

# MODEL 3000 PULL TYPE PLANTER OPERATOR & PARTS MANUAL

**M0164**

**Rev. 9/03**

This manual is applicable to:    Model: 3000 Pull Type Planters  
Serial Number: 642004 and on

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

Model Number \_\_\_\_\_ 3000 \_\_\_\_\_

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

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

## SERIAL NUMBER

The serial number plate is located on the planter hitch to be readily available. It is suggested that the 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.

D061199219



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Rev. 9/03



# 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 assembled.
- Be sure all grease fittings are in place and lubricated.
- Check planter and make sure all working parts are moving freely, bolts are tight and cotter pins are spread.
- Check all drive chains for proper tension and alignment.
- Check for oil leaks and proper hydraulic operation.
- Check to be sure hydraulic hoses are routed correctly to prevent damage to hoses.
- Inflate tires to specified PSI air pressure. Tighten wheel lug bolts to specified torque.
- Check to be sure all safety decals are correctly located and legible. Replace if damaged.
- Check to be sure all reflective decals are correctly located and visible when the planter is in transport position.
- Check to be sure SMV sign is in place.
- 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 lockups are on the planter and correctly located.
- Check seed meters on test stand to ensure proper performance.

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

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

## OWNER REGISTER

Name \_\_\_\_\_ Delivery Date \_\_\_\_\_

Street Address \_\_\_\_\_ Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_

City, State/Province \_\_\_\_\_ Dealer Name \_\_\_\_\_

ZIP/Postal Code \_\_\_\_\_ Dealer No. \_\_\_\_\_

## DELIVERY CHECKLIST

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

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

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

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(Signature Of Delivery Person/Dealer Name/Date)

## AFTER DELIVERY CHECKLIST

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

- Check with the customer as to the performance of the planter.
- Review with the customer the importance of proper maintenance and adherence with all safety precautions.
- Check for parts that may need to be adjusted or replaced.
- Check to be sure all safety warning signs (decals), reflective decals and SMV sign are correctly located and 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 and sturdily built 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 lockups removed for visual clarity. **NEVER OPERATE** the machine without all safety covers, shields and lockups in place.

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

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

# WARRANTY

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

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

To register your KINZE® product for warranty, a Warranty And Delivery Report form must be completed by the KINZE® Dealer and signed by the retail purchaser, with copies to the Dealer, to the retail purchaser and to KINZE Manufacturing, Inc. Registration must be completed and sent to KINZE Manufacturing, Inc. within 30 days of delivery of the KINZE® product to the retail purchaser. KINZE Manufacturing, Inc. reserves the right to refuse warranty on serial numbered products which have not been properly registered.

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

*KINZE® warranty does not include cost of travel time, mileage, hauling or labor.*

# INTRODUCTION

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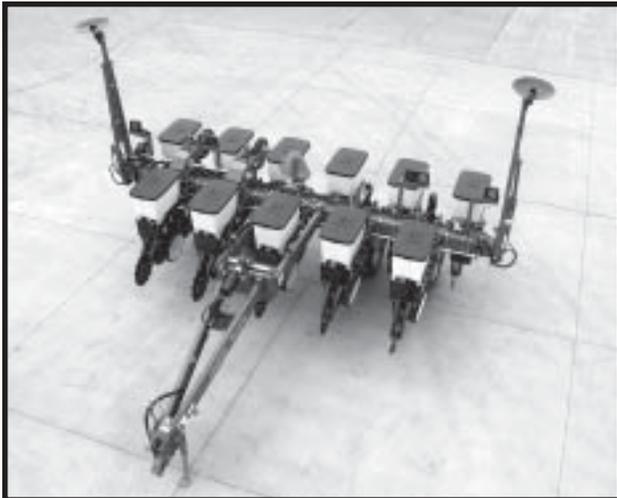
The Model 3000 Pull Type planter is available in various configurations and row spacings. Double Frame<sup>®</sup> Conversion Packages, Liquid Fertilizer Packages, Dry Fertilizer Packages and Interplant<sup>®</sup> Packages are also available.

## GENERAL INFORMATION

The information used in this manual was current at the time of printing. However, due to KINZE's continual attempt 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.

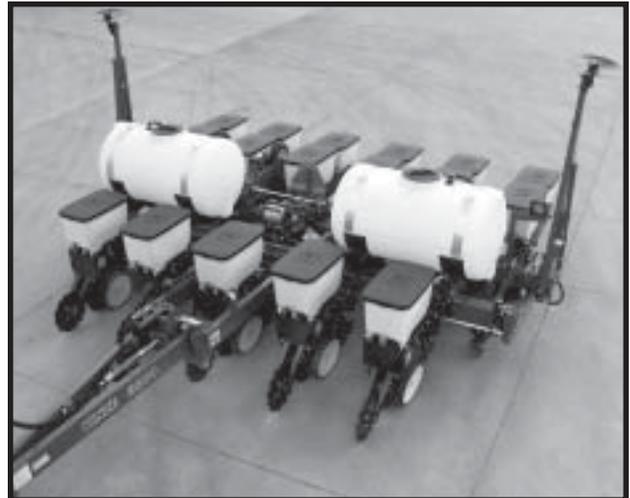
Right hand (R.H.) and left hand (L.H.), as used throughout this manual, are determined by facing in the direction the machine will travel when in use, unless otherwise stated.

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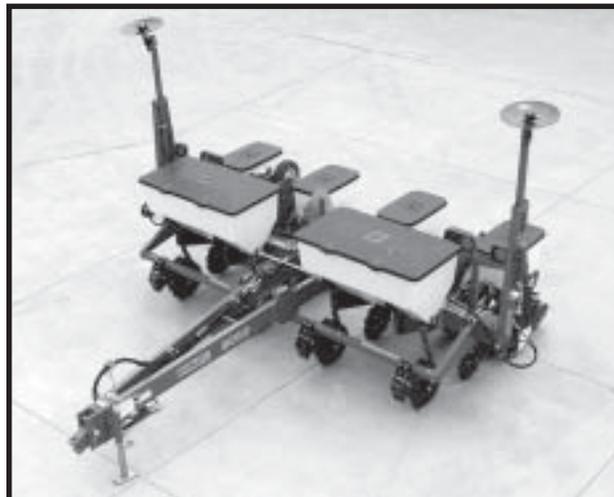
Shown With Interplant<sup>®</sup> Package Installed

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Shown With Double Frame<sup>®</sup> Conversion, Interplant<sup>®</sup> And Liquid Fertilizer Packages Installed

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Shown With Dry Fertilizer Package Installed

# INTRODUCTION

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# SPECIFICATIONS

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**TYPE** - Pull Type (Rigid Frame)

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

<b>ROW SPACING</b>	<u>Standard</u>	<u>Interplant® Package</u>
	4 Row Narrow - 30" Rows	7 - 15" Rows
	4 Row Wide - 36" Or 38" Rows	7 - 18" Or 19" Rows
	6 Row Narrow - 30" Rows	11 - 15" Rows
	6 Row Wide - 36" Or 38" Rows	11 - 18" Or 19" Rows
	8 Row Narrow - 30" Rows	15 - 15" Rows

**DRIVE SYSTEM** - 4.10" x 6" spring-loaded contact drive tire(s) with No. 40 chain  
(One drive tire on 4 row planters and two on 6 and 8 row planters)  
- Quick-adjust end mounted seed transmission with machined sprockets  
- 7/8" hex drive and drill shafts

**TRANSPORT TIRES** - Two 7.50" x 20" transport tires on 4 row and four on 6 and 8 row  
- Adjustable height wheels allow for ridge planting

**TYPE LIFT** - Master/slave hydraulics  
- 2 master/slave rephasing cylinders on 4 row planters  
- 2 master/slave rephasing cylinders and 2 assist cylinders on 6 and 8 row planters

**MARKERS** - Heavy duty conventional markers on 4 Row Narrow/Wide and 6 Row Narrow planters  
- Two-fold low profile markers on 6 Row Wide and 8 Row Narrow planters

**HYDRAULICS** - Standard Single SCV  
- Optional Dual SCV for independent operation of lift and markers  
- Hydraulic sequence valve with flow controls allows alternating marker operation and marker speed adjustment

# SPECIFICATIONS

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## Dimensions/Operating

PLANTER SIZE	4 Row 30"	4 Row 36"/38"	6 Row 30"	6 Row 36"/38"	8 Row 30"
Width	12' 8"	14' 8"	17' 8"	20' 2"	21' 10"
Single Frame Length	11' 4"	11' 4"	11' 4"	11' 4"	11' 4"
Double Frame® Length	13' 10"	13' 10"	13' 10"	13' 10"	13' 10"
*Single Frame Weight	2115 lbs.	2205 lbs.	3369 lbs.	3653 lbs.	4759 lbs.
*Double Frame® Weight	2525 lbs.	2653 lbs.	3951 lbs.	4303 lbs.	5493 lbs.

\* Base machine weights include planter frame including row markers, drive components, tires and wheels, hydraulic cylinders and KINZE® pull row units (closing wheel arms less wheels) with seed hopper and lid and dual quick adjustable down force springs.

## MACHINE OPTIONS

- Double Frame® Conversion Package
- Electronic Seed Monitors
  - KPM I
  - KPM II With Magnetic Distance Sensor Or Radar Distance Sensor
  - KPM II Stack-Mode With Magnetic Distance Sensor Or Radar Distance Sensor
- Dual Valve Conversion Package
- Half Rate (2 To 1) Drive Reduction Package
- Interplant® Package
- Liquid Fertilizer With Fertilizer Opener, Pump And Low Rate Check Valve Options
- Dry Fertilizer With Fertilizer Opener Options

## ROW UNIT OPTIONS/ATTACHMENTS

- Finger Pickup Or Brush-Type Seed Meters
- 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 Extension Bracket
- Row Unit Mounted No Till Coulter
- Row Unit Mounted Disc Furrowers
- Row Unit Mounted Bed Leveler
- Row Unit Mounted Residue Wheel
- Coulter Mounted Residue Wheels
- Frame Mounted Coulter - STYLE A & STYLE B
- Disc Furrowers For STYLE A Frame Mounted Coulter
- Residue Wheel Attachment For STYLE B Frame Mounted Coulter

# 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.**

 **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.**

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

 **Never permit any persons other than the operator to ride on the tractor.**

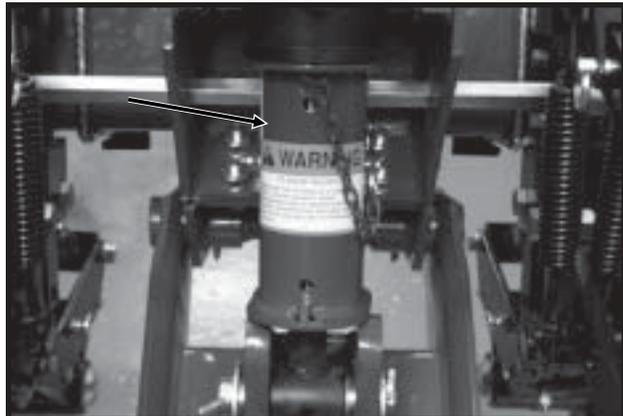
 **Never ride on the planter or allow others to do so.**

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

 **Always make sure there are no persons near the planter when marker assemblies are in operation.**

 **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.**

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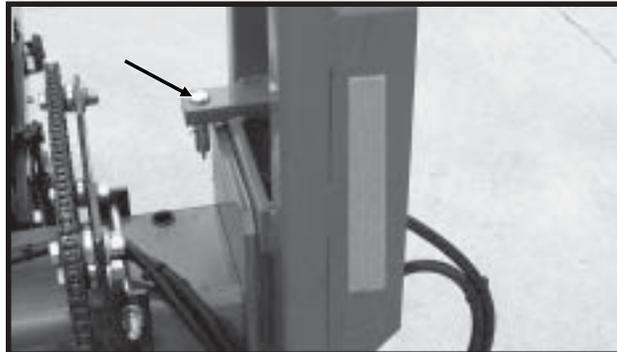


Lift Cylinder Safety Lockup

 **Always install all cylinder safety lockup devices before transporting the planter.**

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

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Conventional Marker Lockup

 **Install safety lockup devices on markers prior to transporting the planter or working around the unit. (If Applicable)**

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

 **Care must be taken when operating row markers around overhead power lines.**

# SAFETY PRECAUTIONS

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-  Limit towing speed to 15 MPH. Tow only with farm tractor of minimum 50 HP.
-  Always make sure safety/warning lights, reflectors/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.
-  Check to be sure all safety/warning lights are working before transporting the machine on public roads.
-  If the planter is going to be transported on a public highway, a safety chain should be obtained and installed. Always follow federal, state/provincial and local regulations regarding a safety chain 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.
-  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.
-  Avoid sudden uphill turns on steep slopes.
-  Always keep the tractor in gear to provide engine braking when going downhill. Do not coast.
-  Be a safe and courteous driver. Always yield to oncoming traffic in all situations, including narrow bridges, intersections, etc.
-  Before operating the planter for the first time and periodically thereafter, check to be sure the lug bolts on the transport wheels are tight. This is especially important if the planter is to be transported for a long distance.
-  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.
-  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.
-  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.
-  Rim and tire servicing can be dangerous. Explosive separation of a tire and rim parts can cause serious injury or death.
-  Agricultural chemicals used with this unit can be dangerous. Improper selection or use can seriously injure persons, animals, plants, soil and other property. **BE SAFE:** Select the right chemical for the job. Handle it with care. Follow the instructions of the chemical manufacturer.
-  Good maintenance is your responsibility. Poor maintenance is an invitation to trouble.

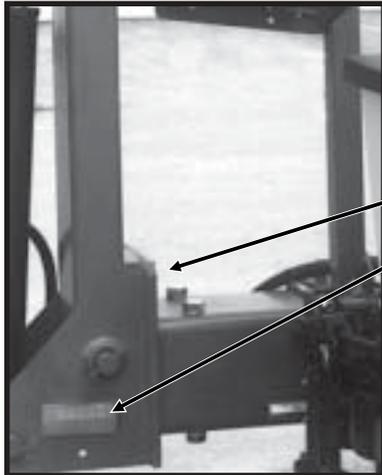
# SAFETY WARNING SIGNS

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!**

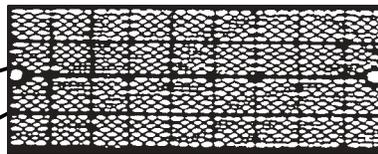
- **Keep these signs clean so they can be readily observed. Wash with soap and water or cleaning solution as required.**
- **Replace “WARNING” signs should they become damaged, painted over or if they are missing.**
- **Check the reflective decals and SMV sign periodically. Replace if they show loss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

**NOTE: The production date of the machine will determine style and locations of reflectors and/or reflective decals and safety/warning lights to conform to ANSI/SAE S279.10 OCT 98.**

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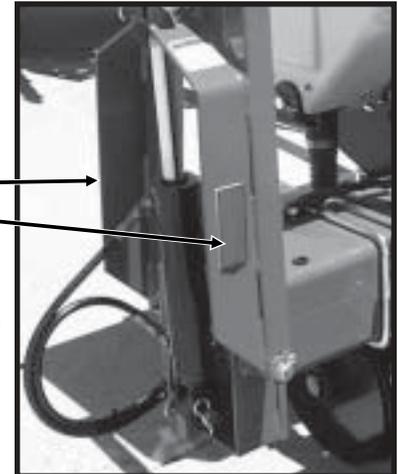


Low Profile Marker



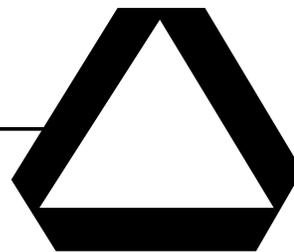
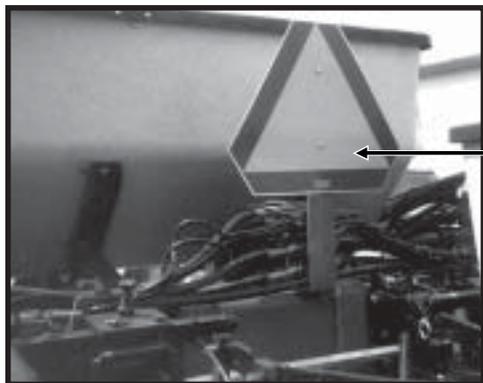
Part No. G7200-03 Red Reflector (Rear)  
Part No. G7200-04 Amber Reflector (Front)  
(Qty. 1 Each Per Marker Assembly)  
(If Applicable)

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Conventional Marker

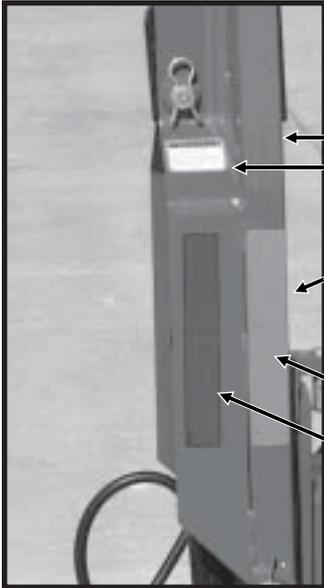
77262-2



Part No. GD2199 SMV Sign (Qty. 1)

# SAFETY WARNING SIGNS

D101900103



Conventional Marker



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

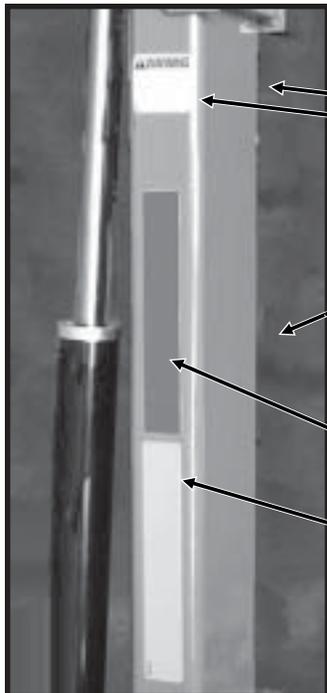


Part No. G7100-259 Amber Reflective Decal Front (Qty. 1 Per Marker)

Part No. G7100-260 Orange Reflective Decal Inside Rear (Qty. 1 Per Marker)

Part No. G7100-258 Red Reflective Decal Outside Rear (Qty. 1 Per Marker)  
(If Applicable)

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Low Profile Marker



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



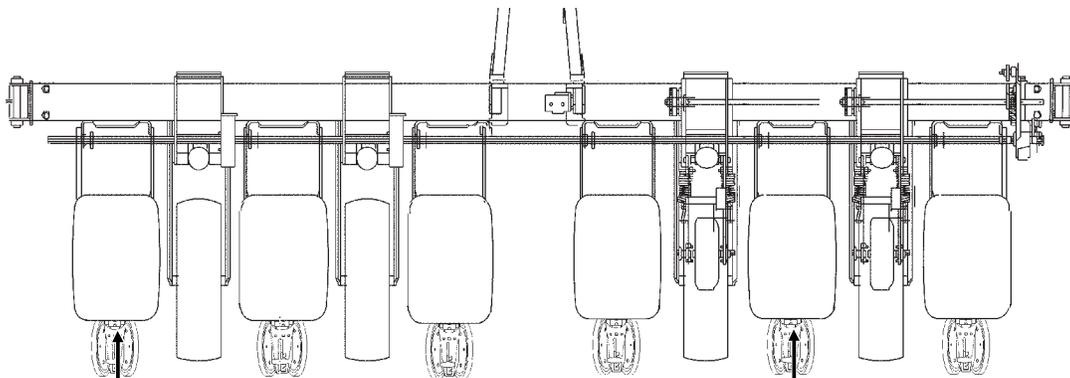
Part No. G7100-259 Amber Reflective Decal Front (Qty. 1 Per Marker)

Part No. G7100-258 Red Reflective Decal Top Rear (Qty. 1 Per Marker)

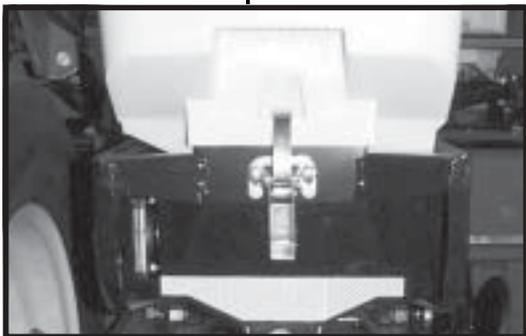
Part No. G7100-260 Orange Reflective Decal Bottom Rear (Qty. 1 Per Marker)  
(If Applicable)

# SAFETY WARNING SIGNS

(PLTR116f)

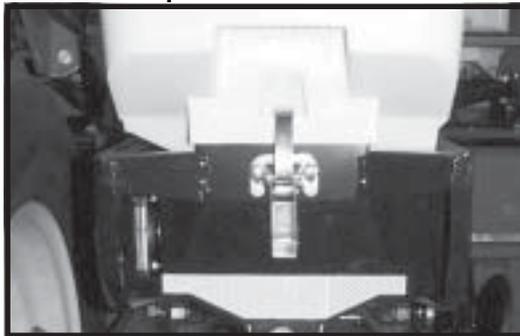


D060800114



Part No. G7100-261 Red Reflective Decal  
(Qty. 1 Per Row Unit - Located On The Hopper Support On The Outside Row On Both Sides Of The Planter) (If Applicable)

D060800114



Part No. G7100-263 Orange Reflective Decal  
(Qty. 1 Per Row Unit - Located On The Hopper Support On The Second Row In On Both Sides Of The Planter) (If Applicable)

D062300102



Part No. G7100-258 Red Reflective Decal  
(Qty. 1 Per Row Unit - Located On The Granular Chemical Hopper Panel Extension On The Outside Row On Both Sides Of The Planter) (If Applicable)

D062300102

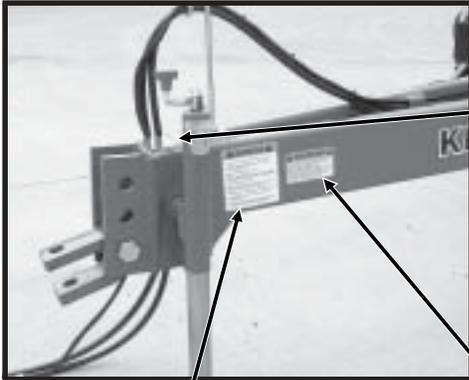


Part No. G7100-260 Orange Reflective Decal  
(Qty. 1 Per Row Unit - Located On The Granular Chemical Hopper Panel Extension On The Second Row In On Both Sides Of The Planter) (If Applicable)

**NOTE: Exceptions to the above are 8 row 30" planters. Red reflective decals are used on the first, third, sixth and eighth rows. Orange reflective decals are used on the second, fourth, fifth and seventh rows. (If Applicable)**

# SAFETY WARNING SIGNS

D061199109



Part No. G7100-56 (Qty. 1)

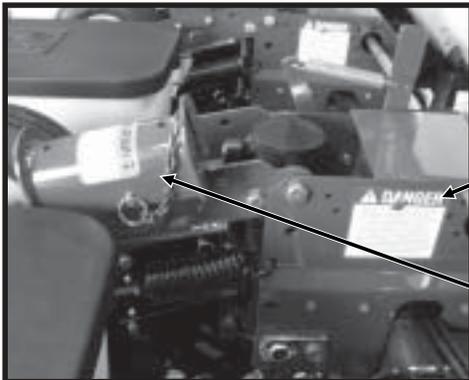


Part No. G7100-46 (Qty. 1)

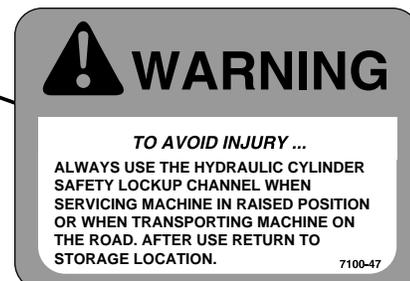


Part No. G7100-90 (Qty. 1)

D05170009a



Part No. G7100-89 (Qty. 1  
Per Contact Wheel Assembly)



Part No. G7100-47 (Qty. 1  
Per Contact Wheel Assembly)

# SAFETY WARNING SIGNS

D06039901



**⚠ 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

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

D06099911



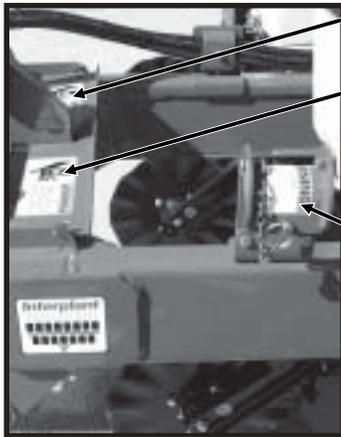
**⚠ CAUTION ⚠**

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

7100-249

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

D06079913



**⚠ WARNING ⚠**

**KEEP CLEAR OF MECHANISM AT ALL TIMES.**

7100-253

Part No. G7100-253 (Qty. 2 - Located On Interplant® Self-Leveling Hitch Extension)

**⚠ WARNING ⚠**

**TO AVOID INJURY...**

ALWAYS USE THE HYDRAULIC CYLINDER SAFETY LOCKUP CHANNEL WHEN SERVICING MACHINE IN RAISED POSITION OR WHEN TRANSPORTING MACHINE ON THE ROAD. AFTER USE RETURN TO STORAGE LOCATION

7100-255

Part No. G7100-255 (Qty. 1 - Located On Interplant® Lift Cylinder Lockup)

# SAFETY WARNING SIGNS

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# 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.

## INITIAL PREPARATION OF THE PLANTER

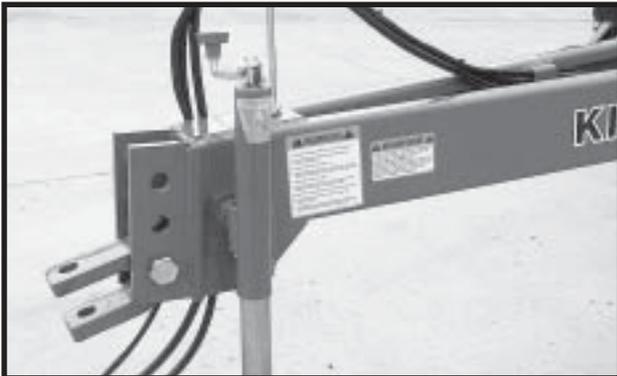
Lubricate the planter and row units per the lubrication information in this manual. Make sure all tires have been properly inflated. Check all drive chains for proper tension, alignment and lubrication.

## TRACTOR REQUIREMENTS

Consult your dealer for information on horsepower requirements and tractor compatibility. Requirements will vary with planter options, tillage and terrain. One dual remote hydraulic outlet (SCV) is required on machines equipped with the standard single valve hydraulic system. Two dual remote hydraulic outlets (SCV) are required on machines equipped with the optional dual valve hydraulic system.

## TRACTOR PREPARATION AND HOOKUP

D061199109



1. Adjust tractor drawbar so it is 13 to 17 inches 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. Back tractor to planter and connect with a minimum  $\frac{3}{4}$ " diameter hitch pin. Make sure hitch pin is secured with locking pin or cotter pin.

3. Connect hydraulic hoses to tractor ports in a sequence which is both familiar and comfortable to the operator.

**NOTE:** If tractor is equipped with an adjustable flow outlet (SCV), adjust to full flow position.



**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.

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

01239805b



6. Lower planter to the planting position and check to be sure planter is level fore and aft. If hitch height is too high or low, disconnect planter and adjust hitch clevis up or down as necessary.

**NOTE:** If using an auxiliary attaching system to retain the connection between the planter and tractor hitch, be sure the auxiliary attaching system is of sufficient strength and length and correctly attached. An auxiliary safety chain package is available from KINZE® through your KINZE® Dealer. Attach safety chain using clevis mounting holes on planter hitch.

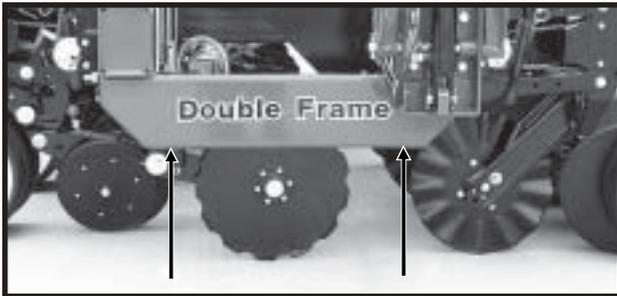
# MACHINE OPERATION

## LEVELING THE PLANTER

For proper operation of the planter and row units, it is important that the planter frame and row unit parallel arms be level. The toolbar should operate at a 20" to 22" height, measured 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. Holes in the hitch bracket allow the clevis to be raised or lowered. When installing clevis mounting bolts, tighten hex nuts to proper torque setting.

D06119926a



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

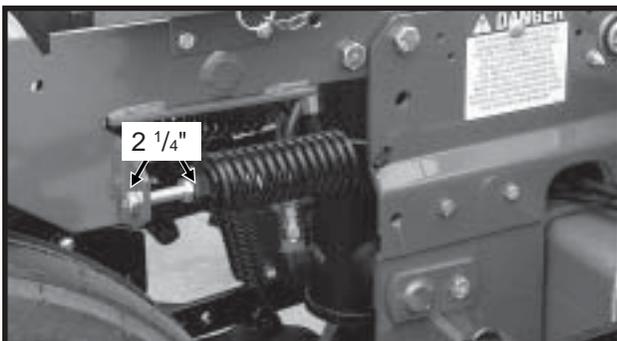
It is important for the planter to operate level laterally. Tire pressure must be maintained at pressures specified. See "Tire Pressure".

## CONTACT DRIVE WHEEL SPRING ADJUSTMENT

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

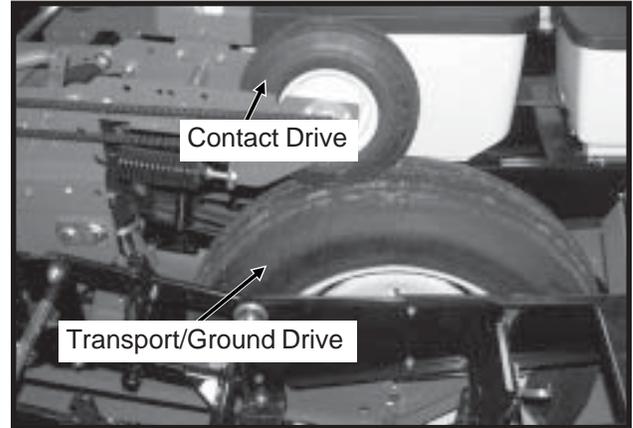
The spring tension is set leaving 2 1/4" between the spring plug and the bolt head.

D061199222



## TIRE PRESSURE

D05220002a



Tire pressure should be checked regularly and maintained as follows:

7.50" x 20", Transport/Ground Drive ..... 40 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 pressure. Do not inflate the tires above the recommended pressure.

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

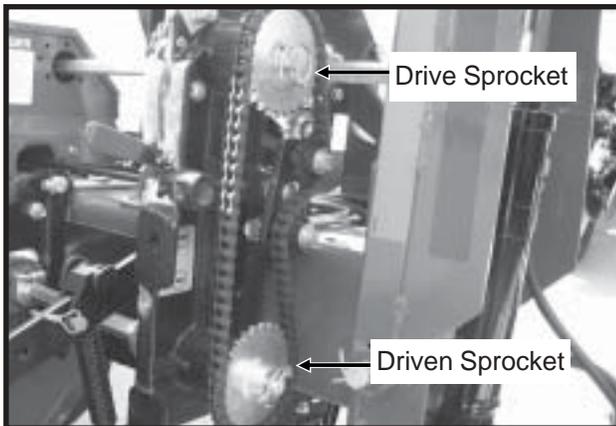
## SEED RATE TRANSMISSION ADJUSTMENT

Planting population rate changes are made at the end mounted transmission. The planter is designed to allow simple, rapid changes in 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 ratchet 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 ratchet arm.

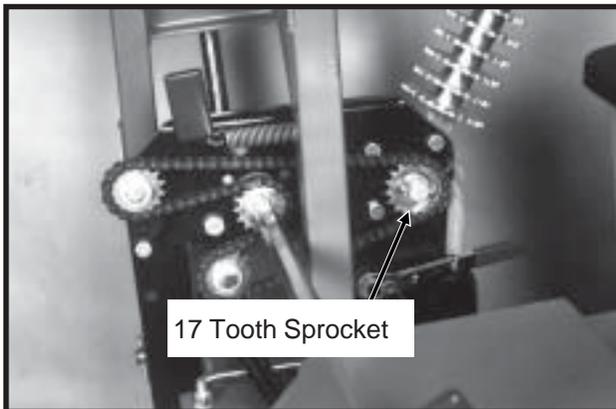
The planting rate charts found at the back of this section will aid you in selecting the correct sprocket combinations.

D062201101a



## STANDARD RATE DRIVE

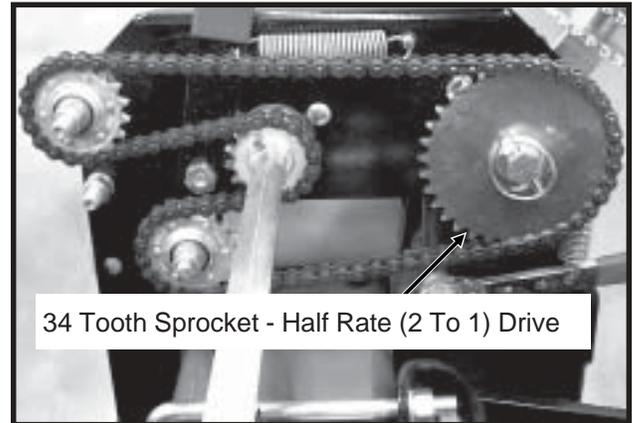
61010-41



Seed planting rate charts are based on the standard rate drive unless specified otherwise. The standard rate drive uses a 17 tooth sprocket as shown above. Using the 34 tooth half rate (2 to 1) drive reduction sprocket in place of the 17 tooth sprocket will reduce the planting and application rates by approximately 50%. See "Half Rate (2 To 1) Drive".

## HALF RATE (2 TO 1) DRIVE

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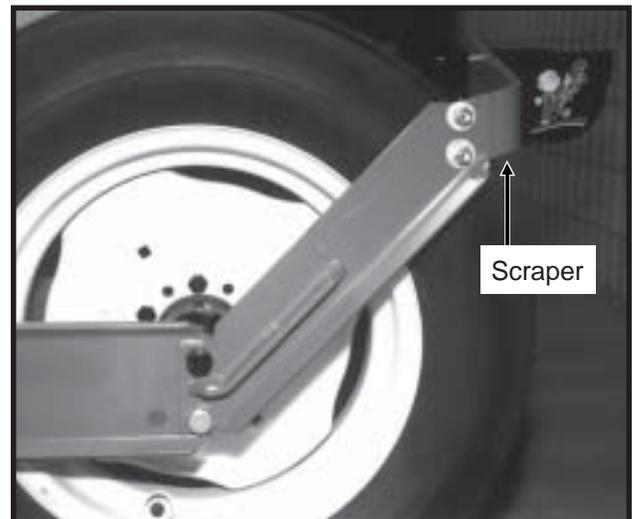
Half rate (2 to 1) drive is recommended only when desired population falls below that on planting rate charts. Replacing the 17 tooth drive sprocket located on the inner side of the top transmission shaft, with the 34 tooth half rate (2 to 1) drive reduction sprocket will reduce the planter transmission speed and reduce planting and application rates by approximately 50%.

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

## TIRE SCRAPER

Due to the clearance between the wheel assembly and the transport tire, a tire scraper should always be used. This will prevent a buildup of dirt/mud between the wheel arm assembly and the tire. Adjust the scraper so it does not contact the tire.

83154-1

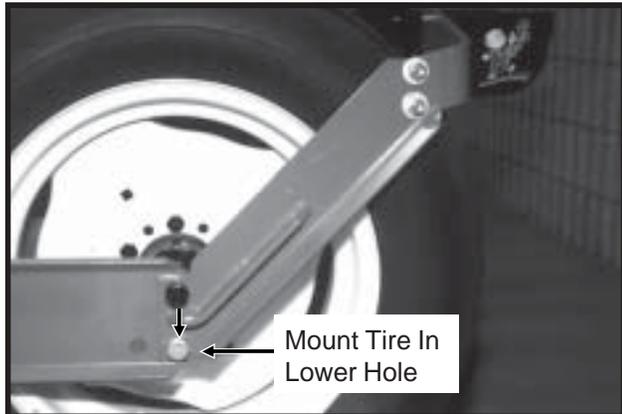


# MACHINE OPERATION

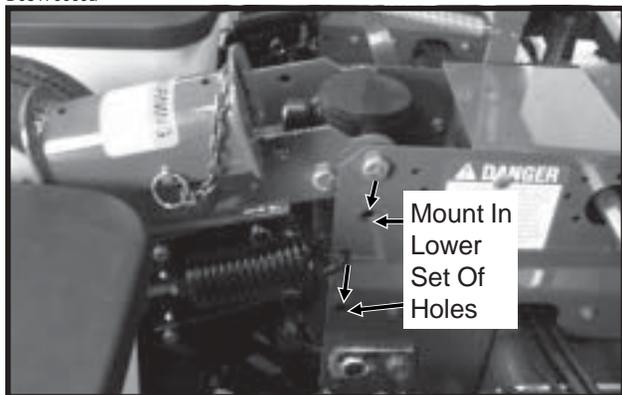
## RIDGE PLANTING

To raise the planter frame height 3" for ridge planting, mount the 20" tires in the lower rear holes in the ground drive wheel arm. Mount the contact drive wheel arm and springs in the lower set of mounting holes in the wheel module mount and raise the hitch height to maintain fore and aft levelness.

83154-1



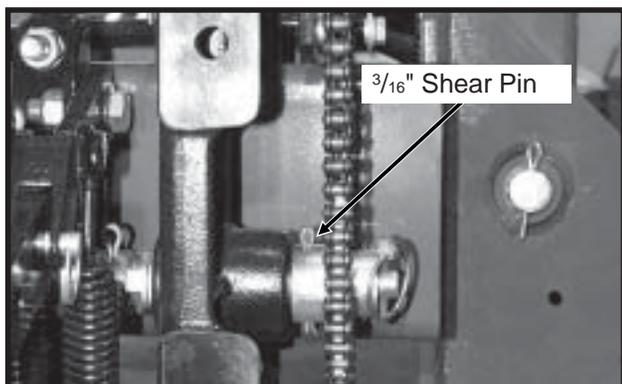
D05170009a



## SHEAR PROTECTION

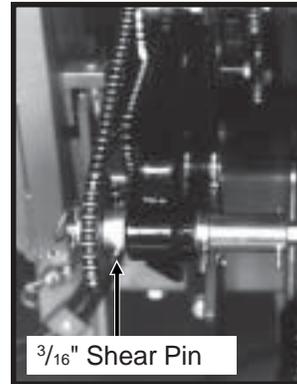
The planter driveline and row unit components are protected from damage by shear pins.

D06099913a



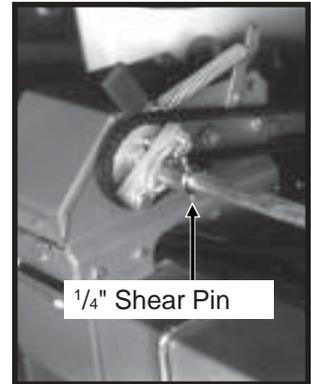
Transmission Shaft

61111-5



Dry Fertilizer Driveline

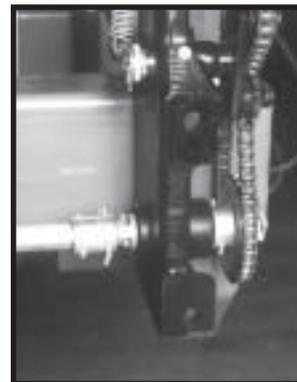
61111-33



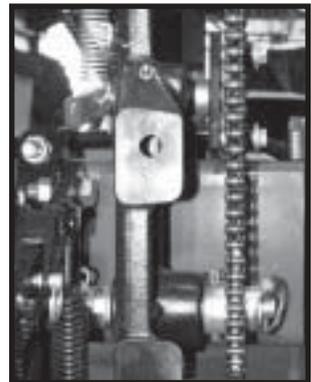
Liquid Fertilizer Driveline

If excessive load should cause a pin to shear, it is important to determine where binding has occurred before replacing the pin. Turn the shaft by hand, checking for misalignment and for the possibility of seized parts. When the shaft can be turned by hand (with the aid of a wrench) replace shear pins with same size and type. To prevent future binding or breakage of components, check driveline alignment and follow prescribed lubrication schedules.

61048-42a

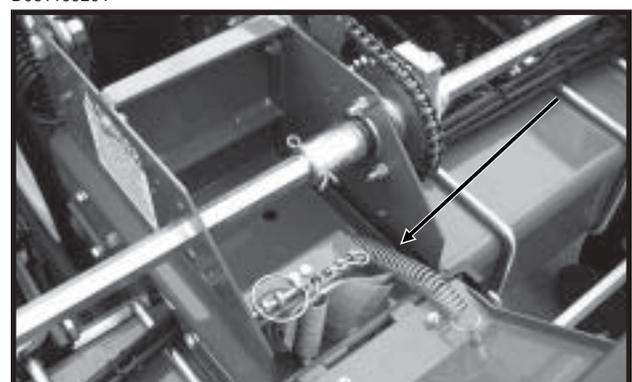


D0609993a



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

D061199204



Additional shear pins can be found in the storage area located on the wheel module.

# MACHINE OPERATION

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## HYDRAULIC PLANTER LIFT OPERATION

The planter lift system consists of a master cylinder on one side of the planter and a slave cylinder on the other side of the planter. On 6 row and 8 row sizes, lift assist cylinders are used on the inner wheel modules.

With the master/slave hydraulic lift system, oil is forced into the butt end of the master and lift assist cylinders when the hydraulic lever on the tractor is moved to the raise position. As the master cylinder is extended, oil from the rod end of the master cylinder is forced into the butt end of the slave cylinder. The displacement on the rod end of the master cylinder is equal to the displacement on the butt end of the slave cylinder. This causes the two cylinders to move at the same rate so the planter will raise and lower evenly.

The assist cylinders are plumbed in parallel in the lift circuit with the master/slave cylinders and provide additional lift capacity. (If applicable)

**IMPORTANT: The planter lift cylinders may get out of phase resulting in the planter lifting unevenly. In each master cylinder and each slave cylinder a valve located in the piston in the cylinder allows the lift system to be rephased when the cylinders are cycled by lowering the planter to the ground and holding the hydraulic lever for approximately 5-10 seconds. Cycle the system until the planter lifts and lowers evenly.**



**WARNING:** Always position lockups in “safety” position when transporting or storing planter. See “Safety Precautions”.

## HYDRAULIC MARKER OPERATION

Model 3000 planters are equipped with a single valve hydraulic system or an optional dual valve hydraulic system. The single valve system requires the planter to be raised in order to lift the markers. Each time the planter is lowered, the markers will alternately be lowered. If the planter is raised to cross a waterway, the opposite marker will be lowered when the planter is lowered back into the ground. Therefore, it will be necessary to stop and again raise and lower the planter to restore correct marker operation.

If planting in this type of situation, dual valve hydraulics are highly recommended. The optional dual valve hydraulic system allows the planter to be raised and lowered independent of the markers. When raising the planter for a waterway the marker that is down will clear the ground and not disturb the waterway. When the planter is again lowered the same marker will continue to mark the path for the return pass. Each time a marker is raised, the sequencing valve will direct flow to lower the opposite marker.

Both markers can be used at the same time if desired. To do this, lower the planter and the marker that has been selected. Move the tractor control lever to the raise position and immediately return it to the lower position. This will shift the marker control valve and the remaining marker will be lowered.



**WARNING:** Always stand clear of the marker assemblies and blades when planter is in operation.



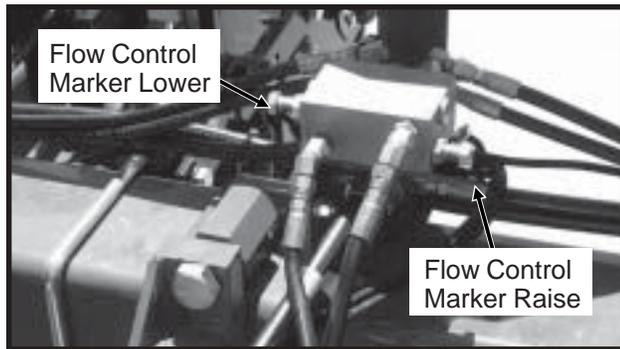
**DANGER:** Care must be taken when operating row markers around overhead power lines.

# MACHINE OPERATION

## MARKER SPEED ADJUSTMENT

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

D05259913



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

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

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

On tractors with a closed center hydraulic system, the tractor's hydraulic flow control can be set so the tractor's detent will function properly.



**DANGER:** Care must be taken when operating markers around overhead power lines.

## MARKER LENGTH ADJUSTMENT

To determine the correct length at which to set the marker assemblies, multiply the number of rows by the average row spacing in inches. This provides the total planting width. Adjust the marker extension so the distance from the marker blade to the center line of the planter is equal to the total planting width previously obtained. Both the planter and 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 marker assemblies equally and securely tighten clamping bolts. An example of marker length adjustment follows:

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

8 Rows x 30" Spacing = 240" Marker Dimension

72359-61



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

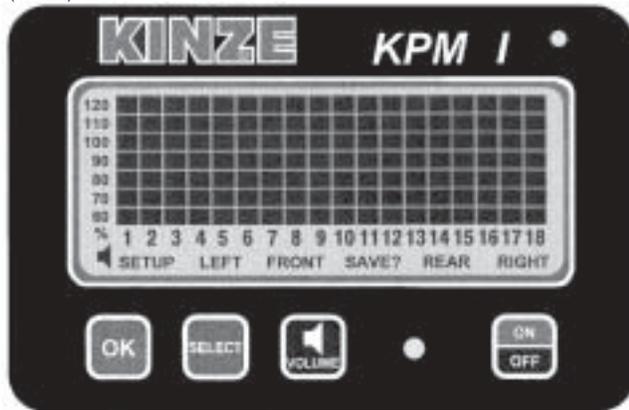
**IMPORTANT:** A marker blade assembly that is set at a sharper angle than necessary will add unnecessary stress to the complete marker assembly and shorten the life of bearings and blades. Set the blade angle only as needed to leave a clear mark.

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

A notched marker blade, for use in more severe no till conditions, is available from KINZE® through your KINZE® Dealer.

## KPM I ELECTRONIC SEED MONITOR

(MTR28)



The 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 .....	6-7
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Field Operation .....	6-10
Connecting Seed Tubes .....	6-10

### MONITOR KEY FUNCTIONS

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

#### OK

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

#### SELECT

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

#### VOLUME

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

#### ON/OFF

- Powers the unit on and off.

### LCD FUNCTIONS

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

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

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

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

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

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

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

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

## CHANGING THE AUDIBLE ALARM VOLUME

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

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

## WARNINGS AND ALARMS

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

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

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

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

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

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

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

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

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

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

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

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

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

## REPLACING A FAULTY SENSOR

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

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

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

## FIELD OPERATION

(MTR28e/MTR28c/MTR28d/MTR28b)

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



Information regarding each section is displayed alternately every 5 seconds.

### REAR/FRONT CONFIGURATION

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



### LEFT/RIGHT CONFIGURATION

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



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

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



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



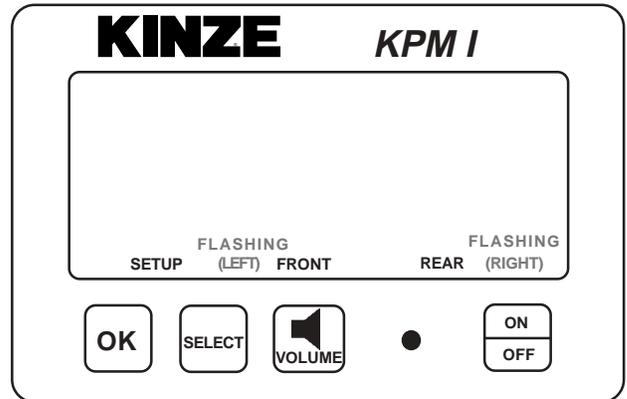
## CONNECTING SEED TUBES

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

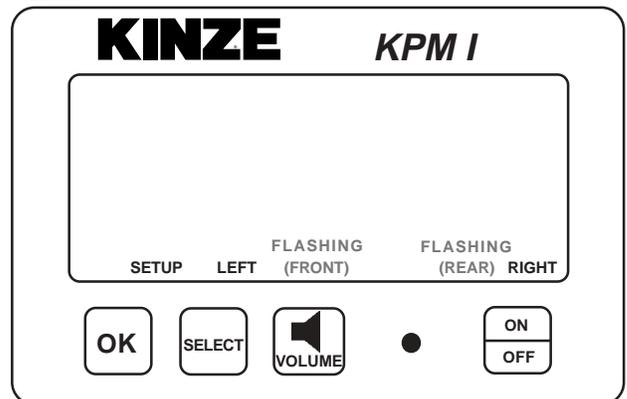
**STEP 2** Press the ON key. The monitor automatically enters the setup procedure. If the monitor was accidentally powered on with no sensors attached, the user can turn the monitor off at this point and the previous configuration is not lost.

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

01229910



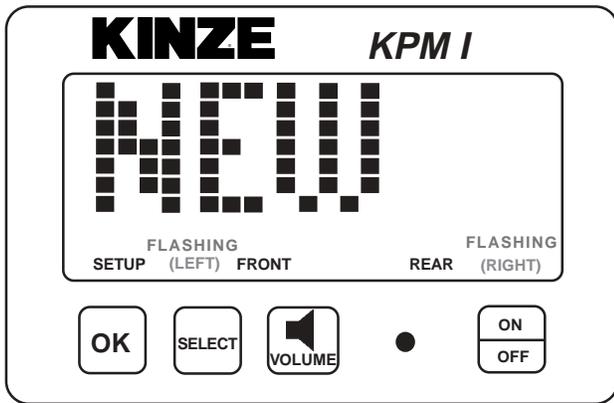
01229911



**NOTE: Model 3000 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.**

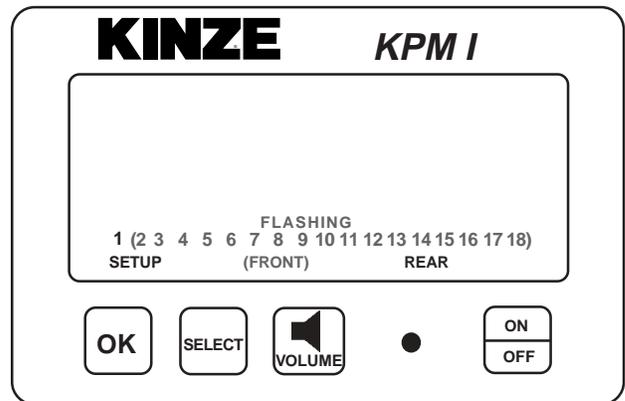
**STEP 4** Press and hold the OK key to confirm the selection and continue holding until the row numbers appear on the display. During confirmation, the display will alternate between “NEW” and “SYS” to alert the user that the previous configuration will be lost. With the rear/front mode selected, the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

01229912

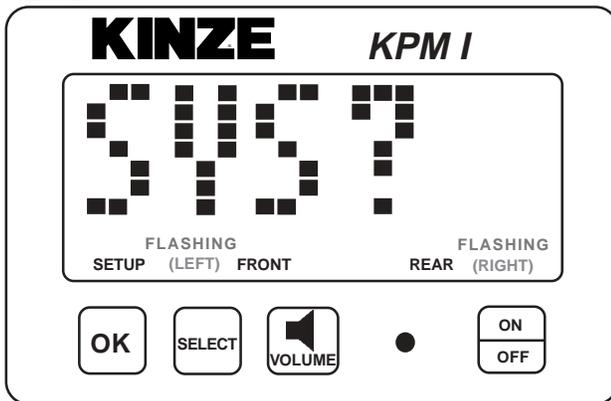


**STEP 5** Plug each seed tube w/sensor into the harness in a predetermined order. Row 1 first, row 2 second and so on up to 18 rows. When a sensor is plugged in, the corresponding row number on the LCD display will stay solid, the monitor will chirp twice and the LED (Light Emitting Diode) on the seed 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.

01229915

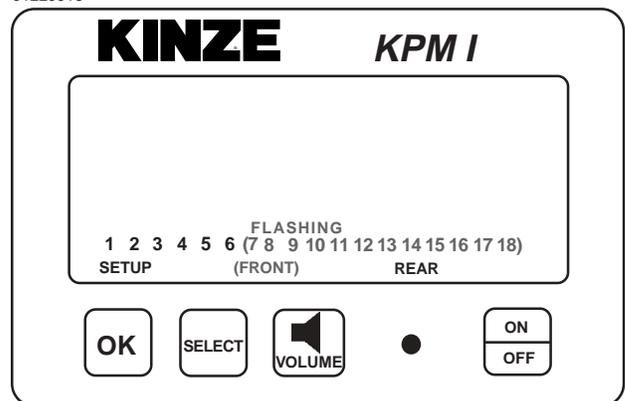


01229912a



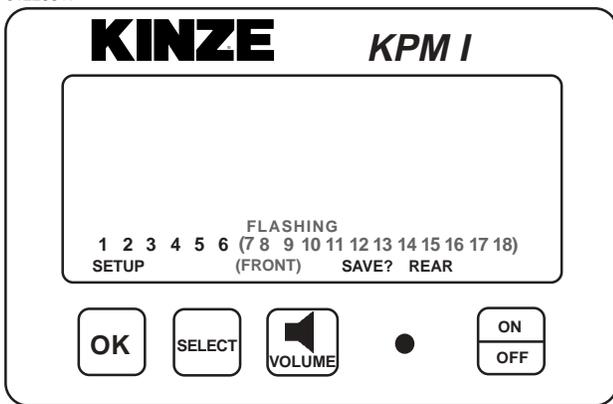
**STEP 6** When all the seed tubes w/sensors for the current section are installed, check to be sure the monitor displays solid numbers for the number of sensors connected.

01229916



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

01229917

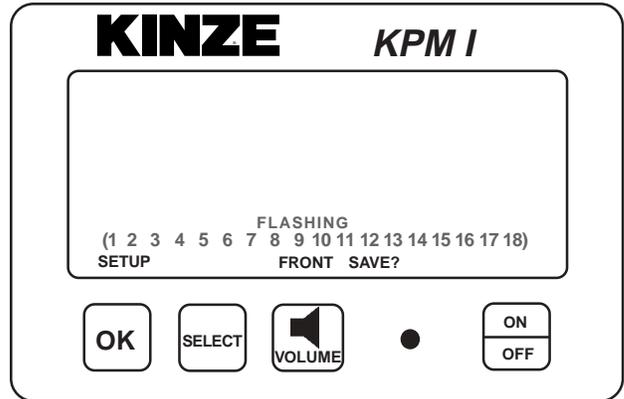


01229918

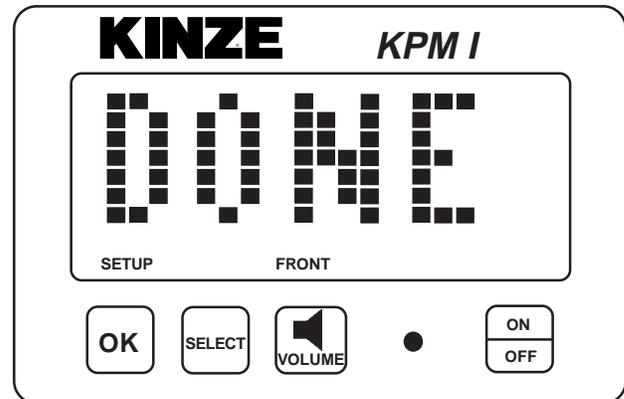


**STEP 8** Follow STEPS 5 through 7 to install the second section. If no seed tubes are installed on the second section, press and hold the OK key until the word "DONE" shows on the screen followed by a long beep and the SAVE? icon turns off.

01229919



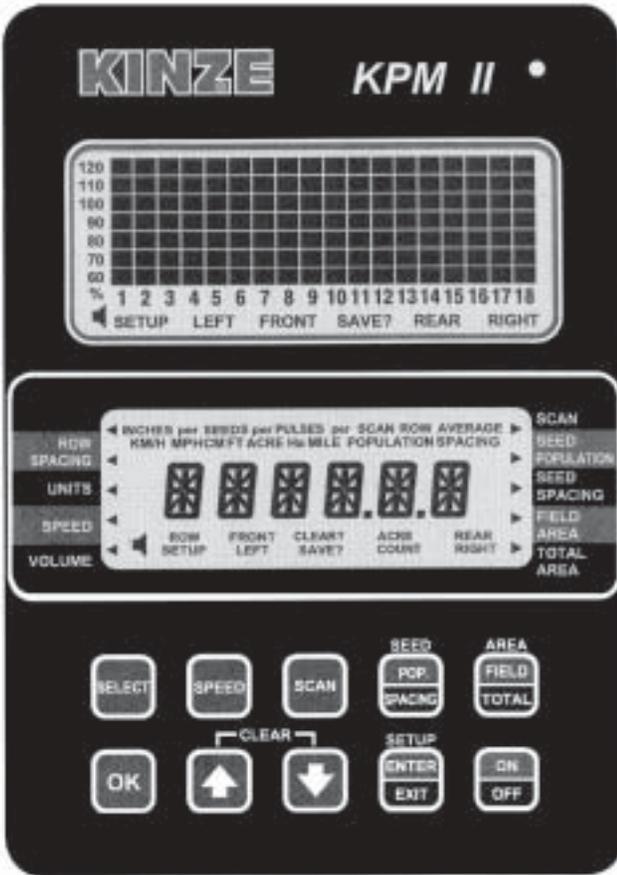
01229920



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

## KPM II ELECTRONIC SEED MONITOR

(MTR29)



The 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 extensions where applicable) to which the individual seed tube sensors and rotation sensors connect. The monitor works with a magnetic (pickup) distance sensor or radar distance sensor.

\* **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.

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 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 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 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)

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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 or left/right) 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

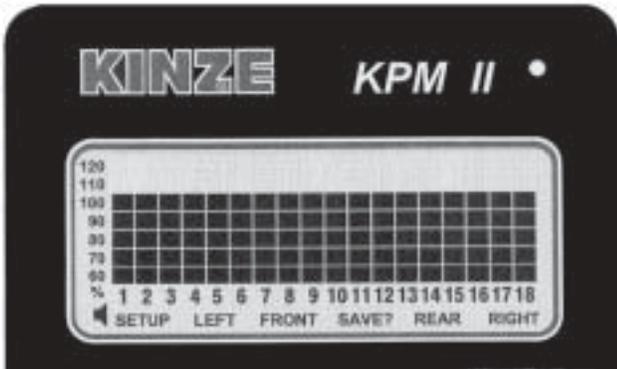
- Enters and exits the programming mode.

### 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.

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 icon is continuously displayed on the LCD.

**EXAMPLE:** The system is setup to display rear/front sections. Press SELECT key. The FRONT icon will be flashing and the REAR section will be displayed on the bar graph. After 1 minute the front 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. Also 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 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.

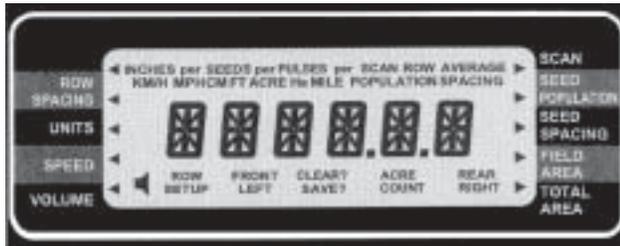
**EXAMPLE:** Press SELECT key a second time. The information regarding each section will display alternately every 5 seconds.

For simple applications, where only one section is programmed, the display will automatically lock on that section. Pressing 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.

## 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.**

## 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 or left/right) must be active. If the monitor is programmed in a rear/front configuration, both sections will be active (alternating every 5 seconds). 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 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.

- 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 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 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, 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

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/left section and continue to replace sensors in ascending order. Then move on to the front/right section and continue in ascending order.

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

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

## FIELD OPERATION

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



(MTR28e)

Information regarding each section is displayed alternately every 5 seconds.

### REAR/FRONT CONFIGURATION

- 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. (Monitor sets correct row spacing.)
- Press the SELECT key a third time to show REAR section only again.



(MTR28c)

### LEFT/RIGHT CONFIGURATION (If Applicable)

- 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.

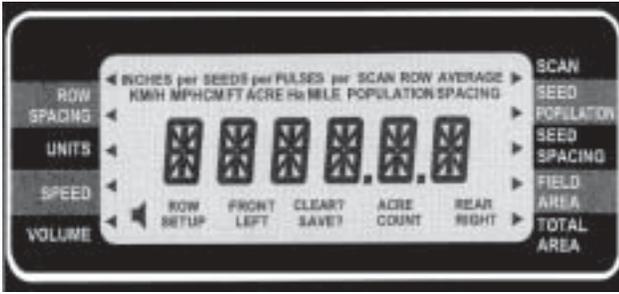


(MTR28c)

**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".



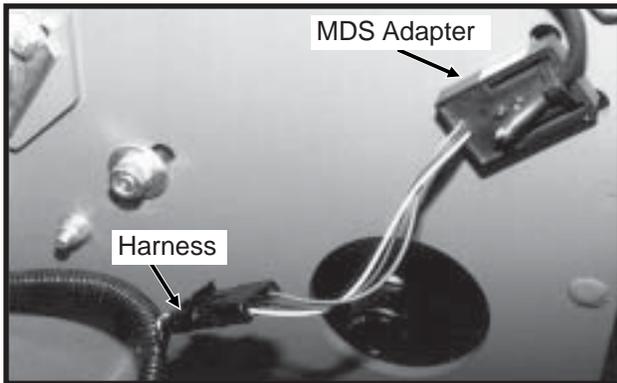
## CONNECTING SEED TUBES, RADAR/MAGNETIC DISTANCE SENSORS AND/OR SHAFT ROTATION SENSORS

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

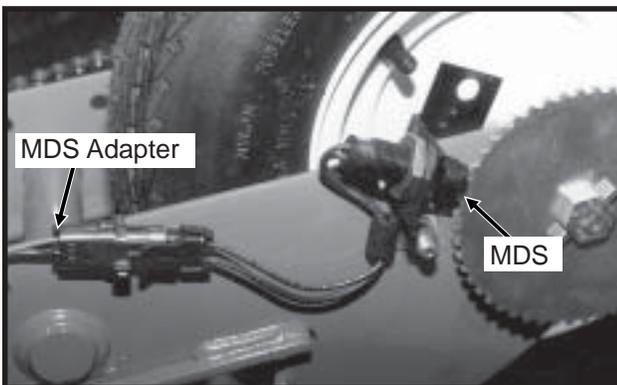
**NOTE:** If the monitor detects a radar sensor but no seed tubes at power up, it will automatically go into AREA COUNT mode. See “Area Counter/Speedometer Mode”.

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

01189909



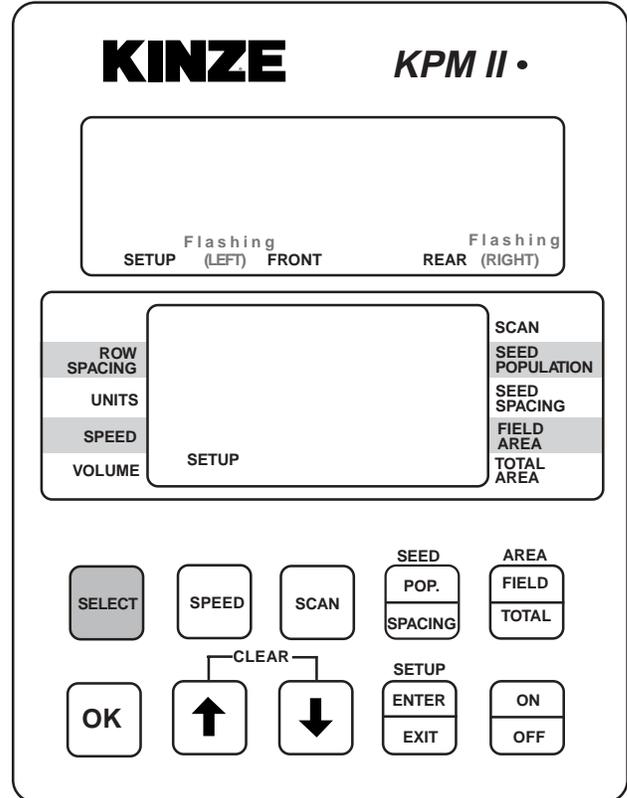
01189910



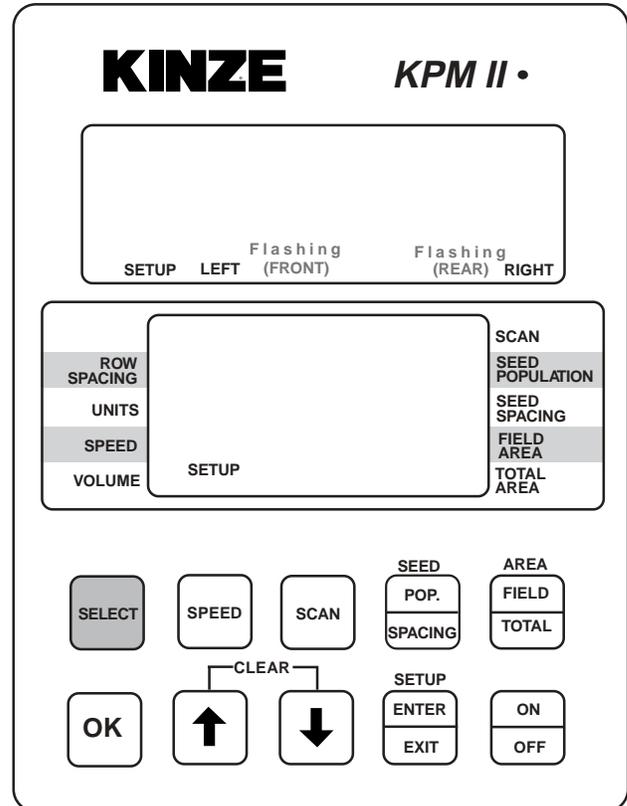
**STEP 2** Press the ON key. The monitor automatically enters the setup procedure.

**STEP 3** The monitor automatically defaults to front/rear. 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 the rear/front mode.

01139923



01139924

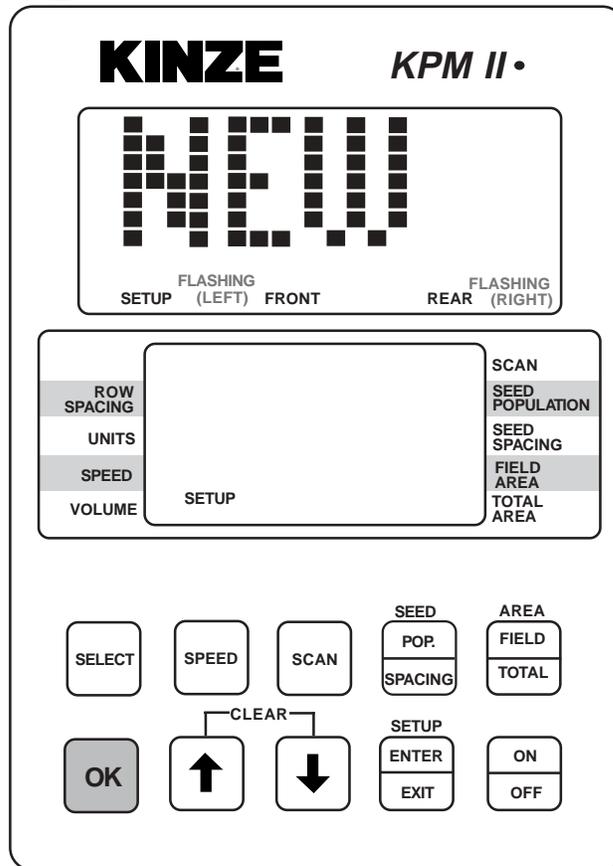


**NOTE:** Model 3000 planters select the rear configuration only. When Interplant® Package rows are in use, select the rear/front configuration.

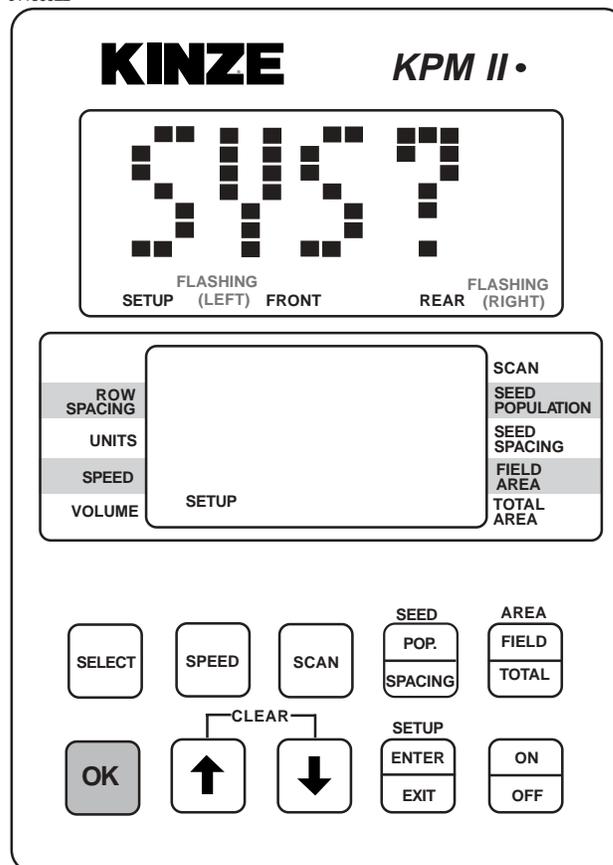
**STEP 4** Press and hold the OK key to confirm selection. The upper display will alternate between “NEW” and “SYS?”.

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

01139922



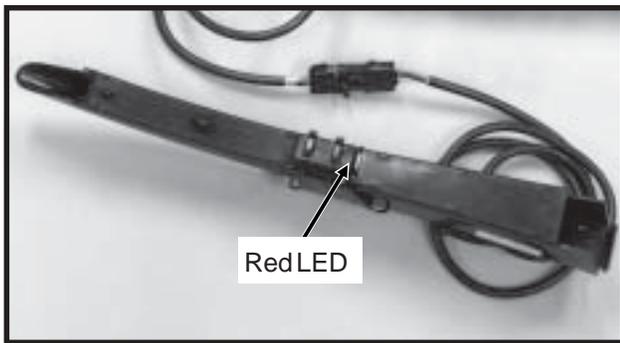
01139922



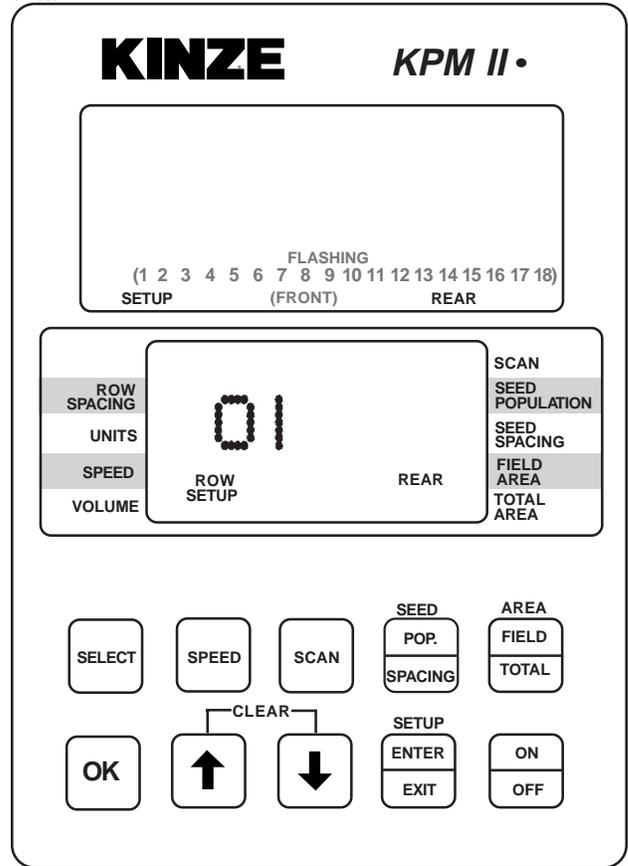
**STEP 5** Determine which row you want as number one and plug the seed tube w/sensor into the harness.

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.

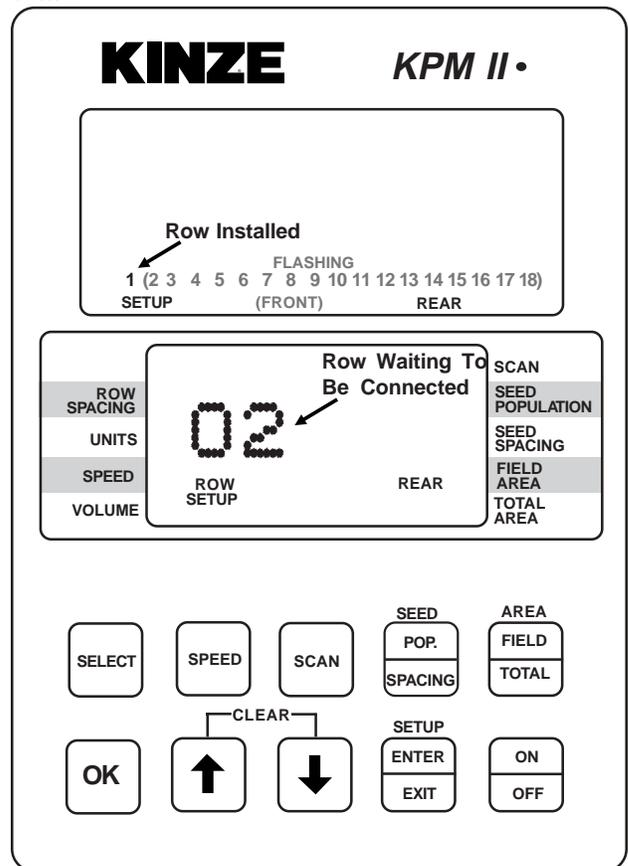
D04219901



01139921

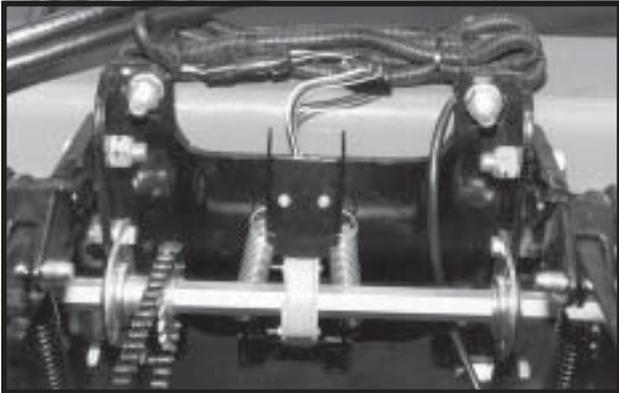


01139911



**STEP 6** If the monitor system includes shaft rotation sensors, these can be installed at any time as the seed tubes are connected. The first shaft rotation sensor installed will be assigned to the rows on the L.H. half of the planter and the second shaft rotation sensor connected will be assigned to the rows on the R.H. half of the planter.

01189906



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

01139919

**KINZE**
**KPM II •**

FLASHING

1 (2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18)

SETUP
(FRONT)
REAR

ROW SPACING
UNITS
SPEED
VOLUME

LSHAFT

SCAN
SEED POPULATION
SEED SPACING
FIELD AREA
TOTAL AREA

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

CLEAR

01139916

**KINZE**
**KPM II •**

FLASHING

1 2 3 4 5 6 7 8 9 10 11 12 (13 14 15 16 17 18)

SETUP
(FRONT)
REAR

ROW SPACING
UNITS
SPEED
VOLUME

RSHAFT

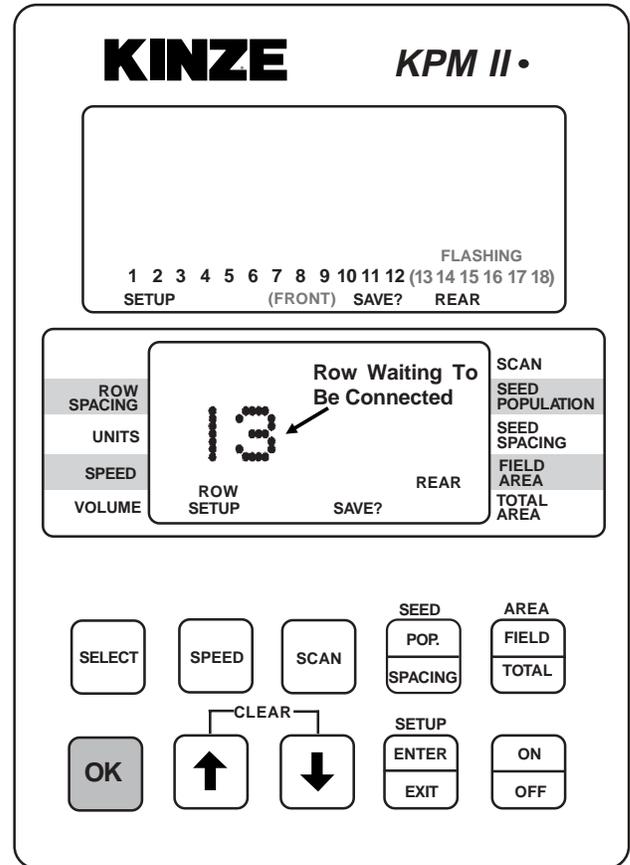
SCAN
SEED POPULATION
SEED SPACING
FIELD AREA
TOTAL AREA

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

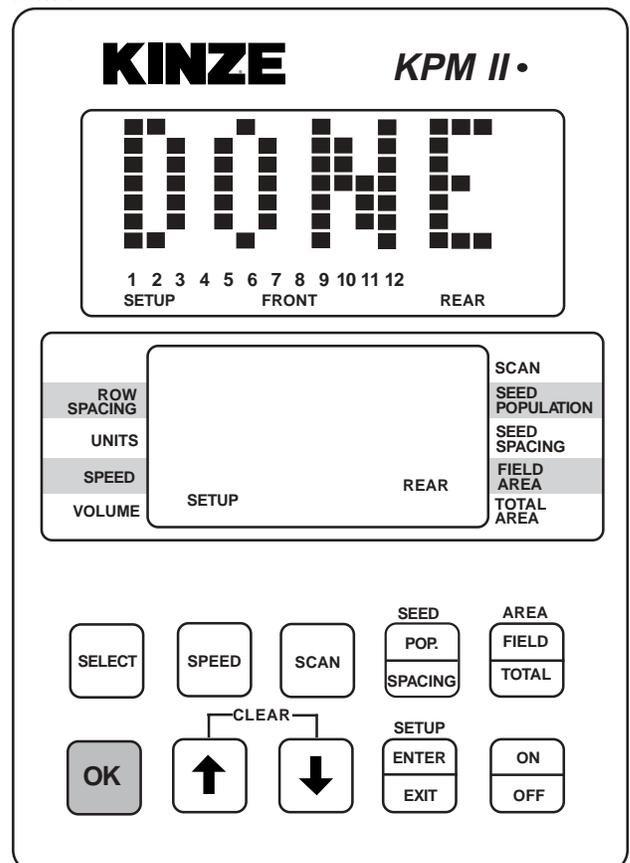
CLEAR

**STEP 7** When all the seed tubes for the current section (Rear/Front or Left/Right) are installed, check to be sure the monitor 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)

01139914

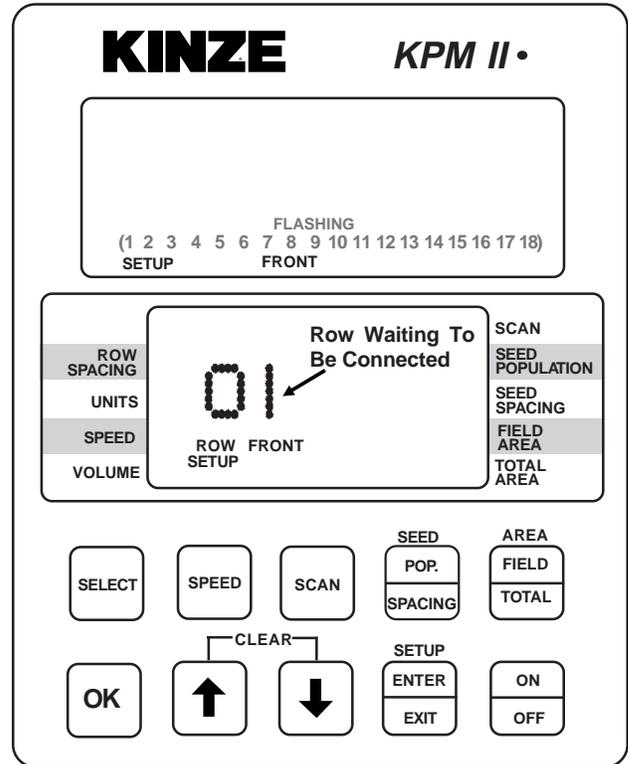


01139913

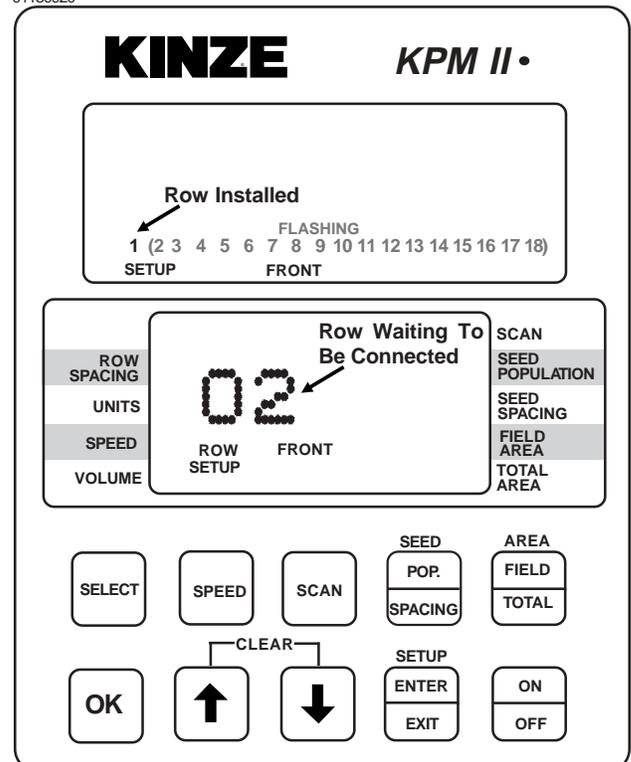


**STEP 8** Follow STEPS 5 through 7 to install the second section. If no seed tubes are installed on the second section, press and hold the OK key. The word "DONE" will appear on upper display. The alarm will sound four short beeps followed by one long beep and the SAVE? icon turns off. The monitor has exited the setup mode. When you release the OK key the upper display will scroll "WAITING CALIBRATION". The lower display will show "GNDSPD" and the audible alarm will sound continually until the distance sensor is connected. See STEP 9.

01139912



01139920



## STEP 8 (Continued)

01139910

**KINZE**
**KPM II •**

**Rows Installed**

1 2 3 4 5 6 7 8 9 10 11 (12 13 14 15 16 17 18)

FLASHING  
SETUP FRONT SAVE?

ROW SPACING
UNITS
SPEED
VOLUME

**Row Waiting To Be Connected**

ROW SETUP FRONT SAVE?

SCAN
SEED POPULATION
SEED SPACING
FIELD AREA
TOTAL AREA

SELECT

SPEED

SCAN

SEED  
POP.  
SPACING

AREA  
FIELD  
TOTAL

OK

↑

↓

SETUP  
ENTER  
EXIT

ON  
OFF

01139910a

**KINZE**
**KPM II •**

**DONE**

1 2 3 4 5 6 7 8 9 10 11 (12 13 14 15 16 17 18)

FLASHING  
SETUP FRONT

ROW SPACING
UNITS
SPEED
VOLUME

FRONT  
SETUP

SCAN
SEED POPULATION
SEED SPACING
FIELD AREA
TOTAL AREA

SELECT

SPEED

SCAN

SEED  
POP.  
SPACING

AREA  
FIELD  
TOTAL

OK

↑

↓

SETUP  
ENTER  
EXIT

ON  
OFF

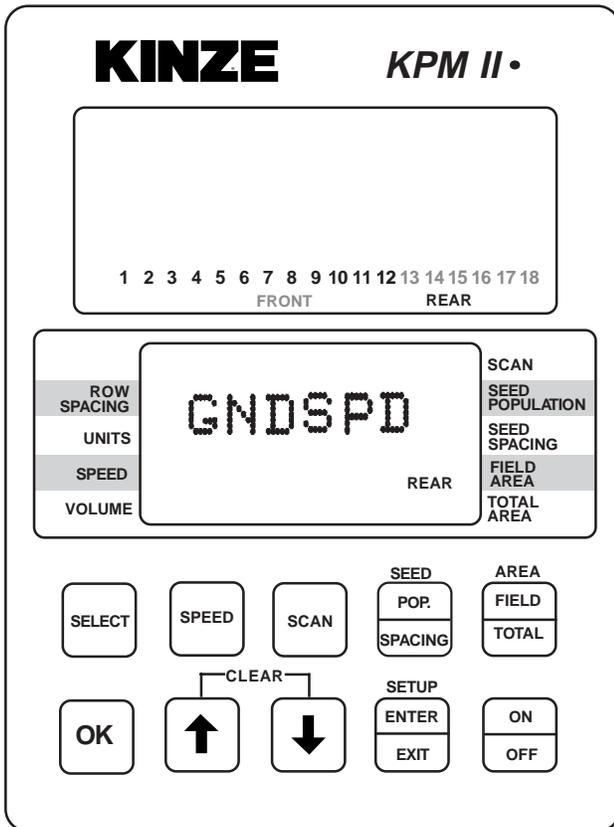
**STEP 9** With the lower display showing “GNDSPD”, connect the distance sensor. The monitor will display “PICKUP” if a magnetic distance sensor is connected or “RADAR” if a radar distance sensor is installed. Only one distance sensor can be connected at a time.

**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.

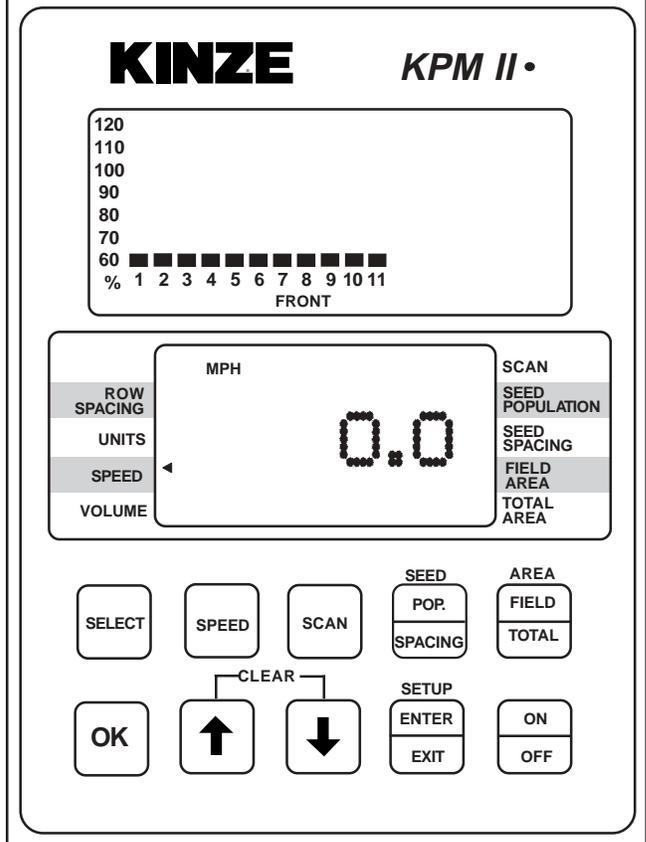
**NOTE:** To reprogram the system to monitor more or less rows (up to the maximum of 18 per section, 36 total), all sensors must be unplugged, followed by the complete setup procedure.

**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.

10250115



01139909



**ROW-BY-ROW ALARM LEVEL SETTING**  
*(Requires Version V0.06 or higher Software -  
 KPM II 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.

**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.

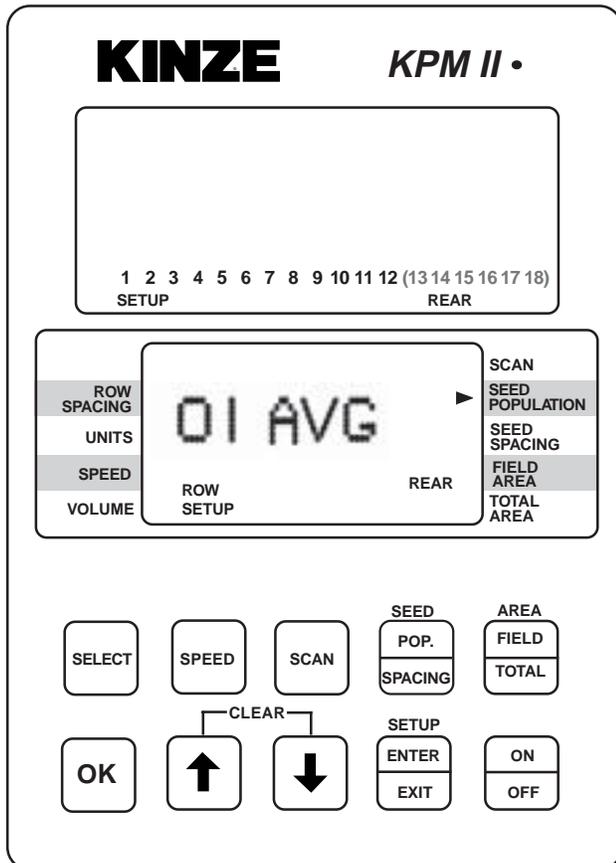
**NOTE: The programming mode may be exited at any time by pressing the SETUP key. Pressing this key will return the monitor to its normal operation. All items changed and saved will come into effect immediately. Any items changed, but not saved will revert to the original programmed value.**

**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.**

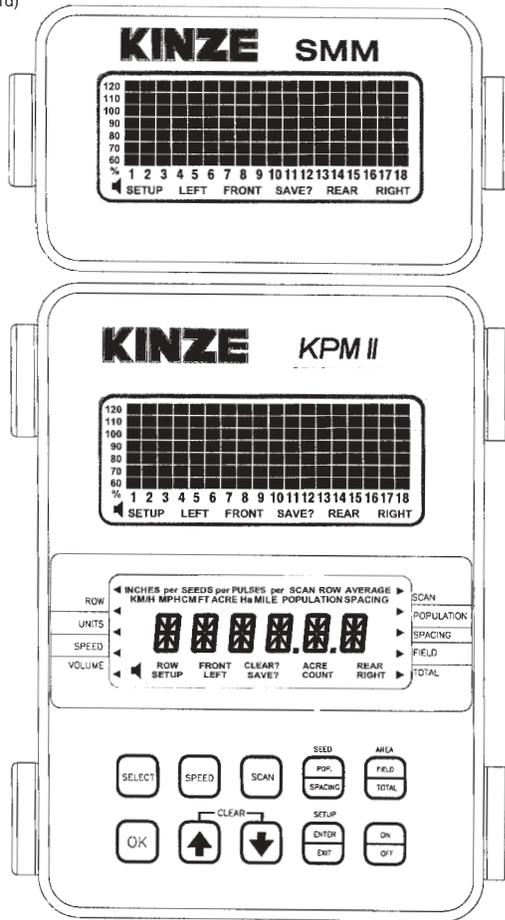
**See "KPM I/KPM II/KPM II Stack-Mode Electronic Seed Monitor Troubleshooting" in the Maintenance Section.**

04130116



## KPM II STACK-MODE ELECTRONIC SEED MONITOR

(MTR41d)



**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 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.

Monitor Key Functions .....	6-36
Upper LCD Functions .....	6-37
Lower LCD Functions .....	6-38
<b>Programming</b>	
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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

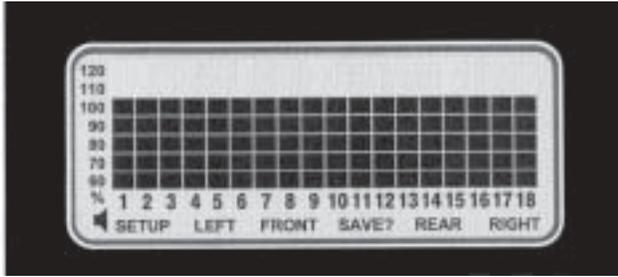
- Enters and exits the programming mode.

### 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 front/rear 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 front/rear 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.

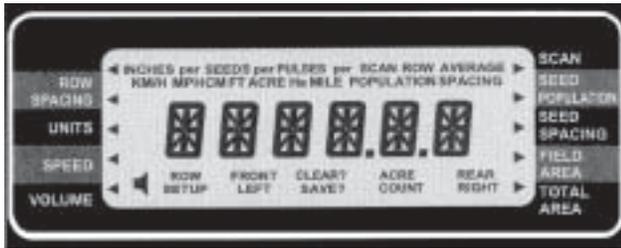
**STEP 2** Press SELECT key again to activate both sections.

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 least significant digit of the displayed value 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 front/rear 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.

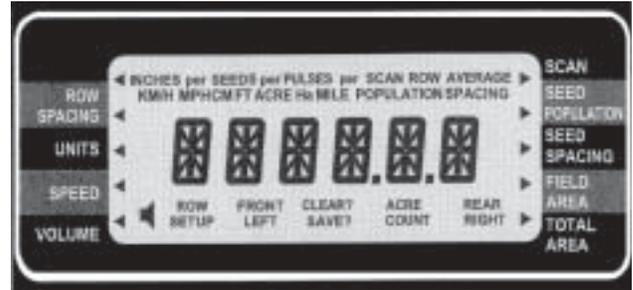


(MTR28c)

**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

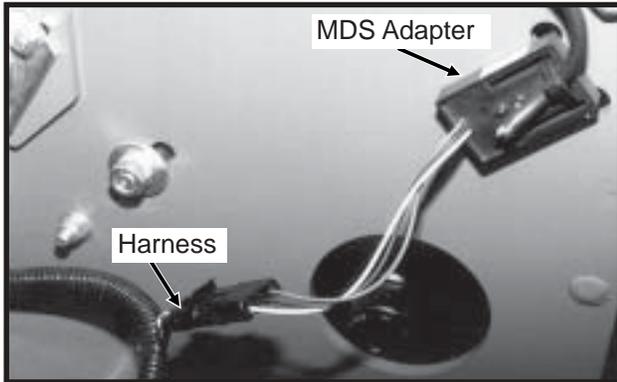
CONNECTING SEED TUBES, RADAR/MAGNETIC DISTANCE SENSORS, SMM CONSOLE AND/OR SHAFT ROTATION SENSORS

**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.

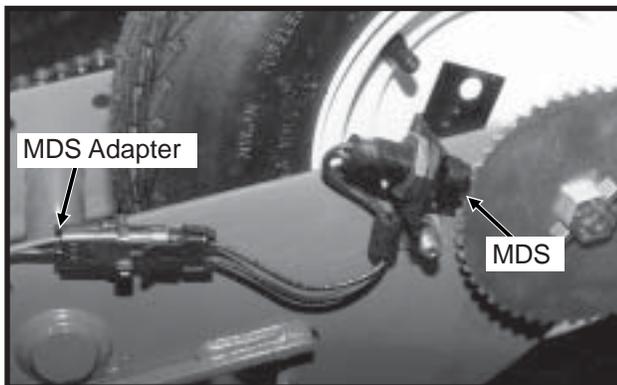
**NOTE:** If the monitor detects a radar sensor but no seed tubes at power up, it will automatically go into AREA COUNT mode. See "Area Counter/Speedometer Mode".

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

01189909



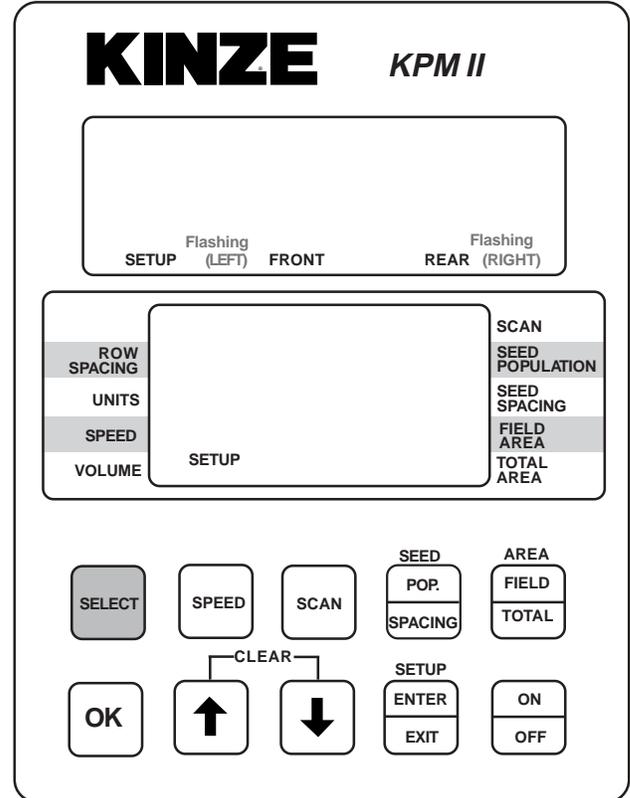
01189910



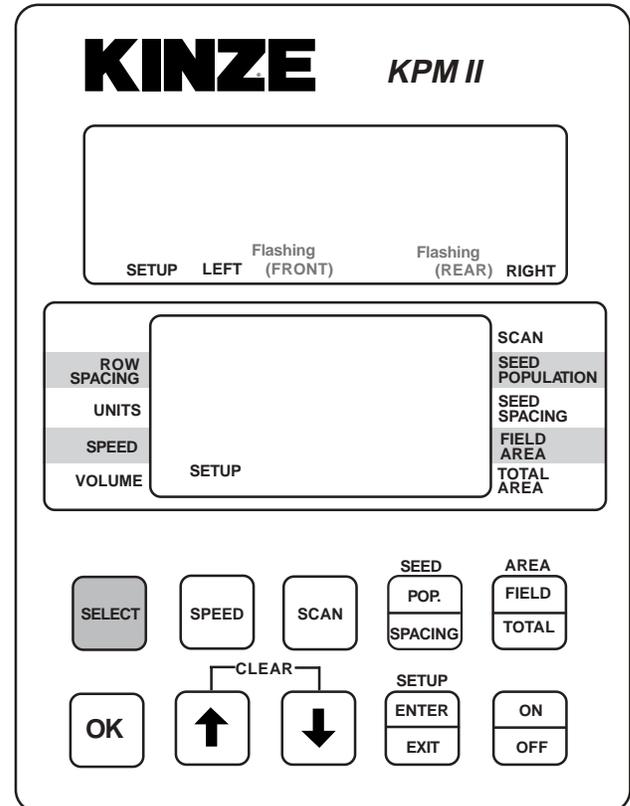
**STEP 2** Press the ON key. The monitor automatically enters the setup procedure. Monitor will scroll "NO SENSOR" on top LCD of KPM II Stack-Mode console.

