

# MODEL 3400 TWIN-LINE® PLANTER (EdgeVac® Seed Metering) OPERATOR & PARTS MANUAL

M0209

2/07

This manual is applicable to: Model: 3400 Twin-Line® Planters  
Serial Number: 625094 And On

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

Model Number 3400

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.

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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 and optional attachments are properly spaced and correctly assembled.
- The second stage row marker assemblies and blade assemblies have been removed from their shipping location and installed on the row marker assembly at each end of the planter. See "Row Marker Length Adjustment" in the Machine Operation section of the Operator & Parts Manual.
- 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.
- Inflate tires to specified PSI air pressure. Tighten wheel lug bolts and/or 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.
- Check electrical wiring connections and operation.
- 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.***

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

## OWNER REGISTER

Name \_\_\_\_\_ Delivery Date \_\_\_\_\_  
Street Address \_\_\_\_\_ Model No. 3400 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.
- Check for proper operation of vacuum fan with tractor to be used with planter.
- 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.***

---

(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.
- Check with the customer as to the performance of the EdgeVac® Seed Metering System.
- 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*

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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 information which, if not heeded, could result in damage to the machine.



**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

The Model 3400 Twin-Line® Planter is factory-assembled in a 12 Row 20" configuration. The machine is designed to allow re-configuration for 22" rows. Optional ultra-narrow 10" or 11" row spacings are obtainable with the addition of Interplant® push row units.

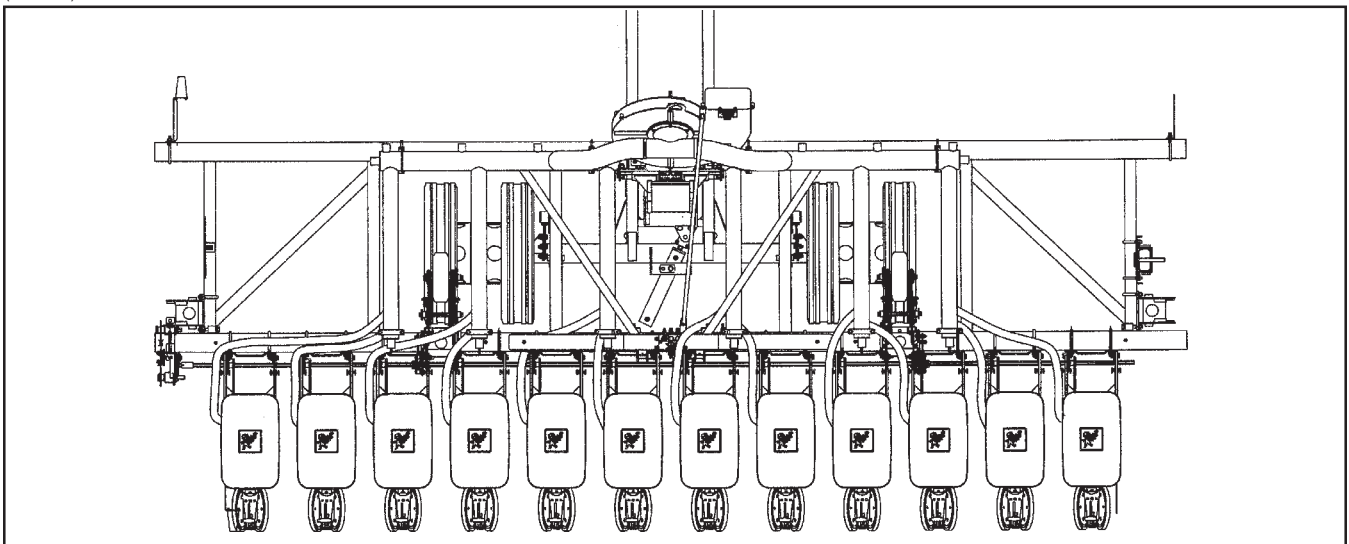
The Model 3400 Twin-Line® Planter permits installation of liquid fertilizer application equipment and various row unit attachments.

## GENERAL INFORMATION

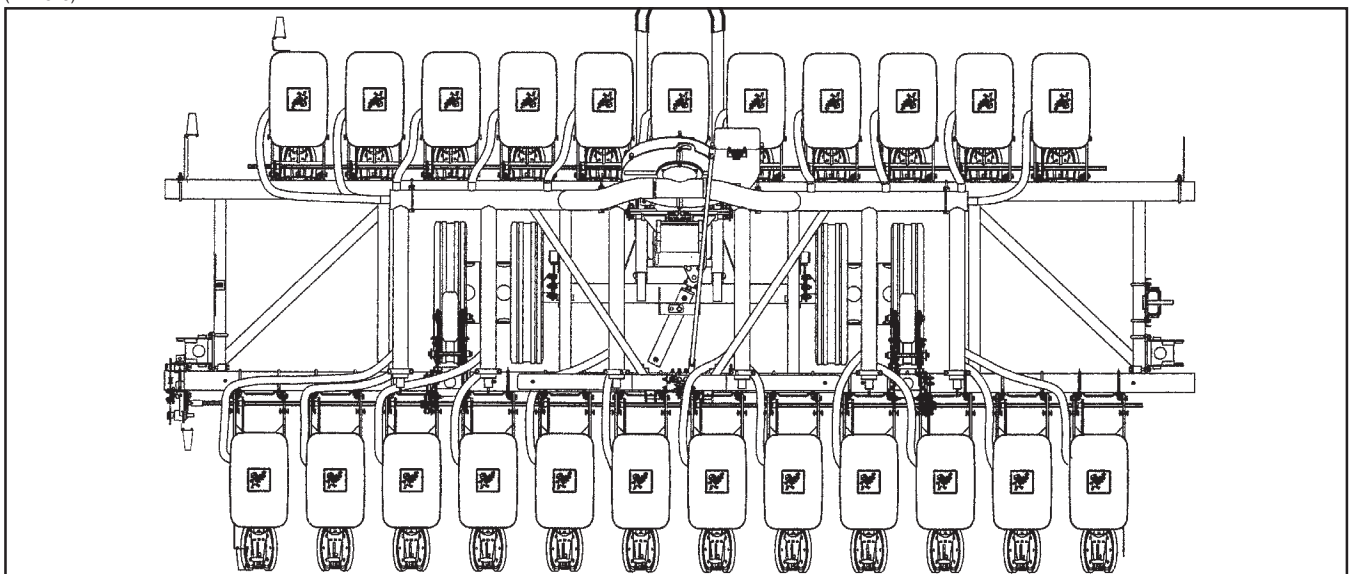
The information used in this manual was current at the time of printing. However, due to KINZE's continual attempts to improve its product, production changes may cause your machine to appear slightly different in detail. KINZE Manufacturing, Inc. reserves the right to change specifications or design 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.

(TWL314)



(TWL315)



Model 3400 Planter Shown With Interplant® Package Installed

# INTRODUCTION

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# SPECIFICATIONS

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**BASE MACHINE TYPE** - Pull Type - Rigid Frame - Hydraulically rotates endwise to transport

**SEED METER TYPE** - EdgeVac® Seed Metering System

**EDGEVAC® SEED METERING SYSTEM INCLUDES -**

EdgeVac® Seed Meters (Less Seed Discs), Meter Drive Clutches, No. 41 Chains, 1.75 Bu. Seed Hoppers With Lids, 20" Diameter Vacuum Fan With Mounting Components, Hydraulic Motor, Hoses And Fittings, 4" Diameter Vacuum Feed Hoses, Distribution Manifolds And 2" Diameter Vacuum Distribution Hoses

**PLANTING UNIT TYPES** - Push and Pull Row Units

<b>ROW SPACING - Standard</b>	<b>Interplant® Package</b>
12 - 20" Rows	23 - 10" Rows
12 - 22" Rows	23 - 11" Rows

**DRIVE SYSTEM** - Spring-Loaded Contact Drive System  
- Two 4.10" x 6" Contact Drive Tires  
- No. 40 Chain And Spring-Loaded Idlers  
- 7/8" Hex Drill And Drive Shafts And End Mounted Seed Transmission

**TRANSPORT TIRES** - Four 255 - 70R x 22.5" Radial Load Range H Tubeless Rib Implement Tires With Custom Center Groove

**LIFT** - One Master Cylinder - Two Slave Cylinders With Counter Balance Valves

**SEED METER/VACUUM SYSTEM HYDRAULIC REQUIREMENTS -**

- 13 GPM @ 2000 PSI  
- Zero PSI Case Drain Plus One Remote Outlet (Pressure And Return) For Vacuum Fan Hydraulic Motor

**ROW MARKERS** - Independently Controlled - Two-Fold Low Profile

**MACHINE OPTIONS**

- Electronic Seed Monitors
  - KPM I
  - KPM II Stack-Mode With Magnetic Distance Sensor Or Radar Distance Sensor
  - KPM III With Magnetic Distance Sensor Or Radar Distance Sensor
- Interplant® Package Options
- Auxiliary Work Lights Package
- Liquid Fertilizer With Piston Pump And Double Disc Or Notched Single Disc Fertilizer Opener Options
- Liquid Fertilizer Low Rate Check Valves Option
- Triple Transport Tire Package

# SPECIFICATIONS

## ROW UNIT OPTIONS/ATTACHMENTS

- Seed Meter Discs
- Closing Options
  - Rubber "V" Closing Wheels
  - Cast Iron "V" Closing Wheels
  - Covering Discs/Single Press Wheel
  - Drag Closing Attachment
- Granular Chemical Application
- Hopper Panel Extension Package
- Spring Tooth Incorporator
- 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 Attachments For Frame Mounted Coulter

## DIMENSIONS/OPERATING

PLANTER SIZE	12 Row 20"	**12 Row 22"
WIDTH	22' 6"	22' 6"
LENGTH	22' 7"	22' 7"

## DIMENSIONS/TRANSPORT

PLANTER SIZE	12 Row 20"	**12 Row 22"
WIDTH Base Machine	11' 3"	11' 7"
WIDTH Push Row Unit With No Till Coulters	12' 9"	12' 9"
LENGTH	25' 8"	25' 8"
HEIGHT	10' 6"	10' 6"

PLANTER WEIGHT	12 Row 20"	**12 Row 22"
*BASE MACHINE WEIGHT	8431 lbs.	8431 lbs.


\* Base machine weights include planter frame including row markers, hydraulic cylinders, hoses, fittings, tires, wheels, drive and drill shafts, sprockets, chains and required drive components, parking jack, safety/warning lights, SMV sign, transport safety chain, KINZE® pull row units (closing wheel arms less closing wheels) with seed hoppers and lids, quick adjustable dual down force springs, EdgeVac® meters (less seed discs) and vacuum seed metering system fan, manifolds and hoses.

\*\* 3400 Twin-Line® Planters are factory assembled for 20" rows. Dealer assembly time is required to respace row units and transport tires for 22" rows.

# 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 marker assemblies 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.**

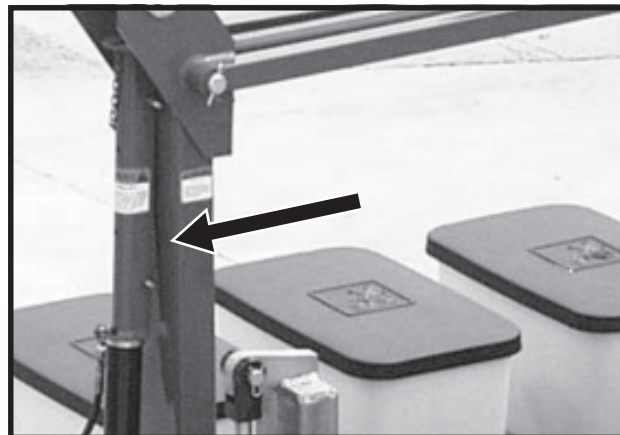
 **Do not allow anyone to stand between the tongue or hitch and the towing vehicle when backing up to the planter.**

 **Use a tractor equipped with a roll-over-protective-system and fasten your seat belt prior to starting the engine.**

 **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.**

 **Install safety lockups on row markers prior to transporting the planter or working around the unit.**


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 **Watch for obstructions such as wires, tree limbs, etc., when folding row markers.**

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

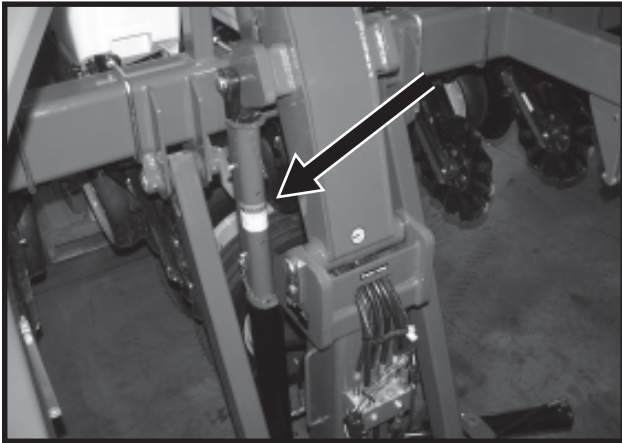
 **Never work under the planter while in raised position without using safety lockup devices.**

 **The seed and fertilizer metering systems of the planter are designed to be driven by ground tires. The use of aftermarket hydraulic, electric or PTO drives may create serious safety hazards to you and the people nearby. If you install such drives you must follow all appropriate safety standards and practices to protect you and others near this planter from injury.**

# SAFETY PRECAUTIONS

 Always install safety lockup devices on center lift cylinders and transport latch locking pin before transporting planter.

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Safety Lockups On Center Lift Cylinders


D060999107




Transport Latch Locking Pin

 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.


 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.

 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.


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

 Avoid transporting planter with hoppers loaded 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.

 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.




# SAFETY PRECAUTIONS

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 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 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,

 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.

 Good maintenance is your responsibility. Poor maintenance is an invitation to trouble.

 Never operate vacuum fan with cover removed.

 Always wear ear protection when working around operating vacuum fan.

# SAFETY PRECAUTIONS

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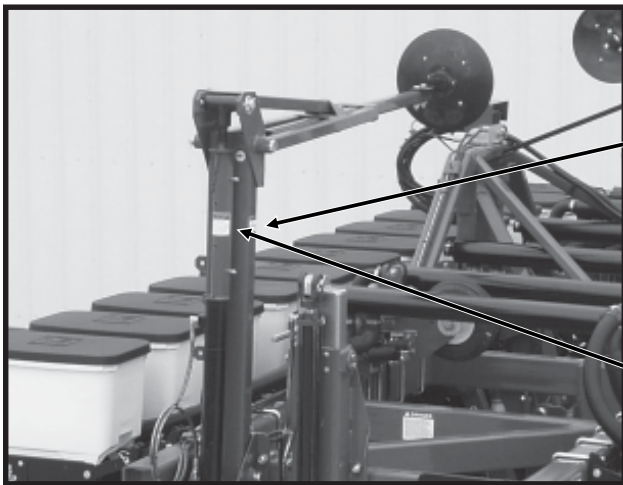
# SAFETY WARNING SIGNS

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!**

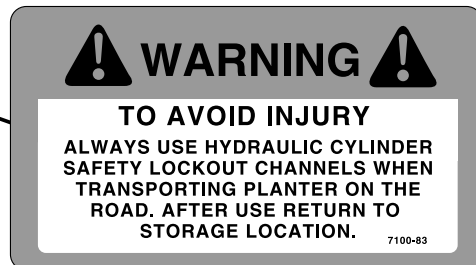
- **Keep these signs clean so they can be readily observed. Wash with soap and water or cleaning solution as required.**
- **Replace “WARNING” signs should they become damaged, painted over or if they are missing.**
- **Check reflective decals and SMV sign periodically. Replace if they show loss of any 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 DEC2005 and ANSI/ASAE S276.6 JAN2005.**

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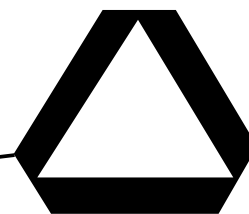


Part No. G7100-42 (Qty. 4 - Two Per Marker)



Part No. G7100-83 (Qty. 2 - One Per Marker Lockup)

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Part No. GD2199 (Qty. 1)

# SAFETY WARNING SIGNS

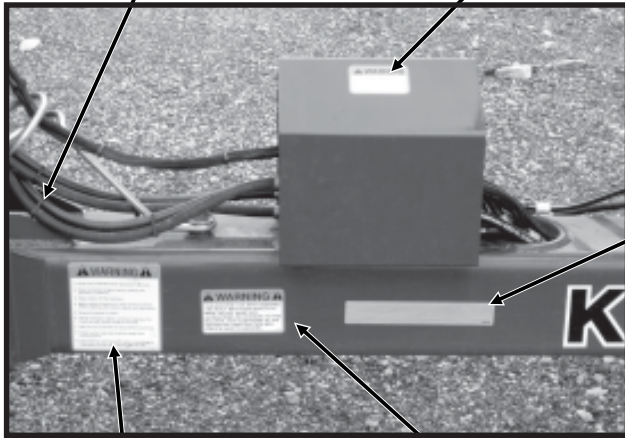


Part No. G7100-302 (Qty. 1)

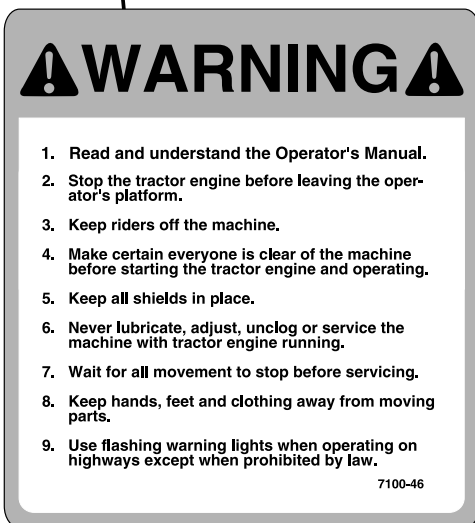


Part No. G7100-43 (Qty. 1)

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



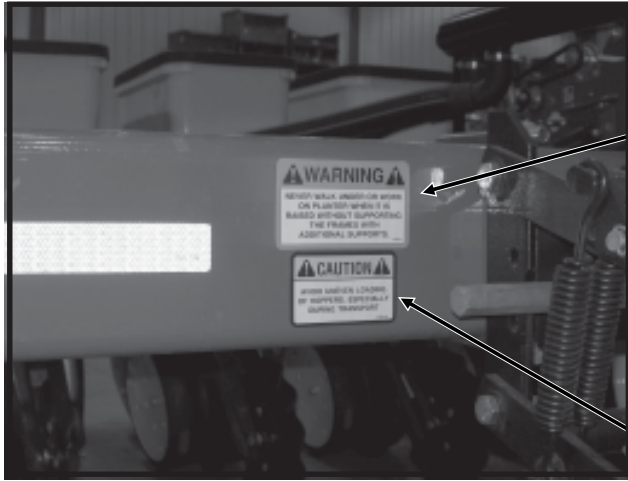
Part No. G7100-46 (Qty. 1)



Part No. G7100-90 (Qty. 1)

# SAFETY WARNING SIGNS

D12140604

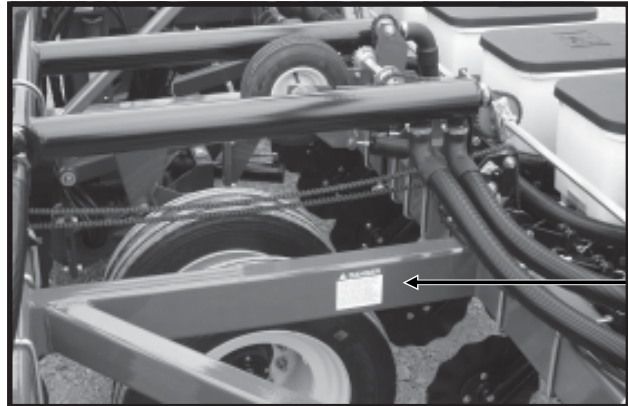


Part No. G7100-68 (Qty. 2 - One On Each End Of Planter)



Part No. G7100-75 (Qty. 2 - One On Each End Of Planter)

D12200630



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

D122006019



Part No. G7100-301 (Qty. 2 - One On Each Side Of Fan)

# SAFETY WARNING SIGNS

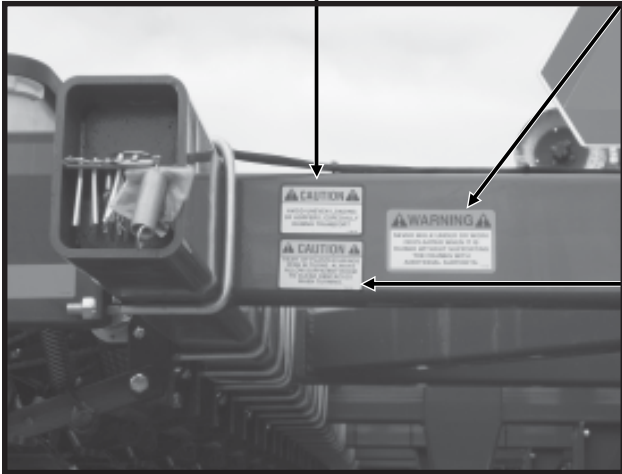


Part No. G7100-75 (Qty. 2 - One On Each End Of Planter)



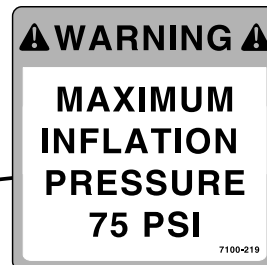
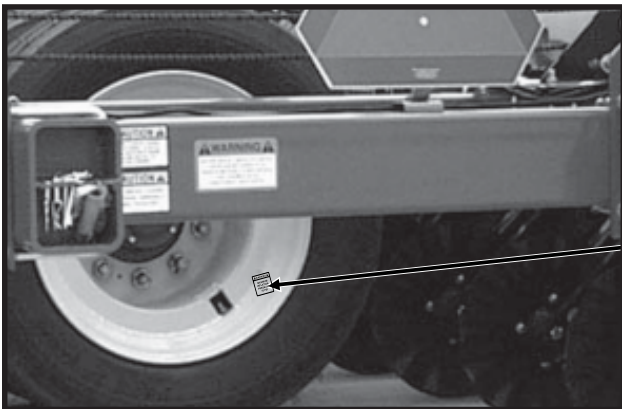
Part No. G7100-68 (Qty. 2 - One On Each End Of Planter)

D05200509



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

D060999127

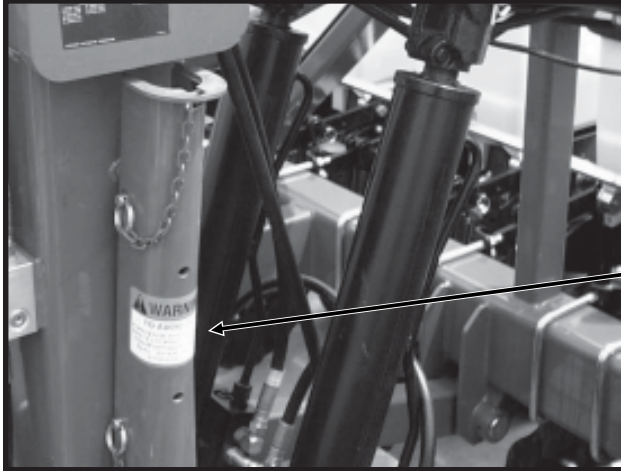


Part No. G7100-219 (Qty. 4 - One On Each Transport Wheel Rim)

# SAFETY WARNING SIGNS

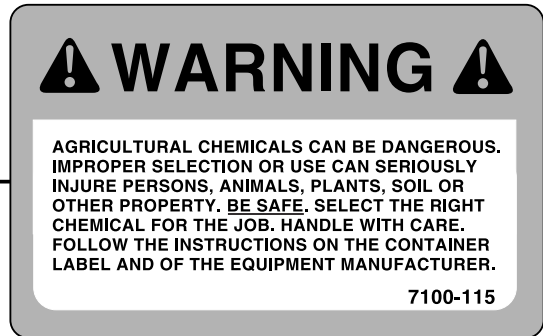


D06109906a



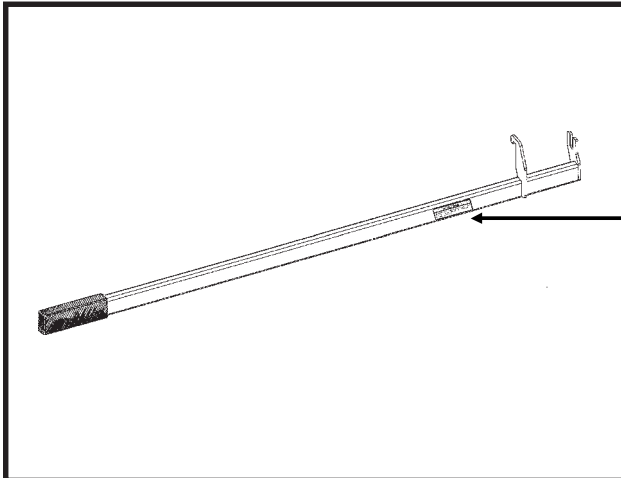
Part No. G7100-83 (Qty. 2 - One On Each Center Lift/Slave Cylinder Safety Lockup)

D06039901



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

A12177b

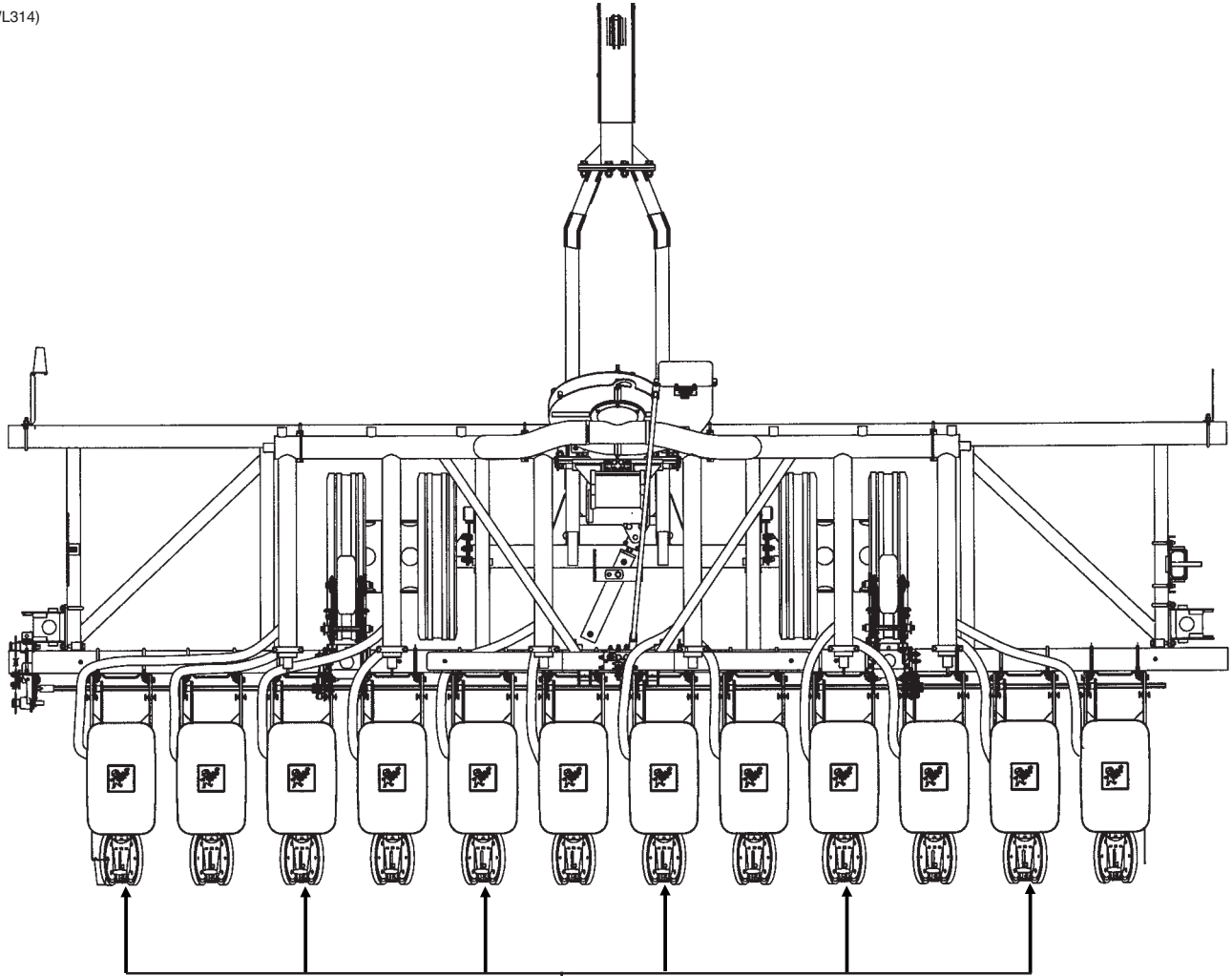


Part No. G7100-249 (With Optional Interplant® Package) (Qty. 1 - Located On Interplant® Push Row Unit Lift Lever)

# SAFETY WARNING SIGNS



(TWL314)

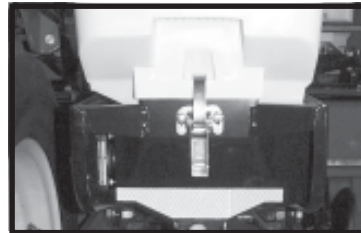


Part No. G7100-262 Amber Reflective Decal  
(Qty. 6 - Located On The Hopper Support On Every  
Other Row Unit Beginning On The L.H. End Of The  
Planter) **(Standard)**



Part No. G7100-259 Amber Reflective Decal  
(Qty. 6 - Located On The Granular Chemical Hopper  
Panel Extension On Every Other Row Unit Beginning On  
The L.H. End Of The Planter)  
**(With Optional Granular Chemical)**

D060800114



D062300102

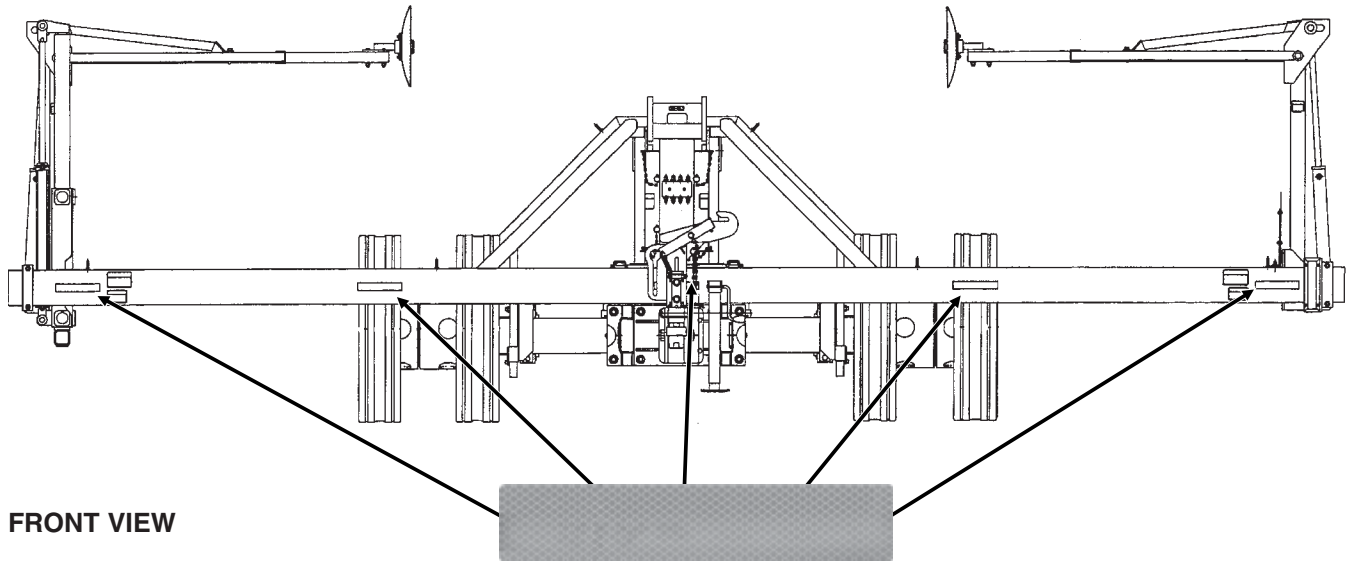




# SAFETY WARNING SIGNS

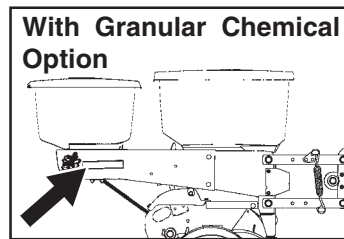


(PLTR163/RU120L/PLTR161a/PLTR162c)

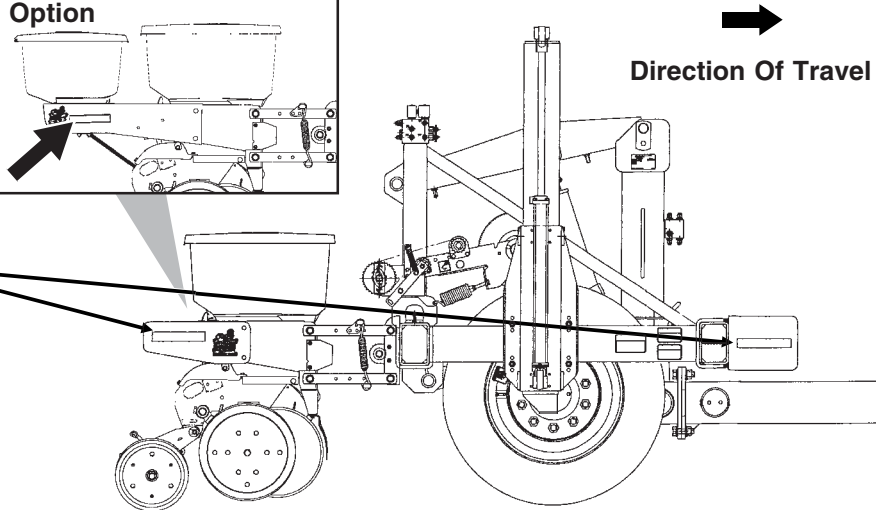


**FRONT VIEW**

Part No. G7100-259 Amber Reflective Decal (Qty. 5)



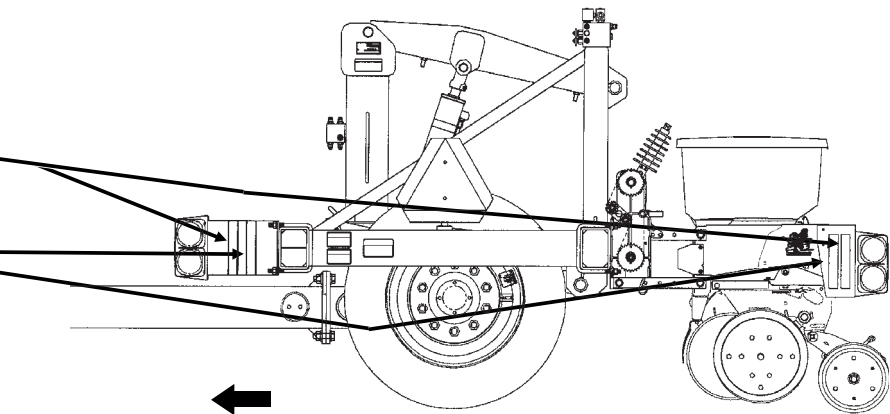
Part No. G7100-259 Amber Reflective Decal (Qty. 2 - Located On The R.H. End Of The Planter - Forward-Facing In Transport Position)



Part No. G7100-258 Red Reflective Decal (Qty. 2)

Part No. G7100-260 Orange Reflective Decal (Qty. 2)

(Located On The L.H. End Of The Planter - Rear-Facing In Transport Position)

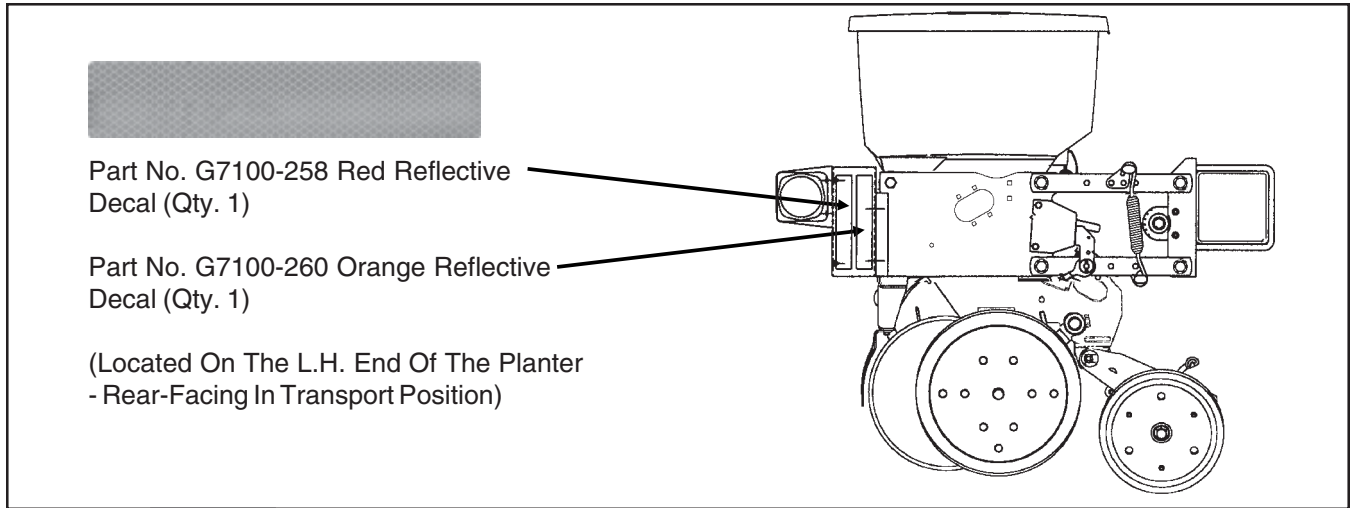


**Direction Of Travel**

# SAFETY WARNING SIGNS



(PLTR159d/TWL315)



Part No. G7100-258 Red Reflective Decal (Qty. 1)

Part No. G7100-260 Orange Reflective Decal (Qty. 1)

(Located On The L.H. End Of The Planter - Rear-Facing In Transport Position)

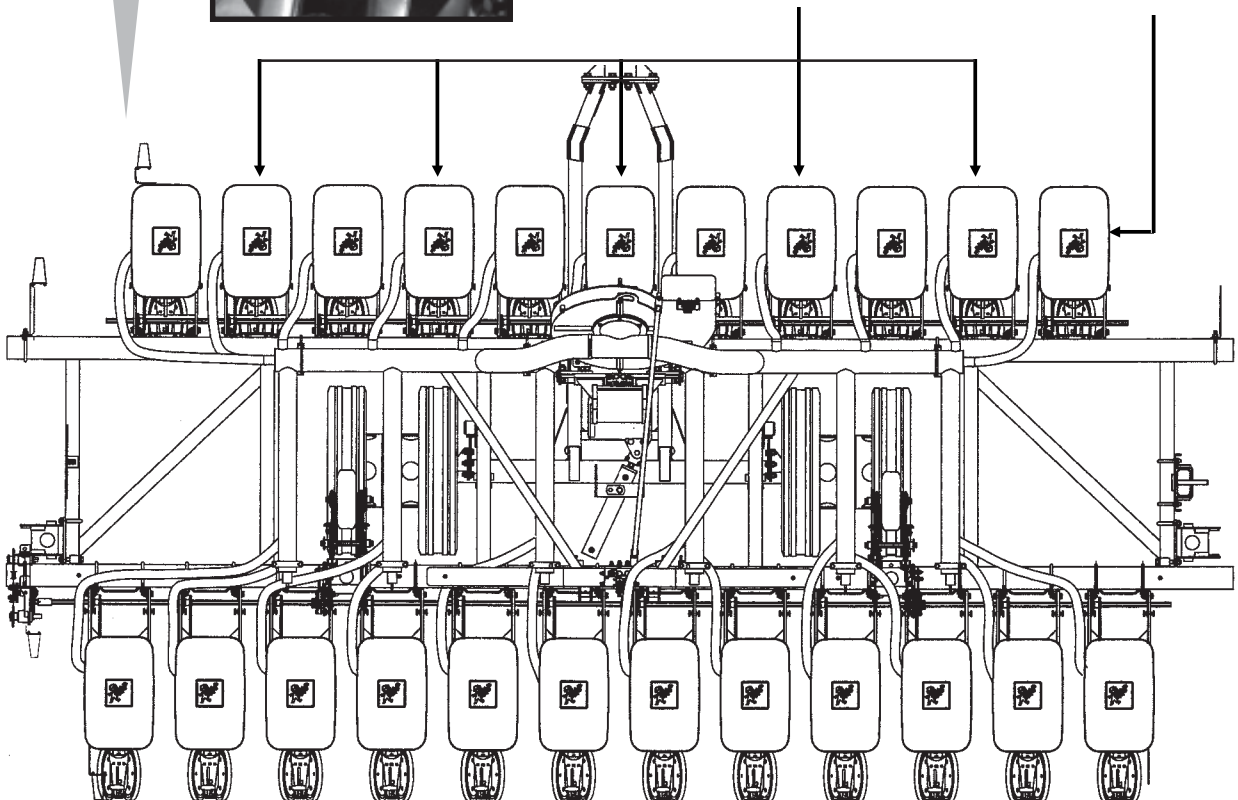
D020101103



## WITH INTERPLANT® OPTION

Part No. G7100-259 Amber Reflective Decal (Qty. 5 - Located On The Front Of Every Other Push Row Unit Starting On The Second Row In - Side-Facing In Transport Position)

Part No. G7100-259 Amber Reflective Decal (Qty. 1 - Located On The Push Row Unit Side Panel - Forward-Facing In Transport Position)



# 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.

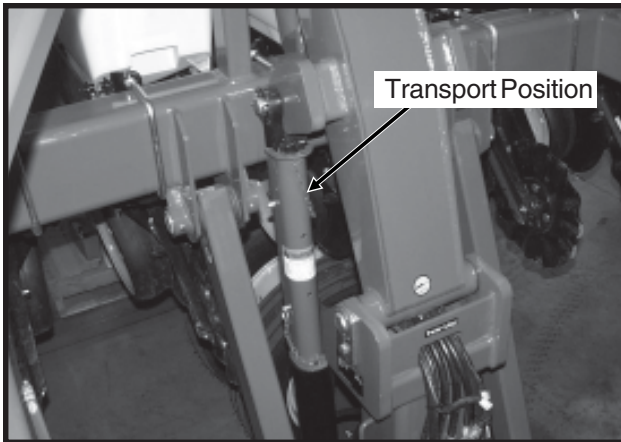
**IMPORTANT:** Always raise the planter out of the ground when making sharp turns or backing up.

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

## MANUAL SAFETY LOCKUPS

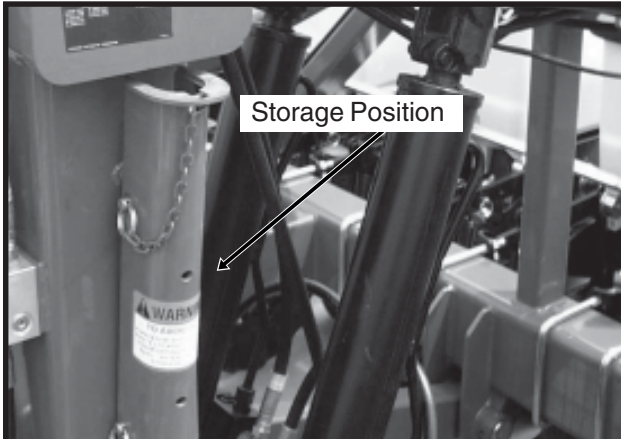
Never allow anyone to work around or under the planter without first installing the manual safety lockups. When transporting the planter use the manual safety lockups for added safety.

D063099114



Manual Safety Lockups In Transport Position

D06109906a



Manual Safety Lockups In Storage Location

For field operation remove the manual safety lockups and store on the side of the center pivot assembly.

## TRANSPORT LATCH LOCKING PIN

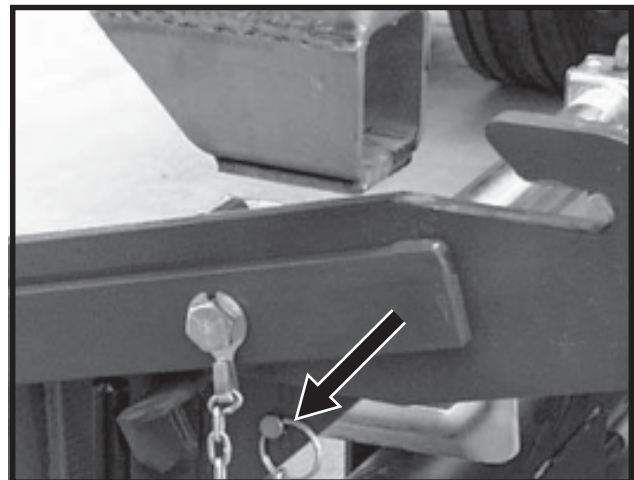
The transport latch locking pin, when installed, will prevent the latch bar from disengaging and allowing the planter frame to swing out of the transport position. Never transport the planter without installing the transport latch locking pin.

D060999107



Transport Latch Locking Pin Installed For Transport

D060999117



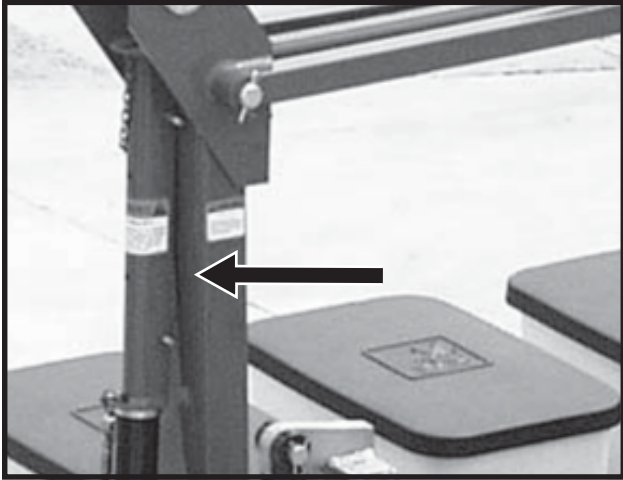
Transport Latch Locking Pin Stored For Field Operation

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

# MACHINE OPERATION

## ROW MARKER SAFETY LOCKUP

D060999113



Install safety lockups over row 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 row markers.

## 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.

## TRACTOR REQUIREMENTS

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

A 12 volt DC electrical system is required on all 3200 series planters.

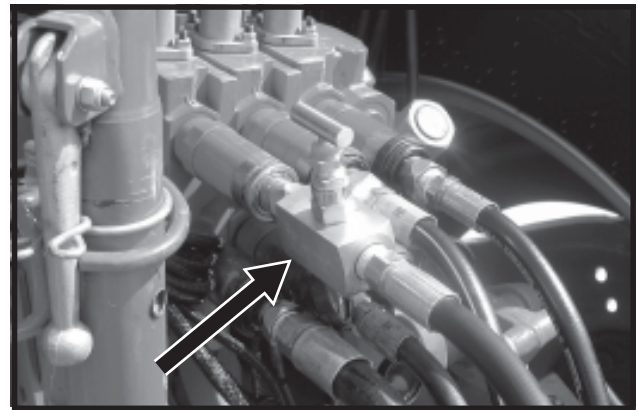
Three dual remote hydraulic outlets (SCV) are required on all sizes. One outlet operates the makers, one the lift and one along with a zero pressure case drain operates the vacuum fan motor.

Maximum hydraulic flow rate of 13 GPM @ 2000 PSI is required (in addition to the planter lift/marker hydraulic requirements) to operate the seed metering system vacuum fan motor.

**IMPORTANT:** Connect hydraulic motor case drain to a case drain return line with zero PSI on the tractor. Failure to connect to a return with zero PSI will cause damage to the hydraulic motor shaft seal. Warranty will not apply on damaged motors resulting from improper hydraulic line connection. DO NOT connect hydraulic motor case drain to a SCV outlet or motor return circuit connection. Contact tractor manufacturer for specific details on “zero pressure return”.

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

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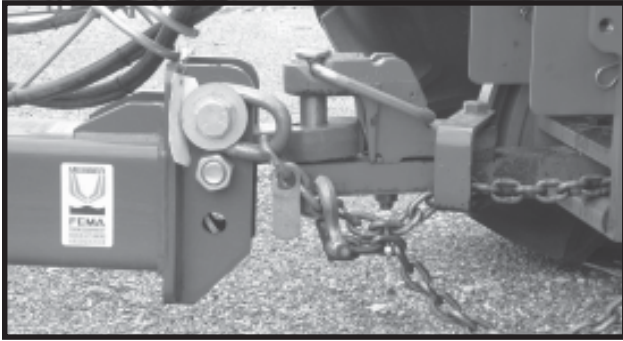


G1K426 Needle Valve Kit

# MACHINE OPERATION

## TRACTOR PREPARATION AND HOOKUP

D05200515



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.
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.

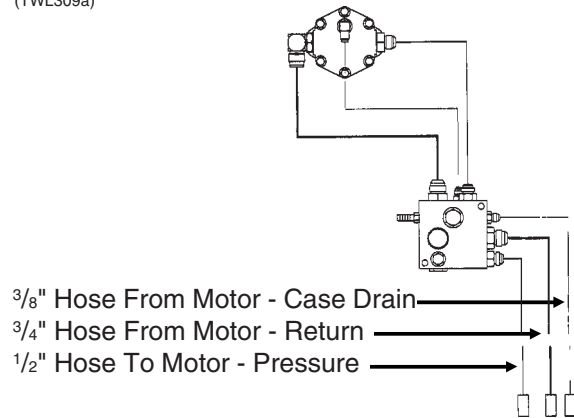
3. Back tractor to planter and connect with 1 1/4" - 1 1/2" diameter hitch pin. If the tractor is not equipped with a hitch pin locking device, make sure hitch pin is secured with a locking pin or cotter pin.
4. The auxiliary attaching system (transport safety chain) provided with your planter should 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 the hook end 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)

The vacuum fan motor hydraulic hoses are as follows:

(TWL309a)



**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.

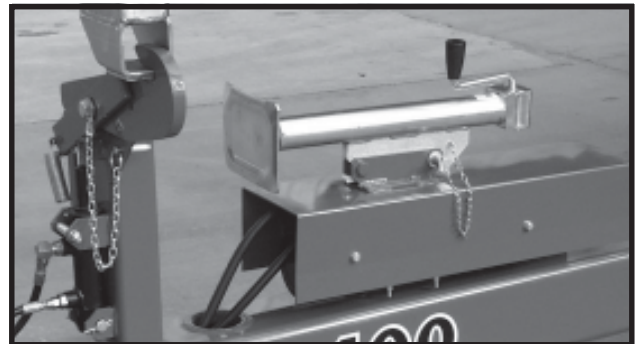
**IMPORTANT:** Always wipe hose ends to remove any dirt before connecting couplers to tractor ports.

6. Connect cable on planter to control console cable on tractor. Connect ASAE Standards 7 terminal connector for 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.

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

7. Remove jack and remount horizontally on storage bracket.

D102999101



8. 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.

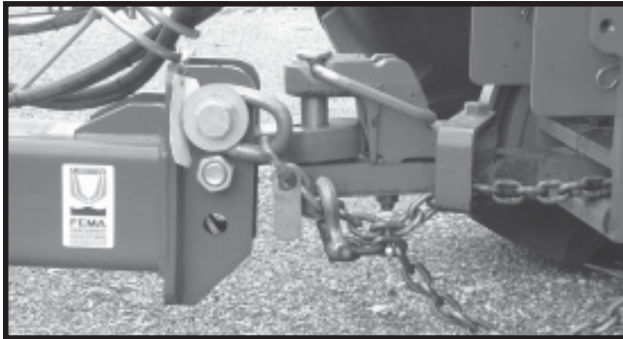
# MACHINE OPERATION

## 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.

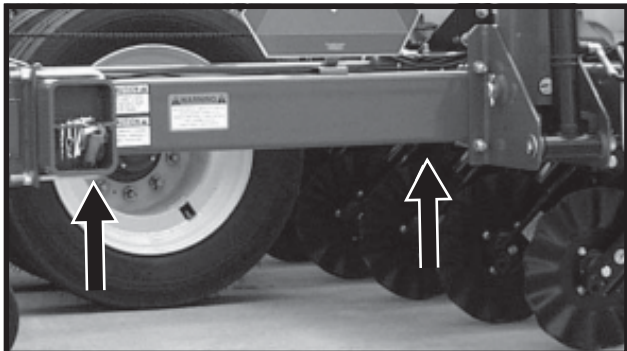
Unless the tractor drawbar is adjustable for height, the fore and aft level adjustment must be maintained by the position of the hitch clevis. Three holes in the hitch bracket allow the clevis to be raised or lowered. In addition, the clevis may be turned over for a finer adjustment between mounting holes. When installing clevis mounting bolt, make sure lock nut is torqued to 840 ft. lbs.

D05200515



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.

D060999127



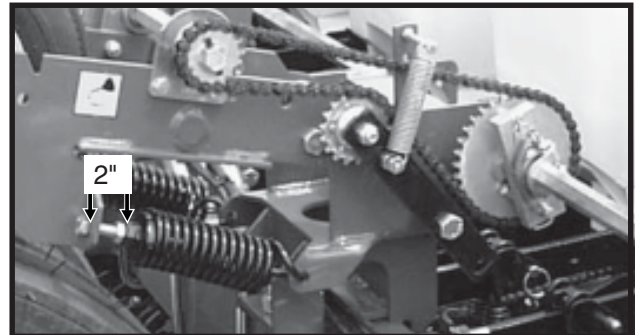
It is important for the planter to operate level laterally. Tire pressure must be maintained at pressures specified. See "Tire Pressure".

## CONTACT WHEEL SPRING ADJUSTMENT

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

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

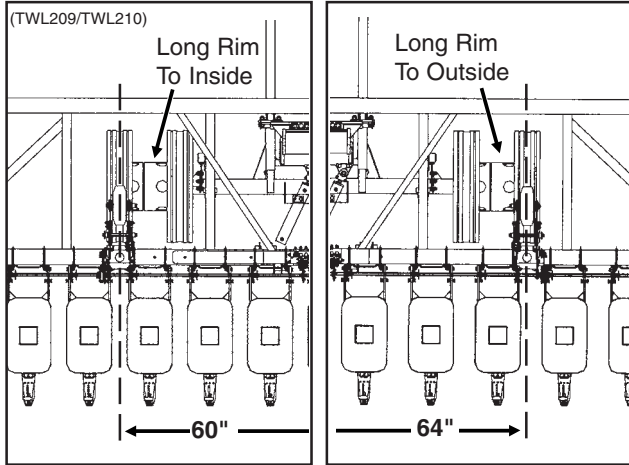
D06109905



# MACHINE OPERATION

## RESPACING FOR 22" ROWS

Model 3400 planters are factory assembled for 20" rows. Row units and transport tires require dealer assembly to respace for 22" rows.



**20" ROW SPACING**

**22" ROW SPACING**

With the planter in transport position, jack the tires off the ground and install blocks to safely support the planter during respacing procedure. On R.H. side of planter, move outside tire/rim assembly to the inside. Repeat procedure on L.H. side of planter. Torque inner budd nuts to 220 ft. lbs. and outer budd nuts to 670 ft. lbs.

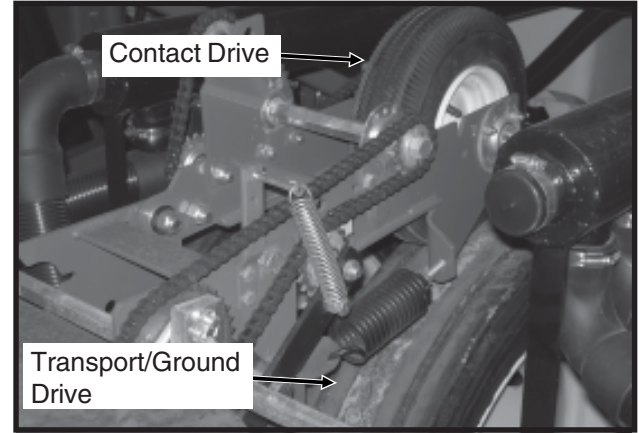
Relocate the row units to 22" spacing. Slide each contact tire outward slightly to center over the transport tire.

Remove safety blocks and lower planter to the ground.

See "Row Marker Length Adjustment" for adjusting row markers.

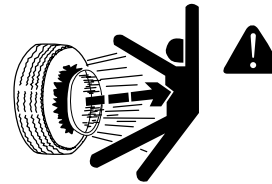
## TIRE PRESSURE

D12140615



Tire pressure should be checked regularly and maintained as follows:

- 255-70R x 22.5" Transport/Ground Drive ..... 75 PSI
- 4.10" x 6" Contact Drive ..... 50 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. TIRE PRESSURE SHOULD BE MAINTAINED AS STATED ABOVE AND NOT AS STATED ON THE TIRE.**

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

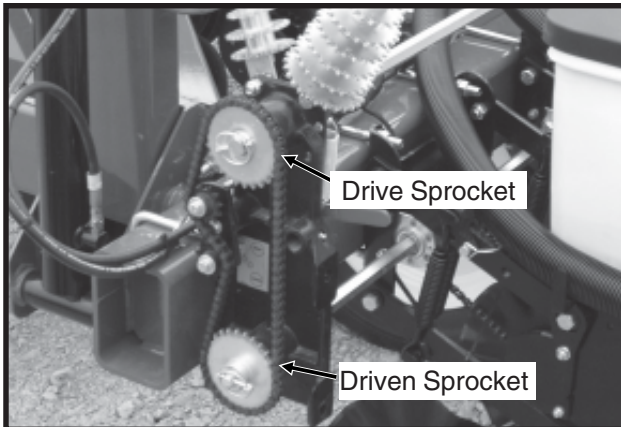
Planting population rate changes are made at the end mounted transmission. The seed rate transmission is designed to allow simple, rapid changes of sprockets to obtain the desired planting population. By removing the lynch pins on the hexagon shafts, sprockets can be interchanged with those from the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

Chain tension is controlled by a spring-loaded dual-sprocket idler. The idler assembly is adjusted with a easy-release idler 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.

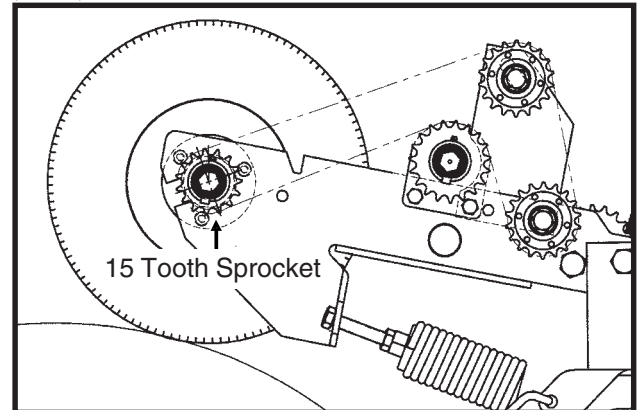
The planting rate charts found in the Seed Meter Operation/Maintenance section will aid you in selecting the correct sprocket combinations.

D12200638



## CONTACT WHEEL DRIVE SPROCKETS

(TWL310)



**NOTE:** The 15 tooth sprocket at each contact drive wheel can be interchanged with the 19 or 38 tooth sprockets from the sprocket storage rod. The 15 and 19 tooth sprockets require use of a 92 pitch No. 40 chain. The 38 tooth sprocket requires use of a 104 pitch chain.

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

The planting rate charts found in the Seed Meter Operation/Maintenance section will aid you in selecting the correct sprocket combinations.

**NOTE:** 15, 19 and 38 tooth drive sprockets are NOT applicable to all rate charts. Check chart titles to ensure the proper rate chart is selected.

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



# MACHINE OPERATION

## SHEAR PROTECTION

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

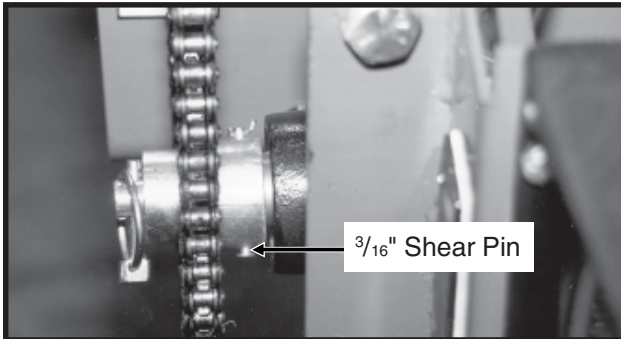
If excessive load should cause a pin to shear, it is important to determine where binding has occurred before replacing the pin. Replace shear pins with same size and type.

Additional shear pins can be found in the storage area located inside the forward planter toolbar.

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

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

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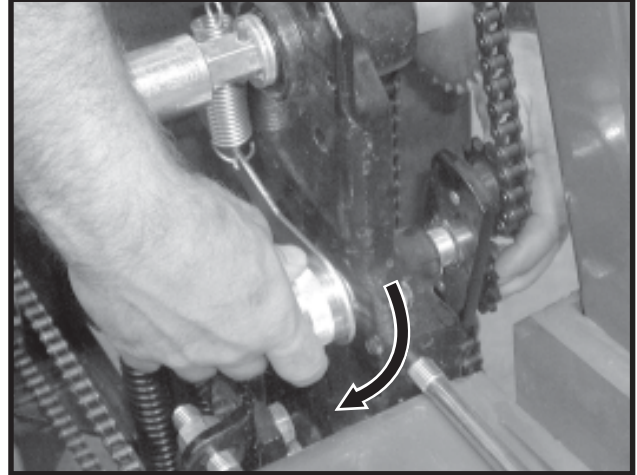


Seed Rate Transmission Shaft

## WRAP SPRING WRENCH OPERATION

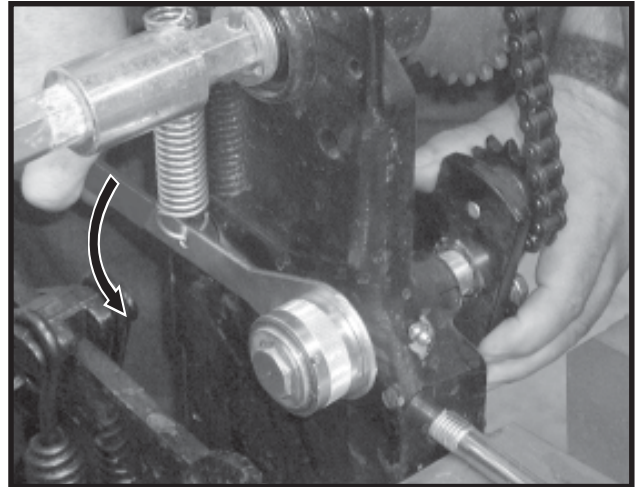
The chain idler is equipped with a wrap spring wrench. Chain tension is released and/or added as shown below.

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

D11120303a



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

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.

# MACHINE OPERATION

## HYDRAULIC/ELECTRIC OPERATION

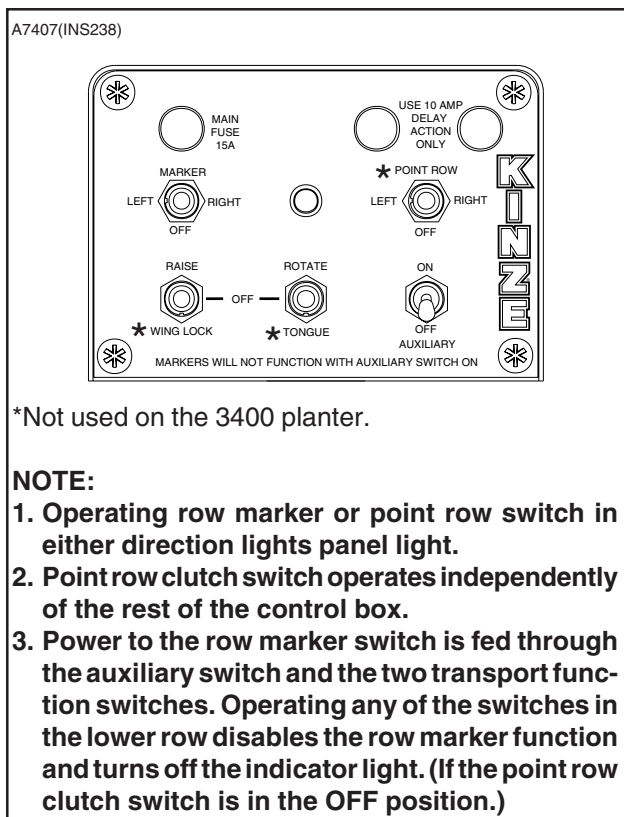
76746-24



Switches on the control console located on the tractor are used to raise the planter to transport position, operate the rotate function and raise and lower the row markers.

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

All 3400 planters are plumbed to operate from two dual remote (SCV) hydraulic outlets. One set of hydraulic outlets, in conjunction with the switch on the control console, is used to operate the raise to transport function. The second set, in conjunction with the switches on the control console, is used to operate the row markers and fold/unfold functions.



\*Not used on the 3400 planter.

The row marker and point row selector switches are an ON-OFF-ON type. Point row clutches are not available on the 3400 planter and, therefore, that switch is not used.

**NOTE: For safety the marker selector switch should be placed in its OFF (center) position. An indicator light on the control box panel is ON whenever the row marker circuit is energized.**

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 control. Activating a fold function switch disables the marker circuit. The wing lock and tongue functions are not used on the 3400 planter.

The auxiliary switch is an ON-OFF type switch. All 3400 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 to operate.

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

**NOTE: When operating in planting position, make sure the planter is lowered all the way to ensure push pads are contacting the axle. Operating with frame partially raised will increase wear on cam rollers and other components.**

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

**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.

**NOTE:** The planter will not lower when the tractor valve is in float position or in the lower position with the engine off. The planter lift cylinders are equipped with counter balance valves that require pressure from the tractor to allow them to retract.

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

# MACHINE OPERATION

## TRANSPORT TO FIELD SEQUENCE

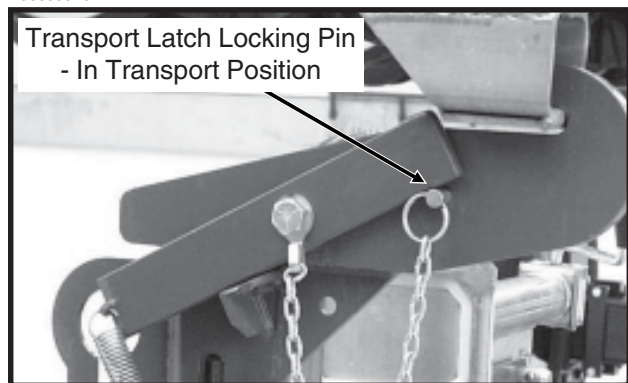
### SUMMARIZED TRANSPORT TO FIELD SEQUENCE

- Remove transport latch locking pin.
- Remove manual safety lockups.
- Rotate planter to planting position.
- Lower planter to the ground.
- Rephase planter lift cylinders.
- Remove row marker lockups.

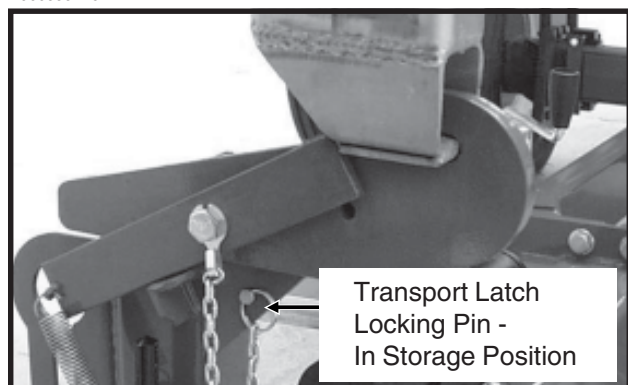
NOTE: Read the following information for more detailed instructions.

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

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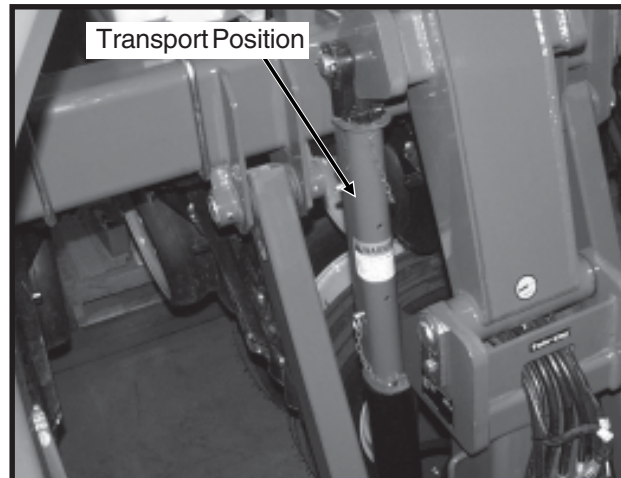


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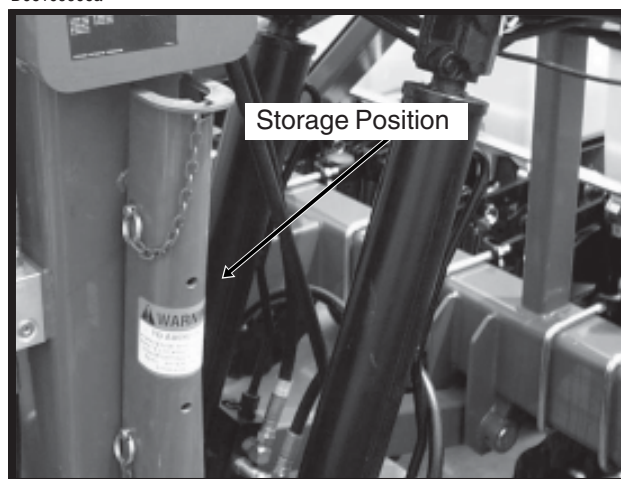
2. Remove the manual safety lockup from each center lift cylinder.

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Place them in the storage location on each side of the center pivot assembly

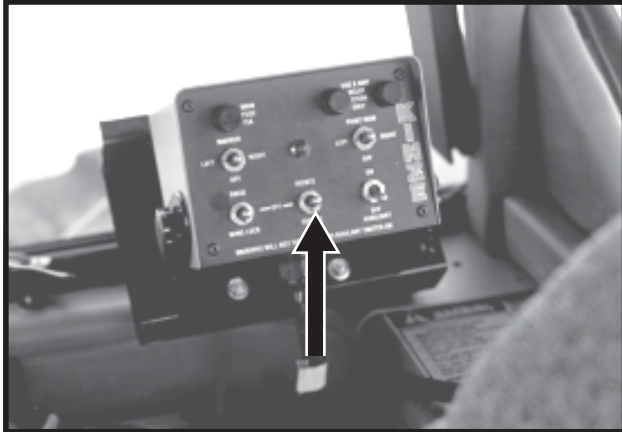
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# MACHINE OPERATION

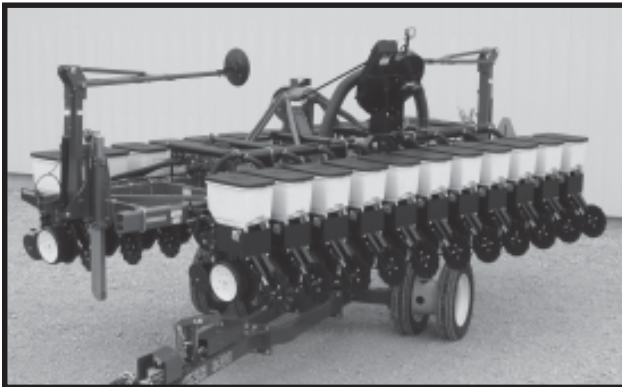
3. Hold the control console switch labeled “ROTATE/TONGUE” in “ROTATE” and operate the hydraulic control to unfold the planter.

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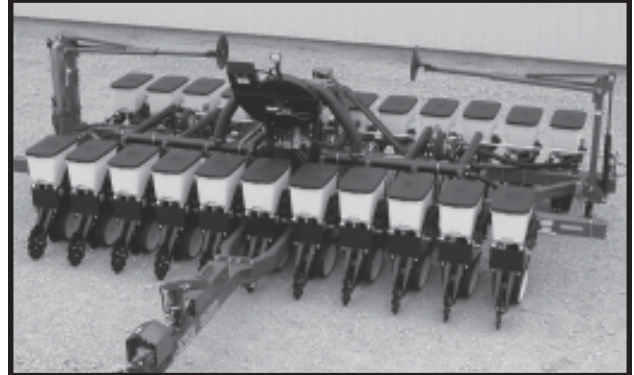
The transport latch will automatically release and the planter will rotate into planting position.

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4. Lower the planter to the ground. The planter will lower at a slower speed until transport latch post is fully raised. Hold the hydraulic control until the planter stalls.

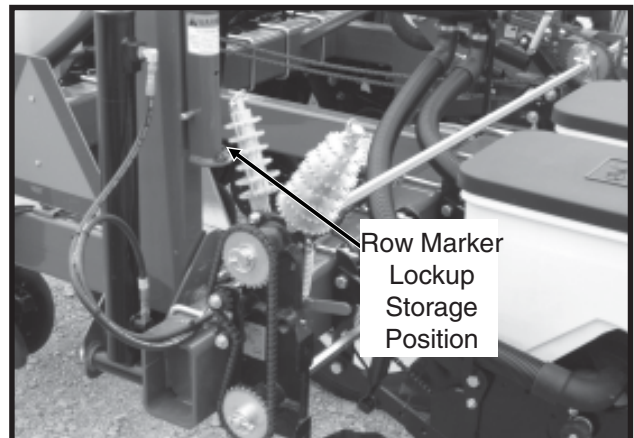
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**NOTE:** If the planter does not stop at the proper **RAISED FIELD POSITION** during field operation, the planter lift system could be out of phase. To rephase the system, hold the control console switch labeled RAISE and operate the hydraulic control to completely raise the planter. Release the RAISE switch and hold the hydraulic control to lower the planter until it stalls.

5. Remove and store row marker lockups.

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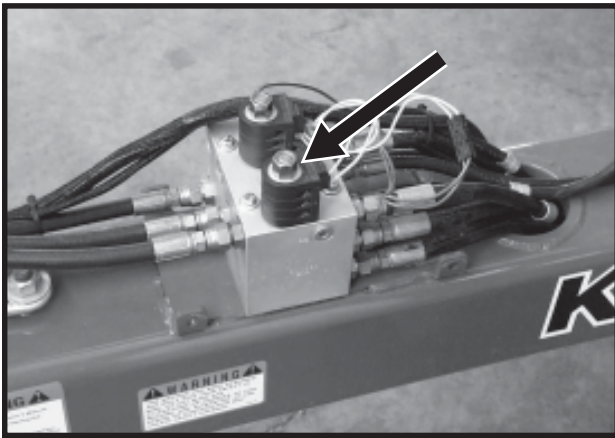
# MACHINE OPERATION

## FIELD OPERATION

There are two raised positions on the planter.

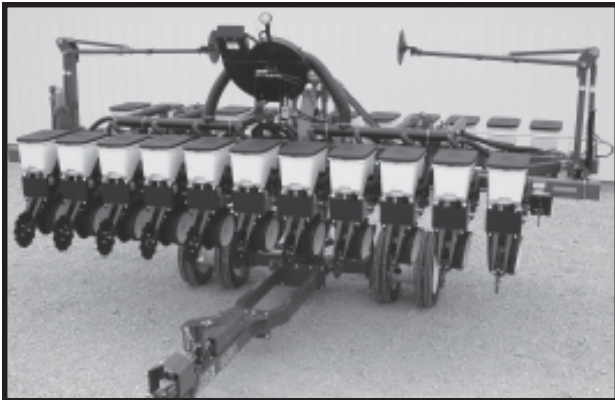
One is the “raised field position” which is when the planter is raised using only the hydraulic control. The solenoid, located on the hitch, is not energized. The master cylinder on the hitch strokes out and the slave cylinders at the center of the planter begin to raise. In the “raised field position” the row units are approximately 14” off the ground. This position is used in making turns or passing over waterways during field operation.

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The second raised position is when the planter is raised to transport height. See “Field To Transport Sequence”.

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**Raised Field Position**

## FIELD TO TRANSPORT SEQUENCE

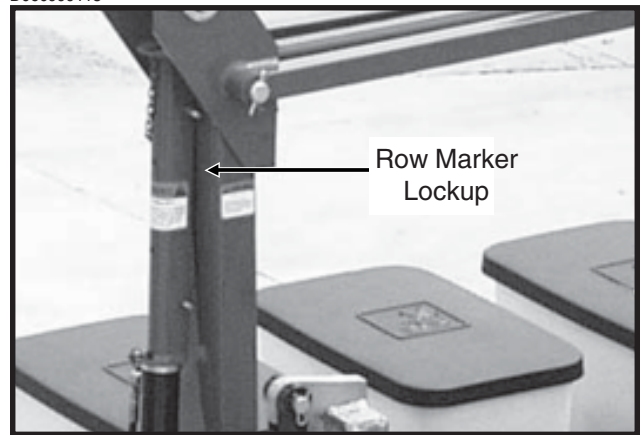
### SUMMARIZED FIELD TO TRANSPORT SEQUENCE

- Install row marker lockups.
- Raise planter to fully raised position.
- Rotate planter to transport position.
- Install transport latch locking pin.
- Install manual safety lockups.

NOTE: Read the following information for more detailed instructions.

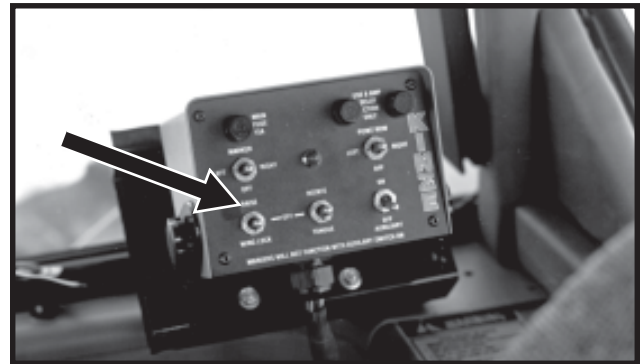
1. Install row marker lockups.

D060999113

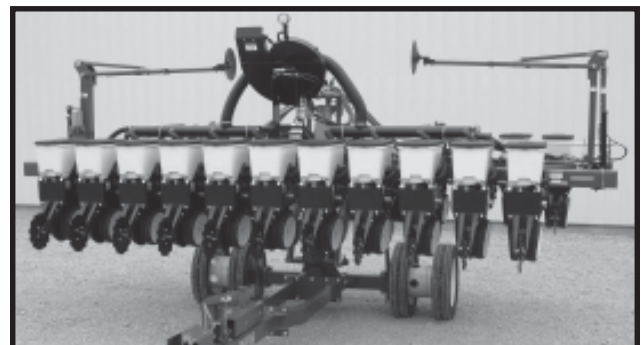


2. Hold the control console switch labeled “RAISE” and operate the hydraulic control to fully raise the planter as shown below.

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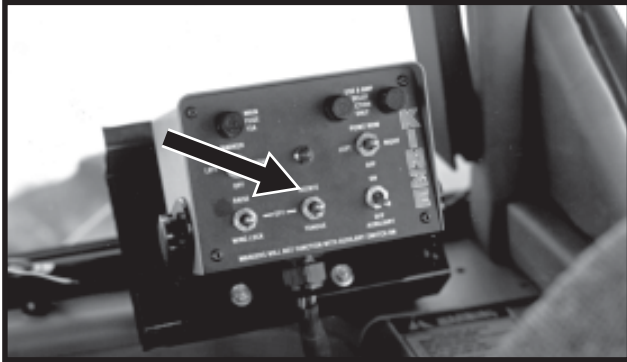
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# MACHINE OPERATION

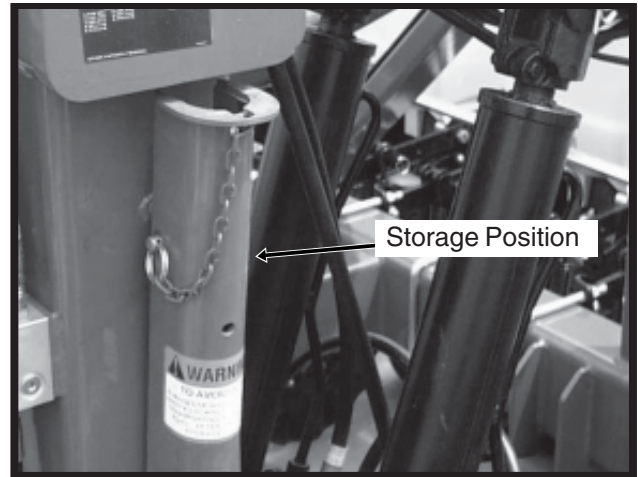
3. Hold the control console switch labeled “ROTATE/TONGUE” in “ROTATE” and operate the hydraulic control to rotate the planter until the transport latch is secured.

76746-24

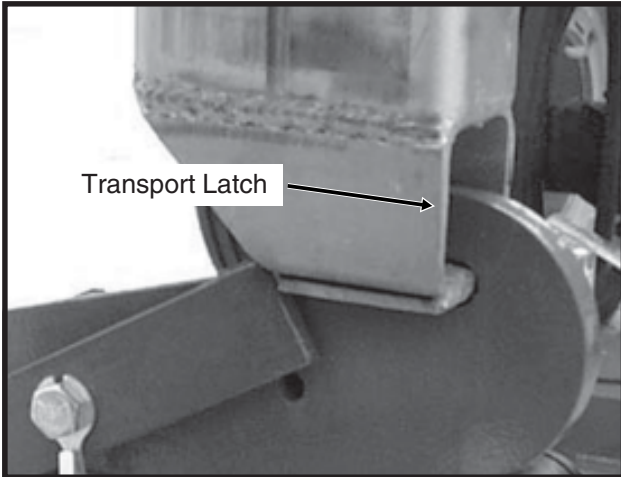


5. Remove the manual safety lockups from their storage position on the side of the center pivot assembly.

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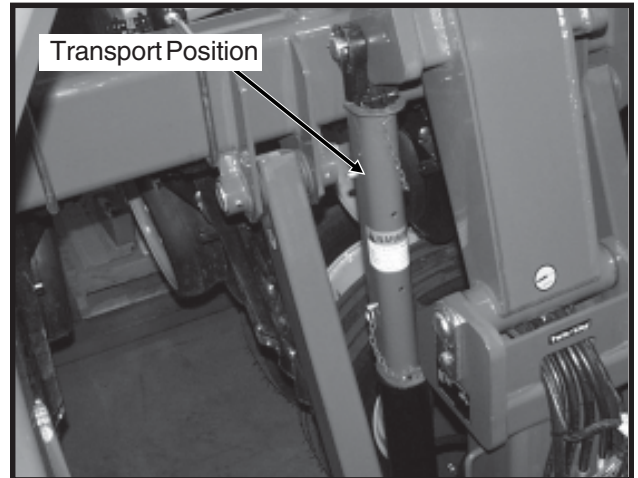


D060999116



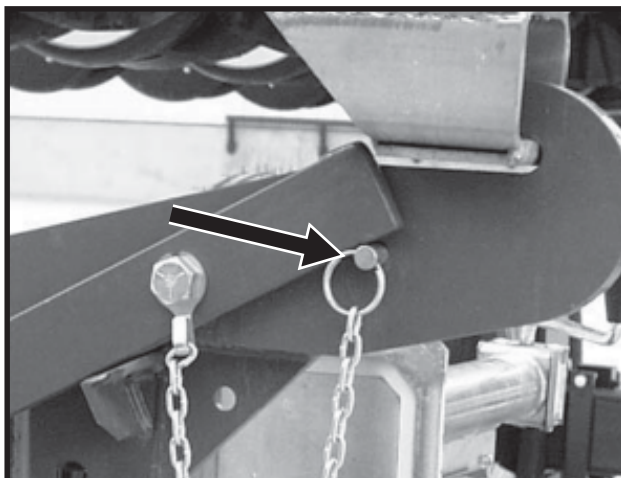
Install a lockup on each center lift cylinder.

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4. Install transport latch locking pin.

D060999107

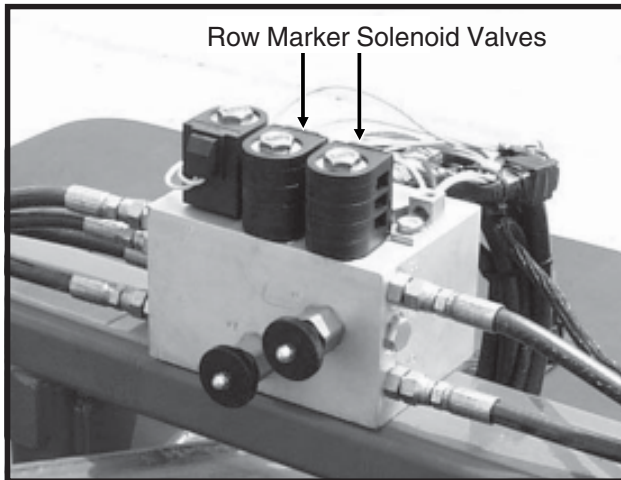


**WARNING:** Always install manual safety lockup devices prior to storage, working under the planter or transporting the planter.

# MACHINE OPERATION

## ROW MARKER OPERATION

D06109908



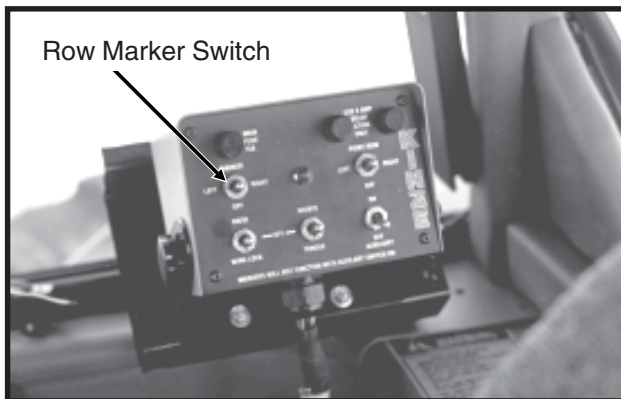
**NOTE:** Both row markers can be lowered by operating the switch in each position and operating the hydraulic control twice. The markers will raise simultaneously with the hydraulic control in the raise position.

**NOTE:** 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.

76746-24



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

### Three Position Selector Switch On Control Console

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

See "Row Marker Speed Adjustment".

1. On the control console, select which row marker you want to lower.
2. Operate hydraulic control to lower row 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 control, lower the pre-selected marker.
6. Continue to follow this procedure.

# MACHINE OPERATION

## DIGITAL VACUUM GAUGE OPERATION

The digital vacuum gauge console is equipped with an ON-OFF-ON type selector switch. The “FAN 1” setting should be used when the planter is equipped with one vacuum fan.

**NOTE: The toggle switch should be left in OFF position when the planter is not in use. If left in either fan position, the tractor battery will be drained.**

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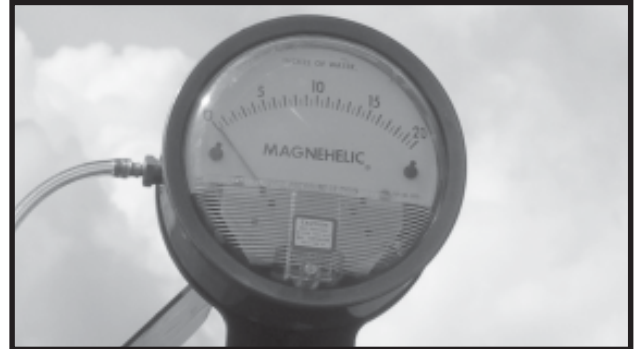


The digital vacuum gauge is calibrated at the factory, however, vacuum variation throughout the manifold system may occur. It may be necessary to adjust the digital readout so it agrees with the actual vacuum at the meter. With the seed discs loaded with seed, compare the digital vacuum gauge readout to the reading taken from the analog gauge or a hand held gauge at several meters along the length of the planter. The elbows located on the covers of the seed meters allow testing of meter vacuum pressure without removing the vacuum hose. If there is more difference than 1" or 2" (H<sub>2</sub>O), the digital gauge can be adjusted by inserting a small flat bladed screwdriver into the opening on the back of the digital gauge housing and turning the potentiometer until the digital gauge displays the vacuum that is present at the meter. Compare readings at 10" and 20" of vacuum.

## ANALOG VACUUM GAUGE

The analog vacuum gauge connects directly to the manifold. The digital vacuum gauge should then be calibrated to match that reading. See “Digital Vacuum Gauge Operation”.

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The only adjustment to the gauge is to “zero” the needle with no vacuum present. If there is a significant difference between this gauge and a reading taken at the meter, a different manifold location should be found to connect the gauge hose.

## VACUUM FAN MOTOR VALVE BLOCK ASSEMBLY

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

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

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

**NOTE: If reverse pressure is applied the fan will turn at a reduced speed.**

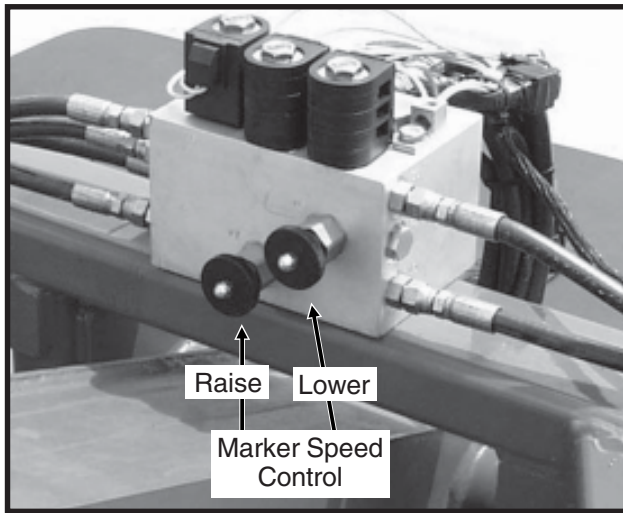


# MACHINE OPERATION

## ROW MARKER SPEED ADJUSTMENT

The row marker hydraulic system includes two flow control valves. One flow control valve sets the lowering speed of both row markers and one sets the raising speed of both markers. To adjust row 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 row markers. Tighten jam nut after adjustments are complete.

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**IMPORTANT:** The flow controls should be properly adjusted before the marker assembly is first put into use. Excessive speed of the row markers can damage the row 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 it. The tractor hydraulic control 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 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 row 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 Of Rows Blade	x	Row Spacing (Inches)	=	Dimension Between Planter Center Line And Marker Disc
-------------------------------	---	----------------------------	---	---

<p>12 Rows x 22" Spacing = 264" Marker Dimension          *12 Rows x 20" Spacing = 240" Marker Dimension          *If set at 20" or 10" row spacing, the 65" row marker extensions will have to be shortened to 55"</p>
---

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The marker disc blade should be installed so the concave side of the blade faces 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 hardware and move the assembly as required. Tighten bolts to the specified torque.

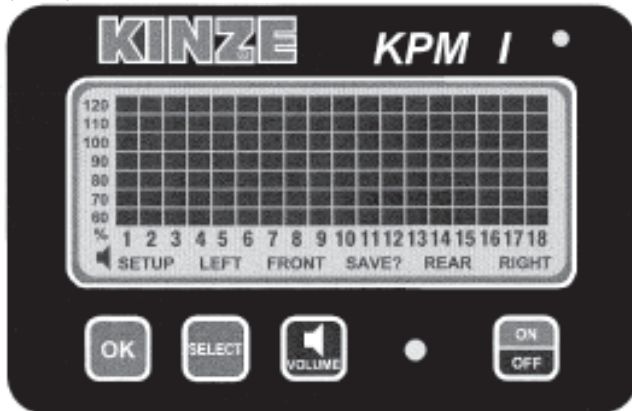
**IMPORTANT:** A marker disc blade assembly that is set at a sharper angle than necessary will add unnecessary stress to the complete row marker assembly and shorten the life of bearings and blades. Set the blade angle only as needed to leave a clear mark.

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.

## 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 .....	6-16
LCD Functions .....	6-16
Changing The Audible Alarm Volume .....	6-17
Warnings And Alarms .....	6-17
Replacing A Faulty Sensor .....	6-18
Field Operation .....	6-19
Programming/Connecting Seed Tubes .....	6-19

### 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 bargraph. 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”.



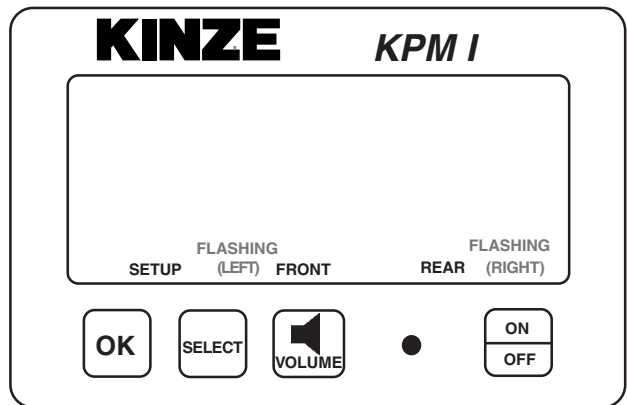
## PROGRAMMING/CONNECTING SEED TUBES

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

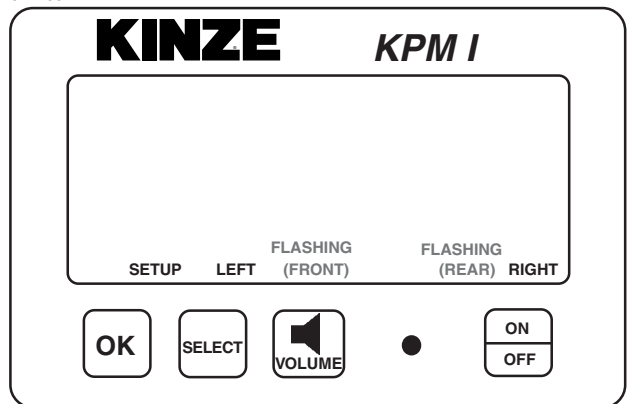
**STEP 2** Press the ON key. The monitor automatically enters the setup procedure. If the monitor was accidentally powered on with no sensors attached, the user can turn the monitor off at this point and the previous configuration is not lost.

**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.

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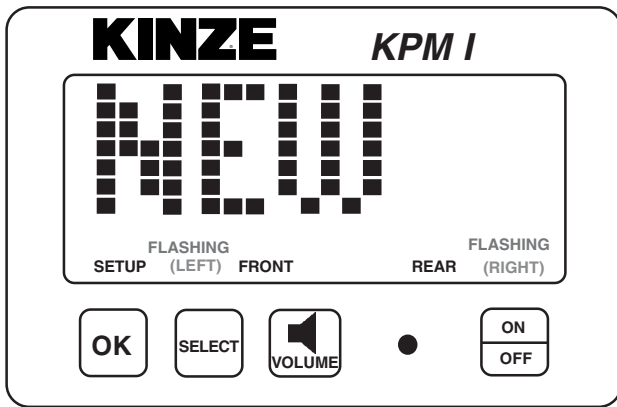


**NOTE: Model 3400 20" and 22" planters will use the rear configuration only. When Interplant® Package rows are in use, select the rear/front configurations. When all rows can be viewed on a single display (rear), pressing the select key has no function.**

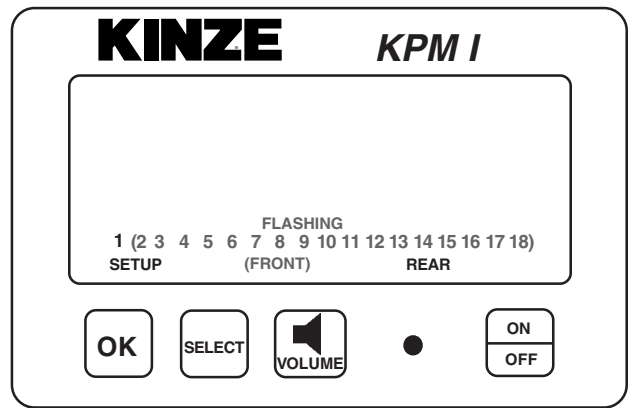
**STEP 4** Press and hold the OK key to confirm the selection and continue holding until the row numbers appear on the display. During confirmation, the display will alternate between “NEW” and “SYS” to alert the user that the previous configuration will be lost. With the rear/front mode selected, the 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.

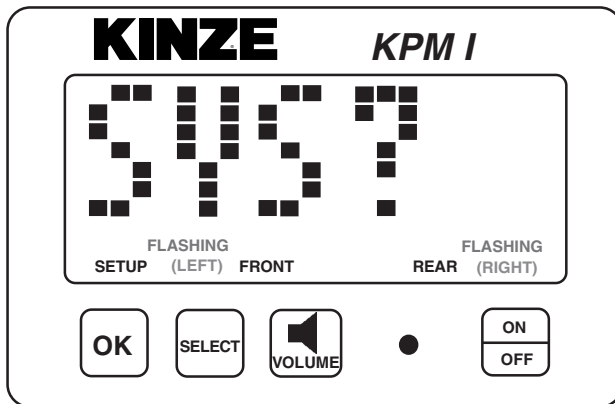
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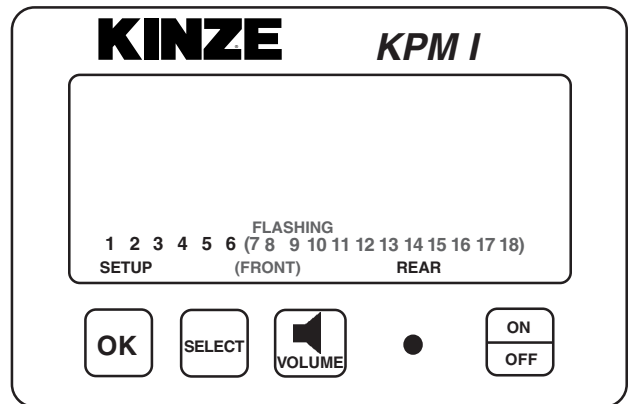


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**STEP 6** When all the seed tubes w/sensors for the current section are installed, check to be sure the monitor displays solid numbers for the number of sensors connected.

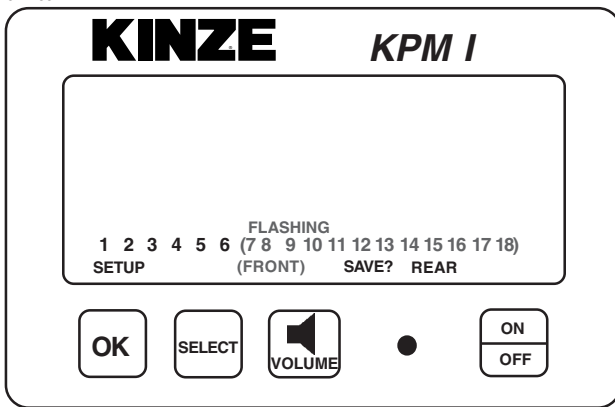
01229916



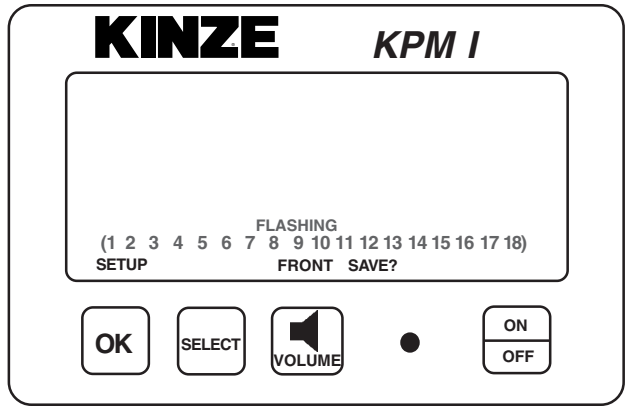
**STEP 7** If this condition is satisfied, press and hold the OK key to save the setup for the current section. The SAVE? icon will show followed by continuous short beeps indicating the monitor is preparing to save. The installer has 5 seconds to decide if he wants to save the current configuration. 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.

**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.

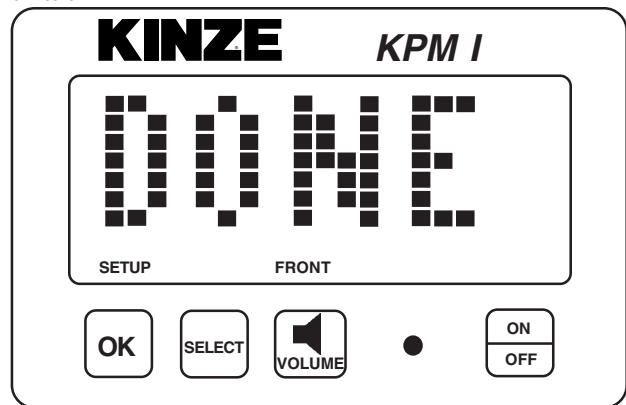
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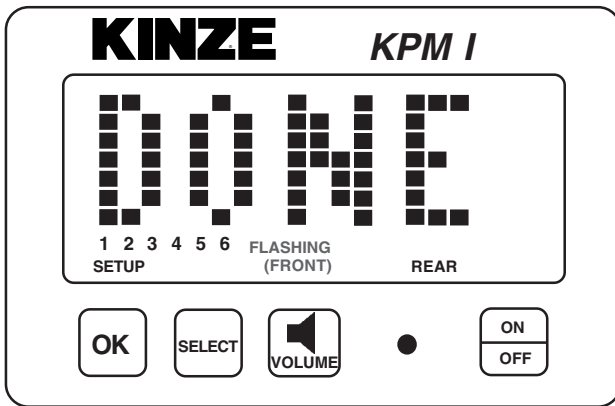
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01229920



01229918

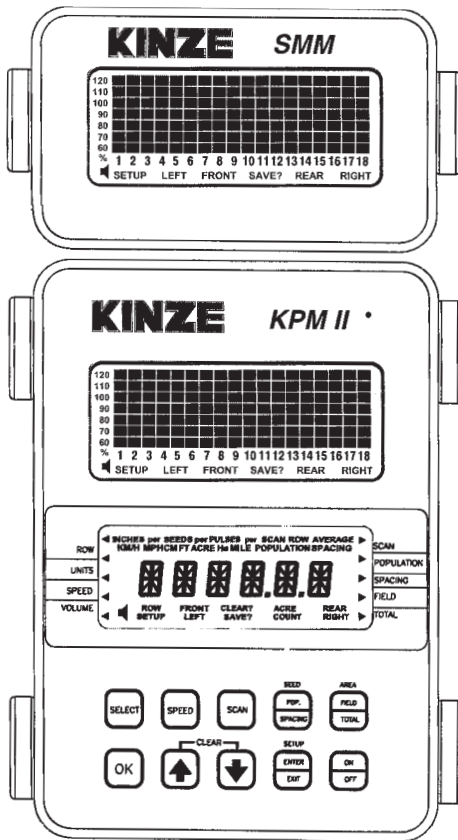


**NOTE:** Individual seed tubes may be unplugged for special situations. An alarm will sound which can be silenced by touching the OK key. The monitor will recognize each seed tube when reconnected.

