

MODEL 3500 TWIN-LINE® PLANTER OPERATOR & PARTS MANUAL

M0166

Rev. 3/05

This manual is applicable to: Model: 3500 Twin-Line® Planters

Serial Number: 901249 and on

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

Model Number _____ 3500 _____

Serial Number _____

Date Purchased _____

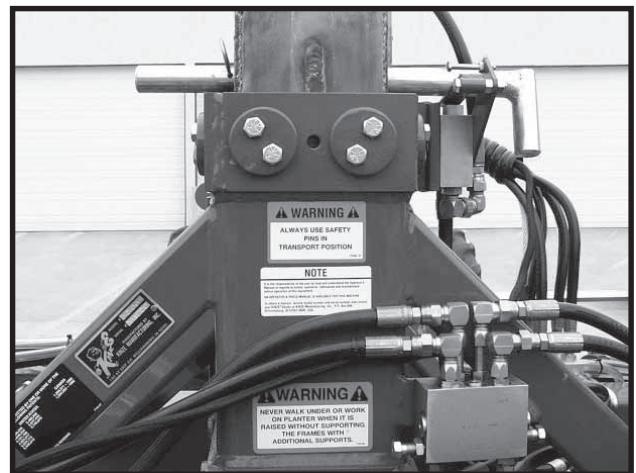
Monitor Serial No. _____
Measured Pulses Per Mile/Km (Radar Distance Sensor) _____
Measured Pulses Per Mile/Km (Magnetic Distance Sensor) _____

SERIAL NUMBER

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

D061199232a



PREDELIVERY/DELIVERY CHECKLIST

TO THE DEALER

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

PREDELIVERY CHECKLIST

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

- Recheck to be sure row units are properly spaced and optional attachments are correctly assembled.
- Be sure 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 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 lockup devices are on the planter and correctly located.
- Check seed meters on test stand to ensure proper performance.
- Auxiliary safety chain is properly installed and hardware is torqued to specification.

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

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

OWNER REGISTER

Name _____ Delivery Date _____

Street Address _____ Model No. _____ Serial No. _____

City, State/Province _____ Dealer Name _____

ZIP/Postal Code _____ Dealer No. _____

DELIVERY CHECKLIST

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

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

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

(Signature Of Delivery Person/Dealer Name/Date)

AFTER DELIVERY CHECKLIST

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

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

(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

TABLE OF CONTENTS

TO THE OWNER	1-1
WARRANTY	1-2
INTRODUCTION	2-1
SPECIFICATIONS	3-1
SAFETY PRECAUTIONS	4-1
SAFETY WARNING SIGNS	5-1
MACHINE OPERATION	
Adjustable Wear Pads	6-7
Checking Granular Chemical Application Rate	6-81
Checking Seed Population	6-80
Contact Drive Wheel Spring Adjustment	6-2
Dry Fertilizer Attachment	6-73
Electronic Seed Monitor System	
KPM I Monitor	6-10
KPM II Monitor	6-16
KPM II Stock-Mode Monitor	6-38
Even-Row Push Row Unit	6-66
Fertilizer Openers And Attachments	6-67
Field Test	6-79
General Planting Rate Information	6-82
Half Rate (2 To 1) Drive	6-4
Hitch Length Setting	6-7
Hydraulic Operation	6-6
Initial Preparation Of The Planter	6-1
Leveling The Planter	6-2
Liquid Fertilizer Attachment	6-75
Metric Conversion Table	6-79
Planting And Application Rate Charts	6-83
Planting Speed	6-79
Rear Trailer Hitch	6-77
Ridge Planting	6-5
Rock Guards	6-66
Row Marker Length Adjustment	6-8
Row Marker Safety Lockup	6-78
Row Marker Speed Adjustment	6-8
Safety Lockup Pin	6-78
Seed Rate Transmission Adjustment	6-3
Shear Protection	6-5
Standard Rate Drive	6-4
Tire Pressure	6-3
Tire Scraper	6-5
Tractor Preparation And Hookup	6-1
Tractor Requirements	6-1
Transport Latch Locking Pin	6-78
Transporting The Planter	6-79
Wrap Spring Wrench Operation	6-4
ROW UNIT OPERATION	
Brush-Type Seed Meter	7-5
Closing Wheel Shield	7-2
Coulter Mounted Residue Wheels	7-18
Covering Discs/Single Press Wheel Adjustment	7-2
Disc Furrower (For Use With Style A Frame Mounted Coulter)	7-14
Drag Closing Attachment	7-3
Finger Pickup Seed Meter	7-4
Frame Mounted Coulter	7-11
Granular Chemical Bander Shield	7-19
Granular Chemical Banding Options	7-19
Granular Chemical Hopper And Drive	7-18
Interplant® Push Row Unit Lockups	7-20

TABLE OF CONTENTS

ROW UNIT OPERATION (Continued)

Interplant® Push Row Unit Clutch Sprocket	7-21
Planting Depth	7-1
Quick Adjustable Down Force Springs	7-9
Residue Wheels (For Use With Style B Frame Mounted Coulter)	7-14
Row Unit Chain Routing	7-9
Row Unit Extension Brackets	7-8
Row Unit Mounted Disc Furrower	7-15
Row Unit Mounted No Till Coulter	7-17
Row Unit Mounted Residue Wheel	7-16
Seed Hopper	7-7
Seed Meter Drive Adjustment	7-8
Seed Meter Drive Release	7-7
Spring Tooth Incorporator	7-19
“V” Closing Wheel Adjustment (Rubber And Cast Iron)	7-1

LUBRICATION

Bushings	8-4
Center Post	8-3
Drive Chains	8-1
Grease Fittings	8-5
Interplant® Push Row Unit Lockups	8-4
Liquid Fertilizer Piston Pump Crankcase Oil Level	8-3
Lubrication Symbols	8-1
Sealed Bearings	8-1
Wheel Bearings	8-3

MAINTENANCE

15" Seed Opener Disc Blade/Bearing Assembly	9-10
Brush-Type Seed Meter Maintenance	9-5
Chain Tension Adjustment	9-1
Coulter Mounted Residue Wheels	9-13
Disc Furrower (For Use With Style A Frame Mounted Coulter)	9-12
Drag Closing Attachment	9-8
Electrical Wiring Diagram For Light Package	9-22
Finger Pickup Seed Meter Cleaning	9-3
Finger Pickup Seed Meter Inspection/Adjustment	9-2
Frame Mounted Coulter	9-11
Gauge Wheel Adjustment	9-8
Gauge Wheel Arm Bushing And/Or Seal Replacement	9-9
Gauge Wheel Arm Pivot Spindle Replacement	9-9
Granular Chemical Attachment	9-14
Hydraulic Diagram	9-23
Mounting Bolts And Hardware	9-1
Piston Pump Storage	9-20
Preparation For Storage	9-21
Residue Wheels (For Use With Style B Frame Mounted Coulter)	9-12
Row Marker Bearing Lubrication Or Replacement	9-18
Row Marker Sequencing/Flow Control Valve Inspection	9-16
Row Unit Mounted Disc Furrower	9-12
Row Unit Mounted No Till Coulter	9-13
Row Unit Mounted Residue Wheel	9-13
Seed Tube Guard/Inner Scraper	9-11
Spring Tooth Incorporator	9-1
Troubleshooting	
Brush-Type Seed Meter Troubleshooting	9-7
Closing Wheel Troubleshooting	9-8
Finger Pickup Seed Meter Troubleshooting	9-4
KPM I/KPM II Electronic Seed Monitor System Troubleshooting	9-15
Piston Pump Troubleshooting	9-20
Row Marker Circuit Troubleshooting	9-17
Torque Values Chart	9-1
Wear Pad Replacement/Adjustment	9-19
Wheel Bearing Lubrication Or Replacement	9-18

PARTS LIST INDEX	P1
-------------------------------	-----------


PARTS SECTION NUMERICAL INDEX	a
--	----------

TO THE OWNER

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

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

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

Throughout this manual the symbol  and/or the words **NOTE, IMPORTANT, CAUTION, WARNING** or **DANGER** are used to call your attention to important information. The definition of each of these terms follows:

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

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



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



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



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



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

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

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

WARRANTY

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

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

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

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

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

INTRODUCTION

The Model 3500 Twin-Line® Planter is available in various sizes and permits installation of various row unit attachments. Interplant®, Liquid Fertilizer or Dry Fertilizer Package options are available for use on the Model 3500 planter.

GENERAL INFORMATION

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

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

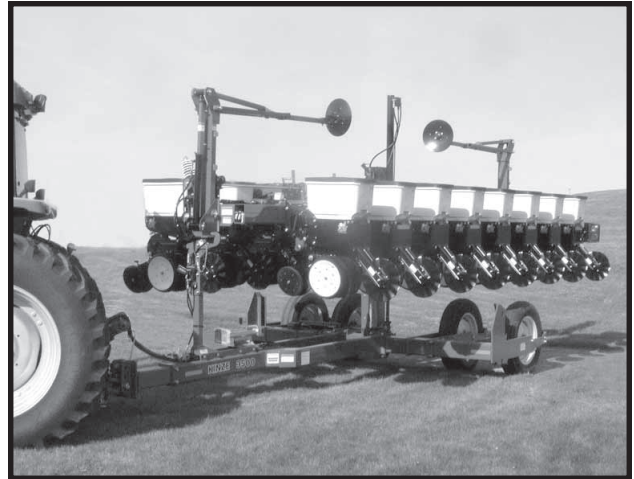
D041604103



8 Row 30" Size

Planter is shown in field operation position with Interplant® Package and Row Unit Mounted No Till Coulter options installed.

D041604108



8 Row 30" Size

Planter is shown in transport position with Interplant® Package and Row Unit Mounted No Till Coulter options installed.

INTRODUCTION

SPECIFICATIONS

TYPE Pull-type, rigid frame. Rotating main frame for transport, hydraulic operation.

PLANTING UNIT TYPES Pull Row Units; Interplant® Push Row Units Optional

ROW SPACING	<u>Standard</u>	<u>Interplant® Package</u>
	6 Row Narrow - 30" Rows	11 or 12 - 15" Rows
	8 Row Narrow - 30" Rows	15 or 16 - 15" Rows

DRIVE SYSTEM

Two 4.10" x 6" spring-loaded contact drive tires. (Driven by two 7.50" x 20" rib implement 8 ply transport tires.)
 No. 40 chain with spring-loaded idlers.
 Quick-adjust end-mounted seed transmission with machined sprockets.
 7/8" hex drive and drill shafts.

TRANSPORT TIRES

Four 7.50" x 20" 8 ply rib implement tires.
 Adjustable height wheels for ridge planting.

LIFT One centrally located lift cylinder. (Front or rear mount.)

MARKERS Two-fold low profile with 16" concave, solid blades and cast iron hubs.

HYDRAULICS Dual SCV for independent operation of lift and markers.
 Manual selector valve to choose marker/fold functions.
 Hydraulic alternating sequence valve with flow controls for markers.

Dimensions

PLANTER SIZE	6 Row 30"	8 Row 30"
Operating Width	16' 10"	21' 10"
Transport Width	11' 2"	11' 2"
Transport Height	10' 6"	10' 6"
Weight	5181 lbs.	5878 lbs.

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

SPECIFICATIONS

MACHINE OPTIONS

- 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
- Half Rate (2 To 1) Drive Reduction Package
- Rock Guard Package (Transport Wheel Arm)
- Rear Trailer Hitch
- Interplant® Package
- Even-Row Push Row Unit Package
- Liquid Fertilizer With Fertilizer Opener And Pump Options
- Liquid Fertilizer Low Rate Check Valve Option
- 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 Options
- Spring Tooth Incorporator
- Row Unit Extension Brackets
- Row Unit Hopper Panel Extension
- Row Unit Mounted No Till Coulter
- Row Unit Mounted Disc Furrowers
- Row Unit Mounted Residue Wheel
- Coulter Mounted Residue Wheels
- Frame Mounted Coulter - STYLE A And 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. Listed below are other safety suggestions that should become common practice.

 Never allow the planter to be operated by anyone who is unfamiliar with the operation of all functions of the unit. All operators should read and thoroughly understand the instructions given in this manual prior to moving the unit.


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


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


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

 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.

 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.

 The left outer transport wheel is bolt-on to allow legal width truck shipment. Install outer transport wheel assembly prior to unloading. Do not remove this assembly after planter is assembled for use. Do not fold planter or tow planter while the outer transport wheel is removed. Tipping may occur because of narrow wheel base.

 Before operating the planter for the first time and periodically thereafter, check to be sure the lug nuts on the transport wheels are tight. This is especially important if the planter is to be transported for a long distance.

 Install safety lockup devices on row marker cylinders prior to transporting the planter or working around the unit.

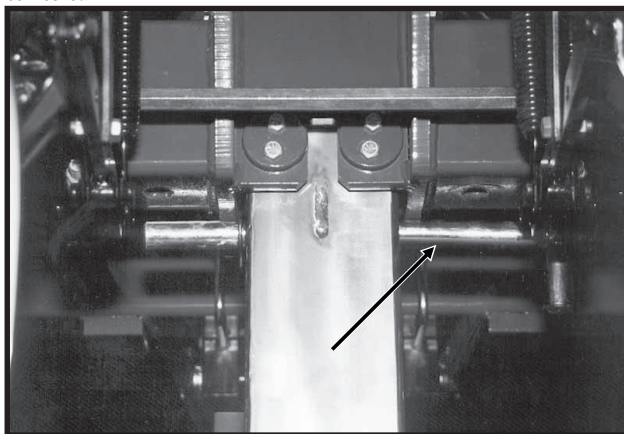
04059908a



Marker Safety Lockup







 Always install all safety lockup devices before transporting the planter.

03279813a



Safety Lockup Pin

SAFETY PRECAUTIONS

-  Never work under the planter while in raised position without installing safety lockup pin.
-  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.
-  Watch for obstructions such as wires, tree limbs, etc., when folding row markers.
-  To avoid serious injury or death, care must be taken when operating row markers around overhead power lines.
-  Use a tractor equipped with a roll-over-protective-system and fasten your seat belt prior to starting engine.
-  Do not allow anyone to stand between the tongue or hitch and the towing vehicle when backing up to the planter.
-  Be a safe and courteous driver. Always yield to oncoming traffic in all situations, including narrow bridges, intersections, etc.
-  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.
-  Allow for unit length when making turns.
-  Avoid sudden uphill turns on steep slopes.
-  Always keep the tractor in gear to provide engine braking when going downhill. Do not coast.
-  Limit towing speed to 15 MPH. Tow only with farm tractor of minimum 70 HP.
-  Always make sure safety/warning lights, reflective decals and SMV sign are in place and visible prior to transporting the machine on public roads. In this regard, check and comply with all federal, state/provincial and local regulations.
-  Check to be sure all safety/warning lights are working properly before transporting the machine on public roads.
-  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 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 on the container label and of the equipment manufacturer.
-  Store the planter in an area away from human activity. **DO NOT PERMIT** children to play on or around the stored unit.
-  Good maintenance is your responsibility. Poor maintenance is an invitation to trouble.

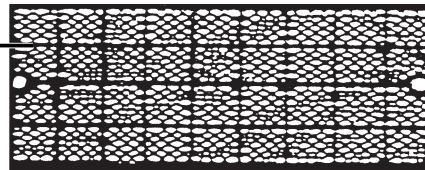
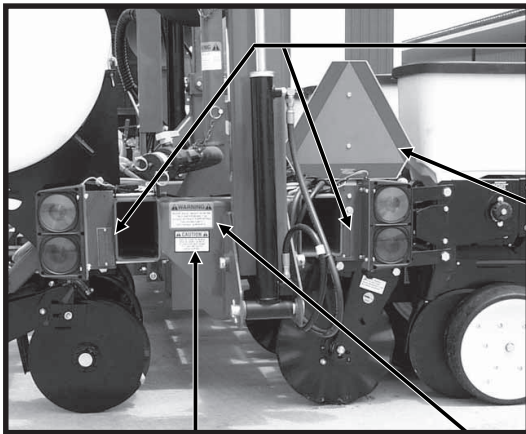
SAFETY WARNING SIGNS

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!**

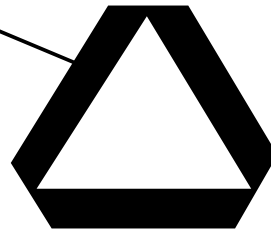
- **Keep these signs clean so they can be readily observed. Wash with soap and water or cleaning solution as required.**
- **Replace “WARNING” signs should they become damaged, painted over or if they are missing.**
- **Check the reflective decals and SMV sign periodically. Replace if they show loss 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 SMV sign, reflectors and/or reflective decals and safety/warning lights to conform to ANSI/ASAE S279.12 DEC 02 and ANSI/ASAE S276.5 FEB 03.

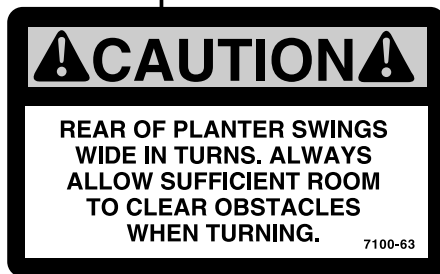
D061199303



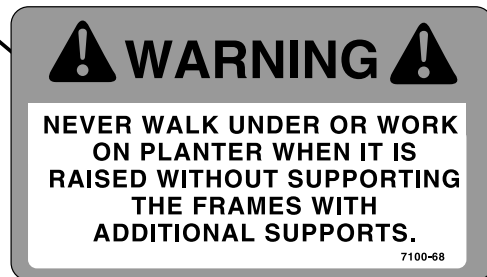
Part No. G7200-03 Red Reflector (Qty. 2)
(If Applicable)



Part No. GD2199 SMV Emblem (Qty. 1)



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



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

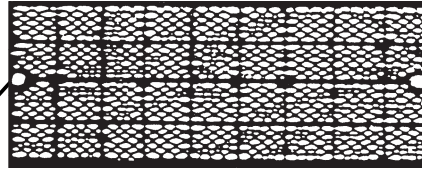
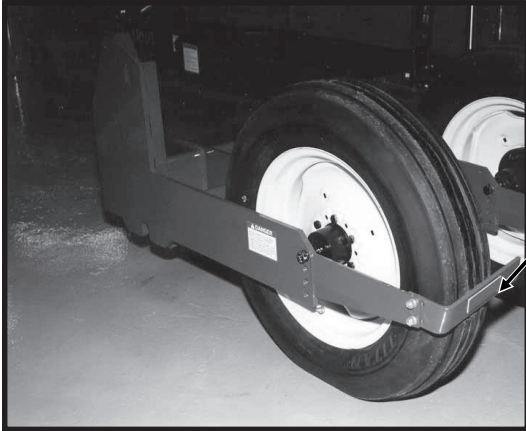
D06099911



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

SAFETY WARNING SIGNS

03279802a

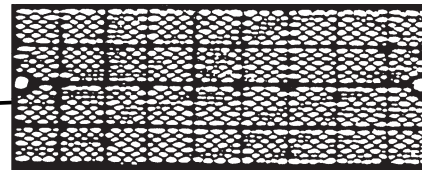
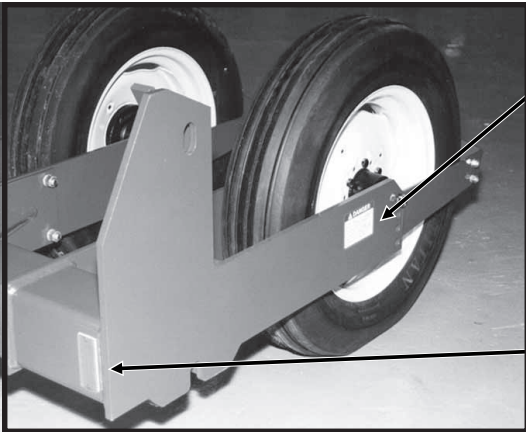


Part No. G7200-03 Red Reflector (Qty. 2)
(If Applicable)

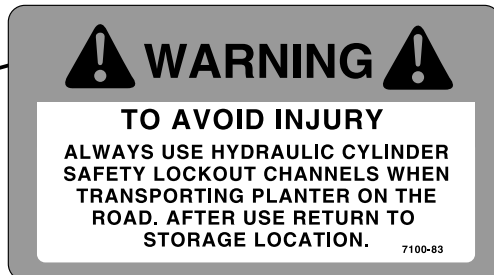
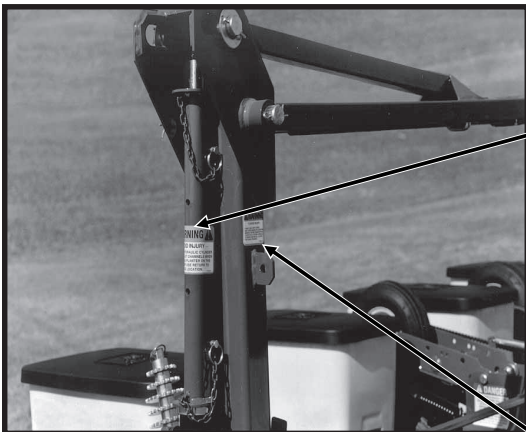


Part No. G7100-215 (Qty. 1)

03279801a



Part No. G7200-02 Amber Reflector (Qty. 2)
(If Applicable)



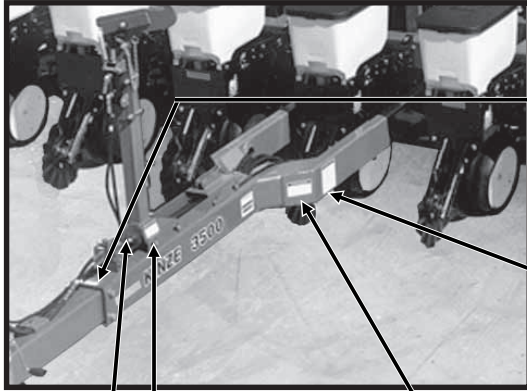
Part No. G7100-83 (1 Per Marker Lockup)



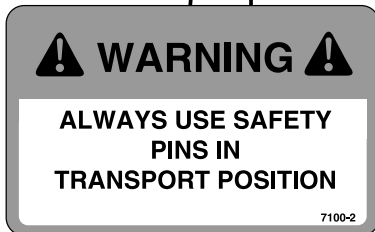
Part No. G7100-42 (2 Per Marker Assembly)

SAFETY WARNING SIGNS

04049941b



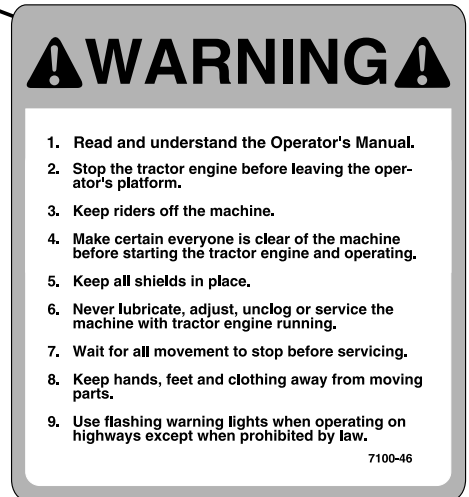
Part No. G7100-302 (Qty. 1)



Part No. G7100-02 (Qty. 2)

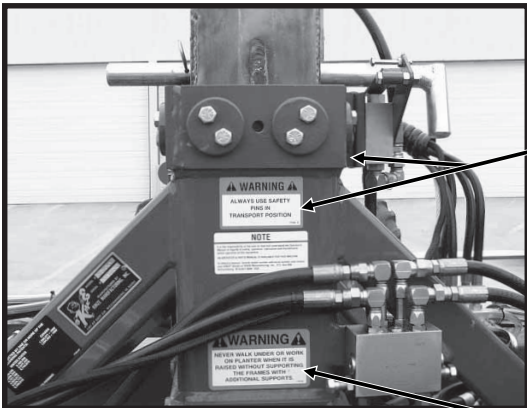


Part No. G7100-90 (Qty. 1)



Part No. G7100-46 (Qty. 1)

D061199232a



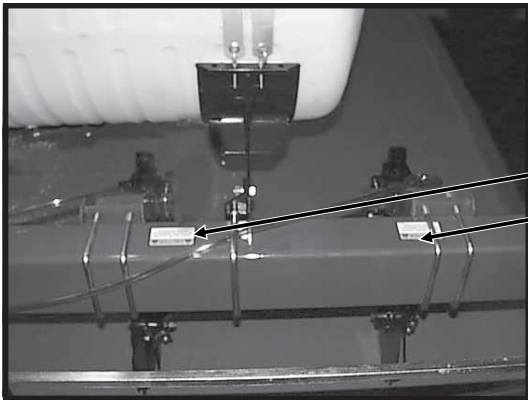
Part No. G7100-02 (Qty. 2 - Front And Rear)



Part No. G7100-68 (Qty. 1)

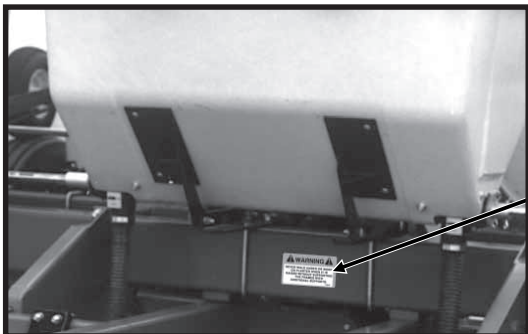
SAFETY WARNING SIGNS

D09250201



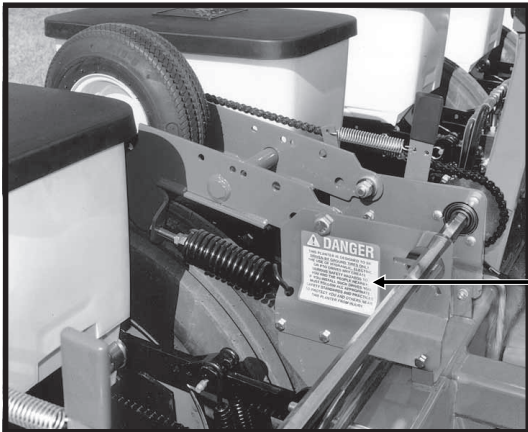
Part No. G7100-75 (Qty. 4 - Located On Top Of Toolbar 36" And 51" From L.H. End Of Toolbar And 28" And 43" From R.H. End Of Toolbar)

69797-58



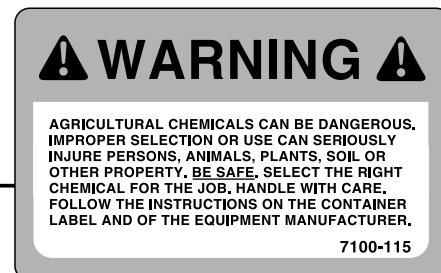
Part No. G7100-68 (Qty. 1)

04059910a



Part No. G7100-89 (Qty. 2)

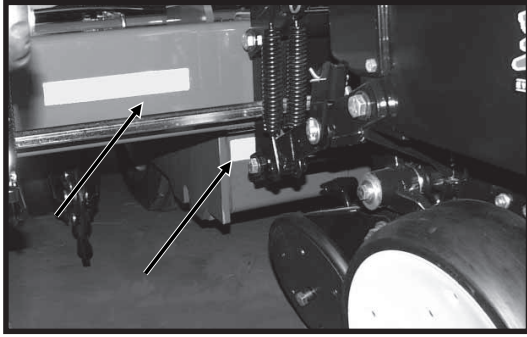
D06039901



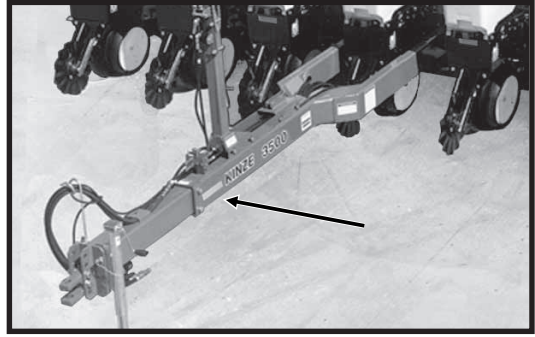
Part No. G7100-115 (1 Per Row Unit - Located On Underside Of Optional Granular Chemical Hopper Lid)

SAFETY WARNING SIGNS

D062300103



04049941b

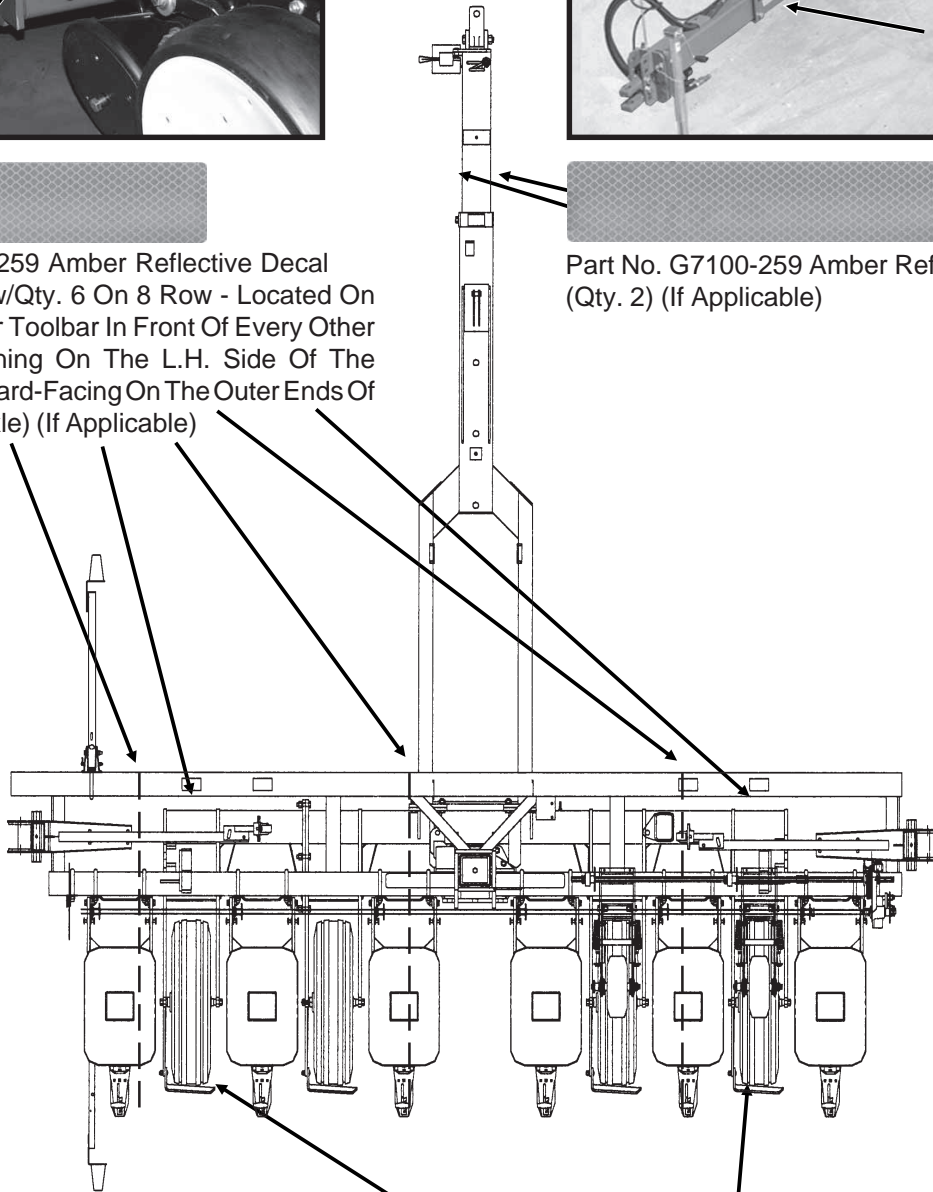


Part No. G7100-259 Amber Reflective Decal
(Qty. 5 On 6 Row/Qty. 6 On 8 Row - Located On
The Front Planter Toolbar In Front Of Every Other
Row Unit Beginning On The L.H. Side Of The
Planter And Forward-Facing On The Outer Ends Of
The Transport Axle) (If Applicable)

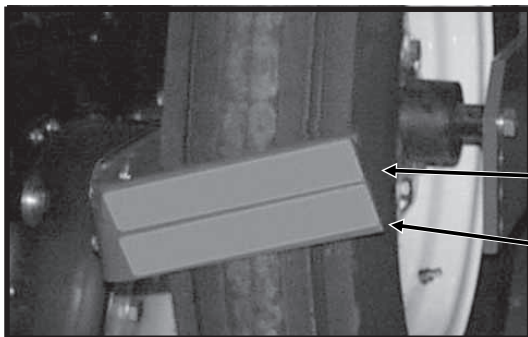


Part No. G7100-259 Amber Reflective Decal
(Qty. 2) (If Applicable)

(TWL186a)



D060800115a

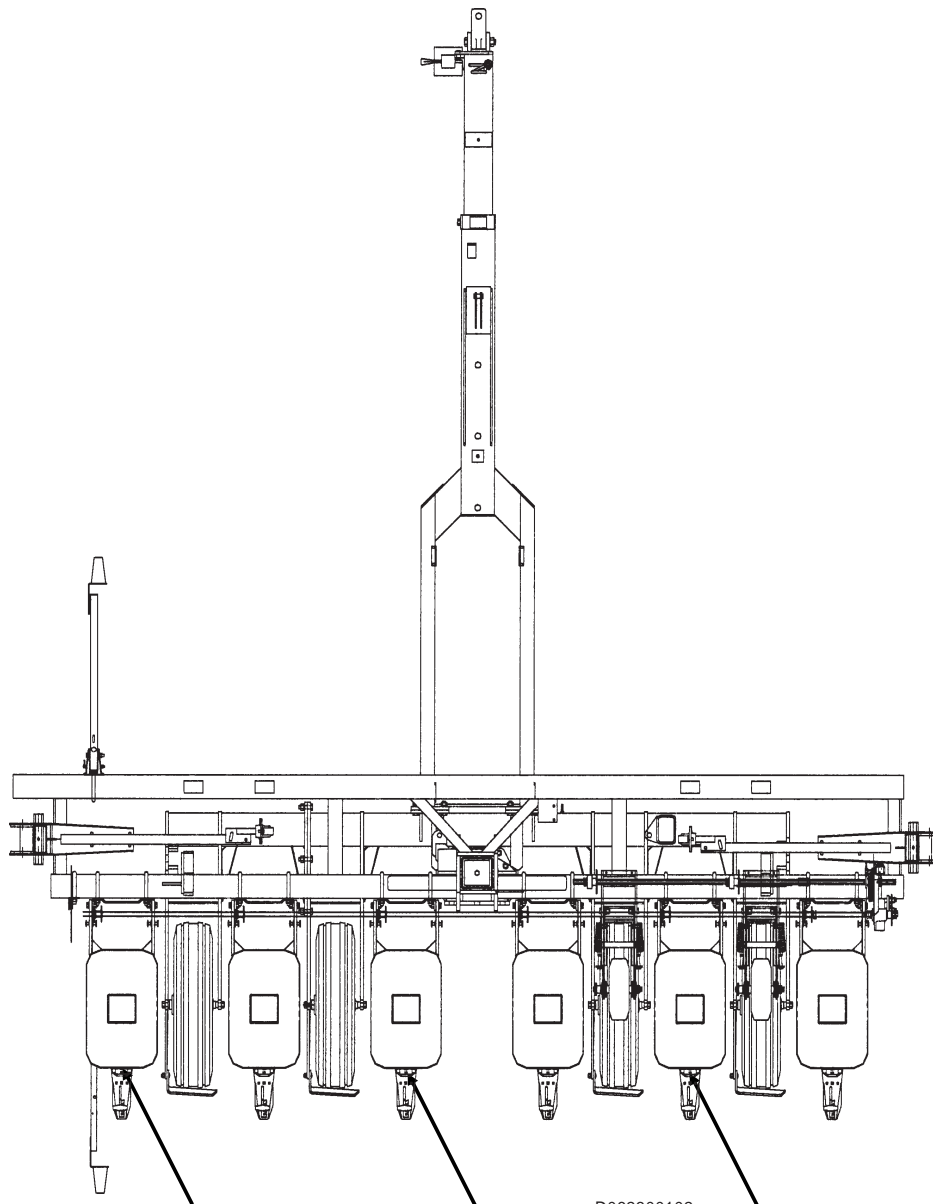


Part No. G7100-258 Red Reflective Decal
(Qty. 1 Per Outer Scraper - Located On Top)
(If Applicable)

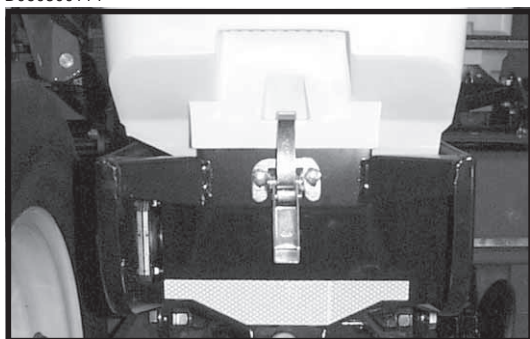
Part No. G7100-260 Orange Reflective Decal
(Qty. 1 Per Outer Scraper - Located On Bottom)
(If Applicable)

SAFETY WARNING SIGNS

(TWL186a)



D060800114



Part No. G7100-262 Amber Reflective Decal
(Qty. 1 Per Row Unit - Located On The Hopper Support On Every Other Row Unit Beginning At The L.H. Side Of The Planter - Side-Facing In Transport Position) (If Applicable)

D062300102



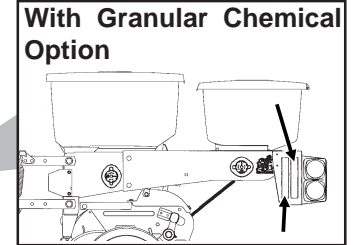
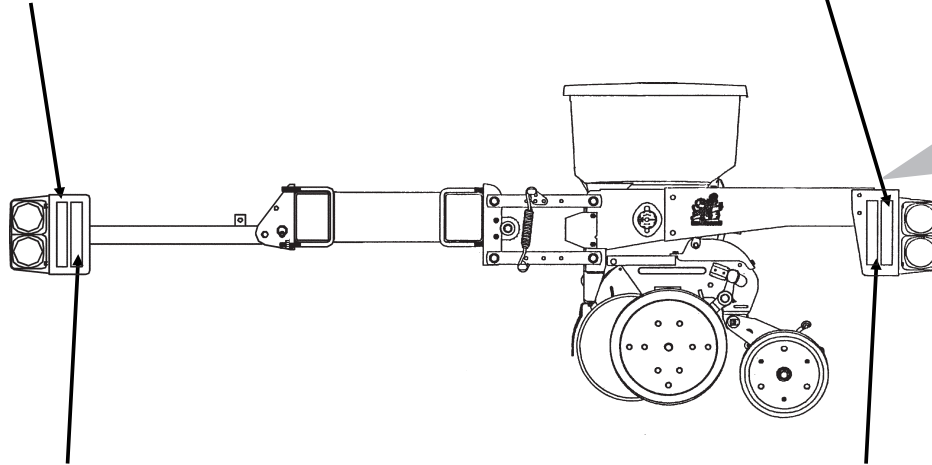
Part No. G7100-259 Amber Reflective Decal
(Qty. 1 Per Row Unit - Located On The Granular Chemical Hopper Panel Extension On Every Other Row Unit Beginning At The L.H. Side Of The Planter - Side-Facing In Transport Position) (If Applicable)

SAFETY WARNING SIGNS

(TWL174b/RU120e/RU120d/TWL186a)

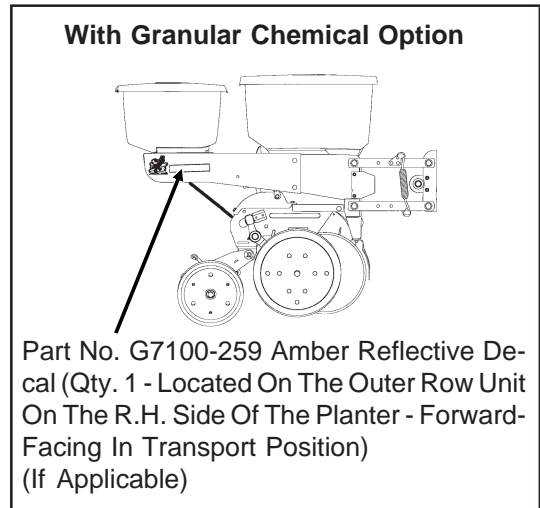
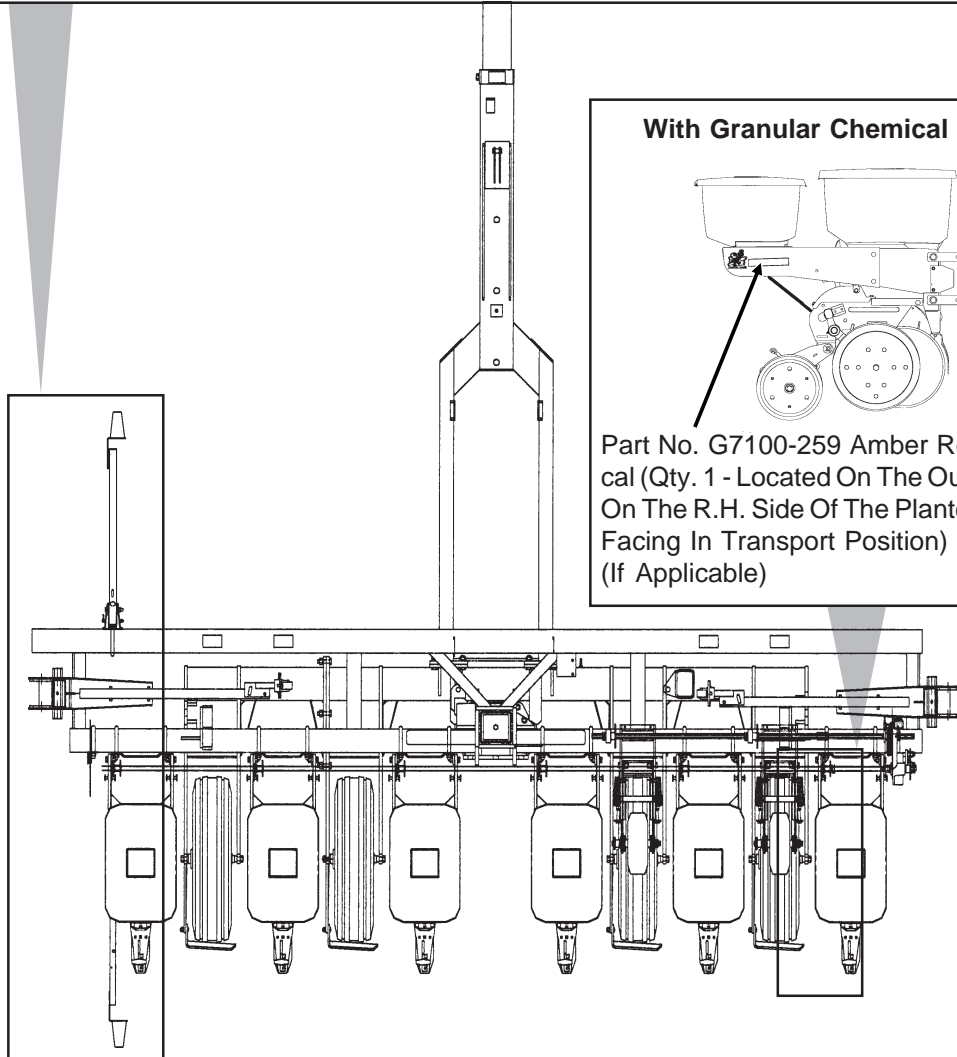
Part No. G7100-258 Red Reflective Decal (Qty. 1 - Located On The Light Bracket On the L.H. Side Of The Planter - Rear-Facing In Transport Position)
(If Applicable)

Part No. G7100-258 Red Reflective Decal (Qty. 1 - Located On The Outer Row Unit On the L.H. Side Of The Planter - Rear-Facing In Transport Position)
(If Applicable)



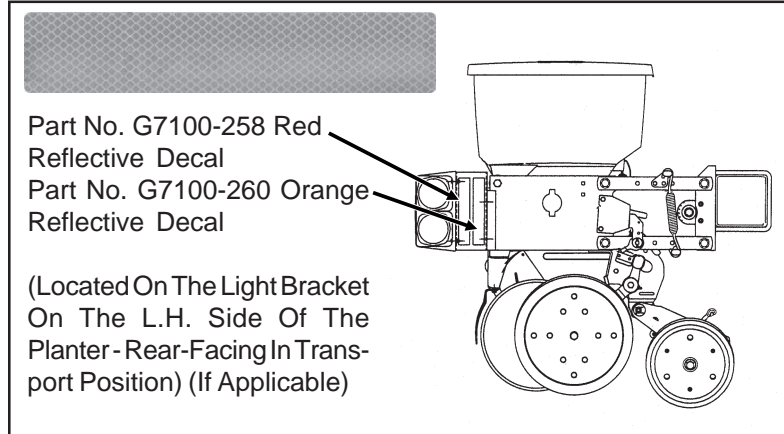
Part No. G7100-260 Orange Reflective Decal (Qty. 1 - Located On The Light Bracket On the L.H. Side Of The Planter - Rear-Facing In Transport Position)
(If Applicable)

Part No. G7100-260 Orange Reflective Decal (Qty. 1 - Located On The Outer Row Unit On the L.H. Side Of The Planter - Rear-Facing In Transport Position)
(If Applicable)

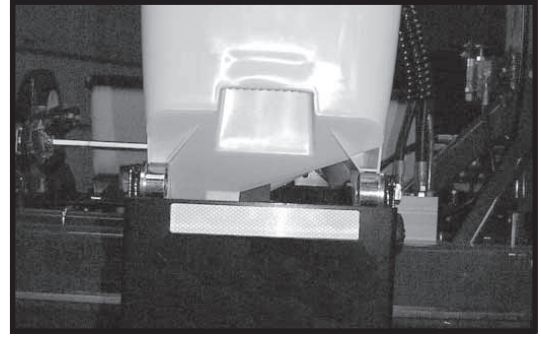


SAFETY WARNING SIGNS

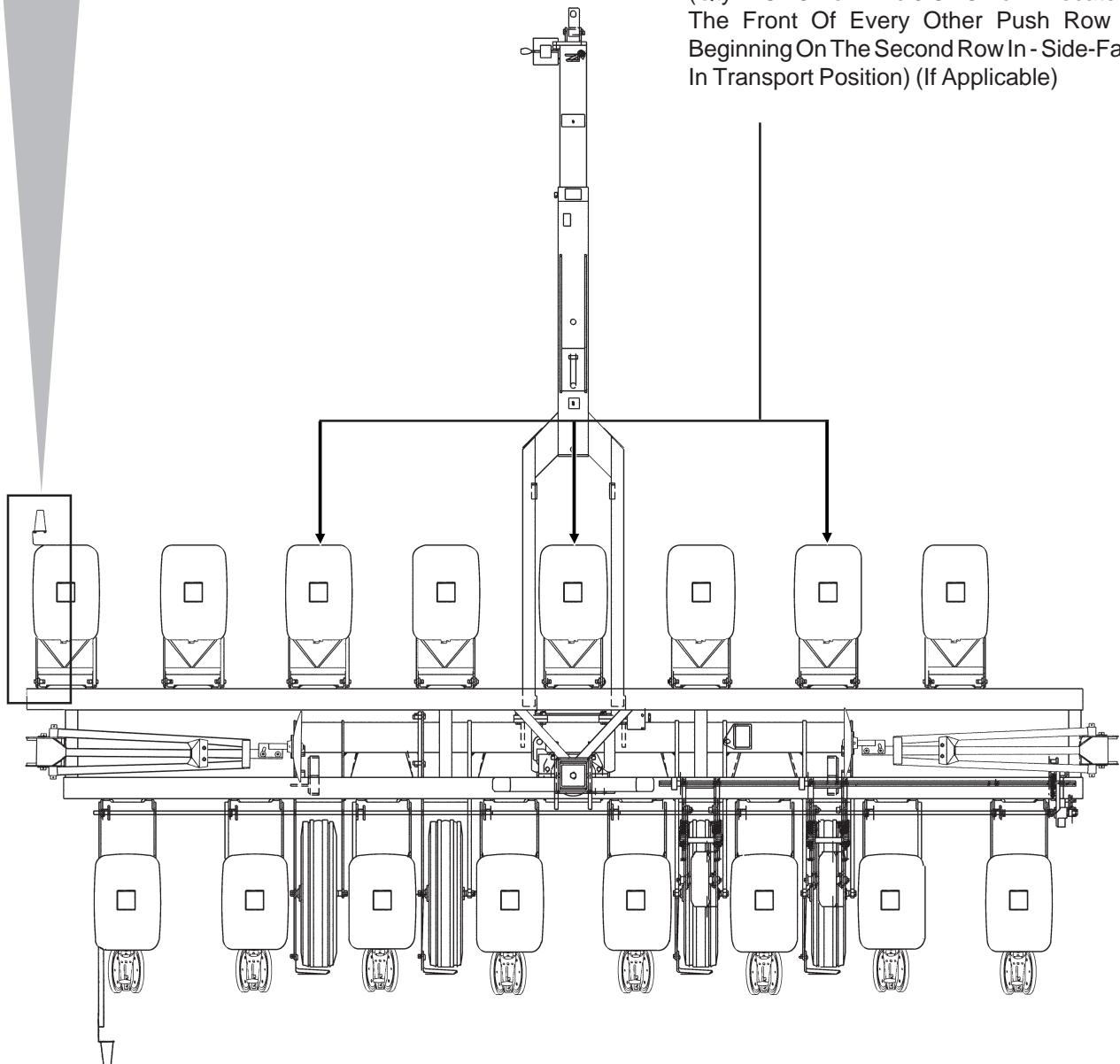
(PLTR59/PLTR121m)



D060800111a



Part No. G7100-259 Amber Reflective Decal
(Qty. 2 On 6 Row And 3 On 8 Row - Located On The Front Of Every Other Push Row Unit Beginning On The Second Row In - Side-Facing In Transport Position) (If Applicable)



WITH EVEN-ROW PUSH ROW UNIT OPTION

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

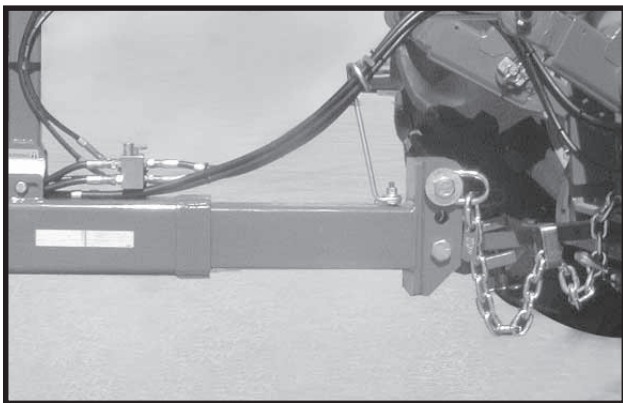
Lubricate the planter and row units per the lubrication information in this manual. Make sure all tires have been properly inflated. Check all drive chains for proper tension, alignment and lubrication.

TRACTOR REQUIREMENTS

Consult your dealer for information on horsepower requirements and tractor compatibility. Requirements will vary with planter options, tillage and terrain. Two dual remote hydraulic outlets (SCV) are required on all sizes. A 12 volt DC electrical system is required on all sizes to operate planter safety/warning lights.

TRACTOR PREPARATION AND HOOKUP

D04140408



1. Adjust tractor drawbar to 13-17 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 3/4" diameter** hitch pin. Make sure hitch pin is secured with locking pin or cotter pin.
3. The auxiliary attaching system (transport safety chain) provided with your planter should be used to ensure the connection is retained between the planter and tractor in the event of a hitch pin/drawbar failure. The safety chain is to be attached using an unused clevis mounting hole on the planter hitch. The attaching hardware should be torqued to 840 ft. lbs.
4. Connect hydraulic hoses to tractor ports in a sequence which is both familiar and comfortable to the operator.



DANGER: Before applying pressure to the hydraulic system, make sure all connections are tight and that 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.

5. 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 safety/warning lights on planter are working in conjunction with warning lights on tractor.
6. Raise parking jack and remount horizontally on storage bracket.
7. Lower planter to the planting position and check to be sure the hitch is level. If hitch slopes up or down, disconnect planter and adjust hitch clevis up or down as necessary.

MACHINE OPERATION

LEVELING THE PLANTER

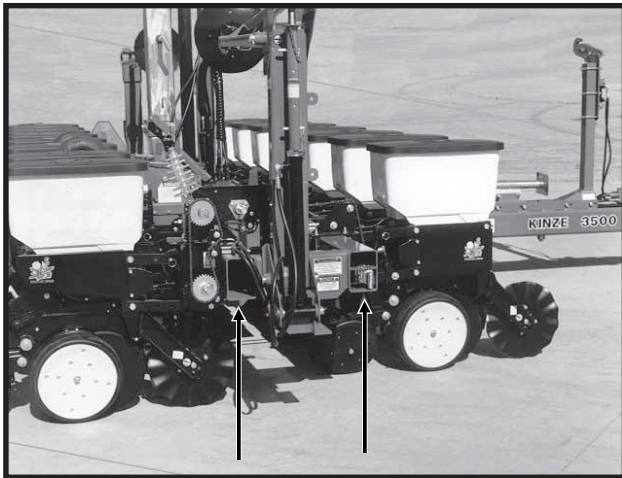
For proper operation of the planter and row units, it is important that the planter frame and row unit parallel arms be level. The toolbar should operate at a 20-22" height, measured to the bottom of the toolbar.

D04140408



Three holes in the hitch bracket allow the clevis to be raised or lowered. In addition, the clevis may be turned over for a finer adjustment between mounting holes. When installing clevis mounting bolt make sure lock nut is tightened to proper torque setting.

04049950a

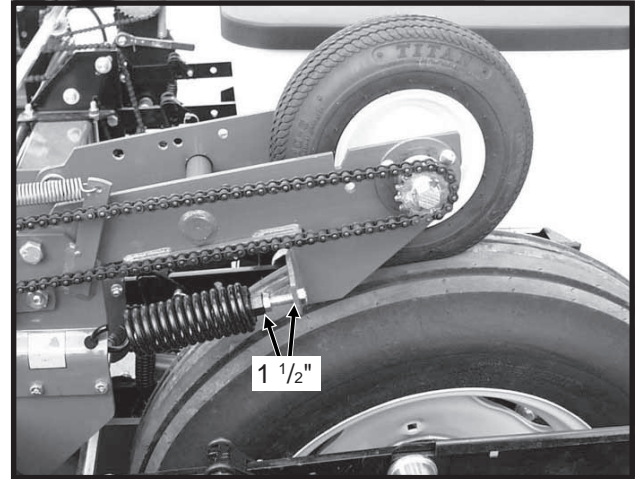


With the planter lowered to proper operating height, check to be sure the frame is level fore and aft. Recheck once planter is in the field.

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

D07279904



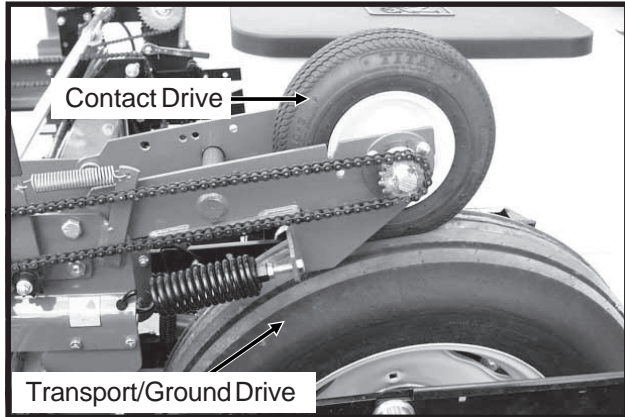
There are two down pressure springs on each contact drive wheel. The down pressure is factory preset and should need no further adjustment.

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

MACHINE OPERATION

TIRE PRESSURE

D07279904



Tire pressure should be checked regularly and maintained as follows:

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



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

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

Always maintain the correct tire 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.

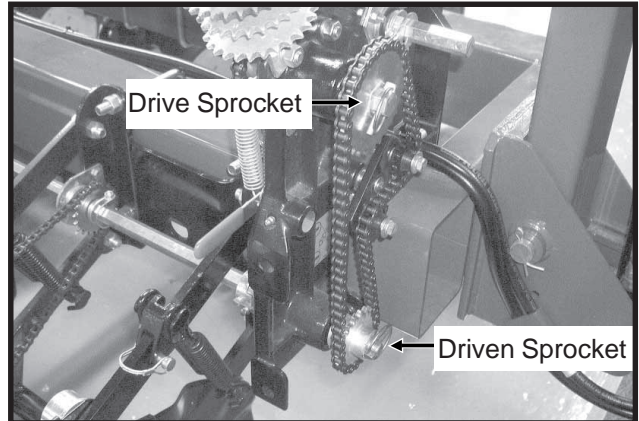
SEED RATE TRANSMISSION ADJUSTMENT

Planting population rate changes are made at the end of the planter. The seed rate transmission 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 easy-release idler arm. This arm has a release position to remove spring tension for replacing sprockets. The amount of spring tension on the chain is controlled by the idler arm.

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

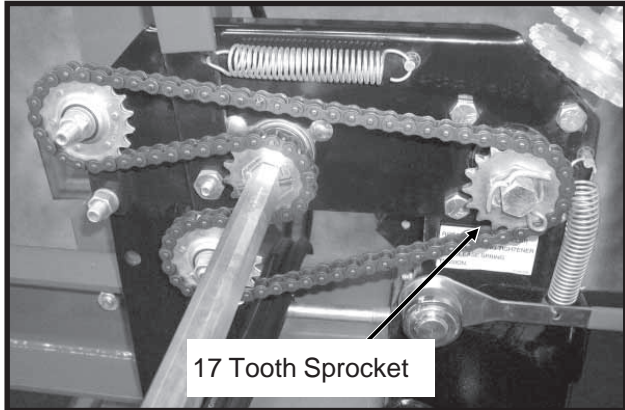
D03190403



MACHINE OPERATION

STANDARD RATE DRIVE

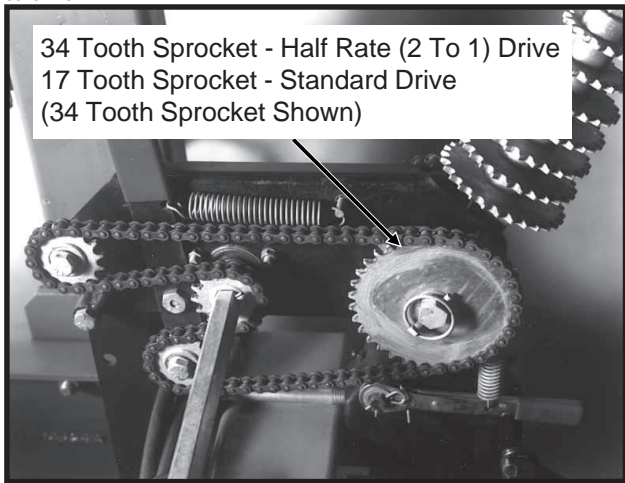
D03220407



Seed planting rate charts are based on the standard rate drive. 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 planting and application rates by approximately 50%. See "Half Rate (2 To 1) Drive".

HALF RATE (2 TO 1) DRIVE

69797-16



Half rate (2 to 1) drive is recommended only when desired population falls below that shown 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 planting and application rates by approximately 50%.

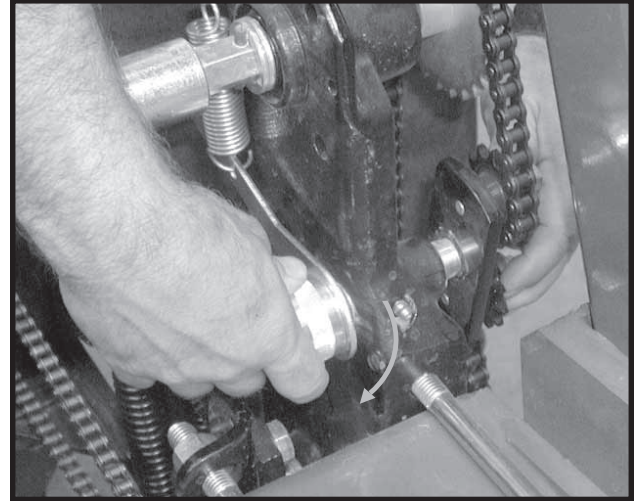
NOTE: After each sprocket combination adjustment, make a field test to be sure you are planting at the desired rate.

WRAP SPRING WRENCH OPERATION

If the chain idler is equipped with a wrap spring wrench, chain tension is released and/or added as shown below.

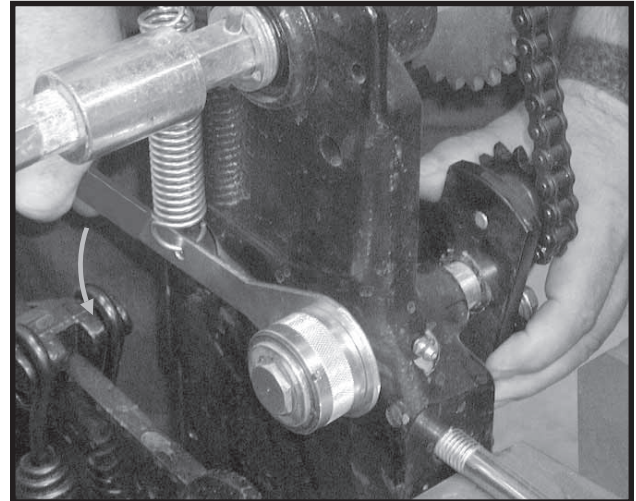
To release chain tension, rotate the knurled collar on the wrap spring wrench while rotating the chain idler away from the chain.

D11120301



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

D11120303a



MACHINE OPERATION

SHEAR PROTECTION

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

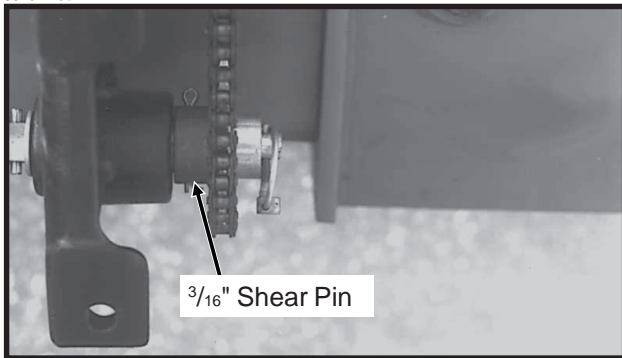
If excessive load should cause a pin to shear, it is important to determine where binding has occurred before replacing the pin. Replace shear pins with same size and type.

Additional shear pins can be found in the storage area located in the R.H. end of the front toolbar.

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

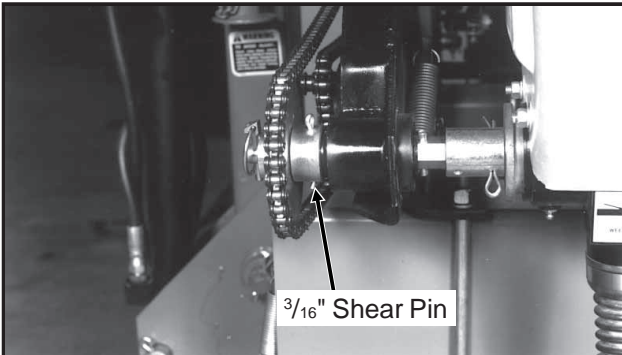
NOTE: Drill shaft/transmission coupler alignment is critical.

55702-10b



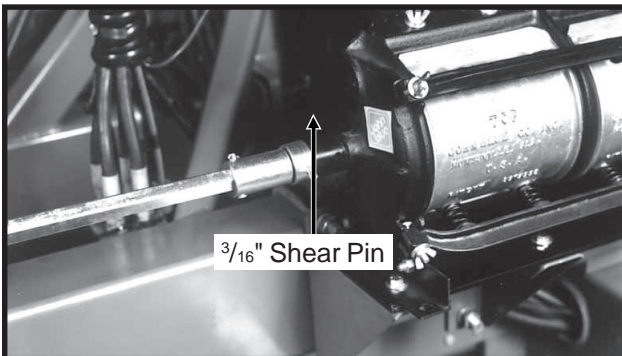
Transmission Shaft

69797-9



Dry Fertilizer Attachment Transmission

69922-6

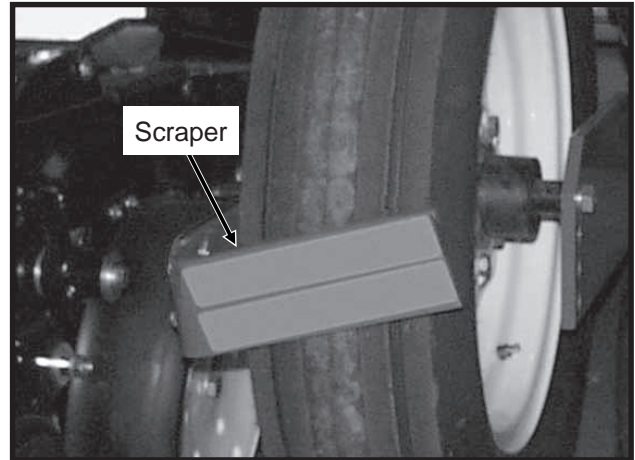


Liquid Fertilizer Squeeze Pump Drive

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.

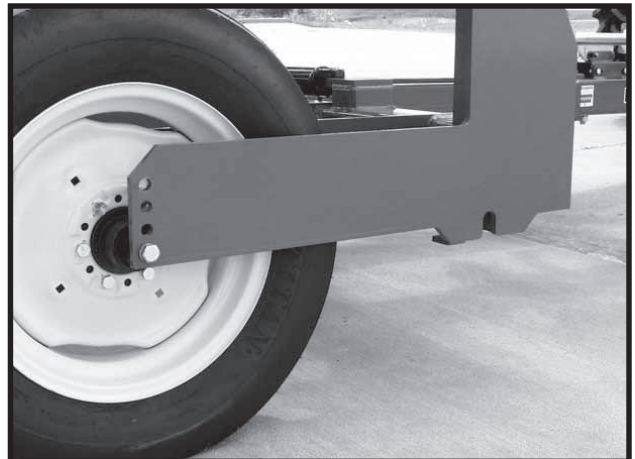
D060800115a



RIDGE PLANTING

When ridge planting, the transport wheels can be lowered to the lower mounting holes in the wheel arms to increase the planter toolbar height. Hitch height should be raised accordingly to ensure level operation.

D07279905



MACHINE OPERATION

HYDRAULIC OPERATION

All Model 3500 planters are equipped for operation from two dual remote hydraulic outlets (SCV).

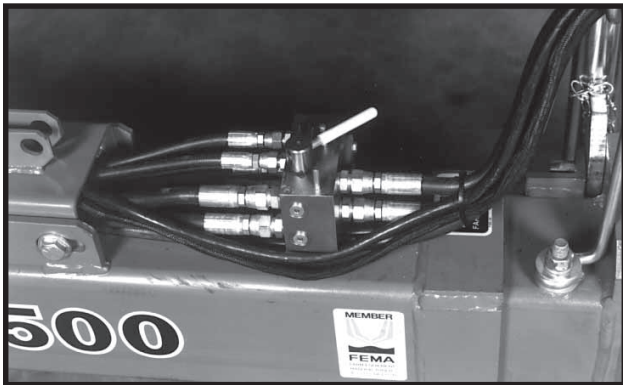
One set of outlets is used to raise and lower the planter and one set is used to operate the markers and fold functions. A hand operated selector valve on the hitch allows selection of marker or fold functions.



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

NOTE: Release hydraulic pressure from the system before moving the selector handle.

69797-67

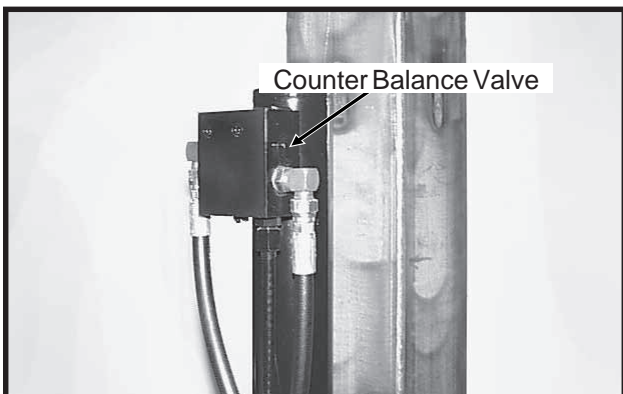


PLANTER LIFT SYSTEM OPERATION

The planter lift system consists of one lift cylinder located at the center of the machine. Mounts for this cylinder are located ahead and behind the center post. For planters with rear mounted row units only, the cylinder may be installed in the rear position. For planters with front mounted options (push row units, fertilizer, etc.), the cylinder must be installed in the front position.

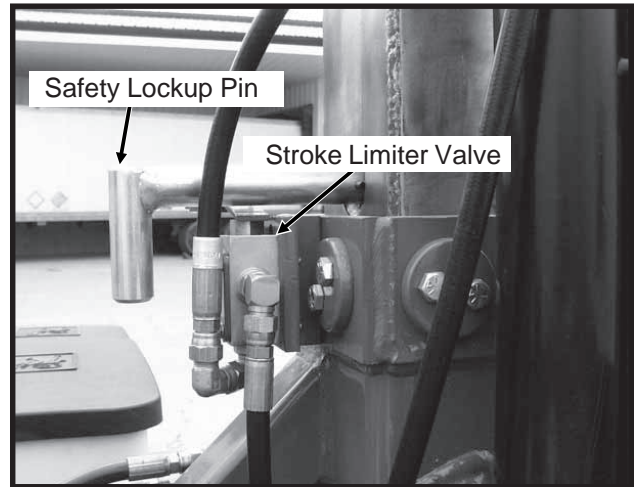
NOTE: The planter lift cylinder is equipped with a counter balance valve. Hydraulic pressure is required to lower the planter.

D09200201a



Raised Field Position

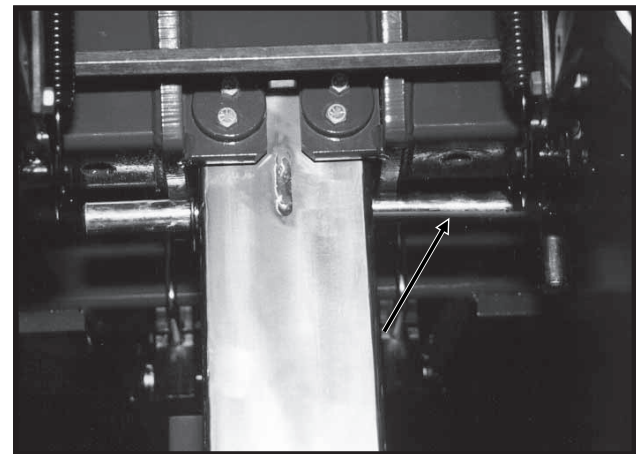
D061199231



There are two raised positions on the planter. The first position is with the safety lockup pin installed above the frame assembly to make contact with the stroke limiter valve. This will allow the row units to raise approximately 14 inches off the ground and the toolbar approximately 40 inches. This position is used in making turns or passing over waterways during field operation.

Raised Transport Position

03279813



The second raised position is the raised transport position. In this position the planter is allowed to raise high enough to permit the row units to clear the transport wheels as the planter is rotated. To raise the planter to the raised transport position: (1) Remove the safety lockup pin. (2) Raise the planter until the lift cylinder is fully extended. (3) Reinstall the safety lockup pin in the same hole which is now below the frame assembly. (4) Lower planter onto safety lockup pin.



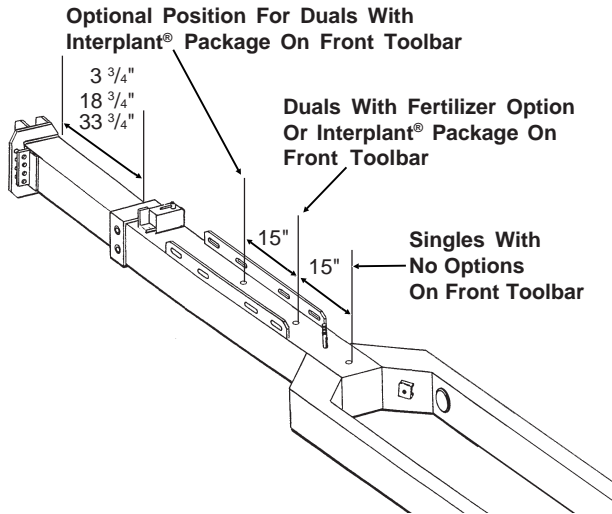
DANGER: Never work under the planter while in raised position without installing safety lockup devices.

MACHINE OPERATION

HITCH LENGTH SETTING

The hitch length can be adjusted in 15" increments to accommodate the tractor tire options being used and attachments installed on the planter.

(TWL49d)



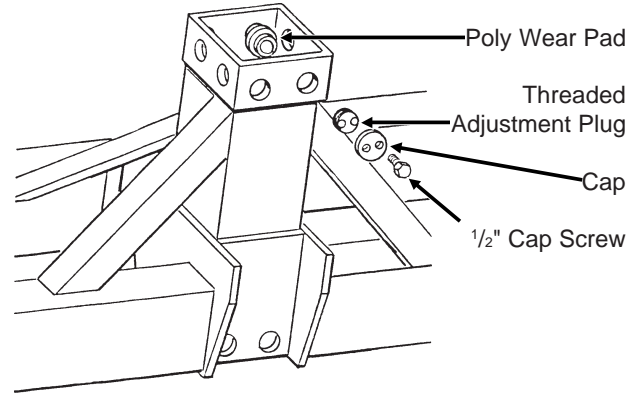
The hitch consists of a rear section of 7" square tube and a front section of 6" square tube. To adjust the length, lower the machine to the field position and block the transport wheels. Support the 7" square tube with a minimum 5000 pound rated jack to take the weight off the 6" square tube. Remove the $1\frac{1}{4}" \times 9"$ hex head cap screw, loosen the two $\frac{5}{8}"$ hex head cap screws on the front end of the 7" square rear section and reposition the 6" square front section to the desired length.

CAUTION: DO NOT set the hitch so short that turning ability is limited when the machine is in road transport position.

Reinstall and tighten hardware to specified torque values.

ADJUSTABLE WEAR PADS

(PLTR80)



The center section of the planter consists of a steel tubular frame equipped with 16 adjustable wear pad assemblies which travel up and down over a stainless steel clad center post. Each adjustable wear pad assembly consists of a poly wear pad, a threaded adjustment plug and a cap. The assembly is held in place by the threaded adjustment plug and locked in place by the cap and two $\frac{1}{2}"$ hex head cap screws.

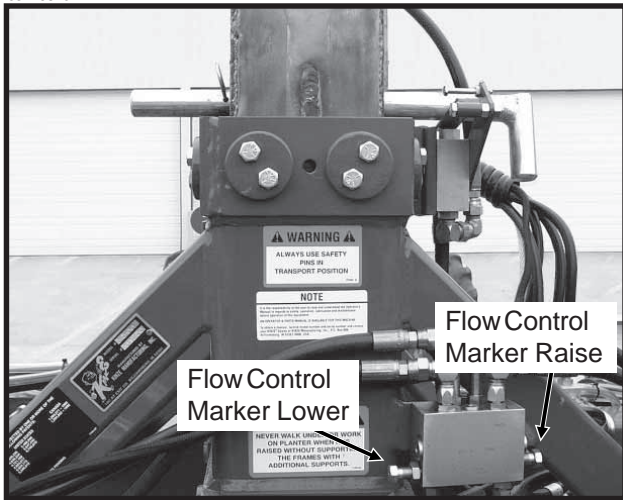
Check pad adjustment and wear annually. See "Wear Pad Replacement/Adjustment" for additional information.

MACHINE OPERATION

ROW 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 complete.

03279810

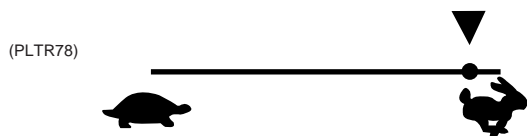


IMPORTANT: The flow controls should be adjusted to restrict flow before the marker assemblies are first put into use. Excessive marker travel speed can damage the marker assembly.

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 the oil. The tractor hydraulic control lever will have to be held until the cylinder reaches the end of its stroke. This occurs most often on tractors with an open center hydraulic system.

On tractors with a closed center hydraulic system, the tractor's hydraulic flow control should be adjusted to the full flow position. If oil is restricted, the sequencing valve may not shift properly.



ROW MARKER LENGTH ADJUSTMENT

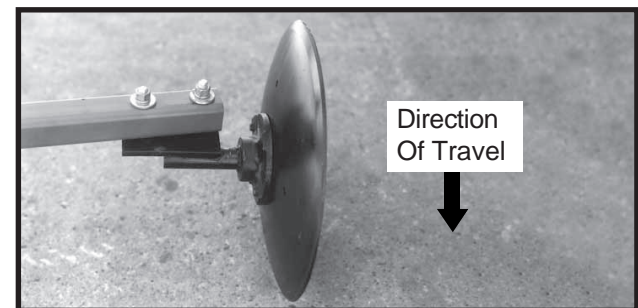
To determine the correct length at which to set the row marker assemblies, multiply the number of rows by the average row spacing in inches. This provides the total planting width. Adjust the marker extension so the distance from the marker disc blade to the center line of the planter is equal to the total planting width previously obtained. Both the planter and 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	Row	Dimension Between
Of Rows	x Spacing	= Planter Center Line
	(Inches)	And Marker Disc Blade.

8 Rows x 30" Spacing = 240" Marker Dimension
--

NOTE: To allow correct marker adjustment, 6 row 30" machines setup with 15" row spacing require the use of shorter marker extensions which are supplied in the Interplant® Package.

72359-61



The marker disc 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 1/2" hardware and move the assembly as required. Tighten bolts to the specified torque.

IMPORTANT: A marker disc blade assembly that is set at a sharper angle than necessary will add unnecessary stress to the complete 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.

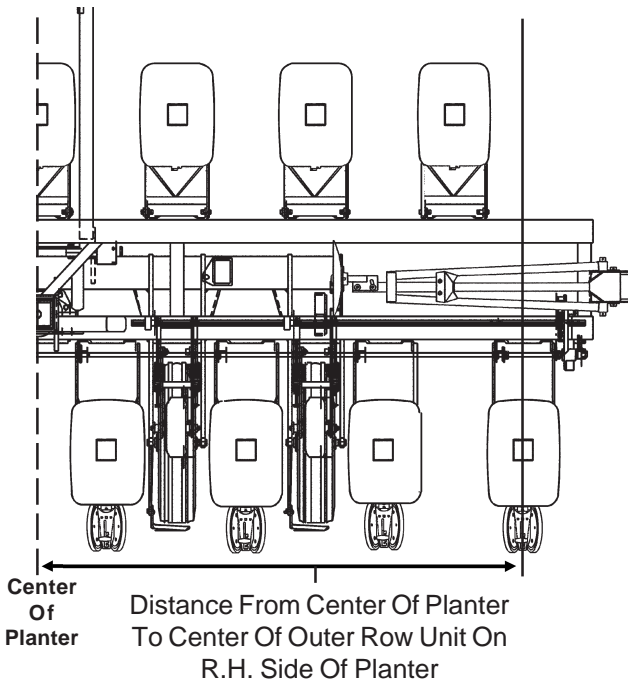
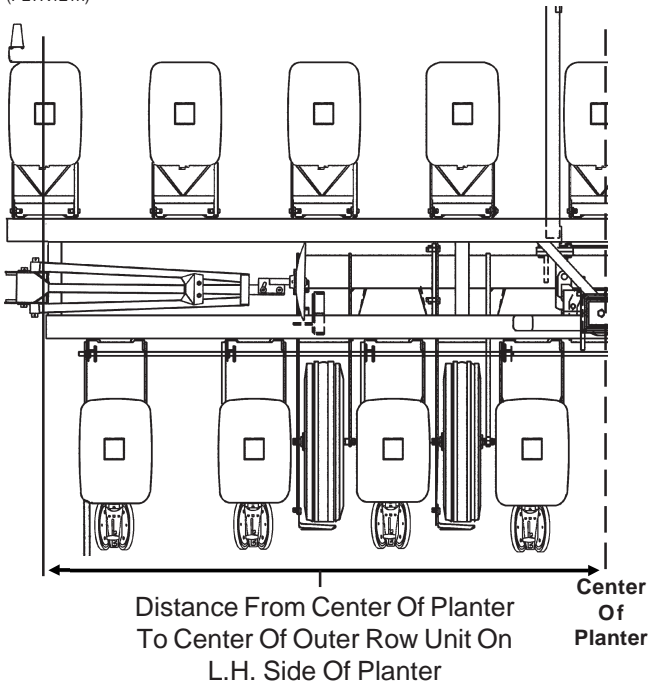
A notched marker blade, for use in more severe no till conditions, is available from KINZE® through you KINZE® Dealer.

MACHINE OPERATION

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

Replace the marker extension tube on the marker assembly on the L.H. side of the planter with the marker extension tube (55" for 6 Row 30"/65" for 8 Row 30") supplied with the Even-Row Push Row Unit And Mounting Package. Reinstall the marker blade assembly onto the new marker extension tube.

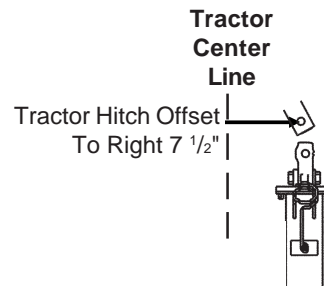
(PLTR121n)



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

6 Row 30" With 6 Interplant® Push Row Units
 (L.H. Marker 90" x 2 + 15" = 195")
 (R.H. Marker 75" x 2 + 15" = 165")
 8 Row 30" With 8 Interplant® Push Row Units
 (L.H. Marker 120" x 2 + 15" = 255")
 (R.H. Marker 105" x 2 + 15" = 225")

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



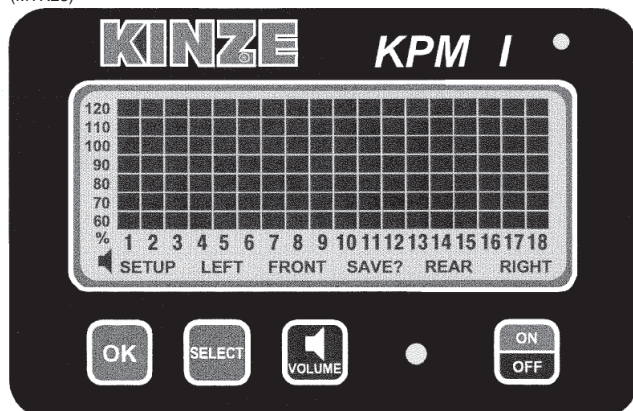
NOTE: Readjust markers when planting 30" rows.

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

6 Rows x 30" Spacing = 180" Marker Dimension
 8 Rows x 30" Spacing = 240" Marker Dimension

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	6-10
LCD Functions	6-10
Changing The Audible Alarm Volume	6-11
Warnings And Alarms	6-11
Replacing A Faulty Sensor	6-12
Field Operation	6-13
Programming/Connecting Seed Tubes	6-13

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 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.

STEP 2 Press SELECT key again to activate both sections.

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

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

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

CHANGING THE AUDIBLE ALARM VOLUME

STEP 1 Press and hold down the VOLUME key.

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

WARNINGS AND ALARMS

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

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

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

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

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

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

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

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

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

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

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

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

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

REPLACING A FAULTY SENSOR

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

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

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

FIELD OPERATION

(MTR28e/MTR28c/MTR28d/MTR28b)

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



Information regarding each section is displayed alternately every 5 seconds.

REAR/FRONT CONFIGURATION

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



LEFT/RIGHT CONFIGURATION

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



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

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



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



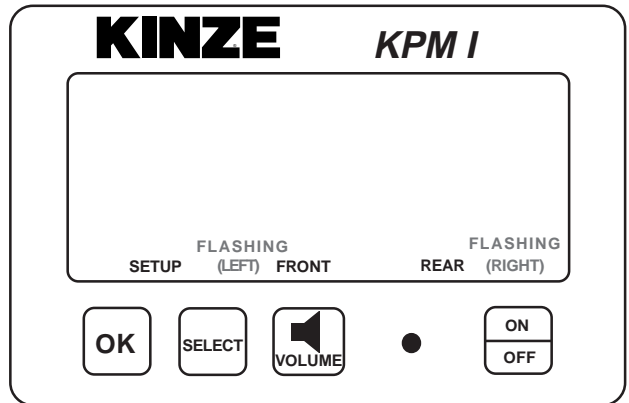
PROGRAMMING/CONNECTING SEED TUBES

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

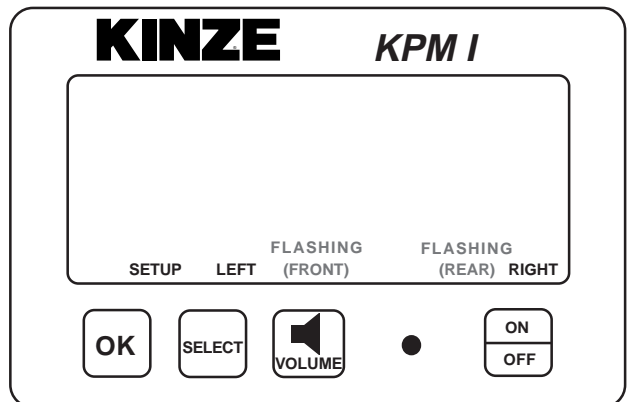
STEP 2 Press the ON key. The monitor automatically enters the setup procedure. If the monitor was accidentally powered on with no sensors attached, the user can turn the monitor off at this point and the previous configuration is not lost.

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

01229910



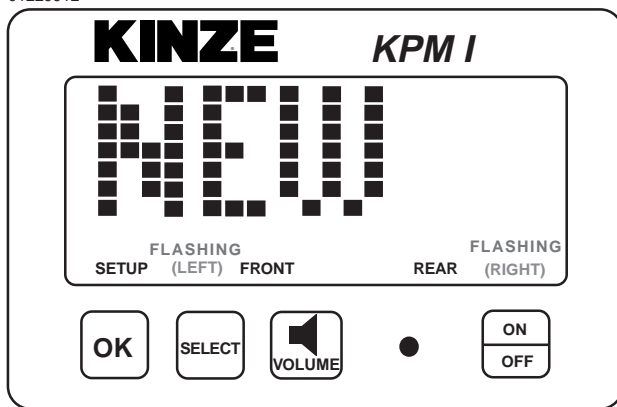
01229911



NOTE: Model 3500 planters will use the rear/front configuration only. When all rows can be viewed on a single display (rear), pressing the select key has no function.

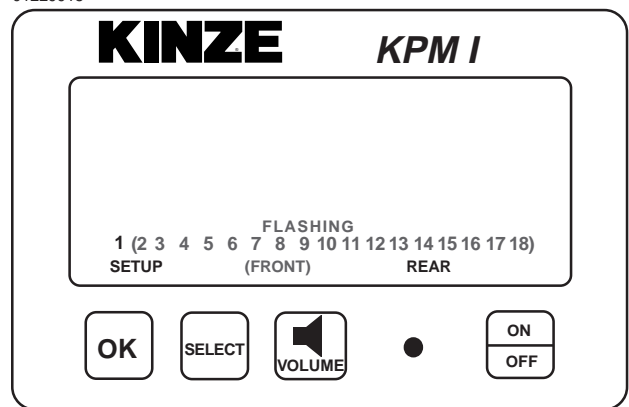
STEP 4 Press and hold the OK key to confirm the selection and continue holding until the row numbers appear on the display. During confirmation, the display will alternate between “NEW” and “SYS” to alert the user that the previous configuration will be lost. With the rear/front mode selected, the monitor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

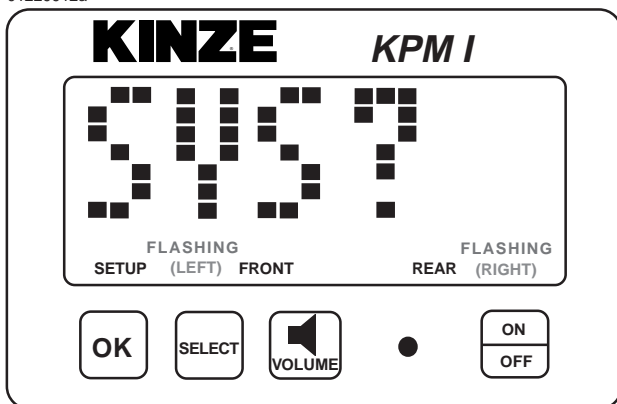


STEP 5 Plug each seed tube w/sensor into the harness in a predetermined order. Row 1 first, row 2 second and so on up to 18 rows. When a sensor is plugged in, the corresponding row number on the LCD display will stay solid, the monitor will chirp twice and the LED (Light Emitting Diode) on the seed tube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

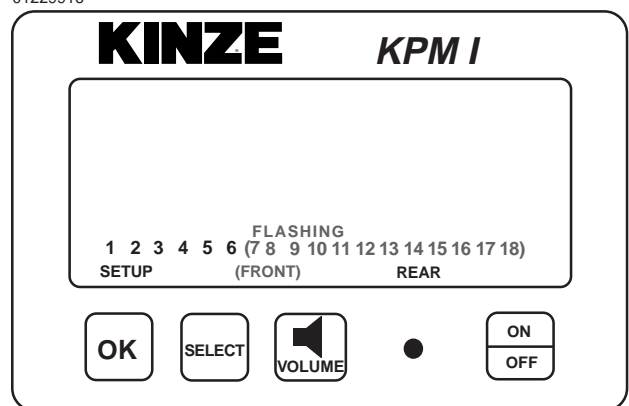


01229912a



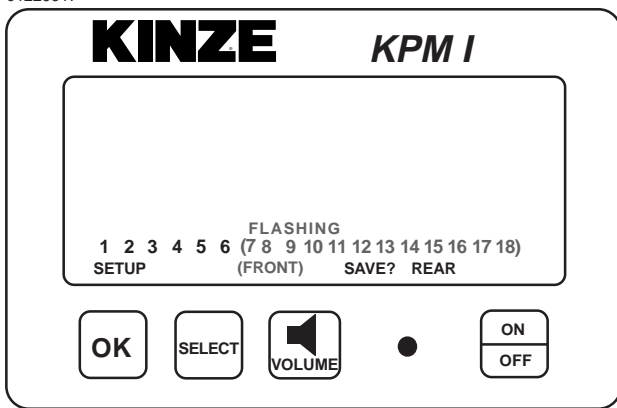
STEP 6 When all the seed tubes w/sensors for the current section are installed, check to be sure the monitor displays solid numbers for the number of sensors connected.

01229916

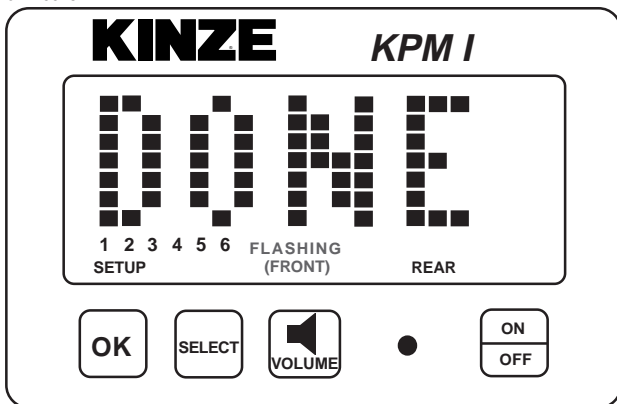


STEP 7 If this condition is satisfied, press and hold the OK key to save the setup for the current section. The SAVE? icon will show followed by continuous short beeps indicating the monitor is preparing to save. The installer has 5 seconds to decide if he wants to save the current configuration. During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

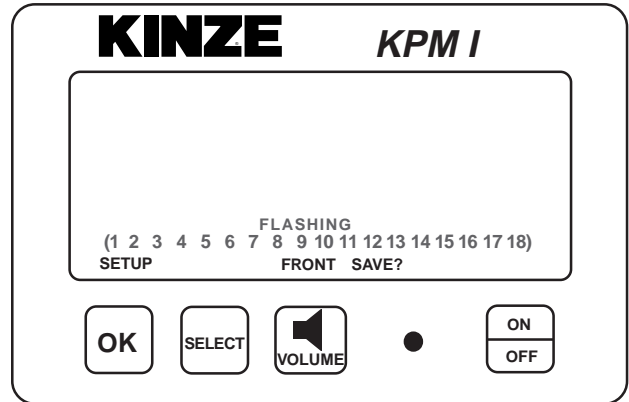


01229918

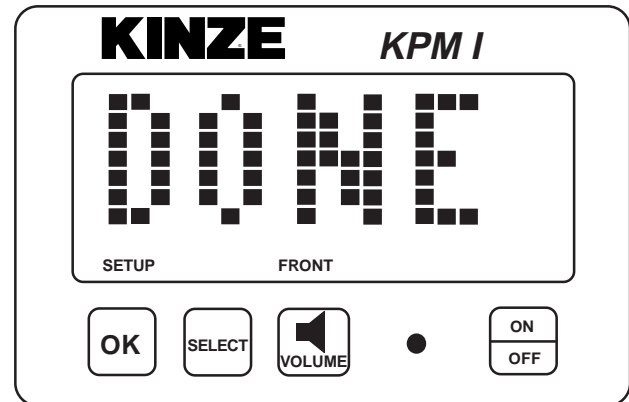


STEP 8 Follow STEPS 5 through 7 to install the second section. If no seed tubes are installed on the second section, press and hold the OK key until the word “DONE” shows on the screen followed by a long beep and the SAVE? icon turns off.

01229919



01229920

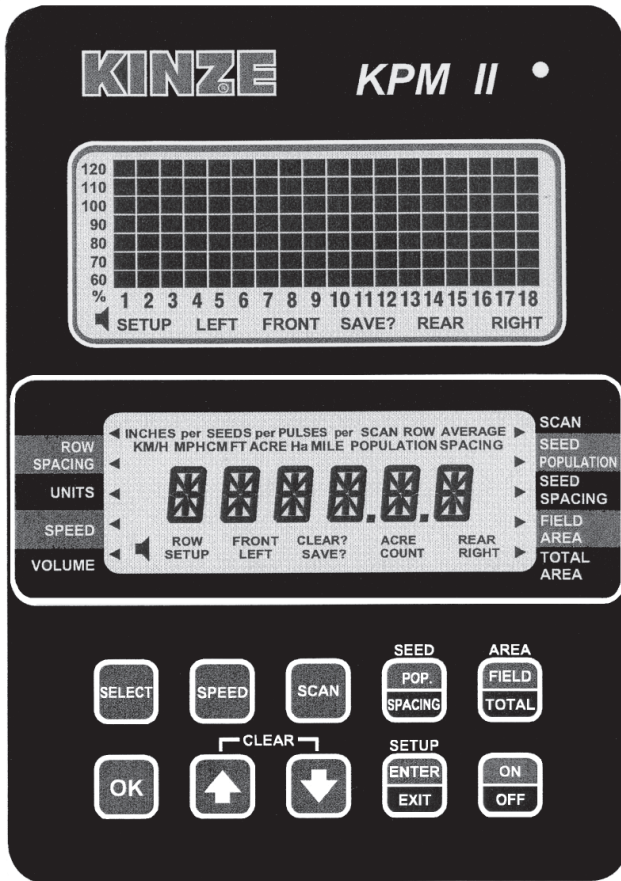


NOTE: Individual seed tubes may be unplugged for special situations. An alarm will sound which can be silenced by touching the OK key. The monitor will recognize each seed tube when reconnected.

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

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)

Monitor Key Functions	6-17
Upper LCD Functions	6-18
Lower LCD Functions	6-19
Programming	
Changing The Audible Alarm Volume	6-21
Units (Metric Or English)	6-22
Row Spacing	6-22
Speed	6-24
Clearing Total Area	6-25
Area Counter/Speedometer Mode	6-26
Warnings And Alarms	6-26
Replacing A Faulty Sensor	6-27
Field Operation	6-27
Clearing Field Area	6-28
Programming/Connecting Seed Tubes, Radar/Magnetic Distance Sensors And/Or Shaft	
Rotation Sensors	6-29
Row-By-Row Alarm Level Setting	6-37

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 and 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

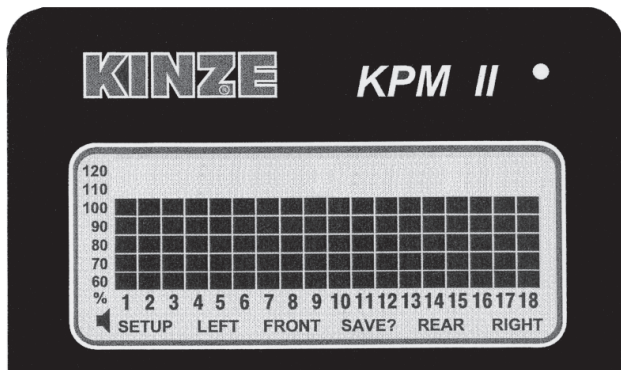
- Enters and exits the programming mode.

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.

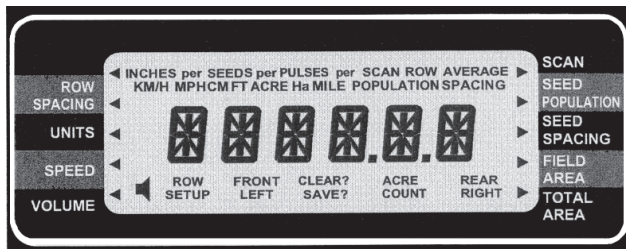
EXAMPLE: Press SELECT key a second time. The information regarding each section will display alternately every 5 seconds.

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 counter 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.

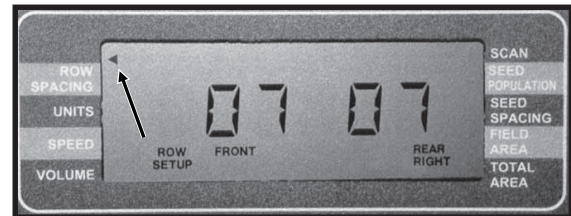
NOTE: When FIELD AREA is selected, the UP or DOWN key must be held in slightly longer than normal so the monitor will not mistake this action with a CLEAR, which consists of the UP and DOWN arrow keys pressed simultaneously. A beep will sound when the function activates.

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 R.H. digit on the display will be blinking.

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

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

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

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

- Pull the tractor up to the starting line.

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

- 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

- 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 "SHAFT" 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.

- 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.

- 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.

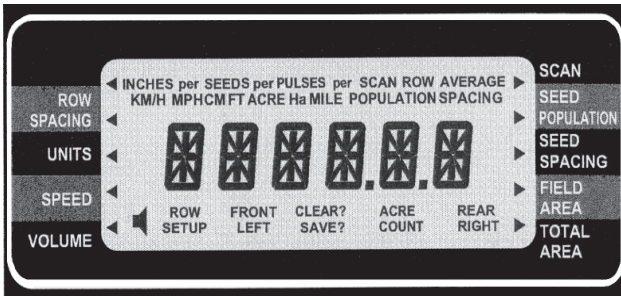


(MTR28c)

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.



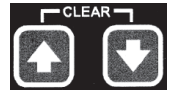
Press the SEED POPULATION/SEED SPACING key to go back to planter average.



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".



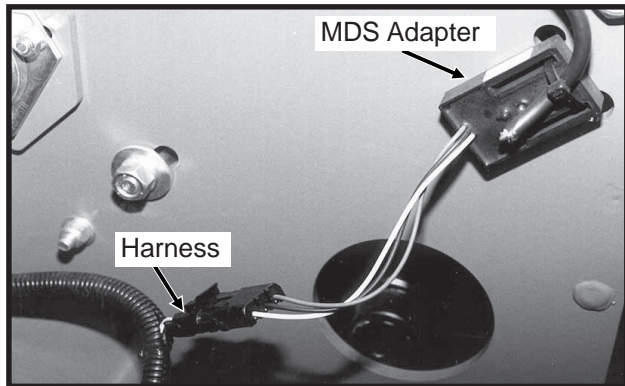
PROGRAMMING/CONNECTING SEEDTUBES, RADAR/MAGNETIC DISTANCE SENSORS AND/OR SHAFT ROTATION SENSORS

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.