**STEP 3** The monitor automatically defaults to front/rear. 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.

12060201



12060202



**NOTE:** Model 3000 planters select the rear configuration only.

# MACHINE OPERATION

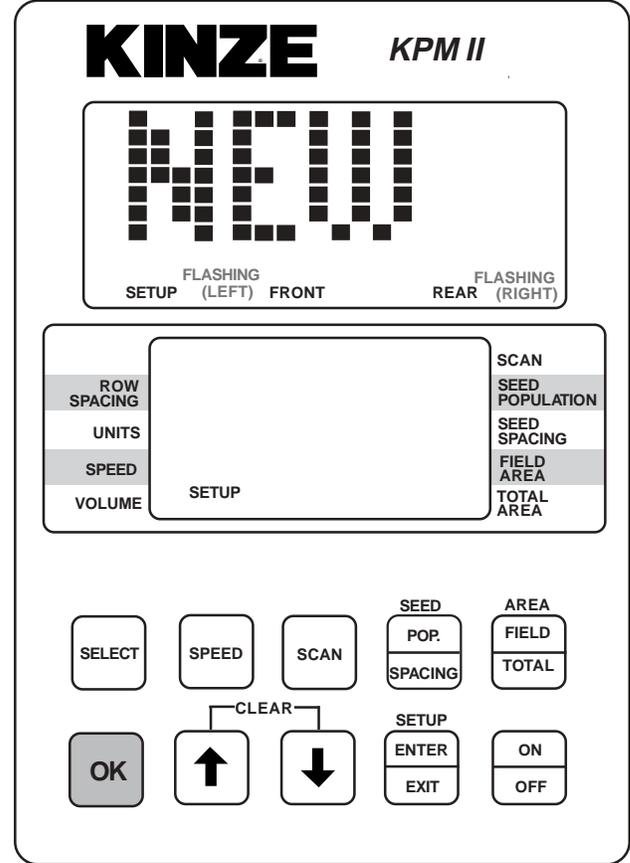
# KPM II STACK-MODE

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

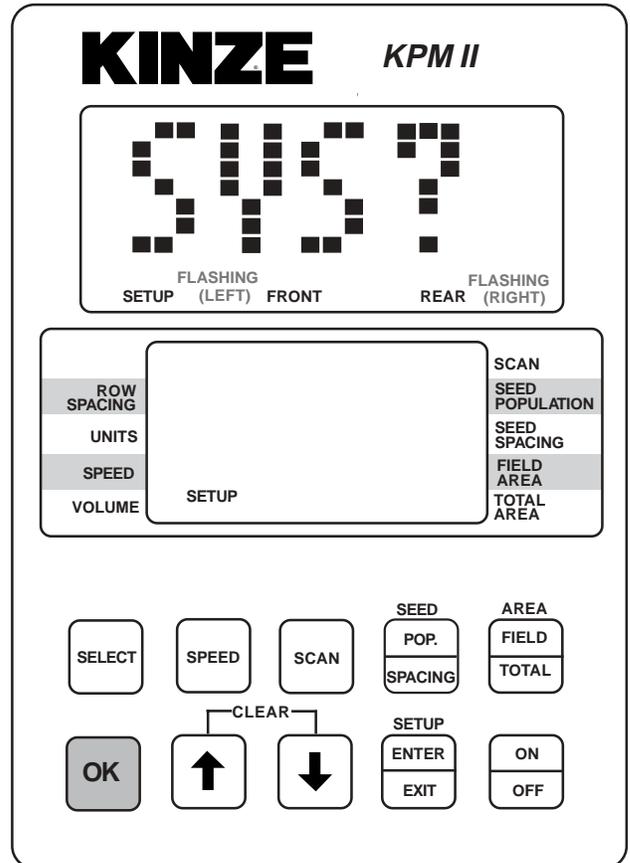
The alarm will sound four short beeps followed by one long beep. At this point your selection has been saved and row numbers will appear flashing on the upper display.

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

12060203



12020604



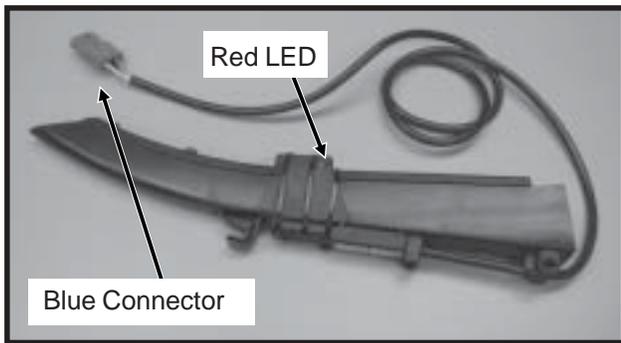
# MACHINE OPERATION

# KPM II STACK-MODE

**STEP 5** Determine which row you want as number one and plug the seed tube w/sensor into the harness.

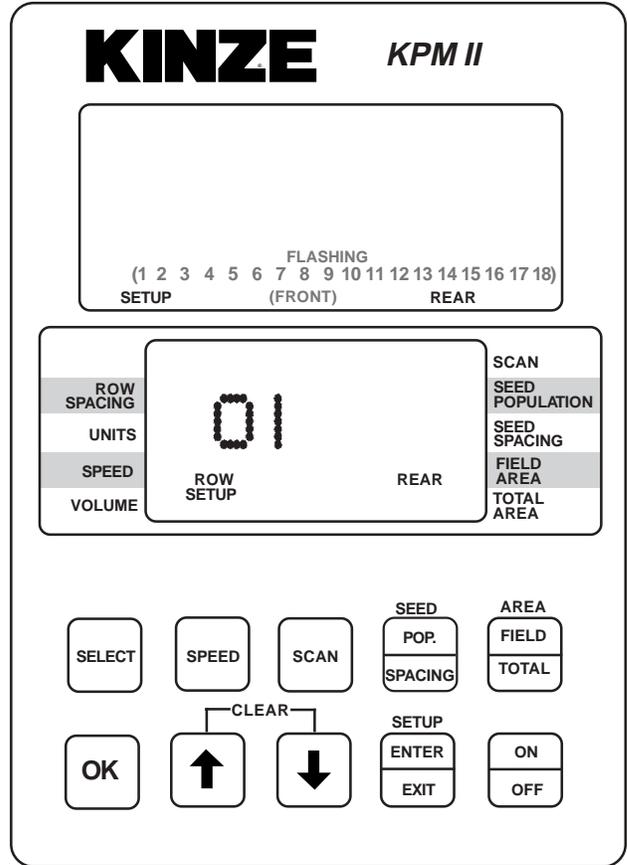
Continue plugging in sensors along with shaft rotation sensors if so equipped. Row 1 first, row 2 second and so on up to 18 rows. When a sensor is plugged in, the corresponding row number on the upper LCD display will stay solid, the monitor will chirp twice and a red LED (Light Emitting Diode) on the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

D120602101

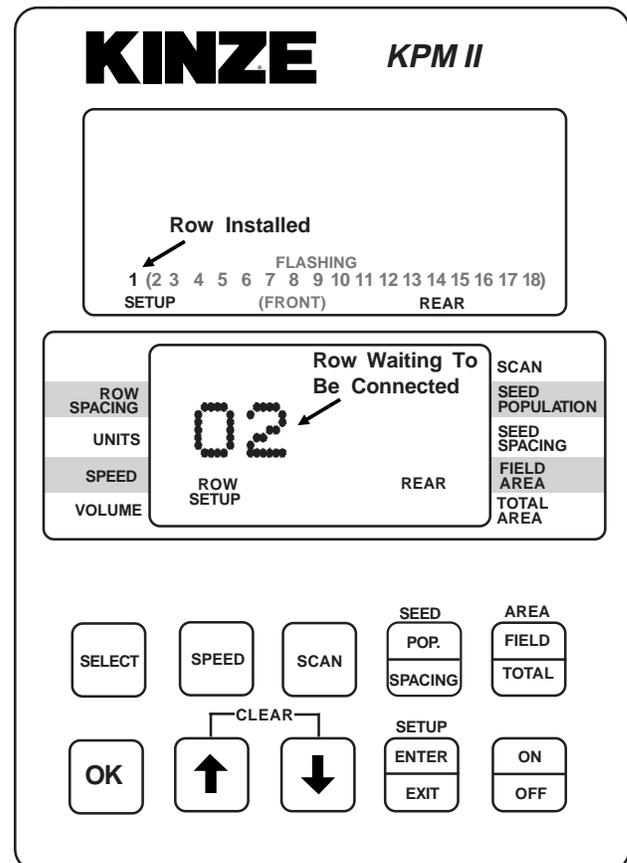


**NOTE:** Illustrated using rear/front configuration. The KPM II Stack-Mode console shows LEFT in the left/right configuration, REAR in the front/rear configuration and FRONT LEFT/REAR LEFT in the four sections configuration.

12060205



12020206

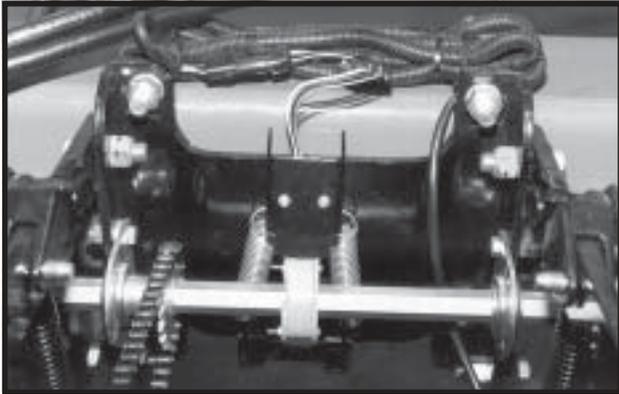


# MACHINE OPERATION

# KPM II STACK-MODE

**STEP 6** If the monitor system includes shaft rotation sensors, these can be installed at any time as the seed tubes are connected. The first shaft rotation sensor installed will be assigned to the rows on the L.H. half of the planter and the second shaft rotation sensor connected will be assigned to the rows on the R.H. half of the planter.

01189906



“LSHAFT” will display on the lower LCD when the first shaft rotation sensor is installed. “RSHAFT” 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 front/rear configuration and FRONT LEFT/REAR LEFT in the four sections configuration.

12060207

**KINZE** *KPM II*

FLASHING

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

SETUP (FRONT) REAR

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

SELECT

SPEED

SCAN

SEED  
POP.  
SPACING

AREA  
FIELD  
TOTAL

OK

↑

↓

SETUP  
ENTER  
EXIT

ON  
OFF

12060208

**KINZE** *KPM II*

FLASHING

1 2 3 4 5 6 7 8 9 10 11 12 (13 14 15 16 17 18)

SETUP (FRONT) REAR

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

SELECT

SPEED

SCAN

SEED  
POP.  
SPACING

AREA  
FIELD  
TOTAL

OK

↑

↓

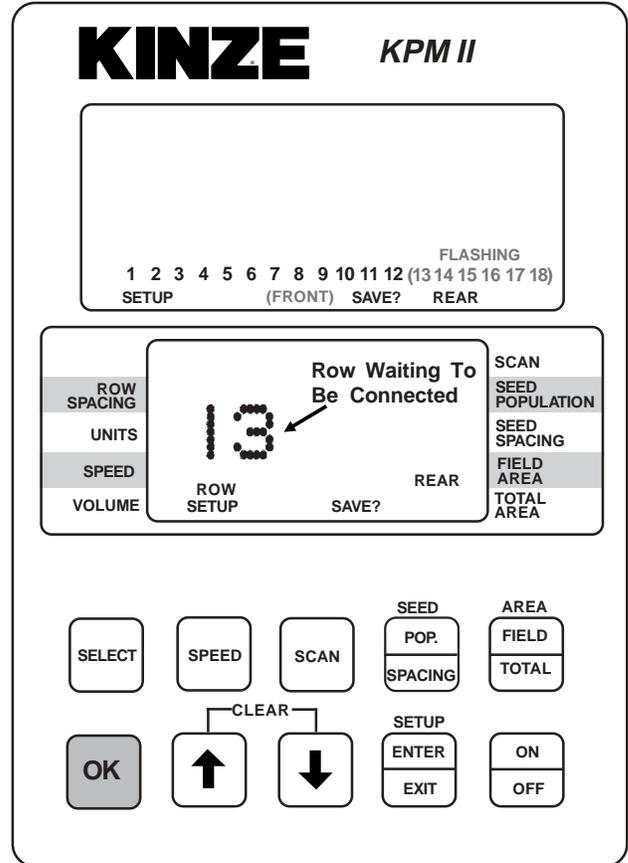
SETUP  
ENTER  
EXIT

ON  
OFF

**STEP 7** 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 front/rear configuration and FRONT LEFT/REAR LEFT in the four sections configuration.

12060209



## STEP 7 (Continued)

12060210

KINZE
KPM II

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

REAR
TOTAL AREA

SELECT

SPEED

SCAN

SEED POP. SPACING

AREA FIELD TOTAL

OK

↑

↓

SETUP ENTER EXIT

ON OFF

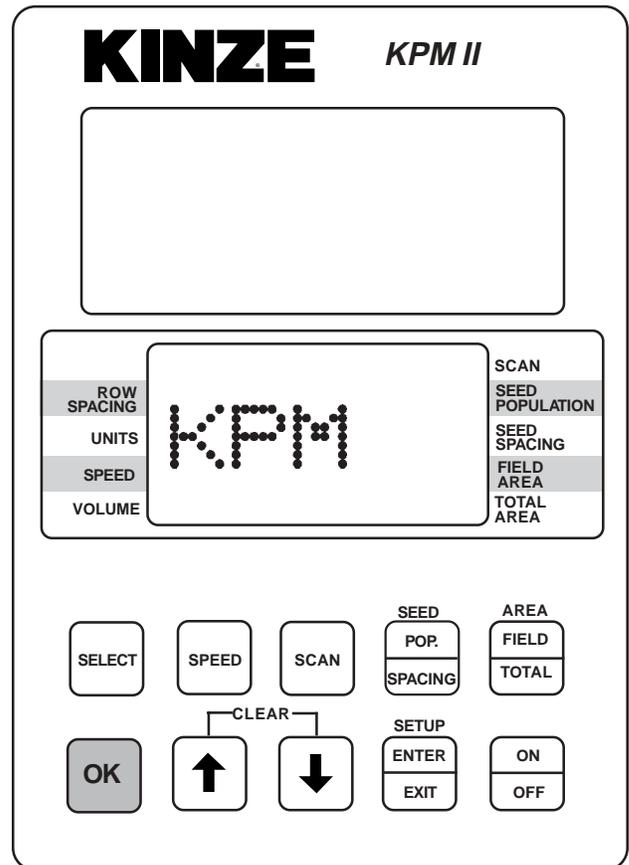
# MACHINE OPERATION

# KPM II STACK-MODE

**STEP 8** (If Applicable) Connect SMM console into junction Y-harness which was installed between KPM II Stack-Mode console and the primary harness. The SMM console will show a backlighted screen and the KPM II Stack-Mode console will show KPM on the lower LCD.

**NOTE:** The SMM console shows nothing except the backlighted screen until the entire system is saved.

12060211

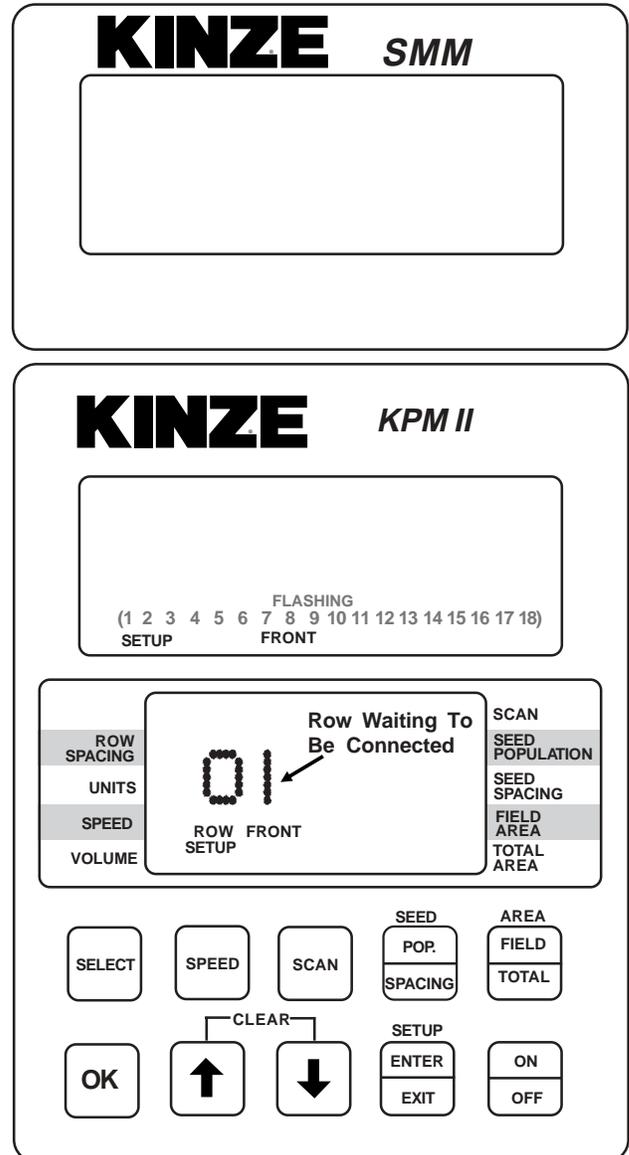


12060212

**STEP 9** Follow STEPS 5, 6 and 8 to install the second section. If no seed tubes are installed on the second section, press and hold the OK key. The word "DONE" will appear on upper display. The alarm will sound four short beeps followed by one long beep and the SAVE? icon turns off. The monitor has exited the setup mode. When you release the OK key the upper display will scroll "WAITING CALIBRATION". The lower display will show "GNDSPD" and the audible alarm will sound continually until the distance sensor is connected. See STEP 10.

**NOTE:** The SMM console shows nothing 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 front/rear 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.



# MACHINE OPERATION

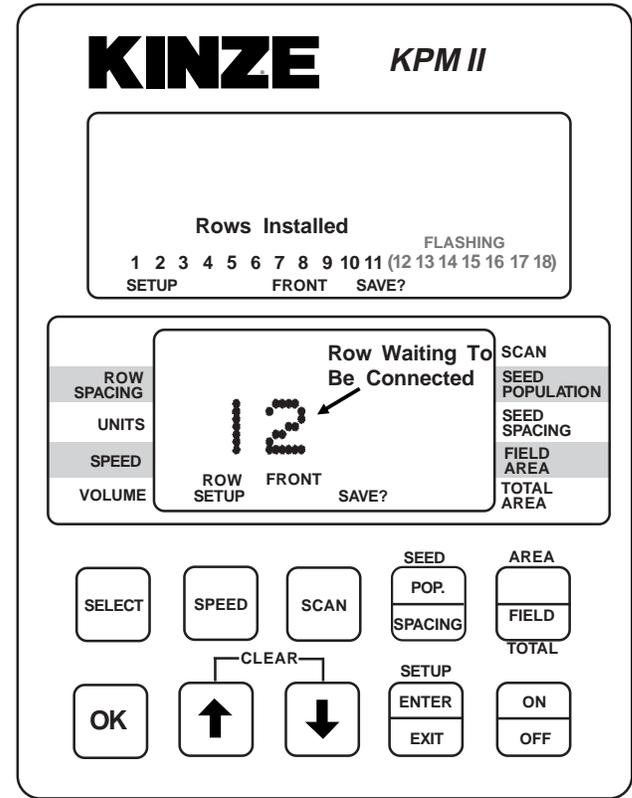
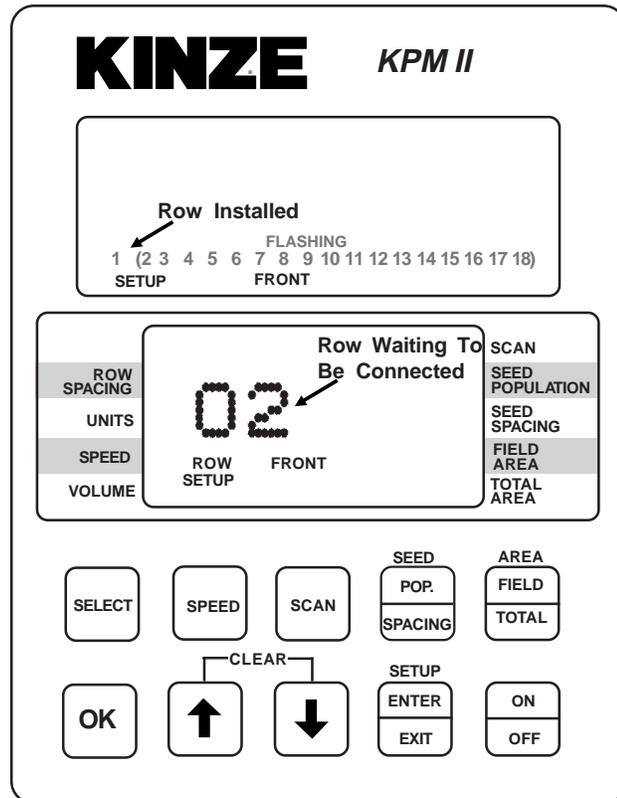
# KPM II STACK-MODE

## STEP 9 (Continued)

12060213



12060214



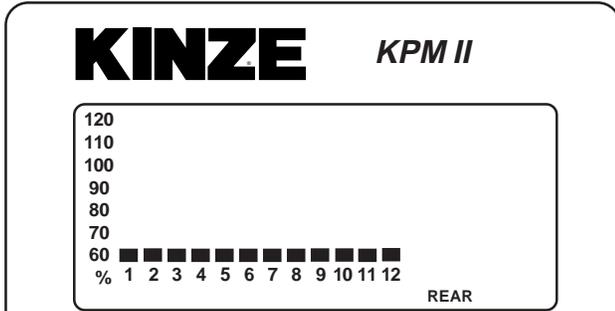
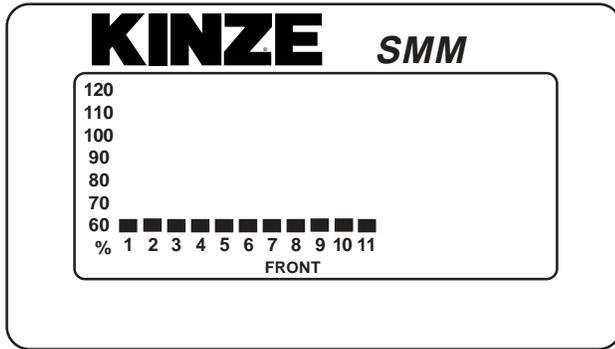


# MACHINE OPERATION

# KPM II STACK-MODE

## STEP 10 (Continued)

12060216



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

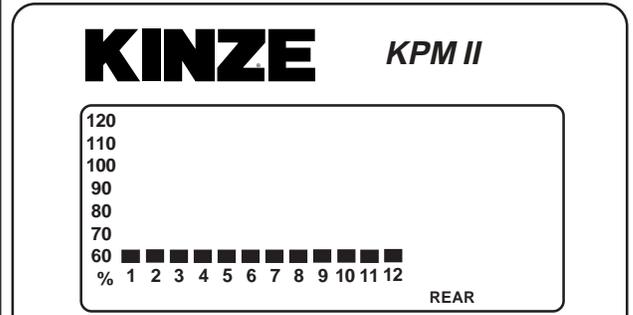
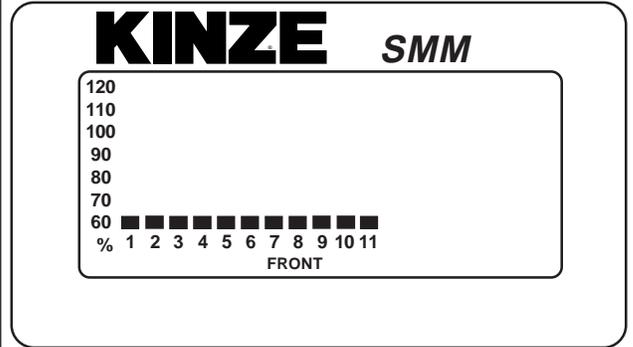
  

SELECT	SPEED	SCAN	SEED POP. SPACING	AREA FIELD TOTAL
OK	CLEAR		SETUP ENTER EXIT	ON OFF
	↑	↓		

**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	MPH	SCAN
UNITS		SEED POPULATION
SPEED		SEED SPACING
VOLUME		FIELD AREA
		TOTAL AREA

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

**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.

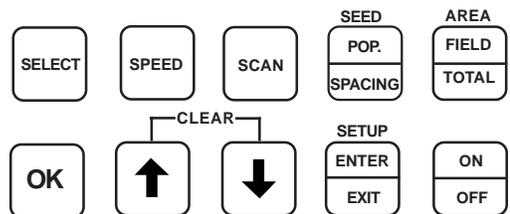
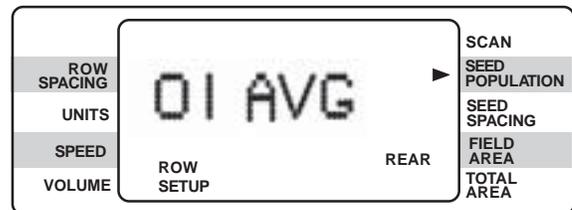
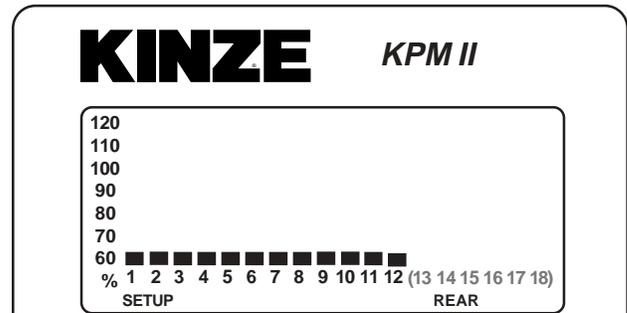
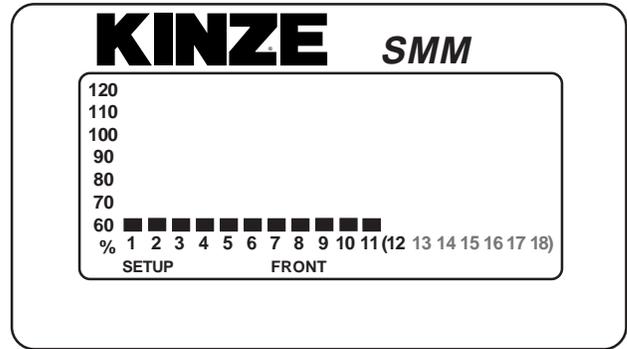
**NOTE:** Illustrated using rear/front configuration. The KPM II Stack-Mode console shows LEFT in the left/right configuration, REAR in the front/rear configuration and FRONT LEFT/REAR LEFT in the four sections configuration. The SMM console shows RIGHT in the left/right configuration, FRONT in the front/rear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

**STEP 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.

12060218



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

# MACHINE OPERATION

## DOUBLE DISC FERTILIZER OPENER

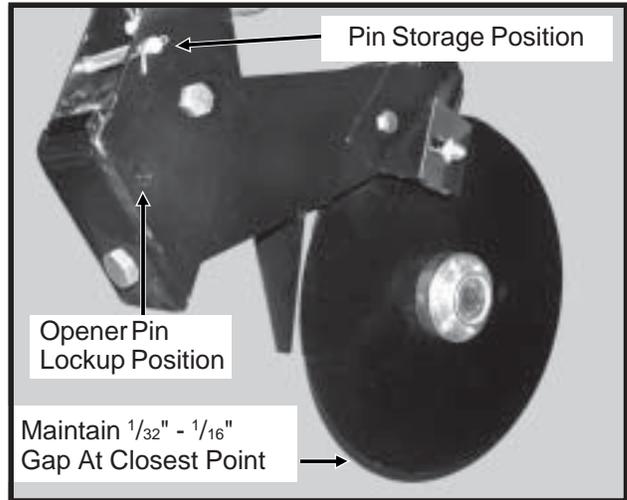
The double disc fertilizer openers should be positioned during assembly **to place fertilizer no closer than 2" to either side of the row**. If the planter frame is level and at proper 20" operating height, fertilizer depth will be approximately 4". Soil conditions can affect depth slightly.

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  $^{15}/_{16}$ " 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 hardground.

**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  $^{1}/_{32}$ " to  $^{1}/_{16}$ " 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. **Never locate the opener to place fertilizer closer than 2".**

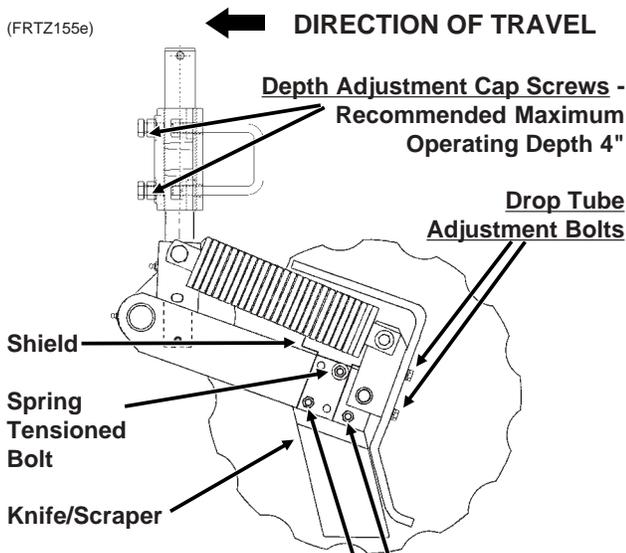
**Adjust blade depth** on each row using the cap screws and jam nuts located on the opener pivot shaft. The blade can be adjusted to allow a maximum 4" operating depth. Be sure the spring pin holes in the pivot post remain parallel with the opener mounting plate. Check fertilizer hose clearance after adjusting opener depth by swiveling the opener left and right. Torque cap screws and jam nuts to 57 ft. lbs.

The opener spring is factory preset at 350 lbs. and is not adjustable.



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

(FRTZ155e)



**Knife/Scraper Leading Edge Adjustment Bolts** (If not equipped with a shield and spring tensioned bolt, the third knife/scraper attachment bolt is also an adjustment bolt.)

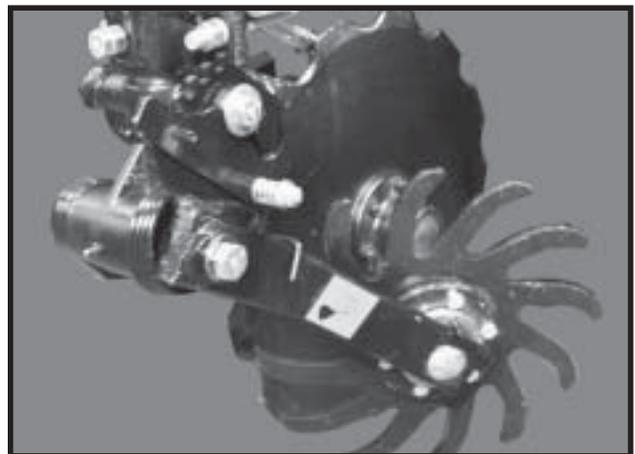
**Adjust knife/scraper leading edge** contact on each row so blade will turn by hand with slight resistance, but will not coast or freewheel. In dry loose soil, knife/scraper adjustment is critical. If adjustment is not maintained, soil or residue may wedge causing the blade to push. If the knife/scraper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

**Adjust drop tube** on each row using the slotted mounting holes in the drop tube. Adjust drop tube so it is protected by the knife/scraper from soil contact and wear. The liquid drop tube should be adjusted as far from the opener blade as possible while keeping it behind the knife/scraper. This adjustment prevents liquid fertilizer from contacting the opener blade.

## RESIDUE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER

(For Use With STYLE A Notched Single Disc Fertilizer Opener)

D05219901



The residue wheel attachment for the notched single disc fertilizer opener is designed for applications where row unit mounted residue wheel attachments cannot be installed. The residue wheel is attached to the notched single disc fertilizer opener using 5/8" x 3 1/2" and 1/2" x 1 3/4" hardware.

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

# MACHINE OPERATION

## NOTCHED SINGLE DISC FERTILIZER OPENER - STYLE B

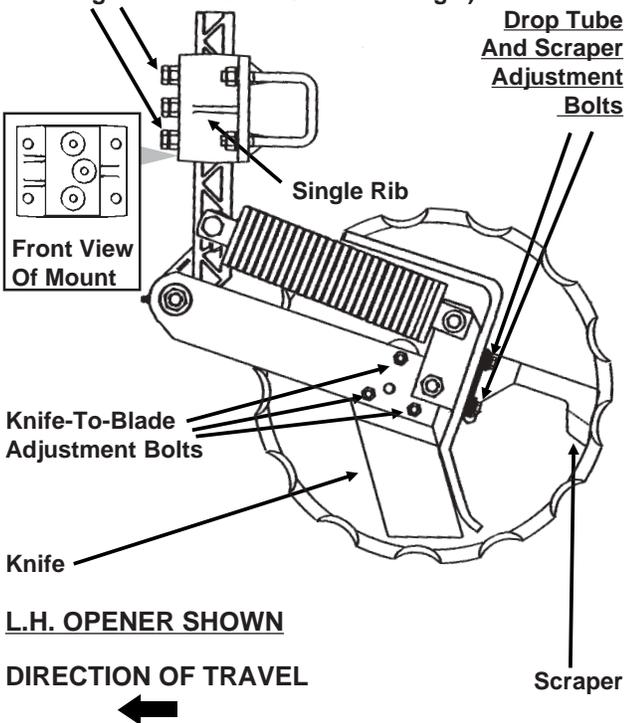
The notched single disc fertilizer opener is designed for use in minimum and no till planting conditions. Placement of fertilizer with the 16 3/4" diameter notched single disc fertilizer opener is recommended at 2 1/2" - 3" from the row. The opener is designed to hold the blade at a set-angle so the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



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

(FRTZ210g/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.**

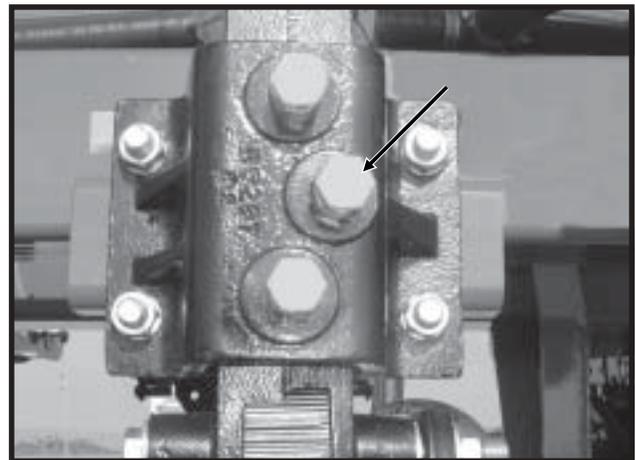
Using the slotted mounting holes in the drop tube mount, **adjust fertilizer drop tube** behind the knife so it is protected from soil contact and wear. The liquid drop tube should be adjusted 1/4"-3/8" from the opener blade while keeping it behind the knife. **Adjust scraper** to just touch the opener 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 runs through the ground 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.**

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

D070103100



**NOTE: Middle cap screw must be tightened prior to tightening depth adjustment cap screws.**

# MACHINE OPERATION

## RESIDUE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER

(For Use With STYLE B Notched Single Disc Fertilizer Opener)

D052201104



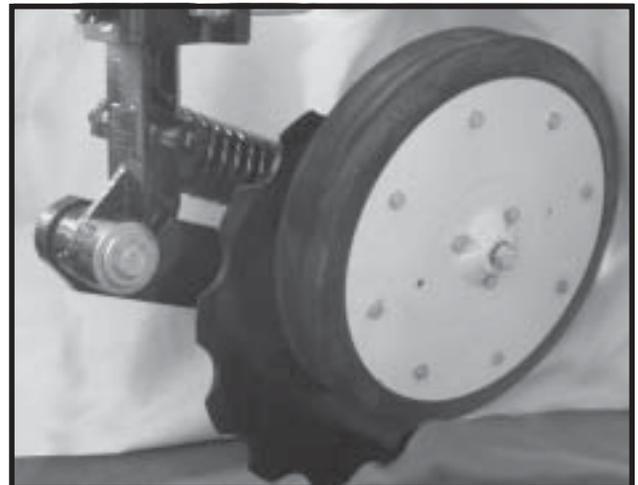
The residue wheel attachment for the notched single disc fertilizer opener is designed for applications where row unit mounted residue wheel attachments cannot be installed. The residue wheel is attached to the notched single disc fertilizer opener using  $\frac{5}{8}$ " x  $7\frac{1}{2}$ " and  $\frac{1}{2}$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

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

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

(For Use With STYLE B Notched Single Disc Fertilizer Opener)

D061101202a



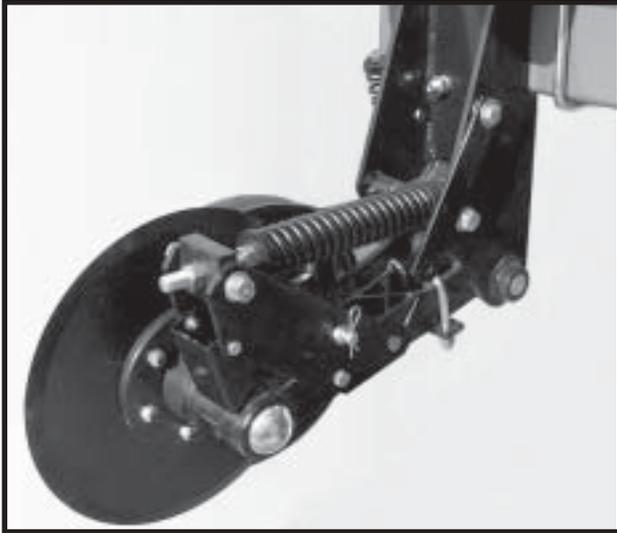
The depth/gauge wheel attachment for the notched single disc fertilizer opener is designed for use in situations where additional gauging is required to maintain desired fertilizer opener depth. The depth/gauge wheel is attached to the notched single disc fertilizer opener using a mounting block fastened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

Depth adjustment is made by using the 5 adjustment holes in the depth/gauge wheel mounting block. Moving the depth/gauge wheel increases/decreases depth in  $\frac{1}{2}$ " increments in relation to the blade depth setting made at the vertical mounting post.

# MACHINE OPERATION

## HD SINGLE DISC FERTILIZER OPENER

D062601103



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

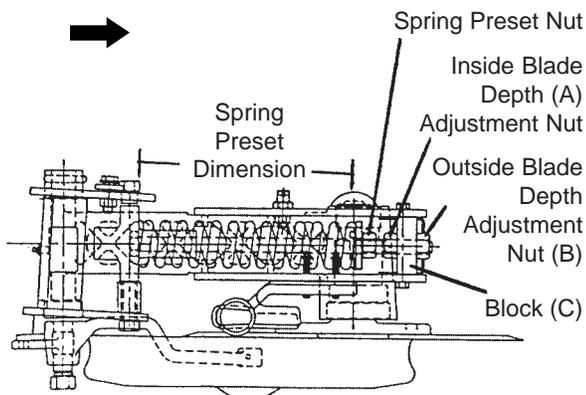
If planter frame is level and at 20" operating height, maximum blade depth for placement of fertilizer is approximately 5". Soil conditions can affect depth slightly.

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

L0114(PLTR3)

(Overhead View)

### DIRECTION OF TRAVEL



R.H. Configuration Shown

Fertilizer opener down pressure can be adjusted from 250 lbs. to 640 lbs. **To make down pressure adjustments**, raise planter to remove weight from the fertilizer opener and turn spring preset nut clockwise to increase down pressure and counterclockwise to decrease down pressure. Adjust all rows to a similar setting. Minimal spring pressure for acceptable operation is recommended. See chart for spring length setting specifications.

SPRING PRESET DIMENSION	DOWN PRESSURE (LBS.)
11"	250
10 3/4"	320
<b>*10 1/2"</b>	<b>370</b>
10 1/4"	450
10"	520
9 3/4"	580
9 1/2"	640

\* Suggested initial setting.

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

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



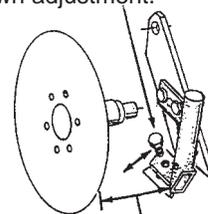
**WARNING: Always install all lockup devices before working under the machine.**

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

**The spring loaded dry fertilizer drop tube/scrapper should be adjusted** periodically to maintain 1/8" gap between drop tube and opener blade. If this dimension is not maintained the fertilizer may not drop into the proper location.

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

FOC016(PLTR4)

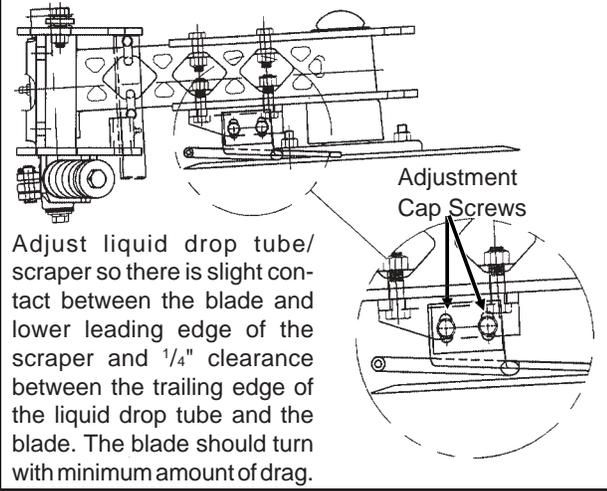


Adjust scraper to maintain 1/8" gap between drop tube and opener blade. Distance is exaggerated in above illustration.

# MACHINE OPERATION

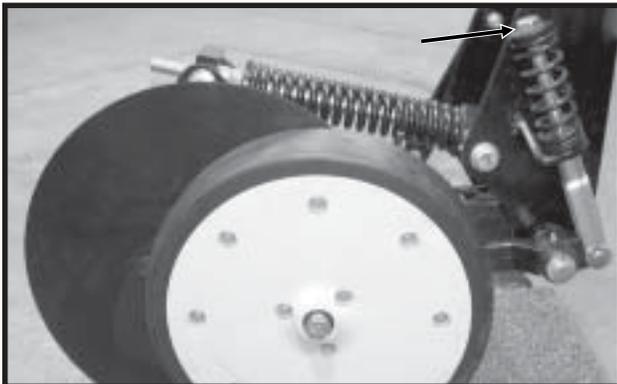
**Maintain liquid fertilizer drop tube/scrapper adjustment as shown below.**

(INS16a)



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

D121202101



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

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

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

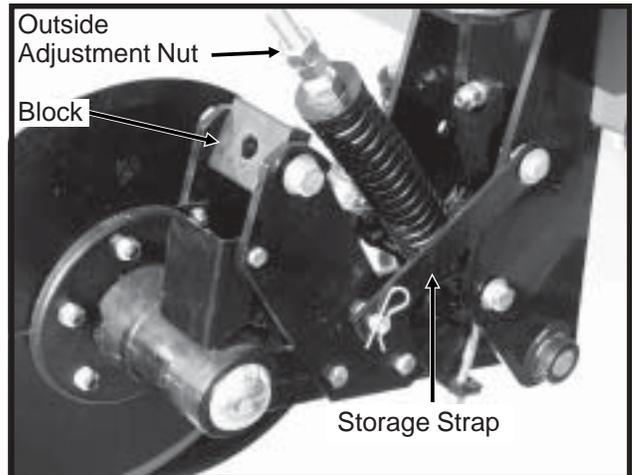
**STEP 1** With the planter in the planting position, remove outside blade depth adjustment nut. ("B" in illustration on previous page.)

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

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

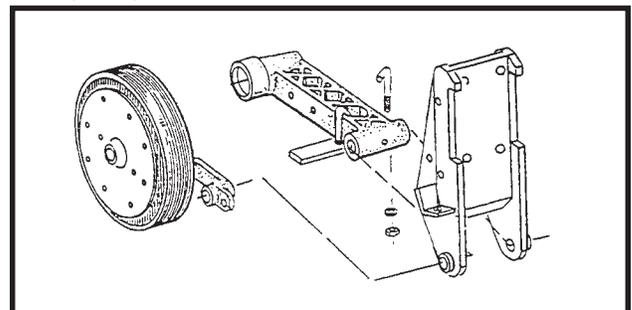
**STEP 4** Re-install depth adjustment nut and tighten.

D062601102



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

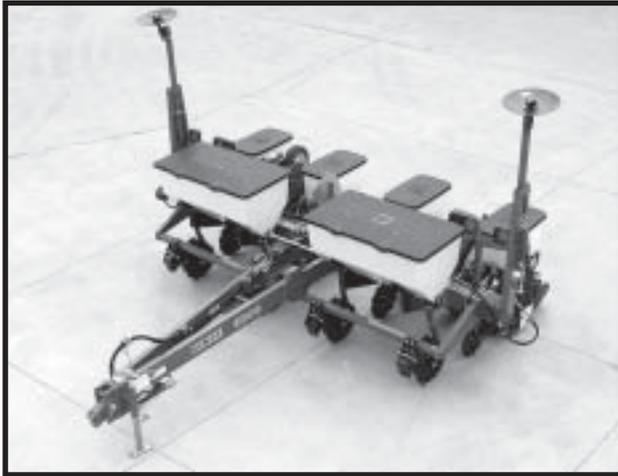
FOC016(PLTR5b)



# MACHINE OPERATION

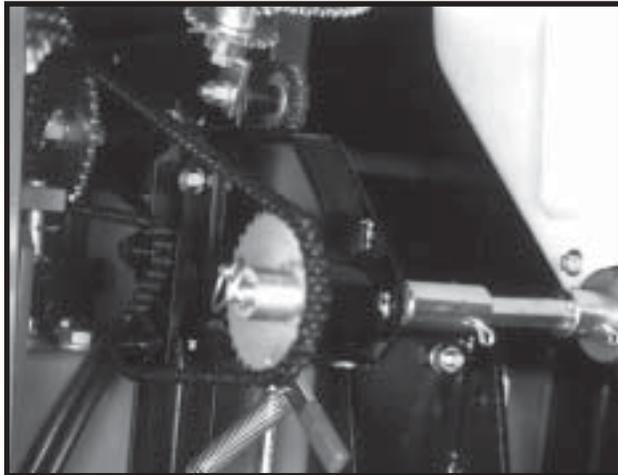
## DRY FERTILIZER ATTACHMENT

D061199214a



The rate of fertilizer application is determined by the drive/driven sprocket combination on the fertilizer drive and by the auger position in the hopper.

61111-7



(PLTR7)



Shown With Augers Positioned For Low Rate Delivery

(PLTR6)



Shown With Augers Positioned For High Rate Delivery

Remove 1/4" stainless steel cap screws holding augers in place on shaft and reposition augers to change delivery rate.

See Dry Fertilizer Application Rate Chart at the end of this section. Uneven delivery of fertilizer will occur if the high rate auger position is used at too low a rate setting.

A fertilizer transmission is located on the right side of the planter directly ahead of the row unit transmission. This fertilizer transmission is designed to allow simple, rapid changes in sprockets to obtain the desired fertilizer application rates. By removing the pins on the hexagon shafts, sprockets can be interchanged with those on the sprocket storage rod bolted to the transmission plate. Chain tension is controlled by a spring loaded idler. This idler is adjusted with a ratchet arm located to the inside of the transmission. 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 ratchet arm. The fertilizer application charts found at the end of this section will aid you in selecting the correct sprocket combinations.

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

The dry fertilizer attachment meters granules by volume rather than weight. For this reason, and given the variances in brands and fertilizer analysis, the weight metered during actual application may vary considerably. Use the chart for reference only. It is suggested that a container be used to catch and measure application (as explained following the application chart) to obtain a closer estimate.

Since most fertilizers easily absorb moisture, it is important that fertilizer be kept dry during use and storage. In addition to waste, deposits of fertilizer left in the hopper can cause metal corrosion. Hoppers should be emptied at the end of each day's use.

**IMPORTANT: Certain analysis of fertilizer, if placed too close to the seed, may cause germination or seedling damage especially if used in amounts in excess of fertilizer manufacturer's recommendations. Check with your fertilizer dealer or manufacturer for the correct amount and placement.**



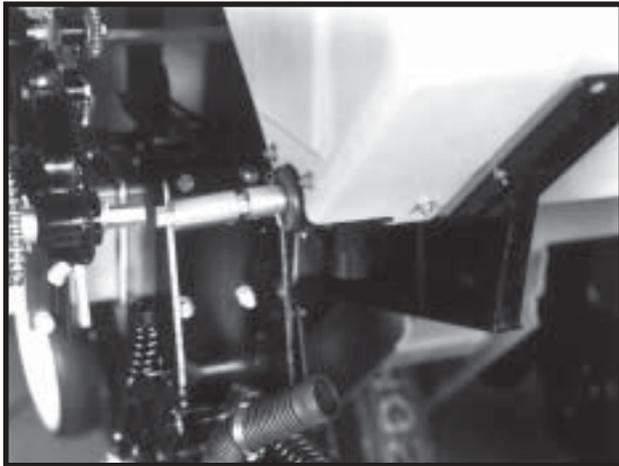
**WARNING: Agricultural chemicals can be dangerous if not selected and handled with care. Always read and follow directions supplied by the chemical manufacturer.**

# MACHINE OPERATION

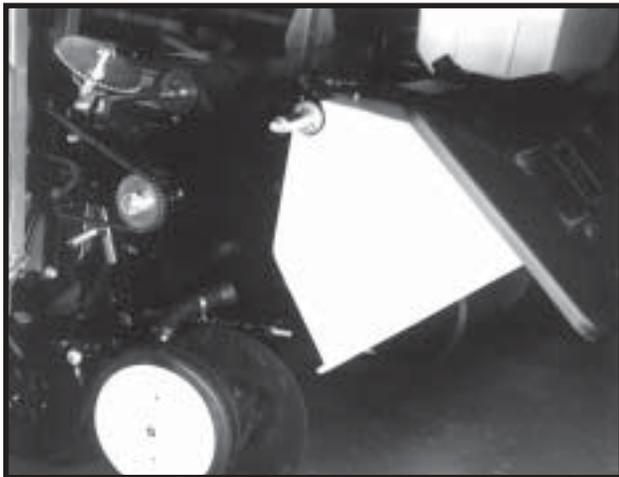
## CLEANING

The dry fertilizer hoppers are designed to tip forward for dumping and ease of cleaning. To dump hoppers, first disconnect the drive shaft from the transmission and/or adjacent hopper. **LOOSEN HOSE CLAMPS AND REMOVE HOSES FROM EACH HOPPER.** Remove the rear 1/2" x 1 1/4" cap screw from between each hopper saddle and hopper mount. Rotate each hopper lid to the back side of the hopper and carefully tip the hopper forward. After dumping contents, flush all loose fertilizer from the hoppers and hoses.

61111-45



61111-14

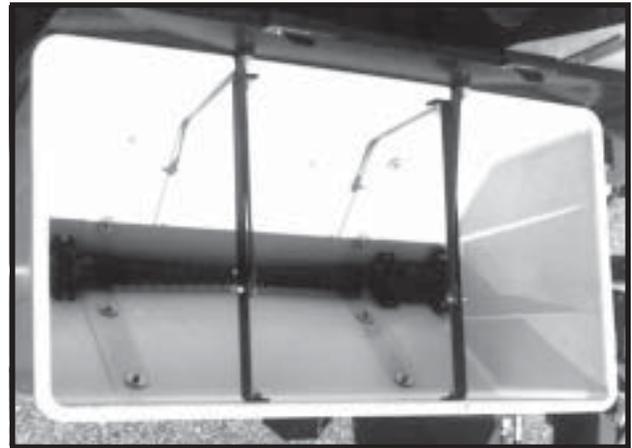


At the end of the planting season, or when the fertilizer attachment is not going to be used for a period of time, the hoppers should be disassembled, cleaned and metal surfaces coated with a rust preventative.

To disassemble auger assemblies, remove 1/4" cotter pin and bearing from one end of the shaft. Pull auger assembly from opposite end of hopper. Remove stainless steel cap screws from auger shaft and remove all auger components for cleaning. Coat all parts with rust preventative before reassembly. Reinstall auger halves in proper low rate or high rate position.

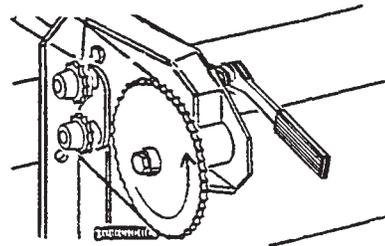
To reassemble, slide auger assembly through the outlet housing back into the hopper. Secure in place by reinstalling the bearing and cotter pin.

59542-38



Check auger installation by rotating the shaft in the direction shown below to see that the spirals on the auger move toward the ends of the hopper. If not, remove auger assembly, turn 180° and reinstall.

(PLTR8a)



DIRECTION OF ROTATION

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

Install auger baffles over the augers and secure in place with two hair pin clips in each hopper. Do not operate fertilizer attachment without auger baffles in place.

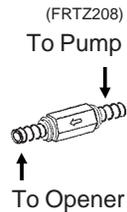
**IMPORTANT:** Frequent lubrication of auger bearings is critical to ensure that the augers will turn freely. Check lubrication section for frequency.

**NOTE:** Be sure the auger assembly is installed so the flighting on the augers move material to the outer openings in the hopper when the augers are rotated in the direction they will turn when the planter is in operation.

# MACHINE OPERATION

## LIQUID FERTILIZER ATTACHMENT

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

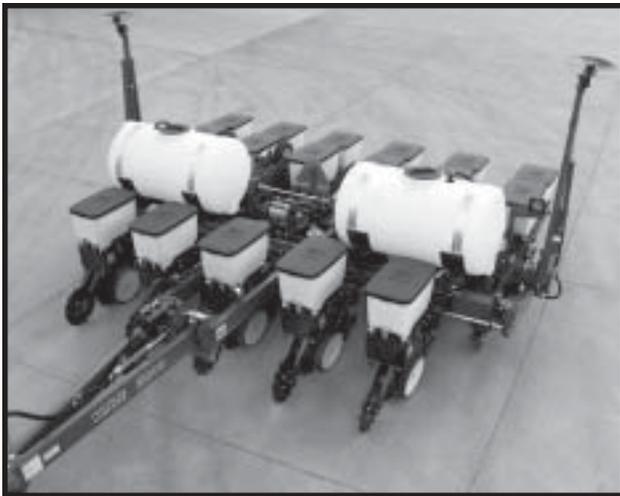


**WARNING:** Agricultural chemicals can be dangerous if not selected and handled with care. Always read and follow directions supplied by the chemical manufacturer.

Shut-off valves provided at various locations should be closed to shut off flow when the planter sits overnight or for extended periods of time. It is also important to close the tank valves whenever service on the pump or hoses is being performed. To prolong the life of the hoses in the squeeze pump, the discharge manifold must be repositioned to the rearward position when not in use to prevent hose distortion.

## OPTIONAL SQUEEZE PUMP

D070199105a

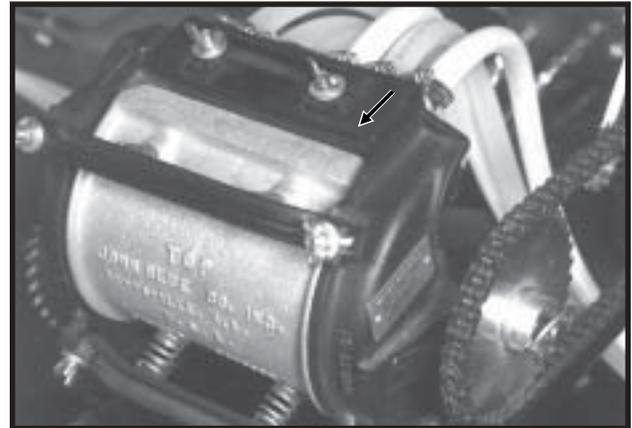


On machines equipped with the squeeze pump option, the rate of liquid fertilizer application is determined by the combination of sprockets on the squeeze pump drive and driven shafts. When changing sprocket combinations, make sure sprockets are in alignment, sprocket retaining collars are tight and chain tension is sufficiently restored.

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.

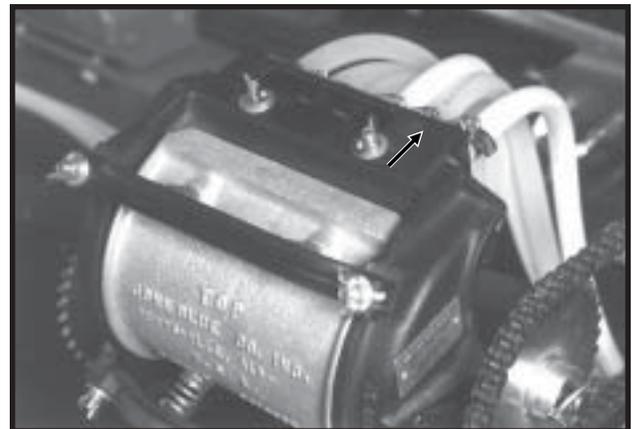
**IMPORTANT:** Certain analysis of fertilizer if placed too close to the seed may cause germination or seedling damage especially if used in amounts in excess of fertilizer manufacturer's recommendations. Check with your fertilizer dealer or manufacturer for the correct amount and placement.

81689-16



**Discharge Manifold Rearward**

81689-19



**Discharge Manifold Forward**

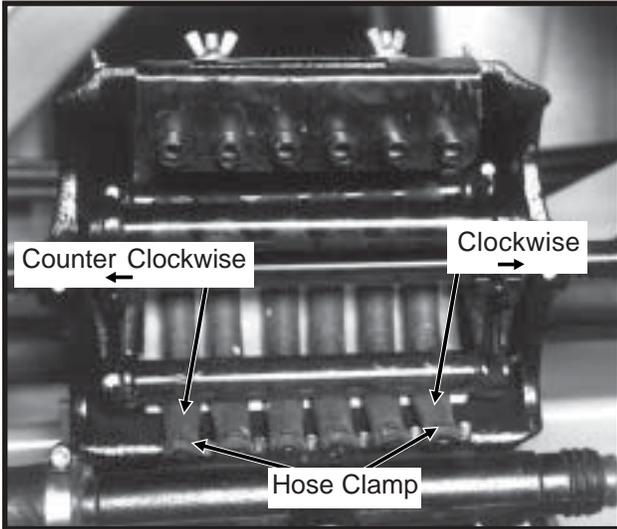
The discharge manifold must be in the forward position when the pump is in operation. To reposition the manifold, loosen the wing nuts and slide the manifold forward and sideways or rearward as required and retighten nuts.

# MACHINE OPERATION

**CAUTION: Avoid excessive pressure when using the quick fill attachment. The rubber plugs installed in the manifold may be forced out under pressure.**

If either of the end pump hoses should run off the back plate, loosen the hose clamps on the intake manifold and rotate the hose as follows.

61010-5



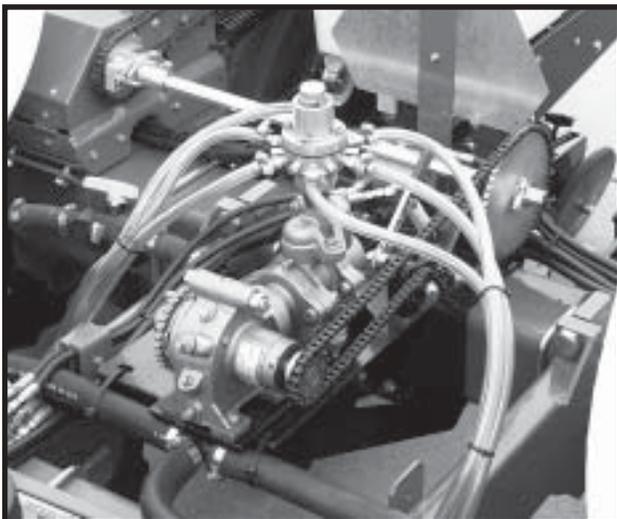
For the right hand hose (facing the pump from front of planter as shown above) twist the hose  $\frac{1}{4}$  turn in the clockwise direction.

For the left hand hose (facing front of pump) twist the hose  $\frac{1}{4}$  turn in the counterclockwise direction.

Retighten hose clamps.

## OPTIONAL PISTON PUMP

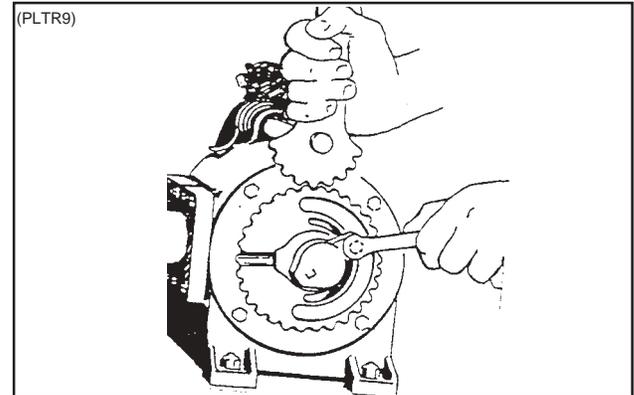
D06299905



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.



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

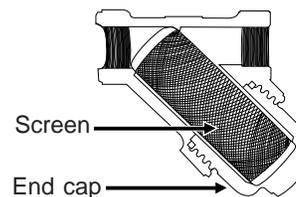
**NOTE: Periodically check flow to all rows. If one or more lines are plugged, set rate will be delivered to remaining rows.**

## 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.

On machines equipped with the piston pump, the strainer located between the piston pump and ball valve 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

## INTERPLANT® SELF-LEVELING HITCH EXTENSION

D07019901



The Interplant® Self-Leveling Hitch Extension is designed to allow the planter to raise level, front to rear, when Interplant® push row units are used.

### TRANSPORTING THE PLANTER



**WARNING:** Always make sure safety/warning lights, reflectors/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.



**WARNING:** Always install safety lockups on lift cylinders before transporting the planter.

## METRIC CONVERSION TABLE

Multiply	By	To Get
Inches (in.)	x 2.54	= centimeters (cm)
Inches (in.)	x 25.4	= millimeters (mm)
Feet (ft.)	x 30.48	= centimeters (cm)
Acres	x 0.405	= hectares (ha)
Miles per hour (mph)	x 1.609	= kilometers per hour (Km/h)
Pounds (lbs.)	x 0.453	= kilograms (kg)
Bushels (bu.)	x 35.238	= liters (l)
Gallons (gal.)	x 3.785	= liters (l)
Pounds per square inch (psi)	x 6.894	= kilopascals (kPa) (100 kPa = 1 bar)
Inch pounds (in. lbs.)	x 0.113	= newtons-meters (N•m)
Foot pounds (ft. lbs.)	x 1.356	= newtons-meters (N•m)
Centimeters (cm)	x .394	= inches (in.)
Millimeters (mm)	x .0394	= inches (in.)
Centimeters (cm)	x .0328	= feet (ft.)
Hectares (ha)	x 2.469	= acres
Kilometers per hour (Km/h)	x 0.621	= miles per hour (mph)
Kilograms (kg)	x 2.208	= pounds (lbs.)
Liters (l)	x 0.028	= bushels (bu.)
Liters (l)	x 0.264	= gallons (gal.)
Kilopascals (kPa) (100 kPa = 1 bar)	x 0.145	= pounds per square inch (psi)
Newtons-meters (N•m)	x 8.85	= inch pounds (in. lbs.)
Newtons-meters (N•m)	x 0.738	= foot pounds (ft. lbs.)

### PLANTING SPEED

Planters are designed to operate within a speed range of 2 to 8 MPH. See “Planting And Application Rate Charts”. Variations in ground speed will produce variations in rates. Finger pickup seed meter populations will tend to be disproportionately higher at high ground speeds.

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

# MACHINE OPERATION

## FIELD TEST

With any change of field and/or planting conditions, seed size or planter adjustment, we recommend a field test be made to ensure proper seed placement and operation of row units. See "Rate Charts", "Checking Seed Population" and "Checking Granular Chemical Application Rate" at end of this section.

- Check the planter for fore to aft and lateral level operation. See "Leveling The Planter".
- 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 "Marker Length Adjustment" and "Marker Speed Adjustment".
- 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".

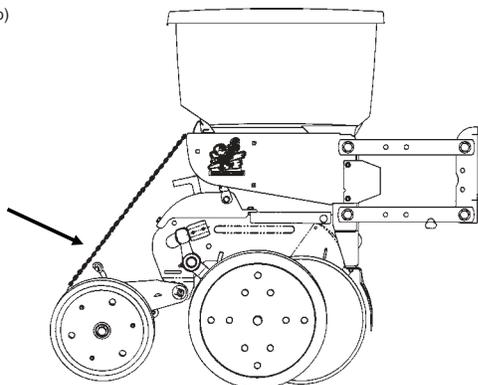
After the planter has been field tested, reinspect the machine.

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

## CHECKING SEED POPULATION

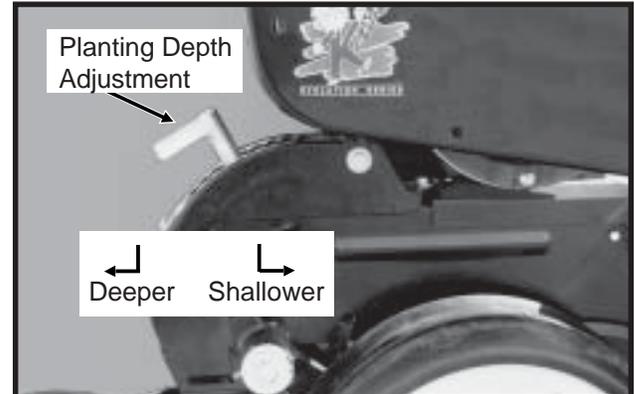
1. Tie up one or more sets of closing wheels by running a chain or rubber tarp strap between the hopper support panel and closing wheels. It may be necessary to decrease closing wheel arm spring tension.

(RU113b)



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.

04059914a



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

LENGTH OF ROW IN FEET AND INCHES						
Fraction Of Acre	Row Width					
	15"	18"	19"	30"	36"	38"
$\frac{1}{1000}$	34' 10"	29' 0"	27' 8"	17' 5"	14' 6"	13' 10"

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

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 30" row spacing 17' 5" equals  $\frac{1}{1000}$  acre.

26 Seeds Counted	x	1000	=	26,000 Seeds Per Acre
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Seed count can be affected by drive ratio between drive wheel and seed meter, tire pressure and/or seed meter malfunction.

If seed check shows the average distance between seeds in inches is significantly different than the seed rate chart indicates, first check drive ratio between drive wheel and seed meter. Check drive wheel air pressure, check for incorrect sprocket(s) in driveline and check drive and driven sprockets on transmission for proper selection.

Second, check for seed meter malfunction. For example, if spacing between kernels of corn at the transmission setting being used is 8" and a gap of 16" is observed, a finger has lost its seed and not functioned properly. If two seeds are found within a short distance of each other, the finger has metered two seeds instead of one.

See "Finger Pickup Seed Meter Troubleshooting" and/or "Brush-Type Seed Meter Troubleshooting" in the Maintenance Section of this manual.

# MACHINE OPERATION

## Determining Pounds Per Acre (Brush-Type Seed Meter)

To determine pounds per acre:

Seeds Per Acre On Chart	÷	Seeds Per Pound From Seed Tag On Bag	=	Pounds Per Acre
-------------------------------	---	---	---	-----------------------

To determine bushels per acre:

Pounds Per Acre	÷	Unit Weight Of Seed	=	Bushels Per Acre
--------------------	---	------------------------	---	---------------------

The unit weight of:

- 1 Bushel Soybeans = 60 Pounds
- 1 Bushel Milo/Grain Sorghum = 56 Pounds
- 1 Bushel Cotton = 32 Pounds

If seeds per pound information is not available the following is an average:

- 2,600 seeds per pound for medium size soybeans
- 15,000 seeds per pound for medium size milo/  
grain sorghum
- 4,500 seeds per pound for medium size cotton

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

## 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
30"	0.83
36"	0.69
38"	0.65

**EXAMPLE:** You are planting 30" rows. You have planted for 1320 feet at the desired planting speed. You caught 12.0 ounces of chemical in one vial. 12.0 ounces times 0.83 equals 9.96 pounds per acre.

**NOTE: 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

## GENERAL PLANTING RATE INFORMATION

These planting rate charts are applicable to KINZE® Model 3000 Pull Type Planters. See “Tire Pressure” for recommended tire pressures.

Not all row spacings listed are applicable to all size planters.

**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.

### Finger Pickup Corn Meter

Larger grades will generally plant more accurately at the high end of the ground speed range than smaller grades. Higher than optimum speeds may result in population rate increase or higher incidence of doubles, particularly with small seed. Medium round corn seed is most desirable for planting accuracy at optimum speed.

### Finger Pickup Oil Sunflower Meter

Larger grades will generally plant more accurately at the high end of the ground speed range than smaller grades. Higher than optimum speeds may result in population rate increase or higher incidence of doubles, particularly with small seed. No. 3 and/or No. 4 size oil sunflower seeds are recommended for use in the finger pickup seed meter equipped with oil sunflower fingers. No. 1 and/or No. 2 size confectionary sunflower seeds are recommended for use in the finger pickup seed meter equipped with corn fingers.

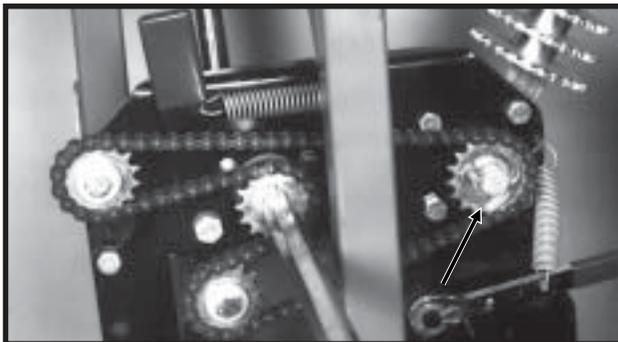
**NOTE: Seed additives, added to the seed in the hopper, may adversely affect performance of the finger pickup seed meter and accelerate wear. See “Finger Pickup Seed Meter” in the Row Unit Operation section.**

### Brush-Type Seed Meter (Soybean, Milo/Grain Sorghum, Acid-Delinted Cotton)

Rate charts are given in seeds per acre as well as seed spacing in inches rounded to the nearest tenth of an inch. Because of the large range in seed size, pounds per acre is not a suggested method of selecting transmission settings. When using smaller size seeds it may appear the pounds per acre is below what was expected and vice versa on large seed. To determine pounds per acre, use the formula given in “Determining Pounds Per Acre (Brush-Type Seed Meter)” in the “Checking Seed Population” section of this manual.

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

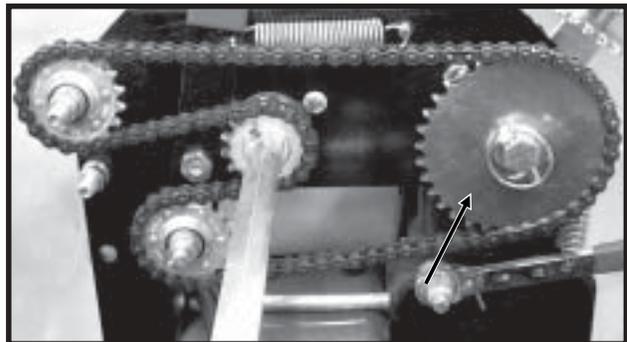
61010-41



**Standard Rate (1 To 1) 17 Tooth Drive Sprocket**

When planting 30"/36"/38" rows with brush-type seed meters using the 17 tooth standard rate (1 to 1) sprocket, use chart on page 6-77. When planting 15"/18"/19" rows using the 17 tooth sprocket, use chart on page 6-78.

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**Half Rate (2 To 1) 34 Tooth Drive Sprocket**

When using the 34 tooth half rate (2 to 1) sprocket with brush-type seed meters, seeding rate will be approximately 50% of the chart readings on pages 6-77 and 6-78. Half rate (2 to 1) drive is recommended only when Interplant® push units are used and desired population falls below that shown on planting rate charts.

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

# MACHINE OPERATION

Z202

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

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

**NOTE: See "General Planting Rate Information" and "Checking Seed Population" pages for additional information. Always check seed population in the field to ensure planting rates are correct.**

# MACHINE OPERATION

Z214/RH

## PLANTING RATES FOR BRUSH-TYPE SEED METERS (STANDARD DRIVE)

### APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

Transmission Sprockets		60 Cell Soybean Or High-Rate Milo/ Grain Sorghum			Average Seed Spacing In Inches	48 Cell Specialty Soybean Or High-Rate Acid-Delinted Cotton			Average Seed Spacing In Inches	Speed Range (MPH)
Drive	Driven	30" Rows	36" Rows	38" Rows		30" Rows	36" Rows	38" Rows		
17	28	80,928	67,440	63,891	2.6	64,742	53,952	51,113	3.2	2 to 8
17	27	83,926	69,938	66,257	2.5	67,141	55,950	53,006	3.1	2 to 8
17	26	87,154	72,628	68,805	2.4	69,723	58,102	55,044	3.0	2 to 8
19	28	90,449	75,374	71,407	2.3	72,359	60,299	57,126	2.9	2 to 8
19	27	93,799	78,166	74,052	2.2	75,039	62,533	59,242	2.8	2 to 8
17	24	94,416	78,680	74,539	2.2	75,533	62,944	59,631	2.8	2 to 8
17	23	98,521	82,101	77,780	2.1	78,817	65,681	62,224	2.7	2 to 8
19	25	101,303	84,419	79,976	2.1	81,042	67,535	63,981	2.6	2 to 8
19	24	105,524	87,937	83,309	2.0	84,419	70,350	66,647	2.5	2 to 8
23	28	109,491	91,243	86,440	1.9	87,593	72,994	69,152	2.4	2 to 8
19	23	110,112	91,760	86,931	1.9	88,090	73,408	69,545	2.4	2 to 8
24	28	114,252	95,210	90,199	1.8	91,402	76,168	72,159	2.3	2 to 8
24	27	118,483	98,736	93,539	1.8	94,786	78,989	74,831	2.2	2 to 8
17	19	119,263	99,386	94,155	1.8	95,410	79,509	75,324	2.2	2 to 8
24	26	123,040	102,534	97,137	1.7	98,432	82,027	77,710	2.1	2 to 8
26	28	123,773	103,144	97,715	1.7	99,018	82,515	78,172	2.1	2 to 8
24	25	127,962	106,635	101,023	1.6	102,370	85,308	80,818	2.0	2 to 8
26	27	128,357	106,964	101,334	1.6	102,686	85,571	81,067	2.0	2 to 8
23	23	133,294	111,078	105,232	1.6	106,635	88,862	84,186	2.0	2 to 8
27	26	138,420	115,350	109,279	1.5	110,736	92,280	87,423	1.9	2 to 8
24	23	139,089	115,907	109,807	1.5	111,271	92,726	87,846	1.9	2 to 8
25	23	144,884	120,737	114,382	1.4	115,907	96,590	91,506	1.8	2 to 8
19	17	148,975	124,146	117,612	1.4	119,180	99,317	94,090	1.8	2 to 8
27	24	149,955	124,963	118,386	1.4	119,964	99,970	94,709	1.7	2 to 8
28	24	155,509	129,591	122,770	1.3	124,407	103,673	98,216	1.7	2 to 8
23	19	161,355	134,463	127,386	1.3	129,084	107,570	101,909	1.6	2 to 8
28	23	162,270	135,225	128,108	1.3	129,816	108,180	102,486	1.6	2 to 8
24	19	168,371	140,309	132,924	1.2	134,696	112,247	106,339	1.6	2 to 8
25	19	175,386	146,155	138,463	1.2	140,309	116,924	110,770	1.5	2 to 8
23	17	180,338	150,282	142,372	1.2	144,270	120,226	113,898	1.5	2 to 8
26	19	182,402	152,001	144,001	1.1	145,922	121,601	115,201	1.4	2 to 7
27	19	189,417	157,848	148,540	1.1	151,534	126,278	118,832	1.4	2 to 7
28	19	196,433	163,694	155,078	1.1	157,146	130,955	124,062	1.3	2 to 7
26	17	203,861	169,884	160,943	1.0	163,089	135,907	128,754	1.3	2 to 7
27	17	211,702	176,418	167,133	0.9	169,362	141,134	133,706	1.2	2 to 7
28	17	219,542	182,952	173,323	0.9	175,634	146,362	138,658	1.2	2 to 7

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

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

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

# MACHINE OPERATION

Z214/RH

## PLANTING RATES FOR BRUSH-TYPE SEED METERS (STANDARD DRIVE)

### APPROXIMATE SEEDS/ACRE FOR 15"/18"/19" ROW WIDTHS

Transmission Sprockets		60 Cell Soybean Or High-Rate Milo/ Grain Sorghum			Average Seed Spacing In Inches	48 Cell Specialty Soybean Or High-Rate Acid-Delinted Cotton			Average Seed Spacing In Inches	Speed Range (MPH)
Drive	Driven	15" Rows	18" Rows	19" Rows		15" Rows	18" Rows	19" Rows		
17	28	161,856	134,880	127,782	2.6	129,484	107,904	102,226	3.2	2 to 8
17	27	167,852	139,876	132,514	2.5	134,282	111,900	106,012	3.1	2 to 8
17	26	174,308	145,256	137,610	2.4	139,446	116,204	110,088	3.0	2 to 8
19	28	180,898	150,748	142,814	2.3	144,718	120,598	114,252	2.9	2 to 8
19	27	187,598	156,332	148,104	2.2	150,078	125,066	118,484	2.8	2 to 8
17	24	188,832	157,360	149,078	2.2	151,066	125,888	119,262	2.8	2 to 8
17	23	197,042	164,202	155,560	2.1	157,634	131,362	124,448	2.7	2 to 8
19	25	202,606	168,838	159,952	2.1	162,084	135,070	127,962	2.6	2 to 8
19	24	211,048	175,874	166,618	2.0	168,838	140,700	133,294	2.5	2 to 8
23	28	218,982	182,486	172,880	1.9	175,186	145,988	138,304	2.4	2 to 8
19	23	220,224	183,520	173,862	1.9	176,180	146,816	139,090	2.4	2 to 8
24	28	228,504	190,420	180,398	1.8	182,804	152,336	144,318	2.3	2 to 8
24	27	236,966	197,472	187,078	1.8	189,572	157,978	149,662	2.2	2 to 8
17	19	238,526	198,772	188,310	1.8	190,820	159,018	150,648	2.2	2 to 8
24	26	246,080	205,068	194,274	1.7	196,864	164,054	155,420	2.1	2 to 8
26	28	247,546	206,288	195,430	1.7	198,036	165,030	156,344	2.1	2 to 8
24	25	255,924	213,270	202,046	1.6	204,740	170,616	161,636	2.0	2 to 8
26	27	256,714	213,928	202,668	1.6	205,372	171,142	162,134	2.0	2 to 8
23	23	266,588	222,156	210,464	1.6	213,270	177,724	168,372	2.0	2 to 8
27	26	276,840	230,700	218,558	1.5	221,472	184,560	174,846	1.9	2 to 8
24	23	278,178	231,814	219,614	1.5	222,542	185,452	175,692	1.9	2 to 8
25	23	289,768	241,474	228,764	1.4	231,814	193,180	183,012	1.8	2 to 8
19	17	297,950	248,292	235,224	1.4	238,360	198,634	188,180	1.8	2 to 8
27	24	299,910	249,926	236,772	1.4	239,928	199,940	189,418	1.7	2 to 8
28	24	311,018	259,182	245,540	1.3	248,814	207,346	196,432	1.7	2 to 8
23	19	322,710	268,926	254,772	1.3	258,168	215,140	203,818	1.6	2 to 8
28	23	324,540	270,450	256,216	1.3	259,632	216,360	204,966	1.6	2 to 8
24	19	336,742	280,618	265,848	1.2	269,392	224,494	212,678	1.6	2 to 8
25	19	350,772	292,310	276,926	1.2	280,618	233,848	221,540	1.5	2 to 8
23	17	360,676	300,564	284,744	1.2	288,540	240,452	227,796	1.5	2 to 8
26	19	364,804	304,002	288,002	1.1	291,844	243,202	230,402	1.4	2 to 7
27	19	378,834	315,756	297,080	1.1	303,068	252,556	237,664	1.4	2 to 7
28	19	392,866	327,388	310,156	1.1	314,292	261,910	248,124	1.3	2 to 7
26	17	407,722	339,768	321,886	1.0	326,178	271,814	257,508	1.3	2 to 7
27	17	423,404	352,836	334,266	0.9	338,724	282,268	267,412	1.2	2 to 7
28	17	439,084	365,904	346,646	0.9	351,268	292,724	277,316	1.2	2 to 7

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

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

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

# MACHINE OPERATION

RH/Z215

## PLANTING RATES FOR BRUSH-TYPE SEED METERS (STANDARD DRIVE)

### APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

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

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

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

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

# MACHINE OPERATION

Z202

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

Due to variations in cotton seed size, meters equipped with the 12 cell acid-delinted hill-drop cotton discs will plant from 3 to 6 seeds per cell. Select proper disc for seed size range to be planted.

*To determine planter transmission setting,* determine desired hill spacing and select the transmission ratio closest to the hill spacing in inches on the chart. To decrease population increase spacing. To increase population decrease spacing.

*To determine population per acre,* determine average seeds per hill and hills per acre by doing a field check. Measure  $\frac{1}{1000}$  of an acre ( $\frac{1}{1000}$  acre = Length of row 17' 5" for 30" row widths, 14' 6" for 36" row widths and 13' 10" for 38" row widths). Multiply average seeds per hill by hills per acre. EXAMPLE: 4 seeds per hill x (13 hills x 1000) = 52,000

Transmission Sprockets Drive Driven		NUMBER OF HILLS PER ACRE 12 Cell Hill-Drop Cotton, Acid-Delinted			Average Hill Spacing In Inches	Speed Range (MPH)
		30" Rows	36" Rows	38" Rows		
17	28	16,186	13,488	12,778	12.9	2 to 8
17	27	16,785	13,988	13,251	12.5	2 to 8
17	26	17,431	14,526	13,761	12.0	2 to 8
19	28	18,090	15,075	14,281	11.6	2 to 8
19	27	18,760	15,633	14,810	11.1	2 to 8
17	24	18,883	15,736	14,908	11.1	2 to 8
17	23	19,704	16,420	15,556	10.6	2 to 8
19	25	20,261	16,884	15,995	10.3	2 to 8
19	24	21,105	17,587	16,662	9.9	2 to 8
23	28	21,898	18,249	17,288	9.5	2 to 8
19	23	22,022	18,352	17,386	9.5	2 to 8
24	28	22,850	19,042	18,040	9.2	2 to 8
24	27	23,697	19,747	18,708	8.8	2 to 8
17	19	23,853	19,877	18,831	8.8	2 to 8
24	26	24,608	20,507	19,427	8.5	2 to 8
26	28	24,755	20,629	19,543	8.4	2 to 8
24	25	25,592	21,327	20,205	8.2	2 to 8
26	27	25,671	21,393	20,267	8.1	2 to 8
23	23	26,659	22,216	21,046	7.8	2 to 8
27	26	27,684	23,070	21,856	7.6	2 to 8
24	23	27,818	23,181	21,961	7.5	2 to 8
25	23	28,977	24,147	22,876	7.2	2 to 8
19	17	29,795	24,829	23,522	7.0	2 to 8
27	24	29,991	24,993	23,677	7.0	2 to 8
28	24	31,102	25,918	24,554	6.7	2 to 8
23	19	32,271	26,893	25,477	6.5	2 to 8
28	23	32,454	27,045	25,622	6.5	2 to 8
24	19	33,674	28,062	26,585	6.2	2 to 8
25	19	35,077	29,231	27,693	6.0	2 to 8
23	17	36,068	30,056	28,474	5.8	2 to 8
26	19	36,480	30,400	28,800	5.7	2 to 7
27	19	37,883	31,570	29,908	5.5	2 to 7
28	19	39,287	32,739	31,016	5.3	2 to 7
26	17	40,772	33,977	32,189	5.1	2 to 7
27	17	42,340	35,284	33,427	4.9	2 to 7
28	17	43,908	36,590	34,665	4.8	2 to 7

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

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

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

# MACHINE OPERATION

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

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

**NOTE:** The above chart represents average values and should be used only as a starting point. The granular chemical flows through the given meter opening at a nearly uniform rate regardless of roller speed. Your actual rate will vary depending upon the insecticide you are using, your planting speed and your plant population. Planting speed/ground speed has the greatest effect on application rate.

Your actual rate must be checked in the field with the actual insecticide that you are using and at the speed and population at which you will be planting. See "Checking Granular Chemical Application Rate" page for additional information.



**WARNING:** Agricultural chemicals can be dangerous if not selected and handled with care. Always read and follow directions supplied by the chemical manufacturer.

# MACHINE OPERATION

## DRY HERBICIDE APPLICATION RATES

### APPROXIMATE POUNDS/ACRE AT 5 MPH FOR VARIOUS ROW WIDTHS

#### CLAY GRANULES

Meter Setting	30" Rows	36" Rows	38" Rows
10	4.7	3.9	3.7
11	5.2	4.4	4.1
12	5.8	4.9	4.6
13	6.5	5.4	5.1
14	7.3	6.1	5.7
15	8.2	6.9	6.5
16	9.0	7.5	7.1
17	9.9	8.2	7.8
18	10.7	8.9	8.4
19	11.6	9.7	9.2
20	12.6	10.5	10.0
21	13.6	11.3	10.7
22	14.6	12.1	11.5
23	15.7	13.1	12.4
24	17.0	14.1	13.4
25	18.1	15.1	14.3
26	19.4	16.2	15.3
27	20.9	17.4	16.5
28	22.6	18.8	17.8
29	24.3	20.2	19.1
30	26.7	22.2	21.1

**NOTE:** 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 herbicide you are using, your planting speed and your plant population. Planting speed/ground speed has the greatest effect on application rate.

Your actual rate must be checked in the field with the actual herbicide that you are using and at the speed and population at which you will be planting. See "Checking Granular Chemical Application Rate" page for additional information.



**WARNING:** Agricultural chemicals can be dangerous if not selected and handled with care. Always read and follow directions supplied by the chemical manufacturer.

# MACHINE OPERATION

## DRY FERTILIZER APPLICATION RATES

### APPROXIMATE RATE IN POUNDS PER ACRE

Drive Sprocket	Driven Sprocket	Low Rate Position			High Rate Position		
		30" Rows	36" Rows	38" Rows	30" Rows	36" Rows	38" Rows
15	35	32	26	25	94	78	74
15	33	36	30	28	109	91	86
15	30	39	33	31	120	100	95
19	33	45	37	36	135	114	107
19	30	50	42	39	153	126	120
15	19	58	48	46	174	144	136
30	35	61	51	48	188	156	148
30	33	67	55	52	200	166	157
33	35	69	58	55	206	172	163
35	33	76	63	61	214	193	183
33	30	81	67	64	241	200	190
19	15	93	77	73	278	230	219
30	19	116	96	91	347	288	274
33	19	127	105	100	382	317	301
35	19	133	111	106	402	335	318
30	15	146	121	115	440	365	347
33	15	161	134	127	482	400	380
35	15	168	141	133	510	424	403

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

#### Direction Of Rotation



High Rate Position



Low Rate Position

(PLTR6/PLTR7)

Above chart for planters equipped with contact drive. See "Tire Pressure" for recommended tire pressures.

This chart was calculated with a bulk density of 65 pounds per cubic foot.

**NOTE:** Fertilizer application rates can vary from the weights calculated in the above chart. To prevent application miscalculations, make field checks to be sure you are applying fertilizer at the desired rate.

To check the exact number of pounds your fertilizer attachment will actually deliver on a 30" row spacing, proceed as follows:

Remove one spout from one of the fertilizer hoppers and attach a container under the opening. Engage the fertilizer attachment and drive forward for 174'. Weigh the amount of fertilizer caught in the container and multiply that amount by 100. The result will be the pounds of fertilizer delivered per acre when planting in 30" rows. To convert this delivery rate for wider rows, multiply by the following conversion factors:

36" multiply by 0.83

38" multiply by 0.79

# MACHINE OPERATION

(Note Sprocket Combinations)

## LIQUID FERTILIZER SQUEEZE PUMP APPLICATION RATES

### GALLONS PER ACRE

Drive	Driven	30" Rows	36" Rows	38" Rows	Drive	Driven	30" Rows	36" Rows	32" Rows
15	*62	6.9	5.8	5.5	46	*62	21.2	17.7	16.7
19	*62	8.8	7.3	6.9	15	19	22.5	18.8	17.8
15	46	9.3	7.8	7.4	32	34	26.9	22.4	21.2
19	46	11.8	9.8	9.3	34	32	30.3	25.3	24.0
15	34	12.6	10.5	9.9	19	15	36.2	30.1	28.6
15	32	13.4	11.2	10.6	46	34	38.6	32.2	30.5
32	*62	14.7	12.3	11.6	46	32	41.0	34.2	32.4
19	34	16.0	13.3	12.6	32	19	48.1	40.1	38.0
19	32	17.0	14.1	13.4	34	19	51.1	42.6	40.3
32	46	19.9	16.6	15.7	*62	34	52.1	43.4	41.1
34	46	21.1	17.6	16.7					

\*Optional sprocket.

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

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 at the desired rate.**

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

Remove the hose from one of the fertilizer openers and insert it into a collection container which has been secured to the planter frame. Engage the fertilizer attachment and drive forward for 174'. Measure the fluid ounces caught in the container and multiply that amount by 100. Divide that amount by 128. The result will be the gallons of fertilizer delivered per acre when planting in 30" rows. Rinse the collection container and repeat test on other rows if necessary. To convert this delivery rate for wider rows, multiply by the following conversion factors:

36" multiply by 0.83

38" multiply by 0.79

# MACHINE OPERATION

## LIQUID FERTILIZER PISTON PUMP APPLICATION RATES GALLONS PER ACRE

Applies to Model LM-2455-R Pump With 18 Tooth Sprocket

Pump Setting	1	2	3	4	5	6	7	8	9	10
4 Row 30"	8.3	16.5	24.8	32.6	41.3	49.5	57.8	66.0	74.3	83.5
4 Row 36"	6.9	13.7	20.6	27.5	34.4	41.3	48.2	55.0	61.9	68.8
4 Row 38"	6.5	13.0	19.5	26.0	32.6	39.1	45.6	52.1	58.7	65.2
6 Row 30"	5.5	11.0	16.5	22.0	27.5	33.0	38.5	44.0	49.5	55.0
6 Row 36"	4.6	9.2	13.7	18.3	22.9	27.5	32.1	36.7	41.3	45.9
6 Row 38"	4.4	8.7	13.0	17.4	21.7	26.0	30.4	34.8	39.1	43.4
8 Row 30"	4.1	8.3	12.4	16.5	20.6	24.8	28.9	33.0	37.1	41.3

The above chart is for planters equipped with contact drive. See "Tire Pressure" for recommended tire pressures. This chart is based on average wheel slippage and liquid viscosities.

Measure and weigh one gallon of actual fertilizer solution to determine exact application rate. This chart was calculated based on a solution weighing ten pounds per gallon.

**NOTE:** Fertilizer application rates can vary from the above chart. To prevent application miscalculations, make field checks to be sure you are applying fertilizer to all rows at the desired rate.

**NOTE:** Flow to all rows should be checked periodically. If one or more lines are plugged, the desired rate will be delivered to the remaining rows keeping total application rate at desired rate.

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

Remove the hose from one of the fertilizer openers and insert it into a collection container which has been secured to the planter frame. Engage the fertilizer attachment and drive forward for 174'. Measure the fluid ounces caught in the container and multiply that amount by 100. Divide that amount by 128. The result will be the gallons of fertilizer delivered per acre when planting in 30" rows. Rinse the collection container and repeat test on other rows if necessary. To convert this delivery rate for wider rows, multiply by the following conversion factors:

36" multiply by 0.83

38" multiply by 0.79

# MACHINE OPERATION

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# ROW UNIT OPERATION

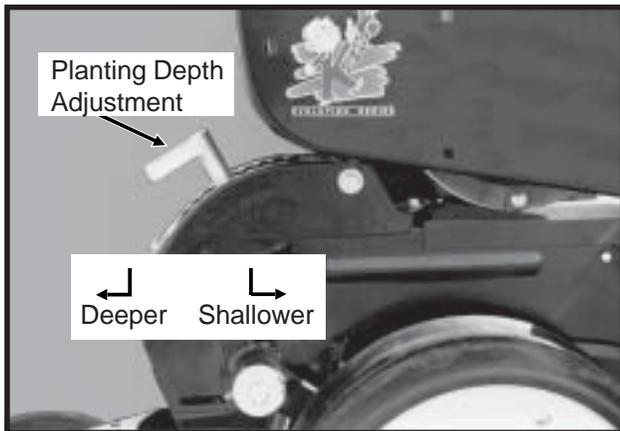
## PLANTING DEPTH

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  $\frac{1}{2}$ " to  $3\frac{1}{2}$ ".



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

04059914a



## "V" CLOSING WHEEL ADJUSTMENT (Rubber And Cast Iron)

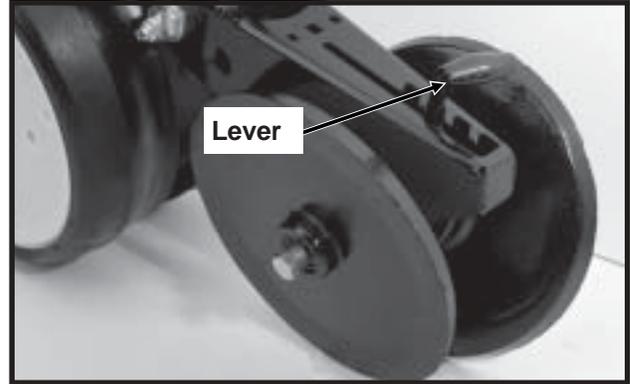


**WARNING:** Raise planter and install safety lockups before making closing wheel adjustments.

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.

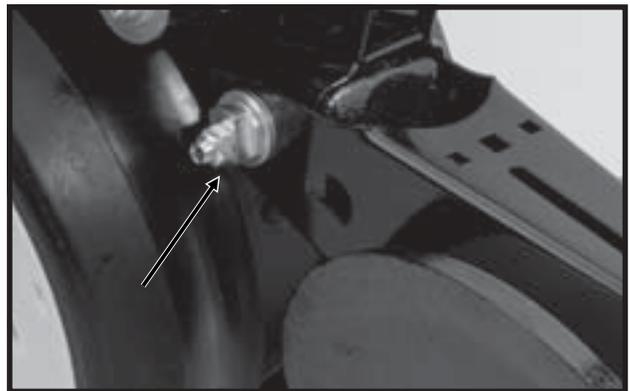
LF212299-15



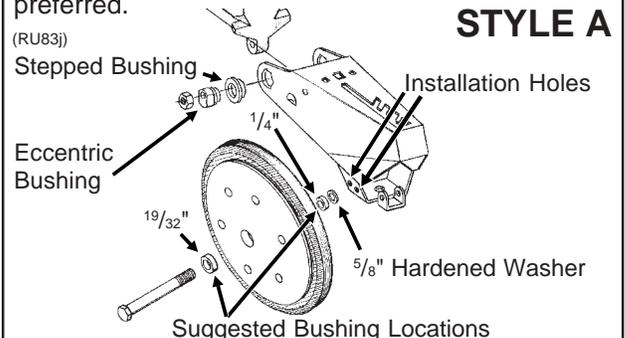
Light soil usually requires less down force at average depth (approximately 2") while heavy soil requires increased down force.

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

LF212299-15



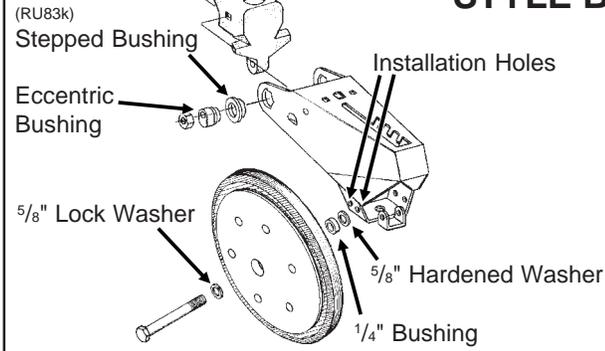
Bushings used for installation of the closing wheels can be moved from side to side for closing wheel spacing adjustment and the closing wheels can be installed in two locations either "offset" (to improve residue flow) or "directly" opposite. If set "directly" opposite, the forward installation holes should be used. Under normal conditions the narrow position is preferred.



