

MODEL 3600 TWIN-LINE® PLANTER OPERATOR & PARTS MANUAL

M0167

Rev. 3/05

This manual is applicable to: Model: 3600 Twin-Line® Planters
Serial Number: 613810 and on

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

Model Number _____ 3600 _____
Serial Number _____
Date Purchased _____

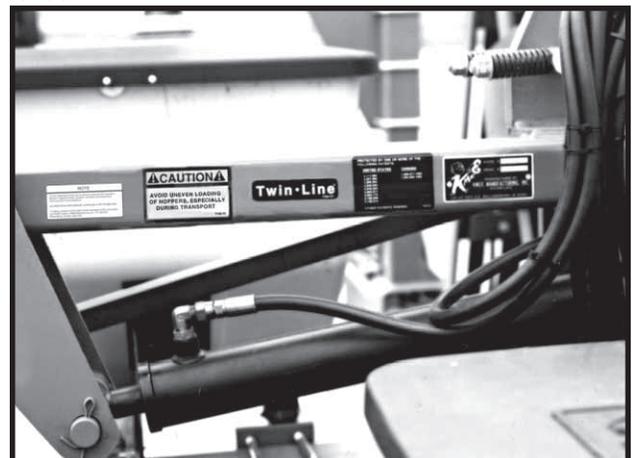
Monitor Serial No. _____
Measured Pulses Per Mile/Km (Radar Distance Sensor) _____
Measured Pulses Per Mile/Km (Magnetic Distance Sensor) _____

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 also be recorded above.

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

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Rev. 3/05

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.
- The hardware box, containing the row unit drive chains and meter drive clutches, has been removed from the seed hopper on the L.H. side of the planter and those components have been installed. See "Row Unit Assembly And Installation Instruction".
- The row marker blade assemblies have been removed from their shipping location over the planter hitch and installed on the row marker assembly at each end of the planter. See "Row Marker Adjustment" in the Machine Operation Section of this manual.
- Be sure all grease fittings are in place and lubricated.
- Check planter and make sure all working parts are moving freely, bolts are tight and cotter pins are spread.
- Check all drive chains for proper tension and alignment.
- Check for oil leaks and proper hydraulic operation.
- Check to be sure hydraulic hoses are routed correctly to prevent damage to hoses.
- Inflate tires to specified PSI air pressure. Tighten wheel lug bolts and lug nuts 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

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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 lockups in place.

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

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

WARRANTY

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 3600 Twin-Line® Planter is available in various configurations and row spacings. Optional Interplant® row spacing is obtainable with the addition of push row units.

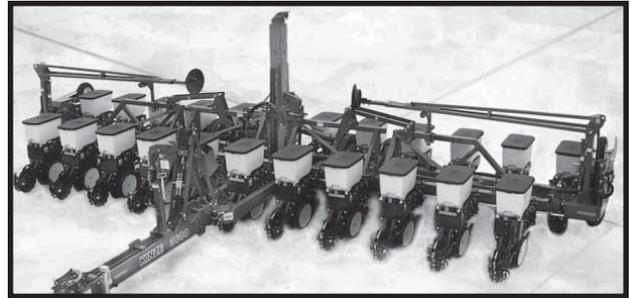
The Model 3600 Twin-Line® Planter permits installation of liquid or dry fertilizer application equipment and various row unit attachments.

GENERAL INFORMATION

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

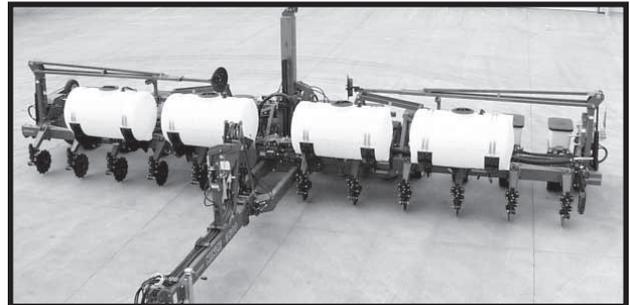
Right hand (R.H.) and left hand (L.H.), as used throughout this manual, are determined by facing in the direction the machine will travel when in use unless otherwise stated.

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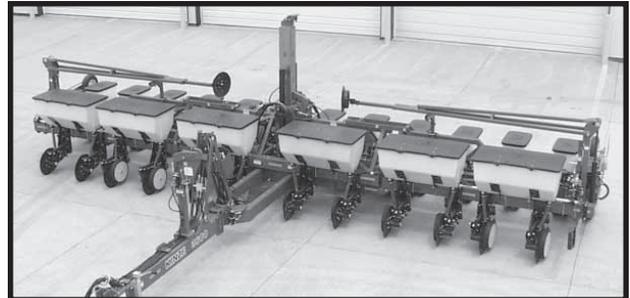
Shown With Optional Interplant® Package

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Shown With Optional Liquid Fertilizer Package

D061901101



Shown With Optional Dry Fertilizer Package

INTRODUCTION

SPECIFICATIONS

TYPE - Pull Type (Hydraulically rotates endwise to transport)

PLANTING UNIT TYPES - Push and Pull Row Units

ROW SPACING	Standard	Interplant® Package
	8 Row Wide - 36" or 38" Rows	15 - 18" or 19" Rows
	12 Row Narrow - 30" Rows	23 - 15" Rows or 24 - 15" Rows
	12 Row Wide - 36" or 38" Rows	23 - 18" or 19" Rows
	16 Row Narrow - 30" Rows	31 - 15" Rows or 32 - 15" Rows

DRIVE SYSTEM - Spring-loaded contact drive system

- 7.50" x 20" 8 ply rib implement wing tire - two on 8 and 12 row; four on 16 row
- 4.80" x 8" 6 ply contact drive tire - two on 8 and 12 row; four on 16 row
- No. 40 roller chain and spring-loaded idlers
- Point row clutches standard on 12 and 16 row sizes and optional on 8 row size
- 7/8" hex drill and drive shafts and end mounted seed transmissions

TRANSPORT TIRES - Equipped with four 255 - 70R 22.5" radial load range H tubeless rib implement tires

- Adjustable height wheels for ridge planting

TYPE LIFT - Master/slave hydraulics

- 8 and 12 row - 2 center lift (master) cylinders, 1 cylinder per wing wheel module (2 slave)
- 16 row - 2 center lift (master) cylinders, 2 cylinders per wing wheel module (4 slave)

MARKERS - Independently controlled. Two-fold, low profile with depth band on marker disc blade

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
- Point Row Clutch Package - Allows half width planting. (Std. 12/16 row, Optional 8 row)
- Two-Speed Point Row Clutch Package - Allows half width planting and reduced rate planting (Available through KINZE® Repair Parts)
- Interplant® Package
- Even-Row Push Row Unit Package
- Liquid Fertilizer Package
- Dry Fertilizer Package
- Half Rate (2 To 1) Drive Reduction Package
- Rear Trailer Hitch
- Piston Pump Mount And Drive Package
- Rock Guard Package For Transport Wheel Arm

ROW UNIT OPTIONS/ATTACHMENTS

- Finger Pickup Or Brush-Type Seed Meters
- Closing Wheel Options
 - Rubber "V" Closing Wheels
 - Cast Iron "V" Closing Wheels
 - Covering Discs/Single Press Wheel
 - Drag Closing Attachment
- Granular Chemical Application
- Hopper Panel Extension Package
- Spring Tooth Incorporator
- Row Unit Extension Brackets
- Row Unit Mounted No Till Coulter
- Row Unit Mounted Disc Furrowers
- Row Unit Mounted Bed Leveler
- Row Unit Mounted Residue Wheel
- Coulter Mounted Residue Wheels
- Frame Mounted Coulter - STYLE A & STYLE B
- Disc Furrowers For STYLE A Frame Mounted Coulter
- Residue Wheels For STYLE B Frame Mounted Coulter

SPECIFICATIONS

Dimensions/Operating

PLANTER SIZE	8 Row 36"/38"	12 Row 30"	12 Row 36"/38"	16 Row 30"
WIDTH	26' 6"	31' 2"	37' 2"	41' 2"
LENGTH - "Y" Hitch	19' 0"	21' 0"	22' 0"	24' 0"
LENGTH - "T" Hitch	17' 0"	19' 0"	20' 0"	22' 0"

Dimensions/Transport

PLANTER SIZE	8 Row 36"/38"	12 Row 30"	12 Row 36"/38"	16 Row 30"
WIDTH Std., fertilizer or push row units	13' 4"	11' 2"	13' 4"	11' 2"
WIDTH Push row unit with no till coulters	13' 4"	11' 4"	13' 4"	11' 4"
Push row unit with no till coulters and coulters mounted residue wheels	13' 4"	11' 8"	13' 4"	11' 8"
LENGTH	30' 6"	36' 10"	43' 10"	46' 10"
HEIGHT	10' 8"	10' 8"	10' 8"	11' 0"

NOTE: L.H. transport wheel and axle stub assembly is removable for truck transport at 10' 3" width on wide row machines and 8' 6" on narrow row machines.

PLANTER SIZE	8 Row 36"/38"	12 Row 30"	12 Row 36"/38"	16 Row 30"
*WEIGHT	11,678 lbs.	12,816 lbs.	13,558 lbs.	15,778 lbs.

* Base Machine weights include planter frame, row markers, drive components, tires and wheels, hydraulic cylinders and hoses, 12VDC control console, KINZE® pull row units (closing wheel arms less closing wheels), seed hopper and lid, dual quick-adjustable down force springs, transport safety chain and point row clutches (12 row and larger sizes).

SAFETY PRECAUTIONS

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

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

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

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

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

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

 **Always keep hands, feet and clothing away from moving parts. Do not wear loose-fitting clothing which may catch in moving parts.**

 **Always wear protective clothing, substantial shoes and suitable hearing and eye sight protectors applicable for the situation.**

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

 **Be aware of bystanders, particularly children! Always look around to make sure it is safe to start the engine of the towing vehicle or move the planter. This is particularly important with higher noise levels and quiet cabs, as you may not hear people shouting.**

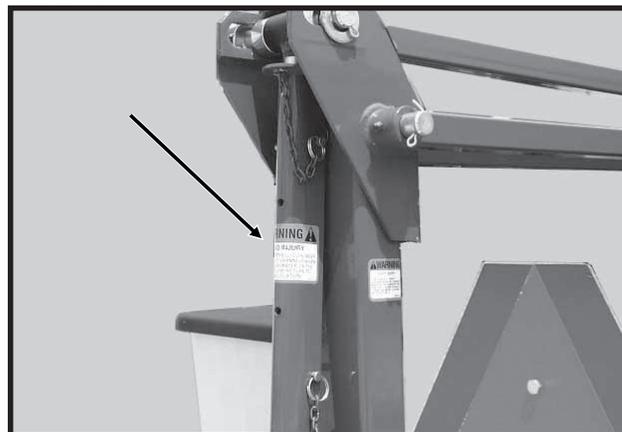
 **Use a tractor equipped with a roll-over-protective-system and fasten your seat belt prior to starting the engine.**

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

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

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

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

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

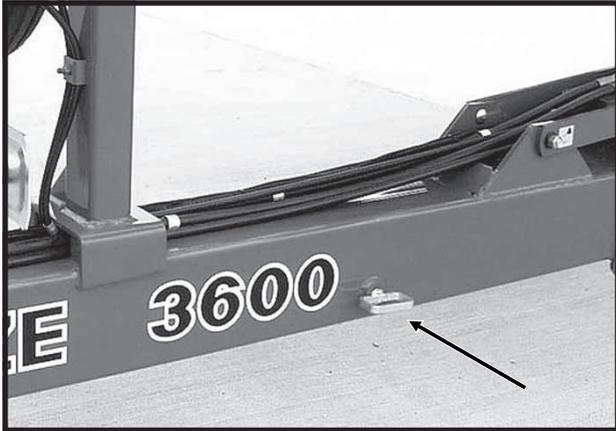
 **On machines where the outer transport wheel on the left side of the planter is bolt-on to allow legal width truck shipment, always install outer transport wheel assembly prior to unloading. DO NOT REMOVE THIS ASSEMBLY AFTER PLANTER IS ASSEMBLED FOR USE. DO NOT fold planter or tow planter while the outer transport wheel is removed. Tipping may occur because of narrow wheel base.**

 **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.**

SAFETY PRECAUTIONS

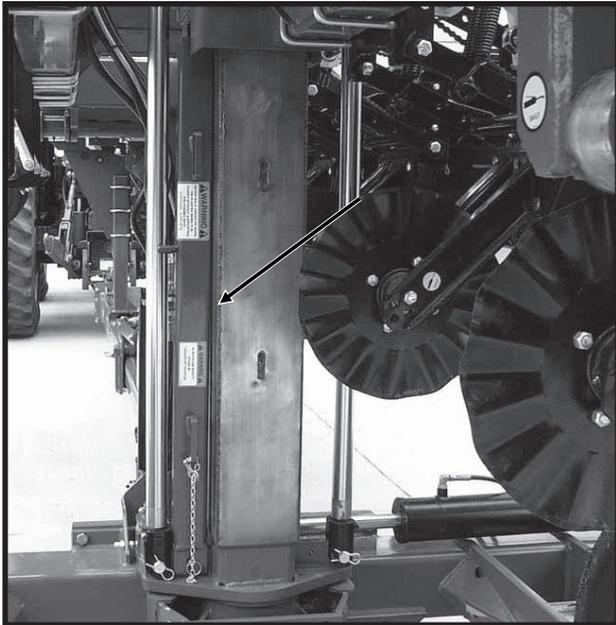
-  Always install tongue safety pin, manual safety lockup device and transport latch locking pin before transporting planter.

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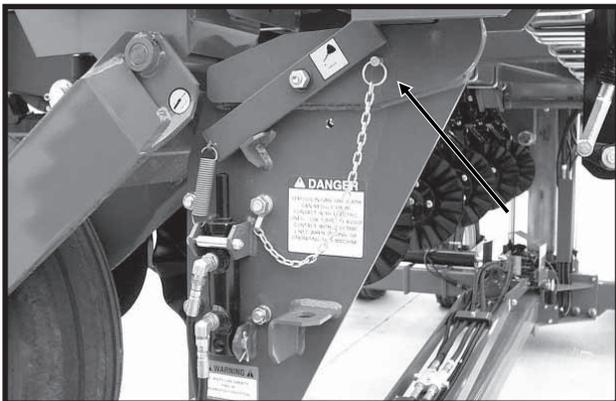
Tongue Safety Pin

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Manual Safety Lockup device

D060299106



Transport Latch Locking Pin

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

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

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

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

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

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

-  Allow for unit length when making turns.

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

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

SAFETY PRECAUTIONS



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



Avoid sudden uphill turns on steep slopes.



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



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



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



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



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



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

SAFETY PRECAUTIONS

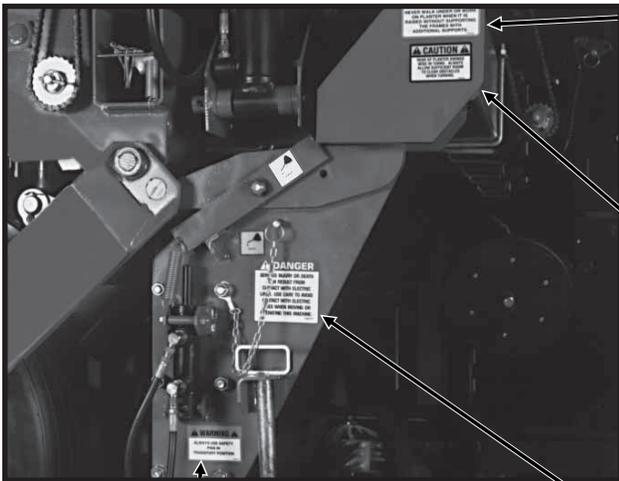
SAFETY WARNING SIGNS

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

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

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Part No. G7100-68 (Qty. 1)



Part No. G7100-63 (Qty. 1)



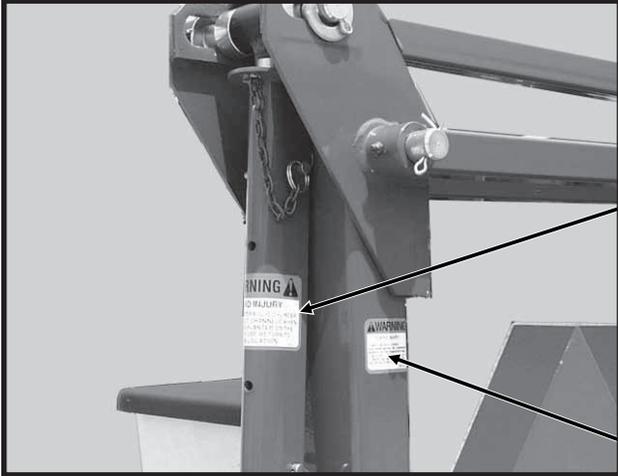
Part No. G7100-02 (Qty. 1)



Part No. G7100-117 (Qty. 1)

SAFETY WARNING SIGNS

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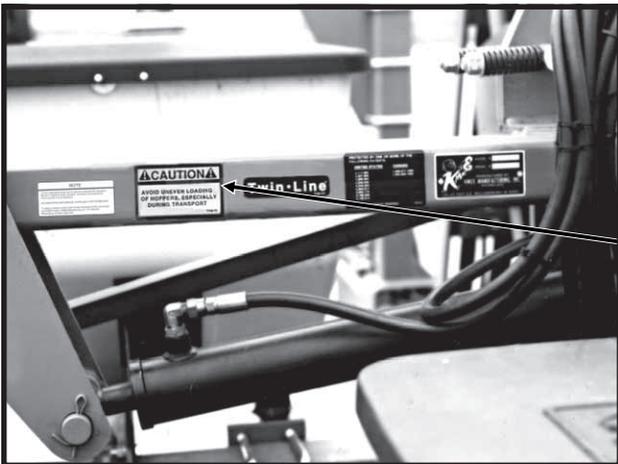


Part No. G7100-83 (Qty. 2 - One Per Marker)



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

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

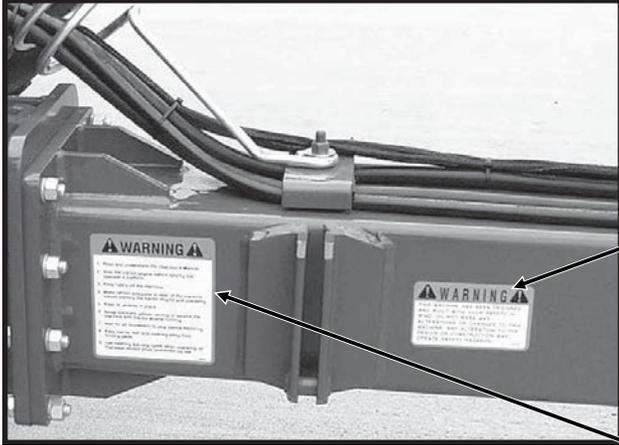
D092702101a



Part No. G7100-302 (Qty. 1)

SAFETY WARNING SIGNS

D060299104

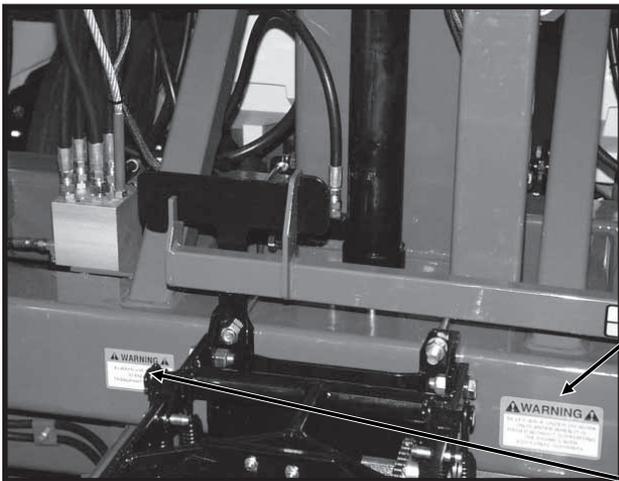


Part No. G7100-90 (Qty. 1)



Part No. G7100-46 (Qty. 1)

D08169904



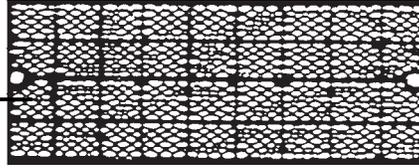
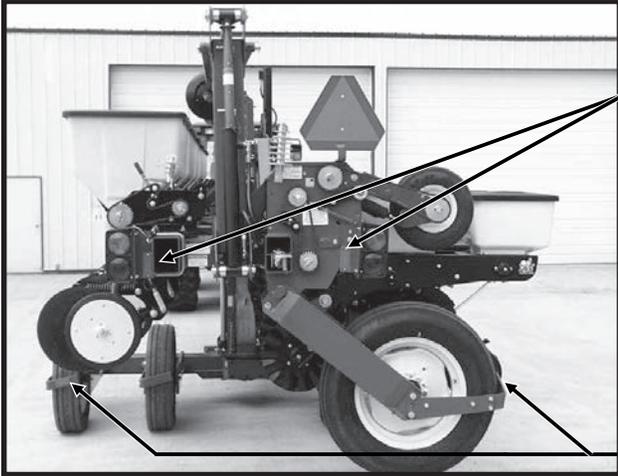
Part No. G7100-68 (Qty. 2 - Front And Rear)



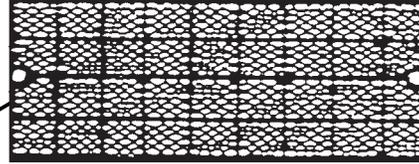
Part No. G7100-200 (Qty. 2 - Front And Rear)

SAFETY WARNING SIGNS

D060299204

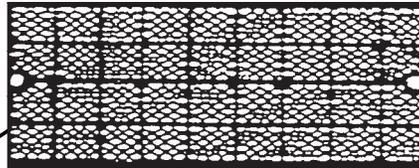
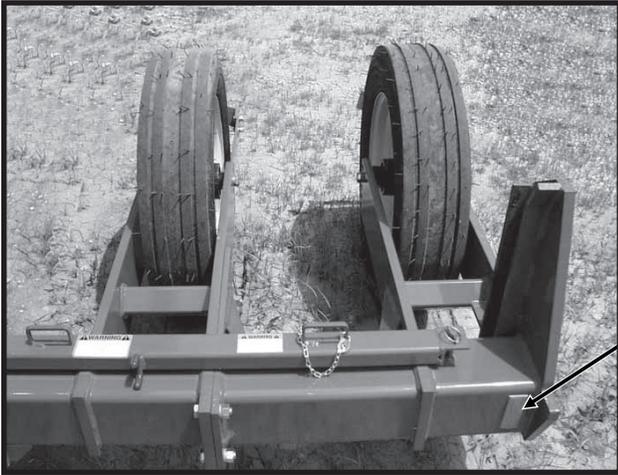


Part No. G7200-03 Red Reflector (Qty. 2)
(If Applicable)



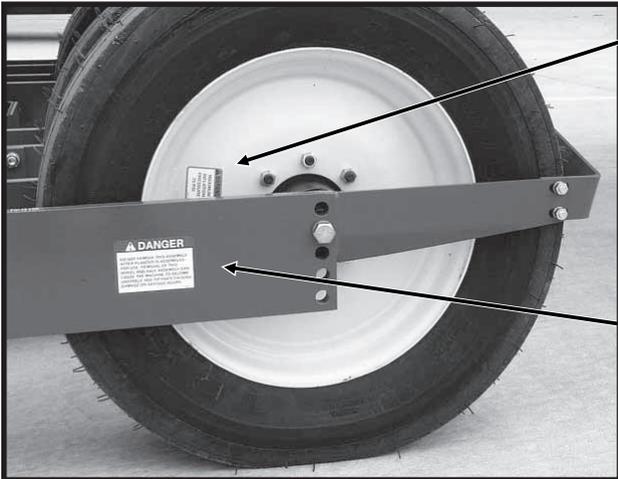
Part No. G7200-03 Red Reflector
(Qty. 2 - Located On Outside Two Transport
Tire Scrapers) (If Applicable)

D06189903



Part No. G7200-04 Amber Reflector
(Qty. 2 - Located At Each End Of Front Axle)
(If Applicable)

D060299108



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



Part No. G7100-215 (Qty. 1 - Located On Rear
Side Of Stub Axle)

SAFETY WARNING SIGNS

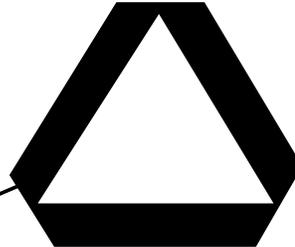
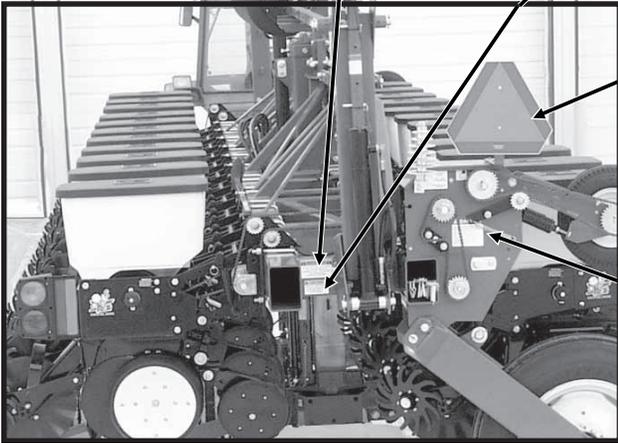


Part No. G7100-68 (Qty. 1)



Part No. G7100-63 (Qty. 1)

D020501108

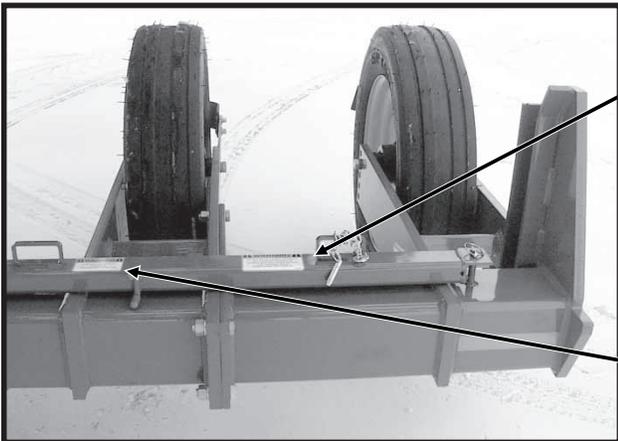


Part No. GD2199 (Qty. 1)



Part No. G7100-89 (Qty. 2 - Located On Wheel Module On Both Ends Of Planter)

D0205001102



Part No. G7100-68 (Qty. 1)

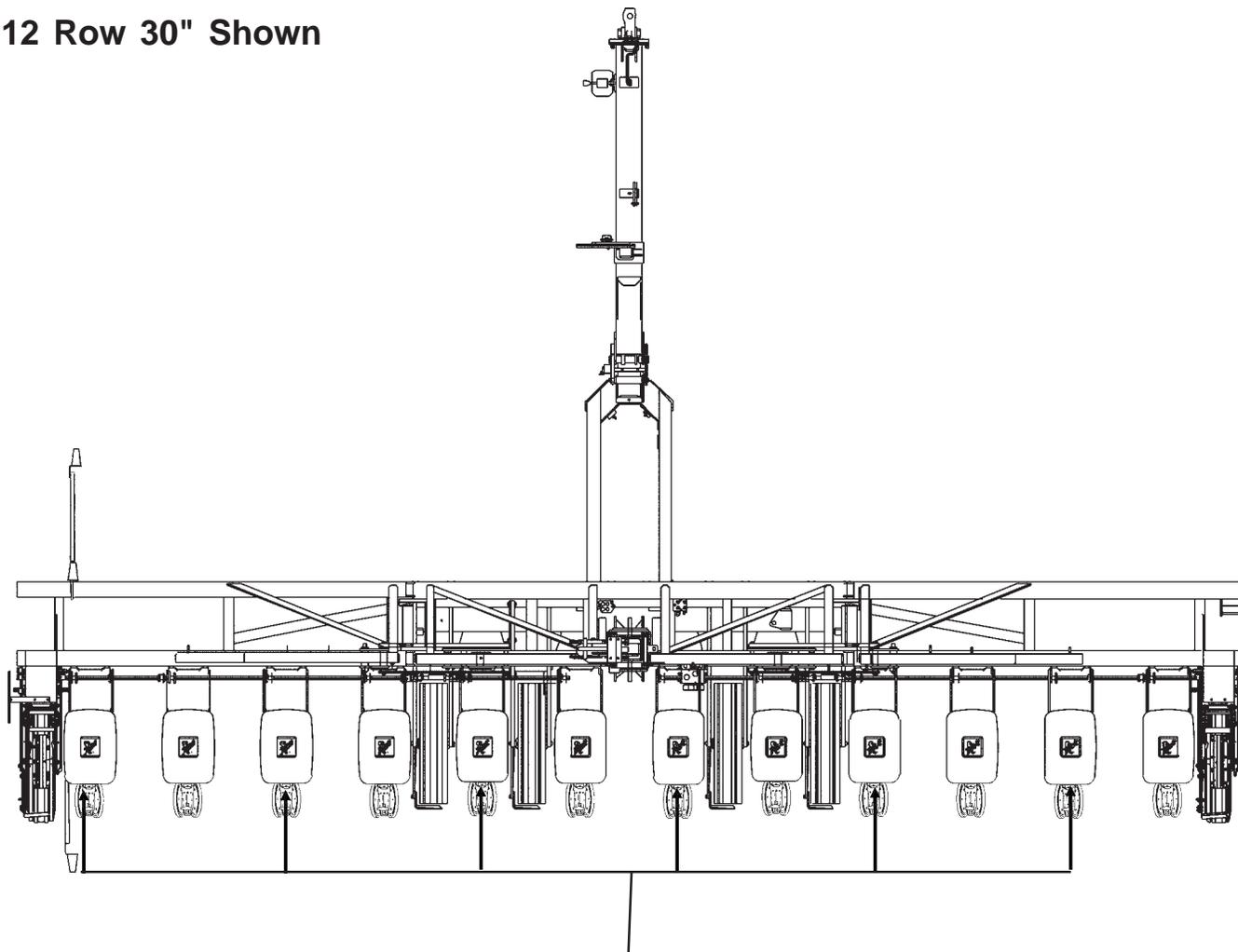


Part No. G7100-200 (Qty. 1)

SAFETY WARNING SIGNS

(PLTR132f)

12 Row 30" Shown

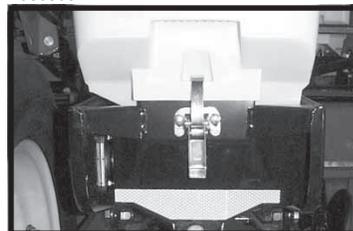


Part No. G7100-262 Amber Reflective Decal (Located On The Hopper Support On Every Other Row Beginning On The 1st Row On The L.H. End Of The Planter - Side-Facing In Transport Position) **(Standard)** (If Applicable)



Part No. G7100-259 Amber Reflective Decal (Located On The Granular Chemical Hopper Panel Extension On Every Other Row Beginning On The 1st Row On The L.H. End Of The Planter - Side-Facing In Transport Position) **(With Optional Granular Chemical)** (If Applicable)

D060800114



D062300102

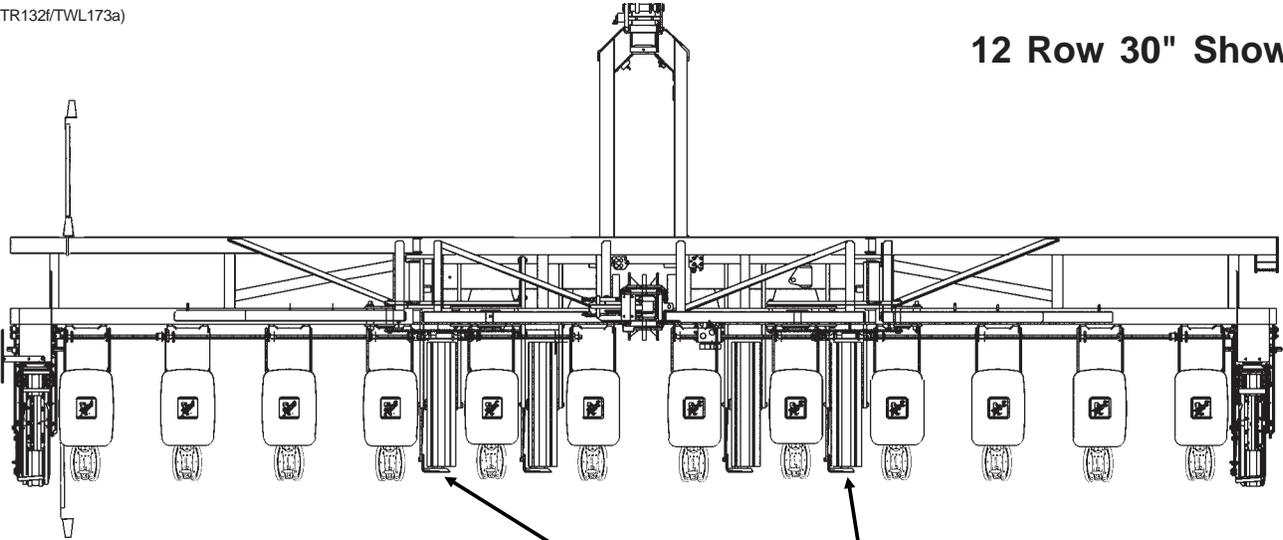


NOTE: 4 Decals Used On 8 Row; 6 Used On 12 Row; 8 Used On 16 Row Sizes

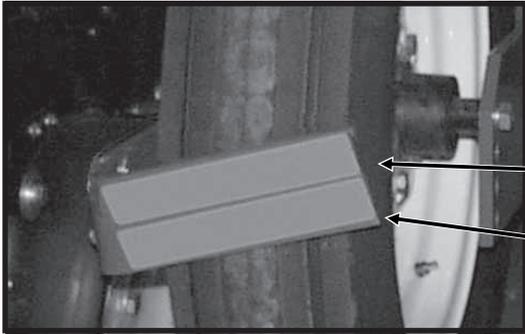
SAFETY WARNING SIGNS

(PLTR132f/TWL173a)

12 Row 30" Shown



D060800115a

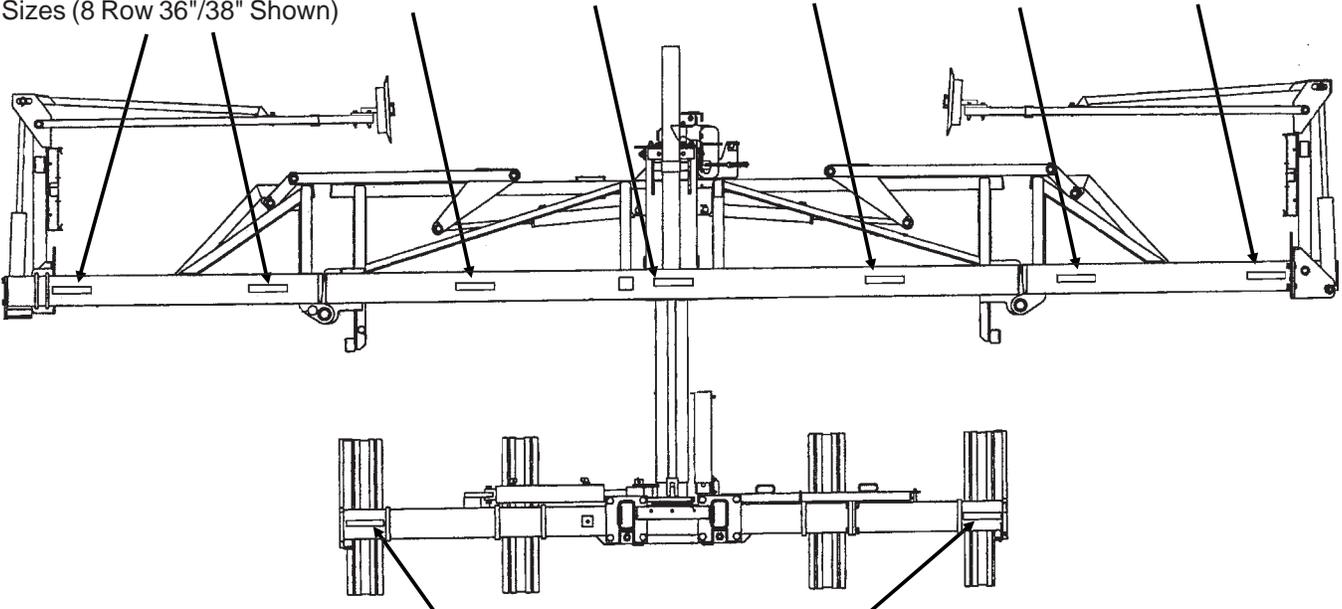


Part No. G7100-258 Red Reflective Decal
(Qty. 1 Per Outer Scraper - Located On Top)
(If Applicable)

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

Part No. G7100-259 Amber Reflective Decal (Located On The Front Side Of The Front Toolbar - Side-Facing In Transport Position) (If Applicable)

NOTE: 7 Decals Used On 8 Row 36"/38"; 7 Used On 12 Row 30"; 9 Used On 12 Row 36"/38"; 9 Used On 16 Row 30" Sizes (8 Row 36"/38" Shown)



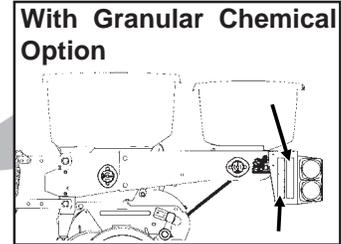
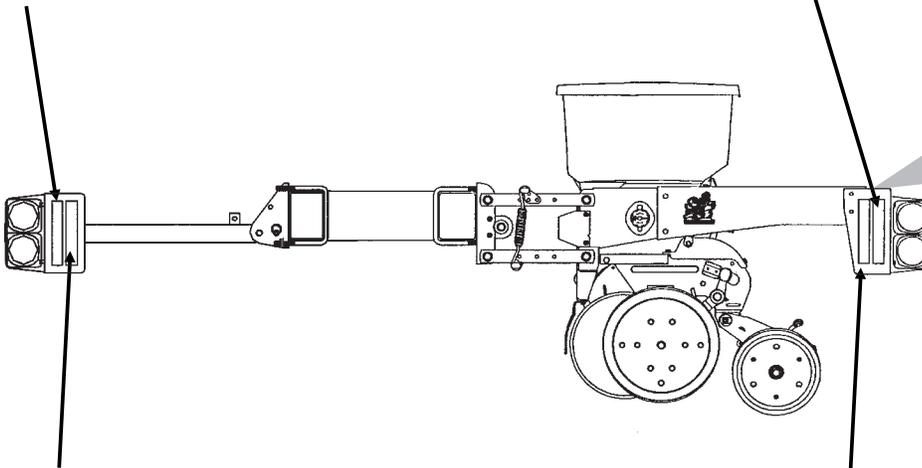
Part No. G7100-259 Amber Reflective Decal (Qty. 2 - Forward-Facing) (If Applicable)

SAFETY WARNING SIGNS

(TWL174b/RU120e/RU130d/PLTR132f)

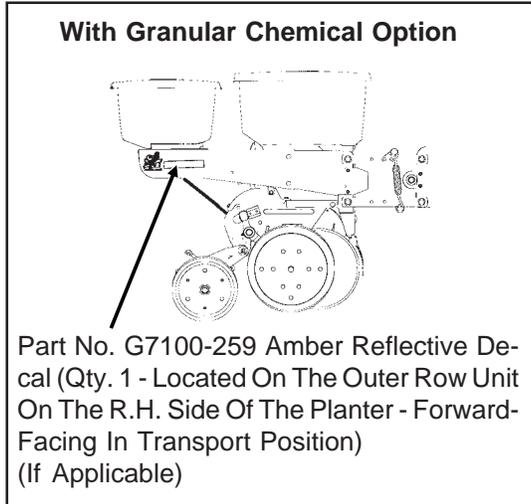
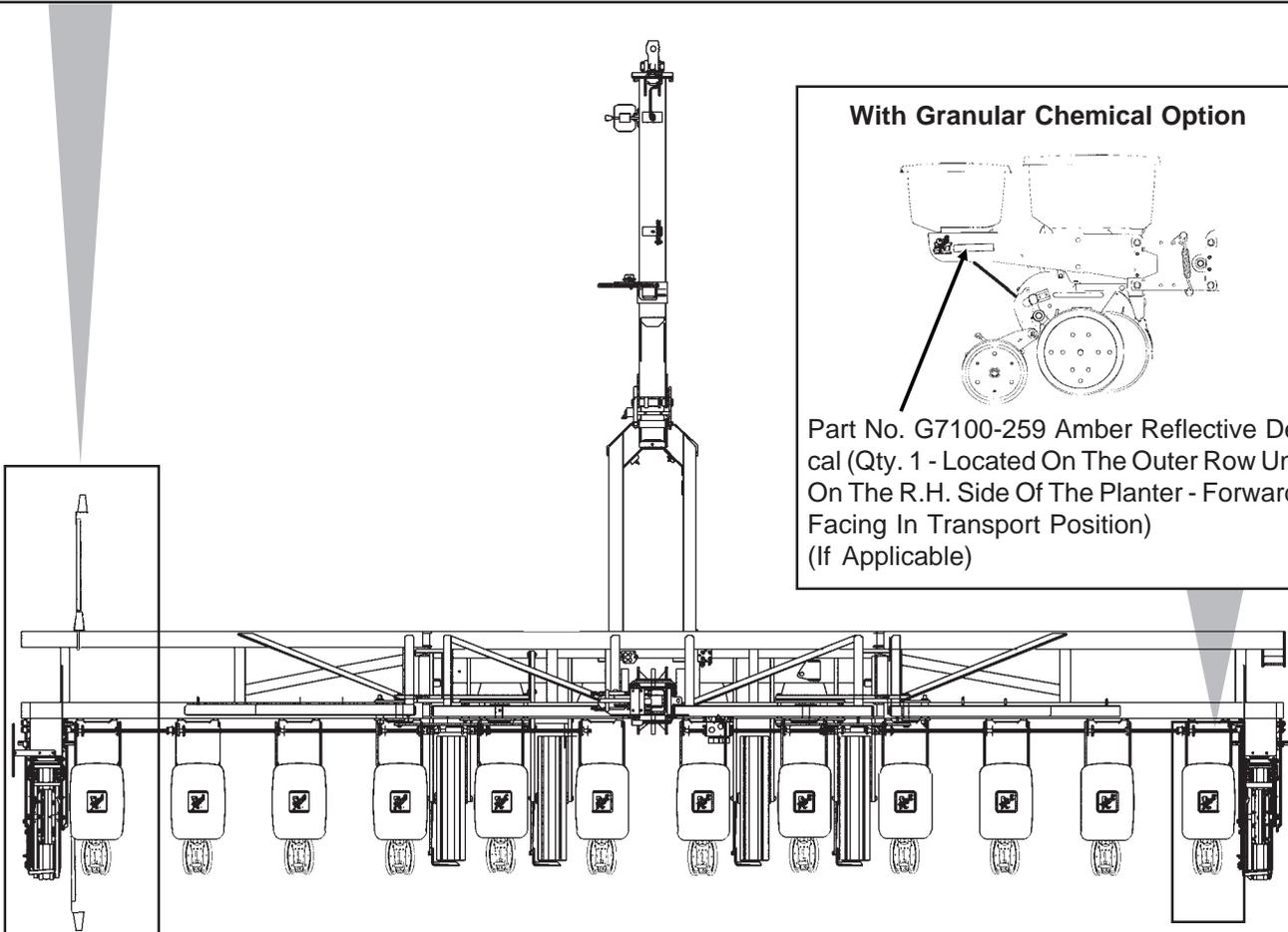
Part No. G7100-258 Red Reflective Decal (Qty. 1 - Located On The Light Bracket On the L.H. Side Of The Planter - Rear-Facing In Transport Position) (If Applicable)

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)

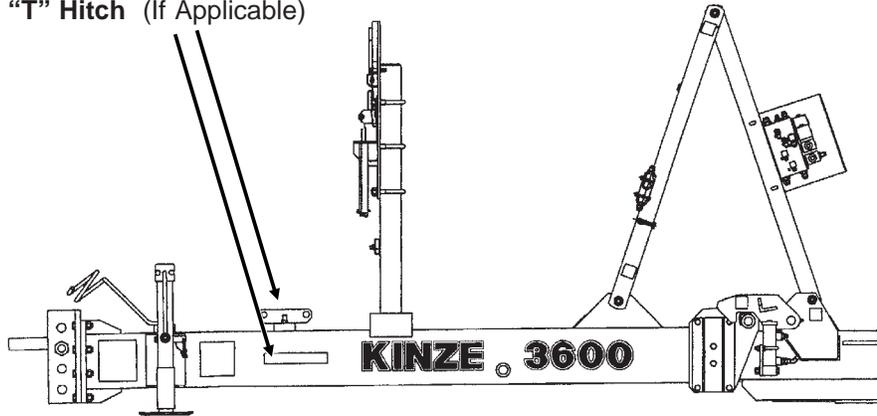


12 Row 30" Shown

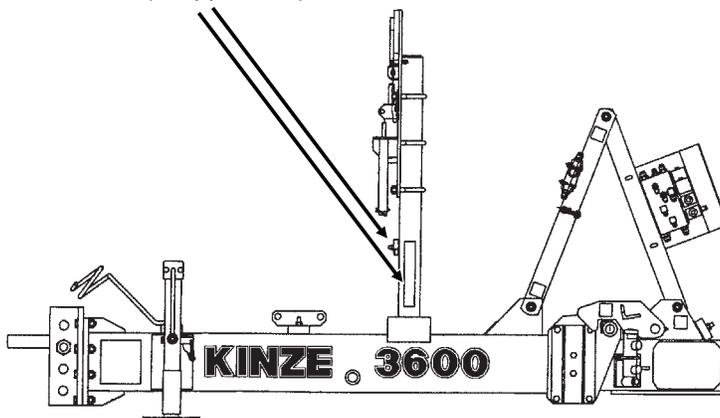
SAFETY WARNING SIGNS

(TGWL175/TWL177/TWL176)

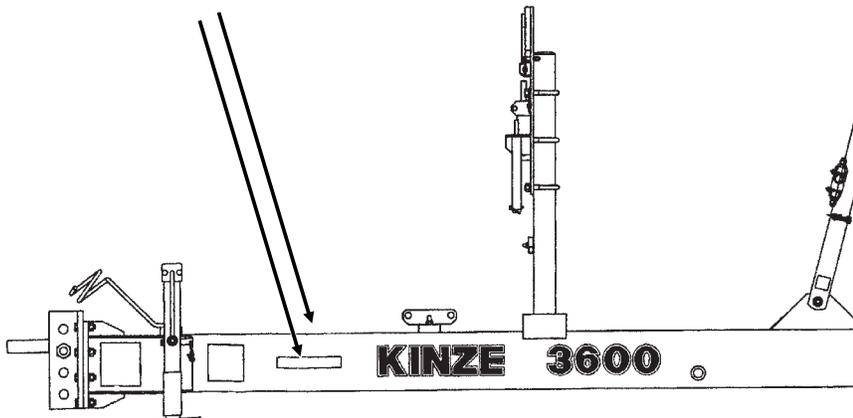
Part No. G7100-259 Amber Reflective Decal (Qty. 2 - 1 Located On Each Side Of Hitch)
8 Row 36"/38" - "T" Hitch (If Applicable)



Part No. G7100-259 Amber Reflective Decal (Qty. 2 - 1 Located On Each Side Of Transport Latch Post)
8 Row 36"/38" - "Y" Hitch (If Applicable)



Part No. G7100-259 Amber Reflective Decal (Qty. 2 - 1 Located On Each Side Of Hitch)
12 Row 30"/36"/38" And 16 Row 30" - "T" And "Y" Hitches (If Applicable)



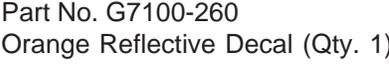
SAFETY WARNING SIGNS



(PLTR159/TWL122m/PLTR133f)

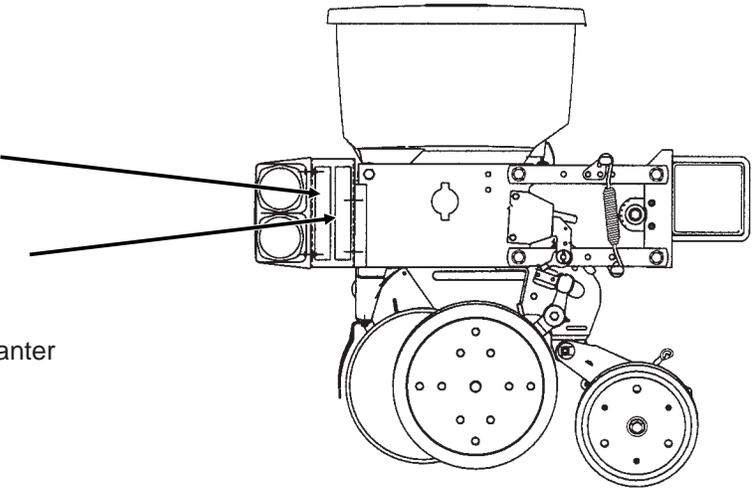


Part No. G7100-258
Red Reflective Decal (Qty. 1)



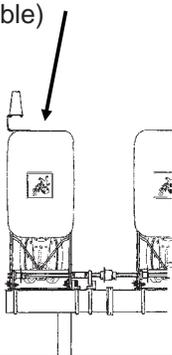
Part No. G7100-260
Orange Reflective Decal (Qty. 1)

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



WITH INTERPLANT® PACKAGE OPTION

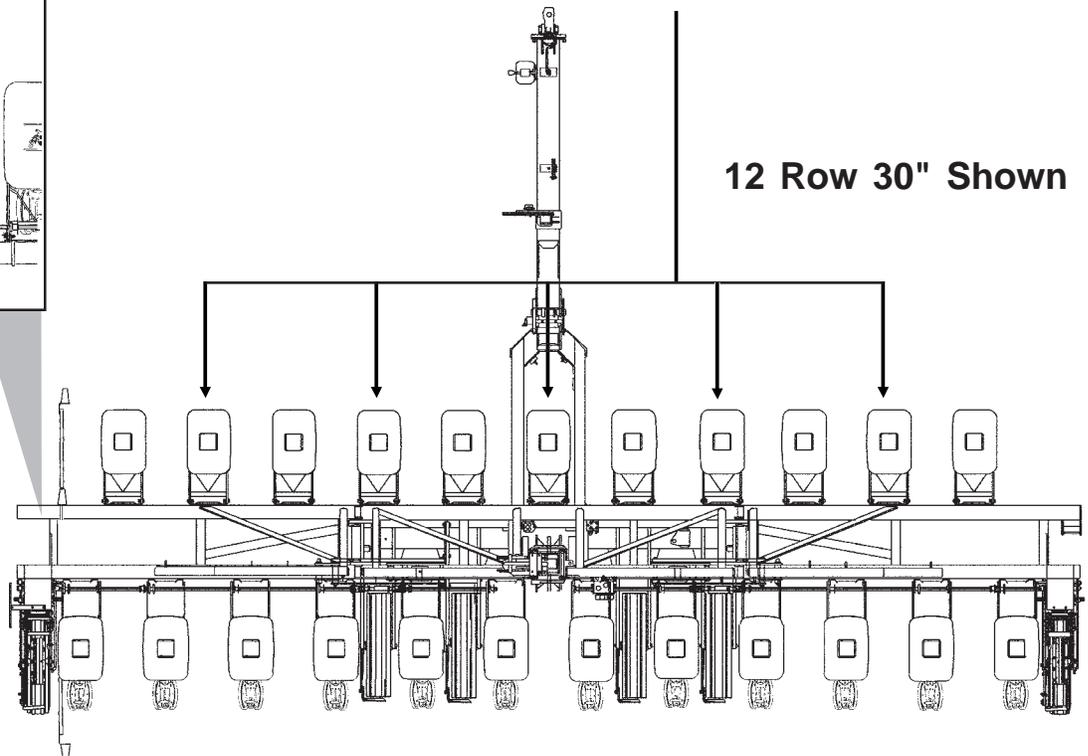
Part No. G7100-259
Amber Reflective Decal
(Qty. 1 - Located On The
Front Of The Optional
Even-Row Push Row Unit
- Side-Facing In Trans-
port Position)
(If Applicable)



D020101103




Part No. G7100-259
Amber Reflective Decal
(Qty. 3 Used On 8 Row; 5 On 12 Row;
7 On 16 Row - Located On The Front
Of Every Other Push Row Unit Begin-
ning With The Center Row And Every
Other Row To Both Ends - Side-Fac-
ing In Transport Position)
(If Applicable)



SAFETY WARNING SIGNS



D06039901



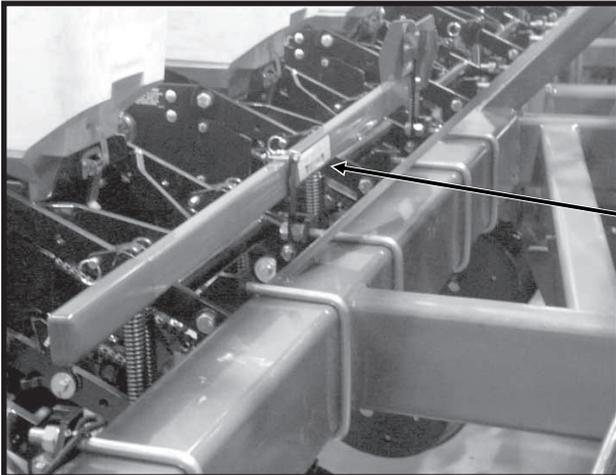
⚠ WARNING ⚠

AGRICULTURAL CHEMICALS CAN BE DANGEROUS. IMPROPER SELECTION OR USE CAN SERIOUSLY INJURE PERSONS, ANIMALS, PLANTS, SOIL OR OTHER PROPERTY. BE SAFE. SELECT THE RIGHT CHEMICAL FOR THE JOB. HANDLE WITH CARE. FOLLOW THE INSTRUCTIONS ON THE CONTAINER LABEL AND OF THE EQUIPMENT MANUFACTURER.

7100-115

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

D020101105



⚠ CAUTION ⚠

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

7100-249

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

SAFETY WARNING SIGNS



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.



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

TRACTOR REQUIREMENTS

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

TRACTOR PREPARATION AND HOOKUP

D101602106



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. Install control console on tractor in a convenient location within reach of the operator and close to the hydraulic controls. Mount control console securely and route power cord to the power source.

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

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

3. Back tractor to planter and connect with 1 1/4 - 1 1/2" diameter hitch pin. If the tractor is not equipped with a hitch pin locking device, make sure hitch pin is secured with a locking pin or cotter pin.
4. The auxiliary attaching system (transport safety chain) provided with your planter should be used to ensure the connection is retained between the planter and tractor in the event of a hitch pin/drawbar failure. The safety chain is to be attached using an unused clevis mounting hole on the planter hitch. The attaching hardware should be torqued to 840 ft. lbs.
5. Connect hydraulic hoses to tractor ports in a sequence which is both familiar and comfortable to the operator.

The hydraulic hoses are color coded as follows:

- Red AA - Lift Functions (Return)
- Red BB - Lift Functions (Pressure)
- Blue AA - Marker And Fold/Unfold Functions (Return)
- Blue BB - Marker And Fold/Unfold Functions (Pressure)



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.

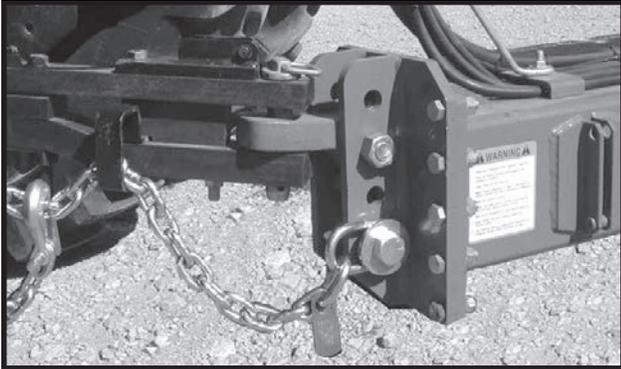
6. Connect cable on planter to control console cable on tractor. Connect ASAE Standards 7 terminal connector for safety/warning lights on planter to ASAE Standards receptacle on tractor. If your tractor is not equipped with an ASAE Standards receptacle, check with your tractor manufacturer for availability. Check to be sure safety/warning lights on planter are working in conjunction with warning lights on tractor.
7. Raise jack and remount horizontally on storage bracket.
8. Lower planter to the planting position and check to be sure the hitch is level. If hitch slopes up or down, disconnect planter and adjust hitch clevis up or down as necessary.

MACHINE OPERATION

LEVELING THE PLANTER

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

D101602106



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

D020501103



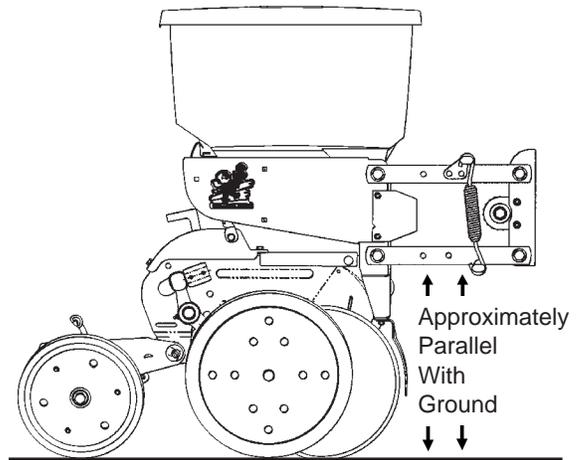
With the planter lowered to proper operating height, check to be sure the frame is level fore and aft. Recheck once planter is in the field.

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

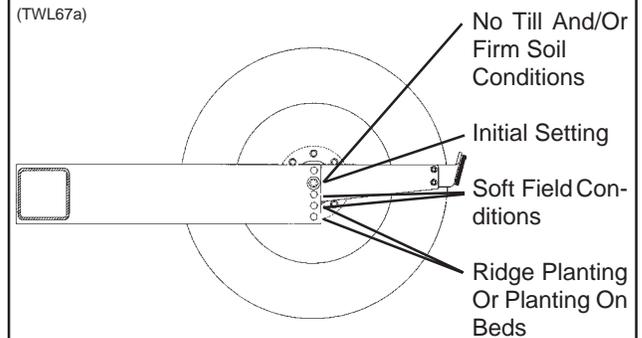
Field and actual planting conditions will dictate which of the transport wheel settings to use to ensure row unit parallel arms are approximately parallel with the ground. It may also be necessary to lower the ground drive wheels to ensure level lateral toolbar operation if the transport wheels are set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

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

(RU113)



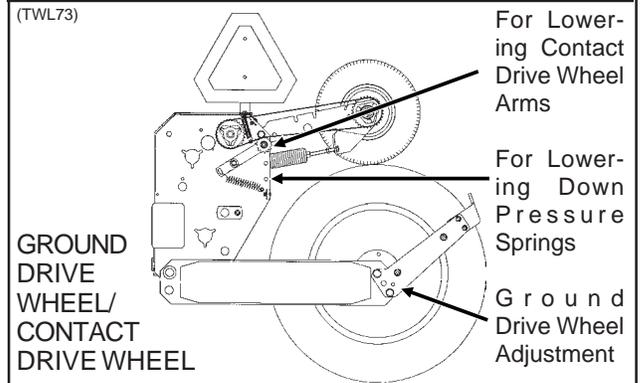
(TWL67a)



TRANSPORT WHEEL

CAUTION: When using top hole setting, check clearance between tires and drill shaft U-joint prior to operation.

(TWL73)



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

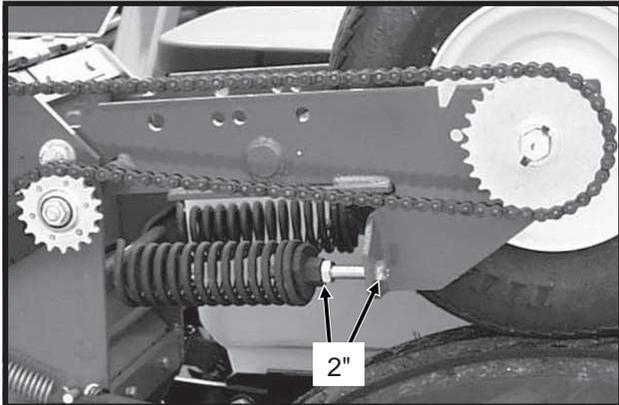
NOTE: As the lift cylinders are (port type) rephasing, it is necessary for the cylinders to fully retract in order to rephase. Cylinder stops can not be used.

MACHINE OPERATION

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

CONTACT DRIVE WHEEL SPRING ADJUSTMENT

D06049909

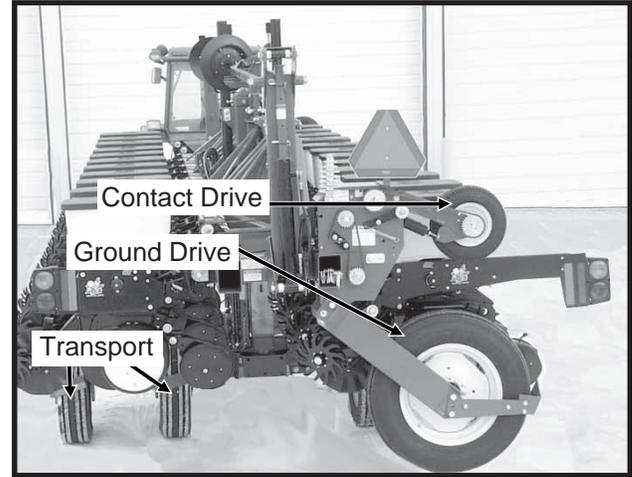


There are two down pressure springs on each contact drive wheel. The down pressure is factory preset and should need no further adjustment.

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

TIRE PRESSURE

D020501108



Tire pressure should be checked regularly and maintained as follows:

- 255-70R 22.5", Transport (Center Section) . . . 75 PSI
- 7.50" x 20", Ground Drive (Wings)40 PSI
- 4.80" x 8", Contact Drive50 PSI
- 4.10" x 6", Contact Drive
(Liquid Fertilizer Piston Pump)50 PSI
- 7.60" x 15", Ground Drive
(Liquid Fertilizer Piston Pump)40 PSI



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

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

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

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

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

MACHINE OPERATION

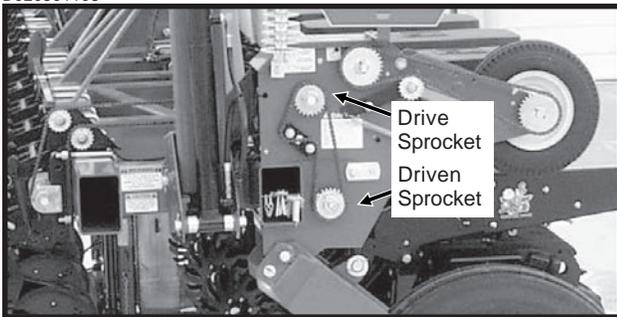
SEED RATE TRANSMISSION ADJUSTMENT

Planting population rate changes are made at each 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 wheel module on each side of the planter.

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

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

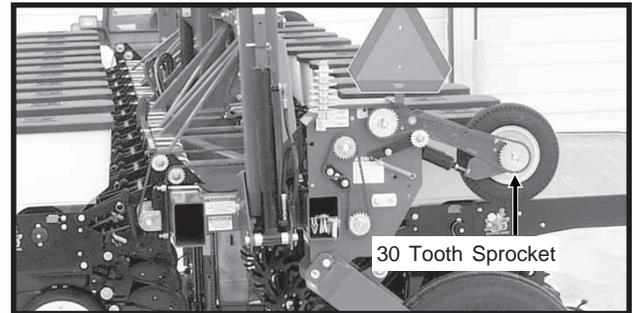
D020501108



12 Row Machine Shown

STANDARD RATE DRIVE

D020501108



12 Row Machine Shown

Seed planting rate charts are based on the standard rate drive. The standard rate drive uses a 30 tooth sprocket on each contact wheel. Using the 15 tooth reduced rate sprocket in place of the 30 tooth sprocket will reduce the planting and application rates by approximately 50%. See "Half Rate (2 To 1) Drive".

HALF RATE (2 TO 1) DRIVE

D070699113a



Half rate (2 to 1) drive is recommended only when desired population falls below that shown on planting rate charts. Replace the 30 tooth sprocket on each contact wheel with a 15 tooth sprocket. This will reduce the planter transmission speed and reduce planting and application rates by approximately 50%.

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

MACHINE OPERATION

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.

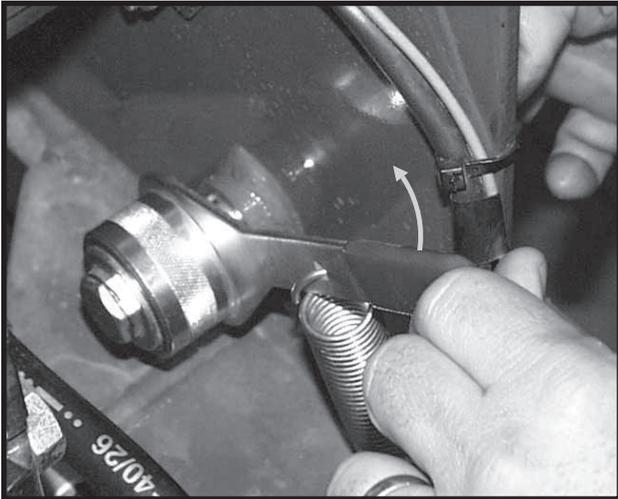
To release chain tension, rotate the knurled collar on the wrap spring wrench while rotating the chain idler away from the chain.

D10290305



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

D10290304

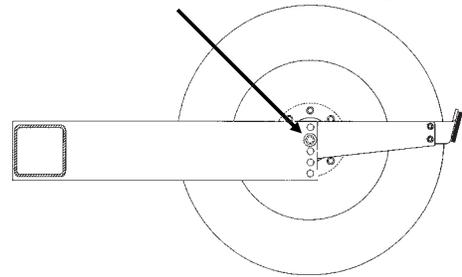


RIDGE PLANTING

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

(TWL67a)

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



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

MACHINE OPERATION

SHEAR PROTECTION

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

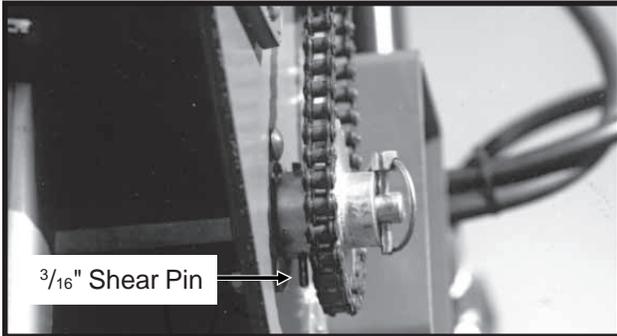
If excessive load should cause a pin to shear, it is important to determine where binding has occurred before replacing the pin. Replace shear pins with same size and type.

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

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

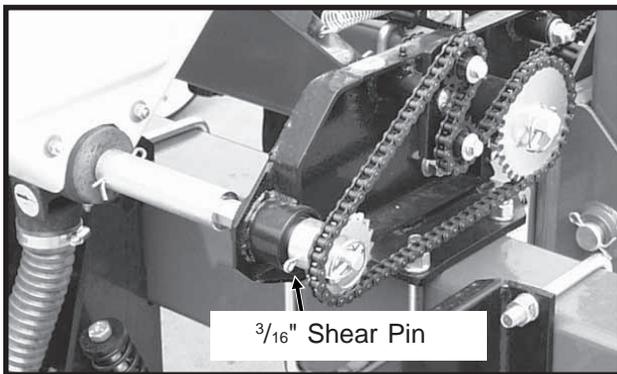
NOTE: Drill shaft/transmission coupler alignment is critical.

50981-10



Transmission Shaft

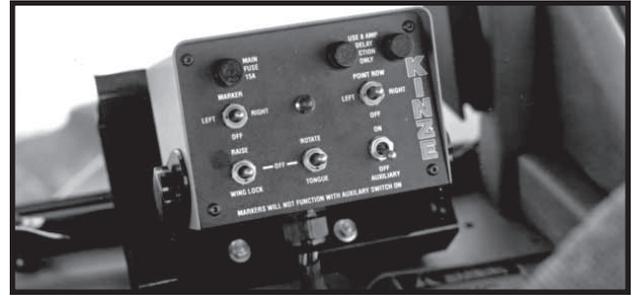
D061901130



Dry Fertilizer Attachment Transmission

HYDRAULIC/ELECTRIC OPERATION

76746-24



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



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

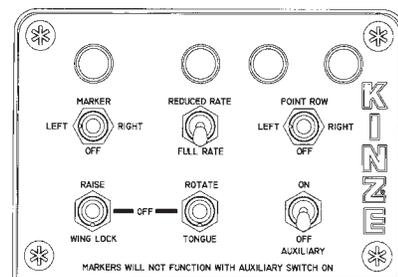
NOTE: The backlit console is equipped with a push button switch on the back of the console which should be used to turn the light off during extended periods of non-use.

Model 3600 planters are equipped for operation from two dual remote hydraulic outlets. One set of hydraulic outlets, in conjunction with a switch on the control console, are used to operate the raise to transport function. The second set, in conjunction with the switches on the control console, are used to operate the row markers and fold/unfold functions.

The marker and point row selector switches are an ON-OFF-ON type. (NOTE: Point row clutches are optional on 8 row sizes and standard on 12 and 16 row sizes. All 3600 planters are shipped with the point row switch installed in the control console.)

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

A7435(TWL81)



MACHINE OPERATION

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



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

The auxiliary switch is an ON-OFF type switch which is used in conjunction with the hydraulic marker/folding functions control lever to operate optional attachments. All 3600 planters are shipped with the auxiliary switch installed in the control console. The auxiliary switch must be in the OFF position to enable other functions.

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

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



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



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

TRANSPORT TO FIELD SEQUENCE

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

SUMMARIZED TRANSPORT TO FIELD SEQUENCE

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

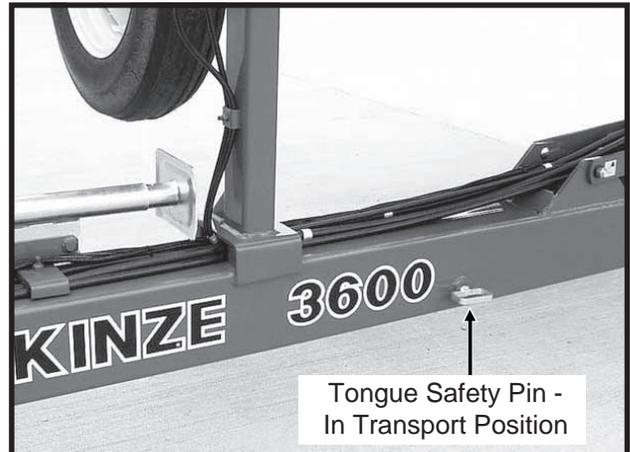
NOTE: Read the following information for more detailed instructions.

D061901118



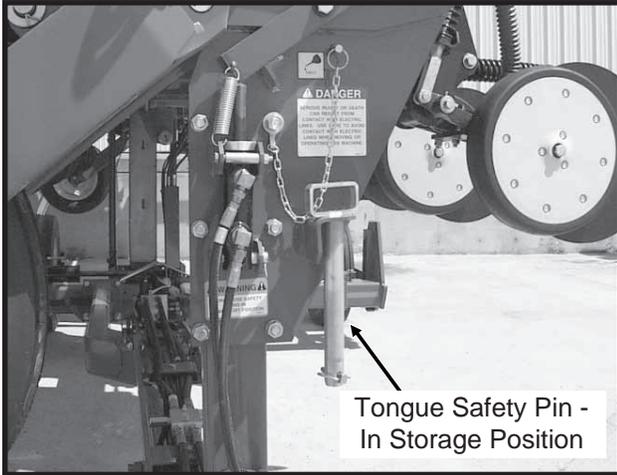
1. With the tongue fully extended and the planter in the raised transport position, remove the tongue safety pin and store it in the storage position.

D060299102



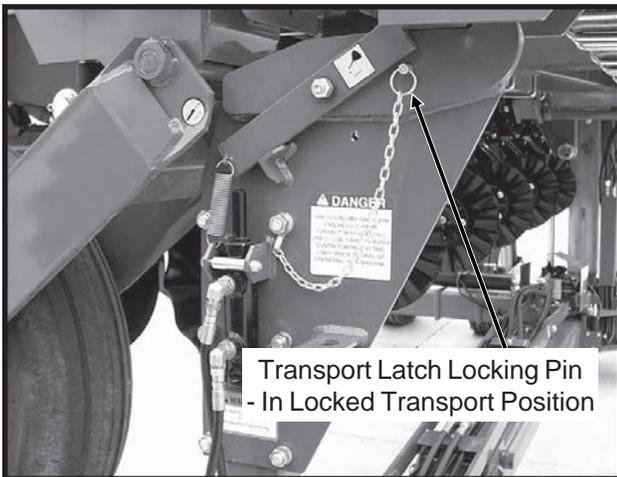
MACHINE OPERATION

D062501101



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

D060299106

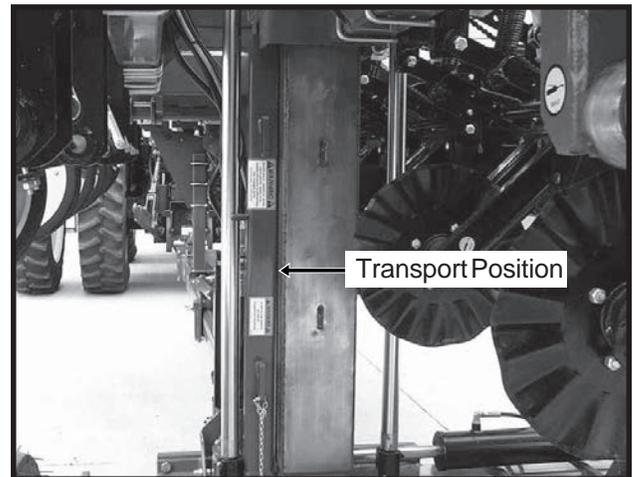


D060299216

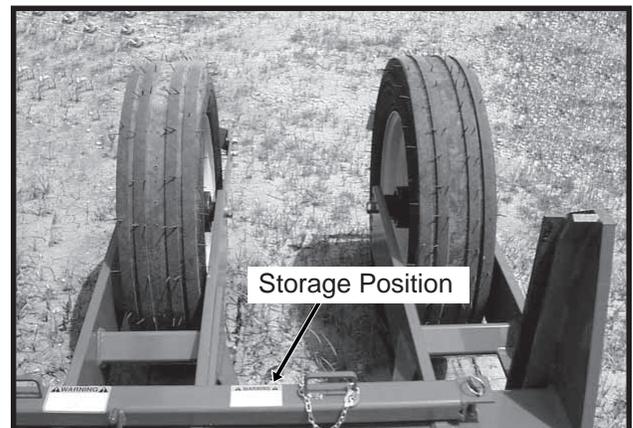


3. Remove the manual safety lockup from under the front center lift cylinder and place it in the storage location on the left side of the planter axle.

D060299107



D06189903



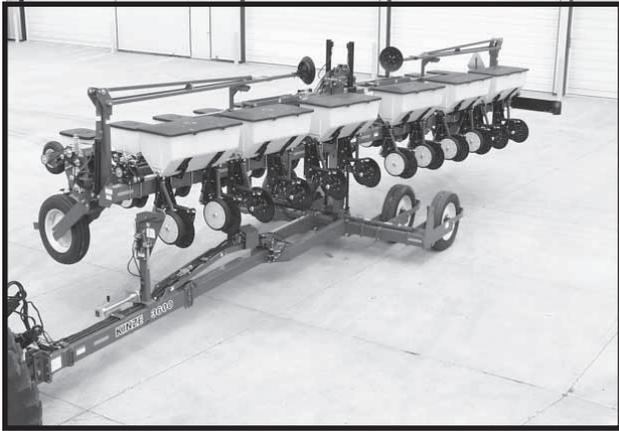
4. Hold the control console switch labeled ROTATE/TONGUE in **ROTATE** and operate the hydraulic lever to unfold the planter. The transport latch will automatically release.

76746-24



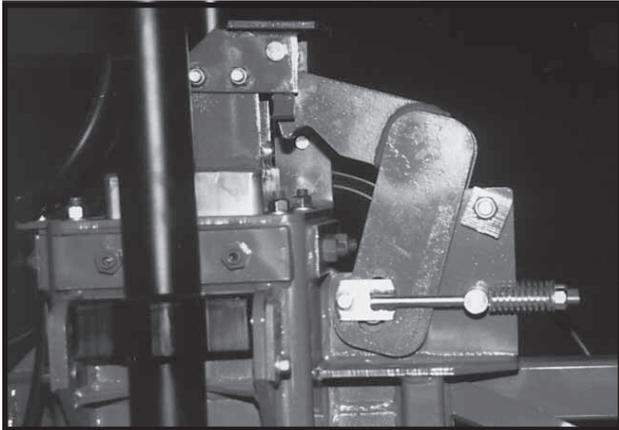
MACHINE OPERATION

D061901120



5. Raise the planter 1-2". The safety hook will release and snap away from the catch pin on the top of the pivot post.

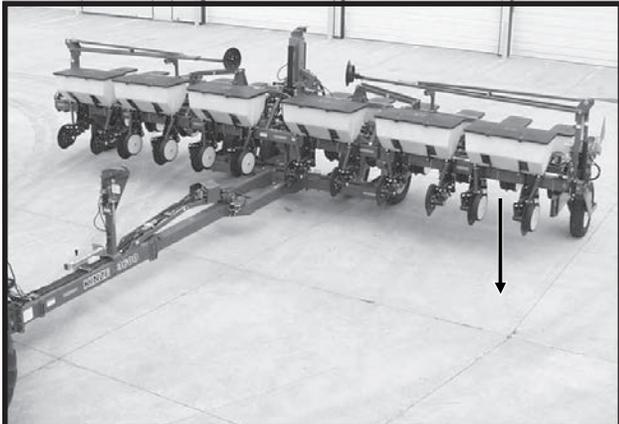
82316-16



NOTE: Raising the planter too high will reset the hook mechanism and the sequence must be repeated.

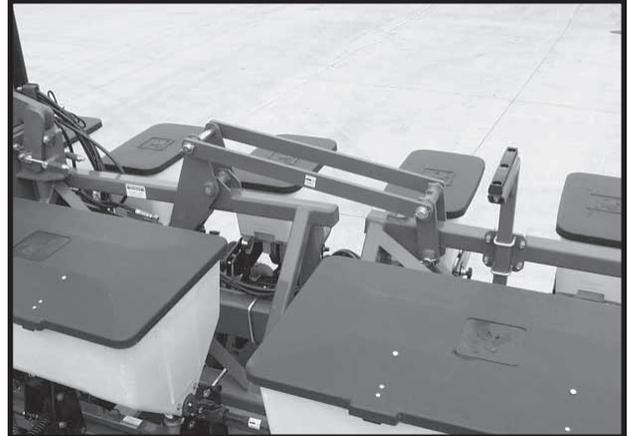
6. Slowly lower the planter to the ground.

D061901125



7. Hold the control console switch labeled RAISE/WING LOCK in **WING LOCK** and operate the hydraulic lever to release the wing locks.

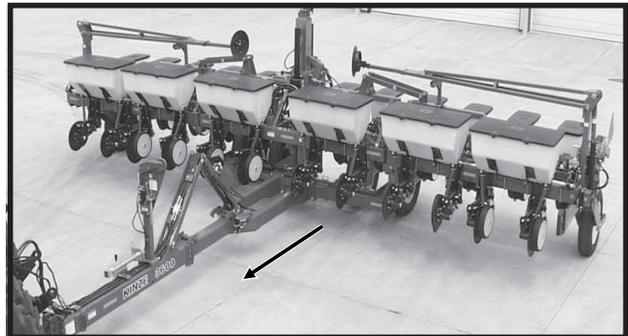
D061901108



8. Hold the hydraulic lever (to lower planter) to rephase the planter lift cylinders. The length of time it takes to rephase the system may vary due to tractor hydraulic flow and/or oil temperature. Normally 5 to 20 seconds is adequate to rephase the system.

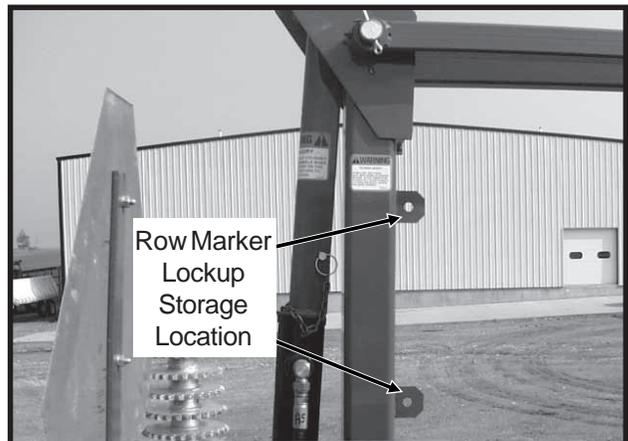
9. Raise the planter to the raised field position. Hold the control console switch labeled ROTATE/TONGUE in **TONGUE** and operate the hydraulic lever to retract the tongue.

D061901126



10. Remove and store row marker lockups.

D08250007

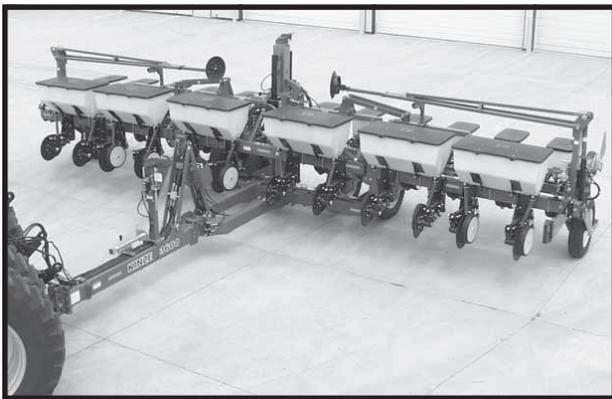


MACHINE OPERATION

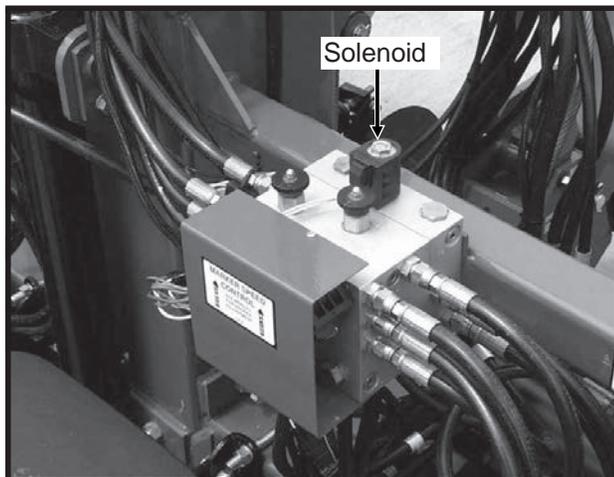
FIELD OPERATION

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

D061901127



D060299126



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

FIELD TO TRANSPORT SEQUENCE

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

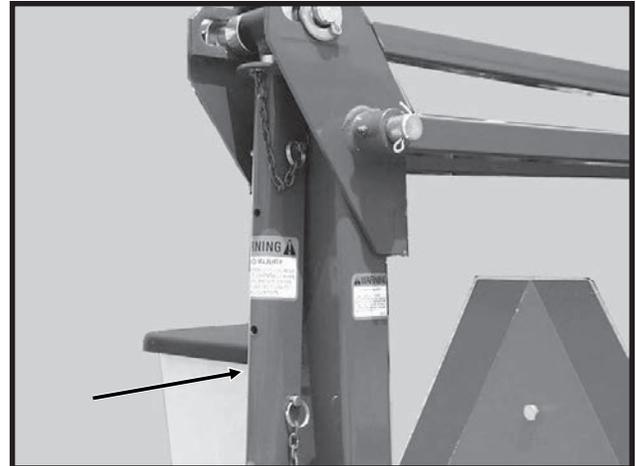
SUMMARIZED FIELD TO TRANSPORT SEQUENCE

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

NOTE: Read the following information for more detailed instructions.

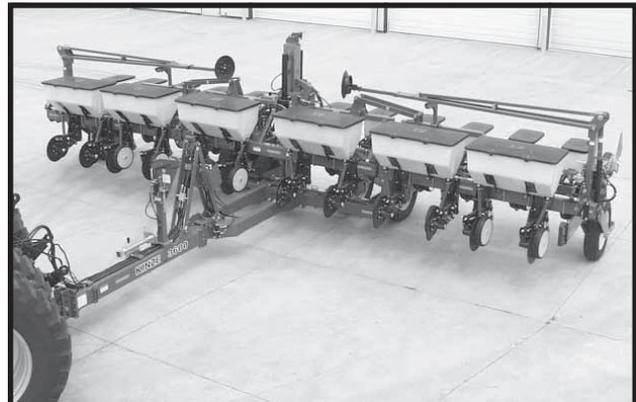
1. Install row marker lockups.

D060299127a



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

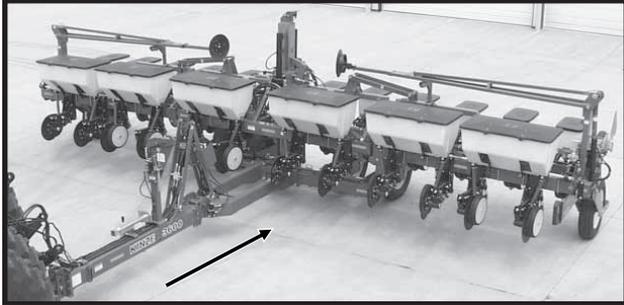
D061901127



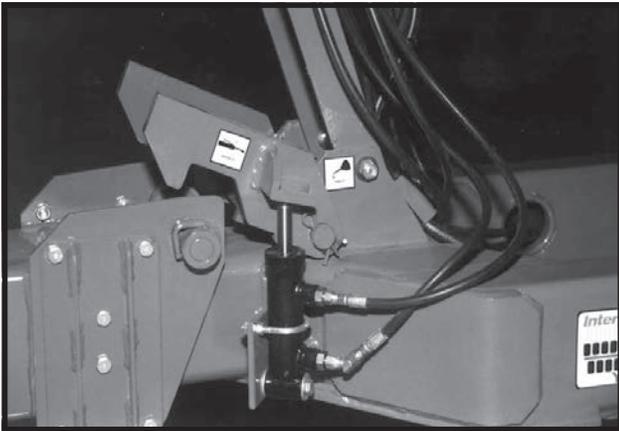
MACHINE OPERATION

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

D061901127

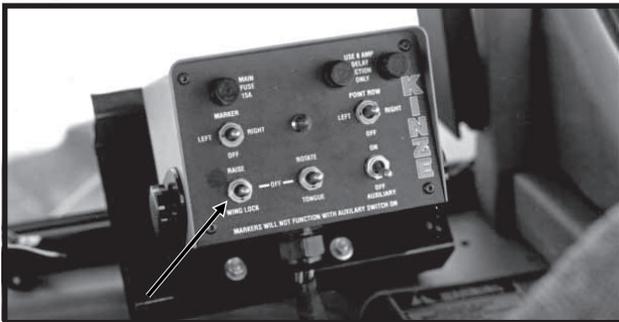


82316-20

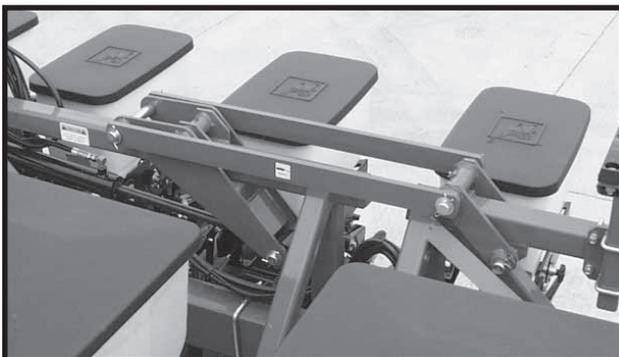


4. Hold the control console switch labeled RAISE/WING LOCK in **WING LOCK** and operate the hydraulic lever until the wing lock cylinders are fully extended and the wing locks are locked over center.

76746-24

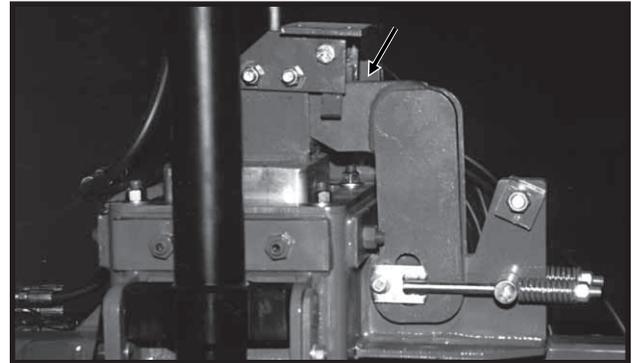


D061901109



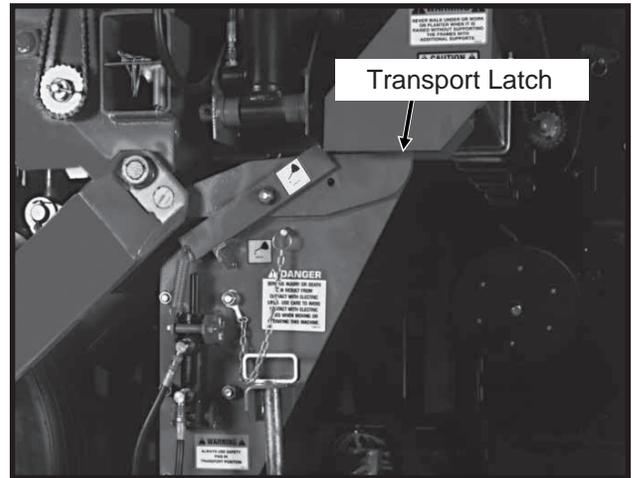
5. Hold the control console switch labeled RAISE/WING LOCK in **RAISE** and operate the hydraulic lever until the two center lift cylinders are fully extended and the safety hook located at the top of the center section rotates into locking position.

82316-15



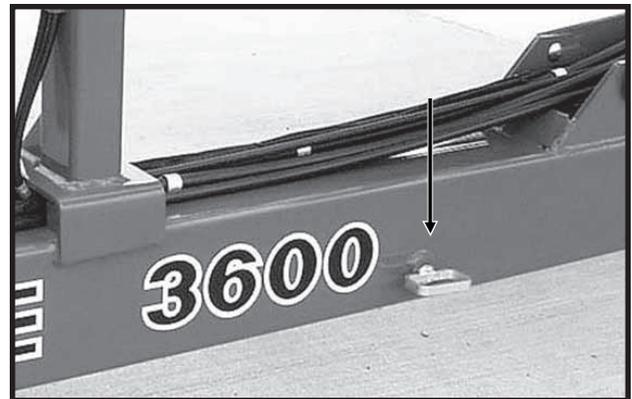
6. Using the hydraulic lever, lower the planter onto the safety hook.
7. Hold the control console switch labeled ROTATE/TONGUE in **ROTATE** and operate the hydraulic lever to rotate the planter until the transport latch is engaged.

82079-2a



8. Install tongue safety pin.

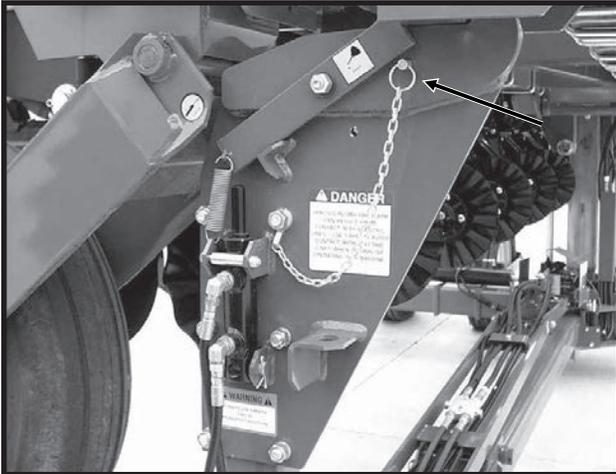
D060299102



MACHINE OPERATION

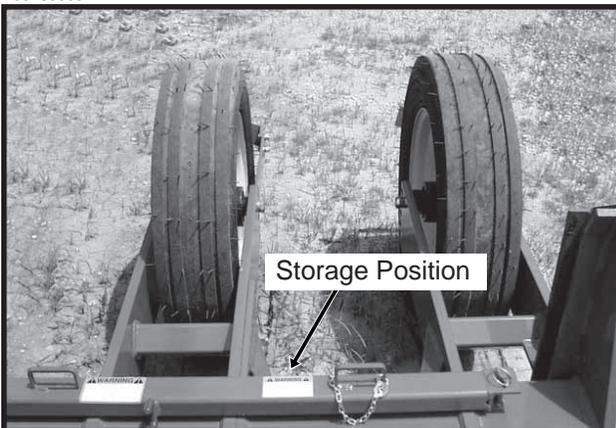
9. Install transport latch locking pin.

D060299106

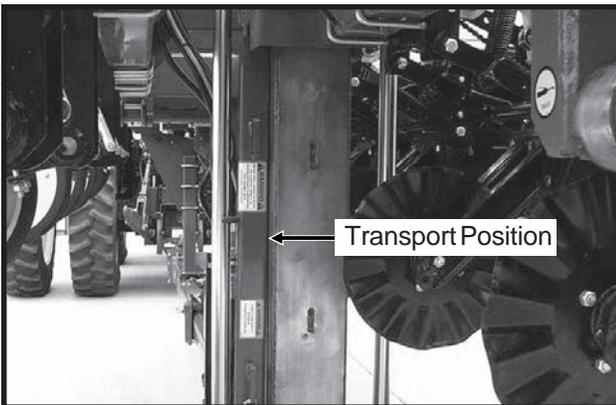


10. Remove manual safety bar from its storage location on the left side of the axle assembly and position it behind the front center lift cylinder.

D06189903



D060299107



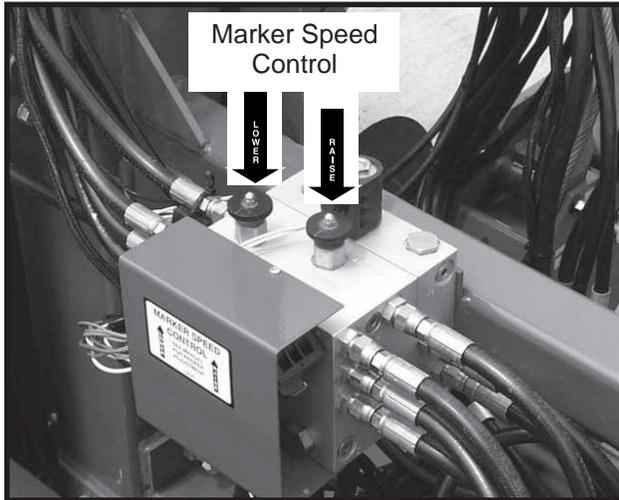
WARNING: Always install the manual safety lockup prior to working under the planter or while transporting the planter.

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.

D060299126



IMPORTANT: The flow controls should be adjusted to restrict flow before the row marker assembly is first put into use. Excessive row 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 equipped with flow control valves, row marker speed adjustment should be made with the tractor flow controls in maximum position. After row marker speed is set, the tractor flow controls can be adjusted to allow the hydraulic lever to stay in detent during the marker raise or lower cycle.



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

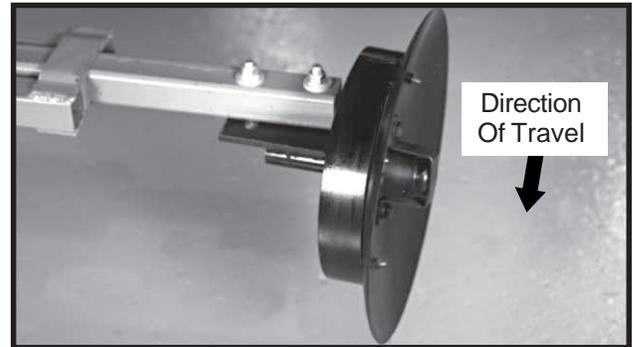
ROW MARKER LENGTH ADJUSTMENT

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

Number of rows	x	Row spacing (Inches)	=	Dimension between planter center line and marker disc blade.
----------------	---	----------------------	---	--

12 Rows x 30" Spacing = 360" Marker Dimension

60569-53



Marker Disc Blade Shown With Depth Band

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 $\frac{1}{2}$ " hardware and move the assembly as required. Tighten bolts to the specified torque.

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

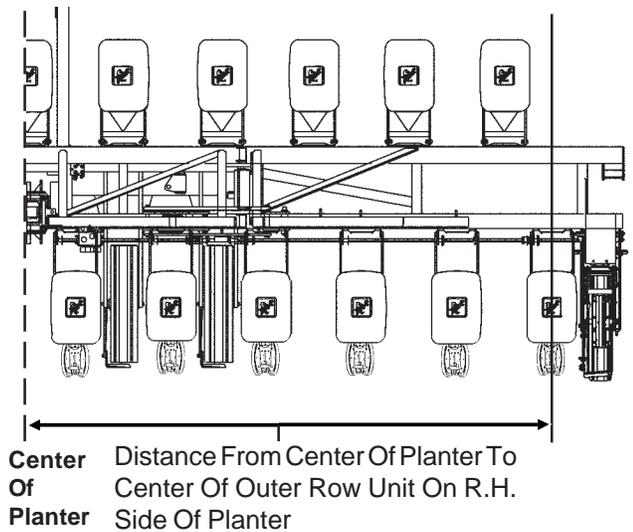
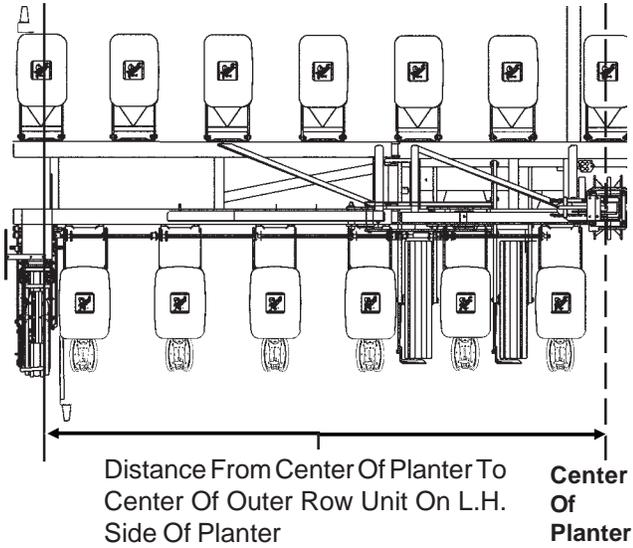
A field test is recommended to ensure the markers are properly adjusted. After the field test is made, make any minor adjustments as necessary.

A notched marker disc blade, for use in more severe no till conditions, is available from KINZE® through your KINZE® Dealer. (Continued On Following Page)

MACHINE OPERATION

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

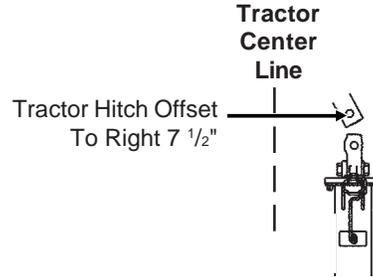
(PLTR132g/INS172a/INS172)



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

<p>12 Row 30" With 12 Interplant® Push Row Units (L.H. Marker 180" x 2 + 15" = 375") (R.H. Marker 165" x 2 + 15" = 345")</p> <p>16 Row 30" With 16 Interplant® Push Row Units (L.H. Marker 240" x 2 + 15" = 495") (R.H. Marker 225" x 2 + 15" = 465")</p>
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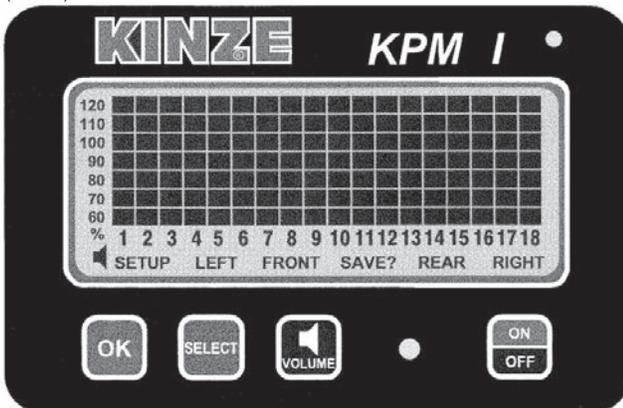
NOTE: If tractor hitch is offset 7 1/2" to the right of the center line of the tractor, add 7 1/2" to the marker dimension on the R.H. side of the planter and subtract 7 1/2" from the marker dimension on the L.H. side of the planter.