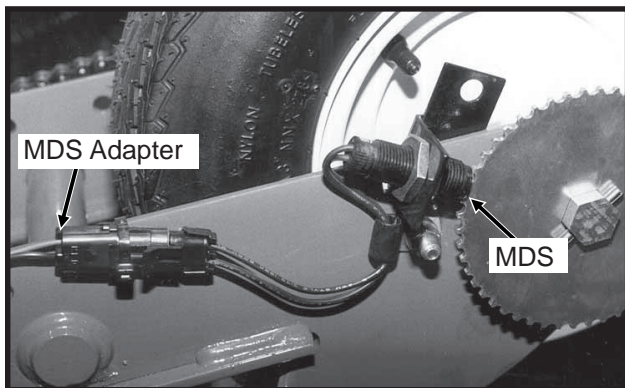
NOTE: If the monitor detects a radar sensor but no seed tubes at power up, it will automatically go into AREA COUNT mode. See “Area Counter/Speedometer Mode”.

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

01189909



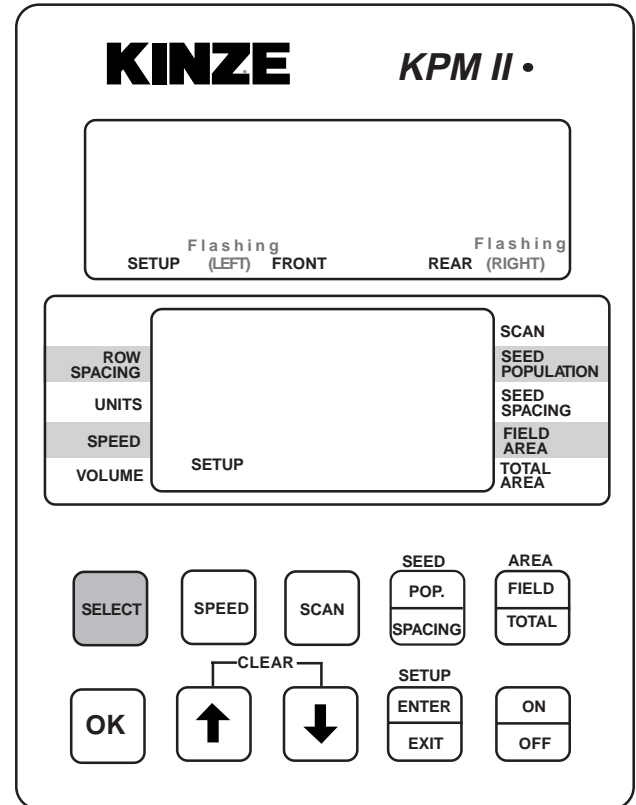
01189910



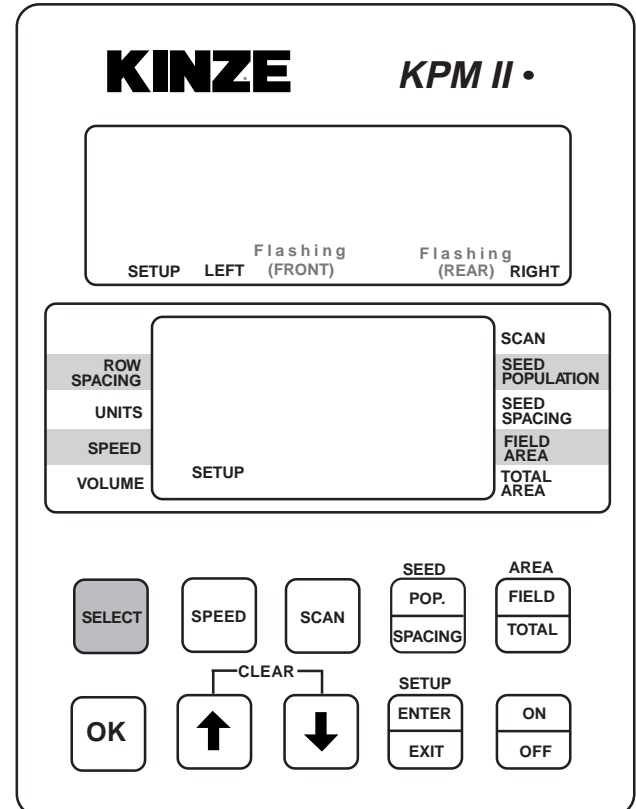
STEP 2 Press the ON key. The monitor automatically enters the setup procedure.

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

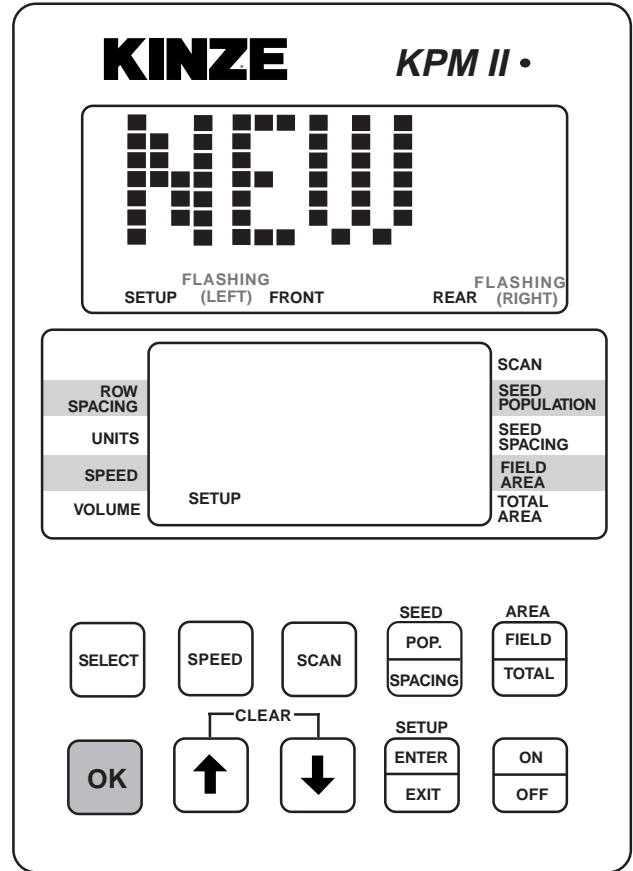


NOTE: Model 3500 planters select the rear configuration only. When Interplant® Package rows are in use, select the rear/front configuration.

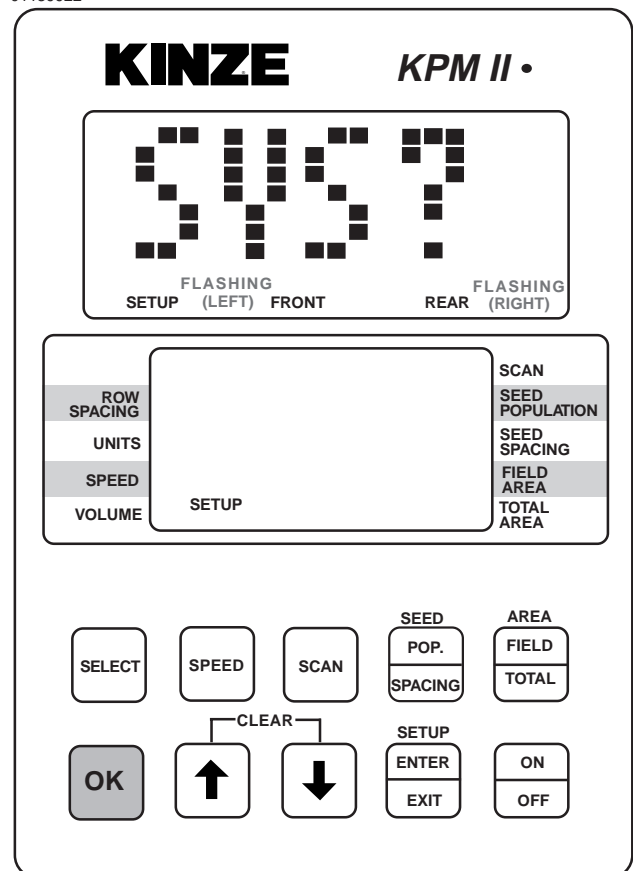
STEP 4 Press and hold the OK key to confirm selection. The upper display will alternate between “NEW” and “SYS”.

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



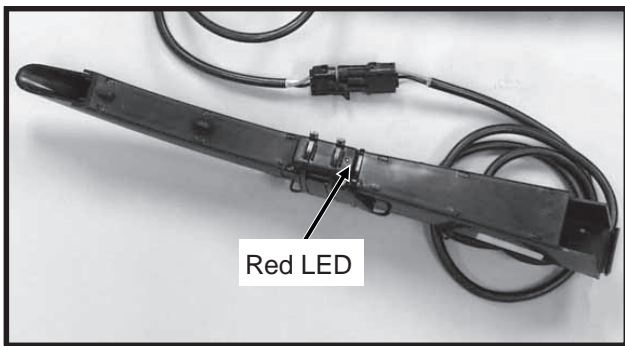
01139922



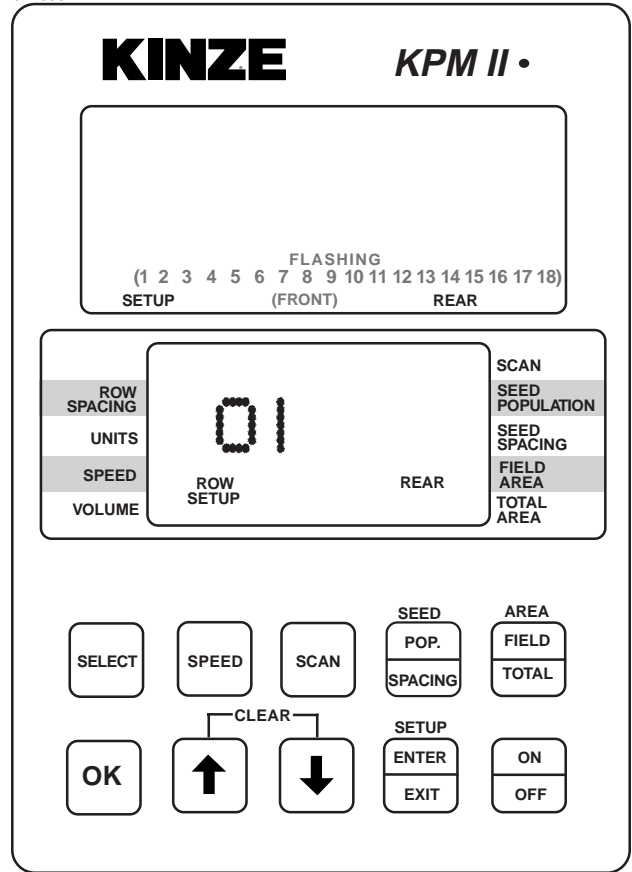
STEP 5 Determine which row you want as number one and plug the seed tube w/sensor into the harness.

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.

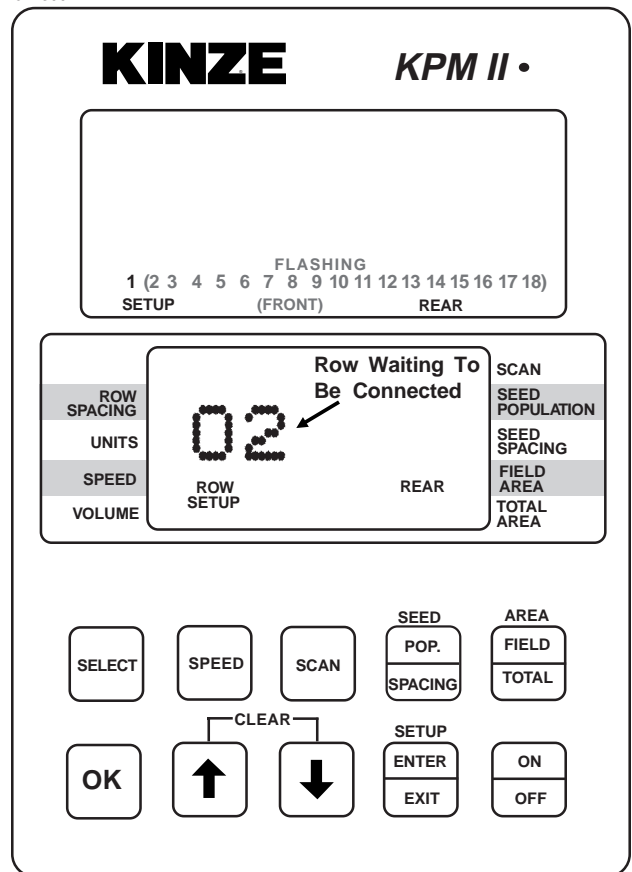
D04219901



01139921

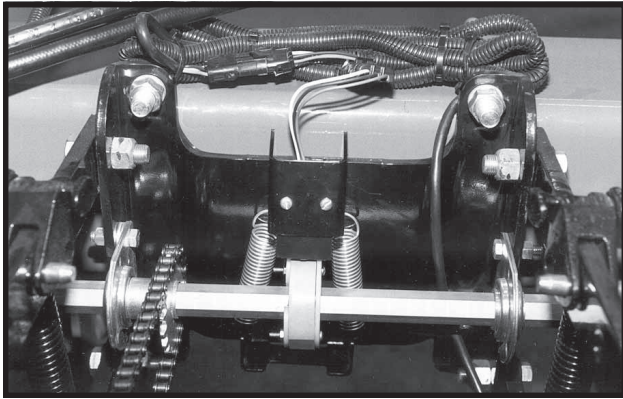


01139911



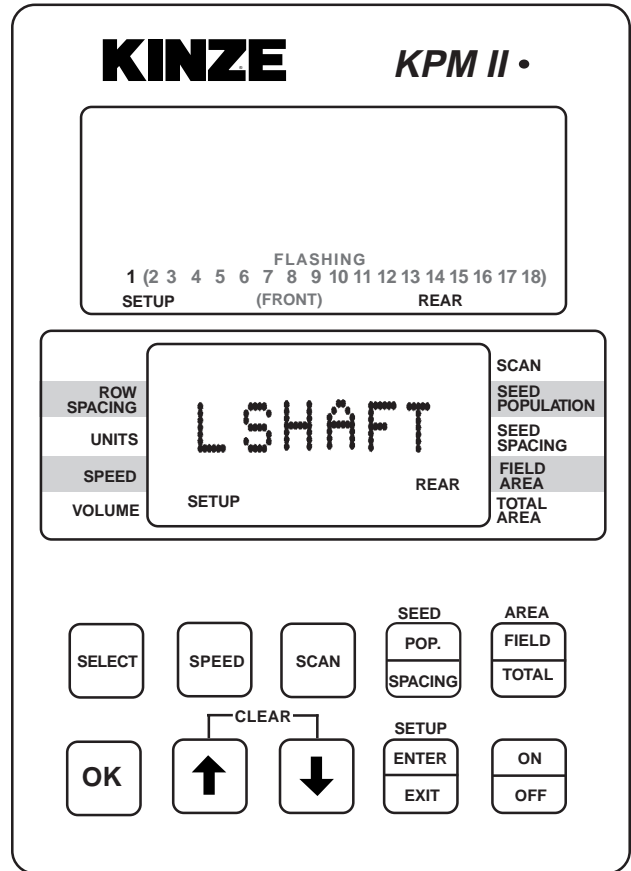
STEP 6 If the monitor system includes shaft rotation sensors, these can be installed at any time as the seed tubes are connected. The first shaft rotation sensor installed will be assigned to the rows on the L.H. half of the planter and the second shaft rotation sensor connected will be assigned to the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

01189906

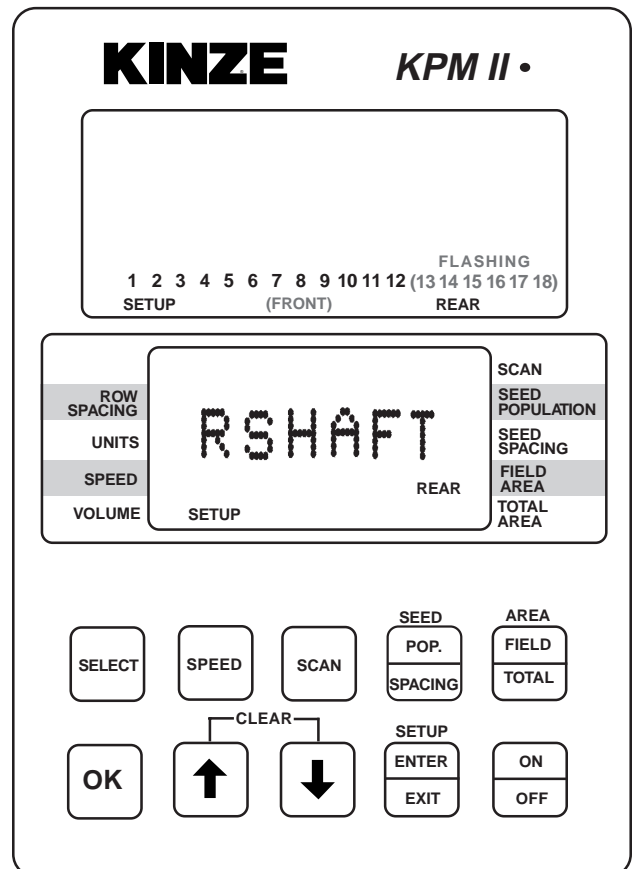


“LSHAFT” will display on the lower LCD when the first shaft rotation sensor is installed. “RSHAFT” will display when the second shaft rotation sensor is installed.

01139919

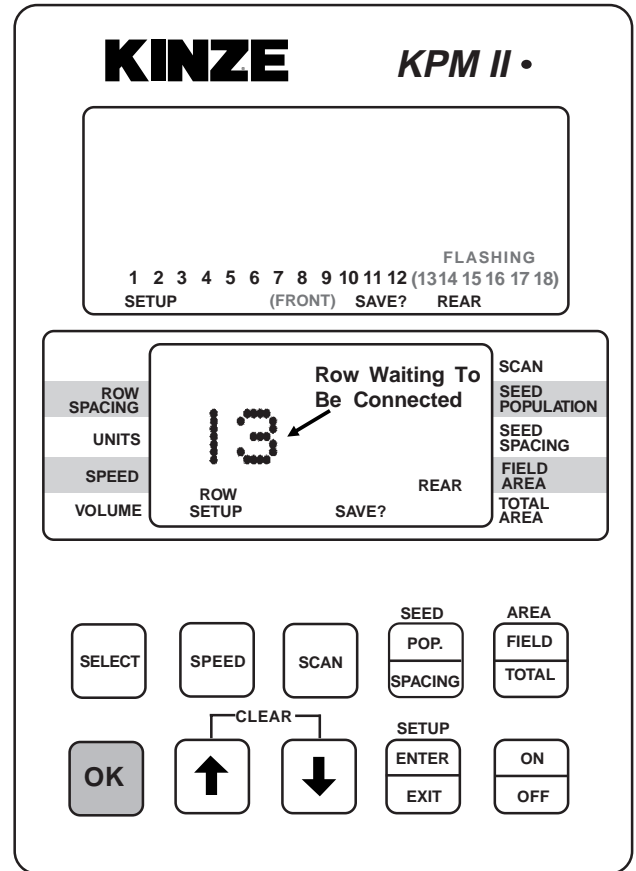


01139916

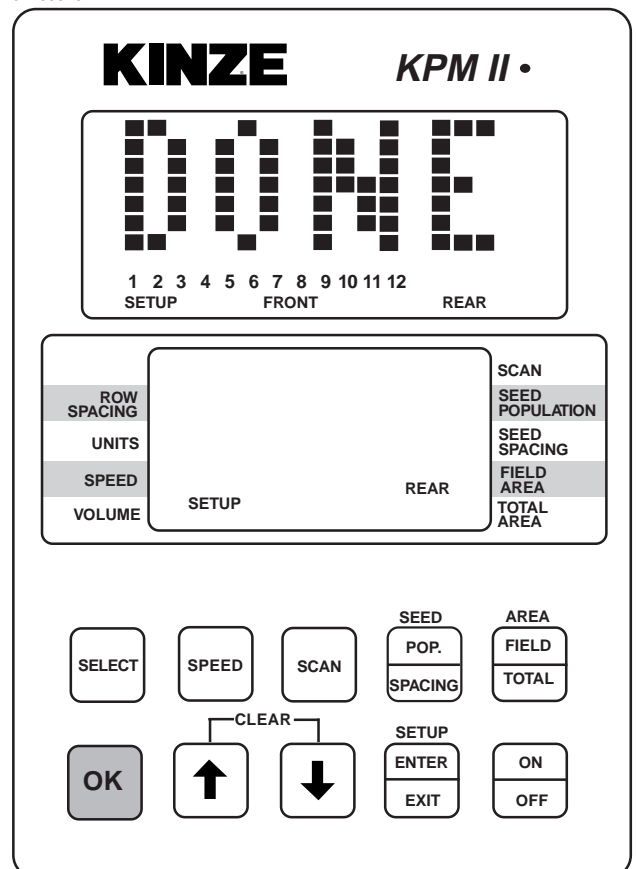


STEP 7 When all the seed tubes for the current section (Rear/Front or Left/Right) are installed, check to be sure the monitor displays solid numbers for the number of seed tubes connected. Press and hold the **OK** key to save the setup for the current section. The **SAVE?** icon will display followed 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

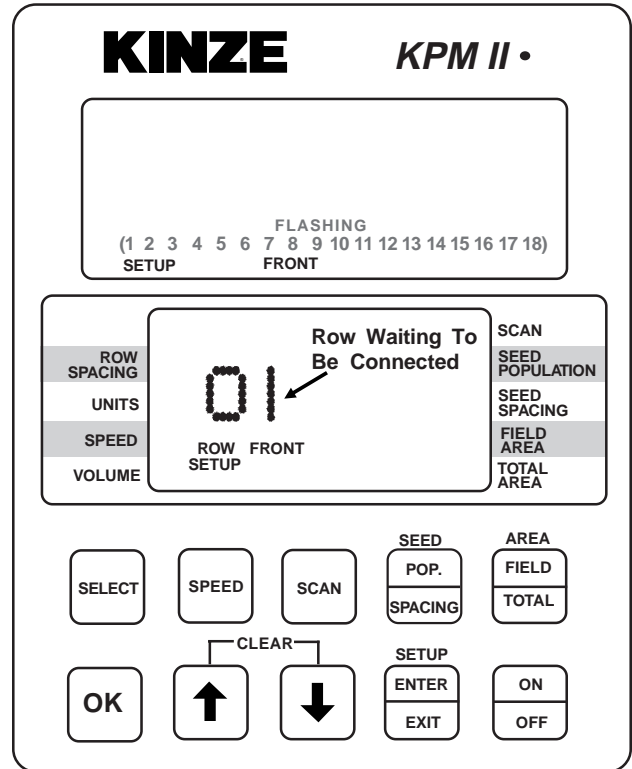


01139913

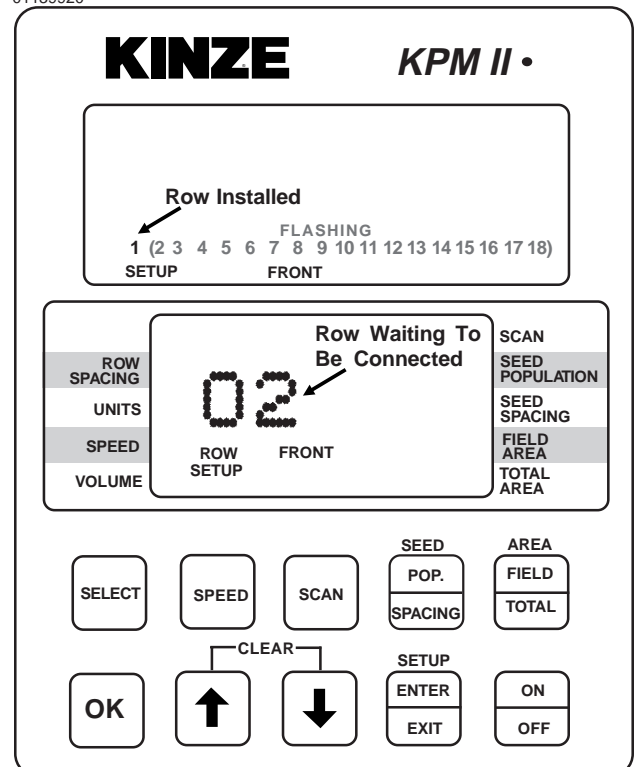


STEP 8 Follow STEPS 5 through 7 to install the second section. If no seed tubes are installed on the second section, press and hold the OK key. The word "DONE" will appear on upper display. The alarm will sound four short beeps followed by one long beep and the SAVE? icon turns off. The monitor has exited 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 FRONT
SETUP SAVE?

SCAN
SEED POPULATION
SEED SPACING
FIELD AREA
TOTAL AREA

SELECT

SPEED

SCAN

SEED
POP.
SPACING

AREA
FIELD
TOTAL

OK

↑
CLEAR

↓

SETUP
ENTER
EXIT

ON
OFF

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

↑
CLEAR

↓

SETUP
ENTER
EXIT

ON
OFF

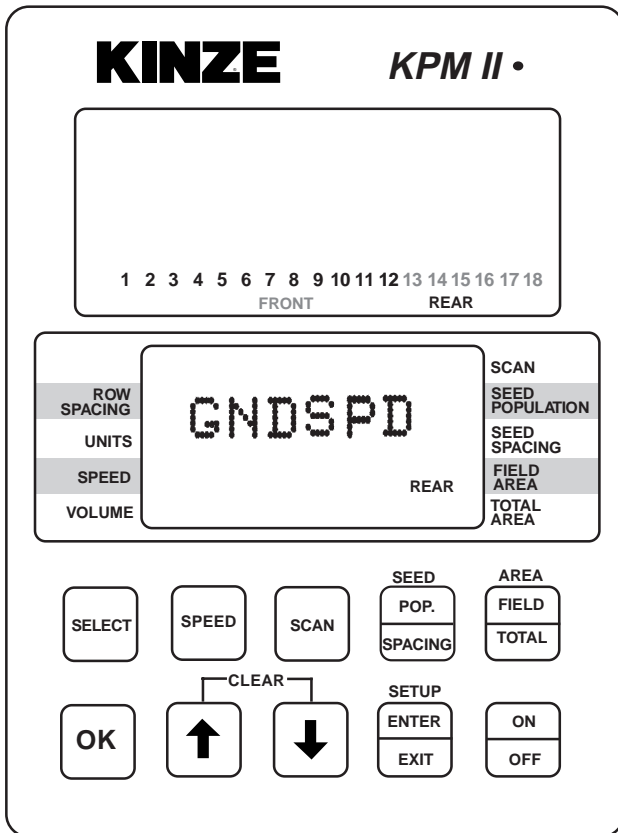
STEP 9 With the lower display showing “GNDSPD”, connect the distance sensor. The monitor will display “PICKUP” if a magnetic distance sensor is connected or “RADAR” if a radar distance sensor is installed. Only one distance sensor can be connected at a time.

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.

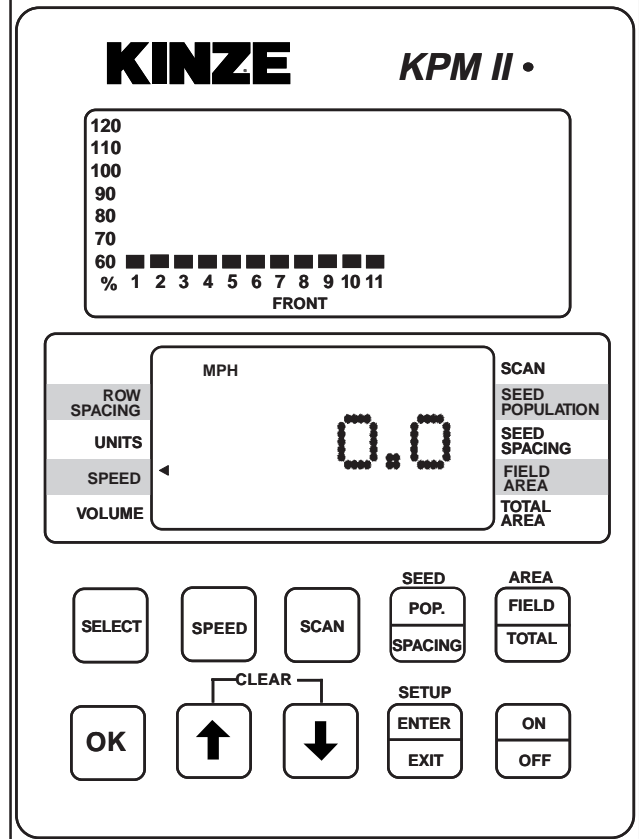
NOTE: To reprogram the system to monitor more or less rows (up to the maximum of 18 per section, 36 total), all sensors must be unplugged, followed by the complete setup procedure.

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 monitor 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.

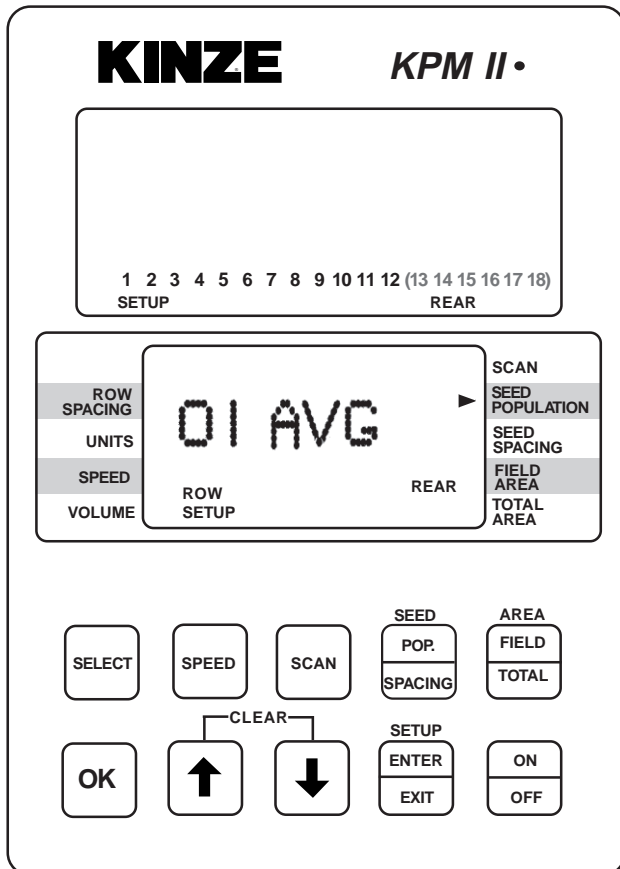
NOTE: The programming mode may be exited at any time by pressing the SETUP key. Pressing this key will return the monitor to its normal operation. All items changed and saved will come into effect immediately. Any items changed, but not saved will revert to the original programmed value.

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.

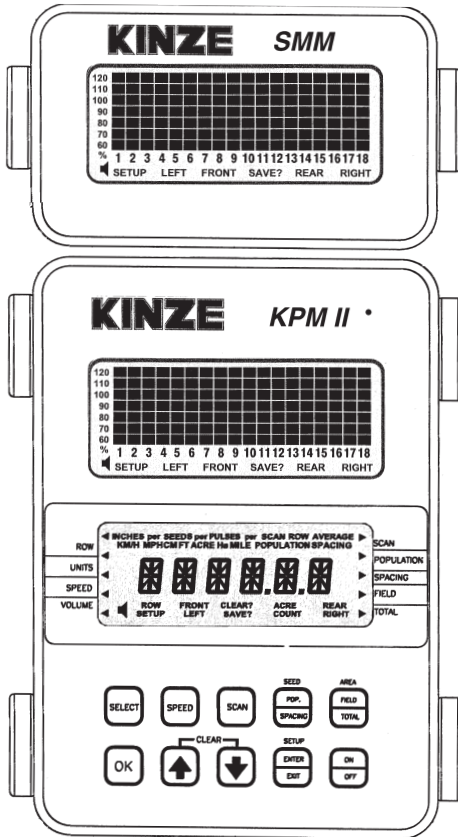
See "KPM I/KPM II/KPMII Stock Mode Electronic Seed Monitor Troubleshooting" in the Maintenance Section.

04130116



KPM II STACK-MODE ELECTRONIC SEED MONITOR

(MTR41e)



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

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

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

The 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	6-39
Upper LCD Functions	6-40
Lower LCD Functions	6-41
Programming	
Changing The Audible Alarm Volume	6-43
Units (Metric Or English)	6-44
Row Spacing	6-44
Speed	6-46
Clearing Total Area	6-47
Area Counter/Speedometer Mode	6-48
Warnings And Alarms	6-48
Replacing A Faulty Sensor	6-49
Field Operation	6-50
Clearing Field Area	6-51
Programming/Connecting SMM Console, Shaft Rotation Sensors, Seed Tubes And/Or Radar/Magnetic Distance Sensors	6-52
Row-By-Row Alarm Level Setting	6-63

MONITOR KEY FUNCTIONS

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

SELECT

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

SPEED

- Immediately displays the current ground speed.

SCAN

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

SEED POPULATION/SEED SPACING

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

AREA FIELD/AREA TOTAL

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

OK

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

UP ARROW AND DOWN ARROW

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

SETUP ENTER/SETUP EXIT

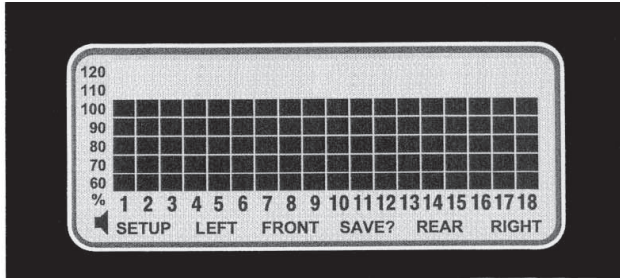
- Enters and exits the programming mode.

ON/OFF

- Powers the unit on and off.

UPPER LCD FUNCTIONS

(MTR29h)



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

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

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

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

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

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

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

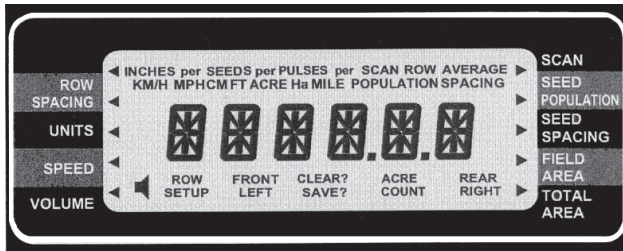
STEP 2 Press SELECT key again to activate both sections.

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

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

LOWER LCD FUNCTIONS

(MTR29g)



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

ROW SPACING

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

UNITS

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

SPEED

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

VOLUME

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

SCAN

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

MACHINE OPERATION

KPM II STACK-MODE

SEED POPULATION/SEED SPACING

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

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

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

FIELD AREA/TOTAL AREA

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

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

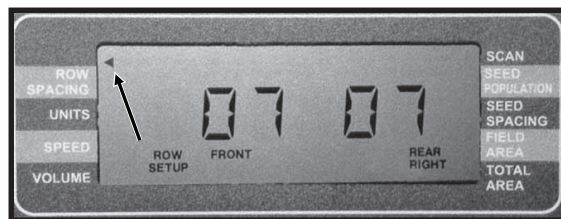
NOTE: When FIELD AREA is selected, the UP or DOWN key must be held in slightly longer than normal so the monitor will not mistake this action with a CLEAR, which consists of the UP and DOWN arrow keys pressed simultaneously. A beep will sound when the function activates.

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

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

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

092597-21



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

PROGRAMMING - Changing The Audible Alarm Volume

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

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

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

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

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

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

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

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

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

MACHINE OPERATION

KPM II STACK-MODE

PROGRAMMING - Units (Metric Or English)

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

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

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

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

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

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

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

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

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

PROGRAMMING - Row Spacing

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

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

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

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

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

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

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

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

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

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

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

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

To exit setup mode, press the SETUP key.

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

PROGRAMMING - Speed

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

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

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

STEP 3 Press the OK key and the flashing arrow becomes solid and the audible alarm will sound. The 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 rear/front or left/right configurations beginning with the lowest numbered row in the rear or left section and continue to replace sensors in ascending order. Then move on to the front or right section and continue in ascending order. For four section configurations, begin with rear/left and continue to rear/right, then front/left and ending with front/right.

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

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

MACHINE OPERATION

KPM II STACK-MODE

FIELD OPERATION

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



(MTR28e)

Information regarding each section is displayed alternately every 5 seconds.

REAR/FRONT CONFIGURATION (Without SMM Console Installed)

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



(MTR28c)

REAR/FRONT CONFIGURATION (With SMM Console Installed)

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



(MTR28c)

FOUR SECTION CONFIGURATION (With SMM Console Installed)

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

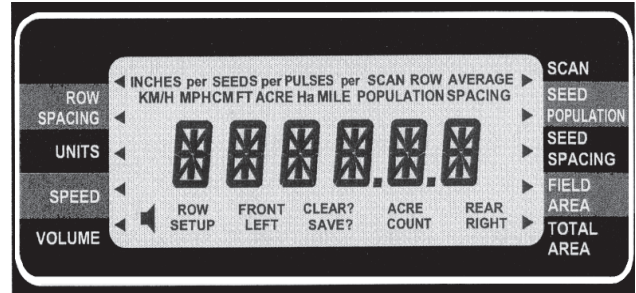


(MTR28c)

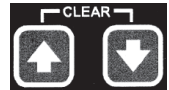
NOTE: SELECT key has no function when only a single section is being used.

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

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



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



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



(MTR29c/MTR29d/MTR29b/MTR29c)

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



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



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



Press the SCAN key again to lock on current row.

Press the SCAN key again to resume scrolling.

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



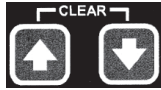
Press the SEED POPULATION/SEED SPACING key to go back to planter average.



CLEARING FIELD AREA

(MTR29n/MTR28b)

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



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



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

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



MACHINE OPERATION

KPM II STACK-MODE

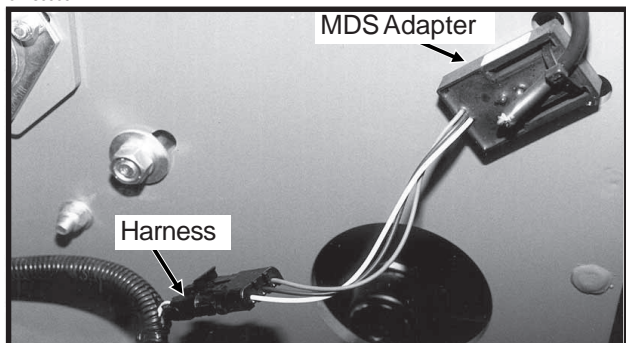
PROGRAMMING/CONNECTING SMM CONSOLE, SHAFT ROTATION SENSORS, SEED TUBES AND/OR RADAR/MAGNETIC DISTANCE SENSORS

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

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

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

01189909



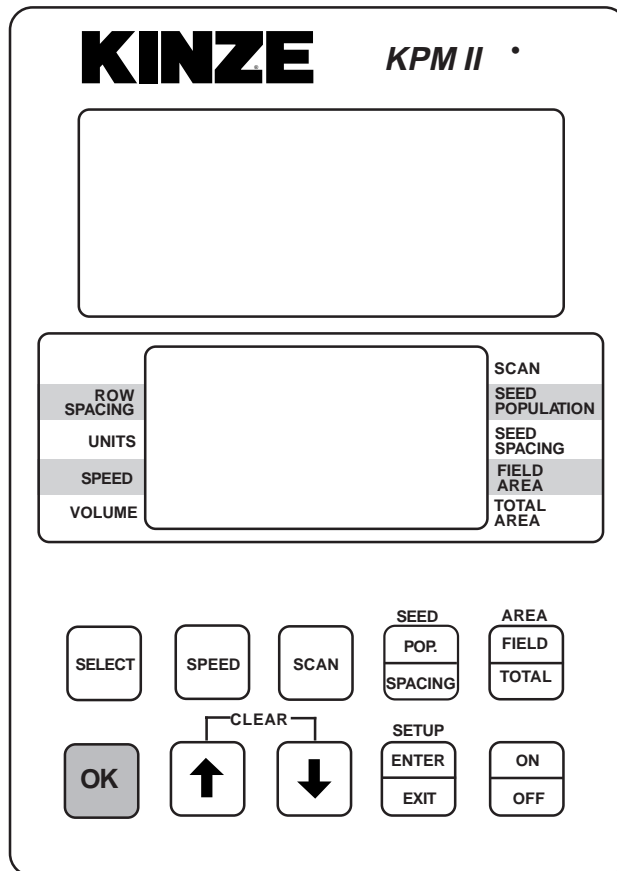
01189910



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

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

12060211

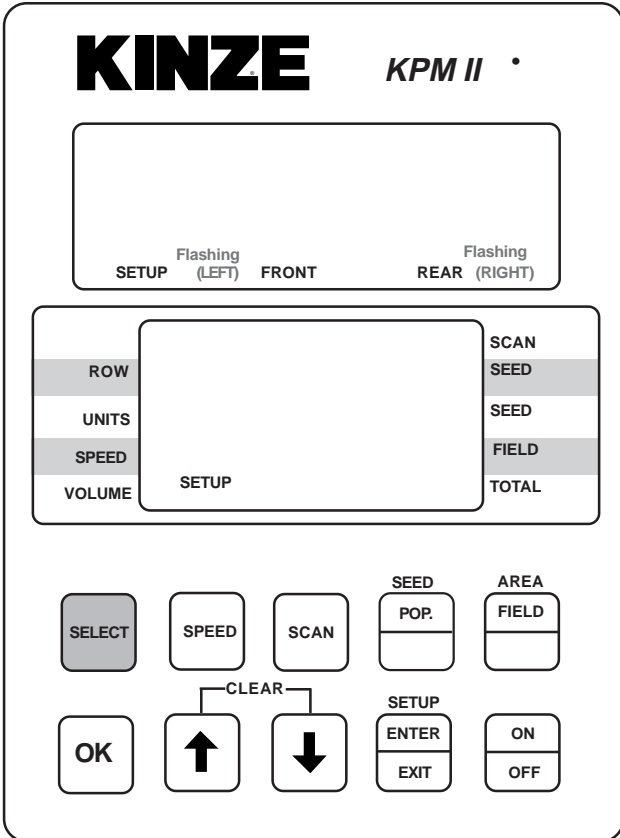


NOTE: SMM console may not be applicable to all models.

MACHINE OPERATION

KPM II STACK-MODE

12060211



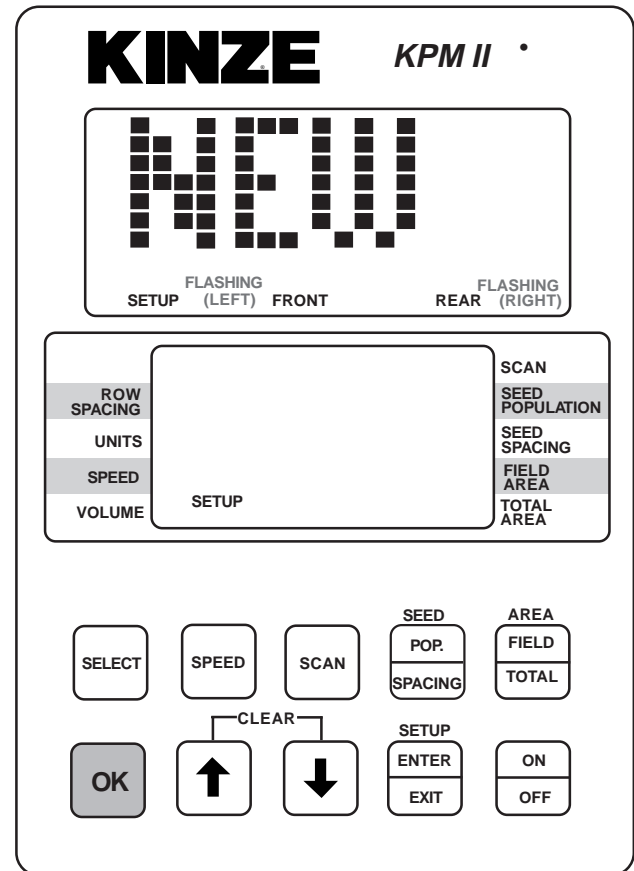
NOTE: SMM console may not be applicable to all models.

NOTE: Model 3500 planters select the rear/front configuration.

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

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

12060211



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

MACHINE OPERATION

KPM II STACK-MODE

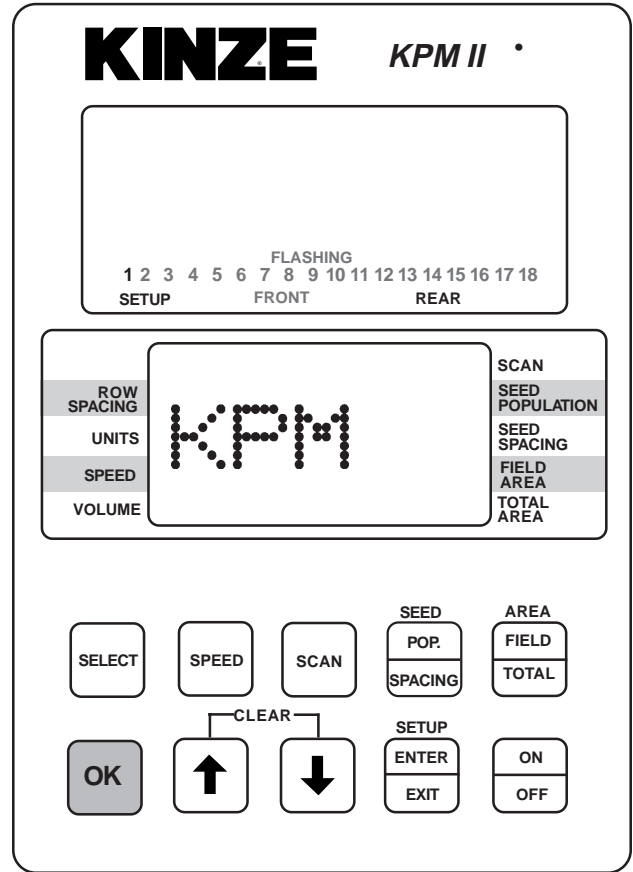
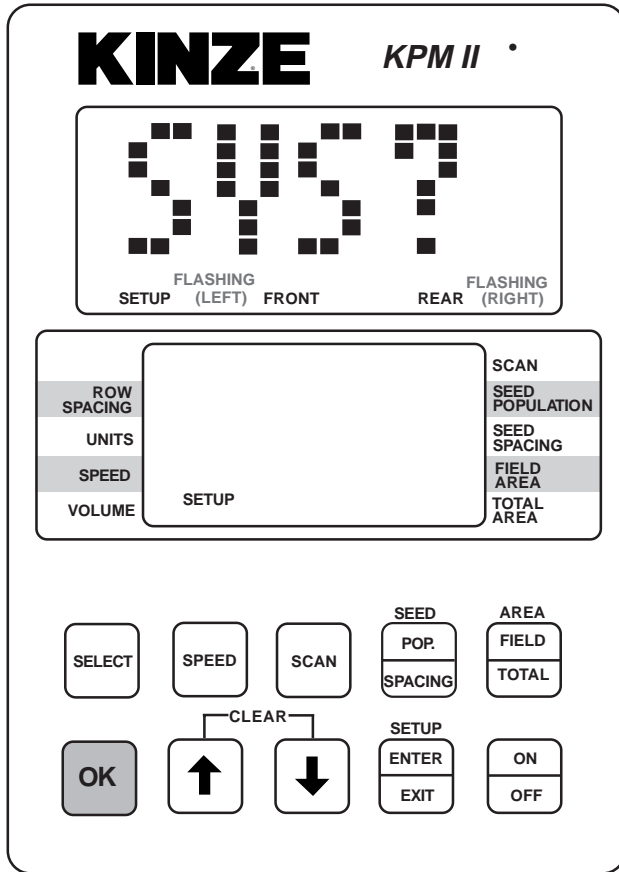
NOTE: Illustrated using rear/front configuration. The KPM II Stack-Mode console shows LEFT in the left/right configuration, REAR in the rear/front configuration and FRONT LEFT/REAR LEFT in the four sections configuration.

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

12060211



12060211



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

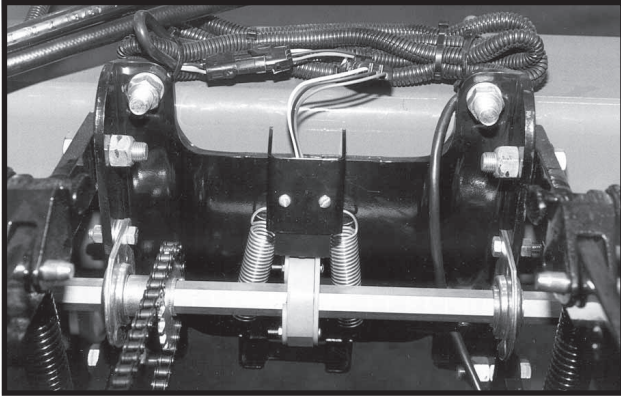
NOTE: SMM console may not be applicable to all models.

MACHINE OPERATION

KPM II STACK-MODE

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

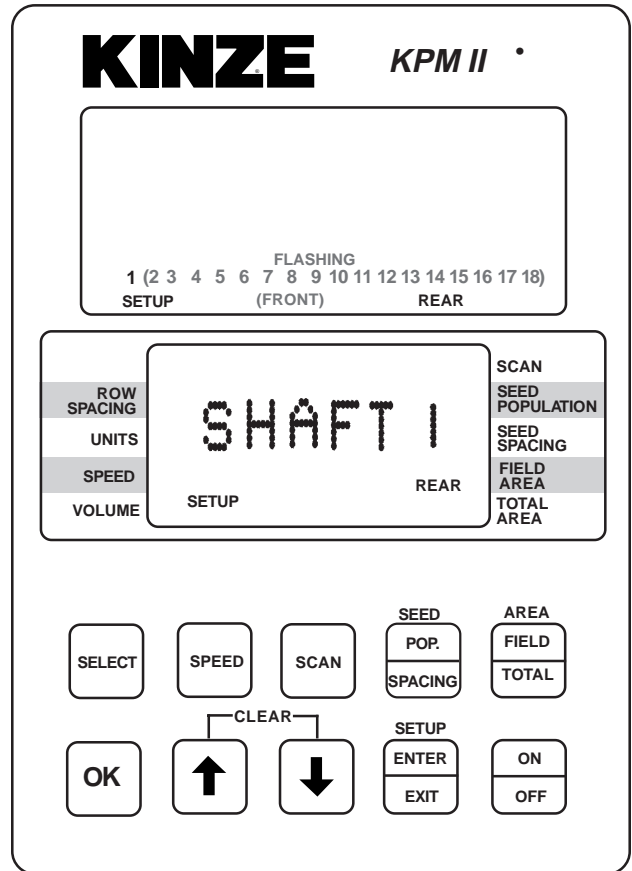
01189906



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

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

12060211



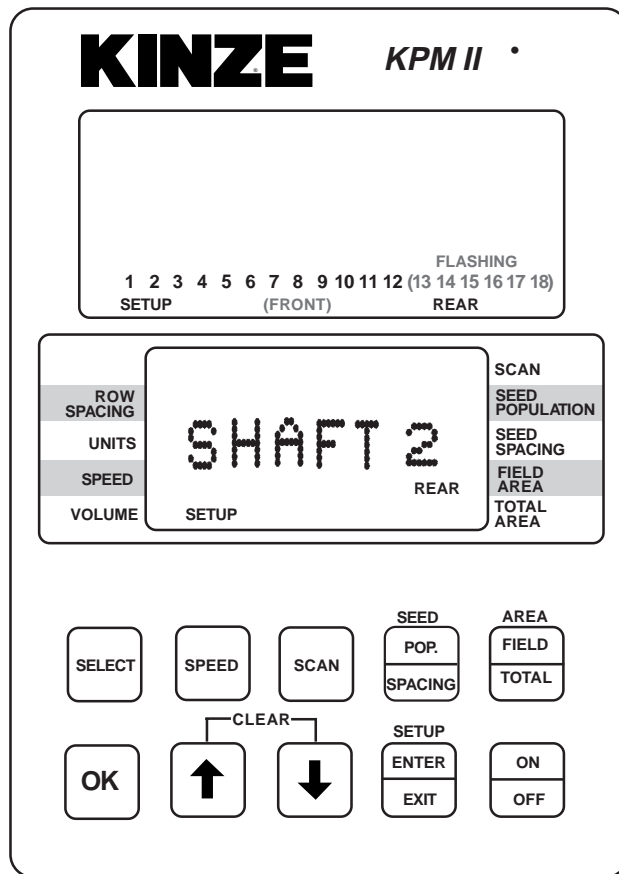
NOTE: SMM console may not be applicable to all models.

MACHINE OPERATION

KPM II STACK-MODE

STEP 6 (Continued)

12060211

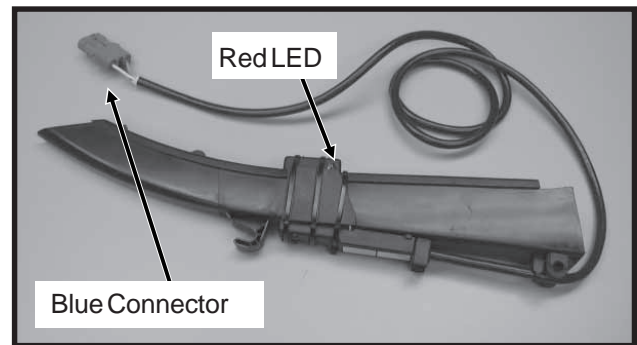


NOTE: SMM console may not be applicable to all models.

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

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

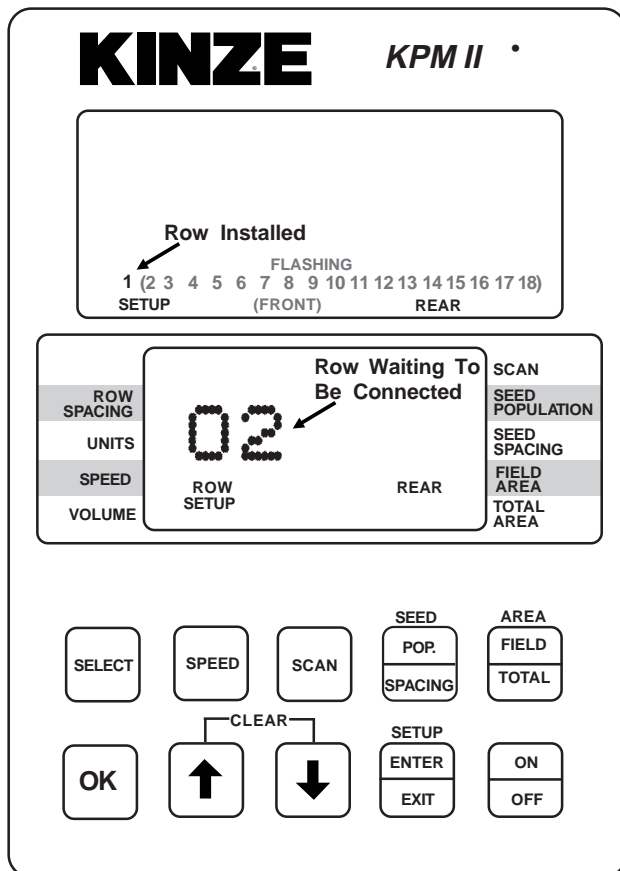
D120602101



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.

STEP 7 (Continued)

12060211



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

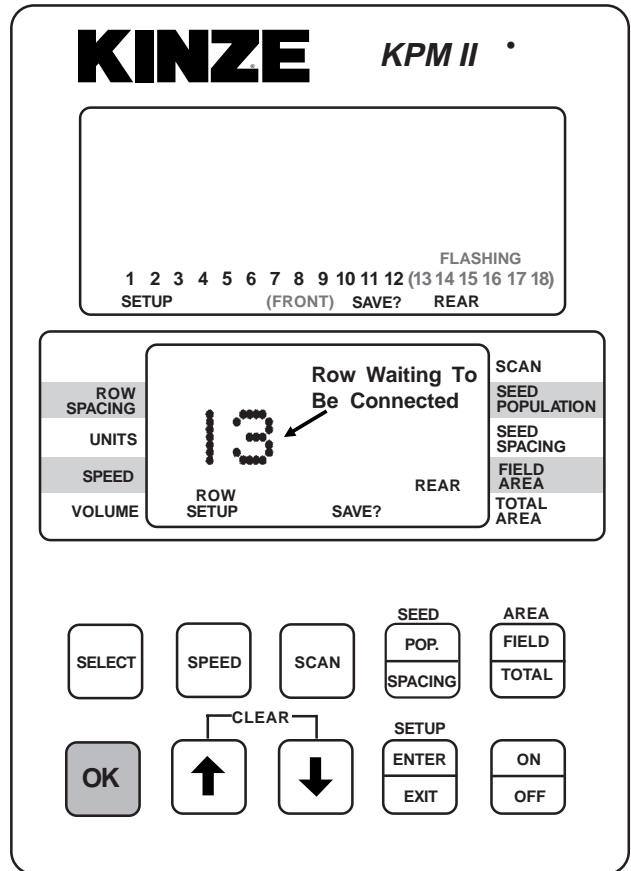
MACHINE OPERATION

KPM II STACK-MODE

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

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

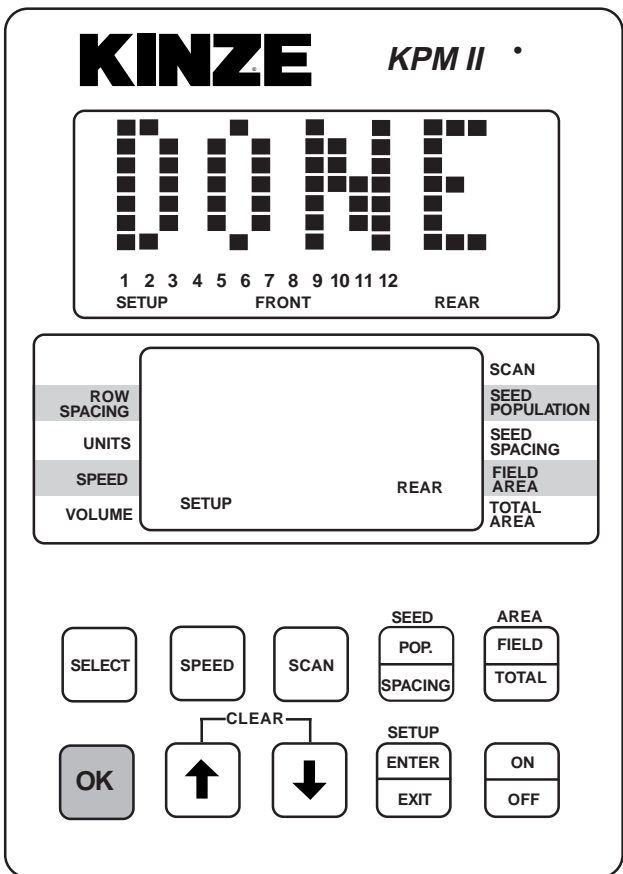
12060211



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

STEP 8 (Continued)

12060211



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

MACHINE OPERATION

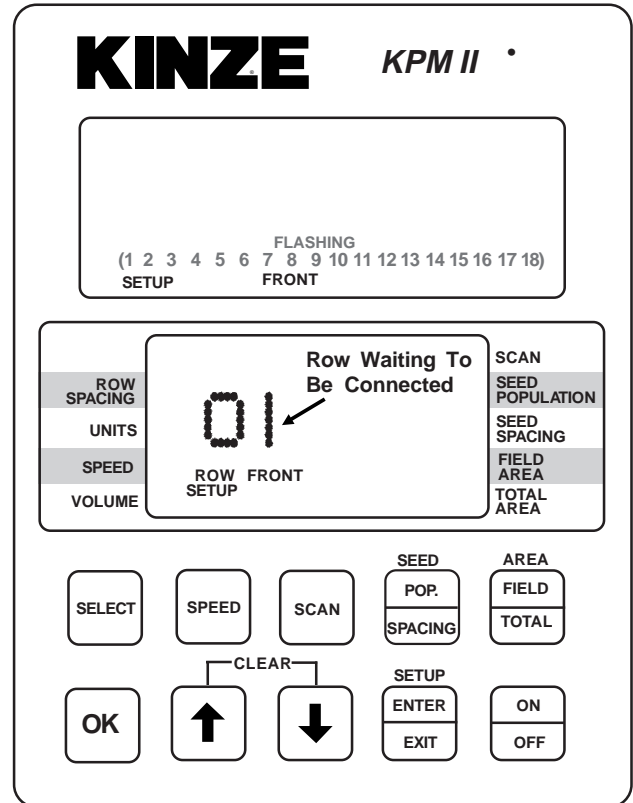
KPM II STACK-MODE

STEP 9 Follow STEPS 6, 7 and 8 to install the second 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 alarm will sound continually until the distance sensor is connected. See STEP 10.

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

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

12060212



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

MACHINE OPERATION

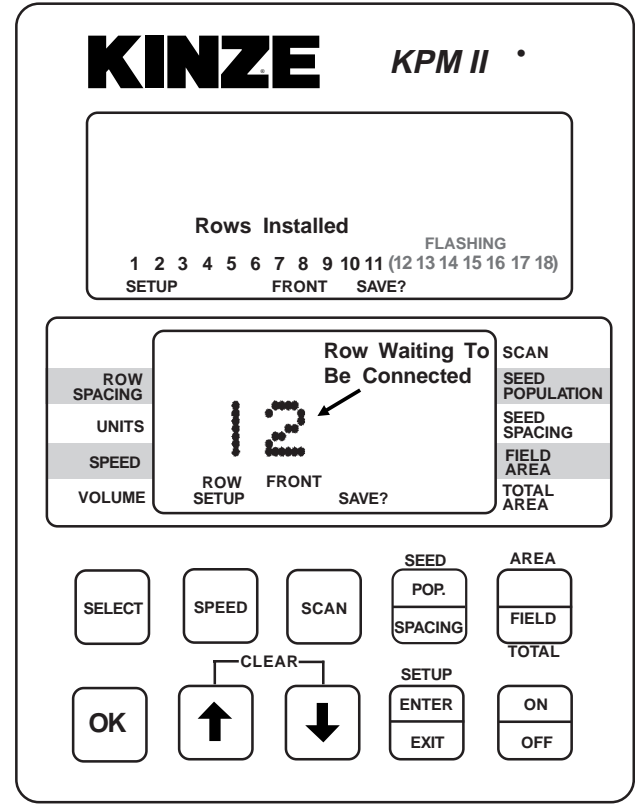
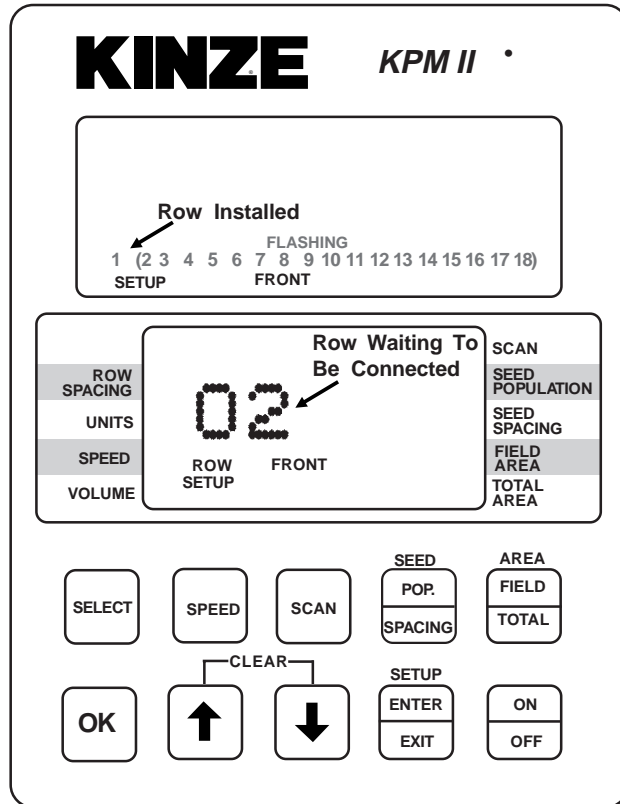
KPM II STACK-MODE

STEP 9 (Continued)

12060213



12060214



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

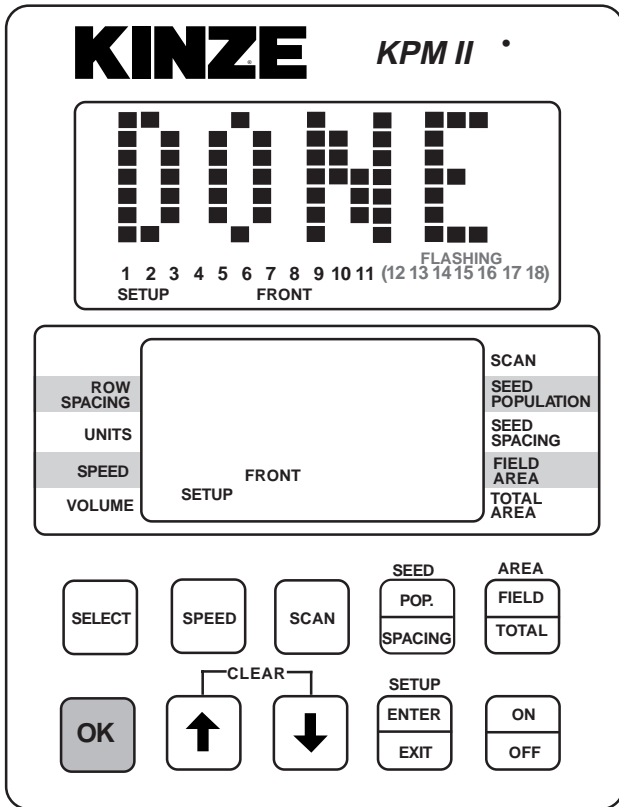
NOTE: SMM console may not be applicable to all models.

MACHINE OPERATION

KPM II STACK-MODE

STEP 9 (Continued)

12060215



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

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

NOTE: 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.

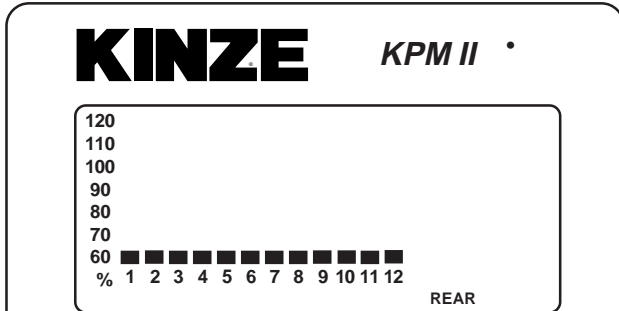
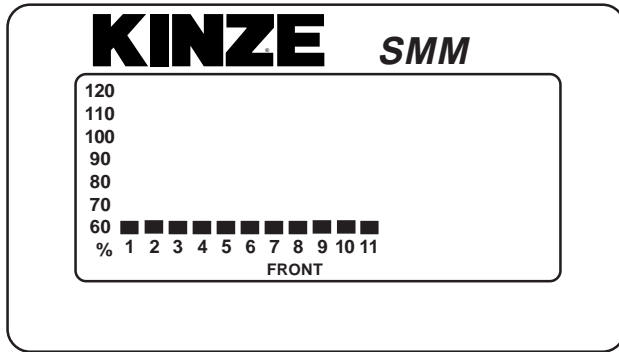
NOTE: To connect the radar distance sensor, install the 10" monitor/radar adapter between the console and radar distance sensor to adapt the monitor system to various tractor radar systems.

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

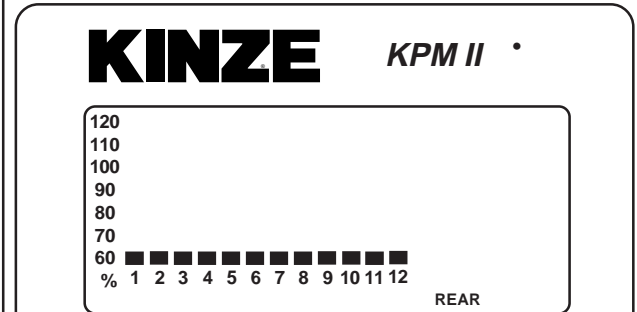
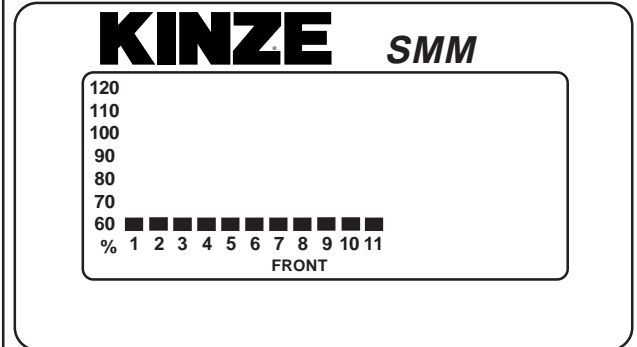
SELECT	SPEED	SCAN	SEED POP. SPACING	AREA FIELD TOTAL
OK	CLEAR		SETUP ENTER EXIT	ON OFF
	↑	↓		

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

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

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

12060217



ROW SPACING	MPH 0.0	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: SMM console may not be applicable to all models.

MACHINE OPERATION

KPM II STACK-MODE

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

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

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

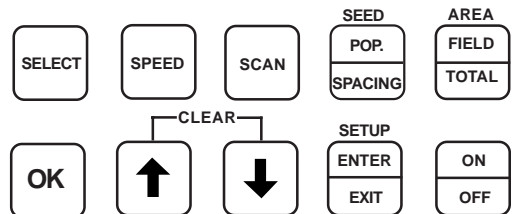
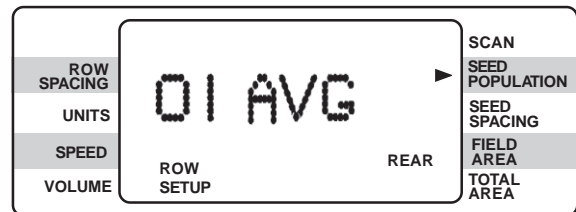
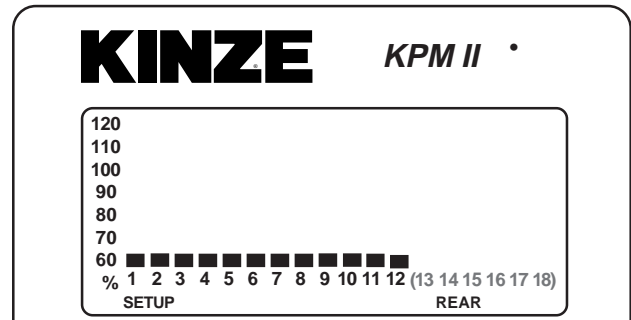
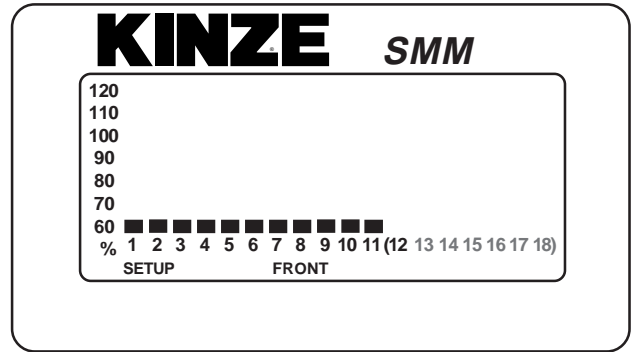
NOTE: Illustrated using rear/front configuration. The KPM II Stack-Mode console shows LEFT in the left/right configuration, REAR in the rear/front configuration and FRONT LEFT/REAR LEFT in the four sections configuration. The SMM console shows RIGHT in the left/right configuration, FRONT in the rear/front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

STEP 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



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

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

STEP 4 Arrow UP or DOWN to desired row.

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

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

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

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

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

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

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

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

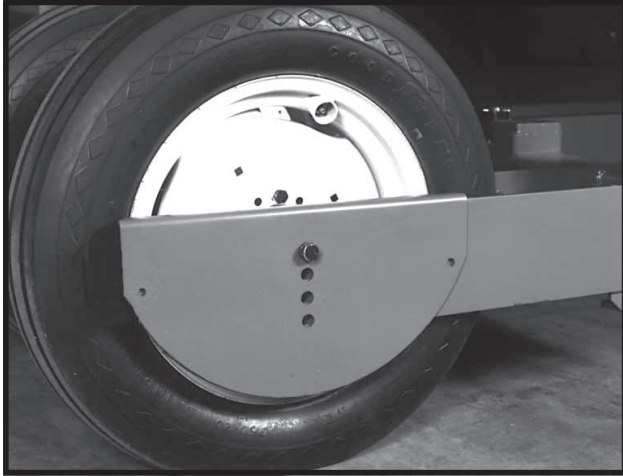
NOTE: See "Programming - Row Spacing" for programming applicable row spacing.

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

MACHINE OPERATION

ROCK GUARDS

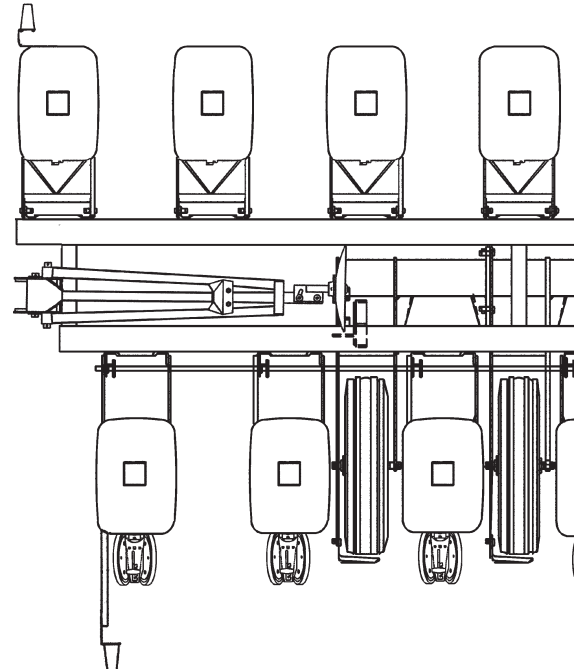
69797-65a



Transport wheel rock guards are designed for use on both sides of each of the four transport wheels when the planter is used in rocky conditions. Rock guards will help prevent rocks from being picked up by the wheels, which can cause damage to the adjoining row units.

EVEN-ROW PUSH ROW UNIT

(PLTR121n)



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

IMPORTANT: See “Row Marker Length Adjustment” in the Machine Operation section for determining correct length at which to set the marker assemblies when using the even-row push row unit.

MACHINE OPERATION

DOUBLE DISC FERTILIZER OPENER

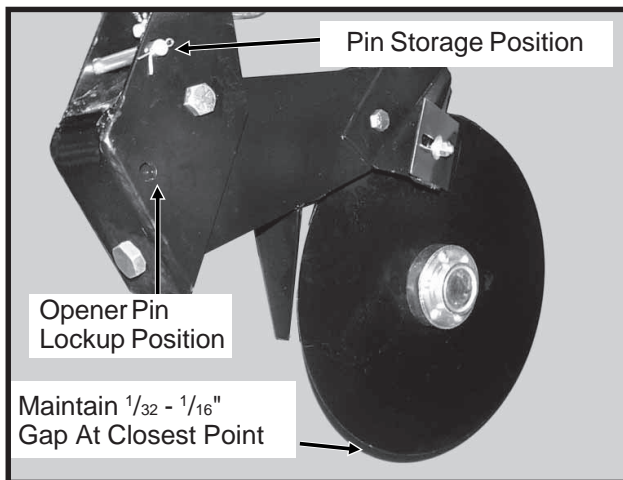
The double disc fertilizer openers should be positioned during assembly **to place fertilizer no closer than 2" to either side of the row.** If the planter frame is level and at proper 20" operating height, fertilizer depth will be approximately 4". Soil conditions can affect depth slightly.

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 hard ground.

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

A gap of $^{1}/_{32}$ " 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.

D06259919a



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

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



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

MACHINE OPERATION

NOTCHED SINGLE DISC FERTILIZER OPENER - STYLE A

The notched single disc fertilizer opener is designed for use in minimum and no till planting conditions. Placement of fertilizer with the 16 ³/₄" diameter notched single disc fertilizer opener is recommended at 2 ¹/₂ - 3" from the row. **Never locate the opener to place fertilizer closer than 2".**

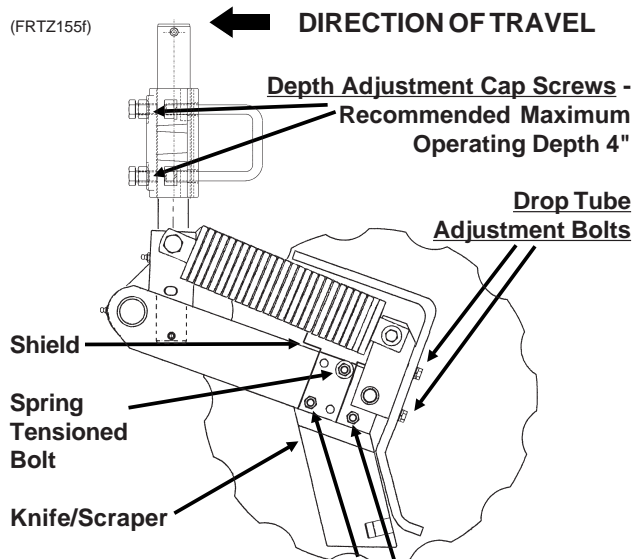
Adjust blade depth on each row using the cap screws and jam nuts located on the opener pivot shaft. The blade can be adjusted to allow a maximum 4" operating depth. Be sure the spring pin holes in the pivot post remain parallel with the opener mounting plate. Check fertilizer hose clearance after adjusting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

(FRTZ155f)



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.)

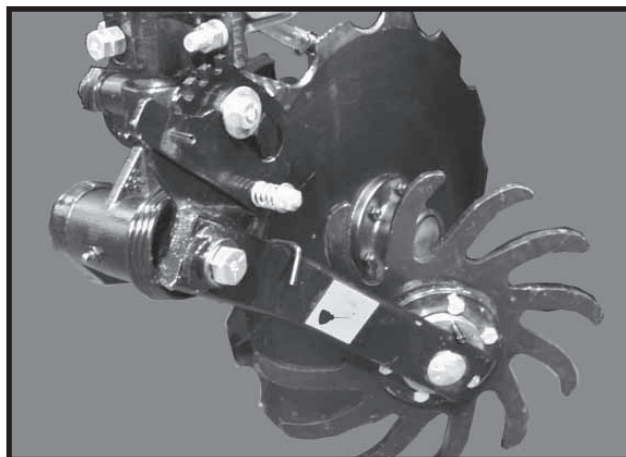
Adjust knife/scraper leading edge contact on each row so blade will turn by hand with slight resistance, but will not coast or freewheel. In dry loose soil, knife/scraper adjustment is critical. If adjustment is not maintained, soil or residue may wedge causing the blade to push. If the knife/scraper 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. Re-adjust 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 the 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.

Due to space restrictions, the residue wheel attachment for the notched single disc fertilizer opener is not applicable to Model 3500 planters equipped with Interplant® push row units and notched single disc fertilizer openers.

MACHINE OPERATION

NOTCHED SINGLE DISC FERTILIZER OPENER - STYLE B

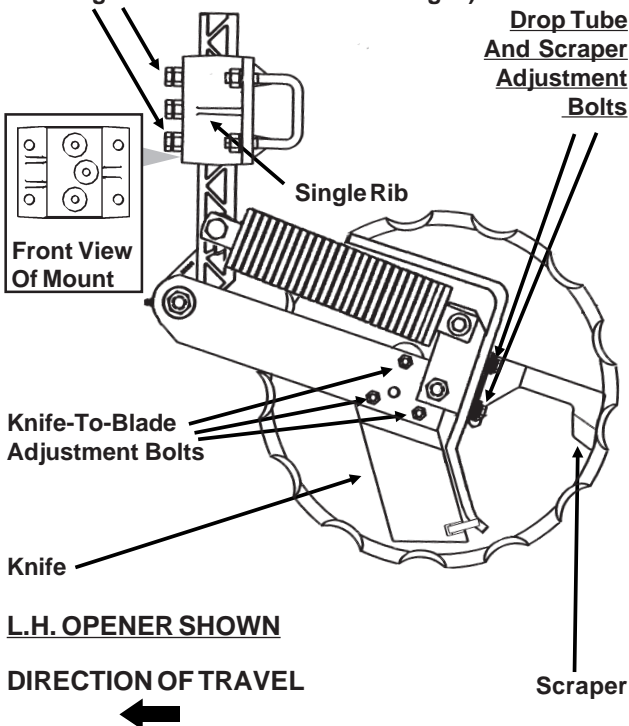
The notched single disc fertilizer opener is designed for use in minimum and no till planting conditions. Placement of fertilizer with the 16 3/4" diameter notched single disc fertilizer opener is recommended at 2 1/2 - 3" from the row. The opener is designed to hold the blade at a set-angle so the knife 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.

(FRTZ210q/B0297)

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



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

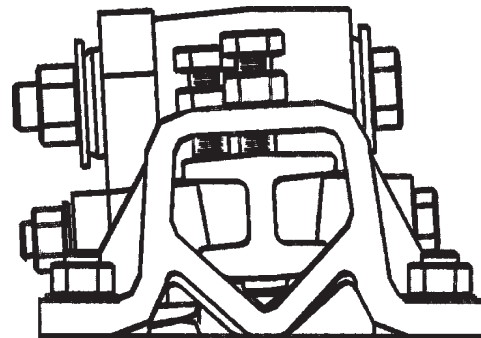
Using the slotted mounting holes in the drop tube mount, **adjust fertilizer drop tube** behind the knife so it is protected from soil contact and wear. The liquid drop tube should be adjusted 1/4 - 3/8" from the opener blade while keeping it behind the knife. **Adjust scraper** to just touch the opener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

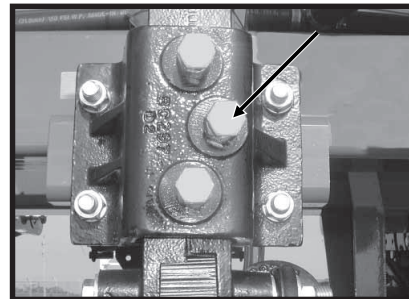
NOTE: The blade runs through the ground at an angle relative to the direction of travel. For this reason and to ensure proper operation, the cast mount should be oriented so the single rib is on the same side of the blade as the drop tube.

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

FRTZ214c



D070103100



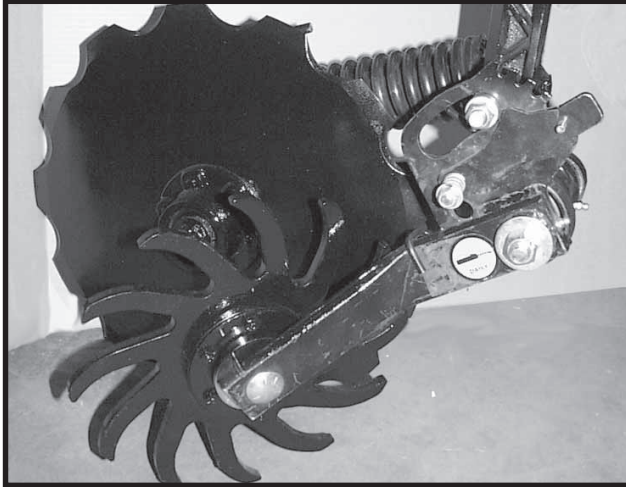
NOTE: Middle cap screw must be tightened prior to tightening depth adjustment cap screws.

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.

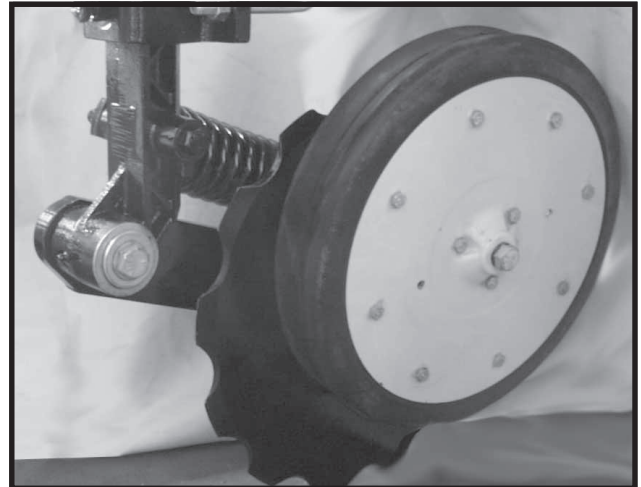
Maximum depth is set by lifting the residue wheel and moving the adjustment lever down to increase depth or up to decrease depth in 1" increments (in relation to blade depth setting). Adjust all rows the same. Down force on the residue wheel is maintained by a torsion spring and is not adjustable.

Due to space restrictions, the residue wheel attachment for the notched single disc fertilizer opener is not applicable to Model 3500 planters equipped with Interplant® push row units and notched single disc fertilizer openers.

DEPTH/GAUGE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER

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

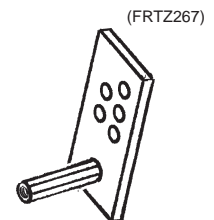
D061101202a



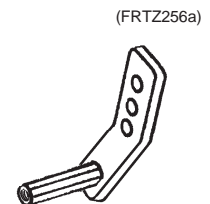
The depth/gauge wheel attachment for the notched single disc fertilizer opener is designed for use in situations where additional gauging is required to maintain desired fertilizer opener depth. The depth/gauge wheel is attached to the notched single disc fertilizer opener using a mounting block fastened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

Depth adjustment is made by using the adjustment holes in the depth/gauge wheel mounting block.

If equipped with the depth/gauge wheel mounting block with 5 holes, 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.



If equipped with the depth/gauge wheel mounting block with 3 holes, moving the depth/gauge wheel increases/decreases depth in approximate 1" increments in relation to the blade depth setting made at the vertical mounting post.

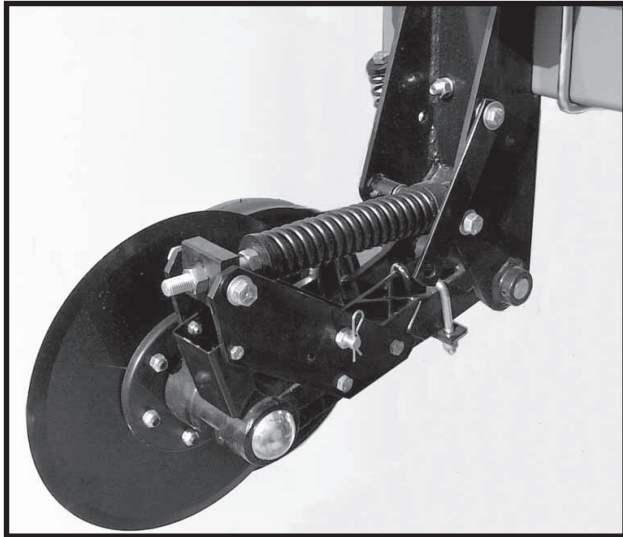


Due to space restrictions, the depth/gauge wheel attachment for the notched single disc fertilizer opener is not applicable to Model 3500 planters equipped with Interplant® push row units and notched single disc fertilizer openers.

MACHINE OPERATION

HD SINGLE DISC FERTILIZER OPENER

D062601103



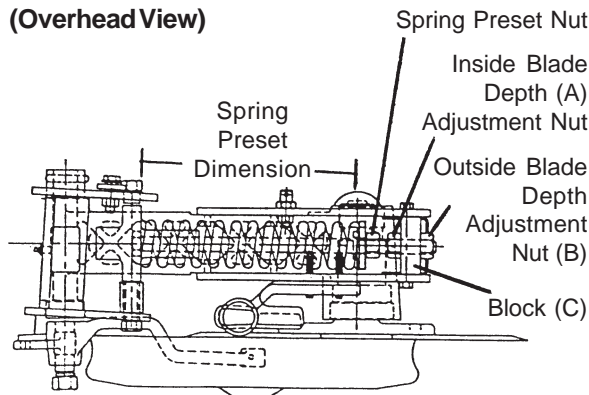
Placement of fertilizer with the HD single disc fertilizer opener is recommended at 3 1/2" - 4" from the row. **Never locate the opener to place fertilizer closer than 2".**

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

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

L0114(PLTR3)

DIRECTION OF TRAVEL →
(Overhead View)



R.H. Configuration Shown

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

SPRING PRESET DIMENSION	DOWN PRESSURE (LBS.)
11"	250
10 3/4"	320
*10 1/2"	370
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.



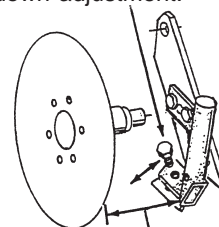
WARNING: Always install all safety lockup devices before working under or around the machine.

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 scrapper adjustment bolt. Slotted hole in scrapper allows up or down adjustment.

FOC016(PLTR4)

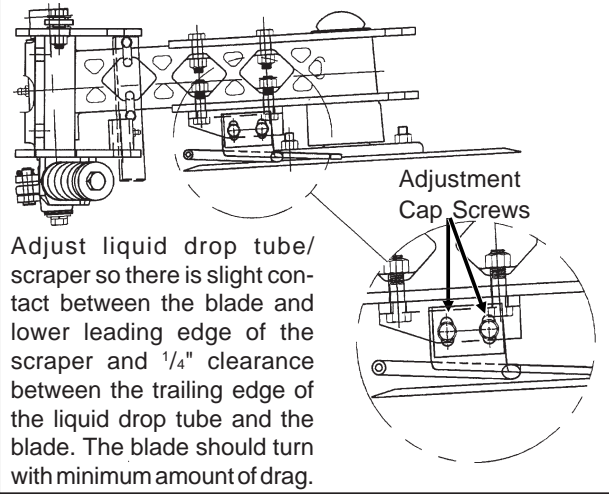


Adjust scrapper to maintain 1/8" gap between drop tube and opener blade. Distance is exaggerated in above illustration.

MACHINE OPERATION

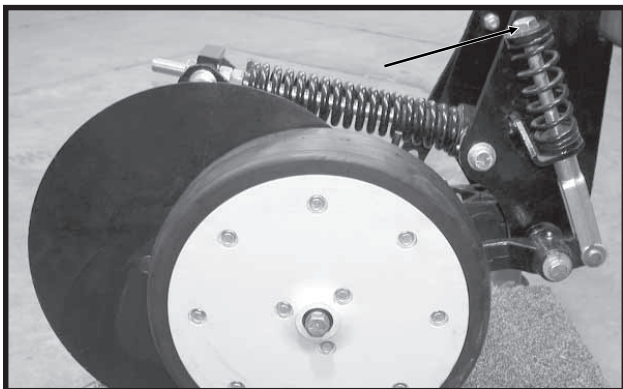
Maintain liquid fertilizer drop tube/scrapper adjustment as shown below.

(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:

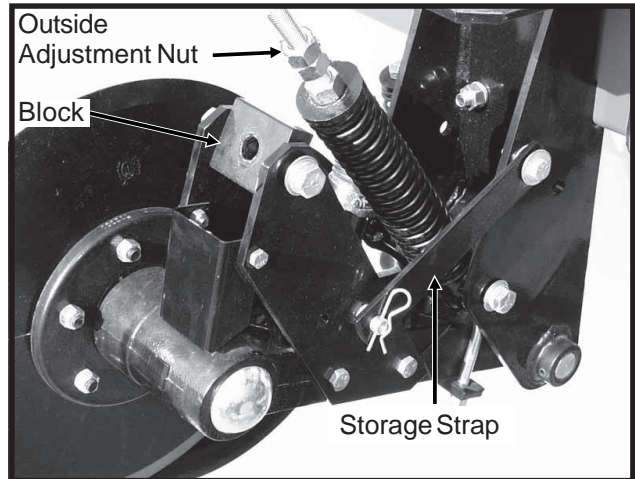
STEP 1 With the planter in the planting position, remove outside blade depth adjustment nut. ("B" in illustration on previous page.)

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.

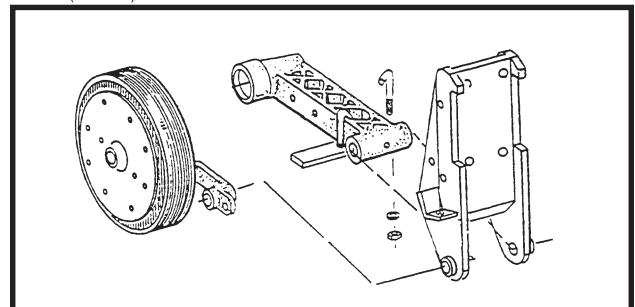
STEP 4 Reinstall depth adjustment nut and tighten.

D062601102



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

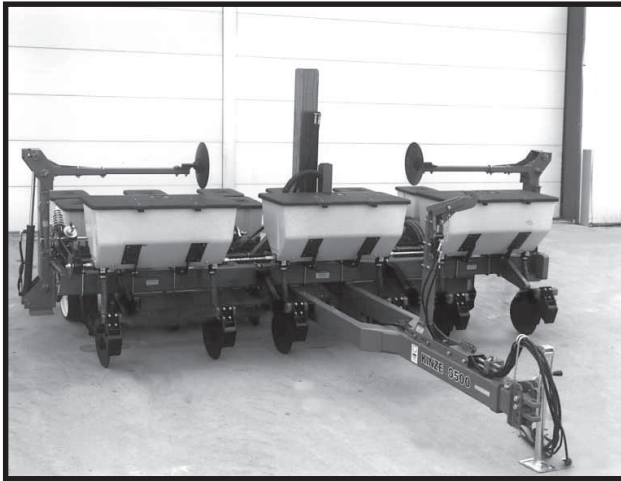
FOC016(PLTR5b)



MACHINE OPERATION

DRY FERTILIZER ATTACHMENT

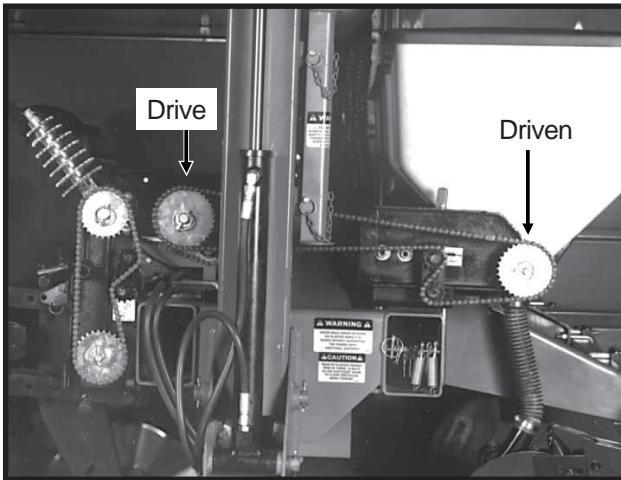
69797-89d



Shown With Optional Double Disc Openers

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.

69797-4a

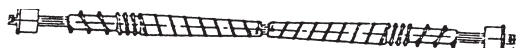


(PLTR7)



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 of a rate setting.

A fertilizer transmission is located on the R.H. 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 assembly is adjusted with a easy-release idler arm. This arm has a release position to remove spring tension for replacing sprockets. The amount of spring tension on the chain is controlled by the idler arm. 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.



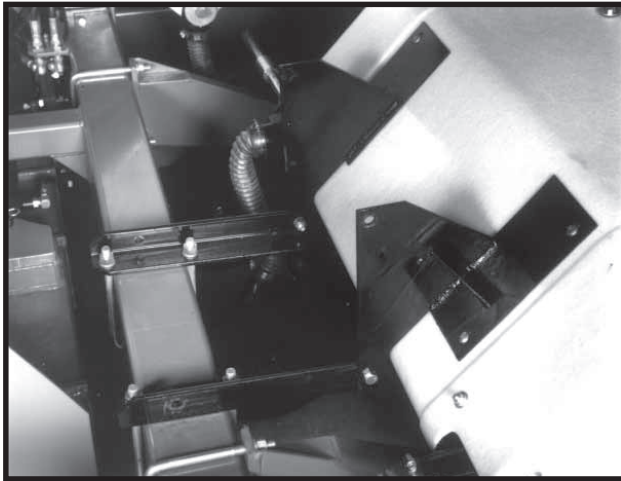
WARNING: Agricultural chemicals can be dangerous if not selected and handled with care. Always read and follow directions supplied by the chemical manufacturer.

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. Remove the two rear $\frac{1}{2}$ " x $1\frac{1}{4}$ " cap screws from between hopper mounts and mounting angles. Rotate hopper lids to the back side of the hopper and carefully tip hopper forward. After dumping contents, flush all loose fertilizer from the hopper and hoses.

69797-85

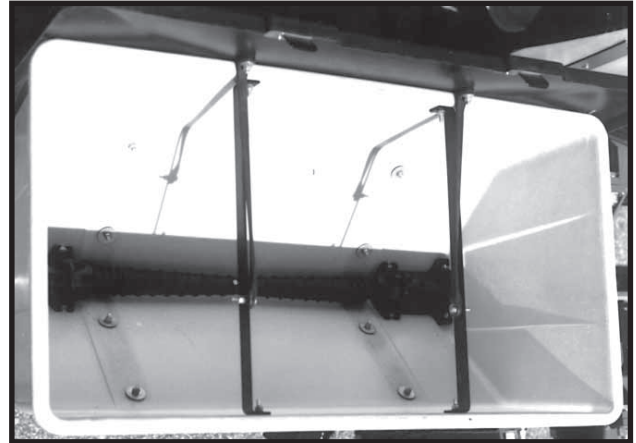


At the end of the planting season, or when the fertilizer attachment is not going to be used for a period of time, the hoppers should be disassembled, cleaned and coated with a rust preventative.

To disassemble auger assemblies, remove $\frac{1}{4}$ " 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



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. **NOTE: THE FERTILIZER TRANSMISSION ROTATES IN THE OPPOSITE DIRECTION OF PLANTER TRAVEL.**

Be certain augers turn freely. If not, loosen the $\frac{5}{16}$ " carriage bolts in the outlet housings, rotate the auger several times and retighten the $\frac{5}{16}$ " 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.

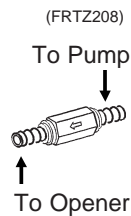
IMPORTANT: Frequent lubrication of auger bearings is critical to ensure that the augers will turn freely. Check lubrication section for frequency.

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

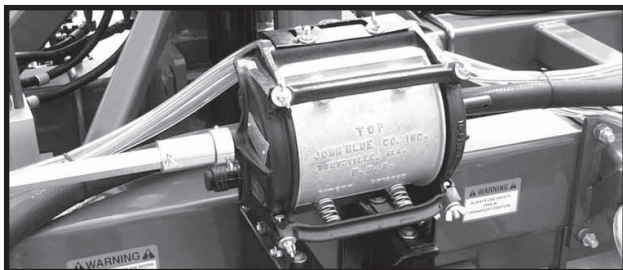
LIQUID FERTILIZER ATTACHMENT

NOTE: An optional low rate check valve is available for installation in-line between the liquid fertilizer squeeze or 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.



OPTIONAL SQUEEZE PUMP

D061199308



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.

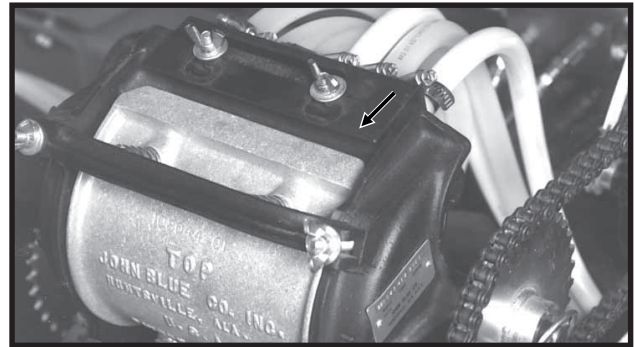
IMPORTANT: Certain analysis of fertilizer, if placed too close to the seed, may cause germination or seedling damage especially if used in amounts in excess of fertilizer manufacturer's recommendations. Check with your fertilizer dealer or manufacturer for the correct amount and placement.