# ROW UNIT OPERATION

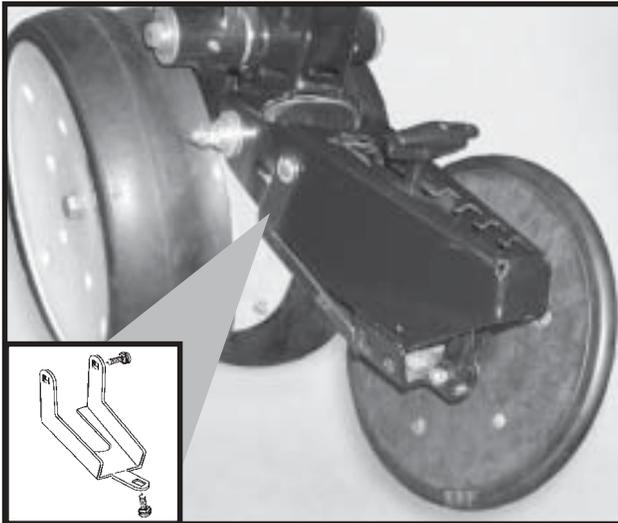
The closing wheels can be installed in two locations either "offset" (to improve residue flow) or "directly" opposite. If set "directly" opposite, the forward installation holes should be used.

## STYLE B



## 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 lockups before making covering discs/single press wheel adjustments.

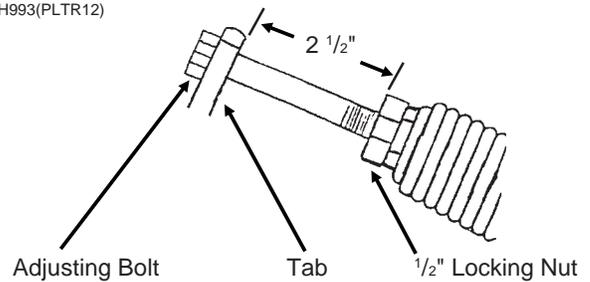
72359-31



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.

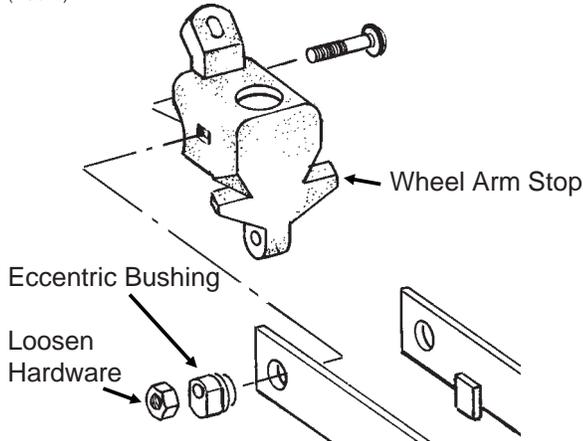
RH993(PLTR12)



# ROW UNIT OPERATION

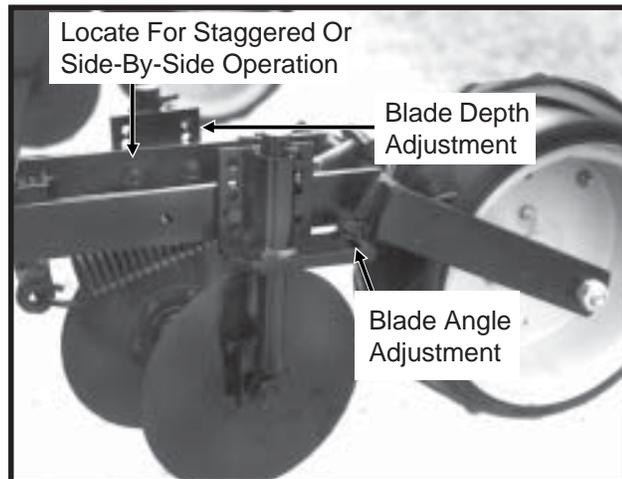
Eccentric bushings in the wheel arm stop allow for lateral adjustment of the covering discs/single press wheel assembly. Using a  $\frac{3}{4}$ " wrench, loosen the hardware which attaches the assembly to the wheel arm stop. Using another  $\frac{3}{4}$ " wrench, turn the eccentric bushings until the 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



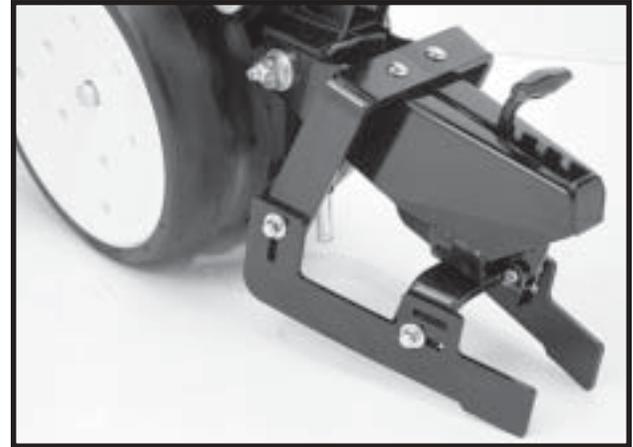
Five sets of holes in each disc bracket allow for  $\frac{1}{2}$ " incremental blade depth adjustment.

Slotted holes in the disc mount and bracket allow for  $0^\circ - 15^\circ$  blade angle adjustment.

Adjust covering discs on all row units to similar settings.

## DRAG CLOSING ATTACHMENT

LF212299-18



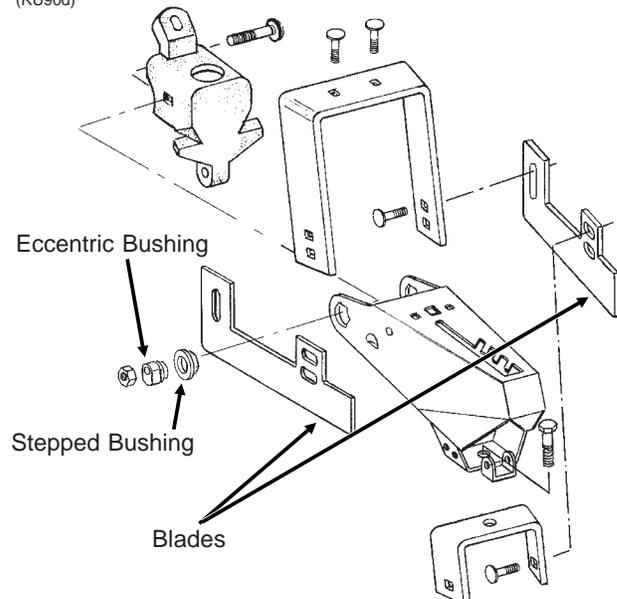
The drag closing attachment is designed to pull loose soil over the seed trench.

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 lockups before making drag closing attachment adjustments.**

(RU90d)



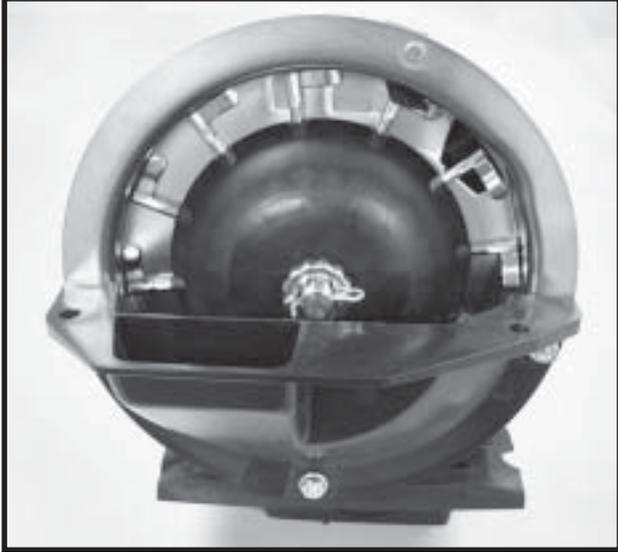
Eccentric bushings allow for lateral adjustment of the drag closing attachment. Using a  $\frac{3}{4}$ " wrench, loosen the hardware which attaches the assembly to the wheel arm stop. Using another  $\frac{3}{4}$ " wrench, turn the eccentric bushings until the drag closing attachment is aligned with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

# ROW UNIT OPERATION

## FINGER PICKUP SEED METER

Refer to the planting rate chart for recommended seed drive transmission sprocket combinations.

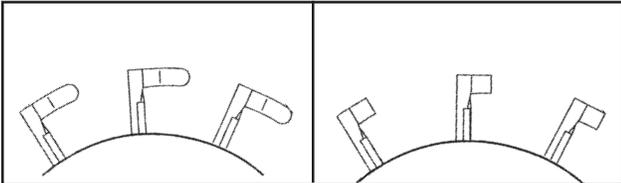
D05030001



Shown With Corn Fingers Installed

The following seed fingers are available for use with the finger pickup seed meter:

(PLTR91/PLTR92/PLTR91a)

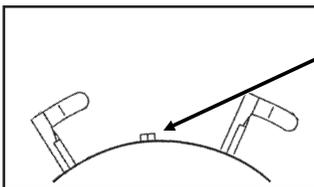


Corn Fingers

Oil Sunflower Fingers

No. 3 and/or No. 4 size oil sunflower seeds are recommended for use in the finger pickup seed meter equipped with oil sunflower fingers.

No. 1 and/or No. 2 size confectionary sunflower seeds are recommended for use in the finger pickup seed meter equipped with corn fingers.



Half Rate Blank Finger

Blank fingers are used to replace alternate fingers in the finger wheel to reduce the planting rate by half while allowing the finger wheel to maintain a minimum of 40 RPM when planting low rates.

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

**NOTE: Powdered graphite is recommended for finger pickup seed meter lubrication to ensure efficient operation of the mechanism and to extend the life of its components. Mix one teaspoon of powdered graphite with the seed twice daily. Apply graphite on top of seed around the outer perimeter of the hopper as shown below. Graphite application frequency and volume may need to be increased if using additional seed treatments.**

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

D05230121b



**NOTE: Follow manufacturer's recommendations when applying and mixing other seed treatments. If the additive is to be applied on top of the seed, apply around the outer perimeter of the hopper as with graphite.**

See "General Planting Rate Information", "Finger Pickup Seed Meter Troubleshooting" and "Finger Pickup Seed Meter Inspection/Adjustment" for additional information.

## CLEANOUT

To maintain genetic purity, thorough seed meter cleanout is important.

To clean the seed meter, disengage the seed drive and remove the seed hopper and meter. Dump the seed from the right rear corner of the hopper into a container. Turn the seed drive several times. Invert hopper to dump seed again. Shake the hopper and listen for any remaining seed. Turn seed drive and shake and dump hopper until all seed is removed.

# ROW UNIT OPERATION

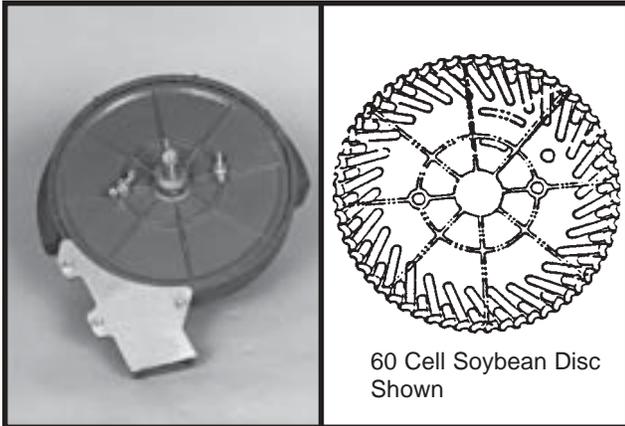
## BRUSH-TYPE SEED METER

LF212299-13a



Shown Without Seed Disc Installed

60607-40a(PLTR13)

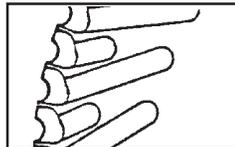


60 Cell Soybean Disc Shown

The following seed discs are available for use with the brush-type seed meter:

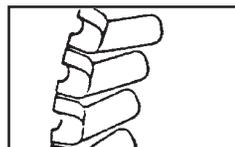
**Soybean:** 60 cells to meter seed sizes from 2200 to 4000 seeds per pound (Black color-coded).

(PLTR14)



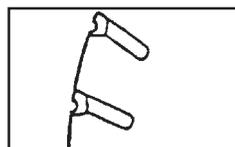
**Specialty soybean:** 48 cells to meter seed sizes from 1400 to 2200 seeds per pound (Dark blue color-coded).

(PLTR15)



**Small milo/grain sorghum:** 30 cells to meter seed sizes from 14,000 to 20,000 seeds per pound (Red color-coded).

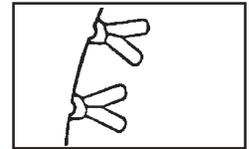
(PLTR16)



**Large milo/grain sorghum:**

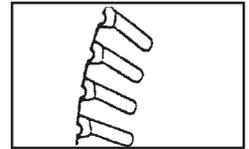
30 cells to meter seed sizes from 10,000 to 16,000 seeds per pound (Light blue color-coded).

(PLTR17)



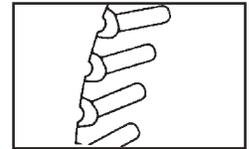
**High-rate small milo/grain sorghum:**

60 cells to meter seed sizes from 12,000 to 18,000 seeds per pound (Red color-coded). (PLTR18)



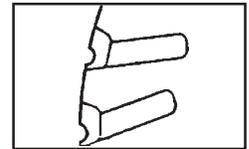
**High-rate large milo/grain sorghum:**

60 cells to meter seed sizes from 10,000 to 14,000 seeds per pound (Yellow color-coded). (PLTR19)



**Cotton, acid-delinted:** 30 cells to meter seed sizes from 4200 to 5200 seeds per pound (White color-coded).

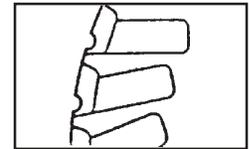
(PLTR20)



**Large cotton, acid-delinted:**

36 cells to meter seed sizes from 3800 to 4400 seeds per pound (Tan color-coded).

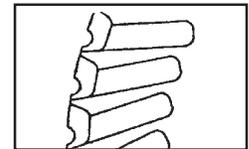
(PLTR21)



**High-rate cotton, acid-delinted:**

48 cells to meter seed sizes from 4200 to 5200 seeds per pound (Light green color-coded).

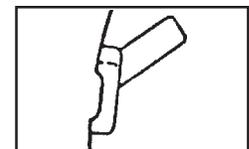
(PLTR22)



**Hill-drop cotton, acid-delinted:**

12 cells, 3 to 6 seeds/cell, to meter seed sizes from 4000 to 5200 seeds per pound (Brown color-coded).

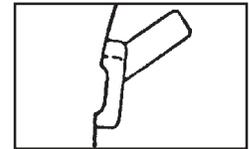
(PLTR23)



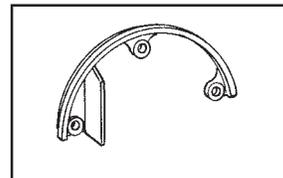
**Small hill-drop cotton, acid-delinted:**

12 cells, 3 to 6 seeds/cell, to meter seed sizes from 5000 to 6200 seeds per pound (Dark green color-coded).

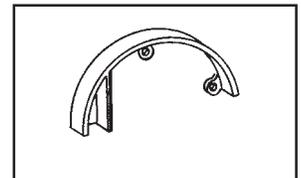
(PLTR23)



(RU14c)



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



Use GD8237 upper brush retainer when using milo/grain sorghum discs.

# ROW UNIT OPERATION

When installing the seed disc onto the meter hub, turn the disc counterclockwise while tightening the two wing nuts that retain the disc. The seed disc should have only slight resistance when rotated counterclockwise after wing nuts are tight.

The brush-type seed meter attaches to the seed hopper in the same manner as the finger pickup seed meter. Secure to bottom of seed hopper with two  $\frac{5}{16}$ " thumbscrews. Tighten thumbscrews slightly with pliers. **DO NOT OVER TIGHTEN.**

Erratic seed spacing may result from misalignment between the drive coupler and seed meter input shaft. Misalignment may cause momentary stoppage of seed disc. Check alignment after initial installation. If adjustment is required, refer to "Meter Drive Adjustment" for correct procedure.

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

One tablespoon of **powdered graphite** should be mixed with the seed each time the hoppers are filled. Regular graphite use will prolong the life of the brush-type seed meter components, improve seed spacing, and may reduce buildup of seed treatments. Apply graphite around the outer perimeter of the hopper as shown below.

D05300104b



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

**NOTE: Additional graphite or talc may be required to retard buildup of seed treatments on meter components. Frequency of monitor seed tube cleaning may be affected due to use of additional graphite or talc.**

**Talc seed lubricant** may be used in lieu of or in addition to graphite to reduce seed treatment buildup on seed disc and meter components. Coat seed disc and brushes with talc before installing meter. Fill hopper  $\frac{1}{2}$  full of seed, add  $\frac{1}{4}$  cup of talc and **mix thoroughly**. Finish filling hopper, add another  $\frac{1}{4}$  cup of talc and **mix thoroughly**. Adjust rate of talc use as needed so all seeds are coated, while avoiding a buildup of talc in the bottom of the hopper. Humid conditions and/or small sized seeds with extra seed treatment may require as much as one cup of talc per hopper to prevent seed treatment buildup on seed disc and/or brushes.

**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.

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

## CLEANOUT

To maintain genetic purity, thorough seed meter cleanout is important.

To clean the seed meter, disengage the seed drive and remove the seed hopper and meter. Dump the seed from the right rear corner of the hopper into a container. Disassemble seed disc by removing wing nuts. Empty the meter. Thoroughly inspect brushes in meter to ensure all seed is removed. Replace seed disc and install wing nuts.

# ROW UNIT OPERATION

## SEED HOPPER

LF212199-7a



The seed hopper has a capacity of 1.9 bushels.

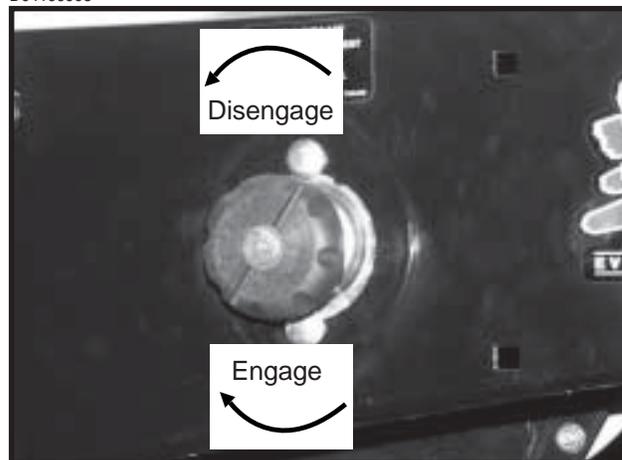
When filling the seed hopper use clean seed and make certain there are no foreign objects in the hopper. **Replace hopper lids after hoppers are filled to prevent the accumulation of dust or dirt in the seed meter which will cause premature wear.** See "Finger Pickup Seed Meter Lubrication" and/or "Brush-Type Seed Meter Lubrication".

Periodically empty the hoppers completely to remove any foreign objects 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".

## SEED METER DRIVE RELEASE

The seed meter drive is equipped with a clutch release mechanism that allows the drive to be disengaged from the seed metering unit for removal of the seed hopper. Disconnecting the drive allows the operator to check granular chemical application rates without dropping seed. It also allows one or more of the rows to be disconnected when finishing fields.

D04199906



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

# ROW UNIT OPERATION

## SEED METER DRIVE ADJUSTMENT

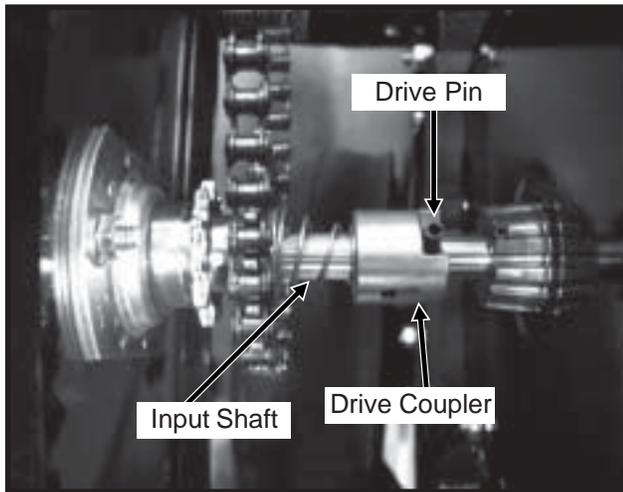
**NOTE: The seed meter drive coupler must be properly aligned with the meter input shaft.**

Improper alignment between the drive coupler and input shaft of the meter can cause the meter housing to flex as the meter rotates. This continual flexing of the meter housing can cause damage to the housing. Any time the hopper support panel is removed or replaced, vertical and horizontal alignment should be checked.

Erratic seed spacing may result from misalignment between the drive coupler and seed meter input shaft. Misalignment may cause momentary stoppage of brush-type meter seed disc. Check alignment after initial installation.

Although the meter drive has a self-aligning feature, the slotted mounting hole in the hopper support panel and clutch plate allow for alignment adjustment between the drive coupler and meter shaft. If the drive clutch is centered in the hole in the hopper support panel the drive should be in alignment.

D04209903



### To check alignment:

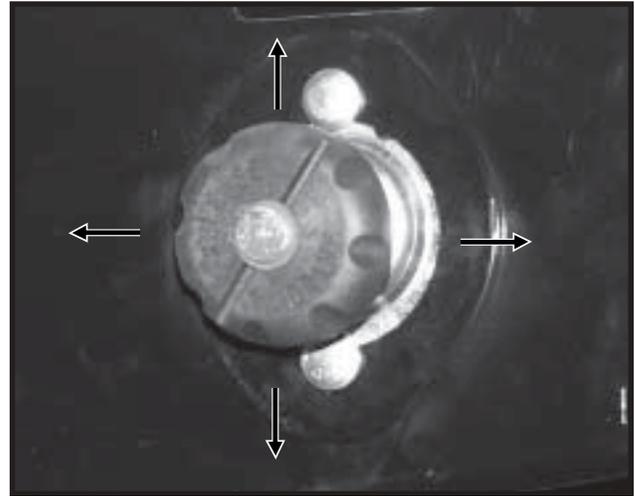
- Engage drive coupler over pin on meter shaft.
- Drive shaft on clutch should be centered in sprocket bore.
- If adjustment is needed, proceed as follows.

### To adjust drive clutch:

- Slightly loosen both  $\frac{5}{16}$ " carriage bolts.
- Move clutch assembly to correct any misalignment.
- Tighten both  $\frac{5}{16}$ " carriage bolts.

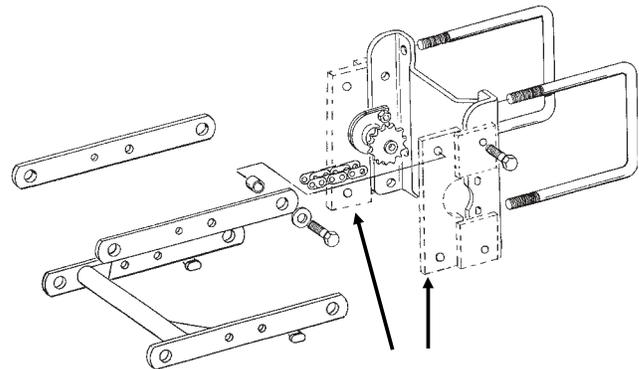
**NOTE: Removing chain idler tension will allow easier clutch alignment adjustments.**

D04199906



## ROW UNIT EXTENSION BRACKETS

RUB005/RUB007/RUB015(INS33a)



Row unit extension brackets are required on all rear row units if the Model 3000 planter is equipped with coulters mounted residue wheels and HD single disc fertilizer openers. The brackets extend the row units rearward 4" to provide required clearance.

# ROW UNIT OPERATION

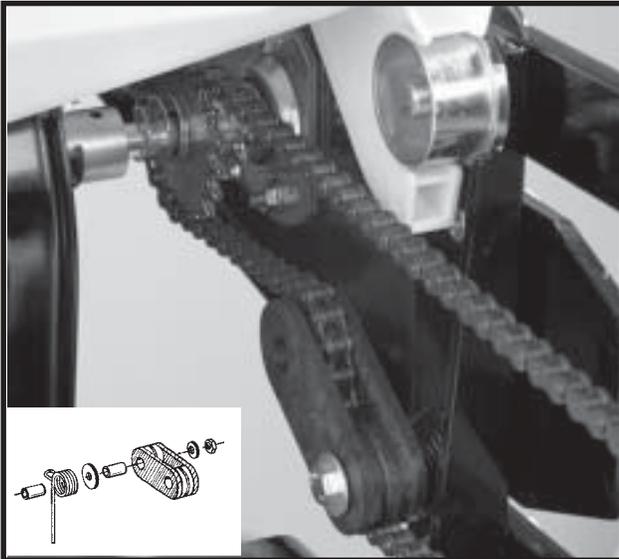
## ROW UNIT CHAIN ROUTING

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.

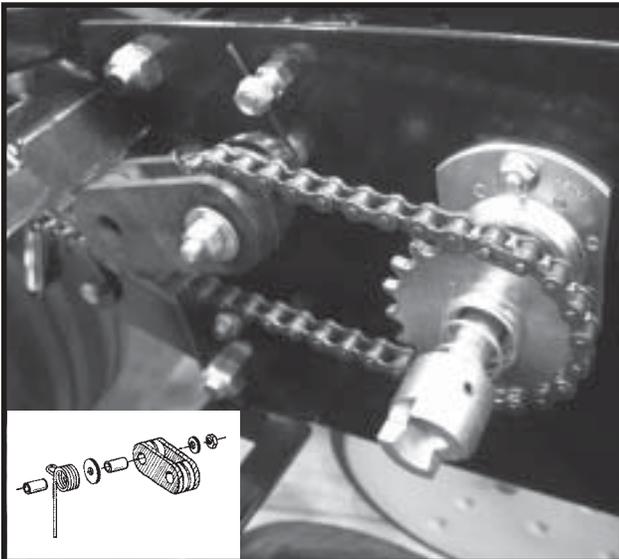
**NOTE: When idler shows signs of wear, it can be reversed for prolonged use.**

LF212199-5a(RU80g)



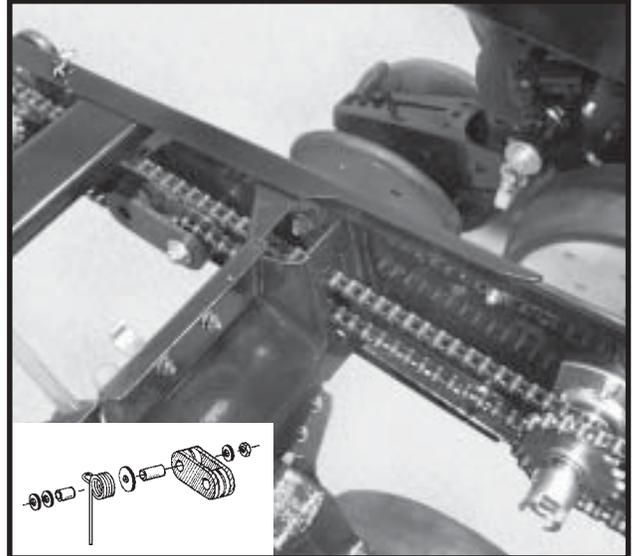
**Pull Row Unit Meter Drive**

D04209901a(RU80g)



**Push Row Unit Meter Drive**

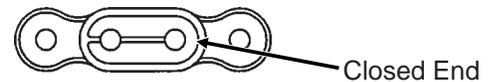
D05139901b(RU92l)



**Row Unit Granular Chemical Drive**

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

(PLTR24)



**Direction Of Chain Travel** →

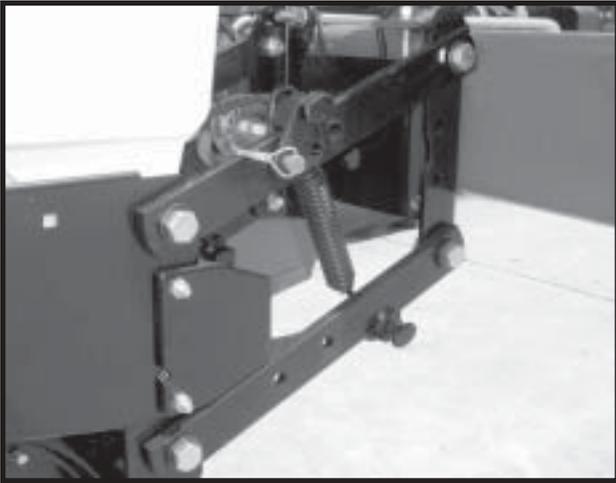
# ROW UNIT OPERATION

## QUICK ADJUSTABLE DOWN FORCE SPRINGS

Quick adjustable down force springs are designed to increase penetration in hard soil and keep the row unit from bouncing in rough field conditions.

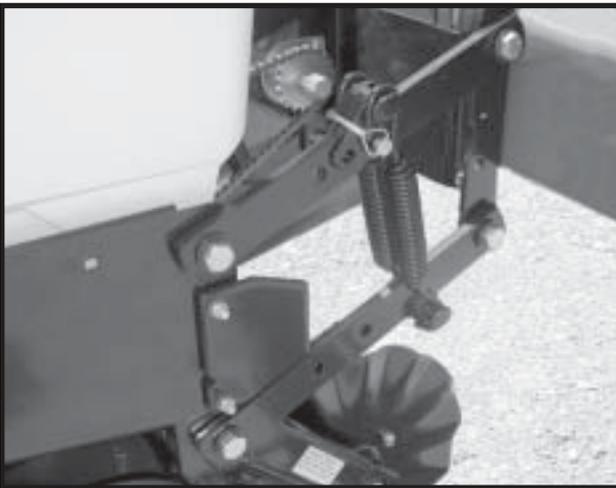
Two springs per row, one on the L.H. parallel arms and one on the R.H. parallel arms, are used unless equipped with row unit mounted no till coulters. Four springs per row are used with row unit mounted no till coulters.

D06300305



**Two Springs Per Row (Dual)**

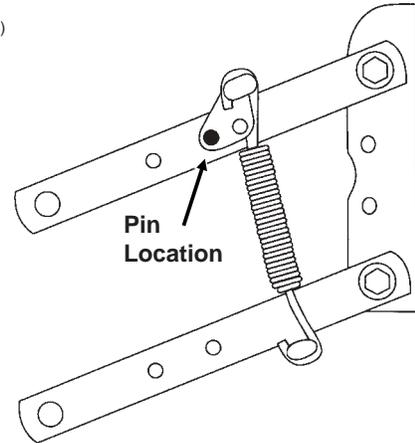
D07010301



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

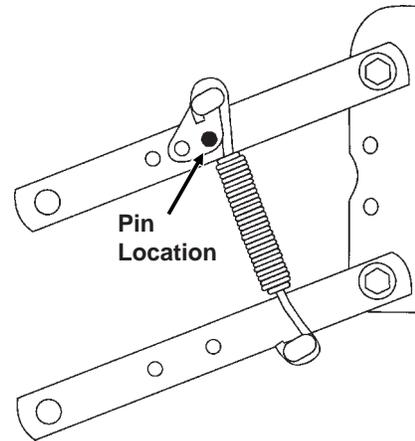
There are four positions for spring tension adjustment. Position 1 allows for minimum down pressure and position 4 for maximum down pressure.

L0096(PLTR27e)



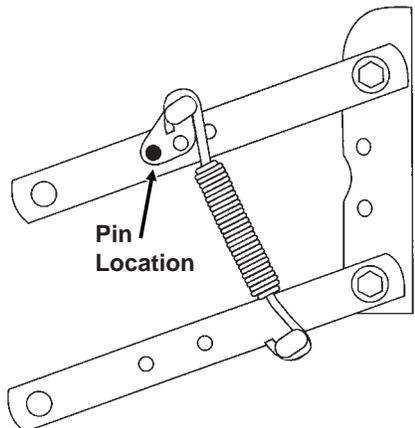
**Position 1 (Minimum)**

(PLTR28e)



**Position 2**

(PLTR29e)

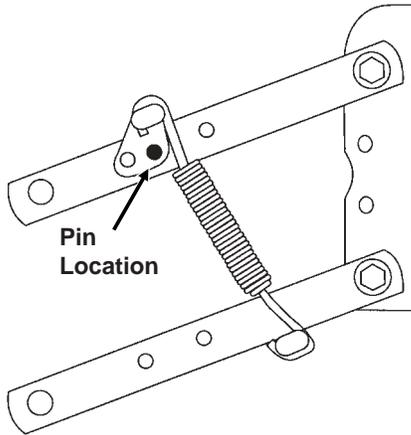


**Position 3**

# 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.



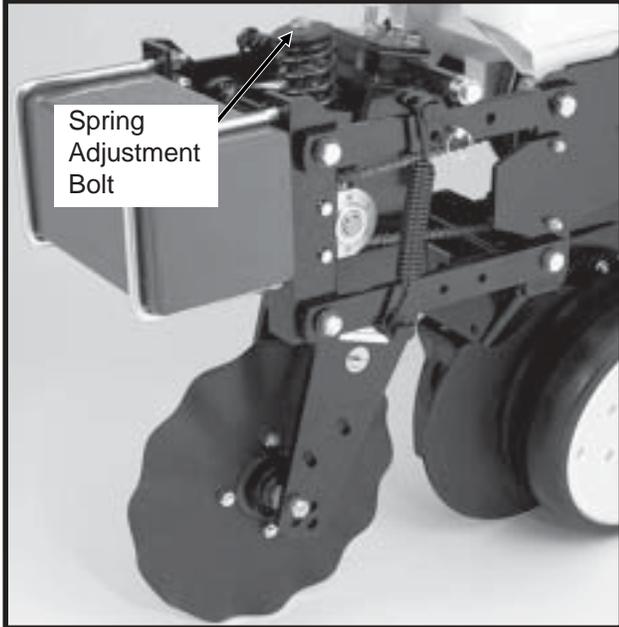
**WARNING:** Always install safety lockups or lower machine to the ground before working under or around the machine.

**NOTE:** Springs must always be installed with open side of spring hooks toward seed hopper to prevent binding on spring mount adjustment pin.

# ROW UNIT OPERATION

## FRAME MOUNTED COULTER - STYLE A

LF212299-20



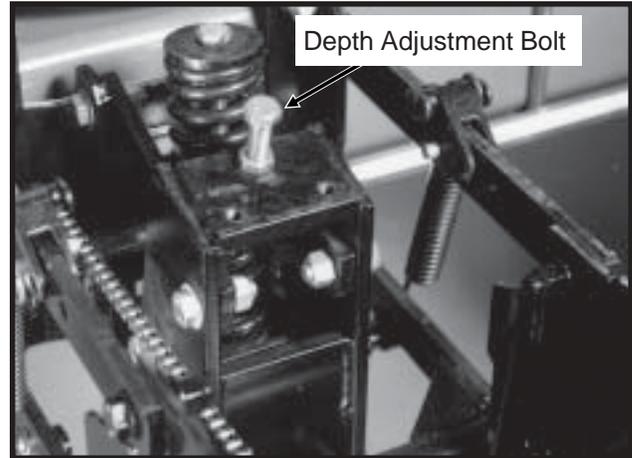
Frame mounted coulters with 1" bubbled, 1" fluted (8 flutes) or  $\frac{3}{4}$ " fluted (13 flutes) blades may be used on pull row units only. (Not compatible with push row units.)

The frame mounted couler is designed to allow required spring down pressure on the couler for maximum penetration while exerting less shock load on the row unit.

The frame mounted couler can be used with or without the depth control bar installed. In most applications, especially in rocky planting conditions, the depth control bar **should not be used**. Use of the depth control bar transfers down force from the couler to the row unit making less down force available to the couler blade.

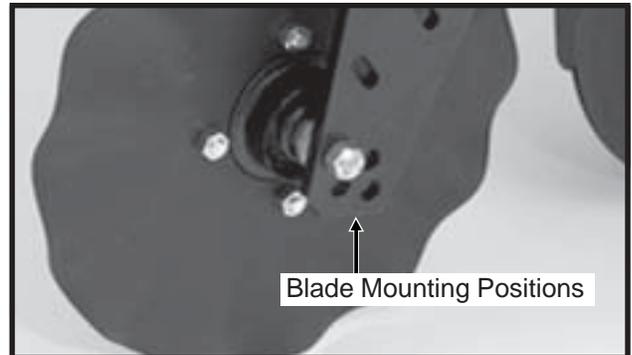
## DEPTH ADJUSTMENT (Without Depth Control Bar Installed)

56314-14a



When the depth control bar is not used, operating depth of the couler blade is determined by adjusting the depth adjustment bolt and positioning of the blade assembly in the fork mount. The depth adjustment bolt will stop downward travel of the couler arm assembly. One turn of the adjusting bolt will change depth setting approximately  $\frac{1}{4}$ ". Initial setting of the depth adjustment bolt should be with approximately  $1\frac{3}{8}$ " of thread showing. With this setting and the toolbar height at 20", the couler depth will be approximately 2" with couler mounting spindle in top hole. Turn the adjustment bolt clockwise to decrease operating depth. Turn the depth adjustment bolt counterclockwise to increase operating depth.

LF212299-20

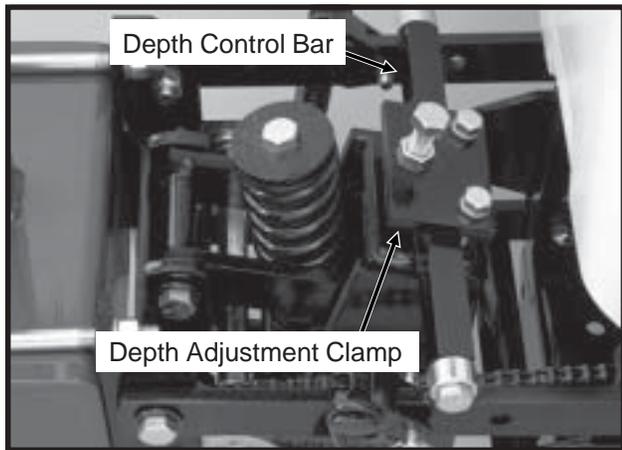


# ROW UNIT OPERATION

## DEPTH ADJUSTMENT

(With Depth Control Bar Installed)

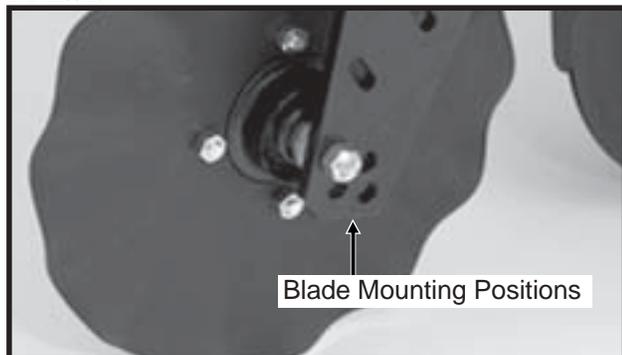
LF212199-4



In certain applications it is desirable to use the depth control bar. In uneven terrain, use of the depth control bar allows greater depth control. The up and down movement of the row unit allows the coulters to move up and down at a rate of approximately  $\frac{1}{2}$  that of the row unit, maintaining a more uniform operating depth. When using the disc furrower attachment, the depth control bar should always be used, as operating depth of the coulters is critical for the disc furrowers to operate with minimal gouging.

When using the depth control bar, down force springs must be located in the forward position and the depth adjustment bolt used only to attach the depth adjustment clamp to the coulters assembly. Operating depth of the coulters blade is adjusted by positioning the blade assembly in the fork mount. Four blade mounting adjustment positions are available at  $\frac{1}{2}$ " increments. Initial position of the blade assembly should be in the top hole. This position will locate the coulters blade approximately  $\frac{1}{4}$ " deeper than the row unit opener blade. In heavy residue it may be desirable to position the blade assembly in the second position to insure that the residue is cut and not forced down into the seed zone. Additional holes are used to compensate for coulters blade wear.

LF212299-20

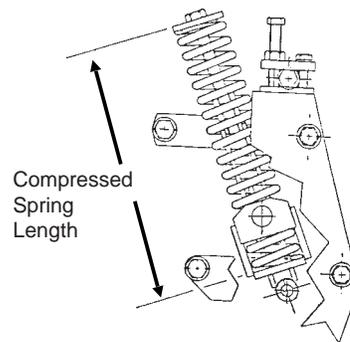


## SPRING ADJUSTMENT

**Down force adjustment is made by** tightening or loosening the spring adjustment bolt. With the planter in the raised position, turn the bolt clockwise to increase down force or counterclockwise to decrease down force. Set all rows equally.

Compressed Spring Length (Including Washer)	Pounds Down Pressure With Blade $\frac{1}{2}$ " Above Maximum Down Position	Pounds Down Pressure With Blade 4" Above Maximum Down Position
13 $\frac{5}{16}$ "	90	230
12 $\frac{5}{16}$ "	190	330
Suggested initial setting.		
11 $\frac{5}{16}$ "	300	430

A5649rev.(PLTR44)

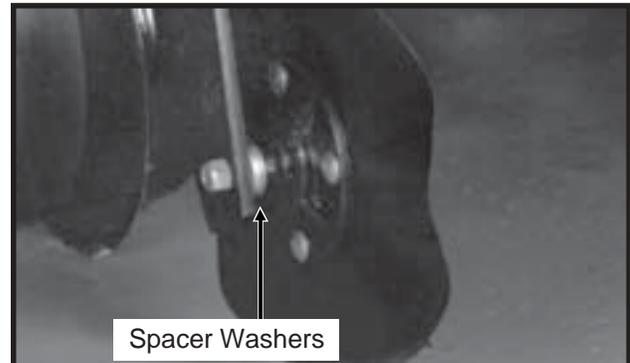


**IMPORTANT: Excessive down force may cause increased wear on components.**

## COULTERS BLADE ADJUSTMENT

The coulters blade can be aligned with the row unit disc opener by moving the spacer washers from one side of the coulters blade hub to the other.

56314-12



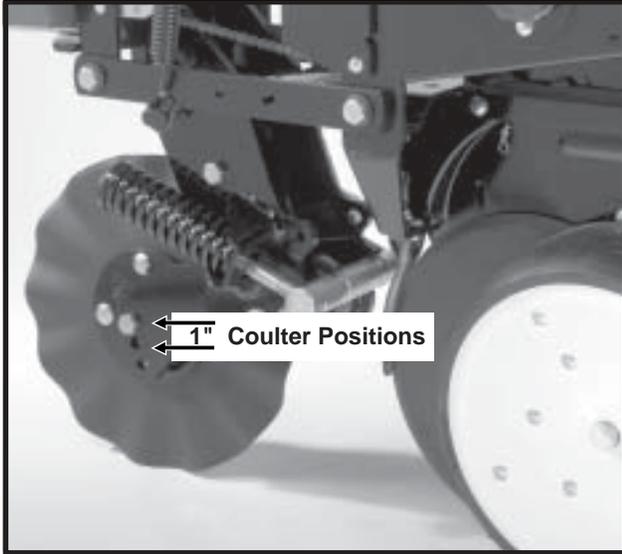
Field adjustment should be made as needed. Operating height of the planter frame will affect operating depth of the frame mounted coulters.

**NOTE: Torque  $\frac{5}{8}$ " spindle bolts to 120 ft. lbs.**

# ROW UNIT OPERATION

## FRAME MOUNTED COULTER - STYLE B

LF083002101

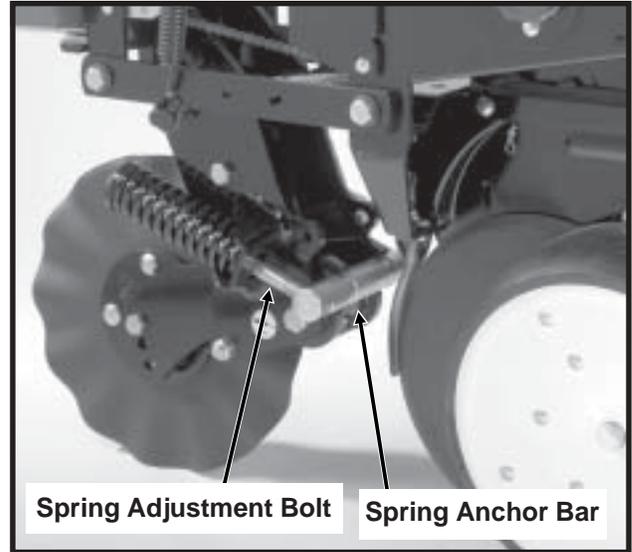


Frame mounted coulters with 1" bubbled, 1" fluted (8 flutes) or 3/4" fluted (13 flutes) blades may be used on pull row units only. (Not compatible with push row units.)

The frame mounted coulters is designed to apply necessary spring down pressure on the coulters for maximum penetration while exerting less shock load on the row unit.

The initial location of the coulters blade is in the top hole. The blade can be relocated to one of the lower two holes (1" increments) as wear occurs or if deeper operation of the blade is desired.

LF083002101



### DOWN PRESSURE ADJUSTMENT

Down force adjustment is made by tightening or loosening the two spring adjustment bolts. With the planter in raised position, turn the bolts clockwise to increase down pressure or counterclockwise to decrease down force. Set both springs the same.

Down force on the blade is shown below in lbs.

End Of Spring Adjustment Bolt Flush With Spring Anchor Bar (Shown Above)	End Of Spring Adjustment Bolt Extended 1/2" Through Spring Anchor Bar	All Threads Used (Maximum)
275 lbs.	400 lbs.	500 lbs.

**NOTE:** Avoid setting down pressure higher than is required for consistent soil penetration. Excessive pressure will increase the chances of damage to coulters components when the coulters strikes an obstacle.

# ROW UNIT OPERATION

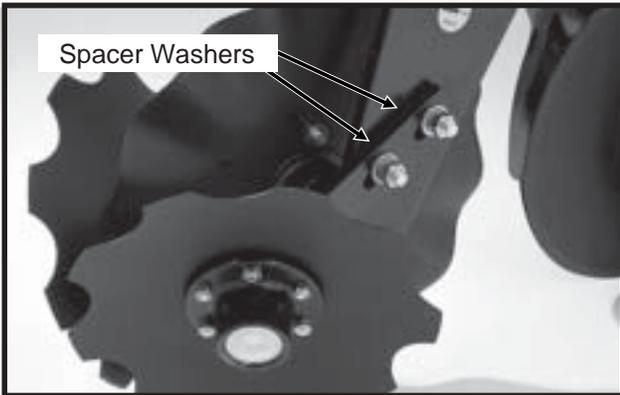
## DISC FURROWER

(For Use With Style A Frame Mounted Coulter)

The disc furrower for use with the frame mounted coulter 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.

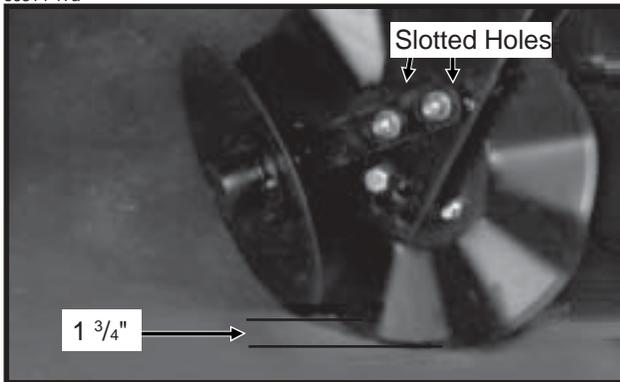
56314-19



Blades can be adjusted so front edges meet by adding spacer washers between the disc furrower arm and frame mounted coulter fork mount.

Slotted holes in the frame mounted coulter fork mount and in the disc furrower arm allow for vertical and horizontal adjustment. 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.

56314-17a



Initial setting for each disc furrower blade is 1 3/4" shallower than the coulter blade. Further adjustment may be desired for various applications.

**NOTE: The depth control bar should always be used when the frame mounted coulter is equipped with disc furrowers.**

## RESIDUE WHEELS

(For Use With Style B Frame Mounted Coulter)

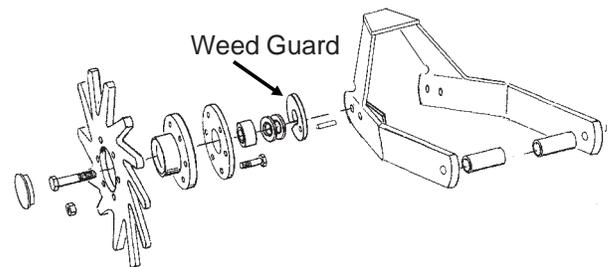
The residue wheels for use with the frame mounted coulter may be used on pull row units only.

LF083002102



The residue wheels are attached to the frame mounted coulter with two cap screws and sleeves allowing the unit to free-float. A 2-position spindle bolt mounting allows the tined wheels to be mounted interlocked or staggered. Depth adjustment is made using a spring-loaded cam and pin with 11 positions in 1/4" increments. A high point on the cam allows the wheels to be locked up so they do not contact the ground. A weed guard, located on the inboard side of each wheel, aids in the prevention of weed wrap which can cause premature bearing failure.

(RU135d)



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

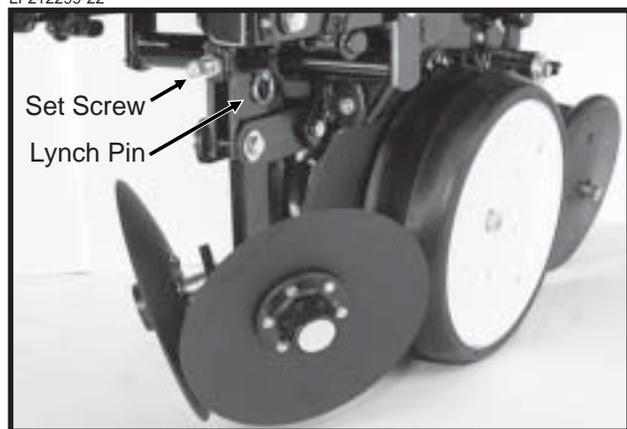
# ROW UNIT OPERATION

## 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.

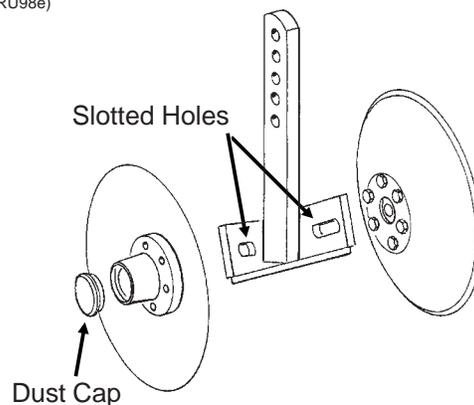
Disc furrowers are used to clear crop residue, dirt clods and dry soil from in front of the row units for a clean and smooth seed bed. Notched blades are used for heavier residue conditions. The notched blades cut crop residue and move it aside to prevent plugging or pushing.

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. Re-install 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)

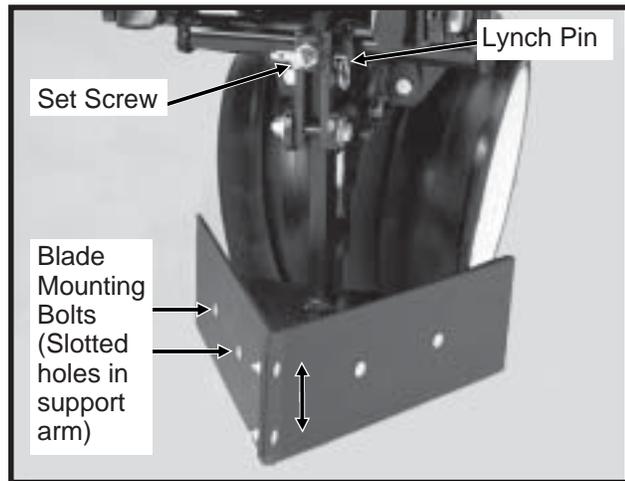


Slotted holes in the support arm where the blades are mounted allow fore and aft adjustment of the disc blades. Blades can be adjusted so the front edges meet or one blade can be moved to the rear and the other to the front of the slot so the cutting edge of one blade overlaps the edge of the other blade.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

# ROW UNIT OPERATION

## ROW UNIT MOUNTED BED LEVELER

LF212299-25a



Row unit mounted bed levelers may be used on pull row units only. They are not compatible with push row units.

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. Re-install 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.

Slotted holes in the support arm where the blades are mounted allow tilting of the blades. The blades can be tilted up or down at the front for desired adjustment.

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

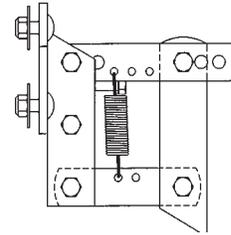
## ROW UNIT MOUNTED RESIDUE WHEEL

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

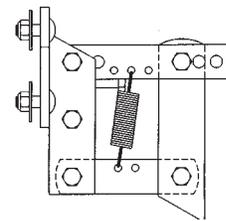
D101701113



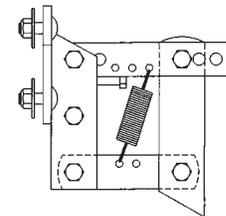
Two adjustable springs on the parallel links on each residue wheel allow for down force adjustment. Position 1 as shown below provides minimum down pressure and position 3 maximum down pressure.



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



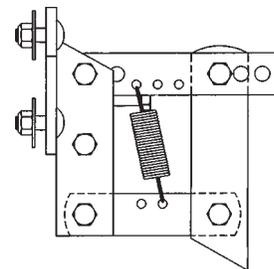
**Position 2** (PLTR32a)



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

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

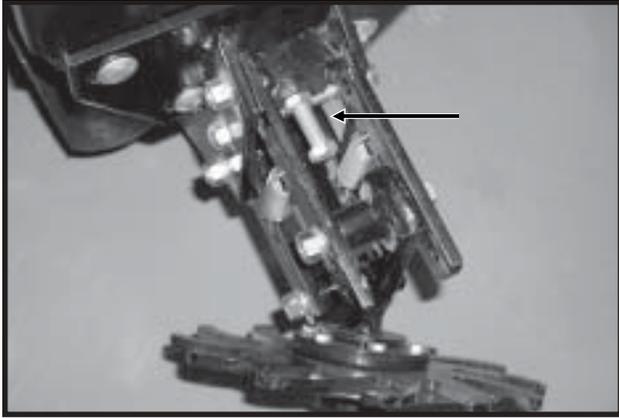
(PLTR34a)



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

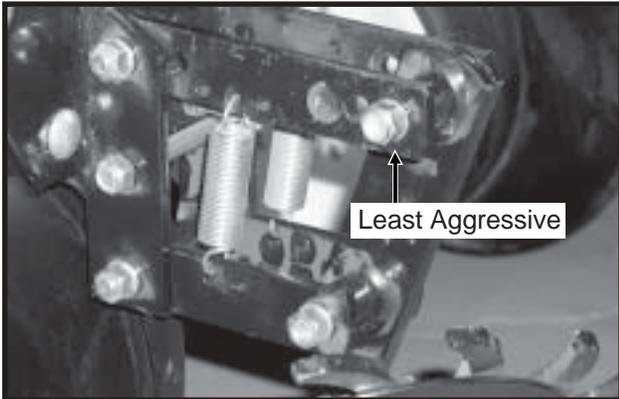
D101701112



A full threaded bolt and jam nut located on the upper link allows maximum depth to be set for loose soil conditions. Initial setting should be 1 3/4" above the depth of the row unit double disc opener.

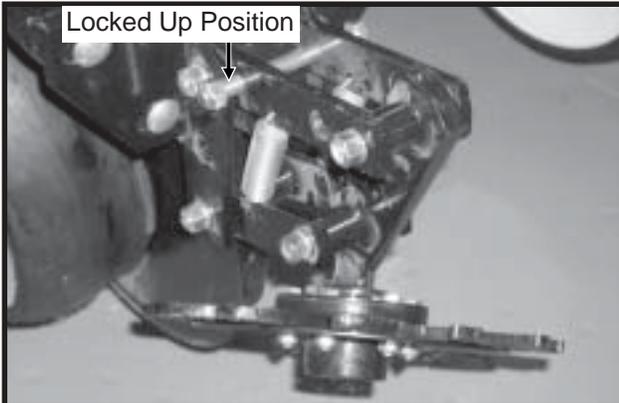
Three holes in the upper link allow for wheel angle adjustment. With the wheel mount in the most vertical position, using the rear hole in the upper link, the residue wheel is most aggressive. Moving the wheel mount to one of the forward holes reduces the aggressiveness of the wheel for use in mulch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

D101701202



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

D011701203



## ROW UNIT MOUNTED NO TILL COULTER

LF212299-19a



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

Four quick adjustable down force springs are required per row when using row unit mounted no till coulters. See "Quick Adjustable Down Force Springs".

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 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 5/8" spindle bolts to 120 ft. lbs.**

# ROW UNIT OPERATION

## COULTER MOUNTED RESIDUE WHEELS

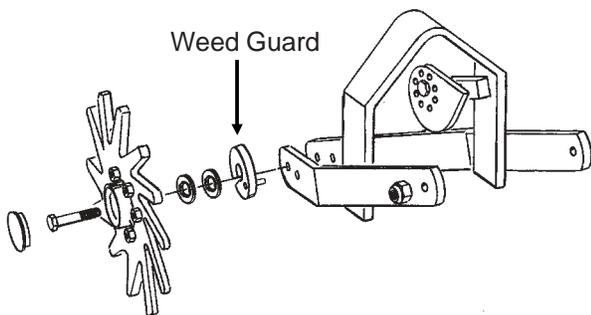
LF212299-23



Coulters mounted residue wheels are designed for use on pull row units and push row units. Row unit extension brackets are required on all the pull row units if the planter is equipped with coulters mounted residue wheels and HD single disc fertilizer openers.

The coulters mounted residue wheels are attached to the row unit mounted no till coulters with one cap screw and sleeve allowing the unit to free-float. A 2-position spindle bolt mounting allows the tined wheels to be mounted interlocked or staggered. 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.

(RU104n)



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

## 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.

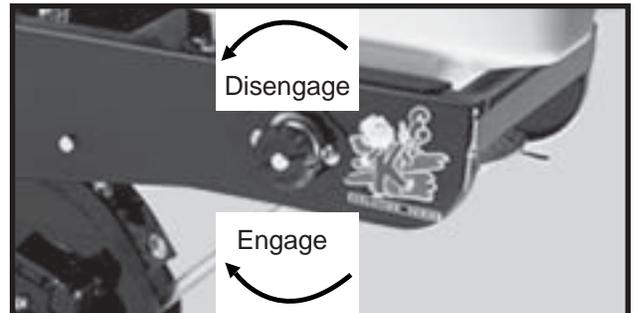
The metering gate located on the bottom of the hopper regulates the application rate. See "Dry Insecticide And Dry Herbicide Application Rate Charts" in this manual. Calibrate using the chemical manufacturers' instructions.



**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.

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 1/4 turn clockwise. To disengage the drive, turn the knob 1/4 turn counterclockwise. Slotted holes in the hopper support panel and clutch housing allow for alignment adjustment between the clutch drive coupler and meter shaft.

LF212299-4

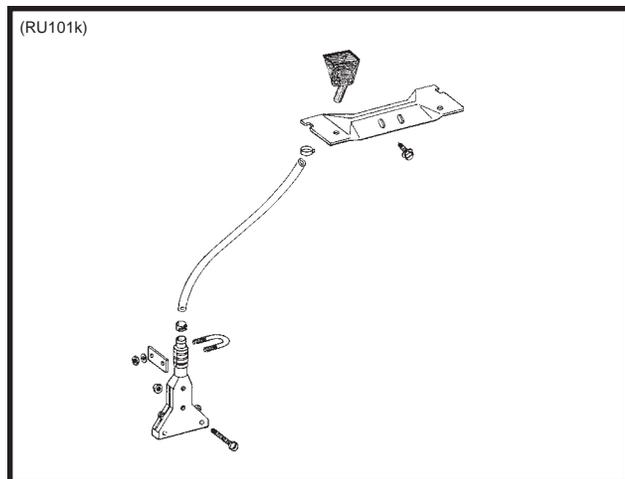


# ROW UNIT OPERATION

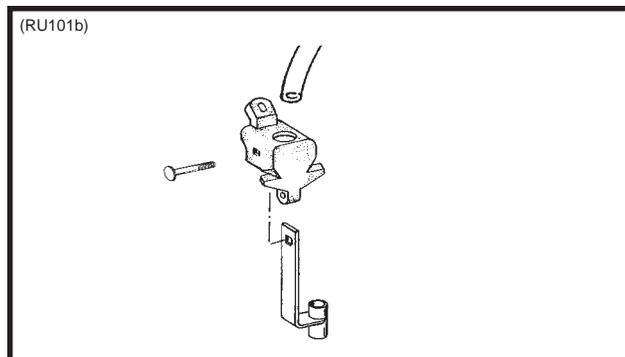
## GRANULAR CHEMICAL BANDING OPTIONS

Granular chemical banding options allow 4 1/2" slope-compensating banding, straight drop in-furrow placement or 14" rear banding.

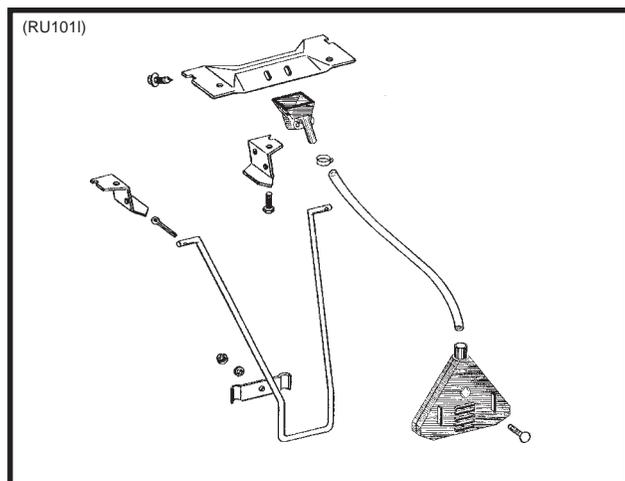
**NOTE:** The granular chemical rear bander is not compatible with the covering discs/single press wheel option.



4 1/2" Slope-Compensating Bander



Straight Drop In-Furrow Placement



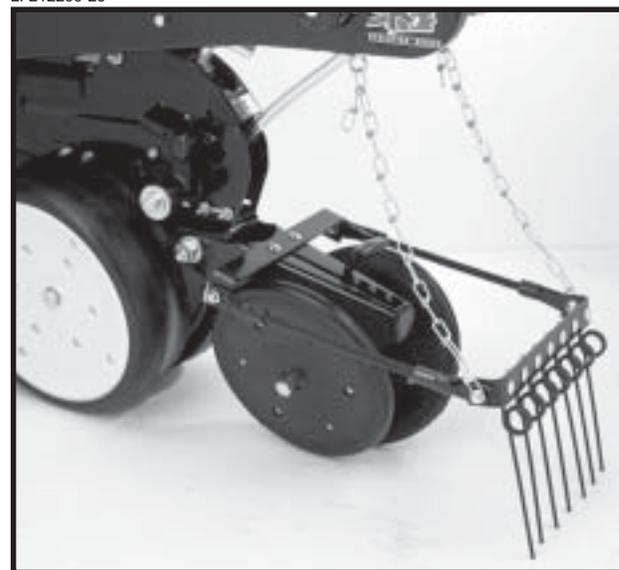
14" Rear Banding

## SPRING TOOTH INCORPORATOR

The spring tooth incorporator smooths 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 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

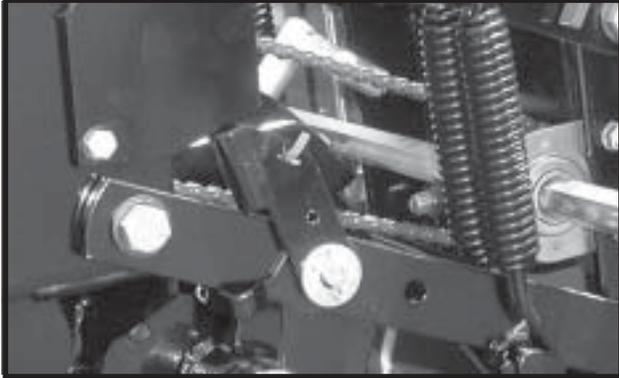
## INTERPLANT® PUSH ROW UNIT LOCK-UPS

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



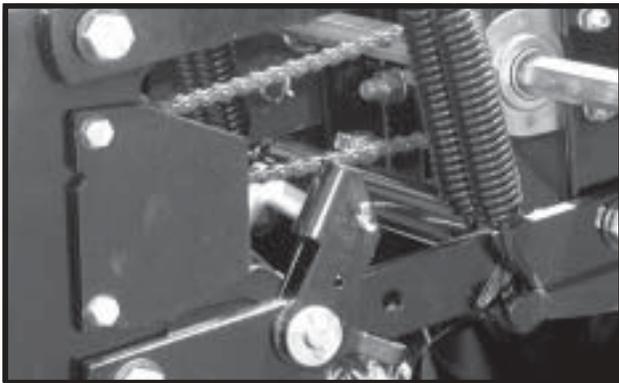
**WARNING:** Always install all safety lock-ups or lower planter to the ground before working under or around the machine.

D062603106



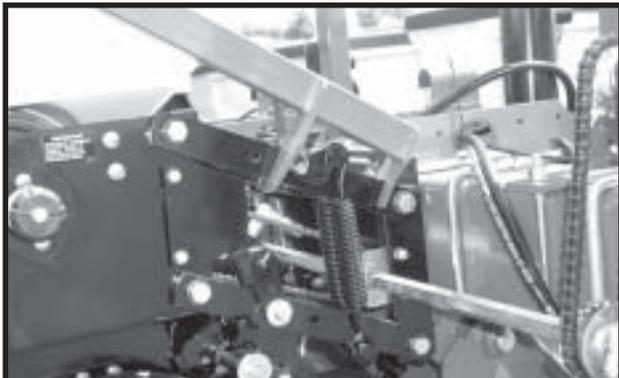
**Push Row Unit Locked In Raised Position**

D062603103



**Lockup Released For Field Operation**

D062603106

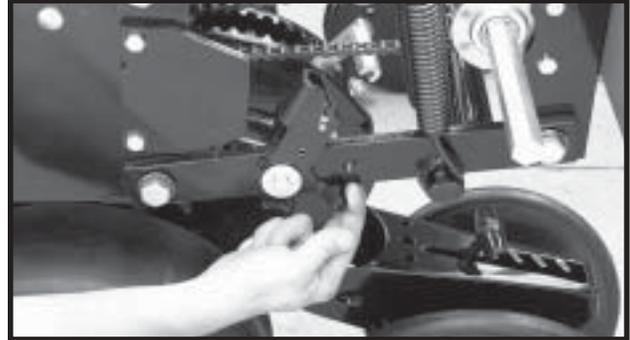


**Lift Lever Positioned To Lift Push Row Unit**

### 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

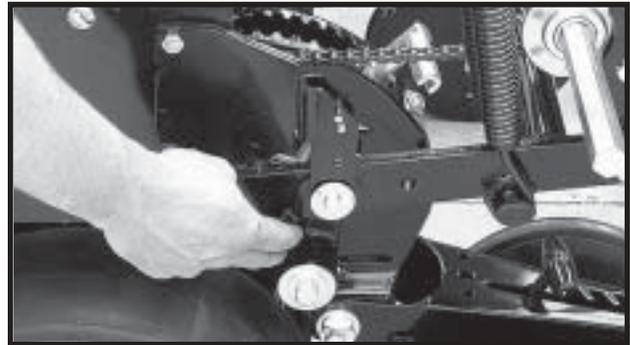


5. Using the lift lever, raise the push row unit to allow the spring loaded lockups to snap into locked position under the row unit stops.
6. Repeat Steps 4 and 5 on remaining push row units.

### To release lockups:

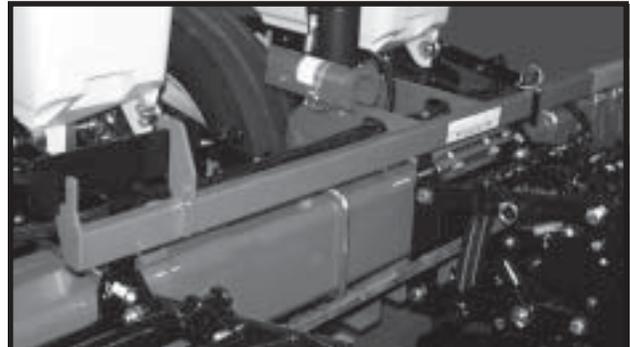
1. Lower the planter to the planting position.
2. On each push row unit lockup, flip the spring tab rearward.

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.

D070699109



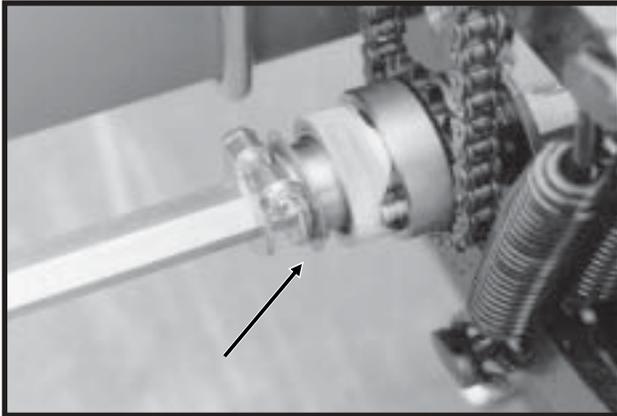
**Lift Lever In Storage Location**

# ROW UNIT OPERATION

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## 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.



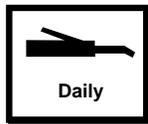
**WARNING:** Always install all safety lock-ups or lower planter to the ground before working under or around the machine.

# 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 lockups or lower the planter to the ground before working under the machine.**

## LUBRICATION SYMBOLS



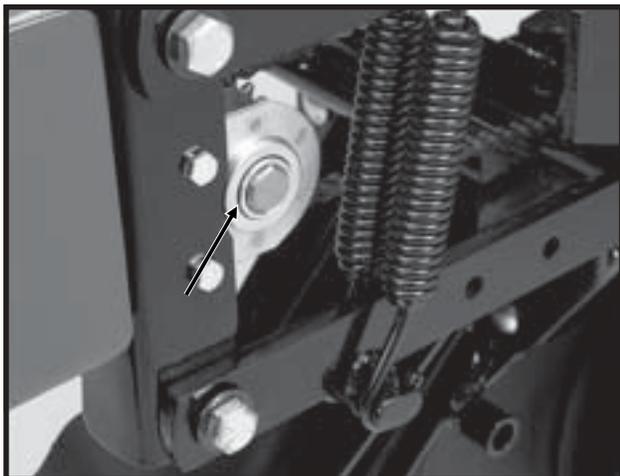
Lubricate at frequency indicated with an SAE multipurpose type grease.



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

## SEALED BEARINGS

LF212199-3

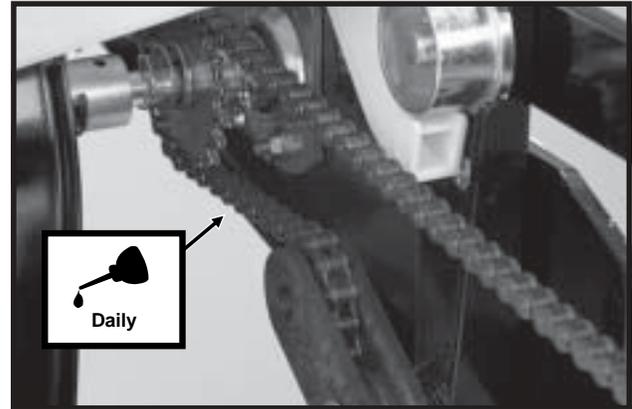


A number of sealed bearings are used on your KINZE® planter to provide trouble free operation. These are located in such areas as the drive shaft, row units and transmission bearings. Sealed bearings are lubricated for life. Due to the seals, relubrication is not practical.

## DRIVE CHAINS

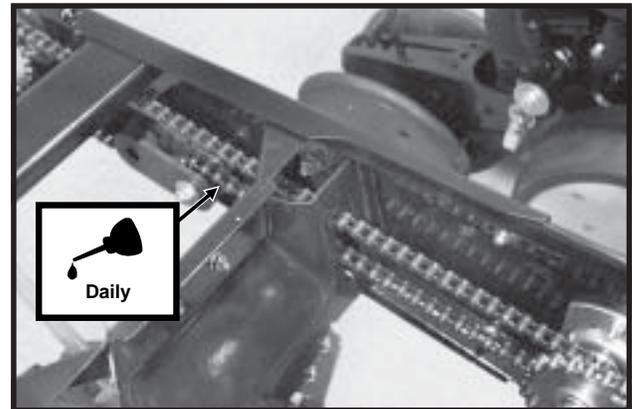
All transmission and drive chains should be lubricated daily with a high quality chain lubricant. Extreme operating conditions such as dirt, temperature or speed may require more frequent lubrication. If a chain becomes stiff, it should be removed, soaked and washed in solvent to loosen and remove dirt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

LF212199-5a



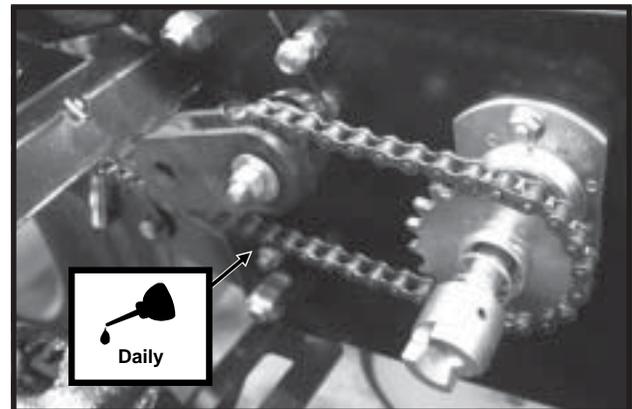
**Pull Row Unit Drive Chains**

D05139901b



**Row Unit Granular Chemical Drive Chains**

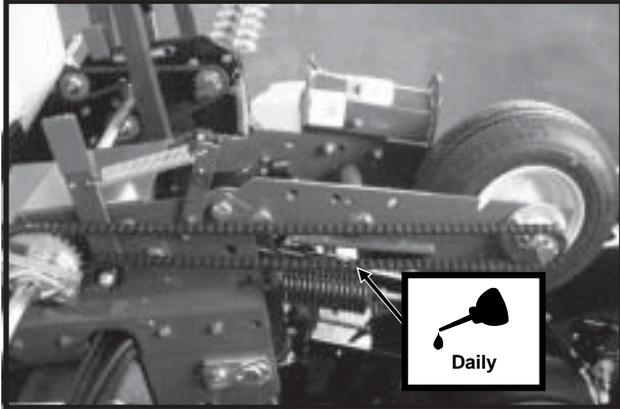
D04209901a



**Push Row Unit Drive Chains**

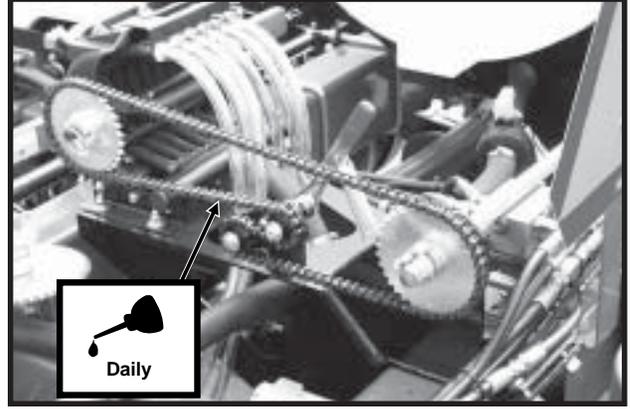
# LUBRICATION

D05170013a



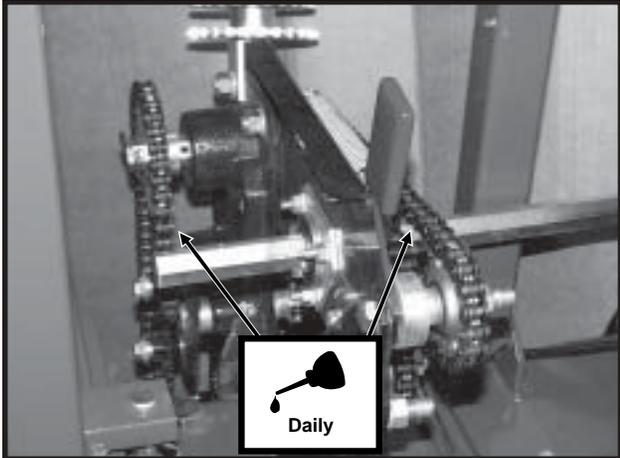
Contact Drive Wheel Chains

D06119928



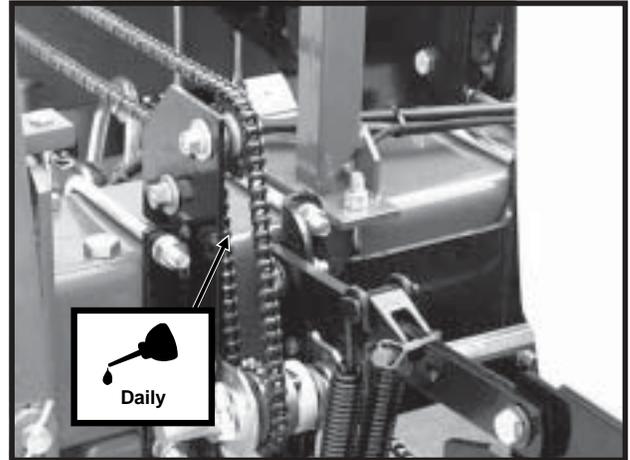
Liquid Fertilizer Drive Chain  
(Squeeze Pump Shown)

D06259920



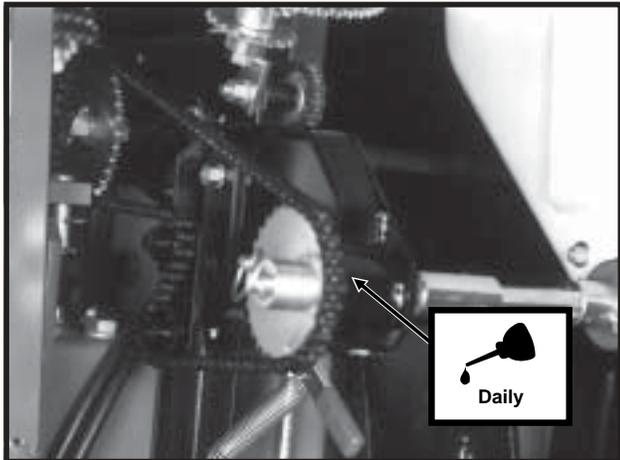
Transmission Assembly And Reverser Plate Chains

D06119927b



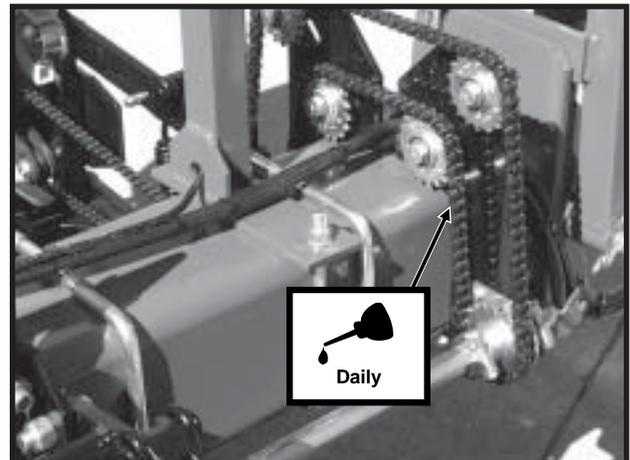
Interplant® Drive Chain (Double Frame®)

61111-7



Dry Fertilizer Drive Chain

D06079915



Interplant® Drive Chain (Single Frame)

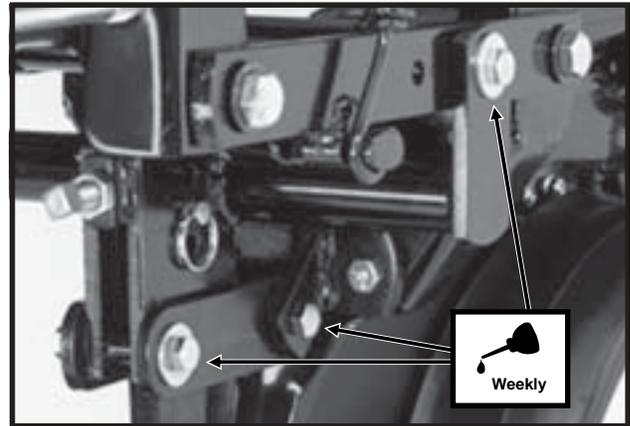
# LUBRICATION

## BUSHINGS

Lubricate bushings at the frequency indicated.

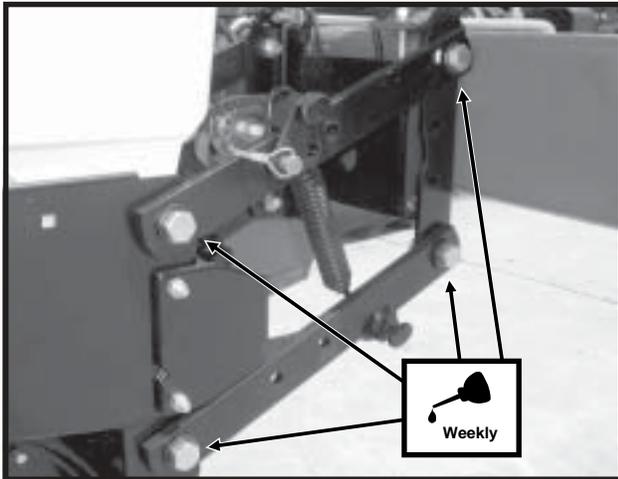
Using a torque wrench, check each bolt for proper torque. If bolt is loose, it should be removed and the bushing inspected for cracks and wear. Replace bushing if necessary. **Only hardened flat washers should be used. Replace damaged flat washers with proper part. Torque bolts to 130 ft. lbs.**

LF212299-22



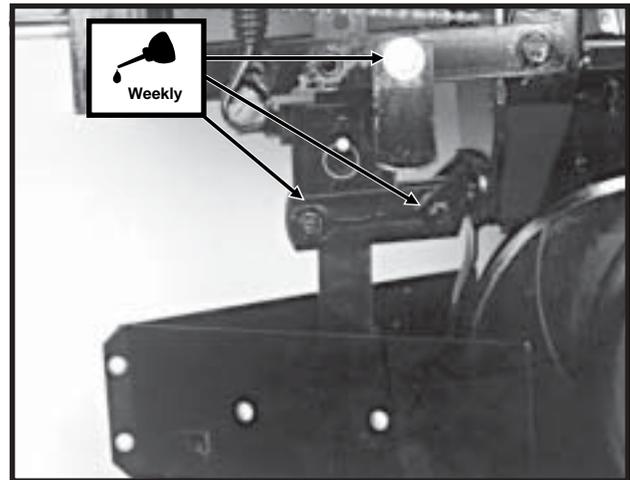
Row Unit Mounted Disc Furrower Parallel Linkage (6 Per Row)

D06300305



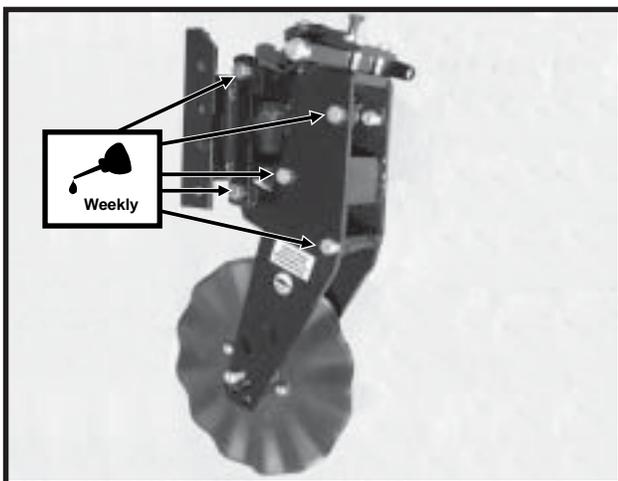
Pull Row Unit And/Or Push Row Unit Parallel Linkage (8 Per Row)

59386-26



Row Unit Mounted Bed Leveler Parallel Linkage (6 Per Row)

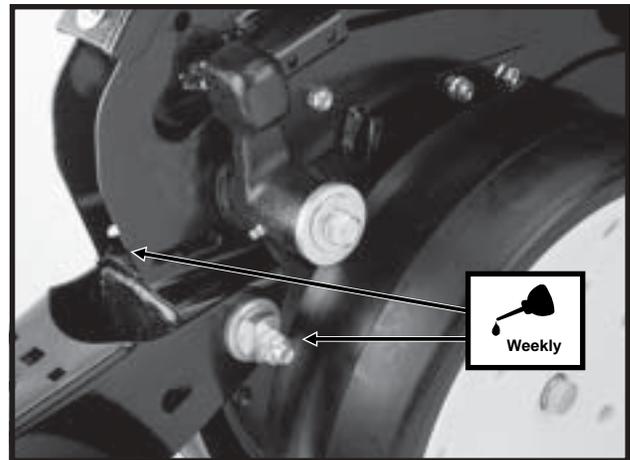
D06189901



Frame Mounted Coulter Parallel Linkage - STYLE A (10 Per Row)

*Shown not installed on row unit for visual clarity.*

LF212199-2



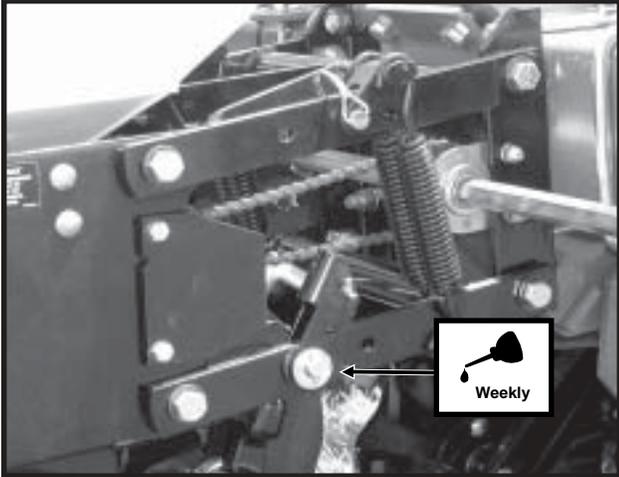
Row Unit "V" Closing Wheel, Covering Discs/ Single Press Wheel And/Or Drag Closing Wheel Eccentric Bushings (2 Per Row)

# LUBRICATION

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## INTERPLANT® PUSH ROW UNIT LOCKUPS

D062603103



2 Per Row

# LUBRICATION

## WHEEL BEARINGS

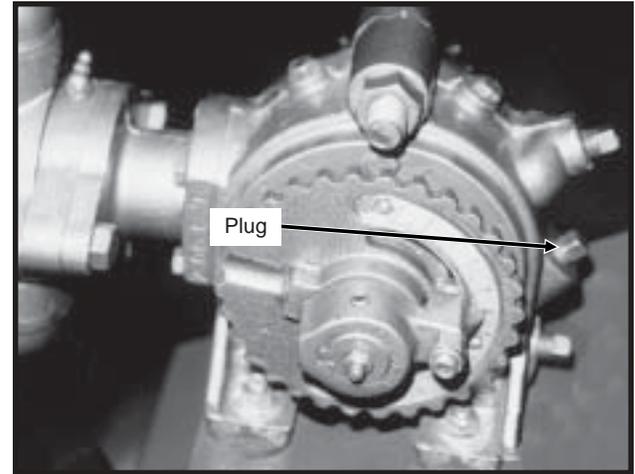
All wheel bearings should be repacked annually and checked for wear. This applies to all drive wheels, transport wheels and marker hubs.

To check for wear, raise the wheel off the ground. Check for endplay in the bearings by moving the tire in and out. 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 "Wheel Bearing Lubrication Or Replacement".

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



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.

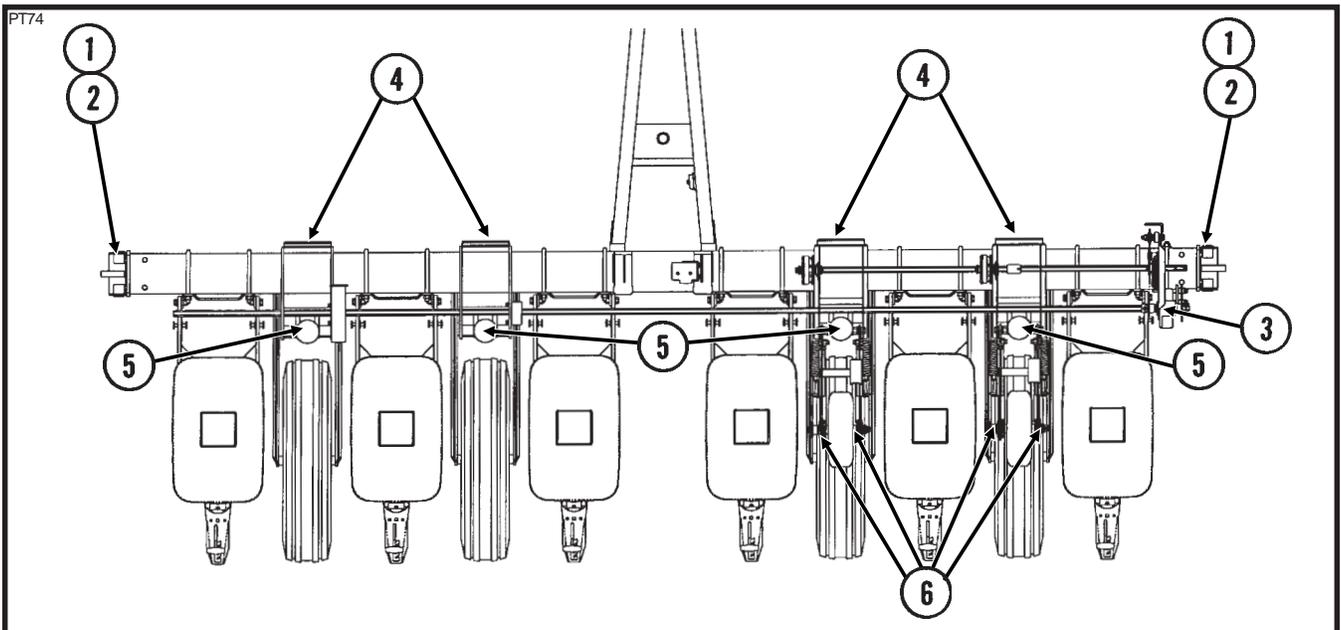
## GREASE FITTINGS

Those parts equipped with grease fittings should be lubricated at the frequency indicated with an SAE multipurpose type 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 lockups or lower the planter to the ground before working under or around the machine.

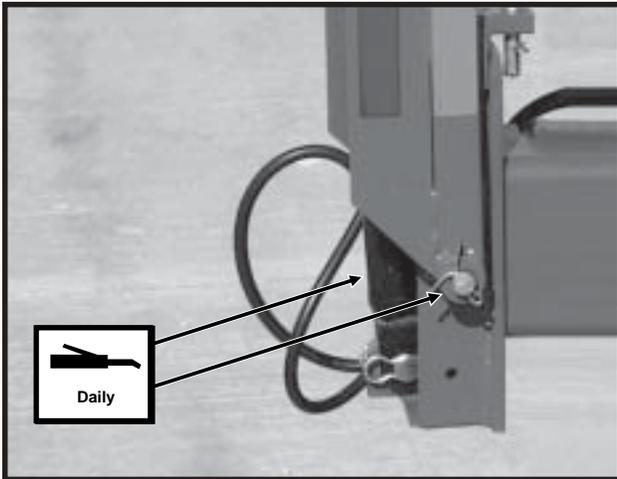
**NOTE:** Numbers on illustration below correspond to photos on following pages showing lubrication frequencies.