NOTE: Readjust markers when planting 30" rows.

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	6-16
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Warnings And Alarms	6-17
Replacing A Faulty Sensor	6-18
Field Operation	6-19
Programming/Connecting Seed Tubes	6-19

MONITOR KEY FUNCTIONS

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

OK

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

SELECT

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

VOLUME

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

ON/OFF

- Powers the unit on and off.

LCD FUNCTIONS

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

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

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

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

STEP 2 Press SELECT key again to activate both sections.

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

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

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

CHANGING THE AUDIBLE ALARM VOLUME

STEP 1 Press and hold down the VOLUME key.

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

WARNINGS AND ALARMS

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

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

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

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

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

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

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

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

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

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

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

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

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

REPLACING A FAULTY SENSOR

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

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

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

FIELD OPERATION

(MTR28e/MTR28c/MTR28d/MTR28b)

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



Information regarding each section is displayed alternately every 5 seconds.

REAR/FRONT CONFIGURATION

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



LEFT/RIGHT CONFIGURATION

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



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

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



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



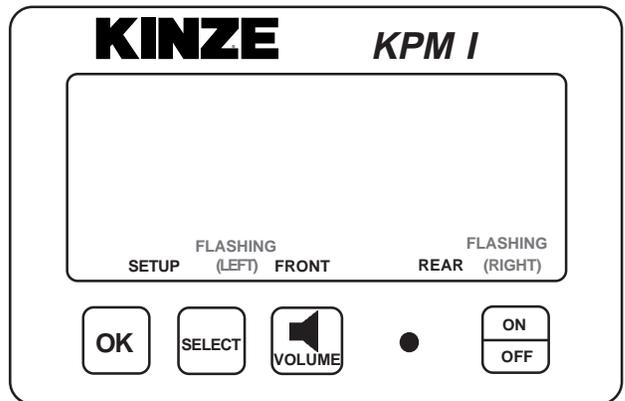
PROGRAMMING/CONNECTING SEED TUBES

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

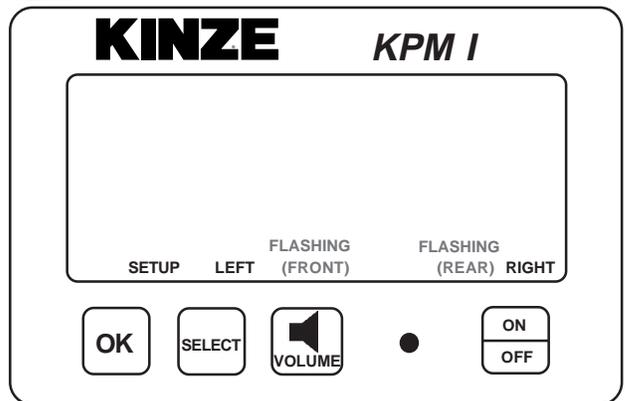
STEP 2 Press the ON key. The monitor automatically enters the setup procedure. If the monitor was accidentally powered on with no sensors attached, the user can turn the monitor off at this point and the previous configuration is not lost.

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

01229910



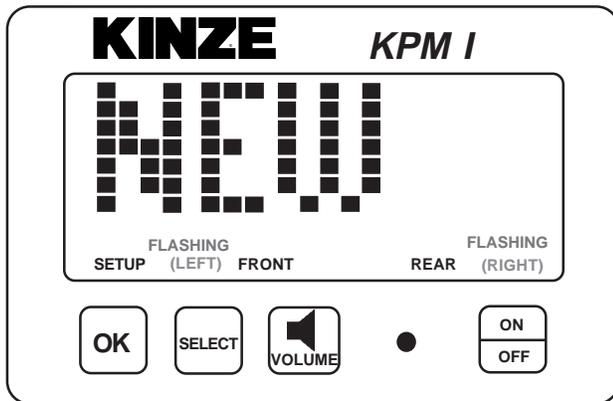
01229911



NOTE: Model 3600 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.

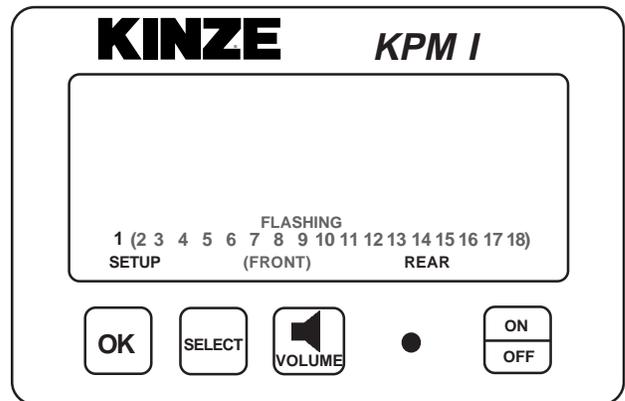
STEP 4 Press and hold the OK key to confirm the selection and continue holding until the row numbers appear on the display. During confirmation, the display will alternate between “NEW” and “SYS” to alert the user that the previous configuration will be lost. With the rear/front mode selected, the monitor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

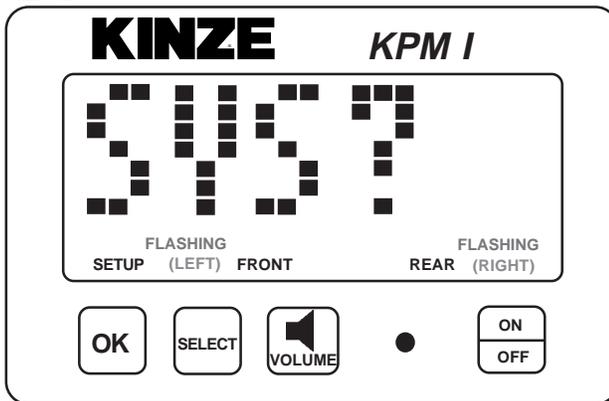


STEP 5 Plug each seed tube w/sensor into the harness in a predetermined order. Row 1 first, row 2 second and so on up to 18 rows. When a sensor is plugged in, the corresponding row number on the LCD display will stay solid, the monitor will chirp twice and the LED (Light Emitting Diode) on the seed tube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

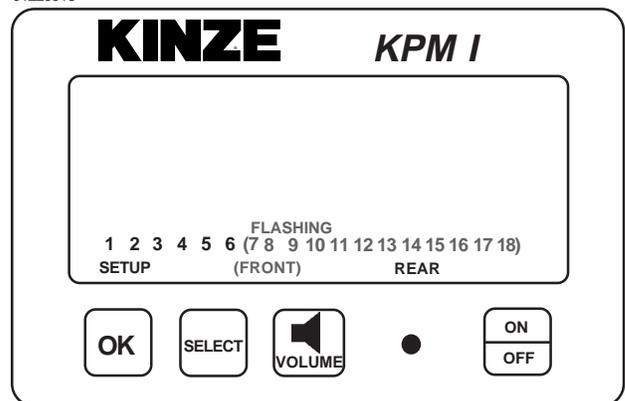


01229912a



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.

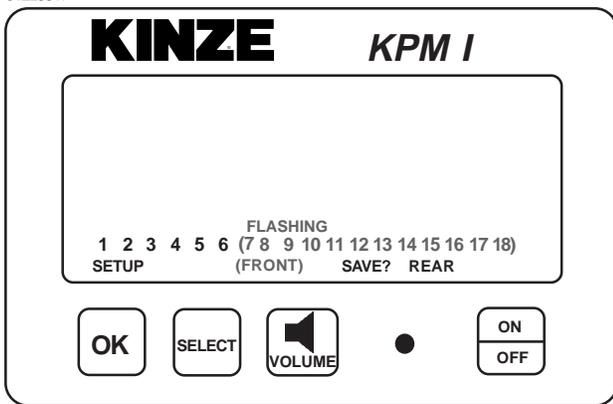
01229916



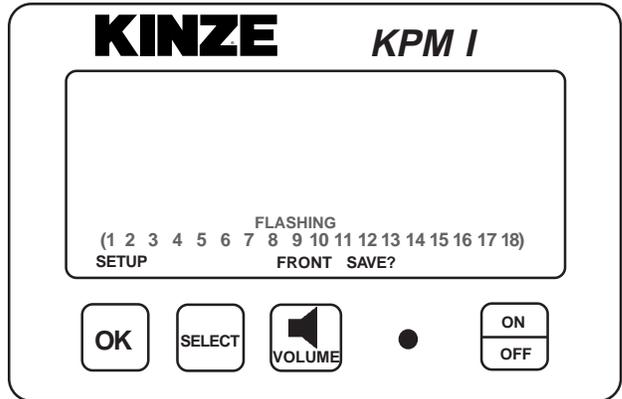
STEP 7 If this condition is satisfied, press and hold the OK key to save the setup for the current section. The SAVE? icon will show followed by continuous short beeps indicating the monitor is preparing to save. The installer has 5 seconds to decide if he wants to save the current configuration. During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

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.

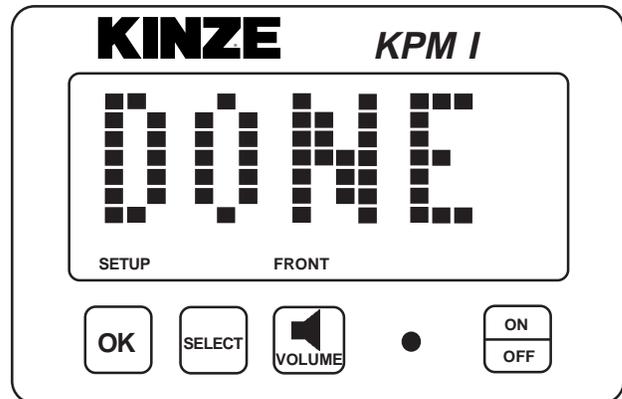
01229917



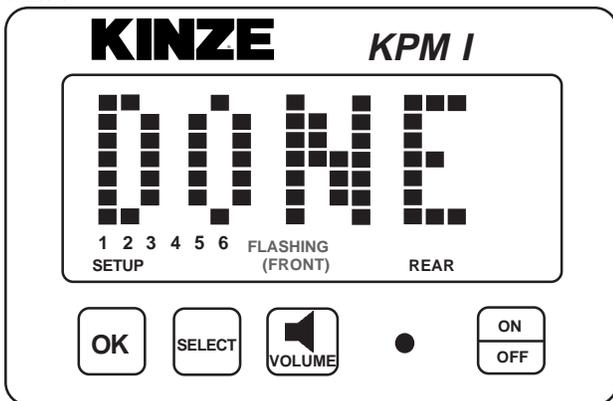
01229919



01229920



01229918

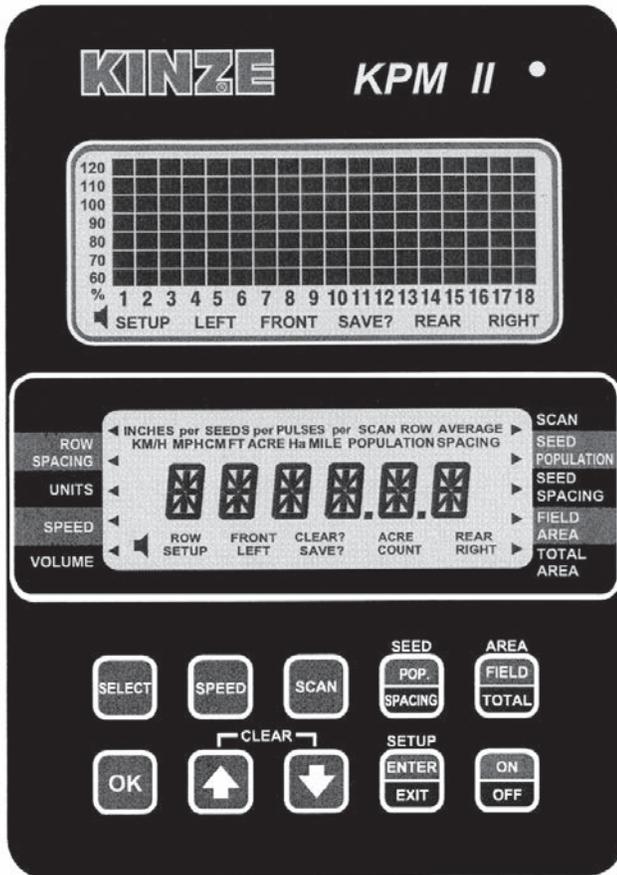


NOTE: Individual seed tubes may be unplugged for special situations. An alarm will sound which can be silenced by touching the OK key. The monitor will recognize each seed tube when reconnected.

See “KPM I/KPM II/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	6-23
Upper LCD Functions	6-24
Lower LCD Functions	6-25
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MONITOR KEY FUNCTIONS

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

SELECT

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

SPEED

- Immediately displays the current ground speed.

SCAN

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

SEED POPULATION/SEED SPACING

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

AREA FIELD/AREA TOTAL

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

OK

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

UP ARROW AND DOWN ARROW

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

SETUP ENTER/SETUP EXIT

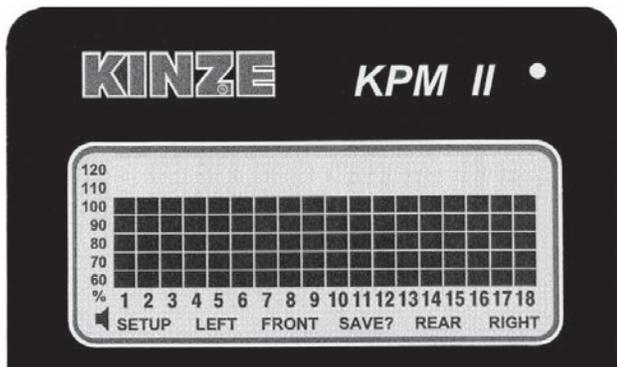
- Enters and exits the programming mode.

ON/OFF

- Powers the unit on and off.

UPPER LCD FUNCTIONS

(MTR29H)



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

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

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

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

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

STEP 2 Press SELECT key again to activate both sections.

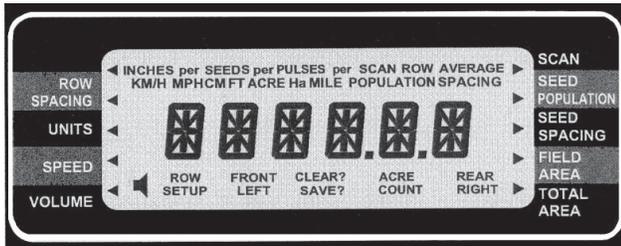
EXAMPLE: Press SELECT key a second time. The information regarding each section will display alternately every 5 seconds.

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

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

LOWER LCD FUNCTIONS

(MTR29g)



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

ROW SPACING

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

UNITS

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

SPEED

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

VOLUME

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

SCAN

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

SEED POPULATION/SEED SPACING

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

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

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

FIELD AREA/TOTAL AREA

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

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

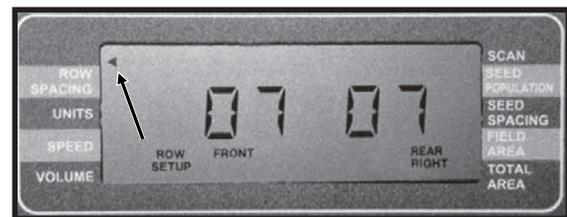
NOTE: When FIELD AREA is selected, the UP or DOWN key must be held in slightly longer than normal so the monitor will not mistake this action with a CLEAR, which consists of the UP and DOWN arrow keys pressed simultaneously. A beep will sound when the function activates.

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

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

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

092597-21



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

PROGRAMMING - Changing The Audible Alarm Volume

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

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

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

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

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

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

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

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

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

PROGRAMMING - Units (Metric Or English)

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

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

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

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

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

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

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

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

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

PROGRAMMING - Row Spacing

STEP 1 Prior to entering the programming mode, the application mode (rear/front or left/right) must be active. If the monitor is programmed in a rear/front configuration, both sections will be active (alternating every 5 seconds). You can then set the row spacing to the Interplant® System row spacing.

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

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

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

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

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

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

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

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

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

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

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

To exit setup mode, press the SETUP key.

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

PROGRAMMING - Speed

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

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

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

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

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

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

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

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

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

The three possible data communication bus errors are:

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

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

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

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

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

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

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

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

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

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

REPLACING A FAULTY SENSOR

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

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

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

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

FIELD OPERATION

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



(MTR28e)

Information regarding each section is displayed alternately every 5 seconds.

REAR/FRONT CONFIGURATION

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



(MTR28c)

LEFT/RIGHT CONFIGURATION (If Applicable)

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

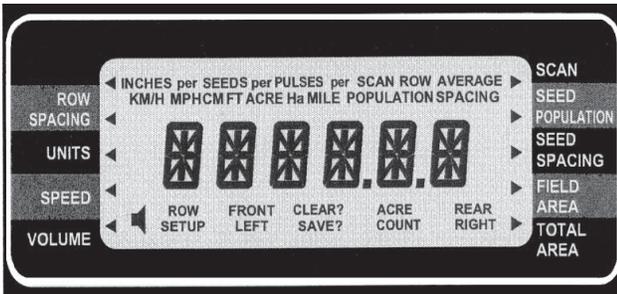


(MTR28c)

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

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

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



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



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



(MTR29c/MTR29d/MTR29b/MTR29c)

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



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



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



Press the SCAN key again to lock on current row.

Press the SCAN key again to resume scrolling.

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



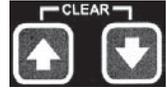
Press the SEED POPULATION/SEED SPACING key to go back to planter average.



CLEARING FIELD AREA

(MTR29n/MTR28b)

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



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



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

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



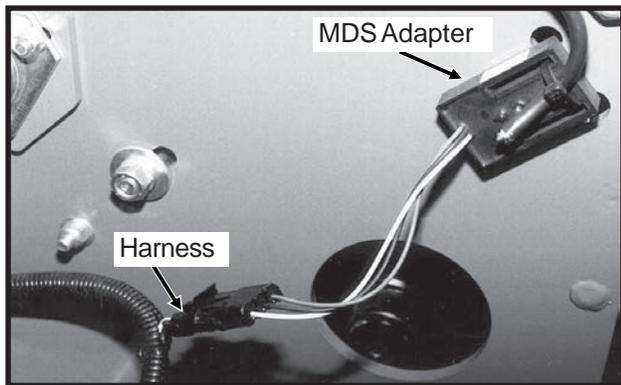
PROGRAMMING/CONNECTING SEEDTUBES, RADAR/MAGNETIC DISTANCE SENSORS AND/OR SHAFT ROTATION SENSORS

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.

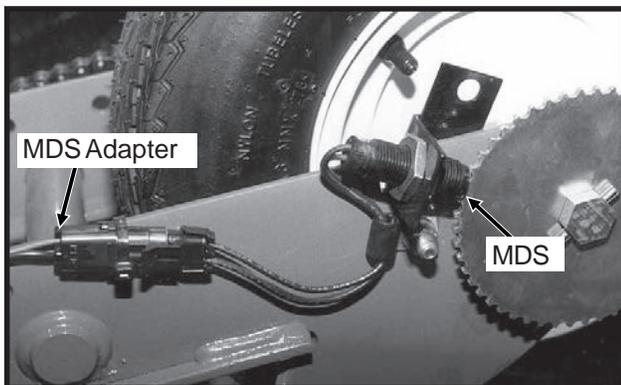
NOTE: If the monitor detects a radar sensor but no seed tubes at power up, it will automatically go into AREA COUNT mode. See “Area Counter/Speedometer Mode”.

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

01189909



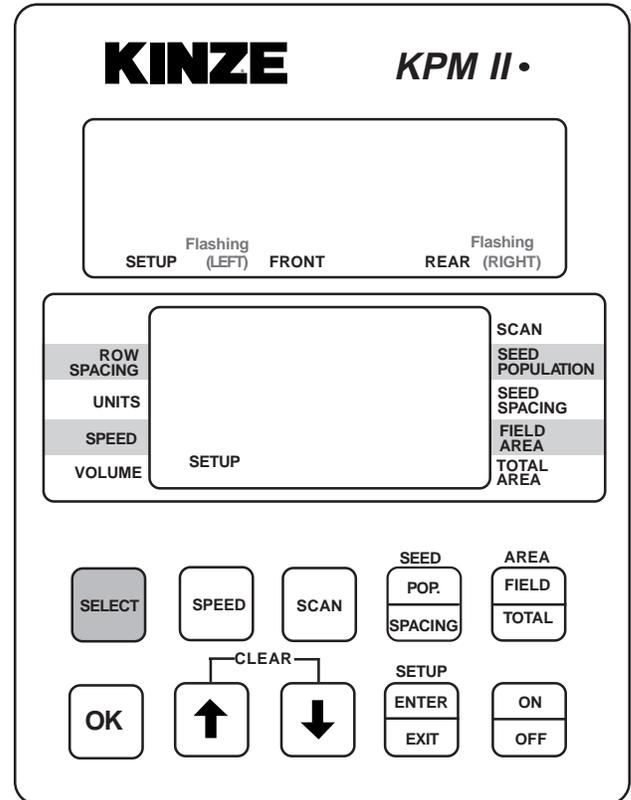
01189910



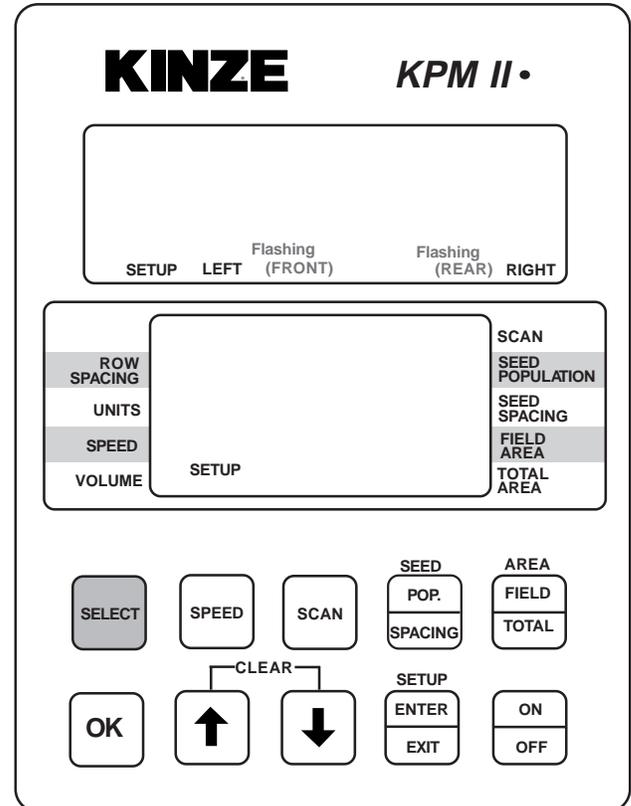
STEP 2 Press the ON key. The monitor automatically enters the setup procedure.

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

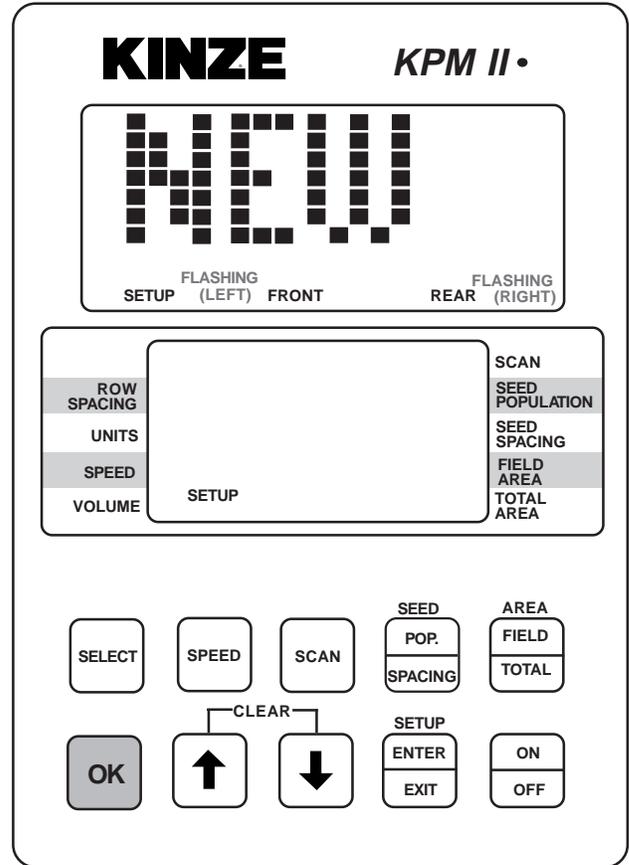


NOTE: Model 3600 planters select the rear/front configuration.

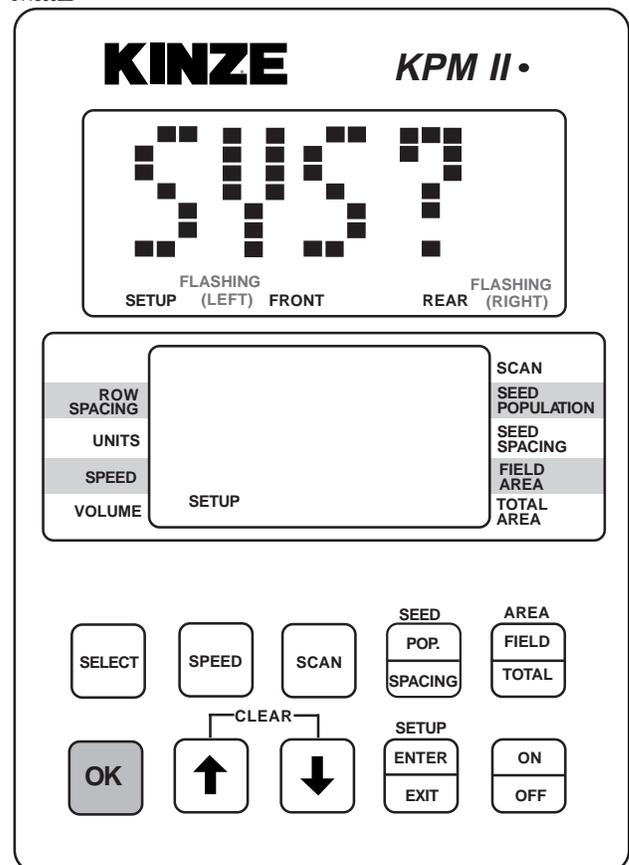
STEP 4 Press and hold the OK key to confirm selection. The upper display will alternate between “NEW” and “SYS?”.

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.

01139922



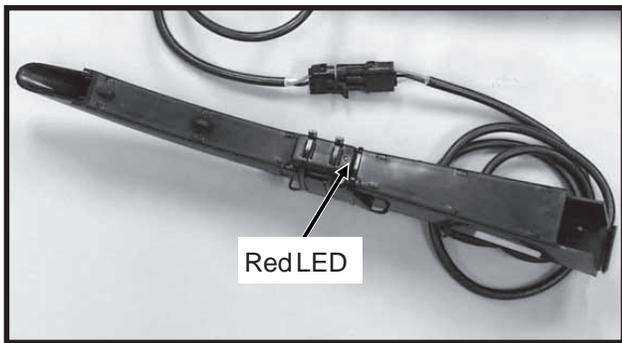
01139922



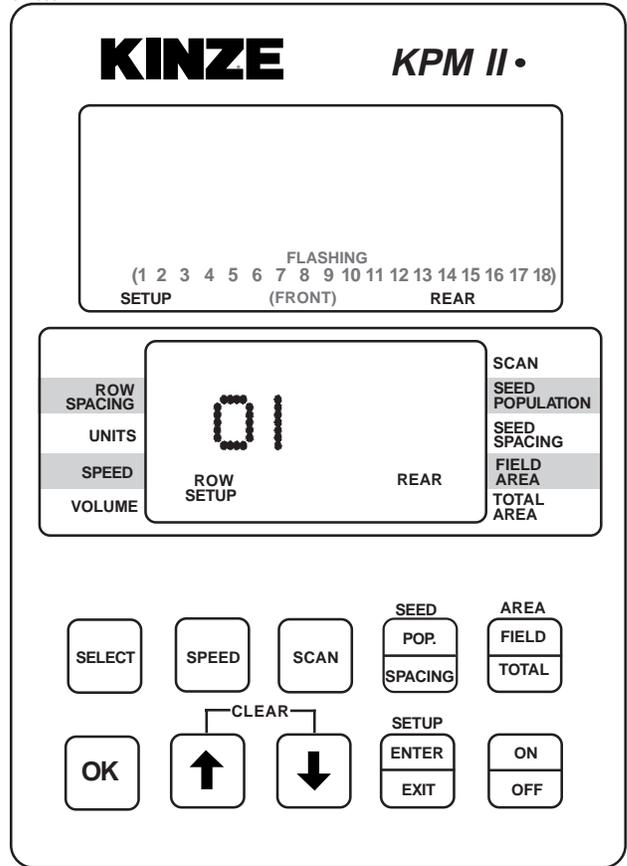
STEP 5 Determine which row you want as number one and plug the seed tube w/sensor into the harness.

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.

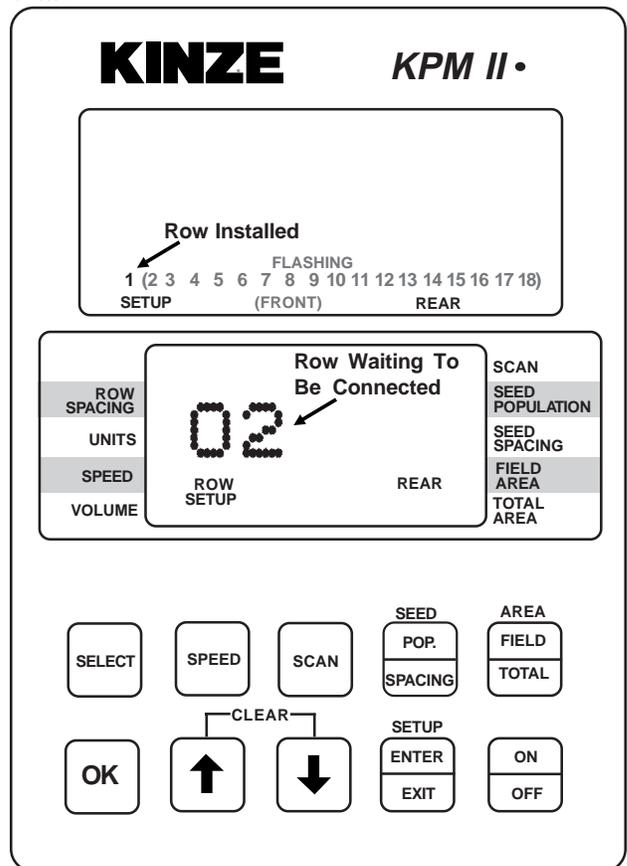
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01139921

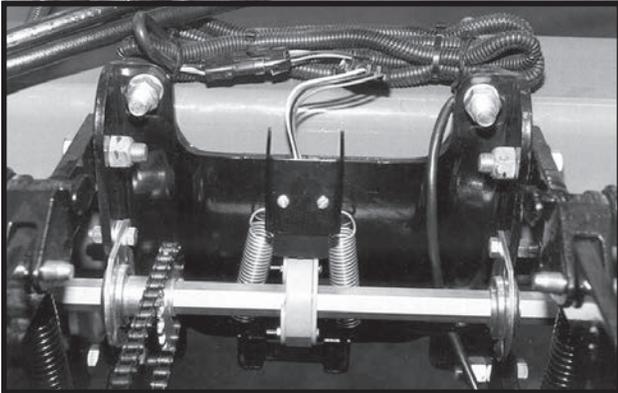


01139911



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

01189906



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

01139919

KINZE
KPM II •

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

ROW SPACING
UNITS
SPEED
VOLUME

LSHAFT

SCAN
SEED POPULATION
SEED SPACING
FIELD AREA
TOTAL AREA

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

CLEAR

01139916

KINZE
KPM II •

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

ROW SPACING
UNITS
SPEED
VOLUME

RSHAFT

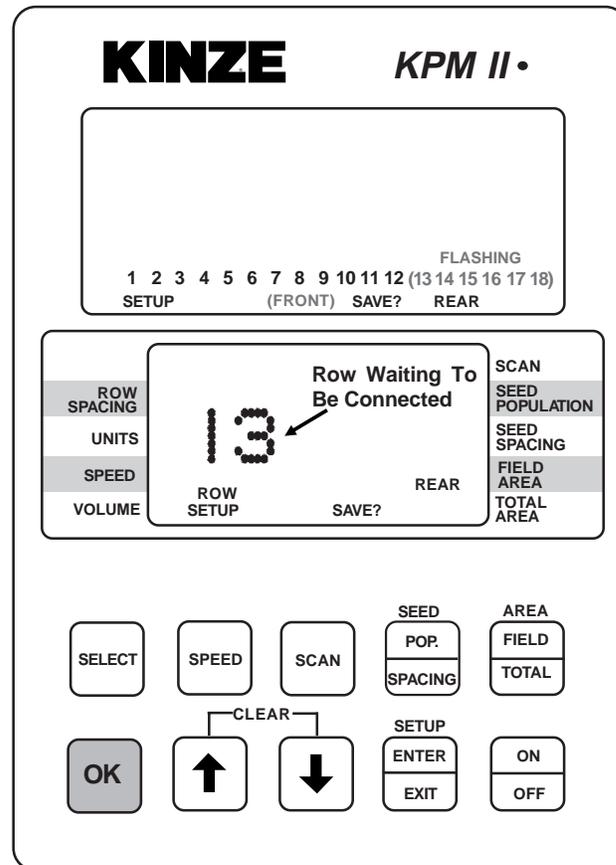
SCAN
SEED POPULATION
SEED SPACING
FIELD AREA
TOTAL AREA

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

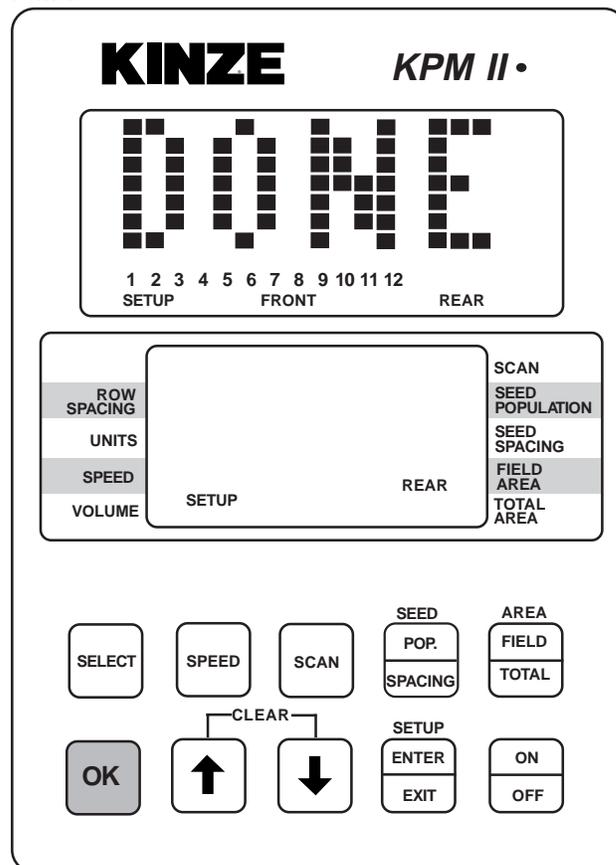
CLEAR

STEP 7 When all the seed tubes for the current section (Rear/Front or Left/Right) are installed, check to be sure the monitor displays solid numbers for the number of seed tubes connected. Press and hold the OK key to save the setup for the current section. The SAVE? icon will display followed by continuous short beeps indicating the monitor is preparing to save. The installer has 5 seconds to decide to save the current configuration. During this time, four short beeps will sound followed by a long beep and the SAVE? icon will turn off and the word "DONE" shows on the screen. The monitor will continue to the second section installation. (If Applicable)

01139914

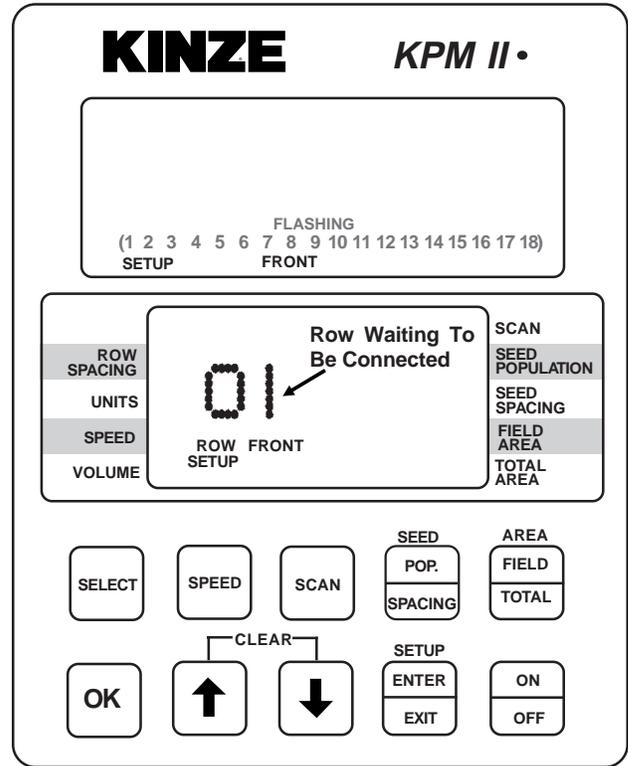


01139913

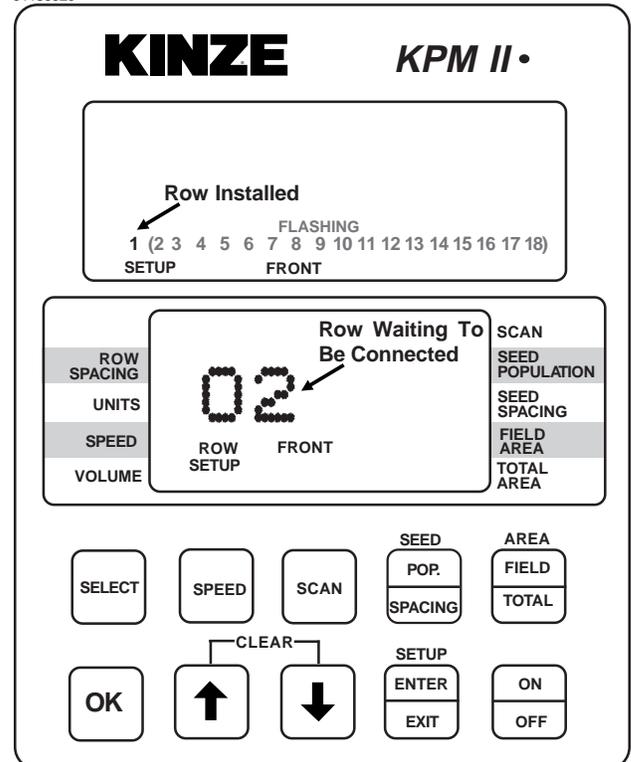


STEP 8 Follow STEPS 5 through 7 to install the second section. If no seed tubes are installed on the second section, press and hold the OK key. The word "DONE" will appear on upper display. The alarm will sound four short beeps followed by one long beep and the SAVE? icon turns off. The monitor has exited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

01139912



01139920



STEP 8 (Continued)

01139910

KINZE
KPM II •

Rows Installed

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

FLASHING
SETUP FRONT SAVE?

ROW SPACING
UNITS
SPEED
VOLUME

Row Waiting To Be Connected



ROW SETUP FRONT SAVE?

SCAN
SEED POPULATION
SEED SPACING
FIELD AREA
TOTAL AREA

SELECT

SPEED

SCAN

SEED POP. SPACING

AREA FIELD TOTAL

OK

↑

↓

SETUP ENTER EXIT

ON OFF

01139910a

KINZE
KPM II •

DONE

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

FLASHING
SETUP FRONT

ROW SPACING
UNITS
SPEED
VOLUME

FRONT
SETUP

SCAN
SEED POPULATION
SEED SPACING
FIELD AREA
TOTAL AREA

SELECT

SPEED

SCAN

SEED POP. SPACING

AREA FIELD TOTAL

OK

↑

↓

SETUP ENTER EXIT

ON OFF

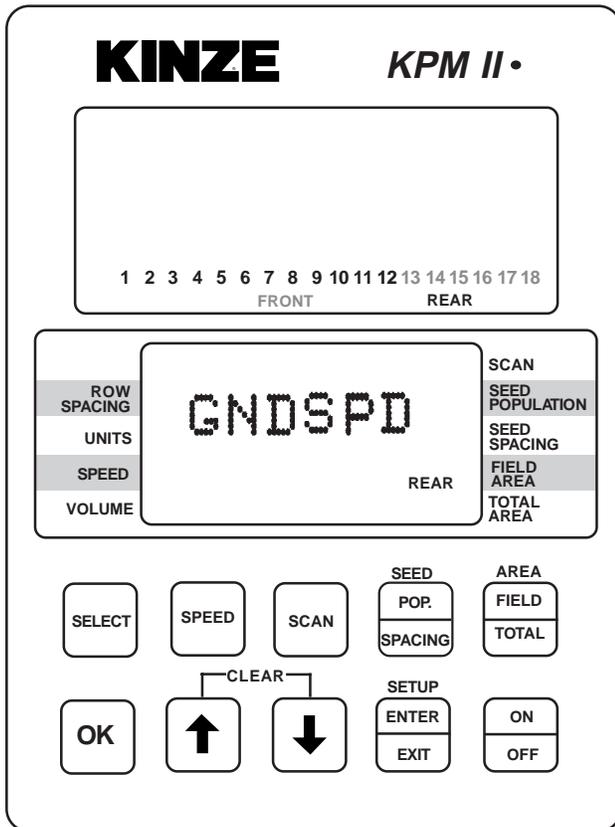
STEP 9 With the lower display showing “GNDSPD”, connect the distance sensor. The monitor will display “PICKUP” if a magnetic distance sensor is connected or “RADAR” if a radar distance sensor is installed. Only one distance sensor can be connected at a time.

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

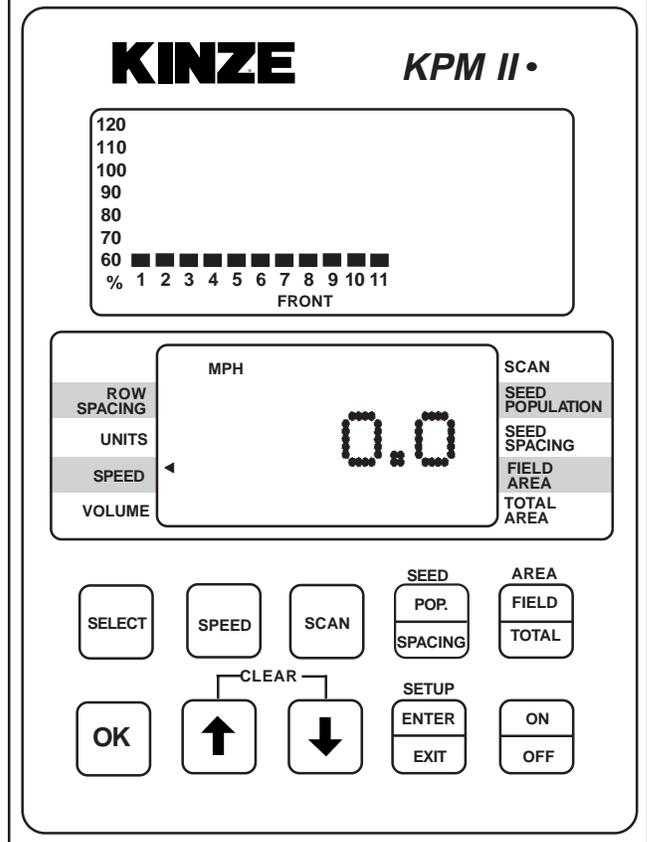
NOTE: To reprogram the system to monitor more or less rows (up to the maximum of 18 per section, 36 total), all sensors must be unplugged, followed by the complete setup procedure.

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

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MACHINE OPERATION

ROW-BY-ROW ALARM LEVEL SETTING
(Requires Version V0.06 Or Higher Software -
KPM II Monitors Only)

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

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

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

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

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

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

STEP 4 Arrow UP or DOWN to desired row.

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

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

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

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

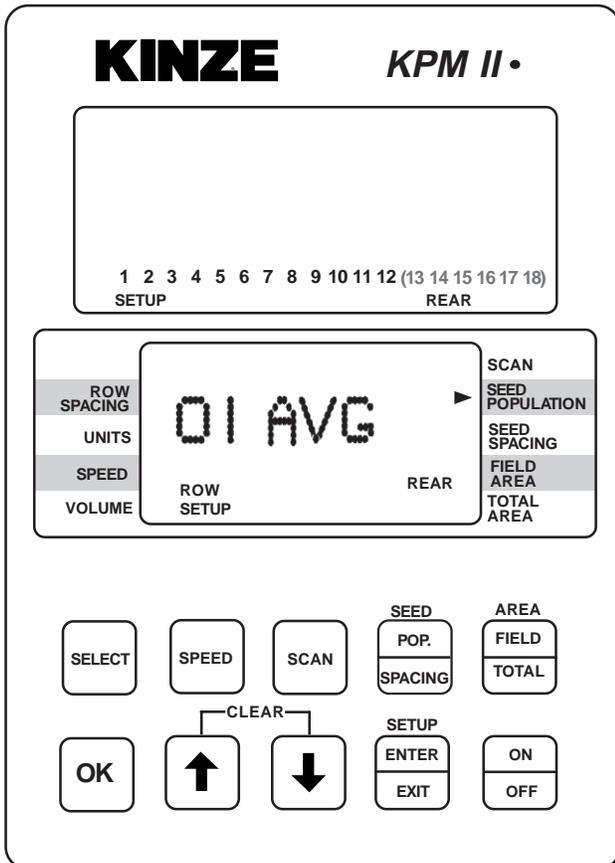
STEP 8 Repeat STEPS 3 through 7 for each row on which you wish to adjust the alarm setting.

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

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

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

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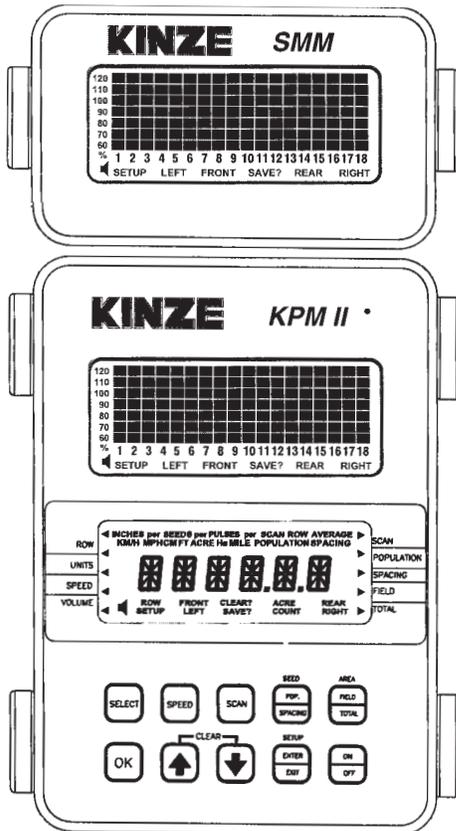


NOTE:
See "Programming - Row Spacing" for programming applicable row spacing.

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

KPM II STACK-MODE ELECTRONIC SEED MONITOR

(MTR41e)



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

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

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

The SMM console is available as a separate package for use when 3600 planters are equipped with Interplant® Package rows.

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

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

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

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

Monitor Key Functions	6-45
Upper LCD Functions	6-46
Lower LCD Functions	6-47
Programming	
Changing The Audible Alarm Volume	6-49
Units (Metric Or English)	6-50
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Clearing Total Area	6-53
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Programming/Connecting SMM Console, Shaft Rotation Sensors, Seed Tubes And/Or Radar/Magnetic Distance Sensors	6-58
Row-By-Row Alarm Level Setting	6-70

MONITOR KEY FUNCTIONS

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

SELECT

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

SPEED

- Immediately displays the current ground speed.

SCAN

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

SEED POPULATION/SEED SPACING

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

AREA FIELD/AREA TOTAL

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

OK

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

UP ARROW AND DOWN ARROW

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

SETUP ENTER/SETUP EXIT

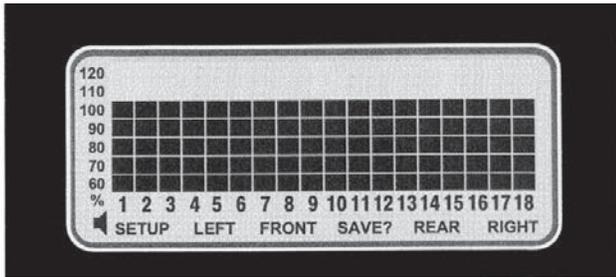
- Enters and exits the programming mode.

ON/OFF

- Powers the unit on and off.

UPPER LCD FUNCTIONS

(MTR29h)



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

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

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

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

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

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

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

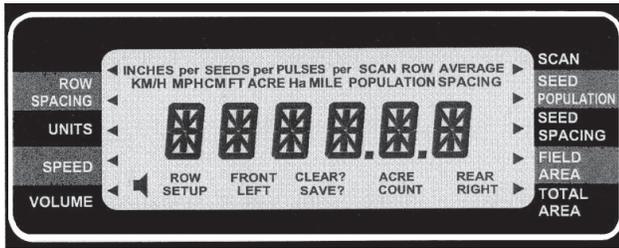
STEP 2 Press SELECT key again to activate both sections.

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

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

LOWER LCD FUNCTIONS

(MTR29g)



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

ROW SPACING

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

UNITS

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

SPEED

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

VOLUME

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

SCAN

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

MACHINE OPERATION

KPM II STACK-MODE

SEED POPULATION/SEED SPACING

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

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

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

FIELD AREA/TOTAL AREA

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

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

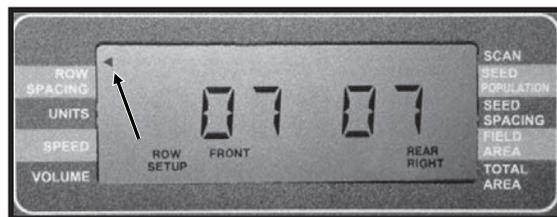
NOTE: When FIELD AREA is selected, the UP or DOWN key must be held in slightly longer than normal so the monitor will not mistake this action with a CLEAR, which consists of the UP and DOWN arrow keys pressed simultaneously. A beep will sound when the function activates.

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

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

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

092597-21



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

PROGRAMMING - Changing The Audible Alarm Volume

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

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

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

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

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

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

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

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

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

MACHINE OPERATION

KPM II STACK-MODE

PROGRAMMING - Units (Metric Or English)

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

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

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

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

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

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

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

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

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

PROGRAMMING - Row Spacing

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

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

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

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

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

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

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

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

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

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

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

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

To exit setup mode, press the SETUP key.

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

PROGRAMMING - Speed

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

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

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

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

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

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

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

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

- Pull the tractor up to the starting line.

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

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

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

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

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

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

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

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

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

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

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

PROGRAMMING - Clearing Total Area

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

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

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

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

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

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

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

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

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

AREA COUNTER/SPEEDOMETER MODE

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

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

WARNINGS AND ALARMS

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

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

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

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

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

The four possible data communication bus errors are:

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

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

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

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

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

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

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

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

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

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

REPLACING A FAULTY SENSOR

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

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

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

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

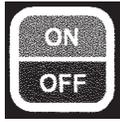
NOTE: If the monitor is not turned off and then on, the replacement sensor(s) will be ignored until the next power on, at which point the sensors will be randomly learned by the monitor.

MACHINE OPERATION

KPM II STACK-MODE

FIELD OPERATION

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



(MTR28e)

Information regarding each section is displayed alternately every 5 seconds.

REAR/FRONT CONFIGURATION (Without SMM Console Installed)

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



(MTR28c)

REAR/FRONT CONFIGURATION (With SMM Console Installed)

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



(MTR28c)

FOUR SECTION CONFIGURATION (With SMM Console Installed)

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

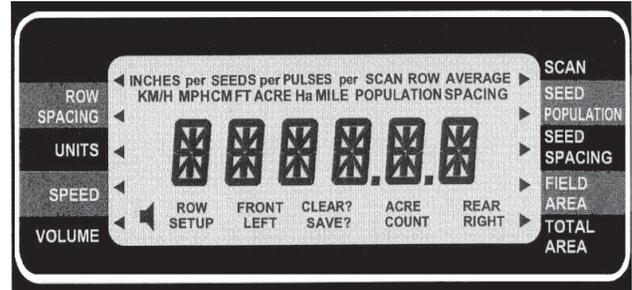


(MTR28c)

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

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

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



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



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



(MTR29c/MTR29d/MTR29b/MTR29c)

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



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



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



Press the SCAN key again to lock on current row.

Press the SCAN key again to resume scrolling.

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



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



CLEARING FIELD AREA

(MTR29n/MTR28b)

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



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



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

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



MACHINE OPERATION

KPM II STACK-MODE

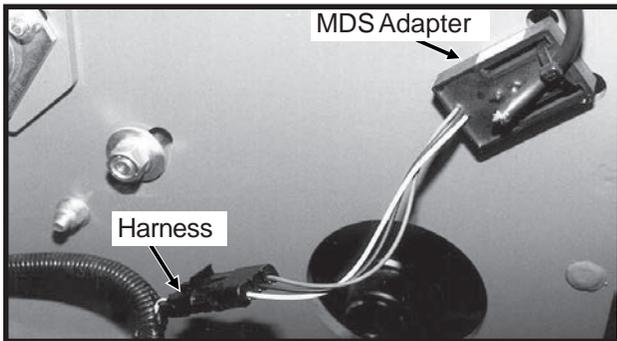
PROGRAMMING/CONNECTING SMM CONSOLE, SHAFT ROTATION SENSORS, SEED TUBES AND/OR RADAR/MAGNETIC DISTANCE SENSORS

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

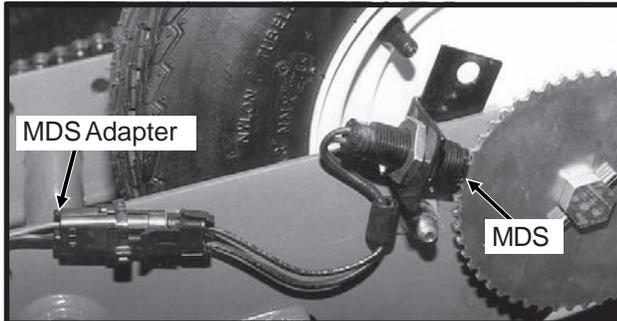
NOTE: If the monitor detects a radar sensor but no seed tubes at power up, it will automatically go into AREA COUNT mode. See “Area Counter/Speedometer Mode”.

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

01189909



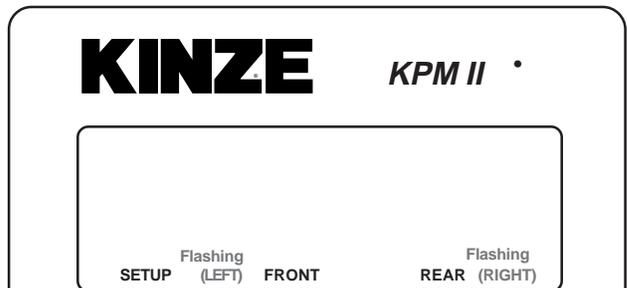
01189910



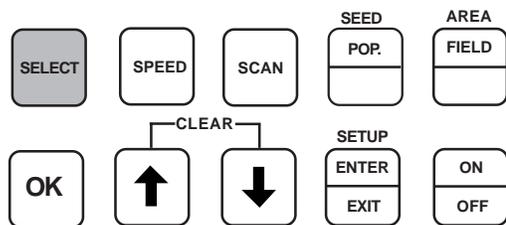
STEP 2 Press the ON key. The monitor automatically enters the setup procedure. Monitor will scroll “NO SENSOR” on top LCD of KPM II Stack-Mode console.

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

12060211



ROW	SETUP	SCAN
UNITS		SEED
SPEED		SEED
VOLUME		FIELD
		TOTAL

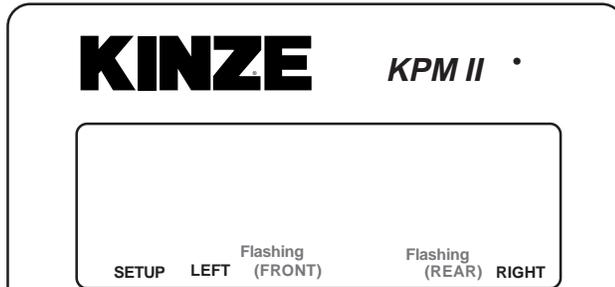


NOTE: SMM console may not be applicable to all models.

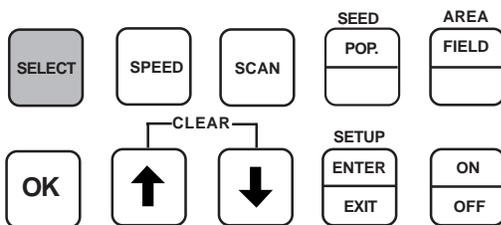
MACHINE OPERATION

KPM II STACK-MODE

12060211



ROW	SETUP	SCAN
UNITS		SEED
SPEED		SEED
VOLUME		TOTAL



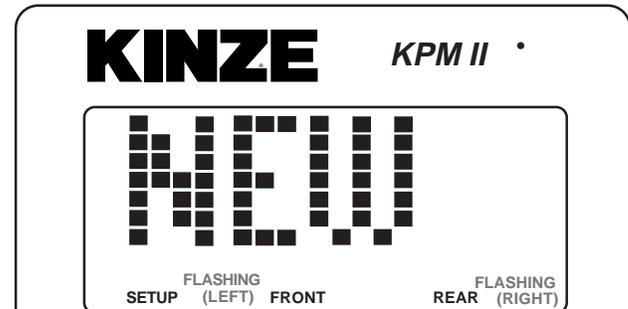
NOTE: SMM console may not be applicable to all models.

NOTE: Model 3600 planters select the rear/front configuration.

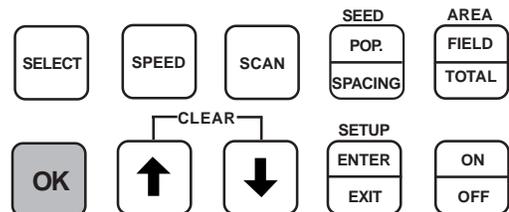
STEP 4 Press and hold the OK key to confirm selection. The upper display will alternate between “NEW” and “SYS?”.

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



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



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

MACHINE OPERATION

KPM II STACK-MODE

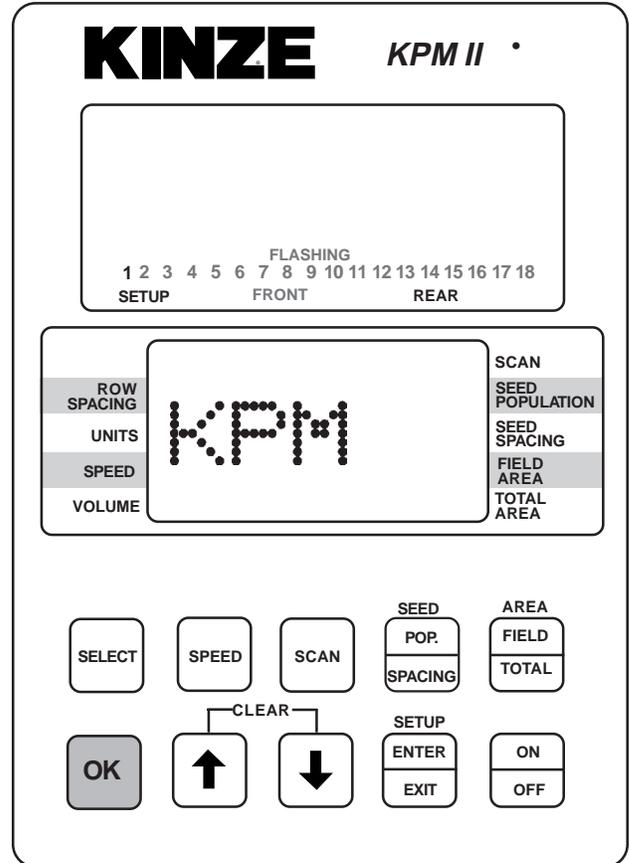
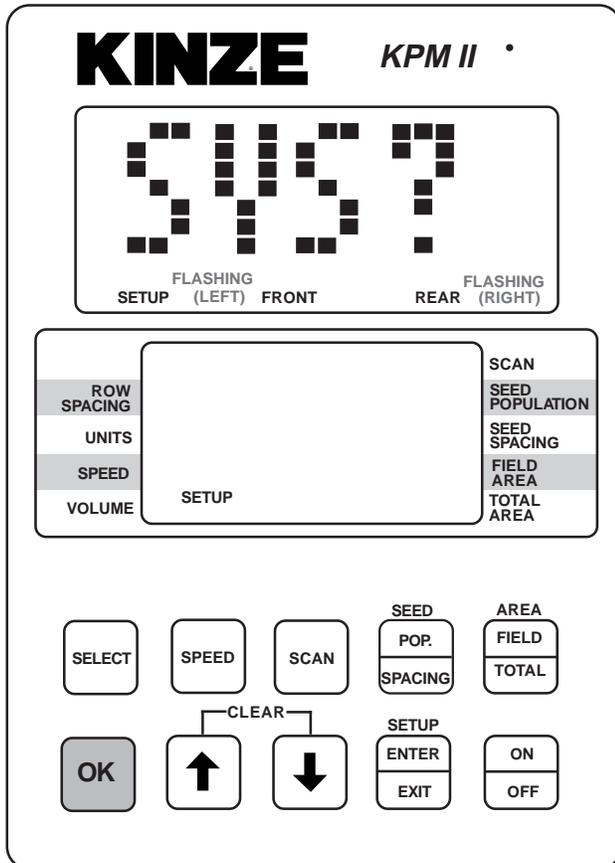
NOTE: Illustrated using rear/front configuration. The KPM II Stack-Mode console shows LEFT in the left/right configuration, REAR in the rear/front configuration and FRONT LEFT/REAR LEFT in the four sections configuration.

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

12060211



12060211



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

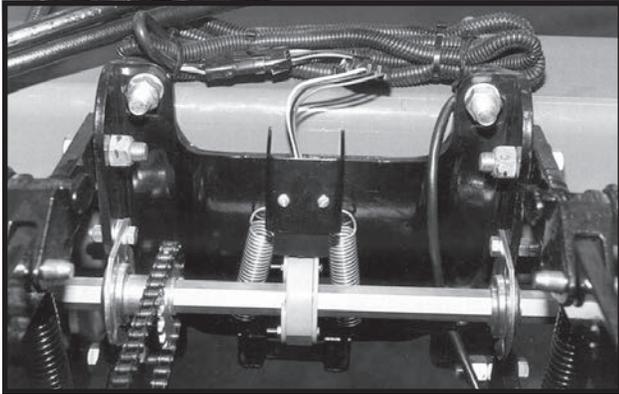
NOTE: SMM console may not be applicable to all models.

MACHINE OPERATION

KPM II STACK-MODE

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

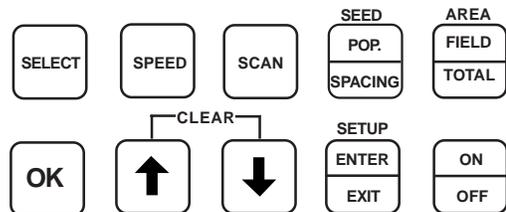
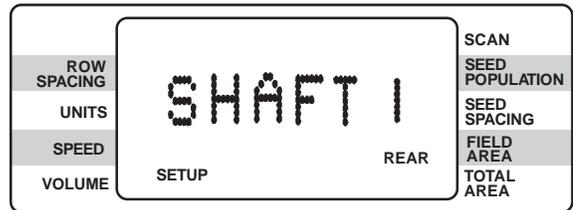
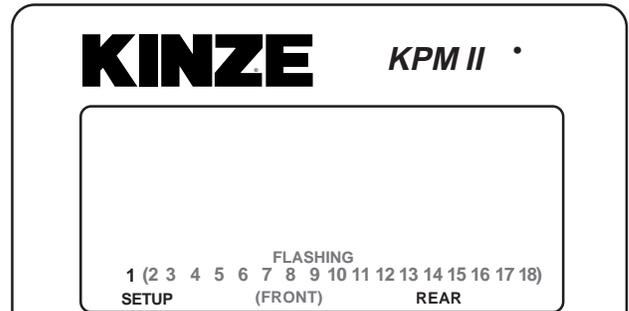
01189906



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

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

12060211



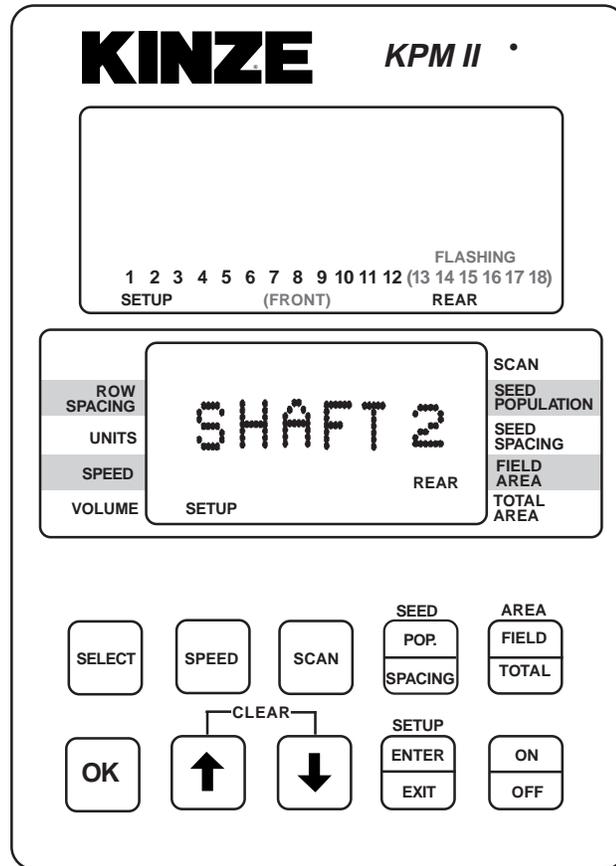
NOTE: SMM console may not be applicable to all models.

MACHINE OPERATION

KPM II STACK-MODE

STEP 6 (Continued)

12060211

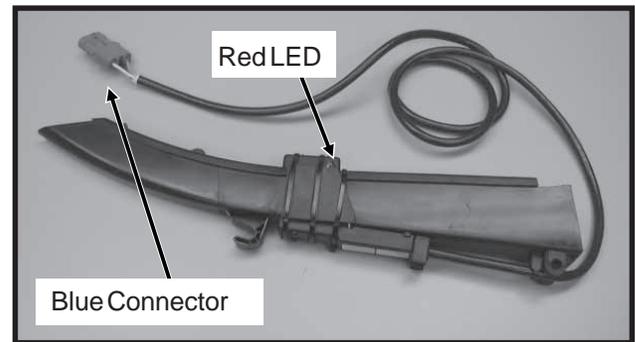


NOTE: SMM console may not be applicable to all models.

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

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

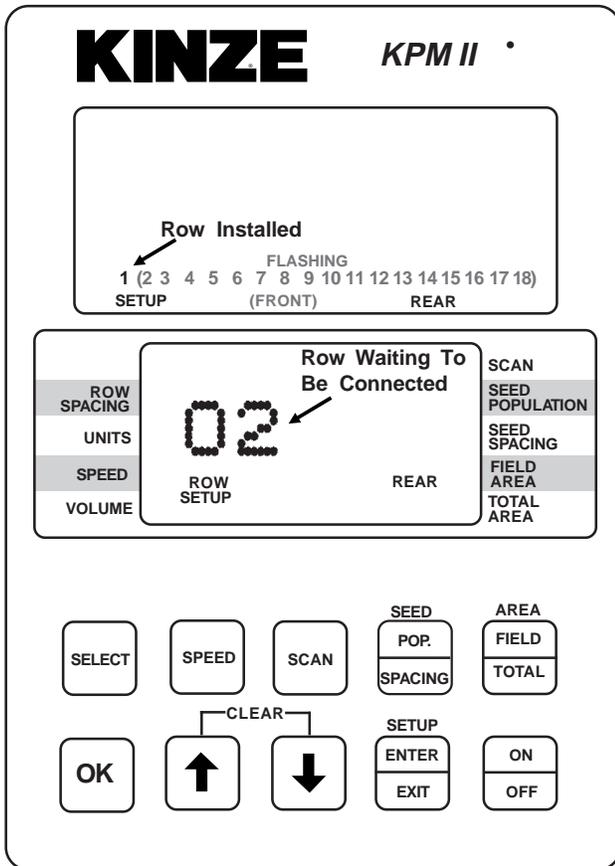
D120602101



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

STEP 7 (Continued)

12060211



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

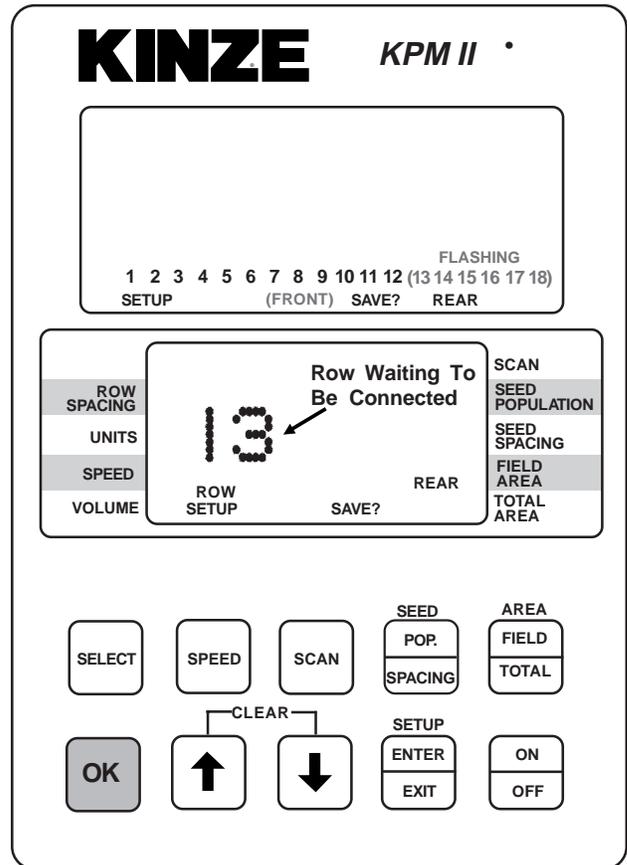
MACHINE OPERATION

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

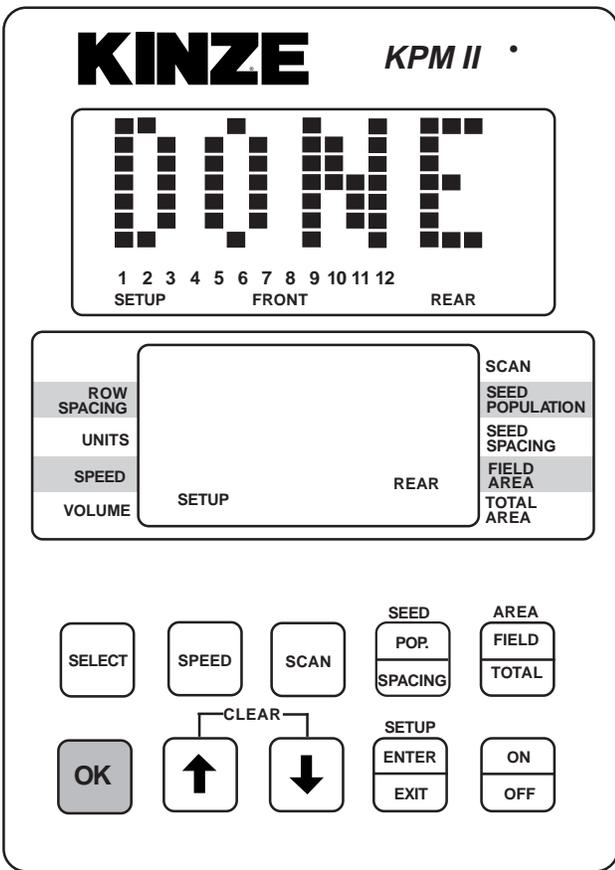
12060211



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

STEP 8 (Continued)

12060211



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

MACHINE OPERATION

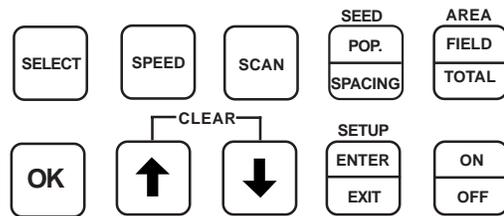
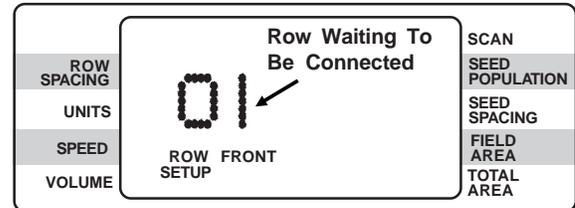
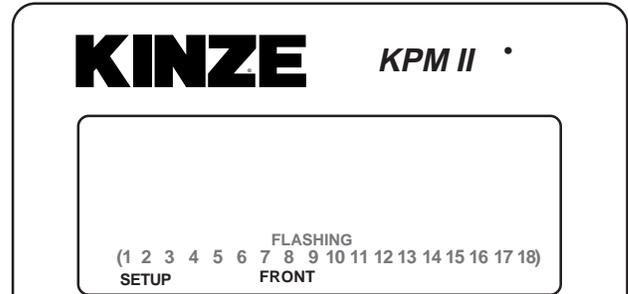
KPM II STACK-MODE

STEP 9 Follow STEPS 6, 7 and 8 to install the second 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 backlighting screen) until the entire system is saved.

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

12060212



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

MACHINE OPERATION

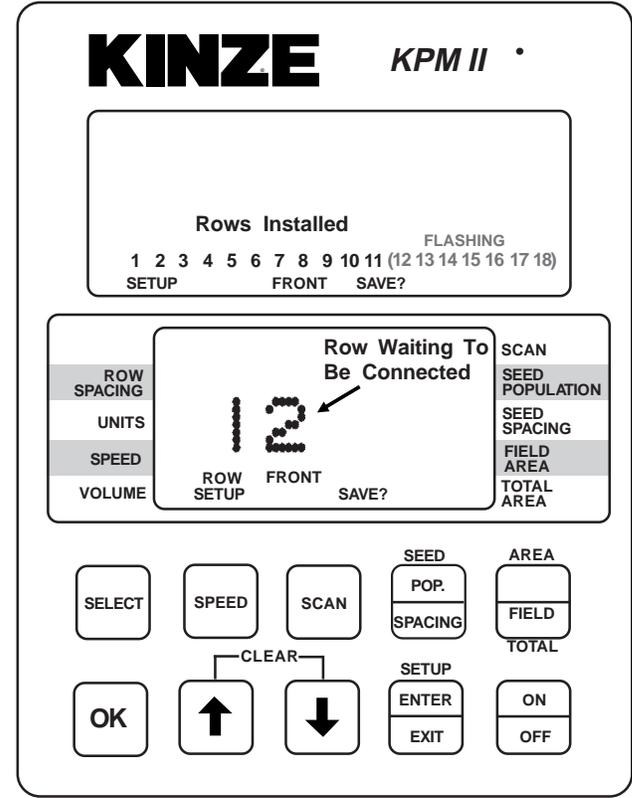
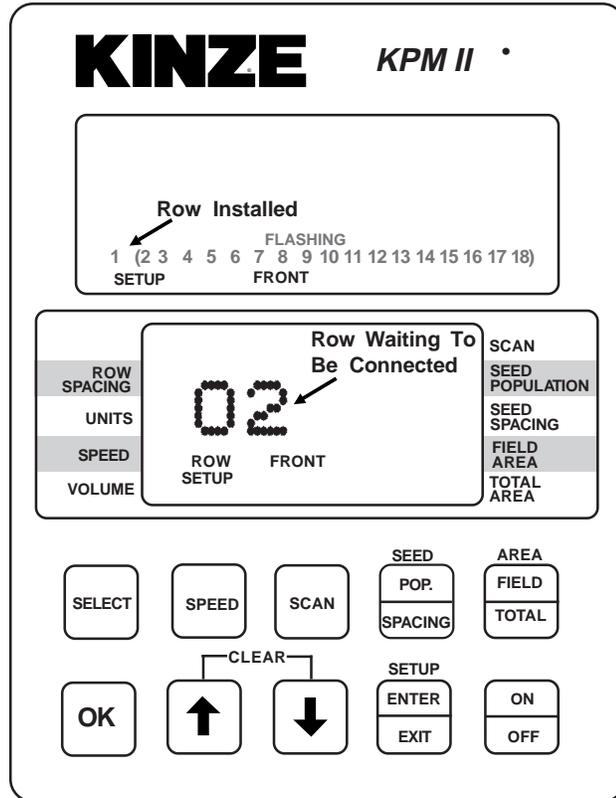
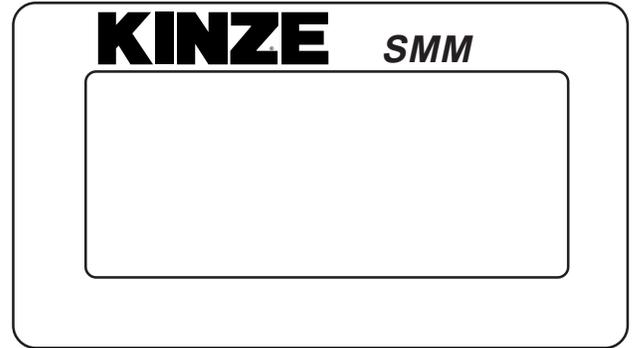
KPM II STACK-MODE

STEP 9 (Continued)

12060213



12060214



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

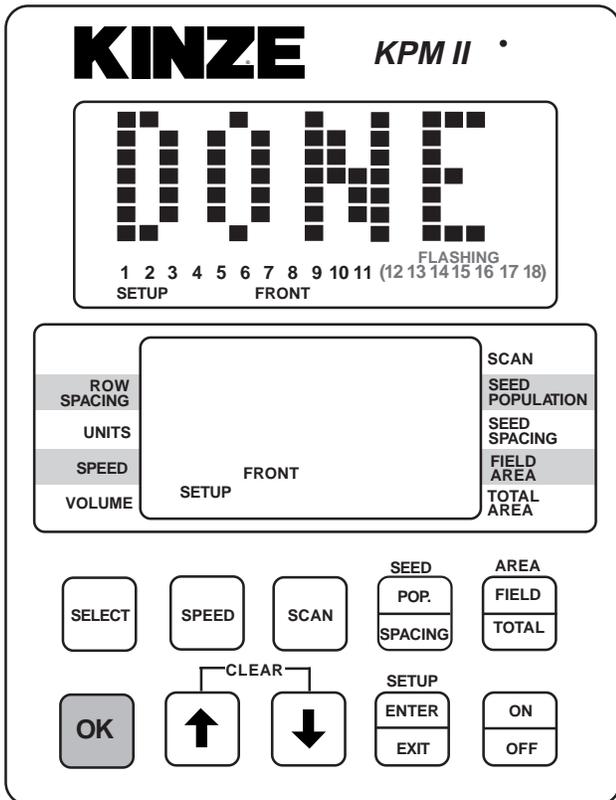
NOTE: SMM console may not be applicable to all models.

MACHINE OPERATION

KPM II STACK-MODE

STEP 9 (Continued)

12060215



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

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

NOTE: 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.

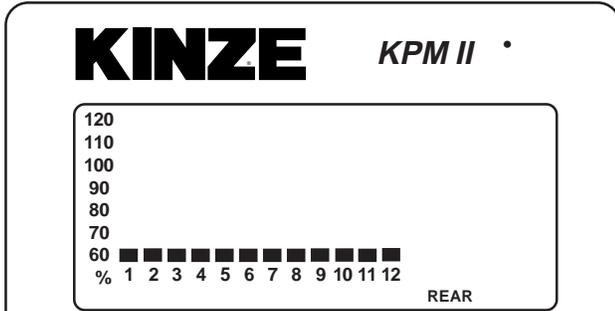
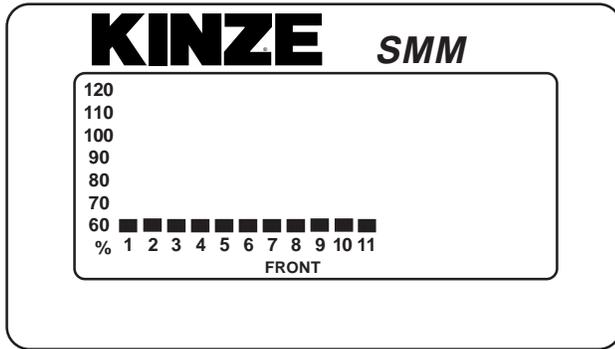
NOTE: To connect the radar distance sensor, install the 10" monitor/radar adapter between the console and radar distance sensor to adapt the monitor system to various tractor radar systems. DO NOT CONNECT 10" MONITOR/RADAR ADAPTER PRIOR TO THIS STEP.

MACHINE OPERATION

KPM II STACK-MODE

STEP 10 (Continued)

12060216



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

REAR

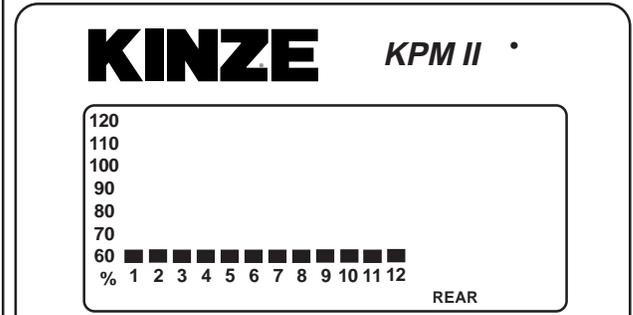
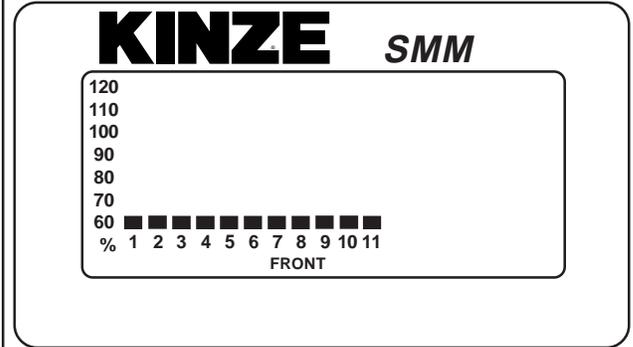
SELECT	SPEED	SCAN	SEED POP. SPACING	AREA FIELD TOTAL
OK	CLEAR		SETUP ENTER EXIT	ON OFF
	↑	↓		

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 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.

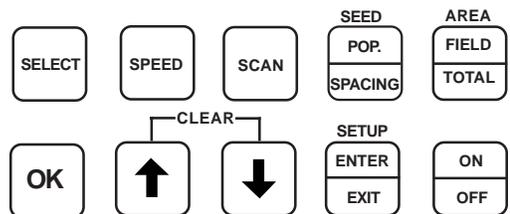
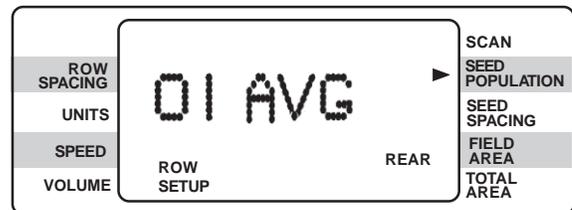
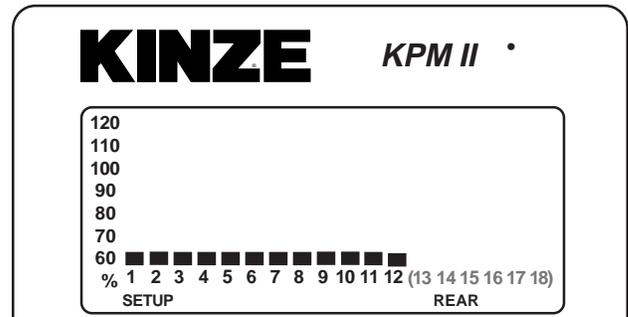
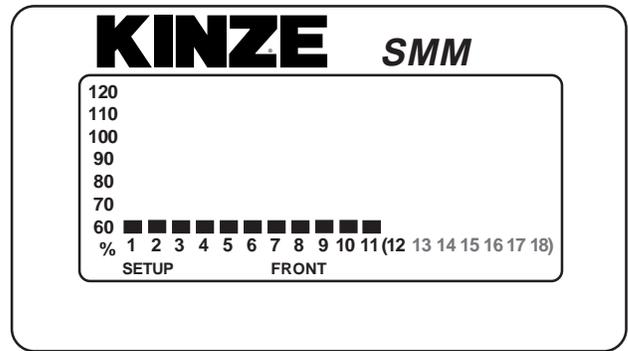
NOTE: Illustrated using rear/front configuration. The KPM II Stack-Mode console shows LEFT in the left/right configuration, REAR in the rear/front configuration and FRONT LEFT/REAR LEFT in the four sections configuration. The SMM console shows RIGHT in the left/right configuration, FRONT in the rear/front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

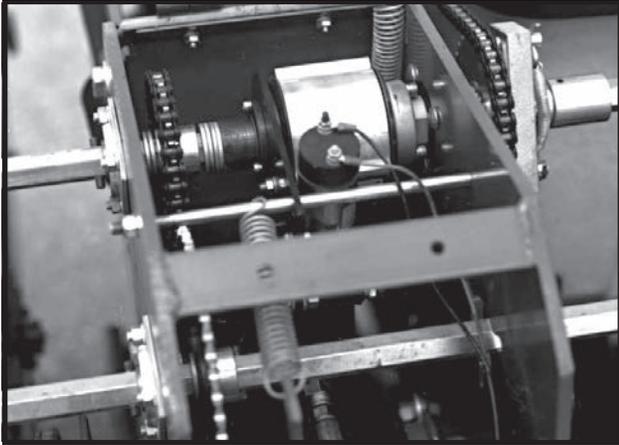
See "KPM I/KPM II/KPM II Stack-Mode Electronic Seed Monitor Troubleshooting" in the Maintenance Section.

MACHINE OPERATION

POINT ROW CLUTCHES

(Standard on 12 and 16 Row/Optional on 8 Row)

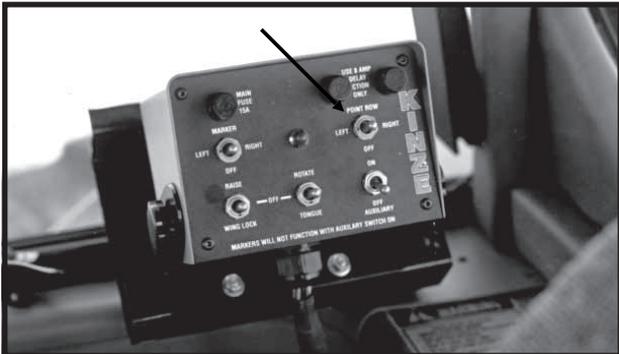
76740-2



16 Row Machine Shown

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

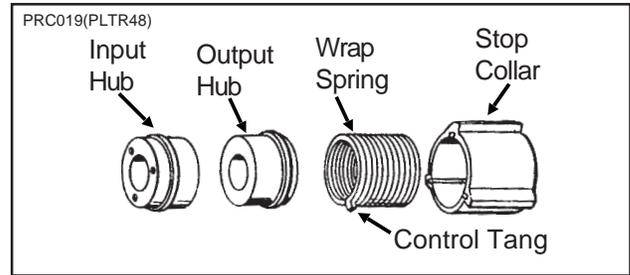
76746-24



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

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

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



The point row clutch consists of a wrap spring riding on an input hub and an output hub. During operation the wrap spring is wrapped tightly over the hubs connecting them in a positive engagement. The greater the force of rotation the tighter the grip of the spring on the hubs.

Rotation in the opposite direction or stopping the spring from rotating prevents the transmission of torque from the input hub to the output hub, stopping the planter drive.

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

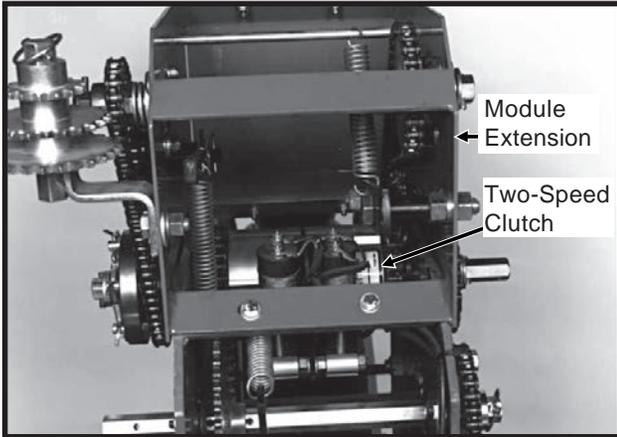
The stop collar is controlled by the use of an electric solenoid and an actuator arm. When the selector switch on the tractor control console is in the OFF position the solenoid coil is NOT ENERGIZED and the actuator arm will not contact the stop on the stop collar allowing it to rotate with the hubs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

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

MACHINE OPERATION

TWO-SPEED POINT ROW CLUTCHES

81826-8

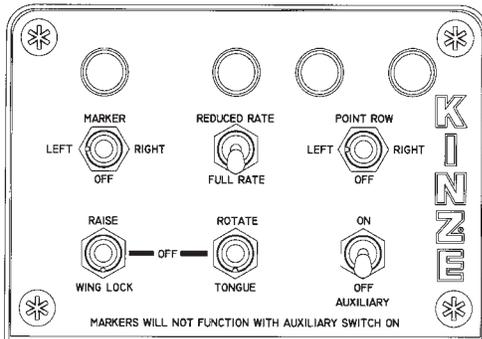


The Two-Speed Point Row Clutch Package is designed to allow on-the-go population rate adjustment as well as the capability to shutoff either half of the planter for finishing up fields or for long point row situations.

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

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

A7435(TWL81)



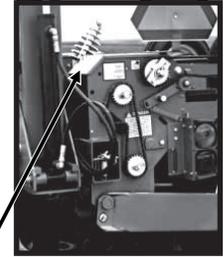
The ratio of population reduction is determined by the sprocket ratio between the drive and driven sprockets on the wheel module extension. A rate reduction decal like the one shown below is located on the wheel module extension.

(7100-214)76740-61

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

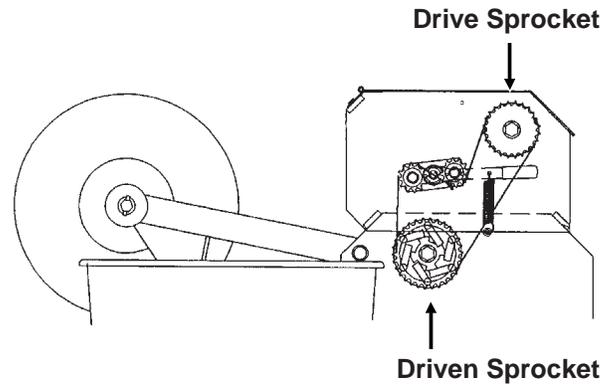
* Use sprockets off seed drive transmission

7100-214



Full rate transmission shown. Two-speed clutch wheel module extension not installed.

(TWL80)

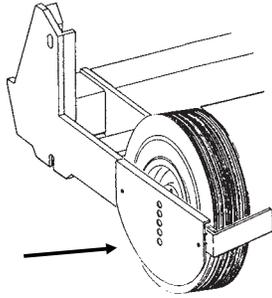


NOTE: Since the two-speed point row clutch is located ahead of the liquid fertilizer squeeze pump and/or dry fertilizer drive, activating the two-speed point row clutch reduced rate switch will cause the same per cent of reduction in dry fertilizer or liquid fertilizer (squeeze pump) application rates. Liquid fertilizer (piston pump) application rates will not be affected as the piston pump uses a dedicated drive tire.

MACHINE OPERATION

ROCK GUARDS

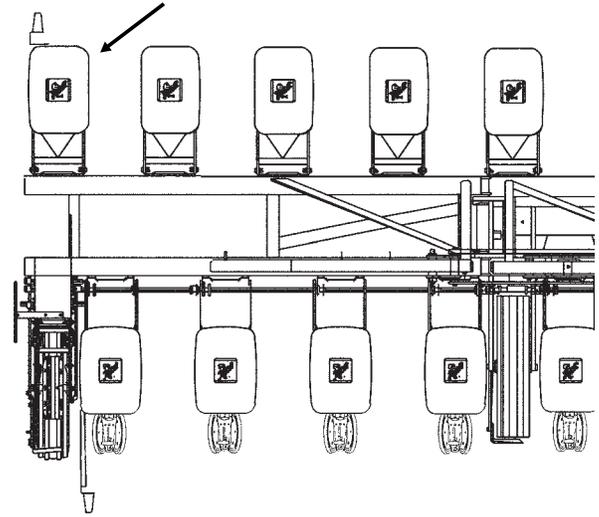
(PLTR49a)



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

EVEN-ROW PUSH ROW UNIT

(PLTR132g)



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.

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

MACHINE OPERATION

DOUBLE DISC FERTILIZER OPENER

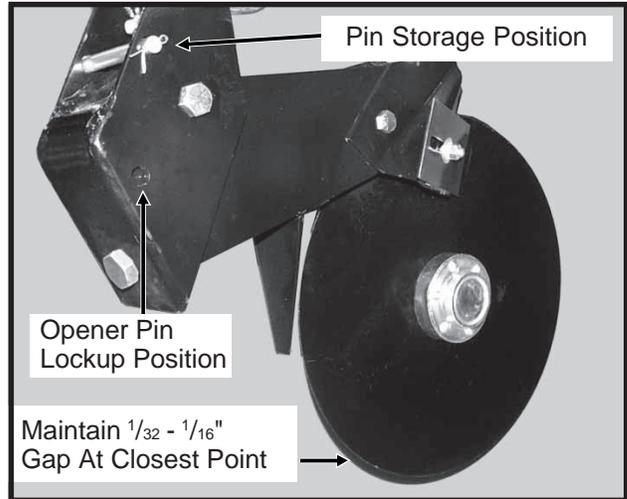
The double disc fertilizer openers should be positioned during assembly **to place fertilizer no closer than 2" to either side of the row**. If the planter frame is level and at proper 20" operating height, fertilizer depth will be approximately 4". Soil conditions can affect depth slightly.

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.

D06259919



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

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



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

MACHINE OPERATION

NOTCHED SINGLE DISC FERTILIZER OPENER - STYLE A

The notched single disc fertilizer opener is designed for use in minimum and no till planting conditions. Placement of fertilizer with the 16³/₄" 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".**

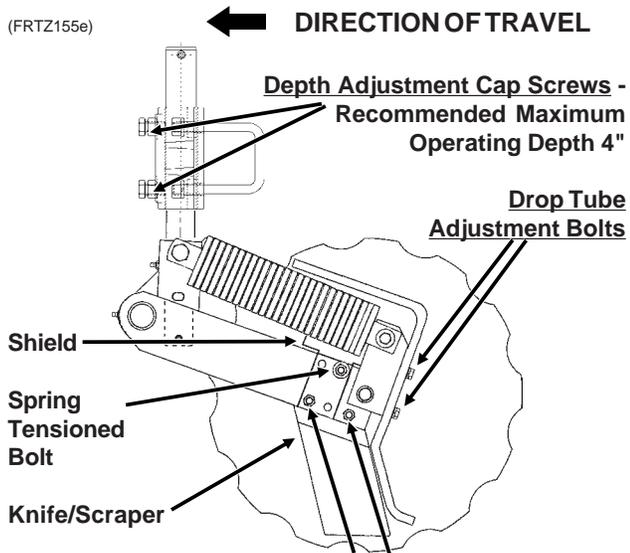
Adjust blade depth on each row using the cap screws and jam nuts located on the opener pivot shaft. The blade can be adjusted to allow a maximum 4" operating depth. Be sure the spring pin holes in the pivot post remain parallel with the opener mounting plate. Check fertilizer hose clearance after adjusting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

(FRTZ155e)



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

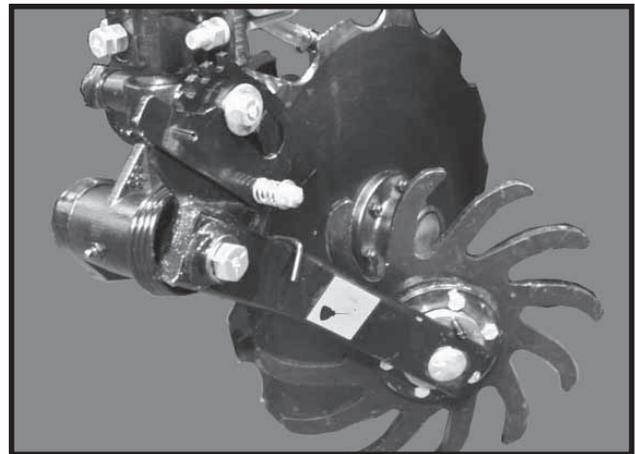
Adjust knife/scraper leading edge contact on each row so blade will turn by hand with slight resistance, but will not coast or freewheel. In dry loose soil, knife/scraper adjustment is critical. If adjustment is not maintained, soil or residue may wedge causing the blade to push. If the knife/scraper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

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

RESIDUE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER

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

D05219901



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

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

Due to space restrictions, the residue wheel attachment for the notched single disc fertilizer opener is not applicable to Model 3600 Planters equipped with Interplant® push row units and notched single disc fertilizer openers.

MACHINE OPERATION

NOTCHED SINGLE DISC FERTILIZER OPENER - STYLE B

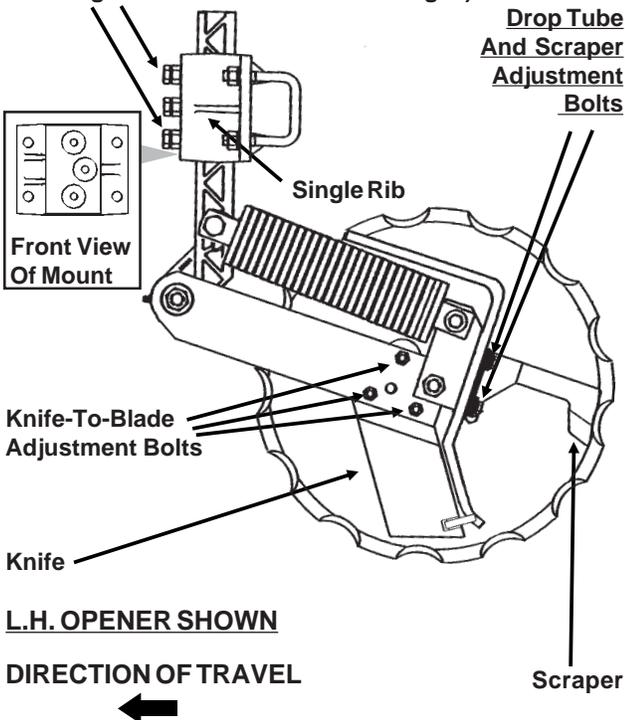
The notched single disc fertilizer opener is designed for use in minimum and no till planting conditions. Placement of fertilizer with the 16 3/4" diameter notched single disc fertilizer opener is recommended at 2 1/2 - 3" from the row. The opener is designed to hold the blade at a set-angle so the knife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

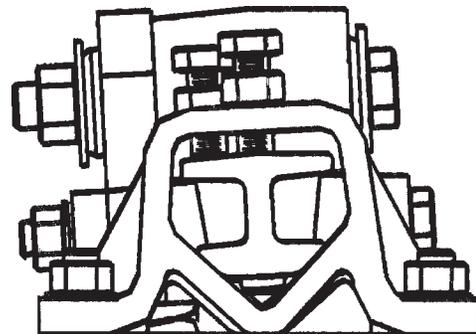
Using the slotted mounting holes in the drop tube mount, **adjust fertilizer drop tube** behind the knife so it is protected from soil contact and wear. The liquid drop tube should be adjusted 1/4 - 3/8" from the opener blade while keeping it behind the knife. **Adjust scraper** to just touch the opener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

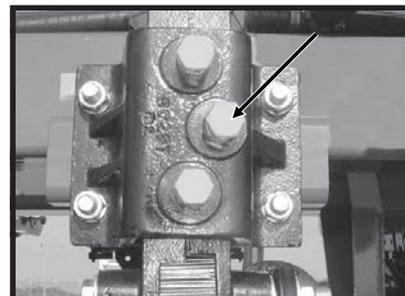
NOTE: The blade runs through the ground at an angle relative to the direction of travel. For this reason and to ensure proper operation, the cast mount should be oriented so the single rib is on the same side of the blade as the drop tube.