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

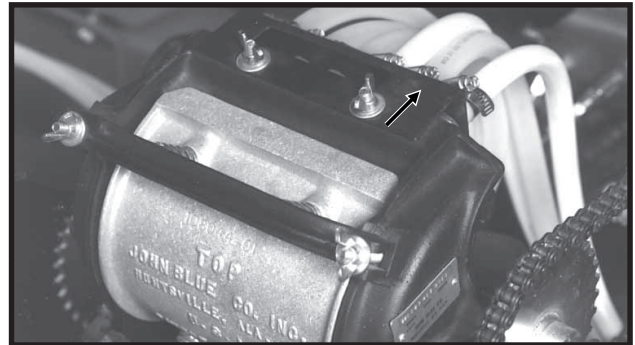
Shutoff valves provided at various locations should be closed to shutoff flow when the planter sits overnight or for extended periods of time. It is also important to close the tank valves whenever service on the pump or hoses is being performed. To prolong the life of the hoses in the squeeze pump,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

81689-16



Discharge Manifold Rearward

81689-19



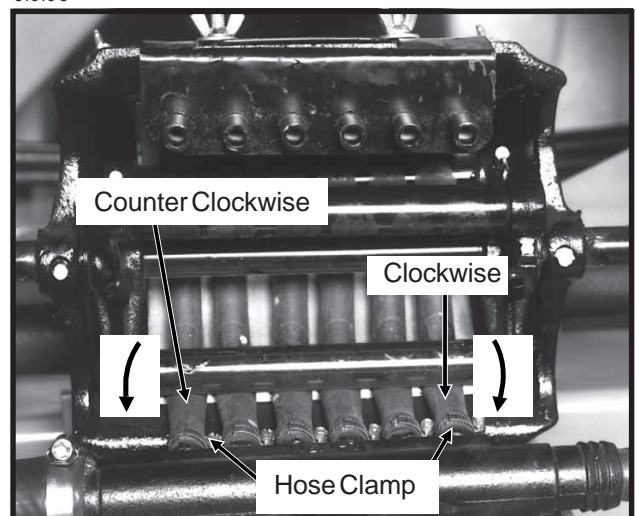
Discharge Manifold Forward

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.

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



MACHINE OPERATION

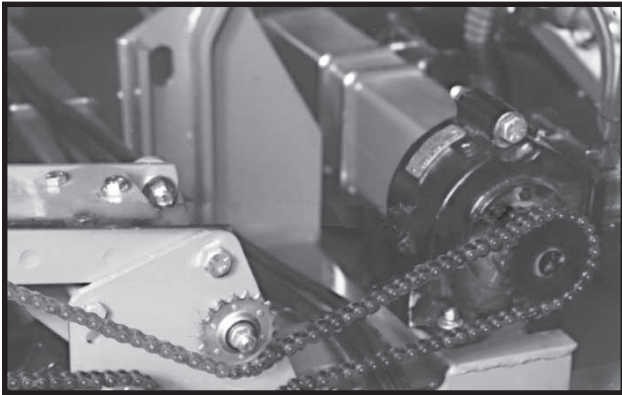
For the right hand hose (facing the pump from front of planter) twist the hose 1/4 turn in the clockwise direction.

For the left hand hose (facing front of pump) twist the hose 1/4 turn in the counterclockwise direction.

Retighten hose clamp.

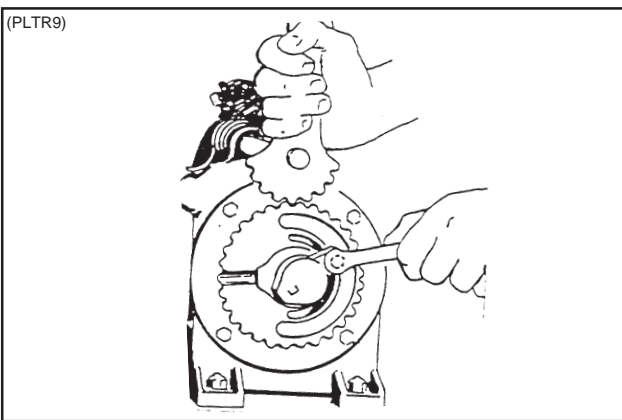
OPTIONAL PISTON PUMP

81999-3b



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 charts found at the end of this section provide approximate application rate only. Actual delivery will vary with temperature and the particular fertilizer being used.

To adjust delivery rate, loosen the 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 3/8" lock nut being careful not to over tighten.

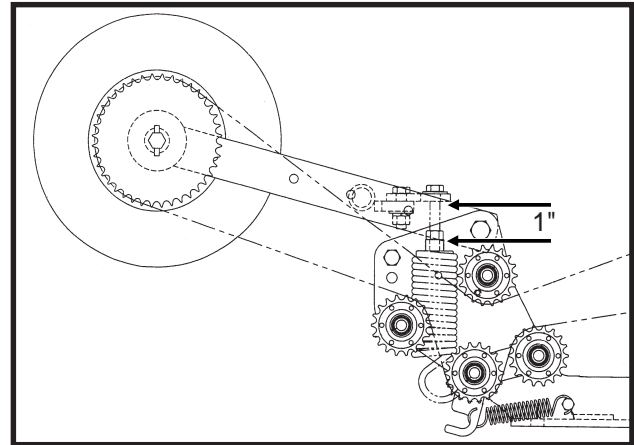


The operator and instruction manual shipped with the pump and flow divider should be kept and stored with this manual for future reference.

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

PISTON PUMP CONTACT DRIVE WHEEL SPRING ADJUSTMENT - STYLE A

(A8482a)



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

PISTON PUMP CONTACT DRIVE WHEEL SPRING ADJUSTMENT - STYLE B

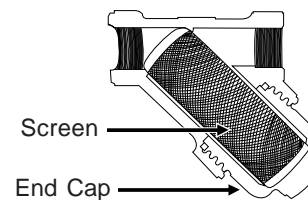
See "Contact Drive Wheel Spring Adjustment"

CLEANING

The tanks and all hoses are made of sturdy plastic and rubber to resist corrosion. However, the tanks, hoses and metering pump should be thoroughly cleaned with water at the end of the planting season or prior to an extended period of non-use. Do not allow fertilizer to crystalize due to cold temperature or evaporation.

The strainer, located between the piston pump and ball valve (On machines equipped with the piston pump.), should be taken apart and cleaned daily. Remove the end cap to clean the screen.

(INS220)



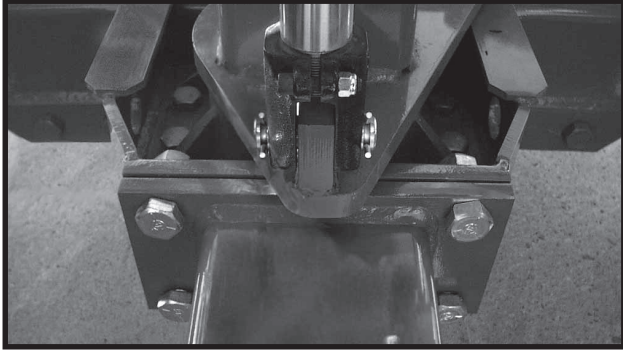
See "Piston Pump Storage" (If Applicable) in the Maintenance Section of this manual.

MACHINE OPERATION

REAR TRAILER HITCH

The Rear Trailer Hitch is used to tow a 3 or 4 wheel wagon behind the planter.

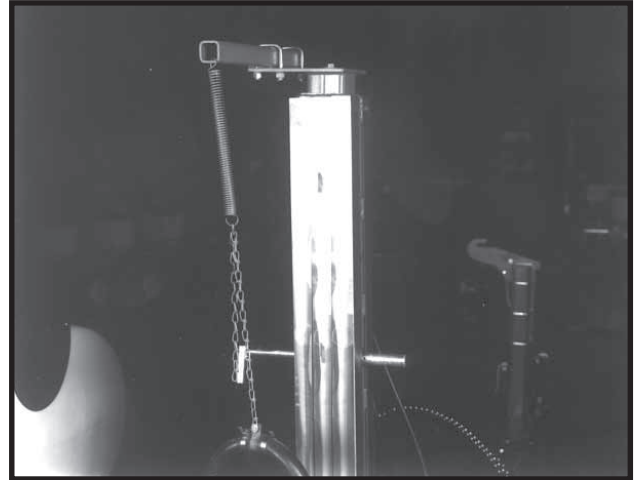
D07309911a



Attach hitch using five 1" x 2 1/2" hex head cap screws and lock nuts. Torque to 640 ft. lbs.

A spring, chain and mounting bracket are used to support the 1 1/4" feed hose from the hitch to the piston pump. This extra length or loop is required to allow the planter to be moved into transport position without stretching the hose.

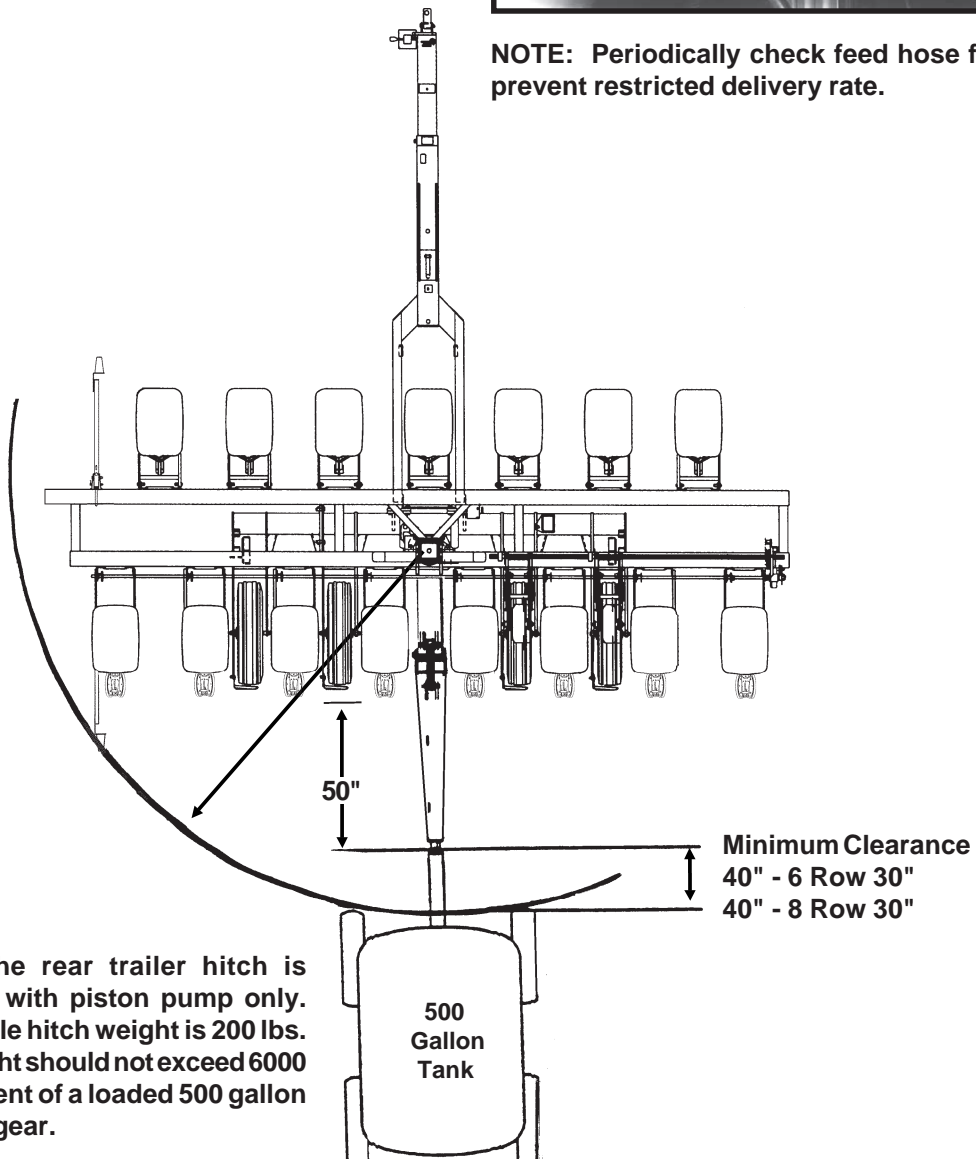
78495-5a



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

(PLTR134f)

Note minimum tank hitch length required to allow planter to be rotated to transport position.




IMPORTANT: The rear trailer hitch is designed for use with piston pump only. Maximum allowable hitch weight is 200 lbs. Gross towing weight should not exceed 6000 lbs. or the equivalent of a loaded 500 gallon tank and running gear.

MACHINE OPERATION

ROW MARKER SAFETY LOCKUP

Install row marker safety lockup devices over marker cylinder rods when transporting the planter or working around the planter. When lockups are not in use, store in the storage position provided as shown below.

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

04059908a



Lockup Stored For Marker Operation

04059909a



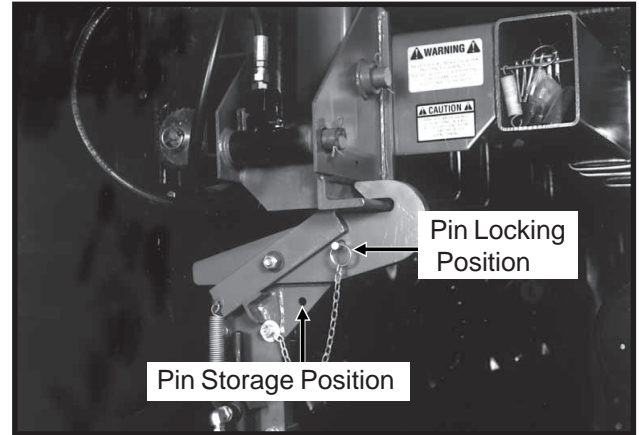
Marker Locked Up For Transport Or Working Around The Machine

TRANSPORT LATCH LOCKING PIN

When the planter is rotated to the transport position, the transport latch located on the hitch of the planter locks in place under the marker mount.

Prior to transporting the planter, install the transport latch locking pin to lock the latch.

79421-26a

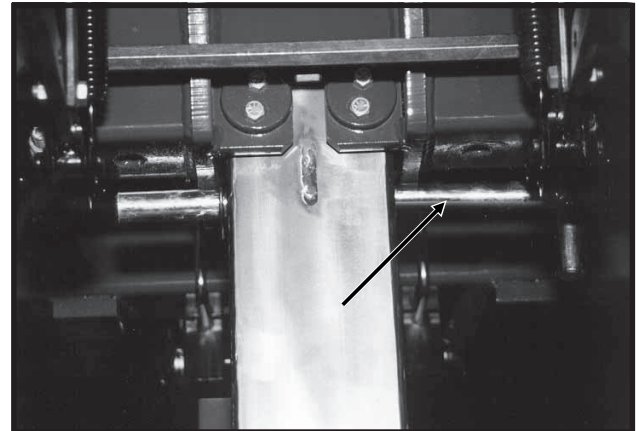


Pin In Locking Position To Secure Planter During Transport

SAFETY LOCKUP PIN

The safety lockup pin located on the center frame assembly is an added safety device. Never allow anyone to work around or under the planter without first installing the safety lockup pin in place. When transporting the planter use the safety lockup pin for added safety.

03279813



NOTE: The center post is clad with stainless steel. To prolong service life keep stainless steel surface clean and free of any lubrication.

CENTER POST AND POLY WEAR PADS REQUIRE NO LUBRICATION. ANY OIL OR GREASE WILL ATTRACT DIRT AND ACCELERATE WEAR ON THE CENTER POST AND ON THE POLY WEAR PADS.

MACHINE OPERATION

TRANSPORTING THE PLANTER



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

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



WARNING: Install all safety lockup devices and safety lock pins 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 “Rate Charts”). Variations in ground speed will produce variations in rates. Finger pickup seed meter populations will tend to be disproportionately higher at high ground speeds.

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

FIELD TEST

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

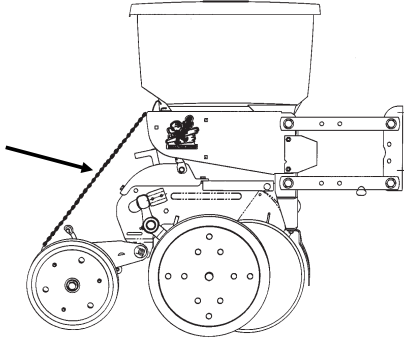
- Check the planter for fore to aft and lateral level operation. See “Leveling The Planter”.
 - Check **all** row units to be certain they are running level. When planting, the row unit parallel arms should be approximately parallel to the ground.
 - Check row markers for proper operation and adjustment. See “Row Marker Length Adjustment” and “Row 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

MACHINE OPERATION

CHECKING SEED POPULATION

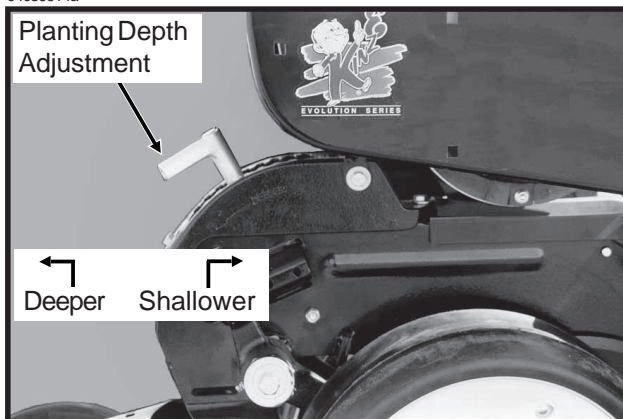
1. Tie up one or more sets of closing wheels by running a light chain or rubber tarp strap between the hopper support panel and closing wheels. It may be necessary to decrease closing wheel arm spring tension.

L0069(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"	30"
$\frac{1}{1000}$	34' 10"	17' 5"

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

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

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

26 Seeds Counted	x	1000	=	26,000 Seeds Per Acre
---------------------	---	------	---	-----------------------

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

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

Second, check for seed meter 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.

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".

MACHINE OPERATION

CHECKING GRANULAR CHEMICAL APPLICATION RATE

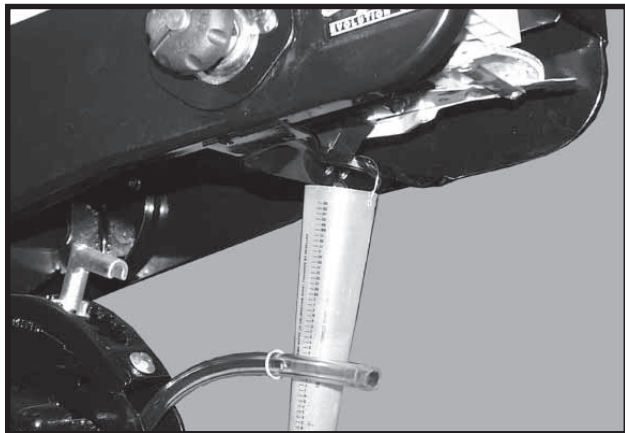
Many things can affect the rate of delivery of granular chemicals such as temperature, humidity, speed, ground conditions, flowability of different material or any obstruction in the meter.



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

A field check is important to determine correct application rates.

D05149901



To check, fill insecticide and/or herbicide hoppers. Attach a calibrated vial to each granular chemical meter. Lower the planter and proceed as follows.

NOTE: It is not necessary for seed meter clutch to be engaged during test. Disengage clutch to avoid dropping seed.

Drive 1320 feet at planting speed. Weigh the chemical in ounces that was caught in one vial. Multiply that amount by the factor shown to determine pounds per acre.

POUNDS PER ACRE FACTOR FOR GIVEN ROW WIDTH	
Row Width	Factor
30"	0.83

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

NOTE: It is important to check calibration of all rows.

Metering Gate

Use the metering gate setting for distributing insecticide or herbicide as a starting point. The charts are based on a 5 miles per hour planting speed. For speeds faster than 5 miles per hour a higher gate setting should be used. For speeds slower than 5 miles per hour a lower gate setting should be used.

MACHINE OPERATION

GENERAL PLANTING RATE INFORMATION

These planting rate charts are applicable to KINZE® Model 3500 Twin-Line® Planters. See "Tire Pressure" for recommended tire pressures.

IMPORTANT: The sprocket combinations listed in these charts are best for average conditions. Changes in sprocket combinations may be required to obtain desired planting population. TO PREVENT PLANTING MISCALCULATIONS, MAKE FIELD CHECKS TO BE SURE YOU ARE PLANTING AT THE DESIRED RATE.

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

Finger Pickup Corn Meter

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

Finger Pickup Oil Sunflower Meter

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

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

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

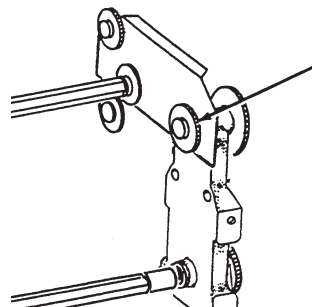
Rate charts are given in seeds per acre as well as seed spacing in inches rounded to the nearest tenth of an inch. Because of the large range in seed size, pounds per acre is not a suggested method of selecting transmission settings. When using smaller size seeds it may appear the pounds per acre is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

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

Seed population per acre with 15" rows (See page 6-85) will be double the rate for 30" rows (See page 6-84) at the listed sprocket combination.

NOTE: Use of the Half Rate (2 To 1) Drive Reduction Package will reduce the planter transmission speed. The seeding rate will be approximately 50% of the chart reading when using the Half Rate (2 to 1) Drive Reduction Package. Planting speed can affect actual seeding rate. Make a field check and adjust setting in the transmission as needed to obtain the desired seed drop.

(PLTR81)



Planter Drive Sprocket:
34 Tooth For Half Rate
17 Tooth For Standard Rate

EXAMPLE: 30" row machine equipped with Interplant® 15" rows, brush-type seed meters with 60 cell seed discs, 17 tooth drive sprocket and 28 tooth driven sprocket.

$$80,928 \text{ Seeds/Acre (30" Rows)} \times 2 \text{ (Interplant® 15" Rows)} = 161,856 \text{ (Seed Spacing 2.6")}$$
$$161,856 \div 2 \text{ (Half Rate Drive Reduction)} = 80,928 \text{ Seeds/Acre (Seed Spacing 5.2")}$$

MACHINE OPERATION

Z202

PLANTING RATES FOR FINGER PICKUP SEED METERS (STANDARD DRIVE) APPROXIMATE SEEDS/ACRE FOR 30" ROW WIDTH

30" Rows	Transmission Sprockets		Recommended Speed Range (MPH)	Average Seed Spacing In Inches
	Drive	Driven		
16,186	17	28	4 to 6	12.9
16,785	17	27	4 to 6	12.5
17,431	17	26	4 to 6	12.0
18,090	19	28	4 to 6	11.6
18,128	17	25	4 to 6	11.5
18,760	19	27	4 to 6	11.1
18,883	17	24	4 to 6	11.1
19,481	19	26	4 to 6	10.7
19,704	17	23	4 to 6	10.6
20,261	19	25	4 to 6	10.3
21,104	19	24	4 to 6	9.9
21,898	23	28	4 to 6	9.5
22,022	19	23	4 to 6	9.5
22,709	23	27	4 to 6	9.2
22,850	24	28	4 to 6	9.2
23,583	23	26	4 to 6	8.9
23,697	24	27	4 to 6	8.8
23,802	25	28	4 to 6	8.8
23,853	17	19	4 to 6	8.8
24,526	23	25	4 to 6	8.5
24,608	24	26	4 to 6	8.5
24,684	25	27	4 to 6	8.5
24,755	26	28	4 to 6	8.4
25,548	23	24	4 to 6	8.2
25,592	24	25	4 to 6	8.2
25,633	25	26	4 to 6	8.2
25,671	26	27	4 to 6	8.1
25,707	27	28	4 to 6	8.1
26,659	23	23	4 to 6	7.8
27,646	28	27	4 to 6	7.6
27,684	27	26	4 to 6	7.6
27,770	25	24	4 to 6	7.5
27,818	24	23	4 to 6	7.5
28,709	28	26	4 to 6	7.3
28,791	27	25	4 to 6	7.3
28,977	25	23	4 to 6	7.2
29,795	19	17	4 to 6	7.0
29,858	28	25	4 to 6	7.0
29,991	27	24	4 to 6	7.0
30,136	26	23	4 to 6	7.0
31,102	28	24	3 to 6	6.7
31,295	27	23	3 to 6	6.7
32,271	23	19	3 to 5.5	6.5
32,454	28	23	3 to 5.5	6.5
33,674	24	19	3 to 5.5	6.2
35,077	25	19	3 to 5	6.0
36,068	23	17	3 to 5	5.8
36,480	26	19	3 to 5	5.7
37,636	24	17	3 to 5	5.6
37,883	27	19	3 to 5	5.5
39,204	25	17	3 to 4.5	5.3
39,287	28	19	3 to 4.5	5.3
40,772	26	17	3 to 4.5	5.1
42,340	27	17	3 to 4.5	4.9
43,908	28	17	3 to 4.5	4.8

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

MACHINE OPERATION

Z214/RH

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

APPROXIMATE SEEDS/ACRE FOR 30" ROW WIDTH

Transmission Sprockets		60 Cell Soybean Or High-Rate Milo/ Grain Sorghum	Average Seed Spacing In Inches	48 Cell Specialty Soybean Or High-Rate Acid-Delinted Cotton	Average Seed Spacing In Inches	Speed Range (MPH)
Drive	Driven	30" Rows		30" Rows		
17	28	80,928	2.6	64,742	3.2	2 to 8
17	27	83,926	2.5	67,141	3.1	2 to 8
17	26	87,154	2.4	69,723	3.0	2 to 8
19	28	90,449	2.3	72,359	2.9	2 to 8
19	27	93,799	2.2	75,039	2.8	2 to 8
17	24	94,416	2.2	75,533	2.8	2 to 8
17	23	98,521	2.1	78,817	2.7	2 to 8
19	25	101,303	2.1	81,042	2.6	2 to 8
19	24	105,524	2.0	84,419	2.5	2 to 8
23	28	109,491	1.9	87,593	2.4	2 to 8
19	23	110,112	1.9	88,090	2.4	2 to 8
24	28	114,252	1.8	91,402	2.3	2 to 8
24	27	118,483	1.8	94,786	2.2	2 to 8
17	19	119,263	1.8	95,410	2.2	2 to 8
24	26	123,040	1.7	98,432	2.1	2 to 8
26	28	123,773	1.7	99,018	2.1	2 to 8
24	25	127,962	1.6	102,370	2.0	2 to 8
26	27	128,357	1.6	102,686	2.0	2 to 8
23	23	133,294	1.6	106,635	2.0	2 to 8
27	26	138,420	1.5	110,736	1.9	2 to 8
24	23	139,089	1.5	111,271	1.9	2 to 8
25	23	144,884	1.4	115,907	1.8	2 to 8
19	17	148,975	1.4	119,180	1.8	2 to 8
27	24	149,955	1.4	119,964	1.7	2 to 8
28	24	155,509	1.3	124,407	1.7	2 to 8
23	19	161,355	1.3	129,084	1.6	2 to 8
28	23	162,270	1.3	129,816	1.6	2 to 8
24	19	168,371	1.2	134,696	1.6	2 to 8
25	19	175,386	1.2	140,309	1.5	2 to 8
23	17	180,338	1.2	144,270	1.5	2 to 8
26	19	182,402	1.1	145,922	1.4	2 to 7
27	19	189,417	1.1	151,534	1.4	2 to 7
28	19	196,433	1.1	157,146	1.3	2 to 7
26	17	203,861	1.0	163,089	1.3	2 to 7
27	17	211,702	0.9	169,362	1.2	2 to 7
28	17	219,542	0.9	175,634	1.2	2 to 7

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

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

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

MACHINE OPERATION

Z214/RH

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

APPROXIMATE SEEDS/ACRE FOR 15" ROW WIDTH

Transmission Sprockets		60 Cell Soybean Or High-Rate Milo/ Grain Sorghum	Average Seed Spacing In Inches	48 Cell Specialty Soybean Or High-Rate Acid-Delinted Cotton	Average Seed Spacing In Inches	Speed Range (MPH)
Drive	Driven	15" Rows		15" Rows		
17	28	161,856	2.6	129,484	3.2	2 to 8
17	27	167,852	2.5	134,282	3.1	2 to 8
17	26	174,308	2.4	139,446	3.0	2 to 8
19	28	180,898	2.3	144,718	2.9	2 to 8
19	27	187,598	2.2	150,078	2.8	2 to 8
17	24	188,832	2.2	151,066	2.8	2 to 8
17	23	197,042	2.1	157,634	2.7	2 to 8
19	25	202,606	2.1	162,084	2.6	2 to 8
19	24	211,048	2.0	168,838	2.5	2 to 8
23	28	218,982	1.9	175,186	2.4	2 to 8
19	23	220,224	1.9	176,180	2.4	2 to 8
24	28	228,504	1.8	182,804	2.3	2 to 8
24	27	236,966	1.8	189,572	2.2	2 to 8
17	19	238,526	1.8	190,820	2.2	2 to 8
24	26	246,080	1.7	196,864	2.1	2 to 8
26	28	247,546	1.7	198,036	2.1	2 to 8
24	25	255,924	1.6	204,740	2.0	2 to 8
26	27	256,714	1.6	205,372	2.0	2 to 8
23	23	266,588	1.6	213,270	2.0	2 to 8
27	26	276,840	1.5	221,472	1.9	2 to 8
24	23	278,178	1.5	222,542	1.9	2 to 8
25	23	289,768	1.4	231,814	1.8	2 to 8
19	17	297,950	1.4	238,360	1.8	2 to 8
27	24	299,910	1.4	239,928	1.7	2 to 8
28	24	311,018	1.3	248,814	1.7	2 to 8
23	19	322,710	1.3	258,168	1.6	2 to 8
28	23	324,540	1.3	259,632	1.6	2 to 8
24	19	336,742	1.2	269,392	1.6	2 to 8
25	19	350,772	1.2	280,618	1.5	2 to 8
23	17	360,676	1.2	288,540	1.5	2 to 8
26	19	364,804	1.1	291,844	1.4	2 to 7
27	19	378,834	1.1	303,068	1.4	2 to 7
28	19	392,866	1.1	314,292	1.3	2 to 7
26	17	407,722	1.0	326,178	1.3	2 to 7
27	17	423,404	0.9	338,724	1.2	2 to 7
28	17	439,084	0.9	351,268	1.2	2 to 7

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

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

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

MACHINE OPERATION

Z214/RH

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

APPROXIMATE SEEDS/ACRE FOR 30" ROW WIDTH

Transmission Sprockets		36 Cell Acid-Delinted Large Cotton	Average Seed Spacing In Inches	30 Cell Milo/Grain Sorghum Or Acid-Delinted Cotton	Average Seed Spacing In Inches	Speed Range (MPH)
Drive	Driven	30" Rows		30" Rows		
17	28	48,557	4.3	40,464	5.2	2 to 8
17	27	50,356	4.2	41,963	5.0	2 to 8
17	26	52,292	4.0	43,577	4.8	2 to 8
19	28	54,269	3.9	45,225	4.6	2 to 8
19	27	56,279	3.7	46,900	4.5	2 to 8
17	24	56,650	3.7	47,208	4.4	2 to 8
17	23	59,113	3.5	49,261	4.2	2 to 8
19	25	60,782	3.4	50,652	4.1	2 to 8
19	24	63,314	3.3	52,762	4.0	2 to 8
23	28	65,695	3.2	54,746	3.8	2 to 8
19	23	66,067	3.2	55,056	3.8	2 to 8
24	28	68,551	3.0	57,126	3.7	2 to 8
24	27	71,090	2.9	59,242	3.5	2 to 8
17	19	71,558	2.9	59,631	3.5	2 to 8
24	26	73,824	2.8	61,520	3.4	2 to 8
26	28	74,264	2.8	61,886	3.4	2 to 8
24	25	76,772	2.7	63,981	3.3	2 to 8
26	27	77,014	2.7	64,178	3.3	2 to 8
23	23	79,976	2.6	66,647	3.1	2 to 8
27	26	83,052	2.5	69,210	3.0	2 to 8
24	23	83,453	2.5	69,544	3.0	2 to 8
25	23	86,930	2.4	72,442	2.9	2 to 8
19	17	89,385	2.3	74,488	2.8	2 to 8
27	24	89,973	2.3	74,978	2.8	2 to 8
28	24	93,305	2.2	77,755	2.7	2 to 8
23	19	96,813	2.2	80,678	2.6	2 to 8
28	23	97,362	2.1	81,135	2.6	2 to 8
24	19	101,023	2.1	84,185	2.5	2 to 8
25	19	105,232	2.0	87,693	2.4	2 to 8
23	17	108,233	1.9	90,169	2.3	2 to 8
26	19	109,441	1.9	91,201	2.3	2 to 7
27	19	113,650	1.8	94,709	2.2	2 to 7
28	19	117,860	1.8	98,216	2.1	2 to 7
26	17	122,317	1.7	101,930	2.1	2 to 7
27	17	127,021	1.6	105,851	2.0	2 to 7
28	17	131,725	1.6	109,771	1.9	2 to 7

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

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

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

MACHINE OPERATION

Z202

PLANTING RATES FOR BRUSH-TYPE SEED METERS (STANDARD DRIVE) APPROXIMATE HILLS/ACRE FOR 30" ROW WIDTH

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

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

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

Transmission Sprockets		NUMBER OF HILLS PER ACRE 12 Cell Hill-Drop Cotton, Acid-Delinted 30" Rows	Average Hill Spacing In Inches	Speed Range (MPH)
Drive	Drive			
17	28	16,186	12.9	2 to 8
17	27	16,785	12.5	2 to 8
17	26	17,431	12.0	2 to 8
19	28	18,090	11.6	2 to 8
19	27	18,760	11.1	2 to 8
17	24	18,883	11.1	2 to 8
17	23	19,704	10.6	2 to 8
19	25	20,261	10.3	2 to 8
19	24	21,105	9.9	2 to 8
23	28	21,898	9.5	2 to 8
19	23	22,022	9.5	2 to 8
24	28	22,850	9.2	2 to 8
24	27	23,697	8.8	2 to 8
17	19	23,853	8.8	2 to 8
24	26	24,608	8.5	2 to 8
26	28	24,755	8.4	2 to 8
24	25	25,592	8.2	2 to 8
26	27	25,671	8.1	2 to 8
23	23	26,659	7.8	2 to 8
27	26	27,684	7.6	2 to 8
24	23	27,818	7.5	2 to 8
25	23	28,977	7.2	2 to 8
19	17	29,795	7.0	2 to 8
27	24	29,991	7.0	2 to 8
28	24	31,102	6.7	2 to 8
23	19	32,271	6.5	2 to 8
28	23	32,454	6.5	2 to 8
24	19	33,674	6.2	2 to 8
25	19	35,077	6.0	2 to 8
23	17	36,068	5.8	2 to 8
26	19	36,480	5.7	2 to 7
27	19	37,883	5.5	2 to 7
28	19	39,287	5.3	2 to 7
26	17	40,772	5.1	2 to 7
27	17	42,340	4.9	2 to 7
28	17	43,908	4.8	2 to 7

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

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

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

MACHINE OPERATION

DRY INSECTICIDE APPLICATION RATES APPROXIMATE POUNDS/ACRE AT 5 MPH FOR 30" ROW WIDTH

Meter Setting	30" Rows
CLAY GRANULES	
10	4.9
11	5.4
12	6.1
13	6.9
14	7.7
15	8.5
16	9.6
17	10.7
18	11.4
19	13.1
20	14.2
21	15.5
22	16.4
23	17.2
24	18.8
25	20.9
26	23.0
27	24.1
28	25.4
29	27.8
30	29.6
SAND GRANULES	
5	2.9
6	4.9
7	5.3
8	6.3
9	7.8
10	8.9
11	10.2
12	11.2
13	12.6
14	14.1
15	15.5
16	17.5
17	19.4
18	21.8
19	24.3
20	25.7
21	27.6
22	29.6
23	32.0
24	34.4
25	36.9

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

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



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

MACHINE OPERATION

DRY HERBICIDE APPLICATION RATES

APPROXIMATE POUNDS/ACRE AT 5 MPH FOR 30" ROW WIDTH

CLAY GRANULES

Meter Setting	30" Rows
10	4.7
11	5.2
12	5.8
13	6.5
14	7.3
15	8.2
16	9.0
17	9.9
18	10.7
19	11.6
20	12.6
21	13.6
22	14.6
23	15.7
24	17.0
25	18.1
26	19.4
27	20.9
28	22.6
29	24.3
30	26.7

NOTE: The 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 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 FERTILIZER APPLICATION RATES

APPROXIMATE RATE IN POUNDS PER ACRE

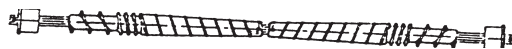
Drive Sprocket	Driven Sprocket	Low Rate Position	High Rate Position
		30" Rows	30" Rows
15	35	32	94
15	33	36	109
15	30	39	120
19	33	45	135
19	30	50	153
15	19	58	174
30	35	61	188
30	33	67	200
33	35	69	206
35	33	76	214
33	30	81	241
19	15	93	278
30	19	116	347
33	19	127	382
35	19	133	402
30	15	146	440
33	15	161	482
35	15	168	510

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

**Direction
Of Rotation**



(PLTR6)



High Rate Position

(PLTR7)



Low Rate Position

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.

MACHINE OPERATION

LIQUID FERTILIZER SQUEEZE PUMP APPLICATION RATES

GALLONS PER ACRE

Drive	Driven	30" Rows
15	*62	6.9
19	*62	8.8
15	46	9.3
19	46	11.8
15	34	12.6
15	32	13.4
32	*62	14.7
19	34	16.0
19	32	17.0
32	46	19.9
34	46	21.1
46	*62	21.2
15	19	22.5
32	34	26.9
34	32	30.3
19	15	36.2
46	34	38.6
46	32	41.0
32	19	48.1
34	19	51.1
*62	34	52.1

*Optional sprocket.

Above chart 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.

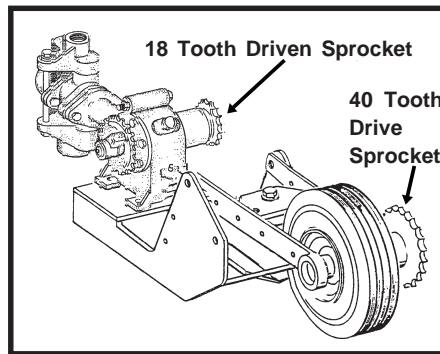
MACHINE OPERATION

LIQUID FERTILIZER PISTON PUMP APPLICATION RATES GALLONS PER ACRE

Applies To Model LM-2455-R Pump With 40 Tooth Drive And 18 Tooth Driven Sprocket

Pump Setting	1	2	3	4	5	6	7	8	9	10
6 Row 30"	6.8	13.8	20.6	27.5	34.4	41.3	48.1	55.1	61.9	68.7
8 Row 30"	5.2	10.3	15.5	20.6	25.8	31.0	36.1	41.3	46.4	51.6

(FRTZ164a)



GA8069 (LM-2455-R)

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

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

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

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

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

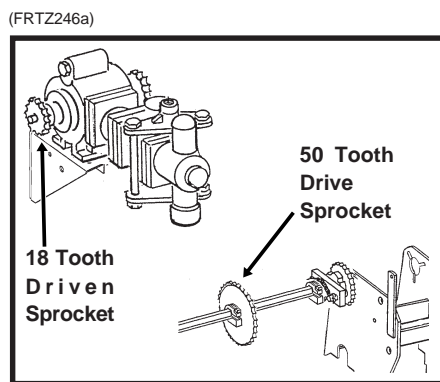
Remove the hose from one of the fertilizer openers and insert it into a collection container which has been secured to the planter frame. Engage the fertilizer attachment and drive forward for 174'. Measure the fluid ounces caught in the container and multiply that amount by 100. Divide that amount by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

MACHINE OPERATION

LIQUID FERTILIZER PISTON PUMP APPLICATION RATES GALLONS PER ACRE

Applies to Model LM-2455-R Pump With 50 Tooth Drive And 18 Tooth Driven Sprocket

Pump Setting	1	2	3	4	5	6	7	8	9	10
6 Row 30"	5.5	11.0	16.5	22.0	27.5	33.0	38.5	44.0	49.5	55.0
8 Row 30"	4.1	8.3	12.4	16.5	20.6	24.8	28.9	33.0	37.1	41.3



GA8069 (LM-2455-R)

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.

MACHINE OPERATION

ROW UNIT OPERATION

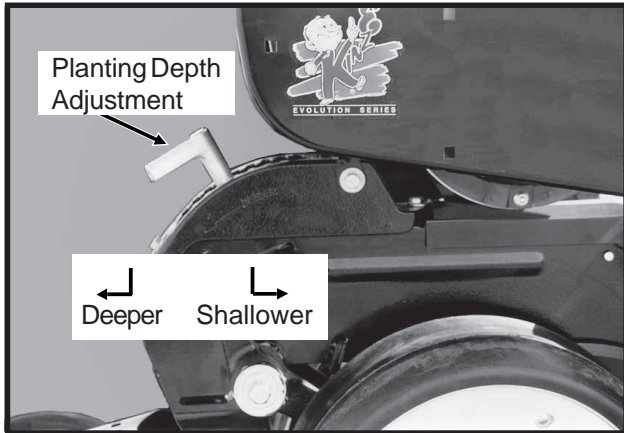
PLANTING DEPTH

Planting depth is maintained by the row unit gauge wheels. To increase or decrease the planting depth, first raise the planter to remove weight from the wheels. Then push down on the depth adjustment handle and reposition it forward to decrease depth or rearward to increase planting depth. Adjust all units to the same setting initially. Then lower the planter and check operation and planting depth of all row units. It may be necessary to readjust some rows to obtain uniform operation. Available depth adjustment range is approximately 1/2" to 3 1/2".



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

04059914a



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

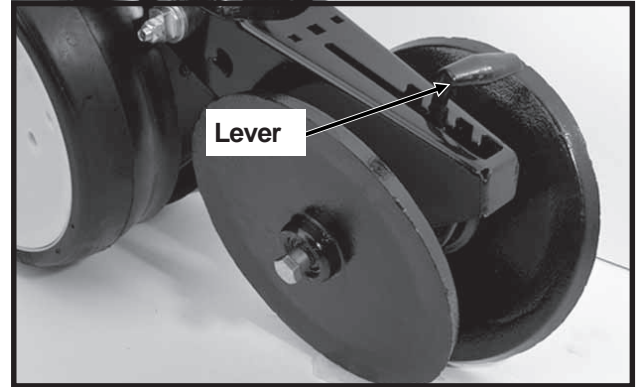


WARNING: Raise planter and install safety lockup devices before making closing wheel adjustments.

After adjusting planting depth, check the operation of the "V" closing wheels. The "V" closing wheels should have enough down pressure to close the seed trench and ensure good soil to seed contact. To increase spring pressure on the closing wheels, move the 5-position quick adjustable down force lever located on the top of the closing wheel arm to the rear. Moving the lever forward decreases spring tension.

Adjust all row units to a similar setting.

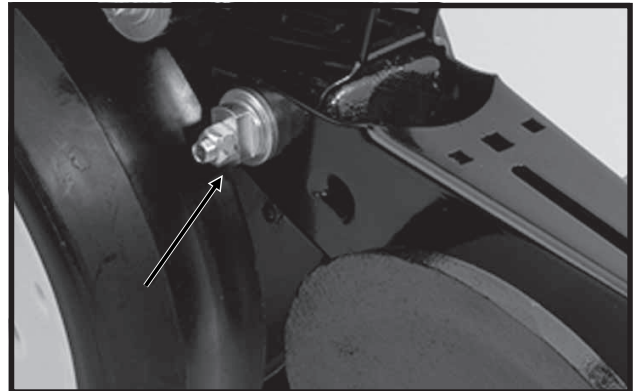
LF212299-15



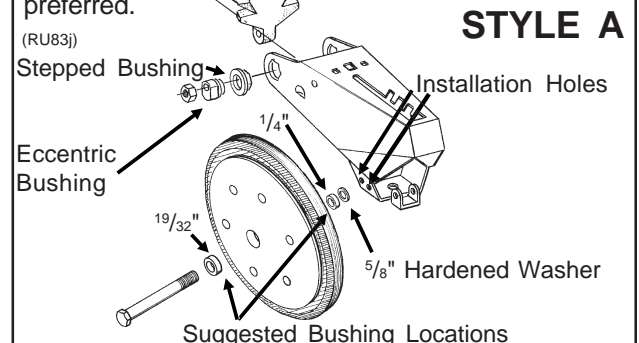
Light soil usually requires less down force at average depth (approximately 2") while heavy soil requires increased down force.

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

LF2122299-15



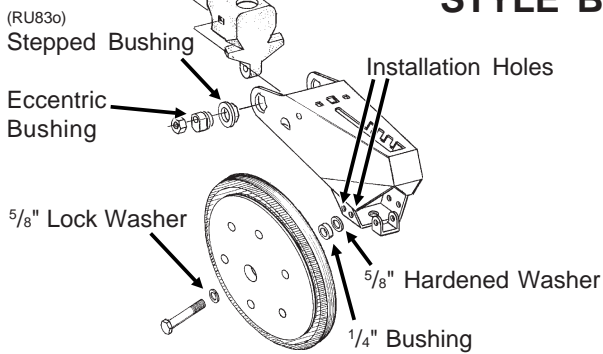
Bushings used for installation of the closing wheels can be moved from side to side for closing wheel spacing adjustment and the closing wheels can be installed in two locations either "offset" (to improve residue flow) or "directly" opposite. If set "directly" opposite, the forward installation holes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



ROW UNIT OPERATION

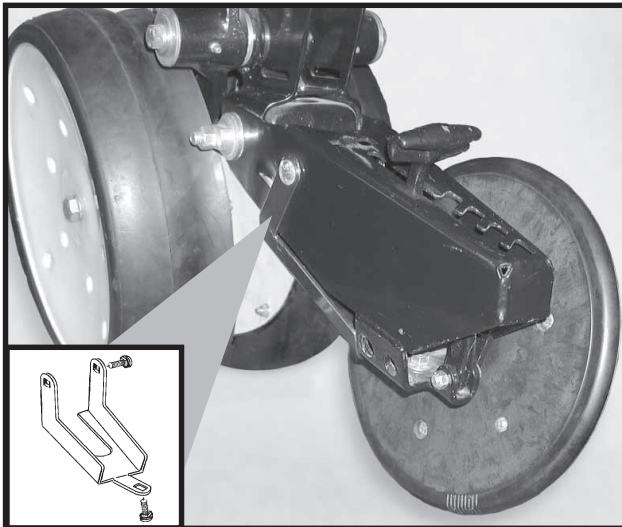
The closing wheels can be installed in two locations either "offset" (to improve residue flow) or "directly" opposite. If set "directly" opposite, the forward installation holes should be used.

STYLE B



CLOSING WHEEL SHIELD (Rubber And Cast Iron "V" Closing Wheels)

D11090208a



Shown With Closing Wheel Removed For Visual Clarity

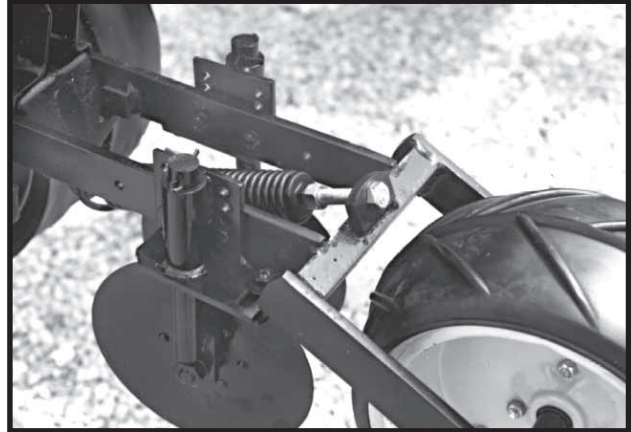
The optional closing wheel shield is designed to be installed onto the underside of the closing wheel arm to help prevent root balls and stalks from plugging the closing wheels.

COVERING DISCS/SINGLE PRESS WHEEL ADJUSTMENT



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

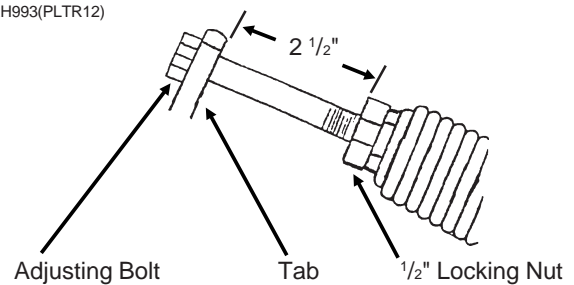
72359-31



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

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

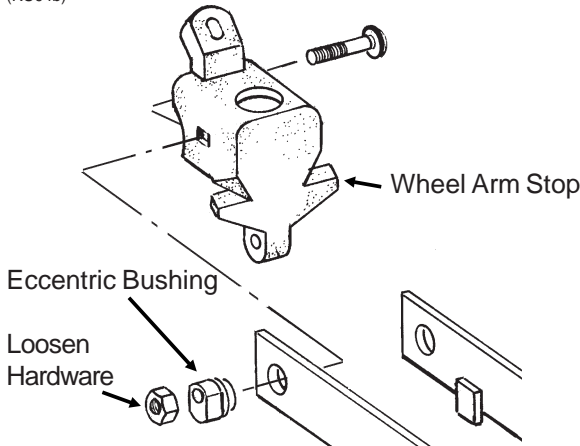
RH993(PLTR12)



ROW UNIT OPERATION

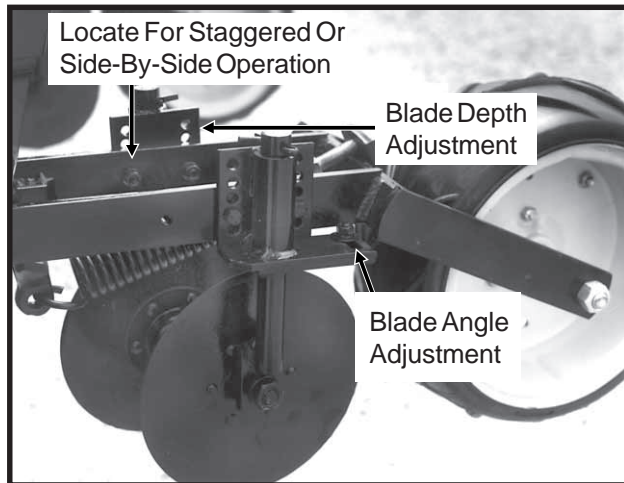
Eccentric bushings in the wheel arm stop allow for lateral adjustment of the covering discs/single press wheel assembly. Using a $\frac{3}{4}$ " wrench, loosen the hardware which attaches the assembly to the wheel arm stop. Using another $\frac{3}{4}$ " wrench, turn the eccentric bushings until the press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



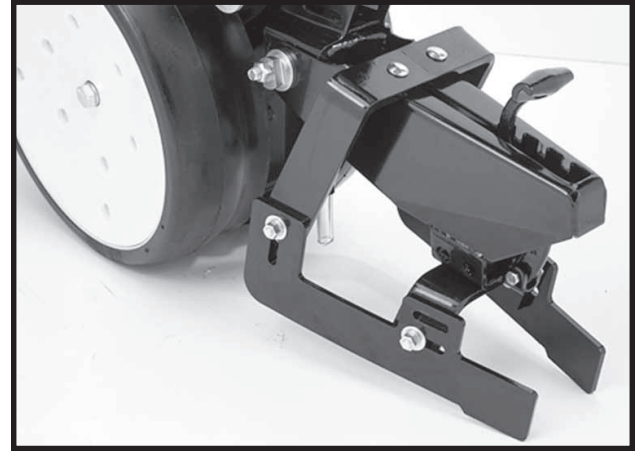
Five sets of holes in each disc bracket allow for $\frac{1}{2}$ " incremental blade depth adjustment.

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

Adjust covering discs on all row units to similar settings.

DRAG CLOSING ATTACHMENT

LF212299-18



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

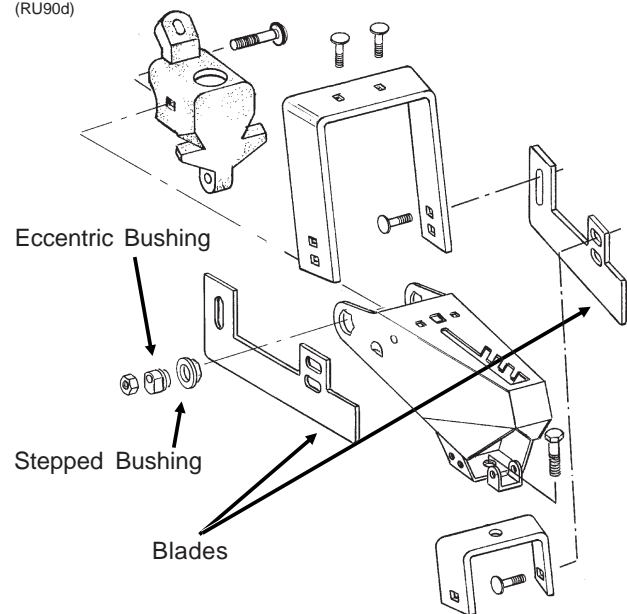
Front and rear adjustment is made using the slotted holes in the blades. Adjust all rows the same.

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



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

(RU90d)



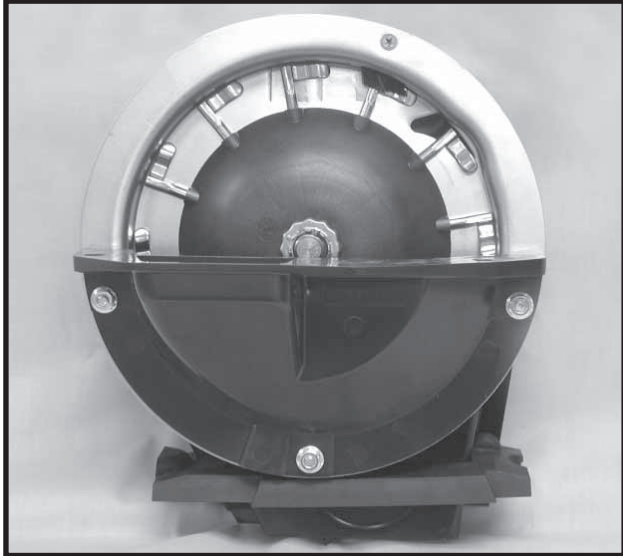
Eccentric bushings allow for lateral adjustment of the drag closing attachment. Using a $\frac{3}{4}$ " wrench, loosen the hardware which attaches the assembly to the wheel arm stop. Using another $\frac{3}{4}$ " wrench, turn the eccentric bushings until the drag closing attachment is aligned with the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

ROW UNIT OPERATION

FINGER PICKUP SEED METER

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

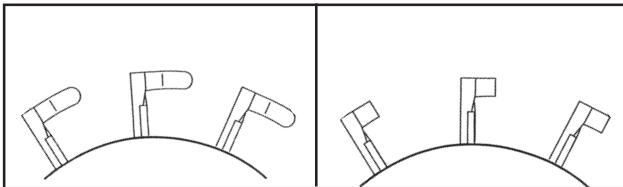
D12220401



Shown With Corn Fingers Installed

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

(PLTR91/PLTR92/PLTR91a)

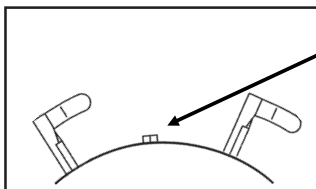


Corn Fingers

Oil Sunflower Fingers

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

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



Half Rate Blank Finger

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

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

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

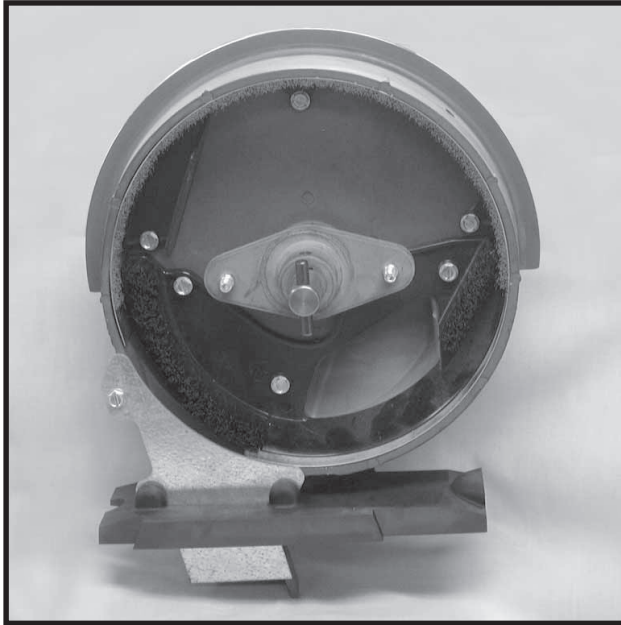
To maintain genetic purity, thorough seed meter cleanout is important.

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

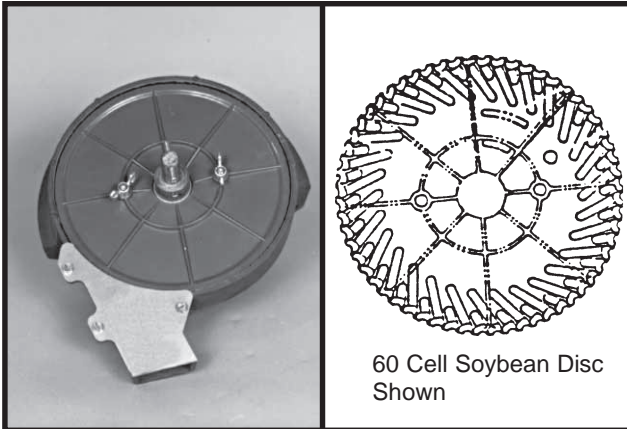
BRUSH-TYPE SEED METER

D12220403



Shown Without Seed Disc Installed

60607-40a(PLTR13)

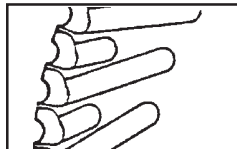


60 Cell Soybean Disc Shown

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

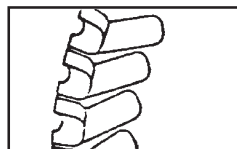
Soybean: 60 cells to meter seed sizes from 2200 to 4000 seeds per pound (Black color-coded).

(PLTR14)



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

(PLTR15)



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

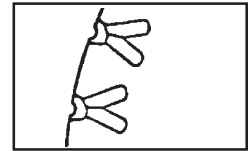
(PLTR16)



Large milo/grain sorghum:

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

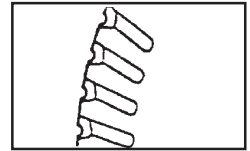
(PLTR17)



High-rate small milo/grain sorghum:

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

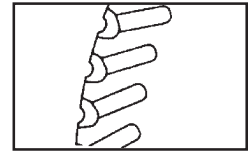
(PLTR18)



High-rate large milo/grain sorghum:

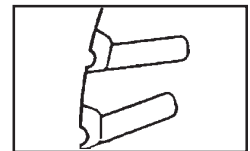
60 cells to meter seed sizes from 10,000 to 14,000 seeds per pound (Yellow color-coded).

(PLTR19)



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

(PLTR20)



Large cotton, acid-delinted:

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

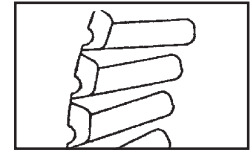
(PLTR21)



High-rate cotton, acid-delinted:

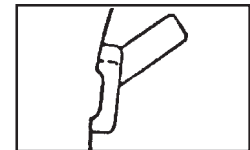
48 cells to meter seed sizes from 4200 to 5200 seeds per pound (Light green color-coded).

(PLTR22)



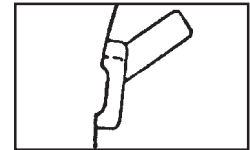
Hill-drop cotton, acid-delinted: 12 cells, 3 to 6 seeds/cell, to meter seed sizes from 4000 to 5200 seeds per pound (Brown color-coded).

(PLTR23)

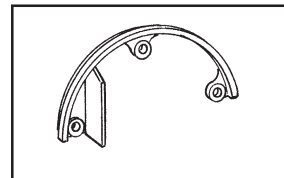


Small hill-drop cotton, acid-delinted: 12 cells, 3 to 6 seeds/cell, to meter seed sizes from 5000 to 6200 seeds per pound (Dark green color-coded).

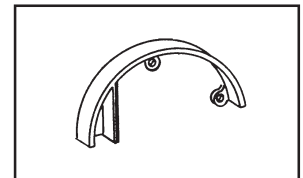
(PLTR23)



(RU14c)



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



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

ROW UNIT OPERATION

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

The brush-type seed meter attaches to the 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.

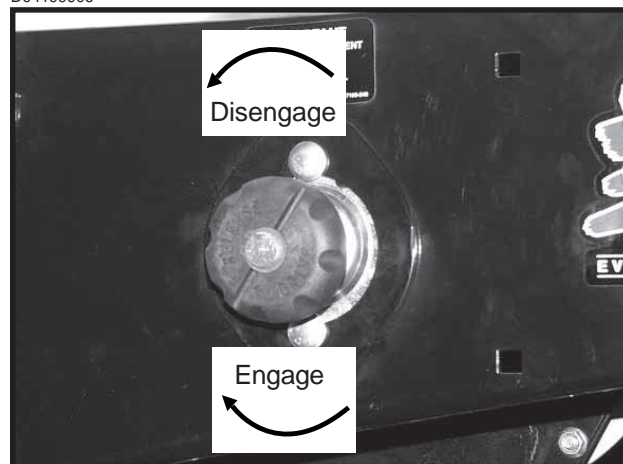
When filling the seed hopper use clean seed and make certain there are no foreign objects in the hopper. **Replace hopper lids after hoppers are filled to prevent the accumulation of dust or dirt in the seed meter which will cause premature wear.** See “Finger Pickup Seed Meter Lubrication” and/or “Brush-Type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

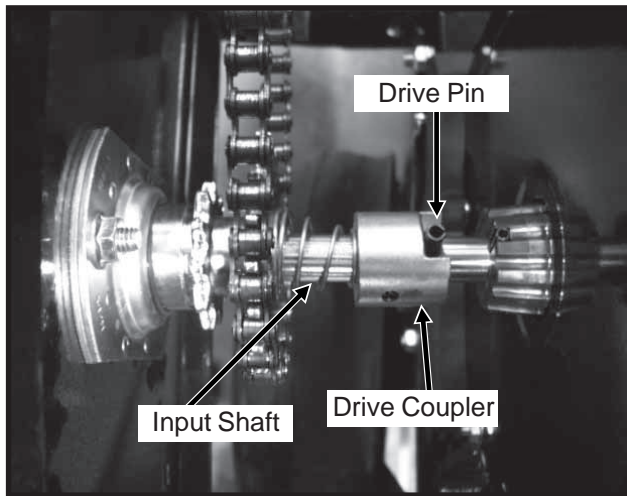
NOTE: The seed meter drive coupler must be properly aligned with the meter input shaft.

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:

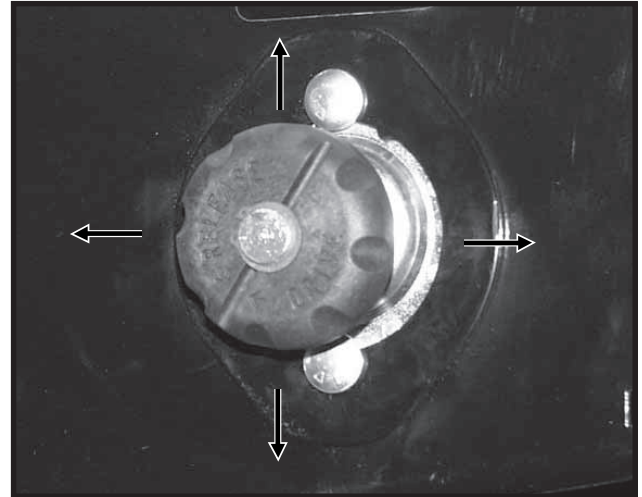
- Engage drive coupler over pin on meter shaft.
- Drive shaft on clutch should be centered in sprocket bore.
- If adjustment is needed, proceed as follows.

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.

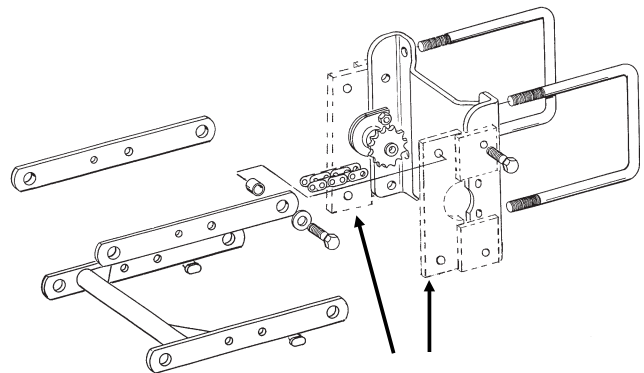
NOTE: Removing chain idler tension will allow easier clutch alignment adjustments

D04199906



ROW UNIT EXTENSION BRACKETS

RUB005/RUB007/RUB015(INS33a)



Row unit extension brackets are required on the 4 center pull row units if the Model 3500 planter is equipped with coulter mounted residue wheels. The brackets extend the row units rearward 4" to provide required clearance.

ROW UNIT OPERATION

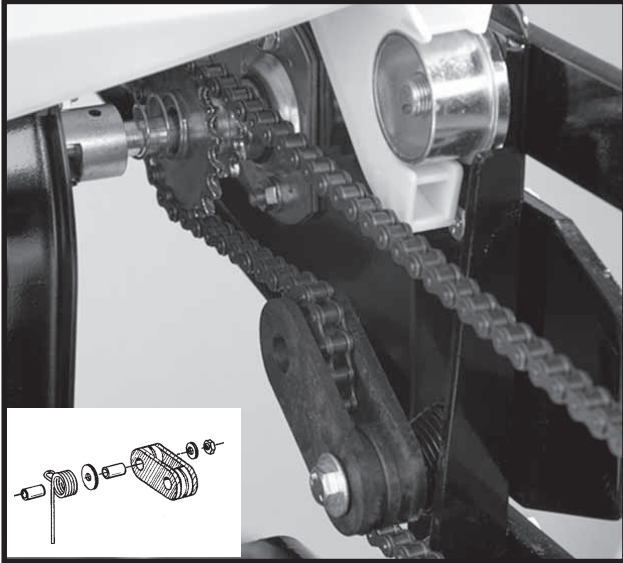
ROW UNIT CHAIN ROUTING

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.

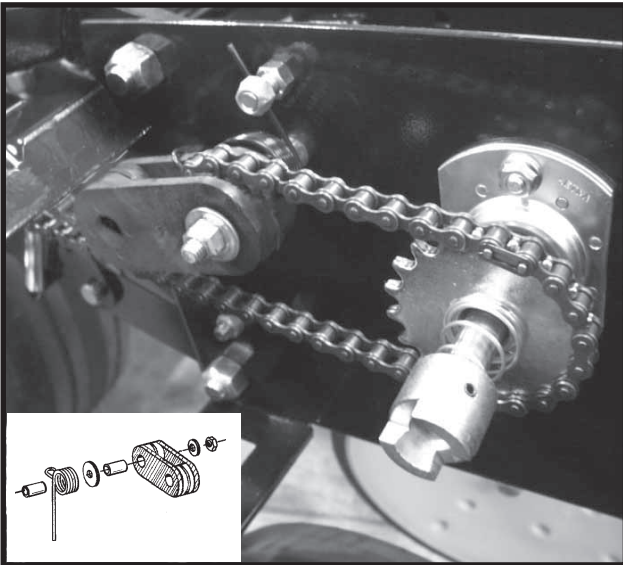
NOTE: When idler shows signs of wear, it can be reversed for prolonged use.

LF212199-5a(RU80g)



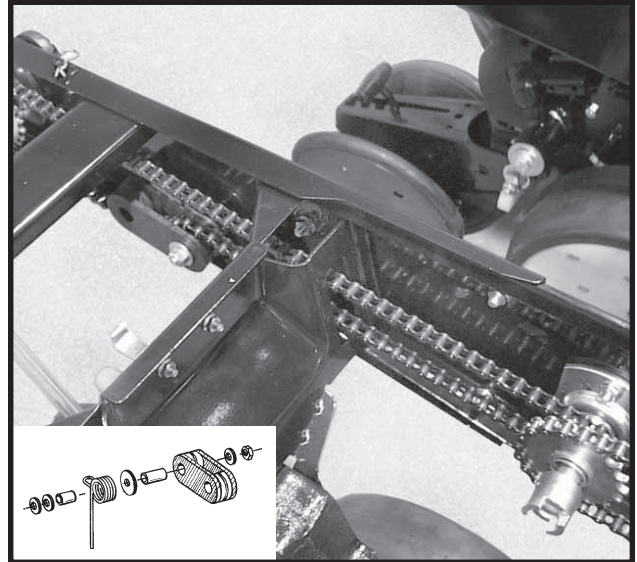
Pull Row Unit Meter Drive

D04209901a(RU80g)



Push Row Unit Meter Drive

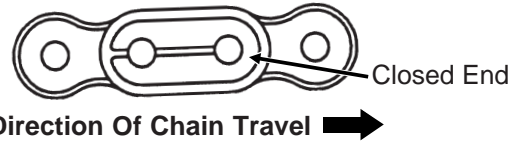
D05139901b(RU92I)



Row Unit Granular Chemical Drive

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

(PLTR24)

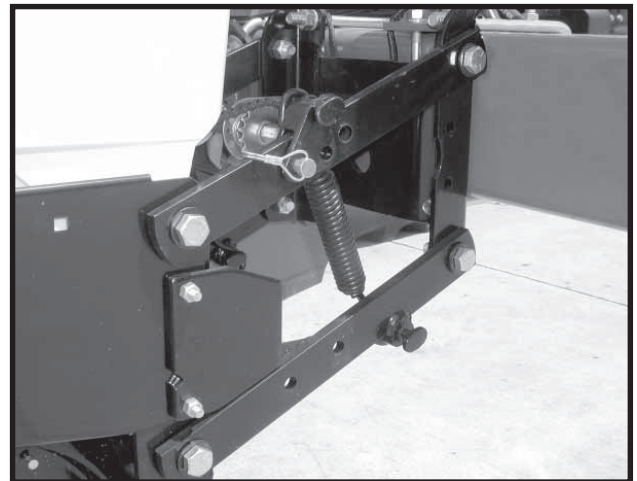


QUICK ADJUSTABLE DOWN FORCE SPRINGS

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.

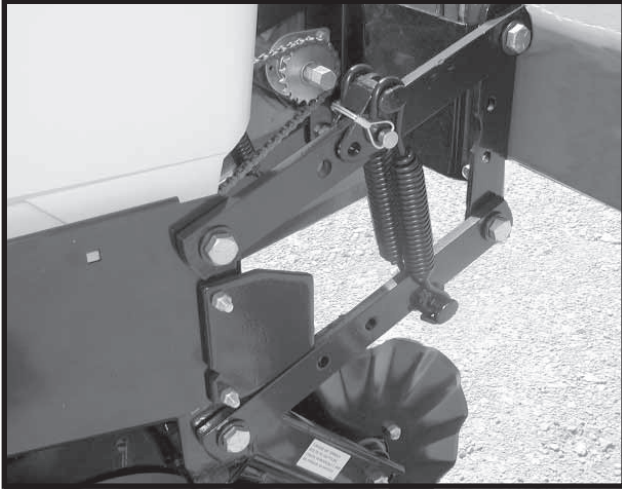
D06300305



Two Springs Per Row (Dual)

ROW UNIT OPERATION

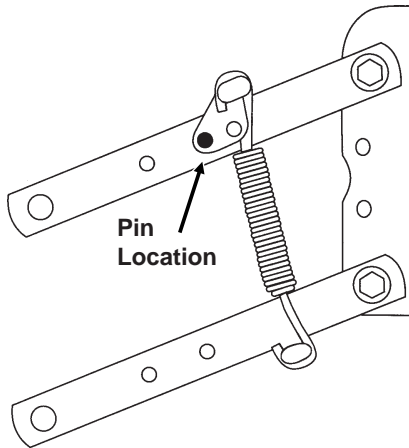
D07010301



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

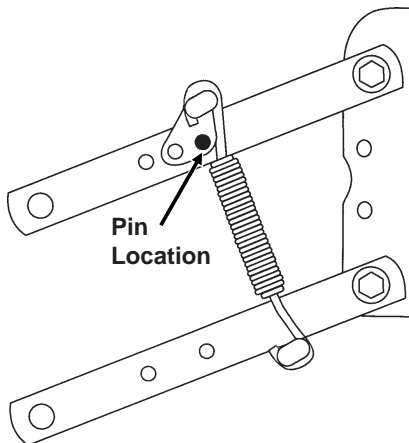
There are four positions for spring tension adjustment. Position 1 allows for minimum down pressure and position 4 for maximum down pressure.

L0096(PLTR27e)



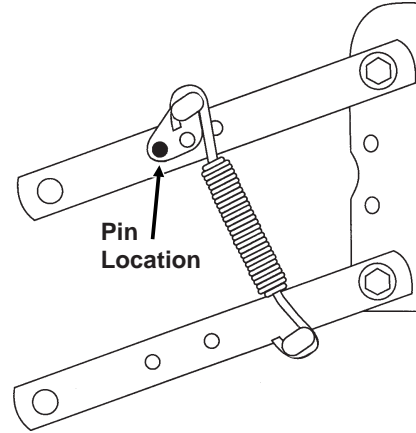
Position 1 (Minimum)

(PLTR28e)



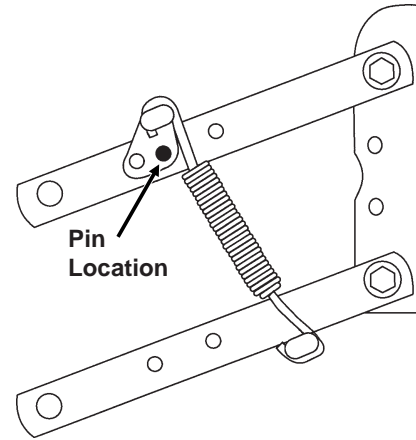
Position 2

(PLTR29e)



Position 3

(PLTR30e)



Position 4 (Maximum)

To adjust spring tension, raise planter and remove spring mount pin at top of spring. Slide mount to desired position and install pin.

NOTE: It is necessary for the operator to adjust springs according to field conditions. If springs are adjusted for too much down pressure for field conditions, it is possible for the row units to lift the planter to the extent that the drive wheels do not make sufficient contact. Too much down pressure in soft field conditions can cause the row unit to run too deep.



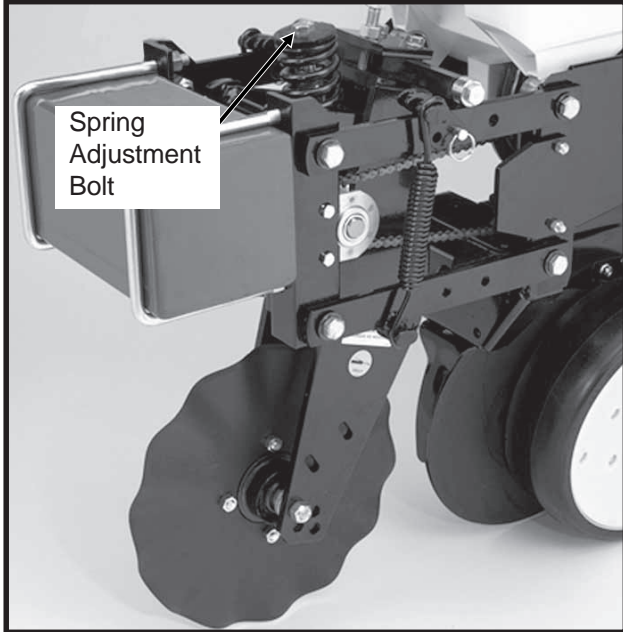
WARNING: Always install safety lockup devices or lower machine to the ground before working under or around the machine.

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

ROW UNIT OPERATION

FRAME MOUNTED COULTER - STYLE A

LF212299-20



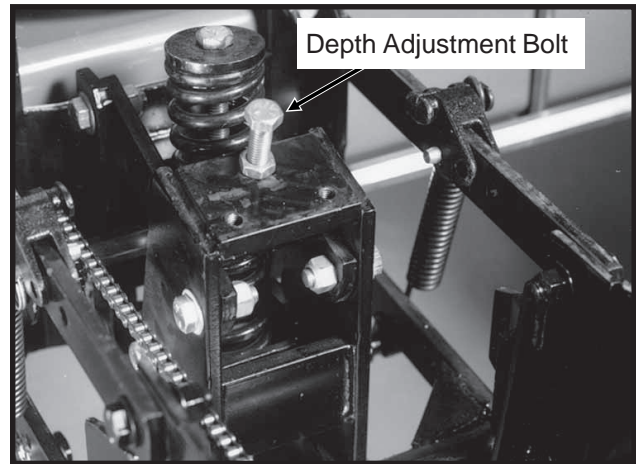
Frame mounted coulters with 1" bubbled, 1" fluted (8 flutes) or $\frac{3}{4}$ " fluted (13 flutes) blades may be used on pull row units only. (Not compatible with push row units.)

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

The frame mounted coulters 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 coulters to the row unit making less down force available to the coulters blade.

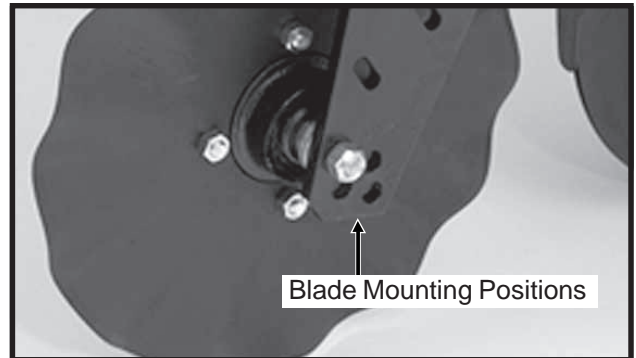
DEPTH ADJUSTMENT (Without Depth Control Bar Installed)

56314-14a



When the depth control bar is not used, operating depth of the coulters 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 coulters 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 $\frac{1}{8}$ " of thread showing. With this setting and the toolbar height at 20", the coulters depth will be approximately 2" with coulters 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

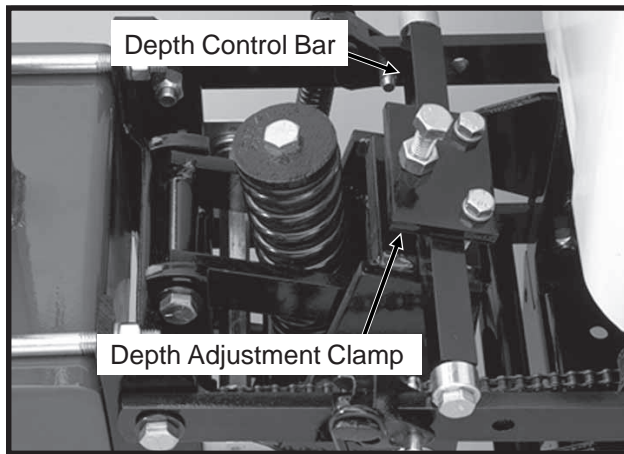


ROW UNIT OPERATION

DEPTH ADJUSTMENT

(With Depth Control Bar Installed)

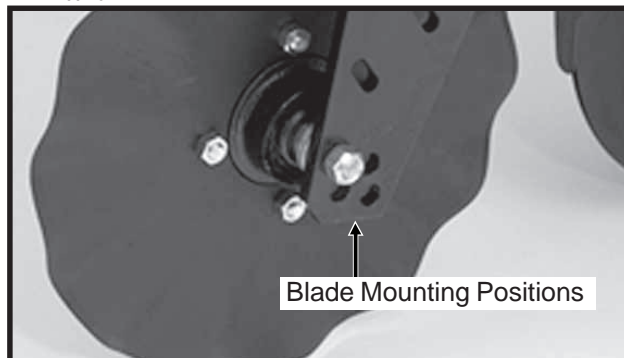
LF212199-4



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 coulter 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 coulter 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 coulter assembly. Operating depth of the coulter 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 coulter 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 coulter blade wear.

LF212299-20

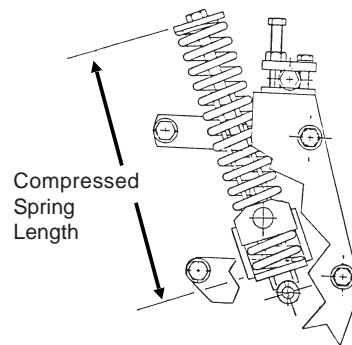


SPRING ADJUSTMENT

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)

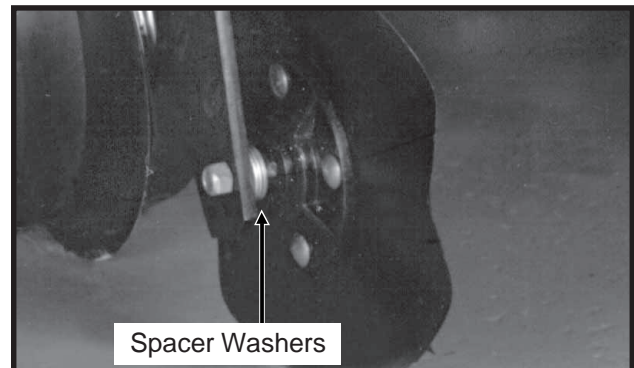


IMPORTANT: Excessive down force may cause increased wear on components.

COULTER BLADE ADJUSTMENT

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

56314-12



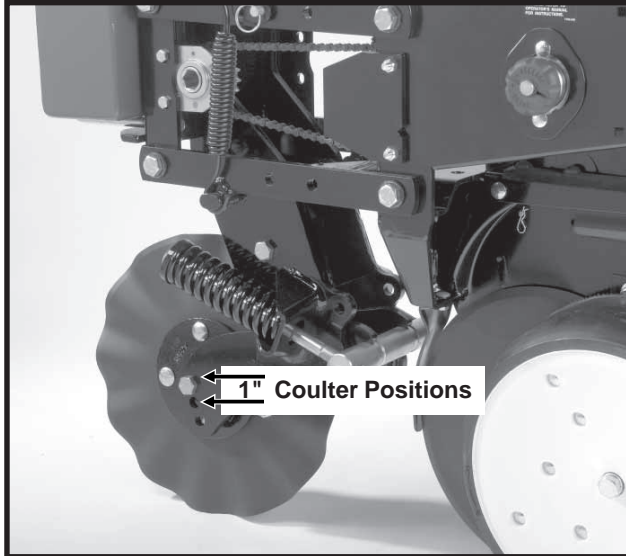
Field adjustment should be made as needed. Operating height of the planter frame will affect operating depth of the frame mounted coulter.

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

ROW UNIT OPERATION

FRAME MOUNTED COULTER - STYLE B

LF083002101

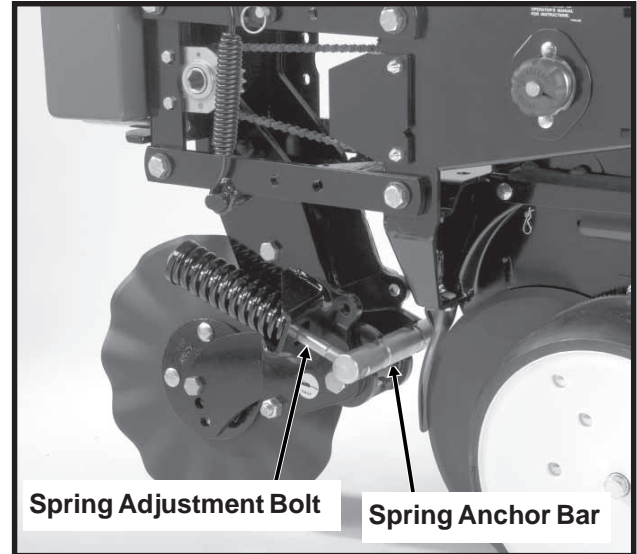


Frame mounted coulters with 1" bubbled, 1" fluted (8 flutes) or 3/4" fluted (13 flutes) blades may be used on pull row units only. (Not compatible with push row units.)

The frame mounted coulters are 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 should strike 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.

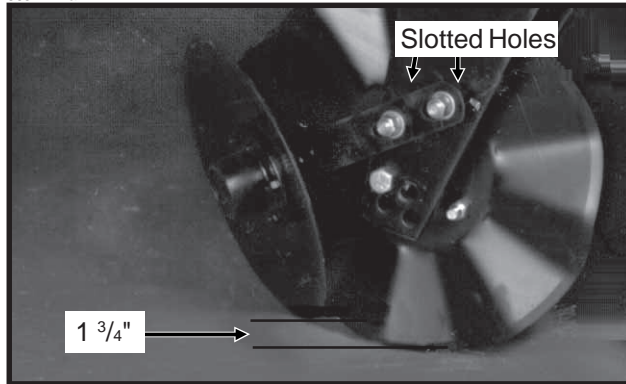
56314-19



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.

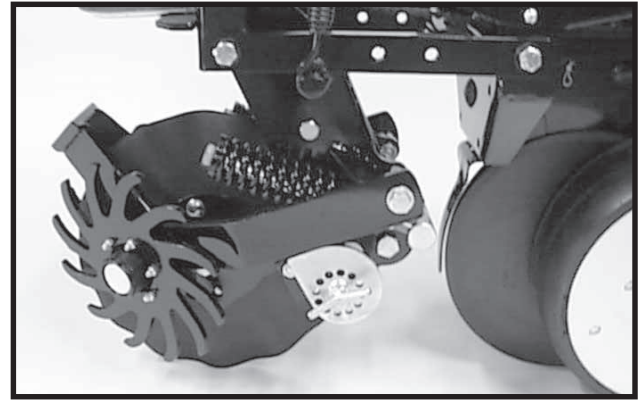
NOTE: The depth control bar should always be used when the frame mounted coulter is equipped with disc furrowers.

RESIDUE WHEELS

(For Use With Style B Frame Mounted Coulter)

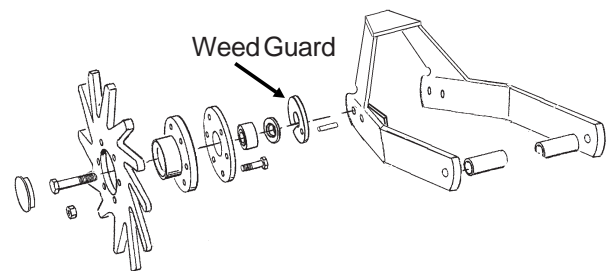
The residue wheels for use with the frame mounted coulter may be used on pull row units only.

D082302107



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.

(RU135k)



NOTE: Opening in weed guard must point down.

IMPORTANT: The forward mounting positions of the tined wheels can not be used on the four rows behind the axle on the 3500 machine due to inadequate clearance.

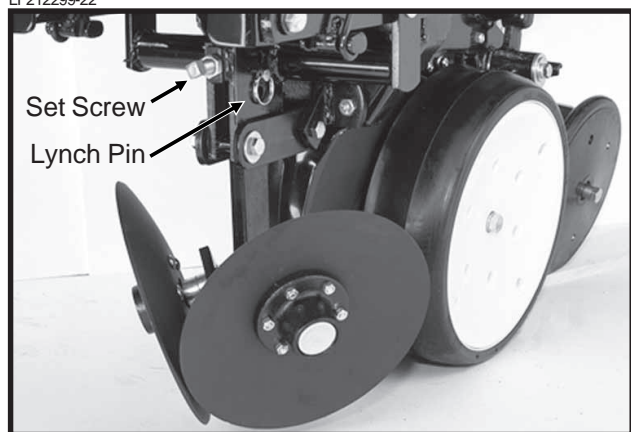
ROW UNIT OPERATION

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.

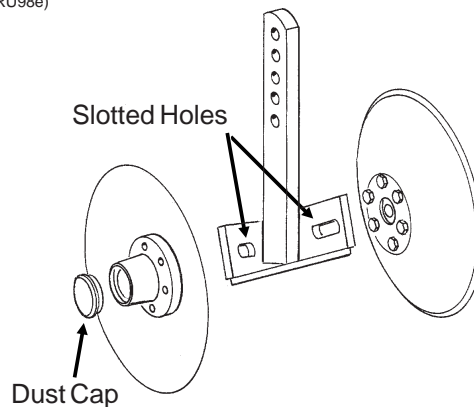
Disc furrowers are used to clear crop residue, dirt clods and dry soil from in front of the row units for a clean and smooth seed bed. Notched blades are used for heavier residue conditions. The notched blades cut crop residue and move it aside to prevent plugging or pushing.

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. Reinstall lynch pin. Finer adjustment can be attained by removing the lynch pin and using the $\frac{5}{8}$ " x $2 \frac{1}{4}$ " set screw to clamp the support arm in the required position.

(RU98e)



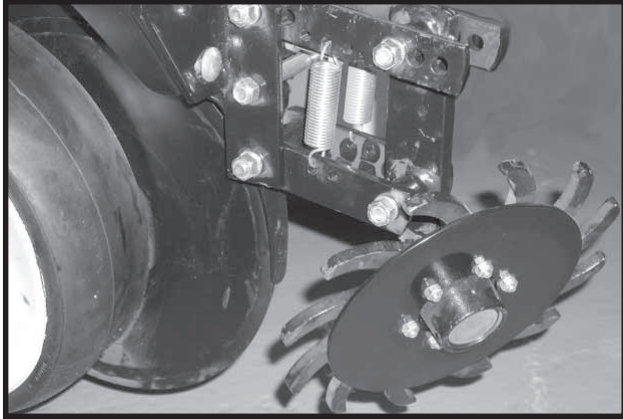
Slotted holes in the support arm where the blades are mounted allow fore and aft adjustment of the disc blades. Blades can be adjusted so the front edges meet or one blade can be moved to the rear and the other to the front of the slot so the cutting edge of one blade overlaps the edge of the other blade.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

ROW UNIT OPERATION

ROW UNIT MOUNTED RESIDUE WHEEL

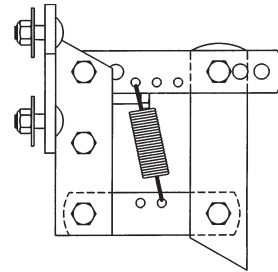
The row unit mounted residue wheel may be used on pull row units and push row units.

D10170113



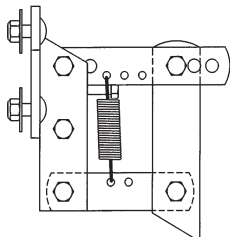
For additional uplift or float, position springs as shown below.

(PLTR34a)

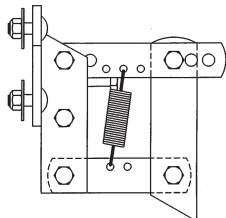


To adjust down force springs, raise the row unit out of the ground and reposition springs as shown for the desired down pressure.

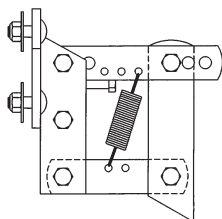
Two adjustable springs on the parallel links on each residue wheel allow for down force adjustment. Position 1 as shown below provides minimum down pressure and position 3 maximum down pressure.



Position 1 (Minimum)(PLTR31a)

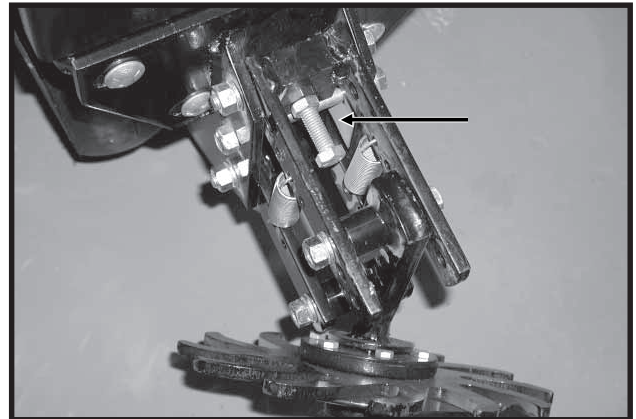


Position 2 (PLTR32a)



Position 3 (Maximum)(PLTR33a)

D10170112

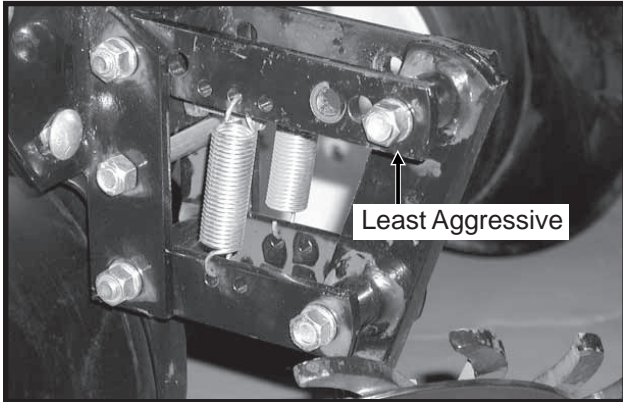


A full threaded bolt and jam nut located on the upper link allows maximum depth to be set for loose soil conditions. Initial setting should be 1 3/4" above the depth of the row unit double disc opener.

ROW UNIT OPERATION

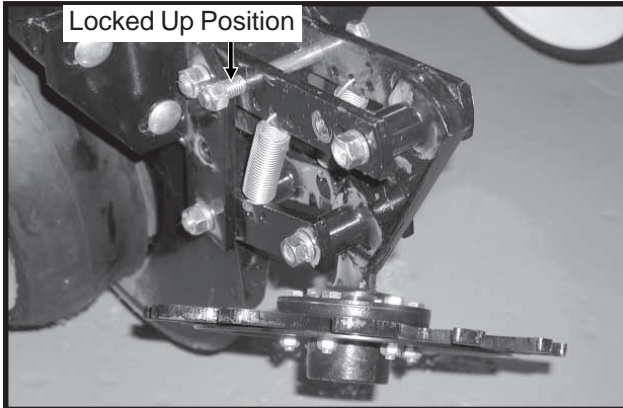
Three holes in the upper link allow for wheel angle adjustment. With the wheel mount in the most vertical position, using the rear hole in the upper link, the residue wheel is most aggressive. Moving the wheel mount to one of the forward holes reduces the aggressiveness of the wheel for use in mulch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

D101701202



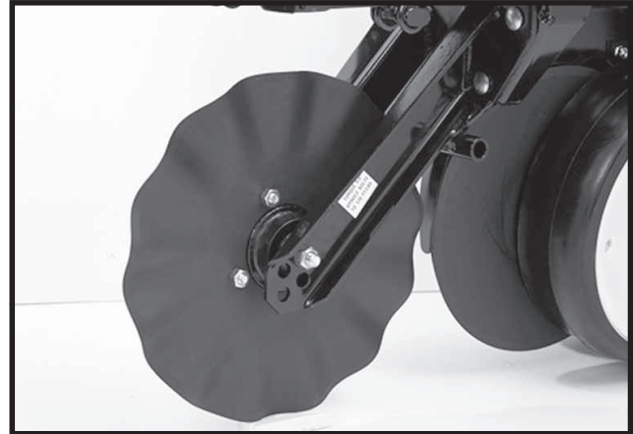
To lock the residue wheel up out of the ground, remove the 1/2" x 5" lockup bolt, raise the residue wheel and install bolt.

D101701203



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.

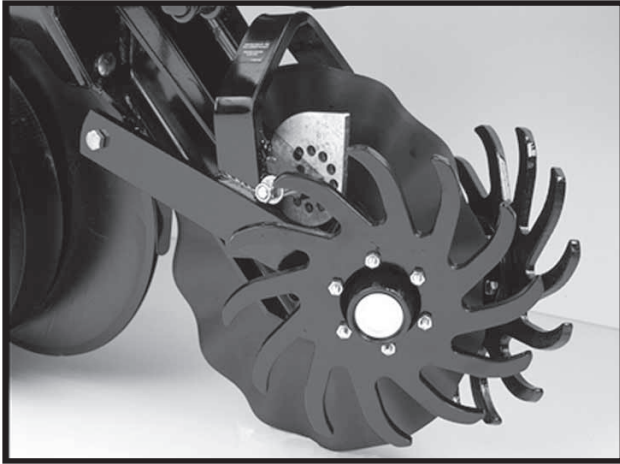
Operating depth can be checked by setting the planter down on a level concrete floor and checking the relationship between the coulters blade and row unit opener blade. Make sure the planter is level and coulters is square with the planter frame and aligned with the row unit disc opener.

NOTE: Torque 5/8" spindle bolts to 120 ft. lbs.

ROW UNIT OPERATION

COULTER MOUNTED RESIDUE WHEELS

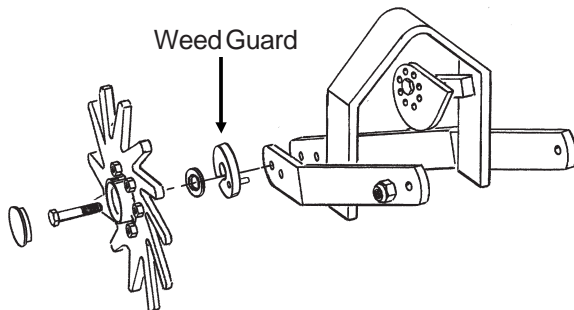
LF212299-23



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

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

(RU104t)



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.

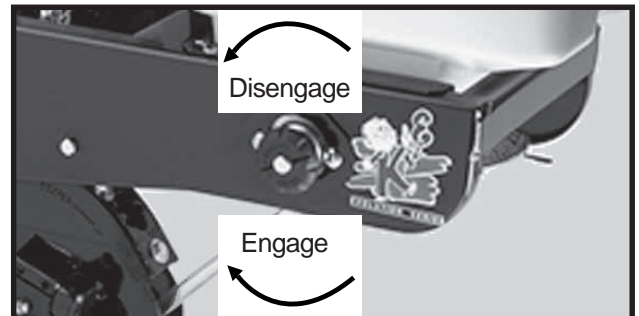
The metering gate located on the bottom of the hopper regulates the application rate. See "Dry Insecticide And Dry Herbicide Application Rate Charts" in this manual. Calibrate using the chemical manufacturers' instructions.



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 and of the equipment manufacturer.

The granular chemical clutch drive coupler and meter shaft can be disengaged and engaged by turning the throwout knob located at the rear of the hopper support panel. To engage the drive, turn the knob 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

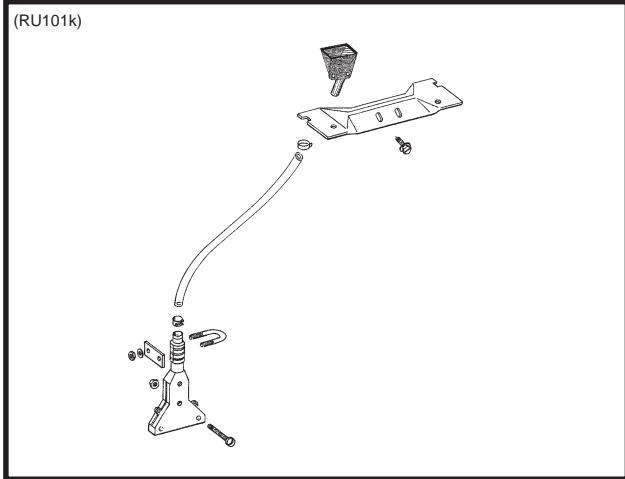


ROW UNIT OPERATION

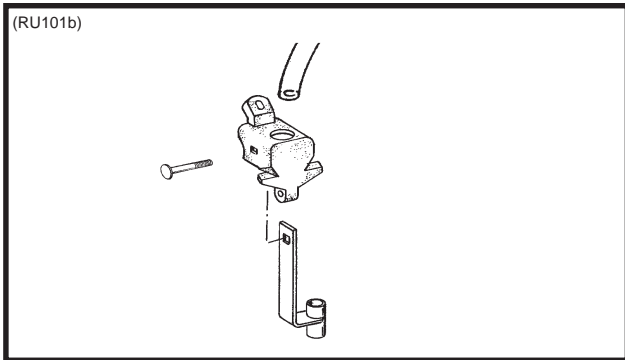
GRANULAR CHEMICAL BANDING OPTIONS

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

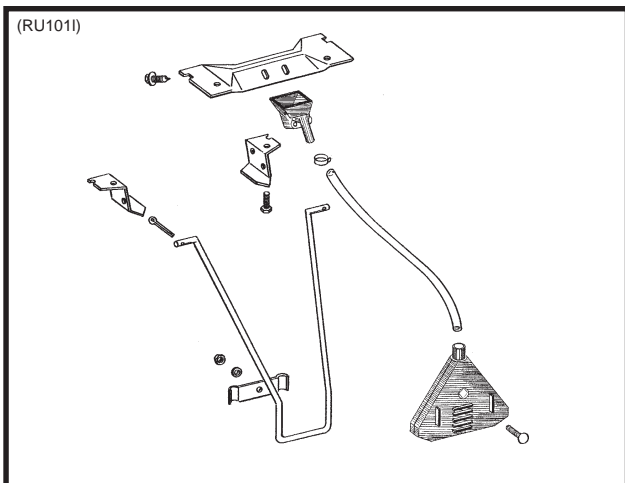
NOTE: The granular chemical rear bander is not compatible with the covering discs/single press wheel option.