6 Row 30" Size Shown

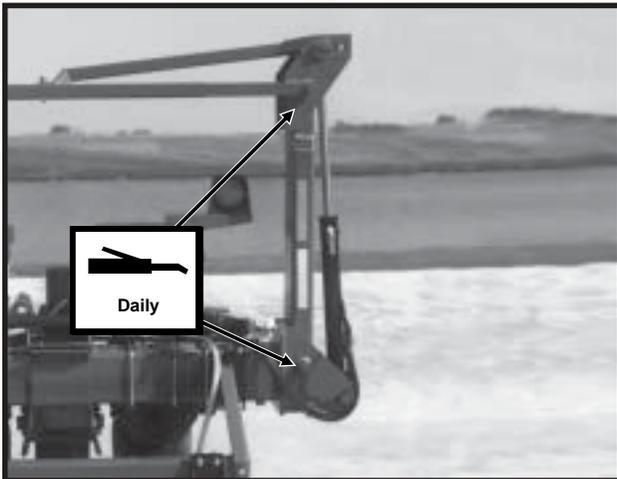
# LUBRICATION

D101900103a



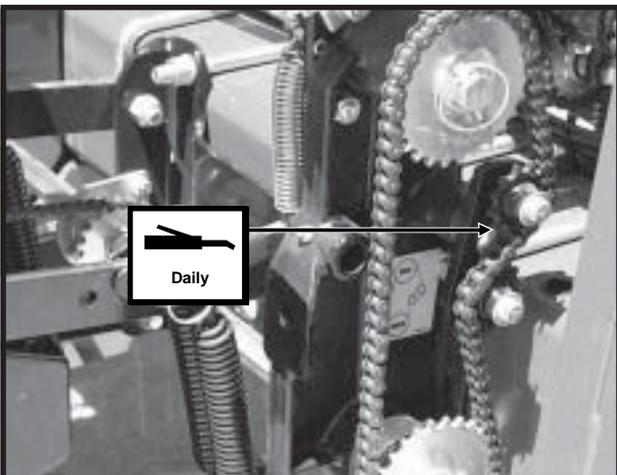
1. Conventional Marker Assembly - 4 Zerks Per Assembly

73327-18b



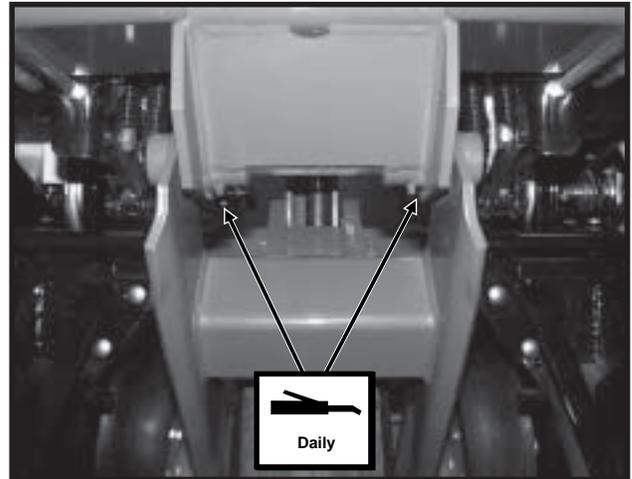
2. Low Profile Marker Assembly - 2 Zerks Per Assembly

D05259914



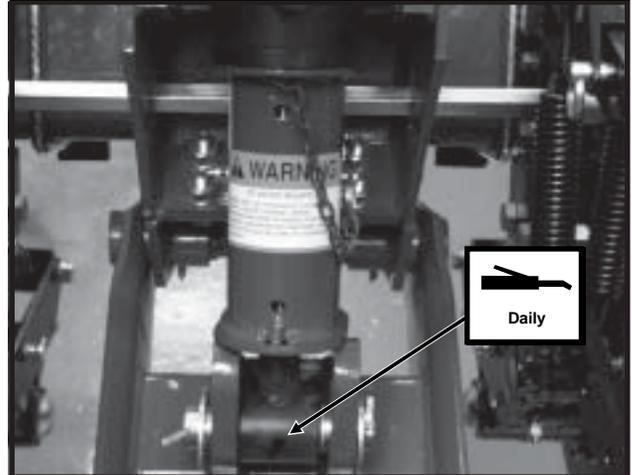
3. Transmission Assembly - 1 Zerk (Idler)

D06289928



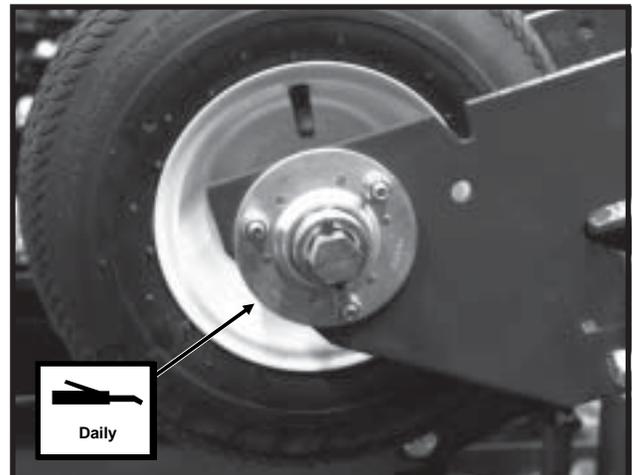
4. Wheel Module Assembly - 2 Zerks Per Module

D05170003a



5. Planter Lift Cylinders (Master, Slave And Assist)- 1 Zerk Per Cylinder.

D04200001

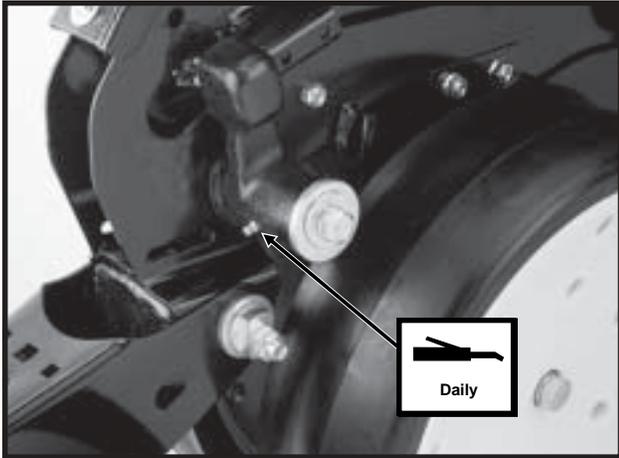


6. (If Applicable) Contact Wheel Arm Bearing - 2 Zerks Per Arm Assembly (**Rotate tire while filling with grease.**)

# LUBRICATION

## Row Unit

LF212199-2



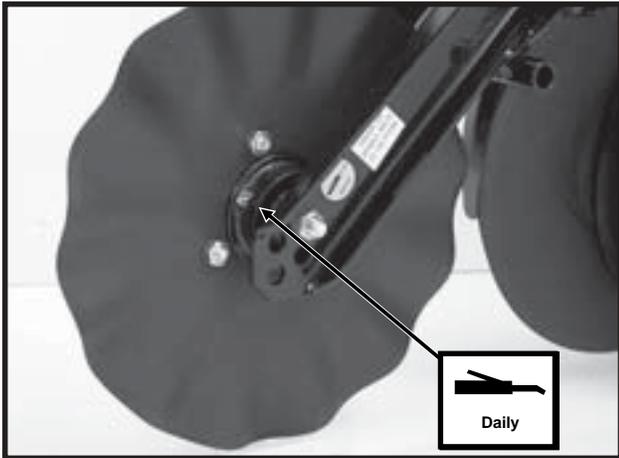
Gauge Wheel Arms - 1 Zerk Per Arm  
**(Seals in gauge wheel arm are installed with lip facing out to allow grease to purge dirt away from seal. Pump grease into arm until fresh grease appears between washers and arm.)**

56673-6



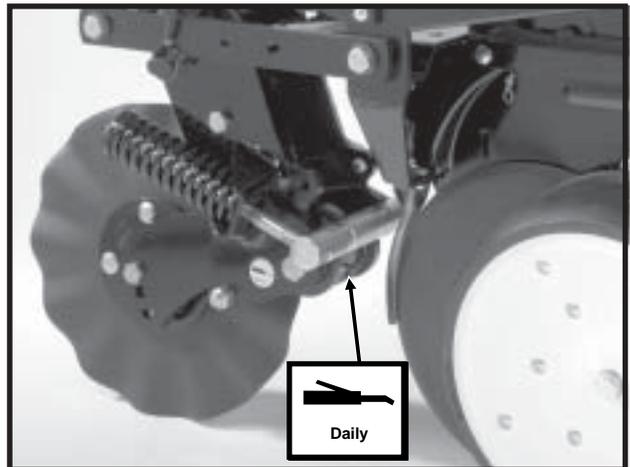
(If Applicable) Frame Mounted Coulters Hubs - STYLE A  
- 1 Zerk Per Hub  
**(Pump grease into hub until grease comes out around the seals. Spin hub while filling with grease.)**

LF212299-19



(If Applicable) Row Unit Mounted No Till Coulters Hubs -  
1 Zerk Per Hub  
**(Pump grease into hub until grease comes out around the seals. Spin hub while filling with grease.)**

LF083002101

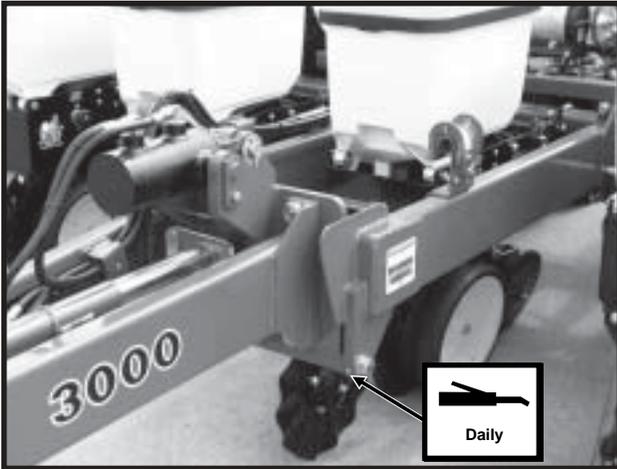


(If Applicable) Frame Mounted Coulters - STYLE B -  
1 Zerk Per Arm

# LUBRICATION

## Interplant® Attachment

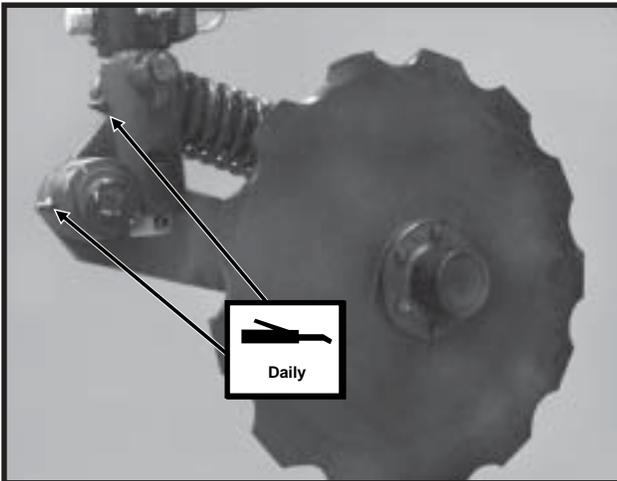
D07019902



Interplant® Self-Leveling Hitch Extension - 2 Zerks

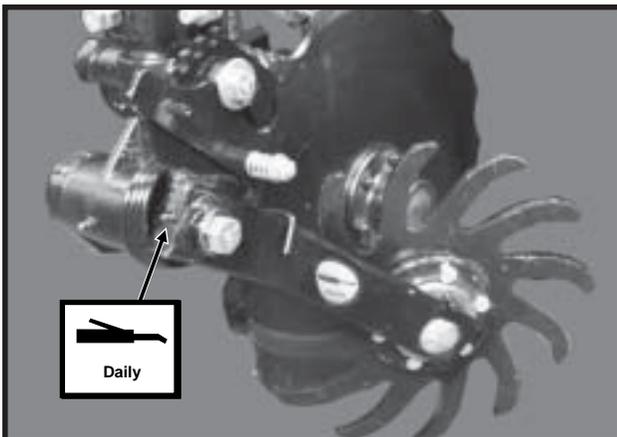
## Fertilizer Openers

D05189901



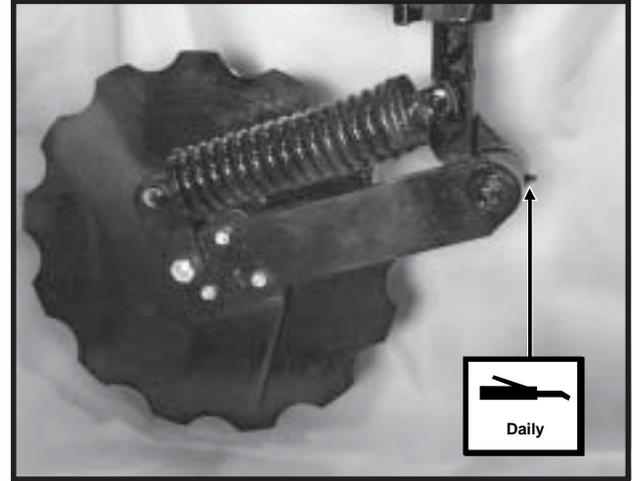
Notched Single Disc Fertilizer Opener - STYLE A - 2 Zerks

D05219901a



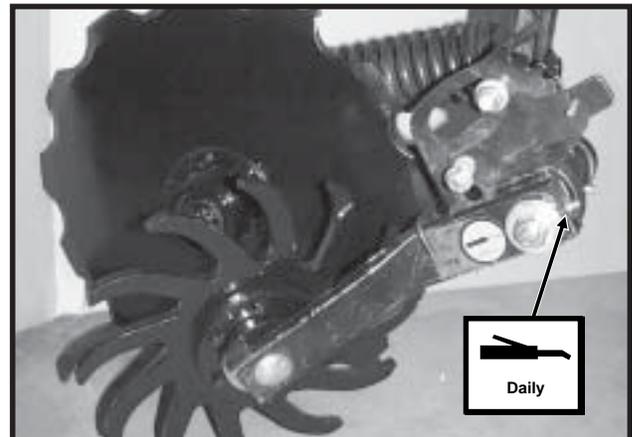
(If Applicable) Residue Wheel Attachment For Use With STYLE A Notched Single Disc Fertilizer Opener - 1 Zerk

D060801304



Notched Single Disc Fertilizer Opener - STYLE B - 1 Zerk

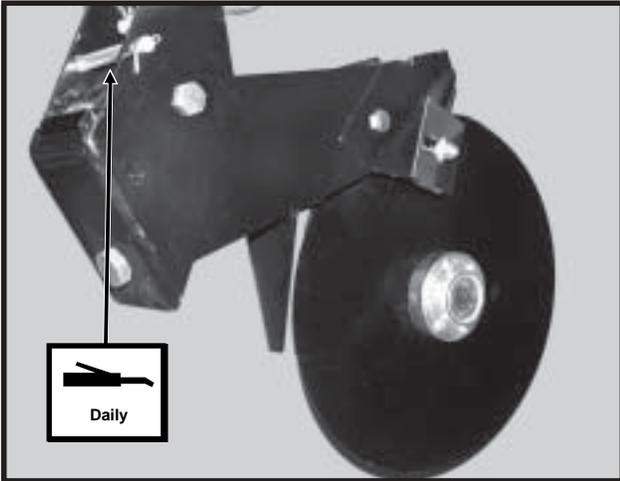
D052201104



(If Applicable) Residue Wheel Attachment For Use With STYLE B Notched Single Disc Fertilizer Opener - 1 Zerk

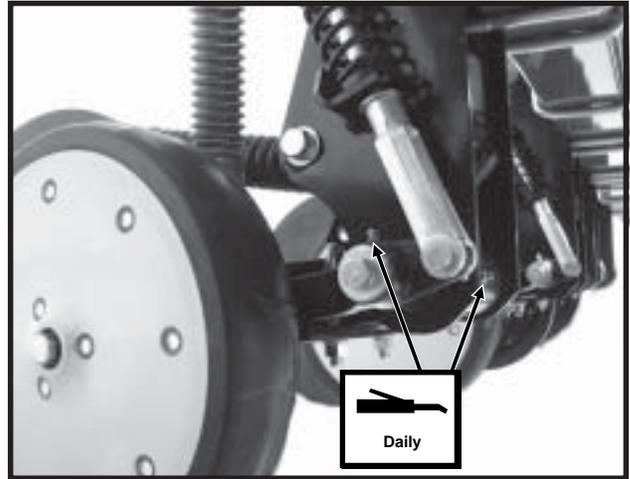
# LUBRICATION

D06259919



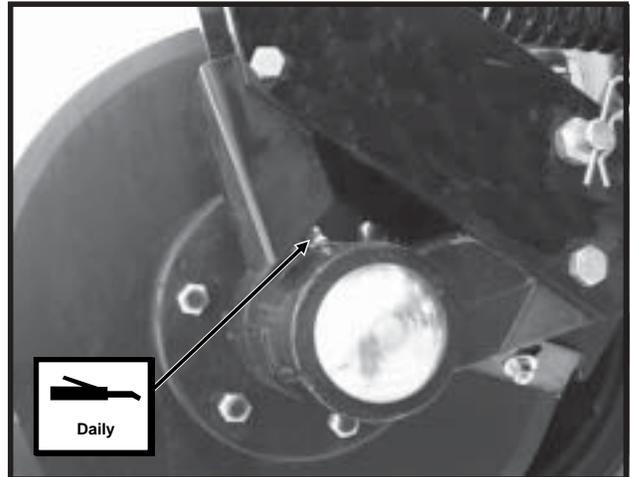
Double Disc Fertilizer Opener - 1 Zerk

D060801304



HD Single Disc Fertilizer Opener - 2 Zerks  
(Located On Wheel Arm And Opener Mount)

D060801303

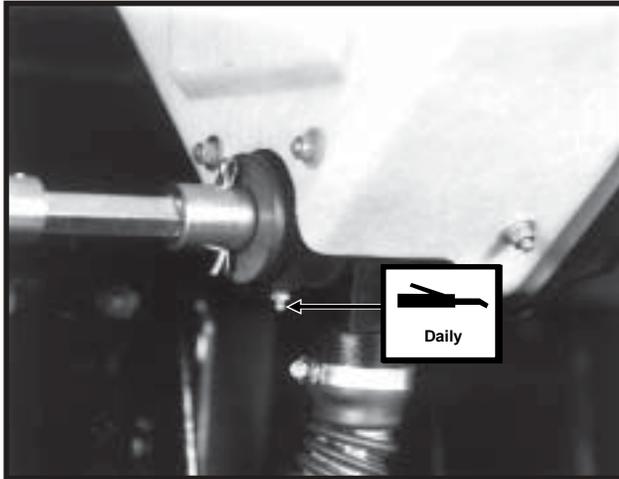


HD Single Disc Fertilizer Opener - 1 Zerk  
(Located On Disc Opener Spindle Hub)

# LUBRICATION

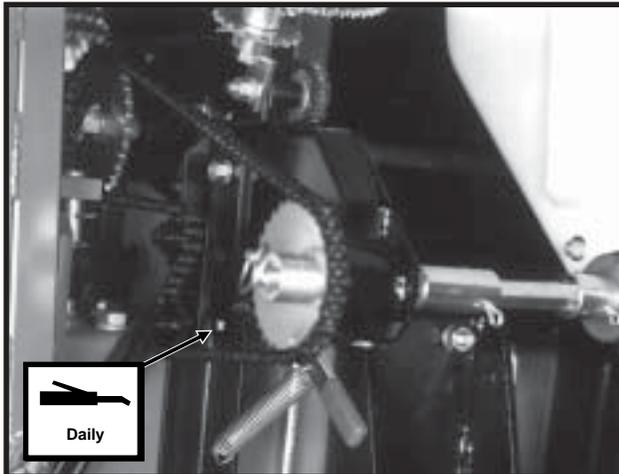
## Dry Fertilizer Attachment

61111-28



Fertilizer Hopper - 2 Zerks Per Hopper

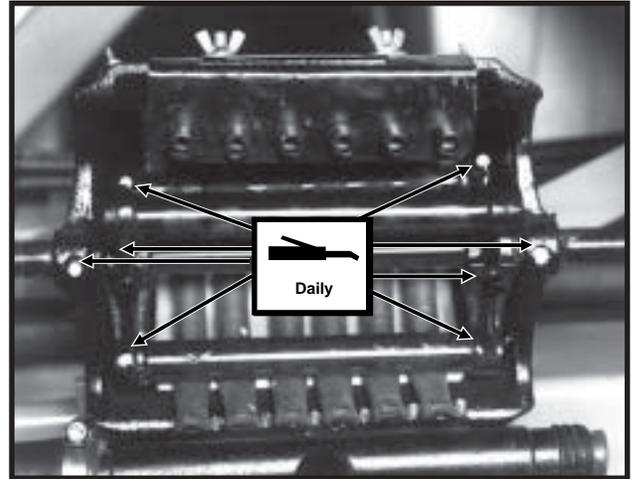
61111-7



Fertilizer Transmission - 1 Zerk Per Transmission

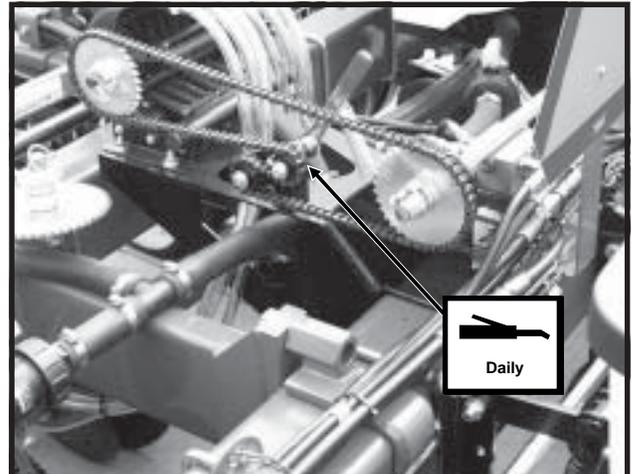
## Liquid Fertilizer Attachment

61010-6



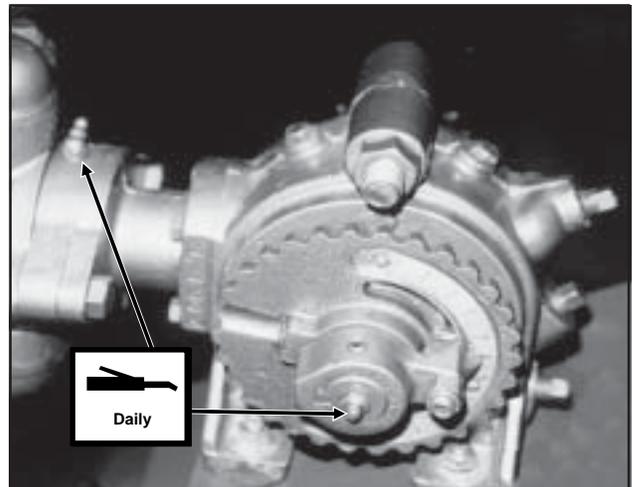
Squeeze Pump - 8 Zerks Per Pump

D06119928



Squeeze Pump/Piston Pump Drive Chain Idler - 1 Zerk Per Idler (Squeeze Pump Shown)

12229799



Liquid Fertilizer Piston Pump - 2 Zerks (Fill zerk on outboard stuffing box until lubricant seeps out of drain hole in bottom.)

# MAINTENANCE

## MOUNTING BOLTS AND HARDWARE

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

All hardware used on the KINZE® planter is Grade 5 (high strength) unless otherwise noted. Cap screws are marked with three radial lines on the head. If hardware must be replaced, be sure to replace it with hardware of equal size, strength and thread type. Refer to the torque values chart when tightening hardware.

Row Unit Parallel Linkage Bushing Bolts - 130 Ft. Lbs. (See "Bushings" in the Lubrication Section of this manual.)

**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 bolts on the transport wheels are tight. This is especially important if the planter is to be transported for a long distance.

<sup>5</sup>/<sub>8</sub>" No Till Coultter Spindle Bolt - 120 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

## TIRE PRESSURE

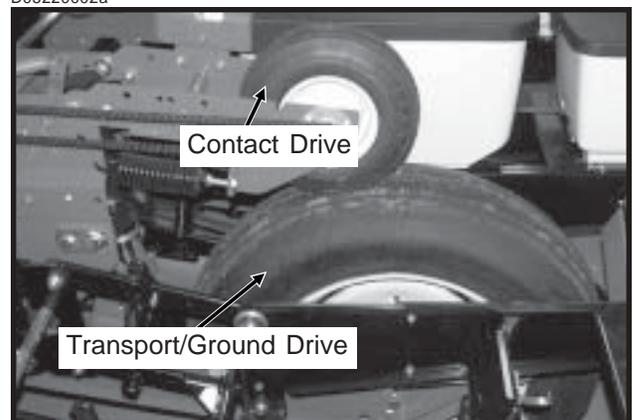
Tire pressure should be checked regularly and maintained as follows:

7.50" x 20", Transport/Ground Drive ..... 40 PSI  
4.10" x 6", Contact Drive ..... 50 PSI



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

D05220002a

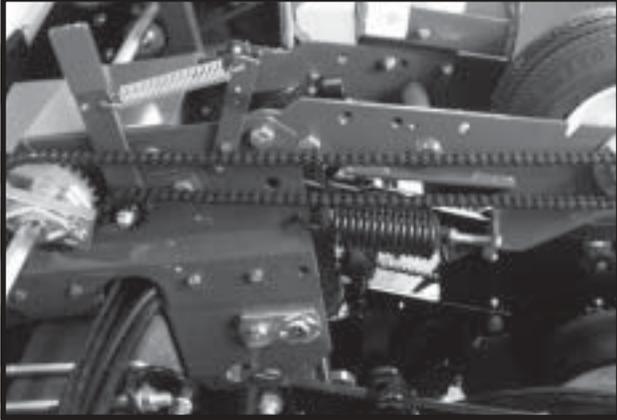


# MAINTENANCE

## CHAIN TENSION ADJUSTMENT

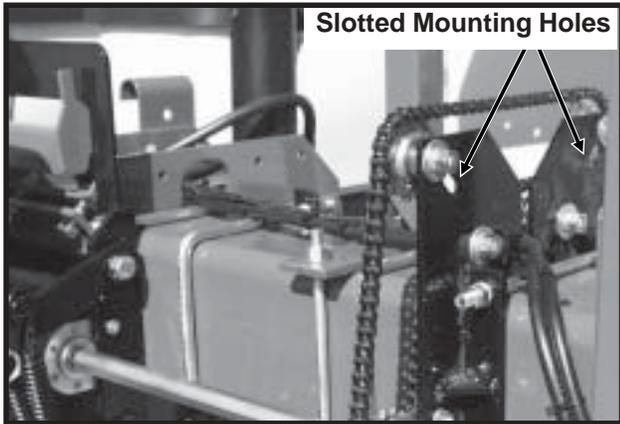
Drive chains equipped with a spring loaded idler are self-adjusting. The only adjustment needed is to shorten the chain if wear stretches the chain and reduces spring tension. The pivot point of these idlers should be checked periodically to ensure they rotate freely.

D060799115



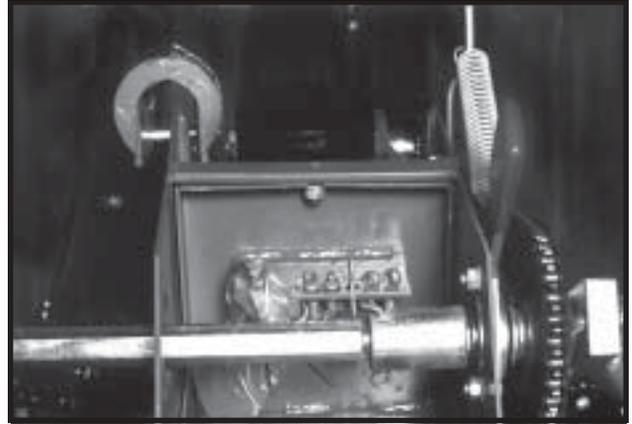
Interplant® push row unit drive chain adjustment is made by loosening the idler sprockets mounting hardware and sliding the sprockets in the slotted mounting holes.

D06079909



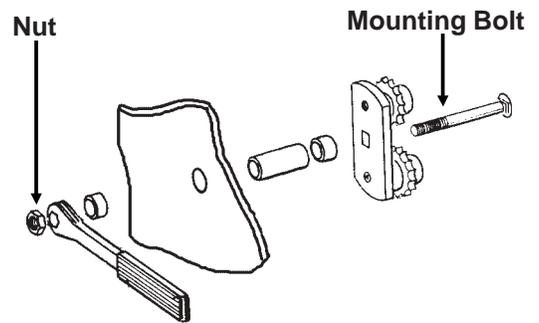
Additional chain links can be found in the storage box located inside the wheel module.

61010-1a



**NOTE:** The nut on the mounting bolt (on applicable idler assemblies) must be kept tight or chain tension will not be maintained and adjustment wrench will not function properly.

(MT18a)

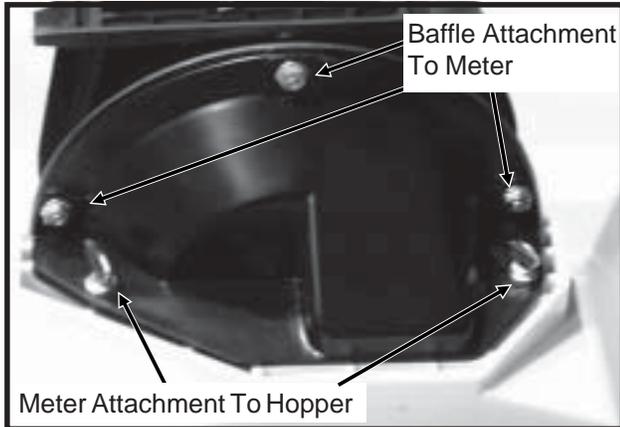


# MAINTENANCE

## FINGER PICKUP SEED METER INSPECTION/ADJUSTMENT

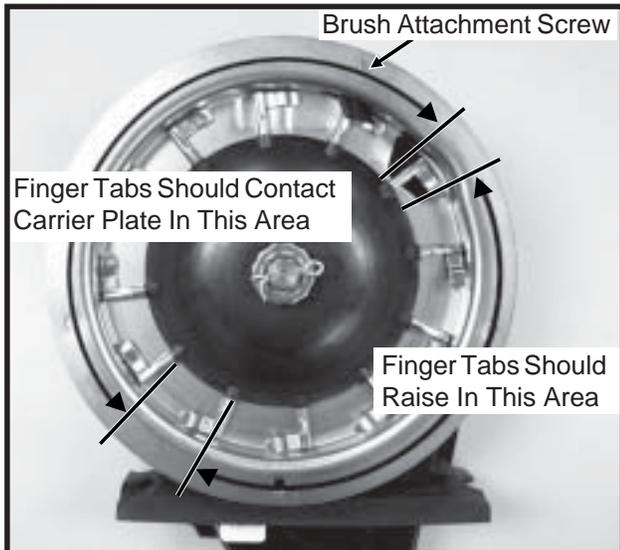
To inspect or service the finger pickup seed meter, remove the meter from the seed hopper by removing the two thumbscrews which secure the mechanism to the hopper. Remove the baffle from the meter assembly by removing three cap screws. This will permit access to the finger pickup.

D04229901



Rotate the seed meter drive by hand to ensure that the springs are holding the tabs of the fingers against the carrier plate where indicated in the photo and that the fingers are being raised in the correct area.

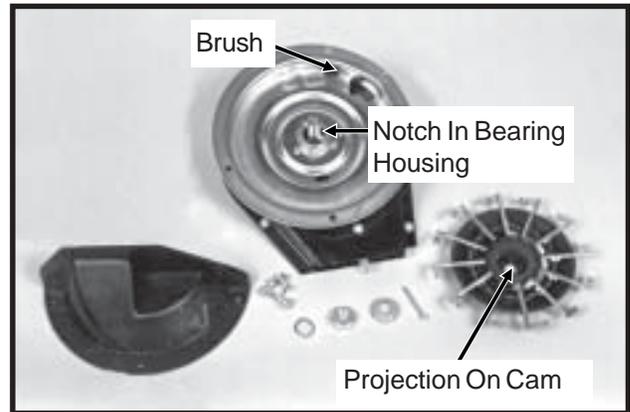
D05030002a



A build-up of debris or chaff may prevent proper finger operation and will require disassembly and cleaning of the finger pickup meter as follows:

1. Remove cotter pin, cover nut and adjusting nut and wave washer (If Applicable) from drive shaft.
2. Carefully lift finger holder, along with fingers and cam, off of the shaft. Clean.

60620-3b



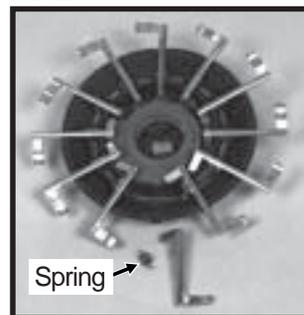
3. Check brush for wear and replace if necessary or following every 100 acres per row of operation.

EXAMPLE: Approximately 600 acres of corn or sunflowers on a 6 row machine or 800 acres on an 8 row machine.

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

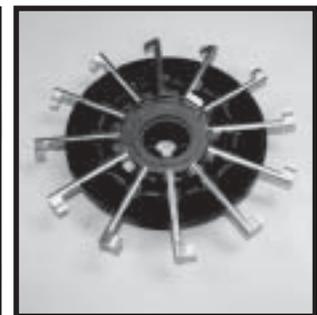
4. To replace fingers or springs, remove springs from fingers and remove finger from holder by lifting it out of the friction fit slot. Under average conditions, life expectancy of these parts should be 600-900 acres per row of operation.
5. After cleaning and/or replacing defective parts, reassemble the meter in the reverse order. When replacing fingers, make sure the open end of the spring loop is toward the inside of the finger holder.

60620-22



**Corn Finger Assembly**  
(Position Spring Opening Toward Holder)

D07299902

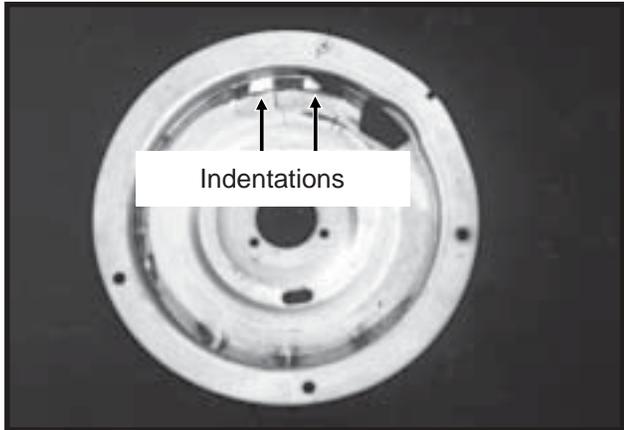


**Oil Sunflower Finger Assembly**

6. Make sure fingers are installed in holder so that holder will be positioned flush with the carrier plate when assembled. A projection on the cam is designed to align with a mating notch in the bearing housing to ensure proper operation when assembled.

# MAINTENANCE

50725-4



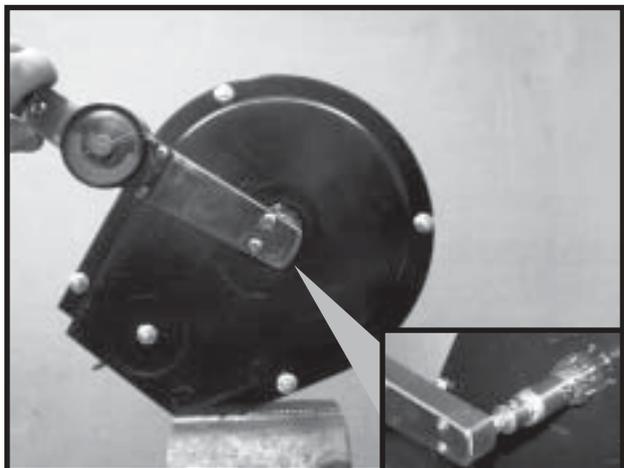
**Photo Shows Worn Carrier Plate**

- Before installing the finger holder on the carrier plate, check the indentations on the carrier plate for wear. Excessive wear of the carrier plate at the indentations will cause over planting especially when using small sizes of seed.

Inspect the carrier plate annually. Under average conditions, the life expectancy of the carrier plate should be 250-300 acres per row of operation.

- With finger holder flush against the carrier, install wave washer and adjusting nut. Tighten adjusting nut to fully compress wave washer. Then back off nut  $\frac{1}{2}$  to 2 flats ( $\frac{1}{12}$  to  $\frac{1}{3}$  turn) to obtain rolling torque of 22 to 25 inch pounds.

D07299903/D07309912

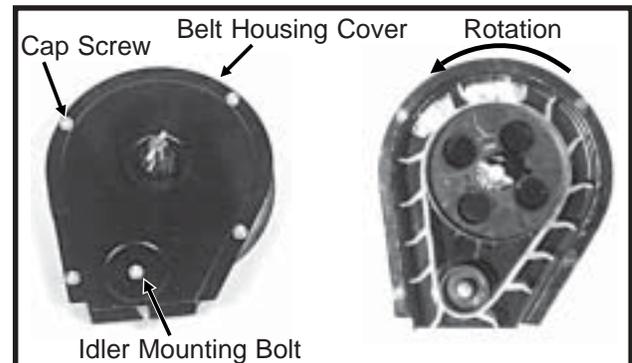


- Turn finger holder by hand to make sure it is positioned firmly against the carrier plate, but is not over tightened and can be rotated with moderate force.
- Install cover nut and cotter pin and reinstall baffle.

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

To inspect or replace the seed belt, remove the four cap screws around the edge of the housing cover and the nut from the belt idler mounting bolt.

60620-13a/60887-97



If the belt is being replaced, make sure it is installed to correctly orient the paddles as shown. A diagram molded into the drive sprocket also illustrates the correct orientation.

Reinstall the housing cover. **DO NOT TIGHTEN** hardware at this time. Wedge a screwdriver between the sprocket hub and housing cover as shown below. Pry cover down until it is centered on the belt housing and tighten hardware. Check idler alignment by rotating meter drive shaft. The seed belt should “run” centered on the idler or with only slight contact with the belt housing or cover.

**IMPORTANT: Do not over tighten hardware.**

D06200030



## FINGER PICKUP SEED METER CLEANING

- Disassemble meter.
- Blow out any foreign material present in the meter mechanism.
- Wash in mild soap and water. **DO NOT USE GASOLINE, KEROSENE OR ANY OTHER PETROLEUM BASED PRODUCT.**
- Dry thoroughly.
- Coat lightly with a rust inhibitor.
- Reassemble and store in a dry place.

# MAINTENANCE

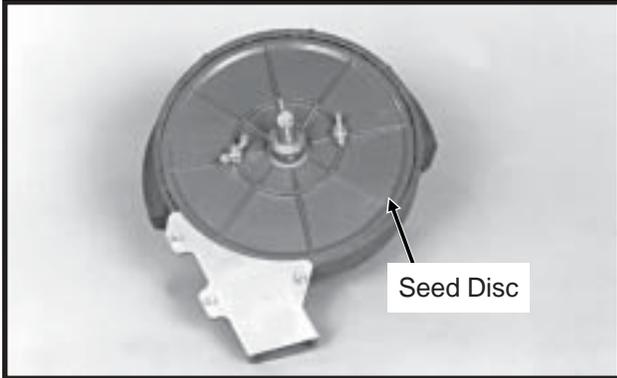
## FINGER PICKUP SEED METER TROUBLESHOOTING

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

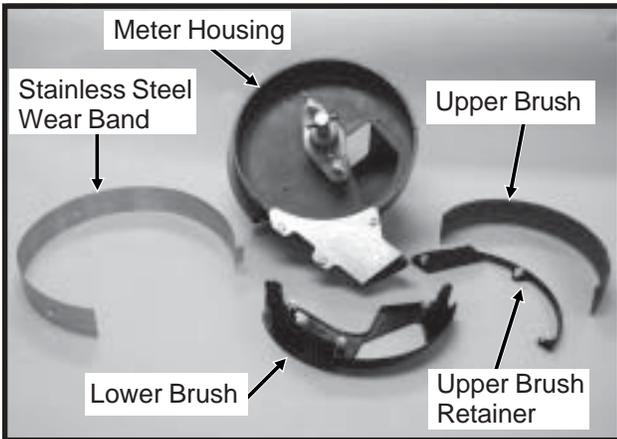
# MAINTENANCE

## BRUSH-TYPE SEED METER MAINTENANCE

60607-10a



D04239911



Only clean, high quality seed should be used for maximum meter accuracy. Damaged or cracked seed, hulls or foreign materials may become lodged in the upper brush and greatly reduce meter accuracy. It is suggested that the seed disc be removed daily, inspected and cleaned. Check for buildup of foreign material on the seed disc, particularly in the seed loading slots. Clean the disc by washing it with soap and water. Check for cracked seed, hulls, etc. lodged between the brush retainer and stainless steel wear band which can greatly reduce the accuracy of the meter because the upper brush will not be able to retain the seed in the seed pocket. Clean the brush areas of the meter housing thoroughly.

D04239912a



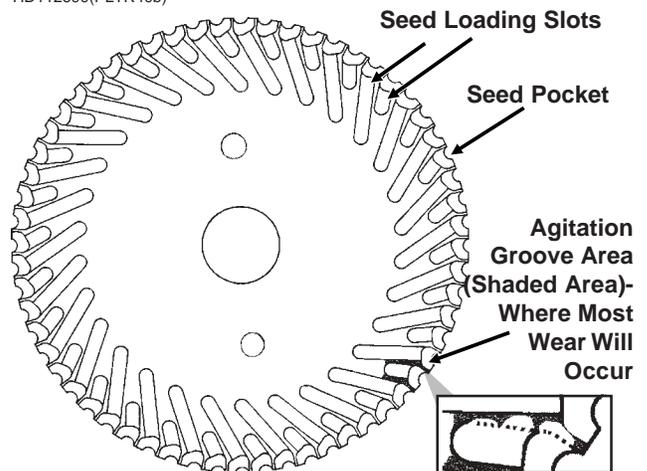
**IMPORTANT:** Replace hopper lids after hoppers are filled to prevent accumulation of dust or dirt in the seed meter which will cause premature wear.

### Cleaning brush-type seed meter for storage:

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

### Seed Disc Wear

HD112690(PLTR40b)



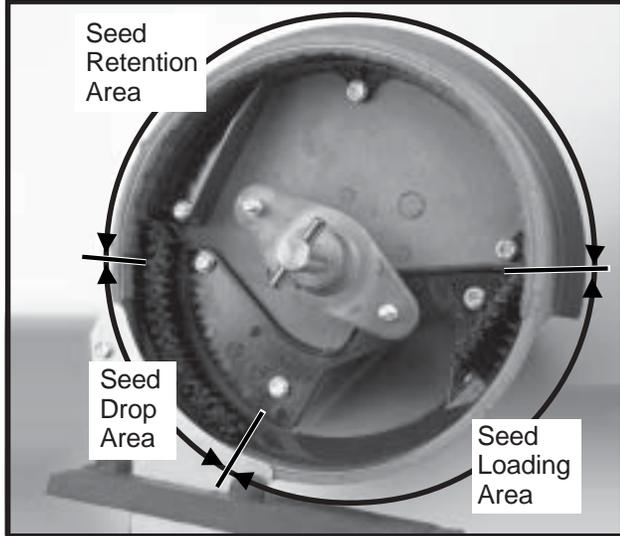
Most wear on the seed disc will be found in the agitation groove area (area between the seed loading slots). Wear will affect planting accuracy at high RPM. To measure for wear, lay a straight edge across the surface of the disc and measure the gap between the disc (at the agitation groove area) and the straight edge. If the agitation groove areas are worn in excess of .030" and accuracy starts to drop off at higher meter RPM, the seed disc should be replaced.

Estimated life expectancy of the seed disc under normal operating conditions should be approximately 200 acres per row. Severe operating conditions such as dust, lack of lubrication or abrasive seed coating could greatly reduce life expectancy of the seed disc to under 100 acres per row.

# MAINTENANCE

## Upper Brush

LF212299-13a



The upper brush holds seed in the seed disc pocket in the seed retention area.

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

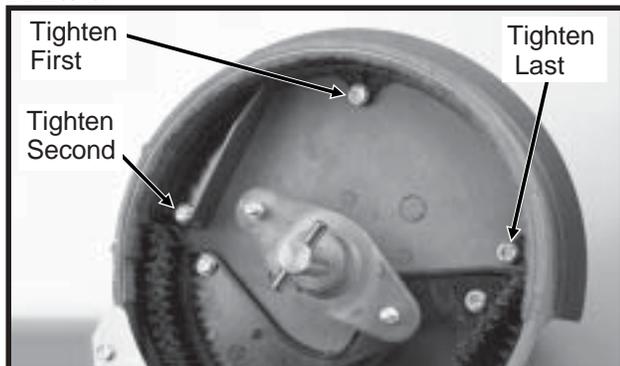
The upper brush should be replaced at approximately 120-400 acres per row of use or sooner if damage or excessive wear is found.

### Installation Of Upper Brush

Position upper brush into inner perimeter of seed retention area. Make sure the base of the brush is tight against the bottom of the meter housing. Install brush retainer and three hex head screws. Tighten center screw first, left screw second and right screw last.

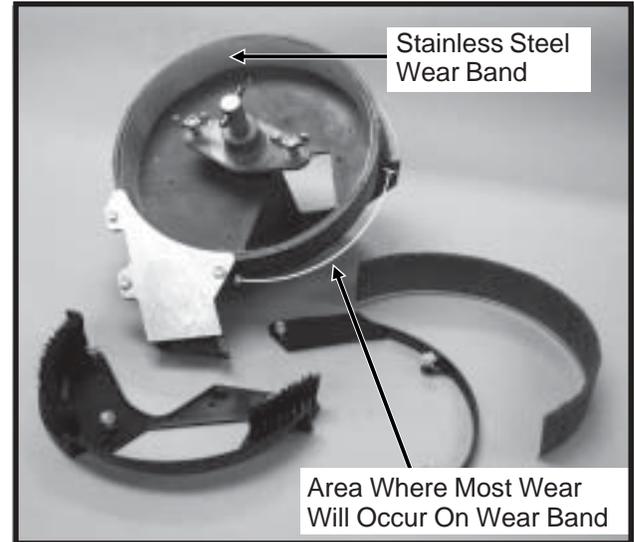
**NOTE: Use GD11122 upper brush retainer when using soybean and cotton discs. Use GD8237 upper brush retainer when using milo/grain sorghum discs. GD11122 brush retainer shown.**

LF212299-13a



## Stainless Steel Wear Band

D04239917a

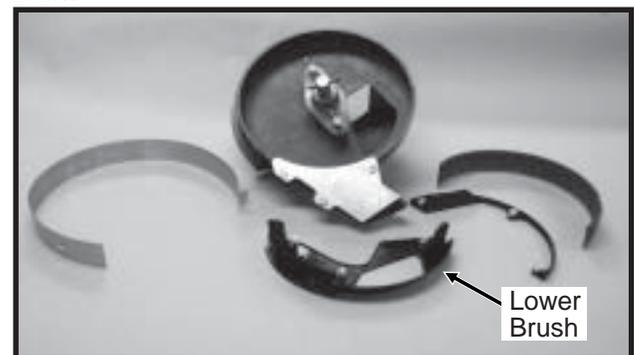


The purpose of the stainless steel wear band is to protect the meter housing from wear. The band is .030" thick and should be replaced when approximately .020" of wear is found in the primary area of wear. If the wear band is allowed to wear through or if the meter is used without the wear band in place, damage to the meter housing may occur.

Estimated life expectancy of the stainless steel wear band is 240-800 acres per row.

## Lower Brush

D04239911



The lower brush has several functions. One function is to move seed down the seed loading slots to the seed pockets. The second function is to isolate seed in the reservoir from entering the seed tube and a third is to clean the seed loading slots.

Estimated life expectancy of the lower brush is 240-800 acres per row. The lower brush should be replaced if the bristles are deformed or missing or if there are cracks in the brush retainer.

# MAINTENANCE

## BRUSH-TYPE SEED METER TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Low count.	Meter RPM too high.	Reduce planting speed.
	Misalignment between drive clutch and meter.	See "Seed Meter Drive Adjustment".
	Seed sensor not picking up all seeds dropped.	Clean seed tube. Switch meter to different row. If problem stays with same row, replace sensor.
	Lack of lubrication causing seeds not to release from disc properly.	Use graphite or talc as recommended.
	Seed size too large for seed disc being used.	Switch to smaller seed or appropriate seed disc. See "Brush-Type Seed Meter" for proper seed disc for size of seed being used.
	Seed treatment buildup in meter.	Reduce amount of treatment used and/or thoroughly mix treatment with seed. Add talc.
Low count at low RPM and higher count at higher RPM.	Foreign material lodged in upper brush.	Remove seed disc and remove foreign material from between brush retainer and bristles. Clean thoroughly.
	Worn upper brush.	Replace. See "Maintenance".
Low count at higher RPM and normal count at low RPM.	Seed disc worn in the agitation groove area.	Replace disc. See "Maintenance".
High count.	Seed size too small for seed disc.	Switch to larger seed or appropriate seed disc.
	Incorrect seed rate transmission setting.	Reset transmission. Refer to proper rate chart in "Machine Operation" section of manual.
	Upper brush too wide (fanned out) for small seed size.	Replace upper brush.
High count. (Milo/Grain Sorghum)	Incorrect brush retainer being used.	Make sure GD8237 brush retainer is installed to keep upper brush from fanning out.
Upper brush laid back.	Seed treatment buildup on brush.	Remove brush. Wash with soap and water. Dry thoroughly before reinstalling. See "Maintenance".
	Buildup of foreign material at base of brush.	Remove brush retainer and brush. Clean thoroughly. Reinstall.

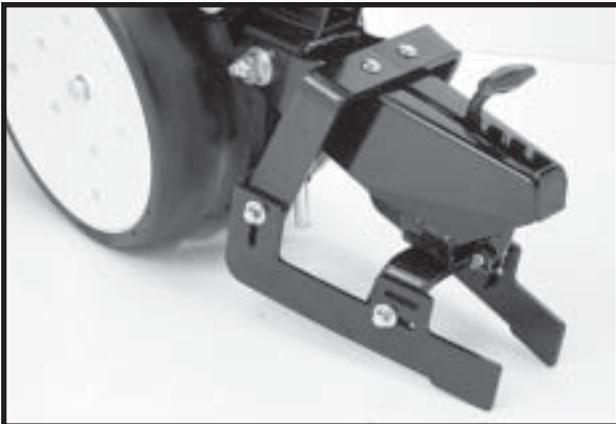
# MAINTENANCE

## CLOSING WHEEL TROUBLESHOOTING

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

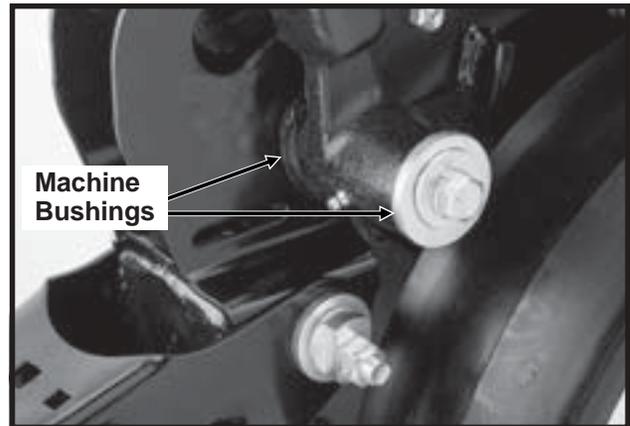
## GAUGE WHEEL ADJUSTMENT

To prevent an accumulation of dirt or trash, gauge wheels should lightly contact the opener blades. Gauge wheels and opener blades should turn with only slight resistance.

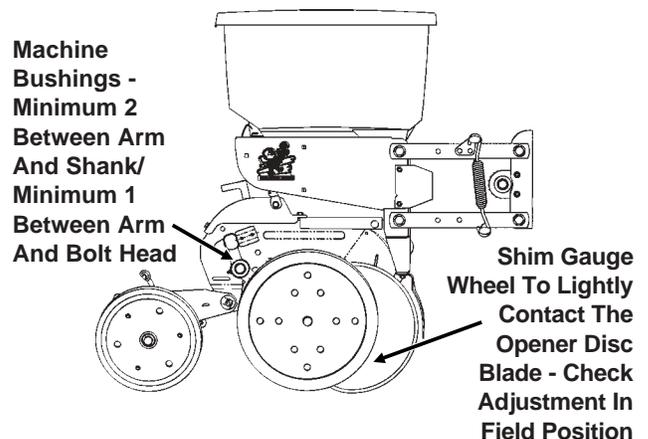
To adjust clearance between gauge wheels and opener blades, add or remove machine bushings between the shank and gauge wheel arm. Store remaining machine bushings between gauge wheel arm and flat washer on outer side of gauge wheel arm.

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

LF212199-2



(RU113)

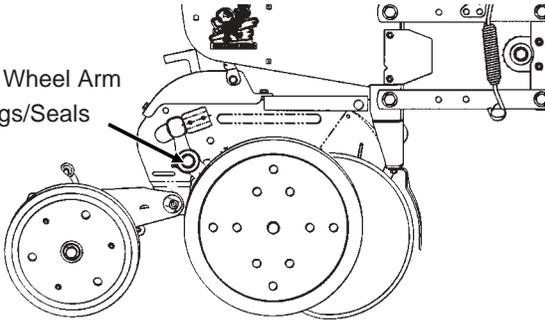


# MAINTENANCE

## GAUGE WHEEL ARM BUSHING AND/OR SEAL REPLACEMENT

(RU113)

Gauge Wheel Arm Bushings/Seals

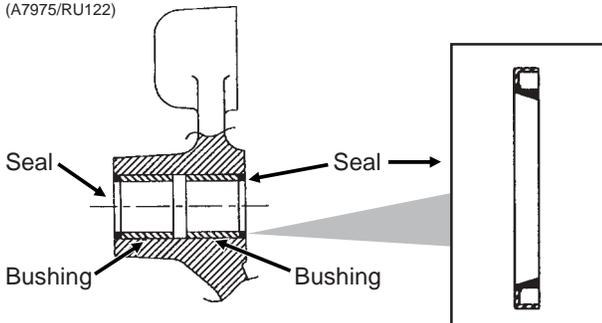


**NOTE: A Gauge Wheel Arm Bushing And Seal Driver Kit (G1K296), for use in bushing and seal replacement, is available through your KINZE® Dealer.**

**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.

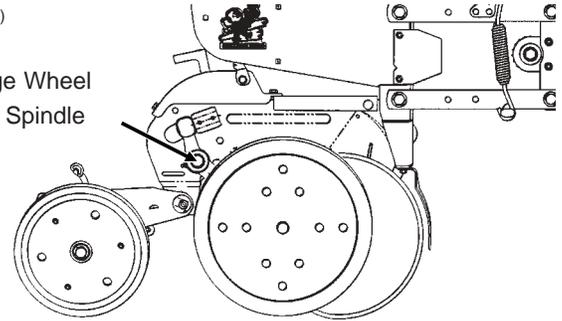
**NOTE: Special machine bushing between gauge wheel arm and gauge wheel.**

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

## GAUGE WHEEL ARM PIVOT SPINDLE REPLACEMENT

(RU113)

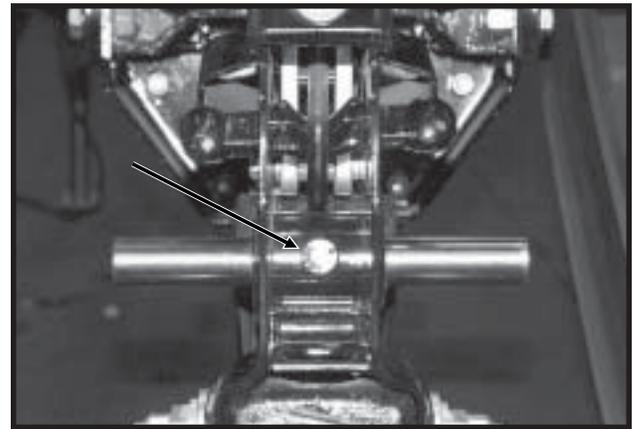
Gauge Wheel Pivot Spindle



**To replace gauge wheel pivot spindle:**

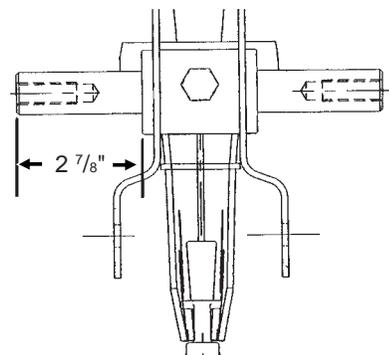
1. Remove the gauge wheel and arm assemblies from the shank assembly.
2. Remove 1/2" x 3/4" cap screw that locks the pivot spindle in place and remove the spindle.

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

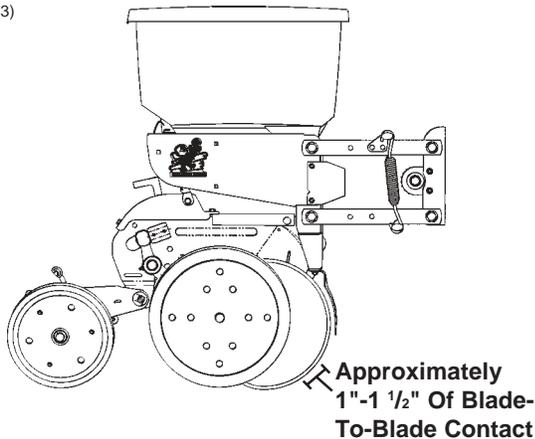
## 15" SEED OPENER DISC BLADE/ BEARING ASSEMBLY

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 blade 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).**

(RU113)



### 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 blade only with disc blade 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.

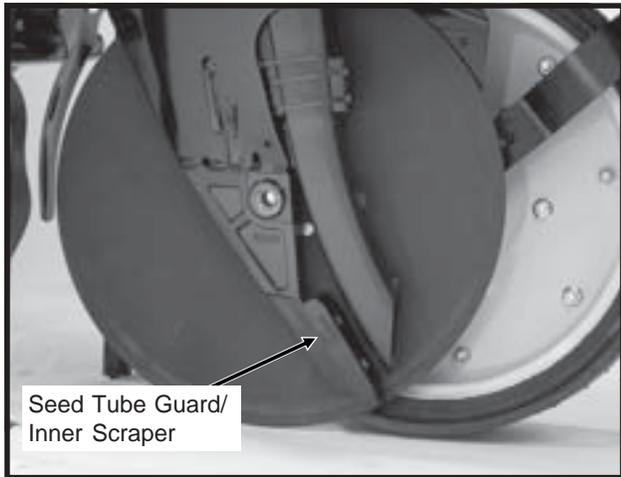
# MAINTENANCE

## 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

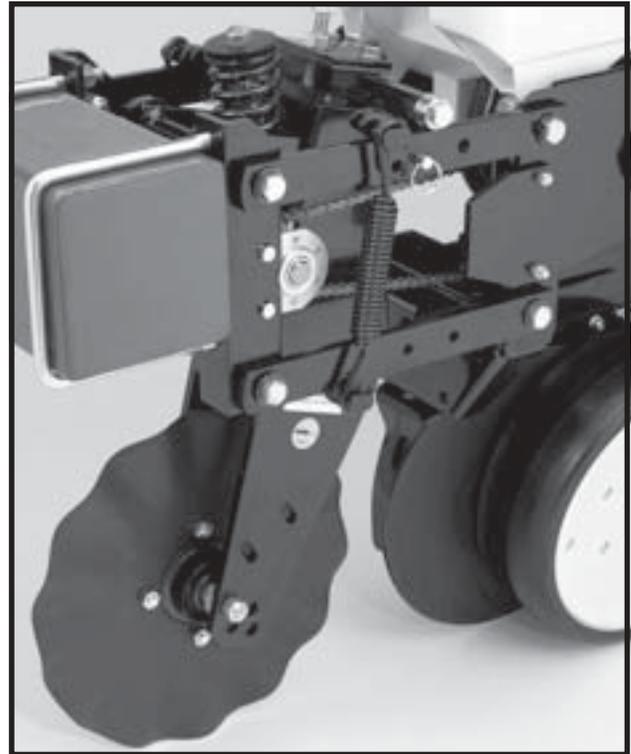
**IMPORTANT: No till planting or planting in hard ground conditions, especially when the planter is not equipped with no till coulters, and/or excessive blade-to-blade contact will increase seed tube guard wear and necessitate more frequent inspection and/or replacement.**

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 - STYLE A

LF212299-20



If properly maintained and lubricated (If Applicable) the bearings in the frame mounted coulters hub may never need to be replaced. Lubricate (If Applicable) at frequency indicated in the Lubrication Section of this manual. Check periodically to be sure nuts and hardware are tightened to proper torque specification. Be sure the coulters are positioned square with the planter frame and aligned in front of row unit disc opener.

**NOTE: Torque  $\frac{5}{8}$ " spindle bolts to 120 ft. lbs.**

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

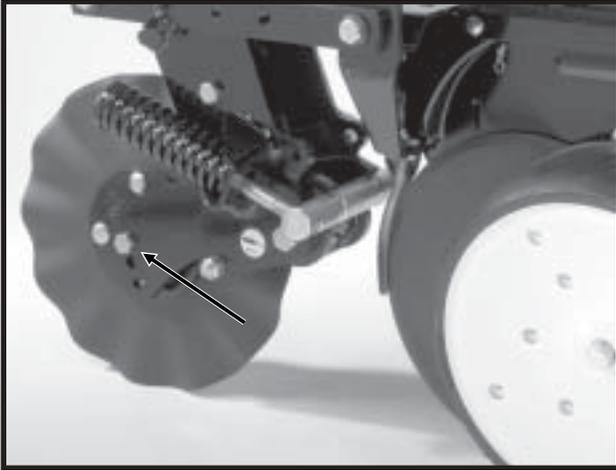
When the 16" diameter coulters blade (1" fluted, 1" bubbled or  $\frac{3}{4}$ " fluted) is worn to 14  $\frac{1}{2}$ " (maximum allowable wear), it should be replaced.

(If Applicable) Timely lubrication at the frequency indicated in the Lubrication Section of this manual is necessary to purge moisture and dirt from bearing and seal. This will also lubricate the seal. Add grease until it comes out around the seal.

# MAINTENANCE

## FRAME MOUNTED COULTER - STYLE B

LF083002101



**NOTE:** Torque  $\frac{5}{8}$ " spindle bolts to 120 ft. lbs.

See "Frame Mounted Coulters - Style B" in Row Unit Operation Section of this manual for depth and spring adjustment.

When the 16" diameter coulters blade (1" fluted, 1" bubbled or  $\frac{3}{4}$ " fluted) is worn to 14  $\frac{1}{2}$ " (maximum allowable wear), it should be replaced.

## DISC FURROWER (For Use With Style A Frame Mounted Coulters)

LF212299-21

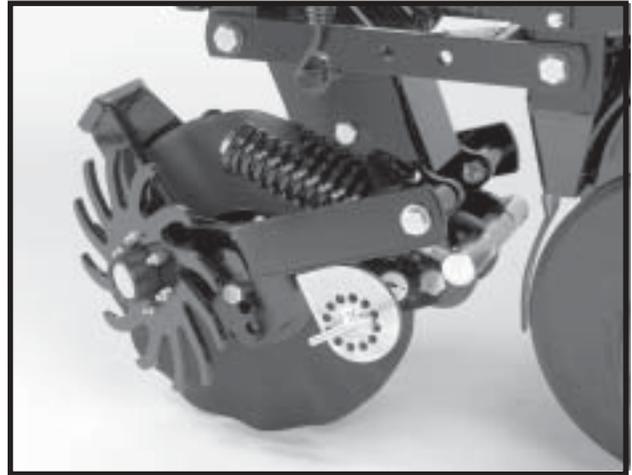


The blade hubs are equipped with sealed bearings. If a bearing sounds or feels rough when the blade is rotated, replace the bearing.

When the 12" diameter blades (solid or notched) are worn to 11", they should be replaced.

## RESIDUE WHEELS (For Use With Style B Frame Mounted Coulters)

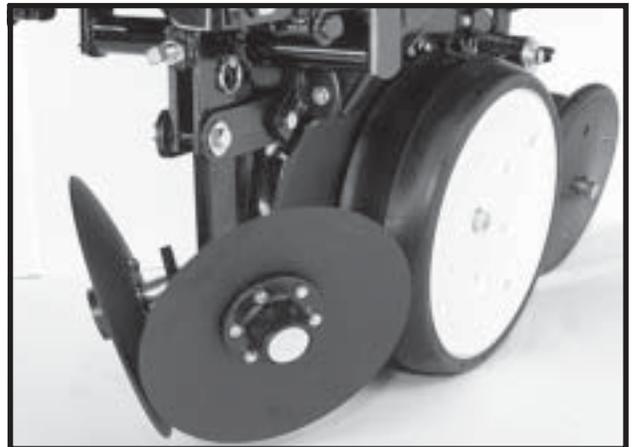
LF083002102



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

## 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 130 ft. lbs.**

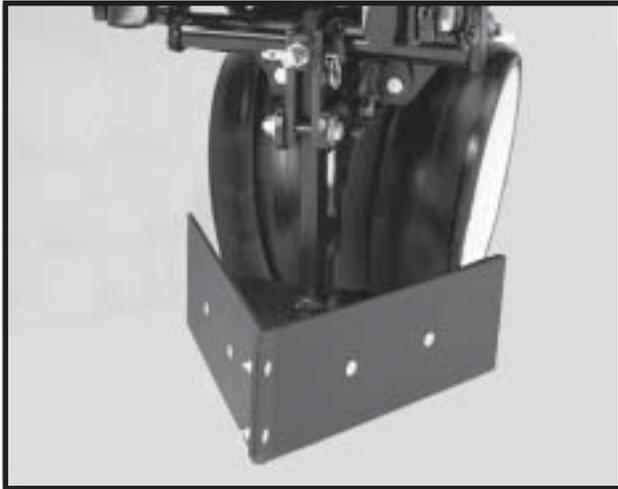
The blade hubs are equipped with sealed bearings. If a bearing sounds or feels rough when the blade is rotated, replace the bearings.

When the 12" diameter blades (solid or notched) are worn to 11", they should be replaced.

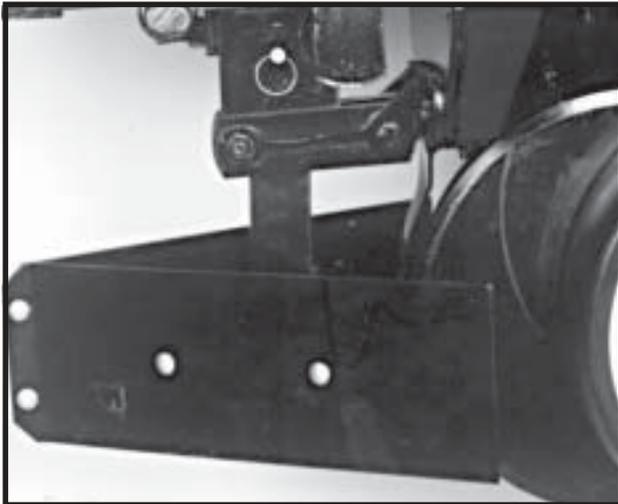
# MAINTENANCE

## ROW UNIT MOUNTED BED LEVELER

LF212299-25a



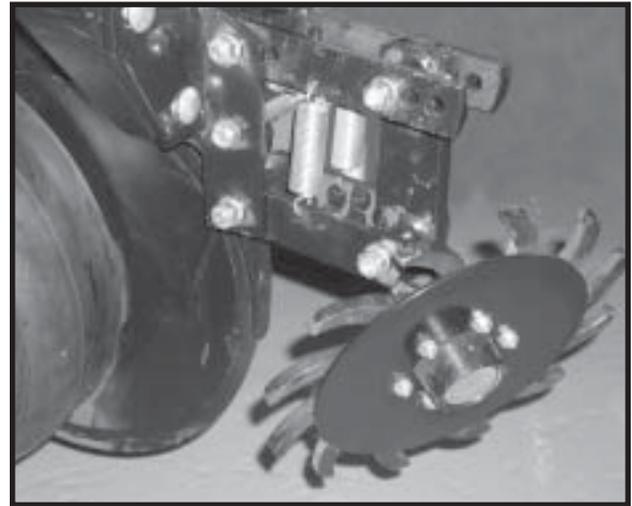
59386-26



Lubricate the bushings in the mounting bracket and links 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 bushing if necessary. **Only hardened flat washers should be used. Replace damaged flat washers with proper part. Torque bolts to 130 ft. lbs.**

## ROW UNIT MOUNTED RESIDUE WHEEL

D101701113



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

# MAINTENANCE

## ROW UNIT MOUNTED NO TILL COULTER

LF212299-19a



Lubricate (If Applicable) at frequency indicated in the Lubrication Section of this manual. Check periodically to be sure nuts and hardware are tightened to proper torque specification.

**NOTE: Torque  $\frac{5}{8}$ " spindle bolts to 120 ft. lbs.**

Be sure the coulters are positioned square with the row unit and aligned in front of row unit disc opener.

The coulters blade can be adjusted to one of four settings. Initially the blade is set in the highest position. As the blade wears it can be adjusted to one of the three lower settings. See "Row Unit Mounted No Till Coulters" in Row Unit Operation Section of this manual.

When the 16" diameter coulters blade is worn to 14  $\frac{1}{2}$ " (maximum allowable wear), it should be replaced.

(If Applicable) Timely lubrication at the frequency indicated in the Lubrication Section of this manual is necessary to purge moisture and dirt from bearings and seals. This will also lubricate the seals. Add grease until it comes out around the seals. Spin hub while filling with grease.

## COULTER MOUNTED RESIDUE WHEELS

LF212299-23



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

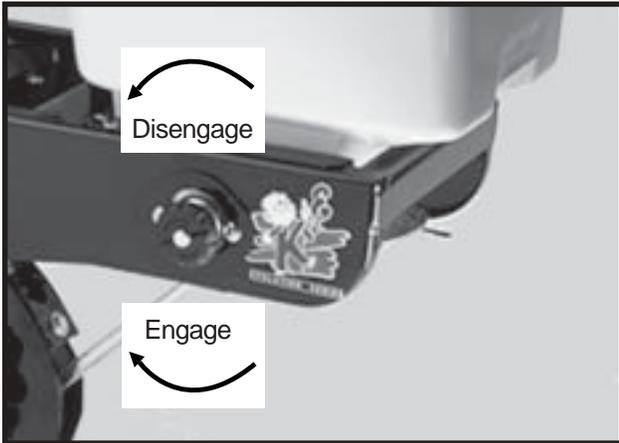
# MAINTENANCE

## 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.

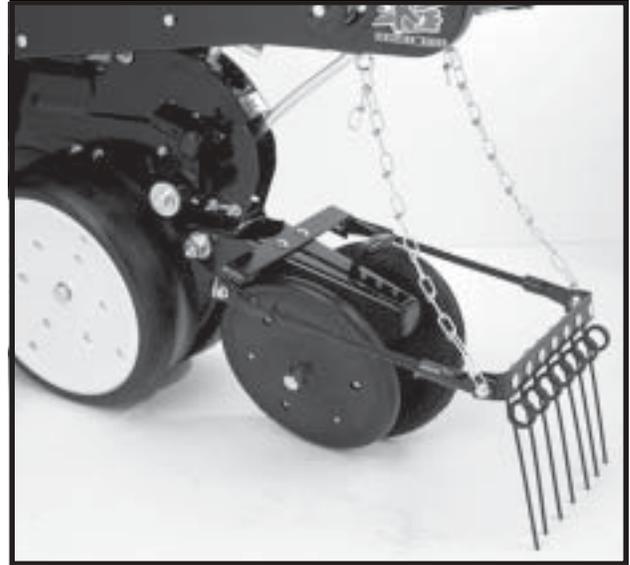
LF212299-4



## 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/KPM II STACK-MODE ELECTRONIC SEED MONITOR TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Single sensor communication alarm comes on (alarm on with no bar graph 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 bar graphs and flashing row numbers on all rows).	Faulty monitor.	Replace monitor.
	Break in the harness just after the monitor.	Inspect for break in harness and repair. If break can't be found, replace harness section.
	Dirty or corroded connector.	Clean connector.
Sensor communication alarms come on for some sensors (alarm on with no bar graphs 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 And 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 bar graph segment on and a flashing row number on a single row).	Seed tube sensor is blocked.	Clean sensor.
	Faulty seed tube sensor.	Replace sensor.
Seed tube sensor dirty or blocked warning comes on (after calibration, bar graph 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

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

\* Operate hydraulics slowly to accentuate the problem. Rephase after each lowering cycle.

# MAINTENANCE

## MARKER SEQUENCING/FLOW CONTROL VALVE INSPECTION

The valve block assembly consists of the marker sequencing and flow control valves in one assembly.

The sequencing valve portion consists of a chambered body containing a spool and series of check valves to direct hydraulic oil flow. Should the valve malfunction, the components may be removed for inspection.

1. Remove valve block assembly from planter.
2. Remove detent assembly and port adapter assemblies from rear of valve block.

**IMPORTANT: Damage to the spool may occur if the detent assembly and port adapter assemblies are not removed prior to removal of the spool.**

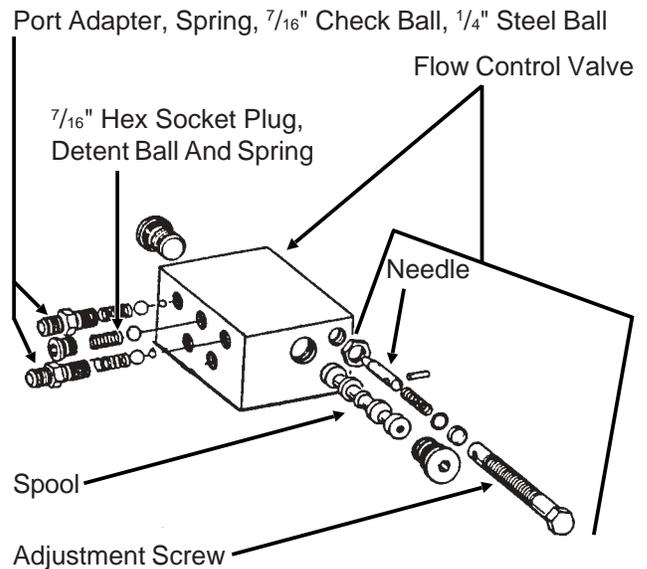
3. Remove plug from both sides of valve block and remove spool.
4. Inspect all parts for pitting, contamination or foreign material. Also check seating surfaces inside the valve. Replace any parts found to be defective.
5. Lubricate spool with a light oil and reinstall. Check to be sure spool moves freely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

**IMPORTANT: Make sure correct check ball(s) and spring are installed in each valve bore upon reassembly.**

A flow control valve is located on each side of the block assembly. The flow control valves should be adjusted for 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, the needle valve should be removed for inspection. Check for foreign material and contamination. Be sure needle moves freely in adjustment screw. Replace any components found to be defective.

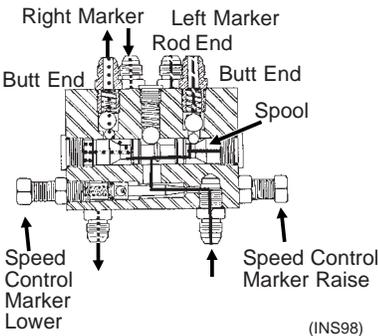
**NOTE: When oil is cold, hydraulics operate slowly. Make sure all adjustments are made with warm oil.**

(PLTR43)



# MAINTENANCE

## MARKER OPERATION TROUBLESHOOTING

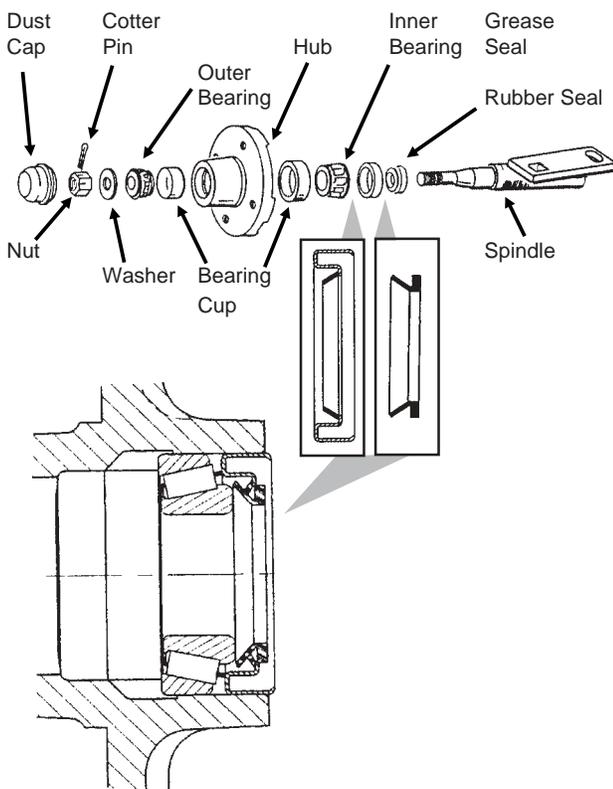
PROBLEM	POSSIBLE CAUSE	SOLUTION
<p>Same marker always operating.</p>  <p>(INS98)</p>	<p>Inadequate oil flow to sequencing valve. Most commonly associated with single valve system (lift and markers on same remote).</p> <p>Spool in sequencing valve not shifting.</p>	<p><b>TEST: Raise planter and install transport lockups. Attempt to raise and lower planter. All hydraulic oil will be directed to markers. If markers function properly, the sequence valve is OK.</b> Slow raising of marker arm so the planter is up before the marker arm is completely up.</p> <p>Remove spool. Inspect for foreign material, making sure all ports in spool are open. Clean and reinstall.</p>
<p>Both markers lowering and only one raising at a time.</p>	<p>Hoses from cylinders to valve connected backwards.</p>	<p>Check hosing diagram in manual and correct.</p>
<p>Both markers lower and raise at same time</p>	<p>Foreign material under check ball in sequencing valve.</p>	<p>Remove hose fitting, spring and balls. Clean. May be desirable to remove spool and clean as well.</p>
	<p>Check ball missing or installed incorrectly in sequencing valve.</p>	<p>Disassemble and correct. See above illustration.</p>
<p>Marker (in raised position) settling down.</p>	<p>Damaged o-ring in marker cylinder or cracked piston.</p>	<p>Disassemble cylinder and inspect for damage and repair.</p>
	<p>Spool in sequencing valve not shifting completely because detent ball or spring is missing.</p>	<p>Check valve assembly and install parts as needed.</p>
	<p>Spool in sequencing valve shifting back toward center position.</p>	<p>Restrict flow of hydraulic oil from tractor to sequencing valve.</p>
<p>Neither marker will move.</p>	<p>Flow control closed too far.</p>	<p>Loosen locking nut and turn flow control adjustment bolt out or counterclockwise until desired speed is set.</p>
<p>Markers moving too fast.</p>	<p>Flow control open too far.</p>	<p>Loosen locking nut and turn flow control adjustment bolt in or clockwise until desired speed is set.</p>
<p>Sporadic marker operation speed.</p>	<p>Needle sticking open in flow control valve.</p>	<p>Remove flow control, inspect and repair or replace.</p>

# MAINTENANCE

## MARKER BEARING LUBRICATION OR REPLACEMENT

1. Remove 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.

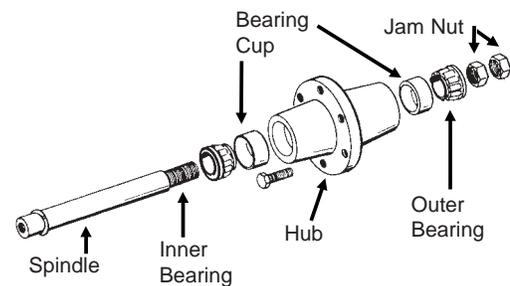
(PLTR45/PLTR99/PLTR98/PLTR102)



## WHEEL BEARING LUBRICATION OR REPLACEMENT

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

PTD057(EF35e)



# MAINTENANCE

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## 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.**

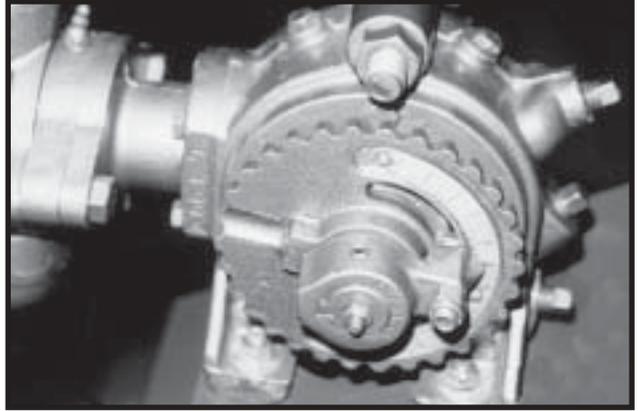
### Overnight Storage

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



# MAINTENANCE

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## 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

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## 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.

If possible, remove weight from all tires particularly if the unit is stored outdoors, in which case it is best to remove wheels and tires for storage in a cool, dry area.

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

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

Clean seed meters and store in a rodent-free, dry area.

Remove seed discs from brush-type seed meters, clean and store meters with discs removed.

Grease exposed areas of cylinder rods before storing planter.

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

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

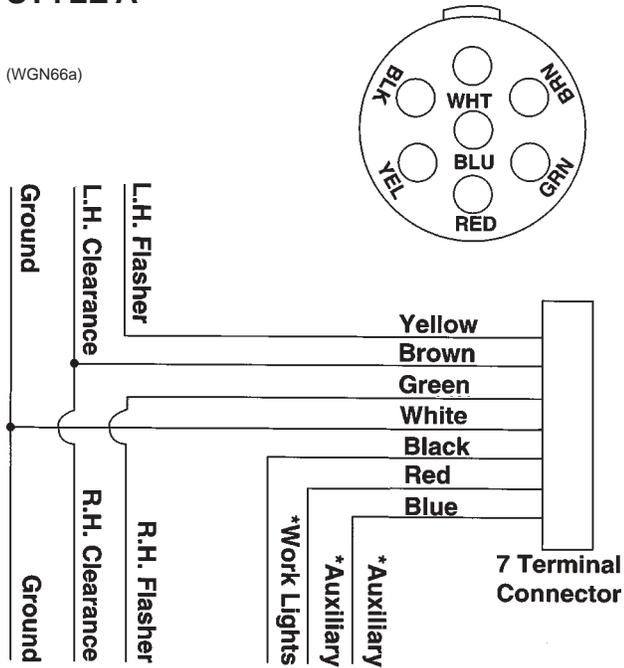
Empty dry fertilizer hoppers. Clean hoppers. Disassemble and clean metering augers. Reassemble, coating all metal parts with rust preventative.

# MAINTENANCE

## ELECTRICAL WIRING DIAGRAM FOR LIGHT PACKAGE

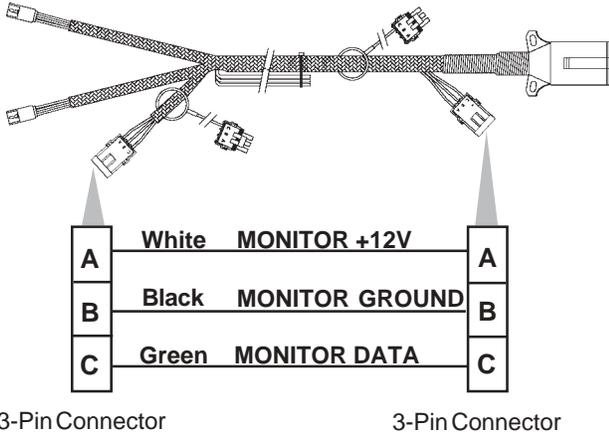
### STYLE A

(WGN66a)



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

(A9152)

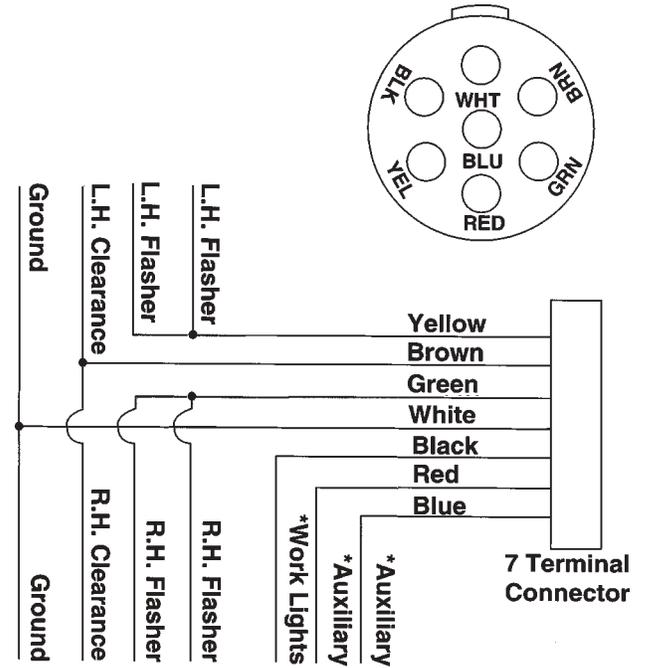


3-Pin Connector

3-Pin Connector

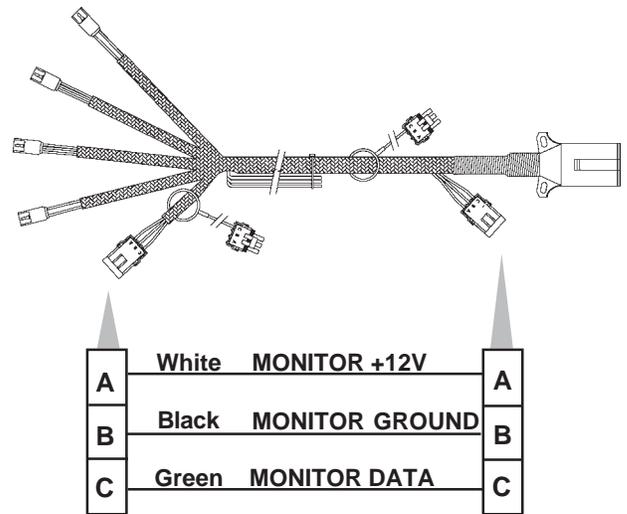
### STYLE B

(WGN66b)



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

(A9206)



3-Pin Connector

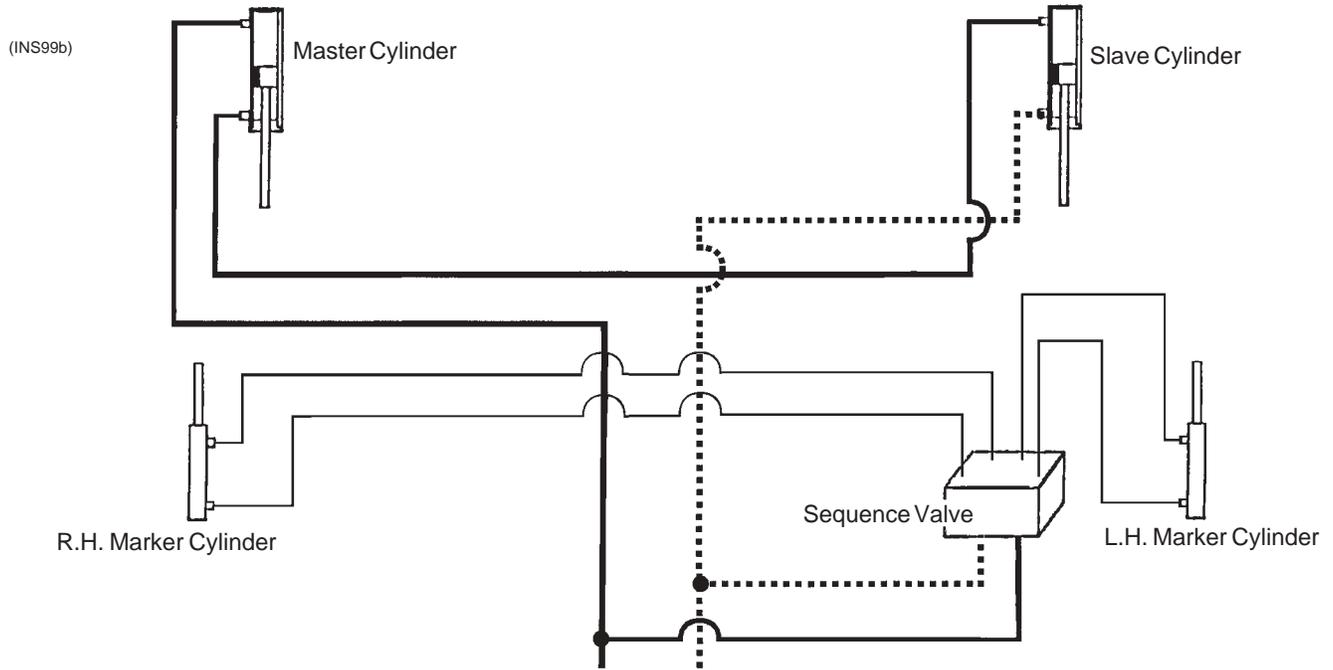
3-Pin Connector

Light package supplied on the Model 3000 planter meets ASAE Standards. For the correct wiring harness to be wired into the lights on your tractor, check with the tractor manufacturer.