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.

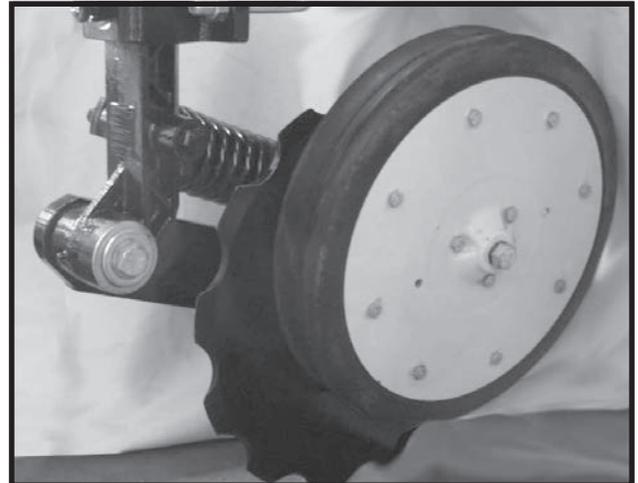
Maximum depth is set by lifting the residue wheel and moving the adjustment lever down to increase depth or up to decrease depth in 1" increments (in relation to blade depth setting). Adjust all rows the same. Down force on the residue wheel is maintained by a torsion spring and is not adjustable.

Due to space restrictions, the residue wheel attachment for the notched single disc fertilizer opener is not applicable to Model 3600 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)

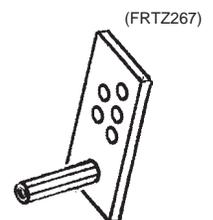
D061101202a



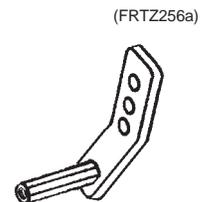
The depth/gauge wheel attachment for the notched single disc fertilizer opener is designed for use in situations where additional gauging is required to maintain desired fertilizer opener depth. The depth/gauge wheel is attached to the notched single disc fertilizer opener using a mounting block fastened 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.

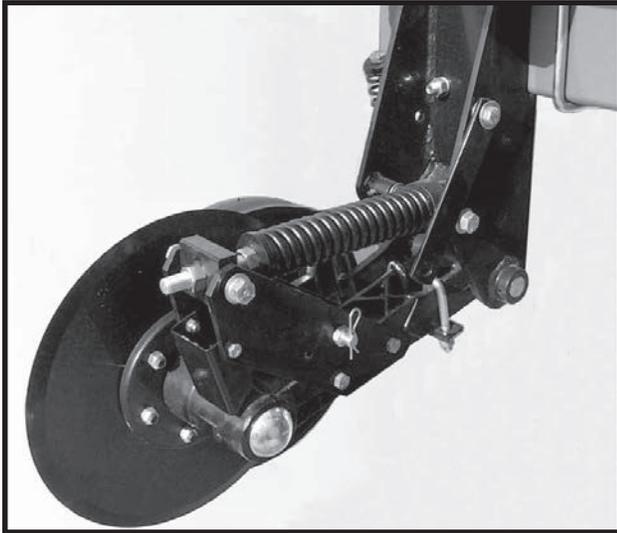


Due to space restrictions, the depth/gauge wheel attachment for the notched single disc fertilizer opener is not applicable to Model 3600 Planters equipped with Interplant® push row units and notched single disc fertilizer openers.

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.

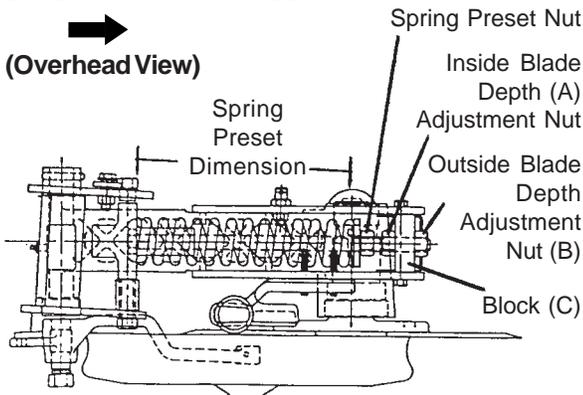
To adjust blade depth, raise the planter to remove weight from the fertilizer opener. Loosen inside adjustment nut (A) with 1 1/8" wrench. Turn outside nut (B) clockwise to decrease blade depth or counterclockwise to increase blade depth. One full turn of the blade depth adjustment nut changes blade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



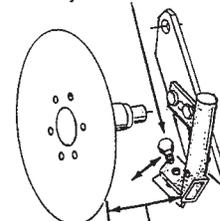
WARNING: Always install all safety lockup devices before working under the machine.

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)

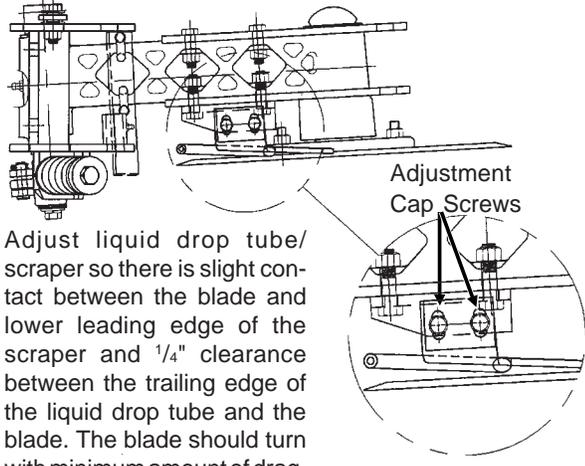


Adjust scrapper to maintain 1/8" gap between drop tube and opener blade. Distance is exaggerated in above illustration.

MACHINE OPERATION

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

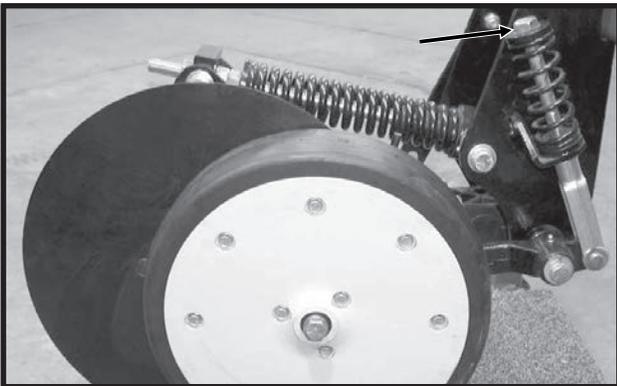
(INS16a)



Adjust liquid drop tube/scrapper so there is slight contact between the blade and lower leading edge of the scraper and $\frac{1}{4}$ " clearance between the trailing edge of the liquid drop tube and the blade. The blade should turn with minimum amount of drag.

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:

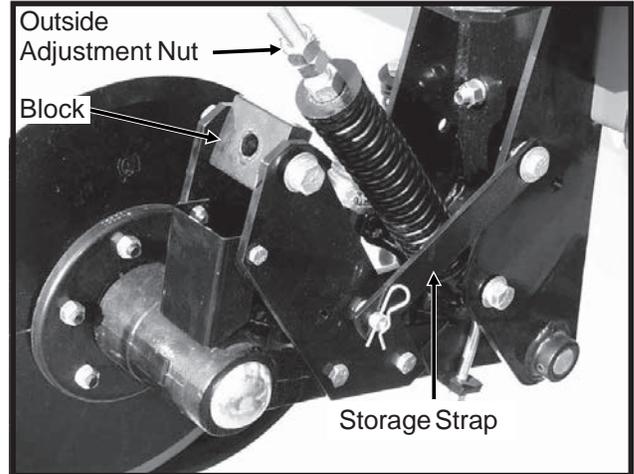
STEP 1 With the planter in the planting position, remove outside blade depth adjustment nut. ("B" in illustration on previous page.)

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.

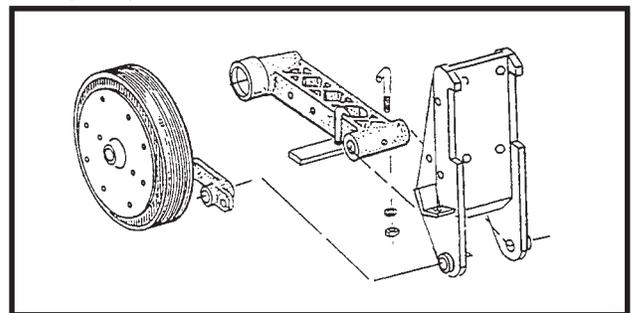
STEP 4 Reinstall depth adjustment nut and tighten.

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.

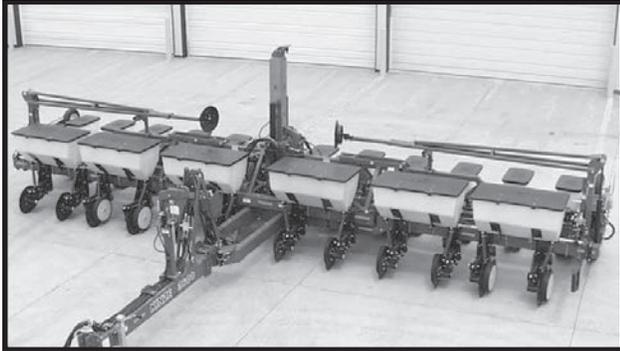
FOC016(PLTR5b)



MACHINE OPERATION

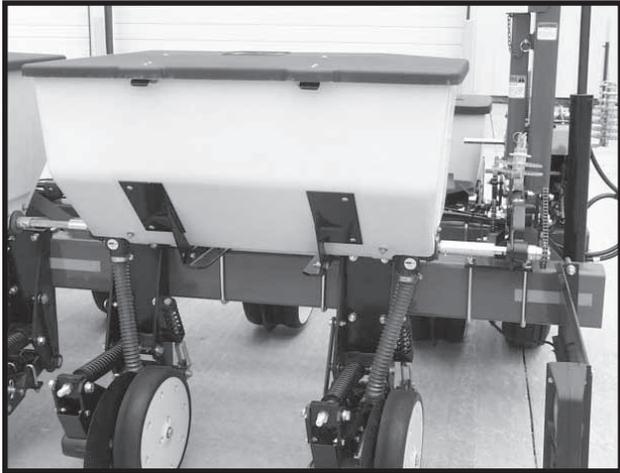
DRY FERTILIZER ATTACHMENT

D061901101



Shown With HD Single Disc Fertilizer Openers

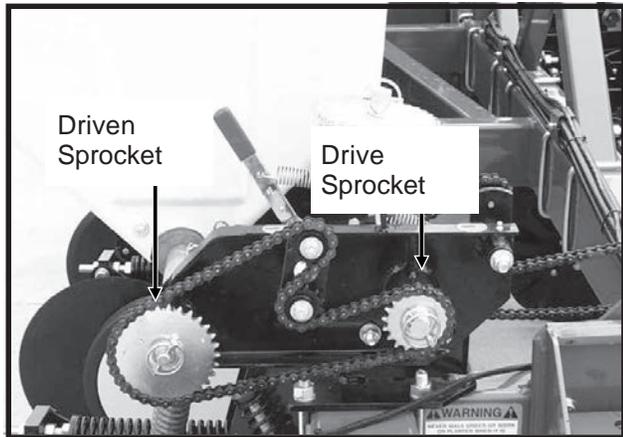
D061901103



Shown With HD Single Disc Fertilizer 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

D060299123



(PLTR7)



Shown with augers positioned for low rate delivery

(PLTR6)



Shown with augers positioned for high rate delivery

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

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

A fertilizer transmission is located on each 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 spring loaded, dual-sprocket idlers. The idler assembly is adjusted with an 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.

MACHINE OPERATION

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.

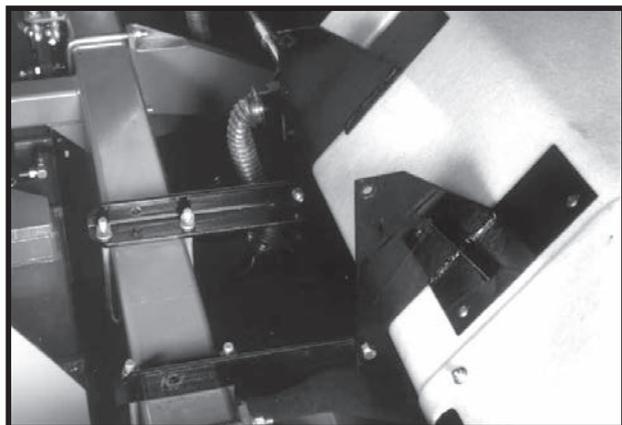


WARNING: Agricultural chemicals can be dangerous if not selected and handled with care. Always read and follow directions supplied by the chemical manufacturer.

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.

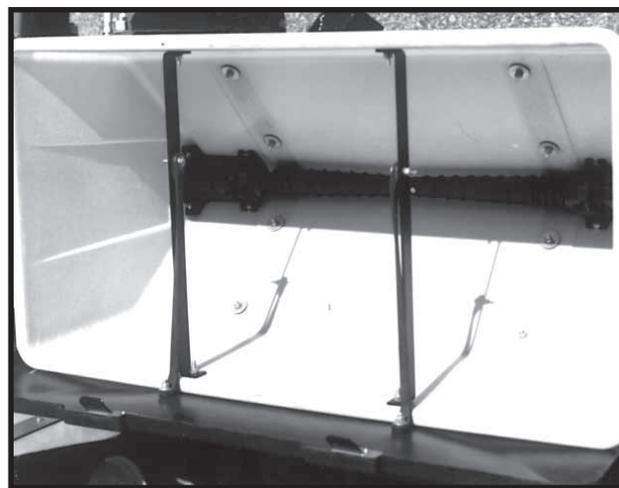
69797-85



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



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

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.

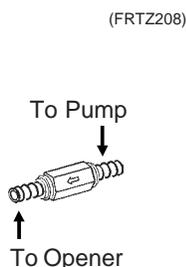
IMPORTANT: Frequent lubrication of auger bearings is critical to ensure that the augers will turn freely. Check lubrication section for frequency.

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.

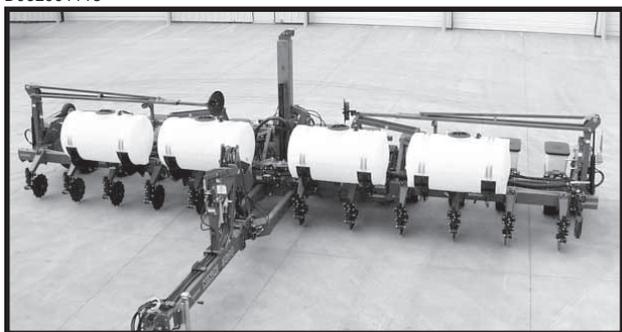
MACHINE OPERATION

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.



D062991118



Shown With Notched Single Disc Fertilizer Openers Installed

OPTIONAL SQUEEZE PUMP

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.



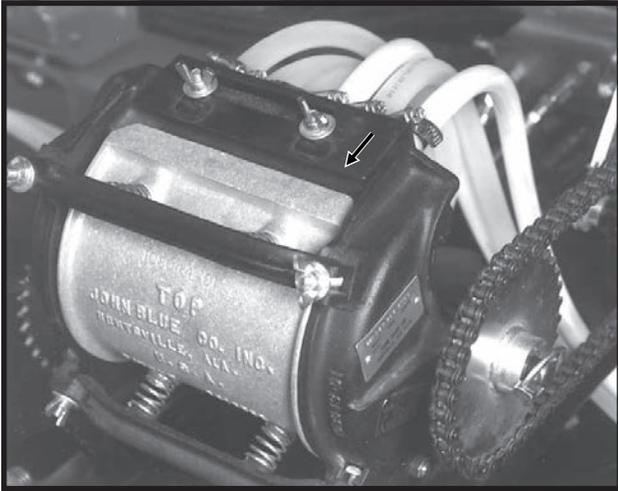
WARNING: Agricultural chemicals can be dangerous if not selected and handled with care. Always read and follow directions supplied by the chemical manufacturer.

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.

(Continued On Following Page)

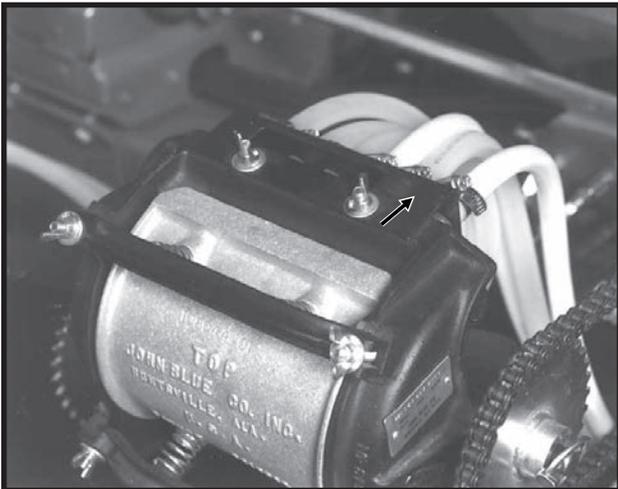
MACHINE OPERATION

81689-16



Discharge Manifold Rearward

81689-19



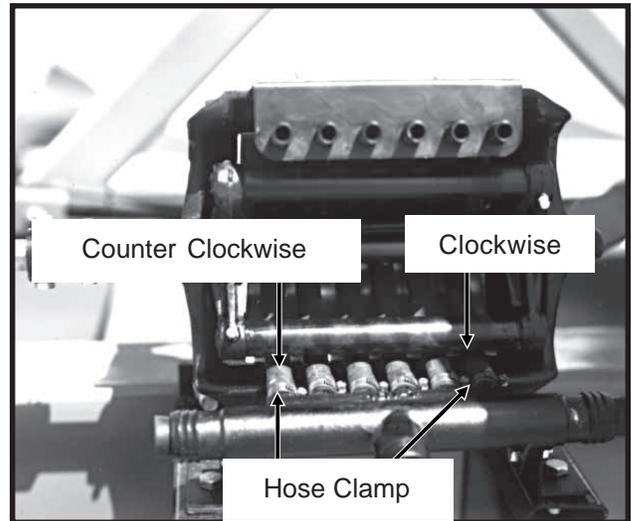
Discharge Manifold Forward

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.

48931-2



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

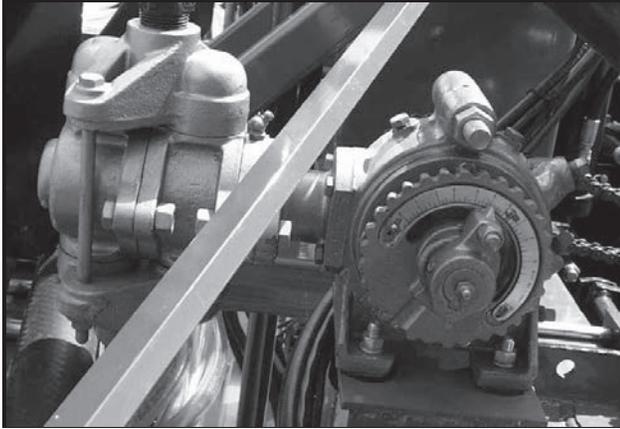
For the left hand hose (facing front of pump) twist the hose $\frac{1}{4}$ turn in the counterclockwise direction.

Retighten hose clamps.

MACHINE OPERATION

OPTIONAL PISTON PUMP

D07250004

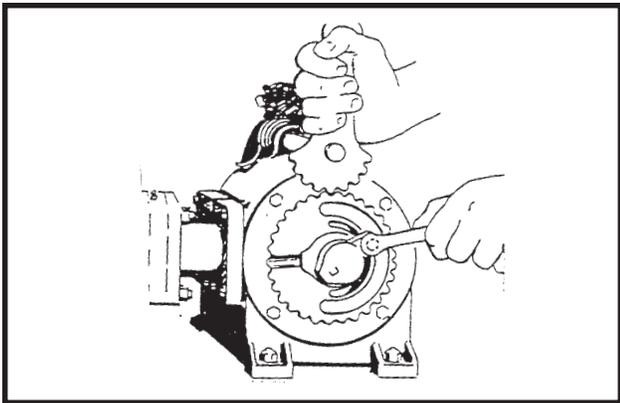


If the machine is equipped with the piston pump option, the rate of liquid fertilizer application is determined by the piston pump settings.

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

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

(PLTR9)

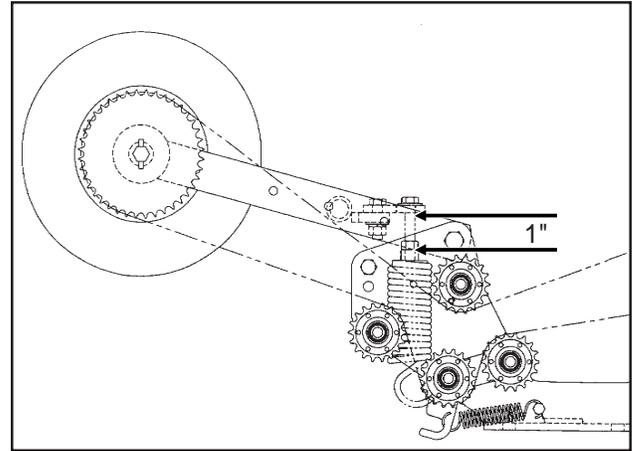


The operator and instruction manual shipped with the pump and flow divider should be kept and stored with this manual for future reference.

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)



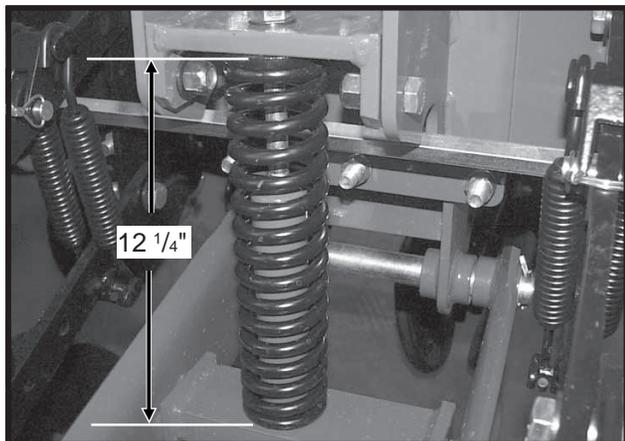
The initial spring tension, on the down pressure spring(s) on the piston pump contact drive wheel, is set leaving 1" between the bottom of the mounting plate and the plug on the top of the spring.

MACHINE OPERATION

PISTON PUMP GROUND DRIVE WHEEL SPRING ADJUSTMENT - STYLE B

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

D012304101



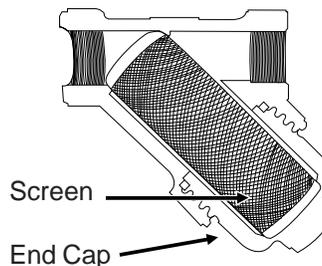
NOTE: The piston pump ground drive wheel assembly is designed to allow the assembly to be locked in raised position when not in use. Remove the two cap screws that attach the upper end of the spring to the spring mount. Reattach the spring using the upper holes in the spring mount. Reverse procedure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

CLEANING

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

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

(INS220)

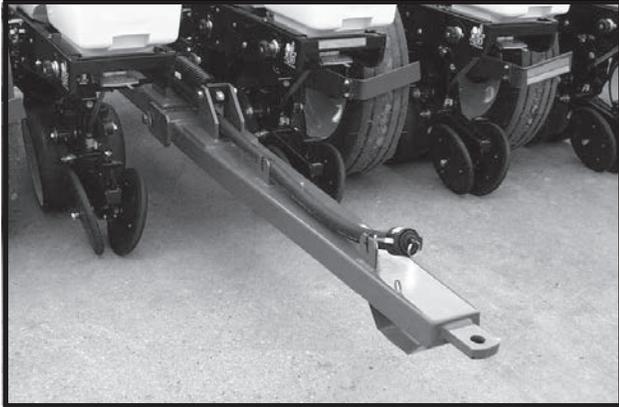


See "Piston Pump Storage" (If Applicable) in the Maintenance Section of this manual.

MACHINE OPERATION

REAR TRAILER HITCH

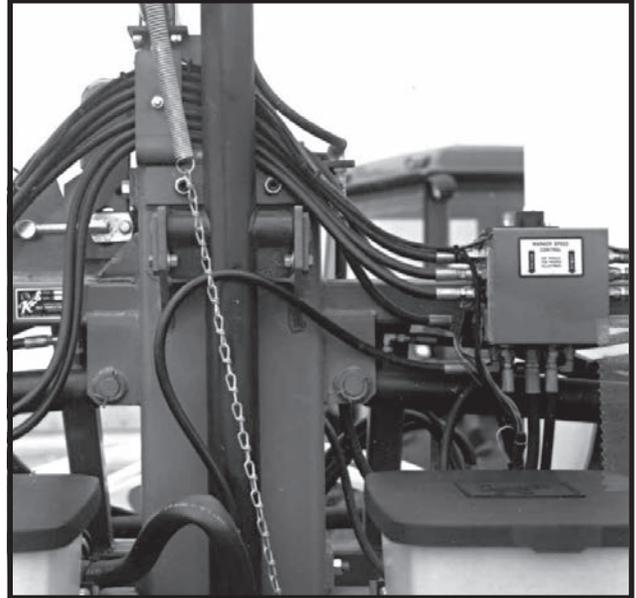
D07309901a



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

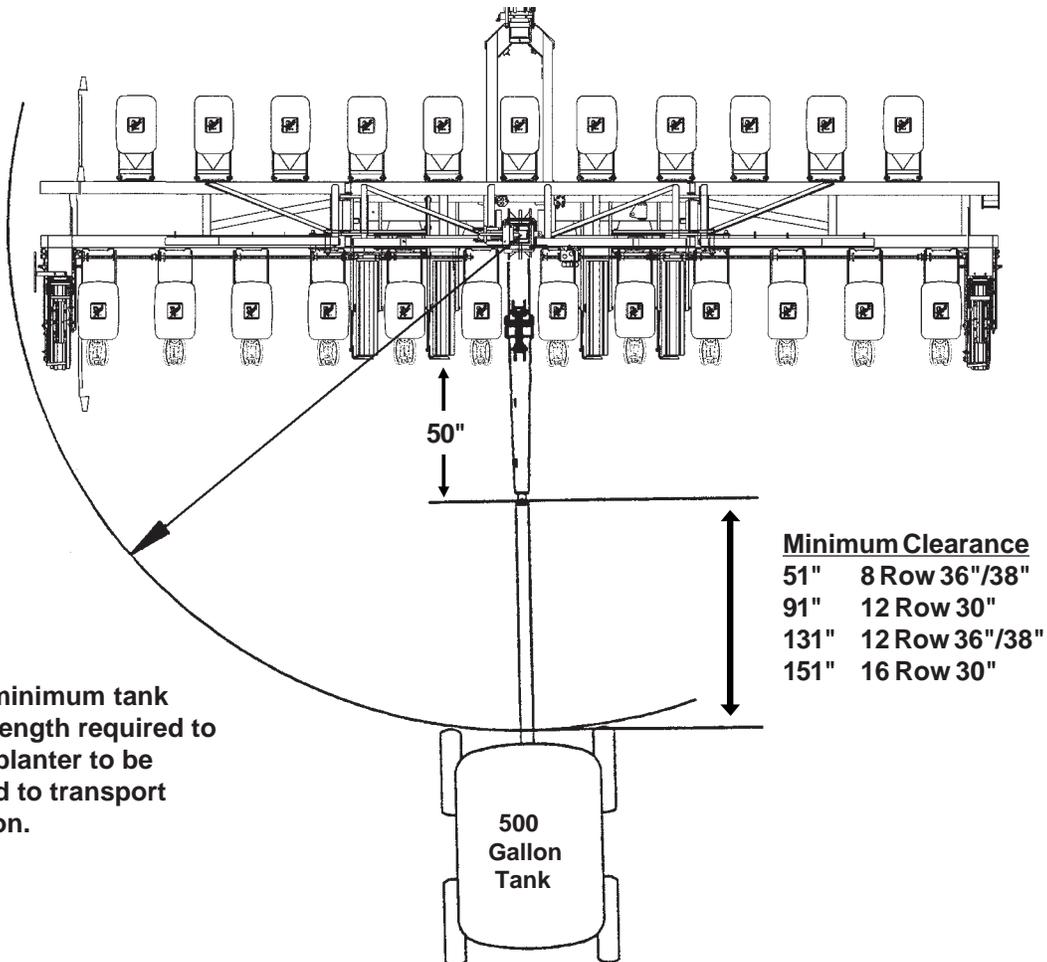
IMPORTANT: The rear trailer hitch is designed for use with piston pump only. Maximum allowable hitch weight is 200 lbs. Gross towing weight should not exceed 6000 lbs. or the equivalent of a loaded 500 gallon tank and running gear.

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

(PLTR133h)



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

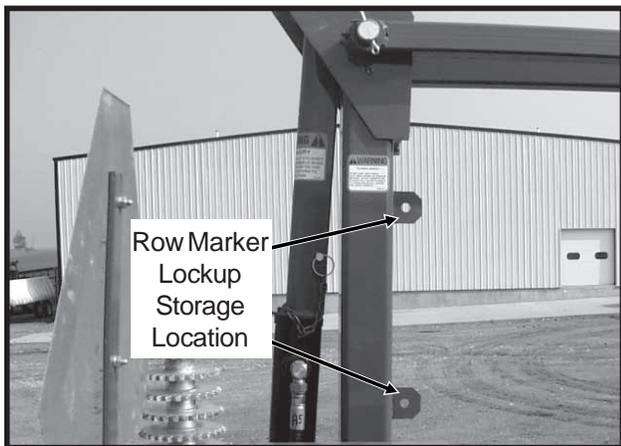
MACHINE OPERATION

ROW MARKER SAFETY LOCKUP

Install 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 on the first stage row marker arm.

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

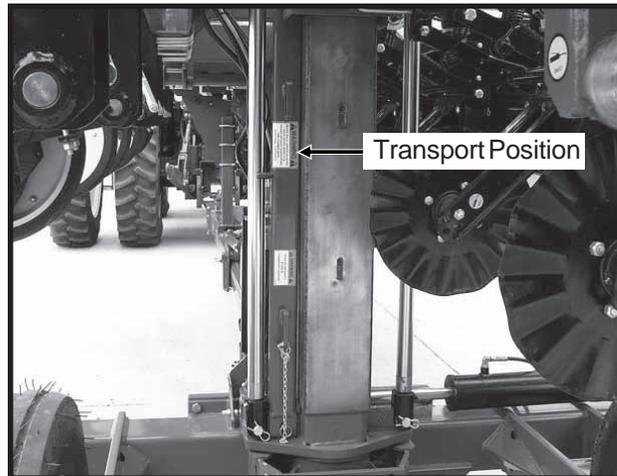
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MANUAL SAFETY LOCKUP

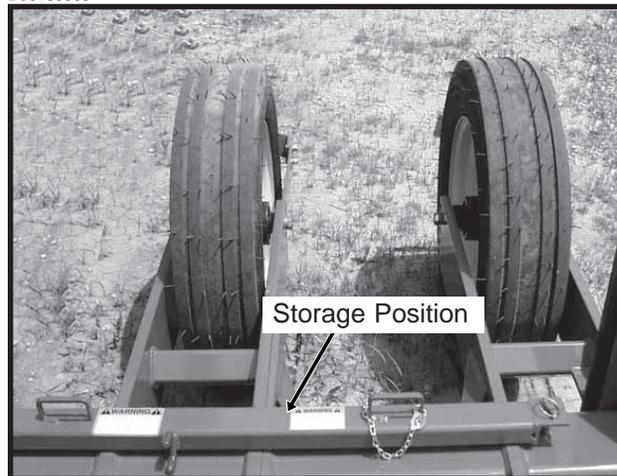
Never allow anyone to work around or under the planter without first securing the manual safety lockup in the locked position. When transporting the planter use the manual safety lockup for added safety.

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Manual Safety Lockup In Transport Position

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Manual Safety Lockup In Storage Position

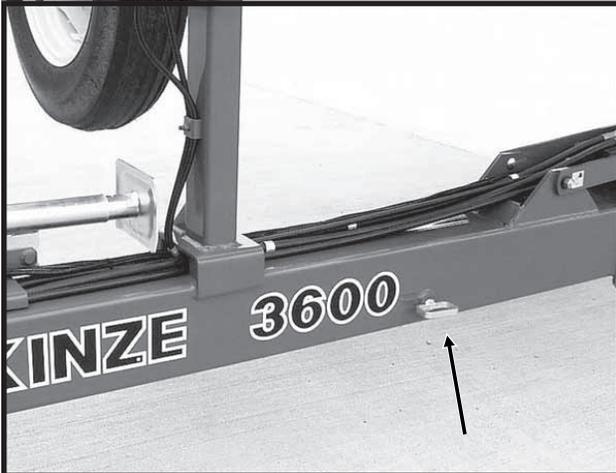
For field operation remove the manual safety lockup and store on the L.H. side of the transport axle.

MACHINE OPERATION

TONGUE SAFETY PIN

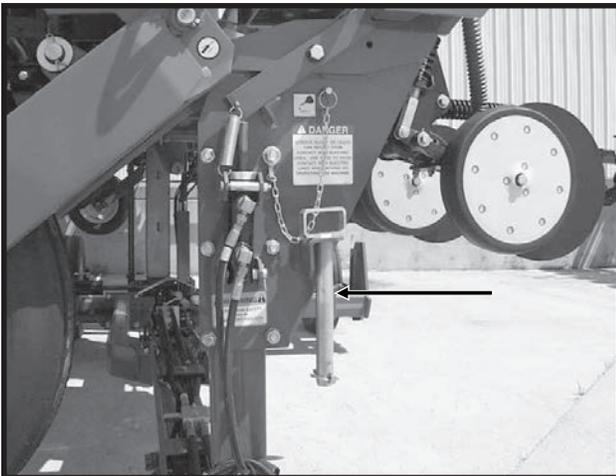
The tongue safety pin when installed will prevent the tongue cylinder from retracting should hydraulic failure occur or a sudden stop be made when transporting the planter. Never transport the planter without installing the tongue safety pin.

D060299102



Tongue Safety Pin Installed For Transport

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Tongue Safety Pin Stored For Field Operation

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

TRANSPORT LATCH LOCKING PIN

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

D060299106



Transport Latch Locking Pin Installed For Transport

D060299216



Transport Latch Locking Pin Stored For Field Operation

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

MACHINE OPERATION

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 “Planting And Application Rate Charts”. Variations in ground speed will produce variations in rates. Finger pickup seed meter populations will tend to be disproportionately higher at high ground speeds.

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

FIELD TEST

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

- Check the planter for fore to aft and lateral level operation. See “Leveling The Planter”
- Check **all** row units to be certain they are running level. When planting, the row unit parallel arms should be approximately parallel to the ground.
- Check row markers for proper operation and adjustment. See “Row Marker Length Adjustment”, “Row Marker Speed Adjustment” and “Row Marker Operation”.
- Check for proper application rates and placement of granular chemicals on **all** rows. See “Checking Granular Chemical Application Rate”.
- Check for desired depth placement and seed population on **all** rows. See “Checking Seed Population”.
- Check for proper application rates of fertilizer on **all** rows. See proper “Fertilizer Application Rate Chart”.

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

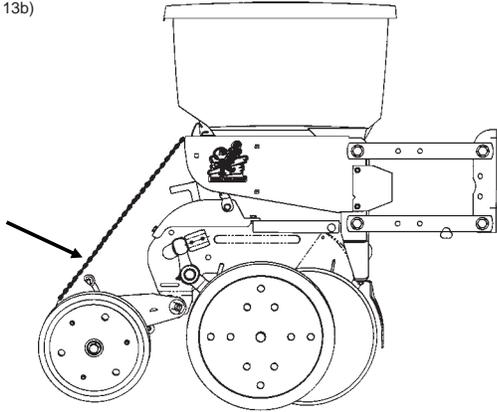
- Hoses And Fittings
- Bolts And Nuts
- Cotter Pins And Spring Pins
- Drive Chain Alignment

MACHINE OPERATION

CHECKING SEED POPULATION

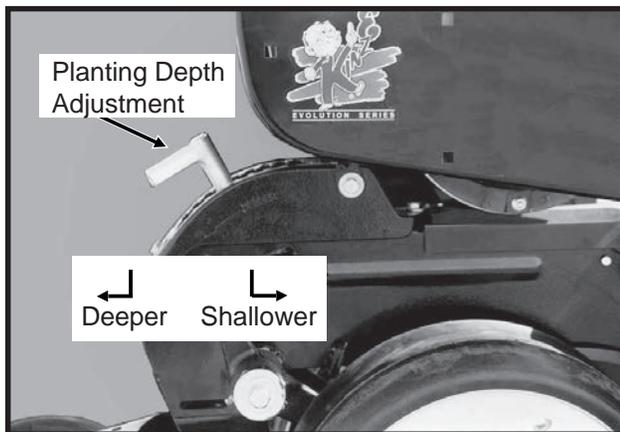
1. Tie up one or more sets of closing wheels by running a chain or rubber tarp strap between the hopper support panel and closing wheels. It may be necessary to decrease closing wheel arm spring tension.

(RU113b)



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

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

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

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

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

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

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

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

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

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

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

MACHINE OPERATION

Determining Pounds Per Acre (Brush-Type Seed Meter)

To determine pounds per acre:

Seeds Per Acre On Chart	÷	Seeds Per Pound From Seed Tag On Bag	=	Pounds Per Acre
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To determine bushels per acre:

Pounds Per Acre	÷	Unit Weight Of Seed	=	Bushels Per Acre
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The unit weight of:

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

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

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

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

CHECKING GRANULAR CHEMICAL APPLICATION RATE

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



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

A field check is important to determine correct application rates.

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

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

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

POUNDS PER ACRE FACTOR FOR GIVEN ROW WIDTH	
Row Width	Factor
30"	0.83
36"	0.69
38"	0.65

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

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

Metering Gate

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

MACHINE OPERATION

GENERAL PLANTING RATE INFORMATION

These planting rate charts are applicable to KINZE® Model 3600 Twin-Line® Planters. See “Tire Pressure” for recommended tire pressures.

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

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

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

Finger Pickup Corn Meter

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

Finger Pickup Oil Sunflower Meter

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

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

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

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

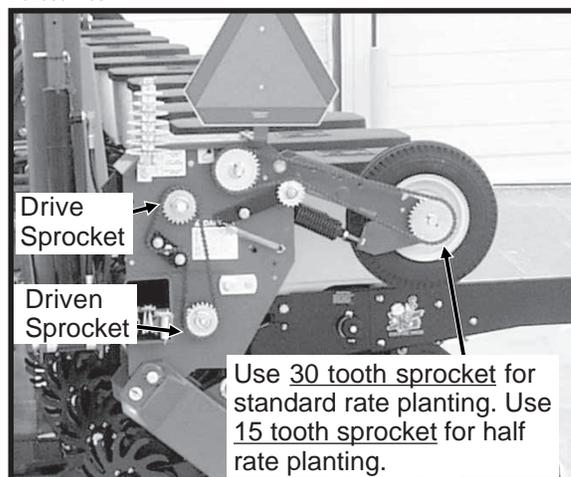
NOTE: Due to a multitude of variables, seed spacing can be adversely affected at speeds above 5.5 MPH.

Seed population per acre with **15" rows will be double the rate for 30" rows**, as well as 18" rows versus 36" rows and 19" rows versus 38" rows, at the listed sprocket combination. See pages 6-96 and 6-97.

In some cases when planting 15" row soybeans or other crops, a **Half Rate (2 To 1) Drive Reduction Package** may be required to obtain the desired population and seed spacing.

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

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MACHINE OPERATION

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

30" Rows	36" Rows	38" Rows	Transmission Sprockets		Recomm. Speed Range (MPH)	Average Seed Spacing In Inches
			Drive	Driven		
16,186	13,488	12,778	17	28	4 to 6	12.9
16,785	13,988	13,251	17	27	4 to 6	12.5
17,431	14,526	13,761	17	26	4 to 6	12.0
18,090	15,075	14,281	19	28	4 to 6	11.6
18,128	15,107	14,312	17	25	4 to 6	11.5
18,760	15,633	14,810	19	27	4 to 6	11.1
18,883	15,736	14,908	17	24	4 to 6	11.1
19,481	16,234	15,380	19	26	4 to 6	10.7
19,704	16,420	15,556	17	23	4 to 6	10.6
20,261	16,884	15,995	19	25	4 to 6	10.3
21,104	17,587	16,662	19	24	4 to 6	9.9
21,898	18,249	17,288	23	28	4 to 6	9.5
22,022	18,352	17,386	19	23	4 to 6	9.5
22,709	18,924	17,928	23	27	4 to 6	9.2
22,850	19,042	18,040	24	28	4 to 6	9.2
23,583	19,652	18,618	23	26	4 to 6	8.9
23,697	19,747	18,708	24	27	4 to 6	8.8
23,802	19,835	18,791	25	28	4 to 6	8.8
23,853	19,877	18,831	17	19	4 to 6	8.8
24,526	20,438	19,363	23	25	4 to 6	8.5
24,608	20,507	19,427	24	26	4 to 6	8.5
24,684	20,570	19,487	25	27	4 to 6	8.5
24,755	20,629	19,543	26	28	4 to 6	8.4
25,548	21,290	20,169	23	24	4 to 6	8.2
25,592	21,327	20,205	24	25	4 to 6	8.2
25,633	21,361	20,237	25	26	4 to 6	8.2
25,671	21,393	20,267	26	27	4 to 6	8.1
25,707	21,422	20,295	27	28	4 to 6	8.1
26,659	22,216	21,046	23	23	4 to 6	7.8
27,646	23,038	21,826	28	27	4 to 6	7.6
27,684	23,070	21,856	27	26	4 to 6	7.6
27,770	23,141	21,923	25	24	4 to 6	7.5
27,818	23,181	21,961	24	23	4 to 6	7.5
28,709	23,924	22,665	28	26	4 to 6	7.3
28,791	23,993	22,730	27	25	4 to 6	7.3
28,977	24,147	22,876	25	23	4 to 6	7.2
29,795	24,829	23,522	19	17	4 to 6	7.0
29,858	24,881	23,572	28	25	4 to 6	7.0
29,991	24,993	23,677	27	24	4 to 6	7.0
30,136	25,113	23,792	26	23	4 to 6	7.0
31,102	25,918	24,554	28	24	3 to 6	6.7
31,295	26,079	24,707	27	23	3 to 6	6.7
32,271	26,893	25,477	23	19	3 to 5.5	6.5
32,454	27,045	25,622	28	23	3 to 5.5	6.5
33,674	28,062	26,585	24	19	3 to 5.5	6.2
35,077	29,231	27,693	25	19	3 to 5	6.0
36,068	30,056	28,474	23	17	2 to 5	5.8
36,480	30,400	28,800	26	19	3 to 5	5.7
37,636	31,363	29,713	24	17	3 to 5	5.6
37,883	31,570	29,908	27	19	3 to 5	5.5
39,204	32,670	30,951	25	17	3 to 4.5	5.3
39,287	32,739	31,016	28	19	3 to 4.5	5.3
40,772	33,977	32,189	26	17	3 to 4.5	5.1
42,340	35,284	33,427	27	17	3 to 4.5	4.9
43,908	36,590	34,665	28	17	3 to 4.5	4.8

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

MACHINE OPERATION

Z214/RH

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

APPROXIMATE SEEDS/ACRE FOR 30"/36"/38" ROW WIDTHS

Transmission Sprockets		60 Cell Soybean Or High-Rate Milo/ Grain Sorghum			Average Seed Spacing In Inches	48 Cell Specialty Soybean Or High-Rate Acid-Delinted Cotton			Average Seed Spacing In Inches	Speed Range (MPH)
Drive	Driven	30" Rows	36" Rows	38" Rows		30" Rows	36" Rows	38" Rows		
17	28	80,928	67,440	63,891	2.6	64,742	53,952	51,113	3.2	2 to 8
17	27	83,926	69,938	66,257	2.5	67,141	55,950	53,006	3.1	2 to 8
17	26	87,154	72,628	68,805	2.4	69,723	58,102	55,044	3.0	2 to 8
19	28	90,449	75,374	71,407	2.3	72,359	60,299	57,126	2.9	2 to 8
19	27	93,799	78,166	74,052	2.2	75,039	62,533	59,242	2.8	2 to 8
17	24	94,416	78,680	74,539	2.2	75,533	62,944	59,631	2.8	2 to 8
17	23	98,521	82,101	77,780	2.1	78,817	65,681	62,224	2.7	2 to 8
19	25	101,303	84,419	79,976	2.1	81,042	67,535	63,981	2.6	2 to 8
19	24	105,524	87,937	83,309	2.0	84,419	70,350	66,647	2.5	2 to 8
23	28	109,491	91,243	86,440	1.9	87,593	72,994	69,152	2.4	2 to 8
19	23	110,112	91,760	86,931	1.9	88,090	73,408	69,545	2.4	2 to 8
24	28	114,252	95,210	90,199	1.8	91,402	76,168	72,159	2.3	2 to 8
24	27	118,483	98,736	93,539	1.8	94,786	78,989	74,831	2.2	2 to 8
17	19	119,263	99,386	94,155	1.8	95,410	79,509	75,324	2.2	2 to 8
24	26	123,040	102,534	97,137	1.7	98,432	82,027	77,710	2.1	2 to 8
26	28	123,773	103,144	97,715	1.7	99,018	82,515	78,172	2.1	2 to 8
24	25	127,962	106,635	101,023	1.6	102,370	85,308	80,818	2.0	2 to 8
26	27	128,357	106,964	101,334	1.6	102,686	85,571	81,067	2.0	2 to 8
23	23	133,294	111,078	105,232	1.6	106,635	88,862	84,186	2.0	2 to 8
27	26	138,420	115,350	109,279	1.5	110,736	92,280	87,423	1.9	2 to 8
24	23	139,089	115,907	109,807	1.5	111,271	92,726	87,846	1.9	2 to 8
25	23	144,884	120,737	114,382	1.4	115,907	96,590	91,506	1.8	2 to 8
19	17	148,975	124,146	117,612	1.4	119,180	99,317	94,090	1.8	2 to 8
27	24	149,955	124,963	118,386	1.4	119,964	99,970	94,709	1.7	2 to 8
28	24	155,509	129,591	122,770	1.3	124,407	103,673	98,216	1.7	2 to 8
23	19	161,355	134,463	127,386	1.3	129,084	107,570	101,909	1.6	2 to 8
28	23	162,270	135,225	128,108	1.3	129,816	108,180	102,483	1.6	2 to 8
24	19	168,371	140,309	132,924	1.2	134,696	112,247	106,339	1.6	2 to 8
25	19	175,386	146,155	138,463	1.2	140,309	116,924	110,770	1.5	2 to 8
23	17	180,338	150,282	142,372	1.2	144,270	120,226	113,898	1.5	2 to 8
26	19	182,402	152,001	144,001	1.1	145,922	121,601	115,201	1.4	2 to 7
27	19	189,417	157,878	148,540	1.1	151,534	126,278	118,832	1.4	2 to 7
28	19	196,433	163,694	155,078	1.1	157,146	130,955	124,062	1.3	2 to 7
26	17	203,861	169,884	160,943	1.0	163,089	135,907	128,754	1.3	2 to 7
27	17	211,702	176,418	167,133	0.9	169,362	141,134	133,706	1.2	2 to 7
28	17	219,542	182,952	173,323	0.9	175,634	146,362	138,658	1.2	2 to 7

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

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

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

MACHINE OPERATION

Z214/RH

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

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

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

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

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

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

MACHINE OPERATION

RH/Z215

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

APPROXIMATE SEEDS/ACRE FOR VARIOUS ROW WIDTHS

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

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

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

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

MACHINE OPERATION

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

Due to variations in cotton seed size, meters equipped with 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 (1/1000 acre = Length of row 17' 5" for 30" row widths, 14' 6" for 36" row widths and 13' 10" for 38" row widths). Multiply average seeds per hill by hills per acre. EXAMPLE: 4 seeds per hill x (13 hills x 1000) = 52,000

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

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

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

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

MACHINE OPERATION

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

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

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

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



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

MACHINE OPERATION

DRY HERBICIDE APPLICATION RATES

APPROXIMATE POUNDS/ACRE AT 5 MPH FOR VARIOUS ROW WIDTHS

CLAY GRANULES

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

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

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



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

MACHINE OPERATION

DRY FERTILIZER APPLICATION RATES

APPROXIMATE RATE IN POUNDS PER ACRE

Drive Sprocket	Driven Sprocket	Low Rate Position			High Rate Position		
		30" Rows	36" Rows	38" Rows	30" Rows	36" Rows	38" Rows
15	35	29	24	23	86	71	68
15	33	33	27	26	98	82	78
15	30	36	30	28	109	90	86
19	33	41	34	33	124	104	98
19	30	45	38	36	138	114	108
15	19	52	43	41	158	132	125
30	35	56	47	44	172	143	136
30	33	60	50	47	182	152	144
33	35	63	53	50	189	158	149
35	33	70	58	56	212	177	168
33	30	73	60	57	220	184	174
19	15	84	70	66	272	227	215
30	19	104	87	82	316	263	250
33	19	115	96	91	347	290	275
35	19	122	102	97	368	307	291
30	15	132	110	104	400	334	316
33	15	145	121	115	440	367	348
35	15	154	129	122	467	389	369

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

Direction
Of Rotation



(PLTR6/PLTR7)



High Rate Position



Low Rate Position

Above chart is 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.

NOTE: Since the optional two-speed point row clutch is located ahead of the dry fertilizer drive, activating the two-speed point row clutch reduced rate switch will cause the same per cent of reduction in dry fertilizer application rates.

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

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

36" multiply by 0.83

38" multiply by 0.79

MACHINE OPERATION

LIQUID FERTILIZER SQUEEZE PUMP APPLICATION RATES

GALLONS PER ACRE

Drive	Driven	30" Rows	36" Rows	38" Rows	Drive	Driven	30" Rows	36" Rows	38" Rows
15	*62	6.1	5.1	4.8	46	*62	18.7	15.6	14.8
19	*62	7.7	6.4	6.1	15	19	19.9	16.6	15.7
15	46	8.2	6.9	6.5	32	34	23.7	19.8	18.7
19	46	10.4	8.7	8.2	34	32	26.8	22.3	21.1
15	34	11.1	9.3	8.8	19	15	31.9	26.6	25.2
15	32	11.8	9.8	9.3	46	34	34.1	28.4	26.9
32	*62	13.0	10.8	10.3	46	32	36.2	30.2	28.6
19	34	14.1	11.7	11.1	32	19	42.4	35.4	33.5
19	32	15.0	12.5	11.8	34	19	45.1	37.6	35.6
32	46	17.5	14.6	13.8	*62	34	45.9	38.3	36.3
34	46	18.6	15.5	14.7					

*Optional sprocket.

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

This chart was calculated based on a solution weighing ten pounds per gallon.

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

NOTE: Since the optional two-speed point row clutch is located ahead of the liquid fertilizer squeeze pump, activating the two-speed point row clutch reduced rate switch will cause the same per cent of reduction in liquid fertilizer (squeeze pump) application rates.

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

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

36" multiply by 0.83

38" multiply by 0.79

MACHINE OPERATION

LIQUID FERTILIZER PISTON PUMP APPLICATION RATES GALLONS PER ACRE

Applies To Model LM-2455-R Pump With 18 Tooth Sprocket
And 4.10" x 6" Contact Drive Tire

Pump Setting	1	2	3	4	5	6	7	8	9	10
8 Row 36"	5.7	11.5	17.1	22.9	28.6	34.3	40.0	45.7	51.4	57.1
8 Row 38"	5.4	10.9	16.3	21.7	27.1	32.5	37.9	43.3	48.7	54.1
12 Row 30"	4.6	9.2	13.7	18.3	22.9	27.5	32.0	36.6	41.1	45.7
12 Row 36"	3.8	7.6	11.4	15.2	19.0	22.9	26.7	30.5	34.3	38.1
12 Row 38"	3.6	7.2	10.8	14.4	18.0	21.7	25.2	28.9	32.5	36.1
16 Row 30"	3.4	6.9	10.3	13.7	17.1	20.6	24.0	27.5	30.9	34.3

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

Measure and weigh one gallon of actual fertilizer solution to determine exact application rate. These charts were calculated based on a solution weighing ten pounds per gallon.

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

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

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

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

36" multiply by 0.83

38" multiply by 0.79

MACHINE OPERATION

LIQUID FERTILIZER PISTON PUMP APPLICATION RATES GALLONS PER ACRE

Applies To Model LM-4405 Pump With 18 Tooth Sprocket
And 7.60" x 15" Ground Drive Tire

Pump Setting	1	2	3	4	5	6	7	8	9	10
8 Row 36"	4.6	9.2	13.9	18.5	23.1	27.6	32.0	36.8	41.5	46.1
8 Row 38"	4.4	8.8	13.1	17.5	21.9	26.1	30.5	34.9	39.3	43.7
12 Row 30"	3.7	7.4	11.1	14.8	18.5	22.1	25.8	29.5	33.2	36.9
12 Row 36"	3.1	6.2	9.3	12.3	15.4	18.4	21.5	24.6	27.7	30.8
12 Row 38"	2.9	5.8	8.8	11.7	14.6	17.4	20.4	23.3	26.2	29.1
16 Row 30"	2.8	5.5	8.3	11.1	13.9	16.6	19.4	22.2	24.9	27.7

Above chart is for planters equipped with 7.60" x 15" ground drive tire, based on 91" forward travel per wheel revolution, 48 tooth drive sprocket and 18 tooth driven sprocket on metering pump. See "Tire Pressure" for recommended tire pressures. Charts are based on average wheel slippage and liquid viscosities.

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

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

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

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

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

36" multiply by 0.83
38" multiply by 0.79

MACHINE OPERATION

ROW UNIT OPERATION

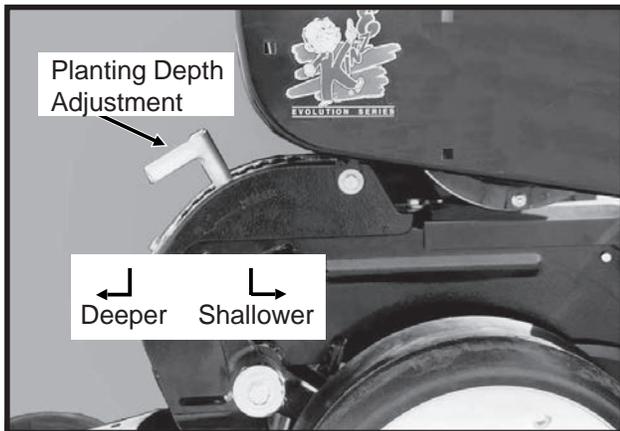
PLANTING DEPTH

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)

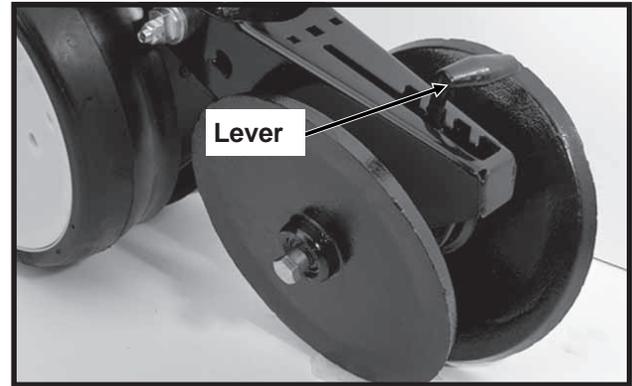


WARNING: Raise planter and install safety lockup devices before making closing wheel adjustments.

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.

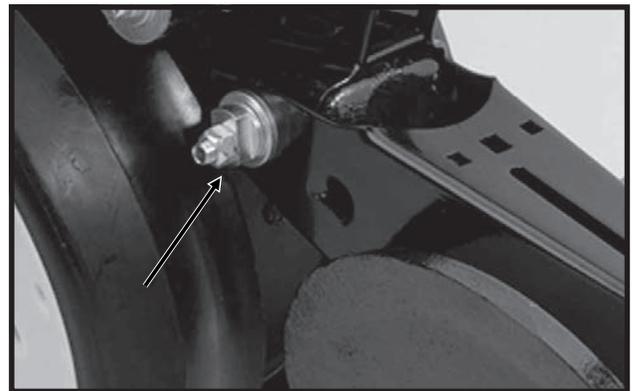
LF212299-15



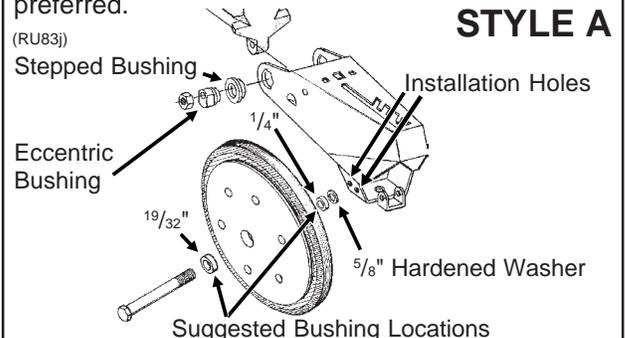
Light soil usually requires less down force at average depth (approximately 2") while heavy soil requires increased down force.

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



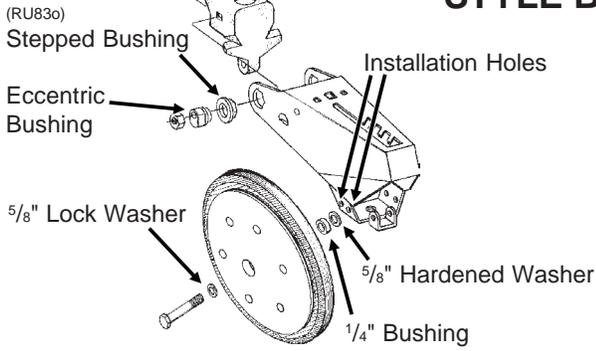
Bushings used for installation of the closing wheels can be moved from side to side for closing wheel spacing adjustment and the closing wheels can be installed in two locations either "offset" (to improve residue flow) or "directly" opposite. If set "directly" opposite, the forward installation holes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



ROW UNIT OPERATION

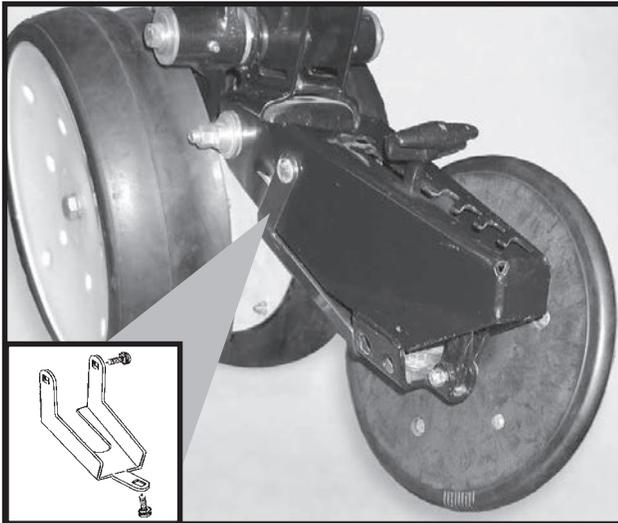
The closing wheels can be installed in two locations either "offset" (to improve residue flow) or "directly" opposite. If set "directly" opposite, the forward installation holes should be used.

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.

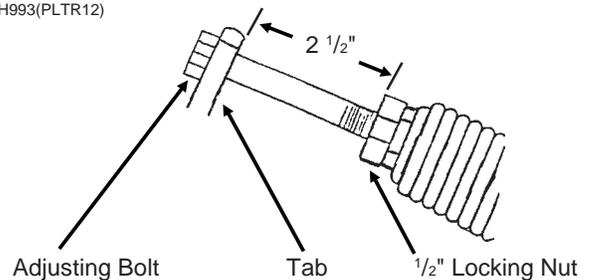
72359-31



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.

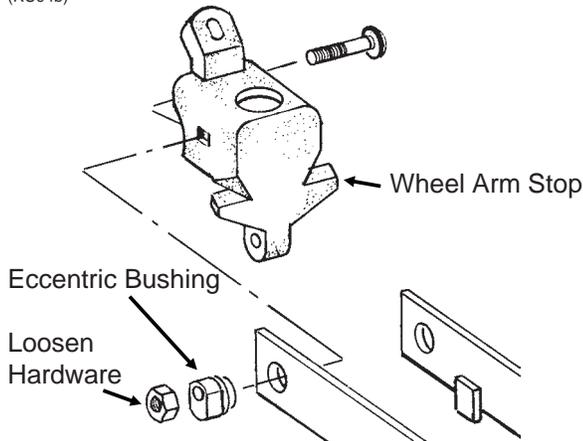
RH993(PLTR12)



ROW UNIT OPERATION

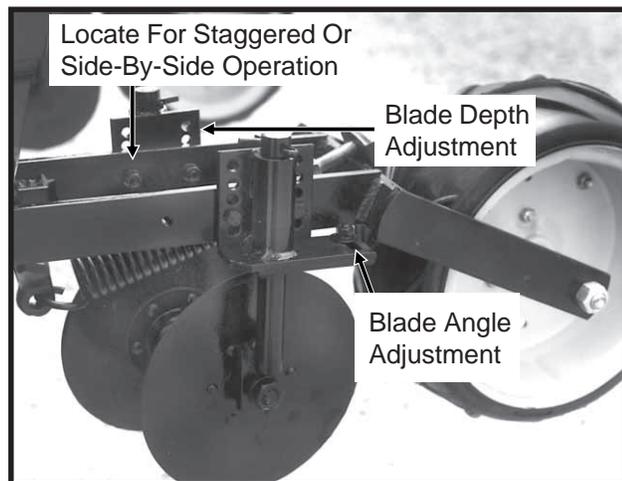
Eccentric bushings in the wheel arm stop allow for lateral adjustment of the covering discs/single press wheel assembly. Using a $\frac{3}{4}$ " wrench, loosen the hardware which attaches the assembly to the wheel arm stop. Using another $\frac{3}{4}$ " wrench, turn the eccentric bushings until the press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



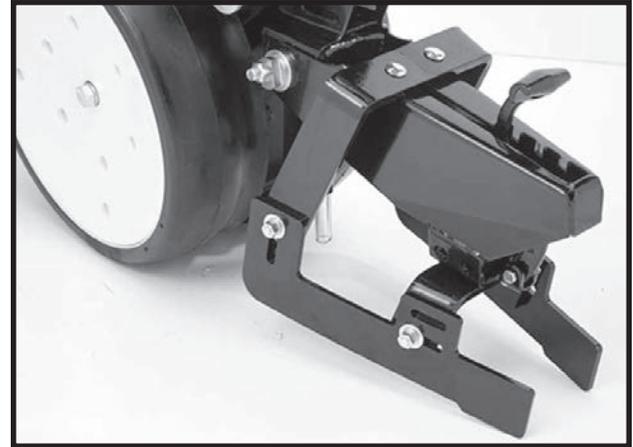
Five sets of holes in each disc bracket allow for $\frac{1}{2}$ " incremental blade depth adjustment.

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



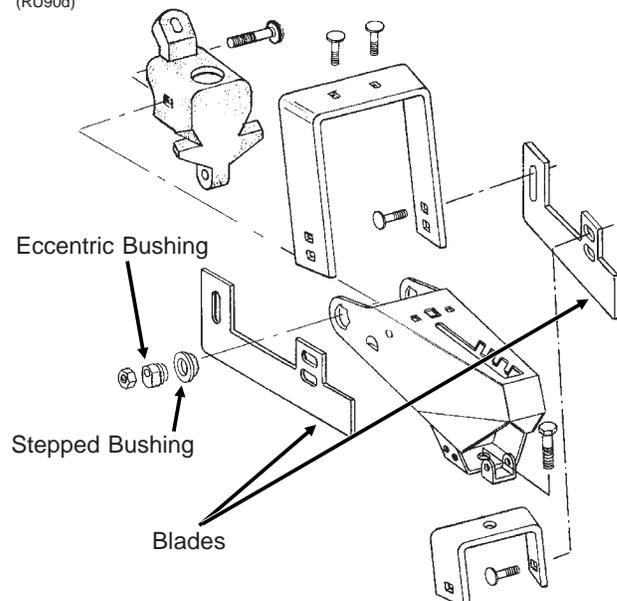
The drag closing attachment is designed to pull loose soil over the seed trench.

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)



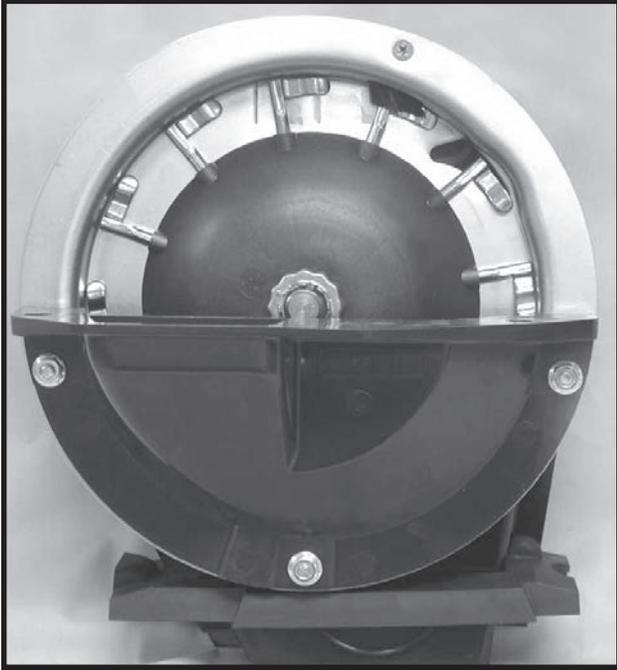
Eccentric bushings allow for lateral adjustment of the drag closing attachment. Using a $\frac{3}{4}$ " wrench, loosen the hardware which attaches the assembly to the wheel arm stop. Using another $\frac{3}{4}$ " wrench, turn the eccentric bushings until the drag closing attachment is aligned with the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

ROW UNIT OPERATION

FINGER PICKUP SEED METER

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

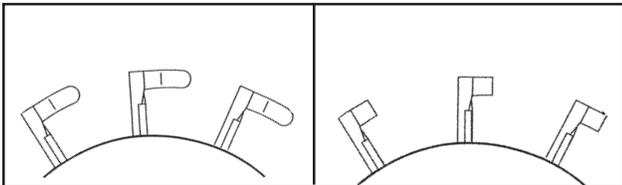
D12220401



Shown With Corn Fingers Installed

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

(PLTR91/PLTR92/PLTR91a)

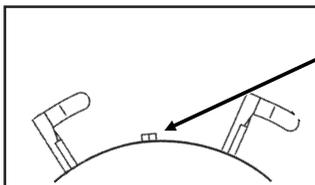


Corn Fingers

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

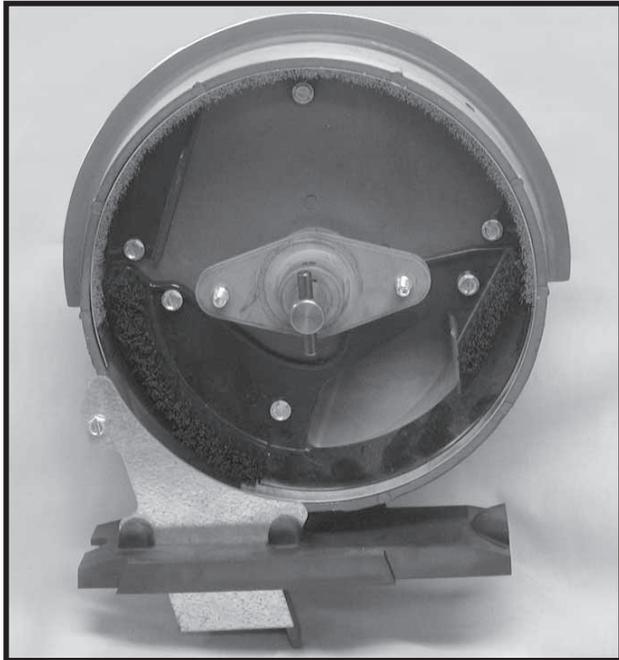
To maintain genetic purity, thorough seed meter cleanout is important.

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

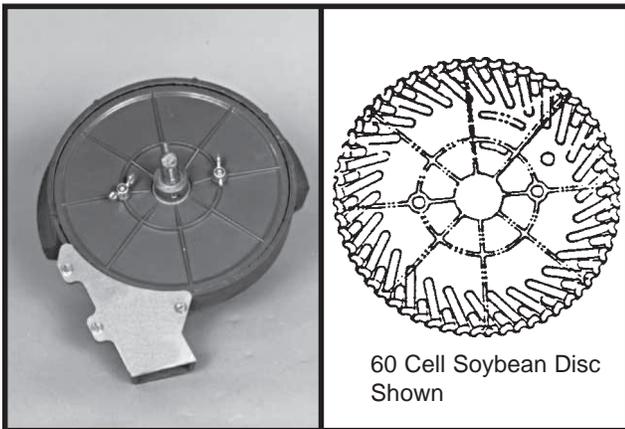
BRUSH-TYPE SEED METER

D12220403



Shown Without Seed Disc Installed

60607-40a(PLTR13)

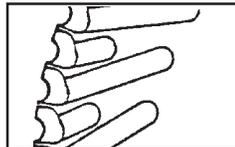


60 Cell Soybean Disc Shown

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

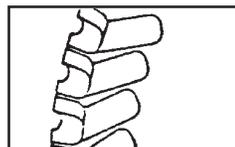
Soybean: 60 cells to meter seed sizes from 2200 to 4000 seeds per pound (Black color-coded).

(PLTR14)



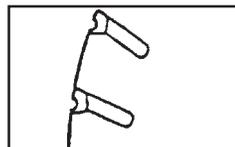
Specialty soybean: 48 cells to meter seed sizes from 1400 to 2200 seeds per pound (Dark blue color-coded).

(PLTR15)



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

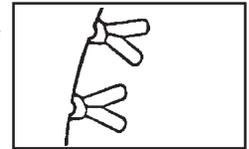
(PLTR16)



Large milo/grain sorghum:

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

(PLTR17)



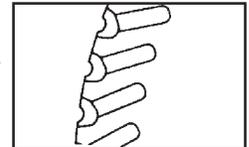
High-rate small milo/grain sorghum:

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



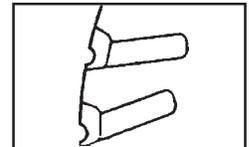
High-rate large milo/grain sorghum:

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).

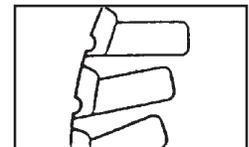
(PLTR20)



Large cotton, acid-delinted:

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

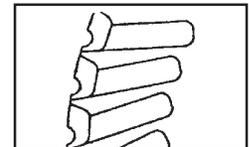
(PLTR21)



High-rate cotton, acid-delinted:

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

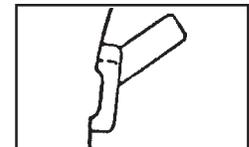
(PLTR22)



Hill-drop cotton, acid-delinted:

12 cells, 3 to 6 seeds/cell, to meter seed sizes from 4000 to 5200 seeds per pound

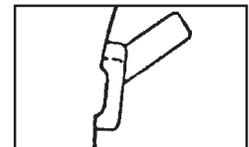
(Brown color-coded). (PLTR23)



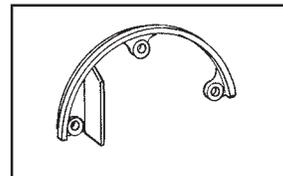
Small hill-drop cotton, acid-delinted:

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

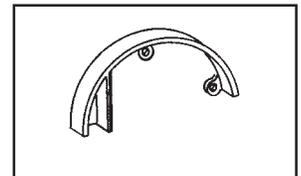
(PLTR23)



(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.

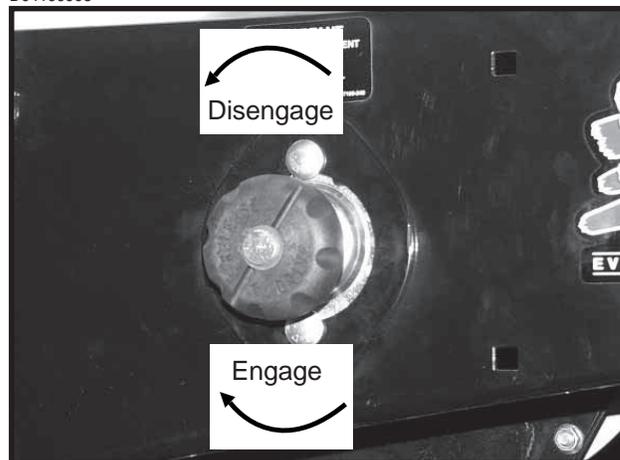
When filling the seed hopper use clean seed and make certain there are no foreign objects in the hopper. **Replace hopper lids after hoppers are filled to prevent the accumulation of dust or dirt in the seed meter which will cause premature wear.** See "Finger Pickup Seed Meter Lubrication" and/or "Brush-Type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

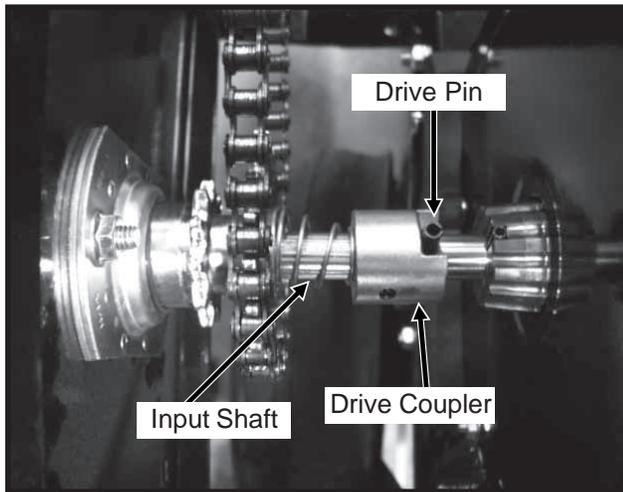
NOTE: The seed meter drive coupler must be properly aligned with the meter input shaft.

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:

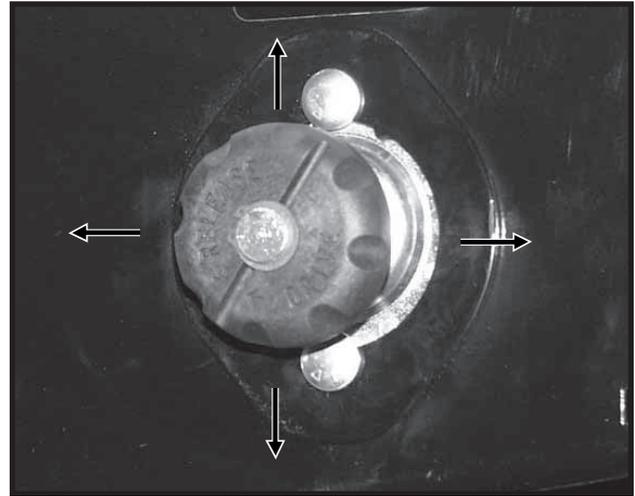
- Engage drive coupler over pin on meter shaft.
- Drive shaft on clutch should be centered in sprocket bore.
- If adjustment is needed, proceed as follows.

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.

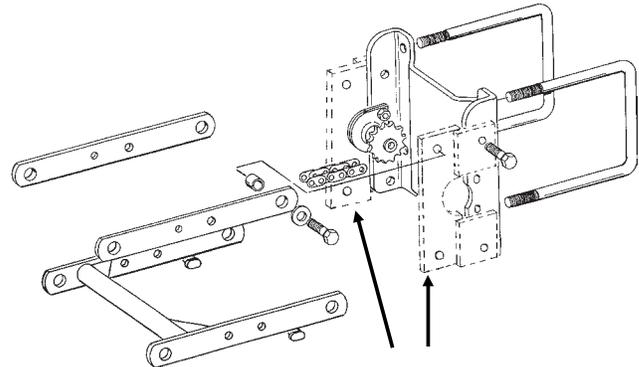
NOTE: Removing chain idler tension will allow easier clutch alignment adjustments.

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 3600 planter is equipped with coulter mounted residue wheels. The brackets extend the row units rearward 4" to provide required clearance.

ROW UNIT OPERATION

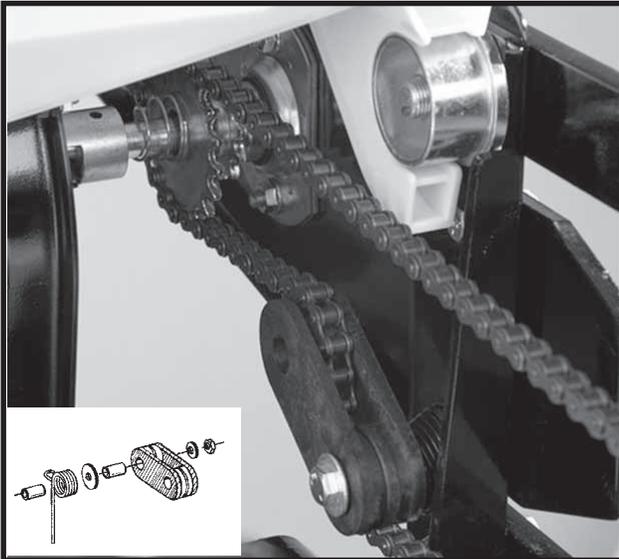
ROW UNIT CHAIN ROUTING

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.

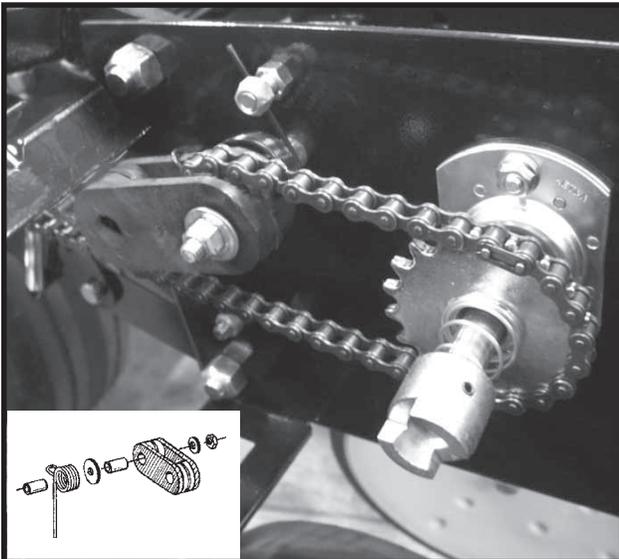
NOTE: When idler shows signs of wear, it can be reversed for prolonged use.

LF212199-5a(RU80g)



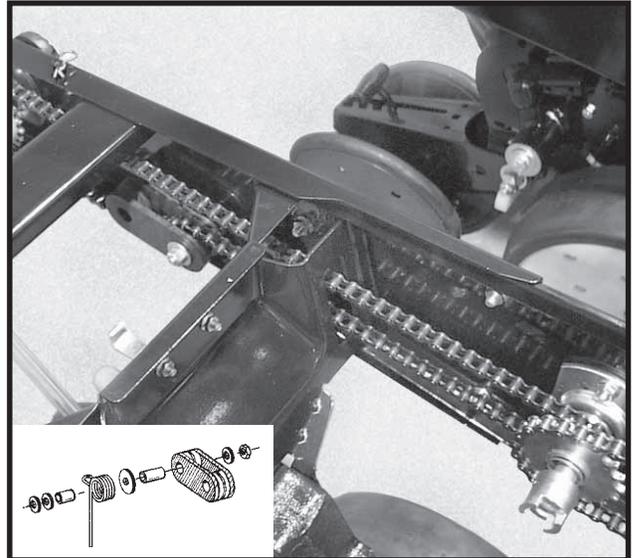
Pull Row Unit Meter Drive

D04209901a(RU80g)



Push Row Unit Meter Drive

D05139901b(RU92l)



Row Unit Granular Chemical Drive

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

(PLTR24)



Direction Of Chain Travel →

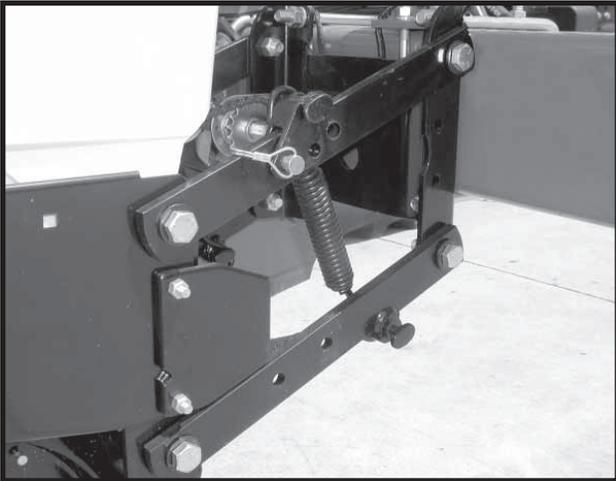
ROW UNIT OPERATION

QUICK ADJUSTABLE DOWN FORCE SPRINGS

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

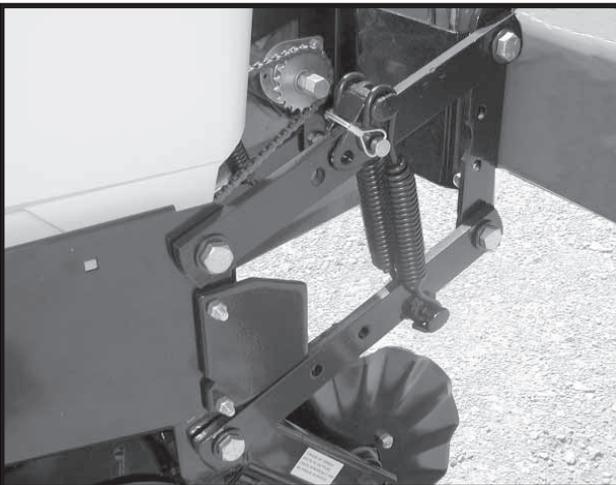
Two springs per row, one on the L.H. parallel arms and one on the R.H. parallel arms, are used unless equipped with row unit mounted no till coulters. Four springs per row are used with row unit mounted no till coulters.

D06300305



Two Springs Per Row (Dual)

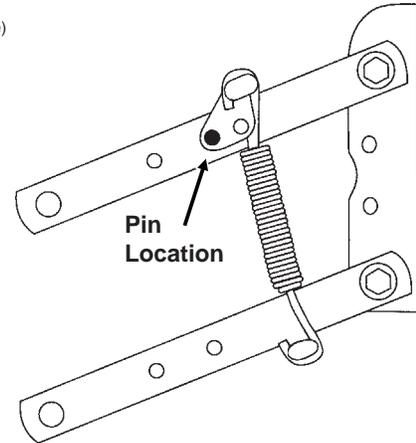
D07010301



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

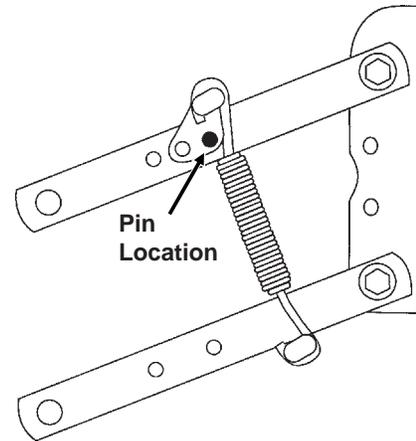
There are four positions for spring tension adjustment. Position 1 allows for minimum down pressure and position 4 for maximum down pressure.

L0096(PLTR27e)



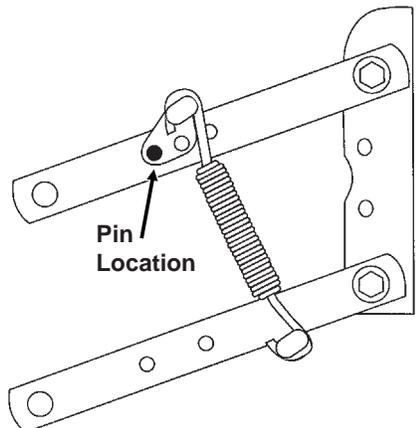
Position 1 (Minimum)

(PLTR28e)



Position 2

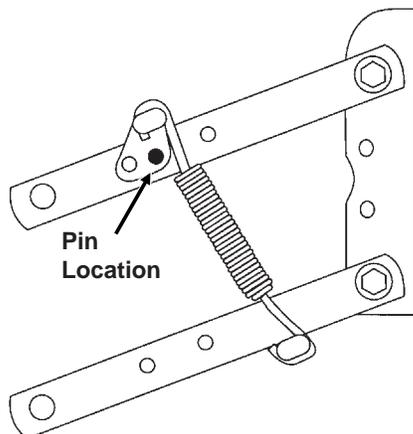
(PLTR29e)



Position 3

ROW UNIT OPERATION

(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.



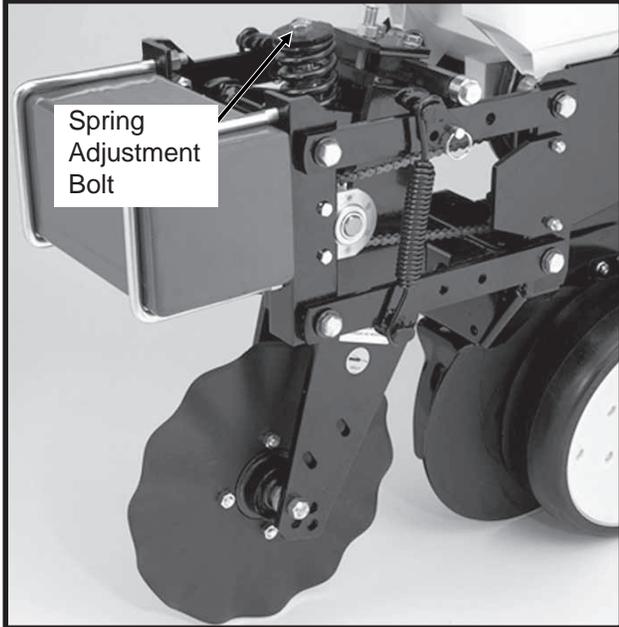
WARNING: Always install safety lockup devices or lower machine to the ground before working under or around the machine.

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



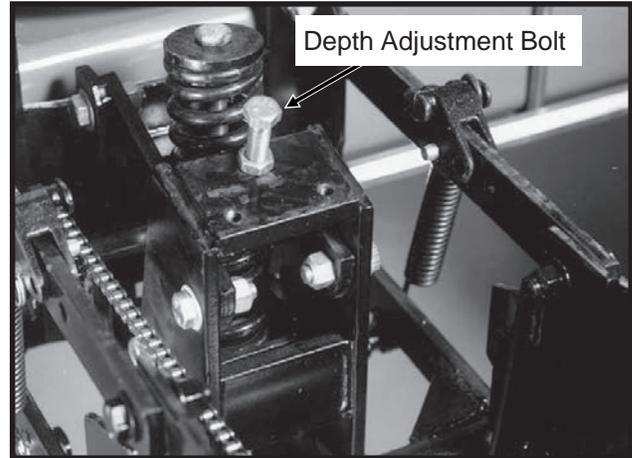
Frame mounted coulters with 1" bubbled, 1" fluted (8 flutes) or $\frac{3}{4}$ " fluted (13 flutes) blades may be used on pull row units only. (Not compatible with push row units.)

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

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

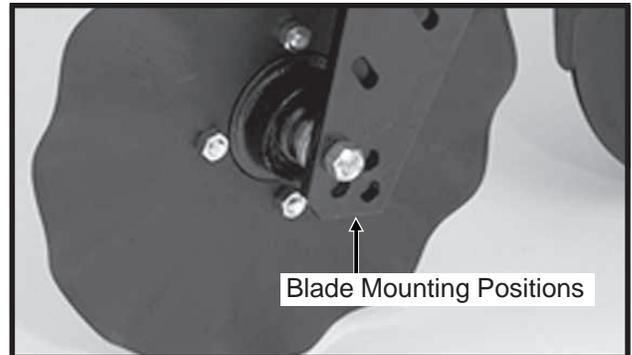
DEPTH ADJUSTMENT (Without Depth Control Bar Installed)

56314-14a



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

LF212299-20

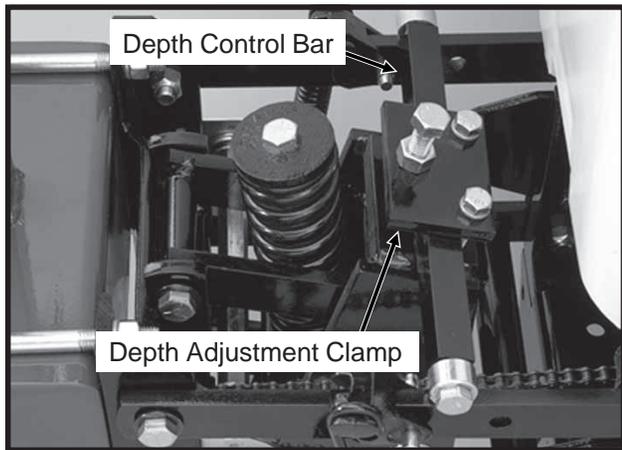


ROW UNIT OPERATION

DEPTH ADJUSTMENT

(With Depth Control Bar Installed)

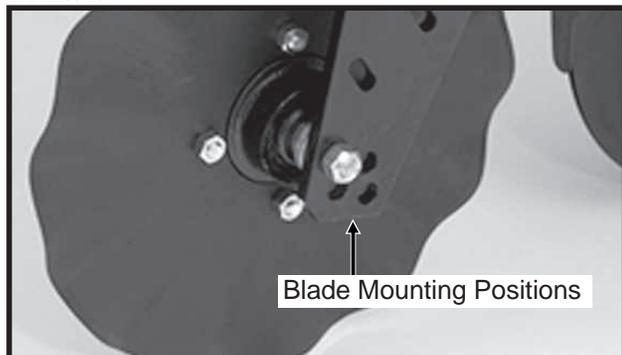
LF212199-4



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

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

LF212299-20

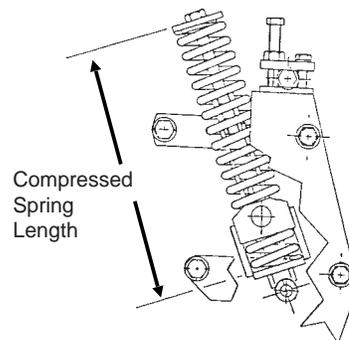


SPRING ADJUSTMENT

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

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

A5649rev.(PLTR44)

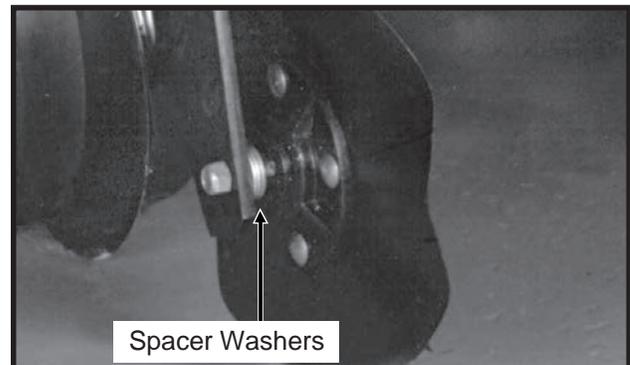


IMPORTANT: Excessive down force may cause increased wear on components.

COULTERS BLADE ADJUSTMENT

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

56314-12



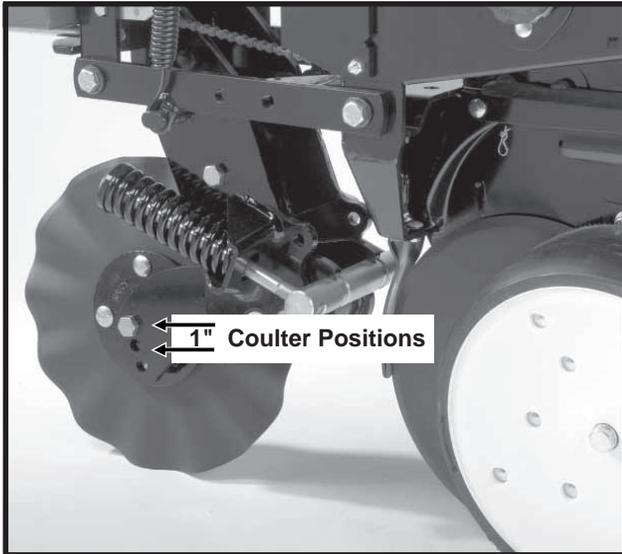
Field adjustment should be made as needed. Operating height of the planter frame will affect operating depth of the frame mounted coulters.

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

ROW UNIT OPERATION

FRAME MOUNTED COULTER - STYLE B

LF083002101

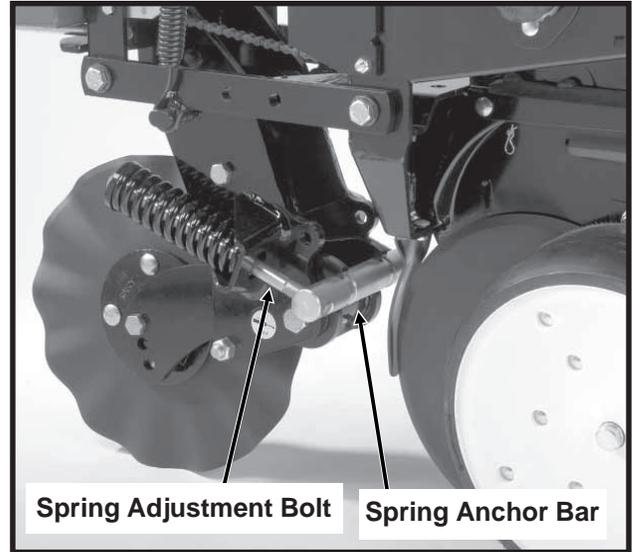


Frame mounted coulters with 1" bubbled, 1" fluted (8 flutes) or 3/4" fluted (13 flutes) blades may be used on pull row units only. (Not compatible with push row units.)

The frame mounted coulters 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 strike an obstacle.

ROW UNIT OPERATION

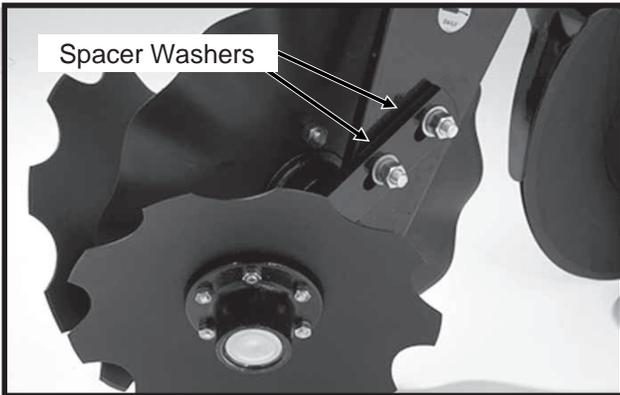
DISC FURROWER

(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.

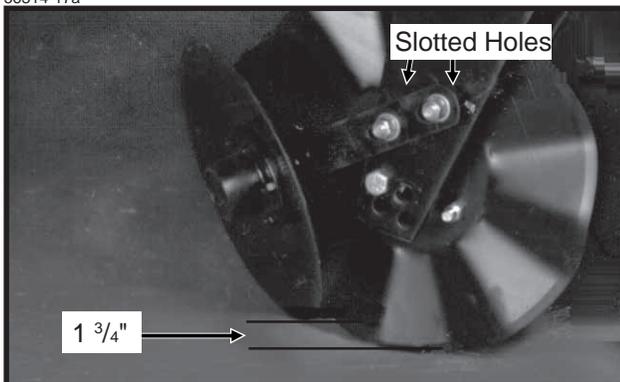
56314-19



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)

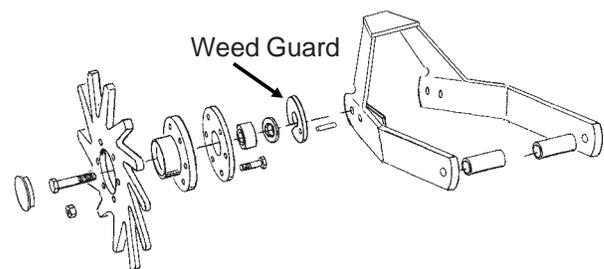
The residue wheels for use with the frame mounted coulter may be used on pull row units only.

LF083002102



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

(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 3600 machine due to inadequate clearance.

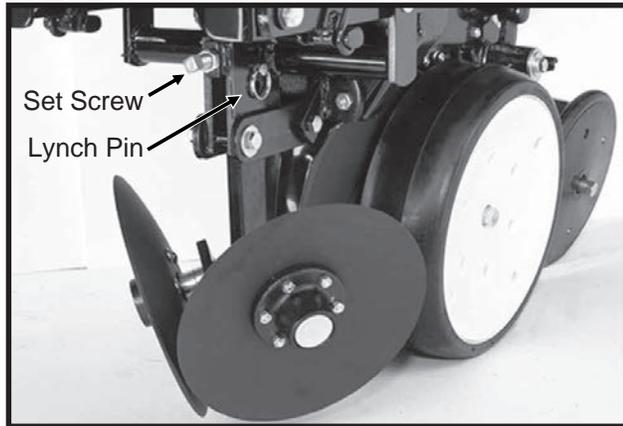
ROW UNIT OPERATION

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.

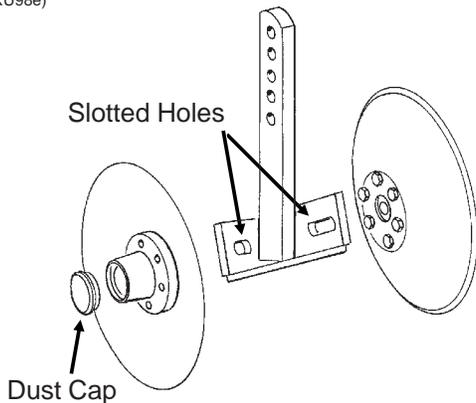
Disc furrowers are used to clear crop residue, dirt clods and dry soil from in front of the row units for a clean and smooth seed bed. Notched blades are used for heavier residue conditions. The notched blades cut crop residue and move it aside to prevent plugging or pushing.

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.

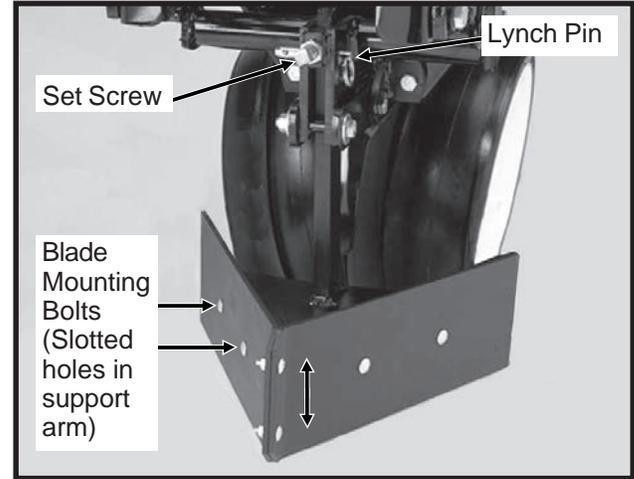
(RU98e)



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 MOUNTED BED LEVELER

LF212299-25a



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

Vertical adjustment in $\frac{1}{3}$ " increments is possible by removing the lynch pin which secures the vertical support arm and moving the support arm up or down as required. 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.

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

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

ROW UNIT MOUNTED RESIDUE WHEEL

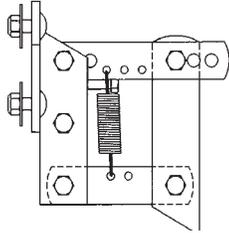
The row unit mounted residue wheel may be used on pull row units and push row units.

D10170113

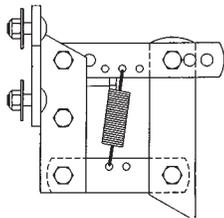


ROW UNIT OPERATION

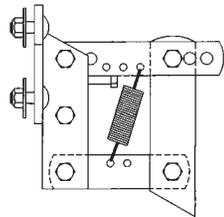
Two adjustable springs on the parallel links on each residue wheel allow for down force adjustment. Position 1 as shown below provides minimum down pressure and position 3 maximum down pressure.