4 1/2" Slope-Compensating Bander



Straight Drop In-Furrow Placement

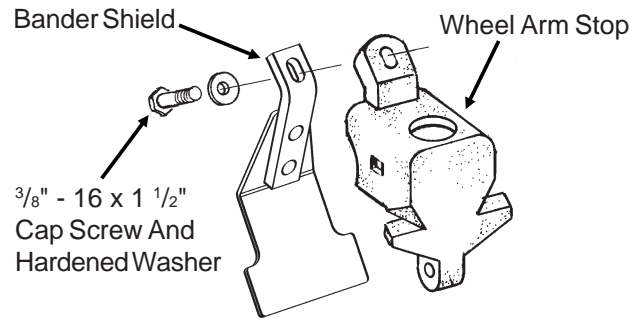


14" Rear Banding

GRANULAR CHEMICAL BANDER SHIELD

The optional granular chemical bander shield is designed to be installed onto the underside of the wheel arm stop to shield crop residue from lodging in the granular chemical bander.

(RU83m)

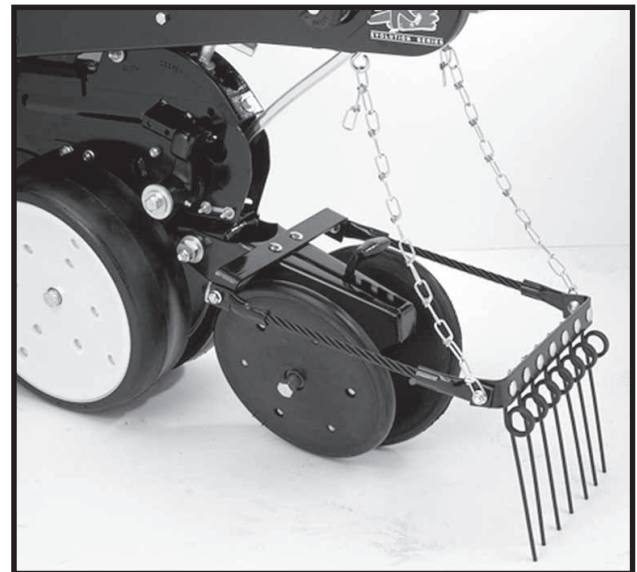


SPRING TOOTH INCORPORATOR

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

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

LF212299-26



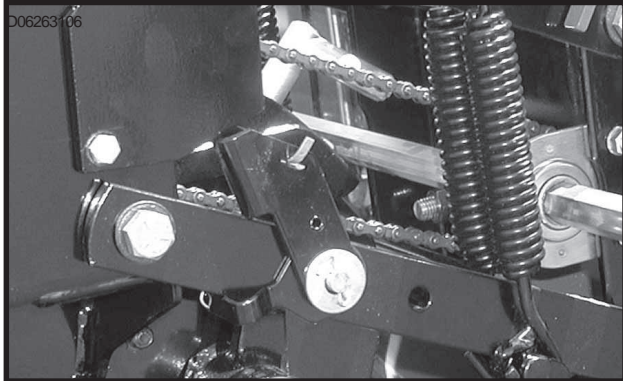
ROW UNIT OPERATION

INTERPLANT® PUSH ROW UNIT LOCKUPS

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

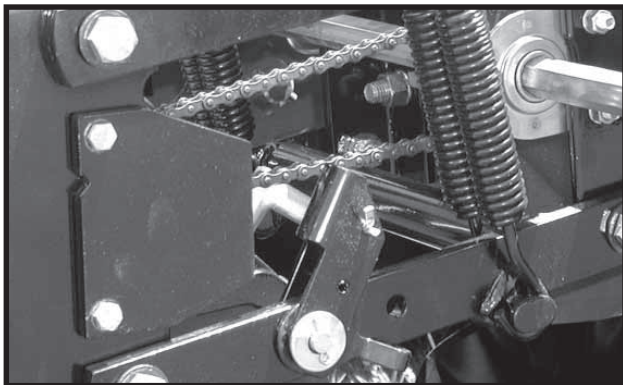


WARNING: Always install all safety lockup devices or lower machine to the ground before working under or around the machine.



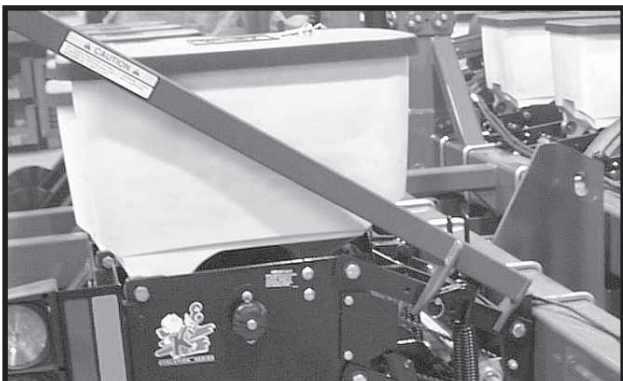
Push Row Unit Locked In Raised Position

D062603103



Lockup Released For Field Operation

D03160402

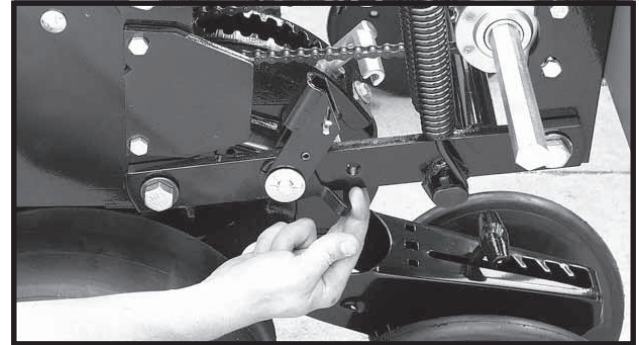


Lift Lever Positioned To Lift Push Row Unit

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

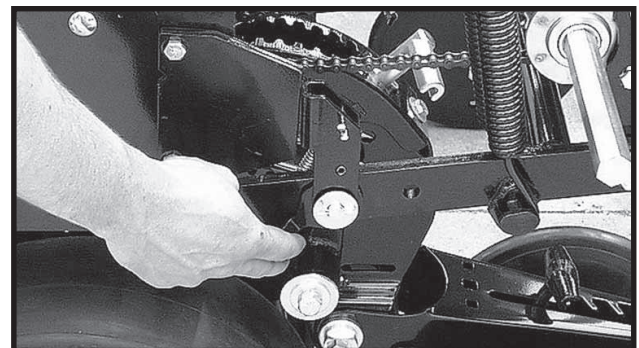


5. Using the lift lever, raise the push row unit to allow the spring loaded lockups to snap into locked position under the row unit stops.
6. Repeat Steps 4 and 5 on remaining push row units.

To release lockups:

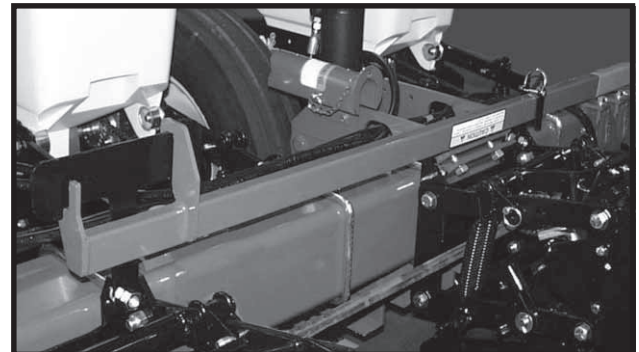
1. Lower the planter to the planting position.
2. On each push row unit lockup, flip the spring tab rearward.

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

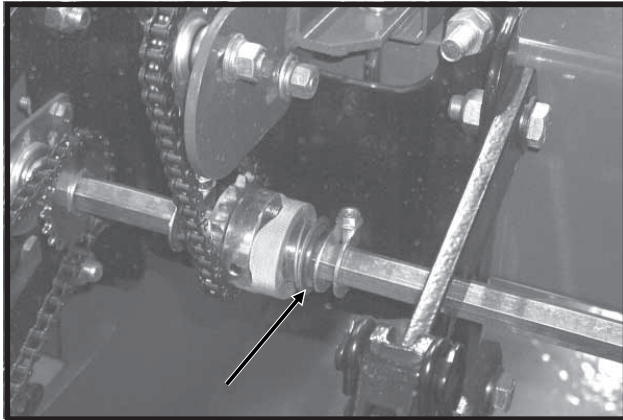


Lift Lever In Storage Location

ROW UNIT OPERATION

INTERPLANT® PUSH ROW UNIT CLUTCH SPROCKET

D03190405



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

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



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

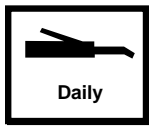
ROW UNIT OPERATION

LUBRICATION

The following pages show the locations of all lubrication points. Proper lubrication of all moving parts will help ensure efficient operation of your KINZE® planter and prolong the life of friction producing parts.

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

LUBRICATION SYMBOLS



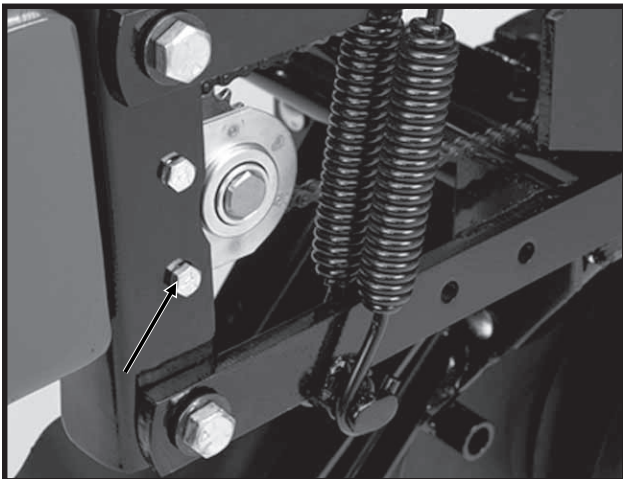
Lubricate at frequency indicated with an SAE multipurpose grease.



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

SEALED BEARINGS

LF212199-3

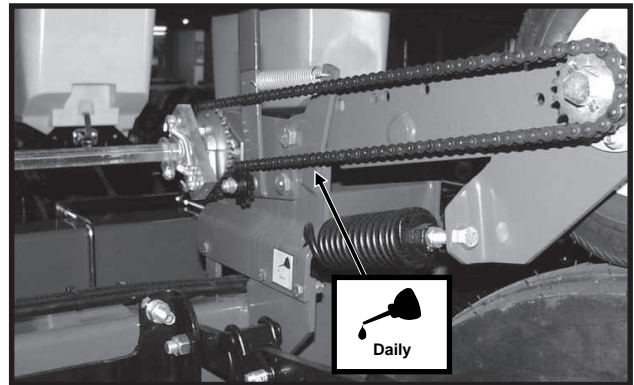


A number of sealed bearings are used on your KINZE® planter to provide trouble free operation. These are located in such areas as the drive shaft, row units and transmission bearings. Sealed bearings are lubricated for life. Due to the seals, relubrication is not practical.

DRIVE CHAINS

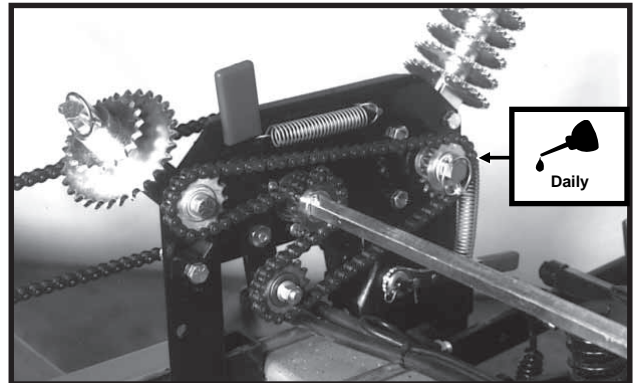
All transmission and drive chains should be lubricated daily with a high quality chain lubricant. Extreme operating conditions such as dirt, temperature or speed may require more frequent lubrication. If a chain becomes stiff, it should be removed, soaked and washed in solvent to loosen and remove dirt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

D062300101



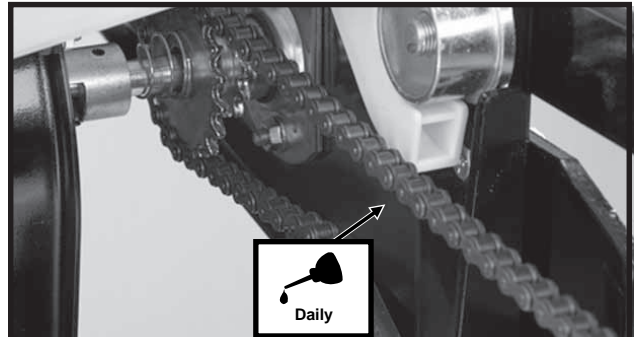
Contact Wheel Drive Chain

69797-26



Reverser Plate Drive Chain

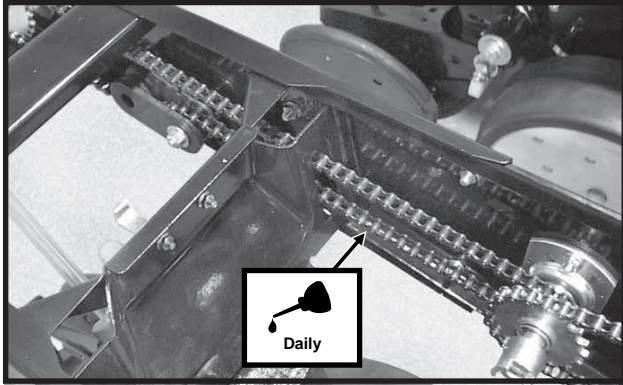
LF212199-5a



Pull Row Unit Meter Drive Chains

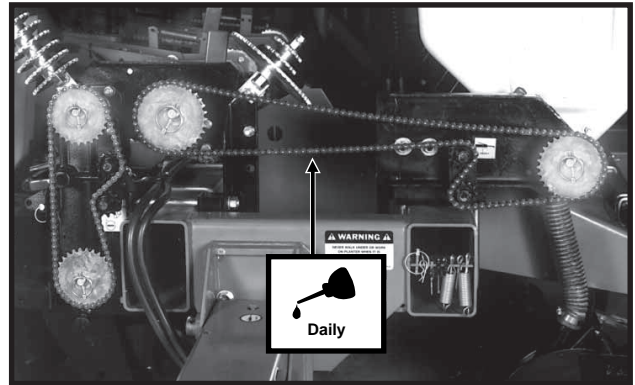
LUBRICATION

D05139901b



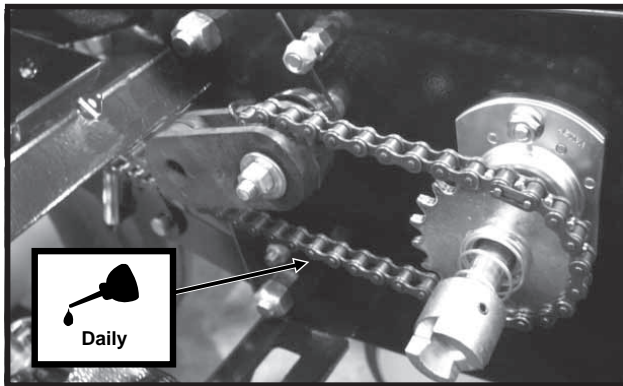
Row Unit Granular Chemical Drive Chains

69797-21a



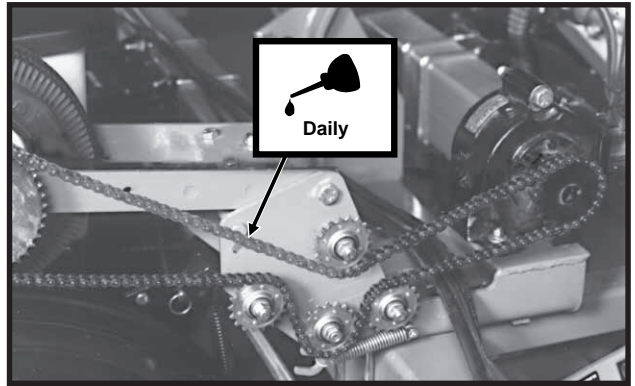
Dry Fertilizer Drive Chain

D04209901a



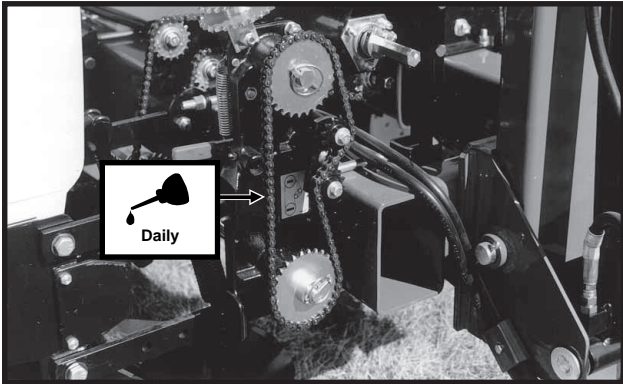
Push Row Unit Drive Chains

81999-3b



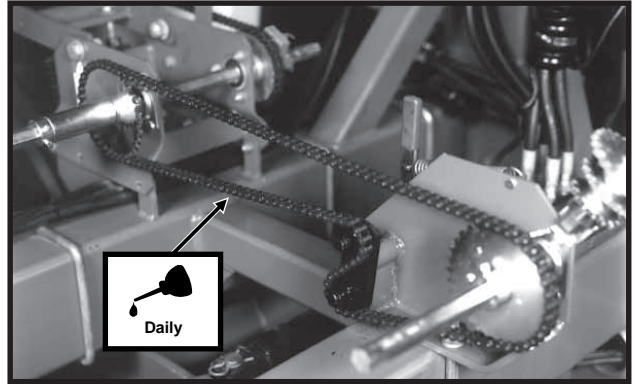
Liquid Fertilizer Piston Pump Drive Chain

04059905a



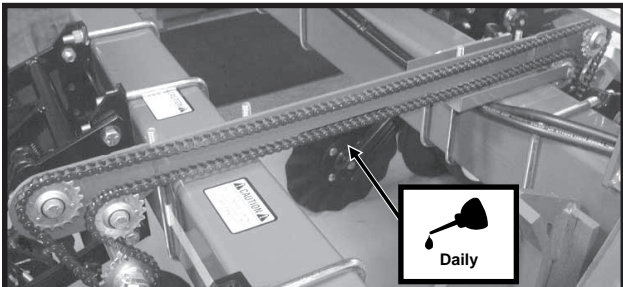
Planter Seed Rate Transmission Drive Chain

69922-21



Liquid Fertilizer Squeeze Pump Drive Chain

D03160401



Interplant® Package Drive Chain

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 side to side. Rotate the tire to check for roughness in the bearings. If bearings sound rough, the hub should be removed and the bearings inspected and replaced if necessary. See "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.

CENTER POST

67976-13a



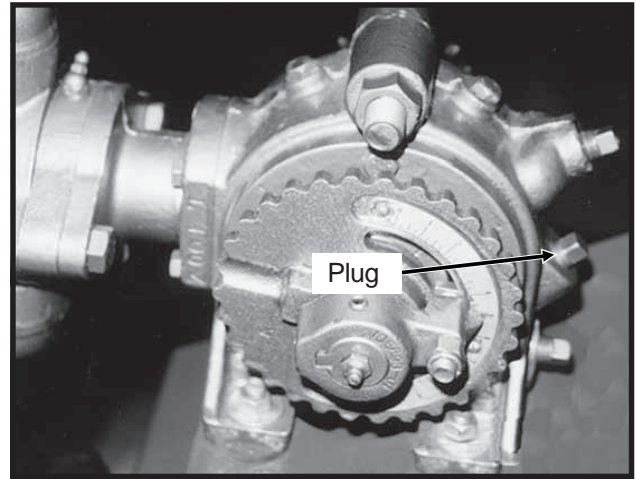
The center post is clad with stainless steel. To prolong service life keep stainless steel surface clean and free of any lubrication.

CENTER POST AND POLY WEAR PADS REQUIRE NO LUBRICATION. ANY OIL OR GREASE WILL ATTRACT DIRT AND ACCELERATE WEAR ON THE CENTER POST AND ON THE POLY WEAR PADS.

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

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.

WRAP SPRING WRENCH ASSEMBLY

The chain idler is equipped with a wrap spring wrench. The wrench components may require occasional lubrication to operate correctly. Disassembly is required to lubricate. (a) Remove the $\frac{1}{4}$ "-20 x $\frac{1}{2}$ " cap screw that secures the idler with sprockets to the wrench tightener shaft. (b) Remove the wrap spring wrench from the planter. (c) Tip the wrap spring wrench on its side and lubricate using a high quality spray lubricant. Lubricant must be absorbed into the wrap spring area. (d) Reinstall wrench on planter.

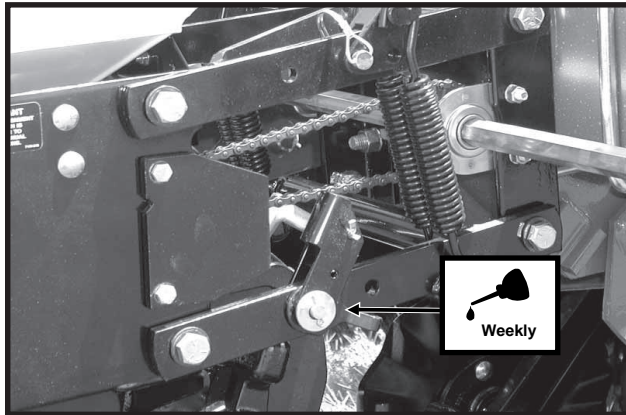
D101303102



LUBRICATION

INTERPLANT® PUSH ROW UNIT LOCKUPS

D062603103



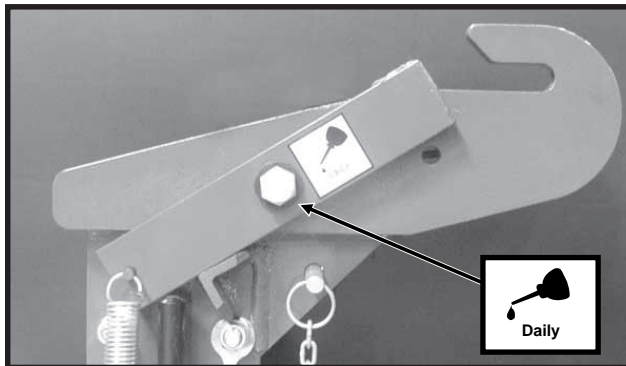
2 Per Row

BUSHINGS

Lubricate bushings at the frequency indicated.

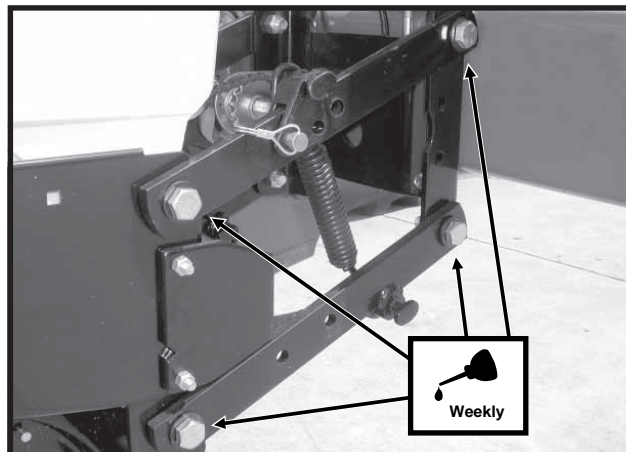
Using a torque wrench, check each bolt for proper torque. If bolt is loose, it should be removed and the bushing inspected for cracks and wear. Replace bushing if necessary. **Only hardened flat washers should be used. Replace damaged flat washers with proper part. Torque bolts to 130 ft. lbs.**

D03310407



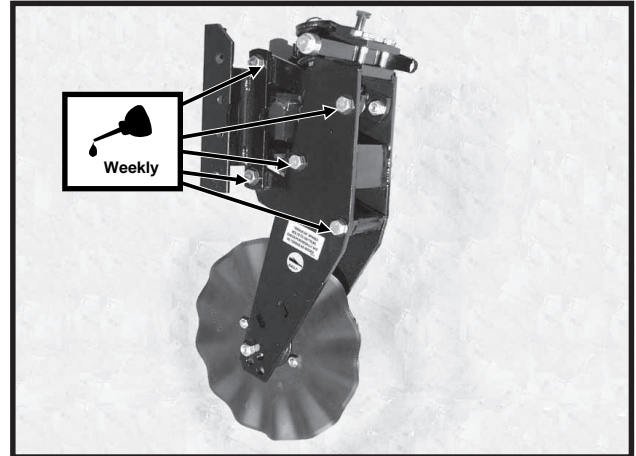
Transport Catch Pivot

D06300305



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

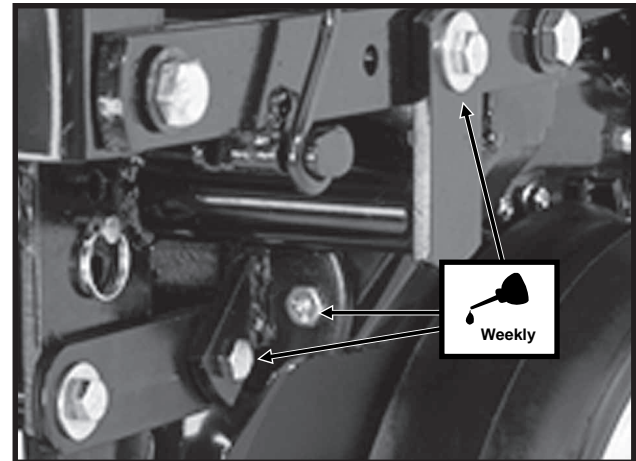
D06189901a



Frame Mounted Coulters Parallel Linkages - STYLE A (10 Per Row)

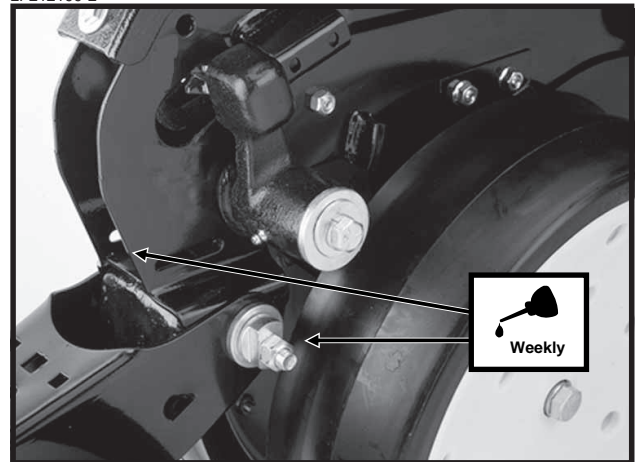
Shown not installed on row unit for visual clarity.

LF212299-22



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

LF212199-2



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

LUBRICATION

GREASE FITTINGS

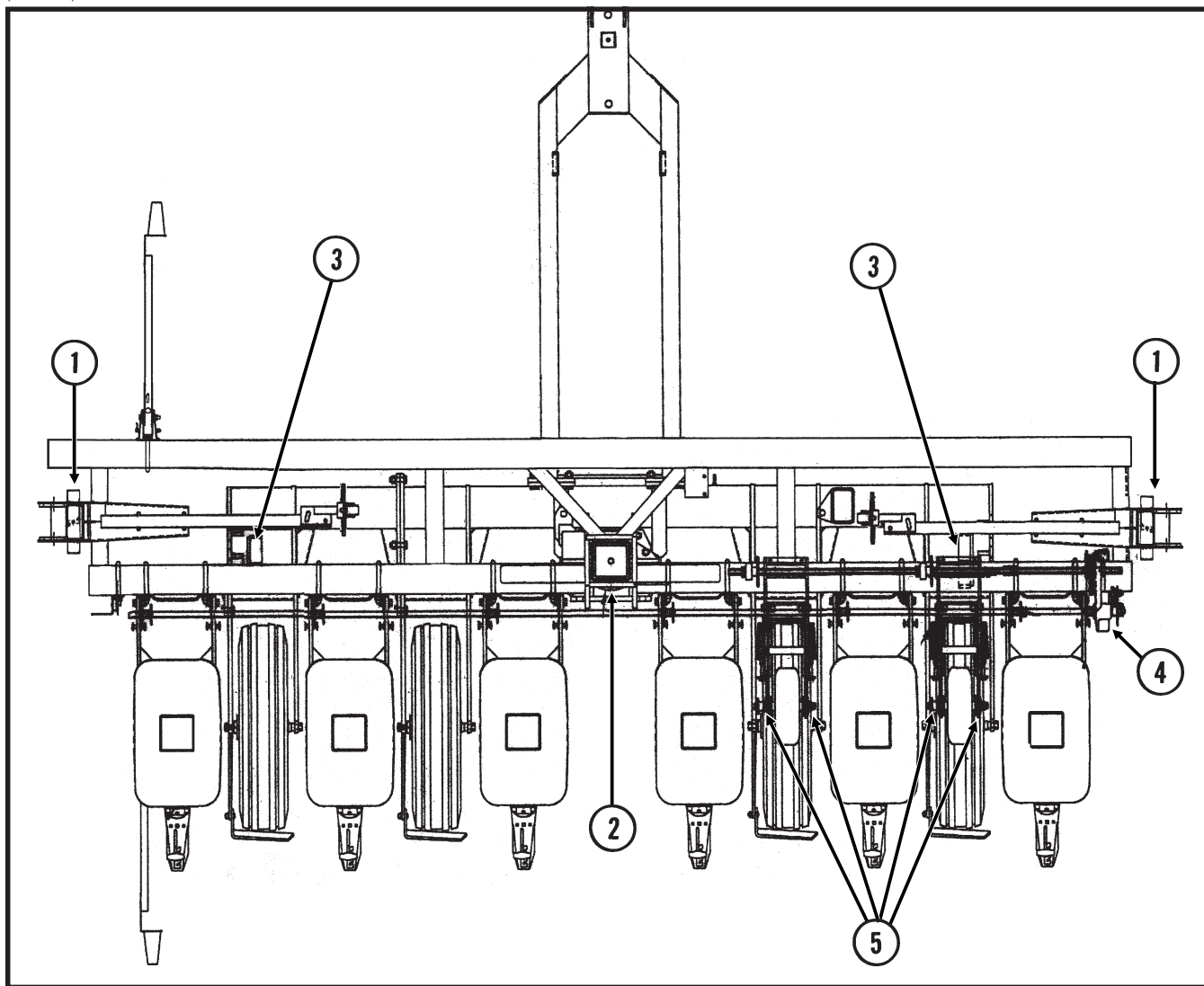
Those parts equipped with grease fittings should be lubricated at the frequency indicated with an SAE multipurpose grease. Be sure to clean the fitting thoroughly before using grease gun. The frequency of lubrication recommended is based on normal operating conditions. Severe or unusual conditions may require more frequent attention.



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

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

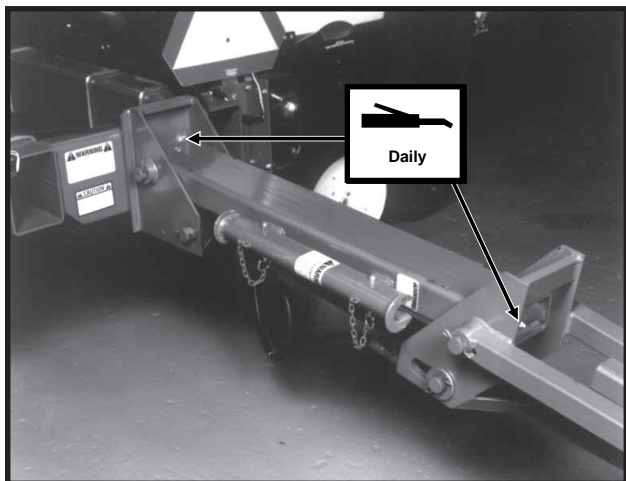
(TWL186d)



LUBRICATION

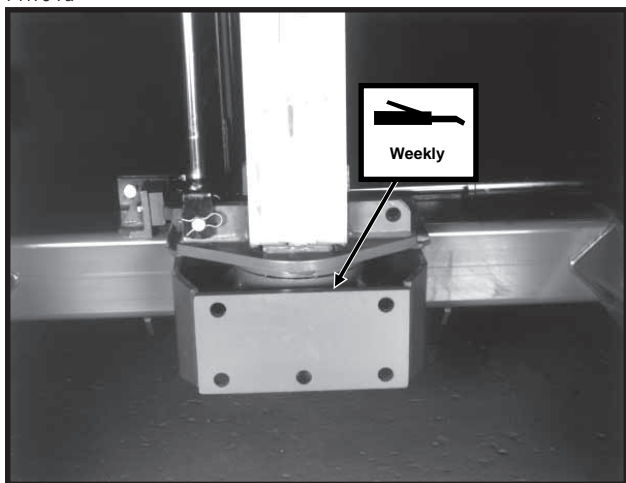
Base Machine

79421-38



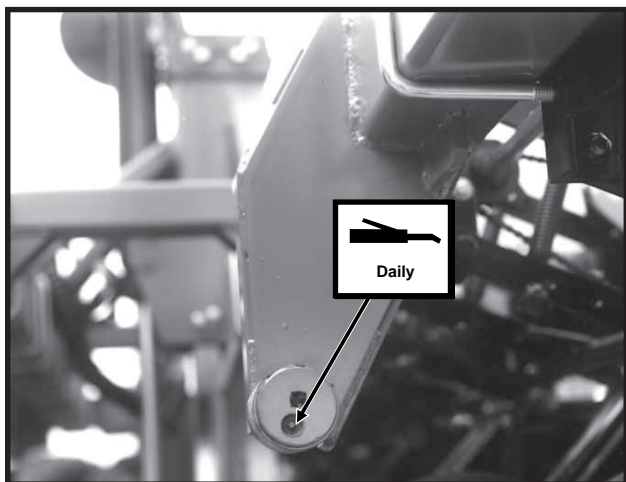
1. Row Marker Assembly - 2 Zerks Per Assembly

74176-7a



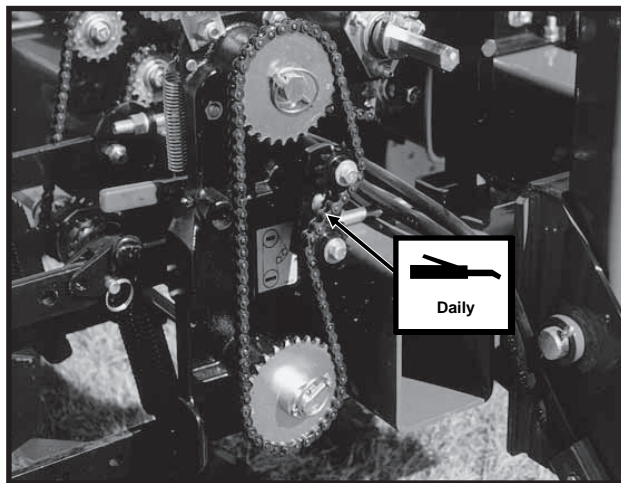
2. Center Pivot - 1 Zerk

67999-22



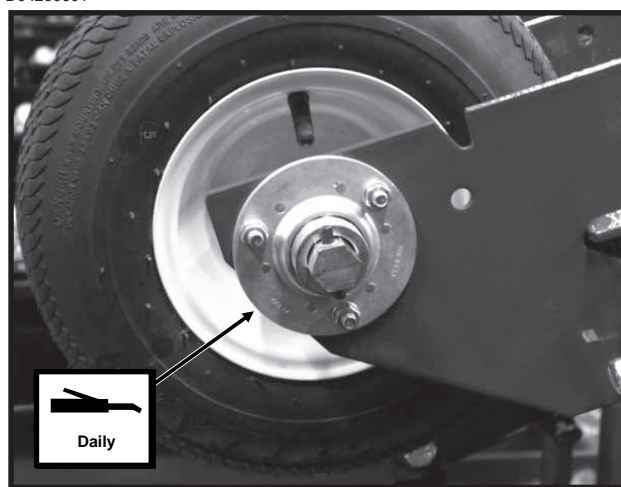
3. Cam Follower - 1 Zerk Per Cam Follower

04059905a



4. Seed Rate Transmission Assembly - 1 Zerk (Idler)

D04200001

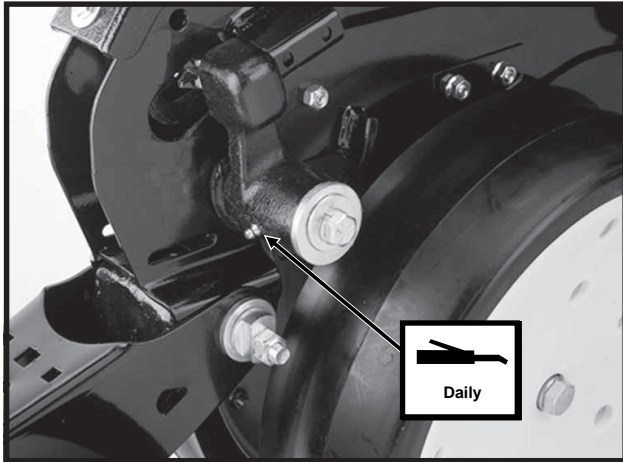


5. (If Applicable) Contact Wheel Arm Bearing - 2 Zerks Per Arm Assembly (**Rotate tire while filling with grease.**)

LUBRICATION

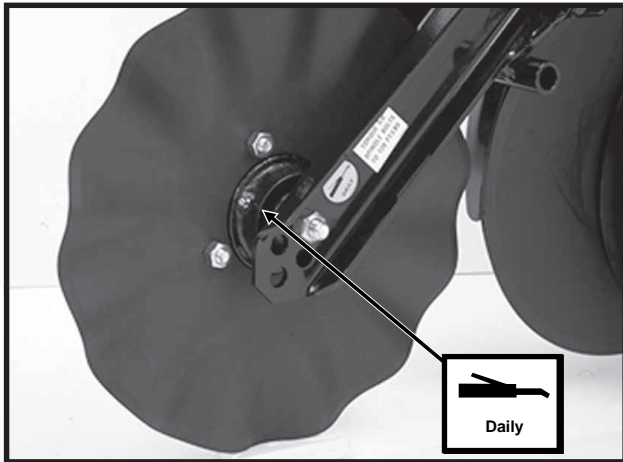
Row Unit

LF212199-2



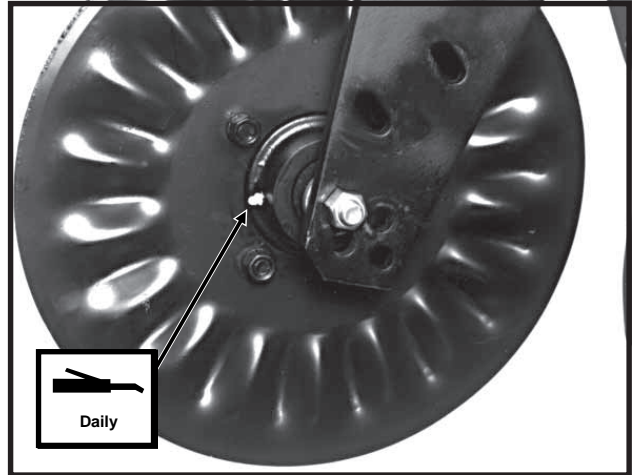
Gauge Wheel Arms - 1 Zerk Per Arm
(Seals in gauge wheel arm are installed with lip facing out to allow grease to purge dirt away from seal. Pump grease into arm until fresh grease appears between washers and arm.)

LF212299-19



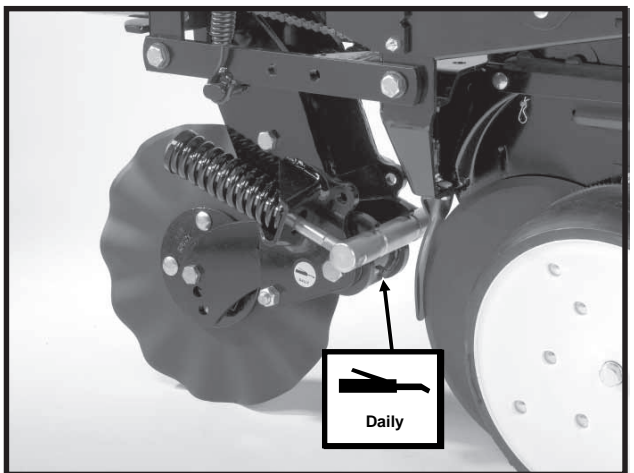
(If Applicable) Row Unit Mounted No Till Coupler Hubs - 1 Zerk Per Hub
(Pump grease into hub until grease comes out around the seals. Spin hub while filling with grease.)

56673-6



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

LF083002101

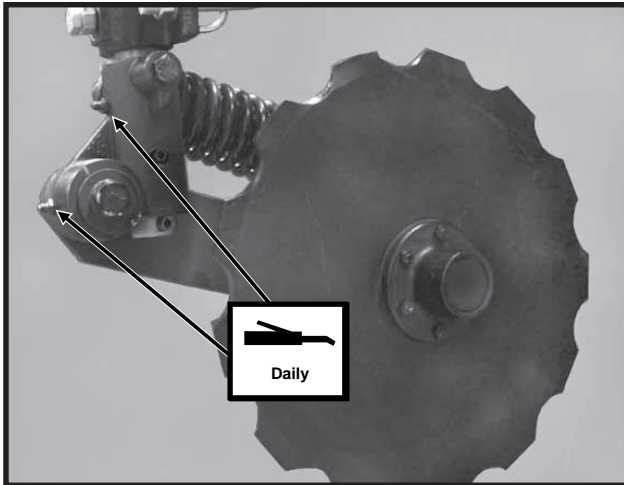


(If Applicable) Frame Mounted Couler - STYLE B - 1 Zerk Per Arm

LUBRICATION

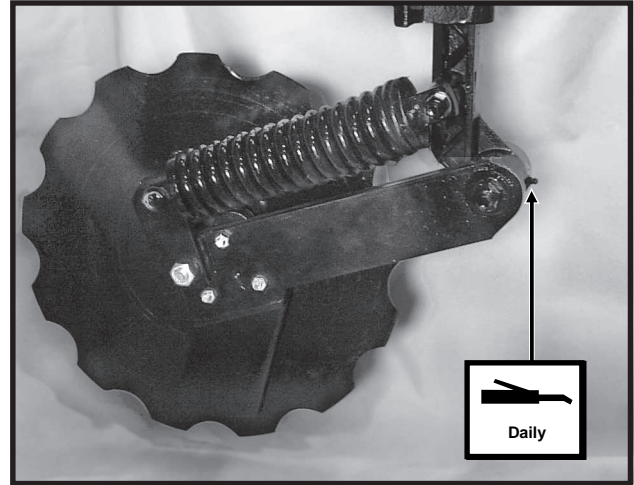
Fertilizer Openers

D05189901



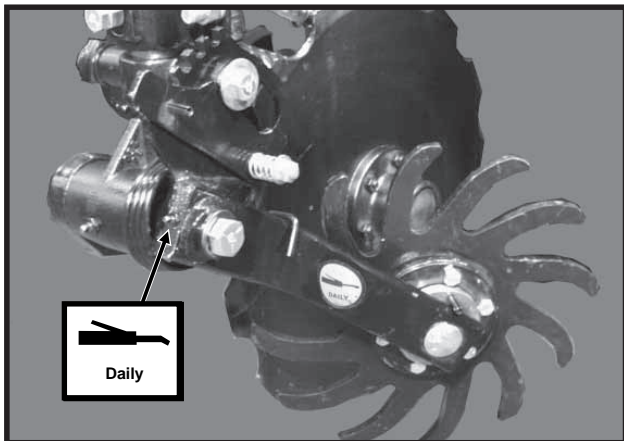
Notched Single Disc Fertilizer Opener STYLE A - 2 Zerks

D060801304



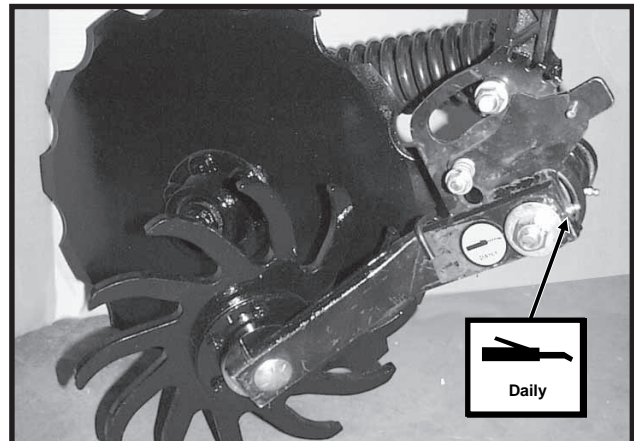
Notched Single Disc Fertilizer Opener STYLE B - 1 Zerk

D05219901a



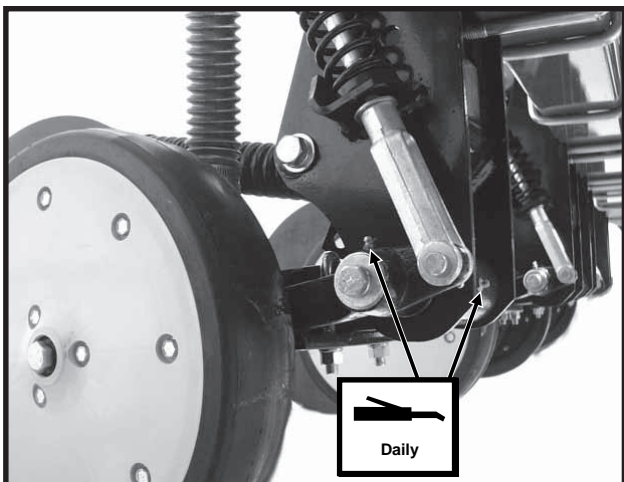
(If Applicable) Residue Wheel Attachment For Use With STYLE A Notched Single Disc Fertilizer Opener - 1 Zerk

D052201104



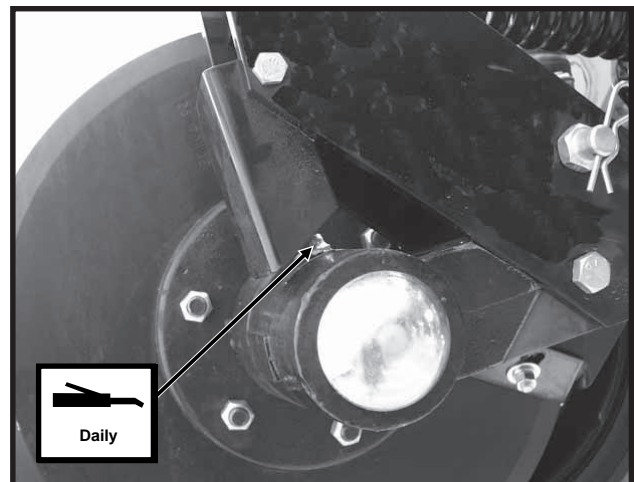
(If Applicable) Residue Wheel Attachment For Use With STYLE B Notched Single Disc Fertilizer Opener - 1 Zerk

D060801304



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

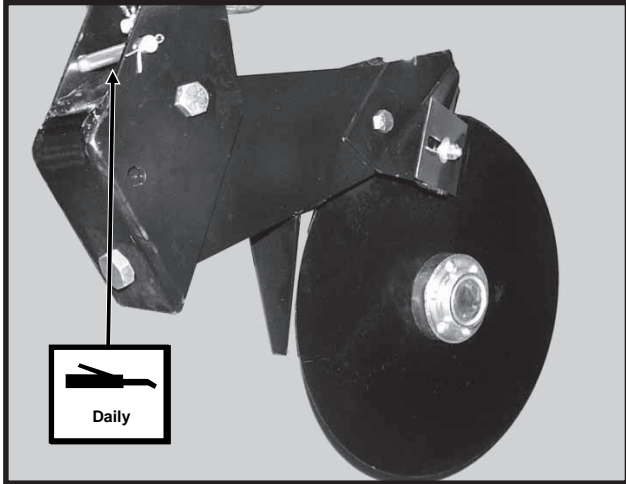
D060801303



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

LUBRICATION

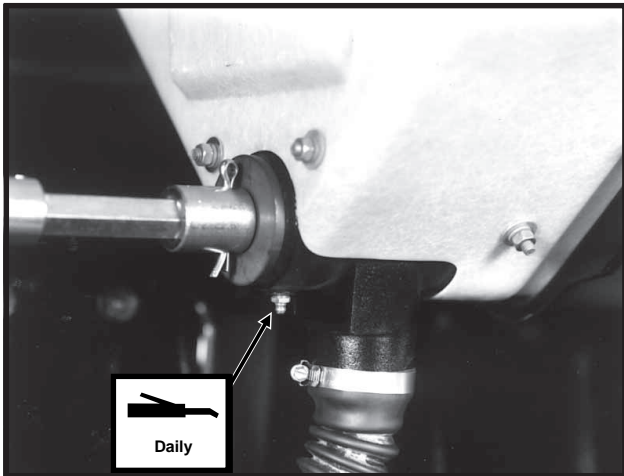
D06259919



Double Disc Fertilizer Opener - 1 Zerk

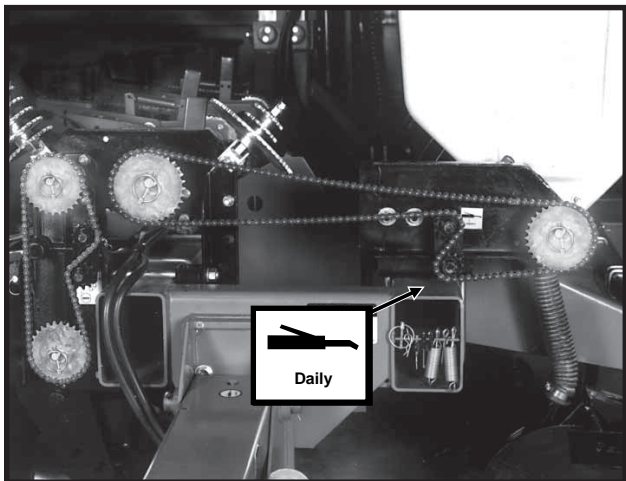
Dry Fertilizer Attachment

61111-28



Fertilizer Hopper - 2 Zerks Per Hopper

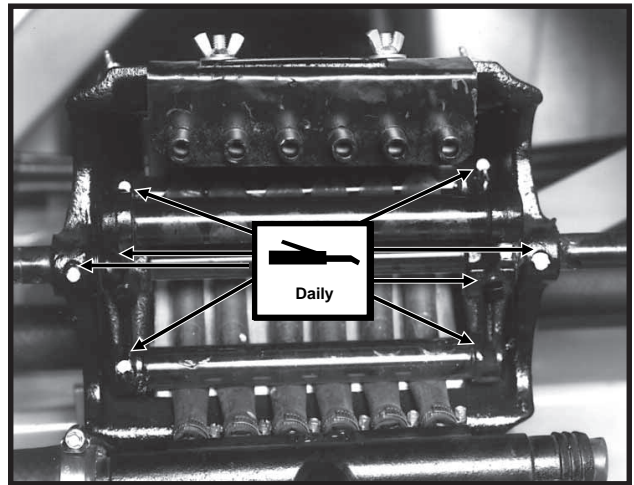
69797-21a



Fertilizer Transmission - 1 Zerk Per Transmission (Idler)

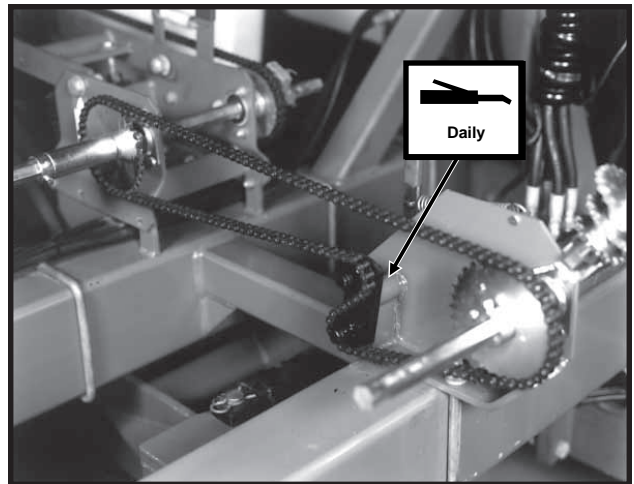
Liquid Fertilizer Attachment

61010-6



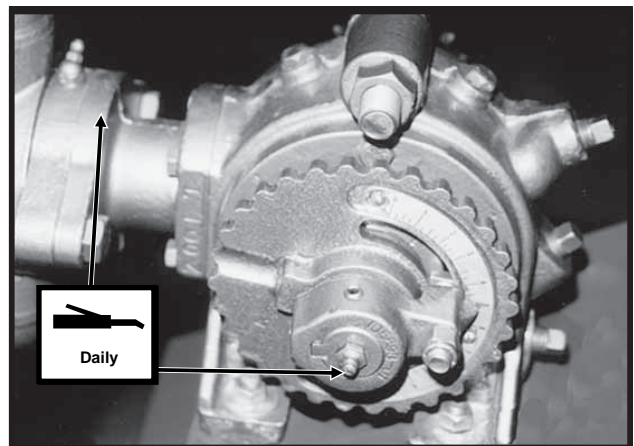
Squeeze Pump - 8 Zerks Per Pump

69922-20



Squeeze Pump Drive Plate - 1 Zerk Per Idler

12229799



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

Rev. 9/02

LUBRICATION

MAINTENANCE

MOUNTING BOLTS AND HARDWARE

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

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

5/8" No Till Coulter Spindle Bolts - 120 ft. lbs.
Transport/Ground Drive Tire Lug Bolts - 90 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

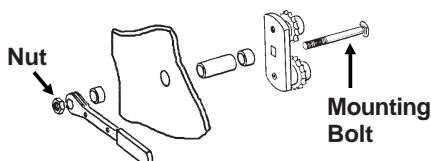


GRADE 8
6 Marks

CHAIN TENSION ADJUSTMENT

The drive chains have a spring loaded idler and therefore 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. See “Wrap Spring Wrench Assembly” (on applicable idler assemblies) in Lubrication Section for additional information.

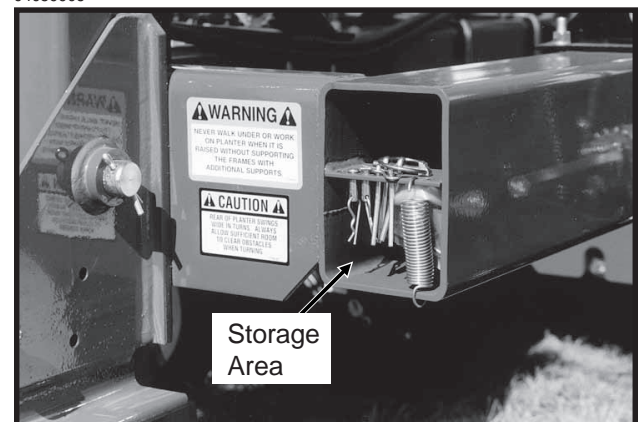
(MT18a)



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.

Additional chain links can be found in the storage area located inside the front planter frame.

04059906



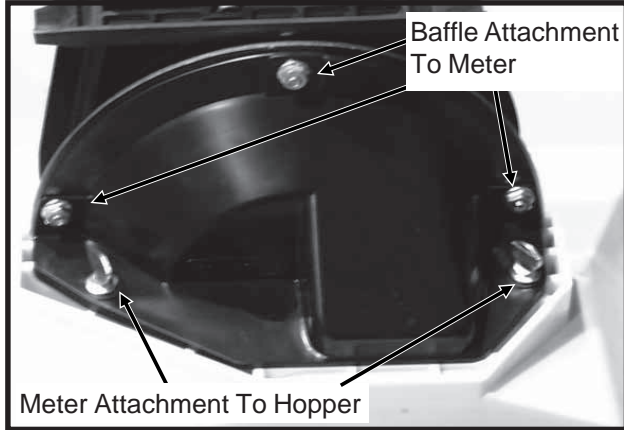
Storage Area

MAINTENANCE

FINGER PICKUP SEED METER INSPECTION/ADJUSTMENT

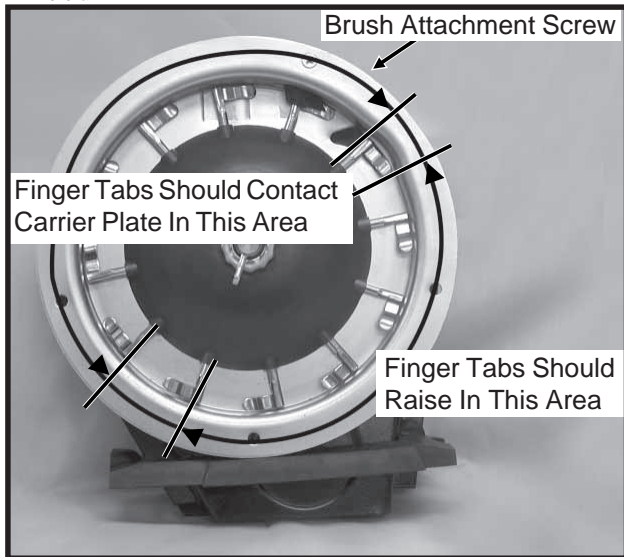
To inspect or service the finger pickup seed meter, remove the meter from the seed hopper by removing the two thumbscrews which secure the mechanism to the hopper. Remove the baffle from the meter assembly by removing three cap screws. This will permit access to the finger pickup.

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.

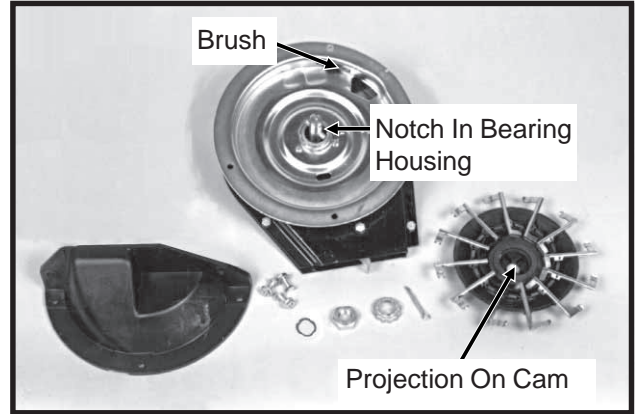
D12220402a



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

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

60620-3b



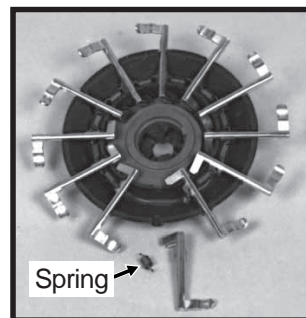
3. Check brush for wear and replace if necessary or following every 100 acres per row of operation.

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.

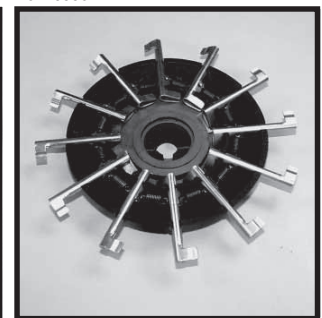
4. To replace fingers or springs, remove springs from fingers and remove finger from holder by lifting it out of the friction fit slot. Under average conditions, life expectancy of these parts should be 600-900 acres per row of operation.
5. After cleaning and/or replacing defective parts, reassemble 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

D092004103a

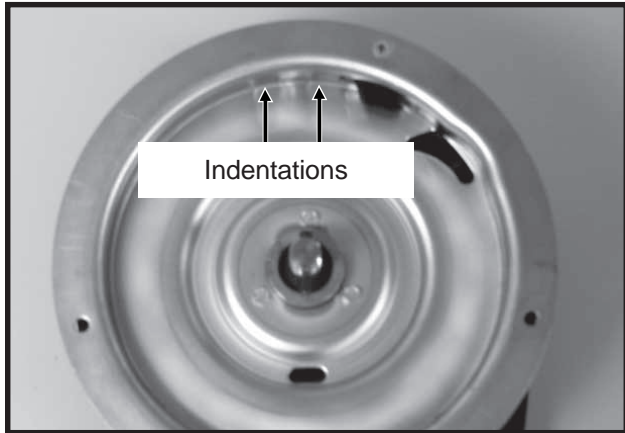


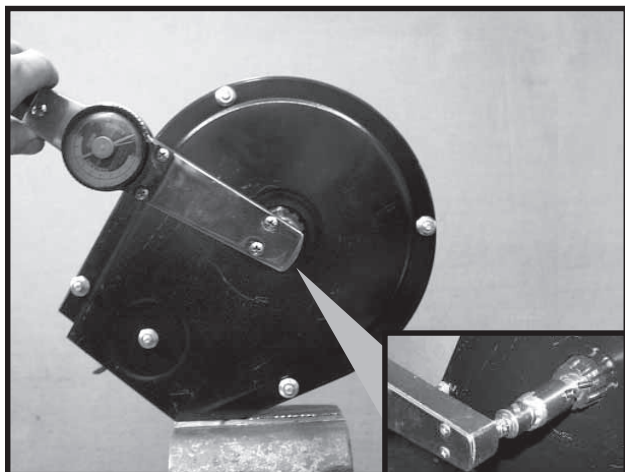
Photo Shows Worn Carrier Plate

- 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

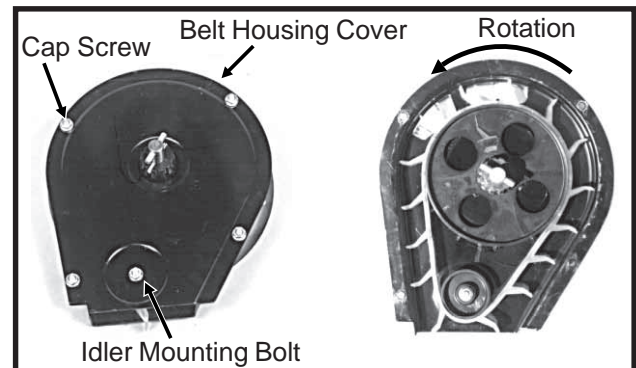


- Turn finger holder by hand to make sure it is positioned firmly against the carrier plate, but is not over tightened and can be rotated with moderate force.
- Install cover nut and cotter pin and reinstall baffle.

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

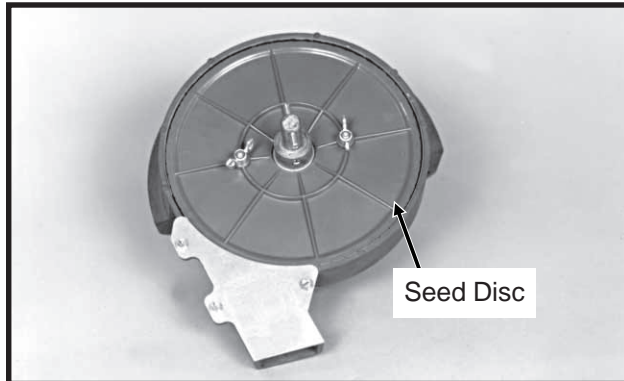
FINGER PICKUP SEED METER TROUBLESHOOTING

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.	Foreign material or obstruction in meter.	Clean and inspect.
	Finger holder improperly adjusted.	Adjust to specifications. (22 to 25 in. lbs. rolling torque)
	Broken fingers.	Replace fingers and/or springs as required.
	Planting too slowly.	Increase planting speed to within recommended range.
Planting too many doubles.	Planting too fast.	Stay within recommended speed range.
	Loose finger holder.	Adjust to specifications. (22 to 25 in. lbs. rolling torque)
	Worn brush in carrier plate.	Inspect and replace if necessary.
Overplanting.	Worn carrier plate.	Inspect and replace if necessary.
	Seed hopper additive being used.	Reduce or eliminate additive or increase graphite.
Underplanting.	Seed belt installed backwards.	Remove and install correctly.
	Weak or broken springs.	Replace.
	Spring not properly installed.	Remove finger holder and correct.
	Seed belt catching or dragging.	Replace belt.
	Brush dislodging seed.	Replace brush.
Irregular or incorrect seed spacing.	Driving too fast.	Check chart for correct speed.
	Wrong tire pressure.	Inflate tires to correct air pressure.
	Drive wheels slipping.	Reduce down pressure on row unit down force springs.
	Wrong sprockets.	Check seed rate charts for correct sprocket combinations.
Seed spacing not as indicated in charts.	Wrong tire pressure.	Inflate tires to correct air pressure.
	Inconsistent seed size.	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.

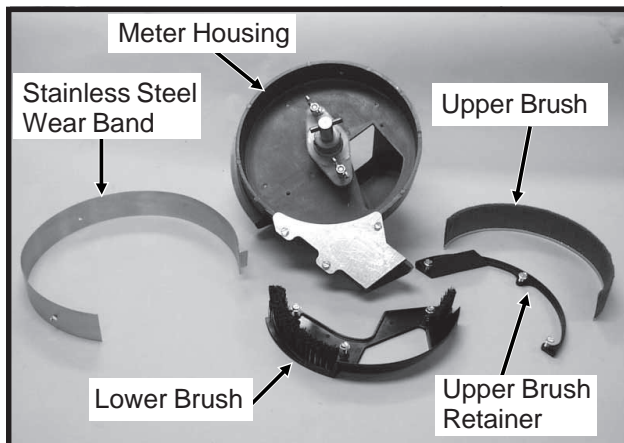
MAINTENANCE

BRUSH-TYPE SEED METER MAINTENANCE

60607-10a

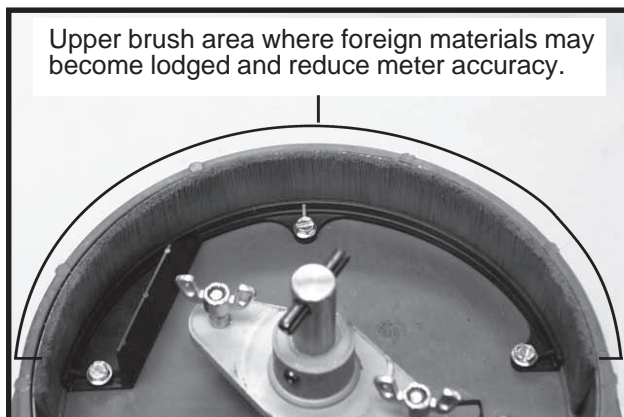


D04239911



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



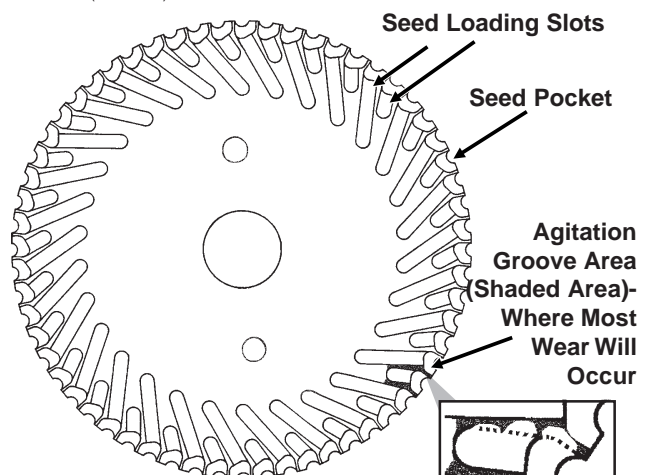
IMPORTANT: Replace hopper lids after hoppers are filled to prevent accumulation of dust or dirt in the seed meter which will cause premature wear.

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)



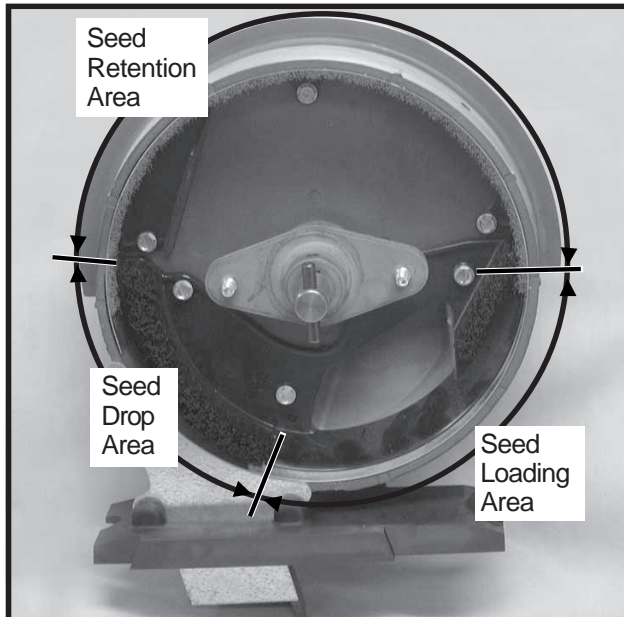
Most wear on the seed disc will be found in the agitation groove area (area between the seed loading slots). Wear will affect planting accuracy at high RPM. To measure for wear, lay a straight edge across the surface of the disc and measure the gap between the disc (at the agitation groove area) and 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 reduce life expectancy of the seed disc to under 100 acres per row.

MAINTENANCE

Upper Brush

D12220403



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

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

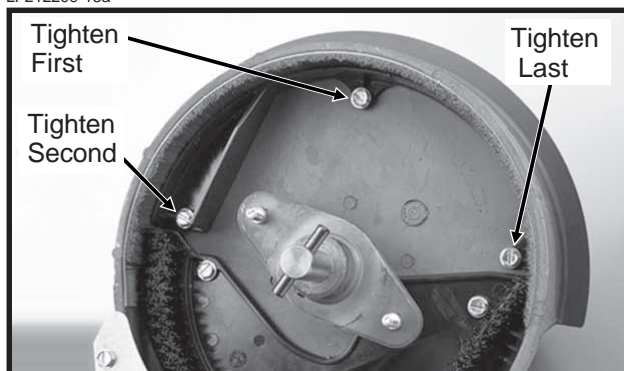
The upper brush should be replaced at approximately 120-400 acres per row of use or sooner if damage or excessive wear is found.

Installation Of Upper Brush

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

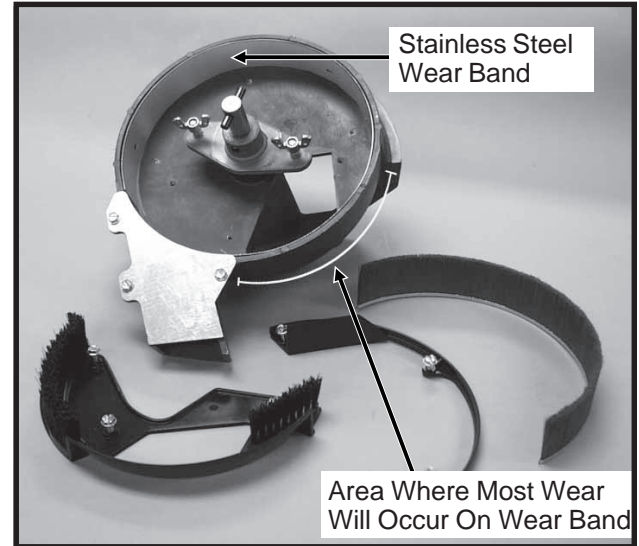
NOTE: Use GD11122 upper brush retainer when using soybean and cotton discs. Use GD8237 upper brush retainer when using milo/grain sorghum discs. GD11122 brush retainer shown.

LF212299-13a



Stainless Steel Wear Band

D04239917a

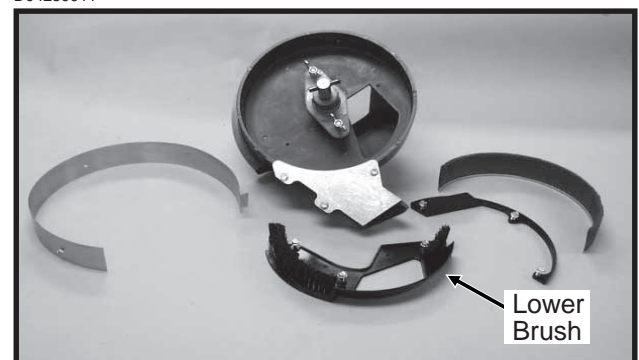


The purpose of the stainless steel wear band is to protect the meter housing from wear. The band is .030" thick and should be replaced when approximately .020" of wear is found in the primary area of wear. If the wear band is allowed to wear through or if the meter is used without the wear band in place,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

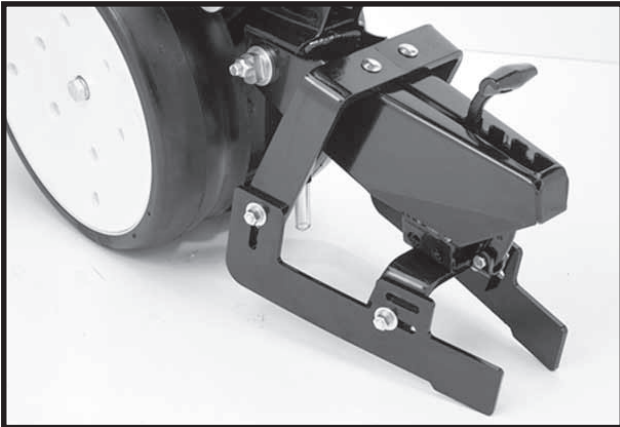
MAINTENANCE

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.

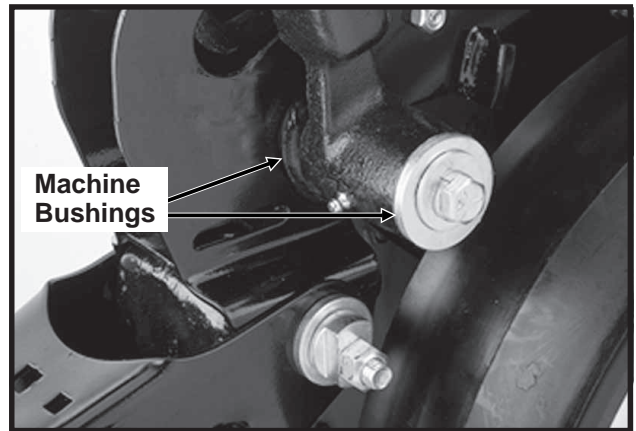
GAUGE WHEEL ADJUSTMENT

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.

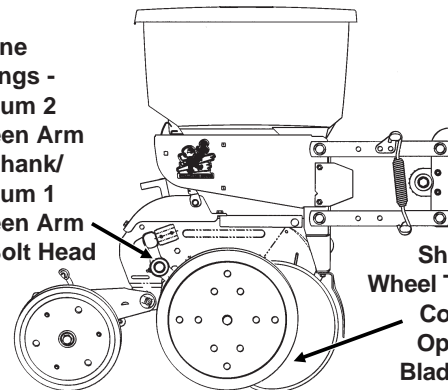
NOTE: It may be desirable to space gauge wheel further from blade when operating in sticky soils.

LF212199-2



(RU113)

Machine Bushings - Minimum 2 Between Arm And Shank/ Minimum 1 Between Arm And Bolt Head



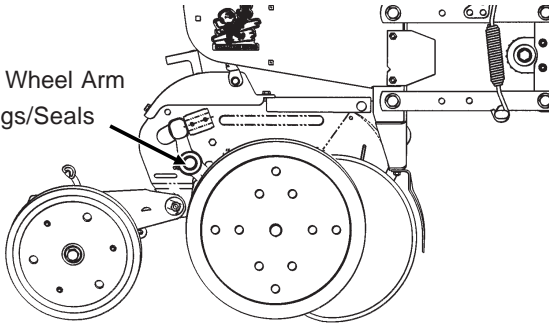
Shim Gauge Wheel To Lightly Contact The Opener Disc Blade - Check Adjustment In Field Position

MAINTENANCE

GAUGE WHEEL ARM BUSHING AND/OR SEAL REPLACEMENT

(RU113)

Gauge Wheel Arm Bushings/Seals

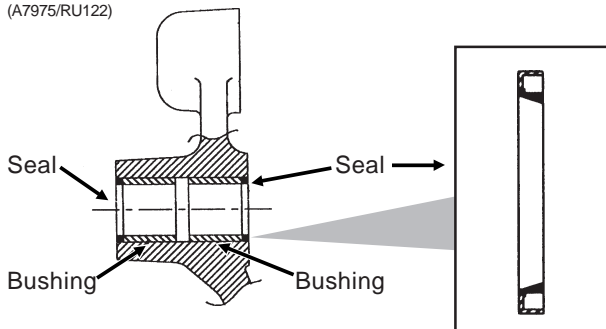


NOTE: A Gauge Wheel Arm Bushing And Seal Driver Kit (G1K296), for use in bushing and seal replacement, is available through your KINZE® Dealer.

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.

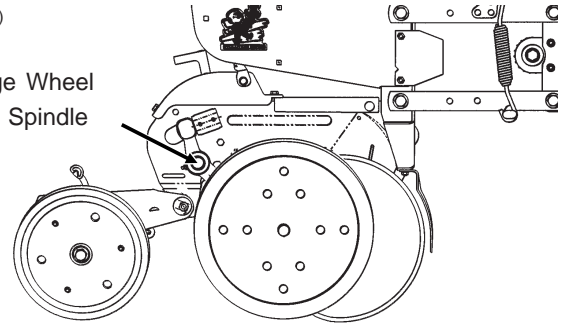
NOTE: Special machine bushing between gauge wheel arm and gauge wheel.

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

GAUGE WHEEL ARM PIVOT SPINDLE REPLACEMENT

(RU113)

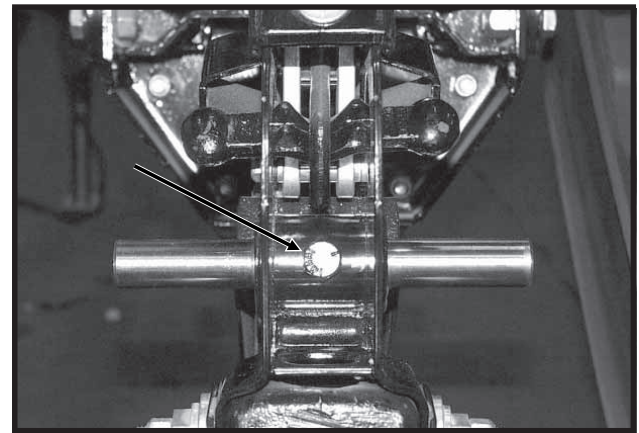
Gauge Wheel Pivot Spindle



To replace gauge wheel pivot spindle:

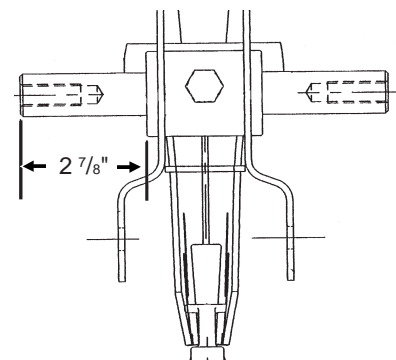
1. Remove the gauge wheel and arm assemblies from the shank assembly.
2. Remove 1/2" x 3/4" cap screw that locks the pivot spindle in place and remove the spindle.

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

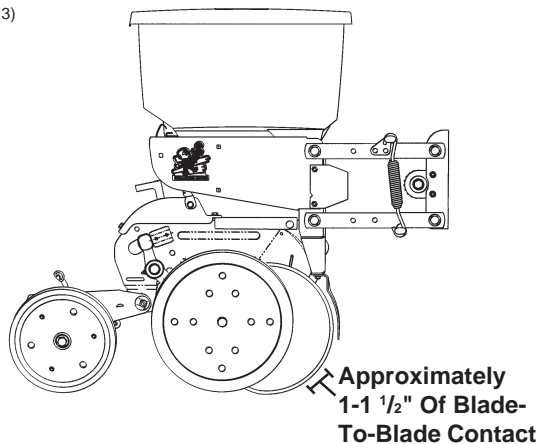
15" SEED OPENER DISC BLADE/ BEARING ASSEMBLY

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.

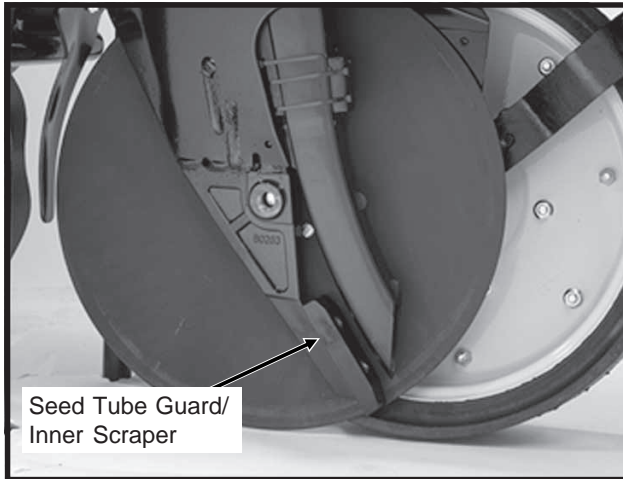
MAINTENANCE

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

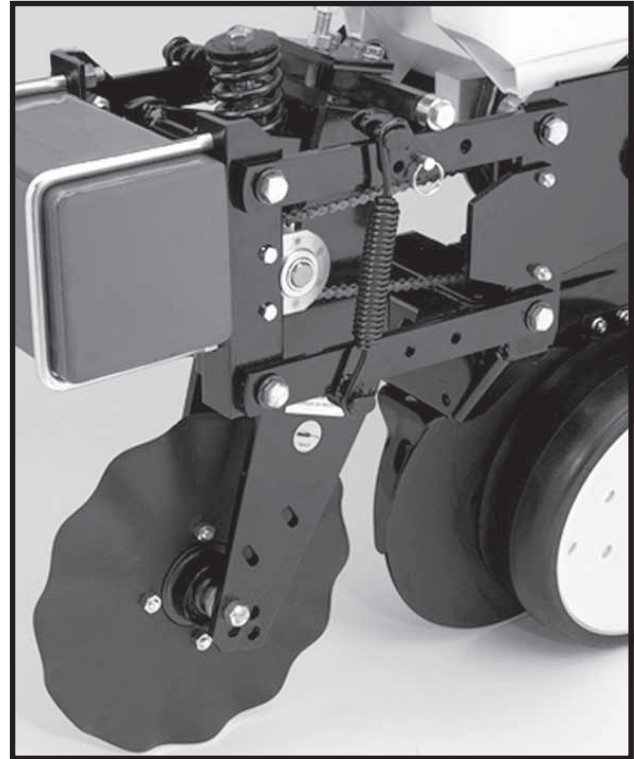
IMPORTANT: No till planting or planting in hard ground conditions, especially when the planter is not equipped with no till coulters, and/or excessive blade-to-blade contact will increase seed tube guard wear and necessitate more frequent inspection and/or replacement.

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 the 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.

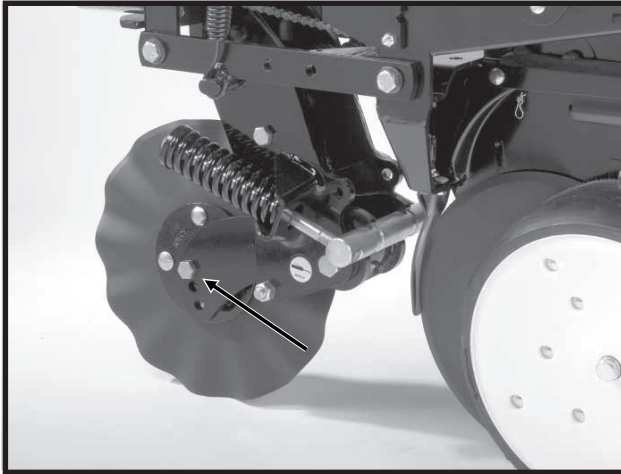
When the 16" diameter coulters blade (1" fluted, 1" bubbled or $\frac{3}{4}$ " fluted) is worn to 14 $\frac{1}{2}$ " (maximum allowable wear), it should be replaced.

(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

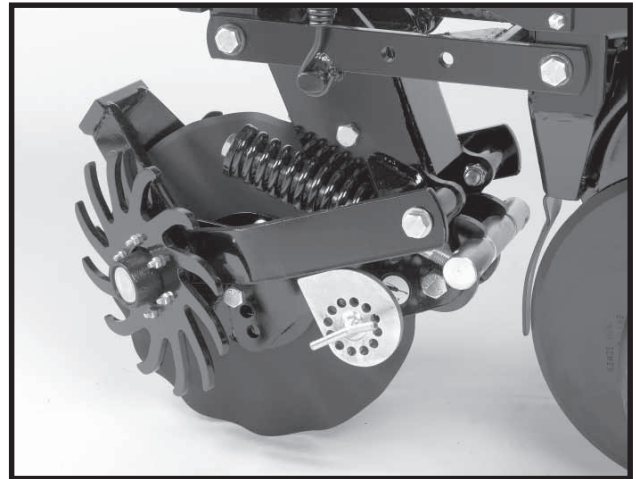


The blade hubs are equipped with sealed bearings. If bearings sound or feel rough when the blade is rotated, replace the bearings.

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

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

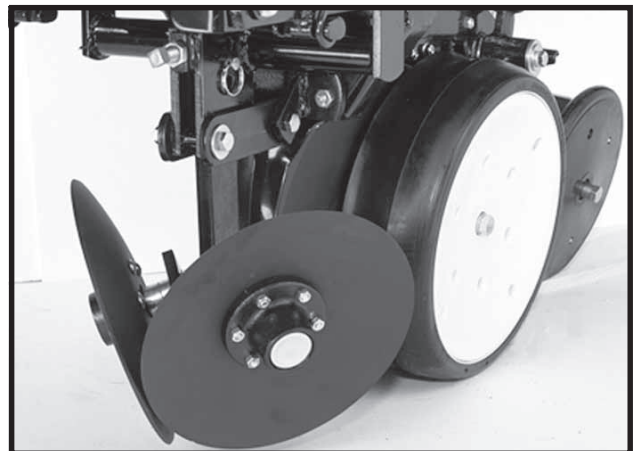
LF083002102



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

ROW UNIT MOUNTED DISC FURROWER

LF212299-22



Lubricate the bushings in the support arm and mounting bracket at the frequency indicated in the Lubrication Section of this manual. Using a torque wrench, check each bolt for proper torque. If the bolt is loose, it should be removed and the bushing inspected for cracks and wear. Replace bushings as necessary. **Only hardened flat washers should be used. Replace damaged flat washers with proper part. Torque bolts to 130 ft. lbs.**

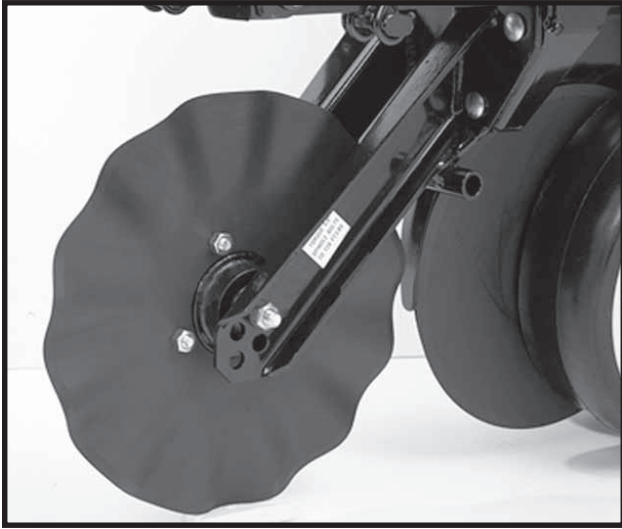
The blade hubs are equipped with sealed bearings. If bearings sound or feel rough when the blade is rotated, replace the bearings.

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

MAINTENANCE

ROW UNIT MOUNTED NO TILL COULTER

LF212299-19a



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.

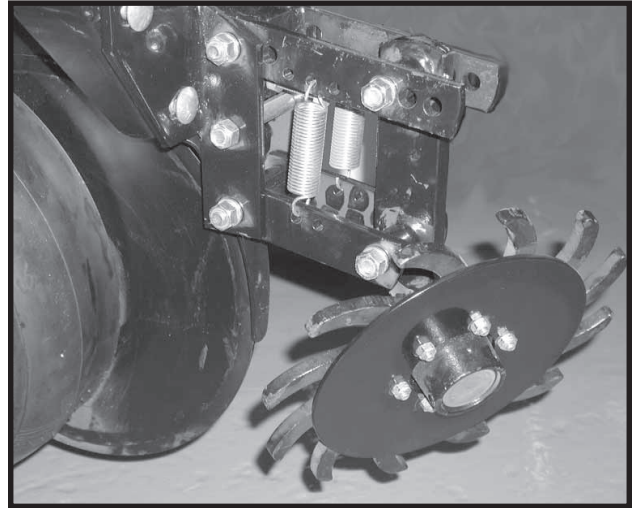
The coulters blade can be adjusted to one of four settings. Initially the blade is set in the highest position. As the blade wears it can be adjusted to one of the three lower settings. See "Row Unit Mounted No Till Coulters" in Row Unit Operation Section of this manual.

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.

ROW UNIT MOUNTED RESIDUE WHEEL

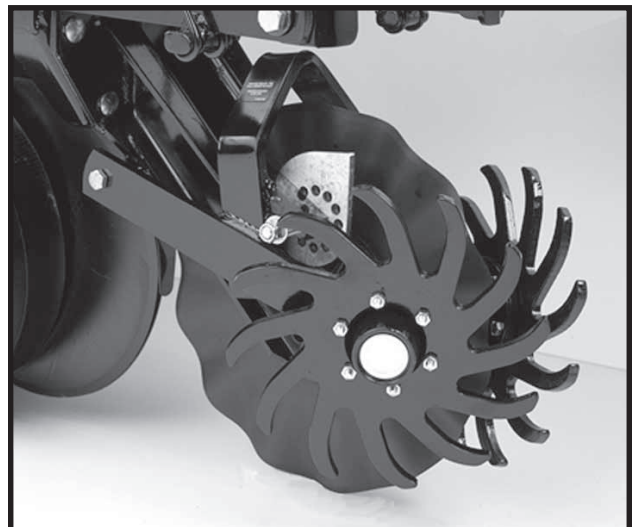
D101701113



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

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.

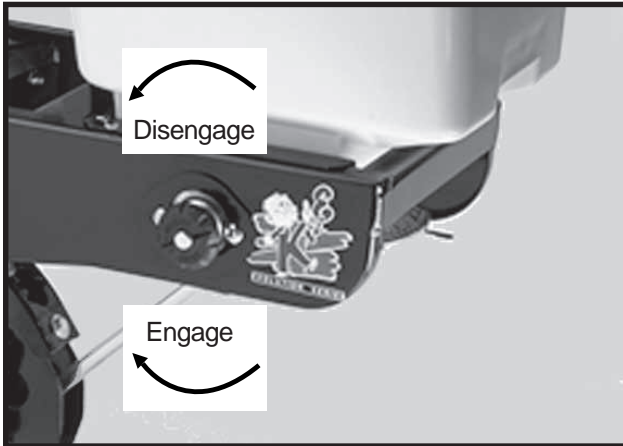
MAINTENANCE

GRANULAR CHEMICAL ATTACHMENT

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

Install hoppers and chains. Check chain alignment.

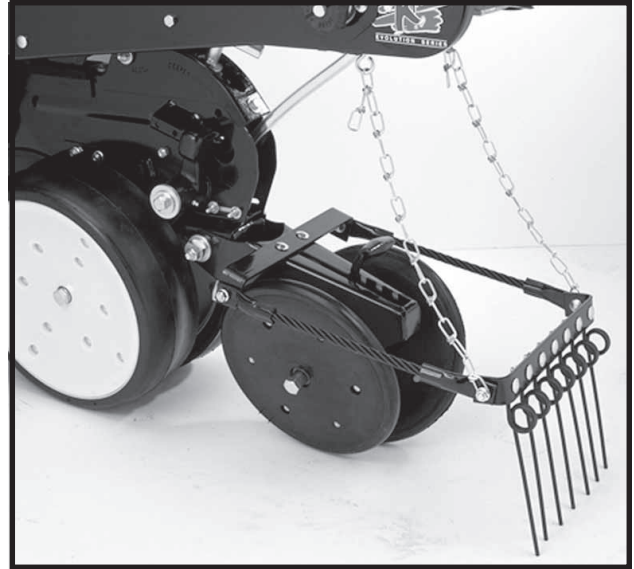
LF212299-4



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 console.	Replace console.
	Break in the harness just after the monitor console.	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 measurements (such as speed, area, etc.) being displayed. (KPM II And KPM II Stack-Mode Only)	Incorrect 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

ROW MARKER SEQUENCING/FLOW CONTROL VALVE INSPECTION

The valve block assembly consists of the row 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.

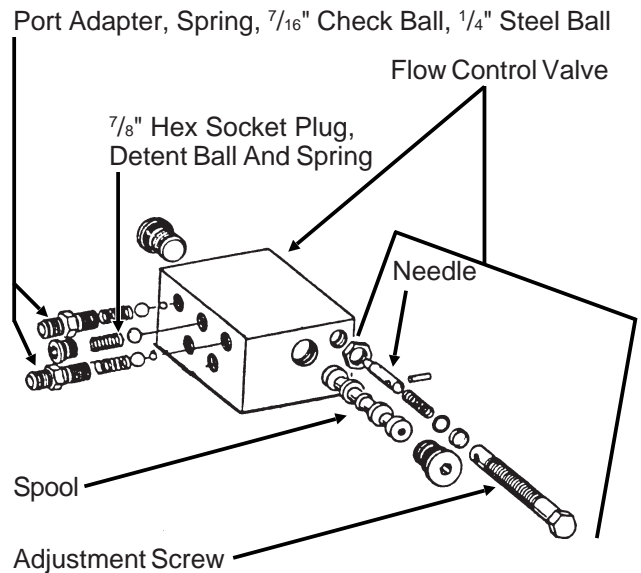
3. Remove plug from both sides of valve block and remove spool.
4. Inspect all parts for pitting, contamination or foreign material. Also check seating surfaces inside the valve. Replace any parts found to be defective.
5. Lubricate spool with a light oil and reinstall. Check to be sure spool moves freely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

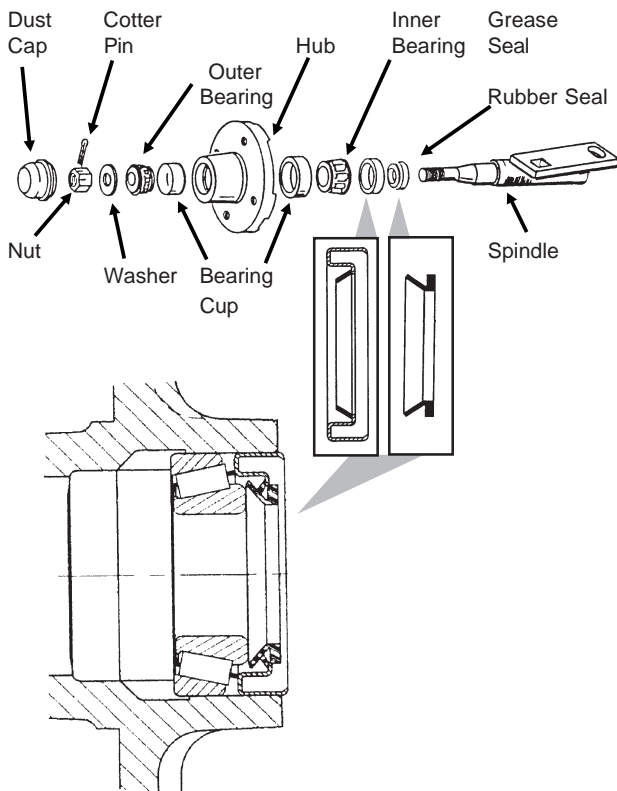
ROW MARKER CIRCUIT TROUBLESHOOTING		
PROBLEM	POSSIBLE CAUSE	SOLUTION
Both markers lowering and only one raising at a time.	Hoses from cylinders to valve connected backwards.	Check hosing diagram in manual and correct.
Same marker always operating.	Spool in sequencing valve not shifting.	Remove spool, inspect for foreign material, making sure all ports in spool are open. Clean and re-install.
Both markers lower and raise at same time.	Foreign material under check ball in sequencing valve.	Remove hose fitting, spring and balls and clean. May be desirable to remove spool and clean as well.
	Check ball missing or installed incorrectly in sequencing valve.	Disassemble and correct. See illustration in Parts Section.
Marker (in raised position) settling down.	Damaged O-ring in marker cylinder or cracked piston.	Disassemble cylinder and inspect for damage and repair.
	Spool in sequencing valve not shifting completely because detent ball or spring is missing.	Check valve assembly and install parts as needed.
	Spool in sequencing valve shifting back toward center position.	Restrict flow of hydraulic oil from tractor to sequencing valve.
Neither marker will move.	Flow control closed too far.	Loosen locking nut and turn flow control adjustment bolt out or counterclockwise until desired speed is set.
Markers moving too fast.	Flow control open too far.	Loosen locking nut and turn flow control adjustment bolt in or clockwise until desired speed is set.
Sporadic marker operation speed.	Needle sticking open in flow control valve.	Remove flow control, inspect and repair or replace.

MAINTENANCE

ROW 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.

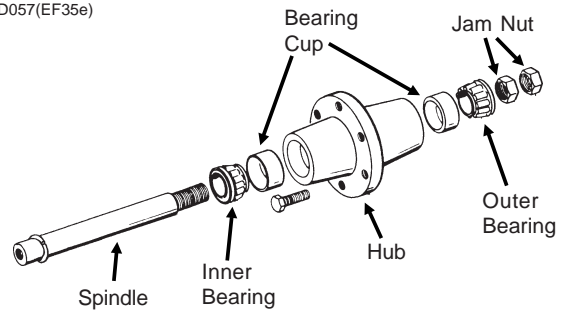
(PLTR45/PLTR99/PLTR98/PLTR102)



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.

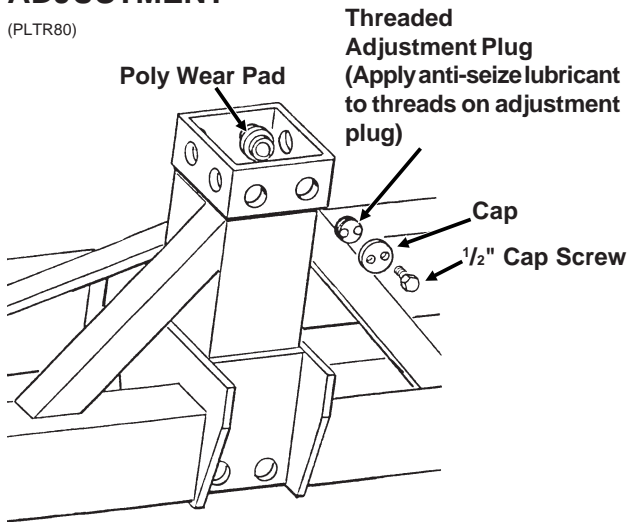
PTD057(EF35e)



MAINTENANCE

WEAR PAD REPLACEMENT/ ADJUSTMENT

(PLTR80)



The center section of the planter consists of a steel tubular frame equipped with 16 adjustable wear pad assemblies which travel up and down against a stainless steel clad center post. Each adjustable wear pad assembly consists of a poly wear pad, a threaded adjustment plug and a cap. The assembly is held in place by the threaded adjustment plug and locked in place by the cap and two 1/2" hex head cap screws.

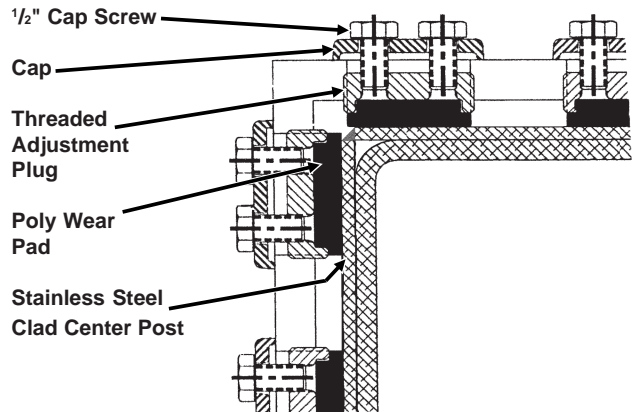
Check pad adjustment and wear annually.

To check adjustment and wear, park the planter on a level surface. Raise the planter to the raised field position. Visually check all 16 adjustable wear pad assemblies. Each wear pad assembly should lightly contact the stainless steel clad center post. The maximum allowable gap, when checked using a thickness gauge, should be no more than .060".



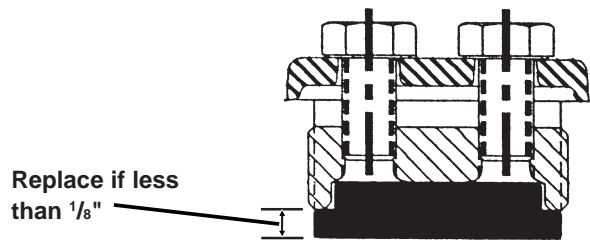
DANGER: Always install all safety lockup devices and safety lock pins before working under the unit.