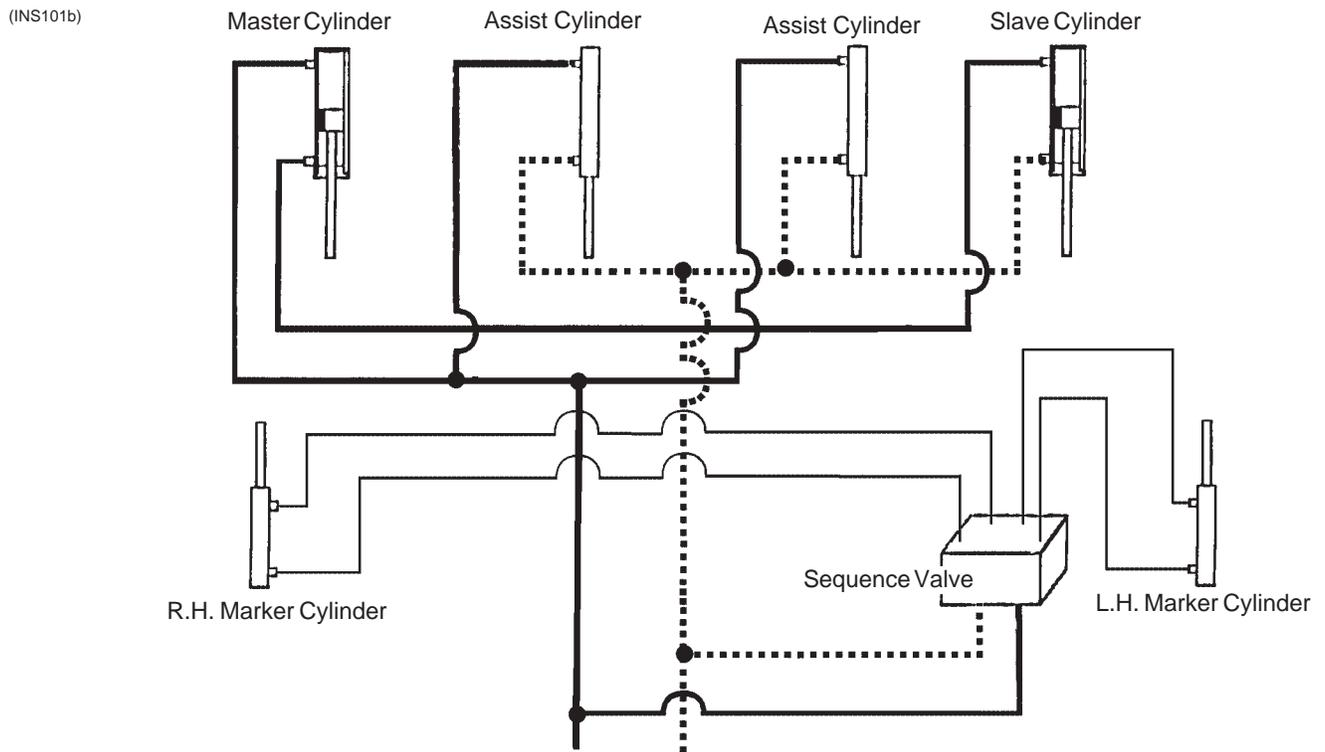
# MAINTENANCE

## HYDRAULIC SYSTEM SCHEMATIC

### 4 Row - Planter Raising



### 6/8 Row - Planter Raising



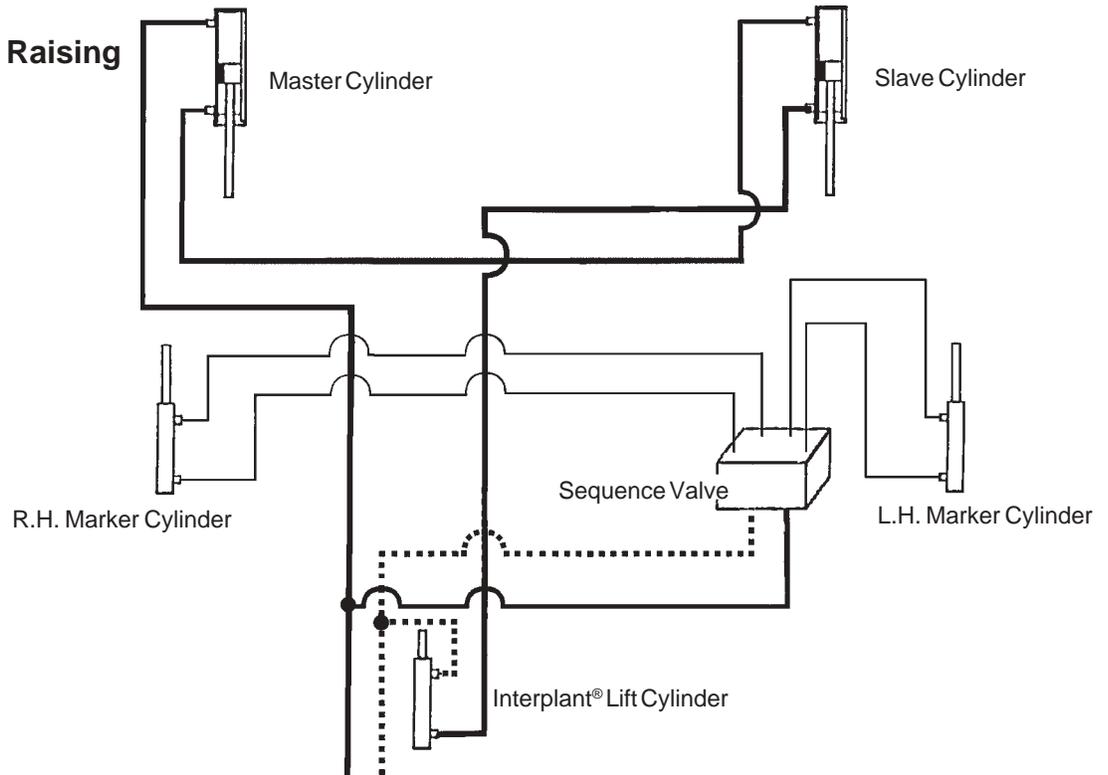
Return Oil .....  
Pressure Oil ———

# MAINTENANCE

## HYDRAULIC SYSTEM SCHEMATIC (Equipped With Interplant® Self-Leveling Hitch Extension)

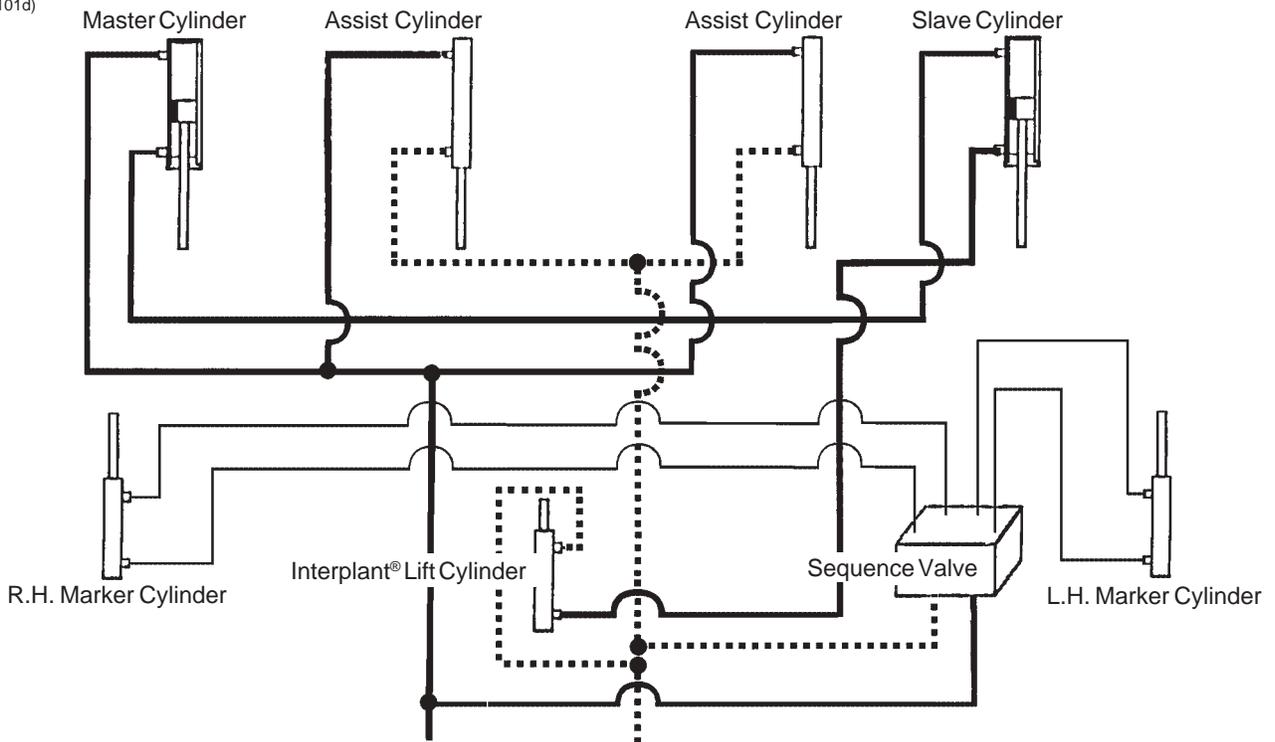
### 4 Row - Planter Raising

(INS99d)



### 6/8 Row - Planter Raising

(INS101d)



Return Oil .....  
Pressure Oil ———

# MAINTENANCE

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## FERTILIZER

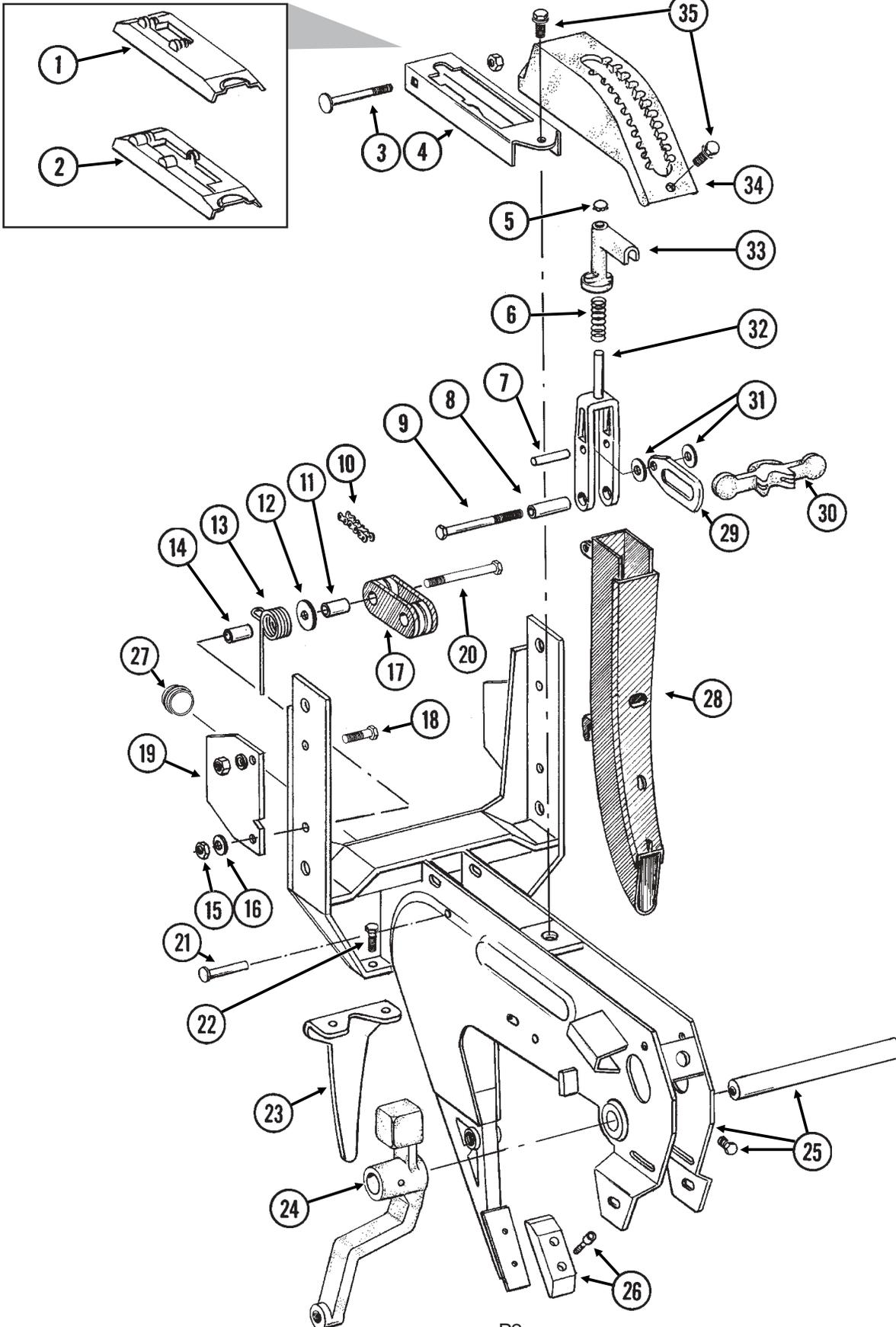
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# SHANK ASSEMBLY, SEED TUBE AND DEPTH ADJUSTMENT

RUB023/RUB024RUB022(RU80i)

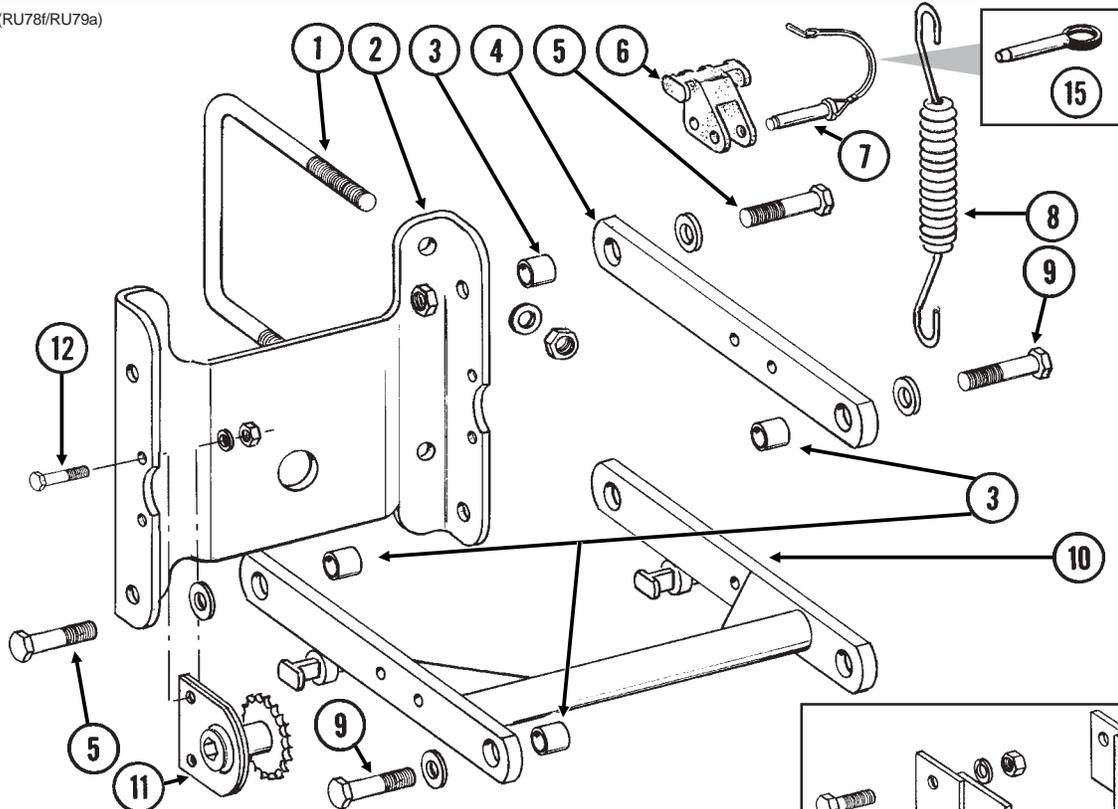


# SHANK ASSEMBLY, SEED TUBE AND DEPTH ADJUSTMENT

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.		-	Shank Cover, See "Brush-Type Seed Meter", Page P15
2.		-	Shank Cover, See "Finger Pickup Seed Meter", Page P14
3.	G10304	1	Carriage Bolt, $\frac{3}{8}$ "-16 x 3"
	G10108	1	Lock Nut, $\frac{3}{8}$ "-16
4.	GD10986	1	Cover
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.	G3303-98	1	Chain, No. 41, 98 Pitch Including Connector Link
	G3303-16	-	Chain, No. 41, 16 Pitch Including Connector Link (Used W/Row Unit Extension Brackets)
	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	Flange Nut, $\frac{5}{16}$ "-18
23.	GD1033	1	Shield
24.		-	See "Gauge Wheels", Pages P6 And P7
25.	GA7965	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.		-	See "15" Seed Opener Disc Blade/Bearing Assembly And Scrapers", Page P5
27.	GD11845	1	Dust Cap
28.	GD1130	-	Seed Tube (No Monitor) See "KPM I/KPM II Electronic Seed Monitor" For Seed Tube With Sensor, Pages P70 And P71 Or "KPM II Stack-Mode Electronic Seed Monitor" For Seed Tube With Sensor, Pages P72 And P73
29.	GB0285	1	Collar, Depth Adjustment
30.	GB0265	1	Pivot Link, Depth Adjustment
31.	G10207	2	Washer, $\frac{7}{8}$ " O.D. x $\frac{13}{32}$ " I.D. x .134" (If Applicable)
32.	GB0267	1	Lever, Depth Adjustment
33.	GB0266	1	Handle, Depth Adjustment
34.	GB0274	1	Cover, Depth Adjustment
35.	G11015	-	Hex Washer Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{1}{4}$ "

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

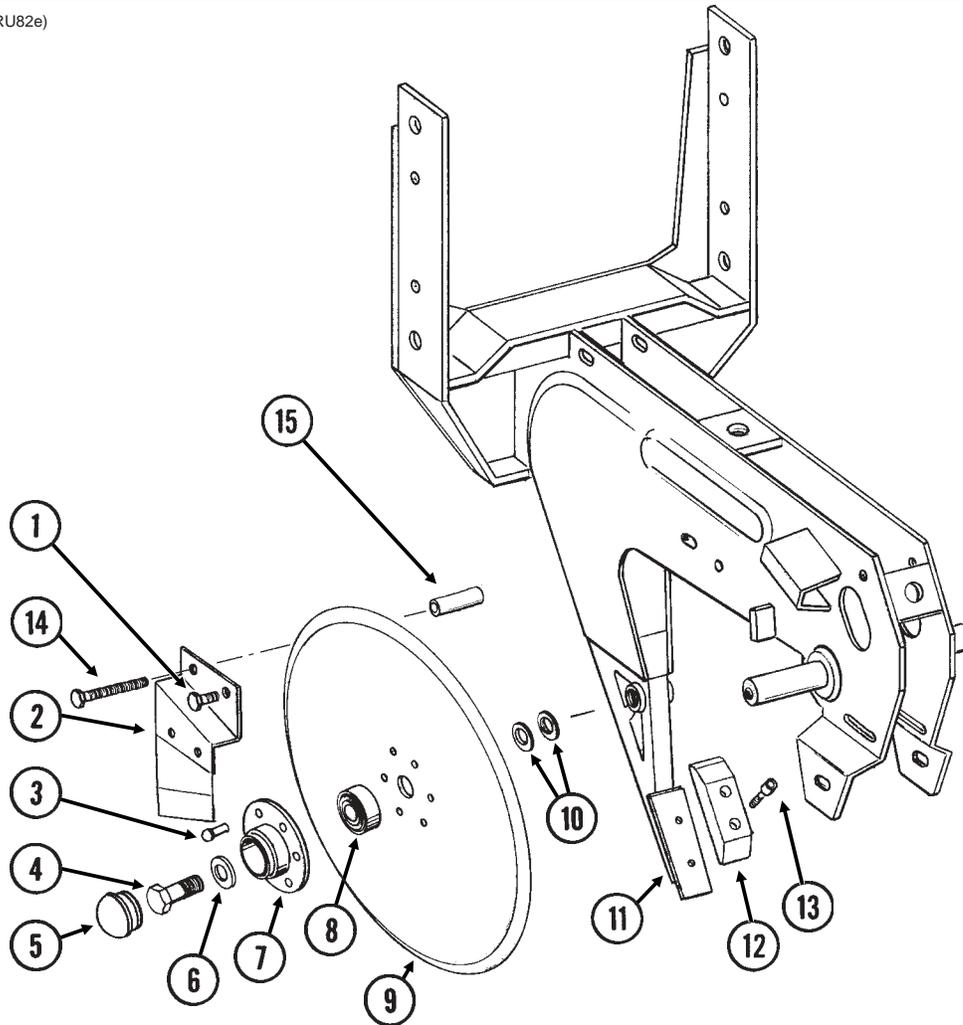
RUB021/RUB022(RU78/RU79a)



ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GD1114	2	U-Bolt, 7" 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, 21/32" 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
13.	G10007	4	Hex Head Cap Screw, 5/8"-11 x 1 1/2"
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
14.	GA7410	2	Extension Bracket
15.	G10545	2	Detent Pin, 1/2" x 1 1/3" Grip
A.	G6326X	-	U-Bolt Package For 7" x 7" Toolbar, Includes: (2) GD1114, (4) G10230, (4) G10104

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

RUB023/RUB025(RU82e)

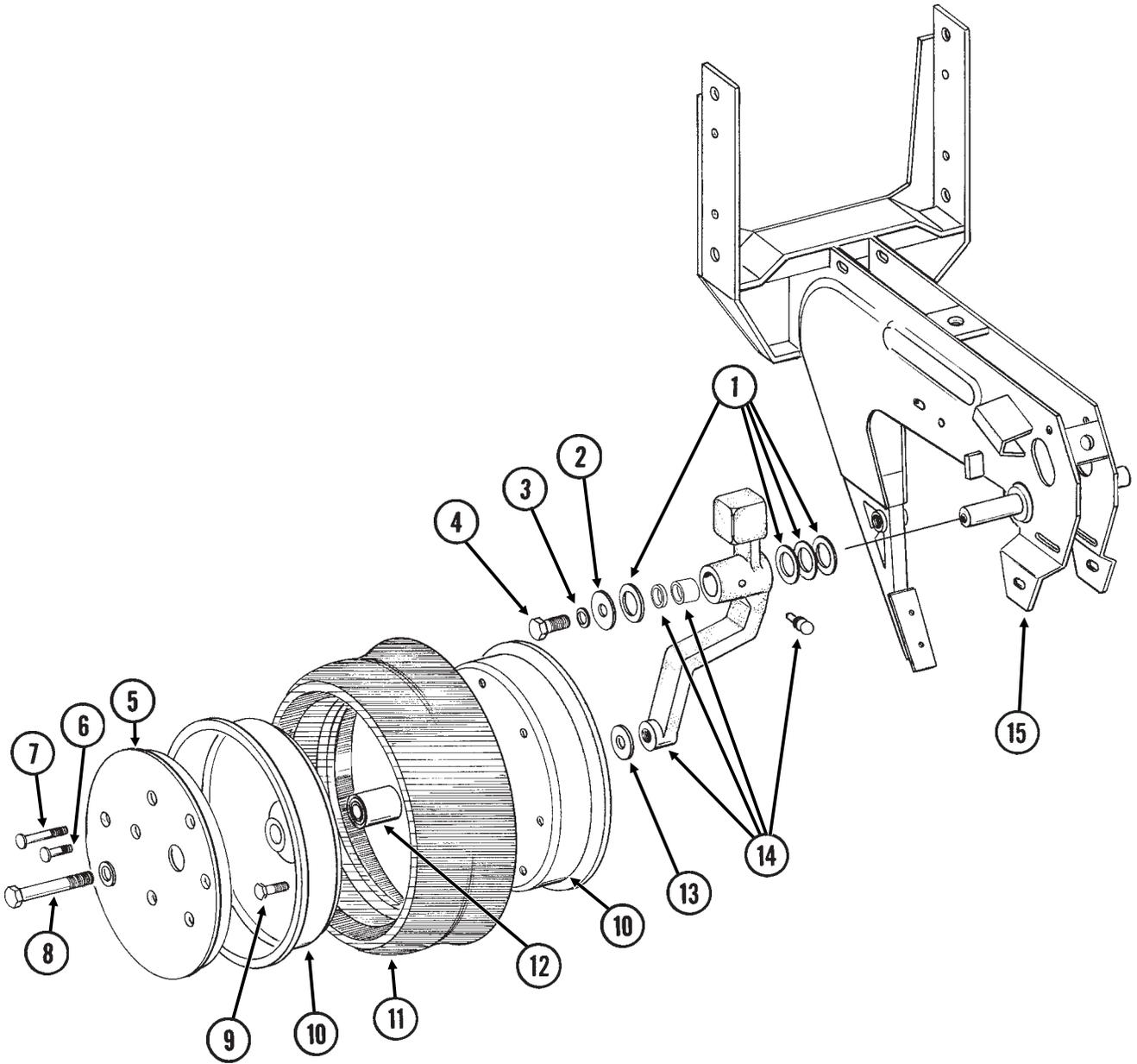


ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10328	2	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x $\frac{5}{8}$ "
	G10622	2	Flange Nut, $\frac{3}{8}$ "-16
2.	GA2012R	1	Disc Scraper, R.H.
	GA2012L	-	Disc Scraper, L.H. (Shown)
3.	G10427	12	Rivet, $\frac{1}{4}$ " x $\frac{1}{2}$ "
4.	GD11017	1	Special Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 1 $\frac{1}{2}$ ", L.H. Thread
	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, 3.5mm 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	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 Bearing Cap (Items 3 And 7-9)

# GAUGE WHEELS

RUB027/RUB023(RU84a/RU84b)

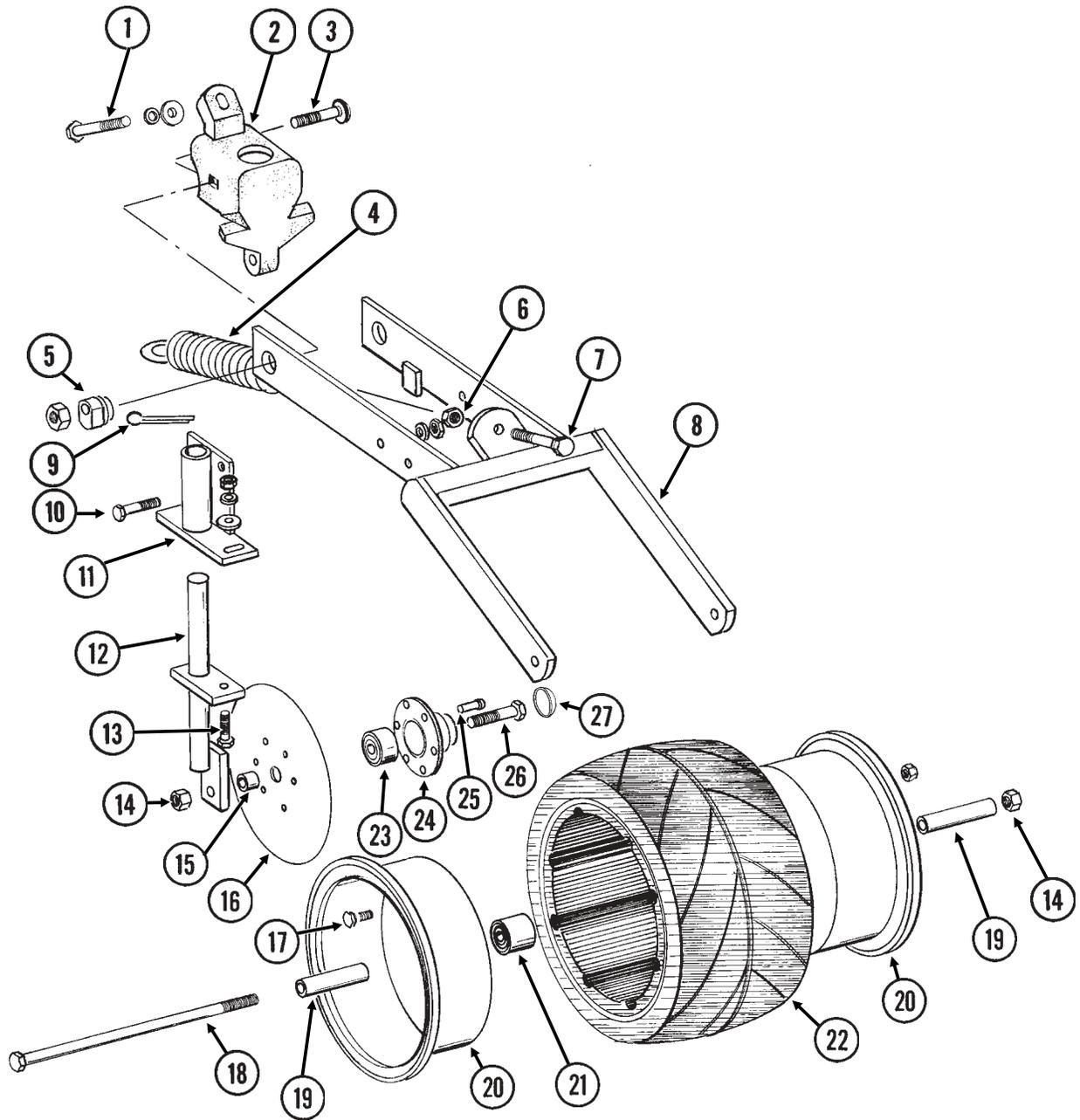


# GAUGE WHEELS

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	Flange Nut, 5/16"-18
7.	G10924	8	Carriage Bolt, 5/16"-18 x 1 3/4"
	G10620	8	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
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)

# COVERING DISCS/SINGLE PRESS WHEEL

RUA054/RUB026(RU94c)



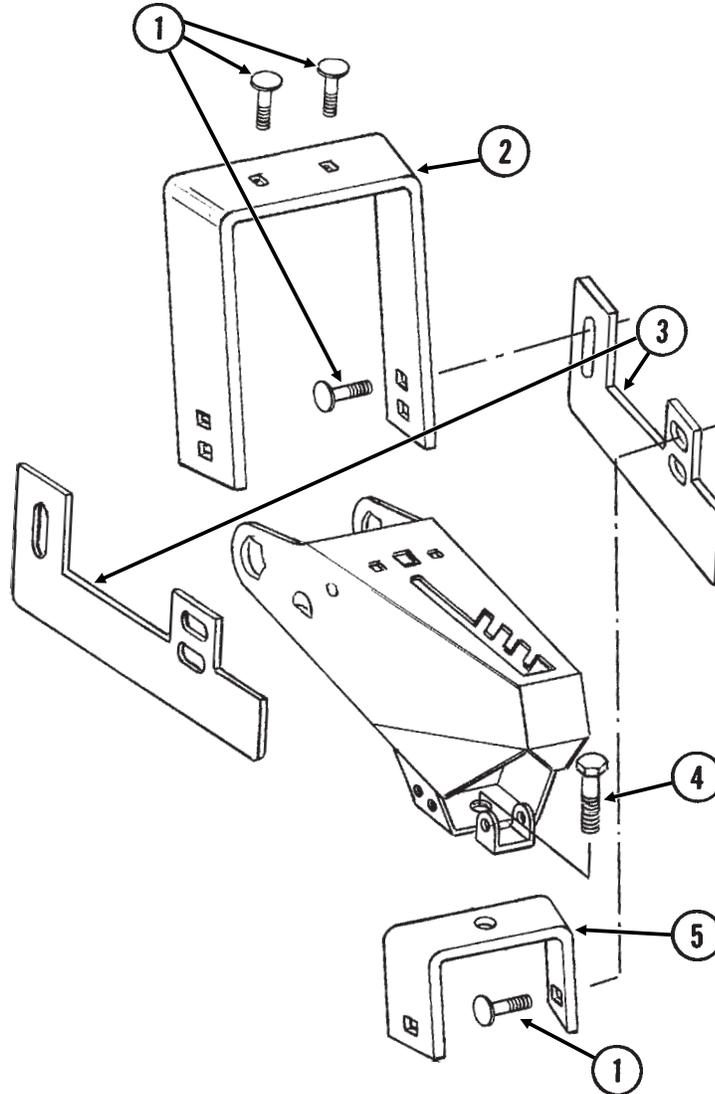
# COVERING DISCS/SINGLE PRESS WHEEL

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10003	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{1}{2}$ "
	G10229	1	Lock Washer, $\frac{3}{8}$ "
	G10210	2	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)
4.	G10102	2	Hex Nut, $\frac{1}{2}$ "-13
	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
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)



# DRAG CLOSING ATTACHMENT

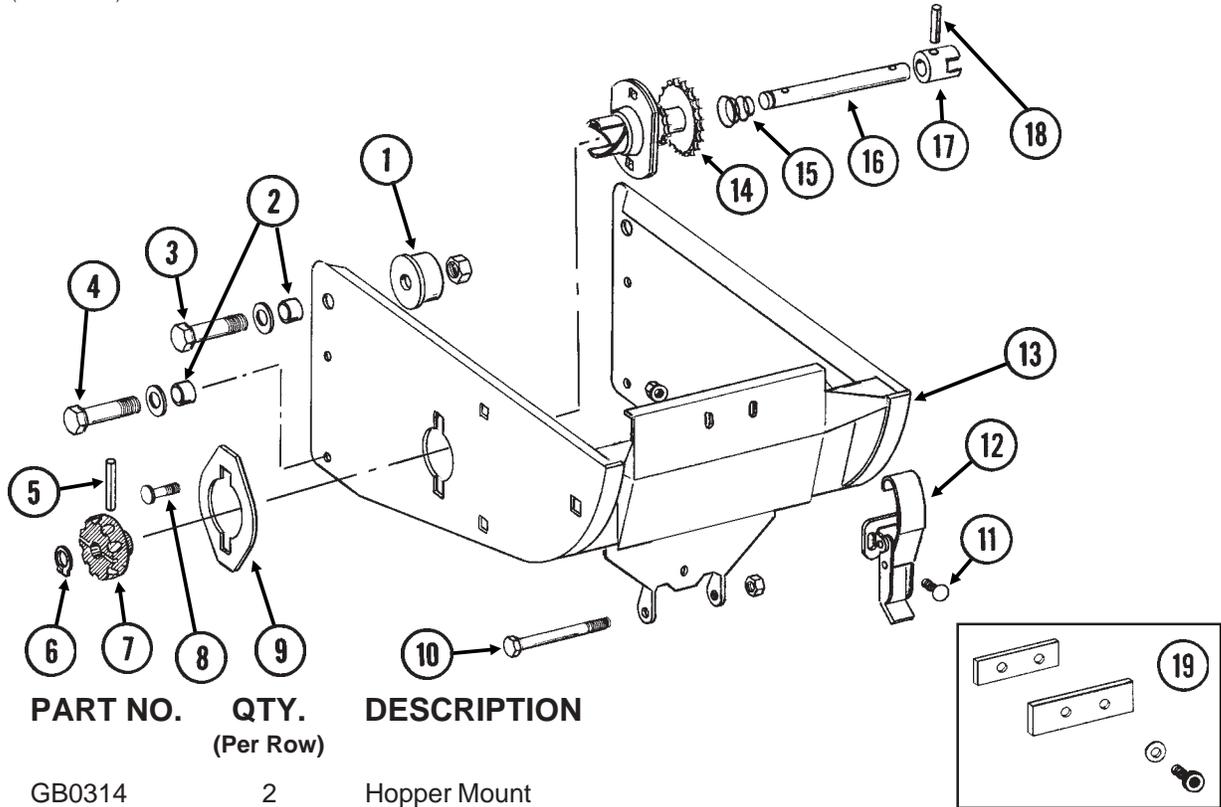
RUB050(RU90c)



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

# HOPPER SUPPORT AND METER DRIVE

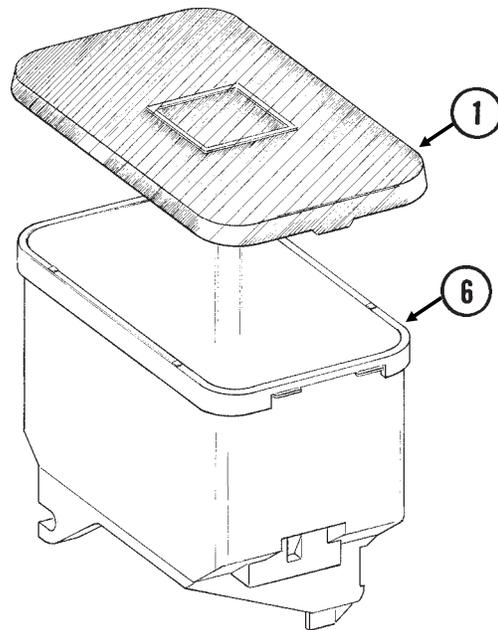
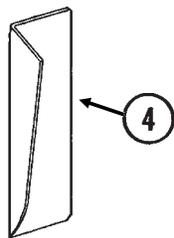
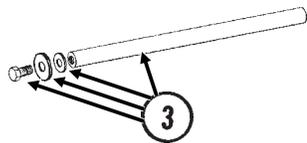
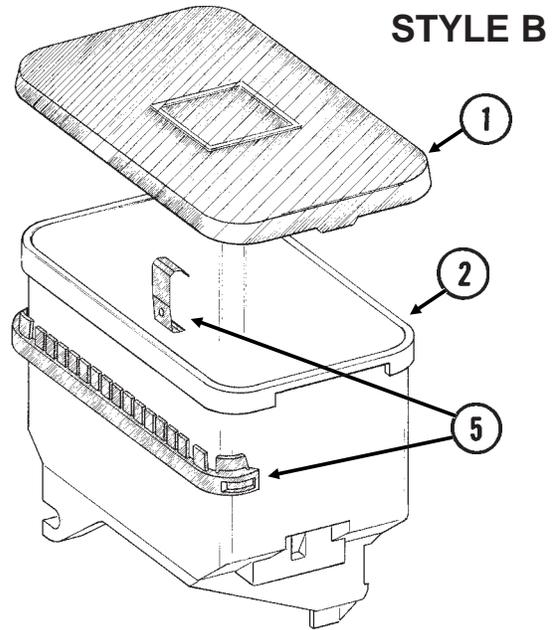
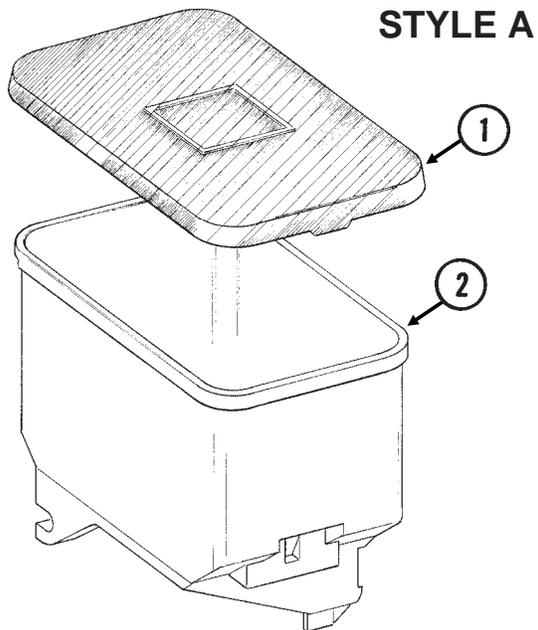
RUB028/RUB029(RU86h/RU86f)



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 $1\frac{1}{4}$ "
	G10302	-	Carriage Bolt, $\frac{5}{16}$ "-18 x $\frac{7}{8}$ "
	G10620	2	Flange Nut, $\frac{5}{16}$ "-18
9.	GD11305	1	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	Flange Nut, $\frac{1}{4}$ "-20
12.	GA2007	1	Hopper Hold Down Latch
13.	GA8304	1	Hopper Support
14.	GA9538	1	Double Sprocket And Bearing, Drive Clutch, 11/19 Tooth
15.	GD11413	1	Spring
16.	GD10958	1	Shaft
17.	GB0278	1	Coupler
18.	G10546	1	Spring Pin, $\frac{3}{16}$ " x $1\frac{1}{4}$ "
19.	G1K312	-	Seed Hopper Support Panel Kit W/Hardware And Instruction (2 Rows)
	G10211	-	Washer, $\frac{1}{4}$ " SAE
	G10252	-	Socket Head Screw, $\frac{1}{4}$ "-20 x $\frac{7}{8}$ ", Grade 8
A.	GA9539	-	Meter Drive Assembly Complete (Items 5-7 And 14-18)

# SEED HOPPER AND LID

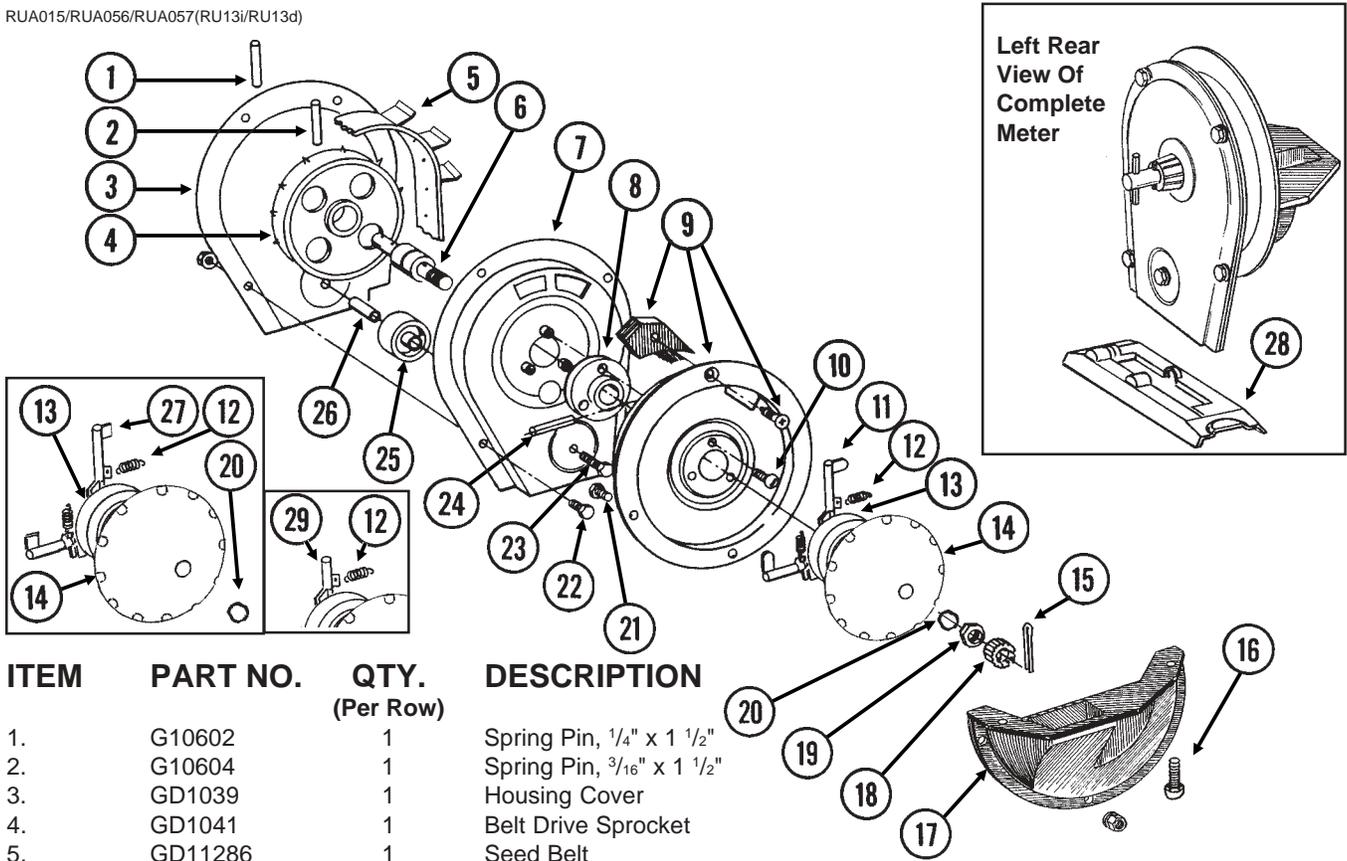
RUA030(RU87d/RU87c/RU128/RU87a/RU87e)



ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GD11279	1	Lid
2.	GA8370	1	Seed Hopper ( <b>Sub GA9714</b> )
3.	G1K313	1	Seed Hopper Cross Brace Kit (STYLE A Seed Hopper)
	G10989	2	Hex Washer Head Cap Screw, $\frac{3}{8}$ "-16 x $\frac{3}{4}$ "
	G10201	2	Special Washer, $\frac{3}{8}$ " x 1 $\frac{1}{2}$ " O.D.
	G10210	2	Washer, $\frac{3}{8}$ " USS
4.	GD11747	1	Seed Reserve Baffle
5.	G1K335	1	Seed Hopper Reinforcement Kit (STYLE B Seed Hopper)
6.	GA9714	1	Seed Hopper, Reinforced

# FINGER PICKUP SEED METER

RUA015/RUA056/RUA057(RU13i/RU13d)

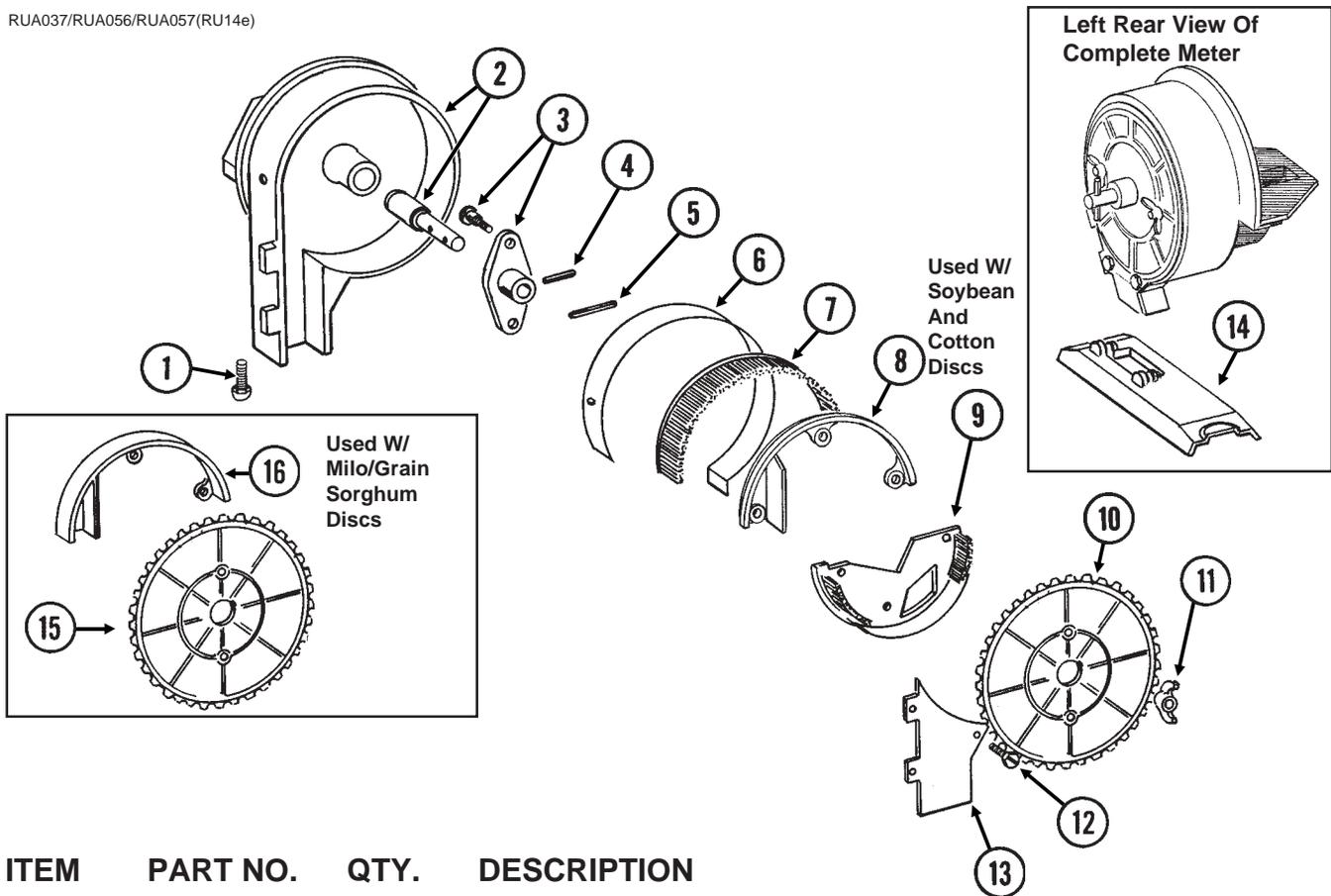


ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10602	1	Spring Pin, 1/4" x 1 1/2"
2.	G10604	1	Spring Pin, 3/16" x 1 1/2"
3.	GD1039	1	Housing Cover
4.	GD1041	1	Belt Drive Sprocket
5.	GD11286	1	Seed Belt
6.	GA2019	1	Bearing
7.	GA2018	1	Conveyor Housing
8.	GB0110	1	Bearing Housing
9.	GR0664	1	Carrier Plate W/Brush And Screw
	GA2020	-	Brush
	G10690	-	Rolling Thread Screw, No. 10 x 3/4"
10.	G10401	3	Slotted Hex Washer Head Screw, No. 10-32 x 5/8"
11.	GD10733	12	Finger, Corn
12.	GD6501	12	Spring
13.	GB0111	1	Cam
14.	GD11528	1	Finger Holder
15.	G10470	1	Cotter Pin, 5/32" x 1"
16.	G11009	2	Locking Thumbscrew, 5/16"-18 x 3/4"
17.	GD11311	1	Seed Baffle
18.	GD1083	1	Cover Nut
19.	G10500	1	Jam Nut, 5/8"-18 UNF
20.	GA8343	1	Wave Washer, 5/8" (Triple Wave)
21.	G10020	3	Hex Head Cap Screw, 1/4"-20 x 5/8"
	G10323	3	Hex Flange Nut, 1/4"-20
22.	G10022	4	Hex Head Cap Screw, 1/4"-20 x 1/2"
	G10621	4	Flange Nut, 1/4"-20
23.	G10021	1	Hex Head Cap Screw, 1/4"-20 x 1 1/2"
	G10621	1	Flange Nut, 1/4"-20
24.	G10603	1	Spring Pin, 1/4" x 1 1/4"
25.	GD1042	1	Idler
26.	GB0120	1	Bushing, 17/64" I.D. x 1 1/32" Long
27.	GD10226	12	Finger, Oil Sunflower
28.	GD11373	1	Shank Cover, Finger Pickup Seed Meter
29.	GD11787	-	Half Rate Blank Finger

- A. GR1487 - Finger Assembly, Corn (Items 11-14 And 20)
- B. GR1327 - Finger Assembly, Oil Sunflower (Items 12-14, 20 And 27)

# BRUSH-TYPE SEED METER

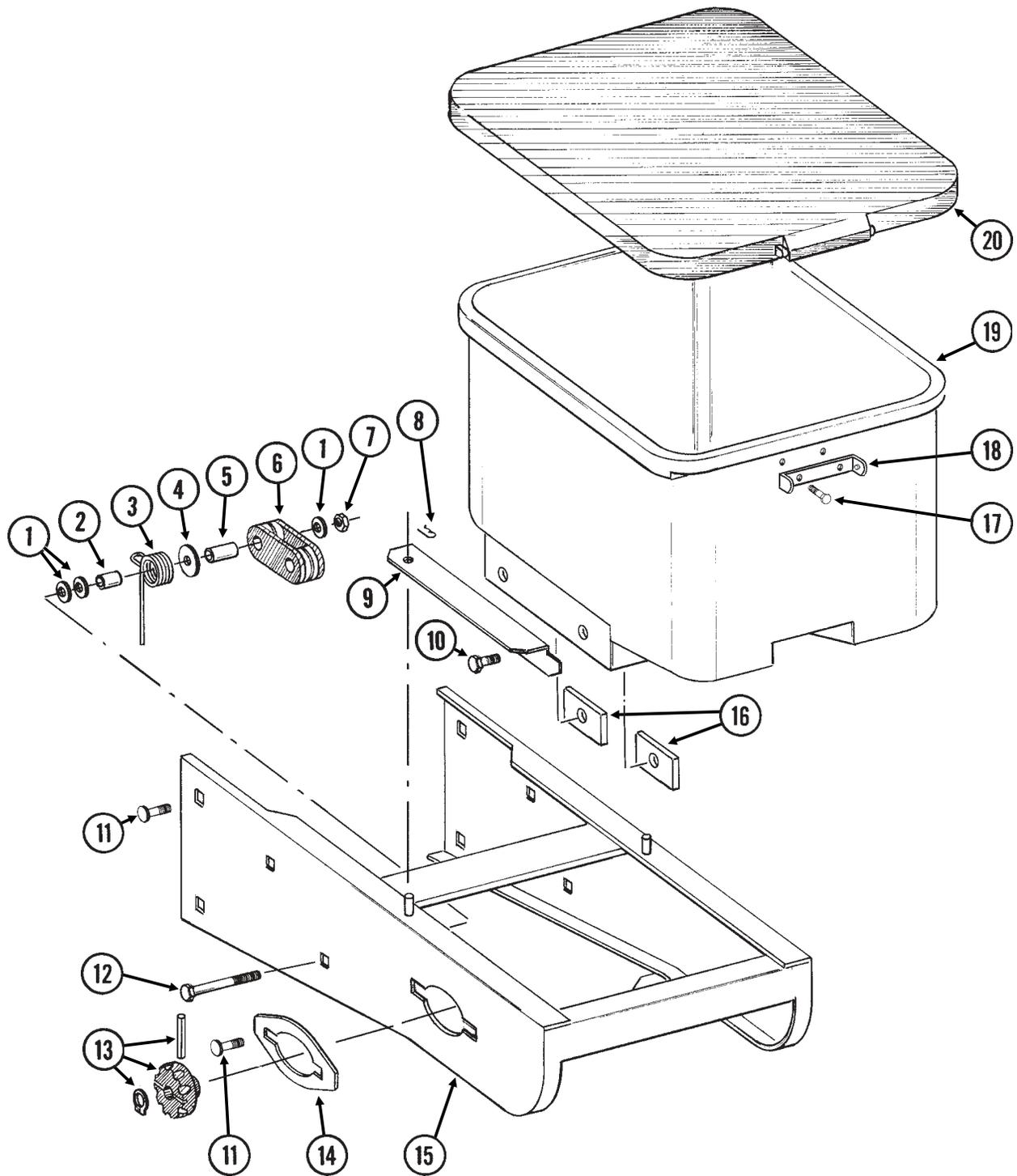
RUA037/RUA056/RUA057(RU14e)



ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Row)	
1.	G11009	2	Locking Thumbscrew, $\frac{5}{16}$ "-18 x $\frac{3}{4}$ "
2.	GA6027	1	Housing W/Bearing
	GA5698	-	Bearing
3.	GA6038	1	Hub W/Shoulder Bolts
	GD1755	-	Shoulder Bolt, $\frac{1}{4}$ "-20 (2 Used)
4.	G10603	1	Spring Pin, $\frac{1}{4}$ " x $1\frac{1}{4}$ "
5.	G10602	1	Spring Pin, $\frac{1}{4}$ " x $1\frac{1}{2}$ "
6.	GD8778	1	Wear Strip
7.	GA5699	1	Upper Brush
8.	GD11122	1	Upper Brush Retainer (Used W/Soybean And Cotton Discs)
9.	GA5834	1	Lower Brush
10.	GA5794	-	Seed Disc, Soybean, 60 Cell, Black Color-Coded
	GA6184	-	Seed Disc, Specialty Soybean, 48 Cell, Dark Blue Color-Coded
	GA5796	-	Seed Disc, Cotton, Acid-Delinted, 30 Cell, White Color-Coded
	GA6168	-	Seed Disc, Large Cotton, Acid-Delinted, 36 Cell, Tan Color-Coded
	GA6478	-	Seed Disc, High-Rate Cotton, Acid-Delinted, 48 Cell, Light Green Color-Coded
	GA6182	-	Seed Disc, Hill-Drop Cotton, Acid-Delinted, 12 Cell, Brown Color-Coded
	GA7255	-	Seed Disc, Small Hill-Drop Cotton, Acid-Delinted, 12 Cell, Dark Green Color-Coded
11.	G10531	2	Wing Nut W/Nylon Insert, $\frac{1}{4}$ "-20
12.	G10584	9	Slotted Tap Screw, No. 10-24 x $\frac{1}{2}$ "
	G10634	-	Slotted Tap Screw, No. 10-24 x $\frac{5}{8}$ " (Use As Required)
13.	GD7878	1	Cover
14.	GD11374	1	Shank Cover, Brush-Type Seed Meter
15.	GA5982	-	Seed Disc, Small Milo/Grain Sorghum, 30 Cell, Red Color-Coded
	GA6187	-	Seed Disc, Large Milo/Grain Sorghum, 30 Cell, Light Blue Color-Coded
	GA5795	-	Seed Disc, High-Rate Small Milo/Grain Sorghum, 60 Cell, Red Color-Coded
	GA6633	-	Seed Disc, High-Rate Large Milo/Grain Sorghum, 60 Cell, Yellow Color-Coded
16.	GD8237	-	Upper Brush Retainer (Used W/Milo/Grain Sorghum Discs)

# GRANULAR CHEMICAL HOPPER AND HOPPER PANEL EXTENSION

RUA052/RUA053/RUB028(RU92k)



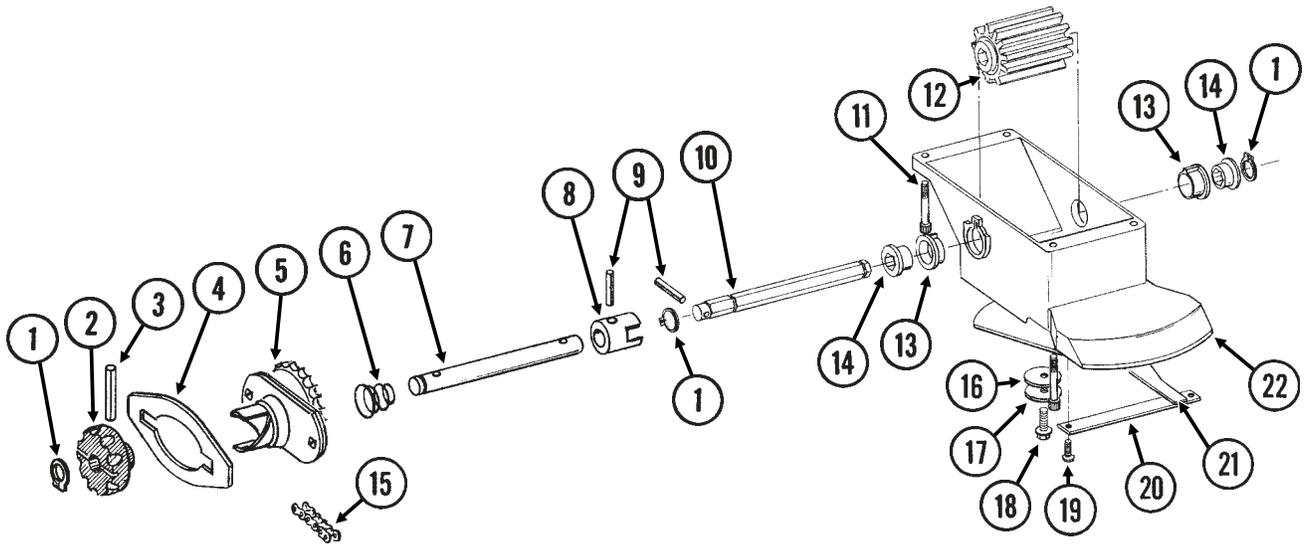
# GRANULAR CHEMICAL HOPPER AND HOPPER PANEL EXTENSION

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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	Flange Nut, $\frac{5}{16}$ "-18
12.	G10325	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 2 $\frac{3}{4}$ "
13.		-	See "Granular Chemical Meter And Meter Drive", Page P18
14.	GD11305	1	Plate
15.	A8422	1	Hopper Panel Extension <b>(Non-Stock Item)</b> <b>(Sub Wholegoods Order Code 700-01080)</b>
16.	GD11424	4	Block
17.	G10023	2	Hex Head Cap Screw, $\frac{1}{4}$ "-20 x $\frac{3}{4}$ "
	G10621	2	Flange Nut, $\frac{1}{4}$ "-20
18.	GD1060	1	Hinge
19.	GA8371	1	Hopper
20.	GA4444	1	Lid

# GRANULAR CHEMICAL METER AND METER DRIVE

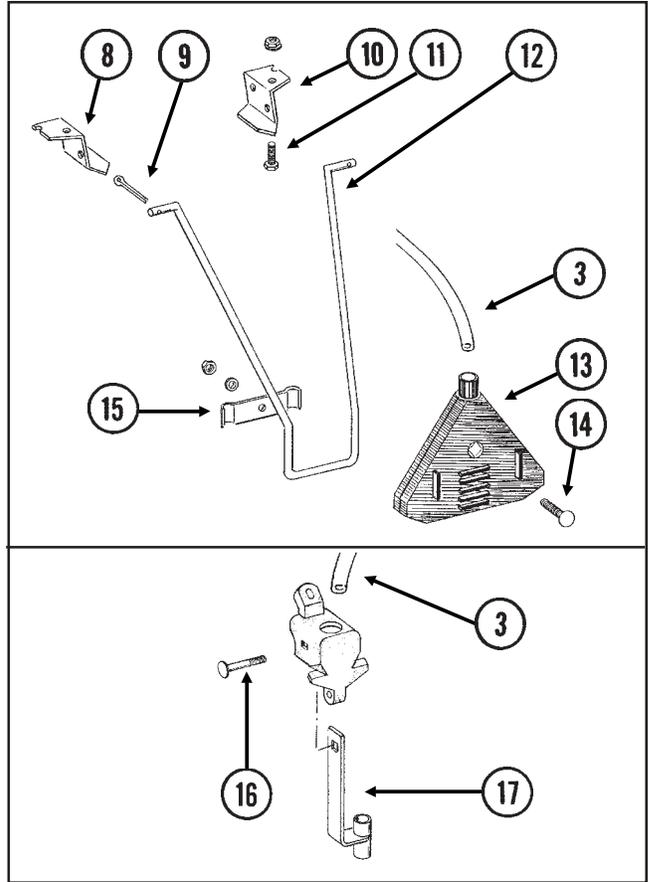
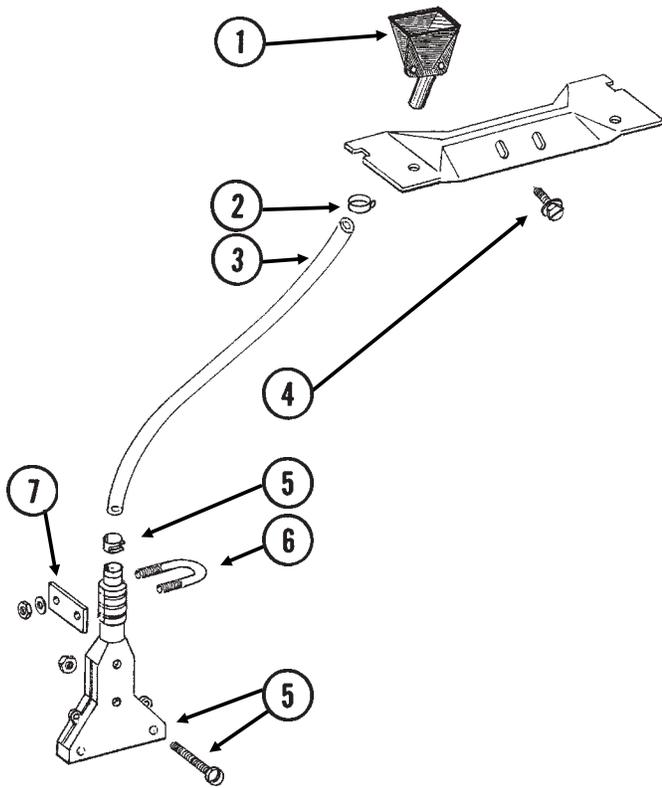
RUA051/RUB028(RU91a)



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.	G3303-114	1	Chain, No. 41, 114 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

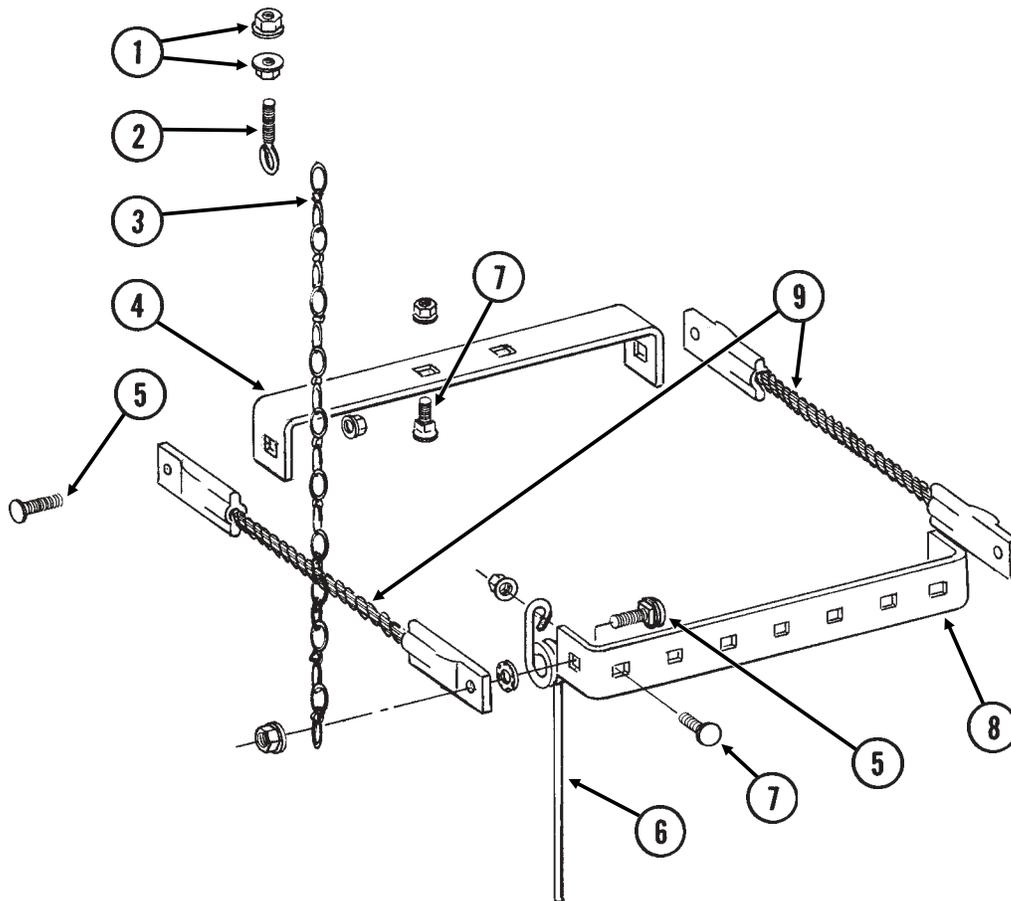
RUA061/RUA073(RU101m)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD2423	1	Funnel
2.	G10673	1	Hose Clamp, No. 8
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
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)

# SPRING TOOTH INCORPORATOR

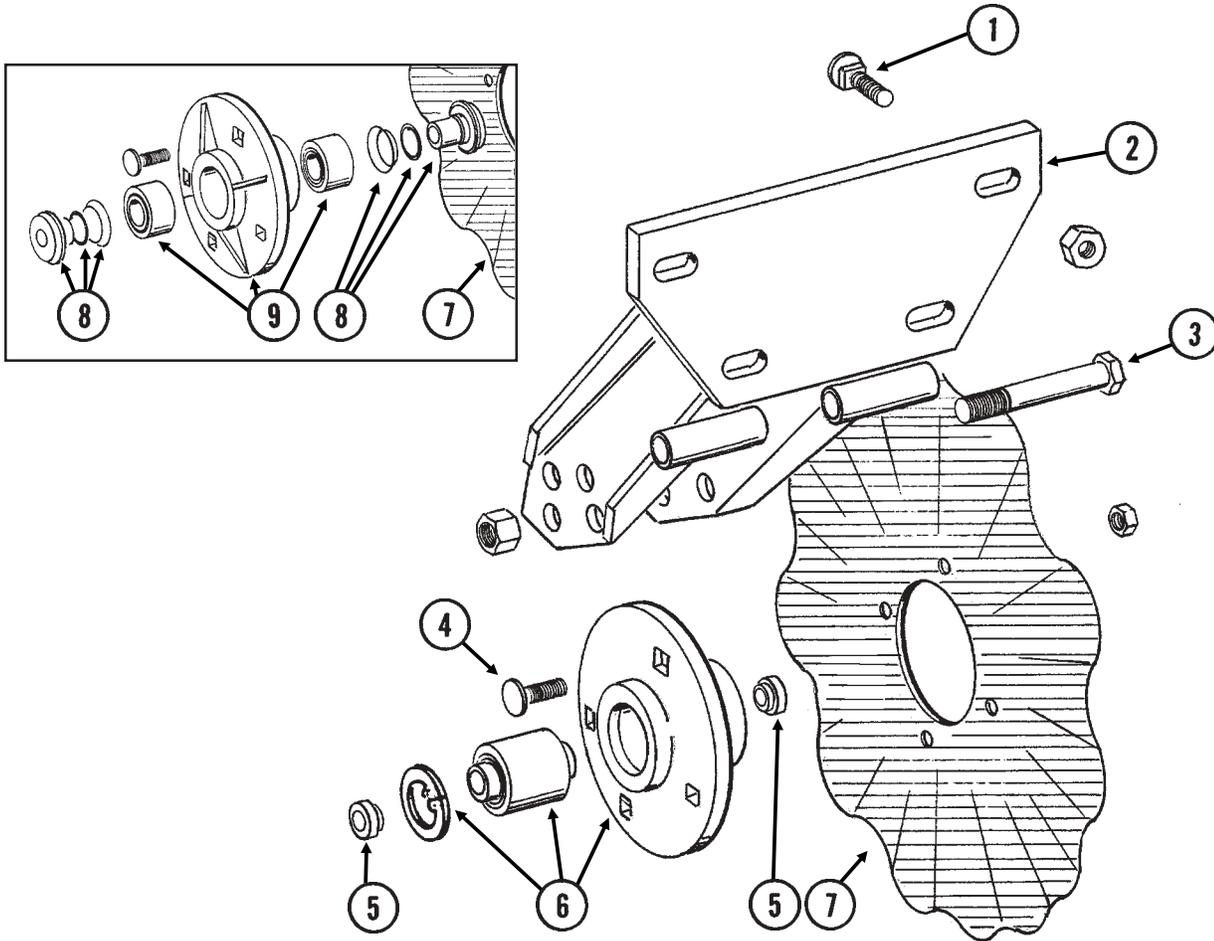
RUA055(RU95)



ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10621	4	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	Flange Nut, 3/8"-16
6.	GD1145	7	Spring Tooth
7.	G10308	9	Carriage Bolt, 3/8"-16 x 3/4"
	G10622	9	Flange Nut, 3/8"-16
8.	GD1144	1	Rear Bracket
9.	GA2094	2	Cable Assembly

# ROW UNIT MOUNTED NO TILL COULTER

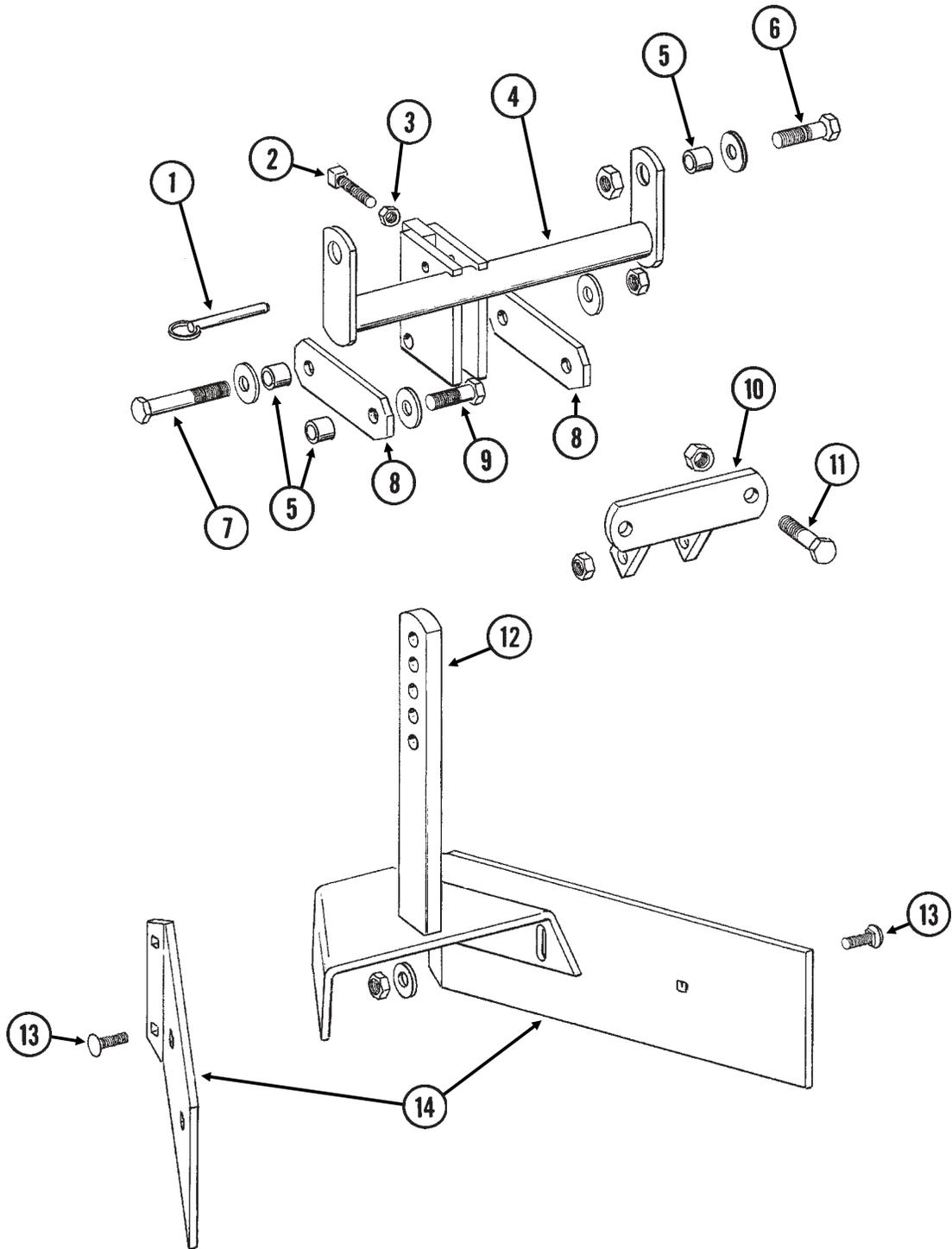
RUA061(RU102/RU102c)



ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10574	4	Carriage Bolt, 1/2"-13 x 1 1/4"
	G10111	4	Lock Nut, 1/2"-13
2.	GA5625	1	Arm
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	-	Double Row Bearing
	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.	G1K330	2	Adapter Kit W/O-Ring And Spring Washer
	GD8844	2	O-Ring
	GD8843	2	Spring Washer
9.	GA5640	1	Hub W/Bearings And Grease Fitting ( <b>Sub G1K289</b> )
	GA5622	-	Bearing (2 Used Per Hub)
	G10640	-	Grease Fitting, 1/4"-28

# ROW UNIT MOUNTED BED LEVELER

RUA059/RUA060(RU99/RU100)



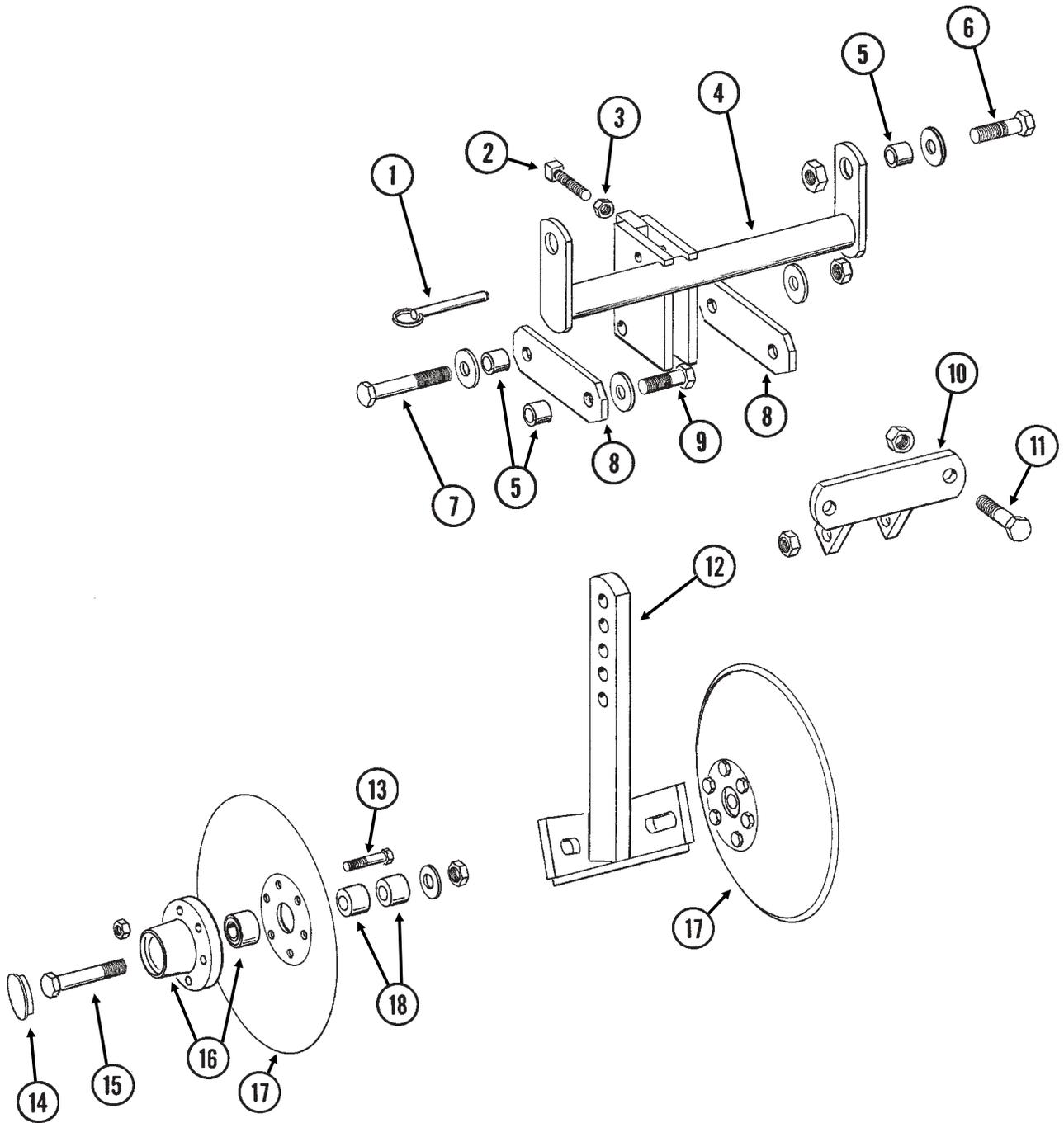
# ROW UNIT MOUNTED BED LEVELER

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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
6.	G10039	2	Hex Head Cap Screw, 1/2"-13 x 1 3/4"
	G10216	2	Washer, 1/2" USS
	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.	GA5892	1	Leveler
13.	G10303	6	Carriage Bolt, 5/16"-18 x 1"
	G10219	4	Washer, 5/16" USS
	G10109	6	Lock Nut, 5/16"-18
14.	GD8266	2	Blade

# ROW UNIT MOUNTED DISC FURROWER

RUA059/RUA058(RU99/RU98g)

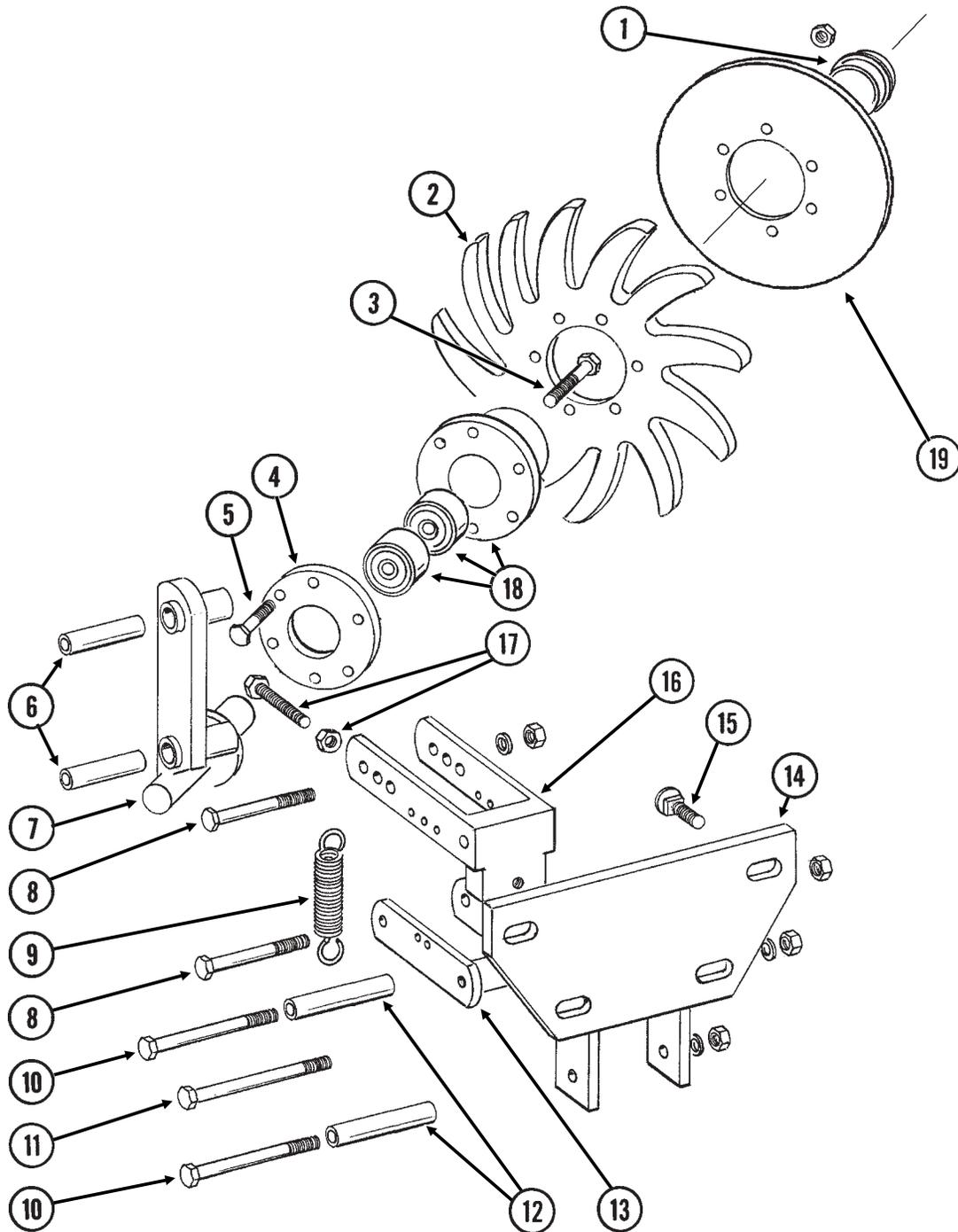


# ROW UNIT MOUNTED DISC FURROWER

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
6.	G10039	2	Hex Head Cap Screw, 1/2"-13 x 1 3/4"
	G10216	2	Washer, 1/2" USS
	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, 11/16" I.D. x 3/4" Long
	GD7817-04	2	Spacer, 11/16" I.D. x 1/2" Long

# ROW UNIT MOUNTED RESIDUE WHEEL

(RU103d)

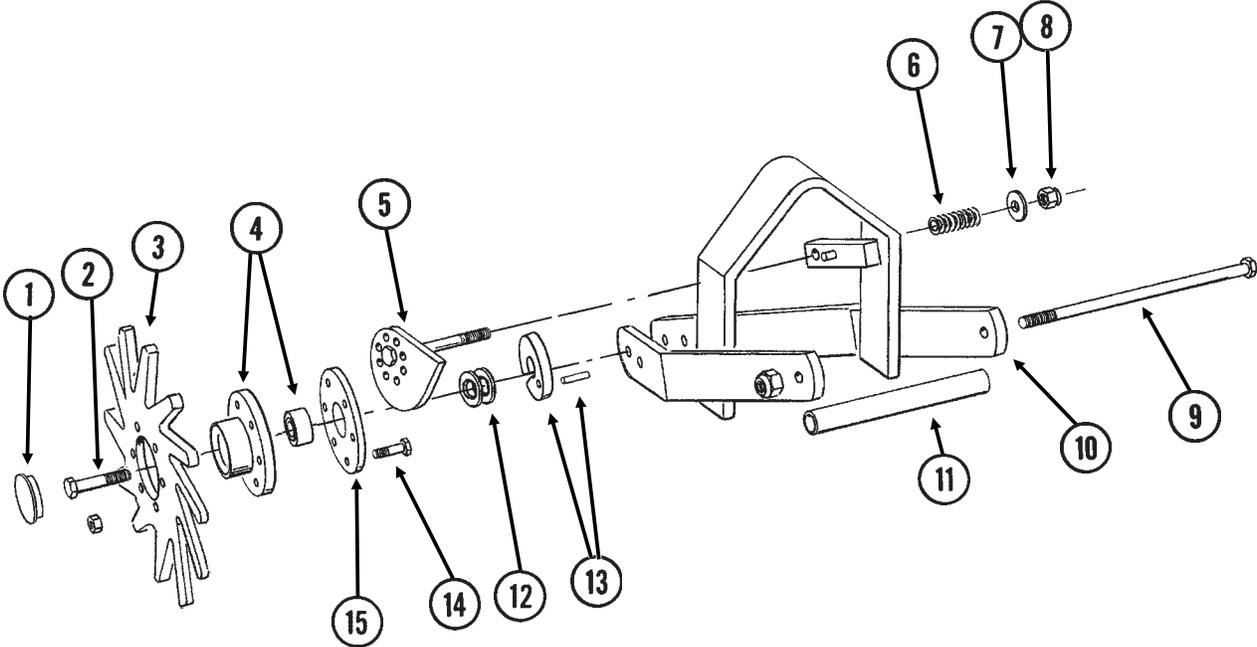


# ROW UNIT MOUNTED RESIDUE WHEEL

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
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
A.	GA7446	-	Wheel Assembly, 12 Tine (Items 2, 4, 5 And 18)

# COULTER MOUNTED RESIDUE WHEELS

RUA063(RU104p)



# COULTER MOUNTED RESIDUE WHEELS

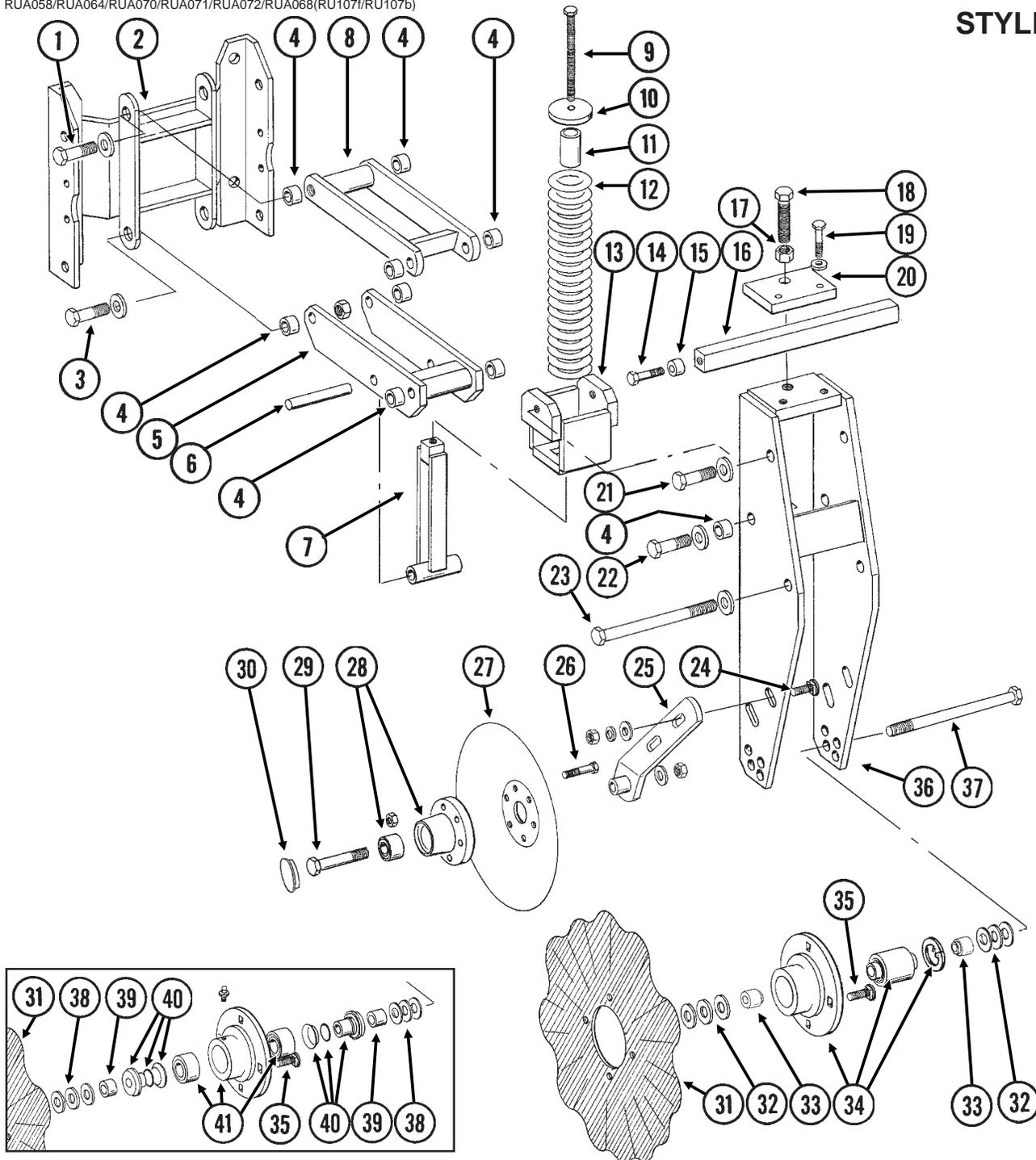
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ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GD1132	2	Dust Cap
2.	G10009	2	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 2 $\frac{1}{2}$ "
3.	GD10552	2	Wheel, 12 Tine, $\frac{3}{8}$ " x 12"
4.	GA5654	2	Hub W/Bearings
	GA2014	-	Bearing
5.	GA7412	1	Cam
6.	GD10519	1	Spring
7.	G10206	1	Washer, $\frac{1}{2}$ " SAE
8.	G10974	1	Lock Nut W/Nylon Insert, $\frac{1}{2}$ "-13
9.	G10148	1	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 9 $\frac{1}{2}$ "
	G10974	1	Lock Nut W/Nylon Insert, $\frac{1}{2}$ "-13
10.	GA7271	1	Mount
11.	GD10526	1	Sleeve, 7 $\frac{1}{2}$ "
12.	G10213	4	Machine Bushing, $\frac{5}{8}$ " (.030" Thick)
13.	GA8760	2	Weed Guard W/Spring Pin
	G10765	-	Spring Pin, $\frac{1}{4}$ " x 1"
14.	G10133	12	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x 1 $\frac{1}{2}$ "
	G10109	12	Lock Nut, $\frac{5}{16}$ "-18
15.	GD9724	2	Backing Plate
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)

# FRAME MOUNTED COULTER W/DISC FURROWER

RUA058/RUA064/RUA070/RUA071/RUA072/RUA068(RU107f/RU107b)

STYLE A



ITEM PART NO. QTY. DESCRIPTION  
(Per Row)

1.	G10008	2	Hex Head Cap Screw, 5/8"-11 x 2"
	GD7805	2	Special Washer, 5/8", Hardened
2.	GA5798	1	Support Plate
3.	G10008	2	Hex Head Cap Screw, 5/8"-11 x 2"
	GD7805	2	Special Washer, 5/8", Hardened
	G10107	2	Lock Nut, 5/8"-11
4.	GB0218	10	Bushing, 21/32" I.D. x 7/8" O.D. x 19/32" Long
5.	GA5631	1	Lower Parallel Link
6.	GD7815	1	Pin, 5/8" x 4 1/4"
7.	GA5635	1	Spring Guide

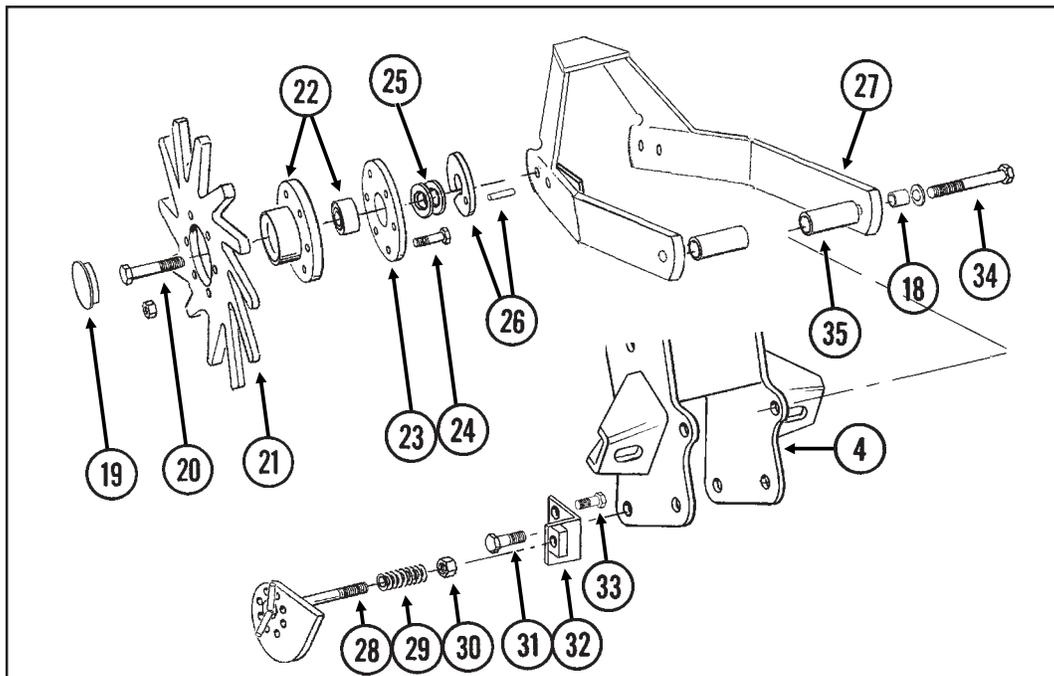
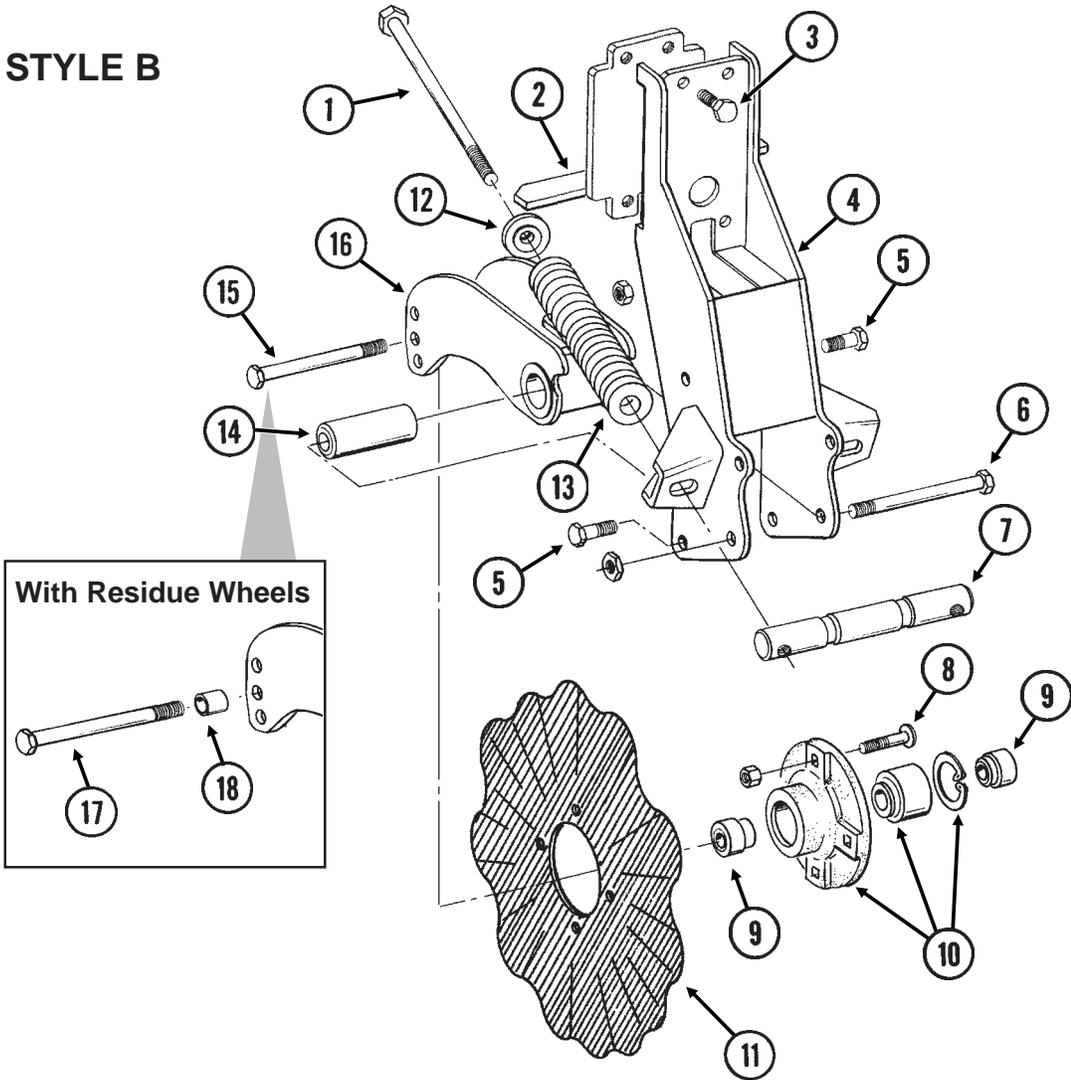
# FRAME MOUNTED COULTER W/DISC FURROWER

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
8.	GA5630	1	Upper Parallel Link
9.	G10573	1	Hex Head Cap Screw, 5/8"-11 x 5 1/2", Full Thread
10.	GB0196	1	Washer
11.	GD7817-09	1	Spacer, 11/16" I.D. x 1 3/4" Long
12.	GD7831	1	Compression Spring
13.	GA5637	1	Spring Socket
14.	GD7818	2	Special Bolt
15.	GD7817-01	2	Spacer, 11/16" I.D. x 3/4" Long
16.	GD7816	1	Depth Control Bar
17.	G10104	1	Hex Nut, 5/8"-11
18.	G10582	1	Hex Head Cap Screw, 5/8"-11 x 4", Full Thread
19.	G10581	2	Hex Head Cap Screw, 1/2"-13 x 2 1/4"
	G10228	2	Lock Washer, 1/2"
20.	GD7811	1	Depth Adjustment Clamp
21.	G10008	2	Hex Head Cap Screw, 5/8"-11 x 2"
	GD7805	2	Special Washer, 5/8", Hardened
	GD1109	-	Bushing, 41/64" I.D. x 7/8" O.D. x 1/4" Long (As Required)
	G10107	1	Lock Nut, 5/8"-11
22.	G10055	2	Hex Head Cap Screw, 5/8"-11 x 1 1/4"
	GD7805	2	Special Washer, 5/8", Hardened
23.	G10012	1	Hex Head Cap Screw, 5/8"-11 x 6 1/2"
	GD7805	2	Special Washer, 5/8", Hardened
	GD1109	-	Bushing, 41/64" I.D. x 7/8" O.D. x 1/4" Long (As Required)
	G10107	1	Lock Nut, 5/8"-11
24.	G10747	4	Carriage Bolt, 1/2"-13 x 2"
	G10206	-	Washer, 1/2" SAE (As Required)
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
25.	GA5636	2	Arm
26.	G10572	12	Truss Head Slotted Machine Screw, 5/16"-18 x 7/8"
	G10106	12	Hex Nut, 5/16"-18
27.	GD7823	2	Disc Blade, Solid, 12" (Shown)
	GD8307	-	Disc Blade, Notched, 12"
28.	GA5654	2	Hub W/Bearings
	GA2014	4	Bearing
29.	G10036	2	Hex Head Cap Screw, 5/8"-11 x 4"
	G10107	2	Lock Nut, 5/8"-11
30.	GD1132	2	Dust Cap
31.	GD7803	1	Disc Blade, Fluted, 1", 8 Flutes (Shown)
	GD7804	-	Disc Blade, Bubbled, 1"
	GD9254	-	Disc Blade, Fluted, 3/4", 13 Flutes
32.	G10213	-	Machine Bushing, 5/8" (.030" Thick) (As Required)
	G10918	-	Machine Bushing, 5/8", 14 Gauge (As Required)
33.	GD11698	2	Adapter
34.	GA8641	1	Hub W/Bearing And Retaining Ring
	GA8603	-	Double Row Bearing
	GD11652	-	Retaining Ring, 2 7/16"
35.	G10574	4	Carriage Bolt, 1/2"-13 x 1 1/4"
	G10111	4	Lock Nut, 1/2"-13
36.	GA5643	1	Fork Mount
37.	G10068	1	Hex Head Cap Screw, 5/8"-11 x 6"
	G10107	1	Lock Nut, 5/8"-11
38.	G10217	-	Washer, 5/8" USS (As Required)
39.	GD7817-04	2	Spacer, 11/16" I.D. x 1/2" Long
40.	G1K330	2	Adapter Kit W/O-Ring And Spring Washer
	GD8844	-	O-Ring
	GD8843	-	Spring Washer
41.	GA5640	1	Hub W/Bearings And Grease Fitting (Sub G1K290)
	GA5622	-	Bearing (2 Used Per Hub)
	G10640	-	Grease Fitting, 1/4"-28

# FRAME MOUNTED COULTER W/RESIDUE WHEELS

(RU135c/RU135g/RU135h)

## STYLE B



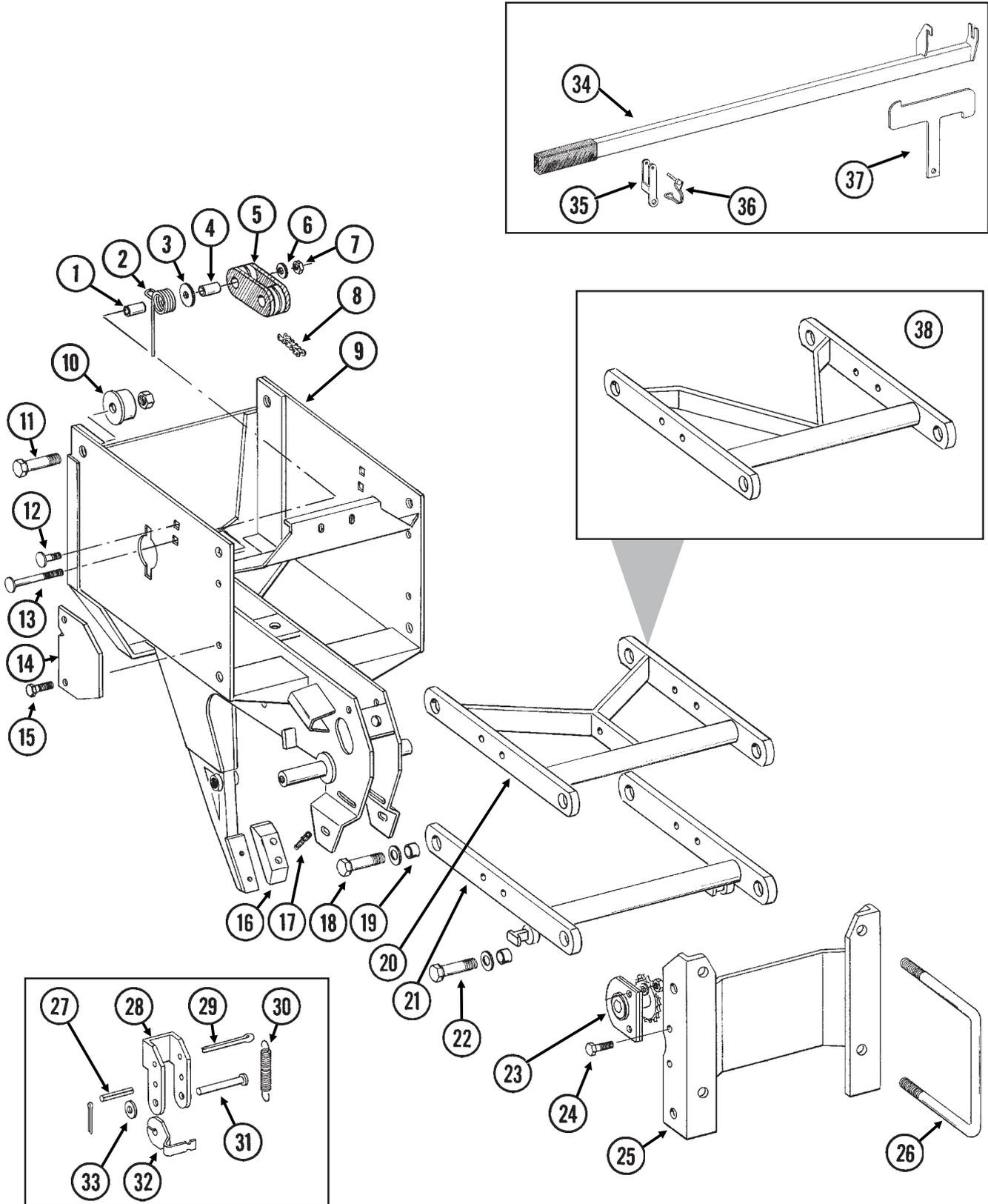
# FRAME MOUNTED COULTER W/RESIDUE WHEELS

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	Double Row Bearing
	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.	G10009	2	Hex Head Cap Screw, 5/8"-11 x 2 1/2"
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
25.	G10213	4	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"
A.	GA7446	-	Wheel Assembly, 12 Tine, R.H. (Items 21-24) (Shown)
	GA7445	-	Wheel Assembly, 12 Tine, L.H. (Items 21-24)

# INTERPLANT® PUSH ROW UNIT

RPU011/RPU012/RPU013(RU89p/RU121/RU89i)

**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.

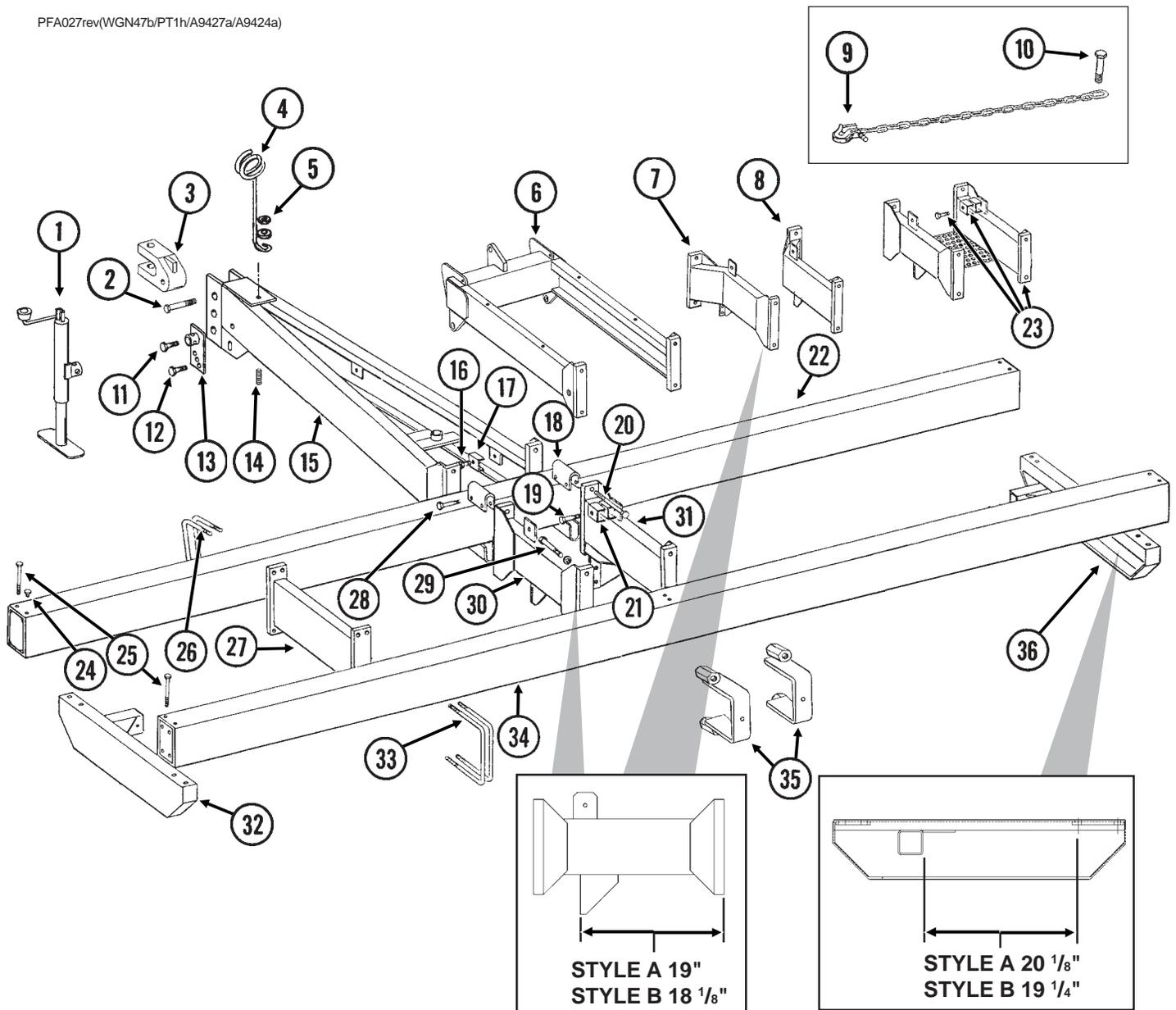


# INTERPLANT® PUSH ROW UNIT

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.	G3303-96	1	Chain, No. 41, 96 Pitch Including Connector Link
	GR0196	1	Connector Link, No. 41
9.	GA8037	-	Push Row Unit Shank
10.	GB0314	2	Hopper Mount
11.	G10751	2	Hex Head Cap Screw, 5/8"-18 x 1 3/4"
	G10412	2	Lock Nut, 5/8"-18
12.	G10599	1	Carriage Bolt, 3/8"-16 x 1 1/4"
	G10101	1	Hex Nut, 3/8"-16
	G10108	1	Lock Nut, 3/8"-16
13.	G10307	1	Carriage Bolt, 3/8"-16 x 3 1/2"
14.	GD10867	2	Stop
15.	G10004	4	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10108	4	Lock Nut, 3/8"-16
16.	GB0301	1	Seed Tube Guard/Inner Scraper
17.	G10912	2	Hex Socket Head Cap Screw, 5/16"-18 x 1", Grade 8
18.	G10751	4	Hex Head Cap Screw, 5/8"-18 x 1 3/4"
	GD7805	4	Special Washer, 5/8", Hardened
	G10412	4	Lock Nut, 5/8"-18
19.	GB0218	8	Bushing, 21/32" I.D. x 7/8" O.D. x 19/32" Long
20.	GA5788	1	Upper Arm
21.	GA5787	1	Lower Arm
22.	G10732	4	Hex Head Cap Screw, 5/8"-18 x 2"
	GD7805	4	Special Washer, 5/8", Hardened
	G10412	4	Lock Nut, 5/8"-18
23.	GA1720	1	Bearing/Sprocket, 7/8" Hex Bore
24.	G10004	2	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
25.	GA5786	1	Mounting Plate
26.	GD1113	2	U-Bolt, 5" x 7" x 5/8"-11
	GD1114	2	U-Bolt, 7" x 7" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
27.	G10718	2	Spring Pin, 5/16" x 1 1/8"
28.	GD11264	2	Lockup
29.	G10463	2	Cotter Pin, 1/4" x 1 1/2"
30.	GD11447	2	Spring
31.	G10284	2	Clevis Pin, 1/2" x 1 1/2"
	G10456	2	Cotter Pin, 1/8" x 3/4"
32.	GD11263	2	Spring Tab
33.	G10216	2	Washer, 1/2" USS
34.	GA8651	1	Lift Lever W/Boot
	GD11649	-	Boot
35.	GD11659	1	Bracket
36.	GD9695	1	Wire Lock Pin, 1/4" x 1 3/4"
37.	GD11752	1	Mount
38.	GA8930	-	Upper Arm

