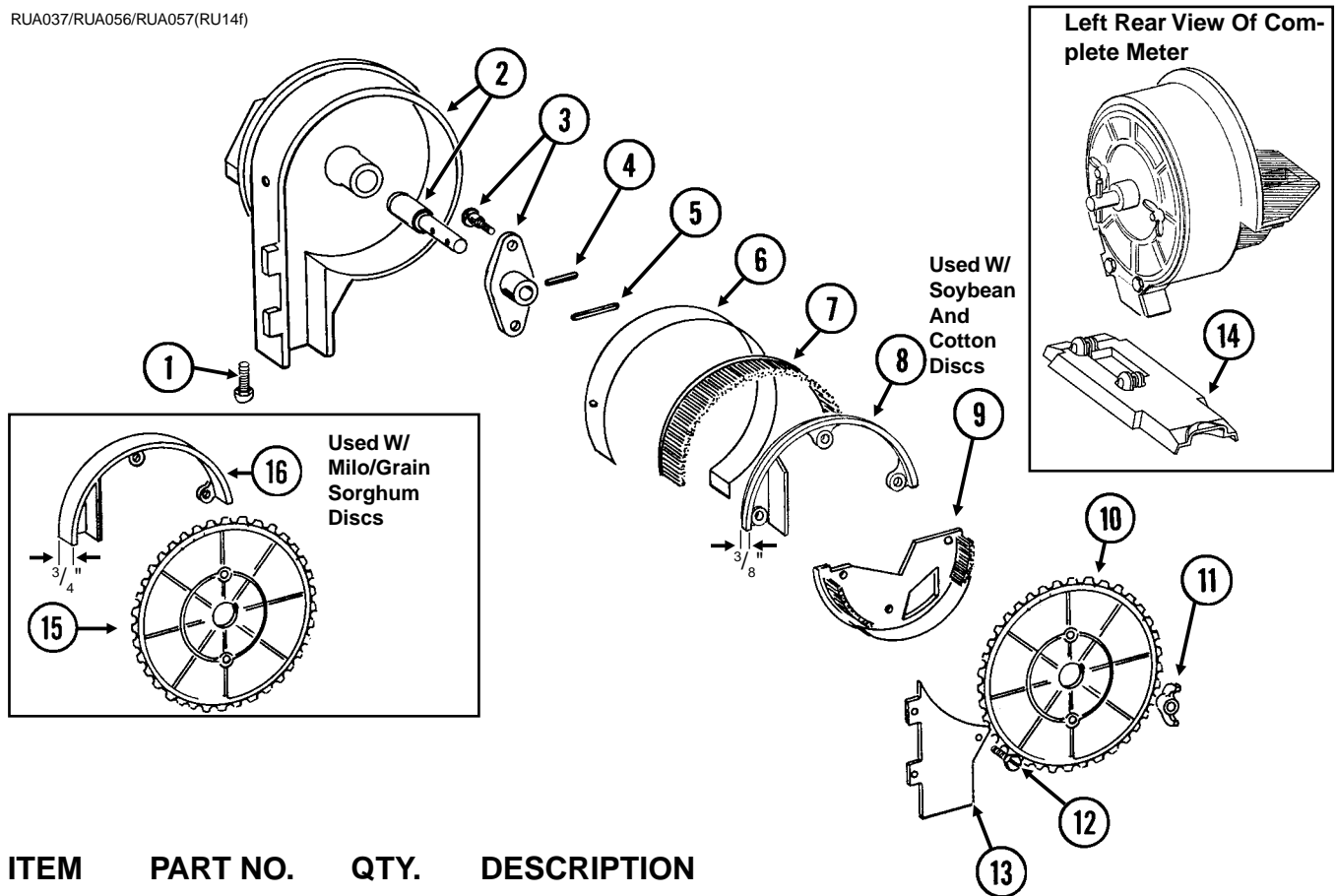


ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10602	1	Spring Pin, 1/4" x 1 1/2"
2.	G10604	1	Spring Pin, 3/16" x 1 1/2"
3.	GD1039	1	Housing Cover
4.	GD1041	1	Belt Drive Sprocket
5.	GD11286	1	Seed Belt
6.	GA2019	1	Bearing
7.	GA2018	1	Conveyor Housing
8.	GB0110	1	Bearing Housing
9.	GR1569	1	Carrier Plate W/Brush And Screw
	GA2020	-	Brush
	G10690	-	Rolling Thread Screw, No. 10 x 3/4"
10.	G10401	3	Slotted Hex Washer Head Screw, No. 10-32 x 5/8"
11.	GD18704	12	Finger, Corn
12.	GD6501	12	Spring
13.	GB1410	1	Cam
14.	GD11528	1	Finger Holder
15.	G10470	1	Cotter Pin, 5/32" x 1"
16.	G11009	2	Locking Thumbscrew, 5/16"-18 x 3/4"
17.	GD11311	1	Seed Baffle
18.	GD1083	1	Cover Nut
19.	G10500	1	Jam Nut, 5/8"-18 UNF
20.	GA8343	1	Wave Washer, 5/8" (Triple Wave)
21.	G10020	3	Hex Head Cap Screw, 1/4"-20 x 5/8"
	G10323	3	Hex Flange Nut, 1/4"-20, No Serrations
22.	G10022	4	Hex Head Cap Screw, 1/4"-20 x 1/2"
	G10621	4	Serrated Flange Nut, 1/4"-20
23.	G10021	1	Hex Head Cap Screw, 1/4"-20 x 1 1/2"
	G10621	1	Serrated Flange Nut, 1/4"-20
24.	G10603	1	Spring Pin, 1/4" x 1 1/4"
25.	GD1042	1	Idler
26.	GB0120	1	Bushing, 17/64" I.D. x 1 1/32" Long
27.	GD10226	12	Finger, Oil Sunflower
28.	GD15698	1	Shank Cover, Finger Pickup Seed Meter
29.	GD11787	-	Half Rate Blank Finger

- A. GR1848 - Finger Assembly, Corn (Items 11-14 And 20)
- B. GR1327 - Finger Assembly, Oil Sunflower (Items 12-14, 20 And 27)

# BRUSH-TYPE SEED METER

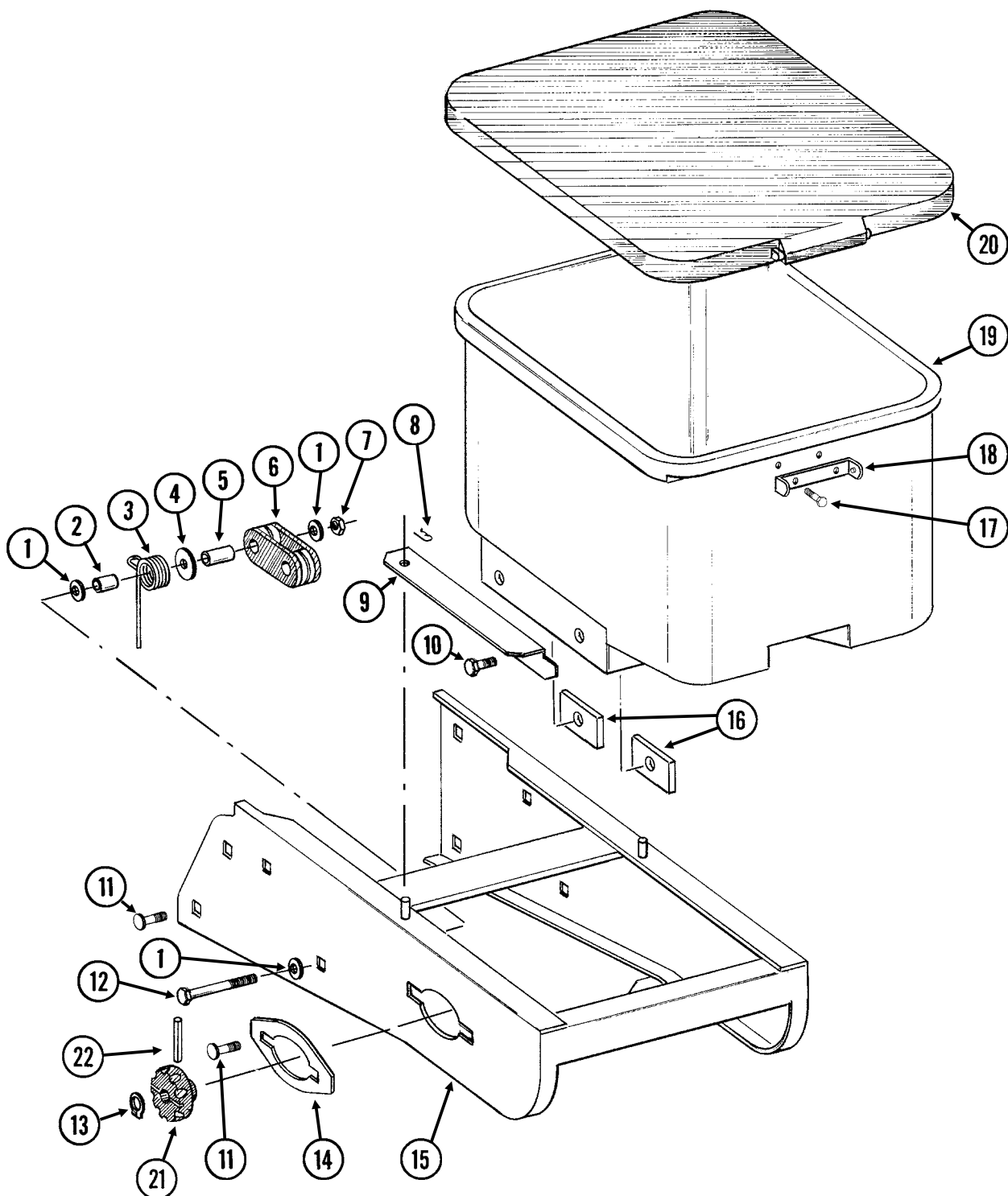
RUA037/RUA056/RUA057(RU14f)



ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Row)	
1.	G11009	2	Locking Thumbscrew, 5/16"-18 x 3/4"
2.	GA6027	1	Housing W/Bearing
	GA5698	-	Bearing
3.	GA6038	1	Hub W/Shoulder Bolts
	GD1755	-	Shoulder Bolt, 1/4"-20 (2 Used)
4.	G10603	1	Spring Pin, 1/4" x 1 1/4"
5.	G10602	1	Spring Pin, 1/4" x 1 1/2"
6.	GD8778	1	Wear Strip
7.	GA5699	1	Upper Brush
8.	GD11122	1	Upper Brush Retainer (Used W/Soybean And Cotton Discs)
9.	GA5834	1	Lower Brush
10.	GA5794	-	Seed Disc, Soybean, 60 Cell, Black Color-Coded
	GA6184	-	Seed Disc, Specialty Soybean, 48 Cell, Dark Blue Color-Coded
	GA5796	-	Seed Disc, Cotton, Acid-Delinted, 30 Cell, White Color-Coded
	GA6168	-	Seed Disc, Large Cotton, Acid-Delinted, 36 Cell, Tan Color-Coded
	GA6478	-	Seed Disc, High-Rate Cotton, Acid-Delinted, 48 Cell, Light Green Color-Coded
	GA6182	-	Seed Disc, Hill-Drop Cotton, Acid-Delinted, 12 Cell, Brown Color-Coded
	GA7255	-	Seed Disc, Small Hill-Drop Cotton, Acid-Delinted, 12 Cell, Dark Green Color-Coded
11.	G10531	2	Wing Nut W/Nylon Insert, 1/4"-20
12.	G11151	9	Hex Washer Head Screw, No. 10-24 x 1/2"
	G10634	-	Slotted Tap Screw, No. 10-24 x 5/8" (Use As Required)
13.	GD7878	1	Cover
14.	GD15699	1	Shank Cover, Brush-Type Seed Meter
15.	GA5982	-	Seed Disc, Small Milo/Grain Sorghum, 30 Cell, Red Color-Coded
	GA6187	-	Seed Disc, Large Milo/Grain Sorghum, 30 Cell, Light Blue Color-Coded
	GA5795	-	Seed Disc, High-Rate Small Milo/Grain Sorghum, 60 Cell, Red Color-Coded
	GA6633	-	Seed Disc, High-Rate Large Milo/Grain Sorghum, 60 Cell, Yellow Color-Coded
16.	GD8237	-	Upper Brush Retainer (Used W/Milo/Grain Sorghum Discs)

# GRANULAR CHEMICAL HOPPER AND HOPPER PANEL EXTENSION

(METR14d)





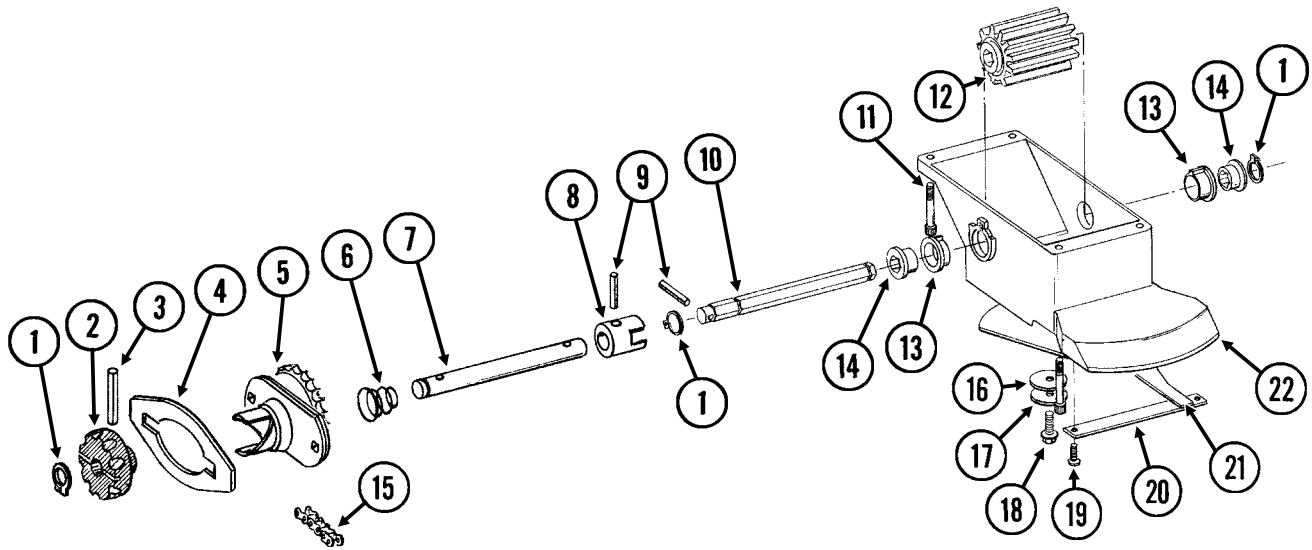
# GRANULAR CHEMICAL HOPPER AND HOPPER PANEL EXTENSION

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ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10210	3	Washer, 3/8" USS
2.	GD2971-10	1	Sleeve, 9/16" Long
3.	GD11219	1	Spring
4.	G10201	1	Special Washer, 3/8" x 1 1/2" O.D.
5.	GD1026	1	Sleeve, 1 3/16" Long
6.	GD11962	1	Idler
7.	G10108	1	Lock Nut, 3/8"-16
8.	G10670	2	Hair Pin Clip, No. 3
9.	GD1059L	1	Support, L.H. (Shown)
	GD1059R	1	Support, R.H.
10.	G10002	4	Hex Head Cap Screw, 3/8"-16 x 3/4"
	G10229	4	Lock Washer, 3/8"
11.	G10312	8	Carriage Bolt, 5/16"-18 x 3/4"
	G10620	8	Serrated Flange Nut, 5/16"-18
12.	G10325	1	Hex Head Cap Screw, 3/8"-16 x 2 3/4"
13.	G10567	3	External Retaining Ring, 5/8"
14.	GD11305	1	Plate
15.	A10759	1	Hopper Panel Extension <b>(Non-Stock Item)</b> <b>(Sub Wholegoods Order Code 700-01099)</b>
16.	GD11424	4	Block
17.	G10023	2	Hex Head Cap Screw, 1/4"-20 x 3/4"
	G10621	2	Serrated Flange Nut, 1/4"-20
18.	GD1060	1	Hinge
19.	GA8371	1	Hopper
20.	GA4444	1	Lid
21.	GD11239	1	Knob
22.	G10602	1	Spring Pin, 1/4" x 1 1/2"

# GRANULAR CHEMICAL METER AND METER DRIVE

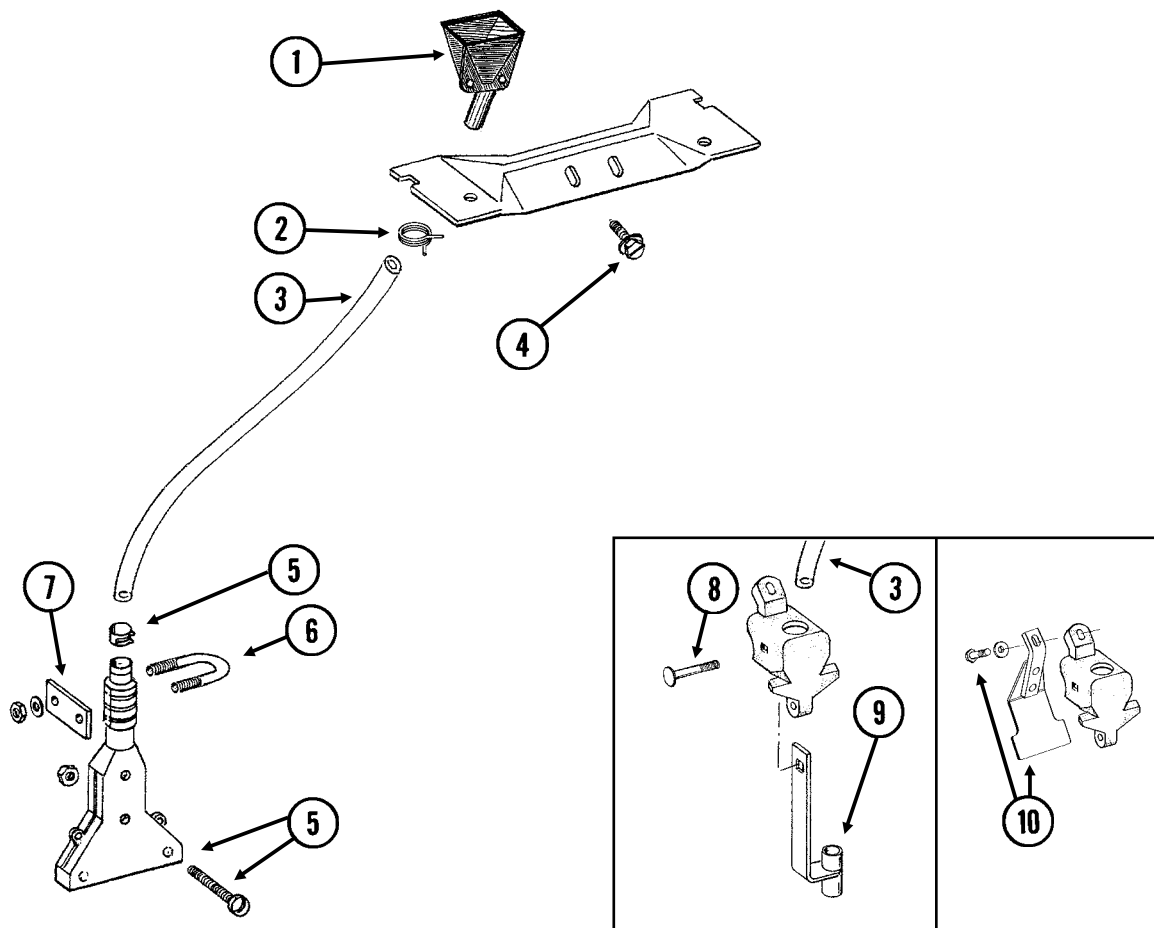
RUA051/RUB028(RU91a)



ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10567	3	External Retaining Ring, 5/8"
2.	GD11239	1	Knob
3.	G10602	1	Spring Pin, 1/4" x 1 1/2"
4.		-	See "Granular Chemical Hopper And Hopper Panel Extension", Pages P26 And P27
5.	GA8364	1	Sprocket And Bearing, Drive Clutch, 24 Tooth
6.	GD11413	1	Spring
7.	GD11240	1	Shaft
8.	GB0278	1	Coupler
9.	G10546	2	Spring Pin, 3/16" x 1 1/4"
10.	GD11297	1	Shaft
11.	G10921	4	Hex Socket Head Cap Screw, No. 10-24 x 7/8"
	G10257	4	Lock Washer, No. 10
12.	GD7148	1	Feed Roller, Hex Bore
13.	GB0115	2	Bearing
14.	GD7258	2	Hex Bushing
15.	G3303-114	1	Chain, No. 41, 114 Pitch Including Connector Link
	GR0196	1	Connector Link, No. 41
16.	G10660	1	Wave Washer, 1/2"
17.	G10209	1	Washer, 1/4" USS
18.	G10570	1	Slotted Hex Self-Tapping Screw, 1/4"-20 x 3/4"
19.	G11073	2	Slotted Hex Self-Tapping Screw, No. 10 x 3/8"
20.	GD1061	1	Support Strap
21.	GD1063	1	Metering Gate
22.	GB0116	1	Granular Housing
A.	GA8326	-	Granular Chemical Meter Complete (Items 1, 9, 10, 12-14 And 16-22)

# GRANULAR CHEMICAL BANDING OPTIONS

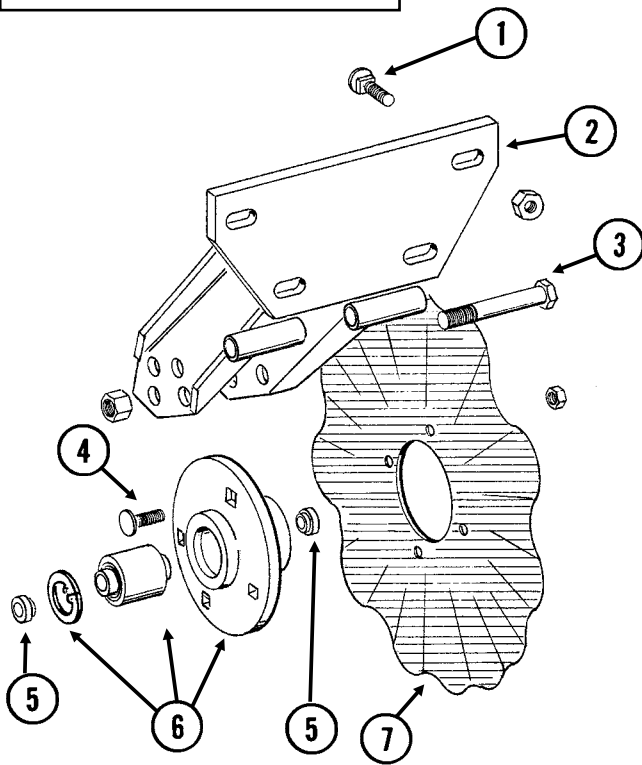
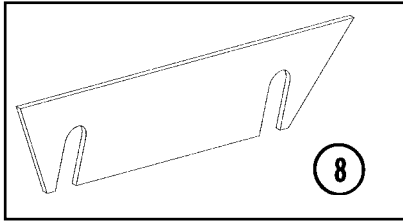
RUA061/RUA073(RU101mm)



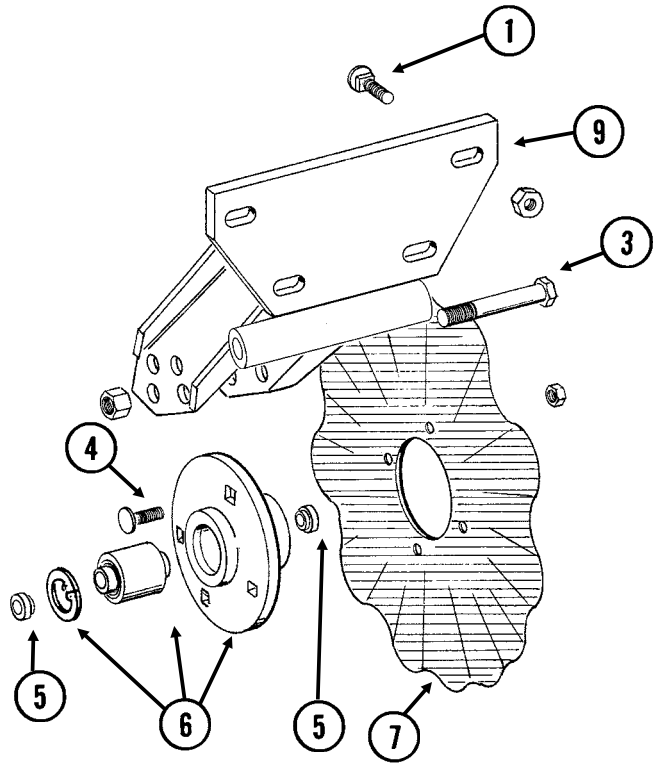
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD2423	1	Funnel
2.	G11209	1	Wire Hose Clamp, 3/4"
3.	GD2947	1	Hose, 7/16" x 28"
4.	G10523	2	Slotted Pan Head Self-Tapping Screw, No. 10 x 1/2"
5.	GA6907	1	Slope-Compensating Bander W/Hardware (4 1/2" Band Width)
	G10864	1	Uni-Clamp
	G10757	2	Pan Head Screw, No. 10-32 x 1 1/4"
	G10758	2	Hex Nut, No. 10-32
6.	GD10963	1	U-Bolt, 1 1/2" x 1 5/16" x 1/4"-20
	G10209	2	Washer, 1/4" USS
	G10110	2	Lock Nut, 1/4"-20, Grade B
7.	GD10984	1	Spacer
8.	G10315	1	Carriage Bolt, 1/2"-13 x 2 1/2" (Replaces Existing 1/2" x 2 1/4" Hardware)
9.	GA6741	1	Bracket (Straight Drop In-Furrow)
10.	G1K385	-	Bander Shield Kit W/Hardware And Instruction
	G10003	1	Hex Head Cap Screw, 3/8"-16 x 1 1/2"
	GD14659	1	Special Washer, 3/8", Hardened

# ROW UNIT MOUNTED NO TILL COULTER

(D14398/RU102c/RU152)



**STYLE A**



**STYLE B**

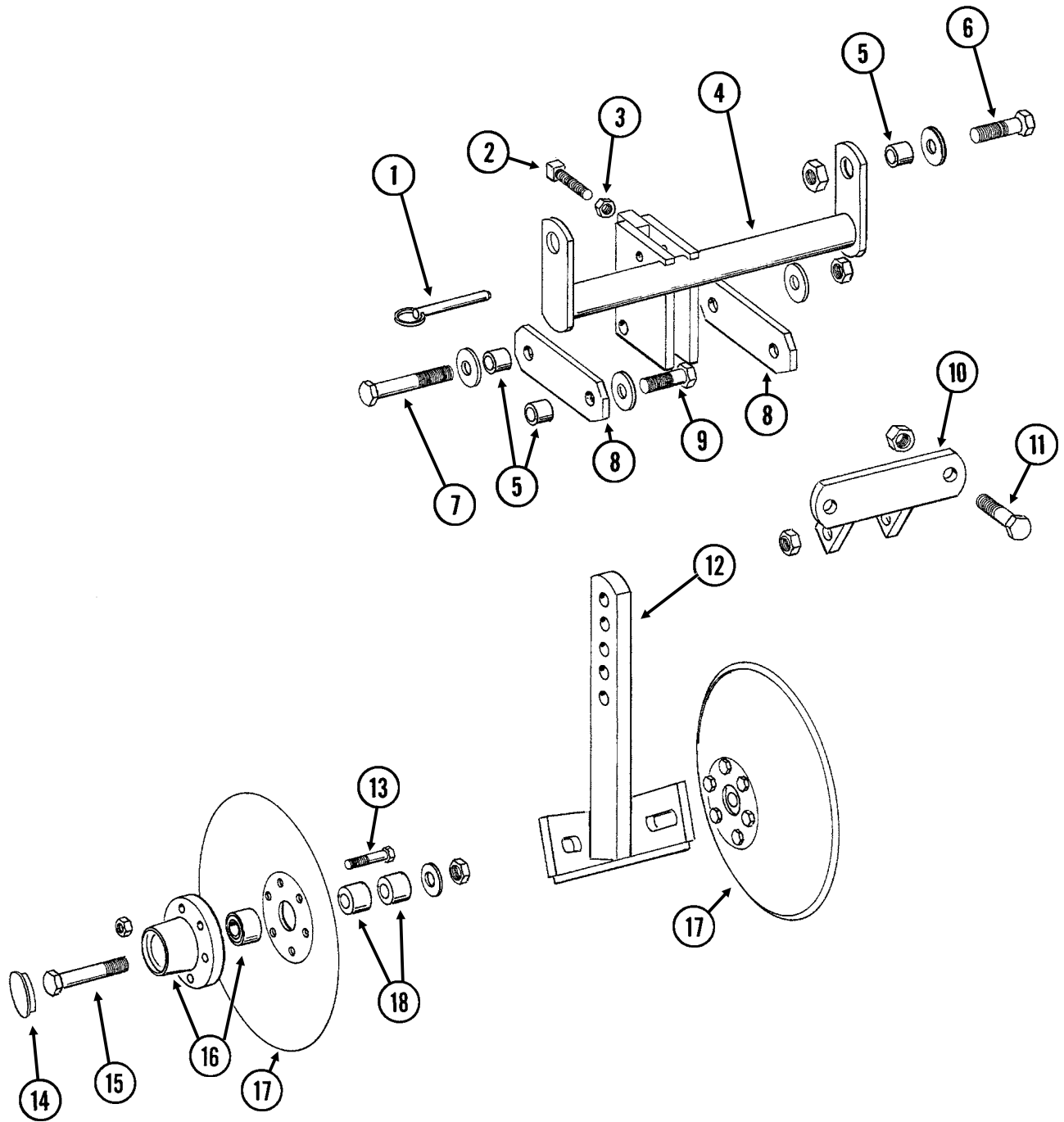
# ROW UNIT MOUNTED NO TILL COULTER

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ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10574	4	Carriage Bolt, 1/2"-13 x 1 1/4"
	G10111	4	Lock Nut, 1/2"-13
2.	GA5625	1	Arm (Style A)
3.	G10036	1	Hex Head Cap Screw, 5/8"-11 x 4"
	G10107	1	Lock Nut, 5/8"-11
4.	G10574	4	Carriage Bolt, 1/2"-13 x 1 1/4"
	G10111	4	Lock Nut, 1/2"-13
5.	GD11677	2	Adapter
6.	GA8641	1	Hub W/Bearing And Retaining Ring
	GA8603	-	Bearing, Double Row
	GD11652	-	Retaining Ring, 2 7/16"
7.	GD7803	-	Disc Blade, Fluted, 1", 8 Flutes (Shown)
	GD7804	-	Disc Blade, Bubbled, 1"
	GD9254	-	Disc Blade, Fluted, 3/4", 13 Flutes
8.	GD14398	-	Spacer
9.	GA11520	1	Arm (Style B)

# ROW UNIT MOUNTED DISC FURROWER

RUA059/RUA058(RU99/RU98g)



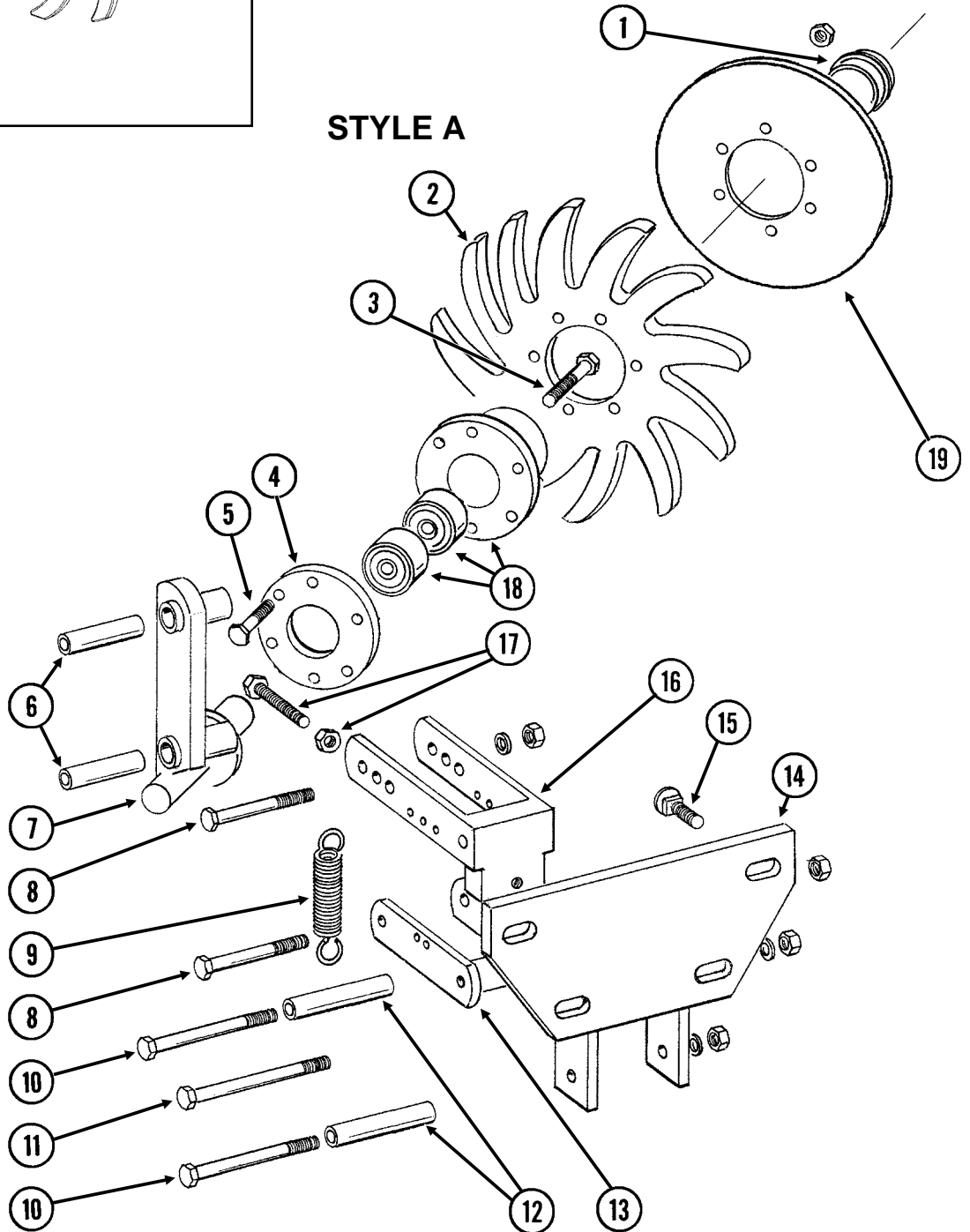
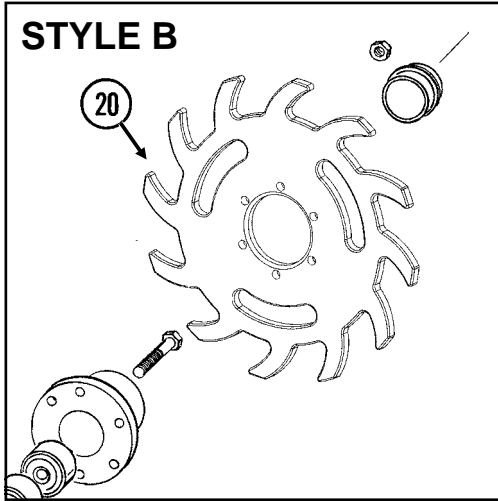
# ROW UNIT MOUNTED DISC FURROWER

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ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10536	1	Detent Pin, 1/2" x 2 1/2" Grip
2.	G10597	1	Square Head Set Screw, 5/8"-11 x 2 1/4"
3.	G10503	1	Hex Jam Nut, 5/8"-11, Grade 2
4.	GA5719	1	Mounting Bracket
5.	GD7889	6	Bushing, 1" O.D. x 9/16" I.D. x 7/16" Long
6.	G10039	2	Hex Head Cap Screw, 1/2"-13 x 1 3/4"
	GD14674	2	Special Washer, 1/2", Hardened
	G10111	2	Lock Nut, 1/2"-13
7.	G10585	1	Hex Head Cap Screw, 1/2"-13 x 3 1/4"
	G10216	2	Washer, 1/2" USS
	G10111	1	Lock Nut, 1/2"-13
8.	GD7890	2	Link
9.	G10017	2	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10216	2	Washer, 1/2" USS
	G10111	2	Lock Nut, 1/2"-13
10.	GA5715	1	Anchor
11.	G10017	2	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10111	2	Lock Nut, 1/2"-13
12.	GA5718	1	Support Arm
13.	G10572	6	Truss Head Slotted Machine Screw, 5/16"-18 x 7/8"
	G10106	6	Hex Nut, 5/16"-18
14.	GD1132	2	Dust Cap
15.	G10318	2	Hex Head Cap Screw, 5/8"-11 x 4 1/2"
	GD7805	2	Special Washer, 5/8", Hardened
	G10107	2	Lock Nut, 5/8"-11
16.	GA5654	2	Hub W/Bearings
	GA2014	-	Bearing
17.	GD7823	-	Disc Blade, Solid, 12" (Shown)
	GD8307	-	Disc Blade, Notched, 12"
18.	GD7817-01	2	Spacer, 1 1/16" I.D. x 3/4" Long
	GD7817-04	2	Spacer, 1 1/16" I.D. x 1/2" Long

# ROW UNIT MOUNTED RESIDUE WHEEL

(RU103d/RU103dd)





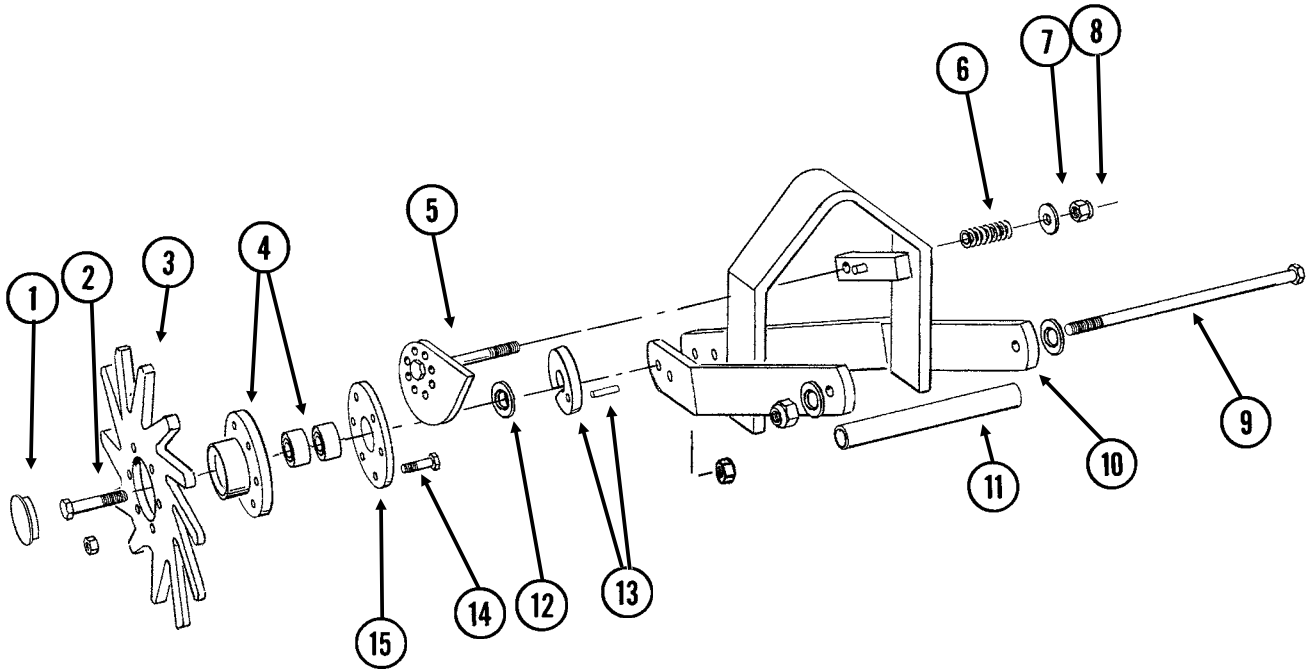
# ROW UNIT MOUNTED RESIDUE WHEEL

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GD1132	1	Dust Cap
2.	GD10552	1	Wheel, 12 Tine, 3/8" x 12"
3.	G10006	1	Hex Head Cap Screw, 5/8"-11 x 2 1/4"
4.	GD9724	1	Backing Plate
5.	G10133	6	Hex Head Cap Screw, 5/16"-18 x 1 1/2"
	G10109	6	Lock Nut, 5/16"-18, Grade 8
6.	GD9720	2	Spacer, 1/2" x 2 3/16" Long
7.	GA6838	1	Wheel Mount
8.	G10033	2	Hex Head Cap Screw, 1/2"-13 x 3 1/2"
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
9.	GD5857	2	Spring
10.	G10045	2	Hex Head Cap Screw, 1/2"-13 x 4 1/2"
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
11.	G10348	1	Hex Head Cap Screw, 1/2"-13 x 5" (Lockup Bolt)
	G10111	1	Lock Nut, 1/2"-13
12.	GD9715	2	Spacer, 1/2" x 3" Long
13.	GA6834	1	Lower Link
14.	GA6832	1	Mount
15.	G10574	4	Carriage Bolt, 1/2"-13 x 1 1/4"
	G10111	4	Lock Nut, 1/2"-13
16.	GA6833	1	Upper Link
17.	G10371	1	Hex Head Cap Screw, 1/2"-13 x 3", Full Thread
	G10501	1	Hex Jam Nut, 1/2"-13, Grade 2
18.	GA5654	1	Hub W/Bearings
	GA2014	-	Bearing
19.	GD12534	-	Cover
20.	GB0387	1	Wheel, 12 Tine, 3/8" x 12"
A.	GA7446	-	Wheel Assembly, 12 Tine, R.H. (Items 2, 4, 5 And 18)
B.	GA12236	-	Wheel Assembly, 12 Tine, R.H. (Items 4, 5, 18, And 20)

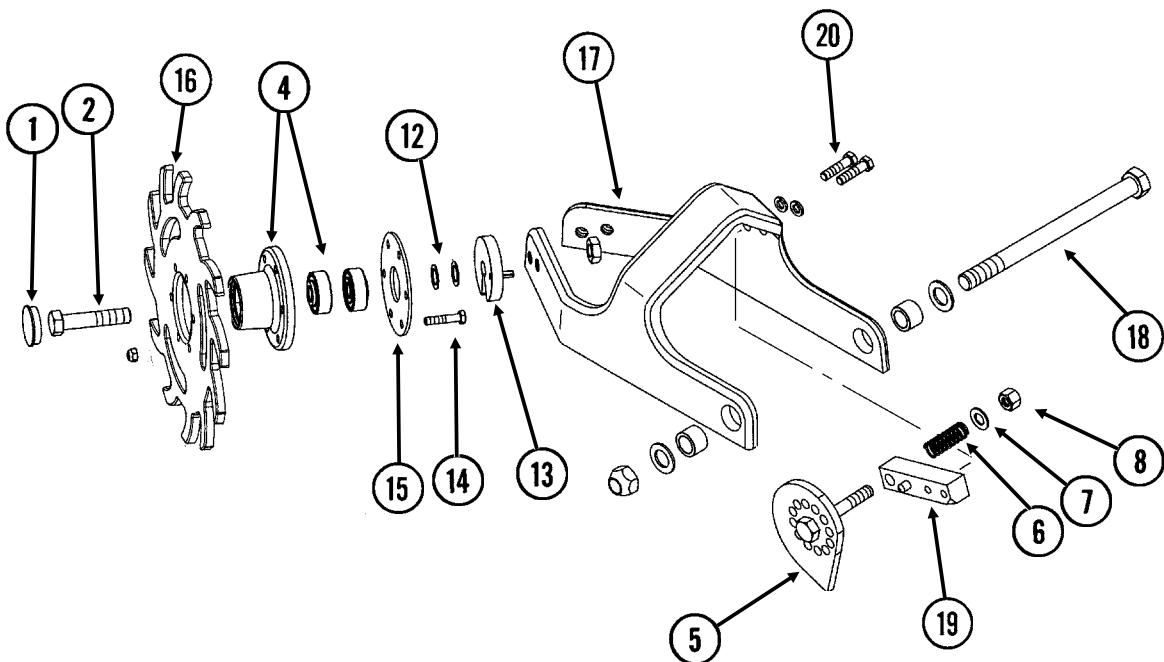
# COULTER MOUNTED RESIDUE WHEELS

RUA063(RU104uu)

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



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

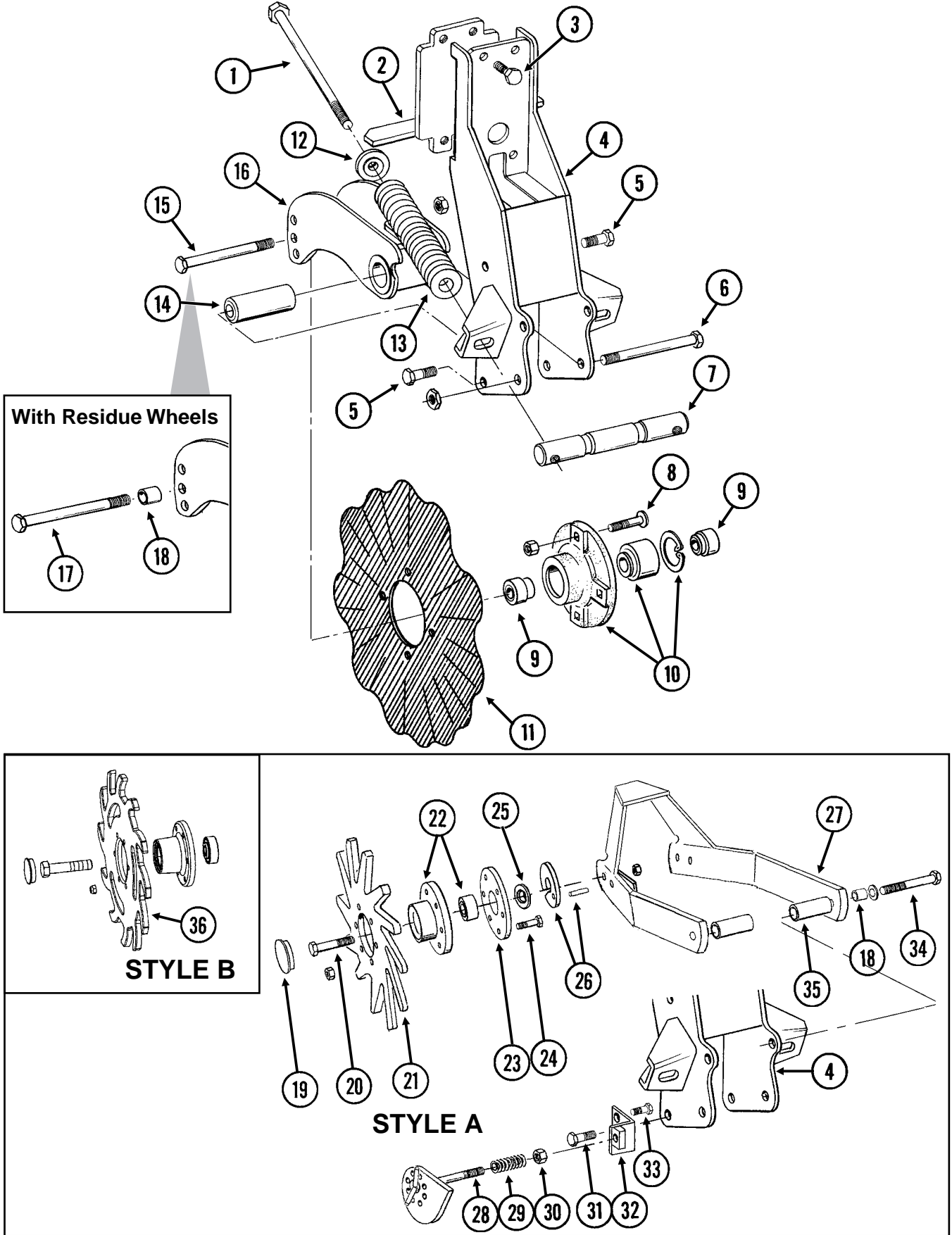


# COULTER MOUNTED RESIDUE WHEELS

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GD1132	2	Dust Cap
2.	G10010	2	Hex Head Cap Screw, 5/8"-11 x 3"
	G10503	2	Hex Jam Nut, 5/8"-11, Grade 2
3.	GD10552	2	Wheel, 12 Tine, 3/8" x 12"
4.	GA5654	2	Hub W/Bearings
	GA2014	-	Bearing
5.	GA7412	1	Cam
6.	GD10519	1	Spring
7.	G10206	1	Washer, 1/2" SAE
8.	G10974	1	Lock Nut W/Nylon Insert, 1/2"-13
9.	G11098	1	Hex Head Cap Screw, 1/2"-13 x 9 1/2", Grade 8
	GD14674	2	Special Washer, 1/2", Hardened
	G10974	1	Lock Nut W/Nylon Insert, 1/2"-13
10.	GA7271	1	Mount
11.	GD10526	1	Sleeve, 7 1/2"
12.	G10213	2-4	Machine Bushing, 5/8" (.030" Thick)
13.	GA8760	2	Weed Guard W/Spring Pin
	G10765	-	Spring Pin, 1/4" x 1"
14.	G10133	12	Hex Head Cap Screw, 5/16"-18 x 1 1/2"
	G10109	12	Lock Nut, 5/16"-18, Grade 8
15.	GD9724	2	Backing Plate
16.	GB0387	2	Wheel, 12 Tine, 3/8" x 12"
17.	GB0401	1	Mount
18.	G11236	1	Hex Head Cap Screw, 3/4"-10 x 10 1/2"
	GB0383	2	Bushing, 1 1/8" O.D. x 25/32" I.D. x 3/4" Long
	G10194	2	Washer, 3/4" SAE
	G11228	1	Lock Nut, 3/4"-10
19.	GA12256	1	Locking Pin
20.	G10003	2	Hex Head Cap Screw, 3/8"-16 x 1 1/2"
	G10229	2	Lock Washer, 3/8"
A.	GA7446	-	Wheel Assembly, 12 Tine, R.H. (Items 3, 4, 14 And 15) (Shown)
	GA7445	-	Wheel Assembly, 12 Tine, L.H. (Items 3, 4, 14 And 15)
B.	GA12236	-	Wheel Assembly, 12 Tine, R.H. (Items 4, 14, 15 And 16) (Shown)
	GA12235	-	Wheel Assembly, 12 Tine, L.H. (Items 4, 14, 15 And 16)

# FRAME MOUNTED COULTER W/RESIDUE WHEELS

(RU135c/RU135g/RU135hh/ RU153b)



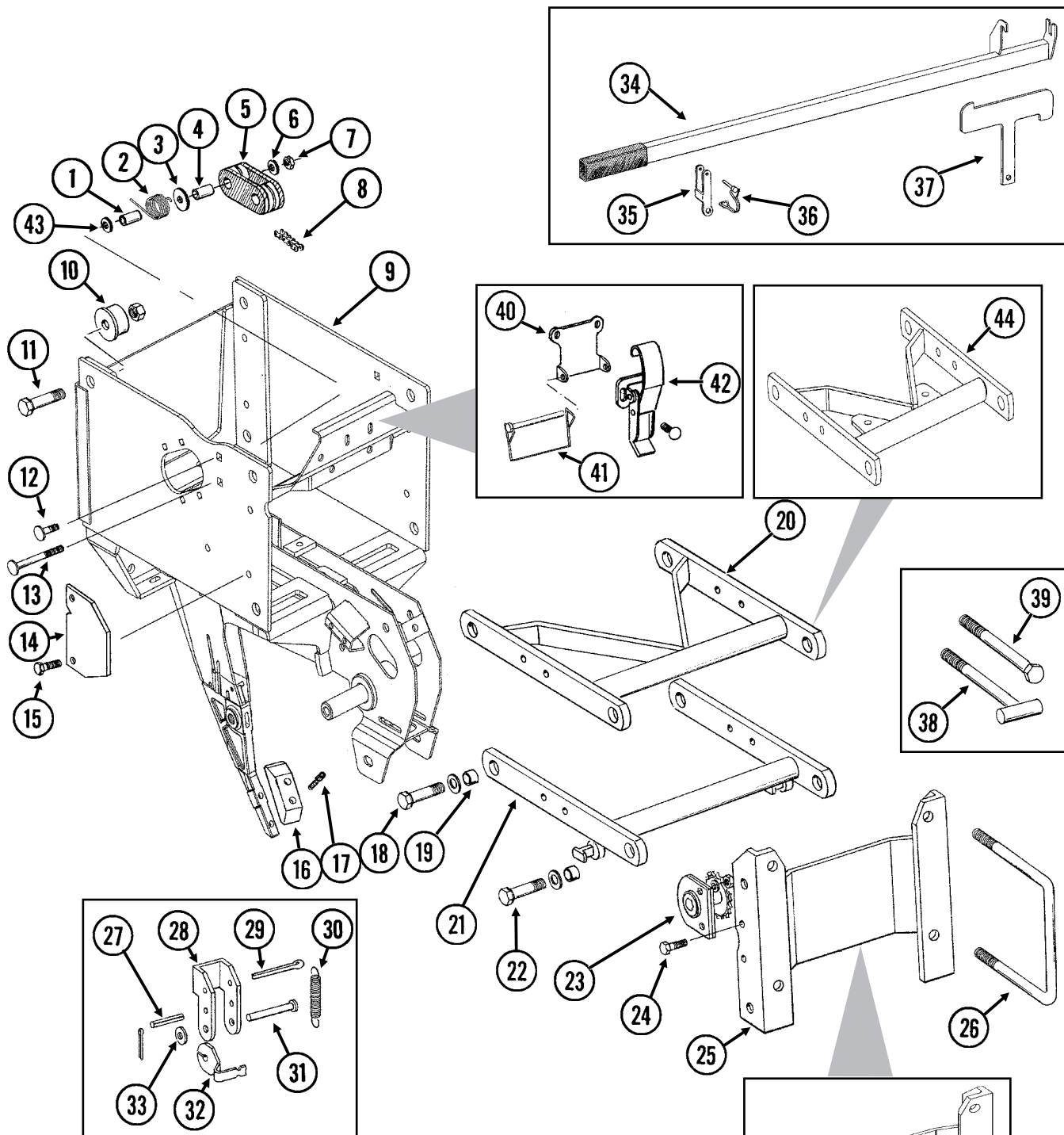
# FRAME MOUNTED COULTER W/RESIDUE WHEELS

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G11010	2	Hex Head Cap Screw, 3/4"-10 x 12"
2.	GA9844	1	Plate W/Angle
3.	G10039	4	Hex Head Cap Screw, 1/2"-13 x 1 3/4"
4.	GA9131	1	Coulter Frame
5.	G10007	4	Hex Head Cap Screw, 5/8"-11 x 1 1/2"
	G10107	4	Lock Nut, 5/8"-11
6.	G10400	1	Hex Head Cap Screw, 3/4"-10 x 6 1/2"
	G10112	1	Lock Nut, 3/4"-10
7.	GD12826	1	Spring Anchor Bar
8.	G10574	4	Carriage Bolt, 1/2"-13 x 1 1/4"
	G10111	4	Lock Nut, 1/2"-13
9.	GD12827	2	Adapter
10.	GA8641	1	Hub W/Bearing And Retaining Ring
	GA8603	1	Bearing, Double Row
	GD11652	1	Retaining Ring, 2 7/16"
11.	GD7803	1	Disc Blade, Fluted, 1", 8 Flutes (Shown)
	GD7804	-	Disc Blade, Bubbled, 1"
	GD9254	-	Disc Blade, Fluted, 3/4", 13 Flutes
12.	GB0213	2	Spring Seat
13.	GD12817	2	Compression Spring
14.	GD12829	1	Sleeve
15.	G10046	1	Hex Head Cap Screw, 5/8"-11 x 5"
	G10107	1	Lock Nut, 5/8"-11
16.	GA9845	1	Coulter Arm W/Grease Fitting
	G10643	-	Grease Fitting, 45°, 1/4"-28
17.	G10011	1	Hex Head Cap Screw, 5/8"-11 x 5 1/2"
	G10107	1	Lock Nut, 5/8"-11
18.	GB0218	3	Bushing, 2 1/32" I.D. x 7/8" O.D. x 1 9/32" Long
19.	GD1132	2	Dust Cap
20.	G10010	2	Hex Head Cap Screw, 5/8"-11 x 3"
	G10503	2	Hex Jam Nut, 5/8"-11, Grade 2
21.	GD10552	2	Wheel, 12 Tine, 3/8" x 12"
22.	GA5654	2	Hub W/Bearings
	GA2014	-	Bearing
23.	GD9724	2	Backing Plate
24.	G10133	12	Hex Head Cap Screw, 5/16"-18 x 1 1/2"
	G10109	12	Lock Nut, 5/16"-18, Grade 8
25.	G10213	2	Machine Bushing, 5/8" (.030" Thick)
26.	GA9862	2	Weed Guard W/Spring Pin
	G10765	-	Spring Pin, 1/4" x 1"
27.	GA9865	1	Mount
28.	GA9861	1	Cam
29.	GD10519	1	Spring
30.	G10974	1	Lock Nut W/Nylon Insert, 1/2"-13
31.	G10005	1	Hex Head Cap Screw, 5/8"-11 x 1 3/4"
	G10107	4	Lock Nut, 5/8"-11
32.	GA9864	1	Support
33.	G10014	1	Hex Head Cap Screw, 1/2"-13 x 1"
	G10102	1	Hex Nut, 1/2"-13
34.	G10011	2	Hex Head Cap Screw, 5/8"-11 x 5 1/2"
	G10205	2	Washer, 5/8" SAE
	G10730	2	Lock Nut W/Nylon Insert, 5/8"-11
35.	GD14170	2	Sleeve, 3"
36.	GB0386	2	Wheel, 12 Tine, 3/8" x 12"
A.	GA7446	-	Wheel Assembly, 12 Tine, R.H. (Items 21-24) (Shown)
	GA7445	-	Wheel Assembly, 12 Tine, L.H. (Items 21-24)
B.	GA12236	-	Wheel Assembly, 12 Tine, R.H. (Items 22, 23, 24 And 36) (Shown)
	GA12235	-	Wheel Assembly, 12 Tine, L.H. (Items 22, 23, 24 And 36)

# INTERPLANT® PUSH ROW UNIT

(RU141d/RU86k/RU121/RU89q/A11969/A11970)

**NOTE:** Push row units use the same seed tube, row unit depth adjustment components, quick adjustable down force springs, 15" opener disc blades, gauge wheels, closing wheels, meter drive and hopper as the pull row unit. See those pages for common parts.