**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 with 3400 planters 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

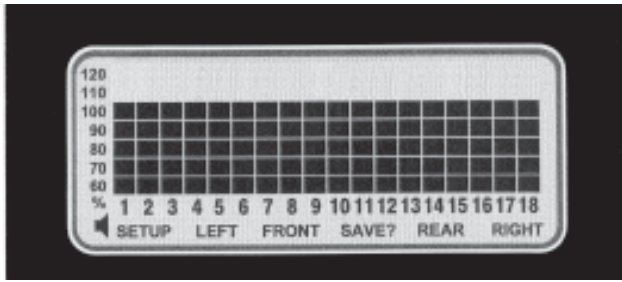
- Enters and exits the programming mode.

### ON/OFF

- Powers the unit on and off.

## 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.

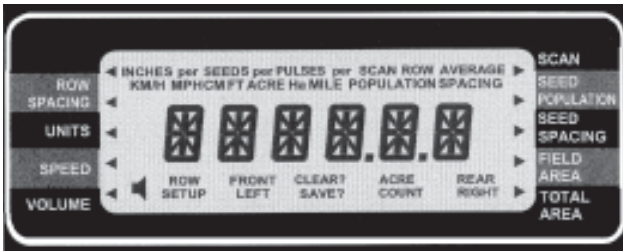
**STEP 2** Press SELECT key again to activate both sections.

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.

### ROW SPACING

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:**

092597-21



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.

## 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.

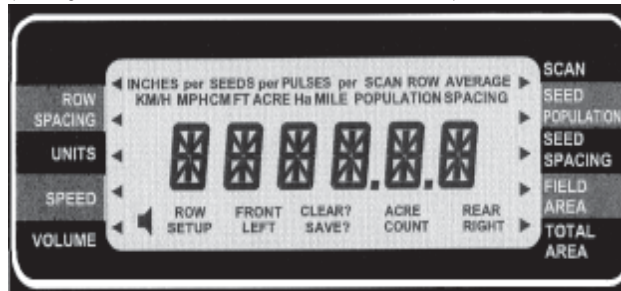


(MTR28c)

**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

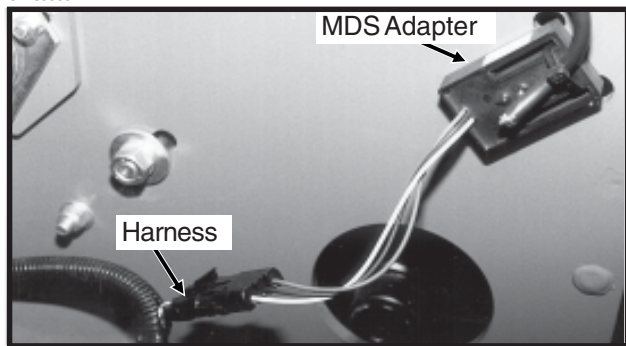
PROGRAMMING/CONNECTING SMM CONSOLE, SHAFT ROTATION SENSORS, SEED TUBES AND/OR RADAR/MAGNETIC DISTANCE SENSORS

**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.

01189909



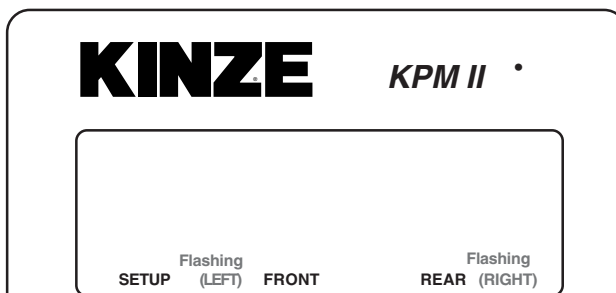
01189910



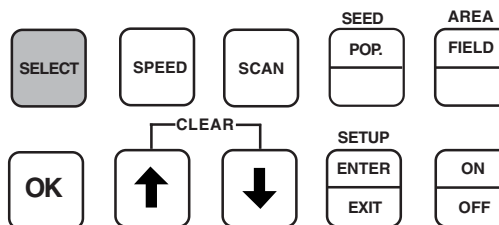
**STEP 2** Press the ON key. The monitor automatically enters the setup procedure. Monitor will scroll “NO SENSOR” on top LCD of KPM II Stack-Mode console.

**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.

12060211



ROW	SETUP	SCAN
UNITS		SEED
SPEED		SEED
VOLUME		FIELD
		TOTAL

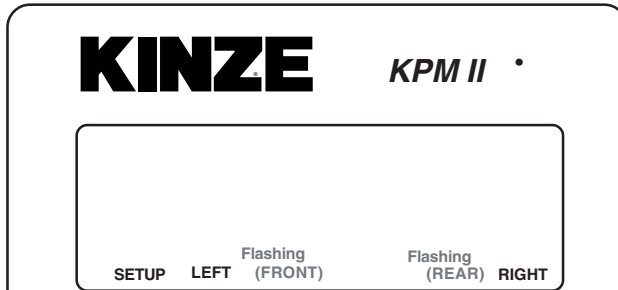


**NOTE:** SMM console may not be applicable to all models.

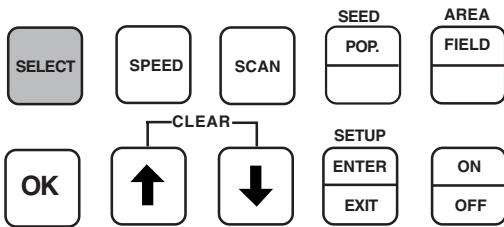
# MACHINE OPERATION

# KPM II STACK-MODE

12060211



ROW	SETUP	SCAN
UNITS		SEED
SPEED		FIELD
VOLUME		TOTAL



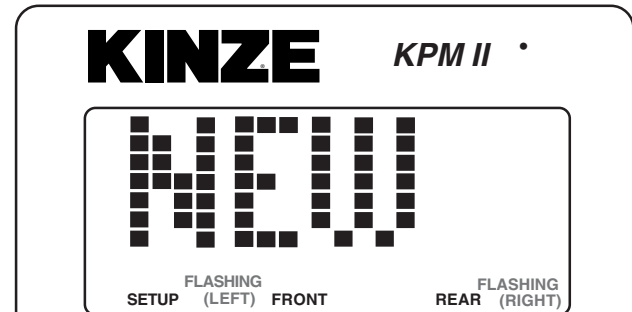
**NOTE: SMM console may not be applicable to all models.**

**NOTE: Model 3400 20" and 22" planters will use the rear configuration only. When Interplant® Package rows are in use, select the rear/front configurations.**

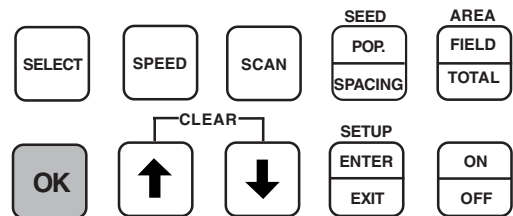
**STEP 4** Press and hold the OK key to confirm selection. The upper display will alternate between "NEW" and "SYS?".

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

12060211



ROW SPACING	SETUP	SCAN
UNITS		SEED POPULATION
SPEED		SEED SPACING
VOLUME		FIELD AREA TOTAL AREA



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

# MACHINE OPERATION

# KPM II STACK-MODE

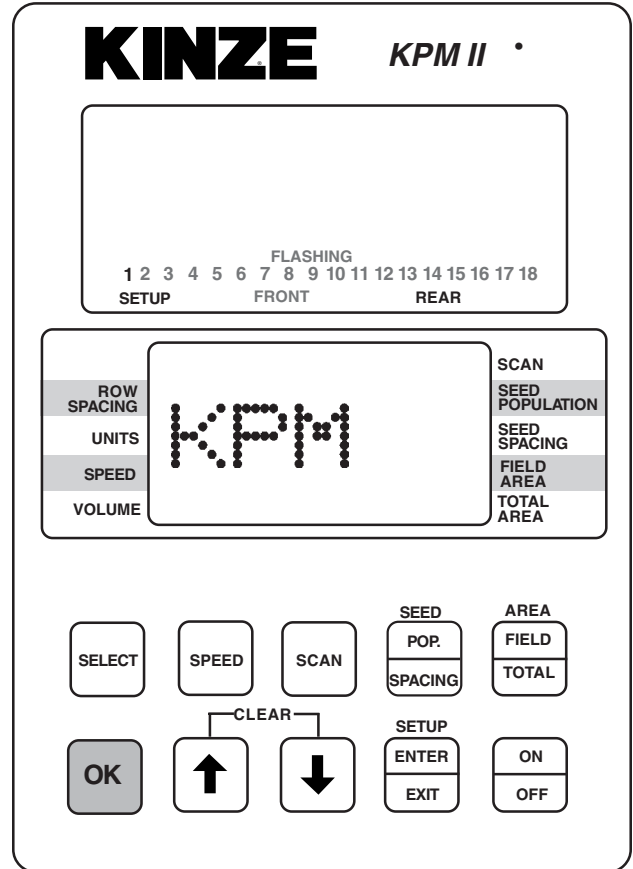
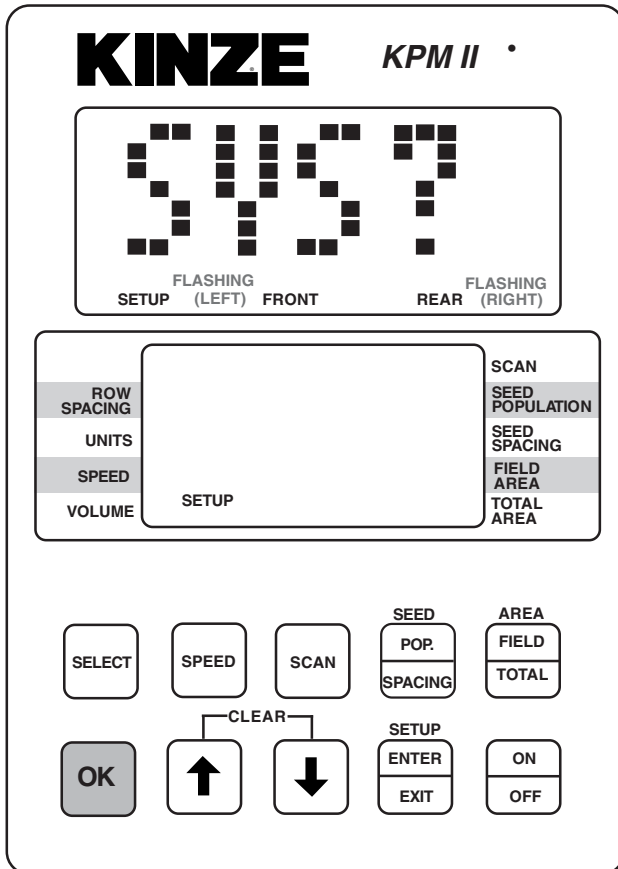
**NOTE: Illustrated using rear/front configuration.** The KPM II Stack-Mode console shows LEFT in the left/right configuration, REAR in the rear/front configuration and FRONT LEFT/REAR LEFT in the four sections configuration.

**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.

12060211



12060211



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

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

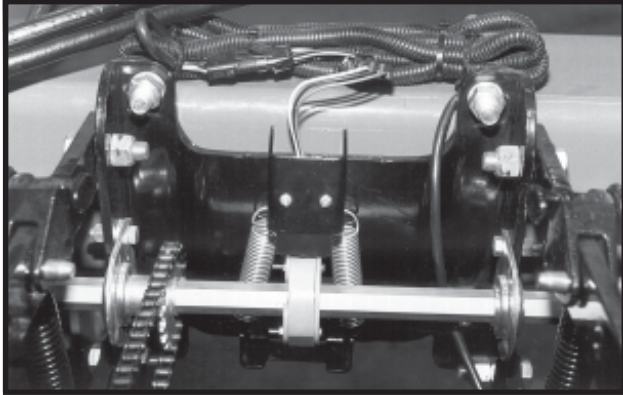


# MACHINE OPERATION

# 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.

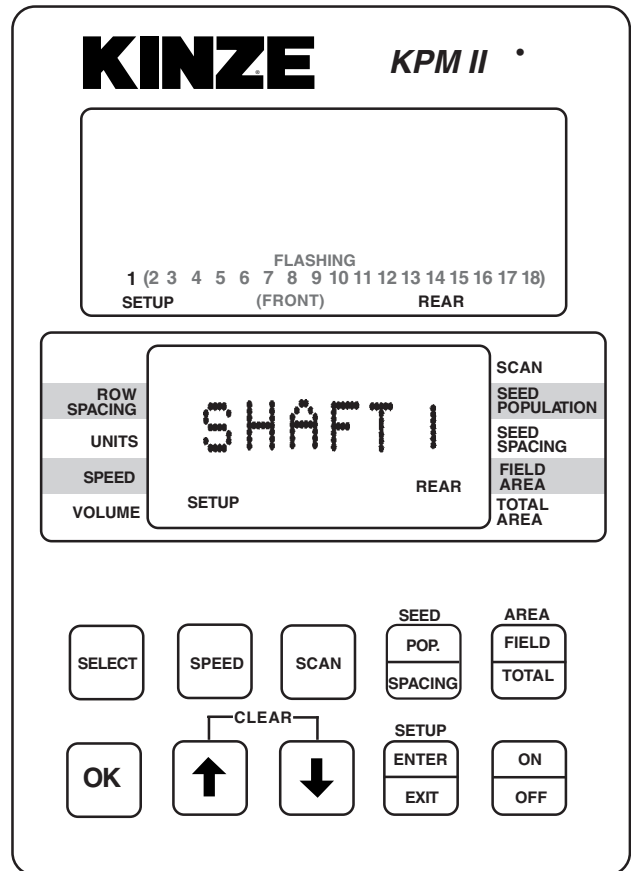
01189906



“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.

12060211



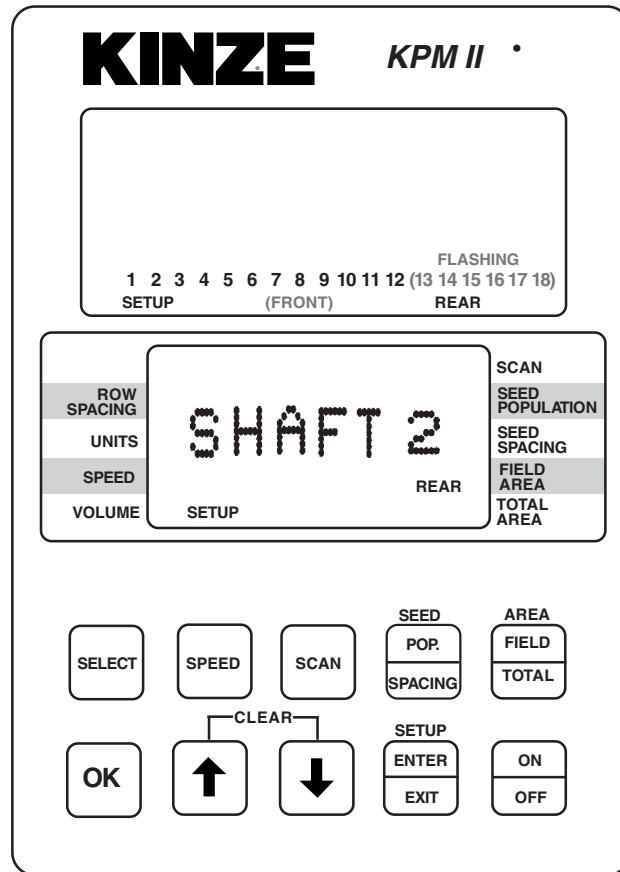
**NOTE:** SMM console may not be applicable to all models.

# MACHINE OPERATION

# KPM II STACK-MODE

## STEP 6 (Continued)

12060211

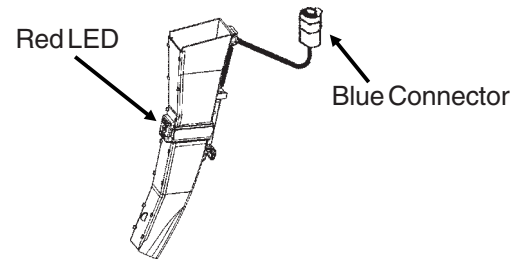


**NOTE: SMM console may not be applicable to all models.**

## 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.

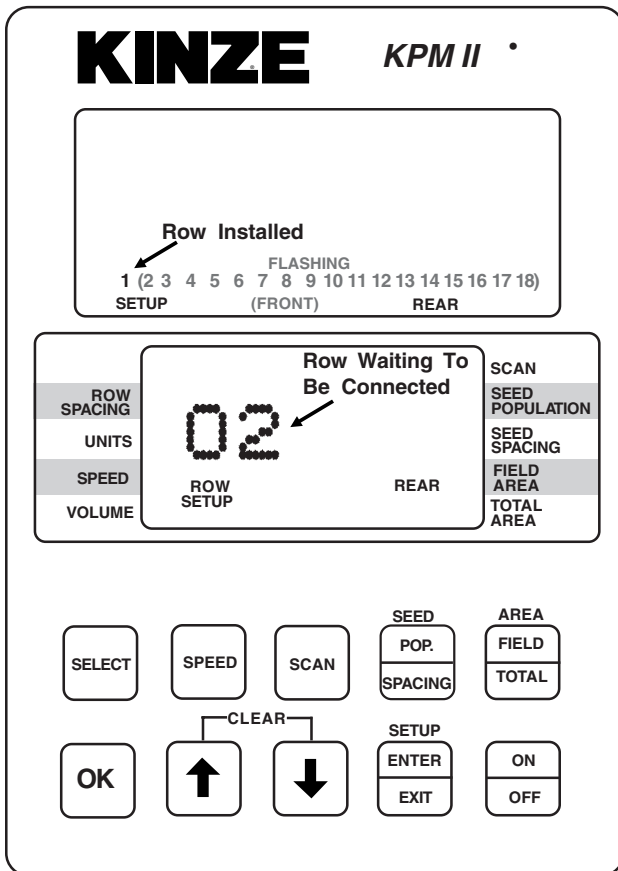
(A11948)



## 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.

12060211



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

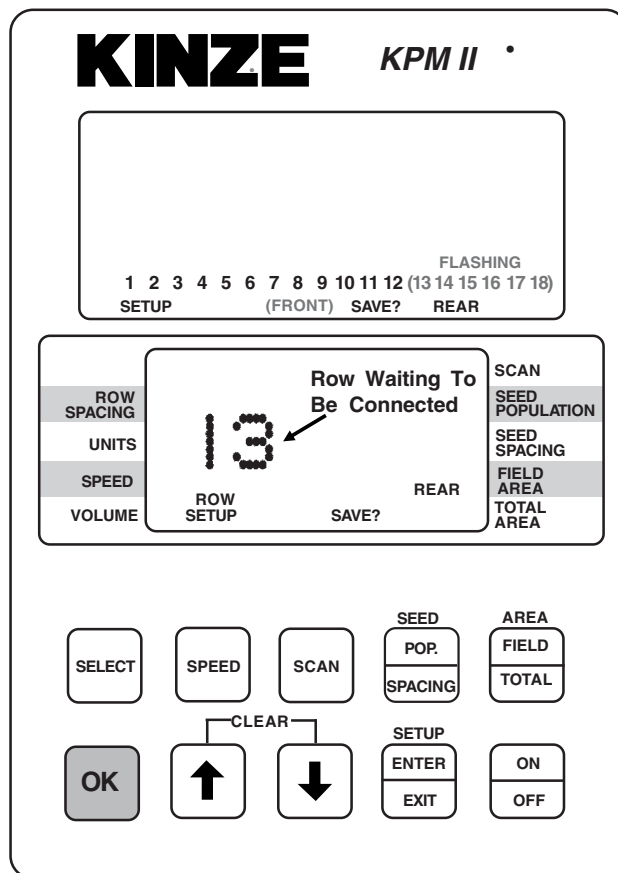
# MACHINE OPERATION

# 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.

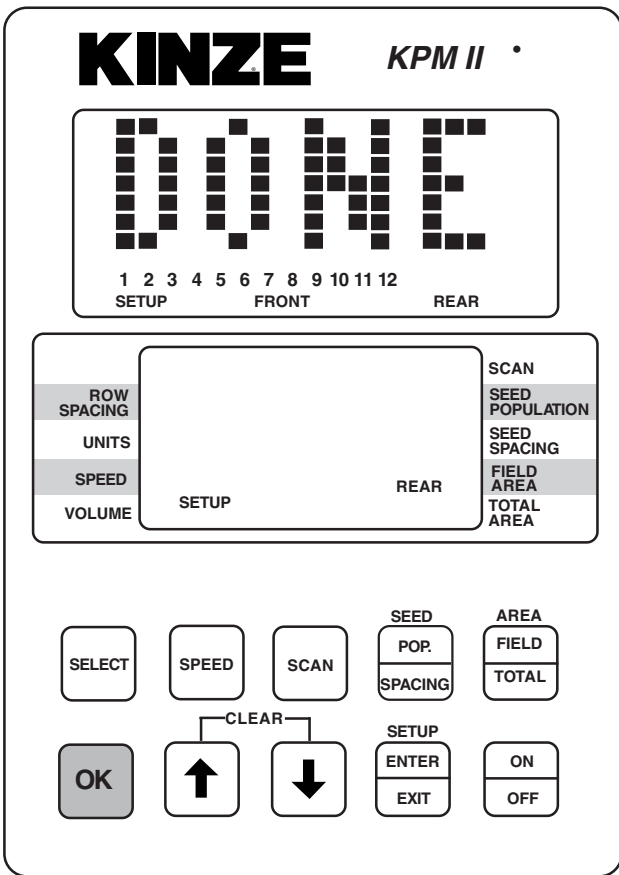
12060211



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

## STEP 8 (Continued)

12060211



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

# MACHINE OPERATION

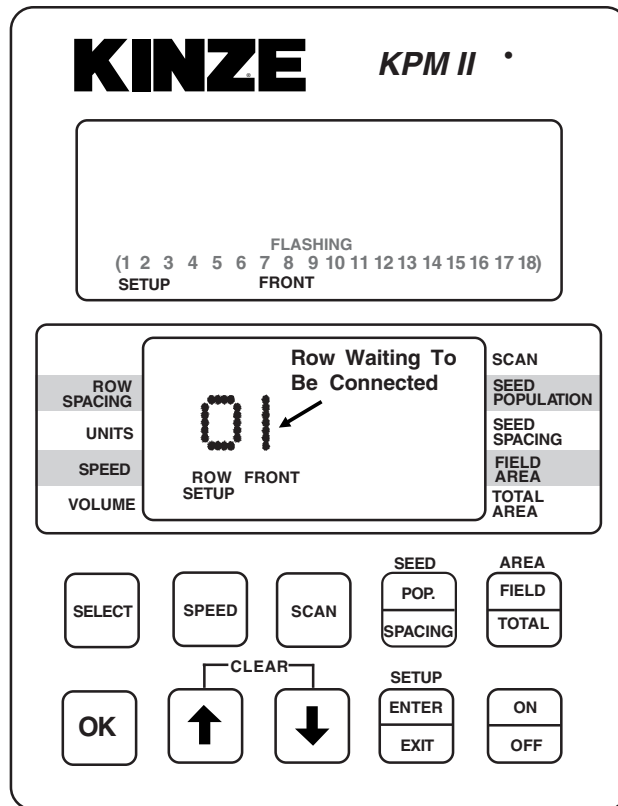
# KPM II STACK-MODE

**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 shortbeeps 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



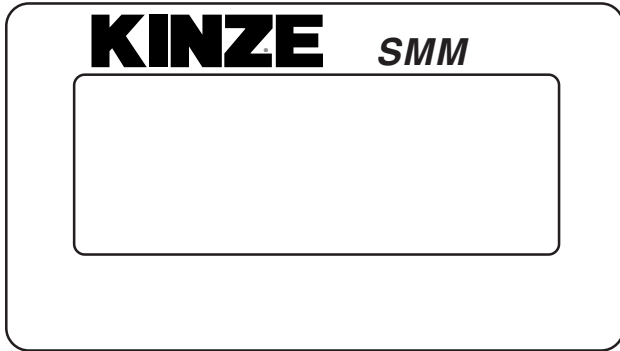
**NOTE:** SMM console may not be applicable to all models.

# MACHINE OPERATION

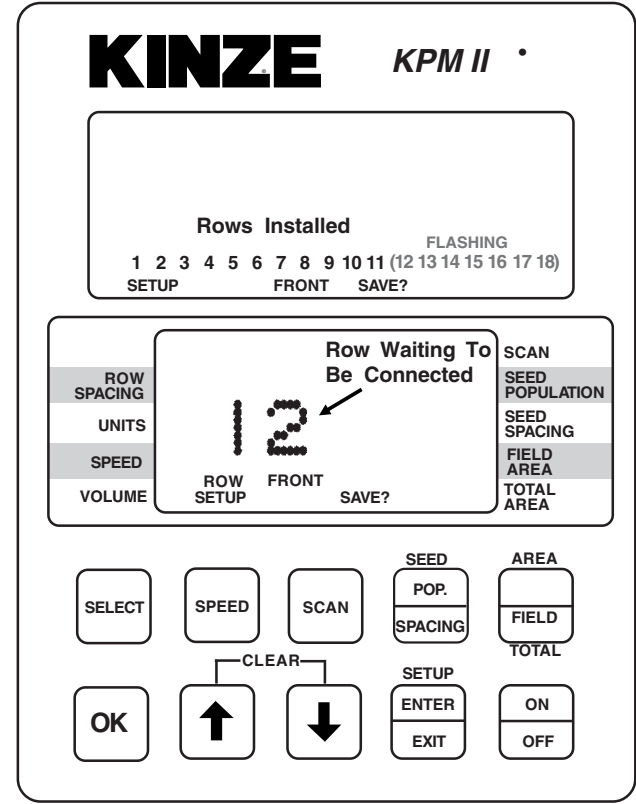
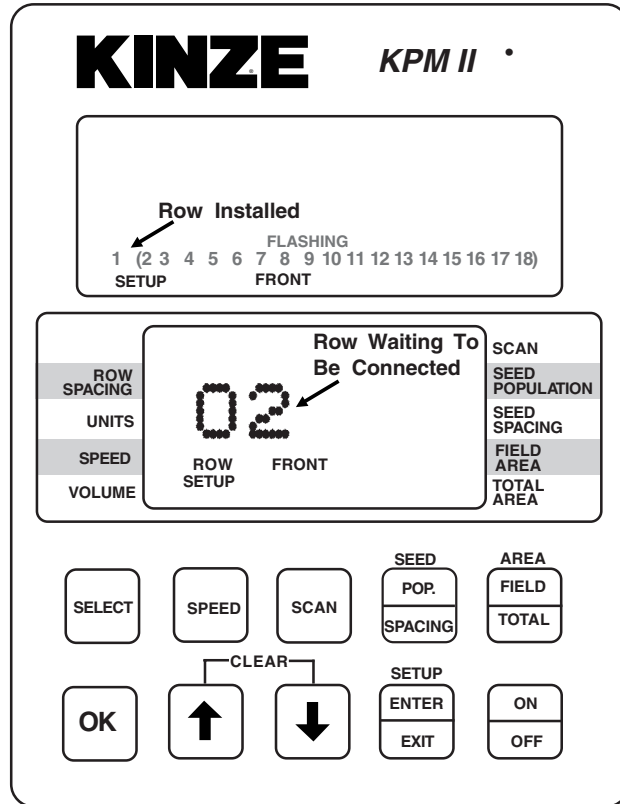
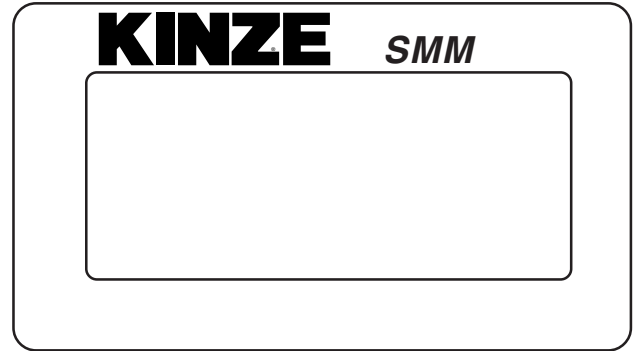
# KPM II STACK-MODE

## STEP 9 (Continued)

12060213



12060214



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

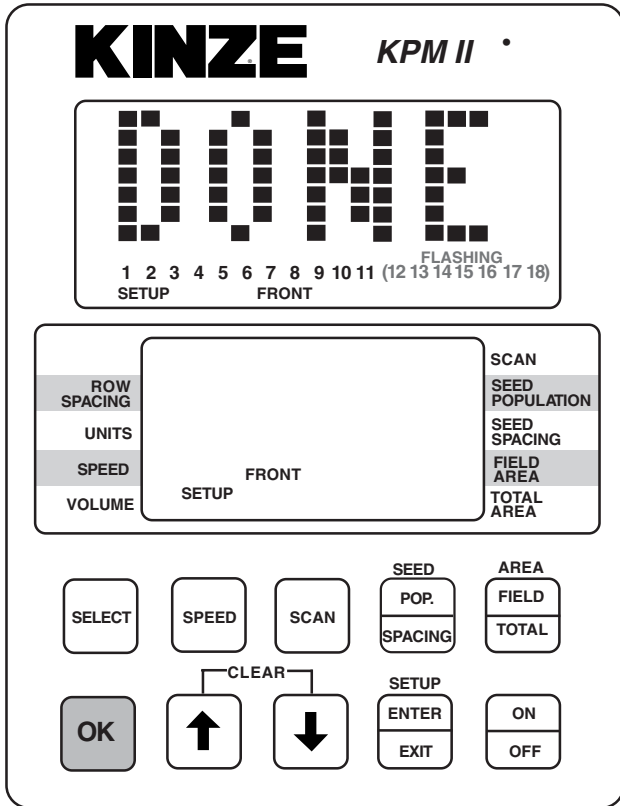
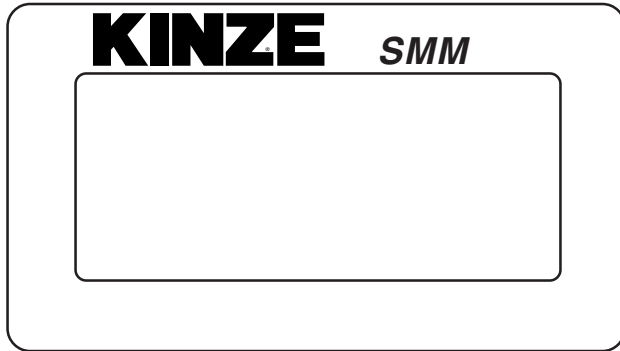
**NOTE: SMM console may not be applicable to all models.**

# 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.**



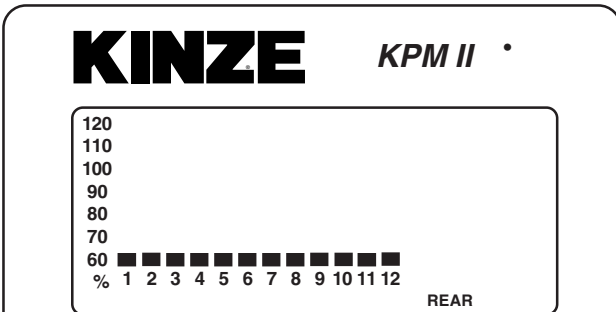
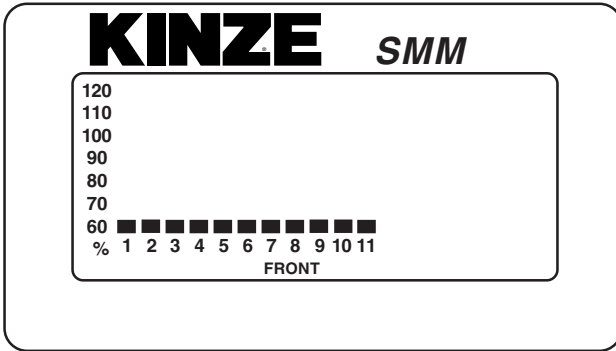
# MACHINE OPERATION

# 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



**KINZE KPM II**

ROW SPACING  
UNITS  
SPEED  
VOLUME

**GNDSPD**

REAR

SCAN  
SEED POPULATION  
SEED SPACING  
FIELD AREA  
TOTAL AREA

SELECT SPEED SCAN SEED POP. SPACING AREA FIELD TOTAL

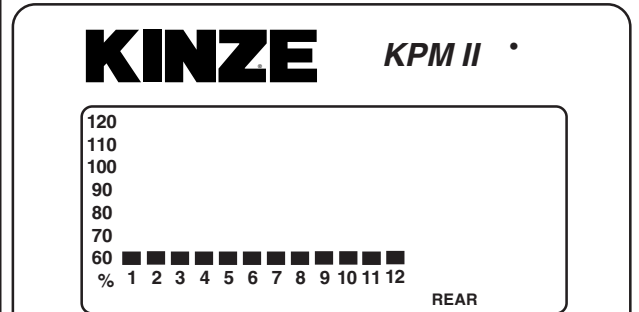
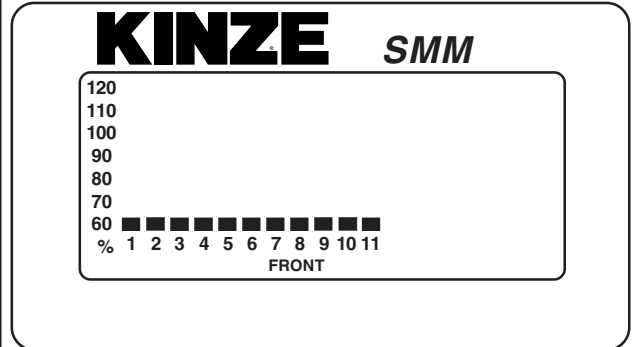
OK CLEAR ↑ ↓ SETUP ENTER EXIT ON OFF

**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  
SPEED  
VOLUME

MPH

**0.0**

SCAN  
SEED POPULATION  
SEED SPACING  
FIELD AREA  
TOTAL AREA

SELECT SPEED SCAN SEED POP. SPACING AREA FIELD TOTAL

OK CLEAR ↑ ↓ SETUP ENTER EXIT ON OFF

**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.**

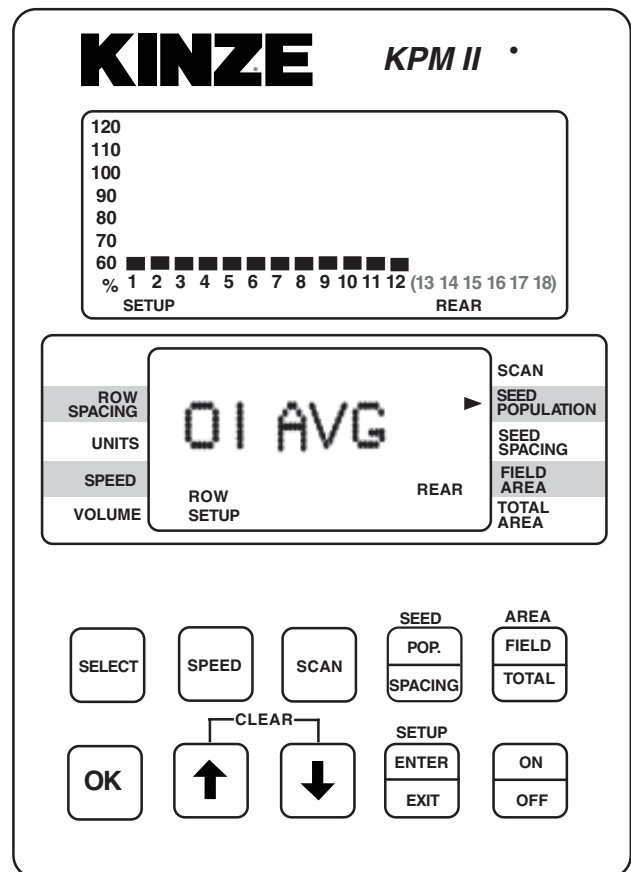
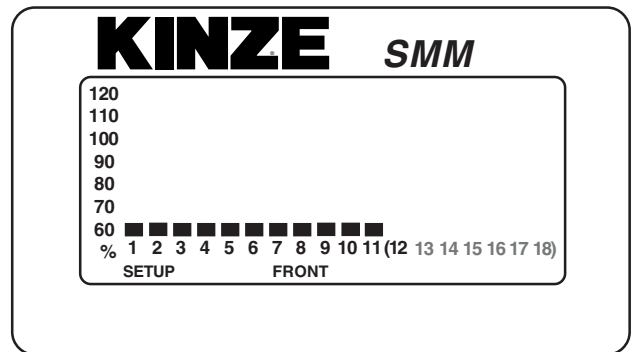
**STEP 1** Enter the programming mode by pressing and holding the SETUP key. The monitor will emit several short beeps, followed by a long beep. On the lower LCD, the SETUP icon will turn on and the arrow head icon will flash, indicating the user can select an item to program.

**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.

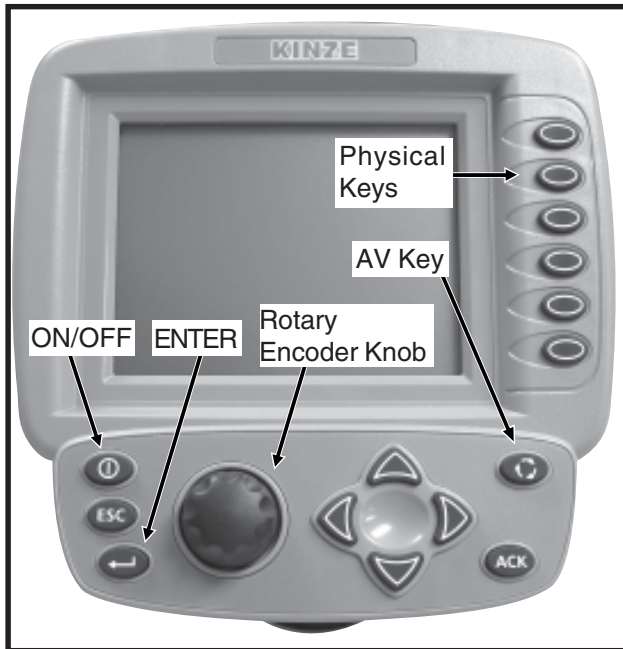
The monitor system will power down if no activity is detected within one hour. No activity means there has been no new seed flow and no operator push key input.

<b>Monitor Key Functions .....</b>	<b>6-51</b>
<b>Configuring Planter Monitor .....</b>	<b>6-52</b>
<b>Programming/Connecting Seed Tubes, Shaft Rotation Sensors And/Or Radar/Magnetic Distance Sensors .....</b>	<b>6-54</b>
<b>Changing Volume, Contrast And Backlighting .....</b>	<b>6-56</b>
<b>Programming Interplant® Condition, Row Spacing And Units (Metric Or English) .....</b>	<b>6-57</b>
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<b>Speed Sensor Calibration/Programming .....</b>	<b>6-59</b>
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<b>Adding Interplant® Rows (If Rear Rows Have Previously Been Programmed) .....</b>	<b>6-64</b>
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<b>Enabling/Disabling Interplant® Rows .....</b>	<b>6-68</b>
<b>Warnings And Alarms .....</b>	<b>6-71</b>
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<b>Area Management .....</b>	<b>6-74</b>
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<b>Clearing Field Area .....</b>	<b>6-77</b>
<b>Acre Count Mode .....</b>	<b>6-77</b>
<b>Replacing Faulty Sensor(s) .....</b>	<b>6-79</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.



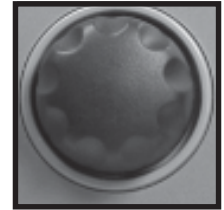
### ENTER KEY

- 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.**



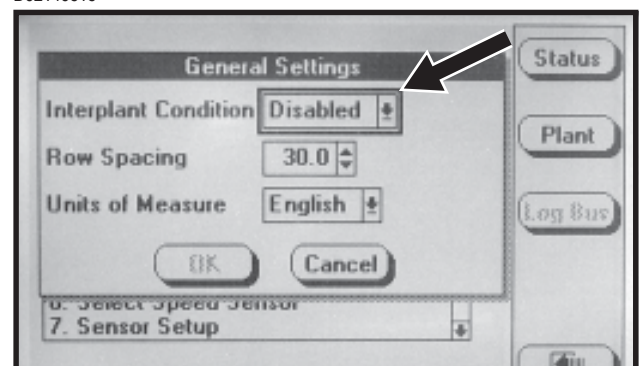
### ARROW KEYS

- 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

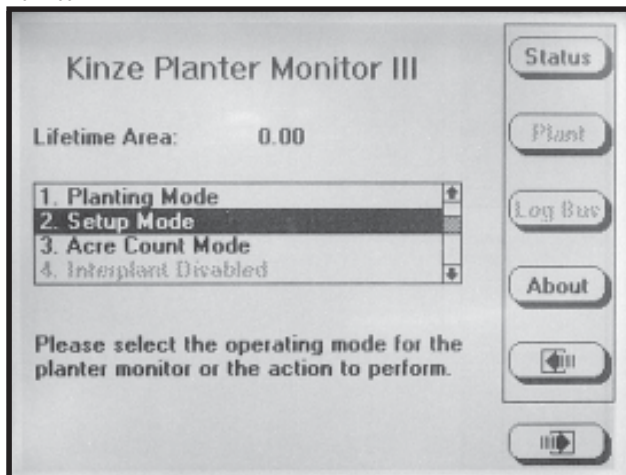


## CONFIGURING PLANTER MONITOR

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.

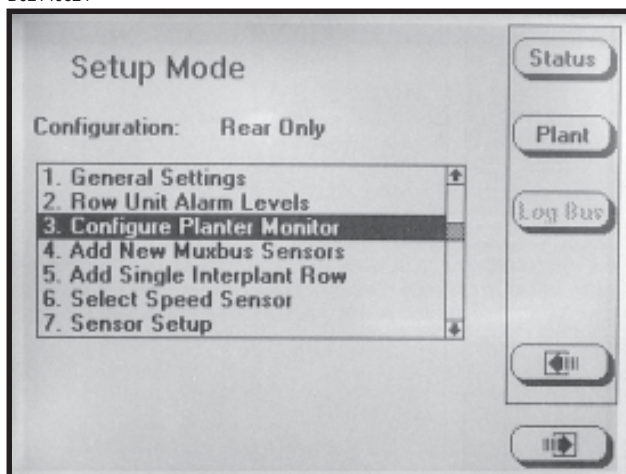
D02140614



**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.

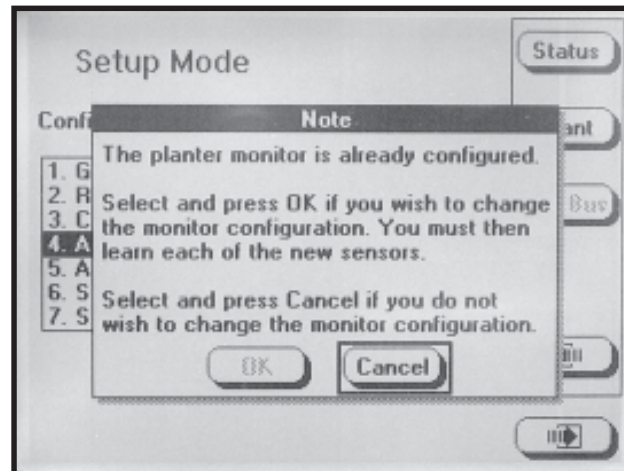
D02140624



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

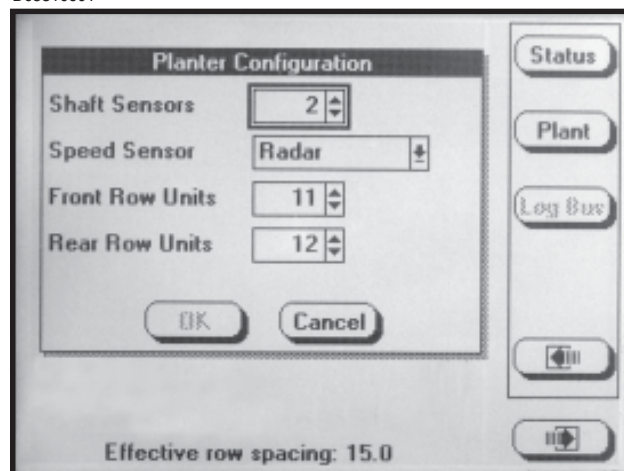
**NOTE:** If the monitor has already been configured the message shown below will appear.

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.

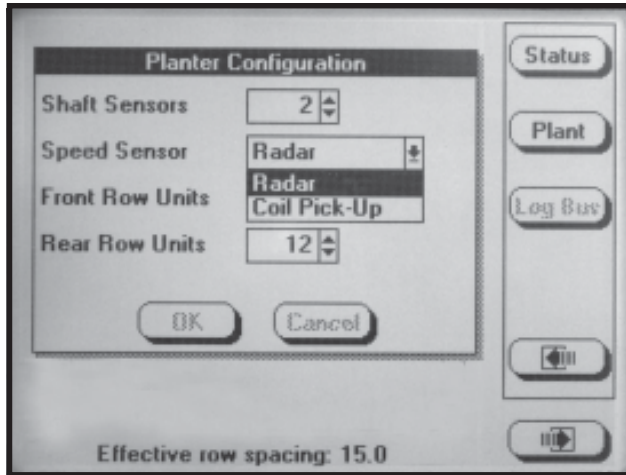
D05310601



**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.

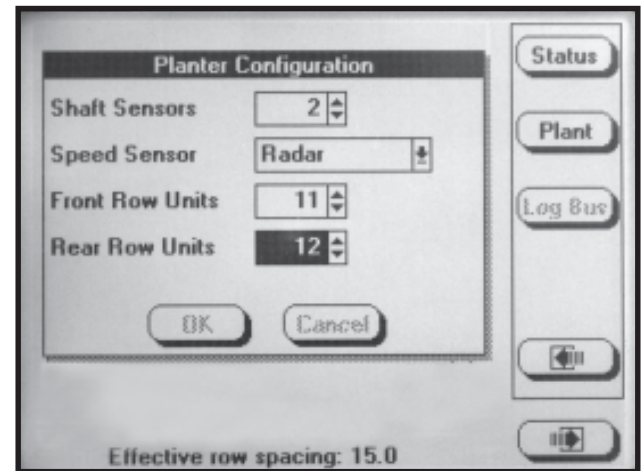
**STEP 5** Press the knob or ENTER key and a drop down menu will appear; select either “Radar” or “Coil Pick-Up” (MDS) by turning the knob or using the UP or DOWN arrow keys. When the desired selection is highlighted press the knob or ENTER key. The black box will advance to “Front Row Units” field.

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.

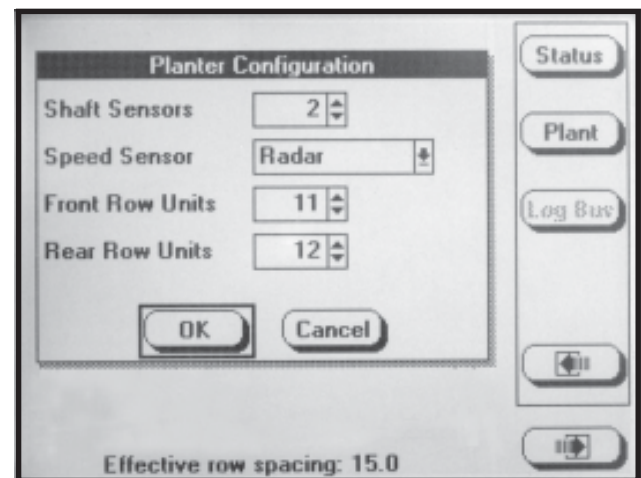
D05310606



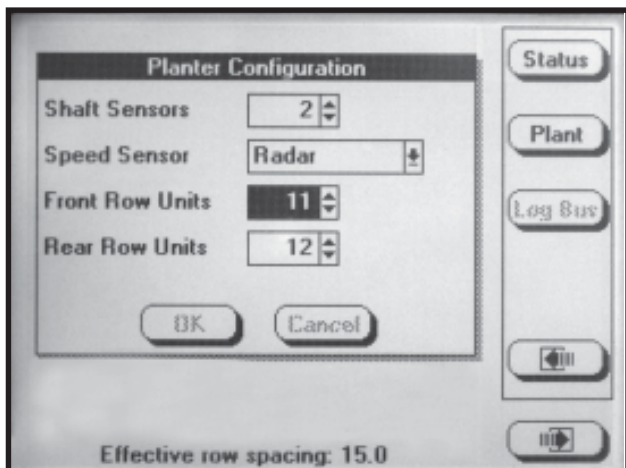
**STEP 6** If there are front rows on the planter, press the knob or ENTER key to highlight the “Front Row Units” field. Turn the knob or use the UP or DOWN arrow keys to obtain correct number of push row units. Press the knob or ENTER key when desired quantity is displayed. The black box will advance 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.

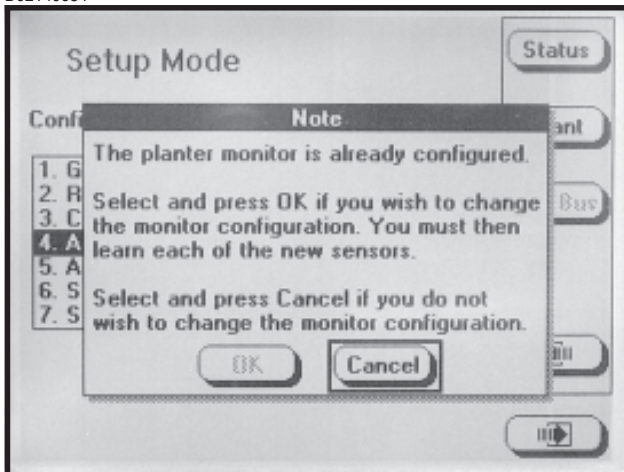
**STEP 9** The monitor screen shown below will appear.

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



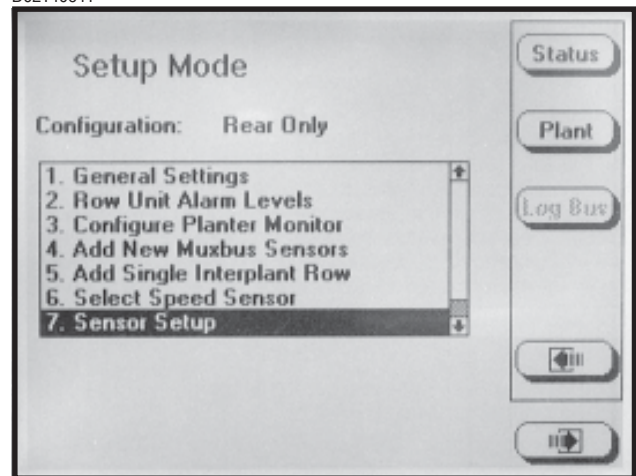
PROGRAMMING/CONNECTING SEED TUBES,  
SHAFT ROTATION SENSORS AND/OR RADAR/  
MAGNETIC DISTANCE SENSORS

**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.

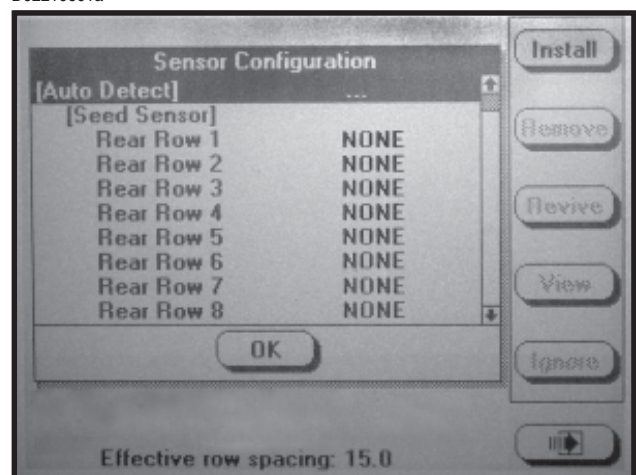
**STEP 3** Select "Sensor Setup" by turning the knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to display the highlighted item.

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



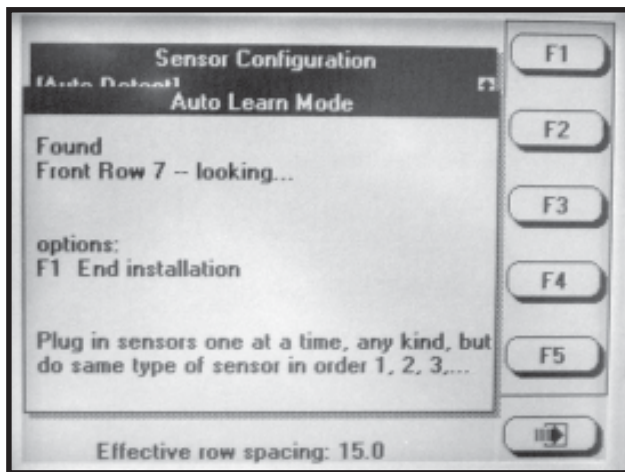


**STEP 5** Plug in the first seed sensor (row 1), working from left to right (rear row units and front next if applicable). When a sensor is connected to the planter harness wait for the monitor to acknowledge with two beeps.

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.

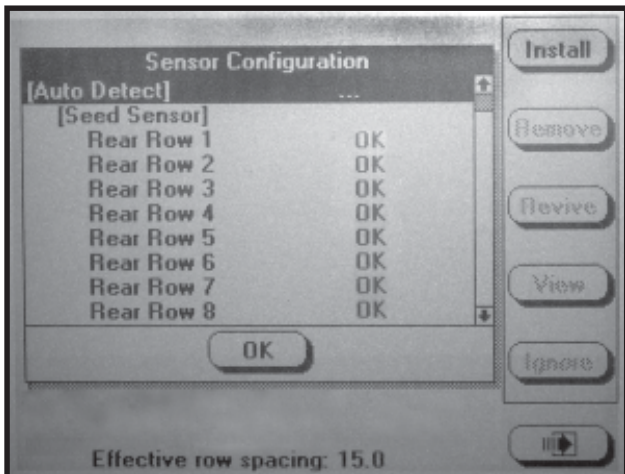
When all sensors are installed press the F1 key to end the installation.

D02170617



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

D02210601b

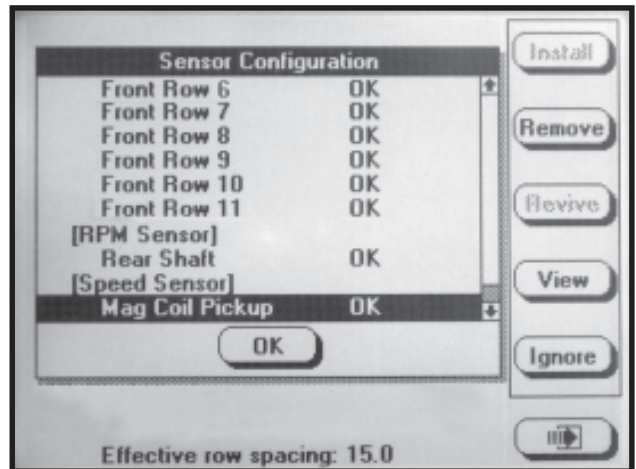


**STEP 6** If “OK” appears behind ALL sensors, press the knob or the ENTER key to save the configuration. The “Setup Mode” menu will then appear.

**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



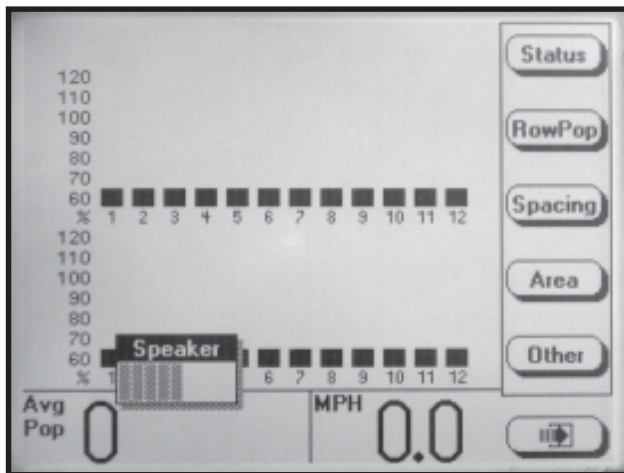
**STEP 7** To return to “Planting Mode” select the PLANT key or press the F6 key until “Planting Mode” screen appears.

## 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

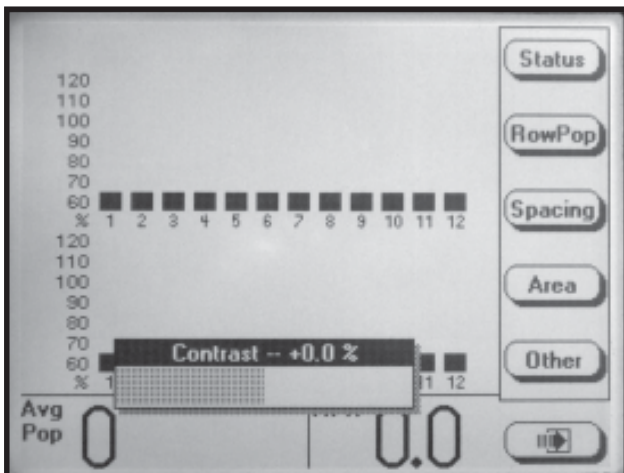


**STEP 2** Use the LEFT and RIGHT arrows or turn the rotary encoder knob to adjust the volume. The volume of the sound emitted from the speaker changes as the adjustment is being made.

**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

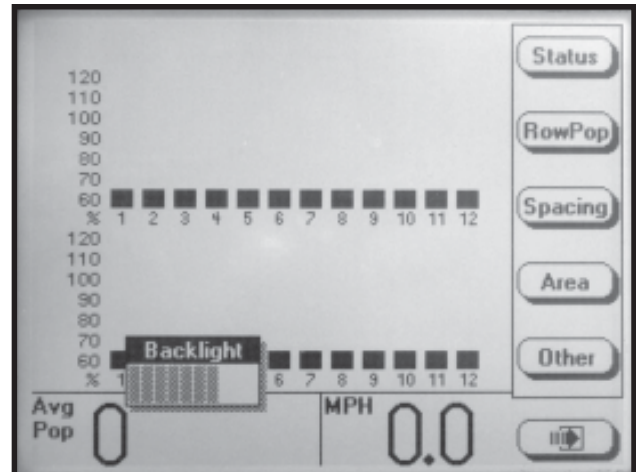


**STEP 5** Use the LEFT and RIGHT arrows or turn the knob to adjust contrast. The effect of the adjustment will be visible on the display.

**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



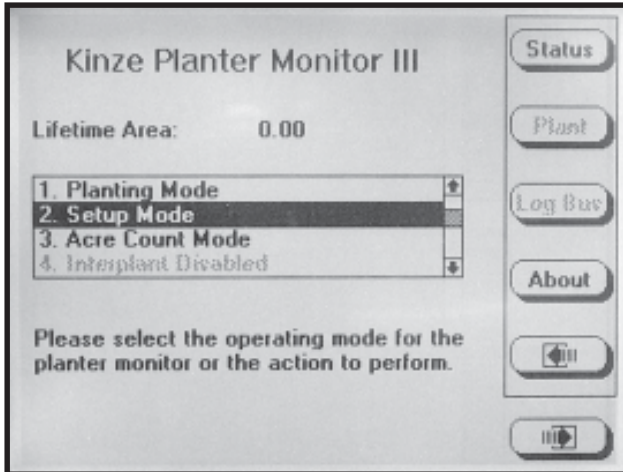
**STEP 8** Use the LEFT and RIGHT arrows or turn the knob to adjust backlighting. The effect of the adjustment will be visible on the display.

**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.

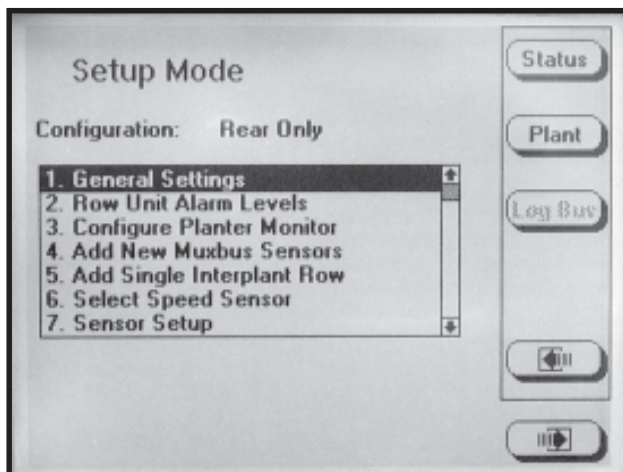
D02140614



**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.

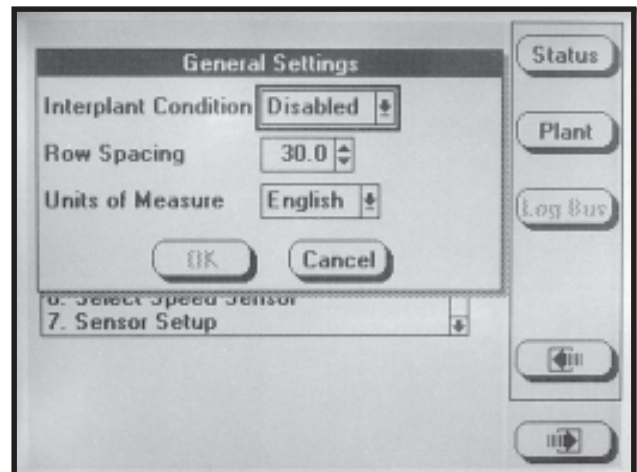
**STEP 3** Select “General Settings” by turning the knob or using the UP or DOWN arrow keys. Press the knob or the ENTER key to display the highlighted item.

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.

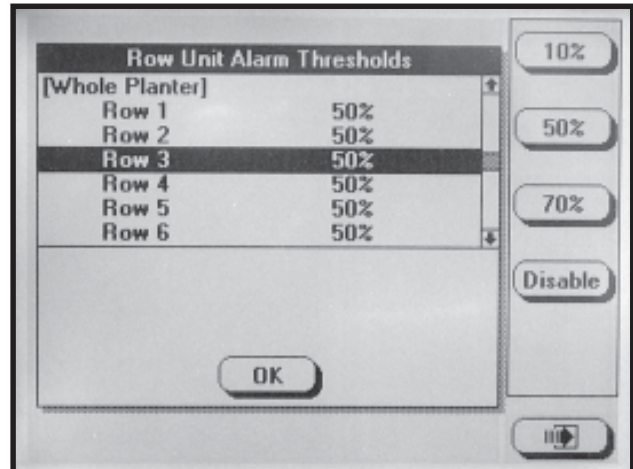
**STEP 8** To return to “Planting Mode” press the PLANT key.

## 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.

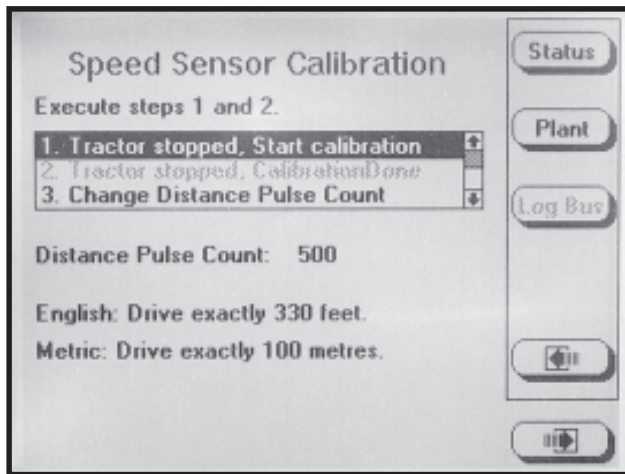
**STEP 5** To return to “Planting Mode” press the PLANT key.

## 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.

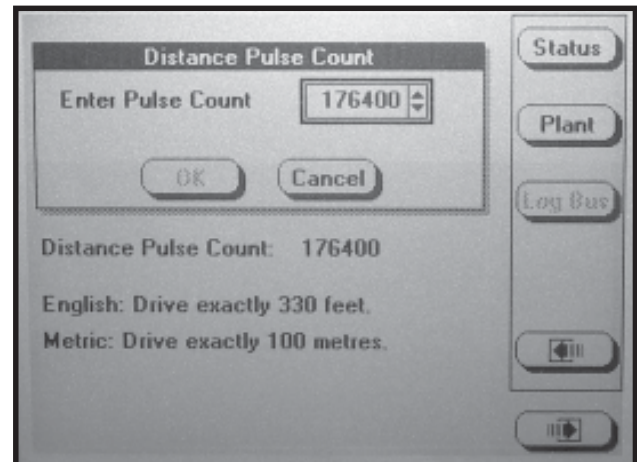
**NOTE:** If the Distance Pulse Count number starts to count pulses with the tractor not moving, check radar distance sensor for vibration or other interference.

- 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.

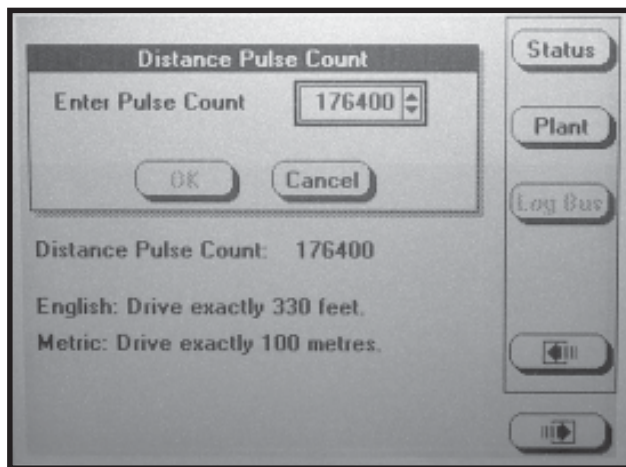
**STEP 3** To return to “Planting Mode” press the PLANT key.

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

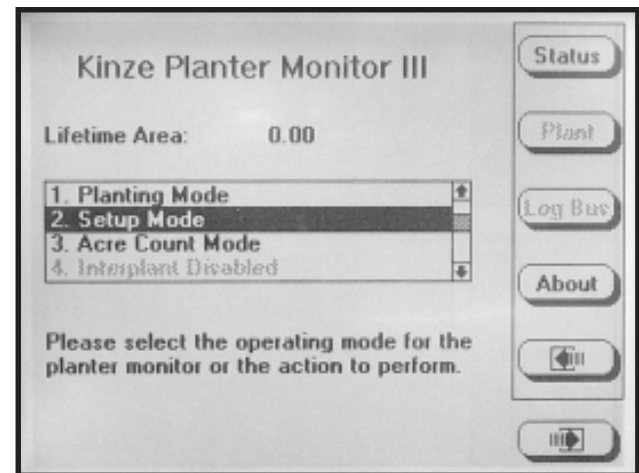
This setting must be specified when the monitor is first configured. It will be necessary to reprogram to use an alternate speed sensor.

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

### RADAR TO MAGNETIC DISTANCE SENSOR

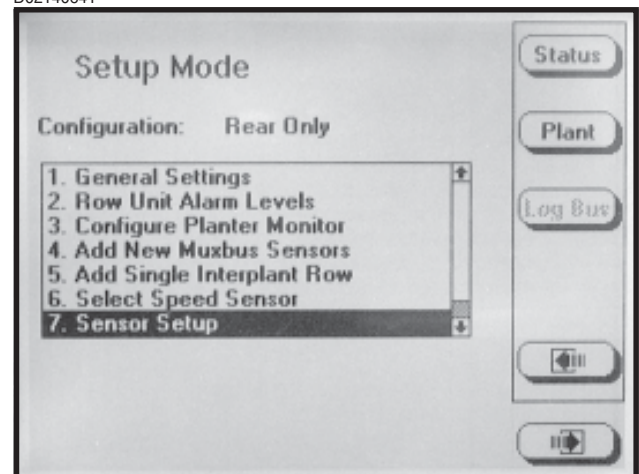
**STEP 1** Press the F6 key until the “Mode Selection” screen appears. Select “Setup Mode” by turning the rotary encoder knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to display the highlighted item.

D02140614



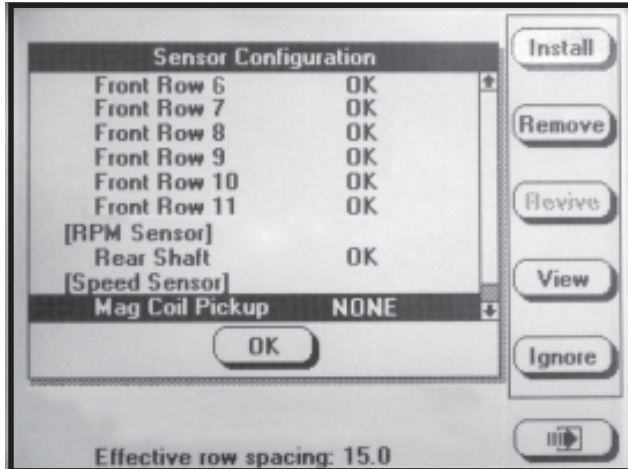
**STEP 2** Turn the knob or use the UP or DOWN arrow keys to choose “Sensor Setup”. Press the knob or ENTER key to display the highlighted item.

D02140641



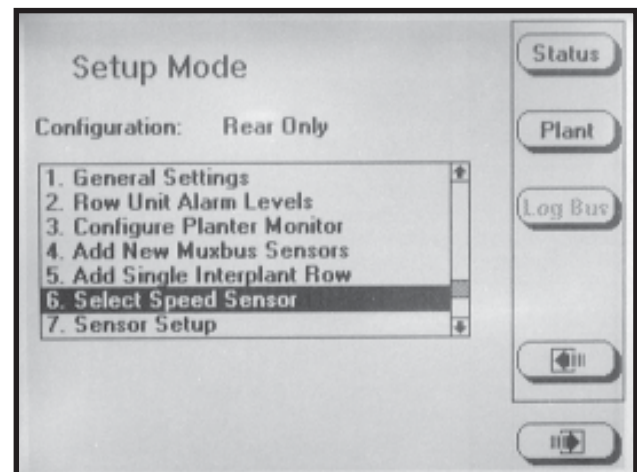
**STEP 3** Turn the knob or use the UP or DOWN arrow keys to highlight “Mag Coil Pickup”. Plug in Magnetic Distance Sensor and press the INSTALL key. Press the knob or ENTER key to save information.

D05310609a

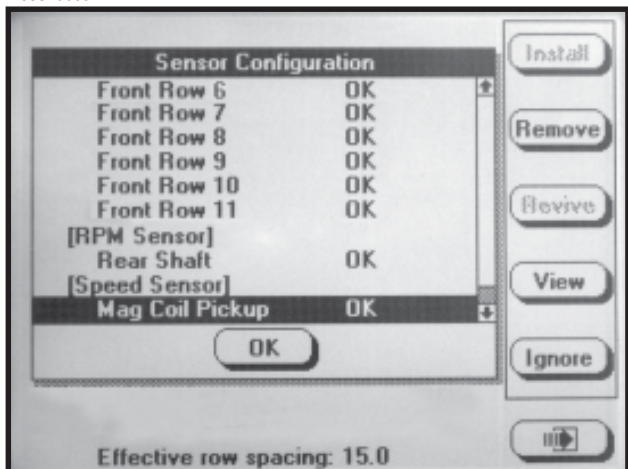


**STEP 4** Turn the knob or use the UP or DOWN arrow keys to select “Select Speed Sensor” and press the knob or ENTER key. Press the knob or ENTER key to select the “Speed Sensor” field and a drop down menu will appear. Turn the knob or use the UP or DOWN arrow keys to select “Coil Pick-Up” and press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

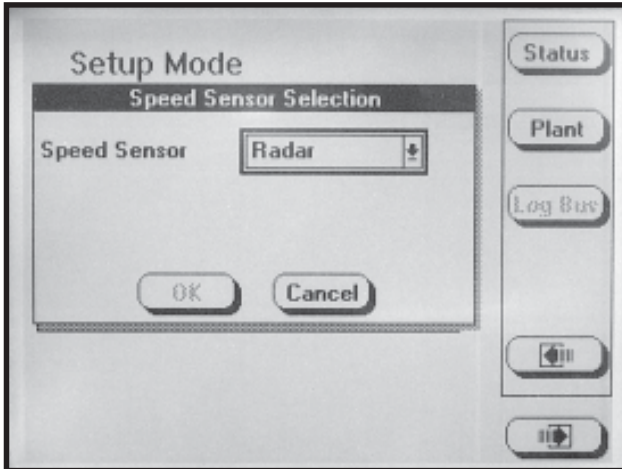
D02140639



D05310609

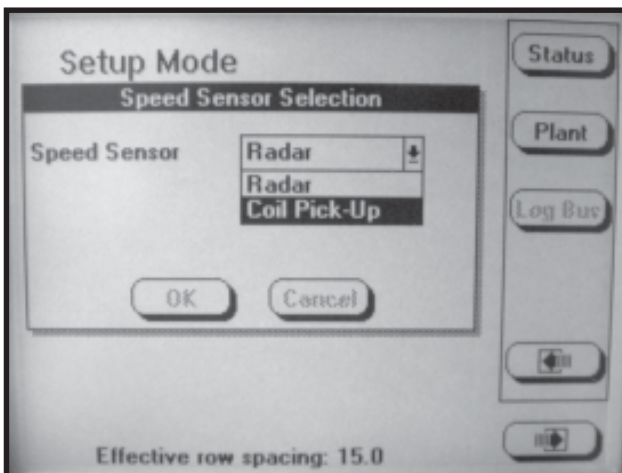


D02140639



**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.

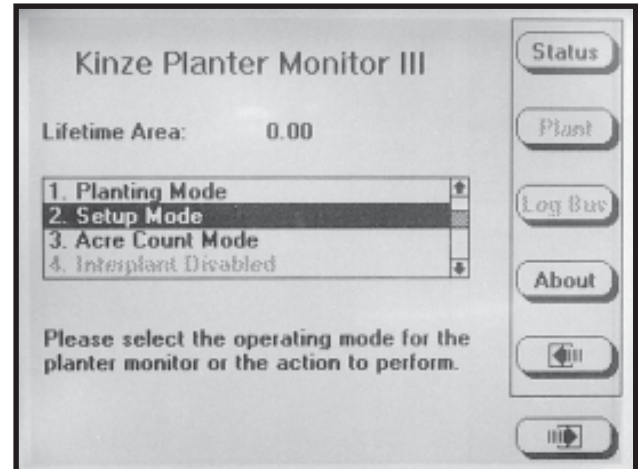
**STEP 6** Press the PLANT key to return to main planting screen.

**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

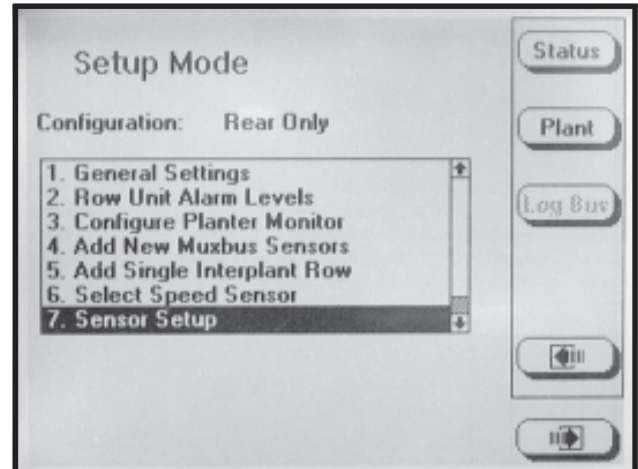
**STEP 1** Press the F6 key until the “Mode Selection” screen appears. Select “Setup Mode” by turning the rotary encoder knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to display the highlighted item.

D02140614



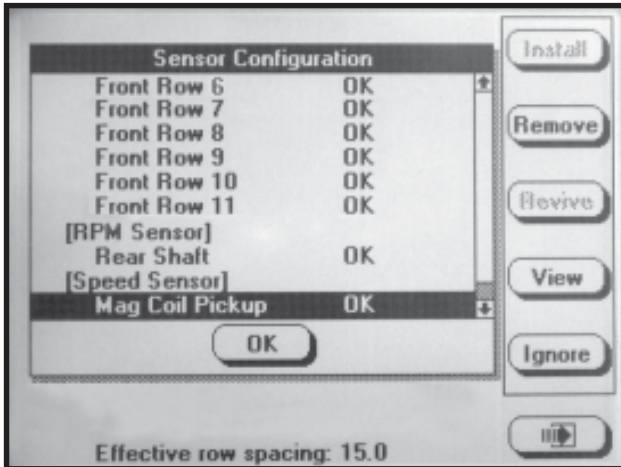
**STEP 2** Turn the knob or use the UP or DOWN arrow keys to choose “Sensor Setup”. Turn the knob or use the UP or DOWN arrow keys to highlight “Mag Coil Pickup”. Press the REMOVE key, a note will appear for confirmation select as appropriate. Unplug Magnetic Distance Sensor and press the knob or ENTER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

D02140641



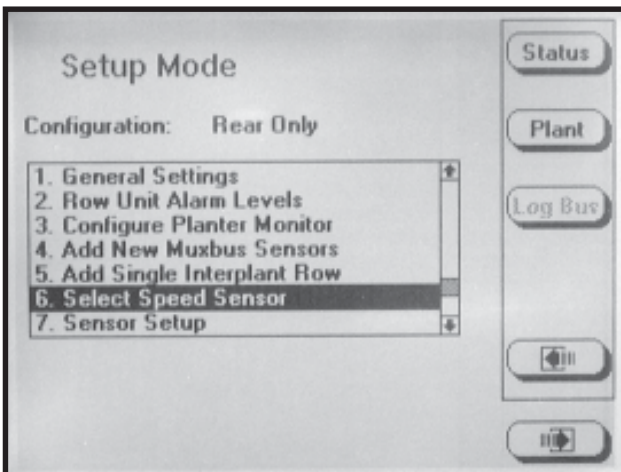


D05310609

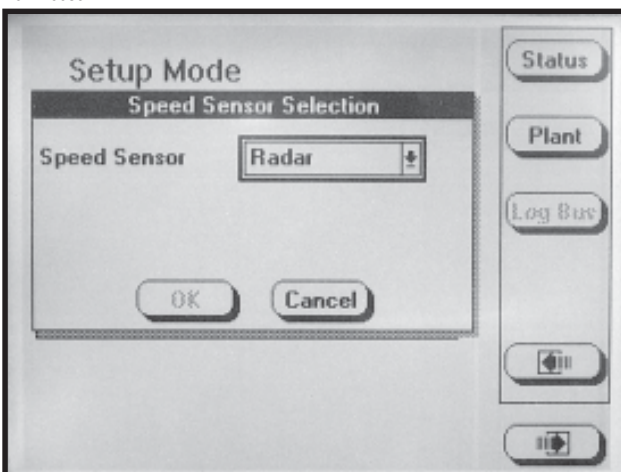


**STEP 3** Turn the knob or use the UP or DOWN arrow keys to select “Select Speed Sensor” and press the knob or ENTER key. Press the knob or ENTER key to select the “Speed Sensor” field and a drop down menu will appear. Turn the knob or use the UP or DOWN arrow keys to select “Radar” and press the knob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

D02140639

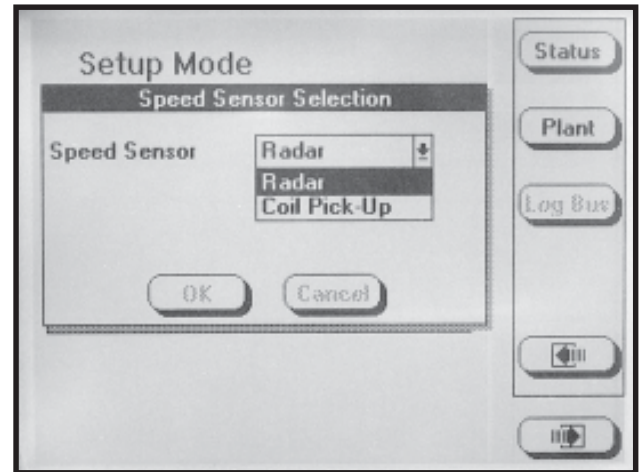


D02140639



**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.

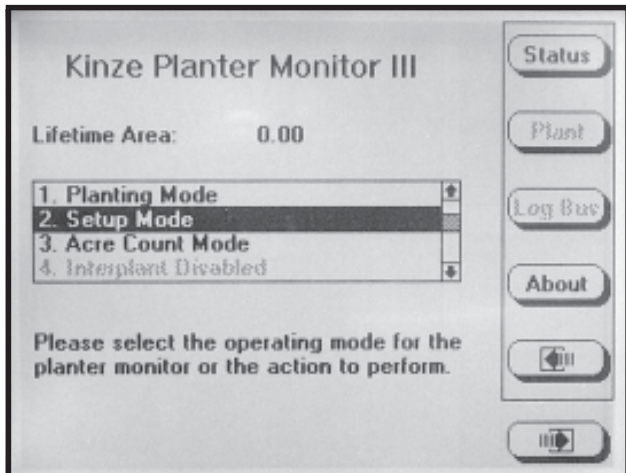
**NOTE:** When switching between speed sensors, verify the distance pulse count is correct for the chosen sensor. There will be significant distance pulse count variation between radar and magnetic distance sensors.

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

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

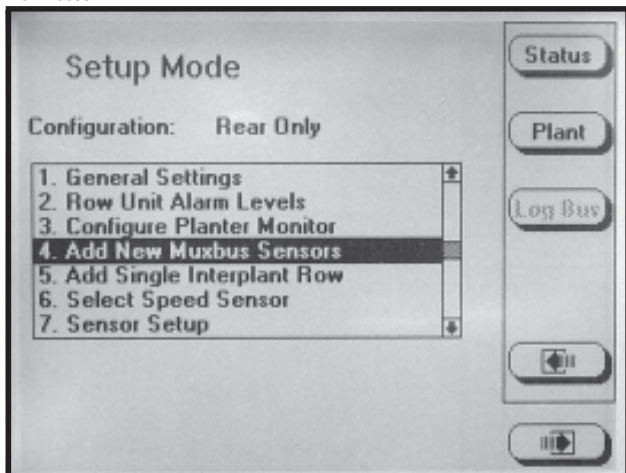
**STEP 2** Select “Setup Mode” by turning the rotary encoder knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to display the highlighted item.

D02140614



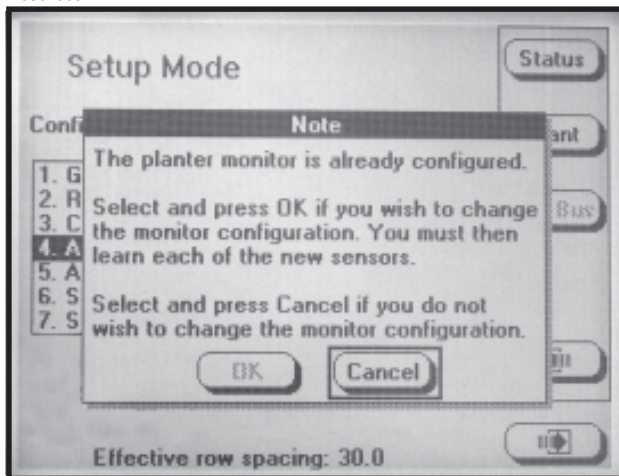
**STEP 3** Select “Add New Muxbus Sensors” by turning the knob or using the UP and DOWN arrow keys. Press the knob or ENTER key to display the highlighted item.

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.

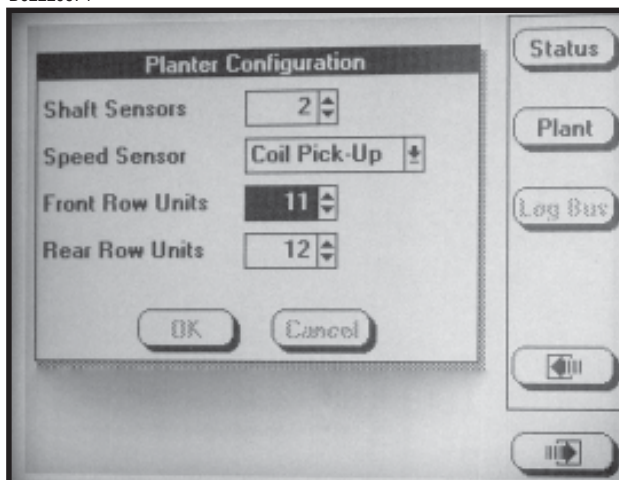
D03010601



**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.

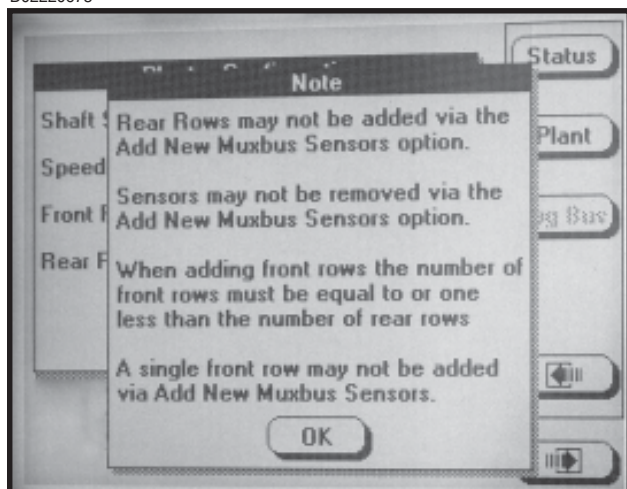
**NOTE:** To prevent the configuration from being changed select CANCEL, then press the knob, ENTER key or ESC key.

D02220674



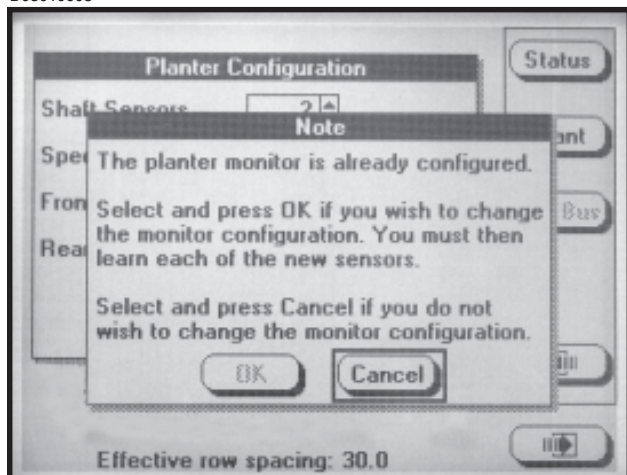
**NOTE:** Attempting to add rear rows while adding new muxbus sensors will cause the following note to appear.

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.

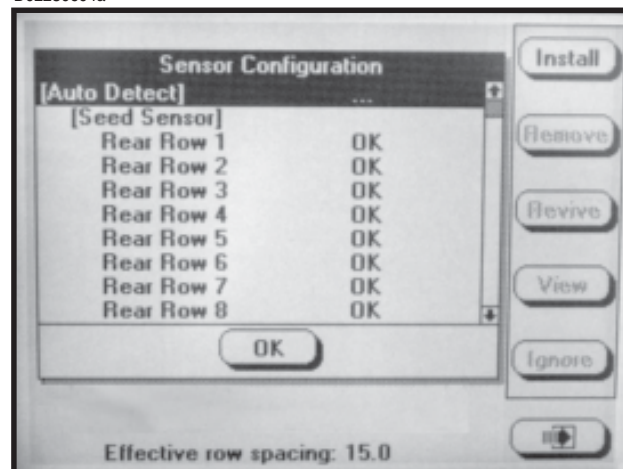
D03010603



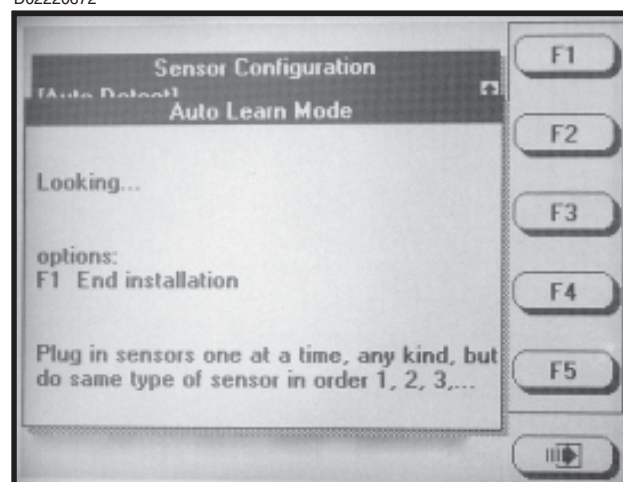
**NOTE:** To prevent the configuration from being changed select CANCEL, then press the knob, ENTER key or ESC key.

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

D02230604a



D02220672

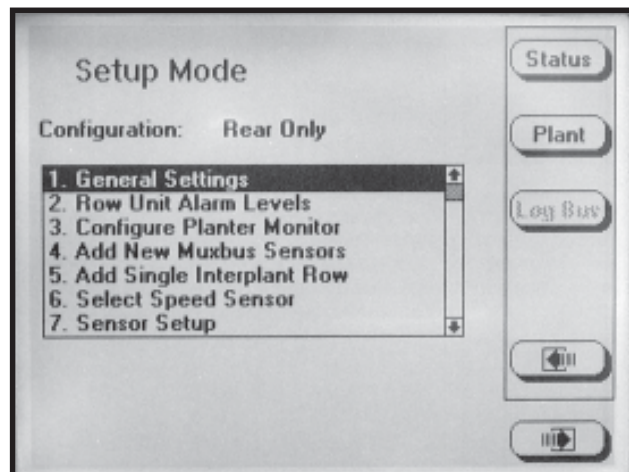


**STEP 8** When all sensors are learned select F1 to end installation. Scroll down to verify the front rows are learned. Select OK by pressing the knob or ENTER key.

**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.

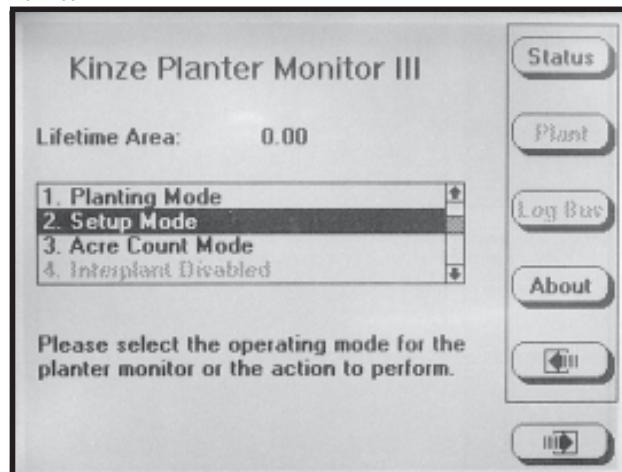
**STEP 11** To return to “Planting Mode” press the PLANT key.

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

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

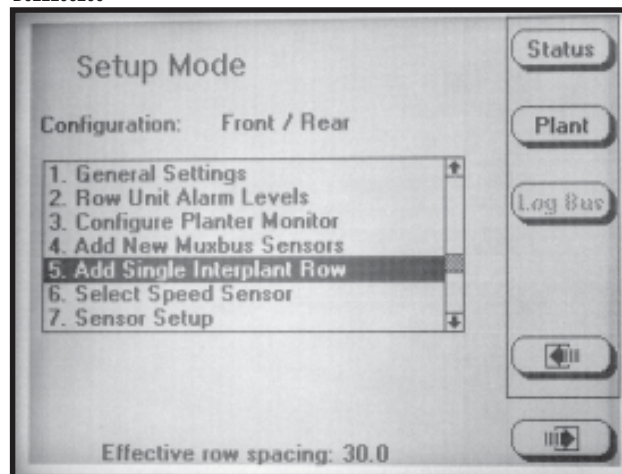
**STEP 2** Select “Setup Mode” by turning the rotary encoder knob or using the UP or DOWN arrow keys. Press the knob or ENTER key to display the highlighted item.

D02140614



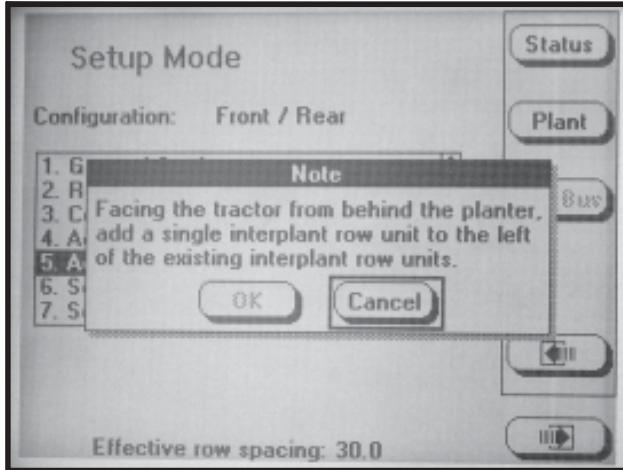
**STEP 3** Select “Add Single Interplant Row” by turning the knob or using the UP and DOWN arrow keys. Press the knob or the ENTER key to display the highlighted item.

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.

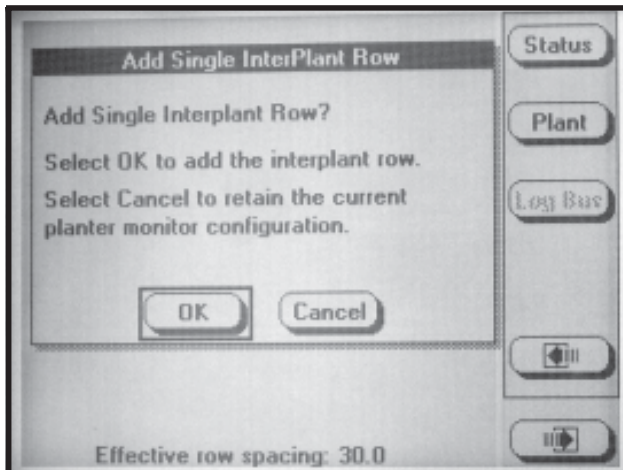
D022206201



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

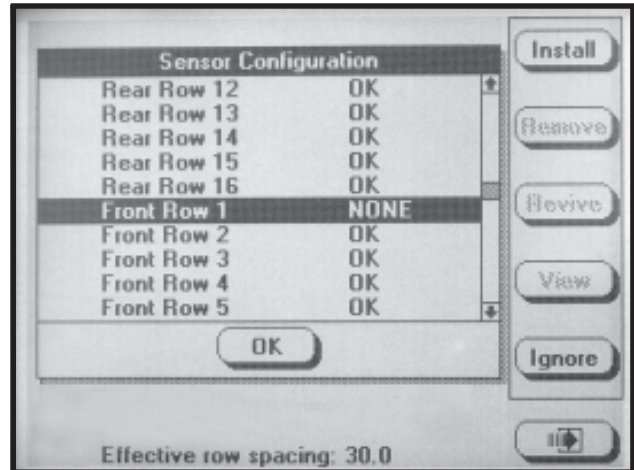
If the single Interplant row is to be added turn the knob or use the UP or DOWN arrow keys to select OK and then press the knob or ENTER key to add the Interplant row. If the single Interplant row is not to be added select the CANCEL key and press the knob or ENTER key to cancel or press the ESC key.

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

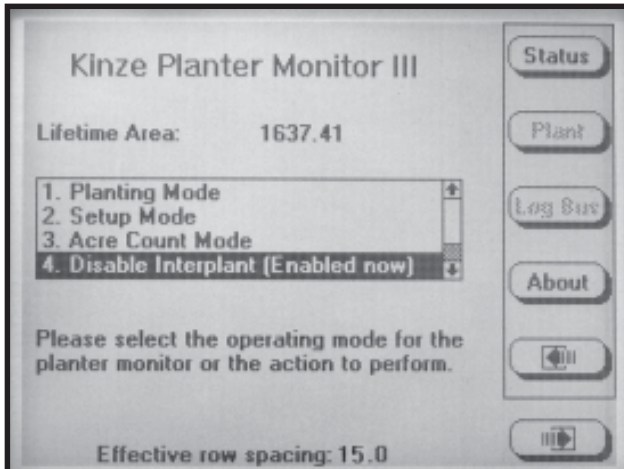


**STEP 7** To return to “Planting Mode” press the PLANT key.

## ENABLING/DISABLING INTERPLANT® ROWS

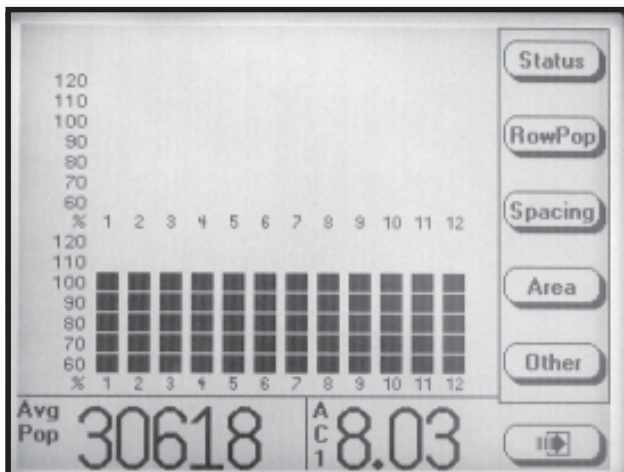
To Enable or Disable Interplant (a) press the F6 key until the “Mode Selection” screen appears, (b) turn the rotary encoder knob or use the UP or DOWN arrow keys to highlight “Disable/Enable Interplant”, (c) press the knob or ENTER key to “Disable” or “Enable” Interplant. To verify selection, the row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

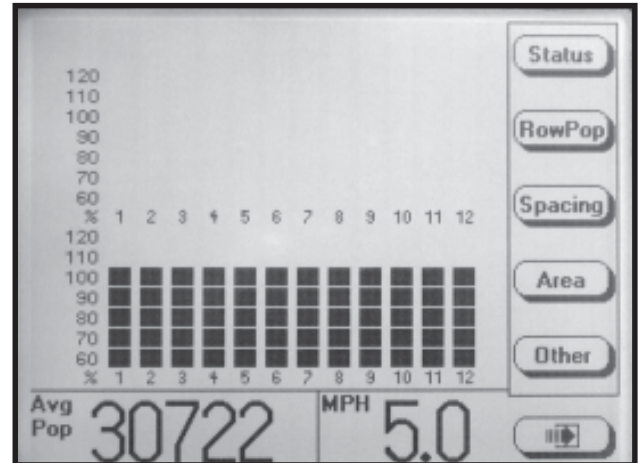
D02240602



## ROW POPULATION

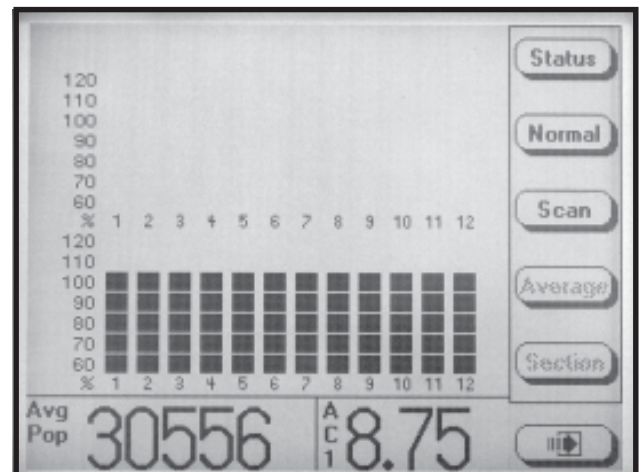
- Press the ROW POP key to display row population. Average planter population will be shown in the lower L.H. corner of the display.

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.

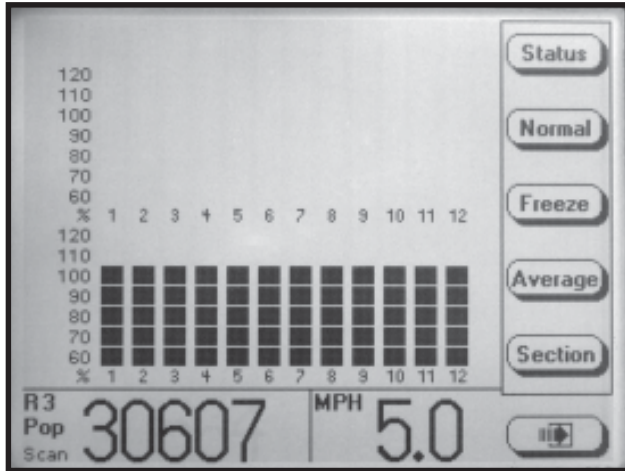
D02240604



- 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



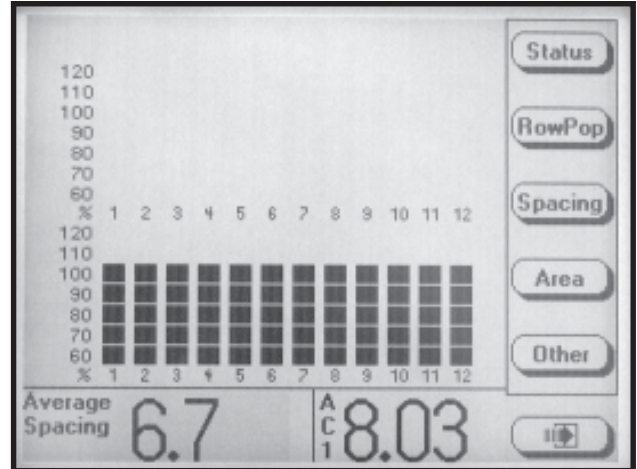
- When either Scan or Frzn is displayed in the L.H. corner the SECTION and arrow keys function as follows: (a) SECTION or RIGHT arrow key advances to the first row of the next section; (b) SECTION or LEFT arrow key selects the first row of the previous section, wrapping around to the first row of the 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.**

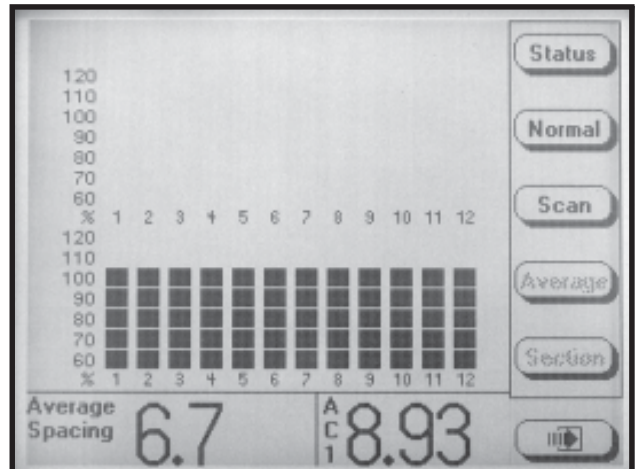
## ROW SPACING

- 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.**

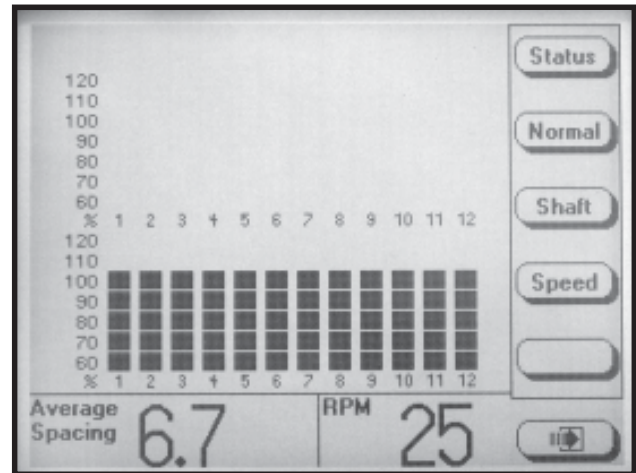
### SPEED/SHAFT ROTATION

- 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.