# HITCH AND FRAME ASSEMBLY/SAFETY CHAIN

PFA027rev(WGN47b/PT1h/A9427a/A9424a)



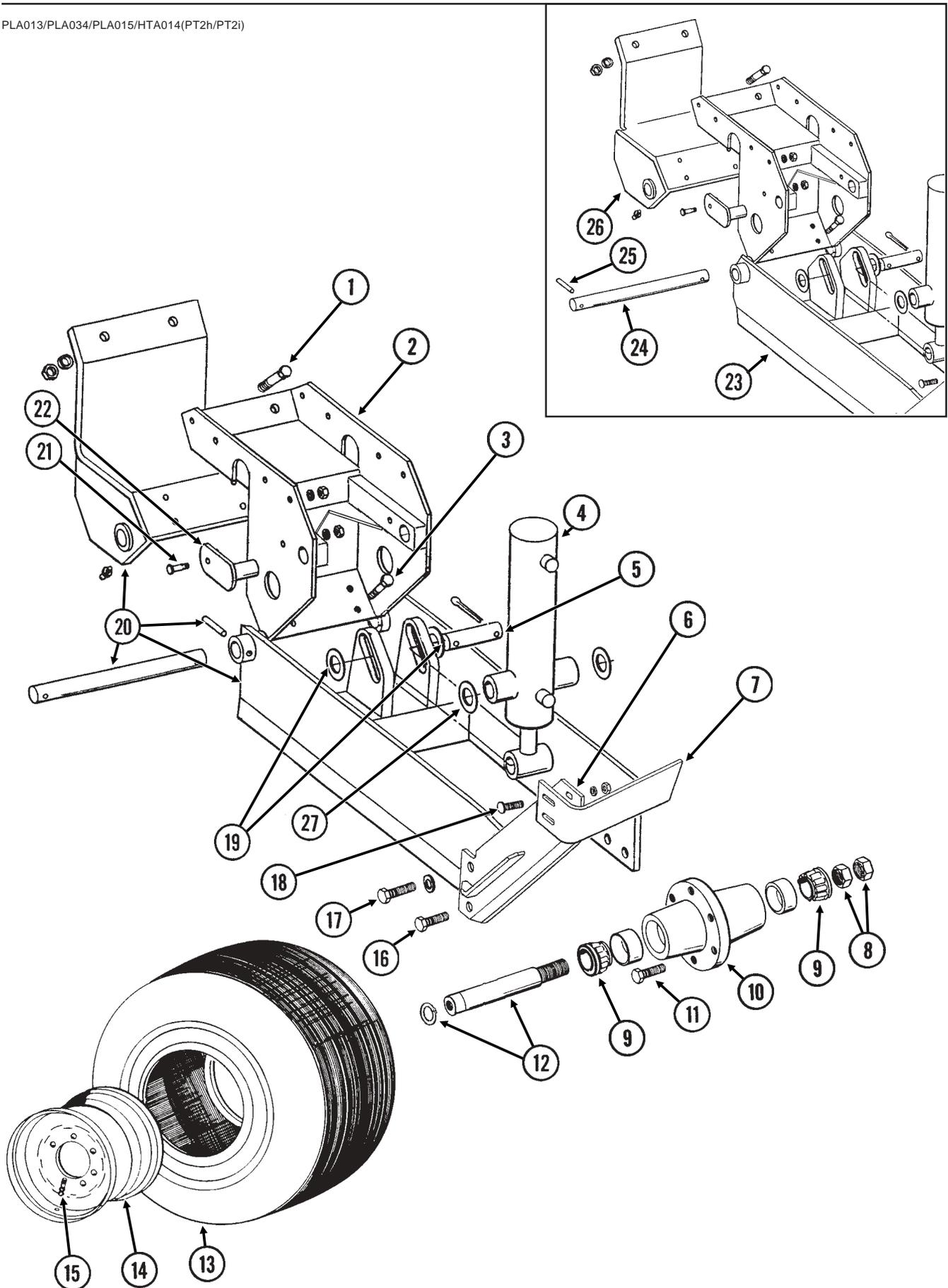
ITEM	PART NO.	QTY.	DESCRIPTION
1.	G4100-02	1	Jack Assembly
	GR0255	-	Repair Kit (Chain And Pin)
2.	G10169	1	Hex Head Cap Screw, 1 1/4"-7 x 6"
	G10157	1	Lock Nut, 1 1/4"-7
3.	GB0156	1	Clevis
4.	GD7140	1	Hose Holder
5.	G10348	1	Hex Head Cap Screw, 1/2"-13 x 5"
	G10216	1	Washer, 1/2" USS
	G10228	1	Lock Washer, 1/2"
	G10102	1	Hex Nut, 1/2"-13
6.		-	See "Interplant® Self-Leveling Hitch Extension", Pages P76 And P77
7.	GA7207	-	Center Extension, L.H., Offset, 24" , STYLE A
	GA9428	-	Center Extension, L.H., Offset, 24" , STYLE B
8.	GA7206	-	Center Extension, R.H., Offset, 24", STYLE A
	GA9429	-	Center Extension, R.H., Offset, 24", STYLE B

# HITCH AND FRAME ASSEMBLY/SAFETY CHAIN

ITEM	PART NO.	QTY.	DESCRIPTION
9.	GA4774	1	Safety Chain, 3/8"
10.	G10119	1	Hex Head Cap Screw, 1"-8 x 3"
	G10200	1	Washer, 1" USS
	GD10646	1	Special Washer
	G10396	1	Lock Nut, 1"-8
11.	G10007	1	Hex Head Cap Screw, 5/8"-11 x 1 1/2"
	G10107	1	Lock Nut, 5/8"-11
12.	G10017	1	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10216	1	Washer, 1/2" USS
	G10111	1	Lock Nut, 1/2"-13
13.	GA7909	1	Jack Adjustment Bracket
14.	GD5888	1	Spring
15.	GA8670	1	Hitch
16.	G10047	2	Hex Head Cap Screw, 3/8"-16 x 1 3/4"
	G10108	2	Lock Nut, 3/8"-16
17.	GD5875	2	Hose Clamp, 9/16" x 2 1/2" x 2"
18.	GA5197	-	Spacer
19.	G10048	-	Hex Head Cap Screw, 3/8"-16 x 2"
	G10108	-	Lock Nut, 3/8"-16
20.	G10993	4	Hex Head Cap Screw, 1"-8 x 8 1/2", Grade 8
	G10647	4	Hex Nut, 1"-8, Grade 8
21.	GD6027	-	Hose Clamp, 3/4" x 2 1/2" x 2 1/2"
22.	A8011	1	Double Frame® Toolbar, 7" x 5" x 120", 4 Row 30" <b>(Non-Stock Item)</b>
	A8012	-	Double Frame® Toolbar, 7" x 5" x 144", 4 Row 36"/38" <b>(Non-Stock Item)</b>
	A8013	-	Double Frame® Toolbar, 7" x 5" x 180", 6 Row 30" <b>(Non-Stock Item)</b>
	A8014	-	Double Frame® Toolbar, 7" x 5" x 220", 6 Row 36"/38" <b>(Non-Stock Item)</b>
	A8015	-	Double Frame® Toolbar, 7" x 5" x 240", 8 Row 30" <b>(Non-Stock Item)</b>
23.	GA9007	-	Hitch Extension W/Hose Clamps And Hardware
	GD6027	-	Hose Clamp, 3/4" x 2 1/2" x 2 1/2"
	G10048	-	Hex Head Cap Screw, 3/8"-16 x 2"
	G10108	-	Lock Nut, 3/8"-16
24.	G10903	-	Cap Plug
25.	G10895	8	Hex Head Cap Screw, 3/4"-10 x 8 1/2"
	G10112	8	Lock Nut, 3/4"-10
26.	GD1113	-	U-Bolt, 5" x 7" x 5/8"-11
	G10230	-	Lock Washer, 5/8"
	G10104	-	Hex Nut, 5/8"-11
27.	GA4265	-	Straight Extension
28.	G10061	4	Hex Head Cap Screw, 3/8"-16 x 3 1/2"
	G10210	4	Washer, 3/8" USS
	G10108	4	Lock Nut, 3/8"-16
29.	G10645	4	Hex Head Cap Screw, 1"-8 x 3", Grade 8
	G10822	-	Hex Head Cap Screw, 1"-8 x 4", Grade 8
30.	GA7205	-	Hitch/Center Extension, L.H., Straight, 24", STYLE A
	GA9427	-	Hitch/Center Extension, L.H., Straight, 24", STYLE B
31.	GA7204	-	Hitch/Center Extension, R.H., Straight, 24", STYLE A
	GA9426	-	Hitch/Center Extension, R.H., Straight, 24", STYLE B
32.	GA5199	-	End Extension, L.H., STYLE A
	GA9439	-	End Extension, L.H., STYLE B
33.	GD1114	-	U-Bolt, 7" x 7" x 5/8"-11
	G10230	-	Lock Washer, 5/8"
	G10104	-	Hex Nut, 5/8"-11
34.	A8016	1	Toolbar, 7" x 7" x 120", 4 Row 30" <b>(Non-Stock Item)</b>
	A8017	-	Toolbar, 7" x 7" x 144", 4 Row 36"/38" <b>(Non-Stock Item)</b>
	A8018	-	Toolbar, 7" x 7" x 180", 6 Row 30" <b>(Non-Stock Item)</b>
	A8019	-	Toolbar, 7" x 7" x 220", 6 Row 36"/38" <b>(Non-Stock Item)</b>
	A8020	-	Toolbar, 7" x 7" x 240", 8 Row 30" <b>(Non-Stock Item)</b>
35.	GA8665	2	Hitch Clamp
36.	GA5198	-	End Extension, R.H., STYLE A
	GA9438	-	End Extension, R.H., STYLE B

# TRANSPORT AND GROUND DRIVE WHEEL ASSEMBLY

PLA013/PLA034/PLA015/HTA014(PT2h/PT2i)



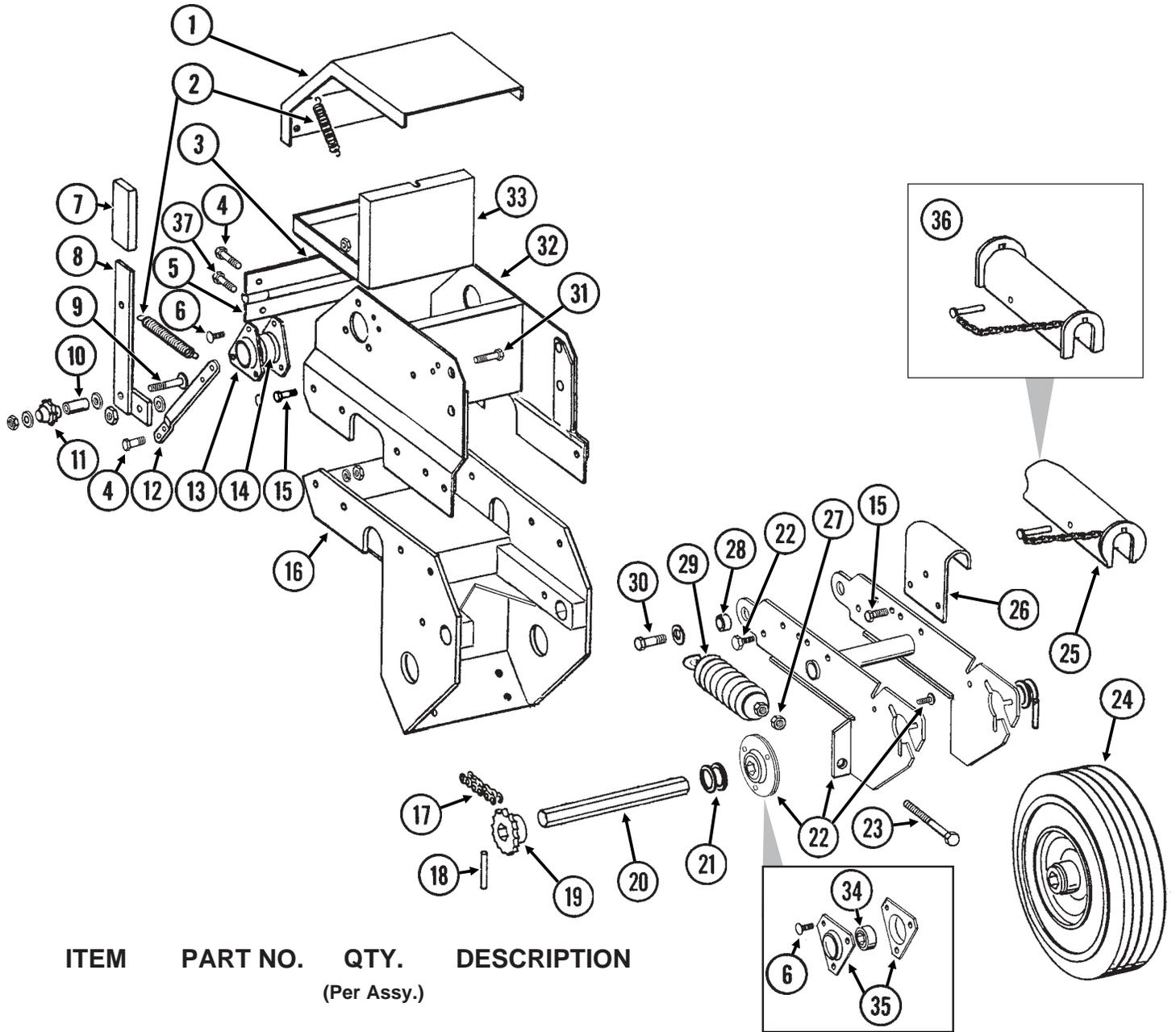
# TRANSPORT AND GROUND DRIVE WHEEL ASSEMBLY

ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
1.	G10009	2	Hex Head Cap Screw, 5/8"-11 x 2 1/2"
	G10230	2	Lock Washer, 5/8"
	G10104	2	Hex Nut, 5/8"-11
2.	GA5122	1	Wheel Tower Clamp
3.	G10008	4	Hex Head Cap Screw, 5/8"-11 x 2"
	GD7805	4	Special Washer, 5/8", Hardened
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
4.		-	See "Master/Slave/Lift Assist Cylinders", Pages P52-P54
5.	GD5841	1	Pin, 1 1/4" x 5 5/8"
	G10460	2	Cotter Pin, 1/4" x 2"
6.	GA7376	1	Scraper Mount
7.	GD10010	1	Scraper
8.	G11081	2	Hex Jam Nut, 1 1/2"-12, Grade 2
9.	GA0895	2	Bearing
10.	GA2148	1	Hub W/Cups, 6 Bolt
	GR0434	-	Cup
11.	GR0270	6	Lug Bolt, 9/16"-18
12.	GA2558	1	Spindle W/Round External Retaining Ring, 9 1/2"
	GD11490	-	Round External Retaining Ring
13.	GD13401	-	Tire, 7.50" x 20", 8 Ply Tubeless W/O Center Rib (Specify Brand*)
14.	GA2142	1	Rim, 5.50" x 20"
15.	GA7434	1	Valve Stem
16.	G10025	2	Hex Head Cap Screw, 3/4"-10 x 1 1/2"
	G10231	2	Lock Washer, 3/4"
	G10105	2	Hex Nut, 3/4"-10
17.	G10026	2	Hex Head Cap Screw, 3/4"-10 x 2"
	G10231	2	Lock Washer, 3/4"
18.	G10636	4	Carriage Bolt, 1/2"-13 x 1 1/2"
	G10228	4	Lock Washer, 1/2"
	G10216	4	Washer, 1/2" USS
	G10102	4	Hex Nut, 1/2"-13
19.	G10139	2	Washer, 1 1/4" USS
20.	GA5124	1	Arm W/Pin, Clamp, Grease Fittings And Spring Pins
	GD5804	-	Pin, 1 1/4" x 12"
	GA5123	-	Clamp W/Grease Fittings
	G10641	-	Grease Fitting, 1/8" NPT
	G10640	-	Grease Fitting, 1/4"-28
	G10610	-	Spring Pin, 3/8" x 2"
21.	G10581	2	Hex Head Cap Screw, 1/2"-13 x 2 1/4"
	G10111	2	Lock Nut, 1/2"-13
22.	GA5121	2	Pin
23.	GA8839	1	Arm
24.	GD11695	1	Pin, 1 1/4" x 13 1/4"
25.	G10610	2	Spring Pin, 3/8" x 2"
26.	GA9877	1	Clamp W/Grease Fittings
	G10640	2	Grease Fitting, 1/4"-28
27.	G10159	-	Machine Bushing, 1 1/4", 10 Gauge (As Required)
A.	GA2147	-	Hub And Spindle Assembly (Items 8-10 And 12)
B.	GA7409	-	Scraper Assembly (Items 6, 7, 16 And 18)

\* 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 DRIVE WHEEL AND ARM ASSEMBLY

PLA014(PT4m)



ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	GA5182	1	Cover
2.	GD5857	2	Spring
3.	GD5790	1	Hinge W/Pins, Male
4.	G10023	4	Hex Head Cap Screw, 1/4"-20 x 3/4"
	G10227	4	Lock Washer, 1/4"
	G10103	4	Hex Nut, 1/4"-20
5.	GD5789	1	Hinge, Female
6.	G10303	-	Carriage Bolt, 5/16"-18 x 1"
	G10232	-	Lock Washer, 5/16"
	G10219	-	Washer, 5/16" USS (As Required)
	G10106	-	Hex Nut, 5/16"-18
7.	GD5827	1	Cover
8.	GA5157	1	Idler Arm, L.H.
	GA5158	-	Idler Arm, R.H.

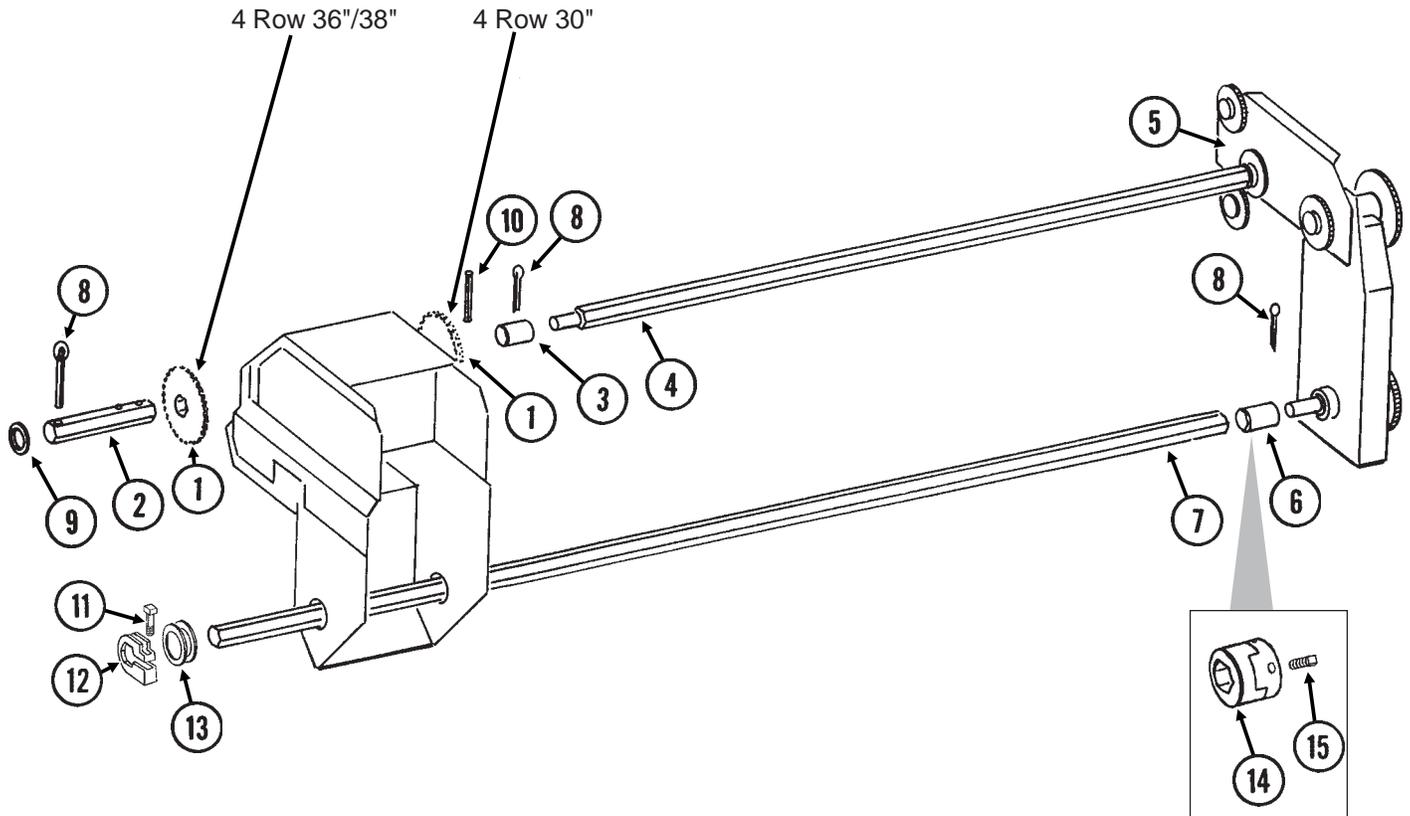
# CONTACT DRIVE WHEEL AND ARM ASSEMBLY

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
9.	G10306	1	Carriage Bolt, 3/8"-16 x 2"
	G10203	-	Washer, 3/8" SAE (As Required)
	G10210	-	Washer, 3/8" USS (As Required)
	G10108	1	Lock Nut, 3/8"-16
10.	GD1026	1	Sleeve, 1 3/16" Long
11.	GD7426	1	Sprocket, 12 Tooth
12.	GD5860	1	Bar
13.	G3400-01	-	Flangette
14.	G2100-03	-	Bearing, 7/8" Hex Bore, Spherical
15.	G10001	6	Hex Head Cap Screw, 3/8"-16 x 1"
	G10229	6	Lock Washer, 3/8"
	G10101	6	Hex Nut, 3/8"-16
16.		-	See "Transport And Ground Drive Wheel Assembly", Pages P38 And P39
17.	G3310-132	1	Chain, No. 40, 132 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
18.	G10602	2	Spring Pin, 1/4" x 1 1/2"
19.	GA5105	1	Sprocket, 15 Tooth
20.	GD6825-10.375	1	Hex Shaft, 7/8" x 10 3/8" (2 Holes)
21.	G10233	6	Machine Bushing, 1", 10 Gauge
22.	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
	GA9846	2	Flanged Bearing, 7/8" Hex Bore
	G10055	2	Hex Head Cap Screw, 5/8"-11 x 1 1/4" (Stop Bolt)
	G10107	2	Lock Nut, 5/8"-11
23.	G10890	2	Hex Head Adjusting Bolt, 1/2"-13 x 4", Grade 2
24.	GA5090	1	Tire And Rim Assembly (Specify Brand*)
	GD5753	-	Tire, 4.10" x 6" (Specify Brand*)
	GD5752	-	Tube
25.	GA8174	1	Lockup W/Pin (Used W/Item 20, Pages P38 And P39)
26.	GD7944	1	Mount
27.	G10501	2	Hex Jam Nut, 1/2"-13, Grade 2
28.	GB0218	2	Bushing, 2 1/32" I.D. x 7/8" O.D. x 1 9/32" Long
29.	GA2068	2	Spring W/Plug
30.	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
31.	G10001	1	Hex Head Cap Screw, 3/8"-16 x 1"
	G10229	1	Lock Washer, 3/8"
	G10370	1-2	Machine Bushing, 3/8", 22 Gauge
	GD5756	1	Special Nut, 3/8"-16
32.	GA5118	1	Mount
33.	GA7235	1	Tool Box Insert
34.	G2100-03	-	Bearing, 7/8" Hex Bore, Spherical
35.	G3400-01	-	Flangette
36.	GA9870	-	Lockup W/Pin (Used W/Item 23, Pages P38 And P39)
37.	G10064	2	Hex Head Cap Screw, 1/4"-20 x 1"
	G10209	2	Washer, 1/4" USS
	G10227	2	Lock Washer, 1/4"
	G10103	2	Hex Nut, 1/4"-20
A.	G1K253	-	Contact Wheel Arm Replacement Kit, (Items 18, 20, 22, 23 And 27)

\* Specific brand requests will be supplied only as available from current KINZE® Repair Parts stock. If a specific brand requested is not in stock, the brand available will be supplied. Different brand tires may have different diameters. Change in tire brand may affect rates. Field checks are recommended after any change in contact tires.

# DRIVELINE, 4 ROW 30"/36"/38"

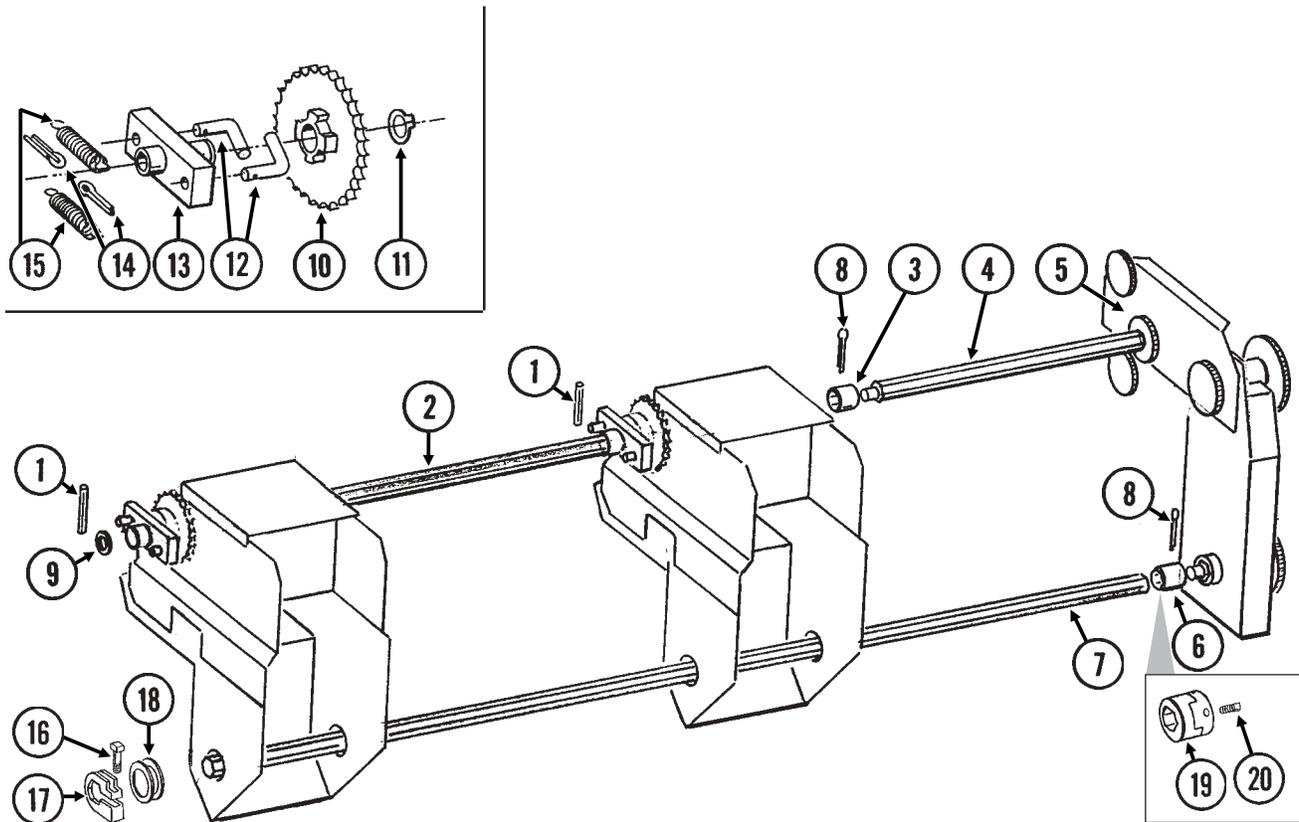
PTD033(PT5a/PLTR157d)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA5114	1	Sprocket, 30 Tooth
2.	GD7819	1	Hex Shaft, 7/8" x 15 1/4" (3 Holes), 4 Row 30"
	GD5958	-	Hex Shaft, 7/8" x 16" (4 Holes), 4 Row 36"/38"
3.	GD5961	1	Coupler, 2 1/4"
4.	GD5885-02	1	Hex Shaft, 7/8" x 19" (6 Holes), 4 Row 30"
	GD5885-03	-	Hex Shaft, 7/8" x 24" (6 Holes), 4 Row 36"/38"
5.		-	See "Transmission Assembly", Pages P44 And P45
6.	GD5886	1	Coupler, 1 3/4"
7.	GD0914-109	1	Hex Shaft, 7/8" x 109" (No Holes), 4 Row 30"
	GD0914-134	-	Hex Shaft, 7/8" x 134" (No Holes), 4 Row 36"/38"
8.	G10460	3	Cotter Pin, 1/4" x 2"
9.	G10233	-	Machine Bushing, 1", 10 Gauge (As Required)
10.	G10602	1	Spring Pin, 1/4" x 1 1/2"
11.	G10130	1	Square Head Machine Bolt, 5/16"-18 x 1 3/4"
	G10923	1	Flange Nut, 5/16"-18, No Serration
12.	GD11045	1	Lock Clamp
13.	G10233	2	Machine Bushing, 1", 10 Gauge
14.	GB0287	2	Coupler
15.	G10131	4	Square Head Set Screw, 5/16"-18 x 3/4"
A.	G1K269	-	Lock Clamp Kit (Items 11 And 12)

# DRIVELINE, 6 ROW 30"/36"/38" AND 8 ROW 30"

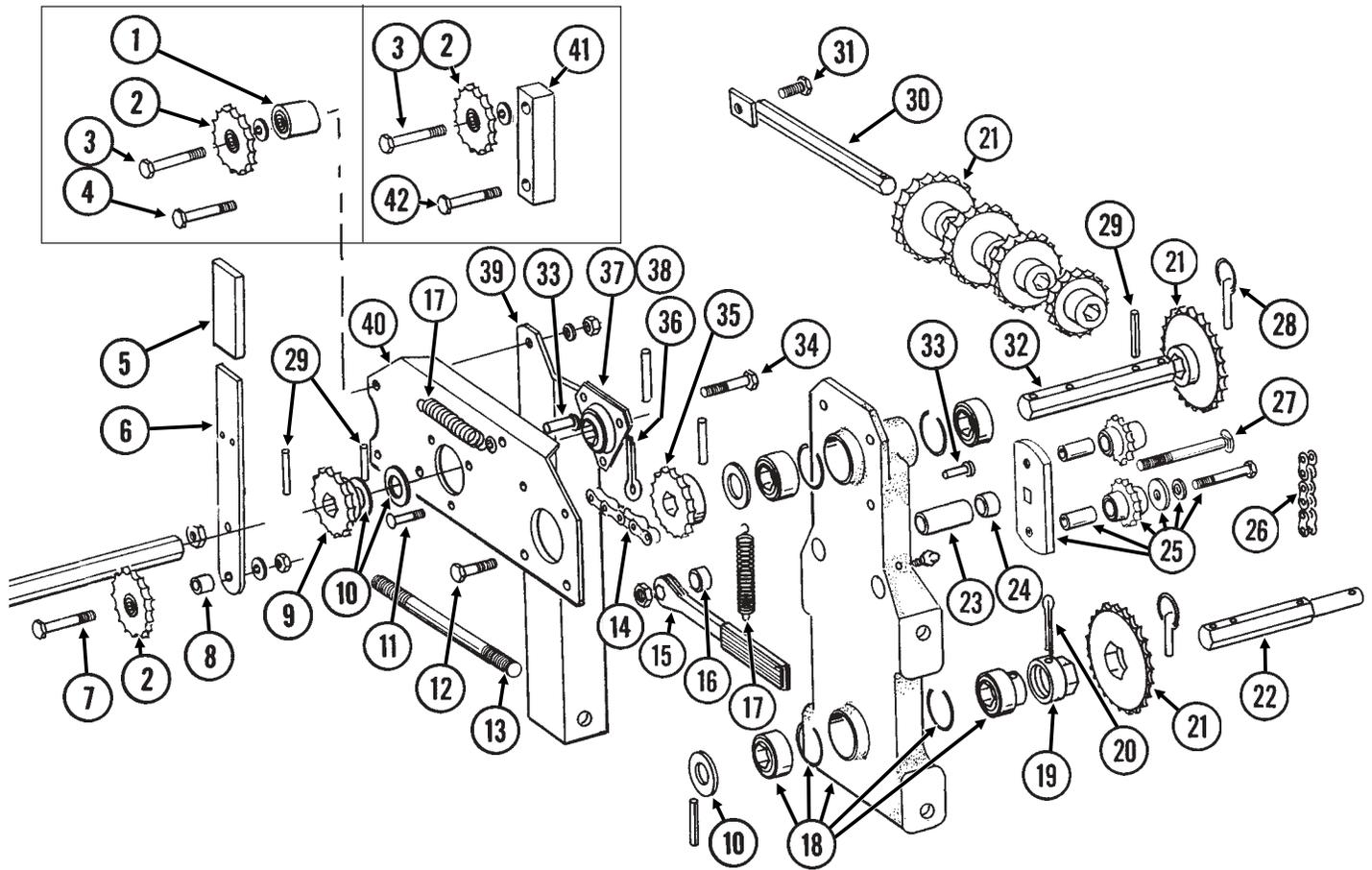
PTD016/PTD034(PT6/PT7b/PLTR157d)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10602	2	Spring Pin, 1/4" x 1 1/2"
2.	GD5884-01	1	Hex Shaft, 7/8" x 36" (3 Holes), 6 Row 30" And 8 Row 30"
	GD5960	-	Hex Shaft, 7/8" x 50" (6 Holes), 6 Row 36"/38"
3.	GD5961	1	Coupler, 2 1/4"
4.	GD5885-01	1	Hex Shaft, 7/8" x 30" (6 Holes), 6 Row 30"/36"/38" And 8 Row 30"
5.		-	See "Transmission Assembly", Pages P44 And P45
6.	GD5886	1	Coupler, 1 3/4"
7.	GD0914-170	1	Hex Shaft, 7/8" x 170" (No Holes), 6 Row 30"
	GD0914-210	-	Hex Shaft, 7/8" x 210" (No Holes), 6 Row 36"/38"
	GD0914-230	-	Hex Shaft, 7/8" x 230" (No Holes), 8 Row 30"
8.	G10460	2	Cotter Pin, 1/4" x 2"
9.	G10233	-	Machine Bushing, 1", 10 Gauge (As Required)
10.	GA5165	1	Sprocket, 30 Tooth
11.	G10430	1	External Retaining Ring, 1 1/4"
12.	GD1255	2	L-Pin
13.	GA0378	1	Block And Hub Assembly
14.	G10464	2	Cotter Pin, 3/16" x 1"
15.	GD1256	2	Spring
16.	G10130	1	Square Head Machine Bolt, 5/16"-18 x 1 3/4"
	G10923	1	Flange Nut, 5/16"-18, No Serration
17.	GD11045	1	Lock Clamp
18.	G10233	2	Machine Bushing, 1", 10 Gauge
19.	GB0287	2	Coupler
20.	G10131	4	Square Head Set Screw, 5/16"-18 x 3/4"
A.	GA5164	-	Ratchet/Sprocket Assembly, Includes: (2) GD1256, (2) G10464, (1) GA0378, (2) GD1255, (1) GA5165, (1) G10430
B.	G1K269	-	Lock Clamp Kit (Items 16 And 17)

# TRANSMISSION ASSEMBLY

PTD040/PTD066/PTD041(PT8h)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GB0259	1	Spacer, 1"
2.	GA7154	1	Sprocket W/Bearing, 18 Tooth
3.	G10033	1	Hex Head Cap Screw, 1/2"-13 x 3 1/2"
	G10128	-	Machine Bushing, 1/2", 14 Gauge (As Required)
	G10228	1	Lock Washer, 1/2"
	G10102	1	Hex Nut, 1/2"-13
4.	G10039	1	Hex Head Cap Screw, 1/2"-13 x 1 3/4"
	G10228	1	Lock Washer, 1/2"
	G10102	1	Hex Nut, 1/2"-13
5.	GD5827	1	Cover
6.	GD5829	1	Arm
7.	G10053	1	Hex Head Cap Screw, 1/2"-13 x 2 1/2"
	G10128	-	Machine Bushing, 1/2", 14 Gauge (As Required)
	G10228	1	Lock Washer, 1/2"
	G10102	1	Hex Nut, 1/2"-13
8.	GD4887-01	1	Sleeve, 1/2" I.D. x 5/8" Long
9.	GA5105	1	Sprocket, 15 Tooth
10.	G10233	-	Machine Bushing, 1", 10 Gauge
11.	G10303	3	Carriage Bolt, 5/16"-18 x 1"
	G10232	3	Lock Washer, 5/16"
	G10106	3	Hex Nut, 5/16"-18
12.	G10037	3	Hex Head Cap Screw, 1/2"-13 x 1 1/4"
	G10228	3	Lock Washer, 1/2"
	G10102	3	Hex Nut, 1/2"-13
13.	GD6793	2	Stud, 5/8"-11 x 9 1/2" (Threaded Both Ends)
	G10230	4	Lock Washer, 5/8"
	G10107	4	Lock Nut, 5/8"-11

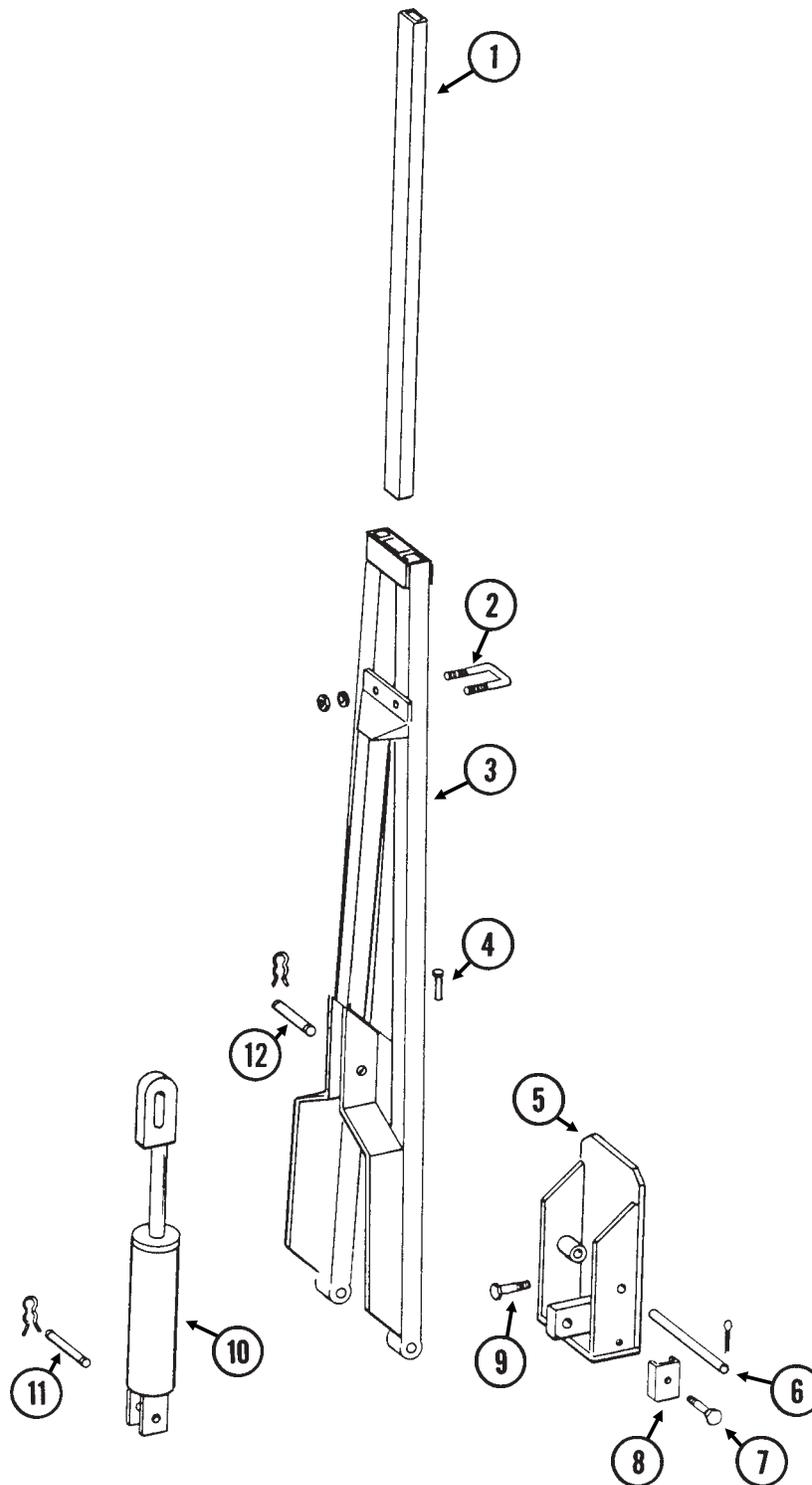
# TRANSMISSION ASSEMBLY

ITEM	PART NO.	QTY.	DESCRIPTION
14.	G3310-92	1	Chain, No. 40, 92 Pitch Including Connector Link
	G3310-100	-	Chain, No. 40, 100 Pitch Including Connector Link, Used With Half Rate (2 To 1) Drive Reduction
	GR0912	-	Connector Link, No. 40
15.	GA4235	1	Ratchet Arm W/Protective Closure
	G10445	-	Protective Closure
16.	GD10161	1	Spacer, 3/8"
17.	GD5857	2	Spring
18.	GA5629	1	Transmission Plate W/Bearings, Grease Fittings And Retaining Rings
	GA5116	3	Bearing, 7/8" Hex Bore, Cylindrical
	GA5624	1	Special Bearing, 7/8" Hex Bore x 1.6"
	GD6551	4	Ring
	G10640	-	Grease Fitting, 1/4"-28
19.	GD7127	1	Shear Coupler
20.	G10462	1	Cotter Pin, 3/16" x 2"
21.	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
22.	GD7822	1	Shaft, 7/8" x 7"
23.	GD3180-16	1	Sleeve, 5/8" I.D. x 7/8" O.D. x 2 13/16" Long
24.	GD2734-01	1	Sleeve, 1 1/4" O.D. x 1/2" Long
25.	GA7336	1	Idler W/Bolt-On Sprockets
	GD7426	-	Sprocket, 12 Tooth
	GD1026	-	Sleeve, 1 3/16" Long
	G10210	-	Washer, 3/8" USS
	G10229	-	Lock Washer, 3/8"
	G10047	-	Hex Head Cap Screw, 3/8"-16 x 1 3/4"
26.	G3310-80	1	Chain, No. 40, 80 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
27.	G10867	1	Carriage Bolt, 1/2"-13 x 5"
	G10111	1	Lock Nut, 1/2"-13
28.	GD2558	3	Lynch Pin, 1/4"
29.	G10602	5	Spring Pin, 1/4" x 1 1/2"
30.	GA5146	1	Sprocket Storage Rod
31.	G10017	1	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10228	1	Lock Washer, 1/2"
	G10102	1	Hex Nut, 1/2"-13
32.	GD5835	1	Shaft, 7/8" x 7"
33.	G10478	1	Clevis Pin, 5/16" x 1"
	G10409	1	Retaining Ring, 5/16"
34.	G10001	1	Hex Head Cap Screw, 3/8"-16 x 1"
	G10229	1	Lock Washer, 3/8"
	G10203	-	Washer, 3/8" SAE (As Required)
	G10210	-	Washer, 3/8" USS (As Required)
	GD5756	1	Special Nut, 3/8"-16
35.	GA5106	1	Sprocket, 17 Tooth, Standard Drive
	GA5202	-	Sprocket, 34 Tooth, Half Rate (2 To 1) Drive Reduction
36.	G10460	1	Cotter Pin, 1/4" x 2"
37.	G2100-03	1	Bearing, 7/8" Hex Bore, Spherical
38.	G3400-01	2	Flangette
39.	GD5830	1	Angle Support, R.H.
40.	GD5824	1	Plate, R.H.
41.	GD12571	-	Spacer, 1" x 4"
42.	G10053	1	Hex Head Cap Screw, 1/2"-13 x 2 1/2"
	G10228	1	Lock Washer, 1/2"
	G10102	1	Hex Nut, 1/2"-13

# MARKER ASSEMBLY, CONVENTIONAL

## 4 ROW 30"/36"/38" AND 6 ROW 30"

MKR010(MKR1a)



# MARKER ASSEMBLY, CONVENTIONAL

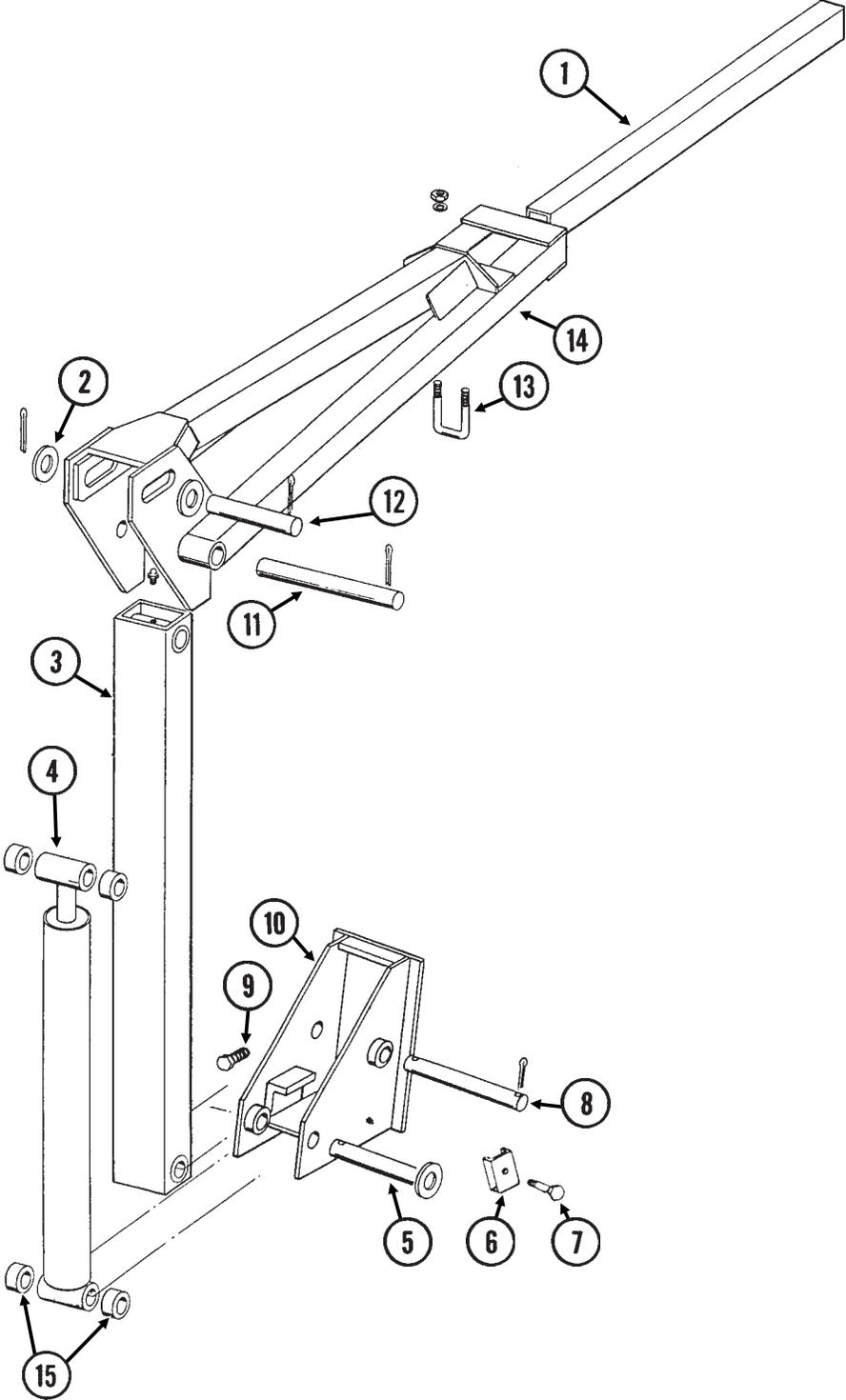
## 4 ROW 30"/36"/38" AND 6 ROW 30"

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ITEM	PART NO.	QTY.	DESCRIPTION
(Per Assy.)			
1.	GD0453-02	1	Extension Tube, 40", 4 Row 30"
	GD0453-07	-	Extension Tube, 45", 4 Row 36"/38" And 6 Row 30"
2.	GD2721	1	U-Bolt, 2" x 2" x 1/2"-13
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
3.	GA5175	1	Arm W/Grease Fittings, 31 1/2", 4 Row 30"
	GA5184	-	Arm W/Grease Fittings, 44 1/2", 4 Row 36"/38"
	GA5183	-	Arm W/Grease Fittings, 58 1/2", 6 Row 30"
	G10640	-	Grease Fitting, 1/4"-28
4.	GD0462	1	Safety Lockup Pin
	G10670	1	Hair Pin Clip, No. 3
	G10187	1	Spring Pin, 5/32" x 2"
5.	GA5177	1	Mount W/Grease Fittings, 4 Row 30"
	GA5178	-	Mount W/Grease Fittings, 4 Row 36"/38" And 6 Row 30"
	G10640	-	Grease Fitting, 1/4"-28
6.	GD0438	1	Pin, 13 1/2"
	G10460	2	Cotter Pin, 1/4" x 2"
7.	G10133	1	Hex Head Cap Screw, 5/16"-18 x 1 1/2"
	G10109	1	Lock Nut, 5/16"-18
8.	GD5892	1	Hose Clamp, 5/8" x 1 1/2" x 1 1/2"
9.	G10008	4	Hex Head Cap Screw, 5/8"-11 x 2"
	G10230	4	Lock Washer, 5/8"
10.		-	See "Marker Cylinder", Pages P55-P57
11.	GR0367	1	Pin, 1" x 2 7/8"
	GR0193	2	Hair Pin Clip
12.	GR0375	1	Pin, 1" x 3 1/2"
	GR0193	2	Hair Pin Clip

# MARKER ASSEMBLY, TWO-FOLD LOW PROFILE 6 ROW 36"/38" AND 8 ROW 30"

MKR006/MKR009(MKR2c)



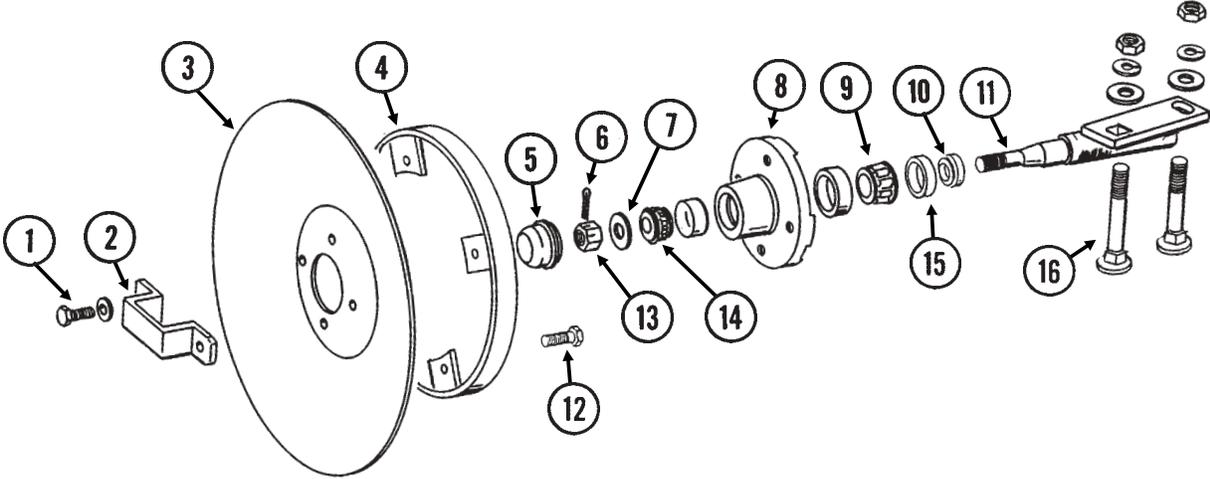
# MARKER ASSEMBLY, TWO-FOLD LOW PROFILE 6 ROW 36"/38" AND 8 ROW 30"

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ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	GD0453-03	1	Extension Tube, 50", 6 Row 36"/38" And 8 Row 30"
2.	G10226	2	Washer, 1 1/4" SAE
3.	GA5173	1	Arm W/Grease Fittings, First Stage
	G10641	-	Grease Fitting, 1/8" NPT
4.		-	See "Marker Cylinder", Pages P55-P57
5.	GA6532	1	Pin, 1 1/4" x 7 5/8"
	G10460	1	Cotter Pin, 1/4" x 2"
6.	GD5875	1	Hose Clamp, 9/16" x 2 1/2" x 2"
7.	G10133	1	Hex Head Cap Screw, 5/16"-18 x 1 1/2"
	G10109	1	Lock Nut, 5/16"-18
8.	GD0652	1	Pin, 1 1/4" x 9 1/2"
	G10460	2	Cotter Pin, 1/4" x 2"
9.	G10879	4	Flanged 12 Point Bolt, 5/8"-11 x 2", Special Hardened
10.	GA5130	1	Mount
11.	GD3214	1	Pin, 1 1/4" x 12 1/4"
	G10460	2	Cotter Pin, 1/4" x 2"
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.	GA5190	1	Arm, Second Stage, 35", 6 Row 36"/38"
	GA5188	-	Arm, Second Stage, 46", 8 Row 30"
15.	GD0752-41	-	Sleeve, 1" (If Applicable)

# MARKER SPINDLE/HUB/BLADE

MKR020(MKR4a)

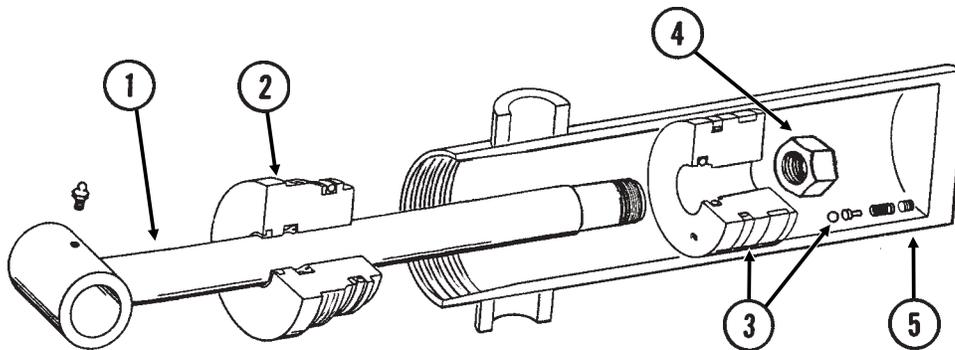


# MARKER SPINDLE/HUB/BLADE

ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
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.	GA5853	1	Depth Band
5.	GD0840	1	Dust Cap
6.	G10544	1	Cotter Pin, 5/32" x 1"
7.	G10724	1	Washer, 5/8" SAE
8.	GA0167	1	Hub W/Cups
	GR0151	-	Outer Cup
	GR0150	-	Inner Cup
9.	GA0245	1	Bearing
10.	GA0899	1	Rubber Seal
11.	GA1677	1	Spindle, L.H. (Shown)
	GA1676	-	Spindle, R.H.
12.	G10019	4	Hex Head Cap Screw, 5/16"-18 x 1"
	G10109	4	Lock Nut, 5/16"-18
13.	G10725	1	Slotted Hex Nut, 5/8"-18
14.	GA0257	1	Bearing
15.	GA0243	1	Grease Seal
16.	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, 5-11 And 13-15)
	GA1678	-	Hub And Spindle Assembly, R.H. (Items 1, 2, 5-11 And 13-15)

# MASTER LIFT CYLINDER

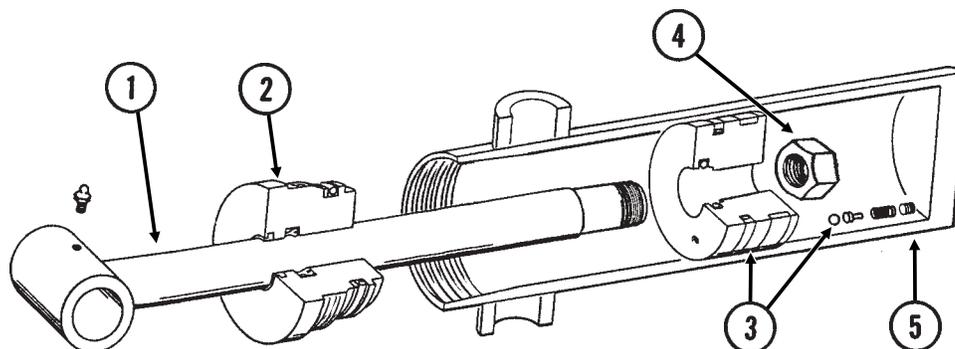
CYL038(CYL1a)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA6137	1	Rod Assembly W/Grease Fitting
	G10640	-	Grease Fitting, 1/4"-28
2.	GD5947	1	Gland
3.	GA6135	1	Piston W/Rephasing Valve
	GR1169	1	Rephasing Valve Replacement Kit (Set Screw, Guide, 2 Springs And Ball)
4.	GR0983	1	Lock Nut, 1"-14
5.	A4295	1	Barrel <b>(Non-Stock Item)</b>
A.	GA6120	-	Cylinder Complete, 3 1/2" x 8" (Part Number Stamped On Barrel) <b>(Sub GA8917)</b>
B.	GR0982	-	Seal Kit, Includes: (1) Wear Ring, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper, (1) Uniring

# MASTER LIFT CYLINDER

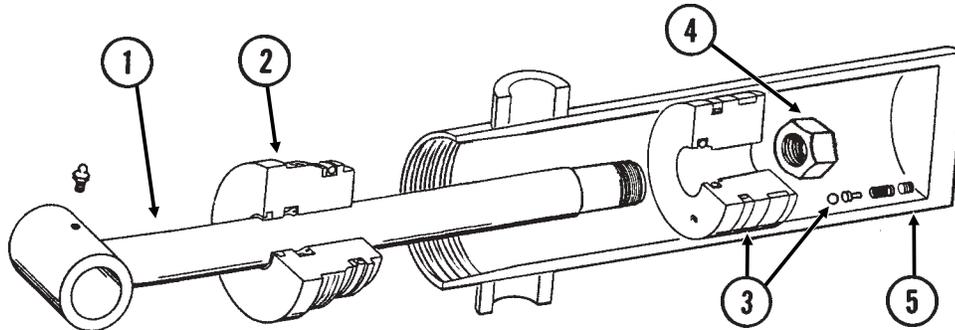
CYL038(CYL1a)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8912	1	Rod Assembly W/Grease Fitting
	G10449	-	Grease Fitting, 3/16", Drive-In
2.	GD12507	1	Gland
3.	GA8916	1	Piston W/Rephasing Valve
	GR1169	1	Rephasing Valve Replacement Kit (Set Screw, Guide, 2 Springs And Ball)
4.	G10958	1	Lock Nut, 1"-14
5.	A4295	1	Barrel <b>(Non-Stock Item)</b>
A.	GA8917	-	Cylinder Complete, 3 1/2" x 8" (Part Number Stamped On Barrel)
B.	GR1528	-	Seal Kit, Includes: (1) Wear Ring, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper, (1) T-Seal

# SLAVE LIFT CYLINDER

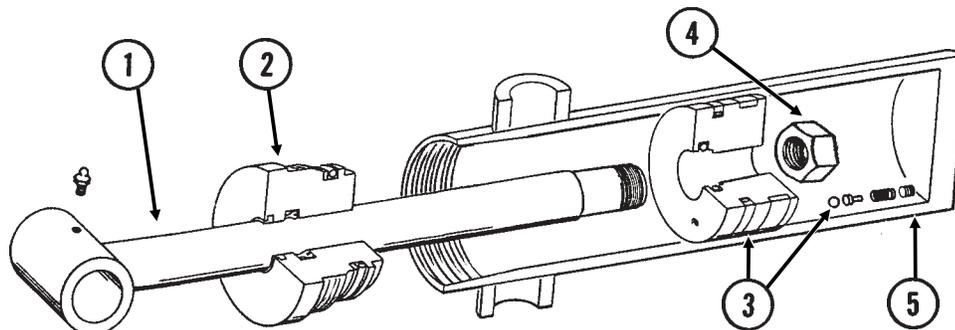
CYL038(CYL1a)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA6137	1	Rod Assembly W/Grease Fitting
	G10640	-	Grease Fitting, 1/4"-28
2.	GD5946	1	Gland
3.	GA6134	1	Piston W/Rephasing Valve
	GR1169	1	Rephasing Valve Replacement Kit (Set Screw, Guide, 2 Springs And Ball)
4.	GR0983	1	Lock Nut, 1"-14
5.	A4297	1	Barrel ( <b>Non-Stock Item</b> )
A.	GA6119	-	Cylinder Complete, 3 1/4" x 8" ( <i>Part Number Stamped On Barrel</i> ) <b>(Sub GA8915)</b>
B.	GR0984	-	Seal Kit, Includes: (2) O-Ring, (1) BU Ring, (1) Wear Ring, (1) Rod Wiper, (1) Uniring, (1) U-Cup

# SLAVE LIFT CYLINDER

CYL038(CYL1a)

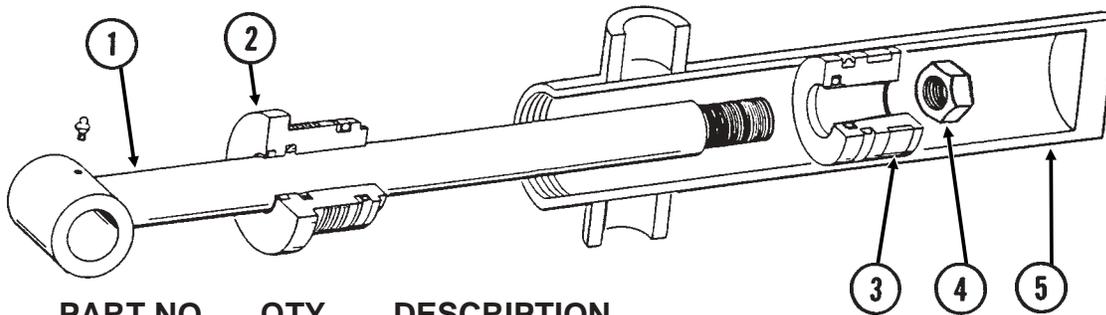


ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8912	1	Rod Assembly W/Grease Fitting
	G10449	-	Grease Fitting, 3/16", Drive-In
2.	GD12505	1	Gland
3.	GA8914	1	Piston W/Rephasing Valve
	GR1169	1	Rephasing Valve Replacement Kit (Set Screw, Guide, 2 Springs And Ball)
4.	G10958	1	Lock Nut, 1"-14
5.	A7538	1	Barrel ( <b>Non-Stock Item</b> )
A.	GA8915	-	Cylinder Complete, 3 1/4" x 8" ( <i>Part Number Stamped On Barrel</i> )
B.	GR1527	-	Seal Kit, Includes: (1) Wear Ring, (1) T-Seal, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper

# LIFT ASSIST CYLINDER

## 6 ROW 30"/36"/38" AND 8 ROW 30"

CYL026(CYL4c)

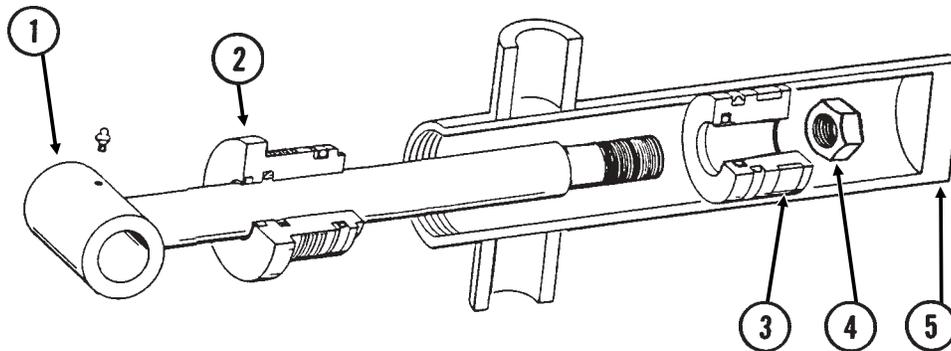


ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA4322	1	Rod Assembly W/Grease Fitting
	G10449	-	Grease Fitting, $\frac{3}{16}$ ", Drive-In
2.	GD5954	1	Gland
3.	GD5956	1	Piston
4.	GR0923	1	Special Jam Nut, 1"-14
5.	A5455	1	Barrel ( <b>Non-Stock Item</b> )
A.	GA5093	-	Cylinder Complete, 2 1/2" x 8" (Part Number Stamped On Barrel)
B.	GR0930	-	Seal Kit, Includes: (1) Wear Ring, (1) T-Seal, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper

# LIFT ASSIST CYLINDER

## 6 ROW 30"/36"/38" AND 8 ROW 30"

CYL026(CYL4d)

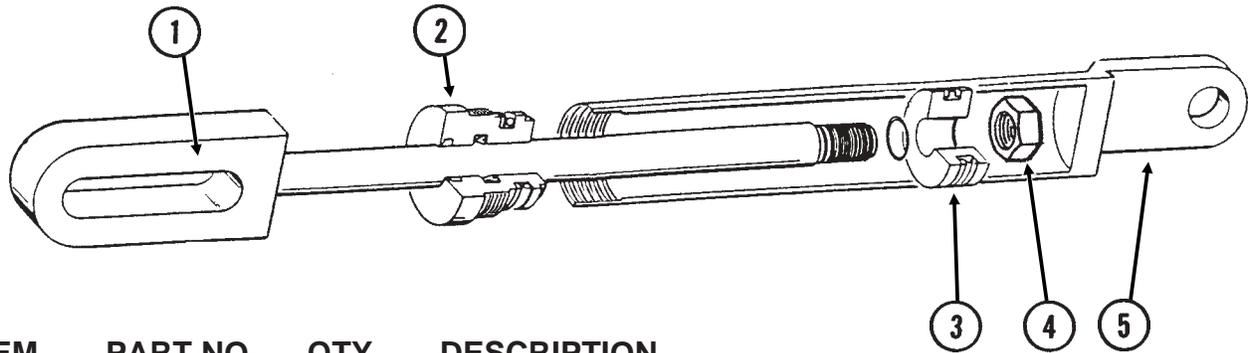


ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8831	1	Rod Assembly W/Grease Fitting
	G10640	-	Grease Fitting, $\frac{1}{4}$ "-28
2.	GD11926	1	Gland
3.	GD5956	1	Piston
4.	G10958	1	Lock Nut, 1"-14
5.	A8827	1	Barrel ( <b>Non-Stock Item</b> )
A.	GA8828	-	Cylinder Complete, 2 1/2" x 8" (Part Number Stamped On Barrel)
B.	GR1522	-	Seal Kit, Includes: (1) T-Seal, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper

# MARKER CYLINDER

## 4 ROW 30"/36"/38" AND 6 ROW 30"

CYL030(CYL2c)

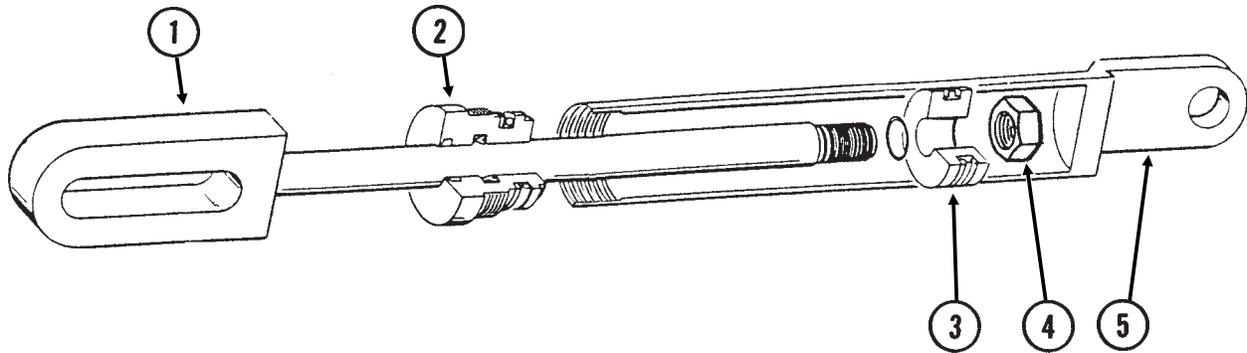


ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA5453	1	Rod Assembly
2.	GD5949	1	Gland
3.	GD4632	1	Piston
4.	G10967	1	Lock Nut, $\frac{3}{4}$ "-16
5.	A5454	1	Barrel ( <b>Non-Stock Item</b> )
A.	GA5095	-	Cylinder Complete, 2" x 8" (Part Number Stamped On Barrel)
B.	GR0927	-	Seal Kit, Includes: (1) T-Seal, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper

# MARKER CYLINDER

## 4 ROW 30"/36"/38" AND 6 ROW 30"

CYL030(CYL2c)

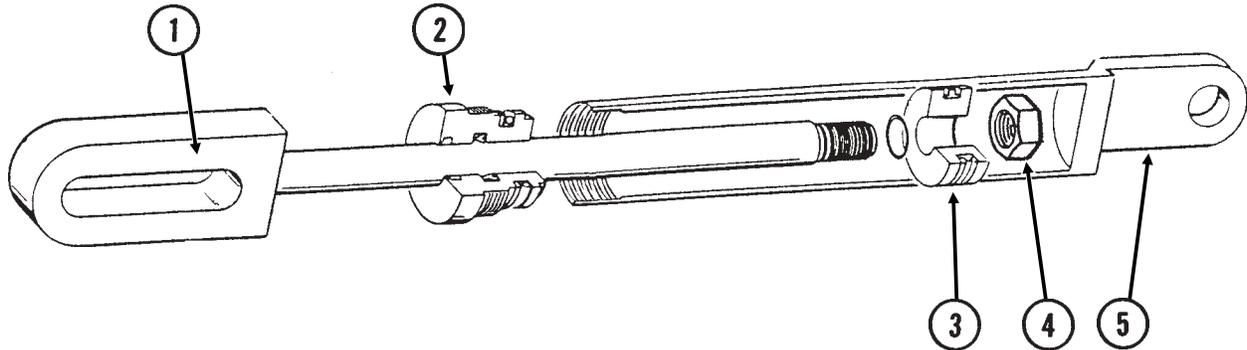


ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8774	1	Rod Assembly
2.	GD5949	1	Gland
3.	GD4632	1	Piston
4.	G10967	1	Lock Nut, $\frac{3}{4}$ "-16
5.	A8775	1	Barrel ( <b>Non-Stock Item</b> )
A.	GA8776	-	Cylinder Complete, 2" x 8" (Part Number Stamped On Barrel) <b>(Sub GA8919)</b>
B.	GR0927	-	Seal Kit, Includes: (1) T-Seal, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper

# MARKER CYLINDER

## 4 ROW 30"/36"/38" AND 6 ROW 30"

CYL030(CYL2c)



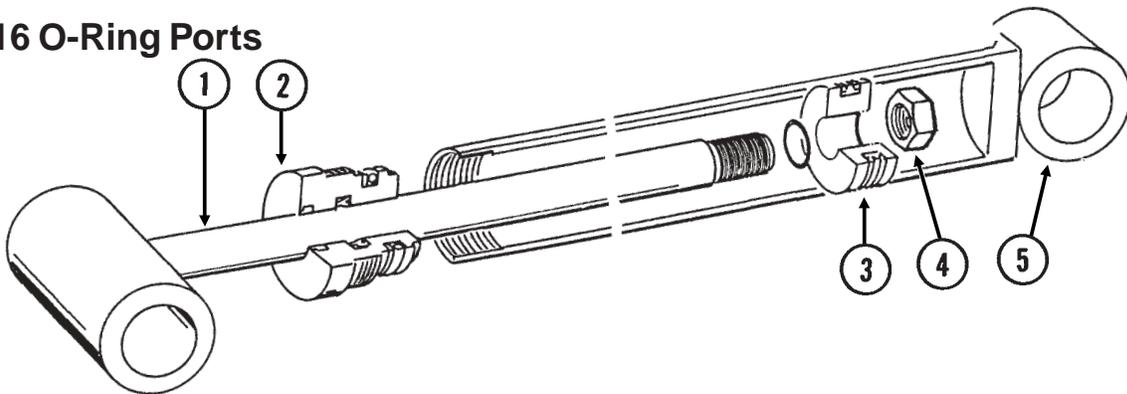
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8918	1	Rod Assembly
2.	GD12510	1	Gland
3.	GD12511	1	Piston
4.	G10967	1	Lock Nut, $\frac{3}{4}$ "-16
5.	A8775	1	Barrel ( <b>Non-Stock Item</b> )
A.	GA8919	-	Cylinder Complete, 2" x 8" ( <i>Part Number Stamped On Barrel</i> )
B.	GR1529	-	Seal Kit, Includes: (1) T-Seal, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper

# MARKER CYLINDER

## 6 ROW 36"/38" AND 8 ROW 30"

CYL039(CYL3e)

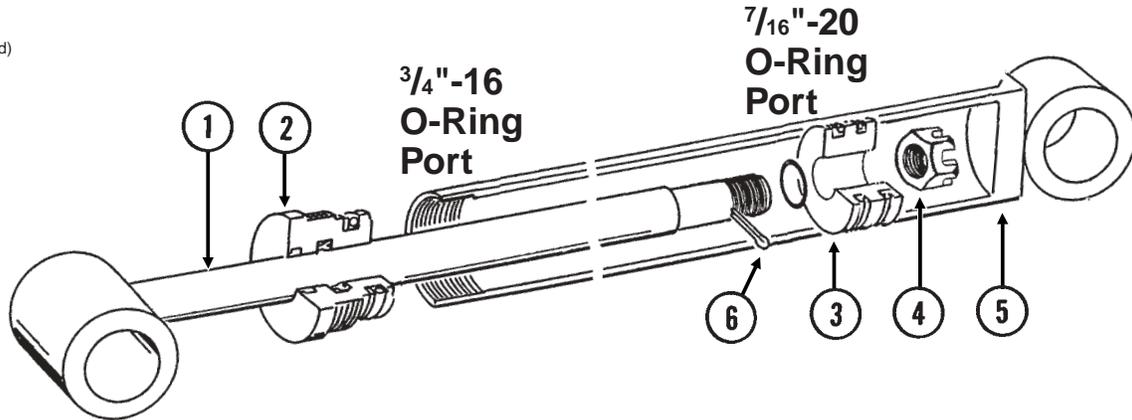
$\frac{3}{4}$ "-16 O-Ring Ports



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA5459	1	Rod Assembly
2.	GD5949	1	Gland
3.	GD4632	1	Piston
4.	GR0959	1	Lock Nut, $\frac{3}{4}$ "-16
5.	A5460	1	Barrel ( <b>Non-Stock Item</b> )
A.	GA5097	-	Cylinder Complete, 2" x 20 $\frac{1}{16}$ " ( <i>Part Number Stamped On Barrel</i> )
B.	GR0927	-	Seal Kit, Includes: (1) T-Seal, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper

# MARKER (Cushion) CYLINDER 6 ROW 36"/38" AND 8 ROW 30"

CYL039(CYL3d)

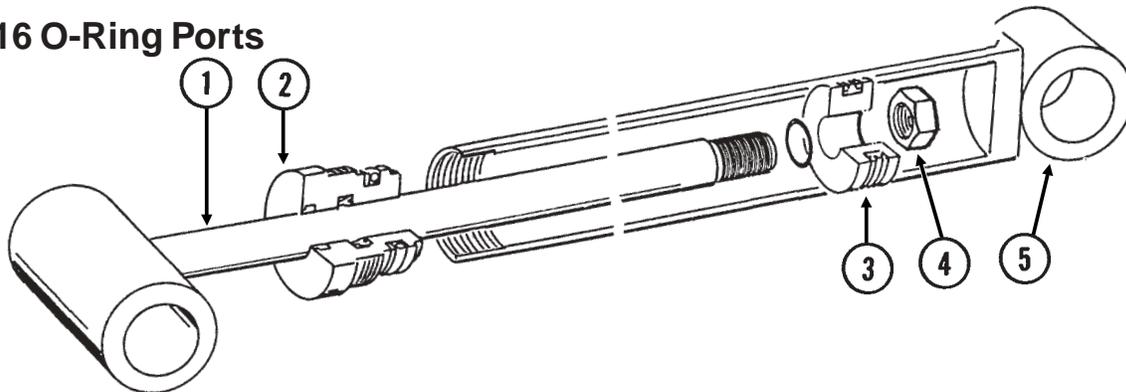


ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8871	1	Rod Assembly
2.	GD10207	1	Gland
3.	GD11983	1	Piston
4.	G10962	1	Slotted Hex Nut, $\frac{7}{8}$ "-14
5.	A7524	1	Barrel <b>(Non-Stock Item)</b>
6.	G10827	1	Cotter Pin, $\frac{1}{8}$ " x $1\frac{3}{4}$ "
A.	GA8895	-	Cylinder Complete, $2\frac{1}{2}$ " x $20\frac{1}{16}$ " (Part Number Stamped On Barrel)
B.	GR1521	-	Seal Kit, Includes: (1) T-Seal, (2) O-Rings, (1) BU Ring, (1) Cast Iron Ring, (1) Wiper, (1) U-Cup

# MARKER CYLINDER 6 ROW 36"/38" AND 8 ROW 30"

CYL039(CYL3e)

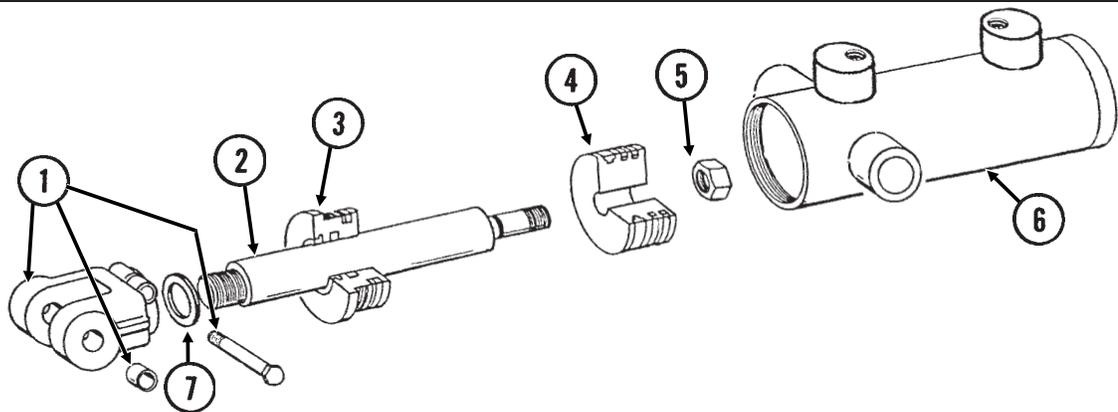
$\frac{3}{4}$ "-16 O-Ring Ports



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA9440	1	Rod Assembly
2.	GD12510	1	Gland
3.	GD12511	1	Piston
4.	G10967	1	Lock Nut, $\frac{3}{4}$ "-16
5.	A9442	1	Barrel <b>(Non-Stock Item)</b>
A.	GA9443	-	Cylinder Complete, 2" x $20\frac{1}{16}$ " (Part Number Stamped On Barrel)
B.	GR1529	-	Seal Kit, Includes: (1) T-Seal, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper

# INTERPLANT® LIFT CYLINDER

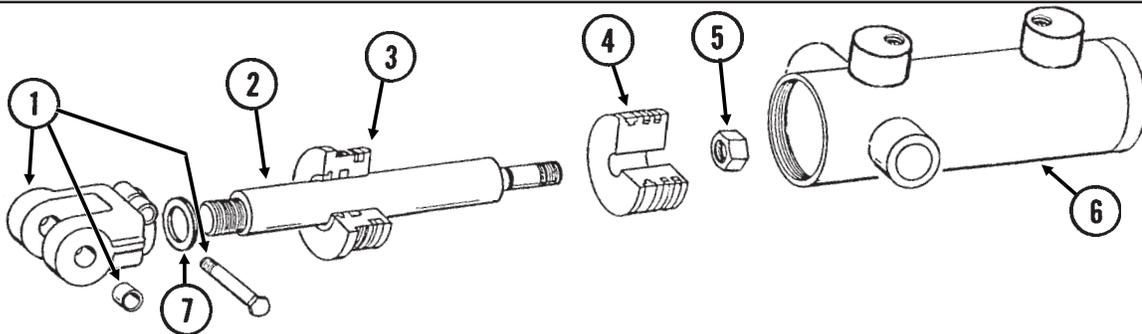
(CYL33b)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8130	1	Clevis W/Bushings, Cap Screw And Hex Nut
	GR1401	2	Bushing
	G10939	1	Hex Head Cap Screw, 3/8"-16 x 2 1/4"
	G10101	1	Hex Nut, 3/8"-16
2.	GD11497	1	Rod
3.	GD11513	1	Gland
4.	GD11500	1	Piston
5.	G10958	1	Lock Nut, 1"-14
6.	A8437	1	Barrel <b>(Non-Stock Item)</b>
7.	G10957	4	Steel Shim
A.	GA8434	-	Cylinder Complete, 4 1/4" x 4" <i>(Part Number Stamped On Barrel)</i> <b>(Sub GA8897)</b>
B.	GR1481	-	Seal Kit, Includes: (1) Wiper, (1) U-Packing Seal, (2) Wear Rings, (1) Uniring, (2) O-Rings, (1) BU Ring

# INTERPLANT® LIFT CYLINDER

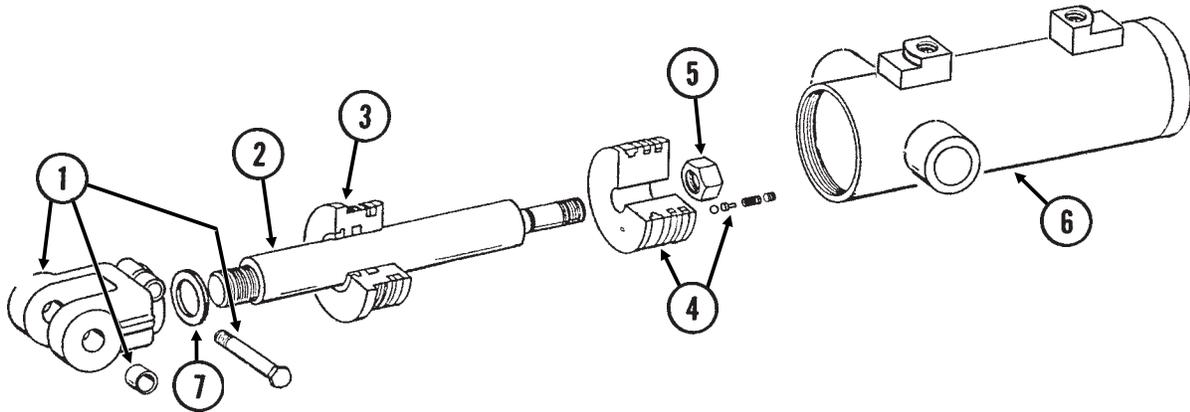
(CYL33b)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8130	1	Clevis W/Bushings, Cap Screw And Hex Nut
	GR1401	2	Bushing
	G10939	1	Hex Head Cap Screw, 3/8"-16 x 2 1/4"
	G10101	1	Hex Nut, 3/8"-16
2.	GD11497	1	Rod
3.	GD11835	1	Gland
4.	GD11500	1	Piston
5.	G10958	1	Lock Nut, 1"-14
6.	A8792	1	Barrel <b>(Non-Stock Item)</b>
7.	G10957	4	Steel Shim
A.	GA8793	-	Cylinder Complete, 4 1/4" x 4" <i>(Part Number Stamped On Barrel)</i> <b>(Sub GA8897)</b>
B.	GR1481	-	Seal Kit, Includes: (1) Wiper, (1) U-Packing Seal, (2) Wear Rings, (1) Uniring, (2) O-Rings, (1) BU Ring

# INTERPLANT® LIFT CYLINDER

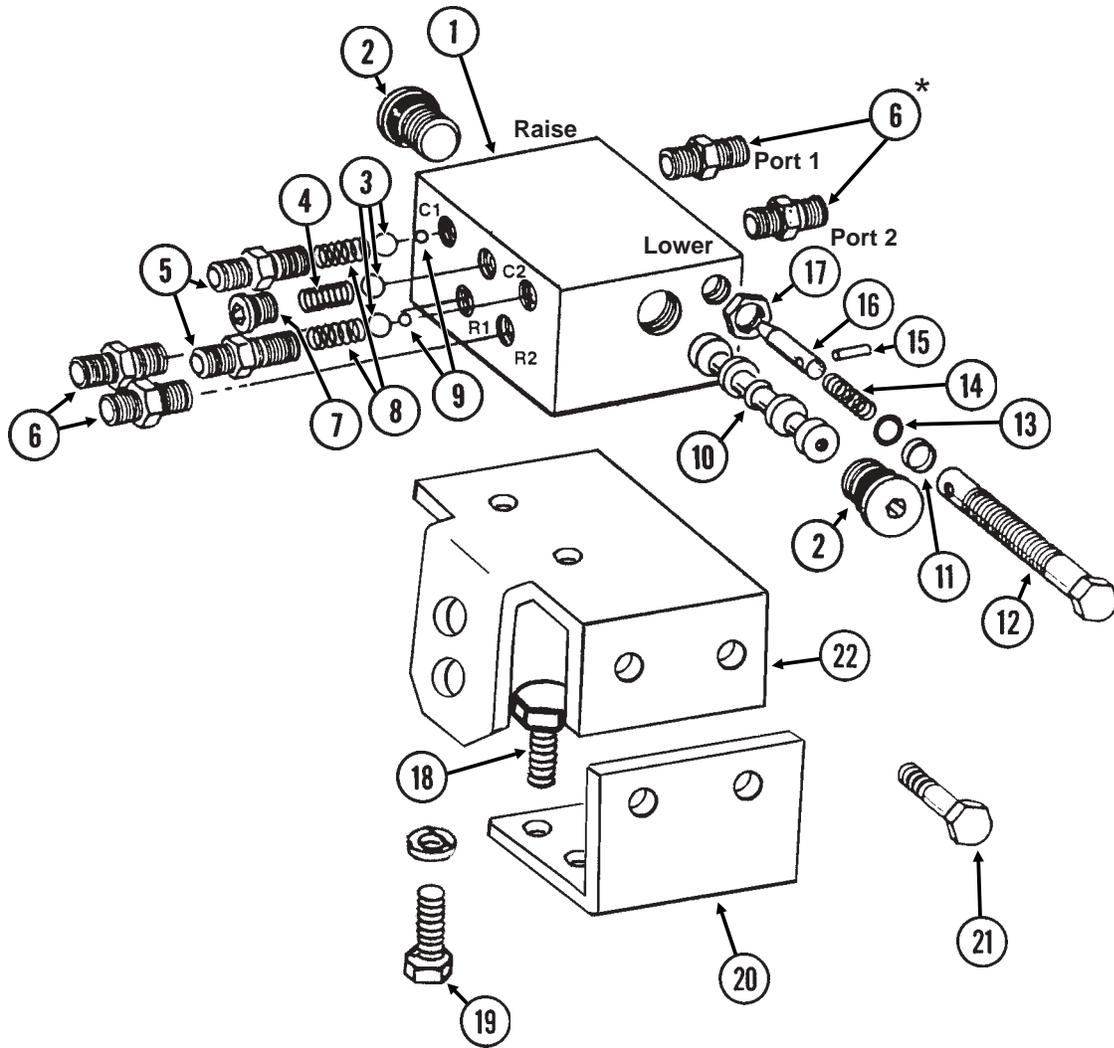
(CYL33c)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8130	1	Clevis W/Bushings, Cap Screw And Hex Nut
	GR1401	2	Bushing
	G10939	1	Hex Head Cap Screw, 3/8"-16 x 2 1/4"
	G10101	1	Hex Nut, 3/8"-16
2.	GD12513	1	Rod
3.	GD11995	1	Gland
4.	GA8924	1	Piston W/Rephasing Valve
	GR1169	-	Rephasing Valve Replacement Kit (Set Screw, Guide, 2 Springs And Ball)
5.	G10958	1	Lock Nut, 1"-14
6.	A8923	1	Barrel <b>(Non-Stock Item)</b>
7.	G10957	4	Steel Shim
A.	GA8897	-	Cylinder Complete, 4 1/4" x 4" <i>(Part Number Stamped On Barrel)</i>
B.	GR1523	-	Seal Kit, Includes: (1) Wiper, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Seal, (1) Expander, (2) Cast Iron Ring

# MARKER SEQUENCING/FLOW CONTROL VALVE

VVB025/PHS035(PT11a)



# MARKER SEQUENCING/FLOW CONTROL VALVE

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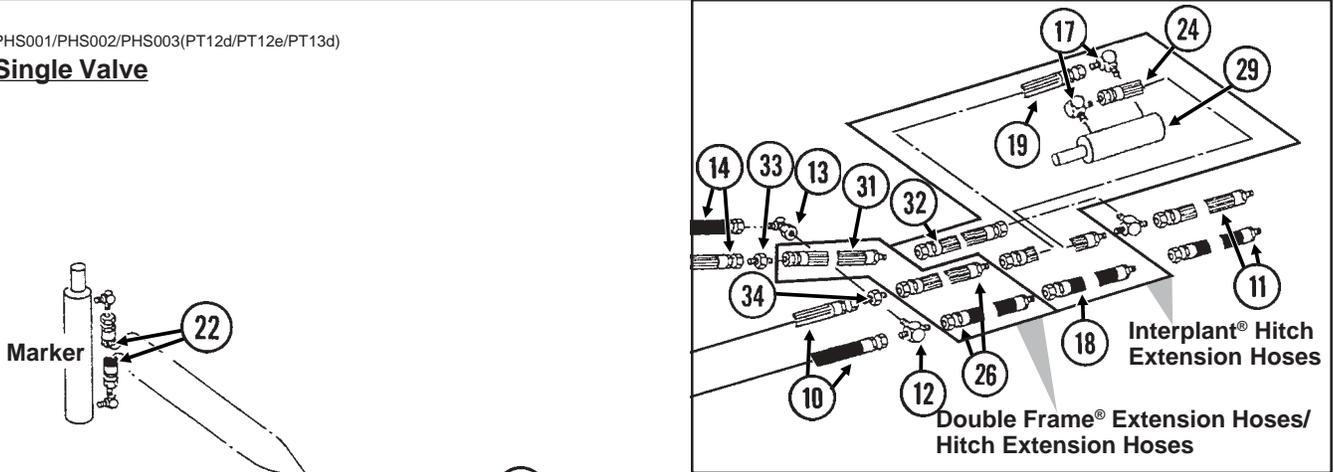
ITEM	PART NO.	QTY.	DESCRIPTION
1.		-	Valve Body <b>(Non-Stock Item)</b>
2.	GR1047	2	Hex Socket Plug W/O-Ring
	GR1037	-	O-Ring
3.	GR1044	3	$\frac{7}{16}$ " Check Ball
4.	GR1033	1	Detent Spring
5.	GR1032	2	Port Adapter W/O-Ring
	GR1045	-	O-Ring
6.	*G6400-06	4	Connector W/O-Ring, $\frac{9}{16}$ "-18 Male 37° JIC To $\frac{9}{16}$ "-18 O-Ring
	GR1045	-	O-Ring
7.	GR1034	1	Hex Socket Plug W/O-Ring
	GR1035	-	O-Ring
8.	GR1036	2	Spring
9.	GR1043	2	$\frac{1}{4}$ " Steel Ball
10.		-	Spool <b>(Non-Stock Item)</b>
11.	GR1041	2	Teflon BU Ring
12.	GR1042	2	Adjustment Screw
13.	GR1040	2	O-Ring
14.	GR1046	2	Compression Spring
15.	GR1039	2	Spring Pin
16.	GR1038	2	Needle
17.	GR1048	2	Hex Jam Nut, $\frac{1}{2}$ "-20
18.	G10001	2	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1"
	G10203	2	Washer, $\frac{3}{8}$ " SAE
	G10229	2	Lock Washer, $\frac{3}{8}$ "
19.	G10001		Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1"
	G10229	2	Lock Washer, $\frac{3}{8}$ "
20.	GD10223	1	Mounting Angle
21.	G10001	2	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1"
	G10203	2	Washer, $\frac{3}{8}$ " SAE
	G10229	2	Lock Washer, $\frac{3}{8}$ "
	G10101	2	Hex Nut, $\frac{3}{8}$ "-16
22.	GD10224	1	Valve Mounting Angle
A.	GA5552	-	Valve Assembly Complete (Items 1-17)
B.	GA5572	-	Flow Control Portion Only (Items 11-17)

\*Not used on sizes with  $\frac{3}{8}$ " hoses.