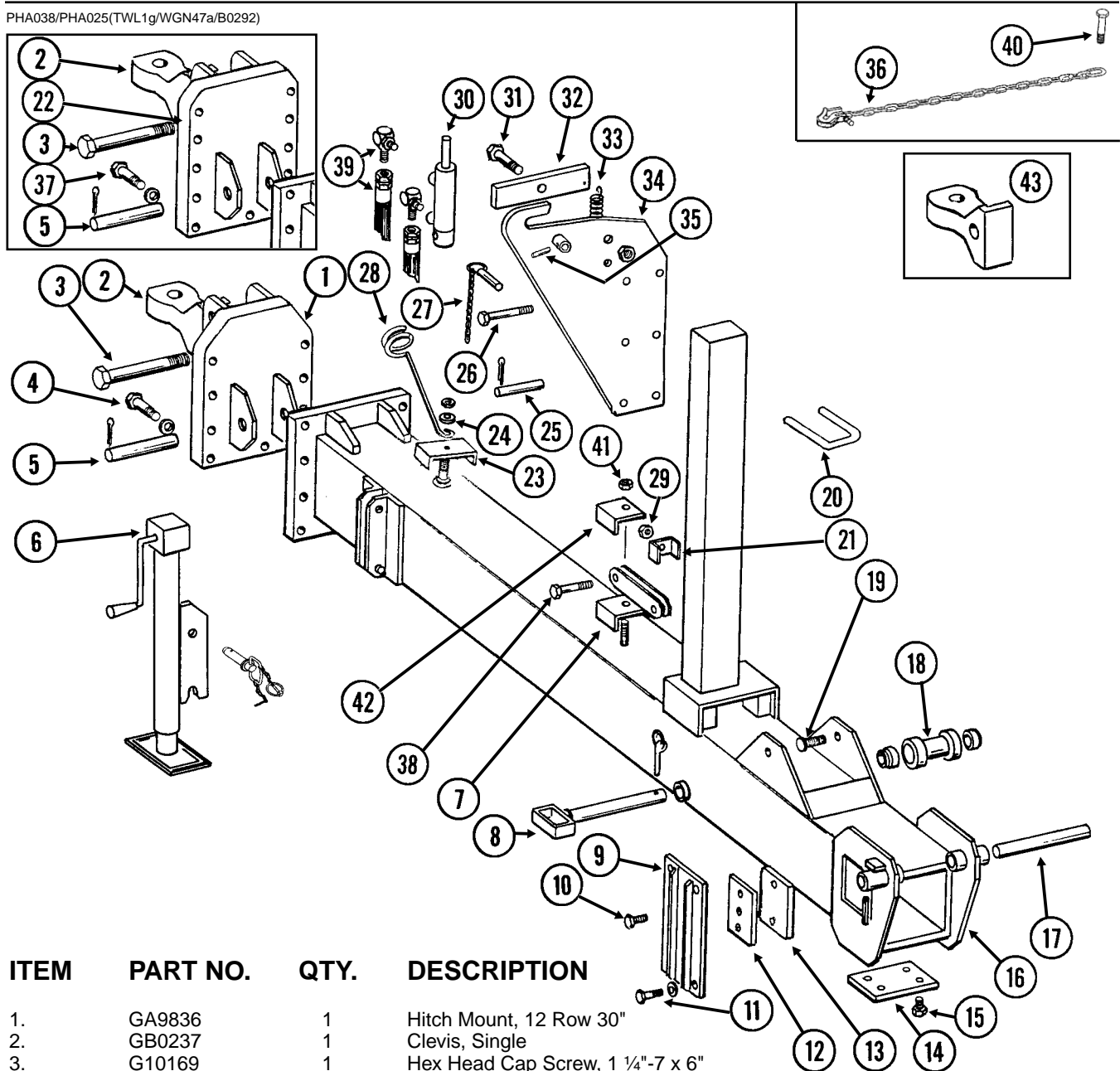
ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GD1026	1	Sleeve, 1 3/16" Long
2.	GD11218	1	Spring
3.	G10201	1	Special Washer, 3/8" x 1 1/2" O.D.
4.	GD8893-01	1	Sleeve, 1 3/8" Long

# INTERPLANT® PUSH ROW UNIT

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
5.	GD11962	1	Idler
6.	G10210	1	Washer, 3/8" USS
7.	G10108	1	Lock Nut, 3/8"-16
8.	G3303-96	1	Chain, No. 41, 96 Pitch Including Connector Link
	GR0196	1	Connector Link, No. 41
9.	GA10161	-	Push Row Unit Shank
10.	GB0314	2	Hopper Mount
11.	G10751	2	Hex Head Cap Screw, 5/8"-18 x 1 3/4"
	G10412	2	Lock Nut, 5/8"-18
12.	G10599	1	Carriage Bolt, 3/8"-16 x 1 1/4"
	G10101	1	Hex Nut, 3/8"-16
	G10108	1	Lock Nut, 3/8"-16
13.	G10307	1	Carriage Bolt, 3/8"-16 x 3 1/2"
14.	GD10867	2	Stop
15.	G10004	4	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10108	4	Lock Nut, 3/8"-16
16.	GB0301	1	Seed Tube Guard/Inner Scraper
17.	G10912	2	Hex Socket Head Cap Screw, 5/16"-18 x 1", Grade 8
18.	G10751	4	Hex Head Cap Screw, 5/8"-18 x 1 3/4"
	GD7805	4	Special Washer, 5/8", Hardened
	G10412	4	Lock Nut, 5/8"-18
19.	GB0218	8	Bushing, 21/32" I.D. x 7/8" O.D. x 19/32" Long
20.	GA8930	-	Upper Arm
21.	GA5787	1	Lower Arm
22.	G10732	4	Hex Head Cap Screw, 5/8"-18 x 2"
	GD7805	4	Special Washer, 5/8", Hardened
	G10412	4	Lock Nut, 5/8"-18
23.	GA1720	1	Bearing/Sprocket, 7/8" Hex Bore
24.	G10004	2	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
25.	GA5786	1	Mounting Plate
26.	GD1113	2	U-Bolt, 5" x 7" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
27.	G10718	2	Spring Pin, 5/16" x 1 1/8"
28.	GD11264	2	Lockup
29.	G10463	2	Cotter Pin, 1/4" x 1 1/2"
30.	GD11447	2	Spring
31.	G10284	2	Clevis Pin, 1/2" x 1 1/2"
	G10456	2	Cotter Pin, 1/8" x 3/4"
32.	GD11263	2	Spring Tab
33.	G10216	2	Washer, 1/2" USS
34.	GA8651	1	Lift Lever W/Boot
	GD11649	-	Boot
35.	GD11659	1	Bracket
36.	GD9695	1	Wire Lock Pin, 1/4" x 1 3/4"
37.	GD11752	1	Mount
38.	GA9105	-	T-Bolt, 5/8"-11 x 6"
	G10230	-	Lock Washer, 5/8"
	G10104	-	Hex Nut, 5/8"-11
39.	G10830	-	Hex Head Cap Screw, 5/8"-11 x 7 1/2"
	G10230	-	Lock Washer, 5/8"
	G10104	-	Hex Nut, 5/8"-11
40.	GD13110	-	Retainer (SDS Only)
41.	GD10705	-	Locking Clip Pin, 1/4" x 2 1/2" (SDS Only)
42.	GA2007	-	Hopper Hold Down Latch
43.	G10203	1	Washer, 3/8" SAE
44.	A11969	1	Upper Arm
45.	A11971	1	Mounting Plate

# OUTER HITCH/SAFETY CHAIN

PHA038/PHA025(TWL1g/WGN47a/B0292)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA9836	1	Hitch Mount, 12 Row 30"
2.	GB0237	1	Clevis, Single
3.	G10169	1	Hex Head Cap Screw, 1 1/4"-7 x 6"
	G10157	1	Lock Nut, 1 1/4"-7
4.	G10009	9	Hex Head Cap Screw, 5/8"-11 x 2 1/2"
	G10230	9	Lock Washer, 5/8"
	G10104	9	Hex Nut, 5/8"-11
5.	GD5173	1	Pin, 1 1/4" x 5 1/8"
	G10462	2	Cotter Pin, 3/16" x 2"
6.	GA4994	1	Jack Assembly Complete
	GA4995	-	Detent Pin Assembly
	GR0517	-	Pin
	GR0516	-	Crank Assembly
	GR0515	-	Bevel Gear Set, Includes: (2) Bevel Gears, (1) Gear Pin, (1) Groove Pin
7.	GA5842	1	Bracket, Jack Mount
	GD8189	-	Rubber Pad
8.	GA4402	1	Safety Pin, 12 3/4", 12 Row 30"
	GA4845	-	Safety Pin, 14 3/4", 16 Row 30"
	GD2557	-	Lynch Pin, 7/16"
9.	GA7029	2	Wear Mount, 12 Row 30"
	GA7084	-	Wear Mount, L.H., 16 Row 30"
	GA7085	-	Wear Mount, R.H., 16 Row 30"
	GA7083	-	Wear Pad Retainer, 16 Row 30"

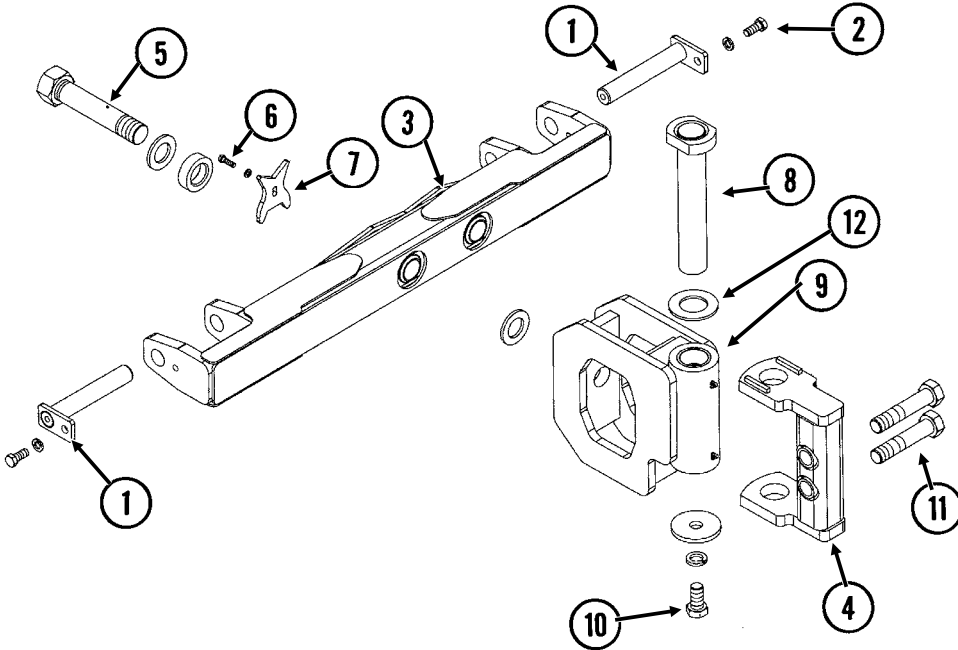


# OUTER HITCH/SAFETY CHAIN

ITEM	PART NO.	QTY.	DESCRIPTION
10.	G10016	-	Hex Head Cap Screw, 1/2"-13 x 2"
	G10014	-	Hex Head Cap Screw, 1/2"-13 x 1"
	G10216	-	Washer, 1/2" USS
	G10228	-	Lock Washer, 1/2"
11.	G10017	8	Hex Head Cap Screw, 1/2"-13 x 1 1/2", 12 Row 30"
	G10016	10	Hex Head Cap Screw, 1/2"-13 x 2", 16 Row 30"
	G10228	8-10	Lock Washer, 1/2"
	G10102	8-10	Hex Nut, 1/2"-13
12.	GD5154	-	Shim, 4" x 4" (As Required), All Sizes
	GD3501	-	Shim, 4" x 6" (As Required), 16 Row 30"
13.	GD9959	-	Wear Pad, Nylatron, 4" x 4" (As Required), All Sizes
	GD9960	-	Wear Pad, Nylatron, 4" x 6" (As Required), 16 Row 30"
14.	GD7519	3	Shim, 16 Gauge, 16 Row 30" Only
	GD7518	1	Shim, 3/8", 16 Row 30" Only
15.	G10014	4	Hex Head Cap Screw, 1/2"-13 x 1"
	G10228	4	Lock Washer, 1/2"
	G10216	4	Washer, 1/2" USS
16.	A7010	-	Outer Hitch, "Y", 97", 12 Row 30" <b>(Non-Stock Item)</b>
	A7088	-	Outer Hitch, "Y", 127 1/2", 16 Row 30" <b>(Non-Stock Item)</b>
17.	GD5804	1	Pin, 1 1/4" x 12", 12 Row 30"
	GD7251	1	Pin, 1 1/4" x 14", 16 Row 30"
	G10610	2	Spring Pin, 3/8" x 2"
18.	GA4418	1	Roller W/Bronze Bushings, 12 Row 30"
	GA4842	-	Roller W/Bronze Bushings, 16 Row 30"
	GD6556	1	Bronze Bushing
19.			See "Hose Take-Up", Pages P54 And P55
20.	GD9953	3	U-Bolt, 3" x 4" x 5/8"-11
	G10205	1	Washer, 5/8" SAE
	G10230	6	Lock Washer, 5/8"
	G10104	6	Hex Nut, 5/8"-11
21.	GD5892	2	Hose Clamp, 5/8" x 1 1/2" x 1 1/2"
22.	GA9837	-	Hitch Mount, 16 Row 30"
23.	GD8188	-	Hose Clamp, 7/8" x 3" x 5 3/8"
	GD8189	-	Rubber Pad
24.	G10216	1	Washer, 1/2" USS
	G10217	1	Washer, 5/8" USS
	G10111	1	Lock Nut, 1/2"-13
25.	GD7137	1	Pin, 3/4" x 3 3/8"
	G10457	2	Cotter Pin, 5/32" x 1 1/2"
26.	G10809	1	Hex Head Cap Screw, 3/8"-16 x 3 1/4"
	GD2971-09	1	Sleeve, 2" Long
	G10108	1	Lock Nut, 3/8"-16
27.	GA7022	1	Detent Pin W/Chain (Transport Latch Locking Pin)
28.	GD8260	1	Hose Holder
29.	G10108	1	Lock Nut, 3/8"-16
30.			See "Transport Latch Cylinder", Page P88
31.	G10006	1	Hex Head Cap Screw, 5/8"-11 x 2 1/4"
	GB0218	1	Bushing, 2 1/32" I.D. x 7/8" O.D. x 1 9/32" Long
	GD7805	1	Special Washer, 5/8", Hardened
	G10107	1	Lock Nut, 5/8"-11
32.	GA7016	1	Catch Bar
33.	GD5857	1	Spring
34.	GA7433	1	Transport Latch
35.	G10765	-	Spring Pin, 1/4" x 1"
36.	GA7533	1	Safety Chain, 1/2"
	G1K412	-	Safety Chain Repair Kit, Includes Hook, Flat Washer, Latch Pin, Safety Latch And Retaining Ring
37.	G10802	11	Hex Head Cap Screw, 3/4"-10 x 2 3/4"
	G10231	11	Lock Washer, 3/4"
	G10105	11	Hex Nut, 3/4"-10
38.	G10026	1	Hex Head Cap Screw, 3/4"-10 x 2"
	G10112	1	Lock Nut, 3/4"-10
39.		-	See "Hydraulic Hoses And Fittings On Hitch", Pages P100 And P101
40.	G11058	1	Hex Head Cap Screw, 1 1/4"-7 x 3"
	GD10646	1	Special Washer
	G10226	1	Washer, 1 1/4" SAE
	G10157	1	Lock Nut, 1 1/4"-7
41.	G10111	1	Lock Nut, 1/2"-13
42.	GD14121	1	Hose Clamp, 7/8" x 3 1/2"
43.	GB0292	-	Hitch Clevis, Single (2" Pin)

# 2-POINT HITCH OPTION

(A12406)



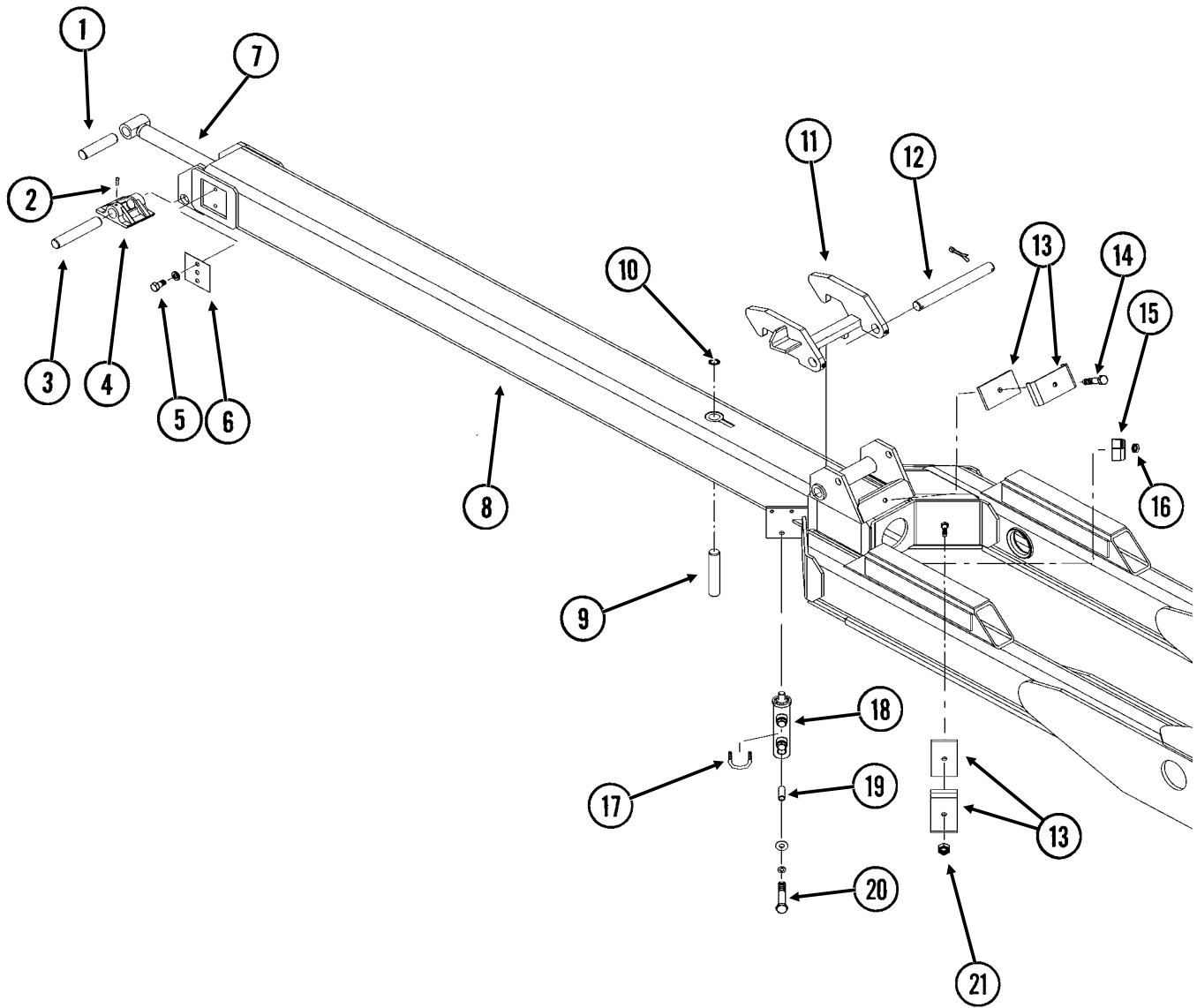
## 2-POINT HITCH OPTION

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ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA11079	2	Hammer Strap, Category 3N And 3
2.	G10007	2	Hex Head Cap Screw, 5/8"-11 x 1 1/2"
	G10230	2	Lock Washer, 5/8"
3.	GA12164	1	Hitch Bar
4.	GA12165	1	Pivot Mount
5.	GA11082	1	Pivot Bolt W/Grease Fitting, 1 3/4" x 10 3/8" (Total Length)
	G10640	-	Grease Fitting, 1/4"-28
	GD16303	2	Washer, 3" O.D. x 1 25/32" x 1/4" Thick
	GD16226	1	Sleeve, 3" O.D. x 1 25/32" x 29/32" Thick
6.	G10005	1	Hex Head Cap Screw, 5/8"-11 x 1 1/4"
	G10217	1	Washer, 5/8" USS
7.	GD15100	1	Pivot Lock
8.	GA12163	1	Pin, 13 3/8"
9.	GA11083	1	Hitch Pivot W/Bushings And Grease Fittings
	GD14562	2	Hardened Bushing, 2 3/4" O.D. x 2 1/4" I.D. x 3"
	G10779	2	Grease Fitting, 90°, 1/4"-28
10	G11223	1	Hex Head Cap Screw, 1"-8 x 2"
	G10118	1	Lock Washer, 1"
	GD17245	1	Washer, 4" O.D. x 1 1/32" I.D. x 3/8"
11.	G10169	2	Hex Head Cap Screw, 1 1/4"-7 x 6"
	G10157	2	Lock Nut, 1 1/4"-7
12.	GD15725	1	Washer, 4" O.D. x 2 1/4" I.D. x 1/4"

# INNER HITCH/UNDERCARRIAGE ASSEMBLY (Front)

(A9999a)

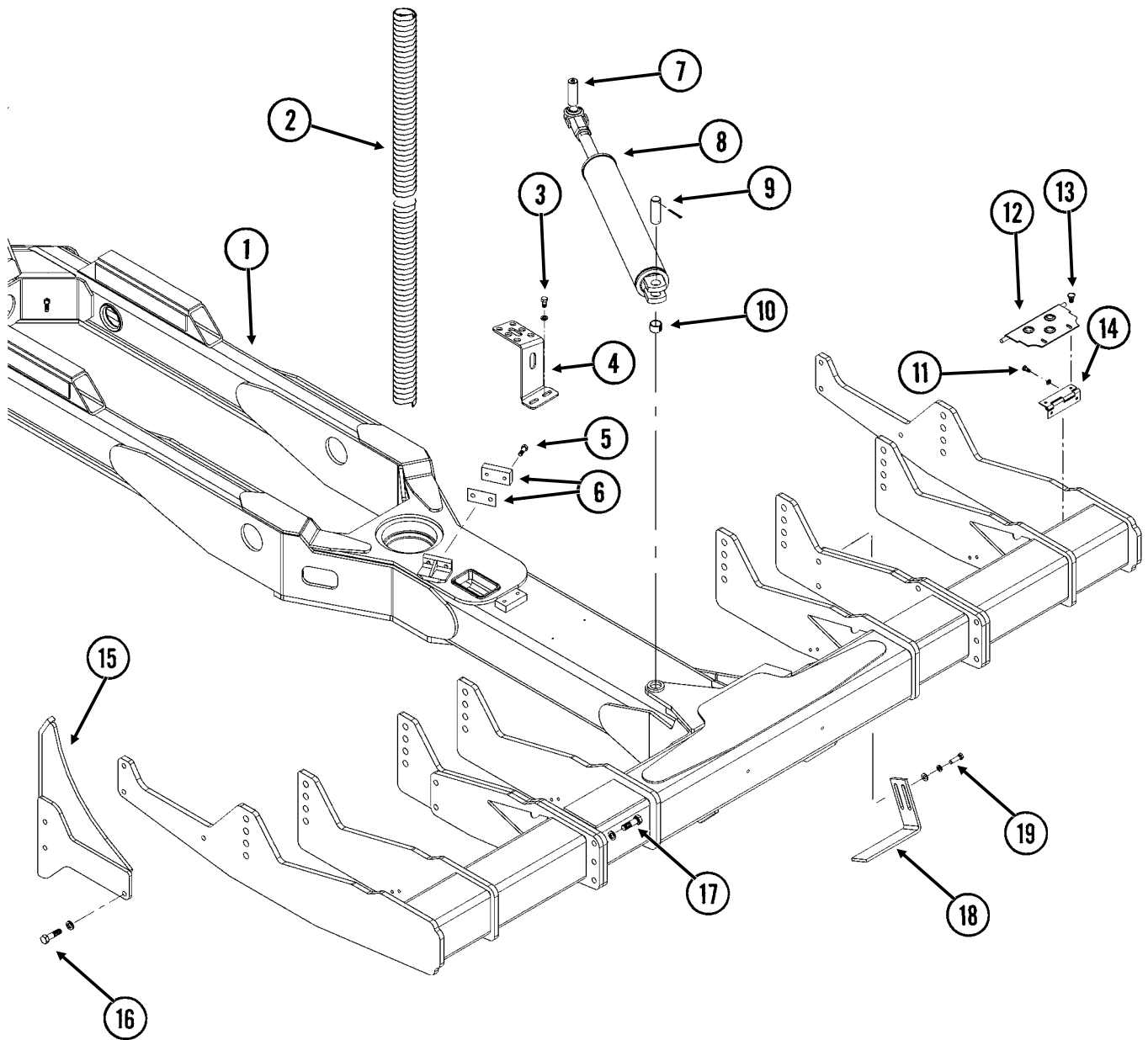


# INNER HITCH/UNDERCARRIAGE ASSEMBLY (Front)

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD5173	1	Pin, 1 1/4" x 5 1/8"
	G10462	1	Cotter Pin, 3/16" x 2"
2.	G10131	1	Square Head Set Screw, 5/16"-18 x 3/4"
3.	GD3537-11	1	Shaft, 1 1/4" x 7", 12 Row 30"
	GD3537-12	-	Shaft, 1 1/4" x 8", 16 Row 30"
4.	GB0246	1	Shoe
5.	G10017	4	Hex Head Cap Screw, 1/2"-13 x 1 1/2", 16 Row 30"
	G10014	-	Hex Head Cap Screw, 1/2"-13 x 1", 12 Row 30"
	G10228	4-6	Lock Washer, 1/2"
6.	GD9959	2	Wear Pad, Nylatron, 4" x 4"
	GD5154	4	Shim, 4" x 4"
7.		-	See "Tongue Cylinder", Pages P89 Or P90
8.		-	Inner Hitch/Undercarriage, See "Inner Hitch/Undercarriage Assembly (Rear)", Pages P46 And P47
9.	GD3537-17	1	Shaft, 1 1/4" x 6 3/8", 12 Row 30"
	GD3537-18	-	Shaft, 1 1/4" x 7 3/8", 16 Row 30"
10.	G10894	-	External Washer
11.	GA7423	1	Tongue Hook W/Grease Fittings, 12 Row 30"
	GA7424	-	Tongue Hook W/Grease Fittings, 16 Row 30"
	G10641	-	Grease Fitting, 1/8" NPT
12.	GD5804	1	Pin, 1 1/4" x 12", 12 Row 30"
	GD7883	-	Pin, 1 1/4" x 14 1/2", 16 Row 30"
	G10468	2	Cotter Pin, 3/8" x 2"
13.	GD8188	-	Hose Clamp, 7/8" x 3" x 5 3/8"
	GD8189	-	Rubber Pad
14.	G11077	1	Hex Head Cap Screw, 1/2"-13 x 2 1/4"
	G10111	1	Lock Nut, 1/2"-13
15.	GD5892	-	Hose Clamp, 5/8" x 1 1/2" x 1 1/2"
16.	G10111	1	Lock Nut, 1/2"-13
17.	GD10530	1	U-Bolt, 2 1/8" x 1 7/8" x 3/8"-16
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
18.		-	See "Tongue Lock Cylinder", Page P88
19.	GD10538-01	1	Sleeve
20.	G10585	1	Hex Head Cap Screw, 1/2"-13 x 3 1/4"
	G10216	1	Washer, 1/2" USS
	G10228	1	Lock Washer, 1/2"
	G10102	1	Hex Nut, 1/2"-13
21.	G10108	1	Lock Nut, 3/8"-16

# INNER HITCH/UNDERCARRIAGE ASSEMBLY (Rear)

(A9999aaa)

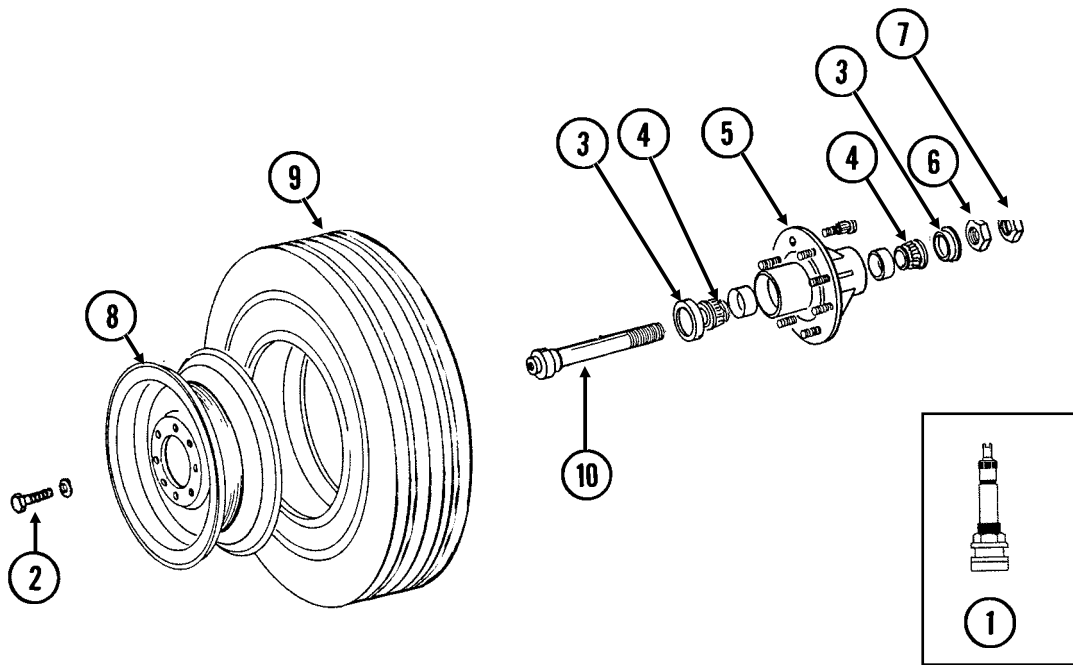


# INNER HITCH/UNDERCARRIAGE ASSEMBLY (Rear)

ITEM	PART NO.	QTY.	DESCRIPTION
1.	A10093	-	Inner Hitch/Undercarriage W/Stub Axles, 254", 12 Row 30" (Shown) <b>(Non-Stock Item)</b>
	A10080	-	Inner Hitch/Undercarriage W/Stub Axles, 290", 16 Row 30" <b>(Non-Stock Item)</b>
	GA10557	-	Stub Axle, L.H.
	GA10558	-	Stub Axle, R.H.
2.	GD9129-01	1	Hose Protector, 48"
3.	G10014	2	Hex Head Cap Screw, 1/2"-13 x 1"
	G10228	2	Lock Washer, 1/2"
4.	GD14073	1	Bulkhead Plate
5.	G10017	2	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
6.	GD14547	1	Tap Block, 1" x 2" x 4"
	GD14418	4	Shim, 2" x 4", 22 Gauge (As Required)
	GD14419	6	Shim, 2" x 4", 16 Gauge
7.		-	See "Center Pivot", Pages P60 And P61
8.		-	See "Rotation Cylinder", Page P81
9.	GD10064	1	Pin, 1 1/4" x 5 1/4"
	G10460	2	Cotter Pin, 1/4" x 2"
10.	GD11751	1	Steel Bushing, 1" Wide
11.	G10043	8	Hex Head Cap Screw, 5/16"-18 x 3/4"
	G10232	8	Lock Washer, 5/16"
12.	GA10077	4	Hinged Step
13.	G10312	8	Carriage Bolt, 5/16"-18 x 3/4"
	G10232	8	Lock Washer, 5/16"
	G10106	8	Hex Nut, 5/16"-18
14.	GD13329	4	Hinge
15.	GA10071	1	Roller Guide, L.H. (Shown)
	GA10070	-	Roller Guide, R.H.
16.	G10006	6	Hex Head Cap Screw, 5/8"-11 x 2 1/4"
	G10230	6	Lock Washer, 5/8"
	G10104	6	Hex Nut, 5/8"-11
17.	G10097	16	Hex Head Cap Screw, 3/4"-16 x 2 1/2"
	GD2169	16	Special Washer, 25/32" I.D. x 1 1/4" O.D., Hardened
	G10098	16	Hex Nut, 3/4"-16
18.	GD13328	4	Scraper
19.	G10017	8	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10206	8	Washer, 1/2" SAE
	G10228	8	Lock Washer, 1/2"

# TRANSPORT WHEELS

(TWL198e)



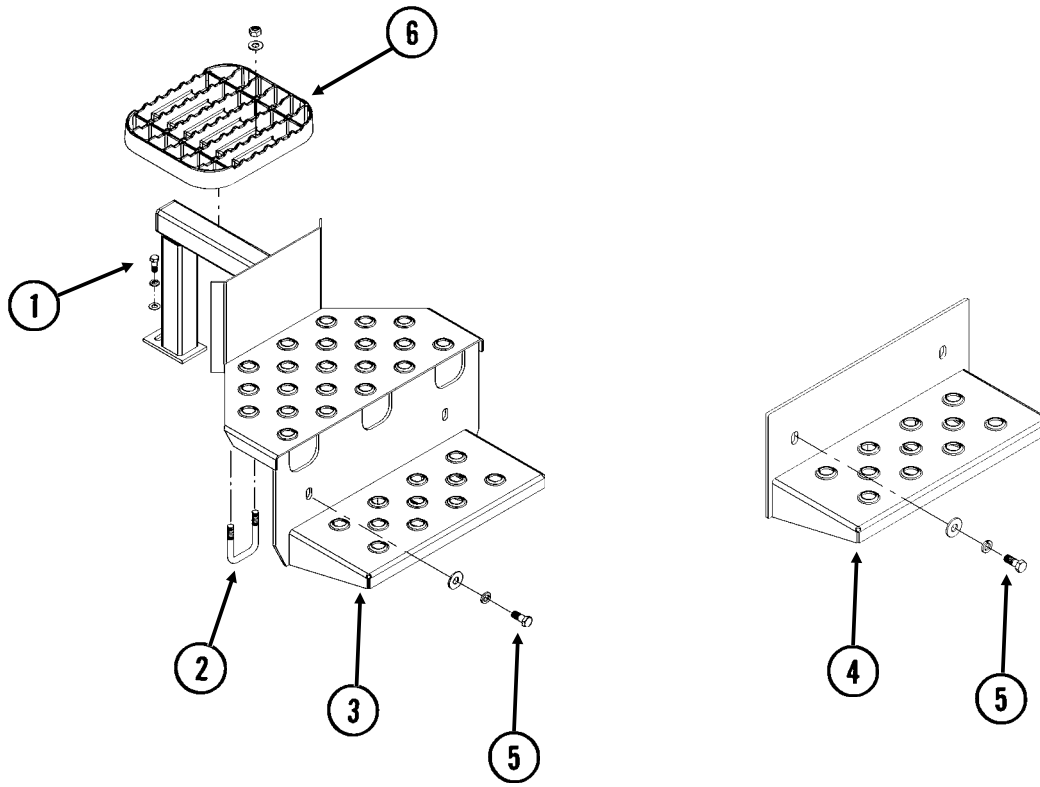
ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
1.	GA7434	-	Valve Stem
2.	G10448	2	Hex Head Cap Screw, 7/8"-9 x 2 1/2", Grade 8
	G10330	2	Lock Washer, 7/8"
3.	GA4722	2	Seal
4.	GA4723	2	Bearing
5.	GA4729	1	Hub W/Cups, Bolts, Nuts And Grease Fitting, 8 Bolt, 1 3/4" Bore
	G10640	-	Grease Fitting, 1/4"-28
	GD7079	-	Cup
	GR0528	-	Hub Bolt, 5/8"-18 x 2 1/4", Grade 8
	GR0531	-	Lug Nut, 5/8"-18 UNF
6.	GD7089	1	Special Nut, 1 3/4"-12 UNF
7.	GD7864	1	Special Hex Nut, 1 3/4"-12 UNF
8.	GA9544	-	Rim, 5.5" x 22.5"
9.	GD15406	-	Tire, 41 x 11 R22.5" W/O Center Rib (Specify Brand*)
10.	GA10139	1	Spindle W/Retaining Ring, 1 3/4"
	G10913	-	External Retaining Ring, 2 1/2"
A.	GA10553	-	Tire And Rim Assembly (Items 1, 8 And 9) (Specify Brand*)

\* Specific brand requests will be supplied only as available from current KINZE® Repair Parts stock. If a specific brand requested is not in stock, the brand available will be supplied.



# AXLE STEPS

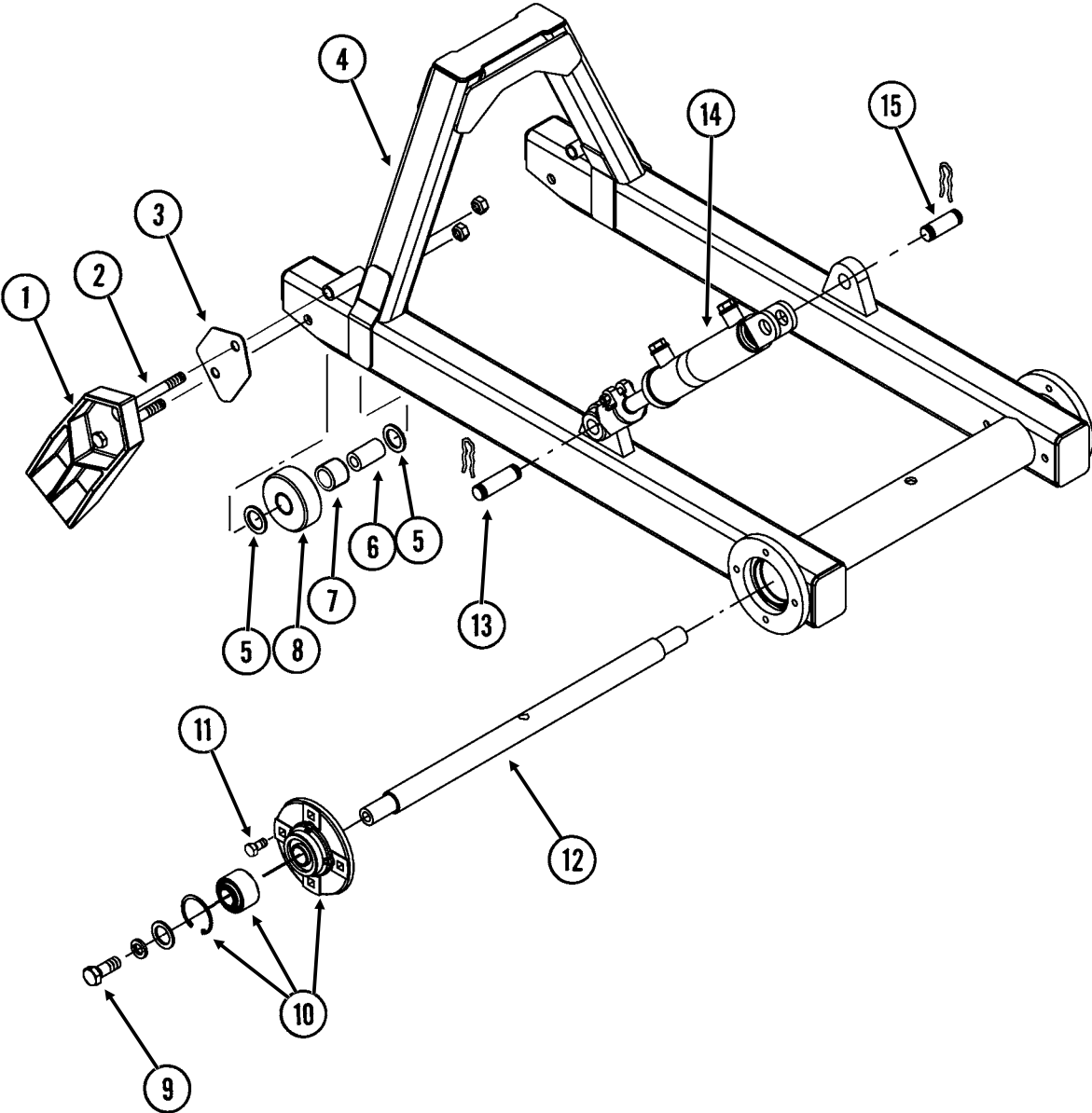
(TWL242/TWL243)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10001	1	Hex Head Cap Screw, 3/8"-16 x 1" (SDS Only)
	G10210	1	Washer, 3/8" USS
	G10229	1	Lock Washer, 3/8"
2.	GD2721	2	U-Bolt, 2" x 2" x 1/2"-13 (SDS Only)
	G10206	4	Washer, 1/2" SAE
	G10111	4	Lock Nut, 1/2"-13
3.	GA9996	1	Axle Step (SDS Only)
4.	GA10131	1	Axle Step (Conventional Only)
5.	G10037	2	Hex Head Cap Screw, 1/2"-13 x 1 1/4"
	G10228	2	Lock Washer, 1/2"
	G10216	2	Washer, 1/2" USS
6.	GB0315	1	Step (SDS Only)

# STABILIZER ASSEMBLY

(TWL244)



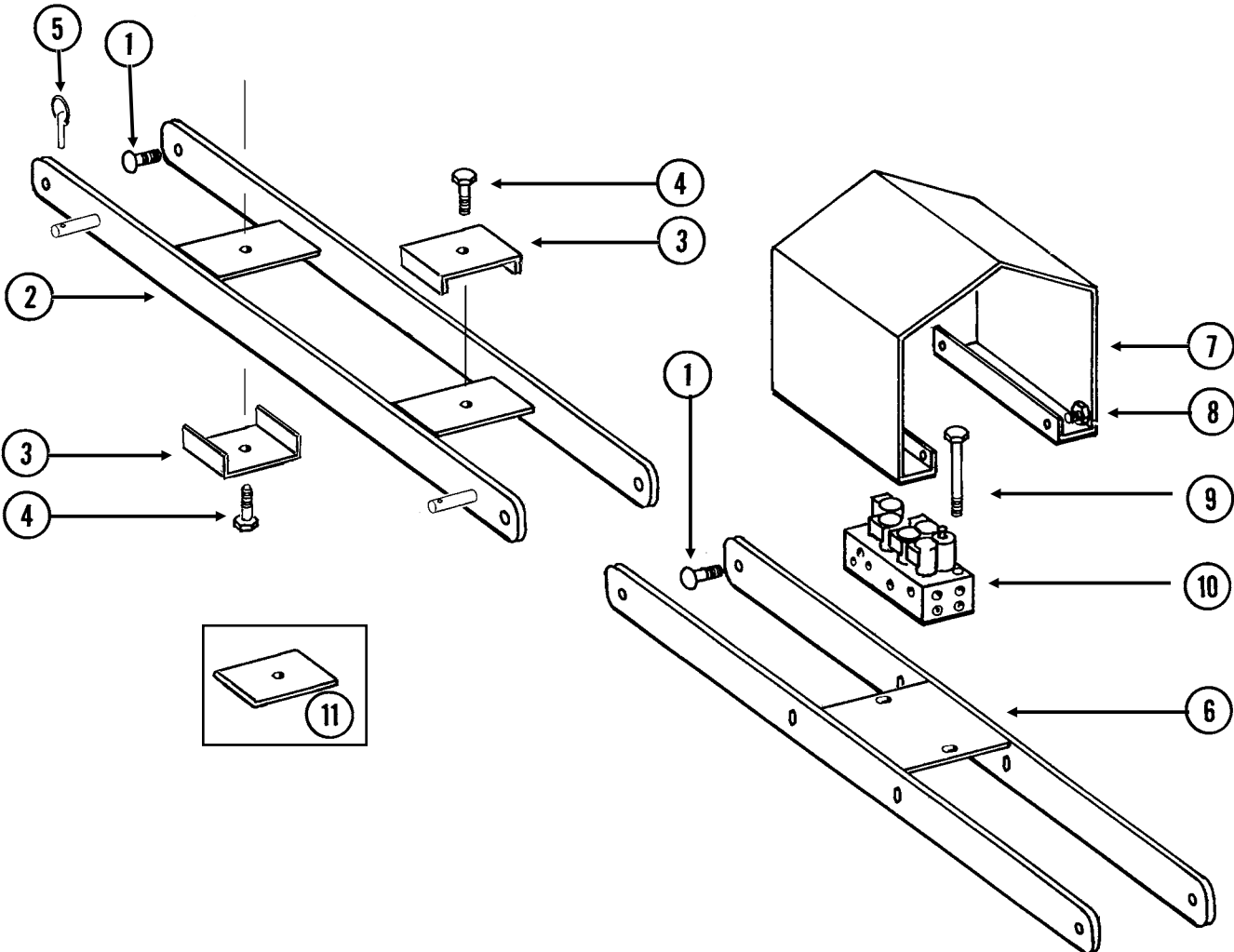
# STABILIZER ASSEMBLY

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ITEM	PART NO.	QTY.	DESCRIPTION
1.	GB0324	4	Guide Bar
2.	G10011	4	Hex Head Cap Screw, 5/8"-11 x 5 1/2"
	G10107	4	Lock Nut, 5/8"-11
3.	GD14350	-	Shim (As Required)
4.	GA9999	1	Stabilizer
5.	G10159	8	Machine Bushing, 1 1/4", 10 Gauge
6.	GD14327	2	Sleeve, 1 1/4" x 2 15/32"
7.	GD14363	2	Bronze Bushing, 1 1/2" O.D. x 1 1/4" I.D. x 1 1/2" Long
8.	GD14328	2	Roller
9.	G10026	2	Hex Head Cap Screw, 3/4"-10 x 2"
	G10231	2	Lock Washer, 3/4"
	G10159	2	Machine Bushing, 1 1/4", 10 Gauge
10.	GA8641	1	Hub W/Bearing And Retaining Ring
	GA8603	-	Double Row Bearing
	GD11652	-	Retaining Ring, 2 7/16"
11.	G10014	8	Hex Head Cap Screw, 1/2"-13 x 1"
12.	GD14341	1	Shaft, 1 1/2" x 28 7/16"
13.	GR0375	2	Pin, 1" x 3 1/2"
	GR0193	4	Hair Pin Clip
14.		-	See "Stabilizer Cylinder", Page P82
15.	GR0367	2	Pin, 1" x 2 7/8"
	GR0193	4	Hair Pin Clip

# HOSE TAKE-UP

PHA039/TWL137b/TWL137bbb



# HOSE TAKE-UP

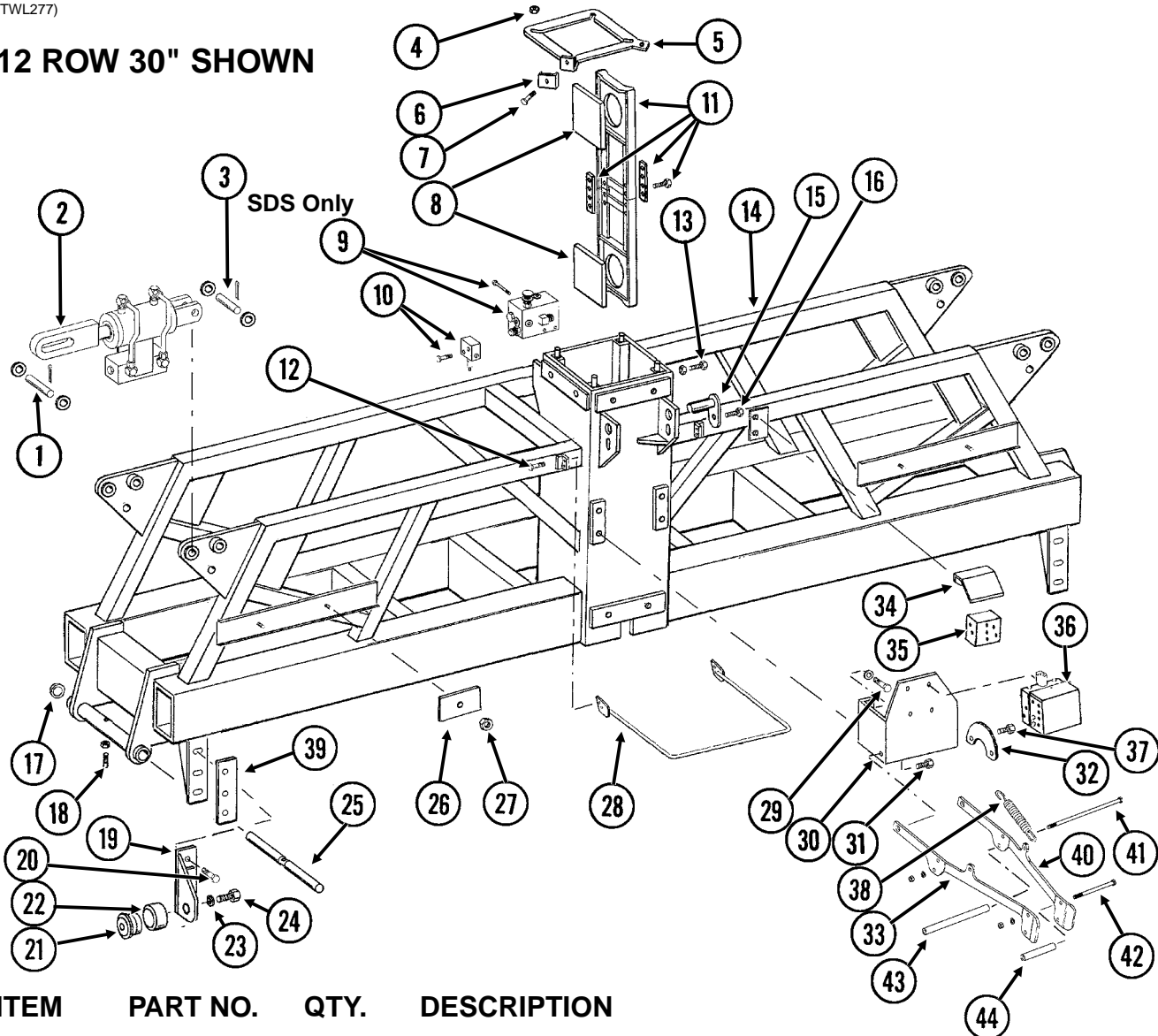
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ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10689	6	Carriage Bolt, 5/8"-11 x 2"
	GB0218	6	Bushing, 2 1/32" I.D. x 7/8" O.D. x 1 9/32" Long
	GD7805	6	Special Washer, 5/8", Hardened
	G10107	6	Lock Nut, 5/8"-11
2.	GA10090	-	Take-Up, 44 1/4", 12 Row 30" (Shown)
	GA10112	-	Take-Up, 56 1/4", 16 Row 30"
3.	GD8188	2	Clamp, 3" x 5 3/8"
	GD8189	2	Rubber Pad
4.	G10581	1	Hex Head Cap Screw, 1/2"-13 x 2 1/4"
	G10111	1	Lock Nut, 1/2"-13
5.	GD2558	2	Lynch Pin, 1/4"
6.	GA7021	-	Take-Up, 44 1/4", 12 Row 30" (Shown)
	GA7050	-	Take-Up, 56 1/4", 16 Row 30"
7.	GD9952	1	Cover
8.	G10004	4	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10229	4	Lock Washer, 3/8"
	G10203	8	Washer, 3/8" SAE
	G10101	4	Hex Nut, 3/8"-16
9.	G10172	2	Hex Head Cap Screw, 3/8"-16 x 5"
	G10210	2	Washer, 3/8" USS
	G10108	2	Lock Nut, 3/8"-16
10.			See "Valve Block - Located On Hitch", Page P96
11.	GD18776	1	Clamp, 4" x 6 3/8"

# CENTER FRAME

(TWL277)