(TWL68b)



If adjustment is necessary proceed as follows: (a) Support the frame with safety stands at a comfortable working height with all row units off the ground. (b) Level the planter frame side to side and fore and aft with the planter axle. (c) To remove each wear pad assembly for inspection, remove the two 1/2" cap screws and cap. Reinstall the cap screws into the adjustment pad and remove the threaded adjustment plug and poly wear pad using the cap screws as a handle. (d) If a poly wear pad is worn to less than 1/8" as shown below, replace the wear pad.

(TWL69a)



(e) Reinstall the wear pad assembly. (f) Hand tighten poly wear pad and adjustment plug until the poly wear pad lightly contacts the stainless steel clad center post. (g) Install cap using two 1/2" cap screws. Torque cap screws to 25-30 ft. lbs.

CAUTION: DO NOT OVER TIGHTEN WEAR PADS. OVER TIGHTENING WILL CAUSE PREMATURE WEAR.

MAINTENANCE

PISTON PUMP STORAGE

IMPORTANT: KEEP AIR OUT OF PUMP! This is the only way to prevent corrosion. Even for short periods of storage, the entrance of air into the pump, will cause RAPID AND SEVERE CORROSION.

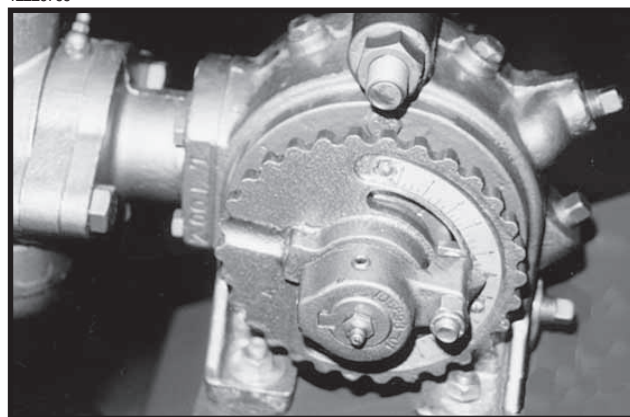
Overnight Storage

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

Winter Storage

1. Flush pump thoroughly with 5 to 10 gallons of fresh water and circulate until all corrosive salts are dissolved in the pump.
2. With the pump set on 10, draw in a mixture of half diesel fuel and half 10 weight oil until the discharge is clean. Then plug inlet and outlet.

12229799



PISTON PUMP TROUBLESHOOTING		
PROBLEM	POSSIBLE CAUSE	SOLUTION
Pump hard or impossible to prime.	Valves fouled or in wrong place. Air leak in suction line.	Inspect and clean valves. Repair leak.
	Pump set too low.	Adjust pump setting.
Low metering.	Packing washers worn out.	Replace.
	Valves fouled or in wrong place.	Inspect and clean valves.
Over meters.	Air leak in suction line.	Repair leak.
	Pump set too low.	Adjust pump setting.
	Broken valve spring.	Replace spring.
	Broken discharge valve spring.	Replace spring.
Leaks through when stopped.	Trash under valves.	Inspect and clean valves.
	Improper rate setting.	Adjust pump setting.
	Broken discharge valve spring.	Replace spring.
Fertilizer solution leaking under stuffing box.	Trash under valves.	Inspect and clean valves.
	Packing washers worn out.	Replace.
Pump using excessive oil.	Oil seals or O-ring worn and leaking.	Replace.
Pump operates noisily.	Crankcase components worn excessively.	Inspect and replace if necessary.

MAINTENANCE

PREPARATION FOR STORAGE

Store the planter in a dry sheltered area if possible.

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

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

Lubricate planter and row units at all lubrication points.

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 disc blades to prevent rust.

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

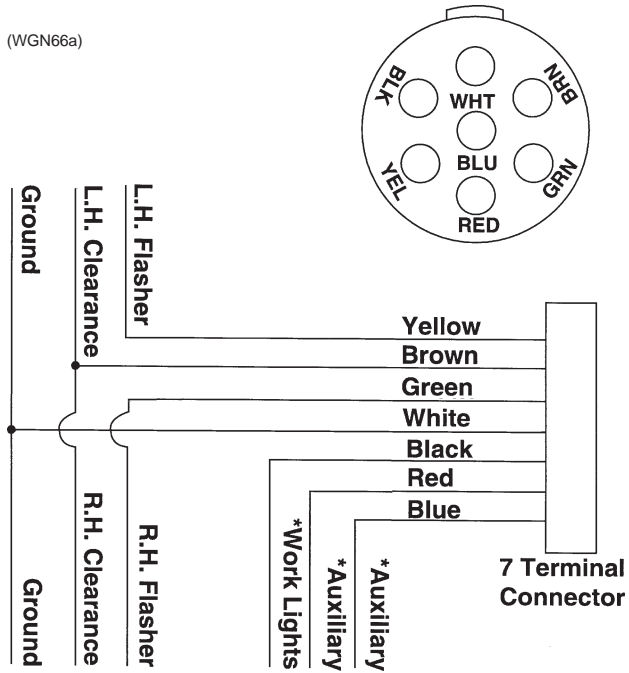
Empty dry fertilizer hoppers. Clean hoppers. Disassemble and clean metering augers. Reassemble coating all metal parts with rust preventative.

The center post is clad with stainless steel. To prolong service life keep stainless steel surface clean and free of any lubrication. CENTER POST AND POLY WEAR PADS REQUIRE NO LUBRICATION. ANY OIL OR GREASE WILL ATTRACT DIRT AND ACCELERATE WEAR ON THE CENTER POST AND ON THE POLY WEAR PADS.

MAINTENANCE

ELECTRICAL WIRING DIAGRAM FOR LIGHT PACKAGE

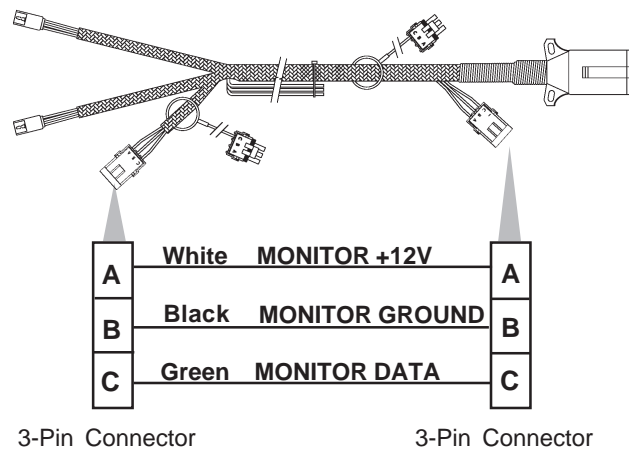
(WGN66a)



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

Light package supplied on the Model 3500 planter meets ASAE Standards. For the correct wiring harness to be wired into the lights on your tractor, check with the tractor manufacturer.

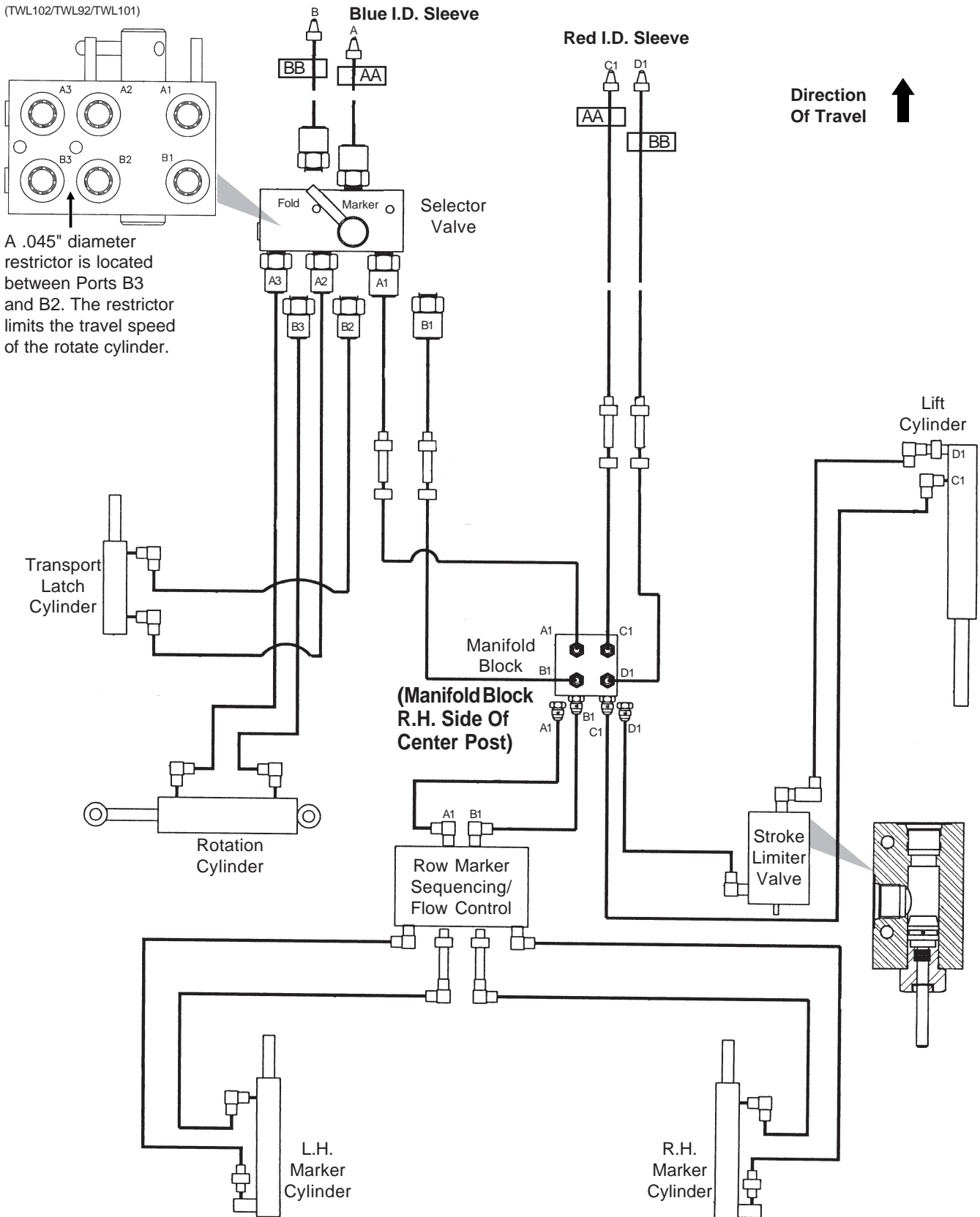
(A9152)



MAINTENANCE

HYDRAULIC DIAGRAM, Model 3500 Twin-Line® Planter

(TWL102/TWL92/TWL101)



A .045" diameter restrictor is located between Ports B3 and B2. The restrictor limits the travel speed of the rotate cylinder.

Direction Of Travel ↑

MAINTENANCE

PARTS LIST INDEX

ROW UNIT

15" Seed Opener Disc Blade/Bearing Assembly And Scrapers	P5
Brush-Type Seed Meter	P15
Coulter Mounted Residue Wheels	P26
Covering Discs/Single Press Wheel	P8
Drag Closing Attachment	P11
Finger Pickup Seed Meter	P14
Frame Mounted Coulter W/Disc Furrower	P28
Frame Mounted Coulter W/Residue Wheels	P30
Gauge Wheels	P6
Granular Chemical Banding Options	P19
Granular Chemical Hopper And Hopper Panel Extension	P16
Granular Chemical Meter And Meter Drive	P18
Hopper Support And Meter Drive	P12
Interplant® Push Row Unit	P32
Parallel Arms, Mounting Support Plate And Quick Adjustable Down Force Springs	P4
Row Unit Mounted Disc Furrower	P22
Row Unit Mounted No Till Coulter	P21
Row Unit Mounted Residue Wheel	P24
Seed Hopper And Lid	P13
Shank Assembly, Seed Tube And Depth Adjustment	P2
Spring Tooth Incorporator	P20
"V" Closing Wheels	P10

BASE MACHINE

Axle/Pivot And Wheel Assembly	P40
Contact Drive Wheel And Arm Assembly	P42
Cylinders	P53
Driveline	P44
Electrical Components	P64
Frame Assembly	P38
Hydraulic Systems	P62
Inner Hitch	P34
Row Marker Assemblies	P48
Row Marker Spindle/Hub/Blade	P52
Outer Hitch	P36
Safety Chain	P34
Seed Rate Transmission Assembly	P46
Valves (Stroke Limiter, Selector, Row Marker Sequencing/Flow Control)	P59

ELECTRONIC SEED MONITOR

KPM I/KPM II Electronic Seed Monitor	P66
KPM II Stack-Mode Electronic Seed Monitor	P68

INTERPLANT® SYSTEM

Interplant® Push Row Unit	P32
Interplant® Push Row Unit Drive	P70

FERTILIZER

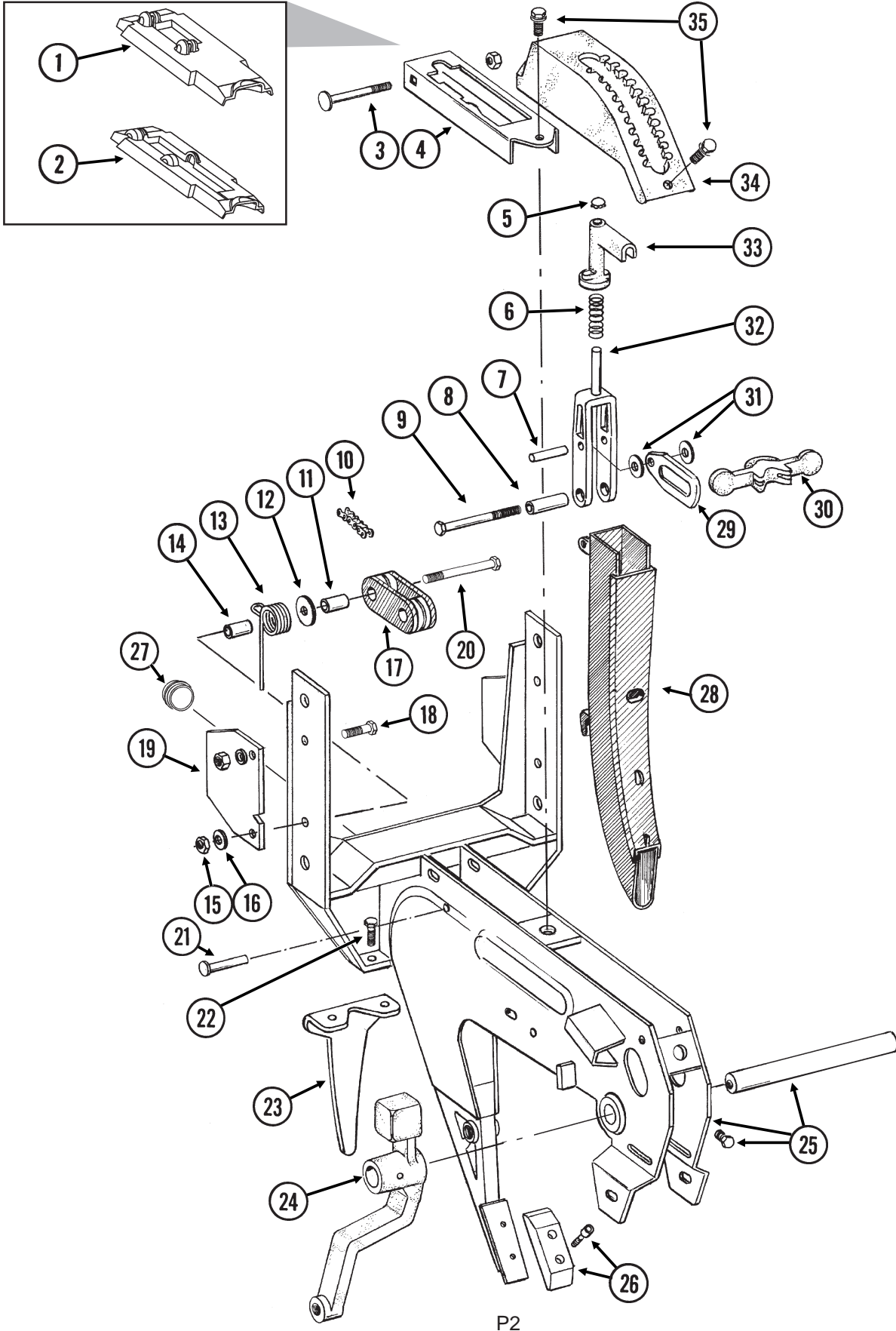
Dry Fertilizer	P88
Fertilizer Openers And Attachments	P72
Liquid Fertilizer	P92
Rear Trailer Hitch	P108

Decals, Paint And Miscellaneous	P110
---------------------------------------	------

Numerical Index	a
-----------------------	---

SHANK ASSEMBLY, SEED TUBE AND DEPTH ADJUSTMENT

RUB023/RUB024RUB022(RU80)

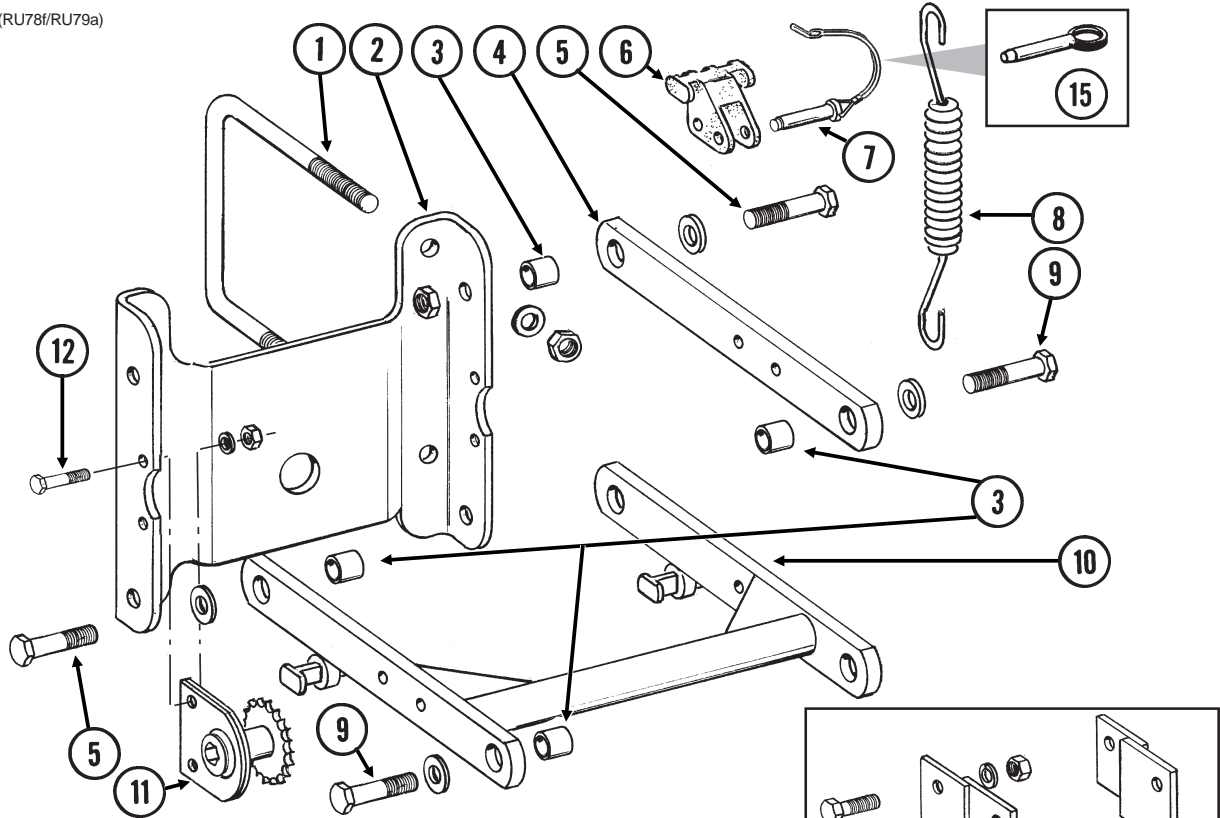


SHANK ASSEMBLY, SEED TUBE AND DEPTH ADJUSTMENT

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, $\frac{3}{8}$ "-16, 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	Serrated Flange Nut, $\frac{5}{16}$ "-18
23.	GD1033	1	Shield
24.		-	See "Gauge Wheels", Pages P6 And P7
25.	GA8600	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" And "KPM II Stock-Mode Electronic Seed Monitor" For Seed Tube With Sensor, Pages P66 - P69
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	2	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

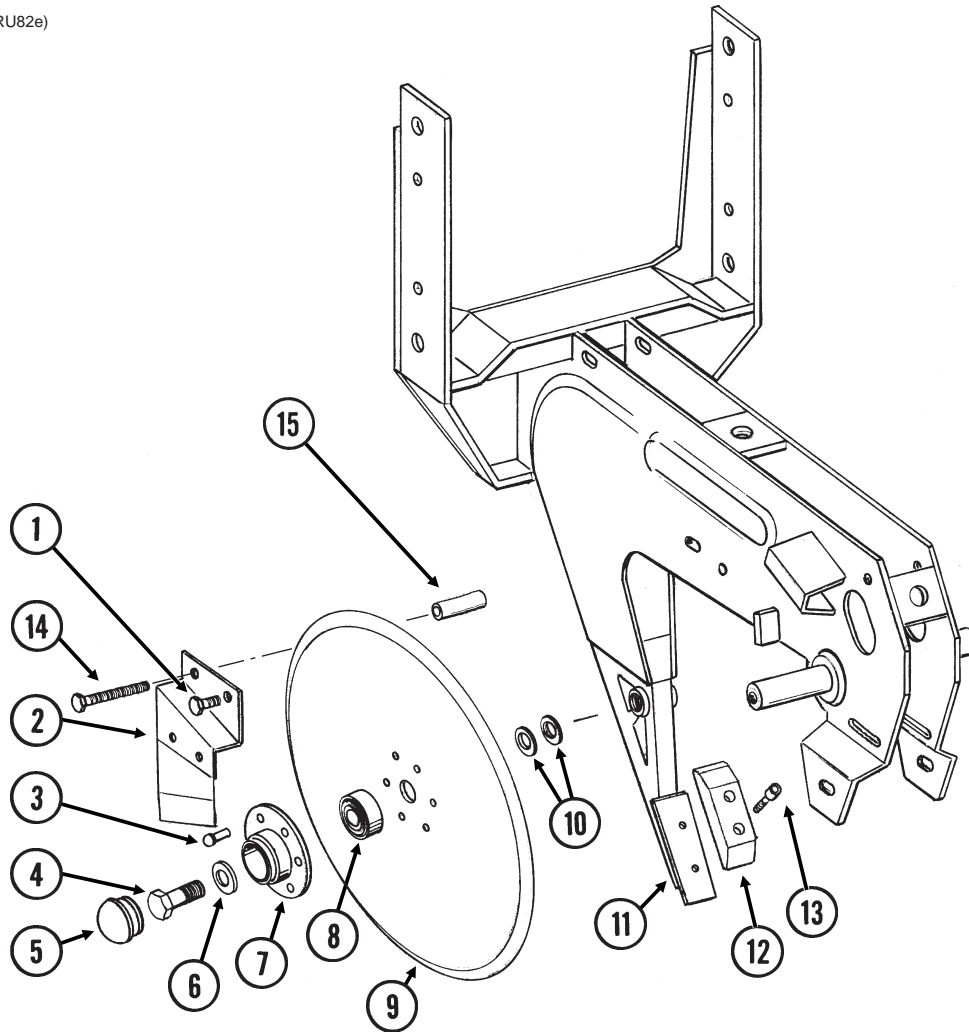
RUB021/RUB022(RU78f/RU79a)



ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GD1113	2	U-Bolt, 5" x 7" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
2.	GD10036	1	Mounting Support Plate
3.	GB0218	4	Bushing, 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.	G6325X	-	U-Bolt Package For 5" x 7" Toolbar, Includes: (2) GD1113, (4) G10230, (4) G10104

15" SEED OPENER DISC BLADE/BEARING ASSEMBLY AND SCRAPERS

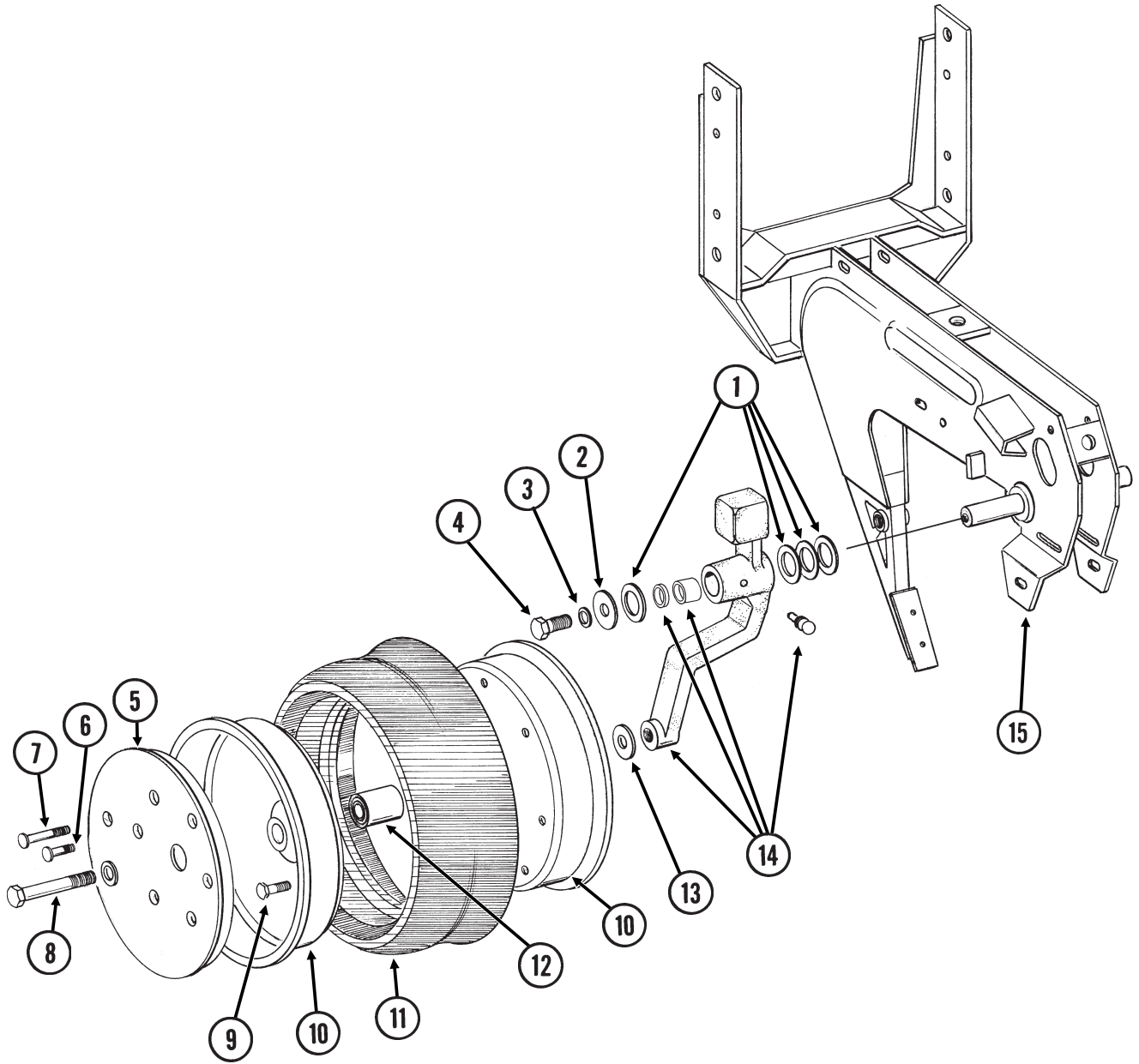
RUB023/RUB025(RU82e)



ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10328	2	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x $\frac{5}{8}$ "
	G10622	2	Serrated Flange Nut, $\frac{3}{8}$ "-16
2.	GA2012R	1	Disc Scraper, R.H.
	GA2012L	-	Disc Scraper, L.H. (Shown)
3.	G10427	12	Rivet, $\frac{1}{4}$ " x $\frac{1}{2}$ "
4.	GD11017	1	Special Hex Head Cap Screw, $\frac{5}{8}$ "-11 x $1\frac{1}{2}$ ", L.H. Threads
	G10007	1	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x $1\frac{1}{2}$ "
5.	GD11845	2	Dust Cap
6.	G10204	2	Special Machine Bushing, $\frac{5}{8}$ " x 1" O.D.
7.	GD10473	2	Bearing Housing
8.	GA2014	2	Bearing
9.	GD11306	2	Disc Blade, 3.5 mm x 15"
10.	G10213	-	Machine Bushing, $\frac{5}{8}$ " (.030" Thick)(As Required)
11.		-	See "Shank Assembly", Pages P2 And P3
12.	GB0301	1	Seed Tube Guard/Inner Scraper
13.	G10912	2	Hex Socket Head Cap Screw, $\frac{5}{16}$ "-18 x 1", Grade 8
14.	G10325	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x $2\frac{3}{4}$ "
	G10622	1	Serrated Flange Nut, $\frac{3}{8}$ "-16
15.	GD11259	1	Sleeve, $\frac{3}{8}$ " I.D. x $\frac{5}{8}$ " O.D. x $1\frac{25}{32}$ " Long
A.	GA8324	-	Disc Blade/Bearing Assembly Less Dust Cap (Items 3 And 7-9)

GAUGE WHEELS

RUB027/RUB023(RU84a)

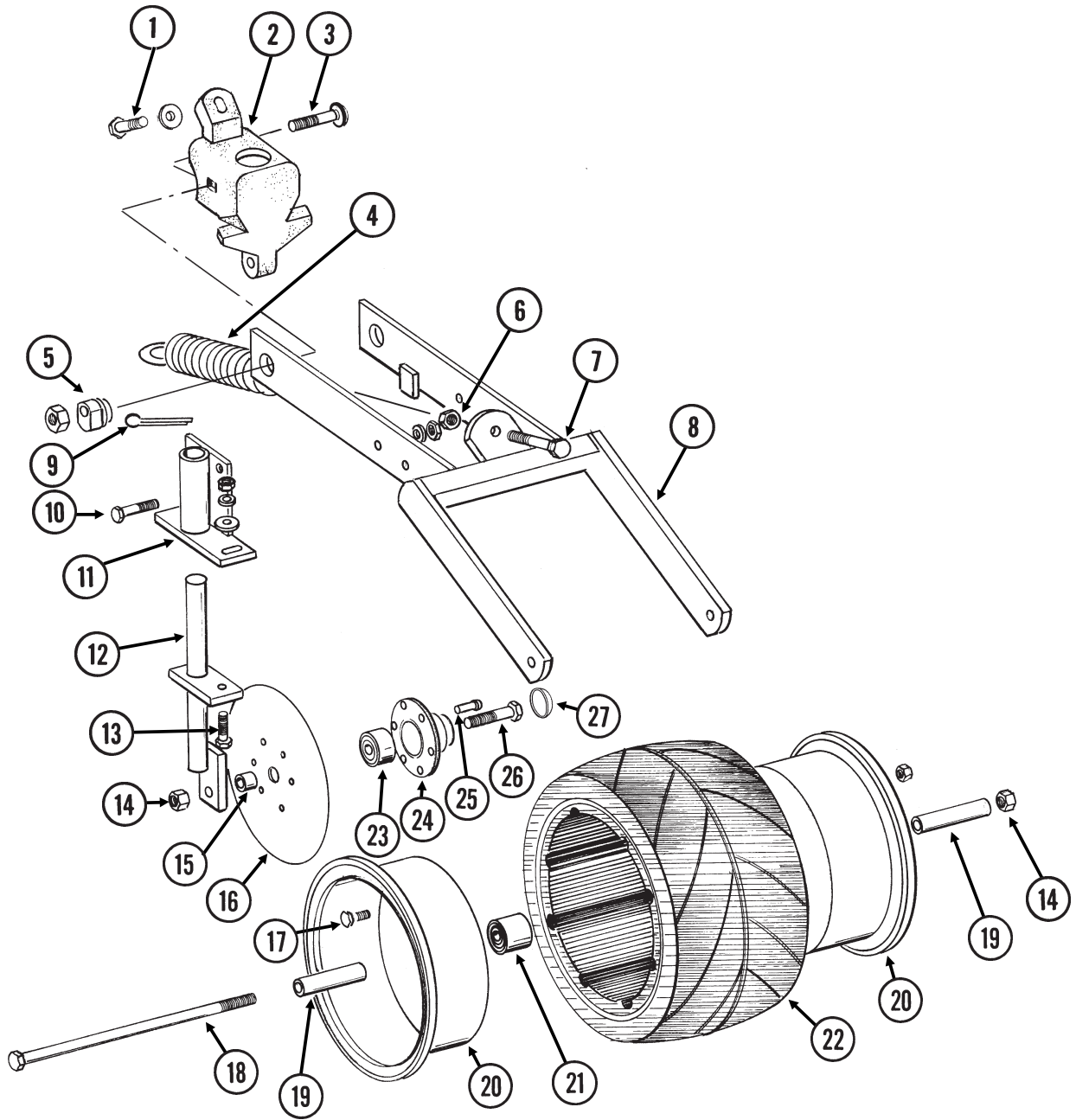


GAUGE WHEELS

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10940	-	Machine Bushing, 1" (.048" Thick)
2.	G10216	2	Washer, 1/2" USS
3.	G10228	2	Lock Washer, 1/2"
4.	G10014	1	Hex Head Cap Screw, 1/2"-13 x 1"
5.	GD11453	2	Cover
6.	G10338	12	Carriage Bolt, 5/16"-18 x 1 1/4"
	G10620	12	Serrated Flange Nut, 5/16"-18
7.	G10924	8	Carriage Bolt, 5/16"-18 x 1 3/4"
	G10620	8	Serrated Flange Nut, 5/16"-18
8.	G10010	2	Hex Head Cap Screw, 5/8"-11 x 3"
	G10230	2	Lock Washer, 5/8"
9.	G10018	14	Hex Head Cap Screw, 5/16"-18 x 5/8"
	G10109	14	Lock Nut, 5/16", Grade 8
10.	GD11423	4	Half Wheel
11.	GD1086	2	Tire
12.	GA6171	2	Bearing
13.	G10204	2	Special Machine Bushing, 5/8" x 1" O.D.
14.	GA7975	1	Wheel Arm W/Grease Fitting, Bushings And Seals, L.H. (Shown)
	GA7976	1	Wheel Arm W/Grease Fitting, Bushings And Seals, R.H.
	G10640	1	Grease Fitting, 1/4"-28 (Per Arm)
	GB0276	2	Bushing, 1" I.D. x 1 1/4" O.D. x 1" Long (Per Arm)
	GD10991	2	Seal (Per Arm)
15.		-	See "Shank Assembly", Pages P2 And P3
A.	GA7949	-	Gauge Wheel Complete (Items 5-7 And 9-12)

COVERING DISCS/SINGLE PRESS WHEEL

RUA054/RUB026(RU94d)

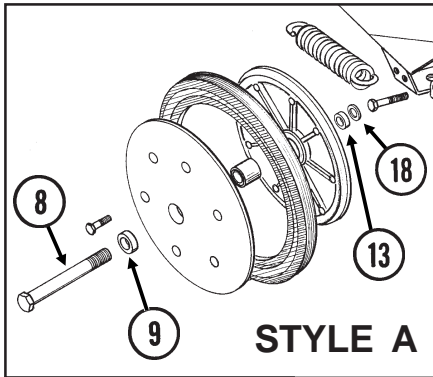


COVERING DISCS/SINGLE PRESS WHEEL

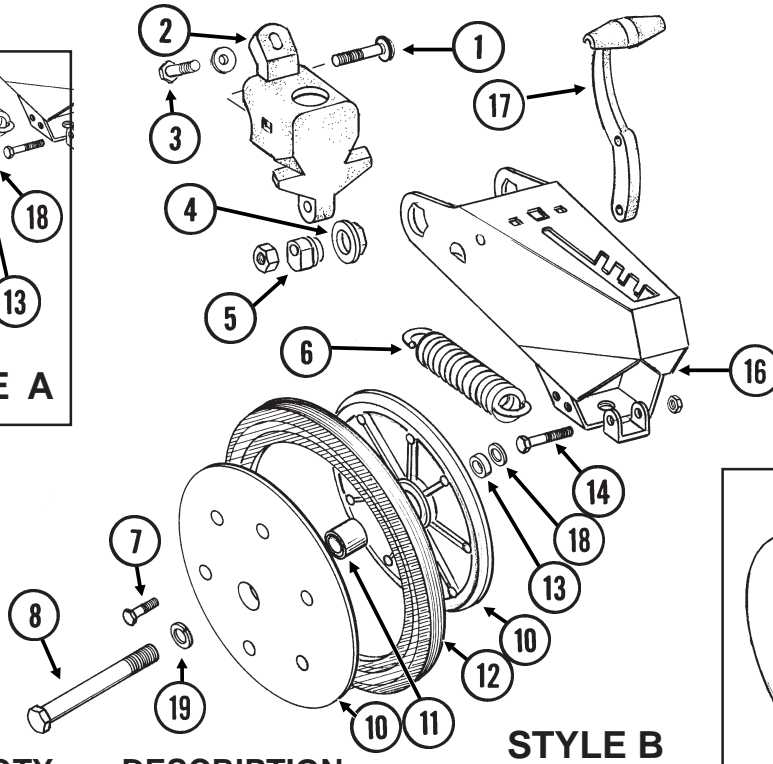
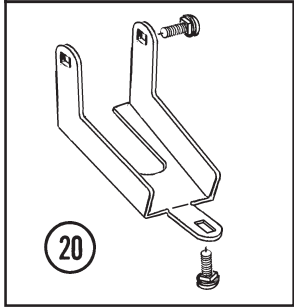
ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10001	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1"
	G10210	2	Washer, $\frac{3}{8}$ " USS
2.	GB0268	1	Wheel Arm Stop
3.	G10801	2	Carriage Bolt, $\frac{1}{2}$ "-13 x 2 $\frac{1}{4}$ "
	G10315	-	Carriage Bolt, $\frac{1}{2}$ "-13 x 2 $\frac{1}{2}$ " (Used W/Straight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

"V" CLOSING WHEELS

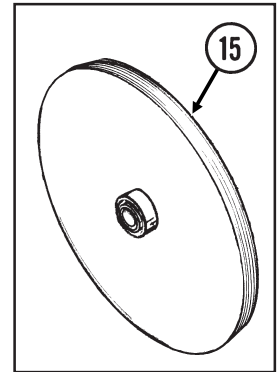
(RU831/RU83i/RU83n)



STYLE A



STYLE B

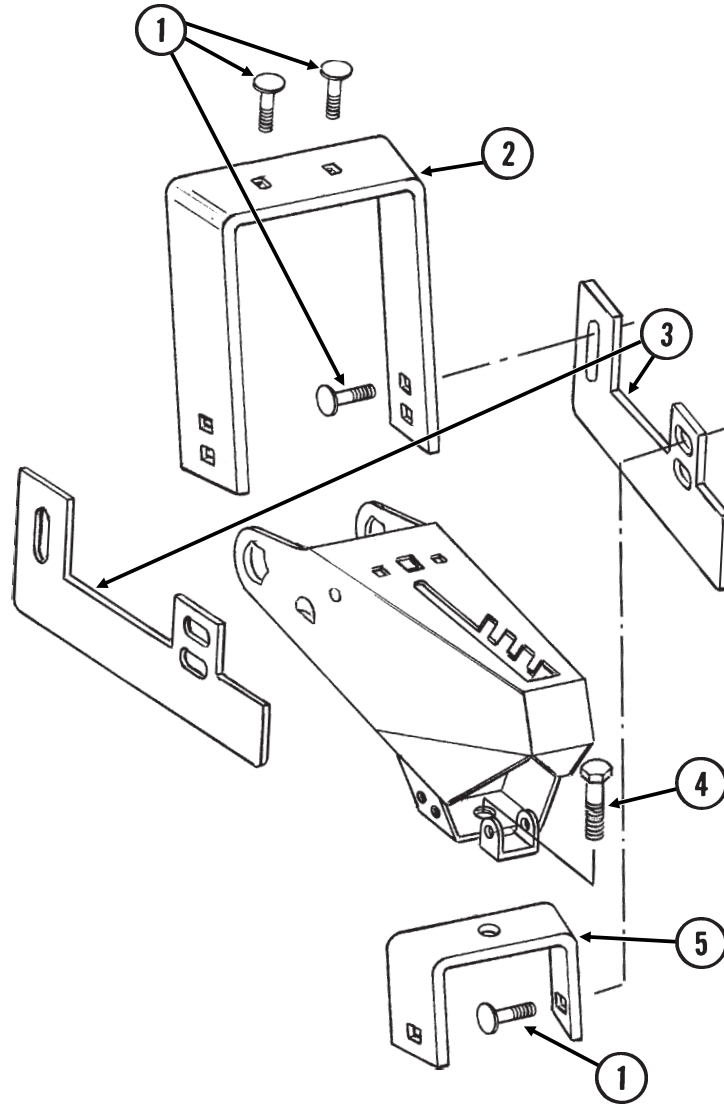


ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10801 G10315	2 -	Carriage Bolt, 1/2"-13 x 2 1/4" Carriage Bolt, 1/2"-13 x 2 1/2" (Used W/Straight Drop In-Furrow Granular Chemical Bracket)
	G10111	2	Lock Nut, 1/2"-13
2.	GB0268	1	Wheel Arm Stop
3.	G10001	1	Hex Head Cap Screw, 3/8"-16 x 1"
	G10210	1	Washer, 3/8" USS
4.	GB0282	2	Stepped Bushing
5.	GB0239	2	Eccentric Bushing
6.	GD8460	1	Spring
7.	G10064	6	Hex Head Cap Screw, 1/4"-20 x 1"
8.	G10013	2	Hex Head Cap Screw, 5/8"-11 x 3 1/2"
	G10107	2	Lock Nut, 5/8"-11
9.	GB0218	2	Bushing, 21/32" I.D. x 7/8" O.D. x 19/32" Long
10.	GD9120	4	Nylon Half Wheel
11.	GA6171	2	Bearing
12.	GD1085	2	Rubber Tire, 1" x 12"
13.	GD1109	2	Bushing, 41/64" I.D. x 7/8" O.D. x 1/4" Long
14.	G10133	1	Hex Head Cap Screw, 5/16"-18 x 1 1/2"
	G10109	1	Lock Nut, 5/16"-18, Grade 8
15.	GA6597	-	Cast Iron Closing Wheel W/Bearing
	GA6171	-	Bearing
16.	GA8322	1	Arm
17.	GB0254	1	Lever
18.	GD7805	2	Special Washer, 5/8", Hardened
19.	G10230	2	Lock Washer, 5/8"
20.	G1K345	-	Closing Wheel Shield Kit W/Hardware And Instruction
	G10308	3	Carriage Bolt, 3/8"-16 x 3/4"
	G10210	1	Washer, 3/8" USS
	G10229	3	Lock Washer, 3/8"
	G10101	3	Hex Nut, 3/8"-16

A. GA6434 - Rubber Closing Wheel Complete W/Bearing (Items 7 And 10-12)

DRAG CLOSING ATTACHMENT

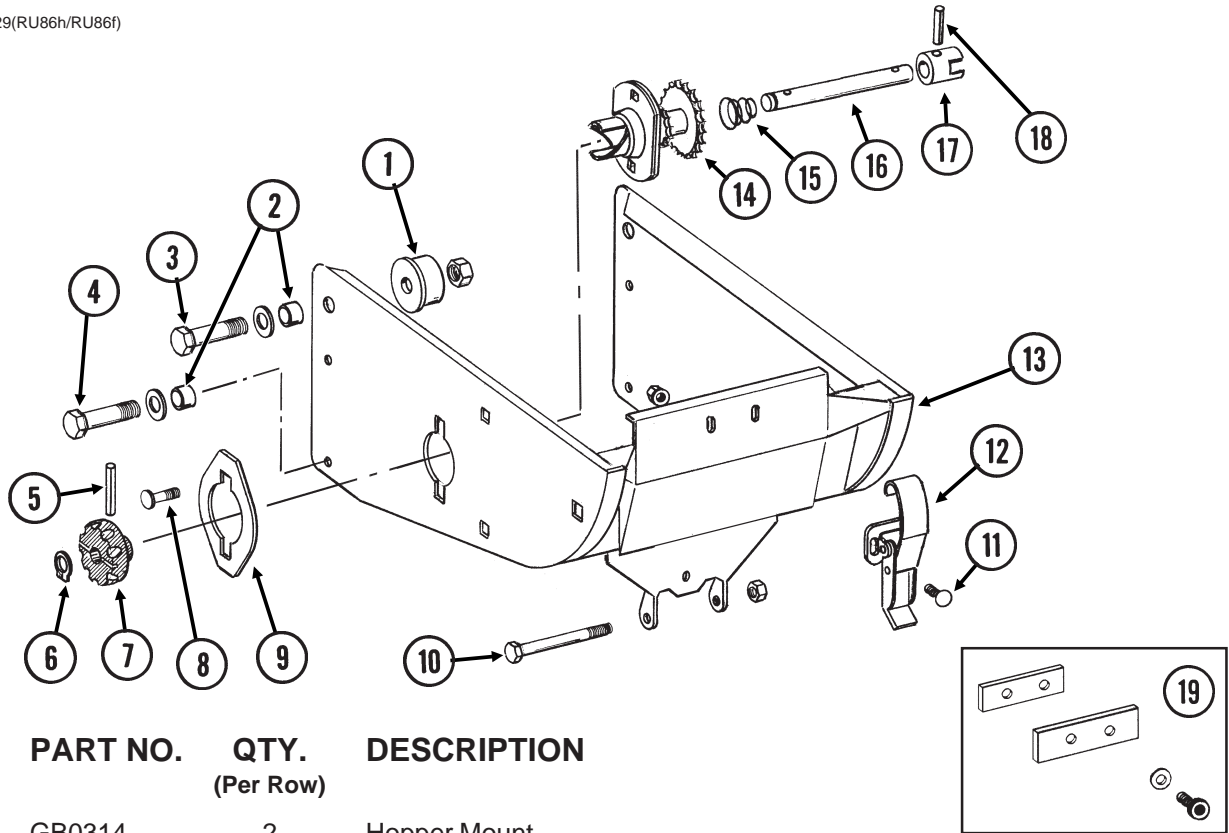
RUB050(RU90c)



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

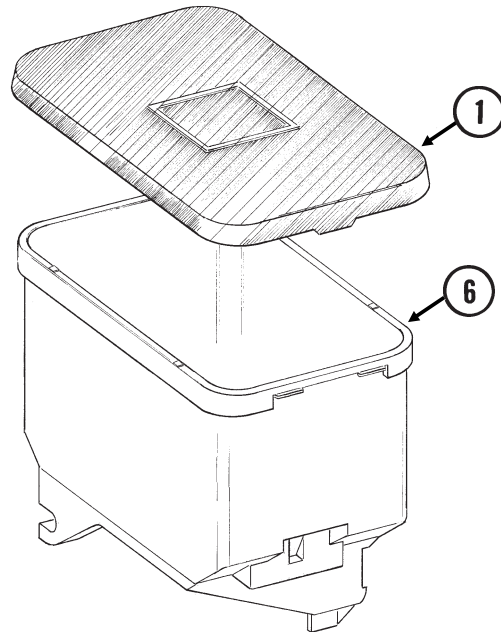
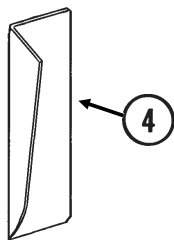
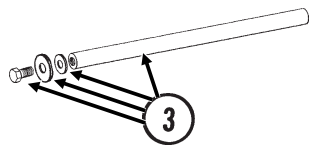
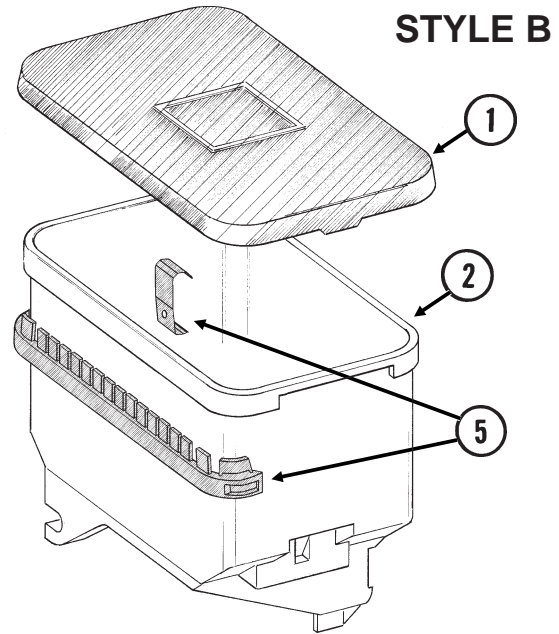
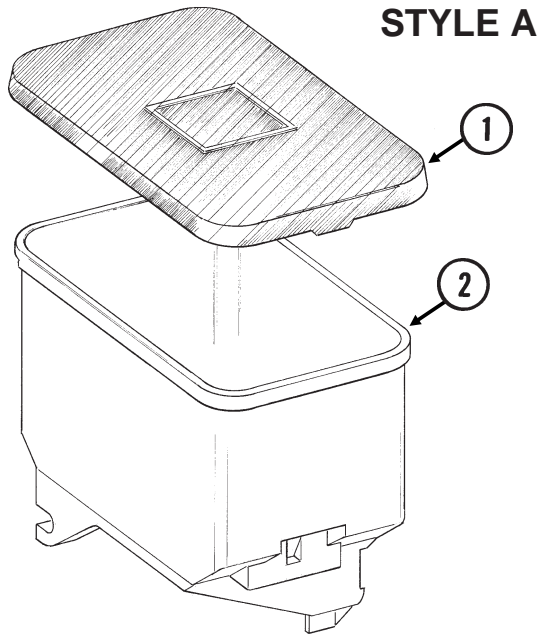
RUB028/RUB029(RU86h/RU86f)



ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GB0314	2	Hopper Mount
2.	GB0218	4	Bushing, 2 ¹ / ₃₂ " I.D. x 7 ⁷ / ₈ " O.D. x 19 ¹⁹ / ₃₂ " Long
3.	G10752	2	Hex Head Cap Screw, 5 ⁵ / ₈ "-18 x 2 1 ¹ / ₄ "
	GD7805	2	Special Washer, 5 ⁵ / ₈ ", Hardened
	G10412	2	Lock Nut, 5 ⁵ / ₈ "-18
4.	G10751	2	Hex Head Cap Screw, 5 ⁵ / ₈ "-18 x 1 3 ³ / ₄ "
	GD7805	2	Special Washer, 5 ⁵ / ₈ ", Hardened
	G10412	2	Lock Nut, 5 ⁵ / ₈ "-18
5.	G10602	1	Spring Pin, 1 ¹ / ₄ " x 1 1 ¹ / ₂ "
6.	G10567	1	External Retaining Ring, 5 ⁵ / ₈ "
7.	GD11239	1	Knob
8.	G10338	2	Carriage Bolt, 5 ⁵ / ₁₆ "-18 x 1 1 ¹ / ₄ "
	G10302	-	Carriage Bolt, 5 ⁵ / ₁₆ "-18 x 7 ⁷ / ₈ "
	G10620	2	Serrated Flange Nut, 5 ⁵ / ₁₆ "-18
9.	GD11305	1	Plate
10.	G10061	1	Hex Head Cap Screw, 3 ³ / ₈ "-16 x 3 1 ¹ / ₂ "
	G10210	2	Washer, 3 ³ / ₈ " USS
	G10108	1	Lock Nut, 3 ³ / ₈ "-16
11.	G10309	2	Carriage Bolt, 1 ¹ / ₄ "-20 x 5 ⁵ / ₈ ", Grade 2
	G10621	2	Serrated Flange Nut, 1 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, 3 ³ / ₁₆ " x 1 1 ¹ / ₄ "
19.	G1K312	-	Seed Hopper Support Panel Kit W/Hardware And Instruction (2 Rows)
	G10211	-	Washer, 1 ¹ / ₄ " SAE
	G10252	-	Hex Socket Head Screw, 1 ¹ / ₄ "-20 x 7 ⁷ / ₈ ", Grade 8
A.	GA9539	-	Meter Drive Assembly Complete (Items 5-7 And 14-18)

SEED HOPPER AND LID

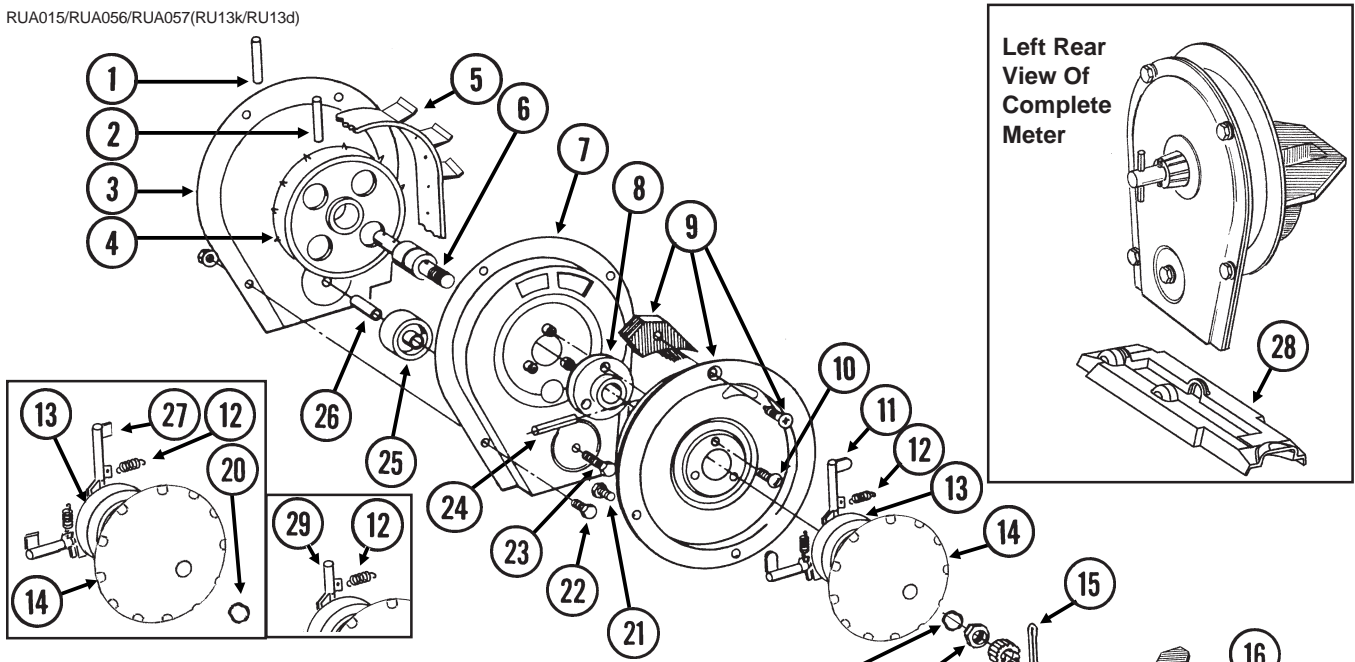
RUA030(RU87d/RU87c/RU128/RU87a/RU87e)



ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GD11279	1	Lid
2.	GA8370	1	Seed Hopper (Sub GA9714)
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 (Optional)
5.	G1K335	1	Seed Hopper Reinforcement Kit (STYLE B Seed Hopper)
6.	GA9714	1	Seed Hopper, Reinforced

FINGER PICKUP SEED METER

RUA015/RUA056/RUA057(RU13k/RU13d)

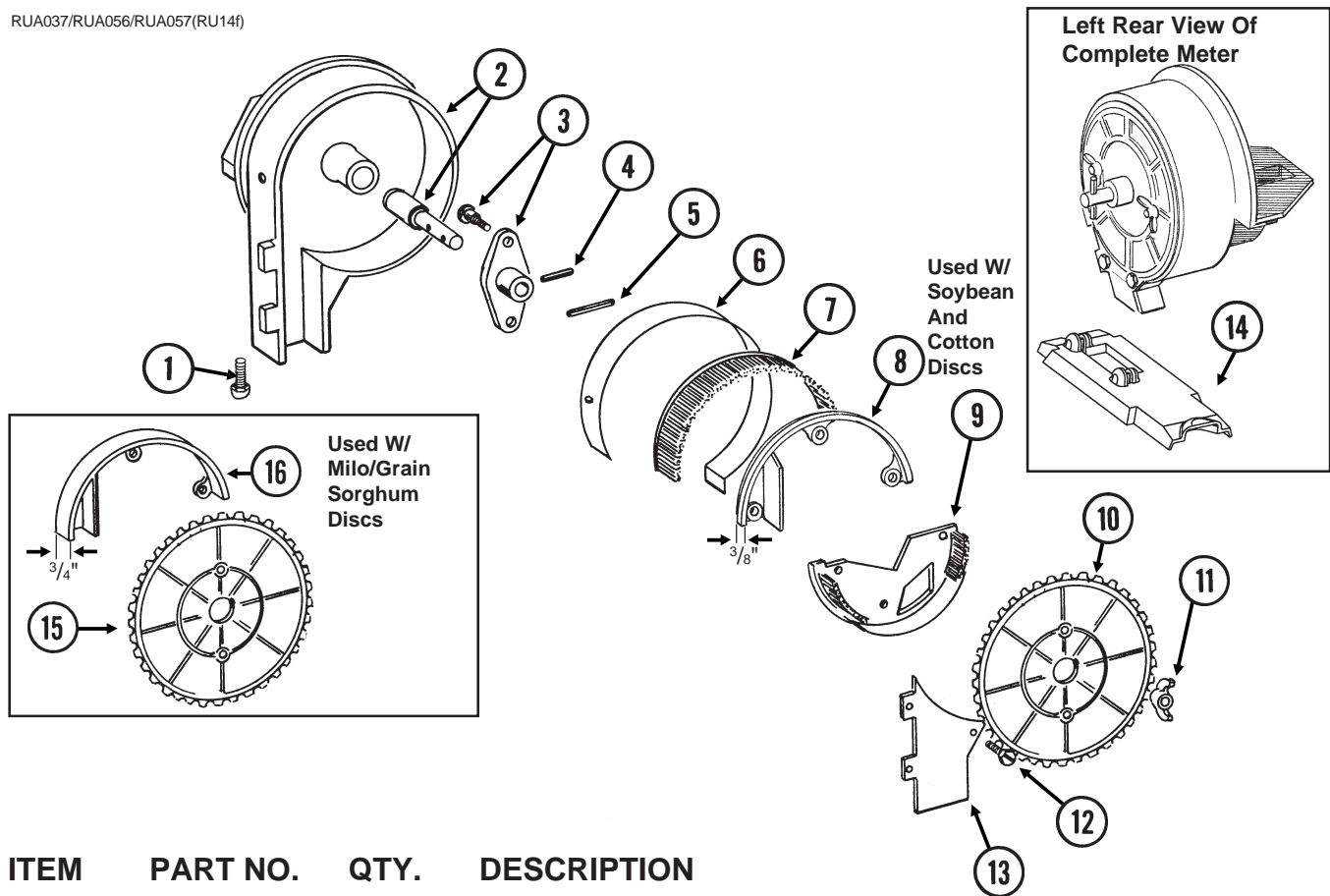


ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10602	1	Spring Pin, 1/4" x 1 1/2"
2.	G10604	1	Spring Pin, 3/16" x 1 1/2"
3.	GD1039	1	Housing Cover
4.	GD1041	1	Belt Drive Sprocket
5.	GD11286	1	Seed Belt
6.	GA2019	1	Bearing
7.	GA2018	1	Conveyor Housing
8.	GB0110	1	Bearing Housing
9.	GR1569	1	Carrier Plate W/Brush And Screw
	GA2020	-	Brush
	G10690	-	Rolling Thread Screw, No. 10 x 3/4"
10.	G10401	3	Slotted Hex Washer Head Screw, No. 10-32 x 5/8"
11.	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	Serrated Flange Nut, 1/4"-20
23.	G10021	1	Hex Head Cap Screw, 1/4"-20 x 1 1/2"
	G10621	1	Serrated Flange Nut, 1/4"-20
24.	G10603	1	Spring Pin, 1/4" x 1 1/4"
25.	GD1042	1	Idler
26.	GB0120	1	Bushing, 17/64" I.D. x 1 1/32" Long
27.	GD10226	12	Finger, Oil Sunflower
28.	GD15698	1	Shank Cover, Finger Pickup Seed Meter
29.	GD11787	-	Half Rate Blank Finger

- A. 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

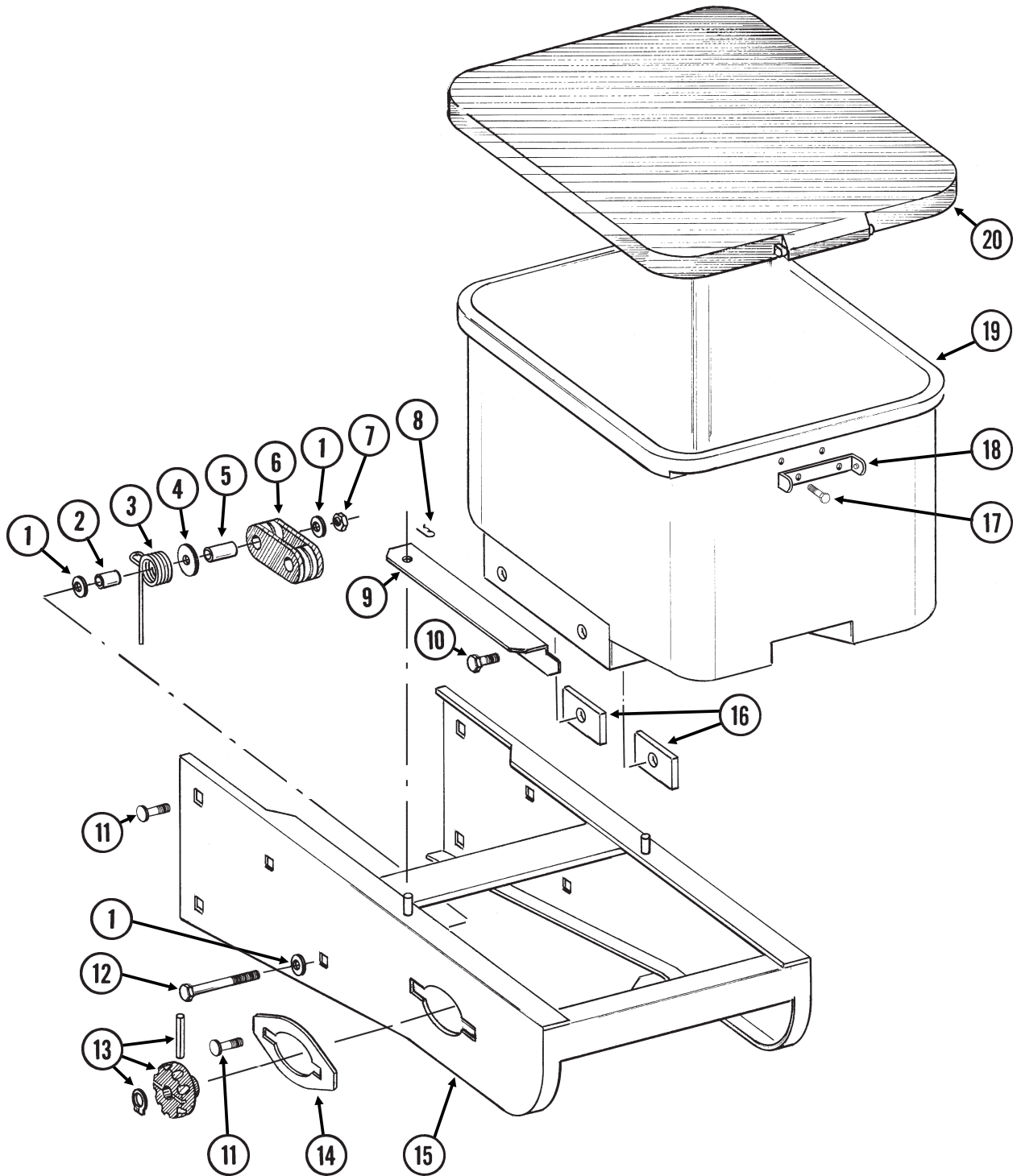
RUA037/RUA056/RUA057(RU14f)



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.	GD15699	1	Shank Cover, Brush-Type Seed Meter
15.	GA5982	-	Seed Disc, Small Milo/Grain Sorghum, 30 Cell, Red Color-Coded
	GA6187	-	Seed Disc, Large Milo/Grain Sorghum, 30 Cell, Light Blue Color-Coded
	GA5795	-	Seed Disc, High-Rate Small Milo/Grain Sorghum, 60 Cell, Red Color-Coded
	GA6633	-	Seed Disc, High-Rate Large Milo/Grain Sorghum, 60 Cell, Yellow Color-Coded
16.	GD8237	-	Upper Brush Retainer (Used W/Milo/Grain Sorghum Discs)

GRANULAR CHEMICAL HOPPER AND HOPPER PANEL EXTENSION

RUA052/RUA053/RUB028(RU92n)

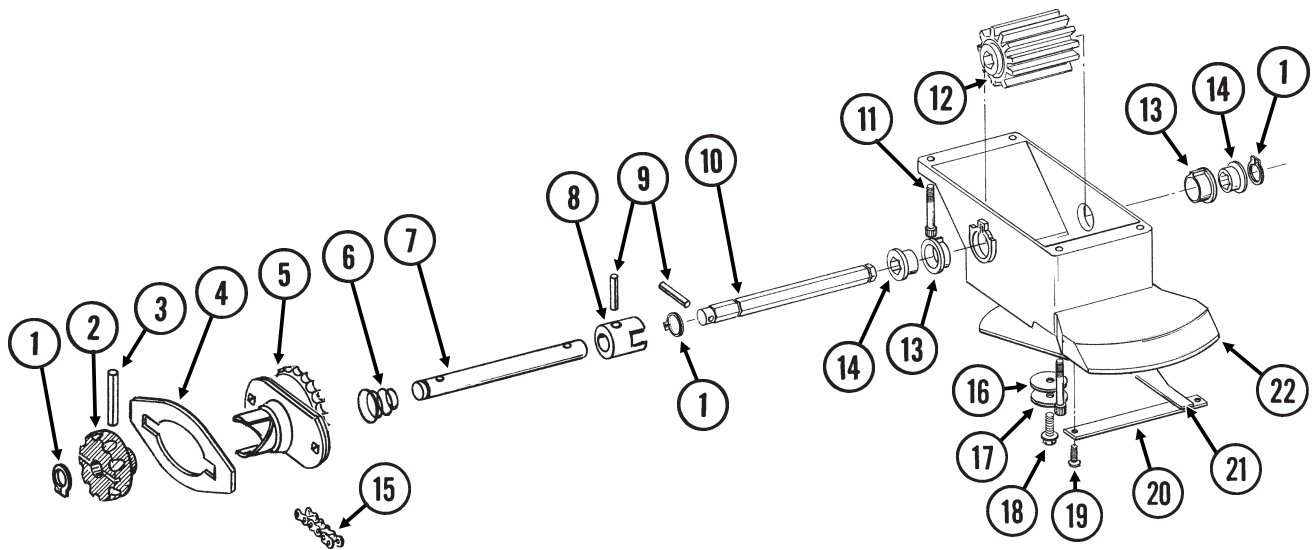


GRANULAR CHEMICAL HOPPER AND HOPPER PANEL EXTENSION

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10210	3	Washer, $\frac{3}{8}$ " USS
2.	GD2971-10	1	Sleeve, $\frac{9}{16}$ " Long
3.	GD11219	1	Spring
4.	G10201	1	Special Washer, $\frac{3}{8}$ " x 1 $\frac{1}{2}$ " O.D.
5.	GD1026	1	Sleeve, 1 $\frac{3}{16}$ " Long
6.	GD11962	1	Idler
7.	G10108	1	Lock Nut, $\frac{3}{8}$ "-16
8.	G10670	2	Hair Pin Clip, No. 3
9.	GD1059L	1	Support, L.H. (Shown)
	GD1059R	1	Support, R.H.
10.	G10002	4	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x $\frac{3}{4}$ "
	G10229	4	Lock Washer, $\frac{3}{8}$ "
11.	G10312	8	Carriage Bolt, $\frac{5}{16}$ "-18 x $\frac{3}{4}$ "
	G10620	8	Serrated Flange Nut, $\frac{5}{16}$ "-18
12.	G10325	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 2 $\frac{3}{4}$ "
13.		-	See "Granular Chemical Meter And Meter Drive", Page P18
14.	GD11305	1	Plate
15.	A8422	1	Hopper Panel Extension (Non-Stock Item) (Sub Wholegoods Order Code 700-01080)
16.	GD11424	4	Block
17.	G10023	2	Hex Head Cap Screw, $\frac{1}{4}$ "-20 x $\frac{3}{4}$ "
	G10621	2	Serrated Flange Nut, $\frac{1}{4}$ "-20
18.	GD1060	1	Hinge
19.	GA8371	1	Hopper
20.	GA4444	1	Lid

GRANULAR CHEMICAL METER AND METER DRIVE

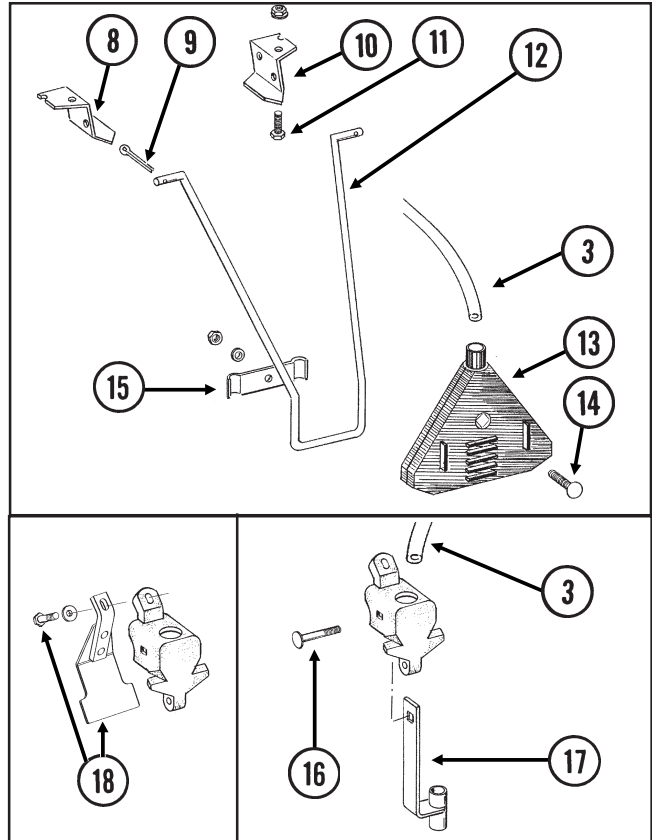
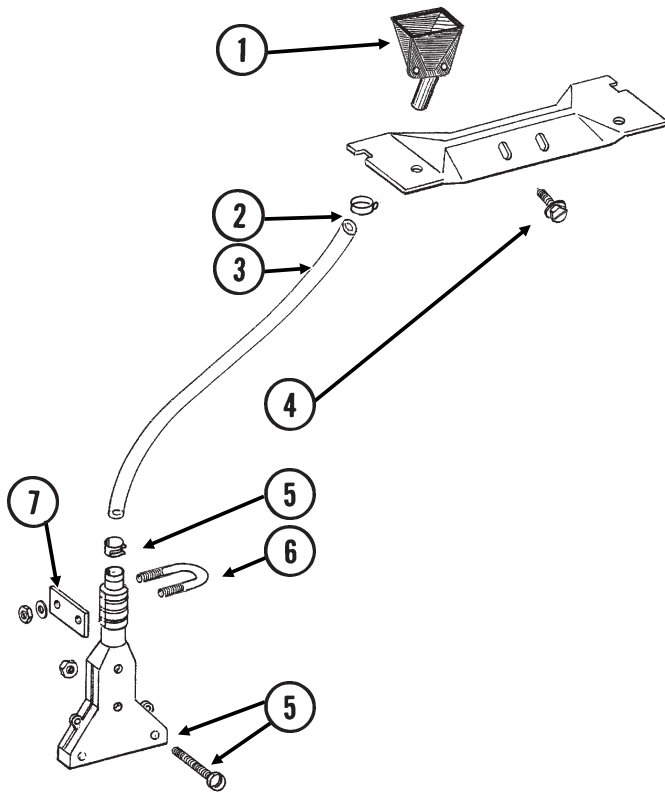
RUA051/RUB028(RU91a)



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

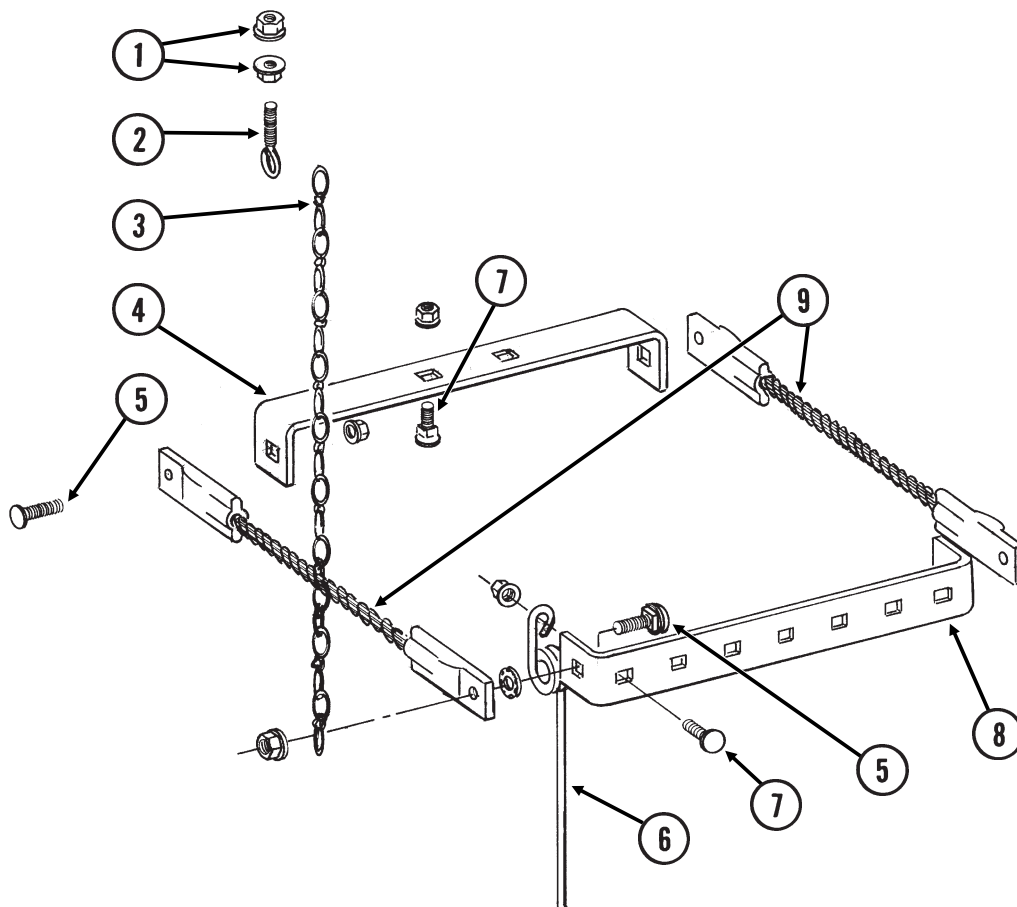
RUA061/RUA073(RU101m/RU83m)



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, Grade B
7.	GD10984	1	Spacer
8.	GD1115L	-	Hanger Bracket, L.H.
9.	G10452	-	Cotter Pin, 1/8" x 1/2"
10.	GD1115R	-	Hanger Bracket, R.H.
11.	G10310	-	Carriage Bolt, 1/4"-20 x 3/4", Grade 2
	G10227	-	Lock Washer, 1/4"
	G10103	-	Hex Nut, 1/4"-20
12.	GD1116	-	Hanger
13.	GA2075	-	Diffuser, 14" Band
14.	G10306	-	Carriage Bolt, 3/8"-16 x 2"
	G10229	-	Lock Washer, 3/8"
	G10101	-	Hex Nut, 3/8"-16
15.	GD1118	-	Clamp
16.	G10315	1	Carriage Bolt, 1/2"-13 x 2 1/2" (Replaces Existing 1/2" x 2 1/4" Hardware)
17.	GA6741	1	Bracket (Straight Drop In-Furrow)
18.	G1K385	-	Bander Shield Kit W/Hardware And Instruction
	G10003	1	Hex Head Cap Screw, 3/8"-16 x 1 1/2"
	GD14659	1	Special Washer, 3/8", Hardened

SPRING TOOTH INCORPORATOR

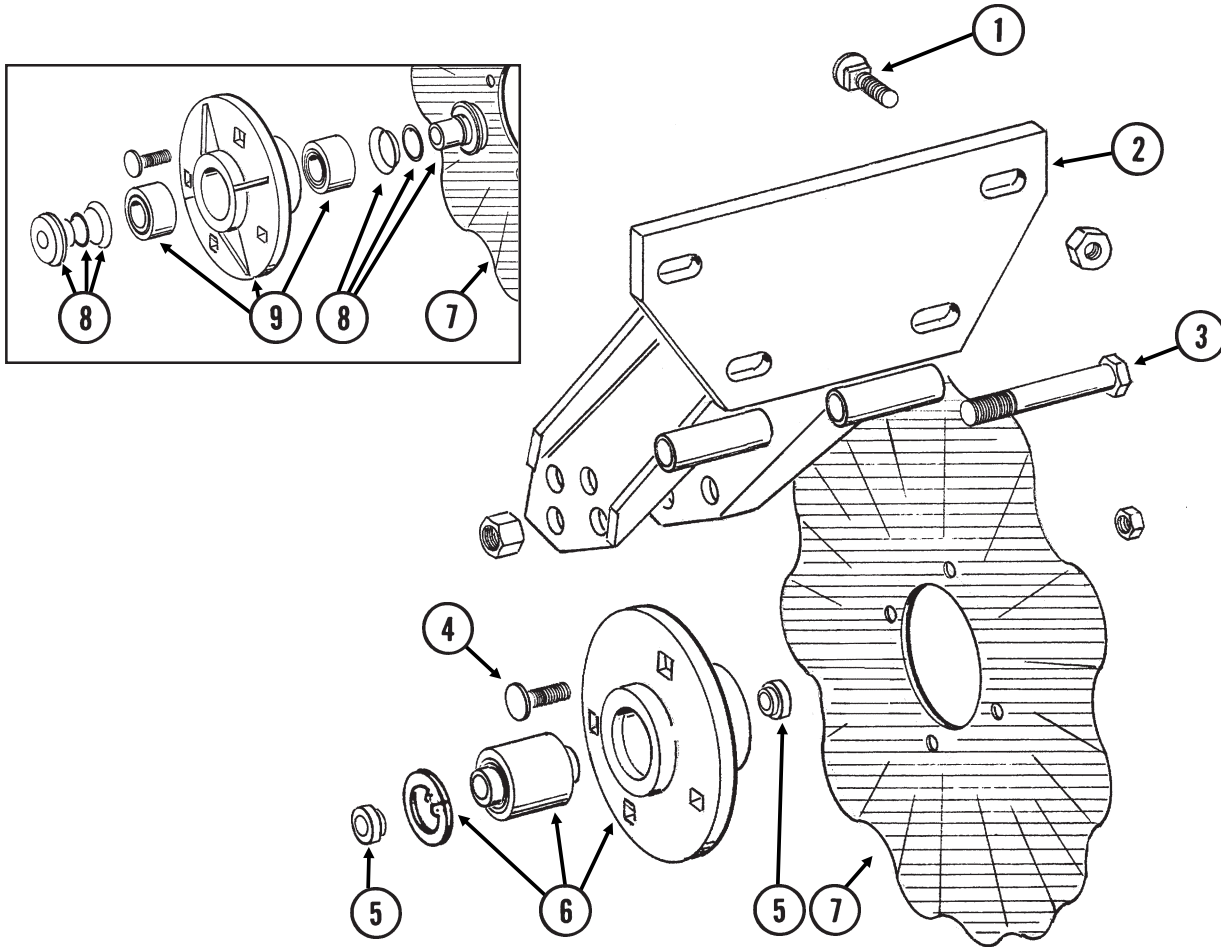
RUA055(RU95)



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

ROW UNIT MOUNTED NO TILL COULTER

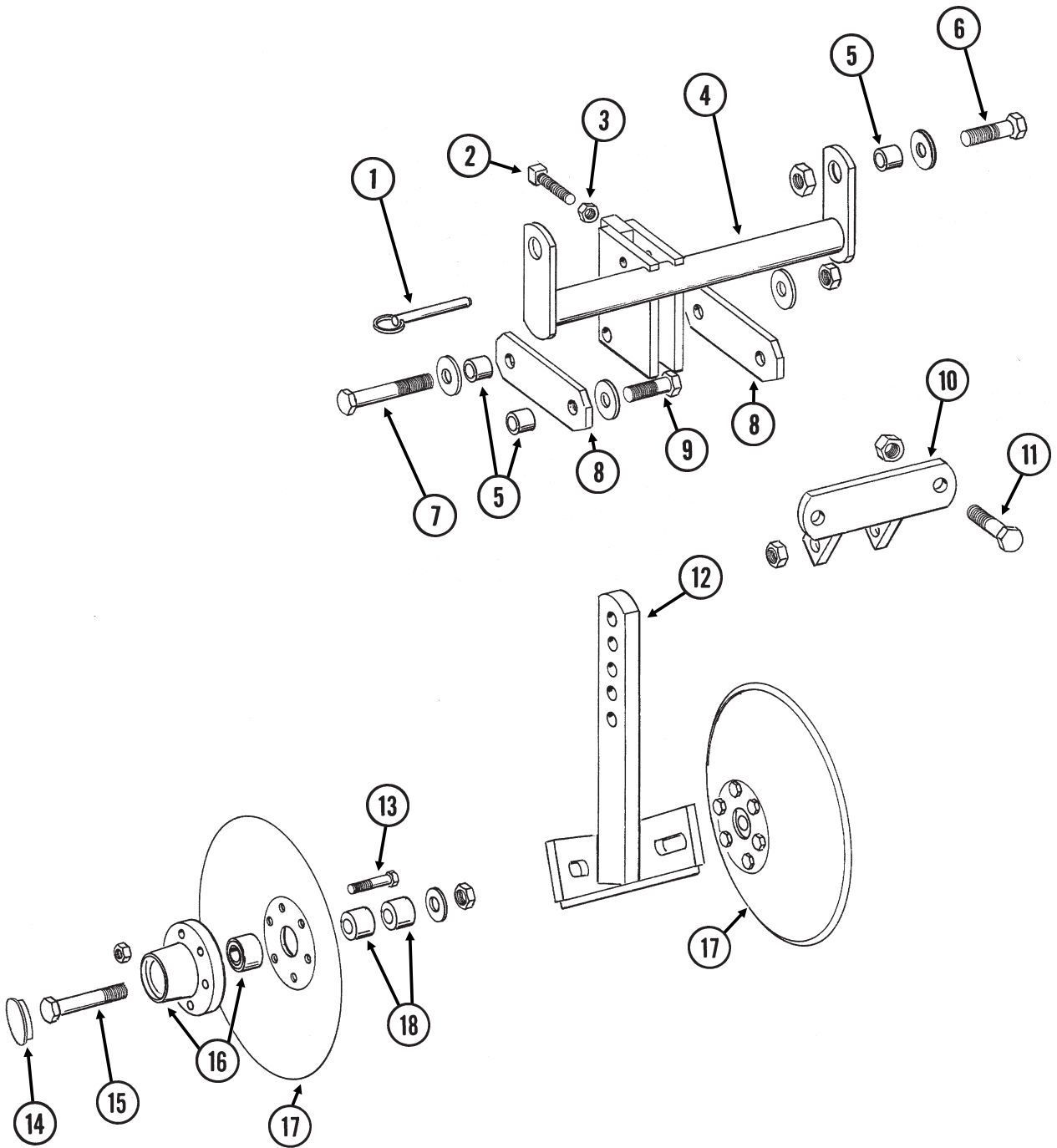
RUA061(RU102/RU102c)



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 W/O-Ring And Spring Washer
	GD8844	2	O-Ring
	GD8843	2	Spring Washer
9.	GA5640	1	Hub W/Bearings And Grease Fitting (Sub G1K289)
	GA5622	-	Bearing (2 Used Per Hub)
	G10640	-	Grease Fitting, 1/4"-28

ROW UNIT MOUNTED DISC FURROWER

RUA059/RUA058(RU99/RU98g)

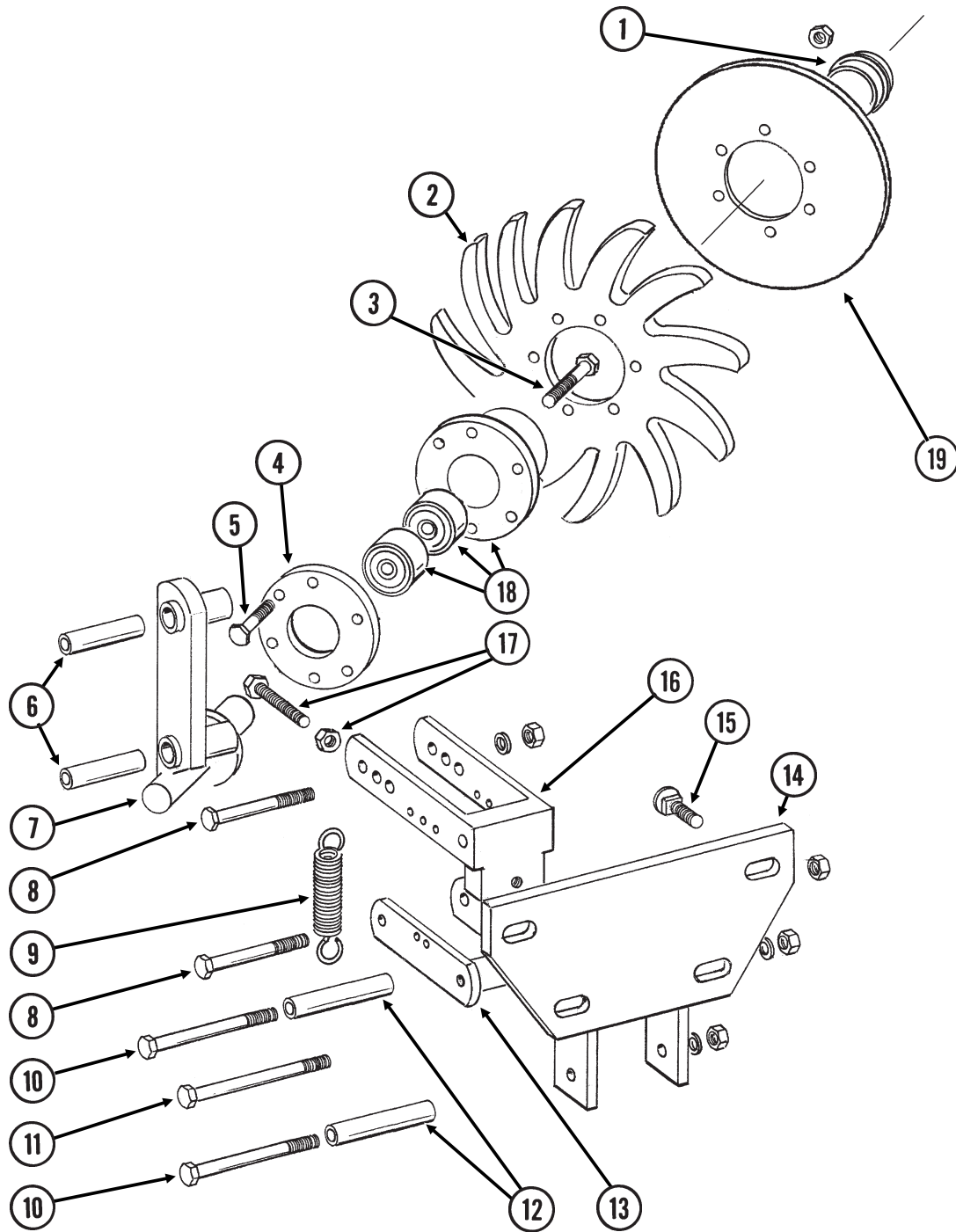


ROW UNIT MOUNTED DISC FURROWER

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, 1" O.D. x 9/16" I.D. x 7/16" Long
6.	G10039	2	Hex Head Cap Screw, 1/2"-13 x 1 3/4"
	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)

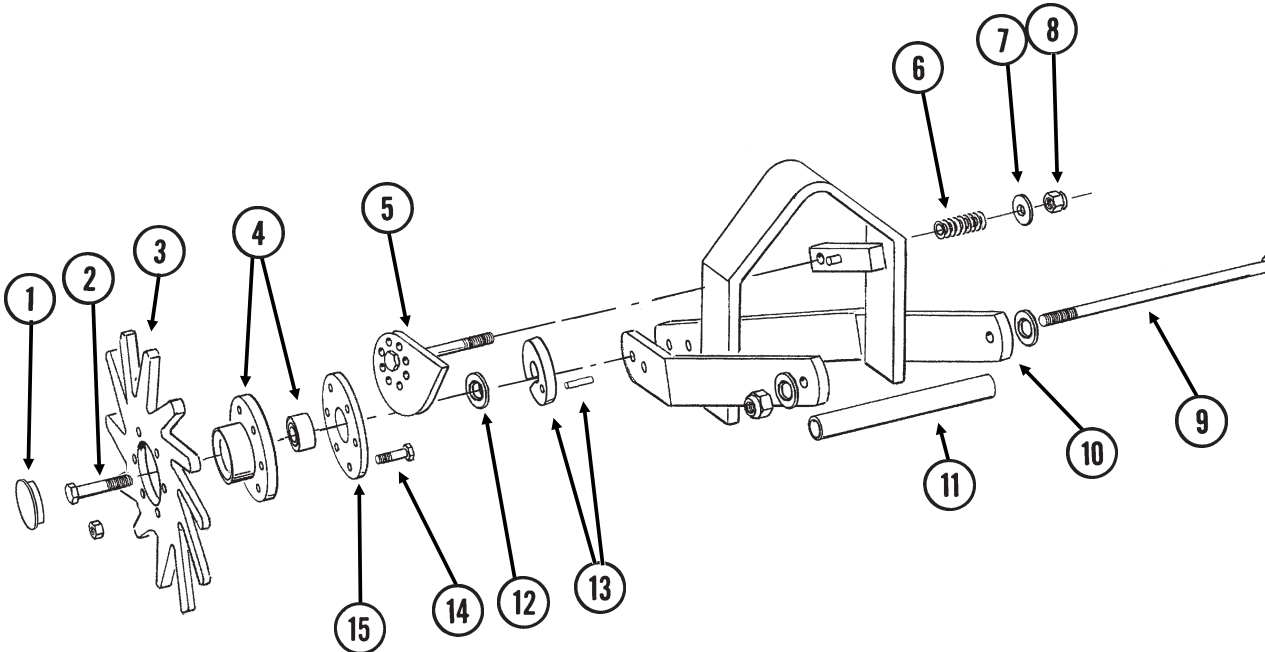


ROW UNIT MOUNTED RESIDUE WHEEL

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, Grade 8
6.	GD9720	2	Spacer, $\frac{1}{2}$ " x 2 $\frac{3}{16}$ " Long
7.	GA6838	1	Wheel Mount
8.	G10033	2	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 3 $\frac{1}{2}$ "
	G10228	2	Lock Washer, $\frac{1}{2}$ "
	G10102	2	Hex Nut, $\frac{1}{2}$ "-13
9.	GD5857	2	Spring
10.	G10045	2	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 4 $\frac{1}{2}$ "
	G10228	2	Lock Washer, $\frac{1}{2}$ "
	G10102	2	Hex Nut, $\frac{1}{2}$ "-13
11.	G10348	1	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 5" (Lockup Bolt)
	G10111	1	Lock Nut, $\frac{1}{2}$ "-13
12.	GD9715	2	Spacer, $\frac{1}{2}$ " x 3" Long
13.	GA6834	1	Lower Link
14.	GA6832	1	Mount
15.	G10574	4	Carriage Bolt, $\frac{1}{2}$ "-13 x 1 $\frac{1}{4}$ "
	G10111	4	Lock Nut, $\frac{1}{2}$ "-13
16.	GA6833	1	Upper Link
17.	G10371	1	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 3", Full Thread
	G10501	1	Hex Jam Nut, $\frac{1}{2}$ "-13, Grade 2
18.	GA5654	1	Hub W/Bearings
	GA2014	-	Bearing
19.	GD12534	-	Cover
A.	GA7446	-	Wheel Assembly, 12 Tine (Items 2, 4, 5 And 18)

COULTER MOUNTED RESIDUE WHEELS

RUA063(RU104u)



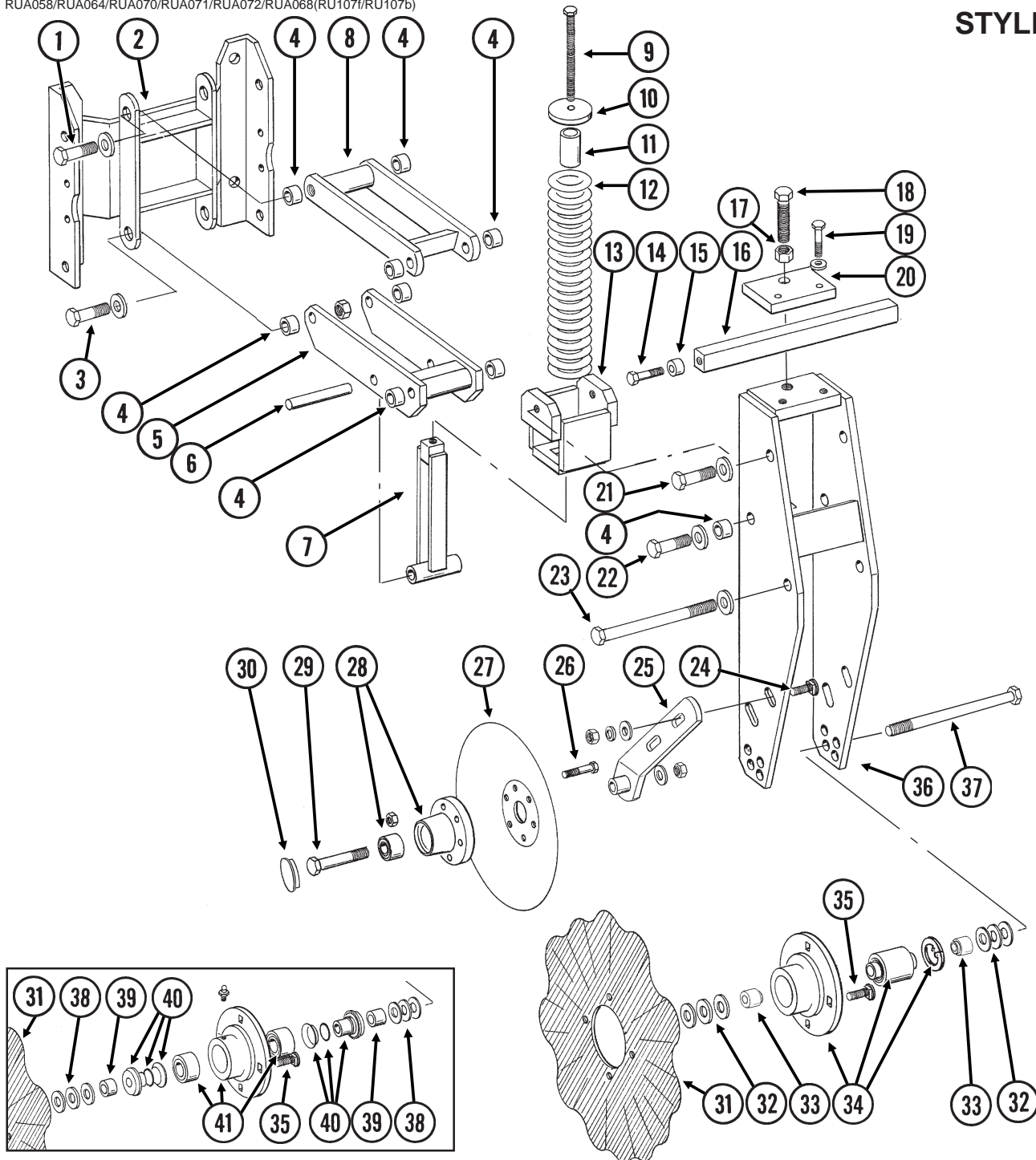
COULTER MOUNTED RESIDUE WHEELS

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.	G11098	1	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 9 $\frac{1}{2}$ ", Grade 8
	GD14674	2	Special Washer, $\frac{1}{2}$ ", Hardened
	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	2	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, Grade 8
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

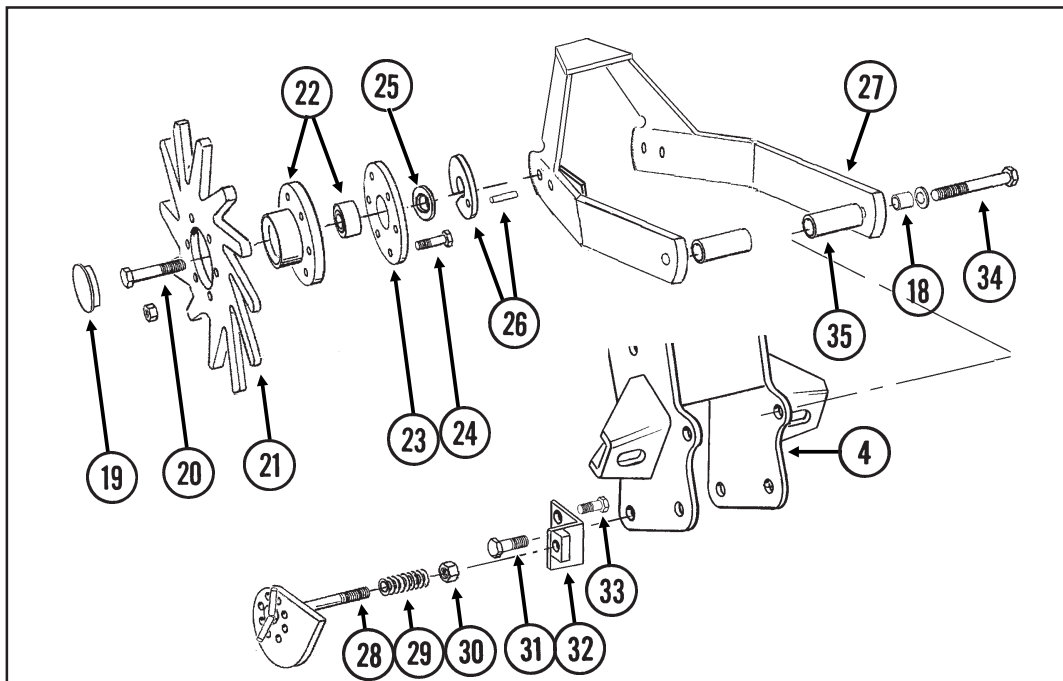
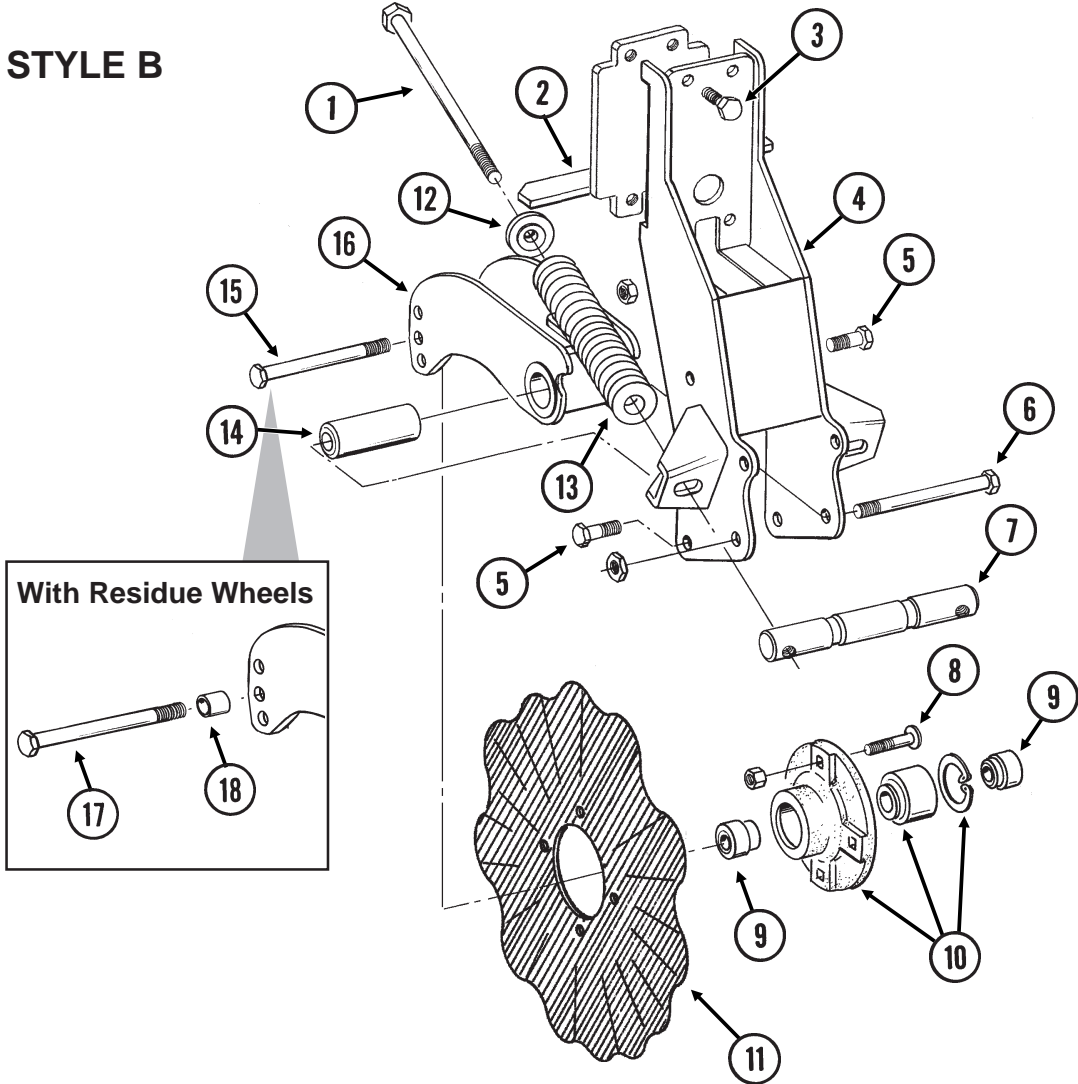
FRAME MOUNTED COULTER W/DISC FURROWER

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, 1 1/16" 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, 1 1/16" 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, 1 1/16" 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/RU135hh)

STYLE B



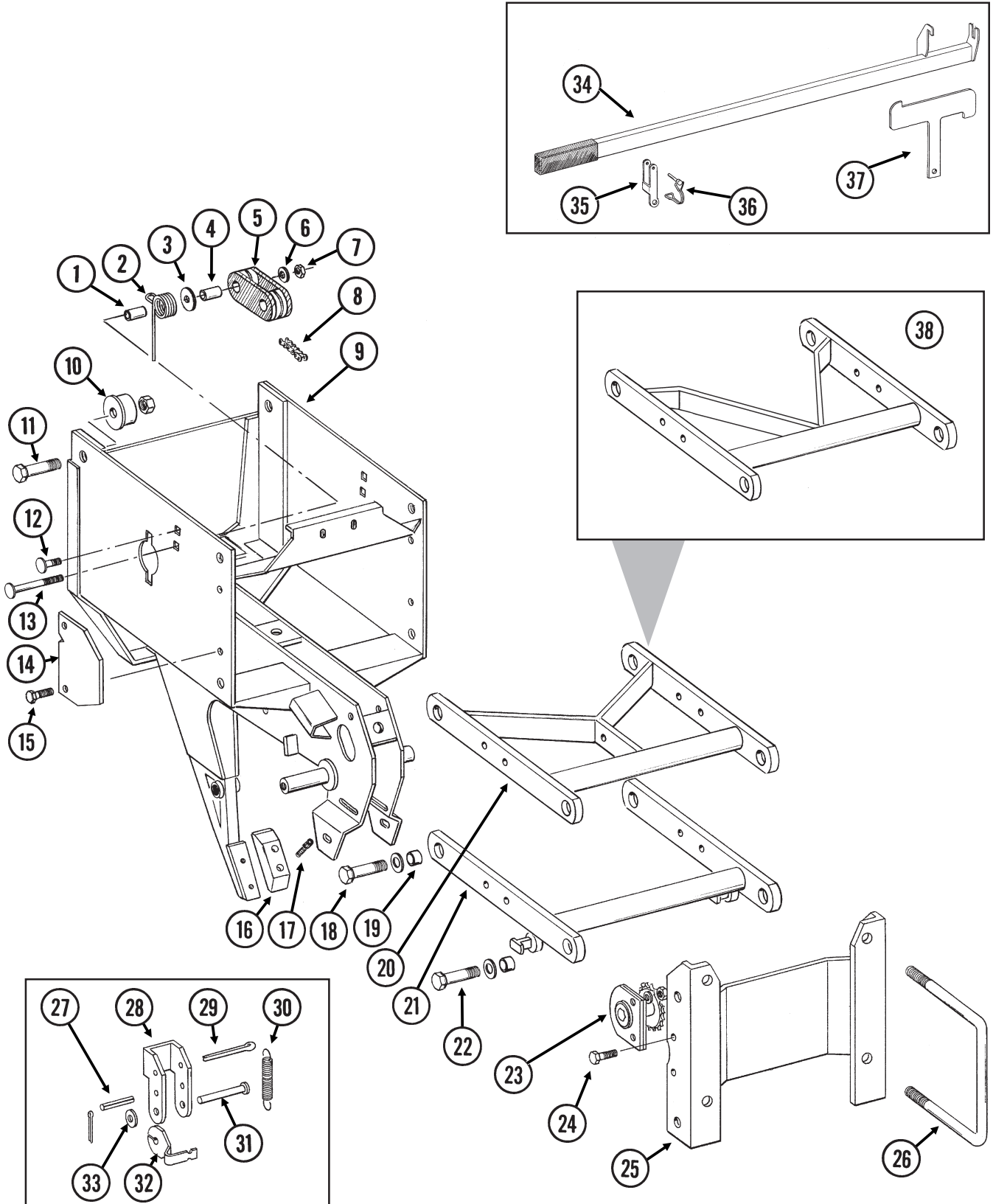
FRAME MOUNTED COULTER W/RESIDUE WHEELS

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G11010	2	Hex Head Cap Screw, $\frac{3}{4}$ "-10 x 12"
2.	GA9844	1	Plate W/Angle
3.	G10039	4	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 1 $\frac{3}{4}$ "
4.	GA9131	1	Coulter Frame
5.	G10007	4	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 1 $\frac{1}{2}$ "
	G10107	4	Lock Nut, $\frac{5}{8}$ "-11
6.	G10400	1	Hex Head Cap Screw, $\frac{3}{4}$ "-10 x 6 $\frac{1}{2}$ "
	G10112	1	Lock Nut, $\frac{3}{4}$ "-10
7.	GD12826	1	Spring Anchor Bar
8.	G10574	4	Carriage Bolt, $\frac{1}{2}$ "-13 x 1 $\frac{1}{4}$ "
	G10111	4	Lock Nut, $\frac{1}{2}$ "-13
9.	GD12827	2	Adapter
10.	GA8641	1	Hub W/Bearing And Retaining Ring
	GA8603	1	Double Row Bearing
	GD11652	1	Retaining Ring, 2 $\frac{7}{16}$ "
11.	GD7803	1	Disc Blade, Fluted, 1", 8 Flutes (Shown)
	GD7804	-	Disc Blade, Bubbled, 1"
	GD9254	-	Disc Blade, Fluted, $\frac{3}{4}$ ", 13 Flutes
12.	GB0213	2	Spring Seat
13.	GD12817	2	Compression Spring
14.	GD12829	1	Sleeve
15.	G10046	1	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 5"
	G10107	1	Lock Nut, $\frac{5}{8}$ "-11
16.	GA9845	1	Coulter Arm W/Grease Fitting
	G10643	-	Grease Fitting, 45°, $\frac{1}{4}$ "-28
17.	G10011	1	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 5 $\frac{1}{2}$ "
	G10107	1	Lock Nut, $\frac{5}{8}$ "-11
18.	GB0218	3	Bushing, $\frac{21}{32}$ " I.D. x $\frac{7}{8}$ " O.D. x $\frac{19}{32}$ " Long
19.	GD1132	2	Dust Cap
20.	G10009	2	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 2 $\frac{1}{2}$ "
21.	GD10552	2	Wheel, 12 Tine, $\frac{3}{8}$ " x 12"
22.	GA5654	2	Hub W/Bearings
	GA2014	-	Bearing
23.	GD9724	2	Backing Plate
24.	G10133	12	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x 1 $\frac{1}{2}$ "
	G10109	12	Lock Nut, $\frac{5}{16}$ "-18, Grade 8
25.	G10213	2	Machine Bushing, $\frac{5}{8}$ " (.030" Thick)
26.	GA9862	2	Weed Guard W/Spring Pin
	G10765	-	Spring Pin, $\frac{1}{4}$ " x 1"
27.	GA9865	1	Mount
28.	GA9861	1	Cam
29.	GD10519	1	Spring
30.	G10974	1	Lock Nut W/Nylon Insert, $\frac{1}{2}$ "-13
31.	G10005	1	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 1 $\frac{3}{4}$ "
	G10107	4	Lock Nut, $\frac{5}{8}$ "-11
32.	GA9864	1	Support
33.	G10014	1	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 1"
	G10102	1	Hex Nut, $\frac{1}{2}$ "-13
34.	G10011	2	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 5 $\frac{1}{2}$ "
	G10205	2	Washer, $\frac{5}{8}$ " SAE
	G10730	2	Lock Nut W/Nylon Insert, $\frac{5}{8}$ "-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(RU89v/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.