Position 1 (Minimum)(PLTR31a)



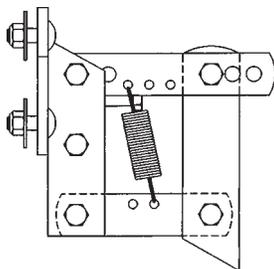
Position 2 (PLTR32a)



Position 3 (Maximum)(PLTR33a)

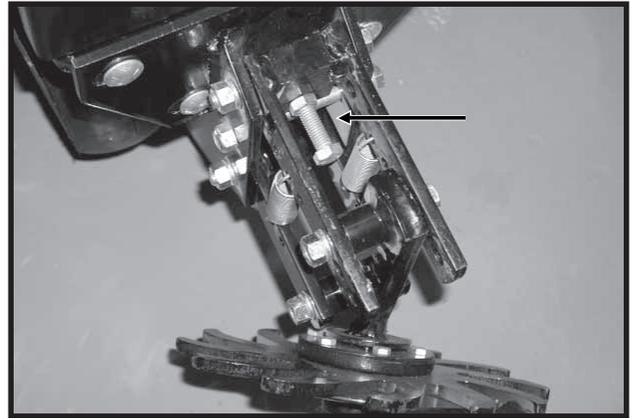
For additional uplift or float, position springs as shown below.

(PLTR34a)



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

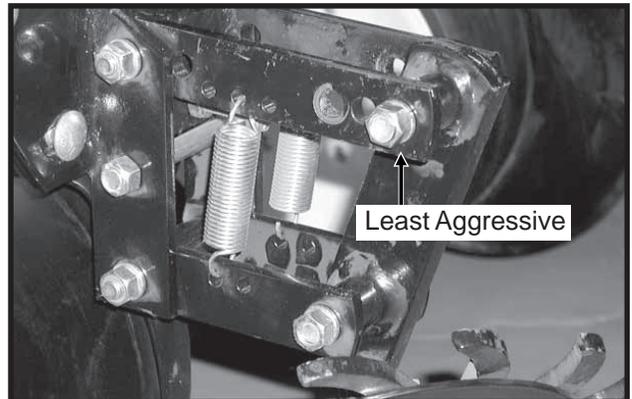
D101701112



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

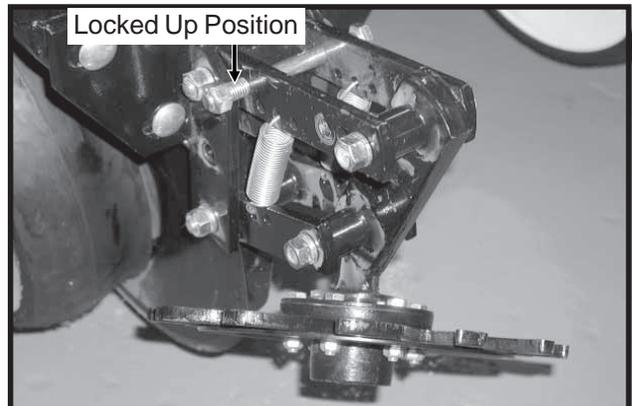
Three holes in the upper link allow for wheel angle adjustment. With the wheel mount in the most vertical position, using the rear hole in the upper link, the residue wheel is most aggressive. Moving the wheel mount to one of the forward holes reduces the aggressiveness of the wheel for use in mulch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

D101701202



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

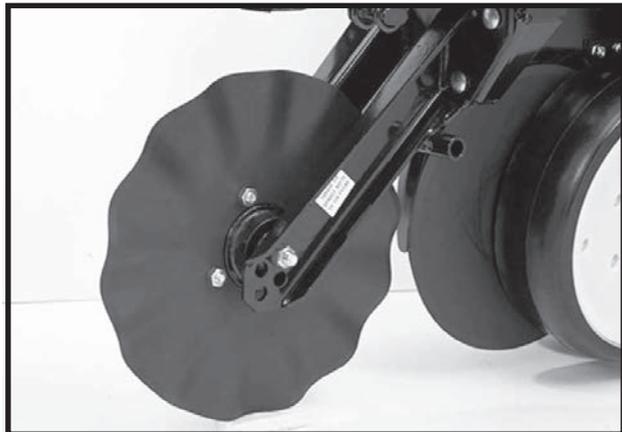
D011701203



ROW UNIT OPERATION

ROW UNIT MOUNTED NO TILL COULTER

LF212299-19a



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

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

For proper operation, the coulters blade should be aligned in relation to the row unit double disc openers. The coulters assembly can be adjusted by loosening the four attaching bolts, moving coulters arm to align and tightening the four attaching bolts.

The coulters blade can be adjusted to one of four $\frac{1}{2}$ " incremental settings in the forked arm. Initial location of the coulters is in the top hole. As the coulters blade wears, the blade should be adjusted downward to one of the three lower settings to maintain the coulters blade at or slightly below the opener discs. In very hard soil conditions such as compacted wheel tracks, opener penetration and cutting of surface residue may be improved by adjusting the coulters to operate below the depth of the double disc opener blades.

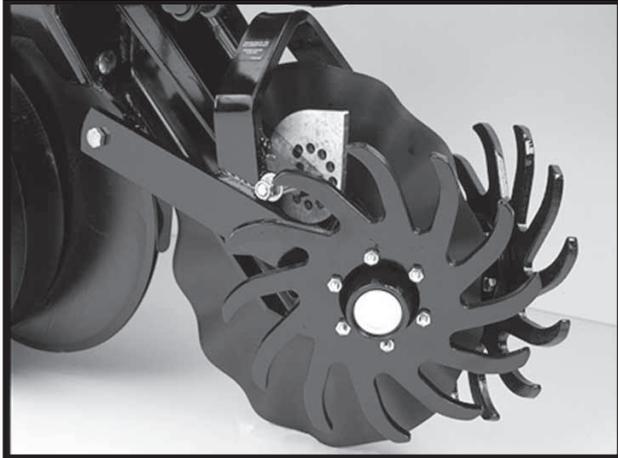
Operating depth can be checked by setting the planter down on a level concrete floor and checking the relationship between the coulters blade and row unit opener blade. Make sure the planter is level and coulters is square with the planter frame and aligned with the row unit disc opener.

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

ROW UNIT OPERATION

COULTER MOUNTED RESIDUE WHEELS

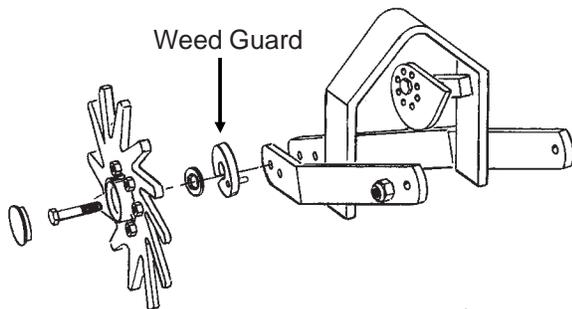
LF212299-23



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

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

(RU1041)



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.

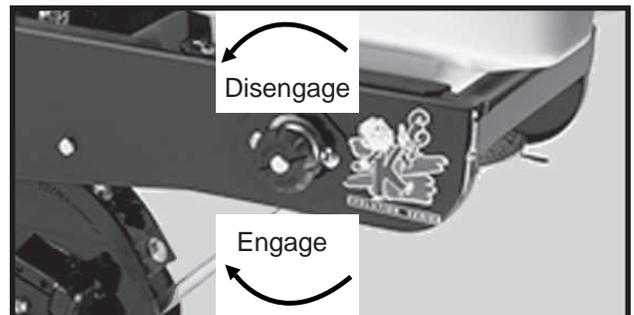
The metering gate located on the bottom of the hopper regulates the application rate. See "Dry Insecticide And Dry Herbicide Application Rate Charts" in this manual. Calibrate using the chemical manufacturers' instructions.



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

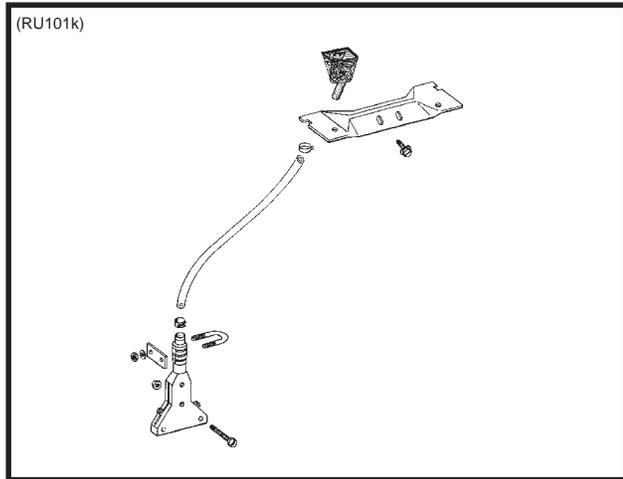


ROW UNIT OPERATION

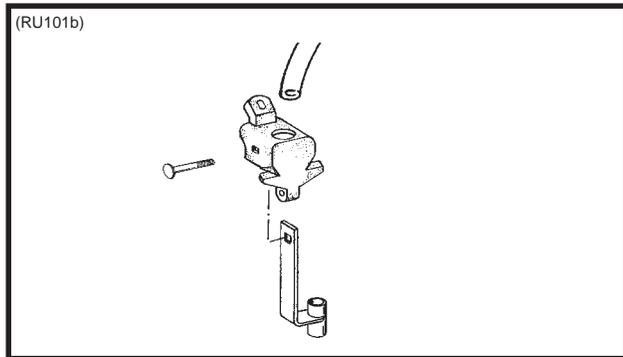
GRANULAR CHEMICAL BANDING OPTIONS

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

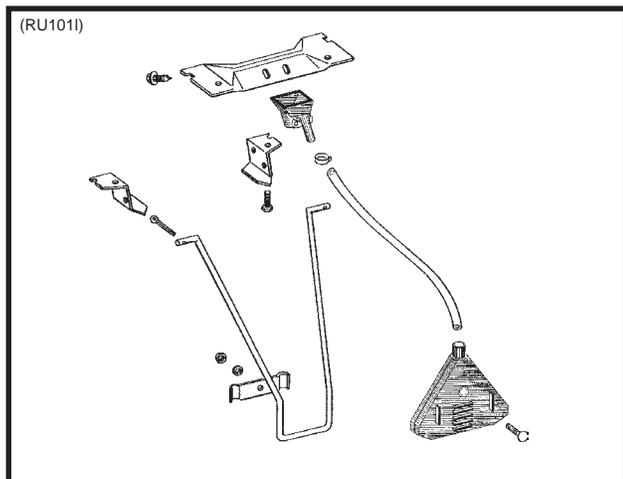
NOTE: The granular chemical rear bander is not compatible with the covering discs/single press wheel option.



4 1/2" Slope-Compensating Bander



Straight Drop In-Furrow Placement

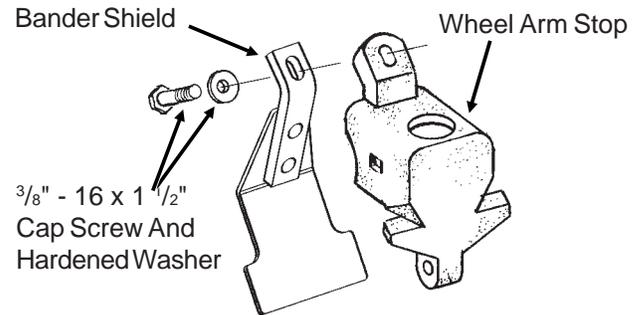


14" Rear Banding

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)

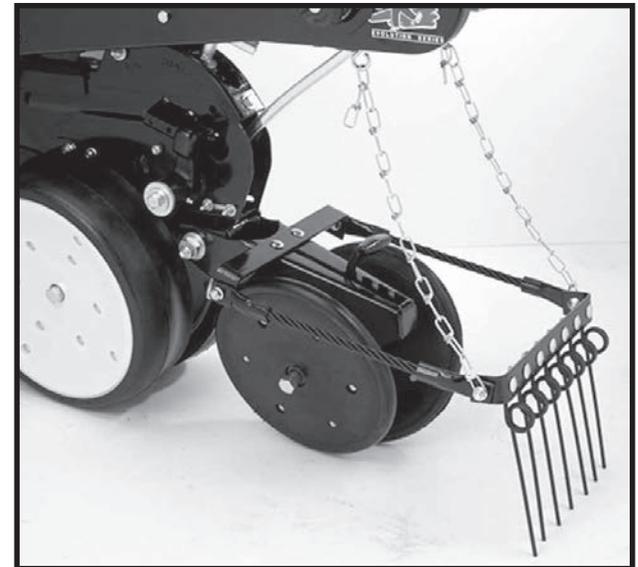


SPRING TOOTH INCORPORATOR

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

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

LF212299-26



ROW UNIT OPERATION

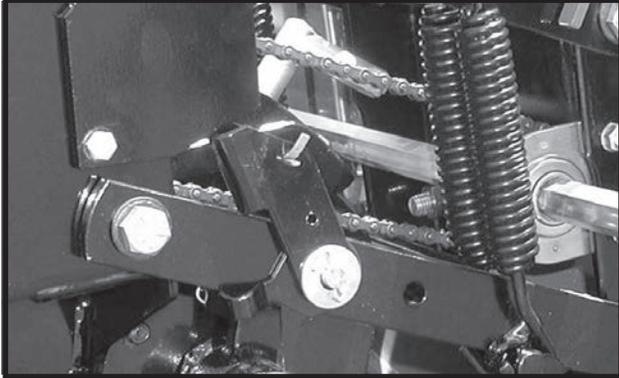
INTERPLANT® PUSH ROW UNIT LOCKUPS

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



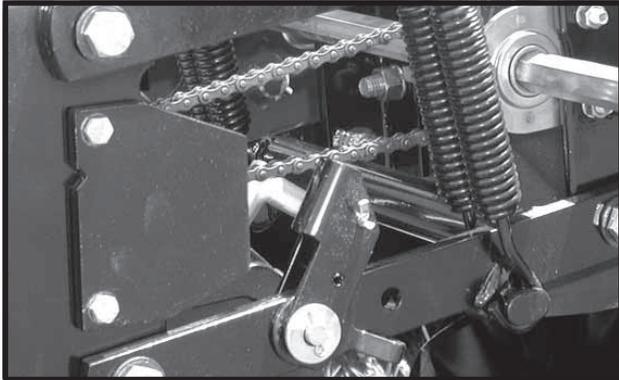
WARNING: Always install all safety lockup devices or lower machine to the ground before working under or around the machine.

D062603106



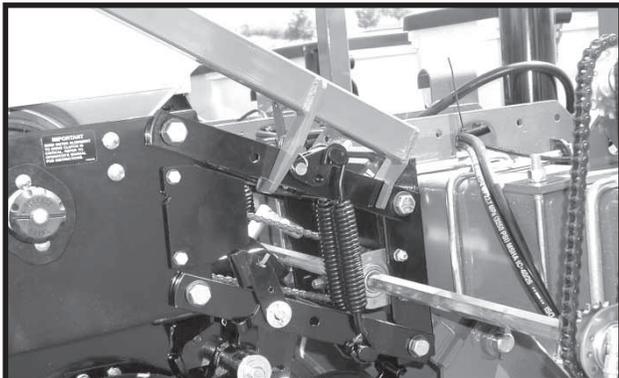
Push Row Unit Locked In Raised Position

D062603103



Lockup Released For Field Operation

D062603106

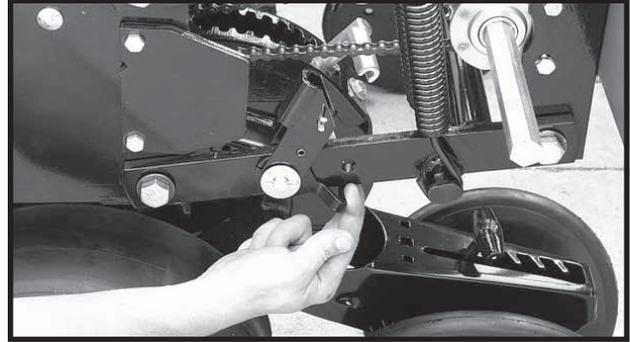


Lift Lever Positioned To Lift Push Row Unit

To lock in raised position:

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

D060499108

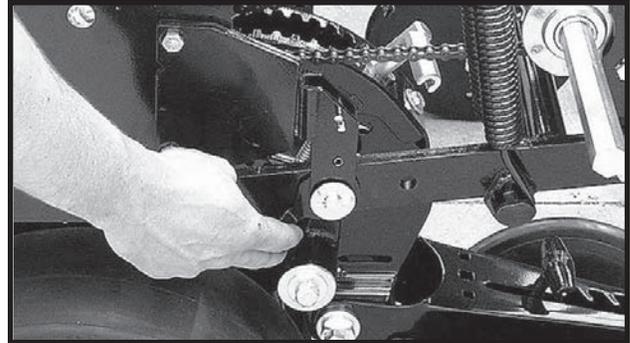


5. Using the lift lever, raise the push row unit to allow the spring loaded lockups to snap into locked position under the row unit stops.
6. Repeat Steps 4 and 5 on remaining push row units.

To release lockups:

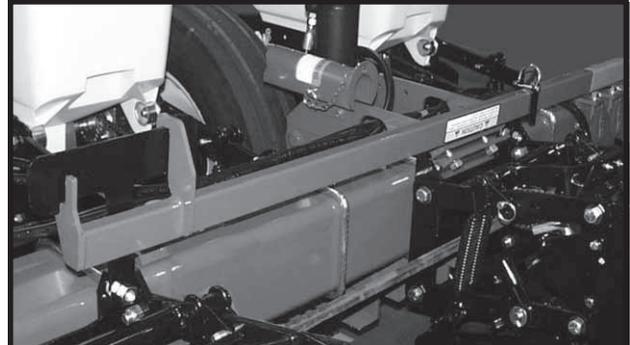
1. Lower the planter to the planting position.
2. On each push row unit lockup, flip the spring tab rearward.

D060499107



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

D070699109

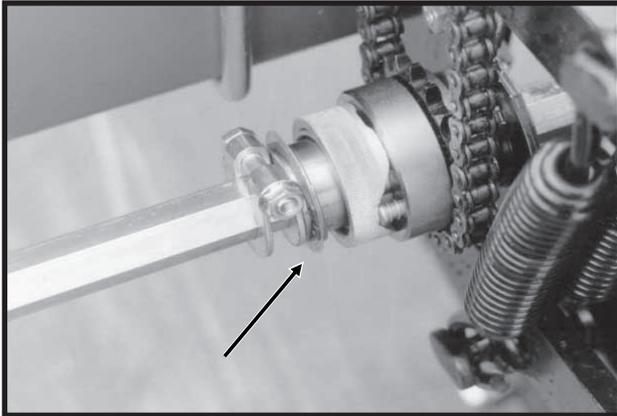


Lift Lever In Storage Location

ROW UNIT OPERATION

INTERPLANT® PUSH ROW UNIT CLUTCH SPROCKET

06309716



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

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



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

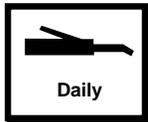
LUBRICATION

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



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

LUBRICATION SYMBOLS



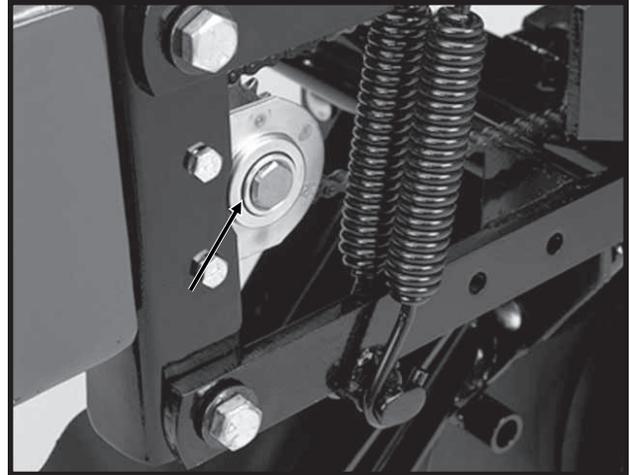
Lubricate at frequency indicated with an SAE multipurpose grease.



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

SEALED BEARINGS

LF212199-3



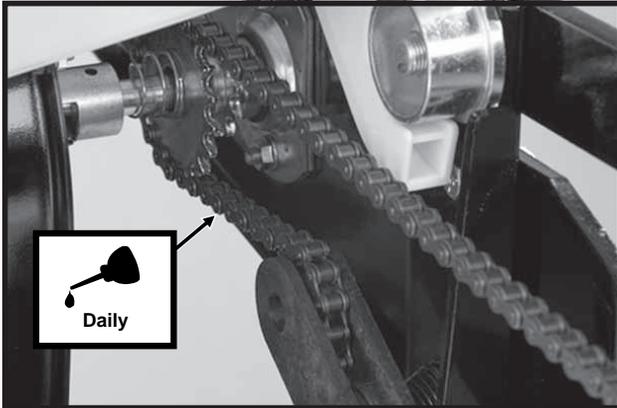
A number of sealed bearings are used on your KINZE® planter to provide trouble free operation. These are located in such areas as the drive shaft, row units and transmission bearings. Sealed bearings are lubricated for life. Due to the seals, relubrication is not practical.

LUBRICATION

DRIVE CHAINS

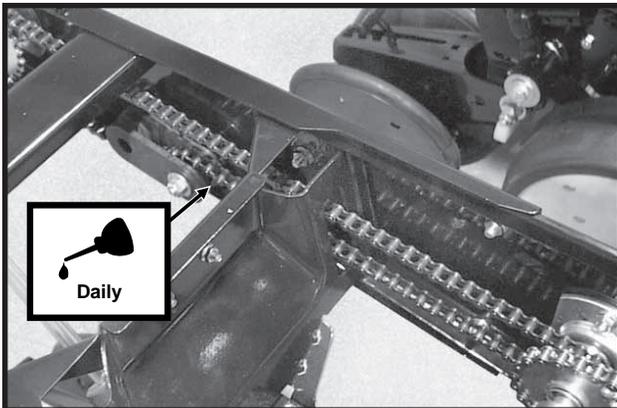
All transmission and drive chains should be lubricated daily with a high quality chain lubricant. Extreme operating conditions such as dirt, temperature or speed may require more frequent lubrication. If a chain becomes stiff, it should be removed, soaked and washed in solvent to loosen and remove dirt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

LF212199-5a



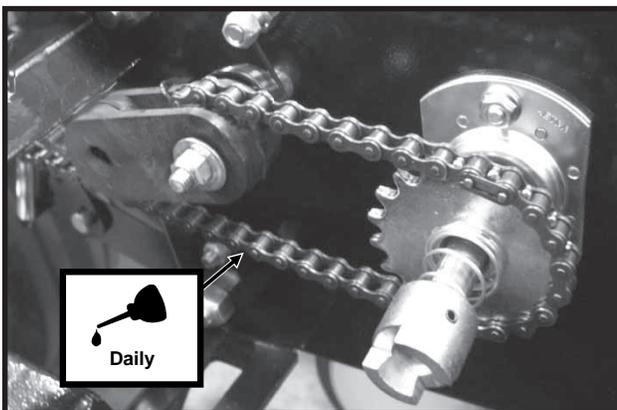
Pull Row Unit Drive Chains

D05139901b



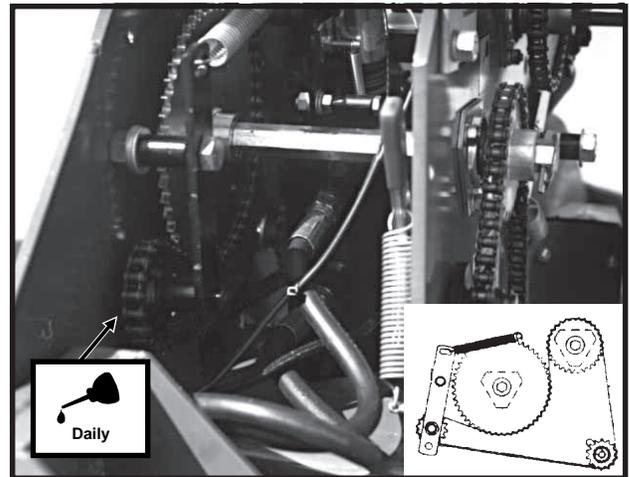
Row Unit Granular Chemical Drive Chains

D04209901a



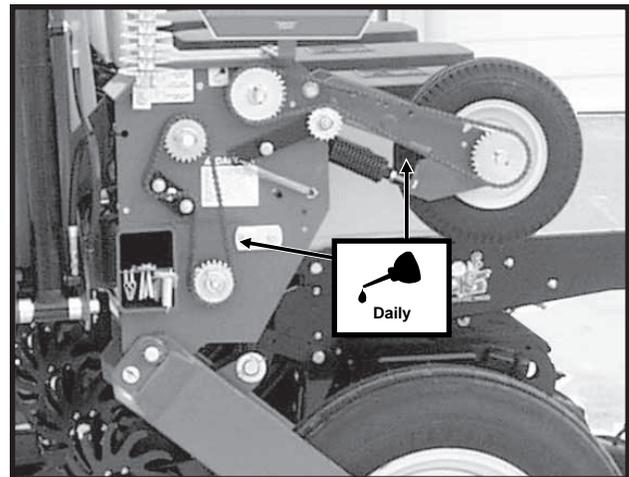
Push Row Unit Drive Chains

77387-8(PLTR52)



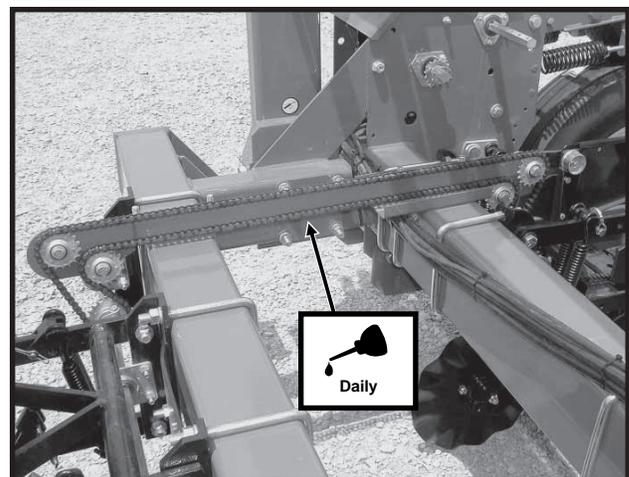
Inner Wheel Module Drive Chains

D020501108



**Contact Wheel Drive Chains
Seed Rate Transmission Drive Chains**

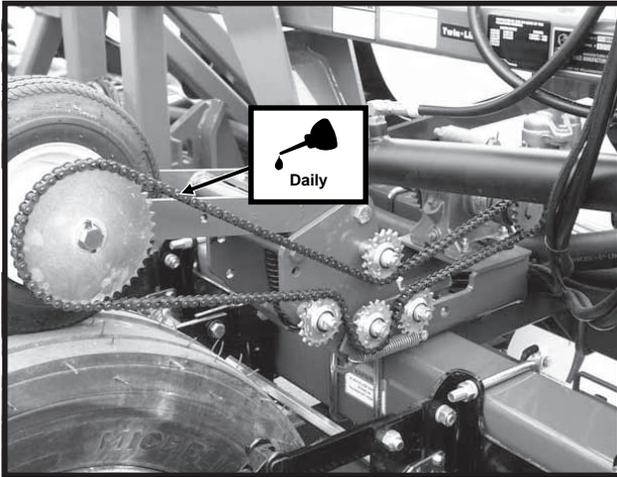
D07140303a



Interplant® Package Drive Chains

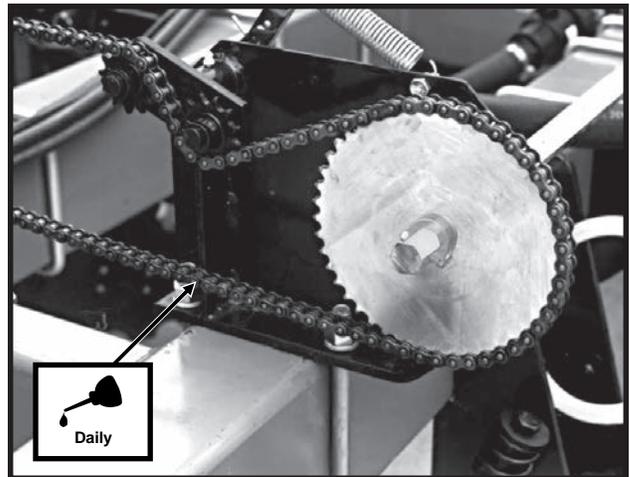
LUBRICATION

D06049911



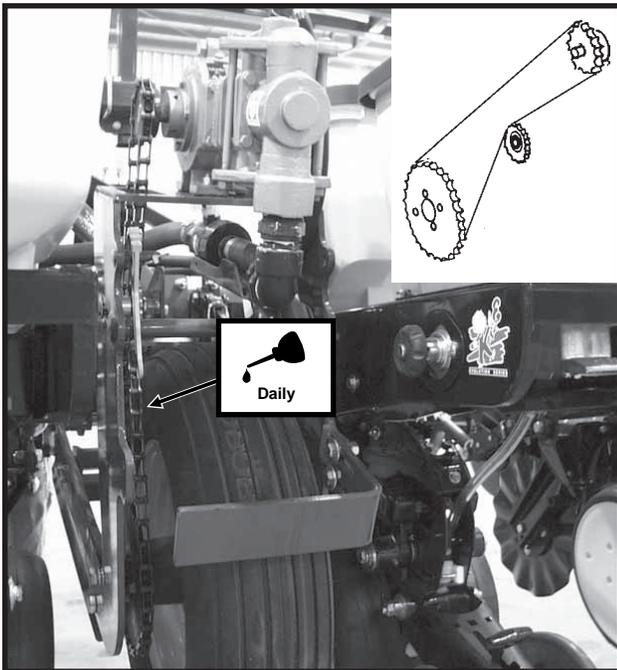
Liquid Fertilizer Contact Drive Chain (Piston Pump)

77570-46a



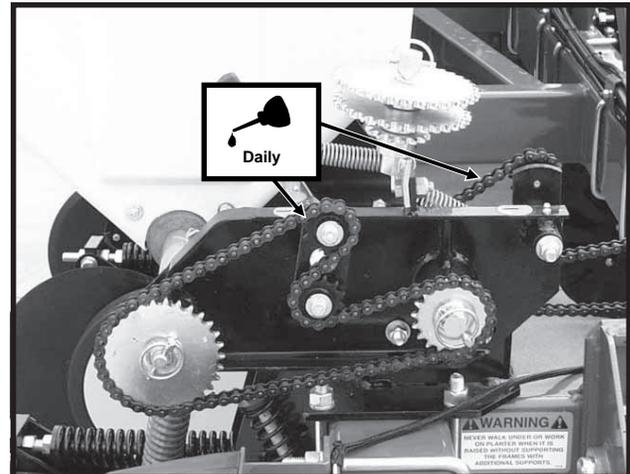
Liquid Fertilizer Drive Chains (Squeeze Pump)

D070804112(TWL219e)



Liquid Fertilizer Ground Drive Chain (Piston Pump)

D060299123



Dry Fertilizer Drive Chains

LUBRICATION

BUSHINGS

Lubricate bushings at the frequency indicated.

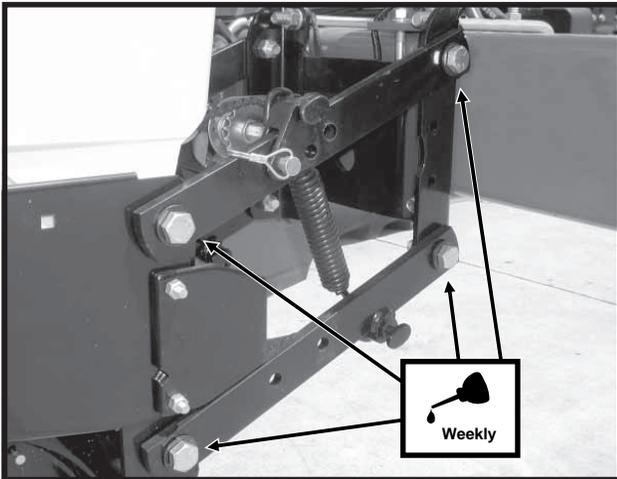
Using a torque wrench, check each bolt for proper torque. If bolt is loose, it should be removed and the bushing inspected for cracks and wear. Replace bushing if necessary. **Only hardened flat washers should be used. Replace damaged flat washers with proper part. Torque bolts to 130 ft. lbs.**

LF212299-22



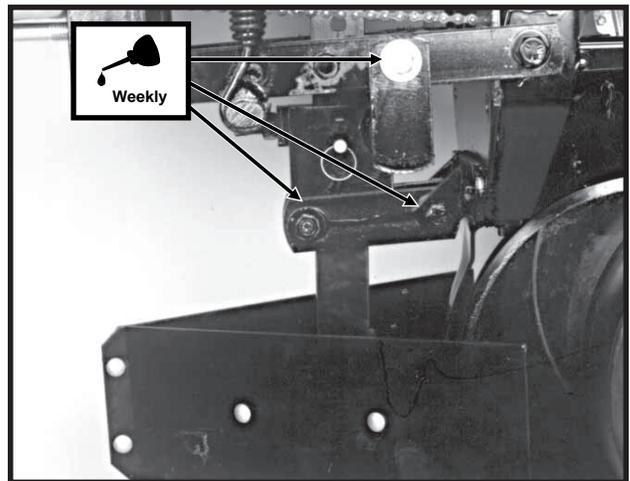
Row Unit Mounted Disc Furrower Parallel Linkages (6 Per Row)

D06300305



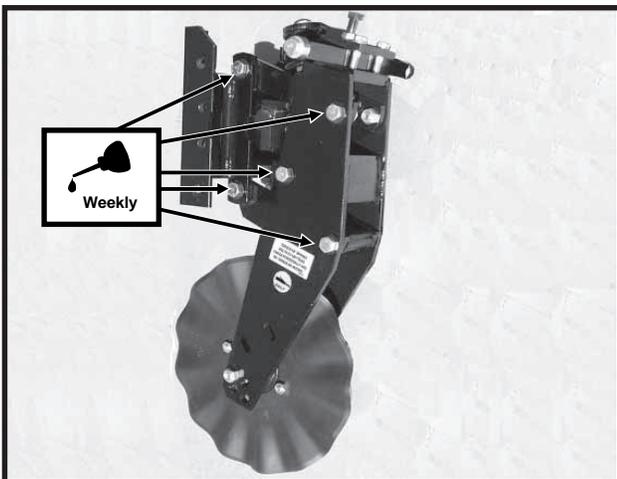
Pull Row Unit And/Or Push Row Unit Parallel Linkages (8 Per Row)

59386-26



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

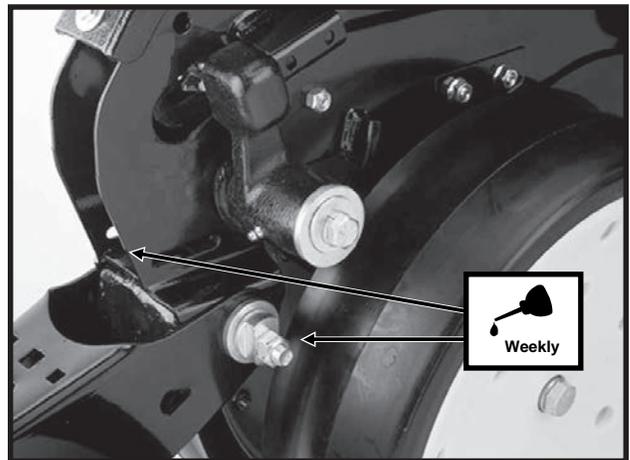
D06189901



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

Shown not installed on row unit for visual clarity.

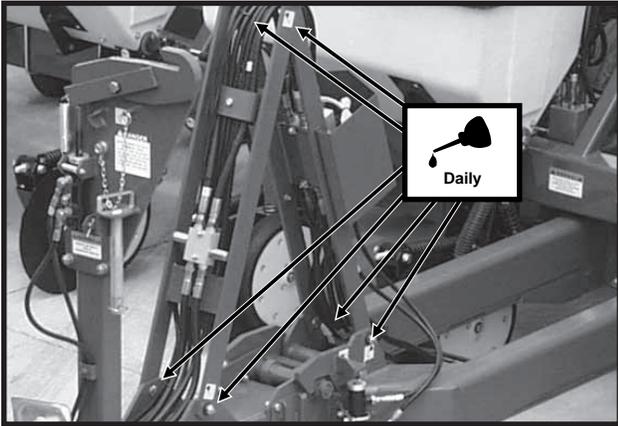
LF212199-2



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

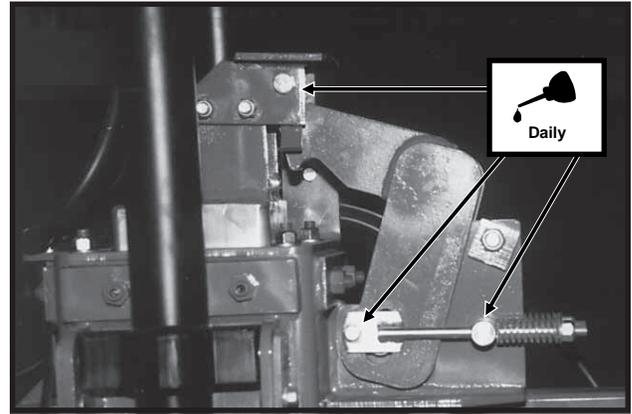
LUBRICATION

D061901128



Hose Take-Up (6 Locations)

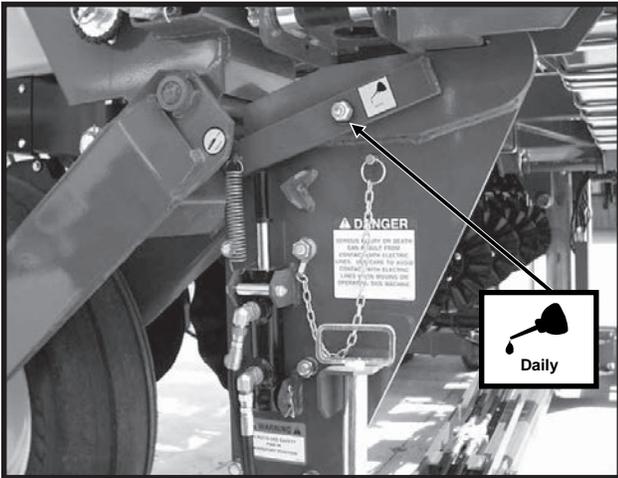
82316-16



Safety Hook Located At Top Of Center Section

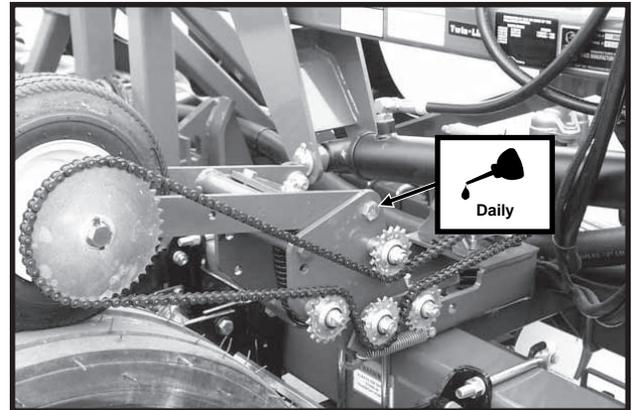
NOTE: CENTER POST AND POLY WEAR PADS REQUIRE NO LUBRICATION. ANY OIL OR GREASE WILL ATTRACT DIRT AND ACCELERATE WEAR ON THE CENTER POST AND ON THE POLY WEAR PADS.

D060299216



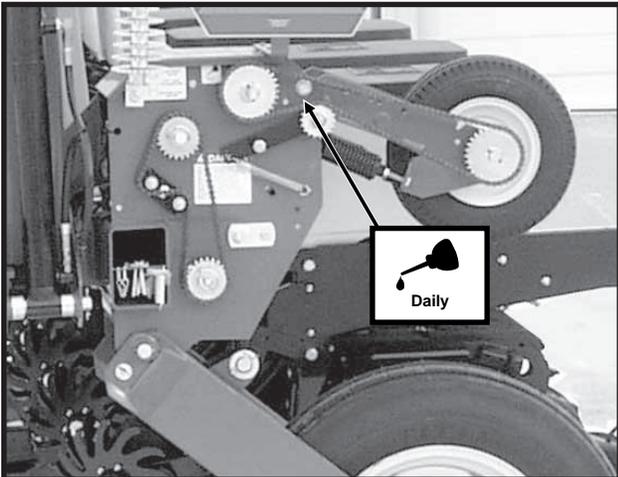
Transport Latch (1 Location)

D06049911



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

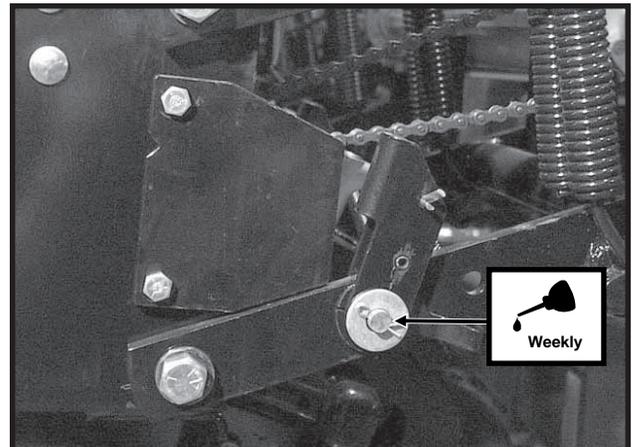
D020501108



Contact Drive Wheel Arm (2 Per Wheel Assembly)

INTERPLANT® PUSH ROW UNIT LOCKUPS

D06099906



2 Per Row

LUBRICATION

WRAP SPRING WRENCH ASSEMBLY

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

D101303102



WHEEL BEARINGS

The transport wheel hubs are equipped with grease fittings. Pump grease into the hub until grease comes out around the seals. See "Grease Fittings" for lubrication frequency.

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

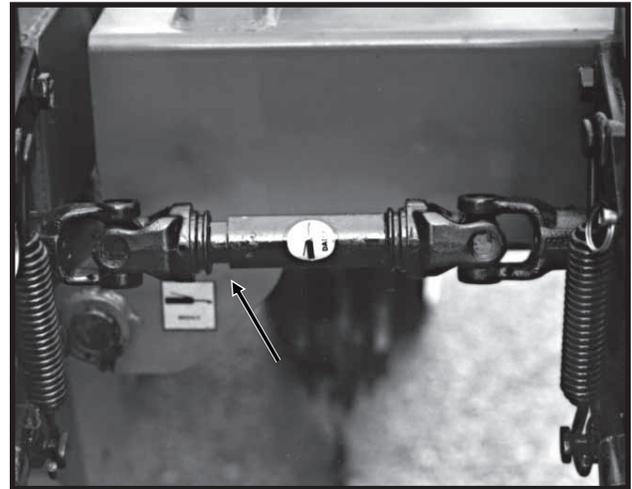
To check for wear, lift the wheel off the ground. Check for endplay in the bearings by moving the tire side to side. Rotate the tire to check for roughness in the bearings. If bearings sound rough, the hub should be removed and the bearings inspected and replaced if necessary. See "Wheel Bearing Lubrication Or Replacement".

To repack wheel hubs, follow the procedure outlined for wheel bearing replacement with the exception that bearings and bearing cups are reused.

U-JOINT SLIDES

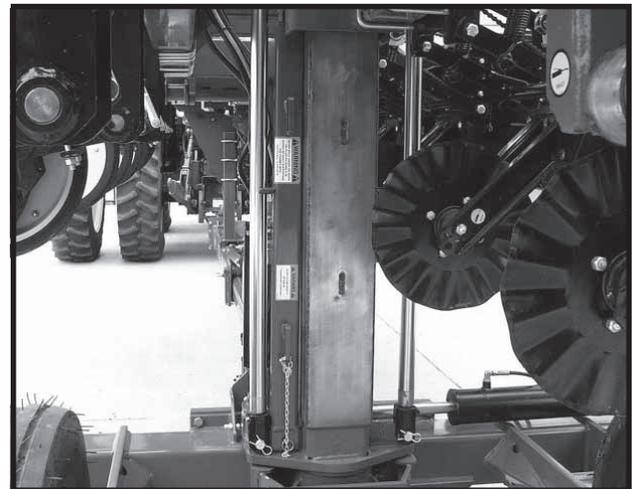
Lubricate all U-joint slides daily with a high quality lubricant.

76740-54



CENTER POST

D060299107



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

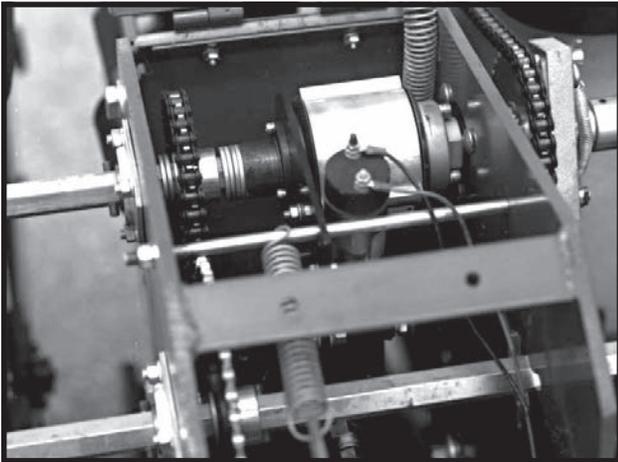
CENTER POST AND POLY WEAR PADS REQUIRE NO LUBRICATION. ANY OIL OR GREASE WILL ATTRACT DIRT AND ACCELERATE WEAR ON THE CENTER POST AND ON THE POLY WEAR PADS.

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

LUBRICATION

POINT ROW CLUTCHES

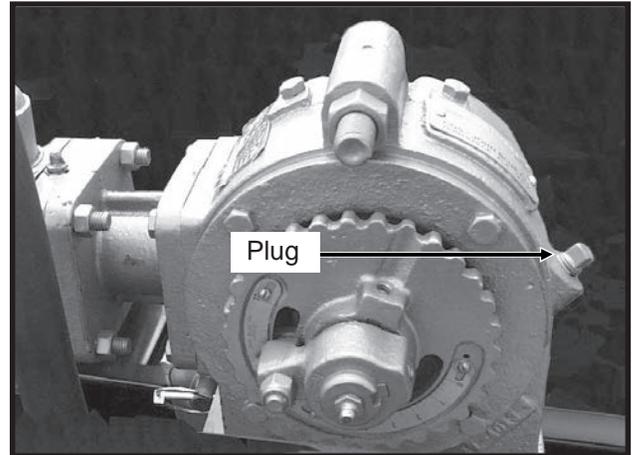
76740-2



The point row clutches are permanently lubricated and sealed and require no periodic maintenance. **DO NOT LUBRICATE. KEEP CLUTCHES CLEAN.**

LIQUID FERTILIZER PISTON PUMP CRANKCASE OIL LEVEL

D071504102a



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

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

GREASE FITTINGS

Those parts equipped with grease fittings should be lubricated at the frequency indicated with an SAE multipurpose 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.

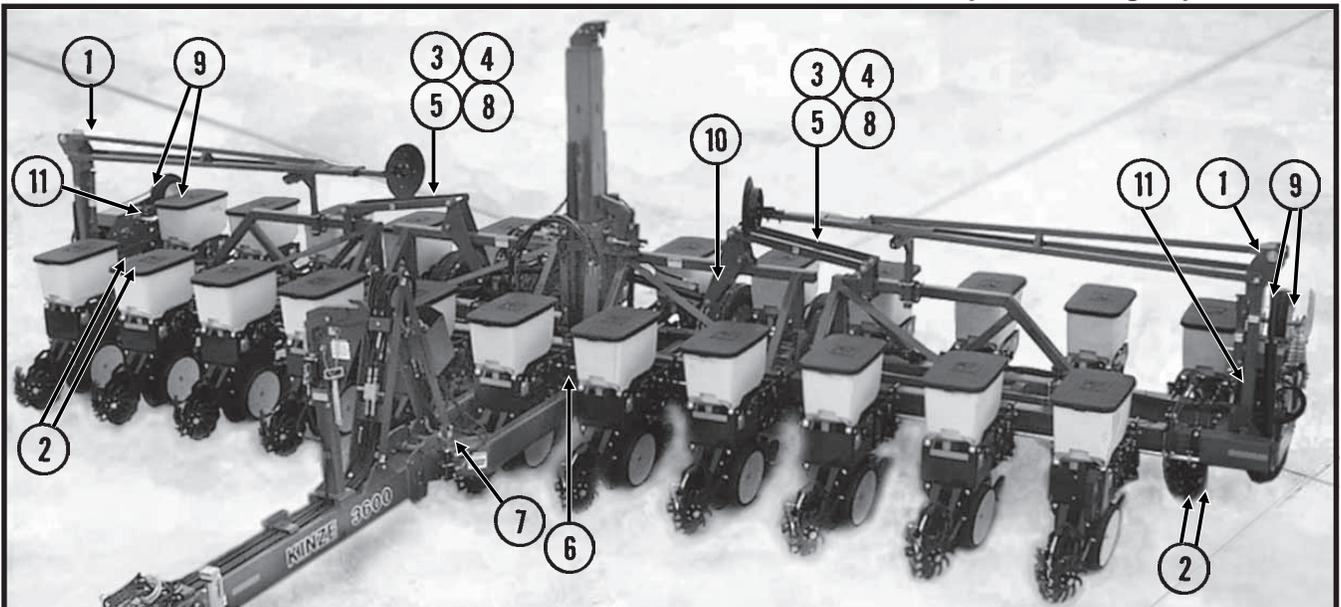


WARNING: Always install safety lockup devices or lower the machine to the ground before working under or around the machine.

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

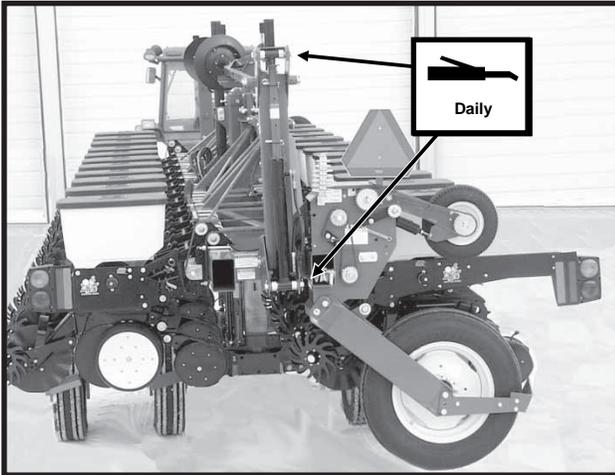
D020501123a

12 Row 30" With Interplant® Package Option Shown



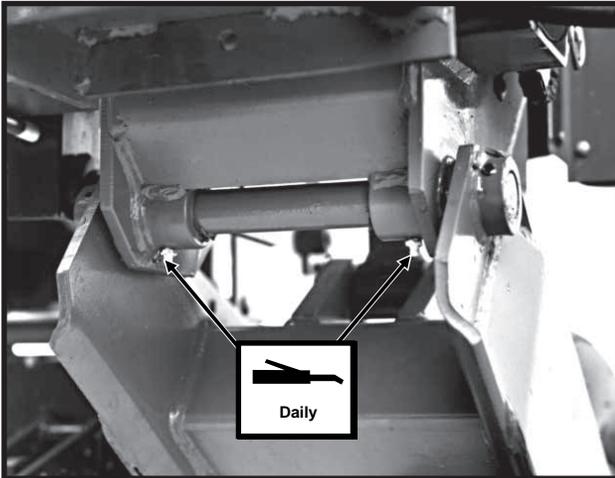
LUBRICATION

D020501108



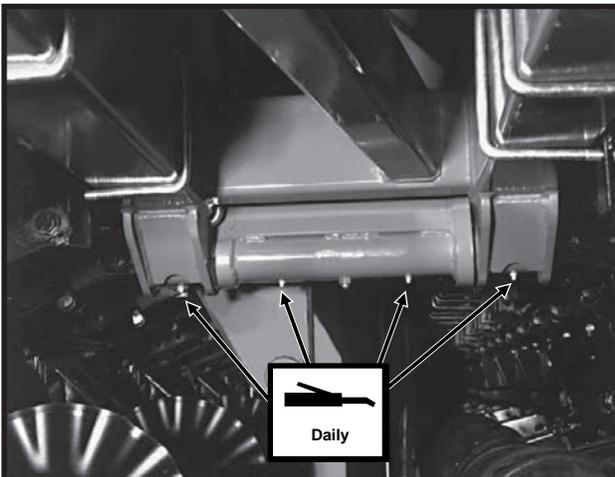
1. Row Marker Assemblies - 4 Zerks Per Assembly On 8 Row Wide And 12 Row 30". 2 Zerks Per Assembly On 12 Row Wide And 16 Row 30".

76609-17



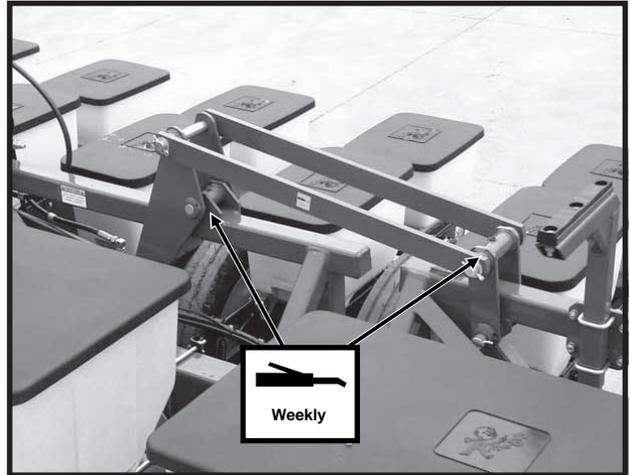
2. Wing Wheel Pivot - 2 Zerks Per Wheel Module

81439-29



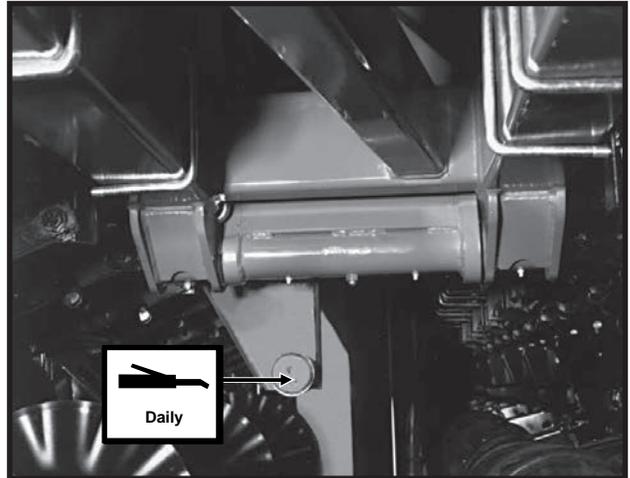
3. Wing Hinges - 4 Zerks Per Wing

D060299117



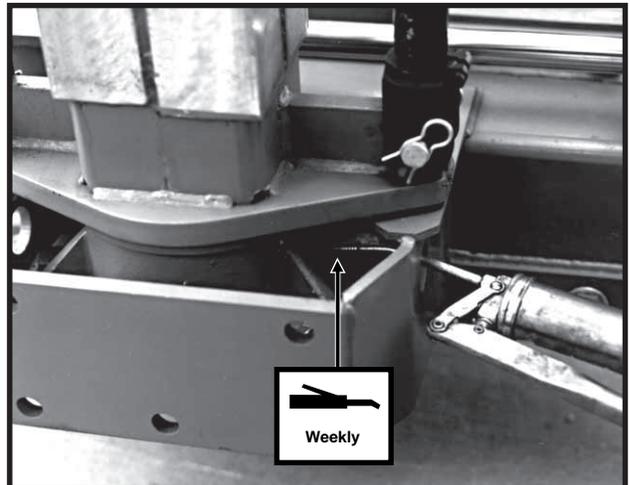
4. Wing Locks - 3 Zerks Per Wing

81439-29



5. Cam Follower - 1 Zerk Per Follower

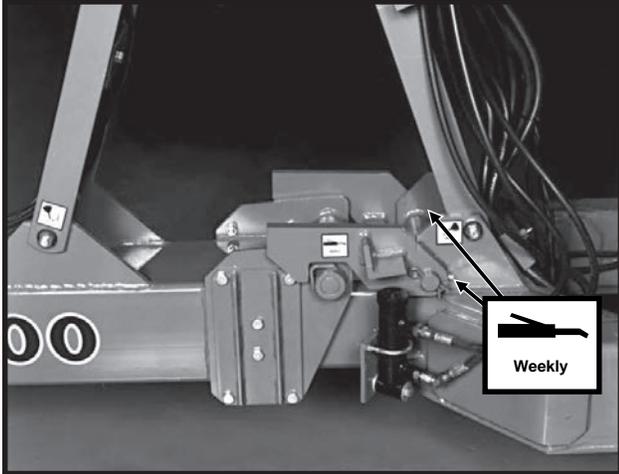
76609-36



6. Center Pivot - 1 Zerk

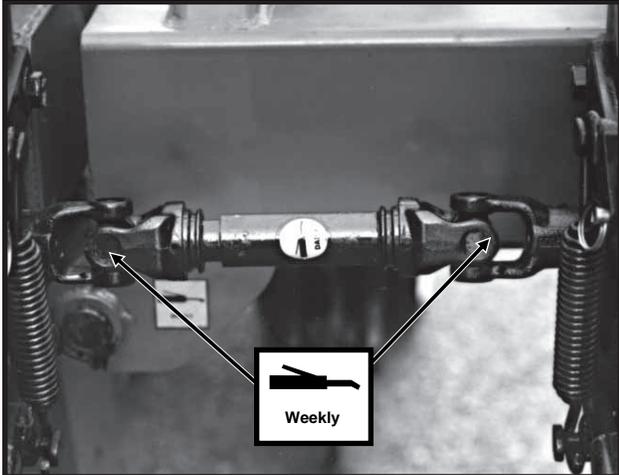
LUBRICATION

81439-7



7. Tongue Hook - 2 Zerks

76740-54



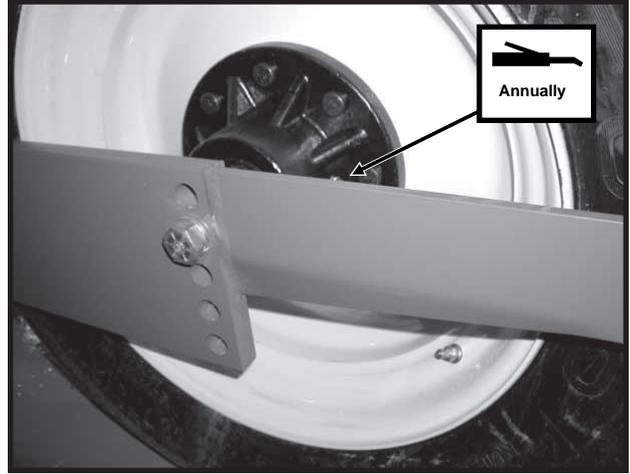
8. U-Joints - 2 Zerks Per Hinge Area

D04200001



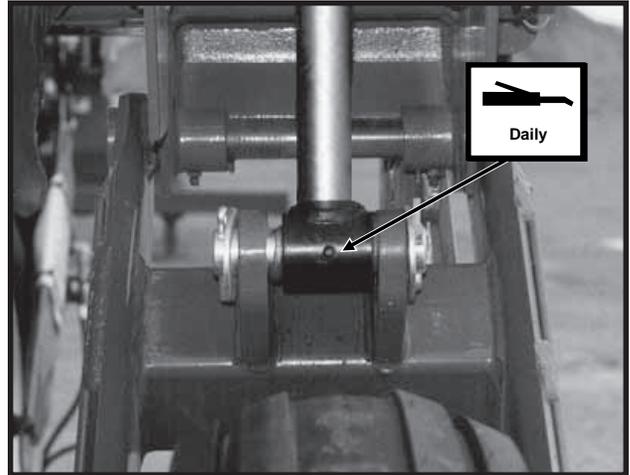
9. (If Applicable) Contact Wheel Arm Bearing - 2 Zerks Per Arm Assembly (**Rotate tire while filling with grease.**)

D091602101



10. Transport Wheel Bearings - 1 Zerk Per Hub

05199819a

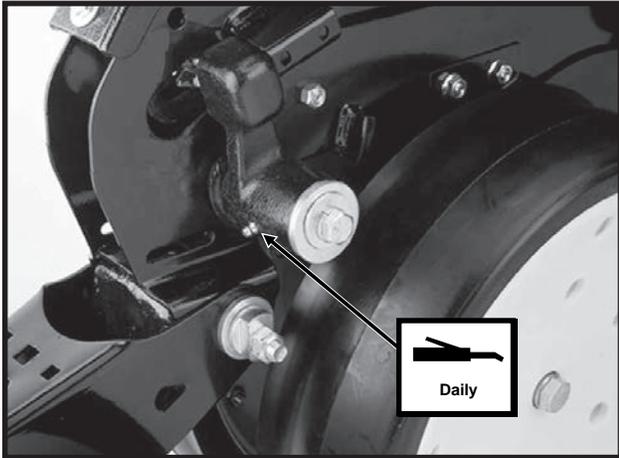


11. Wing Lift Cylinders - 1 Zerk Per Cylinder

LUBRICATION

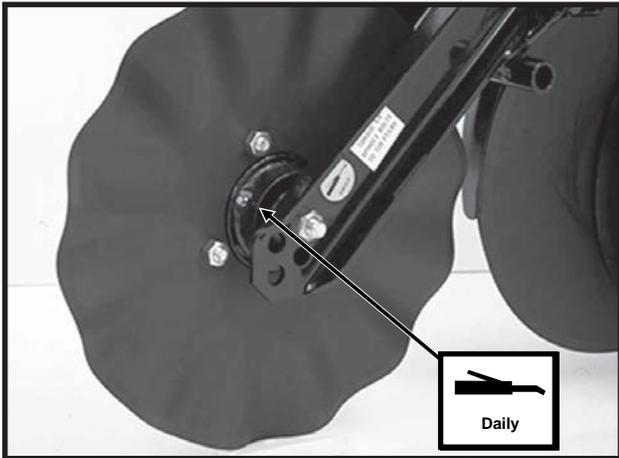
Row Unit

LF212199-2



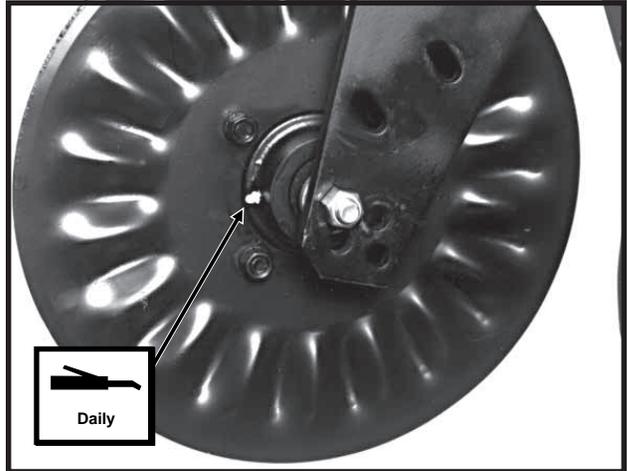
Gauge Wheel Arms - 1 Zerk Per Arm
(Seals in gauge wheel arm are installed with lip facing out to allow grease to purge dirt away from seal. Pump grease into arm until fresh grease appears between washers and arm.)

LF212299-19



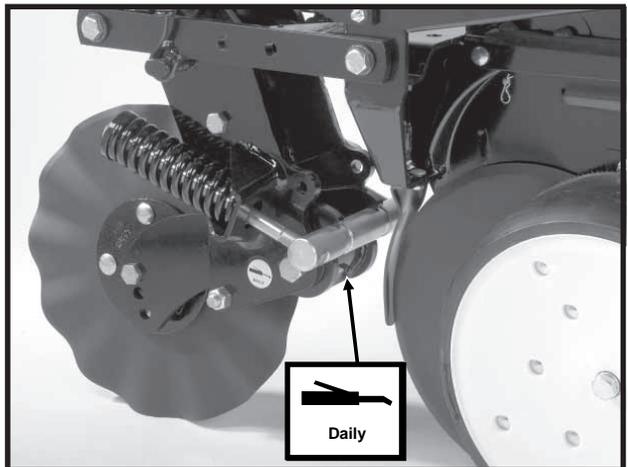
(If Applicable) Row Unit Mounted No Till Coulters Hubs - 1 Zerk Per Hub
(Pump grease into hub until grease comes out around the seals. Spin hub while filling with grease.)

56673-6



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

LF083002101

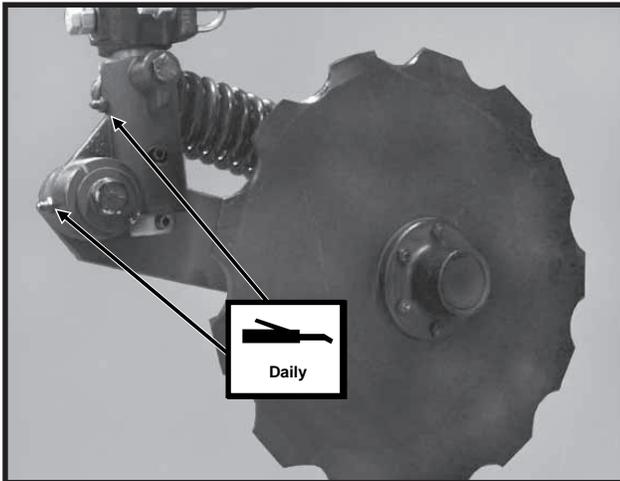


(If Applicable) Frame Mounted Coulters - STYLE B - 1 Zerk Per Arm

LUBRICATION

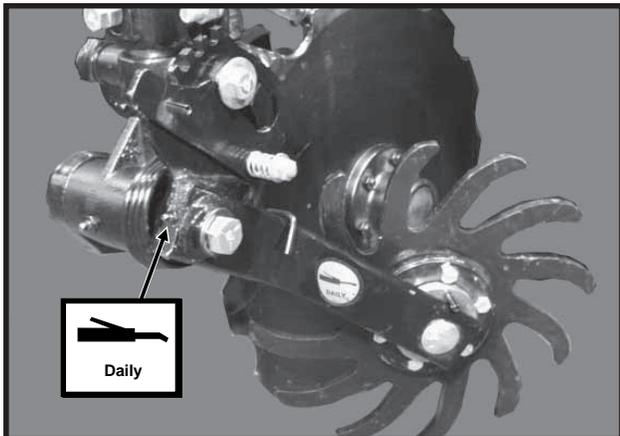
Fertilizer Openers

D05189901



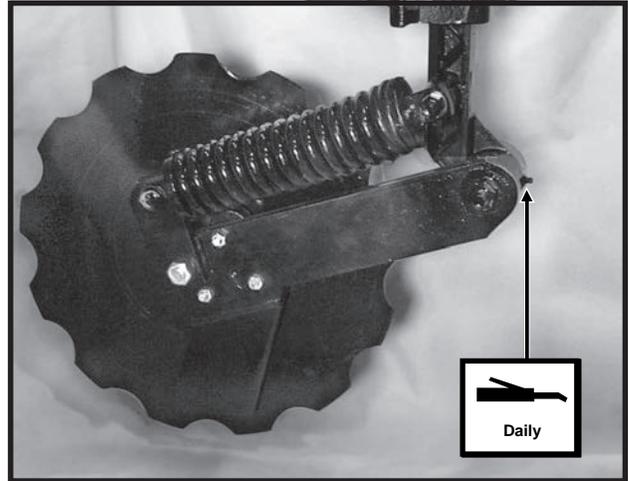
Notched Single Disc Fertilizer Opener (STYLE A)
- 2 Zerks

D05219901a



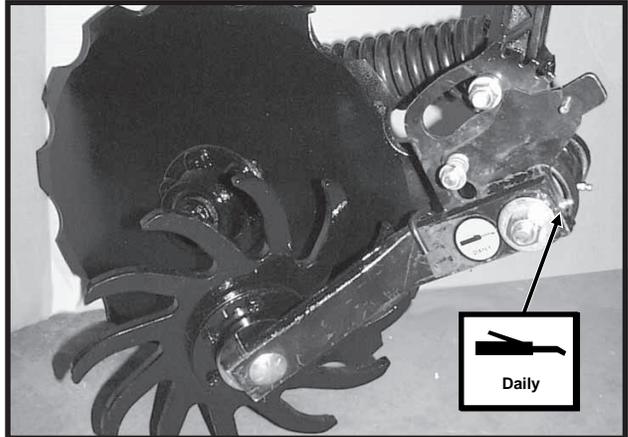
(If Applicable) Residue Wheel Attachment For Use With
STYLE A Notched Single Disc Fertilizer Opener - 1 Zerk

D060801304



Notched Single Disc Fertilizer Opener (STYLE B)
- 1 Zerk

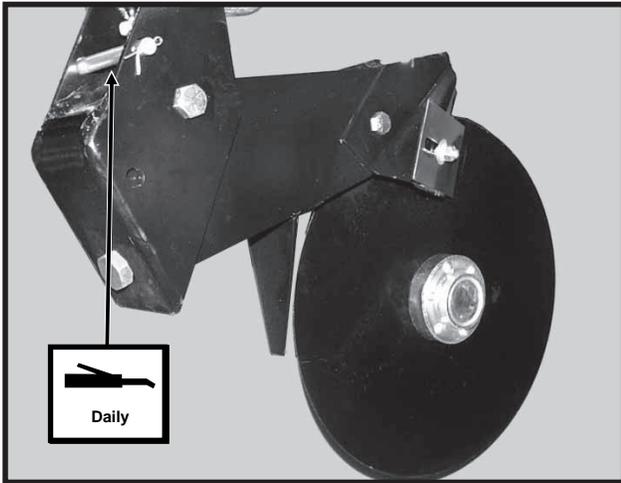
D05219901a



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

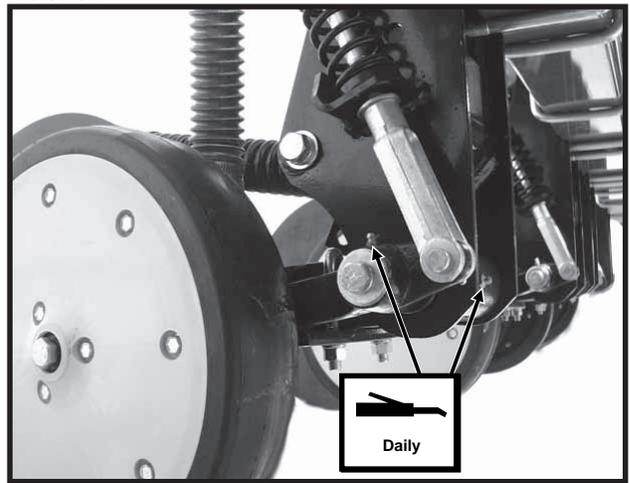
LUBRICATION

D06259919



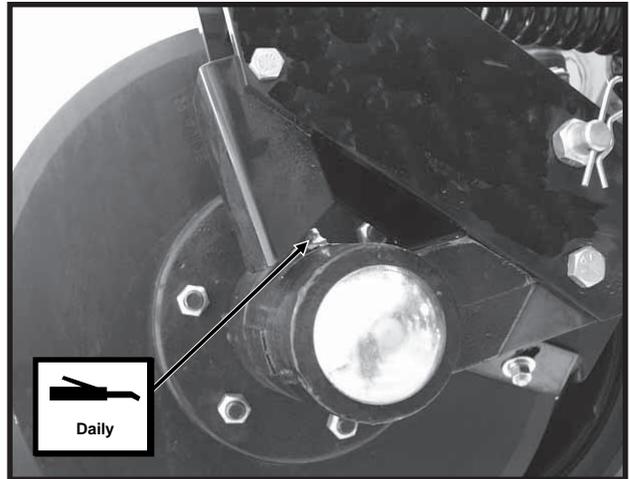
Double Disc Fertilizer Opener - 1 Zerk

D060801304



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

D060801303

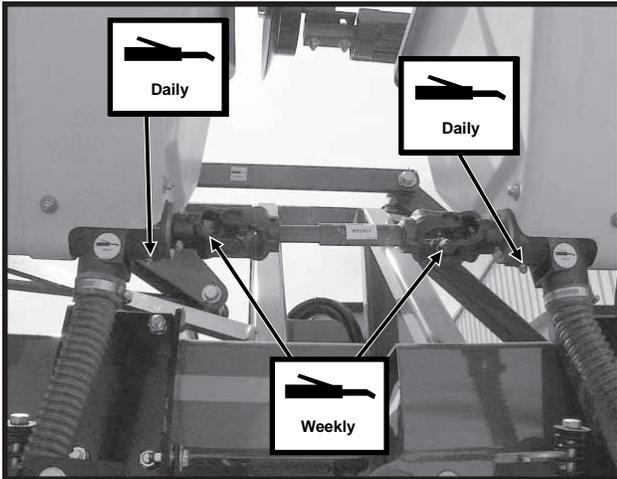


HD Single Disc Fertilizer Opener - 1 Zerk
(Located On Disc Opener Spindle Hub)

LUBRICATION

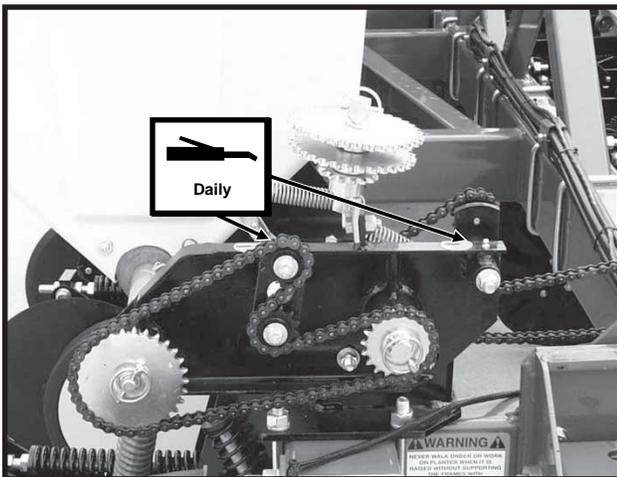
Dry Fertilizer Attachment

D061801101



Fertilizer Hopper - 2 Zerks Per Hopper
U-Joint - 1 Zerk Per Hinge Area

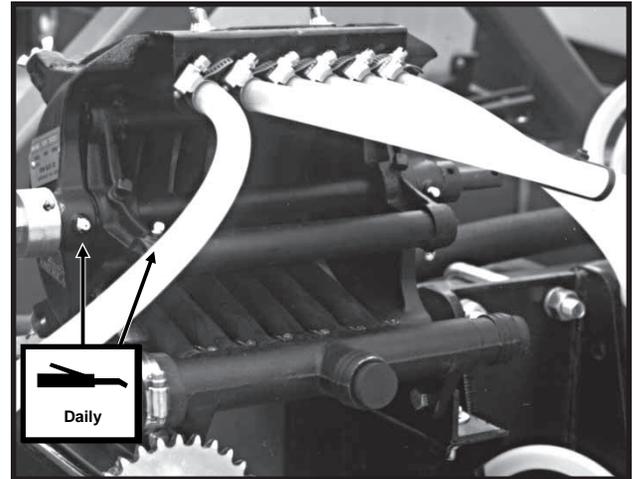
D060299123



Fertilizer Transmission - 2 Zerks Per Transmission

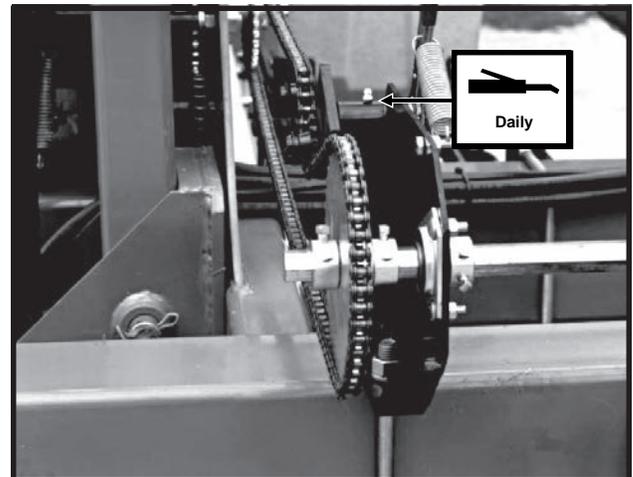
Liquid Fertilizer Attachment

77570-52



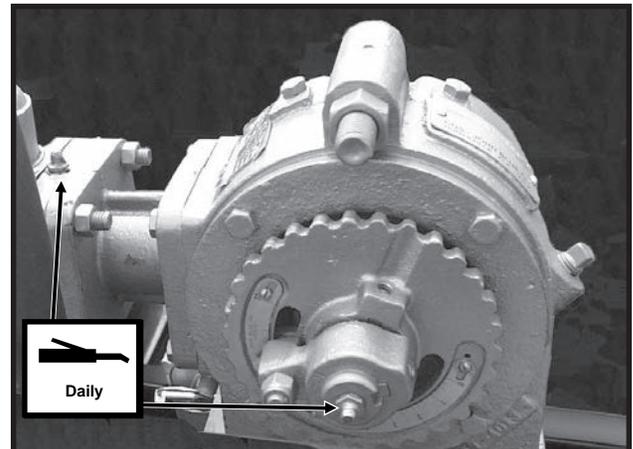
Squeeze Pump - 8 Zerks Per Pump

77570-49



Squeeze Pump Drive Chain Idler - 1 Zerk Per Idler

D071504102a



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

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

**Center Section Transport Tire Lug Nuts - 125 Ft. Lbs.
Wing Ground Drive Tire Lug Bolts - 90 Ft. Lbs.
5/8" No Till Coulter Spindle Bolts - 120 Ft. Lbs.**

TORQUE VALUES CHART - PLATED HARDWARE

Bolt Diameter	Grade 2		Grade 5		Grade 8	
	Coarse	Fine	Coarse	Fine	Coarse	Fine
1/4"	50 In. Lbs.	56 In. Lbs.	76 In. Lbs.	87 In. Lbs.	9 Ft. Lbs.	10 Ft. Lbs.
5/16"	8 Ft. Lbs.	9 Ft. Lbs.	13 Ft. Lbs.	14 Ft. Lbs.	18 Ft. Lbs.	20 Ft. Lbs.
3/8"	15 Ft. Lbs.	17 Ft. Lbs.	23 Ft. Lbs.	26 Ft. Lbs.	33 Ft. Lbs.	37 Ft. Lbs.
7/16"	25 Ft. Lbs.	27 Ft. Lbs.	37 Ft. Lbs.	41 Ft. Lbs.	52 Ft. Lbs.	58 Ft. Lbs.
1/2"	35 Ft. Lbs.	40 Ft. Lbs.	57 Ft. Lbs.	64 Ft. Lbs.	80 Ft. Lbs.	90 Ft. Lbs.
9/16"	50 Ft. Lbs.	60 Ft. Lbs.	80 Ft. Lbs.	90 Ft. Lbs.	115 Ft. Lbs.	130 Ft. Lbs.
5/8"	70 Ft. Lbs.	80 Ft. Lbs.	110 Ft. Lbs.	125 Ft. Lbs.	160 Ft. Lbs.	180 Ft. Lbs.
3/4"	130 Ft. Lbs.	145 Ft. Lbs.	200 Ft. Lbs.	220 Ft. Lbs.	280 Ft. Lbs.	315 Ft. Lbs.
7/8"	125 Ft. Lbs.	140 Ft. Lbs.	320 Ft. Lbs.	350 Ft. Lbs.	450 Ft. Lbs.	500 Ft. Lbs.
1"	190 Ft. Lbs.	205 Ft. Lbs.	480 Ft. Lbs.	530 Ft. Lbs.	675 Ft. Lbs.	750 Ft. Lbs.
1 1/8"	265 Ft. Lbs.	300 Ft. Lbs.	600 Ft. Lbs.	670 Ft. Lbs.	960 Ft. Lbs.	1075 Ft. Lbs.
1 1/4"	375 Ft. Lbs.	415 Ft. Lbs.	840 Ft. Lbs.	930 Ft. Lbs.	1360 Ft. Lbs.	1500 Ft. Lbs.
1 3/8"	490 Ft. Lbs.	560 Ft. Lbs.	1100 Ft. Lbs.	1250 Ft. Lbs.	1780 Ft. Lbs.	2030 Ft. Lbs.
1 1/2"	650 Ft. Lbs.	730 Ft. Lbs.	1450 Ft. Lbs.	1650 Ft. Lbs.	2307 Ft. Lbs.	2670 Ft. Lbs.

NOTE: Unplated hardware and bolts with lock nuts should be torqued approximately 1/3 higher than the above values. Bolts lubricated prior to installation should be torqued to 70% of value shown in chart.



GRADE 2
No Marks



GRADE 5
3 Marks



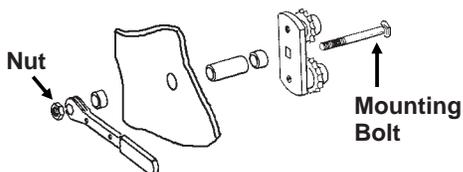
GRADE 8
6 Marks

CHAIN TENSION ADJUSTMENT

The drive chains have spring loaded idlers 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.

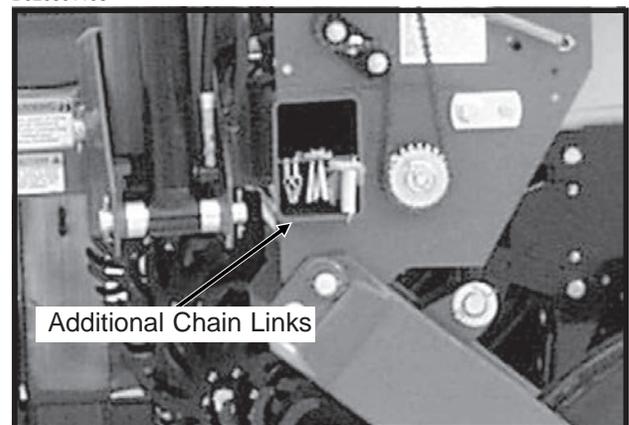
NOTE: The nut on the mounting bolt (on applicable idler assemblies as shown below) must be kept tight or chain tension will not be maintained and adjustment wrench will not function properly.

(MT18d)



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

D020501108

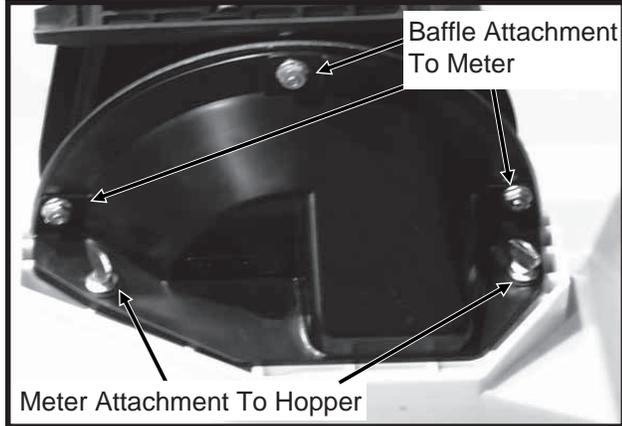


MAINTENANCE

FINGER PICKUP SEED METER INSPECTION/ADJUSTMENT

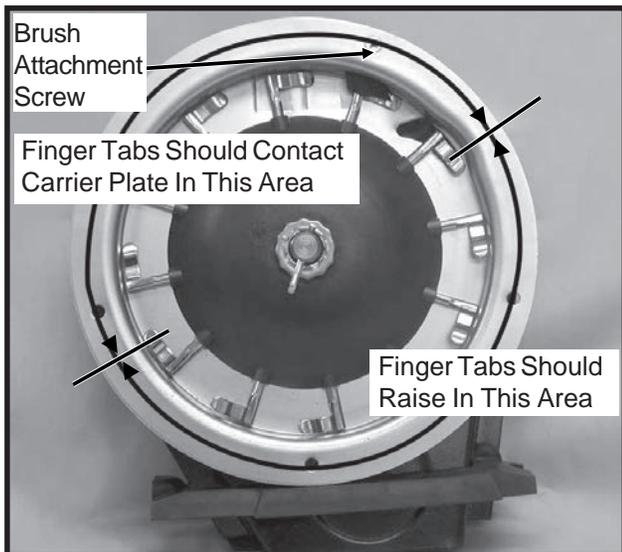
To inspect or service the finger pickup seed meter, remove the meter from the seed hopper by removing the two thumbscrews which secure the mechanism to the hopper. Remove the baffle from the meter assembly by removing three cap screws. This will permit access to the finger pickup.

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.

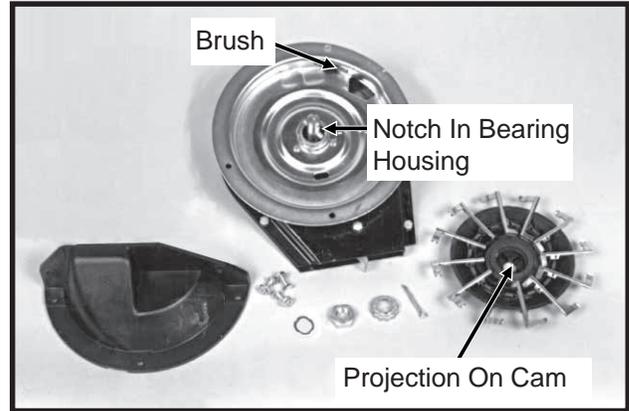
D12220402a



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



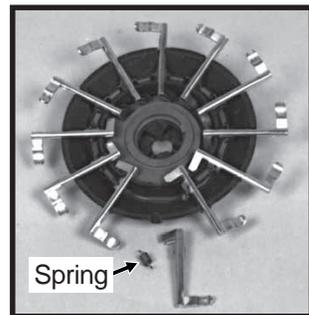
3. Check brush for wear and replace if necessary or following every 100 acres per row of operation.

EXAMPLE: Approximately 800 acres of corn or sunflowers on a 8 row machine, 1200 acres on a 12 row machine or 1600 acres on a 16 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

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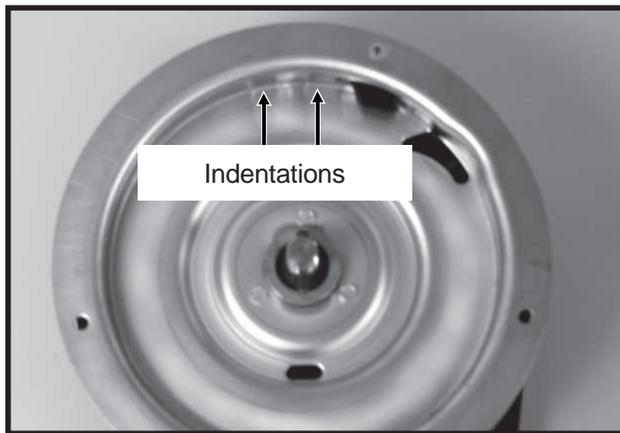


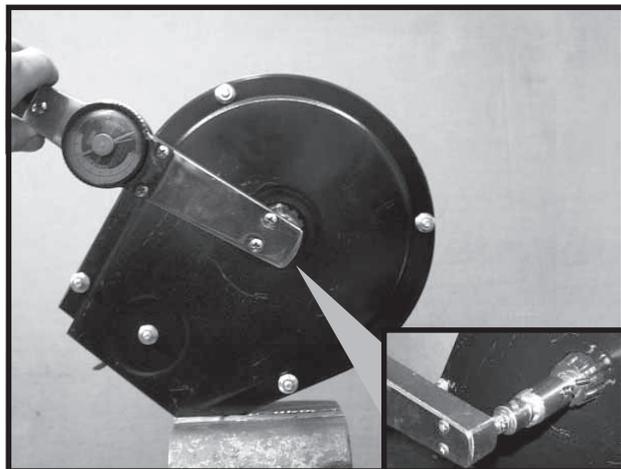
Photo Shows Worn Carrier Plate

- 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

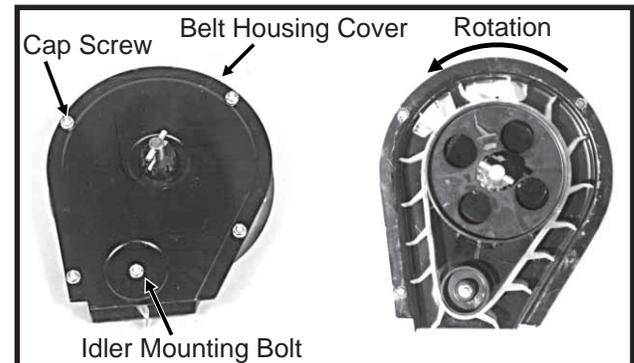


- Turn finger holder by hand to make sure it is positioned firmly against the carrier plate, but is not over tightened and can be rotated with moderate force.
- Install cover nut and cotter pin and reinstall baffle.

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

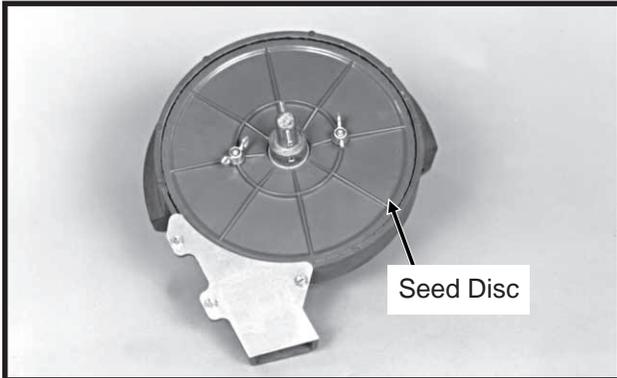
FINGER PICKUP SEED METER TROUBLESHOOTING

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.

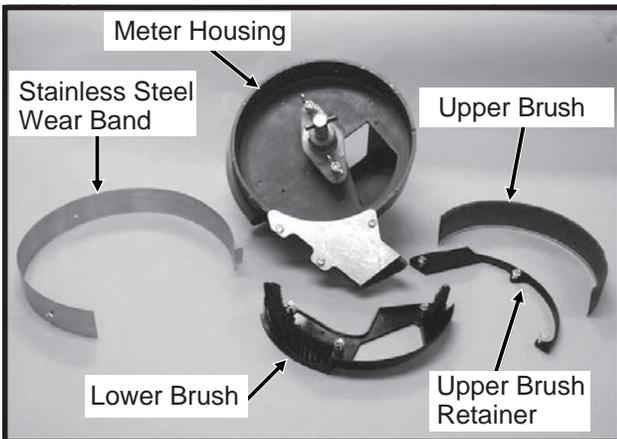
MAINTENANCE

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 disc pocket. Clean the brush areas of the meter housing thoroughly.

D04239912a



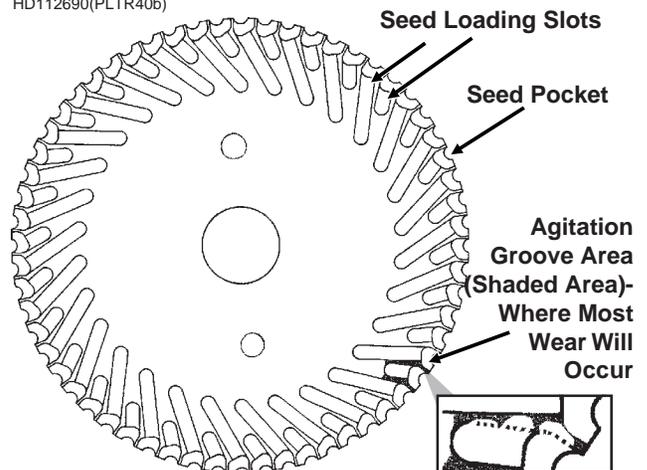
IMPORTANT: Replace hopper lids after hoppers are filled to prevent accumulation of dust or dirt in the seed meter which will cause premature wear.

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)



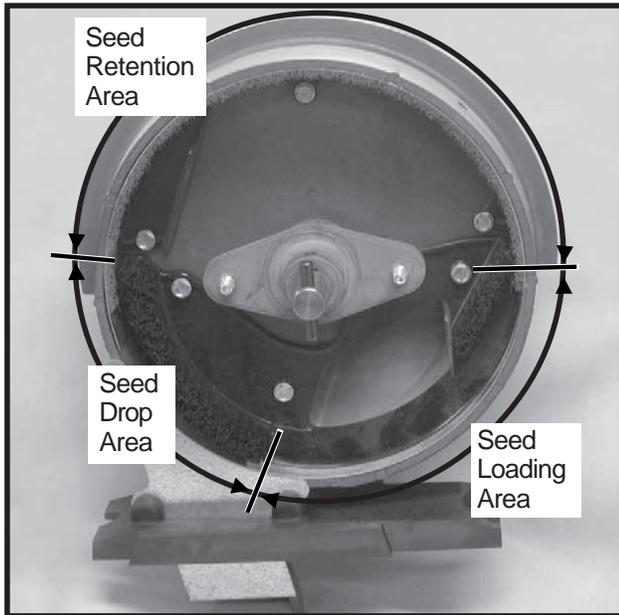
Most wear on the seed disc will be found in the agitation groove area (area between the seed loading slots). Wear will affect planting accuracy at high RPM. To measure for wear, lay a straight edge across the surface of the disc and measure the gap between the disc (at the agitation groove area) and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

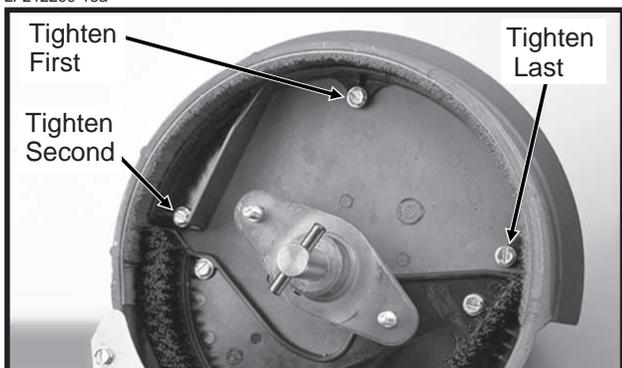
The upper brush should be replaced at approximately 120-400 acres per row of use or sooner if damage or excessive wear is found.

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.

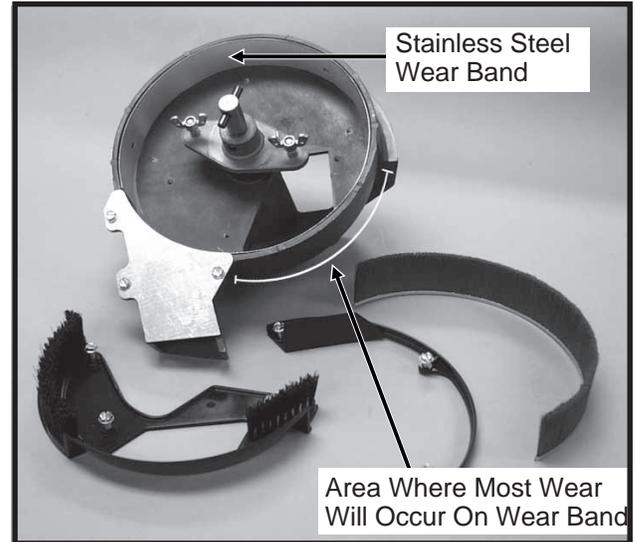
NOTE: Use GD11122 upper brush retainer when using soybean and cotton discs. Use GD8237 upper brush retainer when using milo/grain sorghum discs. GD11122 brush retainer shown.

LF212299-13a



Stainless Steel Wear Band

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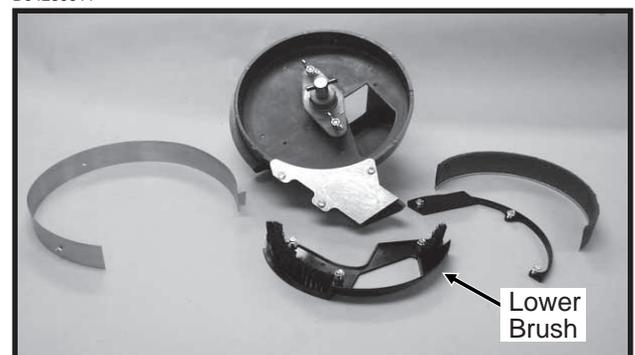


The purpose of the stainless steel wear band is to protect the meter housing from wear. The band is .030" thick and should be replaced when approximately .020" of wear is found in the primary area of wear. If the wear band is allowed to wear through or if the meter is used without the wear band in place,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

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

Lower Brush

D04239911



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

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

MAINTENANCE

BRUSH-TYPE SEED METER TROUBLESHOOTING

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

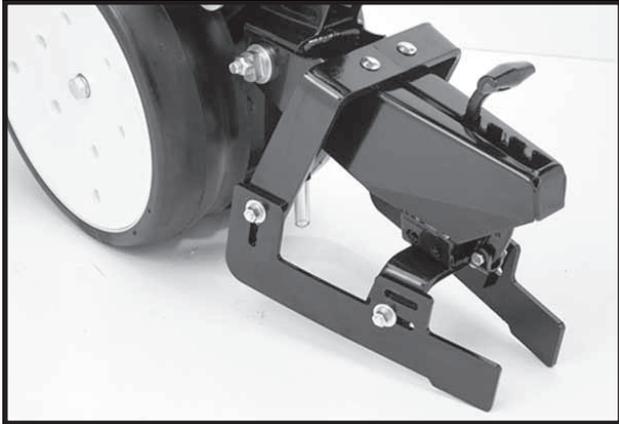
MAINTENANCE

CLOSING WHEEL TROUBLESHOOTING

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

DRAG CLOSING ATTACHMENT

LF212299-18



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

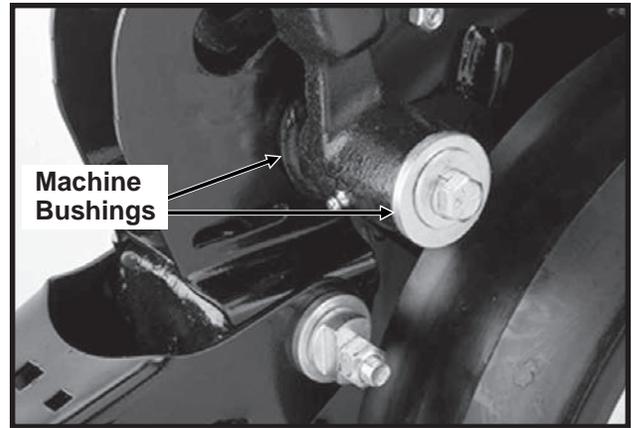
GAUGE WHEEL ADJUSTMENT

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

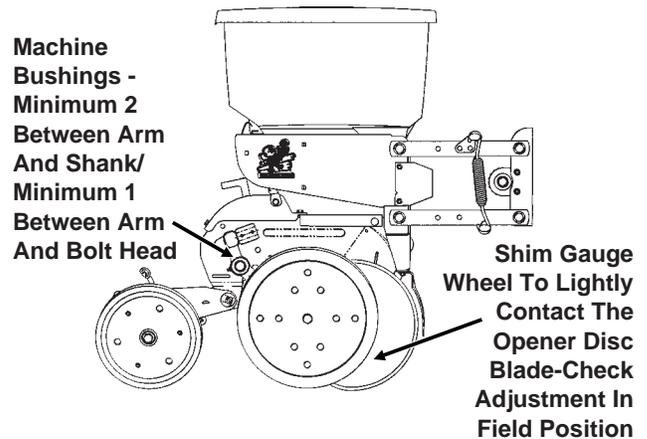
To adjust clearance between gauge wheels and opener blades, add or remove machine bushings between the shank and gauge wheel arm. Store remaining machine bushings between gauge wheel arm and flat washer on outer side of gauge wheel arm.