## 12 ROW 30" SHOWN



ITEM	PART NO.	QTY.	DESCRIPTION
1.		-	See "Wing Frame", Pages P58 And P59
2.		-	See "Wing Lock Cylinders", Pages P86 And P87
3.	GD0535	2	Pin, 1 1/4" x 4 1/2"
	G10159	4	Machine Bushing, 1 1/4", 10 Gauge
	G10460	4	Cotter Pin, 1/4" x 2"
4.	GD7805	4	Special Washer, 5/8", Hardened
	G10104	4	Hex Nut, 5/8"-11
5.	GD14093	1	Cap
6.	GD5875	1	Hose Clamp, 9/16" x 2 1/2" x 2"
7.	G10048	1	Hex Head Cap Screw, 3/8"-16 x 2"
	G10108	1	Lock Nut, 3/8"-16
8.	GD10053	8	Wear Pad, 7" x 7" x 1/2" Thick
9.		-	See "Valve Block - Located On Front Center Frame", Page P91
10.		-	See "Valve Block - Located On Front Center Frame", Page P92
11.	GA7579	4	Pad Holder W/Bars
	GD10706	-	Bar, 1 1/4" x 6" x 1/4" Thick
	GD10707	-	Bar, 1 1/4" x 6" x 3/8" Thick
	G10001	-	Hex Head Cap Screw, 3/8"-16 x 1"
12.	G10004	4	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10229	4	Lock Washer, 3/8"
	G10101	4	Hex Nut, 3/8"-16

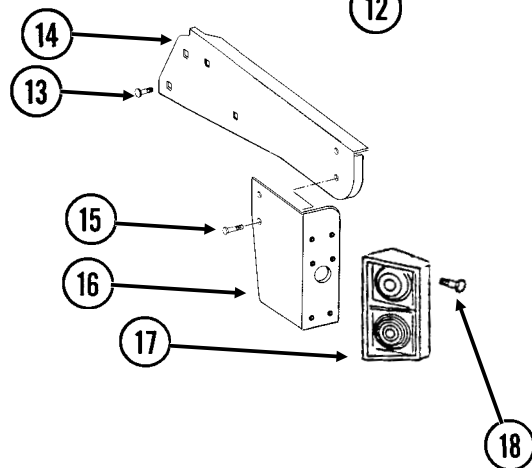
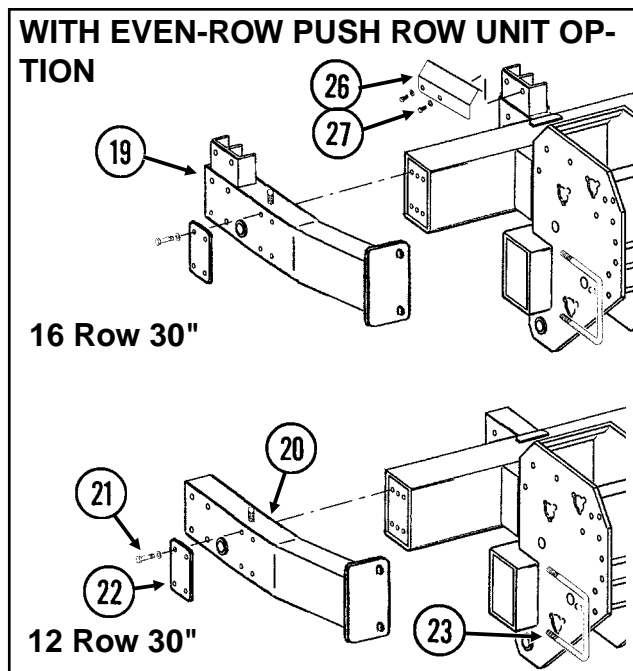
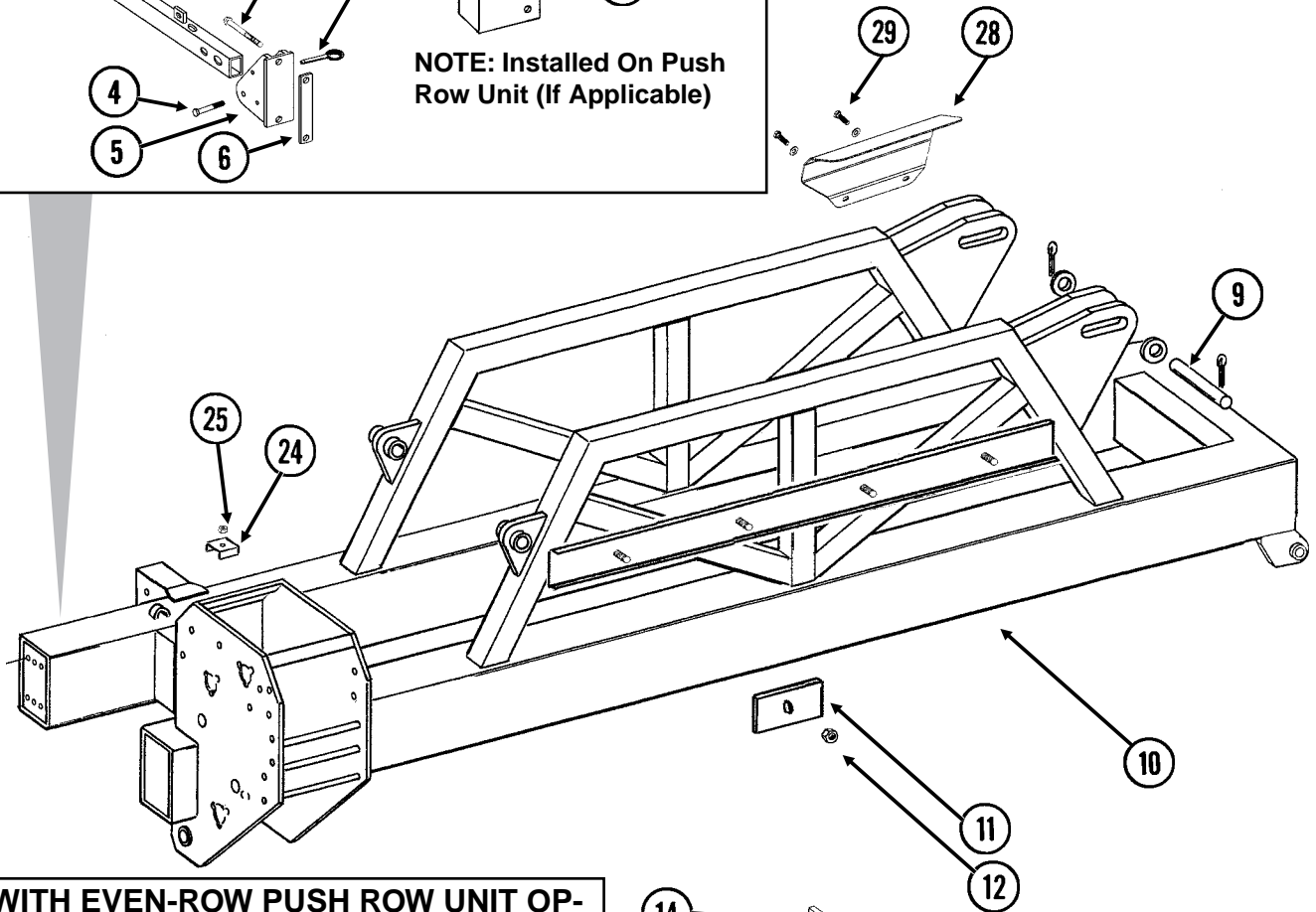
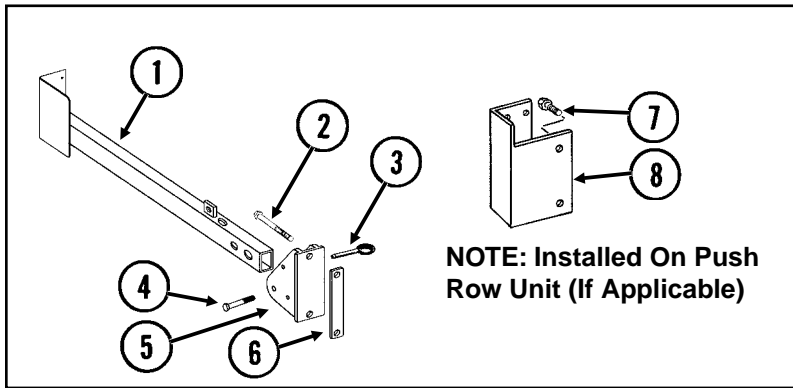
# CENTER FRAME

ITEM	PART NO.	QTY.	DESCRIPTION
13.	G10543	16	Hex Head Cap Screw, 3/4"-10 x 3", Full Thread
	G10105	16	Hex Nut, 3/4"-10
14.	A10089	-	Frame, 136", 12 Row 30" And 16 Row 30" <b>(Non-Stock Item)</b>
15.	GA5121	4	Pin, 2 1/8"
16.	G10636	4	Carriage Bolt, 1/2"-13 x 1 1/2"
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
17.	G10404	-	Machine Bushing, 3 1/8" x 2 1/8" x 3/16" (As Required)
	G10234	-	Machine Bushing, 2 1/8", 10 Gauge (As Required)
	G10336	-	Machine Bushing, 2 1/8", 14 Gauge (As Required)
18.	G10828	2	Hex Socket Set Screw, 1/2"-13 x 1 1/4"
	G10527	2	Lock Washer, 1/2", Internal/External
	G10102	2	Hex Nut, 1/2"-13
19.	GA10073	1	Cam Roller Mount, L.H. (Shown)
	GA10072	-	Cam Roller Mount, R.H.
20.	G11084	6	Carriage Bolt, 5/8"-11 x 1 3/4"
	G10230	6	Lock Washer, 5/8"
	G10104	6	Hex Nut, 5/8"-11
21.	GA6497	4	Cam Follower W/Grease Fitting
	G10640	-	Grease Fitting, 1/4"-28
22.	GD14066	4	Sleeve
23.	GB0409	2	Spring Washer
24.	G10025	2	Hex Head Cap Screw, 3/4"-10 x 1 1/2"
25.	GD10531	2	Hinge Pin, 2 1/8" x 25 3/4"
26.	GD13154	4	Hose Clamp, 4 3/4" x 9"
27.	G10108	4	Lock Nut, 3/8"-16
28.	GA10104	1	Handle (SDS Only)
29.	G10014	4	Hex Head Cap Screw, 1/2"-13 x 1"
	G10216	4	Washer, 1/2" USS
	G10228	4	Lock Washer, 1/2"
30.	GD12774	1	Mount
31.	G11125	2	Carriage Bolt, 5/8"-11 x 1 3/4"
	GB0218	2	Bushing, 2 1/32" I.D. x 7/8" O.D. x 1 9/32" Long
	GD7805	2	Special Washer, 5/8", Hardened
	G10107	2	Lock Nut, 5/8"-11
32.	GD13107	1	Spring Pivot
33.	GD16414	1	Hose Holder, R.H.
34.	GD14102	1	Cover
35.		-	See "Valve Block - Located On R.H. Side Of Center Pivot", Page P93
36.		-	See "Valve Blocks - Located On Rear Center Frame", Pages P94 And P95
37.	G10004	1	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10203	1	Washer, 3/8" SAE
	GD8893-03	1	Sleeve, 1 3/8" Long
	G10108	1	Lock Nut, 3/8"-16
38.	GD8249	1	Spring
	GD7904-02	2	Sleeve, 1/2" x 1/2" Long
39.	GD15806	-	Shim, 3 3/4" x 10", 7 Gauge
	GD15807	-	Shim, 3 3/4" x 10" x 1/4" Thick
40.	GD16415	1	Hose Holder, L.H.
41.	G11177	2	Hex Head Cap Screw, 1/2"-13 x 14"
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
42.	G11109	2	Hex Head Cap Screw, 1/2"-13 x 7 1/2"
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
43.	GD4887-08	2	Sleeve, 1/2" I.D. x 12 1/4" Long
44.	GD4887-09	2	Sleeve, 1/2" I.D. x 6" Long

# WING FRAME

(TWL187c/TWL180a/TWL194h/TWL194g/TWL194e/TWL188b/TWL139b)

## 12 ROW 30" SHOWN



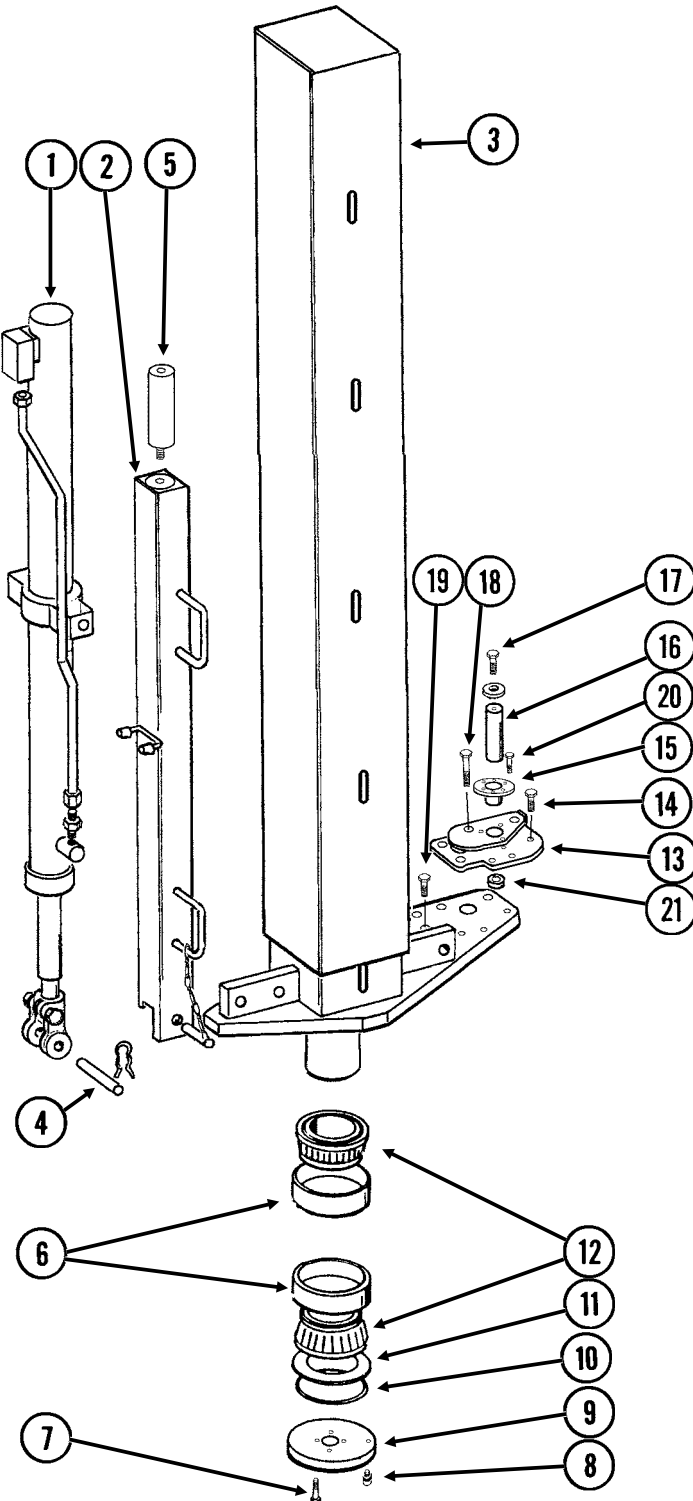


# WING FRAME

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA9840	1	Light Bracket
2.	G10439	2	Hex Head Cap Screw, 5/8"-11 x 7"
	G10230	2	Lock Washer, 5/8"
	G10104	2	Hex Nut, 5/8"-11
3.	G10874	1	Detent Pin, 1/2" x 3 1/2" Grip
4.	G10033	1	Hex Head Cap Screw, 1/2"-13 x 3 1/2"
	G10206	4	Washer, 1/2" SAE
	G10111	1	Lock Nut, 1/2"-13
5.	GB0309	1	Light Mount Bracket
6.	GD1908	1	Mounting Bracket
7.	G10001	2	Hex Head Cap Screw, 3/8"-16 x 1"
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
8.	GD12703	1	Push Row Unit Light Bracket
9.	GD0826	4	Pin, 1 1/4" x 5 1/2"
	GD0752-47	8	Sleeve, 1/2"
	G10159	8	Machine Bushing, 1 1/4", 10 Gauge
	G10460	8	Cotter Pin, 1/4" x 2"
10.	A9070	-	Wing, R.H., 120", 12 Row 30" <b>(Non-Stock Item)</b>
	A9069	-	Wing, L.H., 124", 12 Row 30" <b>(Non-Stock Item)</b>
	A9072	-	Wing, R.H., 180", 16 Row 30" <b>(Non-Stock Item)</b>
	A9073	-	Wing, L.H., 184", 16 Row 30" <b>(Non-Stock Item)</b>
11.	GD13153	8-10	Hose Clamp, 3 1/4" x 9"
12.	G10108	8-10	Lock Nut, 3/8"-16
13.	G10312	3	Carriage Bolt, 5/16"-18 x 3/4"
	G10620	3	Serrated Flange Nut, 5/16"-18
14.	GD15950	1	Light Mount Extension
15.	G10064	-	Hex Head Cap Screw, 1/4"-20 x 1"
	G10227	-	Lock Washer, 1/4"
	G10103	-	Hex Nut, 1/4"-20
16.	GD12724	1	Bracket
17.			See "Electrical Components", Pages P104-P107
18.	G10064	-	Hex Head Cap Screw, 1/4"-20 x 1"
	G10110	-	Lock Nut, 1/4"-20, Grade B
19.	GA9903	1	Marker Mount, 16 Row 30"
20.	GA9902	1	Marker Mount, 12 Row 30"
21.	G10050	4	Hex Head Cap Screw, 3/4"-10 x 5"
	G10231	4	Lock Washer, 3/4"
22.	GD14163	1	Plate
23.	GD1113	1	U-Bolt, 5" x 7" x 5/8"-11
	G10230	2	Lock Washer, 5/8"
	G10104	2	Hex Nut, 5/8"-11
24.	GD5875	5	Hose Clamp, 3/16" x 2 1/2" x 2"
25.	G10108	5	Lock Nut, 3/8"-16
26.	GD15567	1	Shield
27.	G10007	2	Hex Head Cap Screw, 5/8"-11 x 1 1/2"
	G10217	2	Washer, 5/8" USS
	G10230	2	Lock Washer, 5/8"
	G10104	2	Hex Nut, 5/8"-11
28.	GD15574	2	Shield
29.	G10004	4	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10210	4	Washer, 3/8" USS
	G10229	4	Lock Washer, 3/8"
	G10101	4	Hex Nut, 3/8"-16
A.	G7698X	-	Push Row Unit Mounted Light Bracket Package (Items 7 And 8 On This Page And 3/8" Insulated Clamp, Item 6 On Pages P104 And P105 Or Item 6 On Pages P106 And P107)

# CENTER PIVOT

PFA087(TWL196b)

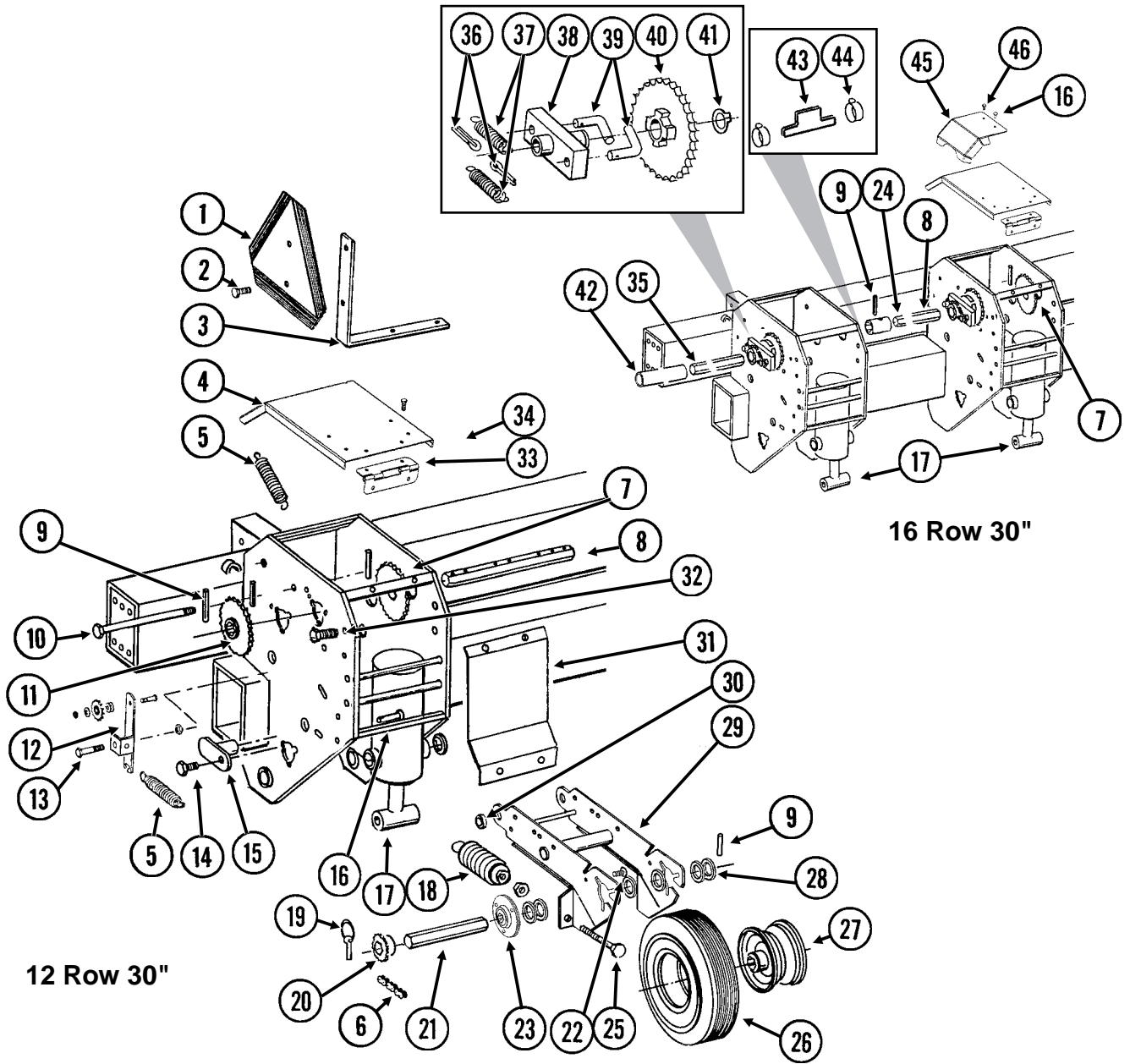


# CENTER PIVOT

ITEM	PART NO.	QTY.	DESCRIPTION
1.		-	See "Center Lift Cylinder", Pages P83 Or P84
2.	GA10092	1	Manual Safety Lockup W/Detent Pin, 42 7/8" Long
	GA7022	-	Detent Pin W/Chain
3.	GA10085	1	Center Post, 97 3/16"
4.	GR0375	2	Pin, 1" x 3 1/2"
	GR0193	4	Hair Pin Clip
5.	GD14507	1	Lockup Extension, 10"
6.	GD10011	2	Cup
7.	G10027	4	Hex Head Cap Screw, 3/4"-10 x 2 1/2"
	GD2169	4	Special Washer, 25/32" I.D. x 1 1/4" O.D., Hardened
8.	G10640	1	Grease Fitting, 1/4"-28
9.	GD13338	1	Bearing Cap
10.	GD13350	1	O-Ring Seal
11.	GD10012	10	Shim, .005" Thick (As Required)
	GD10013	10	Shim, .020" Thick (As Required)
	GD10014	10	Shim, .007" Thick (As Required)
12.	GA7096	2	Cone
13.	GA9618	1	Taper Lock Mount
14.	G11018	3	Hex Head Cap Screw, 5/8"-18 x 1 1/4"
	GD7805	3	Special Washer, 5/8", Hardened
15.	GD13519	1	Taper Lock Collar
16.	GD13520	1	Taper Lock Pin
17.	G10443	1	Hex Head Cap Screw, 5/8"-11 x 1"
	G10205	1	Washer, 5/8" SAE
18.	G11019	2	Hex Head Cap Screw, 5/8"-18 x 5"
	GD7805	2	Special Washer, 5/8", Hardened
19.	G10751	2	Hex Head Cap Screw, 5/8"-18 x 1 3/4"
	GD7805	2	Special Washer, 5/8", Hardened
20.	G10004	3	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
21.	GD13525	1	Tension Bushing, 1 1/2" O.D. x 1 1/4" I.D. x 5/8" Long

# CONTACT WHEEL AND DRIVE SHAFT(S)

PTD057/PFA046/PTD075/PLA033(TWL11m)



# CONTACT WHEEL AND DRIVE SHAFT(S)

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	GD2199	1	SMV Sign
2.	G10022	2	Hex Head Cap Screw, 1/4"-20 x 1/2"
	G10227	2	Lock Washer, 1/4"
	G10103	2	Hex Nut, 1/4"-20
3.	GD9969	1	Bracket
4.	GD10298	1	Cover
5.	GD5857	2	Spring
6.	G3310-110	1	Chain, No. 40, 110 Pitch Including Connector Link, Half Rate (2 To 1) Drive
	G3310-118	-	Chain, No. 40, 118 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
7.		-	See "Inner Module Drive", Pages P68 And P69
8.		-	See "Point Row Clutch", Pages P70 And P71
9.	G10602	4	Spring Pin, 1/4" x 1 1/2"
10.	G10595	-	Hex Head Cap Screw, 3/8"-16 x 10" (Used To Secure Point Row Clutch)
	G10108	-	Lock Nut, 3/8"-16
11.	GA5114	1	Sprocket, 30 Tooth
12.	GA9553	1	Idler W/Sprocket And Hardware, L.H.
	GA9554	1	Idler W/Sprocket And Hardware, R.H. (Shown)
	GA7154	-	Sprocket W/Bearing, 18 Tooth
	G10017	-	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10128	-	Machine Bushing, 1/2", 14 Gauge
	G10501	-	Hex Jam Nut, 1/2"-13, Grade 2
13.	G10036	1	Hex Head Cap Screw, 5/8"-11 x 4"
	G10918	3	Machine Bushing, 5/8", 14 Gauge
	G10104	1	Hex Nut, 5/8"-11
	G10107	1	Lock Nut, 5/8"-11
14.	G10017	2	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10216	2	Washer, 1/2" USS
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
15.	GA5121	2	Pin, 2 1/8"
16.	G10870	2	Clevis Pin, 3/8" x 1"
	G10860	2	Retaining Ring, 3/8"
17.		-	See "Wing Lift Cylinder", Page P85
18.	GA2068	2	Spring W/Plug
19.	GD2558	1	Lynch Pin, 1/4"
20.	GA5114	1	Sprocket, 30 Tooth
	GA5105	-	Sprocket, 15 Tooth, Half Rate (2 To 1) Drive
21.	GD6775	1	Hex Shaft, 7/8" x 11 3/4" (2 Holes)
22.	G10303	6	Carriage Bolt, 5/16"-18 x 1"
	G10232	6	Lock Washer, 5/16"
	G10106	6	Hex Nut, 5/16"-18
23.	GA9846	-	Flanged Bearing, 7/8" Hex Bore
24.	GD5212	1	Coupler, 1 3/4", 16 Row 30" Only
25.	G10890	2	Hex Head Adjusting Bolt, 1/2"-13 x 4", Grade 2
	G10501	2	Hex Jam Nut, 1/2"-13, Grade 2
26.	GD4700	1	Tire, 4.80" x 8", 4 Ply, Rib Implement (Specify Brand*)
	GD4701	-	Valve Stem
27.	GA3553	1	Rim, 3.75" x 8"
28.	G10233	-	Machine Bushing, 1", 10 Gauge

(Continued)

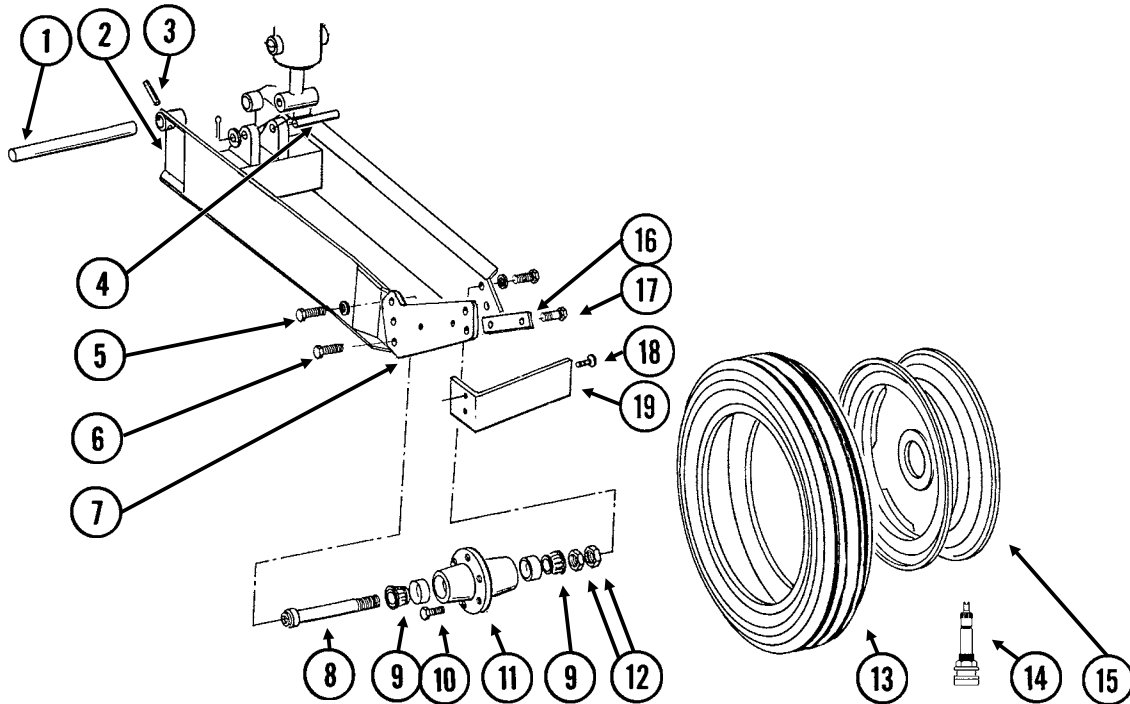
# CONTACT DRIVE WHEEL AND DRIVE SHAFT(S)

ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
(Continued)			
29.	GA7372	1	Wheel Arm
30.	GB0218	2	Bushing, 2 <sup>1</sup> / <sub>32</sub> " I.D. x 7 <sup>7</sup> / <sub>8</sub> " O.D. x 1 <sup>9</sup> / <sub>32</sub> " Long
31.	GD6895	1	Shield
32.	G10008	2	Hex Head Cap Screw, 5 <sup>8</sup> / <sub>16</sub> "-11 x 2"
	G10235	4	Machine Bushing, 7 <sup>8</sup> / <sub>16</sub> ", 14 Gauge
	GD7805	2	Special Washer, 5 <sup>8</sup> / <sub>16</sub> ", Hardened
	G10205	2	Washer, 5 <sup>8</sup> / <sub>16</sub> " SAE
	G10107	2	Lock Nut, 5 <sup>8</sup> / <sub>16</sub> "-11
33.	GD5789	1	Hinge, Female
	GD5790	1	Hinge W/Pins, Male
34.	G10064	6	Hex Head Cap Screw, 1 <sup>4</sup> / <sub>4</sub> "-20 x 1"
	G10227	6	Lock Washer, 1 <sup>4</sup> / <sub>4</sub> "
	G10103	6	Hex Nut, 1 <sup>4</sup> / <sub>4</sub> "-20
35.	GD10099	-	Hex Shaft, 7 <sup>8</sup> / <sub>16</sub> " x 29 5 <sup>8</sup> / <sub>16</sub> "
36.	G10453	2	Cotter Pin, 3 <sup>16</sup> / <sub>16</sub> " x 1"
37.	GD1256	2	Spring
38.	GA0378	1	Block And Hub Assembly
39.	GD1255	2	L-Pin
40.	GA5165	1	Sprocket, 30 Tooth
41.	G10430	1	External Retaining Ring, 1 1 <sup>4</sup> / <sub>4</sub> "
42.	GD13652-01	1	Pipe, 1" x 23 1 <sup>4</sup> / <sub>4</sub> "
43.	GD14115	1	Catch
44.	G10278	2	Hose Clamp, No. 16
45.	GD16465	1	Cover
46.	G10020	1	Hex Head Cap Screw, 1 <sup>4</sup> / <sub>4</sub> "-20 x 1 <sup>2</sup> / <sub>2</sub> "
	G10227	1	Lock Washer, 1 <sup>4</sup> / <sub>4</sub> "
	G10103	1	Hex Nut, 1 <sup>4</sup> / <sub>4</sub> "-20
A.	GA3552	-	Tire And Rim Assembly (Items 26 And 27) (Specify Brand*)
B.	GA9843	-	Ratchet/Sprocket Assembly (L.H. Side Of Planter) (Items 36-41)
	GA5164	-	Ratchet/Sprocket Assembly (R.H. Side Of Planter) (Items 36-41)
C.	G1K324	-	Contact Wheel Arm Replacement Kit (Items 9, 21, 22, 23, 25, 28 And 29)

\* Specific brand requests will be supplied only as available from current KINZE® Repair Parts stock. If a specific brand requested is not in stock, the brand available will be supplied. Different brand tires may have different diameters. Change in tire brand may affect rates. Field checks are recommended after any change in contact tires.

# GROUND DRIVE WHEEL

PTD057(TWL142b)



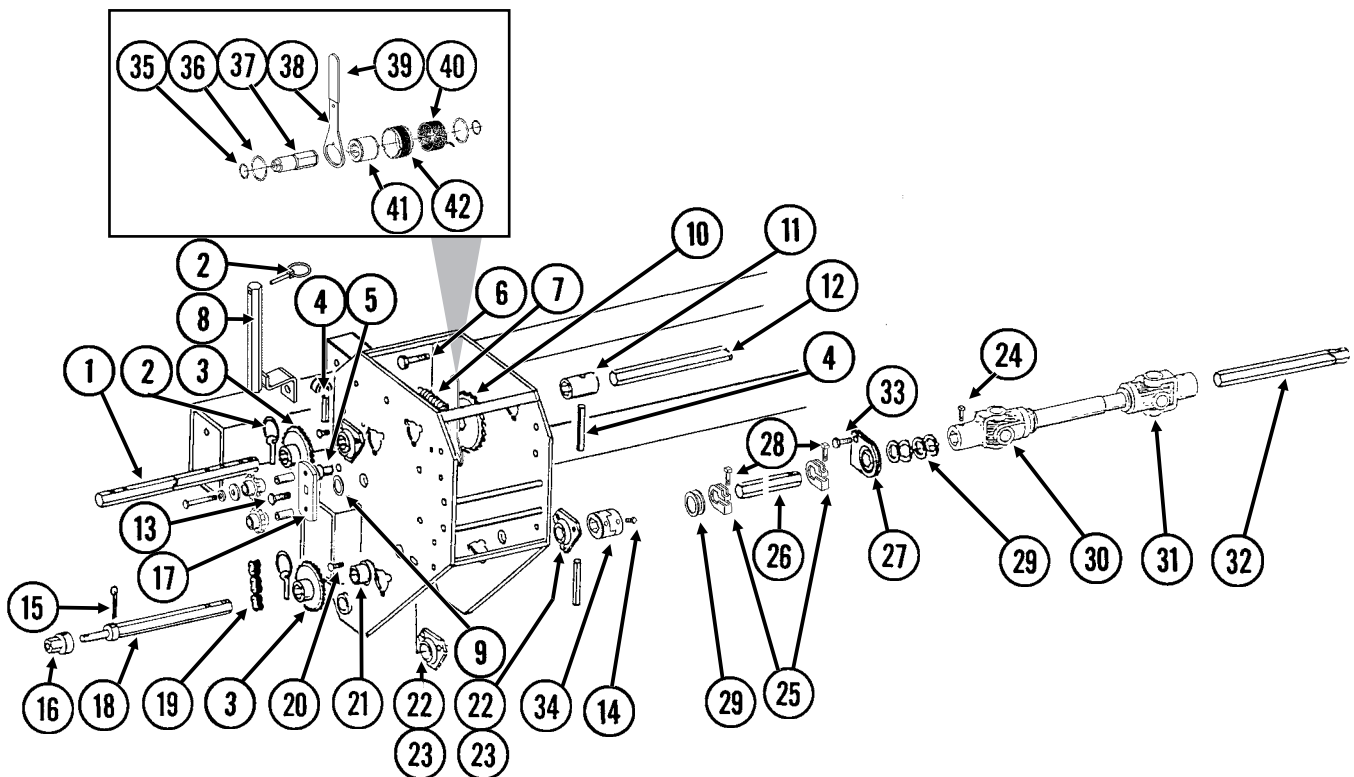
ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
1.	GD11695	-	Pin, 1 1/4" x 13 1/4"
2.	GA8677	1	Wheel Module
3.	G10610	-	Spring Pin, 3/8" x 2"
4.	GD5841	1	Pin, 1 1/4" x 5 5/8"
	G10226	2	Washer, 1 1/4" SAE
	G10460	2	Cotter Pin, 1/4" x 2"
5.	G10026	2	Hex Head Cap Screw, 3/4"-10 x 2"
	G10231	2	Lock Washer, 3/4"
6.	G10026	2	Hex Head Cap Screw, 3/4"-10 x 2"
	G10231	2	Lock Washer, 3/4"
	G10105	2	Hex Nut, 3/4"-10
7.	GD10128	1	Scraper Arm
8.	GA4376	1	Spindle W/Round External Retaining Ring, 10"
	GD11490	-	Round External Retaining Ring
9.	GA0895	2	Bearing
10.	GR0270	6	Lug Bolt, 9/16"-18
11.	GA2148	1	Hub W/Cups, 6 Bolt
	GR0434	-	Cup
12.	G11081	2	Hex Jam Nut, 1 1/2"-12, Grade 2
13.	GD13401	1	Tire, 7.50" x 20", 8 Ply, Tubeless W/O Center Rib (Specify Brand*)
14.	GA7434	-	Valve Stem
15.	GA2908	1	Rim, 5.5" x 20"
16.	GD10144	1	Bar Clamp
17.	G10039	2	Hex Head Cap Screw, 1/2"-13 x 1 3/4"
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
18.	G10636	2	Carriage Bolt, 1/2"-13 x 1 1/2"
	G10216	2	Washer, 1/2" USS
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
19.	GD12543	1	Scraper
A.	GA7997	-	Tire And Rim Assembly (Specify Brand*)(Items 13-15)
B.	GA4377	-	Hub And Spindle Assembly (Items 8, 9, 11 And 12)

\* Specific brand requests will be supplied only as available from current KINZE® Repair Parts stock. If a specific brand requested is not in stock, the brand available will be supplied.

# SEED RATE TRANSMISSION AND ROW UNIT DRILL SHAFTS

PTD056/PTD065/PTD076/PTD079(TWL14jji)

12 Row 30" Shown



ITEM	PART NO.	QTY. (Per Side)	DESCRIPTION
1.	GD6780	1	Shaft, 7/8" x 15"
2.	GD2558	3	Lynch Pin, 1/4"
3.	GA5106	1	Sprocket, 17 Tooth
	GA5107	1	Sprocket, 19 Tooth
	GA5108	2	Sprocket, 23 Tooth
	GA5109	1	Sprocket, 24 Tooth
	GA5110	1	Sprocket, 25 Tooth
	GA5111	1	Sprocket, 26 Tooth
	GA5112	1	Sprocket, 27 Tooth
	GA5113	1	Sprocket, 28 Tooth
4.	G10602	-	Spring Pin, 1/4" x 1 1/2"
5.	G10870	1	Clevis Pin, 3/8" x 1"
	G10860	1	Retaining Ring, 3/8"
6.	G10016	1	Hex Head Cap Screw, 1/2"-13 x 2"
	GD10356	1	Bushing, 3/4" Long (If Applicable)
	G10228	1	Lock Washer, 1/2"
	G10527	2	Lock Washer, 1/2", Internal/External
	G10102	1	Hex Nut, 1/2"-13
7.	GD5857	1	Spring
8.	GA4630	1	Sprocket Storage Rod
9.	G10235	1	Machine Bushing, 7/8", 14 Gauge
10.		-	See "Inner Module Drive", Pages P68 And P69
11.	GD5212	1	Coupler, 1 3/4", 16 Row 30" Only
12.	GD10100	1	Hex Shaft, 7/8" x 31 3/8", 16 Row 30" Only
13.	G11100	1	Hex Socket Button Head Cap Screw, 1/4"-20 x 1/2", Grade 8
	G10227	1	Lock Washer, 1/4"
	G10209	1	Washer, 1/4" USS



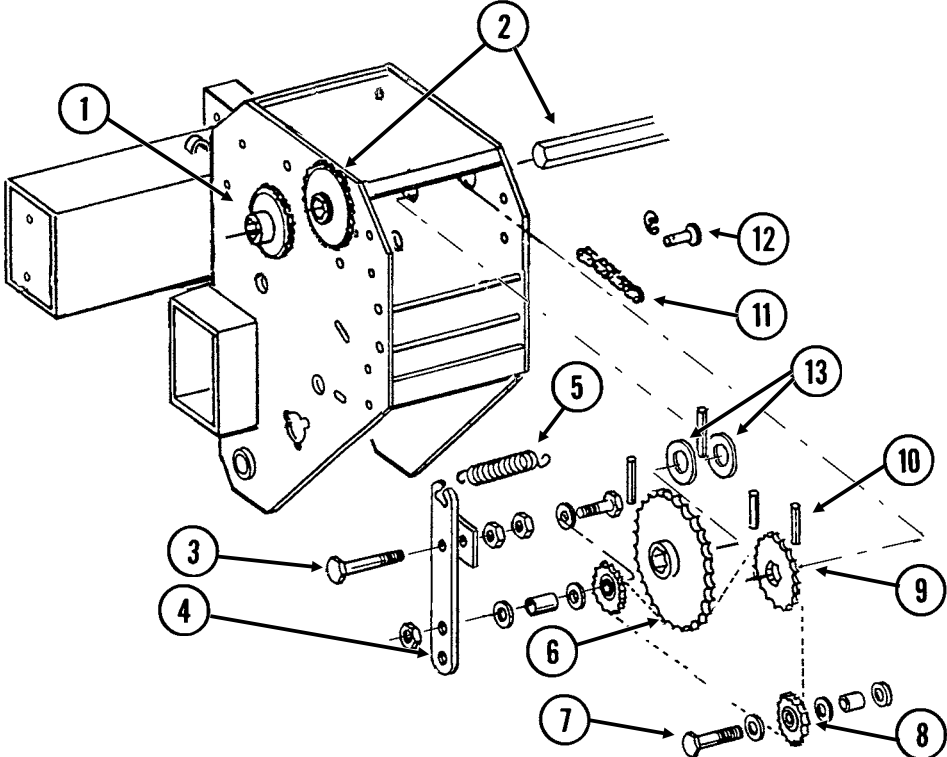
# SEED RATE TRANSMISSION AND ROW UNIT DRILL SHAFTS

ITEM	PART NO.	QTY. (Per Side)	DESCRIPTION
14.	G10131	4	Square Head Set Screw, 5/16"-18 x 3/4"
15.	G10462	-	Cotter Pin, 3/16" x 2"
16.	GD7127	1	Shear Coupler
17.	GA7336	1	Idler W/Bolt-On Sprockets
	GD7426	-	Sprocket, 12 Tooth
	GD1026	-	Sleeve, 1 3/16" Long
	G10210	-	Washer, 3/8" USS
	G10229	-	Lock Washer, 3/8"
	G10047	-	Hex Head Cap Screw, 3/8"-16 x 1 3/4"
18.	GD7612	1	Shaft, 7/8" x 13 1/2"
19.	G3310-80	1	Chain, No. 40, 80 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
20.	G10303	-	Carriage Bolt, 5/16"-18 x 1"
	G10232	-	Lock Washer, 5/16"
	G10106	-	Hex Nut, 5/16"-18
21.	GA5548	1	Special Bearing
22.	G3400-01	-	Flangette
23.	G2100-03	-	Bearing, 7/8" Hex Bore, Spherical
24.	G10688	-	Square Head Set Screw, 3/8"-16 x 5/8"
25.	GD11045	-	Lock Clamp
26.	GD0914-106.5	2	Hex Shaft, 7/8" x 106 1/2" (No Holes), Wing, 12 Row 30"
	GD0914-166.75	-	Hex Shaft, 7/8" x 166 3/4" (No Holes), Wing, 16 Row 30"
27.	GA2180	-	Hanger Bearing, 7/8" Hex Bore
28.	G10130	-	Square Head Machine Bolt, 5/16"-18 x 1 3/4"
	G10923	-	Flange Nut, 5/16"-18, No Serration
29.	G10233	-	Machine Bushing, 1", 10 Gauge
30.	GA7052	-	U-Joint W/Grease Fitting, Female, 10 1/4" Long
	GR1557	-	Grease Fitting, 45°, Metric
	GR1297	-	Inboard Yoke And Outer Profile
	GR1294	-	Cross And Bearing Kit
	GR1293	-	Yoke, 7/8" Hex
31.	GA7051	-	U-Joint W/Grease Fitting, Male, 12 1/4" Long
	GR1557	-	Grease Fitting, 45°, Metric
	GR1296	-	Inner Profile
	GR1295	-	Inboard Yoke
	GR1301	-	Spring Pin, 8 mm x 50 mm
	GR1294	-	Cross And Bearing Kit
	GR1293	-	Yoke, 7/8" Hex
32.	GD0914-45	1	Hex Shaft, 7/8" x 45", R.H. Main Frame (No Holes)
	GD0914-35	-	Hex Shaft, 7/8" x 35", L.H. Main Frame (No Holes)
33.	G10004	2	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10229	2	Lock Washer, 3/8"
	G10101	-	Hex Nut, 3/8"-16
34.	GB0287	2	Coupler
35.	G10496	2	External Inverted Snap Ring, 1 1/2"
36.	G11075	2	External Inverted Snap Ring, 7/8"
37.	GD14426	1	Tightener Shaft, 3 3/8"
38.	GD14431	1	Handle
39.	G11078	1	Vinyl Cap
40.	GD14414	1	Torsion Spring, R.H. (Shown) (Used In L.H. Wrap Spring Wrench)
	GD14413	-	Torsion Spring, L.H. (Used In R.H. Wrap Spring Wrench)
41.	GD14432	1	Sleeve, 1 1/4"
42.	GD14429	-	Release Collar, Silver, L.H. (Shown)
	GD14430	1	Release Collar, Gold, R.H.
A.	G1K269	-	Lock Clamp Kit (Items 25 And 28)
B.	G1K381	-	Wrap Spring Wrench Replacement Kit, Silver Collar, L.H. (Items 9, 13 And 35-42) (Shown)
	G1K380	-	Wrap Spring Wrench Replacement Kit, Gold Collar, R.H. (Items 9, 13 And 35-42)

# INNER MODULE DRIVE

PTD058/PFA046/PTD077(TWL16d)

12 Row 30" Shown  
(Located In Inside Module On 16 Row 30")



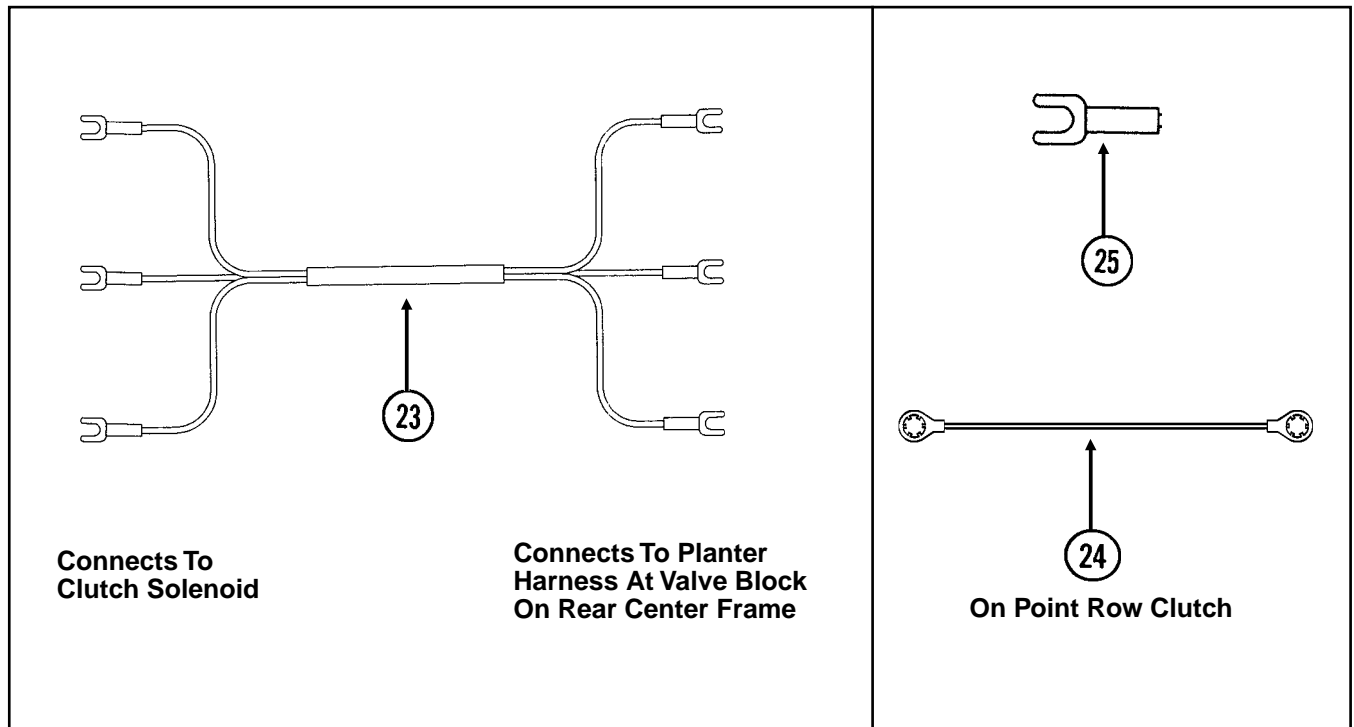
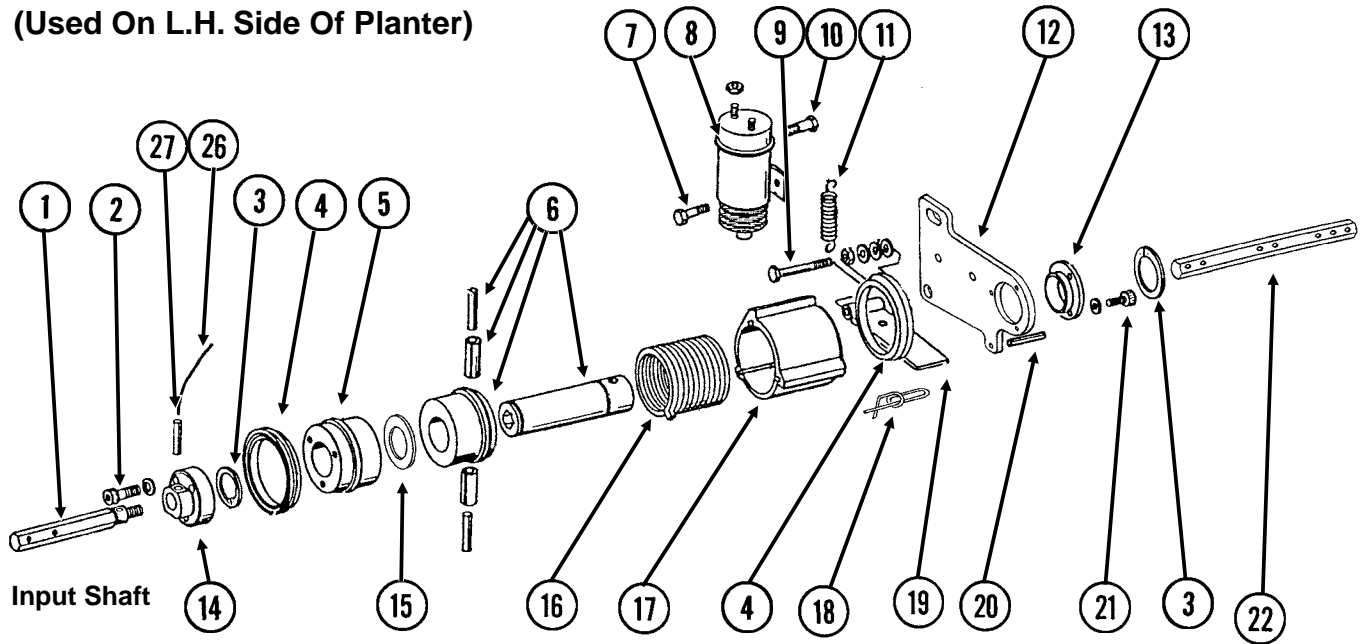
# INNER MODULE DRIVE

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Module)	
1.		-	See "Seed Rate Transmission And Row Unit Drill Shafts", Pages P66 And P67
2.		-	See "Contact Drive Wheel And Drive Shaft(s)", Pages P62-P64
3.	G10743	1	Hex Head Cap Screw, 5/8"-11 x 3 3/4"
	G10503	1	Hex Jam Nut, 5/8"-11, Grade 2
	G10107	1	Lock Nut, 5/8"-11
4.	GA9557	1	Idler W/Sprocket And Hardware, L.H.
	GA9558	-	Idler W/Sprocket And Hardware, R.H. (Shown)
	GA7154	-	Sprocket W/Bearing, 18 Tooth
	G10038	-	Hex Head Cap Screw, 1/2"-13 x 3"
	GD10007	-	Spacer, 1 1/8" Long
	G10206	-	Washer, 1/2" SAE
	G10111	-	Lock Nut, 1/2"-13
5.	GD5857	1	Spring
6.	GA5194	1	Sprocket, 50 Tooth
7.	G10053	1	Hex Head Cap Screw, 1/2"-13 x 2 1/2"
	GD7889	1	Bushing, 1" O.D. x 9/16" I.D. x 7/16" Long
	G10168	2	Machine Bushing, 1/2", 7 Gauge
	G10111	1	Lock Nut, 1/2"-13
8.	GA7154	1	Sprocket W/Bearing, 18 Tooth
9.	GA5113	1	Sprocket, 28 Tooth
10.	G10602	-	Spring Pin, 1/4" x 1 1/2"
11.	G3310-100	1	Chain, No. 40, 100 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
12.	G10870	1	Clevis Pin, 3/8" x 1"
	G10860	1	Retaining Ring, 3/8"
13.	G10345	2	Machine Bushing, 1", 14 Gauge

# POINT ROW CLUTCH

PRC019(TWL70d/TWL71d/TWL71/TWL18/A10054)