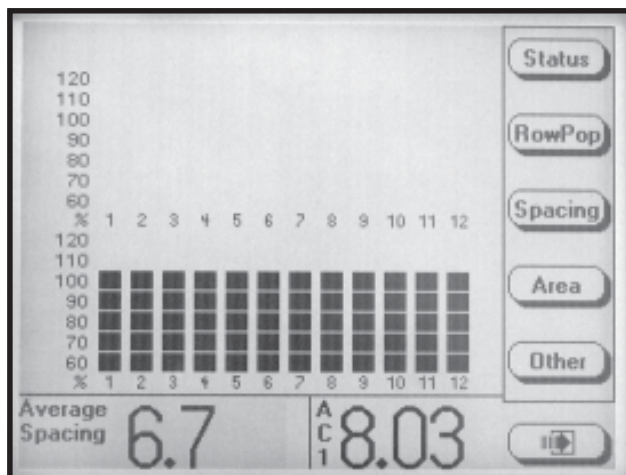
**NOTE: Applicable to planters with shaft rotation sensors installed.**

D02240607

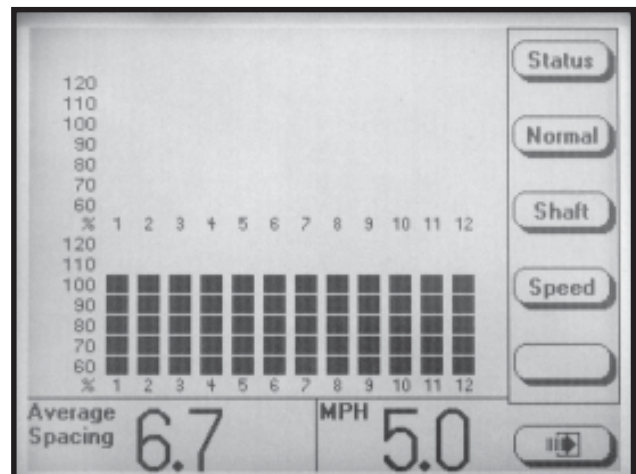


- Press the SPEED key to view the ground speed. The value will appear in the bottom R.H. corner of the display.

D02240602



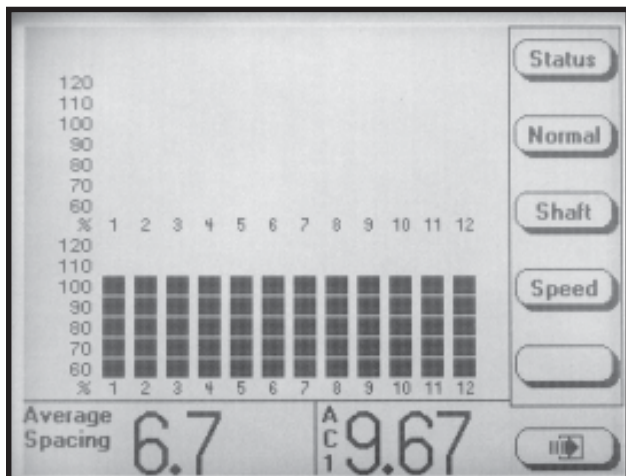
D02240608



**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

- 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.

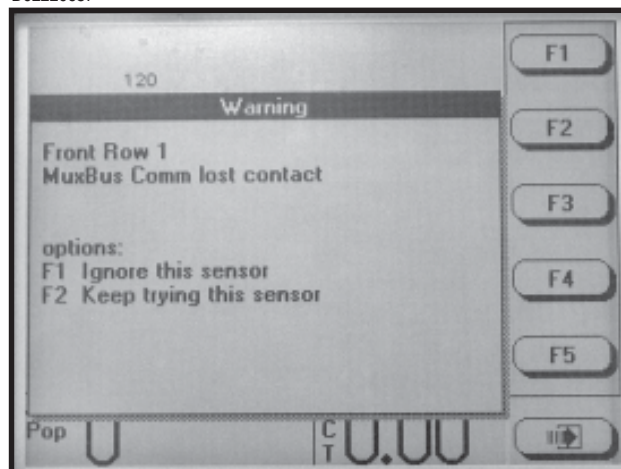
**NOTE: The only way to remove an alarm is to find and correct the problem. Alarms are not reported for rows that seed rate alarm thresholds have been disabled.**

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

- 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.

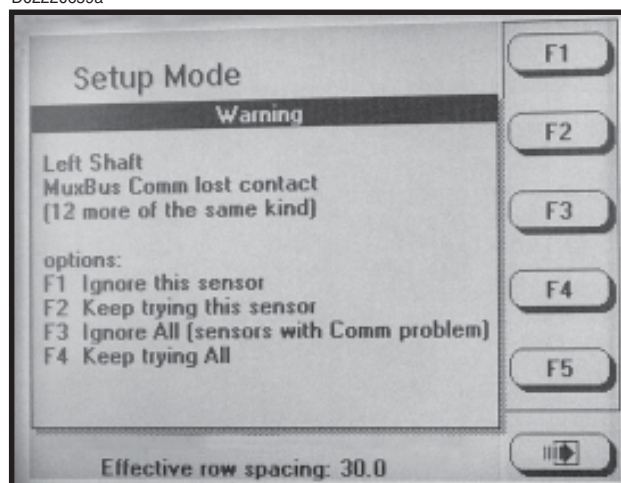
- Seed Counting Sensors Not Communicating With Monitor** - When the monitor detects a communication error between the sensor and the monitor, the monitor will emit two beeps to alert the user. Try to reestablish communication with sensor(s) by pressing F2. If the monitor is unable to establish communication 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



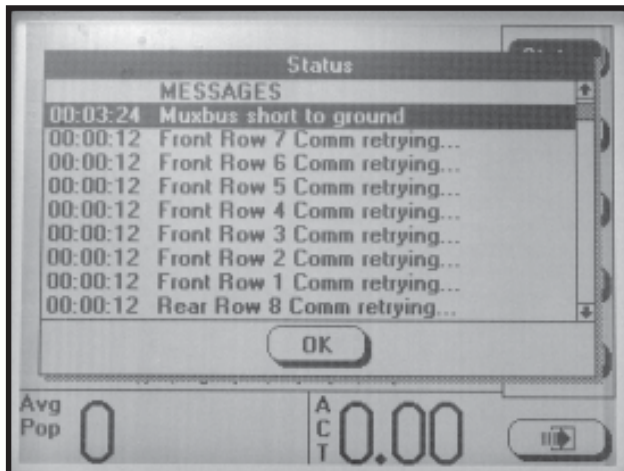
**NOTE:** If the sensors are not faulty, F2 or F4 should be pressed and the message shown below will appear when the STATUS key is pressed.

4. **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.

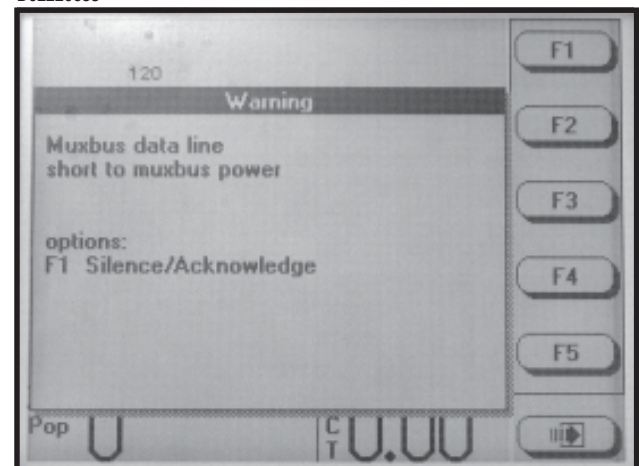
5. **Wire Shorts** - When a wire is shorted any one of the messages shown below will appear, stating which wires are shorted. The short must be located and fixed to continue planting. Cycle the power on the monitor to clear the alarm.

D02220685

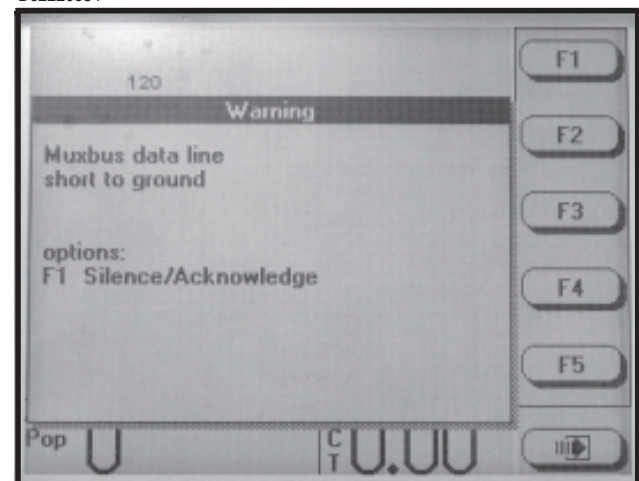


**NOTE:** If a sensor has been ignored, the sensor configuration screen will display as shown below.

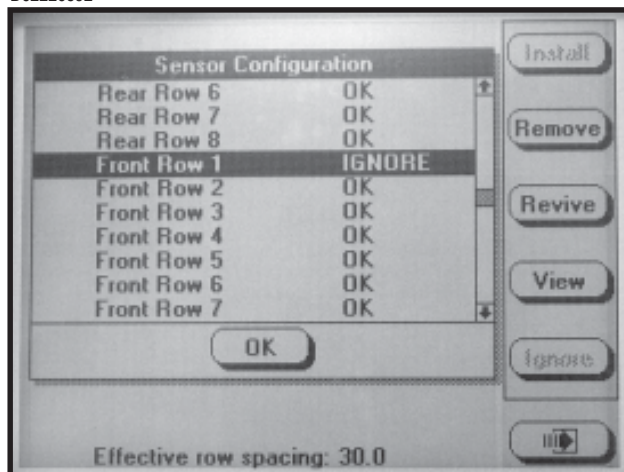
D02220683



D02220684



D02220692

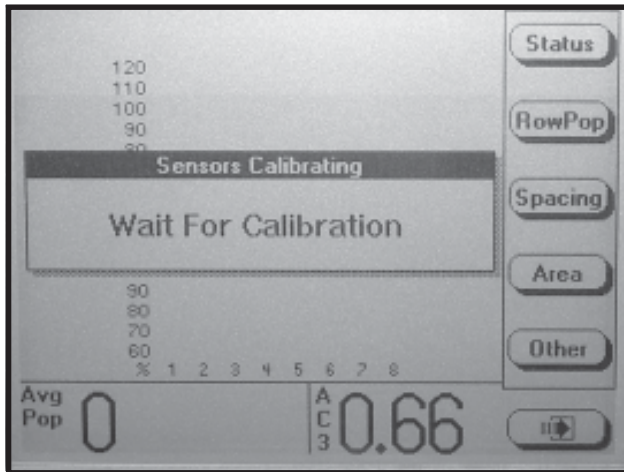


## FIELD OPERATION

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.

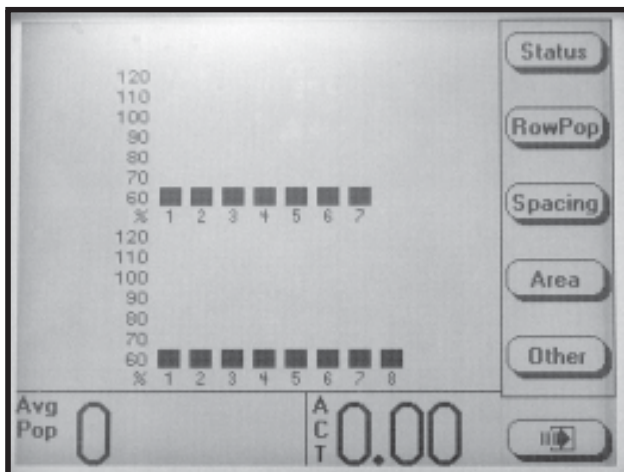
D02200606



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

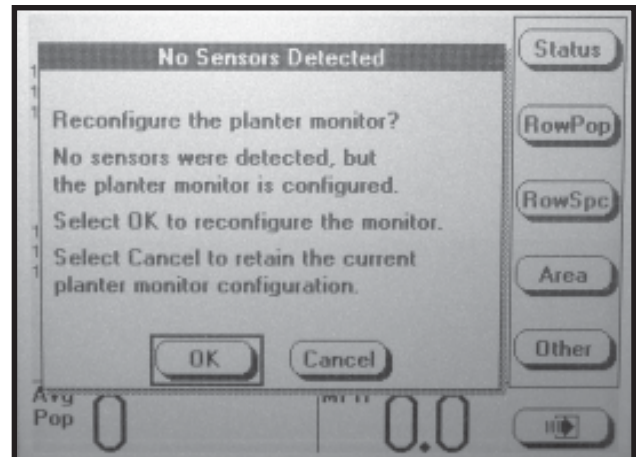
**NOTE:** If the monitor can communicate with the sensors the normal planting mode screen will be displayed.

D0220689a



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

D02200627



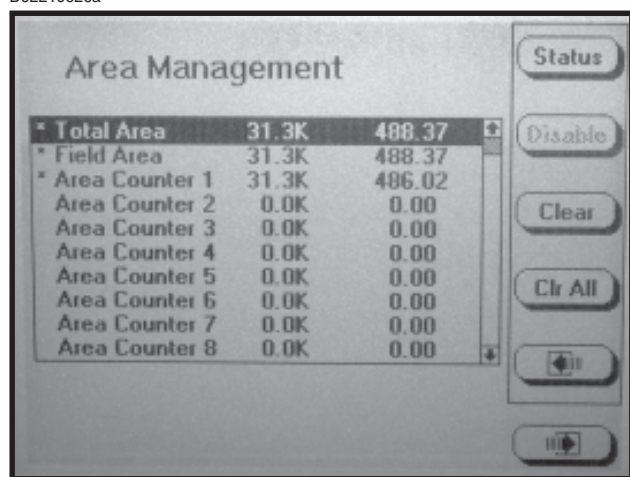
**NOTE:** Selecting OK will reconfigure the monitor requiring all sensors to be re-learned. Selecting CANCEL will maintain the current configuration and the monitor will continue trying to communicate with the sensors.

## 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 (acre/hectare).

- 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

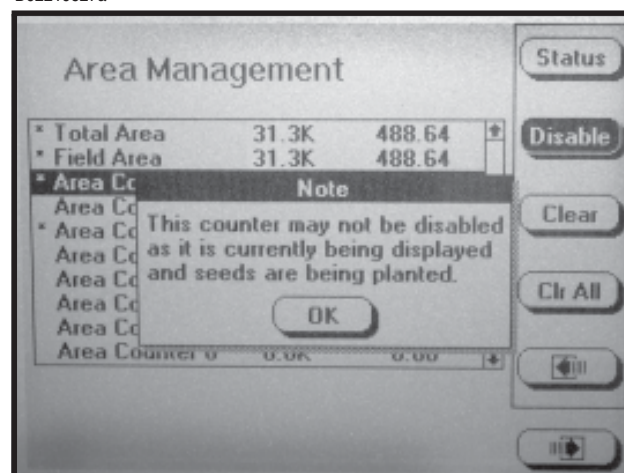
Each of the "Disabled Area Counters" may be enabled up to a total of four "Area Counters". To Enable a Disabled "Area Counter": (a) highlight the desired "Area Counter" by turning the rotary encoder knob or using the UP or DOWN arrow keys; (b) press the ENABLE key or press the knob or ENTER key and an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

### DISABLE AREA COUNTER

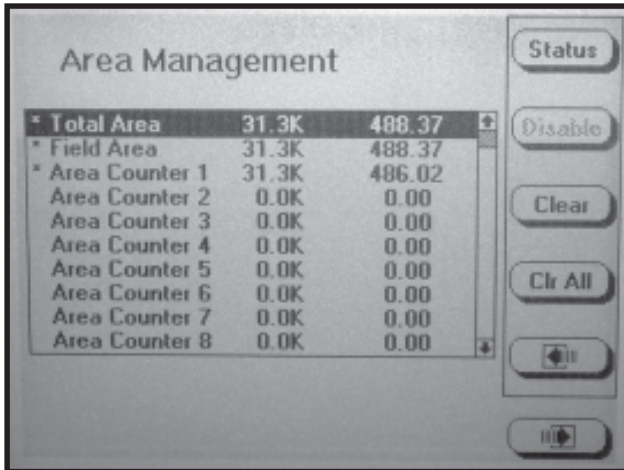
Each of the Enabled Area Counters may be disabled, with the exception of the Total Area Counter. To disable an enabled area counter: (a) highlight that "Area Counter"; (b) press the DISABLE key or press the rotary encoder knob or ENTER key and the asterisk next to the "Area Counter" will disappear. The "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

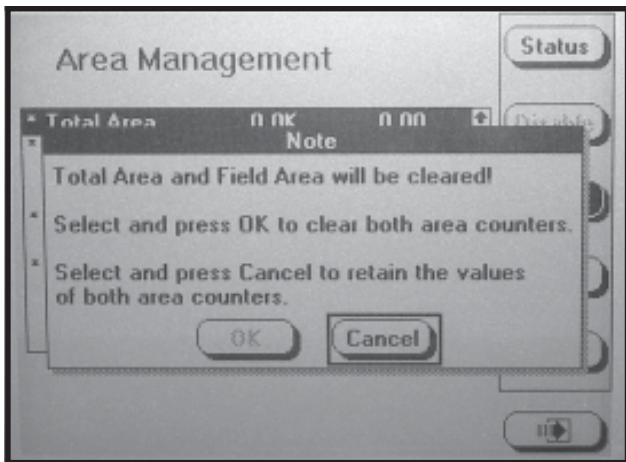


D02210626a



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

D02200612



### CLEAR AREA COUNTER

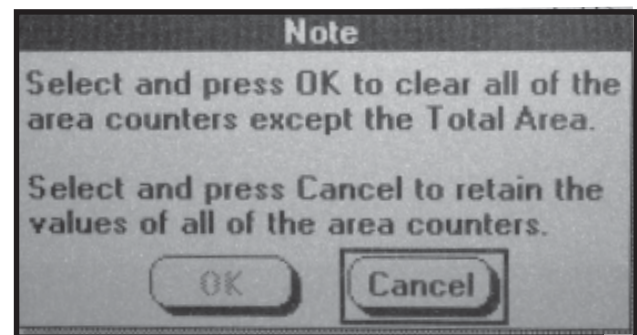
Total Area, Field Area and Area Counters 1 through 8 can be cleared, whether they are Enabled or Disabled. Clearing the “Total Area” counter forces the “Field Area” counter to also be cleared. Clearing any other “Area Counter” including the “Field Area” counter clears only that counter.

**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 selection.

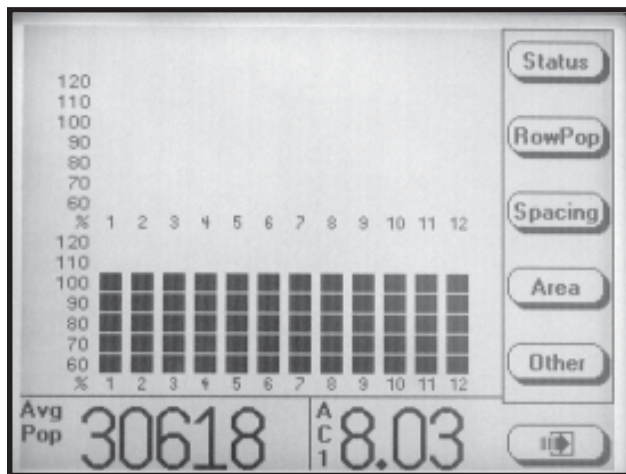
D02210628



## AREA COUNTERS

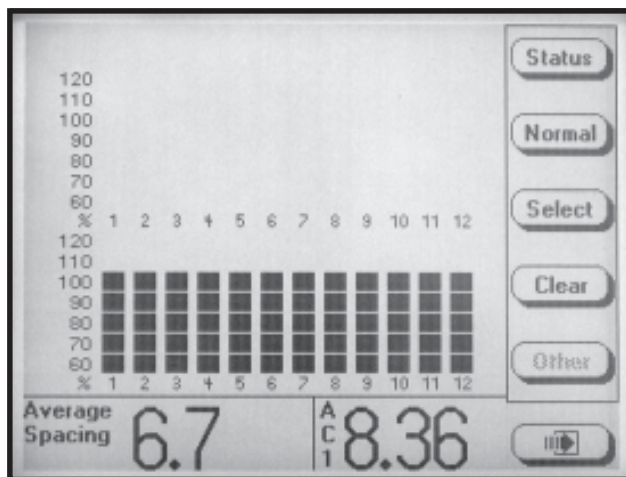
**STEP 1** On the main planting screen press the AREA key.

D02240602



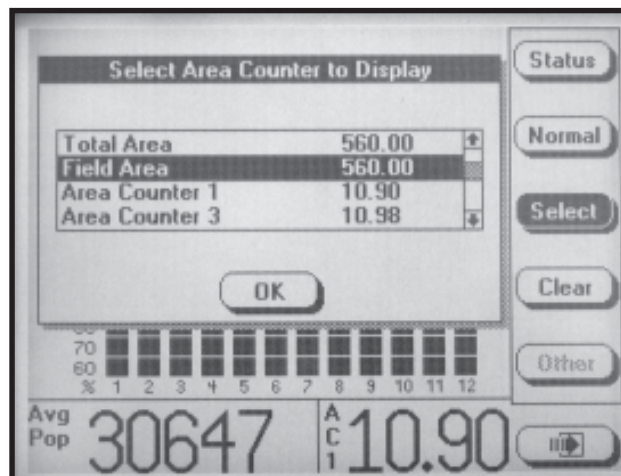
**STEP 2** Press the SELECT key to display the list of the Enabled Area Counters.

D02240603



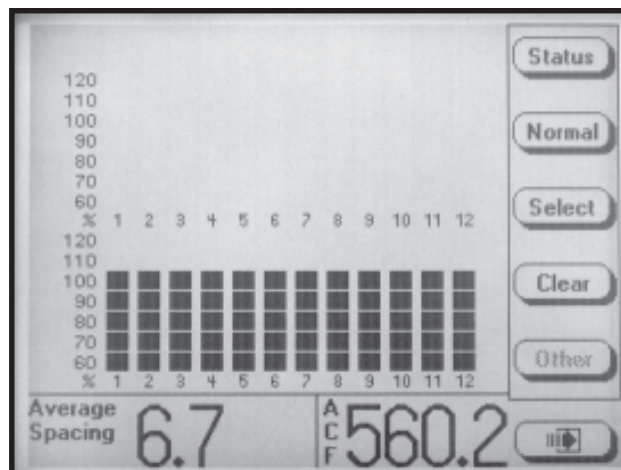
**STEP 3** To select the desired active "Area Counter" turn the knob or use the UP or DOWN arrows to highlight the desired "Area Counter".

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

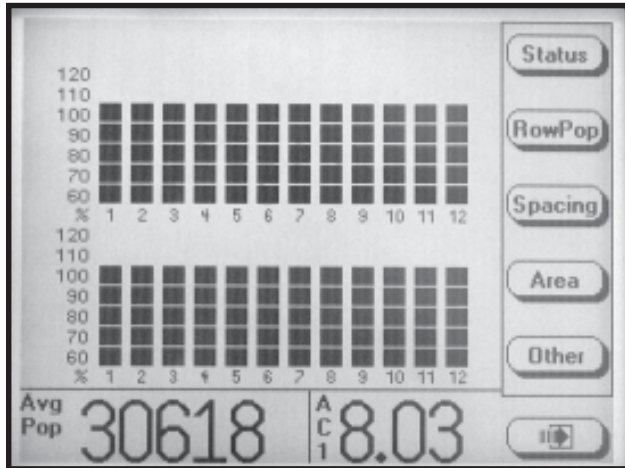


**NOTE:** The abbreviation for the selected area counter numerical value will appear in the bottom R.H. corner of the screen. In the above photo "ACF" represents "Area Counter Field".

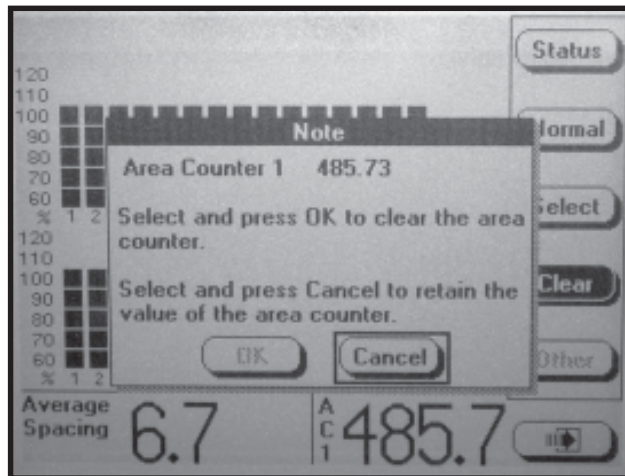
## CLEARING FIELD AREA

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.

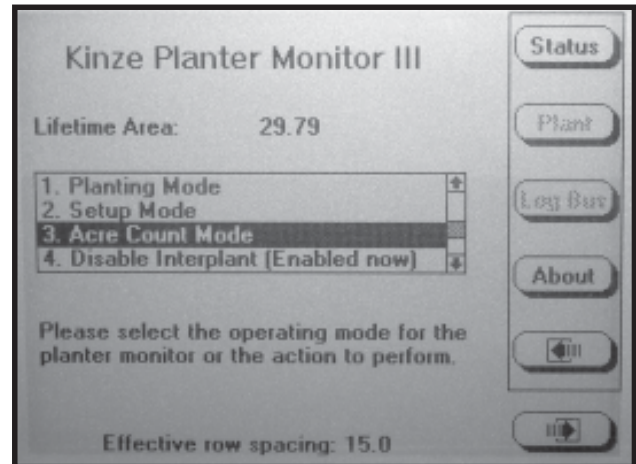
### Acre Count Switch Kit

**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



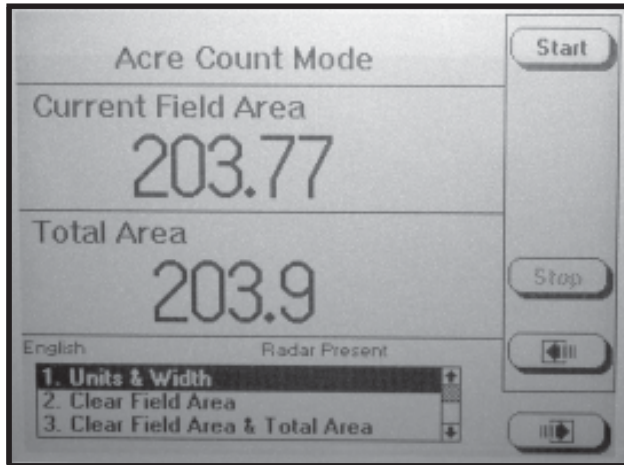
**NOTE:** If no radar unit is detected a warning will appear.

**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.**

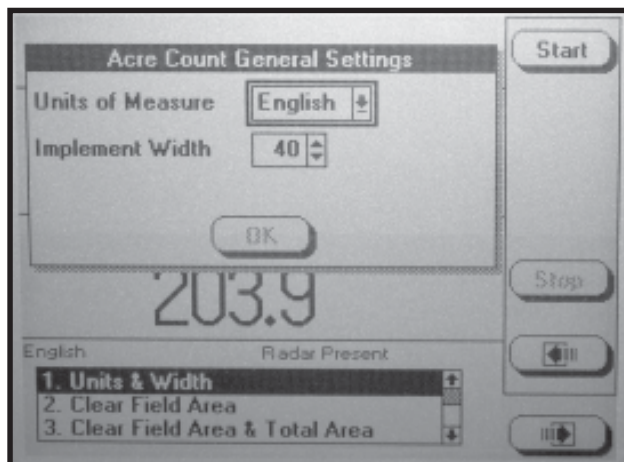
**STEP 2** In the menu, “Units & Width” will be highlighted. Press the knob or ENTER key.

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)

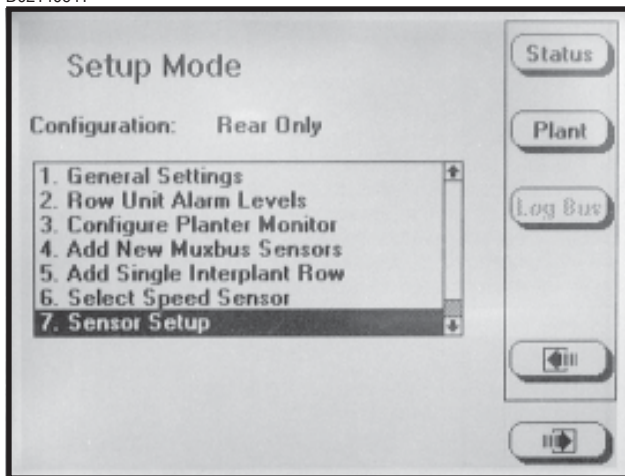
To replace a single faulty sensor: (a) turn OFF the monitor, (b) replace the sensor, (c) turn monitor ON. It will then recognize that a single sensor has been replaced.

**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.

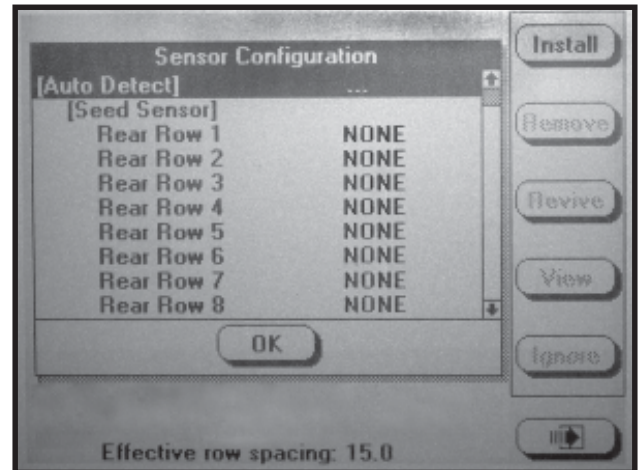
D02140641



- 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

## DOUBLE DISC FERTILIZER OPENER

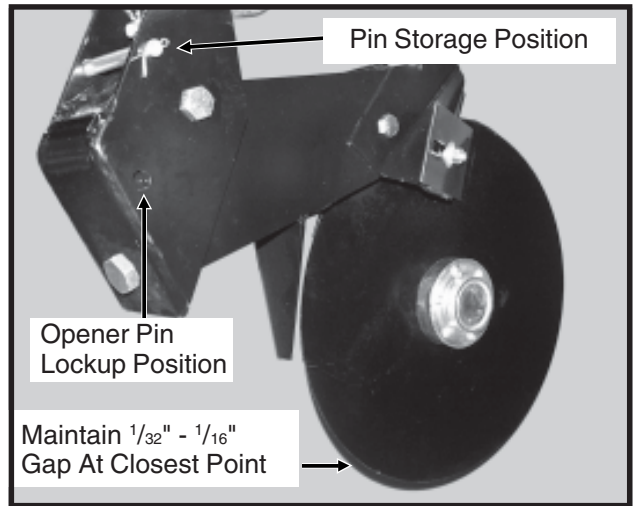
The double disc fertilizer openers should be positioned during assembly **to place fertilizer no closer than 2" to either side of the row.** If the planter frame is level and at proper 20" operating height, fertilizer depth will be approximately 4". Soil conditions can affect depth slightly.

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

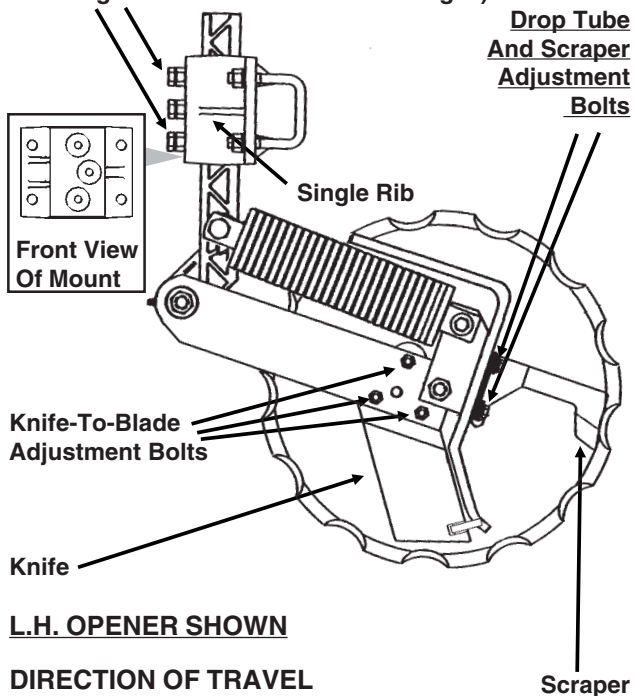
## NOTCHED SINGLE DISC FERTILIZER OPENER (Style A)

The notched single disc fertilizer opener is designed for use in minimum and no till planting conditions. Placement of fertilizer with the 16<sup>3</sup>/<sub>4</sub>" 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)

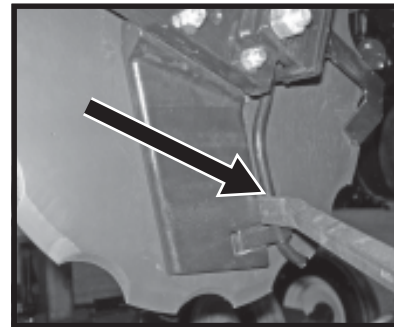
**Depth Adjustment Cap Screws - Recommended Maximum Operating Depth 4"** (Middle Cap Screw Holds Blade Angle But Must Be Loosened To Adjust Depth And Tightened First To Set Blade Angle.)



**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



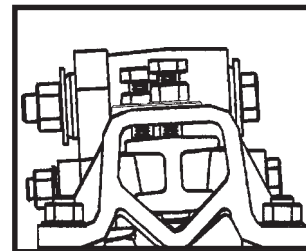
**NOTE:** Adjusting the liquid drop tube will ensure it is out of the path of the soil flow across the knife. Drop tube and tab will wear quickly if not adjusted correctly.

**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.

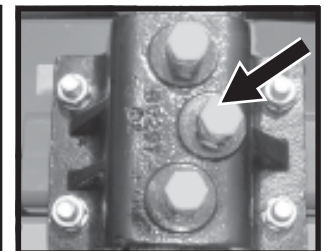
**Adjust blade depth** on each row using the cap screws and jam nuts located on the opener mount. The blade can be adjusted to allow a maximum 4" blade depth. Check fertilizer hose clearance (If Applicable) after adjusting opener depth. Torque cap screws and jam nuts to 57 ft. lbs.

**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

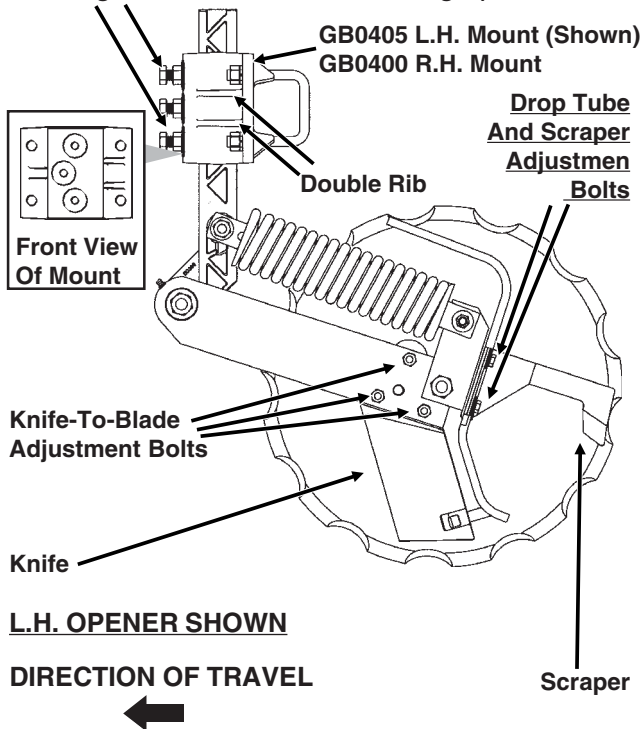
## NOTCHED SINGLE DISC FERTILIZER OPENER (Style B)

The notched single disc fertilizer opener is designed for use in minimum and no till planting conditions. Placement of fertilizer with the 16 <sup>3</sup>/<sub>4</sub>" diameter notched single disc fertilizer opener is recommended at 2 <sup>1</sup>/<sub>2</sub>"- 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.**

(A12429/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.)**



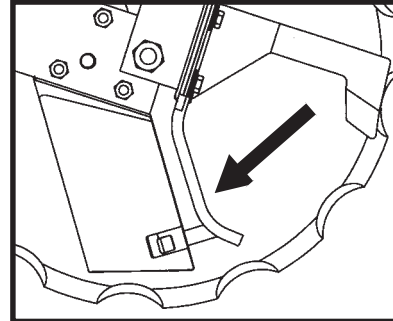
**L.H. OPENER SHOWN**

**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 <sup>3</sup>/<sub>8</sub>" 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 <sup>1</sup>/<sub>4</sub>"-<sup>3</sup>/<sub>8</sub>" 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 <sup>1</sup>/<sub>4</sub>"-<sup>3</sup>/<sub>8</sub>" 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.**

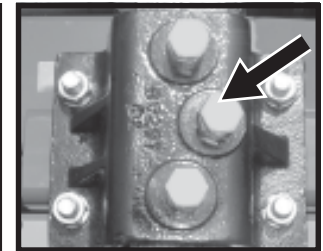
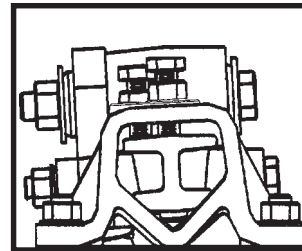
**Adjust scraper** to just touch the opener blade. As the mounting hardware is tightened, the scraper is drawn tighter to the blade. After adjustment, rotate opener blade to be sure blade will turn by hand with slight resistance, but will not coast or freewheel.

**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 double rib is on the same side of the blade as the drop tube.**

FRTZ296

D070103100

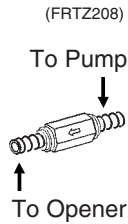


**NOTE: Recommended maximum operating depth is 4". To adjust depth: (a) Loosen depth adjustment cap screws. (b) Adjust depth to desired setting. (c) Tighten upper and lower cap screws slightly to hold opener arm in place. (d) Tighten middle cap screw to set the opener arm angle. (e) Tighten upper and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

# MACHINE OPERATION

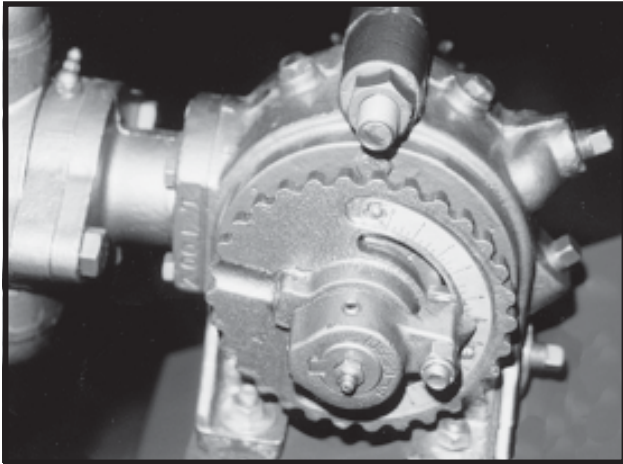
## LIQUID FERTILIZER ATTACHMENT

**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.



## PISTON PUMP

12229799

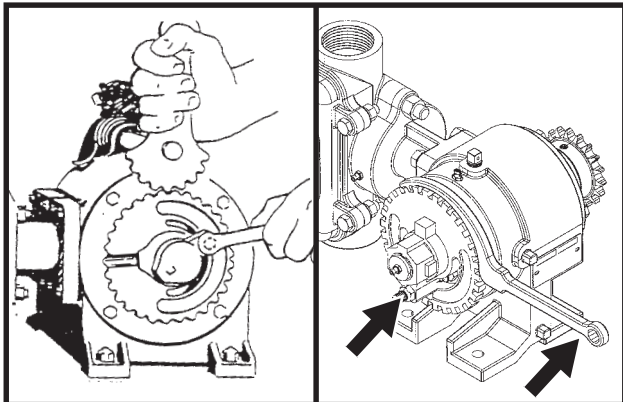


If the machine is equipped with the piston pump option, the rate of liquid fertilizer application is determined by the piston pump settings.

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/A12330b)

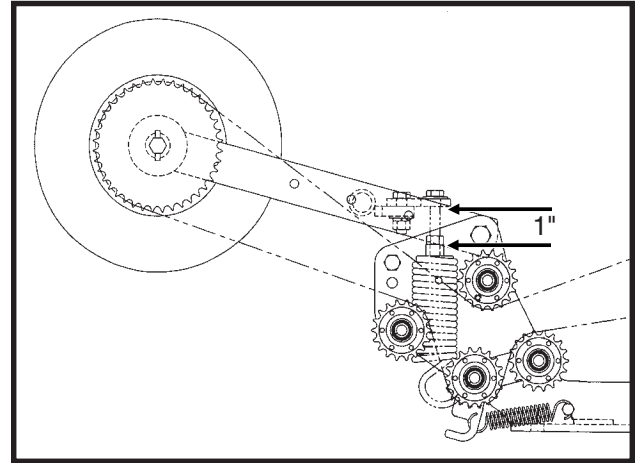


The operator and instruction manuals shipped with the pump and flow divider should be kept and stored with this manual for future reference.

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

## PISTON PUMP CONTACT DRIVE WHEEL SPRING ADJUSTMENT

(A8482a)



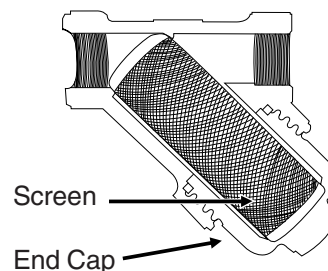
There is one down pressure spring on the piston pump contact drive wheel. The initial spring tension is set leaving 1" between the bottom of the mounting plate and the plug on the top of the spring.

## 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

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## LIQUID FERTILIZER PISTON PUMP APPLICATION RATES

### GALLONS PER ACRE

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

Pump Setting	1	2	3	4	5	6	7	8	9	10
12 Row 20"	7.7	15.6	23.3	30.9	38.7	46.5	54.3	62.0	69.8	77.6
12 Row 22"	7.1	14.6	21.7	28.8	36.1	43.4	50.7	57.8	65.1	72.4

The chart above is for planters equipped with contact drive and the Model LM-2455-R (GA8069) piston pump. See "Tire Pressure" for recommended tire pressures. 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 20" row spacing, proceed as follows:

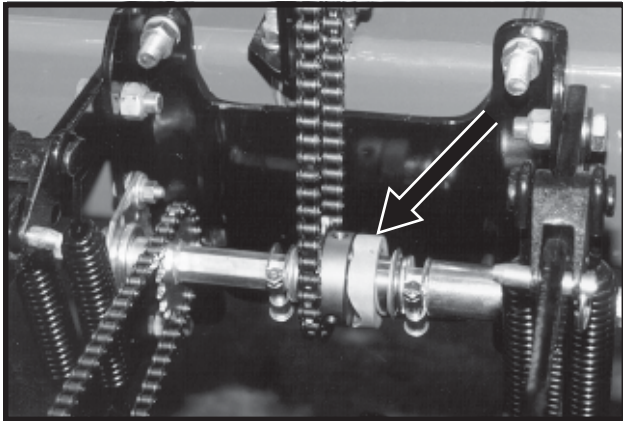
Remove the hose from one of the fertilizer openers and insert it into a collection container which has been secured to the planter frame. Engage the fertilizer attachment and drive forward for 262'. Measure the fluid ounces caught in the container and multiply that amount by 100. Divide that amount by 128. The result will be the gallons of fertilizer delivered per acre when planting in 20" rows. Rinse the collection container and repeat test on other rows if necessary. To convert this delivery rate for wider rows, multiply by the following conversion factor:

22" multiply by 0.91

# MACHINE OPERATION

## INTERPLANT® CLUTCH SPROCKET

01239905



The clutch sprocket is designed to allow the push row unit drill shaft to be disengaged when only the pull row units are being used.

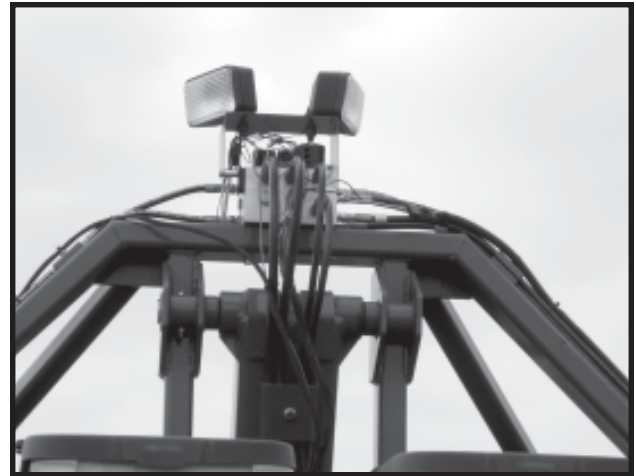
To engage or disengage the push row unit drill shaft using the clutch sprocket, rotate the knurled collar on the clutch sprocket  $\frac{1}{4}$  turn. Then using a  $\frac{7}{8}$ " wrench on the drill shaft, rock the drill shaft slightly to take pressure off of the spring loaded pins in the clutch to allow the clutch to engage or disengage.



**DANGER: Always install all safety lockup devices or lower planter to the ground before working under or around the machine.**

## AUXILIARY WORK LIGHTS PACKAGE

D05200517



The optional Auxiliary Work Lights Package includes two 50 watt, 3" x 5" halogen flood lamps, brackets, hardware to mount on the valve cover above the rear toolbar and a wiring harness to plug into the existing planter light harness.

# 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.



**CAUTION:** Avoid transporting the planter with hoppers loaded 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 and extra caution should be used in transport.



**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. Generally, higher ground speeds will cause more variation in seed spacing. Speeds above 5.5 MPH are typically not recommended. See “Planting And Application Rate Charts” in Seed Meter Operation/Maintenance section for specific recommendations.



# MACHINE OPERATION

## FIELD TEST

With any change of field and/or planting conditions, seed size or planter adjustment, a field test is recommended to ensure proper seed placement and operation of row units. See “Planting And Application Rate Charts” in the Seed Meter Operation/Maintenance section and “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”.
- ❑ 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”.

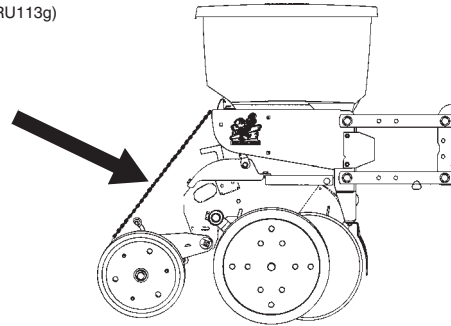
After the planter has been field tested, reinspect the machine.

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

## CHECKING SEED POPULATION

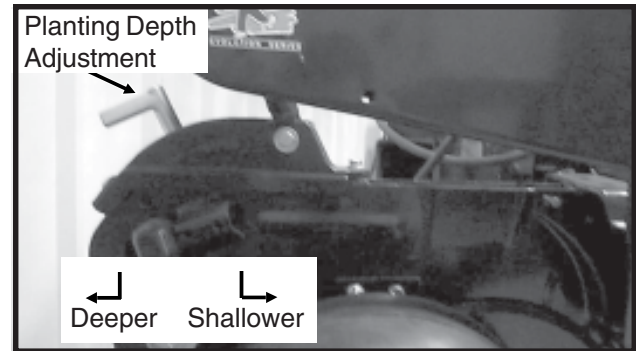
1. Tie up one or more sets of closing wheels by running a chain or rubber tarp strap between the hopper support panel and closing wheels. It may be necessary to decrease closing wheel arm spring tension.

(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.

D020705102



3. Measure  $\frac{1}{1000}$  of an acre. See chart for correct distance for row width being planted. For example, if planting 20" rows  $\frac{1}{1000}$  of an acre would be 26' 2".

LENGTH OF ROW IN FEET AND INCHES				
Fraction Of Acre	Row Width			
	10"	11"	20"	22"
$\frac{1}{1000}$	52' 3"	47' 6"	26' 2"	23' 9"

**NOTE:** When planting with closing wheels raised and planting depth set shallow, seeds may bounce or roll affecting seed spacing accuracy.

# MACHINE OPERATION

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

EXAMPLE: With 20" row spacing 26' 2" equals  $\frac{1}{1000}$  acre.

$26 \text{ Seeds Counted} \times 1000 = 26,000 \text{ Seeds Per Acre}$
--

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 on 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 seed cell has lost its seed. If two seeds are found within a short distance of each other, the seed cell has metered two seeds instead of one.

See "Seed Metering System Troubleshooting" in the Seed Meter Operation/Maintenance section of this manual.

## Determining Pounds Per Acre

To determine pounds per acre:

$\begin{array}{l} \text{Seeds Per} \\ \text{Acre On} \\ \text{Chart} \end{array} \div \begin{array}{l} \text{Seeds Per} \\ \text{Pound From} \\ \text{Seed Tag} \\ \text{On Bag} \end{array} = \begin{array}{l} \text{Pounds} \\ \text{Per} \\ \text{Acre} \end{array}$
---

To determine bushels per acre:

$\begin{array}{l} \text{Pounds} \\ \text{Per Acre} \end{array} \div \begin{array}{l} \text{Unit Weight} \\ \text{Of Seed} \end{array} = \begin{array}{l} \text{Bushels} \\ \text{Per Acre} \end{array}$
---

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 "Seed Metering System Troubleshooting" in the Seed Meter Operation/Maintenance section of this manual.

# 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.

D05149901



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
20"	1.25
22"	1.13

**EXAMPLE:** You are planting 20" 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 1.25 equals 15.0 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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# SEED METER OPERATION/MAINTENANCE

## GENERAL PLANTING RATE INFORMATION

These planting rate charts are applicable to KINZE® Model 3400 EdgeVac® 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 BE SURE YOU ARE PLANTING AT THE DESIRED RATE.**

The size and shape of seed may affect the planting rate.

The following seed discs are available for use with the KINZE® EdgeVac® Seed Metering System:

**Corn/Popcorn:** 39 cell. Light blue color-coded. For all seed corn grades from 35 to 70 pounds per 80,000 kernel count unit or popcorn seed size range from 2210 to 4200 seeds per pound. *When planting popcorn this seed disc requires use of seed baffle. See “Seed Meter” on pages 7-2 and 7-3 for additional information.*

**Low-Rate Corn/Popcorn:** 24 cell. Light green color-coded. For all seed corn grades from 35 to 70 pounds per 80,000 kernel count unit or popcorn seed size range from 2210 to 4200 seeds per pound. *When planting popcorn this seed disc requires use of seed baffle. See “Seed Meter” on pages 7-2 and 7-3 for additional information.*

**Soybean:** 60 cell. Black color-coded. Seed size range from 2200 to 4000 seeds per pound. *This seed disc requires use of seed baffle. See “Seed Meter” on pages 7-2 and 7-3 for additional information.*

**Soybean, High-Rate:** 120 cell. Dark blue color-coded. Seed size range from 2200 to 4000 seeds per pound. *This seed disc requires use of seed baffle. See “Seed Meter” on pages 7-2 and 7-3 for additional information.*

**Milo/Grain Sorghum:** 60 cell. Yellow color-coded. Seed size range from 10,000 to 20,000 seeds per pound. *This seed disc requires use of seed baffle and cleanout brush. See “Seed Meter” on pages 7-2 and 7-3 for additional information.*

**Hill-Drop Cotton, Acid-Delinted (3 Seeds Per Cell):** 20 cell. Brown color-coded. Cotton seed size range from 3800 to 5200 seeds per pound. *This seed disc requires use of cleanout brush w/ball-type ejector. See “Seed Meter” on pages 7-2 and 7-3 for additional information.*

**Cotton, Acid-Delinted/Small Dry Edible Bean:** 54 cell. Dark green color-coded. Cotton seed size range from 3800 to 5200 seeds per pound or dry edible bean seed size range from 1200 to 2500 seeds per pound. *This seed disc requires use of cleanout brush w/ball-type ejector. See “Seed Meter” on pages 7-2 and 7-3 for additional information.*

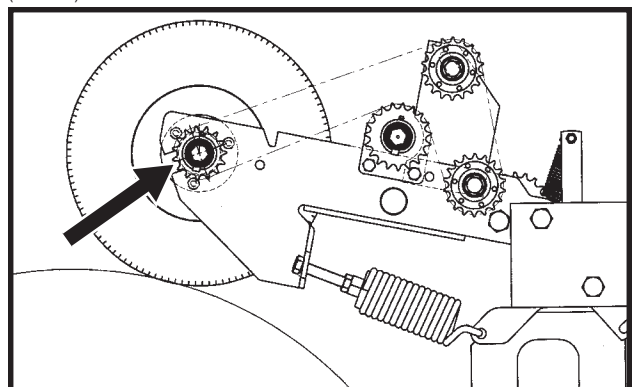
**Large Dry Edible Bean:** 54 cell. Tan color-coded. Seed size range from 800 to 1200 seeds per pound.

**NOTE: Due to a multitude of variables, seed spacing can be adversely affected at speeds above 5.5 MPH.**

**NOTE: See “Seed Meter Singulator Brush And Vacuum Level Adjustments” on page 7-23.**

**NOTE: 15, 19 and 38 tooth drive sprockets are NOT applicable to all rate charts. Check chart titles to ensure the proper rate chart is selected. 15 and 19 tooth sprockets required use of 92 pitch No. 40 chains and 38 tooth sprockets required use of 104 pitch No. 40 chains.**

(TWL310)

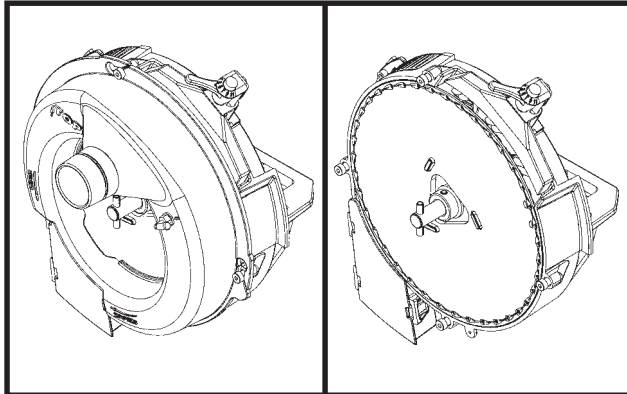


**NOTE: Contact wheel drive sprocket referenced at top of each rate chart.**

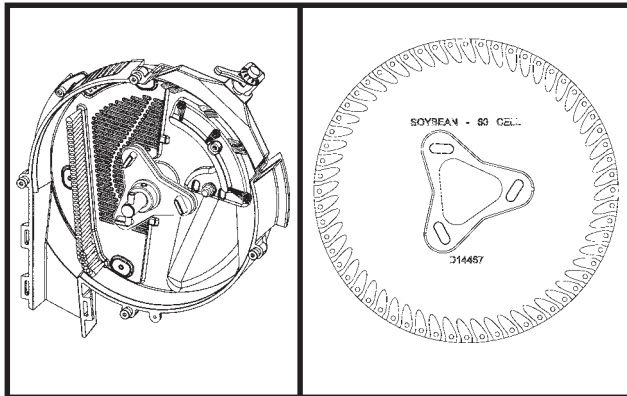
# SEED METER OPERATION/MAINTENANCE

## SEED METER

(METR71/METR71a)

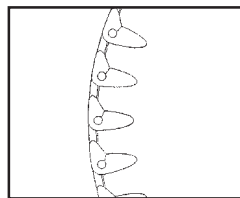


(METR70/D14467a)

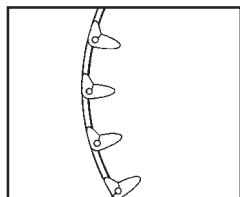


The seed discs below and at right are available for use with the KINZE® EdgeVac® Seed Metering System:

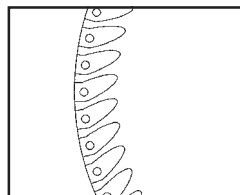
**Corn/Popcorn:** 39 cell. For all seed corn grades from 35 to 70 pounds per 80,000 kernel count unit. Popcorn seed size range from 2210 to 4200 seeds per pound (*Light blue color-coded.*)  
(D14465)



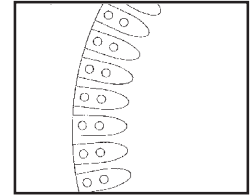
**Low-Rate Corn/Popcorn:** 24 cell. For all seed corn grades from 35 to 70 pounds per 80,000 kernel count unit. Popcorn seed size range from 2210 to 4200 seeds per pound. (*Light green color-coded.*)  
(D16734a)



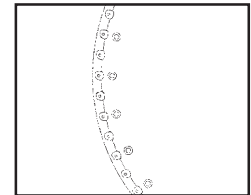
**Soybean:** 60 cell. Seed size range from 2200 to 4000 seeds per pound. (*Black color-coded.*)  
(D14467a)



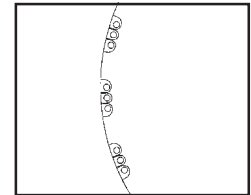
**Soybean, High-Rate:** 120 cell. Seed size range from 2200 to 4000 seeds per pound. (*Dark blue color-coded.*)  
(D14468a)



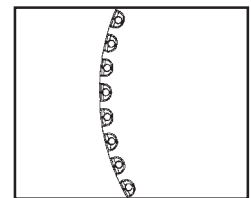
**Milo/Grain Sorghum:** 60 cell. Seed size range from 10,000 to 20,000 seeds per pound. (*Yellow color-coded.*)  
(D17050)



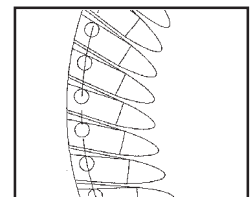
**Hill-Drop Cotton, Acid-Delinted (3 Seeds Per Cell):** 20 cell. Cotton seed size range from 3800 to 5200 seeds per pound. (*Brown color-coded.*)  
(D17187)



**Cotton, Acid-Delinted/Small Dry Edible Bean:** 54 cell. Cotton seed size range from 3800 to 5200 seeds per pound. Dry edible bean seed size range from 1200 to 2500 seeds per pound. (*Dark green color-coded.*)  
(D17186)



**Large Dry Edible Bean:** 54 cell. Seed size range from 800 to 1200 seeds per pound. (*Tan color-coded.*)  
(D14477)



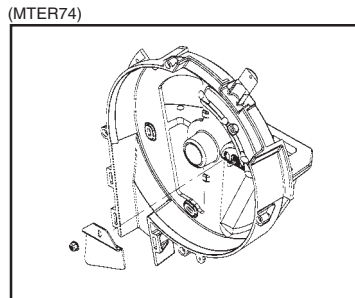
Install the selected seed disc. Position the vacuum cover on the meter by aligning the keyhole slots over the bolt heads. Push the cover on the meter and turn counter clockwise to lock in place. **See following page for additional components required with specific seed discs.**

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

# SEED METER OPERATION/MAINTENANCE

## **SEED BAFFLE**

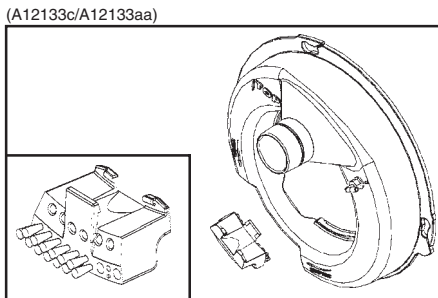
- Milo/Grain Sorghum
- Soybeans
- Popcorn



The **seed baffle** is designed to prevent excessive seed in the meter from restricting air flow through the seed. **Used with 60 Cell Milo/Grain Sorghum Disc, 60 Cell Soybean Disc, 120 Cell High-Rate Soybean Disc and 39 Cell and 24 Cell Popcorn Discs.**

## **CLEANOUT BRUSH**

- Milo/Grain Sorghum

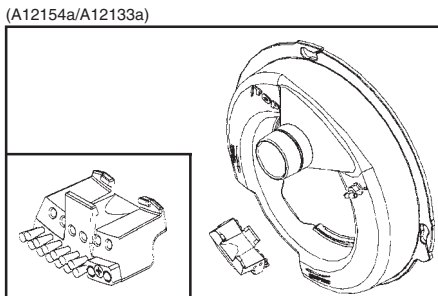


The **cleanout brush** is designed to remove foreign material and seed remnants to help prevent plugging of seed disc orifices.

**Used with 60 Cell Milo/Grain Sorghum Disc.**

## **CLEANOUT BRUSH W/BALL-TYPE EJECTOR**

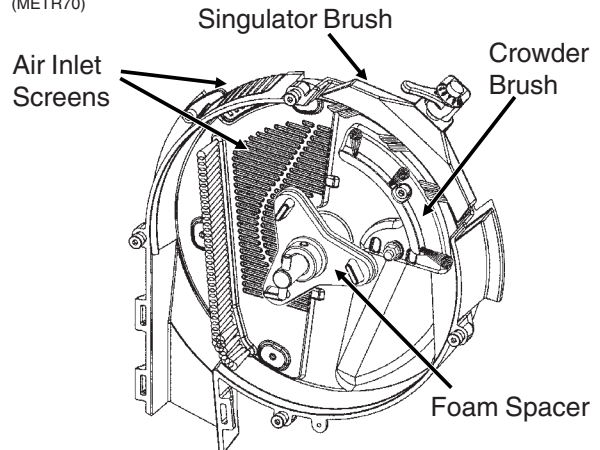
- Cotton
- Small Edible Beans



The **cleanout brush w/ball-type ejector** is designed to eject seed remnants from the seed disc orifices. **Used with 20 Cell Hill-Drop Cotton, Acid-Delinted (3 Seeds Per Cell) Disc and 54 Cell Acid-Delinted Cotton/Small Dry Edible Bean Disc.**

**NOTE: Foreign material in seed disc orifices, such as seed chips, hulls, stems, etc., may affect seed delivery. Clean seed is required to ensure accurate seed metering from the vacuum seed meter. Seed discs should be removed daily to check for buildup of foreign material in the seed disc orifices.**

(METR70)

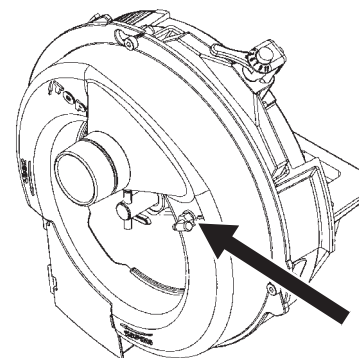


The crowder brush aids in the singulation of small flat seeds by (a) crowding seeds to the outer perimeter of the seed disc and (b) orienting seeds to allow the singulator brush to be more effective.

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

The foam spacer gently preloads the seed disc against the vacuum cover when no vacuum is present.

(METR71)



The  $\frac{3}{16}$ " hose barb elbow on the seed meter vacuum cover allows measurement of vacuum level at each meter. A customer-supplied vacuum gauge is required.

See "Seed Meter Singulator Brush And Vacuum Level Adjustments", "Seed Meter Maintenance" and "Preparation For Storage" for additional EdgeVac® Seed Metering System information.

# SEED METER OPERATION/MAINTENANCE

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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 vacuum 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. More frequent cleaning of monitor seed tubes may be necessary due to use of additional graphite or talc.**

**Talc seed lubricant** may be used in lieu of or in addition to graphite to improve seed release from the 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 maintain meter performance.

**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

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. Lay the hopper on it's right side.

Disassemble seed meter by rotating vacuum cover clockwise to align keyhole slots with bolt heads. Lift off cover. Remove seed disc. Empty the meter and hopper by allowing the seed to run out of the meter. Inspect brushes in meter to ensure all seed is removed. Replace seed disc and install vacuum cover.

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



# SEED METER OPERATION/MAINTENANCE

**PLANTING RATES FOR CORN/POPCORN 39 CELL DISC  
15 TOOTH CONTACT WHEEL DRIVE SPROCKET (See Page 7-1)  
APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS**

20" Rows	22" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
		Drive	Driven		
37,181	33,801	15	28	4 to 6	8.4
38,559	35,053	15	27	4 to 6	8.1
40,042	36,401	15	26	4 to 6	7.8
41,643	37,858	15	25	4 to 6	7.5
42,139	38,308	17	28	4 to 6	7.4
43,378	39,435	15	24	4 to 6	7.2
43,700	39,727	17	27	4 to 6	7.2
45,264	41,149	15	23	4 to 6	6.9
45,380	41,255	17	26	4 to 6	6.9
47,097	42,815	19	28	4 to 6	6.7
47,196	42,905	17	25	4 to 6	6.6
48,841	44,401	19	27	4 to 6	6.4
49,162	44,693	17	24	4 to 6	6.4
50,719	46,109	19	26	4 to 6	6.2
51,300	46,636	17	23	4 to 6	6.1
52,748	47,953	19	25	4 to 6	5.9
54,794	49,813	15	19	4 to 6	5.7
54,946	49,951	19	24	4 to 6	5.7
57,012	51,829	23	28	4 to 6	5.5
57,335	52,123	19	23	4 to 6	5.5
59,123	53,748	23	27	4 to 6	5.3
59,490	54,082	24	28	4 to 6	5.3
61,240	55,673	15	17	4 to 6	5.1
61,694	56,085	24	27	4 to 6	5.1
62,100	56,454	17	19	4 to 6	5.1
63,853	58,048	23	25	4 to 6	4.9
64,448	58,589	26	28	4 to 6	4.9
66,514	60,467	23	24	4 to 6	4.7
66,629	60,572	24	25	4 to 6	4.7
66,927	60,842	27	28	4 to 6	4.7
69,405	63,096	23	23	4 to 6	4.5
71,976	65,433	28	27	4 to 6	4.4
72,075	65,523	27	26	4 to 6	4.4
72,423	65,839	24	23	4 to 6	4.3
74,744	67,949	28	26	4 to 6	4.2
74,958	68,144	27	25	4 to 6	4.2
75,441	68,582	25	23	4 to 6	4.2
77,571	70,519	19	17	4 to 6	4.0
78,081	70,983	27	24	4 to 6	4.0
78,458	71,326	26	23	4 to 6	4.0
80,973	73,612	28	24	4 to 6	3.9
81,476	74,069	27	23	4 to 6	3.8
84,017	76,379	23	19	4 to 6	3.7
84,494	76,812	28	23	4 to 6	3.7
87,670	79,700	24	19	4 to 6	3.6
91,323	83,021	25	19	4 to 6	3.4
93,901	85,365	23	17	4 to 6	3.3
94,976	86,342	26	19	4 to 6	3.3
97,984	89,077	24	17	4 to 6	3.2
98,629	89,663	27	19	4 to 6	3.2
102,067	92,788	25	17	4 to 6	3.1
102,282	92,983	28	19	4 to 6	3.1
106,150	96,500	26	17	4 to 6	3.0
106,422	96,747	23	15	4 to 6	2.9
110,232	100,211	27	17	4 to 6	2.8

**IMPORTANT: 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.**

# SEED METER OPERATION/MAINTENANCE

**PLANTING RATES FOR CORN/POPCORN 39 CELL DISC  
19 TOOTH CONTACT WHEEL DRIVE SPROCKET (See Page 7-1)  
APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS**

20" Rows	22" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
		Drive	Driven		
47,097	42,815	15	28	4 to 6	6.7
48,841	44,401	15	27	4 to 6	6.4
50,719	46,109	15	26	4 to 6	6.2
52,748	47,953	15	25	4 to 6	5.9
53,376	48,524	17	28	4 to 6	5.9
54,946	49,951	15	24	4 to 6	5.7
55,353	50,321	17	27	4 to 6	5.7
57,335	52,123	15	23	4 to 6	5.5
57,482	52,256	17	26	4 to 6	5.5
59,656	54,232	19	28	4 to 6	5.3
59,781	54,347	17	25	4 to 6	5.2
61,865	56,241	19	27	4 to 6	5.1
62,272	56,611	17	24	4 to 6	5.0
64,245	58,404	19	26	4 to 6	4.9
64,980	59,072	17	23	4 to 6	4.8
66,814	60,740	19	25	4 to 6	4.7
69,405	63,096	15	19	4 to 6	4.5
69,598	63,271	19	24	4 to 6	4.5
72,215	65,650	23	28	4 to 6	4.3
72,624	66,022	19	23	4 to 6	4.3
74,889	68,081	23	27	4 to 6	4.2
75,354	68,504	24	28	4 to 6	4.2
77,571	70,519	15	17	4 to 6	4.0
78,145	71,041	24	27	4 to 6	4.0
78,660	71,509	17	19	4 to 6	4.0
80,880	73,528	23	25	4 to 6	3.9
81,634	74,213	26	28	4 to 6	3.8
84,251	76,591	23	24	4 to 6	3.7
84,397	76,725	24	25	4 to 6	3.7
84,774	77,067	27	28	4 to 6	3.7
87,914	79,921	23	23	4 to 6	3.6
91,170	82,881	28	27	4 to 6	3.4
91,295	82,995	27	26	4 to 6	3.4
91,736	83,396	24	23	4 to 6	3.4
94,676	86,069	28	26	4 to 6	3.3
94,947	86,315	27	25	4 to 6	3.3
95,558	86,871	25	23	4 to 6	3.3
98,256	89,324	19	17	4 to 6	3.2
98,903	89,912	27	24	4 to 6	3.2
99,381	90,346	26	23	4 to 6	3.2
102,566	93,242	28	24	4 to 6	3.1
103,203	93,821	27	23	4 to 6	3.0
106,422	96,747	23	19	4 to 6	2.9
107,025	97,296	28	23	4 to 6	2.9
111,049	100,953	24	19	4 to 6	2.8
115,676	105,160	25	19	4 to 6	2.7
118,942	108,129	23	17	4 to 6	2.6
120,303	109,366	26	19	4 to 6	2.6
124,113	112,830	24	17	4 to 6	2.5
124,930	113,573	27	19	4 to 6	2.5
129,285	117,532	25	17	4 to 6	2.4
129,557	117,779	28	19	4 to 6	2.4
134,456	122,233	26	17	4 to 6	2.3
134,801	122,546	23	15	4 to 6	2.3
139,627	126,934	27	17	4 to 6	2.2

**IMPORTANT: 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.**

# SEED METER OPERATION/MAINTENANCE

## PLANTING RATES FOR LOW-RATE CORN/POPCORN 24 CELL DISC

**15 TOOTH CONTACT WHEEL DRIVE SPROCKET** (See Page 7-1)

APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

20" Rows	22" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
		Drive	Driven		
22,881	20,801	15	28	4 to 6	13.7
23,728	21,571	15	27	4 to 6	13.2
24,641	22,401	15	26	4 to 6	12.7
25,627	23,297	15	25	4 to 6	12.2
25,932	23,574	17	28	4 to 6	12.1
26,694	24,268	15	24	4 to 6	11.7
26,892	24,447	17	27	4 to 6	11.7
27,855	25,323	15	23	4 to 6	11.3
27,926	25,388	17	26	4 to 6	11.2
28,982	26,348	19	28	4 to 6	10.8
29,044	26,403	17	25	4 to 6	10.8
30,056	27,324	19	27	4 to 6	10.4
30,254	27,503	17	24	4 to 6	10.4
31,212	28,374	19	26	4 to 6	10.0
31,569	28,699	17	23	4 to 6	9.9
32,460	29,509	19	25	4 to 6	9.7
33,719	30,654	15	19	4 to 6	9.3
33,813	30,739	19	24	4 to 6	9.3
35,084	31,895	23	28	4 to 6	8.9
35,283	32,075	19	23	4 to 6	8.9
36,383	33,076	23	27	4 to 6	8.6
36,609	33,281	24	28	4 to 6	8.6
37,686	34,260	15	17	4 to 6	8.3
37,965	34,514	24	27	4 to 6	8.3
38,215	34,741	17	19	4 to 6	8.2
39,294	35,722	23	25	4 to 6	8.0
39,660	36,055	26	28	4 to 6	7.9
40,931	37,210	23	24	4 to 6	7.7
41,003	37,275	24	25	4 to 6	7.6
41,186	37,442	27	28	4 to 6	7.6
42,711	38,828	23	23	4 to 6	7.3
44,293	40,266	28	27	4 to 6	7.1
44,354	40,322	27	26	4 to 6	7.1
44,568	40,516	24	23	4 to 6	7.0
45,997	41,815	28	26	4 to 6	6.8
46,128	41,934	27	25	4 to 6	6.8
46,425	42,205	25	23	4 to 6	6.8
47,736	43,396	19	17	4 to 6	6.6
48,050	43,682	27	24	4 to 6	6.5
48,282	43,893	26	23	4 to 6	6.5
49,830	45,300	28	24	4 to 6	6.3
50,139	45,581	27	23	4 to 6	6.3
51,703	47,003	23	19	4 to 6	6.1
51,996	47,269	28	23	4 to 6	6.0
53,951	49,046	24	19	4 to 6	5.8
56,199	51,090	25	19	4 to 6	5.6
57,786	52,532	23	17	4 to 6	5.4
58,447	53,133	26	19	4 to 6	5.4
60,298	54,816	24	17	4 to 6	5.2
60,695	55,177	27	19	4 to 6	5.2
62,810	57,100	25	17	4 to 6	5.0
62,943	57,221	28	19	4 to 6	5.0
65,323	59,384	26	17	4 to 6	4.8
65,490	59,537	23	15	4 to 6	4.8
67,835	61,668	27	17	4 to 6	4.6

**IMPORTANT:** 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.

# SEED METER OPERATION/MAINTENANCE

## PLANTING RATES FOR LOW-RATE CORN/POPCORN 24 CELL DISC

**19 TOOTH CONTACT WHEEL DRIVE SPROCKET** (See Page 7-1)

### APPROXIMATE HILLS/ACRE FOR VARIOUS ROW WIDTHS

20" Rows	22" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
		Drive	Driven		
28,982	26,348	15	28	4 to 6	10.8
30,056	27,324	15	27	4 to 6	10.4
31,212	28,374	15	26	4 to 6	10.0
32,460	29,509	15	25	4 to 6	9.7
32,847	29,861	17	28	4 to 6	9.5
33,813	30,739	15	24	4 to 6	9.3
34,063	30,967	17	27	4 to 6	9.2
35,283	32,075	15	23	4 to 6	8.9
35,374	32,158	17	26	4 to 6	8.9
36,711	33,374	19	28	4 to 6	8.5
36,788	33,444	17	25	4 to 6	8.5
38,071	34,610	19	27	4 to 6	8.2
38,321	34,838	17	24	4 to 6	8.2
39,535	35,941	19	26	4 to 6	7.9
39,987	36,352	17	23	4 to 6	7.8
41,117	37,379	19	25	4 to 6	7.6
42,711	38,828	15	19	4 to 6	7.3
42,830	38,936	19	24	4 to 6	7.3
44,440	40,400	23	28	4 to 6	7.1
44,692	40,629	19	23	4 to 6	7.0
46,086	41,896	23	27	4 to 6	6.8
46,372	42,156	24	28	4 to 6	6.8
47,736	43,396	15	17	4 to 6	6.6
48,089	43,718	24	27	4 to 6	6.5
48,406	44,005	17	19	4 to 6	6.5
49,773	45,248	23	25	4 to 6	6.3
50,236	45,669	26	28	4 to 6	6.2
51,846	47,133	23	24	4 to 6	6.0
51,937	47,215	24	25	4 to 6	6.0
52,168	47,426	27	28	4 to 6	6.0
54,101	49,182	23	23	4 to 6	5.8
56,104	51,004	28	27	4 to 6	5.6
56,181	51,074	27	26	4 to 6	5.6
56,453	51,321	24	23	4 to 6	5.6
58,262	52,966	28	26	4 to 6	5.4
58,429	53,117	27	25	4 to 6	5.4
58,805	53,459	25	23	4 to 6	5.3
60,465	54,969	19	17	4 to 6	5.2
60,863	55,330	27	24	4 to 6	5.2
61,157	55,598	26	23	4 to 6	5.1
63,117	57,379	28	24	4 to 6	5.0
63,509	57,736	27	23	4 to 6	4.9
65,490	59,537	23	19	4 to 6	4.8
65,862	59,874	28	23	4 to 6	4.8
68,338	62,125	24	19	4 to 6	4.6
71,185	64,714	25	19	4 to 6	4.4
73,195	66,541	23	17	4 to 6	4.3
74,032	67,302	26	19	4 to 6	4.2
76,377	69,434	24	17	4 to 6	4.1
76,880	69,891	27	19	4 to 6	4.1
79,560	72,327	25	17	4 to 6	3.9
79,727	72,479	28	19	4 to 6	3.9
82,742	75,220	26	17	4 to 6	3.8
82,954	75,413	23	15	4 to 6	3.8
85,925	78,113	27	17	4 to 6	3.7

**IMPORTANT: 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.**

# SEED METER OPERATION/MAINTENANCE

## PLANTING RATES FOR SOYBEAN AND MILO/GRAIN SORGHUM 60 CELL DISCS

### 15 TOOTH CONTACT WHEEL DRIVE SPROCKET (See Page 7-1)

#### APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

10" Rows	11" Rows	20" Rows	22" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
				Drive	Driven		
114,405	104,004	57,202	52,002	15	28	4 to 6	5.5
118,642	107,856	59,321	53,928	15	27	4 to 6	5.3
123,205	112,004	61,602	56,002	15	26	4 to 6	5.1
128,133	116,485	64,067	58,242	15	25	4 to 6	4.9
129,659	117,871	64,829	58,936	17	28	4 to 6	4.8
133,472	121,338	66,736	60,669	15	24	4 to 6	4.7
134,461	122,237	67,230	61,119	17	27	4 to 6	4.7
139,275	126,614	69,638	63,307	15	23	4 to 6	4.5
139,632	126,938	69,816	63,469	17	26	4 to 6	4.5
144,912	131,739	72,456	65,869	19	28	4 to 6	4.3
145,218	132,016	72,609	66,008	17	25	4 to 6	4.3
150,280	136,618	75,140	68,309	19	27	4 to 6	4.2
151,268	137,517	75,634	68,758	17	24	4 to 6	4.1
156,060	141,872	78,030	70,936	19	26	4 to 6	4.0
157,845	143,496	78,923	71,748	17	23	4 to 6	4.0
162,302	147,547	81,151	73,774	19	25	4 to 6	3.9
168,596	153,269	84,298	76,635	15	19	4 to 6	3.7
169,065	153,695	84,532	76,848	19	24	4 to 6	3.7
175,420	159,473	87,710	79,737	23	28	4 to 6	3.6
176,415	160,377	88,208	80,189	19	23	4 to 6	3.6
181,917	165,379	90,959	82,690	23	27	4 to 6	3.4
183,047	166,407	91,524	83,203	24	28	4 to 6	3.4
188,431	171,301	94,216	85,650	15	17	4 to 6	3.3
189,827	172,570	94,913	86,285	24	27	4 to 6	3.3
191,076	173,705	95,538	86,853	17	19	4 to 6	3.3
196,471	178,610	98,235	89,305	23	25	4 to 6	3.2
198,301	180,274	99,151	90,137	26	28	4 to 6	3.2
204,657	186,052	102,329	93,026	23	24	4 to 6	3.1
205,013	186,375	102,507	93,188	24	25	4 to 6	3.1
205,928	187,208	102,964	93,604	27	28	4 to 6	3.0
213,555	194,141	106,778	97,071	23	23	4 to 6	2.9
221,465	201,332	110,732	100,666	28	27	4 to 6	2.8
221,769	201,608	110,884	100,804	27	26	4 to 6	2.8
222,840	202,582	111,420	101,291	24	23	4 to 6	2.8
229,983	209,075	114,991	104,538	28	26	4 to 6	2.7
230,640	209,672	115,320	104,836	27	25	4 to 6	2.7
232,125	211,023	116,063	105,511	25	23	4 to 6	2.7
238,679	216,981	119,340	108,491	19	17	4 to 6	2.6
240,250	218,409	120,125	109,204	27	24	4 to 6	2.6
241,410	219,464	120,705	109,732	26	23	4 to 6	2.6
249,148	226,498	124,574	113,249	28	24	4 to 6	2.5
	227,905	125,348	113,952	27	23	4 to 6	2.5
	235,013	129,257	117,506	23	19	4 to 6	2.4
	236,346	129,990	118,173	28	23	4 to 6	2.4
	245,231	134,877	122,615	24	19	4 to 6	2.3
		140,497	127,724	25	19	4 to 6	2.2
		144,464	131,331	23	17	4 to 6	2.2
		146,117	132,833	26	19	4 to 6	2.1
<b>NOTE: Planting rates over 250,000 seeds/acre are not recommended with subject seed discs and/or drive ratio.</b>		150,745	137,041	24	17	4 to 6	2.1
		151,737	137,942	27	19	4 to 6	2.1
		157,026	142,751	25	17	4 to 6	2.0
		157,356	143,051	28	19	4 to 6	2.0
		163,307	148,461	26	17	4 to 6	1.9
		163,726	148,842	23	15	4 to 6	1.9
		169,588	154,171	27	17	4 to 6	1.8

**IMPORTANT: 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.**

# SEED METER OPERATION/MAINTENANCE

## PLANTING RATES FOR SOYBEAN AND MILO/GRAIN SORGHUM 60 CELL DISCS

**19 TOOTH CONTACT WHEEL DRIVE SPROCKET** (See Page 7-1)

### APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

10" Rows	11" Rows	20" Rows	22" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
				Drive	Driven		
144,912	131,739	72,456	65,869	15	28	4 to 6	4.3
150,280	136,618	75,140	68,309	15	27	4 to 6	4.2
156,060	141,872	78,030	70,936	15	26	4 to 6	4.0
162,302	147,547	81,151	73,774	15	25	4 to 6	3.9
164,234	149,304	82,117	74,652	17	28	4 to 6	3.8
169,065	153,695	84,532	76,848	15	24	4 to 6	3.7
170,317	154,834	85,158	77,417	17	27	4 to 6	3.7
176,415	160,377	88,208	80,189	15	23	4 to 6	3.6
176,868	160,789	88,434	80,394	17	26	4 to 6	3.5
183,556	166,869	91,778	83,434	19	28	4 to 6	3.4
183,942	167,220	91,971	83,610	17	25	4 to 6	3.4
190,354	173,049	95,177	86,525	19	27	4 to 6	3.3
191,607	174,188	95,803	87,094	17	24	4 to 6	3.3
197,675	179,705	98,838	89,852	19	26	4 to 6	3.2
199,937	181,761	99,969	90,881	17	23	4 to 6	3.1
205,583	186,893	102,791	93,447	19	25	4 to 6	3.1
213,555	194,141	106,778	97,071	15	19	4 to 6	2.9
214,148	194,680	107,074	97,340	19	24	4 to 6	2.9
222,199	201,999	111,100	101,000	23	28	4 to 6	2.8
223,459	203,145	111,730	101,572	19	23	4 to 6	2.8
230,429	209,481	115,214	104,740	23	27	4 to 6	2.7
231,860	210,782	115,930	105,391	24	28	4 to 6	2.7
238,679	216,981	119,340	108,491	15	17	4 to 6	2.6
240,447	218,589	120,224	109,294	24	27	4 to 6	2.6
242,029	220,027	121,015	110,013	17	19	4 to 6	2.6
248,863	226,239	124,432	113,120	23	25	4 to 6	2.5
	228,347	125,591	114,173	26	28	4 to 6	2.5
	235,666	129,616	117,833	23	24	4 to 6	2.4
	236,076	129,842	118,038	24	25	4 to 6	2.4
	237,130	130,421	118,565	27	28	4 to 6	2.4
	245,912	135,252	122,956	23	23	4 to 6	2.3
		140,261	127,510	28	27	4 to 6	2.2
		140,454	127,685	27	26	4 to 6	2.2
		141,132	128,302	24	23	4 to 6	2.2
		145,656	132,414	28	26	4 to 6	2.2
		146,072	132,793	27	25	4 to 6	2.1
		147,013	133,648	25	23	4 to 6	2.1
		151,164	137,421	19	17	4 to 6	2.1
		152,158	138,326	27	24	4 to 6	2.1
		152,893	138,994	26	23	4 to 6	2.1
		157,794	143,449	28	24	4 to 6	2.0
		158,774	144,340	27	23	4 to 6	2.0
		163,726	148,842	23	19	4 to 6	1.9
		164,654	149,686	28	23	4 to 6	1.9
		170,844	155,313	24	19	4 to 6	1.8
		177,963	161,784	25	19	4 to 6	1.8
		182,988	166,352	23	17	4 to 6	1.7
		185,081	168,256	26	19	4 to 6	1.7
		190,944	173,585	24	17	4 to 6	1.6
		192,200	174,727	27	19	4 to 6	1.6
		198,899	180,818	25	17	4 to 6	1.6
		199,318	181,198	28	19	4 to 6	1.6
		206,855	188,050	26	17	4 to 6	1.5
		207,386	188,533	23	15	4 to 6	1.5
		214,811	195,283	27	17	4 to 6	1.5

**NOTE: Planting rates over 250,000 seeds/acre are not recommended with subject seed discs and/or drive ratio.**

**IMPORTANT: 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.**

# SEED METER OPERATION/MAINTENANCE

**PLANTING RATES FOR SOYBEAN 60 CELL DISC  
38 TOOTH CONTACT WHEEL DRIVE SPROCKET (See Page 7-1)  
APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS**

20" Rows	22" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
		Drive	Driven		
144,912	131,739	15	28	4 to 6	2.2
150,280	136,618	15	27	4 to 6	2.1
156,060	141,872	15	26	4 to 6	2.0
162,302	147,547	15	25	4 to 6	1.9
164,234	149,304	17	28	4 to 6	1.9
169,065	153,695	15	24	4 to 6	1.9
170,317	154,834	17	27	4 to 6	1.8
176,415	160,377	15	23	4 to 6	1.8
176,868	160,789	17	26	4 to 6	1.8
183,556	166,869	19	28	4 to 6	1.7
183,942	167,220	17	25	4 to 6	1.7
190,354	173,049	19	27	4 to 6	1.6
191,607	174,188	17	24	4 to 6	1.6
197,675	179,705	19	26	4 to 6	1.6
199,937	181,761	17	23	4 to 6	1.6
205,583	186,893	19	25	4 to 6	1.5
213,555	194,141	15	19	4 to 6	1.5
214,148	194,680	19	24	4 to 6	1.5
222,199	201,999	23	28	4 to 6	1.4
223,459	203,145	19	23	4 to 6	1.4
230,429	209,481	23	27	4 to 6	1.4
231,860	210,782	24	28	4 to 6	1.4
238,679	216,981	15	17	4 to 6	1.3
240,447	218,589	24	27	4 to 6	1.3
242,029	220,027	17	19	4 to 6	1.3
248,863	226,239	23	25	4 to 6	1.3
	228,347	26	28	4 to 6	1.2
	235,666	23	24	4 to 6	1.2
	236,076	24	25	4 to 6	1.2
	237,130	27	28	4 to 6	1.2
	245,912	23	23	4 to 6	1.2
		28	27	4 to 6	1.1
		27	26	4 to 6	1.1
		24	23	4 to 6	1.1
		28	26	4 to 6	1.1
		27	25	4 to 6	1.1
		25	23	4 to 6	1.1
		19	17	4 to 6	1.0
		27	24	4 to 6	1.0
		26	23	4 to 6	1.0
		28	24	4 to 6	1.0
		28	24	4 to 6	1.0
		27	23	4 to 6	1.0
		23	19	4 to 6	1.0
		28	23	4 to 6	1.0
		24	19	4 to 6	0.9
		25	19	4 to 6	0.9
		23	17	4 to 6	0.9
		26	19	4 to 6	0.8
		24	17	4 to 6	0.8
		27	19	4 to 6	0.8
		25	17	4 to 6	0.8
		28	19	4 to 6	0.8
		26	17	4 to 6	0.8
		23	15	4 to 6	0.8
		27	17	4 to 6	0.7

**NOTE: Planting rates over 250,000 seeds/acre are not recommended with subject seed disc and/or drive ratio.**

**IMPORTANT: 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.**

# SEED METER OPERATION/MAINTENANCE

**PLANTING RATES FOR HIGH-RATE SOYBEAN 120 CELL DISC  
15 TOOTH CONTACT WHEEL DRIVE SPROCKET (See Page 7-1)  
APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS**

20" Rows	22" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
		Drive	Driven		
114,405	104,004	15	28	4 to 6	2.7
118,642	107,856	15	27	4 to 6	2.6
123,205	112,004	15	26	4 to 6	2.5
128,133	116,485	15	25	4 to 6	2.4
129,659	117,871	17	28	4 to 6	2.4
133,472	121,338	15	24	4 to 6	2.3
134,461	122,237	17	27	4 to 6	2.3
139,275	126,614	15	23	4 to 6	2.3
139,632	126,938	17	26	4 to 6	2.2
144,912	131,739	19	28	4 to 6	2.2
145,218	132,016	17	25	4 to 6	2.2
150,280	136,618	19	27	4 to 6	2.1
151,268	137,517	17	24	4 to 6	2.1
156,060	141,872	19	26	4 to 6	2.0
157,845	143,496	17	23	4 to 6	2.0
162,302	147,547	19	25	4 to 6	1.9
168,596	153,269	15	19	4 to 6	1.9
169,065	153,695	19	24	4 to 6	1.9
175,420	159,473	23	28	4 to 6	1.8
176,415	160,377	19	23	4 to 6	1.8
181,917	165,379	23	27	4 to 6	1.7
183,047	166,407	24	28	4 to 6	1.7
188,431	171,301	15	17	4 to 6	1.7
189,827	172,570	24	27	4 to 6	1.7
191,076	173,705	17	19	4 to 6	1.6
196,471	178,610	23	25	4 to 6	1.6
198,301	180,274	26	28	4 to 6	1.6
204,657	186,052	23	24	4 to 6	1.5
205,013	186,375	24	25	4 to 6	1.5
205,928	187,208	27	28	4 to 6	1.5
213,555	194,141	23	23	4 to 6	1.5
221,465	201,332	28	27	4 to 6	1.4
221,769	201,608	27	26	4 to 6	1.4
222,840	202,582	24	23	4 to 6	1.4
229,983	209,075	28	26	4 to 6	1.4
230,640	209,672	27	25	4 to 6	1.4
232,125	211,023	25	23	4 to 6	1.4
238,679	216,981	19	17	4 to 6	1.3
240,250	218,409	27	24	4 to 6	1.3
241,410	219,464	26	23	4 to 6	1.3
249,148	226,498	28	24	4 to 6	1.3
	227,905	27	23	4 to 6	1.3
	235,013	23	19	4 to 6	1.2
	236,346	28	23	4 to 6	1.2
	245,231	24	19	4 to 6	1.2
		25	19	4 to 6	1.1
		23	17	4 to 6	1.1
		26	19	4 to 6	1.1
		24	17	4 to 6	1.0
		27	19	4 to 6	1.0
		25	17	4 to 6	1.0
		28	19	4 to 6	1.0
		26	17	4 to 6	1.0
		23	15	4 to 6	1.0
		27	17	4 to 6	0.9

**NOTE: Planting rates over 250,000 seeds/acre are not recommended with subject seed disc and/or drive ratio.**

**IMPORTANT: 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.**



# SEED METER OPERATION/MAINTENANCE

**PLANTING RATES FOR HIGH-RATE SOYBEAN 120 CELL DISC  
19 TOOTH CONTACT WHEEL DRIVE SPROCKET (See Page 7-1)  
APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS**

20" Rows	22" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
		Drive	Driven		
144,912	131,739	15	28	4 to 6	2.2
150,280	136,618	15	27	4 to 6	2.1
156,060	141,872	15	26	4 to 6	2.0
162,302	147,547	15	25	4 to 6	1.9
164,234	149,304	17	28	4 to 6	1.9
169,065	153,695	15	24	4 to 6	1.9
170,317	154,834	17	27	4 to 6	1.8
176,415	160,377	15	23	4 to 6	1.8
176,868	160,789	17	26	4 to 6	1.8
183,556	166,869	19	28	4 to 6	1.7
183,942	167,220	17	25	4 to 6	1.7
190,354	173,049	19	27	4 to 6	1.6
191,607	174,188	17	24	4 to 6	1.6
197,675	179,705	19	26	4 to 6	1.6
199,937	181,761	17	23	4 to 6	1.6
205,583	186,893	19	25	4 to 6	1.5
213,555	194,141	15	19	4 to 6	1.5
214,148	194,680	19	24	4 to 6	1.5
222,199	201,999	23	28	4 to 6	1.4
223,459	203,145	19	23	4 to 6	1.4
230,429	209,481	23	27	4 to 6	1.4
231,860	210,782	24	28	4 to 6	1.4
238,679	216,981	15	17	4 to 6	1.3
240,447	218,589	24	27	4 to 6	1.3
242,029	220,027	17	19	4 to 6	1.3
248,863	226,239	23	25	4 to 6	1.3
	228,347	26	28	4 to 6	1.2
	235,666	23	24	4 to 6	1.2
	236,076	24	25	4 to 6	1.2
	237,130	27	28	4 to 6	1.2
	245,912	23	23	4 to 6	1.2
		28	27	4 to 6	1.1
		27	26	4 to 6	1.1
		24	23	4 to 6	1.1
		28	26	4 to 6	1.1
		27	25	4 to 6	1.1
		25	23	4 to 6	1.1
		19	17	4 to 6	1.0
		27	24	4 to 6	1.0
		26	23	4 to 6	1.0
		28	24	4 to 6	1.0
		27	23	4 to 6	1.0
		23	19	4 to 6	1.0
		28	23	4 to 6	1.0
		24	19	4 to 6	0.9
		25	19	4 to 6	0.9
		23	17	4 to 6	0.9
		26	19	4 to 6	0.8
		24	17	4 to 6	0.8
		27	19	4 to 6	0.8
		25	17	4 to 6	0.8
		28	19	4 to 6	0.8
		26	17	4 to 6	0.8
		23	15	4 to 6	0.8
		27	17	4 to 6	0.7

**NOTE: Planting rates over 250,000 seeds/acre are not recommended with subject seed disc and/or drive ratio.**

**IMPORTANT: 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.**

# SEED METER OPERATION/MAINTENANCE

PLANTING RATES FOR ACID-DELINTED HILL-DROP COTTON, 3 SEEDS PER CELL, 20 CELL DISC

**15 TOOTH CONTACT WHEEL DRIVE SPROCKET** (See Page 7-1)

APPROXIMATE HILLS/ACRE FOR VARIOUS ROW WIDTHS

20" Rows	22" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Hill Spacing In Inches
		Drive	Driven		
19,067	17,334	15	28	4 to 6	16.4
19,774	17,976	15	27	4 to 6	15.9
20,534	18,667	15	26	4 to 6	15.3
21,356	19,414	15	25	4 to 6	14.7
21,610	19,645	17	28	4 to 6	14.5
22,245	20,223	15	24	4 to 6	14.1
22,410	20,373	17	27	4 to 6	14.0
23,213	21,102	15	23	4 to 6	13.5
23,272	21,156	17	26	4 to 6	13.5
24,152	21,956	19	28	4 to 6	13.0
24,203	22,003	17	25	4 to 6	13.0
25,047	22,770	19	27	4 to 6	12.5
25,211	22,919	17	24	4 to 6	12.4
26,010	23,645	19	26	4 to 6	12.1
26,308	23,916	17	23	4 to 6	11.9
27,050	24,591	19	25	4 to 6	11.6
28,099	25,545	15	19	4 to 6	11.2
28,177	25,616	19	24	4 to 6	11.1
29,237	26,579	23	28	4 to 6	10.7
29,403	26,730	19	23	4 to 6	10.7
30,320	27,563	23	27	4 to 6	10.3
30,508	27,734	24	28	4 to 6	10.3
31,405	28,550	15	17	4 to 6	10.0
31,486	28,623	23	26	4 to 6	10.0
31,638	28,762	24	27	4 to 6	9.9
31,779	28,890	25	28	4 to 6	9.9
31,846	28,951	17	19	4 to 6	9.8
32,745	29,768	23	25	4 to 6	9.6
32,855	29,868	24	26	4 to 6	9.5
32,956	29,960	25	27	4 to 6	9.5
33,050	30,046	26	28	4 to 6	9.5
34,110	31,009	23	24	4 to 6	9.2
34,169	31,063	24	25	4 to 6	9.2
34,224	31,112	25	26	4 to 6	9.2
34,274	31,158	26	27	4 to 6	9.2
34,321	31,201	27	28	4 to 6	9.1
35,593	32,357	23	23	4 to 6	8.8
36,911	33,555	28	27	4 to 6	8.5
36,961	33,601	27	26	4 to 6	8.5
37,076	33,705	25	24	4 to 6	8.5
37,140	33,764	24	23	4 to 6	8.4
38,330	34,846	28	26	4 to 6	8.2
38,440	34,945	27	25	4 to 6	8.2
38,688	35,170	25	23	4 to 6	8.1
39,780	36,164	19	17	4 to 6	7.9
39,864	36,240	28	25	4 to 6	7.9
40,042	36,401	27	24	4 to 6	7.8
40,235	36,577	26	23	4 to 6	7.8
41,525	37,750	28	24	4 to 6	7.6
41,783	37,984	27	23	4 to 6	7.5
43,086	39,169	23	19	4 to 6	7.3
43,330	39,391	28	23	4 to 6	7.2
44,959	40,872	24	19	4 to 6	7.0
46,832	42,575	25	19	4 to 6	6.7
48,155	43,777	23	17	5 to 6	6.5

**IMPORTANT:** 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.

# SEED METER OPERATION/MAINTENANCE

PLANTING RATES FOR ACID-DELINTED HILL-DROP COTTON, 3 SEEDS PER CELL, 20 CELL DISC  
**19 TOOTH CONTACT WHEEL DRIVE SPROCKET** (See Page 7-1)  
 APPROXIMATE HILLS/ACRE FOR VARIOUS ROW WIDTHS

20" Rows	22" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Hill Spacing In Inches
		Drive	Driven		
24,152	21,956	15	28	4 to 6	13.0
25,047	22,770	15	27	4 to 6	12.5
26,010	23,645	15	26	4 to 6	12.1
27,050	24,591	15	25	4 to 6	11.6
27,372	24,884	17	28	4 to 6	11.5
28,177	25,616	15	24	4 to 6	11.1
28,386	25,806	17	27	4 to 6	11.0
29,403	26,730	15	23	4 to 6	10.7
29,478	26,798	17	26	4 to 6	10.6
30,593	27,811	19	28	4 to 6	10.3
30,657	27,870	17	25	4 to 6	10.2
31,726	28,842	19	27	4 to 6	9.9
31,934	29,031	17	24	4 to 6	9.8
32,946	29,951	19	26	4 to 6	9.5
33,323	30,294	17	23	4 to 6	9.4
34,264	31,149	19	25	4 to 6	9.2
35,593	32,357	15	19	4 to 6	8.8
35,691	32,447	19	24	4 to 6	8.8
37,033	33,667	23	28	4 to 6	8.5
37,243	33,857	19	23	4 to 6	8.4
38,405	34,913	23	27	4 to 6	8.2
38,643	35,130	24	28	4 to 6	8.1
39,780	36,164	15	17	4 to 6	7.9
39,882	36,256	23	26	4 to 6	7.9
40,075	36,431	24	27	4 to 6	7.8
40,253	36,594	25	28	4 to 6	7.8
40,338	36,671	17	19	4 to 6	7.8
41,477	37,707	23	25	4 to 6	7.6
41,616	37,833	24	26	4 to 6	7.5
41,744	37,949	25	27	4 to 6	7.5
41,864	38,058	26	28	4 to 6	7.5
43,205	39,278	23	24	4 to 6	7.3
43,281	39,346	24	25	4 to 6	7.2
43,350	39,409	25	26	4 to 6	7.2
43,414	39,467	26	27	4 to 6	7.2
43,474	39,522	27	28	4 to 6	7.2
45,084	40,985	23	23	4 to 6	7.0
46,754	42,503	28	27	4 to 6	6.7
46,818	42,562	27	26	4 to 6	6.7
46,962	42,693	25	24	4 to 6	6.7
47,044	42,767	24	23	4 to 6	6.7
48,552	44,138	28	26	4 to 6	6.5
48,691	44,264	27	25	4 to 6	6.4
49,004	44,549	25	23	4 to 6	6.4
50,388	45,807	19	17	4 to 6	6.2
50,494	45,904	28	25	4 to 6	6.2
50,719	46,109	27	24	4 to 6	6.2
50,964	46,331	26	23	4 to 6	6.2
52,598	47,816	28	24	4 to 6	6.0
52,925	48,113	27	23	4 to 6	5.9
54,575	49,614	23	19	4 to 6	5.7
54,885	49,895	28	23	4 to 6	5.7
56,948	51,771	24	19	4 to 6	5.5
59,321	53,928	25	19	4 to 6	5.3
60,996	55,451	23	17	5 to 6	5.1

**IMPORTANT: 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.**

# SEED METER OPERATION/MAINTENANCE

## PLANTING RATES FOR ACID-DELINTED COTTON/SMALL DRY EDIBLE BEAN 54 CELL DISC

**15 TOOTH CONTACT WHEEL DRIVE SPROCKET** (See Page 7-1)

### APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

10" Rows	11" Rows	20" Rows	22" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
				Drive	Driven		
102,964	93,604	51,482	46,802	15	28	4 to 6	6.1
106,778	97,071	53,389	48,535	15	27	4 to 6	5.9
110,884	100,804	55,442	50,402	15	26	4 to 6	5.7
115,320	104,836	57,660	52,418	15	25	4 to 6	5.4
116,693	106,084	58,346	53,042	17	28	4 to 6	5.4
120,125	109,204	60,062	54,602	15	24	4 to 6	5.2
121,015	110,013	60,507	55,007	17	27	4 to 6	5.2
125,348	113,952	62,674	56,976	15	23	4 to 6	5.0
125,669	114,245	62,835	57,122	17	26	4 to 6	5.0
130,421	118,565	65,211	59,282	19	28	4 to 6	4.8
130,696	118,814	65,348	59,407	17	25	4 to 6	4.8
135,252	122,956	67,626	61,478	19	27	4 to 6	4.6
136,141	123,765	68,071	61,882	17	24	4 to 6	4.6
140,454	127,685	70,227	63,843	19	26	4 to 6	4.5
142,061	129,146	71,030	64,573	17	23	4 to 6	4.4
146,072	132,793	73,036	66,396	19	25	4 to 6	4.3
151,737	137,942	75,868	68,971	15	19	4 to 6	4.1
152,158	138,326	76,079	69,163	19	24	4 to 6	4.1
157,878	143,526	78,939	71,763	23	28	4 to 6	4.0
158,774	144,340	79,387	72,170	19	23	4 to 6	4.0
163,726	148,842	81,863	74,421	23	27	4 to 6	3.8
164,743	149,766	82,371	74,883	24	28	4 to 6	3.8
169,588	154,171	84,794	77,085	15	17	4 to 6	3.7
170,844	155,313	85,422	77,656	24	27	4 to 6	3.7
171,968	156,335	85,984	78,167	17	19	4 to 6	3.6
176,824	160,749	88,412	80,374	23	25	4 to 6	3.5
178,471	162,247	89,236	81,123	26	28	4 to 6	3.5
184,191	167,447	92,096	83,723	23	24	4 to 6	3.4
184,512	167,738	92,256	83,869	24	25	4 to 6	3.4
185,335	168,487	92,668	84,243	27	28	4 to 6	3.4
192,200	174,727	96,100	87,364	23	23	4 to 6	3.3
199,318	181,198	99,659	90,599	28	27	4 to 6	3.1
199,592	181,447	99,796	90,724	27	26	4 to 6	3.1
200,556	182,324	100,278	91,162	24	23	4 to 6	3.1
206,984	188,168	103,492	94,084	28	26	4 to 6	3.0
207,576	188,705	103,788	94,353	27	25	4 to 6	3.0
208,913	189,921	104,456	94,960	25	23	4 to 6	3.0
214,811	195,283	107,406	97,642	19	17	4 to 6	2.9
216,225	196,568	108,112	98,284	27	24	4 to 6	2.9
217,269	197,517	108,635	98,759	26	23	4 to 6	2.9
224,233	203,848	112,117	101,924	28	24	4 to 6	2.8
225,626	205,114	112,813	102,557	27	23	4 to 6	2.8
232,663	211,512	116,331	105,756	23	19	4 to 6	2.7
233,982	212,711	116,991	106,356	28	23	4 to 6	2.7
242,779	220,708	121,389	110,354	24	19	4 to 6	2.6
	229,904	126,447	114,952	25	19	4 to 6	2.5
	236,395	130,017	118,198	23	17	4 to 6	2.4
	239,100	131,505	119,550	26	19	4 to 6	2.4
	246,673	135,670	123,337	24	17	4 to 6	2.3
	248,296	136,563	124,148	27	19	4 to 6	2.3
		141,323	128,476	25	17	4 to 6	2.2
		141,621	128,746	28	19	4 to 6	2.2
		146,976	133,615	26	17	4 to 6	2.1
		147,353	133,957	23	15	4 to 6	2.1
		152,629	138,754	27	17	4 to 6	2.1