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

LF212199-2



(RU113)

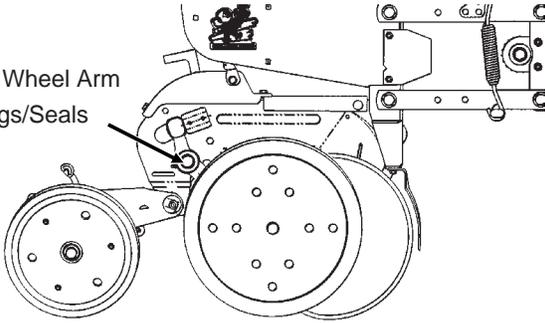


MAINTENANCE

GAUGE WHEEL ARM BUSHING AND/OR SEAL REPLACEMENT

(RU113)

Gauge Wheel Arm Bushings/Seals

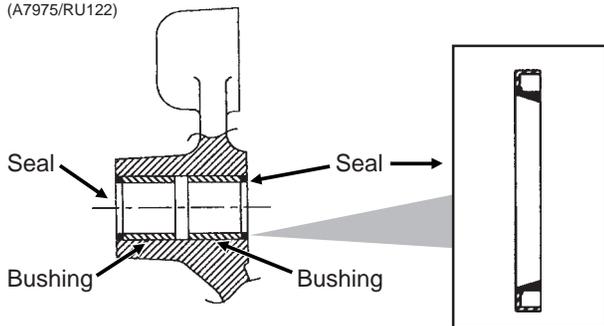


NOTE: A Gauge Wheel Arm Bushing And Seal Driver Kit (G1K296), for use in bushing and seal replacement, is available through your KINZE® Dealer.

To replace gauge wheel arm assembly bushing(s) and/or seal(s):

1. Remove gauge wheel from arm.
2. Remove the gauge wheel arm assembly from the shank assembly.
3. Remove seal and bushing and discard. Clean and dry inner bore.

(A7975/RU122)



4. Drive/press replacement bushing inside bore of arm to a depth of .125" below flush.
5. Coat wiping edge of seal with grease.
6. Drive/press seal into place with lip to the outside as shown above.

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

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

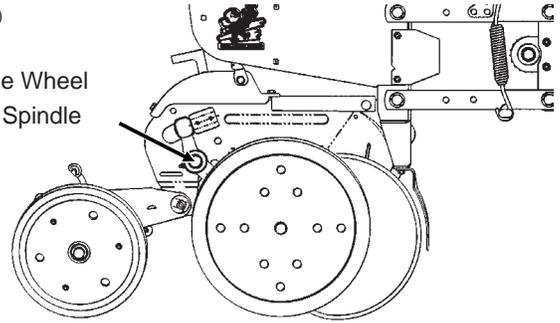
NOTE: Special machine bushing between gauge wheel arm and gauge wheel.

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

GAUGE WHEEL ARM PIVOT SPINDLE REPLACEMENT

(RU113)

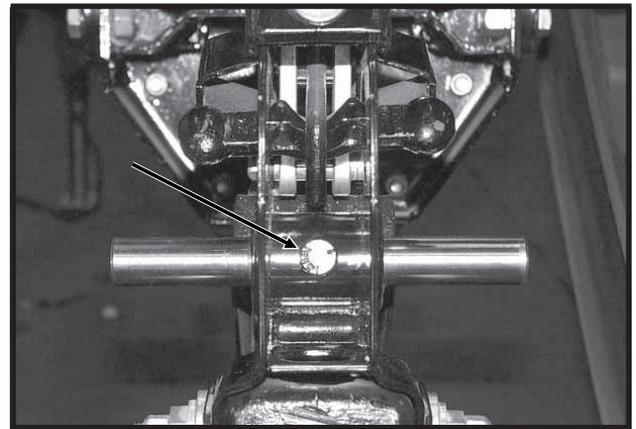
Gauge Wheel Pivot Spindle



To replace gauge wheel pivot spindle:

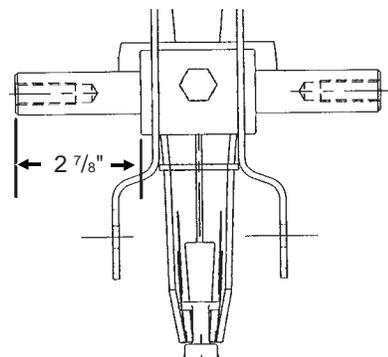
1. Remove the gauge wheel and arm assemblies from the shank assembly.
2. Remove 1/2" x 3/4" cap screw that locks the pivot spindle in place and remove the spindle.

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

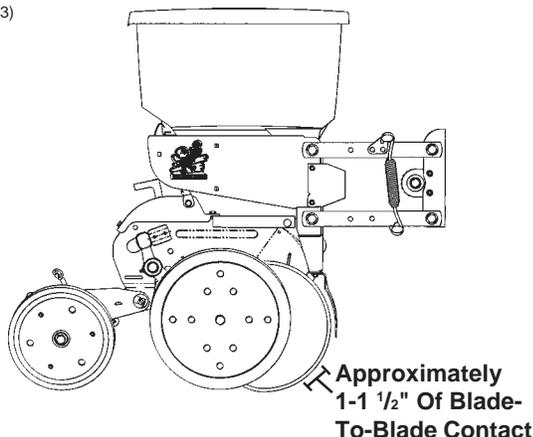
15" SEED OPENER DISC BLADE/ BEARING ASSEMBLY

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.

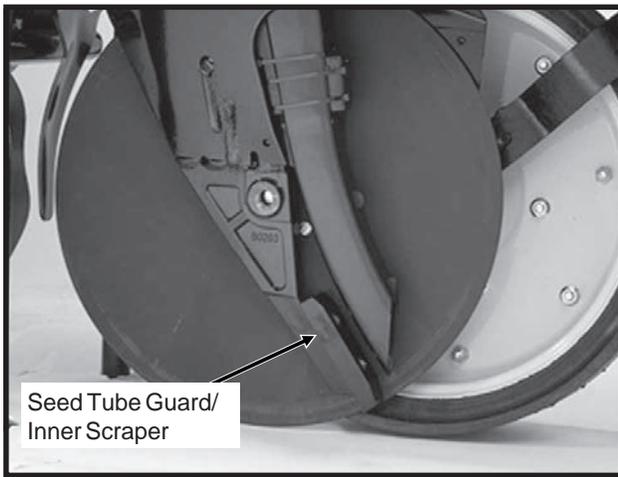
MAINTENANCE

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

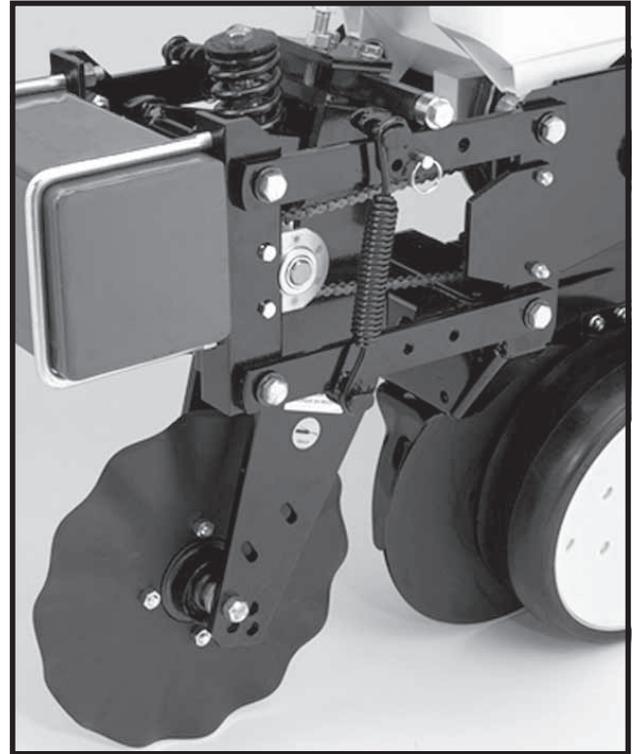
IMPORTANT: No till planting or planting in hard ground conditions, especially when the planter is not equipped with no till coulters, and/or excessive blade-to-blade contact will increase seed tube guard wear and necessitate more frequent inspection and/or replacement.

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.

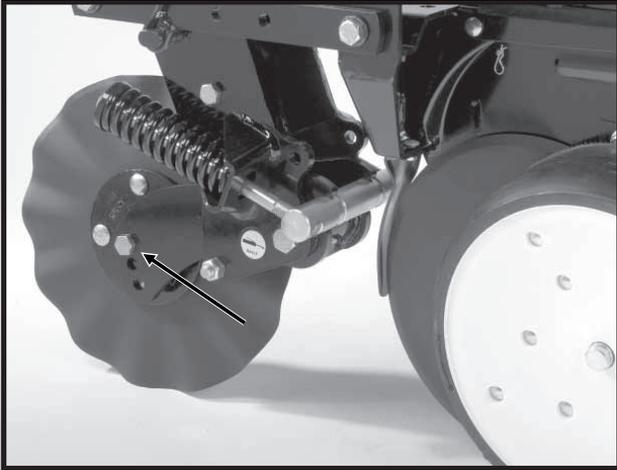
When the 16" diameter coulters blade (1" fluted, 1" bubbled or $\frac{3}{4}$ " fluted) is worn to a 14 $\frac{1}{2}$ " (maximum allowable wear), it should be replaced.

(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

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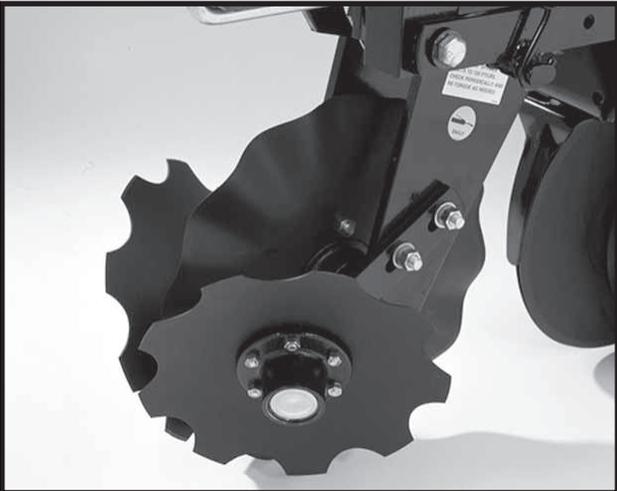
NOTE: Torque $\frac{5}{8}$ " spindle bolts to 120 ft. lbs.

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

When the 16" diameter coupler 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 Coupler)

LF212299-21

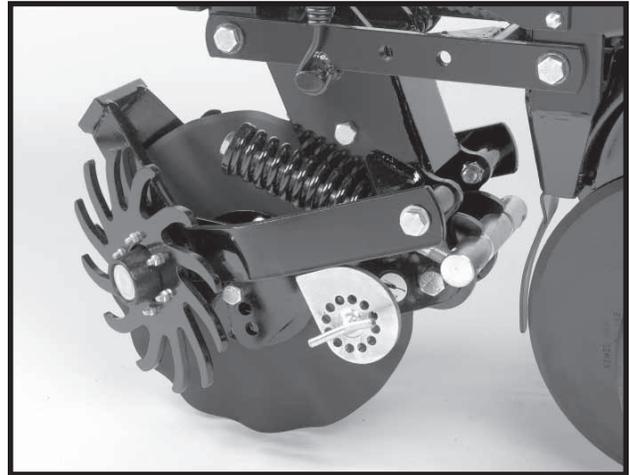


The blade hubs are equipped with sealed bearings. If bearings sound or feel rough when the blade is rotated, replace the bearings.

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 Coupler)

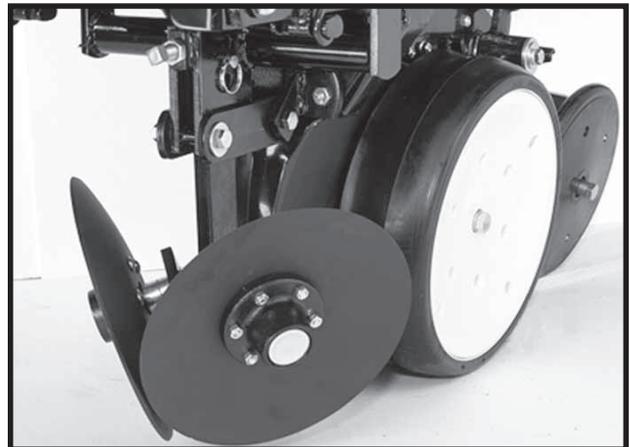
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The wheel hub is equipped with sealed bearings. If bearings sound or feel rough when the wheel is rotated, replace the bearings.

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.**

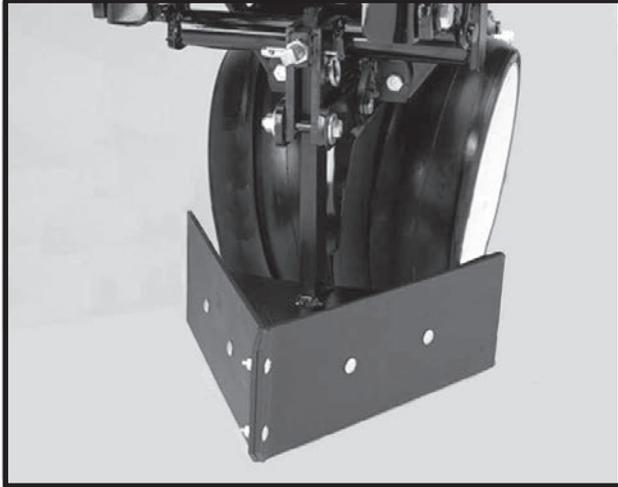
The blade hubs are equipped with sealed bearings. If bearings sound or feel rough when the blade is rotated, replace the bearings.

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

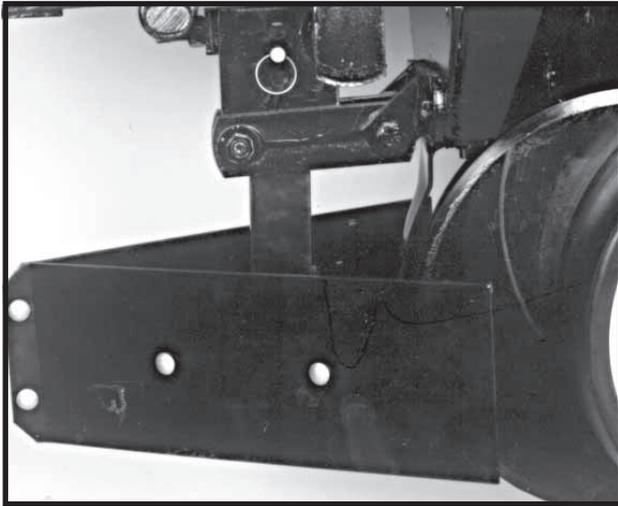
MAINTENANCE

ROW UNIT MOUNTED BED LEVELER

LF212299-25a



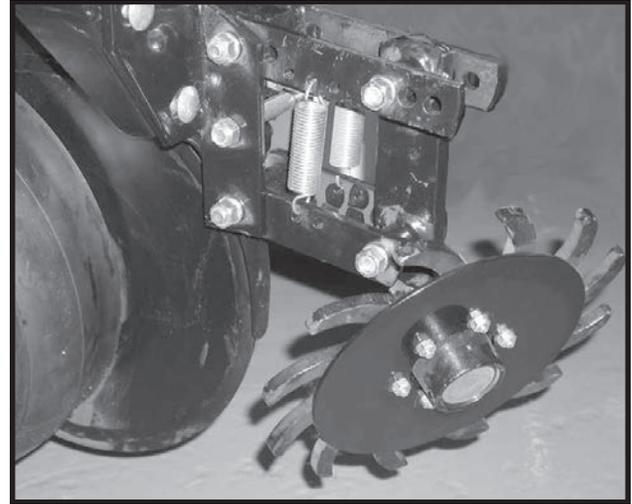
59386-26



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

ROW UNIT MOUNTED RESIDUE WHEEL

D101701113

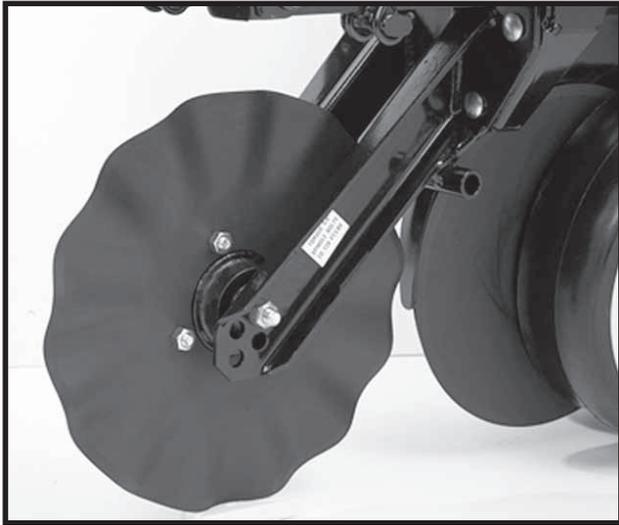


The wheel hub is equipped with sealed bearings. If bearings sound or feel rough when the wheel is rotated, replace the bearings.

MAINTENANCE

ROW UNIT MOUNTED NO TILL COULTER

LF212299-19a



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

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

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

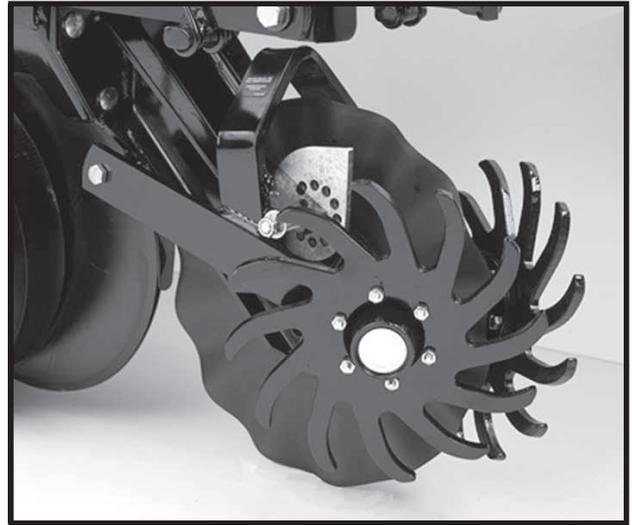
The coulters blade can be adjusted to one of four settings. Initially the blade is set in the highest position. As the blade wears it can be adjusted to one of the three lower settings. See "Row Unit Mounted No Till Coulters" in Row Unit Operation Section of this manual.

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

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

COULTER MOUNTED RESIDUE WHEELS

LF212299-23



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

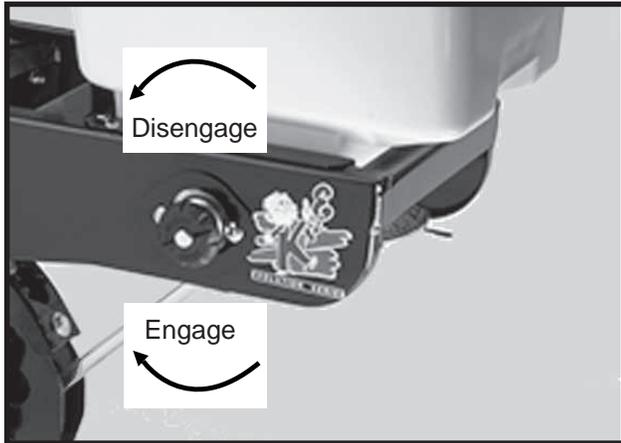
MAINTENANCE

GRANULAR CHEMICAL ATTACHMENT

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

Install hoppers and chains. Check chain alignment.

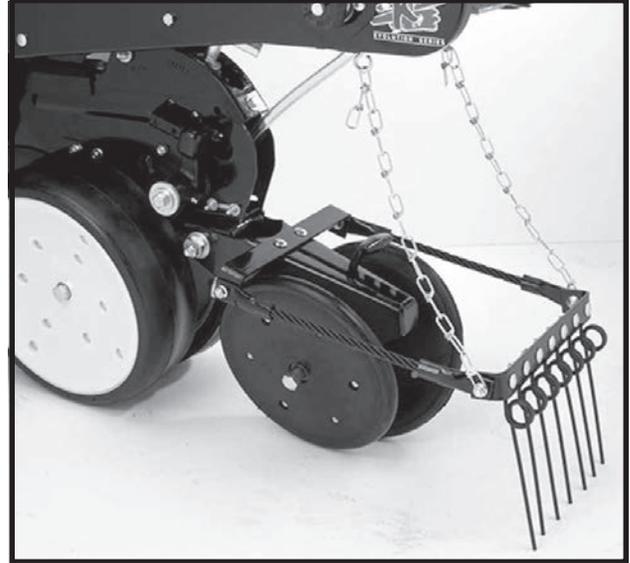
LF212299-4



SPRING TOOTH INCORPORATOR

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

LF212299-26



MAINTENANCE

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

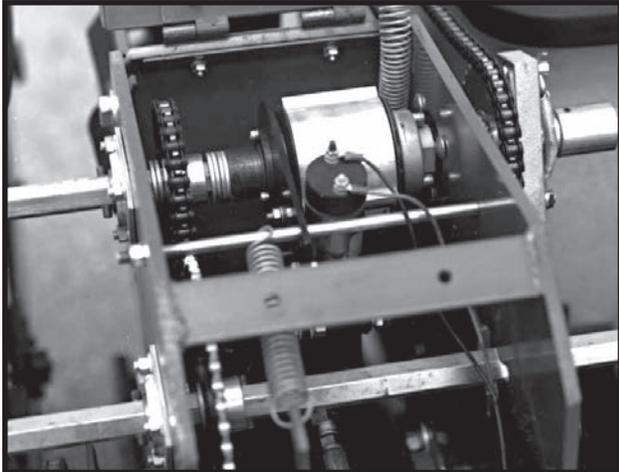
PROBLEM	POSSIBLE CAUSE	SOLUTION
Single sensor communication alarm comes on (alarm on with no bar graph and a flashing row number on a single row).	Faulty seed tube sensor.	Replace sensor.
	Break in the harness just before the seed tube sensor.	Inspect for break in harness and repair. If break can't be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

POINT ROW CLUTCH INSPECTION

The point row clutch is permanently lubricated and sealed and requires no periodic maintenance.

76740-2



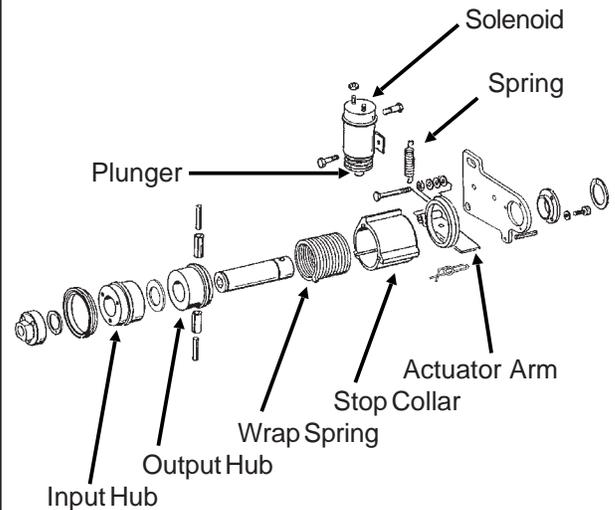
The right hand clutch operates clockwise and the left hand clutch operates counterclockwise. Therefore, some of the parts of the clutch such as the wrap spring differ from one side of the planter to the other. Be sure to use the correct repair part if a clutch must be repaired.

NOTE: The point row clutch input shaft on the R.H. side of the machine will have an "L" stamped on it and the shaft on the L.H. side of the machine will have an "R" stamped on it.

If the clutch or clutches fail to operate, first determine if the problem is electrical or mechanical. Place the operational switch in the RIGHT or LEFT position. When the switch is in the RIGHT or LEFT position and the fuse on the rear of the control console is in working condition, the red indicator light on the control console should be lighted. If light does not come on, check the fuses on the front of the control console. See "Point Row Clutch Troubleshooting" chart. If fuses are not blown, check the clutch and wiring harness for power with a test light or volt meter. If the solenoid is operating properly, the plunger on the solenoid will retract causing a clicking sound. The plunger will also be magnetized which can be checked by touching the plunger with a metal object.

NOTE: Always replace fuse with proper size and type when replacing fuse. Use MDL 10 amp slow blow fuse on front of control console.

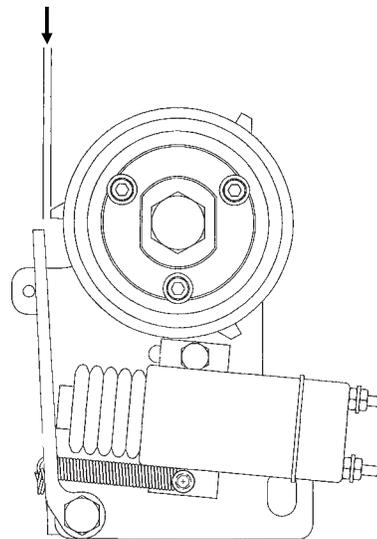
(TWL70c)



(A7110)

ACTUATOR ARM ADJUSTMENT

NOTE: Gap between actuator arm and stop on stop collar should be $\frac{1}{8}$ " ($\pm \frac{1}{32}$ ") when the solenoid is NOT engaged.



NOTE: To adjust gap between actuator arm and stop, loosen nut on mounting pin and move pin in slot until there is $\frac{1}{8}$ " ($\pm \frac{1}{32}$ ") gap between arm and stop on stop collar. Retighten nut.

MAINTENANCE

POINT ROW CLUTCH TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Neither clutch will disengage.	Main fuse blown in control console.	Replace defective fuse.
	Poor terminal connection in wiring harness.	Repair or replace.
	Wiring damage in wiring harness.	Repair or replace.
	Low voltage at coil. (12 volts required)	Check battery connections.
One side of planter will not re-engage.	Shear pin in seed drive transmission sheared.	Replace with one of equal size and grade.
One clutch will not engage.	Fuses blown.	Replace defective fuses.
	Actuator arm and plunger stuck in disengaged position.	Remove, free up and reinstall.
	Actuator arm out of adjustment.	Adjust actuator arm mounting pin in slot so that actuator arm clears stop on stop collar by approximately 1/8" when clutch is rotated.
	Wrap spring broken or stretched.	Disassemble clutch and replace spring.
	Something touching the stop collar.	Check to ensure collar is free to turn with clutch.
	Clutch assembled incorrectly.	Check clutch and diagram for correct assembly.
	Clutch slipping.	Wrap spring stretched.
Planter will not re-engage while planter is moving forward.	Spring in actuator arm not strong enough to push arm away from stop collar when operational switch is turned to the ON position.	Remove spring and str spring slightly or replace. Reinstall spring. If that fails, file the stop on the stop collar slightly so that the stop is not as aggressive.
Frequent solenoid burnout.	Fuses too large.	Replace fuses on front panel with 10 amp slow blow fuses.
Frequent fuse burnout.	Low voltage (12 volts required).	Check power source voltage for partially discharged battery, etc.
	Damage to wiring harness.	Locate damage and repair or replace harness.
Clutch or clutches will not disengage.	Input and output shafts out of alignment.	Align input and output shafts to prevent drag.
	Input or output shaft is pushed in too far creating a coupler.	Reposition input and output shafts.

MAINTENANCE

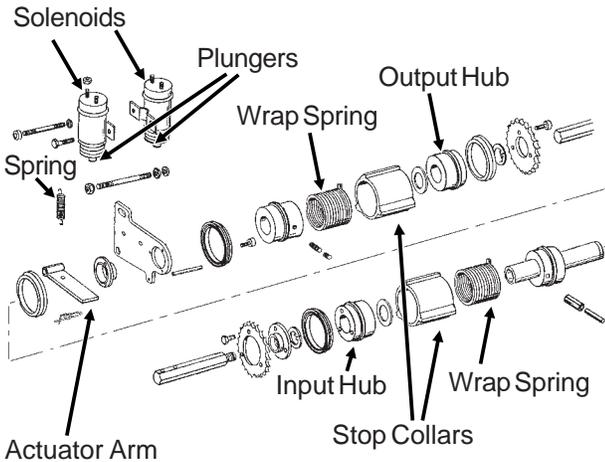
TWO-SPEED POINT ROW CLUTCHES

Optional On 8, 12 And 16 Row

The two-speed point row clutch is similar in design and operation to the standard point row clutch except for the two-speed function. If a two-speed clutch or clutches fail to operate properly, refer to “Point Row Clutch Inspection” and “Point Row Clutch Troubleshooting” for additional information.

NOTE: If the “Reduced Rate/Full Rate” functions fail to engage or disengage, see troubleshooting chart for possible cause.

(FF47b)



RELIEF VALVE (Located On Hitch)

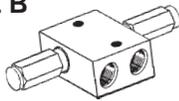
8, 12 And 16 Row If Applicable

(TWL148/TWL171)

STYLE A



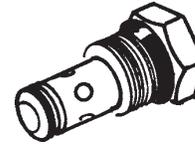
STYLE B



The relief valve pressure is preset and is not adjustable.

CHECK VALVE

(TWL30)



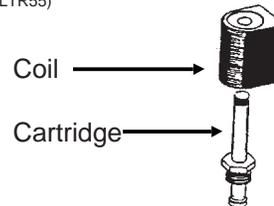
The check valves, located in the valve block on the right side of the center post, trap oil flow in the planter’s lift system to keep the toolbar level during field operation. Consult your KINZE® Dealer for service.

SOLENOID VALVE INSPECTION

The solenoid valve consists of a chambered body containing a cartridge valve which is activated by an electrical coil.

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

VVB019(PLTR55)



SOLENOID VALVE TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
None of the solenoids will operate.	Low voltage.	Must be connected to 12 volt DC only. Negative ground.
	Blown fuse.	Replace fuse in control console on tractor with AGC-15 amp only.
	Battery connection.	Clean and tighten.
	Wiring harness damaged.	Repair or replace.
One solenoid valve will not operate.	Bad switch.	Replace on control panel.
	Cut wire in harness.	Locate and repair.
	Bad coil.	Replace.
	Poor connection at coil.	Check.
Valve operating when not energized.	Valve stem stuck open.	Replace cartridge.
	O-ring leaking.	Install new O-ring kit.
	Foreign material under poppet.	Remove cartridge and clean.

MAINTENANCE

FLOW CONTROL VALVE INSPECTION

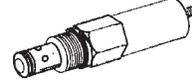
VVB020(TWL28)



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

PRESSURE RELIEF VALVE INSPECTION

VVB020(TWL29)



If the pressure relief valve fails to release the tongue lock or function properly, remove the valve from the valve block and check for foreign material or check to see if the O-ring is leaking internally. Replace if found to be defective.

LIFT CIRCUIT TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Right wing raises faster than left wing. The right wing may even raise completely before the center frame and left wing start to raise. If the planter is loaded, the center frame and left wing may not be able to raise at all.	Master cylinder, located on front side of center post, leaking internally. NOTE: Make sure the lift system is completely rephased.	Repair master cylinder.
Left wing raises faster than right wing. The left wing may even raise completely before the center frame and right wing start to raise. If the planter is loaded, the center frame and right wing may not be able to raise at all.	Master cylinder, located on rear side of center post, leaking internally. NOTE: Make sure the lift system is completely rephased.	Repair master cylinder.
Center frame will raise, but wings do not.	Planter hydraulic circuit out of phase. Usually occurs when the planter is lowered from transport position. Solenoid valve in port V16 leaking.	Hold hydraulic lever in lowering position to give the hydraulic circuit more time to rephase. Replace solenoid valve cartridge.
Center frame will continue to raise after the wing cylinders have reached full stroke when going to raised field position.	Solenoid valve in port V16 leaking.	Replace solenoid valve cartridge.
Planter will raise to raise field position, but will not raise to transport position.	Solenoid valve coil in port V16 is not energized.	Be sure control console switch is in "raise" position to energize solenoid coil in port V16. Check control console fuse by moving auxiliary switch to ON position. If red light comes on the fuse is OK. Return auxiliary to OFF position. Check for poor wire connection or damaged wire and repair. Solenoid valve coil is defective. All solenoid valves used on the planter are the same. Switch the solenoid coil with one you know is working. If this cures the problem, replace defective coil.

MAINTENANCE

LIFT CIRCUIT TROUBLESHOOTING (Continued)

PROBLEM	POSSIBLE CAUSE	SOLUTION
(Continued) Planter will raise to raised field position, but will not raise to transport position.	Solenoid valve cartridge in port V16 is stuck closed.	All solenoid valves used on the planter are the same. Switch the solenoid cartridge with one you know is working. If this cures the problem, replace defective cartridge.
Left wing lowering slower than center frame and right wing. If hydraulic lever is held in lowering position, the left wing cylinder will attempt to extend.	Check valve in port V17 leaking internally.	Remove check valve in port V17 and inspect for foreign material in valve and remove if possible. Replace check valve. If above fails, switch check valve in port V17 with check valve in port V15. If problem moves or switches to right wing, replace defective check valve.
Right wing lowering slower than center frame and left wing. If hydraulic lever is held in lowering position, the right wing cylinder will attempt to extend.	Check valve in port V15 leaking internally.	Remove check valve in port V15 and inspect for foreign material in valve and remove if possible. Replace check valve. If above fails, switch check valve in port V15 with check valve in port V17. If problem moves or switches to right wing, replace defective check valve.
Planter will not raise or raises slowly.	Tractor may have hydraulic problem.	Switch remote outlets being used. Repair tractor hydraulics.
	Planter may be overloaded with hopper extensions and/or extra fertilizer tanks, coulters or other non-KINZE® attachments.	Remove weight.
	Center pivot wear pads may be adjusted too tight and are binding on the post.	Adjust pads.
	Relief valves on hitch leaking. Valves should hold 2500 PSI (± 50).	Remove and inspect relief valve cartridge. Check for blown O-rings. Replace bad cartridge.
Planter will not rephase.	All cylinders not completely retracted. Caused by mechanical interference on or between planter frame and wheel lift module.	Remove interference.
	Center cylinders not retracting completely.	Lower planter and hold hydraulic lever in lower position to rephase system. Lower cylinder pins must be free to rotate in this position. If pins are tight, adjust cylinder clevises

MAINTENANCE

TONGUE CYLINDER CIRCUIT TROUBLESHOOTING

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

MAINTENANCE

ROTATION CYLINDER CIRCUIT TROUBLESHOOTING

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

WING LOCK CYLINDER CIRCUIT TROUBLESHOOTING

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

MAINTENANCE

ROW MARKER OPERATION TROUBLESHOOTING

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

MAINTENANCE

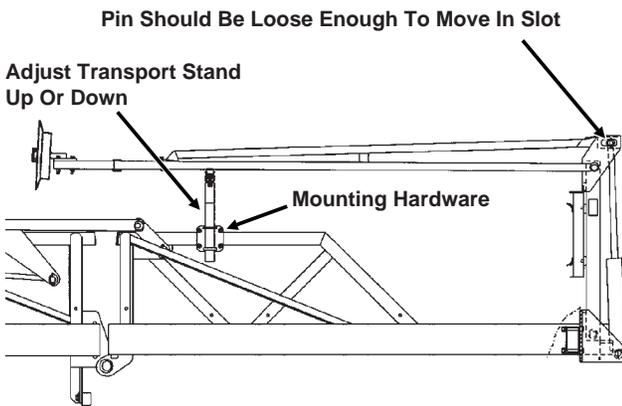
ROW MARKER TRANSPORT STAND ADJUSTMENT (12 And 16 Row Only)

It is critical that the row marker transport stands are adjusted correctly to allow the marker cushion cylinders to function properly.

To adjust the transport stands:

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

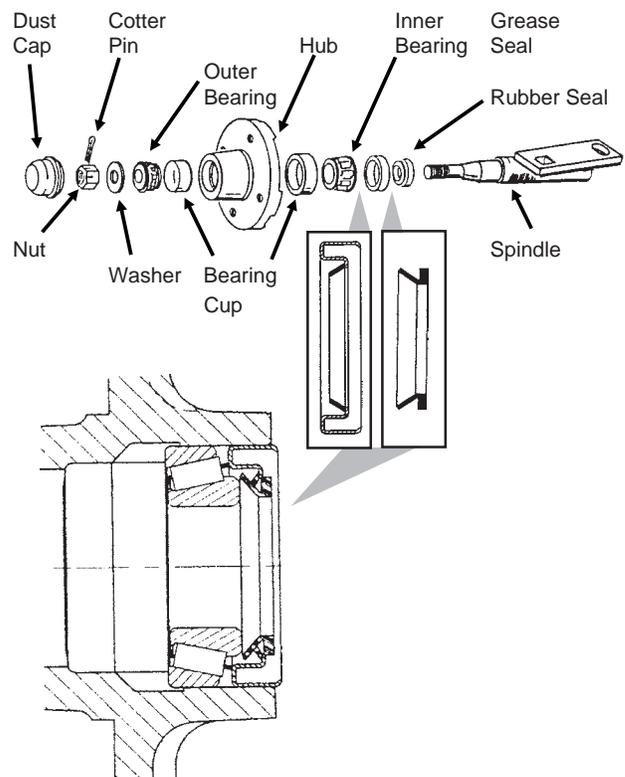
A7102-1(TWL104)



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)



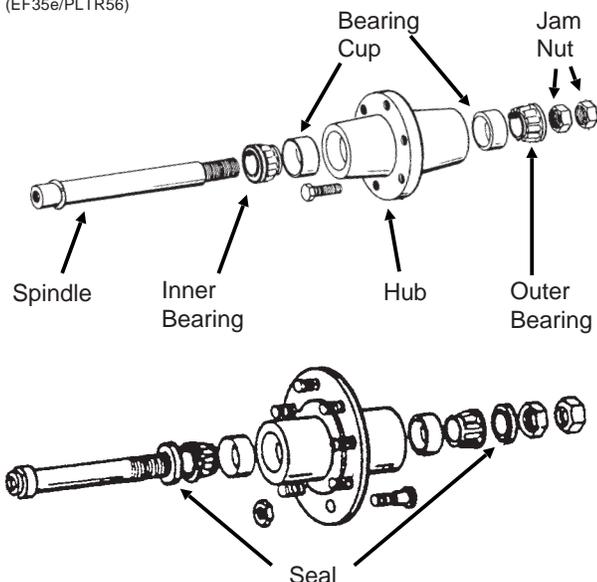
MAINTENANCE

WHEEL BEARING LUBRICATION OR REPLACEMENT

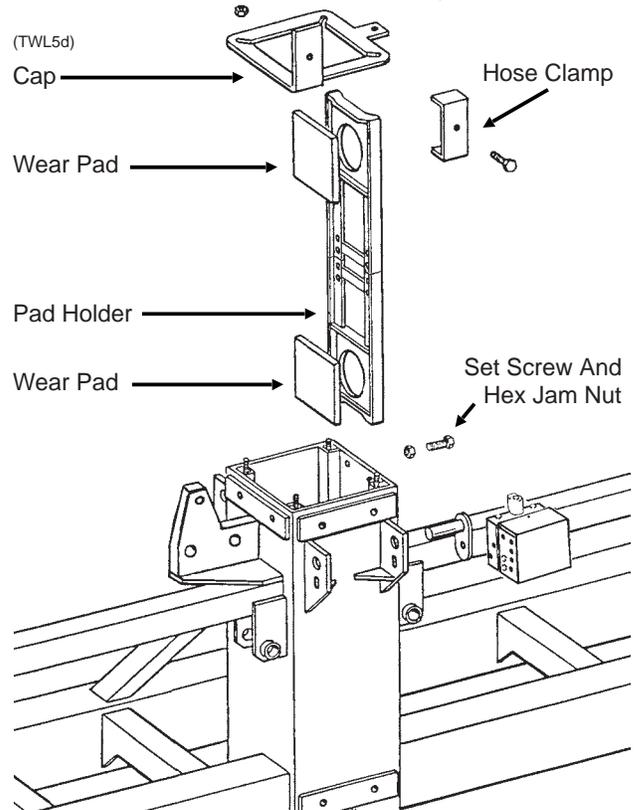
NOTE: Each transport wheel hub is equipped with a grease fitting for lubrication. The below procedure is used only for bearing replacement.

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

(EF35e/PLTR56)



WEAR PAD REPLACEMENT AND ADJUSTMENT



The center section of the planter consists of a steel tubular frame equipped with four wear pad assemblies which travel up and down against a stainless steel clad center post. Each wear pad assembly consists of a pad holder and two wear pads. The wear pads are held in place by the pad holder and adjusted and locked in adjustment by $\frac{3}{4}$ " set screws and hex jam nuts.

Check pad adjustment and wear annually. Replace any broken or missing adjustment set screws.

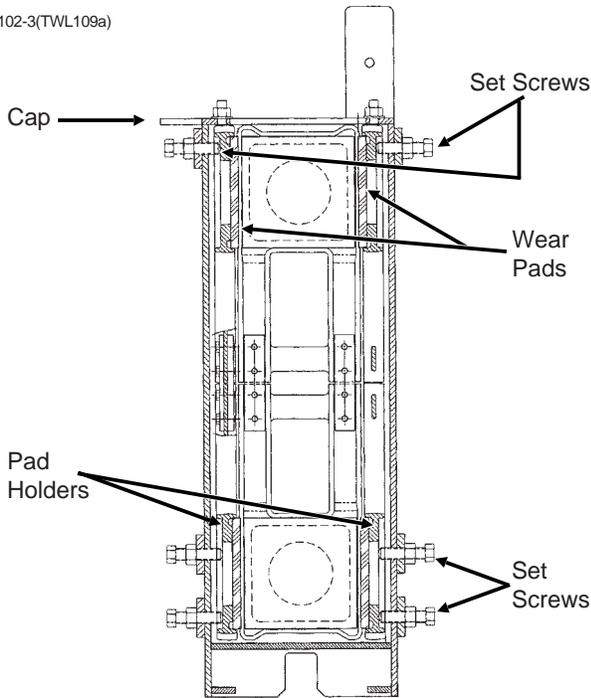


WARNING: Always install all safety lockup devices and safety lock pins before working under the unit.

To check adjustment and wear, park the planter on a level surface. Raise the planter to the raised field position. Visually check the four upper adjustable wear pads. Each wear pad should lightly contact the stainless steel clad center post. The maximum allowable gap between the plastic wear pad and the stainless steel post, when checked using a thickness gauge, should be no more than .060". Raise the planter to the raised transport position, install all safety lockup devices and visually check the four lower adjustable wear pads. Maximum allowable gap on the lower pads is also .060".

MAINTENANCE

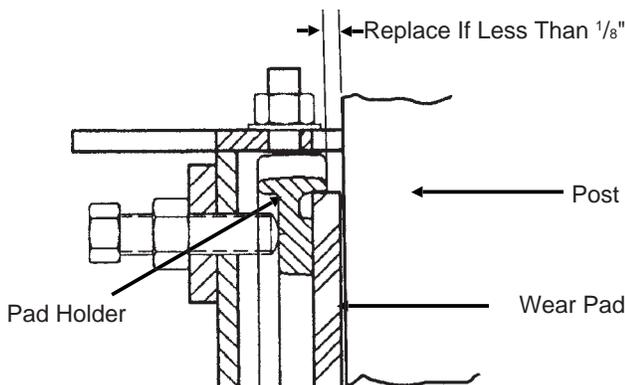
A7102-3(TWL109a)



If adjustment is necessary proceed as follows: (a) Lower the planter to field operation position. It may be necessary to the loosen cap mounting nuts to allow wear pad adjustment. (b) Loosen the necessary hex jam nuts. (c) Tighten set screws until the wear pad lightly contacts the stainless steel clad center post. **DO NOT OVER TIGHTEN.** (d) Tighten hex jam nuts. (e) Recheck clearance. If clearance is not to specifications, repeat adjustment steps. (f) Torque hex jam nuts to 130 ft. lbs. Tighten cap mounting hardware if applicable.

NOTE: If exposed wear pad is worn to less than 1/8" as shown below, replace the wear pad.

(TWL149a)

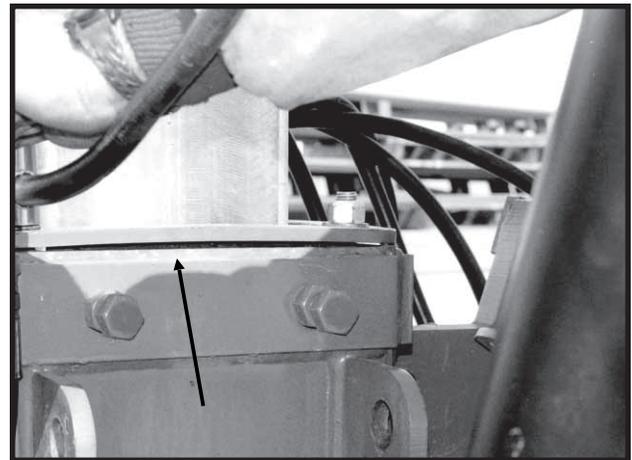


If replacement is necessary proceed as follows: (a) Lower the planter to field operation position. (b) Remove the four 5/8" nuts and remove the cap from the top of the center post. It will be necessary to remove the hose clamp first. (c) Remove the sixteen 3/4" hex jam nuts and set screws which lock the wear pads in place, and slide the four wear pad holders with wear pads out of the top of the center post. (d) Place a minimal amount of heavy grease in pad holder prior to installing pad to hold pad in place during installation. (e) Reinstall the wear pad assembly. (f) Apply an anti-seize lubricant to set screw threads. Hand tighten set screw until the wear pad lightly contacts the stainless steel clad center post.

IMPORTANT: DO NOT OVER TIGHTEN WEAR PADS. OVER TIGHTENING WILL CAUSE PREMATURE WEAR AND/OR BINDING ON POST.

(g) Install and torque hex jam nuts to 130 ft. lbs. (h) Position the center post cap over the studs and torque the nuts evenly alternating between studs. Tighten the nuts until the cap is distorted as shown in the photo below.

10249620a



MAINTENANCE

PISTON PUMP STORAGE

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

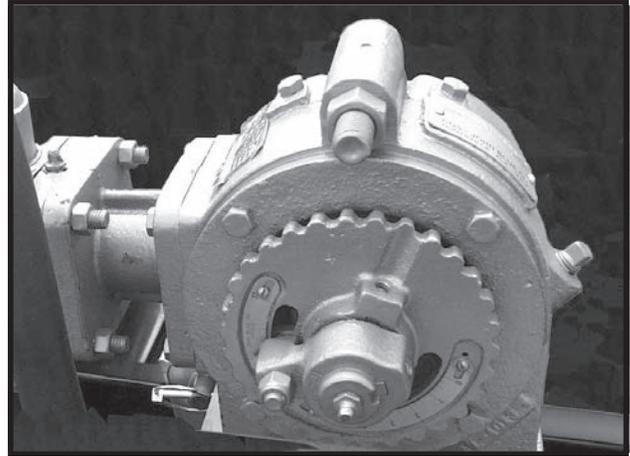
Overnight Storage

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

Winter Storage

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

D071504102a



MAINTENANCE

PISTON PUMP TROUBLESHOOTING

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

MAINTENANCE

PREPARATION FOR STORAGE

Store the planter in a dry sheltered area if possible.

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

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

Lubricate planter and row units at all lubrication points.

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.

Disassemble, clean and grease all U-joint slides.

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.

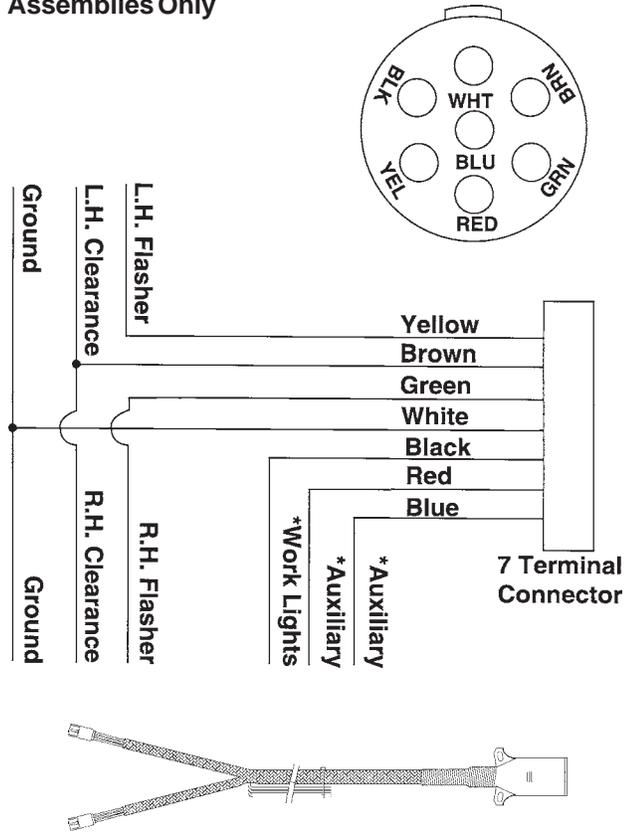
Empty dry fertilizer hoppers. Clean hoppers. Disassemble and clean metering augers. Reassemble, coating all metal parts with rust preventative.

MAINTENANCE

ELECTRICAL WIRING DIAGRAM FOR LIGHT PACKAGE

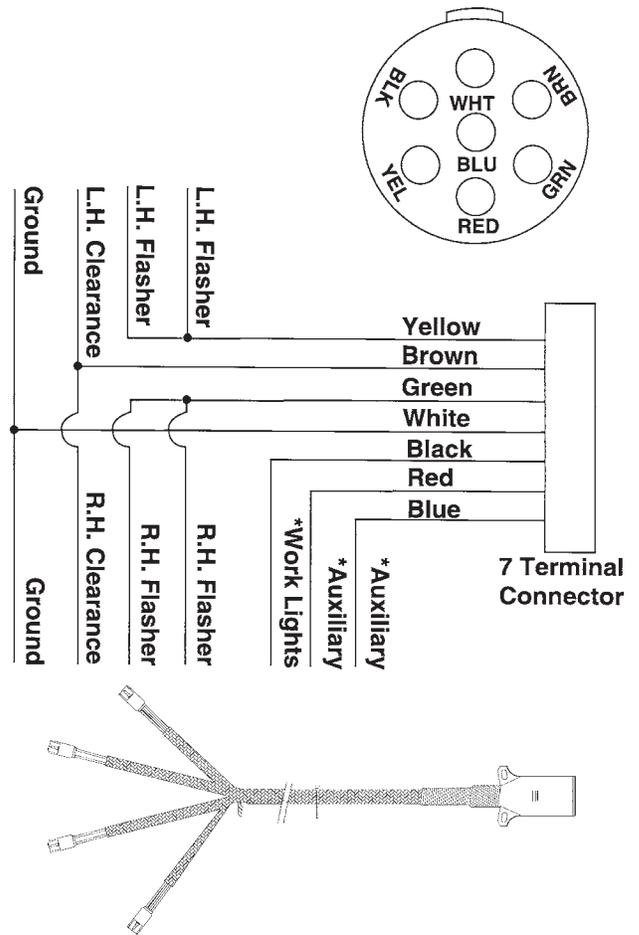
(WGN66a/A9202)

STYLE A - Machines Equipped With Double Light Assemblies Only



(WGN66b/A9201)

STYLE B - Machines Equipped With Single And Double Light Assemblies



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

Light package supplied on the Model 3600 Twin-Line® Planter meets ASAE Standards. For the correct wiring harness to be wired into the lights on your tractor, check with the tractor manufacturer.

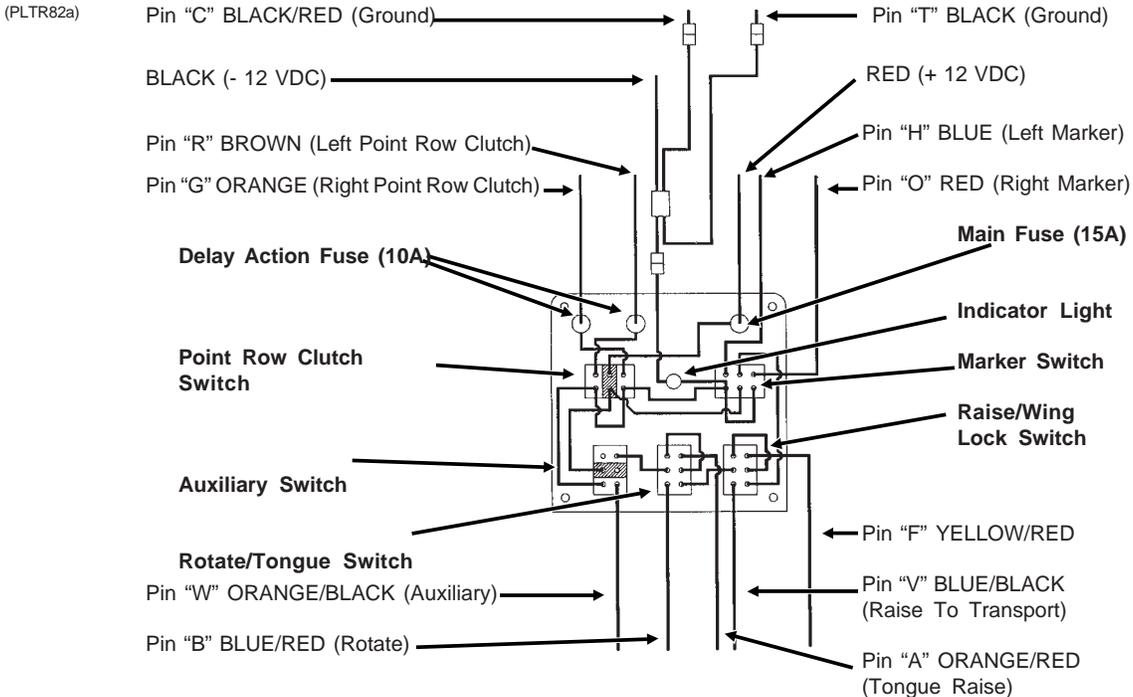
69922-35



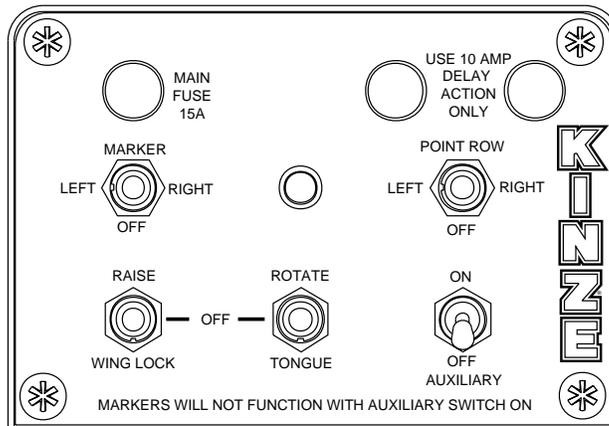
MAINTENANCE

ELECTRICAL CONTROL CONSOLE SCHEMATIC

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



(INS238)



NOTE:

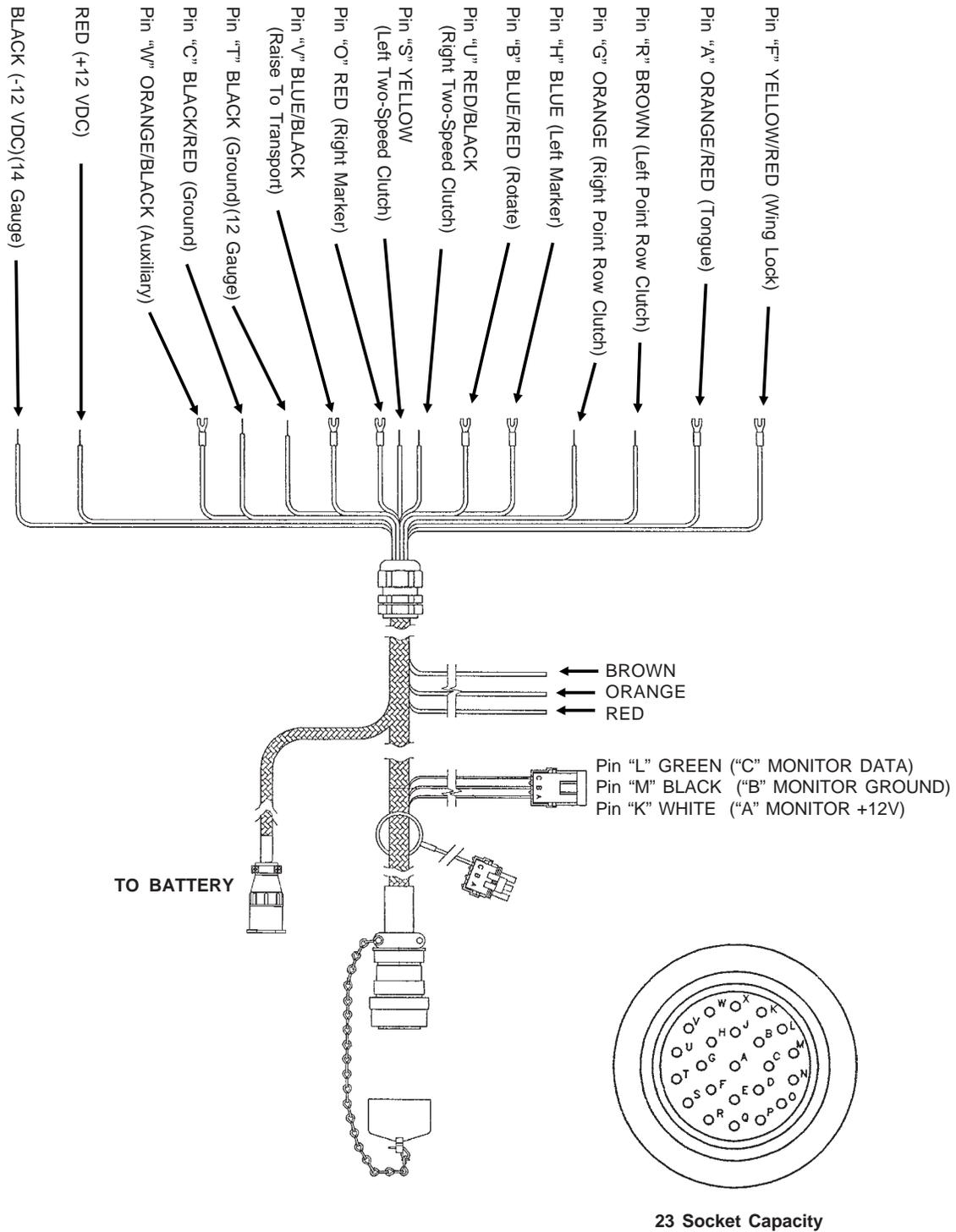
1. Operating marker or point row switch in either direction lights panel light.
2. Point row clutch switch operates independently of the rest of the control box.
3. Power to the marker switch is fed through the auxiliary switch and the two transport function switches. Operating any of the switches in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

See page 9-37 for electrical control console schematic and wiring harness to two-speed point row clutch solenoids for planter equipped with the optional Two-Speed Point Row Clutch Package.

MAINTENANCE

ELECTRICAL WIRING HARNESS SCHEMATIC (On Tractor)

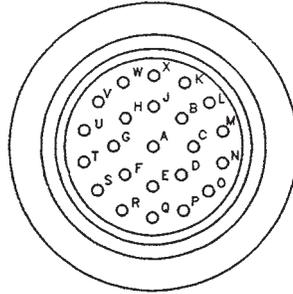
(ELC10c/ELC13)



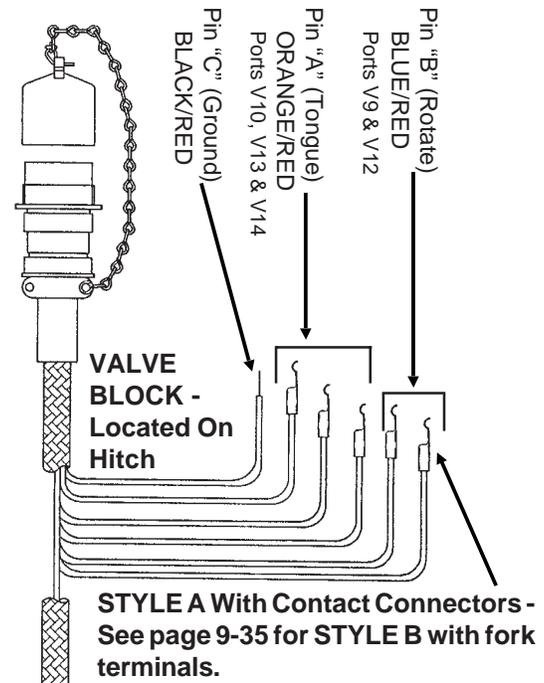
MAINTENANCE

ELECTRICAL WIRING HARNESS SCHEMATIC (On Planter)

(ELC13/ELC12/TWL71)

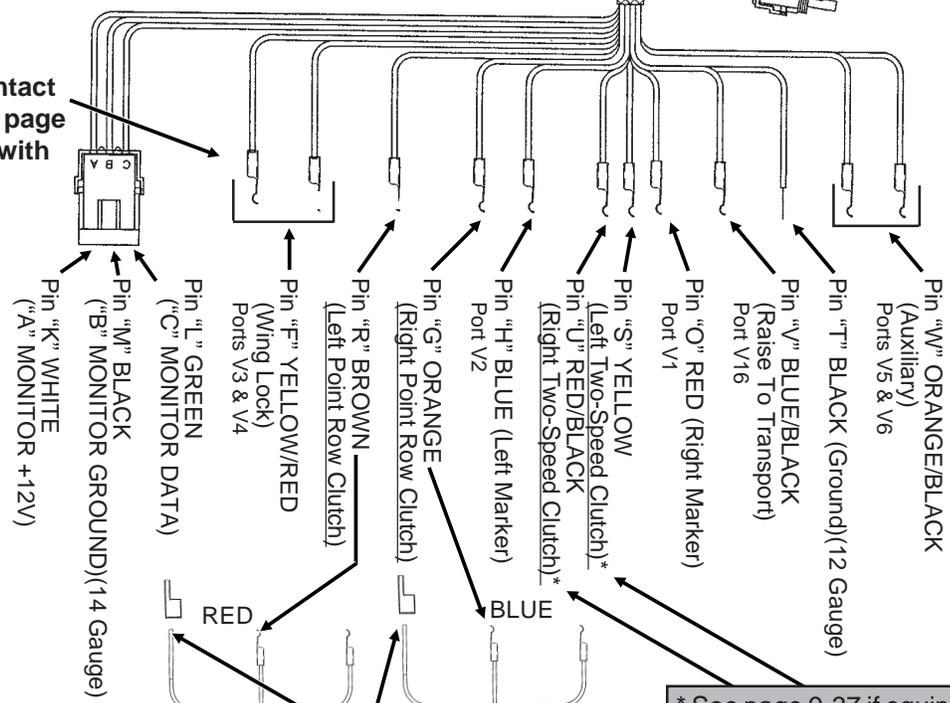


23 Pin Capacity



VALVE BLOCK - Located On Rear Center Frame

STYLE A With Contact Connectors - See page 9-36 for STYLE B with fork terminals.



NOTE: STYLE A With Fork Terminals And Contact Connectors Shown - STYLE B Will Have Fork Terminals Only

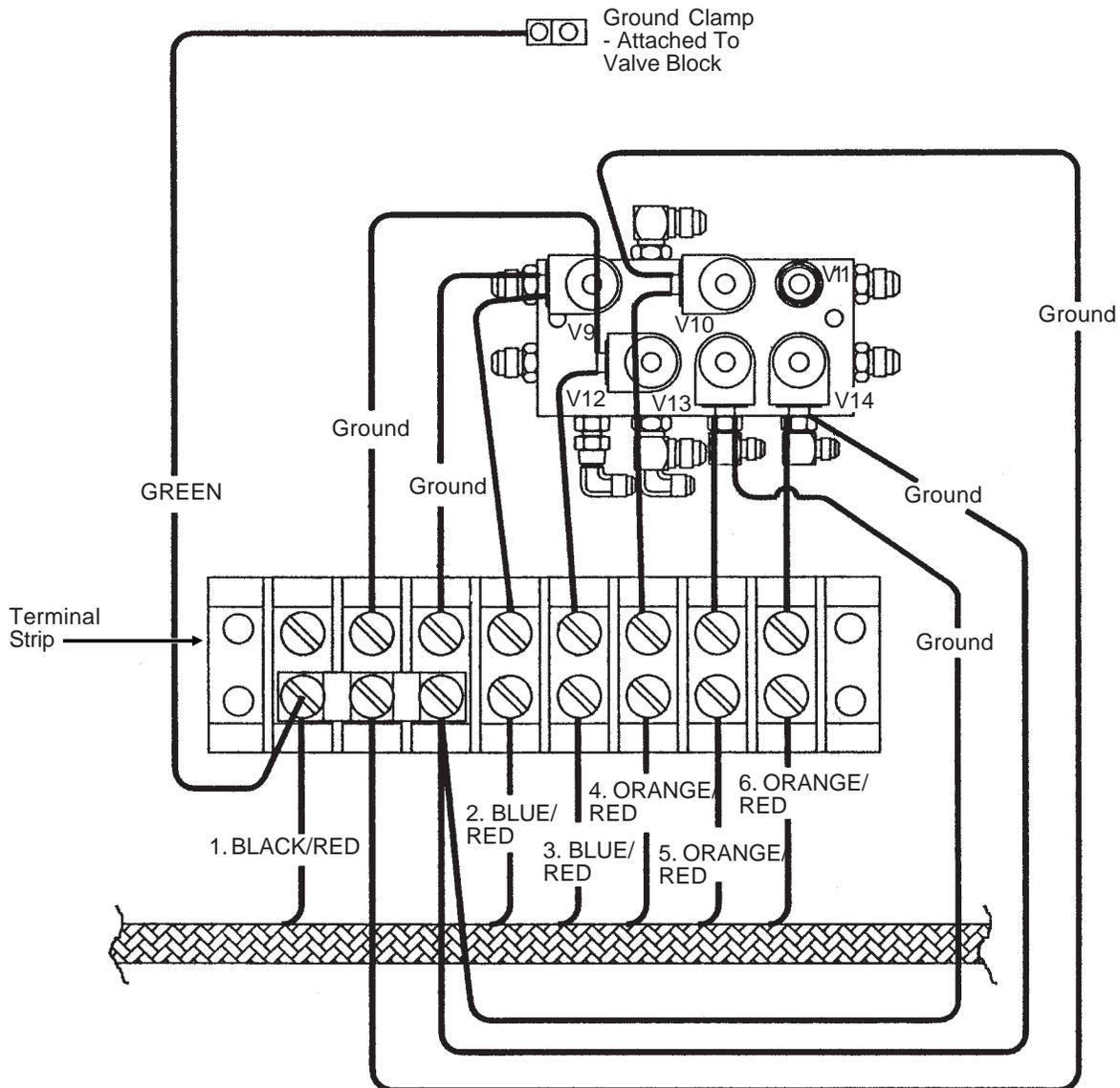
*** See page 9-37 if equipped with the optional Two-Speed Point Row Clutch Package.**

MAINTENANCE

(A7012a)

VALVE BLOCK - Located On Hitch

STYLE B With Fork Terminals And Terminal Strip -
See page 9-34 for STYLE A with contact connectors.



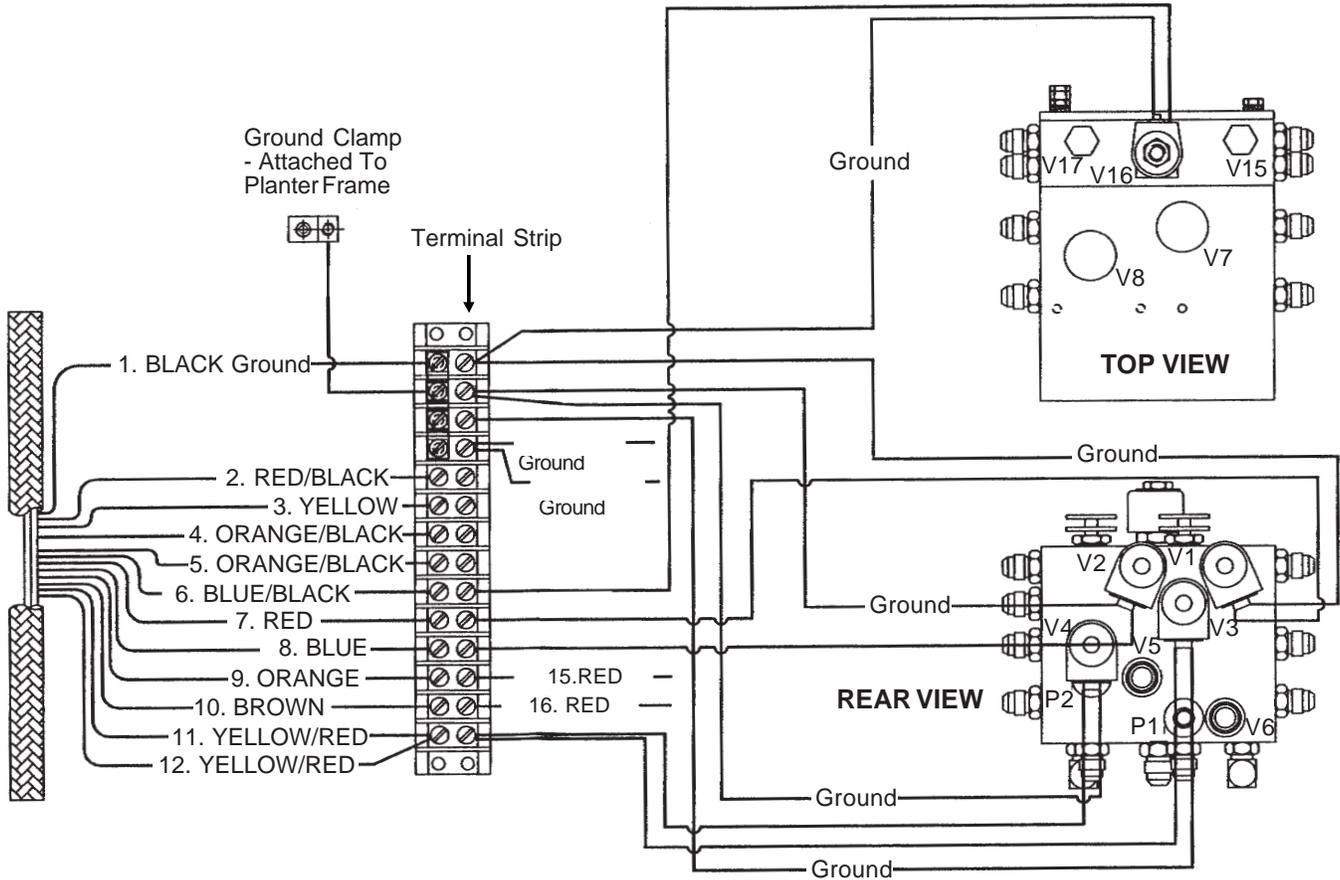
1. BLACK/RED - Pin "C" (Ground)
2. BLUE/RED - Pin "B" (Rotate) - Port V9
3. BLUE/RED - Pin "B" (Rotate) - Port V12
4. ORANGE/RED - Pin "A" (Tongue) - Port V10
5. ORANGE/RED - Pin "A" (Tongue) - Port V13
6. ORANGE/RED - Pin "A" (Tongue) - Port V14

MAINTENANCE

(A7102a)

VALVE BLOCK - Located On Rear Center Frame

**STYLE B With Fork Terminals And Terminal Strip -
See page 9-34 for STYLE A with contact connectors.**

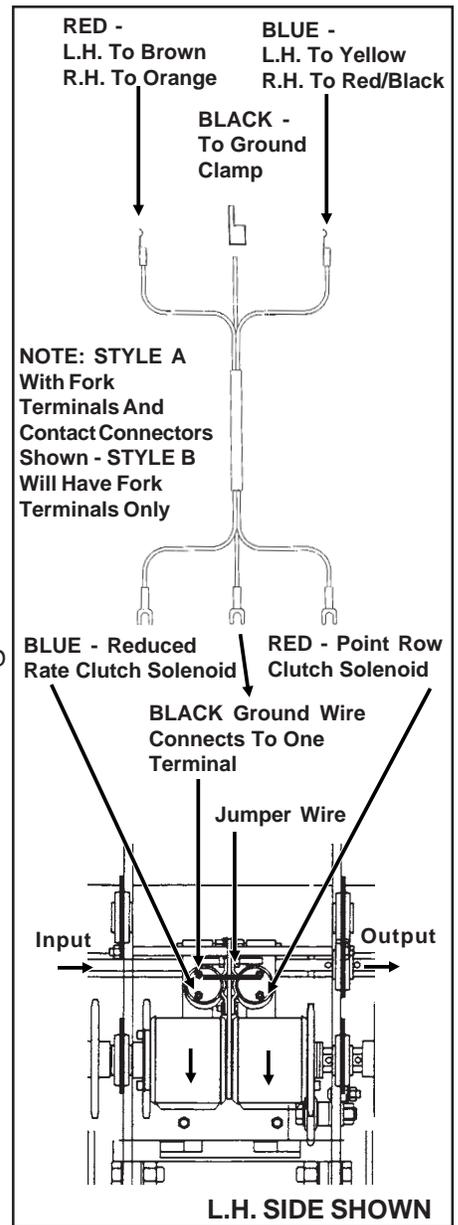
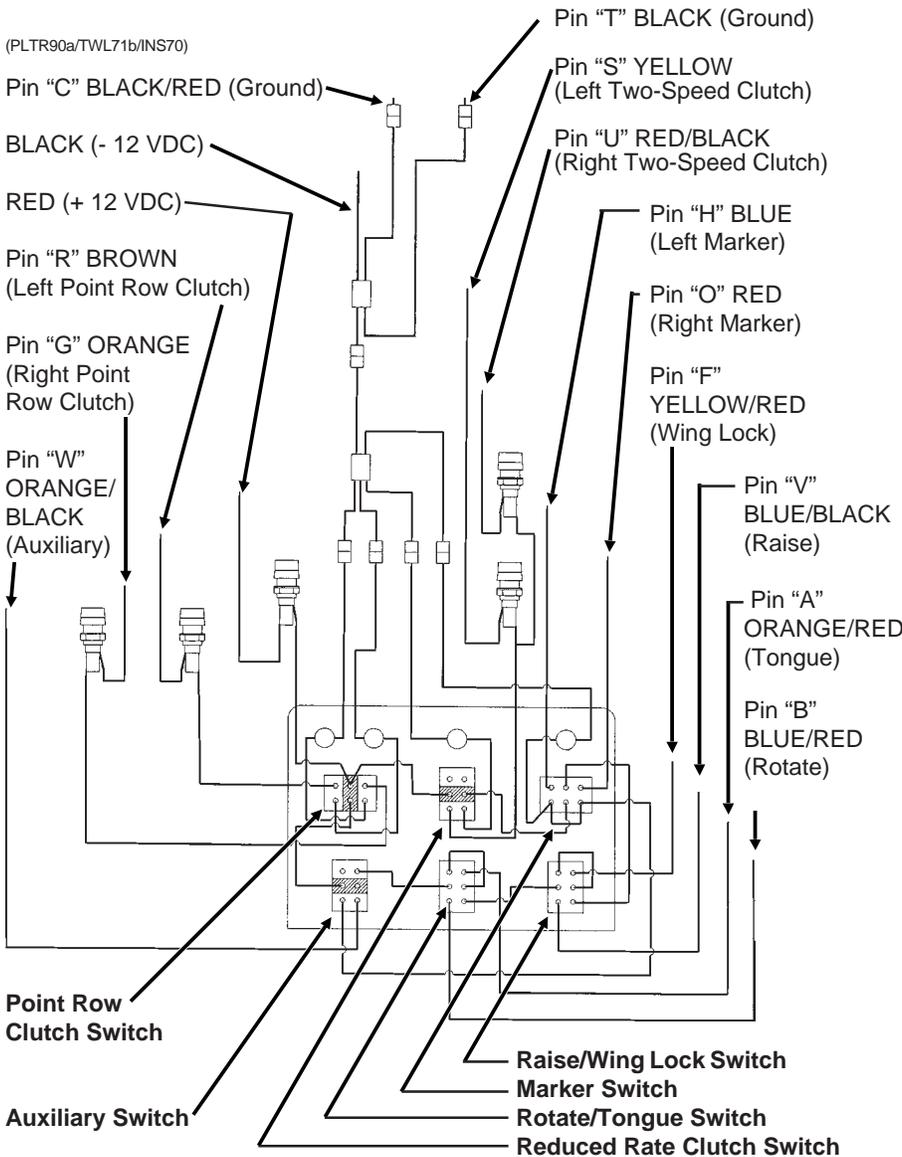


1. BLACK - Pin "T" (Ground)
2. RED/BLACK - Pin "U" (Right Two-Speed Clutch)*
3. YELLOW - Pin "S" (Left Two-Speed Clutch)*
4. ORANGE/BLACK - Pin "W" (Auxiliary) - Ports V5 & V6
5. ORANGE/BLACK - Pin "W" (Auxiliary) - Ports V5 & V6
6. BLUE/BLACK - Pin "V" (Raise To Transport) - Port V16
7. RED - Pin "O"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

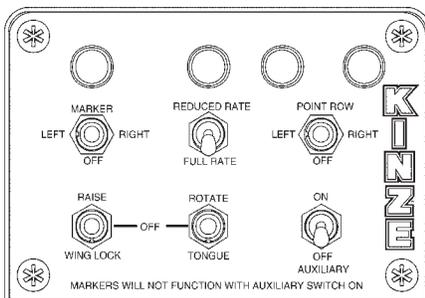
* See page 9-37 if equipped with the optional Two-Speed Point Row Clutch Package.

MAINTENANCE

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



(INS260)



NOTE:

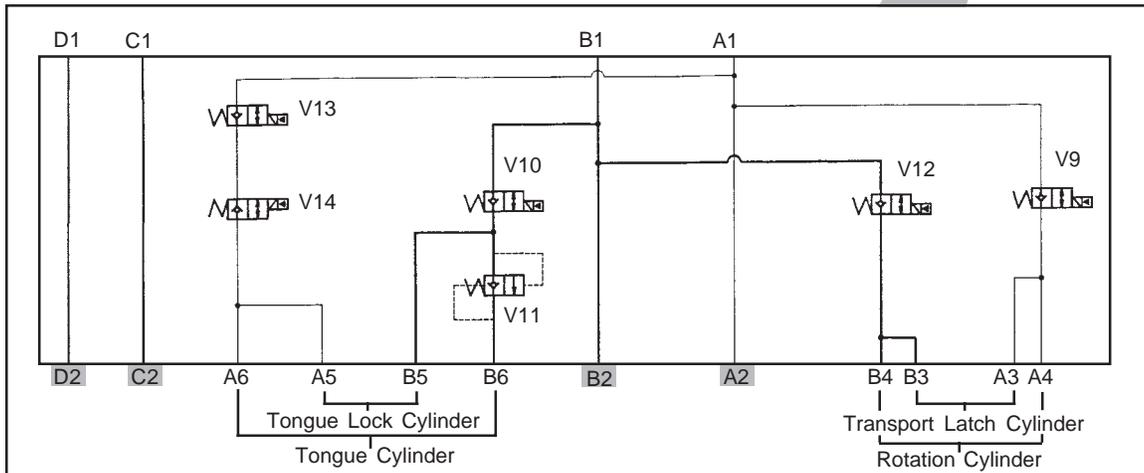
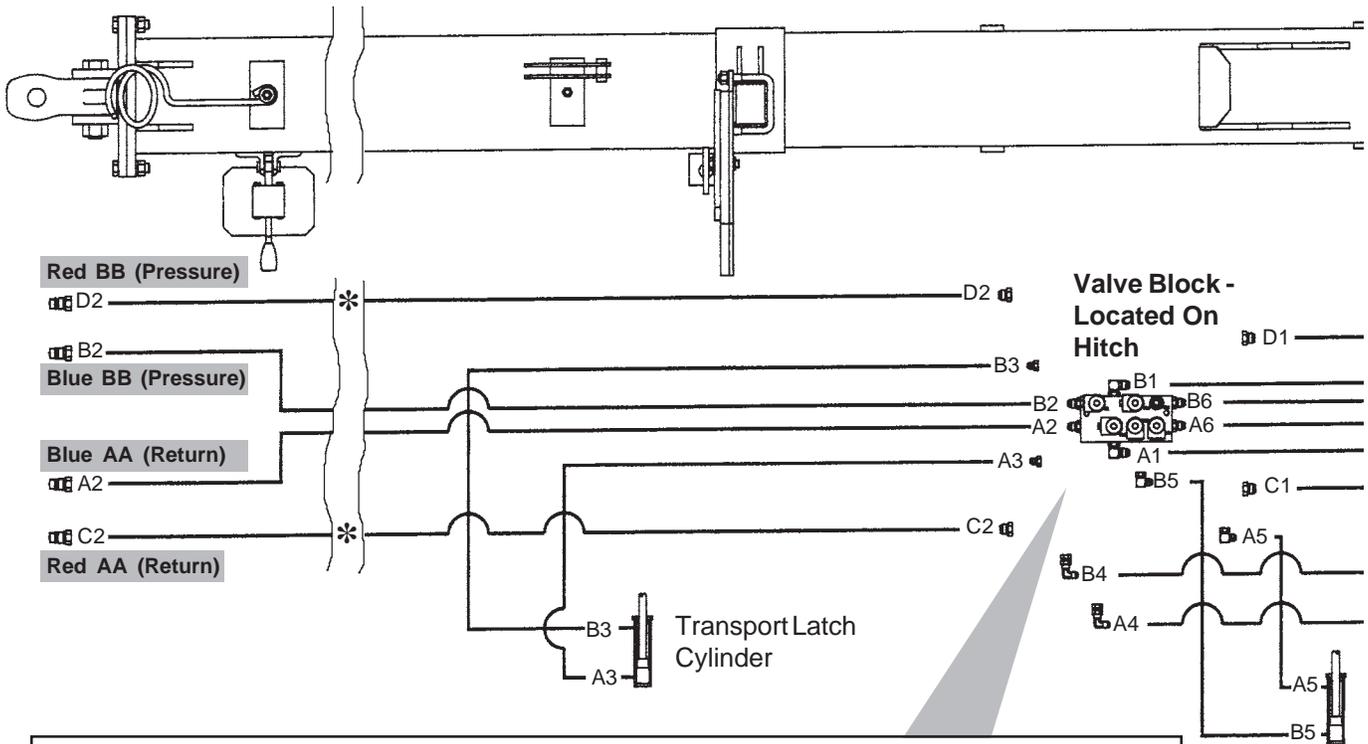
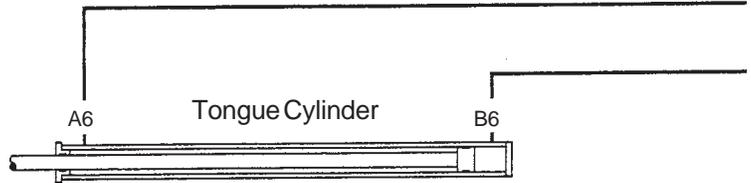
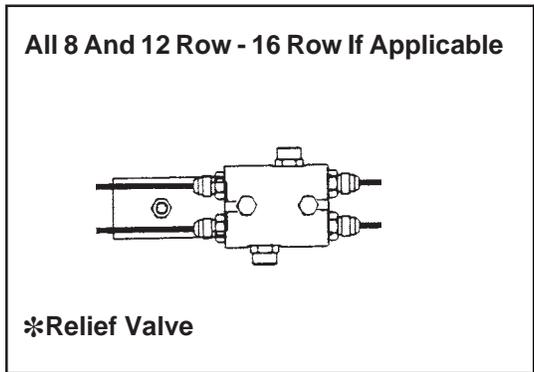
1. Point row and reduced rate clutch switches operate independently of the rest of the control console.
2. Power to the marker switch is fed through the auxiliary switch and the two transport function switches. Operating any of the switches in the lower row disables the marker function and turns off the panel light for the markers.

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

MAINTENANCE

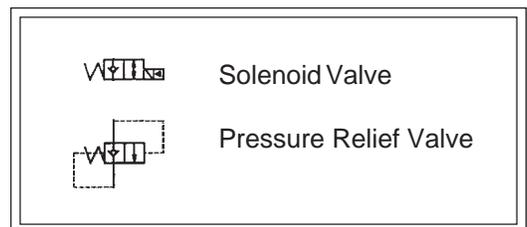
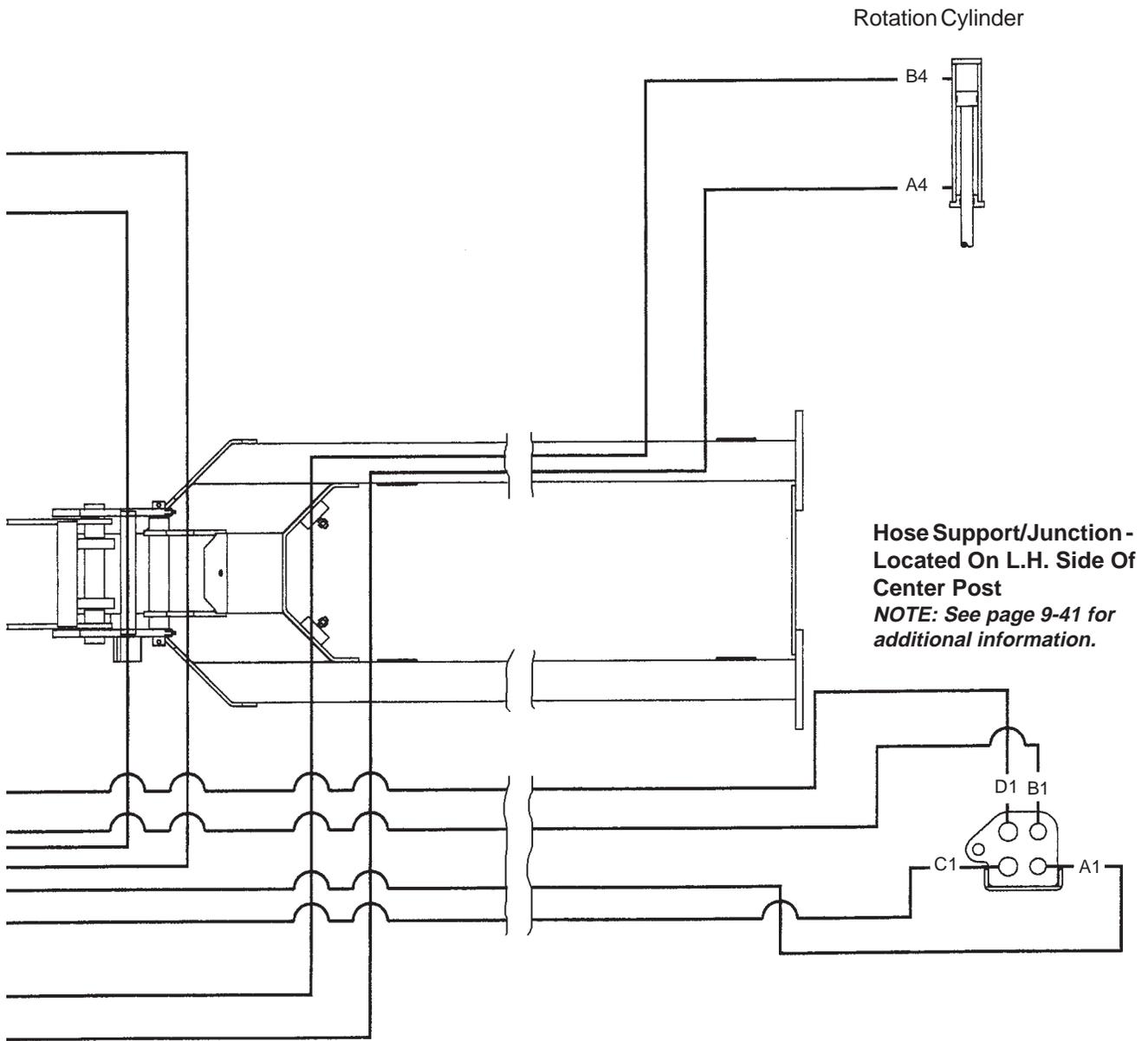
HYDRAULIC SYSTEM SCHEMATIC

(TWL143/TWL107/TWL111)



MAINTENANCE

(TWL108/TWL115)



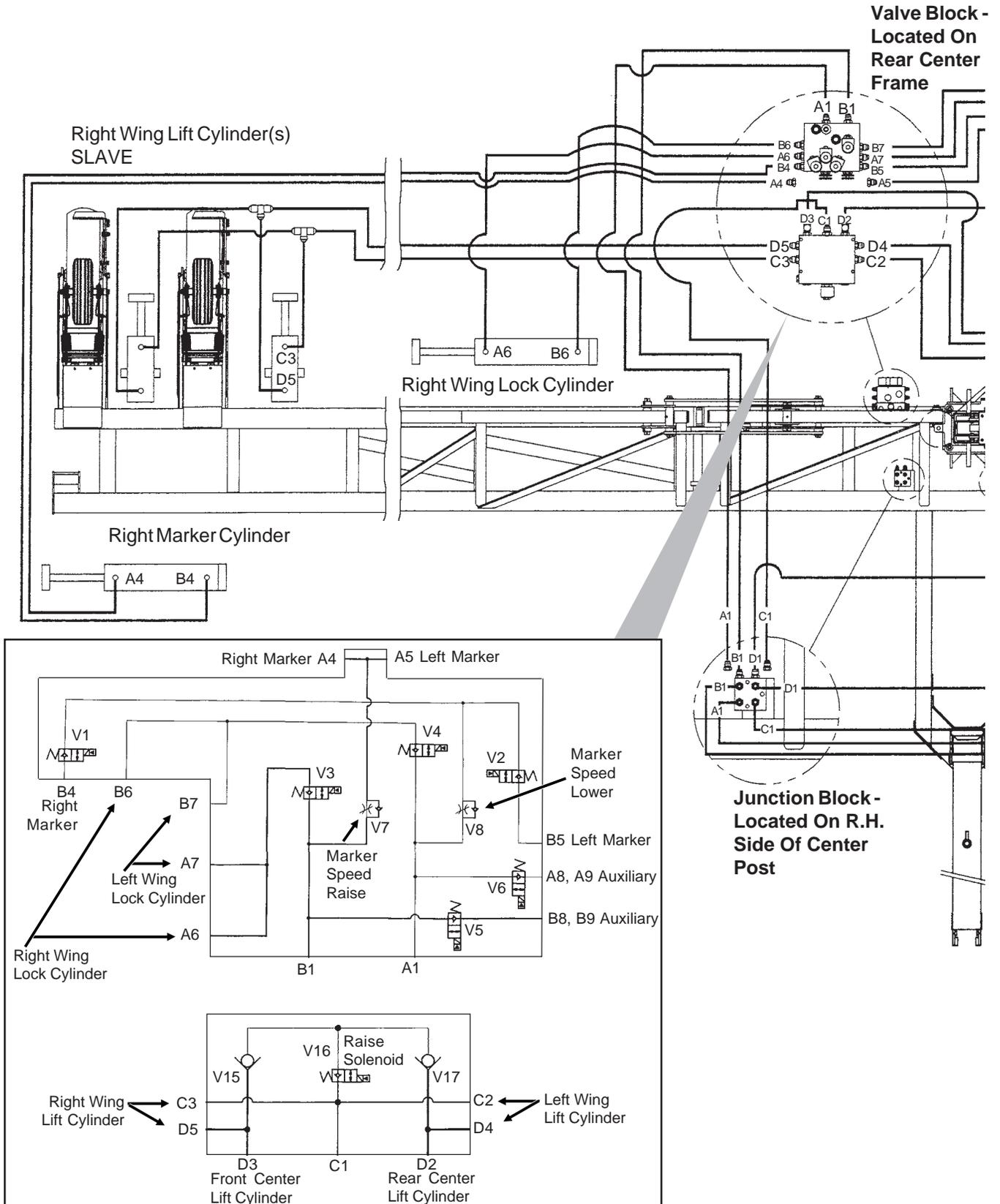
MAINTENANCE

HYDRAULIC SYSTEM SCHEMATIC (Continued)

(TWL105/TWL113/TWL114)

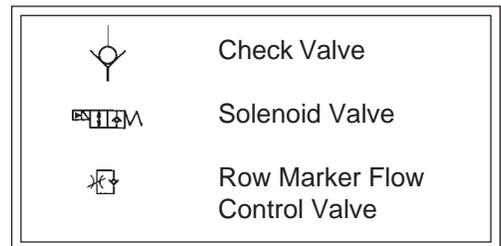
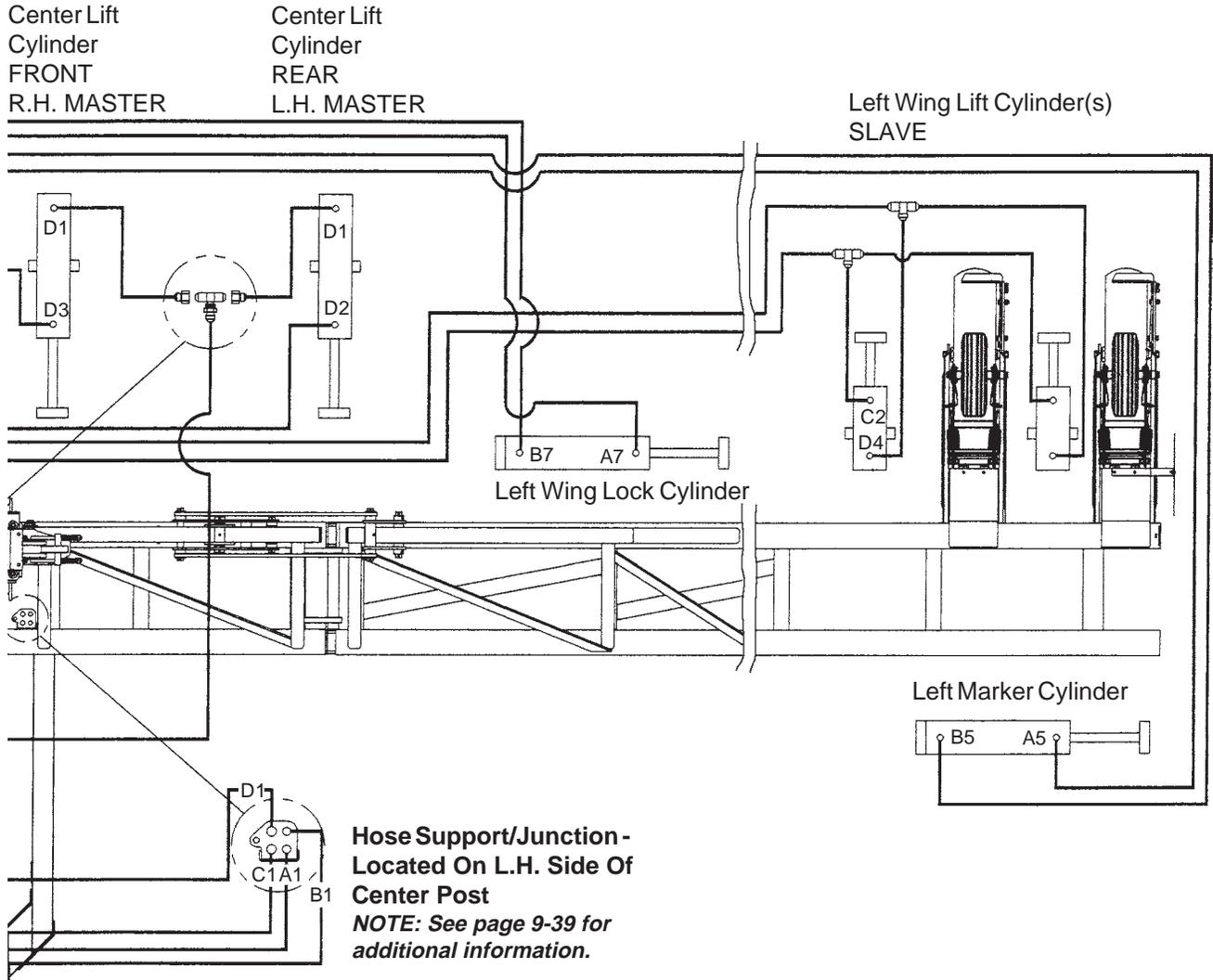
16 Row Shown (Two Wing Lift Cylinders Per Wing)

8 And 12 Row (One Wing Lift Cylinder Per Wing)



MAINTENANCE

(TWL106/TWL114)



MAINTENANCE

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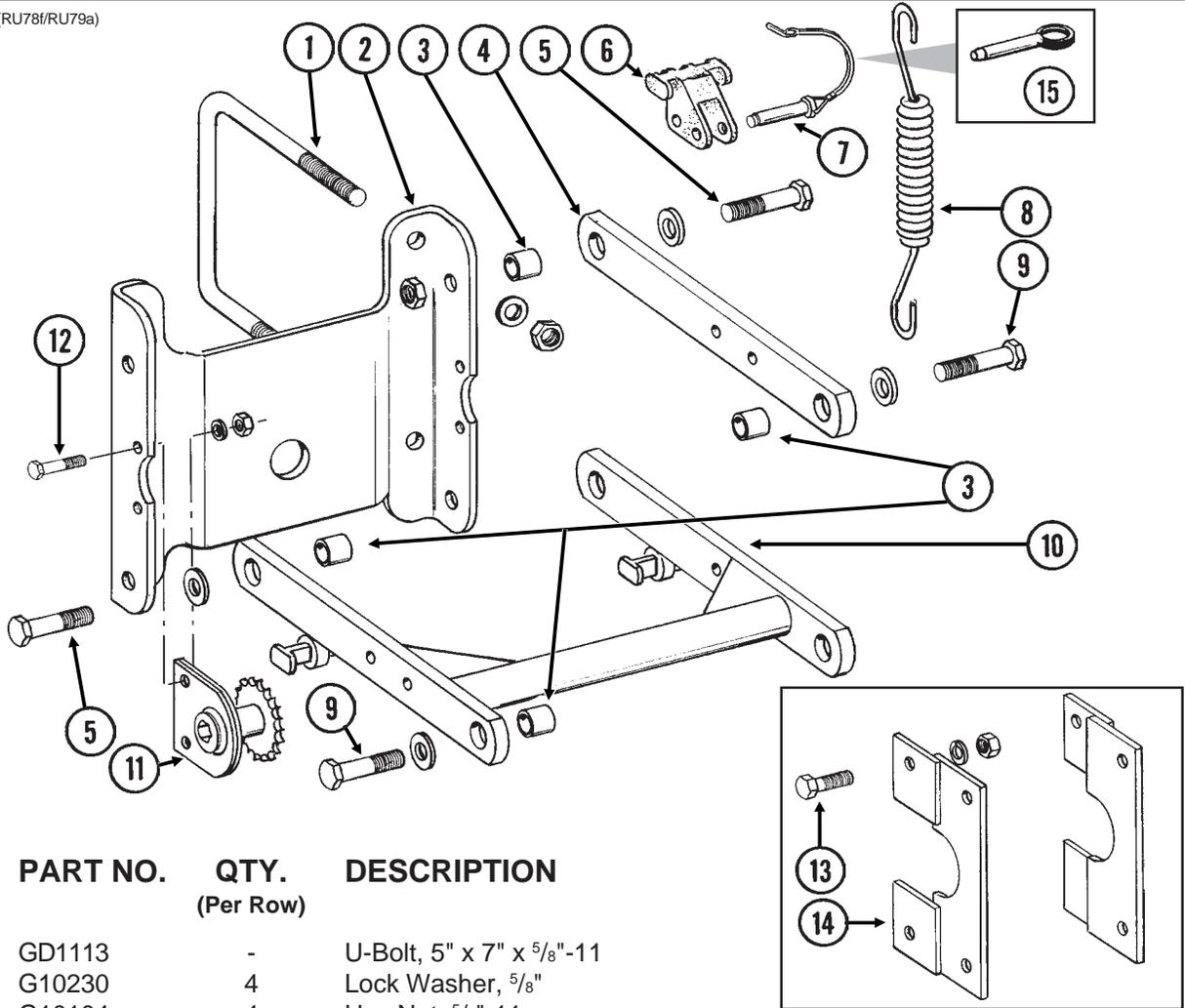
Numerical Index	a
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SHANK ASSEMBLY, SEED TUBE AND DEPTH ADJUSTMENT