**L.H. Point Row Clutch Shown  
(Used On L.H. Side Of Planter)**



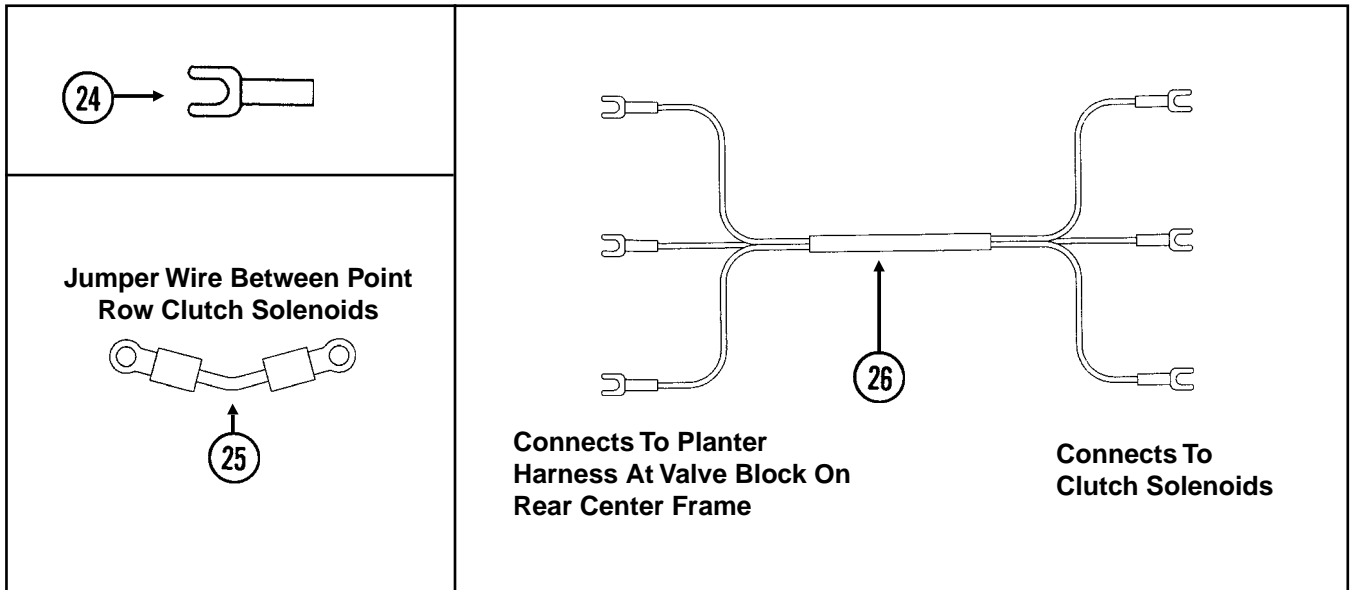
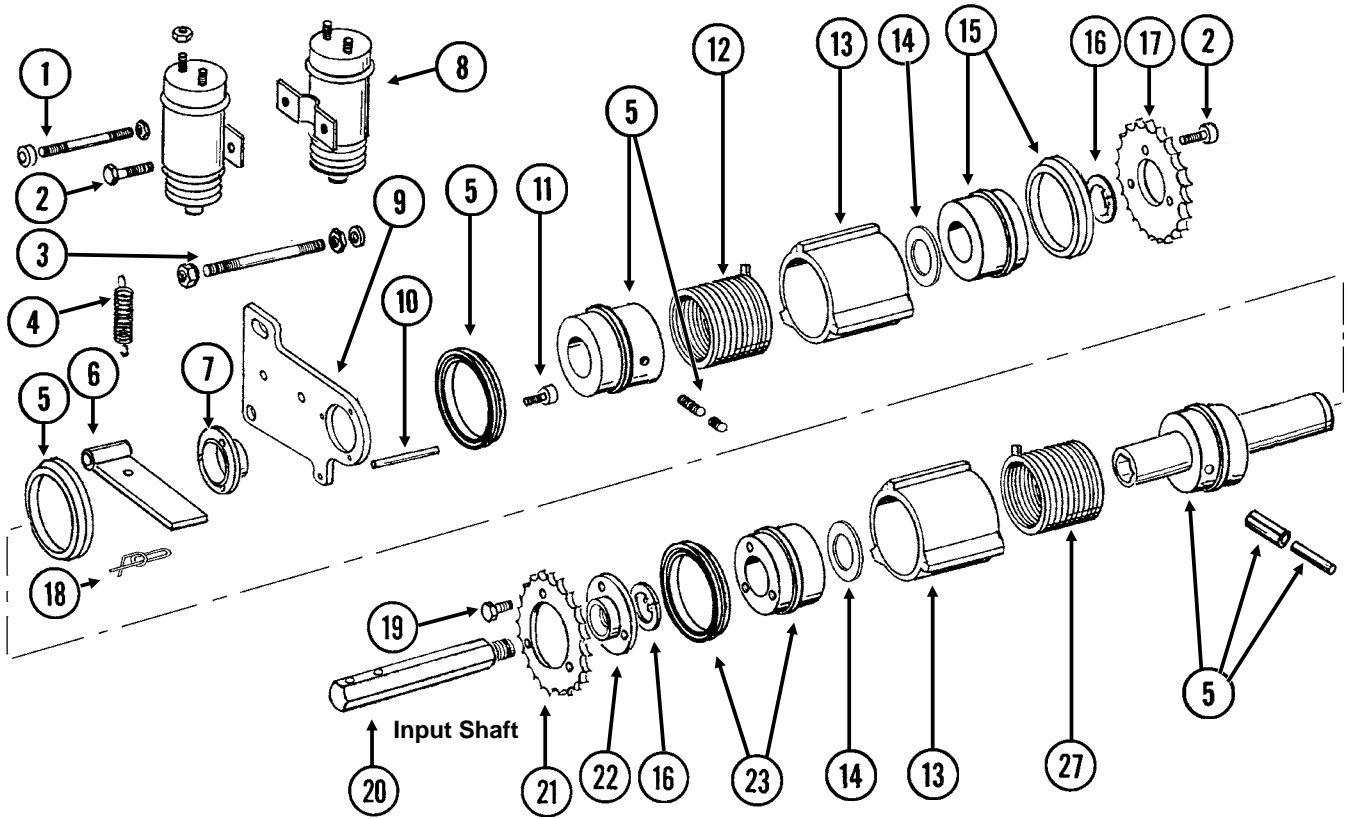
# POINT ROW CLUTCH

ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
1.	GD10068	1	Input Shaft, R.H. Threads (Shown)
	GD10069	1	Input Shaft, L.H. Threads
2.	G10374	3	Hex Socket Head Screw, 1/4"-20 x 1"
	G10227	3	Lock Washer, 1/4"
3.	G10496	2	External Inverted Snap Ring, 1 1/2"
4.	GD14512	2	V-Ring Seal
5.	GD10104	1	Input Hub
6.	GA7137	1	Hub/Sleeve Assembly W/Spring Pins
	G10765	-	Spring Pin, 1/4" x 1"
	G10804	-	Spring Pin, 5/32" x 7/8"
7.	G10023	1	Hex Head Cap Screw, 1/4"-20 x 3/4"
	G10227	1	Lock Washer, 1/4"
	G10103	1	Hex Nut, 1/4"-20
8.	GA8393	1	Solenoid Complete
	GR1306	1	Snap Ring
	GR1303	1	Spring
	GR1304	1	Boot
	GR1305	1	Plunger
9.	G10049	1	Hex Head Cap Screw, 3/8"-16 x 2 1/2"
	G10101	1	Hex Nut, 3/8"-16
	G10203	1	Washer, 3/8" SAE
	G10229	2	Lock Washer, 3/8"
	G10497	1	Hex Jam Nut, 3/8"-16, Grade 2
10.	G10900	1	Hex Socket Head Cap Screw, 1/4"-20 x 1 3/4", Grade 8
	G10227	1	Lock Washer, 1/4"
	G10103	2	Hex Nut, 1/4"-20
11.	GD10123	1	Spring
12.	GD10103	1	Mounting Plate
13.	GD9667	1	Bushing
14.	GD10070	1	Coupler W/R.H. Threads (Shown)
	GD10071	1	Coupler W/L.H. Threads
15.	GD14513	1	Felt Washer
16.	GD9671	-	Spring, L.H. (Shown)
	GD9672	-	Spring, R.H.
17.	GD10102	1	Stop Collar
18.	GD11120	1	Rue Ring Cotter, 5/16"
19.	GD10510	1	Actuator Arm
20.	G10859	1	Spring Pin, 3/16" x 2 1/4"
21.	G10253	3	Hex Socket Head Screw, No. 10-32 x 1/2"
	G10257	3	Lock Washer, No. 10
22.	GD10543	-	Hex Shaft, 7/8" x 13"
23.	GA9479	1	Wiring Harness, 228", R.H. Side, 12 Row 30"
	GA9480	-	Wiring Harness, 264", L.H. Side, 12 Row 30"
	GA9483	-	Wiring Harness, 252", R.H. Side, 16 Row 30"
	GA9482	-	Wiring Harness, 300", L.H. Side, 16 Row 30"
24.	GA10054	-	Ground Cable, Green
25.	G10996	-	Fork Terminal
26.	GD13524-01	1	Lock Wire, 10", Stainless Steel
27.	G10546	1	Spring Pin, 3/16" x 1 1/4"
A.	GA7110	-	Point Row Clutch Assembly, R.H. (R.H. Side Of Machine) (Items 1-21, 24, 26 And 27)
	GA7111	-	Point Row Clutch Assembly, L.H. (L.H. Side Of Machine) (Items 1-21, 24, 26 And 27)

# TWO-SPEED POINT ROW CLUTCH

PRC023(FF47c/A7274/TWL71/TWL18/A10054)

L.H. Two-Speed Point Row Clutch Shown  
(Used On L.H. Side Of Planter)

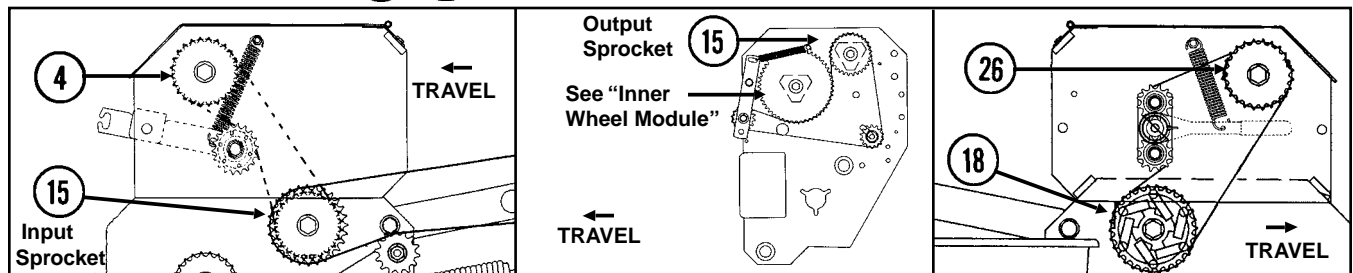
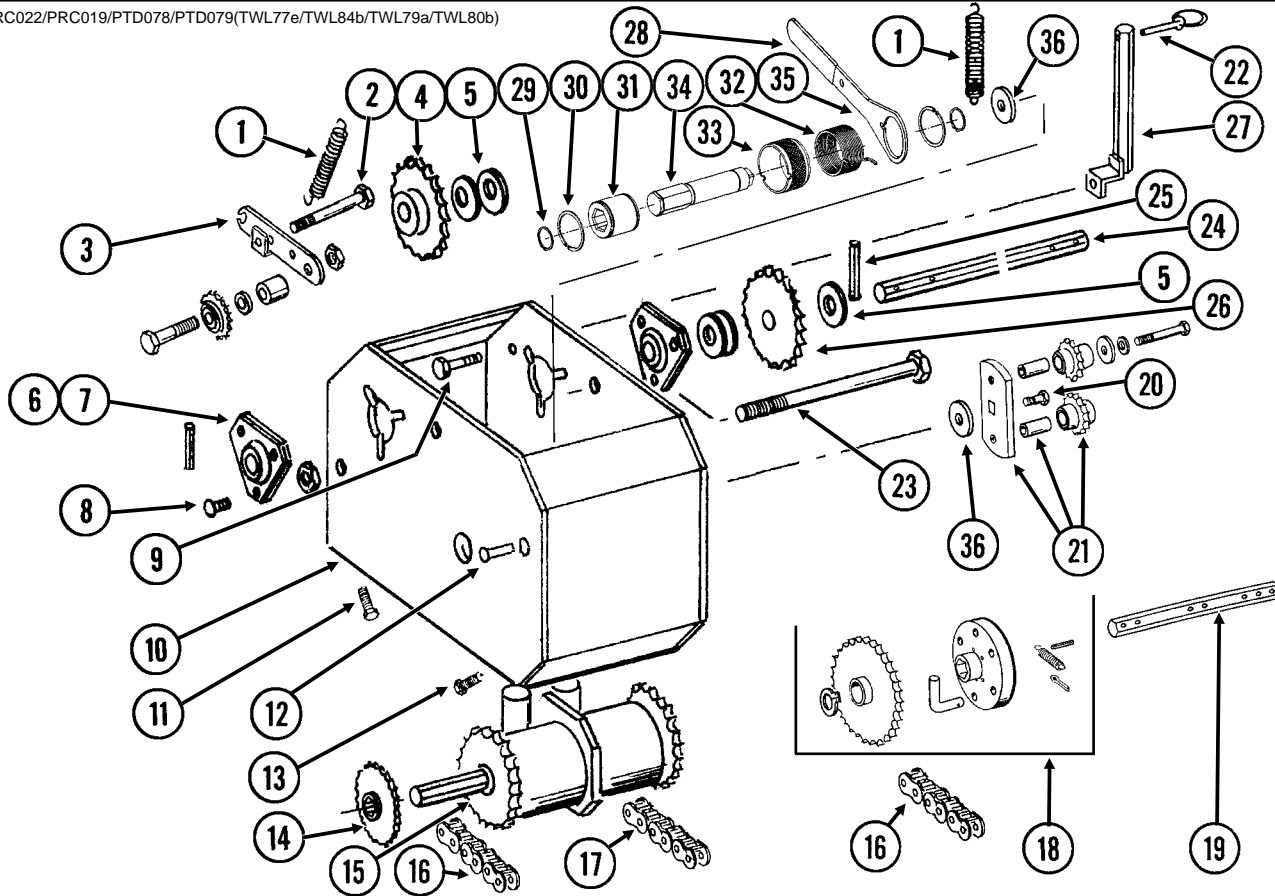


# TWO-SPEED POINT ROW CLUTCH

ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
1.	GD10635	1	Threaded Rod, 1/4"-20 x 3 1/2"
	G10103	2	Hex Nut, 1/4"-20
	G10227	2	Lock Washer, 1/4"
	GD10282	2	Allen Nut, 1/4"-20
2.	G10023	4	Hex Head Cap Screw, 1/4"-20 x 3/4"
	G10227	4	Lock Washer, 1/4"
	G10103	1	Hex Nut, 1/4"-20
3.	GD10636	1	Threaded Rod, 3/8"-16 x 4 1/4"
	G10108	2	Lock Nut, 3/8"-16
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
4.	GD10123	2	Spring
5.	GA7463	1	Hub/Sleeve Assembly W/Seals, Sleeve, Pins And Screws
	GD10120	-	Seal
	GD10584	-	Sleeve
	G10873	-	Hex Socket Set Screw, 5/16"-18 x 3/4"
	G10872	-	Hex Socket Set Screw, 5/16"-18 x 1/4"
	G10804	-	Spring Pin, 5/32" x 7/8"
	G10765	-	Spring Pin, 1/4" x 1"
6.	GD10510	2	Actuator Arm
7.	GD10586	1	Bushing
8.	GA8393	2	Solenoid Complete
	GR1306	-	Snap Ring
	GR1303	-	Spring
	GR1304	-	Boot
	GR1305	-	Plunger
9.	GD10103	1	Mounting Plate
10.	G10859	1	Spring Pin, 3/16" x 2 1/4"
11.	G10876	3	Hex Socket Head Screw, No. 10-32 x 1/4"
12.	GD9671	2	Spring, L.H. (Shown)
13.	GD10585	2	Stop Collar
14.	GD14513	2	Felt Washer
15.	GA9572	1	Hub W/Seal
	GD10120	-	Seal
16.	G10496	2	External Inverted Snap Ring, 1 1/2"
17.	GD10579	1	Output Sprocket, 28 Tooth
18.	GD11120	2	Rue Ring Cotter, 5/16"
19.	G10374	3	Hex Socket Head Screw, 1/4"-20 x 1"
	GD10588	3	Key
20.	GD10068	1	Input Shaft, R.H. Threads (Shown)
	GD10069	-	Input Shaft, L.H. Threads
21.	GD10578	1	Input Sprocket, 28 Tooth
22.	GD10638	1	Coupler W/R.H. Threads (Shown)
	GD10587	-	Coupler W/L.H. Threads
23.	GA9571	1	Hub W/Seal
	GD10120	-	Seal
24.	G10996	-	Fork Terminal
25.	GA7274	1	Jumper Wire W/Ring Terminals, 2 3/16" (Between Solenoids)
26.	GA9479	1	Wiring Harness, 228", R.H. Side, 12 Row 30"
	GA9480	-	Wiring Harness, 264", L.H. Side, 12 Row 30"
	GA9483	-	Wiring Harness, 252", R.H. Side, 16 Row 30"
	GA9482	-	Wiring Harness, 300", L.H. Side, 16 Row 30"
27.	GD9672	-	Spring, R.H.

# TWO-SPEED POINT ROW CLUTCH WHEEL MODULE EXTENSION

PRC022/PRC019/PTD078/PTD079(TWL77e/TWL84b/TWL79a/TWL80b)



ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	GD5857	2	Spring
2.	G10036	1	Hex Head Cap Screw, 5/8"-11 x 4"
	G10107	1	Lock Nut, 5/8"-11
	G10104	1	Hex Nut, 5/8"-11
3.	GA9918	1	Idler W/Sprocket And Hardware
	GD10356	-	Bushing, 3/4" Long
	G10128	-	Machine Bushing, 1/2", 14 Gauge
	G10501	-	Hex Jam Nut, 1/2"-13, Grade 2
	G10053	-	Hex Head Cap Screw, 1/2"-13 x 2 1/2"
	GA7154	-	Sprocket W/Bearing, 18 Tooth
4.	GA5113	1	Sprocket, 28 Tooth
5.	G10233	-	Machine Bushing, 1", 10 Gauge
6.	G3400-01	-	Flangette
7.	G2100-03	-	Bearing, 7/8" Hex Bore, Spherical
8.	G10312	6	Carriage Bolt, 5/16"-18 x 3/4"
	G10232	6	Lock Washer, 5/16"
	G10106	6	Hex Nut, 5/16"-18
9.	G10037	1	Hex Head Cap Screw, 1/2"-13 x 1 1/4"
	G10216	1	Washer, 1/2" USS
	G10228	1	Lock Washer, 1/2"
	G10102	1	Hex Nut, 1/2"-13



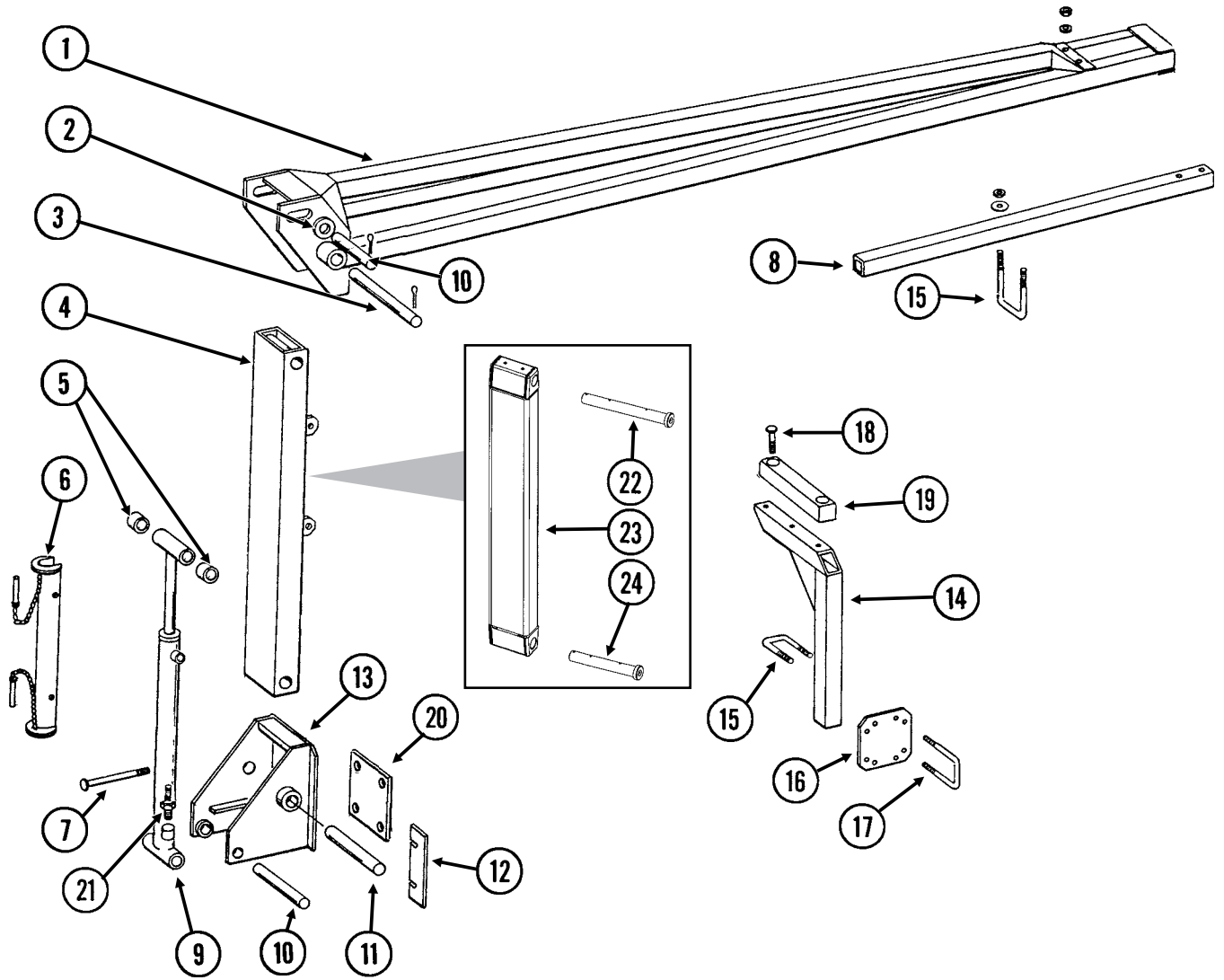
# TWO-SPEED POINT ROW CLUTCH WHEEL MODULE EXTENSION

ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
10.	GA7306	1	Extension Bracket
11.	G10857	2	Hex Head Cap Screw, 1/4"-20 x 1 1/4"
	G10209	2	Washer, 1/4" USS
	G10227	2	Lock Washer, 1/4"
	G10103	2	Hex Nut, 1/4"-20
12.	G10408	1	Clevis Pin, 5/16" x 3/4"
	G10409	1	Retaining Ring, 5/16"
13.	G10064	2	Hex Head Cap Screw, 1/4"-20 x 1"
	G10209	2	Washer, 1/4" USS
	G10227	2	Lock Washer, 1/4"
	G10103	2	Hex Nut, 1/4"-20
14.		-	See "Contact Wheel And Drive Shaft(s)", Pages P62-P64
15.		-	See "Two-Speed Point Row Clutch", Pages P72 And P73
16.	G3310-74	2	Chain, No. 40, 74 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
17.	G3310-100	1	Chain, No. 40, 100 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
18.	GA7320	1	Overrunning Sprocket Assembly, R.H.
	GA7321	-	Overrunning Sprocket Assembly, L.H.
	G10430	1	External Retaining Ring, 1 1/4"
	GD1255	6	L-Pin
	G10546	6	Spring Pin, 3/16" x 1 1/4"
	G10470	6	Cotter Pin, 5/32" x 1"
	GD10366	6	Spring
	GA7317	1	Block
	GA7319	1	Sprocket W/Bushing, 30 Tooth
19.	GD10543	1	Hex Shaft, 7/8" x 13"
20.	G11100	1	Hex Socket Button Head Cap Screw, 1/4"-20 x 1/2", Grade 8
	G10227	1	Lock Washer, 1/4"
	G10209	1	Washer, 1/4" USS
21.	GA7336	1	Idler W/Bolt-On Sprockets
	GD7426	-	Sprocket, 12 Tooth
	GD1026	-	Sleeve, 1 3/16" Long
	G10210	-	Washer, 3/8" USS
	G10229	-	Lock Washer, 3/8"
	G10047	-	Hex Head Cap Screw, 3/8"-16 x 1 3/4"
22.	GD2558	2	Lynch Pin, 1/4"
23.	G10595	1	Hex Head Cap Screw, 3/8"-16 x 10"
	G10108	1	Lock Nut, 3/8"-16
24.	GD10355	1	Shaft, 7/8" x 13 3/4"
25.	G10602	3	Spring Pin, 1/4" x 1 1/2"
26.	GA5109	1	Sprocket, 24 Tooth
	GA5105	1	Sprocket, 15 Tooth
	GA5106	1	Sprocket, 17 Tooth
	GA5112	1	Sprocket, 27 Tooth
	GA5108	-	Sprocket, 23 Tooth (From Transmission)
	GA5110	-	Sprocket, 25 Tooth (From Transmission)
	GA5111	-	Sprocket, 26 Tooth (From Transmission)
27.	GA7313	1	Sprocket Storage Rod
28.	G11078	1	Vinyl Cap
29.	G10496	2	External Inverted Snap Ring, 1 1/2"
30.	G11075	2	External Inverted Snap Ring, 7/8"
31.	GD14432	1	Sleeve, 1 1/4"
32.	GD14414	1	Torsion Spring, R.H. (Shown) (Used In L.H. Wrap Spring Wrench)
	GD14413	-	Torsion Spring, L.H. (Used In R.H. Wrap Spring Wrench)
33.	GD14429	-	Release Collar, Silver, L.H. (Shown)
	GD14430	1	Release Collar, Gold, R.H.
34.	GD14426	1	Tightener Shaft, 3 3/8"
35.	GD14431	1	Handle
36.	G10235	2	Machine Bushing, 7/8", 14 Gauge
A.	G1K381	-	Wrap Spring Wrench Replacement Kit, Silver Collar, L.H. (Items 20 And 28-36) (Shown)
	G1K380	1	Wrap Spring Wrench Replacement Kit, Gold Collar, R.H. (Items 20 And 28-36)

# ROW MARKER ASSEMBLY

# 12 ROW 30"

MKR019/MKR027(MKR14i)



# ROW MARKER ASSEMBLY

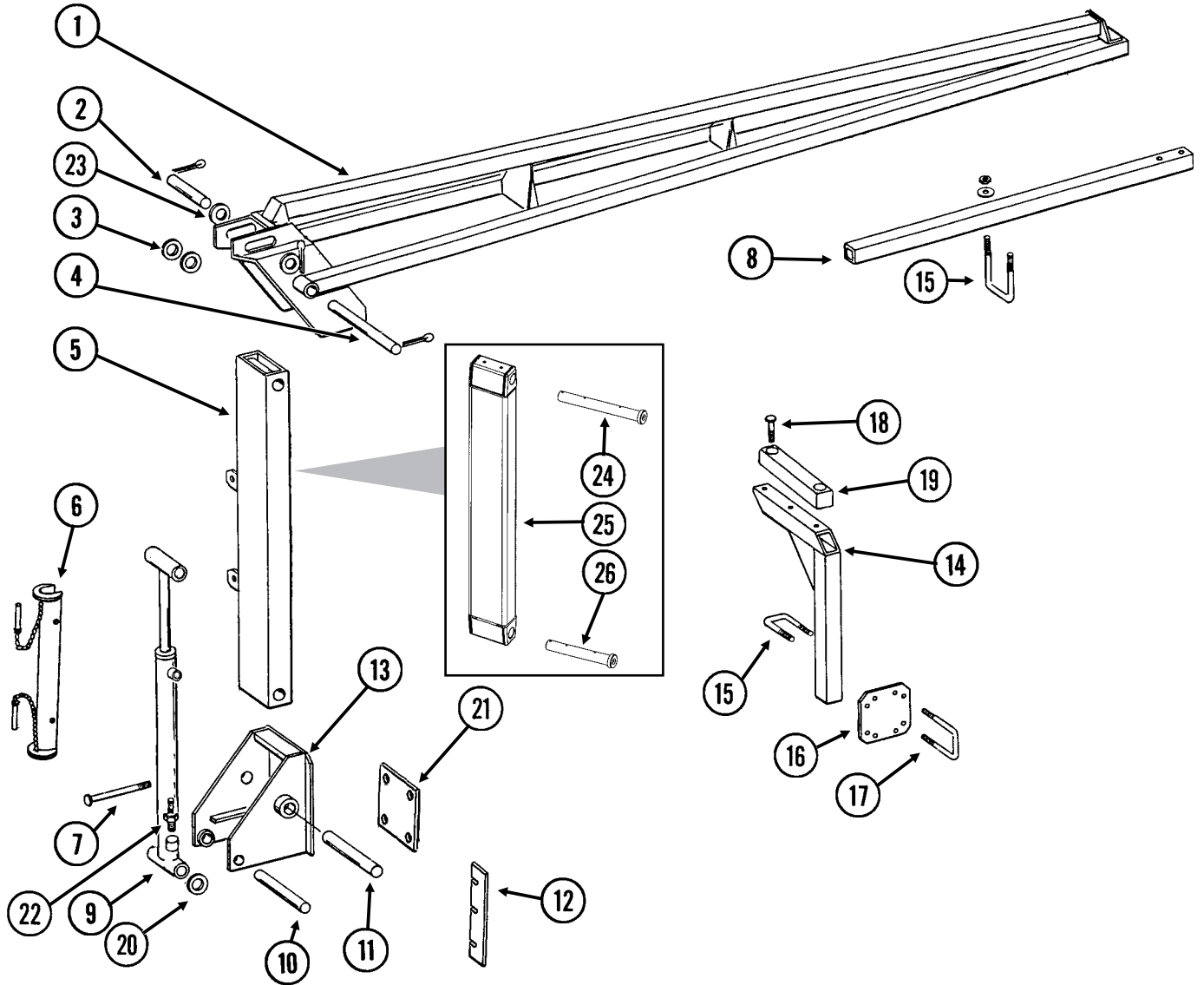
# 12 ROW 30"

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	GA4353	1	Arm W/Grease Fittings, Second Stage, 110"
	G10641	-	Grease Fitting, 1/8" NPT
2.	G10226	-	Washer, 1 1/4" SAE
3.	GD3214	1	Pin, 1 1/4" x 12 1/4"
	G10460	2	Cotter Pin, 1/4" x 2"
4.	GA4611	1	Arm W/Grease Fittings, First Stage
	G10641	-	Grease Fitting, 1/8" NPT
5.	GD0752-41	4	Sleeve, 1"
6.	GA8170	1	Safety Lockup W/Detent Pins, 19 3/8"
	G10536	-	Detent Pin, 1/2" x 2 1/2" Grip
7.	G10046	4	Hex Head Cap Screw, 5/8"-11 x 5"
	GD7805	8	Special Washer, 5/8", Hardened
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
8.	GD0453-05	1	Extension Tube, 55"
9.		-	See "Row Marker (Cushion) Cylinder", Page P90
10.	GD2161	2	Pin, 1 1/4" x 8 1/4"
	G10460	4	Cotter Pin, 1/4" x 2"
11.	GD0652	1	Pin, 1 1/4" x 9 1/2"
	G10460	2	Cotter Pin, 1/4" x 2"
12.	GD10792	-	Shim, 2 1/2" x 7 1/4", 16 Gauge (As Required)
13.	GA5130	1	Mount
14.	GA7042	1	Stand, 20" (12 Row 30" Only)
15.	GD2721	3	U-Bolt, 2" x 2" x 1/2"-13
	G10228	6	Lock Washer, 1/2"
	G10102	6	Hex Nut, 1/2"-13
16.	GD9981	1	Bar
17.	GD1138	2	U-Bolt, 2 1/2" x 2 1/2" x 1/2"-13
	G10216	4	Washer, 1/2" USS
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
18.	G10017	2	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10206	2	Washer, 1/2" SAE
	G10111	2	Lock Nut, 1/2"-13
19.	GA9088	-	Molded Stop, 12 1/4" Long
20.	GD13360	2	Plate, 6" x 6"
21.		-	See "Hydraulic Hoses And Fittings On Planter Frame", Pages P102 And P103
22.	GA11766	-	Pin W/Grease Fitting, 1 1/4" x 11 13/16"
	G10640	-	Grease Fitting, 1/4"-28
23.	GA11590	-	Arm, First Stage
24.	GA11767	-	Pin W/Grease Fitting, 1 1/4" x 9 1/2"
	G10640	-	Grease Fitting, 1/4"-28

# ROW MARKER ASSEMBLY

# 16 ROW 30"

MKR019/MKR023MKR027(MKR15)



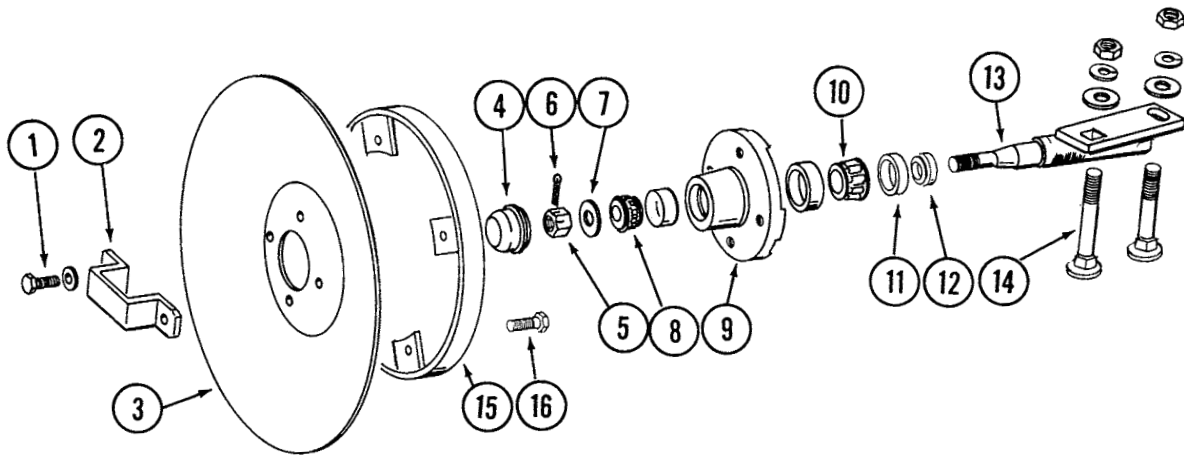
# ROW MARKER ASSEMBLY

# 16 ROW 30"

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	GA7118	-	Arm, Second Stage, 172 1/4"
2.	GD1701	1	Pin, 1 1/4" x 6 1/2"
	G10460	2	Cotter Pin, 1/4" x 2"
3.	G10322	-	Machine Bushing, 1 1/4", 18 Gauge
4.	GD0737	1	Pin, 1 1/4" x 13 1/4"
	G10460	2	Cotter Pin, 1/4" x 2"
5.	GA4878	1	Arm W/Grease Fittings, First Stage, R.H.
	GA4983	-	Arm W/Grease Fittings, First Stage, L.H.
	G10641	-	Grease Fitting, 1/8" NPT
6.	GA8170	1	Safety Lockup W/Detent Pins, 19 3/8"
	G10536	-	Detent Pin, 1/2" x 2 1/2" Grip
7.	G10046	-	Hex Head Cap Screw, 5/8"-11 x 5" (If Applicable)
	G10009	-	Hex Head Cap Screw, 5/8"-11 x 2 1/2" (If Applicable)
	GD7805	8	Special Washer, 5/8", Hardened
	G10230	6	Lock Washer, 5/8"
	G10104	6	Hex Nut, 5/8"-11
8.	GD0453-05	-	Extension Tube, 55"
9.		-	See "Row Marker (Cushion) Cylinder", Page P90
10.	GD0652	1	Pin, 1 1/4" x 9 1/2"
	G10460	2	Cotter Pin, 1/4" x 2"
11.	GD7209	1	Pin, 1 1/4" x 11 1/2"
	G10049	1	Hex Head Cap Screw, 3/8"-16 x 2 1/2"
	G10108	1	Lock Nut, 3/8"-16
12.	GD10793	-	Shim, 2 1/2" x 12 1/2", 16 Gauge (As Required) (Shown)
	GD11791	-	Shim, 2 1/2" x 8 1/4", 16 Gauge (As Required)
13.	GA4877	1	Mount
14.	GA7043	1	Stand, 30"
15.	GD2721	3	U-Bolt, 2" x 2" x 1/2"-13
	G10228	6	Lock Washer, 1/2"
	G10102	6	Hex Nut, 1/2"-13
16.	GD9981	1	Bar
17.	GD1138	2	U-Bolt, 2 1/2" x 2 1/2" x 1/2"-13
	G10216	4	Washer, 1/2" USS
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
18.	G10017	2	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10206	2	Washer, 1/2" SAE
	G10111	2	Lock Nut, 1/2"-13
19.	GA9088	-	Molded Stop, 12 1/4" Long
20.	G10979	4	Special Washer, 1 1/4" (As Required)
21.	GD13359	2	Plate, 7" x 7"
22.		-	See "Hydraulic Hoses And Fittings On Planter Frame", Pages P102 And P103
23.	G10226	2	Washer, 1 1/4" SAE
	G10322	2	Machine Bushing, 1 1/4", 18 Gauge
24.	GA11768	-	Pin W/Grease Fitting, 1 1/4" x 13"
	G10640	-	Grease Fitting, 1/4"-28
25.	GA11569	-	Arm, First Stage, L.H. (Shown)
	GA11568	-	Arm, First Stage, R.H.
26.	GA11769	-	Pin W/Grease Fitting, 1 1/4" x 11 1/2"
	G10640	-	Grease Fitting, 1/4"-28

# ROW MARKER SPINDLE/HUB/BLADE

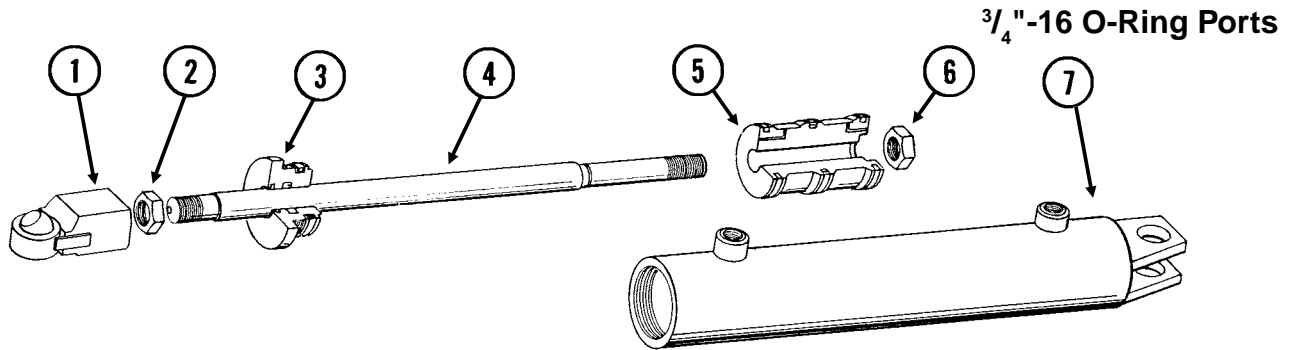
MKR020(MKR4)



ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	G10722	4	Hex Head Cap Screw, 1/2"-20 x 1"
	G10228	4	Lock Washer, 1/2"
2.	GD2597	1	Retainer
3.	GD0746	1	Disc Blade, Solid, 16" (Shown)
	GD10283	-	Disc Blade, Notched, 16" (Optional)
4.	GD0840	1	Dust Cap
5.	G10725	1	Slotted Hex Nut, 5/8"-18
6.	G10544	1	Cotter Pin, 5/32" x 1"
7.	G10724	1	Washer, 5/8" SAE
8.	GA0257	1	Bearing
9.	GA0167	1	Hub W/Cups, 4 Bolt
	GR0151	-	Outer Cup
	GR0150	-	Inner Cup
10.	GA0245	1	Bearing
11.	GA0243	1	Grease Seal
12.	GA0899	1	Rubber Seal
13.	GA1676	1	Spindle, R.H.
	GA1677	-	Spindle, L.H. (Shown)
14.	G10844	2	Carriage Bolt, 1/2"-13 x 3 1/2"
	G10168	2	Machine Bushing, 1/2", 7 Gauge
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
15.	GA5853	1	Depth Band
16.	G10019	4	Hex Head Cap Screw, 5/16"-18 x 1"
	G10109	4	Lock Nut, 5/16"-18, Grade 8
A.	GA1679	-	Hub And Spindle Assembly, L.H. (Items 1, 2 And 4-13)
	GA1678	-	Hub And Spindle Assembly, R.H. (Items 1, 2 And 4-13)

# ROTATION CYLINDER, ALL SIZES

(CYL11g)

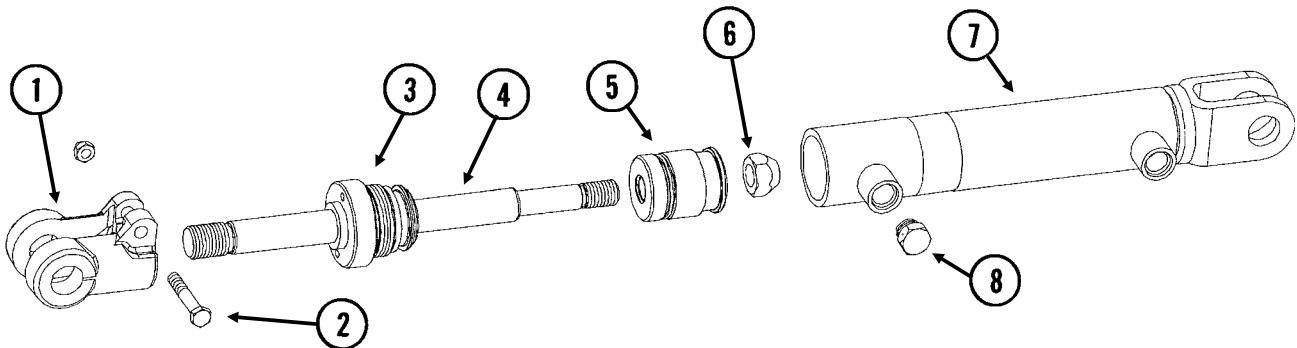


ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA7221	1	Threaded Ball Joint End
2.	G10509	1	Hex Jam Nut, 1 1/4"-12, Grade 2
3.	GD11988	1	Gland
4.	GD14059	1	Rod
5.	GD11992	1	Piston
6.	G10972	1	Lock Nut, 1 1/4"-12
7.	A9018	1	Barrel <b>(Non-Stock Item)</b>
A.	GA9842	-	Cylinder Complete, 4" x 20" <i>(Part Number Stamped On Barrel)</i>
B.	GR1524	-	Seal Kit, Includes: (2) O-Rings, (1) U-Cup, (1) Wiper, (1) Seal, (2) Cast Iron Rings, (1) BU Ring, (1) Expander

# STABILIZER CYLINDER, ALL SIZES

(CYL60)

3/4"-16 O-Ring Ports

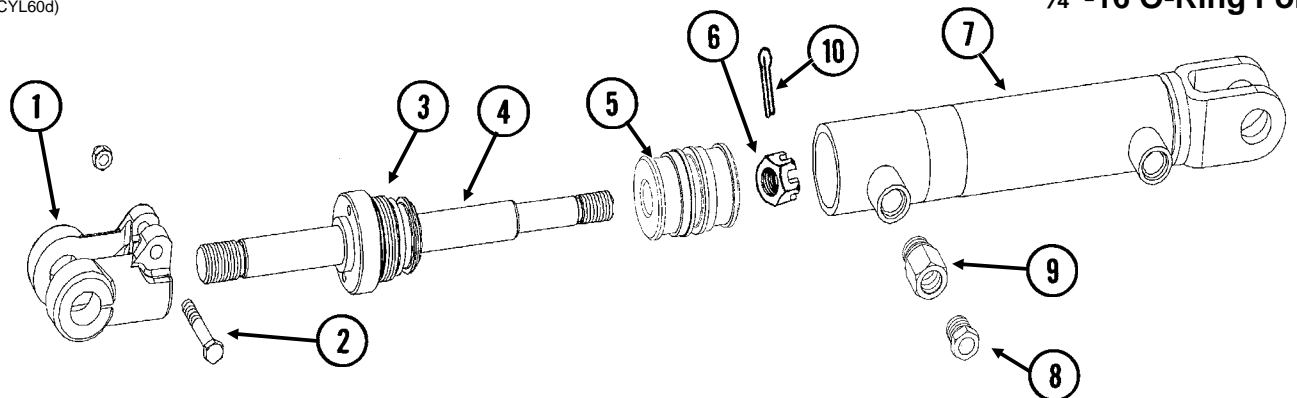


ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD11950	1	Clevis
2.	G10939	1	Hex Head Cap Screw, 3/8"-16 x 2 1/4"
	G10108	1	Lock Nut, 3/8"-16
3.	GD12510	1	Gland
4.	GD16066	1	Rod
5.	GD16065	1	Piston
6.	G10967	1	Lock Nut, 3/4"-16
7.	A8775	1	Barrel <b>(Non-Stock Item)</b>
8.	GA5531	1	Breather Plug W/O-Ring, 3/4"-16 O-Ring
	GR1037	-	O-Ring
A.	GA10947	-	Cylinder Complete, 2" x 6 7/16" (Part Number Stamped On Barrel) (Items 1-7)
B.	GR1738	-	Seal Kit, Includes: (1) T-Seal, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper, (1) U-Cup Seal, (2) Wear Rings, (1) IS511 Instruction

# STABILIZER CYLINDER, ALL SIZES

(CYL60d)

3/4"-16 O-Ring Ports



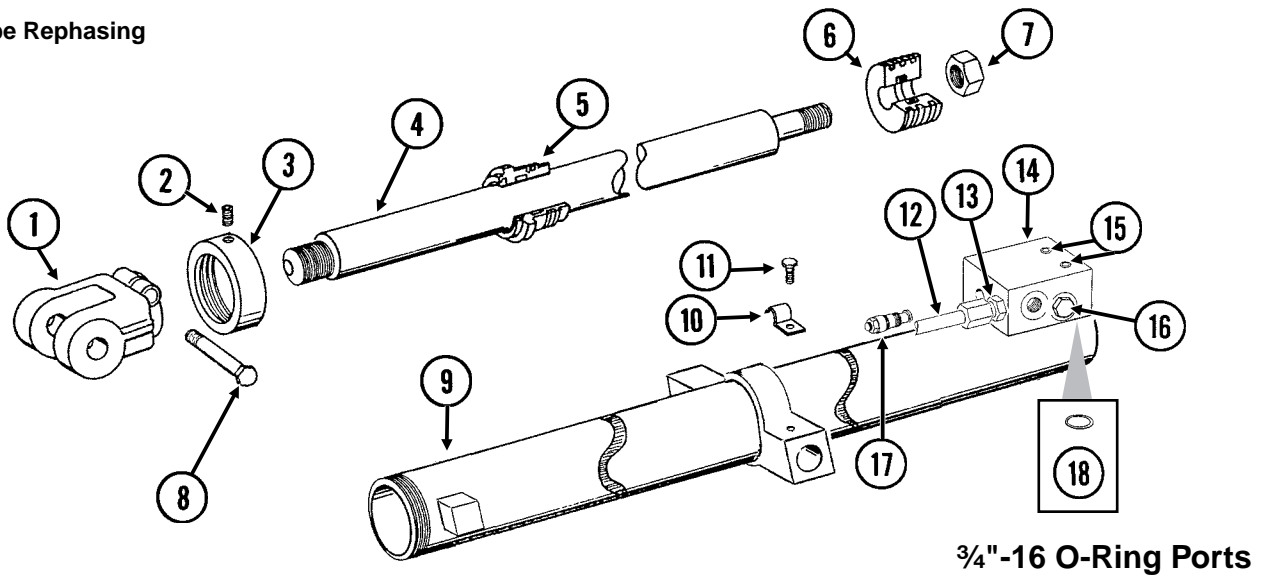
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD11950	1	Clevis
2.	G10939	1	Hex Head Cap Screw, 3/8"-16 x 2 1/4"
	G10108	1	Lock Nut, 3/8"-16
3.	GD17080	1	Gland
4.	GD17079	1	Rod
5.	GD17078	1	Piston
6.	G10723	1	Slotted Hex Nut, 3/4"-16, Grade 2
7.	A8775	1	Barrel <b>(Non-Stock Item)</b>
8.	GA11980	1	Breather Plug, 3/8" NPT
9.	G6405-08-06	1	Connector W/O-Ring, 3/8" Female NPT To 3/4" Male O-Ring
	GR1037	-	O-Ring
10.	G10827	1	Cotter Pin, 1/8" x 1 3/4"
A.	GA11957	-	Cylinder Complete, 2" x 6 7/16" (Part Number Stamped On Barrel) (Items 1-7)
B.	GR1775	-	Seal Kit, Includes: (1) T-Seal, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper, (1) U-Cup Seal, (1) Wear Ring, (1) IS511 Instruction



# CENTER LIFT CYLINDER, 12 ROW 30"

(CYL54c/D12239)

## Port Type Rephasing

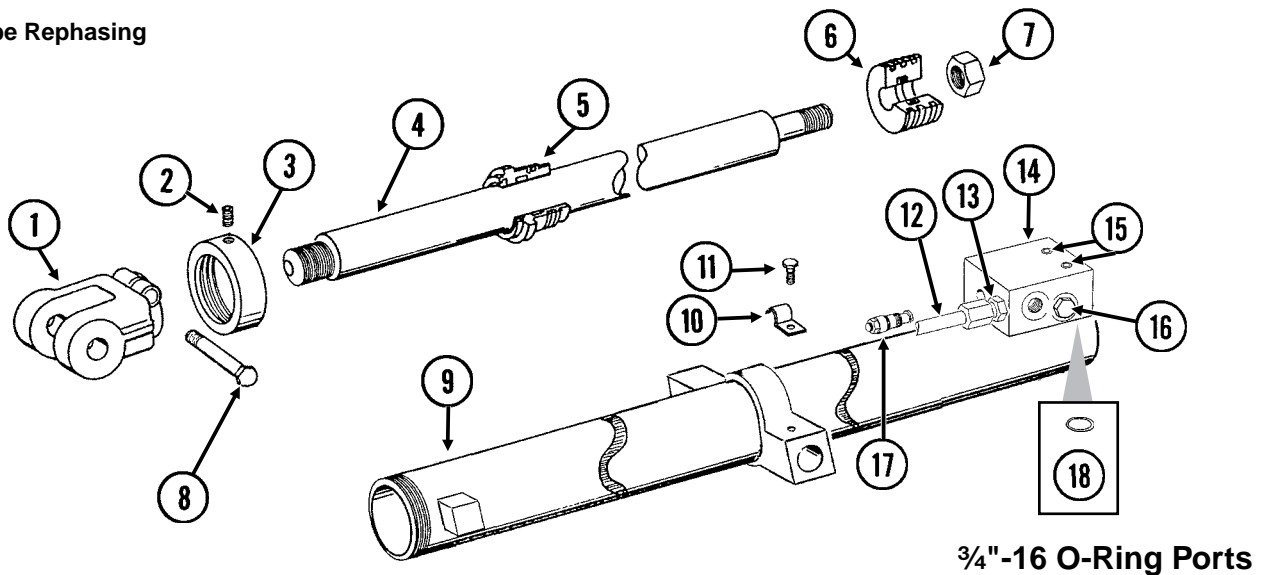


ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD11951	1	Clevis
2.	G10907	1	Set Screw, 1/4"-20 x 1/4"
3.	GD11193	1	Cap
4.	GD14510	1	Rod
5.	GD10211	1	Gland
6.	GD11253	1	Piston
7.	G10958	1	Lock Nut, 1"-14
8.	G10939	1	Hex Head Cap Screw, 3/8"-16 x 2 1/4"
	G10108	1	Lock Nut, 3/8"-16
9.	GA10099	1	Barrel
10.	GD12657	1	Half Clip
11.	G10022	1	Hex Head Cap Screw, 1/4"-20 x 1/2"
	G10227	1	Lock Washer, 1/4"
12.	GA10094	1	Steel Hydraulic Line, 47 5/16"
13.	G6400-08	-	Connector W/O-Ring, 3/4"-16 Male JIC To O-Ring
	GR1037	0	O-Ring
14.	GD11579	1	Block
15.	G10932	2	Hex Socket Head Cap Screw, 5/16"-18 x 2", Grade 8
16.	G6408-08	-	Plug W/O-Ring, 3/4"-16 O-Ring
	GR1037	-	O-Ring
17.	GA8882	1	Counter Balance Valve
18.	GD12239	1	O-Ring, No. 016
A.	GA10100	-	Cylinder Complete, 3" x 52" (Part Number Stamped On Barrel)
B.	GR1550	-	Seal Kit (For Cylinder And Counter Balance Valve), Includes: (1) Wiper, (1) U-Cup, (7) O-Rings, (4) BU Rings, (1) Seal, (1) Expander, (2) Cast Iron Rings

# CENTER LIFT CYLINDER, 16 ROW 30"

(CYL54c/D12239)

## Port Type Rephasing

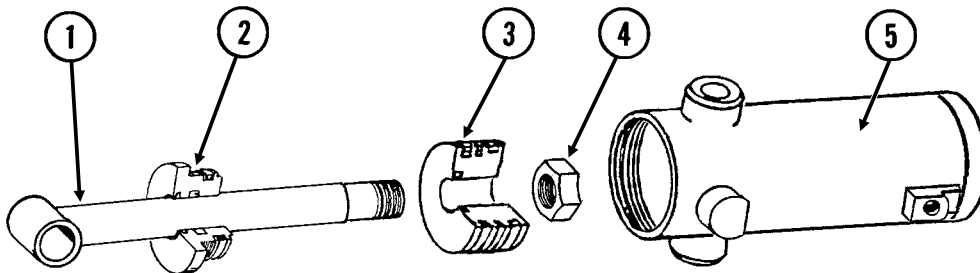


ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD11951	1	Clevis
2.	G10907	1	Set Screw, 1/4"-20 x 1/4"
3.	GD13303	1	Cap
4.	GD14508	1	Rod
5.	GD13307	1	Gland
6.	GD13304	1	Piston
7.	G10958	1	Lock Nut, 1"-14
8.	G10939	1	Hex Head Cap Screw, 3/8"-16 x 2 1/4"
	G10108	1	Lock Nut, 3/8"-16
9.	GA10096	1	Barrel
10.	GD12657	1	Half Clip
11.	G10022	1	Hex Head Cap Screw, 1/4"-20 x 1/2"
	G10227	1	Lock Washer, 1/4"
12.	GA10094	1	Steel Hydraulic Line, 47 5/16"
13.	G6400-08	-	Connector W/O-Ring, 3/4"-16 Male JIC To O-Ring
	GR1037	0	O-Ring
14.	GD11579	1	Block
15.	G10932	2	Hex Socket Head Cap Screw, 5/16"-18 x 2", Grade 8
16.	G6408-08	-	Plug W/O-Ring, 3/4"-16 O-Ring
	GR1037	-	O-Ring
17.	GA8882	1	Counter Balance Valve
18.	GD12239	1	O-Ring, No. 016
A.	GA10097	-	Cylinder Complete, 3 1/4" x 52" (Part Number Stamped On Barrel)
B.	GR1572	-	Seal Kit (For Cylinder And Counter Balance Valve), Includes: (1) Wiper, (1) U-Cup, (7) O-Rings, (4) BU Rings, (1) Seal, (1) Expander, (2) Cast Iron Rings

# WING LIFT CYLINDER, 12 ROW 30"

CYL031/CYL011(CYL43d)