**NOTE: Planting rates over 250,000 seeds/acre are not recommended with subject seed disc and/or drive ratio.**

**IMPORTANT: 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.**

# SEED METER OPERATION/MAINTENANCE

## PLANTING RATES FOR ACID-DELINTED COTTON/SMALL DRY EDIBLE BEAN 54 CELL DISC

### 19 TOOTH CONTACT WHEEL DRIVE SPROCKET (See Page 7-1)

#### APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

10" Rows	11" Rows	20" Rows	22" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
				Drive	Driven		
130,421	118,565	65,211	59,282	15	28	4 to 6	4.8
135,252	122,956	67,626	61,478	15	27	4 to 6	4.6
140,454	127,685	70,227	63,843	15	26	4 to 6	4.5
146,072	132,793	73,036	66,396	15	25	4 to 6	4.3
147,811	134,373	73,905	67,187	17	28	4 to 6	4.2
152,158	138,326	76,079	69,163	15	24	4 to 6	4.1
153,285	139,350	76,643	69,675	17	27	4 to 6	4.1
158,774	144,340	79,387	72,170	15	23	4 to 6	4.0
159,181	144,710	79,590	72,355	17	26	4 to 6	3.9
165,200	150,182	82,600	75,091	19	28	4 to 6	3.8
165,548	150,498	82,774	75,249	17	25	4 to 6	3.8
171,319	155,744	85,659	77,872	19	27	4 to 6	3.7
172,446	156,769	86,223	78,384	17	24	4 to 6	3.6
177,908	161,734	88,954	80,867	19	26	4 to 6	3.5
179,944	163,585	89,972	81,793	17	23	4 to 6	3.5
185,024	168,204	92,512	84,102	19	25	4 to 6	3.4
192,200	174,727	96,100	87,364	15	19	4 to 6	3.3
192,734	175,212	96,367	87,606	19	24	4 to 6	3.3
199,979	181,799	99,990	90,900	23	28	4 to 6	3.1
201,113	182,830	100,557	91,415	19	23	4 to 6	3.1
207,386	188,533	103,693	94,266	23	27	4 to 6	3.0
208,674	189,704	104,337	94,852	24	28	4 to 6	3.0
214,811	195,283	107,406	97,642	15	17	4 to 6	2.9
216,403	196,730	108,201	98,365	24	27	4 to 6	2.9
217,826	198,024	108,913	99,012	17	19	4 to 6	2.9
223,977	203,615	111,988	101,808	23	25	4 to 6	2.8
226,063	205,512	113,032	102,756	26	28	4 to 6	2.8
233,309	212,099	116,655	106,050	23	24	4 to 6	2.7
233,715	212,468	116,857	106,234	24	25	4 to 6	2.7
234,758	213,417	117,379	106,708	27	28	4 to 6	2.7
243,453	221,321	121,726	110,660	23	23	4 to 6	2.6
	229,518	126,235	114,759	28	27	4 to 6	2.5
	229,833	126,408	114,917	27	26	4 to 6	2.5
	230,944	127,019	115,472	24	23	4 to 6	2.5
	238,346	131,090	119,173	28	26	4 to 6	2.4
	239,027	131,465	119,513	27	25	4 to 6	2.4
	240,566	132,311	120,283	25	23	4 to 6	2.4
	247,359	136,047	123,679	19	17	4 to 6	2.3
	248,986	136,942	124,493	27	24	4 to 6	2.3
		137,604	125,094	26	23	4 to 6	2.3
		142,014	129,104	28	24	4 to 6	2.2
		142,896	129,906	27	23	4 to 6	2.2
		147,353	133,957	23	19	4 to 6	2.1
		148,189	134,717	28	23	4 to 6	2.1
		153,760	139,782	24	19	4 to 6	2.0
		160,166	145,606	25	19	4 to 6	2.0
		164,689	149,717	23	17	4 to 6	1.9
		166,573	151,430	26	19	4 to 6	1.9
		171,849	156,227	24	17	4 to 6	1.8
		172,980	157,254	27	19	4 to 6	1.8
		179,010	162,736	25	17	4 to 6	1.8
		179,386	163,079	28	19	4 to 6	1.7
		186,170	169,245	26	17	4 to 6	1.7
		186,647	169,679	23	15	4 to 6	1.7
		193,330	175,755	27	17	4 to 6	1.6

**NOTE: Planting rates over 250,000 seeds/acre are not recommended with subject seed disc and/or drive ratio.**

**IMPORTANT: 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.**

# SEED METER OPERATION/MAINTENANCE

**PLANTING RATES FOR LARGE DRY EDIBLE BEAN 54 CELL DISC  
15 TOOTH CONTACT WHEEL DRIVE SPROCKET (See Page 7-1)  
APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS**

20" Rows	22" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
		Drive	Driven		
51,482	46,802	15	28	4 to 6	6.1
53,389	48,535	15	27	4 to 6	5.9
55,442	50,402	15	26	4 to 6	5.7
57,660	52,418	15	25	4 to 6	5.4
58,346	53,042	17	28	4 to 6	5.4
60,062	54,602	15	24	4 to 6	5.2
60,507	55,007	17	27	4 to 6	5.2
62,674	56,976	15	23	4 to 6	5.0
62,835	57,122	17	26	4 to 6	5.0
65,211	59,282	19	28	4 to 6	4.8
65,348	59,407	17	25	4 to 6	4.8
67,626	61,478	19	27	4 to 6	4.6
68,071	61,882	17	24	4 to 6	4.6
70,227	63,843	19	26	4 to 6	4.5
71,030	64,573	17	23	4 to 6	4.4
73,036	66,396	19	25	4 to 6	4.3
75,868	68,971	15	19	4 to 6	4.1
76,079	69,163	19	24	4 to 6	4.1
78,939	71,763	23	28	4 to 6	4.0
79,387	72,170	19	23	4 to 6	4.0
81,863	74,421	23	27	4 to 6	3.8
82,371	74,883	24	28	4 to 6	3.8
84,794	77,085	15	17	4 to 6	3.7
85,422	77,656	24	27	4 to 6	3.7
85,984	78,167	17	19	4 to 6	3.6
88,412	80,374	23	25	4 to 6	3.5
89,236	81,123	26	28	4 to 6	3.5
92,096	83,723	23	24	4 to 6	3.4
92,256	83,869	24	25	4 to 6	3.4
92,668	84,243	27	28	4 to 6	3.4
96,100	87,364	23	23	4 to 6	3.3
99,659	90,599	28	27	4 to 6	3.1
99,796	90,724	27	26	4 to 6	3.1
100,278	91,162	24	23	4 to 6	3.1
103,492	94,084	28	26	4 to 6	3.0
103,788	94,353	27	25	4 to 6	3.0
104,456	94,960	25	23	4 to 6	3.0
107,406	97,642	19	17	4 to 6	2.9
108,112	98,284	27	24	4 to 6	2.9
108,635	98,759	26	23	4 to 6	2.9
112,117	101,924	28	24	4 to 6	2.8
112,813	102,557	27	23	4 to 6	2.8
116,331	105,756	23	19	4 to 6	2.7
116,991	106,356	28	23	4 to 6	2.7
121,389	110,354	24	19	4 to 6	2.6
126,447	114,952	25	19	4 to 6	2.5
130,017	118,198	23	17	4 to 6	2.4
131,505	119,550	26	19	4 to 6	2.4
135,670	123,337	24	17	4 to 6	2.3
136,563	124,148	27	19	4 to 6	2.3
141,323	128,476	25	17	4 to 6	2.2
141,621	128,746	28	19	4 to 6	2.2
146,976	133,615	26	17	4 to 6	2.1
147,353	133,957	23	15	4 to 6	2.1
152,629	138,754	27	17	4 to 6	2.1

**IMPORTANT: 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.**

# SEED METER OPERATION/MAINTENANCE

**PLANTING RATES FOR LARGE DRY EDIBLE BEAN 54 CELL DISC  
19 TOOTH CONTACT WHEEL DRIVE SPROCKET (See Page 7-1)  
APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS**

20" Rows	22" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
		Drive	Driven		
65,211	59,282	15	28	4 to 6	4.8
67,626	61,478	15	27	4 to 6	4.6
70,227	63,843	15	26	4 to 6	4.5
73,036	66,396	15	25	4 to 6	4.3
73,905	67,187	17	28	4 to 6	4.2
76,079	69,163	15	24	4 to 6	4.1
76,643	69,675	17	27	4 to 6	4.1
79,387	72,170	15	23	4 to 6	4.0
79,590	72,355	17	26	4 to 6	3.9
82,600	75,091	19	28	4 to 6	3.8
82,774	75,249	17	25	4 to 6	3.8
85,659	77,872	19	27	4 to 6	3.7
86,223	78,384	17	24	4 to 6	3.6
88,954	80,867	19	26	4 to 6	3.5
89,972	81,793	17	23	4 to 6	3.5
92,512	84,102	19	25	4 to 6	3.4
96,100	87,364	15	19	4 to 6	3.3
96,367	87,606	19	24	4 to 6	3.3
99,990	90,900	23	28	4 to 6	3.1
100,557	91,415	19	23	4 to 6	3.1
103,693	94,266	23	27	4 to 6	3.0
104,337	94,852	24	28	4 to 6	3.0
107,406	97,642	15	17	4 to 6	2.9
108,201	98,365	24	27	4 to 6	2.9
108,913	99,012	17	19	4 to 6	2.9
111,988	101,808	23	25	4 to 6	2.8
113,032	102,756	26	28	4 to 6	2.8
116,655	106,050	23	24	4 to 6	2.7
116,857	106,234	24	25	4 to 6	2.7
117,379	106,708	27	28	4 to 6	2.7
121,726	110,660	23	23	4 to 6	2.6
126,235	114,759	28	27	4 to 6	2.5
126,408	114,917	27	26	4 to 6	2.5
127,019	115,472	24	23	4 to 6	2.5
131,090	119,173	28	26	4 to 6	2.4
131,465	119,513	27	25	4 to 6	2.4
132,311	120,283	25	23	4 to 6	2.4
136,047	123,679	19	17	4 to 6	2.3
136,942	124,493	27	24	4 to 6	2.3
137,604	125,094	26	23	4 to 6	2.3
142,014	129,104	28	24	4 to 6	2.2
142,896	129,906	27	23	4 to 6	2.2
147,353	133,957	23	19	4 to 6	2.1
148,189	134,717	28	23	4 to 6	2.1
153,760	139,782	24	19	4 to 6	2.0
160,166	145,606	25	19	4 to 6	2.0
164,689	149,717	23	17	4 to 6	1.9
166,573	151,430	26	19	4 to 6	1.9
171,849	156,227	24	17	4 to 6	1.8
172,980	157,254	27	19	4 to 6	1.8
179,010	162,736	25	17	4 to 6	1.8
179,386	163,079	28	19	4 to 6	1.7
186,170	169,245	26	17	4 to 6	1.7
186,647	169,679	23	15	4 to 6	1.7
193,330	175,755	27	17	4 to 6	1.6

**IMPORTANT: 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.**

# SEED METER OPERATION/MAINTENANCE

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

Meter Setting	20" Rows	22" Rows
<b>CLAY GRANULES</b>		
10	7.4	6.7
11	8.1	7.3
12	9.2	8.3
13	10.4	9.4
14	11.6	10.5
15	12.8	11.6
16	14.4	13.1
17	16.1	14.6
18	17.1	15.5
19	19.7	17.8
20	21.3	19.3
21	23.3	21.1
22	24.6	22.3
23	25.8	23.4
24	28.2	25.6
25	31.4	28.4
26	34.5	31.3
27	36.2	32.8
28	38.1	34.5
29	41.7	37.8
30	44.4	40.3
<b>SAND GRANULES</b>		
5	4.4	3.9
6	7.4	6.7
7	8.0	7.2
8	9.5	8.6
9	11.7	10.6
10	13.4	12.1
11	15.3	13.9
12	16.8	15.2
13	18.9	17.1
14	21.2	19.2
15	23.3	21.1
16	26.6	23.8
17	29.1	26.4
18	32.7	29.7
19	36.5	33.1
20	38.6	35.0
21	41.4	37.5
22	44.4	40.3
23	48.0	43.5
24	51.6	46.8
25	55.4	50.2

**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.



# SEED METER OPERATION/MAINTENANCE

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## DRY HERBICIDE APPLICATION RATES

APPROXIMATE POUNDS/ACRE AT 5 MPH FOR VARIOUS ROW WIDTHS

### CLAY GRANULES

Meter Setting	20" Rows	22" Rows
10	7.1	6.4
11	7.8	7.1
12	8.7	7.9
13	9.8	8.8
14	11.0	9.9
15	12.3	11.2
16	13.5	12.2
17	14.9	13.5
18	16.1	14.6
19	17.4	15.8
20	18.9	17.1
21	20.4	18.5
22	21.9	19.9
23	23.6	21.4
24	25.5	23.1
25	27.2	24.6
26	29.1	26.4
27	31.4	28.4
28	33.9	30.7
29	36.5	33.1
30	40.1	36.3

**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.

# SEED METER OPERATION/MAINTENANCE

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**See “Liquid Fertilizer Rate Chart”  
in Machine Operation section.**

# SEED METER OPERATION/MAINTENANCE

## SEED METER SINGULATOR BRUSH AND VACUUM LEVEL ADJUSTMENTS

### SEED DISC SELECTION

CROP	CELLS	SEED SIZE RANGE	COLOR-CODE
Corn	39	35 To 70 Lbs./80,000 Kernel Count Unit	Light Blue
Low-Rate Corn	24	35 To 70 Lbs./80,000 Kernel Count Unit	Light Green
Popcorn	39	2210 To 4200 Seeds/Lb.	Light Blue
Low-Rate Popcorn	24	2210 To 4200 Seeds/Lb.	Light Green
Soybean	60	2200 To 4000 Seeds/Lb.	Black
High-Rate Soybean	120	2200 To 4000 Seeds/Lb.	Dark Blue
Milo/Grain Sorghum	60	10,000 To 20,000 Seeds/Lb.	Yellow
Hill-Drop Cotton, Acid-Delinted (3 Seeds Per Cell)	20	3800 To 5200 Seeds/Lb.	Brown
Cotton, Acid-Delinted	54	3800 To 5200 Seeds/Lb.	Dark Green
Dry Edible Bean (Small)	54	1200 To 2500 Seeds/Lb.	Dark Green
Dry Edible Bean (Large)	54	800 To 1200 Seeds/Lb.	Tan

### EDGEVAC® INITIAL SETTINGS

CROP	SIZE	SEED DISC	SINGULATOR BRUSH SETTING	VACUUM SETTING (H <sub>2</sub> O)	SEE NOTES
Corn	35-45 Lbs./80K	Corn/Popcorn	7	20	4, 5
	45-60 Lbs./80K	Corn/Popcorn	6	20	4, 5
	60-70 Lbs./80K	Corn/Popcorn	5	20	4, 5
Popcorn	2210-4200 Seeds/Lb.	Corn/Popcorn	9	18	1, 4, 5
Soybeans	2200-4000 Seeds/Lb.	Soybean	5	10	1
Milo/Grain Sorghum	10,000-20,000 Seeds/Lb.	Milo/Grain Sorghum	7	18	1, 2
Hill-Drop Cotton	3800-5200 Seeds/Lb.	Hill-Drop Cotton	8	23	3
Cotton	3800-5200 Seeds/Lb.	Cotton	8	20	3
Edible Beans	800-1200 Seeds/Lb.	Large Edible Bean	5	18	5
	1200-2500 Seeds/Lb.	Small Edible Bean	6	18	3, 5

#### NOTES:

- Requires use of seed meter baffle. Refer to page 7-3 for additional information.
- Requires use of cleanout brush. Refer to page 7-3 for additional information.
- Requires use of cleanout brush w/ball-type ejector. Refer to page 7-3 for additional information.
- For flat seeds, higher vacuum level may be required.
- Larger seeds may require a lower numbered singulator brush setting from the initial setting. Smaller seeds may require a higher numbered setting.

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

**IMPORTANT:** 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.

**NOTE:** Singulator brush settings are marked from 1 thru 11. The lower the singulator brush setting, the less aggressive. The higher singulator brush settings are the most aggressive. Refer to illustrations on page 7-24.

**NOTE:** Optimum meter performance will be attained with consistent seed size and shape. A mixture of seed sizes and shapes will affect meter performance.

**NOTE:** Use 1 tablespoon powdered graphite with each hopper fill of seed. Seed treatment, foreign material, dirt or seed chaff may cause gradual reduction of seed disc fill (population). See “Seed Meter”.

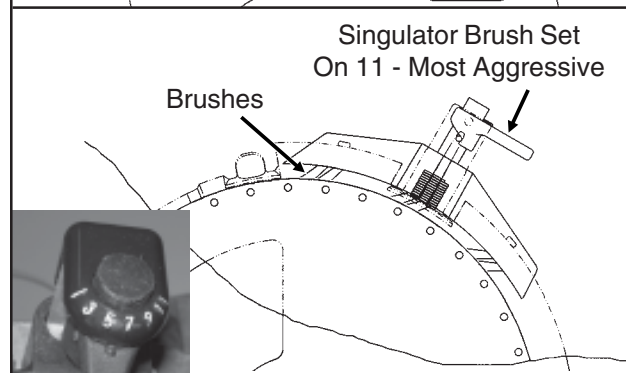
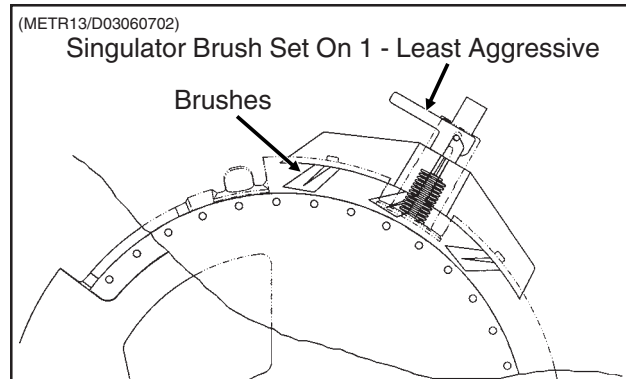
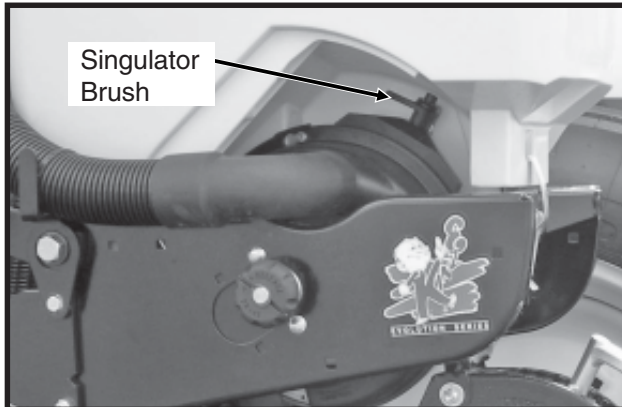
**NOTE:** Excessive seed treatment, humidity and light-weight seed can affect meter performance. Use 1/2 cup of talc with each hopper fill of seed and mix thoroughly so that all seeds are coated, adjust rates as needed. Use of talc will aid the seed flow into the meter, singulation and seed drop from the disc.

# SEED METER OPERATION/MAINTENANCE

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

**STEP 2** Adjust the singulator brush to initial setting. Note that seed size, seed shape, seed treatments, travel speed and planting rate will all affect meter performance.

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**STEP 3** With vacuum fan running, lower planter to planting position and drive forward a short distance to load seed into the seed disc cells.

Adjust vacuum level to the initial setting according to the tables on preceding page. Note that seed size, seed shape, seed treatments, travel speed and planting rate will all affect meter performance.

**NOTE: Vacuum reading will be much lower when seed disc cells are empty. Prior to setting vacuum level, load all seed cells.**

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See “Digital Vacuum Gauge Operation” in Machine Operation section

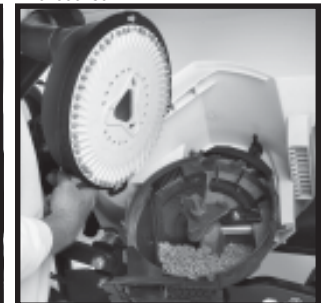
**NOTE: Operate vacuum fan 3-5 minutes to bring oil up to normal operating temperature prior to making the final vacuum level adjustment.**

**STEP 4** Perform optional seed disc fill check.

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

See “Seed Metering System Troubleshooting” at the end of this section.

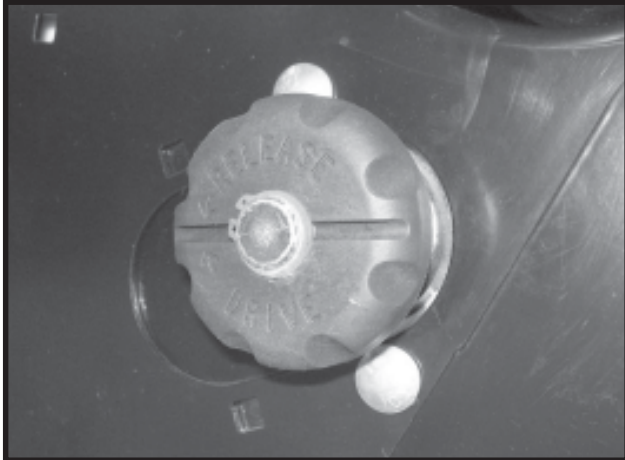
# SEED METER OPERATION/MAINTENANCE

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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 meter and mount or hopper. Disconnecting the drive allows the operator to check granular chemical application rates without dropping seed. It also allows the drive to one or more of the rows to be disconnected when finishing fields.

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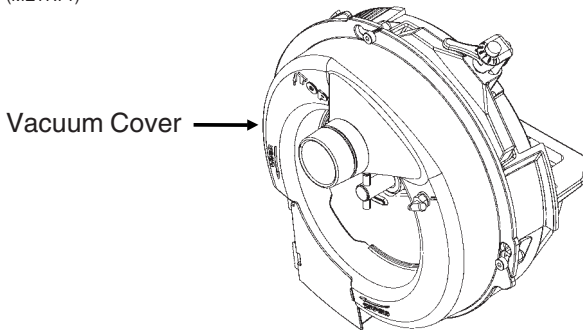


To disengage the drive, turn the knob  $\frac{1}{4}$  turn counter-clockwise. To engage the drive, turn the knob  $\frac{1}{4}$  turn clockwise.

# SEED METER OPERATION/MAINTENANCE

## SEED METER MAINTENANCE

(METR71)



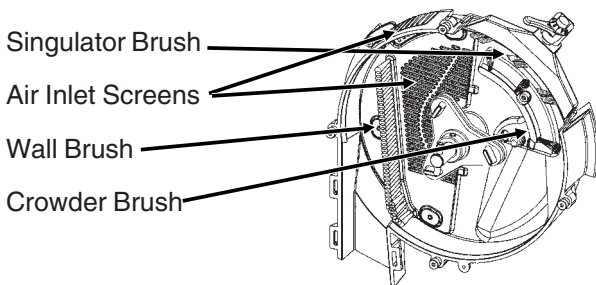
Clean, high quality seed should be used for maximum meter accuracy. Damaged or cracked seed, hulls or foreign material may become lodged in the seed disc orifices and greatly reduce meter accuracy.

It is suggested that the seed disc be inspected and cleaned daily, checking for any buildup of foreign material or any blocked orifices. Clean the seed disc by washing it with soap and water as needed. Dry thoroughly.

Inspect singulator brush for wear and replace if necessary following every 200 acres per row of operation.

The seed disc and/or vacuum cover should be replaced if abnormally high vacuum is required for consistent operation or if consistent operation can not be achieved. If adjustment of the singulator brush does not affect performance of the meter or if the brushes appear frayed, the singulator brush may need to be replaced. If the seed disc orifices are plugged frequently with seed remnants, the cleanout brush or cleanout brush with ball-type ejector (if applicable) may need to be replaced. High quality seed should be used to attain best performance.

(METR70)



Prior to each planting season, inspect seed discs, singulator brush, crowder brush, wall brush and air inlet screens and clean or replace as needed.

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

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

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

## VACUUM MANIFOLD MAINTENANCE

In the course of normal operation, dust will accumulate in manifolds and hoses. Manifolds should be cleaned annually. More frequent cleaning may be necessitated by abnormally dusty planting conditions.

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

# SEED METER OPERATION/MAINTENANCE

## SEED METERING SYSTEM TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Low seed count.	Meter RPM too high.	Reduce planting rate or planting speed.
	Singulator brush setting too aggressive.	Adjust singulator brush.
	Vacuum level too low.	Increase fan speed.
	Seed sensor not picking up all seeds dropped.	Clean seed tube. Move meter to different row.
	Seeds sticking to seed disc.	Use graphite or talc to aid release.
	Seed treatment buildup in seed disc recesses.	Reduce amount of treatment used and or mix thoroughly. Add talc.
	Seed size too large for disc used.	Use appropriate disc for seed size.
	Wrong transmission setting.	Change transmission to desired rate.
	Wrong seed disc.	Use appropriate disc for seed type and size.
	Drive wheel slippage.	Compensate by adjusting transmission sprockets.
	Low tire pressure.	Adjust tire pressure to correct level.
	Failed/worn drive components.	Inspect and replace parts as required.
	Plugged orifices in seed disc.	Inspect and clean disc. Check cleanout brush. (If Applicable)
	Loss of vacuum at meter.	Check for foreign material between vacuum cover and disc. Inspect parts for wear/damage. Clean or replace as required.
	Seed bridging in hopper.	Add graphite to improve seed flow.
	Faulty vacuum gauge reading.	Repair/replace gauge.
	Dirt in vacuum manifold.	Check vacuum manifold for dirt and clean.
	Seed baffle (If Applicable) not allowing seed flow due to bridging of seed.	Thoroughly mix talc to coat all seeds. Remove seed baffle. See "Seed Meter" in Seed Meter Operation/Maintenance section.
	60 cell soybean disc not filling properly due to excessive RPM.	Replace with 120 cell soybean disc.
	Seed disc worn.	Replace.
Vacuum cover worn.	Replace.	
Not planting seed.	Seed hoppers empty.	Fill seed hopper.
	Seed tube plugged/damaged.	Clean or replace tube.
	Meter drive damaged.	Repair/replace drive components.
	Low/no vacuum.	Inspect vacuum system and repair as necessary.
	Singulator brush setting too aggressive.	Adjust singulator brush.
	Faulty vacuum gauge.	Repair/replace vacuum gauge.
	Seed bridging in hopper.	Add graphite to improve seed flow.
	Loss of vacuum at meter.	Check for foreign material between vacuum cover and disc. Inspect parts for wear/damage. Clean and/or replace as required.
	Wrong seed disc.	Use appropriate disc for seed type and size.
	Meter drive clutch not engaged.	Engage drive clutch.
	Fan not running.	Start fan.
	Dirt in vacuum manifold.	Check vacuum manifold for dirt and clean.

(Continued On Following Page)

# SEED METER OPERATION/MAINTENANCE

## SEED METERING SYSTEM TROUBLESHOOTING (Continued)

PROBLEM	POSSIBLE CAUSE	SOLUTION
Not planting seed. (Continued)	Seed baffle (If Applicable) not allowing seed flow due to bridging of seed.	Thoroughly mix talc to coat all seeds. Remove seed baffle. See "Seed Meter" in Seed Meter Operation/Maintenance section.
	60 cell soybean disc not filling properly due to excessive RPM.	Replace with 120 cell soybean disc.
High seed count.	Wrong transmission setting.	Change transmission to desired rate.
	High vacuum.	Adjust vacuum level to appropriate level.
	Wrong seed disc.	Replace seed disc.
	Singulator brush setting not aggressive enough.	Adjust singulator brush.
	Worn singulator brush.	Inspect brush and replace as required.
	Seed leaking past wall brush.	Inspect wall brush condition and installation. Replace as necessary.
	Faulty vacuum gauge.	Check gauge line for dirt/obstruction. Repair/replace vacuum gauge.
Poor seed spacing.	Obstruction in seed tube.	Clean seed tube.
	Dirty/damaged seed disc.	Inspect seed disc for damage, foreign material in orifices or seed treatment buildup in recesses. Clean or replace as required.
	Wrong vacuum setting.	Adjust vacuum to appropriate level.
	Excess foreign material in seed.	Inspect and clean meter and seed discs. Use clean, undamaged seed.
	Incorrect singulator brush setting.	Adjust singulator brush to appropriate setting.
	Inconsistent driveline.	Inspect drive components for rust, misalignment, worn or damaged parts. Replace/repair as required.
	Toolbar not level or wrong height.	Adjust hitch to level toolbar and row units.
	Planting too fast for conditions.	Reduce speed.
	Rough field conditions.	Reduce speed.
Irregular seed population.	Driving too fast.	Reduce speed.
	Drive wheels slipping.	Reduce speed. Decrease row unit down pressure spring settings.
Unable to achieve desired vacuum level.	Tractor hydraulic flow set too low.	Increase flow to fan motor.
	Incorrect hydraulic connections.	Check all hydraulic connections and hose routings.
	Damaged fan components.	Inspect motor and impeller for wear/damage and repair/replace as necessary.
	Vacuum hose pinched/kinked/ blocked.	Inspect air lines for any damage or obstruction. Clean air lines and manifold by removing end cap from manifold and running fan at high speed.
	Vacuum hose loose/disconnected.	Inspect and reattach all air hoses.
	Tractor not producing required hydraulic flow/pressure.	Have tractor serviced by qualified technician.
	Dirt in vacuum gauge line.	Check gauge line for dirt/obstruction and clean.



# ROW UNIT OPERATION

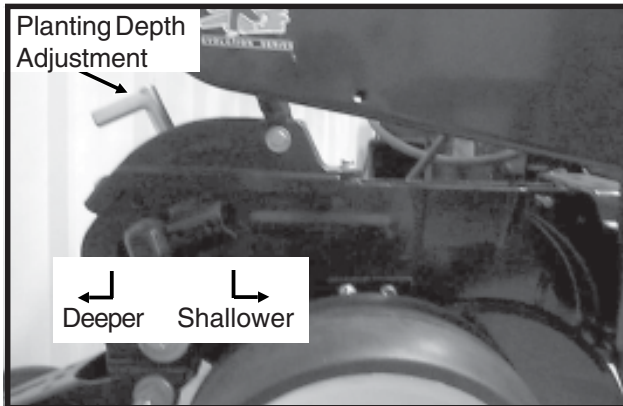
## PLANTING DEPTH

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)

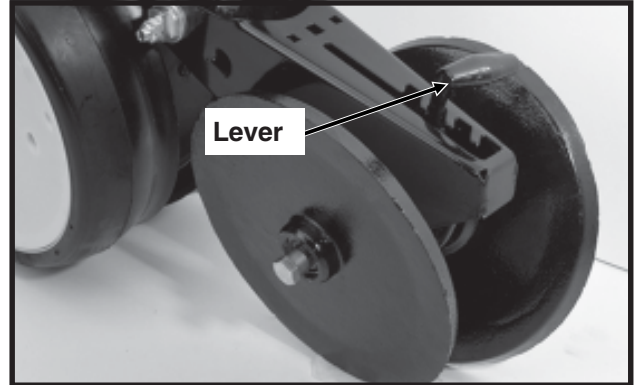


**WARNING:** Raise planter and install safety lockup devices before making closing wheel adjustments.

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.

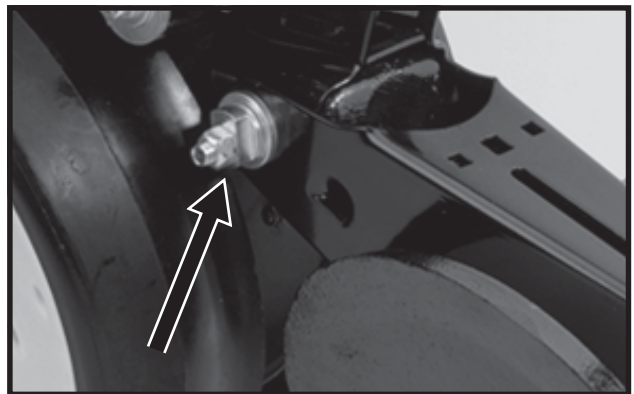
LF212299-15



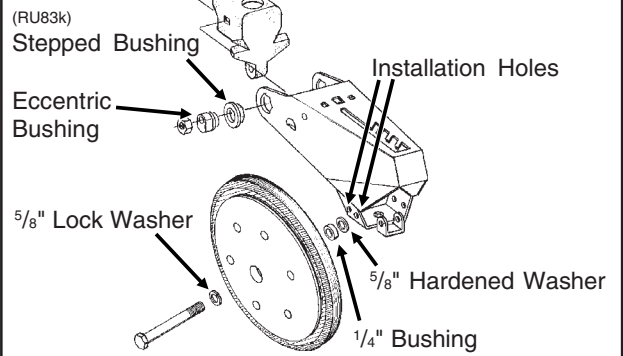
Light soil usually requires less down force at average depth (approximately 2") while heavy soil requires increased down force.

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.

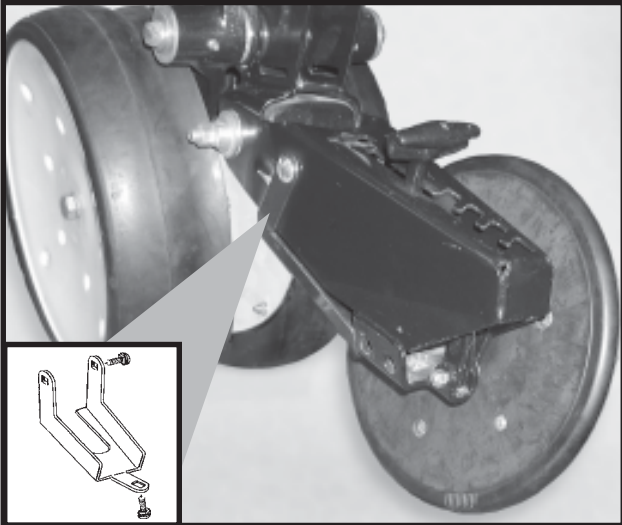


# ROW UNIT OPERATION

## 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.

## COVERING DISCS/SINGLE PRESS WHEEL ADJUSTMENT



**WARNING:** Raise planter and install safety lockup devices before making covering discs/single press wheel adjustments.

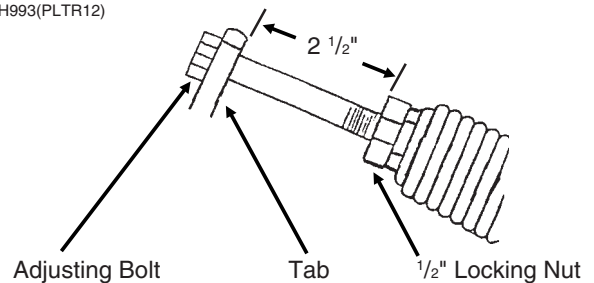
72359-31



After adjusting planting depth, check the operation of the covering discs/single press wheels.

Initial press wheel down force setting should be with 2 1/2" between mounting arm tab and locking nut. To adjust down force spring, loosen 1/2" locking nut and turn adjusting bolt in to increase down force or out to decrease down force. Tighten locking nut against spring plug. Adjust all row units to a similar setting.

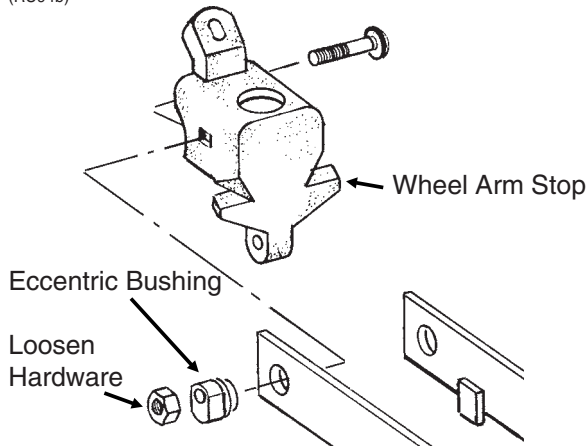
RH993(PLTR12)



# ROW UNIT OPERATION

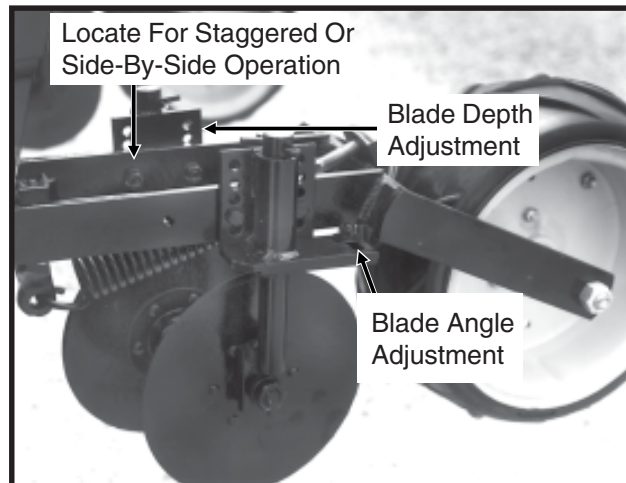
Eccentric bushings in the wheel arm stop allow for lateral adjustment of the covering discs/single press wheel assembly. Using a 3/4" wrench, loosen the hardware which attaches the assembly to the wheel arm stop. Using another 3/4" wrench, turn the eccentric bushings until the press wheel is aligned with the seed trench.

(RU94b)



Two sets of holes in the mounting arm allow the covering discs to be located for staggered or side-by-side operation as desired.

72359-35



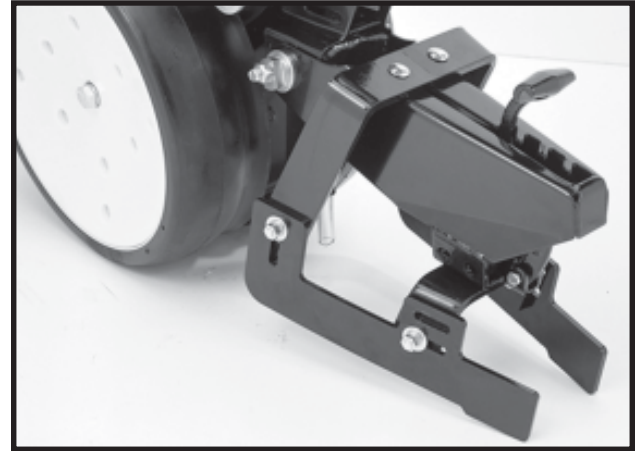
Five sets of holes in each disc bracket allow for 1/2" incremental blade depth adjustment.

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

Adjust covering discs on all row units to similar settings.

## DRAG CLOSING ATTACHMENT

LF212299-18



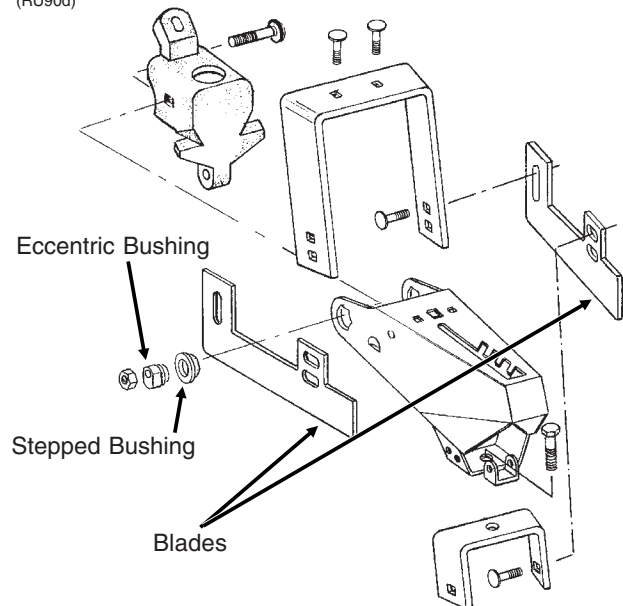
The drag closing attachment is designed to pull loose soil over the seed trench.

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

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

**WARNING: Raise planter and install safety lockup devices before making drag closing attachment adjustments.**

(RU90d)

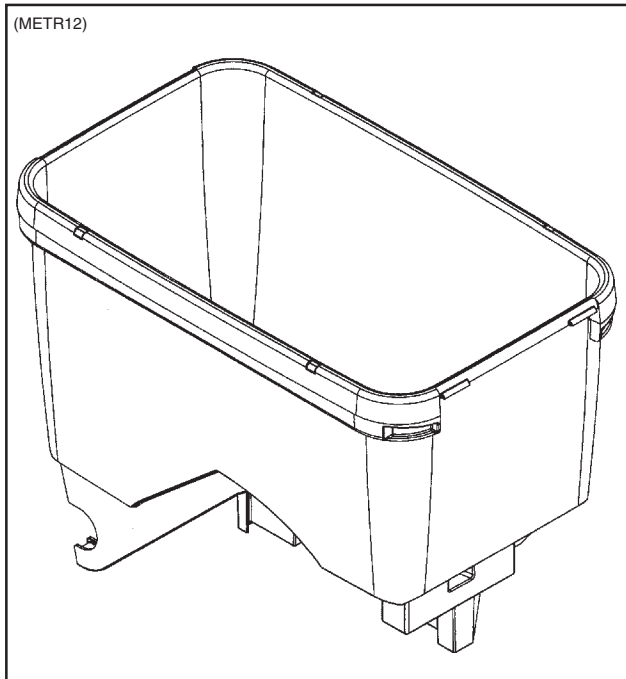


Eccentric bushings allow for lateral adjustment of the drag closing attachment. Using a 3/4" wrench, loosen the hardware which attaches the assembly to the wheel arm stop. Using another 3/4" wrench, turn the eccentric bushings until the drag closing attachment is aligned with the seed trench.

# ROW UNIT OPERATION

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## SEED HOPPER



The seed hopper has a capacity of 1.75 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 “Seed Meter” in Seed Meter Operation/Maintenance section.

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” in Seed Meter Operation/Maintenance section.

# ROW UNIT OPERATION

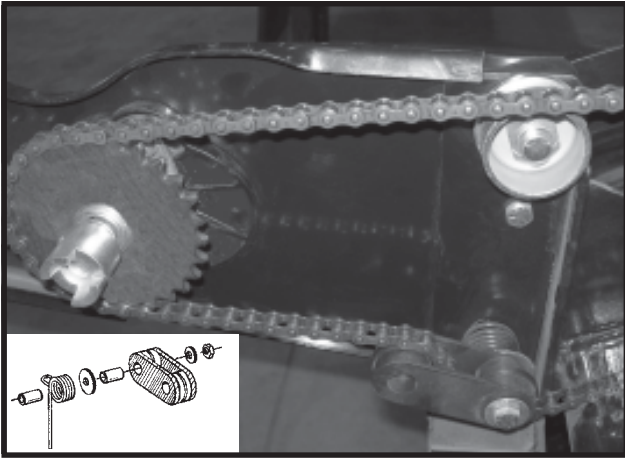
## ROW UNIT CHAIN ROUTING

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.

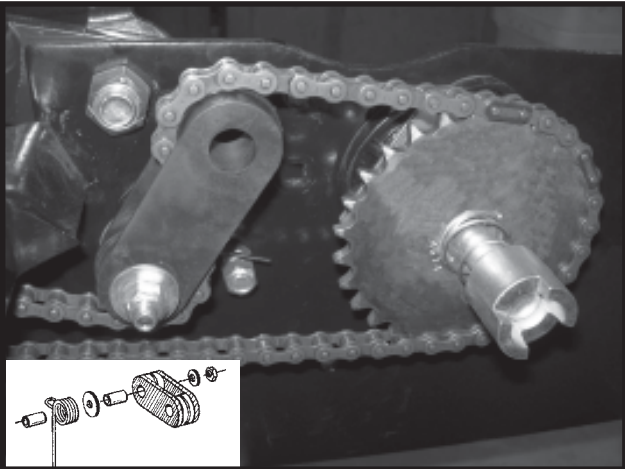
**NOTE: When idler shows signs of wear, it can be reversed for prolonged use.**

D09280611a(RU80g)



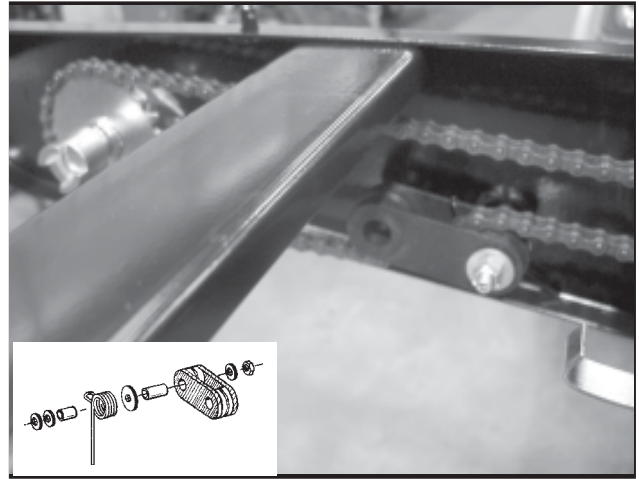
**Pull Row Unit Meter Drive**

D09280603a(RU80g)



**Push Row Unit Meter Drive**

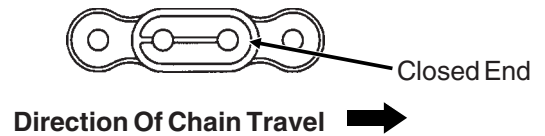
D051705102



**Row Unit Granular Chemical Drive**

**NOTE: Make sure connector link is installed with closed end oriented properly as shown below.**

(PLTR24)



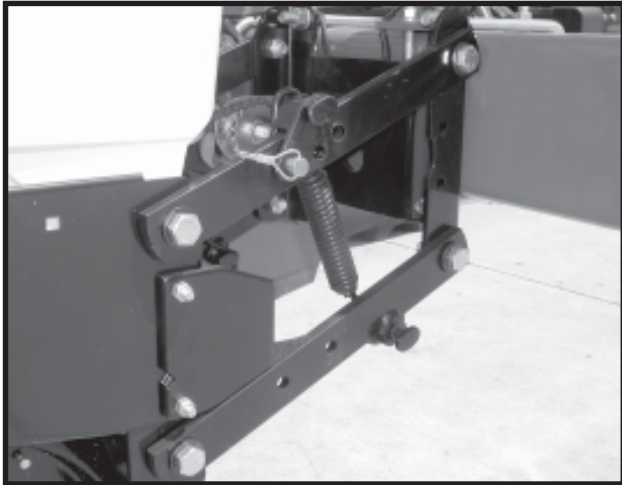
# ROW UNIT OPERATION

## 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.

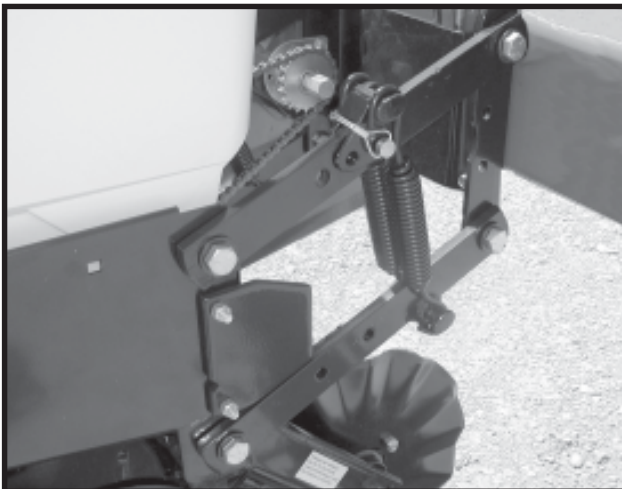
Two springs per row, one on the L.H. parallel arms and one on the R.H. parallel arms, are used unless equipped with row unit mounted no till coulters. Four springs per row are used with row unit mounted no till coulters.

D06300305



**Two Springs Per Row (Dual)**

D07010301

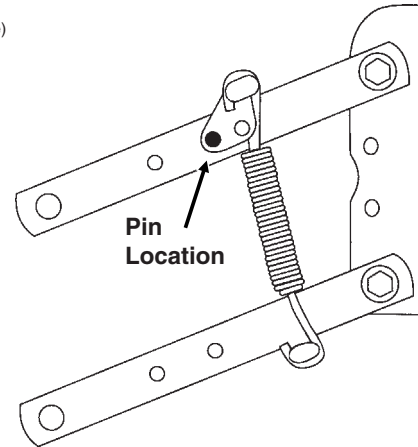


**Four Springs Per Row (Quad)  
(Used Only In Conjunction With Row Unit Mounted No Till Coulters)**

**NOTE: Four springs per row are to be used with row unit mounted no till coulters only.**

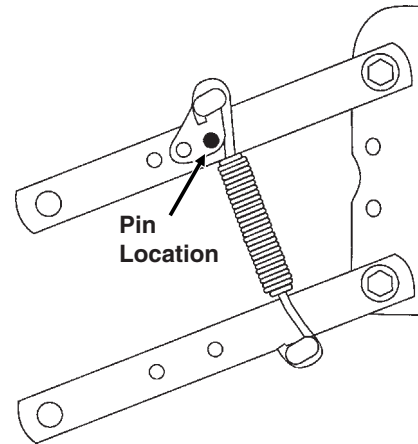
There are four positions for spring tension adjustment. Position 1 allows for minimum down pressure and position 4 for maximum down pressure.

L0096(PLTR27e)



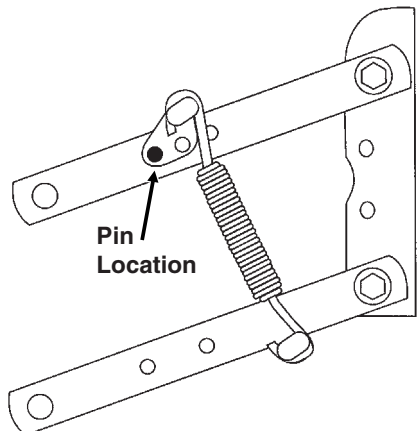
**Position 1 (Minimum)**

(PLTR28e)



**Position 2**

(PLTR29e)

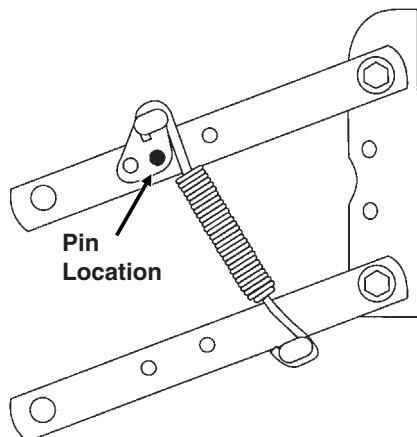


**Position 3**

# 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.



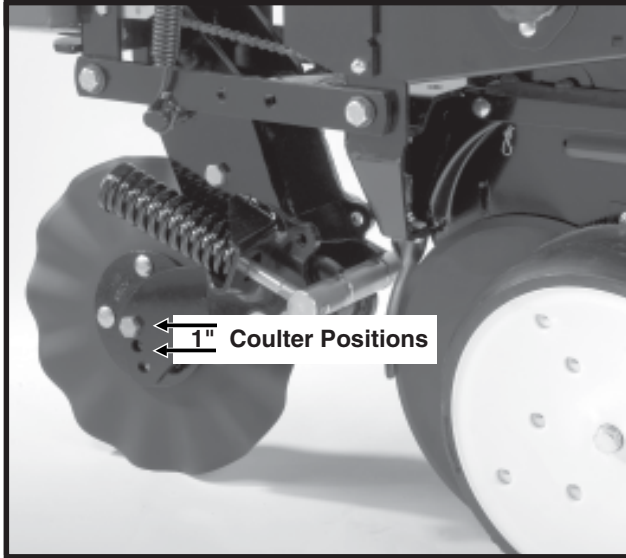
**WARNING:** Always install safety lockup devices or lower machine to the ground before working under or around the machine.

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

# ROW UNIT OPERATION

## FRAME MOUNTED COULTER

LF083002101

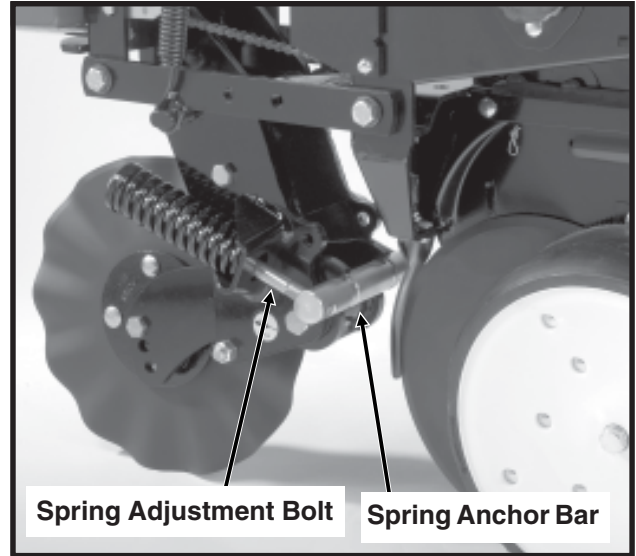


Frame mounted coulters with 1" bubbled, 1" fluted (8 flutes) or <sup>3</sup>/<sub>4</sub>" fluted (13 flutes) blades may be used on pull row units only. (Not compatible with push row units.)

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.

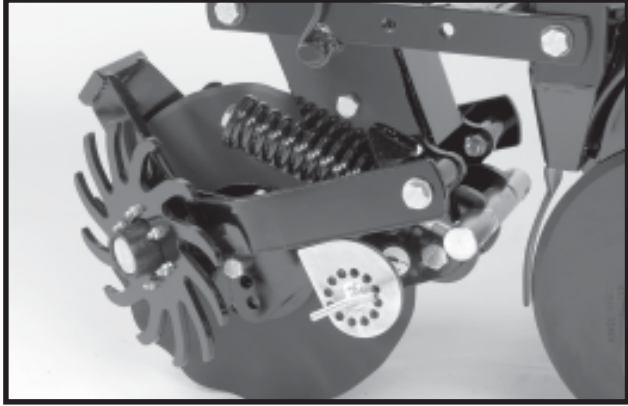


# ROW UNIT OPERATION

## 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.

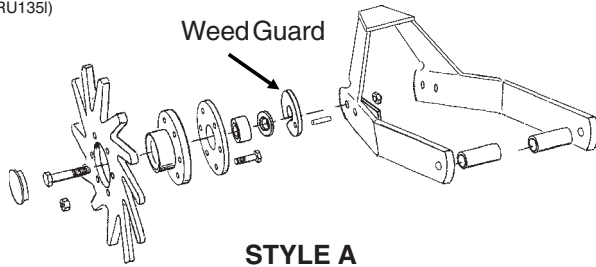
LF083002102



### STYLE A Shown

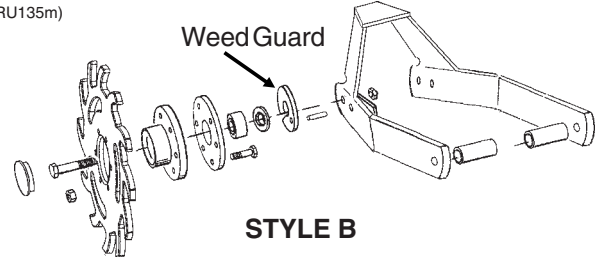
The residue wheels are attached to the frame mounted coulter with two cap screws and sleeves allowing the unit to free-float. A 2-position spindle bolt mounting allows the tined wheels to be mounted interlocked or staggered. Depth adjustment is made using a spring-loaded cam and pin with 11 positions in  $\frac{1}{4}$ " 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.

(RU135l)



STYLE A

(RU135m)



STYLE B

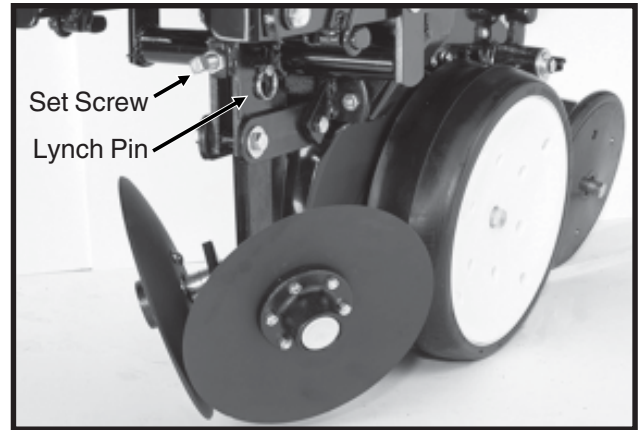
**NOTE: Opening in weed guard must point down.**

## 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.

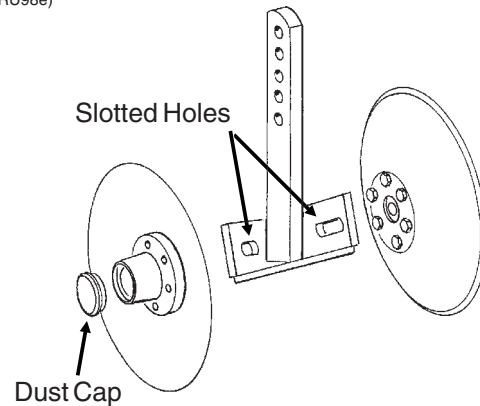
Disc furrowers are used to clear crop residue, dirt clods and dry soil from in front of the row units for a clean and smooth seed bed. Notched blades are used for heavier residue conditions. The notched blades cut crop residue and move it aside to prevent plugging or pushing.

LF212299-22



Vertical adjustment in  $\frac{1}{3}$ " 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  $\frac{5}{8}$ " x  $2 \frac{1}{4}$ " set screw to clamp the support arm in the required position.

(RU98e)



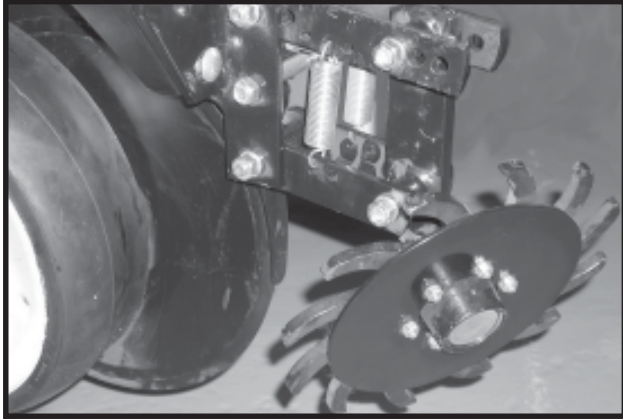
Slotted holes in the support arm where the blades are mounted allow fore and aft adjustment of the disc blades. Blades can be adjusted so the front edges meet or one blade can be moved to the rear and the other to the front of the slot so the cutting edge of one blade overlaps the edge of the other blade. The dust cap must be removed to make these adjustments.

# ROW UNIT OPERATION

## ROW UNIT MOUNTED RESIDUE WHEEL

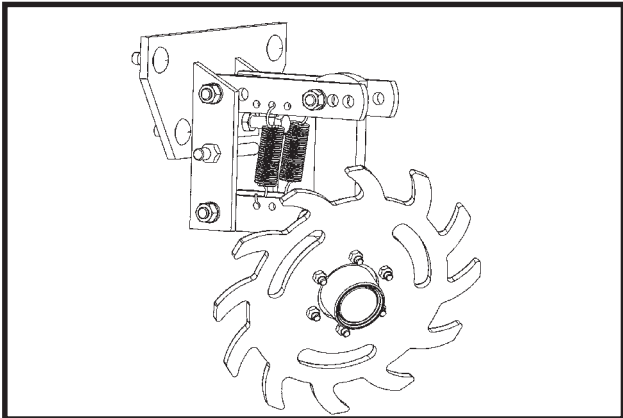
The row unit mounted residue wheel may be used on pull row units and push row units.

D101701113



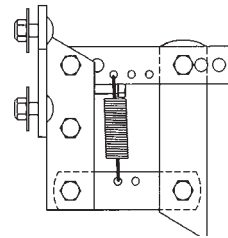
**STYLE A**

(A12685)

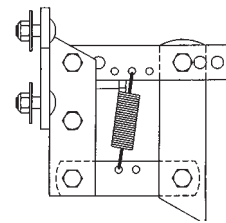


**STYLE B**

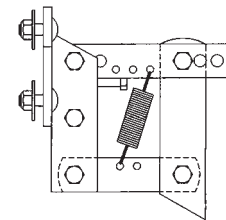
Two adjustable springs on the parallel links on each residue wheel allow for down force adjustment. Position 1 as shown below provides minimum down pressure and position 3 maximum down pressure.



**Position 1 (Minimum)** (PLTR31a)



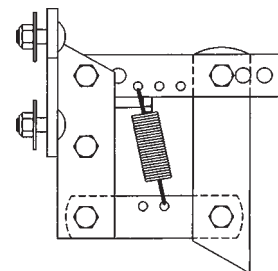
**Position 2** (PLTR32a)



**Position 3 (Maximum)** (PLTR33a)

For additional uplift or float, position springs as shown below.

(PLTR34a)

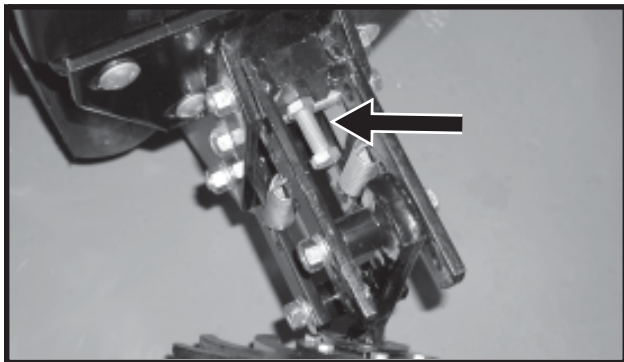


To adjust down force springs, raise the row unit out of the ground and reposition springs as shown for the desired down pressure.

# ROW UNIT OPERATION

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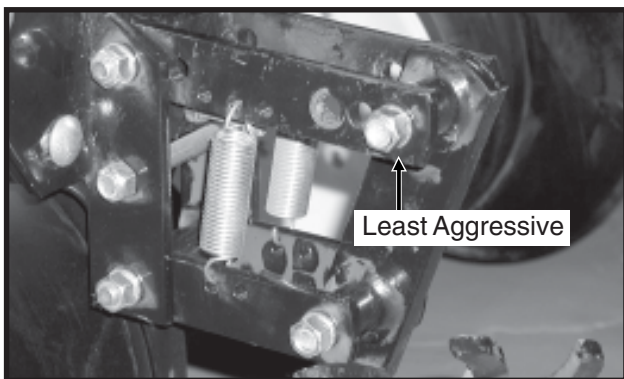
D101701112



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  $1 \frac{3}{4}$ " above the depth of the row unit double disc opener.

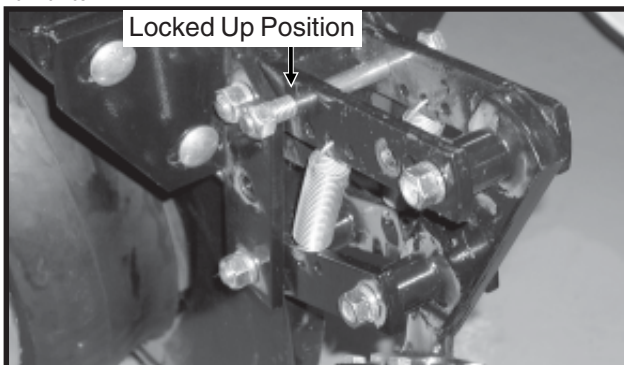
Three holes in the upper link allow for wheel angle adjustment. With the wheel mount in the most vertical position, using the rear hole in the upper link, the residue wheel is most aggressive. Moving the wheel mount to one of the forward holes reduces the aggressiveness of the wheel for use in mulch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

D101701202



To lock the residue wheel up out of the ground, remove the  $\frac{1}{2}$ " x 5" lockup bolt, raise the residue wheel and install bolt.

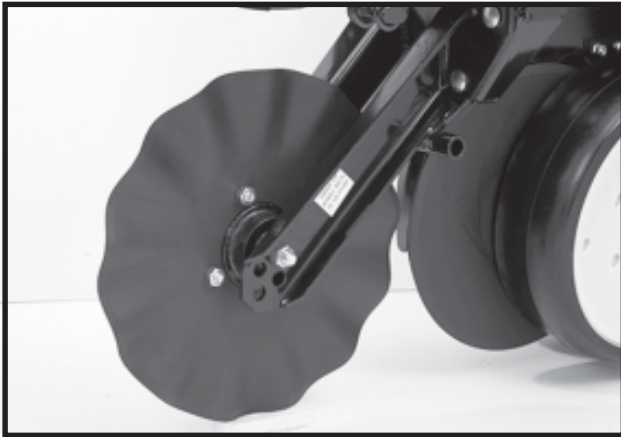
D011701203



# ROW UNIT OPERATION

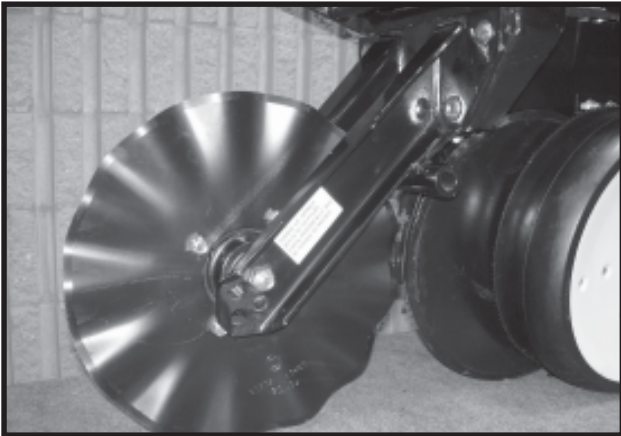
## ROW UNIT MOUNTED NO TILL COULTER

LF212299-19a



**STYLE A (Two Sleeves For Installing Coulters Mounted Residue Wheels)**

D05170706



**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 blade 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

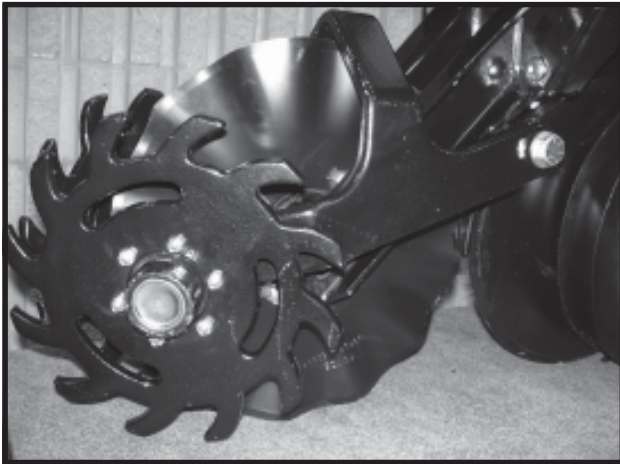
## COULTER MOUNTED RESIDUE WHEELS

LF212299-23



**STYLE A - Used With Style A Row Unit Mounted No Till Coultter**

D05170708

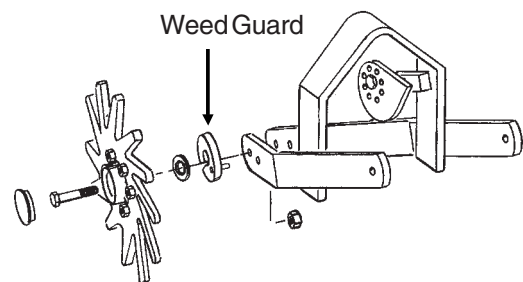


**STYLE B - Used With Style B Row Unit Mounted No Till Coultter**

Coultter 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 coultter mounted residue wheels.

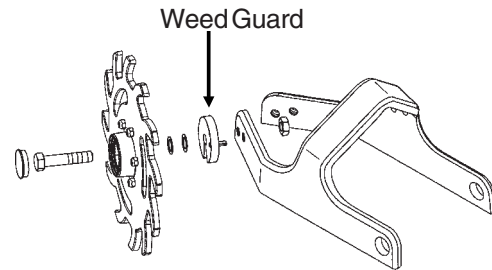
The coultter mounted residue wheels are attached to the row unit mounted no till coultter with one cap screw and sleeve allowing the unit to free-float. A 2-position spindle bolt mounting allows the tined wheels to be mounted interlocked or staggered. A lock nut on the inside of the mount locks the spindle 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.

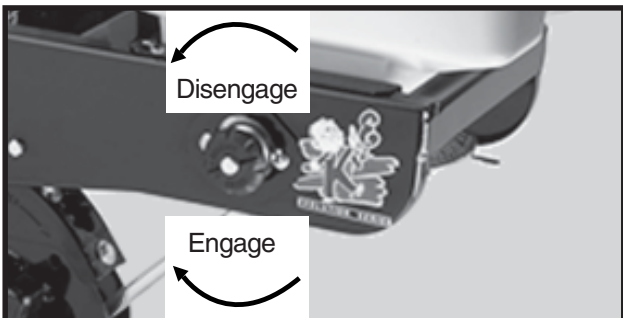
The metering gate located on the bottom of the hopper regulates the application rate. See “Dry Insecticide And Dry Herbicide Application Rate Charts” in this manual. Calibrate using the chemical manufacturers’ instructions.



**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.

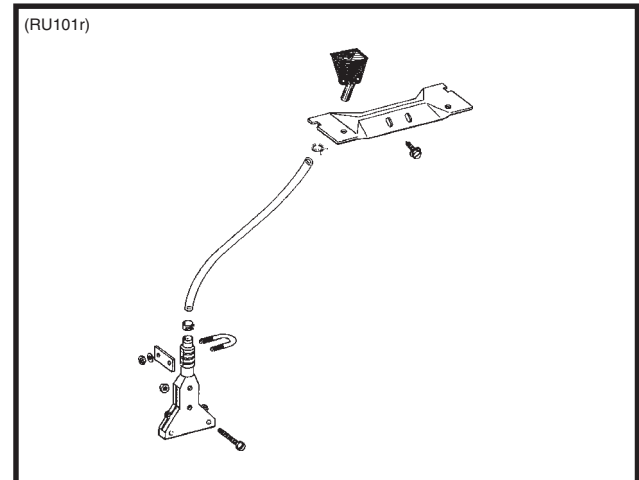
LF212299-4



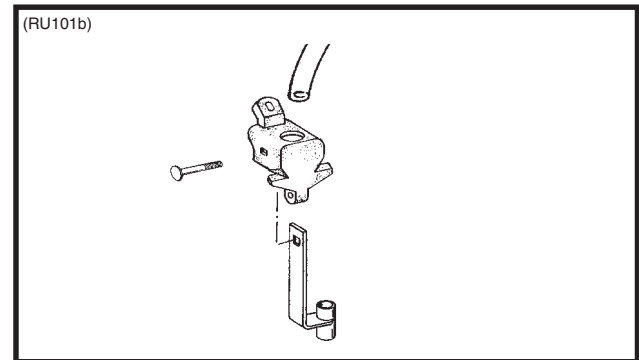
## GRANULAR CHEMICAL BANDING OPTIONS

Granular chemical banding options allow 4  $\frac{1}{2}$ " slope-compensating banding, straight drop in-furrow placement or 14" rear banding.

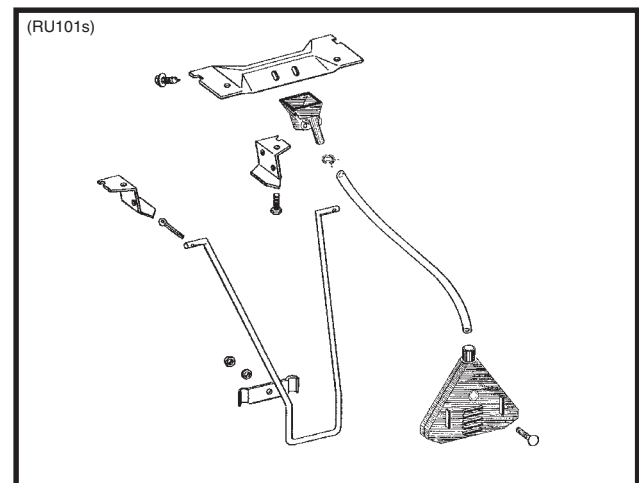
**NOTE: The granular chemical rear bander is not compatible with the covering discs/single press wheel option.**



4  $\frac{1}{2}$ " Slope-Compensating Bander



Straight Drop In-Furrow Placement



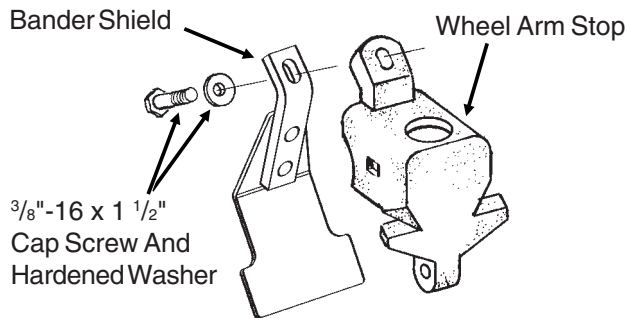
14" Rear Banding

# ROW UNIT OPERATION

## 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.

(RU83m)

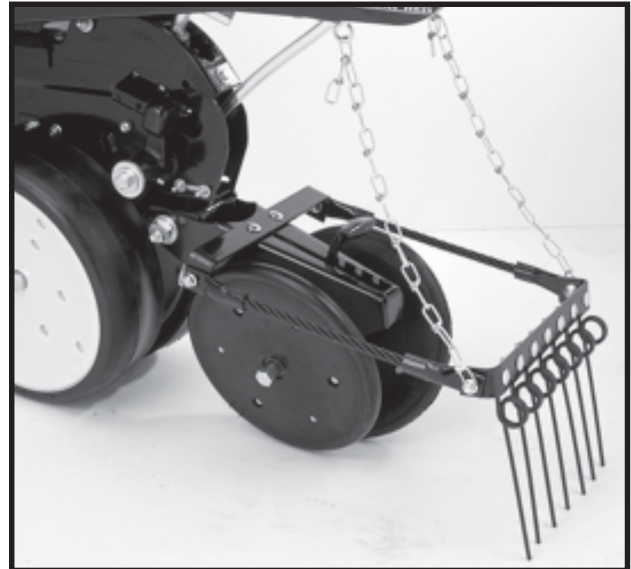


## SPRING TOOTH INCORPORATOR

The spring tooth incorporator smoothes the soil behind the row unit and incorporates granular chemicals. The two mounting chains on each spring tooth incorporator should be adjusted so there is approximately  $\frac{1}{8}$ " slack in the chain when the unit is lowered to planting position.

**NOTE: The spring tooth incorporator is not compatible with the covering discs/single press wheel option.**

LF212299-26



# ROW UNIT OPERATION

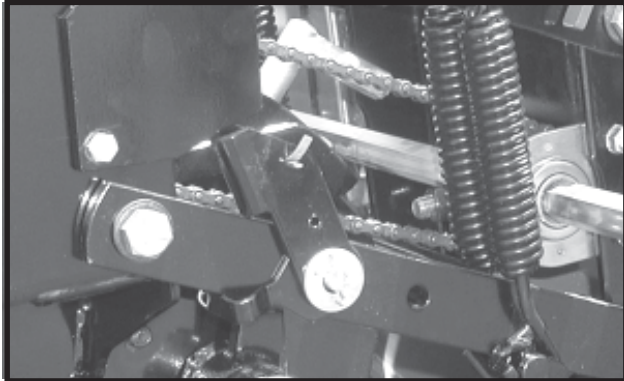
## INTERPLANT® PUSH ROW UNIT LOCKUPS

Push row unit lockups are designed to allow the push row units to be locked in the raised position.



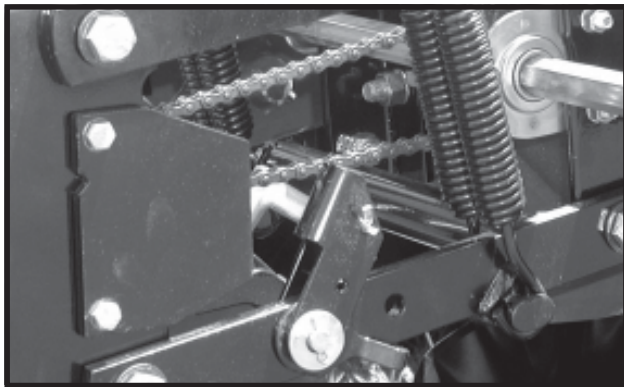
**WARNING:** Always install all safety lockup devices or lower planter to the ground before working under or around the machine.

D062603106



**Push Row Unit Locked In Raised Position**

D062603103



**Lockup Released For Field Operation**

D062603106a

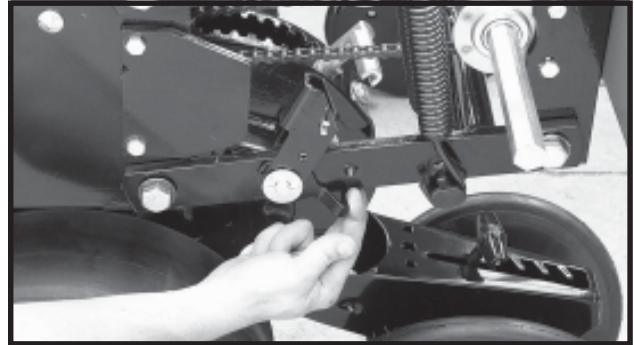


**Lift Lever Positioned To Lift Push Row Unit**

### 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

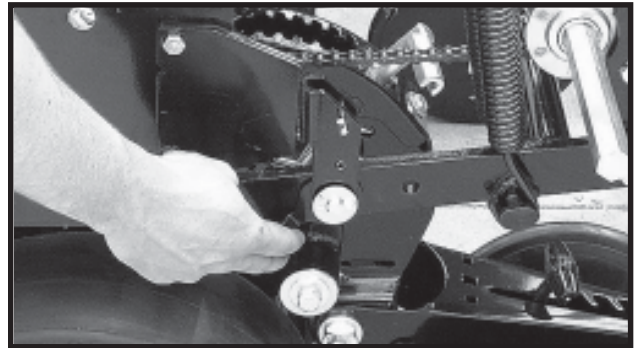


5. Using the lift lever, raise the push row unit to allow the spring loaded lockups to snap into locked position under the row unit stops.
6. Repeat Steps 4 and 5 on remaining push row units.

### To release lockups:

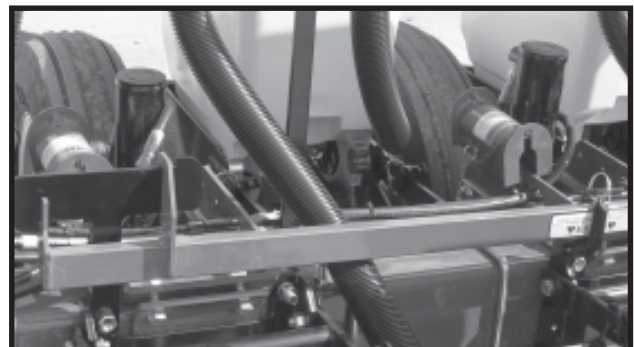
1. Lower the planter to the planting position.
2. On each push row unit lockup, flip the spring tab rearward.

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.

D08220663



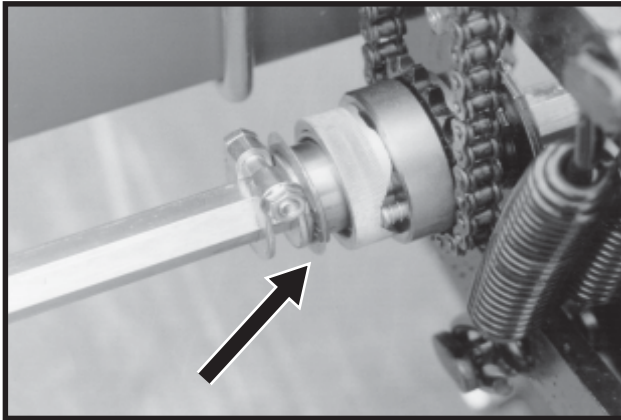
**Lift Lever In Storage Location**



# ROW UNIT OPERATION

## INTERPLANT® PUSH ROW UNIT CLUTCH SPROCKET

06309716



The push row unit clutch sprocket is designed to allow the push row unit drill shaft to be disengaged when only the pull row units are being used.

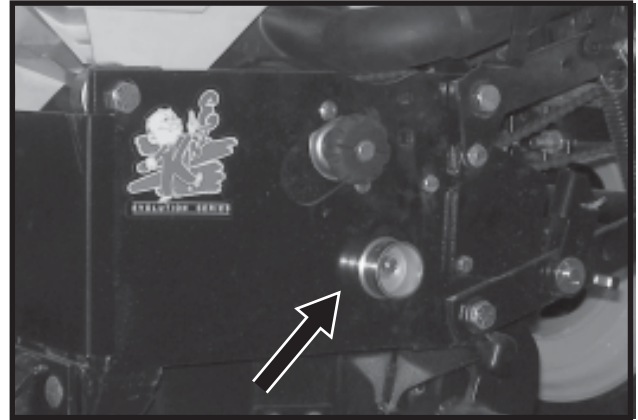
To disengage the push row unit drill shaft using the clutch sprocket, rotate the knurled collar on the clutch sprocket  $\frac{1}{4}$  turn. Then using a  $\frac{7}{8}$ " wrench on the drill shaft, rock the drill shaft slightly to take pressure off of the spring loaded pins in the clutch to allow the 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.



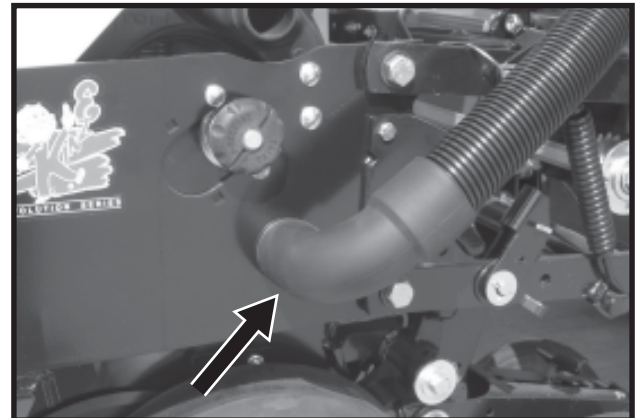
**WARNING: Always install all safety lockup devices or lower planter to the ground before working under or around the machine.**

## INTERPLANT® PUSH ROW UNIT VACUUM HOSE SHUTOFF

D12140617



D08220662



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



**WARNING: Always install all safety lockup devices or lower machine to the ground before working under or around the machine.**

# ROW UNIT OPERATION

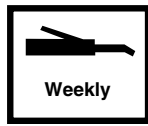
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# LUBRICATION

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 planter to the ground before working under the machine.

## LUBRICATION SYMBOLS



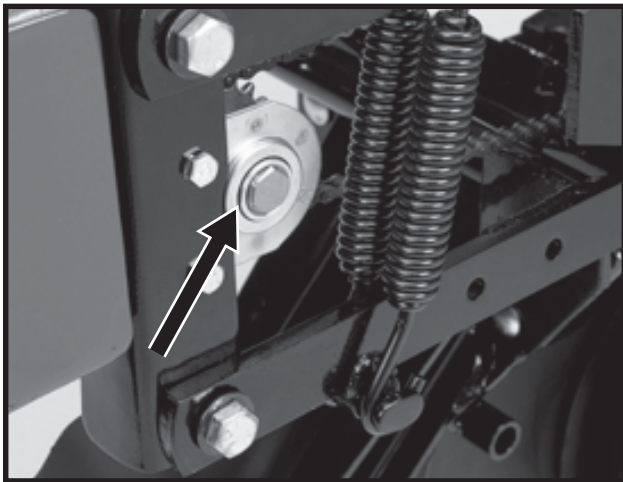
Lubricate at frequency indicated with an SAE multipurpose grease.



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

## SEALED BEARINGS

LF212199-3

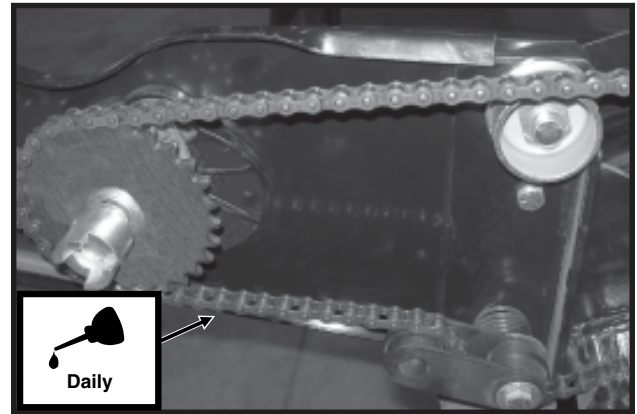


The number of sealed bearings are based on your KINZE planter to provide trouble free operation. These are located in such areas as the drive shaft, row units and transmission bearings. Sealed bearings are lubricated for life. Due to the seals, relubrication is not practical.

## DRIVE CHAINS

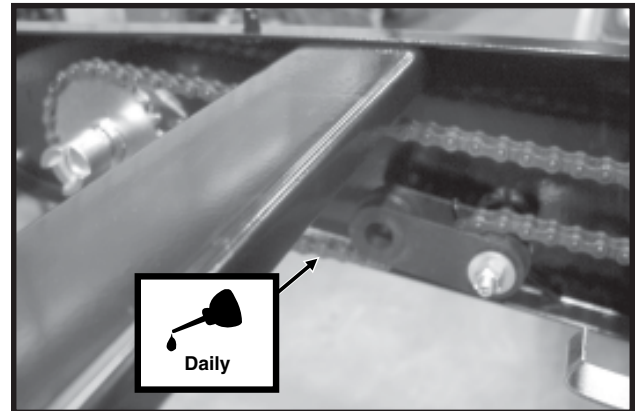
All transmission and drive chains should be lubricated daily with a high quality chain lubricant. Extreme operating conditions such as dirt, temperature or speed may require more frequent lubrication. If a chain becomes stiff, it should be removed, soaked and washed in solvent to loosen and remove dirt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

D09280611a



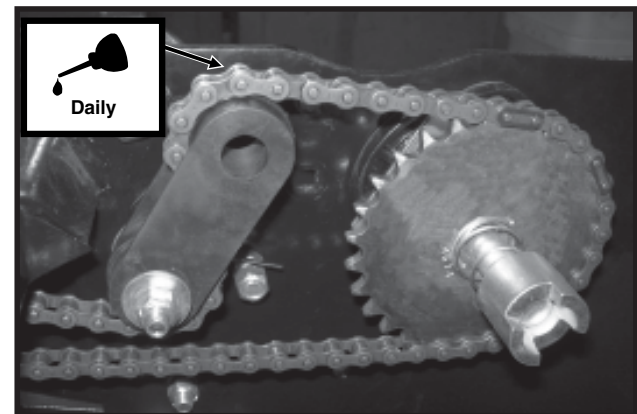
Pull Row Unit Drive Chains

D051705102



Row Unit Granular Chemical Drive Chains

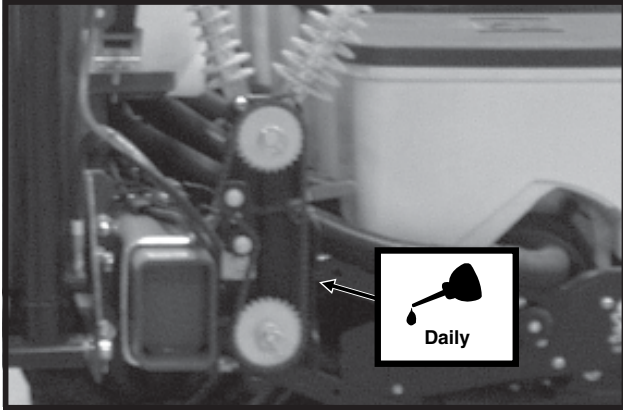
D09280603a



Push Row Unit Drive Chains

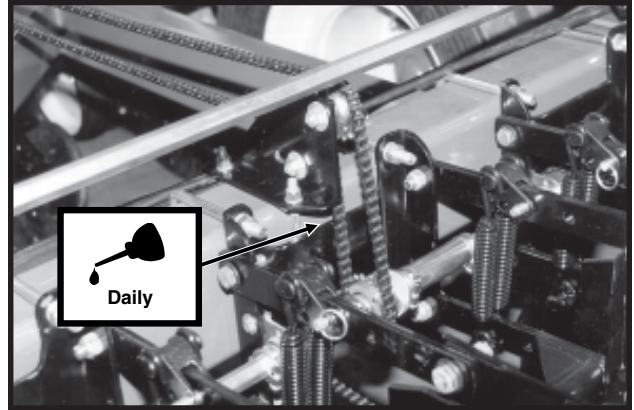
# LUBRICATION

D02070718a



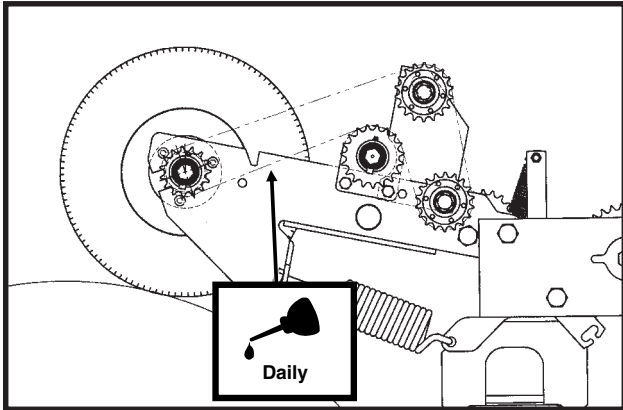
Seed Rate Transmission Drive Chain

01239906



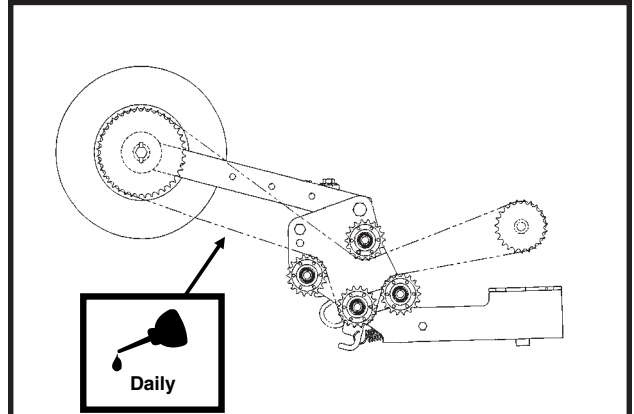
Push Row Unit Drive Chain

(TWL310)



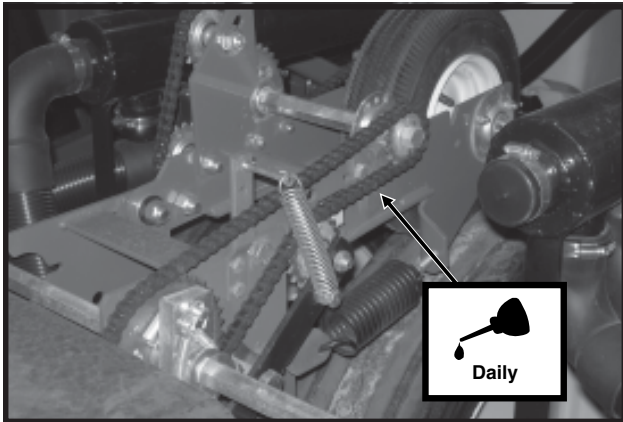
Contact Wheel Drive Chain(s)

(FRTZ198)



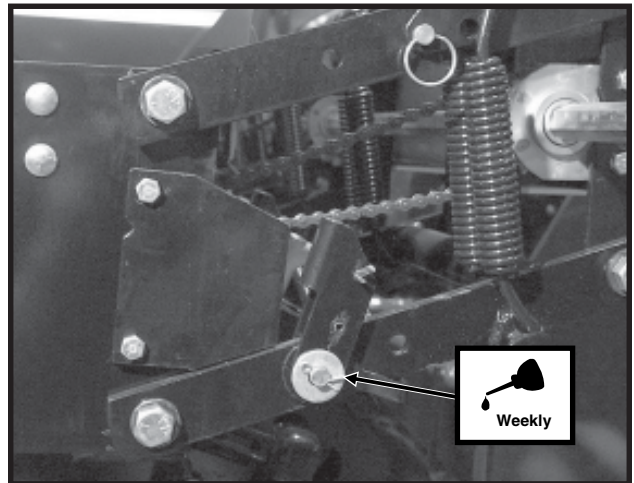
Liquid Fertilizer Drive Chain (Piston Pump)

D12140615



Contact Wheel Driven Chain(s)

D06099906



2 Per Row

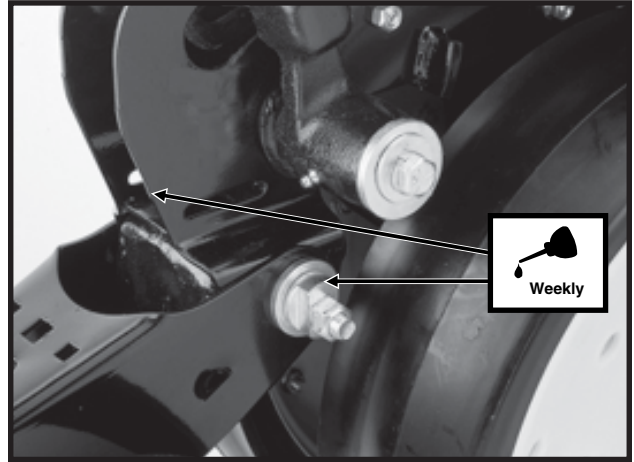
# LUBRICATION

## BUSHINGS

Lubricate bushings at the frequency indicated.

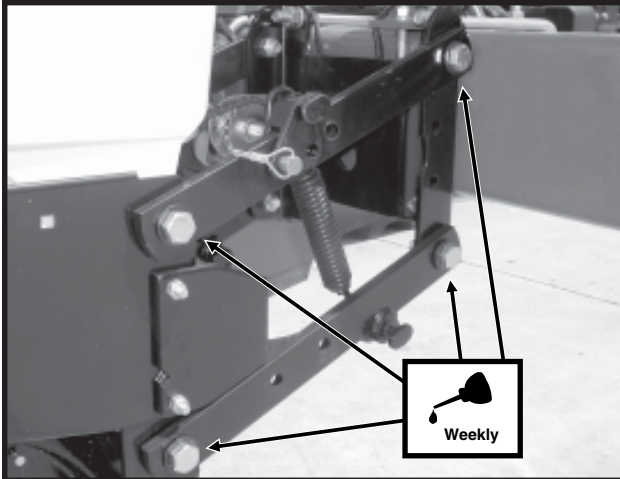
Using a torque wrench, check each bolt for proper torque. If bolt is loose, it should be removed and the bushing inspected for cracks and wear. Replace bushing if necessary **Only hardened flat washers should be used. Replace damaged flat washers with proper part. Torque hardware to 130 ft. lbs.**

LF212199-2



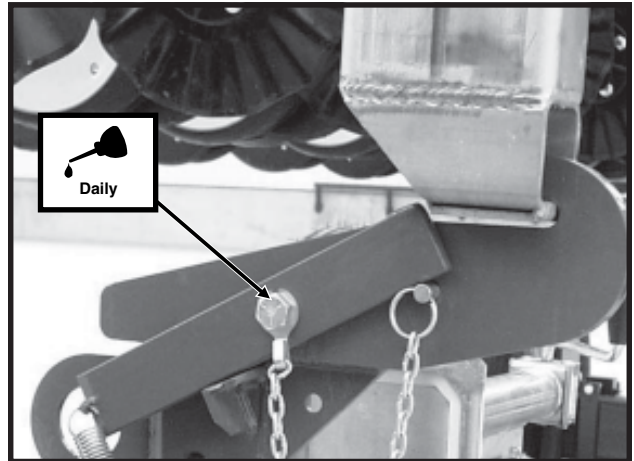
**Row Unit “V” Closing Wheel, Covering Discs/ Single Press Wheel And/Or Drag Closing Wheel Eccentric Bushings (2 Per Row)**

LF212199-3



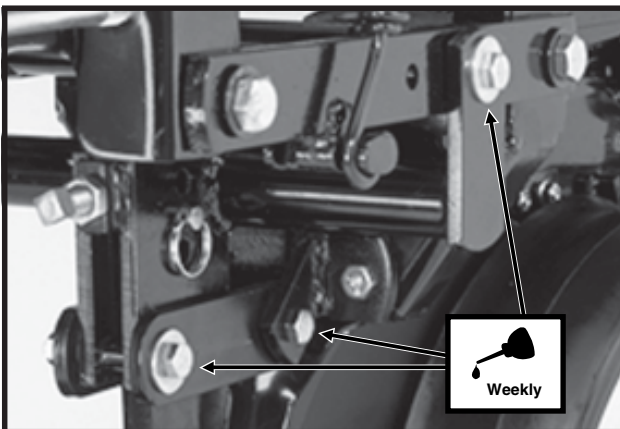
**Pull Row Unit And/Or Push Row Unit Parallel Linkages (8 Per Row)**

D060999107



**Transport Latch (1 Location)**

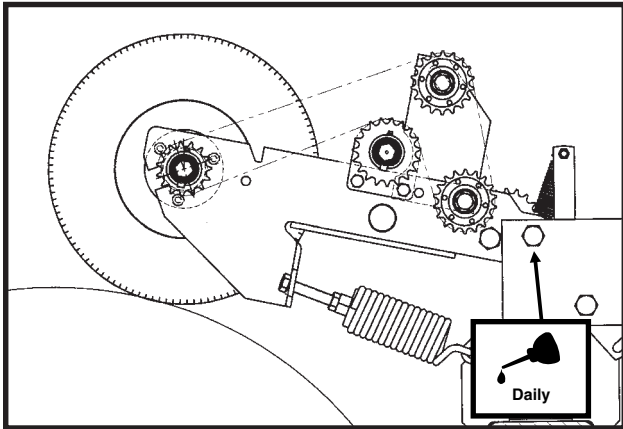
LF212299-22



**Row Unit Mounted Disc Furrower Parallel Linkages (6 Per Row)**

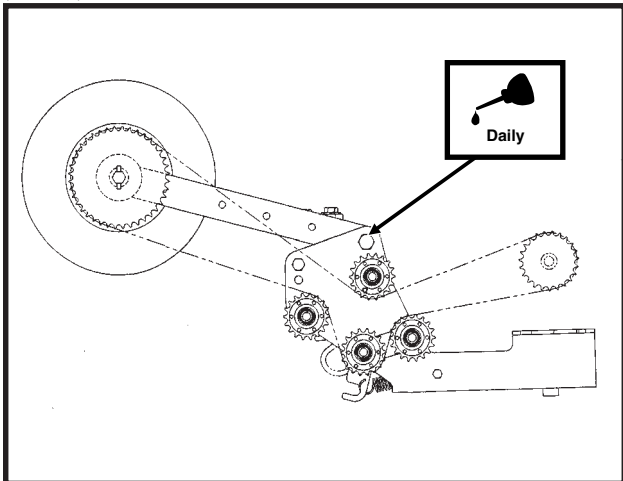
# LUBRICATION

(TWL310)



**Contact Drive Wheel Arm (2 Per Wheel Assembly)**

(FRTZ198)



**Optional Piston Pump Drive Wheel Arm Assembly (2 Per Wheel Assembly)**

## 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

## 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.

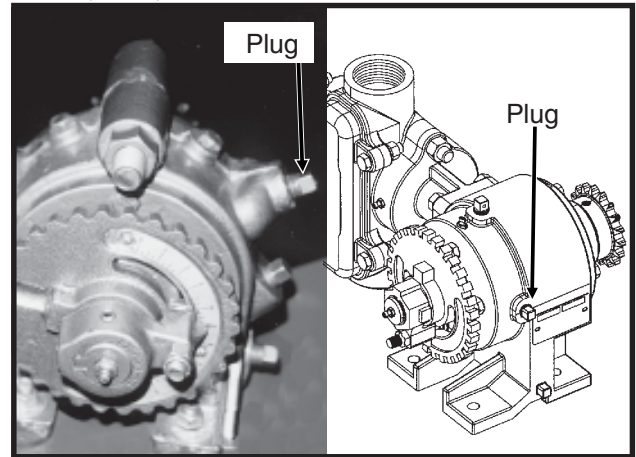
All wheel bearings should be repacked annually and checked for wear. This applies to all drive wheels, transport wheels and marker hubs.

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.