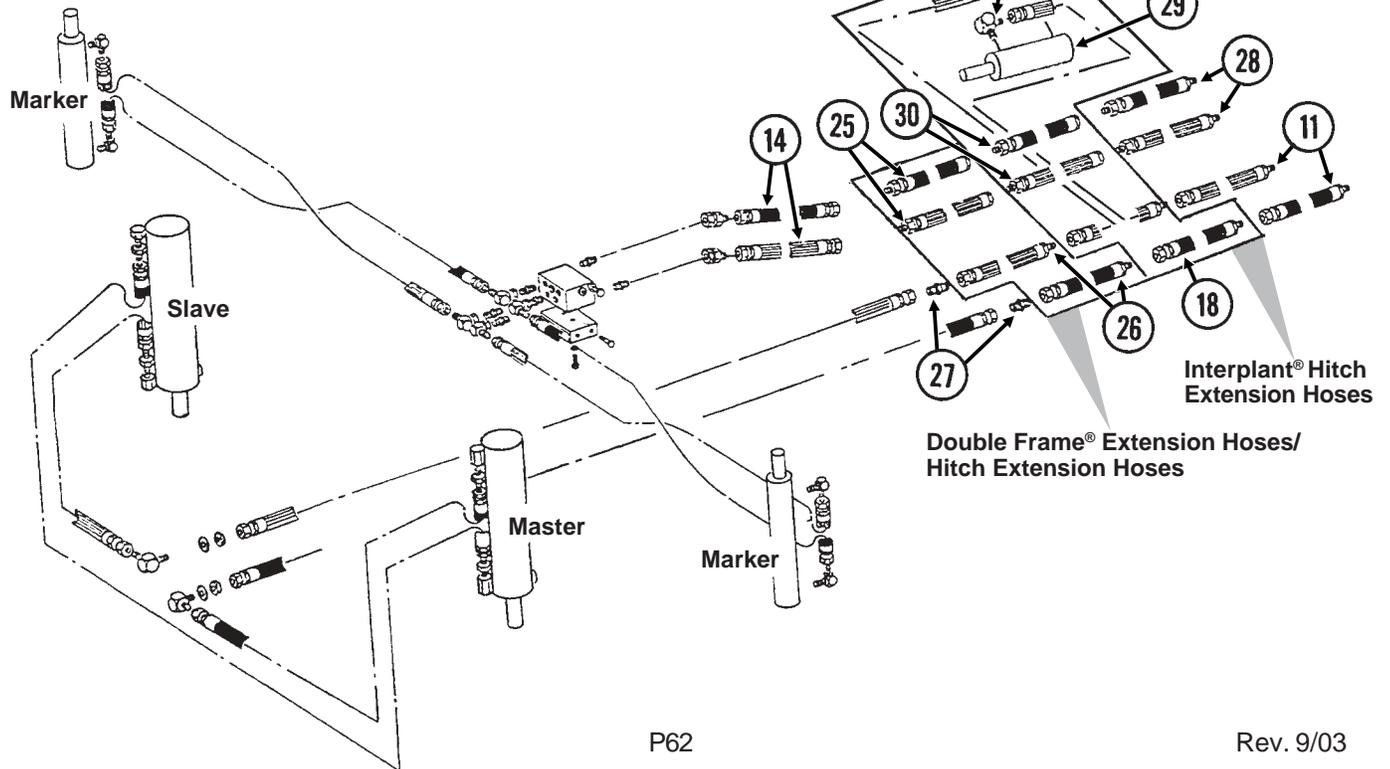
# HYDRAULIC SYSTEM, 4 ROW 30"/36"/38" CONVENTIONAL MARKER

PHS001/PHS002/PHS003(PT12d/PT12e/PT13d)

## Single Valve



## Dual Valve



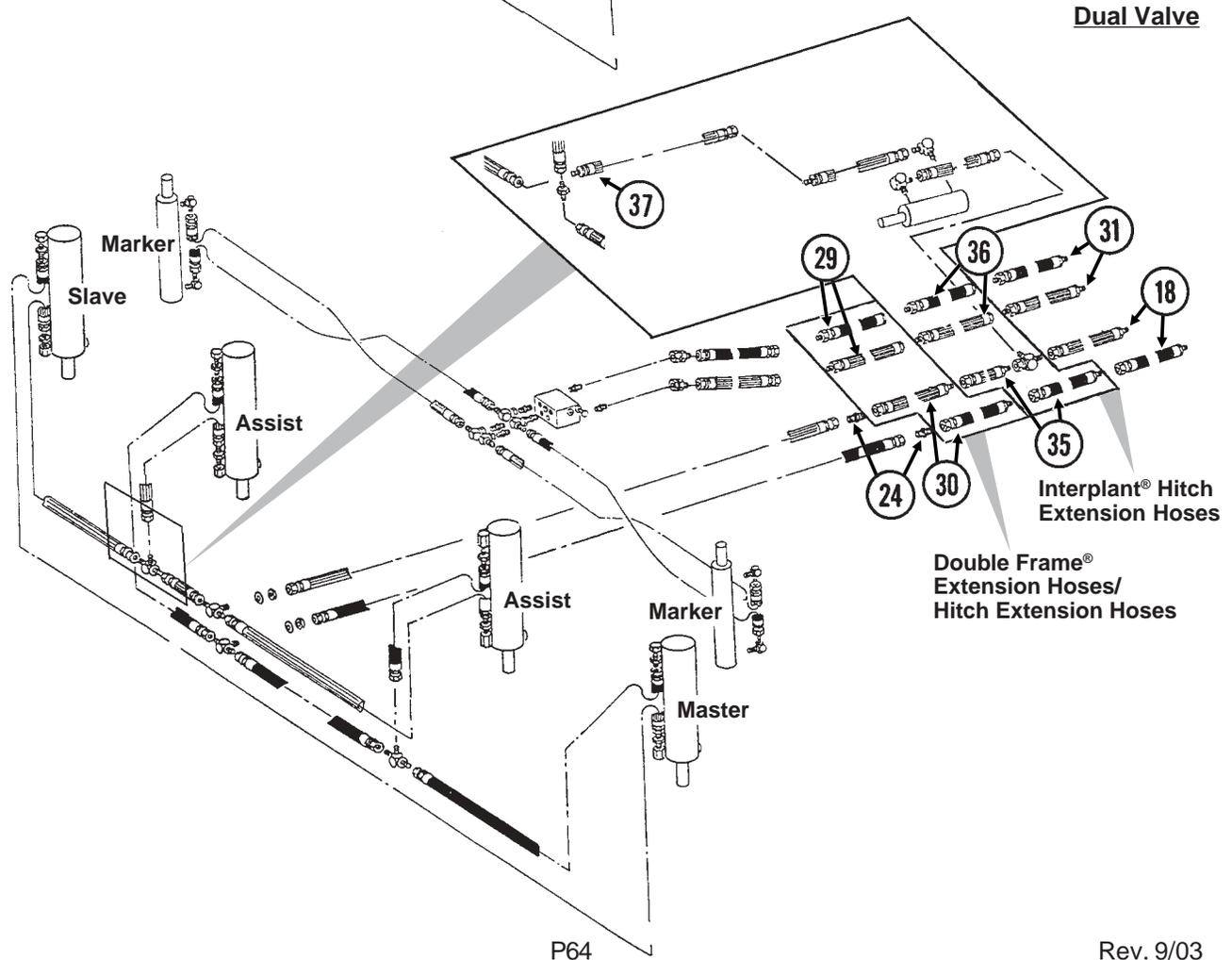
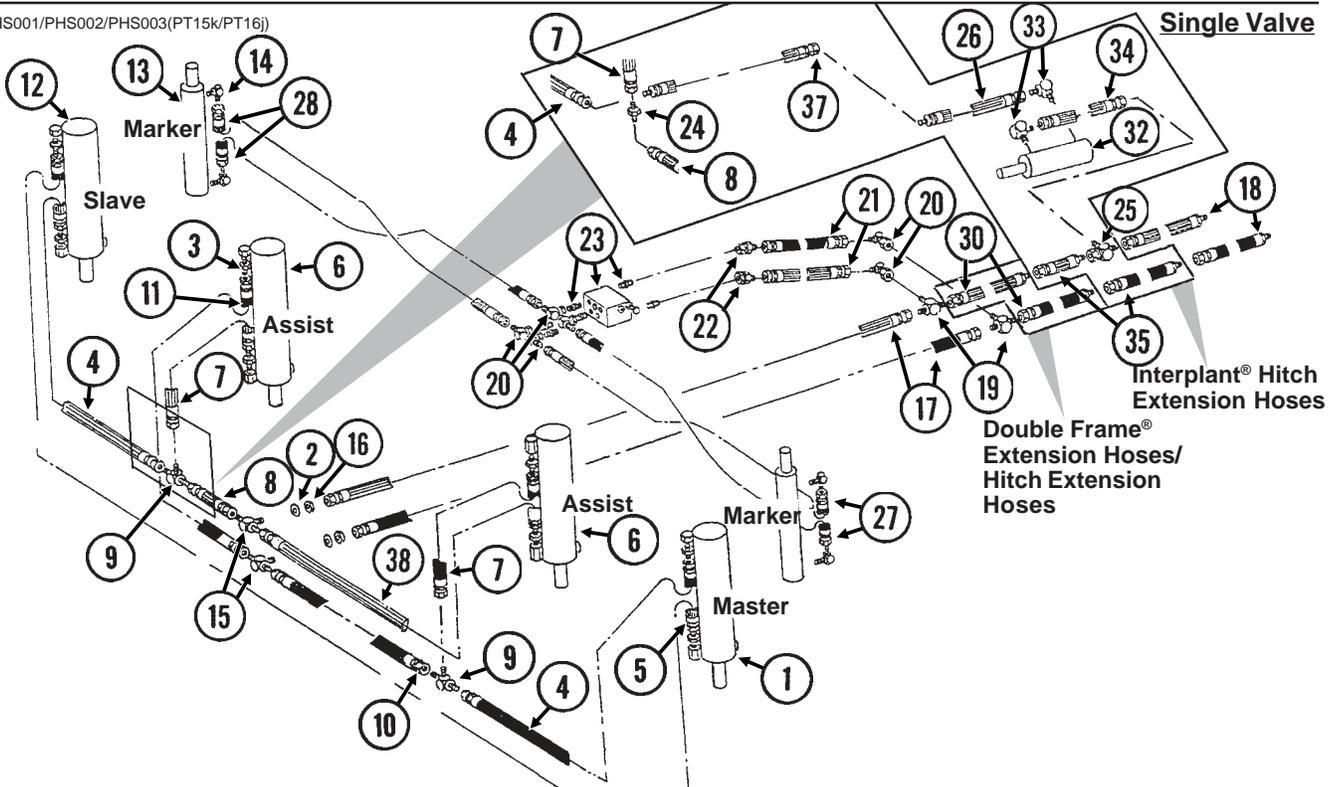
# HYDRAULIC SYSTEM, 4 ROW 30"/36"/38" CONVENTIONAL MARKER

ITEM	PART NO.	QTY.	DESCRIPTION
1.		-	See "Master Lift Cylinder", Page P52
2.	G10215	2	Machine Bushing, 3/4", 14 Gauge
3.	G6400-08	4	Connector W/O-Ring, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
4.	*A1018	1	Hose Assembly, 3/8" x 40", 4 Row 30"
	*A1020	-	Hose Assembly, 3/8" x 48", 4 Row 36"/38"
5.	*A3113	1	Hose Assembly, 3/8" x 84", 4 Row 30"
	*A3136	-	Hose Assembly, 3/8" x 100", 4 Row 36"/38"
6.	*A1020	1	Hose Assembly, 3/8" x 48", 4 Row 30"
	*A1021	-	Hose Assembly, 3/8" x 56", 4 Row 36"/38"
7.		-	See "Slave Lift Cylinder", Page P53
8.	G2701-08	2	Bulkhead Elbow, 90°, 3/4"-16 Male JIC
9.	G306-08	2	Lock Nut, 3/4"-16
10.	*A1076	2	Hose Assembly, 3/8" x 30"
11.	*A3135	2	Hose Assembly, 3/8" x 100"
12.	G2603-08-08-06	2	Tee, 3/4"-16 Male JIC To 9/16"-18 JIC
13.	G6500-06	-	Swivel Elbow, 90°, 9/16"-18 Male JIC To Female
14.	*A1138	2	Hose Assembly, 1/4" x 29"
15.	G6502-06	2	Swivel Elbow, 45°, 9/16"-18 Male JIC To Female
16.		-	See "Marker Sequencing/Flow Control Valve", Pages P60 And P61 (For Valve Mounts See "Marker Sequencing/Flow Control Valve")
17.	G6801-08	2	Elbow W/O-Ring, 90°, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
18.	*A3211	1	Hose Assembly, 3/8" x 66", W/Interplant® Package
19.	*A1020	1	Hose Assembly, 3/8" x 48", W/Interplant® Package
20.		-	See "Marker Cylinder", Pages P55-P57
21.	G6801-06-08	4	Elbow W/O-Ring, 90°, 9/16"-18 Male JIC To 3/4"-16 O-Ring
	GR1037	-	O-Ring
22.	*A1102	2	Hose Assembly, 1/4" x 95", 4 Row 30"
	*A1171	-	Hose Assembly, 1/4" x 108", 4 Row 36"/38"
23.	*A1170	2	Hose Assembly, 1/4" x 90", 4 Row 30"
	*A1150	-	Hose Assembly, 1/4" x 103", 4 Row 36"/38"
24.	*A1076	1	Hose Assembly, 3/8" x 30", W/Interplant® Package
25.	*A1182	-	Hose Assembly, 1/4" x 30", W/Double Frame® Package
	*A1177	-	Hose Assembly, 1/4" x 24", W/Hitch Extensions
26.	*A3142	-	Hose Assembly, 3/8" x 30", W/Double Frame® Package
	*A3147	-	Hose Assembly, 3/8" x 24", W/Hitch Extensions
27.	G2403-08	2	Union, 3/4"-16 Male JIC
28.	*A1173	2	Hose Assembly, 1/4" x 100"
29.		-	See "Interplant® Lift Cylinder", Pages P58 And P59
30.	*A1179	2	Hose Assembly, 1/4" x 56", W/Interplant® Package
31.	*A1182	1	Hose Assembly, 1/4" x 30", W/Double Frame® Package
32.	*A1153	1	Hose Assembly, 1/4" x 56", W/Interplant® Package
33.	G2403-06	1	Union, 9/16"-18 Male JIC, W/Interplant® Package
34.	G2403-08	1	Union, 3/4"-16 Male JIC, W/Interplant® Package

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

# HYDRAULIC SYSTEM, 6 ROW 30" CONVENTIONAL MARKER

PHS001/PHS002/PHS003(PT15k/PT16j)



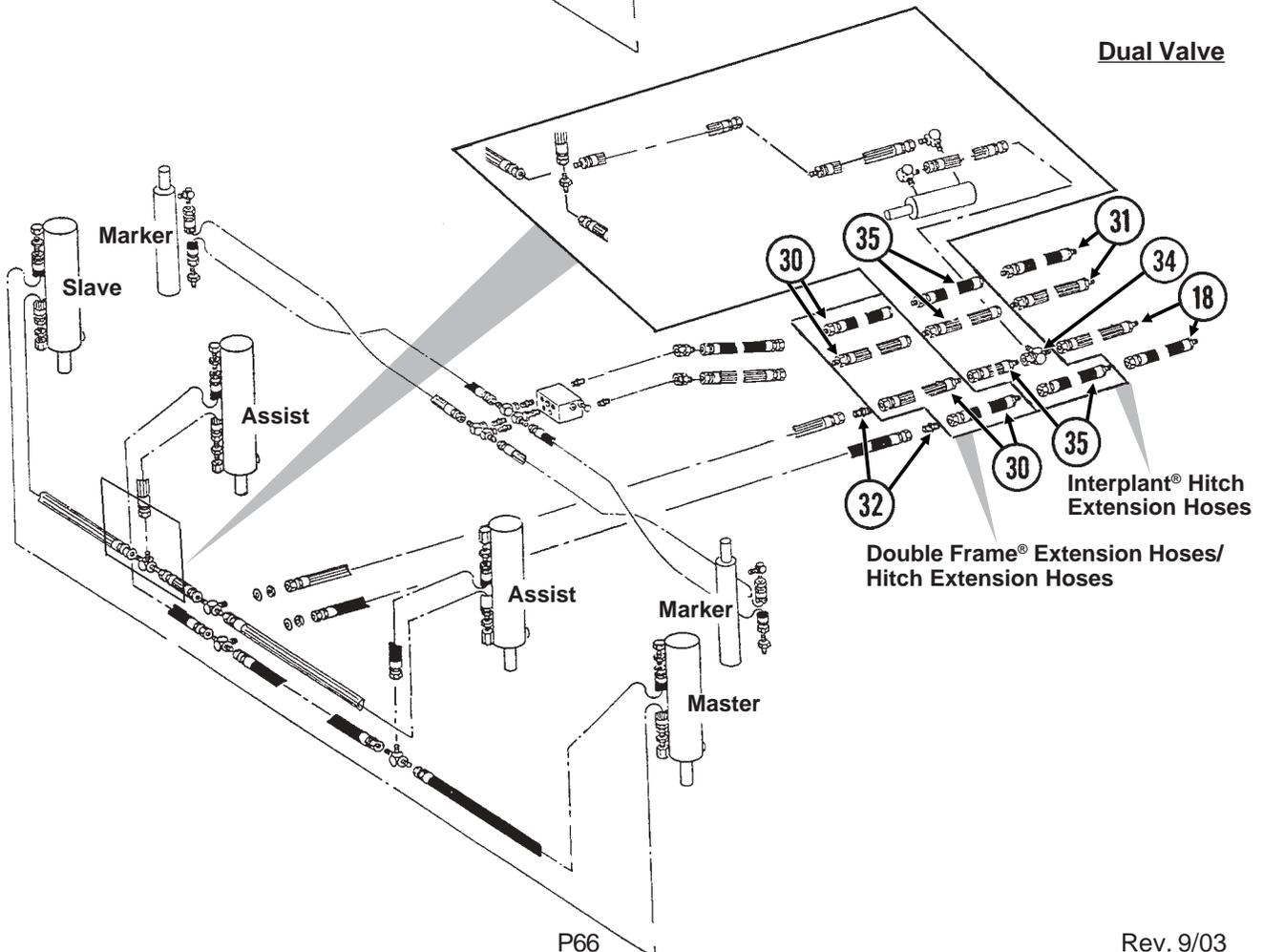
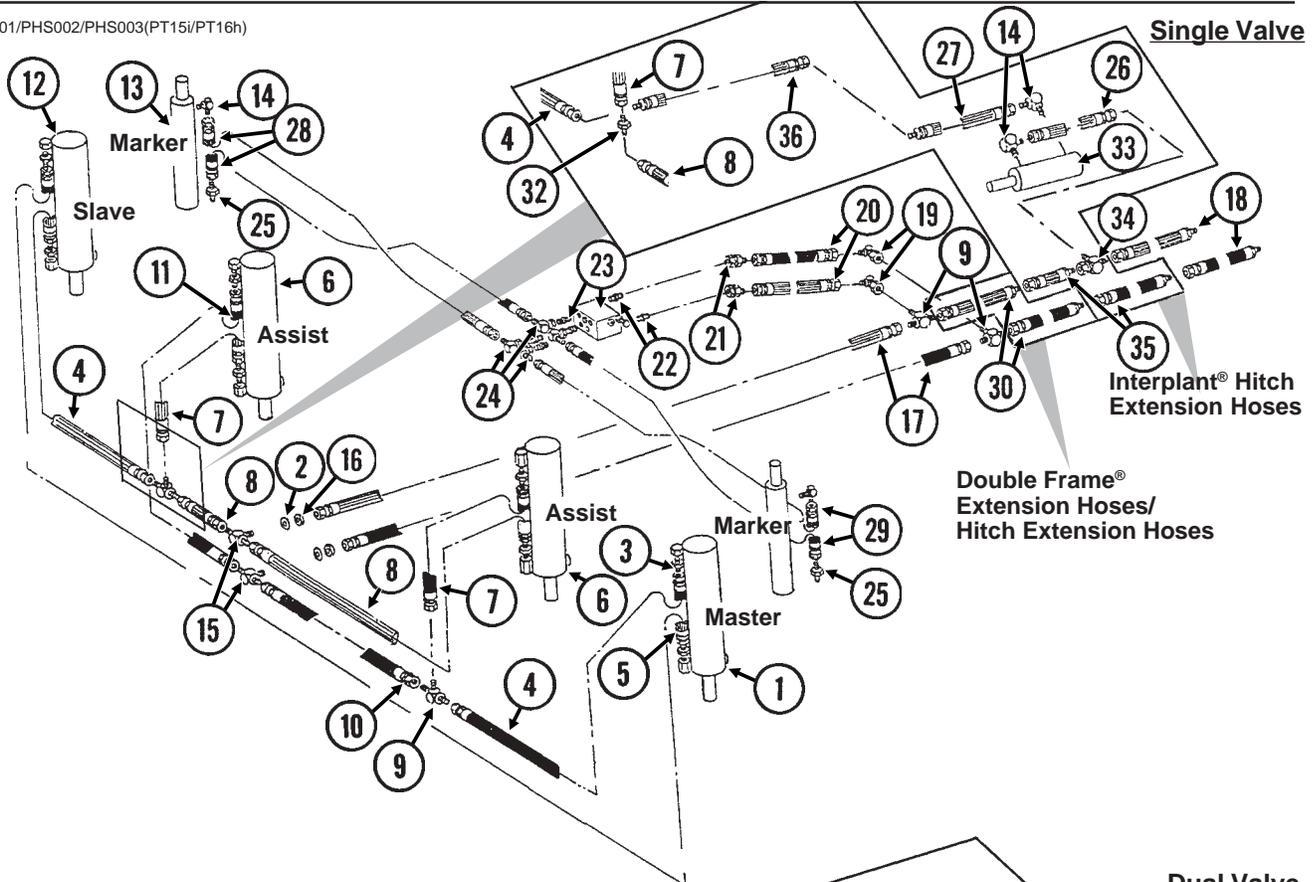
# HYDRAULIC SYSTEM, 6 ROW 30" CONVENTIONAL MARKER

ITEM	PART NO.	QTY.	DESCRIPTION
1.		-	See "Master Lift Cylinder", Page P52
2.	G10215	2	Machine Bushing, 3/4", 14 Gauge
3.	G6400-08	8	Connector W/O-Ring, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
4.	*A1018	2	Hose Assembly, 3/8" x 40"
5.	*A3115	1	Hose Assembly, 3/8" x 146"
6.		-	See "Lift Assist Cylinder", Page P54
7.	*A1000	2	Hose Assembly, 3/8" x 15"
8.	*A3119	1	Hose Assembly, 3/8" x 36"
9.	G2603-08	2	Tee, 3/4"-16 Male JIC
10.	*A1086	1	Hose Assembly, 3/8" x 28"
11.	*A1019	1	Hose Assembly, 3/8" x 44"
12.		-	See "Slave Lift Cylinder", Page P53
13.		-	See "Marker Cylinder", Pages P55-P57
14.	G6801-06-08	4	Elbow W/O-Ring, 90°, 9/16"-18 Male JIC To 3/4"-16 O-Ring
	GR1037	-	O-Ring
15.	G2703-08	2	Bulkhead Tee, 3/4"-16 Male JIC
16.	G306-08	2	Lock Nut, 3/4"-16
17.	*A1076	2	Hose Assembly, 3/8" x 30"
18.	*A3135	2	Hose Assembly, 3/8" x 100"
19.	G2603-08-08-06	2	Tee, 3/4"-16 Male JIC To 9/16"-18 JIC
20.	G6500-06	2	Swivel Elbow, 90°, 9/16"-18 Male JIC To Female
21.	*A1138	2	Hose Assembly, 1/4" x 29"
22.	G6502-06	2	Swivel Elbow, 45°, 9/16"-18 Male JIC To Female
23.		-	See "Marker Sequencing/Flow Control Valve", Pages P60 And P61 (For Valve Mounts See "Marker Sequencing/Flow Control Valve")
24.	G2403-08	1	Union, 3/4"-16 Male JIC
25.	G6602-08	1	Swivel Tee, 3/4"-16 JIC
26.	*A3208	1	Hose Assembly, 3/8" x 140", W/Interplant® Package
27.	*A1168	2	Hose Assembly, 1/4" x 120"
28.	*A1105	2	Hose Assembly, 1/4" x 125"
29.	*A1182	-	Hose Assembly, 1/4" x 30", W/Double Frame® Package
	*A1177	-	Hose Assembly, 1/4" x 24", W/Hitch Extensions
30.	*A3142	-	Hose Assembly, 3/8" x 30", W/Double Frame® Package
	*A3147	-	Hose Assembly, 3/8" x 24", W/Hitch Extensions
31.	*A1173	2	Hose Assembly, 1/4" x 100"
32.		-	See "Interplant® Lift Cylinder", Pages P58 And P59
33.	G6801-08	2	Elbow W/O-Ring, 90°, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
34.	*A1076	1	Hose Assembly, 3/8" x 30", W/Interplant® Package
35.	*A3150	2	Hose Assembly, 3/8" x 56", W/Interplant® Package
36.	*A1179	2	Hose Assembly, 1/4" x 56", W/Interplant® Package
37.	*A3142	1	Hose Assembly, 3/8" x 30", W/Interplant® Package (Double Frame® Only)
38.	*A3175	1	Hose Assembly, 3/8" x 38"

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

# HYDRAULIC SYSTEM, 6 ROW 36"/38" AND 8 ROW 30", TWO-FOLD LOW PROFILE MARKER

PHS001/PHS002/PHS003(PT15/PT16h)



# HYDRAULIC SYSTEM, 6 ROW 36"/38" AND 8 ROW 30", TWO-FOLD LOW PROFILE MARKER

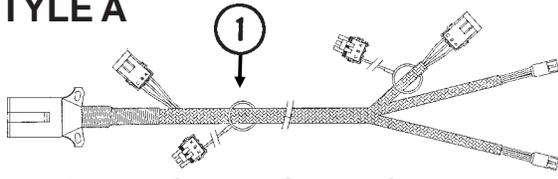
ITEM	PART NO.	QTY.	DESCRIPTION
1.		-	See "Master Lift Cylinder", Page P52
2.	G10215	2	Machine Bushing, 3/4", 14 Gauge
3.	G6400-08	8	Connector W/O-Ring, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
4.	*A1020	2	Hose Assembly, 3/8" x 48", 6 Row 36"/38"
	*A1018	-	Hose Assembly, 3/8" x 40", 8 Row 30"
5.	*A3132	1	Hose Assembly, 3/8" x 178", 6 Row 36"/38"
	*A1054	-	Hose Assembly, 3/8" x 204", 8 Row 30"
6.		-	See "Lift Assist Cylinder", Page P54
7.	*A1000	2	Hose Assembly, 3/8" x 15"
8.	*A1019	2	Hose Assembly, 3/8" x 44", 6 Row 36"/38"
	*A1055	-	Hose Assembly, 3/8" x 66", 8 Row 30"
9.	G2603-08	2	Tee, 3/4"-16 Male JIC
10.	*A1044	1	Hose Assembly, 3/8" x 34", 6 Row 36"/38"
	*A1021	-	Hose Assembly, 3/8" x 56", 8 Row 30"
11.	*A3128	1	Hose Assembly, 3/8" x 52", 6 Row 36"/38"
	*A1039	-	Hose Assembly, 3/8" x 76", 8 Row 30"
12.		-	See "Slave Lift Cylinder", Page P53
13.		-	See "Marker Cylinder", Pages P55-P57
14.	G6801-08	2	Elbow W/O-Ring, 90°, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
15.	G2703-08	2	Bulkhead Tee, 3/4"-16 Male JIC
16.	G306-08	2	Lock Nut, 3/4"-16
17.	*A1076	2	Hose Assembly, 3/8" x 30"
18.	*A3135	2	Hose Assembly, 3/8" x 100"
19.	G6500-08	2	Swivel Elbow, 90°, 3/4"-16 Male JIC To Female
20.	*A1079	2	Hose Assembly, 3/8" x 24"
21.	G6502-08	2	Swivel Elbow, 45°, 3/4"-16 Male JIC To Female
22.	G6400-08-06	2	Connector W/O-Ring, 3/4"-16 Male JIC To 9/16"-18 O-Ring
	GR1045	-	O-Ring
23.		-	See "Marker Sequencing/Flow Control Valve", Pages P60 And P61
24.	G6500-08-06	2	Swivel Elbow, 90°, 3/4"-16 Male JIC To 9/16"-18 Female
25.	G6400-08	2	Connector W/O-Ring, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
	G6400-08-04	-	Connector W/O-Ring, 3/4"-16 Male JIC To 7/16"-20 O-Ring
	GR1465	-	O-Ring
26.	*A1076	1	Hose Assembly, 3/8" x 30", W/Interplant® Package
27.	*A3208	1	Hose Assembly, 3/8" x 140", W/Interplant® Package, 6 Row 36"/38"
	*A3209	1	Hose Assembly, 3/8" x 170", W/Interplant® Package, 8 Row 30"
28.	*A1013	2	Hose Assembly, 3/8" x 150", 6 Row 36"/38"
	*A1090	-	Hose Assembly, 3/8" x 162", 8 Row 30"
29.	*A3137	2	Hose Assembly, 3/8" x 140", 6 Row 36"/38"
	*A3114	-	Hose Assembly, 3/8" x 156", 8 Row 30"
30.	*A3142	-	Hose Assembly, 3/8" x 30", W/Double Frame® Package
	*A3147	-	Hose Assembly, 3/8" x 24", W/Hitch Extensions
31.	*A3143	2	Hose Assembly, 3/8" x 100"
32.	G2403-08	-	Union, 3/4"-16 Male JIC
33.		-	See "Interplant® Lift Cylinder", Pages P58 And P59
34.	G6602-08	1	Swivel Tee, 3/4"-16 JIC
35.	*A3150	2-4	Hose Assembly, 3/8" x 56", W/Interplant® Package
36.	*A3142	1	Hose Assembly, 3/8" x 30", W/Interplant® Package (Double Frame® Only)

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

# ELECTRICAL COMPONENTS AND SMV SIGN

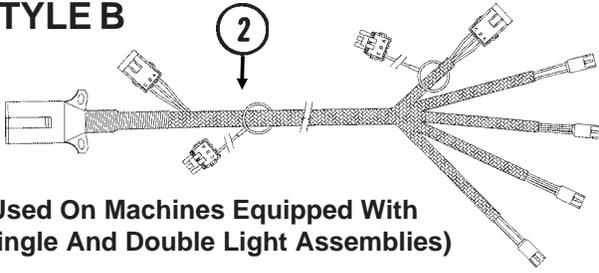
PFA052/PFA055(ELC9/ELC9a/MTR27a/ELC8/PT49f)

## STYLE A

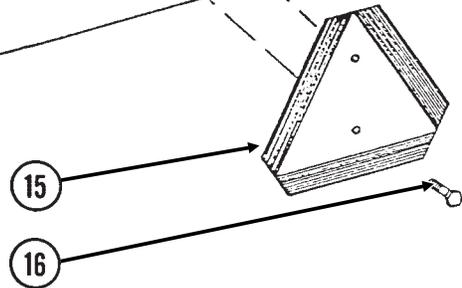
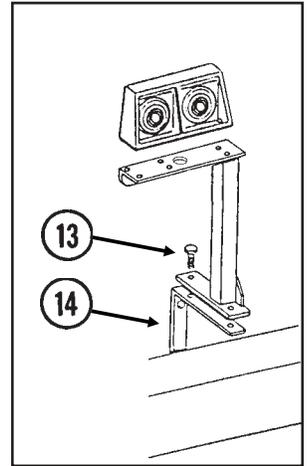
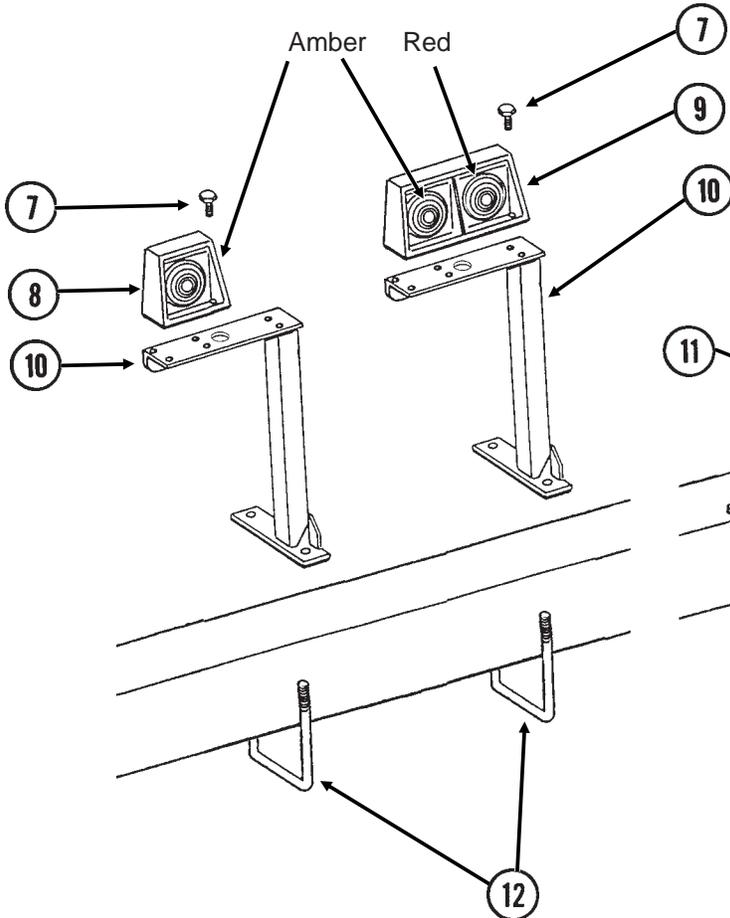
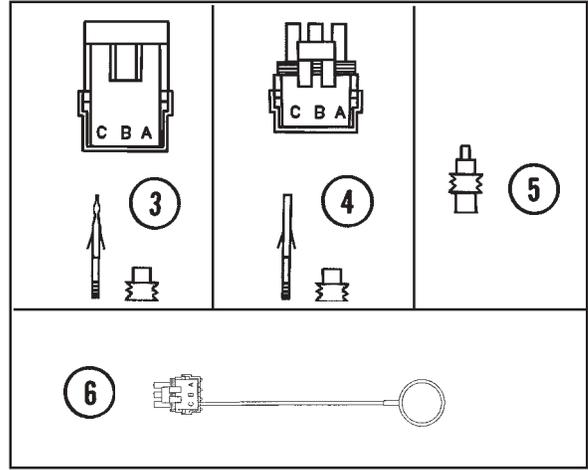


(Used On Machines Equipped With Double Light Assemblies Only)

## STYLE B



(Used On Machines Equipped With Single And Double Light Assemblies)



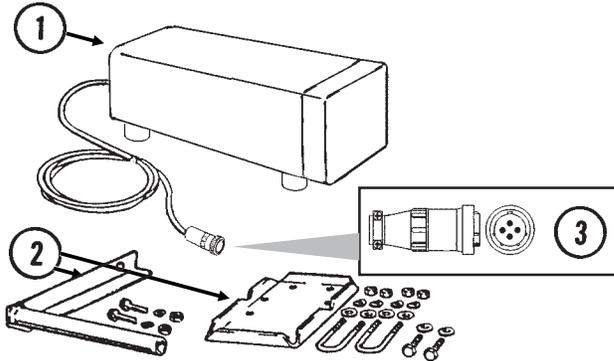
# ELECTRICAL COMPONENTS AND SMV SIGN

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA6814	-	Wiring Harness W/7 Terminal Female Connector, 329", 4 Row 30"/36"/38" And 6 Row 30" (2 Light Connections)
	GA6815	-	Wiring Harness W/7 Terminal Female Connector, 395", 6 Row 36"/38" And 8 Row 30" (2 Light Connections)
	GA5385	-	7 Terminal Female Connector
2.	GA9207	-	Wiring Harness W/7 Terminal Female Connector, 329", 4 Row 30"/36"/38" And 6 Row 30" (4 Light Connections)
	GA9206	-	Wiring Harness W/7 Terminal Female Connector, 396", 6 Row 36"/38" And 8 Row 30" (4 Light Connections)
	GA5385	-	7 Terminal Female Connector
3.	G1K248	-	3-Pin Female Connector Kit (Black), Includes: (3) 3-Pin Female Housings, (9) Pin Contacts, (9) Seals
4.	G1K252	-	3-Pin Male Connector Kit (Black), Includes: (3) 3-Pin Male Housings, (9) Socket Contacts, (9) Seals
5.	GD11089	-	Sealing Plug
6.	GA8047	-	Dust Plug (Black)
7.	G10064	8-16	Hex Head Cap Screw, 1/4"-20 x 1"
	G10209	8-16	Washer, 1/4" USS
	G10110	8-16	Lock Nut, 1/4"-20
8.	GA6701	1	Single Amber Light Assembly
	GR1204	-	Amber Lens
	GR1206	-	Rubber Grommet (2)
	GR1207	-	Lamp Unit
	GR1208	-	Bulb
9.	GA6699	1	Double Light Assembly
	GA6700	1	Double Light Assembly (Shown)
	GR1203	-	Red Lens
	GR1204	-	Amber Lens
	GR1205	-	Cover
	GR1206	-	Rubber Grommet (4)
	GR1207	-	Lamp Unit
	GR1208	-	Bulb
10.	GA6823	1	Bracket, L.H. (Shown)
	GA6824	1	Bracket, R.H.
11.	GD7152	1	Bracket
12.	GD7145	2-4	U-Bolt, 7" x 7" x 1/2"-13
	G10228	4-8	Lock Washer, 1/2"
	G10102	4-8	Hex Nut, 1/2"-13
13.	G10039	-	Hex Head Cap Screw, 1/2"-13 x 1 3/4"
	G10228	-	Lock Washer, 1/2"
	G10102	-	Hex Nut, 1/2"-13
14.	GD8304	-	Bracket (Used To Mount Light Bracket When HD Single Disc Fertilizer Openers Are Used)
15.	GD2199	1	SMV Sign
16.	G10023	2	Hex Head Cap Screw, 1/4"-20 x 3/4"
	G10110	2	Lock Nut, 1/4"-20

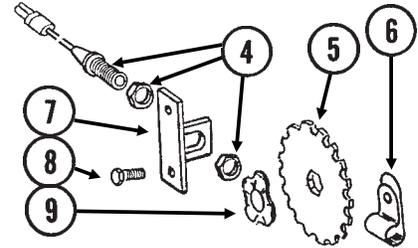
# KPM I/KPM II ELECTRONIC SEED MONITOR

(MTR27z)

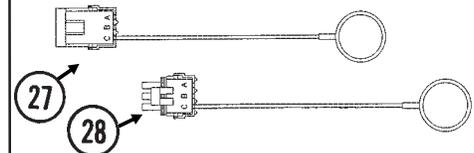
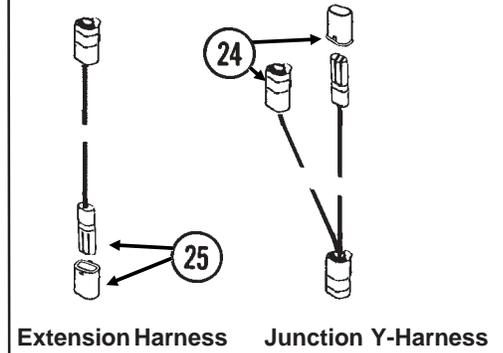
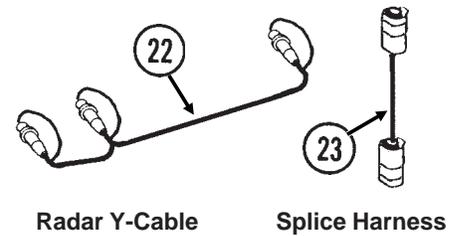
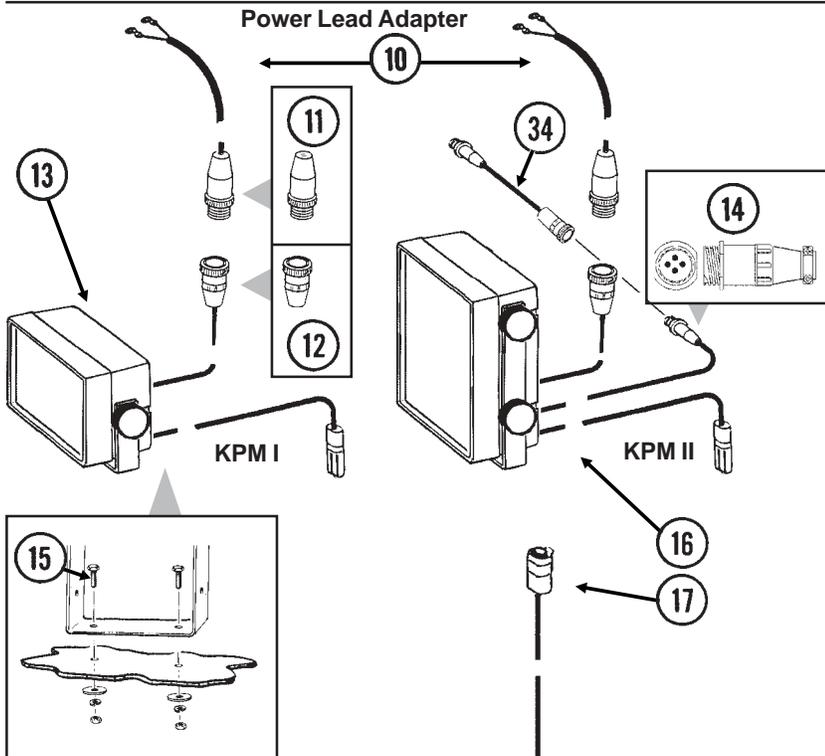
## Radar Distance Sensor (KPM II Only)



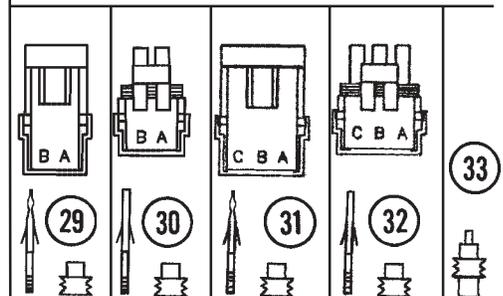
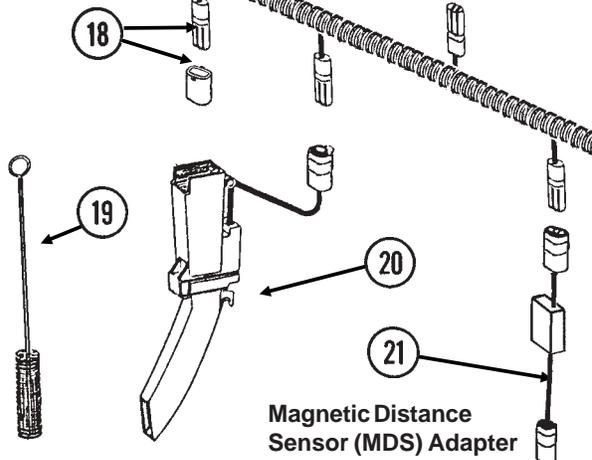
## Magnetic Distance Sensor (MDS) (KPM II Only)



## Power Lead Adapter



## Planter Harness



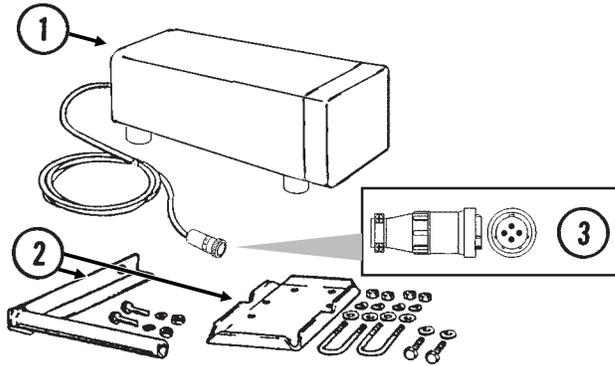
# KPM I/KPM II ELECTRONIC SEED MONITOR

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, 4 Pins And Cable Clamp
4.	GA5600	1	Magnetic Distance Sensor
5.	GD8751	-	Magnetic Distance Sensor Pulse Wheel
6.	GD6291	-	Insulated Clamp, 3/8"
7.	GD8770	1	Bracket
8.	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
9.	GD8771	1	Spring Wave Washer
10.	GA7856	1	Power Lead Adapter
11.	G1K267	-	Power Lead Adapter Connector Kit, Includes: (1) Cable Clamp, (1) 3-Pin Connector, (3) Male Terminal Pins
12.	G1K268	-	Console Cable Connector Kit, Includes: (1) Cable Clamp, (1) 3-Pin Connector, (1) Lock Ring, (3) Female Terminal Pins
13.	GA8680	1	KPM I Backlit Console W/Mounting Bracket, Power Lead Adapter (Item 10), Brush (Item 19) And Dust Plug (Item 27)
	GR1390	-	Mounting Bracket, KPM I
	GR1392	-	Console Mounting Bracket Hardware Package (Includes 2 Knobs And 1/4" Hardware)
14.	G1K322	-	4-Pin Connector Kit W/Male Housing, 4 Female Socket Contacts And Cable Clamp
15.	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
16.	GA9393	-	KPM II Backlit Console W/Mounting Bracket, Power Lead Adapter (Item 10), Brush (Item 19), Dust Plug (Item 27) And Monitor/Radar Adapter, 10" (Item 34)
	GR1391	-	Mounting Bracket, KPM II
	GR1393	-	Console Mounting Bracket Hardware Package (Includes 4 Knobs And 1/4" Hardware)
17.		-	Included In Planter Wiring Harnesses, See Item 1 Or 2, Pages P68 And P69
18.	GA8021	-	Planter Harness W/Dust Caps, 4 Row (7 Connectors)
	GA8022	-	Planter Harness W/Dust Caps, 6 Row (9 Connectors)
	GA7850	-	Planter Harness W/Dust Caps, 8 Row (12 Connectors)
	GD11993	-	Dust Cap
19.	GR0594	-	Brush
20.	GA8495	-	Seed Tube W/Computerized Sensor
	GR1395	-	Sensor Only
	GR1461	-	Seed Tube (With Holes For Computerized Sensor Installation)
	GD2117	-	Tie Strap, 14 1/2"
21.	GA7859	1	Magnetic Distance Sensor Adapter (Analog To Digital)
22.	GR0586	1	Radar Y-Cable (Used To Connect Radar Distance Sensor For Multiple Functions)
23.	GA7857	-	Splice Harness, 1'
24.	GA7853	-	Junction Y-Harness W/Dust Cap
	GD11993	-	Dust Cap
25.	GA7854	-	Extension Harness W/Dust Cap, 15'
	GA7855	-	Extension Harness W/Dust Cap, 30'
	GD11993	-	Dust Cap
26.	G1K249	-	Acre Counter Switch Kit
27.	GA8046	-	Dust Plug (Black)
28.	GA8047	-	Dust Plug (Black)
29.	G1K321	-	2-Pin Female Connector Kit (Black), Includes: (3) 2-Pin Female Housings, (6) Pin Contacts, (6) Seals
30.	G1K320	-	2-Pin Male Connector Kit (Black), Includes: (3) 2-Pin Male Housings, (6) Socket Contacts, (6) Seals
31.	G1K248	-	3-Pin Female Connector Kit (Black), Includes: (3) 3-Pin Female Housings, (9) Pin Contacts, (9) Seals
32.	G1K252	-	3-Pin Male Connector Kit (Black), Includes: (3) 3-Pin Male Housings, (9) Socket Contacts, (9) Seals
33.	GD11089	-	Sealing Plug
34.	GA9144	-	Monitor/Radar Adapter, 10"
A.	GA6147	-	Magnetic Distance Sensor And Mounting Package (Items 4-9)

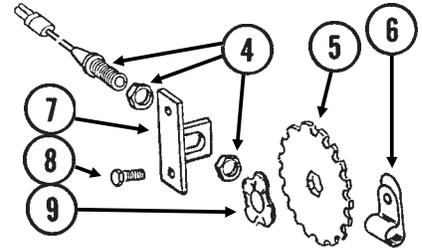
# KPM II STACK-MODE ELECTRONIC SEED MONITOR

(MTR43D)

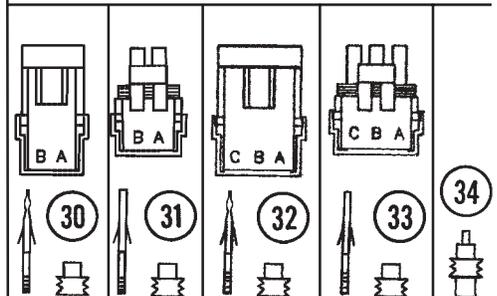
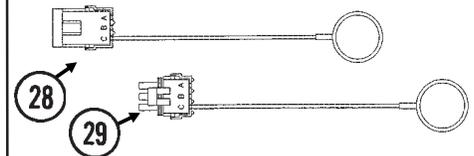
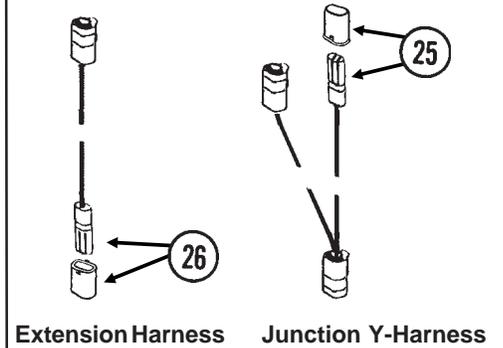
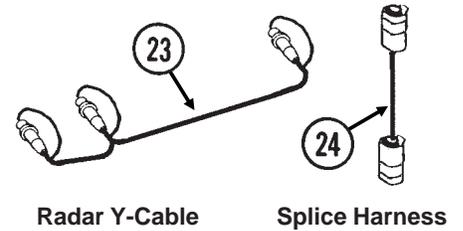
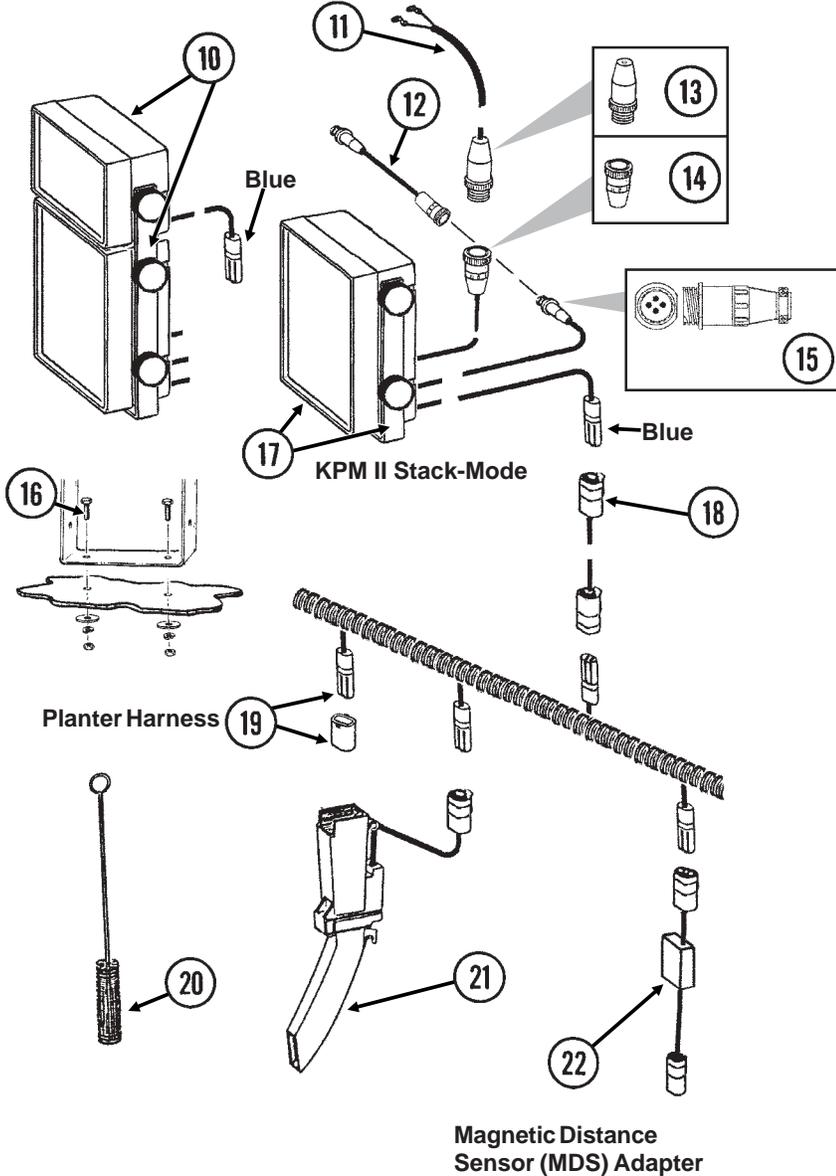
## Radar Distance Sensor (KPM II Only)



## Magnetic Distance Sensor (MDS) (KPM II Only)



## Power Lead Adapter

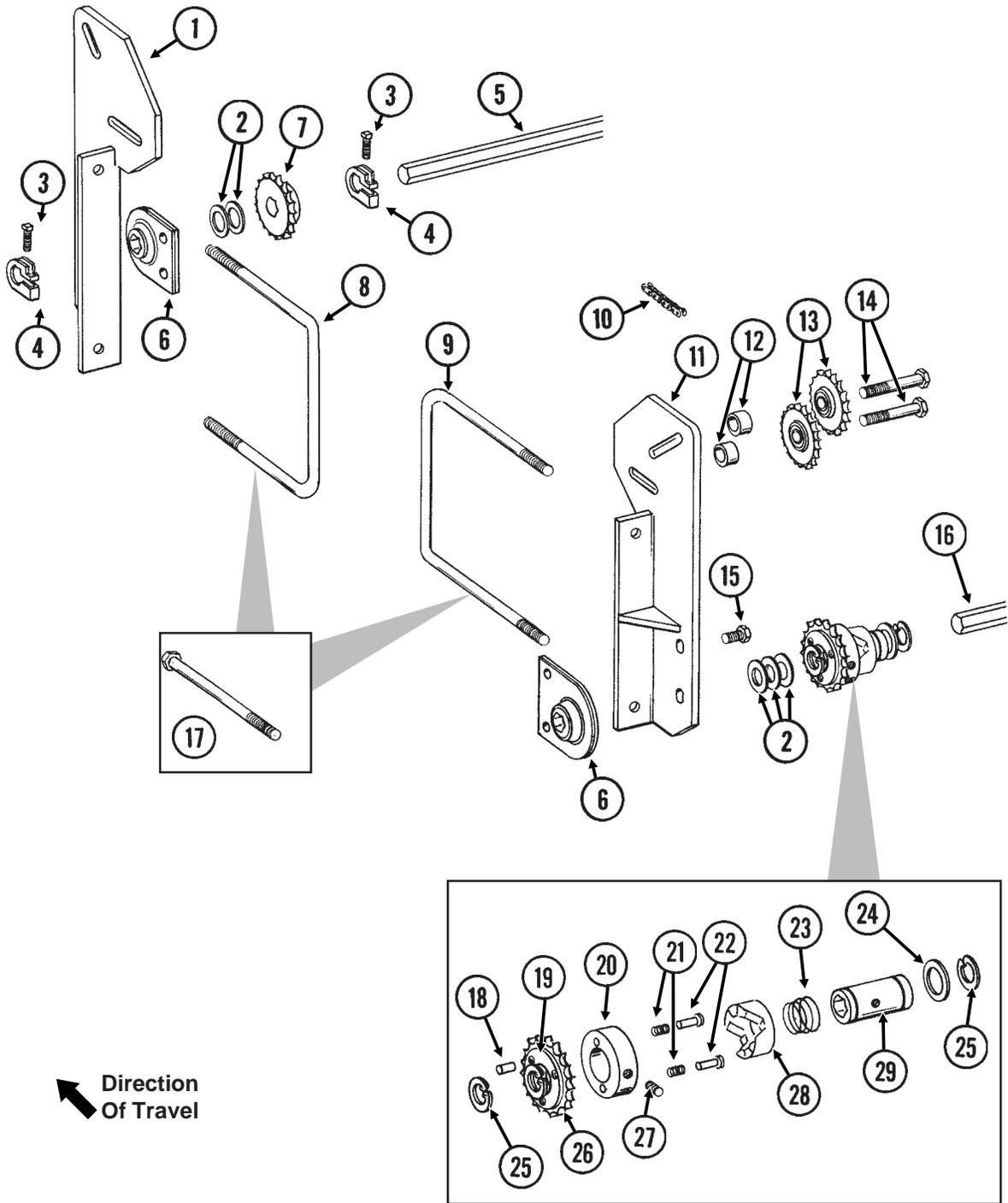


# KPM II STACK-MODE ELECTRONIC SEED MONITOR

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, 4 Pins And Cable Clamp
4.	GA5600	1	Magnetic Distance Sensor
5.	GD8751	-	Magnetic Distance Sensor Pulse Wheel
6.	GD6291	-	Insulated Clamp, 3/8"
7.	GD8770	1	Bracket
8.	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
9.	GD8771	1	Spring Wave Washer
10.	GA9857	1	SMM Backlit Console W/Mounting Bracket And Dust Plug (Item 36)
	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, 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.	G1K322	-	4-Pin Connector Kit W/Male Housing, 4 Female Socket Contacts And Cable Clamp
16.	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
17.	GA9858	-	KPM II Stack-Mode Backlit Console W/Mounting Bracket, Power Lead Adapter (Item 11), Brush (Item 20), Dust Plug (Item 28) 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)
18.		-	Included In Planter Wiring Harnesses, See Item 1 Or 2, Pages P68 And P69
19.	GA8021	-	Planter Harness W/Dust Caps, 4 Row (7 Connectors)
	GA8022	-	Planter Harness W/Dust Caps, 6 Row (9 Connectors)
	GA7850	-	Planter Harness W/Dust Caps, 8 Row (12 Connectors)
	GD11993	-	Dust Cap
20.	GR0594	-	Brush
21.	GA9847	-	Seed Tube W/Computerized Sensor (KPM II Stack-Mode)
	GR1629	-	Sensor Only (KPM II Stack-Mode)
	GR1461	-	Seed Tube (With Holes For Computerized Sensor Installation)
	GD2117	-	Tie Strap, 14 1/2"
22.	GA7859	1	Magnetic Distance Sensor Adapter (Analog To Digital)
23.	GR0586	1	Radar Y-Cable (Used To Connect Radar Distance Sensor For Multiple Functions)
24.	GA7857	-	Splice Harness, 1'
25.	GA7853	-	Junction Y-Harness W/Dust Cap
	GD11993	-	Dust Cap
26.	GA7854	-	Extension Harness W/Dust Cap, 15'
	GA7855	-	Extension Harness W/Dust Cap, 30'
	GD11993	-	Dust Cap
27.	G1K249	-	Acre Counter Switch Kit
28.	GA8046	-	Dust Plug (Black)
	GA9978	-	Dust Plug (Blue)
29.	GA8047	-	Dust Plug (Black)
	GA9979	-	Dust Plug (Blue)
30.	G1K321	-	2-Pin Female Connector Kit (Black), Includes: (3) 2-Pin Female Housings, (6) Pin Contacts, (6) Seals
31.	G1K320	-	2-Pin Male Connector Kit (Black), Includes: (3) 2-Pin Male Housings, (6) Socket Contacts, (6) Seals
32.	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
33.	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
34.	GD11089	-	Sealing Plug
A.	GA6147	-	Magnetic Distance Sensor And Mounting Package (Items 4-9)

# INTERPLANT® PUSH ROW UNIT DRIVE

PTD093(PT75e)

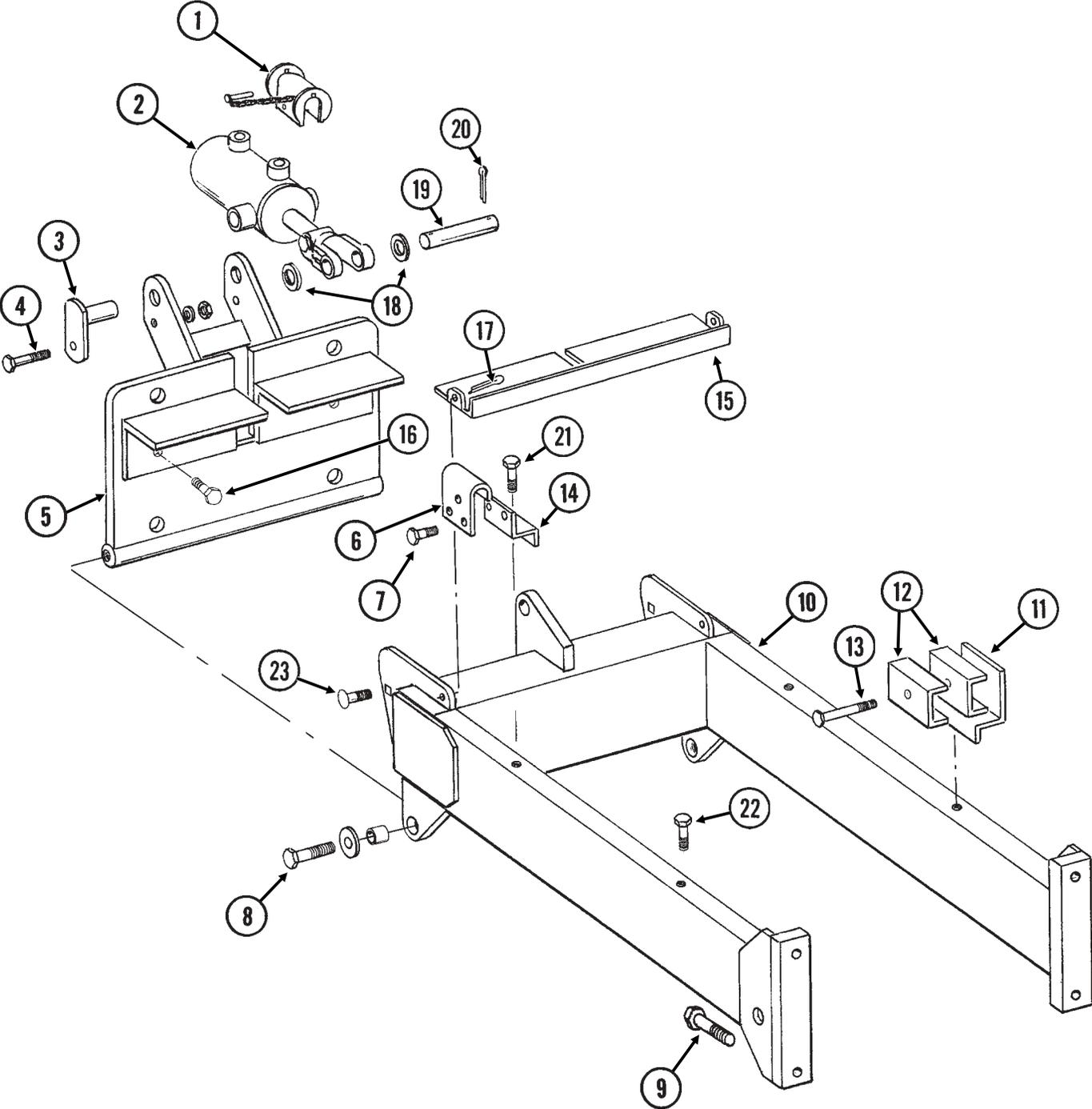


# INTERPLANT® PUSH ROW UNIT DRIVE

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8717	1	Front Mount
2.	G10233	5	Machine Bushing, 1", 10 Gauge
3.	G10130	2	Square Head Machine Bolt, $\frac{5}{16}$ "-18 x 1 $\frac{3}{4}$ "
	G10923	2	Flange Nut, $\frac{5}{16}$ "-18, No Serration
4.	GD11045	2	Lock Clamp
5.	GD0914-84	1	Hex Shaft, $\frac{7}{8}$ " x 84" (No Holes), 4 Row 30"
	GD0914-105	-	Hex Shaft, $\frac{7}{8}$ " x 105" (No Holes), 4 Row 36"/38"
	GD0914-144	-	Hex Shaft, $\frac{7}{8}$ " x 144" (No Holes), 6 Row 30"
	GD0914-180	-	Hex Shaft, $\frac{7}{8}$ " x 180" (No Holes), 6 Row 36"/38"
	GD0914-205	-	Hex Shaft, $\frac{7}{8}$ " x 205" (No Holes), 8 Row 30"
6.	GA2180	2	Hanger Bearing, $\frac{7}{8}$ " Hex Bore
7.	GA5107	1	Sprocket, 19 Tooth
8.	GD11721	1	U-Bolt, 5" x 7" x $\frac{1}{2}$ "-13 (Double Frame® Planters)
	G10228	2	Lock Washer, $\frac{1}{2}$ "
	G10102	2	Hex Nut, $\frac{1}{2}$ "-13
9.	GD7145	1	U-Bolt, 7" x 7" x $\frac{1}{2}$ "-13 (Double Frame® Planters)
	G10228	2	Lock Washer, $\frac{1}{2}$ "
	G10102	2	Hex Nut, $\frac{1}{2}$ "-13
10.	G3310-138	1	Chain, No. 40, 138 Pitch Including Connector Link (Single Frame Planters)
	G3310-252	-	Chain, No. 40, 252 Pitch Including Connector Link (Double Frame® Planters)
	GR0912	-	Connector Link, No. 40
11.	GA8716	1	Rear Mount
12.	GD9229	4	Spacer, 1 $\frac{1}{4}$ " O.D. x $\frac{1}{2}$ " Long
13.	GA7154	4	Sprocket W/Bearing, 18 Tooth
14.	G10581	4	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 2 $\frac{1}{4}$ "
	G10216	4	Washer, $\frac{1}{2}$ " USS
	G10228	4	Lock Washer, $\frac{1}{2}$ "
	G10102	4	Hex Nut, $\frac{1}{2}$ "-13
15.	G10001	-	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1"
	G10229	-	Lock Washer, $\frac{3}{8}$ "
	G10101	-	Hex Nut, $\frac{3}{8}$ "-16
16.		-	See "Driveline", Pages P42 And P43
17.	G10909	2	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 9" (Single Frame Planters)
	G10228	2	Lock Washer, $\frac{1}{2}$ "
	G10102	2	Hex Nut, $\frac{1}{2}$ "-13
18.	G10968	1	Spring Pin, $\frac{5}{32}$ " x $\frac{7}{16}$ "
19.	GR1406	1	Bushing
20.	GR1405	1	Lock Collar
21.	GR1413	2	Spring
22.	GR1410	2	Pin
23.	GR1408	1	Compression Spring
24.	GR1411	1	Shim
25.	G10496	2	External Inverted Snap Ring, 1 $\frac{1}{2}$ "
26.	GR1412	1	Sprocket, 19 Tooth
27.	G10535	1	Hex Socket Set Screw, $\frac{3}{8}$ "-16 x $\frac{3}{4}$ "
28.	GR1409	1	Knurled Collar
29.	GR1407	1	Drive Shaft
A.	GA8092	-	Clutch Sprocket Assembly, 19 Tooth (Items 18-29)
B.	G1K269	-	Lock Clamp Kit (Items 3 And 4)
C.	G1K331	-	Clutch Sprocket Kit (Items 18, 19 And 26)

# INTERPLANT® SELF-LEVELING HITCH EXTENSION

(PT73d)

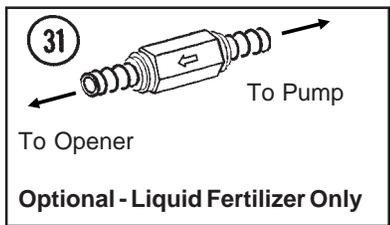
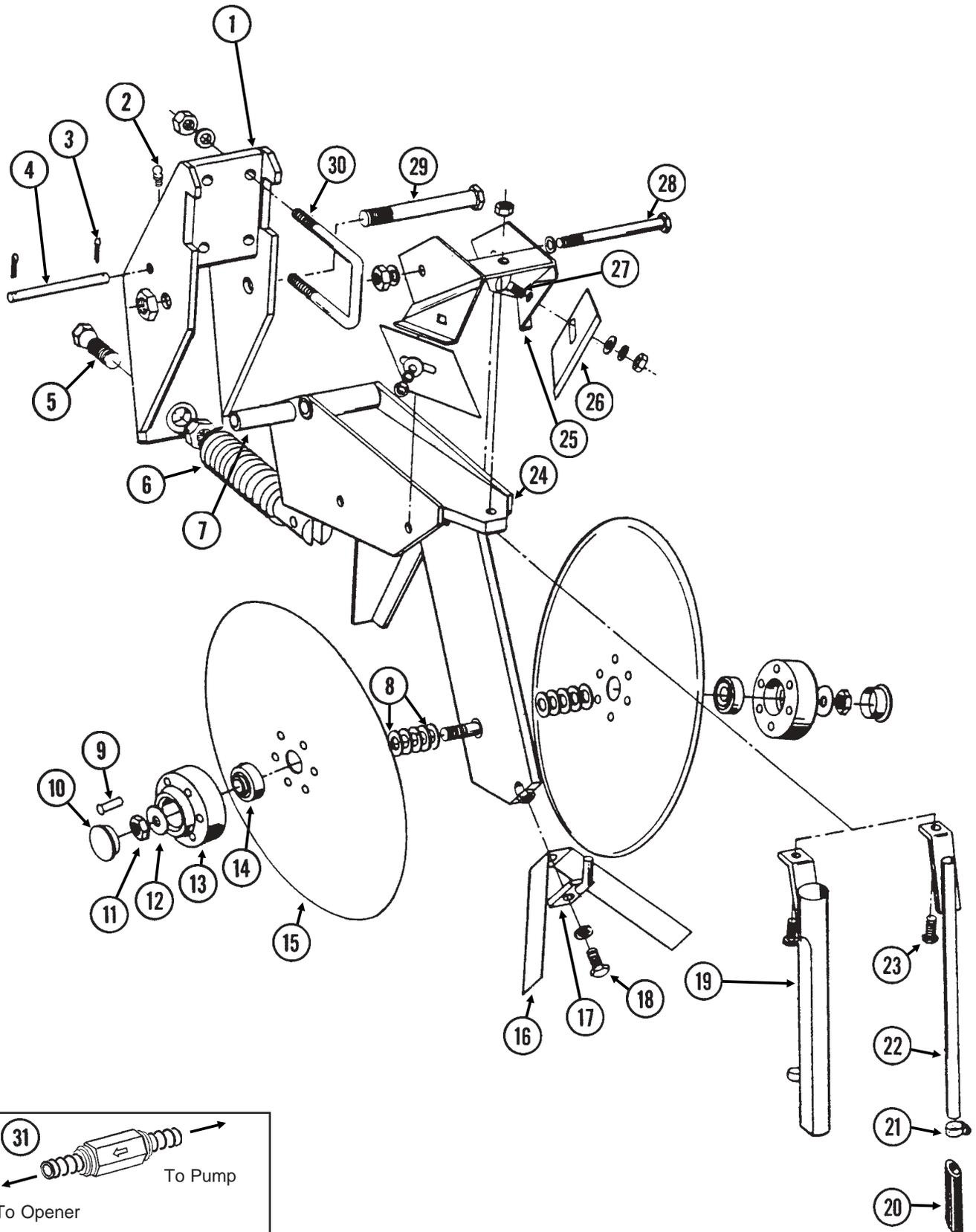


# INTERPLANT® SELF-LEVELING HITCH EXTENSION

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA9872	1	Lockup W/Pin
2.		-	See "Interplant® Lift Cylinder", Pages P58 And P59
3.	GA6761	2	Pin
4.	G10581	2	Hex Head Cap Screw, 1/2"-13 x 2 1/4"
	G10206	2	Washer, 1/2" SAE
	G10111	2	Lock Nut, 1/2"-13
5.	GA8487	1	Hinge
6.	GD7944	1	Mount
7.	G10001	2	Hex Head Cap Screw, 3/8"-16 x 1"
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
8.	G10645	2	Hex Head Cap Screw, 1"-8 x 3", Grade 8
	GD10231	2	Special Washer, 1 1/16" I.D. x 2" O.D.
	GD11535	2	Bushing, 1 1/2" O.D.
9.	G10645	4	Hex Head Cap Screw, 1"-8 x 3", Grade 8
	G10647	4	Hex Nut, 1"-8, Grade 8
10.	GA8488	1	Hitch Extension W/Grease Fittings, 4 Row 30", 6 Row 30" And 8 Row 30" (Shown)
	GA8656	-	Hitch Extension W/Grease Fittings, 4 Row 36"/38" And 6 Row 36"/38"
	G10640	-	Grease Fitting, 1/4"-28
11.	GD11657	2	Mount
12.	GD6027	4	Hose Clamp, 3/4" x 2 1/2" x 2 1/2"
13.	G10325	2	Hex Head Cap Screw, 3/8"-16 x 2 3/4"
	G10108	2	Lock Nut, 3/8"-16
14.	GD11662	1	Mounting Bracket
15.	GA8676	1	Shield
16.	G10428	2	Hex Head Cap Screw, 5/8"-11 x 3/4"
17.	G10451	2	Cotter Pin, 1/8" x 1"
18.	G10226	2	Washer, 1 1/4" SAE
19.	GD11559	1	Pin, 1 1/4" x 4 7/8"
20.	G10460	2	Cotter Pin, 1/4" x 2"
21.	G10001	3	Hex Head Cap Screw, 3/8"-16 x 1"
	G10229	3	Lock Washer, 3/8"
	G10210	3	Washer, 3/8" USS
22.	G10001	1	Hex Head Cap Screw, 3/8"-16 x 1"
23.	G10574	2	Carriage Bolt, 1/2"-13 x 1 1/4"
	G10206	2	Washer, 1/2" SAE
	G10111	2	Lock Nut, 1/2"-13

# DOUBLE DISC FERTILIZER OPENER

FOC007(PT25e/FRTZ208)

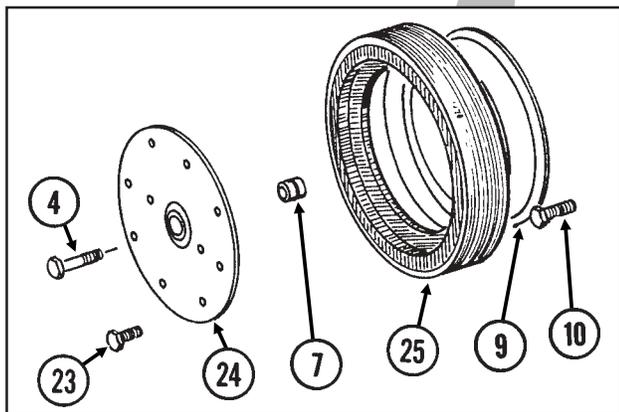
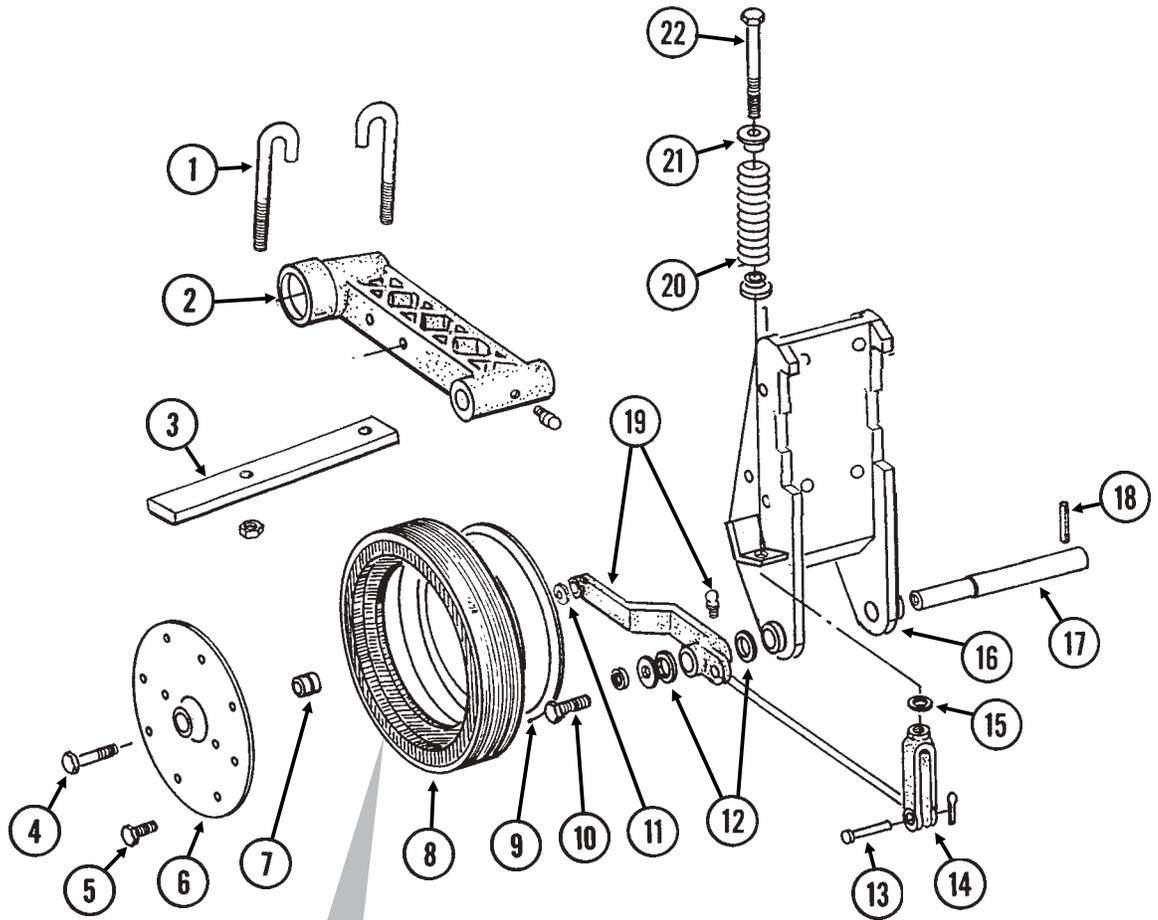


# DOUBLE DISC FERTILIZER OPENER

ITEM	PART NO.	QTY.	DESCRIPTION
(Per Assy.)			
1.	GA8483	1	Bracket
2.	G10938	1	Grease Fitting, 1/4"-28, Taper Thread
3.	G10451	2	Cotter Pin, 1/8" x 1"
4.	GD1657	1	Lockup Pin
5.	GD0962	1	Hex Head Adjusting Bolt, 5/8"-18 x 3 1/4"
	G10499	1	Hex Jam Nut, 5/8"-18, Grade 2
6.	GA0328	1	Spring
7.	GD0487	1	Bushing, 41/64" I.D. x 3 1/2" Long
8.	G10213	-	Machine Bushing, 5/8" (.030" Thick)
9.	G10542	12	Rivet, 1/4" x 1 5/16"
10.	GD1132	2	Dust Cap
11.	G10503	1	Hex Jam Nut, 5/8"-11, Grade 2
	G10504	1	Hex Jam Nut, 5/8"-11, L.H. Thread, Grade 2
12.	G10204	2	Special Machine Bushing, 5/8" x 1" O.D.
13.	GB0134	2	Hub
14.	GA2014	2	Bearing
15.	GD11306	2	Disc Blade, 3.5mm x 15"
16.	GD2589	1	Inner Scraper
17.	GA0312	1	Mount
18.	G10019	1	Hex Head Cap Screw, 5/16"-18 x 1"
	G10232	1	Lock Washer, 5/16"
19.	GA1369	-	Drop Tube, Dry Fertilizer
20.	GD11705	-	Extension
21.	G10681	-	Hose Clamp, No. 6
22.	GA8685	-	Drop Tube, Liquid Fertilizer
23.	G10133	1	Hex Head Cap Screw, 5/16"-18 x 1 1/2"
	G10221	1	Washer, 5/16" SAE
	G10109	1	Lock Nut, 5/16"-18
24.	GA9195	1	Shank
25.	GA0810	1	Scraper Mount
26.	GD1673	2	Scraper
27.	G10305	2	Carriage Bolt, 3/8"-16 x 1"
	G10210	2	Washer, 3/8" USS
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
28.	G10045	1	Hex Head Cap Screw, 1/2"-13 x 4 1/2"
	G10111	1	Lock Nut, 1/2"-13
29.	G10046	1	Hex Head Cap Screw, 5/8"-11 x 5"
	G10107	1	Lock Nut, 5/8"-11
30.	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
31.	GA8983	-	Check Valve, Low Rate
A.	GA8845	-	Disc Blade And Bearing Assembly (Items 9 And 13-15)

# HD SINGLE DISC FERTILIZER OPENER (Soil Press Wheel)

FOC016/FOC007(PT35b/PT35c)

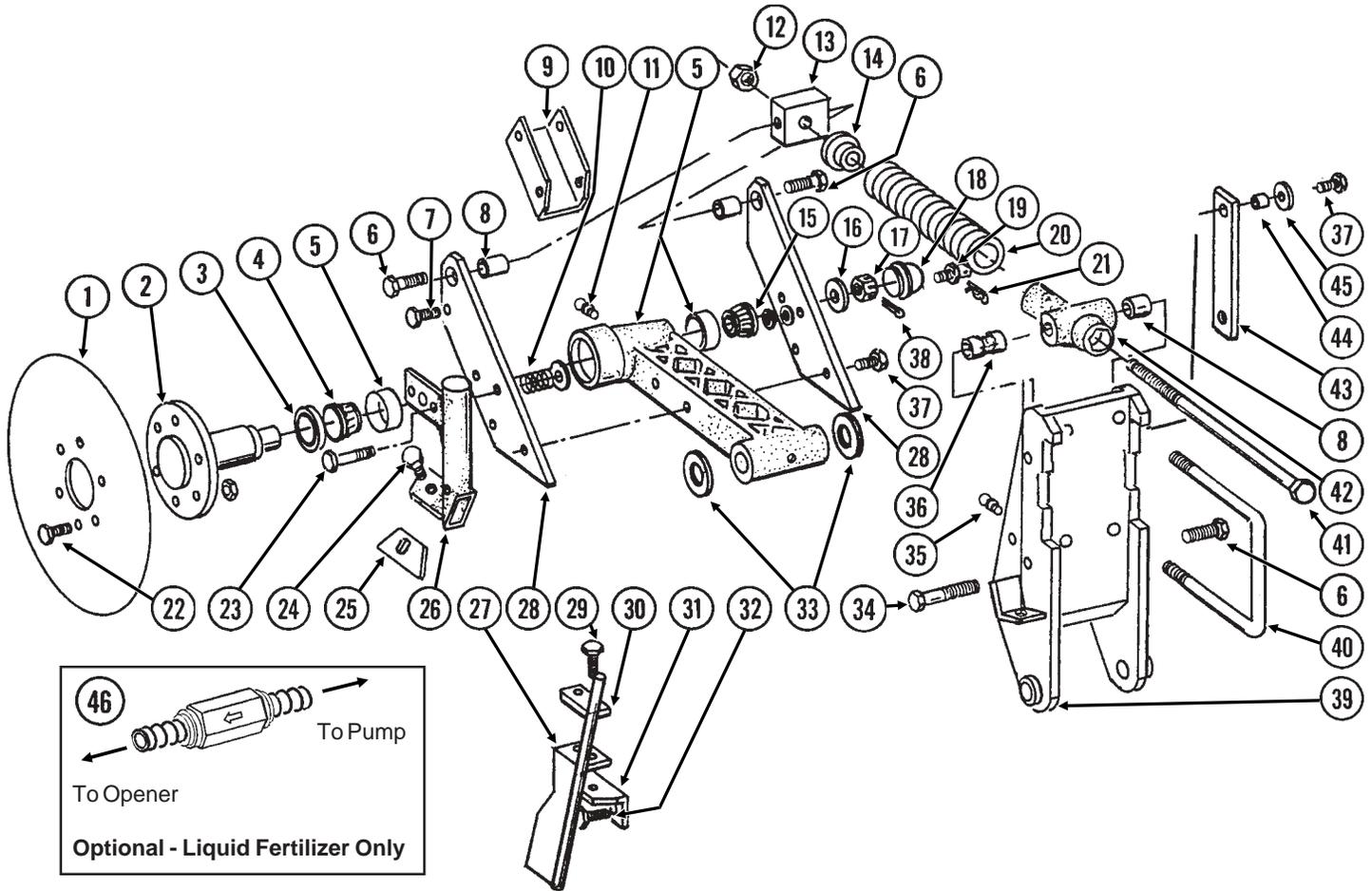


# HD SINGLE DISC FERTILIZER OPENER (Soil Press Wheel)

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	GD9705	2	J-Bolt, 1/2"-13
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
2.		-	See "HD Single Disc Fertilizer Opener (Blade And Drop Tube)", Pages P82 And P83
3.	GD9706	1	Lockup Bar
4.	G10010	1	Hex Head Cap Screw, 5/8"-11 x 3"
5.	G10018	11	Hex Head Cap Screw, 5/16"-18 x 5/8"
	G10109	11	Lock Nut, 5/16"-18
6.	GD4888	1	Half Wheel Cover, Metal
7.	GA6171	1	Bearing
8.	GD4850	1	Offset Tire
9.	GD11423	1	Half Wheel
10.	G10438	1	Hex Head Cap Screw, 1/2"-13 x 3/4"
	G10228	1	Lock Washer, 1/2"
	G10216	1	Washer, 1/2" USS
11.	G10230	1	Lock Washer, 5/8"
12.	G10526	10	Machine Bushing, 1" (.048" Thick)
13.	G10560	1	Clevis Pin, 1/2" x 1 3/4"
	G10456	1	Cotter Pin, 1/8" x 3/4"
14.	GD8218	1	Yoke
15.	G10205	1	Washer, 5/8" SAE
16.		-	See "HD Single Disc Fertilizer Opener (Blade And Drop Tube)", Pages P82 And P83
17.	GD7911	1	Pivot Pin
18.	G10610	1	Spring Pin, 3/8" x 2"
19.	GA8306	-	Wheel Arm W/Grease Fitting, R.H.
	GA8305	1	Wheel Arm W/Grease Fitting, L.H. (Shown)
	G10640	1	Grease Fitting, 1/4"-28
20.	GD8308	1	Spring
21.	GB0212	2	Washer
22.	GD9709	1	Special Bolt
23.	G10961	11	Flanged Whiz-Lock Screw, 5/16"-18 x 3/4", No Serration
	G10620	11	Flange Nut, 5/16"-18
24.	GD11954	1	Half Wheel Cover, Nylon
25.	GD11953	1	Offset Tire
A.	G1K215	-	Lockup Kit (Items 1 And 3)
B.	GA8877	-	Gauge Wheel Complete (Items 7, 9 And 23-25)

# HD SINGLE DISC FERTILIZER OPENER (Blade And Drop Tube)

FOC016/FOC007/FOC019(PT27c/FRTZ208)



ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	GD7900	1	Disc Blade, 18"
2.	GB0205	1	Spindle
3.	GA4286	1	Seal
4.	GA4287	1	Bearing
5.	GA5887	1	Arm W/Cups And Washers
	GD6553	-	Cup
	GR0188	-	Cup
	G10205	3	Washer, 5/8" SAE
6.	G10007	3	Hex Head Cap Screw, 5/8"-11 x 1 1/2"
7.	G10001	2	Hex Head Cap Screw, 3/8"-16 x 1"
	G10108	2	Lock Nut, 3/8"-16
8.	GB0218	3	Bushing, 21/32" I.D. x 7/8" O.D. x 19/32" Long
9.	GD8238	1	Channel
10.	GD7962	2	Spring
11.	G10641	2	Grease Fitting, 1/8" NPT
12.	G10105	3	Hex Nut, 3/4"-10
13.	GD7908	1	Tap Block
14.	GB0213	1	Spring Seat
15.	GA0237	1	Bearing
16.	G10220	1	Machine Bushing, 1 1/16", 10 Gauge
17.	G10507	1	Slotted Nut, 1"-14
18.	GD1104	1	Dust Cap

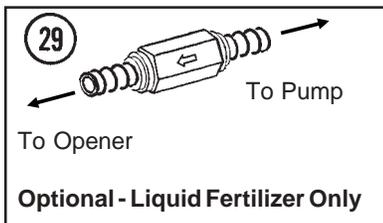
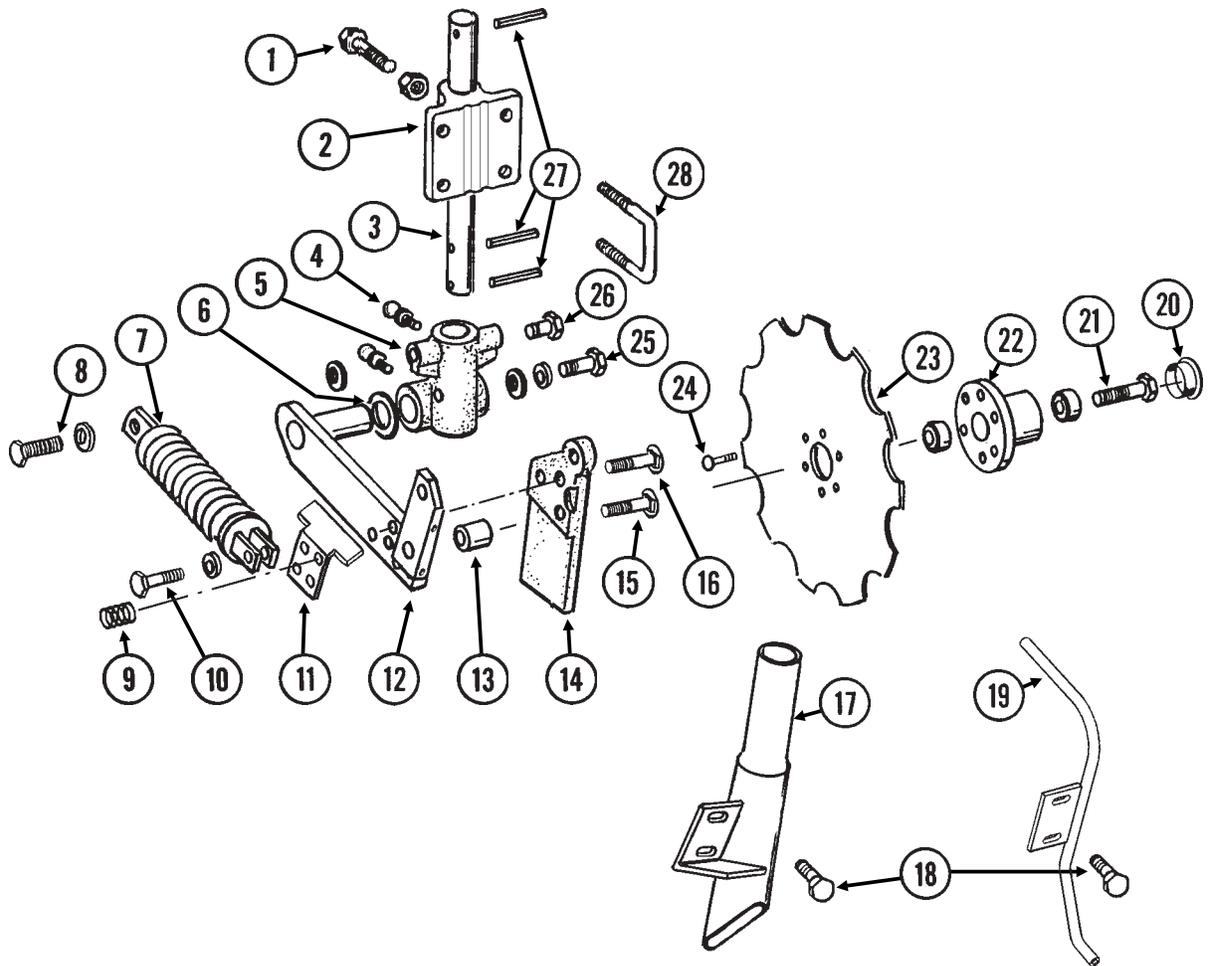
# HD SINGLE DISC FERTILIZER OPENER (Blade And Drop Tube)

ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
19.	GD8276	1	Pin
	G10237	1	Lock Washer, $\frac{7}{16}$ "
	G10100	1	Hex Nut, $\frac{7}{16}$ "-14
20.	GD10273	1	Compression Spring
21.	G10592	1	Hair Pin Clip, No. 11
22.	G10594	6	Bolt, $\frac{1}{2}$ "-13 x 1 $\frac{1}{2}$ "
	G10111	6	Lock Nut, $\frac{1}{2}$ "-13
23.	G10049	2	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 2 $\frac{1}{2}$ "
	G10210	2	Washer, $\frac{3}{8}$ " USS
	G10108	2	Lock Nut, $\frac{3}{8}$ "-16
24.	G10599	1	Carriage Bolt, $\frac{3}{8}$ "-16 x 1 $\frac{1}{4}$ "
	G10210	1	Washer, $\frac{3}{8}$ " USS
	G10229	1	Lock Washer, $\frac{3}{8}$ "
	G10101	1	Hex Nut, $\frac{3}{8}$ "-16
25.	GD7912	1	Scraper
26.	GB0210	-	Drop Tube, R.H., Dry Fertilizer
	GB0209	1	Drop Tube, L.H., Dry Fertilizer (Shown)
27.	GA8689	1	Drop Tube, L.H., Liquid Fertilizer (Shown)
	GA8688	-	Drop Tube, R.H., Liquid Fertilizer
28.	GD8224	2	Bar
29.	G10004	2	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{1}{4}$ "
	G10229	2	Lock Washer, $\frac{3}{8}$ "
30.	GD10487	1	Clamp
31.	GD10304	-	Angle, R.H.
	GD10303	1	Angle, L.H. (Shown)
32.	G10016	2	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 2"
	G10111	2	Lock Nut, $\frac{1}{2}$ "-13
33.	G10322	-	Machine Bushing, 1 $\frac{1}{4}$ ", 18 Gauge (As Required)
34.	G10862	1	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 3 $\frac{1}{4}$ "
	G10205	2	Washer, $\frac{5}{8}$ " SAE
	G10230	1	Lock Washer, $\frac{5}{8}$ "
35.	G10640	1	Grease Fitting, $\frac{1}{4}$ "-28
36.	GD10242	1	Bushing, 2 $\frac{1}{4}$ "
37.	G10039	5	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 1 $\frac{3}{4}$ "
	G10111	5	Lock Nut, $\frac{1}{2}$ "-13
38.	G10459	1	Cotter Pin, $\frac{3}{16}$ " x 1 $\frac{1}{2}$ "
39.	GA7240	-	Opener Mount, R.H.
	GA7239	1	Opener Mount, L.H. (Shown)
40.	GD1114	2	U-Bolt, 7" x 7" x $\frac{5}{8}$ "-11
	G10230	4	Lock Washer, $\frac{5}{8}$ "
	G10104	4	Hex Nut, $\frac{5}{8}$ "-11
41.	GD7907	1	Special Bolt
42.	GB0206	1	Rod Guide
43.	GD8239	1	Storage Strap
44.	GD7904-02	1	Sleeve, $\frac{1}{2}$ " x $\frac{1}{2}$ " Long
45.	G10216	3	Washer, $\frac{1}{2}$ " USS
46.	GA8983	-	Check Valve, Low Rate

# NOTCHED SINGLE DISC FERTILIZER OPENER

FOC018(PT67b/FRTZ208)

## STYLE A



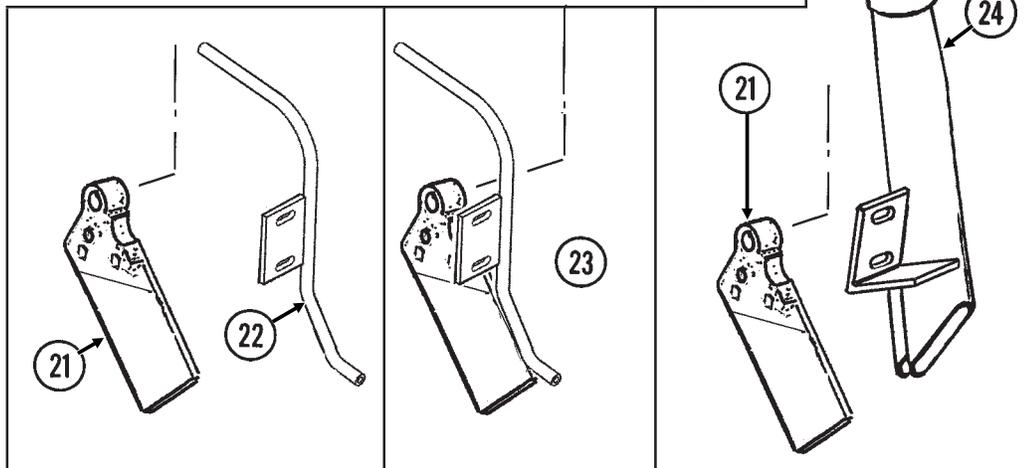
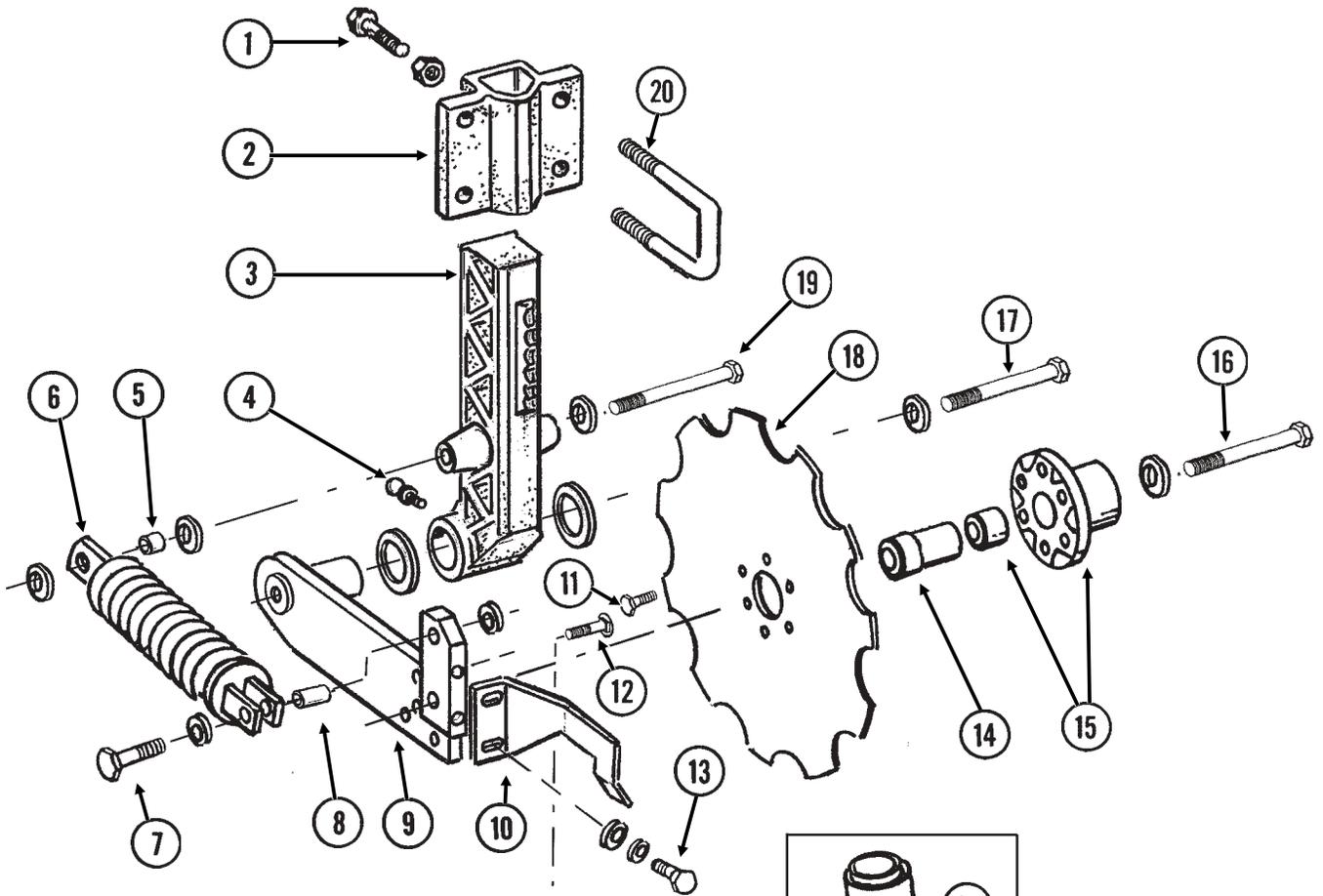
# NOTCHED SINGLE DISC FERTILIZER OPENER