Port Type Rephasing



Port Type Rephasing

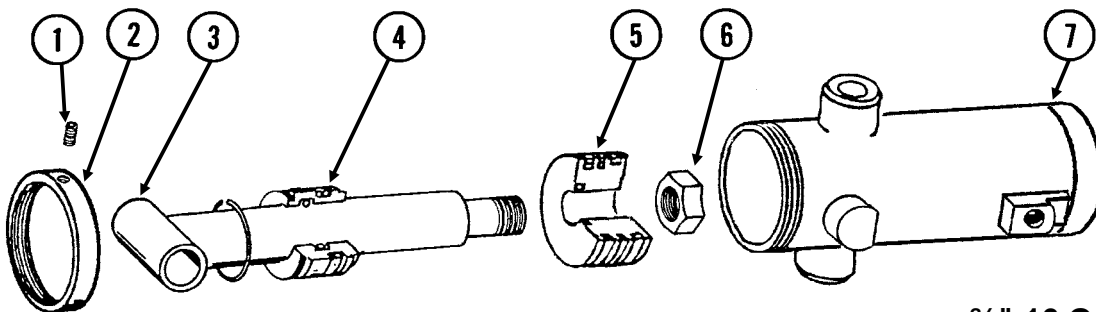
3/4"-16 O-Ring Ports

ITEM	PART NO.	QTY	DESCRIPTION
1.	GA8320	1	Rod Assembly W/Grease Fitting
	G10640	-	Grease Fitting, 1/4"-28
2.	GD11995	1	Gland
3.	GD11994	1	Piston
4.	G10958	1	Lock Nut, 1"-14
5.	A8797	1	Barrel <b>(Non-Stock Item)</b>
A.	GA8909	-	Cylinder Complete, 4 1/4" x 6" <i>(Part Number Stamped On Barrel)</i>
B.	GR1523	-	Seal Kit, Includes: (1) Wiper, (2) O-Rings, (1) BU Ring, (1) U-Cup, (2) Seals, (1) Piston Ring

# WING LIFT CYLINDER, 16 ROW 30"

CYL031/CYL011(CYL41c)

Port Type Rephasing



Port Type Rephasing

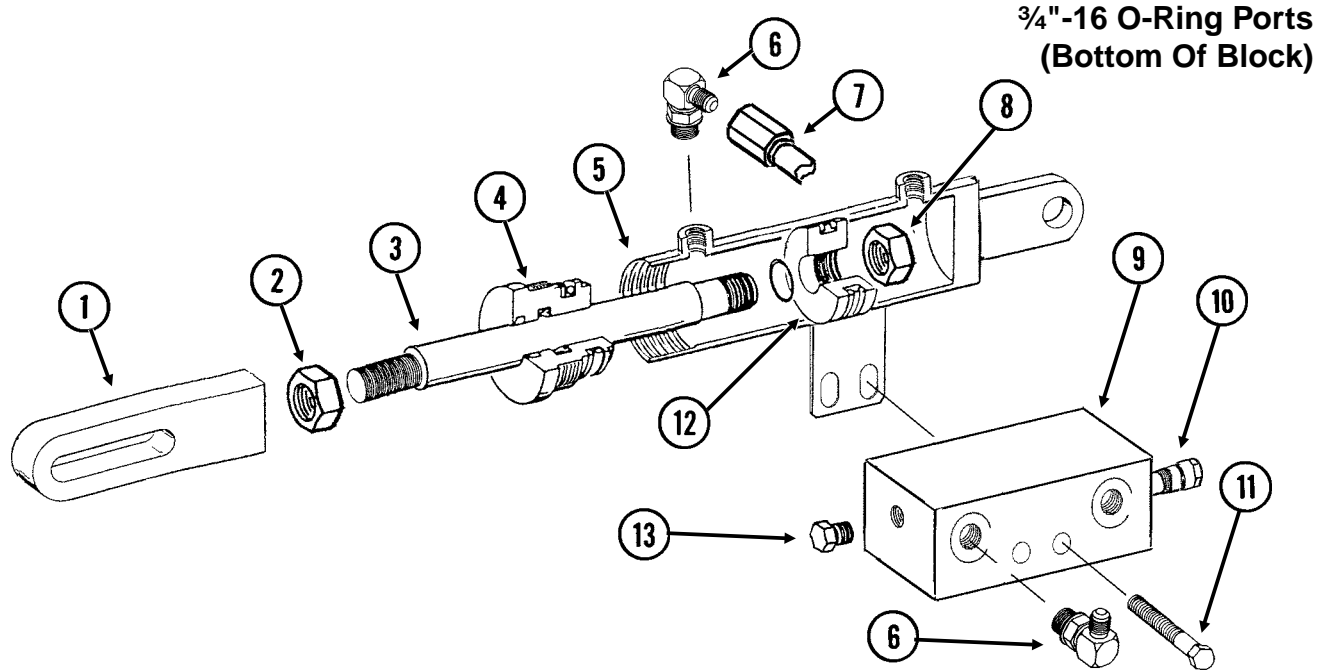
3/4"-16 O-Ring Ports

## ITE

1.	G10907	1	Set Screw, 1/4"-20 x 1/4"
2.	GD13303	1	Cap
3.	GA8157	1	Rod Assembly W/Grease Fitting
	G10449	-	Grease Fitting, 3/16", Drive-In
4.	GD13302	1	Gland
5.	GD13304	1	Piston
6.	G10958	1	Lock Nut, 1"-14
7.	A9467	1	Barrel <b>(Non-Stock Item)</b>
A.	GA9468	-	Cylinder Complete, 3 1/4" x 6" <i>(Part Number Stamped On Barrel)</i>
B.	GR1573	-	Seal Kit, Includes: (1) Expander, (2) O-Rings, (1) BU Ring, (1) Wiper, (1) U-Cup, (1) Piston Seal, (2) Cast Iron Rings

# WING LOCK CYLINDERS, R.H. FRONT AND L.H. REAR

(CYL2d)

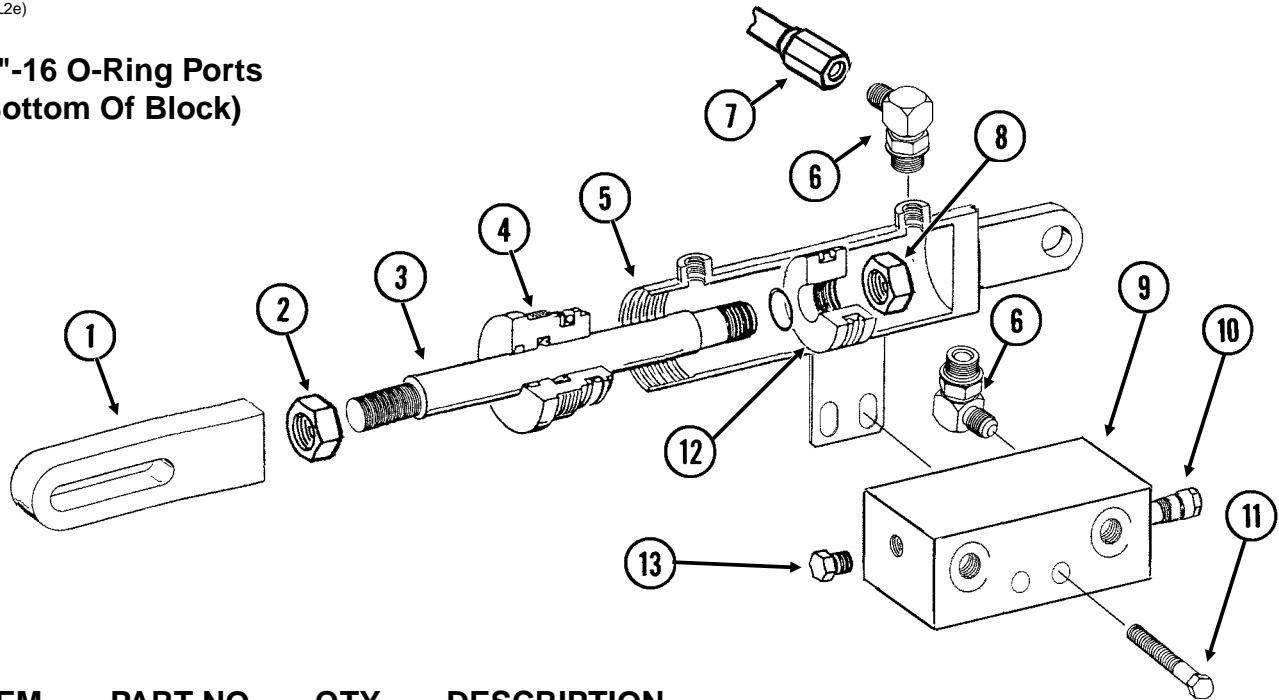


ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA9013	1	Clevis
2.	G10509	1	Hex Jam Nut, 1 1/4"-12, Grade 2
3.	GD12658	1	Rod
4.	GD12659	1	Gland
5.	A9015	1	Barrel <b>(Non-Stock Item)</b>
6.	G6801-06-08	4	Elbow W/O-Ring, 90°, 3/16"-18 Male JIC To 3/4"-16 O-Ring
	GR1037	-	O-Ring
7.	GA9012	2	Steel Hydraulic Line, 7 9/16"
8.	G10972	1	Lock Nut, 1 1/4"-12
9.	GD12665	1	Block
10.	GA8882	1	Counter Balance Valve
11.	G10753	2	Hex Head Cap Screw, 3/8"-16 x 4 1/2"
	G10203	4	Washer, 3/8" SAE
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
12.	GD12660	1	Piston
13.	G6408-08	3	Plug W/O-Ring, 3/4"-16 O-Ring
	GR1037	-	O-Ring
A.	GA9016	-	Cylinder Complete, 4" x 3 1/2" <i>(Part Number Stamped On Barrel)</i>
B.	GR1551	-	Seal Kit (For Cylinder And Counter Balance Valve), Includes: (1) Wiper, (5) O-Rings, (4) BU Rings, (1) U-Cup, (1) T-Seal

# WING LOCK CYLINDERS, L.H. FRONT AND R.H. REAR

(CYL2e)

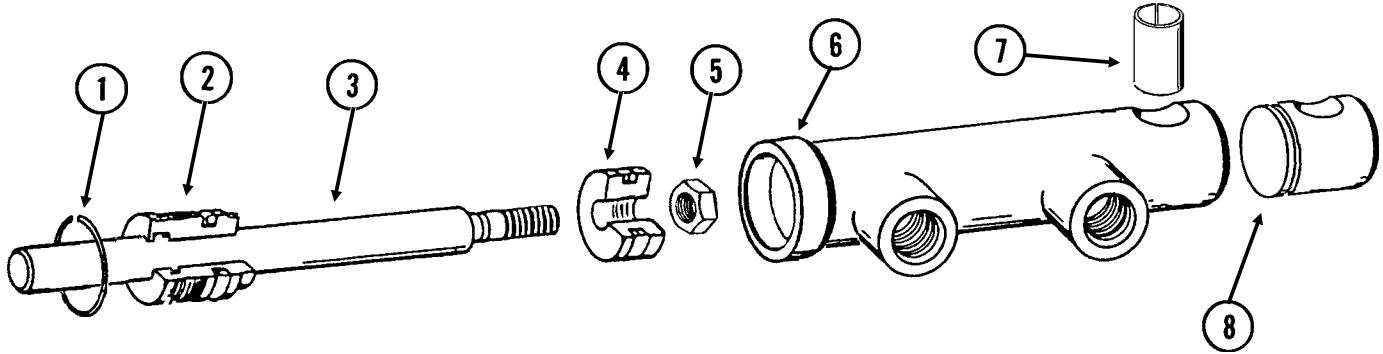
## 3/4"-16 O-Ring Ports (Bottom Of Block)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA9013	1	Clevis
2.	G10509	1	Hex Jam Nut, 1 1/4"-12, Grade 2
3.	GD12658	1	Rod
4.	GD12659	1	Gland
5.	A9015	1	Barrel <b>(Non-Stock Item)</b>
6.	G6801-06-08	4	Elbow W/O-Ring, 90°, 3/16"-18 Male JIC To 3/4"-16 O-Ring
	GR1037	-	O-Ring
7.	GA9012	2	Steel Hydraulic Line, 7 9/16"
8.	G10972	1	Lock Nut, 1 1/4"-12
9.	GD12665	1	Block
10.	GA8882	1	Counter Balance Valve
11.	G10753	2	Hex Head Cap Screw, 3/8"-16 x 4 1/2"
	G10203	4	Washer, 3/8" SAE
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
12.	GD12660	1	Piston
13.	G6408-08	3	Plug W/O-Ring, 3/4"-16 O-Ring
	GR1037	-	O-Ring
A.	GA9134	-	Cylinder Complete, 4" x 3 1/2" <i>(Part Number Stamped On Barrel)</i>
B.	GR1551	-	Seal Kit (For Cylinder And Counter Balance Valve), Includes: (1) Wiper, (5) O-Rings, (4) BU Rings, (1) U-Cup, (1) T-Seal

# TRANSPORT LATCH CYLINDER, ALL SIZES

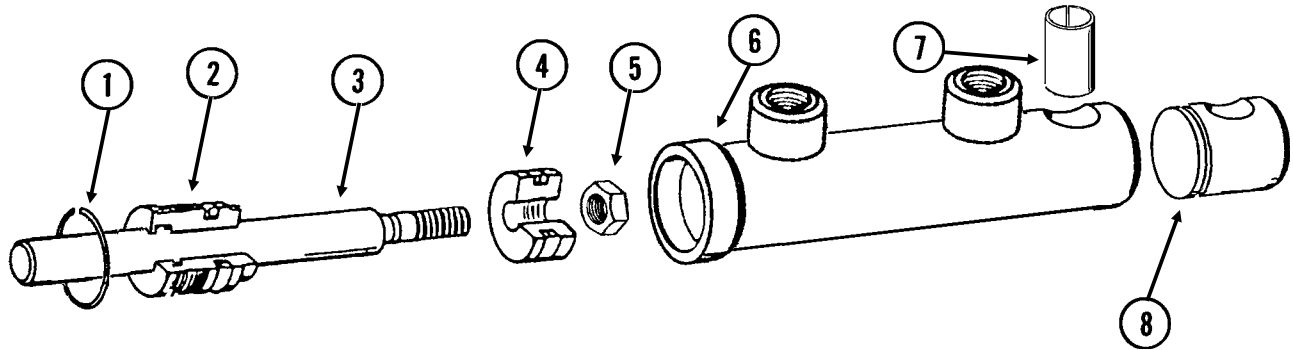
CYL035/CYL050(CYL9c)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10770	1	Internal Retaining Ring, 1 1/16"
2.	GD13170	1	Gland
3.	GD13425	1	Rod
4.	GD13172	1	Piston
5.	G11016	1	Lock Nut, 1/2"-20
6.	GD13426	1	Barrel ( <b>Non-Stock Item</b> )
7.	GD13400	1	Tension Bushing, 1" x 2" Long
8.	GD13173	1	End Cap
A.	GA9559	-	Cylinder Complete, 1 1/2" x 2 1/2" ( <i>Part Number Stamped On Barrel</i> )
B.	GR1598	-	Seal Kit, Includes: (3) O-Rings, (2) BU Rings, (1) Wiper, (1) T-Seal, (1) Bronze Bushing, (1) U-Cup

# TONGUE LOCK CYLINDER, ALL SIZES

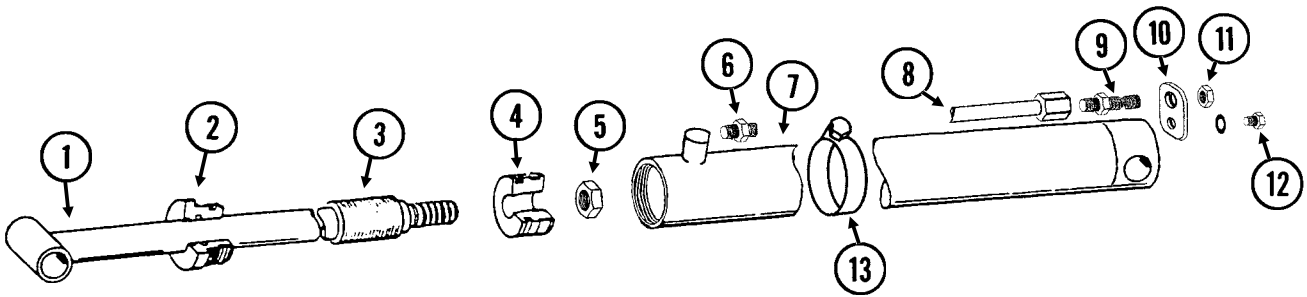
CYL035(CYL9d)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10770	1	Internal Retaining Ring, 1 1/16"
2.	GD13170	1	Gland
3.	GD13171	1	Rod
4.	GD13172	1	Piston
5.	G11016	1	Lock Nut, 1/2"-20
6.	GD13169	1	Barrel ( <b>Non-Stock Item</b> )
7.	GD13400	1	Tension Bushing, 1" x 2" Long
8.	GD13173	1	End Cap
A.	GA9205	-	Cylinder Complete, 1 1/2" x 2 1/2" ( <i>Part Number Stamped On Barrel</i> )
B.	GR1598	-	Seal Kit, Includes: (3) O-Rings, (2) BU Rings, (1) Wiper, (1) T-Seal, (1) Bronze Bushing, (1) U-Cup

# TONGUE CYLINDER, 12 ROW 30"

(CYL12f)

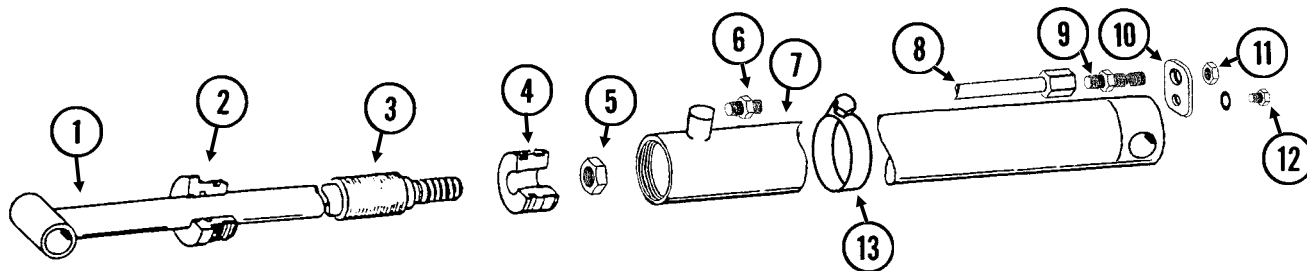


**3/4"-16 O-Ring Port  
And 3/4"-16 JIC Port**

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8893	1	Rod Assembly
2.	GD11984	1	Gland
3.	GD7147	1	Spacer
4.	GD11970	1	Piston
5.	G10972	1	Lock Nut, 1 1/4"-12
6.	G6400-08-04	1	Connector W/O-Ring, 3/4"-16 Male JIC To 7/16"-20 O-Ring
	GR1465	-	O-Ring
7.	GA8858	1	Barrel
8.	GA8978	1	Steel Hydraulic Line, 68 11/16"
9.	G2700-08	1	Bulkhead Tube Union, 3/4"-16 Male JIC
10.	GD12597	1	Bracket
11.	G306-08	1	Lock Nut, 3/4"-16
12.	G10328	1	Hex Head Cap Screw, 3/8"-16 x 5/8"
	G10229	1	Lock Washer, 3/8"
13.	G10990	1	Hose Clamp, No. 52
A.	GA8857	-	Cylinder Complete, 3" x 60" ( <i>Part Number Stamped On Barrel</i> )
B.	GR1519	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring, (1) Wear Ring, (1) Wiper, (1) U-Cup, (1) T-Seal W/BU Rings

# TONGUE CYLINDER, 16 ROW 30"

CYL036(CYL12f)



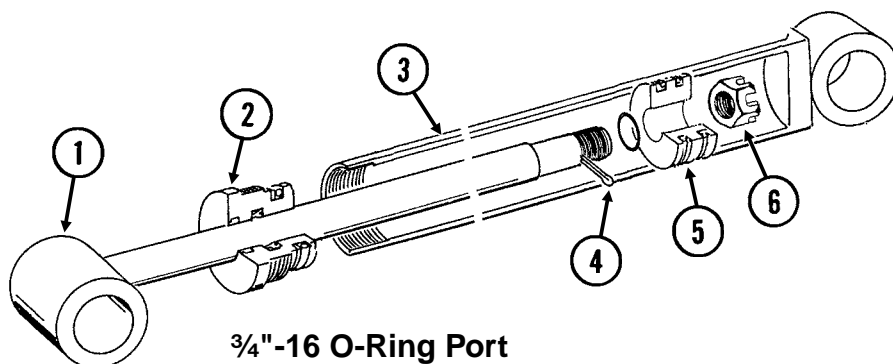
**3/4"-16 O-Ring Port  
And 3/4"-16 JIC Port**

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8859	1	Rod Assembly
2.	GD11984	1	Gland
3.	GD7147	1	Spacer
4.	GD11970	1	Piston
5.	G10972	1	Lock Nut, 1 1/4"-12
6.	G6400-08-04	1	Connector W/O-Ring, 3/4"-16 Male JIC To 7/16"-20 O-Ring
	GR1465	-	O-Ring
7.	GA8861	1	Barrel
8.	GA8979	1	Steel Hydraulic Line, 92 11/16"
9.	G2700-08	1	Bulkhead Tube Union, 3/4"-16 Male JIC
10.	GD12597	1	Bracket
11.	G306-08	1	Lock Nut, 3/4"-16
12.	G10328	1	Hex Head Cap Screw, 3/8"-16 x 5/8"
	G10229	1	Lock Washer, 3/8"
13.	G10990	1	Hose Clamp, No. 52
A.	GA8862	-	Cylinder Complete, 3" x 84" (Part Number Stamped On Barrel)
B.	GR1519	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring, (1) Wear Ring, (1) Wiper, (1) U-Cup, (1) T-Seal W/BU Rings

# ROW MARKER (Cushion) CYLINDER

(CYL3d)

**7/16"-20 O-Ring Port**



**3/4"-16 O-Ring Port**

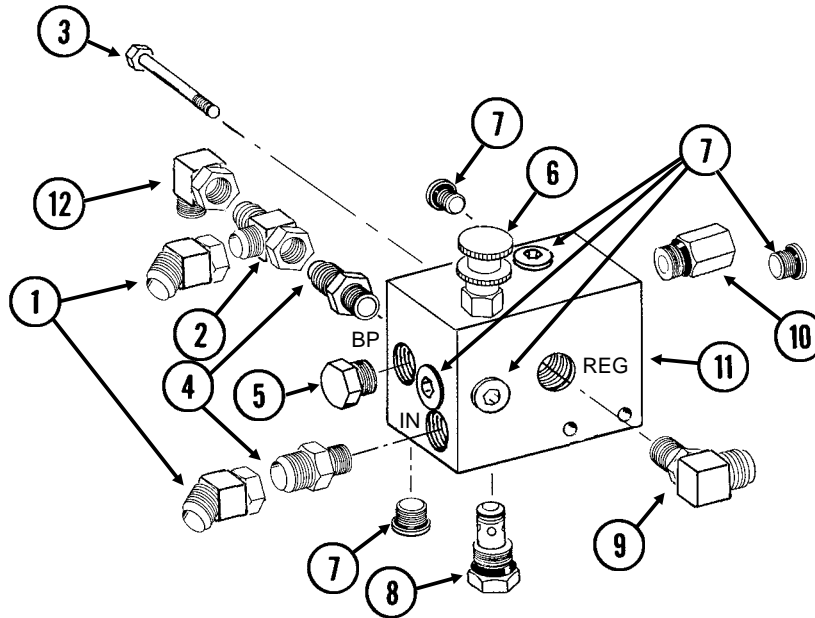
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8871	1	Rod Assembly
2.	GD10207	1	Gland
3.	A7524	1	Barrel (Non-Stock Item)
4.	G10827	1	Cotter Pin, 1/8" x 1 3/4"
5.	GD11983	1	Piston
6.	G10962	1	Slotted Hex Nut, 7/8"-14
A.	GA8895	-	Cylinder Complete, 2 1/2" x 20 1/16" (Part Number Stamped On Barrel)
B.	GR1521	-	Seal Kit, Includes: (1) T-Seal, (2) O-Rings, (1) BU Ring, (1) Cast Iron Ring, (1) Wiper, (1) Lip Seal



# VALVE BLOCK - LOCATED ON FRONT CENTER FRAME

VVB036(TWL24)

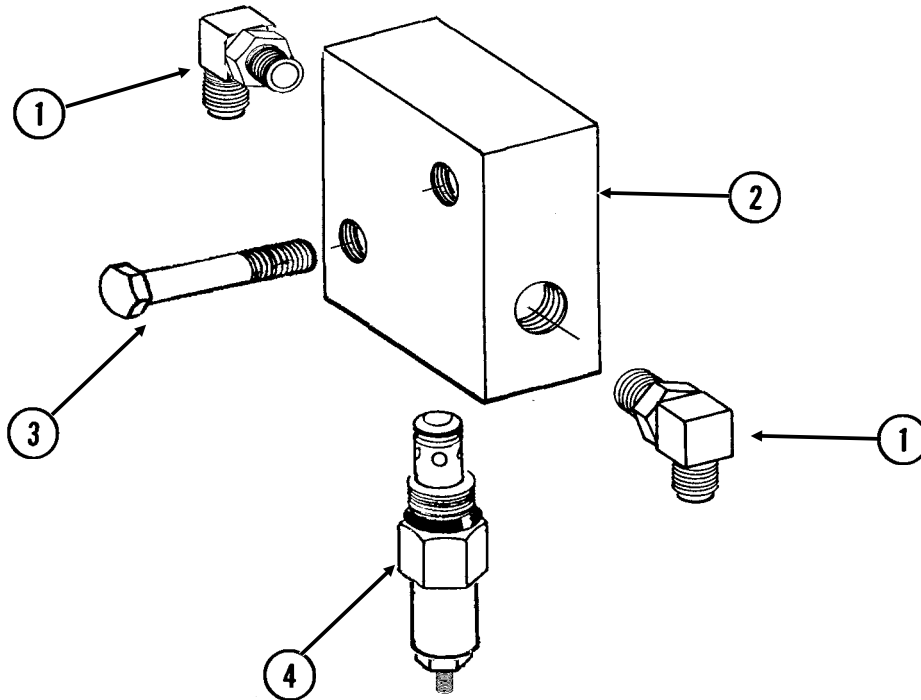
SDS ONLY



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G6502-10	2	Swivel Elbow, 45°, 7/8"-14 Male JIC To Female
2.	G6602-10	1	Swivel Tee, 7/8"-14 JIC
3.	G10061	2	Hex Head Cap Screw, 3/8"-16 x 3 1/2"
	G10108	2	Lock Nut, 3/8"-16
4.	G6400-10-08	2	Connector W/O-Ring, 7/8"-14 Male JIC To 3/4"-16 O-Ring
	GR1037	-	O-Ring
5.	GR1603	1	Plug W/Stop Pin
6.		-	See "Flow Control Valve", Page P97
7.	GR1607	6	Socket Plug
8.		-	See "Check Valve", Page P97
9.	G6801-10-08	1	Elbow W/O-Ring, 90°, 7/8"-14 Male JIC To 3/4"-16 O-Ring
	GR1037	-	O-Ring
10.		-	See "Pressure Relief Valve", Page P97
11.		-	Block ( <b>Non-Stock Item</b> )
12.	G6500-10	1	Swivel Elbow, 90°, 7/8"-14 Male JIC To Female
A.	GR1609	-	Seal Kit, Includes: (12) O-Rings, (2) BU Rings
B.	GA9128	-	Valve Block Assembly (Items 5, 6, 7, 8, 10, And 11)

# VALVE BLOCK - LOCATED ON FRONT CENTER FRAME

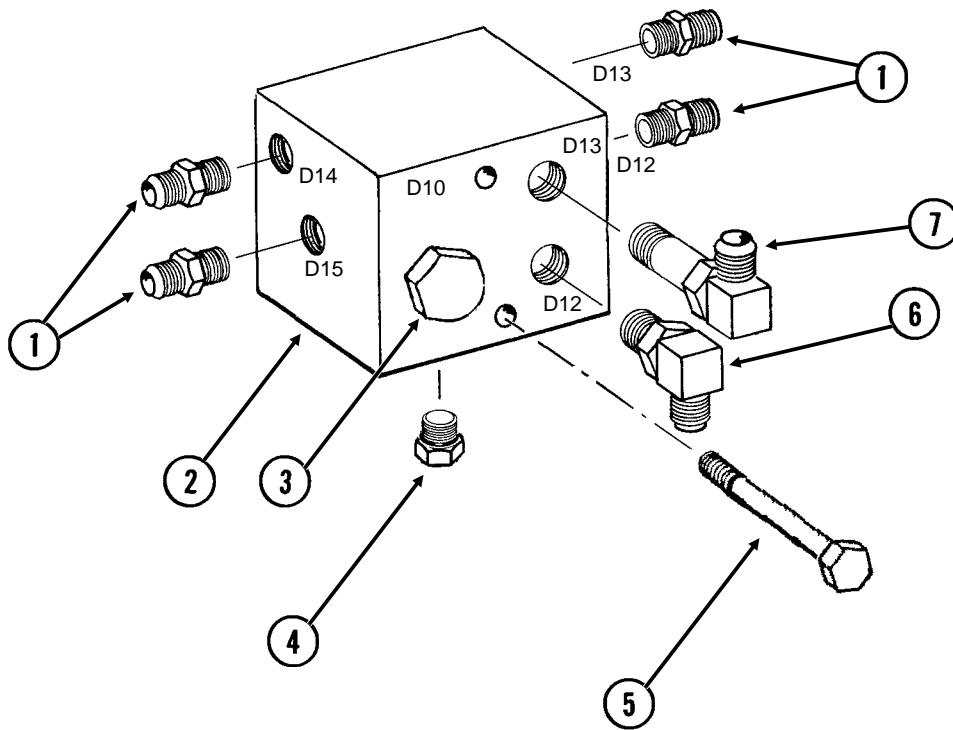
VVB036(TWL241)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G6801-08 GR1037	2 -	Elbow W/O-Ring, 90°, 3/4"-16 Male JIC To O-Ring O-Ring
2.	GD14528	-	Valve Block
3.	G10069 G10232 G10106	2 2 2	Hex Head Cap Screw, 5/16"-18 x 2 1/4" Lock Washer, 5/16" Hex Nut, 5/16"-18
4.		-	See "Pressure Relief Valve", Page P98

# VALVE BLOCK - LOCATED ON R.H. SIDE OF CENTER PIVOT

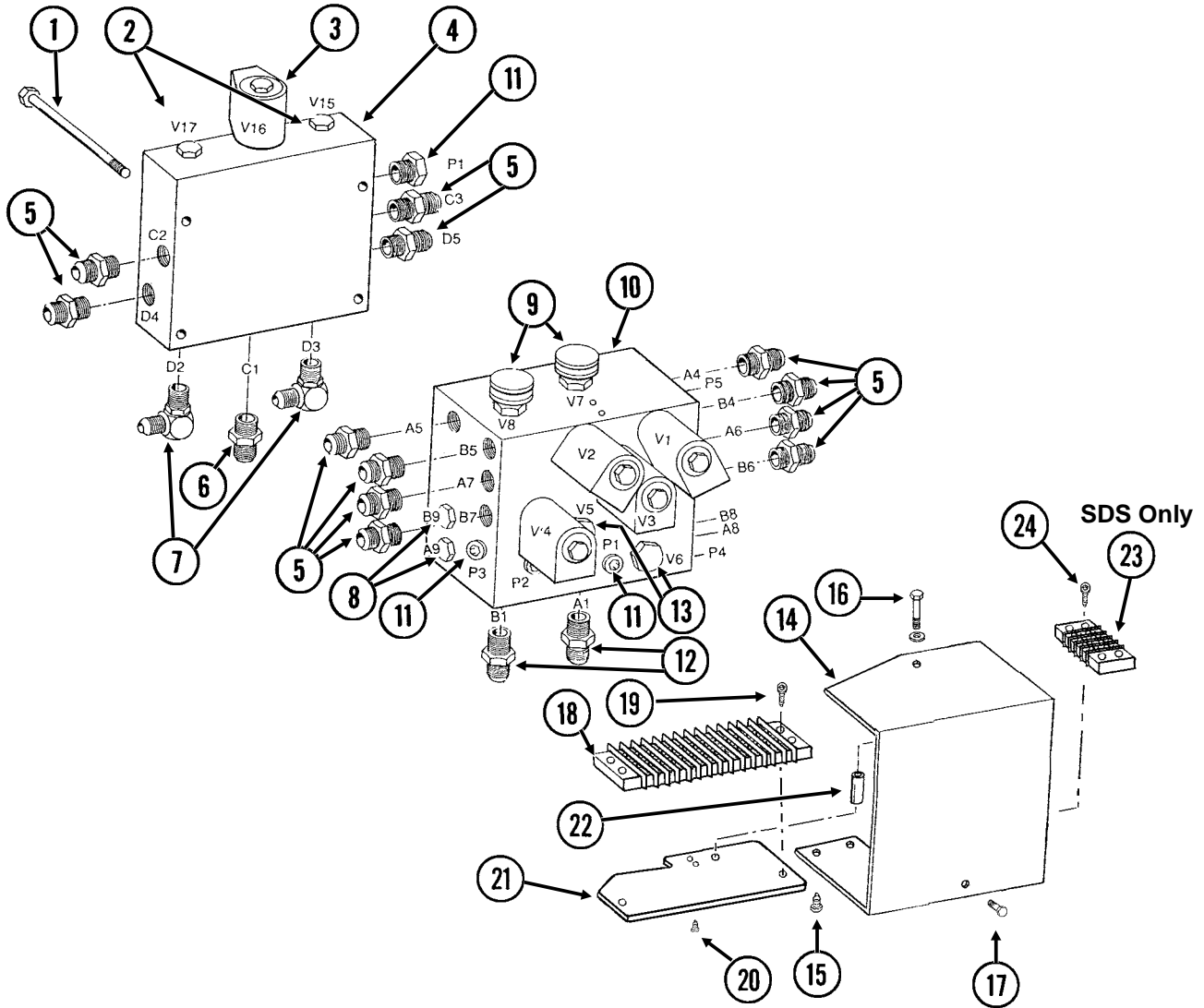
VVB036(TWL208a)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G6400-08 GR1037	4 -	Connector W/O-Ring, 3/4"-16 Male JIC To O-Ring O-Ring
2.	GD12758	1	Block
3.		-	See "Pilot Operated Check Valve", Page P99
4.	G6408-08 GR1037	1 -	Plug W/O-Ring, 3/4"-16 O-Ring O-Ring
5.	G10753 G10108	2 2	Hex Head Cap Screw, 3/8"-16 x 4 1/2" Lock Nut, 3/8"-16
6.	G6801-08 GR1037	1 -	Elbow W/O-Ring, 90°, 3/4"-16 Male JIC To O-Ring O-Ring
7.	G6801-LL-08 GR1037	1 -	X-Long Elbow W/O-Ring, 90°, 3/4"-16 Male JIC To O-Ring O-Ring

# VALVE BLOCKS - LOCATED ON REAR CENTER FRAME

VVB034(TWL25d)

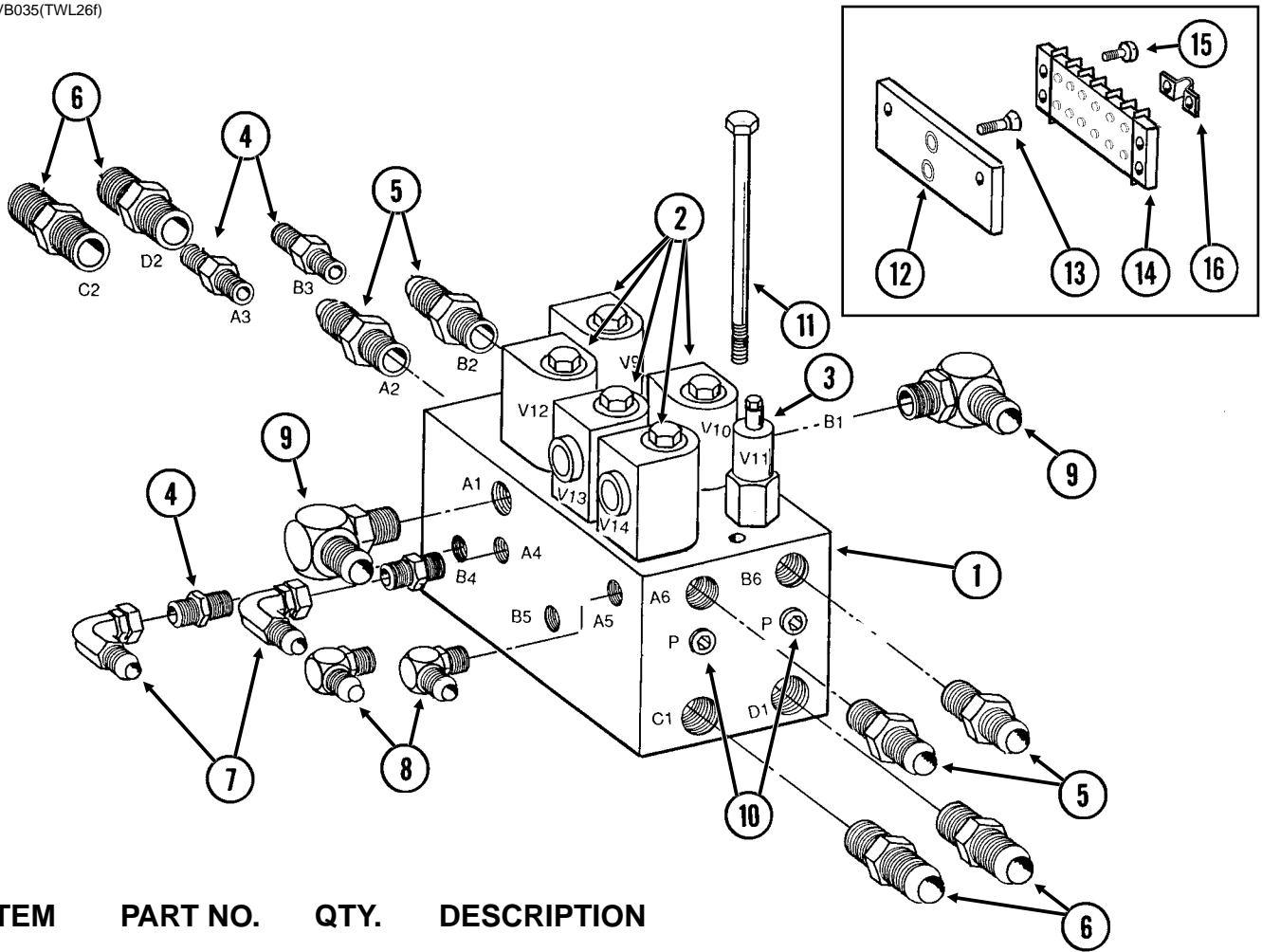


# VALVE BLOCKS - LOCATED ON REAR CENTER FRAME

ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10583	4	Hex Head Cap Screw, 5/16"-18 x 2 3/4"
	G10232	4	Lock Washer, 5/16"
2.		2	See "Check Valve", Page P99
3.		5	See "Solenoid Valve", Page P98
4.	GD9977	1	Block
5.	G6400-08	12	Connector W/O-Ring, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
6.	G6400-10	1	Connector W/O-Ring, 7/8"-14 Male JIC To O-Ring
	GR1466	-	O-Ring
7.	G6801-08-10	2	Elbow W/O-Ring, 90°, 3/4"-16 Male JIC To 7/8"-14 O-Ring
	GR1466	-	O-Ring
8.	G6408-08	4	Plug W/O-Ring, 3/4"-16 O-Ring
	GR1037	-	O-Ring
9.		2	See "Flow Control Valve", Page P98
10.	GD9533	1	Block
11.	G6408-H06-O	6	Hex Socket Head Plug W/O-Ring, 9/16"-18 O-Ring
	GR1045	-	O-Ring
12.	G6400-08-10	2	Connector W/O-Ring, 3/4"-16 Male JIC To 7/8"-14 O-Ring
	GR1466	-	O-Ring
13.	G6408-10	2	Plug W/O-Ring, 7/8"-14 O-Ring
	GR1466	-	O-Ring
14.	GD13146	1	Cover
15.	G10977	2	Phillips Pan Head Machine Screw, No. 10-24 x 1/2", Stainless Steel
16.	G10133	1	Hex Head Cap Screw, 5/16"-18 x 1 1/2"
	G10232	1	Lock Washer, 5/16"
17.	G10054	1	Hex Head Cap Screw, 5/16"-18 x 1/2"
	G10232	1	Lock Washer, 5/16"
	G10106	1	Hex Nut, 5/16"-18
18.	GA9097	1	Terminal Strip W/Screws, No. 6, 14 Terminal
	GR1635	-	Screw, No. 6-32 x 1/4"
19.	G11067	2	Phillips Pan Head Machine Screw, No. 8-32 x 3/4", Stainless Steel
20.	G11066	2	Phillips Pan Head Machine Screw, No. 10-24 x 3/4", Stainless Steel
21.	GA9095	1	Terminal Strip Mount
22.	GD8066-02	1	Sleeve, 1" Long
23.	GA9510	1	Terminal Strip W/Screws, No. 6, 4 Terminal
	GR1635	-	Screw, No. 6-32 x 1/4"
24.	G11067	2	Phillips Pan Head Machine Screw, No. 8-32 x 3/4", Stainless Steel
	G10928	2	Hex Nut, No. 8-32, Stainless Steel

# VALVE BLOCK - LOCATED ON HITCH

VVB035(TWL26f)



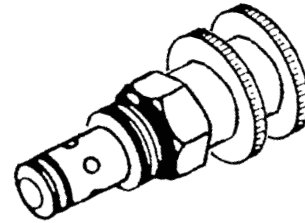
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD9905	1	Block
2.		-	See "Solenoid Valve", Page P98
3.		-	See "Pressure Relief Valve", Page P98
4.	G6400-06	4	Connector W/O-Ring, 1/16"-18 Male JIC To O-Ring
	GR1045	-	O-Ring
5.	G6400-08	4	Connector W/O-Ring, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
6.	G6400-10	4	Connector W/O-Ring, 7/8"-14 Male JIC To O-Ring
	GR1466	-	O-Ring
7.	G6500-06	2	Swivel Elbow, 90°, 1/16"-18 Male JIC To Female
8.	G6801-06	2	Elbow W/O-Ring, 90°, 1/16"-18 Male JIC To O-Ring
	GR1045	-	O-Ring
9.	G6801-08	2	Elbow W/O-Ring, 90°, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
10.	G6408-H06-O	2	Hex Socket Head Plug W/O-Ring, 1/16"-18 O-Ring
	GR1045	-	O-Ring
11.		-	See "Hose Take-Up", Pages P54 And P55
12.	GD12818	-	Terminal Strip Mount
13.	G11068	2	Phillips Flat Head Machine Screw, No. 10-24 x 5/8", Stainless Steel
14.	GA9098	-	Terminal Strip W/Screws, No. 6, 8 Terminal
	GR1635	-	Screw, No. 6-32 x 1/4"
15.	G11065	2	Phillips Pan Head Machine Screw, No. 8-32 x 5/8", Stainless Steel
16.		-	See "Electrical Components", Pages P104-P107

# FLOW CONTROL VALVE (Located In Valve Block On Front Center Frame)

(TWL28a)

SDS ONLY

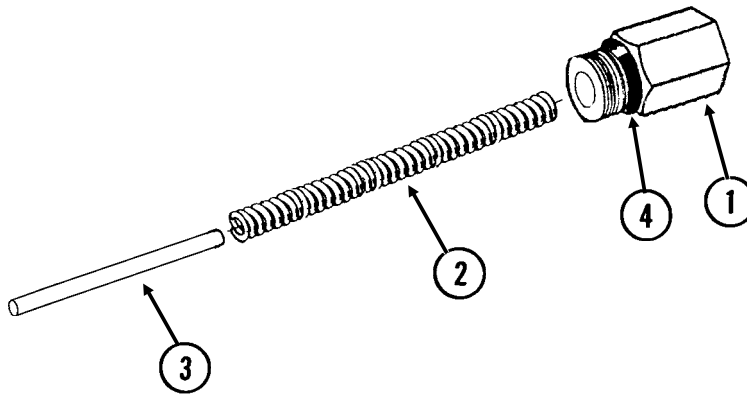
ITEM	PART NO.	QTY.	DESCRIPTION
A.	GR1601	-	Flow Control Valve
B.	GR1610	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring



# PRESSURE RELIEF VALVE (Located In Valve Block On Front Center Frame)

(TWL24c)

SDS ONLY



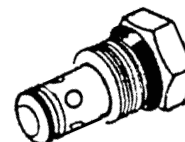
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1604	1	Cap
2.	GR1605	1	Compression Spring
3.	GR1606	1	Spring Guide
4.	GR1608	2	O-Ring

# CHECK VALVE (Located In Valve Block On Front Center Frame)

(TWL24b)

SDS ONLY

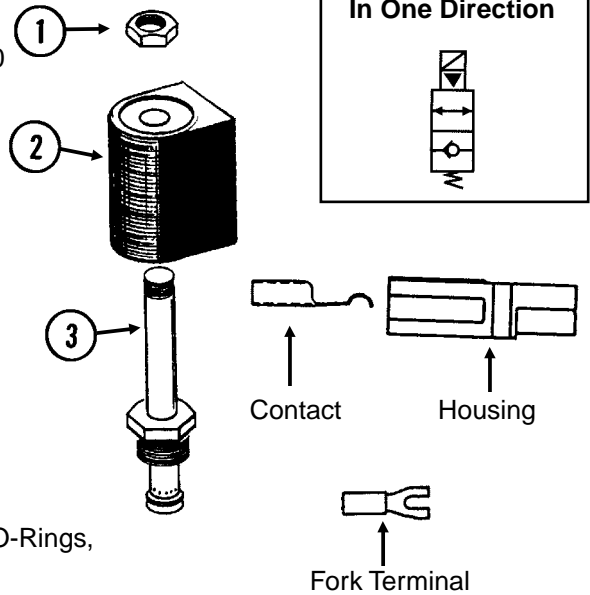
ITEM	PART NO.	QTY.	DESCRIPTION
A.	GR1602	-	Check Cartridge
B.	GR1610	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring



# SOLENOID VALVE

VVB019(TWL27c/TWL18/PLTR75c/A9481)

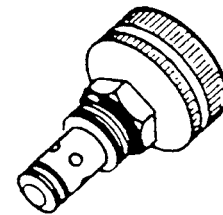
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR0761	1	Special Hex Nut, 1/2"-20
2.	G1K274	1	Coil Kit W/Contacts, Housings And Fork Terminals
	GD9529	2	Housing, Black
	GD9530	2	Contact
	G10996	2	Fork Terminal
3.	GR0763	1	Cartridge
A.	G1K275	-	Solenoid Valve Kit W/Contacts, Housings And Fork Terminals
	GD9529	2	Housing, Black
	GD9530	2	Contact
	G10996	2	Fork Terminal
B.	GR0764	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring



# FLOW CONTROL VALVE (Located In Valve Block On Rear Center Frame)

VVB020(TWL28)

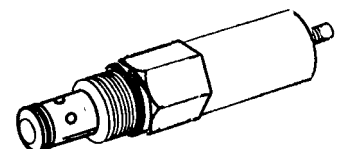
ITEM	PART NO.	QTY.	DESCRIPTION
A.	GA3413	-	Flow Control Valve
B.	GR0764	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring



# PRESSURE RELIEF VALVE (Located In Valve Block On Hitch And In Valve Block On Front Center Frame)

VVB020(TWL29)

ITEM	PART NO.	QTY.	DESCRIPTION
A.	GA3407	-	Pressure Relief Valve, 1000 PSI
B.	GR0764	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring

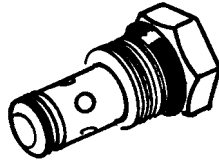




# CHECK VALVE (Located In Valve Block On Rear Center Frame)

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VVB020(TWL30)



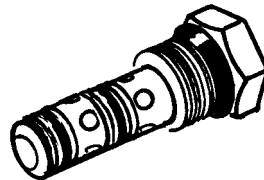
ITEM	PART NO.	QTY.	DESCRIPTION
A.	GA4293	-	Check Valve
B.	GR0764	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring

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# PILOT OPERATED CHECK VALVE (Located In Valve Block On R.H. Side Of Front Center Frame)

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VVB020(TWL30b)

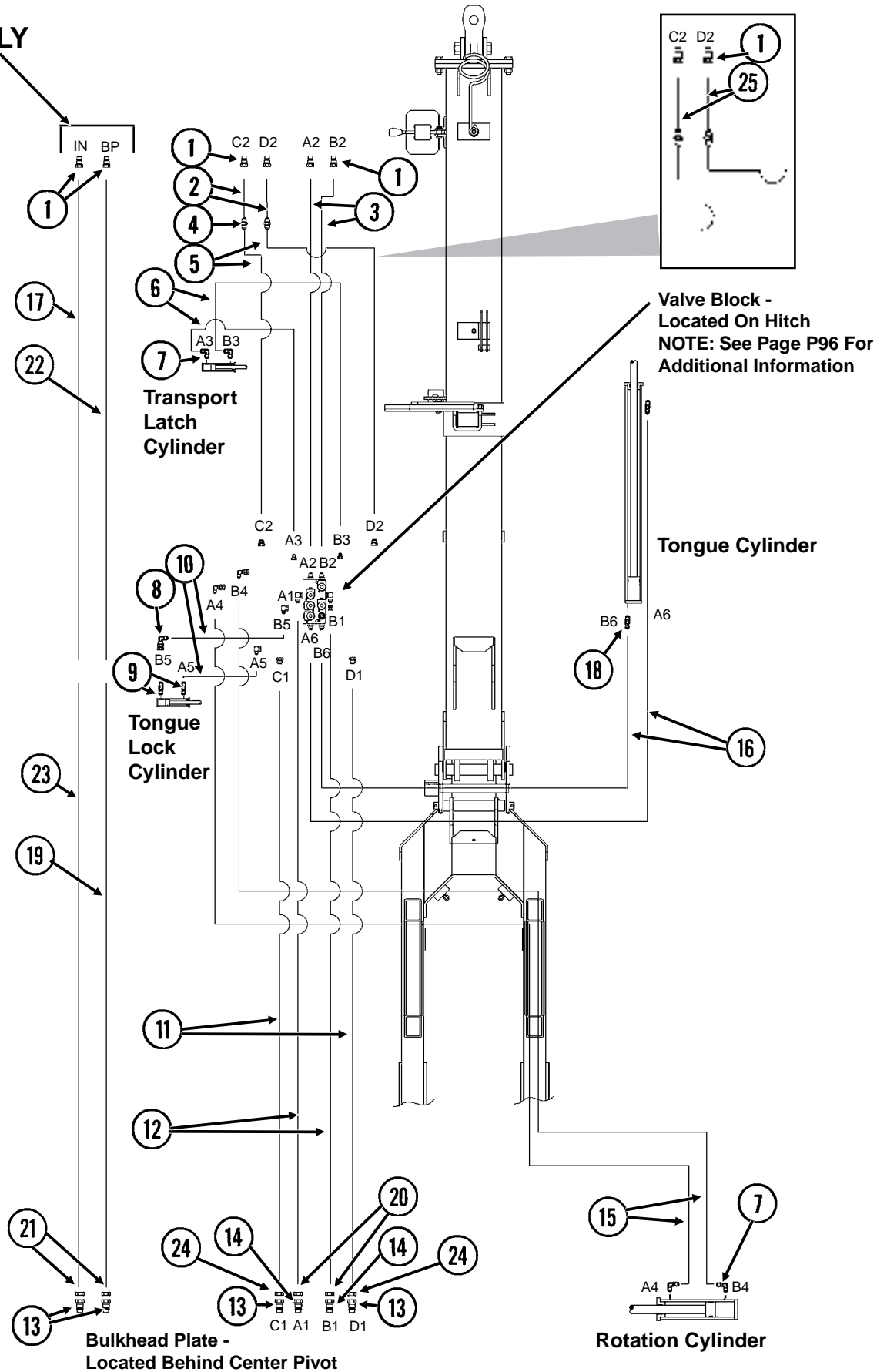


ITEM	PART NO.	QTY.	DESCRIPTION
A.	GA9126	-	Pilot Operated Check Valve
B.	GR1627	-	Seal Kit, Includes: (3) O-Rings, (4) BU Rings

# HYDRAULIC HOSES AND FITTINGS ON HITCH

(A10125a)

SDS ONLY



# HYDRAULIC HOSES AND FITTINGS ON HITCH

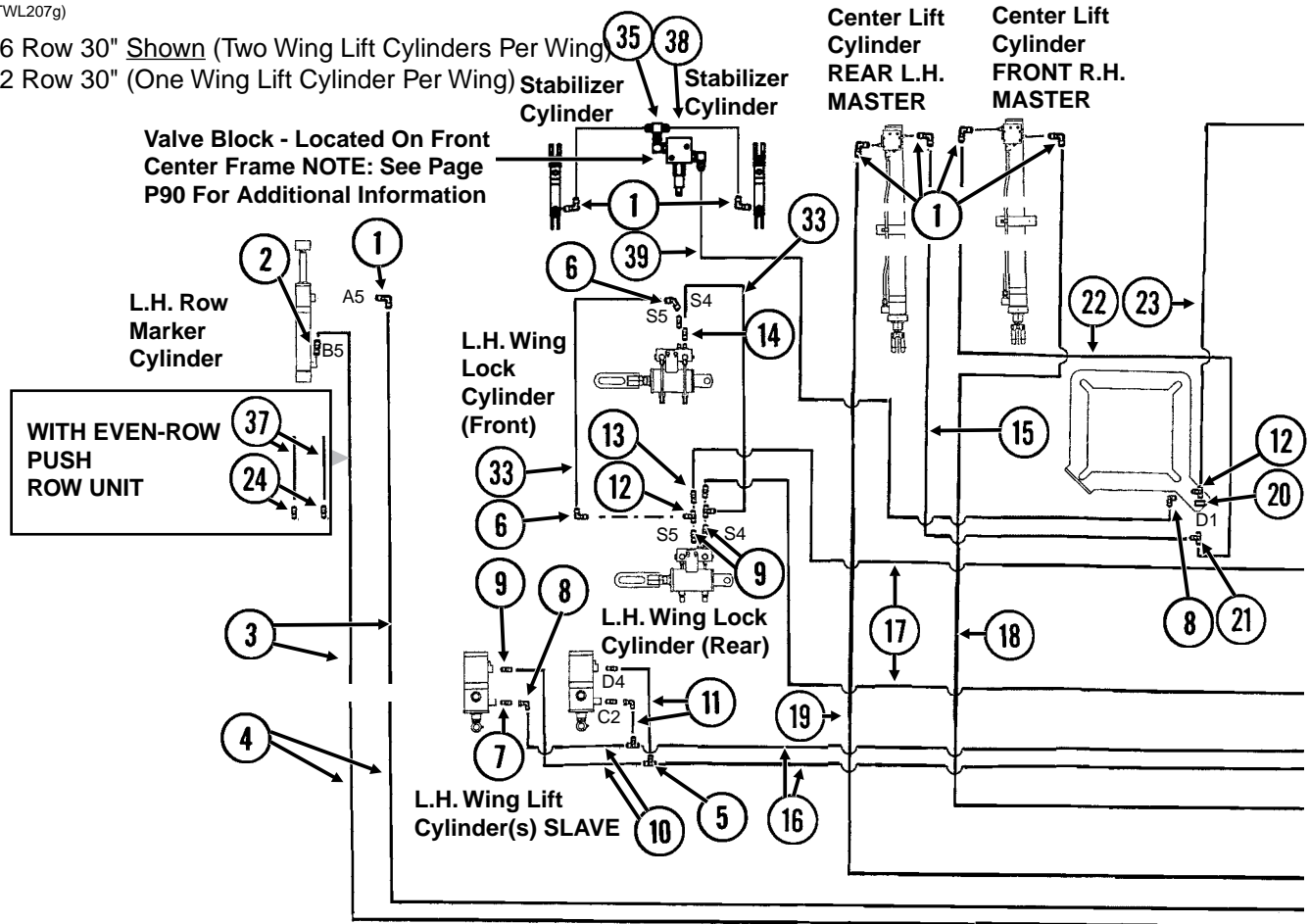
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD4086	6	ISO Coupler
2.	*A8206	2	Hose Assembly, 1/2" x 147", 12 Row 30"
	*A8200	-	Hose Assembly, 1/2" x 178", 16 Row 30"
3.	*A3133	2	Hose Assembly, 3/8" x 191", 12 Row 30"
	*A3183	-	Hose Assembly, 3/8" x 246", 16 Row 30"
4.	G2403-10	2	Union, 7/8"-14 Male JIC
5.	*A8203	2	Hose Assembly, 1/2" x 43", 12 Row 30"
	*A1463	-	Hose Assembly, 1/2" x 68", 16 Row 30"
6.	*A7603	2	Hose Assembly, 1/4" x 112", 12 Row 30"
	*A1129	-	Hose Assembly, 1/4" x 168", 16 Row 30"
7.	G6801-06-08	4	Elbow W/O-Ring, 90°, 9/16"-18 Male JIC To 3/4"-16 O-Ring
	GR1037	-	O-Ring
8.	G6502-06	1	Swivel Elbow, 45°, 9/16"-18 Male JIC To Female
9.	G6400-06-08	2	Connector W/O-Ring, 9/16"-18 Male JIC To 3/4"-16 O-Ring
	GR1037	-	O-Ring
10.	*A1139	2	Hose Assembly, 1/4" x 40"
11.	*A8217	2	Hose Assembly, 1/2" x 133", 12 Row 30"
	*A8218	-	Hose Assembly, 1/2" x 139", 16 Row 30"
12.	*A3199	2	Hose Assembly, 3/8" x 132", 12 Row 30"
	*A3137	-	Hose Assembly, 3/8" x 140", 16 Row 30"
13.	G2700-10	4	Bulkhead Tube Union, 7/8"-14 Male JIC
14.	G2700-08	2	Bulkhead Tube Union, 3/4"-16 Male JIC
15.	*A7609	2	Hose Assembly, 1/4" x 164", 12 Row 30"
	*A1184	-	Hose Assembly, 1/4" x 173", 16 Row 30"
16.	*A3156	2	Hose Assembly, 3/8" x 68", 12 Row 30"
	*A3118	-	Hose Assembly, 3/8" x 80", 16 Row 30"
17.	*A8220	1	Hose Assembly, 1/2" x 198", 12 Row 30" (SDS Only)
	*A8219	-	Hose Assembly, 1/2" x 250", 16 Row 30" (SDS Only)
18.	G6400-08	1	Connector W/O-Ring, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
19.	*A3333	1	Hose Assembly, 3/4" x 144"
20.	G306-08	2	Lock Nut, 3/4"-16
21.	G306-10	2	Lock Nut, 7/8"-14
22.	*A3331	1	Hose Assembly, 3/4" x 198", 12 Row 30" (SDS Only)
	*A3332	-	Hose Assembly, 3/4" x 250", 16 Row 30" (SDS Only)
23.	*A8216	1	Hose Assembly, 1/2" x 144"
24.	G306-10	2	Lock Nut, 7/8"-14
25.	*A1489	2	Hose Assembly, 1/2" x 191", 12 Row 30"
26.	*A1491	-	Hose Assembly, 1/2" x 246", 12 Row 30"

\* Hydraulic hose is not stocked by KINZE® Repair Parts, but can be made available on a special order basis. Call for quote.