## LIQUID FERTILIZER PISTON PUMP CRANKCASE OIL LEVEL

12229799/(A12330a)



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

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

# LUBRICATION

## 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.

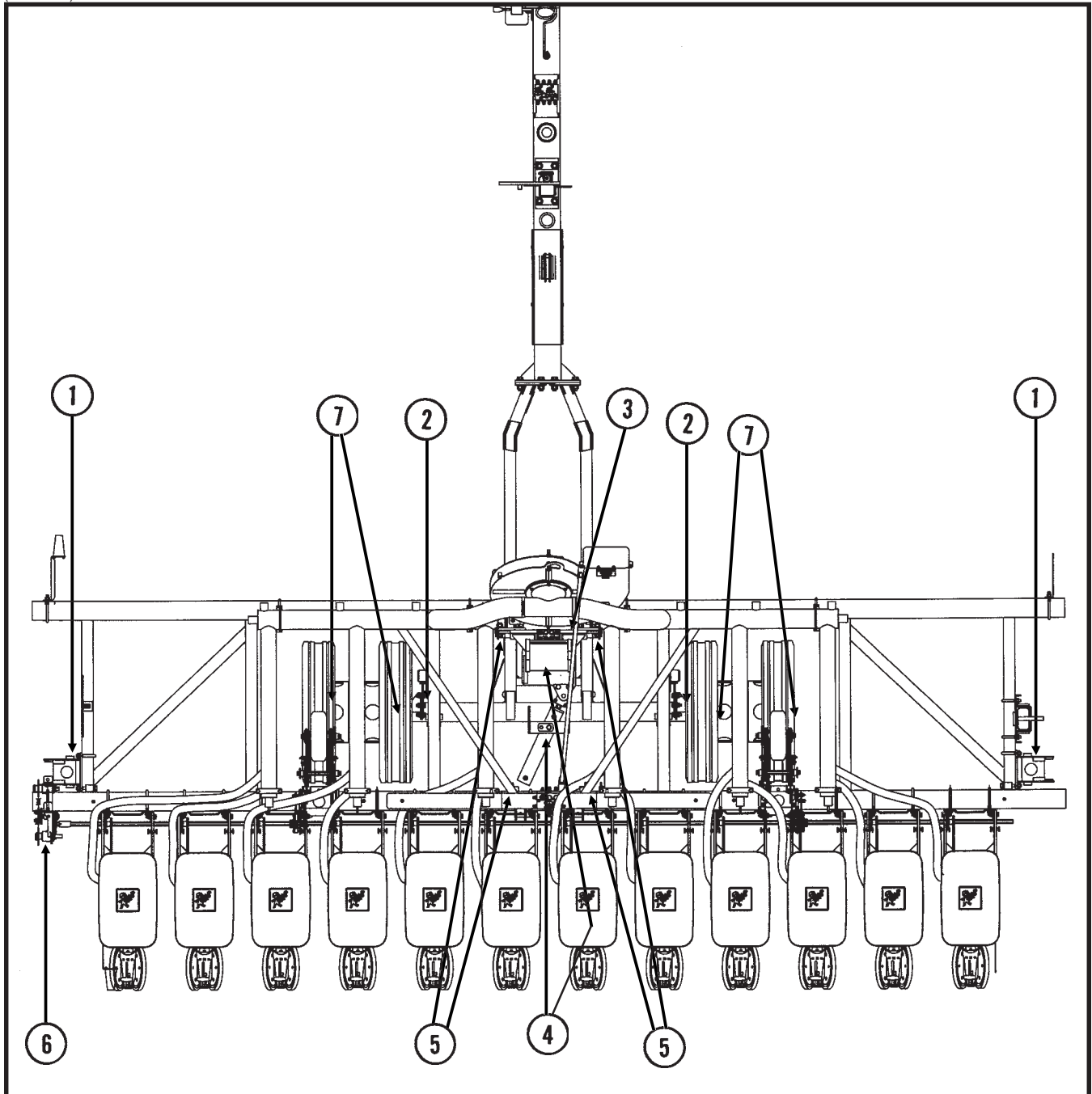


**WARNING:** Always install safety lockup devices or lower the planter to the ground before working under or around the machine.

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

(PLTR147K)

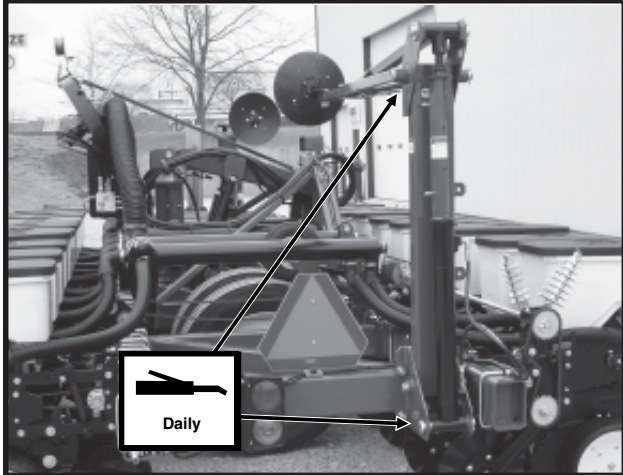
12 Row 20" Shown





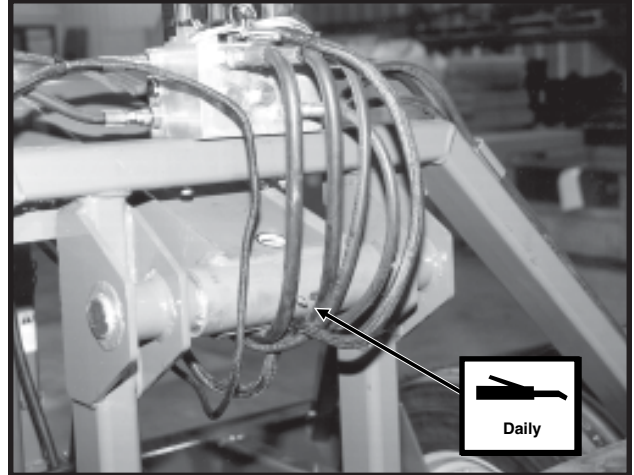
# LUBRICATION

D12200626



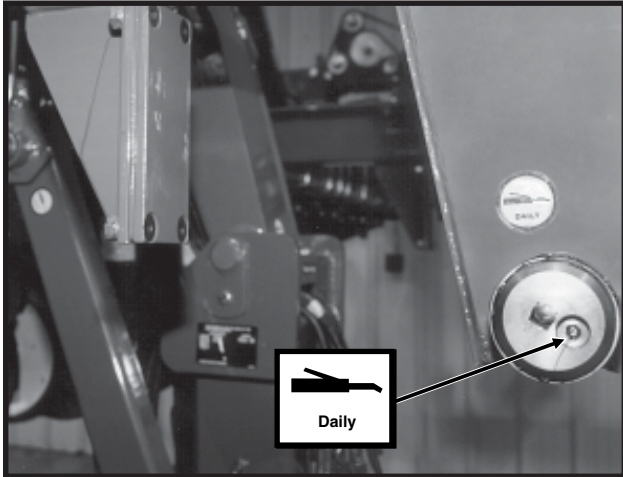
1. Row Marker Assemblies - 2 Zerks Per Assembly

01209912



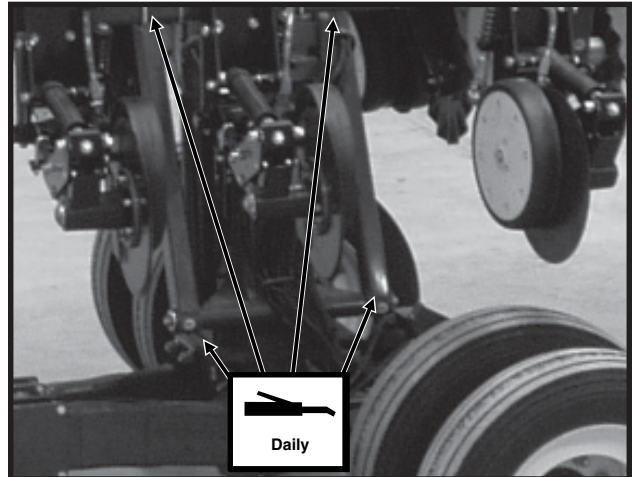
4. Upper Lift Arm - 2 Zerks

01199919a



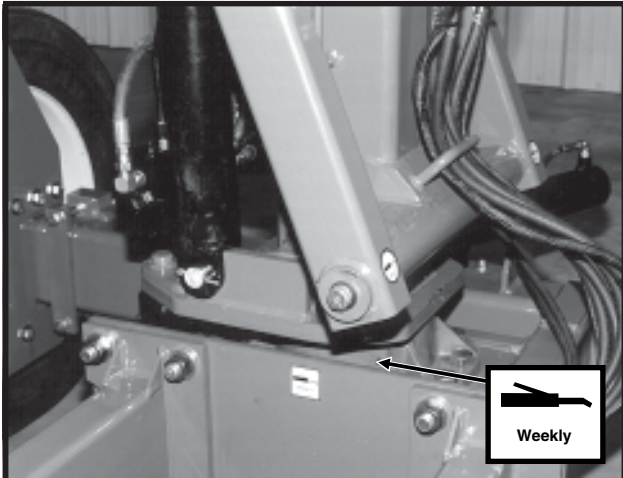
2. Cam Follower - 1 Zerk Per Follower

D02070737



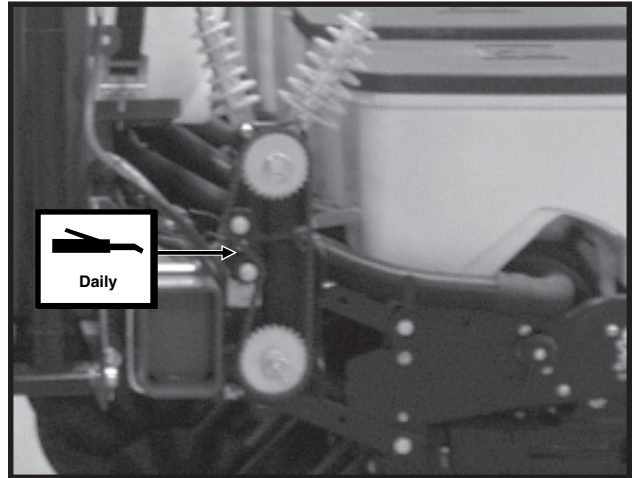
5. Lower Lift Arms - 2 Zerks Per Arm

01199914



3. Center Pivot Hub - 1 Zerk

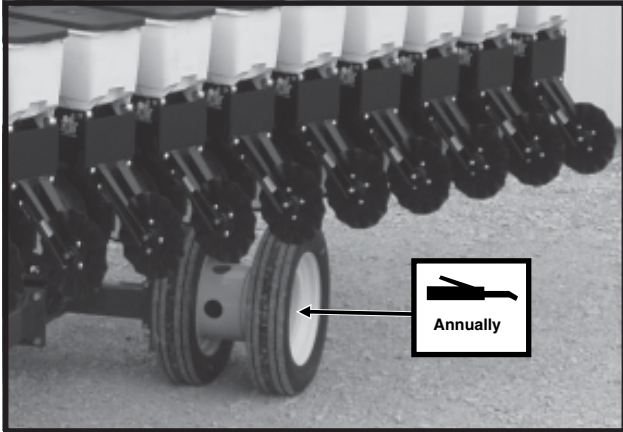
D02070718a



6. Seed Rate Transmission Assembly - 1 Zerk

# LUBRICATION

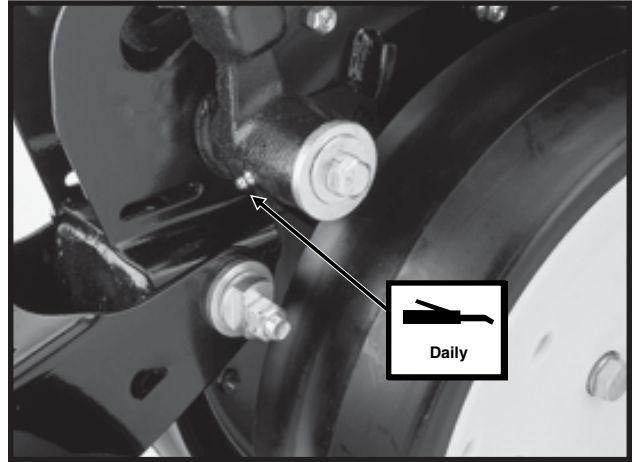
D12200606



7. Transport Wheel Bearings - 1 Zerk Per Hub

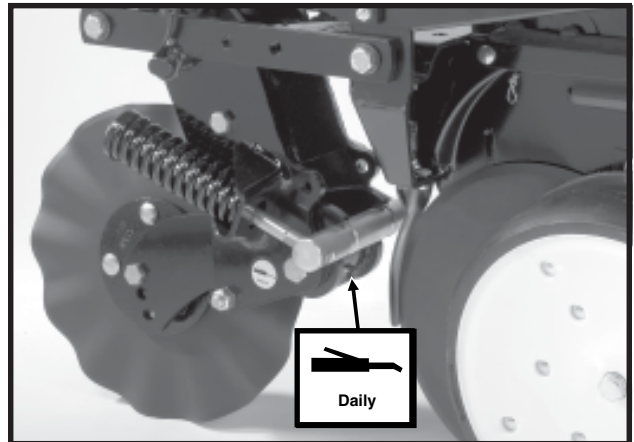
## Row Unit

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

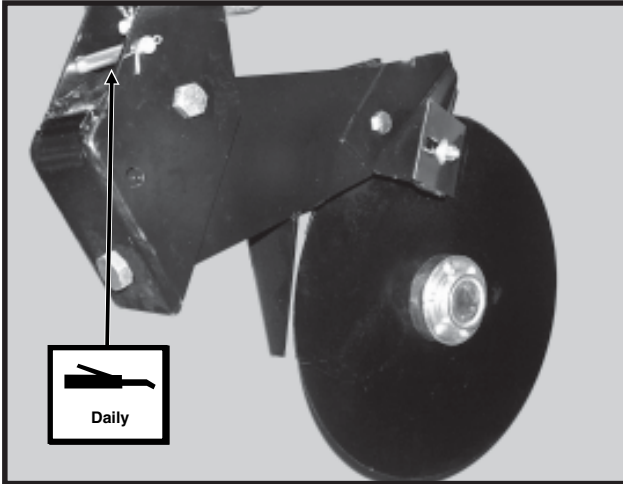


Frame Mounted Coulter - 1 Zerk Per Arm

# LUBRICATION

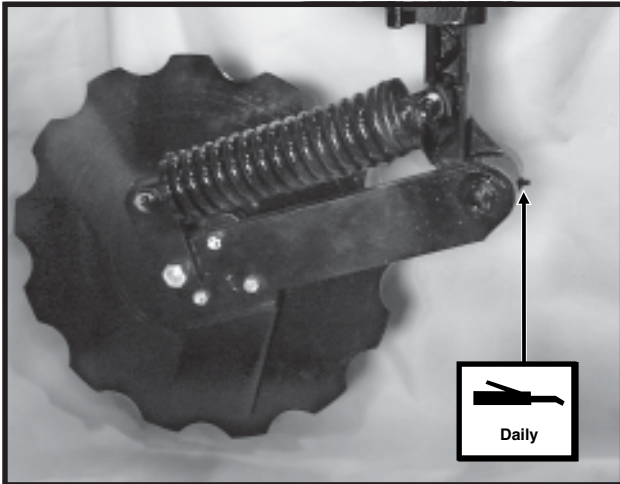
## Fertilizer Openers

D06259919



Double Disc Fertilizer Opener - 1 Zerk

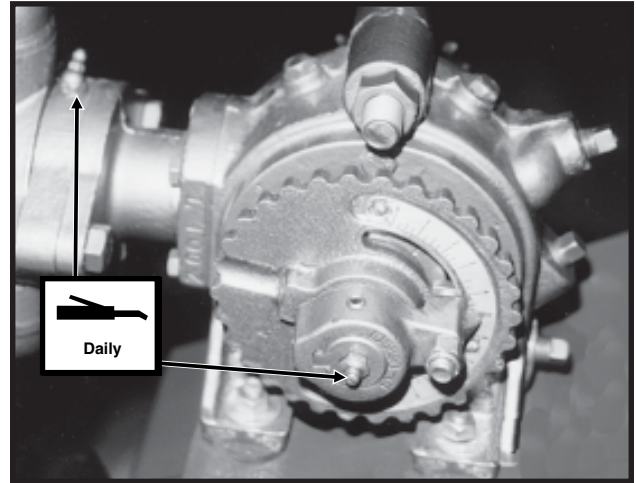
D060801304



Notched Single Disc Fertilizer Opener - 1 Zerk

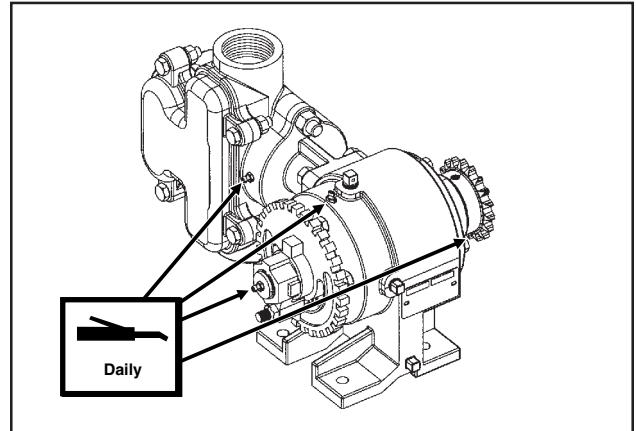
## Liquid Fertilizer Attachment

12229799



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.)

# LUBRICATION

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# 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 is 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 bolts.

**Row Unit Parallel Linkage Bushing Hardware - 130 Ft. Lbs. (See “Bushings” in the Lubrication section of this manual.)**

**5/8" No Till Coultter Spindle Hardware - 120 Ft. Lbs.**

**Transport Tire Inner Budd Nuts - 220 Ft. Lbs.**

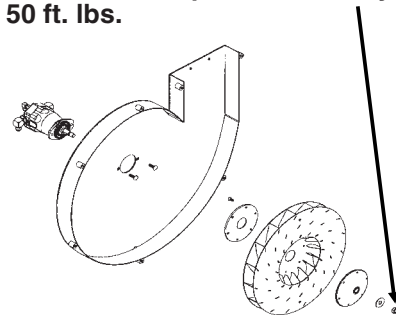
**Transport Tire Outer Budd Nuts - 670 Ft. Lbs.**

**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.

**IMPORTANT:** Torque setting for 5/8"-18 hex jam nut that secures fan impellor assembly to motor shaft is 50 ft. lbs.



### 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

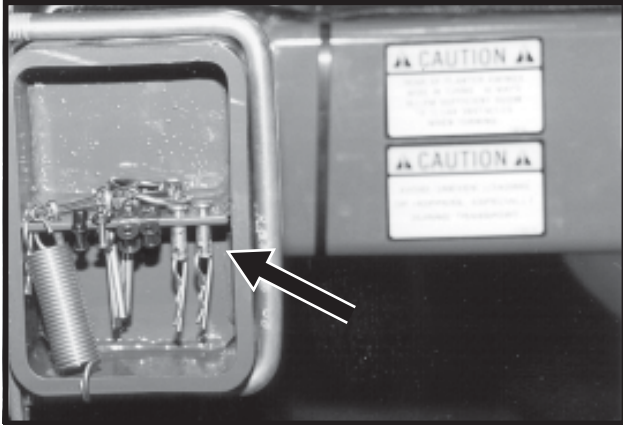
# MAINTENANCE

## CHAIN TENSION ADJUSTMENT

Drive chains are equipped with spring loaded idlers and are self-adjusting. The only adjustment needed is to shorten the chain if wear stretches a chain and reduces spring tension. The pivot point of these idlers should be checked periodically to ensure they rotate freely.

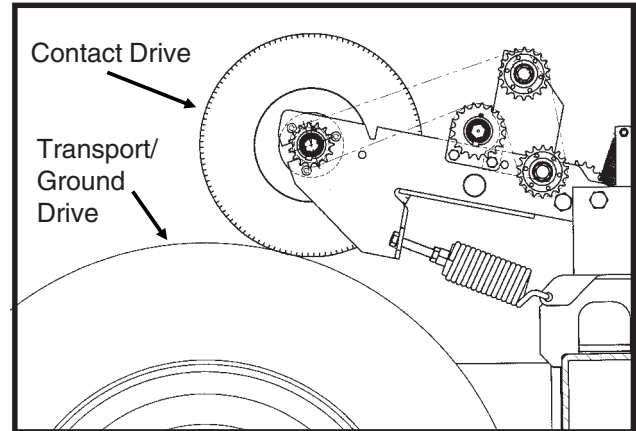
Additional chain links can be found in the storage area located inside the forward planter toolbar.

1239909



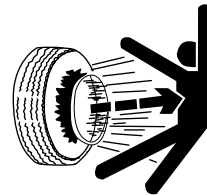
## TIRE PRESSURE

(TWL310)



Tire pressure should be checked regularly and maintained as follows:

Transport/Ground Drive 255-70R x 22.5" ..... 75 PSI  
Contact Drive 4.10" x 6" ..... 50 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.

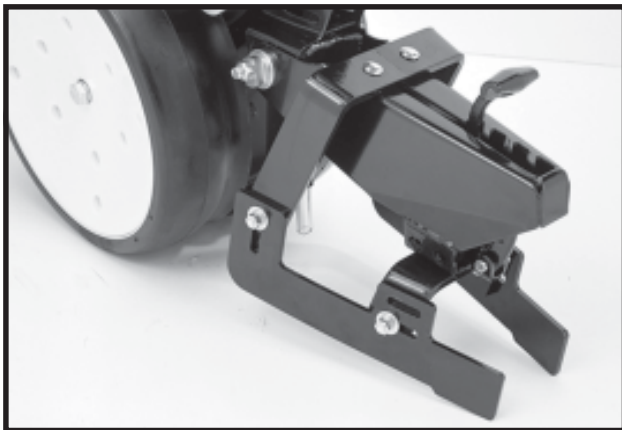
# MAINTENANCE

## CLOSING WHEEL TROUBLESHOOTING

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

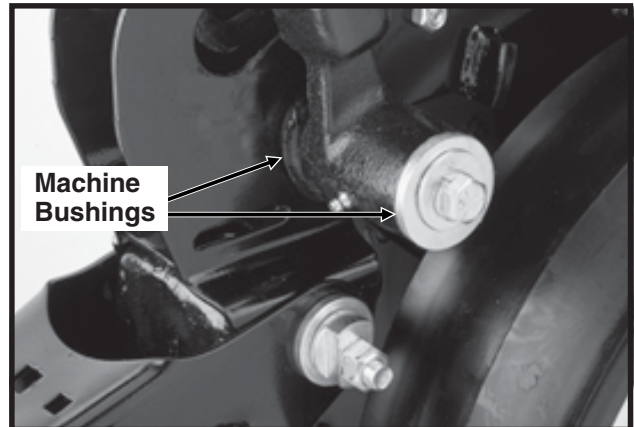
## DRAG CLOSING ATTACHMENT

LF212299-18



Prior to storage of the planter, inspect each drag closing attachment and replace any worn or broken parts. Check for loose hardware and tighten as needed.

LF212199-2



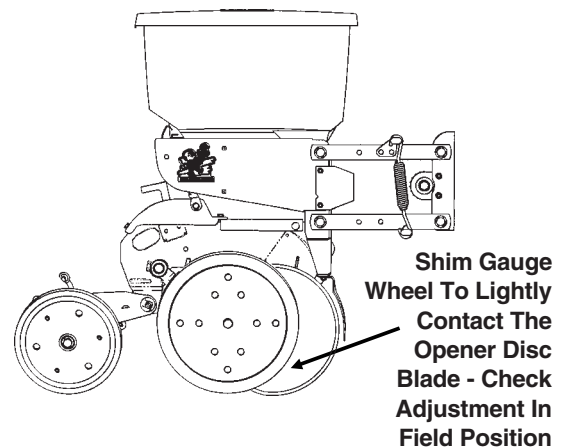
(RU113g)

## 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.

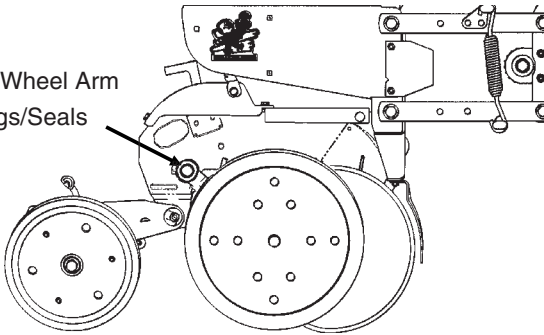


# MAINTENANCE

## GAUGE WHEEL ARM BUSHING AND/OR SEAL REPLACEMENT

(RU113g)

Gauge Wheel Arm Bushings/Seals

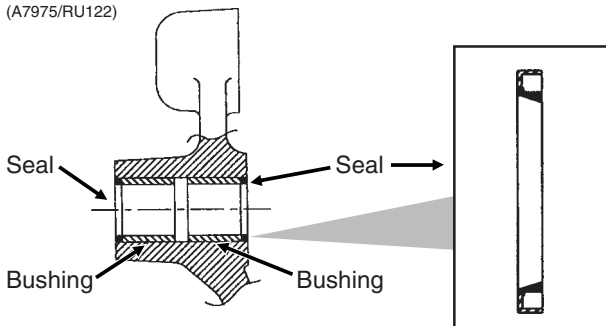


**NOTE: A Gauge Wheel Arm Bushing And Seal Driver Kit (G1K296), for use in bushing and seal replacement, is available through your KINZE® Dealer.**

**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.

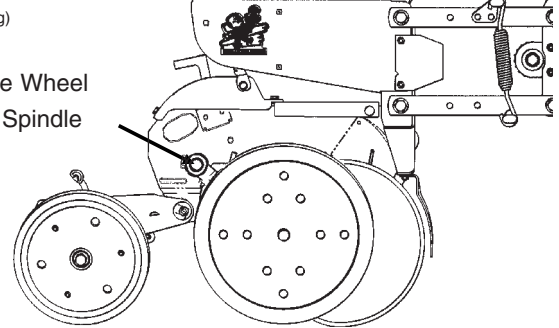
**NOTE: Special machine bushing between gauge wheel arm and gauge wheel.**

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

## GAUGE WHEEL ARM PIVOT SPINDLE REPLACEMENT

(RU113g)

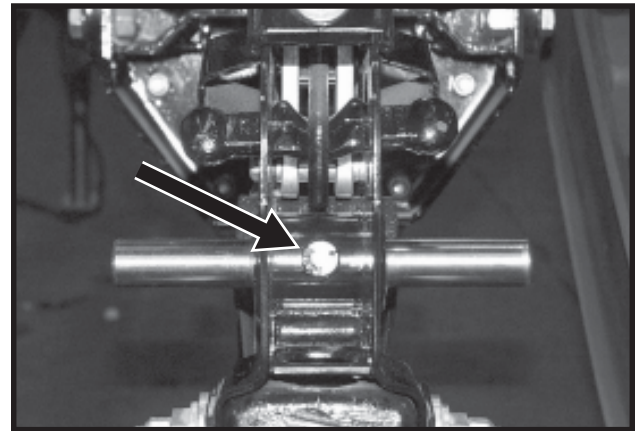
Gauge Wheel Pivot Spindle



**To replace gauge wheel pivot spindle:**

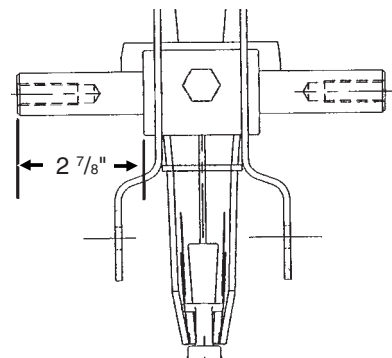
1. Remove the gauge wheel and arm assemblies from the shank assembly.
2. Remove 1/2" x 3/4" cap screw that locks the pivot spindle in place and remove the spindle.

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

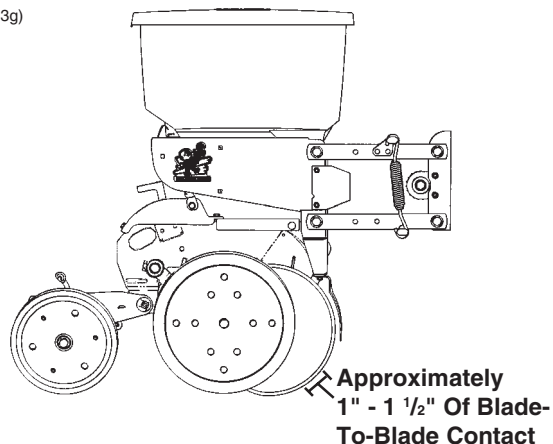
## 15" SEED OPENER DISC BLADE/ BEARING ASSEMBLY

Approximately 1" - 1 1/2" 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 1/2" of contact.

**NOTE: If proper blade-to-blade contact cannot be maintained after relocating machine bushings or if blade diameter wears below 14 1/2", 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 1/2" of blade-to-blade contact.

**IMPORTANT: Left hand side of opener uses a left hand threaded cap screw. DO NOT OVER TIGHTEN. 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 5/8"-11 Grade 5 cap screw to value shown in "Torque Values Chart".

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

6. Replace bearing dust cap.
7. Install scraper.
8. Install gauge wheel.

It may be necessary to replace 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 1/4" rivets from bearing housing to expose bearing.
3. After installing new bearing, install three evenly spaced 1/4" 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 1/4" cap screws and install rivets in those three holes.
4. Reinstall disc blade/bearing assembly, washer and cap screw. Torque 5/8"-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.

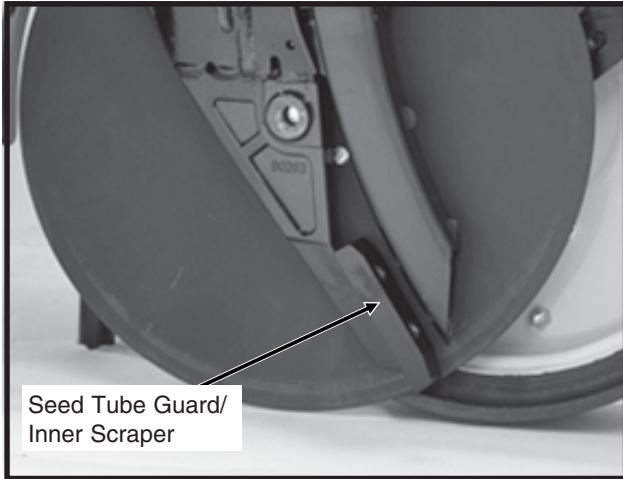
# MAINTENANCE

## 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

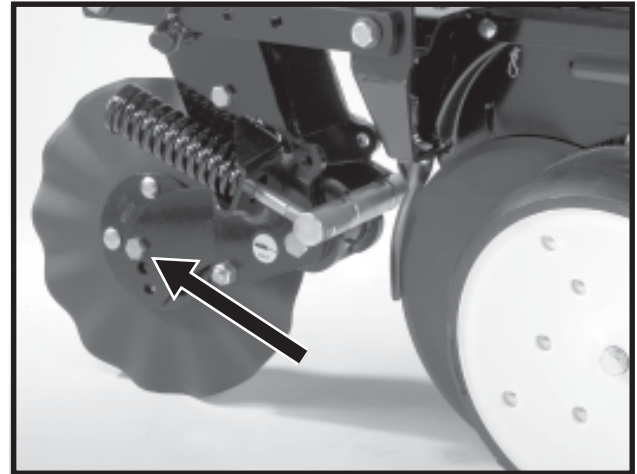
**IMPORTANT: No till planting or planting in hard ground conditions, especially when the planter is not equipped with no till coulters, and/or excessive blade-to-blade contact will increase seed tube guard wear and necessitate more frequent inspection and/or replacement.**

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.**

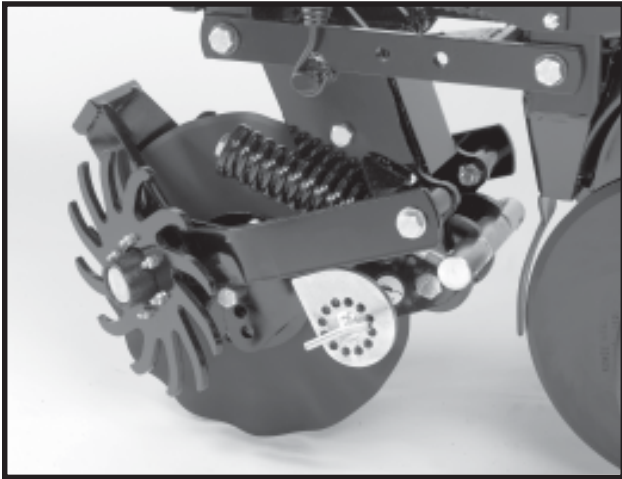
See "Frame Mounted Coulter" in Row Unit Operation section of this manual for depth and spring adjustment.

When the 16" diameter coulter 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

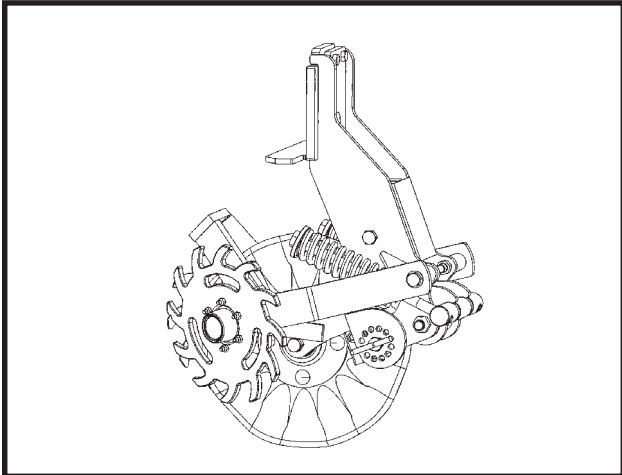
## RESIDUE WHEELS (For Use With Frame Mounted Coulter)

LF083002102



### STYLE A

(RU154)

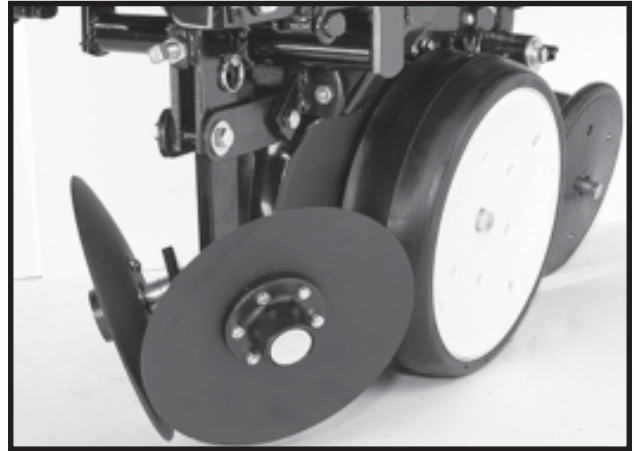


### STYLE B

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 bolts 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

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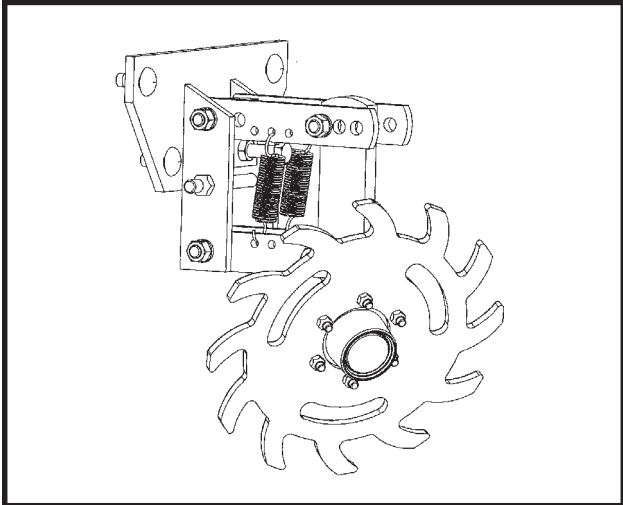
## ROW UNIT MOUNTED RESIDUE WHEEL

D101701113



**STYLE A**

(A12685)



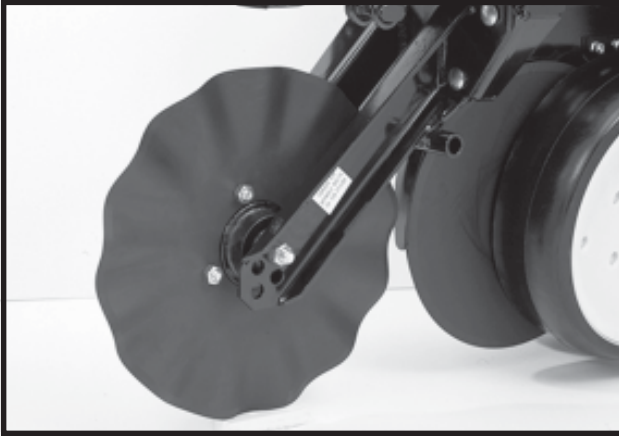
**STYLE B**

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

# MAINTENANCE

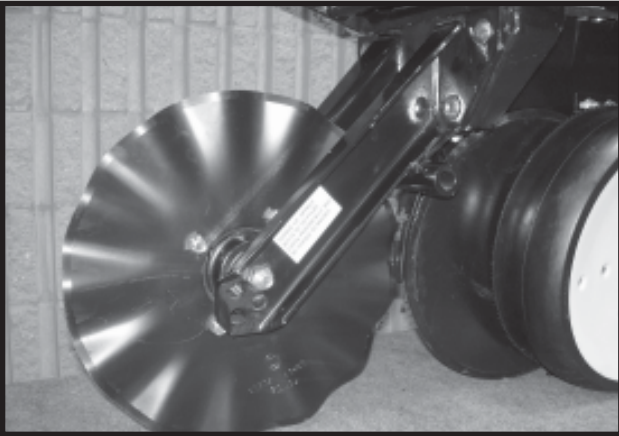
## ROW UNIT MOUNTED NO TILL COULTER

LF212299-19a



**STYLE A (Two Sleeves For Installing Coulters Mounted Residue Wheels)**

D05170706



**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 is 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.

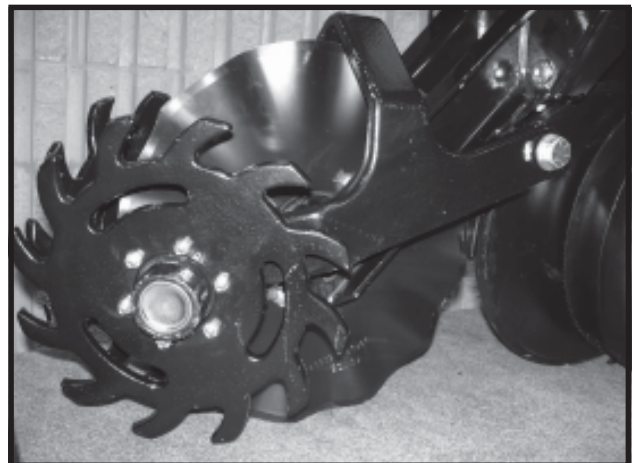
## COULTERS MOUNTED RESIDUE WHEELS

LF212299-23



**STYLE A - Used With Style A Row Unit Mounted No Till Coulters**

D05170708



**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.

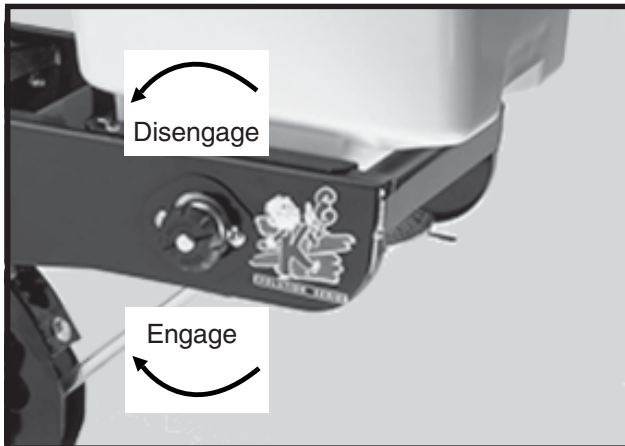
# MAINTENANCE

## GRANULAR CHEMICAL ATTACHMENT

Prior to storage of the planter, disengage the granular chemical drive by rotating the throwout knob 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.

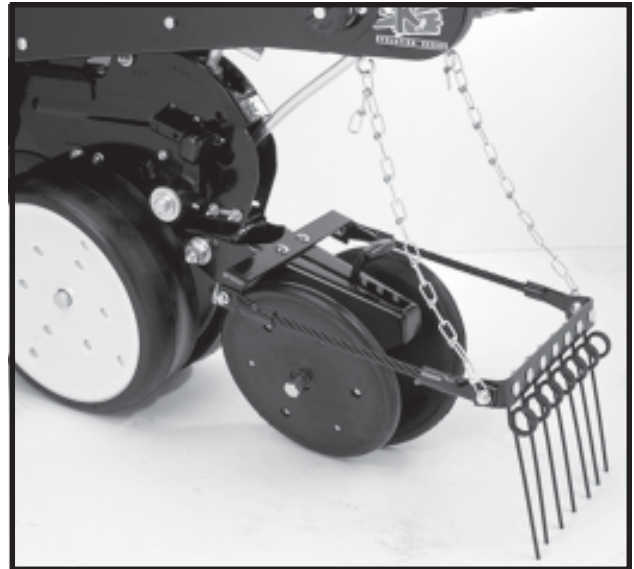
LF212299-4



## SPRING TOOTH INCORPORATOR

Prior to storage of the planter, inspect each spring tooth incorporator and replace any worn or broken parts. Check for loose hardware and tighten as needed.

LF212299-26



# 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 Stack-Mode 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.	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.	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.



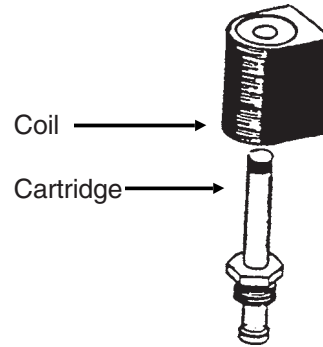
# MAINTENANCE

## SOLENOID VALVE INSPECTION

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.

VVB019(PLTR55)



## SOLENOID VALVE TROUBLESHOOTING

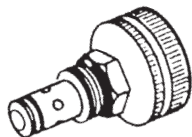
PROBLEM	POSSIBLE CAUSE	SOLUTION
None of the solenoids will operate.	Low voltage.	Must be connected to 12 volt DC only. Negative ground.
	Blown fuse.	Replace fuse in control console on tractor with AGC-15 amp only.
	Battery connection.	Clean and tighten.
	Wiring harness damaged.	Repair or replace.
One 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

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## FLOW CONTROL VALVE INSPECTION

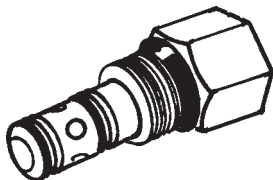
VVB020(TWL28)



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.

## CHECK VALVE INSPECTION (Located In Valve Block On Hitch)

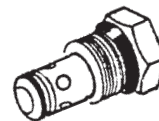
VVB020(TWL30a)



The check valve, located in the valve block on the planter hitch, traps oil flow in the planter lift system to hold the toolbar tight against the axle during field operation. Hydraulic pressure from the tractor is required to lift the toolbar. Consult your KINZE® Dealer for service.

## CHECK VALVE INSPECTION (Located In Valve Block Below Vacuum Fan Motor Assembly)

(TWL24b)



The check valve operates as a check in the return line to prevent reverse operation of the vacuum fan motor. 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.

## RELIEF VALVE CARTRIDGE INSPECTION (Located In Valve Block Below Vacuum Fan Motor Assembly)

(A11340)



The pressure relief valve helps prevent damage to the vacuum fan motor by limiting pressure in the motor case drain line. It is set to open at 35 PSI. 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 if found to be defective.

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

# MAINTENANCE

## LIFT CIRCUIT TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Planter will raise to raised field position, but will not raise to transport position.	Solenoid valve coil in port V3 is not energized.	Be sure control console switch is in RAISE position to energize solenoid coil in port V3. 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 V3 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.
Planter will not raise.	Tractor may have hydraulic problem.	Repair tractor hydraulics.
	Planter may be overloaded with hopper extensions and/or extra fertilizer tanks, coulters or non-KINZE® approved attachments.	Remove excessive weight.

## ROTATION CYLINDER CIRCUIT TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Cylinder does not extend or retract.	Solenoid valve coil in port V1 defective.	Check switch on control console. Replace if defective. Check coil ground wire. Check for poor connection or damaged wire.
	Solenoid valve cartridge in port V1 is stuck closed.	Replace cartridge. Test cartridge by switching with one you know is working properly. Try cartridge from port V1 which is the raise-to-transport cartridge.

**NOTE: One set of hydraulic outlets, in conjunction with the switches on the control console, are used to operate the row markers and the rotation function. The rotation function is controlled by one solenoid valve located in the valve block on the planter hitch. Energize the solenoid valve to operate the rotation function.**

# MAINTENANCE

## ROW MARKER OPERATION TROUBLESHOOTING

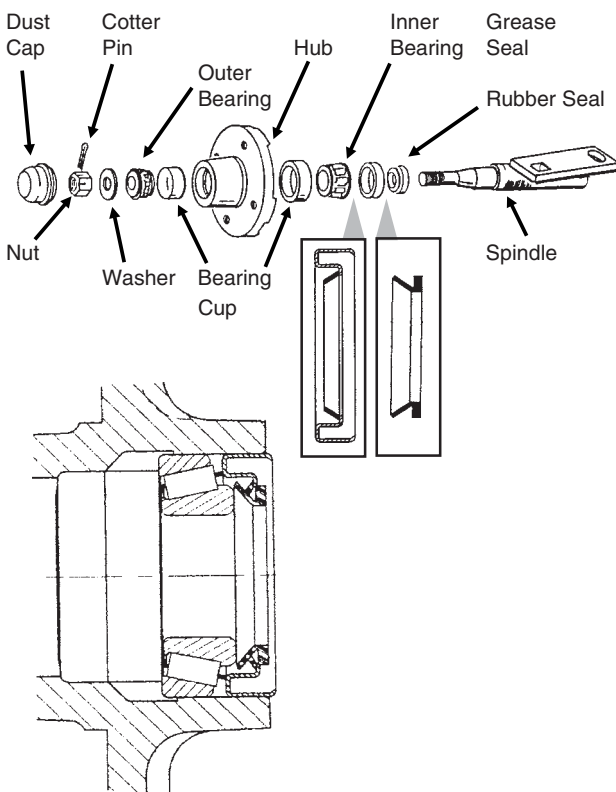
PROBLEM	POSSIBLE CAUSE	SOLUTION
Right marker lowering slower than left marker.	Solenoid valve cartridge in port V2 not opening completely.	Switch cartridge with one in port V1. If problem follows cartridge, replace cartridge.
	Hose pinched or collapsed.	Inspect hose routing. Replace or repair hoses as required.
Left marker lowering slower than right 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.
Both markers lowering.	Solenoid valve cartridge stuck open. If marker switch is in the left marker position, the right cartridge (V2) is defective. If the marker switch is in the right marker position, the left cartridge (V1) 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 V2 and V1 not energized.	Poor ground on wire, bad wire connection or damaged wire. Repair as required.
	Marker flow control valve closed too far.	See Machine Operation section for adjustment.
Neither marker will raise.	Marker flow control valve closed too far.	See Machine Operation section for adjustment.
Right 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 right marker lowers, replace defective cartridge.
Left 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 left marker lowers, replace defective cartridge.
Markers traveling too fast and damaging pivot at rod end of marker cylinders.	Marker flow control valve out of adjustment.	See Machine Operation section for adjustment.

# MAINTENANCE

## 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.

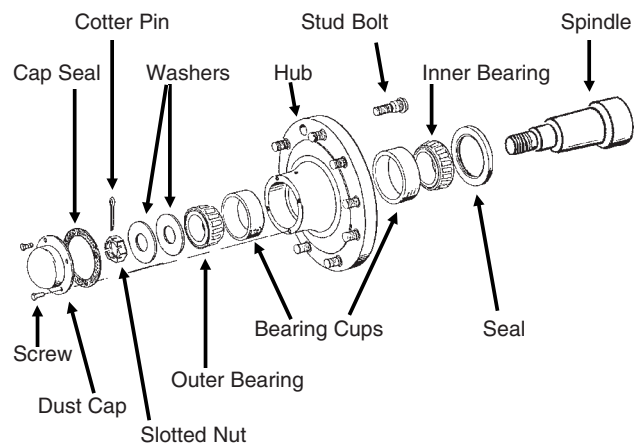
(PLTR45/PLTR99/PLTR98/PLTR102)



## TRANSPORT WHEEL BEARING REPLACEMENT

1. Raise tires clear of ground and remove wheels.
2. Remove dust cap attachment hardware and remove cap from wheel hub.
3. Remove cotter pin, axle nut and 2" washer.
4. Slide hub from axle spindle, using a hub puller if necessary.
5. Remove bearings and cups from hub and discard. Thoroughly clean and dry wheel hub.
6. Press in new bearing cups with thickest edges facing in.
7. Pack bearing 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. Place inner bearing in hub and press in new grease seal with lip pointing towards bearing.
9. Clean axle spindle and install hub.
10. Install outer bearing, 2" washer and slotted hex nut. Tighten slotted hex nut while rotating the 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. Check for endplay in bearings.
11. Fill dust cap half full of wheel bearing grease and install on hub with attachment bolts.
12. Install wheels and remove jack. Torque inner budd nuts to 220 ft. lbs. and outer budd nuts to 670 ft. lbs.

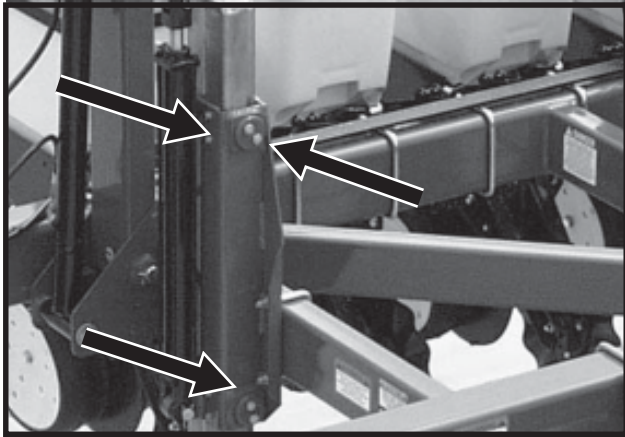
HTA002(PLTR149)



# MAINTENANCE

## TRANSPORT LATCH POST WEAR PAD REPLACEMENT/ADJUSTMENT

D060999113

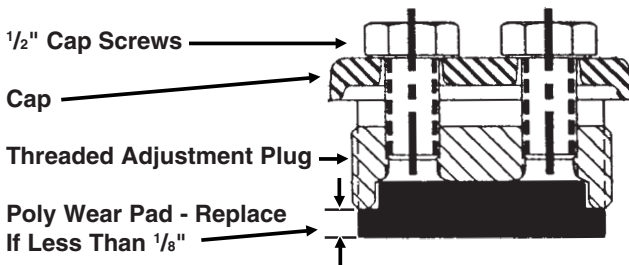


The transport latch post assembly consists of a plated tubular post equipped with two stationary and six adjustable wear pad assemblies. Each adjustable wear pad assembly consists of a poly wear pad, a threaded adjustment plug and a cap. The assembly is held in place by the threaded adjustment plug and locked in position by the cap and two 1/2" hex head cap screws.

Check wear and pad adjustment annually.

To check wear pad adjustment, visually inspect all six adjustable assemblies. Each wear pad should lightly contact the plated post. If adjustment is necessary, loosen two 1/2" cap screws on cap. Hand tighten wear pad assembly until poly pad lightly contacts post. Retighten 1/2" cap screws to 25-30 ft. lbs.

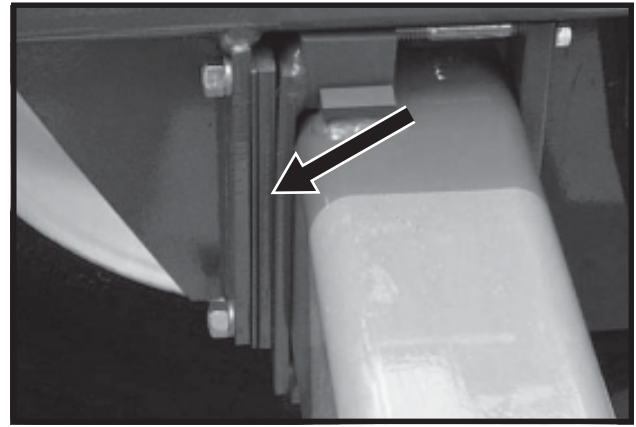
(TWL69a)



**IMPORTANT: DO NOT OVERTIGHTEN WEAR PADS. OVERTIGHTENING WILL CAUSE PREMATURE WEAR.**

## PUSH PAD SHIM REPLACEMENT/ADJUSTMENT

D06109911



Shims on the push pads on the planter frame can be added or removed to adjust planter frame height.

Frame height is correct when distance between frame and top of axle measured just in front of push pads is 2" - 2 3/4".

# 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.**

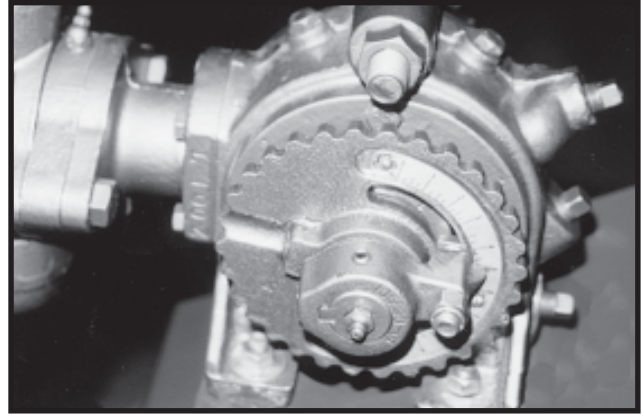
### Overnight Storage

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

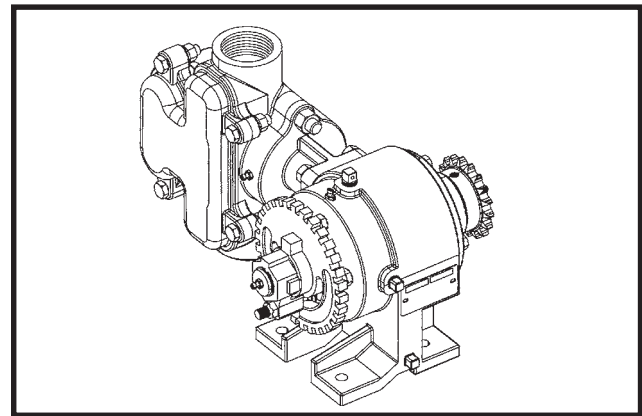
### Winter Storage

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.

12229799



(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 metering.	Broken discharge valve spring.	Replace spring.
	Trash under valves.	Inspect and clean valves.
	Improper rate setting.	Adjust pump setting.
Leaks through when stopped.	Broken discharge valve spring.	Replace spring.
	Trash under valves.	Inspect and clean valves.
Fertilizer solution leaking under stuffing box.	Packing washers worn out.	Replace.
Pump using excessive oil.	Oil seals or o-ring worn and leaking.	Replace.
Pump operates noisily.	Crankcase components worn excessively.	Inspect and replace if necessary.

# 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.

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

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

Clean breather on analog vacuum gauge.

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

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

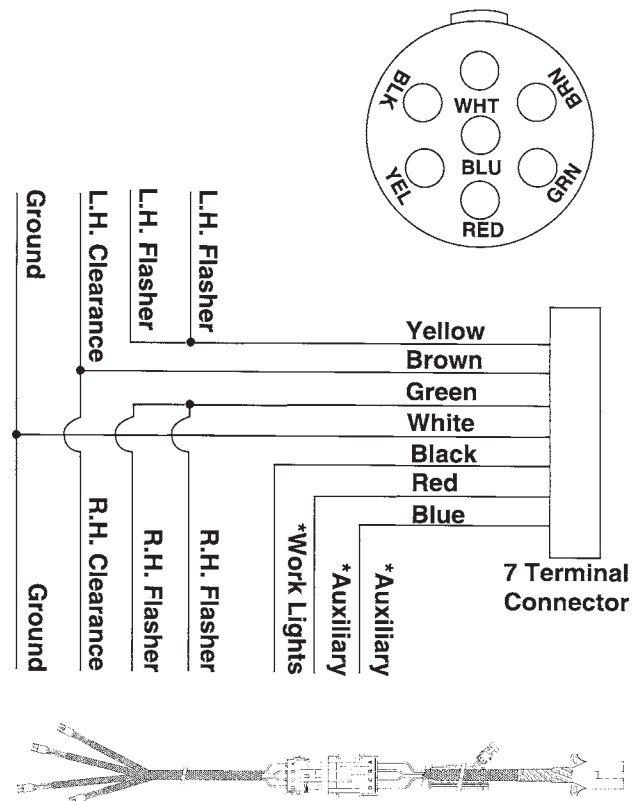
## ELECTRICAL WIRING DIAGRAM FOR LIGHT PACKAGE

The light package supplied on the Model 3400 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



(WGN66b/A8430gg)



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

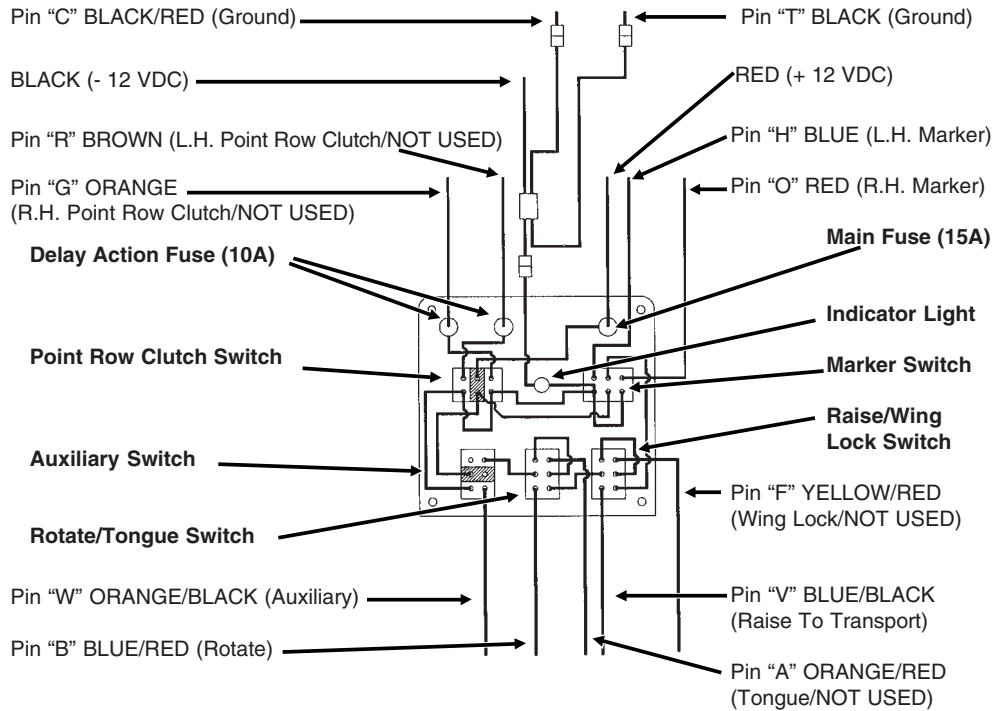


# MAINTENANCE

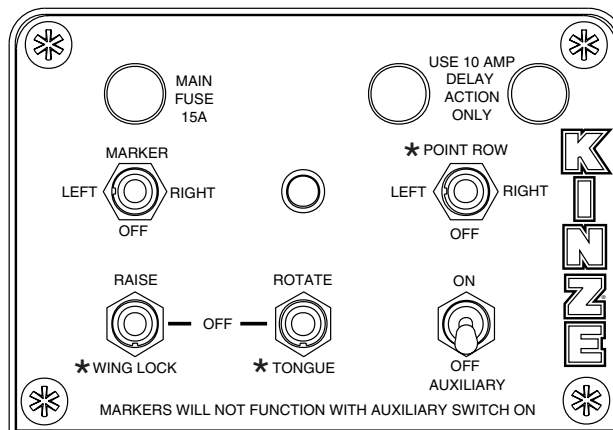
## ELECTRICAL CONTROL CONSOLE SCHEMATIC

**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.

A7407(PLTR82a)



A7407(INS238)



### NOTE:

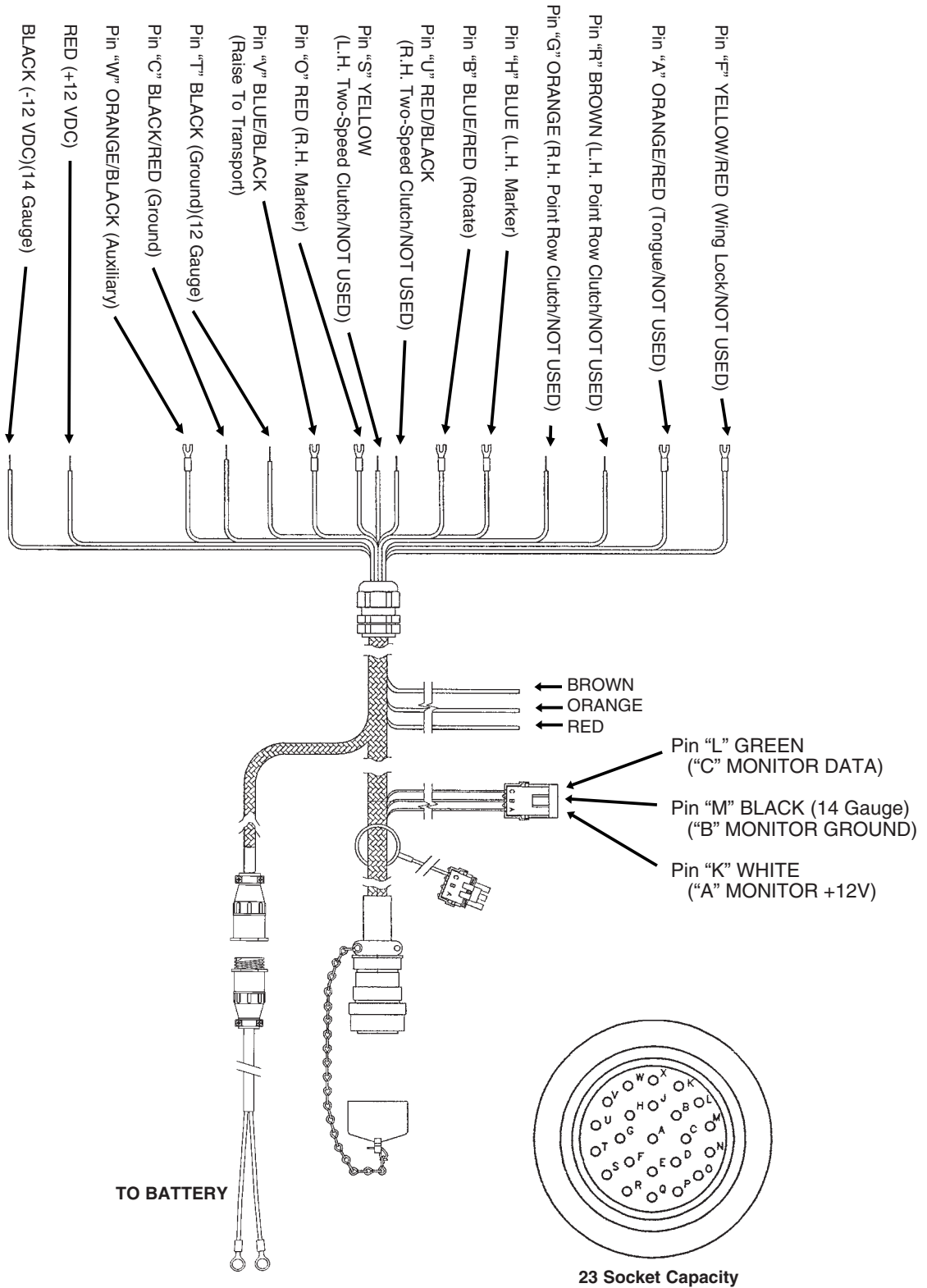
1. Operating marker or point row switch in either direction lights panel light.
2. Point row clutch switch operates independently of the rest of the control box.
3. Power to the marker switch is fed through the auxiliary switch and the two transport function switches. Operating any of the switches in the lower row disables the marker function and turns off the panel light. (If the point row clutch switch is in the OFF position.)

\*Not used on Model 3400 planter.

# MAINTENANCE

## ELECTRICAL WIRING HARNESS SCHEMATIC (On Tractor)

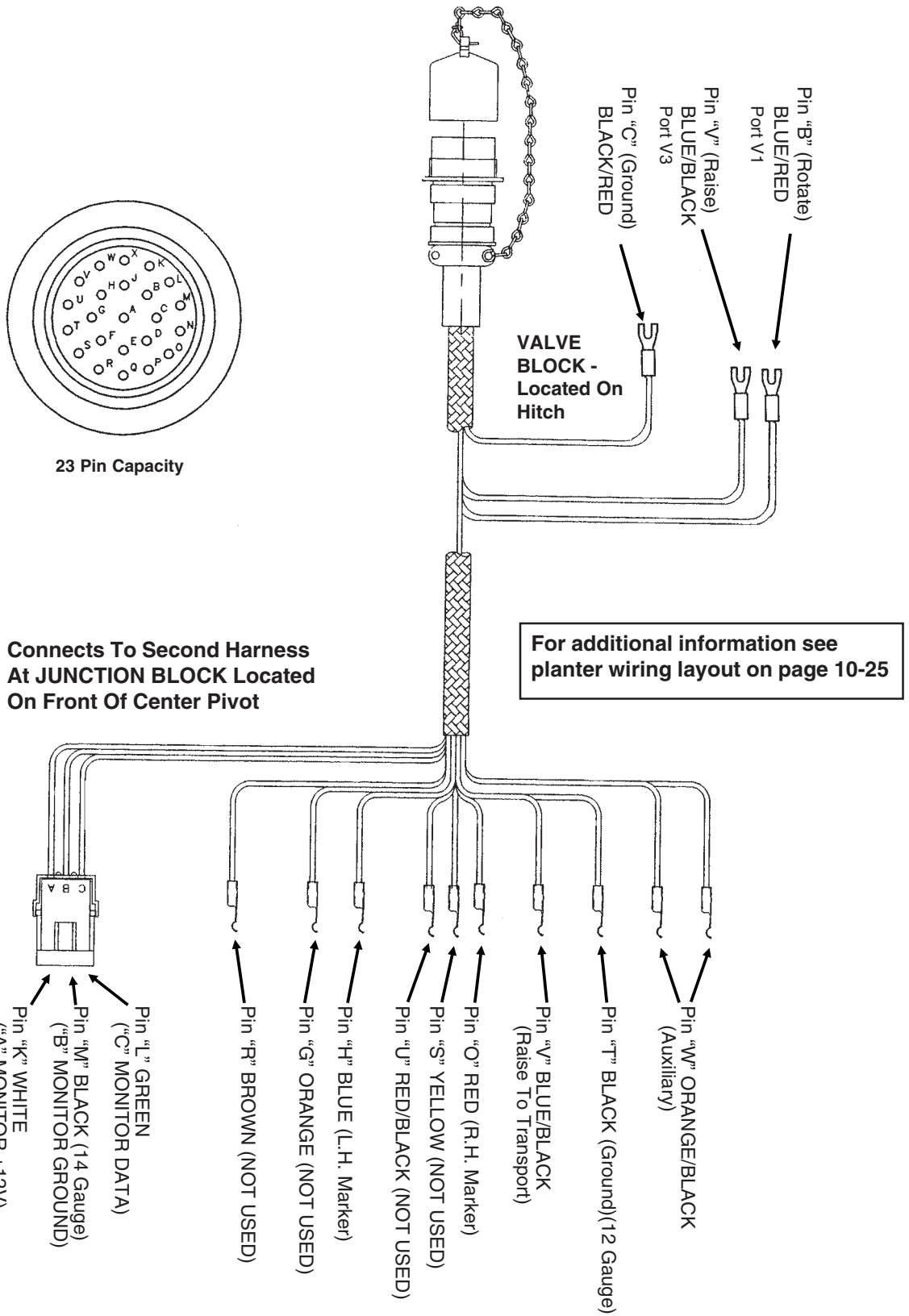
A7368(ELC10C/ELC13)



# MAINTENANCE

## ELECTRICAL WIRING HARNESS SCHEMATIC (On Planter)

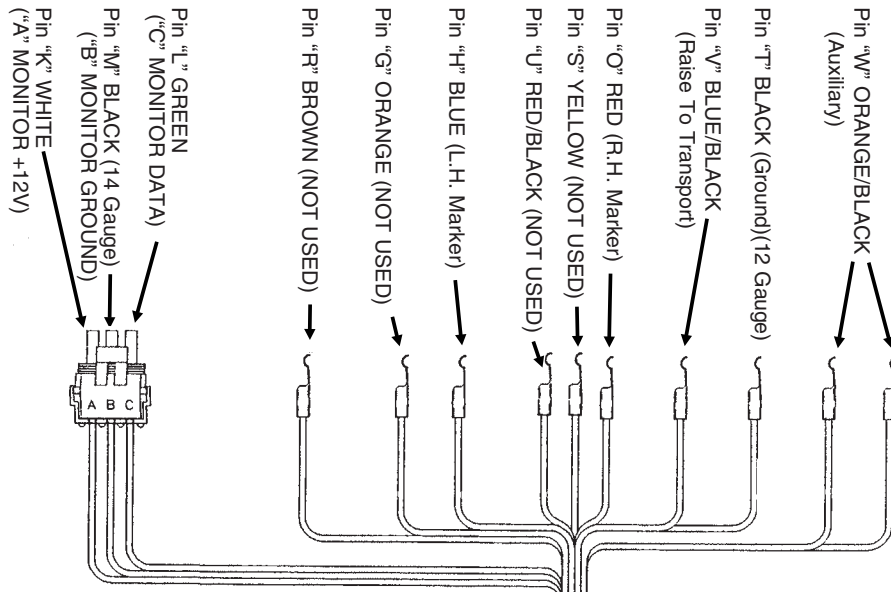
(ELC13/A9530)



# MAINTENANCE

## ELECTRICAL WIRING HARNESS SCHEMATIC (On Planter)

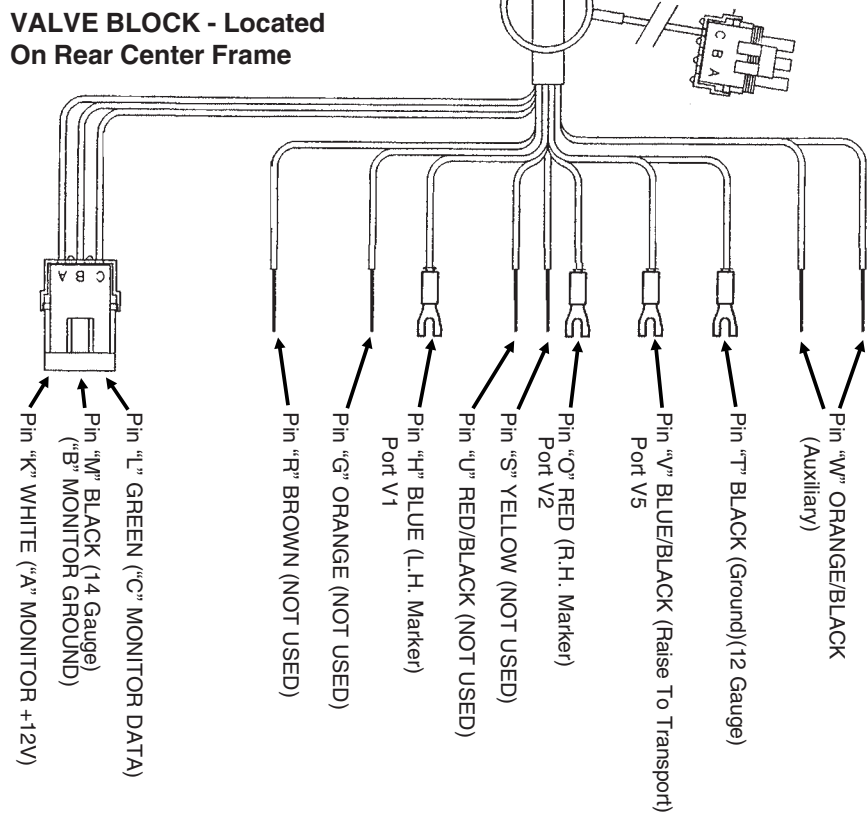
(A9531)



Connects To Second Harness  
At JUNCTION BLOCK Located  
On Front Of Center Pivot

For additional information see  
planter wiring layout on page 10-25

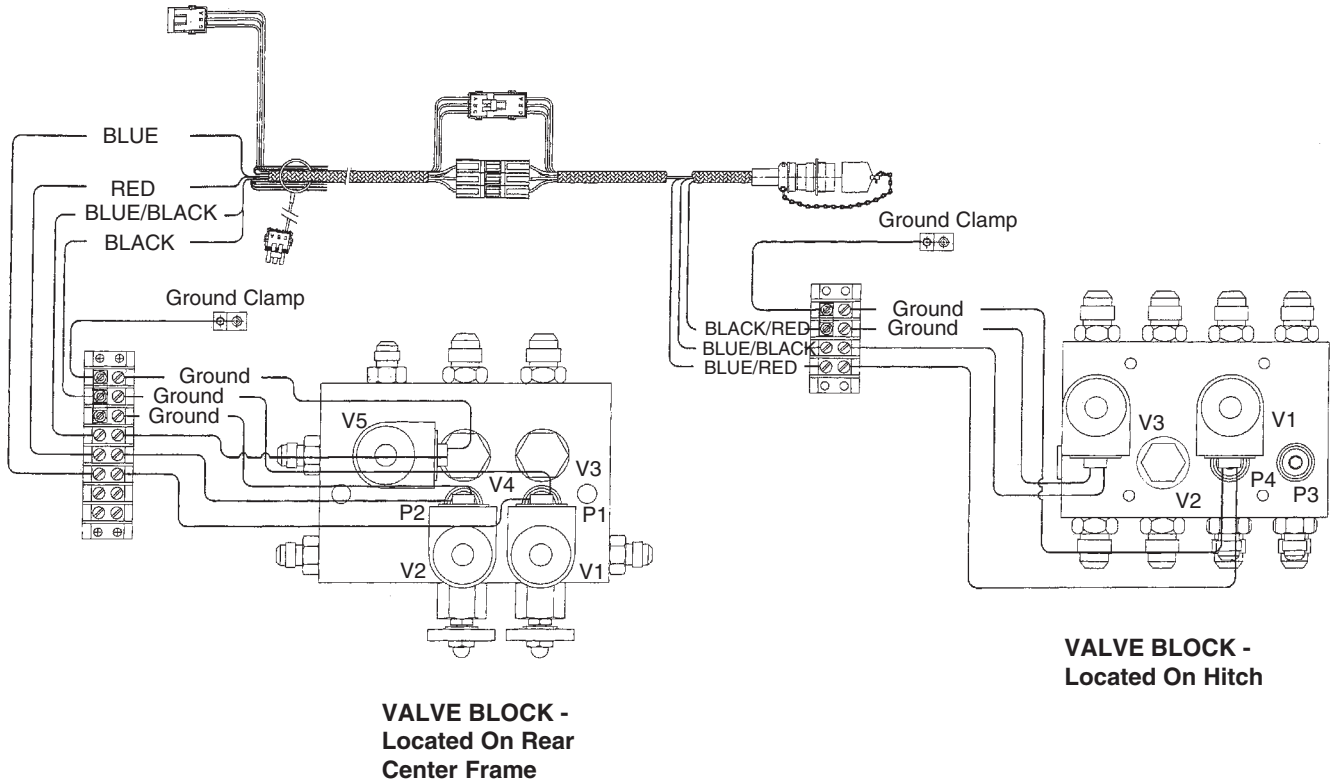
VALVE BLOCK - Located  
On Rear Center Frame



# MAINTENANCE

## PLANTER WIRING LAYOUT

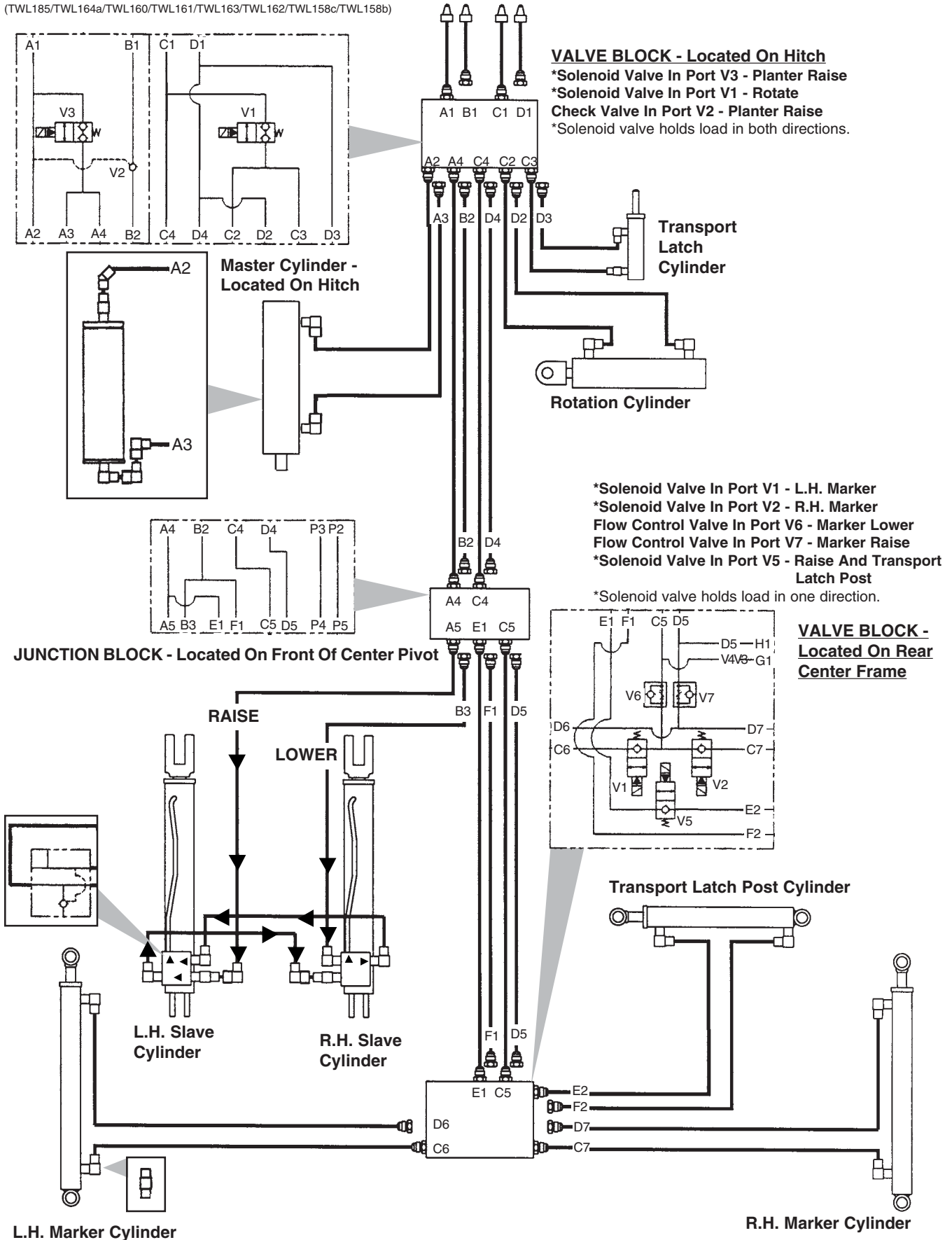
(ELC40)



# MAINTENANCE

## HYDRAULIC SYSTEM SCHEMATIC - Planter

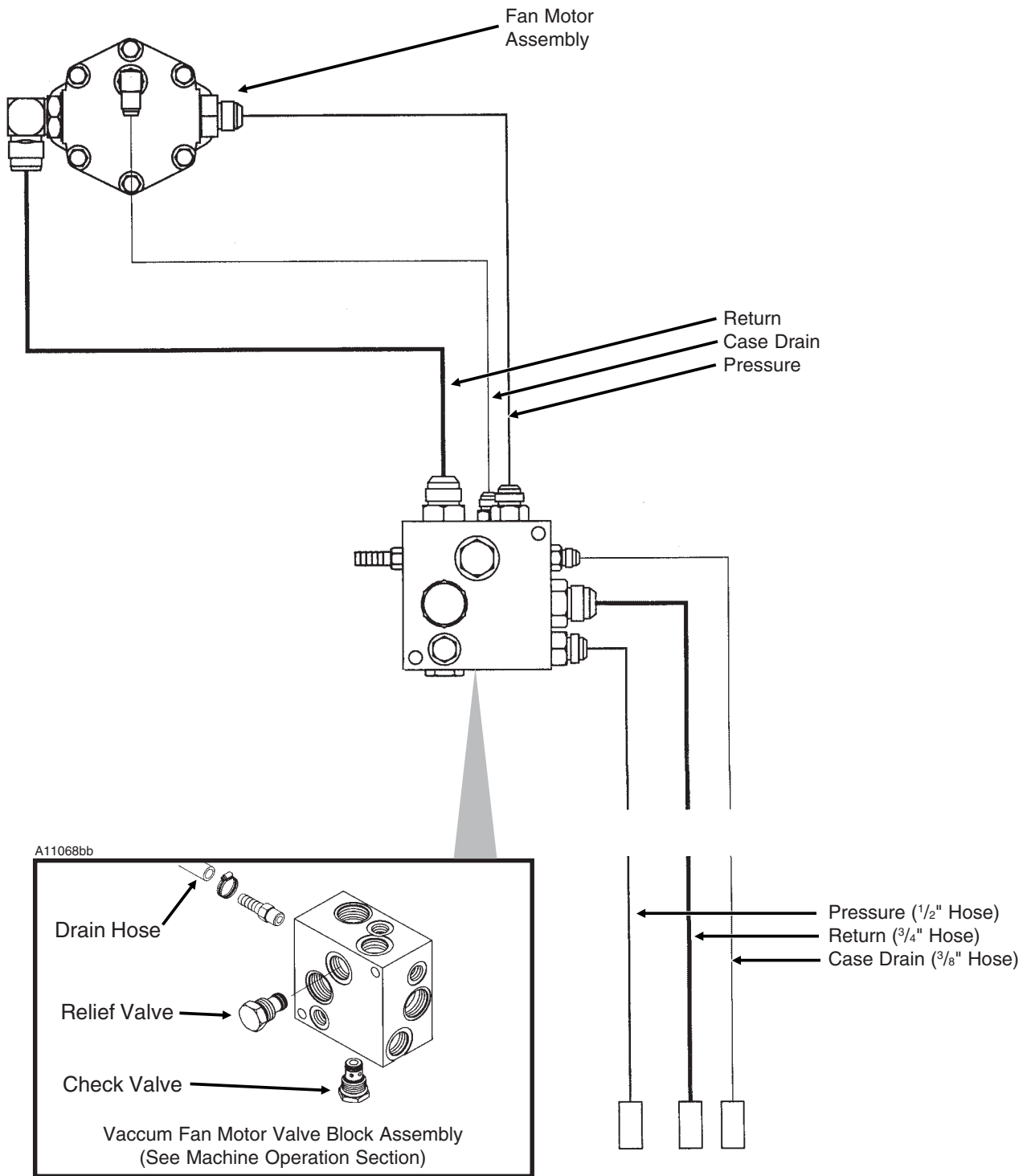
(TWL185/TWL164a/TWL160/TWL161/TWL163/TWL162/TWL158c/TWL158b)



# MAINTENANCE

## HYDRAULIC SYSTEM SCHEMATIC - Vacuum Fan Motor System

(TWL309)



**IMPORTANT:** Connect hydraulic motor case drain to a case drain return line with zero pressure on the tractor. Failure to connect to a return with zero pressure will cause damage to the hydraulic motor. DO NOT connect hydraulic motor case drain to SCV outlet. Contact tractor manufacturer for specific details on “zero pressure return”.

# MAINTENANCE

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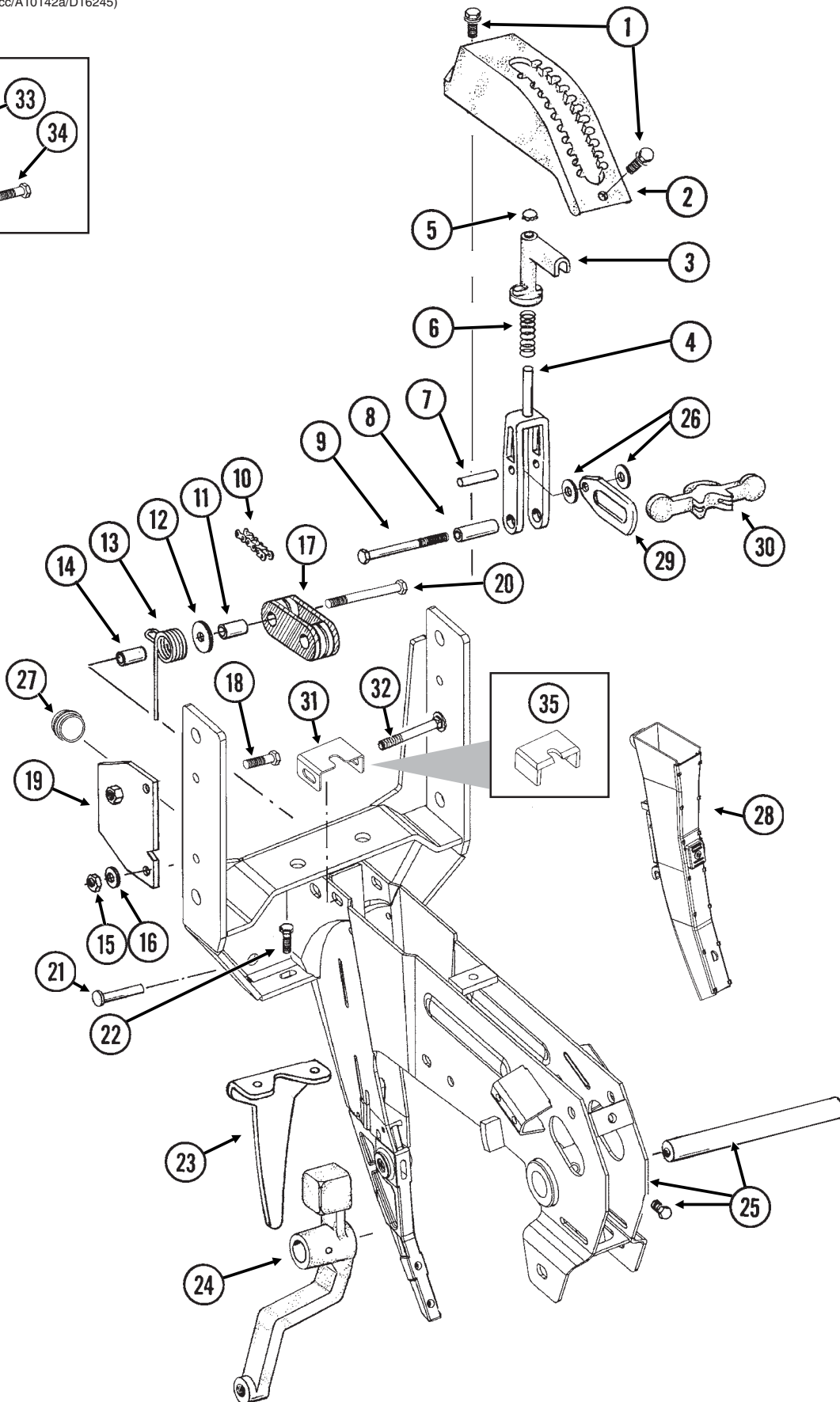
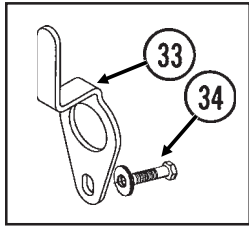
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# SHANK ASSEMBLY, SEED TUBE AND DEPTH ADJUSTMENT

(D17014/METR29cc/A10142a/D16245)

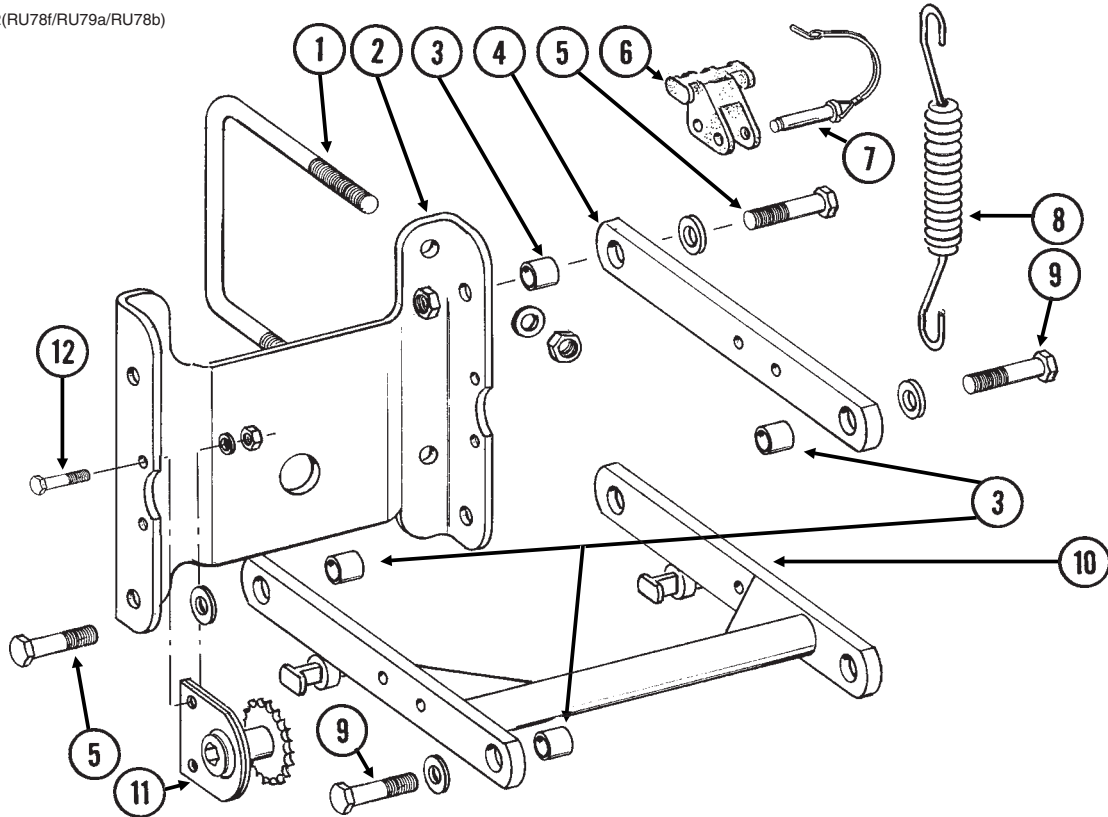


# SHANK ASSEMBLY, SEED TUBE AND DEPTH ADJUSTMENT

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G11015	2	Hex Washer Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{1}{4}$ "
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, $\frac{3}{8}$ " x 1 $\frac{2}{3}$ "
8.	GD11259	1	Sleeve, $\frac{3}{8}$ " I.D. x $\frac{5}{8}$ " O.D. x 1 $\frac{25}{32}$ " Long
9.	G11008	1	Hex Head Cap Screw, $\frac{3}{8}$ "-24 x 2 $\frac{1}{2}$ ", Grade 8
	G11007	1	Lock Nut, $\frac{3}{8}$ "-24, Grade C
10.	G3303-108	1	Chain, No. 41, 108 Pitch Including Connector Link
	GR0196	1	Connector Link, No. 41
11.	GD1026	1	Sleeve, 1 $\frac{3}{16}$ " Long
12.	G10201	1	Special Washer, $\frac{3}{8}$ " x 1 $\frac{1}{2}$ " O.D.
13.	GD1065	1	Idler Spring
14.	GD7318	1	Sleeve, 1" Long
15.	G10108	1	Lock Nut, $\frac{3}{8}$ "-16
16.	G10210	1	Washer, $\frac{3}{8}$ " USS
17.	GD11962	1	Idler
18.	G10003	3	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{1}{2}$ "
	G10108	3	Lock Nut, $\frac{3}{8}$ "-16
19.	GD10867	2	Stop
20.	G10326	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 3 $\frac{3}{4}$ "
21.	G10551	1	Clevis Pin, $\frac{1}{4}$ " x 2 $\frac{1}{2}$ "
	G10669	1	Hair Pin Clip, No. 22
22.	G10312	2	Carriage Bolt, $\frac{5}{16}$ "-18 x $\frac{3}{4}$ "
	G10620	2	Serrated Flange Nut, $\frac{5}{16}$ "-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, $\frac{1}{2}$ "-13 x $\frac{3}{4}$ "
26.	G10207	2	Washer, $\frac{7}{8}$ " O.D. x $\frac{13}{32}$ " I.D. x .134" (If Applicable)
27.	GD11845	1	Dust Cap
28.			See "KPM I Electronic Seed Monitor", "KPM II Stack-Mode Electronic Seed Monitors", And KPM III Electronic Seed Monitors, Pages P78-P82
29.	GB0285	1	Collar, Depth Adjustment
30.	GB0265	1	Pivot Link, Depth Adjustment
31.	GD15970	1	Sun Shade
32.	G10304	1	Carriage Bolt, $\frac{3}{8}$ "-16 x 3"
	G10108	1	Lock Nut, $\frac{3}{8}$ "-16
33.	GD17014	1	Hose Guide
34.	G10047	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{3}{4}$ "
	G10203	2-3	Washer, $\frac{3}{8}$ " SAE
	G10108	1	Lock Nut, $\frac{3}{8}$ "-16
35.	GD16245	-	Sun Shade (Rubber)

# PARALLEL ARMS, MOUNTING SUPPORT PLATE AND QUICK ADJUSTABLE DOWN FORCE SPRINGS

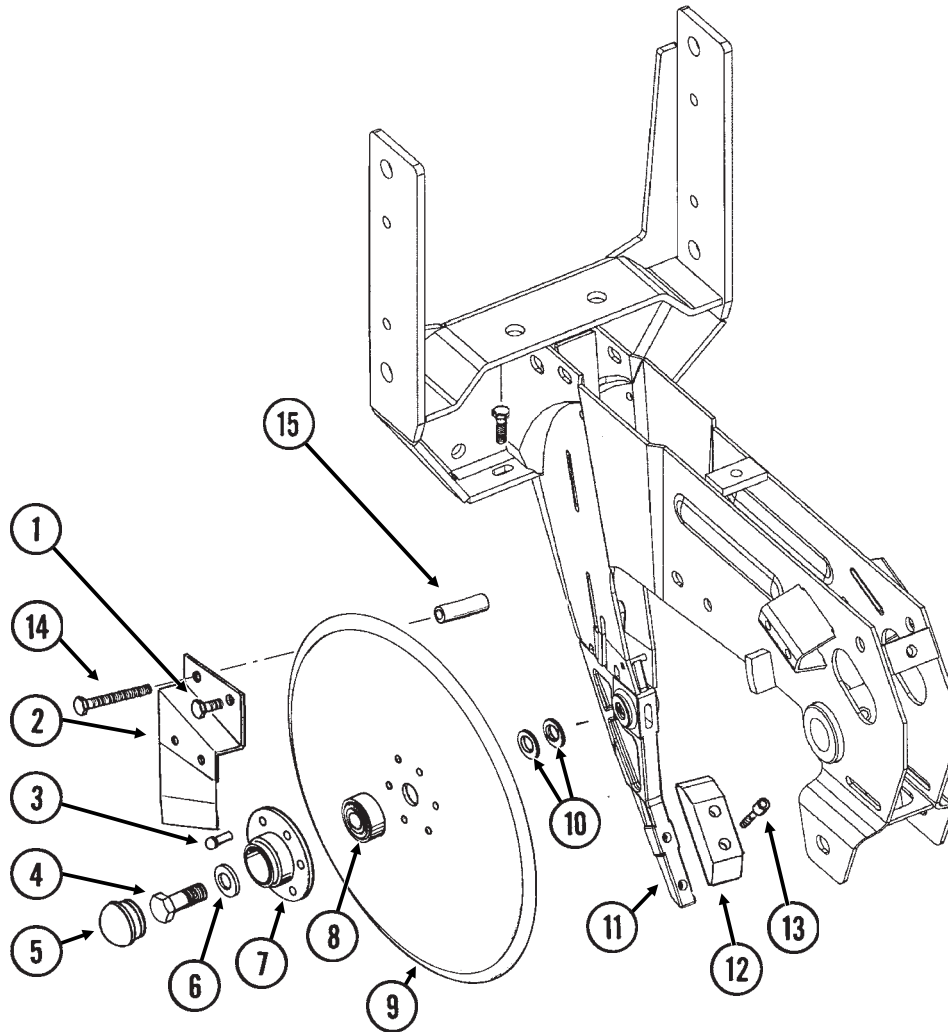
RUB021/RUB022(RU78f/RU79a/RU78b)



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 19/32" 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 P12
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) GD1114, (4) G10230, (4) G10104

# 15" SEED OPENER DISC BLADE/BEARING ASSEMBLY AND SCRAPERS

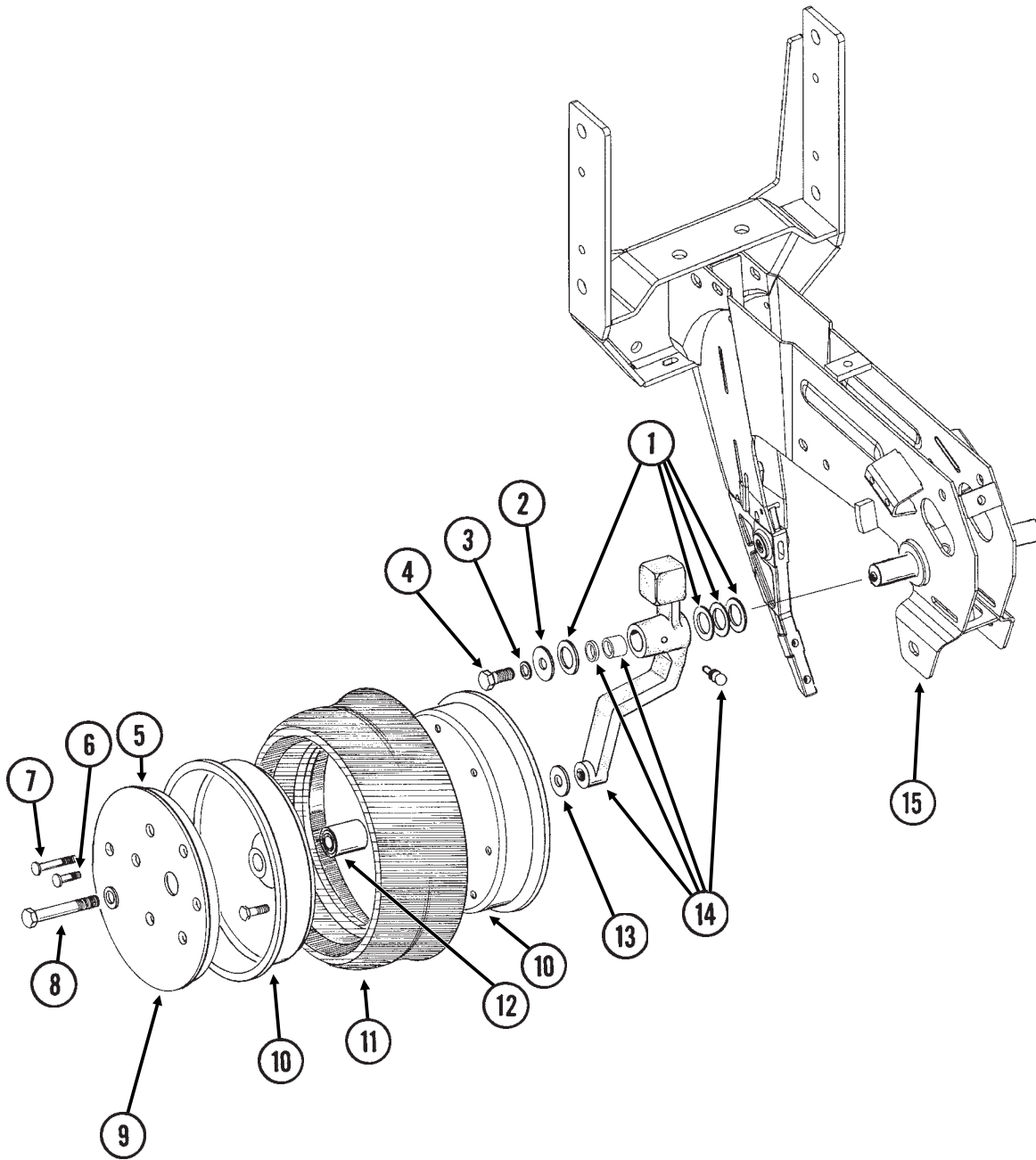
(RU139)



ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10328	2	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x $\frac{5}{8}$ "
	G10622	2	Serrated Flange Nut, $\frac{3}{8}$ "-16
2.	GA2012R	1	Disc Scraper, R.H.
	GA2012L	-	Disc Scraper, L.H. (Shown)
3.	G10427	12	Rivet, $\frac{1}{4}$ " x $\frac{1}{2}$ "
4.	GD11017	1	Special Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 1 $\frac{1}{2}$ ", L.H. Threads
	G10007	1	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 1 $\frac{1}{2}$ "
5.	GD11845	2	Dust Cap
6.	G10204	2	Special Machine Bushing, $\frac{5}{8}$ " 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, $\frac{5}{8}$ " (.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, $\frac{5}{16}$ "-18 x 1", Grade 8
14.	G10325	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 2 $\frac{3}{4}$ "
	G10622	1	Serrated Flange Nut, $\frac{3}{8}$ "-16
15.	GD11259	1	Sleeve, $\frac{3}{8}$ " I.D. x $\frac{5}{8}$ " O.D. x 1 $\frac{25}{32}$ " Long
A.	GA8324	-	Disc Blade/Bearing Assembly, Less Dust Cap (Items 3 And 7-9)

# GAUGE WHEELS

(RU140)

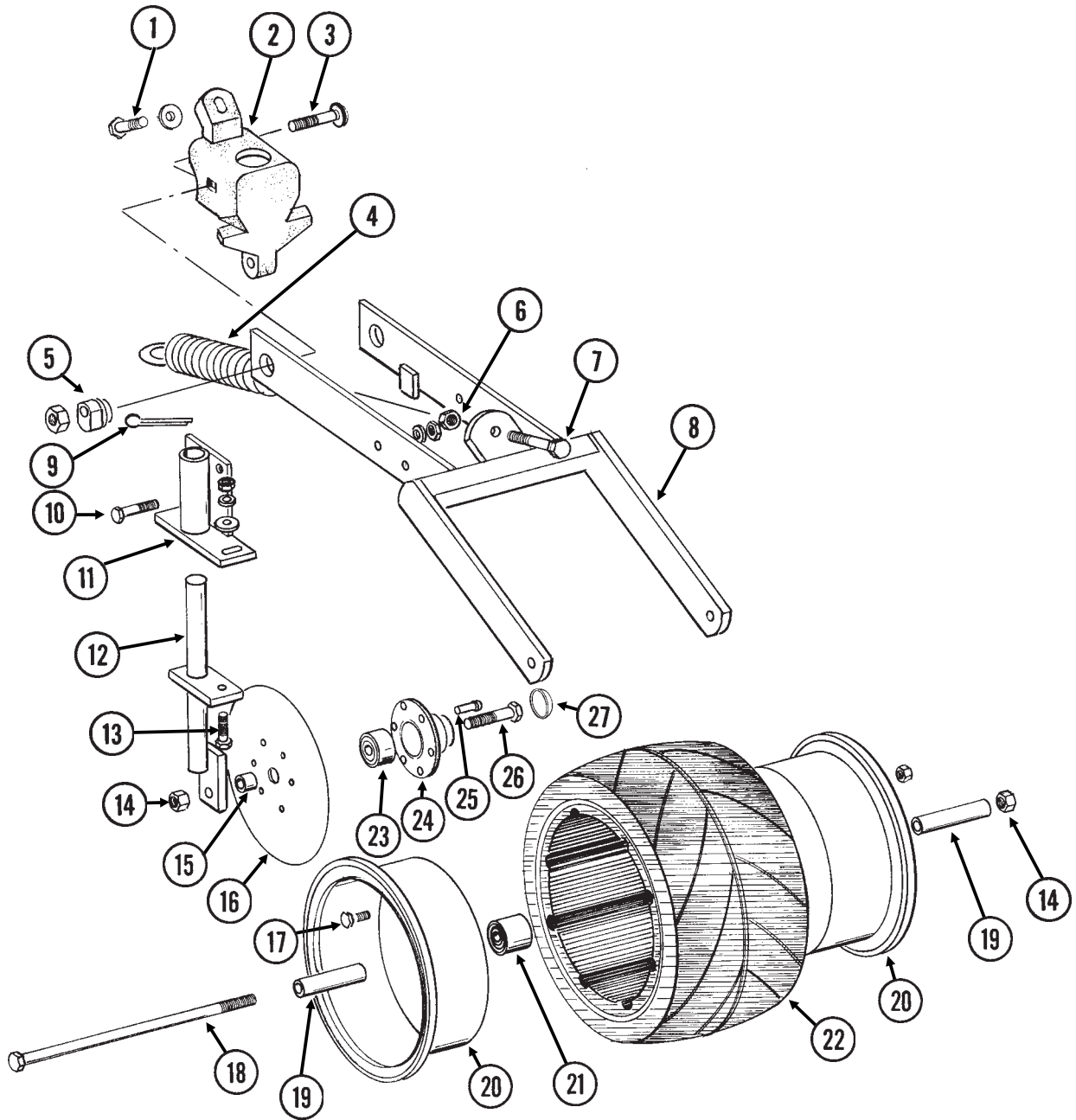


# GAUGE WHEELS

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

# COVERING DISCS/SINGLE PRESS WHEEL

RUA054/RUB026(RU94d)