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.		-	Shank Cover, See "Brush-Type Seed Meter", Page P15
2.		-	Shank Cover, See "Finger Pickup Seed Meter", Page P14
3.	G10304	1	Carriage Bolt, $\frac{3}{8}$ "-16 x 3"
	G10108	1	Lock Nut, $\frac{3}{8}$ "-16
4.	GD10986	1	Cover
5.	GD3612	1	Cap Plug
6.	GD10993	1	Spring
7.	GD13361	1	Pin, $\frac{3}{8}$ " x 1 $\frac{2}{3}$ "
8.	GD11259	1	Sleeve, $\frac{3}{8}$ " I.D. x $\frac{5}{8}$ " O.D. x 1 $\frac{25}{32}$ " Long
9.	G11008	1	Hex Head Cap Screw, $\frac{3}{8}$ "-24 x 2 $\frac{1}{2}$ ", Grade 8
	G11007	1	Lock Nut, $\frac{3}{8}$ "-24, Grade C
10.	G3303-98	1	Chain, No. 41, 98 Pitch Including Connector Link
	G3303-16	-	Chain, No. 41, 16 Pitch Including Connector Link (Used W/Row Unit Extension Brackets)
	GR0196	1	Connector Link, No. 41
11.	GD1026	1	Sleeve, 1 $\frac{3}{16}$ " Long
12.	G10201	1	Special Washer, $\frac{3}{8}$ " x 1 $\frac{1}{2}$ " O.D.
13.	GD1065	1	Idler Spring
14.	GD7318	1	Sleeve, 1" Long
15.	G10108	1	Lock Nut, $\frac{3}{8}$ "-16
16.	G10210	1	Washer, $\frac{3}{8}$ " USS
17.	GD11962	1	Idler
18.	G10003	3	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{1}{2}$ "
	G10108	3	Lock Nut, $\frac{3}{8}$ "-16
19.	GD10867	2	Stop
20.	G10326	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 3 $\frac{3}{4}$ "
21.	G10551	1	Clevis Pin, $\frac{1}{4}$ " x 2 $\frac{1}{2}$ "
	G10669	1	Hair Pin Clip, No. 22
22.	G10312	2	Carriage Bolt, $\frac{5}{16}$ "-18 x $\frac{3}{4}$ "
	G10620	2	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 Stack-Mode Electronic Seed Monitor" For Seed Tube With Sensor, Pages P98-P101
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

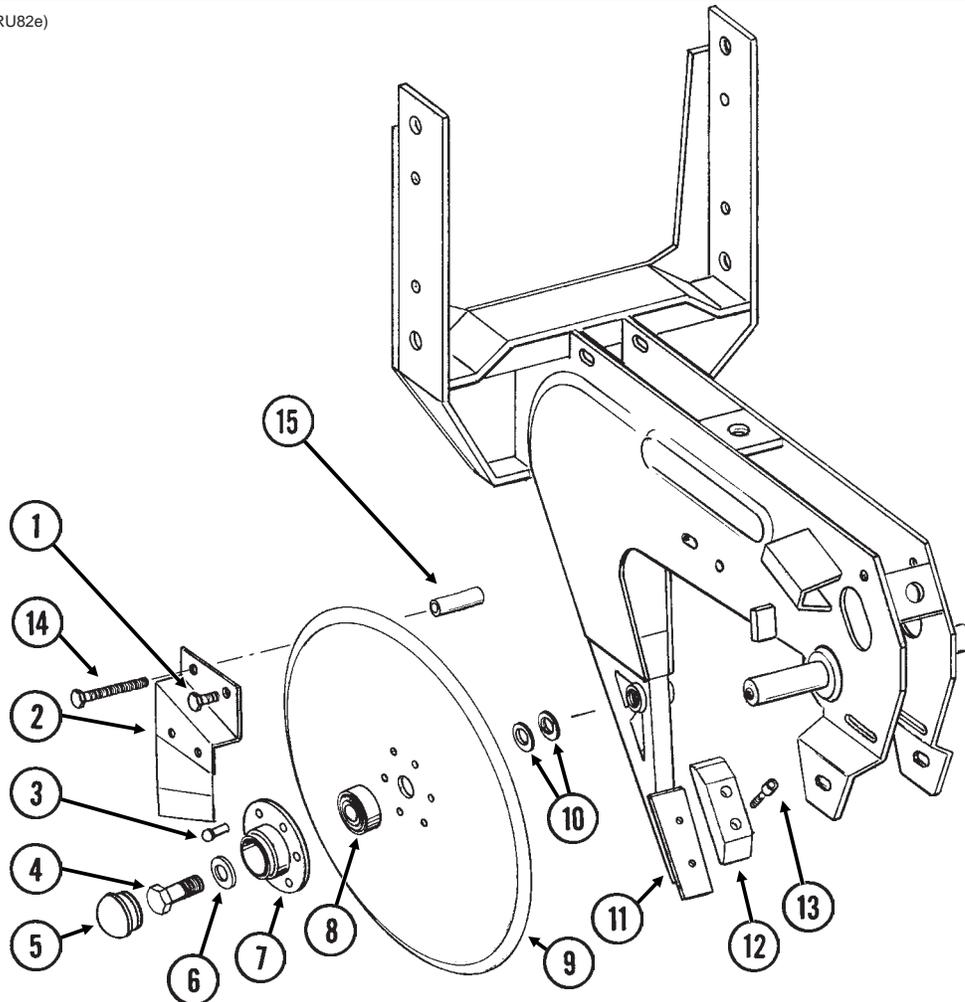
RUB021/RUB022(RU78f/RU79a)



ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GD1113	-	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

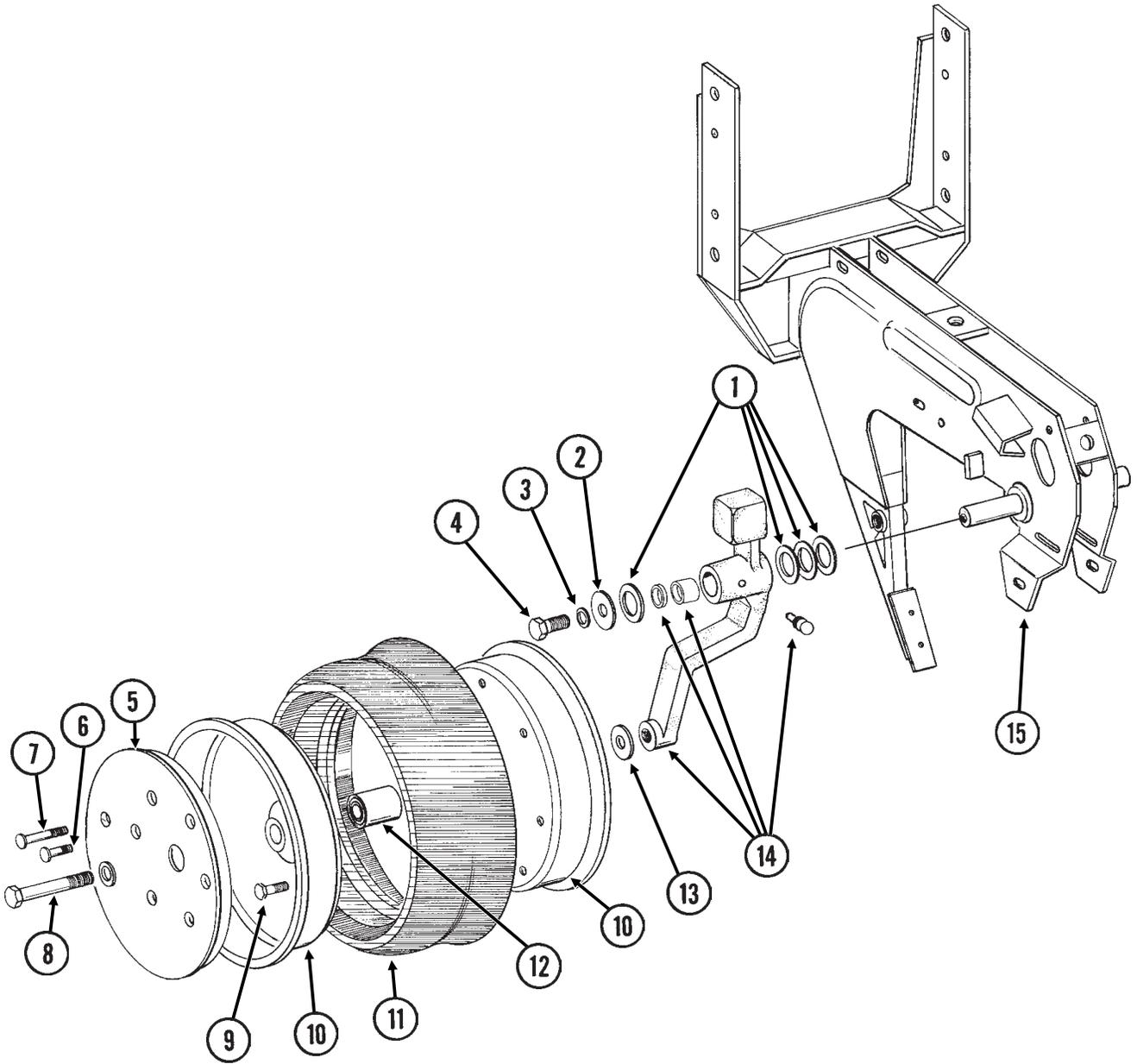
RUB023/RUB025(RU82e)



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, Seed Tube And Depth Adjustment", 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 Bearing Cap (Items 3 And 7-9)

GAUGE WHEELS

RUB027/RUB023(RU84a/RU84b)

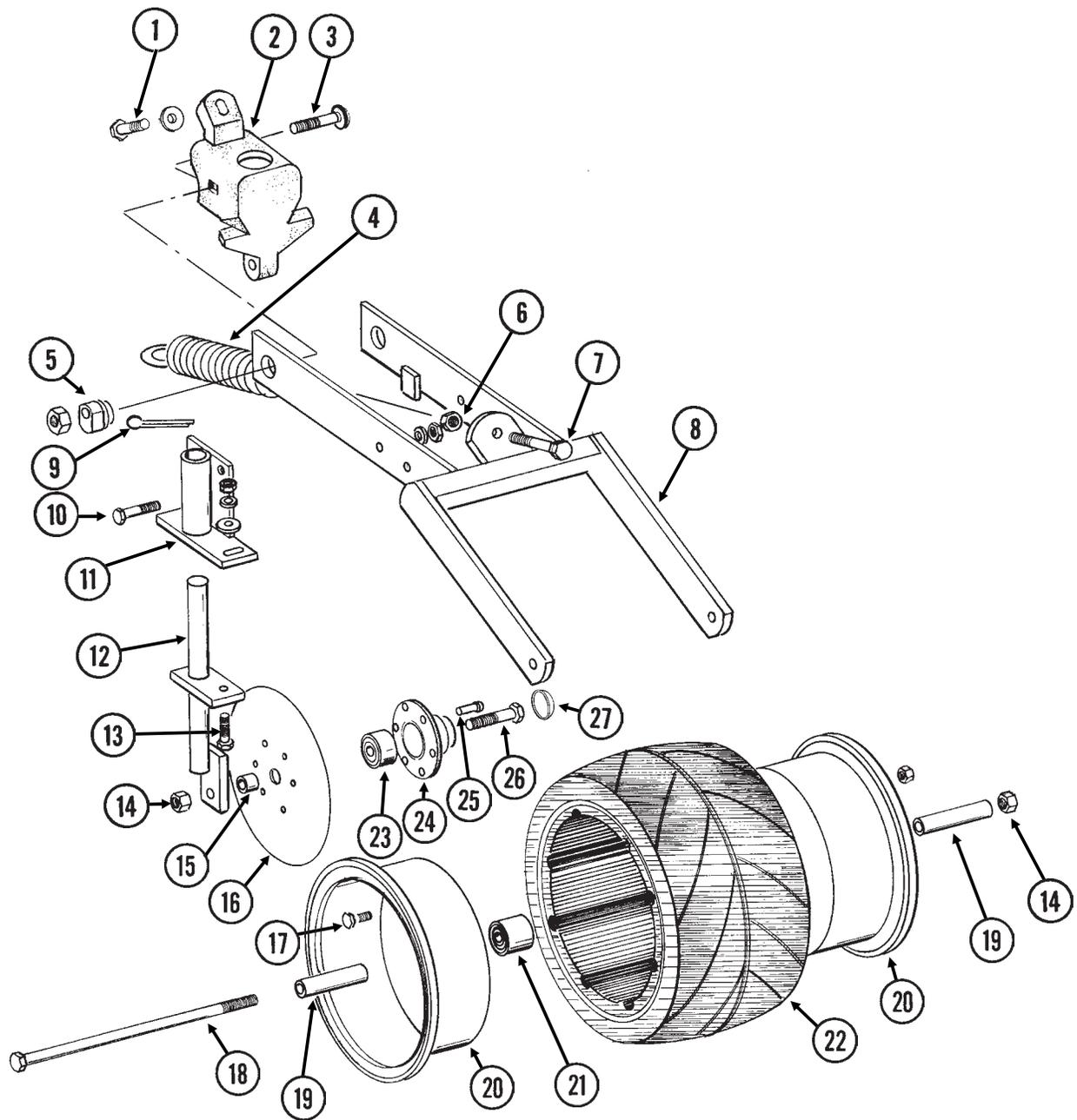


GAUGE WHEELS

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10940	-	Machine Bushing, 1" (.048" Thick)
2.	G10216	2	Washer, 1/2" USS
3.	G10228	2	Lock Washer, 1/2"
4.	G10014	1	Hex Head Cap Screw, 1/2"-13 x 1"
5.	GD11453	2	Cover
6.	G10338	12	Carriage Bolt, 5/16"-18 x 1 1/4"
	G10620	12	Serrated Flange Nut, 5/16"-18
7.	G10924	8	Carriage Bolt, 5/16"-18 x 1 3/4"
	G10620	8	Serrated Flange Nut, 5/16"-18
8.	G10010	2	Hex Head Cap Screw, 5/8"-11 x 3"
	G10230	2	Lock Washer, 5/8"
9.	G10018	14	Hex Head Cap Screw, 5/16"-18 x 5/8"
	G10109	14	Lock Nut, 5/16"-18
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, Seed Tube And Depth Adjustment", Pages P2 And P3
A.	GA7949	-	Gauge Wheel Complete (Items 5-7 And 9-12)

COVERING DISCS/SINGLE PRESS WHEEL

RUA054/RUB026(RU94d)

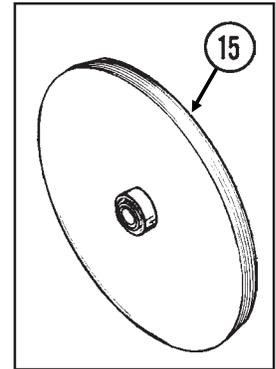
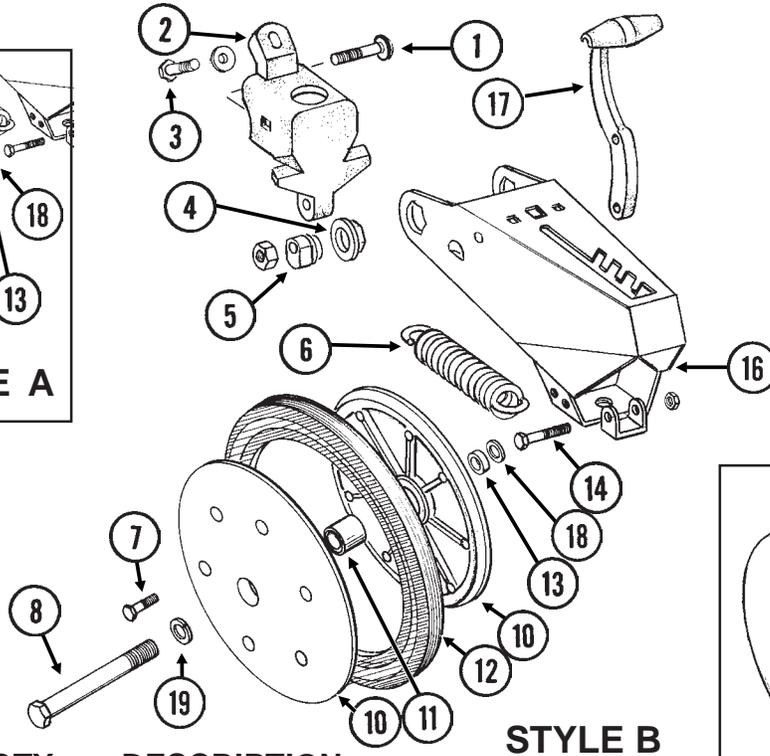
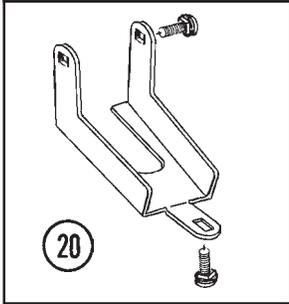
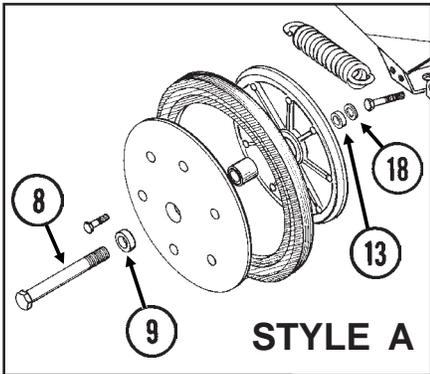


COVERING DISCS/SINGLE PRESS WHEEL

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

"V" CLOSING WHEELS

(RU83i/RU83j/RU83n)

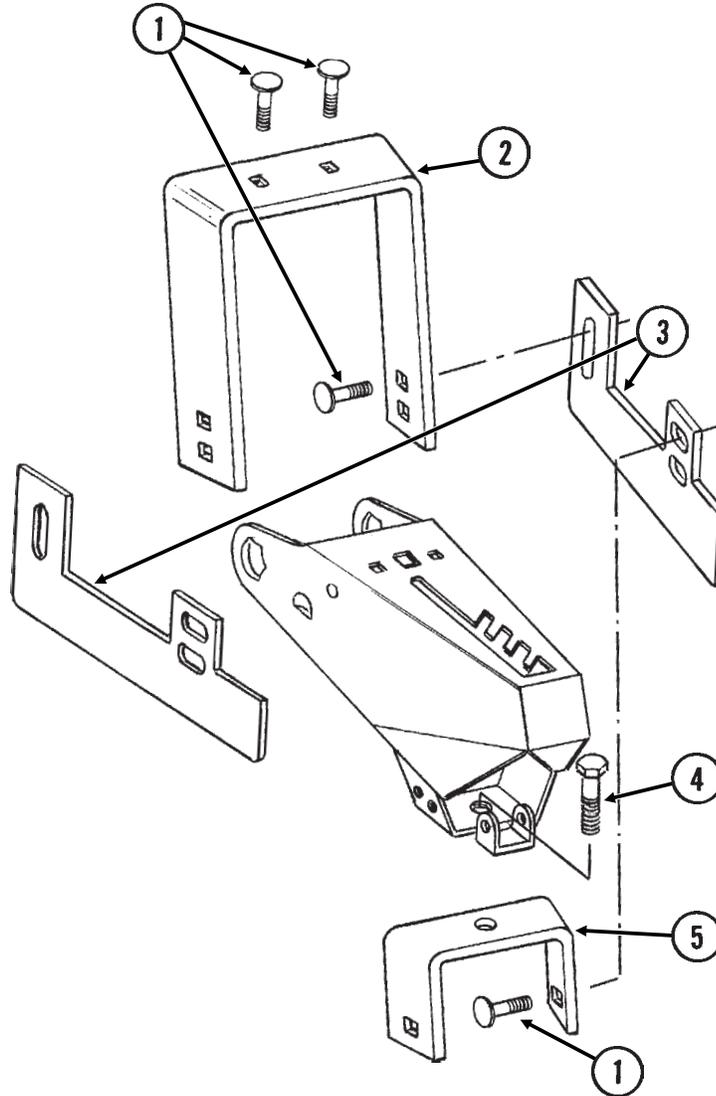


ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10801	2	Carriage Bolt, 1/2"-13 x 2 1/4"
	G10315	-	Carriage Bolt, 1/2"-13 x 2 1/2" (Used W/Straight Drop In-Furrow Granular Chemical Bracket)
	G10111	2	Lock Nut, 1/2"-13
2.	GB0268	1	Wheel Arm Stop
3.	G10001	1	Hex Head Cap Screw, 3/8"-16 x 1"
	G10210	1	Washer, 3/8" USS
4.	GB0282	2	Stepped Bushing
5.	GB0239	2	Eccentric Bushing
6.	GD8460	1	Spring
7.	G10064	6	Hex Head Cap Screw, 1/4"-20 x 1"
8.	G10013	2	Hex Head Cap Screw, 5/8"-11 x 3 1/2"
	G10107	2	Lock Nut, 5/8"-11
9.	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
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

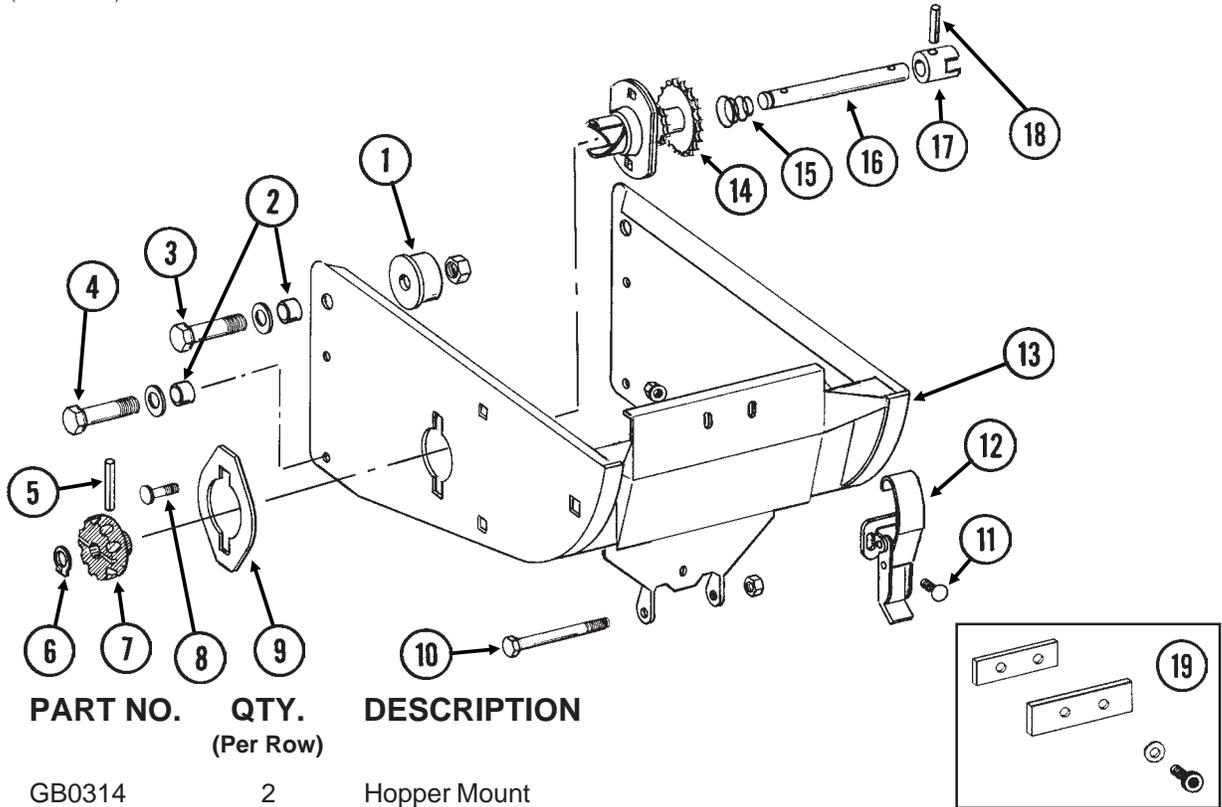
RUB050(RU90c)



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

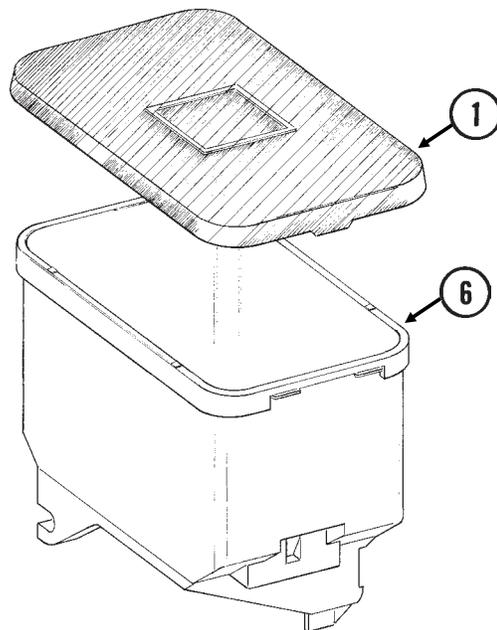
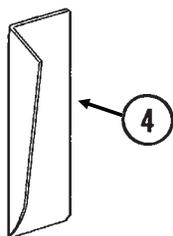
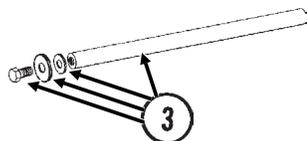
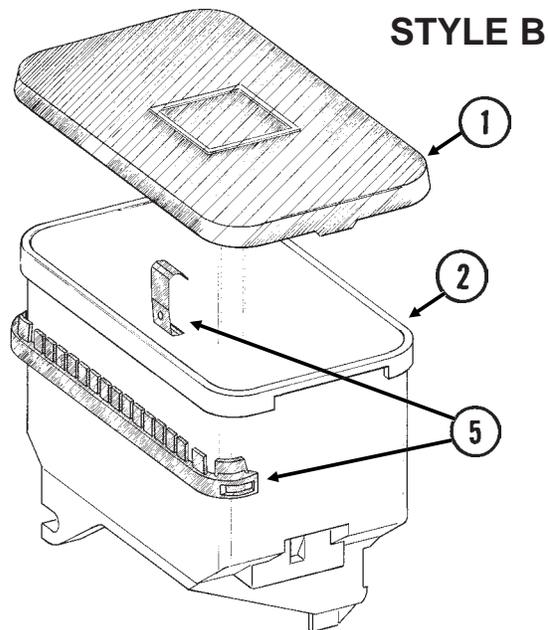
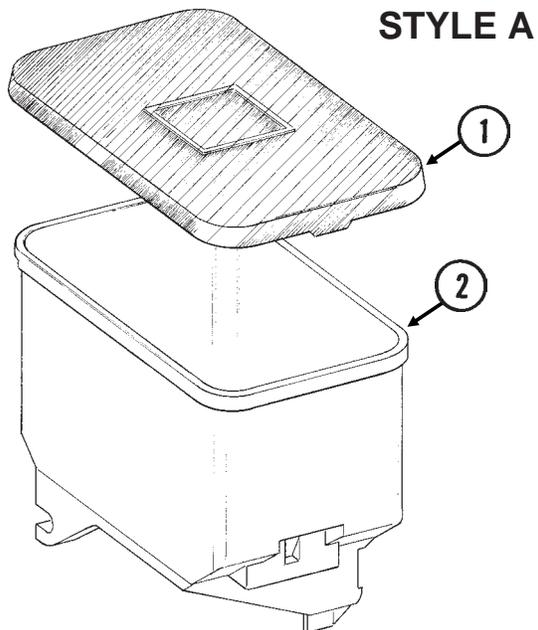
RUB028/RUB029(RU86h/RU86f)



ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GB0314	2	Hopper Mount
2.	GB0218	4	Bushing, $2\frac{1}{32}$ " I.D. x $\frac{7}{8}$ " O.D. x $\frac{19}{32}$ " Long
3.	G10752	2	Hex Head Cap Screw, $\frac{5}{8}$ "-18 x $2\frac{1}{4}$ "
	GD7805	2	Special Washer, $\frac{5}{8}$ ", Hardened
	G10412	2	Lock Nut, $\frac{5}{8}$ "-18
4.	G10751	2	Hex Head Cap Screw, $\frac{5}{8}$ "-18 x $1\frac{3}{4}$ "
	GD7805	2	Special Washer, $\frac{5}{8}$ ", Hardened
	G10412	2	Lock Nut, $\frac{5}{8}$ "-18
5.	G10602	1	Spring Pin, $\frac{1}{4}$ " x $1\frac{1}{2}$ "
6.	G10567	1	External Retaining Ring, $\frac{5}{8}$ "
7.	GD11239	1	Knob
8.	G10338	2	Carriage Bolt, $\frac{5}{16}$ "-18 x $1\frac{1}{4}$ "
	G10302	-	Carriage Bolt, $\frac{5}{16}$ "-18 x $\frac{7}{8}$ "
	G10620	2	Serrated Flange Nut, $\frac{5}{16}$ "-18
9.	GD11305	1	Plate
10.	G10061	1	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x $3\frac{1}{2}$ "
	G10210	2	Washer, $\frac{3}{8}$ " USS
	G10108	1	Lock Nut, $\frac{3}{8}$ "-16
11.	G10309	2	Carriage Bolt, $\frac{1}{4}$ "-20 x $\frac{5}{8}$ ", Grade 2
	G10621	2	Serrated Flange Nut, $\frac{1}{4}$ "-20
12.	GA2007	1	Hopper Hold Down Latch
13.	GA8304	1	Hopper Support
14.	GA9538	1	Double Sprocket And Bearing, Drive Clutch, 11/19 Tooth
15.	GD11413	1	Spring
16.	GD10958	1	Shaft
17.	GB0278	1	Coupler
18.	G10546	1	Spring Pin, $\frac{3}{16}$ " x $1\frac{1}{4}$ "
19.	G1K312	-	Seed Hopper Support Panel Kit W/Hardware And Instruction (2 Rows)
	G10211	-	Washer, $\frac{1}{4}$ " SAE
	G10252	-	Hex Socket Head Screw, $\frac{1}{4}$ "-20 x $\frac{7}{8}$ ", Grade 8
A.	GA9539	-	Meter Drive Assembly Complete (Items 5-7 And 14-18)

SEED HOPPER AND LID

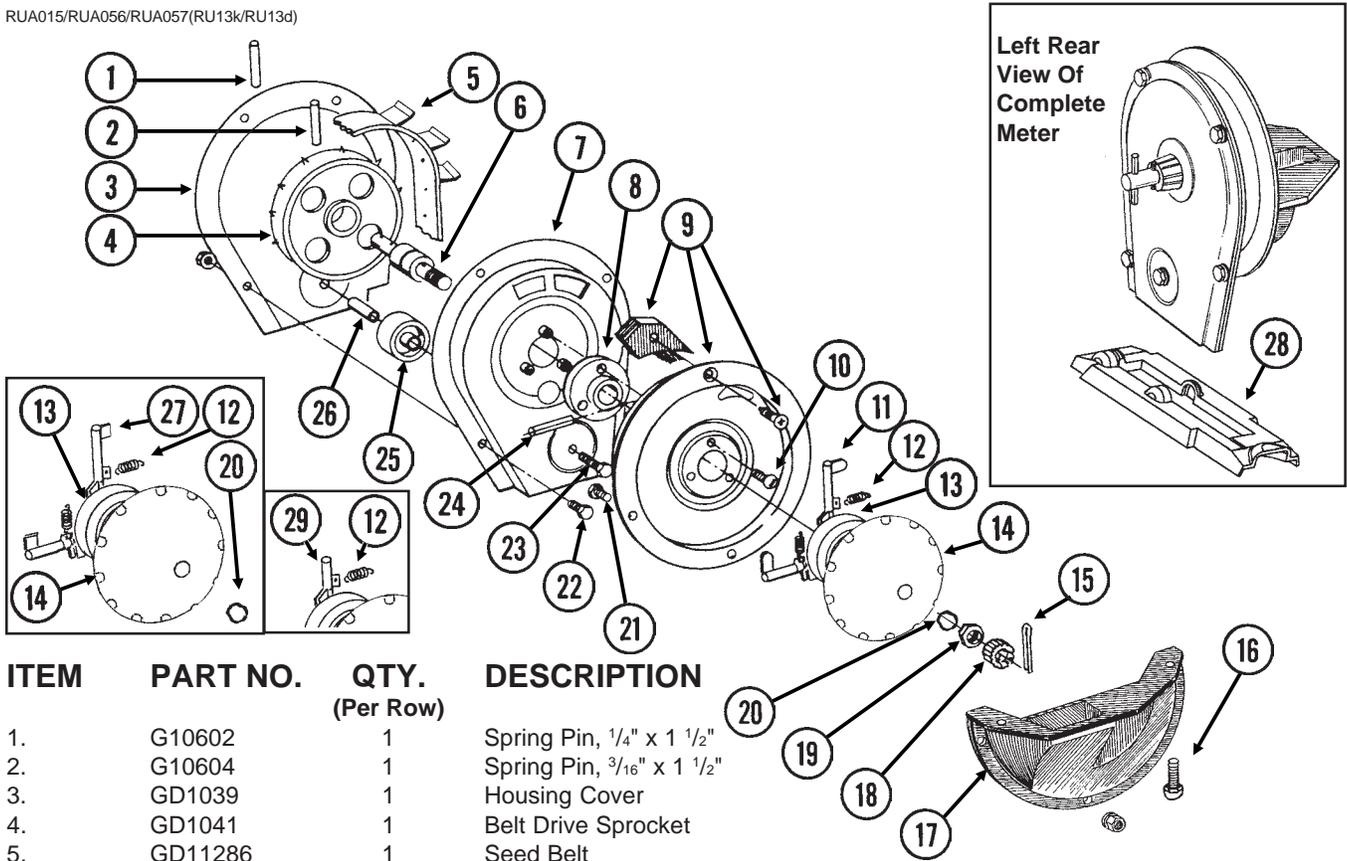
RUA030(RU87d/RU87c/RU128/RU87a/RU87e)



ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GD11279	1	Lid
2.	GA8370	1	Seed Hopper (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)

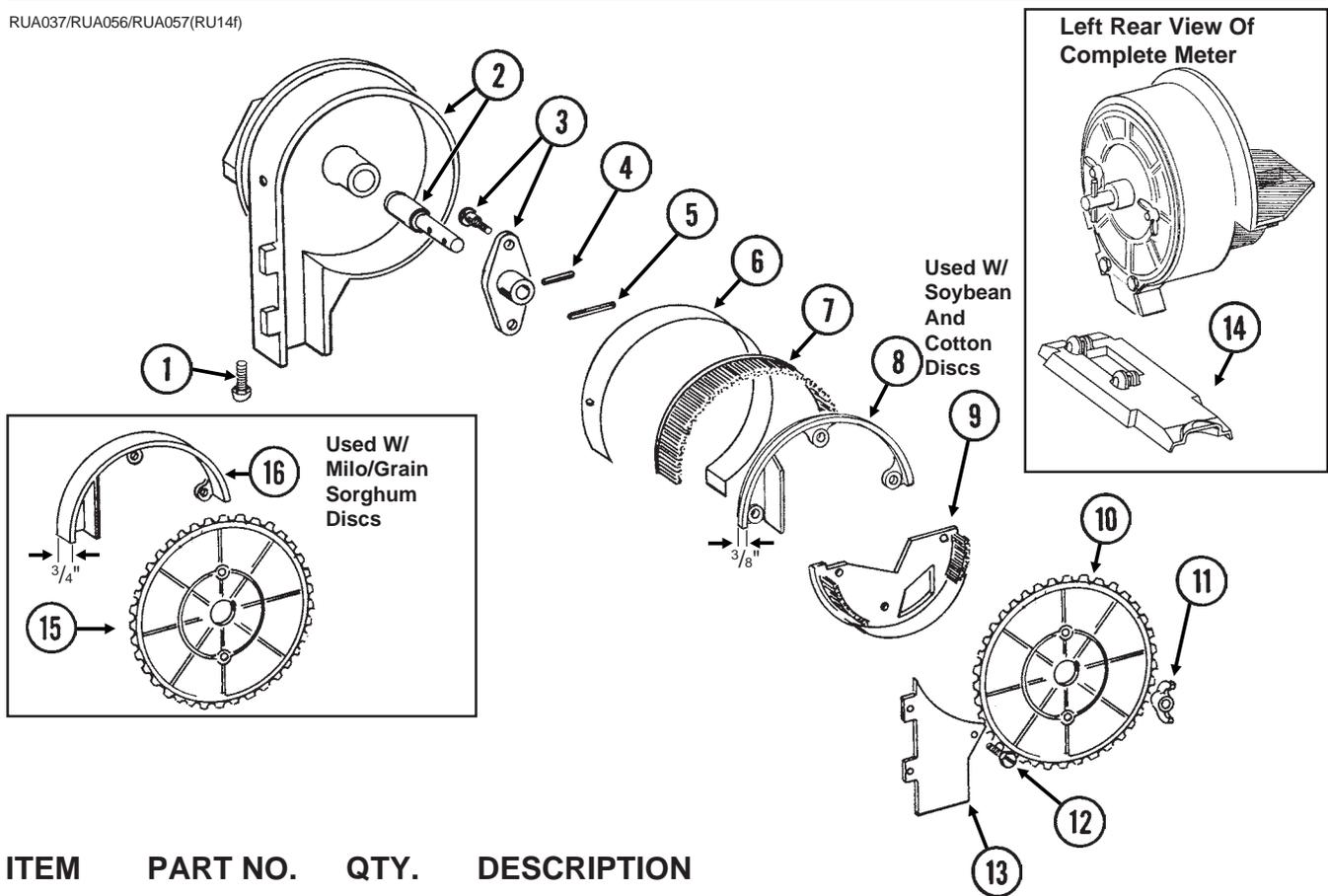


ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10602	1	Spring Pin, 1/4" x 1 1/2"
2.	G10604	1	Spring Pin, 3/16" x 1 1/2"
3.	GD1039	1	Housing Cover
4.	GD1041	1	Belt Drive Sprocket
5.	GD11286	1	Seed Belt
6.	GA2019	1	Bearing
7.	GA2018	1	Conveyor Housing
8.	GB0110	1	Bearing Housing
9.	GR1569	1	Carrier Plate 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

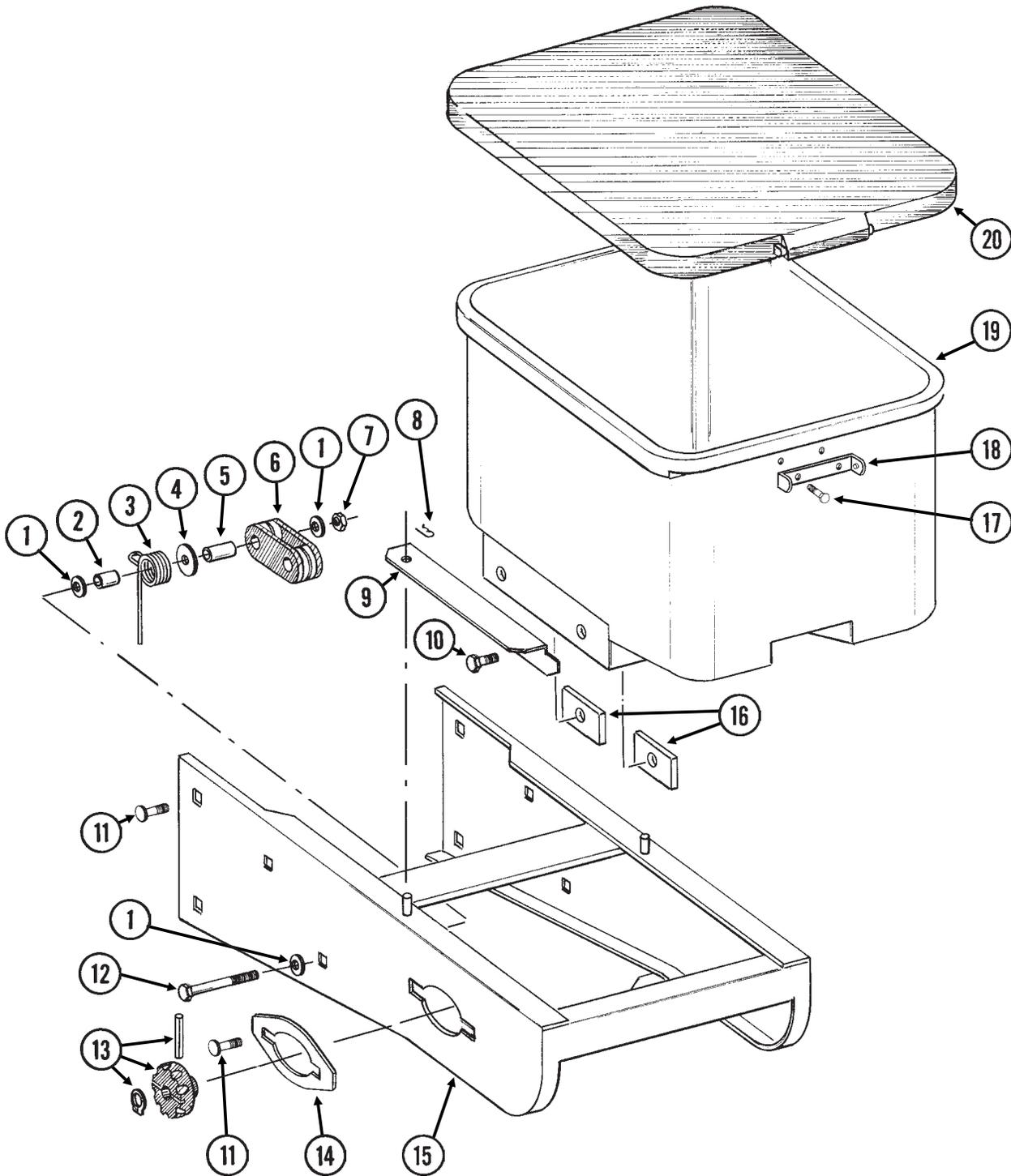
RUA037/RUA056/RUA057(RU14f)



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

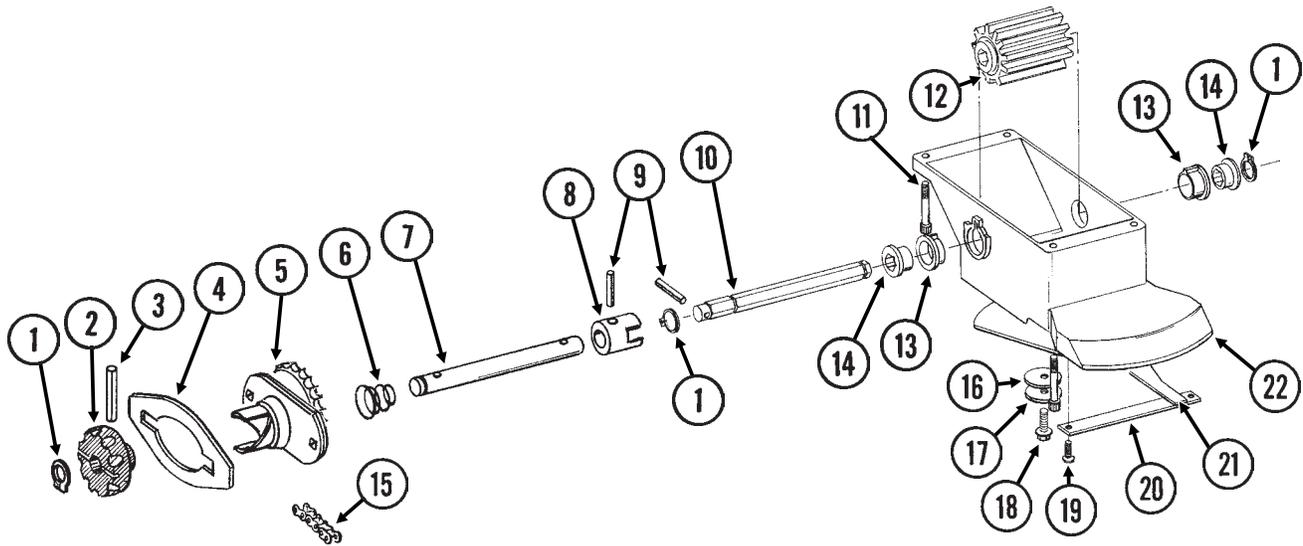


GRANULAR CHEMICAL HOPPER AND HOPPER PANEL EXTENSION

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

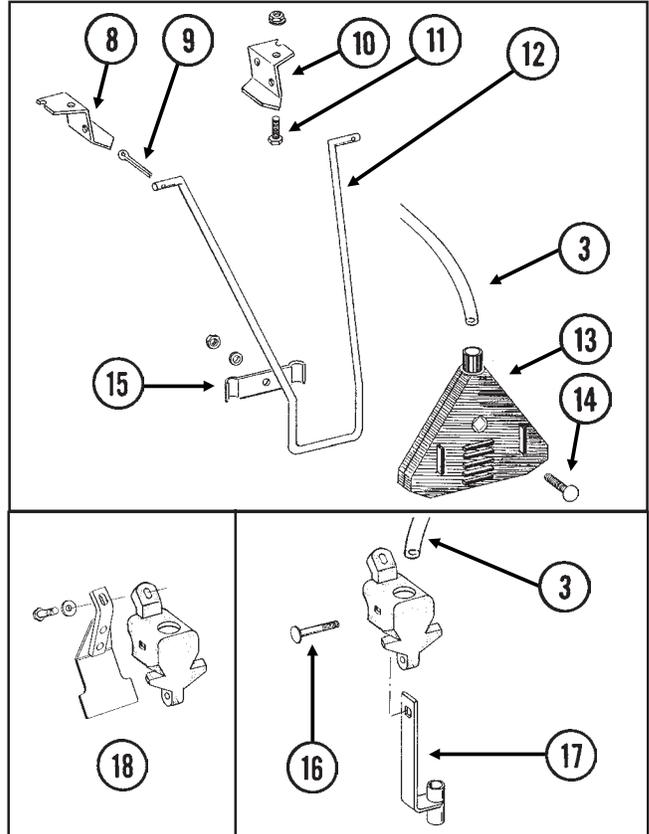
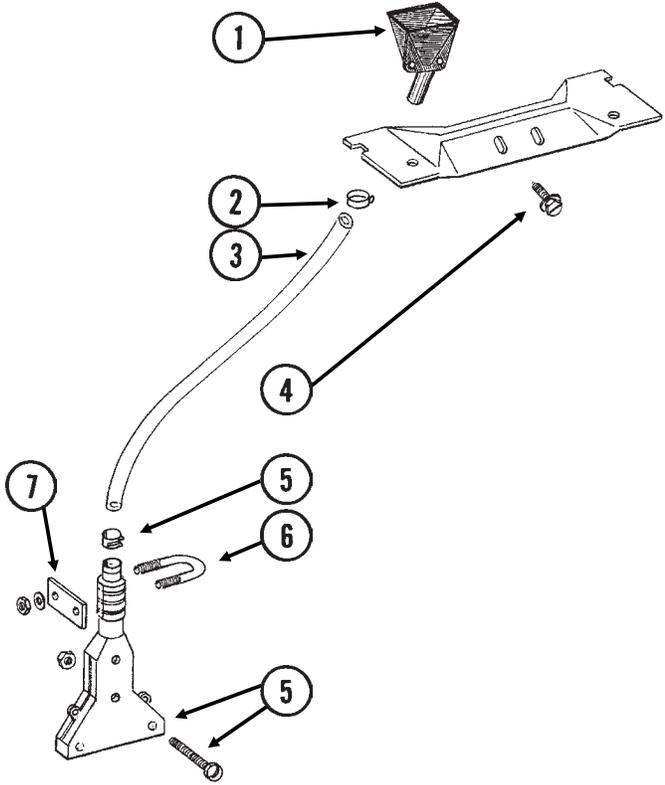
RUA051/RUB028(RU91a)



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

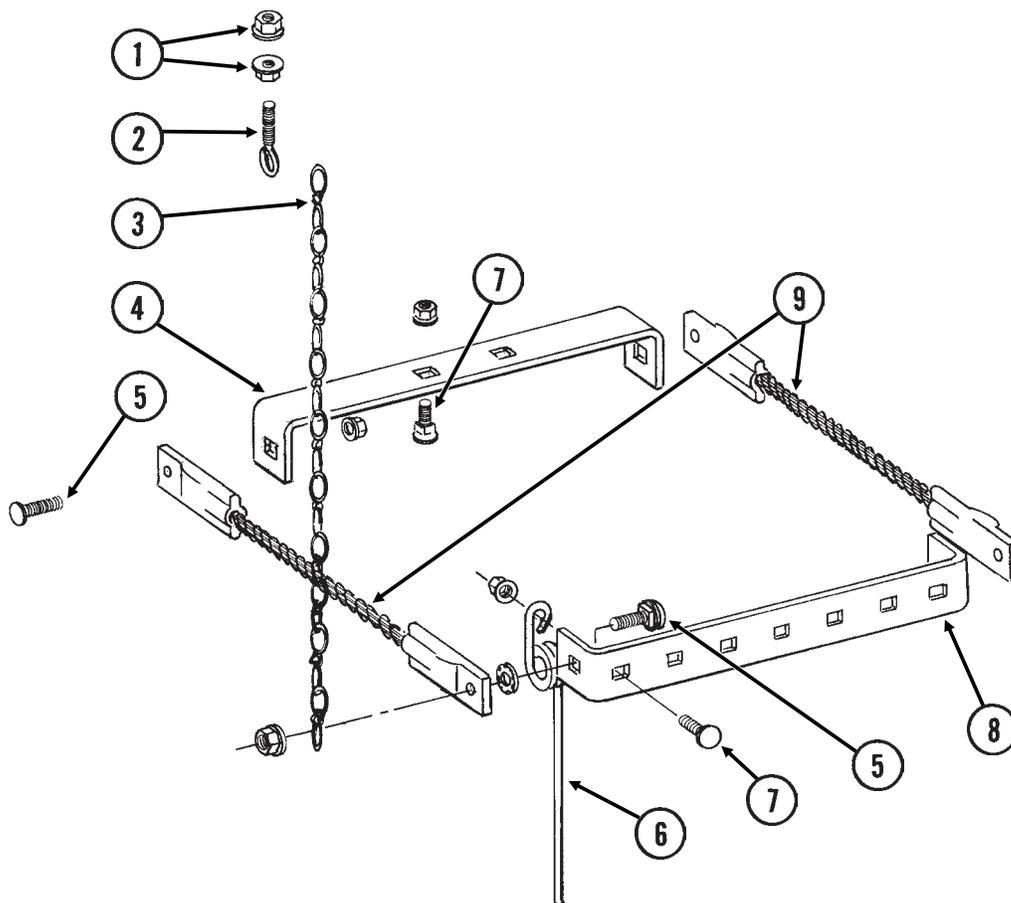
RUA061/RUA073(RU101m/RU83m)



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

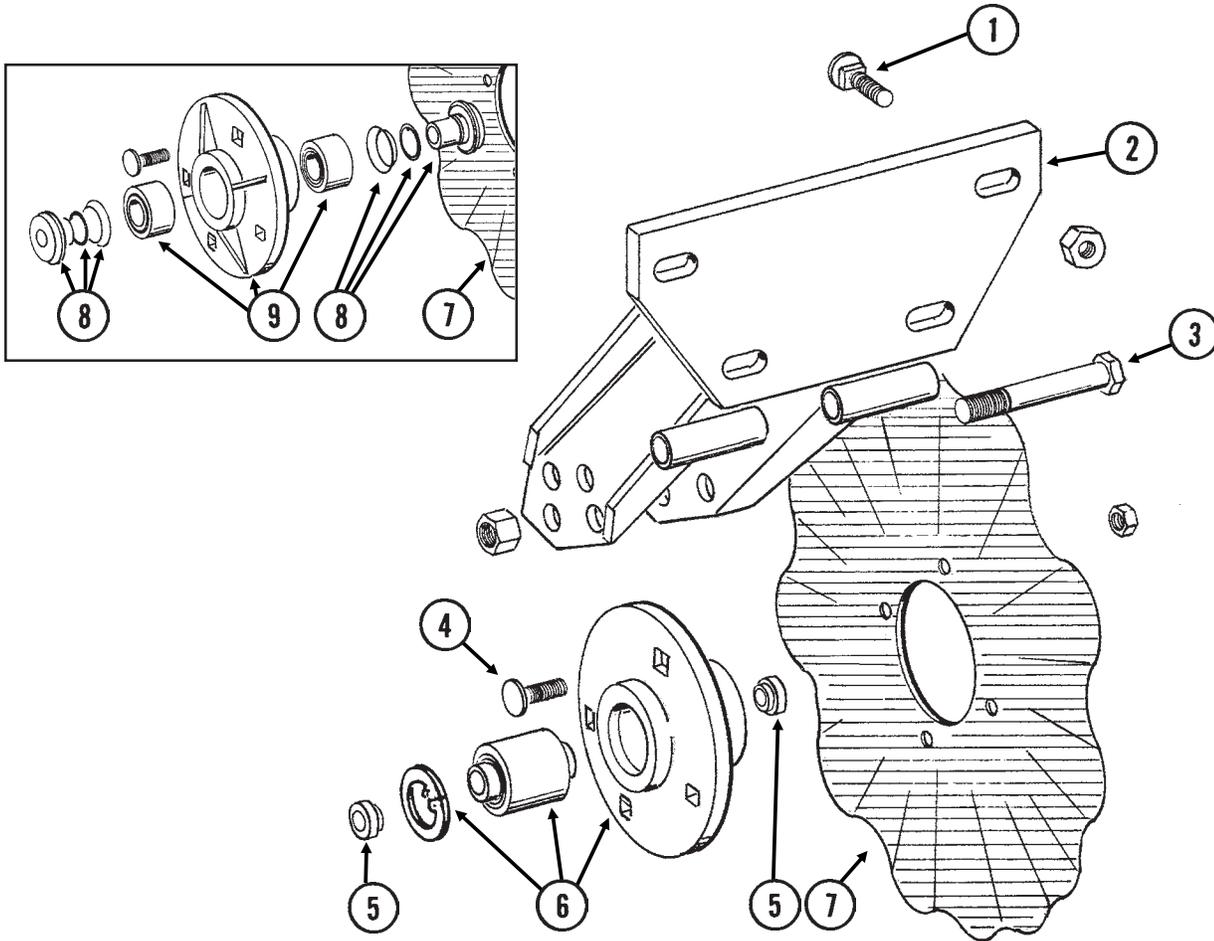
RUA055(RU95)



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

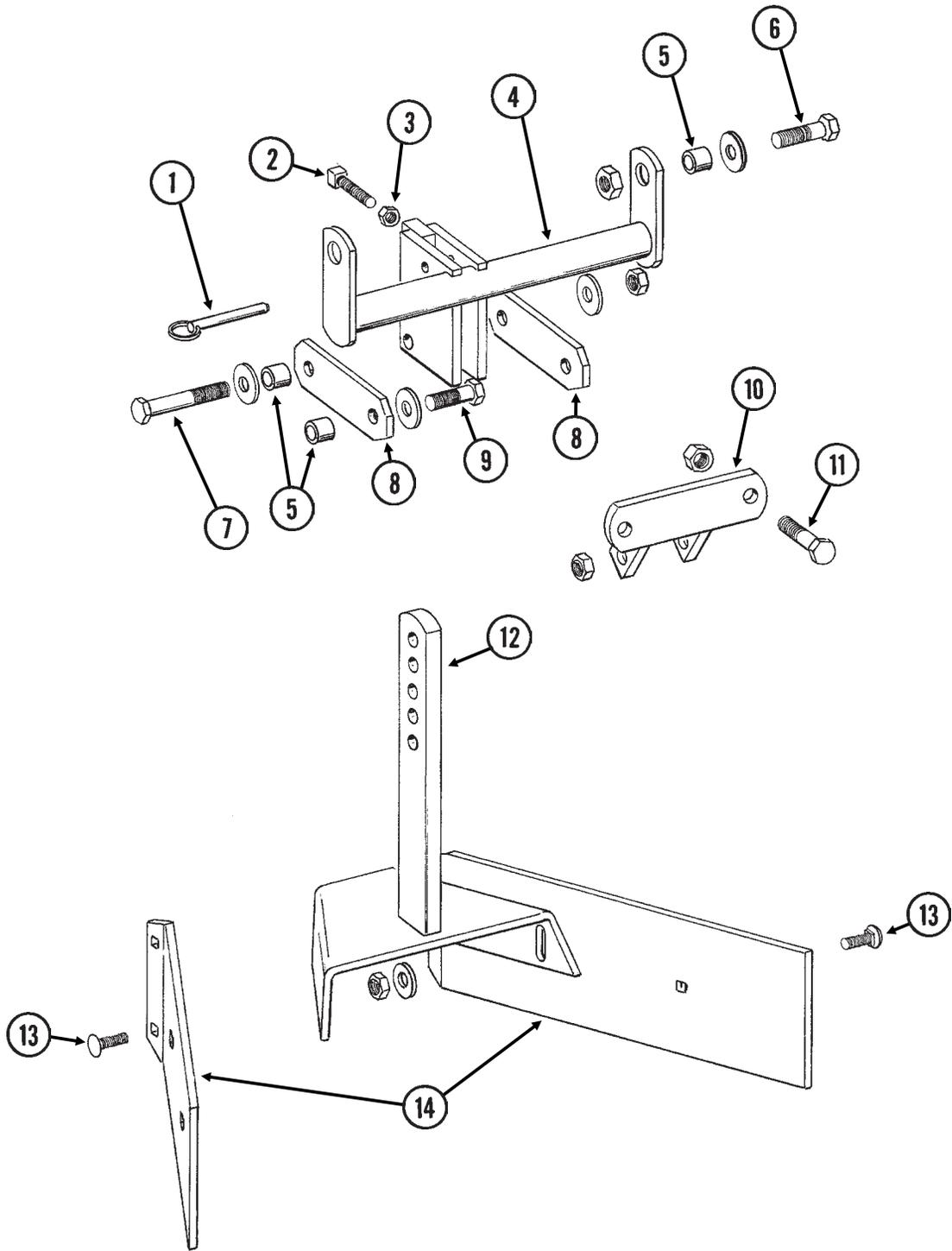
RUA061(RU102/RU102c)



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 Kit 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 BED LEVELER

RUA059/RUA060(RU99/RU100)

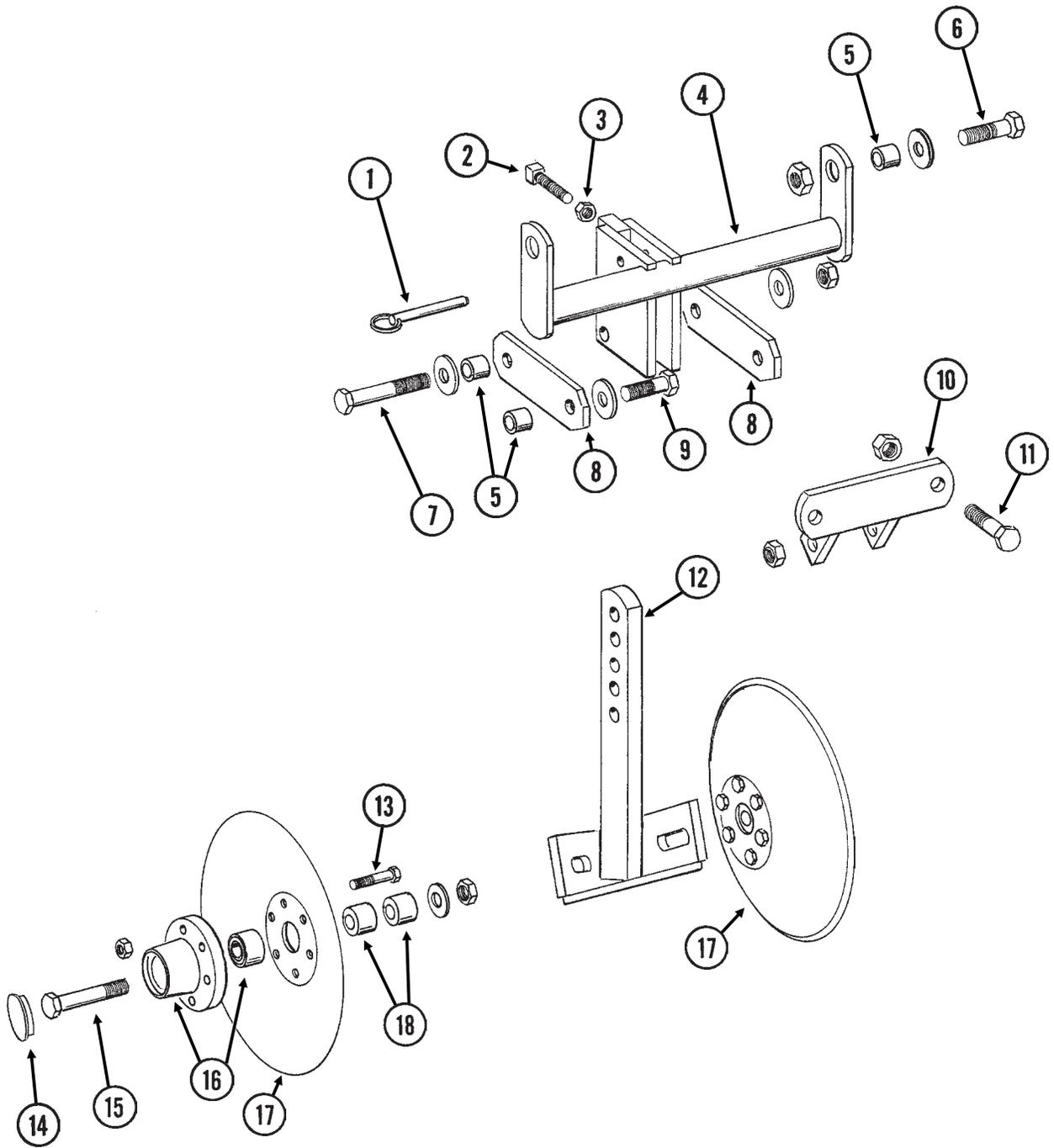


ROW UNIT MOUNTED BED LEVELER

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

ROW UNIT MOUNTED DISC FURROWER

RUA059/RUA058(RU99/RU98g)

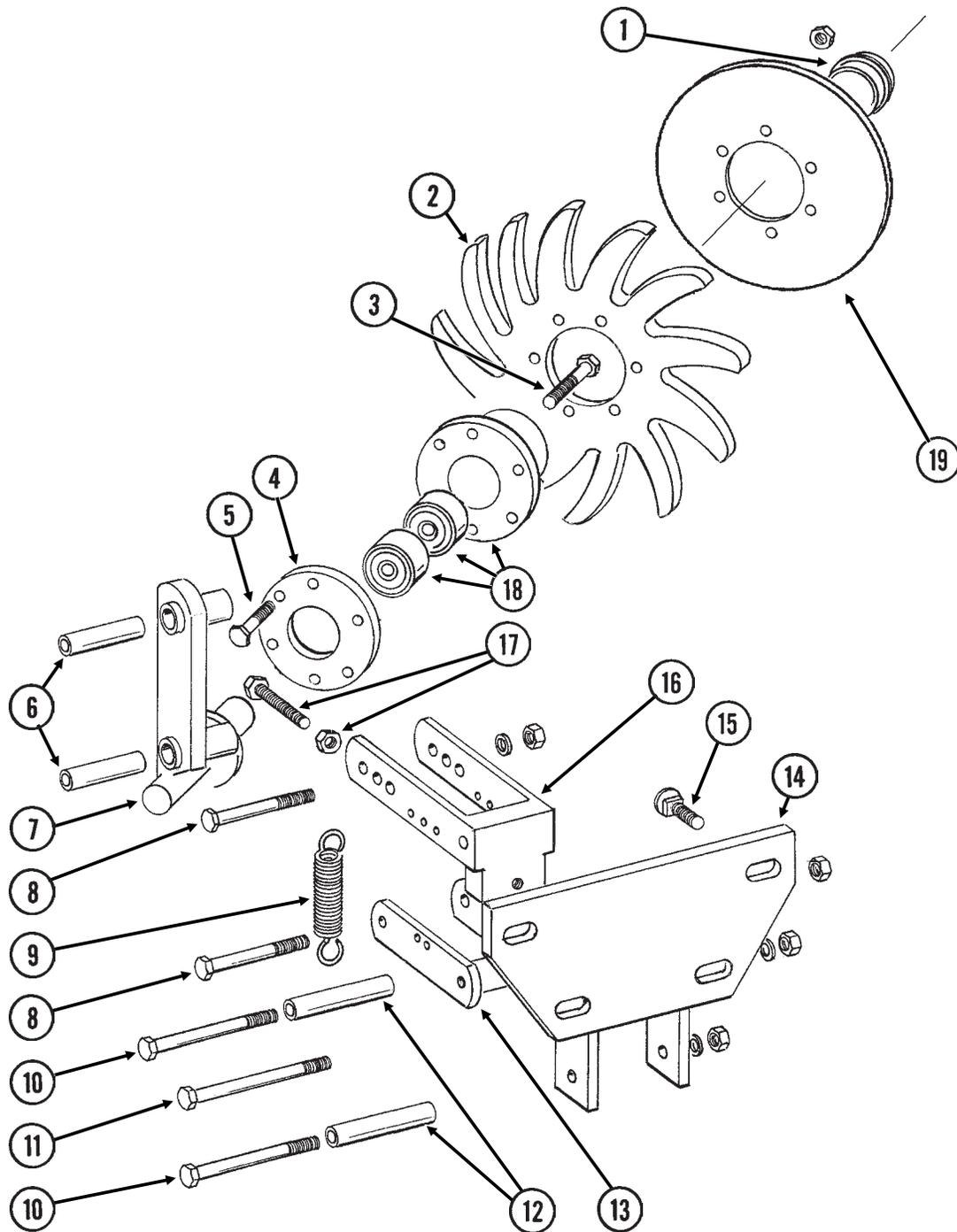


ROW UNIT MOUNTED DISC FURROWER

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	G10536	1	Detent Pin, 1/2" x 2 1/2" Grip
2.	G10597	1	Square Head Set Screw, 5/8"-11 x 2 1/4"
3.	G10503	1	Hex Jam Nut, 5/8"-11, Grade 2
4.	GA5719	1	Mounting Bracket
5.	GD7889	6	Bushing, 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, 1 1/16" I.D. x 3/4" Long
	GD7817-04	2	Spacer, 1 1/16" I.D. x 1/2" Long

ROW UNIT MOUNTED RESIDUE WHEEL

(RU103d)

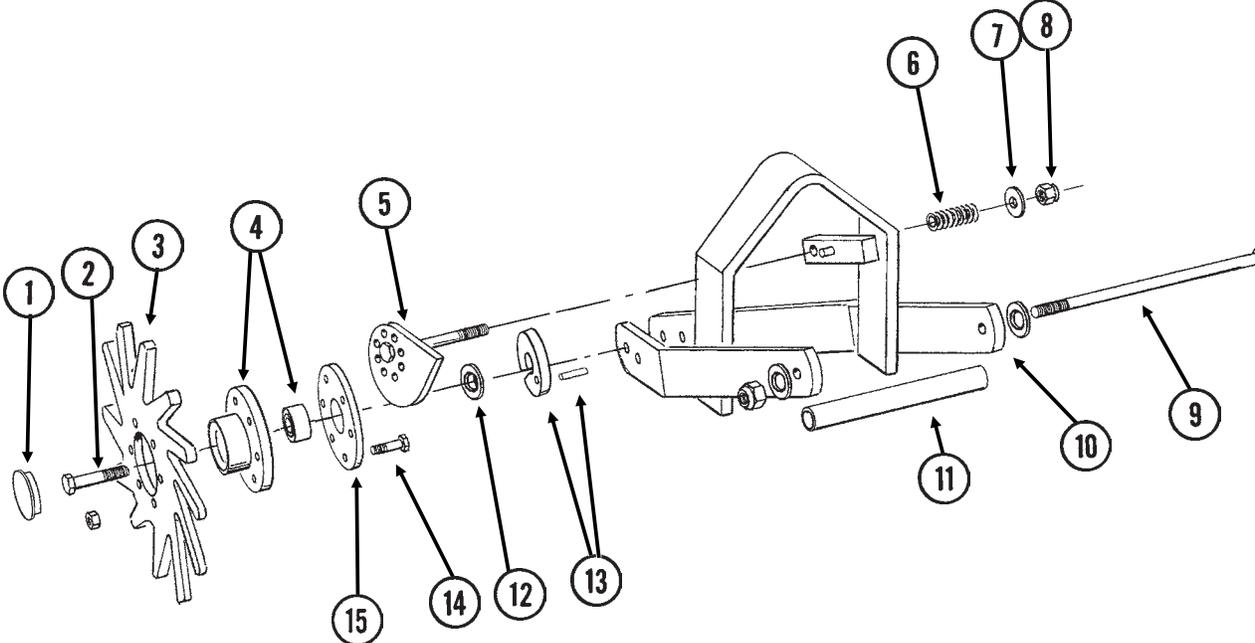


ROW UNIT MOUNTED RESIDUE WHEEL

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GD1132	1	Dust Cap
2.	GD10552	1	Wheel, 12 Tine, $\frac{3}{8}$ " x 12"
3.	G10006	1	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 2 $\frac{1}{4}$ "
4.	GD9724	1	Backing Plate
5.	G10133	6	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x 1 $\frac{1}{2}$ "
	G10109	6	Lock Nut, $\frac{5}{16}$ "-18
6.	GD9720	2	Spacer, $\frac{1}{2}$ " x 2 $\frac{3}{16}$ " Long
7.	GA6838	1	Wheel Mount
8.	G10033	2	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 3 $\frac{1}{2}$ "
	G10228	2	Lock Washer, $\frac{1}{2}$ "
	G10102	2	Hex Nut, $\frac{1}{2}$ "-13
9.	GD5857	2	Spring
10.	G10045	2	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 4 $\frac{1}{2}$ "
	G10228	2	Lock Washer, $\frac{1}{2}$ "
	G10102	2	Hex Nut, $\frac{1}{2}$ "-13
11.	G10348	1	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 5" (Lockup Bolt)
	G10111	1	Lock Nut, $\frac{1}{2}$ "-13
12.	GD9715	2	Spacer, $\frac{1}{2}$ " x 3" Long
13.	GA6834	1	Lower Link
14.	GA6832	1	Mount
15.	G10574	4	Carriage Bolt, $\frac{1}{2}$ "-13 x 1 $\frac{1}{4}$ "
	G10111	4	Lock Nut, $\frac{1}{2}$ "-13
16.	GA6833	1	Upper Link
17.	G10371	1	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 3", Full Thread
	G10501	1	Hex Jam Nut, $\frac{1}{2}$ "-13, Grade 2
18.	GA5654	1	Hub W/Bearings
	GA2014	-	Bearing
19.	GD12534	-	Cover
A.	GA7446	-	Wheel Assembly, 12 Tine (Items 2, 4, 5 And 18)

COULTER MOUNTED RESIDUE WHEELS

RUA063(RU104u)



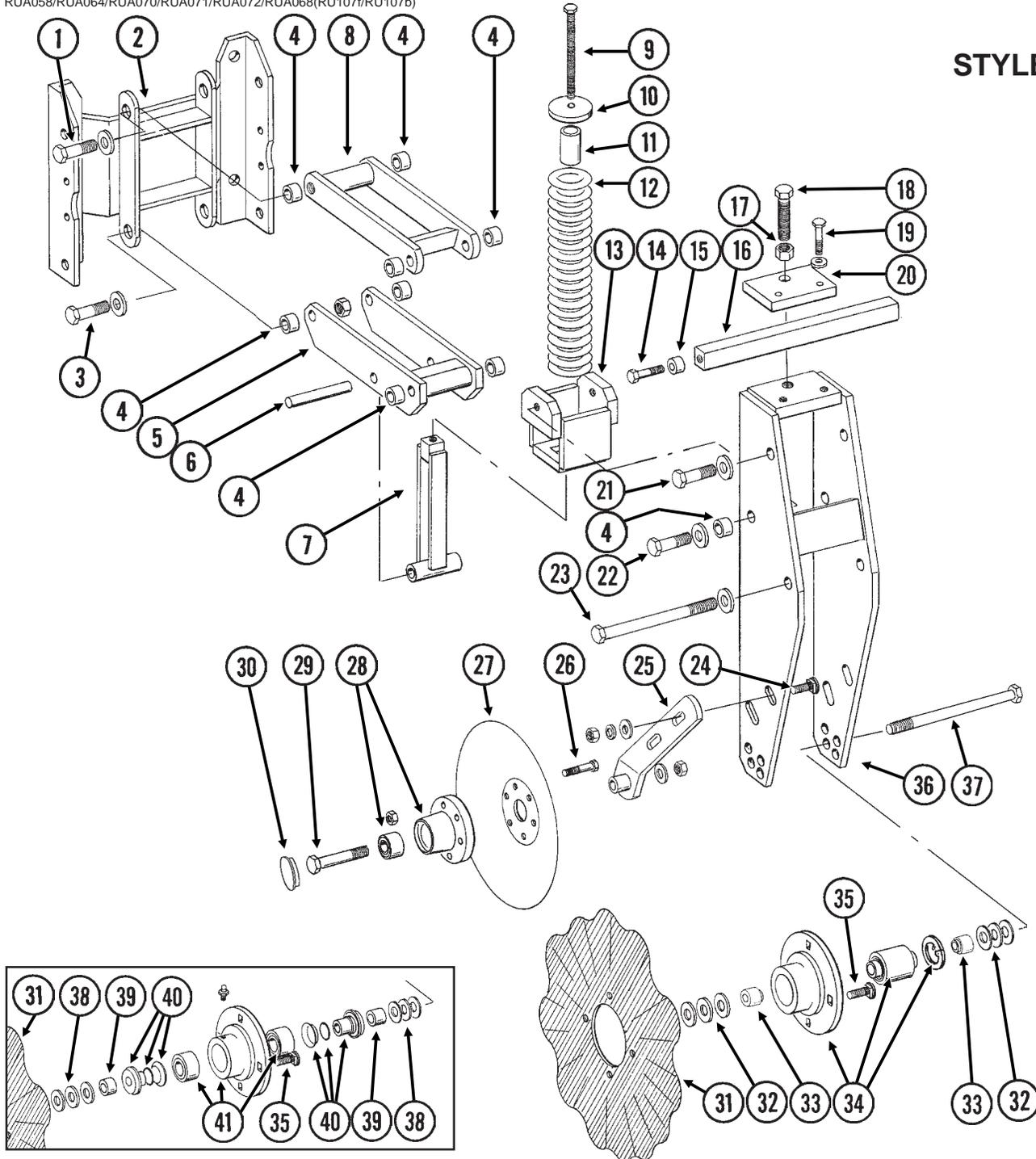
COULTER MOUNTED RESIDUE WHEELS

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GD1132	2	Dust Cap
2.	G10010	2	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 3"
	G10503	2	Hex Jam Nut, $\frac{5}{8}$ "-11, Grade 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
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

P30

Rev. 9/02

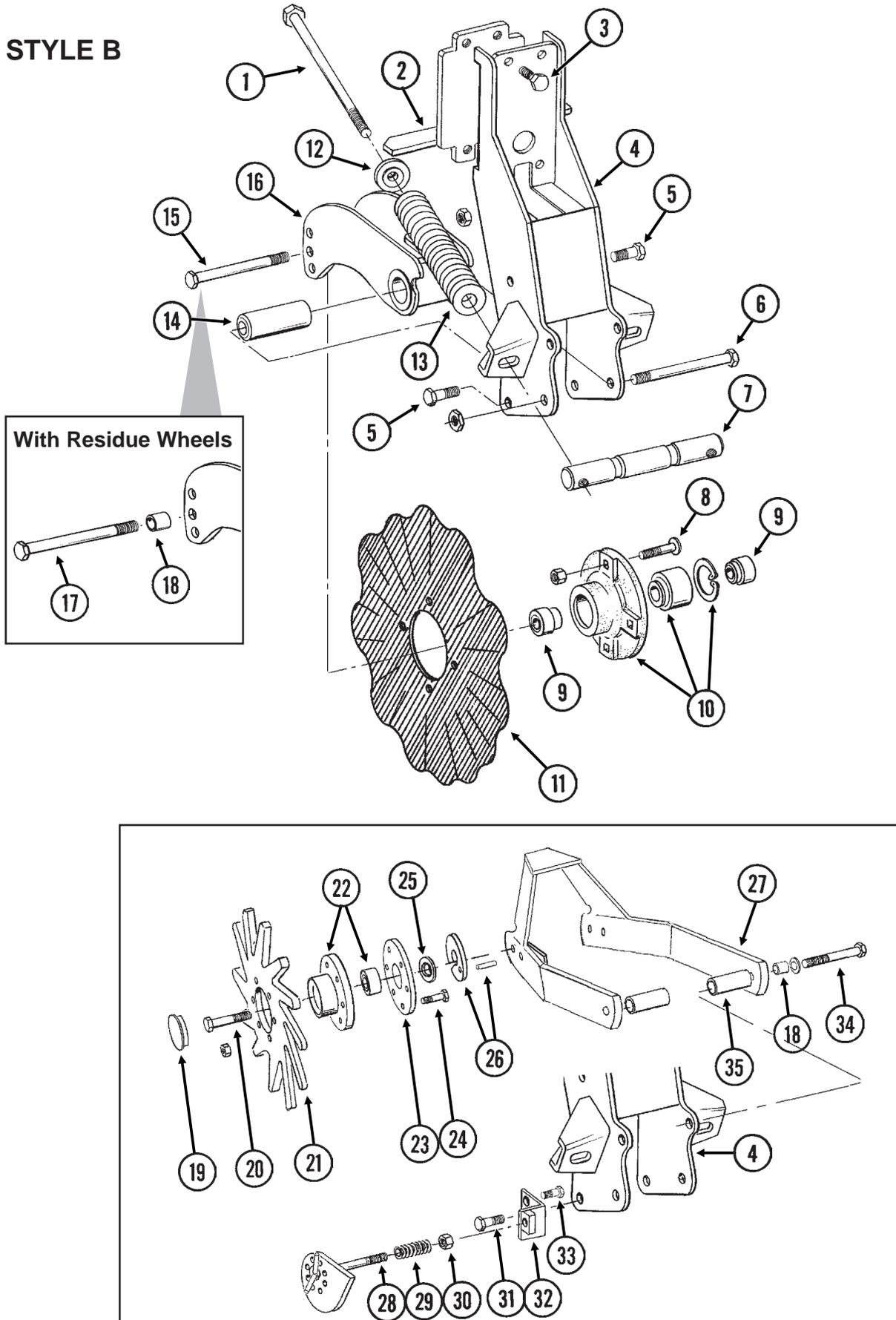
FRAME MOUNTED COULTER W/DISC FURROWER

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
8.	GA5630	1	Upper Parallel Link
9.	G10573	1	Hex Head Cap Screw, 5/8"-11 x 5 1/2", Full Thread
10.	GB0196	1	Washer
11.	GD7817-09	1	Spacer, 11/16" I.D. x 1 3/4" Long
12.	GD7831	1	Compression Spring
13.	GA5637	1	Spring Socket
14.	GD7818	2	Special Bolt
15.	GD7817-01	2	Spacer, 11/16" I.D. x 3/4" Long
16.	GD7816	1	Depth Control Bar
17.	G10104	1	Hex Nut, 5/8"-11
18.	G10582	1	Hex Head Cap Screw, 5/8"-11 x 4", Full Thread
19.	G10581	2	Hex Head Cap Screw, 1/2"-13 x 2 1/4"
	G10228	2	Lock Washer, 1/2"
20.	GD7811	1	Depth Adjustment Clamp
21.	G10008	2	Hex Head Cap Screw, 5/8"-11 x 2"
	GD7805	2	Special Washer, 5/8", Hardened
	GD1109	-	Bushing, 41/64" I.D. x 7/8" O.D. x 1/4" Long (As Required)
	G10107	1	Lock Nut, 5/8"-11
22.	G10055	2	Hex Head Cap Screw, 5/8"-11 x 1 1/4"
	GD7805	2	Special Washer, 5/8", Hardened
23.	G10012	1	Hex Head Cap Screw, 5/8"-11 x 6 1/2"
	GD7805	2	Special Washer, 5/8", Hardened
	GD1109	-	Bushing, 41/64" I.D. x 7/8" O.D. x 1/4" Long (As Required)
	G10107	1	Lock Nut, 5/8"-11
24.	G10747	4	Carriage Bolt, 1/2"-13 x 2"
	G10206	-	Washer, 1/2" SAE (As Required)
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
25.	GA5636	2	Arm
26.	G10572	12	Truss Head Slotted Machine Screw, 5/16"-18 x 7/8"
	G10106	12	Hex Nut, 5/16"-18
27.	GD7823	2	Disc Blade, Solid, 12" (Shown)
	GD8307	-	Disc Blade, Notched, 12"
28.	GA5654	2	Hub W/Bearings
	GA2014	4	Bearing
29.	G10036	2	Hex Head Cap Screw, 5/8"-11 x 4"
	G10107	2	Lock Nut, 5/8"-11
30.	GD1132	2	Dust Cap
31.	GD7803	1	Disc Blade, Fluted, 1", 8 Flutes (Shown)
	GD7804	-	Disc Blade, Bubbled, 1"
	GD9254	-	Disc Blade, Fluted, 3/4", 13 Flutes
32.	G10213	-	Machine Bushing, 5/8" (.030" Thick) (As Required)
	G10918	-	Machine Bushing, 5/8", 14 Gauge (As Required)
33.	GD11698	2	Adapter
34.	GA8641	1	Hub W/Bearing And Retaining Ring
	GA8603	-	Double Row Bearing
	GD11652	-	Retaining Ring, 2 7/16"
35.	G10574	4	Carriage Bolt, 1/2"-13 x 1 1/4"
	G10111	4	Lock Nut, 1/2"-13
36.	GA5643	1	Fork Mount
37.	G10068	1	Hex Head Cap Screw, 5/8"-11 x 6"
	G10107	1	Lock Nut, 5/8"-11
38.	G10217	-	Washer, 5/8" USS (As Required)
39.	GD7817-04	2	Spacer, 11/16" I.D. x 1/2" Long
40.	G1K330	2	Adapter Kit W/O-Ring And Spring Washer
	GD8844	-	O-Ring
	GD8843	-	Spring Washer
41.	GA5640	1	Hub W/Bearings And Grease Fitting (Sub G1K290)
	GA5622	-	Bearing (2 Used Per Hub)
	G10640	-	Grease Fitting, 1/4"-28

FRAME MOUNTED COULTER W/RESIDUE WHEELS

(RU135c/RU135g/RU135hh)

STYLE B



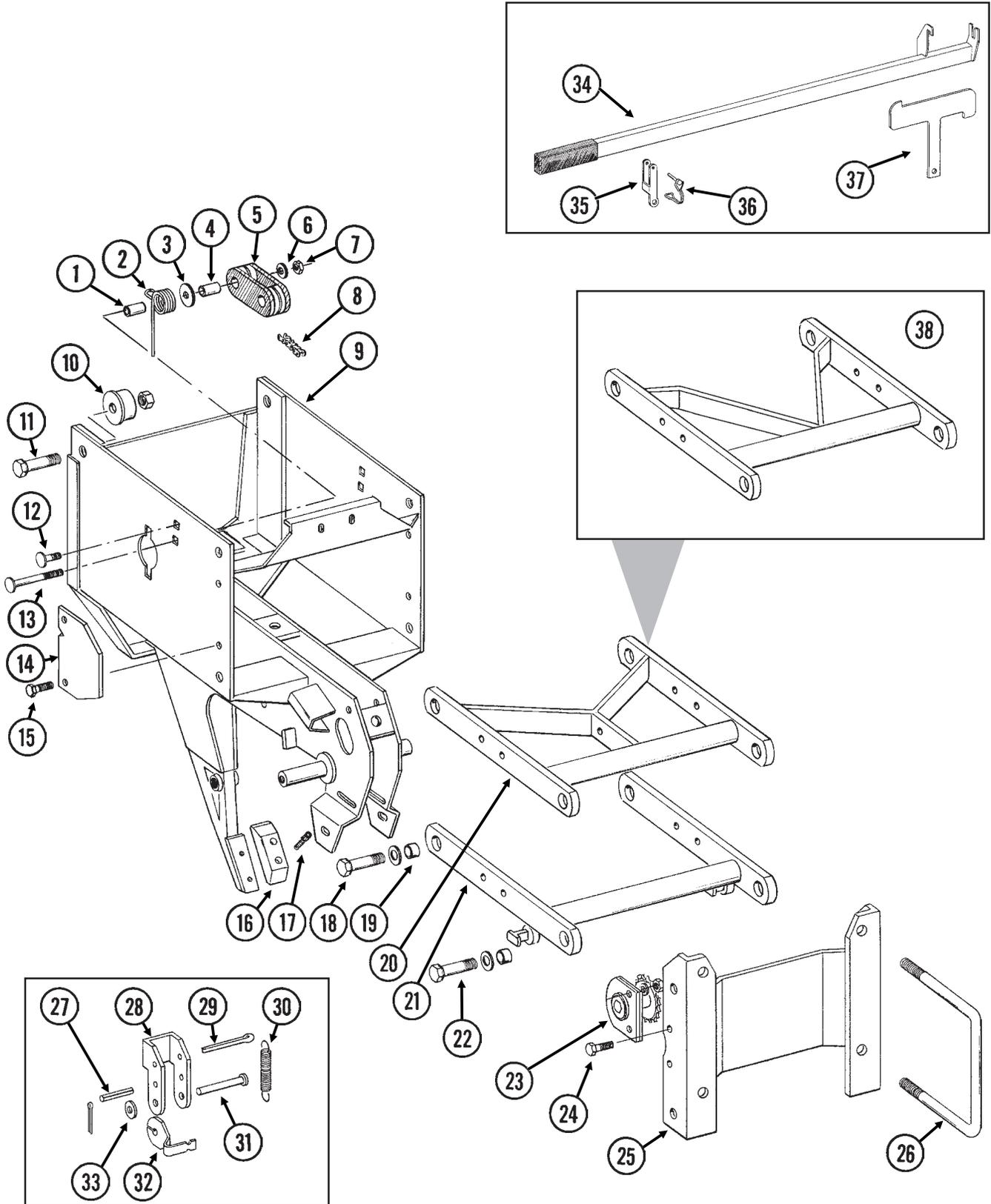
FRAME MOUNTED COULTER W/RESIDUE WHEELS

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.	G10010	2	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 3"
	G10503	2	Hex Jam Nut, $\frac{5}{8}$ "-11, Grade 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
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(RU89p/RU121/RU89i)

NOTE: Push row units use the same seed tube, row unit depth adjustment components, quick adjustable down force springs, 15" opener disc blades, gauge wheels, closing wheels, meter drive and seed hopper as the pull row unit. See those pages for common parts.