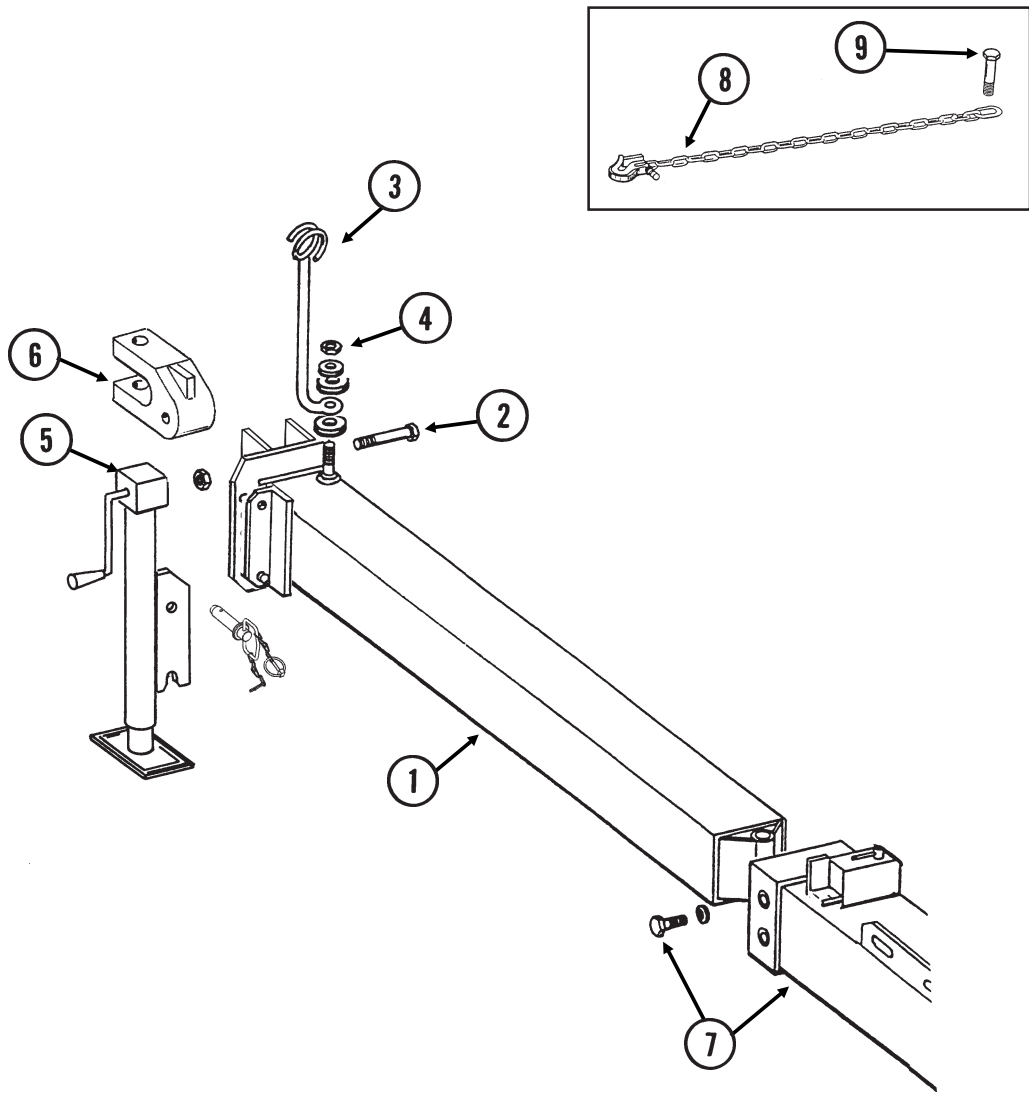


INTERPLANT® PUSH ROW UNIT

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, 2 1/32" 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
	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

INNER HITCH/SAFETY CHAIN

PHA021/PHA025(WGN47e/TWL48c)



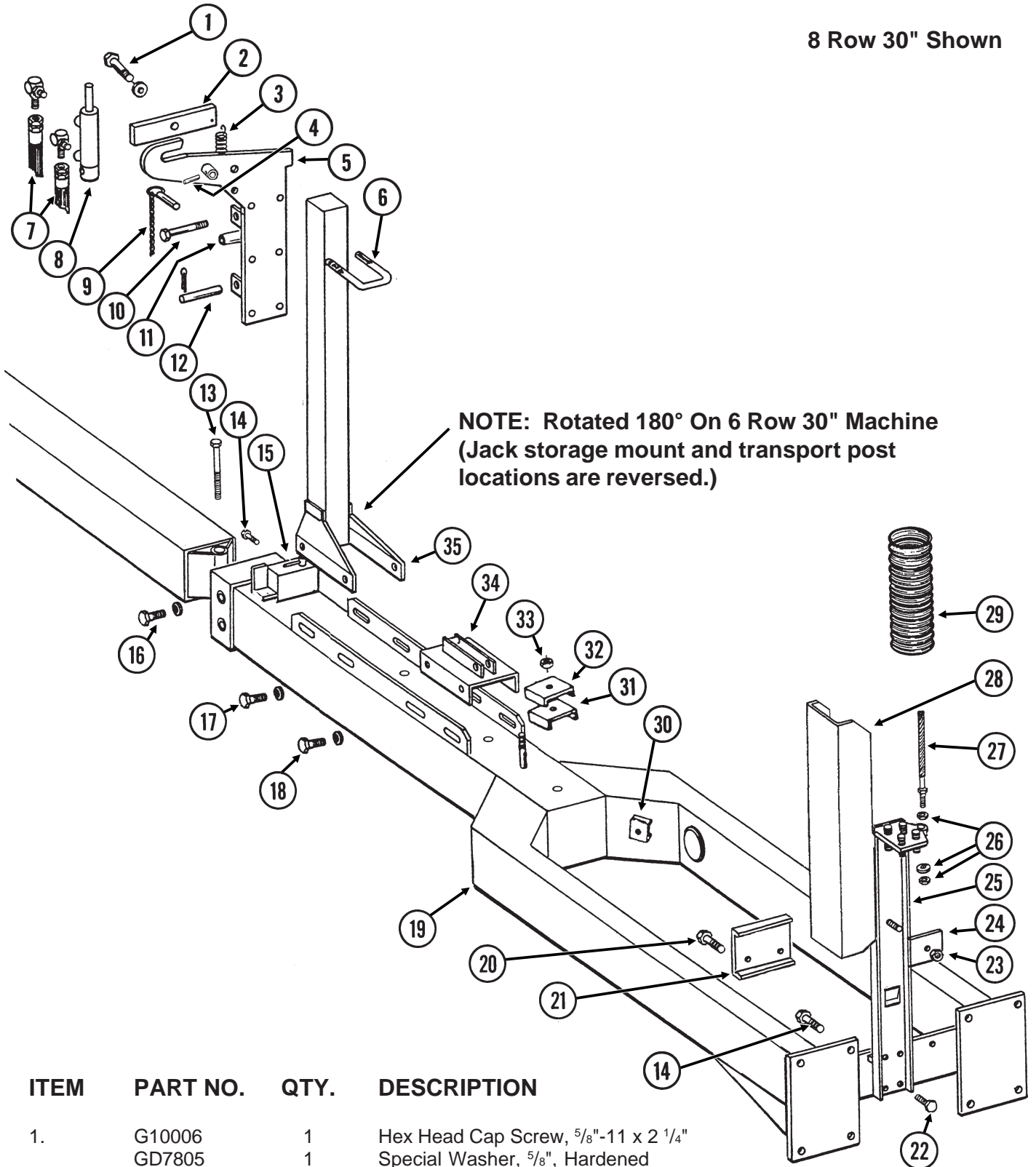
INNER HITCH/SAFETY CHAIN

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8699	1	Inner Hitch, 65 1/4"
2.	G10169	1	Hex Head Cap Screw, 1 1/4"-7 x 6"
	G10157	1	Lock Nut, 1 1/4"-7
3.	GD7140	1	Hose Holder
4.	G10217	2	Washer, 5/8" USS
	G10230	1	Lock Washer, 5/8"
	G10104	1	Hex Nut, 5/8"-11
5.	GA4994	1	Jack Assembly Complete
	GA4995	-	Detent Pin Assembly
	GR0517	-	Pin
	GR0516	-	Crank Assembly
	GR0515	-	Bevel Gear
6.	GB0156	1	Clevis
7.		-	See "Outer Hitch", Pages P36 And P37
8.	GA4774	1	Safety Chain, 3/8"
9.	G11058	1	Hex Head Cap Screw, 1 1/4"-7 x 3"
	G10226	1	Washer, 1 1/4" SAE
	GD10646	1	Special Washer
	G10157	1	Lock Nut, 1 1/4"-7

OUTER HITCH

PHA028(TWL49e)

8 Row 30" Shown



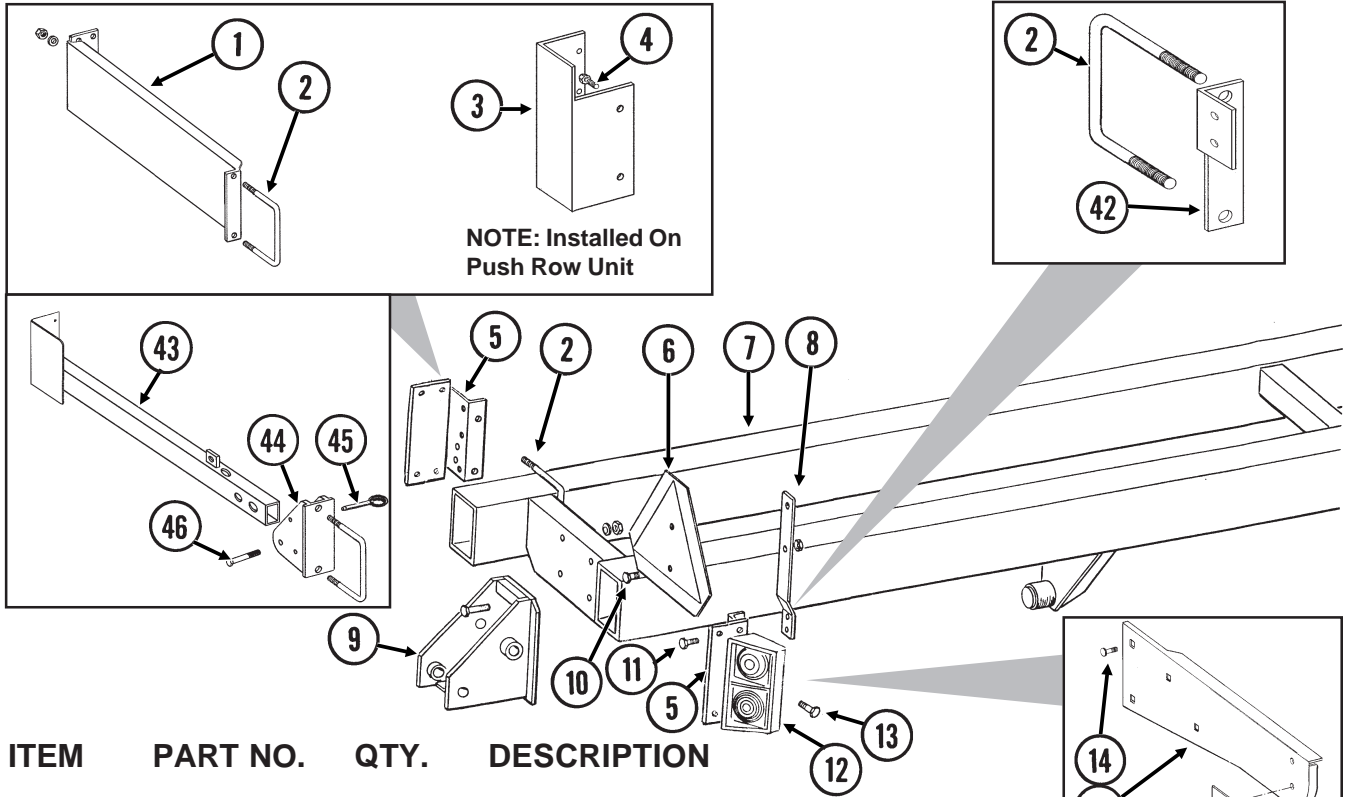
ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10006	1	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 2 $\frac{1}{4}$ "
	GD7805	1	Special Washer, $\frac{5}{8}$ ", Hardened
	GB0218	1	Bushing, $\frac{21}{32}$ " I.D. x $\frac{7}{8}$ " O.D. x $\frac{19}{32}$ " Long
	G10107	1	Lock Nut, $\frac{5}{8}$ "-11
2.	GA6422	1	Catch Bar
3.	GD5857	1	Spring
4.	G10765	1	Spring Pin, $\frac{1}{4}$ " x 1"
5.	GA6420	1	Transport Catch

OUTER HITCH

ITEM	PART NO.	QTY.	DESCRIPTION
6.	GD4743	3	U-Bolt, 3" x 3" x 1/2"-13
	G10228	6	Lock Washer, 1/2"
	G10102	6	Hex Nut, 1/2"-13
7.		-	See "Hydraulic System", Pages P62 And P63
8.		-	See "Transport Latch Cylinder", Page P56
9.	GA7022	1	Detent Pin W/Chain
10.	G10061	1	Hex Head Cap Screw, 3/8"-16 x 3 1/2"
	G10229	1	Lock Washer, 3/8"
	G10101	1	Hex Nut, 3/8"-16
11.	GD2971-09	1	Sleeve, 2" Long
	GD3180-03	-	Sleeve, 5/8" I.D. x 7/8" O.D. x 1 15/16" Long (As Required)
12.	GD7137	1	Pin, 3/4" x 3 3/8"
	G10457	2	Cotter Pin, 5/32" x 1 1/2"
13.	G10717	1	Hex Head Cap Screw, 1 1/4"-7 x 9"
	G10236	1	Lock Washer, 1 1/4"
	G10239	1	Hex Nut, 1 1/4"-7
14.	G10027	8	Hex Head Cap Screw, 3/4"-10 x 2 1/2"
	GD2169	8	Special Washer, 25/32" I.D. x 1 1/4" O.D., Hardened
	G10105	8	Hex Nut, 3/4"-10
15.		-	See "Selector Valve", Page P59
16.	G10716	2	Hex Head Cap Screw, 3/4"-10 x 1"
	G10231	2	Lock Washer, 3/4"
	GD2169	2	Special Washer, 25/32" I.D. x 1 1/4" O.D., Hardened
17.	G10005	4	Hex Head Cap Screw, 5/8"-11 x 1 3/4"
	GD7805	4	Special Washer, 5/8", Hardened
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
18.	G10005	4	Hex Head Cap Screw, 5/8"-11 x 1 3/4"
	G10205	4	Washer, 5/8" SAE
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
19.	GA6371	1	Outer Hitch, 125 1/2"
20.	G10004	2	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10108	2	Lock Nut, 3/8"-16
21.	GD10731	1	Wire Clamp (If Applicable)
22.	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
23.	G10048	1	Hex Head Cap Screw, 3/8"-16 x 2"
	G10229	1	Lock Washer, 3/8"
	G10101	1	Hex Nut, 3/8"-16
24.	GD9046	1	Hose Clamp, 3 1/4" x 4"
25.	GA6402	1	Hose Support
26.	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
27.	GA6608	1	Cable Assembly
28.	GD14106	1	Channel
29.	GD9129-01	1	Hose Protector, 48"
30.	GD5875	3	Hose Clamp, 9/16" x 2 1/2" x 2"
31.	GD0740	2	Hose Clamp, 3/4" x 4" x 3 1/2"
32.	GD5892	2	Hose Clamp, 5/8" x 1 1/2" x 1 1/2"
33.	G10108	1	Lock Nut, 3/8"-16
34.	GA6404	1	Jack Storage Mount
35.	GA6623	-	Transport Post, 6 Row 30"
	GA6418	-	Transport Post, 8 Row 30" (Shown)

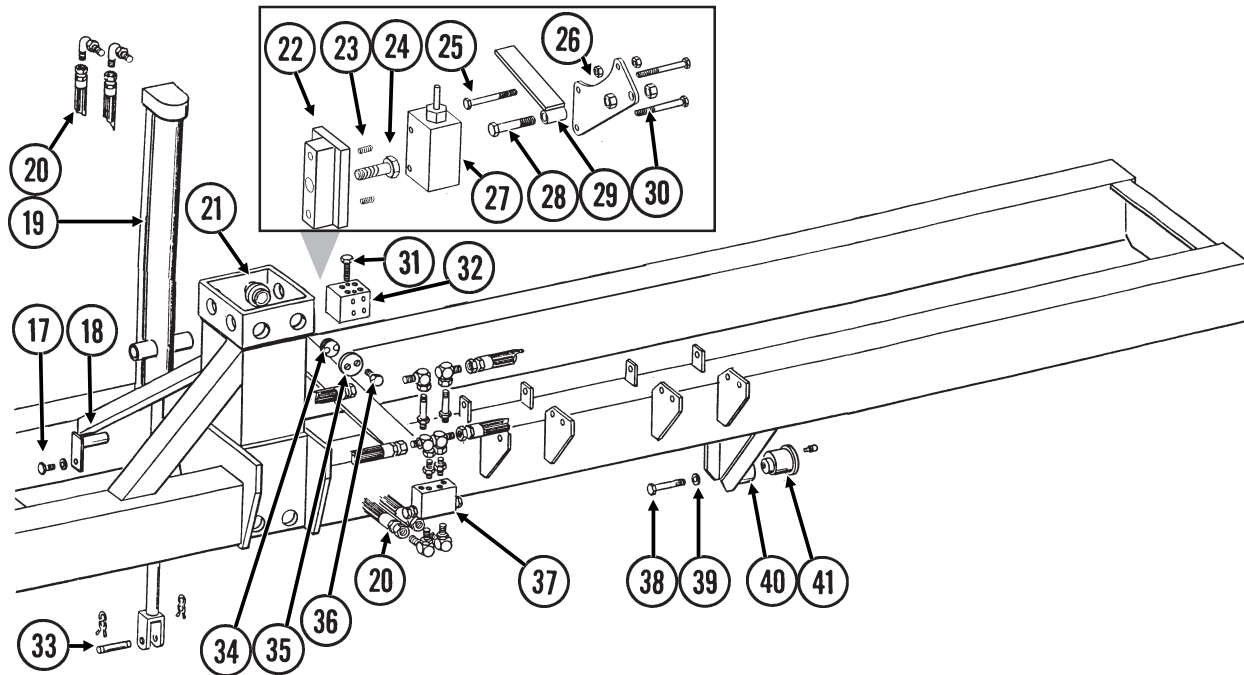
FRAME ASSEMBLY

PFA054/PFA055(TWL187/TWL180b/TWL180c/TWL187a/TWL50b/TWL188/TWL51b)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA9078	1	Bracket
2.	GD1113	2	U-Bolt, 5" x 7" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
3.	GD12703	1	Push Row Unit Light Bracket
4.	G10001	2	Hex Head Cap Screw, 3/8"-16 x 1"
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
5.	GA6792	2	Light Bracket
6.	-	-	See "Decals, Paint And Miscellaneous", Pages P110-P112
7.	A6401	-	Frame, 180", 6 Row 30" (Non-Stock Item)
	A9402	-	Frame, 188", 6 Row 30" (Non-Stock Item)
	A6364	-	Frame, 240", 8 Row 30" (Non-Stock Item)
	A9401	-	Frame, 248", 8 Row 30" (Non-Stock Item)
8.	GD6783	1	Bracket
9.	-	-	See "Row Marker Assembly", Pages P48-P51
10.	G10022	2	Hex Head Cap Screw, 1/4"-20 x 1/2"
	G10227	2	Lock Washer, 1/4"
	G10103	2	Hex Nut, 1/4"-20
11.	G10031	2	Hex Head Cap Screw, 5/16"-18 x 1 3/4"
	G10232	2	Lock Washer, 5/16"
	G10106	2	Hex Nut, 5/16"-18
12.	-	-	See "Electrical Components", Pages P64 And P65
13.	G10064	-	Hex Head Cap Screw, 1/4"-20 x 1"
	G10227	-	Lock Washer, 1/4"
	G10103	-	Hex Nut, 1/4"-20
	G10110	-	Lock Nut, 1/4"-20, Grade B
14.	G10312	2-4	Carriage Bolt, 5/16"-18 x 3/4"
	G10620	2-4	Serrated Flange Nut, 5/16"-18
15.	GD12754	1	Light Mount Extension
16.	GD12724	1	Bracket
17.	G10037	2	Hex Head Cap Screw, 1/2"-13 x 1 1/4"
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
18.	GA5121	2	Pin, 2 1/8"
19.	-	-	See "Lift Cylinder", Pages P54 And P55

FRAME ASSEMBLY

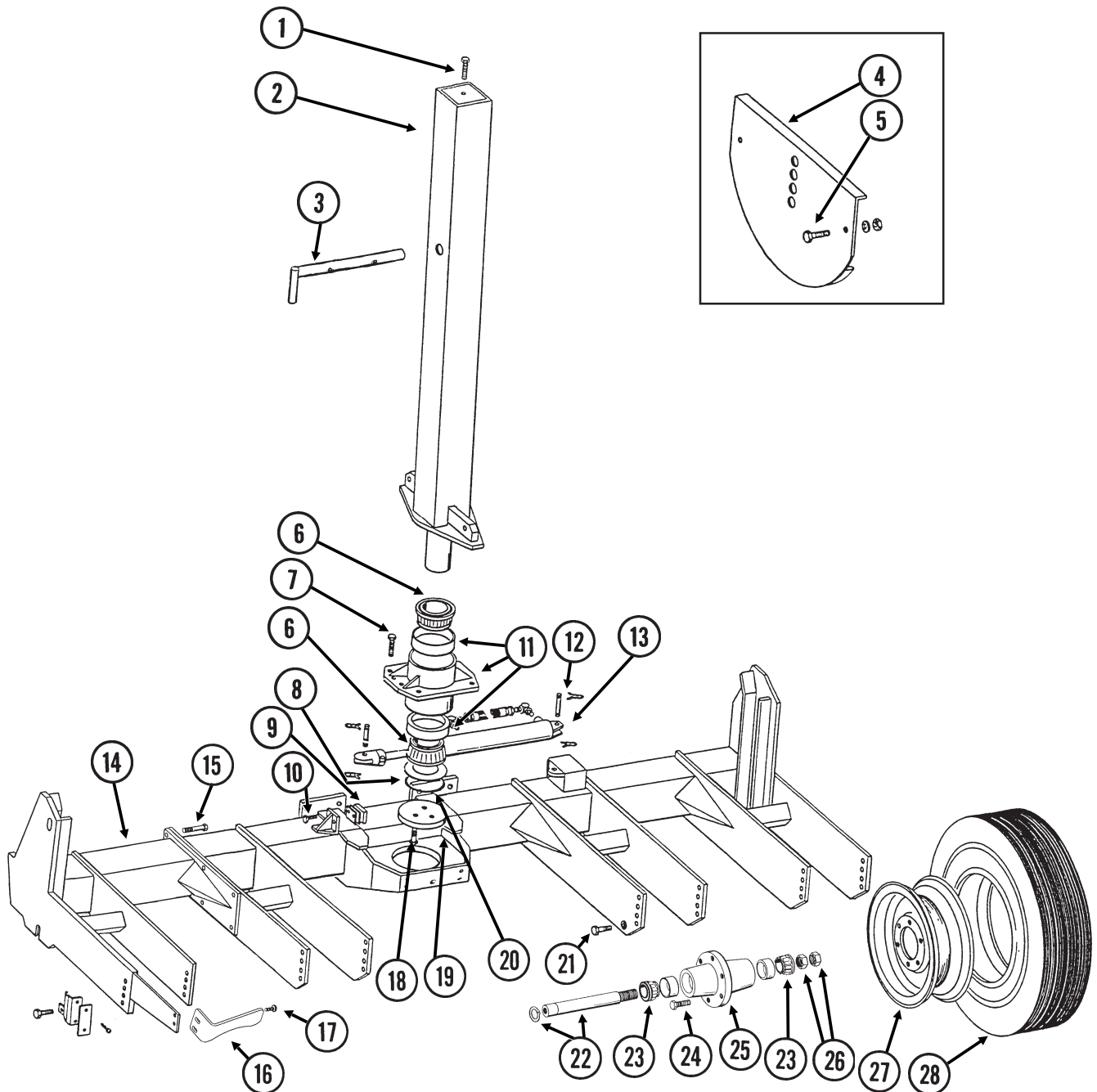


ITEM	PART NO.	QTY.	DESCRIPTION
20.		-	See "Hydraulic System", Pages P62 And P63
21.	GD9093	16	Poly Wear Pad
22.	GA6850	1	Valve Mount
23.	G10120	2	Hex Socket Set Screw, 3/8"-16 x 1/2"
24.	G10005	1	Hex Head Cap Screw, 5/8"-11 x 1 3/4"
25.	G10638	1	Hex Head Cap Screw, 1/4"-20 x 2"
	G10103	2	Hex Nut, 1/4"-20
26.	GD10129	1	Mounting Bracket
27.		-	See "Stroke Limiter Valve", Page P59
28.	G10048	1	Hex Head Cap Screw, 3/8"-16 x 2"
	G10101	2	Hex Nut, 3/8"-16
29.	GA7153	1	Stroke Limiter Arm
30.	G10403	2	Hex Head Cap Screw, 1/4"-20 x 2 1/2"
	G10227	2	Lock Washer, 1/4"
31.	G10172	2	Hex Head Cap Screw, 3/8"-16 x 5"
	G10108	2	Lock Nut, 3/8"-16
32.	GD9971	1	Manifold Block
33.	GR0375	1	Pin, 1" x 3 1/2"
	GR0193	2	Hair Pin Clip
34.	GB0234	16	Adjustment Plug
35.	GB0230	16	Cap
36.	G10014	32	Hex Head Cap Screw, 1/2"-13 x 1"
37.		-	See "Row Marker Sequencing/Flow Control Valve", Pages P60 And P61
38.	G10025	2	Hex Head Cap Screw, 3/4"-10 x 1 1/2"
	G10231	2	Lock Washer, 3/4"
39.	GD9052	2	Special Washer, 3/4" I.D. x 2" O.D., Hardened
40.	GD10532	2	Sleeve
41.	GA6497	2	Cam Follower W/Grease Fitting
	G10640	-	Grease Fitting, 1/4"-28
42.	GD13250	1	SMV Bracket
43.	GA9840	1	Light Bracket
44.	GB0309	1	Light Mount Bracket
45.	G10874	1	Detent Pin, 1/2" x 3 1/2" Grip
46.	G10033	1	Hex Head Cap Screw, 1/2"-13 x 3 1/2"
	G10206	4	Washer, 1/2" SAE
	G10111	1	Lock Nut, 1/2"-13

A. G7698X - Push Row Unit Mounted Light Bracket Package (Items 3 And 4 On This Page And 42" Harness Extension, Item 3 On Pages P64 And P65)

AXLE/PIVOT AND WHEEL ASSEMBLY

PFA040/PLA015/HTA014(TWL52f)



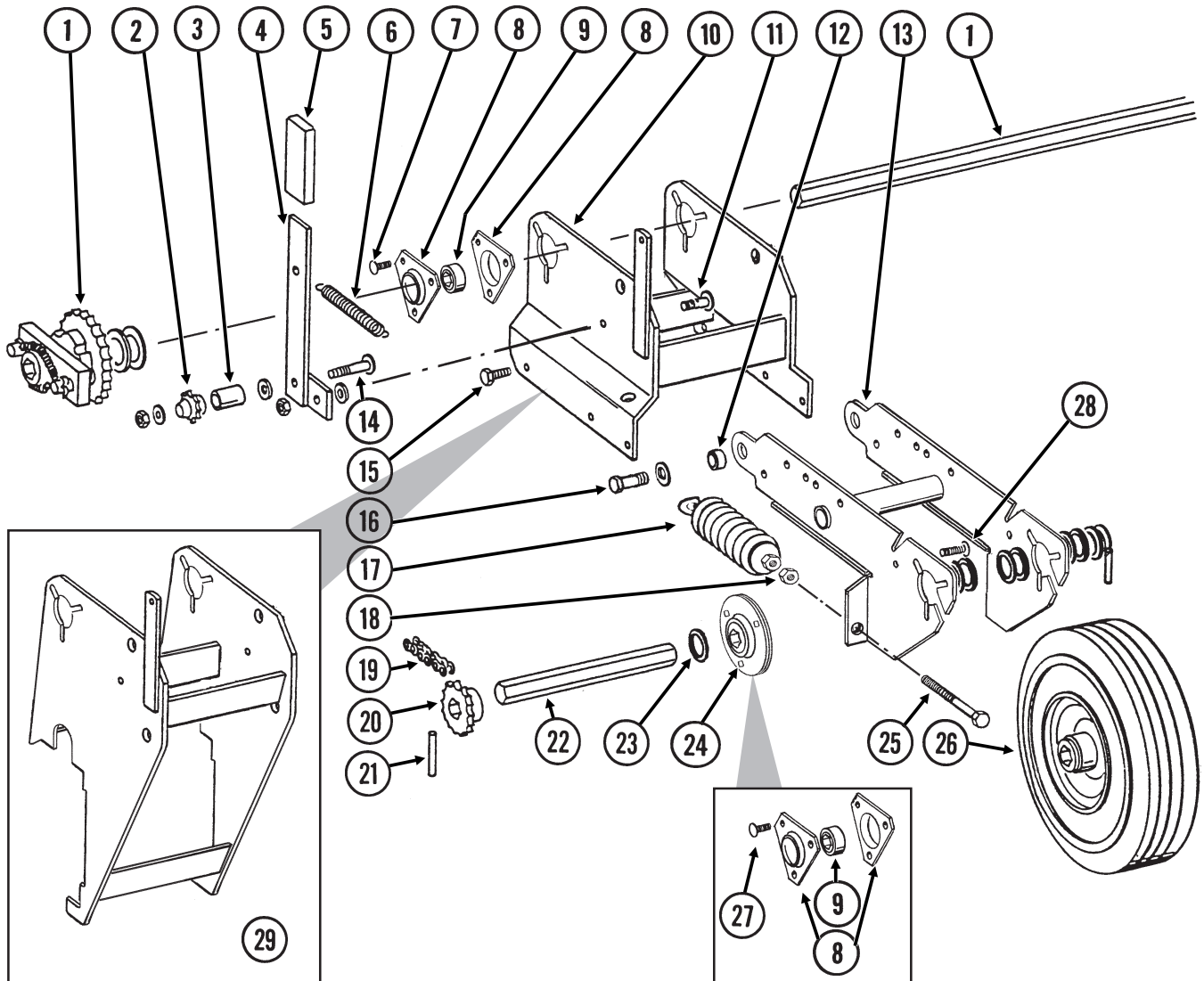
AXLE/PIVOT AND WHEEL ASSEMBLY

ITEM	PART NO.	QTY. (Per Planter)	DESCRIPTION
1.		-	See "Rear Trailer Hitch", Pages P108 And P109
2.	GA7543	1	Center Post
3.	GA6849	1	Safety Lockup Pin, 17 1/4"
	G10671	1	Slotted Spring Pin, 3/16" x 3 1/4"
	G10606	1	Spring Pin, 1/4" x 2"
4.	GA6529	-	Rock Guard (Optional)
5.	G10037	-	Hex Head Cap Screw, 1/2"-13 x 1 1/4"
	G10228	-	Lock Washer, 1/2"
	G10102	-	Hex Nut, 1/2"-13
6.	GA6435	2	Bearing
7.	G10028	8	Hex Head Cap Screw, 3/4"-10 x 3"
	GD2169	8	Special Washer, 25/32" I.D. x 1 1/4" O.D., Hardened
	G10105	8	Hex Nut, 3/4"-10
8.	GD9122	-	Shim, .005" Thick (As Required)
	GD9123	-	Shim, .007" Thick (As Required)
	GD9124	-	Shim, .020" Thick (As Required)
9.	GD3389	1	Tap Block
	GD3398	-	Shim, 16 Gauge (As Required)
	GD7888	-	Shim, 22 Gauge (As Required)
10.	G10016	2	Hex Head Cap Screw, 1/2"-13 x 2"
	G10228	2	Lock Washer, 1/2"
11.	GA6496	1	Bearing Housing W/Cups And Grease Fitting
	GD9121	-	Cup
	G10779	-	Grease Fitting, 90°, 1/4"-28
12.	GR0375	2	Pin, 1" x 3 1/2"
	GR0193	4	Hair Pin Clip
13.		-	See "Rotation Cylinder", Page P53
14.	A7380	1	Axle W/Stub And Scraper Mounts (Non-Stock Item)
15.	G10027	6	Hex Head Cap Screw, 3/4"-10 x 2 1/2"
	G10231	6	Lock Washer, 3/4"
	G10105	6	Hex Nut, 3/4"-10
16.	GD12543	4	Scraper
17.	G10636	8	Carriage Bolt, 1/2"-13 x 1 1/2"
	G10216	8	Washer, 1/2" USS
	G10228	8	Lock Washer, 1/2"
	G10102	8	Hex Nut, 1/2"-13
18.	G10008	3	Hex Head Cap Screw, 5/8"-11 x 2"
	G10230	3	Lock Washer, 5/8"
19.	GD9051	1	Bearing Cap
20.	GD9130	1	O-Ring
21.	G10026	2	Hex Head Cap Screw, 3/4"-10 x 2"
	G10231	2	Lock Washer, 3/4"
22.	GA4693	1	Spindle, W/Round External Retaining Ring, 10 1/2"
	GD11490	-	Round External Retaining Ring
23.	GA0895	2	Bearing
24.	GR0270	6	Lug Bolt, 9/16"-18
25.	GA2148	1	Hub W/Cups, 6 Bolt
	GR0434	-	Cup
26.	G11081	2	Hex Jam Nut, 1 1/2"-12, Grade 2
27.	GA2142	1	Rim, 5.50" x 20"
28.	GD13401	-	Tire, 7.50" x 20", 8 Ply, Tubeless W/O Center Rib (Specify Brand*)
	GA7434	1	Valve Stem
A.	GA6428	-	Hub And Spindle Assembly (Items 22, 23, 25 And 26)

* 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

PLA026(TWL53j/PLTR150/TWL53m)



ITEM	PART NO.	QTY.	DESCRIPTION
------	----------	------	-------------

(Per Wheel)

1.		-	See "Driveline", Pages P44 And P45
2.	GD7426	1	Sprocket, 12 Tooth
3.	GD1026	1	Sleeve, 1 3/16" Long
4.	GA5157	1	Idler Arm, L.H.
5.	GD5827	1	Cover
6.	GD5857	1	Spring

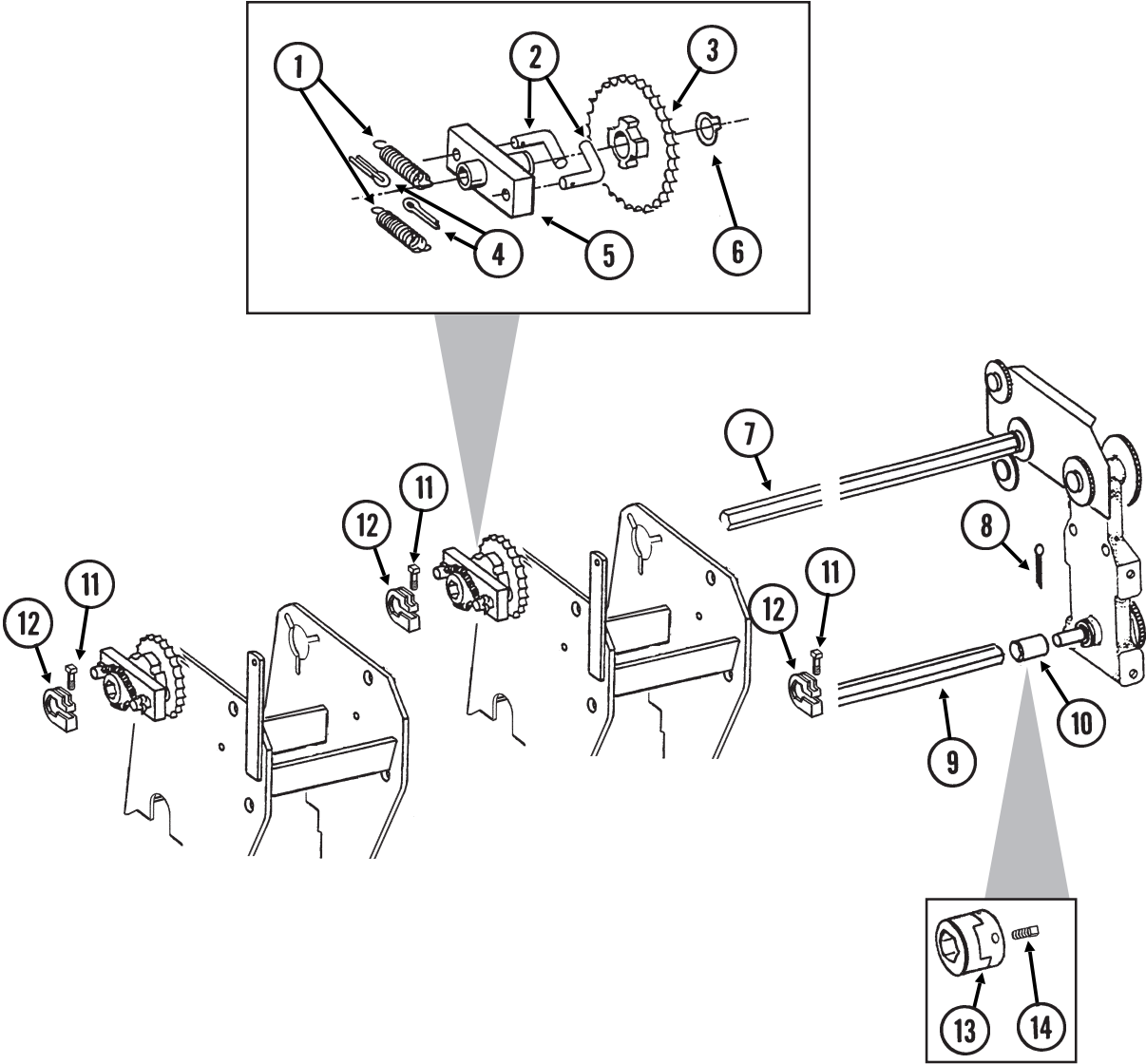
CONTACT DRIVE WHEEL AND ARM ASSEMBLY

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Wheel)	
7.	G10312	3	Carriage Bolt, $\frac{5}{16}$ "-18 x $\frac{3}{4}$ "
	G10232	3	Lock Washer, $\frac{5}{16}$ "
	G10106	3	Hex Nut, $\frac{5}{16}$ "-18
8.	G3400-01	4	Flangette
9.	G2100-03	2	Bearing, $\frac{7}{8}$ " Hex Bore, Spherical
10.	GA7826	1	Mount
11.	G10004	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{1}{4}$ "
	G10229	1	Lock Washer, $\frac{3}{8}$ "
	G10370	1	Machine Bushing, $\frac{3}{8}$ ", 22 Gauge
	GD5756	1	Special Nut, $\frac{3}{8}$ "-16
12.	GB0218	2	Bushing, $\frac{21}{32}$ " I.D. x $\frac{7}{8}$ " O.D. x $\frac{19}{32}$ " Long
13.	A7369	1	Wheel Arm (Non-Stock Item)(Sub G1K253)
14.	G10306	1	Carriage Bolt, $\frac{3}{8}$ "-16 x 2"
	G10210	-	Washer, $\frac{3}{8}$ " USS (As Required)
	G10108	1	Lock Nut, $\frac{3}{8}$ "-16
15.	G10001	6	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1"
	G10229	6	Lock Washer, $\frac{3}{8}$ "
	G10101	6	Hex Nut, $\frac{3}{8}$ "-16
16.	G10751	2	Hex Head Cap Screw, $\frac{5}{8}$ "-18 x 1 $\frac{3}{4}$ "
	G10235	6	Machine Bushing, $\frac{7}{8}$ ", 14 Gauge
	GD7805	2	Special Washer, $\frac{5}{8}$ ", Hardened
	G10412	2	Lock Nut, $\frac{5}{8}$ "-18
17.	GA2068	2	Spring W/Plug
18.	G10501	2	Hex Jam Nut, $\frac{1}{2}$ "-13, Grade 2
19.	G3310-116	1	Chain, No. 40, 116 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
20.	GA5105	1	Sprocket, 15 Tooth
21.	G10602	2	Spring Pin, $\frac{1}{4}$ " x 1 $\frac{1}{2}$ "
22.	GD6825-10.375	1	Hex Shaft, $\frac{7}{8}$ " x 10 $\frac{3}{8}$ " (2 Holes)
23.	G10233	6	Machine Bushing, 1", 10 Gauge
24.	GA9846	-	Flanged Bearing, $\frac{7}{8}$ " Hex Bore
25.	G10890	2	Hex Head Adjusting Bolt, $\frac{1}{2}$ "-13 x 4", Grade 2
26.	GA5090	-	Tire And Rim Assembly (Specify Brand*)
	GD5753	1	Tire, 4.10" x 6" (Specify Brand*)
	GD5752	1	Inner Tube
27.	G10303	6	Carriage Bolt, $\frac{5}{16}$ "-18 x 1"
	G10219	6	Washer, $\frac{5}{16}$ " USS
	G10232	6	Lock Washer, $\frac{5}{16}$ "
	G10106	6	Hex Nut, $\frac{5}{16}$ "-18
28.	G10303	-	Carriage Bolt, $\frac{5}{16}$ "-18 x 1"
	G10232	-	Lock Washer, $\frac{5}{16}$ "
	G10106	6	Hex Nut, $\frac{5}{16}$ "-18
29.	GA8925	-	Mount
A.	G1K253	-	Contact Wheel Arm Replacement Kit (Items 13, 18, 21, 22, 24, 25 And 28)

* 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

PTD033/PLA026/PTD016/PTD066(TWL54d/PLTR157d)

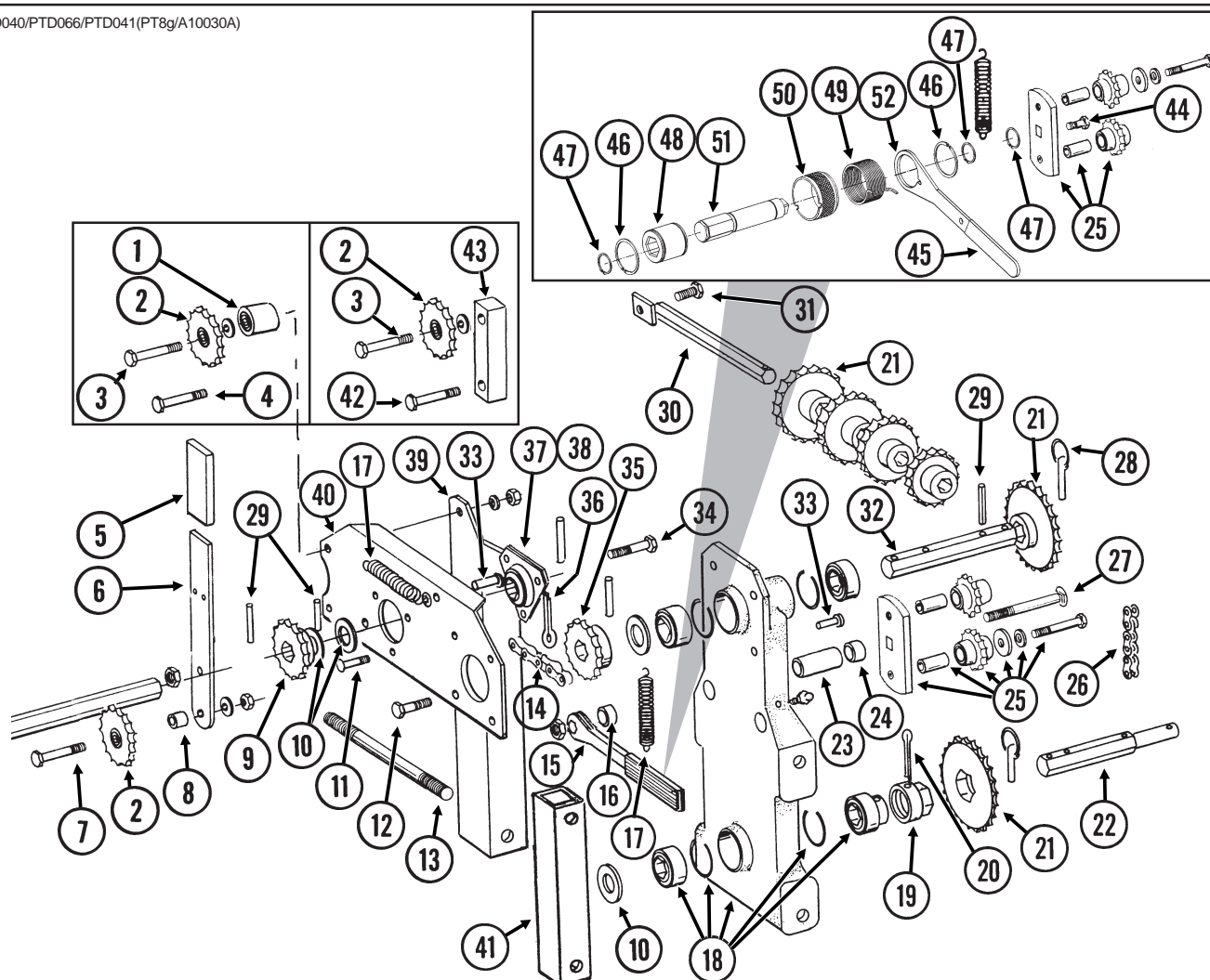


DRIVELINE

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Planter)	
1.	GD1256	4	Spring
2.	GD1255	4	L-Pin
3.	GA5165	2	Sprocket, 30 Tooth
4.	G10464	4	Cotter Pin, $\frac{3}{16}$ " x 1"
5.	GA0378	2	Block And Hub Assembly
6.	G10430	2	External Retaining Ring, 1 $\frac{1}{4}$ "
7.	GD9078	-	Hex Shaft, $\frac{7}{8}$ " x 58" (4 Holes), 6 Row 30"
	GD9077	-	Hex Shaft, $\frac{7}{8}$ " x 98" (4 Holes), 8 Row 30"
8.	G10460	1	Cotter Pin, $\frac{1}{4}$ " x 2"
9.	GD0914-165	-	Hex Shaft, $\frac{7}{8}$ " x 165" (No Holes), 6 Row 30"
	GD0914-225	-	Hex Shaft, $\frac{7}{8}$ " x 225" (No Holes), 8 Row 30"
10.	GD5886	1	Coupler, 1 $\frac{3}{4}$ "
11.	G10130	-	Square Head Machine Bolt, $\frac{5}{16}$ "-18 x 1 $\frac{3}{4}$ "
	G10923	-	Flange Nut, $\frac{5}{16}$ "-18, No Serration
12.	GD11045	-	Lock Clamp
13.	GB0287	2	Coupler
14.	G10131	4	Square Head Set Screw, $\frac{5}{16}$ "-18 x $\frac{3}{4}$ "
A.	GA5164	-	Ratchet/Sprocket Assembly (Items 1-6)
B.	G1K269	-	Lock Clamp Kit (Items 11 And 12)

SEED RATE TRANSMISSION ASSEMBLY

PTD040/PTD066/PTD041(PT8g/A10030A)



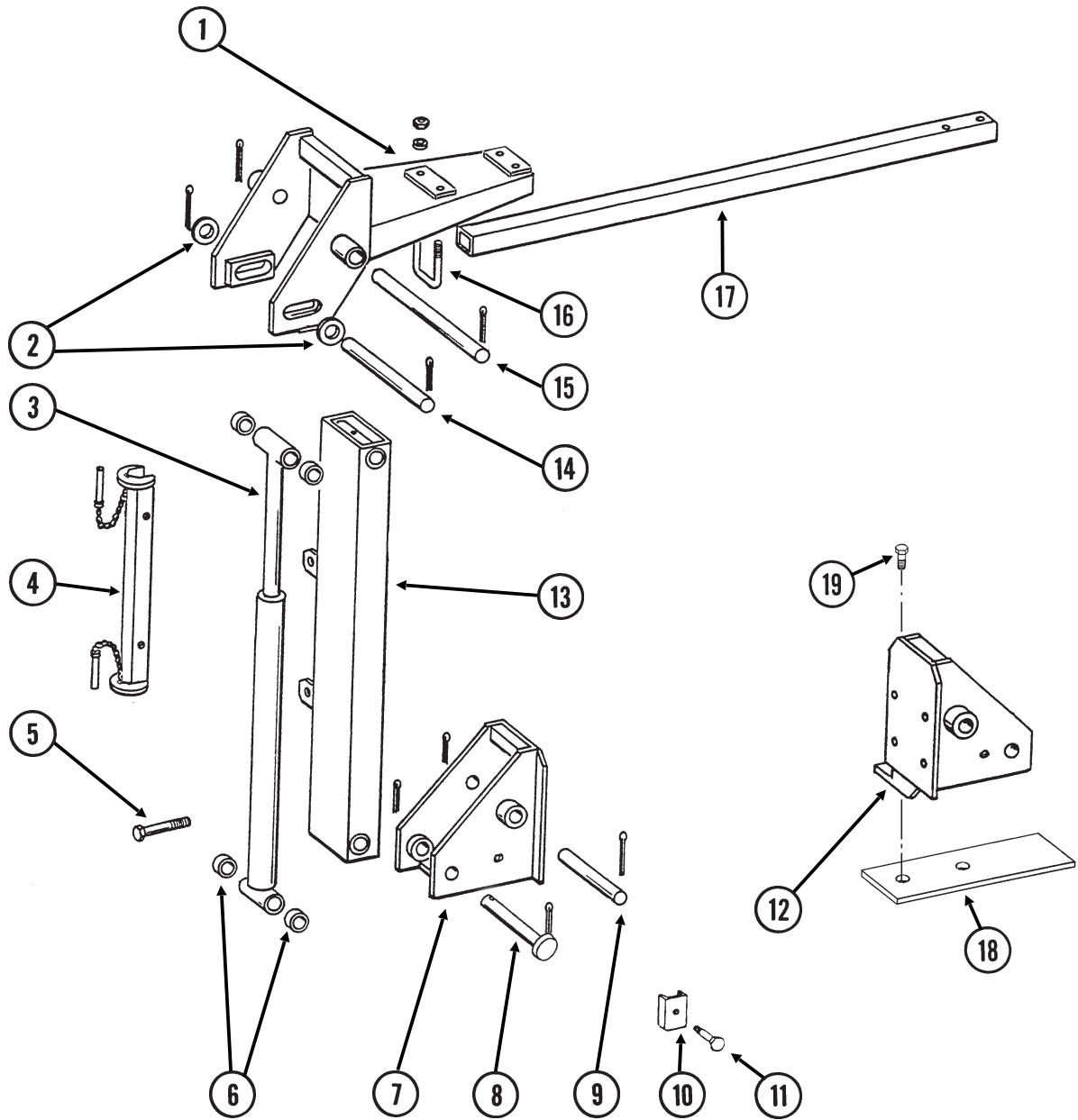
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GB0259	1	Spacer, 1"
2.	GA7154	1	Sprocket W/Bearing, 18 Tooth
3.	G10033	1	Hex Head Cap Screw, 1/2"-13 x 3 1/2"
	G10128	-	Machine Bushing, 1/2", 14 Gauge (As Required)
	G10228	1	Lock Washer, 1/2"
	G10102	1	Hex Nut, 1/2"-13
4.	G10017	1	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10228	1	Lock Washer, 1/2"
	G10102	1	Hex Nut, 1/2"-13
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
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

SEED RATE TRANSMISSION ASSEMBLY

ITEM	PART NO.	QTY.	DESCRIPTION
15.	GA4235	1	Ratchet Arm W/Protective Closure
	G10445	-	Protective Closure
16.	GD10161	1	Spacer, $\frac{3}{8}$ "
17.	GD5857	2	Spring
18.	GA5629	1	Transmission Plate W/Bearings, Grease Fittings And Retaining Rings
	GA5116	3	Bearing, $\frac{7}{8}$ " Hex Bore, Cylindrical
	GA5624	1	Special Bearing, $\frac{7}{8}$ " Hex Bore x 1.6"
	GD6551	4	Ring
	G10641	-	Grease Fitting, $\frac{1}{8}$ " NPT
19.	GD7127	1	Shear Coupler
20.	G10462	1	Cotter Pin, $\frac{3}{16}$ " x 2"
	G10641	-	Grease Fitting, $\frac{1}{8}$ " NPT
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, $\frac{7}{8}$ " x 7"
23.	GD3180-16	1	Sleeve, $\frac{5}{8}$ " I.D. x $\frac{7}{8}$ " O.D. x 2 $\frac{13}{16}$ " Long
24.	GD2734-01	1	Sleeve, 1 $\frac{1}{4}$ " O.D. x $\frac{1}{2}$ " Long
25.	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 $\frac{3}{4}$ "
26.	G3310-80	1	Chain, No. 40, 80 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
27.	G10867	1	Carriage Bolt, $\frac{1}{2}$ "-13 x 5"
	G10111	1	Lock Nut, $\frac{1}{2}$ "-13
28.	GD2558	3	Lynch Pin, $\frac{1}{4}$ "
29.	G10602	5	Spring Pin, $\frac{1}{4}$ " x 1 $\frac{1}{2}$ "
30.	GA5146	1	Sprocket Storage Rod
31.	G10017	1	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 1 $\frac{1}{2}$ "
	G10527	1	Lock Washer, $\frac{1}{2}$ " Internal/External
	G10111	1	Lock Nut, $\frac{1}{2}$ "-13
32.	GD5835	1	Shaft, $\frac{7}{8}$ " x 7"
33.	G10478	1	Clevis Pin, $\frac{5}{16}$ " x 1"
	G10409	1	Retaining Ring, $\frac{5}{16}$ "
34.	G10004	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{1}{4}$ "
	G10229	1	Lock Washer, $\frac{3}{8}$ "
	G10203	-	Washer, $\frac{3}{8}$ " SAE (As Required)
	G10210	-	Washer, $\frac{3}{8}$ " USS (As Required)
	GD5756	1	Special Nut, $\frac{3}{8}$ "-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, $\frac{1}{4}$ " x 2"
37.	G2100-03	1	Bearing, $\frac{7}{8}$ " Hex Bore, Spherical
38.	G3400-01	2	Flangette
39.	GD5830	1	Angle Support, R.H.
40.	GD5824	1	Plate, R.H.
41.	GD9047	1	Spacer
42.	G10053	1	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 2 $\frac{1}{2}$ "
	G10228	1	Lock Washer, $\frac{1}{2}$ "
	G10102	1	Hex Nut, $\frac{1}{2}$ "-13
43.	GD12571	1	Spacer, 1" x 4"
44.	G11100	1	Hex Socket Button Head Screw, $\frac{1}{4}$ "-20 x $\frac{1}{2}$ ", Grade 8
	G10227	1	Lock Washer, $\frac{1}{4}$ "
	G10209	1	Washer, $\frac{1}{4}$ " USS
45.	G11078	1	Vinyl Cap
46.	G10496	2	External Inverted Snap Ring, 1 $\frac{1}{2}$ "
47.	G11075	3	Internal Inverted Snap Ring, $\frac{7}{8}$ "
48.	GD14432	1	Sleeve, 1 $\frac{1}{4}$ "
49.	GD14413	1	Torsion Spring, L.H. (Used On R.H. Wrap Spring Wrench)
50.	GD14430	1	Release Collar, Gold, R.H.
51.	GD14427	1	Tightener Shaft, 4 $\frac{7}{8}$ "
52.	GD14431	1	Handle
A.	G1K269	-	Lock Clamp Kit (Items 7 And 28)
B.	G1K378	1	Wrap Spring Wrench Replacement Kit, Gold Collar, R.H. (Items 44-52)

ROW MARKER ASSEMBLY, TWO-FOLD LOW PROFILE, 6 ROW 30"

MKR025/PFA054(MKR9e)

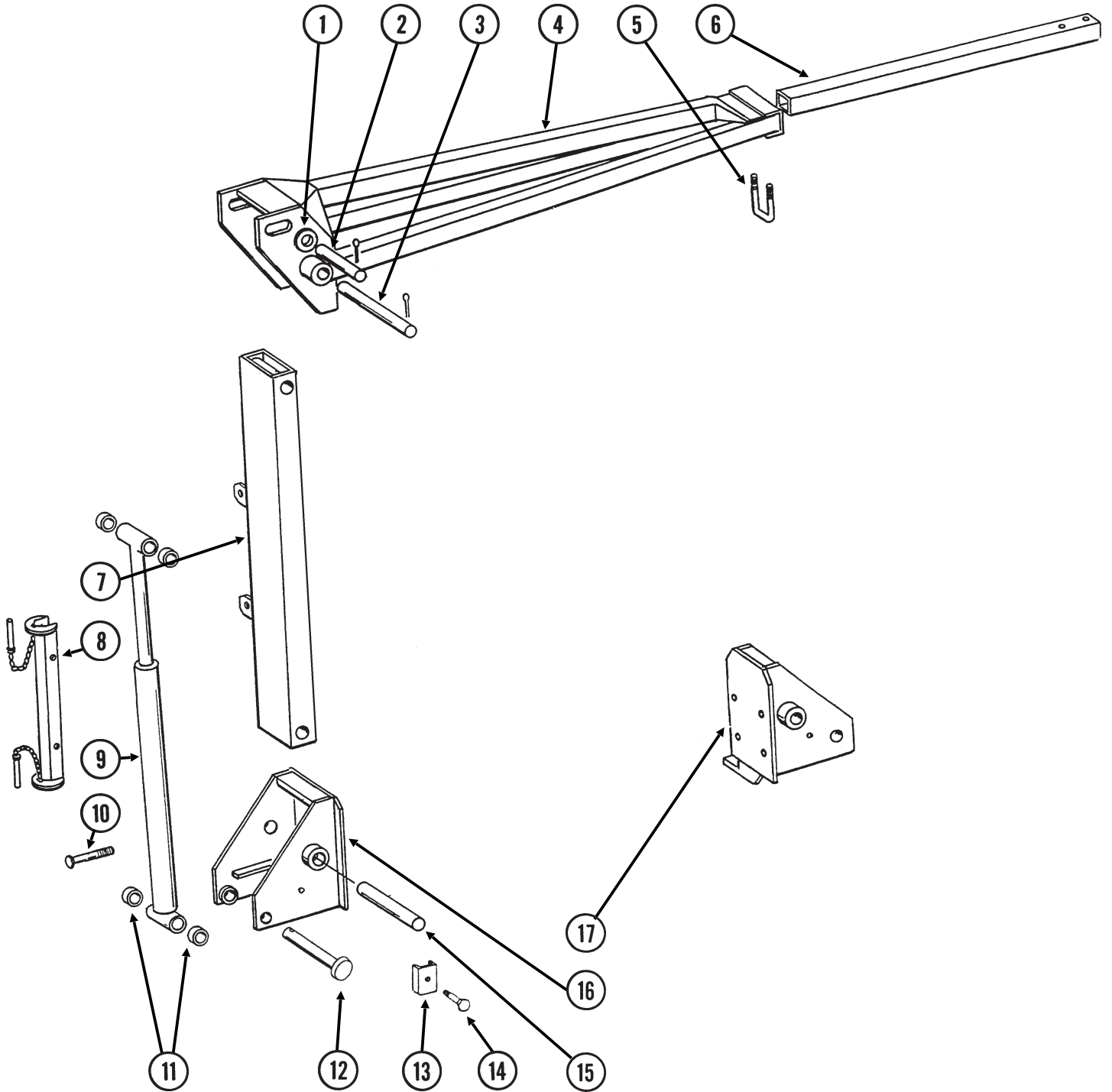


ROW MARKER ASSEMBLY, TWO-FOLD LOW PROFILE, 6 ROW 30"

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Marker)	
1.	GA6442	1	Arm, Second Stage, 20"
2.	G10226	2	Washer, 1 1/4" SAE
3.		-	See "Marker Cylinder", Pages P57 And P58
4.	GA5526	1	Safety Lockup W/Detent Pins (Sub GA8170)
	G10536	-	Detent Pin, 1/2" x 2 1/2" Grip
5.	G10008	4	Hex Head Cap Screw, 5/8"-11 x 2"
	G10230	4	Lock Washer, 5/8"
	G10205	4	Washer, 5/8" SAE
	G10104	4	Hex Nut, 5/8"-11
6.	GD0752-41	-	Sleeve, 1" (If Applicable)
7.	GA6859	1	Mount, L.H.
8.	GD15386	1	Pin, 1 1/4" x 7 5/8"
	G10460	1	Cotter Pin, 1/4" x 2"
9.	GD0652	1	Pin, 1 1/4" x 9 1/2"
	G10460	2	Cotter Pin, 1/4" x 2"
10.	GD5875	1	Hose Clamp, 9/16" x 2 1/2" x 2"
11.	G10003	1	Hex Head Cap Screw, 3/8"-16 x 1 1/2"
	G10229	1	Lock Washer, 3/8"
	G10101	1	Hex Nut, 3/8"-16
12.	GA6858	-	Mount, R.H.
13.	GA6585	1	Arm W/Grease Fittings, First Stage, L.H. (Shown)
	GA6586	-	Arm W/Grease Fittings, First Stage, R.H.
	G10641	-	Grease Fitting, 1/8" NPT
14.	GD2161	1	Pin, 1 1/4" x 8 1/4"
	G10460	2	Cotter Pin, 1/4" x 2"
15.	GD3214	1	Pin, 1 1/4" x 12 1/4"
	G10460	2	Cotter Pin, 1/4" x 2"
16.	GD2721	2	U-Bolt, 2" x 2" x 1/2"-13
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
17.	GD0453-02	1	Extension Tube, 40"
	GD0453-06	-	Extension Tube, 30" (Used With Interplant® Package Option)
	GD0453-05	-	Extension Tube, 55" (L.H. Side Only With Even-Row Push Row Unit)
18.	GD13457	1	Extension Plate (If Applicable)
19.	G10005	2	Hex Head Cap Screw, 5/8"-11 x 1 3/4"
	G10230	2	Lock Washer, 5/8"
	G10104	2	Hex Nut, 5/8"-11

ROW MARKER ASSEMBLY, TWO-FOLD LOW PROFILE, 8 ROW 30"

MKR026/PFA054/MKR019(MKR10d)

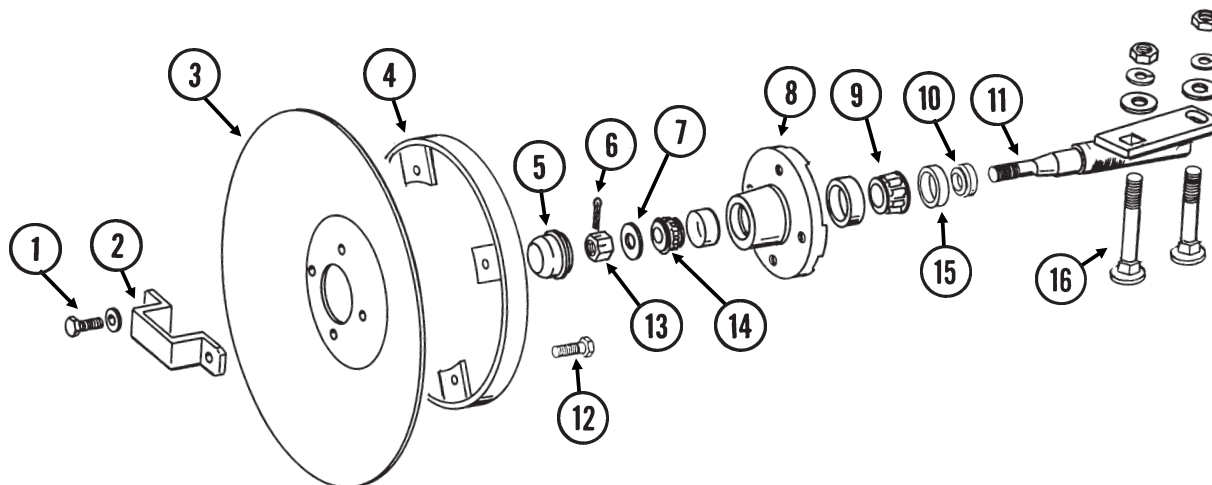


ROW MARKER ASSEMBLY, TWO-FOLD LOW PROFILE, 8 ROW 30"

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Marker)	
1.	G10226	2	Washer, 1 1/4" SAE
2.	GD2161	1	Pin, 1 1/4" x 8 1/4"
	G10460	2	Cotter Pin, 1/4" x 2"
3.	GD3214	1	Pin, 1 1/4" x 12 1/4"
	G10460	2	Cotter Pin, 1/4" x 2"
4.	GA5188	1	Arm, Second Stage, 46"
5.	GD2721	1	U-Bolt, 2" x 2" x 1/2"-13
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
6.	GD0453-03	1	Extension Tube, 50"
	GD0453-08	-	Extension Tube, 65" (L.H. Side Only With Even-Row Push Row Unit)
7.	GA6585	1	Arm W/Grease Fittings, First Stage, L.H. (Shown)
	GA6586	-	Arm W/Grease Fittings, First Stage, R.H.
	G10641	-	Grease Fitting, 1/8" NPT
8.	GA5526	1	Safety Lockup W/Detent Pins (Sub GA8170)
	G10536	-	Detent Pin, 1/2" x 2 1/2" Grip
9.		-	See "Marker Cylinder", Pages P57 And P58
10.	G10008	4	Hex Head Cap Screw, 5/8"-11 x 2"
	G10230	4	Lock Washer, 5/8"
	G10205	4	Washer, 5/8" SAE
	G10104	4	Hex Nut, 5/8"-11
11.	GD0752-41	-	Sleeve, 1" (If Applicable)
12.	GD15386	1	Pin, 1 1/4" x 7 5/8"
	G10460	1	Cotter Pin, 1/4" x 2"
13.	GD5875	1	Hose Clamp, 9/16" x 2 1/2" x 2"
14.	G10003	1	Hex Head Cap Screw, 3/8"-16 x 1 1/2"
	G10229	1	Lock Washer, 3/8"
	G10101	1	Hex Nut, 3/8"-16
15.	GD0652	1	Pin, 1 1/4" x 9 1/2"
	G10460	2	Cotter Pin, 1/4" x 2"
16.	GA6859	1	Mount, L.H.
17.	GA6858	-	Mount, R.H.

ROW MARKER SPINDLE/HUB/BLADE

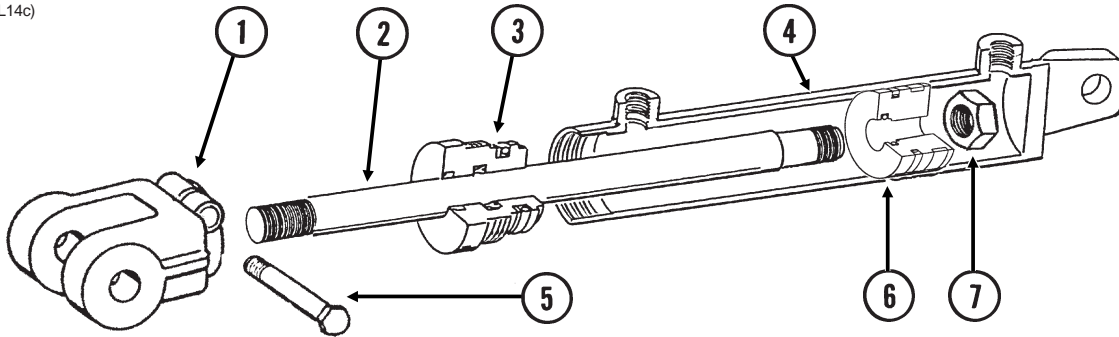
MKR020(MKR4a)



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, Grade 8
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)

ROTATION CYLINDER

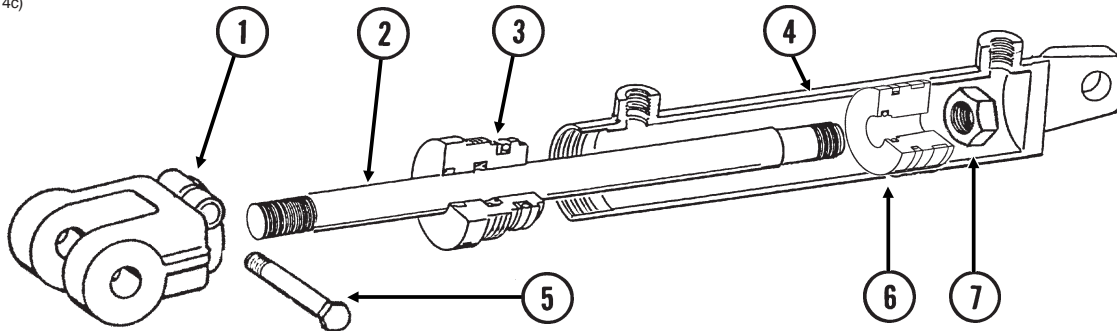
CYL032(CYL14c)



ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Cylinder)	
1.	GD11950	1	Clevis
2.	GD9241	1	Rod
3.	GD5951	1	Gland
4.	A6524	1	Barrel (Non-Stock Item)
5.	G10939	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 2 $\frac{1}{4}$ "
	G10108	1	Lock Nut, $\frac{3}{8}$ "-16
6.	GD9239	1	Piston
7.	G10958	1	Lock Nut, 1"-14
A.	GA6349	-	Cylinder Complete, 3" x 16" <i>(Part Number Stamped On Barrel)</i>
			(Sub GA8911)
B.	GR1185	-	Seal Kit, Includes: (1) Wear Ring, (1) Uniring, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper

ROTATION CYLINDER

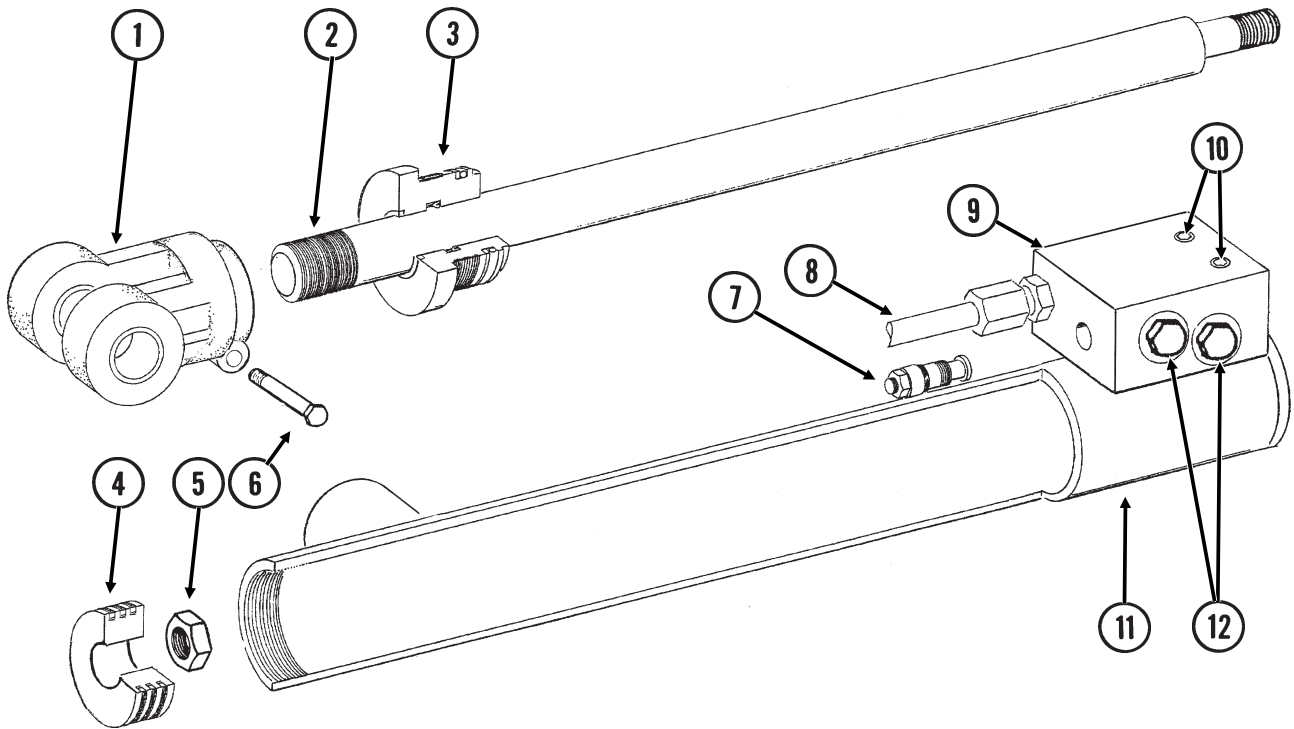
CYL032(CYL14c)



ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Cylinder)	
1.	GD11950	1	Clevis
2.	GD12501	1	Rod
3.	GD11999	1	Gland
4.	A6524	1	Barrel (Non-Stock Item)
5.	G10939	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 2 $\frac{1}{4}$ "
	G10108	1	Lock Nut, $\frac{3}{8}$ "-16
6.	GD12502	1	Piston
7.	G10958	1	Lock Nut, 1"-14
A.	GA8911	-	Cylinder Complete, 3" x 16" <i>(Part Number Stamped On Barrel)</i>
B.	GR1526	-	Seal Kit, Includes: (1) Wear Ring, (1) T-Seal, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper

LIFT CYLINDER

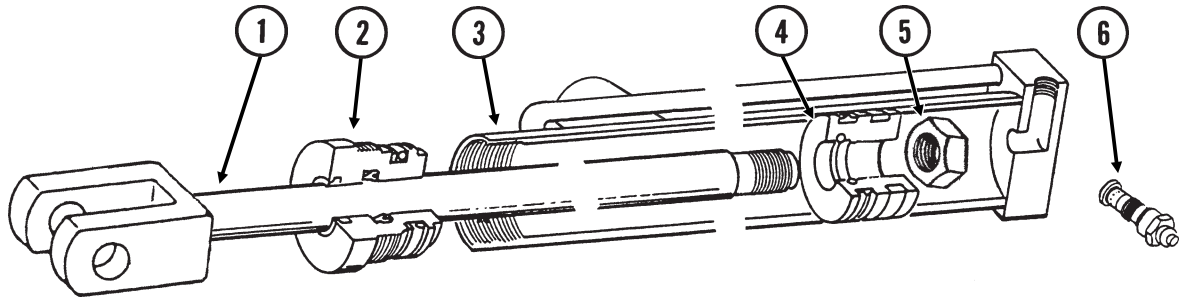
(CYL54a)



ITEM	PART NO.	QTY.	DESCRIPTION
(Per Cylinder)			
1.	GD11950	1	Clevis
2.	GD11957	1	Rod
3.	GD12518	1	Gland
4.	GD11253	1	Piston
5.	G10958	1	Lock Nut, 1"-14
6.	G10939	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 2 $\frac{1}{4}$ "
	G10108	1	Lock Nut, $\frac{3}{8}$ "-16
7.	GA8882	1	Counter Balance Valve
	GR1517	-	Seal Kit For Counter Balance Valve, Includes: (3) O-Rings, (3) BU Rings
8.	GA8888	1	Steel Hydraulic Line, 43 $\frac{11}{16}$ "
9.	GD11579	1	Block
10.	G10932	2	Hex Socket Head Cap Screw, $\frac{5}{16}$ "-18 x 2", Grade 8
11.	GA8884	1	Barrel
12.	G6408-08	2	Plug W/O-Ring, $\frac{3}{4}$ "-16 O-Ring
	GR1037	-	O-Ring
A.	GA8885	-	Cylinder Complete, 3" x 48" (Part Number Stamped On Barrel)
B.	GR1520	-	Seal Kit (For Cylinder And Counter Balance Valve), Includes: (1) Wiper, (1) U-Cup, (6) O-Rings, (4) BU Rings, (1) Seal, (1) Seal Expander, (2) Cast Iron Rings

LIFT CYLINDER

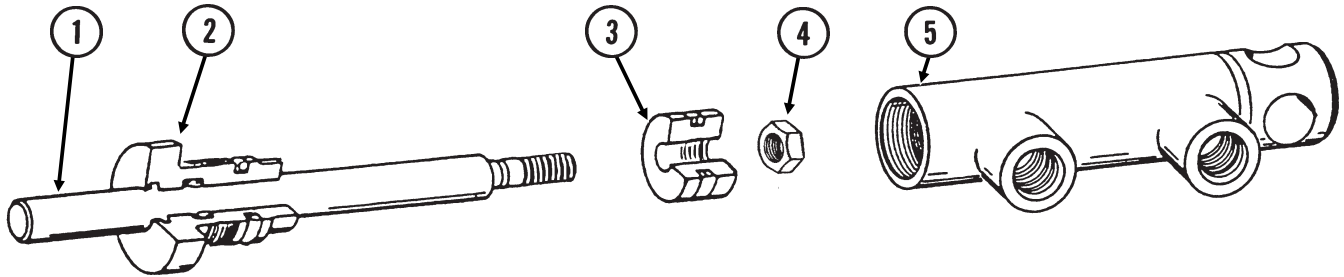
CYL054/RH(CYL24b)



ITEM	PART NO.	QTY.	DESCRIPTION
			(Per Cylinder)
1.	GA6523	1	Rod Assembly
2.	GD6574	1	Gland
3.	GA6522	1	Barrel
4.	GD9238	1	Piston
5.	GR0983	1	Lock Nut, 1"-14
6.	GR1183	1	Counter Balance Valve
A.	GA6350	-	Cylinder Complete, 3" x 48" (Part Number Stamped On Barrel) (Sub GA8885)
B.	GR1184	-	Seal Kit, Includes: (1) Wear Ring, (1) Uniring, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper For Cylinder And (3) O-Rings, (3) BU Rings For Counter Balance Valve

TRANSPORT LATCH CYLINDER, ALL SIZES

CYL035/CYL050(CYL9b)



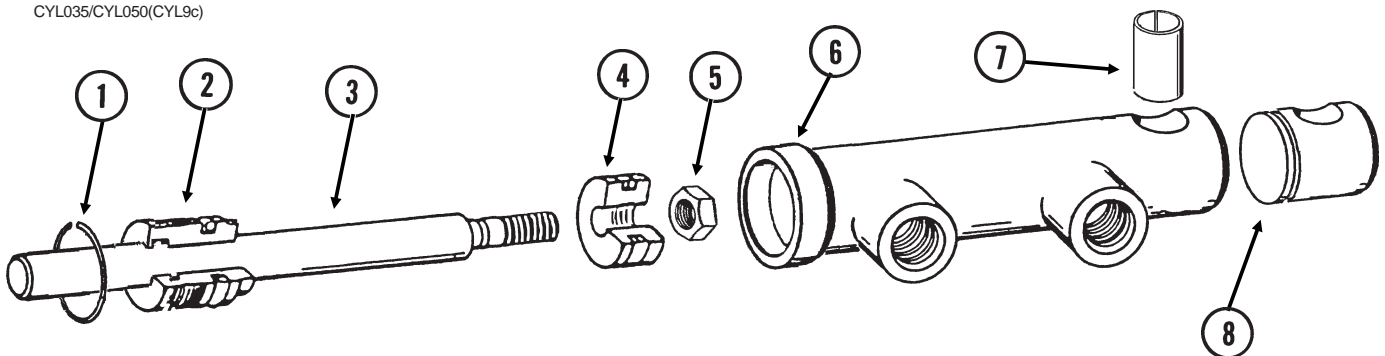
ITEM	PART NO.	QTY.	DESCRIPTION
------	----------	------	-------------

(Per Cylinder)

1.	GD7124	1	Rod
2.	GD7122	1	Gland
3.	GD7120	1	Piston
4.	GR0999	1	Lock Nut, 1/2"-20
5.	A6020	1	Barrel (Non-Stock Item)
A.	GA4309	-	Cylinder Complete, 1 1/2" x 2 1/2"
B.	GR1001	-	Seal Kit, Includes: (2) O-Rings, (1) U-Cup, (1) Rod Wiper, (1) T-Seal

TRANSPORT LATCH CYLINDER, ALL SIZES

CYL035/CYL050(CYL9c)

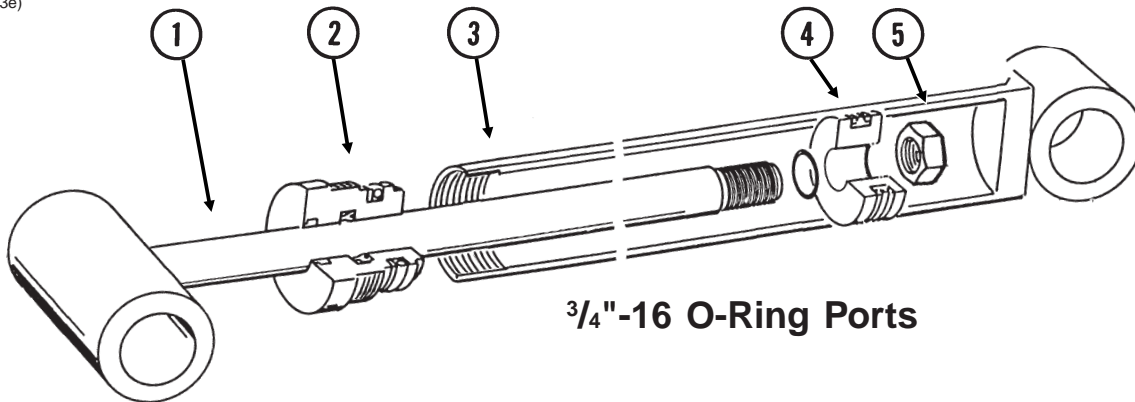


ITEM	PART NO.	QTY.	DESCRIPTION
------	----------	------	-------------

1.	G10770	1	Internal Retaining Ring, 1 11/16"
2.	GD13170	1	Gland
3.	GD13425	1	Rod
4.	GD13172	1	Piston
5.	G11016	1	Lock Nut, 1/2"-20
6.	D13426	1	Barrel (Non-Stock Item)
7.	GD13400	1	Tension Bushing, 1" x 2" Long
8.	GD13173	1	End Cap
A.	GA9559	-	Cylinder Complete, 1 1/2" x 2 1/2" (Part Number Stamped On Barrel)
B.	GR1598	-	Seal Kit, Includes: (3) O-Rings, (2) BU Rings, (1) Rod Wiper, (1) T-Seal, (1) Bronze Bushing, (1) Seal, (1) U-Cup

MARKER CYLINDER

CYL039(CYL3e)



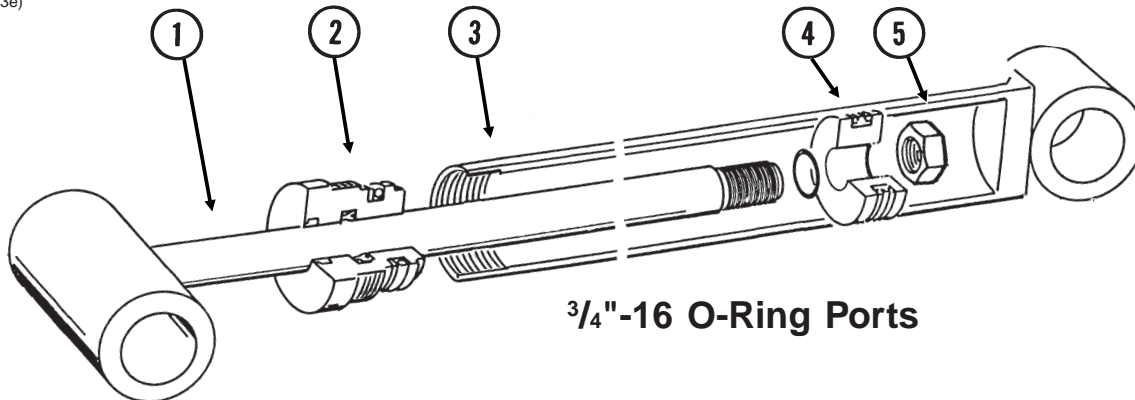
ITEM	PART NO.	QTY.	DESCRIPTION
------	----------	------	-------------

(Per Cylinder)

1.	GA9440	1	Rod Assembly
2.	GD12510	1	Gland
3.	A9442	1	Barrel (Non-Stock Item)
4.	GD12511	1	Piston
5.	G10967	1	Lock Nut, 3/4"-16
A.	GA9443	-	Cylinder Complete, 2" x 20 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

MARKER CYLINDER

CYL039(CYL3e)



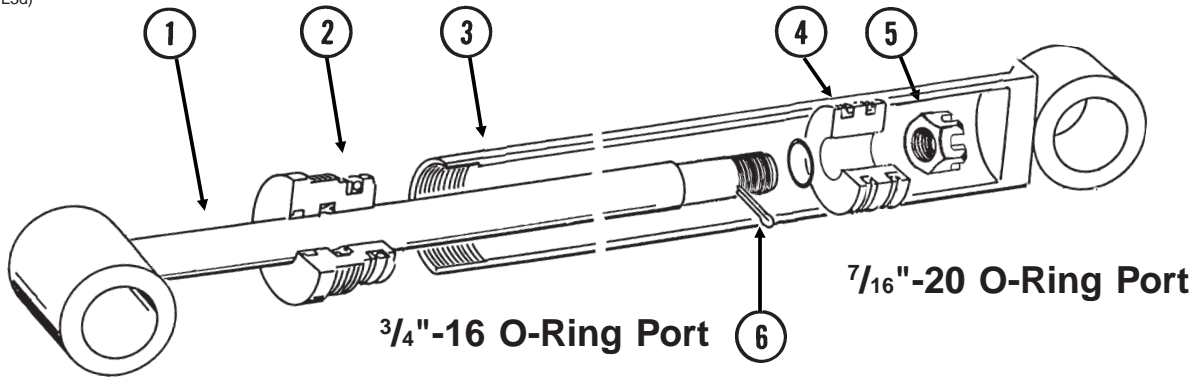
ITEM	PART NO.	QTY.	DESCRIPTION
------	----------	------	-------------

(Per Cylinder)

1.	GA5459	1	Rod Assembly
2.	GD5949	1	Gland
3.	A5460	1	Barrel (Non-Stock Item)
4.	GD4632	1	Piston
5.	GR0959	1	Lock Nut, 3/4"-16
A.	GA5097	-	Cylinder Complete, 2" x 20 1/16" (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 (Cushion) CYLINDER

CYL039(CYL3d)

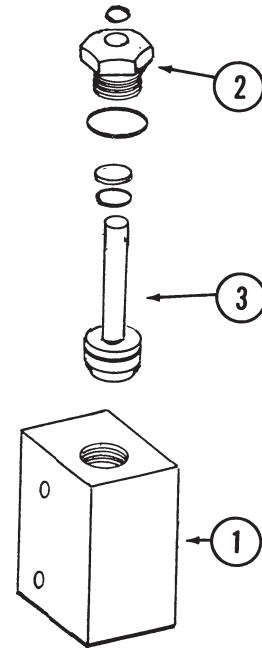


ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Cylinder)	
1.	GA8871	1	Rod Assembly
2.	GD10207	1	Gland
3.	A7524	1	Barrel (Non-Stock Item)
4.	GD11983	1	Piston
5.	G10962	1	Slotted Hex Nut, $\frac{7}{8}$ "-14
6.	G10827	1	Cotter Pin, $\frac{1}{8}$ " x $1 \frac{3}{4}$ "
A.	GA8895	-	Cylinder Complete, $2 \frac{1}{2}$ " 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

STROKE LIMITER VALVE

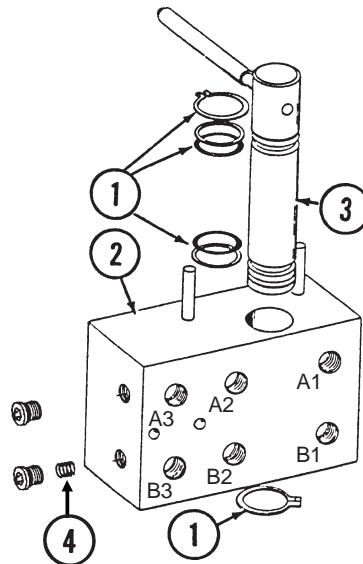
VVB027rev(TWL55)

ITEM	PART NO.	QTY.	DESCRIPTION
1.		1	Block (Non-Stock Item)
2.	GR1281	1	Adapter Plug
3.	GR1282	1	Piston Rod And Poppet Assembly
A.	GA6884	-	Stroke Limiter Valve Complete
B.	GR1289	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring, (1) Seal



SELECTOR VALVE

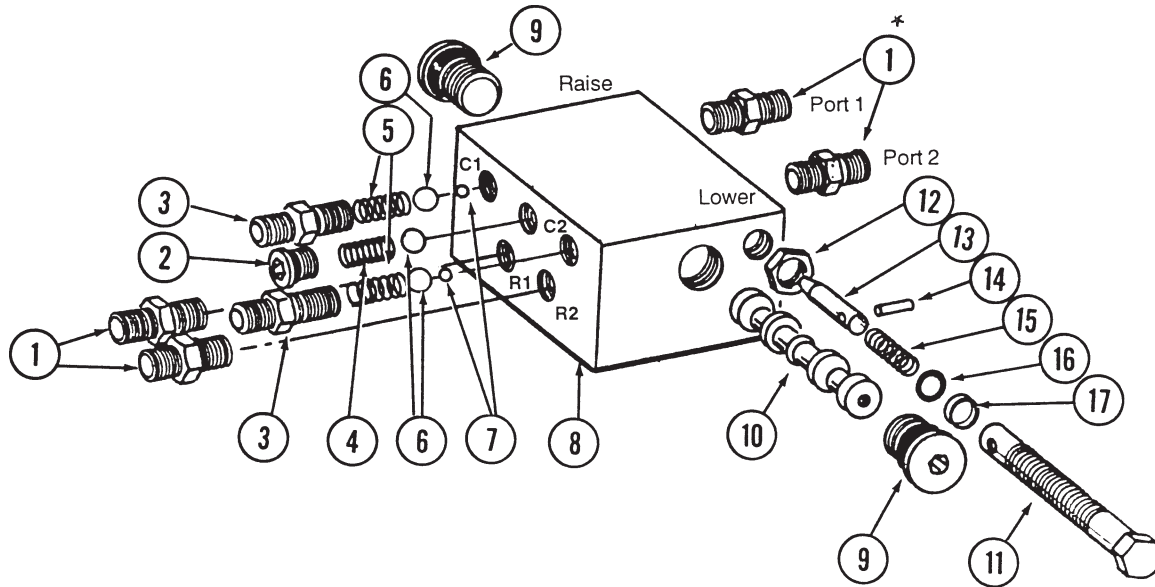
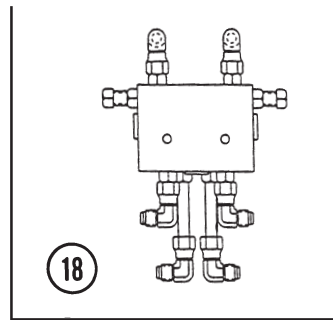
VVB028(EF8a)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1096	1	Seal Kit, Includes: (2) Retaining Rings, (2) O-Rings, (2) BU Rings
2.		1	Block (Non-Stock Item)
3.	GR1177	1	Spool W/Handle
4.	GR1178	1	Restrictor
A.	GA6438	-	Valve Assembly

ROW MARKER SEQUENCING/FLOW CONTROL VALVE

VVB025(PT9a/TWL56)



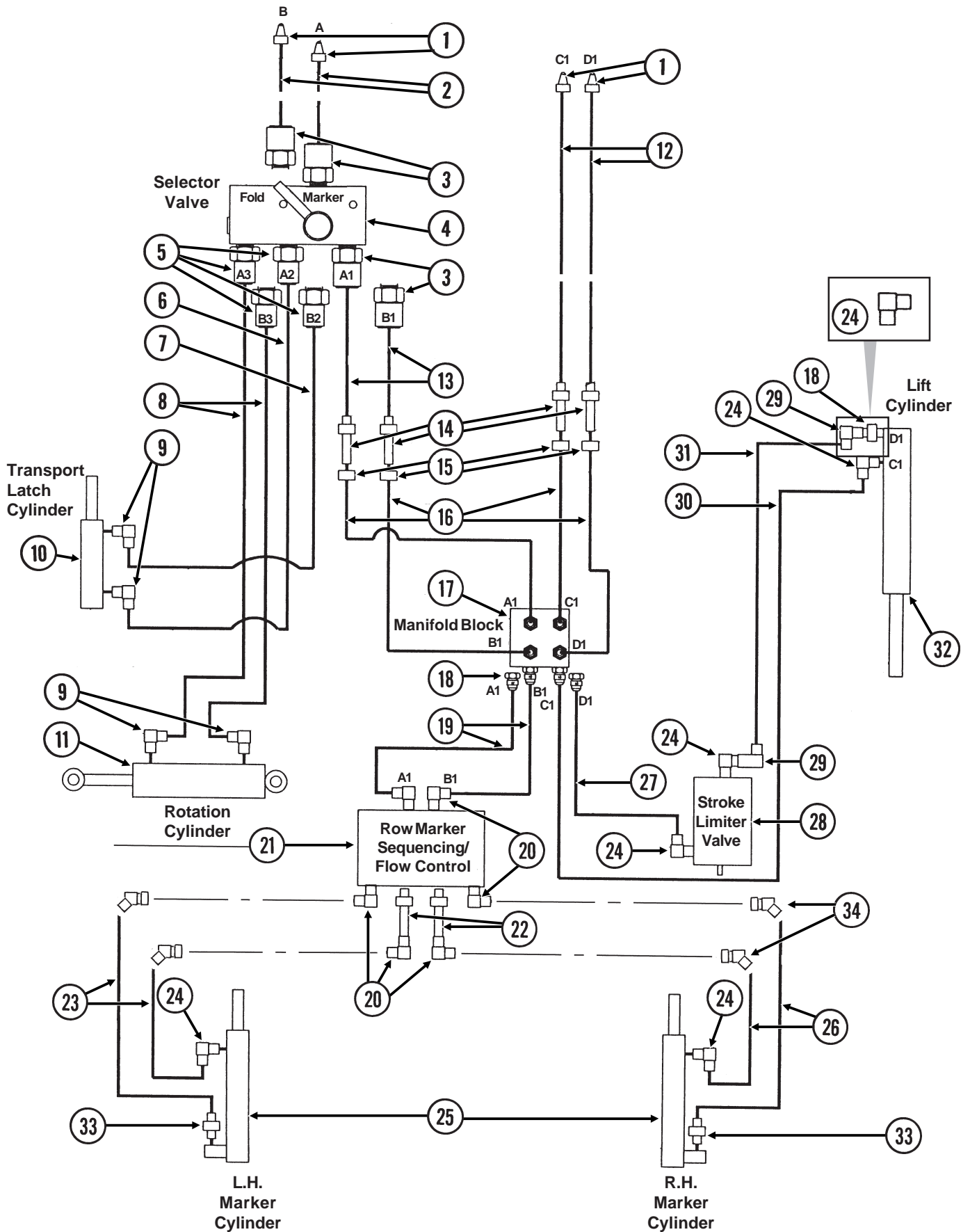
ROW MARKER SEQUENCING/FLOW CONTROL VALVE

ITEM	PART NO.	QTY.	DESCRIPTION
1.	*G6400-06	4	Connector W/O-Ring, $\frac{9}{16}$ "-18 Male JIC To O-Ring
	GR1045	-	O-Ring
2.	GR1034	2	Hex Socket Plug W/O-Ring
	GR1035	-	O-Ring
3.	GR1032	2	Port Adapter W/O-Ring
	GR1045	-	O-Ring
4.	GR1033	1	Detent Spring
5.	GR1036	2	Spring
6.	GR1044	3	$\frac{7}{16}$ " Check Ball
7.	GR1043	2	$\frac{1}{4}$ " Steel Ball
8.		1	Valve Body (Non-Stock Item)
9.	GR1047	2	Hex Socket Plug W/O-Ring
	GR1037	-	O-Ring
10.		-	Spool (Non-Stock Item)
11.	GR1042	2	Adjustment Screw
12.	GR1048	2	Hex Jam Nut, $\frac{1}{2}$ "-20
13.	GR1038	2	Needle
14.	GR1039	2	Spring Pin
15.	GR1046	2	Compression Spring
16.	GR1040	2	O-Ring
17.	GR1041	2	Teflon BU Ring
18.		-	See "Hydraulic System", Pages P62 And P63
A.	GA5552	-	Valve Assembly Complete (Items 1-17)
B.	GA5572	-	Flow Control Portion Only (Items 11-17)

*Not used.