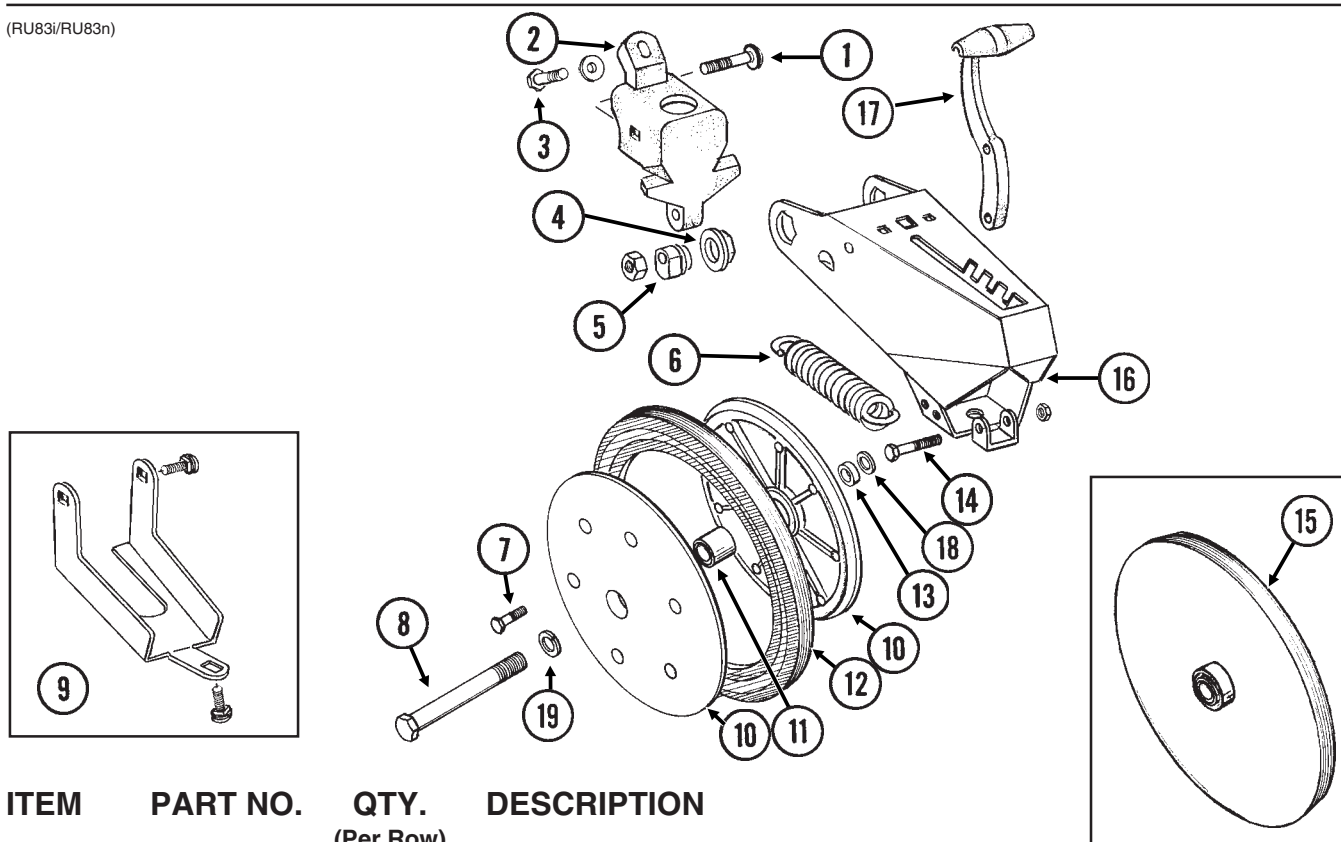


# COVERING DISCS/SINGLE PRESS WHEEL

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10001	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1"
	G10210	1	Washer, $\frac{3}{8}$ " USS
2.	GB0268	1	Wheel Arm Stop
3.	G10801	2	Carriage Bolt, $\frac{1}{2}$ "-13 x 2 $\frac{1}{4}$ "
	G10315	-	Carriage Bolt, $\frac{1}{2}$ "-13 x 2 $\frac{1}{2}$ " (Used W/Straight Drop In-Furrow Granular Chemical Bracket)
	G10102	2	Hex Nut, $\frac{1}{2}$ "-13
4.	GA2054	1	Spring
5.	GB0239	2	Eccentric Bushing
6.	G10102	1	Hex Nut, $\frac{1}{2}$ "-13
7.	G10015	1	Adjusting Bolt, $\frac{1}{2}$ "-13 x 5"
8.	GA6619	1	Mounting Arm
9.	G10463	2	Cotter Pin, $\frac{1}{4}$ " x 1 $\frac{1}{2}$ "
10.	G10171	4	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x 1 $\frac{1}{4}$ "
	G10232	4	Lock Washer, $\frac{5}{16}$ "
	G10106	4	Hex Nut, $\frac{5}{16}$ "-18
11.	GA6620	2	Bracket
12.	GA6618	2	Mount
13.	G10303	2	Carriage Bolt, $\frac{5}{16}$ "-18 x 1"
	G10219	2	Washer, $\frac{5}{16}$ " USS
	G10232	2	Lock Washer, $\frac{5}{16}$ "
	G10106	2	Hex Nut, $\frac{5}{16}$ "-18
14.	G10107	3	Lock Nut, $\frac{5}{8}$ "-11
15.	GD1109	2	Bushing, $\frac{41}{64}$ " I.D. x $\frac{7}{8}$ " O.D. x $\frac{1}{4}$ " Long
16.	GD9290	2	Disc Blade, 8"
17.	G10018	7	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x $\frac{5}{8}$ "
	G10109	7	Lock Nut, $\frac{5}{16}$ "-18, Grade 8
18.	G10152	1	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 9"
19.	GD3180-12	2	Sleeve, $\frac{5}{8}$ " I.D. x $\frac{7}{8}$ " O.D. x 2 $\frac{7}{8}$ " Long
20.	GD9562	2	Half Wheel
21.	GA6171	1	Bearing
22.	GD9305	1	Tire
23.	GA2014	2	Bearing
24.	GD10473	2	Bearing Housing
25.	G10427	12	Rivet, $\frac{1}{4}$ " x $\frac{1}{2}$ "
26.	G10006	2	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 2 $\frac{1}{4}$ "
27.	GD11845	2	Dust Cap
A.	GA6733	-	Single Press Wheel Complete W/Bearing (Items 17 And 20-22)
B.	GA6801	-	Covering Disc Blade Complete W/Bearing (Items 16 And 23-25)

# "V" CLOSING WHEELS

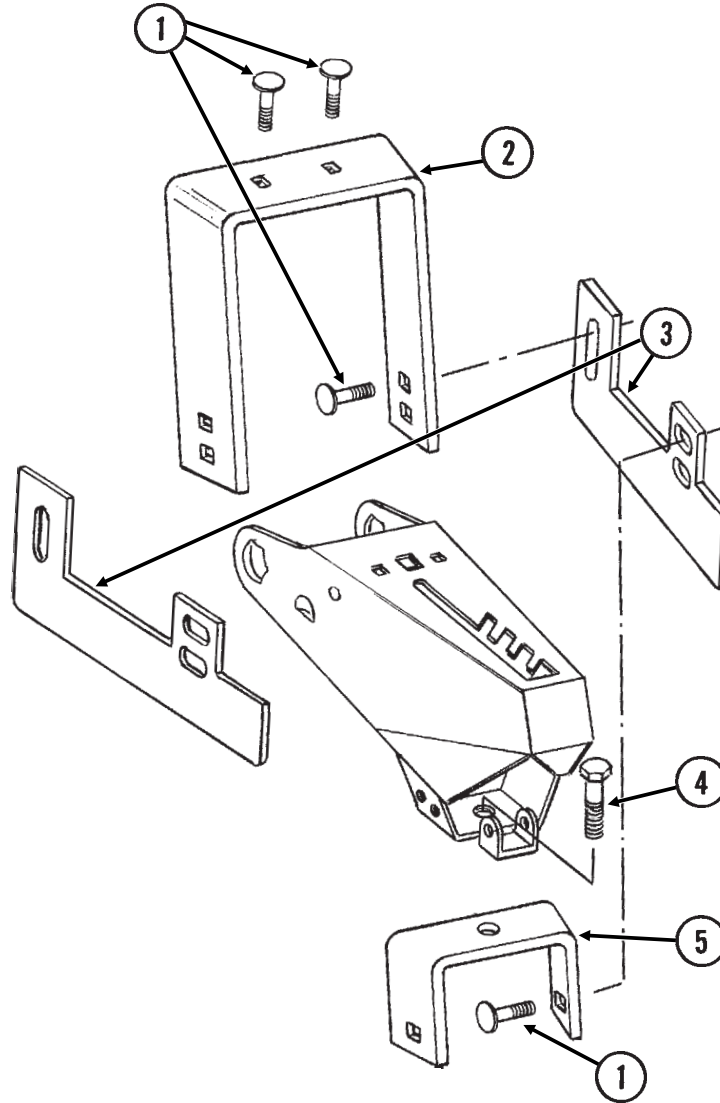
(RU83i/RU83n)



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.	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
10.	GD9120	4	Nylon Half Wheel
11.	GA6171	2	Bearing
12.	GD1085	2	Rubber Tire, 1" x 12"
13.	GD1109	2	Bushing, 41/64" 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.	G10230	2	Lock Washer, 5/8"
A.	GA6434	-	Rubber Closing Wheel Complete W/Bearing (Items 7 And 10-12)

# DRAG CLOSING ATTACHMENT

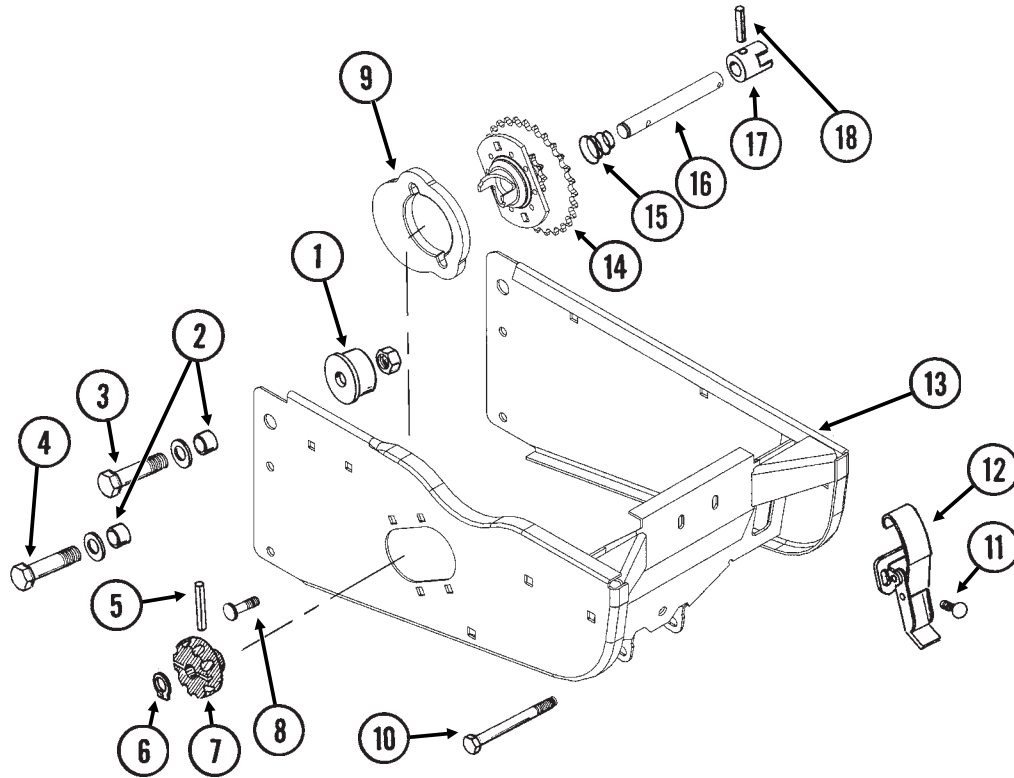
RUB050(RU90c)



ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Row)	
1.	G10599	6	Carriage Bolt, 3/8"-16 x 1 1/4"
	G10210	6	Washer, 3/8" USS
	G10229	6	Lock Washer, 3/8"
	G10101	6	Hex Nut, 3/8"-16
2.	GD11508	1	Front Bracket
3.	GD11313	2	Blade
4.	G10007	1	Hex Head Cap Screw, 5/8"-11 x 1 1/2"
	G10230	1	Lock Washer, 5/8"
	G10104	1	Hex Nut, 5/8"-11
5.	GD11509	1	Rear Bracket
A.	G7566X	-	Drag Closing Attachment Complete (Items 1-5)

# HOPPER SUPPORT AND METER DRIVE

(METR72)

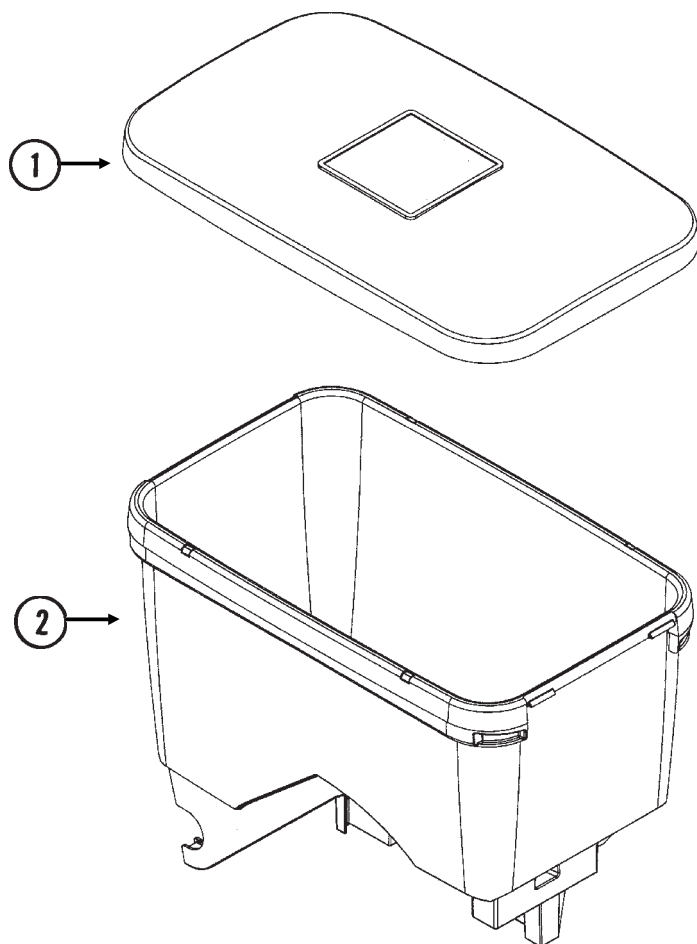


ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GB0314	2	Hopper Mount
2.	GB0218	4	Bushing, $2\frac{1}{32}$ " I.D. x $\frac{7}{8}$ " O.D. x $\frac{19}{32}$ " Long
3.	G10752	2	Hex Head Cap Screw, $\frac{5}{8}$ "-18 x 2 $\frac{1}{4}$ "
	GD7805	2	Special Washer, $\frac{5}{8}$ ", Hardened
	G10412	2	Lock Nut, $\frac{5}{8}$ "-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.	GA12143	1	Double Sprocket And Bearing, Drive Clutch, 11/28 Tooth
15.	GD11413	1	Spring
16.	GD15747	1	Shaft
17.	GB0278	1	Coupler
18.	G10546	1	Spring Pin, $\frac{3}{16}$ " x 1 $\frac{1}{4}$ "
A.	GA12144	-	Meter Drive Assembly, 11/28 Tooth (Items 5-7 And 14-18)

# SEED HOPPER AND LID

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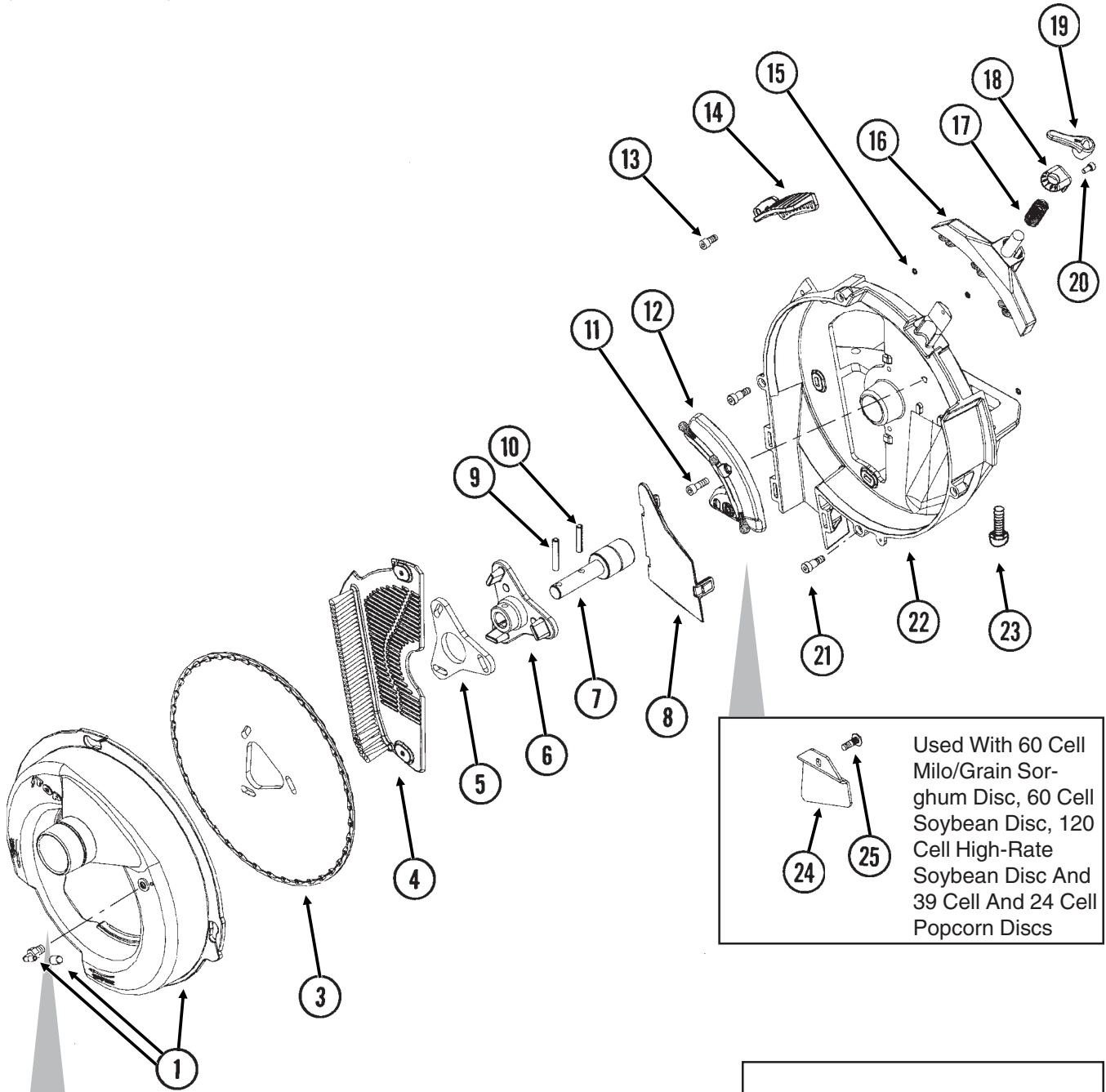
(METR12)





ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD11279	1	Lid
2.	GA10634	1	Seed Hopper

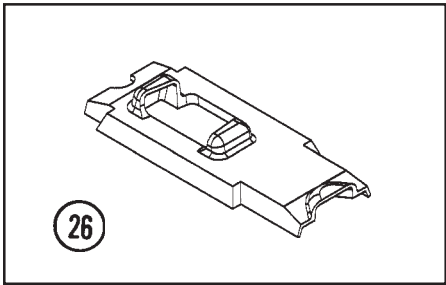
# SEED METER

(METR69/METR65/A12133)



Used With 60 Cell Milo/Grain Sorghum Disc, 60 Cell Soybean Disc, 120 Cell High-Rate Soybean Disc And 39 Cell And 24 Cell Popcorn Discs

	<p><b>2</b> Used With 60 Cell Milo/Grain Sorghum Disc</p>
	<p><b>27</b> Used With 20 Cell Hill-Drop Acid-Delinted Cotton Disc And 54 Cell Acid-Delinted Cotton/ Small Dry Edible Bean Disc</p>

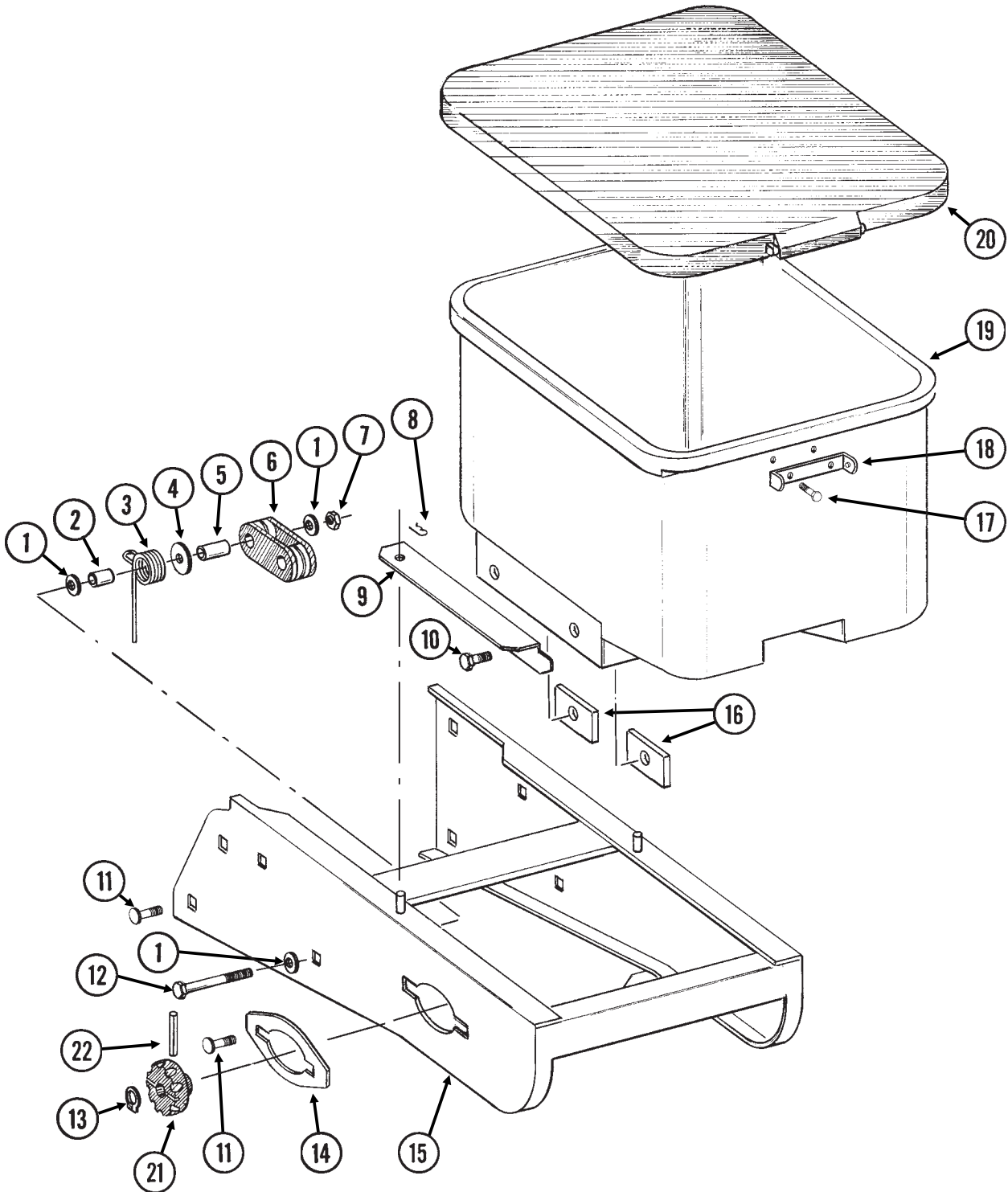


# SEED METER

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA11911	1	Vacuum Cover W/Elbow And Cap
	GD17099	-	<sup>3</sup> / <sub>16</sub> " Hose Barb Elbow
	GD17152	-	Cap
2.	GA12133	1	Cleanout Brush <b>(Used With 60 Cell Milo/Grain Sorghum Disc)</b>
3.	GD17049	-	Seed Disc, Corn/Popcorn, 39 Cell, Light Blue Color-Coded
	GD17048	-	Seed Disc, Low-Rate Corn/Popcorn, 24 Cell, Light Green Color-Coded
	GD14467	-	Seed Disc, Soybean, 60 Cell, Black Color-Coded
	GD14468	-	Seed Disc, High-Rate Soybean, 120 Cell, Dark Blue Color-Coded
	GD17050	-	Seed Disc, Milo/Grain Sorghum, 60 Cell, Yellow Color-Coded
	GD17187	-	Seed Disc, Hill-Drop Cotton, Acid-Delinted, 20 Cell (3 Seeds Per Cell), Brown Color-Coded
	GD17186	-	Seed Disc, Cotton, Acid-Delinted/Small Dry Edible Bean, 54 Cell, Dark Green Color-Coded
	GD14477	-	Seed Disc, Large Dry Edible Bean, 54 Cell, Tan Color-Coded
4.	GD17028	1	Wall Brush/Vent
5.	GD17021	1	Foam Spacer
6.	GB0328	1	Mount
7.	GA5698	1	Bearing
8.	GD14541	1	Discharge Cover
9.	G10602	1	Spring Pin, <sup>1</sup> / <sub>4</sub> " x 1 <sup>1</sup> / <sub>2</sub> "
10.	G10603	1	Spring Pin, <sup>1</sup> / <sub>4</sub> " x 1 <sup>1</sup> / <sub>4</sub> "
11.	G11213	1	Hex Socket Head Cap Screw, <sup>1</sup> / <sub>4</sub> "-20 x <sup>3</sup> / <sub>4</sub> "
12.	GA11935	1	Crowder Brush
13.	G10260	1	Hex Socket Head Cap Screw, <sup>1</sup> / <sub>4</sub> "-20 x <sup>1</sup> / <sub>2</sub> "
14.	GD17047	1	Air Inlet Screen
15.	GD17162	3	Push Nut, <sup>1</sup> / <sub>8</sub> " I.D.
16.	GA10755	1	Singulator Brush
17.	GD14592	1	Spring
18.	GB0358	1	Cap
19.	GD15663	1	Brush Adjustment Lever
20.	G11173	1	Hex Socket Head Cap Screw, No. 10-24 x <sup>3</sup> / <sub>8</sub> ", Stainless Steel
21.	G11172	4	Hex Socket Head Shoulder Screw, <sup>1</sup> / <sub>4</sub> "-20 x <sup>3</sup> / <sub>8</sub> ", Stainless Steel
22.	GB0319	1	Housing
23.	G11009	2	Locking Thumbscrew, <sup>5</sup> / <sub>16</sub> "-18 x <sup>3</sup> / <sub>4</sub> "
24.	GD17104	1	Seed Baffle <b>(Used With 60 Cell Milo/Grain Sorghum Disc, 60 Cell Soybean Disc, 120 Cell High-Rate Soybean Disc And 39 Cell And 24 Cell Popcorn Discs)</b>
25.	G11210	1	Rib Neck Bolt, <sup>1</sup> / <sub>4</sub> "-20 x <sup>3</sup> / <sub>4</sub> "
	G10323	1	Hex Flange Nut, <sup>1</sup> / <sub>4</sub> "-20, No Serration
26.	GD15700	1	Shank Cover, EdgeVac <sup>®</sup> Meter
27.	GA12154	-	Cleanout Brush W/Ball-Type Ejector <b>(Used With 20 Cell Hill-Drop Acid-Delinted Cotton Disc And 54 Cell Acid-Delinted Cotton/Small Dry Edible Bean Disc)</b>

# GRANULAR CHEMICAL HOPPER AND HOPPER PANEL EXTENSION

(METR14d)





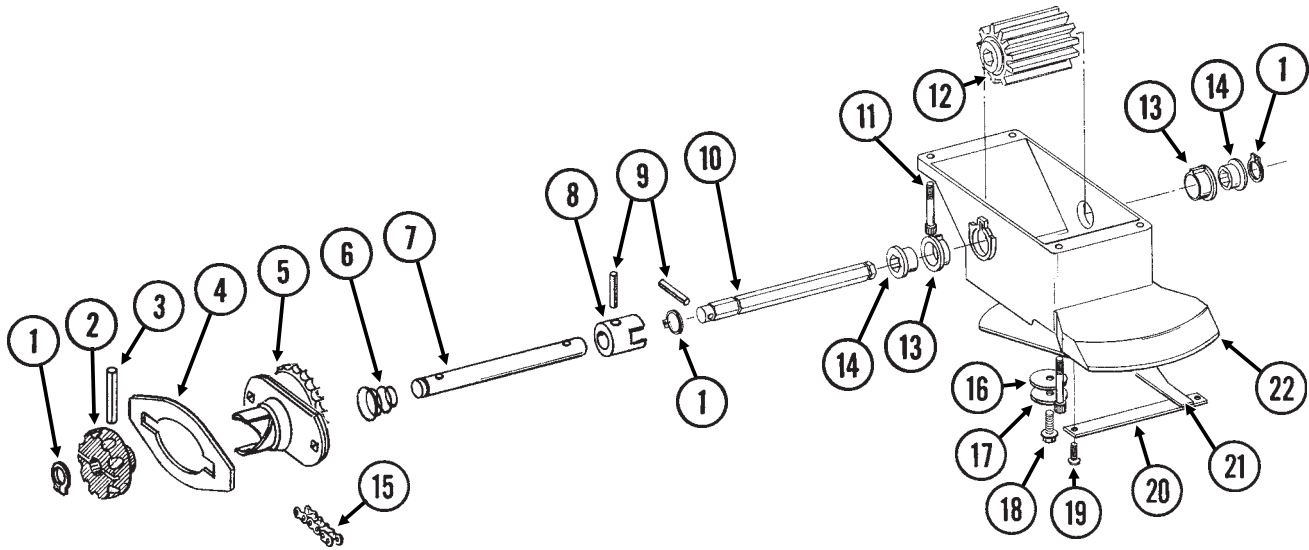
# GRANULAR CHEMICAL HOPPER AND HOPPER PANEL EXTENSION

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ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10210	3	Washer, $\frac{3}{8}$ " USS
2.	GD2971-10	1	Sleeve, $\frac{9}{16}$ " Long
3.	GD11219	1	Spring
4.	G10201	1	Special Washer, $\frac{3}{8}$ " x 1 $\frac{1}{2}$ " O.D.
5.	GD1026	1	Sleeve, 1 $\frac{3}{16}$ " Long
6.	GD11962	1	Idler
7.	G10108	1	Lock Nut, $\frac{3}{8}$ "-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, $\frac{3}{8}$ "-16 x $\frac{3}{4}$ "
	G10229	4	Lock Washer, $\frac{3}{8}$ "
11.	G10312	8	Carriage Bolt, $\frac{5}{16}$ "-18 x $\frac{3}{4}$ "
	G10620	8	Serrated Flange Nut, $\frac{5}{16}$ "-18
12.	G10325	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 2 $\frac{3}{4}$ "
13.	G10567	3	External Retaining Ring, $\frac{5}{8}$ "
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, $\frac{1}{4}$ "-20 x $\frac{3}{4}$ "
	G10621	2	Serrated Flange Nut, $\frac{1}{4}$ "-20
18.	GD1060	1	Hinge
19.	GA8371	1	Hopper
20.	GA4444	1	Lid
21.	GD11239	1	Knob
22.	G10602	1	Spring Pin, $\frac{1}{4}$ " x 1 $\frac{1}{2}$ "

# GRANULAR CHEMICAL METER AND METER DRIVE

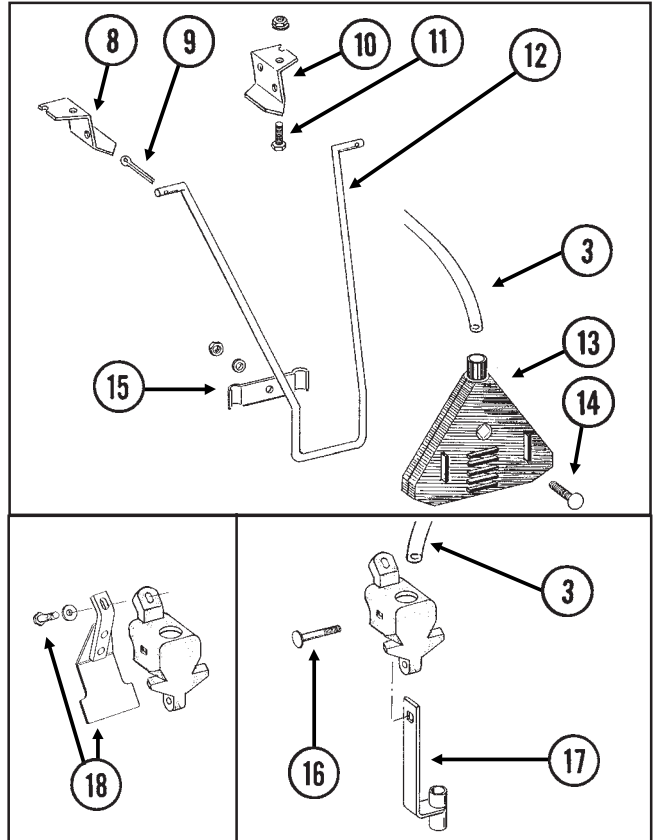
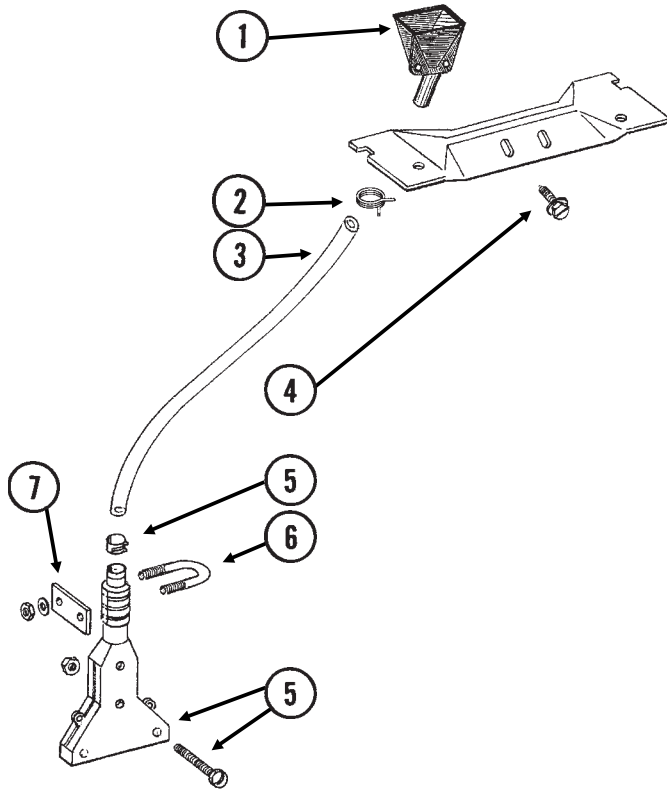
RUA051/RUB028(RU91a)



ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10567	3	External Retaining Ring, $\frac{5}{8}$ "
2.	GD11239	1	Knob
3.	G10602	1	Spring Pin, $\frac{1}{4}$ " x $1 \frac{1}{2}$ "
4.		-	See "Granular Chemical Hopper And Hopper Panel Extension", Pages P16 And P17
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, $\frac{3}{16}$ " x $1 \frac{1}{4}$ "
10.	GD11297	1	Shaft
11.	G10921	4	Hex Socket Head Cap Screw, No. 10-24 x $\frac{7}{8}$ "
	G10257	4	Lock Washer, No. 10
12.	GD7148	1	Feed Roller, Hex Bore
13.	GB0115	2	Bearing
14.	GD7258	2	Hex Bushing
15.	G3303-108	1	Chain, No. 41, 108 Pitch Including Connector Link
	GR0196	1	Connector Link, No. 41
16.	G10660	1	Wave Washer, $\frac{1}{2}$ "
17.	G10209	1	Washer, $\frac{1}{4}$ " USS
18.	G10570	1	Slotted Hex Self-Tapping Screw, $\frac{1}{4}$ "-20 x $\frac{3}{4}$ "
19.	G11073	2	Slotted Hex Self-Tapping Screw, No. 10 x $\frac{3}{8}$ "
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

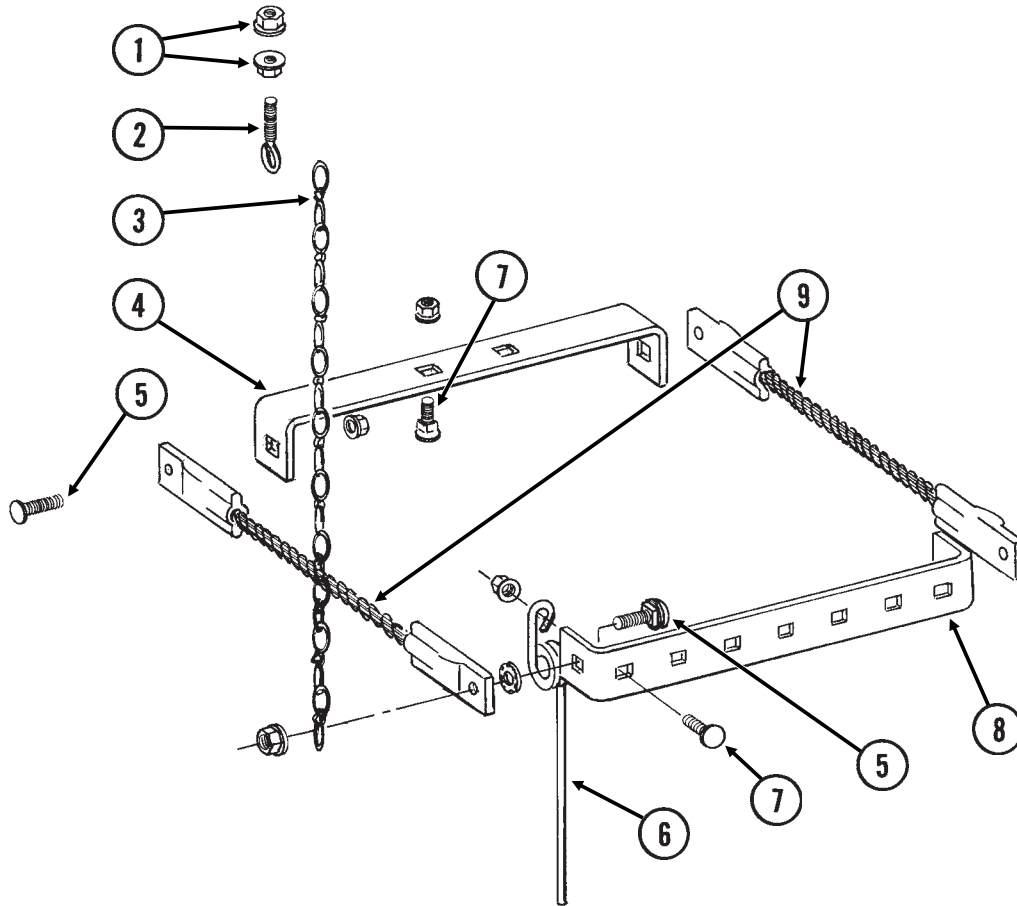
RUA061/RUA073(RU101mm/RU83m)



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.	GD1115L	-	Hanger Bracket, L.H.
9.	G10452	-	Cotter Pin, 1/8" x 1/2"
10.	GD1115R	-	Hanger Bracket, R.H.
11.	G10310	-	Carriage Bolt, 1/4"-20 x 3/4", Grade 2
	G10227	-	Lock Washer, 1/4"
	G10103	-	Hex Nut, 1/4"-20
12.	GD1116	-	Hanger
13.	GA2075	-	Diffuser, 14" Band
14.	G10306	-	Carriage Bolt, 3/8"-16 x 2"
	G10229	-	Lock Washer, 3/8"
	G10101	-	Hex Nut, 3/8"-16
15.	GD1118	-	Clamp
16.	G10315	1	Carriage Bolt, 1/2"-13 x 2 1/2" (Replaces Existing 1/2" x 2 1/4" Hardware)
17.	GA6741	1	Bracket (Straight Drop In-Furrow)
18.	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

# SPRING TOOTH INCORPORATOR

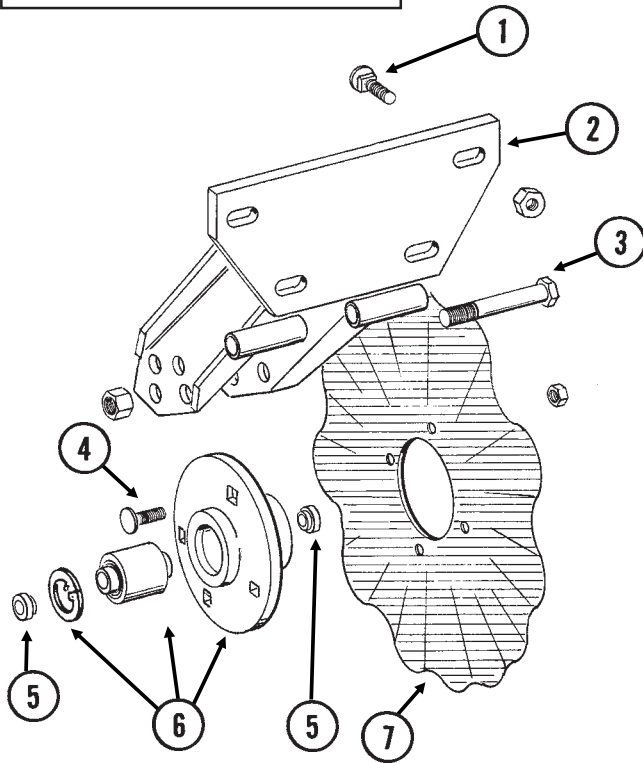
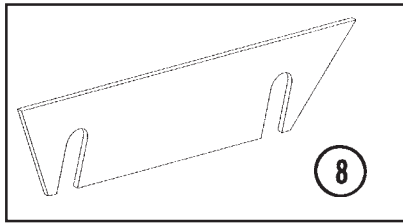
RUA055(RU95)



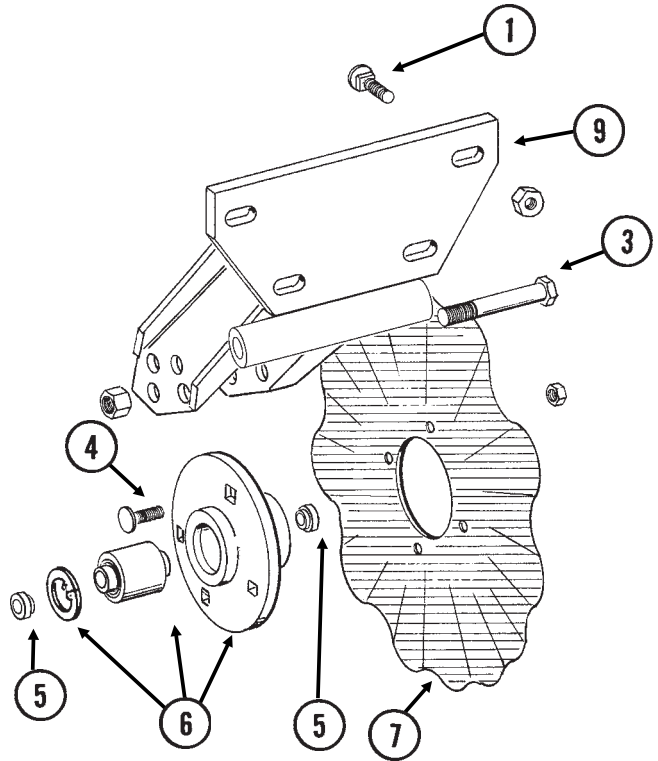
ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10621	4	Serrated Flange Nut, 1/4"-20
2.	GD2460	2	Eyebolt, 1/4"-20
3.	G3305-01	4	Twin Loop Chain, 9 Links
4.	GD1143	1	Front Bracket
5.	G10305	4	Carriage Bolt, 3/8"-16 x 1"
	G10529	4	External Tooth Lock Washer, 3/8"
	G10622	4	Serrated Flange Nut, 3/8"-16
6.	GD1145	7	Spring Tooth
7.	G10308	9	Carriage Bolt, 3/8"-16 x 3/4"
	G10622	9	Serrated Flange Nut, 3/8"-16
8.	GD1144	1	Rear Bracket
9.	GA2094	2	Cable Assembly

# ROW UNIT MOUNTED NO TILL COULTER

(D14398/RU102c/RU152)



**STYLE A**

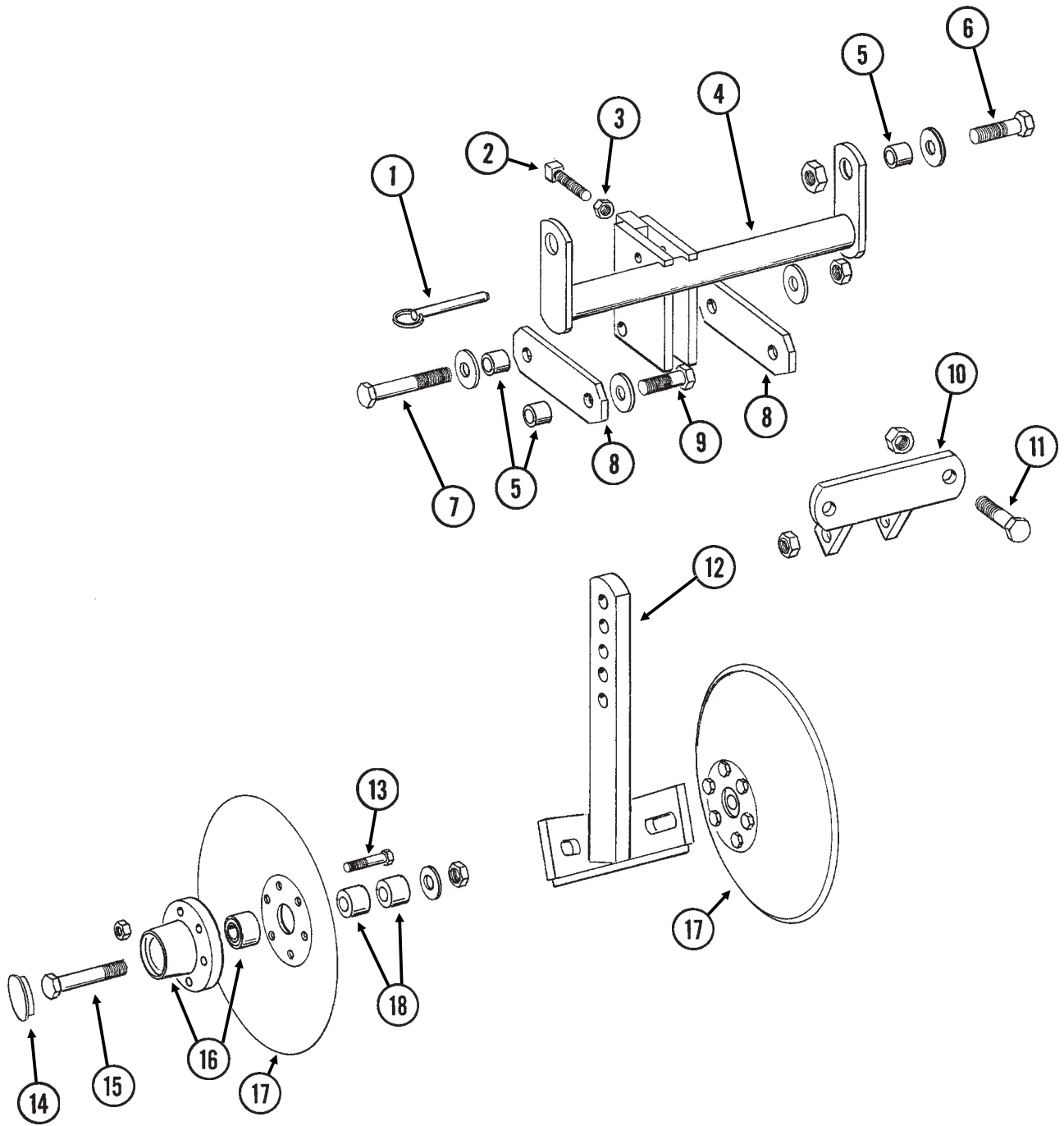


**STYLE B**

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Row)	
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)



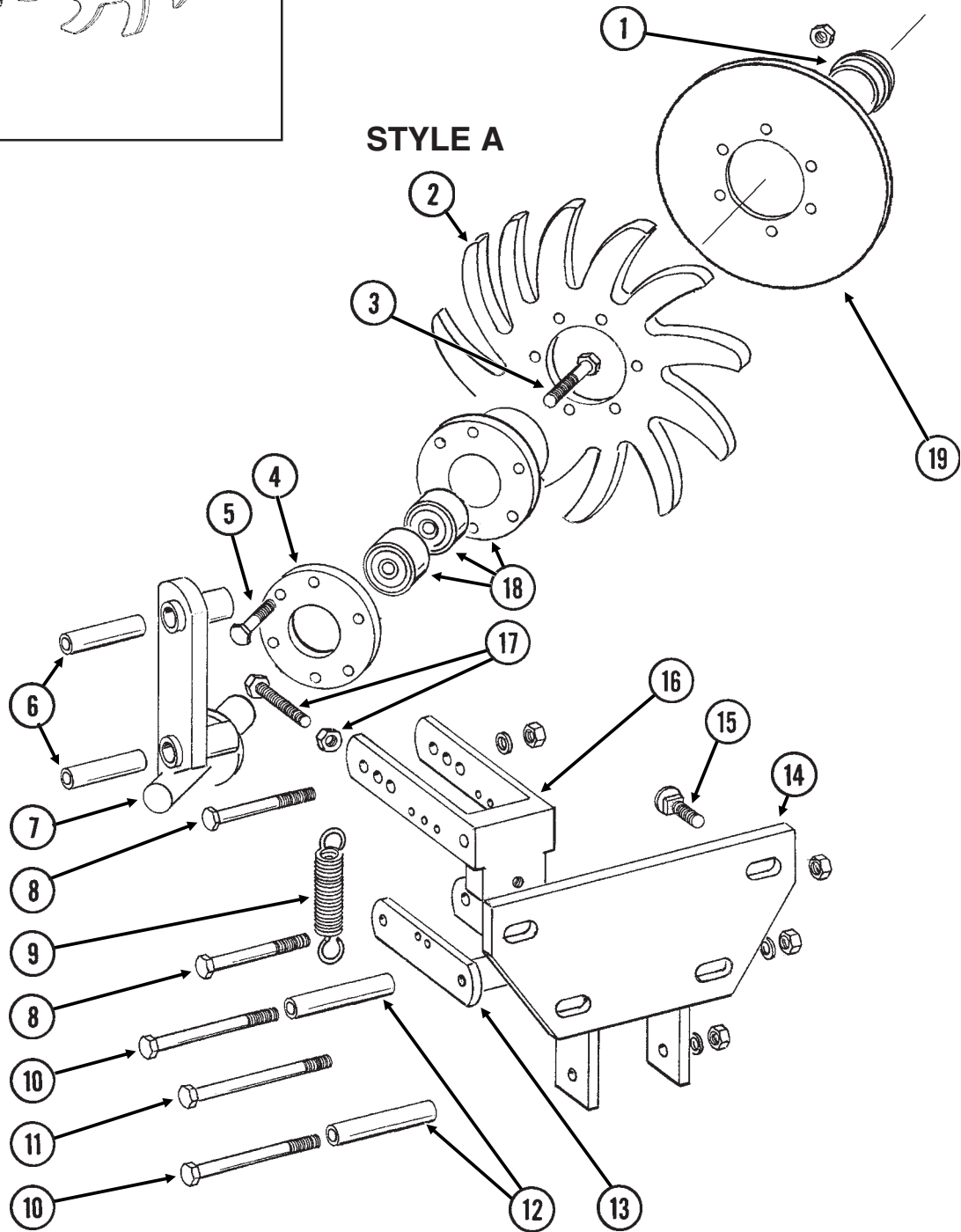
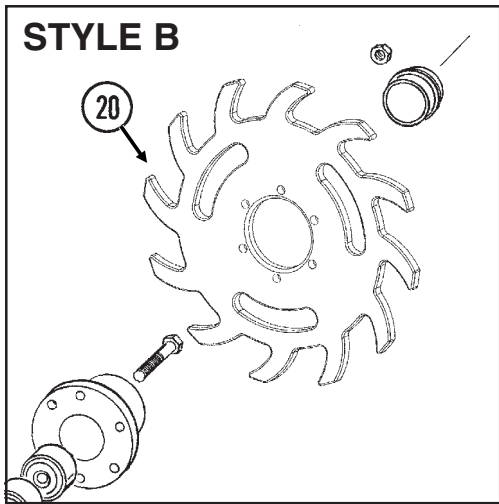
# ROW UNIT MOUNTED DISC FURROWER

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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

(RU103dd/RU103d)





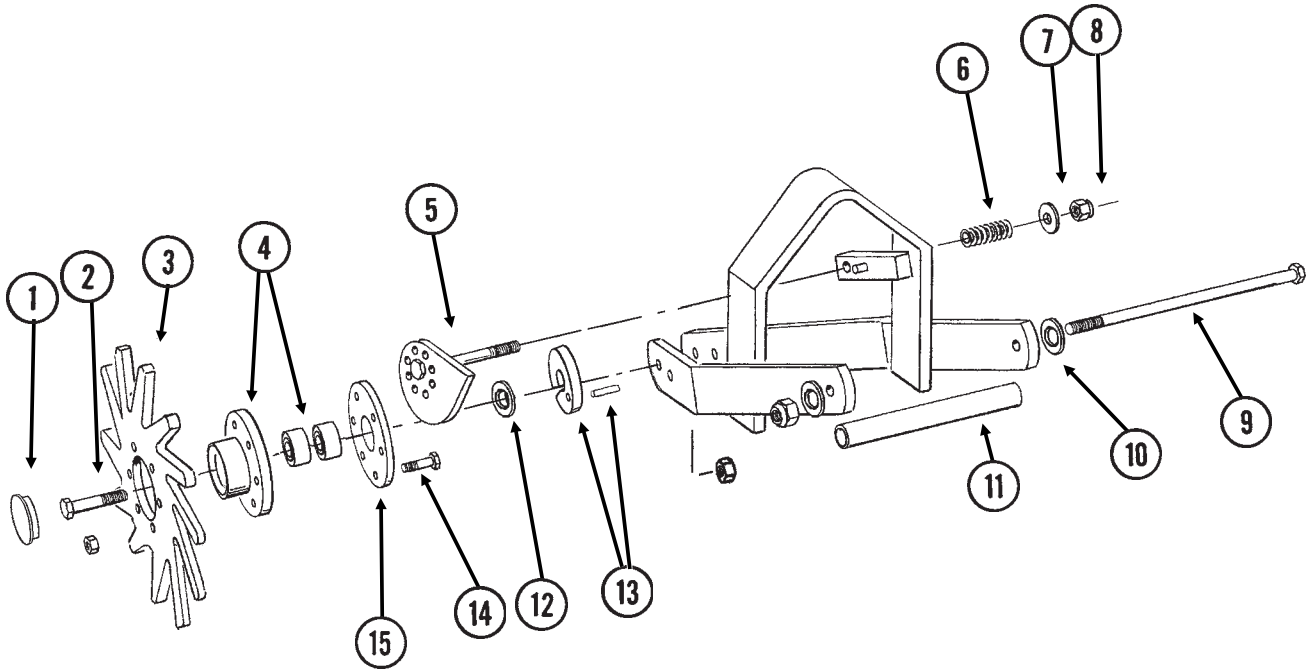
# ROW UNIT MOUNTED RESIDUE WHEEL

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GD1132	1	Dust Cap
2.	GD10552	1	Wheel, 12 Tine, $\frac{3}{8}$ " x 12"
3.	G10006	1	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 2 $\frac{1}{4}$ "
4.	GD9724	1	Backing Plate
5.	G10133	6	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x 1 $\frac{1}{2}$ "
	G10109	6	Lock Nut, $\frac{5}{16}$ "-18, Grade 8
6.	GD9720	2	Spacer, $\frac{1}{2}$ " x 2 $\frac{3}{16}$ " Long
7.	GA6838	1	Wheel Mount
8.	G10033	2	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 3 $\frac{1}{2}$ "
	G10228	2	Lock Washer, $\frac{1}{2}$ "
	G10102	2	Hex Nut, $\frac{1}{2}$ "-13
9.	GD5857	2	Spring
10.	G10045	2	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 4 $\frac{1}{2}$ "
	G10228	2	Lock Washer, $\frac{1}{2}$ "
	G10102	2	Hex Nut, $\frac{1}{2}$ "-13
11.	G10348	1	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 5" (Lockup Bolt)
	G10111	1	Lock Nut, $\frac{1}{2}$ "-13
12.	GD9715	2	Spacer, $\frac{1}{2}$ " x 3" Long
13.	GA6834	1	Lower Link
14.	GA6832	1	Mount
15.	G10574	4	Carriage Bolt, $\frac{1}{2}$ "-13 x 1 $\frac{1}{4}$ "
	G10111	4	Lock Nut, $\frac{1}{2}$ "-13
16.	GA6833	1	Upper Link
17.	G10371	1	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 3", Full Thread
	G10501	1	Hex Jam Nut, $\frac{1}{2}$ "-13, Grade 2
18.	GA5654	1	Hub W/Bearings
	GA2014	-	Bearing
19.	GD12534	-	Cover
20.	GB0387	1	Wheel, 12 Tine, $\frac{3}{8}$ " 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)

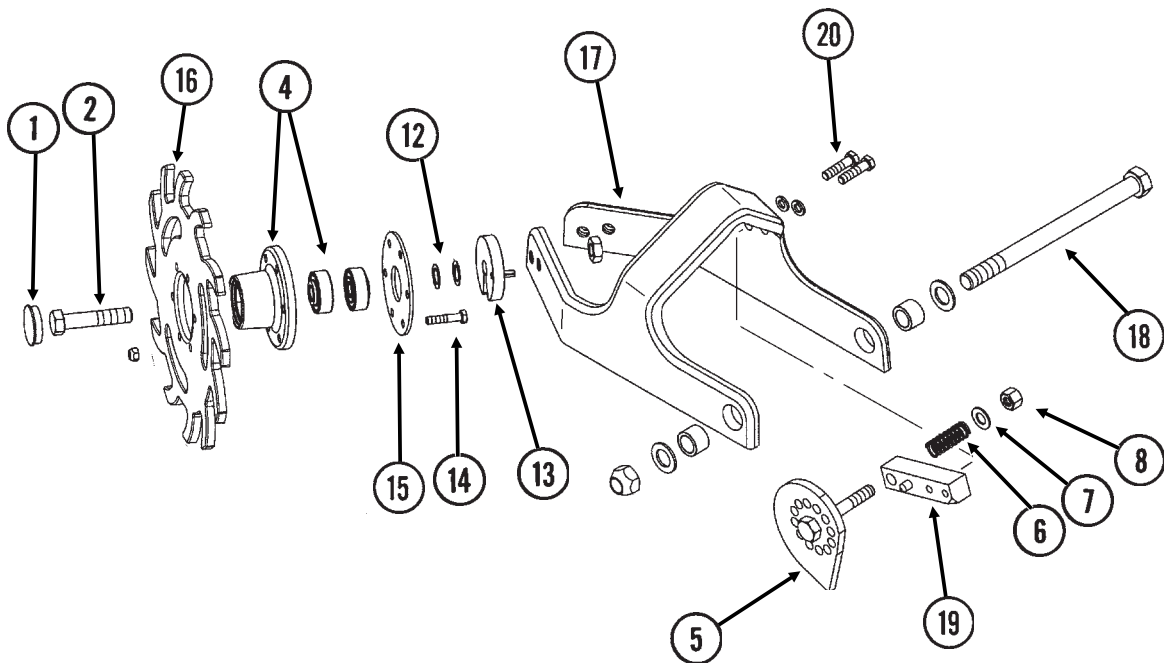
# COULTER MOUNTED RESIDUE WHEELS

(RU104uuu/RU153)

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



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

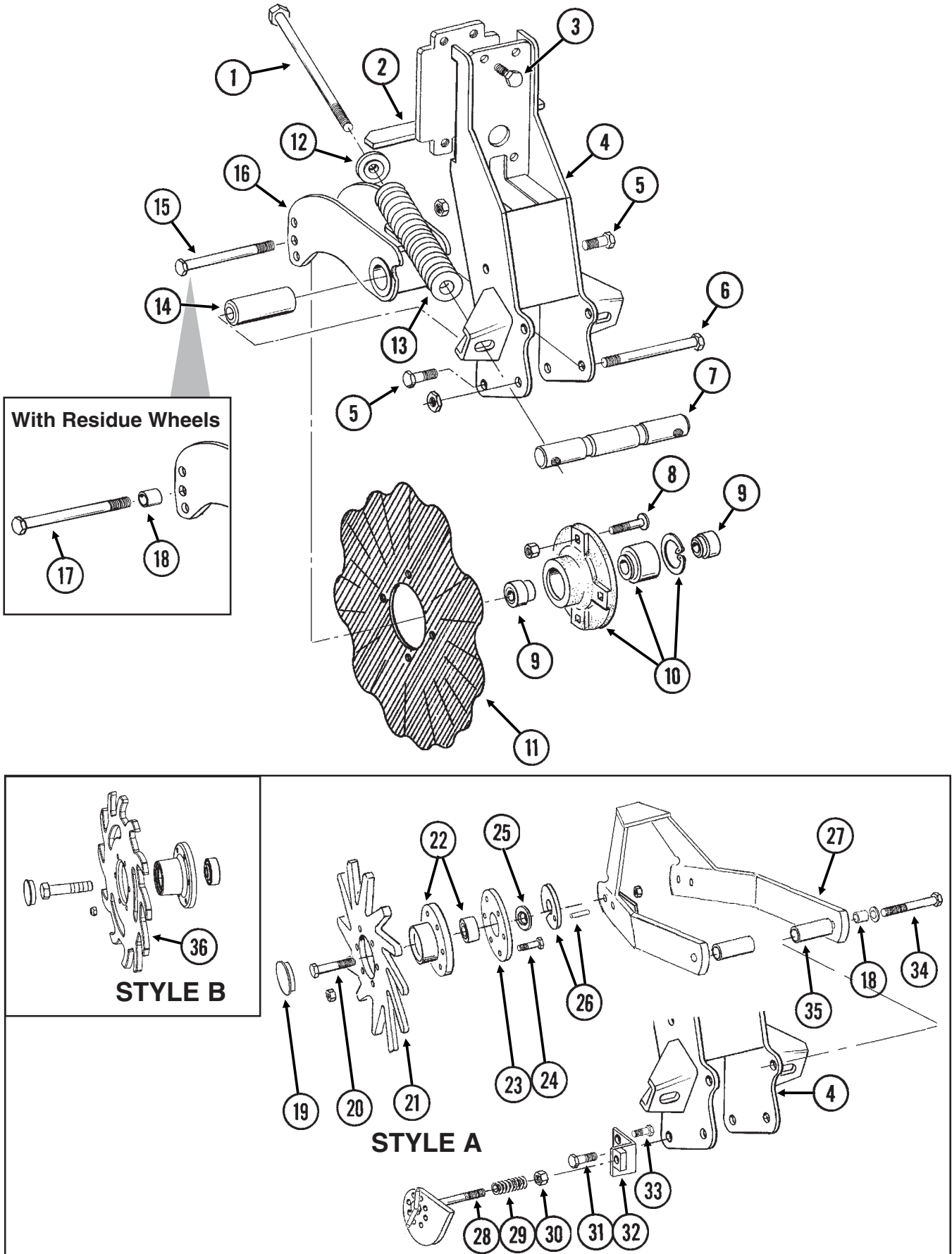


# COULTER MOUNTED RESIDUE WHEELS

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/RU153b/RU135hh)



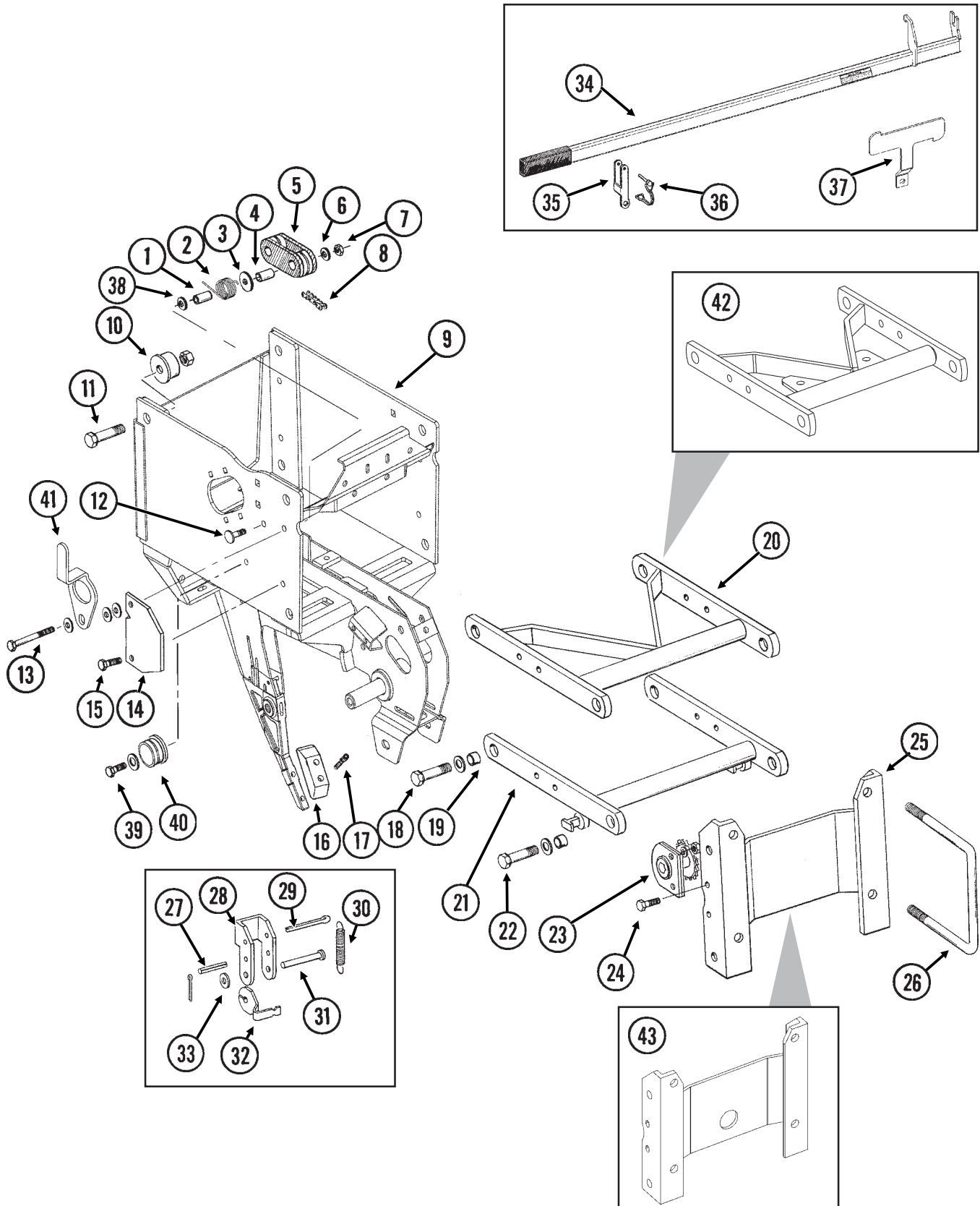
# FRAME MOUNTED COULTER W/RESIDUE WHEELS

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 19/32" 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

(A12177c/RU150a/A11969/A11971)

**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 seed hopper as the pull row unit. See those pages for common parts.

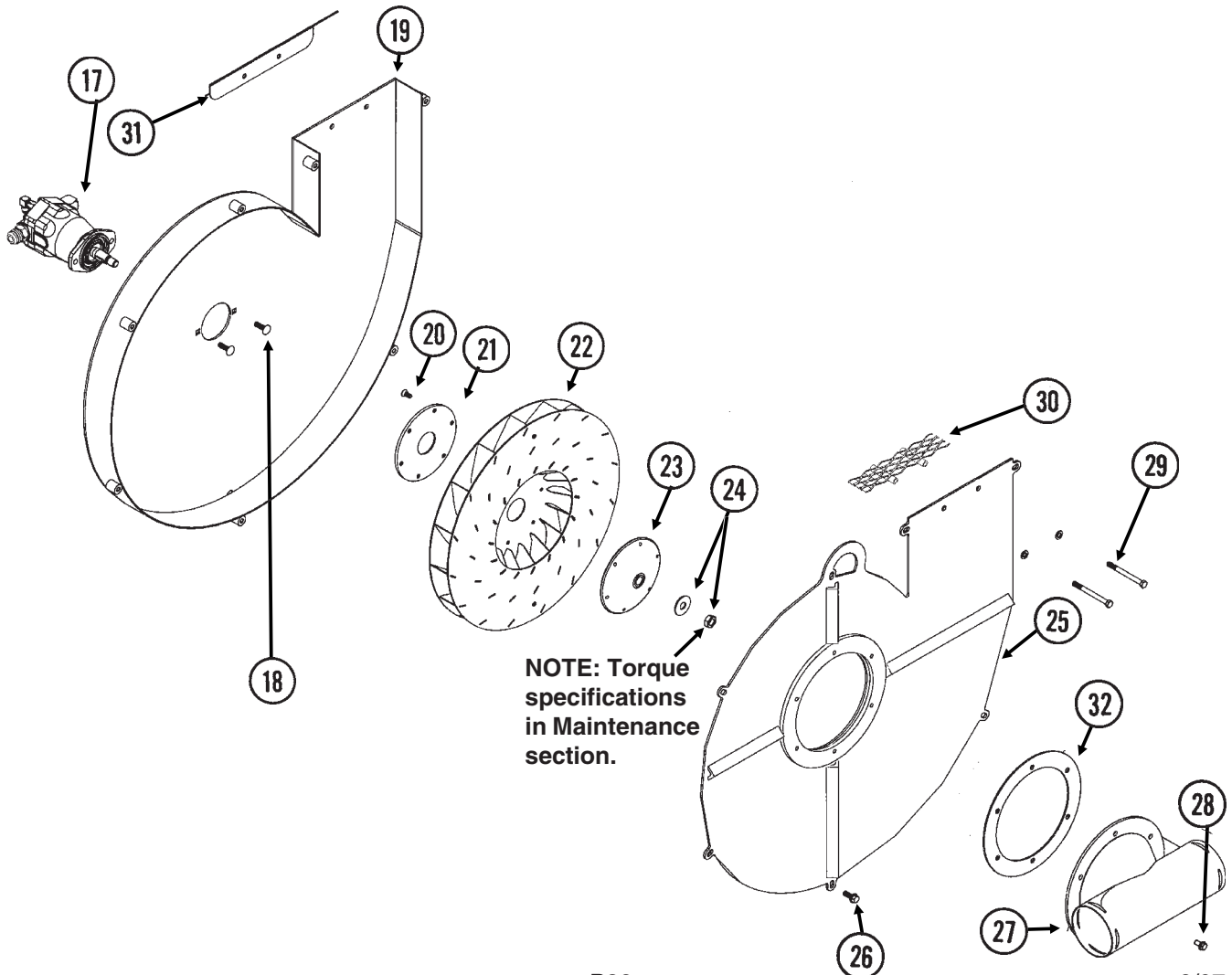
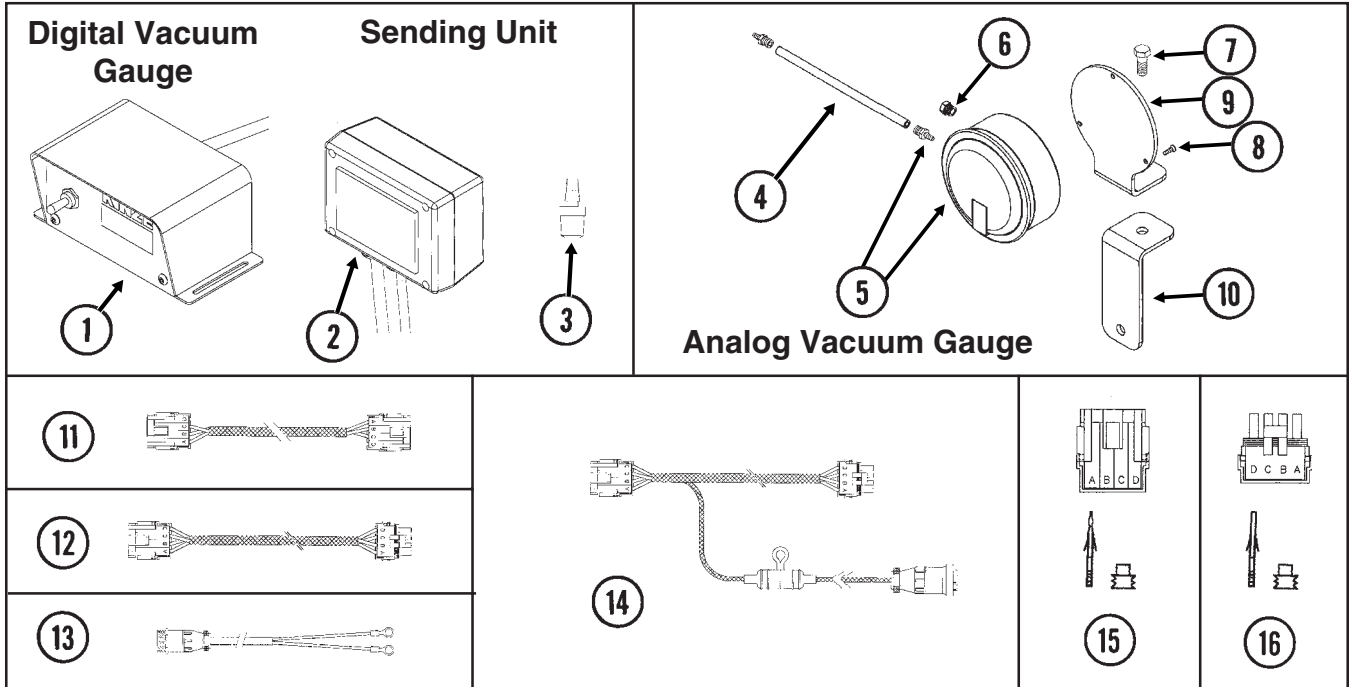


# INTERPLANT® PUSH ROW UNIT

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
5.	GD11962	1	Idler
6.	G10210	1	Washer, 3/8" USS
7.	G10108	1	Lock Nut, 3/8"-16
8.	G3303-100	1	Chain, No. 41, 100 Pitch Including Connector Link and Offset Link
	GR0196	1	Connector Link, No. 41
	GR0202	-	Offset 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.	G10753	1	Hex Head Cap Screw, 3/8"-16 x 4 1/2"
	G10203	3	Washer, 3/8" SAE
14.	GD10867	2	Stop
15.	G10004	3	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10108	3	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	-	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.	GA12117	1	Lift Lever W/Boot
	GD11649	-	Boot
35.	GD11659	1	Bracket
36.	GD9695	1	Wire Lock Pin, 1/4" x 1 3/4"
37.	GD17169	1	Mount
38.	G10203	1	Washer, 3/8" SAE
39.	G10001	1	Hex Head Cap Screw, 3/8"-16 x 1"
	G10210	-	Washer, 3/8" USS
	G10108	1	Lock Nut, 3/8"-16
40.	GD17052	1	Vacuum Plug
41.	GD17014	1	Hose Guide
42.	GA11969	1	Upper Arm
43.	GA11971	1	Mounting Plate

# DIGITAL VACUUM GAUGE, ANALOG VACUUM GAUGE AND VACUUM FAN ASSEMBLY

(A11154/A11156/GR1736/A10765/A11158/A11699/A7856/A11155/A8329/METR23bb)



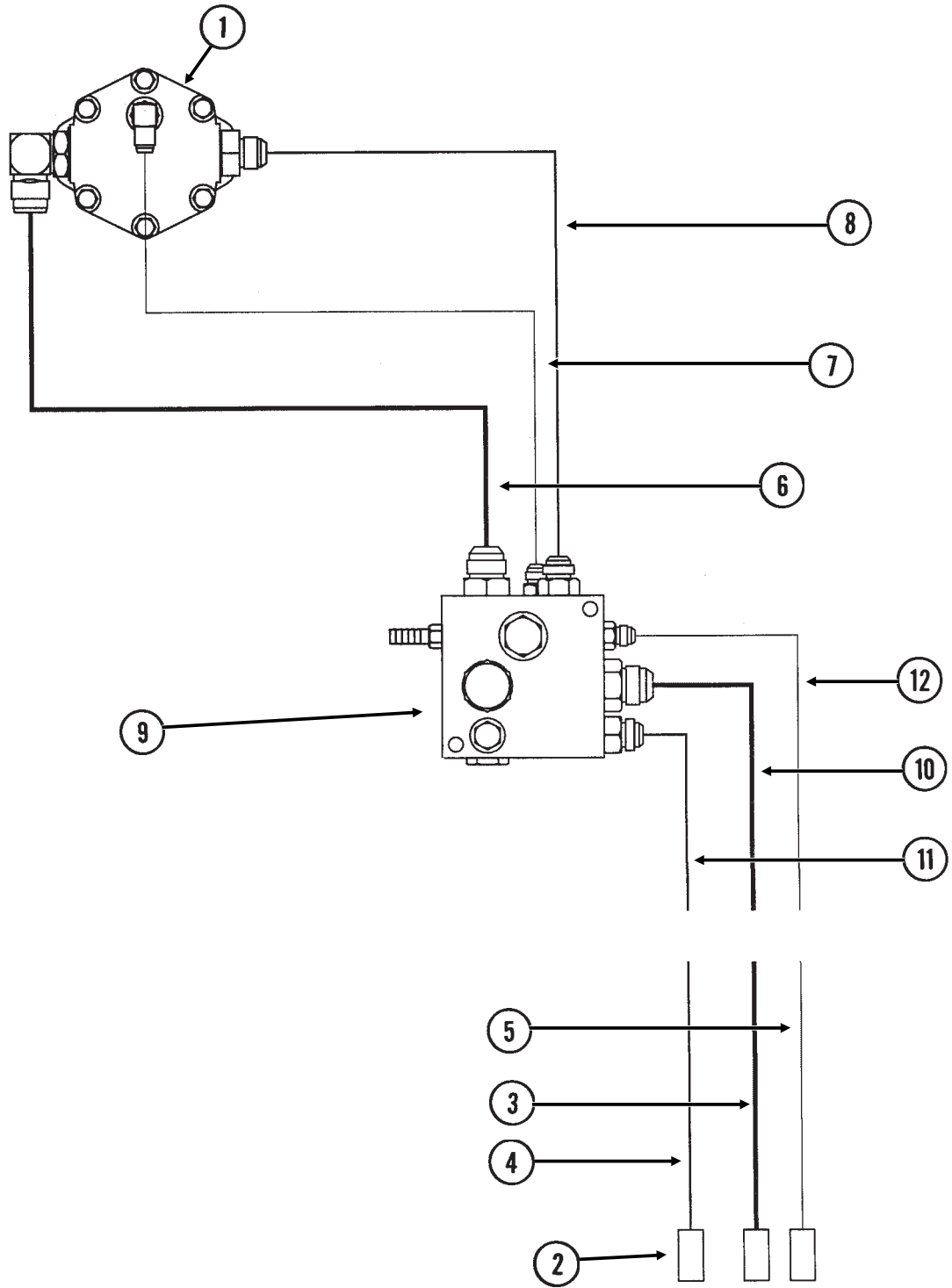


# DIGITAL VACUUM GAUGE, ANALOG VACUUM GAUGE AND VACUUM FAN ASSEMBLY

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	GA11154	1	Digital Vacuum Gauge W/4-Pin Connector
2.	GA11156	1	Sending Unit W/1/4" Tubing And Harness
	GD16224-01	-	Tubing, 1/4" x 45"
	GA11175	-	Strain Relief
3.	GR1736	1	Hose Barb, 1/8" Male NPT To Barb
4.	GD15849-02	1	Clear Plastic Tubing, 5/16" O.D. x 120"
5.	GA10765	1	Analog Vacuum Gauge W/Hose Barb
	GR1777	-	Hose Barb, 1/8" Male NPT To 3/16" Barb
6.	GA10799	1	Breather, 1/8" Male NPT
7.	G10001	1	Hex Head Cap Screw, 3/8"-16 x 1"
	G10108	1	Lock Nut, 3/8"-16
8.	G11215	3	Hex Socket Head Cap Screw, No. 6-32 x 3/8", Grade 8
9.	GD15804	1	Mount
10.	GD15803	1	Support
11.	GA11159	1	Harness, 550"
12.	GA11699	-	Extension Harness, 180"
13.	GA7856	-	Power Lead Adapter
14.	GA11155	1	Harness W/Fuse Holder And Fuse, 132"
	GD14258	-	Fuse Holder
	GD14660	-	Fuse, 2 Amp Delay Action
	G1K268	-	Console Cable Connector Kit, Includes: (1) 3-Pin Connector, (1) Cable Clamp, (1) Lock Ring, (3) Female Terminal Pins
15.	GA8328	-	4-Pin Connector W/Female Housing, 4 Seals And 4 Pin Contacts
16.	GA8329	-	4-Pin Connector W/Male Housing, 4 Seals And 4 Sockets
17.		-	See "Vacuum Fan Hydraulic Motor Assembly", Page P36
18.	G10599	2	Carriage Bolt, 3/8"-16 x 1 1/4"
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
19.	GA10148	1	Shroud
20.	G11133	6	Hex Socket Head Cap Screw, 5/16"-18 x 3/4", Grade 8
21.	GD15789	1	Backing Plate
22.	GA10635	1	Impeller
23.	GD15790	1	Hub
24.	G10205	1	Washer, 5/8" SAE
	G10499	1	Hex Jam Nut, 5/8"-18, Grade 2
25.	GA10752	1	Cover
26.	G11124	7	Whiz Lock Bolt, 3/8"-18 x 1"
27.	GA12151	1	Manifold
28.	G11124	6	Whiz Lock Bolt, 3/8"-16 x 1"
29.	G10753	2	Hex Head Cap Screw, 3/8"-16 x 4 1/2"
	G10203	2	Washer, 3/8" SAE
	G10108	2	Lock Nut, 3/8"-16
30.	GA11987	1	Screen
31.	GD15863	1	Discharge Deflector
32.	GD17268	1	Gasket, 9" I.D. x 12" O.D.
A.	GA12184	-	Vacuum Fan Assembly (Items 17-26 And 29-31)

# VACUUM FAN HYDRAULIC COMPONENTS

(TWL309)



# VACUUM FAN HYDRAULIC COMPONENTS

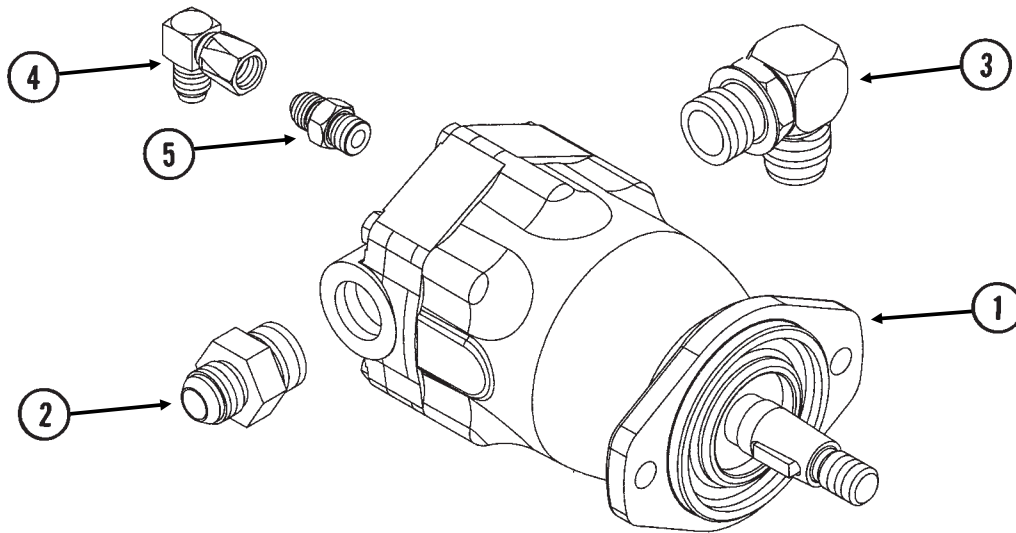
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ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
1.		-	See "Vacuum Fan Hydraulic Motor Assembly", Page P36
2.	GD4086	3	ISO Coupler
3.	*A3399	1	Hose Assembly, $\frac{3}{4}$ " x 162"
4.	*A8296	1	Hose Assembly, $\frac{1}{2}$ " x 162"
5.	*A12034	1	Hose Assembly, $\frac{3}{8}$ " x 162"
6.	*A3381	1	Hose Assembly, $\frac{3}{4}$ " x 26"
7.	*A12038	1	Hose Assembly, $\frac{3}{8}$ " x 30"
8.	*A1424	1	Hose Assembly, $\frac{1}{2}$ " x 30"
9.		-	See "Vacuum Fan Motor Valve Block Assembly (Located Below Vacuum Fan Assembly)", Page P37
10.	*A3358	1	Hose Assembly, $\frac{3}{4}$ " x 268"
11.	*A8266	1	Hose Assembly, $\frac{1}{2}$ " x 268"
12.	*A12022	1	Hose Assembly, $\frac{3}{8}$ " x 268"

\* Hydraulic hose is not stocked by KINZE® Repair Parts, but can be made available on a special order basis. Call for quote.