# HYDRAULIC HOSES AND FITTINGS ON PLANTER FRAME

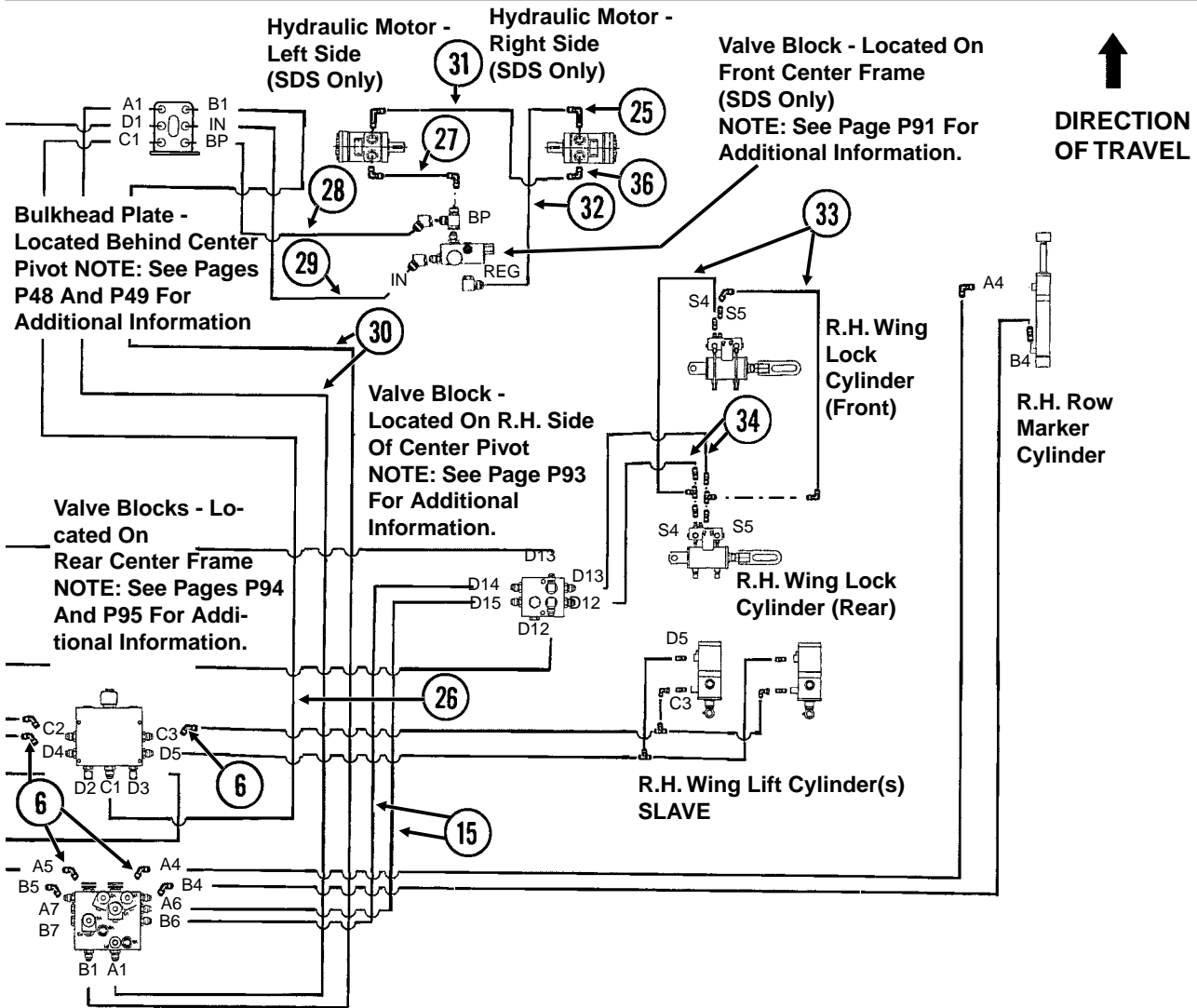
(TWL207g)

16 Row 30" Shown (Two Wing Lift Cylinders Per Wing)  
 12 Row 30" (One Wing Lift Cylinder Per Wing)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G6801-08 GR1037	8 -	Elbow W/O-Ring, 90°, 3/4"-16 Male JIC To O-Ring O-Ring
2.	G6400-08-04 GR1465	2 -	Connector W/O-Ring, 3/4"-16 Male JIC To 7/16"-20 O-Ring O-Ring
3.	*A3220 *A3219	4 -	Hose Assembly, 3/8" x 82", 12 Row 30" Hose Assembly, 3/8" x 104", 16 Row 30"
4.	*A3101 *A3161	4 -	Hose Assembly, 3/8" x 168", 12 Row 30" Hose Assembly, 3/8" x 210", 16 Row 30"
5.	G2603-08	4	Tee, 3/4"-16 Male JIC
6.	G6502-08	11	Swivel Elbow, 45°, 3/4"-16 Male JIC To Female
7.	G6400-L-08 GR1037	2-4 -	Long Connector W/O-Ring, 3/4"-16 Male JIC To O-Ring O-Ring
8.	G6500-08	3-5	Swivel Elbow, 90°, 3/4"-16 Male JIC To Female
9.	G6400-08 GR1037	6-8 -	Connector W/O-Ring, 3/4"-16 Male JIC To O-Ring O-Ring
10.	*A1018	4	Hose Assembly, 3/8" x 40"
11.	*A3218	4	Hose Assembly, 3/8" x 8"
12.	G6602-08	5	Swivel Tee, 3/4"-16 JIC
13.	G2406-08-06	4	Reducer, 3/4"-16 Female JIC To 1/16"-18 Male JIC
14.	G6400-06-08 GR1037	4 -	Connector W/O-Ring, 1/16"-18 Male JIC To 3/4"-16 O-Ring O-Ring
15.	*A1098	3	Hose Assembly, 3/8" x 26"
16.	*A1054 *A3163	4 -	Hose Assembly, 3/8" x 204", 12 Row 30" Hose Assembly, 3/8" x 225", 16 Row 30"
17.	*A1008	2	Hose Assembly, 3/8" x 110"
18.	*A1021	1	Hose Assembly, 3/8" x 56"
19.	*A3128	1	Hose Assembly, 3/8" x 52"

# HYDRAULIC HOSES AND FITTINGS ON PLANTER FRAME



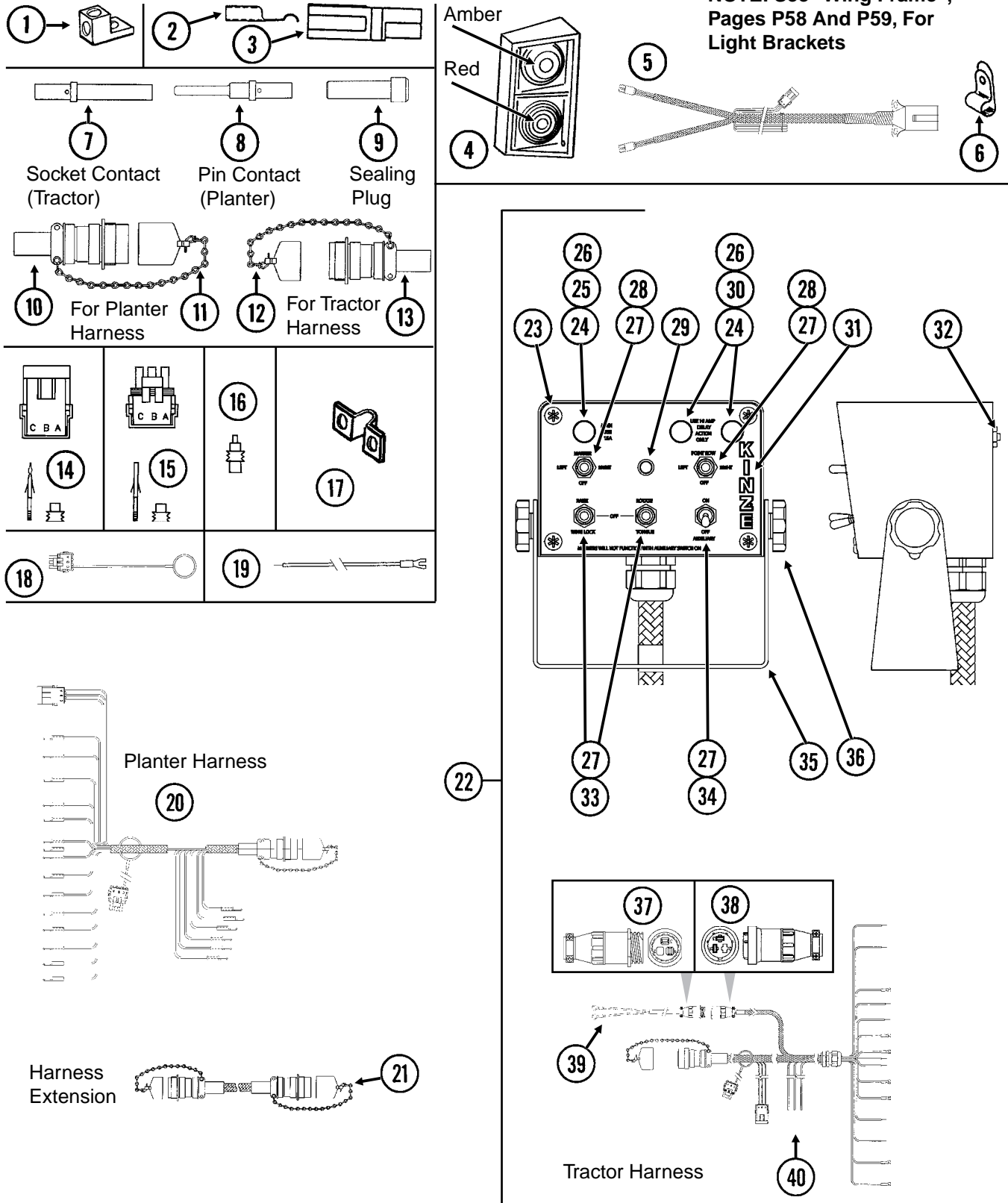
ITEM	PART NO.	QTY.	DESCRIPTION
20.	G306-08	1	Lock Nut, 3/4"-16
21.	G2704-08	1	Bulkhead Tee, 3/4"-16 JIC
22.	*A1044	1	Hose Assembly, 3/8" x 34"
23.	*A8222	1	Hose Assembly, 1/2" x 91"
24.	G2403-08	2	Union, 3/4"-16 Male JIC
25.	G6801-10	2	Elbow W/O-Ring, 90°, 7/8"-14 Male JIC To O-Ring
	GR1466	-	O-Ring
26.	*A8221	1	Hose Assembly, 1/2" x 76"
27.	*A3329	1	Hose Assembly, 3/4" x 29"
28.	*A3334	1	Hose Assembly, 3/4" x 111" (SDS Only)
29.	*A8223	1	Hose Assembly, 1/2" x 111" (SDS Only)
30.	*A1039	2	Hose Assembly, 3/8" x 76"
31.	*A1457	1	Hose Assembly, 1/2" x 51"
32.	*A1424	1	Hose Assembly, 1/2" x 30"
33.	*A1189	4	Hose Assembly, 1/4" x 36"
34.	*A3152	2	Hose Assembly, 3/8" x 62"
35.	G6600-08	1	Swivel Tee, 3/4"-16 JIC
36.	G6801-LL-10	2	X-Long Elbow W/O-Ring, 90°, 7/8"-14 Male JIC To O-Ring
	GR1466	-	O-Ring
37.	*A1073	2	Hose Assembly, 3/8" x 18"
38.	*A1000	2	Hose Assembly, 3/8" x 15"
39.	*A1020	1	Hose Assembly, 3/8" x 48"

\* Hydraulic hose is not stocked by KINZE® Repair Parts, but can be made available on a special order basis. Call for quote.

# ELECTRICAL COMPONENTS (Conventional Planters)

(TWL19a/TWL18/ELC14/ELC3a/ELC5c/MTR27a/TWL26e/ELC8/A9481/A10101a/ELC4/TWL23/A9202a/ELC39/A8705/ELC10c)

**NOTE:** See "Wing Frame",  
Pages P58 And P59, For  
Light Brackets



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA3584	-	Ground Clamp
2.	GD9530	-	Contact
3.	GD9529	-	Housing, Black
	GD12726	-	Housing, Red

# ELECTRICAL COMPONENTS (Conventional Planters)

ITEM	PART NO.	QTY.	DESCRIPTION
4.	GA6699	1	Double Light Assembly (Shown)
	GA6700	1	Double Light Assembly
	GR1203	-	Red Lens
	GR1204	-	Amber Lens
	GR1205	-	Cover
	GR1206	-	Rubber Grommet (4)
	GR1207	-	Lamp Unit
	GR1208	-	Bulb
5.	GA9202	-	Wiring Harness W/7 Terminal Female Connector, 786" (2 Light Connections), 12 Row 30"
	GA9204	-	Wiring Harness W/7 Terminal Female Connector, 882" (2 Light Connections), 16 Row 30"
	GA5385	-	7 Terminal Female Connector
6.	GD6291	-	Insulated Clamp, 3/8"
	GD13348	-	Insulated Clamp, 1 1/16"
7.	GD8740	-	Socket Contact, No. 14
8.	GD8741	-	Pin Contact, No. 14
9.	GD8739	-	Sealing Plug, No. 12
10.	GA6109	1	Connector W/Cable Clamp, 23 Pin Capacity
11.	GA7862	-	Dust Cap W/Chain
12.	GA7863	-	Dust Cap W/Chain
13.	GA6108	1	Connector W/Cable Clamp, 23 Socket Capacity
14.	G1K248	-	3-Pin Female Connector Kit (Black), Includes: (3) 3-Pin Female Housings, (9) Pin Contacts, (9) Seals
15.	G1K252	-	3-Pin Male Connector Kit (Black), Includes: (3) 3-Pin Male Housings, (9) Socket Contacts, (9) Seals
16.	GD11089	-	Sealing Plug
17.	GD13310	-	Jumper, 7/16"
18.	GA8047	-	Dust Plug (Black)
19.	GA9481	-	Jumper Wire W/Fork Terminal, 13"
	G10996	-	Fork Terminal
20.	GA10101	1	Wiring Harness W/Dust Cap, 516", 12 Row 30"
	GA10102	-	Wiring Harness W/Dust Cap, 636", 16 Row 30"
21.	GA10547	-	Harness Extension W/Dust Caps, 180"
22.	G7633X	-	Backlit Control Console Assembly W/Mounting Brackets, Short Harness W/Dust Cap And Power Cable
	G7639X	-	Backlit Control Console Assembly W/Mounting Brackets, Short Harness W/Dust Cap And Power Cable, (Planters Equipped With Two-Speed Point Row Clutches)
23.	GR1292	4	Pan Head Screw, No. 8-32 x 1/2"
24.	GA2612	3-5	Fuse Holder W/Spade, 1 33/50"
25.	GD2829	1-2	Fuse, 15 Amp, Type AGC
26.	GD3860	3	O-Ring (If Applicable)
27.	GR1363	5-6	Hex Face Nut, 15/32"-32
	GR1364	5-6	Internal Tooth Lock Washer, 15/32"
28.	GA2528	2	Switch, 3 Position Toggle, On-Off-On
29.	GA7077	1-4	Indicator Light
30.	GD10243	4-6	Fuse, MDL 10 Amp Delay Action
31.	GA8734	1	Cover Plate (Shown)
	GA8735	-	Cover Plate, (Planters Equipped With Two-Speed Point Row Clutches)
32.	GA8731	1	Switch, Push Button W/Transformer
33.	GA6978	2	Switch, 3 Position Toggle, Momentary On-Off-Momentary On
34.	GA6977	1-2	Switch, 2 Position Toggle, On-Off
35.	GD9896	1	Mounting Bracket
36.	GA6975	2	Knob
	G10211	4	Washer, 1/4" SAE
	GR1290	2	Cage Nut, 1/4"-20
37.	G1K267	-	Power Lead Adapter Connector Kit, Includes: (1) 3-Pin Connector, (1) Cable Clamp, (3) Male Terminal Pins
38.	G1K268	-	Console Cable Connector Kit, Includes: (1) 3-Pin Connector, (1) Cable Clamp, (1) Lock Ring, (3) Female Terminal Pins
39.	GA7856	1	Power Lead Adapter
40.	GA8729	1	Wiring Harness W/Dust Cap And Power Cable

**NOTE: See "Point Row Clutch" or "Two-Speed Point Row Clutch" for R.H. and L.H. wiring harness for the point row clutches. See "KPM I Electronic Seed Monitor or KPM II Stack-Mode/KPM III Electronic Seed Monitors" for those components.**





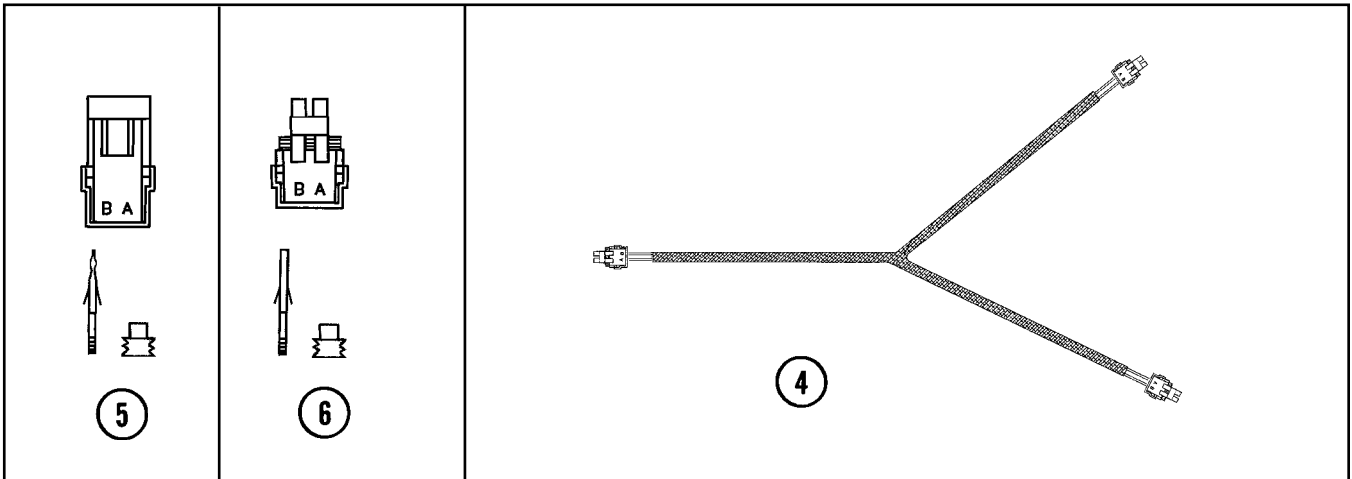
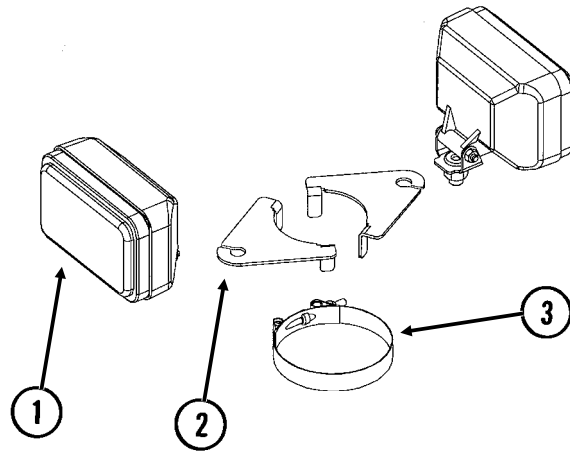
# ELECTRICAL COMPONENTS (SDS Planters)

ITEM	PART NO.	QTY.	DESCRIPTION
4.	GA6699	1	Double Light Assembly (Shown)
	GA6700	1	Double Light Assembly
	GR1203	-	Red Lens
	GR1204	-	Amber Lens
	GR1205	-	Cover
	GR1206	-	Rubber Grommet (4)
	GR1207	-	Lamp Unit
	GR1208	-	Bulb
5.	GA9202	-	Wiring Harness W/7 Terminal Female Connector, 786" (2 Light Connections), 12 Row 30"
	GA9204	-	Wiring Harness W/7 Terminal Female Connector, 882" (2 Light Connections), 16 Row 30"
	GA5385	-	7 Terminal Female Connector
6.	GD6291	-	Insulated Clamp, 3/8"
	GD13348	-	Insulated Clamp, 1 1/16"
7.	GD8740	-	Socket Contact, No. 14
8.	GD8741	-	Pin Contact, No. 14
9.	GD8739	-	Sealing Plug, No. 12
10.	GA6109	1	Connector W/Cable Clamp, 23 Pin Capacity
11.	GA7862	-	Dust Cap W/Chain
12.	GA7863	-	Dust Cap W/Chain
13.	GA6108	1	Connector W/Cable Clamp, 23 Socket Capacity
14.	G1K248	-	3-Pin Female Connector Kit (Black), Includes: (3) 3-Pin Female Housings, (9) Pin Contacts, (9) Seals
15.	G1K252	-	3-Pin Male Connector Kit (Black), Includes: (3) 3-Pin Male Housings, (9) Socket Contacts, (9) Seals
16.	GD11089	-	Sealing Plug
17.	GD13310	-	Jumper, 7/16"
	GD15462	-	Jumper, 3/8"
18.	GA8047	-	Dust Plug (Black)
19.	GA9481	-	Jumper Wire W/Fork Terminal, 13"
	G10996	-	Fork Terminal
20.	GA10101	1	Wiring Harness W/Dust Cap, 516", 12 Row 30"
	GA10102	-	Wiring Harness W/Dust Cap, 636", 16 Row 30"
21.	GA10547	-	Harness Extension W/Dust Caps, 180"
22.	G7830X	-	Backlit Control Console Assembly W/Mounting Brackets, Short Harness W/Dust Cap And Power Cable (Items 23-43)
23.	GR1292	4	Pan Head Screw, No. 8-32 x 1/2"
24.	GA2612	6	Fuse Holder W/Spade, 1 33/50"
25.	GD2829	1	Fuse, 15 Amp, Type AGC
26.	GD3860	6	O-Ring
27.	GR1363	6	Hex Face Nut, 15/32"-32
	GR1364	6	Internal Tooth Lock Washer, 15/32"
28.	GA2528	2	Switch, 3 Position Toggle, On-Off-On
29.	GA10194	1	Indicator Light, Red
30.	GD10243	4-6	Fuse, MDL 10 Amp Delay Action
31.	GA10191	1	Cover Plate
32.	GA8731	1	Switch, Push Button W/Transformer
33.	GA6978	2	Switch, 3 Position Toggle, Momentary On-Off-Momentary On
34.	GA6977	2-3	Switch, 2 Position Toggle, On-Off
35.	GD14640	1	Mounting Bracket
36.	GA6975	2	Knob
	G10211	4	Washer, 1/4" SAE
	GR1290	2	Cage Nut, 1/4"-20
37.	GA10195	1	Indicator Light, Amber
38.	GD14660	1	Fuse, 2 Amp Delay Action
39.	GA9965	1	Tachometer
40.	G1K267	-	Power Lead Adapter Connector Kit, Includes: (1) 3-Pin Connector, (1) Cable Clamp, (3) Male Terminal Pins
41.	G1K268	-	Console Cable Connector Kit, Includes: (1) 3-Pin Connector, (1) Cable Clamp, (1) Lock Ring, (3) Female Terminal Pins
42.	GA7856	1	Power Lead Adapter
43.	GA10192	1	Wiring Harness W/Dust Cap And Power Cable
44.	GA3072	1	Jumper Wire, 5", Red (Two-Speed Point Row Clutch)
45.	GA10206	1	Indicator Light, Green (Two-Speed Point Row Clutch)
46.	GA10556	1	Jumper Wire, 8", Black (Two-Speed Point Row Clutch)
47.	GA10555	1	Jumper Wire, 5", Red (Two-Speed Point Row Clutch)

**NOTE: See "Point Row Clutch" or "Two-Speed Point Row Clutch" for R.H. and L.H. wiring harness for the point row clutches. See "KPM I Electronic Seed Monitor or KPM II Stack-Mode/KPM III Electronic Seed Monitors" for those components.**

# AUXILIARY WORK LIGHTS PACKAGE

(A9689b/MTR27/A10924)



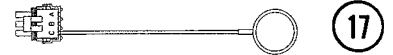
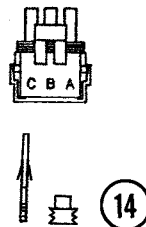
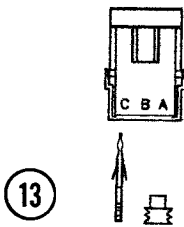
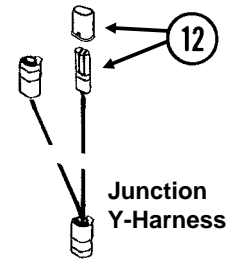
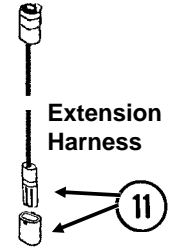
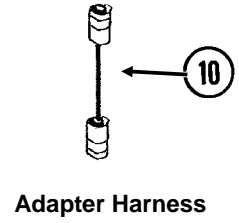
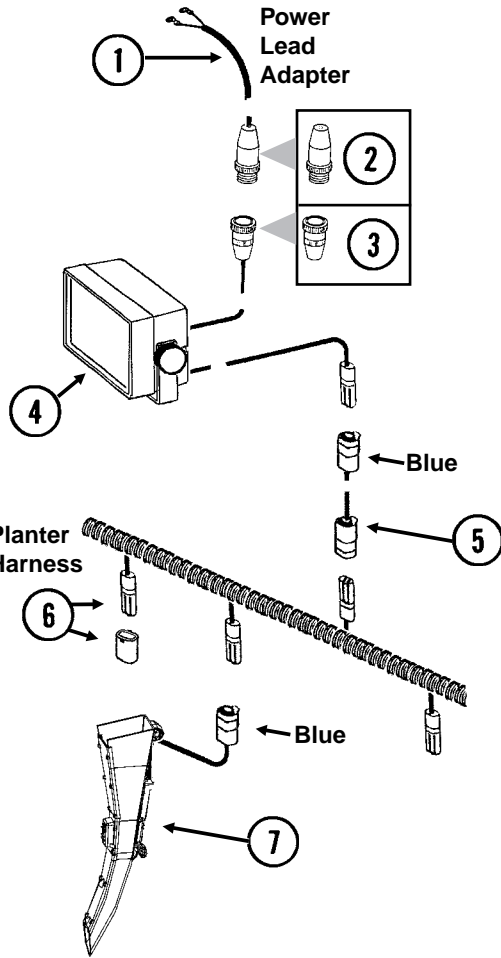
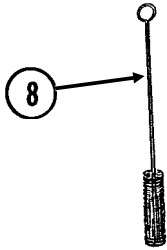
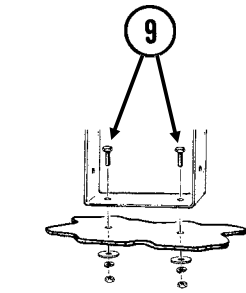
# AUXILIARY WORK LIGHTS PACKAGE

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ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA9689	2	Work Light Assembly
2.	GD16046	2	Bracket, 4 1/4" x 4", 12 Row 30"
	GD16047	-	Bracket, 4 5/16" x 4 1/8", 16 Row 30"
3.	G11159	2	T-Bolt Clamp, 3 1/2" Stainless Steel, 12 Row 30"
	G11137	-	T-Bolt Clamp, 4 1/4" Stainless Steel, 16 Row 30"
4.	GA10924	1	Wiring Harness, 348"
5.	G1K321	-	2-Pin Female Connector Kit (Black), Includes: (3) 2-Pin Female Housings, (6) Pin Contacts, (6) Seals
6.	G1K320	-	2-Pin Male Connector Kit (Black), Includes: (3) 2-Pin Male Housings, (6) Socket Contacts, (6) Seals

# KPM I ELECTRONIC SEED MONITOR

(MTR46b)



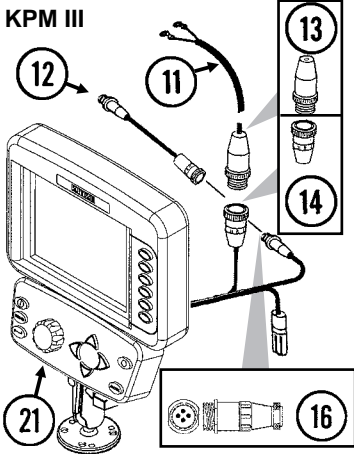
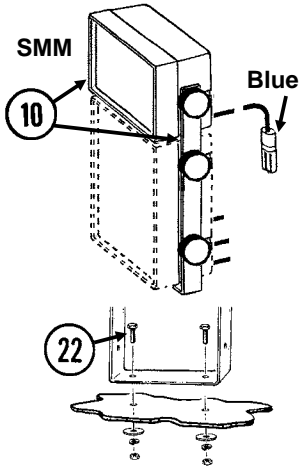
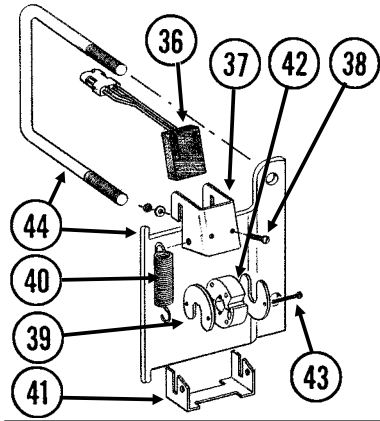
# KPM I ELECTRONIC SEED MONITOR

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA7856	1	Power Lead Adapter
2.	G1K267	-	Power Lead Adapter Connector Kit, Includes: (1) Cable Clamp, (1) 3-Pin Connector, (3) Male Terminal Pins
3.	G1K268	-	Console Cable Connector Kit, Includes: (1) Cable Clamp, (1) 3-Pin Connector, (1) Lock Ring, (3) Female Terminal Pins
4.	GA10570	1	KPM I Backlit Console W/Mounting Bracket, Fuse Holder And Fuse, Power Lead Adapter (Item 1), Brush (Item 10) And Dust Plug (Item 16)
	GR1390	-	Mounting Bracket, KPM I
	GR1392	-	Console Mounting Bracket Hardware Package (Includes 2 Knobs And 1/4" Hardware)
	GA10601	-	Fuse Holder
	GD7639	-	Fuse
5.		-	Included In Tractor/Planter Wiring Harnesses, See Pages P104-P107
6.	GA7851	-	Planter Harness W/Dust Caps, 12 Row (16 Connectors)
	GA7852	-	Planter Harness W/Dust Caps, 16 Row (20 Connectors)
	GD11993	-	Dust Cap
7.	GA10901	-	Seed Tube W/Computerized Sensor (Shown)
	GR1629	-	Sensor Only
	GA10940	-	Seed Tube (With Holes For Sensor Installation)
8.	GR0594	-	Brush
9.	G10022	2	Hex Head Cap Screw, 1/4"-20 x 1/2"
	G10211	2	Washer, 1/4" SAE
	G10227	2	Lock Washer, 1/4"
	G10103	2	Hex Nut, 1/4"-20
10.	GA7857	-	Adapter Harness, 1'
11.	GA7854	-	Extension Harness W/Dust Cap, 15'
	GA7855	-	Extension Harness W/Dust Cap, 30'
	GD11993	-	Dust Cap
12.	GA7853	-	Junction Y-Harness W/Dust Cap
	GD11993	-	Dust Cap
13.	G1K248	-	3-Pin Female Connector Kit (Black), Includes: (3) 3-Pin Female Housings, (9) Pin Contacts, (9) Seals
	G1K362	-	3-Pin Female Connector Kit (Blue), Includes: (3) 3-Pin Female Housings, (9) Pin Contacts, (9) Seals
14.	G1K252	-	3-Pin Male Connector Kit (Black), Includes: (3) 3-Pin Male Housings, (9) Socket Contacts, (9) Seals
	G1K363	-	3-Pin Male Connector Kit (Blue), Includes: (3) 3-Pin Male Housings, (9) Socket Contacts, (9) Seals
15.	GD11089	-	Sealing Plug
16.	GA8046	-	Dust Plug (Black)
	GA9978	-	Dust Plug (Blue)
17.	GA8047	-	Dust Plug (Black)
	GA9979	-	Dust Plug (Blue)

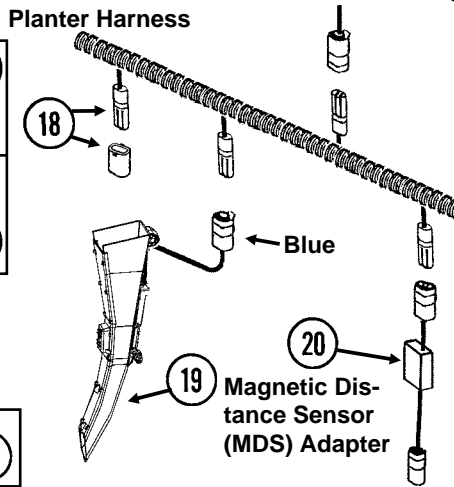
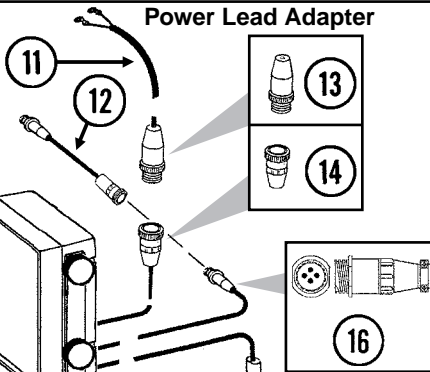
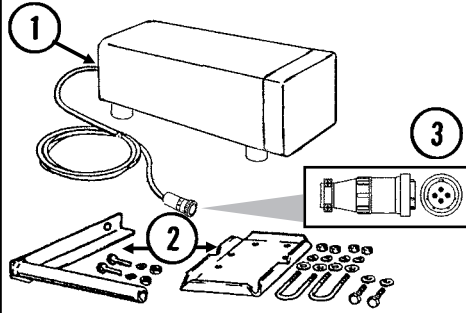
# KPM II STACK-MODE/KPM III ELECTRONIC SEED MONITORS

(MTR43jj/A10901a)

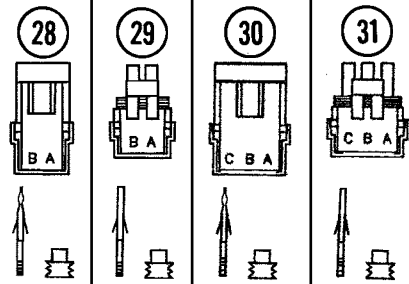
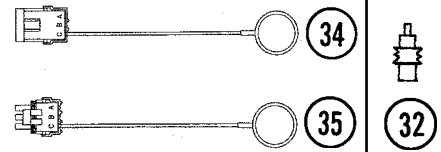
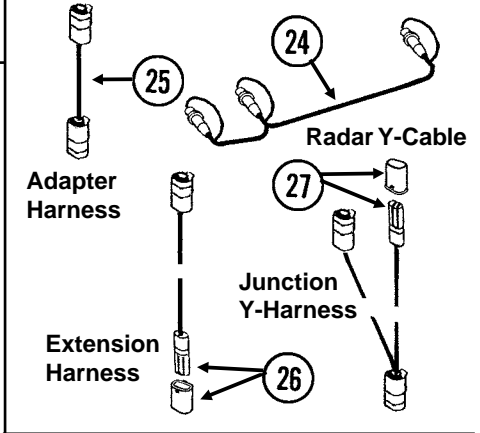
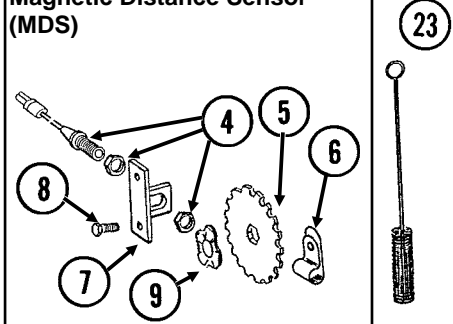
## Shaft Rotation Sensor



## Radar Distance Sensor



## Magnetic Distance Sensor (MDS)



ITEM	PART NO.	QTY.	DESCRIPTION
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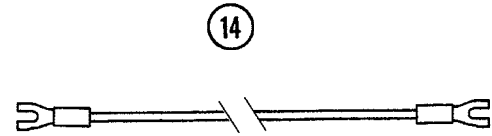
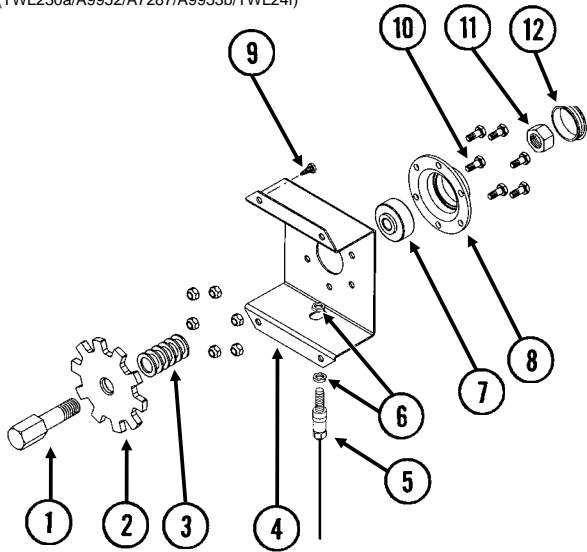
1.	GA7858	-	Radar Distance Sensor W/20' Cable
2.	GA8026	-	Radar Sensor Pipe/Mounting Bracket Package
3.	G1K323	-	4-Pin Connector Kit W/Female Housing, (4) Pins And (1) Cable Clamp
4.	GA5600	1	Magnetic Distance Sensor
5.	GD8751	-	Magnetic Distance Sensor Pulse Wheel
6.	GD6291	-	Insulated Clamp, 3/8"
7.	GD8770	1	Bracket
8.	G10001	2	Hex Head Cap Screw, 3/8"-16 x 1"
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
9.	GD8771	1	Spring Wave Washer
10.	GA9857	1	SMM Backlit Console W/Mounting Bracket And Dust Plug (Item 34)
	GR1631	-	Mounting Bracket, KPM II Stack-Mode And SMM Consoles
	GR1632	-	Console Mounting Bracket Hardware Package (Includes 2 Knobs And 1/4" Hardware)
11.	GA7856	1	Power Lead Adapter

# KPM II STACK-MODE/KPM III ELECTRONIC SEED MONITORS

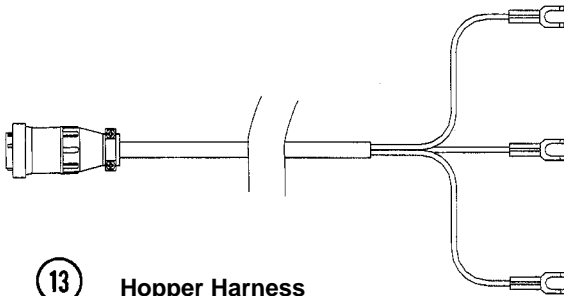
ITEM	PART NO.	QTY.	DESCRIPTION
12.	GA9144	-	Monitor/Radar Adapter Cable, 10"
13.	G1K267	-	Power Lead Adapter Connector Kit, Includes: (1) Cable Clamp, (1) 3-Pin Connector, (3) Male Terminal Pins
14.	G1K268	-	Console Cable Connector Kit, Includes: (1) Cable Clamp, (1) 3-Pin Connector, (1) Lock Ring, (3) Female Terminal Pins
15.	GA10575	-	KPM II Backlit Console W/Mounting Bracket, Fuse Holder And Fuse, Power Lead Adapter (Item 11), Brush (Item 23), Dust Plug (Item 34) And Monitor/Radar Adapter, 10" (Item 12)
	GR1391	-	Mounting Bracket, KPM II
	GR1393	-	Console Mounting Bracket Hardware Package (Includes 4 Knobs And ¼" Hardware)
	GA10601	-	Fuse Holder
	GD7639	-	Fuse
16.	G1K322	-	4-Pin Connector Kit W/Male Housing, (4) Female Socket Contacts And (1) Cable Clamp
17.		-	Included In Tractor/Planter Wiring Harnesses, See Pages P104-P107
18.	GA7851	-	Planter Harness W/Dust Caps, 12 Row (16 Connectors)
	GA7852	-	Planter Harness W/Dust Caps, 16 Row (20 Connectors)
	GD11993	-	Dust Cap
19.	GA10901	-	Seed Tube W/Computerized Sensor
	GR1629	-	Sensor Only
	GA10940	-	Seed Tube (With Holes For Sensor Installation)
20.	GA7859	1	Magnetic Distance Sensor Adapter (Analog To Digital)
21.	GA11039	1	KPM III Backlit Console W/Brush (Item 23), Dust Plug (Item 34), Mounting Bracket Assembly, Console Mounting Bracket Hardware And Power Harness
	GR1761	-	Mounting Bracket Assembly, Includes: (2) Mounting Brackets, (2) Connector Halves, (1) Compression Spring, (1) Tension Knob, (1) ¼"-20 x 1 ¾" Hex Head Cap Screw, (1) ¼" Plastic Washer, (1) ¼" Steel Washer
	GR1762	-	Console Mounting Bracket Hardware Package, Includes: (3) No. 10-32 x ⅝" Hex Socket Pan Head Screws, (3) ¼" Lock Washers
	GR1764	-	Power Harness
22.	G10022	2	Hex Head Cap Screw, ¼"-20 x ½"
	G10211	2	Washer, ¼" SAE
	G10227	2	Lock Washer, ¼"
	G10103	2	Hex Nut, ¼"-20
23.	GR0594	-	Brush
24.	GR0586	1	Radar Y-Cable (Used To Connect Radar Distance Sensor For Multiple Functions)
25.	GA7857	-	Adapter Harness, 1'
26.	GA7854	-	Extension Harness W/Dust Cap, 15'
	GA7855	-	Extension Harness W/Dust Cap, 30'
	GD11993	-	Dust Cap
27.	GA7853	-	Junction Y-Harness W/Dust Cap
	GD11993	-	Dust Cap
28.	G1K321	-	2-Pin Female Connector Kit (Black), Includes: (3) 2-Pin Female Housings, (6) Pin Contacts, (6) Seals
29.	G1K320	-	2-Pin Male Connector Kit (Black), Includes: (3) 2-Pin Male Housings, (6) Socket Contacts, (6) Seals
30.	G1K248	-	3-Pin Female Connector Kit (Black), Includes: (3) 3-Pin Female Housings, (9) Pin Contacts, (9) Seals
	G1K362	-	3-Pin Female Connector Kit (Blue), Includes: (3) 3-Pin Female Housings, (9) Pin Contacts, (9) Seals
31.	G1K252	-	3-Pin Male Connector Kit (Black), Includes: (3) 3-Pin Male Housings, (9) Socket Contacts, (9) Seals
	G1K363	-	3-Pin Male Connector Kit (Blue), Includes: (3) 3-Pin Male Housings, (9) Socket Contacts, (9) Seals
32.	GD11089	-	Sealing Plug
33.	G1K249	-	Acre Counter Switch Kit
34.	GA8046	-	Dust Plug (Black)
	GA9978	-	Dust Plug (Blue)
35.	GA8047	-	Dust Plug (Black)
	GA9979	-	Dust Plug (Blue)
36.	GR1415	1	Rotation Sensor
37.	GD11169	1	Mount
38.	G10757	2	Pan Head Screw, No. 10-32 x 1 ¼"
	G10243	2	Washer, No. 10 SAE
	G10758	2	Hex Nut, No. 10-32
39.	GD11474	2	Cover
40.	GD5857	2	Spring
41.	GD11170	1	Spring Mount
42.	GR1414	1	Actuator
43.	G10927	2	Pan Head Machine Screw, No. 8-32 x 1 ¼", Stainless Steel
	G10931	2	Lock Washer, No. 8, Internal/External, Stainless Steel
	G10928	2	Hex Nut, No. 8-32, Stainless Steel
44.	G1K364	-	Rotation Sensor Mount Kit, Includes: (2) Mounts, (2) GD11721 5" x 7" U-Bolts, (4) G10228 Lock Washers, (4) G10102 Hex Nuts, (1) Instruction
A.	GA6147	-	Magnetic Distance Sensor And Mounting Package (Items 4-9)

# BULK FILL SEED HOPPER MONITOR COMPONENTS

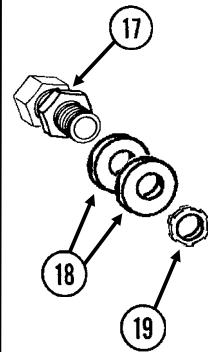
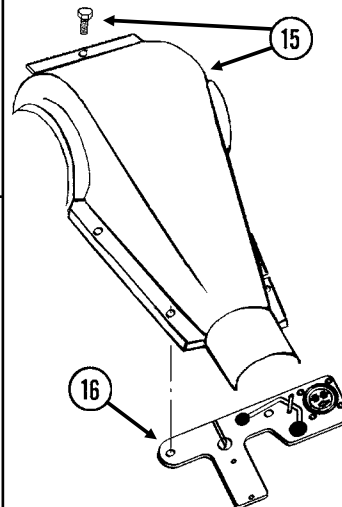
(TWL230a/A9952/A7287/A9953b/TWL24f)



Jumper Wire Between Terminal Strips On Valve Block On Rear Center Frame (See Pages P94 And P95)



Hopper Harness





# BULK FILL SEED HOPPER MONITOR COMPONENTS

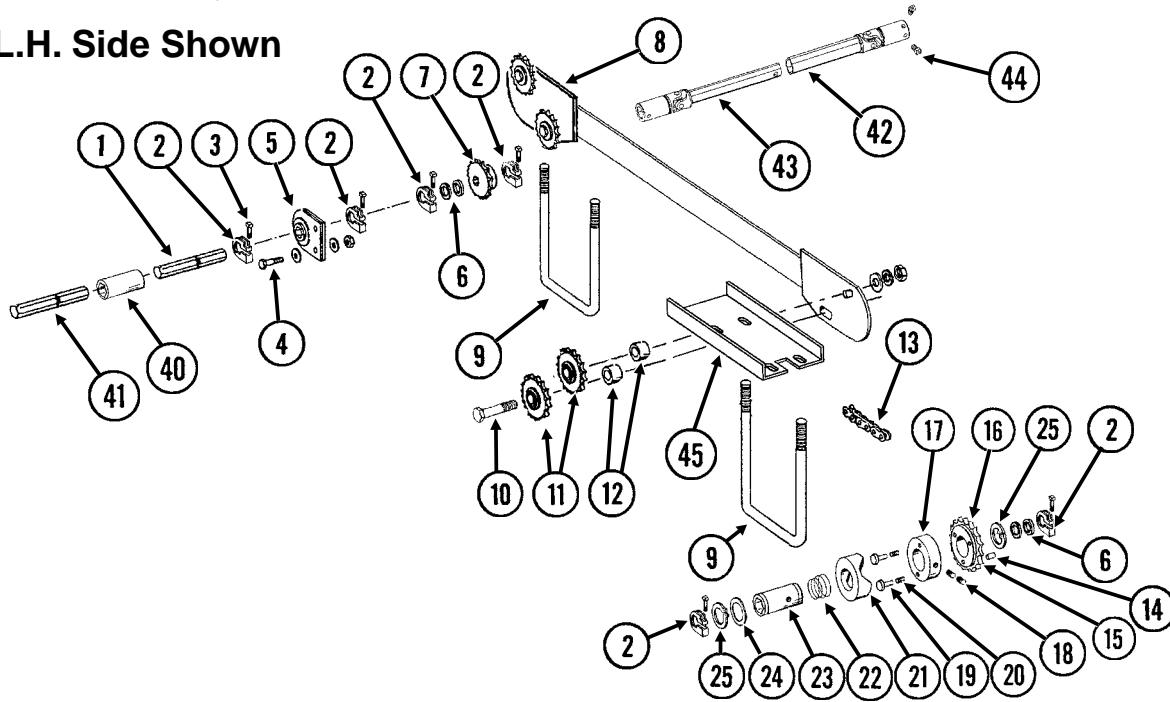
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ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD14256	1	Speed Sensor Shaft
2.	GD14255	1	Sensor Wheel
3.	G10918	6	Machine Bushing, 5/8", 14 Gauge
4.	GD14254	1	Bracket
5.	GA9954	1	Speed Sensor Assembly
6.	GD14257	2	Nut, M12 x 1"
7.	GA2014	1	Bearing
8.	GD10473	1	Bearing Housing
9.	G11062	4	Sheet Metal Screw, 1/4"-14 x 1/2"
10.	G10020	6	Hex Head Cap Screw, 1/4"-20 x 5/8"
	G10110	6	Lock Nut, 1/4"-20, Grade B
11.	G10104	1	Hex Nut, 5/8"-11
12.	GD11845	1	Dust Cap
13.	GA9952	2	Hopper Harness, 84"
14.	GA7287	1	Jumper Wire W/Fork Terminals, 13"
15.		-	See "Bulk Seed Hopper Auger Manifold Assembly", Pages P20 And P21
16.	GA9953	2	Seed Flow Sensor Assembly
17.	GD14270	2	Power Cable Connector
18.	G10235	4	Machine Bushing, 7/8", 14 Gauge
19.	GD4163	2	Lock Nut, 1/2" Conduit

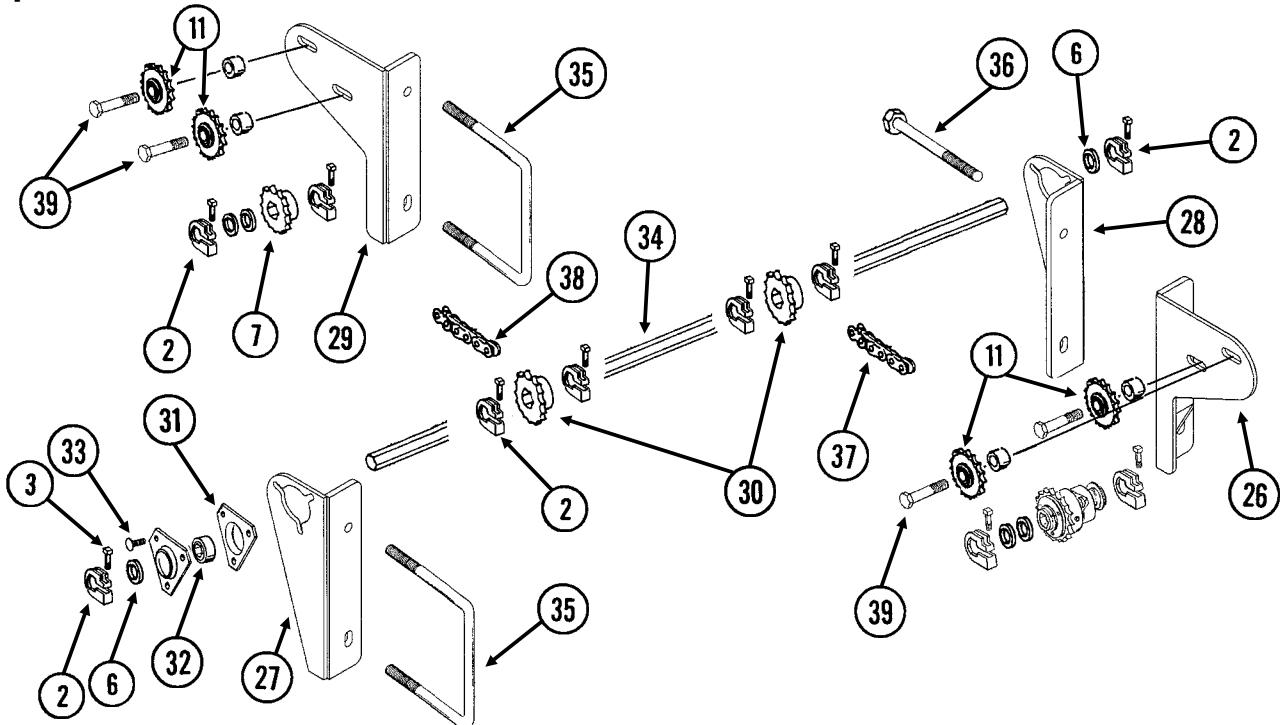
# INTERPLANT® PUSH ROW UNIT DRIVE

(TWL33r/TWL247aa/TWL246bb)