HYDRAULIC SYSTEM

A6499-2(TWL92c/TWL92b)



HYDRAULIC SYSTEM

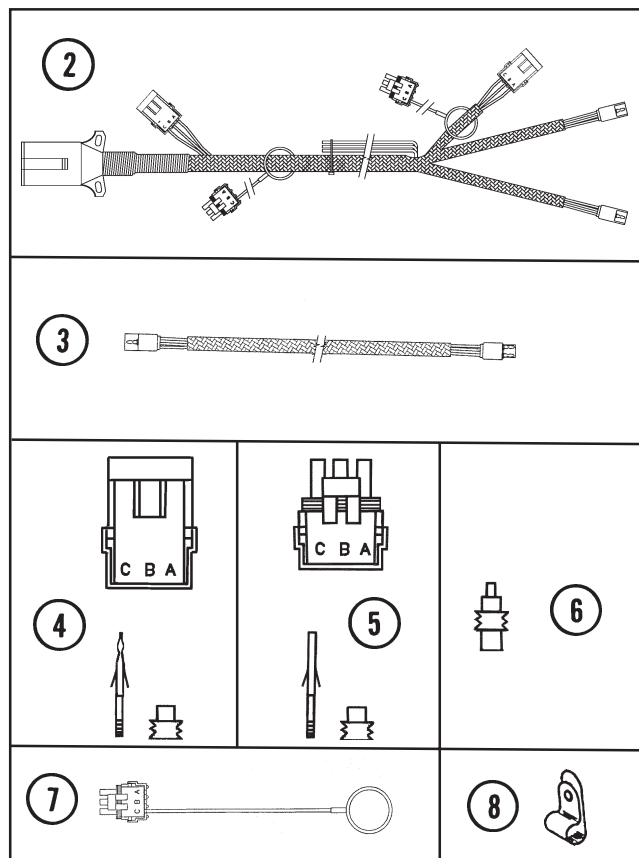
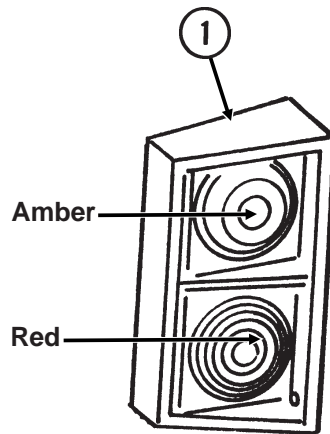
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD4086	4	ISO Coupler
2.	*A3210	2	Hose Assembly, $\frac{3}{8}$ " x 88"
3.	G6400-08-06	4	Connector W/O-Ring, $\frac{3}{4}$ "-16 Male JIC To $\frac{9}{16}$ "-18 O-Ring
	GR1045	-	O-Ring
4.		-	See "Selector Valve", Page P59
5.	G6400-06	4	Connector W/O-Ring, $\frac{9}{16}$ "-18 Male JIC To O-Ring
	GR1045	-	O-Ring
6.	*A1153	1	Hose Assembly, $\frac{1}{4}$ " x 56", 6 Row 30"
	*A1194	-	Hose Assembly, $\frac{1}{4}$ " x 30", 8 Row 30"
7.	*A1141	1	Hose Assembly, $\frac{1}{4}$ " x 62", 6 Row 30"
	*A1195	-	Hose Assembly, $\frac{1}{4}$ " x 34", 8 Row 30"
8.	*A1107	2	Hose Assembly, $\frac{1}{4}$ " x 140"
9.	G6801-06-08	4	Elbow W/O-Ring, 90°, $\frac{9}{16}$ "-18 Male JIC To $\frac{3}{4}$ "-16 O-Ring
	GR1037	-	O-Ring
10.		-	See "Transport Latch Cylinder", Page P56
11.		-	See "Rotation Cylinder", Page P53
12.	*A3183	2	Hose Assembly, $\frac{3}{8}$ " x 246"
13.	*A1026	2	Hose Assembly, $\frac{3}{8}$ " x 152"
14.	G2700-08	4	Bulkhead Tube Union, $\frac{3}{4}$ "-16 Male JIC
15.	G306-08	4	Lock Nut, $\frac{3}{4}$ "-16
16.	*A1021	4	Hose Assembly, $\frac{3}{8}$ " x 56"
17.		-	See "Frame Assembly", Pages P38 And P39
18.	G6400-08	8-9	Connector W/O-Ring, $\frac{3}{4}$ "-16 Male JIC To O-Ring
	GR1037	-	O-Ring
19.	*A1002	2	Hose Assembly, $\frac{3}{8}$ " x 20"
20.	G6500-08-06	6	Swivel Elbow, 90°, $\frac{3}{4}$ "-16 Male JIC To $\frac{9}{16}$ "-18 Female
21.		-	See "Row Marker Sequencing/Flow Control Valve", Pages P60 And P61
22.	G6400-L-06	2	Long Connector W/O-Ring, $\frac{9}{16}$ "-18 Male JIC To O-Ring
	GR1045	-	O-Ring
23.	*A3137	2	Hose Assembly, $\frac{3}{8}$ " x 140", 6 Row 30"
	*A3105	-	Hose Assembly, $\frac{3}{8}$ " x 170", 8 Row 30"
24.	G6801-08	5-6	Elbow W/O-Ring, 90°, $\frac{3}{4}$ "-16 Male JIC To O-Ring
	GR1037	-	O-Ring
25.		-	See "Marker Cylinder", Pages P57 And P58
26.	*A1041	2	Hose Assembly, $\frac{3}{8}$ " x 130", 6 Row 30"
	*A1090	-	Hose Assembly, $\frac{3}{8}$ " x 162", 8 Row 30"
27.	*A1076	1	Hose Assembly, $\frac{3}{8}$ " x 30"
28.		-	See "Stroke Limiter Valve", Page P59 And "Frame Assembly", Pages P38 And P39
29.	G6500-08	1-2	Swivel Elbow, 90°, $\frac{3}{4}$ "-16 Male JIC To Female
30.	*A1055	3	Hose Assembly, $\frac{3}{8}$ " x 66"
31.	*A1018	1	Hose Assembly, $\frac{3}{8}$ " x 40"
32.		-	See "Lift Cylinder", Pages P54 And P55
33.	G6400-08	2	Connector W/O-Ring, $\frac{3}{4}$ "-16 Male JIC To O-Ring
	GR1037	-	O-Ring
	G6400-08-04	2	Connector W/O-Ring, $\frac{3}{4}$ "-16 Male JIC To $\frac{7}{16}$ "-20 O-Ring
	GR1465	-	O-Ring
34.	G6502-08	4	Swivel Elbow, 45°, $\frac{3}{4}$ "-16 Male JIC To Female

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

ELECTRICAL COMPONENTS

(TWL23/A9152/ELC38/ELC8/MTR27a/ELC39)

See "Frame Assembly", Pages P38 and P39 for light brackets.



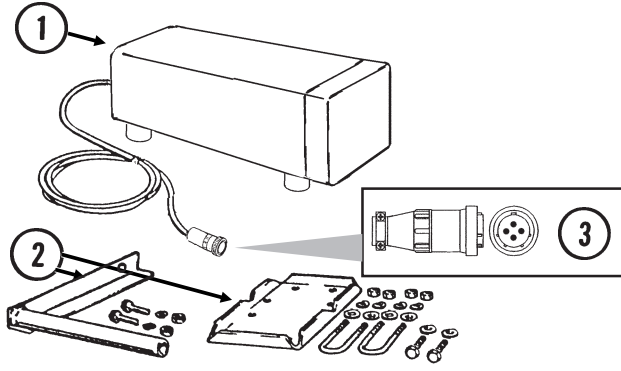
ELECTRICAL COMPONENTS

ITEM	PART NO.	QTY.	DESCRIPTION
1.	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
2.	GA9152	-	Wiring Harness W/7 Terminal Female Connector, 516" (2 Light Connections), 6 Row 30"
	GA9153	-	Wiring Harness W/7 Terminal Female Connector, 564" (2 Light Connections), 8 Row 30"
	GA5385	-	7 Terminal Female Connector
3.	GA9096	2	Harness Extension, 42"
4.	G1K248	-	3-Pin Female Connector Kit, Includes: (3) 3-Pin Female Housings, (9) Pin Contacts, (9) Seals
5.	G1K252	-	3-Pin Male Connector Kit, Includes: (3) 3-Pin Male Housings, (9) Socket Contacts, (9) Seals
6.	GD11089	-	Sealing Plug
7.	GA8047	-	Dust Plug (Black)
8.	GD6291	1-2	Insulated Clamp, ³ / ₈ "

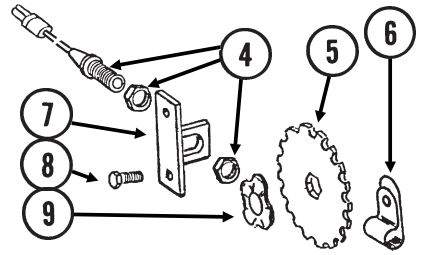
KPM I/KPM II ELECTRONIC SEED MONITOR

(MTR27z)

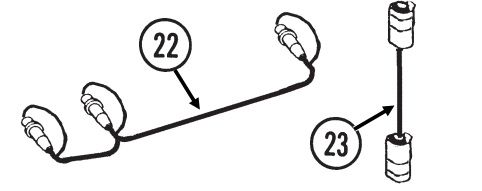
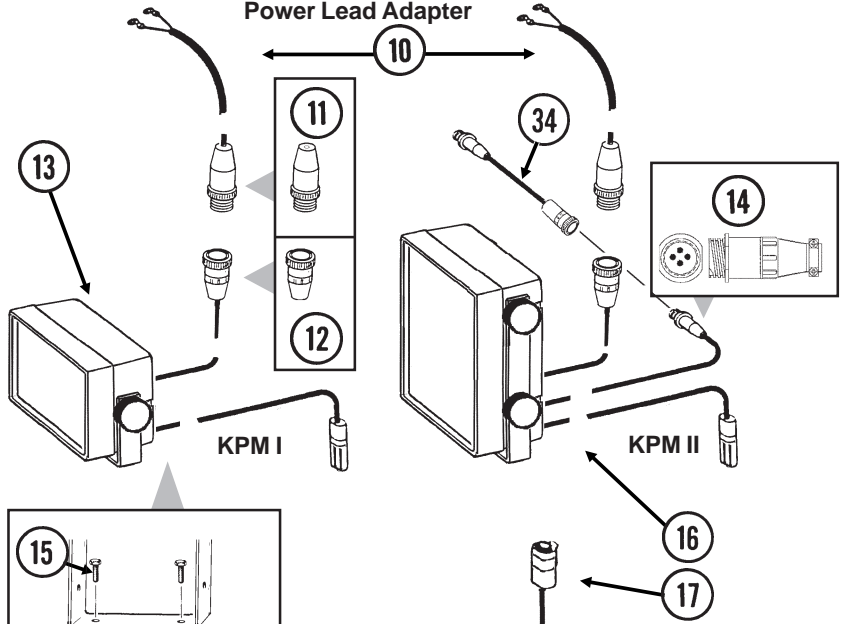
Radar Distance Sensor (KPM II ONLY)



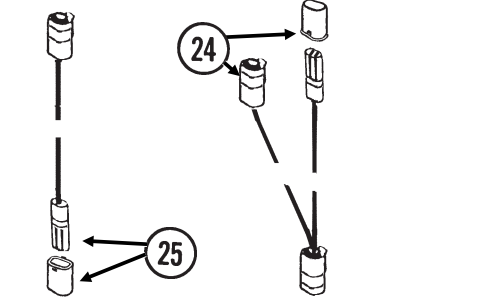
Magnetic Distance Sensor (MDS) (KPM II ONLY)



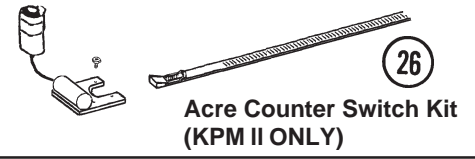
Power Lead Adapter



Radar Y-Cable Extension Harness

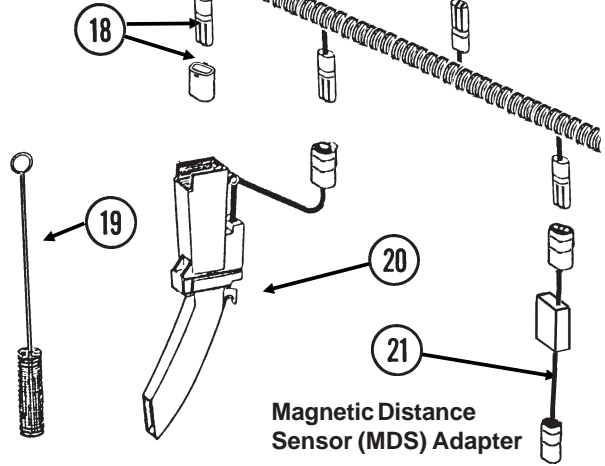


Extension Harness Junction Y-Harness

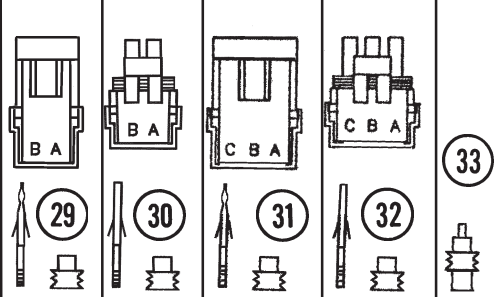
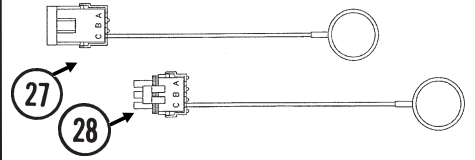


Acre Counter Switch Kit (KPM II ONLY)

Planter Harness



Magnetic Distance Sensor (MDS) Adapter



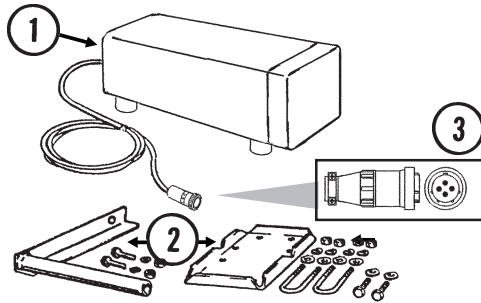
KPM I/KPM II ELECTRONIC SEED MONITOR

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.	G10001	2	Hex Head Cap Screw, 3/8"-16 x 1"
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
9.	GD8771	1	Spring Wave Washer
10.	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.	GA10570	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)
	GA10601	-	Fuse Holder
	GD7639	-	Fuse
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.	GA10575	-	KPM II Backlit Console W/Mounting Bracket, Power Lead Adapter (Item 10), Brush (Item 19), Dust Plug (Item 27) And Monitor/Radar Adapter (Item 34)
	GR1391	-	Mounting Bracket, KPM II
	GR1393	-	Console Mounting Bracket Hardware Package (Includes 4 Knobs And 1/4" Hardware)
	GA10601	-	Fuse Holder
	GD7639	-	Fuse
17.		-	Included In Planter Wiring Harnesses, See Item 2, Pages P64 And P65
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	-	Extension Harness, 1'
24.	GA7853	-	Junction 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 (Used W/KPM II Console Only)
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)

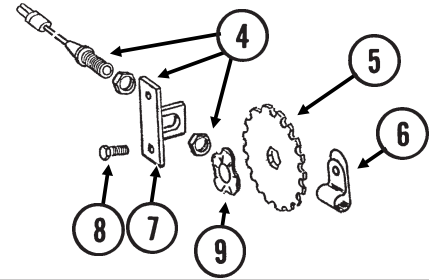
KPM II STACK-MODE ELECTRONIC SEED MONITOR

(MTR43h)

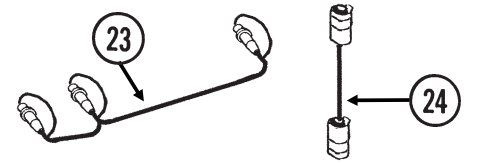
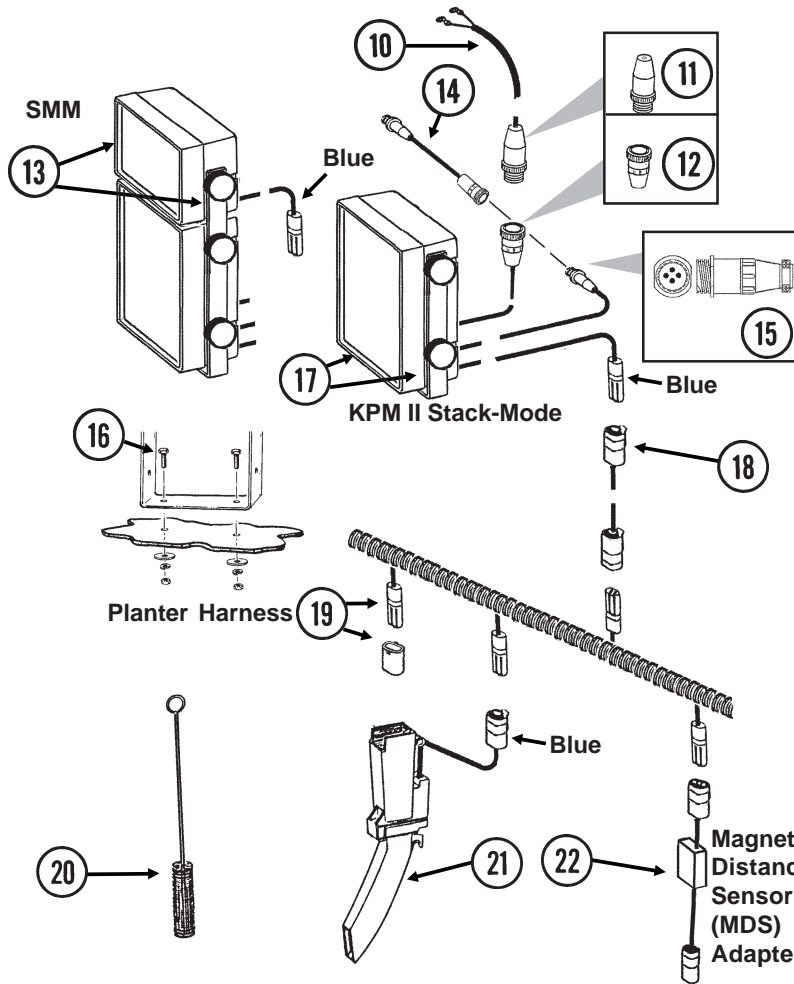
Radar Distance Sensor



Magnetic Distance Sensor (MDS)

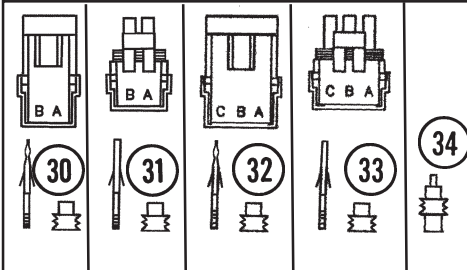
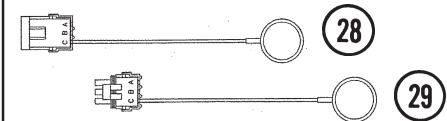
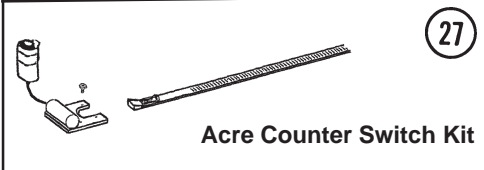
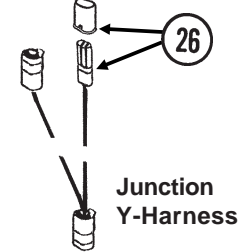


Power Lead Adapter



Radar Y-Cable

Extension Harness



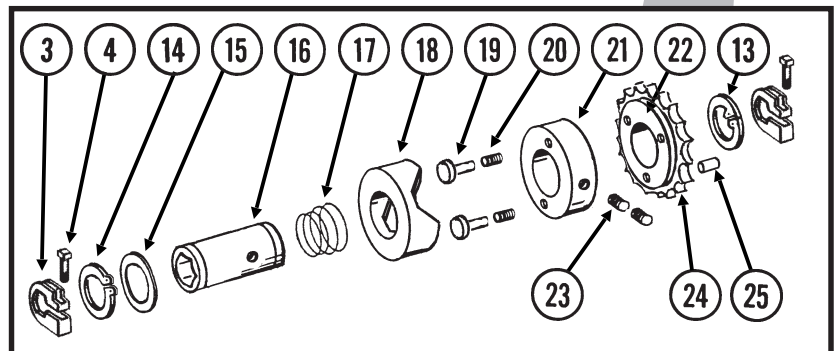
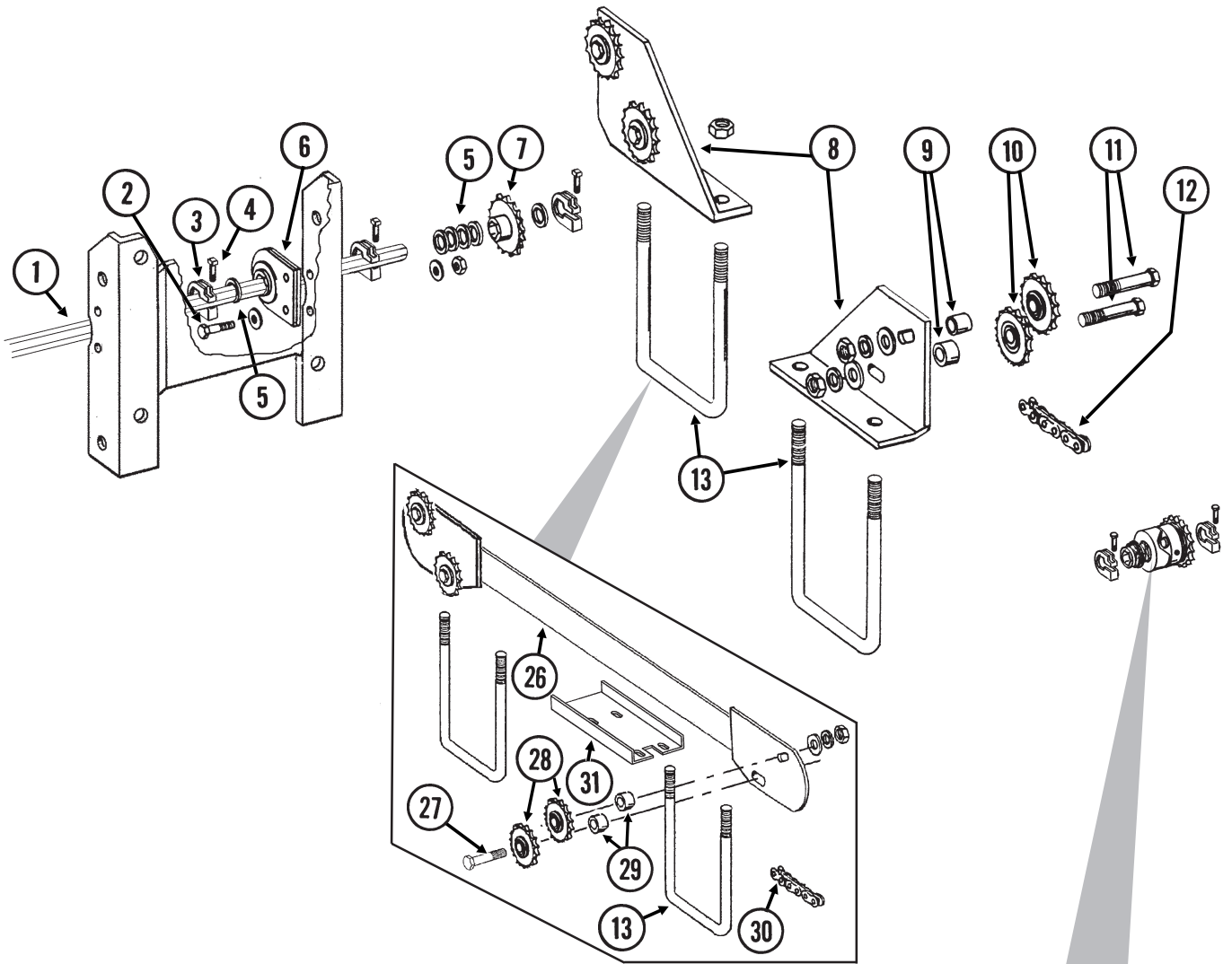
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA7858	-	Radar Distance Sensor W/20' Cable
2.	GA8026	-	Radar Sensor Pipe/Mounting Bracket Package
3.	G1K323	-	4-Pin Connector Kit W/Female Housing, 4 Pins And Cable Clamp
4.	GA5600	1	Magnetic Distance Sensor
5.	GD8751	-	Magnetic Distance Sensor Pulse Wheel
6.	GD6291	-	Insulated Clamp, 3/8"
7.	GD8770	1	Bracket
8.	G10001	2	Hex Head Cap Screw, 3/8"-16 x 1"
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
9.	GD8771	1	Spring Wave Washer

KPM II STACK-MODE ELECTRONIC SEED MONITOR

ITEM	PART NO.	QTY.	DESCRIPTION
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.	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)
14.	GA9144	-	Monitor/Radar Adapter, 10"
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.	GA10575	-	KPM II Stack-Mode Backlit Console W/Mounting Bracket, Power Lead Adapter (Item 10), Brush (Item 20), Dust Plug (Item 28) And Monitor/Radar Adapter, 10" (Item 14)
	GR1391	-	Mounting Bracket, KPM II
	GR1393	-	Console Mounting Bracket Hardware Package (Includes 4 Knobs And 1/4" Hardware)
	GA10601	-	Fuse Holder
	GD7639	-	Fuse
18.		-	Included In Planter Wiring Harness, See Item 2, Pages P64 And P65
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	-	Extension Harness, 1'
25.	GA7854	-	Extension Harness W/Dust Cap, 15'
	GA7855	-	Extension Harness W/Dust Cap, 30'
	GD11993	-	Dust Cap
26.	GA7853	-	Junction Y-Harness W/Dust Cap
	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

PTD073(TWL58d/TWL33k)

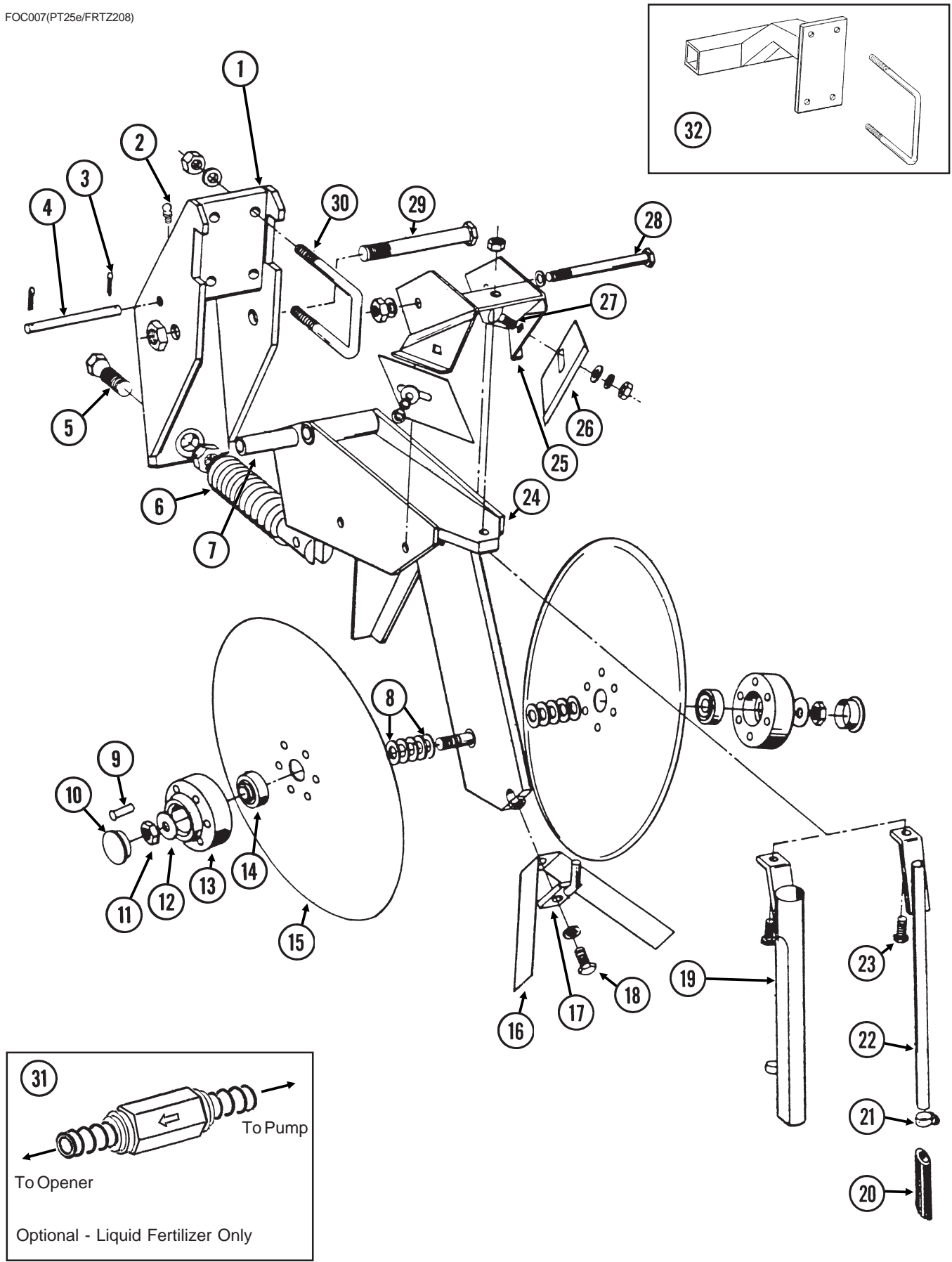


INTERPLANT® PUSH ROW UNIT DRIVE

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD0914-155	-	Hex Shaft, 7/8" x 155" (No Holes), 6 Row 30"
	GD0914-215	-	Hex Shaft, 7/8" x 215" (No Holes), 8 Row 30"
2.	G10001	-	Hex Head Cap Screw, 3/8"-16 x 1"
	G10229	-	Lock Washer, 3/8"
	G10101	-	Hex Nut, 3/8"-16
3.	GD11045	-	Lock Clamp
4.	G10130	-	Square Head Machine Bolt, 5/16"-18 x 1 3/4"
	G10923	-	Flange Nut, 5/16"-18, No Serration
5.	G10233	-	Machine Bushing, 1", 10 Gauge (As Required)
6.	GA2180	-	Hanger Bearing, 7/8" Hex Bore
7.	GA5107	2	Sprocket, 19 Tooth
8.	GD11569	2	Mount
9.	GD9229	4	Spacer, 1 1/4" O.D. x 1/2" Long
10.	GA7154	-	Sprocket W/Bearing, 18 Tooth
11.	G10581	4	Hex Head Cap Screw, 1/2"-13 x 2 1/4"
	G10216	4	Washer, 1/2" USS
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
12.	G3310-204	1	Chain, No. 40, 204 Pitch Including Connector Link (Used With 15 Tooth Idler Sprockets)
	G3310-208	-	Chain, No. 40, 208 Pitch Including Connector Link (Used With 18 Tooth Idler Sprockets)
	GR0912	-	Connector Link, No. 40
13.	GD8306	2	U-Bolt, 7" x 5" x 1/2"-13
	G10228	4	Lock Washer, 1/2"
	G10102	-	Hex Nut, 1/2"-13
14.	G10496	2	External Inverted Snap Ring, 1 1/2"
15.	GR1411	1	Shim
16.	GR1407	1	Drive Shaft
17.	GR1408	1	Compression Spring
18.	GR1409	1	Knurled Collar
19.	GR1410	1	Pin
20.	GR1413	1	Spring
21.	GR1405	1	Lock Collar
22.	GR1406	1	Bushing
23.	G10535	1	Hex Socket Set Screw, 3/8"-16 x 3/4"
24.	GR1412	1	Sprocket, 19 Tooth
25.	G10968	1	Spring Pin, 5/32" x 7/16"
26.	GA9138	1	Mount
27.	G10581	4	Hex Head Cap Screw, 1/2"-13 x 2 1/4"
	G10016	4	Hex Head Cap Screw, 1/2"-13 x 2"
	G10206	4-8	Washer, 1/2" SAE
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
28.	GA7154	4	Sprocket W/Bearing, 18 Tooth
29.	GD9229	4	Spacer, 1 1/4" O.D. x 1/2" Long (If Applicable)
30.	G3310-226	1	Chain, No. 40, 226 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
31.	GD14417	1	Hose Protector
A.	GA8092	-	Clutch Sprocket Assembly, 19 Tooth (Items 14-25)
B.	G1K269	-	Lock Clamp Kit (Items 3 And 4)
C.	G1K331	-	Clutch Sprocket Kit (Items 22, 24 And 25)

DOUBLE DISC FERTILIZER OPENER AND MOUNT

FOC007(PT25e/FRTZ208)

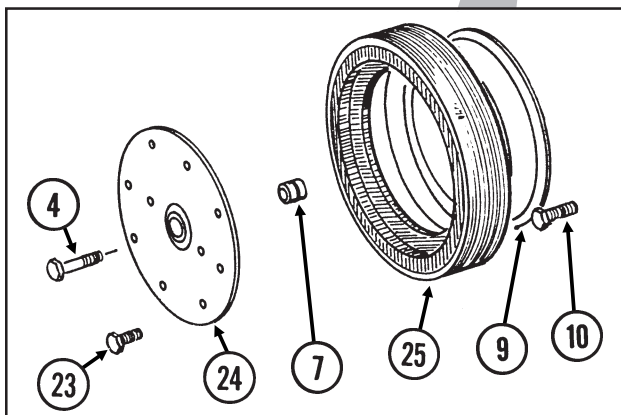
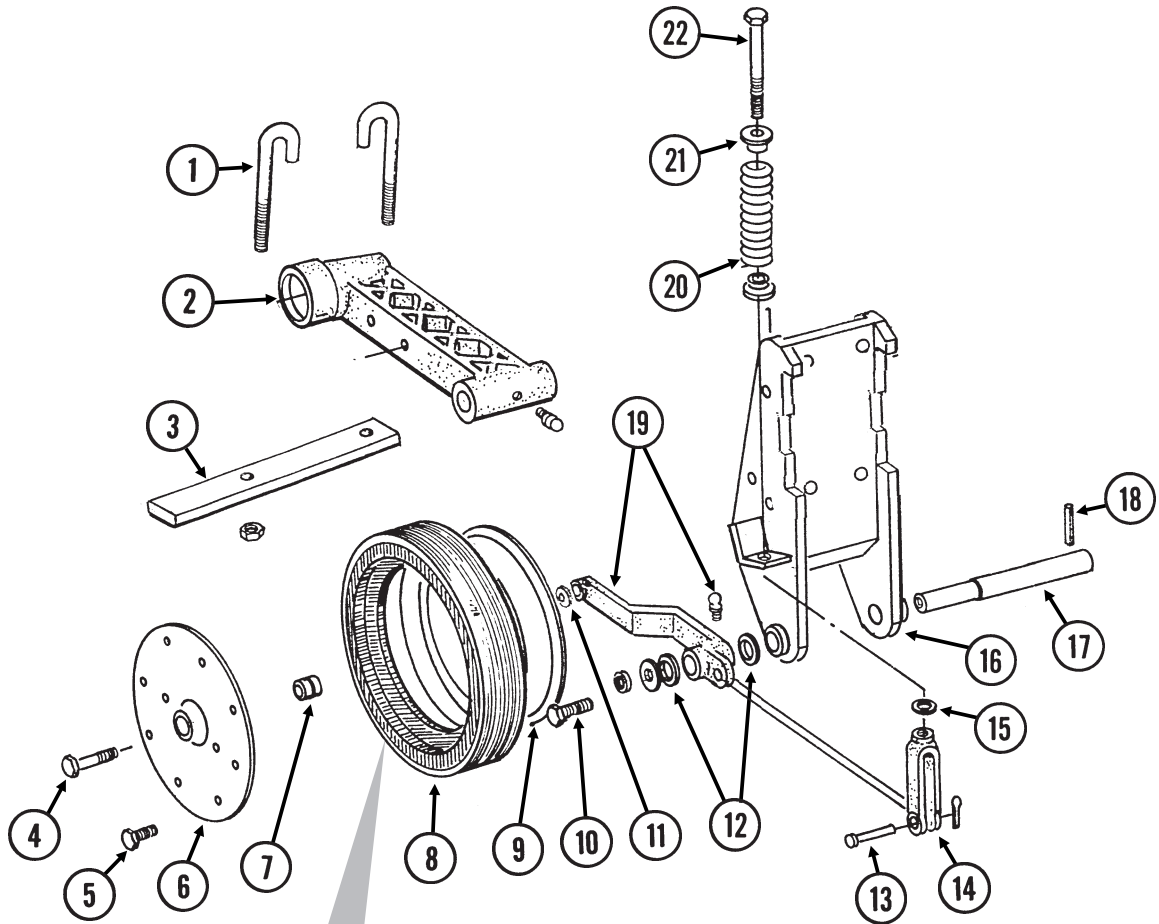


DOUBLE DISC FERTILIZER OPENER AND MOUNT

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	GA8483	1	Bracket
2.	G10938	1	Grease Fitting, 1/4"-28, Taper 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, 3.5 mm x 15"
16.	GD2589	1	Inner Scraper
17.	GA0312	1	Mount
18.	G10019	1	Hex Head Cap Screw, 5/16"-18 x 1"
	G10232	1	Lock Washer, 5/16"
19.	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	-	Washer, 5/16" SAE
	G10109	1	Lock Nut, 5/16"-18, Grade 8
24.	GA9195	1	Shank
25.	GA0810	1	Scraper Mount
26.	GD1673	2	Scraper
27.	G10305	2	Carriage Bolt, 3/8"-16 x 1"
	G10210	2	Washer, 3/8" USS
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
28.	G10045	1	Hex Head Cap Screw, 1/2"-13 x 4 1/2"
	G10111	1	Lock Nut, 1/2"-13
29.	G10046	1	Hex Head Cap Screw, 5/8"-11 x 5"
	G10107	1	Lock Nut, 5/8"-11
30.	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
32.	GA7135	-	Mount (One Per Opener) W/U-Bolts
	GD1113	-	U-Bolt, 5" x 7" x 5/8"-11
	G10230	-	Lock Washer, 5/8"
	G10104	-	Hex Nut, 5/8"-11
A.	GA8845	-	Disc Blade And Bearing Assembly (Items 9 And 13-15)

HD SINGLE DISC FERTILIZER OPENER (Soil Press Wheel)

FOC016/FOC007(PT35b/PT35c)

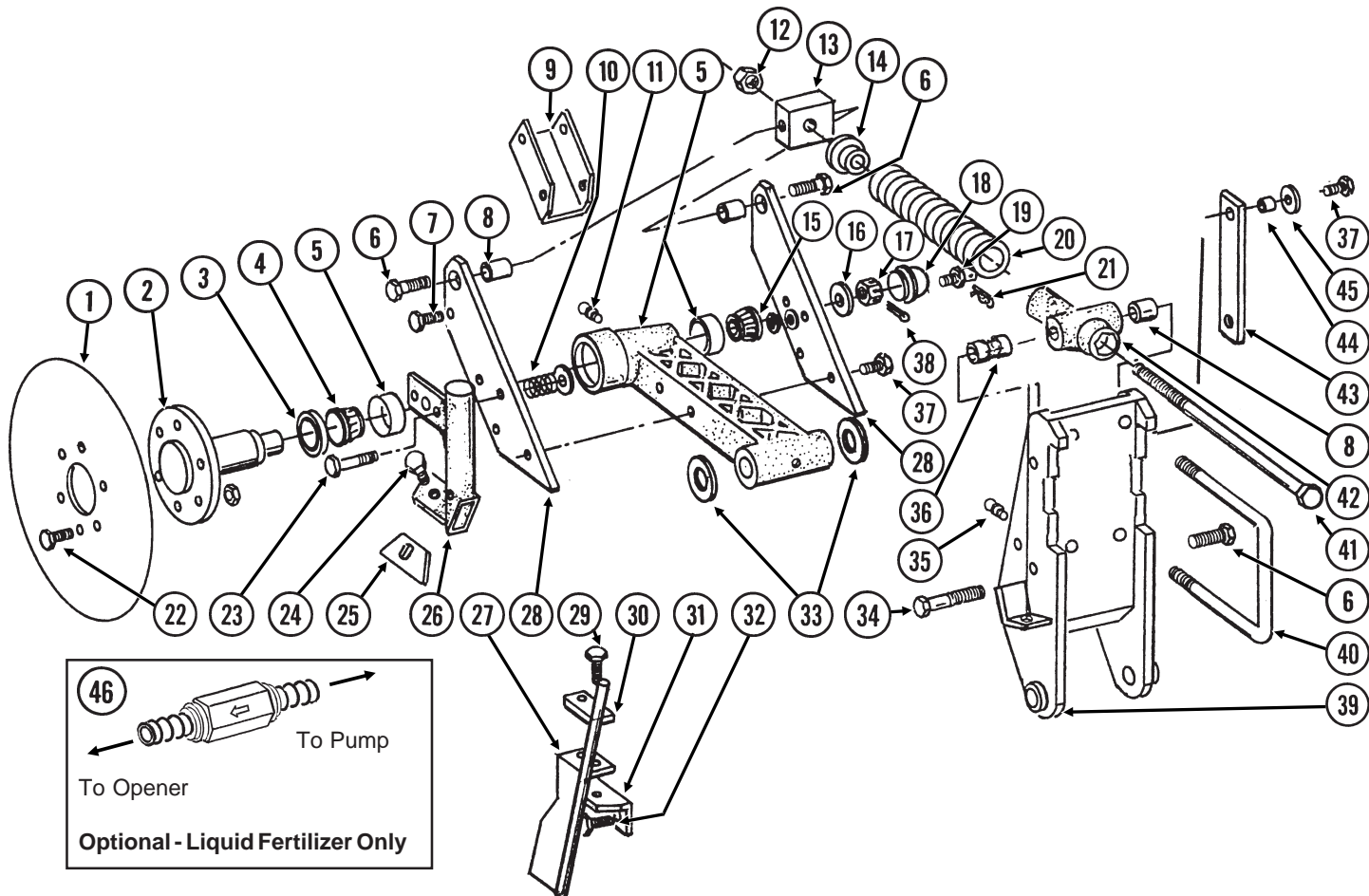


HD SINGLE DISC FERTILIZER OPENER (Soil Press Wheel)

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 P76 And P77
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, Grade 8
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 P76 And P77
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	Serrated 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"
	GD8247	-	Disc Blade, 20" (Optional)
2.	GB0205	1	Spindle
3.	GA4286	1	Seal
4.	GA4287	1	Bearing
5.	GA5887	1	Arm W/Cups And Washers
	GD6553	-	Inner Cup
	GR0188	-	Outer Cup
	G10205	3	Washer, 5/8" SAE
6.	G10007	3	Hex Head Cap Screw, 5/8"-11 x 1 1/2"
7.	G10001	2	Hex Head Cap Screw, 3/8"-16 x 1"
	G10108	2	Lock Nut, 3/8"-16
8.	GB0218	3	Bushing, 2 1/32" I.D. x 7/8" O.D. x 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

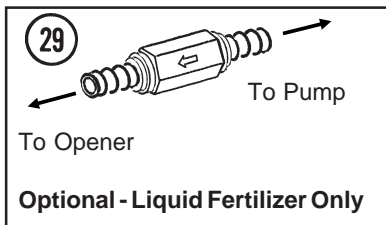
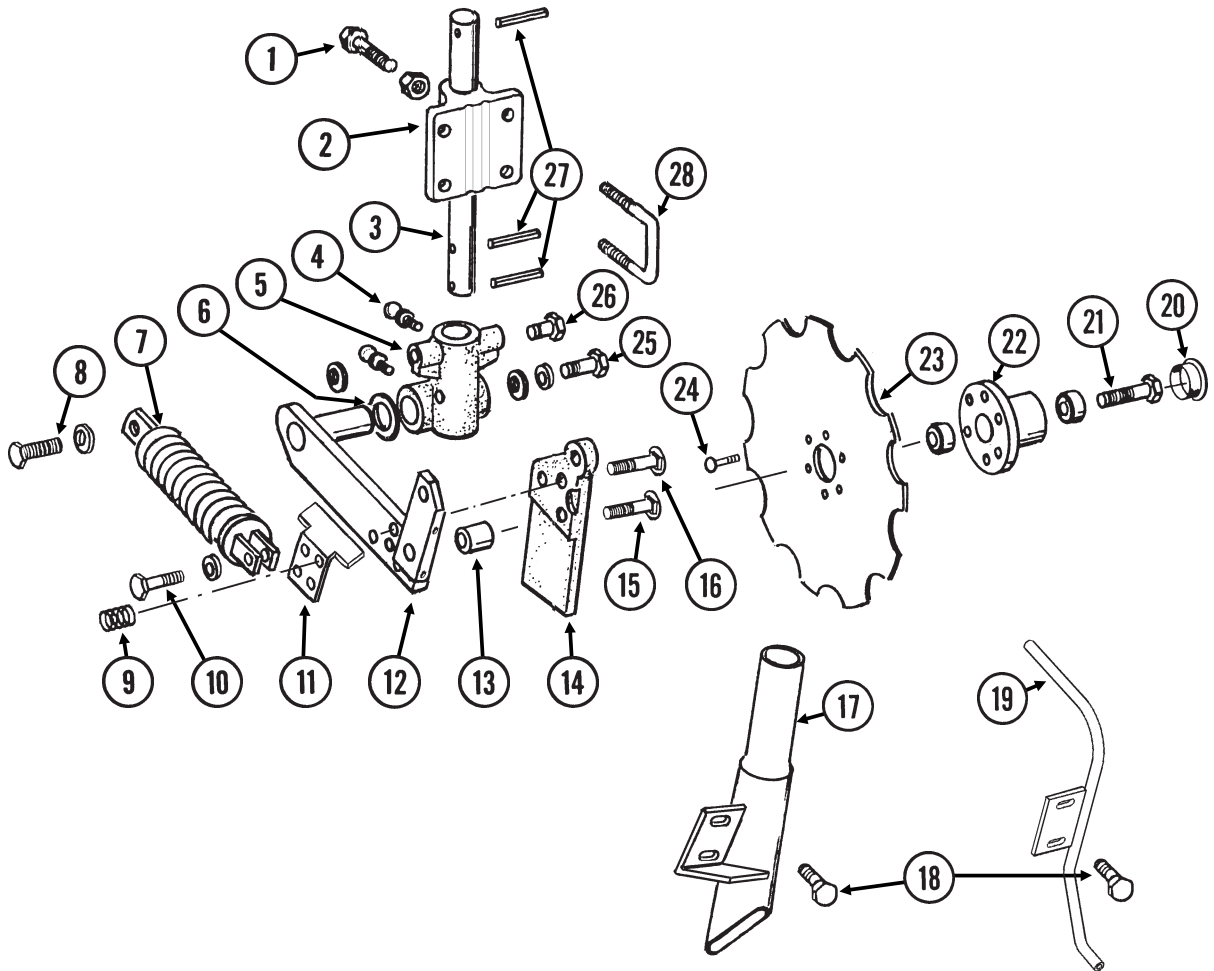
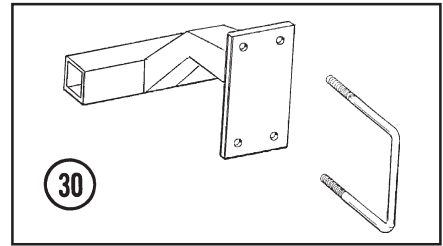
HD SINGLE DISC FERTILIZER OPENER (Blade And Drop Tube)

ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
19.	GD8276	1	Pin
	G10237	1	Lock Washer, 7/16"
	G10100	1	Hex Nut, 7/16"-14
20.	GD10273	1	Compression Spring
21.	G10592	1	Hair Pin Clip, No. 11
22.	G10594	6	Bolt, 1/2"-13 x 1 1/2"
	G10111	6	Lock Nut, 1/2"-13
23.	G10049	2	Hex Head Cap Screw, 3/8"-16 x 2 1/2"
	G10210	2	Washer, 3/8" USS
	G10108	2	Lock Nut, 3/8"-16
24.	G10599	1	Carriage Bolt, 3/8"-16 x 1 1/4"
	G10210	1	Washer, 3/8" USS
	G10229	1	Lock Washer, 3/8"
	G10101	1	Hex Nut, 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, 3/8"-16 x 1 1/4"
	G10229	2	Lock Washer, 3/8"
30.	GD10487	1	Clamp
31.	GD10304	-	Angle, R.H.
	GD10303	1	Angle, L.H. (Shown)
32.	G10016	2	Hex Head Cap Screw, 1/2"-13 x 2"
	G10111	2	Lock Nut, 1/2"-13
33.	G10322	-	Machine Bushing, 1 1/4", 18 Gauge (As Required)
34.	G10862	1	Hex Head Cap Screw, 5/8"-11 x 3 1/4"
	G10205	2	Washer, 5/8" SAE
	G10230	1	Lock Washer, 5/8"
35.	G10640	1	Grease Fitting, 1/4"-28
36.	GD10242	1	Bushing, 2 1/4"
37.	G10039	5	Hex Head Cap Screw, 1/2"-13 x 1 3/4"
	G10111	5	Lock Nut, 1/2"-13
38.	G10459	1	Cotter Pin, 3/16" x 1 1/2"
39.	GA7240	-	Opener Mount, R.H.
	GA7239	1	Opener Mount, L.H. (Shown)
40.	GD1113	2	U-Bolt, 5" x 7" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
41.	GD7907	1	Special Bolt
42.	GB0206	1	Rod Guide
43.	GD8239	1	Storage Strap
44.	GD7904-02	1	Sleeve, 1/2" x 1/2" Long
45.	G10216	3	Washer, 1/2" USS
46.	GA8983	-	Check Valve, Low Rate

NOTCHED SINGLE DISC FERTILIZER OPENER

FOC018(PT67b/FRTZ208)

STYLE A



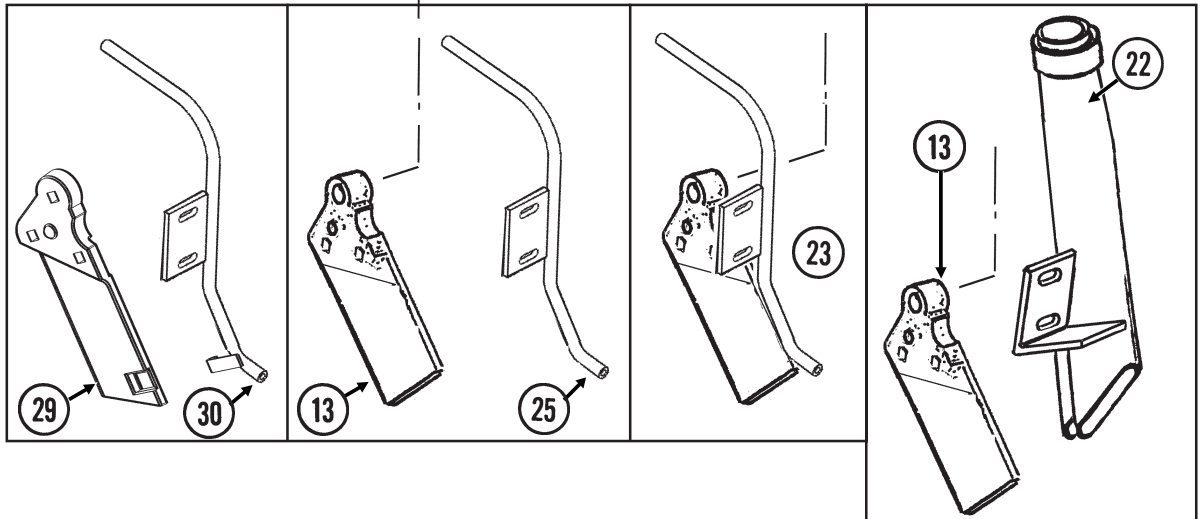
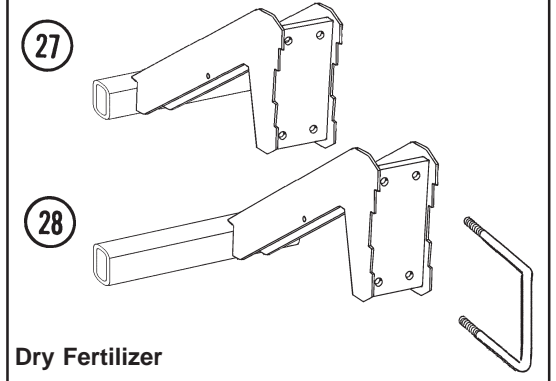
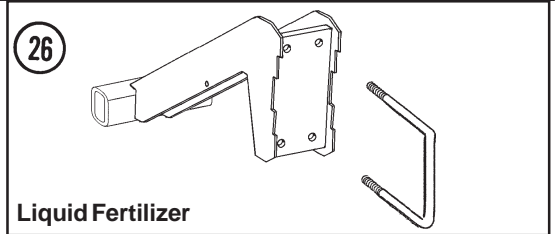
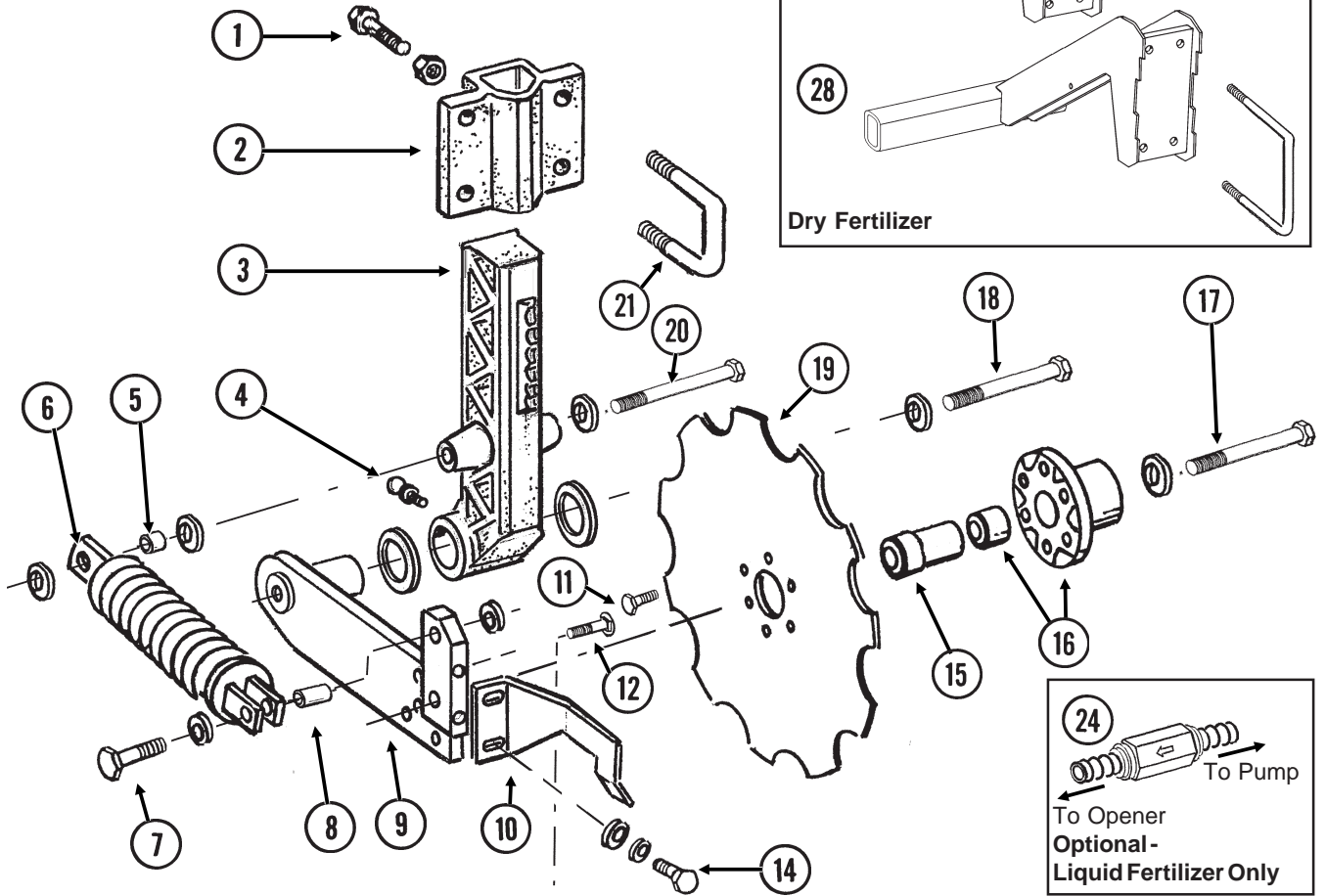
NOTCHED SINGLE DISC FERTILIZER OPENER

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
	GD15464	2	Special Washer
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 (Sub GA10048)
	GA6973	-	Drop Tube, L.H., Dry Fertilizer (Sub GA10048) (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
30.	GA7135	-	Mount (One Per Opener) W/U-Bolts
	GD1113	-	U-Bolt, 5" x 7" x 5/8"-11
	G10230	-	Lock Washer, 5/8"
	G10104	-	Hex Nut, 5/8"-11

NOTCHED SINGLE DISC FERTILIZER OPENER

FOC018(TWL34e/TWL34f/TWL34g/FRTZ242/FRTZ209z)

STYLE B



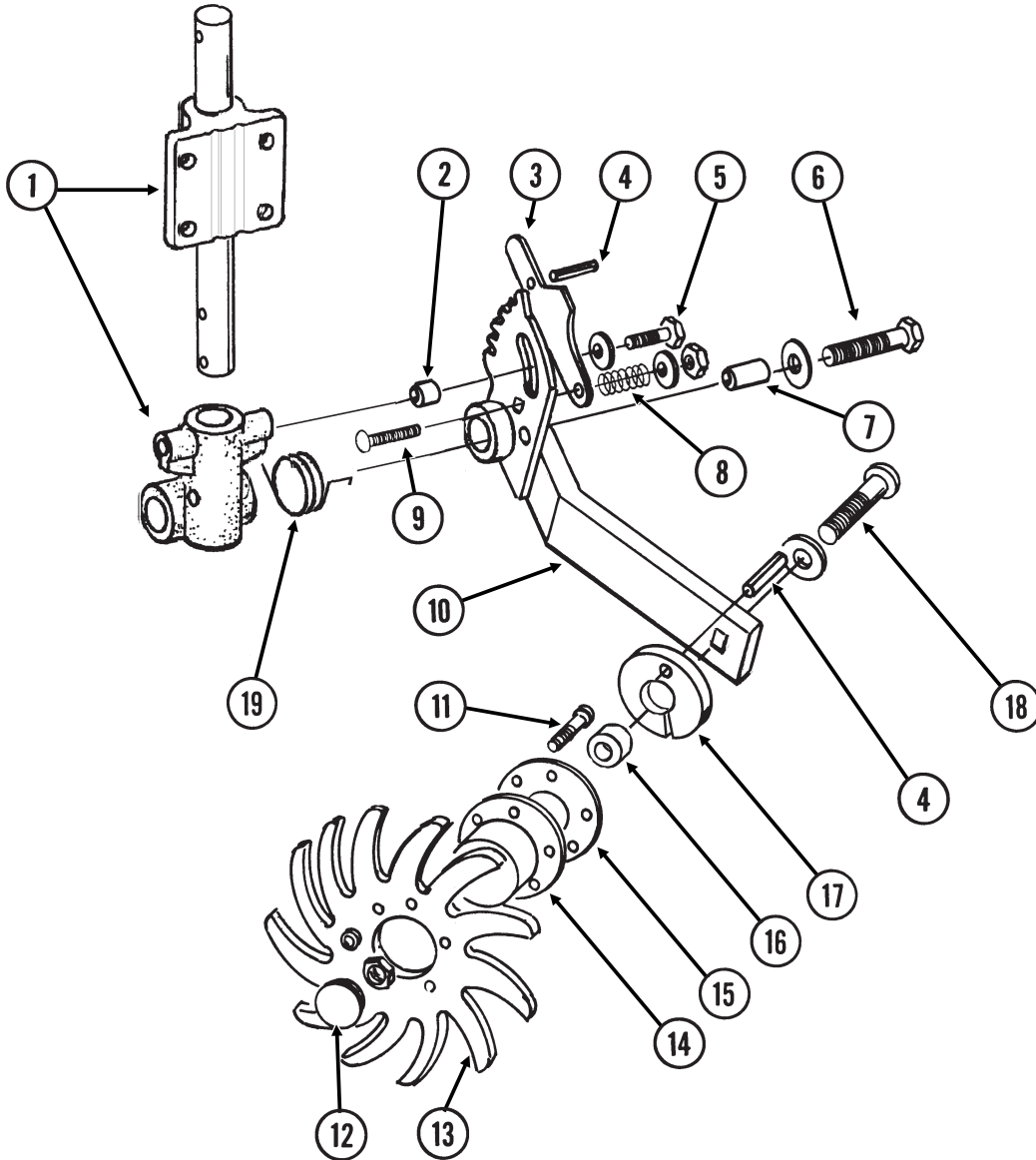
NOTCHED SINGLE DISC FERTILIZER OPENER

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.	GB0322	-	Knife, R.H.
	GB0323	1	Knife, L.H. (Shown)
14.	G10991	2	Hex Head Cap Screw, 5/16"-18 x 7/8"
	G10232	2	Lock Washer, 5/16"
	G10219	6	Washer, 5/16" USS
15.	GD12679	1	Stepped Spacer, 3" Long
16.	GA9437	1	Hub W/Bearing
	GA8603	-	Double Row Bearing
17.	G10011	1	Hex Head Cap Screw, 5/8"-11 x 5 1/2"
	GD12677	1	Washer, 1 1/2" O.D., 7 Gauge, Hardened
	G10107	1	Lock Nut, 5/8"-11
18.	G10046	1	Hex Head Cap Screw, 5/8"-11 x 5"
	G10217	1	Washer, 5/8" USS
	G10450	2	Machine Bushing, 1 1/2", 18 Gauge (As Required)
	G10107	1	Lock Nut, 5/8"-11
19.	GD12676	1	Disc Blade, Notched, 16 3/4"
20.	G10871	1	Hex Head Cap Screw, 1/2"-13 x 6"
	G10206	3	Washer, 1/2" SAE
	G10111	1	Lock Nut, 1/2"-13
21.	GD13287	2	U-Bolt, 1 1/2" x 2 1/2" x 1/2"-13
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
22.	GA10047	-	Drop Tube, L.H., Dry Fertilizer (Shown)
	GA10048	1	Drop Tube, R.H., Dry Fertilizer
23.	GA9461	1	Knife/Drop Tube, L.H., Liquid Fertilizer (Shown)
	GA9462	1	Knife/Drop Tube, R.H., Liquid Fertilizer
24.	GA8983	-	Check Valve, Low Rate
25.	GA8399	-	Drop Tube, L.H., Liquid Fertilizer (Shown)
	GA8398	1	Drop Tube, R.H., Liquid Fertilizer
26.	GA9458	1	Mount W/U-Bolts, Liquid Fertilizer
	GD11113	2	U-Bolt, 5" x 7" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
27.	GA9821	-	Mount W/U-Bolts, L.H., Dry Fertilizer
	GD11113	2	U-Bolt, 5" x 7" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	GD10104	4	Hex Nut, 5/8"-11
28.	GA9822	-	Mount W/U-Bolts, R.H., Dry Fertilizer
	GD11113	2	U-Bolt, 5" x 7" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	GD10104	4	Hex Nut, 5/8"-11
29.	GB0323	1	Knife, L.H. (Shown)
	GB0322	-	Knife, R.H.
30.	GA10213	-	Drop Tube, L.H., Liquid Fertilizer (Shown)
	GA10214	1	Drop Tube, R.H., Liquid Fertilizer

RESIDUE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER MOUNTED

DFC024(FRTZ165)

FOR USE WITH STYLE A
NOTCHED SINGLE DISC FERTILIZER OPENER



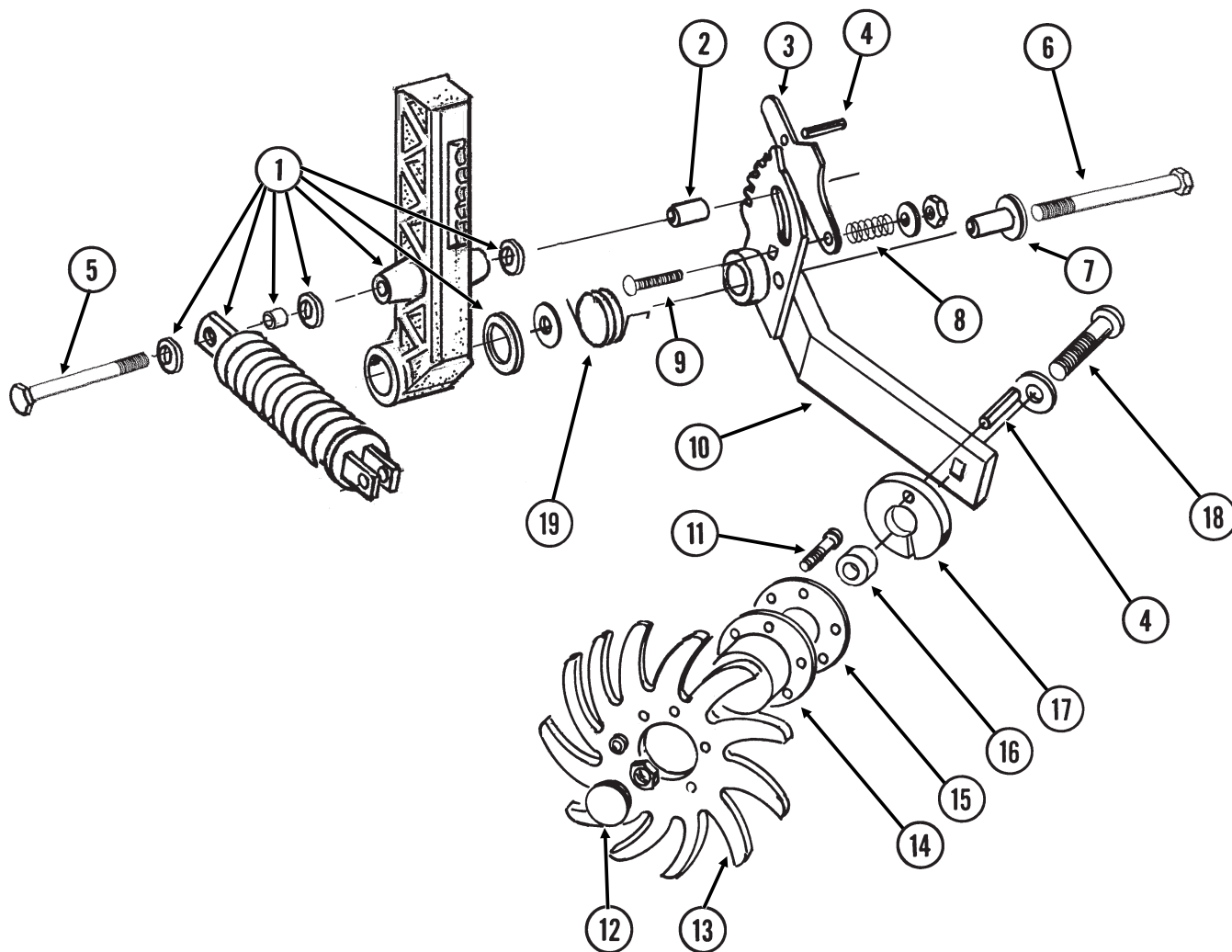
RESIDUE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.		-	See "Notched Single Disc Fertilizer Opener", Pages P78 And P79
2.	GD11053	1	Bushing, 7/8" Long
3.	GD11178	1	Adjustment Lever
4.	G10603	2	Spring Pin, 1/4" x 1 1/4"
5.	G10919	1	Self-Locking Hex Head Cap Screw, 1/2"-13 x 1 3/4"
	G10216	1	Washer, 1/2" USS
6.	G10920	1	Self-Locking Hex Head Cap Screw, 5/8"-11 x 3 1/2"
	GD7805	1	Special Washer, 5/8", Hardened
7.	GD11358	1	Hardened Bushing, 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, Grade 8
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)

RESIDUE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER

DFC024(FRTZ165)

FOR USE WITH STYLE B
NOTCHED SINGLE DISC FERTILIZER OPENER



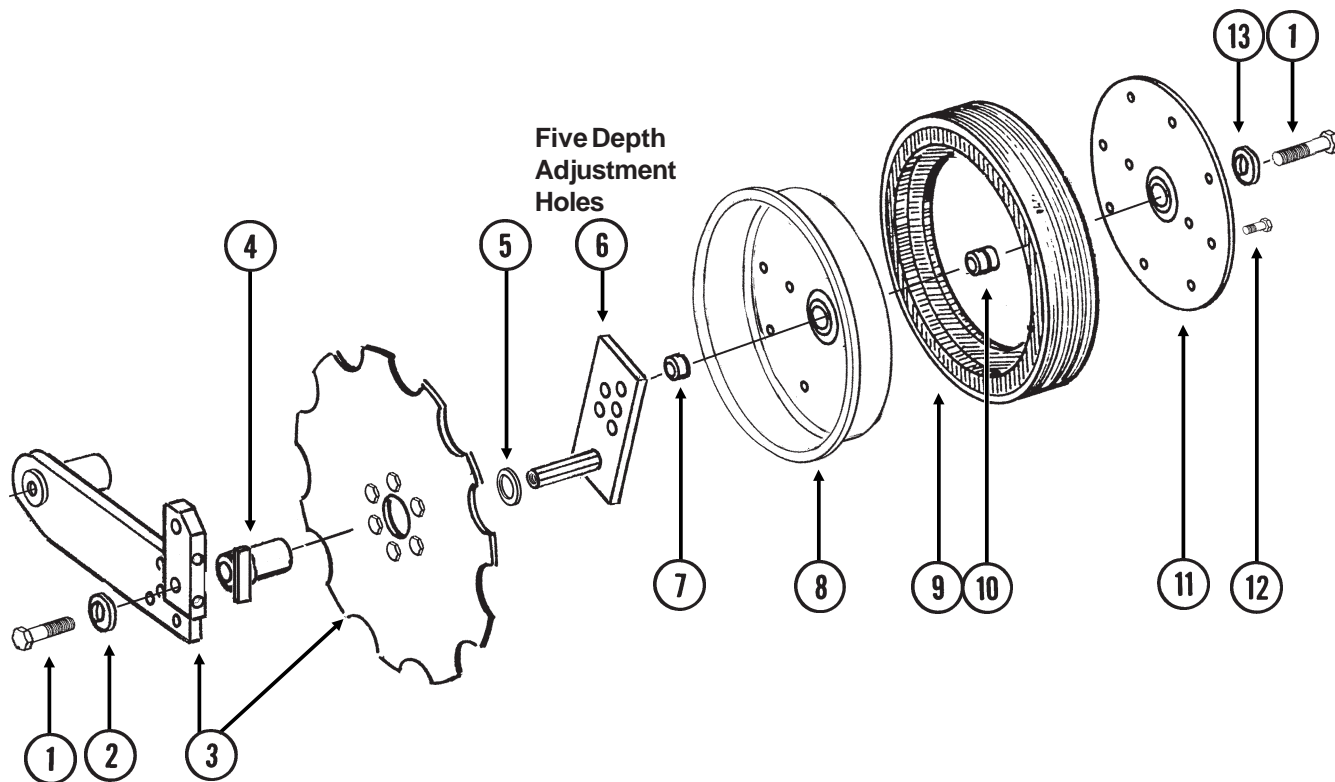
RESIDUE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.		-	See "Notched Single Disc Fertilizer Opener", Pages P80 And P81
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, Grade 8
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, 1 1/16" 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

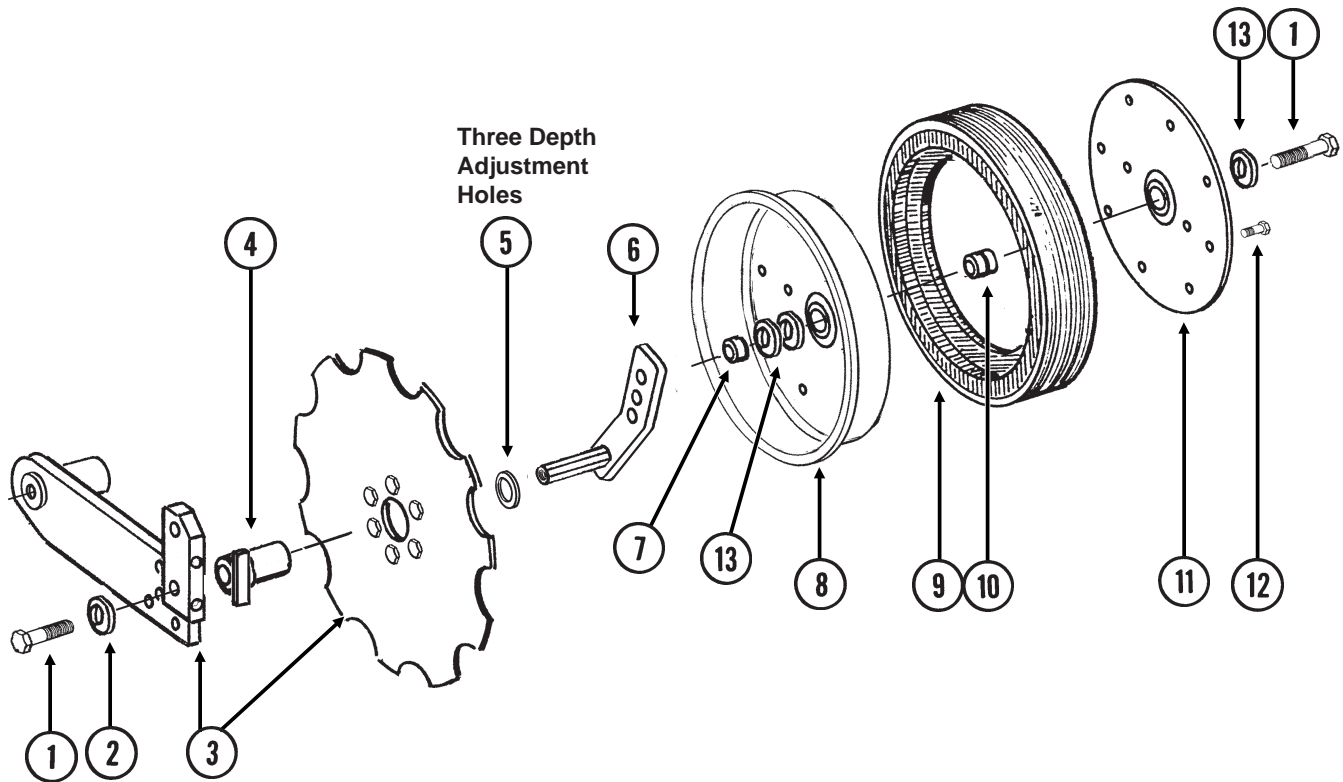


ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	G10010	2	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 3"
2.	GD7805	1	Special Washer, $\frac{5}{8}$ ", Hardened
3.		-	See "Notched Single Disc Fertilizer Opener", Pages P80 And P81
4.	GA9472	1	Blade Mount
5.	G10233	1	Machine Bushing, 1", 10 Gauge
6.	GA9473	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	Serrated 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)

DEPTH/GAUGE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER

(FRTZ256)

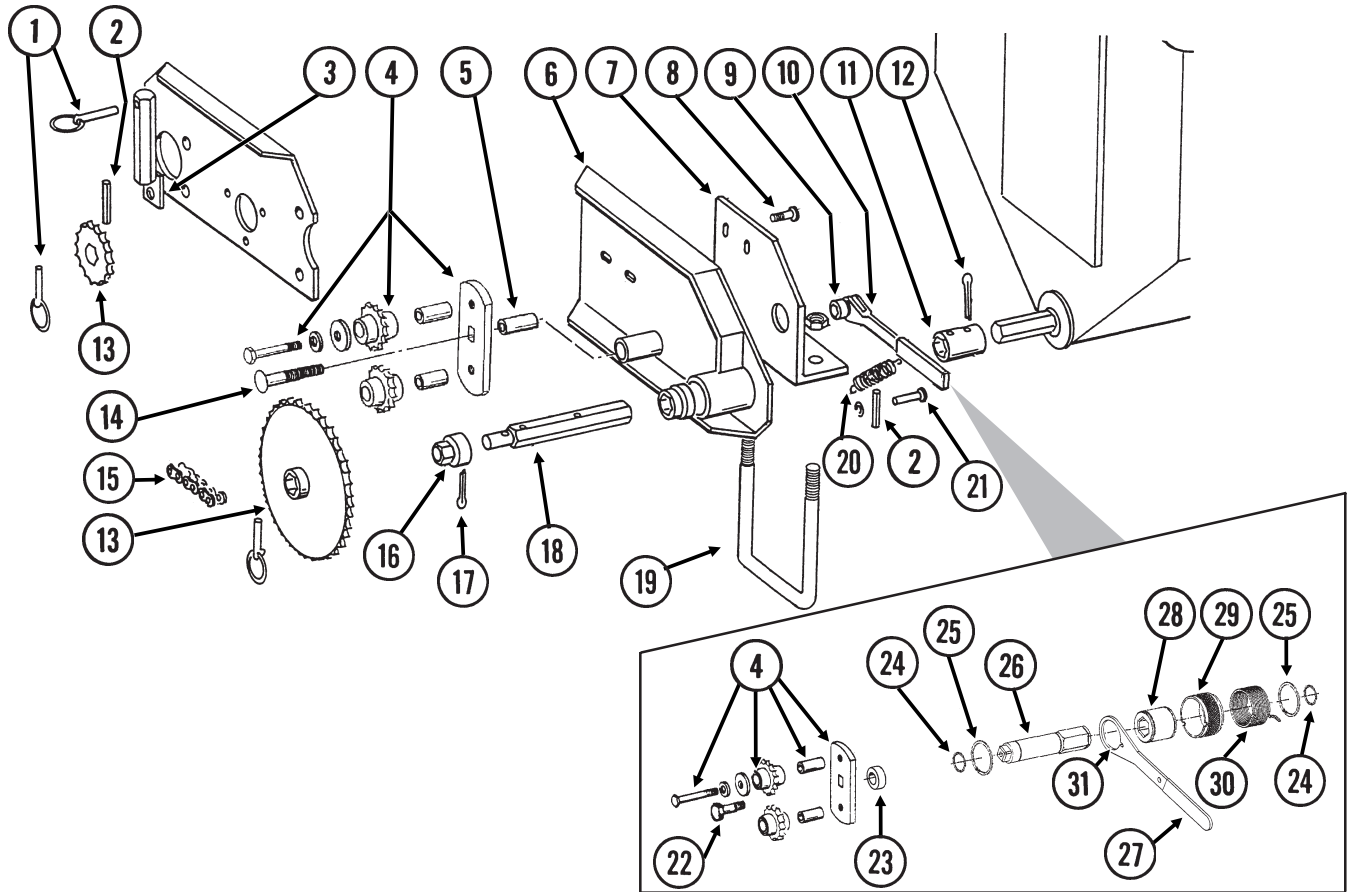
FOR USE WITH STYLE B
NOTCHED SINGLE DISC FERTILIZER OPENER



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 P80 And P81
4.	GA9472	1	Blade Mount
5.	G10233	1	Machine Bushing, 1", 10 Gauge
6.	GA10037	1	Wheel Mount, L.H. (Shown)
	GA10036	1	Wheel Mount, R.H.
7.	GD13309	1	Spacer
8.	GD11423	1	Half Wheel
9.	GD11953	1	Offset Tire
10.	GA6171	1	Bearing
11.	GD11954	1	Half Wheel Cover, Nylon
12.	G10961	11	Flanged Whiz-Lock Screw, $\frac{5}{16}$ "-18 x $\frac{3}{4}$ ", No Serration
	G10620	11	Serrated Flange Nut, $\frac{5}{16}$ "-18
13.	G10204	-	Special Machine Bushing, $\frac{5}{8}$ " x 1" O.D. (As Required)
A.	GA8877	-	Gauge Wheel Complete (Items 8-12)

DRY FERTILIZER TRANSMISSION ASSEMBLY

PTD072(TWL60b/TWL14k)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD2558	3	Lynch Pin, 1/4"
2.	G10602	2	Spring Pin, 1/4" x 1 1/2"
3.	GA5229	1	Sprocket Storage Rod
4.	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"
5.	GD3180-17	1	Sleeve, 5/8" I.D. x 7/8" O.D. x 2 5/16" Long
6.	GA6579	1	Plate W/Bearings And Grease Fitting
	GA5116	-	Bearing, 7/8" Hex Bore, Cylindrical
	GA5624	-	Special Bearing, 7/8" Hex Bore x 1.6"
	G10643	-	Grease Fitting, 45°, 1/4"-28
7.	GD9320	1	Mount
8.	G10574	2	Carriage Bolt, 1/2"-13 x 1 1/4"
	G10216	4	Washer, 1/2" USS
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
9.	GD10161	1	Spacer, 3/8"
10.	GA4235	1	Ratchet Arm W/Protective Closure
	G10445	-	Protective Closure
11.	GD5886	-	Coupler, 1 3/4"
12.	G10460	-	Cotter Pin, 1/4" x 2"
13.	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
14.	G10419	1	Carriage Bolt, 1/2"-13 x 4 1/2"
	G10111	1	Lock Nut, 1/2"-13
15.	G3310-155	1	Chain, No. 40, 155 Pitch Including Connector Link And Offset Link
	GR0912	-	Connector Link, No. 40
	GR0911	-	Offset Link, No. 40

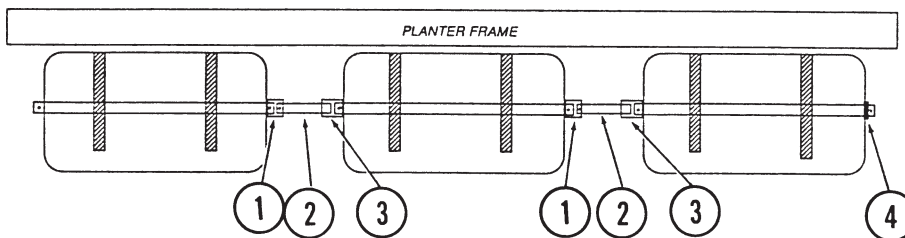
DRY FERTILIZER TRANSMISSION ASSEMBLY

ITEM	PART NO.	QTY.	DESCRIPTION
16.	GD7127	1	Shear Coupler
17.	G10462	1	Cotter Pin, 3/16" x 2"
18.	GD7870	1	Shaft, 7"
19.	GD1134	1	U-Bolt, 7" x 5" x 5/8"-11
	G10230	2	Lock Washer, 5/8"
	G10104	2	Hex Nut, 5/8"-11
20.	GD5857	1	Spring
21.	G10408	1	Clevis Pin, 5/16" x 3/4"
	G10409	1	Retaining Ring, 5/16"
22.	G11100	1	Hex Socket Button Head Screw, 1/4"-20 x 1/2", Grade 8
	G10227	1	Lock Washer, 1/4"
	G10209	1	Washer, 1/4" USS
23.	GD2734-18	1	Sleeve, 1 1/4" O.D. x 7/16" Long
24.	G11075	2	Internal Inverted Snap Ring, 7/8"
25.	G10496	2	External Inverted Snap Ring, 1 1/2"
26.	GD14427	1	Tightener Shaft, 4 7/8"
27.	G11078	1	Vinyl Cap
28.	GD14432	1	Sleeve, 1 1/4"
29.	GD14430	1	Release Collar, Gold, R.H.
30.	GD14413	-	Torsion Spring, L.H. (Used On R.H. Wrap Spring Wrench)
31.	GD14431	1	Handle
A.	G1K269	-	Lock Clamp Kit (Items 2 And 3)
B.	G1K378	1	Wrap Spring Wrench Replacement Kit, Gold Collar, R.H. (Items 22-31)

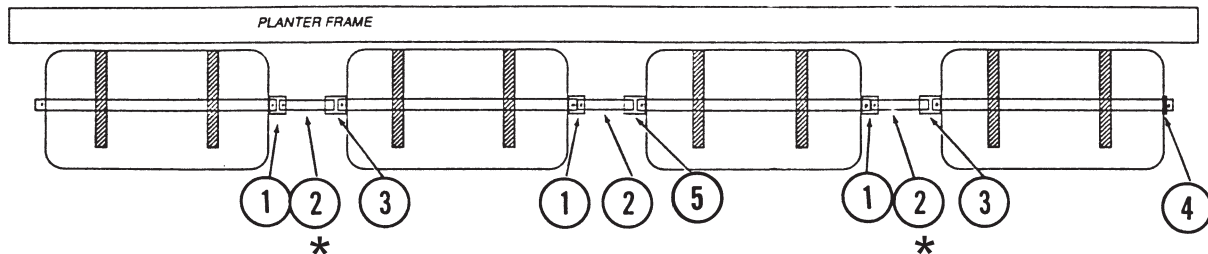
DRY FERTILIZER COUPLERS/SHAFTS

RH101190(PT33/PT35)

6 Row 30"



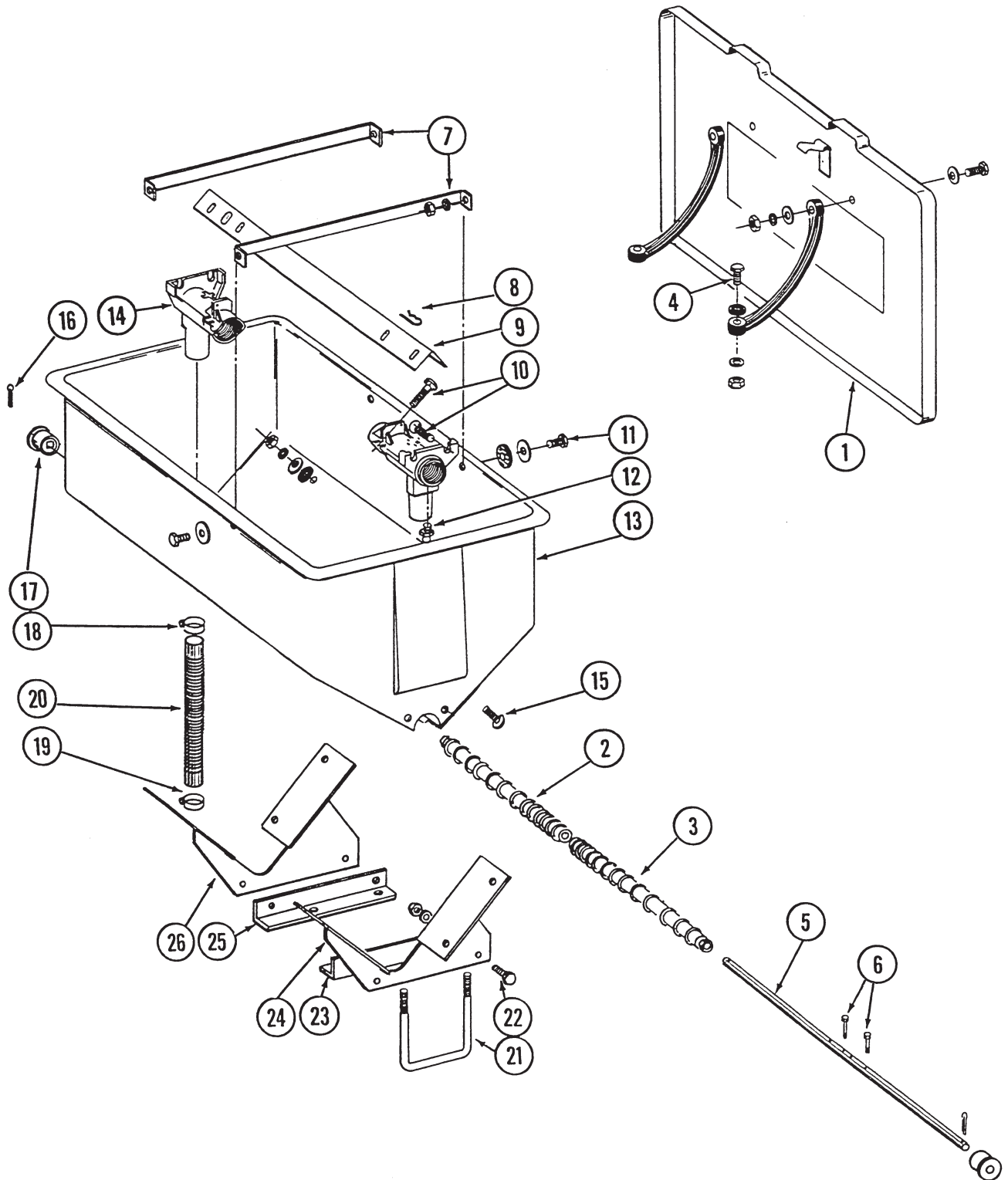
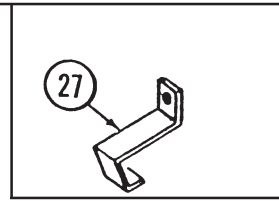
8 Row 30"



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) (*Trim 4" On 8 Row 30" Size With HD Single Disc Fertilizer Openers)
3.	GD7867	-	Coupler, 3"
4.	G10233	2	Machine Bushing, 1", 10 Gauge
5.	GD9378	-	Coupler, 12"

DRY FERTILIZER HOPPER AND MOUNTS

DFC009/DFC018/DFC023(TWL61)

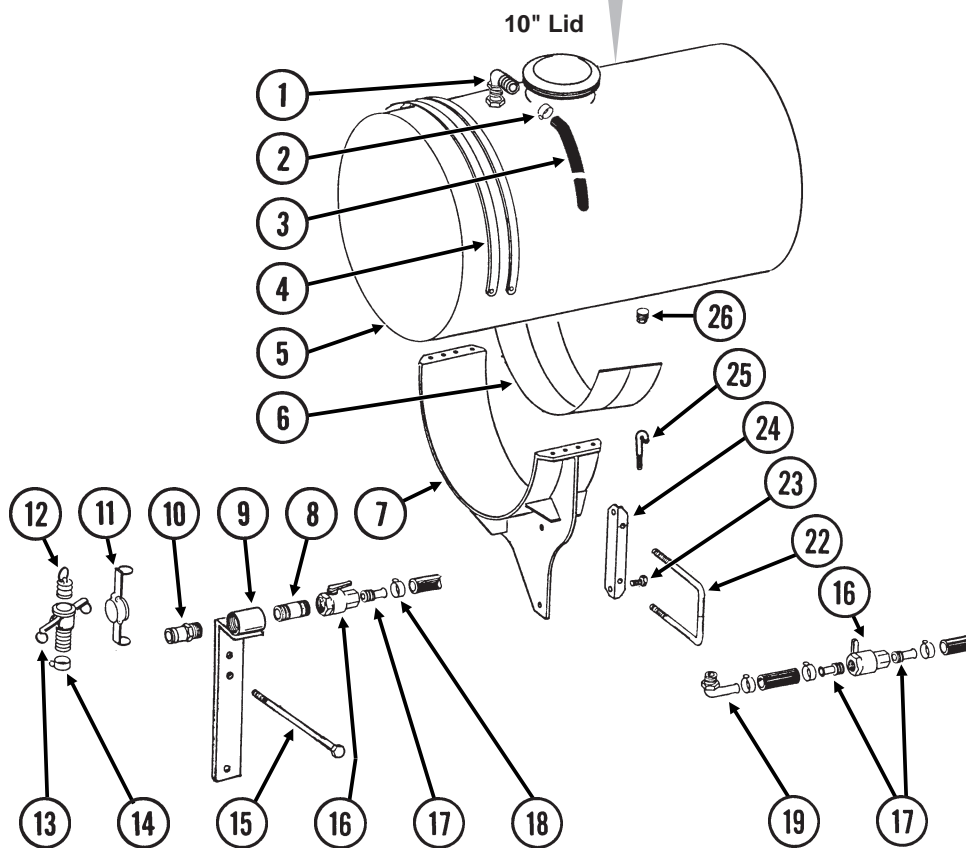
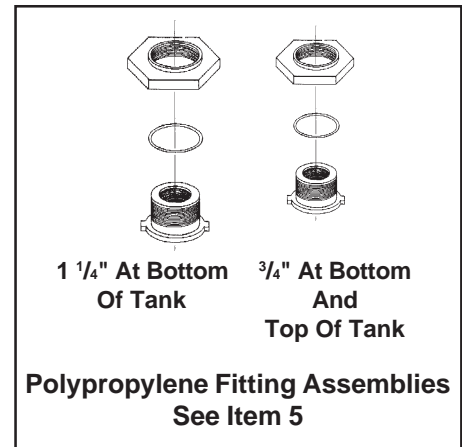
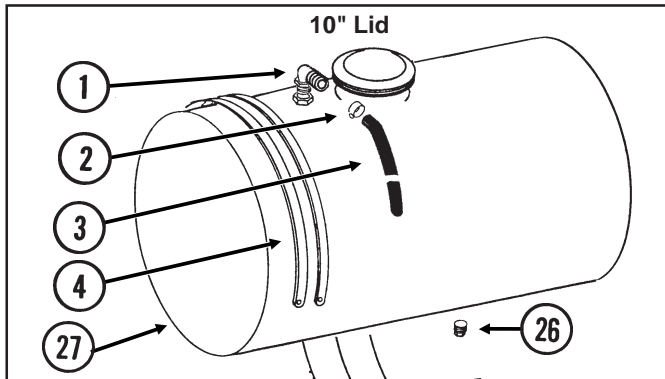