# VACUUM FAN HYDRAULIC MOTOR ASSEMBLY

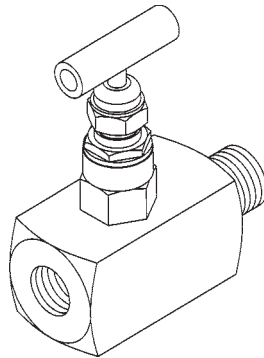
(TWL311)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA10149	1	Hydraulic Motor
	GR1734	-	Seal Kit
2.	G6400-10-12	1	Connector W/O-Ring, $\frac{7}{8}$ "-14 Male JIC To 1 $\frac{1}{16}$ "-12 O-Ring
	GR1467	-	O-Ring
3.	G6801-12	1	Elbow W/O-Ring, 90°, 1 $\frac{1}{16}$ "-12 Male JIC To O-Ring
	GR1467	-	O-Ring
4.	G6500-06	1	Swivel Elbow, 90°, $\frac{9}{16}$ "-18 Male JIC To Female
5.	G6400-06	1	Connector W/O-Ring, $\frac{9}{16}$ "-18 Male JIC To O-Ring
	GR1045	-	O-Ring

## OPTIONAL FLOW CONTROL NEEDLE VALVE KIT

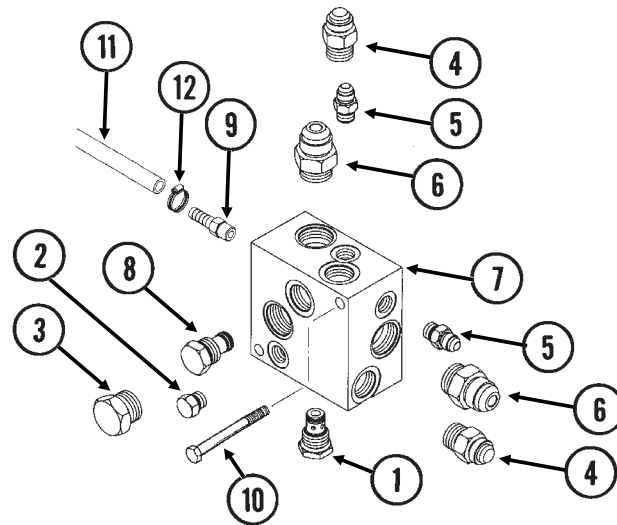
(A11650)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G1K426	-	Needle Valve Kit W/Instructions

# VACUUM FAN MOTOR VALVE BLOCK ASSEMBLY (Located Below Vacuum Fan Motor Assembly)

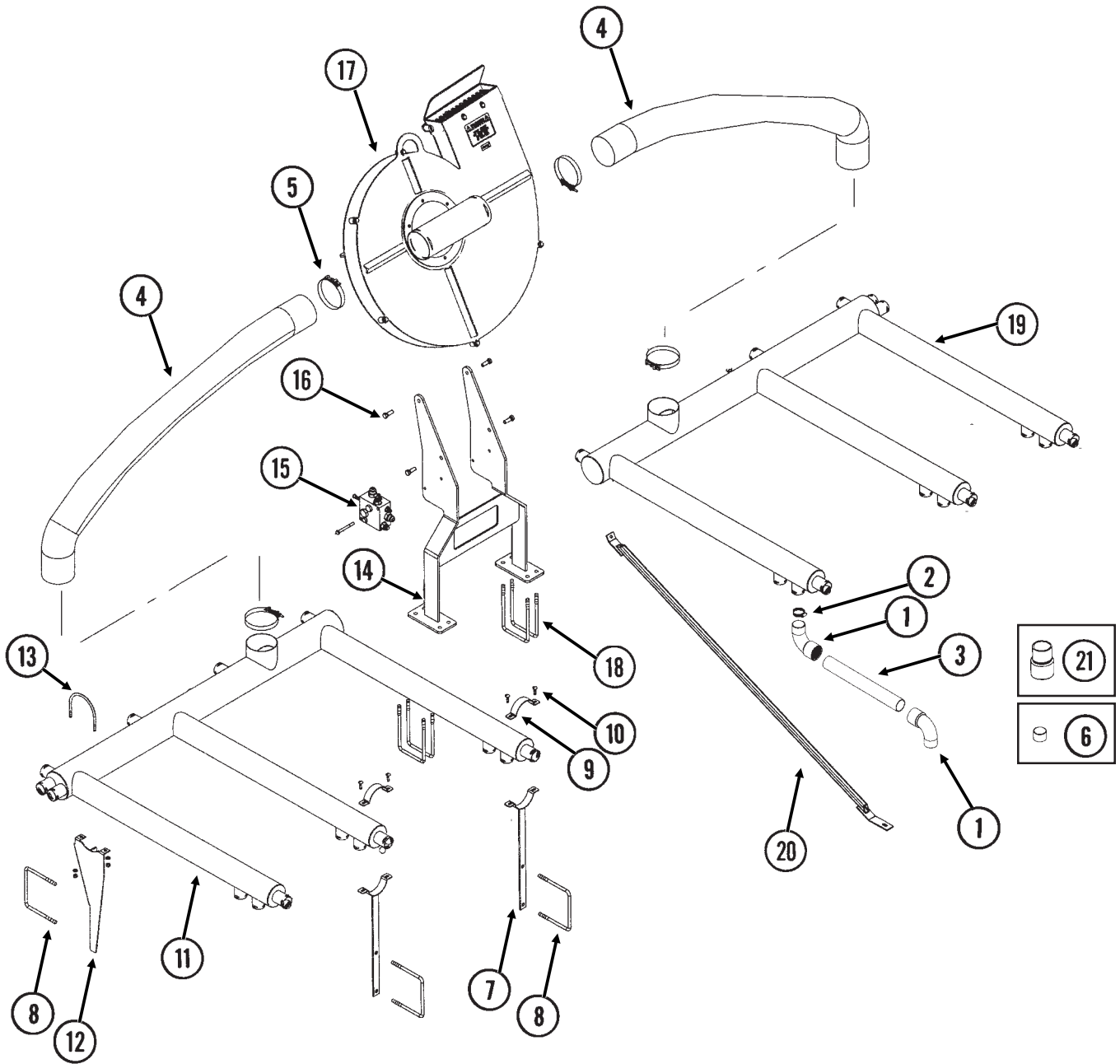
(A11068cc)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA4293	1	Check Valve
	GR0764	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring
2.	G6408-06	1	Plug W/O-Ring, $\frac{9}{16}$ "-18 O-Ring
	GR1045	-	O-Ring
3.	G6408-12	1	Plug W/O-Ring, 1 $\frac{1}{16}$ "-12 O-Ring
	GR1467	-	O-Ring
4.	G6400-10	2	Connector W/O-Ring, $\frac{7}{8}$ "-14 Male JIC To O-Ring
	GR1466	-	O-Ring
5.	G6400-06	2	Connector W/O-Ring, $\frac{9}{16}$ "-18 Male JIC To O-Ring
	GR1045	-	O-Ring
6.	G6400-12	2	Connector W/O-Ring, 1 $\frac{1}{16}$ "-12 Male JIC To O-Ring
	GR1467	-	O-Ring
7.	GD16188	1	Valve Block
8.	GA11934	1	Relief Valve Cartridge
9.	GD11700	1	Adapter, $\frac{1}{4}$ " NPT To $\frac{3}{8}$ " Barb
10.	G10061	2	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 3 $\frac{1}{2}$ "
	G10210	2	Washer, $\frac{3}{8}$ " USS
	G10229	2	Lock Washer, $\frac{3}{8}$ "
	G10101	2	Hex Nut, $\frac{3}{8}$ "-16
11.	GD6279-05	1	Clear Plastic Tubing, $\frac{9}{16}$ " O.D. x 60"
12.	G10681	1	Hose Clamp, No. 6

# VACUUM FAN MOUNTING BRACKETS AND DISTRIBUTION MANIFOLDS/HOSES

(TWL313/PT85d)



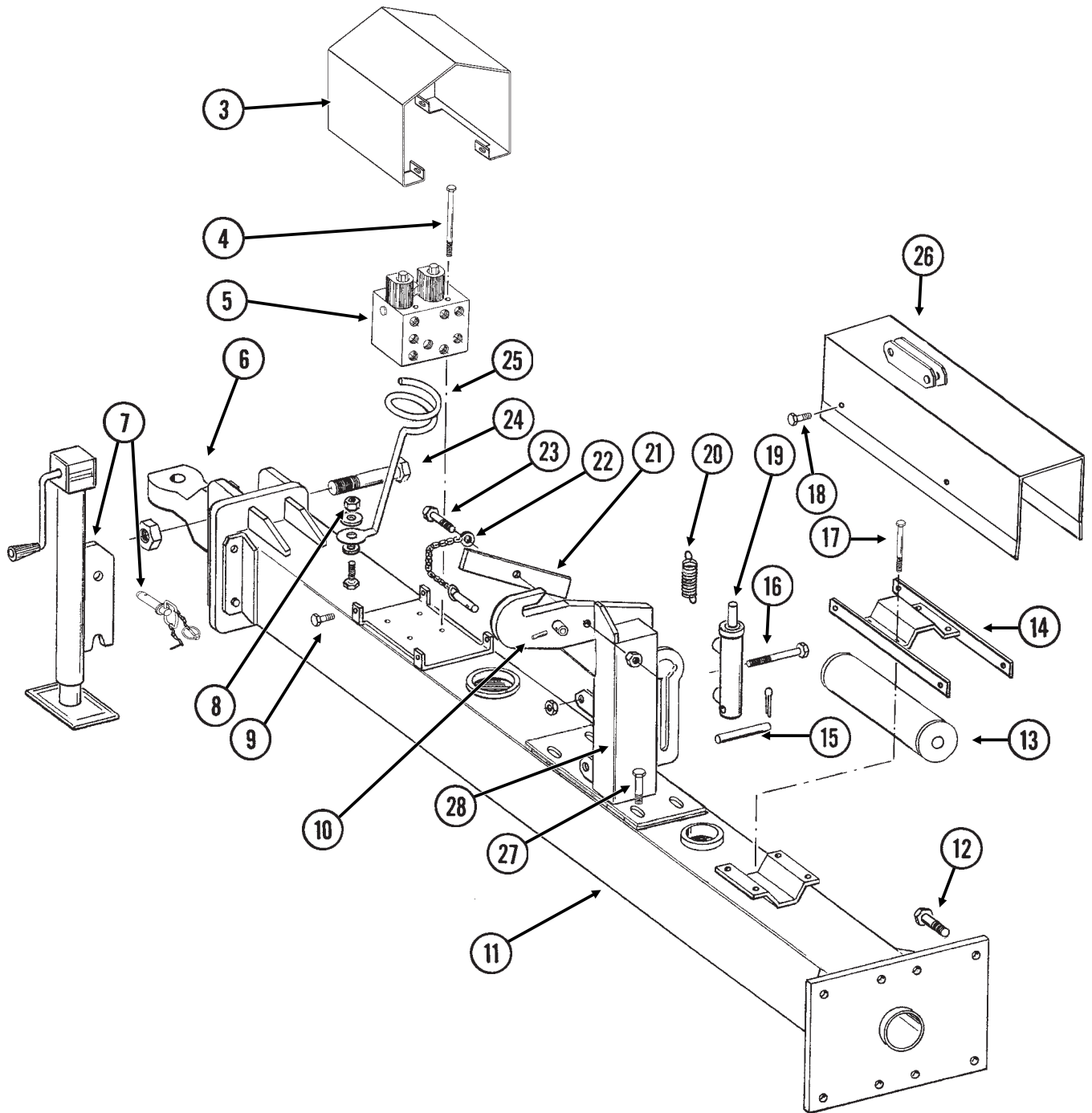
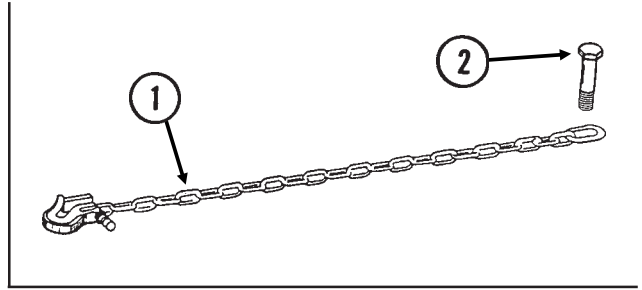
# VACUUM FAN MOUNTING BRACKETS AND DISTRIBUTION MANIFOLDS/HOSES

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ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD14626	-	Elbow, 90°, 2"
2.	G10676	-	Hose Clamp, No. 36
3.	GD15792-05	8	Hose, 2" x 38", Standard Row Units
	GD15792-10	1	Hose, 2" x 60", Standard Row Unit
	GD15792-26	3	Hose, 2" x 48", Standard Row Units
	GD15792-04	4	Hose, 2" x 36", Interplant® Row Units
	GD15792-09	5	Hose, 2" x 30", Interplant® Row Units
	GD15792-24	1	Hose, 2" x 40", Interplant® Row Unit
	GD15792-14	1	Hose, 2" x 46", Interplant® Row Unit
4.	GD15867-07	2	Hose, 5" x 60"
5.	G11188	4	T-Bolt Clamp, 5 1/4"
6.	G11147	-	Cap, 2"
7.	GA12188	6	Rear Support
8.	GD11721	10	U-Bolt, 5" x 7" x 1/2"-13
	G10228	20	Lock Washer, 1/2"
	G10102	20	Hex Nut, 1/2"-13
9.	GD17278	6	Clamp
10.	G10338	12	Cariage Bolt, 5/16"-18 x 1 1/4"
	G10620	12	Serrated Flange Nut, 5/16"-18
11.	GA12187	1	Manifold, L.H.
12.	GA12189	4	Front Support
13.	GD15833	4	U-Bolt, 5" Diameter x 3/8"-16
	G10229	8	Lock Washer, 3/8"
	G10101	8	Hex Nut, 3/8"-16
14.	GA12185	1	Fan Support
15.		-	See "Vacuum Fan Motor Valve Block Assembly (Located Below Vacuum Fan Assembly), Page P37
16.	G10017	4	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
17.		-	See "Digital Vacuum Gauge, Analog Vacuum Gauge And Vacuum Fan Assembly", Pages P32 And P33
18.	GD8306	4	U-Bolt, 7" x 5" x 1/2"-13
	G10228	8	Lock Washer, 1/2"
	G10102	8	Hex Nut, 1/2"-13
19.	GA12186	1	Manifold, R.H.
20.	GA12190	1	Stabilizer
21.	GD14627	-	Coupler, 2"

# HITCH AND SAFETY CHAIN

WAC011/PHA048/PHS049(WGN47e/TWL169e)



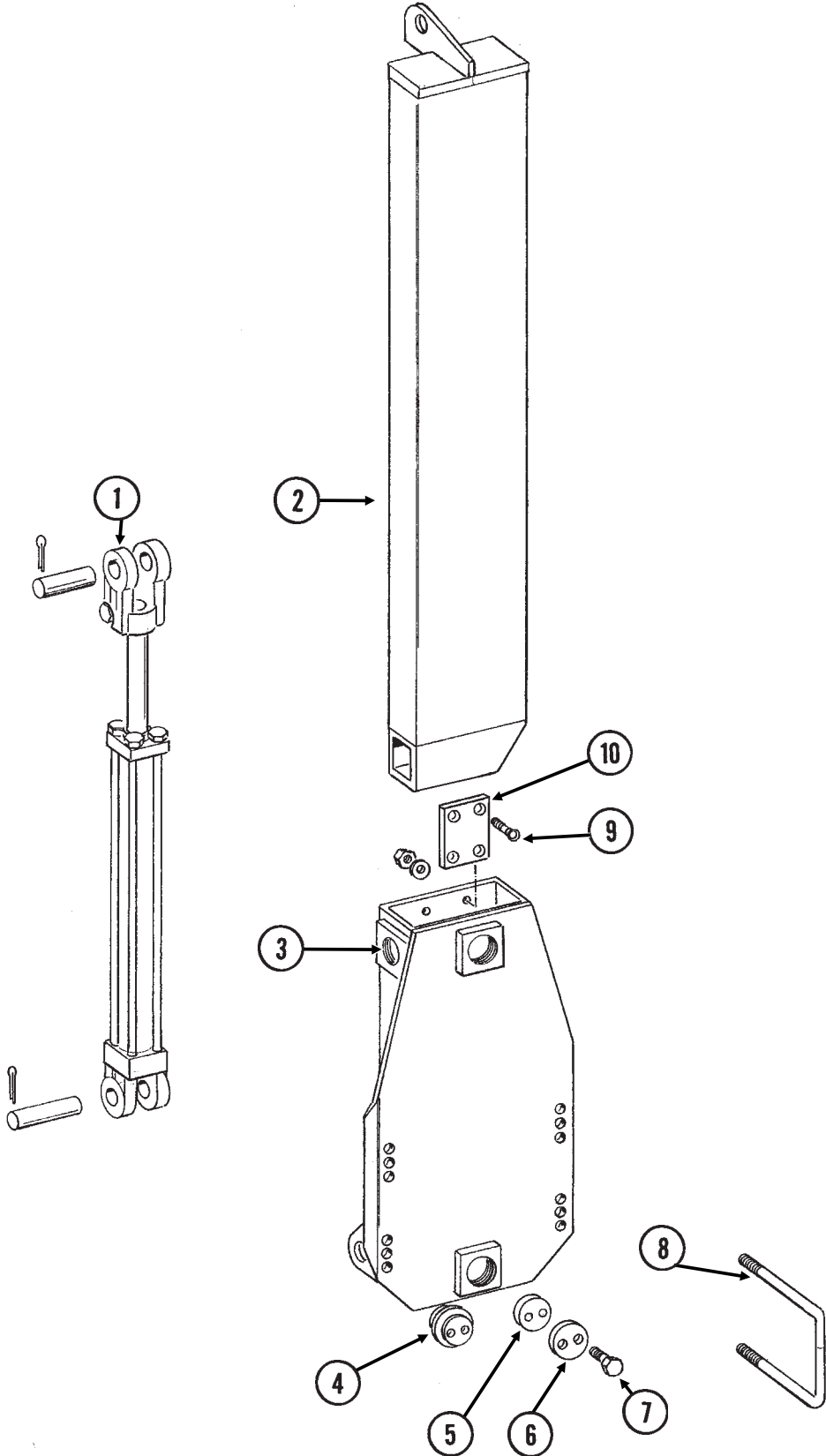


# HITCH AND SAFETY CHAIN

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA7533	1	Safety Chain, 1/2"
	G1K412	-	Safety Chain Repair Kit, Includes: (1) Hook, (1) Flat Washer, (1) Latch Pin, (1) Safety Latch, (1) Spring, (1) Retaining Ring
2.	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
3.	GD13397	-	Cover
4.	G10935	4	Hex Head Cap Screw, 1/4"-20 x 5"
	G10209	4	Washer, 1/4" USS
	G10227	4	Lock Washer, 1/4"
5.		-	See "Valve Block - Located On Hitch", Page P67
6.	GB0237	1	Clevis, Single
7.	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
8.	G10217	1	Washer, 5/8" USS
	G10107	1	Lock Nut, 5/8"-11
9.	G10043	4	Hex Head Cap Screw, 5/16"-18 x 3/4"
	G10232	4	Lock Washer, 5/16"
	G10106	4	Hex Nut, 5/16"-18
10.	G10765	-	Spring Pin, 1/4" x 1"
11.	A9548	-	Front Hitch <b>(Non-Stock Item)</b>
12.	G10441	8	Hex Head Cap Screw, 7/8"-9 x 3", Grade 8
	GD10063	16	Hardened Washer, 7/8"
	G11053	8	Hex Nut, 7/8"-9, Grade 8
13.		-	See "Master Cylinder", Page P64
14.	GA8765	1	Cover Mount
15.	GD7137	1	Pin, 3/4" x 3 3/8"
	G10457	2	Cotter Pin, 5/32" x 1 1/2"
16.	G10061	1	Hex Head Cap Screw, 3/8"-16 x 3 1/2"
	GD2971-09	1	Sleeve, 2" Long
	G10229	1	Lock Washer, 3/8"
	G10101	1	Hex Nut, 3/8"-16
17.	G10063	4	Hex Head Cap Screw, 3/8"-16 x 4"
	G10229	4	Lock Washer, 3/8"
	G10101	4	Hex Nut, 3/8"-16
18.	G10001	4	Hex Head Cap Screw, 3/8"-16 x 1"
	G10229	4	Lock Washer, 3/8"
19.			See "Transport Latch Cylinder", Page P64
20.	GD5857	1	Spring
21.	GA7016	1	Catch Bar
22.	GA7022	1	Detent Pin W/Chain (Transport Latch Locking Pin)
23.	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 19/32" Long
	GD5154	1	Shim, 4" x 4"
	G10107	1	Lock Nut, 5/8"-11
24.	G10169	1	Hex Head Cap Screw, 1 1/4"-7 x 6"
	G10157	1	Lock Nut, 1 1/4"-7
25.	GD8260	1	Hose Holder
26.	GA8764	1	Cover/Bracket, Jack Storage
27.	G10008	4	Hex Head Cap Screw, 5/8"-11 x 2"
	G10217	4	Washer, 5/8" USS
	G10230	4	Lock Washer, 5/8"
28.	GA9537	1	Catch Post

# TRANSPORT LATCH POST

PHA049(2400m)



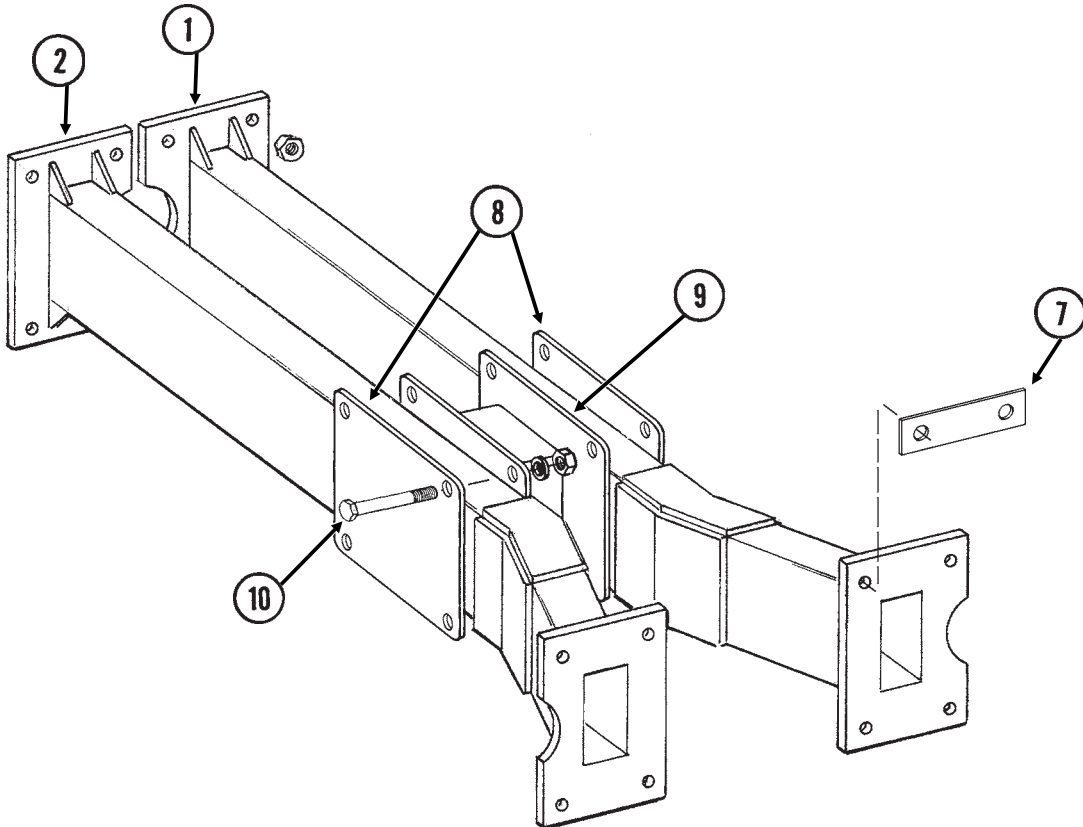
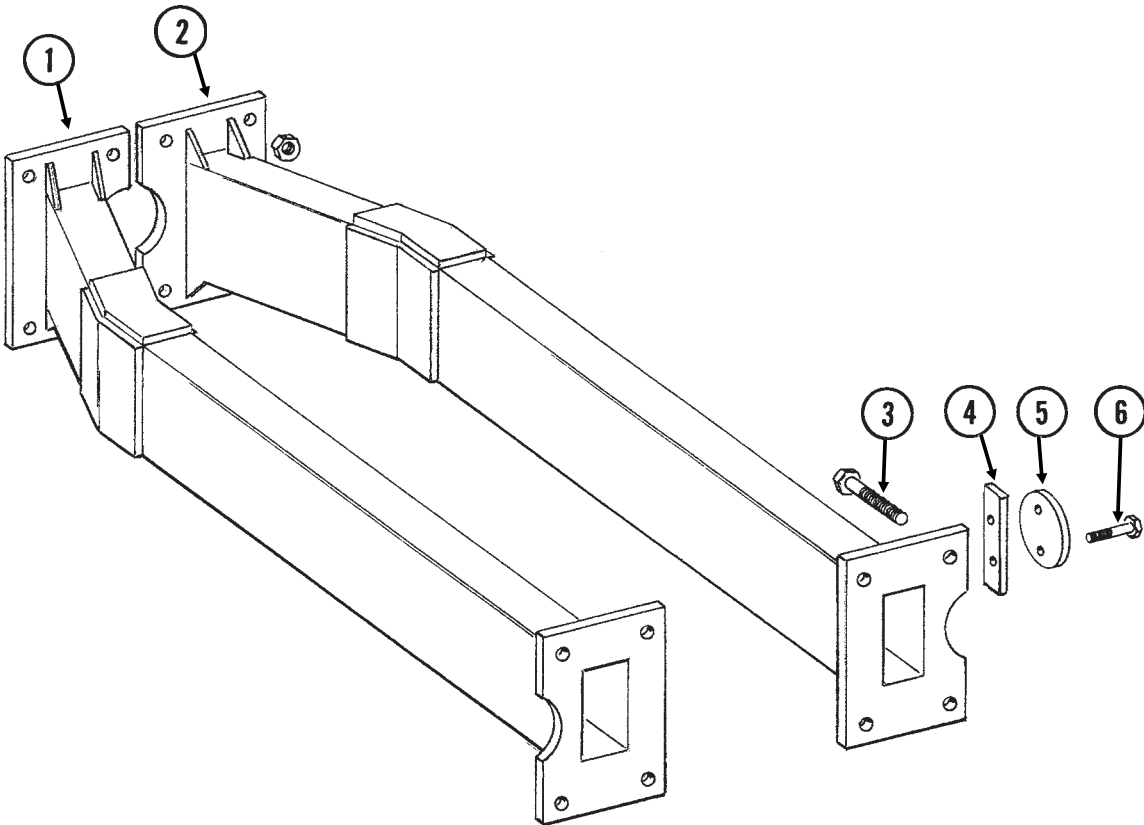
# TRANSPORT LATCH POST

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ITEM	PART NO.	QTY.	DESCRIPTION
1.		-	See "Transport Latch Post Cylinder", Page P65
2.	GA8356	1	Catch Post
3.	GA8357	1	Catch Mount
4.	GD9093	6	Poly Wear Pad
5.	GB0230	6	Cap
6.	GB0234	6	Adjustment Plug
7.	G10438	8	Hex Head Cap Screw, 1/2"-13 x 3/4"
	G10014	4	Hex Head Cap Screw, 1/2"-13 x 1"
8.	GD11489	2	U-Bolt, 3" x 6" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
9.	G10934	8	Flat Head Hex Socket Cap Screw, 5/16"-18 x 1"
	G10221	8	Washer, 5/16" SAE
	G10232	8	Lock Washer, 5/16"
	G10106	8	Hex Nut, 5/16"-18
10.	GD11473	2	Pad

# HITCH EXTENSIONS

PHA050/PHA051(2400L)



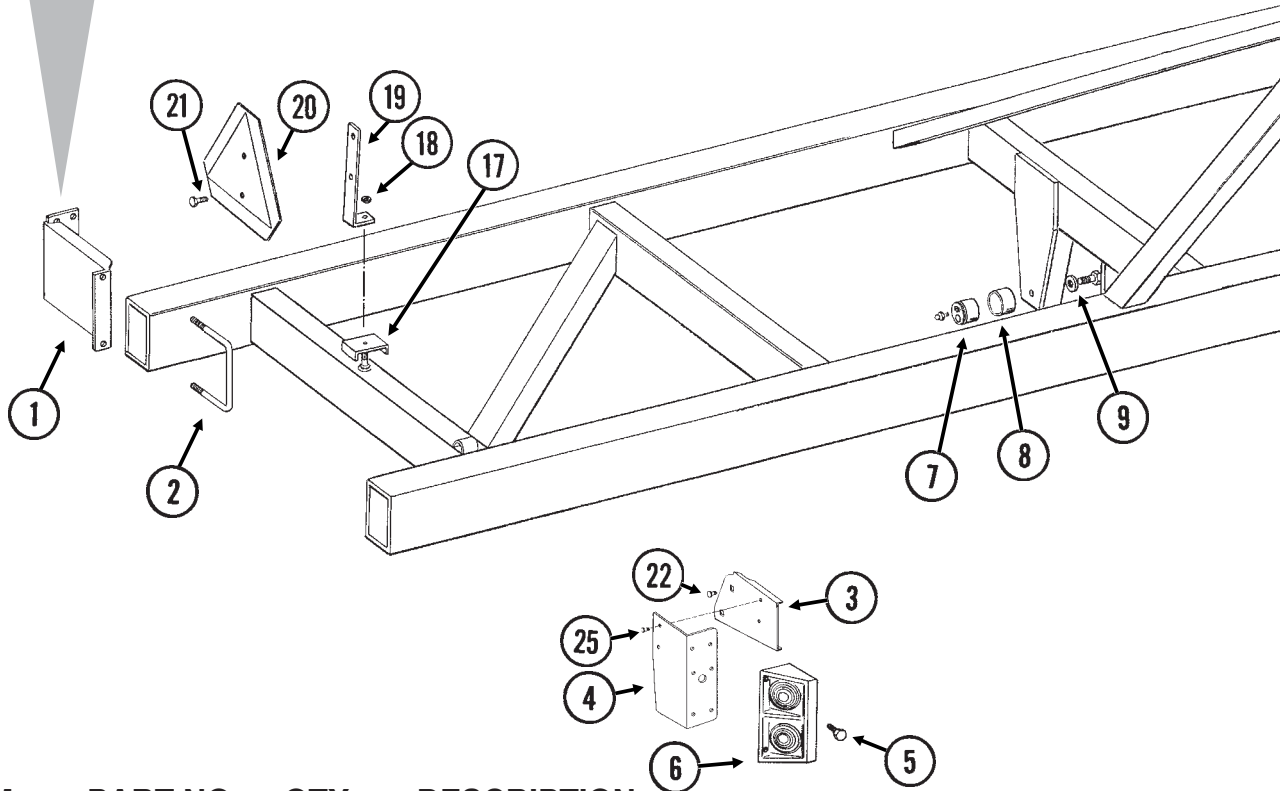
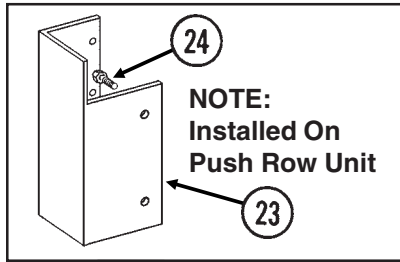
# HITCH EXTENSIONS

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ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8350	1	Hitch Extension, R.H.
2.	GA8362	1	Hitch Extension, L.H.
3.	G10441	8	Hex Head Cap Screw, $\frac{7}{8}$ "-9 x 3", Grade 8
	GD10063	16	Hardened Washer, $\frac{7}{8}$ "
	G10442	8	Hex Nut, $\frac{7}{8}$ "-9, Grade 8
4.	GD11512	1	Dust Cap Bar
5.	GD11507	1	Dust Cap
6.	G10048	2	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 2"
	G10229	2	Lock Washer, $\frac{3}{8}$ "
7.	GD13115	2	Spacer (If Applicable)
8.	GD14249	2	Hitch Support Plate
9.	GA9945	1	Hitch Support Assembly
10.	G10046	8	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 5"
	G10104	8	Hex Nut, $\frac{5}{8}$ "-11
	G10230	8	Lock Washer, $\frac{5}{8}$ "

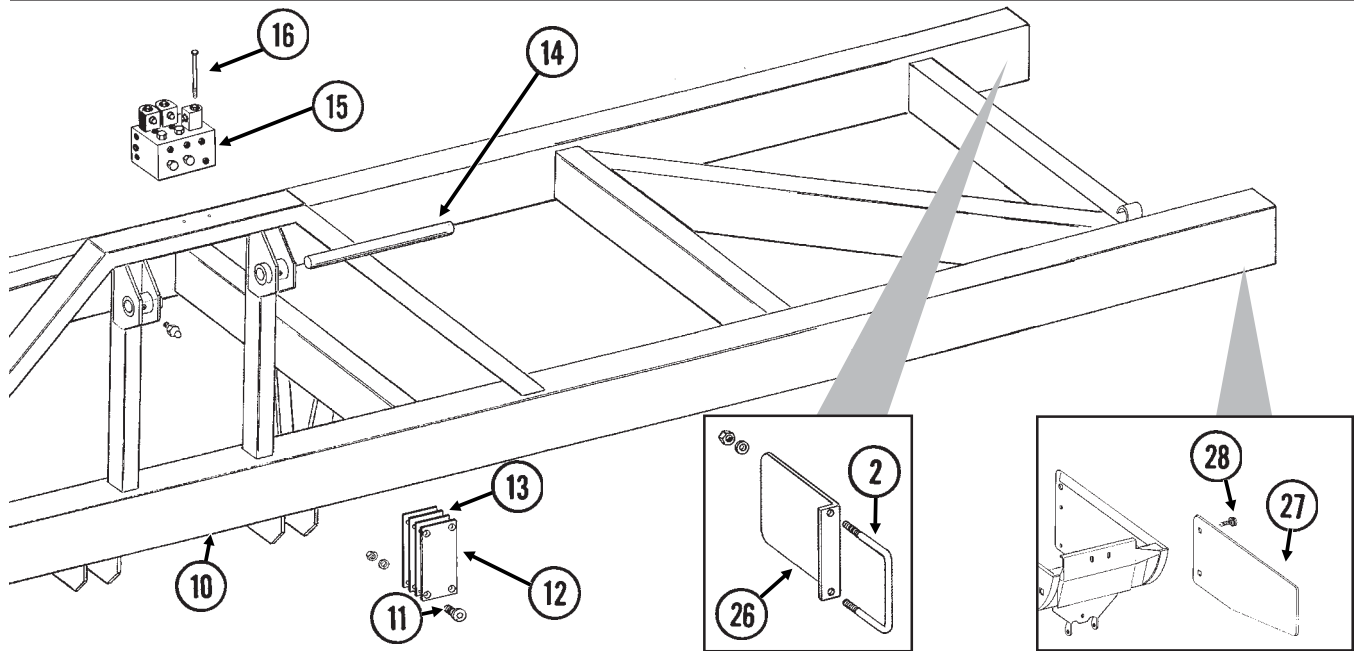
# PLANTER FRAME

(3400hhh/TWL180b/3400i/TWL181/TWL182)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA9061	1	Light Bracket, Short
2.	GD1113	1-2	U-Bolt, 5" x 7" x 5/8"-11
	G10230	2-4	Lock Washer, 5/8"
	G10104	2-4	Hex Nut, 5/8"-11
3.	GD15968	1	Light Mount Extension
4.	GD12724	1	Bracket
5.	G10064	8	Hex Head Cap Screw, 1/4"-20 x 1"
	G10227	8	Lock Washer, 1/4"
	G10103	8	Hex Nut, 1/4"-20
6.		-	See "Electrical Components", Pages P74 And P75
7.	GA6497	2	Cam Follower W/Grease Fitting
	G10640	-	Grease Fitting, 1/4"-28
8.	GD10532	2	Sleeve
9.	G10025	2	Hex Head Cap Screw, 3/4"-10 x 1 1/2"
	G10231	2	Lock Washer, 3/4" (If Applicable)
	GD9052	2	Special Washer, 3/4" I.D. x 2" O.D., Hardened
10.	A8352	1	Frame, 270" <b>(Non-Stock Item)</b>
11.	G10361	8	Flat Head Hex Socket Countersunk Cap Screw, 1/2"-13 x 1 1/2"
	G10228	8	Lock Washer, 1/2"
	G10102	8	Hex Nut, 1/2"-13
12.	GD11362	2	Push Pad
13.	GD11359	6	Shim

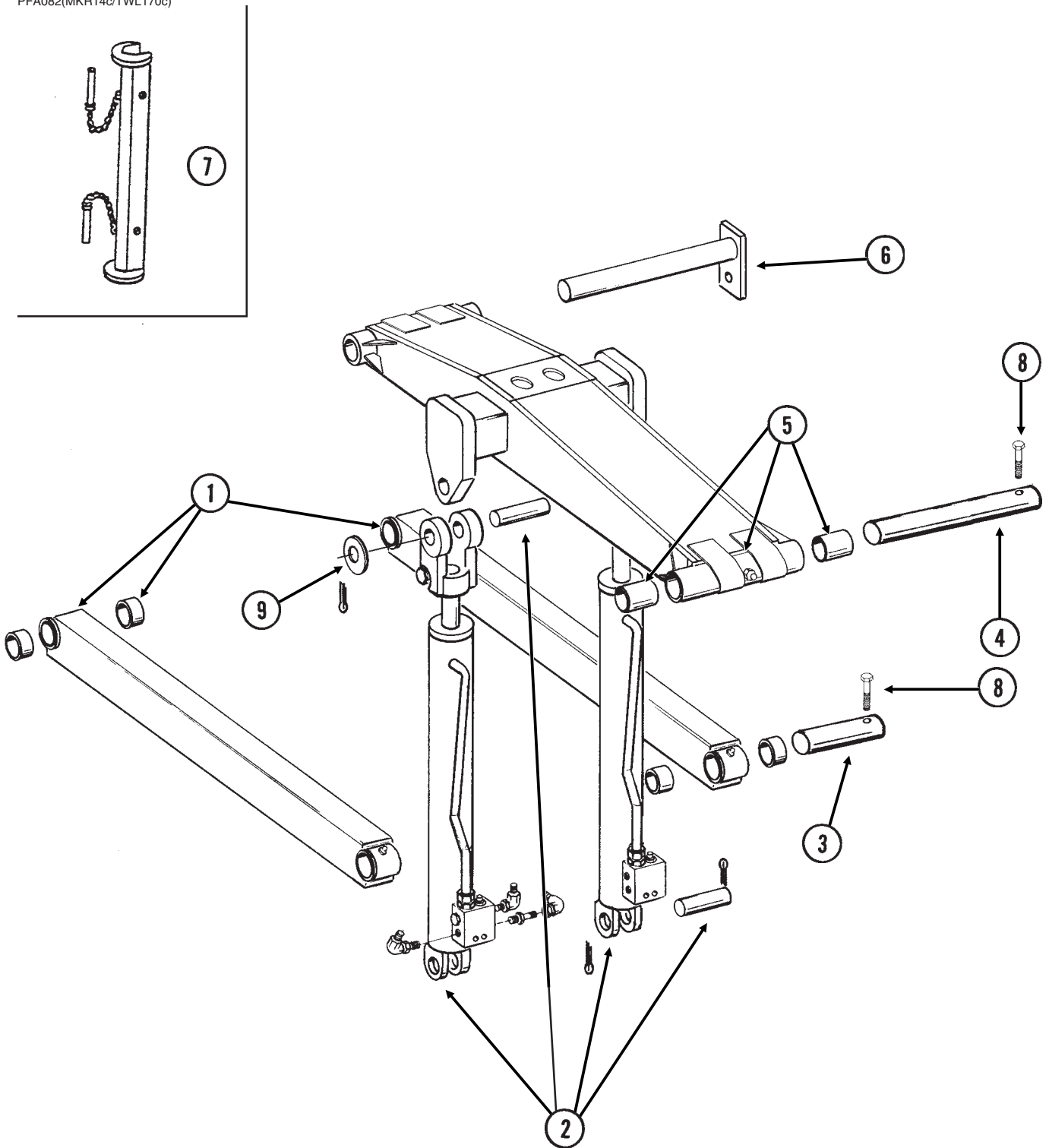
# PLANTER FRAME



ITEM	PART NO.	QTY.	DESCRIPTION
14.		-	See "Frame Lift Linkage", Pages P48 And P49
15.		-	See "Valve Block - Located On Rear Center Frame", Page P68
16.	G10937	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 6 $\frac{1}{2}$ "
	G10954	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 7"
	G10210	2	Washer, $\frac{3}{8}$ " USS
	G10229	2	Lock Washer, $\frac{3}{8}$ "
	G10101	2	Hex Nut, $\frac{3}{8}$ "-16
17.	GD0740	-	Hose Clamp, $\frac{3}{4}$ " x 4" x 3 $\frac{1}{2}$ "
	GD5875	-	Hose Clamp, $\frac{9}{16}$ " x 2 $\frac{1}{2}$ " x 2"
18.	G10101	-	Hex Nut, $\frac{3}{8}$ "-16
19.	GD11555	-	SMV Bracket
20.			See "Decals, Paint And Miscellaneous", Pages P104-P106
21.	G10022	2	Hex Head Cap Screw, $\frac{1}{4}$ "-20 x $\frac{1}{2}$ "
	G10227	2	Lock Washer, $\frac{1}{4}$ "
	G10103	2	Hex Nut, $\frac{1}{4}$ "-20
22.	G10312	-	Carriage Bolt, $\frac{5}{16}$ "-18 x $\frac{3}{4}$ "
	G10620	-	Serrated Flange Nut, $\frac{5}{16}$ "-18
23.	GD12703	1	Push Row Unit Light Bracket
24.	G10001	2	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1"
	G10229	2	Lock Washer, $\frac{3}{8}$ "
	G10101	2	Hex Nut, $\frac{3}{8}$ "-16
25.	G10064	-	Hex Head Cap Screw, $\frac{1}{4}$ "-20 x 1"
	G10227	-	Lock Washer, $\frac{1}{4}$ "
	G10103	-	Hex Nut, $\frac{1}{4}$ "-20
26.	GA9063	1	Reflective Decal Bracket
27.	GD12710	1	Reflective Decal Bracket
28.	G10312	2	Carriage Bolt, $\frac{5}{16}$ "-18 x $\frac{3}{4}$ "
	G10620	2	Serrated Flange Nut, $\frac{5}{16}$ "-18
A.	G7698X	-	Push Row Unit Mounted Light Bracket Package (Items 23 And 24 On This Page And Harness Extension, Item 41 on Pages P66 And P67)

# FRAME LIFT LINKAGE

PFA082(MKR14c/TWL170c)





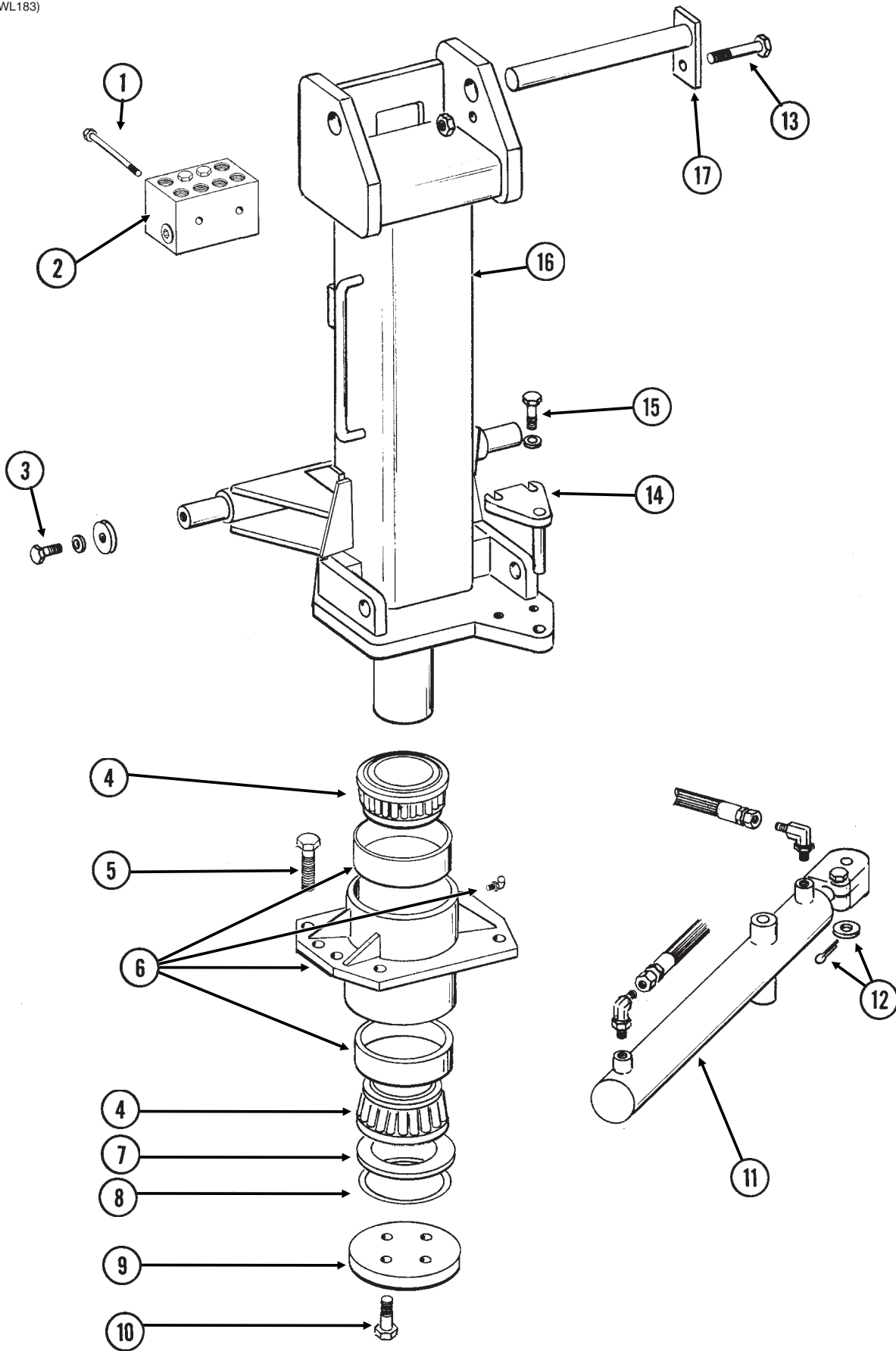
# FRAME LIFT LINKAGE

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ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8762	2	Lower Arm W/Grease Fittings And Bronze Bushings
	G10640	-	Grease Fitting, 1/4"-28
	GD11428	-	Bronze Bushing, 1 1/4" Wide (4 Per Arm)
2.		-	See "Slave Cylinder", Page P63
3.	GD11444	2	Pin, 1 3/4" x 7 3/8"
4.	GD11445	1	Pin, 1 3/4" x 18 1/4"
5.	GA9909	1	Upper Lift Arm W/Grease Fittings And Bronze Bushings
	G10640	-	Grease Fitting, 1/4"-28
	G10643	-	Grease Fitting, 45°, 1/4"-28
	GD11427	-	Bronze Bushing, 2" Wide (4 Per Arm)
	GD11751	-	Steel Bushing, 1" Wide (2 Per Arm)
6.		-	See "Center Pivot", Pages P50 And P51
7.	GA8172	2	Safety Lockup W/Detent Pins, 20"
	G10536	-	Detent Pin, 1/2" x 2 1/2" Grip
8.	G10755	3	Hex Head Cap Screw, 5/16"-18 x 3"
	G10109	3	Lock Nut, 5/16"-18, Grade 8
9.	G10139	4	Washer, 1 1/4" USS

# CENTER PIVOT

PFA083(TWL183)



# CENTER PIVOT

ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10936	2	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x 3 $\frac{1}{2}$ "
	G10210	2	Washer, $\frac{3}{8}$ " USS
	G10229	2	Lock Washer, $\frac{3}{8}$ "
2.		-	See "Junction Block - Located On Front Of Center Pivot", Page P69
3.	G10007	2	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 1 $\frac{1}{2}$ "
	GD11456	2	Washer, $\frac{11}{16}$ " I.D. x 2 $\frac{1}{2}$ " O.D. x $\frac{1}{4}$ " Thick
	GD7805	2	Special Washer, $\frac{5}{8}$ ", Hardened
	G10230	2	Lock Washer, $\frac{5}{8}$ "
4.	GA7096	2	Cone
5.	G10441	8	Hex Head Cap Screw, $\frac{7}{8}$ "-9 x 3", Grade 8
	GD10063	8	Hardened Washer, $\frac{7}{8}$ "
	G10442	8	Hex Nut, $\frac{7}{8}$ "-9, Grade 8
6.	GA7067	1	Bearing Housing W/Cups And Grease Fitting
	GD10011	-	Cup
	G10779	-	Grease Fitting, 90°, $\frac{1}{4}$ "-28
7.	GD10012	10	Shim, .005" Thick (As Required)
	GD10014	10	Shim, .007" Thick (As Required)
	GD10013	10	Shim, .020" Thick (As Required)
8.	GD9130	1	O-Ring
9.	GD9636	1	Bearing Cap
10.	G10027	4	Hex Head Cap Screw, $\frac{3}{4}$ "-10 x 2 $\frac{1}{2}$ "
	GD2169	4	Special Washer, $\frac{25}{32}$ " I.D. x 1 $\frac{1}{4}$ " O.D., Hardened
11.		-	See "Rotation Cylinder", Page P66
12.	G10139	1	Washer, 1 $\frac{1}{4}$ " USS
	G10460	1	Cotter Pin, $\frac{1}{4}$ " x 2"
13.	G10016	1	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 2"
	G10228	1	Lock Washer, $\frac{1}{2}$ "
	G10102	1	Hex Nut, $\frac{1}{2}$ "-13
14.	GA8351	1	Hammer Strap
15.	G10394	2	Hex Head Cap Screw, $\frac{3}{4}$ "-16 x 2"
	GD2169	2	Special Washer, $\frac{25}{32}$ " I.D. x 1 $\frac{1}{4}$ " O.D., Hardened
	G10231	2	Lock Washer, $\frac{3}{4}$ "
16.	GA9064	1	Center Post
17.	GA8374	1	Hammer Strap



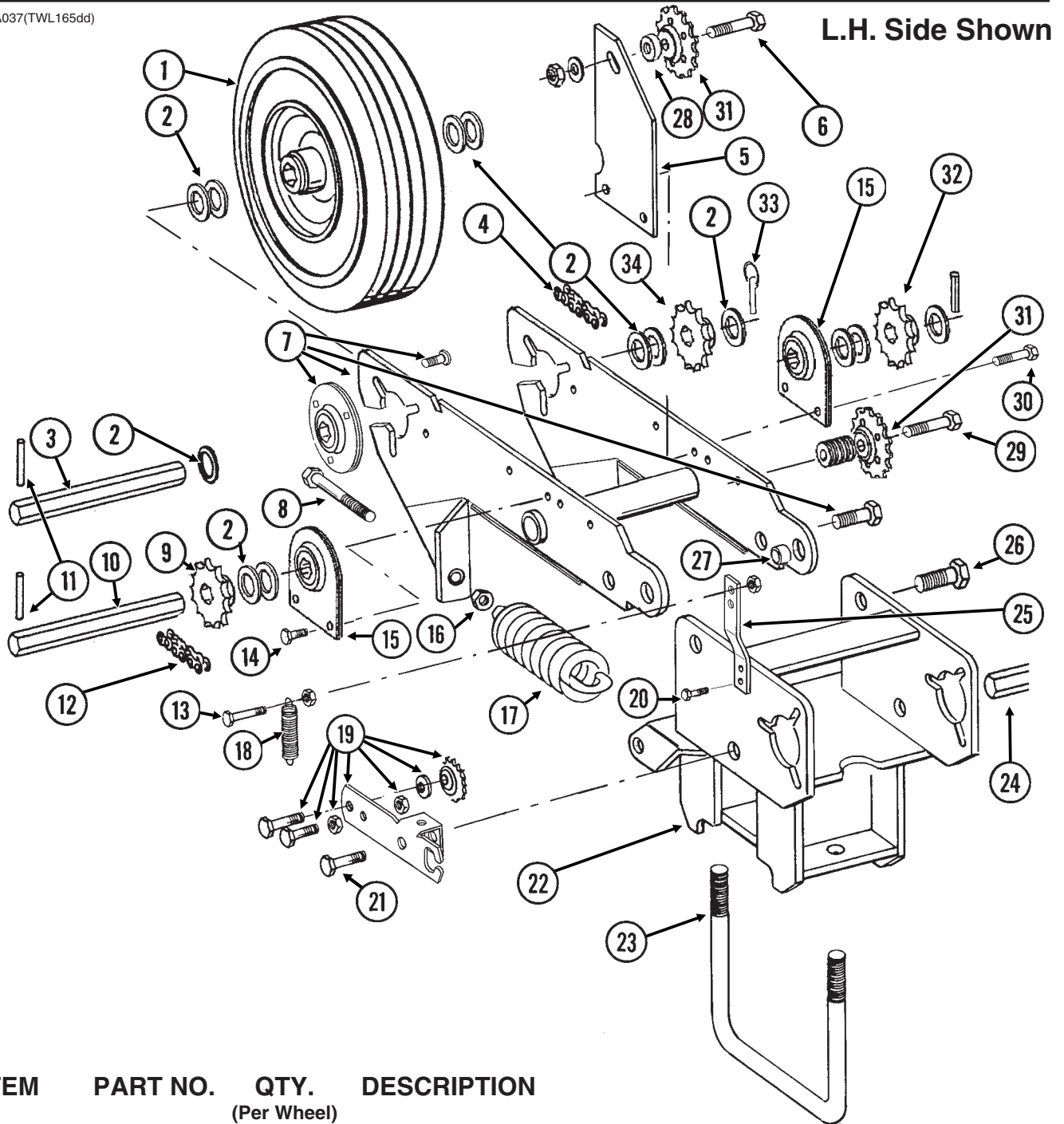
# AXLE AND TRANSPORT/GROUND DRIVE WHEEL ASSEMBLY

ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
1.	G10017	2	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
2.	G10008	10	Hex Head Cap Screw, 5/8"-11 x 2"
	GD7805	20	Special Washer, 5/8", Hardened
	G10107	10	Lock Nut, 5/8"-11
3.	GA8402	1	Cam Guide
4.	G10318	2	Hex Head Cap Screw, 5/8"-11 x 4 1/2"
	G10230	2	Lock Washer, 5/8"
5.	GD11454	1	Bar
6.	GA8348	1	Axle
7.	GA8383	1	Push Pad
8.	GA8405	2	Hammer Strap
9.	GD9509	10	Outer Budd Nut
10.	GD12567	10	Inner Budd Nut, 2 5/8" Long
11.	G10376	4	Hex Head Cap Screw, 5/16"-18 x 3/4"
12.	GD1529	1	Dust Cap
13.	G10460	1	Cotter Pin, 1/4" x 2"
14.	GA5988	1	Seal
15.	GA7434	1	Valve Stem
16.	GA5987	1	Inner Bearing
17.	GA5965	1	Hub W/Cups, Grease Fitting And Stud Bolts (10 Bolt)
	GR0322	-	Outer Cup
	GD8532	-	Inner Cup
	G10373	-	Grease Fitting, 45°, 1/8"-27
	GR0257	-	Bolt, 3/4"-16 x 2 1/2"
18.	GA0705	1	Outer Bearing
19.	G10139	2	Washer, 1 1/4" USS
20.	G10070	1	Slotted Hex Nut, 1 1/4"-12
21.	GD1536	1	Seal
22.	GA8354	1	Long Rim, 15 1/4" Deep
23.	GA8353	1	Short Rim, 11 1/4" Deep
24.	GD13409	2-3	Tire, 255-70R 22.5" W/O Center Rib, Tubeless (Specify Brand*)
25.	GA9056	1	Air Hose
26.	GD12704	1	Bracket
27.	GA8952	1	Center Rim Weld
28.	GA9139	1	Air Hose Elbow, 90°

\* 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.

# CONTACT WHEEL ASSEMBLY

PLA037(TWL165dd)



ITEM	PART NO.	QTY. (Per Wheel)	DESCRIPTION
1.	GA5090	-	Tire And Rim Assembly (Specify Brand*)
	GD5753	1	Tire, 4.10" x 6" (Specify Brand*)
	GD5752	1	Inner Tube
2.	G10233	-	Machine Bushing, 1", 10 Gauge
3.	GD6825-10.25	1	Hex Shaft, 7/8" x 10 1/4" (2 Holes)
4.	G3310-104	1	Chain, No. 40, 104 Pitch Including Connector Link, Used With 38 Tooth Sprocket
	G3310-92	1	Chain, No. 40, 92 Pitch Including Connector Link, Used With 15 And 19 Tooth Sprockets
5.	GR0912	-	Connector Link, No. 40
	GD11125	1	Bar
6.	G10397	1	Hex Head Cap Screw, 1/2"-13 x 2 3/4"
	G10168	1	Machine Bushing, 1/2", 7 Gauge
	G10111	1	Lock Nut, 1/2"-13

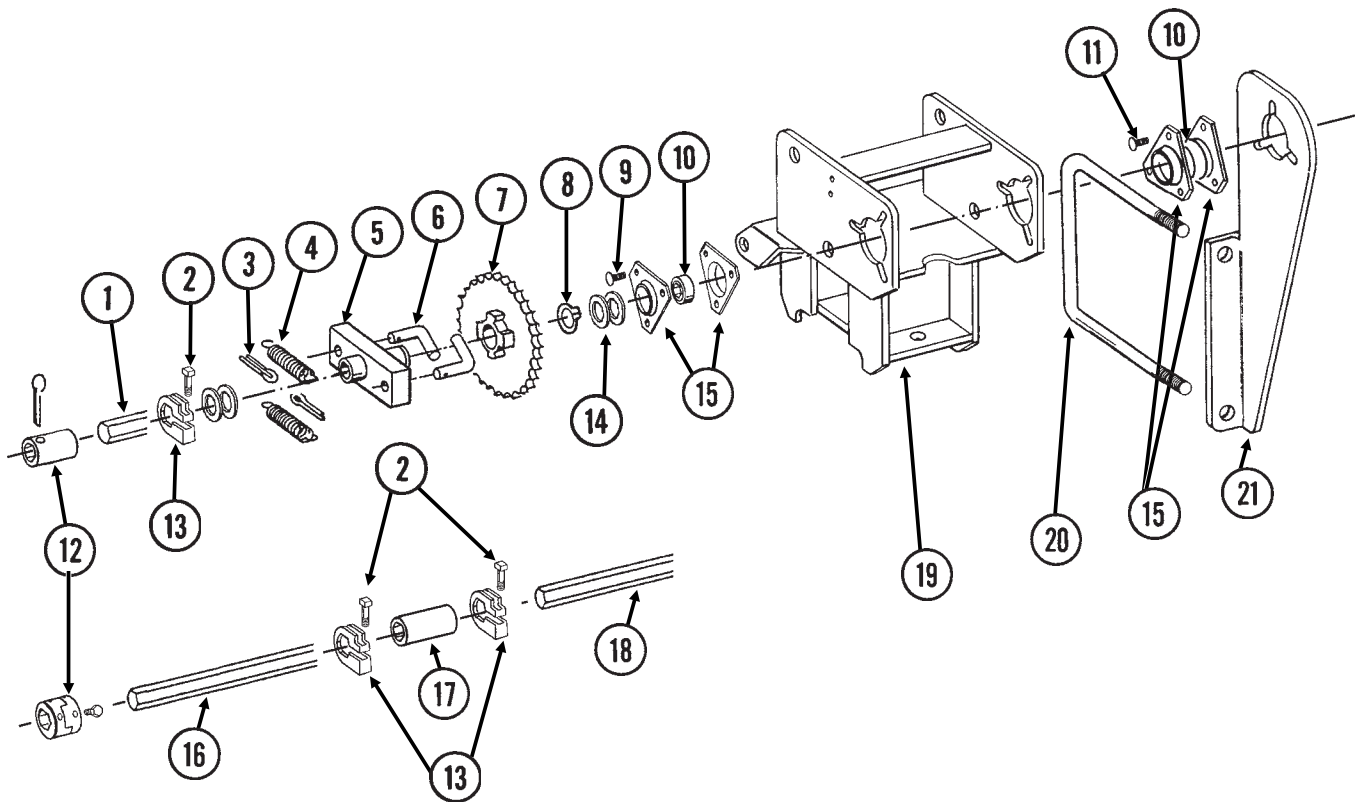
# CONTACT WHEEL ASSEMBLY

ITEM	PART NO.	QTY. (Per Wheel)	DESCRIPTION
7.	A7370	1	Arm W/Flanged Bearings And Hardware <b>(Non-Stock Item) (Sub G1K253)</b>
	G10303	6	Carriage Bolt, 5/16"-18 x 1"
	G10232	6	Lock Washer, 5/16"
	G10106	6	Hex Nut, 5/16"-18
	GA8789	2	Flanged Bearing W/Grease Fitting, 7/8" Hex Bore <b>(Sub GA9846)</b>
	G10971	-	Grease Fitting, 45°, 1/4", Drive-In
	G10055	2	Hex Head Cap Screw, 5/8"-11 x 1 1/4" (Stop Bolt)
	G10107	2	Lock Nut, 5/8"-11
8.	G10890	2	Hex Head Adjusting Bolt, 1/2"-13 x 4", Grade 2
9.	GA5105	1	Sprocket, 15 Tooth
10.	GD6825-11.375	1	Hex Shaft, 7/8" x 11 3/8" (2 Holes)
11.	G10602	4	Spring Pin, 1/4" x 1 1/2"
12.	G3310-83	1	Chain, No. 40, 83 Pitch Including Connector Link And Offset Link
	GR0912	-	Connector Link, No. 40
	GR0911	-	Offset Link, No. 40
13.	G10746	1	Hex Head Cap Screw, 1/4"-20 x 2 3/4"
	G10103	1	Hex Nut, 1/4"-20
	G10110	1	Lock Nut, 1/4"-20, Grade B
14.	G10001	3	Hex Head Cap Screw, 3/8"-16 x 1"
	G10229	3	Lock Washer, 3/8"
	G10101	3	Hex Nut, 3/8"-16
15.	GA2180	2	Hanger Bearing, 7/8" Hex Bore
16.	G10501	2	Hex Jam Nut, 1/2"-13, Grade 2
17.	GA2068	2	Spring W/Plug
18.	GD5857	1	Spring
19.	GA9914	1	Idler W/Sprocket And Hardware, R.H.
	GA10081	-	Idler W/Sprocket And Hardware, L.H.
	G10100	2	Hex Nut, 7/16"-14
	G10421	1	Hex Head Cap Screw, 7/16"-14 x 1 1/4"
	GD11158	1	Spacer, 3/4" O.D. x 9/16" Long
	G10501	1	Hex Jam Nut, 1/2"-13, Grade 2
	G10581	1	Hex Head Cap Screw, 1/2"-13 x 2 1/4"
	GA7154	1	Sprocket W/Bearing, 18 Tooth
20.	G10019	2	Hex Head Cap Screw, 5/16"-18 x 1"
	G10232	2	Lock Washer, 5/16"
	G10106	2	Hex Nut, 5/16"-18
21.	G10036	1	Hex Head Cap Screw, 5/8"-11 x 4"
	G10503	1	Hex Jam Nut, 5/8"-11, Grade 2
	G10107	1	Lock Nut, 5/8"-11
22.	GA8426	1	Wheel Mount
23.	GD1134	1	U-Bolt, 7" x 5" x 5/8"-11
	G10230	2	Lock Washer, 5/8"
	G10104	2	Hex Nut, 5/8"-11
24.	-	-	See "Driveline", Pages P56 And P57
25.	GD5860	1	Bar
26.	G10751	2	Hex Head Cap Screw, 5/8"-18 x 1 3/4"
	G10235	6	Machine Bushing, 7/8", 14 Gauge
	GD7805	2	Special Washer, 5/8", Hardened
	G10412	2	Lock Nut, 5/8"-18
27.	GB0218	2	Bushing, 21/32" I.D. x 7/8" O.D. x 19/32" Long
28.	GD11158	1	Spacer, 3/4" O.D. x 9/16" Long
29.	G10053	1	Hex Head Cap Screw, 1/2"-13 x 2 1/2"
	G10128	5	Machine Bushing, 1/2", 14 Gauge
	G10111	1	Lock Nut, 1/2"-13
30.	G10004	1	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10229	1	Lock Washer, 3/8"
	G10101	1	Hex Nut, 3/8"-16
31.	GA7154	2	Sprocket W/Bearing, 18 Tooth
32.	GA5107	1	Sprocket, 19 Tooth
33.	GD2558	1	Lynch Pin, 1/4"
34.	GA5105	1	Sprocket, 15 Tooth
	GA5107	-	Sprocket, 19 Tooth
	GA11285	-	Sprocket, 38 Tooth
A.	G1K253	-	Contact Wheel Arm Replacement Kit (Item 3, 7, 8, 11 And 16)

\* 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 could result in rate changes. To maintain consistent planting rates throughout all rows, it is recommended that all contact tires be of the same brand and be equally inflated.

# DRIVELINE

PTD091(TWL166a)



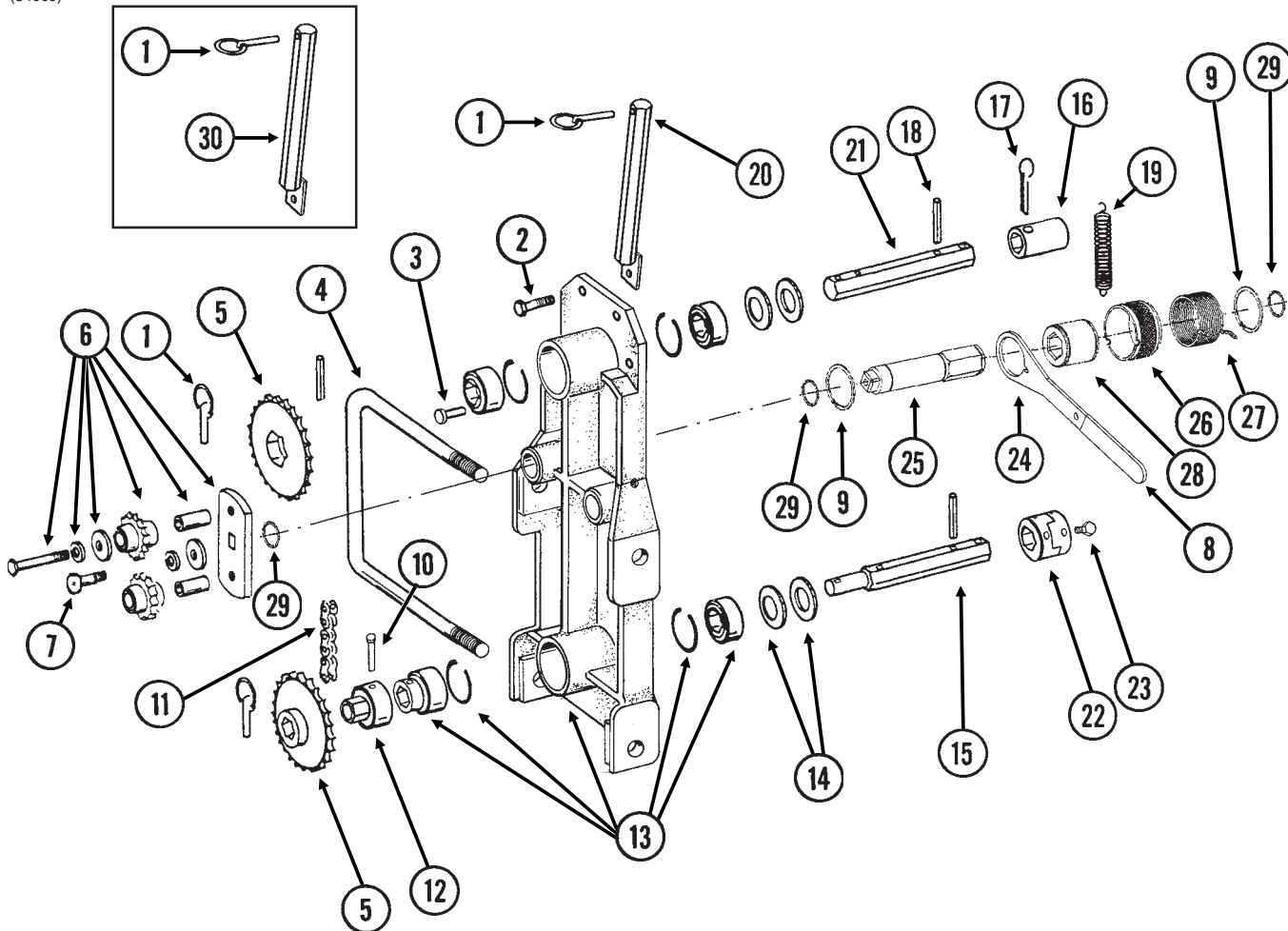


# DRIVELINE

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD0914-204	1	Hex Shaft, 7/8" x 204" (No Holes)
2.	G10130	-	Square Head Machine Bolt, 5/16"-18 x 1 3/4"
	G10923	-	Flange Nut, 5/16"-18, No Serration
3.	G10453	2	Cotter Pin, 3/16" x 1"
4.	GD1256	2	Spring
5.	GA0378	1	Block And Hub Assembly
6.	GD1255	2	L-Pin
7.	GA7574	1	Sprocket W/Bushing, 34 Tooth
8.	G10430	1	External Retaining Ring, 1 1/4"
9.	G10303	6	Carriage Bolt, 5/16"-18 x 1"
	G10232	6	Lock Washer, 5/16"
	G10106	6	Hex Nut, 5/16"-18
10.	G2100-03	3	Bearing, 7/8" Hex Bore, Spherical
11.	G10303	3	Carriage Bolt, 5/16"-18 x 1"
	G10219	3	Washer, 5/16" USS
	G10232	3	Lock Washer, 5/16"
	G10106	3	Hex Nut, 5/16"-18
12.		-	See "Seed Rate Transmission", Pages P58 And P59
13.	GD11045	-	Lock Clamp
14.	G10233	-	Machine Bushing, 1", 10 Gauge
15.	G3400-01	6	Flangette
16.	GD0914-43	1	Hex Shaft, 7/8" x 43" (No Holes)
17.	GD1719	1	Coupler, 4"
18.	GD0914-206	1	Hex Shaft, 7/8" x 206" (No Holes)
19.		-	See "Contact Wheel Assembly", Pages P54 And P55
20.	GD1113	1	U-Bolt, 5" x 7" x 5/8"-11
	G10230	2	Lock Washer, 5/8"
	G10104	2	Hex Nut, 5/8"-11
21.	GD11549	1	Center Support
A.	GA8451	-	Ratchet/Sprocket Assembly, L.H. (Items 3-8)(Shown)
	GA8450	-	Ratchet/Sprocket Assembly, R.H. (Items 3-8)
B.	G1K269	-	Lock Clamp Kit (Items 2 And 13)

# SEED RATE TRANSMISSION

(3400J)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD2558	3	Lynch Pin, 1/4"
2.	G10017	2	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
3.	G10478	1	Clevis Pin, 5/16" x 1"
	G10409	1	Retaining Ring, 5/16"
4.	GD1113	1	U-Bolt, 5" x 7" x 5/8"-11
	G10230	2	Lock Washer, 5/8"
	G10104	2	Hex Nut, 5/8"-11

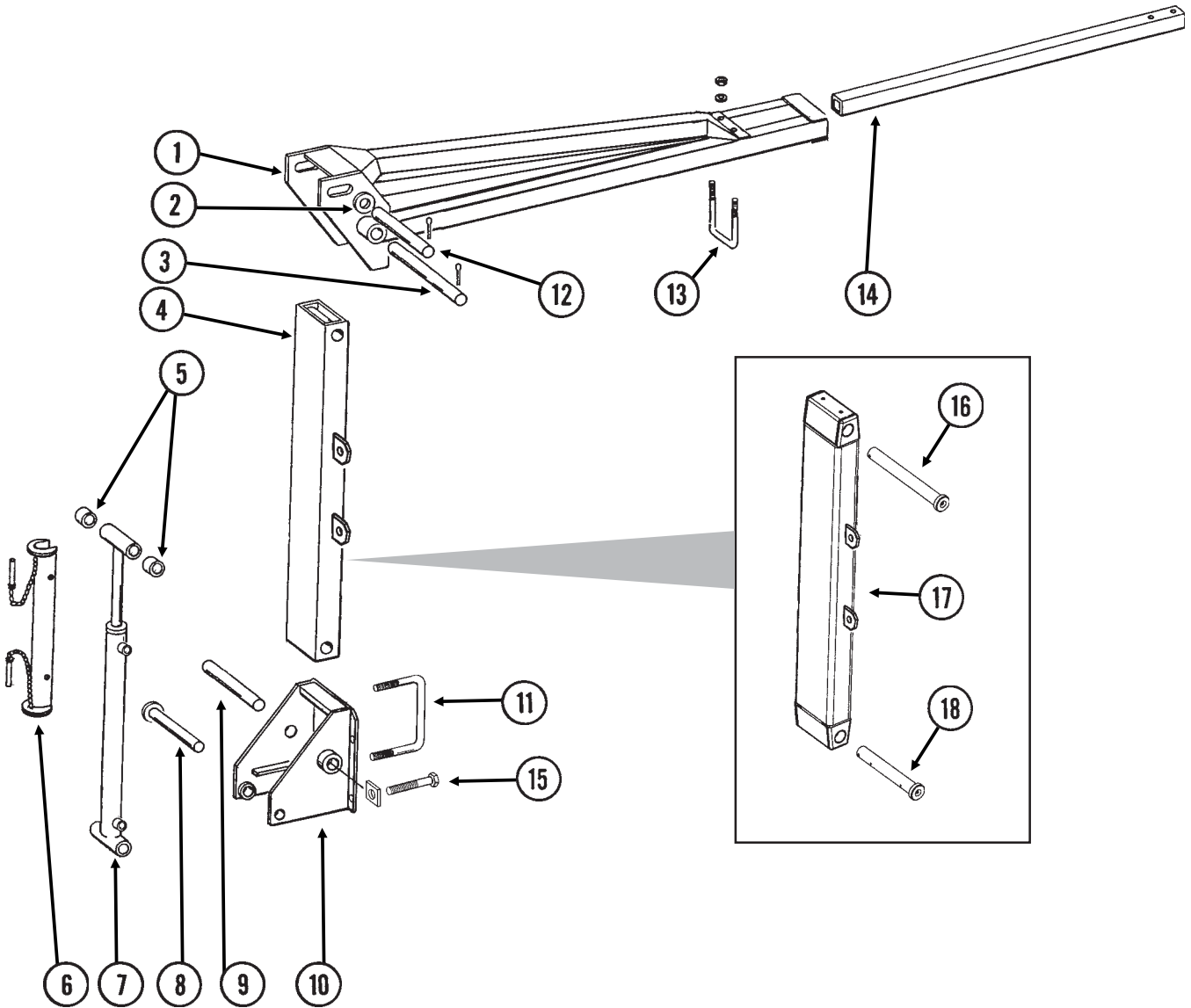
# SEED RATE TRANSMISSION

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ITEM	PART NO.	QTY.	DESCRIPTION
5.	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
6.	GA7336	1	Idler W/Bolt-On Sprockets
	GD7426	-	Sprocket, 12 Tooth
	GD1026	-	Sleeve, 1 <sup>3</sup> / <sub>16</sub> " Long
	G10210	-	Washer, <sup>3</sup> / <sub>8</sub> " USS
	G10229	-	Lock Washer, <sup>3</sup> / <sub>8</sub> "
	G10047	-	Hex Head Cap Screw, <sup>3</sup> / <sub>8</sub> "-16 x 1 <sup>3</sup> / <sub>4</sub> "
7.	G11100	1	Hex Socket Button Head Cap Screw, <sup>1</sup> / <sub>4</sub> "-20 x <sup>1</sup> / <sub>2</sub> ", Grade 8
	G10227	1	Lock Washer, <sup>1</sup> / <sub>4</sub> "
	G10209	1	Washer, <sup>1</sup> / <sub>4</sub> " USS
8.	G11078	1	Vinyl Cap
9.	G10496	2	External Inverted Snap Ring, 1 <sup>1</sup> / <sub>2</sub> "
10.	G10821	1	Clevis Pin, <sup>3</sup> / <sub>16</sub> " x 2"
	G10455	1	Cotter Pin, <sup>1</sup> / <sub>16</sub> " x <sup>1</sup> / <sub>2</sub> "
11.	G3310-80	1	Chain, No. 40, 80 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
12.	GD7127	1	Shear Coupler
	GR0912	-	Connector Link, No. 40
13.	GA5629	1	Transmission Plate W/Bearings, Grease Fittings And Retaining Rings
	GA5116	3	Bearing, <sup>7</sup> / <sub>8</sub> " Hex Bore, Cylindrical
	GA5624	1	Special Bearing, <sup>7</sup> / <sub>8</sub> " Hex Bore x 1.6"
	GD6551	4	Ring
	G10640	-	Grease Fitting, <sup>1</sup> / <sub>4</sub> "-28
14.	G10233	4	Machine Bushing, 1", 10 Gauge
15.	GD7822	1	Shaft, <sup>7</sup> / <sub>8</sub> " x 7"
16.	GD7867	1	Coupler, 3"
17.	G10460	1	Cotter Pin, <sup>1</sup> / <sub>4</sub> " x 2"
18.	G10602	3	Spring Pin, <sup>1</sup> / <sub>4</sub> " x 1 <sup>1</sup> / <sub>2</sub> "
19.	GD5857	1	Spring
20.	GA5146	1	Sprocket Storage Rod, 9 <sup>9</sup> / <sub>16</sub> "
21.	GD5835	1	Shaft, <sup>7</sup> / <sub>8</sub> " x 7"
22.	GB0287	2	Coupler
23.	G10131	4	Square Head Set Screw, <sup>5</sup> / <sub>16</sub> "-18 x <sup>3</sup> / <sub>4</sub> "
24.	GD14431	1	Handle
25.	GD14427	1	Tightener Shaft, 4 <sup>7</sup> / <sub>8</sub> "
26.	GD14429	1	Release Collar, Silver, L.H.
27.	GD14414	1	Torsion Spring, R.H. (Used In L.H. Wrap Spring Wrench)
28.	GD14432	1	Sleeve, 1 <sup>1</sup> / <sub>4</sub> "
29.	G11075	3	External Inverted Snap Ring, <sup>7</sup> / <sub>8</sub> "
30.	GA8802	1	Sprocket Storage Rod, 8 <sup>9</sup> / <sub>16</sub> "
A.	G1K379	-	Wrap Spring Wrench Replacement Kit, Silver Collar, L.H. (Items 7-9 And 24-29)

# ROW MARKER ASSEMBLY

(MKR23b/A11593a)

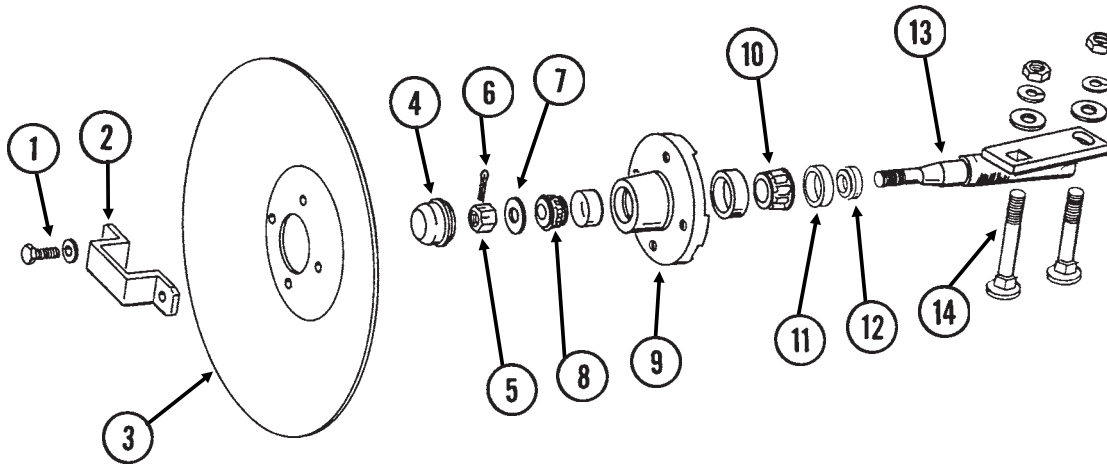


# ROW MARKER ASSEMBLY

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	GA8472	1	Arm, Second Stage, 46"
2.	G10226	-	Washer, 1 1/4" SAE (As Required)
	G10159	-	Machine Bushing, 1 1/4", 10 Gauge (As Required)
	G10322	-	Machine Bushing, 1 1/4", 18 Gauge (As Required)
3.	GD3214	1	Pin, 1 1/4" x 12 1/4"
	G10460	2	Cotter Pin, 1/4" x 2"
4.	GA8407	1	Arm W/Grease Fittings, First Stage
	G10641	2	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.		-	See "Row Marker Cylinder", Page P66
8.	GD15386	1	Pin, 1 1/4" x 7 5/8"
	G10460	1	Cotter Pin, 1/4" x 2"
9.	GD0652	1	Pin, 1 1/4" x 9 1/2"
	G10460	2	Cotter Pin, 1/4" x 2"
10.	GA8382	1	Mount
11.	GD14605	1	U-Bolt, 3" x 6" x 3/4"-10
	G10231	2	Lock Washer, 3/4"
	G10105	2	Hex Nut, 3/4"-10
12.	GD2161	1	Pin, 1 1/4" x 8 1/4"
	G10460	2	Cotter Pin, 1/4" x 2"
13.	GD2721	1	U-Bolt, 2" x 2" x 1/2"-13
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
14.	GD0453-08	1	Extension Tube, 65"
15.	G10050	2	Hex Head Cap Screw, 3/4"-10 x 5"
	GD14604	2	Square Washer
	G10231	2	Lock Washer, 3/4"
	G10105	2	Hex Nut, 3/4"-10
16.	GA11766	-	Pin W/Grease Fitting, 1 1/4" x 11 13/16"
	G10640	-	Grease Fitting, 1/4"-28
	G10463	-	Cotter Pin, 1/4" x 1 1/2"
17.	GA11593	-	Arm, First Stage
18.	GA11767	-	Pin W/Grease Fitting, 1 1/4" x 9 1/2"
	G10640	-	Grease Fitting, 1/4"-28

# ROW MARKER SPINDLE/HUB/BLADE

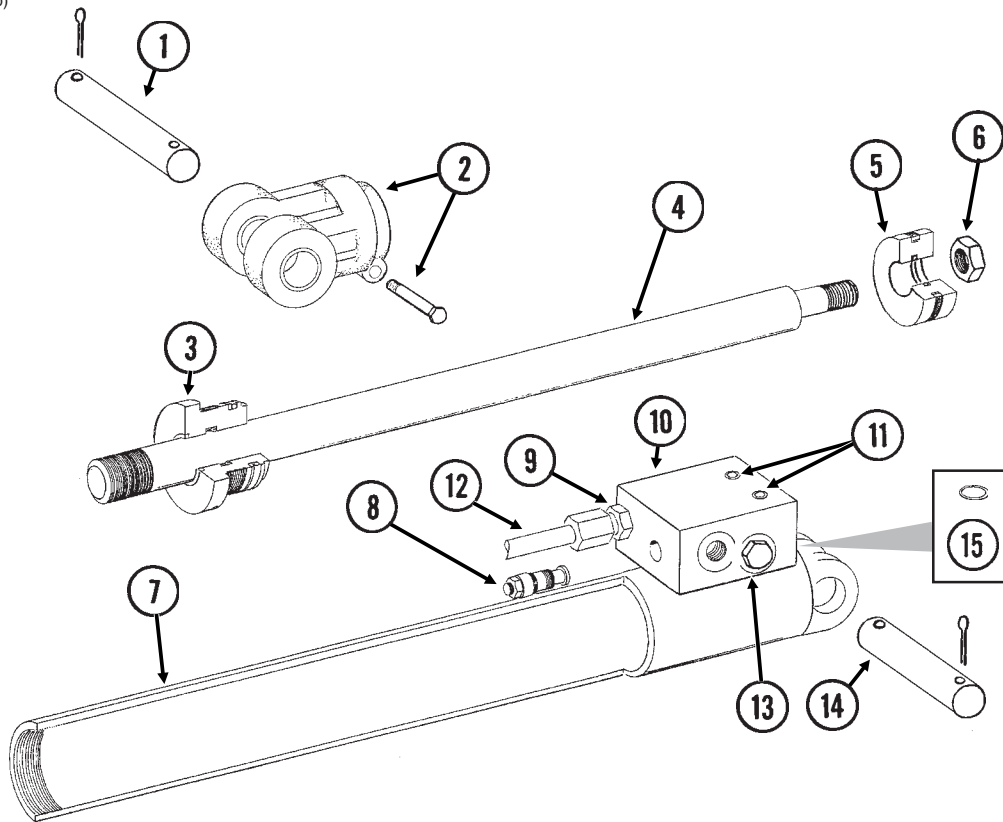
MKR020(MKR3a)



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
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)

# SLAVE CYLINDER

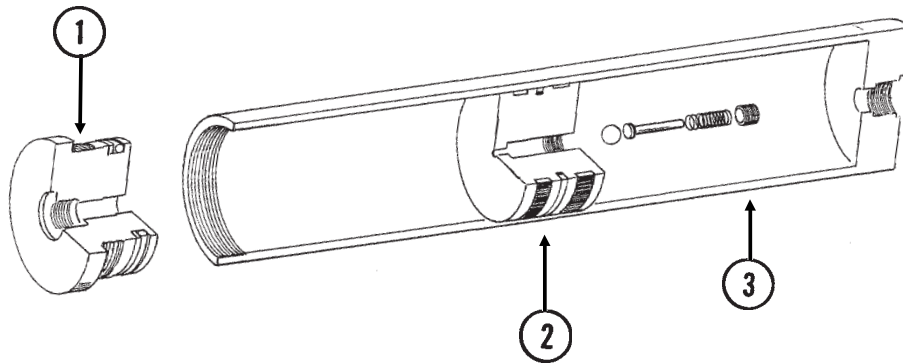
CYL062(CYL54b)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD12585	1	Pin, 1 1/4" x 4 1/2"
	G10460	-	Cotter Pin, 1/4" x 2"
2.	GA8130	1	Clevis W/Bushings, Hex Head Cap Screw And Hex Nut
	GR1401	-	Bushing
	G10939	1	Hex Head Cap Screw, 3/8"-16 x 2 1/4"
	G10101	1	Hex Nut, 3/8"-16
3.	GD12548	1	Gland
4.	GD12600	1	Rod
5.	GD12602	1	Piston
6.	G10958	1	Lock Nut, 1"-14
7.	A8986	1	Barrel ( <b>Non-Stock Item</b> )
8.	GA8882	1	Counter Balance Valve
9.	G6400-08	1	Connector W/O-Ring, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
10.	GD11579	1	Block
11.	G10932	2	Hex Socket Head Cap Screw, 5/16"-18 x 2", Grade 8
12.	GA8984	1	Steel Hydraulic Line, 15 1/8"
13.	G6408-08	-	Plug W/O-Ring, 3/4"-16 O-Ring
	GR1037	-	O-Ring
14.	GD12790	1	Pin, 1 1/4" x 3 1/2"
	G10460	-	Cotter Pin, 1/4" x 2"
15.	GD12239	1	O-Ring, No. 016
A.	GA8987	-	Cylinder Complete, 3 1/2" x 20" (Items 2-13) (Part Number Stamped On Barrel)
B.	GR1548	-	Seal Kit (For Cylinder And Counter Balance Valve), Includes: (1) Seal, (6) O-Rings, (4) BU Rings, (1) U-Cup, (1) Wiper, (1) Expander, (2) Cast Iron Rings

# MASTER CYLINDER

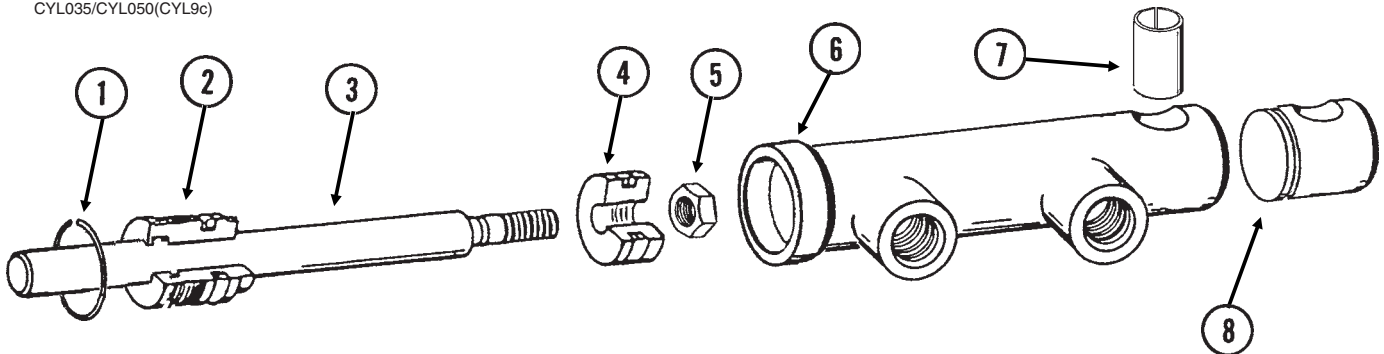
(CYL55a)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD12606	1	Gland
2.	GA8989 GR1169	1 -	Piston W/Rephasing Valve Rephasing Valve Replacement Kit, Includes: (1)Set Screw, (1) Guide, (2) Springs, (1) Ball)
3.	A8988	1	Barrel <b>(Non-Stock Item)</b>
A.	GA8896	-	Cylinder Complete, 4 1/4" x 11 1/16" <i>(Part Number Stamped On Barrel)</i>
B.	GR1549	-	Seal Kit, Includes: (1) O-Ring, (1) BU Ring, (2) Cast Iron Rings, (1) Seal, (1) Expander

# TRANSPORT LATCH CYLINDER

CYL035/CYL050(CYL9c)

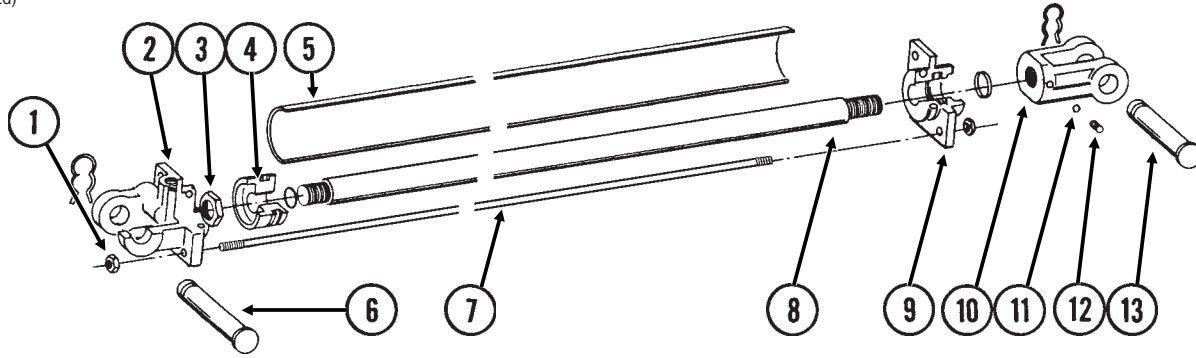


ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10770	1	Internal Retaining Ring, 1 11/16"
2.	GD13170	1	Gland
3.	GD13425	1	Rod
4.	GD13172	1	Piston
5.	G11016	1	Lock Nut, 1/2"-20
6.	D13426	1	Barrel <b>(Non-Stock Item)</b>
7.	GD13400	1	Tension Bushing, 1" x 2" Long
8.	GD13173	1	End Cap
A.	GA9559	-	Cylinder Complete, 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) Rod Wiper, (1) T-Seal, (1) Bronze Bushing, (1) Seal, (1) U-Cup



# TRANSPORT LATCH POST CYLINDER

(CYL22d)

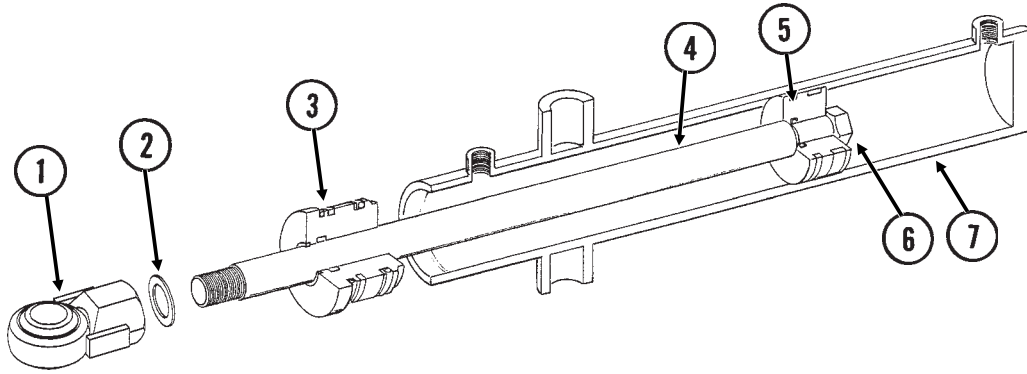


ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10100	8	Hex Nut, 7/16"-14
2.	GR1494	1	Clevis
3.	GR0170	1	Hex Nut, 7/8"-14
4.	GR1498	1	Piston
5.	R1500	1	Barrel <b>(Non-Stock Item)</b>
6.	GR1503	1	Clevis Pin W/Clip
	GR0193	-	Hair Pin Clip
7.	GR1501	4	Tie Rod
8.	GR1499	1	Rod
9.	GR1495	1	Gland
10.	GR1497	1	Clevis
11.	GR0716	1	Nylon Ball
12.	G10072	1	Hex Socket Set Screw, 3/8"-16 x 3/8"
13.	GR1504	1	Pin W/Clip
	GR0193	-	Hair Pin Clip
A.	GA8456B	-	Cylinder Complete, 2" x 24"
B.	GR1502	-	Seal Kit, Includes: (2) Seals, (3) O-Rings, (3) BU Seals, (1 ) Wiper

**IDENTIFICATION NOTE:** "Energy" cast in clevis.

# ROTATION CYLINDER

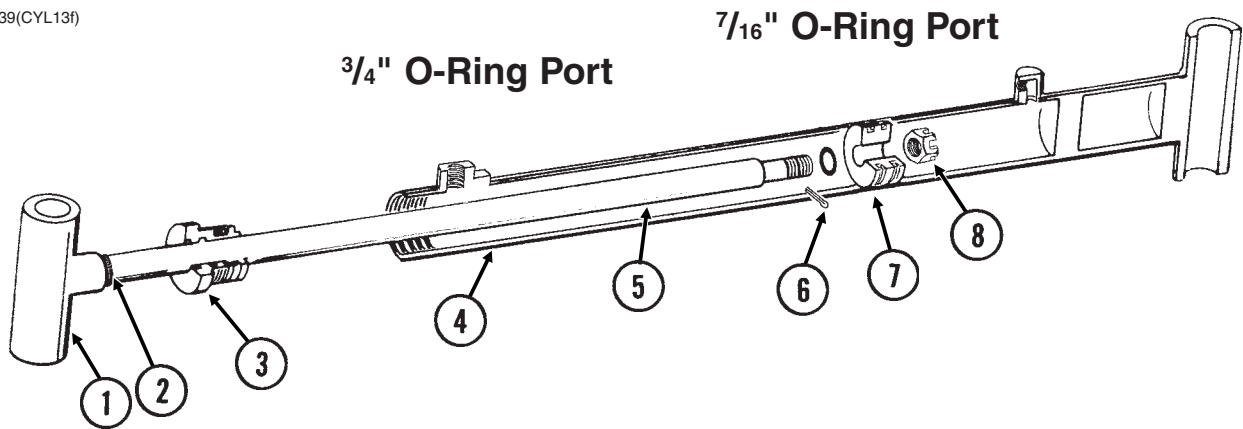
(A10150a)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA10150	1	Threaded Ball Joint End
2.	G11088	2	Bushing, 1 <sup>5</sup> / <sub>32</sub> " I.D. x 1 <sup>5</sup> / <sub>8</sub> " O.D., 14 Gauge
3.	GD12615	1	Gland
4.	GD12610	1	Rod
5.	GD12614	1	Piston
6.	G10958	1	Lock Nut, 1"-14
7.	A8991	1	Barrel <b>(Non-Stock Item)</b>
A.	GA8992	-	Cylinder Complete, 3" x 16" <i>(Part Number Stamped On Barrel)</i>
B.	GR1526	-	Seal Kit, Includes: (1) Wear Ring, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper, (1) T-Seal

# ROW MARKER (CUSHION) CYLINDER

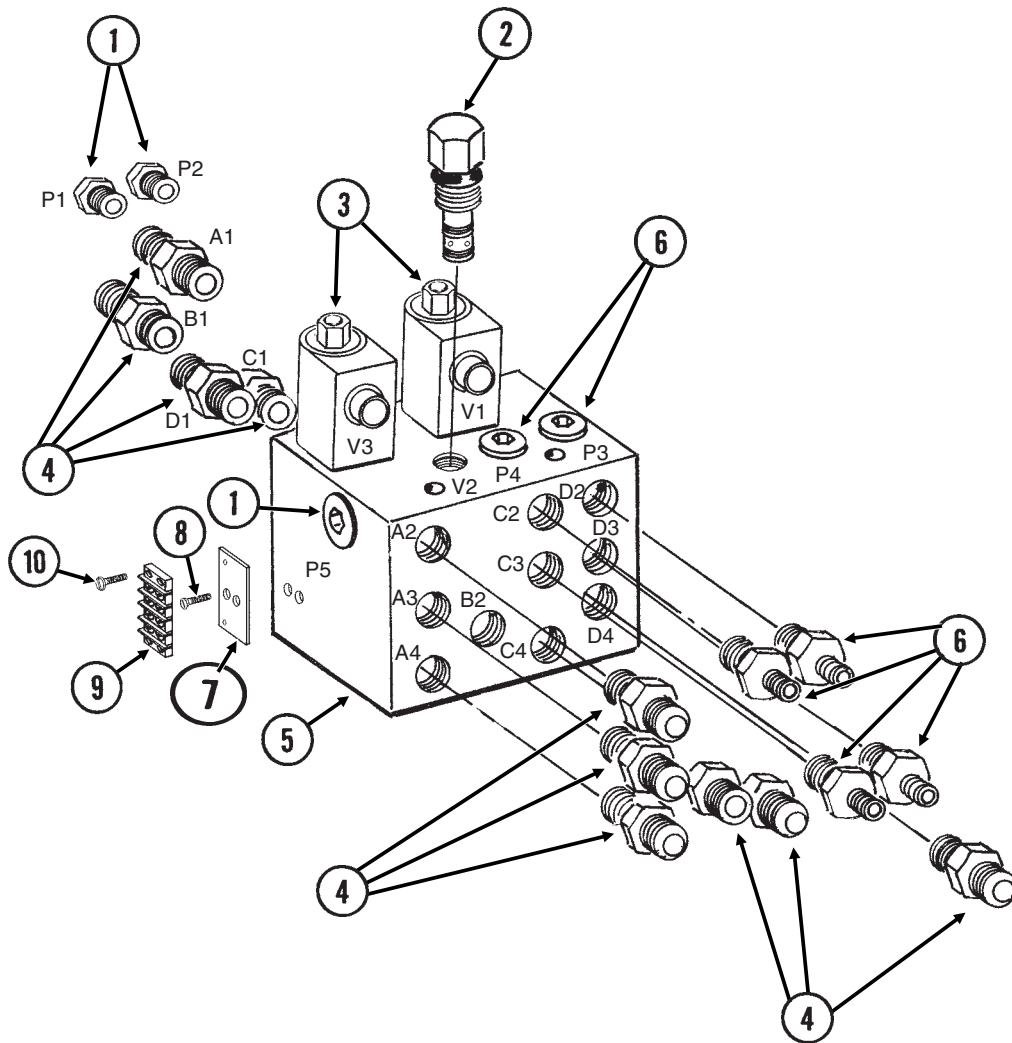
CYL039(CYL13f)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD14308	1	Threaded Sleeve End
2.	G10526	4	Machine Bushing, 1" (.048" Thick)
3.	GD10207	1	Gland
4.	A8836	1	Barrel <b>(Non-Stock Item)</b>
5.	GD14529	1	Rod
6.	G10827	1	Cotter Pin, 1/8" x 1 3/4"
7.	GD11983	1	Piston
8.	G10962	1	Slotted Hex Nut, 7/8"-14
A.	GA10123	-	Cylinder Complete, 2 1/2" x 20 1/16" <i>(Part Number Stamped On Barrel)</i>
B.	GR1521	-	Seal Kit, Includes: (1) T Seal, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper, (1) Cast Iron Ring

# VALVE BLOCK (Located On Hitch)

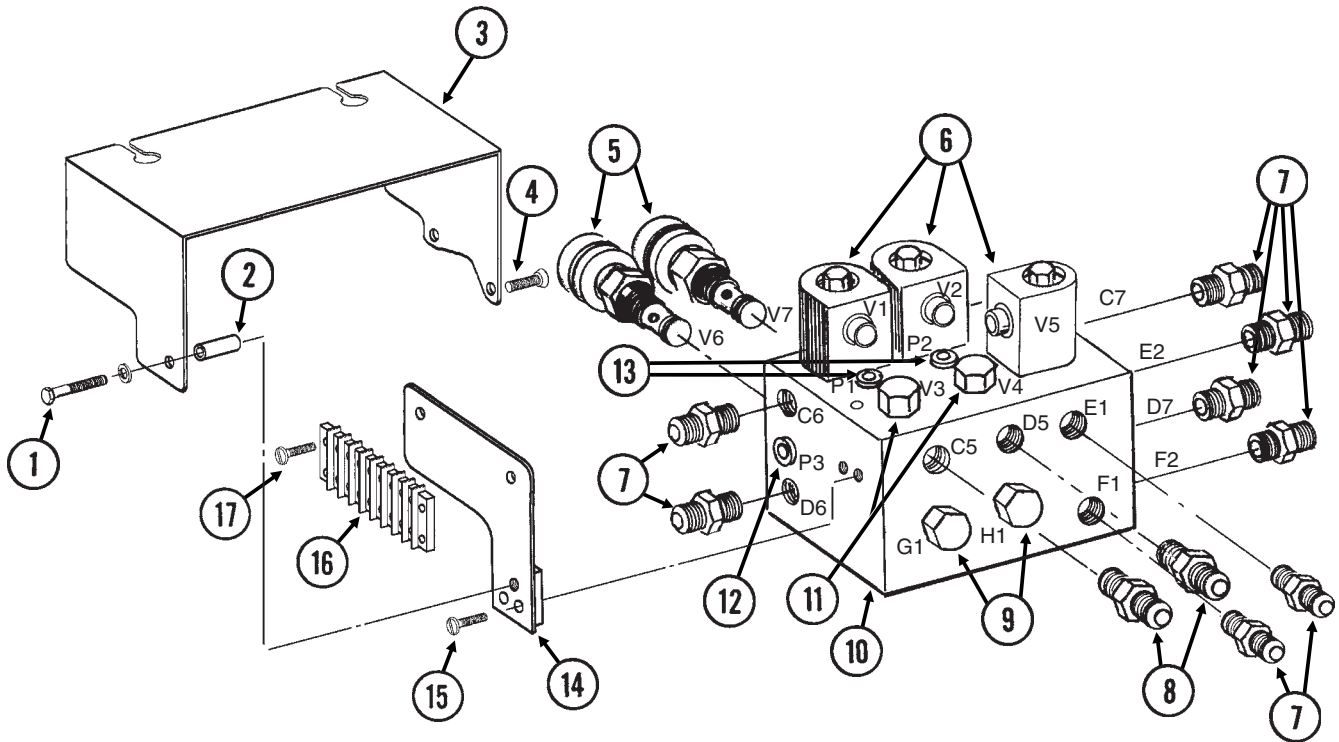
PHS049(3400b)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G6408-H06-O GR1045	5 -	Hex Socket Head Plug W/O-Ring, $\frac{9}{16}$ "-18 O-Ring
2.		-	See "Check Valve", Page P71
3.		-	See "Solenoid Valve (G1K276)", Page P70
4.	G6400-08 GR1037	10 -	Connector W/O-Ring, $\frac{3}{4}$ "-16 Male JIC To O-Ring
5.	GD11460	1	Block
6.	G6400-06 GR1045	4 -	Connector W/O-Ring, $\frac{9}{16}$ "-18 Male JIC To O-Ring
7.	GD13395	1	Terminal Strip Mount
8.	G11068	2	Phillips Flat Head Machine Screw, No. 10-24 x $\frac{5}{8}$ ", Stainless Steel
9.	GA9510 GR1635	1 -	Terminal Strip W/Screws, No. 6, 4 Terminal
10.	G11065	2	Phillips Pan Head Machine Screw, No. 8-32 x $\frac{5}{8}$ ", Stainless Steel

# VALVE BLOCK (Located On Rear Center Frame)

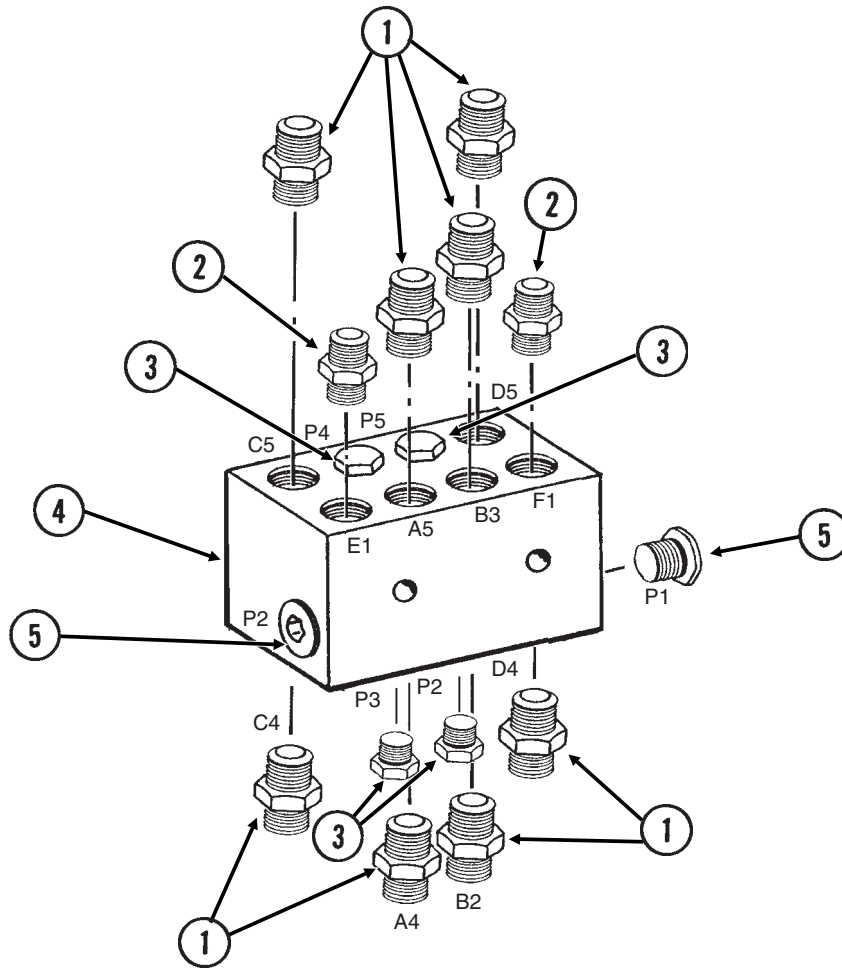
PHS050(3400ee)A8455



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10133	1	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x 1 $\frac{1}{2}$ "
	G10232	1	Lock Washer, $\frac{5}{16}$ "
2.	GD8066-02	1	Sleeve, 1" Long
3.	GD16039	1	Cover
4.	G10977	2	Phillips Pan Head Machine Screw, No. 10-24 x $\frac{1}{2}$ ", Stainless Steel
5.		-	See "Flow Control Valve", Page P71
6.		-	See "Solenoid Valve (G1K275)", Page P70
7.	G6400-06	8	Connector W/O-Ring, $\frac{9}{16}$ "-18 Male JIC To O-Ring
	GR1045	-	O-Ring
8.	G6400-08	2	Connector W/O-Ring, $\frac{3}{4}$ "-16 Male JIC To O-Ring
	GR1037	-	O-Ring
9.	G6408-08	2	Plug W/O-Ring, $\frac{3}{4}$ "-16 O-Ring
	GR1037	-	O-Ring
10.	GD11461	1	Block
11.	G6408-10	2	Plug W/O-Ring, $\frac{7}{8}$ "-14 O-Ring
	GR1466	-	O-Ring
12.	G6408-06	1	Plug W/O-Ring, $\frac{9}{16}$ "-18 O-Ring
	GR1045	-	O-Ring
13.	G6408-H06-O	2	Hex Socket Head Plug W/O-Ring, $\frac{9}{16}$ "-18 O-Ring
	GR1045	-	O-Ring
14.	GA9543	1	Terminal Strip Mount
15.	G11066	2	Phillips Pan Head Machine Screw, No. 10-24 x $\frac{3}{4}$ ", Stainless Steel
16.	GA9098	1	Terminal Strip W/Screws, No. 6, 8 Terminal
	GR1635	-	Screw, No. 6-32 x $\frac{1}{4}$ "
17.	G11067	2	Phillips Pan Head Machine Screw, No. 8-32 x $\frac{3}{4}$ ", Stainless Steel

# JUNCTION BLOCK (Located On Front Of Center Pivot)

(2400d)

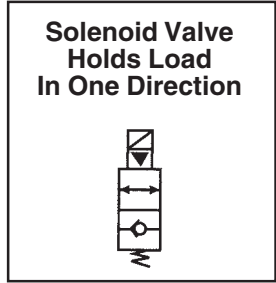
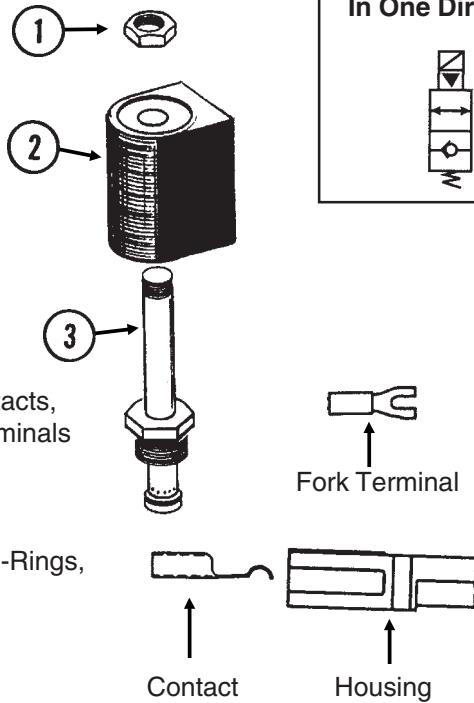


ITEM	PART NO.	QTY.	DESCRIPTION
1.	G6400-08 GR1037	8 -	Connector W/O-Ring, 3/4"-16 Male JIC To O-Ring O-Ring
2.	G6400-06 GR1045	2 -	Connector W/O-Ring, 9/16"-18 Male JIC To O-Ring O-Ring
3.	G6408-08 GR1037	4 -	Plug W/O-Ring, 3/4"-16 O-Ring O-Ring
4.	GD11459	1	Block
5.	G6408-H06-O GR1045	2 -	Hex Socket Head Plug W/O-Ring, 9/16"-18 O-Ring O-Ring

# SOLENOID VALVE (G1K275)

VVB019(TWL27c/TWL18/PLTR75c/A9481)

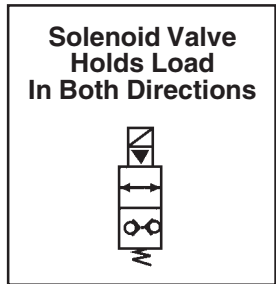
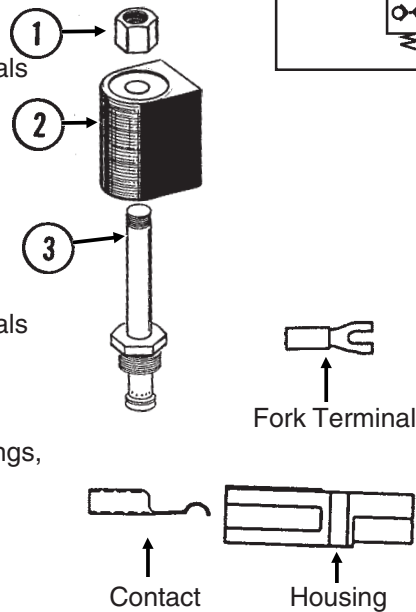
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR0761	1	Special Hex Nut, 1/2"-20
2.	G1K274	1	Coil Kit W/Contacts, Housings And Fork Terminals
	GD9529	2	Housing, Black
	GD9530	2	Contact
	G10996	2	Fork Terminal
3.	GR0763	1	Cartridge
A.	G1K275	-	Solenoid Valve Kit W/Solenoid Valve, Contacts, Housings And Fork Terminals
	GD9529	2	Housing, Black
	GD9530	2	Contact
	G10996	2	Fork Terminal
B.	GR0764	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring



# SOLENOID VALVE (G1K276)

VVB019(FF25/TWL18/PLTR75c)

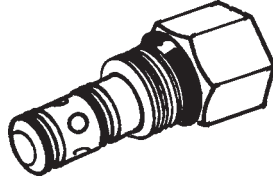
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1322	1	Special Hex Nut, 1/2"-20
2.	G1K274	1	Coil Kit W/Contacts, Housings And Fork Terminals
	GD9529	2	Housing, Black
	GD9530	2	Contact
	G10996	2	Fork Terminal
3.	GR1321	1	Cartridge
A.	G1K276	-	Solenoid Valve Kit W/Contacts, Housings And Fork Terminals
	GD9529	2	Housing, Black
	GD9530	2	Contact
	G10996	2	Fork Terminal
B.	GR0764	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring



# CHECK VALVE

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VVB020(TWL30a)



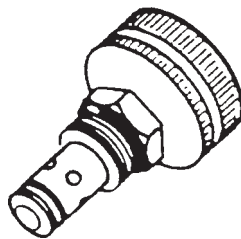
ITEM	PART NO.	QTY.	DESCRIPTION
A.	GA8406	-	Check Valve
B.	GR1468	-	Seal Kit, Includes: (4) O-Rings, (5) BU Rings

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# FLOW CONTROL VALVE

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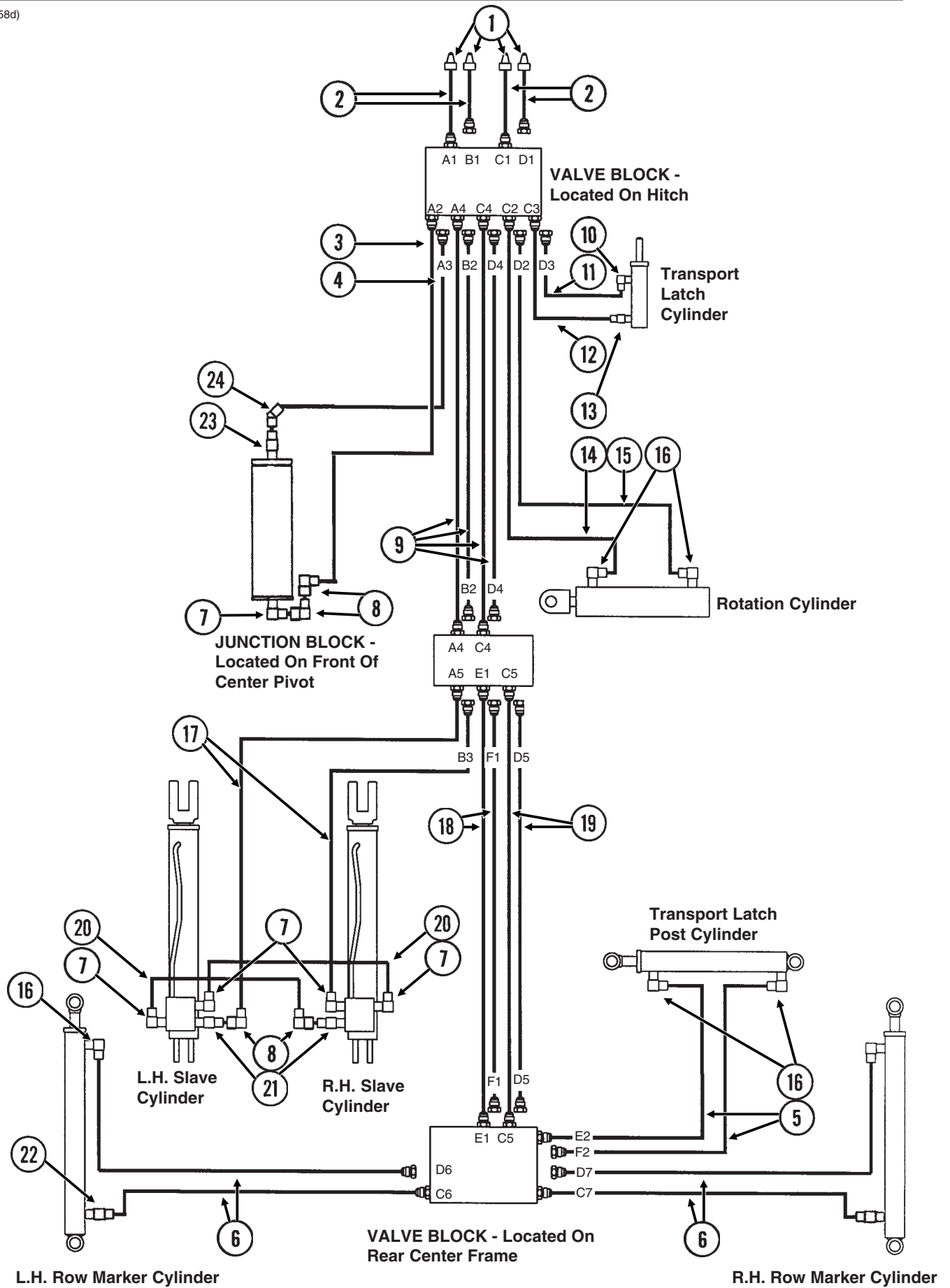
VVB020(TWL28)



ITEM	PART NO.	QTY.	DESCRIPTION
A.	GA3413	-	Flow Control Valve
B.	GR0764	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring

# HYDRAULIC SYSTEM

(TWL158d)





# HYDRAULIC SYSTEM

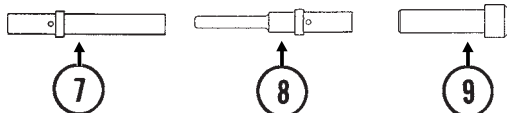
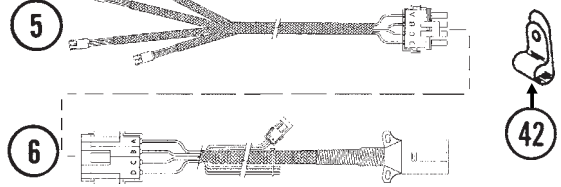
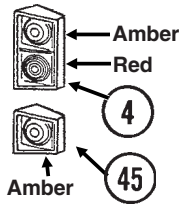
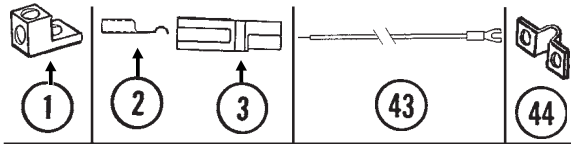
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD4086	4	ISO Coupler
2.	*A3123	4	Hose Assembly, 3/8" x 72"
3.	*A1021	1	Hose Assembly, 3/8" x 56"
4.	*A3158	1	Hose Assembly, 3/8" x 46"
5.	*A7609	2	Hose Assembly, 1/4" x 164"
6.	*A7610	4	Hose Assembly, 1/4" x 175"
7.	G6801-08	5	Elbow W/O-Ring, 90°, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
8.	G6500-08	4	Swivel Elbow, 90°, 3/4"-16 Male JIC To Female
9.	*A3206	4	Hose Assembly, 3/8" x 184"
10.	G6801-06	1	Elbow W/O-Ring, 90°, 9/16"-18 Male JIC To O-Ring
	GR1045	-	O-Ring
11.	*A1169	1	Hose Assembly, 1/4" x 24"
12.	*A1192	1	Hose Assembly, 1/4" x 20"
13.	G6400-06	1	Connector W/O-Ring, 9/16"-18 Male JIC To O-Ring
	GR1045	-	O-Ring
14.	*A7606	1	Hose Assembly, 1/4" x 177"
15.	*A7607	1	Hose Assembly, 1/4" x 187"
16.	G6801-06-08	6	Elbow W/O-Ring, 90°, 9/16"-18 Male JIC To 3/4"-16 O-Ring
	GR1037	-	O-Ring
17.	*A1096	2	Hose Assembly, 3/8" x 50 1/2"
18.	*A1113	2	Hose Assembly, 1/4" x 80"
19.	*A3118	2	Hose Assembly, 3/8" x 80"
20.	*A1079	2	Hose Assembly, 3/8" x 24"
21.	G6400-L-08	2	Long Connector W/O-Ring, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
22.	G6400-06-04	2	Connector W/O-Ring, 9/16"-18 Male JIC To 7/16"-20 O-Ring
	GR1465	-	O-Ring
23.	G6400-08	1	Connector W/O-Ring, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
24.	G6502-08	1	Swivel Elbow, 45°, 3/4"-16 Male JIC To Female

\* Hydraulic hose is not stocked by KINZE® Repair Parts, but can be made available on a special order basis. Call for quote.