L.H. Side Shown



## Special Push Row Unit Drive Kit (For Use W/Frame Mounted Coulters On Pull Row Units)



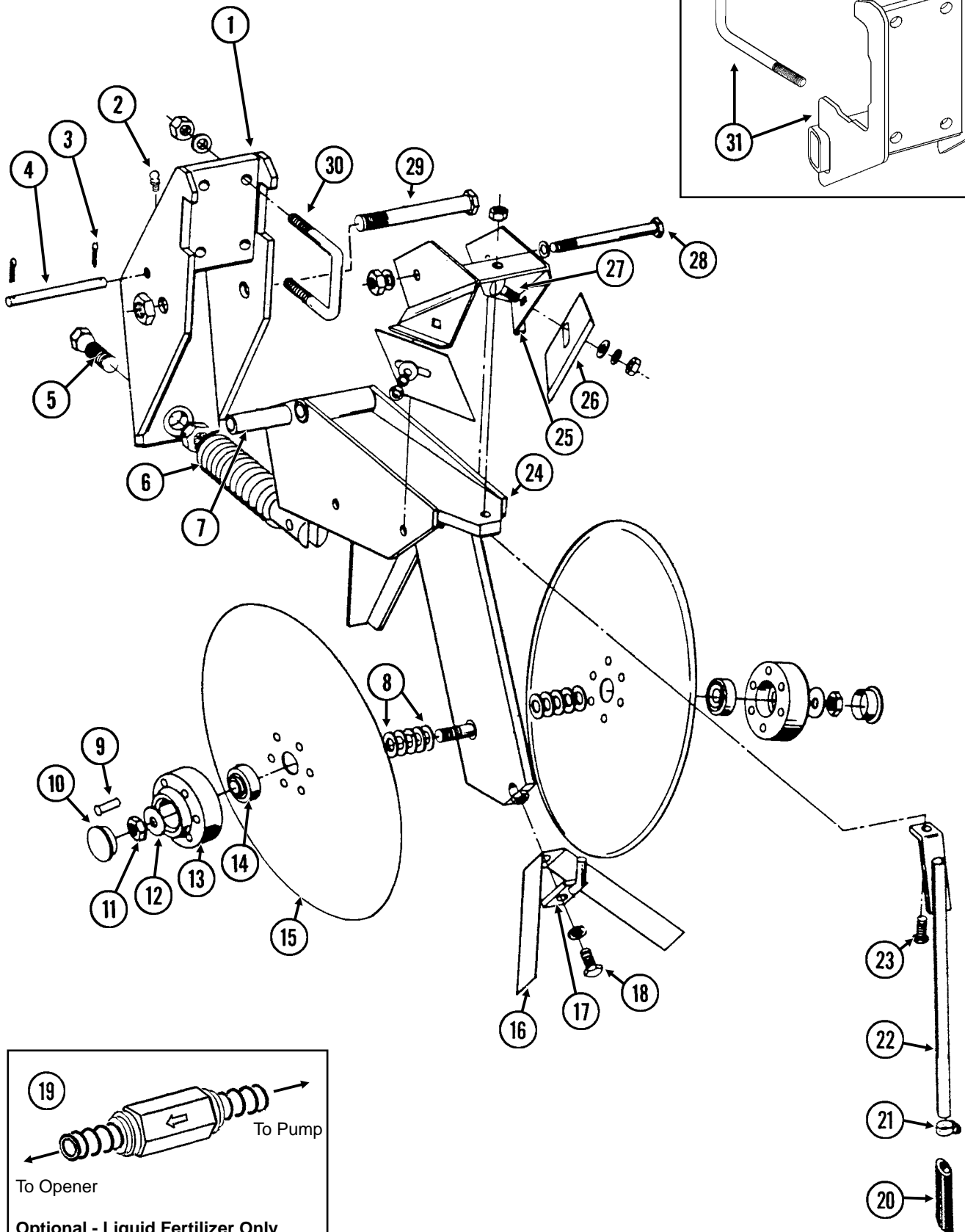
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD0914-48	1	Hex Shaft, 7/8" x 48" (No Holes), R.H. Center Frame, 12 Row 30" And 16 Row 30"
	GD0914-66	1-2	Hex Shaft, 7/8" x 66" (No Holes), L.H. Center Frame And R.H. Wing, 12 Row 30"/L.H. Center Frame, 16 Row 30"
	GD0914-76	1	Hex Shaft, 7/8" x 76" (No Holes), L.H. Wing, 12 Row 30"
	GD0914-124	1	Hex Shaft, 7/8" x 124" (No Holes), R.H. Wing, 16 Row 30"
	GD0914-138	1	Hex Shaft, 7/8" x 138" (No Holes), L.H. Wing, 16 Row 30"

# INTERPLANT® PUSH ROW UNIT DRIVE

ITEM	PART NO.	QTY.	DESCRIPTION
2.	GD11045	-	Lock Clamp
3.	G10130	-	Square Head Machine Bolt, 5/16"-18 x 1 3/4"
	G10923	-	Flange Nut, 5/16"-18, No Serration
4.	G10004	-	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10210	-	Washer, 3/8" USS
	G10229	-	Lock Washer, 3/8"
	G10101	-	Hex Nut, 3/8"-16
5.	GA2180	-	Hanger Bearing, 7/8" Hex Bore
6.	G10233	-	Machine Bushing, 1", 10 Gauge (As Required)
7.	GA5107	1	Sprocket, 19 Tooth
8.	GA9138	1	Mount
9.	GD8306	2	U-Bolt, 7" x 5" x 1/2"-13
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
10.	G10581	4	Hex Head Cap Screw, 1/2"-13 x 2 1/4"
	G10206	4	Washer, 1/2" SAE
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
11.	GA7154	4	Sprocket W/Bearing, 18 Tooth
12.	GD9229	4	Spacer, 1 1/4" O.D. x 1/2" Long (If Applicable)
13.	G3310-226	1	Chain, No. 40, 226 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
14.	G10968	1	Spring Pin, 3/32" x 7/16"
15.	GR1406	1	Bushing
16.	GR1412	1	Sprocket, 19 Tooth
17.	GR1405	1	Lock Collar
18.	G10535	1	Hex Socket Set Screw, 3/8"-16 x 3/4"
19.	GR1410	1	Pin
20.	GR1413	1	Spring
21.	GR1409	1	Knurled Collar
22.	GR1408	1	Compression Spring
23.	GR1407	1	Drive Shaft
24.	GR1411	1	Shim
25.	G10496	2	External Inverted Snap Ring, 1 1/2"
26.	GA10596	4	Idler Mount, R.H.
27.	GA10597	4	Idler Mount, L.H.
28.	GA10598	4	Bearing Mount, R.H.
29.	GA10599	4	Bearing Mount, L.H.
30.	GA5106	8	Sprocket, 17 Tooth
31.	G3400-01	16	Flangette
32.	G2100-03	8	Bearing, 7/8" Hex Bore, Spherical
33.	G10303	24	Carriage Bolt, 5/16"-18 x 1"
	G10219	24	Washer, 5/16" USS
	G10232	24	Lock Washer, 5/16"
	G10106	24	Hex Nut, 5/16"-18
34.	GD0914-30	4	Hex Shaft, 7/8" x 30" (No Holes)
35.	GD11721	12	U-Bolt, 5" x 7" x 1/2"-13
	G10216	-	Washer, 1/2" USS
	G10228	24	Lock Washer, 1/2"
	G10102	24	Hex Nut, 1/2"-13
36.	G11034	4	Hex Head Cap Screw, 1/2"-13 x 7"
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
37.	G3310-102	4	Chain, No. 40, 102 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
38.	G3310-144	4	Chain, No. 40, 144 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
39.	G10016	4	Hex Head Cap Screw, 1/2"-13 x 2"
	G10206	4	Washer, 1/2" SAE
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
40.	GD1719	1	Coupler, 4"
41.	GD0914-30	1	Hex Shaft, 7/8" x 30" (No Holes), Even-Row Push Row Unit, 12 Row 30" And 16 Row 30"
42.	GA11345	2	U-Joint, Female, 10 1/4"
43.	GA11344	2	U-Joint, Male, 12 1/4"
44.	G10688	8	Square Head Set Screw, 3/8"-16 x 5/8"
45.	GD14417	1	Hose Protector
A.	GA8092	-	Clutch Sprocket Assembly, 19 Tooth (Items 14-25)
B.	G1K269	-	Lock Clamp Kit (Items 2 And 3)

# DOUBLE DISC FERTILIZER OPENER AND MOUNT

FOC007(PT25/A10119/FRTZ208)

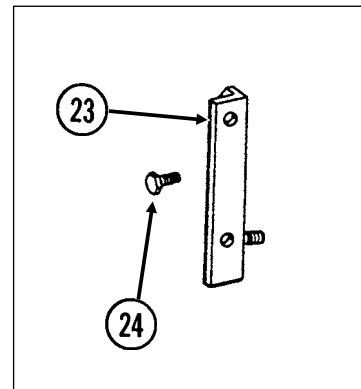
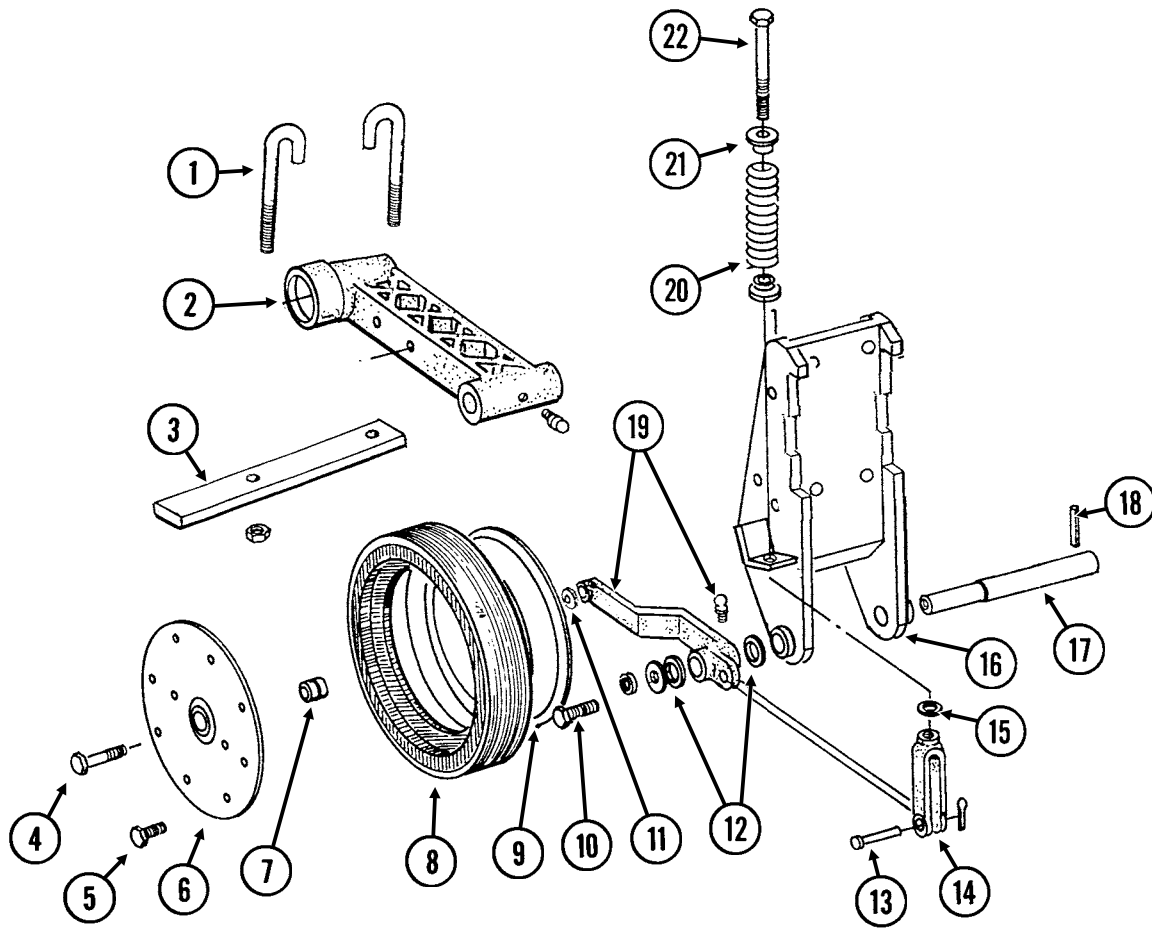


# DOUBLE DISC FERTILIZER OPENER AND MOUNT

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	GA8483	1	Bracket
2.	G10938	1	Grease Fitting, 1/4"-28, Taper Threads
3.	G10451	2	Cotter Pin, 1/8" x 1"
4.	GD1657	1	Lockup Pin
5.	GD0962	1	Hex Head Adjusting Bolt, 5/8"-18 x 3 1/4"
	G10499	1	Hex Jam Nut, 5/8"-18, Grade 2
6.	GA0328	1	Spring
7.	GD0487	1	Bushing, 4 1/64" I.D. x 3 1/2" Long
8.	G10213	-	Machine Bushing, 5/8" (.030" Thick)
9.	G10542	12	Rivet, 1/4" x 1 5/16"
10.	GD1132	2	Dust Cap
11.	G10503	1	Hex Jam Nut, 5/8"-11, Grade 2
	G10504	1	Hex Jam Nut, 5/8"-11, L.H. Threads, Grade 2
12.	G10204	2	Special Machine Bushing, 5/8" x 1" O.D.
13.	GB0134	2	Hub
14.	GA2014	2	Bearing
15.	GD11306	2	Disc Blade, 3.5 mm x 15"
16.	GD2589	1	Inner Scraper
17.	GA0312	1	Mount
18.	G10019	1	Hex Head Cap Screw, 5/16"-18 x 1"
	G10232	1	Lock Washer, 5/16"
19.	GA8983	-	Check Valve, Low Rate
20.	GD11705	-	Extension
21.	G10681	-	Hose Clamp, No. 6
22.	GA8685	-	Drop Tube, Liquid Fertilizer
23.	G10133	1	Hex Head Cap Screw, 5/16"-18 x 1 1/2"
	G10221	1	Washer, 5/16" SAE
	G10109	1	Lock Nut, 5/16"-18, Grade 8
24.	GA9195	1	Shank
25.	GA0810	1	Scraper Mount
26.	GD1673	2	Scraper
27.	G10305	2	Carriage Bolt, 3/8"-16 x 1"
	G10210	2	Washer, 3/8" USS
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
28.	G10045	1	Hex Head Cap Screw, 1/2"-13 x 4 1/2"
	G10111	1	Lock Nut, 1/2"-13
29.	G10046	1	Hex Head Cap Screw, 5/8"-11 x 5"
	G10107	1	Lock Nut, 5/8"-11
30.	GD13287	2	U-Bolt, 1 1/2" x 2 1/2" x 1/2"-13
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
31.	GA10119	1	Mount W/U-Bolts
	GD1113	2	U-Bolt, 5" x 7" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
A.	GA8845	-	Disc Blade And Bearing Assembly (Items 9 And 13-15)

# HD SINGLE DISC FERTILIZER OPENER (Soil Press Wheel)

(TWL35d/TWL35b)

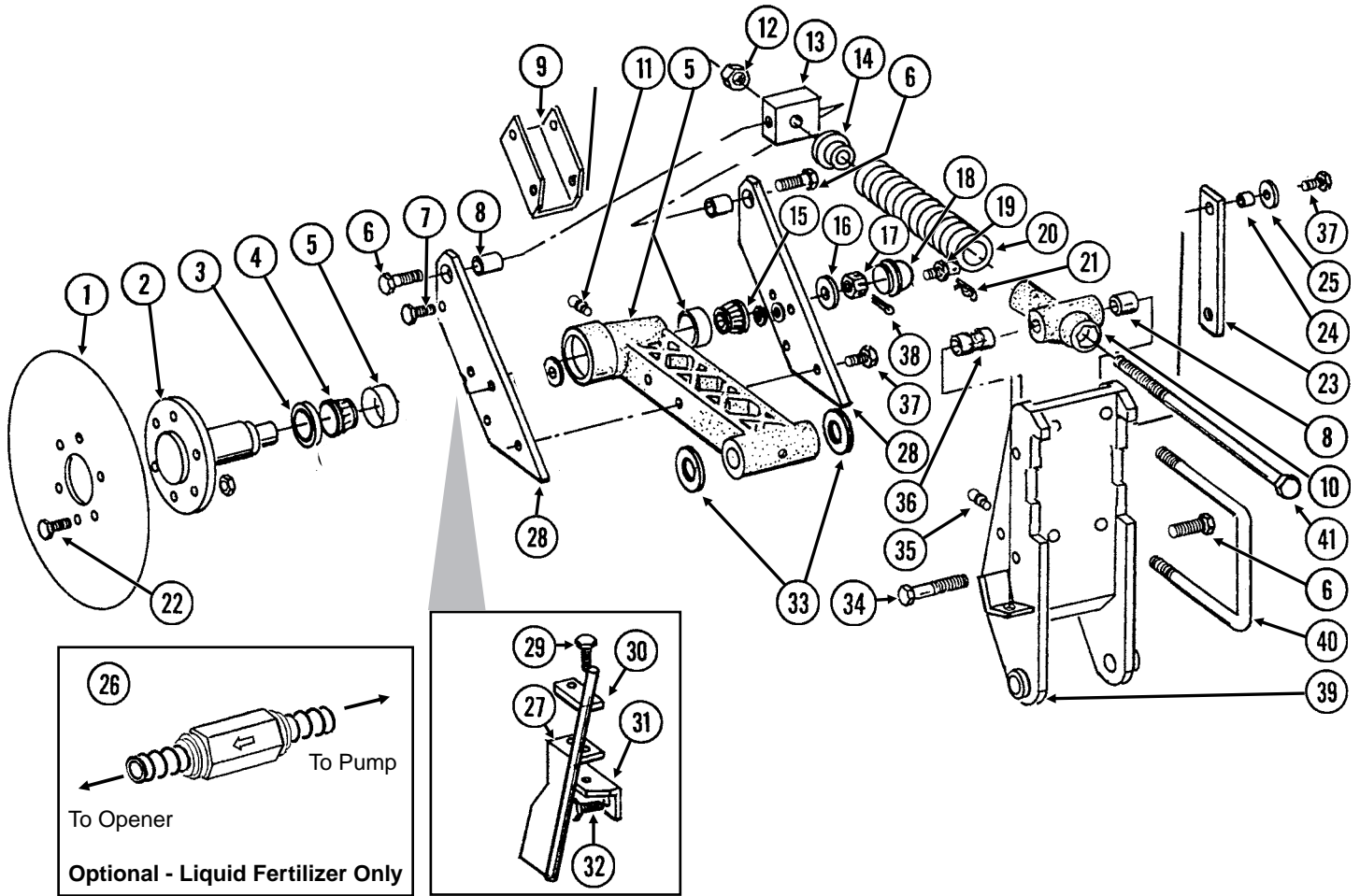


# HD SINGLE DISC FERTILIZER OPENER (Soil Press Wheel)

ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
1.	GD9705	2	J-Bolt, 1/2"-13
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
2.		-	See "HD Single Disc Fertilizer Opener (Blade And Drop Tube)", Pages P122 And P123
3.	GD9706	1	Lockup Bar
4.	G10010	1	Hex Head Cap Screw, 5/8"-11 x 3"
5.	G10961	11	Flanged Whiz Lock Screw, 5/16"-18 x 5/8", No Serration
	G10620	11	Serrated Flange Nut, 5/16"-18
6.	GD11954	1	Half Wheel Cover, Nylon
7.	GA6171	1	Bearing
8.	GD11953	1	Offset Tire
9.	GD11423	1	Half Wheel
10.	G10438	1	Hex Head Cap Screw, 1/2"-13 x 3/4"
	G10228	1	Lock Washer, 1/2"
	G10216	1	Washer, 1/2" USS
11.	G10230	1	Lock Washer, 5/8"
12.	G10526	10	Machine Bushing, 1" (.048" Thick)
13.	G10560	1	Clevis Pin, 1/2" x 1 3/4"
	G10456	1	Cotter Pin, 1/8" x 3/4"
14.	GD8218	1	Yoke
15.	G10205	1	Washer, 5/8" SAE
16.		-	See "HD Single Disc Fertilizer Opener (Blade And Drop Tube)", Pages P122 And P123
17.	GD7911	1	Pivot Pin
18.	G10610	1	Spring Pin, 3/8" x 2"
19.	GA8306	-	Wheel Arm W/Grease Fitting, R.H.
	GA8305	1	Wheel Arm W/Grease Fitting, L.H. (Shown)
	G10640	1	Grease Fitting, 1/4"-28
20.	GD8308	1	Spring
21.	GB0212	2	Spring Washer
22.	GD9709	1	Special Bolt
23.	GA6345	-	Mounting Angle, L.H. (As Required) (Shown)
	GA6344	-	Mounting Angle, R.H. (As Required)
24.	G10005	-	Hex Head Cap Screw, 5/8"-11 x 1 3/4"
	G10230	-	Lock Washer, 5/8"
	G10104	-	Hex Nut, 5/8"-11
A.	G1K215	-	Lockup Kit (Items 1 And 3)
B.	GA8877	-	Gauge Wheel Complete (Items 5-9)

# HD SINGLE DISC FERTILIZER OPENER (Blade And Drop Tube)

FOC016/FOC007/FOC019(PT27c/FRTZ208)



**ITEM      PART NO.      QTY.      DESCRIPTION**  
(Per Assy.)

1.	GD7900	1	Disc Blade, 18"
	GD8247	-	Disc Blade, 20" (Optional)
2.	GB0205	1	Spindle
3.	GA4286	1	Seal
4.	GA4287	1	Bearing
5.	GA5887	1	Arm W/Cups And Washers
	GD6553	-	Inner Cup
	GR0188	-	Outer Cup
	G10205	3	Washer, 5/8" SAE
6.	G10007	3	Hex Head Cap Screw, 5/8"-11 x 1 1/2"
7.	G10001	2	Hex Head Cap Screw, 3/8"-16 x 1"
	G10108	2	Lock Nut, 3/8"-16
8.	GB0218	3	Bushing, 2 1/32" I.D. x 7/8" O.D. x 1 9/32" Long
9.	GD8238	1	Channel
10.	GB0206	1	Rod Guide
11.	G10641	2	Grease Fitting, 1/8" NPT
12.	G10105	3	Hex Nut, 3/4"-10
13.	GD7908	1	Tap Block
14.	GB0213	1	Spring Seat
15.	GA0237	1	Bearing
16.	G10220	1	Machine Bushing, 1 1/16", 10 Gauge
17.	G10507	1	Slotted Nut, 1"-14
18.	GD1104	1	Dust Cap



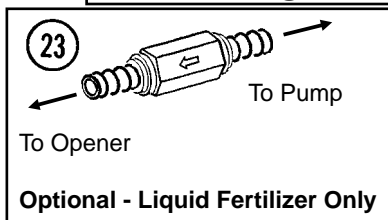
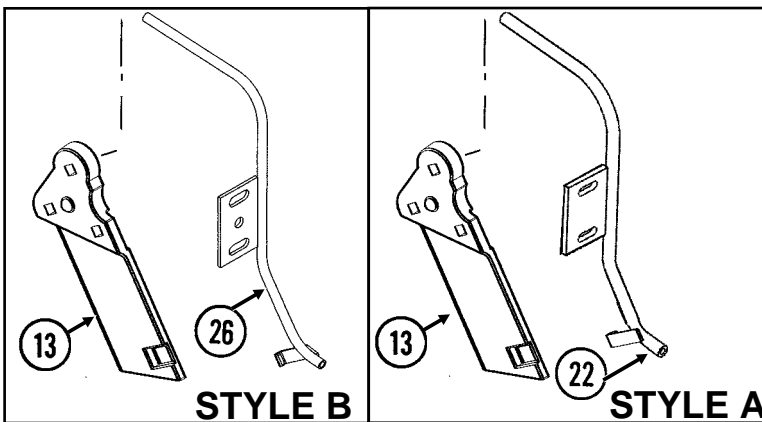
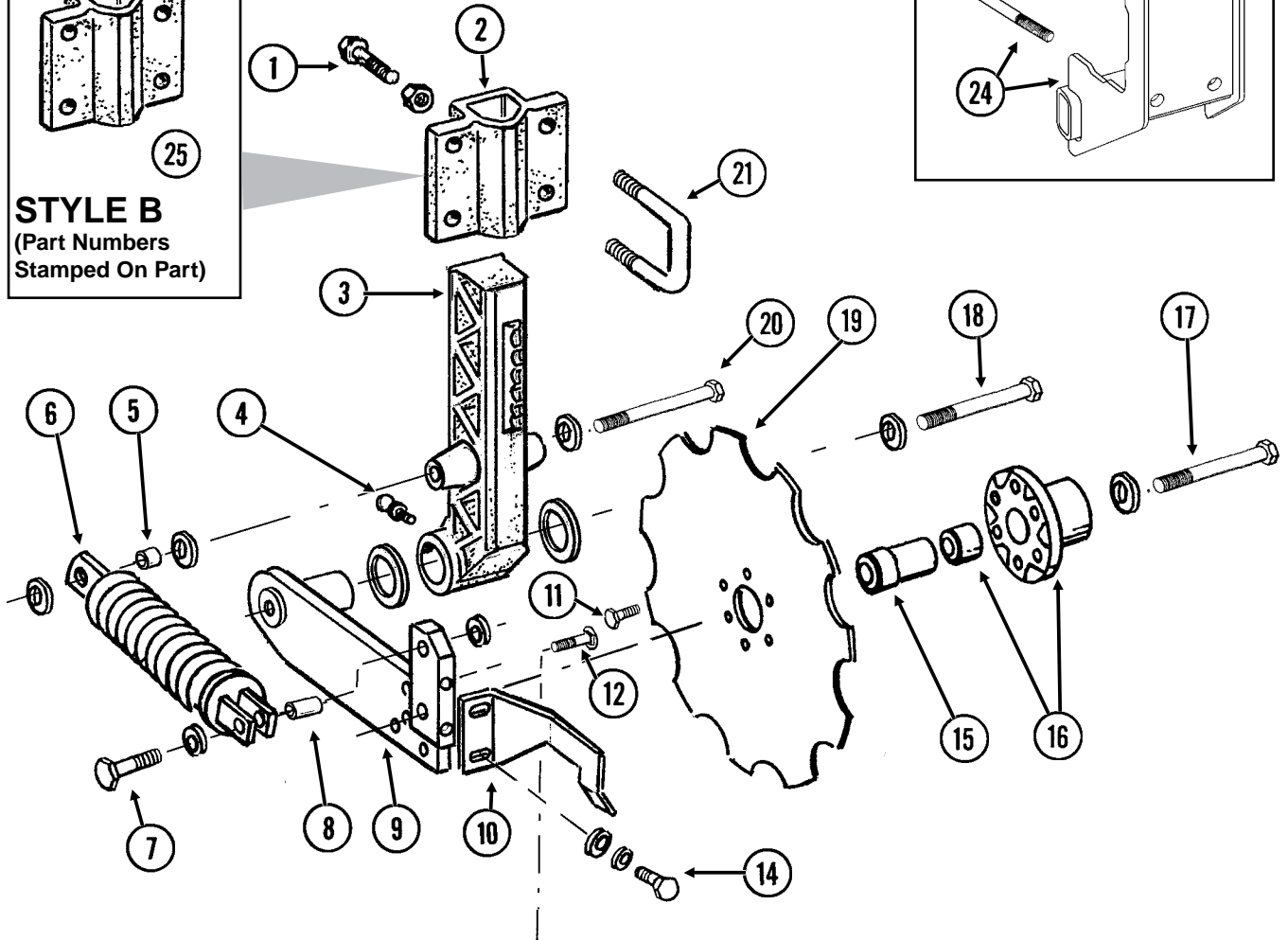
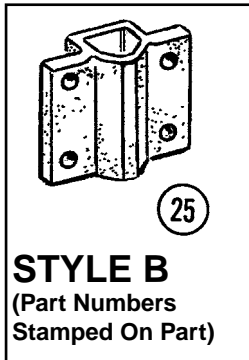
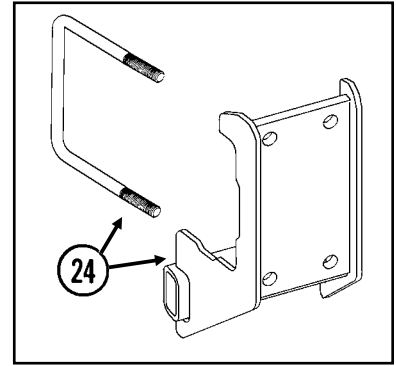
# HD SINGLE DISC FERTILIZER OPENER (Blade And Drop Tube)

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
19.	GD8276	1	Pin
	G10237	1	Lock Washer, 7/16"
	G10100	1	Hex Nut, 7/16"-14
20.	GD10273	1	Compression Spring
21.	G10592	1	Hair Pin Clip, No. 11
22.	G10594	6	Bolt, 1/2"-13 x 1 1/2"
	G10111	6	Lock Nut, 1/2"-13
23.	GD8239	1	Storage Strap
24.	GD7904-02	1	Sleeve, 1/2" x 1/2" Long
25.	G10216	3	Washer, 1/2" USS
26.	GA8983	-	Check Valve, Low Rate
27.	GA8689	1	Drop Tube, L.H., Liquid Fertilizer (Shown)
	GA8688	-	Drop Tube, R.H., Liquid Fertilizer
28.	GD8224	2	Bar
29.	G10004	2	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10229	2	Lock Washer, 3/8"
30.	GD10487	1	Clamp
31.	GD10304	-	Angle, R.H.
	GD10303	1	Angle, L.H. (Shown)
32.	G10016	2	Hex Head Cap Screw, 1/2"-13 x 2"
	G10111	2	Lock Nut, 1/2"-13
33.	G10322	-	Machine Bushing, 1 1/4", 18 Gauge (As Required)
34.	G10862	1	Hex Head Cap Screw, 5/8"-11 x 3 1/4"
	G10205	2	Washer, 5/8" SAE
	G10230	1	Lock Washer, 5/8"
35.	G10640	1	Grease Fitting, 1/4"-28
36.	GD10242	1	Bushing, 2 1/4"
37.	G10039	5	Hex Head Cap Screw, 1/2"-13 x 1 3/4"
	G10111	5	Lock Nut, 1/2"-13
38.	G10459	1	Cotter Pin, 3/16" x 1 1/2"
39.	GA7240	-	Opener Mount, R.H.
	GA7239	1	Opener Mount, L.H. (Shown)
40.	GD1113	2	U-Bolt, 5" x 7" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
41.	GD7907	1	Special Bolt

# NOTCHED SINGLE DISC FERTILIZER OPENER

FOC018(A10119/FRTZ209qQ/FRTZ208/B0405)

**STYLE A**  
(Part Number  
Stamped On Part)

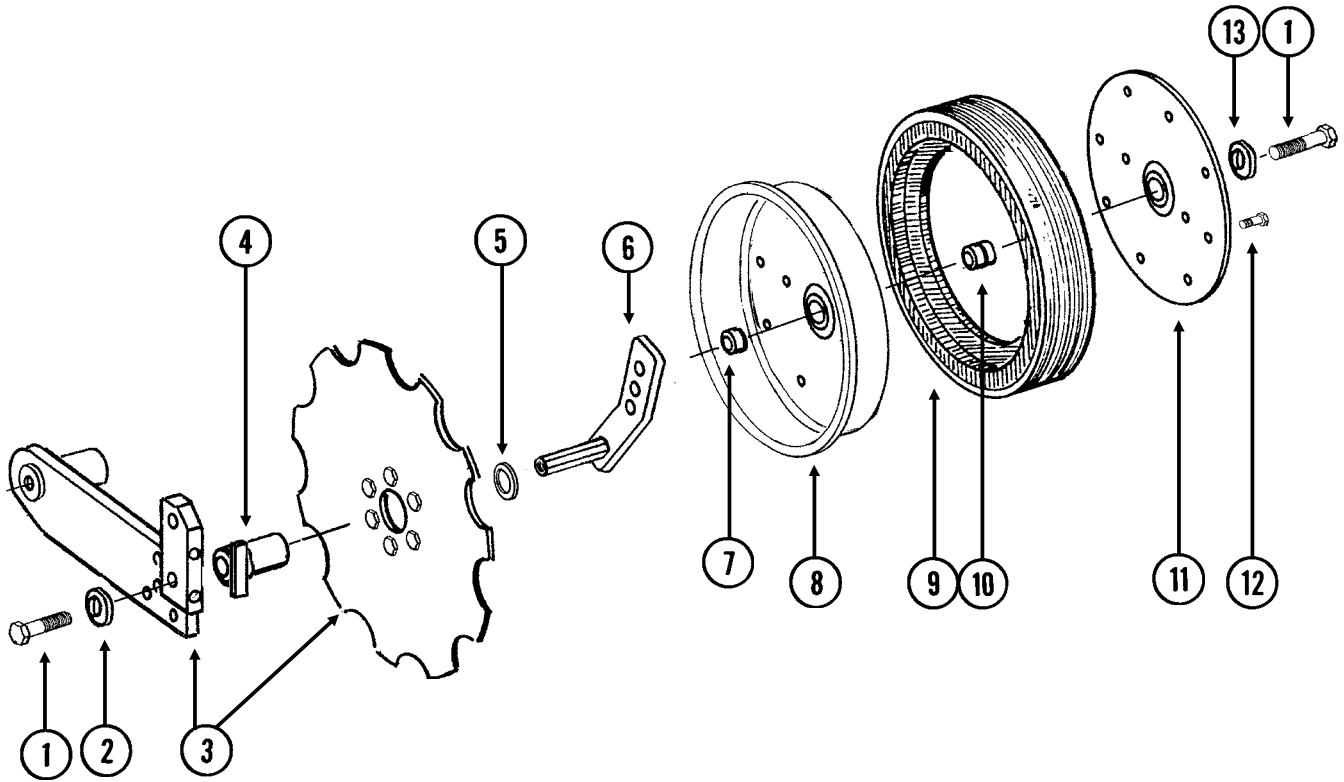


# NOTCHED SINGLE DISC FERTILIZER OPENER

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	G10017	3	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10102	3	Hex Nut, 1/2"-13
2.	GB0297	1	Mount
3.	GB0296	1	Arm, 13 1/2"
4.	G10640	1	Grease Fitting, 1/4"-28
5.	GD12685	1	Bushing, 3/4" O.D. x 1/2" Long
6.	GA6966	1	Compression Spring Assembly
7.	G10047	1	Hex Head Cap Screw, 3/8"-16 x 1 3/4"
	G10210	2	Washer, 3/8" USS
	G10108	1	Lock Nut, 3/8"-16
8.	GD1026	1	Sleeve, 1 3/16" Long
9.	GA9433	1	Pivot Arm, L.H. (Shown)
	GA9434	-	Pivot Arm, R.H.
10.	GD11557	1	Scraper, L.H. (Shown)
	GD11558	-	Scraper, R.H.
11.	G10002	6	Hex Head Cap Screw, 3/8"-16 x 3/4"
12.	G10306	3	Carriage Bolt, 3/8"-16 x 2"
	G10108	3	Lock Nut, 3/8"-16
13.	GB0323	1	Knife, L.H. (Shown)
	GB0322	-	Knife, R.H.
14.	G10991	2	Hex Head Cap Screw, 5/16"-18 x 7/8"
	G10232	2	Lock Washer, 5/16"
	G10219	6	Washer, 5/16" USS
15.	GD12679	1	Stepped Spacer, 3" Long
16.	GA9437	1	Hub W/Bearing
	GA8603	-	Double Row Bearing
17.	G10011	1	Hex Head Cap Screw, 5/8"-11 x 5 1/2"
	GD12677	1	Washer, 1 1/2" O.D., 7 Gauge, Hardened
	G10107	1	Lock Nut, 5/8"-11
18.	G10046	1	Hex Head Cap Screw, 5/8"-11 x 5"
	G10217	1	Washer, 5/8" USS
	G10450	2	Machine Bushing, 1 1/2", 18 Gauge (As Required)
	G10107	1	Lock Nut, 5/8"-11
19.	GD12676	1	Disc Blade, Notched, 16 3/4"
20.	G10871	1	Hex Head Cap Screw, 1/2"-13 x 6"
	G10206	3	Washer, 1/2" SAE
	G10111	1	Lock Nut, 1/2"-13
21.	GD13287	2	U-Bolt, 1 1/2" x 2 1/2" x 1/2"-13
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
22.	GA10213	-	Drop Tube, L.H., Liquid Fertilizer (Shown)
	GA10214	1	Drop Tube, R.H., Liquid Fertilizer
23.	GA8983	-	Check Valve, Low Rate
24.	GA10119	1	Mount W/U-Bolts
	GD1113	2	U-Bolt, 5" x 7" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
25.	GB0405	1	Mount, L.H. (Shown)
	GB0400	-	Mount, R.H.
26.	GA12108	1	Drop Tube, Liquid Fertilizer (Shown)
	GA12109	-	Drop Tube, Liquid Fertilizer

# DEPTH/GAUGE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER

(FRTZ209u)



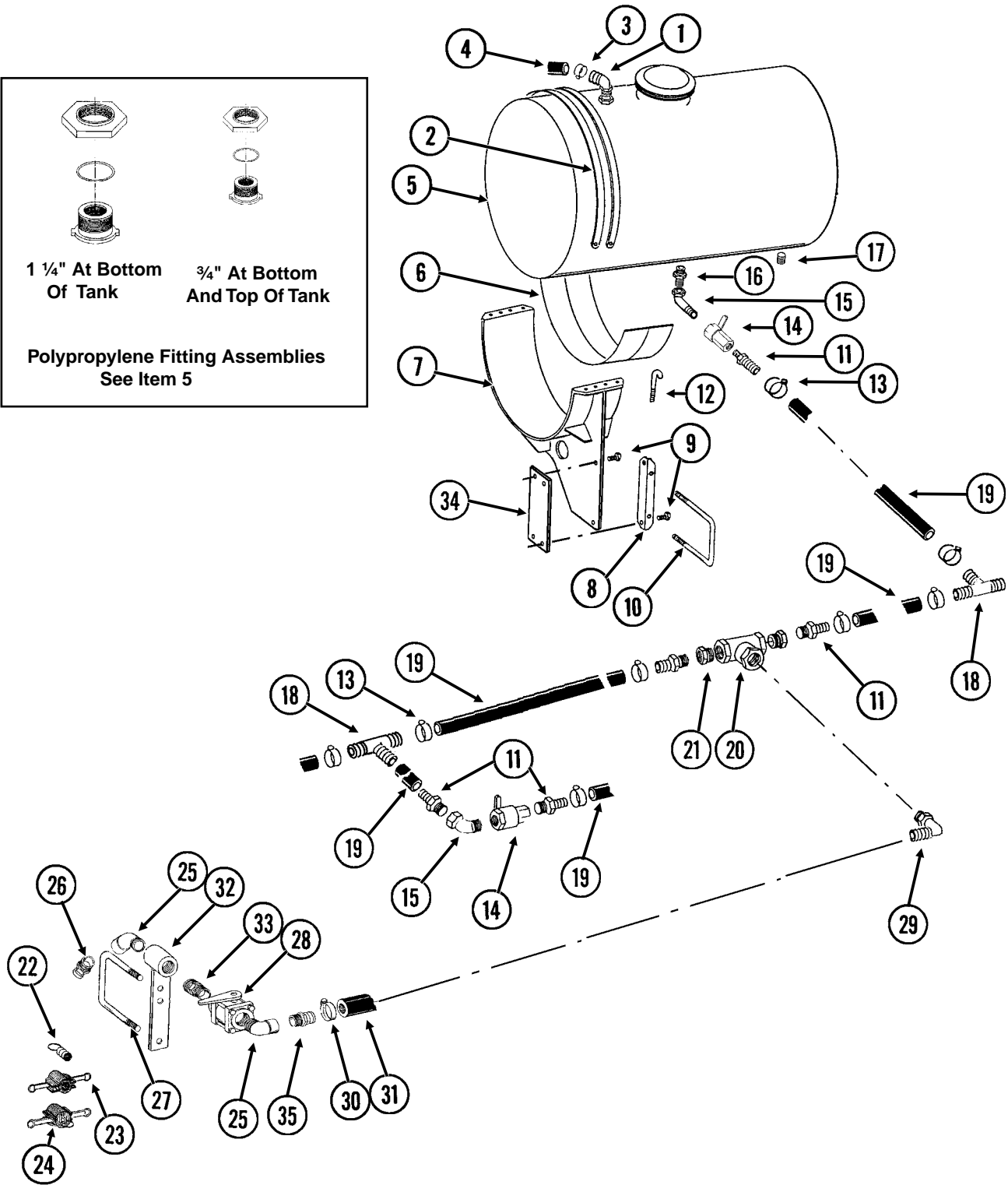
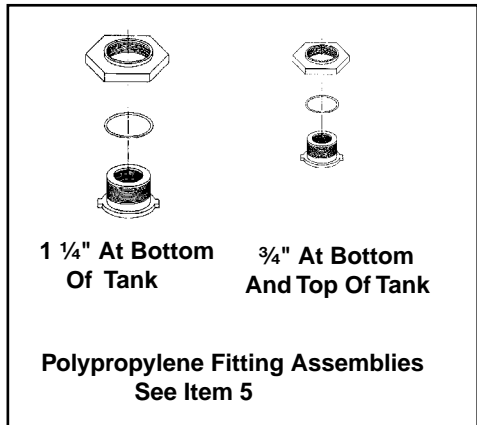
# DEPTH/GAUGE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER

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ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	G10010	2	Hex Head Cap Screw, 5/8"-11 x 3"
2.	GD7805	1	Special Washer, 5/8", Hardened
3.		-	See "Notched Single Disc Fertilizer Opener", Pages P124 And P125
4.	GA9472	1	Blade Mount
5.	G10233	1	Machine Bushing, 1", 10 Gauge
6.	GA10037	1	Wheel Mount, L.H. (Shown)
	GA10036	1	Wheel Mount, R.H.
7.	GD13309	1	Spacer
8.	GD11423	1	Half Wheel
9.	GD11953	1	Offset Tire
10.	GA6171	1	Bearing
11.	GD11954	1	Half Wheel Cover, Nylon
12.	G10961	11	Flanged Whiz Lock Screw, 5/16"-18 x 3/4", No Serration
	G10620	11	Serrated Flange Nut, 5/16"-18
13.	G10204	1	Special Machine Bushing, 5/8" x 1" O.D. (As Required)
A.	GA8877	-	Gauge Wheel Complete (Items 8-12)

# LIQUID FERTILIZER TANKS, SADDLES, SADDLE MOUNTS AND HOSES (SDS Planters)

LFC021/LFC023/LFC030/LFC012(FRTZ201f/FRTZ227)

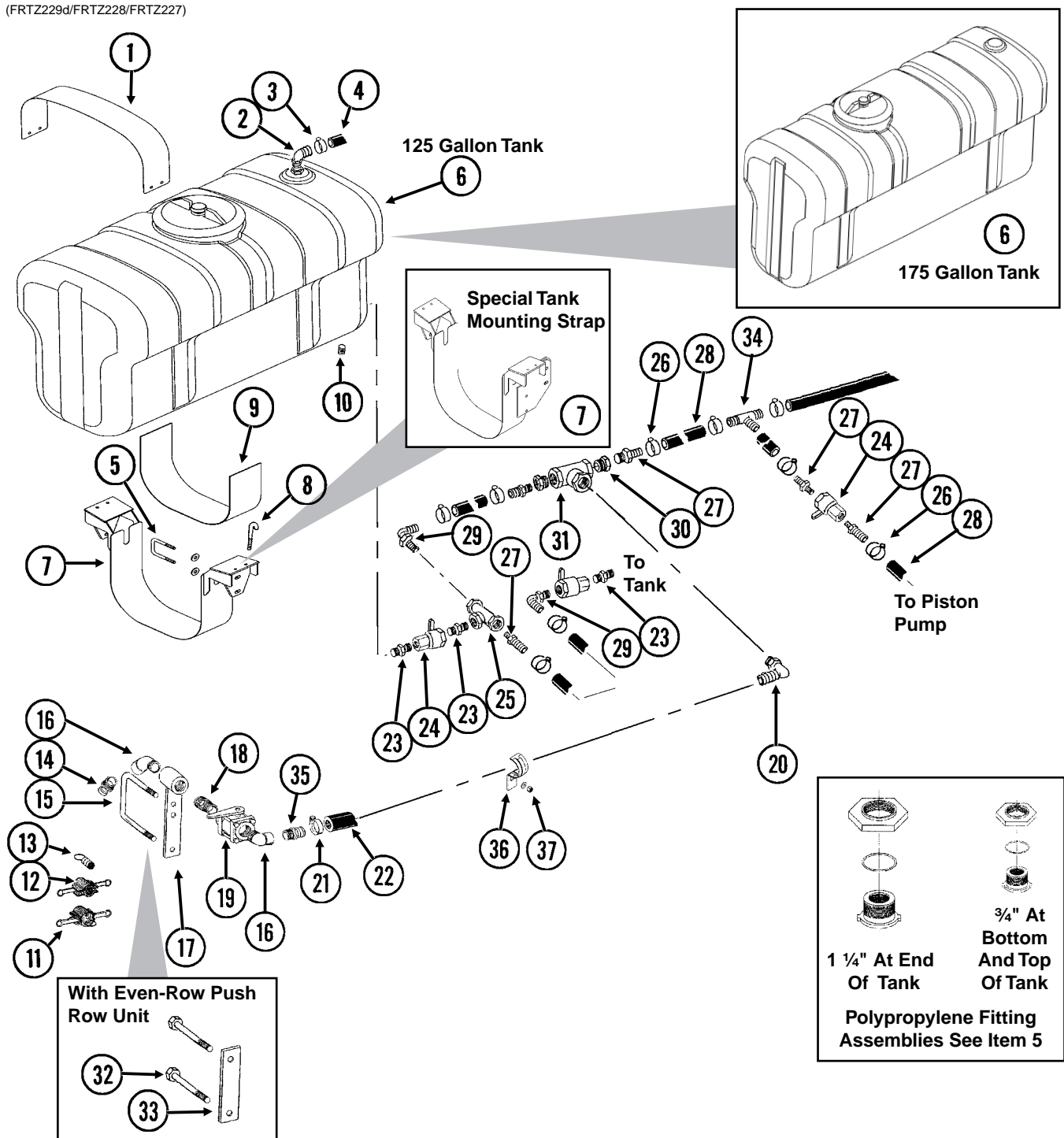


# LIQUID FERTILIZER TANKS, SADDLES, SADDLE MOUNTS AND HOSES (SDS Planters)

ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10917	4	Elbow, 90°, ¾" NPT To Barb
2.	GD1520	16	Band, 30" (4 Per Tank)
3.	G10278	4	Hose Clamp, No. 16
4.	G4205-11	-	Hose, ¾" x 72" (One Per Tank)
5.	GA9905	4	Tank W/Lid And Fittings, 30" x 150 Gallon
	GR1678	-	Lid W/Vent, 8" (Top Of Tank)
	GR0513	-	¾" Polypropylene Fitting Assembly (Overflow Fitting, Nut, Bushing And O-Ring) (Top And Bottom Of Tank)
	GR1397	-	Overflow Fitting
	GR0508	-	1 ¼" Polypropylene Fitting Assembly (Nut, Bushing And O-Ring) (Bottom Of Tank)
6.	GD1862	2	Pad, 8" x 14' (For Two 30" Tanks)
7.	GA9671	8	Tank Mount (2 Per Tank)
8.	GD10110	8	Mounting Angle (2 Per Tank)
9.	G10007	24	Hex Head Cap Screw, ⅝"-11 x 1 ½"
	G10230	24	Lock Washer, ⅝"
	G10104	24	Hex Nut, ⅝"-11
10.	GD1747	8	U-Bolt, 5" x 7" x ¾"-10
	G10231	16	Lock Washer, ¾"
	G10105	16	Hex Nut, ¾"-10
11.	G10626	10	Adapter, 1 ¼" NPT To Barb
12.	GD1337	32	J-Bolt, ⅝"-18 (8 Per Tank)
	G10109	32	Lock Nut, ⅝"-18, Grade 8 (8 Per Tank)
13.	G10674	24	Hose Clamp, No. 24
14.	GA4976	5	Shutoff Valve, 1 ¼" NPT
	GR1015	-	Body O-Ring
	GR1016	-	Stem O-Ring
	GR1017	-	Teflon Seat
	GR1018	-	Ball
	GR1019	-	Handle
15.	G10887	5	Elbow, 90°, 1 ¼" Male NPT To Female
16.	G10619	4	Close Nipple, 1 ¼" NPT
17.	G10096	4	Pipe Plug, ¾" NPT
18.	G10633	3	Tee, 1 ¼" Barb
19.	G4200-03	1	Hose, 1 ¼" x 32', 12 Row 30"
	G4200-06	-	Hose, 1 ¼" x 40', 16 Row 30"
20.	G10888	1	Tee, 2" Female NPT
21.	G10616	2	Reducing Bushing, 2" Male NPT To 1 ¼" Female
22.	GD10777	1	Dust Plug, 2" Male Cam Lock
23.	GD3622	1	Adapter, 2" Female NPT To Cam Lock
24.	GD3951	1	Dust Cap, 2" Cam Lock
25.	G10889	2	Elbow, 45°, 2" Male NPT To Female
26.	GD3623	1	Adapter, 2" Male NPT To Cam Lock
27.	GD1113	1	U-Bolt, 5" x 7" x ⅝"-11
	G10230	2	Lock Washer, ⅝"
	G10104	2	Hex Nut, ⅝"-11
28.	GA2660	1	Shutoff Valve, 2" NPT
29.	G10630	1	Elbow, 90°, 2" NPT To Barb
30.	G10676	2	Hose Clamp, No. 36, Stainless Steel
31.	G4201-03	1	Hose, 2" x 18'
32.	GA7845	1	Quick Fill Mount, 2"
33.	G10623	1	Close Nipple, 2" NPT
34.	GD13648	4	Plate, 4" x 10 ½" (Outboard Tanks Only)
35.	G10628	1	Adapter, 2" NPT To Barb

# LIQUID FERTILIZER TANKS, SADDLES, SADDLE MOUNTS AND HOSES (Conventional Planters)

(FRTZ229d/FRTZ228/FRTZ227)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA10109	8	Tank Band, 42 3/4" (2 Per Tank)
2.	G10917	4	Elbow, 90°, 3/4" NPT To Barb
3.	G10278	4	Hose Clamp, No. 16
4.	G4205-11	-	Hose, 3/4" x 72" (One Per Tank)
5.	GD1138	16	U-Bolt, 2 1/2" x 2 1/2" x 1/2"-13
	G10216	32	Washer, 1/2" USS
	G10228	32	Lock Washer, 1/2"
	G10102	32	Hex Nut, 1/2"-13

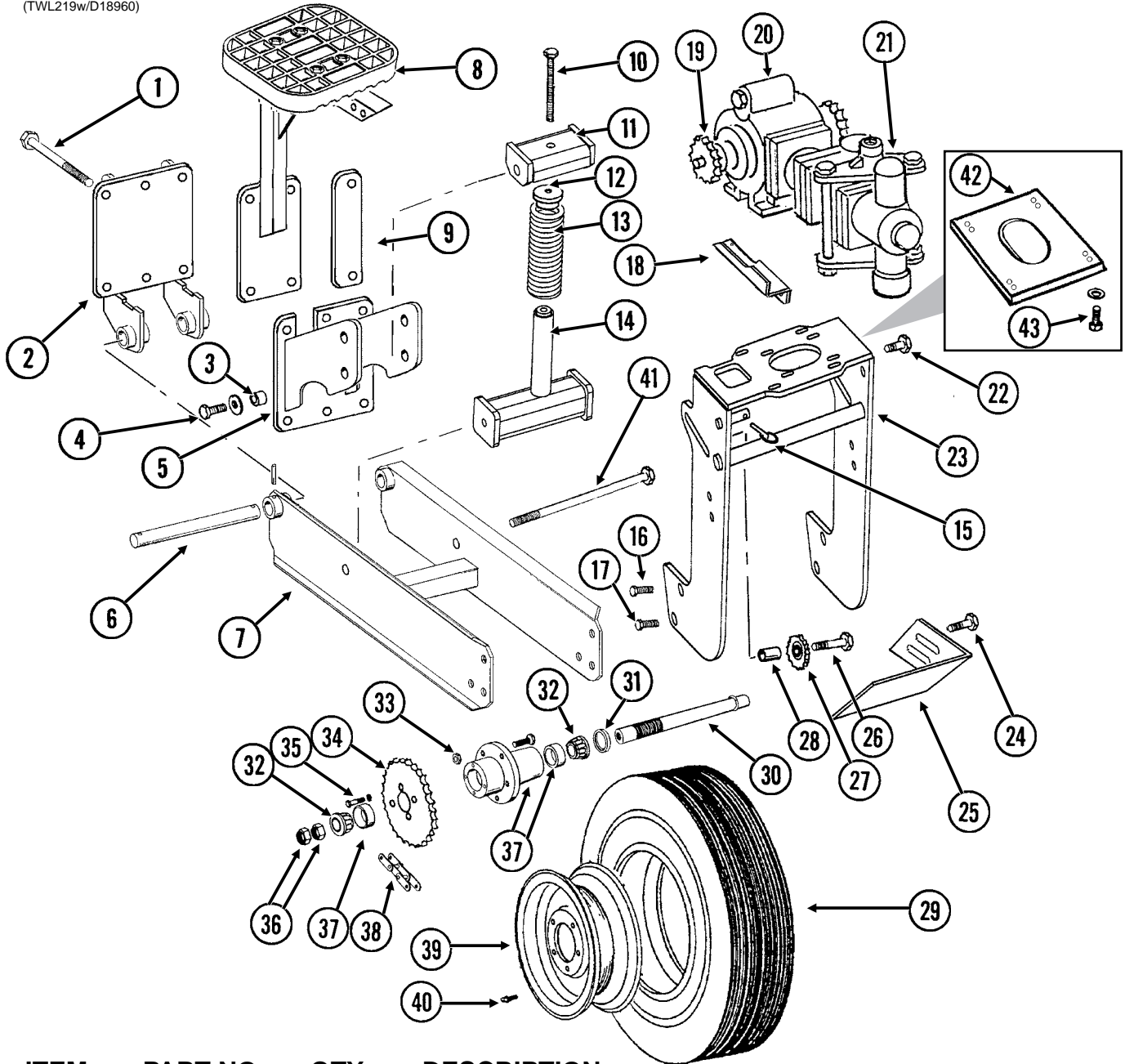


# LIQUID FERTILIZER TANKS, SADDLES, SADDLE MOUNTS AND HOSES (Conventional Planters)

ITEM	PART NO.	QTY.	DESCRIPTION
6.	GA10034	-	Tank W/Lid And Fittings, 24" x 125 Gallon (12 Row 30" - Qty. 4) (16 Row 30" - Qty. 2)
	GA10035	-	Tank W/Lid And Fittings, 24" x 175 Gallon (16 Row 30" - Qty. 2)
	GR1702	-	Lid/Fillwell, 8" (Top Of Tank)
	GR1708	-	3/4" Bulkhead Fitting Assembly (Overflow Fitting, Nut, Bushing And O-Ring) (Top And Bottom Of Tank)
	GR1709	-	1 1/4" Bulkhead Fitting Assembly (Nut, Bushing And O-Ring) (End Of Tank)
	GR1686	-	Lanyard, 12 1/2" (Top Of Tank)
7.	GA10833	4	Long Tank Mounting Strap
	GA10834	3	Short Tank Mounting Strap
	GA10835	1	Special Tank Mounting Strap
8.	GD1337	32	J-Bolt, 5/16"-18 (8 Per Tank)
	G10109	32	Lock Nut, 5/16"-18, Grade 8 (8 Per Tank)
9.	GD14517	2	Tank Pad, 6" x 16"
10.	G10096	4	Pipe Plug, 3/4" NPT
11.	GD3951	1	Dust Cap, 2" Cam Lock
12.	GD3622	1	Adapter, 2" Female NPT To Cam Lock
13.	GD10777	1	Dust Plug, 2" Male Cam Lock
14.	GD3623	1	Adapter, 2" Male NPT To Cam Lock
15.	GD1113	1	U-Bolt, 5" x 7" x 5/8"-11
	G10230	2	Lock Washer, 5/8"
	G10104	2	Hex Nut, 5/8"-11
16.	G10889	2	Elbow, 45°, 2" Male NPT To Female
17.	GA7845	1	Quick Fill Mount, 2"
18.	G10623	1	Close Nipple, 2" NPT
19.	GA2660	1	Shutoff Valve, 2" NPT
20.	G10630	1	Elbow, 90°, 2" NPT To Barb
21.	G10676	2	Hose Clamp, No. 36, Stainless Steel
22.	G4201-03	1	Hose, 2" x 18'
23.	G10619	6	Close Nipple, 1 1/4" NPT
24.	GA4976	5	Shutoff Valve, 1 1/4" NPT
	GR1015	-	Body O-Ring
	GR1016	-	Stem O-Ring
	GR1017	-	Teflon Seat
	GR1018	-	Ball
	GR1019	-	Handle
25.	G10719	2	Tee, 1 1/4" Female NPT
26.	G10674	-	Hose Clamp, No. 24
27.	G10626	6	Adapter, 1 1/4" NPT To Barb
28.	G4200-03	1	Hose, 1 1/4" x 32', 12 Row 30"
	G4200-06	-	Hose, 1 1/4" x 40', 16 Row 30"
29.	G10629	4	Elbow, 90°, 1 1/4" NPT To Barb
30.	G10616	2	Reducing Bushing, 2" Male NPT To 1 1/4" Female
31.	G10888	1	Tee, 2" Female NPT
32.	G10046	2	Hex Head Cap Screw, 5/8"-11 x 5"
	G10230	2	Lock Washer, 5/8"
	G10104	2	Hex Nut, 5/8"-11
33.	GD14522	1	Plate, 2" x 9 5/8"
34.	G10633	1	Tee, 1 1/4" Barb
35.	G10628	1	Adapter, 2" NPT To Barb
36.	GD11235	4	Hose Clamp, 2"
37.	G10203	4	Washer, 3/8" SAE
	G10108	4	Lock Nut, 3/8"-16