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	G10014	2	Hex Head Cap Screw, 1/2"-13 x 1"
	G10102	2	Hex Nut, 1/2"-13
2.	GB0270	1	Mount
3.	GD9908	1	Shaft, 1 1/2" x 14"
4.	G10641	2	Grease Fitting, 1/8" NPT
5.	GB0250	1	Pivot
6.	G10450	2	Machine Bushing, 1 1/2", 18 Gauge
7.	GA6966	1	Compression Spring Assembly
8.	GD7818	1	Special Bolt
	GD7805	2	Special Washer, 5/8", Hardened
9.	GD11106	1	Spring
10.	G10047	1	Hex Head Cap Screw, 3/8"-16 x 1 3/4"
	G10210	1	Washer, 3/8" USS
	GD1026	1	Sleeve, 1 3/16" Long
	G10108	1	Lock Nut, 3/8"-16
11.	GD11097	1	Shield
12.	GA8007	1	Pivot Arm, L.H. (Shown)
	GA8008	-	Pivot Arm, R.H.
13.	GD7817-05	1	Spacer, 1 1/16" I.D. x 1 1/4" Long
14.	GB0249	1	Knife/Scraper, L.H. (Shown)
	GB0248	-	Knife/Scraper, R.H.
15.	G10306	2-3	Carriage Bolt, 3/8"-16 x 2"
	G10108	2-3	Lock Nut, 3/8"-16
16.	G10898	1	Carriage Bolt, 3/8"-16 x 2 3/4"
	G10210	1	Washer, 3/8" USS
	G10108	1	Lock Nut, 3/8"-16
17.	GA6972	1	Drop Tube, R.H., Dry Fertilizer <b>(Sub GA10048)</b>
	GA6973	-	Drop Tube, L.H., Dry Fertilizer <b>(Sub GA10047)</b> (Shown)
18.	G10043	2	Hex Head Cap Screw, 5/16"-18 x 3/4"
	G10232	2	Lock Washer, 5/16"
	G10219	2	Washer, 5/16" USS
19.	GA8398	1	Drop Tube, R.H., Liquid Fertilizer
	GA8399	-	Drop Tube, L.H., Liquid Fertilizer (Shown)
20.	GD1132	1	Dust Cap
21.	G10013	1	Hex Head Cap Screw, 5/8"-11 x 3 1/2"
22.	GA5654	1	Hub W/Bearings
	GA2014	-	Bearing
23.	GD9934	1	Disc Blade, Notched, 16 3/4"
24.	G10886	6	Truss Head Bolt, 5/16"-18 x 1"
	G10106	6	Hex Nut, 5/16"-18
25.	G10007	1	Hex Head Cap Screw, 5/8"-11 x 1 1/2"
	G10230	1	Lock Washer, 5/8"
	G10217	1	Washer, 5/8" USS
26.	G10438	1	Hex Head Cap Screw, 1/2"-13 x 3/4"
27.	G10476	3-4	Spring Pin, 3/8" x 2 1/4"
28.	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
29.	GA8983	-	Check Valve, Low Rate

# NOTCHED SINGLE DISC FERTILIZER OPENER

FOC018(FRTZ209o/FRTZ208)

## STYLE B



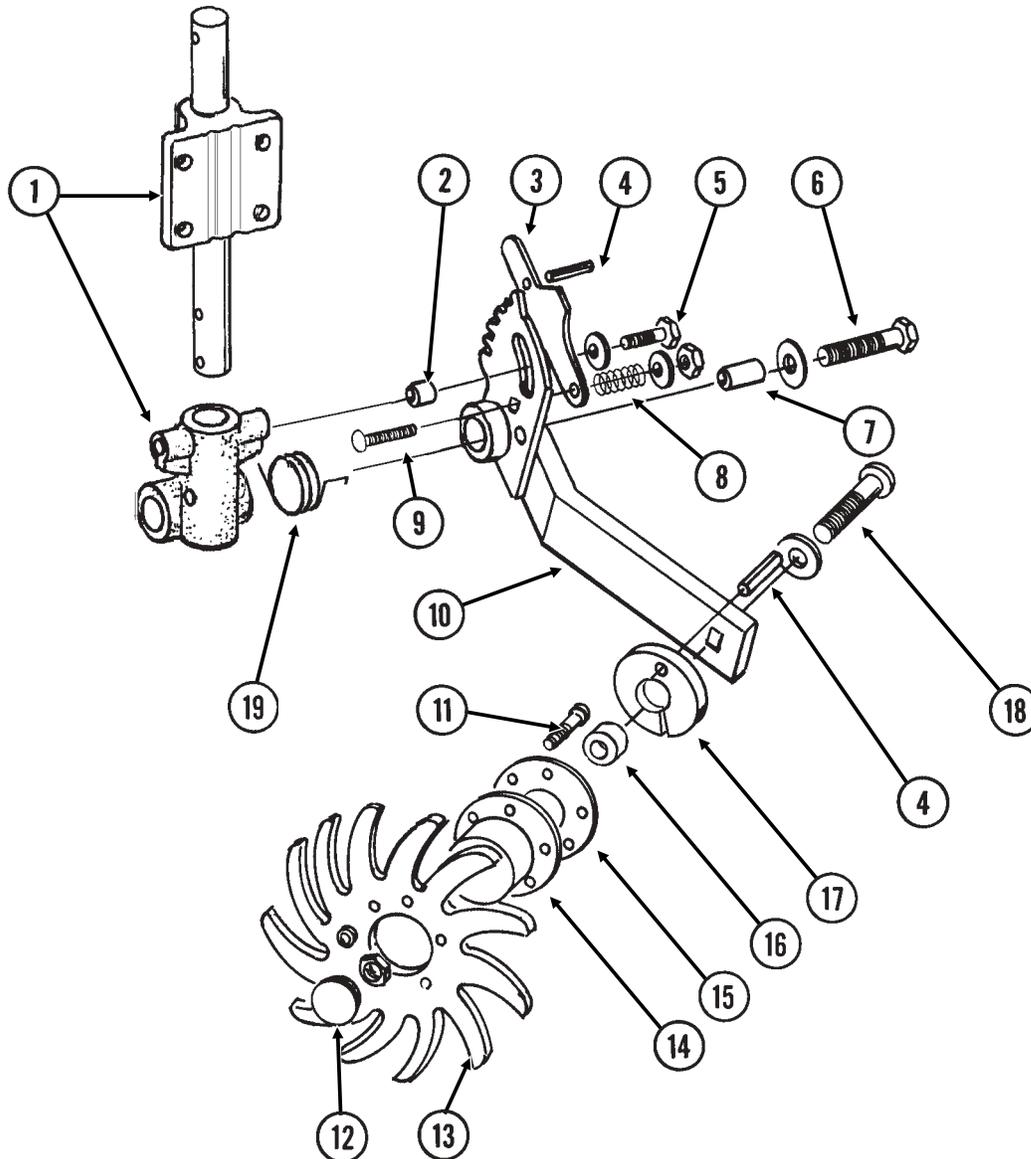
# NOTCHED SINGLE DISC FERTILIZER OPENER

ITEM	PART NO.	QTY.	DESCRIPTION
(Per Assy.)			
1.	G10017	3	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10102	3	Hex Nut, 1/2"-13
2.	GB0297	1	Mount
3.	GB0296	1	Arm, 13 1/2"
4.	G10640	1	Grease Fitting, 1/4"-28
5.	GD12685	1	Bushing, 3/4" O.D. x 1/2" Long
6.	GA6966	1	Compression Spring Assembly
7.	G10047	1	Hex Head Cap Screw, 3/8"-16 x 1 3/4"
	G10210	2	Washer, 3/8" USS
	G10108	1	Lock Nut, 3/8"-16
8.	GD1026	1	Sleeve, 1 3/16" Long
9.	GA9433	1	Pivot Arm, L.H. (Shown)
	GA9434	-	Pivot Arm, R.H.
10.	GD11557	1	Scraper, L.H. (Shown)
	GD11558	-	Scraper, R.H.
11.	G10002	6	Hex Head Cap Screw, 3/8"-16 x 3/4"
12.	G10306	3	Carriage Bolt, 3/8"-16 x 2"
	G10108	3	Lock Nut, 3/8"-16
13.	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	-	Double Row Bearing
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.	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
21.	GB0249	1	Knife, L.H. (Shown)
	GB0248	-	Knife, R.H.
22.	GA8399	-	Drop Tube, L.H., Liquid Fertilizer (Shown)
	GA8398	1	Drop Tube, R.H., Liquid Fertilizer
23.	GA9461	1	Knife/Drop Tube, L.H., Liquid Fertilizer (Shown)
	GA9462	1	Knife/Drop Tube, R.H., Liquid Fertilizer <b>(Sub GA8399 And GB0249)</b>
24.	GA10047	-	Drop Tube, L.H., Dry Fertilizer (Shown)
	GA10048	1	Drop Tube, R.H., Dry Fertilizer
25.	GA8983	-	Check Valve, Low Rate

# RESIDUE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER

DFC024(FRTZ165i)

FOR USE WITH STYLE A  
NOTCHED SINGLE DISC FERTILIZER OPENER



# RESIDUE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER

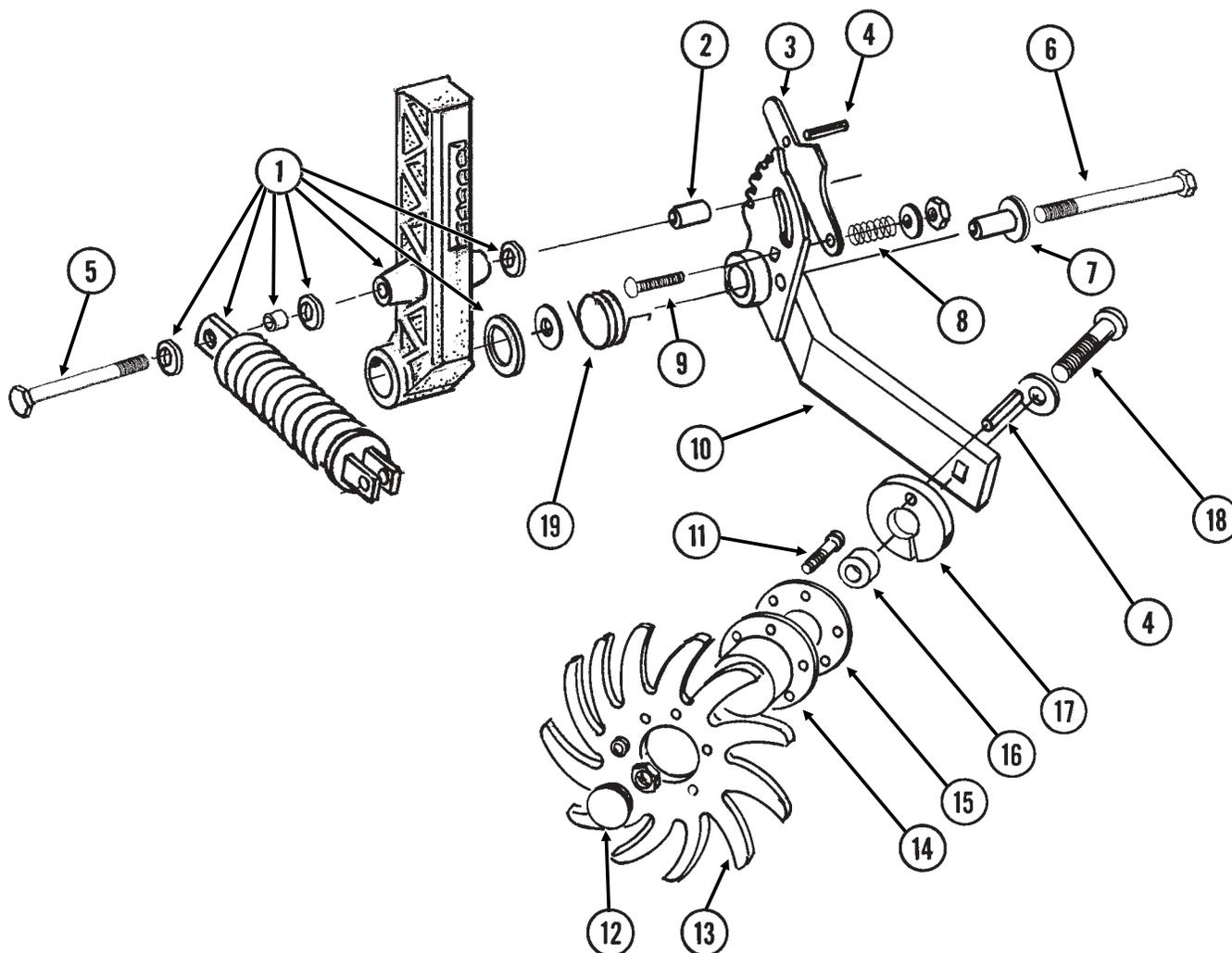
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ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.		-	See "Notched Single Disc Fertilizer Opener", Pages P84 And P85
2.	GD11053	1	Bushing, $\frac{7}{8}$ " Long
3.	GD11178	1	Adjustment Lever
4.	G10603	2	Spring Pin, $\frac{1}{4}$ " x $1\frac{1}{4}$ "
5.	G10919	1	Self-Locking Hex Head Cap Screw, $\frac{1}{2}$ "-13 x $1\frac{3}{4}$ "
	G10216	1	Washer, $\frac{1}{2}$ " USS
6.	G10920	1	Self-Locking Hex Head Cap Screw, $\frac{5}{8}$ "-11 x $3\frac{1}{2}$ "
	GD7805	1	Special Washer, $\frac{5}{8}$ ", Hardened
7.	GD11358	1	Hardened Bushing, $2\frac{1}{8}$ " Long
8.	GD7962	1	Spring
9.	G10306	1	Carriage Bolt, $\frac{3}{8}$ "-16 x 2"
	G10203	1	Washer, $\frac{3}{8}$ " SAE
	G10108	1	Lock Nut, $\frac{3}{8}$ "-16
10.	GA7999	1	Mount W/Grease Fitting, L.H. (Shown)
	GA7998	-	Mount W/Grease Fitting, R.H.
	G10640	-	Grease Fitting, $\frac{1}{4}$ "-28
11.	G10133	6	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x $1\frac{1}{2}$ "
	G10109	6	Lock Nut, $\frac{5}{16}$ "-18
12.	GD1132	2	Dust Cap
13.	GD10552	2	Wheel, 12 Tine, $\frac{3}{8}$ " x 12"
14.	GA5654	1	Hub W/Bearings
	GA2014	-	Bearing
15.	GD9724	1	Backing Plate
16.	GD7817-04	1	Spacer, $\frac{11}{16}$ " I.D. x $\frac{1}{2}$ " Long
17.	GD11188	1	Spacer
18.	G10908	1	Carriage Bolt, $\frac{5}{8}$ "-11 x 3"
	G10503	1	Hex Jam Nut, $\frac{5}{8}$ "-11, Grade 2
19.	GD11265	1	Spring, L.H. (Shown)
	GD11266	-	Spring, R.H.
A.	GA7445	-	Wheel Assembly, 12 Tine, L.H. (Items 11 And 13-15)(Shown)
	GA7446	-	Wheel Assembly, 12 Tine, R.H. (Items 11 And 13-15)

# RESIDUE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER

DFC024(FRTZ165)

FOR USE WITH STYLE B  
NOTCHED SINGLE DISC FERTILIZER OPENER



# RESIDUE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER

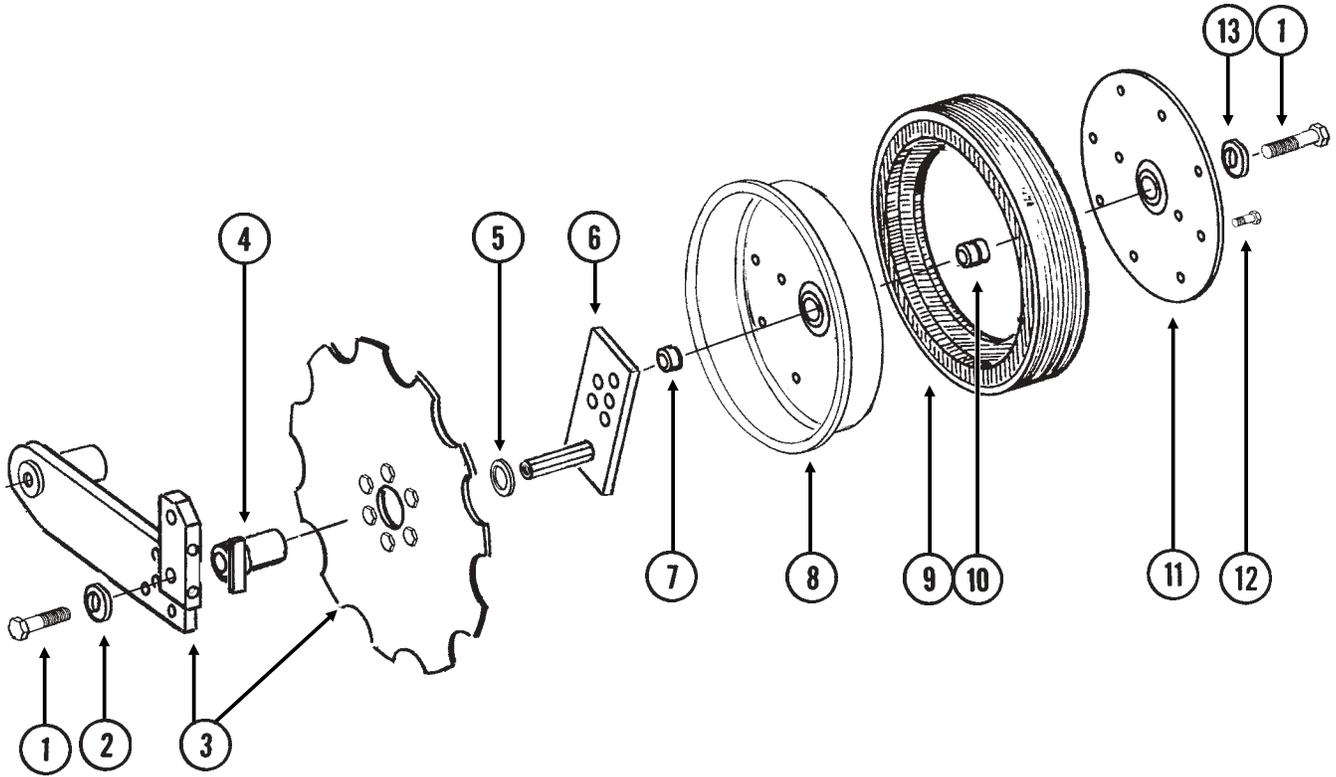
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ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
1.		-	See "Notched Single Disc Fertilizer Opener", Pages P86 And P87
2.	GD12684	1	Bushing, 1 1/3" Long
3.	GD11178	1	Adjustment Lever
4.	G10603	2	Spring Pin, 1/4" x 1 1/4"
5.	G11034	1	Hex Head Cap Screw, 1/2"-13 x 7"
	G10111	1	Lock Nut, 1/2"-13
6.	G10830	1	Hex Head Cap Screw, 5/8"-11 x 7 1/2"
	GD7805	1	Special Washer, 5/8", Hardened
	G10107	1	Lock Nut, 5/8"-11
7.	GD11836	1	Sleeve, 2 1/8" Long
8.	GD7962	1	Spring
9.	G10306	1	Carriage Bolt, 3/8"-16 x 2"
	G10203	1	Washer, 3/8" SAE
	G10108	1	Lock Nut, 3/8"-16
10.	GA7999	1	Mount W/Grease Fitting, L.H. (Shown)
	GA7998	-	Mount W/Grease Fitting, R.H.
	G10640	-	Grease Fitting, 1/4"-28
11.	G10133	6	Hex Head Cap Screw, 5/16"-18 x 1 1/2"
	G10109	6	Lock Nut, 5/16"-18
12.	GD1132	2	Dust Cap
13.	GD10552	2	Wheel, 12 Tine, 3/8" x 12"
14.	GA5654	1	Hub W/Bearings
	GA2014	-	Bearing
15.	GD9724	1	Backing Plate
16.	GD7817-04	1	Spacer, 11/16" I.D. x 1/2" Long
17.	GD11188	1	Spacer
18.	G10908	1	Carriage Bolt, 5/8"-11 x 3"
	G10503	1	Hex Jam Nut, 5/8"-11, Grade 2
19.	GD11265	1	Spring, L.H. (Shown)
	GD11266	-	Spring, R.H.
A.	GA7445	-	Wheel Assembly, 12 Tine, L.H. (Items 11 And 13-15)(Shown)
	GA7446	-	Wheel Assembly, 12 Tine, R.H. (Items 11 And 13-15)

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

(FRTZ209d)

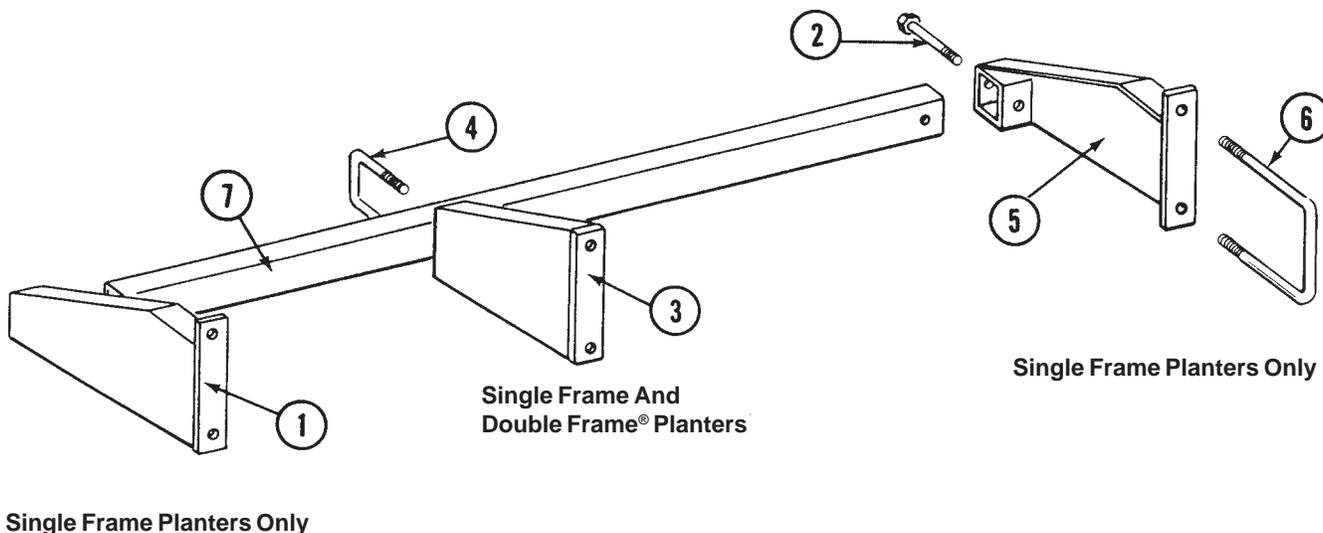
FOR USE WITH STYLE B  
NOTCHED SINGLE DISC FERTILIZER OPENER



ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	G10010	2	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 3"
2.	GD7805	1	Special Washer, $\frac{5}{8}$ ", Hardened
3.		-	See "Notched Single Disc Fertilizer Opener", Pages P89 And P87
4.	GA9472	1	Blade Mount
5.	G10233	1	Machine Bushing, 1", 10 Gauge
6.	GA9473	1	Wheel Mount
7.	GD13309	1	Spacer
8.	GD11423	1	Half Wheel
9.	GD11953	1	Offset Tire
10.	GA6171	1	Bearing
11.	GD11954	1	Half Wheel Cover, Nylon
12.	G10961	11	Flanged Whiz-Lock Screw, $\frac{5}{16}$ "-18 x $\frac{3}{4}$ ", No Serration
	G10620	11	Flange Nut, $\frac{5}{16}$ "-18
13.	G10204	1	Special Machine Bushing, $\frac{5}{8}$ " x 1" O.D.
A.	GA8877	-	Gauge Wheel Complete (Items 8-12)

# FERTILIZER OPENER MOUNTING BAR (Double Disc And Notched Single Disc Fertilizer Openers)

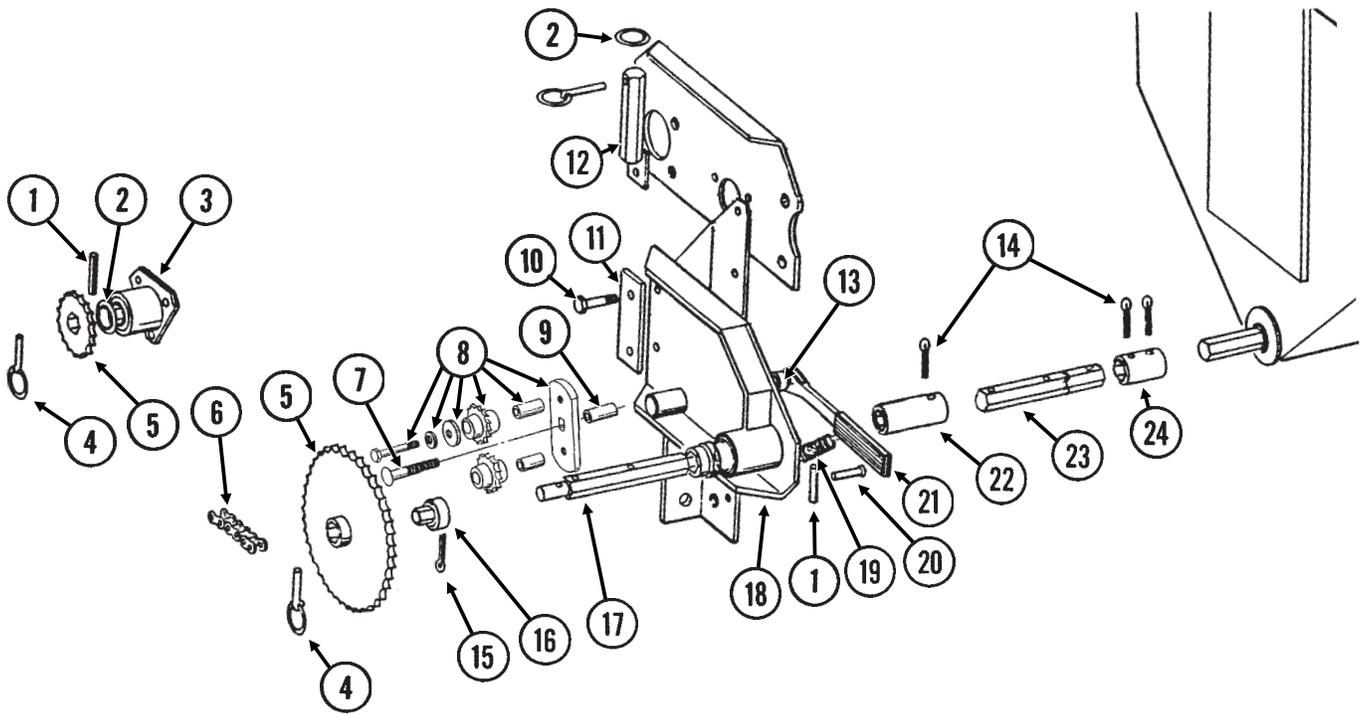
FOC008(PT28)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA5231	1	Support, L.H., Single Frame Planters Only
2.	G10035	2	Hex Head Cap Screw, 1/2"-13 x 4"
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
3.	GA5237	1	Support, 19" Long, L.H. (Shown), 8 Row 30" Single Frame Planters
	GA5236	1	Support, 19" Long, R.H., 8 Row 30" Single Frame Planters
	GA9431	1	Support, 18 1/8" Long, L.H., 8 Row 30" Double Frame® Planters
	GA9430	1	Support, 18 1/8" Long, R.H., 8 Row 30" Double Frame® Planters
4.	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
5.	GA5230	1	Support, R.H., Single Frame Planters Only
6.	GD1114	2	U-Bolt, 7" x 7" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
7.	GD1685-14	1	Toolbar, 2 1/2" x 2 1/2" x 105", 4 Row 30"
	GD1685-15	-	Toolbar, 2 1/2" x 2 1/2" x 129", 4 Row 36"/38"
	GD1685-13	-	Toolbar, 2 1/2" x 2 1/2" x 165", 6 Row 30"
	GD1685-12	-	Toolbar, 2 1/2" x 2 1/2" x 205", 6 Row 36"/38"
	GD1685-16	-	Toolbar, 2 1/2" x 2 1/2" x 225", 8 Row 30"
A.	G6795X	-	Support Bundle (Items 1, 2, 4, 5 And 6)

# DRY FERTILIZER TRANSMISSION ASSEMBLY

DFC008rev(PT29d)

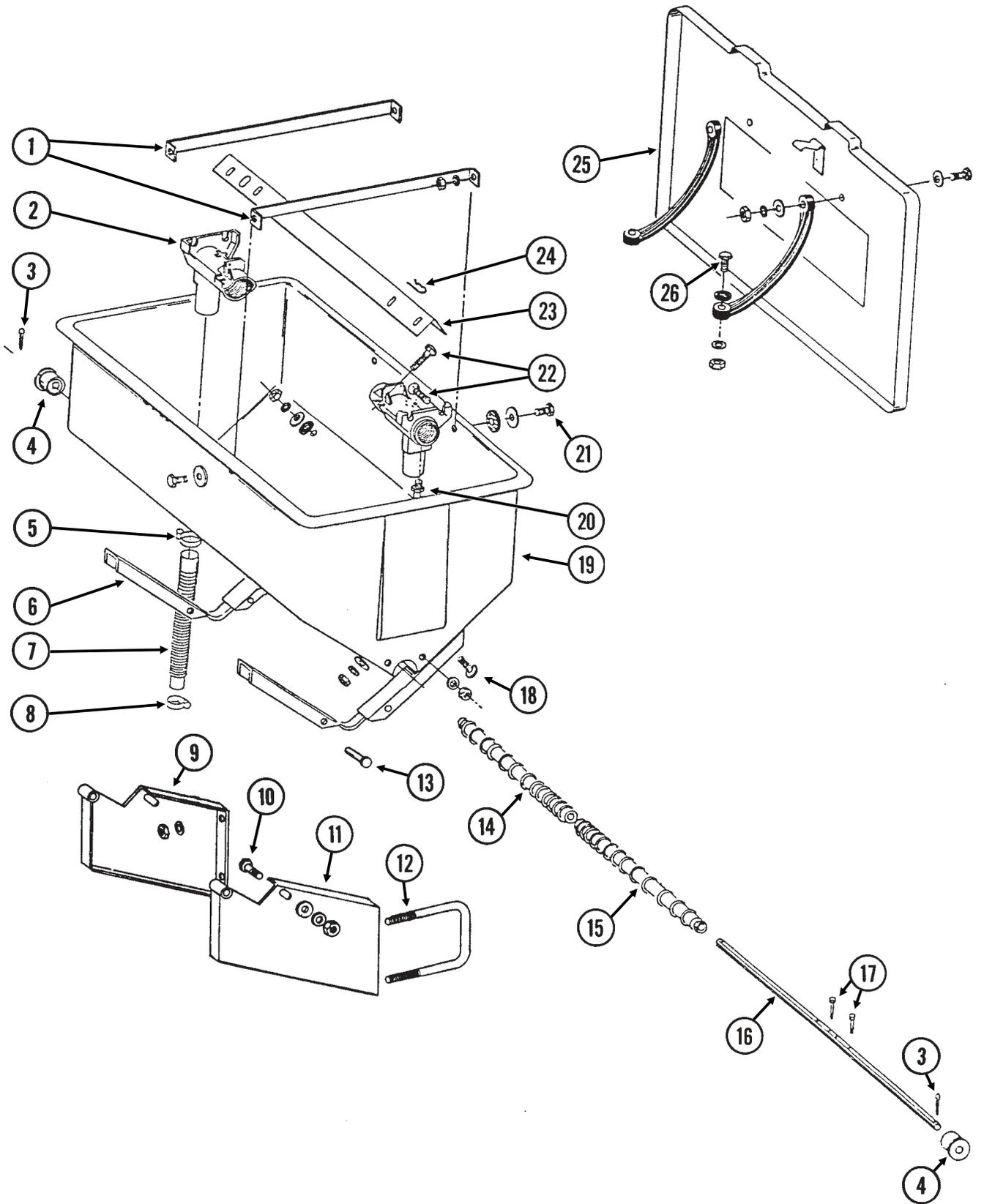


# DRY FERTILIZER TRANSMISSION ASSEMBLY

ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10602	2	Spring Pin, 1/4" x 1 1/2"
2.	G10233	2	Machine Bushing, 1", 10 Gauge
3.	GA5223	1	Spacer W/Bearing
	GA5116	-	Bearing, 7/8" Hex Bore, Cylindrical
4.	GD2558	3	Lynch Pin, 1/4"
5.	GA5105	1	Sprocket, 15 Tooth
	GA5107	1	Sprocket, 19 Tooth
	GA5114	1	Sprocket, 30 Tooth
	GA5115	1	Sprocket, 33 Tooth
	GA6337	1	Sprocket, 35 Tooth
6.	G3310-98	1	Chain, No. 40, 98 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
7.	G10419	1	Carriage Bolt, 1/2"-13 x 4 1/2"
	G10111	1	Lock Nut, 1/2"-13
8.	GA7336	1	Idler W/Bolt-On Sprockets
	GD7426	-	Sprocket, 12 Tooth
	GD1026	-	Sleeve, 1 3/16" Long
	G10210	-	Washer, 3/8" USS
	G10229	-	Lock Washer, 3/8"
	G10047	-	Hex Head Cap Screw, 3/8"-16 x 1 3/4"
9.	GD3180-17	1	Sleeve, 5/8" I.D. x 7/8" O.D. x 2 5/16" Long
10.	G10053	2	Hex Head Cap Screw, 1/2"-13 x 2 1/2"
	G10585	1	Hex Head Cap Screw, 1/2"-13 x 3 1/4"
	G10033	1	Hex Head Cap Screw, 1/2"-13 x 3 1/2"
	G10016	2	Hex Head Cap Screw, 1/2"-13 x 2"
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
11.	GD8246	1	Overlay
12.	GA5229	1	Sprocket Storage Rod
13.	GD10161	1	Spacer, 3/8"
14.	G10460	-	Cotter Pin, 1/4" x 2"
15.	G10462	1	Cotter Pin, 3/16" x 2"
16.	GD7127	1	Shear Coupler
17.	GD7870	1	Shaft, 7"
18.	GA5678	1	Plate W/Bearings And Grease Fitting
	GA5116	-	Bearing, 7/8" Hex Bore, Cylindrical
	GA5624	-	Special Bearing, 7/8" Hex Bore x 1.6"
	G10640	-	Grease Fitting, 1/4"-28
19.	GD5857	1	Spring
20.	G10408	1	Clevis Pin, 5/16" x 3/4"
	G10409	1	Retaining Ring, 5/16"
21.	GA4235	1	Ratchet Arm W/Protective Closure
	G10445	-	Protective Closure
22.	GD7867	-	Coupler, 3", 4 Row 36"/38" And 6 Row 36"/38" Only
23.	GD7871	-	Hex Shaft, 7/8" x 6" (3 Holes), 4 Row 36"/38" And 6 Row 36"/38" Only
24.	GD5886	-	Coupler, 1 3/4"

# DRY FERTILIZER HOPPER AND MOUNTS

DFC009/DFC014/DFC018(PT30a)



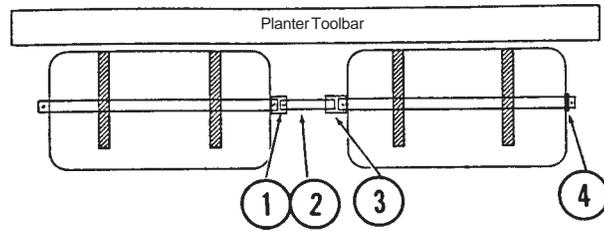
# DRY FERTILIZER HOPPER AND MOUNTS

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Hopper)	
1.	GD1209	2	Strap
2.	GD1200	2	Outlet Housing
3.	G10460	2	Cotter Pin, 1/4" x 2"
4.	GB0200	2	Bearing
5.	G10676	2	Hose Clamp, No. 36
6.	GA5652	2	Saddle
7.	GD3790	2	Rubber Tube
8.	G10672	2	Hose Clamp, No. 28
9.	GA0864	1	Hopper Mount, R.H.
10.	G10037	2	Hex Head Cap Screw, 1/2"-13 x 1 1/4"
	G10206	2	Washer, 1/2" SAE
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
11.	GA0863	1	Hopper Mount, L.H.
12.	GD1114	2	U-Bolt, 7" x 7" x 5/8"-11
	G10177	-	Hex Head Cap Screw, 5/8"-11 x 9 1/2"
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
13.	G10561	2	Clevis Pin, 1/2" x 3"
	G10451	2	Cotter Pin, 1/8" x 1"
14.	GB0198	1	Auger, R.H.
15.	GB0199	1	Auger, L.H.
16.	GD7848	1	Shaft
17.	G10587	2	Hex Head Cap Screw, 1/4"-20 x 2", Stainless Steel
	G10588	2	Hex Nut, 1/4"-20, Stainless Steel
18.	G10303	8	Carriage Bolt, 5/16"-18 x 1"
	G10201	8	Special Washer, 3/8" x 1 1/2" O.D.
	GD1213	8	Rubber Washer
	G10232	8	Lock Washer, 5/16"
	G10106	8	Hex Nut, 5/16"-18
19.	GD1379	1	Hopper
20.	G10641	2	Grease Fitting, 1/8" NPT
21.	G10171	4	Hex Head Cap Screw, 5/16"-18 x 1 1/4"
	G10201	4	Special Washer, 3/8" x 1 1/2" O.D.
	GD1213	4	Rubber Washer
	G10232	4	Lock Washer, 5/16"
	G10106	4	Hex Nut, 5/16"-18
22.	G10303	8	Carriage Bolt, 5/16"-18 x 1"
	G10219	8	Washer, 5/16" USS
	G10232	8	Lock Washer, 5/16"
	G10106	8	Hex Nut, 5/16"-18
23.	GD1207	1	Baffle
24.	G10670	2	Hair Pin Clip, No. 3
25.	GA0898	1	Lid W/Retainers, Clips, Rivets, Rubber Straps And Hardware
	GD1380	-	Front Clip
	GD2412	-	Rear Retainer
	G10655	-	Rivet, 3/16" x 13/32"
	GD1210	-	Rubber Strap
	G10171	-	Hex Head Cap Screw, 5/16"-18 x 1 1/4"
	G10219	-	Washer, 5/16" USS
	G10232	-	Lock Washer, 5/16"
	G10106	-	Hex Nut, 5/16"-18
26.	G10133	2	Hex Head Cap Screw, 5/16"-18 x 1 1/2"
	G10219	2	Washer, 5/16" USS
	G10232	2	Lock Washer, 5/16"
	G10106	2	Hex Nut, 5/16"-18
A.	GA5666	-	Hopper Sub-Assembly (Items 2,6,18,19, 22 And 24)
B.	GA5667	-	Hopper Hardware Box (Items 1, 3, 4, 14-17, 21, 23 And 26)

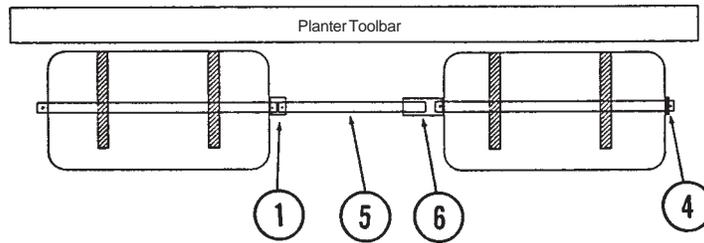
# DRY FERTILIZER COUPLERS/SHAFTS

RH101190(PT31/PT32/PT33/PT34/PT35)

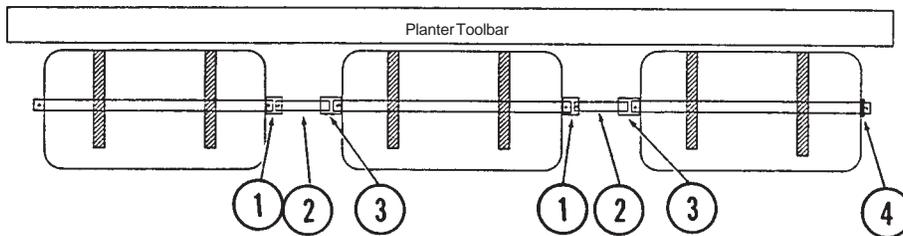
## 4 Row 30"



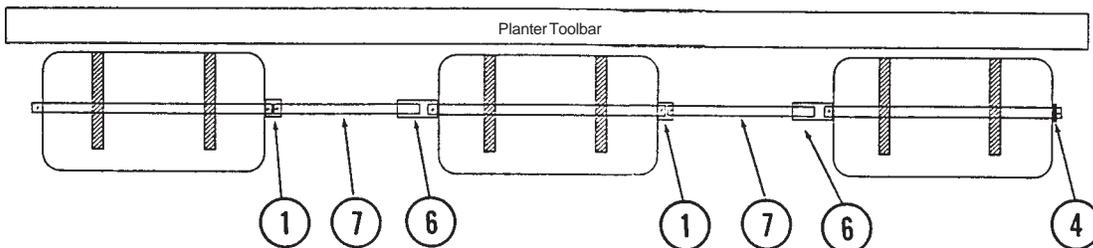
## 4 Row 36"/38"



## 6 Row 30"

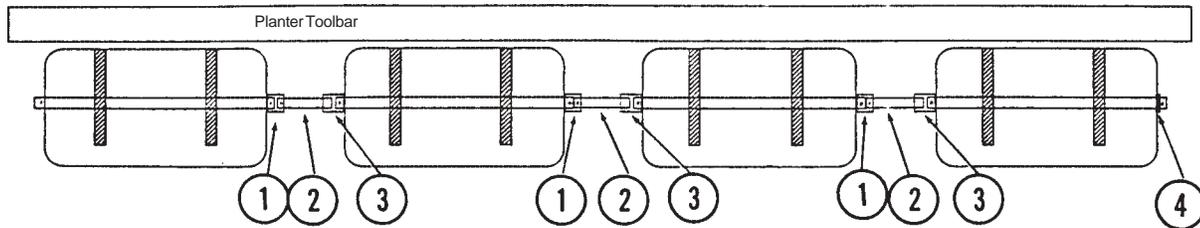


## 6 Row 36"/38"



# DRY FERTILIZER COUPLERS/SHAFTS

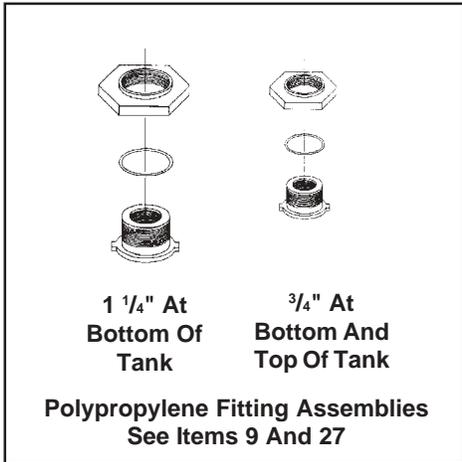
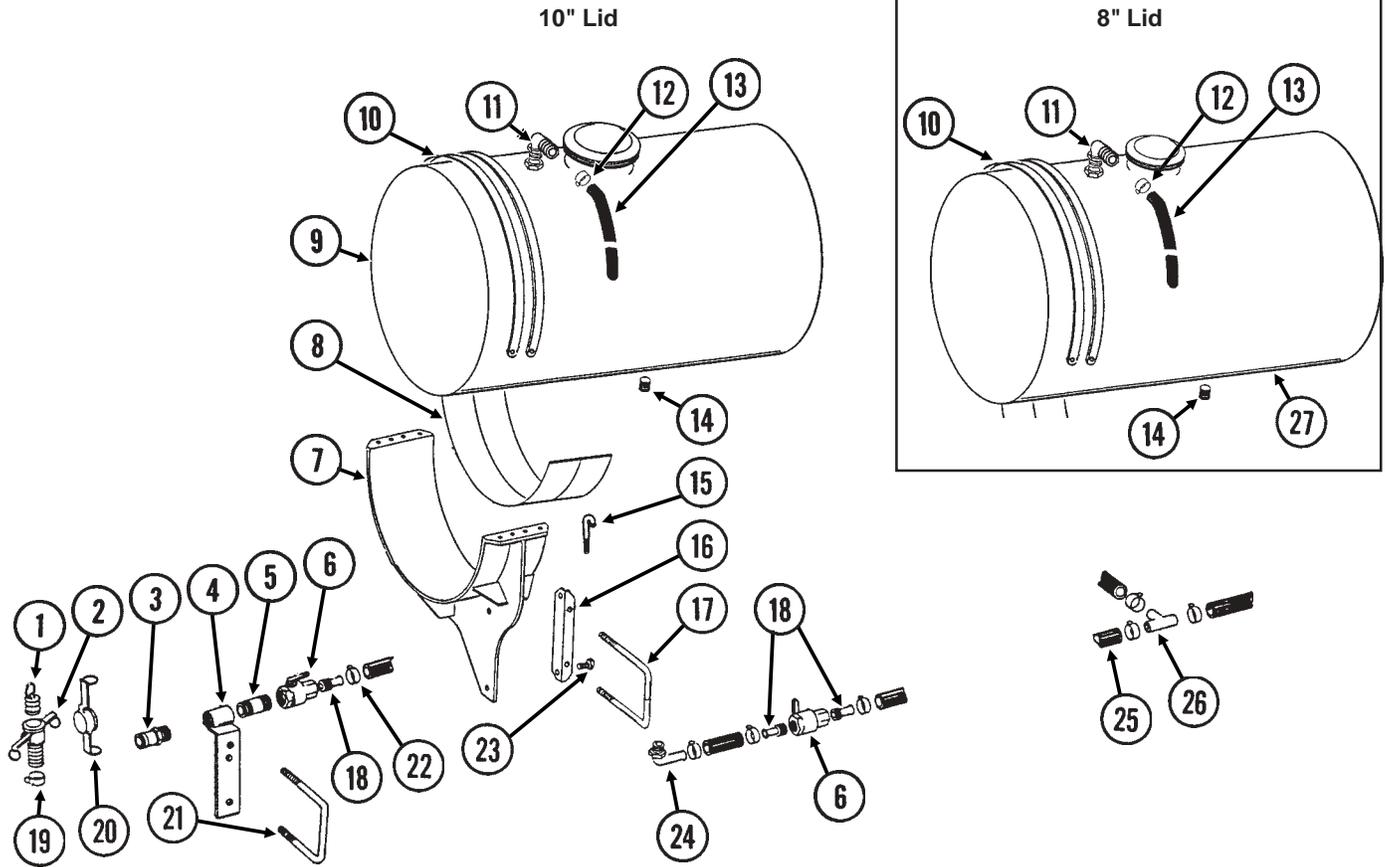
8 Row 30"



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD5886	-	Coupler, 1 3/4"
2.	GD2548-15.5	-	Hex Shaft, 7/8" x 15 1/2" (1 Hole)
3.	GD7867	-	Coupler, 3"
4.	G10233	2	Machine Bushing, 1", 10 Gauge
5.	GD2548-25.5	-	Hex Shaft, 7/8" x 25 1/2" (1 Hole)
6.	GD7868	-	Coupler, 7"
7.	GD2548-27.5	-	Hex Shaft, 7/8" x 27 1/2" (1 Hole)

# LIQUID FERTILIZER TANKS, SADDLES, MOUNTS, HOSES AND FITTINGS

LFC012rev(PT36d/PT36f/PT51)



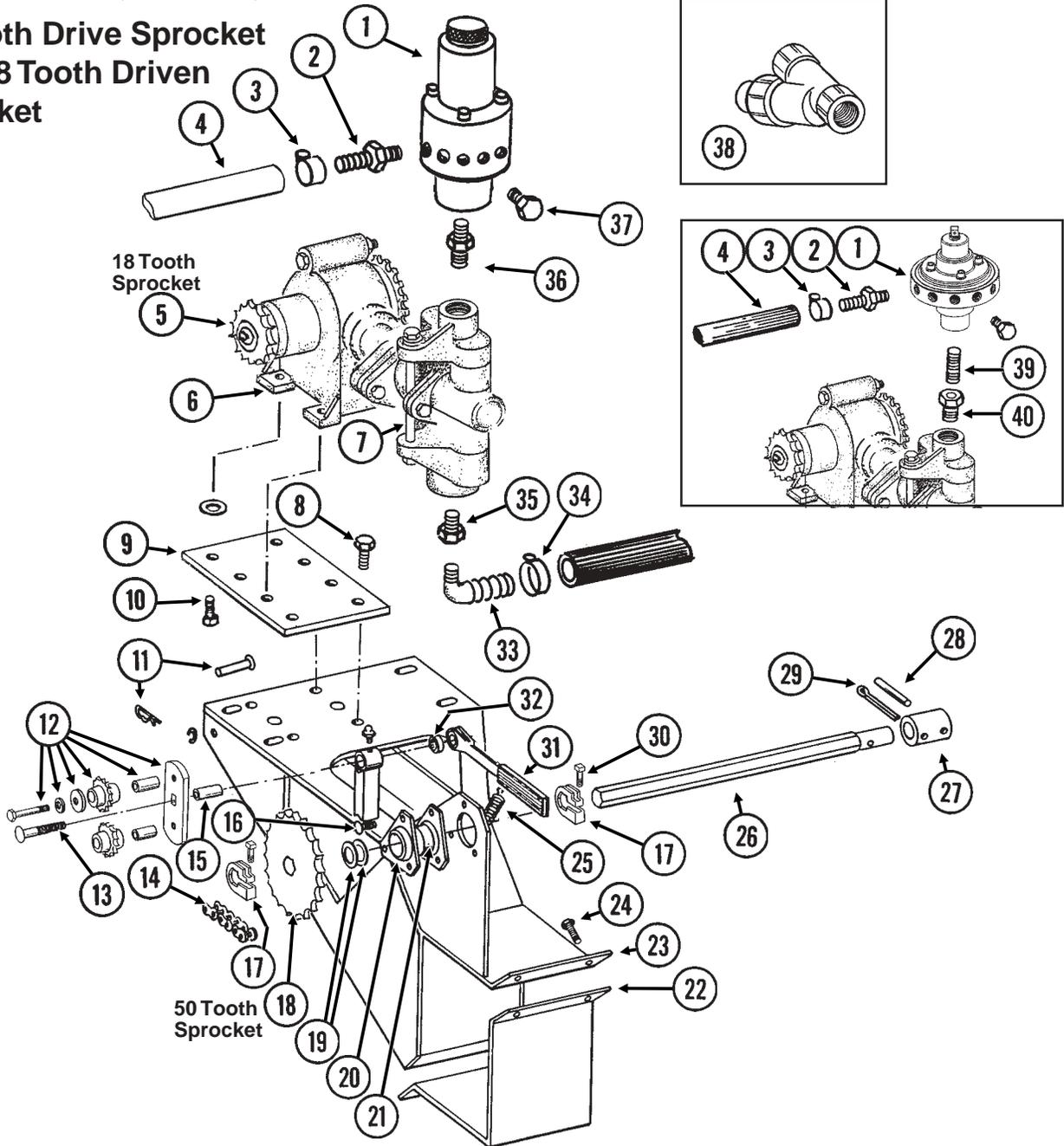
# LIQUID FERTILIZER TANKS, SADDLES, MOUNTS, HOSES AND FITTINGS

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD1517	1	Dust Plug, 1 1/4" Male Cam Lock
2.	GD1516	1	Adapter, 1 1/4" Barb To Female Cam Lock
3.	GD1514	1	Adapter, 1 1/4" Male NPT To Cam Lock
4.	GA5917	1	Quick Fill Mount
5.	G10619	1	Close Nipple, 1 1/4" NPT
6.	GA4976	-	Shutoff Valve, 1 1/4" NPT
	GR1015	-	Body O-Ring
	GR1016	-	Stem O-Ring
	GR1017	-	Teflon Seat
	GR1018	-	Ball
	GR1019	-	Handle
7.	GA7375	-	Tank Mount (2 Per Tank)
8.	GD1862	-	Pad, 8" x 14" (For Two 30" Tanks)
9.	GA5258	2	Tank W/Lid And Fittings, 30" x 110 Gallon, 4 Row
	GD1812	2	Tank W/Lid And Fittings, 30" x 150 Gallon, 6 And 8 Row
	GR1005	-	Fillwell, 10" (Top Of Tank)
	GR1006	-	Lid W/Removable Vent, 10" (Top Of Tank)
	GR1683	-	Vent
	GR0513	-	3/4" Polypropylene Fitting Assembly (Overflow Fitting, Nut, Bushing And O-Ring) (Top And Bottom Of Tank)
	GR1397	-	Overflow Fitting
	GR0508	-	1 1/4" Polypropylene Fitting Assembly (Nut, Bushing And O-Ring) (Bottom Of Tank)
	GR1571	-	Strap W/Cap Rivet (Top Of Tank)
10.	GD1520	-	Band, 30"
11.	G10917	2	Elbow, 90°, 3/4" NPT To Barb
12.	G10278	2	Hose Clamp, No. 16
13.	G4205-11	1	Hose, 3/4" x 72" (1 Per Tank)
14.	G10096	-	Pipe Plug, 3/4" NPT
15.	GD1337	-	J-Bolt, 5/16"-18
	G10109	-	Lock Nut, 5/16"-18
16.	GD10110	-	Mounting Angle (2 Per Tank)
17.	GD1748	-	U-Bolt, 7" x 7" x 3/4"-10
	G10231	-	Lock Washer, 3/4"
	G10105	-	Hex Nut, 3/4"-10
18.	G10626	-	Adapter, 1 1/4" NPT To Barb
19.	G10672	1	Hose Clamp, No. 28
20.	GD1515	1	Dust Cap, 1 1/4" Cam Lock
21.	GD7145	1	U-Bolt, 7" x 7" x 1/2"-13
	GD11721	1	U-Bolt, 5" x 7" x 1/2"-13
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
22.	G10674	-	Hose Clamp, No. 24
23.	G10007	-	Hex Head Cap Screw, 5/8"-11 x 1 1/2"
	G10230	-	Lock Washer, 5/8"
	G10104	-	Hex Nut, 5/8"-11
24.	G10629	-	Elbow, 90°, 1 1/4" NPT To Barb
25.	G4200-01	1	Hose, 1 1/4" x 22', 4 Row
	G4200-02	-	Hose, 1 1/4" x 27', 6 Row
	G4200-03	-	Hose, 1 1/4" x 32', 8 Row
26.	G10633	-	Tee, 1 1/4" Barb
27.	GA9900	-	Tank W/Lid And Fittings, 30" x 110 Gallon, 4 Row
	GA9905	-	Tank W/Lid And Fittings, 30" x 150 Gallon, 6 And 8 Row
	GR1678	-	Lid W/Vent, 8" (Top Of Tank)
	GR0513	-	3/4" Polypropylene Fitting Assembly (Overflow Fitting, Nut, Bushing And O-Ring) (Top And Bottom Of Tank)
	GR1397	-	Overflow Fitting
	GR0508	-	1 1/4" Polypropylene Fitting Assembly (Nut, Bushing And O-Ring) (Bottom Of Tank)

# LIQUID FERTILIZER PISTON PUMP DRIVE

LFC009/LFC024/LFC026/LFC027(FRTZ160c/FRTZ31e)

## 50 Tooth Drive Sprocket And 18 Tooth Driven Sprocket



ITEM	PART NO.	QTY.	DESCRIPTION
1.		-	See "Liquid Fertilizer Piston Pump Flow Divider", Pages P108 And P109
2.	GD11700	-	Adapter, 1/4" NPT To 3/8" Barb
3.	G10681	-	Hose Clamp, No. 6
4.	G4301-01	1	Hose, 3/8" x 30', 4 Row
	G4301-03	-	Hose, 3/8" x 60', 6 Row
	G4301-04	-	Hose, 3/8" x 100', 8 Row
5.		-	See "Liquid Fertilizer Piston Pump W/18 Tooth Sprocket (Crankcase Assembly)", Pages P104 And P105
6.		-	See "Liquid Fertilizer Piston Pump W/18 Tooth Sprocket (Crankcase Assembly)", Pages P104 And P105
7.		-	See "Liquid Fertilizer Piston Pump W/18 Tooth Sprocket (Cylinder Assembly)", Pages P106 And P107
8.	G10004	4	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10229	4	Lock Washer, 3/8"
	G10101	4	Hex Nut, 3/8"-16
9.	GD11180	1	Plate

# LIQUID FERTILIZER PISTON PUMP DRIVE

ITEM	PART NO.	QTY.	DESCRIPTION
10.	G10003	4	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{1}{2}$ "
	G10210	4	Washer, $\frac{3}{8}$ " USS
	GR1122	4	Mounting Pad
	G10229	4	Lock Washer, $\frac{3}{8}$ "
	G10101	4	Hex Nut, $\frac{3}{8}$ "-16
11.	G10478	1	Clevis Pin, $\frac{5}{16}$ " x 1"
	G10409	1	Retaining Ring, $\frac{5}{16}$ "
	G10670	1	Hair Pin Clip, No. 3
12.	GA7336	1	Idler W/Bolt-On Sprockets
	GD7426	-	Sprocket, 12 Tooth
	GD1026	-	Sleeve, 1 $\frac{3}{16}$ " Long
	G10210	-	Washer, $\frac{3}{8}$ " USS
	G10229	-	Lock Washer, $\frac{3}{8}$ "
	G10047	-	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{3}{4}$ "
13.	G10865	1	Carriage Bolt, $\frac{1}{2}$ "-13 x 4"
	G10111	1	Lock Nut, $\frac{1}{2}$ "-13
14.	G3310-126	1	Chain, No. 40, 126 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
15.	GD3180-04	1	Sleeve, $\frac{5}{8}$ " I.D. x $\frac{7}{8}$ " O.D. x 2 $\frac{1}{8}$ " Long
16.	G10303	3	Carriage Bolt, $\frac{5}{16}$ "-18 x 1"
	G10232	3	Lock Washer, $\frac{5}{16}$ "
	G10106	3	Hex Nut, $\frac{5}{16}$ "-18
17.	GD11045	2	Lock Clamp
	G10130	-	Square Head Machine Bolt, $\frac{5}{16}$ "-18 x 1 $\frac{3}{4}$ "
	G10923	-	Flange Nut, $\frac{5}{16}$ "-18, No Serration
18.	GA5194	1	Sprocket, 50 Tooth
19.	G10233	2	Machine Bushing, 1", 10 Gauge
20.	G3400-01	2	Flangette
21.	G2100-03	1	Bearing, $\frac{7}{8}$ " Hex Bore, Spherical
22.	GD6182	1	Clamp
23.	GA6501	1	Drive Plate W/Grease Fitting
	G10641	-	Grease Fitting, $\frac{1}{8}$ " NPT
	G10640	-	Grease Fitting, $\frac{1}{4}$ "-28
24.	G10017	4	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 1 $\frac{1}{2}$ "
	G10228	4	Lock Washer, $\frac{1}{2}$ "
	G10102	4	Hex Nut, $\frac{1}{2}$ "-13
25.	GD5857	1	Spring
26.	GD5990	1	Shaft, 74"
27.	GD3839	1	Coupler, 2"
28.	G10602	1	Spring Pin, $\frac{1}{4}$ " x 1 $\frac{1}{2}$ "
29.	G10460	1	Cotter Pin, $\frac{1}{4}$ " x 2"
30.	G10130	-	Square Head Machine Bolt, $\frac{5}{16}$ "-18 x 1 $\frac{3}{4}$ "
	G10923	-	Flange Nut, $\frac{5}{16}$ "-18, No Serration
31.	GA4235	1	Ratchet Arm W/Protective Closure
	G10445	-	Protective Closure
32.	GD10161	1	Spacer, $\frac{3}{8}$ "
33.	G10629	1	Elbow, 90°, 1 $\frac{1}{4}$ " NPT To Barb
34.		-	See "Liquid Fertilizer Tanks, Saddles, Mounts, Hoses And Fittings", Pages P100 And P101
35.	G10615	1	Reducing Bushing, 1 $\frac{1}{2}$ " Male NPT To 1 $\frac{1}{4}$ " Female
36.	G10618	1	Close Nipple, 1" NPT
	G10926	-	Reducing Pipe Bushing, 1" Male NPT To $\frac{3}{4}$ "
37.	G10292	-	Pipe Plug, $\frac{1}{4}$ " NPT
38.	GA3893	1	Strainer Complete
	GR0880	-	Screen, No. 40 Mesh
	GR0881	-	Gasket
	GR0882	-	Y-Body
	GR0883	-	End Cap
39.	G10994	1	Close Nipple, $\frac{3}{4}$ " NPT, Stainless Steel
40.	G10995	1	Reducing Bushing, 1" Male NPT To $\frac{3}{4}$ " Female, Stainless Steel
A.	G1K269	-	Lock Clamp Kit (Items 17 And 30)



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

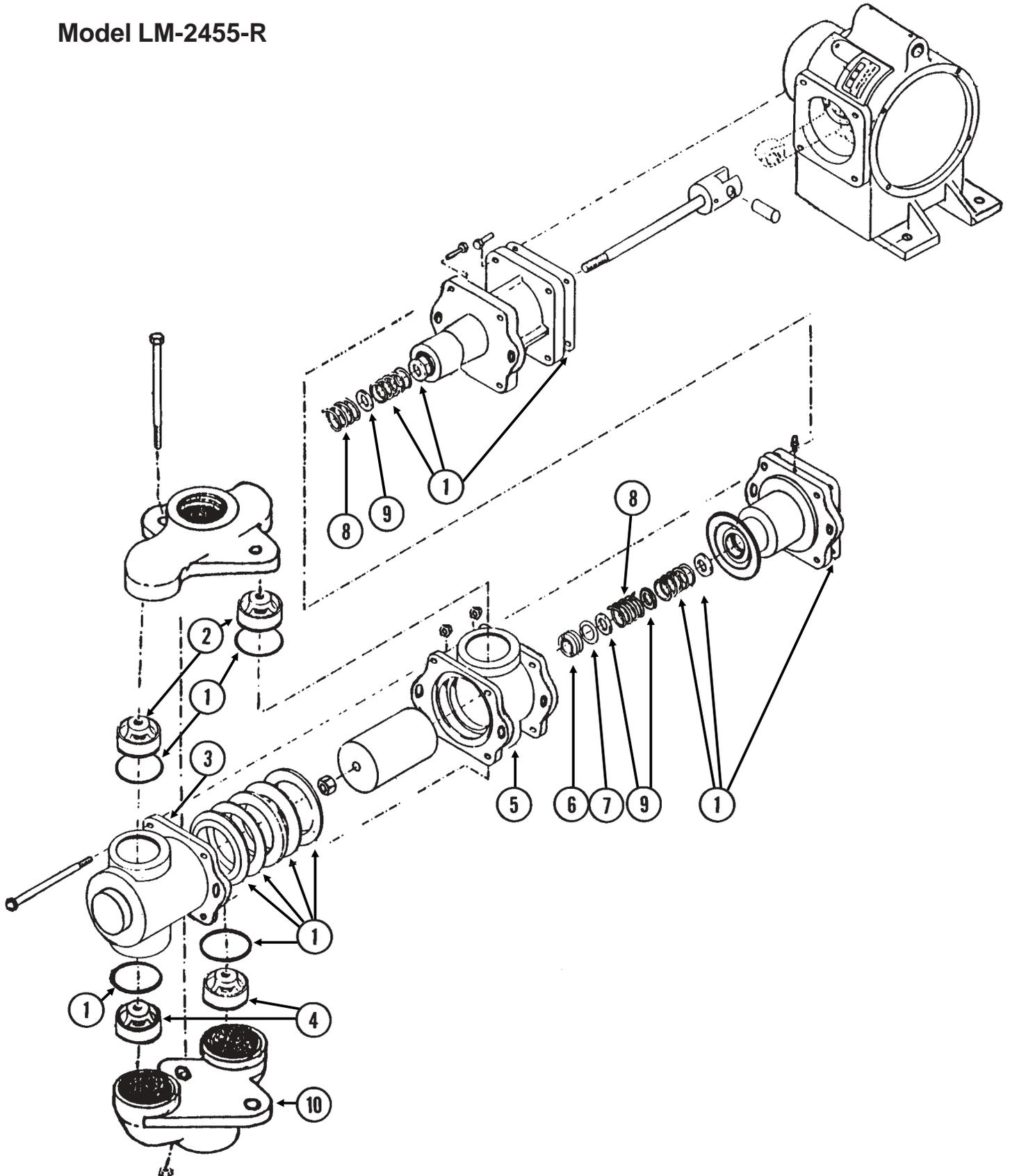
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ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1389	1	Sprocket, 18 Tooth
2.	G10688	2	Square Head Set Screw, $\frac{3}{8}$ "-16 x $\frac{5}{8}$ "
3.	GR1425	1	Repair Kit, Also Includes Item 1 On Pages P106 And P107
4.	GR1427	2	Bearing
5.	GR1420	1	Woodruff Key, $\frac{3}{8}$ "-16 x 1 $\frac{3}{4}$ "
6.	GR1167	1	Square Head Bolt, $\frac{3}{8}$ "-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 P102 And P103
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 P106 And P107

# 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

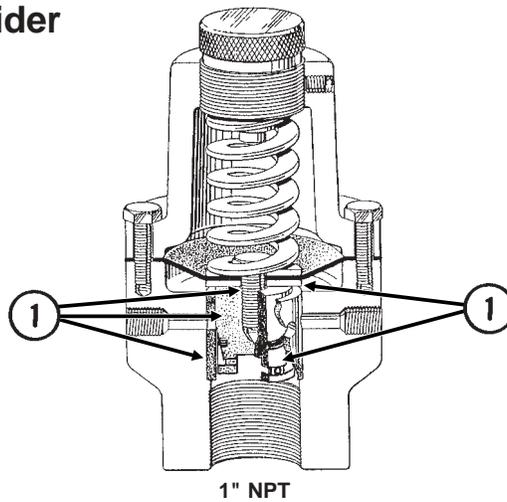
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ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1425	1	Repair Kit, Includes Item 3 On Pages P104 And P105
2.	GR1144	2	Discharge Valve
3.	GR1423	1	Outboard Cylinder
4.	GR1142	2	Suction Valve
5.	GR1422	1	Inboard Cylinder
6.	GR1134	1	Stuffing Box Insert
7.	GR1133	1	Retaining Ring
8.	GR1130	2	Packing Spring
9.	GR1129	3	Washer
10.	GR1451	1	Suction Manifold

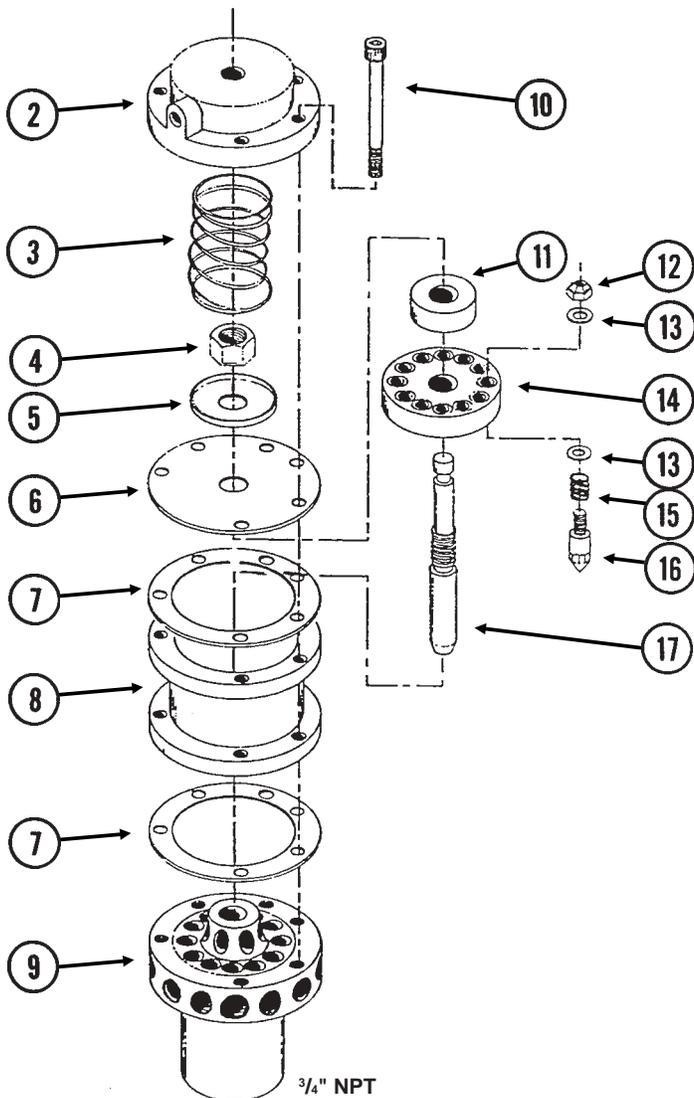
# LIQUID FERTILIZER PISTON PUMP FLOW DIVIDER

(FRTZ159/PT40a/FRTZ202c)

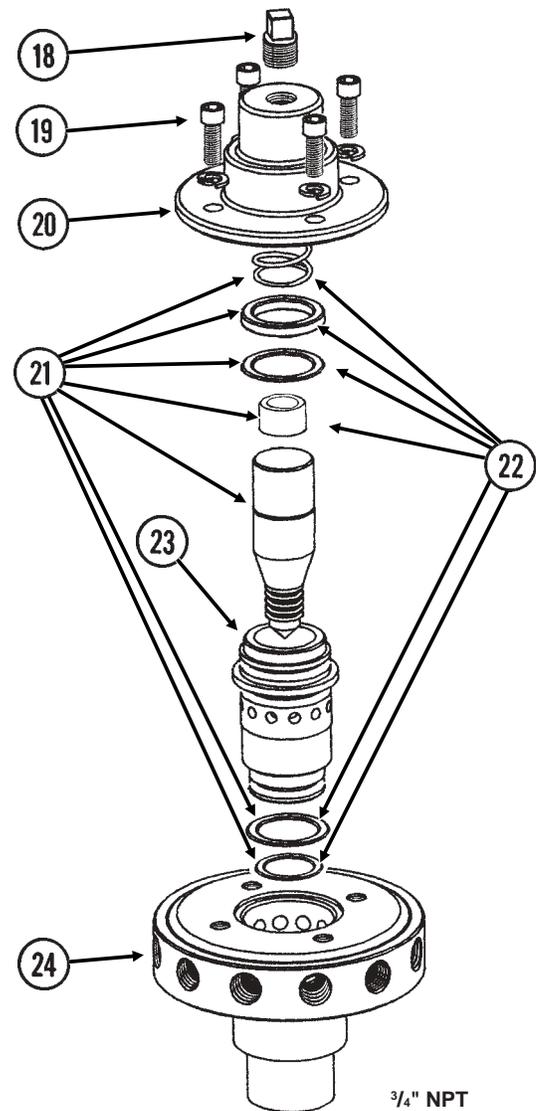
## Model 70-12 Flow Divider



## Model L-2190 Flow Divider



## Model FD-1200 Flow Divider



# LIQUID FERTILIZER PISTON PUMP FLOW DIVIDER

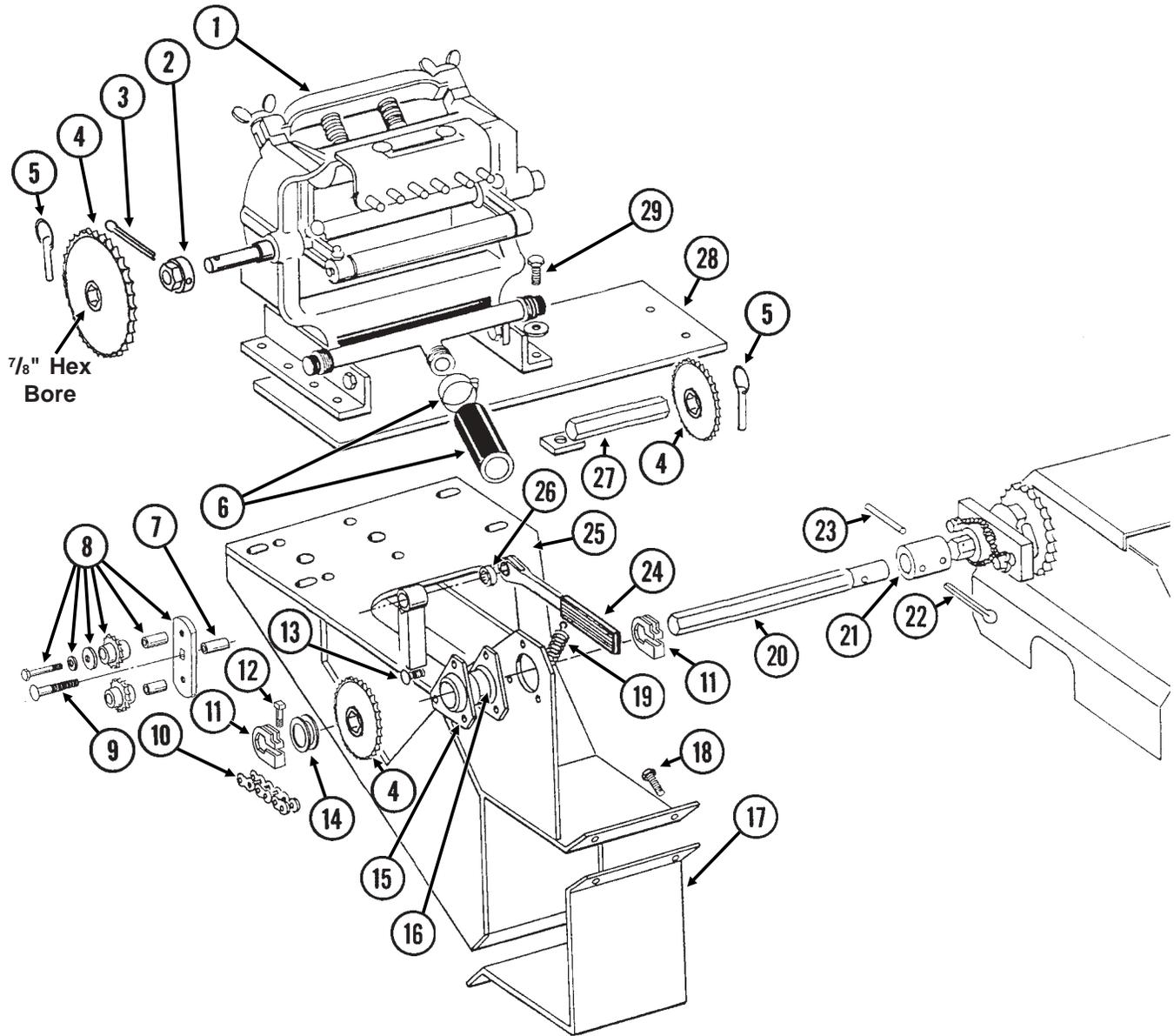
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ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1388	1	Repair Kit, Includes: (2) Washers, (1) Piston, (1) O-Ring, (1) Piston Bolt, (1) Piston Ring
2.	GR1150	1	Cap
3.	GR1151	1	Spring
4.	G10358	1	Hex Nut, 9/16"-18
5.	GR1152	1	Plate
6.	GR1153	1	Diaphragm
8.	GR1154	1	Housing
7.	GR1155	2	Gasket
9.	*	1	Manifold
10.	GR1157	6	Socket Screw, 1/4"-20
11.	GR1158	1	Lock
12.	*	12	Valve Nut
13.	*	24	Stainless Steel Washer
14.	*	1	Disk
15.	*	12	Spring
16.	*	12	Valve
17.	GR1162	1	Plunger
18.	GR1543	1	Plug
19.	GR1542	4	Hex Socket Head Screw, 1/4"-20 x 3/4", Stainless Steel
	GR1541	4	Lock Washer, 1/4", Stainless Steel
20.	GR1540	1	Cap
21.	GR1544	1	Needle Assembly W/Seal Kit (Item 22)
22.	GR1545	1	Seal Kit, Includes: (3) O-Rings, (1) Seal, (1) Spring, (1) Stainless Steel Sleeve
23.	GR1535	1	Sleeve
24.	GR1533	1	Body
A.	GA8068	1	Liquid Fertilizer Piston Pump Flow Divider Complete, 12 Outlet (Model 70-12 Or Model L-2190) <b>(Sub GA8931)</b>
B.	GA8931	1	Liquid Fertilizer Piston Pump Flow Divider Complete, 12 Outlet (Model FD-1200)

\* Factory calibration required on Model L-2190. Replacement not recommended. Always be sure timing marks on disk and manifold line up.

# LIQUID FERTILIZER SQUEEZE PUMP MOUNTING BRACKET AND DRIVE

LFC009/LFC027(PT45g)



ITEM	PART NO.	QTY.	DESCRIPTION
1.		-	See "Liquid Fertilizer Squeeze Pump", Pages P112-P114
2.	GD7127	1	Shear Coupler
3.	G10462	1	Cotter Pin, $\frac{3}{16}$ " x 2"
4.	GA5105	1	Sprocket, 15 Tooth
	GA5107	1	Sprocket, 19 Tooth
	GA6513	1	Sprocket, 32 Tooth
	GA5202	1	Sprocket, 34 Tooth
	GA6514	1	Sprocket, 46 Tooth
	GA6515	-	Sprocket, 62 Tooth (Optional)
5.	GD2558	2	Lynch Pin, $\frac{1}{4}$ "
6.		-	See "Liquid Fertilizer Tanks, Saddles, Mounts, Hoses And Fittings", Pages P100 And P101

# LIQUID FERTILIZER SQUEEZE PUMP MOUNTING BRACKET AND DRIVE

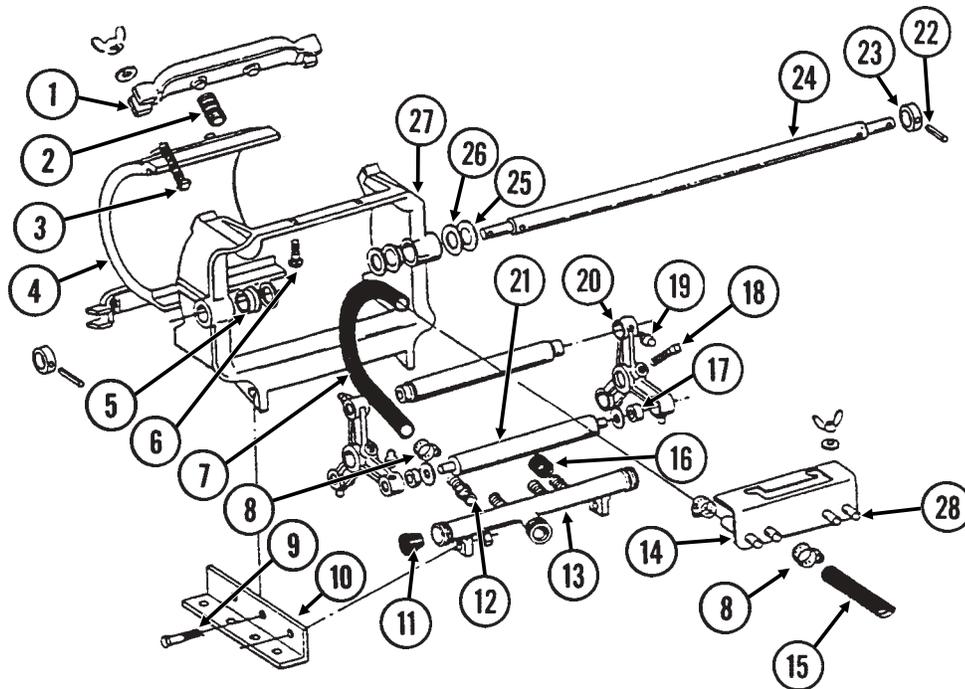
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ITEM	PART NO.	QTY.	DESCRIPTION
7.	GD3180-04	1	Sleeve, $\frac{5}{8}$ " I.D. x $\frac{7}{8}$ " O.D. x 2 $\frac{1}{8}$ " Long
8.	GA7336	1	Idler W/Bolt-On Sprockets
	GD7426	-	Sprocket, 12 Tooth
	GD1026	-	Sleeve, 1 $\frac{3}{16}$ " Long
	G10210	-	Washer, $\frac{3}{8}$ " USS
	G10229	-	Lock Washer, $\frac{3}{8}$ "
	G10047	-	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{3}{4}$ "
9.	G10865	1	Carriage Bolt, $\frac{1}{2}$ "-13 x 4"
	G10111	1	Lock Nut, $\frac{1}{2}$ "-13
10.	G3310-140	1	Chain, No. 40, 140 Pitch Including Connector
	GR0912	-	Connector Link, No. 40
11.	GD11045	2	Lock Clamp
12.	G10130	2	Square Head Machine Bolt, $\frac{5}{16}$ "-18 x 1 $\frac{3}{4}$ "
	G10923	2	Flange Nut, $\frac{5}{16}$ "-18, No Serration
13.	G10303	3	Carriage Bolt, $\frac{5}{16}$ "-18 x 1"
	G10232	3	Lock Washer, $\frac{5}{16}$ "
	G10106	3	Hex Nut, $\frac{5}{16}$ "-18
14.	G10233	-	Machine Bushing, 1", 10 Gauge
15.	G3400-01	2	Flangette
16.	G2100-03	1	Bearing, $\frac{7}{8}$ " Hex Bore, Spherical
17.	GD6182	1	Clamp
18.	G10017	4	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 1 $\frac{1}{2}$ "
	G10228	4	Lock Washer, $\frac{1}{2}$ "
	G10102	4	Hex Nut, $\frac{1}{2}$ "-13
19.	GD5857	1	Spring
20.	GD5988	-	Shaft, 36", 4 Row 30"/36"/38" And 6 Row 30"/36"/38"
	GD5990	-	Shaft, 74", 8 Row 30"
21.	GD3839	1	Coupler, 2"
22.	G10460	1	Cotter Pin, $\frac{1}{4}$ " x 2"
23.	G10602	1	Spring Pin, $\frac{1}{4}$ " x 1 $\frac{1}{2}$ "
24.	GA4235	1	Ratchet Arm W/Protective Closure
	G10445	-	Protective Closure
25.	GA6501	1	Drive Plate W/Grease Fitting
	G10641	-	Grease Fitting, $\frac{1}{8}$ " NPT
	G10640	-	Grease Fitting, $\frac{1}{4}$ "-28
26.	GD10161	1	Spacer, $\frac{3}{8}$ "
27.	GA5229	1	Sprocket Storage Rod
28.	GD6165	-	Plate, 8 Row 30" Only
29.	G10004	4	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{1}{4}$ "
	G10210	4	Washer, $\frac{3}{8}$ " USS
	G10229	4	Lock Washer, $\frac{3}{8}$ "
	G10101	4	Hex Nut, $\frac{3}{8}$ "-16
A.	G1K269	-	Lock Clamp Kit (Items 11 And 12)

# LIQUID FERTILIZER SQUEEZE PUMP

# 4 ROW

LFC011(PT46a)

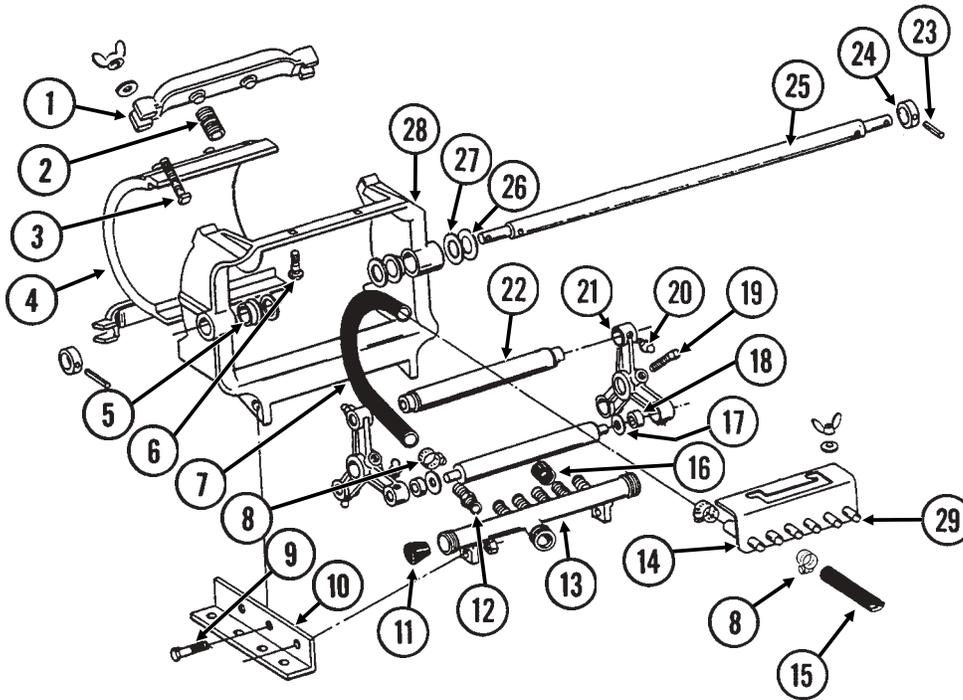


ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR0216	2	Spring Anchor Bar
2.	GR0214	4	Spring
3.	G10130	4	Square Head Machine Bolt, $\frac{5}{16}$ "-18 x 1 $\frac{3}{4}$ "
	G10219	4	Washer, $\frac{5}{16}$ " USS
	G10144	4	Wing Nut, $\frac{5}{16}$ "-18
4.	GR0212	1	Plate
5.	GR0207	2	Nylon Bushing
6.	G10303	2	Carriage Bolt, $\frac{5}{16}$ "-18 x 1"
	G10219	2	Washer, $\frac{5}{16}$ " USS
	G10144	2	Wing Nut, $\frac{5}{16}$ "-18
7.	GR0215	4	Metering Hose, $\frac{1}{2}$ " x 13"
8.	G10681	-	Hose Clamp, No. 6
9.	G10004	4	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{1}{4}$ "
	G10101	4	Hex Nut, $\frac{3}{8}$ "-16
10.	GR0213	2	Angle
11.	GR0217	2	Manifold Plug
12.	GR0232	4	Adapter
13.	GR0228	1	Intake Manifold
14.	GR1484	1	Discharge Manifold Less Hose Barbs
15.	G4301-01	1	Hose, $\frac{3}{8}$ " x 30'
16.	GR0211	2	Rubber Cap
17.	GR0227	6	Nylon Washer
18.	G10131	2	Square Head Set Screw, $\frac{5}{16}$ "-18 x $\frac{3}{4}$ "
19.	G10640	2	Grease Fitting, $\frac{1}{4}$ "-28
20.	GR0223	2	Roller Arm
21.	GR0209	3	Roller
22.	G10718	2	Spring Pin, $\frac{5}{16}$ " x 1 $\frac{1}{8}$ "
23.	GD9109	2	Sleeve
24.	GD9107	1	Shaft
25.	GR0226	2	Shim, $\frac{3}{64}$ "
26.	GR0225	2	Shim, $\frac{1}{32}$ "
27.	GR0208	1	Frame
28.	GR1577	4	Nylon Hose Barb, $\frac{1}{2}$ " x $\frac{3}{8}$ " (If Applicable)
A.	GA8690	-	Squeeze Pump Complete, 4 Row (Items 1-14, 16-21 And 24-28)

# LIQUID FERTILIZER SQUEEZE PUMP

# 6 ROW

LFC011/LFC011(PT47a)

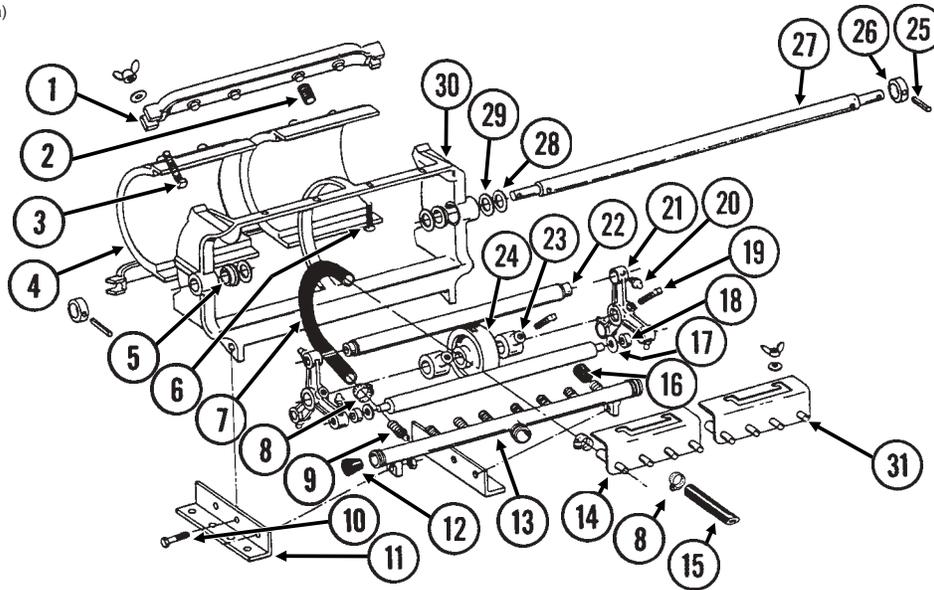


ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR0216	2	Spring Anchor Bar
2.	GR0214	4	Spring
3.	G10130	4	Square Head Machine Bolt, $\frac{5}{16}$ "-18 x $1 \frac{3}{4}$ "
	G10219	4	Washer, $\frac{5}{16}$ " USS
	G10144	4	Wing Nut, $\frac{5}{16}$ "-18
4.	GR0212	1	Plate
5.	GR0207	2	Nylon Bushing
6.	G10303	2	Carriage Bolt, $\frac{5}{16}$ "-18 x 1"
	G10219	2	Washer, $\frac{5}{16}$ " USS
	G10144	2	Wing Nut, $\frac{5}{16}$ "-18
7.	GR0215	6	Metering Hose, $\frac{1}{2}$ " x 13"
8.	G10681	-	Hose Clamp, No. 6
9.	G10004	4	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x $1 \frac{1}{4}$ "
	G10101	4	Hex Nut, $\frac{3}{8}$ "-16
10.	GR0213	2	Angle
11.	GR0217	2	Manifold Plug
12.	GR0232	6	Adapter
13.	GR0228	1	Intake Manifold
14.	GR1484	1	Discharge Manifold Less Hose Barbs
15.	G4301-03	1	Hose, $\frac{3}{8}$ " x 60'
16.	GR0211	-	Rubber Cap
17.	GR0229	6	Nylon Washer
18.	GR1626	6	Bushing
19.	G10131	2	Square Head Set Screw, $\frac{5}{16}$ "-18 x $\frac{3}{4}$ "
20.	G10640	8	Grease Fitting, $\frac{1}{4}$ "-28
21.	GR0231	2	Roller Arm
22.	GR0233	3	Roller
23.	G10718	2	Spring Pin, $\frac{5}{16}$ " x $1 \frac{1}{8}$ "
24.	GD9109	2	Sleeve
25.	GD9107	1	Shaft
26.	GR0226	2	Shim, $\frac{3}{64}$ "
27.	GR0225	2	Shim, $\frac{1}{32}$ "
28.	GR0208	1	Frame
29.	GR1577	6	Nylon Hose Barb, $\frac{1}{2}$ " x $\frac{3}{8}$ " (If Applicable)
A.	GA8691	-	Squeeze Pump Complete, 6 Row (Items 1-13, 15-22 And 25-29)

# LIQUID FERTILIZER SQUEEZE PUMP

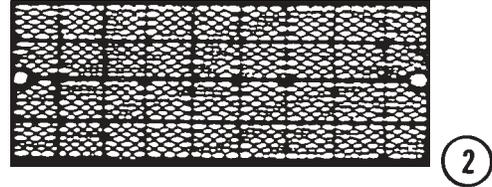
# 8 ROW

LFC010(PT48a)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR0221	2	Spring Anchor Bar
2.	GR0214	8	Spring
3.	G10130	4	Square Head Machine Bolt, 5/16"-18 x 1 3/4"
	G10219	4	Washer, 5/16" USS
	G10144	4	Wing Nut, 5/16"-18
4.	GR0212	2	Plate
5.	GR0207	2	Nylon Bushing
6.	G10303	4	Carriage Bolt, 5/16"-18 x 1"
	G10219	4	Washer, 5/16" USS
	G10144	4	Wing Nut, 5/16"-18
7.	GR0215	8	Metering Hose, 1/2" x 13"
8.	G10681	-	Hose Clamp, No. 6
9.	GR0232	8	Adapter
10.	G10004	4	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10101	4	Hex Nut, 3/8"-16
11.	GR0279	1	Angle, L.H.
	GR0280	1	Angle, R.H.
12.	GR0217	2	Manifold Plug
13.	GR0284	1	Intake Manifold
14.	GR1485	2	Discharge Manifold Less Hose Barbs
15.	G4301-04	1	Hose, 3/8" x 100'
16.	GR0211	-	Rubber Cap
17.	GR0229	6	Nylon Washer
18.	GR1626	6	Bushing
19.	G10131	2	Square Head Set Screw, 5/16"-18 x 3/4"
20.	G10640	8	Grease Fitting, 1/4"-28
21.	GR0231	2	Roller Arm
22.	GR0283	3	Roller
23.	GR0282	2	Set Collar
24.	GR0281	1	Back Up Roller
25.	G10718	2	Spring Pin, 5/16" x 1 1/8"
26.	GD9109	2	Sleeve
27.	GD9108	1	Shaft
28.	GR0226	4	Shim, 3/64"
29.	GR0225	4	Shim, 1/32"
30.	GR0222	1	Frame
31.	GR1577	8	Nylon Hose Barb, 1/2" x 3/8" (If Applicable)
A.	GA8692	-	Squeeze Pump Complete, 8 Row (Items 1-14, 16-24 And 27-31)

# DECALS, PAINT AND MISCELLANEOUS



**! 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

3

**! 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, unplug 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

4

**! WARNING**

**TO AVOID INJURY ...**  
ALWAYS USE THE HYDRAULIC CYLINDER SAFETY LOCKUP CHANNEL WHEN SERVICING MACHINE IN RAISED POSITION OR WHEN TRANSPORTING MACHINE ON THE ROAD. AFTER USE RETURN TO STORAGE LOCATION.

7100-47

5

**KINZE**

6

**! WARNING**

**TOW ONLY WITH FARM TRACTOR**

7100-56

7

**Double Frame**

8

**3000**

9

**! 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

10

**! 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

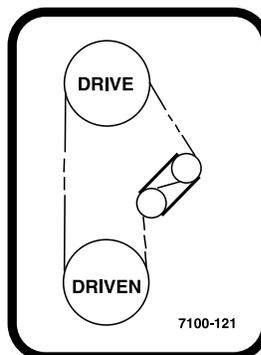
11

**! 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

12



**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

14

# DECALS, PAINT AND MISCELLANEOUS



15

**IMPORTANT**  
SEED METER ALIGNMENT  
TO DRIVE CLUTCH IS  
CRITICAL. REFER TO  
OPERATOR'S MANUAL  
FOR INSTRUCTIONS.  
7100-248

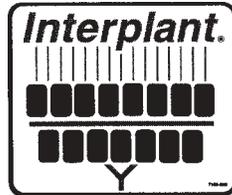
16



17



18



19

**TORQUE 5/8" SPINDLE  
BOLTS TO 120 FT/LBS.  
CHECK PERIODICALLY AND  
RE-TORQUE AS NEEDED.**  
7100-234

20

**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

21



22



23



24

**! WARNING !**

**TO AVOID INJURY...**

ALWAYS USE THE HYDRAULIC CYLINDER SAFETY LOCKUP CHANNEL WHEN SERVICING MACHINE IN RAISED POSITION OR WHEN TRANSPORTING MACHINE ON THE ROAD. AFTER USE RETURN TO STORAGE LOCATION 7100-255

26

**! WARNING !**

**KEEP CLEAR  
OF MECHANISM  
AT ALL TIMES.**

7100-253

25

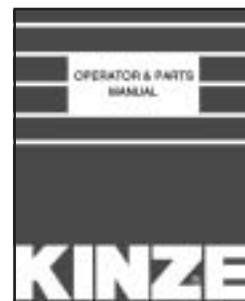
**! CAUTION !**

SET DOWN PRESSURE SPRINGS TO MINIMUM. LOWER PLANTER TO GROUND AND EMPTY SEED HOPPERS. REQUIRES 90 LB MIN TO LIFT. 7100-249

27



28



30



29

**KINZE 3000**

31

# DECALS, PAINT AND MISCELLANEOUS

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD1162	-	Tie Strap, 28"
	GD1512	-	Tie Strap, 7 1/2"
	GD2117	-	Tie Strap, 14 1/2"
	GD2984	-	Tie Strap, 34"
2.	G7200-03	2	Reflector, Red (If Applicable)
	G7200-04	2	Reflector, Amber (If Applicable)
3.	G7100-42	4	Decal, Warning
4.	G7100-46	1	Decal, Warning
5.	G7100-47	2-4	Decal, Warning
6.	G7100-104	1	Decal, KINZE®, 3" x 12"
7.	G7100-56	1	Decal, Warning
8.	G7100-60	1	Decal, Double Frame®
9.	G7100-238	1	Decal, 3000
10.	G7100-89	2-4	Decal, Danger
11.	G7100-90	1	Decal, Warning
12.	G7100-115	-	Decal, Warning (1 Per Granular Chemical Hopper)
13.	G7100-121	1	Decal, Transmission
14.	G7100-153	-	Decal, Information (1 Per Brush-Type Seed Meter)
15.	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)
16.	G7100-248	-	Decal, Meter Alignment (1 Per Row Unit)
17.	G7100-116	-	Decal, Grease Daily
18.	G7100-111	-	Decal, Oil Daily
19.	G7100-208	2	Decal, Interplant®
20.	G7100-234	-	Decal, Bolt Torque
21.	G7100-217	1	Decal, Note
22.	GR0155	-	Blue Paint, Aerosol Can
	GR0155MPP	-	Blue Paint, Twelve Aerosol Cans
23.	GR0146	-	Powdered Graphite, 1 Pound Container
	GR0146MPP	-	Powdered Graphite, Twenty-Four 1 Pound Containers
24.	GR1570MPP	-	Talc Lubricant, Four 8 Pound Containers
25.	G7100-253	-	Decal, Warning
26.	G7100-255	-	Decal, Warning
27.	G7100-249	-	Decal, Caution
28.	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)
29.	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)
30.	GM0164	-	Operator & Parts Manual, Model 3000
31.	G7100-292	-	Decal, KINZE 3000



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A1019	P65, P67	A8019	P37	G10064	P10, P41, P69
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