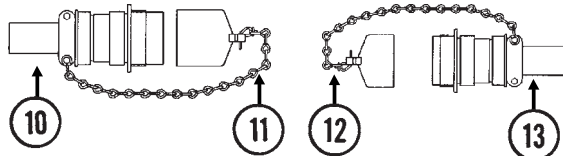
# ELECTRICAL COMPONENTS

ECP010/ECP011/ECP018/ECP023(TWL19a/TWL18/TWL23/A8430ff/ELC39/ELC14/ELC3a/ELC5c/MTR27a/ELC8/A9531/A9530/TWL20f/ELC10a/ELC4)

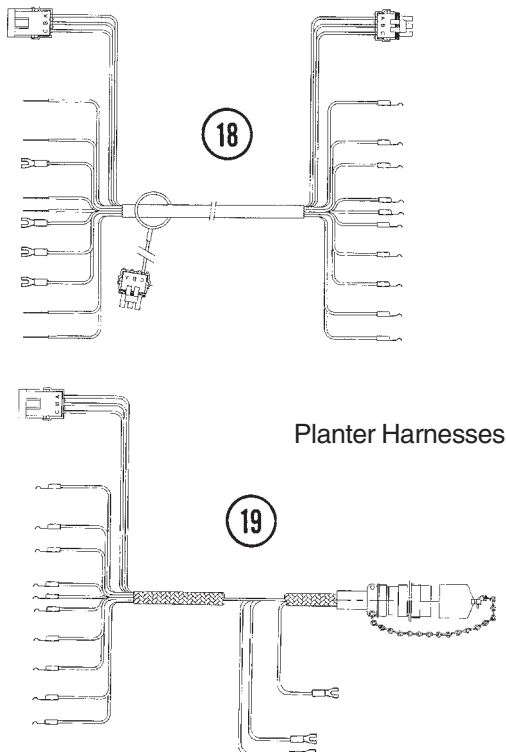
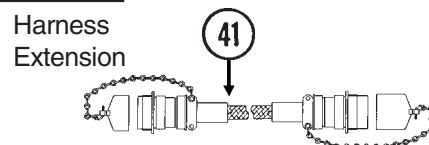
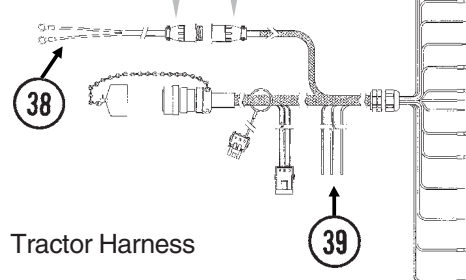
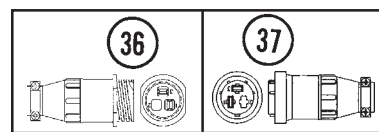
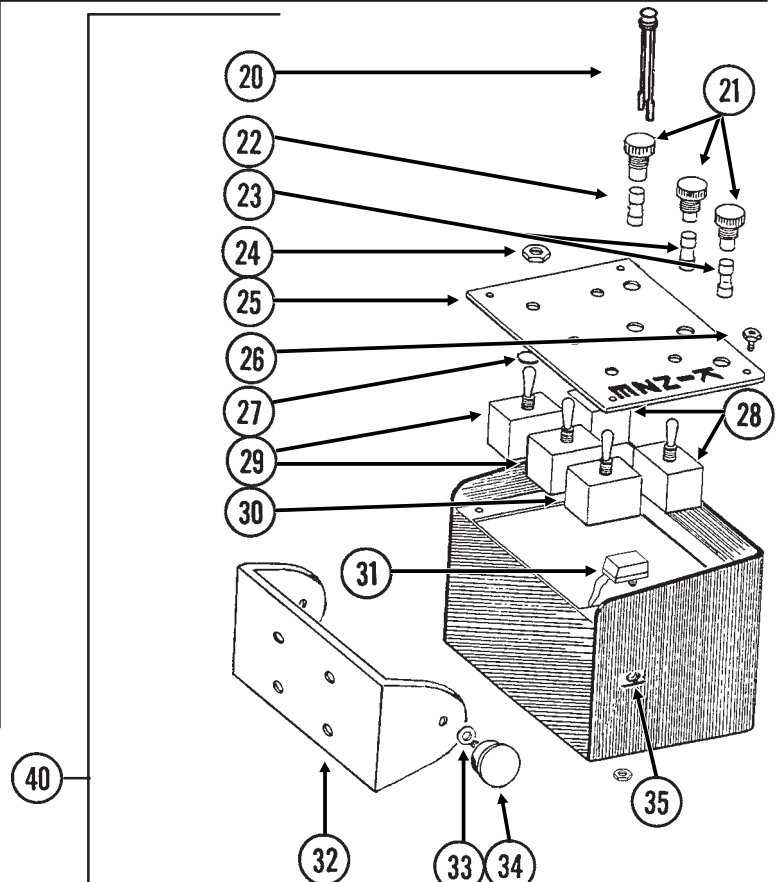
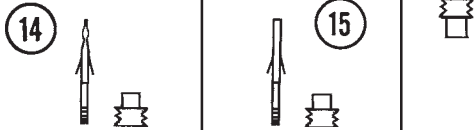
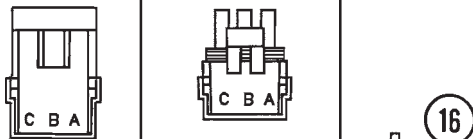
For light brackets see "Planter Frame", pages P46 and P47.



Socket Contact (Tractor) Pin Contact Sealing (Planter) Plug



For Planter Harness For Tractor Harness



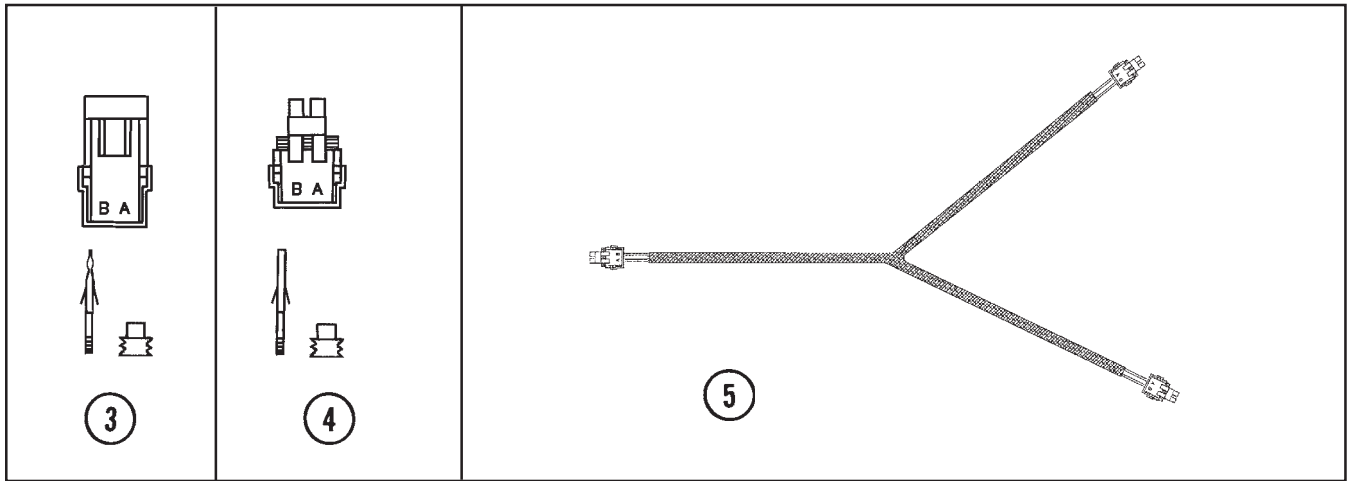
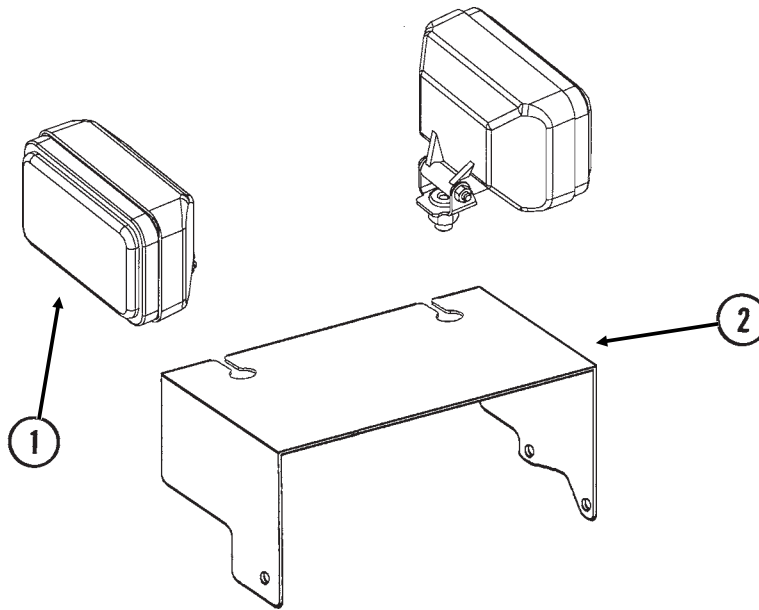
# ELECTRICAL COMPONENTS

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA3584	-	Ground Clamp
2.	GD9530	-	Contact
3.	GD9529	-	Housing, Black
	GD12726	-	Housing, Red
4.	GA6699	1	Double Light Assembly (Shown)
	GA6700	1	Double Light Assembly
	GA6701	-	Single Amber Light Assembly (Shown)
	GR1203	-	Red Lens
	GR1204	-	Amber Lens
	GR1205	-	Cover
	GR1206	-	Rubber Grommet (4)
	GR1207	-	Lamp Unit
	GR1208	-	Bulb
5.	GA9529	1	Light Wiring Harness W/4-Pin Connector, 336" (4 Light Connections)
	GA8329	-	4-Pin Connector W/Male Housing, 4 Seals And 4 Socket Contacts
6.	GA8430	1	Wiring Harness W/7 Terminal Female Connector And 4-Pin Connector, 282"
	GA5385	-	7 Terminal Female Connector
	GA8328	-	4-Pin Connector W/Female Housing, 4 Seals And 4 Pin Contacts
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, 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.	GA8047	-	Dust Plug (Black)
18.	GA9531	1	Hydraulic Wiring Harness, 84"
19.	GA9530	1	Hydraulic Wiring Harness W/Dust Cap, 294"
20.	GA7077	1-4	Indicator Light
21.	GA2612	3-5	Fuse Holder W/Spade, 1 <sup>33</sup> / <sub>50</sub> "
22.	GD2829	1-2	Fuse, 15 Amp, Type AGC
23.	GD10243	2-6	Fuse, MOL 10 Amp Delay Action
24.	GR1363	5	Hex Face Nut, <sup>15</sup> / <sub>32</sub> "-32
	GR1364	5	Internal Tooth Lock Washer, <sup>15</sup> / <sub>32</sub> "
25.	GA8734	1	Cover Plate
26.	GR1292	4	Pan Head Screw, No. 8-32 x <sup>1</sup> / <sub>2</sub> "
27.	GD3860	-	O-Ring (If Applicable)
28.	GA2528	2	Switch, 3 Position Toggle, On-Off-On
29.	GA6978	2	Switch, 3 Position Toggle, Momentary On-Off-Momentary On
30.	GA6977	1-2	Switch, 2 Position Toggle, On-Off
31.	GA8731	1	Switch, Push Button W/Transformer
32.	GD9896	1	Mounting Bracket
33.	G10211	4	Washer, <sup>1</sup> / <sub>4</sub> " SAE
34.	GA6975	2	Knob
35.	GR1290	2	Cage Nut, <sup>1</sup> / <sub>4</sub> "-20
36.	G1K267	-	Power Lead Adapter Connector Kit, Includes: (1) 3-Pin Connector, (1) Cable Clamp, (3) Male Terminal Pins
37.	G1K268	-	Console Cable Connector Kit, Includes: (1) 3-Pin Connector, (1) Cable Clamp, (1) Lock Ring, (3) Female Terminal Pins
38.	GA7856	1	Power Lead Adapter
39.	GA8729	1	Wiring Harness W/Dust Cap And Power Cable
40.	G7633X	-	Backlit Control Console Assembly W/Mounting Brackets, Short Harness W/Dust Cap And Power Cable
41.	GA7399	-	Harness Extension W/Dust Caps, 180"
42.	GD6291	-	Insulated Clamp, <sup>3</sup> / <sub>8</sub> "
43.	GA9481	-	Jumper Wire W/Fork Terminal, 13"
	G10996	-	Fork Terminal
44.	GD13310	-	Jumper, <sup>7</sup> / <sub>16</sub> "
45.	GA6701	-	Single Amber Light Assembly (Planters Equipped With Interplant® Package)
	GR1204	-	Amber Lens
	GR1206	-	Rubber Grommet (2)
	GR1207	-	Lamp Unit
	GR1208	-	Bulb

**NOTE:** See "KPM I Electronic Seed Monitor", "KPM II Stack-Mode Electronic Seed Monitor" or "KPM III Electronic Seed Monitor" for those components.

# AUXILIARY WORK LIGHTS PACKAGE

(A9689a/MTR27t/A10924)



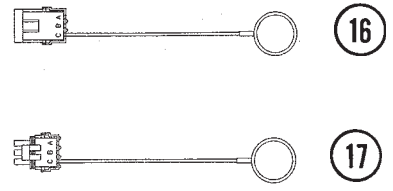
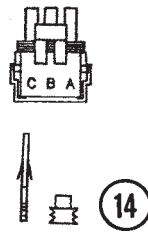
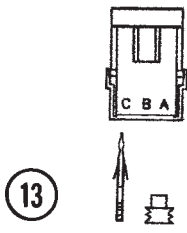
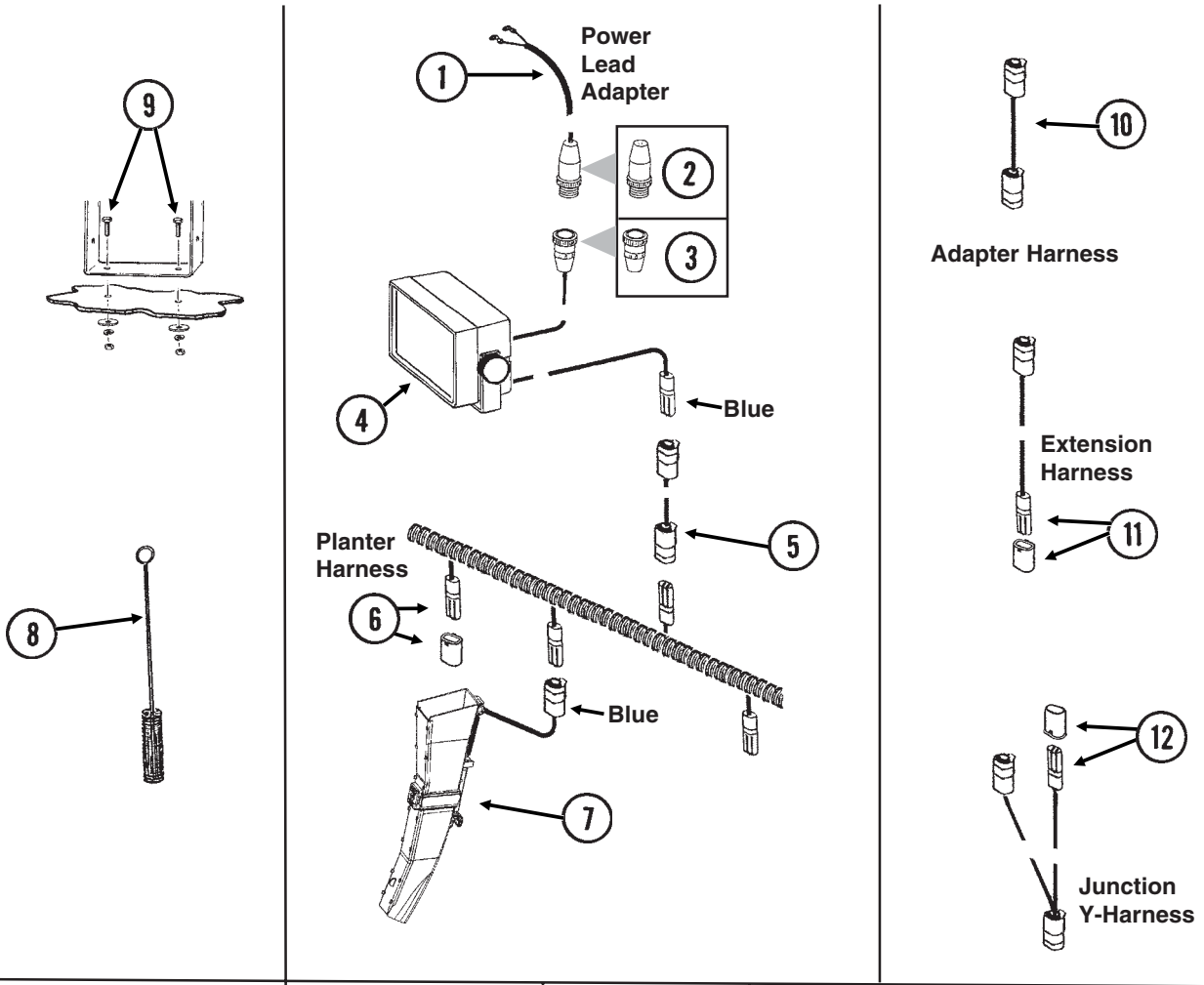
# AUXILIARY WORK LIGHTS PACKAGE

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ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA9689	2	Work Light Assembly
2.		-	See "Valve Block - Located On Rear Center Frame", Page P68
3.	G1K321	-	2-Pin Female Connector Kit (Black), Includes: (3) 2-Pin Female Housings, (6) Pin Contacts, (6) Seals
4.	G1K320	-	2-Pin Male Connector Kit (Black), Includes: (3) 2-Pin Male Housings, (6) Socket Contacts, (6) Seals
5.	GA10924	1	Wiring Harness, 348"

# KPM I ELECTRONIC SEED MONITOR

(MTR46b/A11948)



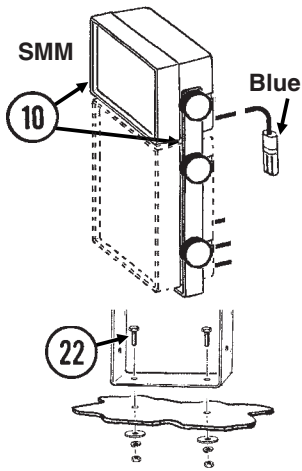
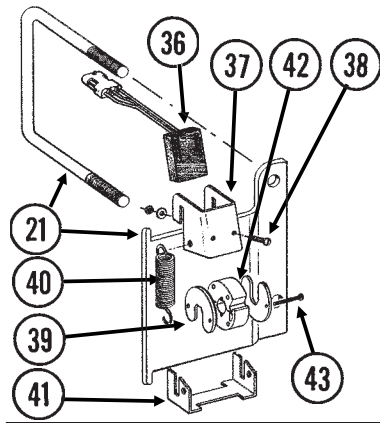
# KPM I ELECTRONIC SEED MONITOR

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.		-	See Tractor/Planter Wiring Harnesses, Pages P74 And P75
6.	GA7851	-	Planter Harness W/Dust Caps, 12 Row (16 Connectors)
	GD11993	-	Dust Cap
7.	GA11948	-	Seed Tube W/Computerized Sensor
	GR1737	-	Sensor Only
	GA11947	-	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)

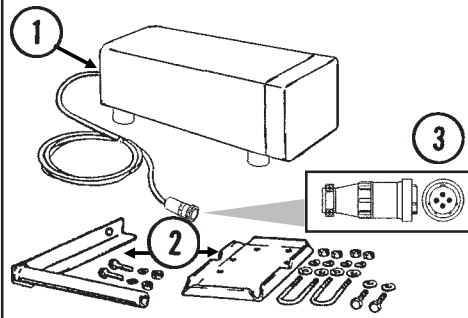
# KPM II STACK-MODE ELECTRONIC SEED MONITOR

(MTR55)

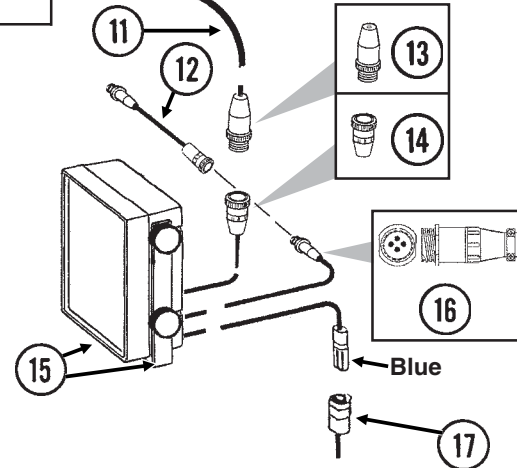
## Shaft Rotation Sensor



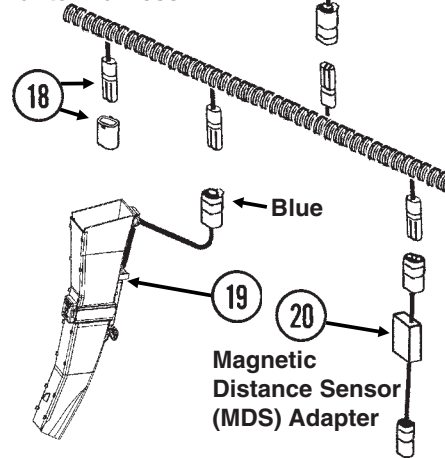
## Radar Distance Sensor



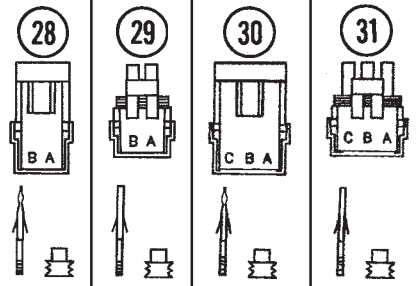
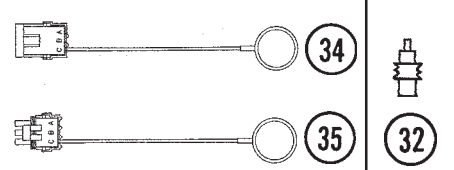
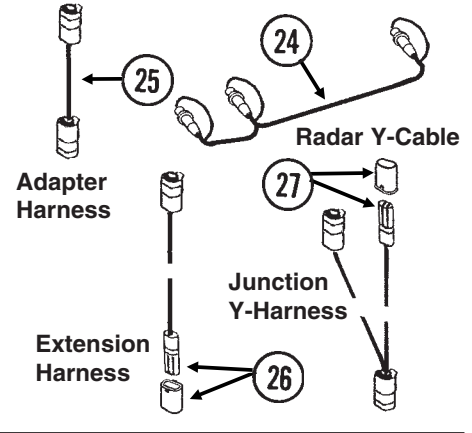
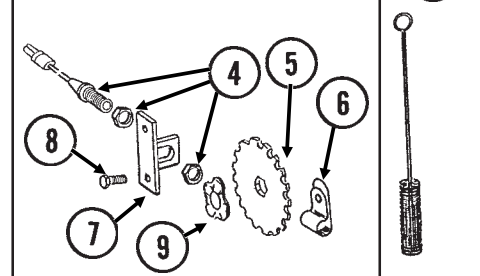
## Power Lead Adapter



## Planter Harness



## Magnetic Distance Sensor (MDS)



ITEM	PART NO.	QTY.	DESCRIPTION
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, Includes: (4) Pins, (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



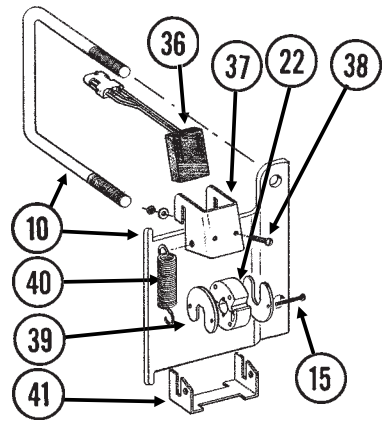
# KPM II STACK-MODE ELECTRONIC SEED MONITOR

ITEM	PART NO.	QTY.	DESCRIPTION
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
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 1/4" Hardware)
	GA10601	-	Fuse Holder
	GD7639	-	Fuse
16.	G1K322	-	4-Pin Connector Kit W/Male Housing, Includes: (4) Female Socket Contacts, (1) Cable Clamp
17.		-	See Tractor/Planter Wiring Harnesses, Pages P74 And P75
18.	GA7851	-	Planter Harness W/Dust Caps, 12 Row (16 Connectors)
	GD11993	-	Dust Cap
19.	GA11948	-	Seed Tube W/Computerized Sensor
	GR1737	-	Sensor Only
	GA11947	-	Seed Tube (With Holes For Sensor Installation)
20.	GA7859	1	Magnetic Distance Sensor Adapter (Analog To Digital)
21.	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
22.	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
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 1/4"
	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 1/4", Stainless Steel
	G10931	2	Lock Washer, No. 8, Internal/External, Stainless Steel
	G10928	2	Hex Nut, No. 8-32, Stainless Steel
A.	GA6147	-	Magnetic Distance Sensor And Mounting Package (Items 4-9)

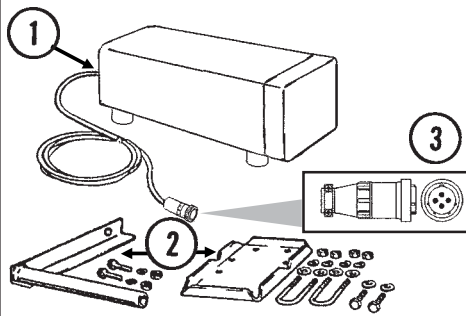
# KPM III ELECTRONIC SEED MONITOR

(MTR56)

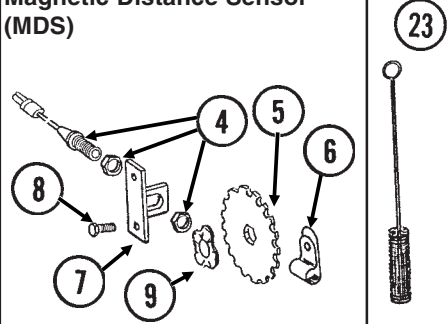
## Shaft Rotation Sensor



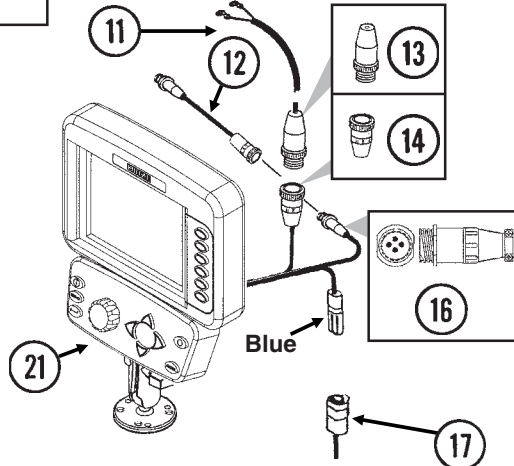
## Radar Distance Sensor



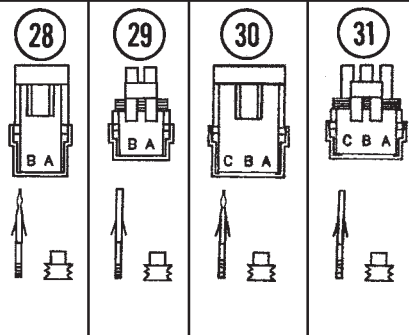
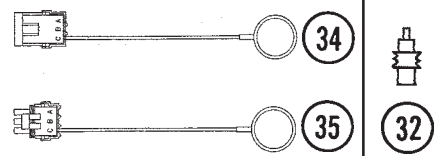
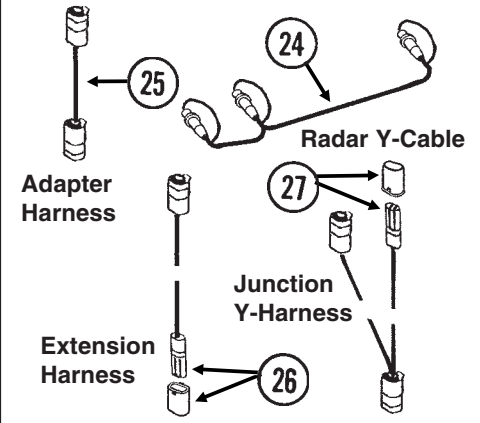
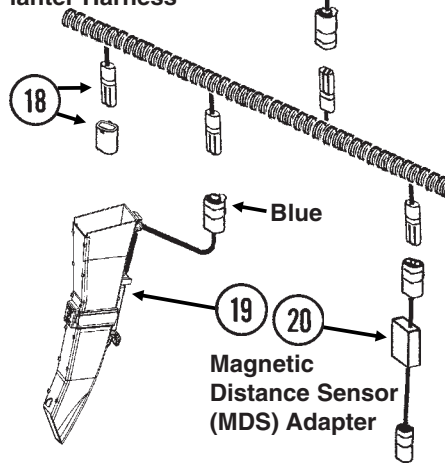
## Magnetic Distance Sensor (MDS)



## Power Lead Adapter



## Planter Harness



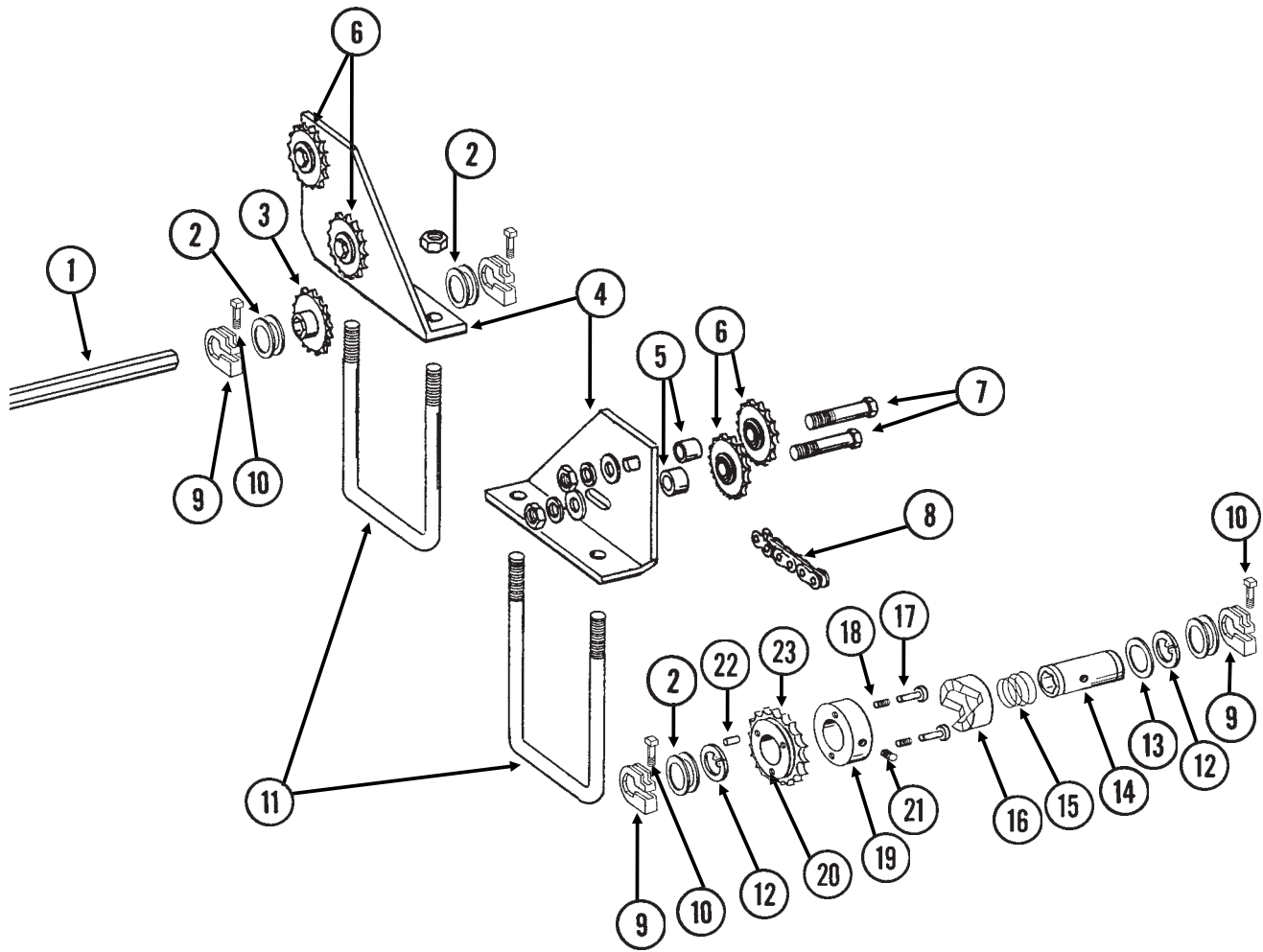
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA7858	-	Radar Distance Sensor W/20' Cable
2.	GA8026	-	Radar Sensor Pipe/Mounting Bracket Package
3.	G1K323	-	4-Pin Connector Kit W/Female Housing, Includes: (4) Pins, (1) Cable Clamp
4.	GA5600	1	Magnetic Distance Sensor
5.	GD8751	-	Magnetic Distance Sensor Pulse Wheel
6.	GD6291	-	Insulated Clamp, 3/8"
7.	GD8770	1	Bracket

# KPM III ELECTRONIC SEED MONITOR

ITEM	PART NO.	QTY.	DESCRIPTION
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.	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
11.	GA7856	1	Power Lead Adapter
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.	G10927	2	Pan Head Machine Screw, No. 8-32 x 1 1/4", Stainless Steel
	G10931	2	Lock Washer, No. 8, Internal/External, Stainless Steel
	G10928	2	Hex Nut, No. 8-32, Stainless Steel
16.	G1K322	-	4-Pin Connector Kit W/Male Housing, Includes: (4) Female Socket Contacts, (1) Cable Clamp
17.		-	See Tractor/Planter Wiring Harnesses, Pages P74 And P75
18.	GA7851	-	Planter Harness W/Dust Caps, 12 Row (16 Connectors)
	GD11993	-	Dust Cap
19.	GA12650	-	Seed Tube W/Computerized Sensor
	GR1737	-	Sensor Only
	GA12636	-	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 Mounting Bracket Assembly, Includes: (2) Mounting Brackets, (2) Connector Halves, (1) Compression Spring, (1) Tension Knob, (1) 1/4"-20 x 1 3/4" Hex Head Cap Screw, (1) 1/4" Plastic Washer, (1) 1/4" Steel Washer
	GR1761	-	Console Mounting Bracket Hardware Package, Includes: (3) No. 10-32 x 5/8" Hex Socket Pan Head Screws, (3) 1/4" Lock Washers
	GR1762	-	Power Harness
	GR1764	-	Actuator
22.	GR1414	1	Brush
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 1/4"
	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
A.	GA6147	-	Magnetic Distance Sensor And Mounting Package (Items 4-9)

# INTERPLANT® DRIVELINE

PTD073(TWL167a)



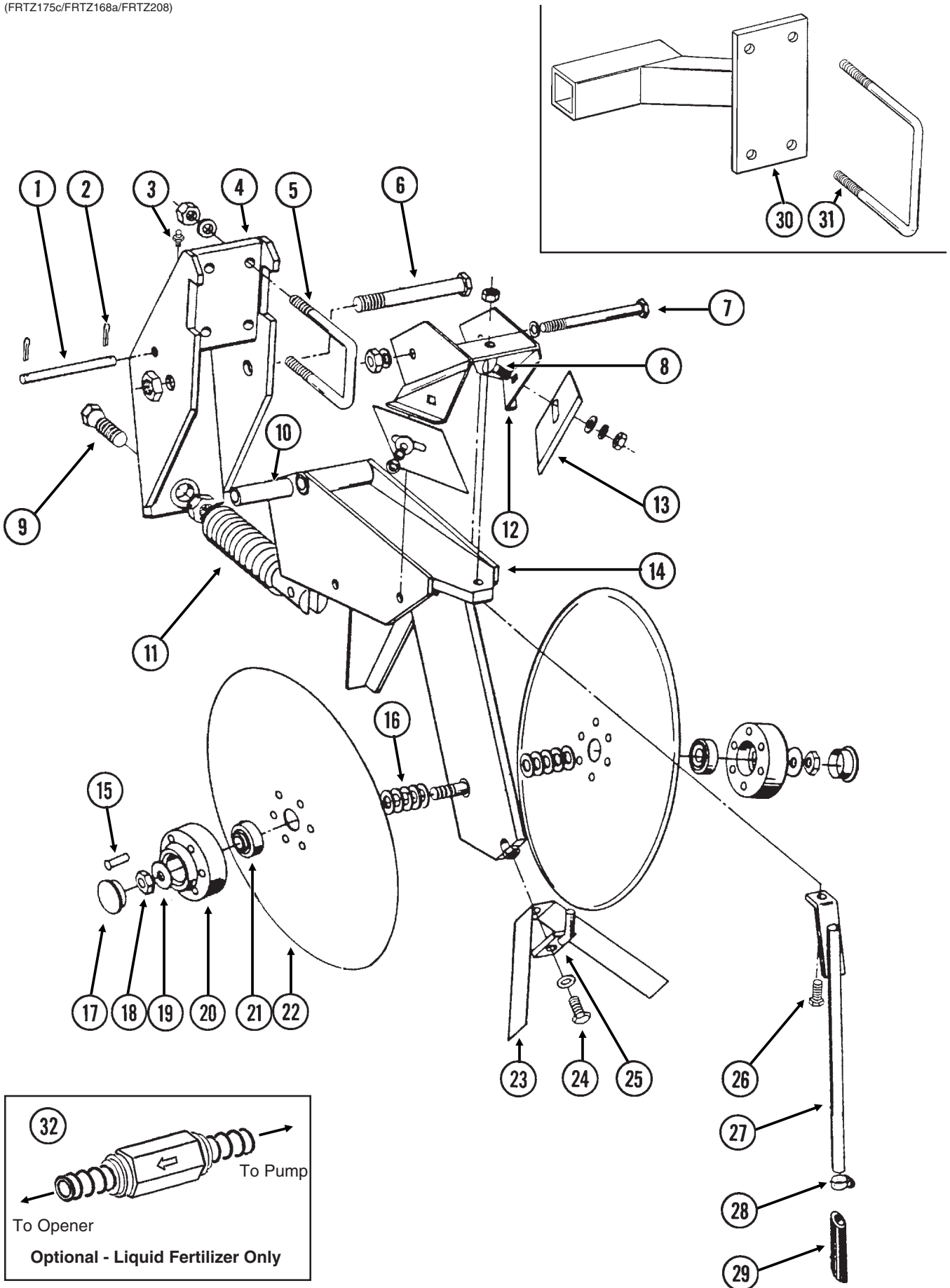
# INTERPLANT® DRIVELINE

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ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD0914-225	-	Hex Shaft, 7/8" x 225" (No Holes)
2.	G10233	-	Machine Bushing, 1", 10 Gauge (As Required)
3.	GA5107	2	Sprocket, 19 Tooth
4.	GD11569	2	Mount
5.	GD9229	4	Spacer, 1 1/4" O.D. x 1/2" Long
6.	GA7154	-	Sprocket W/Bearing, 18 Tooth
7.	G10581	4	Hex Head Cap Screw, 1/2"-13 x 2 1/4"
	G10168	20	Machine Bushing, 1/2", 7 Gauge
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
8.	G3310-328	1	Chain, No. 40, 328 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
9.	GD11045	6	Lock Clamp
10.	G10130	6	Square Head Machine Bolt, 5/16"-18 x 1 3/4"
	G10923	6	Flange Nut, 5/16"-18, No Serration
11.	GD8306	2	U-Bolt, 7" x 5" x 1/2"-13
	G10228	4	Lock Washer, 1/2"
	G10102	-	Hex Nut, 1/2"-13
12.	G10496	2	External Inverted Snap Ring, 1 1/2"
13.	GR1411	1	Shim
14.	GR1407	1	Drive Shaft
15.	GR1408	1	Compression Spring
16.	GR1409	1	Knurled Collar
17.	GR1410	1	Pin
18.	GR1413	1	Spring
19.	GR1405	1	Lock Collar
20.	GR1406	1	Bushing
21.	G10535	1	Hex Socket Set Screw, 3/8"-16 x 3/4"
22.	G10968	1	Spring Pin, 5/32" x 7/16"
23.	GR1412	1	Sprocket, 19 Tooth
A.	GA8092	-	Clutch Sprocket Assembly, 19 Tooth (Items 12-23)
B.	G1K269	-	Lock Clamp Kit (Items 9 And 10)
C.	G1K331	-	Clutch Sprocket Kit (Items 20, 22 And 23)

# DOUBLE DISC FERTILIZER OPENER AND MOUNT

(FRTZ175c/FRTZ168a/FRTZ208)

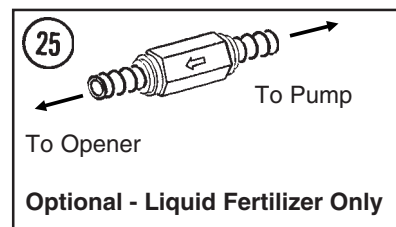
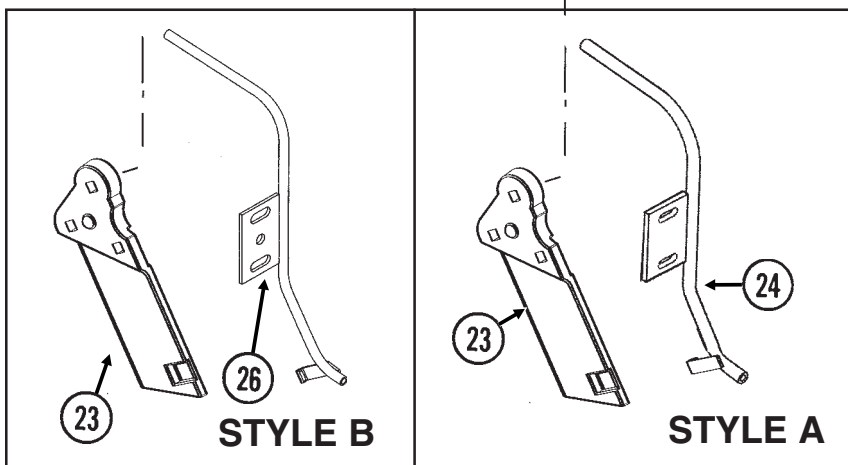
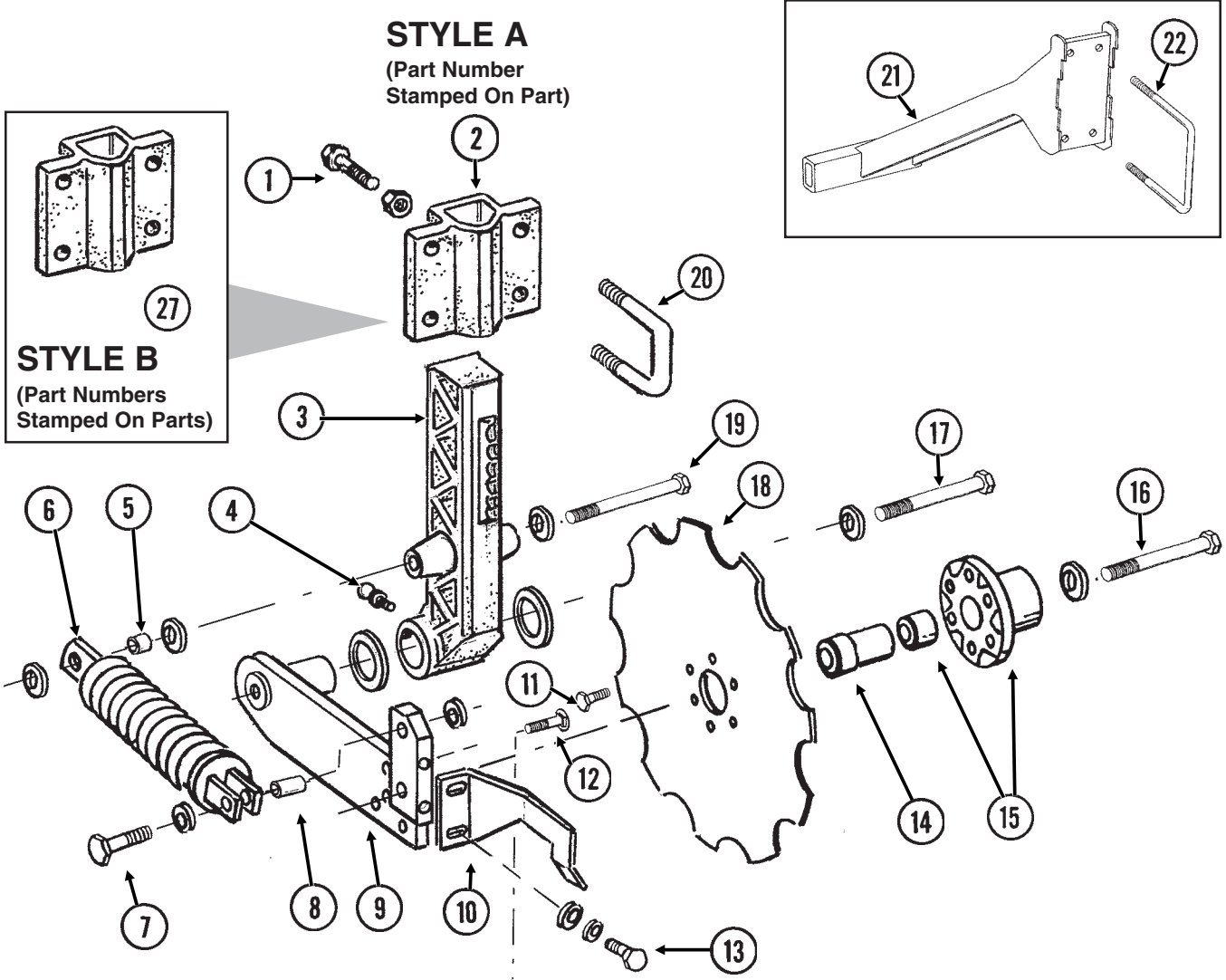


# DOUBLE DISC FERTILIZER OPENER AND MOUNT

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	GD1657	1	Lockup Pin
2.	G10451	2	Cotter Pin, 1/8" x 1"
3.	G10938	1	Grease Fitting, 1/4"-28, Taper Threads
4.	GA8483	1	Bracket
5.	GD1138	2	U-Bolt, 2 1/2" x 2 1/2" x 1/2"-13
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
6.	G10046	1	Hex Head Cap Screw, 5/8"-11 x 5"
	G10107	1	Lock Nut, 5/8"-11
7.	G10045	1	Hex Head Cap Screw, 1/2"-13 x 4 1/2"
	G10111	1	Lock Nut, 1/2"-13
8.	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
9.	GD0962	1	Hex Head Adjusting Bolt, 5/8"-18 x 3 1/4"
	G10499	1	Hex Jam Nut, 5/8"-18, Grade 2
10.	GD0487	1	Bushing, 41/64" I.D. x 3 1/2" Long
11.	GA0328	1	Spring
12.	GA0810	1	Scraper Mount
13.	GD1673	2	Scraper
14.	GA9195	1	Shank
15.	G10542	12	Rivet, 1/4" x 1 5/16"
16.	G10213	-	Machine Bushing, 5/8" (.030" Thick)
17.	GD1132	2	Dust Cap
18.	G10503	1	Hex Jam Nut, 5/8"-11, Grade 2
	G10504	1	Hex Jam Nut, 5/8"-11, L.H. Threads, Grade 2
19.	G10204	2	Special Machine Bushing, 5/8" x 1" O.D.
20.	GB0134	2	Hub
21.	GA2014	2	Bearing
22.	GD11306	2	Disc Blade, 3.5 mm x 15"
23.	GD2589	1	Inner Scraper
24.	G10019	1	Hex Head Cap Screw, 5/16"-18 x 1"
	G10232	1	Lock Washer, 5/16"
25.	GA0312	1	Mount
26.	G10133	1	Hex Head Cap Screw, 5/16"-18 x 1 1/2"
	G10221	-	Washer, 5/16" SAE
	G10109	1	Lock Nut, 5/16"-18, Grade 8
27.	GA8685	-	Drop Tube, Liquid Fertilizer
28.	G10681	-	Hose Clamp, No. 6
29.	GD11705	-	Extension
30.	GA8081	-	Opener Mount, L.H. (Shown)
	GA8080	-	Opener Mount, R.H.
31.	GD1113	2	U-Bolt, 5" x 7" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
32.	GA8983	-	Check Valve, Low Rate
A.	GA8845	-	Disc Blade And Bearing Assembly (Items 15 And 20-22)

# NOTCHED SINGLE DISC FERTILIZER OPENER AND MOUNT

(EF71c/FRTZ268a/A12108/FRTZ208)



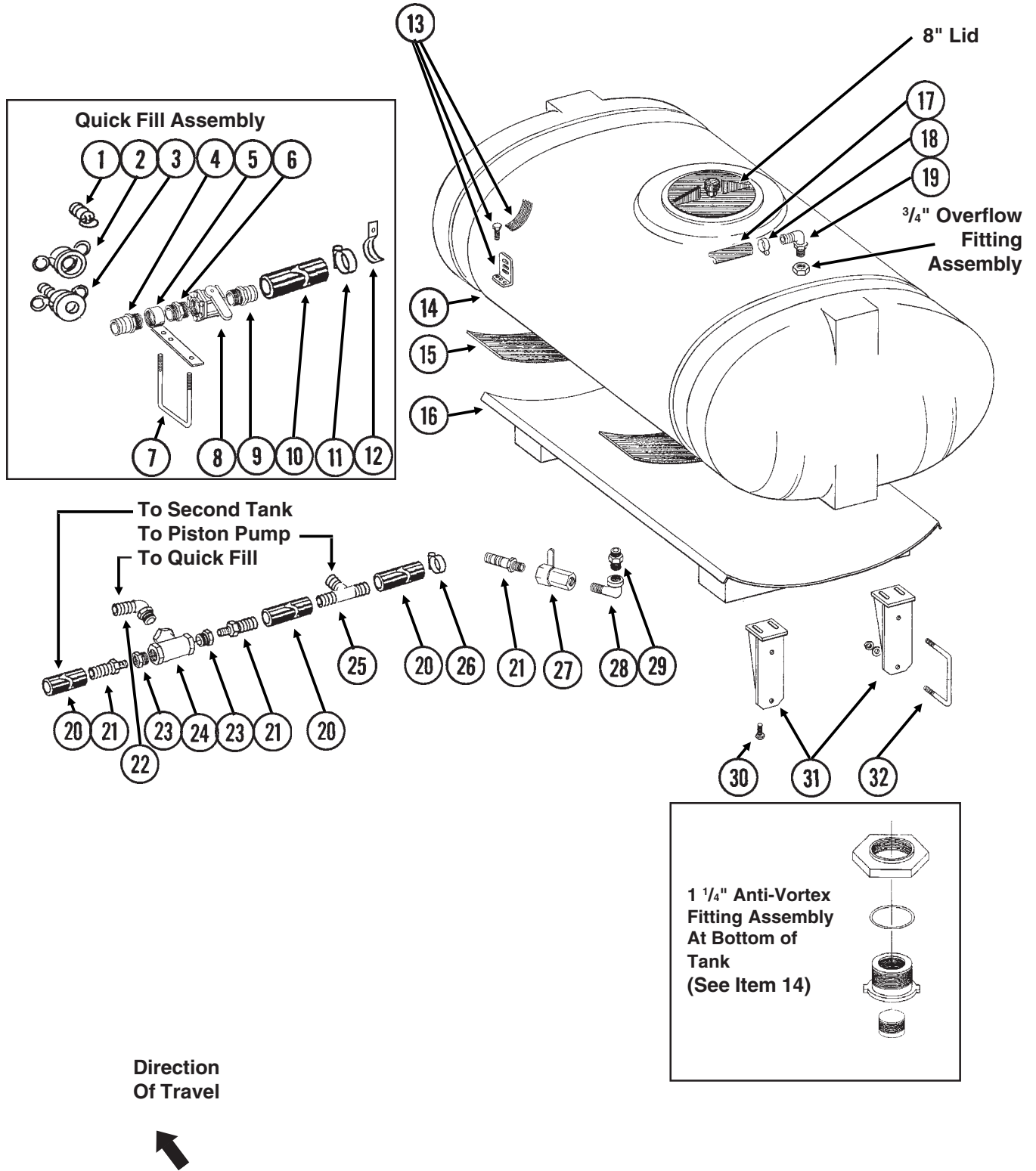


# NOTCHED SINGLE DISC FERTILIZER OPENER AND MOUNT

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.	G10991	2	Hex Head Cap Screw, 5/16"-18 x 7/8"
	G10232	2	Lock Washer, 5/16"
	G10219	6	Washer, 5/16" USS
14.	GD12679	1	Stepped Spacer, 3" Long
15.	GA9437	1	Hub W/Bearing
	GA8603	-	Bearing, Double Row
16.	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
17.	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
18.	GD12676	1	Disc Blade, Notched, 16 3/4"
19.	G10871	1	Hex Head Cap Screw, 1/2"-13 x 6"
	G10206	3	Washer, 1/2" SAE
	G10111	1	Lock Nut, 1/2"-13
20.	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
21.	GA9457	-	Opener Mount, L.H. (Shown)
	GA9456	-	Opener Mount, R.H.
22.	GD1113	-	U-Bolt, 5" x 7" x 5/8"-11
	G10230	-	Lock Washer, 5/8"
	G10104	-	Hex Nut, 5/8"-11
23.	GB0323	1	Knife, L.H. (Shown)
	GB0322	-	Knife, R.H.
24.	GA10213	-	Drop Tube, L.H., Liquid Fertilizer (Shown)
	GA10214	1	Drop Tube, R.H., Liquid Fertilizer
25.	GA8983	-	Check Valve, Low Rate
26.	GA12108	1	Drop Tube, Liquid Fertilizer (Shown)
	GA12109	-	Drop Tube, Liquid Fertilizer
27.	GB0405	1	Mount, L.H. (Shown)
	GB0400	-	Mount, R.H.

# LIQUID FERTILIZER TANKS, SADDLES, SADDLE MOUNTS AND HOSES

LFC037/LFC038(FRTZ196i)



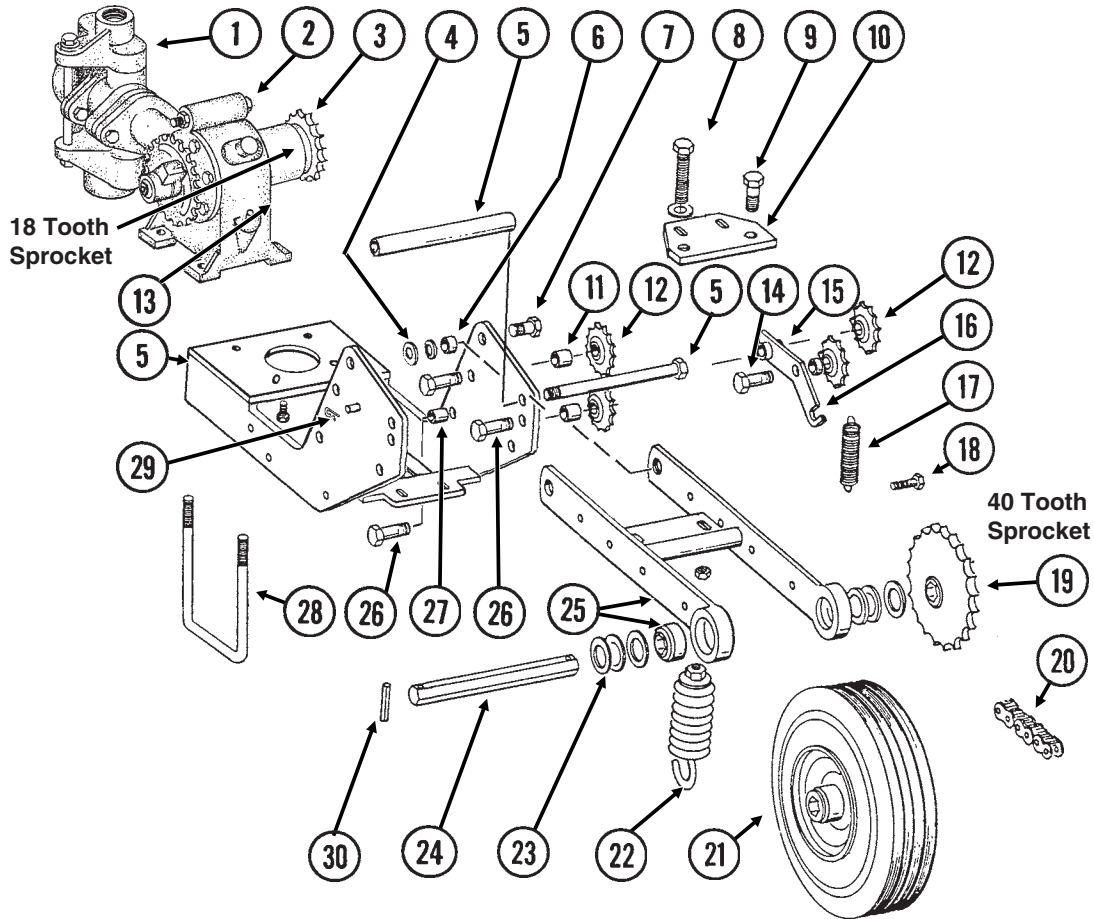
# LIQUID FERTILIZER TANKS, SADDLES, SADDLE MOUNTS AND HOSES

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD10777	1	Dust Plug, 2" Male Cam Lock
2.	GD3622	1	Adapter, 2" Female NPT To Cam Lock
3.	GD3951	1	Dust Cap, 2" Cam Lock
4.	GD3623	1	Adapter, 2" Male NPT To Cam Lock
5.	GA8082	1	Quick Fill Mount, 2" NPT
6.	G10623	1	Close Nipple, 2" NPT
7.	GD1134	1	U-Bolt, 7" x 5" x 5/8"-11
	G10230	2	Lock Washer, 5/8"
	G10104	2	Hex Nut, 5/8"-11
8.	GA2660	1	Shutoff Valve, 2" NPT
9.	G10628	1	Adapter, 2" NPT To Barb
10.	G4201-04	1	Hose, 2" x 15'
11.	G10676	2	Hose Clamp, No. 36
12.	GD11235	1	Hose Clamp, 2" (If Applicable)
13.	GA8114	2	Tank Mounting Hardware Package, Includes: (2) Straps, (4) Anchors, (8) G10485 Tap Bolts, (8) G10901 Lock Nuts
	G10485	-	Hex Head Tap Bolt, 3/8"-16 x 5"
	G10901	-	Lock Nut W/Nylon Insert, 3/8"-16
14.	GA9910	2	Tank W/Lid And Fittings, 200 Gallon
	GR1678	-	Lid W/Vent, 8" (Top Of Tank)
	GR0513	-	3/4" Polypropylene Fitting Assembly (Overflow Fitting, Nut, Bushing And O-Ring)(Top Of Tank)
	GR1397	-	Overflow Fitting
	GR1435	-	1 1/4" Anti-Vortex Fitting Assembly (Nut, Bushing And O-Ring) (Bottom Of Tank)
	GR1396	-	Anti-Vortex Fitting
15.	GD1862	-	Pad, 8" x 14' (For Two Tanks)
16.	GA8088	2	Tank Saddle
17.	G4205-11	-	Hose, 3/4" x 72" (One Per Tank)
18.	G10278	4	Hose Clamp, No. 16
19.	G10917	2	Elbow, 90°, 3/4" NPT To Barb
20.	G4200-01	1	Hose, 1 1/4" x 22'
21.	G10626	4	Adapter, 1 1/4" NPT To Barb
22.	G10630	1	Elbow, 90°, 2" NPT To Barb
23.	G10616	2	Reducing Bushing, 2" Male NPT To 1 1/4" Female
24.	G10888	1	Tee, 2" Female NPT
25.	G10633	1	Tee, 1 1/4" Barb
26.	G10674	10	Hose Clamp, No. 24
27.	GA4976	2	Shutoff Valve, 1 1/4" NPT
	GR1015	-	Body O-Ring
	GR1016	-	Stem O-Ring
	GR1017	-	Teflon Seal
	GR1018	-	Ball
	GR1019	-	Handle
28.	G10887	2	Elbow, 90°, 1 1/4" Male NPT To Female
29.	G10619	2	Close Nipple, 1 1/4" NPT
30.	G10017	16	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10216	32	Washer, 1/2" USS
	G10228	16	Lock Washer, 1/2"
	G10102	16	Hex Nut, 1/2"-13
31.	GA8438	8	Saddle Mount
32.	GD1113	8	U-Bolt, 5" x 7" x 5/8"-11
	G10230	16	Lock Washer, 5/8"
	G10104	16	Hex Nut, 5/8"-11

# LIQUID FERTILIZER PISTON PUMP DRIVE

LFC028(TWL43L)

## 40 Tooth Drive Sprocket And 18 Tooth Driven Sprocket



ITEM	PART NO.	QTY.	DESCRIPTION
1.		-	See "Liquid Fertilizer Piston Pump (Cylinder Assembly)", Pages P98 And P99
2.		-	See "Liquid Fertilizer Piston Pump (Crankcase Assembly)", Pages P96 And P97
3.		-	Sprocket, 18 Tooth, See "Liquid Fertilizer Piston Pump (Crankcase Assembly)", Pages P96 And P97
4.	GD7805	2	Special Washer, $\frac{5}{8}$ ", Hardened
5.	GA8486	1	Pump Mount W/Sleeve And Sleeve Mounting Hardware
	GD10165	1	Sleeve, $6 \frac{3}{4}$ "
	G10819	1	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x $8 \frac{1}{2}$ "
	G10228	1	Lock Washer, $\frac{1}{2}$ "
	G10102	1	Hex Nut, $\frac{1}{2}$ "-13
6.	GB0218	2	Bushing, $2\frac{1}{32}$ " I.D. x $\frac{7}{8}$ " O.D. x $\frac{19}{32}$ " Long

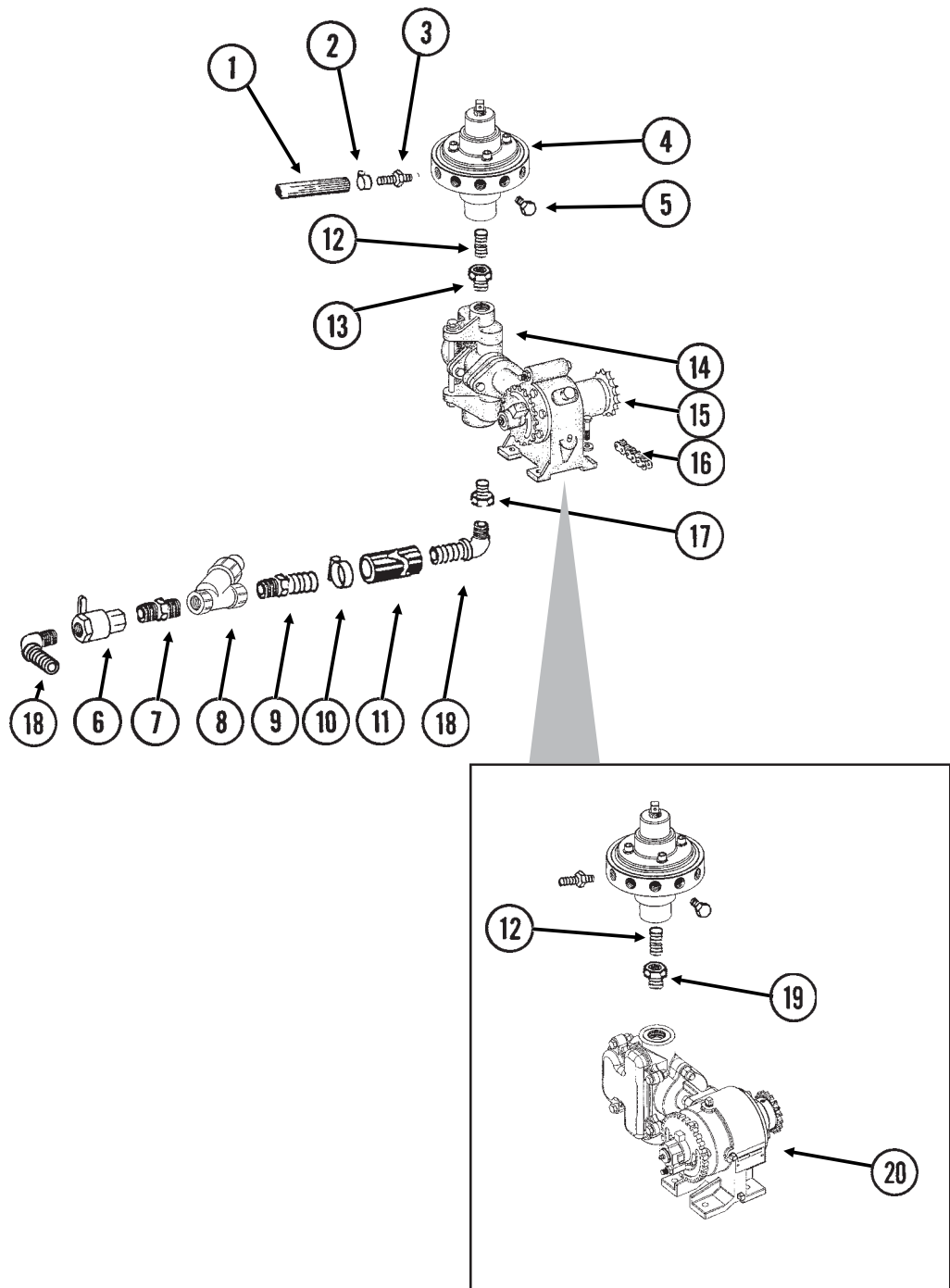
# LIQUID FERTILIZER PISTON PUMP DRIVE

ITEM	PART NO.	QTY.	DESCRIPTION
7.	G10005	2	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 1 $\frac{3}{4}$ "
	G10235	2	Machine Bushing, $\frac{7}{8}$ ", 14 Gauge
	G10107	2	Lock Nut, $\frac{5}{8}$ "-11
8.	G10371	1-2	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 3", Full Thread
	G10206	1-2	Washer, $\frac{1}{2}$ " SAE
	G10102	1-2	Hex Nut, $\frac{1}{2}$ "-13
9.	G10039	2	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 1 $\frac{3}{4}$ "
	G10206	2	Washer, $\frac{1}{2}$ " SAE
	G10228	2	Lock Washer, $\frac{1}{2}$ "
	G10102	2	Hex Nut, $\frac{1}{2}$ "-13
10.	GD13268	-	Spring Mount
11.	GD10007	2	Spacer, 1 $\frac{1}{8}$ " Long
12.	GA7154	4	Sprocket W/Bearing, 18 Tooth
13.	G10003	4	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{1}{2}$ "
	GR1122	4	Mounting Pad
	G10210	4	Washer, $\frac{3}{8}$ " USS
	G10229	4	Lock Washer, $\frac{3}{8}$ "
	G10101	4	Hex Nut, $\frac{3}{8}$ "-16
	14.	G10016	1
G10228		1	Lock Washer, $\frac{1}{2}$ "
G10102		1	Hex Nut, $\frac{1}{2}$ "-13
15.	GD10161	1	Spacer, $\frac{3}{8}$ "
16.	GA7179	1	Idler Arm
17.	GD5857	1	Spring
18.	G10003	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{1}{2}$ "
	G10229	1	Lock Washer, $\frac{3}{8}$ "
	G10101	2	Hex Nut, $\frac{3}{8}$ "-16
19.	GA7180	1	Sprocket, 40 Tooth
20.	G3310-160	1	Chain, No. 40, 160 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
21.	GA5090	1	Tire And Rim Assembly (Specify Brand*)
	GD5753	-	Tire, 4.10" x 6" (Specify Brand*)
	GD5752	-	Inner Tube
22.	GA2068	1-2	Spring W/Plug
23.	G10233	5	Machine Bushing, 1", 10 Gauge
24.	GD5797	1	Hex Shaft, $\frac{7}{8}$ " x 10"
25.	GA6415	1	Wheel Arm W/Bearings
	GA5116	-	Bearing, $\frac{7}{8}$ " Hex Bore, Cylindrical
26.	G10038	3	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 3"
	G10228	3	Lock Washer, $\frac{1}{2}$ "
	G10102	3	Hex Nut, $\frac{1}{2}$ "-13
27.	GD7904-04	-	Sleeve, $\frac{1}{2}$ " x 1 $\frac{1}{8}$ " Long
28.	GD1134	2	U-Bolt, 7" x 5" x $\frac{5}{8}$ "-11
	G10217	4	Washer, $\frac{5}{8}$ " USS
	G10230	4	Lock Washer, $\frac{5}{8}$ "
	G10104	4	Hex Nut, $\frac{5}{8}$ "-11
	G10670	1	Hair Pin Clip, No. 3
30.	G10602	2	Spring Pin, $\frac{1}{4}$ " x 1 $\frac{1}{2}$ "

\* 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 could result in rate changes.

# LIQUID FERTILIZER FLOW DIVIDER MOUNT AND HOSES

(FRTZ176L/FRTZ176ii)



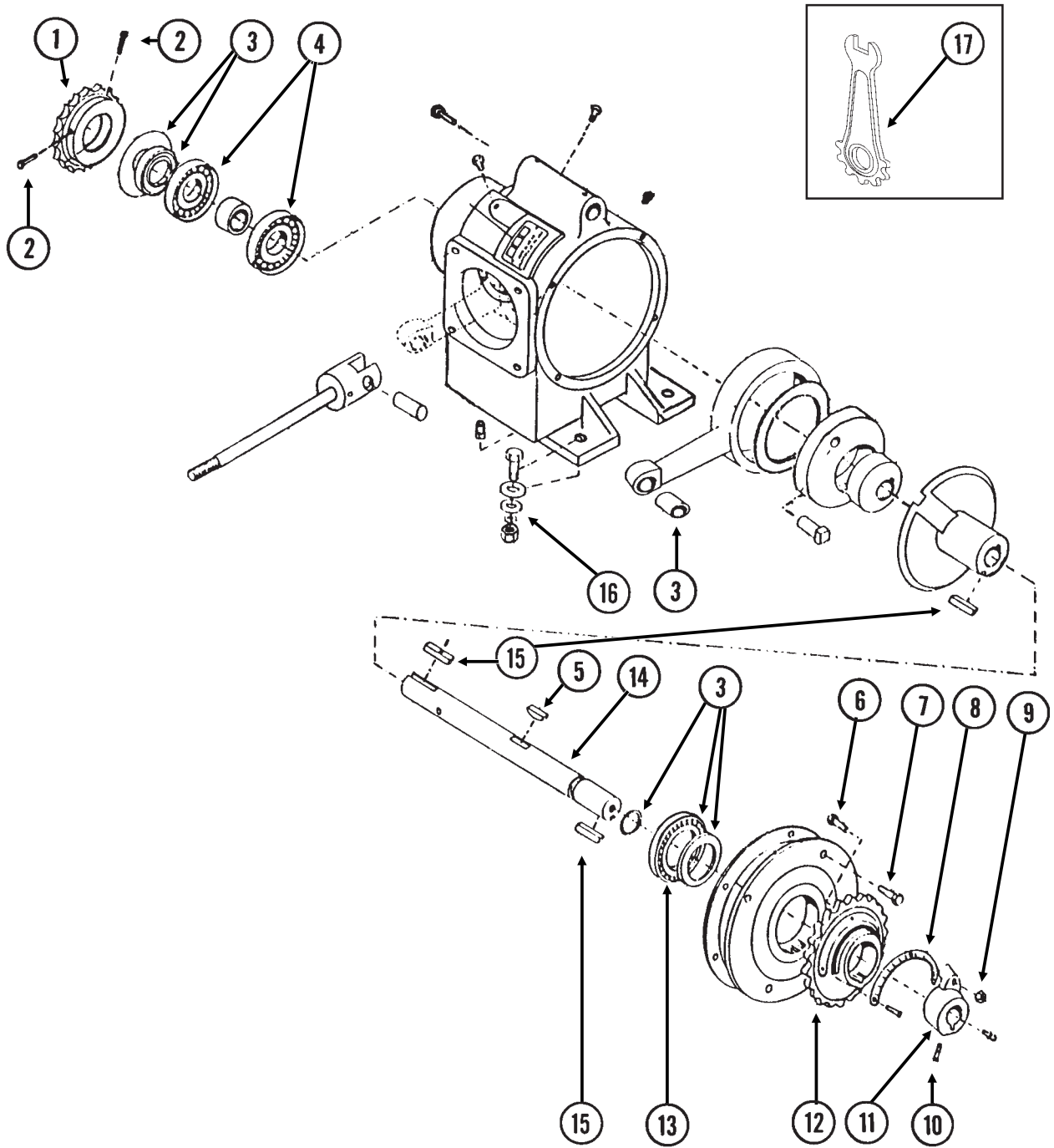
# LIQUID FERTILIZER FLOW DIVIDER MOUNT AND HOSES

ITEM	PART NO.	QTY.	DESCRIPTION
1.	G4301-06	1	Hose, 3/8" x 160'
2.	G10681	24	Hose Clamp, No. 6
3.	GD11700	12	Adapter, 1/4" NPT To 3/8" Barb
4.		-	See "Liquid Fertilizer Piston Pump Flow Divider", Pages P102 And P103
5.	G10292	-	Plug, 1/4" NPT
6.	GA4976	2	Shutoff Valve, 1 1/4" NPT
	GR1015	-	Body O-Ring
	GR1016	-	Stem O-Ring
	GR1017	-	Teflon Seal
	GR1018	-	Ball
	GR1019	-	Handle
7.	G10619	1	Close Nipple, 1 1/4" NPT
8.	GA3893	1	Strainer Complete
	GR0880	-	Screen, No. 40 Mesh
	GR0881	-	Gasket
	GR0882	-	Y-Body
	GR0883	-	End Cap
9.	G10626	2	Adapter, 1 1/4" NPT To Barb
10.	G10674	2	Hose Clamp, No. 24
11.		-	Hose, 1 1/4", See "Liquid Fertilizer Tanks, Saddles, Saddle Mounts And Hoses", Pages P90 And P91
12.	G10994	1	Close Nipple, 3/4" NPT, Stainless Steel
13.	G10995	1	Reducing Bushing, 1" Male NPT To 3/4" Female, Stainless Steel
14.		-	See "Liquid Fertilizer Piston Pump (Cylinder Assembly)", Pages P98 And P99
15.		-	See "Liquid Fertilizer Piston Pump (Crankcase Assembly)", Pages P96 And P97
16.		-	See "Liquid Fertilizer Piston Pump Drive", Pages P92 And P93
17.	G10615	1	Reducing Bushing, 1 1/2" Male NPT To 1 1/4" Female
18.	G10629	2	Elbow, 90°, 1 1/4" NPT To Barb
19.	G11237	1	Close Nipple, 1 1/2" Male NPT To 3/4" Female
20.		-	See "Liquid Fertilizer Piston Pump", Pages P100 And P101

# LIQUID FERTILIZER PISTON PUMP (Crankcase Assembly) Uses 18 Tooth Sprocket

JB-L4400-991/CCU077(FRTZ172a/GR1424)

Model LM-2455-R





# LIQUID FERTILIZER PISTON PUMP (Crankcase Assembly) Uses 18 Tooth Sprocket

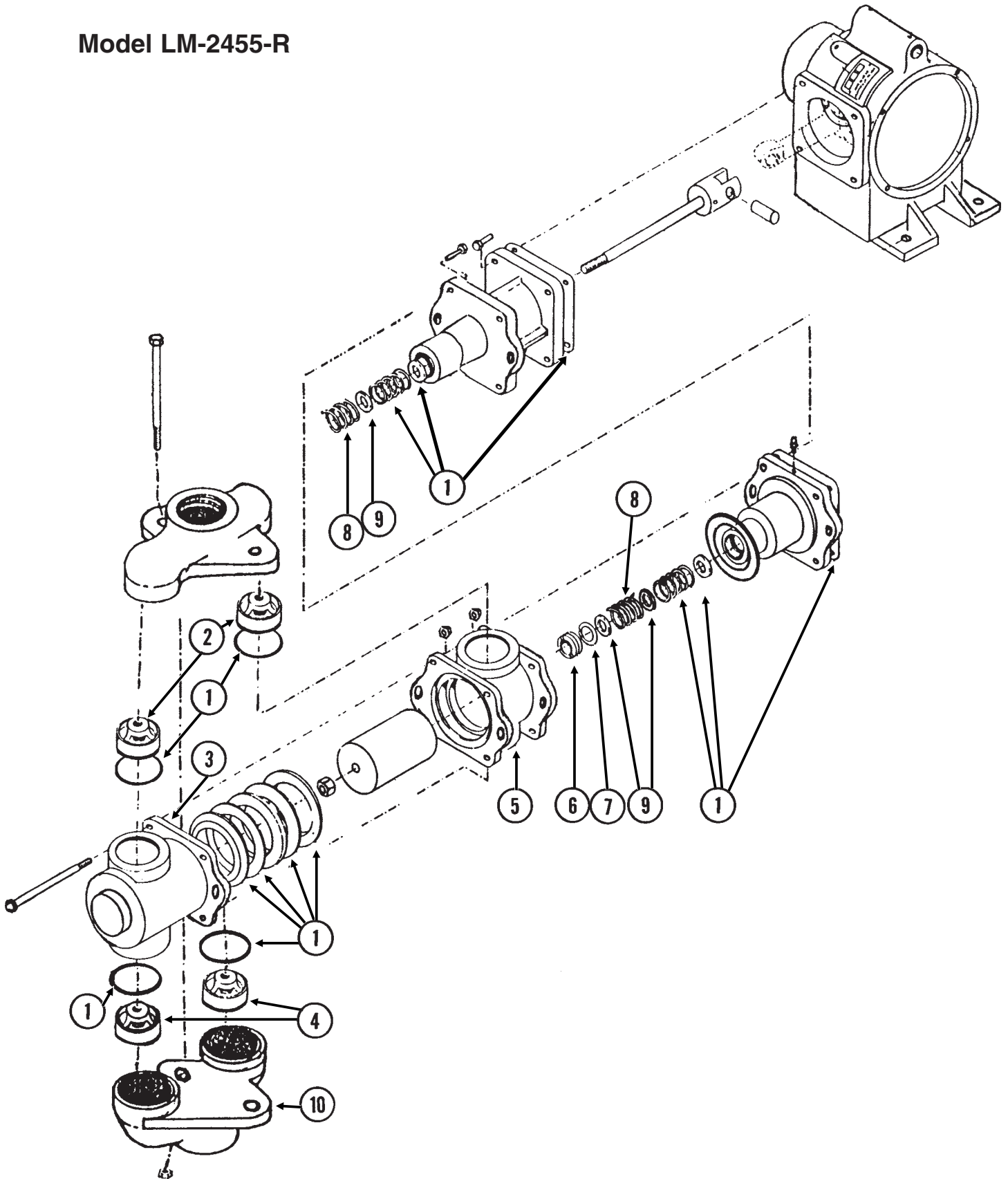
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ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1389	1	Sprocket, 18 Tooth
2.	G10688	2	Square Head Set Screw, $\frac{3}{8}$ "-16 x $\frac{5}{8}$ "
3.	GR1425	1	Repair Kit, Includes Item 1 On Pages P98 And P99
4.	GR1427	2	Bearing
5.	GR1420	1	Woodruff Key, $\frac{3}{8}$ "-16 x 1 $\frac{3}{4}$ "
6.	GR1167	1	Square Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{3}{4}$ "
7.	G10043	4	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x $\frac{3}{4}$ "
8.	GR1168	1	Scale
9.	G10108	1	Lock Nut, $\frac{3}{8}$ "-16
10.	G10693	3	Hex Socket Head Set Screw, $\frac{5}{16}$ "-18 x $\frac{3}{8}$ "
11.	GR1165	1	Arm
12.	GR1114	1	Flange
13.	GR1116	1	Bearing
14.	GR1421	1	Crankshaft
15.	GR1118	2	Setting Arm Key
16.		-	See "Liquid Fertilizer Piston Pump Drive", Pages P92 And P93
17.	GR1424	1	Adjustment Wrench
A.	GA8069	-	Piston Pump Complete W/18 Tooth Sprocket (LM-2455-R), Includes Crankcase Assembly On This Page And Cylinder Assembly On Pages P98 And P99

# LIQUID FERTILIZER PISTON PUMP (Cylinder Assembly) Uses 18 Tooth Sprocket

JB-L2190-991(FRTZ171)

Model LM-2455-R



# LIQUID FERTILIZER PISTON PUMP (Cylinder Assembly) Uses 18 Tooth Sprocket

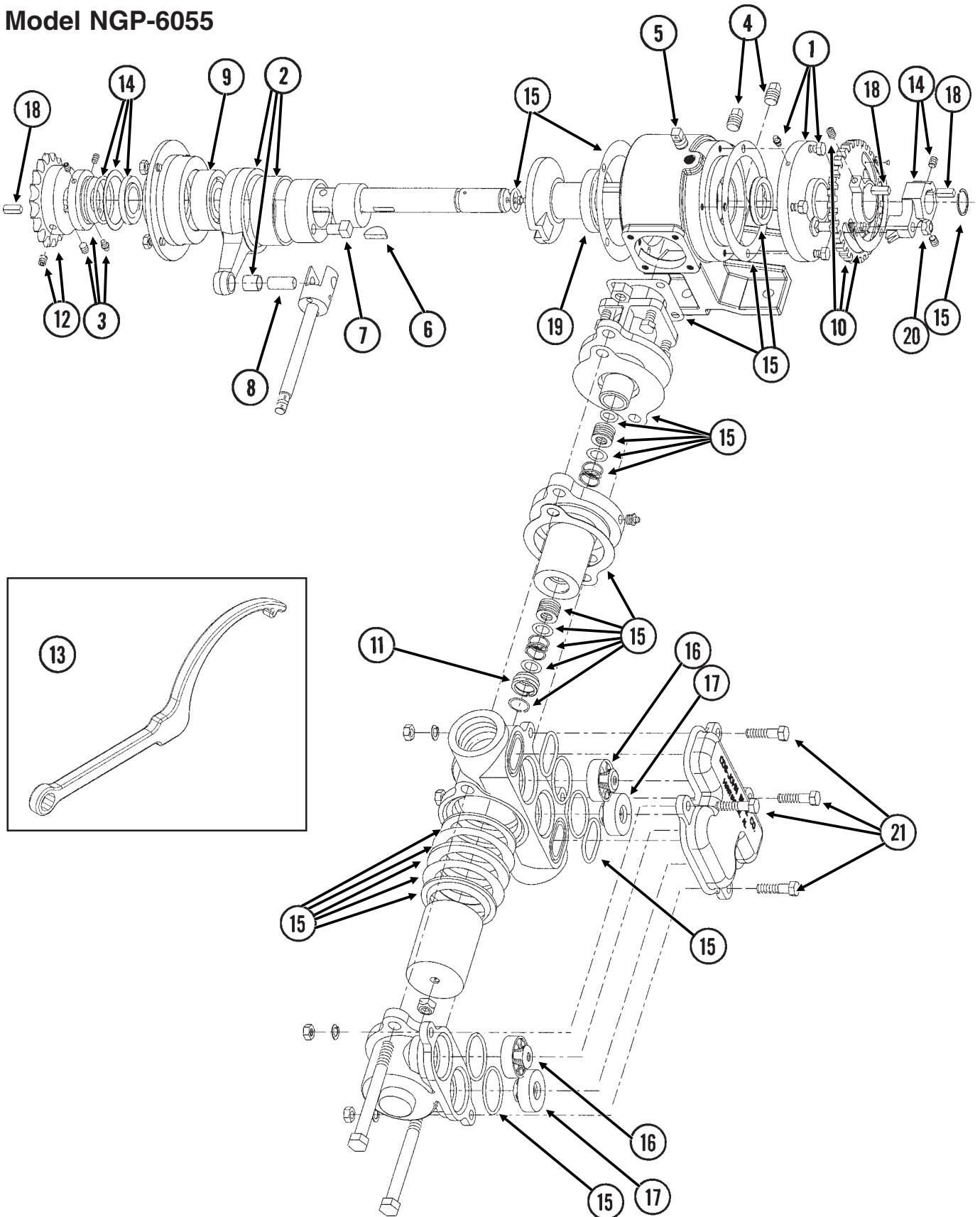
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ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1425	1	Repair Kit, Includes Item 3 On Pages P96 And P97
2.	GR1144	2	Discharge Valve
3.	GR1423	1	Outboard Cylinder
4.	GR1142	2	Suction Valve
5.	GR1422	1	Inboard Cylinder
6.	GR1134	1	Stuffing Box Insert
7.	GR1133	1	Retaining Ring
8.	GR1130	2	Packing Spring
9.	GR1129	3	Washer
10.	GR1451	1	Suction Manifold

# LIQUID FERTILIZER PISTON PUMP Uses 18 Tooth Sprocket

(A12335a/GR1808)

## Model NGP-6055



# LIQUID FERTILIZER PISTON PUMP

## Uses 18 Tooth Sprocket

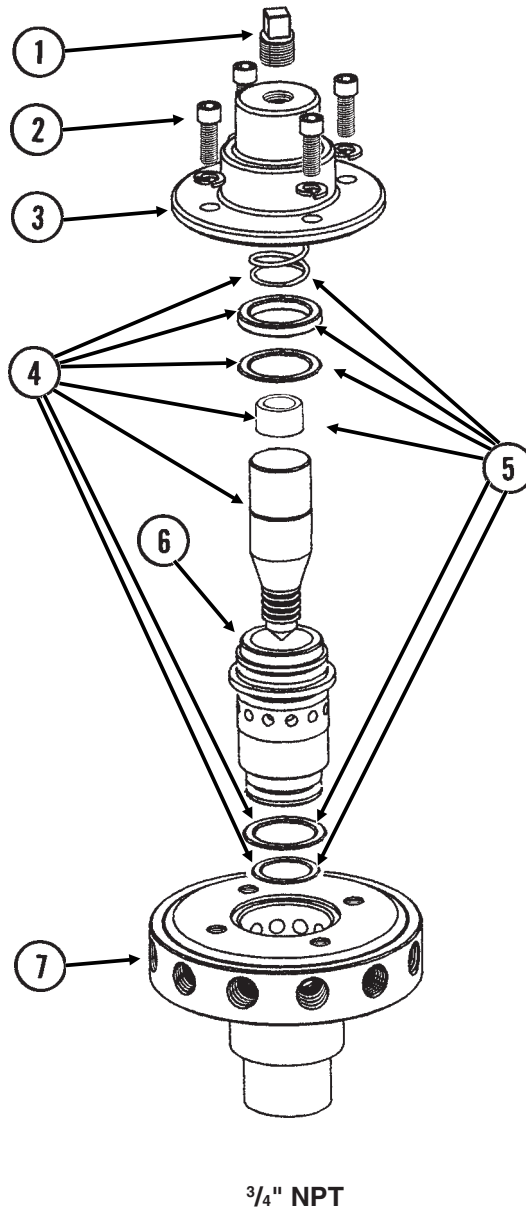
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ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1804	1	Flange Cover Assembly
	G10991	4	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x $\frac{7}{8}$ "
2.	GR1802	1	Connecting Rod Assembly
3.	GR1801	1	Spacer Assembly
	G10693	3	Hex Socket Set Screw, $\frac{5}{16}$ "-18 x $\frac{3}{8}$ "
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.	GR1389	1	Sprocket, 18 Tooth
13.	GR1808	1	Adjustment Wrench
14.	GR1806	1	Setting Pointer Assembly
15.	GR1795	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.	GR1799	2	Discharge Valve Assembly
17.	GR1797	2	Suction Valve Assembly
18.	GR1118	3	Setting Arm Key
19.	GR1116	1	Bearing
20.	G10306	1	Carriage Bolt, $\frac{3}{8}$ "-16 x 2"
	G10108	1	Lock Nut, $\frac{3}{8}$ "-16
21.	G10003	4	Hex Head Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{1}{2}$ "
	G10210	4	Washer, $\frac{3}{8}$ " USS
	G10229	4	Lock Washer, $\frac{3}{8}$ "
	G10101	4	Hex Nut, $\frac{3}{8}$ "-16
A.	GA12330	-	Piston Pump Complete W/18 Tooth Sprocket (Model NGP-6055)

# LIQUID FERTILIZER PISTON PUMP FLOW DIVIDER

(FRTZ159/PT40a/FRTZ202c)

## Model FD-1200 Flow Divider, 12 Outlet



# LIQUID FERTILIZER PISTON PUMP FLOW DIVIDER

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ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1543	1	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 22)
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)
A.	GA8931	1	Liquid Fertilizer Piston Pump Flow Divider Complete, 12 Outlet (Model FD-1200)

# DECALS, PAINT AND MISCELLANEOUS



1



2

**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 WITH CARE. FOLLOW THE INSTRUCTIONS ON THE CONTAINER LABEL AND OF THE EQUIPMENT MANUFACTURER.

7100-115

3



4

**DANGER**

SERIOUS INJURY OR DEATH CAN RESULT FROM CONTACT WITH ELECTRICAL LINES. USE CARE TO AVOID CONTACT WITH ELECTRIC LINES WHEN MOVING OR OPERATING THIS MACHINE.

7100-117

5

**ATTENTION**

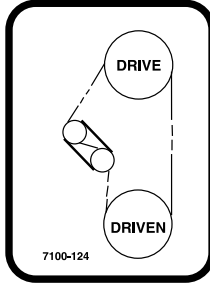
Connect directly to **BATTERY** whenever possible

Connect black lead to negative terminal

Connect to **12 Volts Only**

7100-123

6



7

USE 1 TABLESPOON POWDERED GRAPHITE WITH EACH HOPPER FILL OF SEED. SEED TREATMENT, FOREIGN MATERIAL, DIRT, OR SEED CHAFF MAY CAUSE GRADUAL REDUCTION OF SEED POPULATION. REFER TO MANUAL FOR MAINTENANCE AND CARE.

7100-153

8

**Twin-Line**

7100-177

9

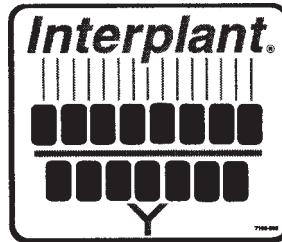
ROTATE KNURLED SLEEVE ON RATCHET TIGHTENER TO RELEASE SPRING TENSION.

7100-295

10



11



12

13

**NOTE**

It is the responsibility of the user to read and understand the Operator's Manual in regards to safety, operation, lubrication and maintenance before operation of this equipment.

AN OPERATOR & PARTS MANUAL IS AVAILABLE FOR THIS MACHINE.

To obtain a manual, furnish model number and serial number and contact your KINZE Dealer or KINZE Manufacturing, Inc., P.O. Box 806 Williamsburg, IA 52361-0806 USA

**WARNING**

MAXIMUM INFLATION PRESSURE **75 PSI**

7100-119

14

**KINZE 3400**

TORQUE 5/8" SPINDLE BOLTS TO 120 FT/LBS. CHECK PERIODICALLY AND RE-TORQUE AS NEEDED.

7100-231

16

15

**WARNING**

TO AVOID INJURY -- STAND CLEAR--KEEP OTHERS AWAY WHEN RAISING OR LOWERING MARKERS. BEFORE TRANSPORTING PLANTER FULLY EXTEND HYDRAULIC CYLINDERS AND INSTALL LOCKING PINS WHERE PROVIDED.

7100-42

17

**WARNING**

TO AVOID INJURY -- ALWAYS LOWER PLANTER UNITS TO THE GROUND BEFORE UNHITCHING PLANTER. TONGUE CAN RAISE SUDDENLY.

7100-43

18

**WARNING**

1. Read and understand the Operator's Manual.
2. Stop the tractor engine before leaving the operator's platform.
3. Keep riders off the machine.
4. Make certain everyone is clear of the machine before starting the tractor engine and operating.
5. Keep all shields in place.
6. Never lubricate, adjust, unclog or service the machine with tractor engine running.
7. Wait for all movement to stop before servicing.
8. Keep hands, feet and clothing away from moving parts.
9. Use flashing warning lights when operating on highways except when prohibited by law.

7100-46

19

**CAUTION**

SET DOWN PRESSURE SPRINGS TO MINIMUM. LOWER PLANTER TO GROUND AND EMPTY SEED HOPPERS. REQUIRES 90 LB MIN TO LIFT.

7100-249

20

**CAUTION**

REAR OF PLANTER SWINGS WIDE IN TURNS. ALWAYS ALLOW SUFFICIENT ROOM TO CLEAR OBSTACLES WHEN TURNING.

7100-63

22

**WARNING**

USE SAFETY CHAINS PROVIDED. TOW ONLY WITH FARM TRACTOR.

7100-302

21

**WARNING**

NEVER WALK UNDER OR WORK ON PLANTER WHEN IT IS RAISED WITHOUT SUPPORTING THE FRAMES WITH ADDITIONAL SUPPORTS.

7100-68

23

**CAUTION**

AVOID UNEVEN LOADING OF HOPPERS, ESPECIALLY DURING TRANSPORT

7100-75

24

**WARNING**

TO AVOID INJURY ALWAYS USE HYDRAULIC CYLINDER SAFETY LOCKOUT CHANNELS WHEN TRANSPORTING PLANTER ON THE ROAD. AFTER USE RETURN TO STORAGE LOCATION.

7100-83

25

**DANGER**

THIS PLANTER IS DESIGNED TO BE DRIVEN BY GROUND TIRES ONLY. THE USE OF HYDRAULIC, ELECTRIC OR PTO DRIVES MAY CREATE SERIOUS SAFETY HAZARDS TO YOU AND THE PEOPLE NEARBY. IF YOU INSTALL SUCH DRIVES YOU MUST FOLLOW ALL APPROPRIATE SAFETY STANDARDS AND PRACTICES TO PROTECT YOU AND OTHERS NEAR THIS PLANTER FROM INJURY.

7100-89

26

**WARNING**

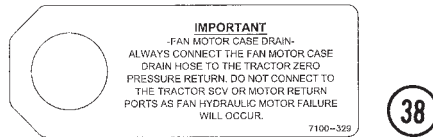
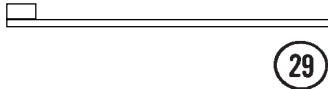
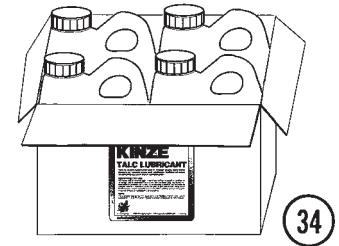
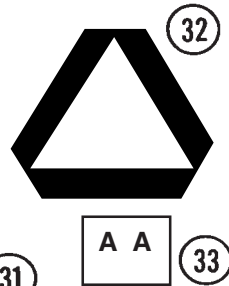
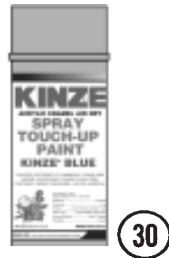
THIS MACHINE HAS BEEN DESIGNED AND BUILT WITH YOUR SAFETY IN MIND. DO NOT MAKE ANY ALTERATIONS OR CHANGES TO THIS MACHINE. ANY ALTERATION TO THE DESIGN OR CONSTRUCTION MAY CREATE SAFETY HAZARDS.

7100-90

27



# DECALS, PAINT AND MISCELLANEOUS



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G7100-110	-	Decal, Grease Weekly
2.	G7100-111	-	Decal, Oil Daily
3.	G7100-115	-	Decal, Warning (1 Per Granular Chemical Hopper)
4.	G7100-116	-	Decal, Grease Daily
5.	G7100-117	1	Decal, Danger
6.	G7100-123	1	Decal, Attention
7.	G7100-124	1	Decal, Transmission, L.H.
8.	G7100-153	-	Decal, Information (1 Per Seed Meter)
9.	G7100-177	1	Decal, Twin-Line®, 3/4" x 3"
10.	G7100-295	-	Decal, Spring Tension Release
11.	G7100-247	-	Decal, Logo, 4 3/8" x 4 1/2" (2 Per Row Unit)
	G7100-252	-	Decal, Logo, 3 1/2" x 3 5/8" (Hopper Panel Extension)
12.	G7100-208	-	Decal, Interplant®
13.	G7100-217	1	Decal, Note
14.	G7100-219	4	Decal, Warning
15.	G7100-243	2	Decal, 3400
16.	G7100-234	-	Decal, Bolt Torque (Frame Mounted Coulter)
17.	G7100-42	4	Decal, Warning
18.	G7100-43	1	Decal, Warning
19.	G7100-46	1	Decal, Warning
20.	G7100-249	-	Decal, Caution (Interplant® Push Row Unit Lift Lever)
21.	G7100-302	1	Decal, Warning
22.	G7100-63	2	Decal, Caution
23.	G7100-68	4	Decal, Warning
24.	G7100-75	4	Decal, Caution
25.	G7100-83	4	Decal, Warning (1 Per Marker Lockup)
26.	G7100-89	2	Decal, Danger
27.	G7100-90	1	Decal, Warning

(Continued)

# DECALS, PAINT AND MISCELLANEOUS

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ITEM	PART NO.	QTY.	DESCRIPTION
28.	GM0209	1	Operator & Parts Manual, Model 3400 (EdgeVac® Seed Metering)
29.	GD1512	-	Tie Strap, 7 1/2"
	GD2117	-	Tie Strap, 14 1/2"
	GD1162	-	Tie Strap, 28"
	GD2984	-	Tie Strap, 34"
30.	GR0155MPP	-	Blue Paint, Twelve Aerosol Cans
31.	GR0146MPP	-	Powdered Graphite, Twenty-Four 1 Pound Containers
32.	GD2199	1	SMV Sign
33.	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
34.	GR1570MPP	-	Talc Lubricant, Four 8 Pound Containers
35.	G7100-258	-	Reflective Decal, Red, 1 1/2" x 9", Rectangular (If Applicable)
	G7100-259	-	Reflective Decal, Amber, 1 1/2" x 9", Rectangular (If Applicable)
	G7100-260	-	Reflective Decal, Orange, 1 1/2" x 9", Rectangular (If Applicable)
36.	G7100-261	-	Reflective Decal, Red, 1 3/4" x 9", Die-Cut (If Applicable)
	G7100-262	-	Reflective Decal, Amber, 1 3/4" x 9", Die-Cut (If Applicable)
	G7100-263	-	Reflective Decal, Orange, 1 3/4" x 9", Die-Cut (If Applicable)
37.	G7100-311	-	Decal, EdgeVac®
38.	G7100-329	-	Tag, Fan Motor Case Drain
39.	G7100-301	-	Decal, Warning

# NUMERICAL INDEX

Part No.	Page	Part No.	Page	Part No.	Page
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*A1096	P73	G10038	P93	G10194	P27
*A1113	P73	G10039	P23, P29, P93	G10201	P3, P17, P31
*A1169	P73	G10043	P41, P97	G10203	P3, P31, P33
*A1192	P73	G10045	P25, P87	G10204	P5, P7, P87
*A12022	P35	G10046	P29, P45, P87, P89	G10205	P29, P33
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*A12038	P35	G10048	P45	G10207	P3
*A1424	P35	G10050	P61	G10209	P18, P19, P41, P59
*A3118	P73	G10053	P55	G10210	P3, P9, P10, P11,
*A3123	P73	G10055	P55		P12, P17, P31, P37,
*A3158	P73	G10061	P12, P37, P41		P47, P51, P59, P87,
*A3206	P73	G10063	P41		P89, P93, P101
*A3358	P35	G10064	P10, P46, P47	G10211	P75, P79, P81
*A3381	P35	G10070	P53	G10213	P5, P27, P29, P87
*A3399	P35	G10072	P65	G10216	P7, P23, P31, P91
*A7606	P73	G10100	P55, P65	G10217	P41, P89, P93
*A7607	P73	G10101	P4, P10, P11, P19,	G10219	P9, P57, P89
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