# LIQUID FERTILIZER PISTON PUMP MOUNT/DRIVE

(TWL219w/D18960)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10830	6	Hex Head Cap Screw, 5/8"-11 x 7 1/2"
	G10230	6	Lock Washer, 5/8"
	G10104	6	Hex Nut, 5/8"-11
2.	GA9711	1	Wheel Arm Mount
3.	GB0218	2	Bushing, 2 1/32" I.D. x 7/8" O.D. x 1 9/32" Long
4.	G10005	2	Hex Head Cap Screw, 5/8"-11 x 1 3/4"
	GD7805	2	Special Washer, 5/8", Hardened
	G10107	2	Lock Nut, 5/8"-11
5.	GA9712	1	Spring Mount
6.	GD2681	1	Pin, 1 1/4" x 13 1/2"
	G10460	2	Cotter Pin, 1/4" x 2"
7.	GA10621	1	Arm W/Grease Fittings
	G10641	2	Grease Fitting, 1/8" NPT
8.	-	-	See "Bulk Seed Hopper Catwalk", Pages P12 And P13
9.	GD13766	1	Spacer Plate (SDS Only)
10.	G10012	1	Hex Head Cap Screw, 5/8"-11 x 6 1/2"
	GD7805	1	Special Washer, 5/8", Hardened

P132

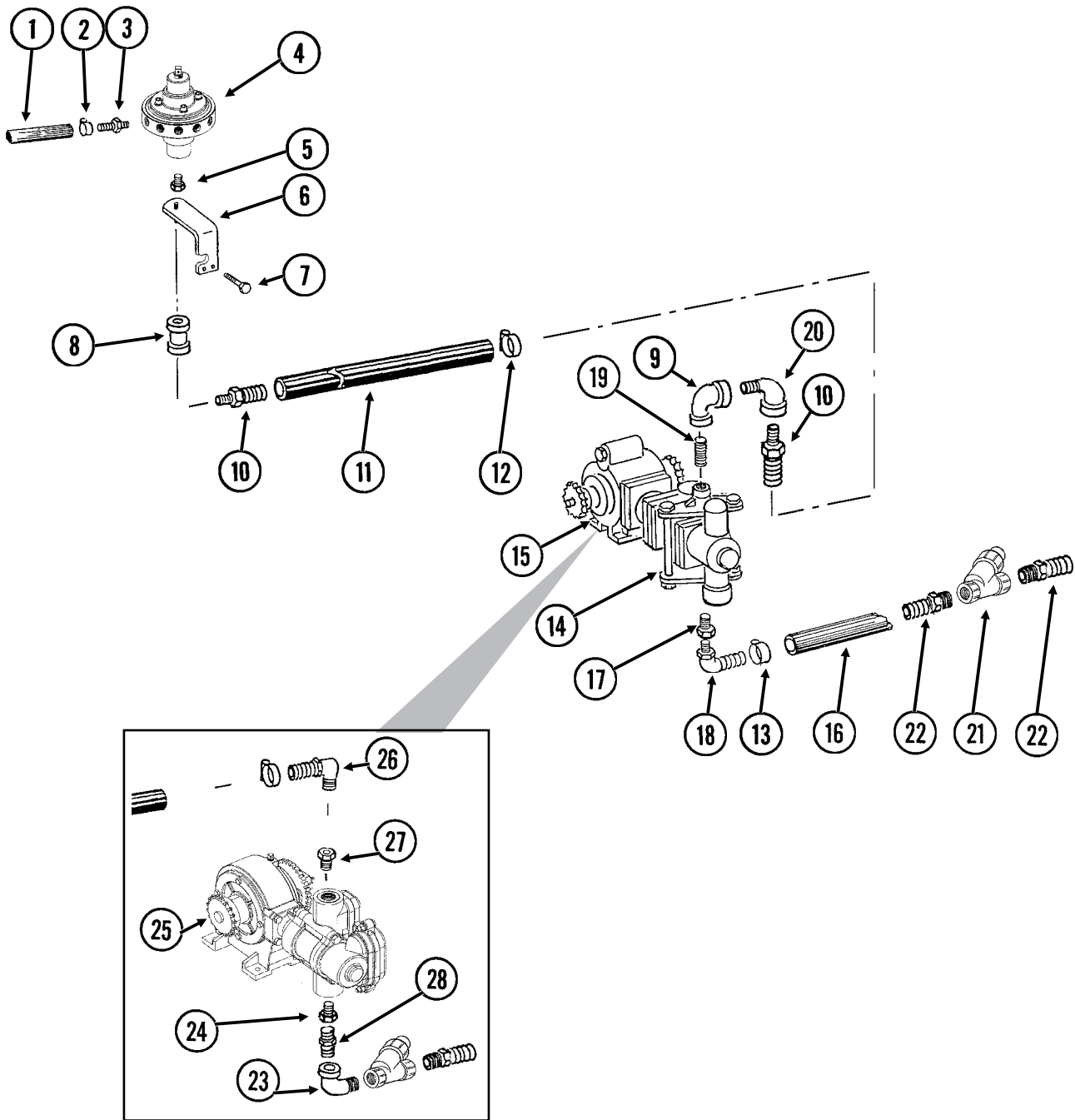
# LIQUID FERTILIZER PISTON PUMP MOUNT/DRIVE

ITEM	PART NO.	QTY.	DESCRIPTION
11.	GA10908	1	Spring Mount
12.	GB0196	1	Washer
13.	GD7831	1	Compression Spring
14.	GA10907	1	Spring Guide
15.	GD2558	1	Lynch Pin, 1/4"
16.	G10026	2	Hex Head Cap Screw, 3/4"-10 x 2"
	G10231	2	Lock Washer, 3/4"
17.	G11042	2	Hex Head Cap Screw, 3/4"-10 x 1 3/4"
	G10231	2	Lock Washer, 3/4"
	G10105	2	Hex Nut, 3/4"-10
18.	GD13744	1	Hose Holder
19.	GR1146	1	Sprocket, 18 Tooth
20.		-	See "Liquid Fertilizer Piston Pump (Crankcase Assembly)", Pages P134 And P135
	GR0200	1	Offset Link, No. 2050
21.		-	See "Liquid Fertilizer Piston Pump (Cylinder Assembly)", Pages P136 And P137
22.	G10007	2	Hex Head Cap Screw, 5/8"-11 x 1 1/2"
	G10217	2	Washer, 5/8" USS
	G10230	2	Lock Washer, 5/8"
	G10104	2	Hex Nut, 5/8"-11
23.	GA10893	1	Pump Mount
24.	G10017	2	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10216	2	Washer, 1/2" USS
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
25.	GD13328	1	Scraper
26.	G10013	1	Hex Head Cap Screw, 5/8"-11 x 3 1/2"
	G10205	1	Washer, 5/8" SAE
	G10230	1	Lock Washer, 5/8"
	G10104	1	Hex Nut, 5/8"-11
27.	GA0262	1	Idler Sprocket W/Bearing, 15 Tooth
28.	GD7817-05	1	Spacer, 1 1/16" I.D. x 1 1/4" Long
29.	GD0844	1	Tire, 7.60" x 15", 8 Ply (Specify Brand*)
30.	GA2559	1	Spindle
31.	GA0252	2	Seal
32.	GA0251	2	Bearing
33.	GR0267	5	Lug Nut, 1/2"-20
34.	G2500-84	1	Sprocket, 48 Tooth
35.	G10019	4	Hex Head Cap Screw, 5/16"-18 x 1"
	G10232	4	Lock Washer, 5/16"
36.	GD0831	2	Shoulder Nut, 1 1/4"-12 UNF-2A
37.	GA0547	1	Hub W/Cups And Studs, 5 Bolt
	GR0190	2	Cup
	GR0204	5	Stud
38.	G3200-59	1	Chain, No. 2050, 59 Pitch Including Connector Link And Offset Link, Used W/Model L-4405 Piston Pump
	G3200-62	1	Chain, No. 2050, 62 Pitch Including Connector Link And Offset Link, Used W/Model NGP-7055 Piston Pump
	GR0195	1	Connector Link, No. 2050
	GR0200	-	Offset Link, No. 2050
39.	GA0241	1	Wheel, 5" x 15"
40.	GD1166	1	Valve Stem
41.	G11122	1	Hex Head Cap Screw, 5/8"-11 x 12"
	G10107	1	Lock Nut, 5/8"-11
42.	GD18960	1	Adapter Plate (Used W/Model NGP-7055 Piston Pump - If Applicable)
43.	G10001	8	Hex Head Cap Screw, 3/8"-16 x 1"
	G10203	4	Washer, 3/8" SAE

\* Specific brand requests will be supplied only as available from current KINZE® Repair Parts stock. If a specific brand requested is not in stock, the brand available will be supplied. Different brand tires may have different diameters. Change in tire brand may affect rates. Field checks are recommended after any change in tires.

# LIQUID FERTILIZER FLOW DIVIDER MOUNT AND HOSES

(FRTZ215c/FRTZ297aa)



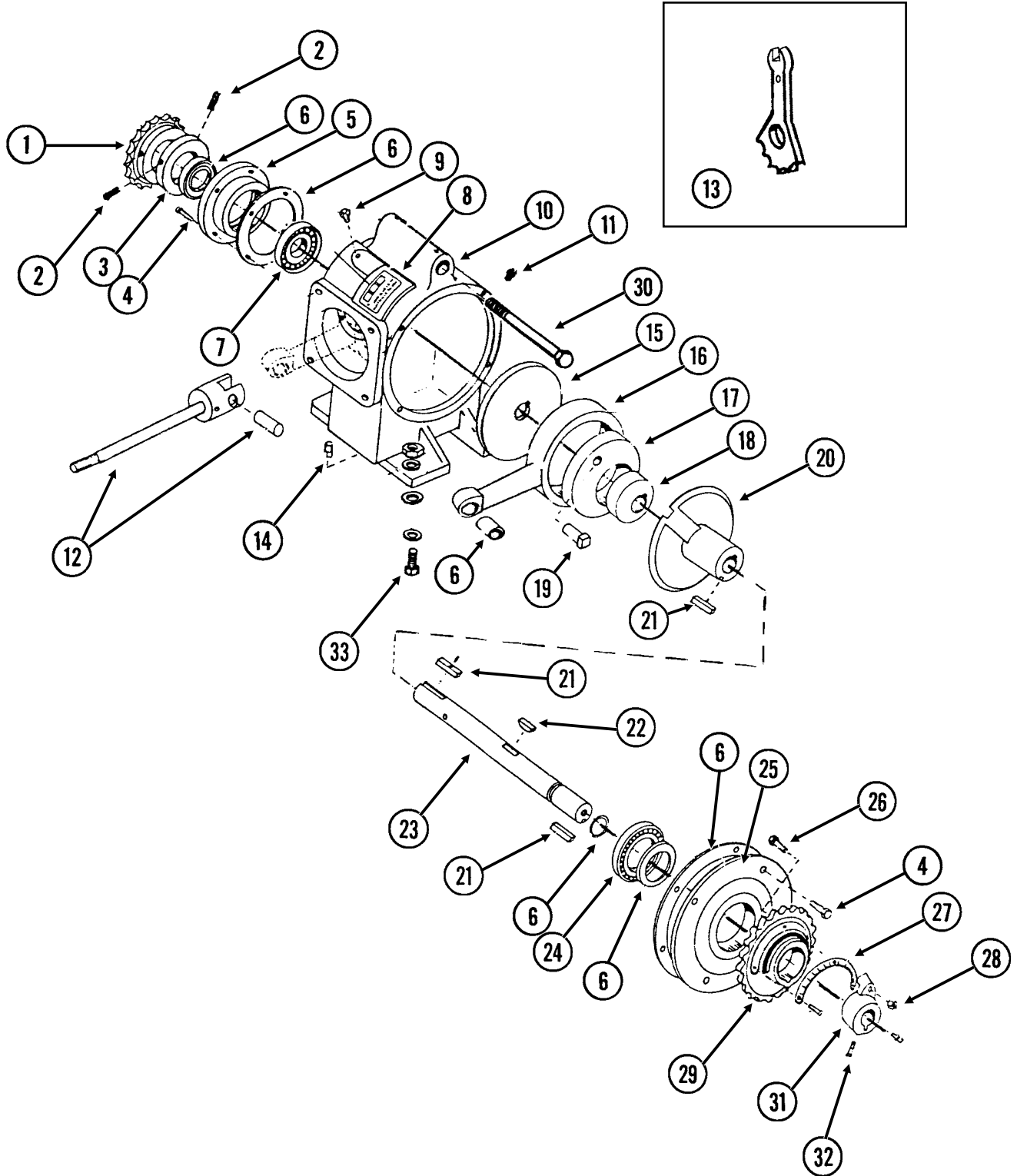
# LIQUID FERTILIZER FLOW DIVIDER MOUNT AND HOSES

ITEM	PART NO.	QTY.	DESCRIPTION
1.	G4301-06	1	Hose, 3/8" x 160', 12 Row 30"
	G4301-05	2	Hose, 3/8" x 120', 16 Row 30"
2.	G10681	24-32	Hose Clamp, No. 6
3.	GD11700	12-16	Adapter, 1/4" NPT To 3/8" Barb
4.		-	See "Liquid Fertilizer Piston Pump Flow Dividers", Pages P142 And P143
5.	G10995	1	Reducing Bushing, 1" Male NPT To 3/4" Female, Stainless Steel, 16 Row 30"
6.	GA10110	1	Support, 3/4" NPT
7.	G10004	2	Hex Head Cap Screw, 3/8"-16 x 1 1/4" (Conventional)
	G10325	2	Hex Head Cap Screw, 3/8"-16 x 2 3/4" (SDS)
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
8.	G11083	1	Coupler, 3/4" Female NPT
9.	G10733	1	Elbow, 90°, 3/4" Female NPT
10.	G10734	2	Adapter, 3/4" NPT To Barb
11.	G4205-10	-	Hose, 3/4" x 200"
12.	G10278	2	Hose Clamp, No. 16
13.	G10674	2	Hose Clamp, No. 24
14.		-	See "Liquid Fertilizer Piston Pump (Cylinder Assembly)", Pages P138 And P139
15.		-	See "Liquid Fertilizer Piston Pump (Crankcase Assembly)", Pages P136 And P137
16.		-	Hose, 1 1/4", See "Liquid Fertilizer Tanks, Saddles, Saddle Mounts And Hoses", Pages P128-P131
17.	G10615	1	Reducing Bushing, 1 1/2" Male NPT To 1 1/4" Female
18.	G10629	1	Elbow, 90°, 1 1/4" NPT To Barb
19.	G10389	1	Pipe Nipple, 3/4" NPT x 1 1/2" Long
20.	G10735	1	Elbow, 90°, 3/4" Male NPT To Female
21.	GA3893	1	Strainer Complete
	GR0880	-	Screen, No. 40 Mesh
	GR0881	-	Gasket
	GR0882	-	Y-Body
	GR0883	-	End Cap
22.	G10626	2	Adapter, 1 1/4" NPT To Barb
23.	G10887	1	Elbow, 90°, 1 1/4" Male NPT To Female
24.	G10615	1	Reducing Bushing, 1 1/2" Male NPT To 1 1/4" Female
25.			See "Liquid Fertilizer Piston Pump W/18 Tooth Sprocket", P140 and P141
26.	G10917	1	Elbow, 90°, 3/4" NPT To Barb
27.	G11237	1	Reducing Bushing, 1 1/2" Male NPT To 3/4" Female
28.	G10619	1	Close Nipple, 1 1/4" NPT

# LIQUID FERTILIZER PISTON PUMP (Crankcase Assembly)

(PT38a/GR1100)

## John Blue® Model L-4405



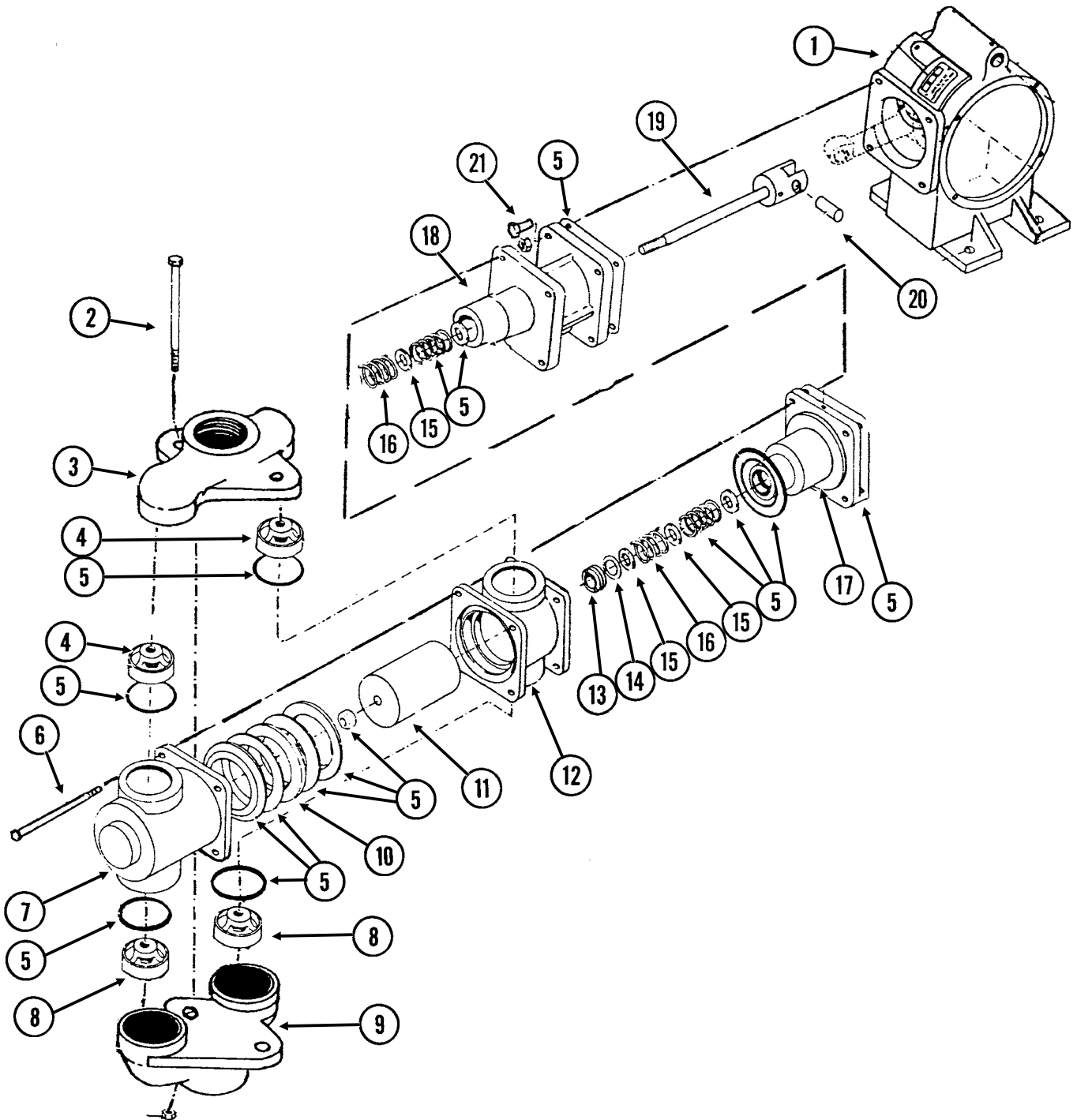
# LIQUID FERTILIZER PISTON PUMP (Crankcase Assembly)

ITEM	PART NO.	QTY.	DESCRIPTION
1.		-	See "Liquid Fertilizer Piston Pump Mount/Drive", Pages P132 And P133
2.	G10688	2	Square Head Set Screw, 3/8"-16 x 5/8"
3.	GR1147	1	Spacer
4.	G10019	4	Hex Head Cap Screw, 5/16"-18 x 1"
5.	GR1102	1	Housing
6.	GR1173	-	Repair Kit, Includes Item 5 On "Liquid Fertilizer Piston Pump (Cylinder Assembly)", Pages P138 And P139
7.	GR1104	1	Bearing
8.	GR1105	1	Name Plate
9.	G10054	2	Hex Head Cap Screw, 5/16"-18 x 1/2"
10.	GR1106	1	Crankcase
11.	GR1107	1	Vent Plug
12.		-	See "Liquid Fertilizer Piston Pump (Cylinder Assembly)", Pages P138 And P139
13.	GR1100	1	Adjustment Wrench
14.	GR1123	3	Plug
15.	GR1108	1	Disc
16.	GR1109	1	Connecting Rod
17.	GR1110	1	Large Eccentric
18.	GR1111	1	Small Eccentric
19.	GR1120	1	Eccentric Pin
20.	GR1119	1	Sleeve
21.	GR1118	3	Setting Arm Key
22.	GR1112	1	Woodruff Key
23.	GR1148	1	Crankshaft
24.	GR1116	1	Bearing
25.	GR1166	1	Cover Plate
26.	GR1167	1	Square Head Cap Screw, 3/8"-16 x 1 3/4"
27.	GR1168	1	Scale
28.	G10108	1	Lock Nut, 3/8"-16
29.	GR1114	1	Flange
30.	G10318	1	Hex Head Cap Screw, 5/8"-11 x 4 1/2"
	G10104	1	Hex Nut, 5/8"-11
31.	GR1165	1	Arm
32.	G10693	4	Hex Socket Head Set Screw, 5/16"-18 x 3/8"
33.	G10003	4	Hex Head Cap Screw, 3/8"-16 x 1 1/2"
	GR1122	4	Mounting Pad
	G10210	8	Washer, 3/8" USS
	G10229	4	Lock Washer, 3/8"
	G10101	4	Hex Nut, 3/8"-16
A.	GA6154	1	Piston Pump Complete Less Sprocket (Model L-4405), Includes Crankcase (Items 2-33 On This Page) And Cylinder (Items 1-22 On Pages P138 And P139) Assemblies

# LIQUID FERTILIZER PISTON PUMP (Cylinder Assembly)

(PT39a)

John Blue® Model L-4405





# LIQUID FERTILIZER PISTON PUMP (Cylinder Assembly)

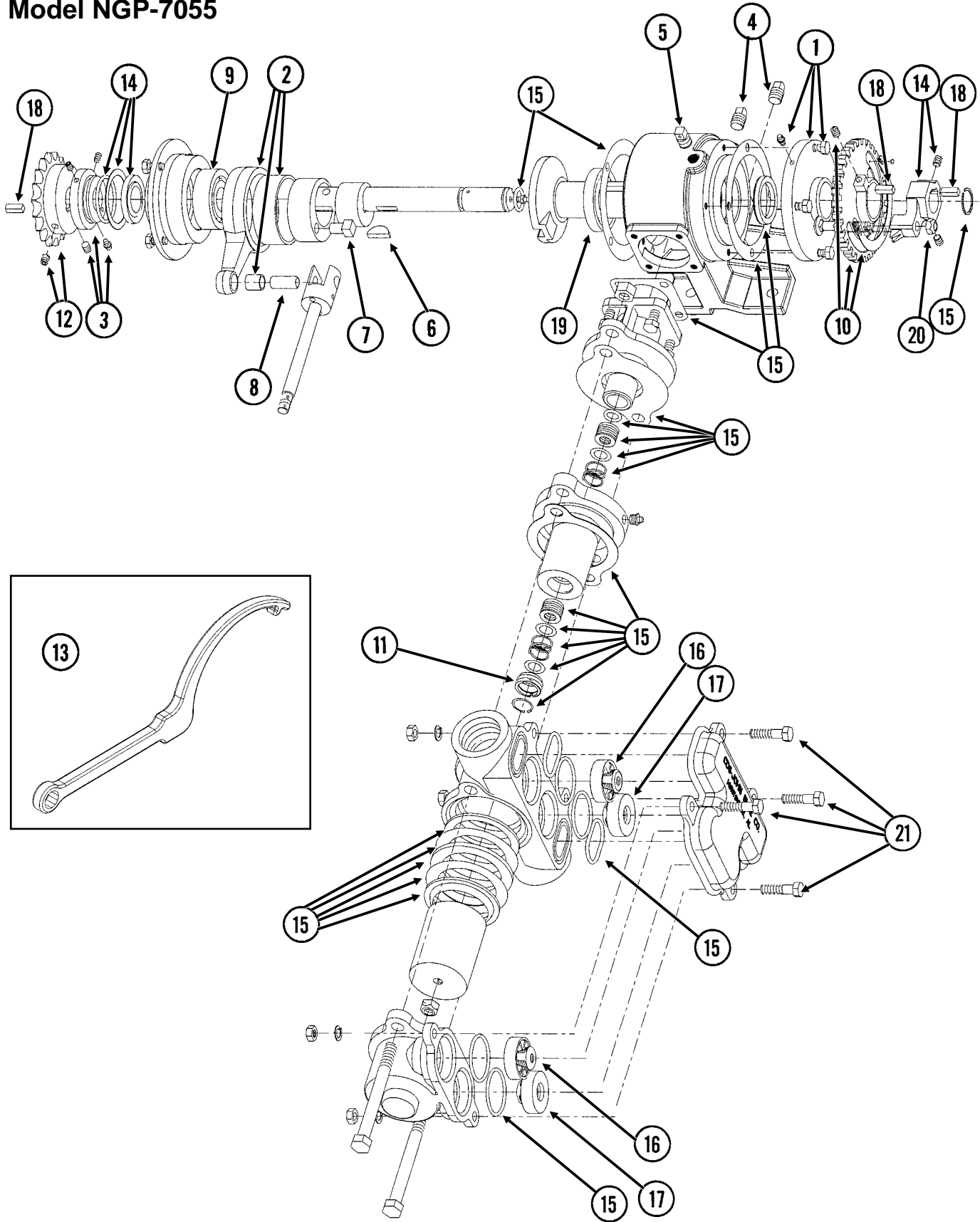
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ITEM	PART NO.	QTY.	DESCRIPTION
1.		-	See "Liquid Fertilizer Piston Pump (Crankcase Assembly)", Pages P136 And P137
2.	G10686	2	Hex Head Cap Screw, 3/8"-16 x 8"
	G10101	2	Hex Nut, 3/8"-16
3.	GR1145	1	Discharge Manifold
4.	GR1144	2	Discharge Valve
5.	GR1173	-	Repair Kit, Includes Item 6 On "Liquid Fertilizer Piston Pump (Crankcase Assembly)", Pages P136 And P137
6.	G10687	4	Hex Head Cap Screw, 3/8"-16 x 5 1/2"
	G10101	4	Hex Nut, 3/8"-16
7.	GR1143	1	Outboard Cylinder
8.	GR1142	2	Suction Valve
9.	GR1140	1	Suction Manifold
10.	GR1137	1	Flange Packing Washer
11.	GR1136	1	Plunger
12.	GR1135	1	Inboard Cylinder
13.	GR1134	1	Stuffing Box Insert
14.	GR1133	1	Retaining Ring
15.	GR1129	3	Washer
16.	GR1130	2	Packing Spring
17.	GR1132	1	Outboard Stuffing Box
18.	GR1127	1	Crosshead Guide
19.	GR1125	1	Piston Rod
20.	GR1124	1	Pin
21.	G10019	4	Hex Head Cap Screw, 5/16"-18 x 1"

# LIQUID FERTILIZER PISTON PUMP Uses 18 Tooth Sprocket

(A12335a/GR1808)

## Model NGP-7055



# LIQUID FERTILIZER PISTON PUMP

## Uses 18 Tooth Sprocket

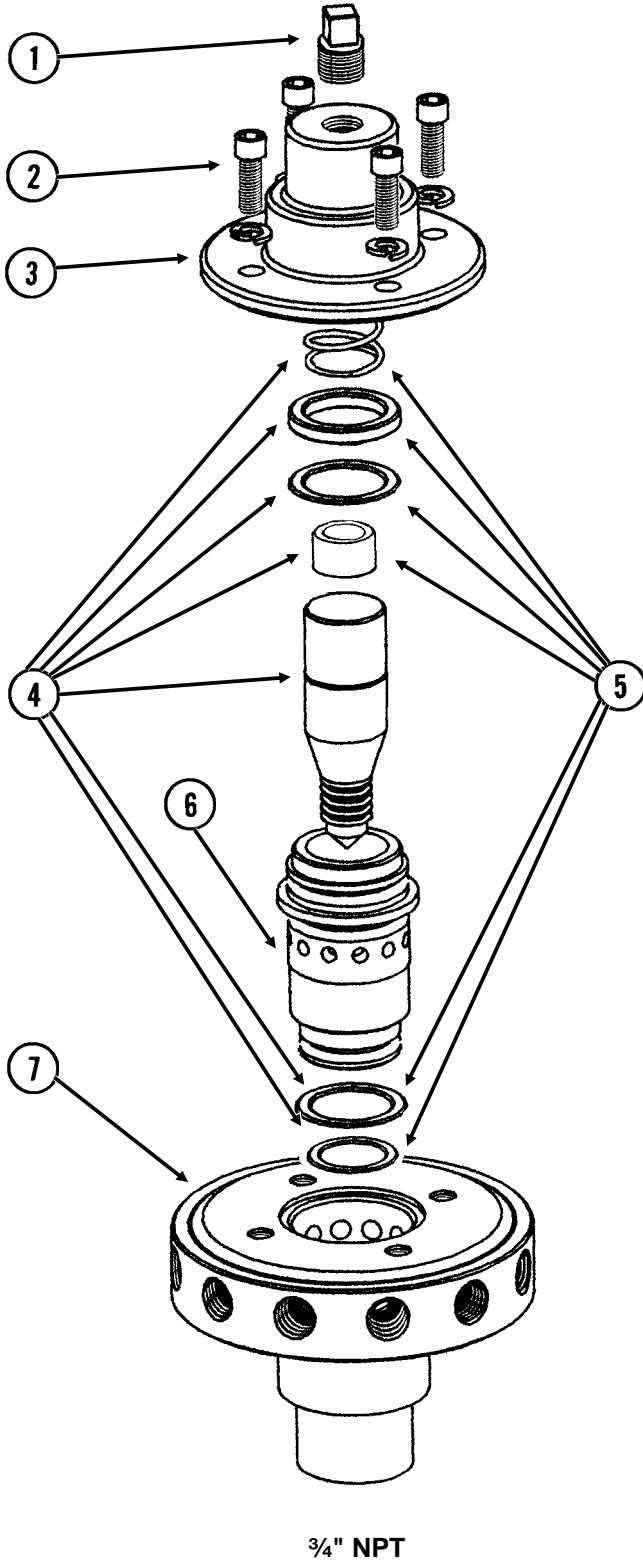
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ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1804	1	Flange Cover Assembly
	G10991	4	Hex Head Cap Screw, 5/16"-18 x 7/8"
2.	GR1803	1	Connecting Rod Assembly
3.	GR1801	1	Spacer Assembly
	G10693	3	Hex Socket Head Set Screw, 5/16"-18 x 3/8"
4.	GR1123	2	Plug
5.	GR1543	1	Vent Plug
6.	GR1112	1	Woodruff Key
7.	GR1120	1	Eccentric Pin
8.	GR1124	1	Pin
9.	GR1104	1	Bearing
10.	GR1805	1	Setting Hub Assembly
11.	GR1134	1	Stuffing Box Insert
12.	GR1146	1	Sprocket, 18 Tooth
13.	GR1808	1	Adjustment Wrench
14.	GR1806	1	Setting Pointer Assembly
15.	GR1796	1	Repair Kit, Includes: (6) Gaskets, (9) O-Rings, (4) Washers, (1) Retaining Ring, (2) Oil Seals, (1) Snap Ring, (1) Thrust Washer, (1) Rod Bushing, (2) Flange Plunger Packings, (2) Packing Springs, (2) Rod Vee Packing Sets
16.	GR1800	2	Discharge Valve Assembly
17.	GR1798	2	Suction Valve Assembly
18.	GR1118	3	Setting Arm Key
19.	GR1116	1	Bearing
20.	G10306	1	Carriage Bolt, 3/8"-16 x 2"
	G10108	1	Lock Nut, 3/8"-16
21.	G10003	4	Hex Head Head Cap Screw, 3/8"-16 x 1 1/2"
	G10210	4	Washer, 3/8" USS
	G10229	4	Lock Washer, 3/8"
	G10101	4	Hex Nut, 3/8"-16
A.	GA12335	-	Piston Pump Complete W/18 Tooth Sprocket (Model NGP-7055)

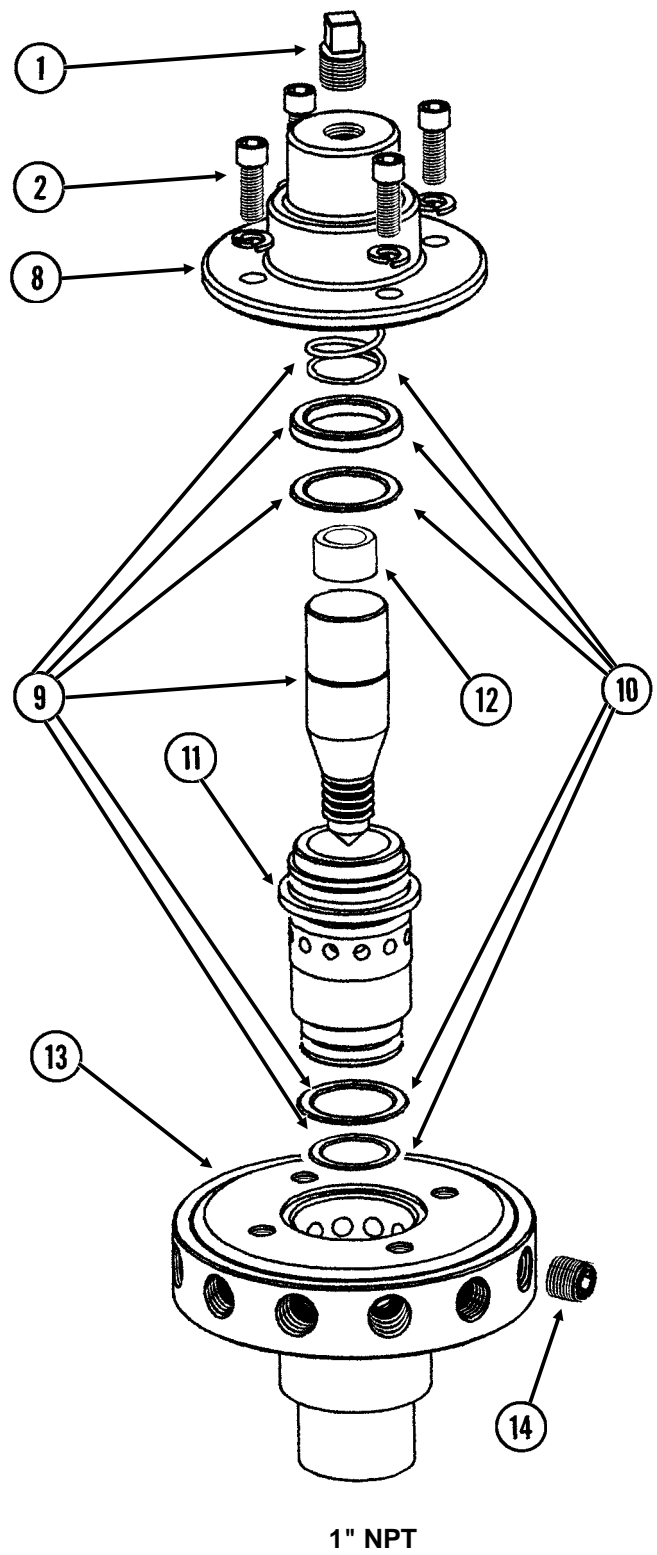
# LIQUID FERTILIZER PISTON PUMP FLOW DIVIDERS

(FRTZ202a/FRTZ202c/FRTX202d)

**12 Row 30"**  
**Model FD-1200 Flow Divider,**  
**12 Outlet**



**16 Row 30"**  
**Model FD-2000 Flow Divider,**  
**20 Outlet**



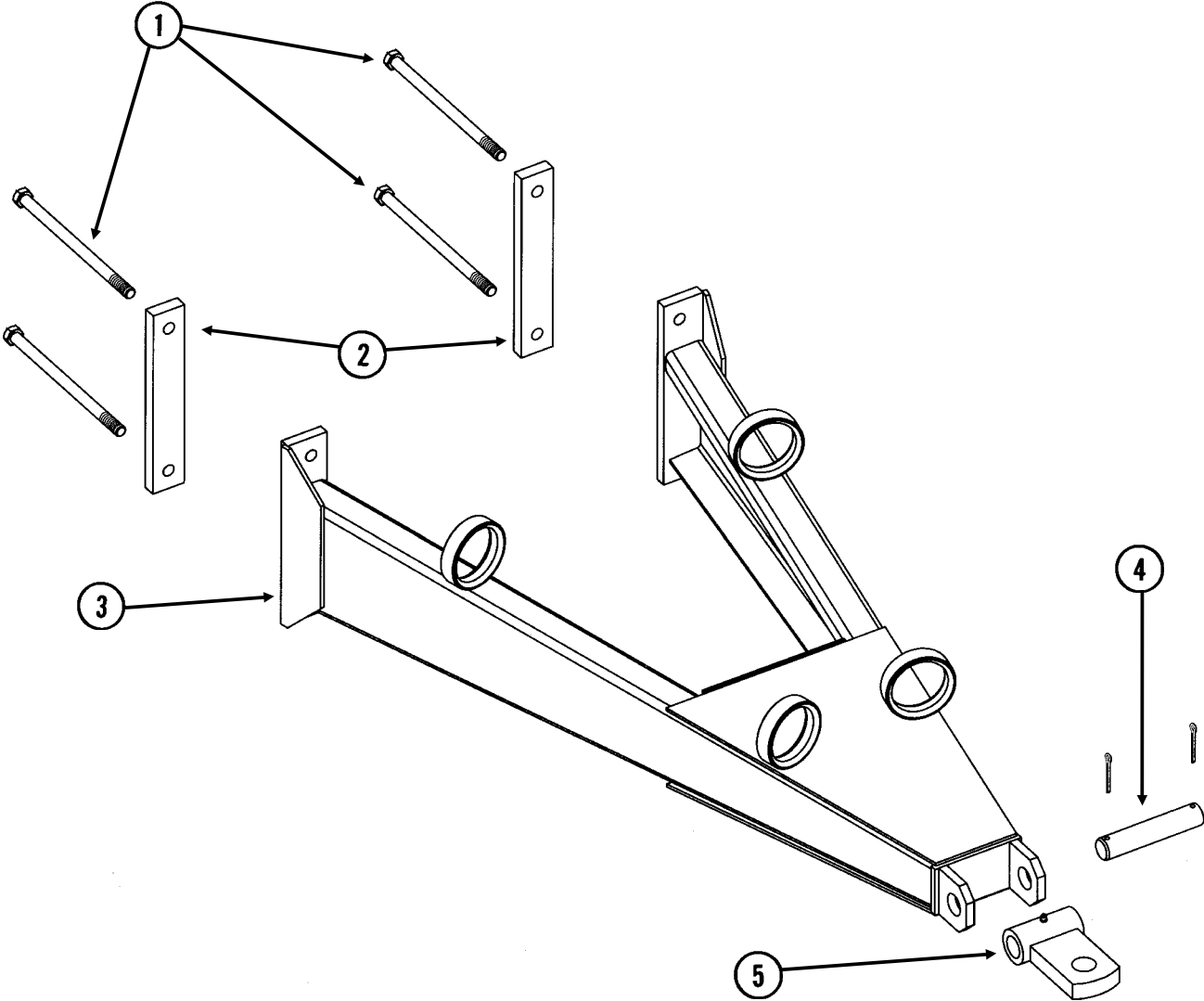
# LIQUID FERTILIZER PISTON PUMP FLOW DIVIDERS

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ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1543	1	Vent Plug
2.	GR1542	4	Hex Socket Head Screw, 1/4"-20 x 3/4"
	GR1541	4	Lock Washer, 1/4", Stainless Steel
3.	GR1540	1	Cap
4.	GR1544	1	Needle Assembly W/Seal Kit (Item 11)
5.	GR1545	1	Seal Kit, Includes: (3) O-Rings, (1) Seal, (1) Spring, (1) Stainless Steel Sleeve
6.	GR1535	1	Sleeve
7.	GR1533	1	Body, (12 Outlet)
8.	GR1566	1	Cap
9.	GR1567	1	Needle Assembly W/Seal Kit (Item 11)
10.	GR1568	1	Seal Kit, Includes: (3) O-Rings, (1) Seal, (1) Spring
11.	GR1561	1	Sleeve
12.	GR1574	1	Sleeve, 1" O.D. x 1/2" Long, Stainless Steel
13.	GR1559	1	Body, 20 Outlets
14.	G10350	4	Hex Socket Head Plug, 1/4" NPT, Stainless Steel
A.	GA8931	1	Liquid Fertilizer Piston Pump Flow Divider Complete, 12 Outlet (Model FD-1200)
B.	GA9407	1	Liquid Fertilizer Piston Pump Flow Divider Complete, 20 Outlet (Model FD-2000)

# REAR TRAILER HITCH

(A9895b)



# REAR TRAILER HITCH

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ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10668	4	Hex Head Cap Screw, 5/8"-11 x 11"
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
2.	GD14150	2	Clamp, 2" x 11 3/4"
3.	GA9896	1	Hitch
4.	GD8839	1	Pin, 1 1/4" x 6 1/4"
	G10460	2	Cotter Pin, 1/4" x 2"
5.	GA6177	1	Clevis W/Grease Fitting
	G10640	-	Grease Fitting, 1/4"-28

# DECALS, PAINT AND MISCELLANEOUS



1



2



4



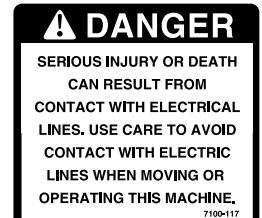
3



5



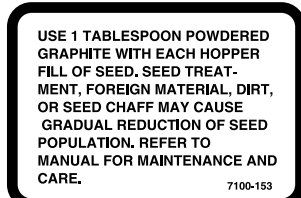
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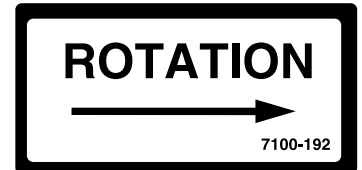
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10



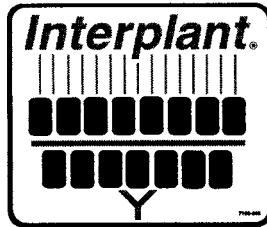
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14

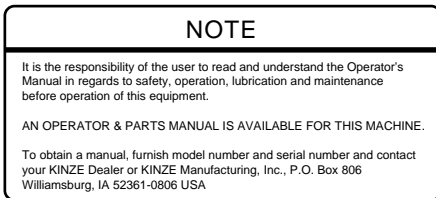
TRANSMISSION RATE REDUCTION		
DRIVE	DRIVEN	% REDUCTION IN POPULATION
15	30	50
17	30	43
23*	30	23
24	30	20
25*	30	17
26*	30	13
27	30	10

\* Use sprockets off seed drive transmission

15



16



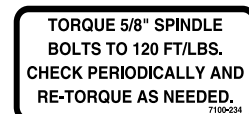
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19



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21

# KINZE 3650

22



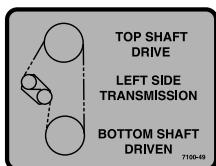
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25



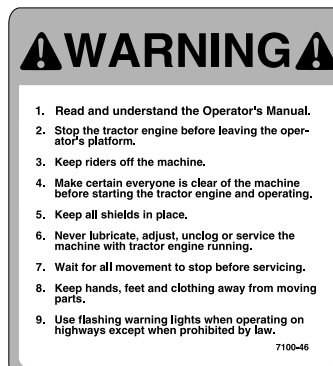
23



26



27



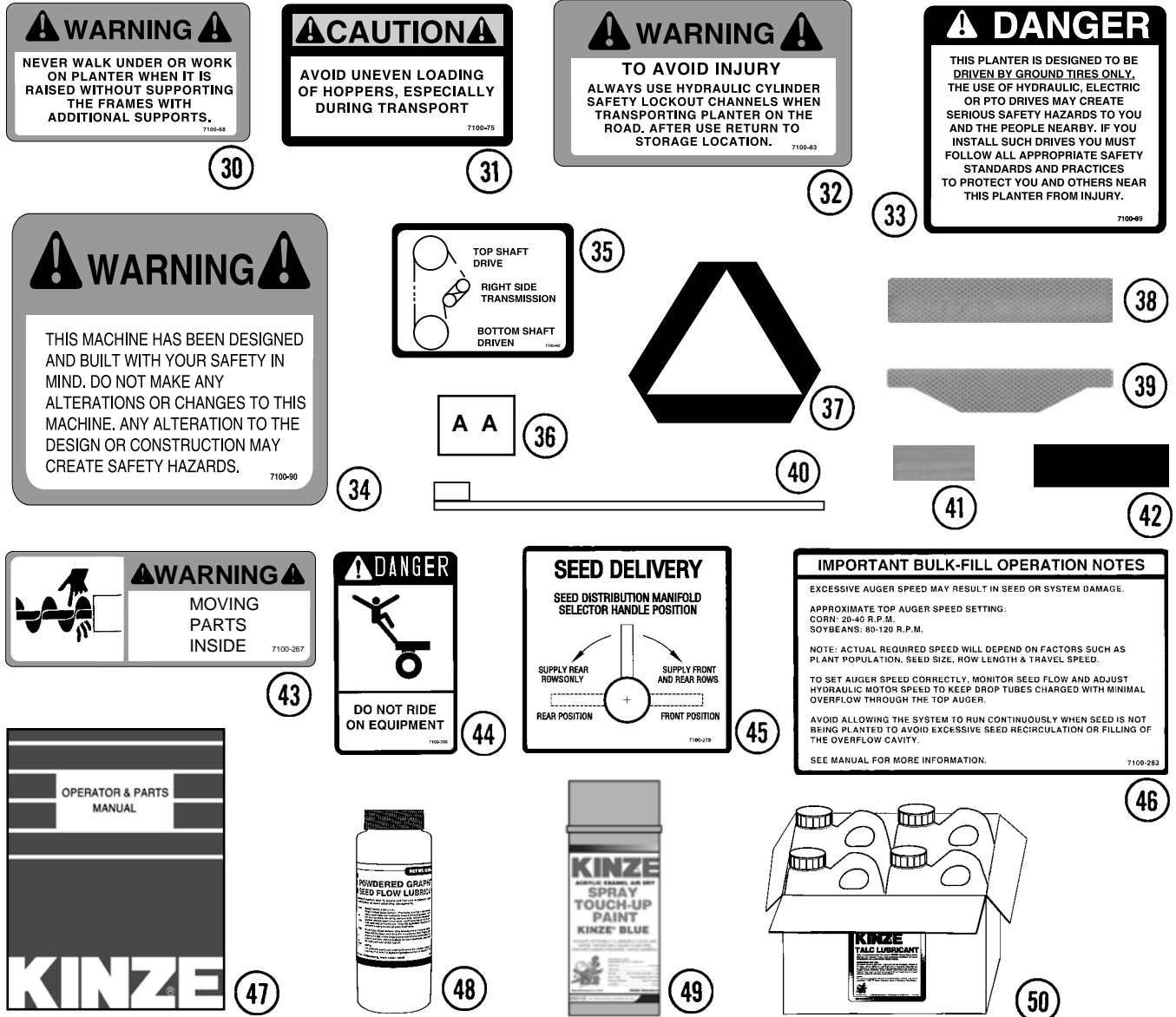
28



29



# DECALS, PAINT AND MISCELLANEOUS



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G7100-02	3	Decal, Warning
2.	G7100-110	-	Decal, Grease Weekly
3.	G7100-111	-	Decal, Oil Daily
4.	G7100-116	-	Decal, Grease Daily
5.	G7100-277	-	Decal, Grease Annually
6.	G7100-115	-	Decal, Warning (1 Per Granular Chemical Hopper)
7.	G7100-117	1	Decal, Danger
8.	G7100-172	-	Decal, Warning
9.	G7100-153	-	Decal, Information (1 Per Brush-Type Seed Meter)
10.	G7100-177	1	Decal, Twin-Line®, ¾" x 3"
11.	G7100-200	-	Decal, Warning
12.	G7100-192	-	Decal, Point Row Clutch Rotation
13.	G7100-201	1	Decal, Information
14.	G7100-208	-	Decal, Interplant®
15.	G7100-214	-	Decal, Two-Speed Point Row Clutch Rate Reduction
16.	G7100-215	1	Decal, Danger
17.	G7100-217	-	Decal, Note

# DECALS, PAINT AND MISCELLANEOUS

ITEM	PART NO.	QTY.	DESCRIPTION
18.	G7100-219	-	Decal, Warning
19.	GD13704-01	-	Foam Seal, ¼" x ¼" x 102"
	GD13705-02	-	Foam Seal, ½" x ½" x 11 ¾"
	GD13705-03	-	Foam Seal, ½" x ½" x 36"
20.	G7100-234	-	Decal, Bolt Torque
21.	G7100-247	-	Decal, Logo, 4 ⅜" x 4 ½" (2 Per Row Unit)
	G7100-252	-	Decal, Logo, 3 ½" x 3 ⅝" (Hopper Panel Extension)
22.	G7100-264	2	Decal, 3650
23.	G7100-249	-	Decal, Caution
24.	G7100-295	-	Decal, Spring Tension Release
25.	G7100-42	4	Decal, Warning
26.	G7100-49	1	Decal, Left Side Transmission
27.	G7100-302	1	Decal, Warning
28.	G7100-46	1	Decal, Warning
29.	G7100-63	2	Decal, Caution
30.	G7100-68	3	Decal, Warning
31.	G7100-75	4	Decal, Caution
32.	G7100-83	2	Decal, Warning (1 Per Marker Lockup)
33.	G7100-89	2	Decal, Danger
34.	G7100-90	1	Decal, Warning
35.	G7100-92	1	Decal, Right Side Transmission
36.	GD10057-01	-	Hose Identification Sleeve, Red AA
	GD10057-02	-	Hose Identification Sleeve, Red BB
	GD10057-03	-	Hose Identification Sleeve, Blue AA
	GD10057-04	-	Hose Identification Sleeve, Blue BB
	GD10057-05	-	Hose Identification Sleeve, Green AA
	GD10057-06	-	Hose Identification Sleeve, Green BB
37.	GD2199	1	SMV Sign
38.	G7100-258	-	Reflective Decal, Red, 1 ½" x 9", Rectangular (If Applicable)
	G7100-259	-	Reflective Decal, Amber, 1 ½" x 9", Rectangular (If Applicable)
	G7100-260	-	Reflective Decal, Orange, 1 ½" x 9", Rectangular (If Applicable)
39.	G7100-261	-	Reflective Decal, Red, 1 ¾" x 9", Die-Cut (If Applicable)
	G7100-262	-	Reflective Decal, Amber, 1 ¾" x 9", Die-Cut (If Applicable)
	G7100-263	-	Reflective Decal, Orange, 1 ¾" x 9", Die-Cut (If Applicable)
40.	GD1512	-	Tie Strap, 7 ½"
	GD2117	-	Tie Strap, 14 ½"
	GD1162	-	Tie Strap, 28"
	GD2984	-	Tie Strap, 34"
41.	G7100-276	-	Reflective Decal, Orange, 1" x 2 ¼", Rectangular
42.	GD13706-01	-	Anti-Slip Tape, 4" x 9"
	GD13706-03	-	Anti-Slip Tape, 4" x 16"
	GD13706-04	-	Anti-Slip Tape, 4" x 10"
	GD13706-05	-	Anti-Slip Tape, 4" x 42"
43.	G7100-267	-	Decal, Warning
44.	G7100-266	-	Decal, Danger
45.	G7100-279	-	Decal, Seed Delivery (Located On Underside Of Bulk Hopper Lid)
46.	G7100-283	-	Decal, Important (Located On Underside Of Bulk Hopper Lid)
47.	GM0198	-	Operator & Parts Manual, Model 3650 (Mechanical Seed Metering)
48.	GR0146MPP	-	Powdered Graphite, Twenty-Four 1 Pound Containers
49.	GR0155MPP	-	Blue Paint, Twelve Aerosol Cans
50.	GR1570MPP	-	Talc Lubricant, Four 8 Pound Containers
	GR1828	-	Talc Lubricant, 30 Pound Container

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