DRY FERTILIZER HOPPER AND MOUNTS

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Hopper)	
1.	GA0898	1	Lid W/Retainers, Clips, Rivets, Rubber Straps And Hardware
	GD1380	-	Front Clip
	GD2412	-	Rear Retainer
	G10655	-	Rivet, $\frac{3}{16}$ " x $\frac{13}{32}$ "
	GD1210	-	Rubber Strap
	G10171	-	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x 1 $\frac{1}{4}$ "
	G10219	-	Washer, $\frac{5}{16}$ " USS
	G10232	-	Lock Washer, $\frac{5}{16}$ "
	G10106	-	Hex Nut, $\frac{5}{16}$ "-18
2.	GB0198	1	Auger, R.H.
3.	GB0199	1	Auger, L.H.
4.	G10133	2	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x 1 $\frac{1}{2}$ "
	G10219	2	Washer, $\frac{5}{16}$ " USS
	G10232	2	Lock Washer, $\frac{5}{16}$ "
	G10106	2	Hex Nut, $\frac{5}{16}$ "-18
5.	GD7848	1	Shaft
6.	G10587	2	Hex Head Cap Screw, $\frac{1}{4}$ "-20 x 2", Stainless Steel
	G10588	2	Hex Nut, $\frac{1}{4}$ "-20, Stainless Steel
7.	GD1209	2	Strap
8.	G10670	2	Hair Pin Clip, No. 3
9.	GD1207	1	Baffle
10.	G10303	8	Carriage Bolt, $\frac{5}{16}$ "-18 x 1"
	G10219	8	Washer, $\frac{5}{16}$ " USS
	G10232	8	Lock Washer, $\frac{5}{16}$ "
	G10106	8	Hex Nut, $\frac{5}{16}$ "-18
11.	G10171	4	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x 1 $\frac{1}{4}$ "
	G10201	4	Special Washer, $\frac{3}{8}$ " x 1 $\frac{1}{2}$ " O.D.
	GD1213	4	Rubber Washer
	G10232	4	Lock Washer, $\frac{5}{16}$ "
	G10106	4	Hex Nut, $\frac{5}{16}$ "-18
12.	G10641	2	Grease Fitting, $\frac{1}{8}$ " NPT
13.	GD1379	1	Hopper
14.	GD1200	2	Outlet Housing
15.	G10303	8	Carriage Bolt, $\frac{5}{16}$ "-18 x 1"
	G10201	8	Special Washer, $\frac{3}{8}$ " x 1 $\frac{1}{2}$ " O.D.
	GD1213	8	Rubber Washer
	G10232	8	Lock Washer, $\frac{5}{16}$ "
	G10106	8	Hex Nut, $\frac{5}{16}$ "-18
16.	G10460	2	Cotter Pin, $\frac{1}{4}$ " x 2"
17.	GB0200	2	Bearing
18.	G10676	2	Hose Clamp, No. 36
19.	G10672	2	Hose Clamp, No. 28
20.	GD3790	2	Rubber Tube
21.	GD1134	2	U-Bolt, 7" x 5" x $\frac{5}{8}$ "-11
	G10230	4	Lock Washer, $\frac{5}{8}$ "
	G10104	4	Hex Nut, $\frac{5}{8}$ "-11
22.	G10017	2	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 1 $\frac{1}{2}$ "
	G10228	2	Lock Washer, $\frac{1}{2}$ "
	G10102	2	Hex Nut, $\frac{1}{2}$ "-13
23.	GD9131	1	Angle, L.H.
24.	GA6437	1	Mount, L.H.
25.	GD9132	1	Angle, R.H.
26.	GA6436	1	Mount, R.H.
27.	GD8722	-	Holder, Rubber Tube (As Required)
A.	GA6503	-	Hopper Sub-Assembly (Items 8,10 And 12-15)
B.	GA5667	-	Hopper Hardware Box (Items 2-7, 9, 11, 16 And 17)

LIQUID FERTILIZER TANKS, SADDLES, MOUNTS, HOSES AND FITTINGS

LFC012rev(FRTZ201e/PT51/TWL62C)



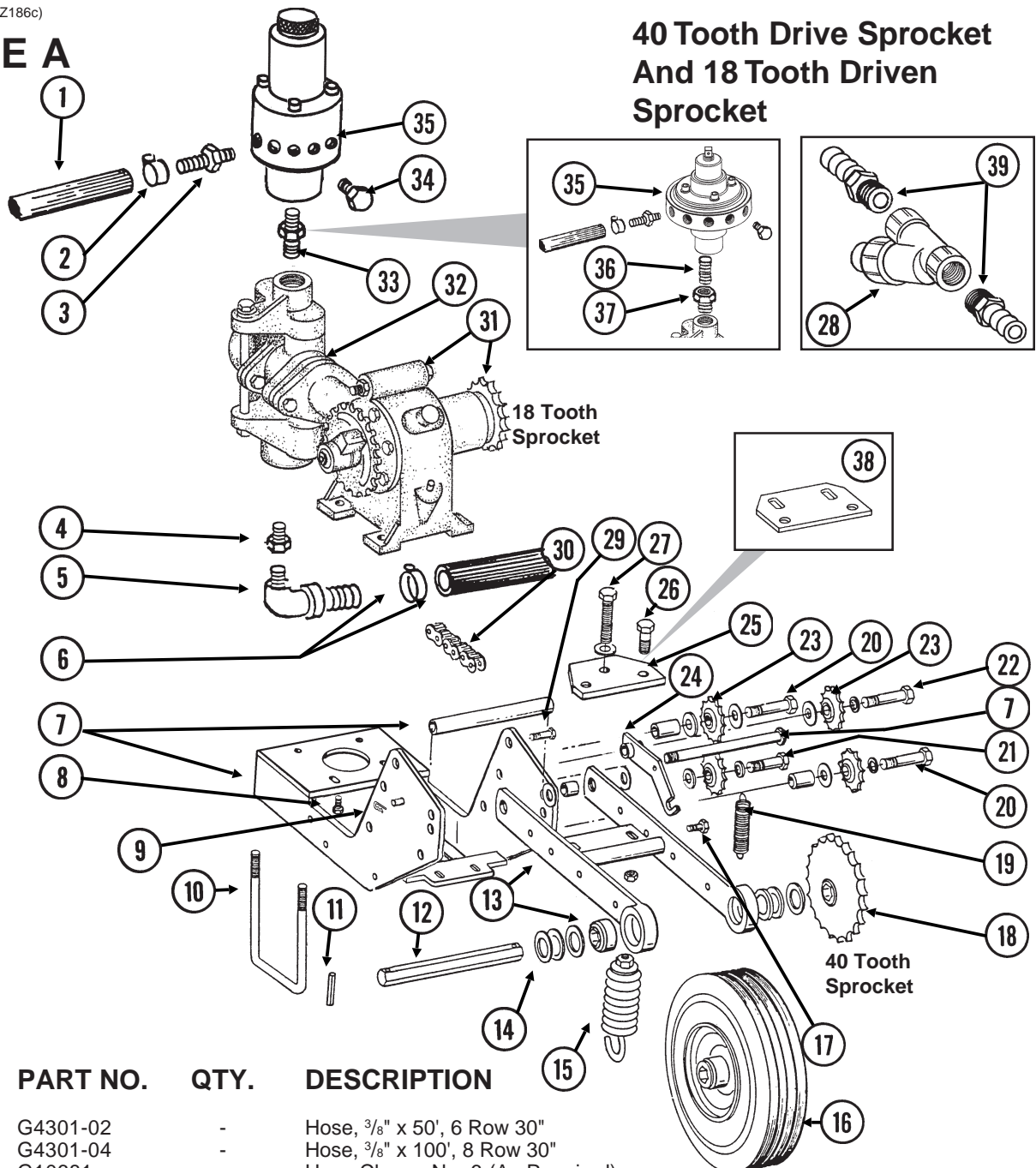
LIQUID FERTILIZER TANKS, SADDLES, MOUNTS, HOSES AND FITTINGS

ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10917	2	Elbow, 90°, 3/4" NPT To Barb
2.	G10278	2	Hose Clamp, No. 16
3.	G4205-11	1	Hose, 3/4" x 72" (One Per Tank)
4.	GD1520	8	Band, 30"
5.	GD1812	2	Tank W/Lid And Fittings, 30" x 150 Gallon
	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
	GR1571	-	Strap W/Cap Rivet (Top Of Tank)
	GR0508	-	1 1/4" Polypropylene Fitting Assembly (Nut, Bushing And O-Ring) (Bottom Of Tank)
6.	GD1862	1	Pad, 8" x 14" (For Two 30" Tanks)
7.	GA7375	-	Tank Mount (2 Per Tank)
8.	G10619	-	Close Nipple, 1 1/4" NPT
9.	GA5917	1	Quick Fill Mount
10.	GD1514	1	Adapter, 1 1/4" Male NPT To Cam Lock
11.	GD1515	1	Dust Cap, 1 1/4" Cam Lock
12.	GD1517	1	Dust Plug, 1 1/4" Male Cam Lock
13.	GD1516	1	Adapter, 1 1/4" Barb To Female Cam Lock
14.	G10672	1	Hose Clamp, No. 28
15.	G10829	2	Hex Head Cap Screw, 1/2"-13 x 6 1/2" (Used Between Light Assembly And Quick Fill Mount)
	G10216	2	Washer, 1/2" USS
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
16.	GA4976	-	Shutoff Valve, 1 1/4" NPT
	GR1015	-	Body O-Ring
	GR1016	-	Stem O-Ring
	GR1017	-	Teflon Seat
	GR1018	-	Ball
	GR1019	-	Handle
17.	G10626	-	Adapter, 1 1/4" NPT To Barb
18.	G10674	-	Hose Clamp, No. 24
19.	G10629	2	Elbow, 90°, 1 1/4" NPT To Barb
20.	G4200-02	1	Hose, 1 1/4" x 27', 6 Row 30"
	G4200-03	-	Hose, 1 1/4" x 32', 8 Row 30"
21.	G10633	1	Tee, 1 1/4" Barb
22.	GD1747	4	U-Bolt, 5" x 7" x 3/4"-10
	G10231	8	Lock Washer, 3/4"
	G10105	8	Hex Nut, 3/4"-10
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.	GD10110	-	Mounting Angle (2 Per Tank)
25.	GD1337	16	J-Bolt, 5/16"-18
	G10109	16	Lock Nut, 5/16"-18, Grade 8
26.	G10096	2	Pipe Plug, 3/4" NPT
27.	GA9905	2	Tank W/Lid And Fittings, 30" x 150 Gallon
	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 MOUNTING BRACKETS AND DRIVELINE

(FRTZ161d/FRTZ186c)

STYLE A



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G4301-02	-	Hose, 3/8" x 50', 6 Row 30"
	G4301-04	-	Hose, 3/8" x 100', 8 Row 30"
2.	G10681	-	Hose Clamp, No. 6 (As Required)
3.	GD11700	-	Adapter, 1/4" NPT To 3/8" Barb (As Required)
4.	G10615	1	Reducing Bushing, 1 1/2" Male NPT To 1 1/4" Female
5.	G10629	1	Elbow, 90°, 1 1/4" NPT To Barb
6.		-	See "Liquid Fertilizer Tanks, Saddles, Mounts, Hoses And Fittings", Pages P92 And P93
7.	GA8486	1	Pump Mount W/Sleeve And Sleeve Mounting Hardware
	GD10165	1	Sleeve, 6 3/4"
	G10819	1	Hex Head Cap Screw, 1/2"-13 x 8 1/2"
	G10228	1	Lock Washer, 1/2"
	G10102	1	Hex Nut, 1/2"-13
8.	G10003	4	Hex Head Cap Screw, 3/8"-16 x 1 1/2"
	GR1122	4	Rubber Washer
	G10210	4	Washer, 3/8" USS
	G10229	4	Lock Washer, 3/8"
	G10101	4	Hex Nut, 3/8"-16
9.	G10670	1	Hair Pin Clip, No. 3

LIQUID FERTILIZER PISTON PUMP MOUNTING BRACKETS AND DRIVELINE

ITEM	PART NO.	QTY.	DESCRIPTION
10.	GD1134	2	U-Bolt, 7" x 5" x 5/8"-11
	G10217	4	Washer, 5/8" USS
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
11.	G10602	2	Spring Pin, 1/4" x 1 1/2"
12.	GD5797	1	Hex Shaft, 7/8" x 10"
	G10602	2	Spring Pin, 1/4" x 1 1/2"
13.	GA6415	1	Wheel Arm W/Bearings (Sub G1K253)
	GA5116	-	Bearing, 7/8" Hex Bore, Cylindrical
14.	G10233	5	Machine Bushing, 1", 10 Gauge
15.	GA2068	1-2	Spring W/Plug
16.	GA5090	1	Tire And Rim Assembly (Specify Brand*)
	GD5753	1	Tire, 4.10" x 6" (Specify Brand*)
	GD5752	1	Inner Tube
17.	G10003	1	Hex Head Cap Screw, 3/8"-16 x 1 1/2"
	G10229	1	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
18.	GA7180	1	Sprocket, 40 Tooth
19.	GD5857	1	Spring
20.	G10038	2	Hex Head Cap Screw, 1/2"-13 x 3"
	GD10007	2	Spacer, 1 1/8"
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
21.	G10016	1	Hex Head Cap Screw, 1/2"-13 x 2"
	GD10161	1	Spacer, 3/8"
	G10228	1	Lock Washer, 1/2"
	G10102	1	Hex Nut, 1/2"-13
22.	G10038	1	Hex Head Cap Screw, 1/2"-13 x 3"
	GD7904-04	-	Sleeve, 1/2" x 1 1/8" Long
	G10228	-	Lock Washer, 1/2"
	G10102	-	Hex Nut, 1/2"-13
23.	GA7154	4	Sprocket W/Bearing, 18 Tooth
24.	GA7179	1	Idler Arm
25.	GD10156	1	Spring Mount
26.	G10039	2	Hex Head Cap Screw, 1/2"-13 x 1 3/4"
	G10206	2	Washer, 1/2" SAE
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
27.	G10371	1-2	Hex Head Cap Screw, 1/2"-13 x 3", Full Thread
	G10206	1-2	Washer, 1/2" SAE
	G10102	1-2	Hex Nut, 1/2"-13
28.	GA3893	1	Strainer Complete
	GR0880	-	Screen, No. 40 Mesh
	GR0881	-	Gasket
	GR0882	-	Y-Body
	GR0883	-	End Cap
29.	G10005	2	Hex Head Cap Screw, 5/8"-11 x 1 3/4"
	GB0218	2	Bushing, 21/32" I.D. x 7/8" O.D. x 19/32" Long
	G10235	2	Machine Bushing, 7/8", 14 Gauge
	GD7805	2	Special Washer, 5/8", Hardened
	G10107	2	Lock Nut, 5/8"-11
30.	G3310-160	1	Chain, No. 40, 160 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
31.		-	See "Liquid Fertilizer Piston Pump (Crankcase Assembly)", Pages P98 And P99
32.		-	See "Liquid Fertilizer Piston Pump (Cylinder Assembly)", Pages P100 And P101
33.	G10618	1	Close Nipple, 1" NPT
	G10926	-	Reducing Pipe Bushing, 1" Male NPT To 3/4"
34.	G10292	-	Pipe Plug, 1/4" NPT
35.		-	See "Liquid Fertilizer Piston Pump Flow Divider", Pages P102 And P103
36.	G10995	-	Reducing Bushing, 1" Male NPT To 3/4" Female, Stainless Steel
37.	G10994	-	Close Nipple, 3/4" NPT, Stainless Steel
38.	GD13268	-	Spring Mount
39.	G10626	-	Adapter, 1 1/4" NPT To Barb

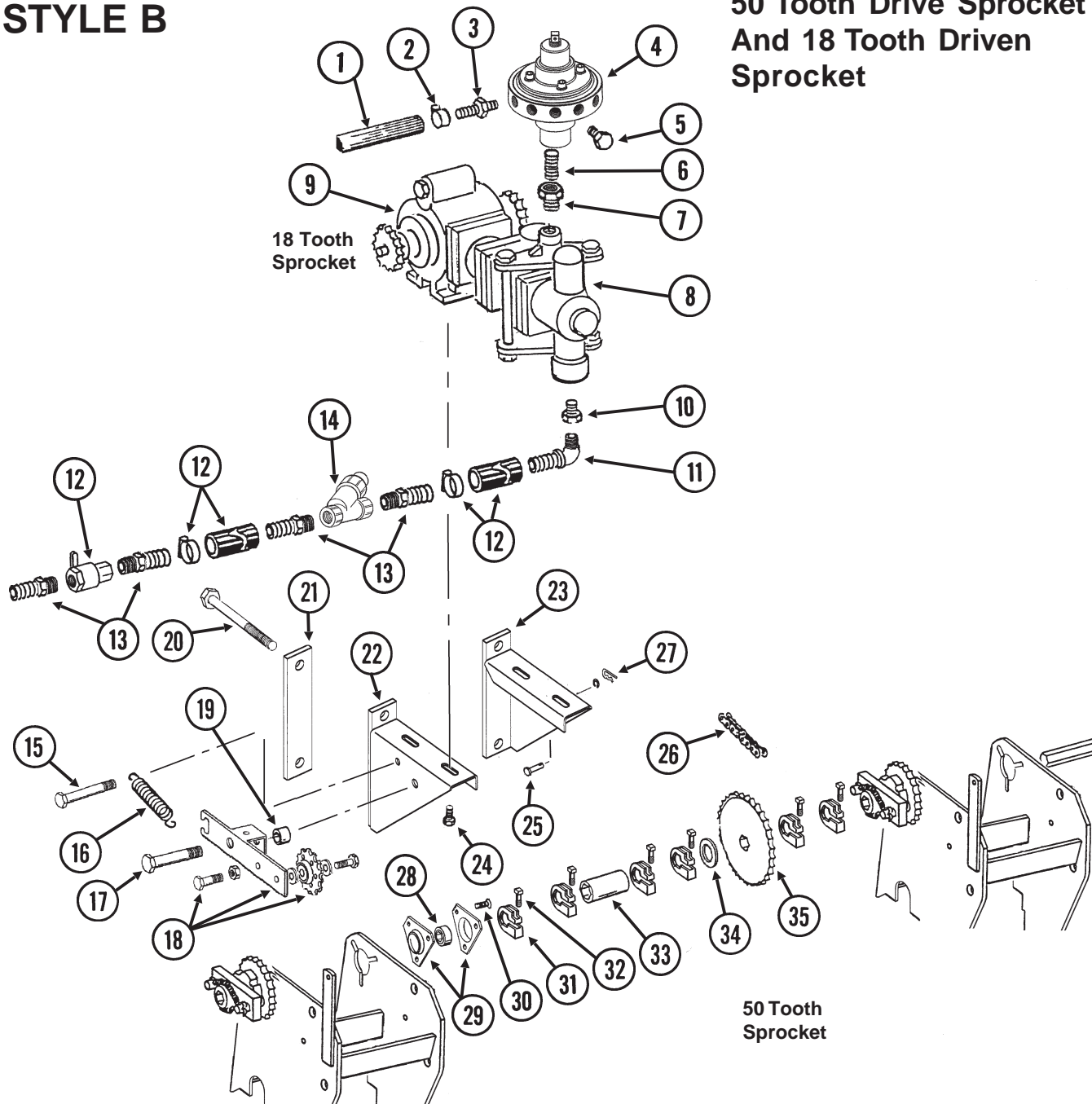
* Specific brand requests will be supplied only as available from current KINZE® Repair Parts stock. If a specific brand requested is not in stock, the brand available will be supplied. Different brand tires may have different diameters. Change in tire brand could result in rate changes.

LIQUID FERTILIZER PISTON PUMP MOUNTING BRACKETS AND DRIVELINE

(FRTZ246)

STYLE B

50 Tooth Drive Sprocket
And 18 Tooth Driven Sprocket



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G4301-02	-	Hose, 3/8" x 50', 6 Row 30"
	G4301-04	-	Hose, 3/8" x 100', 8 Row 30"
2.	G10681	8	Hose Clamp, No. 6 (As Required)
3.	GD11700	-	Adapter, 1/4" NPT To 3/8" Barb (As Required)
4.		-	See "Liquid Fertilizer Piston Pump Flow Divider", Pages P102 And P103
5.	G10292	-	Pipe Plug, 1/4" NPT (As Required)
6.	G10995	1	Reducing Bushing, 1" Male NPT To 3/4" Female, Stainless Steel

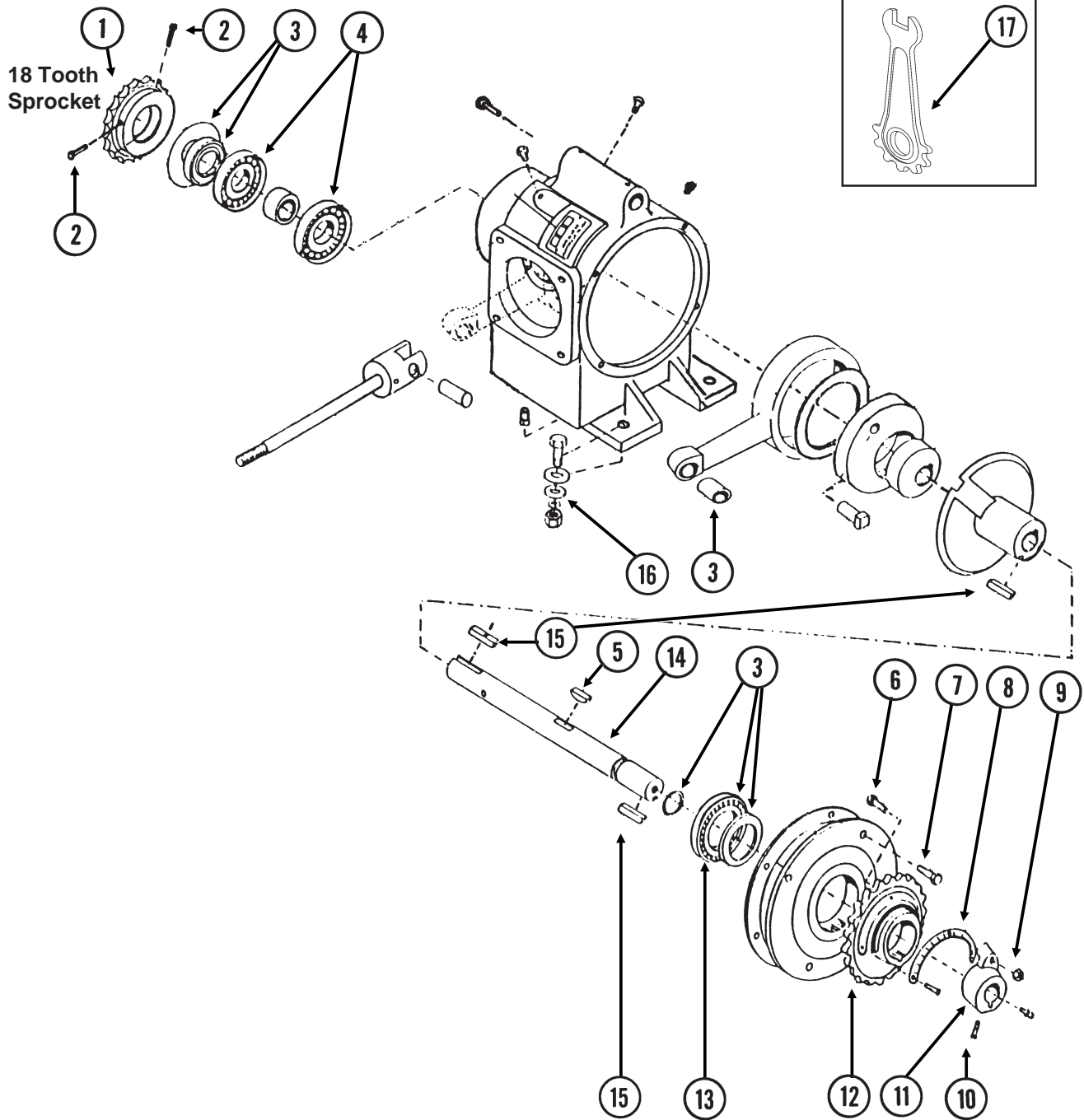
LIQUID FERTILIZER PISTON PUMP MOUNTING BRACKETS AND DRIVELINE

ITEM	PART NO.	QTY.	DESCRIPTION
7.	G10994	1	Close Nipple, 3/4" NPT, Stainless Steel
8.		-	See "Liquid Fertilizer Piston Pump (Cylinder Assembly)", Pages P100 And P101
9.		-	See "Liquid Fertilizer Piston Pump (Crankcase Assembly)", Pages P98 And P99
10.	G10615	1	Reducing Bushing, 1 1/2" Male NPT To 1 1/4" Female
11.	G10629	1	Elbow, 90°, 1 1/4" NPT To Barb
12.		-	See "Liquid Fertilizer Tanks, Saddles, Mounts, Hoses And Fittings", Pages P92 And P93
13.	G10626	4	Adapter, 1 1/4" NPT To Barb
14.	GA3893	1	Strainer Complete
	GR0880	-	Screen, No. 40 Mesh
	GR0881	-	Gasket
	GR0882	-	Y-Body
	GR0883	-	End Cap
15.	G10753	1	Hex Head Cap Screw, 3/8"-16 x 4 1/2"
	G10210	1	Washer, 3/8" USS
	G10108	1	Lock Nut, 3/8"-16
	G10101	1	Hex Nut, 3/8"-16
16.	GD5857	1	Spring
17.	G10045	1	Hex Head Cap Screw, 1/2"-13 x 4 1/2"
	G10206	2	Washer, 1/2" SAE
	G10111	1	Lock Nut, 1/2"-13
	G10102	1	Hex Nut, 1/2"-13
18.	GA10081	1	Idler W/Sprocket And Hardware
	GA7154	-	Sprocket W/Bearing, 18 Tooth
	G10581	-	Hex Head Cap Screw, 1/2"-13 x 2 1/4"
	GD11158	-	Spacer, 3/4" O.D. x 9/16" Long
	G10501	-	Hex Jam Nut, 1/2"-13, Grade 2
	G10421	-	Hex Head Cap Screw, 7/16"-14 x 1 1/4"
	G10100	-	Hex Nut, 7/16"-14
19.	GD11158	1	Spacer, 3/4" O.D. x 9/16" Long
20.	G10439	4	Hex Head Cap Screw, 5/8"-11 x 7"
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
21.	GD1908	2	Mounting Bracket
22.	GA10603	1	Pump Mount, L.H.
23.	GA4620	1	Pump Mount, R.H.
24.	G10003	4	Hex Head Cap Screw, 3/8"-16 x 1 1/2"
	GR1122	4	Rubber Washer
	G10210	4	Washer, 3/8" USS
	G10229	4	Lock Washer, 3/8"
	G10101	4	Hex Nut, 3/8"-16
25.	G10478	1	Clevis Pin, 5/16" x 1"
	G10409	1	Retaining Ring, 5/16"
26.	G3310-88	1	Chain, No. 40, 88 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
27.	G10670	1	Hair Pin Clip, No. 3
28.	G2100-03	1	Bearing, 7/8" Hex Bore, Spherical
29.	G3400-01	2	Flangette
30.	G10303	3	Carriage Bolt, 5/16"-18 x 1"
	G10232	3	Lock Washer, 5/16"
	G10106	3	Hex Nut, 5/16"-18
31.	GD11045	5	Lock Clamp
32.	G10130	5	Square Head Machine Bolt, 5/16"-18 x 1 3/4"
	G10923	5	Flange Nut, 5/16"-18, No Serration
33.	GD1719	1	Coupler, 4"
34.	G10233	1	Machine Bushing, 1", 10 Gauge
35.	GA5194	1	Sprocket, 50 Tooth

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

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

Model LM-2455-R



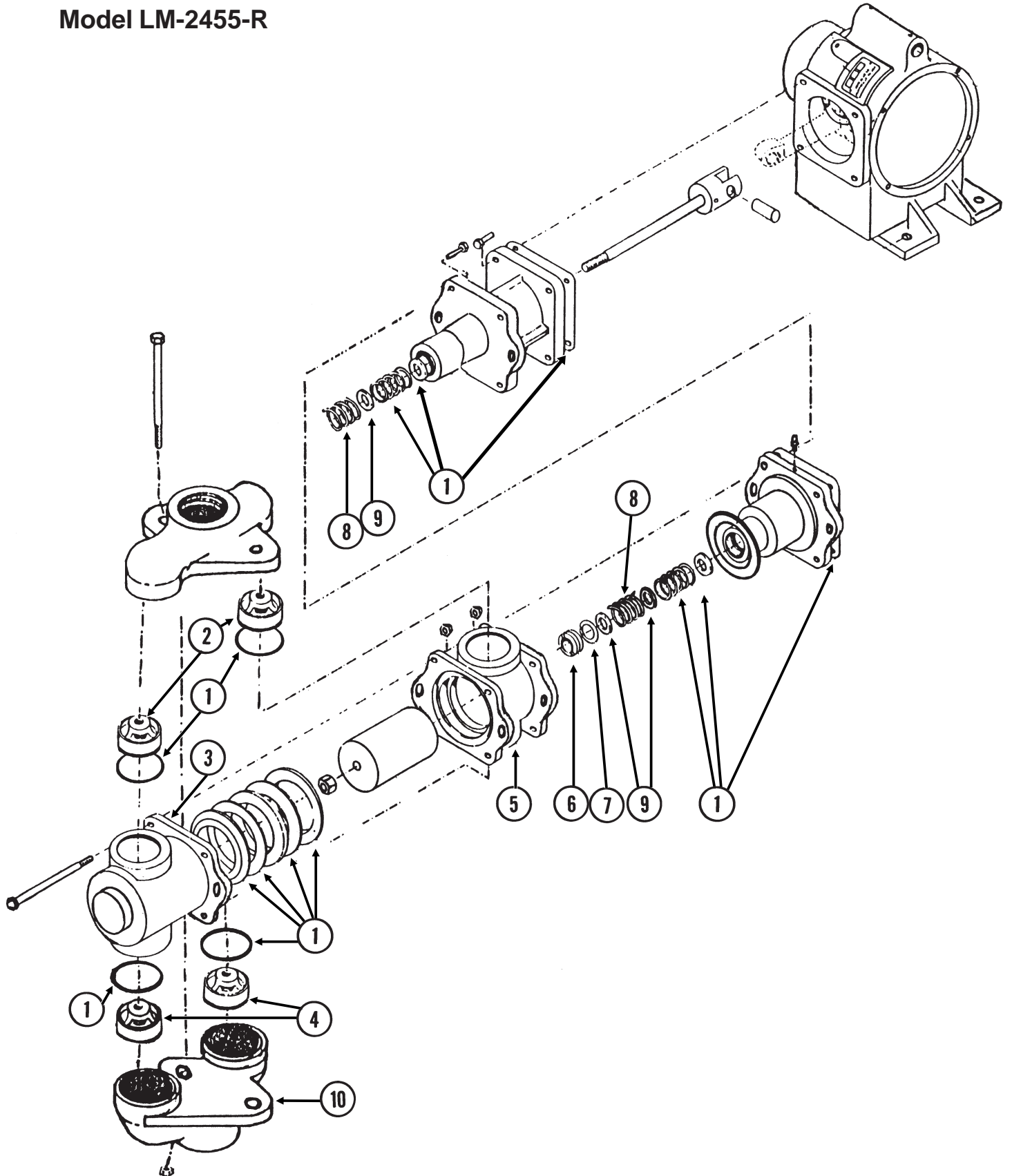
LIQUID FERTILIZER PISTON PUMP (Crankcase Assembly) Uses 18 Tooth Sprocket

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1389	1	Sprocket, 18 Tooth
2.	G10688	2	Square Head Set Screw, $\frac{3}{8}$ "-16 x $\frac{5}{8}$ "
3.	GR1425	1	Repair Kit, Includes Item 1 On Pages P100 And P101
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 Mounting Brackets And Driveline", Pages P94 And P95
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 P100 And P101

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

JB-L2190-991(FRTZ171)

Model LM-2455-R



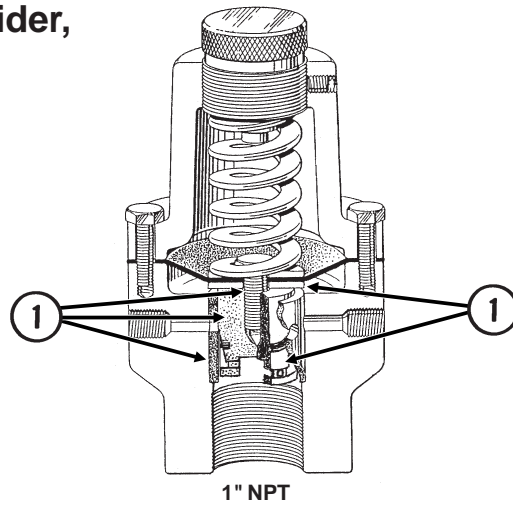
LIQUID FERTILIZER PISTON PUMP (Cylinder Assembly) Uses 18 Tooth Sprocket

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1425	1	Repair Kit, Includes Item 3 On Pages P98 And P99
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

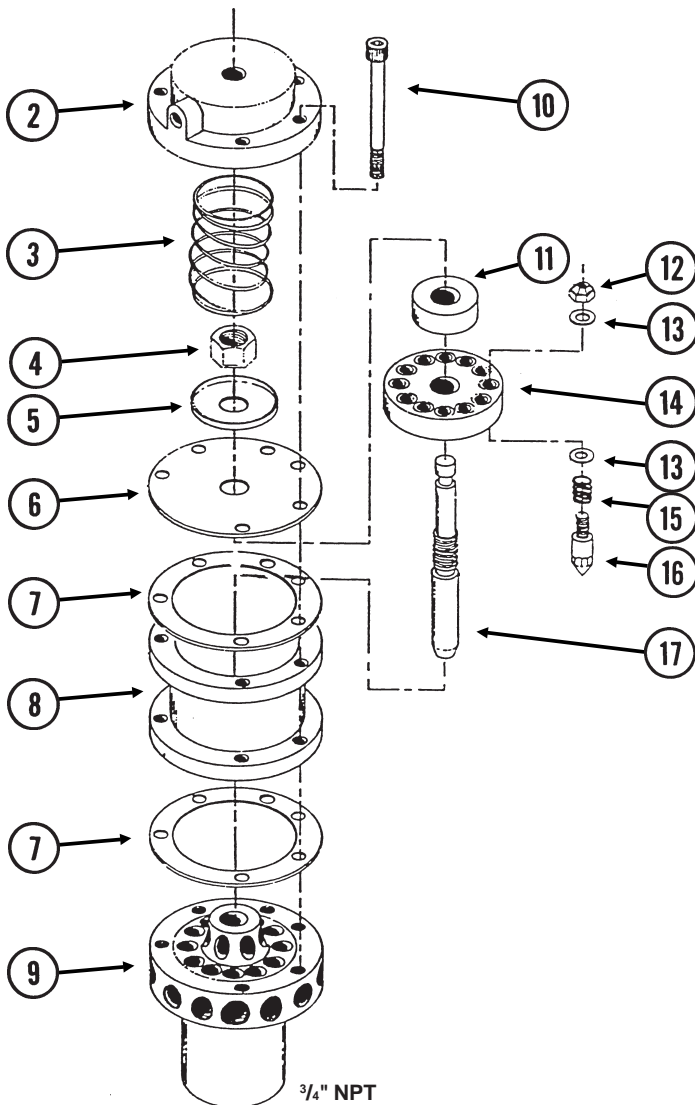
LIQUID FERTILIZER PISTON PUMP FLOW DIVIDER

(FRTZ159/PT40a/FRTZ202c)

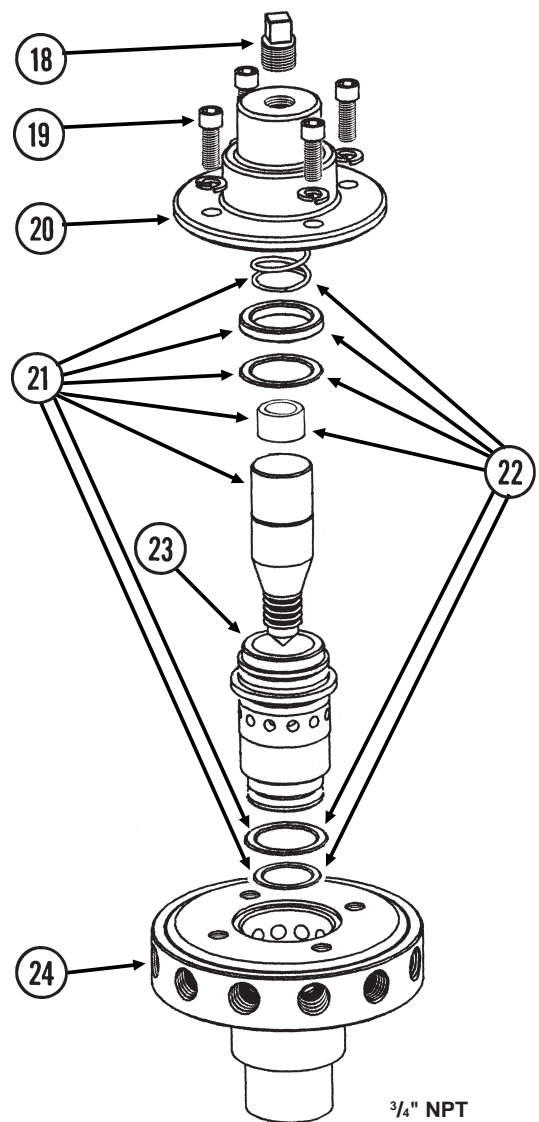
Model 70-12 Flow Divider, 12 Outlet



Model L-2190 Flow Divider, 12 Outlet



Model FD-1200 Flow Divider, 12 Outlet



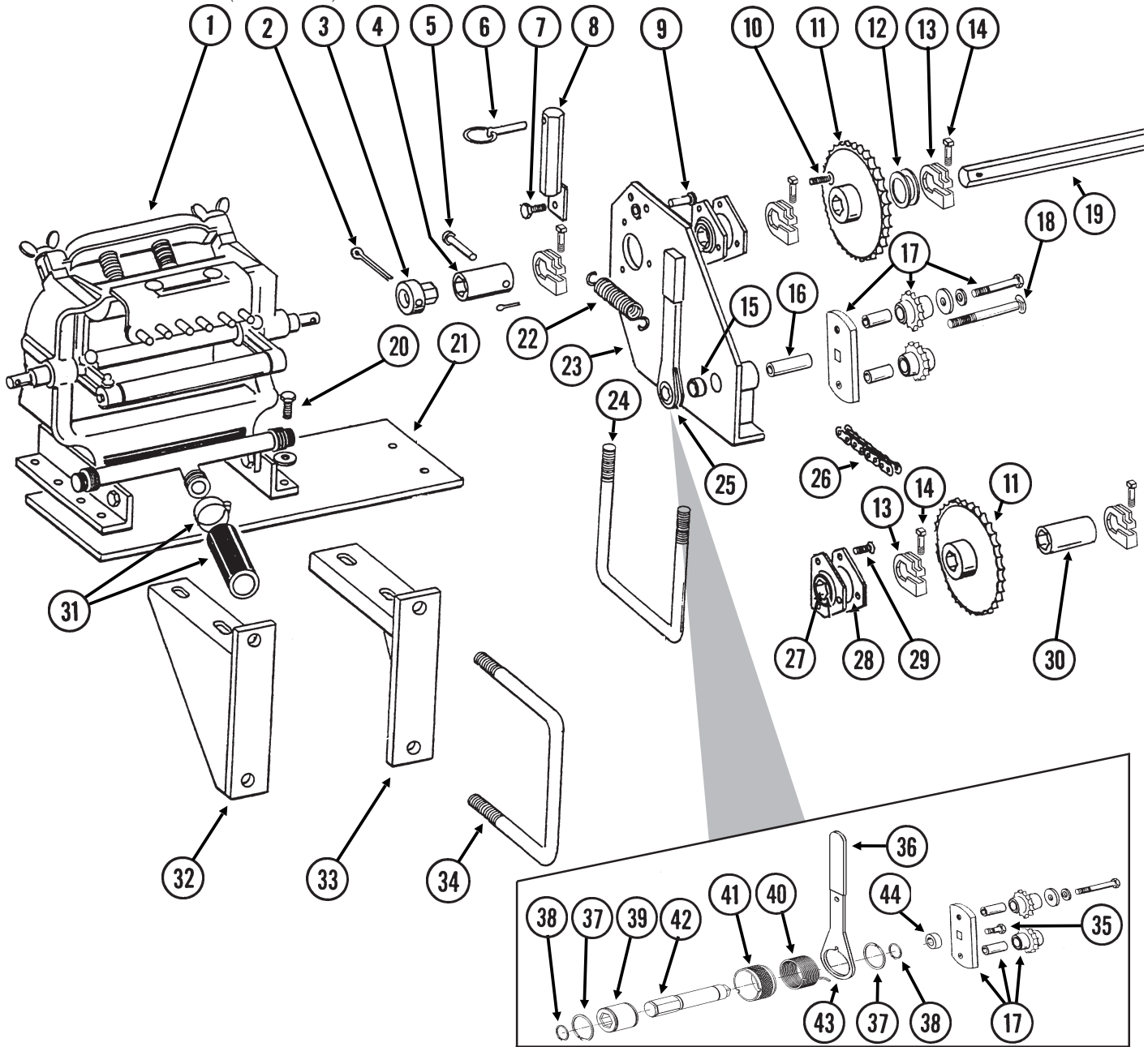
LIQUID FERTILIZER PISTON PUMP FLOW DIVIDER

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, $\frac{9}{16}$ "-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, $\frac{1}{4}$ "-20
11.	GR1158	1	Lock
12.	*	12	Valve Nut
13.	*	24	Washer, Stainless Steel
14.	*	1	Disk
15.	*	12	Spring
16.	*	12	Valve
17.	GR1162	1	Plunger
18.	GR1543	1	Plug
19.	GR1542	4	Hex Socket Head Screw, $\frac{1}{4}$ "-20 x $\frac{3}{4}$ ", Stainless Steel
	GR1541	4	Lock Washer, $\frac{1}{4}$ ", 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) (Sub GA8931)
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 BRACKETS AND DRIVELINE

LFC009/LFC010/LFC024/PTD074(TWL63c/A10030d)



ITEM	PART NO.	QTY.	DESCRIPTION
------	----------	------	-------------

1.		-	See "Liquid Fertilizer Squeeze Pump", Pages P106 And P107
2.	G10462	1	Cotter Pin, $\frac{3}{16}$ " x 2"
3.	GD7127	1	Shear Coupler
4.	GD9048	1	Coupler, 2 $\frac{1}{2}$ "
5.	G10558	1	Clevis Pin, $\frac{5}{16}$ " x 1 $\frac{3}{4}$ "
6.	G10456	1	Cotter Pin, $\frac{1}{8}$ " x $\frac{3}{4}$ "
7.	GD2558	1	Lynch Pin, $\frac{1}{4}$ "
	G10037	1	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 1 $\frac{1}{4}$ "
	G10228	1	Lock Washer, $\frac{1}{2}$ "
	G10102	1	Hex Nut, $\frac{1}{2}$ "-13
8.	GA5229	1	Sprocket Storage Rod
9.	G10478	1	Clevis Pin, $\frac{5}{16}$ " x 1"
10.	G10312	3	Carriage Bolt, $\frac{5}{16}$ "-18 x $\frac{3}{4}$ "
	G10232	3	Lock Washer, $\frac{5}{16}$ "
	G10106	3	Hex Nut, $\frac{5}{16}$ "-18

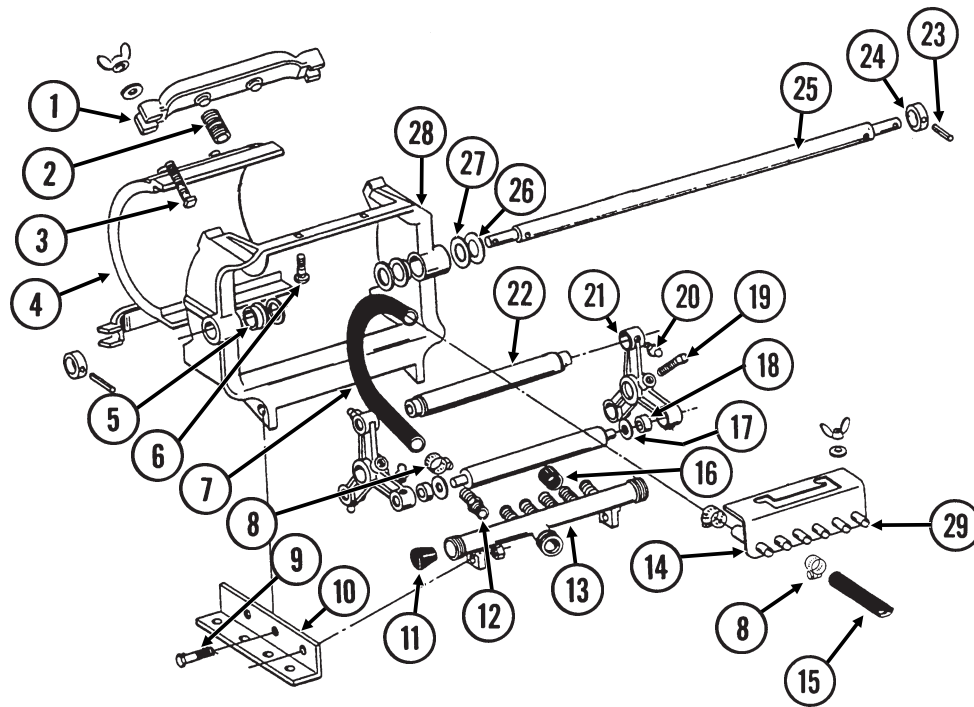
LIQUID FERTILIZER SQUEEZE PUMP MOUNTING BRACKETS AND DRIVELINE

ITEM	PART NO.	QTY.	DESCRIPTION
11.	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)
12.	G10233	2	Machine Bushing, 1", 10 Gauge
13.	GD11045	5	Lock Clamp
14.	G10130	5	Square Head Machine Bolt, $\frac{5}{16}$ "-18 x 1 $\frac{3}{4}$ "
	G10923	5	Flange Nut, $\frac{5}{16}$ "-18, No Serration
15.	GD10161	1	Spacer, $\frac{3}{8}$ "
16.	GD3180-04	1	Sleeve, $\frac{5}{8}$ " I.D. x $\frac{7}{8}$ " O.D. x 2 $\frac{1}{8}$ " Long
17.	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 $\frac{3}{4}$ "
18.	G10865	1	Carriage Bolt, $\frac{1}{2}$ "-13 x 4"
	G10111	1	Lock Nut, $\frac{1}{2}$ "-13
19.	GD2548-30	1	Hex Shaft, $\frac{7}{8}$ " x 30" (1 Hole)
20.	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
21.	GD6165	-	Plate, (8 Row 30" Only)
22.	GD5857	1	Spring
23.	GA6403	1	Drive Plate W/Grease Fitting
	G10641	-	Grease Fitting, $\frac{1}{8}$ " NPT
	G10640	-	Grease Fitting, $\frac{1}{4}$ "-28
24.	GD1134	1	U-Bolt, 7" x 5" x $\frac{5}{8}$ "-11
	G10230	2	Lock Washer, $\frac{5}{8}$ "
	G10104	2	Hex Nut, $\frac{5}{8}$ "-11
25.	GA4235	1	Ratchet Arm W/Protective Closure
	G10445	-	Protective Closure
26.	G3310-176	1	Chain, No. 40, 176 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
27.	G2100-03	2	Bearing, $\frac{7}{8}$ " Hex Bore, Spherical
28.	G3400-01	4	Flangette
29.	G10303	6	Carriage Bolt, $\frac{5}{16}$ "-18 x 1"
	G10232	6	Lock Washer, $\frac{5}{16}$ "
	G10106	6	Hex Nut, $\frac{5}{16}$ "-18
30.	GD1719	1	Coupler, 4"
	G10409	1	Retaining Ring, $\frac{5}{16}$ "
31.		-	See "Liquid Fertilizer Tanks, Saddles, Mounts, Hoses And Fittings", Pages P92 And P93
32.	GA4619	1	Pump Mount, L.H.
33.	GA4620	1	Pump Mount, R.H.
34.	GD1113	2	U-Bolt, 5" x 7" x $\frac{5}{8}$ "-11
	G10230	4	Lock Washer, $\frac{5}{8}$ "
	G10104	4	Hex Nut, $\frac{5}{8}$ "-11
35.	G11100	1	Hex Socket Button Head Screw, $\frac{1}{4}$ "-20 x $\frac{1}{2}$ ", Grade 8
	G10227	1	Lock Washer, $\frac{1}{4}$ "
	G10209	1	Washer, $\frac{1}{4}$ " USS
36.	G11078	1	Vinyl Cap
37.	G10496	2	External Inverted Snap Ring, 1 $\frac{1}{2}$ "
38.	G11075	2	Internal Inverted Snap Ring, $\frac{7}{8}$ "
39.	GD14432	1	Sleeve, 1 $\frac{1}{4}$ "
40.	GD14413	-	Torsion Spring, L.H. (Used On R.H. Wrap Spring Wrench)(Shown)
	GD14414	1	Torsion Spring, R.H. (Used On L.H. Wrap Spring Wrench)
41.	GD14430	1	Release Collar, Gold, R.H. (Shown)
	GD14429	-	Release Collar, Silver, L.H.
42.	GD14427	1	Tightener Shaft, 4 $\frac{7}{8}$ "
43.	GD14431	1	Handle
44.	GD2734-08	1	Sleeve, 1 $\frac{1}{4}$ " O.D. x $\frac{5}{8}$ " Long
A.	G1K269	-	Lock Clamp Kit (Items 13 And 14)
B.	G1K379	-	Wrap Spring Wrench Replacement Kit, Silver Collar, L.H. (Items 35-44)

LIQUID FERTILIZER SQUEEZE PUMP

6 ROW

LFC011/LFC011(PT47a)

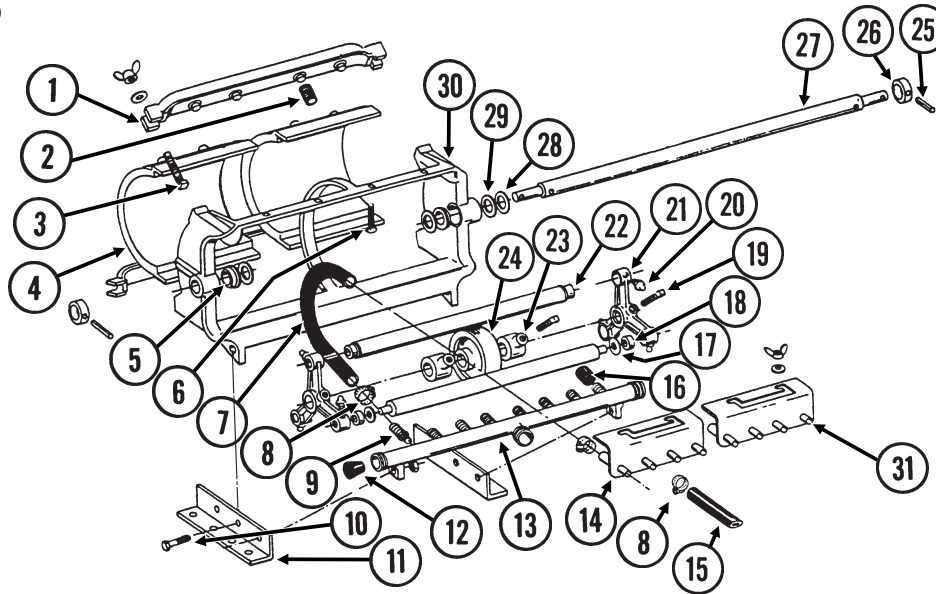


ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR0216	2	Spring Anchor Bar
2.	GR0214	4	Spring
3.	G10130	4	Square Head Machine Bolt, $\frac{5}{16}$ "-18 x 1 $\frac{3}{4}$ "
	G10219	4	Washer, $\frac{5}{16}$ " USS
	G10144	4	Wing Nut, $\frac{5}{16}$ "-18
4.	GR0212	1	Plate
5.	GR0207	2	Nylon Bushing
6.	G10303	2	Carriage 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.	G4301-02	1	Hose, $\frac{3}{8}$ " x 50'
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 Rows (Items 1-13, 15-22 And 25-29)

LIQUID FERTILIZER SQUEEZE PUMP

8 ROW

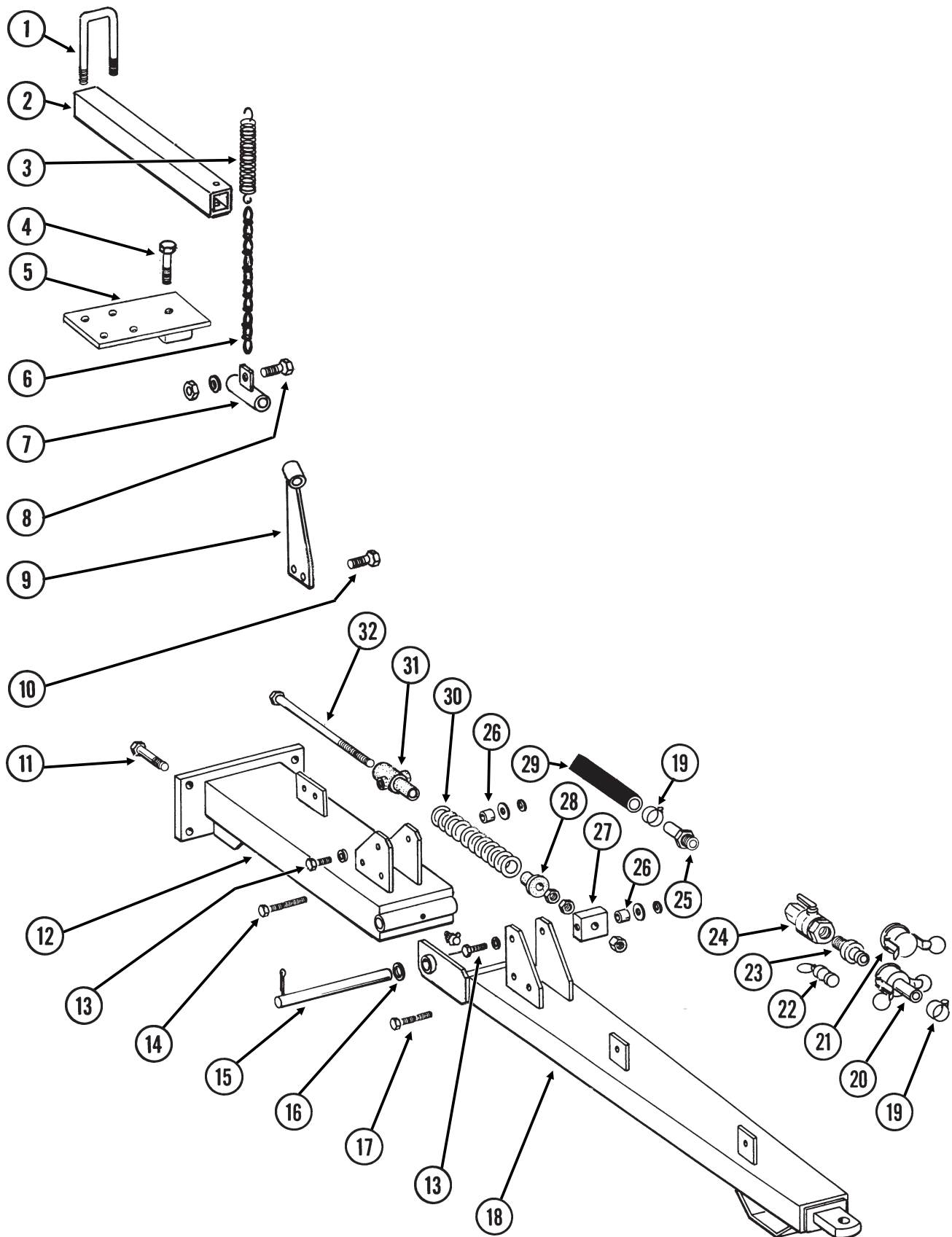
LFC010(PT48a)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR0221	2	Spring Anchor Bar
2.	GR0214	8	Spring
3.	G10130	4	Square Head Machine Bolt, $\frac{5}{16}$ "-18 x 1 $\frac{3}{4}$ "
	G10219	4	Washer, $\frac{5}{16}$ " USS
	G10144	4	Wing Nut, $\frac{5}{16}$ "-18
4.	GR0212	2	Plate
5.	GR0207	2	Nylon Bushing
6.	G10303	4	Carriage Bolt, $\frac{5}{16}$ "-18 x 1"
	G10219	4	Washer, $\frac{5}{16}$ " USS
	G10144	4	Wing Nut, $\frac{5}{16}$ "-18
7.	GR0215	8	Metering Hose, $\frac{1}{2}$ " x 13"
8.	G10681	-	Hose Clamp, No. 6
9.	GR0232	8	Adapter
10.	G10004	4	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{1}{4}$ "
	G10101	4	Hex Nut, $\frac{3}{8}$ "-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, $\frac{3}{8}$ " x 100'
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.	GR0283	3	Roller
23.	GR0282	2	Set Collar
24.	GR0281	1	Back Up Roller
25.	G10718	2	Spring Pin, $\frac{5}{16}$ " x 1 $\frac{1}{8}$ "
26.	GD9109	2	Sleeve
27.	GD9108	1	Shaft
28.	GR0226	4	Shim, $\frac{3}{64}$ "
29.	GR0225	4	Shim, $\frac{1}{32}$ "
30.	GR0222	1	Frame
31.	GR1577	8	Nylon Hose Barb, $\frac{1}{2}$ " x $\frac{3}{8}$ " (If Applicable)
A.	GA8692	-	Squeeze Pump Complete, 8 Rows (Items 1-14, 16-24 And 27-31)

REAR TRAILER HITCH

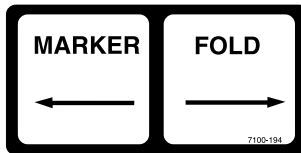
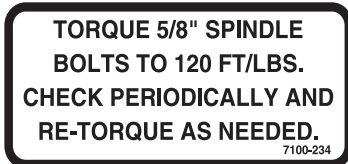
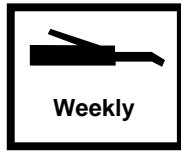
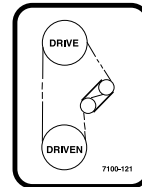
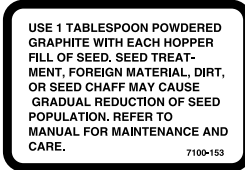
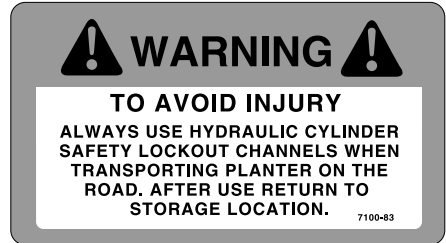
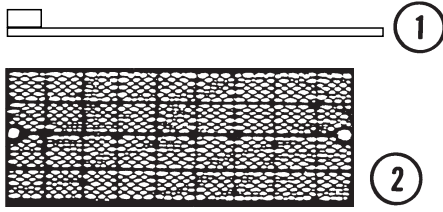
PHA032/LFC003(TWL47b)



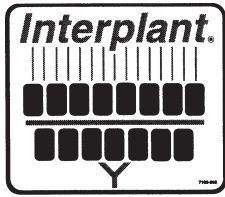
REAR TRAILER HITCH

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD2721	2	U-Bolt, 2" x 2" x 1/2"-13
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
2.	GD10196	-	Hanger Tube
3.	GD0829	-	Spring
4.	G10013	1	Hex Head Cap Screw, 5/8"-11 x 3 1/2" (As Required)
	G10217	1	Washer, 5/8" USS (As Required)
	G10230	1	Lock Washer, 5/8" (As Required)
	G10056	-	Hex Head Cap Screw, 3/4"-10 x 3 1/2" (As Required)
	G10218	-	Washer, 3/4" USS (As Required)
	G10231	-	Lock Washer, 3/4" (As Required)
5.	GA7211	1	Mount
6.	G3305-03	-	Twin Loop Chain, 15 Links
7.	GA7209	-	Hose Support
8.	G10064	1	Hex Head Cap Screw, 1/4"-20 x 1"
	G10209	2	Washer, 1/4" USS
	G10110	1	Lock Nut, 1/4"-20, Grade B
9.	GA7208	-	Hose Support
10.	G10004	2	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10108	2	Lock Nut, 3/8"-16
11.	G10826	5	Hex Head Cap Screw, 1"-8 x 2 1/2"
	G10396	5	Lock Nut, 1"-8
12.	GA6960	1	Hitch
13.	G10007	4	Hex Head Cap Screw, 5/8"-11 x 1 1/2"
	GD7805	4	Special Washer, 5/8", Hardened
	G10230	4	Lock Washer, 5/8"
14.	G10756	1	Hex Head Cap Screw, 3/8"-16 x 6"
	G10229	1	Lock Washer, 3/8"
	G10101	1	Hex Nut, 3/8"-16
15.	GD3547	1	Pin, 1 1/4" x 12 3/4"
16.	G10226	2	Washer, 1 1/4" SAE
	G10460	2	Cotter Pin, 1/4" x 2"
17.	G10172	1	Hex Head Cap Screw, 3/8"-16 x 5"
	G10229	1	Lock Washer, 3/8"
	G10101	1	Hex Nut, 3/8"-16
18.	GA6961	1	Hitch
19.	G10672	6	Hose Clamp, No. 28
20.	GD1516	1	Adapter, 1 1/4" Barb To Female Cam Lock
21.	GD1515	1	Dust Cap, 1 1/4" Cam Lock
22.	GD1517	1	Dust Plug, 1 1/4" Male Cam Lock
23.	GD1514	1	Adapter, 1 1/4" Male NPT To Cam Lock
24.	GA4976	1	Shutoff Valve, 1 1/4" NPT
	GR1015	-	Body O-Ring
	GR1016	-	Stem O-Ring
	GR1017	-	Teflon Seat
	GR1018	-	Ball
	GR1019	-	Handle
25.	G10626	1	Adapter, 1 1/4" NPT To Barb
26.	GB0218	4	Bushing, 2 1/32" I.D. x 7/8" O.D. x 19/32" Long
27.	GD7908	1	Tap Block
28.	GB0213	1	Spring Seat
29.	G4200-01	1	Hose, 1 1/4" x 22'
30.	GD2115	1	Spring
31.	GB0206	1	Rod Guide
32.	GD7907	1	Special Bolt
	G10105	3	Hex Nut, 3/4"-10

DECALS, PAINT AND MISCELLANEOUS



DECALS, PAINT AND MISCELLANEOUS



27



29



30



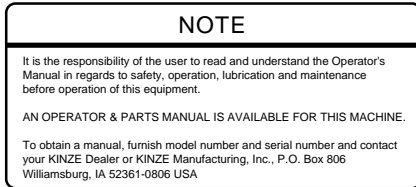
31



32



28



33



34



35



36



37



38

KINZE

3500

39

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	4	Reflector, Red (If Applicable)
	G7200-04	2	Reflector, Amber (If Applicable)
3.	G7100-02	4	Decal, Warning
4.	G7100-42	-	Decal, Warning (2 Per Marker)
5.	G7100-46	1	Decal, Warning
6.	G7100-302	1	Decal, Warning
7.	G7100-63	2	Decal, Caution
8.	G7100-68	4	Decal, Warning
9.	G7100-75	4	Decal, Caution
10.	G7100-83	-	Decal, Warning (1 Per Marker Lockup)
11.	G7100-89	2	Decal, Danger
12.	G7100-90	1	Decal, Warning
13.	G7100-115	-	Decal, Warning (1 Per Granular Chemical Hopper)
14.	G7100-104	2	Decal, KINZE®, 3" x 12"
15.	G7100-153	-	Decal, Information (1 Per Brush-Type Seed Meter)
16.	G7100-121	1	Decal, Transmission

(Continued)

DECALS, PAINT AND MISCELLANEOUS

ITEM	PART NO.	QTY.	DESCRIPTION
(Continued)			
17.	G7100-116	-	Decal, Grease Daily
18.	G7100-111	-	Decal, Oil Daily
19.	G7100-110	-	Decal, Grease Weekly
20.	G7100-234	-	Decal, Bolt Torque
21.	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)
22.	GD10057-01	-	Hose Identification Sleeve, Red AA
	GD10057-02	-	Hose Identification Sleeve, Red BB
	GD10057-03	-	Hose Identification Sleeve, Blue AA
	GD10057-04	-	Hose Identification Sleeve, Blue BB
23.	G7100-244	2	Decal, 3500
24.	G7100-248	-	Decal, Meter Alignment (1 Per Row Unit)
25.	G7100-194	1	Decal, Instruction
26.	GD2199	1	SMV Sign
27.	G7100-208	2	Decal, Interplant®
28.	G7100-177	1	Decal, Twin-Line®, ³ / ₄ " x 3"
29.	G7100-215	1	Decal, Danger
30.	GR0146	-	Powdered Graphite, 1 Pound Container
	GR0146MPP	-	Powdered Graphite, Twenty-Four 1 Pound Containers
31.	GR0155	-	Blue Paint, Aerosol Can
	GR0155MPP	-	Blue Paint, Twelve Aerosol Cans
32.	GR1570MPP	-	Talc Lubricant, Four 8 Pound Containers
33.	G7100-217	1	Decal, Note
34.	G7100-295	1	Decal, Spring Tension Release
35.	G7100-249	1	Decal, Caution
36.	G7100-261	-	Reflective Decal, Red, 1 ³ / ₄ " x 9", Die-Cut (If Applicable)
	G7100-262	-	Reflective Decal, Amber, 1 ³ / ₄ " x 9", Die-Cut (If Applicable)
	G7100-263	-	Reflective Decal, Orange, 1 ³ / ₄ " x 9", Die-Cut (If Applicable)
37.	G7100-258	-	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)
38.	GM0166	-	Operator & Parts Manual, Model 3500
39.	G7100-294	2	Decal, KINZE® 3500

NUMERICAL INDEX

Part No.	Page	Part No.	Page	Part No.	Page
A1002	P63	G10016	P41, P71, P77, P95	G10106	P9, P23, P29, P38, P43, P46, P79, P91, P97, P104, P105
A1018	P63	G10017	P23, P46, P47, P81, P91	G10107	P9, P10, P21, P23, P28, P29, P31, P36, P46, P73, P81, P85, P95
A1021	P63	G10018	P7, P9, P75	G10108	P3, P12, P17, P33, P37, P39, P43, P53, P54, P76, P77, P79, P81, P83, P85, P97, P99, P109
A1026	P63	G10019	P52, P73	G10109	P7, P9, P10, P25, P27, P31, P52, P73, P75, P83, P85, P93
A1041	P63	G10020	P14	G10110	P19, P38, P109
A1055	P63	G10021	P14	G10111	P10, P21, P23, P25, P29, P31, P39, P47, P73, P77, P81, P85, P88, P97, P105
A1076	P63	G10022	P14, P38, P67, P69	G10112	P31
A1090	P63	G10023	P17	G10120	P39
A1107	P63	G10025	P39	G10128	P46
A1141	P63	G10026	P41	G10130	P45, P71, P97, P105, P106, P107
A1153	P63	G10027	P37, P41	G10131	P45, P106, P107
A1194	P63	G10028	P41	G10133	P10, P25, P27, P31, P73, P83, P85, P91
A1195	P63	G10031	P38	G10144	P106, P107
A3105	P63	G10033	P25, P39, P46	G10152	P9
A3137	P63	G10036	P21, P29	G10157	P35
A3183	P63	G10037	P38, P41, P46, P104	G10168	P52
A3210	P63	G10038	P95	G10169	P35
G6400-06	P61	G10039	P23, P31, P77, P95	G10171	P9, P91
A5460	P57	G10043	P79, P99	G10172	P39, P109
A6020	P56	G10045	P25, P73, P97	G10201	P3, P13, P17, P33, P91
A6364	P38	G10046	P31, P73, P81	G10203	P47, P83, P85
A6401	P38	G10047	P47, P79, P81, P88, P105	G10204	P5, P7, P73, P86, P87
A6524	P53	G10048	P37, P39	G10205	P31, P37, P49, P51, P75, P76, P77
A7369	P43	G10049	P77	G10206	P27, P29, P39, P71, P81, P95, P97
A7380	P41	G10053	P46, P47	G10207	P3
A7524	P58	G10055	P29	G10209	P18, P19, P47, P89, P105, P109
A8422	P17	G10056	P109	G10210	P3, P9, P10, P11, P12, P13, P17, P33, P43, P47, P73, P77, P79, P81, P88, P94, P97, P105
A9401	P38	G10061	P12, P37	G10211	P12, P67, P69
A9402	P38	G10064	P10, P38, P109	G10213	P5, P27, P29, P31, P73
A9442	P57	G10068	P29		
D13426	P56	G10096	P93		
G10001	P4, P9, P10, P38, P43, P67, P68, P71, P76	G10100	P77, P97		
G10002	P81	G10101	P4, P10, P11, P19, P33, P37, P38, P39, P43, P51, P67, P68, P71, P73, P77, P94, P95, P97, P105, P106, P107, P109		
G10003	P3, P19, P49, P51, P94, P95, P97	G10102	P9, P25, P29, P31, P37, P38, P41, P46, P47, P49, P51, P52, P71, P73, P75, P79, P81, P88, P91, P93, P94, P95, P97, P104, P109		
G10004	P33, P37, P43, P47, P77, P105, P106, P107, P109	G10103	P19, P38, P39, P67, P69		
G10005	P31, P37, P39, P49, P95	G10104	P4, P11, P29, P33, P35, P37, P38, P49, P51, P73, P77, P79, P81, P89, P91, P93, P95, P97, P105		
G10006	P9, P25, P36	G10105	P37, P41, P76, P93, P109		
G10007	P4, P5, P11, P31, P76, P79, P93, P109				
G10008	P28, P29, P41, P49, P51				
G10009	P27, P31				
G10010	P7, P75, P86, P87				
G10011	P31, P81				
G10012	P29				
G10013	P10, P79, P109				
G10014	P7, P31, P39, P79				
G10015	P9				

NUMERICAL INDEX

Part No.	Page	Part No.	Page	Part No.	Page
G10216	..... P7, P23, P33, P41, P71, P75, P77, P83, P88, P93	G10307	..... P33	G10529	..... P20
G10217	..... P29, P35, P79, P81, P95, P109	G10308	..... P10, P20	G10531	..... P15
G10218	..... P109	G10309	..... P12	G10535	..... P71
G10219	..... P9, P43, P79, P81, P91, P106, P107	G10310	..... P19	G10536	..... P23, P49, P51
G10220	..... P76	G10312	..... P3, P17, P38, P43, P104	G10542	..... P73
G10221	..... P73	G10315	..... P9, P10, P19	G10544	..... P52
G10226	..... P35, P49, P51, P109	G10318	..... P23	G10545	..... P4
G10227	..... P19, P38, P39, P47, P67, P69, P89, P105	G10322	..... P77	G10546	..... P12, P18
G10228	..... P7, P25, P29, P37, P38, P41, P46, P47, P49, P51, P52, P71, P73, P75, P79, P81, P88, P91, P93, P94, P95, P104, P109	G10323	..... P14	G10551	..... P3
G10229	..... P4, P10, P11, P17, P19, P33, P37, P38, P43, P47, P49, P51, P67, P68, P71, P73, P77, P88, P94, P95, P97, P105, P109	G10325	..... P5, P17	G10558	..... P104
G10230	..... P4, P7, P10, P11, P33, P35, P37, P38, P41, P46, P49, P51, P73, P75, P77, P79, P81, P89, P91, P93, P95, P97, P105, P109	G10326	..... P3	G10560	..... P75
G10231	..... P37, P39, P41, P93, P109	G10328	..... P5	G10567	..... P12, P18
G10232	..... P9, P38, P43, P46, P73, P79, P81, P91, P97, P104, P105	G10338	..... P7, P12	G10570	..... P18
G10233	..... P43, P46, P71, P86, P87, P89, P95, P97, P105	G10348	..... P25	G10572	..... P23, P29
G10235	..... P43, P95	G10358	..... P103	G10573	..... P29
G10236	..... P37	G10370	..... P43	G10574	..... P21, P25, P29, P31, P88
G10237	..... P77	G10371	..... P25, P95	G10581	..... P29, P71, P97
G10239	..... P37	G10396	..... P109	G10582	..... P29
G10252	..... P12	G10400	..... P31	G10584	..... P15
G10257	..... P18	G10401	..... P14	G10585	..... P23
G10278	..... P93	G10403	..... P39	G10587	..... P91
G10284	..... P33	G10408	..... P89	G10588	..... P91
G10292	..... P95, P96	G10409	..... P47, P89, P97, P105	G10592	..... P77
G10302	..... P12	G10412	..... P4, P12, P33, P43	G10594	..... P77
G10303	..... P9, P43, P46, P91, P97, P105, P106, P107	G10419	..... P88	G10597	..... P23
G10304	..... P3	G10421	..... P97	G10599	..... P11, P33, P77
G10305	..... P20, P73	G10427	..... P5, P9	G10602	..... P12, P14, P15, P18, P43, P47, P88, P95
G10306	..... P19, P43, P79, P81, P83, P85	G10430	..... P45	G10603	..... P14, P15, P83, P85
G10307	..... P33	G10438	..... P3, P75, P79	G10604	..... P14
G10308	..... P10, P20	G10439	..... P97	G10606	..... P41
G10309	..... P12	G10445	..... P47, P88, P105	G10610	..... P75
G10310	..... P19	G10450	..... P79, P81	G10615	..... P94, P97
G10312	..... P3, P17, P38, P43, P104	G10451	..... P73	G10618	..... P95
G10315	..... P9, P10, P19	G10452	..... P19	G10619	..... P93
G10318	..... P23	G10456	..... P33, P75, P104	G10620	..... P3, P7, P12, P17, P38, P75, P86, P87
G10322	..... P77	G10457	..... P37	G10621	..... P12, P14, P17, P20
G10323	..... P14	G10459	..... P77	G10622	..... P5, P20, P93, P95, P97, P109
G10325	..... P5, P17	G10460	..... P45, P47, P49, P51, P88, P91, P109	G10629	..... P93, P94, P97
G10326	..... P3	G10462	..... P47, P89, P104	G10633	..... P93
G10328	..... P5	G10463	..... P9, P33	G10634	..... P15
G10338	..... P7, P12	G10464	..... P45	G10636	..... P41
G10348	..... P25	G10470	..... P14	G10638	..... P39
G10358	..... P103	G10476	..... P79	G10640	..... P7, P21, P29, P39, P75, P77, P81, P83, P85, P105, P106, P107
G10370	..... P43	G10478	..... P47, P97, P104	G10641	..... P47, P49, P51, P76, P79, P91, P105
G10371	..... P25, P95	G10496	..... P47, P71, P89, P105	G10643	..... P31, P88
G10396	..... P109	G10499	..... P73	G10655	..... P91
G10400	..... P31	G10500	..... P14	G10660	..... P18
G10401	..... P14	G10501	..... P25, P43, P97	G10669	..... P3
G10403	..... P39	G10503	..... P23, P73, P83, P85		
G10408	..... P89	G10504	..... P73		
G10409	..... P47, P89, P97, P105	G10507	..... P76		
G10412	..... P4, P12, P33, P43	G10523	..... P19		
G10419	..... P88	G10526	..... P75		
G10421	..... P97	G10527	..... P47		
G10427	..... P5, P9				
G10430	..... P45				
G10438	..... P3, P75, P79				
G10439	..... P97				
G10445	..... P47, P88, P105				
G10450	..... P79, P81				
G10451	..... P73				
G10452	..... P19				
G10456	..... P33, P75, P104				
G10457	..... P37				
G10459	..... P77				
G10460	..... P45, P47, P49, P51, P88, P91, P109				
G10462	..... P47, P89, P104				
G10463	..... P9, P33				
G10464	..... P45				
G10470	..... P14				
G10476	..... P79				
G10478	..... P47, P97, P104				
G10496	..... P47, P71, P89, P105				
G10499	..... P73				
G10500	..... P14				
G10501	..... P25, P43, P97				
G10503	..... P23, P73, P83, P85				
G10504	..... P73				
G10507	..... P76				
G10523	..... P19				
G10526	..... P75				
G10527	..... P47				

NUMERICAL INDEX

Part No.	Page	Part No.	Page	Part No.	Page
G10670	..... P17, P91, P94, P97	G10938	..... P73	G3303-96	..... P33
G10671	..... P41	G10939	..... P53, P54	G3303-98	..... P3
G10672	..... P91, P93, P109	G10940	..... P7	G3305-01	..... P20
G10673	..... P19	G10958	..... P53, P54	G3305-03	..... P109
G10674	..... P93	G10961	..... P75, P86, P87	G3310-100	..... P46
G10676	..... P91	G10962	..... P58	G3310-116	..... P43
G10681	..... P73, P94, P96, P106, P107	G10967	..... P57	G3310-155	..... P88
G10688	..... P99	G10968	..... P71	G3310-160	..... P95
G10690	..... P14	G10974	..... P27, P31	G3310-176	..... P105
G10693	..... P99	G10989	..... P13	G3310-204	..... P71
G10716	..... P37	G10991	..... P81	G3310-208	..... P71
G10717	..... P37	G10994	..... P95, P97	G3310-226	..... P71
G10718	..... P33, P106, P107	G10995	..... P95, P96	G3310-80	..... P47
G10722	..... P52	G11007	..... P3	G3310-88	..... P97
G10724	..... P52	G11008	..... P3	G3310-92	..... P46
G10725	..... P52	G11009	..... P14, P15	G3400-01	..... P43, P47, P97, P105
G10732	..... P4, P33	G11010	..... P31	G4200-01	..... P109
G10747	..... P29	G11015	..... P3	G4200-02	..... P93
G10751	..... P12, P33, P43	G11016	..... P56	G4200-03	..... P93
G10752	..... P12	G11034	..... P85	G4205-11	..... P93
G10753	..... P97	G11058	..... P35	G4301-02	..... P94, P96, P106
G10756	..... P109	G11073	..... P18	G4301-04	..... P94, P96, P107
G10757	..... P19	G11075	..... P47, P89, P105	G6325X	..... P4
G10758	..... P19	G11078	..... P47, P89, P105	G6400-06	..... P63
G10765	..... P27, P31, P36	G11081	..... P41	G6400-08	..... P63
G10770	..... P56	G11098	..... P27	G6400-08-04	..... P63
G10779	..... P41	G11100	..... P47, P89, P105	G6400-08-06	..... P63
G10801	..... P9, P10	G1K215	..... P75	G6400-L-06	..... P63
G10819	..... P94	G1K248	..... P65, P67, P69	G6408-08	..... P54
G10826	..... P109	G1K249	..... P67, P69	G6500-08	..... P63
G10827	..... P58	G1K252	..... P65, P67, P69	G6500-08-06	..... P63
G10829	..... P93	G1K253	..... P43	G6502-08	..... P63
G10830	..... P85	G1K267	..... P67, P69	G6801-06-08	..... P63
G10844	..... P52	G1K268	..... P67, P69	G6801-08	..... P63
G10862	..... P77	G1K269	..... P45, P47, P71, P89, P105	G7100-02	..... P111
G10864	..... P19	G1K312	..... P12	G7100-104	..... P111
G10865	..... P105	G1K313	..... P13	G7100-110	..... P112
G10867	..... P47	G1K320	..... P67, P69	G7100-111	..... P112
G10871	..... P81	G1K321	..... P67, P69	G7100-115	..... P111
G10874	..... P39	G1K322	..... P67, P69	G7100-116	..... P112
G10886	..... P79	G1K323	..... P67, P68	G7100-121	..... P111
G10890	..... P43	G1K330	..... P21, P29	G7100-153	..... P111
G10898	..... P79	G1K331	..... P71	G7100-177	..... P112
G10908	..... P83, P85	G1K335	..... P13	G7100-194	..... P112
G10912	..... P5, P33	G1K345	..... P10	G7100-208	..... P112
G10917	..... P93	G1K362	..... P69	G7100-215	..... P112
G10918	..... P29	G1K363	..... P69	G7100-217	..... P112
G10919	..... P83	G1K378	..... P47, P89	G7100-244	..... P112
G10920	..... P83	G1K379	..... P105	G7100-247	..... P112
G10921	..... P18	G1K385	..... P19	G7100-248	..... P112
G10923	..... P45, P71, P97, P105	G2100-03	..... P43, P47, P97, P105	G7100-249	..... P112
G10924	..... P7	G2700-08	..... P63	G7100-252	..... P112
G10926	..... P95	G306-08	..... P63	G7100-258	..... P112
G10932	..... P54	G3303-114	..... P18	G7100-259	..... P112
		G3303-16	..... P3	G7100-260	..... P112

NUMERICAL INDEX

Part No.	Page	Part No.	Page	Part No.	Page
G7100-261	P112	GA2054	P9	GA5631	P28
G7100-262	P112	GA2068	P43, P95	GA5635	P28
G7100-263	P112	GA2075	P19	GA5636	P29
G7100-294	P112	GA2094	P20	GA5637	P29
G7100-295	P112	GA2142	P41	GA5640	P21, P29
G7100-302	P111	GA2148	P41	GA5643	P29
G7100-42	P111	GA2180	P71	GA5651	P4
G7100-46	P111	GA3893	P95, P97	GA5654	P23, P25, P27, P29, P31, P79, P83, P85
G7100-63	P111	GA4235	P47, P88, P105	GA5667	P91
G7100-68	P111	GA4286	P76	GA5698	P15
G7100-75	P111	GA4287	P76	GA5699	P15
G7100-83	P111	GA4309	P56	GA5715	P23
G7100-89	P111	GA4444	P17	GA5718	P23
G7100-90	P111	GA4619	P105	GA5719	P23
G7200-03	P111	GA4620	P97, P105	GA5786	P33
G7200-04	P111	GA4693	P41	GA5787	P33
G7566X	P11	GA4774	P35	GA5788	P33
G7698X	P39	GA4976	P93, P109	GA5794	P15
GA0167	P52	GA4994	P35	GA5795	P15
GA0237	P76	GA4995	P35	GA5796	P15
GA0243	P52	GA5090	P43, P95	GA5798	P28
GA0245	P52	GA5097	P57	GA5834	P15
GA0257	P52	GA5105	P43, P46, P88, P105	GA5853	P52
GA0312	P73	GA5106	P47	GA5887	P76
GA0328	P73	GA5107	P47, P71, P88, P105	GA5917	P93
GA0378	P45	GA5108	P47	GA5982	P15
GA0810	P73	GA5109	P47	GA6027	P15
GA0895	P41	GA5110	P47	GA6038	P15
GA0898	P91	GA5111	P47	GA6147	P67, P69
GA0899	P52	GA5112	P47	GA6168	P15
GA10036	P87	GA5113	P47	GA6171	P7, P9, P10, P75, P86, P87
GA10037	P87	GA5114	P88	GA6182	P15
GA10047	P81	GA5115	P88	GA6184	P15
GA10048	P81	GA5116	P47, P88, P95	GA6187	P15, P88
GA10081	P97	GA5121	P38	GA6349	P53
GA10213	P81	GA5146	P47	GA6350	P55
GA10214	P81	GA5157	P42	GA6371	P37
GA10570	P67	GA5164	P45	GA6402	P37
GA10575	P67, P69	GA5165	P45	GA6403	P105
GA10601	P67, P69	GA5188	P51	GA6404	P37
GA10603	P97	GA5194	P97	GA6415	P95
GA1369	P73	GA5202	P47, P105	GA6418	P37
GA1676	P52	GA5229	P88, P104	GA6420	P36
GA1677	P52	GA5385	P65	GA6422	P36
GA1678	P52	GA5459	P57	GA6428	P41
GA1679	P52	GA5526	P49, P51	GA6434	P10
GA1720	P4, P33	GA5552	P61	GA6435	P41
GA2007	P12	GA5572	P61	GA6436	P91
GA2012L	P5	GA5600	P67, P68	GA6437	P91
GA2012R	P5	GA5622	P21, P29	GA6438	P59
GA2014	P5, P9, P23, P25, P27, P29, P31, P73, P79, P83, P85	GA5624	P47, P88	GA6442	P49
GA2018	P14	GA5625	P21	GA6478	P15
GA2019	P14	GA5629	P47	GA6496	P41
GA2020	P14	GA5630	P29	GA6497	P39

NUMERICAL INDEX

Part No.	Page	Part No.	Page	Part No.	Page
GA6503	P91	GA7445	P27, P31,	GA8845	P73
GA6513	P105		P83, P85	GA8871	P58
GA6514	P105	GA7446	P25, P27, P31,	GA8877	P75, P86, P87
GA6515	P105		P83, P85	GA8882	P54
GA6522	P55	GA7543	P41	GA8884	P54
GA6523	P55	GA7826	P43	GA8885	P54
GA6529	P41	GA7850	P67, P69	GA8888	P54
GA6579	P88	GA7853	P67, P69	GA8895	P58
GA6585	P49, P51	GA7854	P67, P69	GA8911	P53
GA6586	P49, P51	GA7855	P67, P69	GA8925	P43
GA6597	P10	GA7856	P67, P69	GA8930	P33
GA6608	P37	GA7857	P67, P69	GA8931	P103
GA6618	P9	GA7858	P67, P68	GA8983	P73, P77, P79, P81
GA6619	P9	GA7859	P67, P69	GA9078	P38
GA6620	P9	GA7949	P7	GA9096	P65
GA6623	P37	GA7975	P7	GA9131	P31
GA6633	P15	GA7976	P7	GA9138	P71
GA6699	P65	GA7998	P83, P85	GA9144	P67, P69
GA6700	P65	GA7999	P83, P85	GA9152	P65
GA6733	P9	GA8007	P79	GA9153	P65
GA6741	P19	GA8008	P79	GA9195	P73
GA6792	P38	GA8021	P69	GA9433	P81
GA6801	P9	GA8022	P67, P69	GA9434	P81
GA6832	P25	GA8026	P67, P68	GA9437	P81
GA6833	P25	GA8037	P33	GA9440	P57
GA6834	P25	GA8046	P67, P69	GA9443	P57
GA6838	P25	GA8047	P65, P67, P69	GA9458	P81
GA6849	P41	GA8068	P103	GA9461	P81
GA6850	P39	GA8069	P99	GA9462	P81
GA6858	P49, P51	GA8092	P71	GA9472	P86, P87
GA6859	P49, P51	GA8304	P12	GA9473	P86
GA6884	P59	GA8305	P75	GA9538	P12
GA6907	P19	GA8306	P75	GA9539	P12
GA6960	P109	GA8322	P10	GA9559	P56
GA6961	P109	GA8324	P5	GA9714	P13
GA6966	P79, P81	GA8326	P18	GA9821	P81
GA6972	P79	GA8343	P14	GA9822	P81
GA6973	P79	GA8364	P18	GA9840	P39
GA7022	P37	GA8370	P13	GA9844	P31
GA7135	P73, P79	GA8371	P17	GA9845	P31
GA7153	P39	GA8398	P79, P81	GA9846	P43
GA7154	P46, P71, P95, P97	GA8399	P79, P81	GA9847	P69
GA7179	P95	GA8483	P73	GA9857	P69
GA7180	P95	GA8486	P94	GA9861	P31
GA7208	P109	GA8495	P67	GA9862	P31
GA7209	P109	GA8600	P3	GA9864	P31
GA7211	P109	GA8603	P21, P29, P31, P81	GA9865	P31
GA7239	P77	GA8641	P21, P29, P31	GA9905	P93
GA7240	P77	GA8651	P33	GA9978	P69
GA7255	P15	GA8685	P73	GA9979	P69
GA7271	P27	GA8688	P77	GB0110	P14
GA7336	P47, P88, P105	GA8689	P77	GB0111	P14
GA7375	P93	GA8691	P106	GB0115	P18
GA7410	P4	GA8692	P107	GB0116	P18
GA7412	P27	GA8699	P35	GB0120	P14
GA7434	P41	GA8760	P27	GB0134	P73

NUMERICAL INDEX

Part No.	Page	Part No.	Page	Part No.	Page
GB0156	P35	GD0914-225	P45	GD11017	P5
GB0186	P4	GD0962	P73	GD1104	P76
GB0196	P29	GD10007	P95	GD11045	P45, P71, P97, P105
GB0198	P91	GD10036	P4	GD11053	P83
GB0199	P91	GD10057-01	P112	GD11089	P65, P67, P69
GB0200	P91	GD10057-02	P112	GD1109	P9, P10, P29
GB0205	P76	GD10057-03	P112	GD11097	P79
GB0206	P77, P109	GD10057-04	P112	GD11106	P79
GB0209	P77	GD10104	P81	GD11122	P15
GB0210	P77	GD10110	P93	GD1113	P4, P33, P38, P73, P77, P79, P81, P105
GB0212	P75	GD10129	P39	GD11158	P97
GB0213	P76, P109	GD10156	P95	GD1115L	P19
GB0218	P4, P10, P12, P28, P31, P33, P36, P43, P76, P95, P109	GD10161	P47, P88, P95, P105	GD1115R	P19
GB0230	P39	GD10165	P94	GD1116	P19
GB0234	P39	GD10196	P109	GD11178	P83, P85
GB0239	P9, P10	GD10207	P58	GD1118	P19
GB0248	P79	GD10226	P14	GD11188	P83, P85
GB0249	P79	GD10242	P77	GD11218	P33
GB0250	P79	GD1026	P3, P17, P33, P42, P47, P79, P81, P88, P105	GD11219	P17
GB0254	P10	GD10273	P77	GD11239	P12, P18
GB0259	P46	GD10283	P52	GD11240	P18
GB0265	P3	GD10303	P77	GD11253	P54
GB0266	P3	GD10304	P77	GD11259	P3, P5
GB0267	P3	GD1033	P3	GD11263	P33
GB0268	P9, P10	GD1039	P14	GD11264	P33
GB0270	P79	GD1041	P14	GD11265	P83, P85
GB0274	P3	GD1042	P14	GD11266	83, 85
GB0276	P7	GD10473	P5, P9	GD11279	P13
GB0278	P12, P18	GD10487	P77	GD11286	P14
GB0282	P10	GD10519	P27, P31	GD11297	P18
GB0285	P3	GD10526	P27	GD1130	P3
GB0287	P45	GD10532	P39	GD11305	P12, P17
GB0296	P81	GD10552	P25, P27, P31, P83, P85	GD11306	P5, P73
GB0297	P81	GD1059L	P17	GD11311	P14
GB0301	P5, P33	GD1059R	P17	GD11313	P11
GB0309	P39	GD1060	P17	GD1132	P23, P25, P27, P29, P31, P73, P79, P83, P85
GB0314	P12, P33	GD1061	P18	GD1134	P89, P91, P95, P105
GB0322	P81	GD1063	P18	GD11358	P83
GB0323	P81	GD10646	P35	GD1138	P73, P79
GD0453-02	P49	GD1065	P3	GD11413	P12, P18
GD0453-03	P51	GD10731	P37	GD11422	P4
GD0453-05	P49	GD10733	P14	GD11423	P7, P75, P86, P87
GD0453-06	P49	GD1083	P14	GD11424	P17
GD0453-08	P51	GD1085	P10	GD1143	P20
GD0487	P73	GD1086	P7	GD1144	P20
GD0652	P49, P51	GD10867	P3, P33	GD11447	P33
GD0740	P37	GD10958	P12	GD1145	P20
GD0746	P52	GD10963	P19	GD11453	P7
GD0752-41	P49, P51	GD10984	P19	GD11490	P41
GD0829	P109	GD10986	P3	GD11508	P11
GD0840	P52	GD10991	P7	GD11509	P11
GD0914-155	P71	GD10993	P3	GD11528	P14
GD0914-165	P45	GD11001	P3	GD11557	P81
GD0914-215	P71				

NUMERICAL INDEX

Part No.	Page	Part No.	Page	Part No.	Page
GD11558	P81	GD13309	P86, P87	GD2734-18	P89
GD11569	P71	GD13361	P3	GD2947	P19
GD11579	P54	GD1337	P93	GD2971-09	P37
GD1162	P111	GD13400	P56	GD2971-10	P17
GD11649	P33	GD13401	P41	GD2984	P111
GD11652	P21, P29, P31	GD13425	P56	GD3180-03	P37
GD11659	P33	GD13457	P49	GD3180-04	P105
GD11677	P21	GD1379	P91	GD3180-12	P9
GD11698	P29	GD1380	P91	GD3180-16	P47
GD11700	P94, P96	GD14106	P37	GD3180-17	P88
GD11705	P73	GD14170	P31	GD3214	P49, P51
GD11747	P13	GD14217	P4	GD3389	P41
GD11752	P33	GD14413	P47, P89, P105	GD3398	P41
GD11787	P14	GD14414	P105	GD3547	P109
GD11836	P85	GD14417	P71	GD3612	P3
GD11845	P3, P5, P9	GD14427	P47, P89, P105	GD3790	P91
GD11950	P53, P54	GD14429	P105	GD4086	P63
GD11953	P75, P86, P87	GD14430	P47, P89, P105	GD4632	P57
GD11954	P75, P86, P87	GD14431	P47, P89, P105	GD4743	P37
GD11957	P54	GD14432	P47, P89, P105	GD4850	P75
GD11962	P3, P17, P33	GD14659	P19	GD4887-01	P46
GD11983	P58, P67, P69	GD14674	P27	GD4888	P75
GD11999	P53	GD1512	P111	GD5752	P43, P95
GD1200	P91	GD1514	P93, P109	GD5753	P43, P95
GD1207	P91	GD1515	P93, P109	GD5756	P43, P47
GD1209	P91	GD1516	P93, P109	GD5797	P95
GD1210	P91	GD1517	P93, P109	GD5824	P47
GD1213	P91	GD1520	P93	GD5827	P42, P46
GD12501	P53	GD15386	P49, P51	GD5829	P46
GD12502	P53	GD15464	P79	GD5830	P47
GD12510	P57	GD15698	P14	GD5835	P47
GD12511	P57	GD15699	P15	GD5857	P25, P36, P42, P47, P89, P95, P97, P105
GD12518	P54	GD1657	P73	GD5875	P37, P49, P51
GD12534	P25	GD1673	P73	GD5886	P45, P88, P89
GD12543	P41	GD1719	P97, P105	GD5892	P37
GD1255	P45	GD1747	P93	GD5949	P57
GD1256	P45	GD1755	P15	GD5951	P53
GD12571	P47	GD1812	P93	GD6165	P105
GD12676	P81	GD1862	P93	GD6291	P65, P67, P68
GD12677	P81	GD1908	P97	GD6501	P14
GD12679	P81	GD2115	P109	GD6551	P47
GD12684	P85	GD2117	P67, P69, P111	GD6553	P76
GD12685	P81	GD2161	P49, P51	GD6574	P55
GD12703	P38	GD2169	P37, P41	GD6783	P38
GD12724	P38	GD2199	P112	GD6793	P46
GD12754	P38	GD2412	P91	GD6825-10.375	P43
GD12817	P31	GD2423	P19	GD7120	P56
GD12826	P31	GD2460	P20	GD7122	P56
GD12827	P31	GD2548-15.5	P89	GD7124	P56
GD12829	P31	GD2548-30	P105	GD7127	P47, P89, P104
GD13170	P56	GD2558	P47, P88, P104	GD7137	P37
GD13172	P56	GD2589	P73	GD7140	P35
GD13173	P56	GD2597	P52	GD7148	P18
GD13250	P39	GD2721	P49, P51, P109	GD7258	P18
GD13268	P95	GD2734-01	P47	GD7318	P3
GD13287	P81	GD2734-08	P105		

NUMERICAL INDEX

Part No.	Page	Part No.	Page	Part No.	Page
GD7426	..... P42, P47, P88, P105	GD9048	..... P104	GR0216	..... P106
GD7639	..... P67, P69	GD9051	..... P41	GR0217	..... P106, P107
GD7803	..... P21, P29, P31	GD9052	..... P39	GR0221	..... P107
GD7804	..... P21, P29, P31	GD9077	..... P45	GR0222	..... P107
GD7805	..... P4, P10, P12, P23, P28, P29, P33, P36, P37, P43, P83, P85, P86, P87, P95, P109	GD9078	..... P45	GR0225	..... P106, P107
GD7811	..... P29	GD9093	..... P39	GR0226	..... P106, P107
GD7815	..... P28	GD9107	..... P106	GR0228	..... P106
GD7816	..... P29	GD9108	..... P107	GR0229	..... P106, P107
GD7817-01	..... P23, P29	GD9109	..... P106, P107	GR0231	..... P106, P107
GD7817-04	..... P23, P29, P83, P85	GD9120	..... P10	GR0232	..... P106, P107
GD7817-05	..... P79	GD9121	..... P41	GR0233	..... P106
GD7817-09	..... P29	GD9122	..... P41	GR0270	..... P41
GD7818	..... P29, P79	GD9123	..... P41	GR0279	..... P107
GD7822	..... P47	GD9124	..... P41	GR0280	..... P107
GD7823	..... P23, P29	GD9129-01	..... P37	GR0281	..... P107
GD7831	..... P29	GD9130	..... P41	GR0282	..... P107
GD7848	..... P91	GD9131	..... P91	GR0283	..... P107
GD7867	..... P89	GD9132	..... P91	GR0284	..... P107
GD7870	..... P89	GD9229	..... P71	GR0375	..... P39, P41
GD7878	..... P15	GD9238	..... P55	GR0434	..... P41
GD7888	..... P41	GD9239	..... P53	GR0508	..... P93
GD7889	..... P23	GD9241	..... P53	GR0513	..... P93
GD7890	..... P23	GD9254	..... P21, P29, P31	GR0515	..... P35
GD7900	..... P76	GD9290	..... P9	GR0516	..... P35
GD7904-02	..... P77	GD9305	..... P9	GR0517	..... P35
GD7904-04	..... P95	GD9320	..... P88	GR0586	..... P67, P69
GD7907	..... P77, P109	GD9378	..... P89	GR0594	..... P67, P69
GD7908	..... P76, P109	GD9562	..... P9	GR0880	..... P95, P97
GD7911	..... P75	GD9695	..... P33	GR0881	..... P95, P97
GD7912	..... P77	GD9705	..... P75	GR0882	..... P95, P97
GD7962	..... P76, P83, P85	GD9706	..... P75	GR0883	..... P95, P97
GD8218	..... P75	GD9709	..... P75	GR0911	..... P88
GD8224	..... P77	GD9715	..... P25	GR0912	..... P43, P46, P47, P71, P88, P95, P97, P105
GD8237	..... P15	GD9720	..... P25		
GD8238	..... P76	GD9724	..... P25, P27, P31, P83, P85	GR0927	..... P57
GD8239	..... P77	GD9908	..... P79	GR0959	..... P57
GD8247	..... P76	GD9934	..... P79	GR0983	..... P55
GD8249	..... P4	GD9971	..... P39	GR0999	..... P56
GD8276	..... P77	GM0166	..... P112	GR1001	..... P56
GD8306	..... P71	GR0146	..... P112	GR1005	..... P93
GD8307	..... P23, P29	GR0146MPP	..... P112	GR1006	..... P93
GD8308	..... P75	GR0150	..... P52	GR1015	..... P93, P109
GD8460	..... P10	GR0151	..... P52	GR1016	..... P93, P109
GD8722	..... P91	GR0155	..... P112	GR1017	..... P93, P109
GD8751	..... P67, P68	GR0155MPP	..... P112	GR1018	..... P93, P109
GD8770	..... P67, P68	GR0188	..... P76	GR1019	..... P93, P109
GD8771	..... P67, P68	GR0193	..... P39, P41	GR1032	..... P61
GD8778	..... P15	GR0196	..... P3, P18, P33	GR1033	..... P61
GD8843	..... P21, P29	GR0207	..... P106, P107	GR1034	..... P61
GD8844	..... P21, P29	GR0208	..... P106	GR1035	..... P61
GD8893-01	..... P33	GR0211	..... P106, P107	GR1036	..... P61
GD9046	..... P37	GR0212	..... P106, P107	GR1037	..... P54, P61, P63
GD9047	..... P47	GR0213	..... P106	GR1038	..... P61
		GR0214	..... P106, P107	GR1039	..... P61
		GR0215	..... P106, P107	GR1040	..... P61

NUMERICAL INDEX

Part No.	Page	Part No.	Page	Part No.	Page
GR1041	P61	GR1407	P71		
GR1042	P61	GR1408	P71		
GR1043	P61	GR1409	P71		
GR1044	P61	GR1410	P71		
GR1045	P61, P63	GR1411	P71		
GR1046	P61	GR1412	P71		
GR1047	P61	GR1413	P71		
GR1048	P61	GR1420	P99		
GR1096	P59	GR1421	P99		
GR1114	P99	GR1422	P101		
GR1116	P99	GR1423	P101		
GR1118	P99	GR1424	P99		
GR1122	P94, P97	GR1425	P99, P101		
GR1129	P101	GR1427	P99		
GR1130	P101	GR1451	P101		
GR1133	P101	GR1461	P67, P69		
GR1134	P101	GR1465	P63		
GR1142	P101	GR1484	P106		
GR1144	P101	GR1485	P107		
GR1150	P103	GR1487	P14		
GR1151	P103	GR1517	P54		
GR1152	P103	GR1520	P54		
GR1153	P103	GR1521	P58		
GR1154	P103	GR1526	P53		
GR1155	P103	GR1529	P57		
GR1157	P103	GR1533	P103		
GR1158	P103	GR1535	P103		
GR1162	P103	GR1540	P103		
GR1165	P99	GR1541	P103		
GR1167	P99	GR1542	P103		
GR1168	P99	GR1543	P103		
GR1177	P59	GR1544	P103		
GR1178	P59	GR1545	P103		
GR1183	P55	GR1569	P14		
GR1184	P55	GR1570MPP	P112		
GR1185	P53	GR1571	P93		
GR1203	P65	GR1577	P106, P107		
GR1204	P65	GR1598	P56		
GR1205	P65	GR1626	P106, P107		
GR1206	P65	GR1629	P69		
GR1207	P65	GR1631	P69		
GR1208	P65	GR1632	P69		
GR1281	P59	GR1678	P93		
GR1282	P59	GR1683	P93		
GR1289	P59				
GR1327	P14				
GR1388	P103				
GR1389	P99				
GR1390	P67				
GR1391	P67, P69				
GR1392	P67				
GR1393	P67, P69				
GR1395	P67				
GR1397	P93				
GR1405	P71				
GR1406	P71				