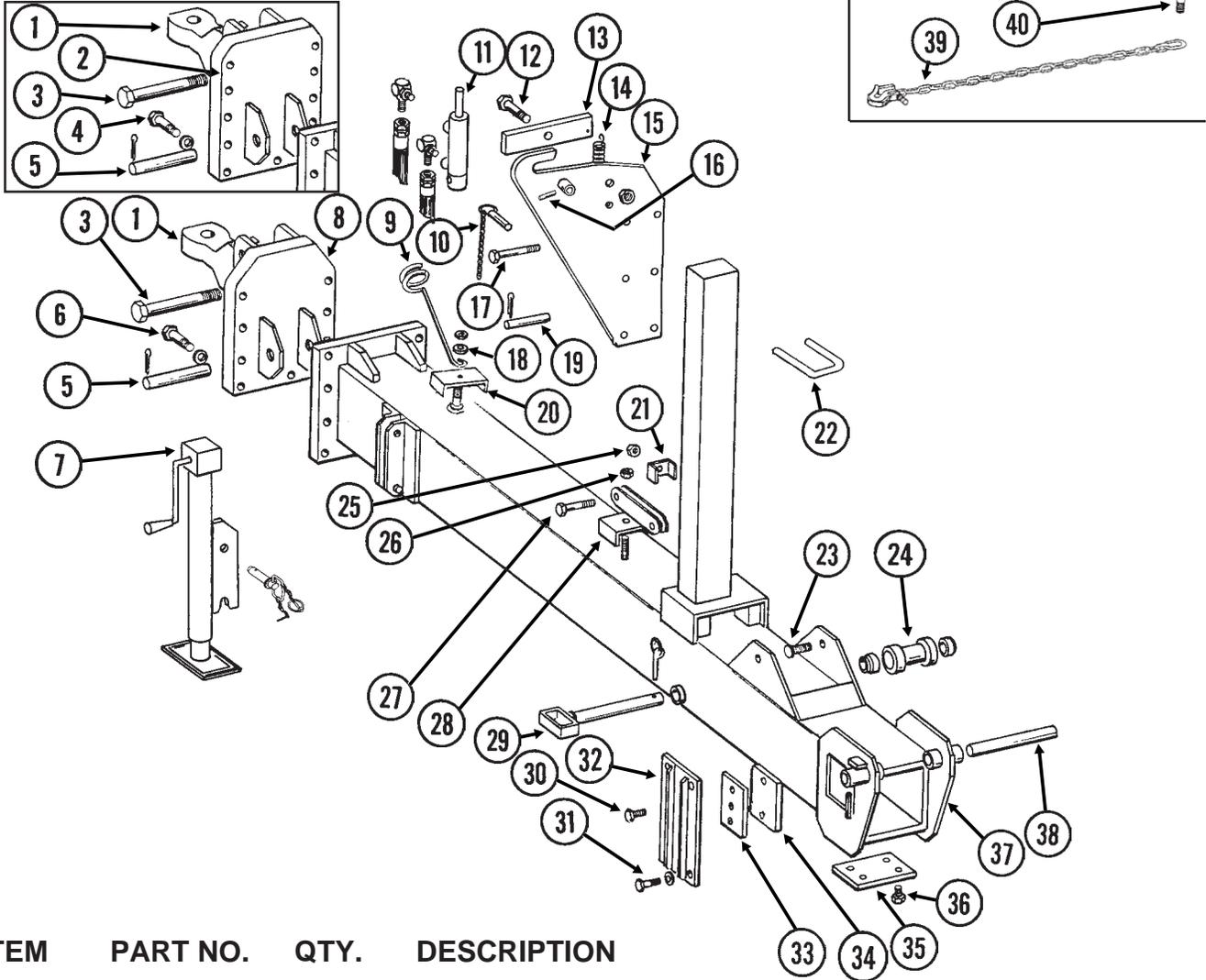


INTERPLANT® PUSH ROW UNIT

ITEM	PART NO.	QTY. (Per Row)	DESCRIPTION
1.	GD1026	1	Sleeve, 1 3/16" Long
2.	GD11218	1	Spring
3.	G10201	1	Special Washer, 3/8" x 1 1/2" O.D.
4.	GD8893-01	1	Sleeve, 1 3/8" Long
5.	GD11962	1	Idler
6.	G10210	1	Washer, 3/8" USS
7.	G10108	1	Lock Nut, 3/8"-16
8.	G3303-96	1	Chain, No. 41, 96 Pitch Including Connector Link
	GR0196	1	Connector Link, No. 41
9.	GA8037	-	Push Row Unit Shank
10.	GB0314	2	Hopper Mount
11.	G10751	2	Hex Head Cap Screw, 5/8"-18 x 1 3/4"
	G10412	2	Lock Nut, 5/8"-18
12.	G10599	1	Carriage Bolt, 3/8"-16 x 1 1/4"
	G10101	1	Hex Nut, 3/8"-16
	G10108	1	Lock Nut, 3/8"-16
13.	G10307	1	Carriage Bolt, 3/8"-16 x 3 1/2"
14.	GD10867	2	Stop
15.	G10004	4	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10108	4	Lock Nut, 3/8"-16
16.	GB0301	1	Seed Tube Guard/Inner Scraper
17.	G10912	2	Hex Socket Head Cap Screw, 5/16"-18 x 1", Grade 8
18.	G10751	4	Hex Head Cap Screw, 5/8"-18 x 1 3/4"
	GD7805	4	Special Washer, 5/8", Hardened
	G10412	4	Lock Nut, 5/8"-18
19.	GB0218	8	Bushing, 21/32" I.D. x 7/8" O.D. x 19/32" Long
20.	GA5788	1	Upper Arm
21.	GA5787	1	Lower Arm
22.	G10732	4	Hex Head Cap Screw, 5/8"-18 x 2"
	GD7805	4	Special Washer, 5/8", Hardened
	G10412	4	Lock Nut, 5/8"-18
23.	GA1720	1	Bearing/Sprocket, 7/8" Hex Bore
24.	G10004	2	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
25.	GA5786	1	Mounting Plate
26.	GD1113	2	U-Bolt, 5" x 7" x 5/8"-11
	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

OUTER HITCH/SAFETY CHAIN

PHA038/PHA025(TWL1f/WGN47a)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GB0237	1	Clevis, Single
2.	GA9837	-	Hitch Mount, 12 Row 36"/38" ("T" Hitch Only) And 16 Row 30"
3.	G10169	1	Hex Head Cap Screw, 1 1/4"-7 x 6"
	G10157	1	Lock Nut, 1 1/4"-7
4.	G10802	11	Hex Head Cap Screw, 3/4"-10 x 2 3/4"
	G10231	11	Lock Washer, 3/4"
	G10105	11	Hex Nut, 3/4"-10
5.	GD5173	1	Pin, 1 1/4" x 5 1/8"
	G10462	2	Cotter Pin, 3/16" x 2"
6.	G10009	9	Hex Head Cap Screw, 5/8"-11 x 2 1/2"
	G10230	9	Lock Washer, 5/8"
	G10104	9	Hex Nut, 5/8"-11
7.	GA4994	1	Jack Assembly Complete
	GA4995	-	Detent Pin Assembly
	GR0517	-	Pin
	GR0516	-	Crank Assembly
	GR0515	-	Bevel Gear
8.	GA9836	1	Hitch Mount, 8 Row 36"/38" And 12 Row 30", 12 Row 36"/38" ("Y" Hitch Only)
9.	GD8260	1	Hose Holder
10.	GA7022	1	Detent Pin W/Chain (Transport Latch Locking Pin)
11.			See "Transport Latch Cylinder", Page P79
12.	G10006	1	Hex Head Cap Screw, 5/8"-11 x 2 1/4"
	GB0218	1	Bushing, 21/32" I.D. x 7/8" O.D. x 19/32" Long
	GD7805	1	Special Washer, 5/8", Hardened
	G10107	1	Lock Nut, 5/8"-11
13.	GA7016	1	Catch Bar
14.	GD5857	1	Spring

OUTER HITCH/SAFETY CHAIN

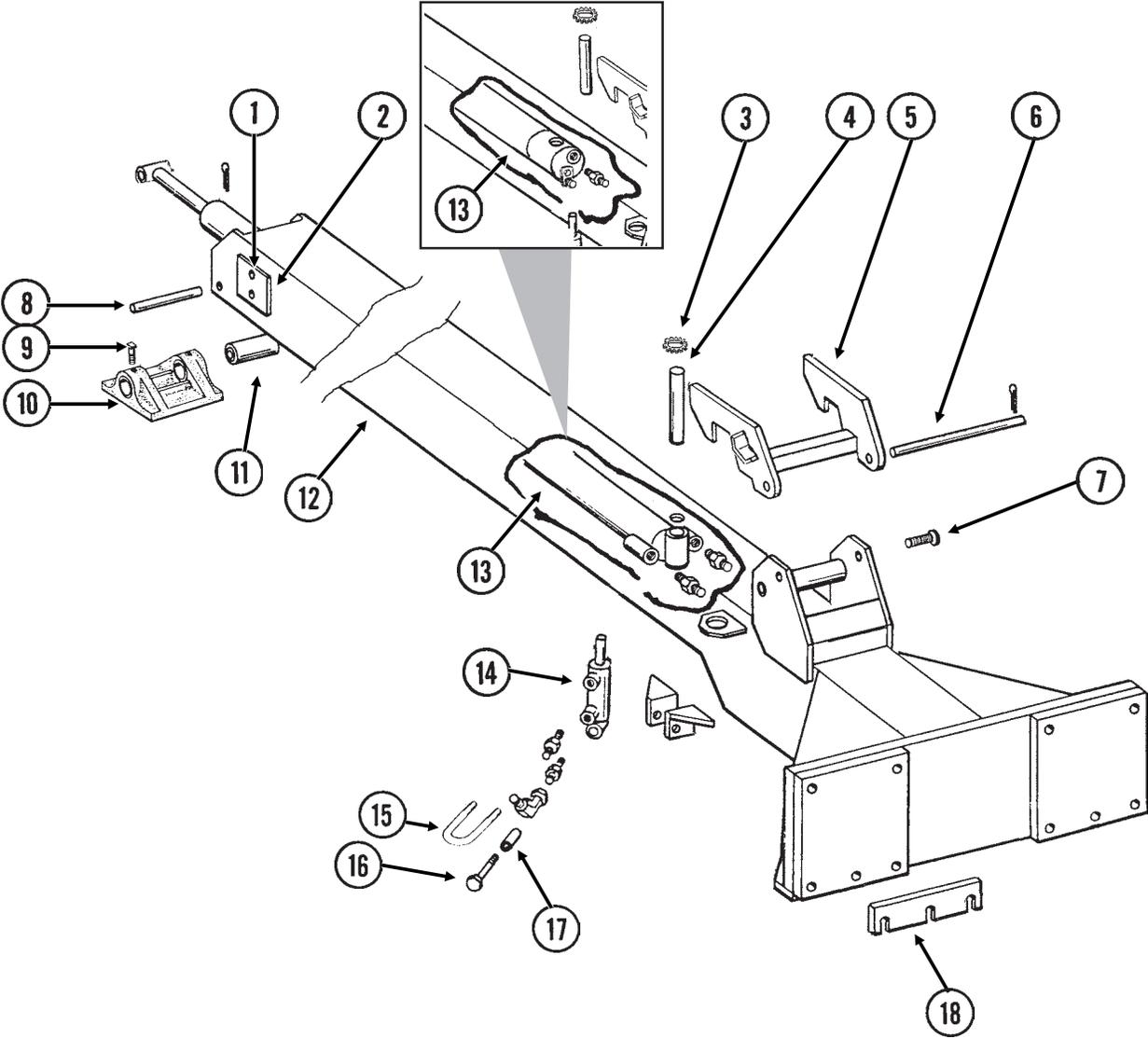
ITEM	PART NO.	QTY.	DESCRIPTION
15.	GA7433	1	Transport Latch
16.	G10765	-	Spring Pin, 1/4" x 1"
17.	G10809	1	Hex Head Cap Screw, 3/8"-16 x 3 1/4"
	GD2971-09	1	Sleeve, 2" Long
	G10108	1	Lock Nut, 3/8"-16
18.	G10216	1	Washer, 1/2" USS
	G10111	1	Lock Nut, 1/2"-13
19.	GD7137	1	Pin, 3/4" x 3 3/8"
	G10457	2	Cotter Pin, 5/32" x 1 1/2"
20.	GD8188	-	Clamp, 7/8" x 3" x 5 3/8"
	GD8189	-	Rubber Pad
21.	GD5892	2	Hose Clamp, 5/8" x 1 1/2" x 1 1/2"
22.	GD9953	3	U-Bolt, 3" x 4" x 5/8"-11
	G10205	1	Washer, 5/8" SAE
	G10230	6	Lock Washer, 5/8"
	G10104	6	Hex Nut, 5/8"-11
23.			See "Hose Take-Up", Pages P42 And P43
24.	GA4418	1	Roller W/Bronze Bushings, 8 Row "Y" And "T" Hitch, 12 Row "Y" Hitch
	GA4842	-	Roller W/Bronze Bushings, 12 Row "T" Hitch And 16 Row "Y" and "T" Hitch
	GD6556	1	Bronze Bushing
25.	G10108	1	Lock Nut, 3/8"-16
26.	G10111	1	Lock Nut, 1/2"-13
27.	G10026	1	Hex Head Cap Screw, 3/4"-10 x 2"
	G10112	1	Lock Nut, 3/4"-10
28.	GA5842	1	Bracket, Jack Mount
	GD8189	-	Rubber Pad
29.	GA4402	1	Safety Pin, 12 3/4", 8 Row 36"/38" And 12 Row 30", 12 Row 36"/38" ("Y" Hitch Only)
	GA4845	-	Safety Pin, 14 3/4", 12 Row 36"/38" ("T" Hitch Only) And 16 Row 30"
	GD2558	-	Lynch Pin, 1/4"
	GD2557	-	Lynch Pin, 7/16"
30.	G10016	8	Hex Head Cap Screw, 1/2"-13 x 2"
	G10228	8	Lock Washer, 1/2"
31.	G10017	8	Hex Head Cap Screw, 1/2"-13 x 1 1/2", 8/12 Row
	G10016	10	Hex Head Cap Screw, 1/2"-13 x 2", 16 Row
	G10228	8-10	Lock Washer, 1/2"
	G10102	8-10	Hex Nut, 1/2"-13
32.	GA7029	2	Wear Mount, 8 Row 36"/38" And 12 Row 30", 12 Row 36"/38" ("Y" Hitch Only)
	GA7084	-	Wear Mount, L.H., 12 Row 36"/38" ("T" Hitch Only) And 16 Row 30"
	GA7085	-	Wear Mount, R.H., 12 Row 36"/38" ("T" Hitch Only) And 16 Row 30"
	GA7083	-	Wear Pad Retainer, 12 Row 36"/38" ("T" Hitch Only) And 16 Row 30"
33.	GD5154	-	Shim, 4" x 4" (As Required), All Sizes
	GD3501	-	Shim, 4" x 6" (As Required), 12 Row 36"/38" ("T" Hitch Only) And 16 Row 30"
34.	GD9959	-	Wear Pad, Nylatron, 4" x 4" (As Required), All Sizes
	GD9960	-	Wear Pad, Nylatron, 4" x 6" (As Required), 12 Row 36"/38" ("T" Hitch Only) And 16 Row 30"
35.	GD7519	3	Shim, 16 Gauge (16 Row Only)
	GD7518	1	Shim, 3/8" (16 Row Only)
36.	G10014	4	Hex Head Cap Screw, 1/2"-13 x 1"
	G10228	4	Lock Washer, 1/2"
	G10216	4	Washer, 1/2" USS
37.	A7835	-	Outer Hitch, "Y", 73", 8 Row 36"/38" (Non-Stock Item)
	A7836	-	Outer Hitch, "T", 97", 8 Row 36"/38" (Non-Stock Item)
	A7010	-	Outer Hitch, "Y", 97", 12 Row 30" (Non-Stock Item)
	A7061	-	Outer Hitch, "T", 121", 12 Row 30" (Non-Stock Item)
	A7044	-	Outer Hitch, "Y", 121", 12 Row 36"/38" (Non-Stock Item)
	A7072	-	Outer Hitch, "T", 151 1/2", 12 Row 36"/38" (Non-Stock Item)
	A7088	-	Outer Hitch, "Y", 127 1/2", 16 Row 30" (Non-Stock Item)
	A7073	-	Outer Hitch, "T", 151 1/2", 16 Row 30" (Non-Stock Item)
38.	GD5804	1	Pin, 1 1/4" x 12", 8 Row "Y" And "T" Hitch, 12 Row "Y" Hitch
	GD7251	1	Pin, 1 1/4" x 14", 12 Row "T" Hitch And 16 Row "Y" and "T" Hitch
	G10610	2	Spring Pin, 3/8" x 2"
39.	GA7533	1	Safety Chain, 1/2"
40.	G11058	1	Hex Head Cap Screw, 1 1/4"-7 x 3"
	GD10646	1	Special Washer
	G10226	1	Washer, 1 1/4" SAE
	G10157	1	Lock Nut, 1 1/4"-7

INNER HITCH, "Y"

ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10014	4	Hex Head Cap Screw, 1/2"-13 x 1", 8 Row 36"/38" And 12 Row 30"/36"/38"
	G10017	4	Hex Head Cap Screw, 1/2"-13 x 1 1/2", 16 Row 30"
	G10228	4	Lock Washer, 1/2", 16 Row 30"
2.	GD9959	2	Wear Pad, Nylatron, 4" x 4"
	GD5154	4-6	Shim, 4" x 4"
3.	G10894	-	External Washer
4.	GD3537-17	1	Shaft, 1 1/4" x 6 3/8", 8 Row 36"/38" And 12 Row 30"/36"/38"
	GD3537-18	-	Shaft, 1 1/4" x 7 3/8", 16 Row 30"
5.	GA7423	1	Tongue Hook W/Grease Fittings, 8/12 Row
	GA7424	-	Tongue Hook W/Grease Fittings, 16 Row
	G10641	-	Grease Fitting, 1/8" NPT
6.	GD5804	1	Pin, 1 1/4" x 12", 8/12 Row
	GD7883	-	Pin, 1 1/4" x 14 1/2", 16 Row
	G10468	2	Cotter Pin, 3/8" x 2"
7.	GD8188	-	Clamp, 7/8" x 3" x 5 3/8"
	GD8189	-	Rubber Pad
8.			See "Hose Take-Up", Pages P42 And P43
9.	G11077	1	Hex Head Cap Screw, 1/2"-13 x 2 1/4"
	G10111	1	Lock Nut, 1/2"-13
10.	G10004	1	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10229	1	Lock Washer, 3/8"
	G10101	1	Hex Nut, 3/8"-16
11.	GD10650	1	Hose Clamp
12.	G10003	1	Hex Head Cap Screw, 3/8"-16 x 1 1/2"
	G10210	1	Washer, 3/8" USS
	G10108	1	Lock Nut, 3/8"-16
13.	GD10664	1	Shield (If Applicable)
14.	GD5173	1	Pin, 1 1/4" x 5 1/8"
	G10462	1	Cotter Pin, 3/16" x 2"
15.	G10131	1	Square Head Set Screw, 5/16"-18 x 3/4"
16.	GB0246	1	Shoe
17.	GD3537-11	1	Shaft, 1 1/4" x 7", 8/12 Row
	GD3537-12	-	Shaft, 1 1/4" x 8", 16 Row
18.	A7427	-	Inner Hitch, 145 3/8", 8 Row 36"/38" (Non-Stock Item)
	A7429	-	Inner Hitch, 169 3/8", 12 Row 30" (Shown) (Non-Stock Item)
	A7428	-	Inner Hitch, 191 5/8", 12 Row 36"/38" (Non-Stock Item)
	A7426	-	Inner Hitch, 205 3/8", 16 Row 30" (Non-Stock Item)
19.		-	See "Tongue Cylinder", Pages P81-P84
20.		-	See "Tongue Lock Cylinder", Page P80
21.	GD10530	1	U-Bolt, 2 1/8" x 1 7/8" x 3/8"-16
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
22.	G10585	1	Hex Head Cap Screw, 1/2"-13 x 3 1/4"
	G10216	1	Washer, 1/2" USS
	G10228	1	Lock Washer, 1/2"
	G10102	1	Hex Nut, 1/2"-13
23.	GD10538-01	1	Sleeve
24.	GD13543	1	Shim, 2 1/2" x 10", 7 Gauge
	GD13544	1	Shim, 2 1/2" x 10", 10 Gauge
	GD13545	1	Shim, 2 1/2" x 10", 12 Gauge
	GD13546	1	Shim, 2 1/2" x 10", 14 Gauge

INNER HITCH, "T"

PHA035/PHA036(TWL2d/TWL3e)

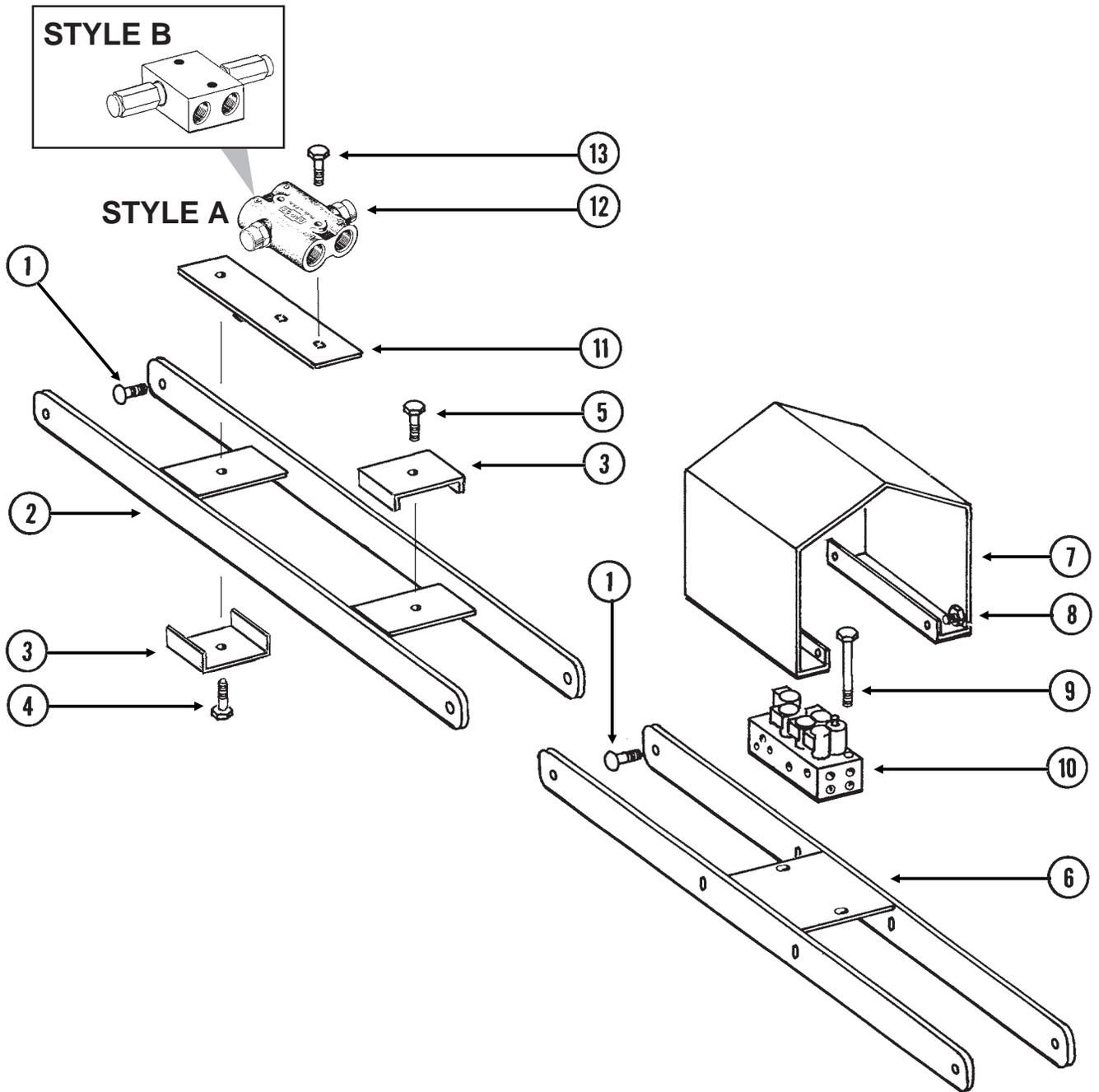


INNER HITCH, "T"

ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10014	4	Hex Head Cap Screw, 1/2"-13 x 1", 8 Row 36"/38" And 12 Row 30"
	G10017	4	Hex Head Cap Screw, 1/2"-13 x 1 1/2", 12 Row 36"/38" And 16 Row 30"
	G10228	4	Lock Washer, 1/2", 12 Row 36"/38" And 16 Row 30"
2.	GD9959	2	Wear Pad, Nylatron, 4" x 4"
	GD5154	4-6	Shim, 4" x 4"
3.	G10894	-	External Washer
4.	GD3537-17	1	Shaft, 1 1/4" x 6 3/8", 8 Row 36"/38" And 12 Row 30"
	GD3537-18	-	Shaft, 1 1/4" x 7 3/8", 12 Row 36"/38" And 16 Row 30"
5.	GA7423	1	Tongue Hook W/Grease Fittings, 8 Row 36"/38" And 12 Row 30"
	GA7424	-	Tongue Hook W/Grease Fittings, 12 Row 36"/38" And 16 Row 30"
	G10641	-	Grease Fitting, 1/8" NPT
6.	GD5804	1	Pin, 1 1/4" x 12", 8 Row 36"/38" And 12 Row 30"
	GD7883	-	Pin, 1 1/4" x 14 1/2", 12 Row 36"/38" And 16 Row 30"
	G10468	2	Cotter Pin, 3/8" x 2"
7.		-	See "Hose Take-Up", Pages P42 And P43
8.	GD5173	1	Pin, 1 1/4" x 5 1/8"
	G10462	1	Cotter Pin, 3/16" x 2"
9.	G10131	1	Square Head Set Screw, 5/16"-18 x 3/4"
10.	GB0246	1	Shoe
11.	GD3537-11	1	Shaft, 1 1/4" x 7", 8 Row 36"/38" And 12 Row 30"
	GD3537-12	-	Shaft, 1 1/4" x 8", 12 Row 36"/38" And 16 Row 30"
12.	A7431	-	Inner Hitch, 121 5/8", 8 Row 36"/38" (Non-Stock Item)
	A7432	-	Inner Hitch, 145 3/8", 12 Row 30" (Shown) (Non-Stock Item)
	A7430	-	Inner Hitch, 183 1/8", 12 Row 36"/38" And 16 Row 30" (Non-Stock Item)
13.		-	See "Tongue Cylinder", Pages P81-P84
14.		-	See "Tongue Lock Cylinder", Page P80
15.	GD10530	1	U-Bolt, 2 1/8" x 1 7/8" x 3/8"-16
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
16.	G10585	1	Hex Head Cap Screw, 1/2"-13 x 3 1/4"
	G10216	1	Washer, 1/2" USS
	G10228	1	Lock Washer, 1/2"
	G10102	1	Hex Nut, 1/2"-13
17.	GD10538-01	1	Sleeve
18.	GD13543	1	Shim, 2 1/2" x 10", 7 Gauge
	GD13544	1	Shim, 2 1/2" x 10", 10 Gauge
	GD13545	1	Shim, 2 1/2" x 10", 12 Gauge
	GD13546	1	Shim, 2 1/2" x 10", 14 Gauge

HOSE TAKE-UP

PHA039(TWL137/TWL171)



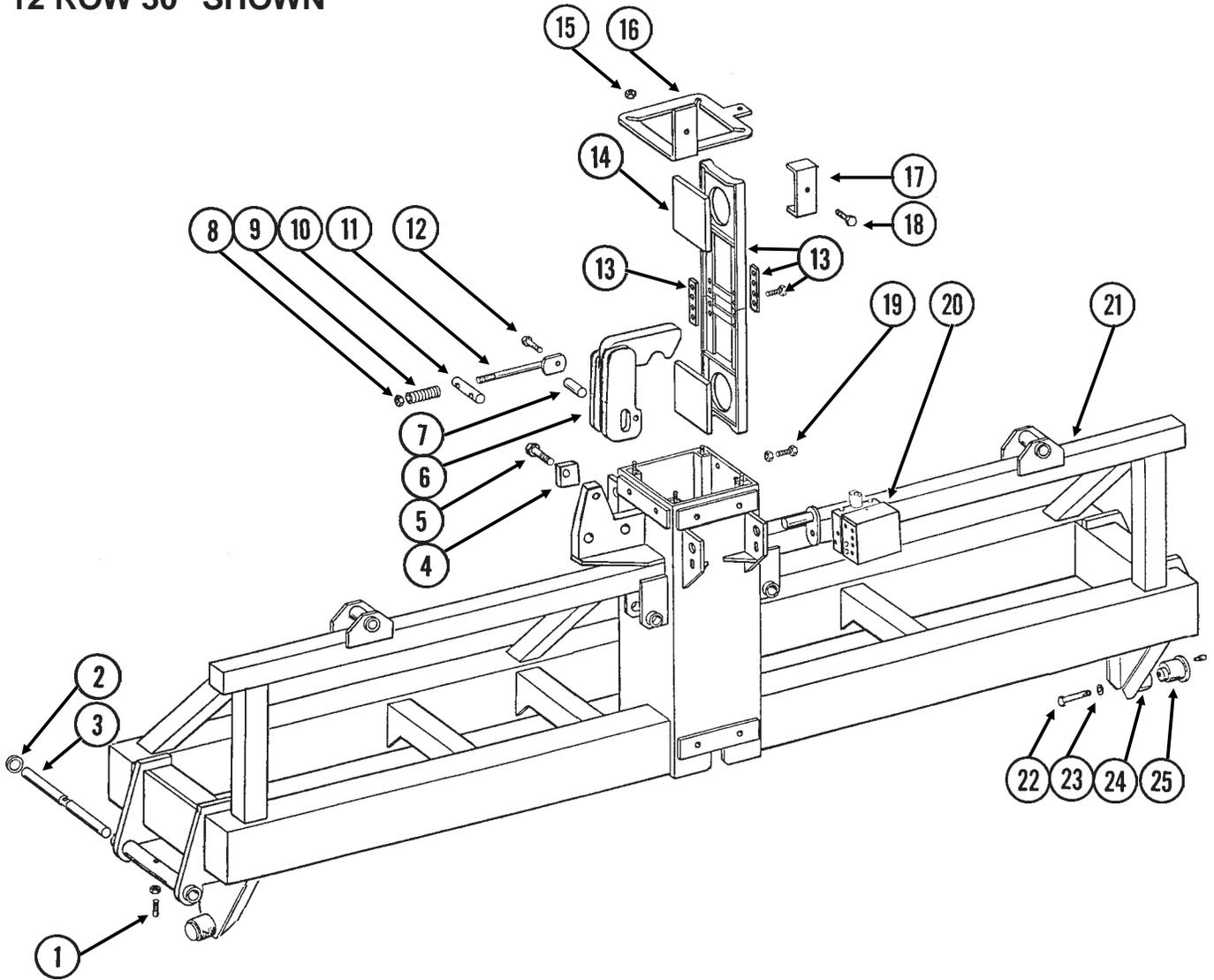
HOSE TAKE-UP

ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10689	6	Carriage Bolt, $\frac{5}{8}$ "-11 x 2"
	GB0218	6	Bushing, $\frac{21}{32}$ " I.D. x $\frac{7}{8}$ " O.D. x $\frac{19}{32}$ " Long
	GD7805	6	Special Washer, $\frac{5}{8}$ ", Hardened
	G10107	6	Lock Nut, $\frac{5}{8}$ "-11
2.	GA7058	1	Take-Up, 28 $\frac{1}{4}$ ", 8 Row 36"/38" "Y" Hitch
	GA7013	-	Take-Up, 44 $\frac{1}{4}$ ", 8 Row 36"/38" "T" Hitch And 12 Row 30" "Y" Hitch (Shown)
	GA7049	-	Take-Up, 56 $\frac{1}{4}$ ", 12 Row 30" "T" Hitch, 12 Row 36"/38" And 16 Row 30" "Y" Hitch
	GA7074	-	Take-Up, 67 $\frac{5}{8}$ ", 12 Row 36"/38" And 16 Row 30" "T" Hitch
3.	GD8188	2	Clamp, $\frac{7}{8}$ " x 3" x 5 $\frac{3}{8}$ "
	GD8189	2	Rubber Pad
4.	G10581	1-2	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 2 $\frac{1}{4}$ "
	G10053	-	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 2 $\frac{1}{2}$ "
	G10111	1	Lock Nut, $\frac{1}{2}$ "-13
5.	G10581	1	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 2 $\frac{1}{4}$ "
	G10111	1	Lock Nut, $\frac{1}{2}$ "-13
6.	GA7057	1	Take-Up, 28 $\frac{1}{4}$ ", 8 Row 36"/38" "Y" Hitch
	GA7021	-	Take-Up, 44 $\frac{1}{4}$ ", 8 Row 36"/38" "T" Hitch And 12 Row 30" "Y" Hitch (Shown)
	GA7050	-	Take-Up, 56 $\frac{1}{4}$ ", 12 Row 30" "T" Hitch And 12 Row 36"/38" And 16 Row 30" "Y" Hitch
	GA7075	-	Take-Up, 67 $\frac{5}{8}$ ", 12 Row 36"/38" And 16 Row 30" "T" Hitch
7.	GD9952	1	Cover, 8 Row 36"/38" "T" Hitch, 12 Row 30"/36"/38" "Y"/"T" Hitch And 16 Row 30" "Y"/"T" Hitch (Shown)
	GD10295	-	Cover, 8 Row 36"/38" "Y" Hitch
8.	G10004	4	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{1}{4}$ "
	G10229	4	Lock Washer, $\frac{3}{8}$ "
	G10203	8	Washer, $\frac{3}{8}$ " SAE
	G10101	4	Hex Nut, $\frac{3}{8}$ "-16
9.	G10172	2	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 5"
	G10210	2	Washer, $\frac{3}{8}$ " USS
	G10108	2	Lock Nut, $\frac{3}{8}$ "-16
10.			See "Valve Block - Located On Hitch", Page P89
11.	GA8131	1	Mount
12.			See "Relief Valve - Located On Hitch", Page P91
13.	G10902	2	Carriage Bolt, $\frac{5}{16}$ "-18 x 2 $\frac{1}{2}$ "
	G10232	2	Lock Washer, $\frac{5}{16}$ "
	G10106	2	Hex Nut, $\frac{5}{16}$ "-18

CENTER FRAME

PFA070/VVB034(TWL138a)

12 ROW 30" SHOWN

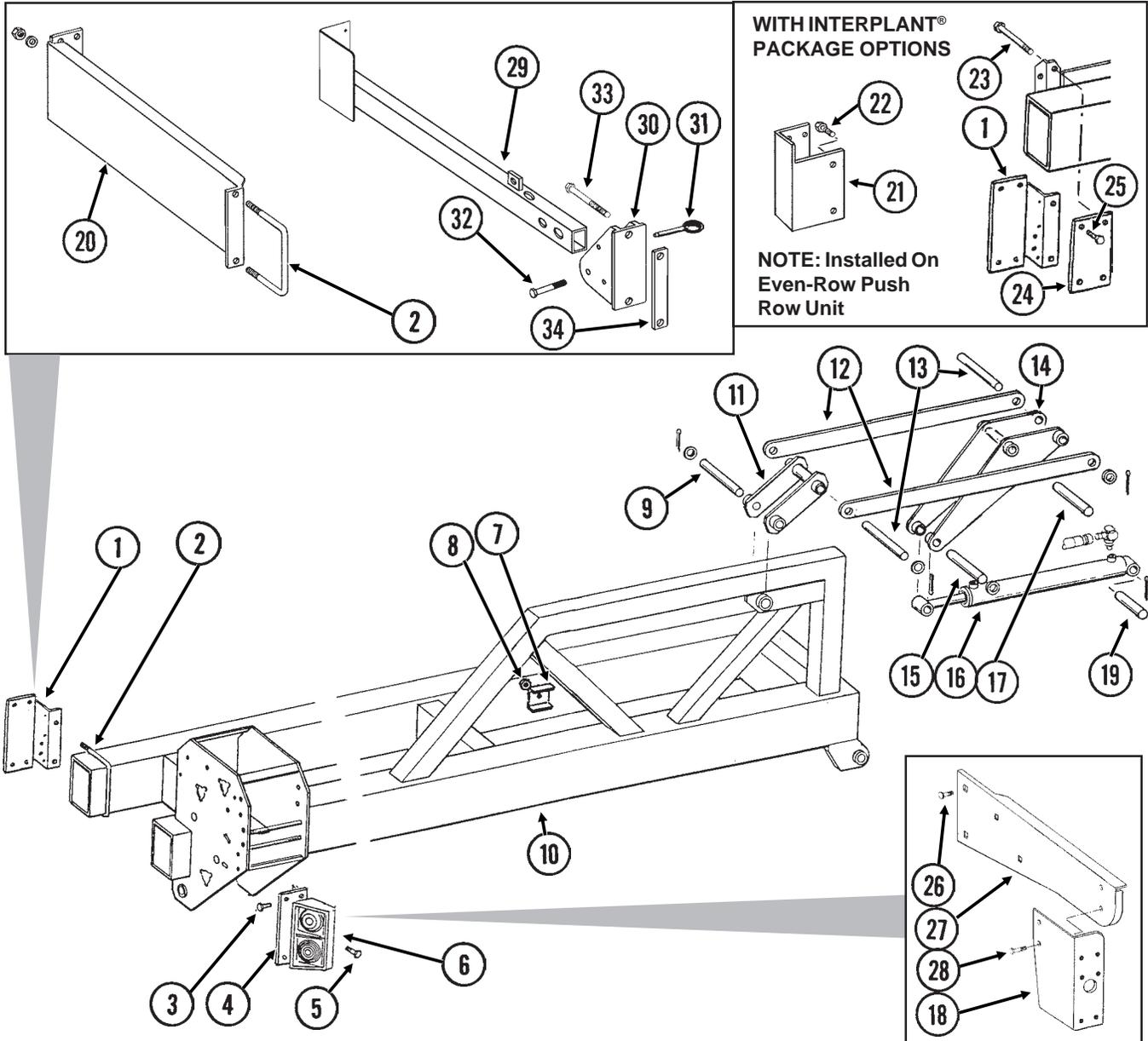


CENTER FRAME

ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10102	1	Hex Nut, 1/2"-13
	G10828	1	Hex Socket Set Screw, 1/2"-13 x 1 1/4"
2.	G10404	-	Machine Bushing, 3 1/8" x 2 1/8" x 3/16" (As Required)
	G10234	-	Machine Bushing, 2 1/8", 10 Gauge (As Required)
	G10336	-	Machine Bushing, 2 1/8", 14 Gauge (As Required)
3.	GD10531	1	Hinge Pin, 2 1/8" x 25 3/4"
4.	GD10492	2	Adjustment Block
5.	G10085	-	Hex Head Cap Screw, 3/4"-10 x 3 3/4"
	G10218	-	Washer, 3/4" USS
	G10112	-	Lock Nut, 3/4"-10
6.	GA7390	-	Safety Hook
7.	GD9898	1	Pin, 1 1/4" x 2 15/16"
8.	G10205	2	Washer, 5/8" SAE
	G10107	2	Lock Nut, 5/8"-11
9.	GD10006	2	Spring
10.	GD9870	1	Pin 1 1/4" x 6"
11.	GA6943	2	Spring Rod
12.	G10037	2	Hex Head Cap Screw, 1/2"-13 x 1 1/4"
	G10206	2	Washer, 1/2" SAE
	G10228	2	Lock Washer, 1/2"
	GD7904-02	2	Sleeve, 1/2" x 1/2" Long
13.	GA7579	4	Pad Holder W/Bars
	GD10706	-	Bar, 1 1/4" x 6" (1/4" Thick)
	GD10707	-	Bar, 1 1/4" x 6" (3/8" Thick)
	G10001	-	Hex Head Cap Screw, 3/8"-16 x 1"
14.	GD10053	8	Wear Pad, 7" x 7", 1/2" Thick
15.	GD7805	4	Special Washer, 5/8", Hardened
	G10104	4	Hex Nut, 5/8"-11
16.	GD9968	1	Cap
17.	GD8188	1	Clamp, 7/8" x 3" x 5 3/8"
	GD8189	1	Rubber Pad
18.	G10053	1	Hex Head Cap Screw, 1/2"-13 x 2 1/2"
	G10228	1	Lock Washer, 1/2"
	G10102	1	Hex Nut, 1/2"-13
19.	G10543	16	Hex Head Cap Screw, 3/4"-10 x 3", Full Thread
	G10105	16	Hex Nut, 3/4"-10
20.		-	See "Valve Blocks - Located On Rear Center Frame", Page P88
21.	A7394	1	Frame, 166", 8 Row 36"/38" And 12 Row 36"/38" (Non-Stock Item)
	A7393	-	Frame, 136", 12 Row 30" And 16 Row 30" (Non-Stock Item)
22.	G10025	2	Hex Head Cap Screw, 3/4"-10 x 1 1/2"
23.	GD9052	2	Special Washer, 3/4" I.D. x 2" O.D., Hardened
24.	GD10532	2	Sleeve
25.	GA6497	2	Cam Follower W/Grease Fitting
	G10640	-	Grease Fitting, 1/4"-28

WING FRAME

PFA069(TWL187/TWL187c/TWL180a/TWL139c/TWL139a/TWL188)



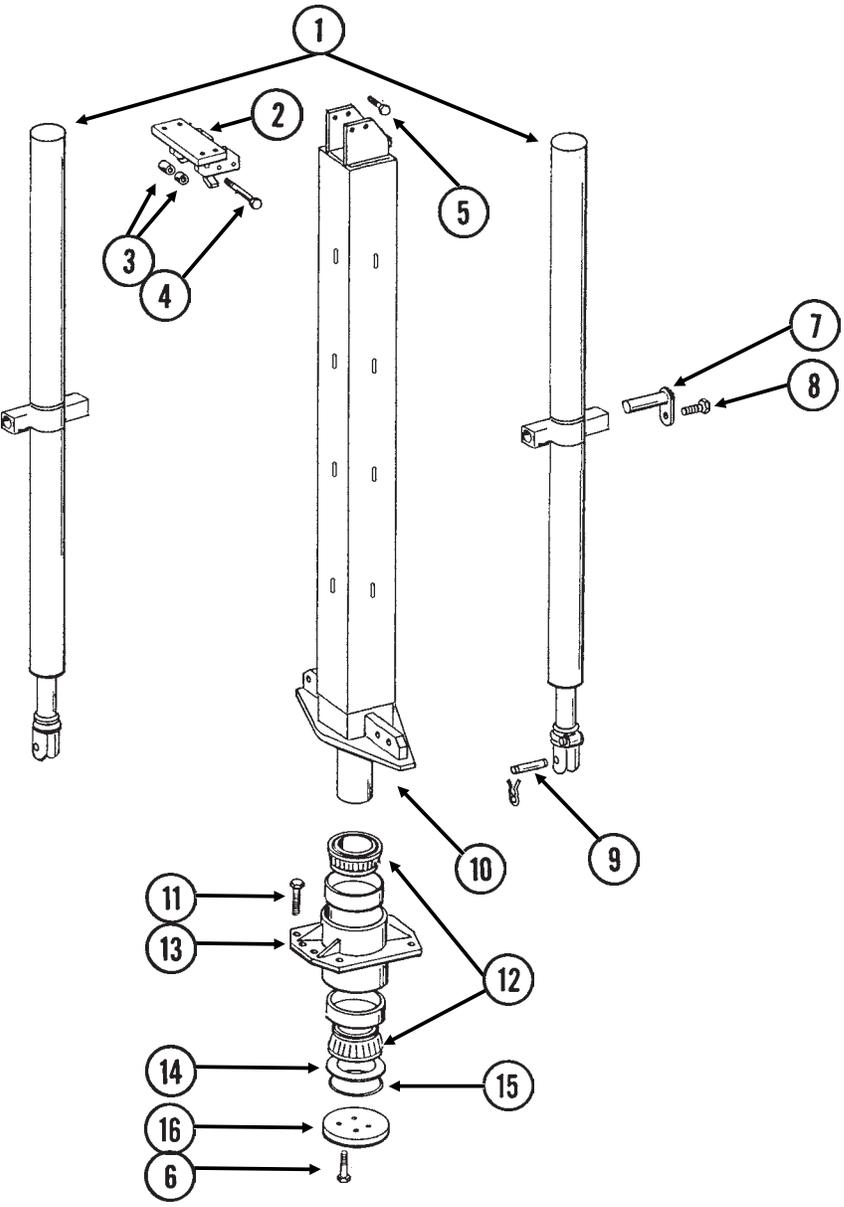
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA6792	1	Light Bracket
2.	GD1113	1	U-Bolt, 5" x 7" x 5/8"-11
	G10230	2	Lock Washer, 5/8"
	G10104	2	Hex Nut, 5/8"-11
3.	G10001	2	Hex Head Cap Screw, 3/8"-16 x 1"
	G10210	1	Washer, 3/8" USS
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
4.	GD9681	1	Light Bracket
5.	G10064	8	Hex Head Cap Screw, 1/4"-20 x 1"
	G10110	8	Lock Nut, 1/4"-20, Grade B
6.		-	See "Electrical Components", Pages P96 And P97
7.	GD5875	-	Hose Clamp, 9/16" x 2 1/2" x 2"
8.	G10108	-	Lock Nut, 3/8"-16
9.	GD9963	1	Pin, 1 1/4" x 9"
	G10460	2	Cotter Pin, 1/4" x 2"

WING FRAME

ITEM	PART NO.	QTY.	DESCRIPTION
10.	A7834	-	Wing, R.H., 75 1/2", 8 Row 36"/38" (Non-Stock Item)
	A7833	-	Wing, L.H., 75 1/2", 8 Row 36"/38" (Non-Stock Item)
	A6904	-	Wing, R.H., 119 1/4", 12 Row 30" (Non-Stock Item)
	A6905	-	Wing, L.H., 119 1/4", 12 Row 30" (Non-Stock Item)
	A7028	-	Wing, R.H., 152", 12 Row 36"/38" (Non-Stock Item)
	A7027	-	Wing, L.H., 152", 12 Row 36"/38" (Non-Stock Item)
	A6892	-	Wing, R.H., 179 1/4", 16 Row 30" (Two Wheel Towers Per Wing) (Non-Stock Item)
	A6893	-	Wing, L.H., 179 1/4", 16 Row 30" (Two Wheel Towers Per Wing) (Non-Stock Item)
11.	GA7018	1	Link
12.	GD10049	2	Strap, 56", 8 Row 36"/38" And 12 Row 36"/38"
	GD9956	2	Strap, 41", 12 Row 30" And 16 Row 30"
13.	GD9964	2	Pin, 1 1/4" x 10 1/2"
	G10159	4	Machine Bushing, 1 1/4", 10 Gauge
	G10460	4	Cotter Pin, 1/4" x 2"
14.	GA7019	1	Toggle Link
15.	GD4108	1	Pin, 1 1/4" x 7"
	G10159	2	Machine Bushing, 1 1/4", 10 Gauge
	G10460	2	Cotter Pin, 1/4" x 2"
16.		-	See "Wing Lock Cylinder", Page P85
17.	GD9955	1	Pin 1 1/4" x 7"
	G10606	2	Spring Pin, 1/4" x 2"
18.	GD12724	1	Bracket
19.	GD6136	2	Pin, 1 1/4" x 5"
	G10460	4	Cotter Pin, 1/4" x 2"
20.	GA9078	1	Bracket
21.	GD12703	1	Push Row Unit Light Bracket
22.	G10001	2	Hex Head Cap Screw, 3/8"-16 x 1"
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
23.	G10439	2	Hex Head Cap Screw, 5/8"-11 x 7"
	G10230	2	Lock Washer, 5/8"
	G10104	2	Hex Nut, 5/8"-11
24.	GD10117	1	Plate
25.	G10007	2	Hex Head Cap Screw, 5/8"-11 x 1 1/2"
	G10230	2	Lock Washer, 5/8"
	G10104	2	Hex Nut, 5/8"-11
26.	G10312	2	Carriage Bolt, 5/16"-18 x 3/4"
	G10620	2	Flange Nut, 5/16"-18
27.	GD12754	1	Light Mount Extension
28.	G10064	2	Hex Head Cap Screw, 1/4"-20 x 1"
	G10227	2	Lock Washer, 1/4"
	G10103	2	Hex Nut, 1/4"-20
29.	GA9840	1	Light Bracket
30.	GB0309	1	Light Mount Bracket
31.	G10874	1	Detent Pin, 1/2" x 3 1/2" Grip
32.	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
33.	G10439	2	Hex Head Cap Screw, 5/8"-11 x 7"
	G10230	2	Lock Washer, 5/8"
	G10104	2	Hex Nut, 5/8"-11
34.	GD1908	1	Mounting Bracket
A.	G7698X	-	Push Row Unit Mounted Light Bracket Package (Items 21 And 22 On This Page And 42" Harness Extension, Item 5 On Page P96)

CENTER PIVOT

PFA067/PFA068(TWL7c)

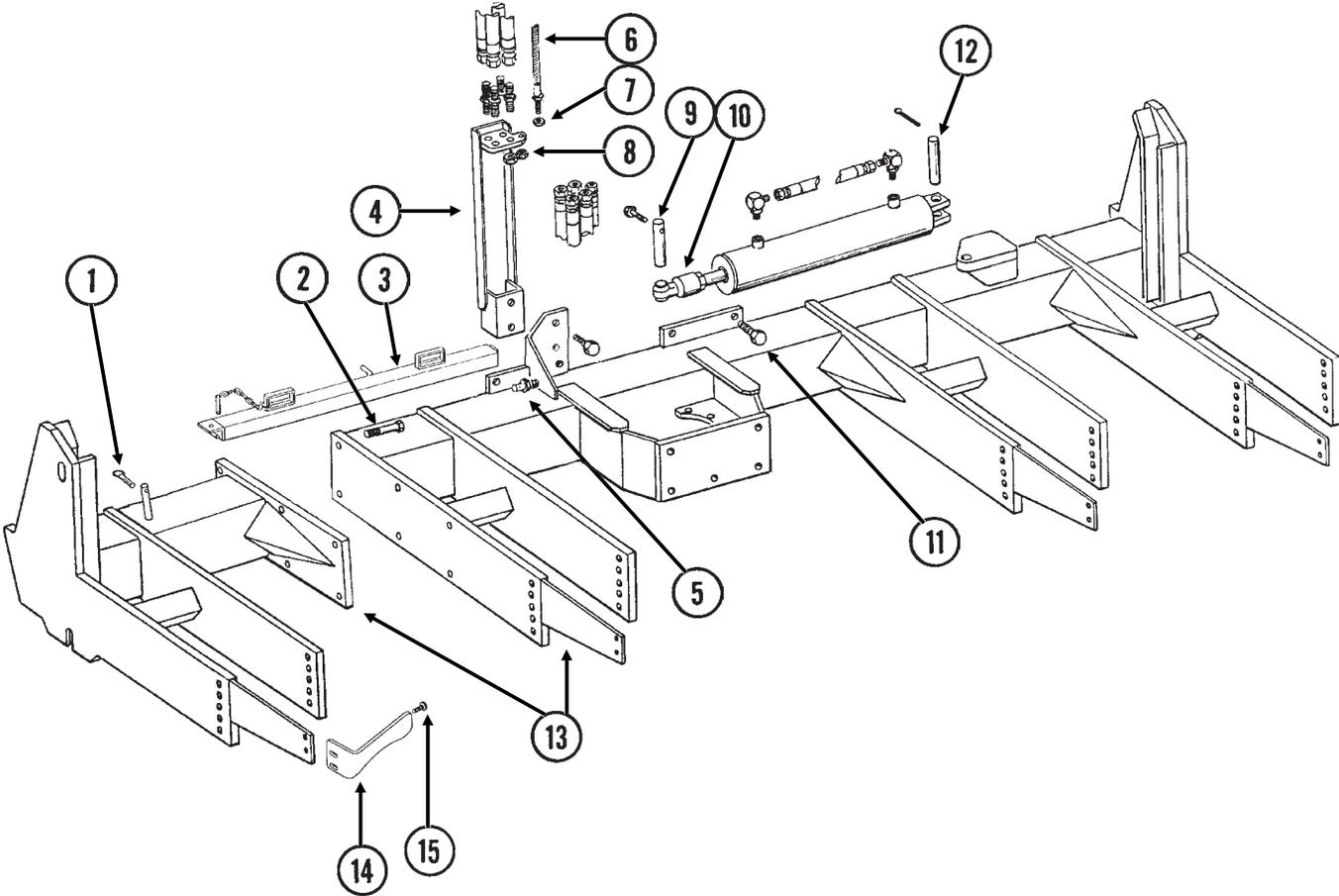


CENTER PIVOT

ITEM	PART NO.	QTY.	DESCRIPTION
1.		-	See "Center Lift Cylinder", Page P75
2.	GA6964	1	Hook Strap
3.	GD10447	1	Sleeve, 3 ⁵ / ₈ "
	GD10446	1	Sleeve, 3 ¹³ / ₁₆ "
4.	G10011	1	Hex Head Cap Screw, ⁵ / ₈ "-11 x 5 ¹ / ₂ "
	G10107	1	Lock Nut, ⁵ / ₈ "-11
5.	G10689	4	Carriage Bolt, ⁵ / ₈ "-11 x 2"
	G10107	4	Lock Nut, ⁵ / ₈ "-11
6.	G10027	4	Hex Head Cap Screw, ³ / ₄ "-10 x 2 ¹ / ₂ "
	GD2169	1	Special Washer, ²⁵ / ₃₂ " I.D. x 1 ¹ / ₄ " O.D., Hardened
7.	GA5121	4	Pin, 2 ¹ / ₈ "
8.	G10017	4	Hex Head Cap Screw, ¹ / ₂ "-13 x 1 ¹ / ₂ "
	G10216	4	Washer, ¹ / ₂ " USS
	G10228	4	Lock Washer, ¹ / ₂ "
	G10102	4	Hex Nut, ¹ / ₂ "-13
9.	GR0375	2	Pin, 1" x 3 ¹ / ₂ "
	GR0193	4	Hair Pin Clip
10.	GA7540	1	Center Post
11.	G10441	8	Hex Head Cap Screw, ⁷ / ₈ "-9 x 3", Grade 8
	GD10063	8	Hardened Washer, ⁷ / ₈ "
	G11053	8	Hex Nut, ⁷ / ₈ "-9, Grade 8
12.	GA7096	2	Cone
13.	GA7067	1	Bearing Housing W/Cups And Grease Fitting
	GD10011	2	Cup
	G10779	1	Grease Fitting, 90°, ¹ / ₄ "-28
14.	GD10012	-	Shim, .005" Thick (As Required)
	GD10013	-	Shim, .020" Thick (As Required)
	GD10014	-	Shim, .007" Thick (As Required)
15.	GD9130	1	O-Ring
16.	GD9636	1	Bearing Cap

AXLE ASSEMBLY

HTA043/HTA044/PFA071/PHA033/PHA034/PFA073(TWL140b)

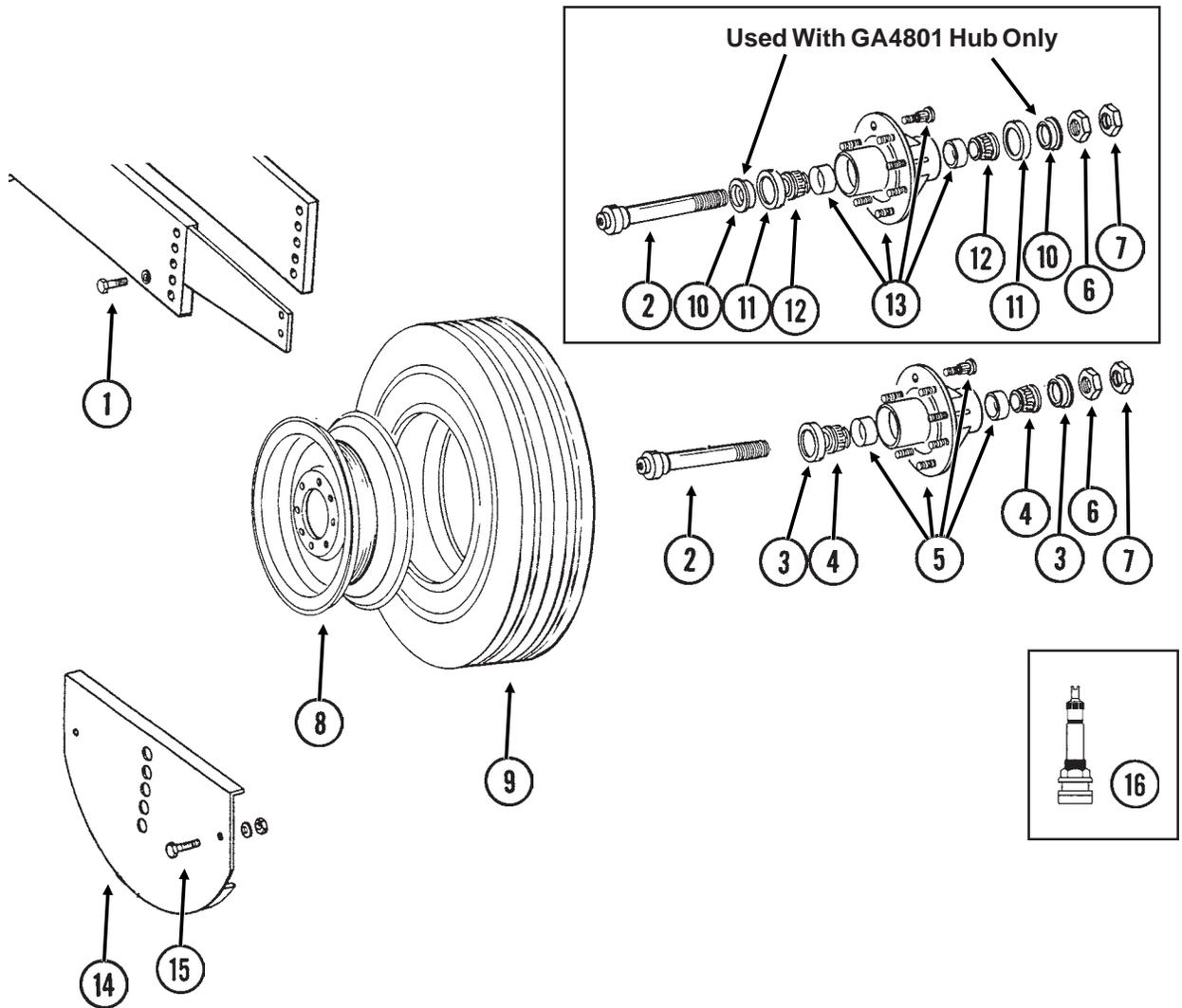


AXLE ASSEMBLY

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD2558	1	Lynch Pin, 1/4"
2.	G10802	6	Hex Head Cap Screw, 3/4"-10 x 2 3/4"
	G10028	-	Hex Head Cap Screw, 3/4"-10 x 3"
	G10231	6	Lock Washer, 3/4"
	G10105	6	Hex Nut, 3/4"-10
3.	GA7098	1	Manual Safety Lockup W/Detent Pin
	GA7022	1	Detent Pin W/Chain
4.	GA7048	1	Hose Support/Junction
5.	GD8276	1	Pin
	G10237	1	Lock Washer, 7/16"
	G10100	1	Hex Nut, 7/16"-14
6.	GA7120	1	Cable, 8 Row 36"/38" And 12 Row 36"/38"
	GA6608	-	Cable Assembly, 12 Row 30" And 16 Row 30"
7.	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
8.	G306-08	2	Lock Nut, 3/4"-16
	G306-10	2	Lock Nut, 7/8"-14
9.	GD10092	1	Pin, 1 1/4" x 5 1/4"
	G10226	4	Washer, 1 1/4" SAE
	G10049	1	Hex Head Cap Screw, 3/8"-16 x 2 1/2"
	G10108	1	Lock Nut, 3/8"-16
10.		-	See "Rotation Cylinder", Page P74
11.	G10808	6	Hex Head Cap Screw, 1"-8 x 10", Grade 8, "Y" Hitch
	G10437	4	Hex Head Cap Screw, 3/4"-8 x 2 1/2", Grade 8, "Y" Hitch
	G10811	6	Hex Head Cap Screw, 1"-8 x 11", Grade 8, "T" Hitch
	G10810	4	Hex Head Cap Screw, 3/4"-10 x 3 1/2", Grade 8, "T" Hitch
	GD10231	6	Special Washer, 1 1/16" I.D. x 2" O.D.
	G10647	6	Hex Nut, 1"-8, Grade 8
	GD2169	4	Special Washer, 25/32" I.D. x 1 1/4" O.D., Hardened
	G10436	4	Hex Nut, 3/4"-10
12.	GD10064	1	Pin, 1 1/4" x 5 1/4", 8/12/16 Row
	G10460	2	Cotter Pin, 1/4" x 2"
13.	GA8062	-	Axle W/Stub Axle, 12 Row 30" And 16 Row 30"
	GA9883	-	Stub Axle, Narrow Row
	GA8063	-	Axle W/Stub Axle, 8 Row 36"/38" And 12 Row 36"/38"
	GA9882	-	Stub Axle, Wide Row
14.	GD12543	-	Scraper
15.	G10636	-	Carriage Bolt, 1/2"-13 x 1 1/2"
	G10216	-	Washer, 1/2" USS
	G10228	-	Lock Washer, 1/2"
	G10102	-	Hex Nut, 1/2"-13

TRANSPORT WHEELS/ROCK GUARDS

HTA032/HTA040/HTA043/HTA004(TVL141c)



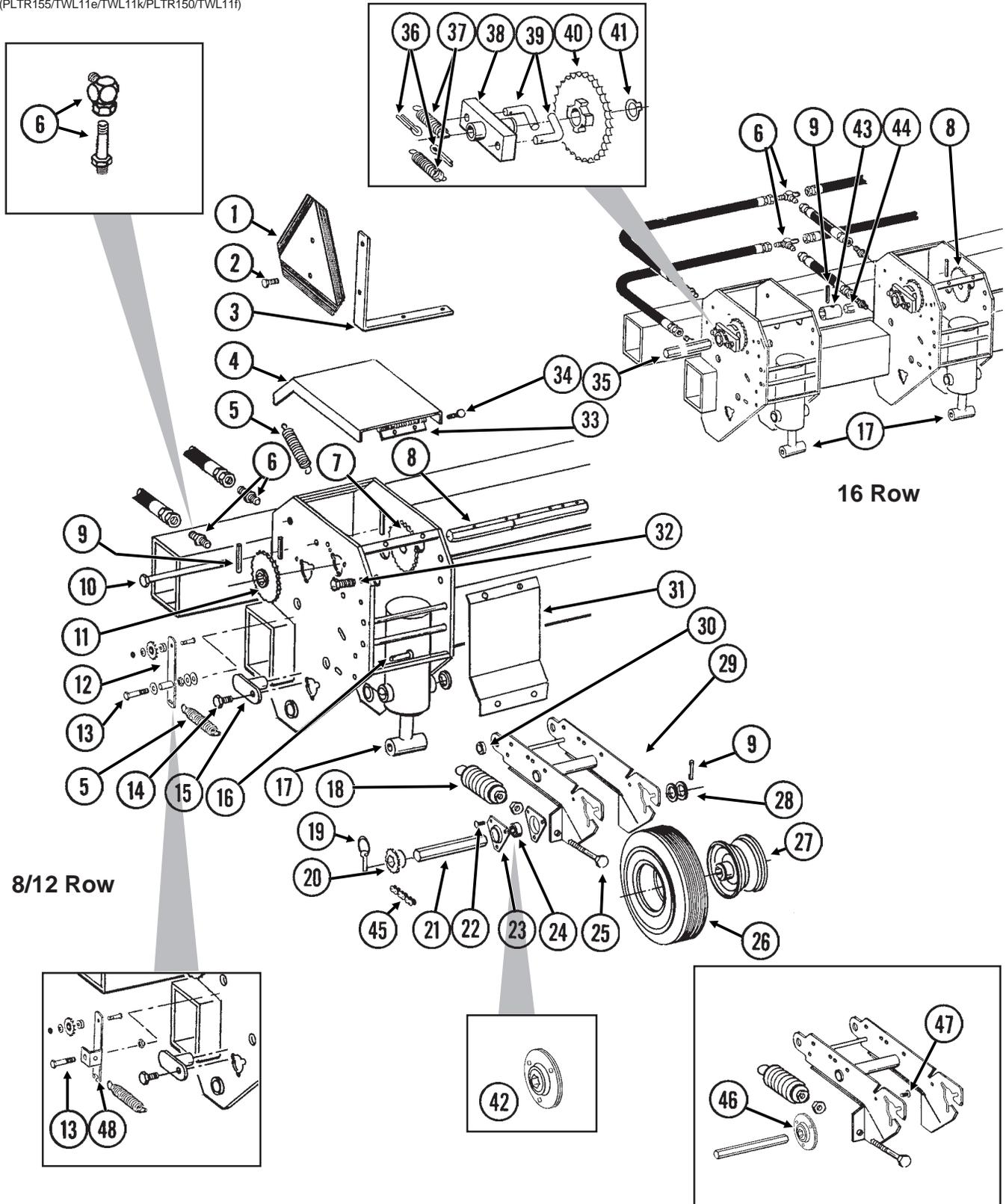
TRANSPORT WHEELS/ROCK GUARDS

ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
1.	G10448	2	Hex Head Cap Screw, 7/8"-9 x 2 1/2", Grade 8
	G10330	2	Lock Washer, 7/8"
2.	GA4727	1	Spindle W/Retaining Ring, 1 3/4"
	G10913	-	External Retaining Ring, 2 1/2"
3.	GA4722	2	Seal
4.	GA4723	2	Bearing
5.	GA4729	1	Hub W/Cups, Bolts, Nuts And Grease Fitting, 8 Bolt, 1 3/4" Bore, All 8/12 Row And 16 Row (If Applicable)
	G10640	-	Grease Fitting, 1/4"-28
	GD7079	-	Cup
	GR0528	-	Lug Bolt, 5/8"-12 x 2 1/4"
	GR0531	-	Lug Nut, 5/8"-18 UNF
6.	GD7089	1	Special Nut, 1 3/4"-12 UNF
7.	GD7864	1	Special Hex Nut, 1 3/4"-12 UNF
8.	GA9544	-	Rim, 5.5" x 22.5", 8/12/16 Row
9.	GD13409	-	Tire, 255-70R 22.5" W/O Center Rib, Tubeless (Specify Brand*), 8/12/16 Row
10.	GD7163	2	Spacer
11.	GA4799	2	Seal
12.	GA4800	2	Bearing
13.	GA4801	1	Hubs W/Cups, Bolts, Nuts And Grease Fitting, 8 Bolt, 1 3/4" Bore, 16 Row (If Applicable)
	GD7167	-	Cup
	GR0528	-	Lug Bolt, 5/8"-12 x 2 1/4"
	GR0531	-	Lug Nut, 5/8"-18 UNF
	G10640	-	Grease Fitting, 1/4"-28
14.	GA5716	-	Rock Guard (Optional)
15.	G10037	-	Hex Head Cap Screw, 1/2"-13 x 1 1/4"
	G10228	-	Lock Washer, 1/2"
	G10102	-	Hex Nut, 1/2"-13
16.	GA7434	-	Valve Stem, 8/12/16 Row
A.	GA9545	-	Tire And Rim Assembly (Items 8, 9 And 16) (Specify Brand*)

* Specific brand requests will be supplied only as available from current KINZE® Repair Parts stock. If a specific brand requested is not in stock, the brand available will be supplied.

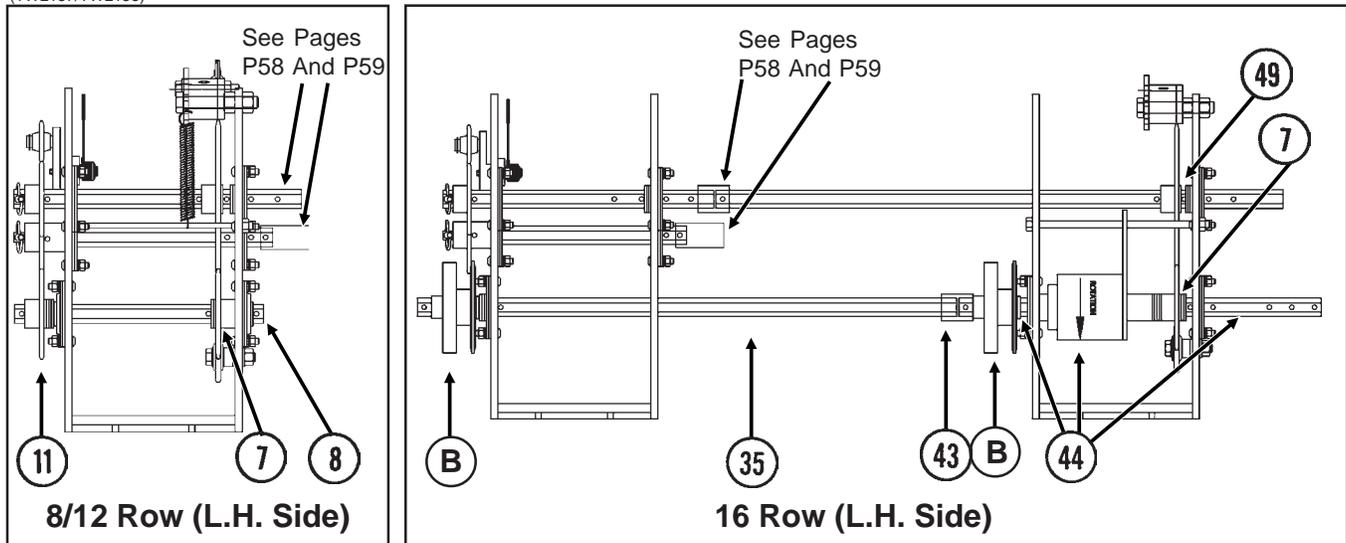
CONTACT DRIVE WHEEL AND DRIVE SHAFT(S)

(PLTR155/TWL11e/TWL11k/PLTR150/TWL11f)



CONTACT DRIVE WHEEL AND DRIVE SHAFT(S)

(TWL157/TWL156)



ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	GD2199	1	SMV Sign
2.	G10022	2	Hex Head Cap Screw, 1/4"-20 x 1/2"
	G10227	2	Lock Washer, 1/4"
	G10103	2	Hex Nut, 1/4"-20
3.	GD9969	1	Bracket
4.	GD10298	1	Cover
5.	GD5857	2	Spring
6.		-	See "Hydraulic Hoses And Fittings On Planter Frame", Pages P94 And P95
7.		-	See "Inner Module Drive", Page P61
8.	GD10543	1	Hex Shaft, 7/8" x 13", See "Point Row Clutch", Pages P62-P65 For 8 And 12 Row Machines Equipped With Point Row Clutches
9.	G10602	4	Spring Pin, 1/4" x 1 1/2"
10.	G10595	-	Hex Head Cap Screw, 3/8"-16 x 10" (Used To Secure Point Row Clutch)
	G10108	-	Lock Nut, 3/8"-16
11.	GA5114	1	Sprocket, 30 Tooth
12.	GA6534	1	Idler W/Sprocket And Hardware
	GA7154	-	Sprocket W/Bearing, 18 Tooth
	G10017	-	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10128	-	Machine Bushing, 1/2", 14 Gauge
	G10501	-	Hex Jam Nut, 1/2"-13, Grade 2
13.	G10743	1	Hex Head Cap Screw, 5/8"-11 x 3 3/4"
	G10036	-	Hex Head Cap Screw, 5/8"-11 x 4"
	G10235	-	Machine Bushing, 7/8", 14 Gauge (As Required)
	G10205	-	Washer, 5/8" SAE (As Required)
	G10104	1	Hex Nut, 5/8"-11
	G10107	1	Lock Nut, 5/8"-11
14.	G10017	2	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10216	2	Washer, 1/2" USS
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
15.	GA5121	2	Pin, 2 1/8"
16.	G10870	1	Clevis Pin, 3/8" x 1"
	G10860	1	Retaining Ring, 3/8"
17.		-	See "Wing Lift Cylinder", Pages P76-P78
18.	GA2068	2	Spring W/Plug
19.	GD2558	1	Lynch Pin, 1/4"
20.	GA5114	1	Sprocket, 30 Tooth
	GA5105	-	Sprocket, 15 Tooth, Half Rate (2 To 1) Drive P55

(Continued On Following Page)

Rev. 3/05

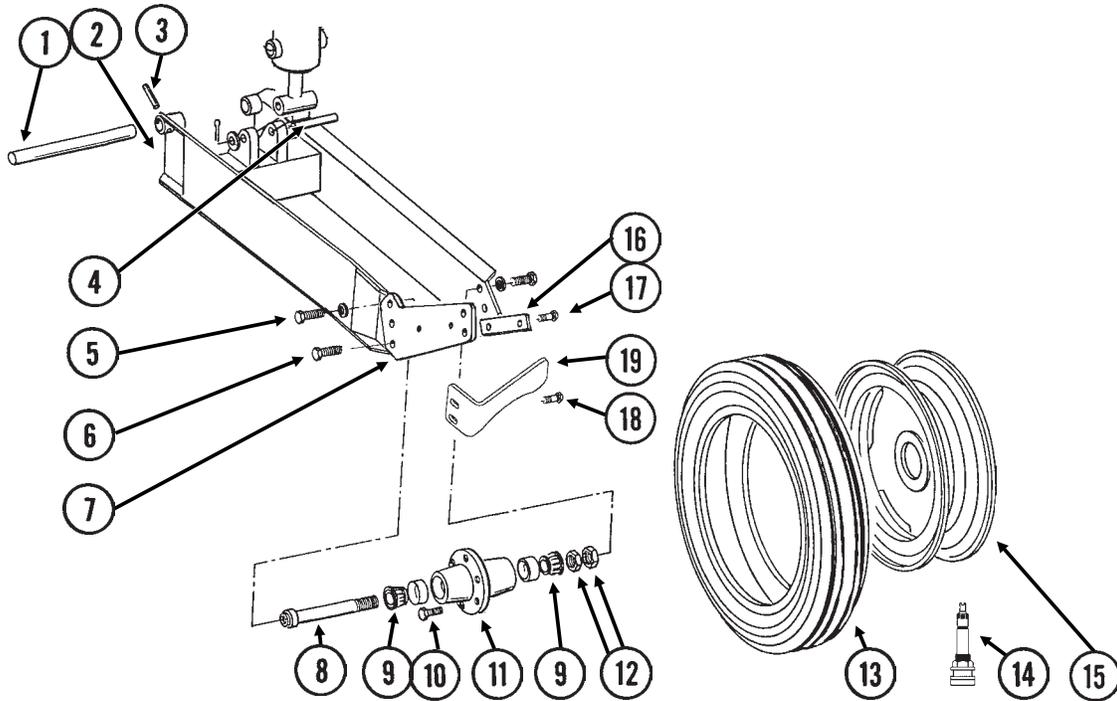
CONTACT DRIVE WHEEL AND DRIVE SHAFT(S)

ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
(Continued)			
21.	GD6775	1	Hex Shaft, 7/8" x 11 3/4" (2 Holes)
22.	G10303	6	Carriage Bolt, 5/16"-18 x 1"
	G10219	6	Washer, 5/16" USS
	G10232	6	Lock Washer, 5/16"
	G10106	6	Hex Nut, 5/16"-18
23.	G3400-01	4	Flangette
24.	G2100-03	2	Bearing, 7/8" Hex Bore, Spherical
25.	G10890	2	Hex Head Adjusting Bolt, 1/2"-13 x 4", Grade 2
	G10501	2	Hex Jam Nut, 1/2"-13, Grade 2
26.	GD4700	1	Tire, 4.80" x 8", 4 Ply, Rib Implement (Specify Brand*)
	GD4701	-	Valve Stem
27.	GA3553	1	Rim, 3.75" x 8"
28.	G10233	-	Machine Bushing, 1", 10 Gauge
29.	GA7372	1	Wheel Arm
30.	GB0218	2	Bushing, 21/32" I.D. x 7/8" O.D. x 19/32" Long
31.	GD6895	1	Shield
32.	G10005	2	Hex Head Cap Screw, 5/8"-11 x 1 3/4"
	G10235	4	Machine Bushing, 7/8", 14 Gauge
	GD7805	2	Special Washer, 5/8", Hardened
	G10205	2	Washer, 5/8" SAE
	G10107	2	Lock Nut, 5/8"-11
33.	GD5789	1	Hinge, Female
	GD5790	1	Hinge W/Pins, Male
34.	G10064	6	Hex Head Cap Screw, 1/4"-20 x 1"
	G10209	4	Washer, 1/4" USS
	G10227	6	Lock Washer, 1/4"
	G10103	6	Hex Nut, 1/4"-20
35.	GD10099	-	Hex Shaft, 7/8" x 29 5/8"
36.	G10464	2	Cotter Pin, 3/16" x 1"
37.	GD1256	2	Spring
38.	GA0378	1	Block And Hub Assembly
39.	GD1255	2	L-Pin
40.	GA5165	1	Sprocket, 30 Tooth
41.	G10430	1	External Retaining Ring, 1 1/4"
42.	GA8706	-	Flange Bearing W/Grease Fitting, 7/8" Hex Bore (Sub GA9846)
	G10938	-	Grease Fitting, 1/4"-28, Taper Thread
43.	GD5212	1	Coupler, 1 3/4", 16 Row Only
44.		-	See "Point Row Clutch", Pages P62-P65
45.	G3310-110	1	Chain, No. 40, 110 Pitch Including Connector Link, Half Rate (2 To 1) Drive
	G3310-118	-	Chain, No. 40, 118 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
46.	GA9846	-	Flanged Bearing, 7/8" Hex Bore
47.	G10303	6	Carriage Bolt, 5/16"-18 x 1"
	G10232	6	Lock Washer, 5/16"
	G10106	6	Hex Nut, 5/16"-18
48.	GA9553	1	Idler W/Sprocket And Hardware, L.H. Side Of Planter
48.	GA9554	-	Idler W/Sprocket And Hardware, R.H. Side Of Planter
	GA7154	-	Sprocket W/Bearing, 19 Tooth
	G10017	-	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10128	-	Machine Bushing, 1/2", 14 Gauge
	G10501	-	Hex Jam Nut, 1/2"-13, Grade 2
49.	G10233	2	Machine Bushing, 1", 10 Gauge
	G10345	2	Machine Bushing, 1", 14 Gauge
A.	GA3552	-	Tire And Rim Assembly (Items 26 And 27) (Specify Brand*)
B.	GA5164	-	Ratchet/Sprocket Assembly, L.H. Side Of Planter (Items 36-41)
	GA9843	-	Ratchet/Sprocket Assembly, R.H. Side Of Planter (Items 36-41)
C.	G1K324	-	Contact Wheel Arm Replacement Kit (Items 9, 21, 25, 28, 29, 46 And 47)

* Specific brand requests will be supplied only as available from current KINZE® Repair Parts stock. If a specific brand requested is not in stock, the brand available will be supplied. Different brand tires may have different diameters. Change in tire brand may affect rates. Field checks are recommended after any change in contact tires.

GROUND DRIVE WHEEL

PTD057(TWL142c)



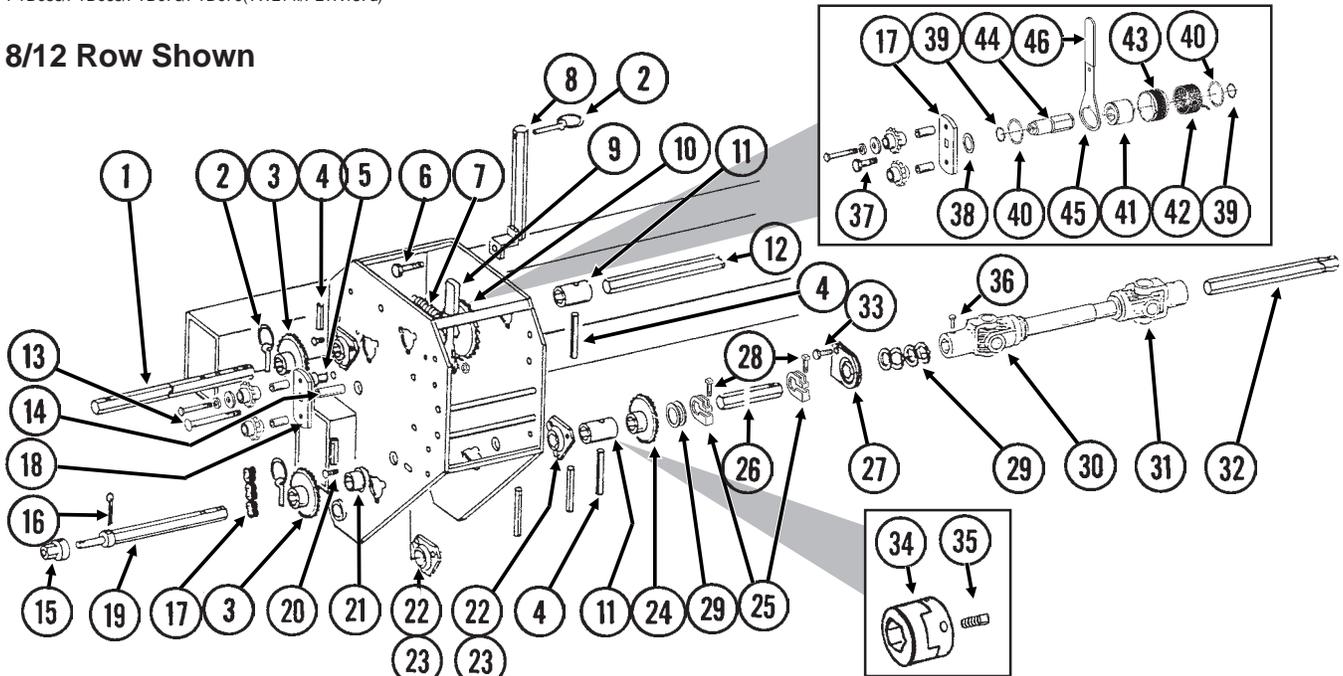
ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
1.	GD11695	-	Pin, 1 1/4" x 13 1/4"
2.	GA8677	1	Wheel Module
3.	G10610	-	Spring Pin, 3/8" x 2"
4.	GD5841	1	Pin, 1 1/4" x 5 5/8"
	G10226	2	Washer, 1 1/4" SAE
	G10460	2	Cotter Pin, 1/4" x 2"
5.	G10026	2	Hex Head Cap Screw, 3/4"-10 x 2"
	G10231	2	Lock Washer, 3/4"
6.	G10026	2	Hex Head Cap Screw, 3/4"-10 x 2"
	G10231	2	Lock Washer, 3/4"
	G10105	2	Hex Nut, 3/4"-10
7.	GD10128	1	Scraper Arm
8.	GA4376	1	Spindle W/Round External Retaining Ring, 10"
	GD11490	-	Round External Retaining Ring
9.	GA0895	2	Bearing
10.	GR0270	6	Lug Bolt, 9/16"-18
11.	GA2148	1	Hub W/Cups, 6 Bolt
	GR0434	-	Cup
12.	G11081	2	Hex Jam Nut, 1 1/2"-12, Grade 2
13.	GD13401	1	Tire, 7.50" x 20", 8 Ply Tubeless W/O Center Rib (Specify Brand*)
14.	GA7434	-	Valve Stem
15.	GA2908	1	Rim, 5.5" x 20"
16.	GD10144	1	Bar Clamp
17.	G10017	2	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
18.	G10636	2	Carriage Bolt, 1/2"-13 x 1 1/2"
	G10216	2	Washer, 1/2" USS
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
19.	GD12543	1	Scraper
A.	GA7997	-	Tire And Rim Assembly (Specify Brand*)(Items 13-15)
B.	GA4377	-	Hub And Spindle Assembly (Items 8, 9, 11 And 12)

* Specific brand requests will be supplied only as available from current KINZE® Repair Parts stock. If a specific brand requested is not in stock, the brand available will be supplied.

SEED RATE TRANSMISSION AND ROW UNIT DRILL SHAFTS

PTD056/PTD065/PTD076/PTD079(TWL14f/PLTR157d)

8/12 Row Shown



ITEM	PART NO.	QTY. (Per Side)	DESCRIPTION
1.	GD6780	1	Shaft, 7/8" x 15"
2.	GD2558	3	Lynch Pin, 1/4"
3.	GA5106	1	Sprocket, 17 Tooth
	GA5107	1	Sprocket, 19 Tooth
	GA5108	2	Sprocket, 23 Tooth
	GA5109	1	Sprocket, 24 Tooth
	GA5110	1	Sprocket, 25 Tooth
	GA5111	1	Sprocket, 26 Tooth
	GA5112	1	Sprocket, 27 Tooth
	GA5113	1	Sprocket, 28 Tooth
4.	G10602	7	Spring Pin, 1/4" x 1 1/2"
5.	G10870	1	Clevis Pin, 3/8" x 1"
	G10860	1	Retaining Ring, 3/8"
6.	G10016	1	Hex Head Cap Screw, 1/2"-13 x 2"
	GD10356	1	Bushing, 3/4" Long (If Applicable)
	G10228	1	Lock Washer, 1/2"
	G10527	2	Lock Washer, 1/2", Internal/External
	G10102	1	Hex Nut, 1/2"-13
7.	GD5857	1	Spring
8.	GA4630	1	Sprocket Storage Rod
9.	GA4235	1	Ratchet Arm W/Protective Closure
	G10445	-	Protective Closure
10.		-	See "Inner Module Drive", Page P61
11.	GD5212	1	Coupler, 1 3/4", 16 Row Only
12.	GD10100	1	Hex Shaft, 7/8" x 31 3/8", 16 Row Only
13.	G10314	1	Carriage Bolt, 1/2"-13 x 3"
	G10111	1	Lock Nut, 1/2"-13
14.	GD3180-05	1	Sleeve, 5/8" I.D. x 7/8" O.D. x 1 3/16" Long
15.	GD7127	1	Shear Coupler
16.	G10462	-	Cotter Pin, 3/16" x 2"
	G10047	-	Hex Head Cap Screw, 3/8"-16 x 1 3/4"
17.	G3310-80	1	Chain, No. 40, 80 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
18.	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"

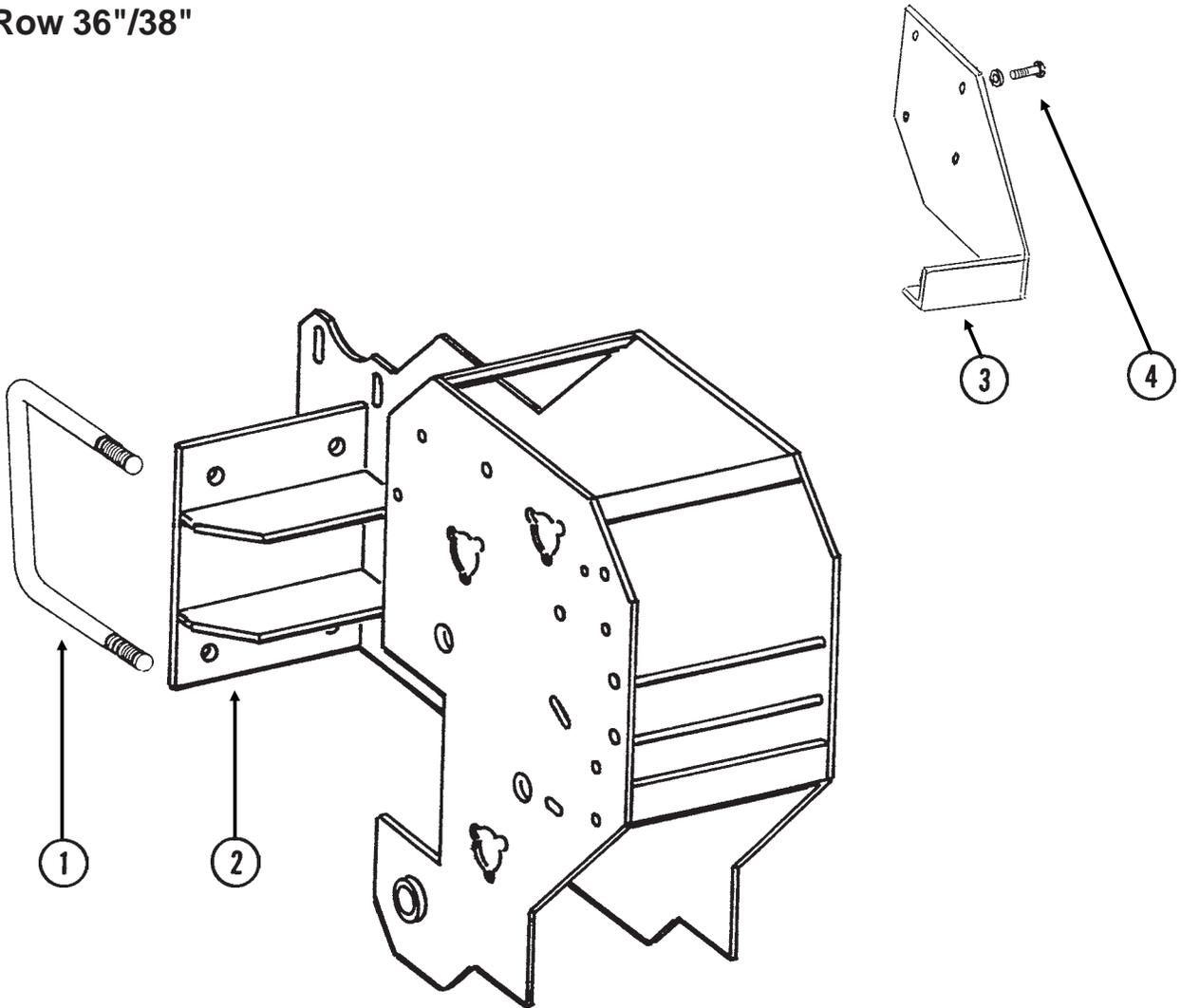
SEED RATE TRANSMISSION AND ROW UNIT DRILL SHAFTS

ITEM	PART NO.	QTY. (Per Side)	DESCRIPTION
19.	GD7612	1	Shaft, 7/8" x 13 1/2"
20.	G10303	-	Carriage Bolt, 5/16"-18 x 1"
	G10232	-	Lock Washer, 5/16"
	G10106	-	Hex Nut, 5/16"-18
21.	GA5548	1	Special Bearing
22.	G3400-01	-	Flangette
23.	G2100-03	-	Bearing, 7/8" Hex Bore, Spherical
24.	GA5107	1	Sprocket, 19 Tooth, Interplant® Package Drive
25.	GD11045	-	Lock Clamp
26.	GD0914-58.5	2	Hex Shaft, 7/8" x 58 1/2" (No Holes), Wing, 8 Row 36"/38"
	GD0914-106.5	-	Hex Shaft, 7/8" x 106 1/2" (No Holes), Wing, 12 Row 30"
	GD0914-134.5	-	Hex Shaft, 7/8" x 134 1/2" (No Holes), Wing, 12 Row 36"/38"
	GD0914-166.75	-	Hex Shaft, 7/8" x 166 3/4" (No Holes), Wing, 16 Row 30"
27.	GA2180	-	Hanger Bearing, 7/8" Hex Bore
28.	G10130	-	Square Head Machine Bolt, 5/16"-18 x 1 3/4"
	G10923	-	Flange Nut, 5/16"-18, No Serration
29.	G10233	-	Machine Bushing, 1", 10 Gauge
30.	GA7053	1	U-Joint W/Grease Fitting, Female, 18 1/8" Long, 8 Row 36"/38" And 12 Row 36"/38"
	GA7052	-	U-Joint W/Grease Fitting, Female, 10 1/4" Long, 12 Row 30" And 16 Row 30"
	GR1557	-	Grease Fitting, 45°, Metric
	GR1298	-	Inboard Yoke And Outer Profile (18 1/4" U-Joint)
	GR1297	-	Inboard Yoke And Outer Profile (10 1/4" U-Joint)
	GR1294	-	Cross And Bearing Kit
	GR1293	-	Yoke, 7/8" Hex
31.	GA7051	-	U-Joint, W/Grease Fitting, Male, 12 1/4" Long
	GR1557	-	Grease Fitting, 45°, Metric
	GR1296	-	Inner Profile
	GR1295	-	Inboard Yoke
	GR1301	-	Spring Pin, 8mm x 50mm
	GR1294	-	Cross And Bearing Kit
	GR1293	-	Yoke, 7/8" Hex
32.	GD0914-53	1	Hex Shaft, 7/8" x 53" (No Holes), R.H. Main Frame, 8 Row 36"/38" And 12 Row 36"/38"
	GD0914-44	1	Hex Shaft, 7/8" x 44" (No Holes), L.H. Main Frame, 8 Row 36"/38" And 12 Row 36"/38"
	GD0914-45	1	Hex Shaft, 7/8" x 45" (No Holes), R.H. Main Frame, 12 Row 30" And 16 Row 30"
	GD0914-35	-	Hex Shaft, 7/8" x 35" (No Holes), L.H. Main Frame, 12 Row 30" And 16 Row 30"
33.	G10004	2	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10229	2	Lock Washer, 3/8"
	G10101	-	Hex Nut, 3/8"-16
34.	GB0287	2	Coupler
35.	G10131	4	Square Head Set Screw, 5/16"-18 x 3/4"
36.	G10688	-	Square Head Set Screw, 3/8"-16 x 5/8"
37.	G11100	1	Hex Socket Button Head Screw, 1/4"-20 x 1 1/2", Grade 8
	G10227	1	Lock Washer, 1/4"
	G10209	1	Washer, 1/4" USS
38.	G10235	1	Machine Bushing, 7/8", 14 Gauge
39.	G10496	2	External Inverted Snap Ring, 1 1/2"
40.	G11075	2	Internal Inverted Snap Ring, 7/8"
41.	GD14432	1	Sleeve, 1 1/4"
42.	GD14414	1	Torsion Spring, R.H. (Used On L.H. Wrap Spring Wrench)(Shown)
	GD14413	-	Torsion Spring, L.H. (Used On R.H. Wrap Spring Wrench)
43.	GD14429	-	Release Collar, Silver, L.H. (Shown)
	GD14430	1	Release Collar, Gold, R.H.
44.	GD14426	1	Tightener Shaft, 3 3/8"
45.	GD14431	1	Handle
46.	G11078	1	Vinyl Cap
A.	G1K269	-	Lock Clamp Kit (Items 25 And 28)
B.	G1K381	-	Wrap Spring Wrench Replacement Kit, Silver Collar, L.H. (Items 37-46) (Shown)
	G1K380	1	Wrap Spring Wrench Replacement Kit, Gold Collar, R.H. (Items 37-46)

BOLT-ON WHEEL MODULE/TRANSPORT LATCH CATCH

PFA072(TWL15a)

8 Row 36"/38"
12 Row 36"/38"

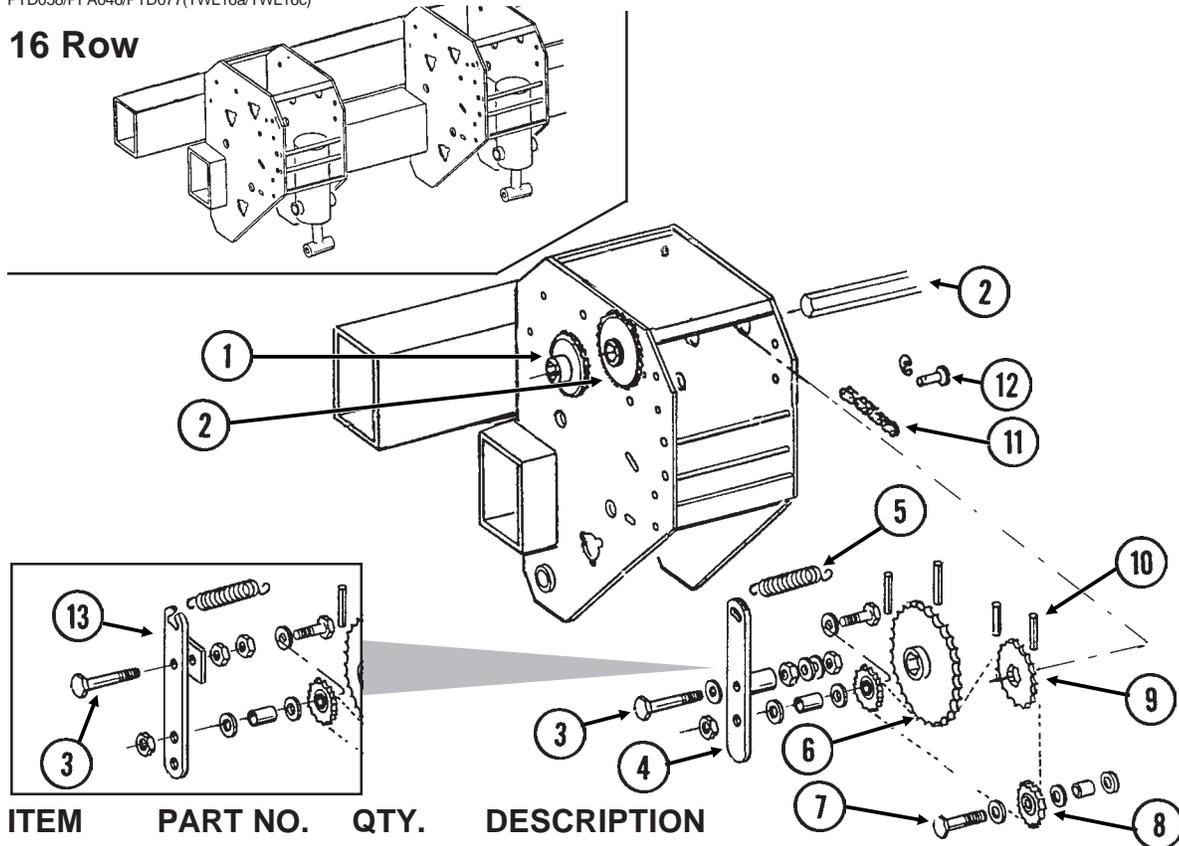


ITEM	PART NO.	QTY. (Per Side)	DESCRIPTION
1.	GD1747	5	U-Bolt, 5" x 7" x 3/4"-10
	G10231	10	Lock Washer, 3/4"
	G10105	10	Hex Nut, 3/4"-10
2.	GA8071	1	Wheel Tower W/Grease Fitting, L.H.
	GA8070	-	Wheel Tower W/Grease Fitting, R.H.
	G10640	-	Grease Fitting, 1/4"-28
3.	GA7108	1	Transport Latch Catch
4.	G10007	4	Hex Head Cap Screw, 5/8"-11 x 1 1/2"
	G10230	4	Lock Washer, 5/8"

INNER MODULE DRIVE

PTD058/PFA046/PTD077(TWL16a/TWL16c)

16 Row

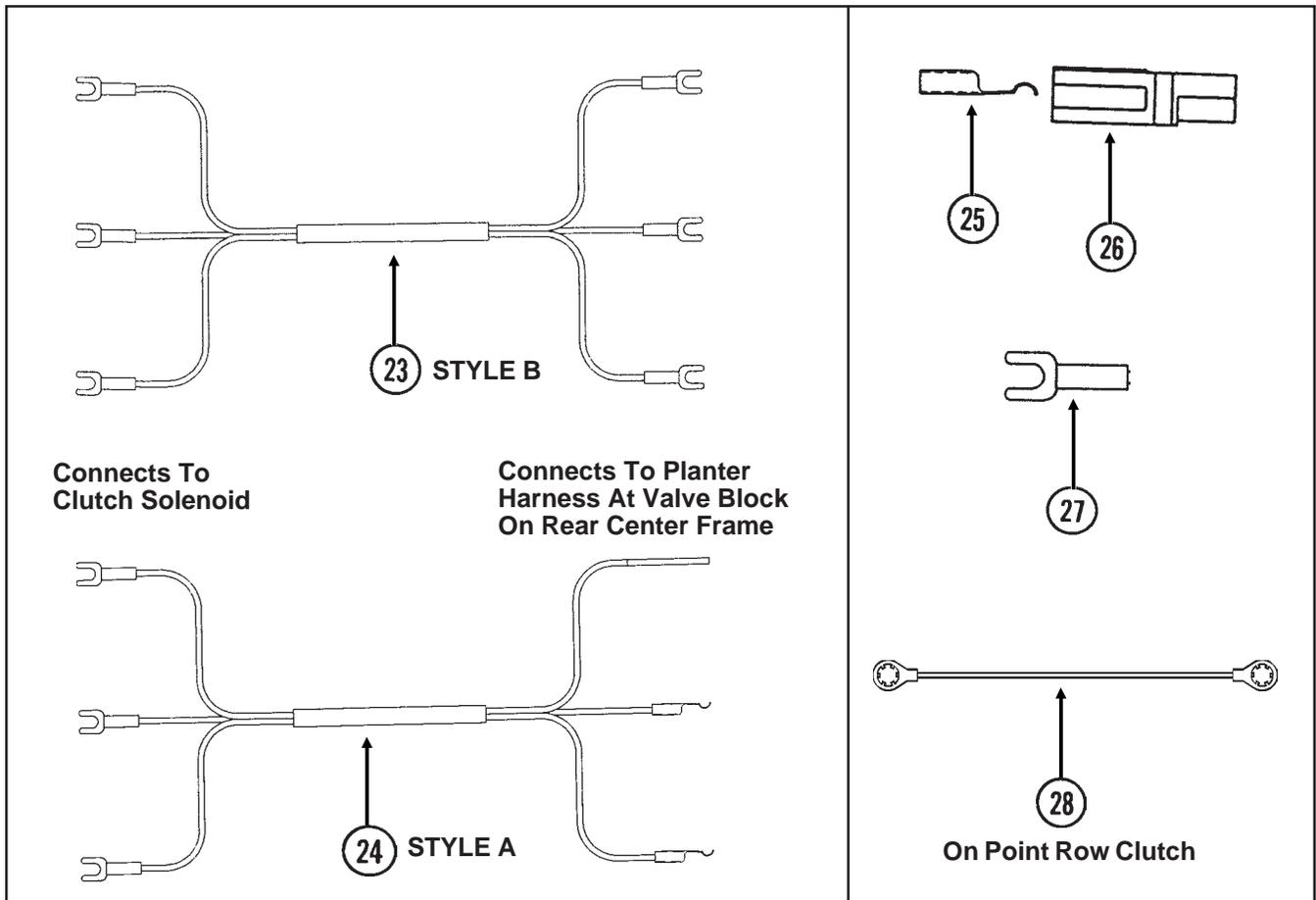
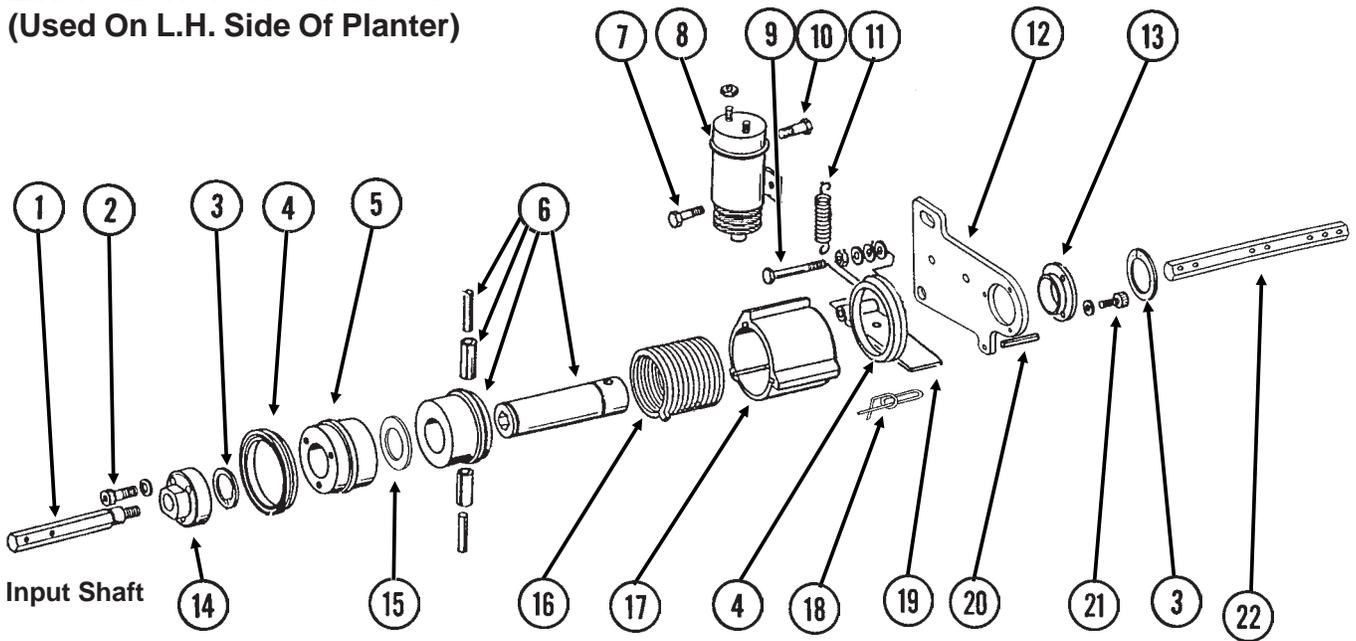


ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Module)	
1.		-	See "Seed Rate Transmission And Row Unit Drill Shafts", Pages P58 And P59
2.		-	See "Contact Drive Wheel And Drive Shaft(s)", Pages P54-P56
3.	G10743	1	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 3 $\frac{3}{4}$ "
	G10918	3	Machine Bushing, $\frac{5}{8}$ ", 14 Gauge (As Required)
	G10104	1	Hex Nut, $\frac{5}{8}$ "-11
	G10107	1	Lock Nut, $\frac{5}{8}$ "-11
4.	GA7063	1	Idler W/Sprocket And Hardware
	GA7154	-	Sprocket W/Bearing, 18 Tooth
	G10397	-	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 2 $\frac{3}{4}$ "
	GD10007	-	Spacer, 1 $\frac{1}{8}$ "
	G10206	-	Washer, $\frac{1}{2}$ " SAE
	G10111	-	Lock Nut, $\frac{1}{2}$ "-13
5.	GD5857	1	Spring
6.	GA5194	1	Sprocket, 50 Tooth
7.	G10581	1	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 2 $\frac{1}{4}$ "
	GD7889	1	Bushing, 1" O.D. x $\frac{9}{16}$ " I.D. x $\frac{7}{16}$ " Long
	G10168	2	Machine Bushing, $\frac{1}{2}$ ", 7 Gauge
	G10205	2	Washer, $\frac{5}{8}$ " SAE
	G10111	1	Lock Nut, $\frac{1}{2}$ "-13
8.	GA7154	1	Sprocket W/Bearing, 18 Tooth
9.	GA5113	1	Sprocket, 28 Tooth
10.	G10602	-	Spring Pin, $\frac{1}{4}$ " x 1 $\frac{1}{2}$ "
11.	G3310-100	1	Chain, No. 40, 100 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
12.	G10870	1	Clevis Pin, $\frac{3}{8}$ " x 1"
	G10860	1	Retaining Ring, $\frac{3}{8}$ "
13.	GA9558	1	Idler W/Sprocket And Hardware, L.H. Side Of Planter
	GA9557	-	Idler W/Sprocket And Hardware, R.H. Side Of Planter
	GA7154	-	Sprocket W/Bearing, 18 Tooth
	G10038	-	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 3"
	GD10007	-	Spacer, 1 $\frac{1}{8}$ "
	G10206	-	Washer, $\frac{1}{2}$ " SAE
	G10111	-	Lock Nut, $\frac{1}{2}$ "-13

POINT ROW CLUTCH

PRC019(TWL70d/TWL71d/TWL71/TWL18/A10054)

**L.H. Point Row Clutch Shown
(Used On L.H. Side Of Planter)**



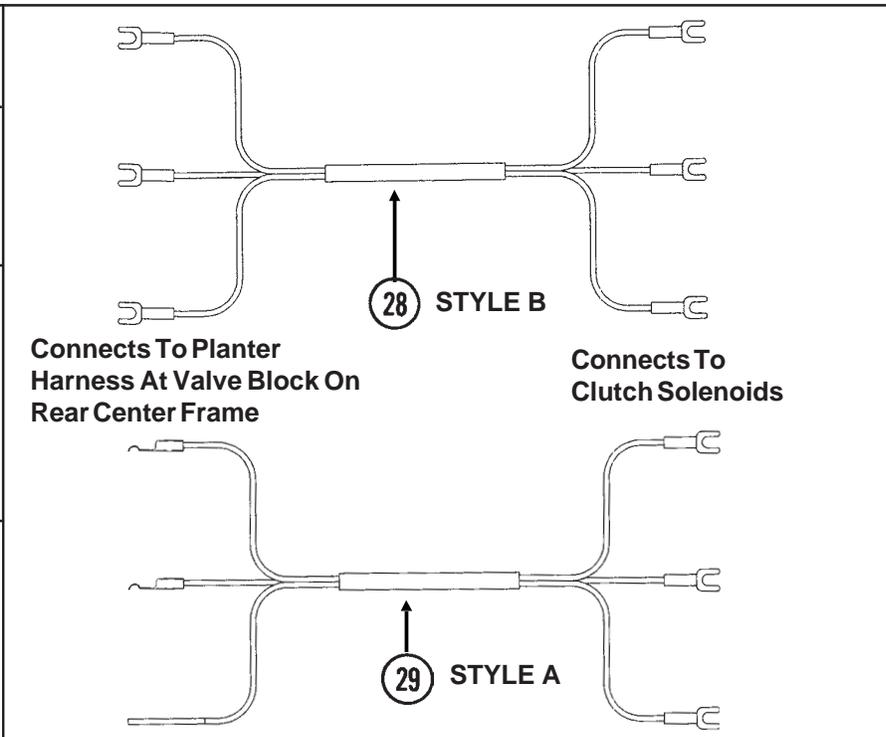
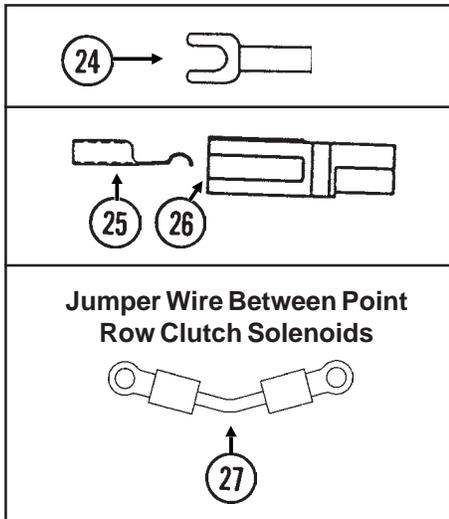
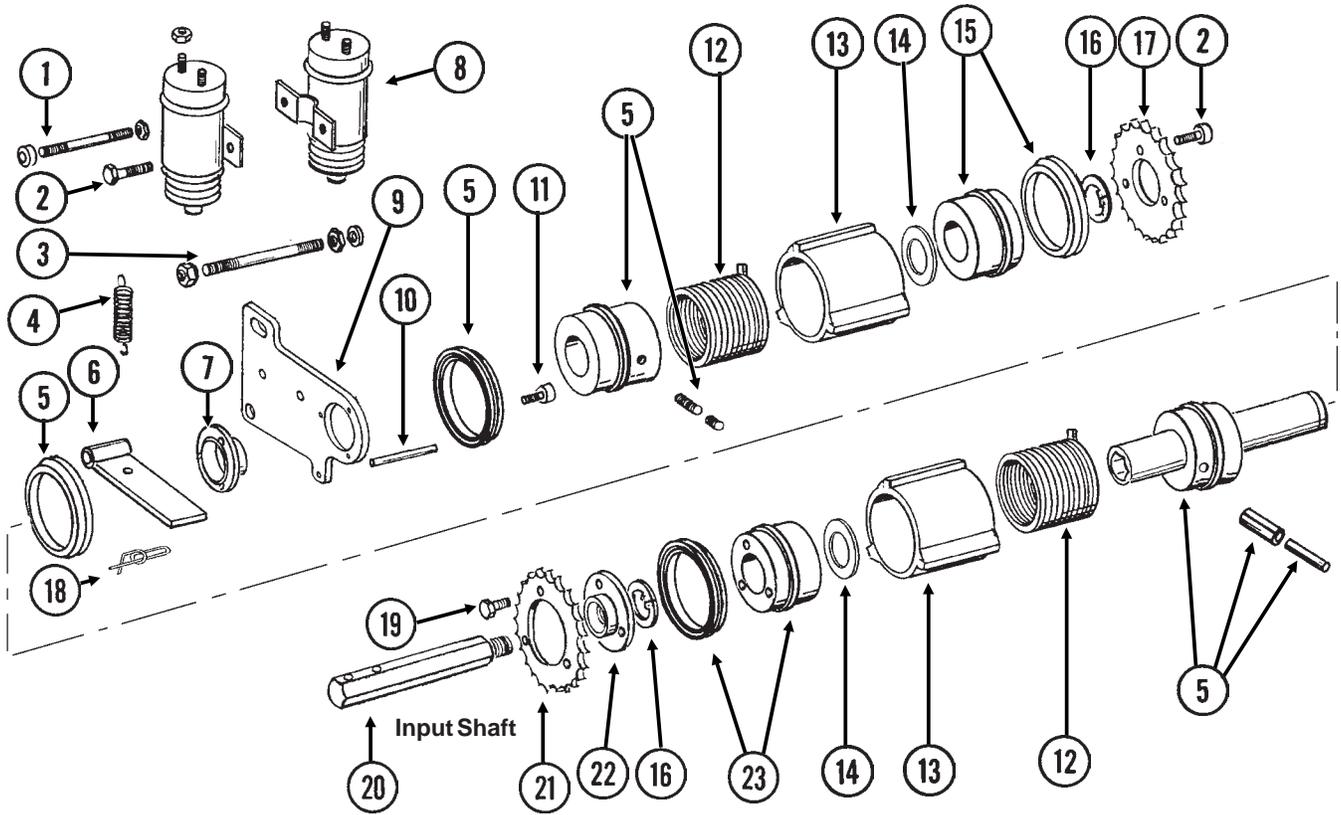
POINT ROW CLUTCH

ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
1.	GD10068	1	Input Shaft, R.H. Thread (Shown)
	GD10069	1	Input Shaft, L.H. Thread
2.	G10374	3	Hex Socket Head Screw, 1/4"-20 x 1"
	G10227	3	Lock Washer, 1/4"
3.	G10496	2	External Inverted Snap Ring, 1 1/2"
4.	GD14512	2	V-Ring Seal
5.	GD10104	1	Input Hub
6.	GA7137	1	Hub/Sleeve Assembly W/Spring Pins
	G10765	-	Spring Pin, 1/4" x 1"
	G10804	-	Spring Pin, 5/32" x 7/8"
7.	G10023	1	Hex Head Cap Screw, 1/4"-20 x 3/4"
	G10227	1	Lock Washer, 1/4"
	G10103	1	Hex Nut, 1/4"-20
8.	GA8393	1	Solenoid Complete
	GR1306	1	Snap Ring
	GR1303	1	Spring
	GR1304	1	Boot
	GR1305	1	Plunger
9.	G10049	1	Hex Head Cap Screw, 3/8"-16 x 2 1/2"
	G10101	1	Hex Nut, 3/8"-16
	G10203	1	Washer, 3/8" SAE
	G10229	2	Lock Washer, 3/8"
	G10497	1	Hex Jam Nut, 3/8"-16, Grade 2
10.	G10900	1	Hex Socket Head Cap Screw, 1/4"-20 x 1 3/4", Grade 8
	G10227	1	Lock Washer, 1/4"
	G10103	2	Hex Nut, 1/4"-20
11.	GD10123	1	Spring
12.	GD10103	1	Mounting Plate
13.	GD9667	1	Bushing
14.	GD10070	1	Coupler W/R.H. Threads (Shown)
	GD10071	1	Coupler W/L.H. Threads
15.	GD14513	1	Felt Washer
16.	GD9671	-	Spring, L.H. (Shown)
	GD9672	-	Spring, R.H.
17.	GD10102	1	Stop Collar
18.	GD11120	1	Rue Ring Cotter, 5/16"
19.	GD10510	1	Actuator Arm
20.	G10859	1	Spring Pin, 3/16" x 2 1/4"
21.	G10253	3	Hex Socket Head Screw, No. 10-32 x 1/2"
	G10257	3	Lock Washer, No. 10
22.	GD10543	-	Hex Shaft, 7/8" x 13"
23.	GA9490	1	Wiring Harness, 192", R.H. Side, 8 Row 36"/38"
	GA9479	1	Wiring Harness, 228", L.H. Side, 8 Row 36"/38" And R.H. Side, 12 Row 30"
	GA9480	-	Wiring Harness, 264", L.H. Side, 12 Row 30" And R.H. Side, 12 Row 36"/38"
	GA9489	-	Wiring Harness, 312", L.H. Side, 12 Row 36"/38"
	GA9483	-	Wiring Harness, 252", R.H. Side, 16 Row 30"
	GA9482	-	Wiring Harness, 300", L.H. Side, 16 Row 30"
24.	GA7401	1	Wiring Harness, 192", R.H. Side, 8 Row 36"/38"
	GA7405	1	Wiring Harness, 228", L.H. Side, 8 Row 36"/38" And R.H. Side, 12 Row 30"
	GA7400	-	Wiring Harness, 264", L.H. Side, 12 Row 30" And R.H. Side, 12 Row 36"/38"
	GA7402	-	Wiring Harness, 312", L.H. Side, 12 Row 36"/38"
	GA7403	-	Wiring Harness, 252", R.H. Side, 16 Row 30"
	GA7404	-	Wiring Harness, 300", L.H. Side, 16 Row 30"
25.	GD9530	-	Contact
26.	GD9529	-	Housing, Black
	GD12726	-	Housing, Red
27.	G10996	-	Fork Terminal
28.	GA10054	-	Ground Cable, Green
A.	GA7110	-	Point Row Clutch Assembly, R.H. (R.H. Side Of Machine) (Items 1-21 And 28)
	GA7111	-	Point Row Clutch Assembly, L.H. (L.H. Side Of Machine) (Items 1-21 And 28)

TWO-SPEED POINT ROW CLUTCH

PRC023(FF47b/A7274/TWL71/TWL18/A10054)

L.H. Two-Speed Point Row Clutch Shown (Used On L.H.Side Of Planter)

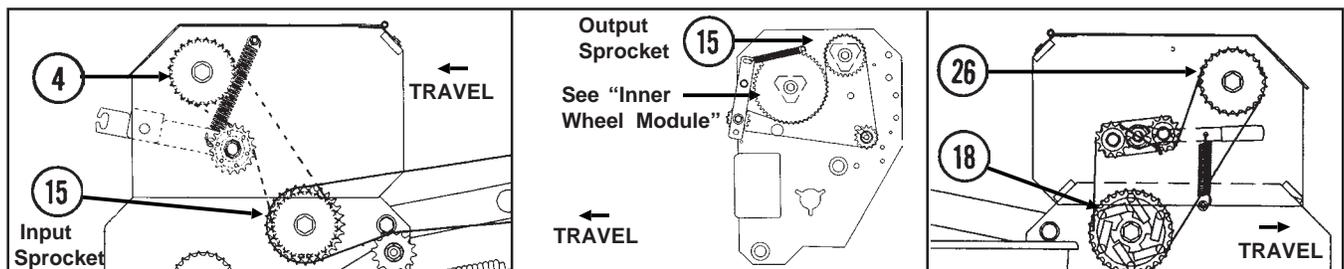
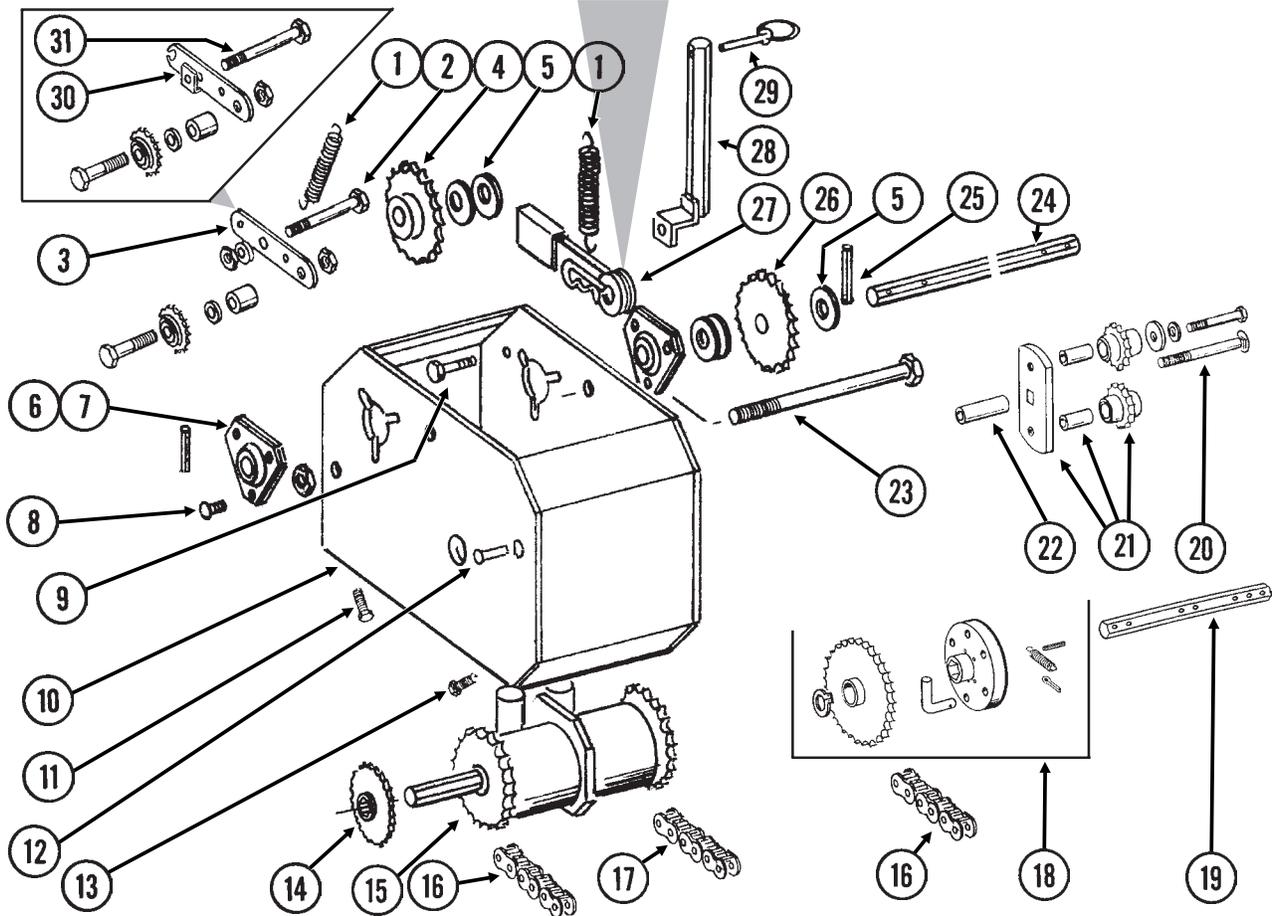
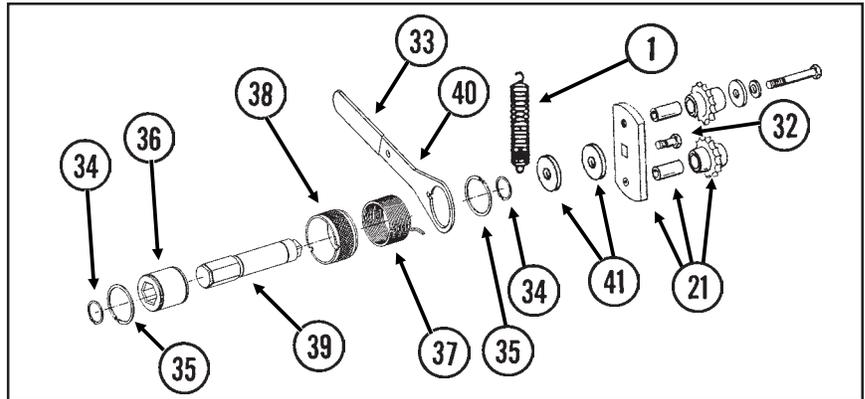


TWO-SPEED POINT ROW CLUTCH

ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
1.	GD10635	1	Threaded Rod, 1/4"-20 x 3 1/2"
	G10103	2	Hex Nut, 1/4"-20
	G10227	2	Lock Washer, 1/4"
	GD10282	2	Allen Nut, 1/4"-20
2.	G10023	4	Hex Head Cap Screw, 1/4"-20 x 3/4"
	G10227	4	Lock Washer, 1/4"
	G10103	1	Hex Nut, 1/4"-20
3.	GD10636	1	Threaded Rod, 3/8"-16 x 4 1/4"
	G10108	2	Lock Nut, 3/8"-16
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
4.	GD10123	2	Spring
5.	GA7463	1	Hub/Sleeve Assembly W/Seals, Sleeve, Pins And Screws
	GD10120	-	Seal
	GD10584	-	Sleeve
	G10873	-	Hex Socket Set Screw, 5/16"-18 x 3/4"
	G10872	-	Hex Socket Set Screw, 5/16"-18 x 1/4"
	G10804	-	Spring Pin, 5/32" x 7/8"
	G10765	-	Spring Pin, 1/4" x 1"
6.	GD10510	2	Actuator Arm
7.	GD10586	1	Bushing
8.	GA8393	2	Solenoid Complete
	GR1306	-	Snap Ring
	GR1303	-	Spring
	GR1304	-	Boot
	GR1305	-	Plunger
9.	GD10103	1	Mounting Plate
10.	G10859	1	Spring Pin, 3/16" x 2 1/4"
11.	G10876	3	Hex Socket Head Screw, No. 10-32 x 1/4"
12.	GD9671	2	Spring, L.H. (Shown)
	GD9672	-	Spring, R.H.
13.	GD10585	2	Stop Collar
14.	GD14513	2	Felt Washer
15.	GA9572	1	Hub W/Seal
	GD10120	-	Seal
16.	G10496	2	External Inverted Snap Ring, 1 1/2"
17.	GD10579	1	Output Sprocket, 28 Tooth
18.	GD11120	2	Rue Ring Cotter, 5/16"
19.	G10374	3	Hex Socket Head Screw, 1/4"-20 x 1"
	GD10588	3	Key
20.	GD10068	1	Input Shaft, R.H. Threads (Shown)
	GD10069	-	Input Shaft, L.H. Threads
21.	GD10578	1	Input Sprocket, 28 Tooth
22.	GD10638	1	Coupler W/R.H. Threads (Shown)
	GD10587	-	Coupler W/L.H. Threads
23.	GA9571	1	Hub W/Seal
	GD10120	-	Seal
24.	G10996	-	Fork Terminal
25.	GD9530	-	Contact
26.	GD9529	-	Housing, Black
	GD12726	-	Housing, Red
27.	GA7274	1	Jumper Wire W/Ring Terminals, 2 3/16"
28.	GA9479	1	Wiring Harness, 228", R.H. And L.H. Sides, 8 Row 36"/38" And R.H. Side, 12 Row 30"
	GA9480	-	Wiring Harness, 264", L.H. Side, 12 Row 30" And R.H. Side 12 Row 36"/38"
	GA9489	-	Wiring Harness, 312", L.H. Side, 12 Row 36"/38"
	GA9483	-	Wiring Harness, 252", R.H. Side, 16 Row 30"
	GA9482	-	Wiring Harness, 300", L.H. Side, 16 Row 30"
29.	GA7401	1	Wiring Harness, 192", R.H. Side, 8 Row 36"/38"
	GA7405	1	Wiring Harness, 228", L.H. Side, 8 Row 36"/38" And R.H. Side 12 Row 30"
	GA7400	-	Wiring Harness, 264", L.H. Side, 12 Row 30" And R.H. Side 12 Row 36"/38"
	GA7402	-	Wiring Harness, 312", L.H. Side, 12 Row 36"/38"
	GA7403	-	Wiring Harness, 252", R.H. Side, 16 Row 30"
	GA7404	-	Wiring Harness, 300", L.H. Side, 16 Row 30"

TWO-SPEED POINT ROW CLUTCH WHEEL MODULE EXTENSION

PRC022/PRC019/PTD078/PTD079(A10030b/TWL77c/TWL84b/TWL79a/TWL80)



TWO-SPEED POINT ROW CLUTCH WHEEL MODULE EXTENSION

ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
1.	GD5857	2	Spring
2.	G10013	1	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 3 $\frac{1}{2}$ "
	G10204	2	Special Machine Bushing, $\frac{5}{8}$ " x 1" O.D.
	G10107	1	Lock Nut, $\frac{5}{8}$ "-11
	G10104	1	Hex Nut, $\frac{5}{8}$ "-11
3.	GA7307	1	Idler W/Sprocket And Hardware
	GA7154	-	Sprocket W/Bearing, 18 Tooth
	G10053	-	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 2 $\frac{1}{2}$ "
	GD10356	-	Bushing, $\frac{3}{4}$ " Long
	G10206	-	Washer, $\frac{1}{2}$ " SAE
	G10111	-	Lock Nut, $\frac{1}{2}$ "-13
4.	GA5113	1	Sprocket, 28 Tooth
5.	G10233	-	Machine Bushing, 1", 10 Gauge
6.	G3400-01	-	Flangette
7.	G2100-03	-	Bearing, $\frac{7}{8}$ " Hex Bore, Spherical
8.	G10312	6	Carriage Bolt, $\frac{5}{16}$ "-18 x $\frac{3}{4}$ "
	G10232	6	Lock Washer, $\frac{5}{16}$ "
	G10106	6	Hex Nut, $\frac{5}{16}$ "-18
9.	G10037	1	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 1 $\frac{1}{4}$ "
	G10216	1	Washer, $\frac{1}{2}$ " USS
	G10228	1	Lock Washer, $\frac{1}{2}$ "
	G10102	1	Hex Nut, $\frac{1}{2}$ "-13
10.	GA7306	1	Extension Bracket
11.	G10857	2	Hex Head Cap Screw, $\frac{1}{4}$ "-20 x 1 $\frac{1}{4}$ "
	G10209	2	Washer, $\frac{1}{4}$ " USS
	G10227	2	Lock Washer, $\frac{1}{4}$ "
	G10103	2	Hex Nut, $\frac{1}{4}$ "-20
12.	G10408	1	Clevis Pin, $\frac{5}{16}$ " x $\frac{3}{4}$ "
	G10409	1	Retaining Ring, $\frac{5}{16}$ "
13.	G10064	2	Hex Head Cap Screw, $\frac{1}{4}$ "-20 x 1"
	G10209	2	Washer, $\frac{1}{4}$ " USS
	G10227	2	Lock Washer, $\frac{1}{4}$ "
	G10103	2	Hex Nut, $\frac{1}{4}$ "-20
14.		-	See "Contact Drive Wheel And Drive Shaft(s)", Pages P54-P56
15.		-	See "Two-Speed Point Row Clutch", Pages P64 And P65
16.	G3310-74	2	Chain, No. 40, 74 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
17.	G3310-100	1	Chain, No. 40, 100 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
18.	GA7320	1	Overrunning Sprocket Assembly, R.H.
	GA7321	-	Overrunning Sprocket Assembly, L.H.
	G10430	1	External Retaining Ring, 1 $\frac{1}{4}$ "
	GD1255	6	L-Pin
	G10546	6	Spring Pin, $\frac{3}{16}$ " x 1 $\frac{1}{4}$ "
	G10470	6	Cotter Pin, $\frac{5}{32}$ " x 1"
	GD10366	6	Spring
	GA7317	1	Block
	GA7319	1	Sprocket W/Bushing, 30 Tooth
19.	GD10543	1	Hex Shaft, $\frac{7}{8}$ " x 13"
20.	G10863	1	Carriage Bolt, $\frac{1}{2}$ "-13 x 2 $\frac{3}{4}$ "
	G10111	1	Lock Nut, $\frac{1}{2}$ "-13

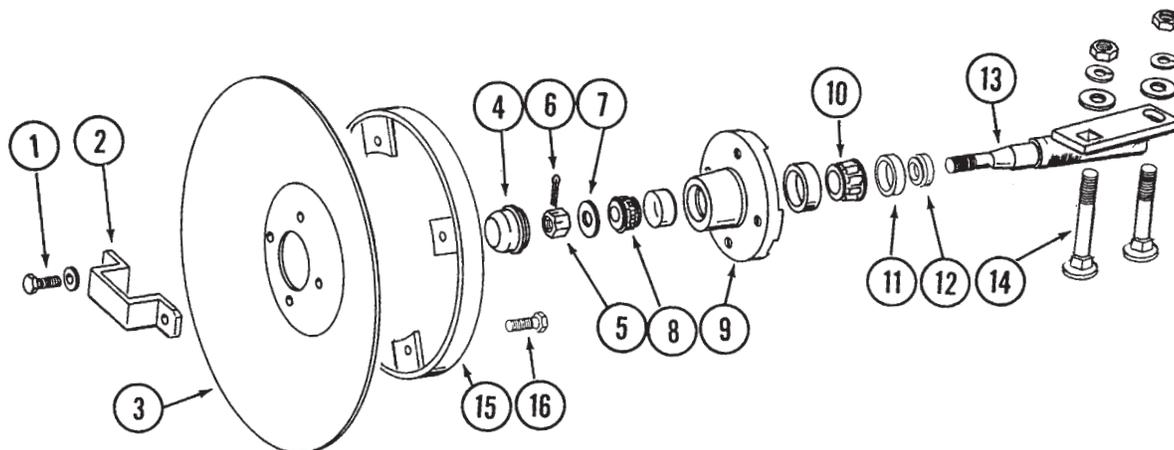
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TWO-SPEED POINT ROW CLUTCH WHEEL MODULE EXTENSION

ITEM	PART NO.	QTY. (Per Assy.)	DESCRIPTION
(Continued)			
21.	GA7336	1	Idler W/Bolt-On Sprockets
	GD7426	-	Sprocket, 12 Tooth
	GD1026	-	Sleeve, 1 ³ / ₁₆ " Long
	G10210	-	Washer, ³ / ₈ " USS
	G10229	-	Lock Washer, ³ / ₈ "
	G10047	-	Hex Head Cap Screw, ³ / ₈ "-16 x 1 ³ / ₄ "
22.	GD3180-18	1	Sleeve, ⁵ / ₈ " I.D. x ⁷ / ₈ " O.D. x 1 ¹ / ₈ " Long
23.	G10595	1	Hex Head Cap Screw, ³ / ₈ "-16 x 10"
	G10108	1	Lock Nut, ³ / ₈ "-16
24.	GD10355	1	Shaft, ⁷ / ₈ " x 13 ³ / ₄ "
25.	G10602	3	Spring Pin, ¹ / ₄ " x 1 ¹ / ₂ "
26.	GA5109	1	Sprocket, 24 Tooth
	GA5105	1	Sprocket, 15 Tooth
	GA5106	1	Sprocket, 17 Tooth
	GA5112	1	Sprocket, 27 Tooth
	GA5108	-	Sprocket, 23 Tooth (From Transmission)
	GA5110	-	Sprocket, 25 Tooth (From Transmission)
	GA5111	-	Sprocket, 26 Tooth (From Transmission)
27.	GA4235	1	Ratchet Arm W/Protective Closure
	G10445	-	Protective Closure
28.	GA7313	1	Sprocket Storage Rod
29.	GD2558	2	Lynch Pin, ¹ / ₄ "
30.	GA9918	1	Idler W/Sprocket And Hardware
	GD10356	-	Bushing, ³ / ₄ " Long
	G10128	-	Machine Bushing, ¹ / ₂ ", 14 Gauge
	G10501	-	Hex Jam Nut, ¹ / ₂ "-13, Grade 2
	G10053	-	Hex Head Cap Screw, ¹ / ₂ "-13 x 2 ¹ / ₂ "
	GA7154	-	Sprocket W/Bearing, 18 Tooth
31.	G10036	1	Hex Head Cap Screw, ⁵ / ₈ "-11 x 4"
	G10107	1	Lock Nut, ⁵ / ₈ "-11
	G10104	1	Hex Nut, ⁵ / ₈ "-11
32.	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
33.	G11078	1	Vinyl Cap
34.	G10496	2	External Inverted Snap Ring, 1 ¹ / ₂ "
35.	G11075	2	Internal Inverted Snap Ring, ⁷ / ₈ "
36.	GD14432	1	Sleeve, 1 ¹ / ₄ "
37.	GD14414	1	Torsion Spring, R.H. (Used On L.H. Wrap Spring Wrench) (Shown)
	GD14413	-	Torsion Spring, L.H. (Used On R.H. Wrap Spring Wrench)
38.	GD14429	-	Release Collar, Silver, L.H. (Shown)
	GD14430	1	Release Collar, Gold, R.H.
39.	GD14426	1	Tightener Shaft, 3 ³ / ₈ "
40.	GD14431	1	Handle
41.	G10235	2	Machine Bushing, ⁷ / ₈ ", 14 Gauge
A.	G1K381	-	Wrap Spring Wrench Replacement Kit, Silver Collar, L.H. (Items 32-41) (Shown)
	G1K380	1	Wrap Spring Wrench Replacement Kit, Gold Collar, R.H. (Items 32-41)

ROW MARKER SPINDLE/HUB/BLADE

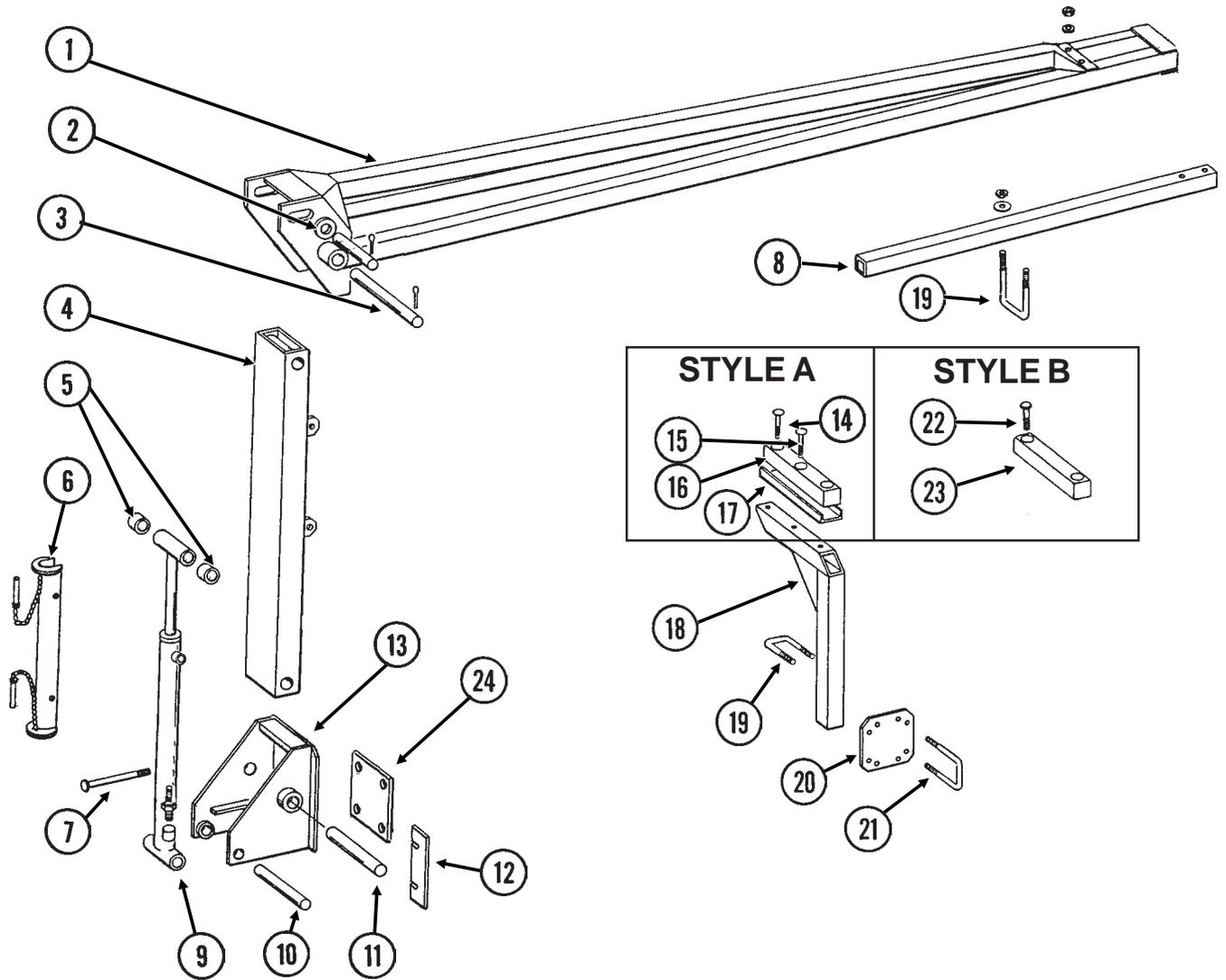
MKR020(MKR4)



ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	G10722	4	Hex Head Cap Screw, 1/2"-20 x 1"
	G10228	4	Lock Washer, 1/2"
2.	GD2597	1	Retainer
3.	GD0746	1	Disc Blade, Solid, 16" (Shown)
	GD10283	-	Disc Blade, Notched, 16" (Optional)
4.	GD0840	1	Dust Cap
5.	G10725	1	Slotted Hex Nut, 5/8"-18
6.	G10544	1	Cotter Pin, 5/32" x 1"
7.	G10724	1	Washer, 5/8" SAE
8.	GA0257	1	Bearing
9.	GA0167	1	Hub W/Cups
	GR0151	-	Outer Cup
	GR0150	-	Inner Cup
10.	GA0245	1	Bearing
11.	GA0243	1	Grease Seal
12.	GA0899	1	Rubber Seal
13.	GA1676	1	Spindle, R.H.
	GA1677	-	Spindle, L.H. (Shown)
14.	G10844	2	Carriage Bolt, 1/2"-13 x 3 1/2"
	G10168	2	Machine Bushing, 1/2", 7 Gauge
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
15.	GA5853	1	Depth Band
16.	G10019	4	Hex Head Cap Screw, 5/16"-18 x 1"
	G10109	4	Lock Nut, 5/16"-18
A.	GA1679	-	Hub And Spindle Assembly, L.H. (Items 1, 2 And 4-13)
	GA1678	-	Hub And Spindle Assembly, R.H. (Items 1, 2 And 4-13)

ROW MARKER ASSEMBLY, 8 ROW 36"/38" AND 12 ROW 30"

MKR019/MKR027(MKR14f/MKR14d)

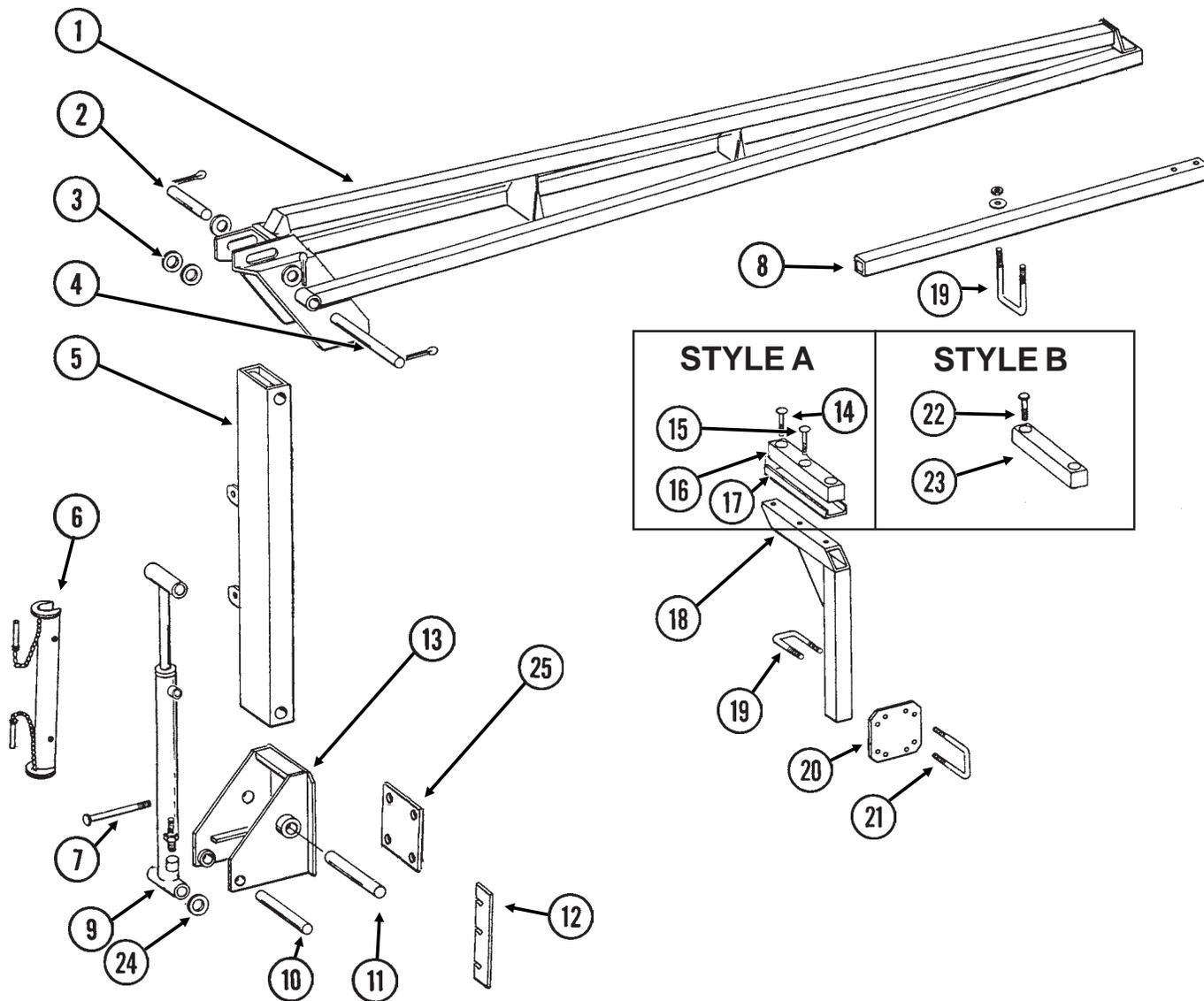


ROW MARKER ASSEMBLY, 8 ROW 36"/38" AND 12 ROW 30"

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	GA4353	1	Arm W/Grease Fittings, Second Stage, 110", 12 Row 30"
	G10641	-	Grease Fitting, 1/8" NPT
	GA5192	-	Arm, Second Stage, 67", 8 Row 36"/38"
2.	G10226	-	Washer, 1 1/4" SAE (As Required)
	G10159	-	Machine Bushing, 1 1/4", 10 Gauge (As Required)
	G10322	-	Machine Bushing, 1 1/4", 18 Gauge (As Required)
3.	GD3214	1	Pin, 1 1/4" x 12 1/4"
	G10460	2	Cotter Pin, 1/4" x 2"
4.	GA4611	1	Arm W/Grease Fittings, First Stage
	G10641	-	Grease Fitting, 1/8" NPT
5.	GD0752-41	4	Sleeve, 1"
6.	GA8170	1	Safety Lockup W/Detent Pins, 19 3/8"
	G10536	-	Detent Pin, 1/2" x 2 1/2" Grip
7.	G10011	4	Hex Head Cap Screw, 5/8"-11 x 5 1/2" (If Applicable)
	G10046	-	Hex Head Cap Screw, 5/8"-11 x 5" (If Applicable)
	G10008	-	Hex Head Cap Screw, 5/8"-11 x 2" (If Applicable)
	GD7805	8	Special Washer, 5/8", Hardened
	G10205	-	Washer, 5/8" SAE
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
8.	GD0453-07	1	Extension Tube, 45", 12 Row 30"
	GD0453-04	-	Extension Tube, 60", 12 Row 30" (L.H. Even-Row Marker) (If Applicable)
	GD0453-08	-	Extension Tube, 65", 8 Row 36"/38"
9.		-	See "Marker (Cushion) Cylinder", Page P86
10.	GD2161	2	Pin, 1 1/4" x 8 1/4"
	G10460	4	Cotter Pin, 1/4" x 2"
11.	GD0652	1	Pin, 1 1/4" x 9 1/2"
	G10460	2	Cotter Pin, 1/4" x 2"
12.	GD10792	-	Shim, 2 1/2" x 7 1/4", 16 Gauge (As Required)
13.	GA5130	1	Mount
14.	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
15.	G10033	1	Hex Head Cap Screw, 1/2"-13 x 3 1/2"
	G10206	1	Washer, 1/2" SAE
	G10228	1	Lock Washer, 1/2"
	G10102	1	Hex Nut, 1/2"-13
16.	GD4512	1	Rubber Stop (Sub GA9088)
17.	GD6772	1	Retainer (Sub GA9088)
18.	GA7042	1	Stand, 20" (12 Row 30" Only)
19.	GD2721	-	U-Bolt, 2" x 2" x 1/2"-13
	G10228	-	Lock Washer, 1/2"
	G10102	-	Hex Nut, 1/2"-13
20.	GD9981	1	Bar
21.	GD4743	2	U-Bolt, 3" x 3" x 1/2"-13
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
22.	G10017	2	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10206	2	Washer, 1/2" SAE
	G10111	2	Lock Nut, 1/2"-13
23.	GA9088	-	Molded Stop, 12 1/4" Long (Replaces GD4512 And GD6772)
24.	GD13360	2	Plate, 6" x 6"

ROW MARKER ASSEMBLY, 12 ROW 36"/38" AND 16 ROW 30"

MKR019/MKR023MKR027(MKR15e/MKR14d)

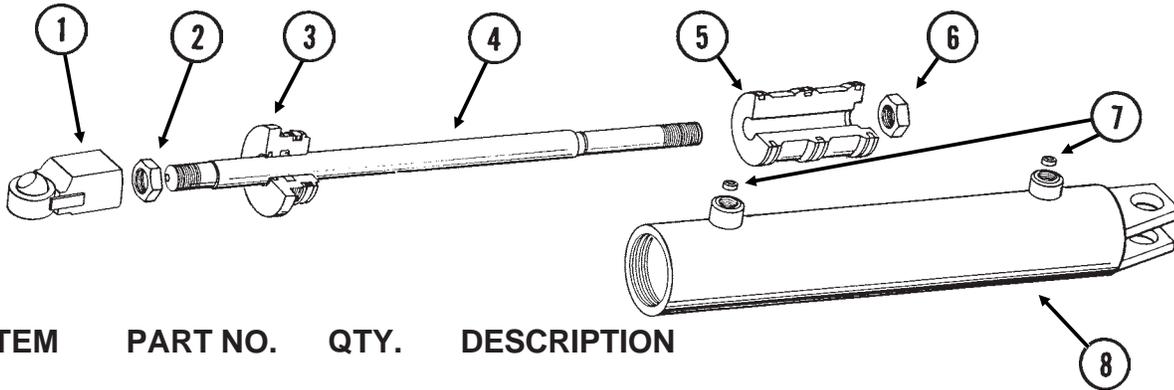


ROW MARKER ASSEMBLY, 12 ROW 36"/38" AND 16 ROW 30"

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	GA7116	1	Arm, Second Stage, 138 1/4", 12 Row 36"/38"
	GA7118	-	Arm, Second Stage, 172 1/4", 16 Row 30"
2.	GD1701	1	Pin, 1 1/4" x 6 1/2"
	G10460	2	Cotter Pin, 1/4" x 2"
3.	G10979	4	Special Washer, 1 1/4" (As Required)
	G10159	-	Machine Bushing, 1 1/4", 10 Gauge (As Required)
	G10322	-	Machine Bushing, 1 1/4", 18 Gauge (As Required)
4.	GD0737	1	Pin, 1 1/4" x 13 1/4"
	G10460	2	Cotter Pin, 1/4" x 2"
5.	GA4878	1	Arm W/Grease Fittings, First Stage, R.H.
	GA4983	-	Arm W/Grease Fittings, First Stage, L.H.
	G10641	-	Grease Fitting, 1/8" NPT
6.	GA8170	1	Safety Lockup W/Detent Pins, 19 3/8"
	G10536	-	Detent Pin, 1/2" x 2 1/2" Grip
7.	G10012	-	Hex Head Cap Screw, 5/8"-11 x 6 1/2" (If Applicable)
	G10068	-	Hex Head Cap Screw, 5/8"-11 x 6" (If Applicable)
	G10008	-	Hex Head Cap Screw, 5/8"-11 x 2" (If Applicable)
	GD7805	8	Special Washer, 5/8", Hardened
	G10205	-	Washer, 5/8" SAE
	G10230	6	Lock Washer, 5/8"
	G10104	6	Hex Nut, 5/8"-11
8.	GD0453-09	1	Extension Tube, 75", 12 Row 36"/38" And 16 Row 30" (L.H. Ever-Row Marker) (If Applicable)
	GD0453-03	-	Extension Tube, 50", 16 Row 30"
9.		-	See "Marker (Cushion) Cylinder", Page P86
10.	GD0652	1	Pin, 1 1/4" x 9 1/2"
	G10460	2	Cotter Pin, 1/4" x 2"
11.	GD7209	1	Pin, 1 1/4" x 11 1/2"
	G10049	1	Hex Head Cap Screw, 3/8"-16 x 2 1/2"
	G10108	1	Lock Nut, 3/8"-16
12.	GD10793	-	Shim, 2 1/2" x 12 1/2", 16 Gauge (As Required) (Shown)
	GD11791	-	Shim, 2 1/2" x 8 1/4", 16 Gauge (As Required)
13.	GA4877	1	Mount
14.	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
15.	G10033	1	Hex Head Cap Screw, 1/2"-13 x 3 1/2"
	G10206	1	Washer, 1/2" SAE
	G10228	1	Lock Washer, 1/2"
	G10102	1	Hex Nut, 1/2"-13
16.	GD4512	1	Rubber Stop (Sub GA9088)
17.	GD6772	1	Retainer (Sub GA9088)
18.	GA7043	1	Stand, 30"
19.	GD2721	3	U-Bolt, 2" x 2" x 1/2"-13
	G10228	6	Lock Washer, 1/2"
	G10102	6	Hex Nut, 1/2"-13
20.	GD9981	1	Bar
21.	GD4743	2	U-Bolt, 3" x 3" x 1/2"-13
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
22.	G10017	2	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
23.	GA9088	-	Molded Stop, 12 1/4" Long (Replaces GD4512 And GD6772)
24.	G10979	4	Special Washer, 1 1/4" (As Required)
25.	GD13359	2	Plate, 7" x 7"

ROTATION CYLINDER, ALL SIZES

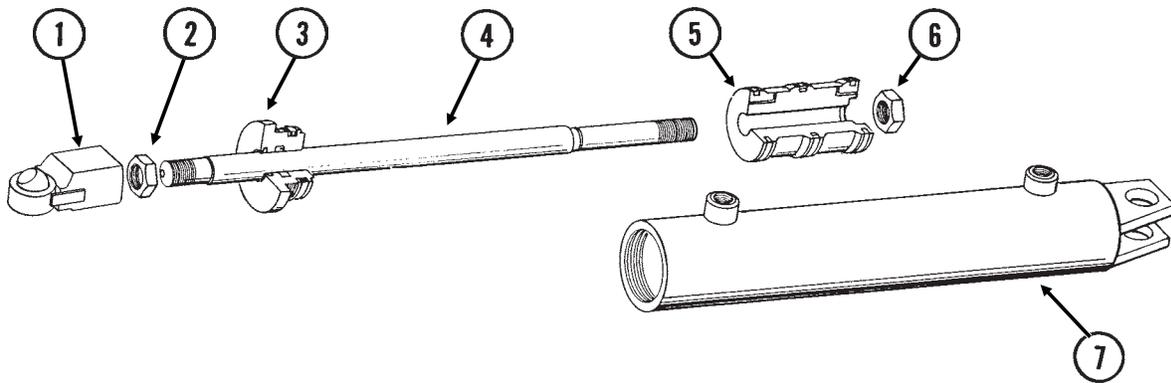
CYL058(CYL11h)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA7221	1	Threaded Ball Joint End
2.	G10509	1	Hex Jam Nut, 1 1/4"-12, Grade 2
3.	GD6571	1	Gland
4.	GD10208	1	Rod
5.	GD10765	1	Piston
6.	G10972	1	Lock Nut, 1 1/4"-12
7.	GD11884	2	Restrictor (If Applicable)
8.	A7220	1	Barrel (Non-Stock Item)
A.	GA7801	-	Cylinder Complete, 4" x 16" <i>(Part Number Stamped On Barrel)</i> (Sub GA8904)
B.	GR1366	-	Seal Kit, Includes: (2) O-Rings, (1) U-Cup, (1) Wiper, (1) Uniring, (2) Cast Iron Rings, (1) BU Ring

ROTATION CYLINDER, ALL SIZES

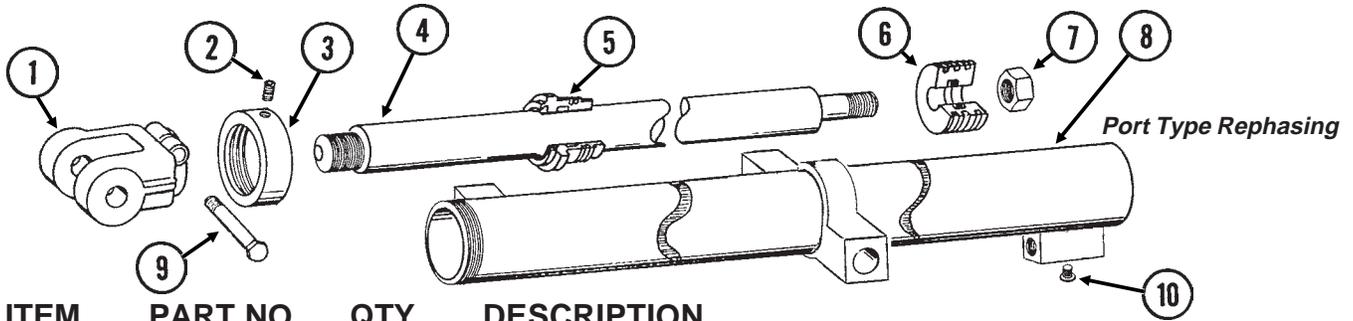
(CYL11i)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA7221	1	Threaded Ball Joint End
2.	G10509	1	Hex Jam Nut, 1 1/4"-12, Grade 2
3.	GD11988	1	Gland
4.	GD11991	1	Rod
5.	GD11992	1	Piston
6.	G10972	1	Lock Nut, 1 1/4"-12
7.	A7220	1	Barrel (Non-Stock Item)
A.	GA8904	-	Cylinder Complete, 4" x 16" <i>(Part Number Stamped On Barrel)</i>
B.	GR1524	-	Seal Kit, Includes: (2) O-Rings, (1) U-Cup, (1) Wiper, (1) Seal, (2) Cast Iron Rings, (1) BU Ring, (1) Expander

CENTER LIFT CYLINDER, ALL SIZES

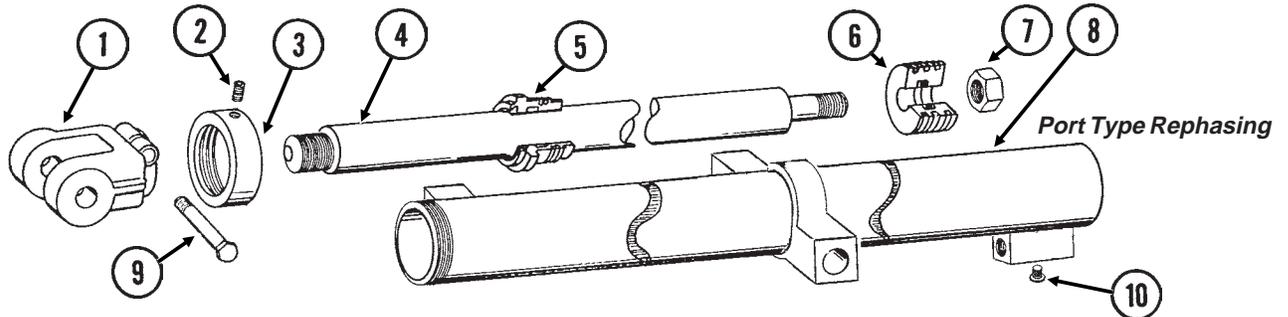
CYL031/CYL011(CYL39c)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD11951	1	Clevis
2.	G10907	1	Set Screw, 1/4"-20 x 1/4"
3.	GD11193	1	Cap
4.	GD10936	1	Rod
5.	GD10211	1	Gland
6.	GD11253	1	Piston
7.	G10958	1	Lock Nut, 1"-14
8.	GA8149	1	Barrel
9.	G10939	1	Hex Head Cap Screw, 3/8"-16 x 2 1/4"
	G10108	1	Lock Nut, 3/8"-16
10.	G6408-H04-O	1	Hex Socket Head Plug W/O-Ring, 7/16"-20 O-Ring
	GR1465	1	O-Ring
A.	GA8107	-	Cylinder Complete, 3" x 48" (Part Number Stamped On Barrel) (Sub GA8908)
B.	GR1428	-	Seal Kit, Includes: (2) O-Rings, (2) BU Rings, (1) Wiper, (1) U-Cup, (1) Piston Seal, (2) Cast Iron Rings, (1) Expander

CENTER LIFT CYLINDER, ALL SIZES

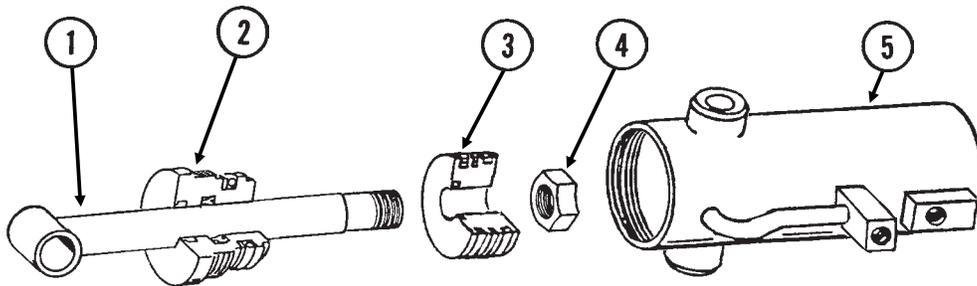
(CYL39c)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD11951	1	Clevis
2.	G10907	1	Set Screw, 1/4"-20 x 1/4"
3.	GD11193	1	Cap
4.	GD10936	1	Rod
5.	GD10211	1	Gland
6.	GD11253	1	Piston
7.	G10958	1	Lock Nut, 1"-14
8.	GA8149	1	Barrel
9.	G10939	1	Hex Head Cap Screw, 3/8"-16 x 2 1/4"
	G10108	1	Lock Nut, 3/8"-16
10.	G6408-H04-O	1	Hex Socket Head Plug W/O-Ring, 7/16"-20 O-Ring
	GR1465	1	O-Ring
A.	GA8908	-	Cylinder Complete, 3" x 48" (Part Number Stamped On Barrel)
B.	GR1428	-	Seal Kit, Includes: (2) O-Rings, (2) BU Rings, (1) Wiper, (1) U-Cup, (1) Piston Seal, (2) Cast Iron Rings, (1) Expander

WING LIFT CYLINDER, 8 AND 12 ROW

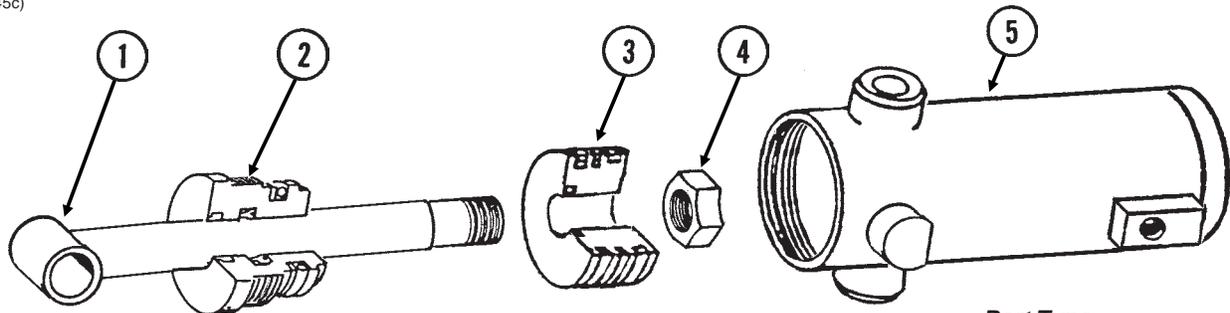
(CYL45b)



ITEM	PART NO.	QTY	DESCRIPTION	Port Type Rephasing
1.	GA8320	1	Rod Assembly W/Grease Fitting	
	G10640	-	Grease Fitting, 1/4"-28	
2.	GD11295	1	Gland	
3.	GD11294	1	Piston	
4.	GR0983	1	Lock Nut, 1"-14	
5.	A8319	1	Barrel (Non-Stock Item)	
A.	GA8310	-	Cylinder Complete, 4 1/4" x 6" (Part Number Stamped On Barrel) (Sub GA8909, G6400-L-08 And G6500-08)	
B.	GR1442	-	Seal Kit, Includes: (2) Rings, (1) Seal, (3) O-Rings, (1) BU Ring, (1) Wiper, (1) U-Cup	

WING LIFT CYLINDER, 8 AND 12 ROW

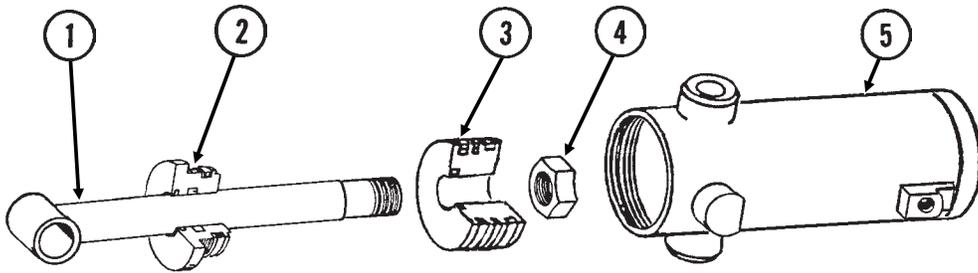
(CYL45c)



ITEM	PART NO.	QTY	DESCRIPTION	Port Type Rephasing
1.	GA8320	1	Rod Assembly W/Grease Fitting	
	G10640	-	Grease Fitting, 1/4"-28	
2.	GD11835	1	Gland	
3.	GD11294	1	Piston	
4.	G10958	1	Lock Nut, 1"-14	
5.	A8797	1	Barrel (Non-Stock Item)	
A.	GA8798	-	Cylinder Complete, 4 1/4" x 6" (Part Number Stamped On Barrel) (Sub GA8909, G6400-L-08 And G6500-08)	
B.	GR1496	-	Seal Kit, Includes: (2) Cast Iron Rings, (1) Expander, (2) O-Rings, (1) U-Packing, (1) Wiper, (1) Piston Ring, (1) BU Ring	

WING LIFT CYLINDER, 8 AND 12 ROW

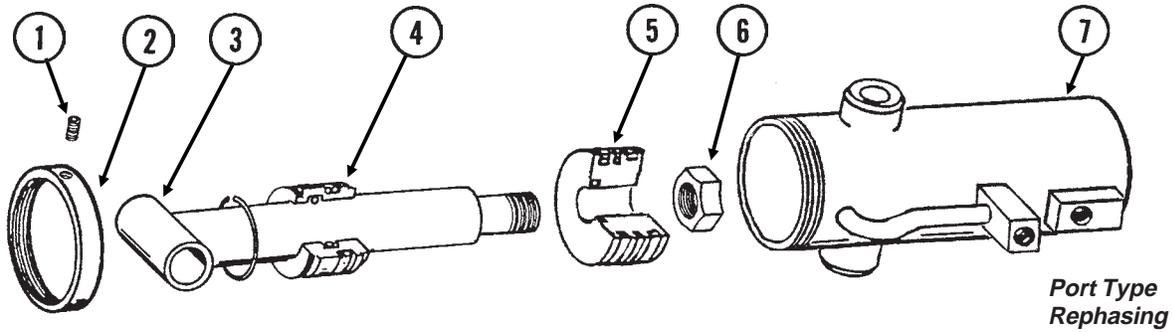
CYL031/CYL011(CYL45d)



ITEM	PART NO.	QTY	DESCRIPTION	Port Type Rephasing
1.	GA8320	1	Rod Assembly W/Grease Fitting	
	G10640	-	Grease Fitting, 1/4"-28	
2.	GD11995	1	Gland	
3.	GD11994	1	Piston	
4.	G10958	1	Lock Nut, 1"-14	
5.	A8797	1	Barrel (Non-Stock Item)	
A.	GA8909	-	Cylinder Complete, 4 1/4" x 6" <i>(Part Number Stamped On Barrel)</i>	
B.	GR1523	-	Seal Kit, Includes: (1) Wiper, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Seal, (2) Cast Iron Rings, (1) Expander	

WING LIFT CYLINDER, 16 ROW

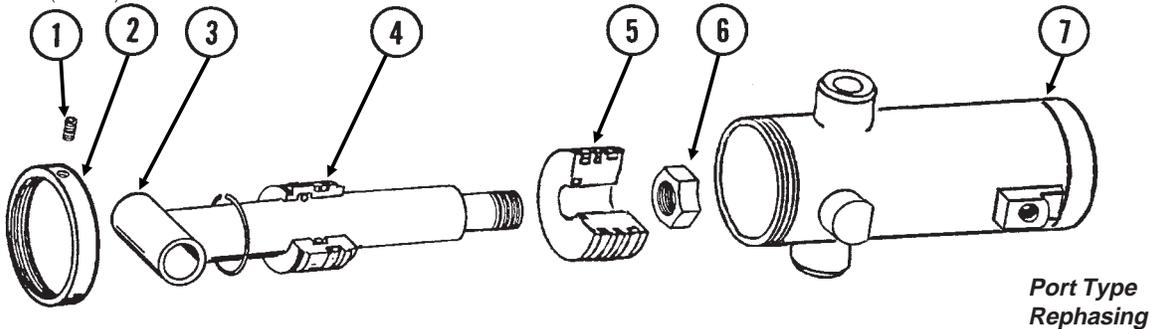
CYL031/CYL011(CYL41b)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10907	1	Set Screw, 1/4"-20 x 1/4"
2.	GD11193	1	Cap
3.	GA8157	1	Rod Assembly W/Grease Fitting
	G10449	-	Grease Fitting, 3/16", Drive-In
4.	GD11194	1	Gland
5.	GD11253	1	Piston
6.	GR0983	1	Lock Nut, 1"-14
7.	A8147	1	Barrel (Non-Stock Item)
A.	GA8108	-	Cylinder Complete, 3" x 6" <i>(Part Number Stamped On Barrel)</i> (Sub GA8874)
B.	GR1417	-	Seal Kit, Includes: (2) O-Rings, (2) BU Rings, (1) Expander, (1) Wiper, (1) U-Cup, (1) Piston Seal, (2) Cast Iron Rings

WING LIFT CYLINDER, 16 ROW

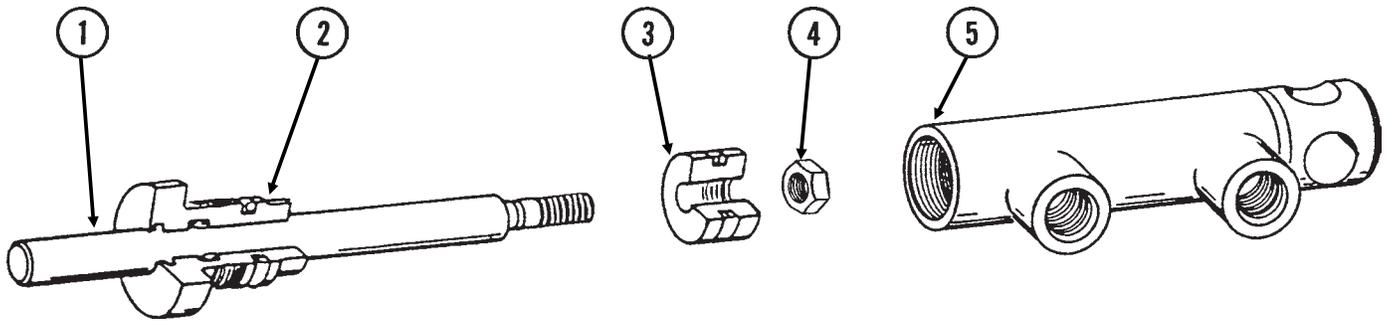
CYL031/CYL011(CYL41c)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10907	1	Set Screw, 1/4"-20 x 1/4"
2.	GD11193	1	Cap
3.	GA8157	1	Rod Assembly W/Grease Fitting
	G10449	-	Grease Fitting, 3/16", Drive-In
4.	GD11194	1	Gland
5.	GD11253	1	Piston
6.	G10958	1	Lock Nut, 1"-14
7.	A8873	1	Barrel (Non-Stock Item)
A.	GA8874	-	Cylinder Complete, 3" x 6" <i>(Part Number Stamped On Barrel)</i>
B.	GR1417	-	Seal Kit, Includes: (2) O-Rings, (2) BU Rings, (1) Expander, (1) Wiper, (1) U-Cup, (1) Piston Seal, (2) Cast Iron Rings

TRANSPORT LATCH CYLINDER, ALL SIZES

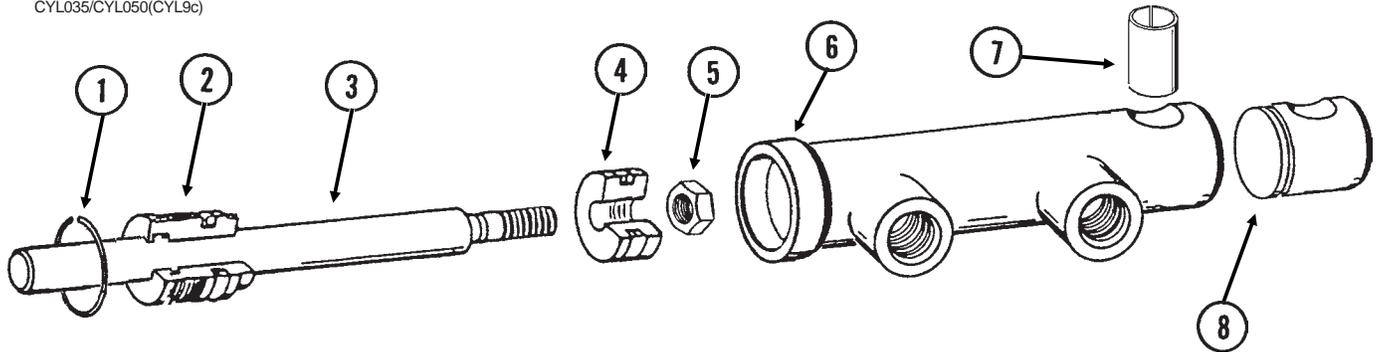
CYL035/CYL050(CYL9b)



ITEM	PART NO.	QTY.	DESCRIPTION
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" <i>(Part Number Stamped On Barrel)</i>
B.	GR1001	-	Seal Kit, Includes: (2) O-Rings, (1) U-Cup, (1) Wiper, (1) T-Seal

TRANSPORT LATCH CYLINDER, ALL SIZES

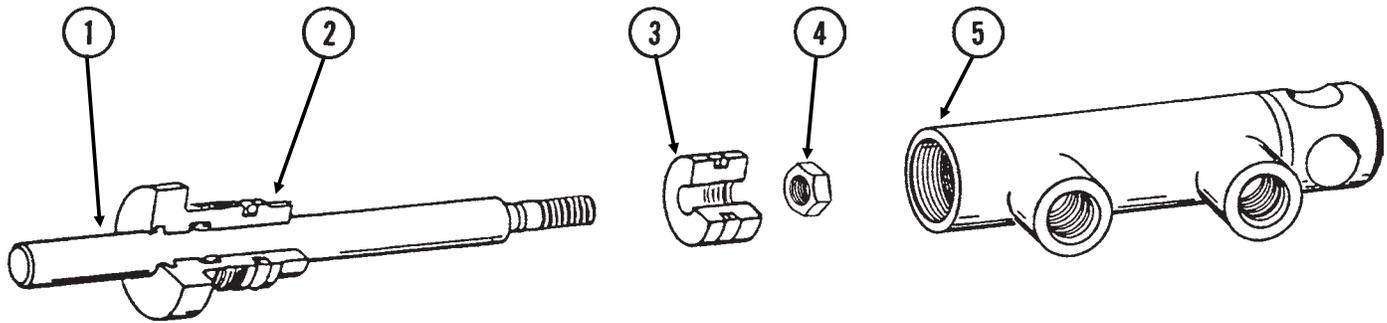
CYL035/CYL050(CYL9c)



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" <i>(Part Number Stamped On Barrel)</i>
B.	GR1598	-	Seal Kit, Includes: (3) O-Rings, (2) BU Rings, (1) Wiper, (1) T-Seal, (1) Bronze Bushing, (1) Seal, (1) U-Cup

TONGUE LOCK CYLINDER, ALL SIZES

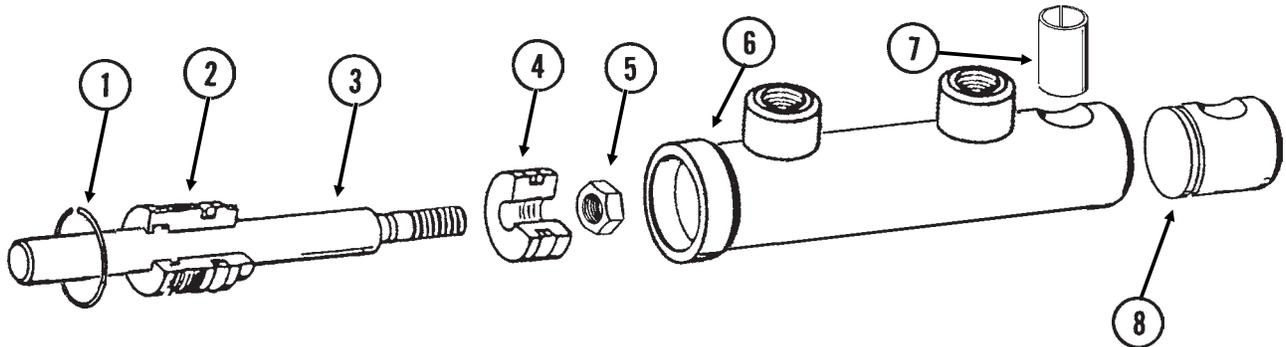
CYL035(CYL9b)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD7123	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.	GA4310	-	Cylinder Complete, 1 1/2" x 2 1/2" <i>(Part Number Stamped On Barrel)</i>
B.	GR1001	-	Seal Kit, Includes: (2) O-Rings, (1) U-Cup, (1) Wiper, (1) T-Seal

TONGUE LOCK CYLINDER, ALL SIZES

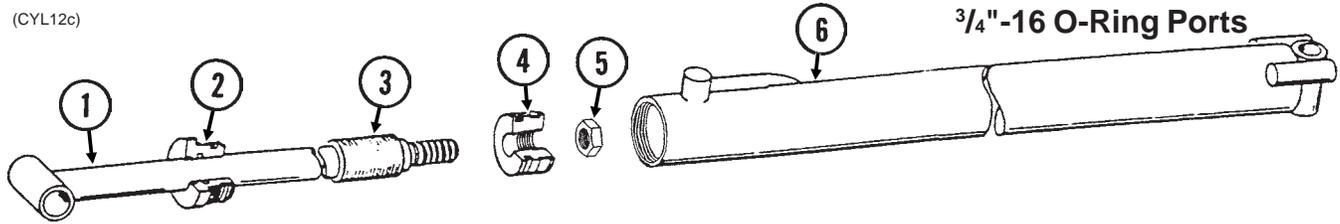
CYL035(CYL9d)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10770	1	Internal Retaining Ring, 1 11/16"
2.	GD13170	1	Gland
3.	GD13171	1	Rod
4.	GD13172	1	Piston
5.	G11016	1	Lock Nut, 1/2"-20
6.	D13169	1	Barrel (Non-Stock Item)
7.	GD13400	1	Tension Bushing, 1" x 2" Long
8.	GD13173	1	EndCap
A.	GA9205	-	Cylinder Complete, 1 1/2" x 2 1/2" <i>(Part Number Stamped On Barrel)</i>
B.	GR1598	-	Seal Kit, Includes: (3) O-Rings, (2) BU Rings, (1) Wiper, (1) T-Seal, (1) Bronze Bushing, (1) Seal, (1) U-Cup

TONGUE CYLINDER, 8 ROW 36"/38" WITH "Y" HITCH

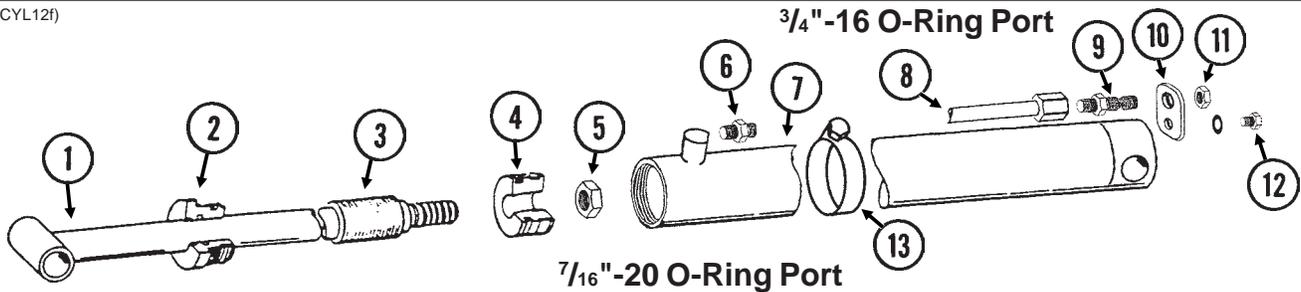
(CYL12c)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA4791	1	Rod Assembly
2.	GD7146	1	Gland
3.	GD7147	1	Spacer
4.	GD4527	1	Piston
5.	GR0987	1	Lock Nut, 1 1/4"-12
6.	A4792	1	Barrel (Non-Stock Item)
A.	GA4484	-	Cylinder Complete, 3" x 36" <i>(Part Number Stamped On Barrel)</i> (Sub GA8870)
B.	GR1004	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring, (1) Wear Ring, (1) Wiper, (1) U-Cup, (1) T-Seal

TONGUE CYLINDER, 8 ROW 36"/38" WITH "Y" HITCH

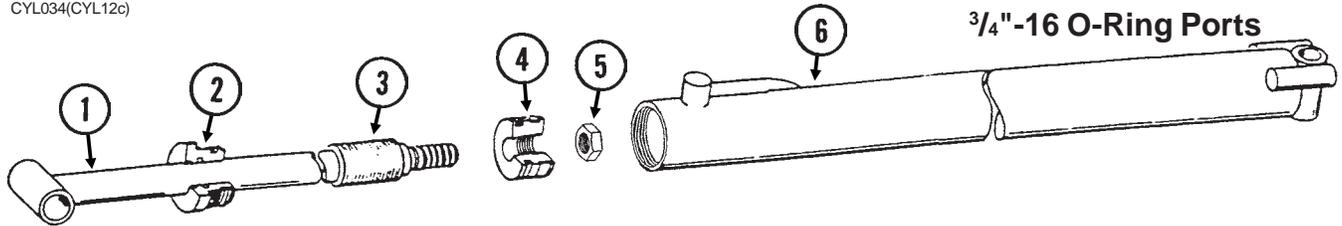
(CYL12f)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8867	1	Rod Assembly
2.	GD11984	1	Gland
3.	GD7147	1	Spacer
4.	GD11970	1	Piston
5.	G10972	1	Lock Nut, 1 1/4"-12
6.	G6400-08-04	1	Connector W/O-Ring, 3/4"-16 Male JIC To 7/16"-20 O-Ring
	GR1465	-	O-Ring
7.	A8869	1	Barrel (Non-Stock Item)
8.	GA8981	1	Steel Hydraulic Line, 44 11/16"
9.	G2700-08	1	Bulkhead Tube Union, 3/4"-16 Male JIC
10.	GD12597	1	Bracket
11.	G306-08	1	Lock Nut, 3/4"-16
12.	G10328	1	Hex Head Cap Screw, 3/8"-16 x 5/8"
	G10229	1	Lock Washer, 3/8"
13.	G10990	1	Hose Clamp, No. 52
A.	GA8870	-	Cylinder Complete, 3" x 36" <i>(Part Number Stamped On Barrel)</i>
B.	GR1519	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring, (1) Wear Ring, (1) Wiper, (1) U-Cup, (1) T-Seal

TONGUE CYLINDER, 8 ROW 36"/38" WITH "T" HITCH, 12 ROW 30" WITH "Y" HITCH

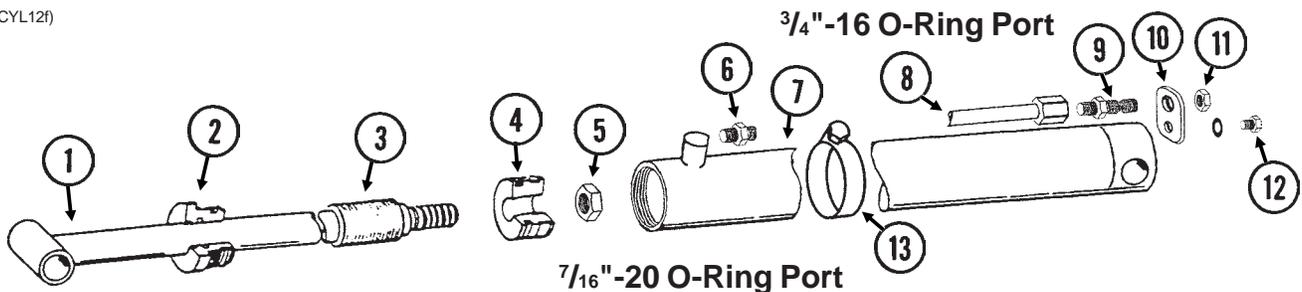
CYL034(CYL12c)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA4780	1	Rod Assembly
2.	GD7146	1	Gland
3.	GD7147	1	Spacer
4.	GD4527	1	Piston
5.	GR0987	1	Lock Nut, 1 1/4"-12
6.	GA4779	1	Barrel
A.	GA4285	-	Cylinder Complete, 3" x 60" (Part Number Stamped On Barrel) (Sub GA8857)
B.	GR1004	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring, (1) Wear Ring, (1) Wiper, (1) U-Cup, (1) T-Seal

TONGUE CYLINDER, 8 ROW 36"/38" WITH "T" HITCH, 12 ROW 30" WITH "Y" HITCH

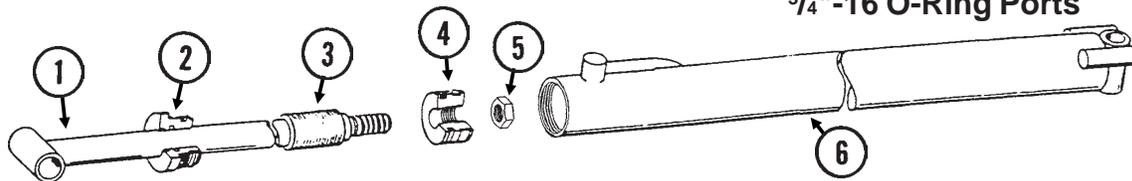
(CYL12f)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8893	1	Rod Assembly
2.	GD11984	1	Gland
3.	GD7147	1	Spacer
4.	GD11970	1	Piston
5.	G10972	1	Lock Nut, 1 1/4"-12
6.	G6400-08-04	1	Connector W/O-Ring, 3/4"-16 Male JIC To 7/16"-20 O-Ring
	GR1465	-	O-Ring
7.	GA8858	1	Barrel
8.	GA8978	1	Steel Hydraulic Line, 68 11/16"
9.	G2700-08	1	Bulkhead Tube Union, 3/4"-16 Male JIC
10.	GD12597	1	Bracket
11.	G306-08	1	Lock Nut, 3/4"-16
12.	G10328	1	Hex Head Cap Screw, 3/8"-16 x 5/8"
	G10229	1	Lock Washer, 3/8"
13.	G10990	1	Hose Clamp, No. 52
A.	GA8857	-	Cylinder Complete, 3" x 60" (Part Number Stamped On Barrel)
B.	GR1519	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring, (1) Wear Ring, (1) Wiper, (1) U-Cup, (1) T-Seal

TONGUE CYLINDER, 12 ROW 30" WITH "T" HITCH, 12 ROW 36"/38" AND 16 ROW 30" WITH "Y" HITCH

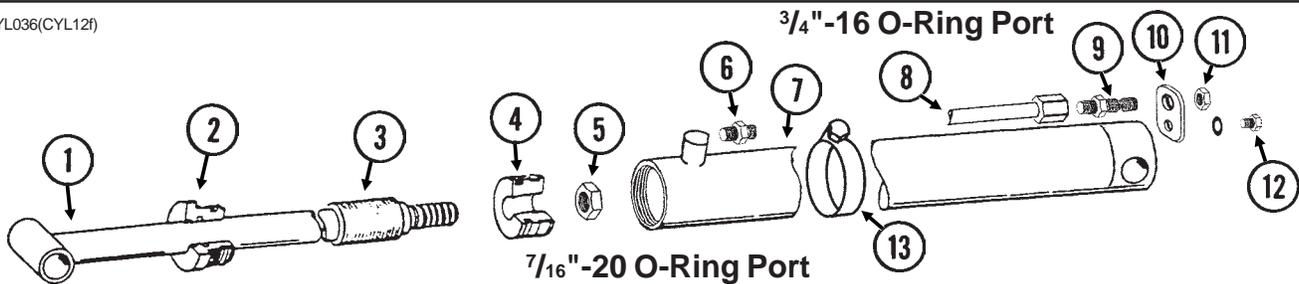
CYL036(CYL12c)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA4782	1	Rod Assembly
2.	GD7146	1	Gland
3.	GD7147	1	Spacer
4.	GD4527	1	Piston
5.	GR0987	1	Lock Nut, 1 1/4"-12
6.	GA4781	1	Barrel
A.	GA4332	-	Cylinder Complete, 3" x 84" (Part Number Stamped On Barrel) (Sub GA8862)
B.	GR1004	-	Seal Kit, Includes: (1) Wear Ring, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper, (1) T-Seal

TONGUE CYLINDER, 12 ROW 30" WITH "T" HITCH, 12 ROW 36"/38" AND 16 ROW 30" WITH "Y" HITCH

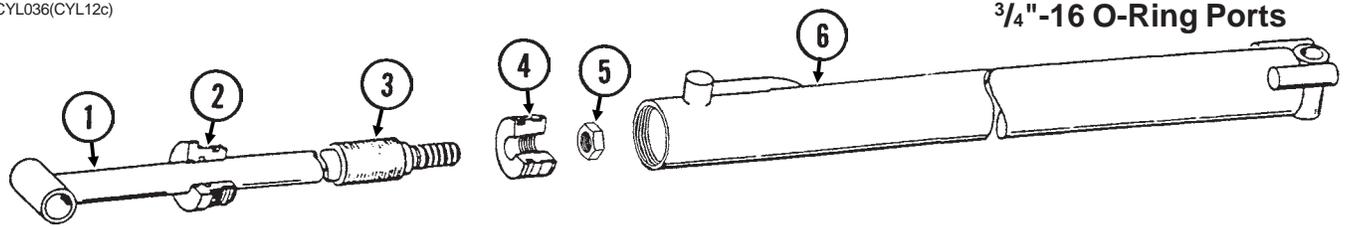
CYL036(CYL12f)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8859	1	Rod Assembly
2.	GD11984	1	Gland
3.	GD7147	1	Spacer
4.	GD11970	1	Piston
5.	G10972	1	Lock Nut, 1 1/4"-12
6.	G6400-08-04	1	Connector W/O-Ring, 3/4"-16 Male JIC To 7/16"-20 O-Ring
	GR1465	-	O-Ring
7.	GA8861	1	Barrel
8.	GA8979	1	Steel Hydraulic Line, 92 11/16"
9.	G2700-08	1	Bulkhead Tube Union, 3/4"-16 Male JIC
10.	GD12597	1	Bracket
11.	G306-08	1	Lock Nut, 3/4"-16
12.	G10328	1	Hex Head Cap Screw, 3/8"-16 x 5/8"
	G10229	1	Lock Washer, 3/8"
13.	G10990	1	Hose Clamp, No. 52
A.	GA8862	-	Cylinder Complete, 3" x 84" (Part Number Stamped On Barrel)
B.	GR1519	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring, (1) Wear Ring, (1) Wiper, (1) U-Cup, (1) T-Seal

TONGUE CYLINDER, 12 ROW 36"/38" AND 16 ROW 30" WITH "T" HITCH

CYL036(CYL12c)

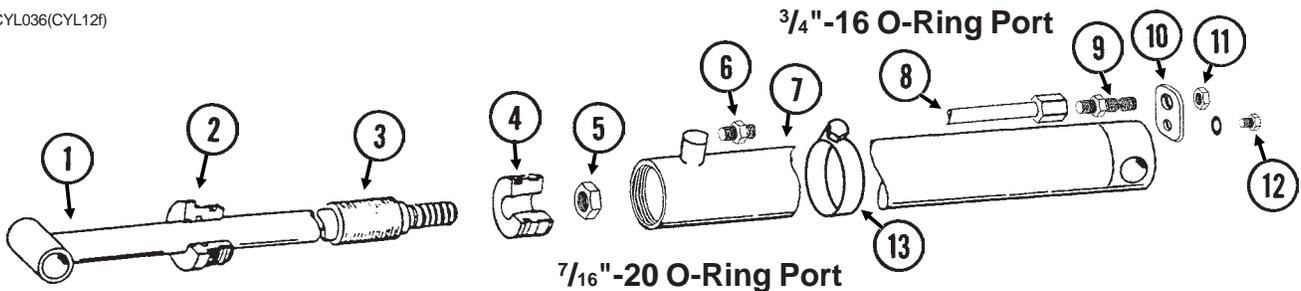


ITEM	PART NO.	QTY.	DESCRIPTION
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1.	GA5620	1	Rod Assembly
2.	GD7146	1	Gland
3.	GD7147	1	Spacer
4.	GD4527	1	Piston
5.	GR0987	1	Lock Nut, 1 1/4"-12
6.	GA5619	1	Barrel
A.	GA5584	-	Cylinder Complete, 3" x 108" (Part Number Stamped On Barrel) (Sub GA8866)
B.	GR1004	-	Seal Kit, Includes: (1) Wear Ring, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper, (1) T-Seal

TONGUE CYLINDER, 12 ROW 36"/38" AND 16 ROW 30" WITH "T" HITCH

CYL036(CYL12f)

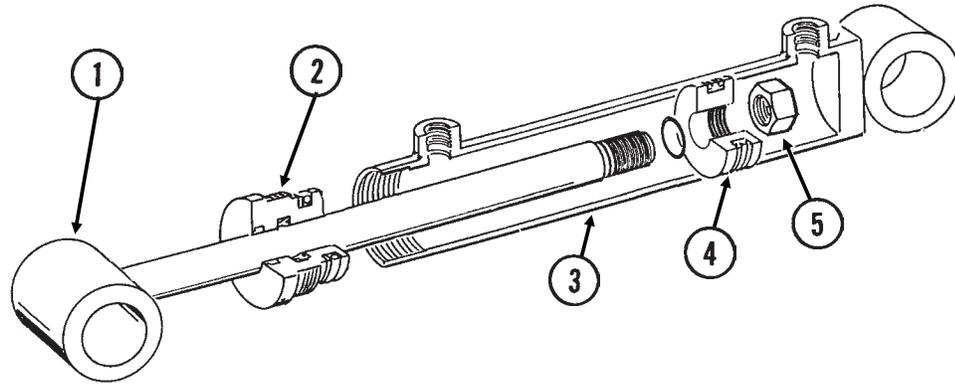


ITEM	PART NO.	QTY.	DESCRIPTION
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1.	GA8863	1	Rod Assembly
2.	GD11984	1	Gland
3.	GD7147	1	Spacer
4.	GD11970	1	Piston
5.	G10972	1	Lock Nut, 1 1/4"-12
6.	G6400-08-04	1	Connector W/O-Ring, 3/4"-16 Male JIC To 7/16"-20 O-Ring
	GR1465	-	O-Ring
7.	GA8865	1	Barrel
8.	GA8980	1	Steel Hydraulic Line, 116 11/16"
9.	G2700-08	1	Bulkhead Tube Union, 3/4"-16 Male JIC
10.	GD12597	1	Bracket
11.	G306-08	1	Lock Nut, 3/4"-16
12.	G10328	1	Hex Head Cap Screw, 3/8"-16 x 5/8"
	G10229	1	Lock Washer, 3/8"
13.	G10990	1	Hose Clamp, No. 52
A.	GA8866	-	Cylinder Complete, 3" x 108" (Part Number Stamped On Barrel)
B.	GR1519	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring, (1) Wear Ring, (1) Wiper, (1) U-Cup, (1) T-Seal

WING LOCK CYLINDER, ALL SIZES

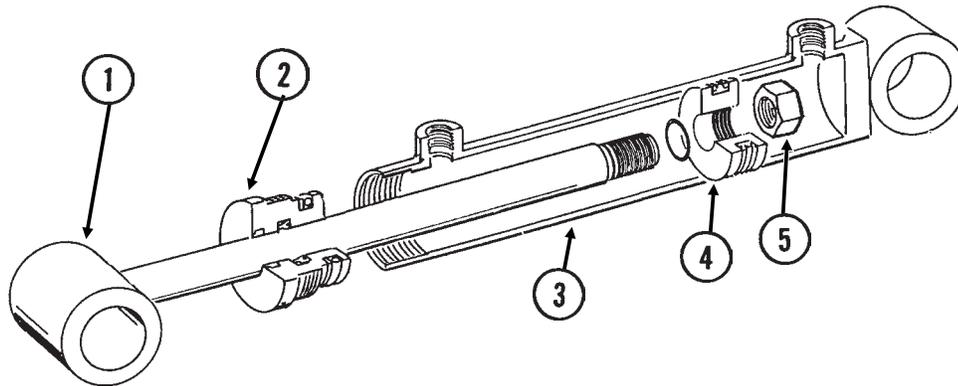
CYL032(CYL3f)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA4193	1	Rod Assembly
2.	GD11926	1	Gland
3.	A4192	1	Barrel (Non-Stock Item)
4.	GD4525	1	Piston
5.	G10969	1	Lock Nut, 7/8"-14
A.	GA4115	-	Cylinder Complete, 2 1/2" x 20 1/16" (Part Number Stamped On Barrel) (Sub GA8899)
B.	GR0963	-	Seal Kit, Includes: (1) T-Seal, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper

WING LOCK CYLINDER, ALL SIZES

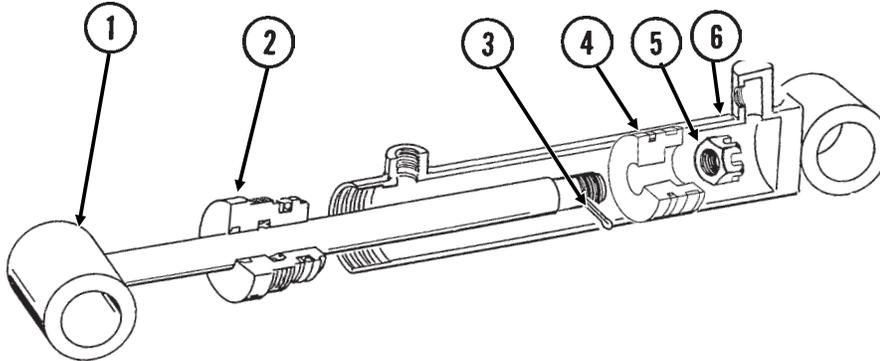
CYL032(CYL3f)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8898	1	Rod Assembly
2.	GD11985	1	Gland
3.	A8822	1	Barrel (Non-Stock Item)
4.	GD11986	1	Piston
5.	G10969	1	Lock Nut, 7/8"-14
A.	GA8899	-	Cylinder Complete, 2 1/2" x 20 1/16" (Part Number Stamped On Barrel)
B.	GR1522	-	Seal Kit, Includes: (1) T-Seal, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper

MARKER (Cushion) CYLINDER, ALL SIZES

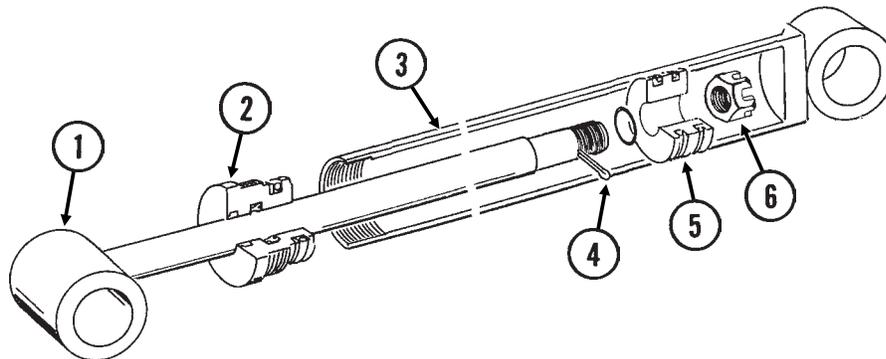
CYL032(CYL32d)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA7219	1	Rod Assembly
2.	GD10207	1	Gland
3.	G10827	1	Cotter Pin, 1/8" x 1 3/4"
4.	GD10206	1	Piston
5.	G10962	1	Slotted Hex Nut, 7/8"-14
6.	A7524	1	Barrel (Non-Stock Item)
A.	GA7523	-	Cylinder Complete, 2 1/2" x 20 1/16" <i>(Part Number Stamped On Barrel)</i> (Sub GA8895)
B.	GR1309	-	Seal Kit, Includes: (1) Seal, (2) O-Rings, (1) BU Ring, (1) U-Cup, (1) Wiper, (1) Cast Iron Ring

MARKER (Cushion) CYLINDER, ALL SIZES

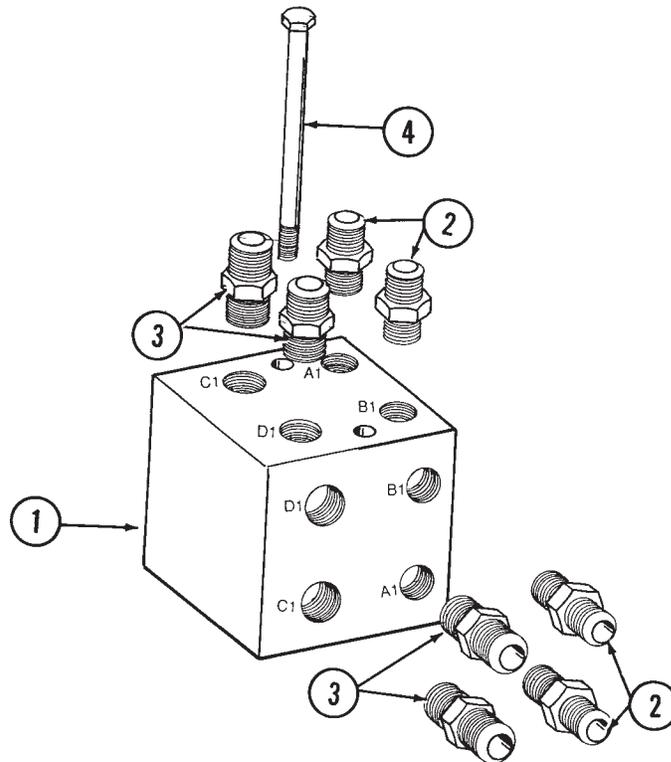
(CYL3d)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA8871	1	Rod Assembly
2.	GD10207	1	Gland
3.	A7524	1	Barrel (Non-Stock Item)
4.	G10827	1	Cotter Pin, 1/8" x 1 3/4"
5.	GD11983	1	Piston
6.	G10962	1	Slotted Hex Nut, 7/8"-14
A.	GA8895	-	Cylinder Complete, 2 1/2" x 20 1/16" <i>(Part Number Stamped On Barrel)</i>
B.	GR1521	-	Seal Kit, Includes: (1) T-Seal, (2) O-Rings, (1) BU Ring, (1) Cast Iron Ring, (1) Wiper, (1) U-Cup

JUNCTION BLOCK - LOCATED ON R.H. SIDE OF CENTER PIVOT

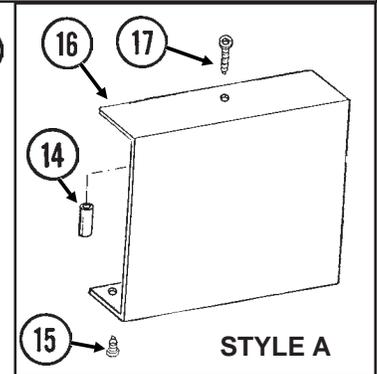
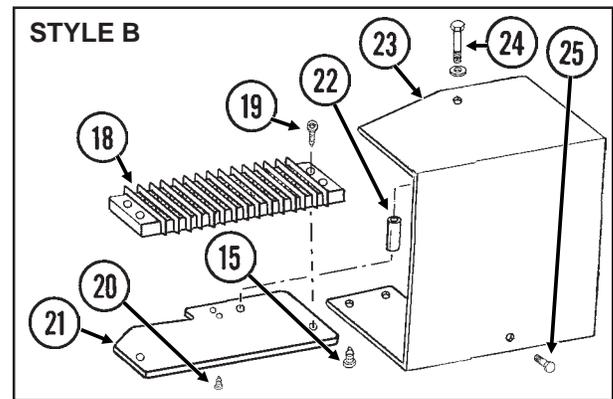
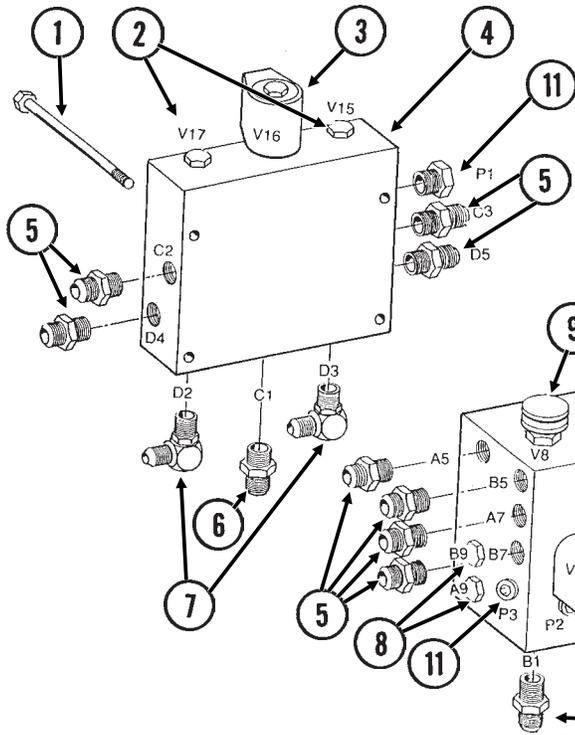
VVB036(TWL24)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD9971	1	Manifold Block
2.	G6400-08	4	Connector W/O-Ring, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
3.	G6400-10-08	4	Connector W/O-Ring, 7/8"-14 Male JIC To 3/4"-16 O-Ring
	GR1037	-	O-Ring
4.	G10172	2	Hex Head Cap Screw, 3/8"-16 x 5"
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16

VALVE BLOCKS - LOCATED ON REAR CENTER FRAME

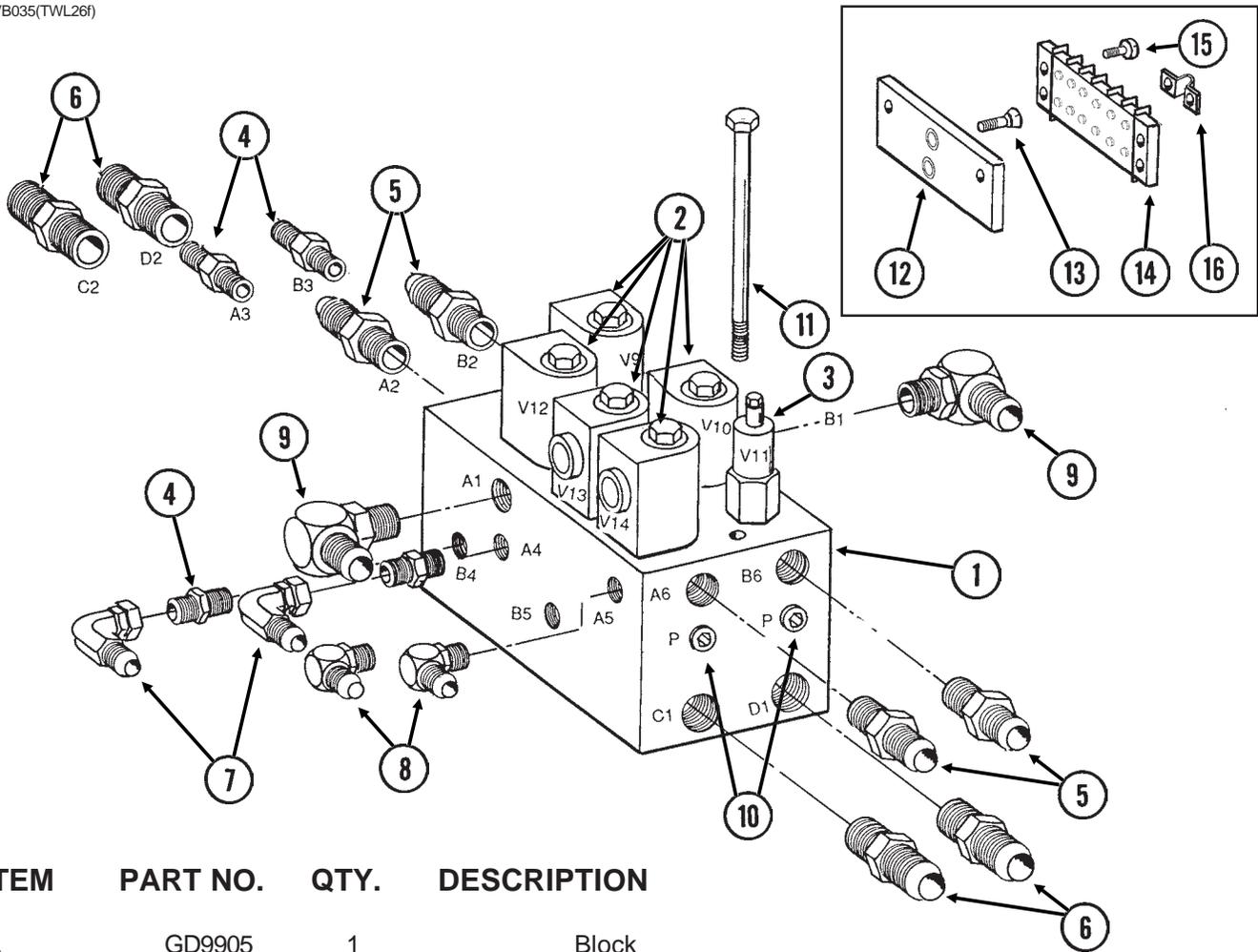
VVB034(TWL25c)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10583	4	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x $2\frac{3}{4}$ "
	G10232	4	Lock Washer, $\frac{5}{16}$ "
2.		2	See "Check Valve", Page P91
3.		5	See "Solenoid Valve", Page P90
4.	GD9977	1	Block
5.	G6400-08	12	Connector W/O-Ring, $\frac{3}{4}$ "-16 Male JIC To O-Ring
	GR1037	-	O-Ring
6.	G6400-10	1	Connector W/O-Ring, $\frac{7}{8}$ "-14 Male JIC To O-Ring
	GR1466	-	O-Ring
7.	G6801-08-10	2	Elbow W/O-Ring, 90°, $\frac{3}{4}$ "-16 Male JIC To $\frac{7}{8}$ "-14 O-Ring
	GR1466	-	O-Ring
8.	G6408-08	4	Plug W/O-Ring, $\frac{3}{4}$ "-16 O-Ring
	GR1037	-	O-Ring
9.		2	See "Flow Control Valve", Page P90
10.	GD9533	1	Block
11.	G6408-H06-O	6	Hex Socket Head Plug W/O-Ring, $\frac{9}{16}$ "-18 O-Ring
	GR1045	-	O-Ring
12.	G6400-08-10	2	Connector W/O-Ring, $\frac{3}{4}$ "-16 Male JIC To $\frac{7}{8}$ "-14 O-Ring
	GR1466	-	O-Ring
13.	G6408-10	2	Plug W/O-Ring, $\frac{7}{8}$ "-14 O-Ring
	GR1466	-	O-Ring
14.	GD7363-04	1	Sleeve, $\frac{15}{16}$ " Long
15.	G10977	2	Phillips Pan Head Machine Screw, No. 10-24 x $1\frac{1}{2}$ ", Stainless Steel
16.	GD9583	1	Cover
17.	G10767	1	Slotted Pan Head Screw, No. 10-24 x $1\frac{1}{2}$ "
18.	GA9097	1	Terminal Strip W/Screws, No. 6, 14 Terminal
	GR1635	-	Screw, No. 6-32 x $\frac{1}{4}$ "
19.	G11067	2	Phillips Pan Head Machine Screw, No. 8-32 x $\frac{3}{4}$ ", Stainless Steel
20.	G11066	2	Phillips Pan Head Machine Screw, No. 10-24 x $\frac{3}{4}$ ", Stainless Steel
21.	GA9095	1	Terminal Strip Mount
22.	GD8066-02	1	Sleeve, 1" Long
23.	GD13146	1	Cover
24.	G10133	1	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x $1\frac{1}{2}$ "
	G10232	1	Lock Washer, $\frac{5}{16}$ "
25.	G10054	1	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x $1\frac{1}{2}$ "
	G10232	1	Lock Washer, $\frac{5}{16}$ "
	G10106	1	Hex Nut, $\frac{5}{16}$ "-18

VALVE BLOCK - LOCATED ON HITCH

VVB035(TWL26f)

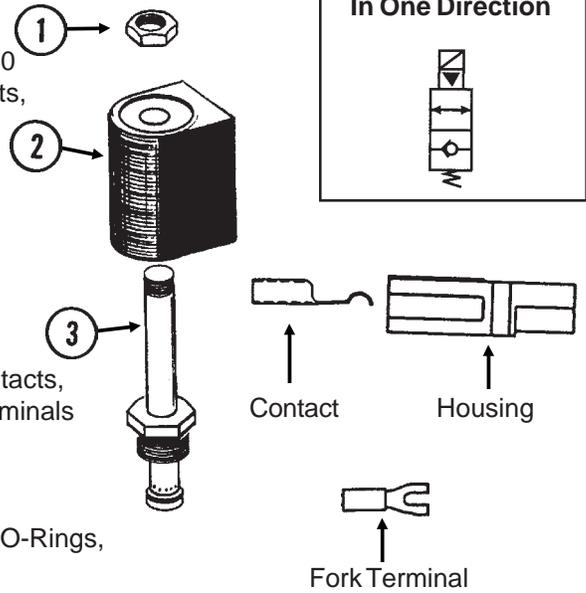


ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD9905	1	Block
2.		-	See "Solenoid Valve", Page P90
3.		-	See "Pressure Relief Valve", Page P90
4.	G6400-06	4	Connector W/O-Ring, 9/16"-18 Male JIC To O-Ring
	GR1045	-	O-Ring
5.	G6400-08	4	Connector W/O-Ring, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
6.	G6400-10	4	Connector W/O-Ring, 7/8"-14 Male JIC To O-Ring
	GR1466	-	O-Ring
7.	G6500-06	2	Swivel Elbow, 90°, 9/16"-18 Male JIC To Female
8.	G6801-06	2	Elbow W/O-Ring, 90°, 9/16"-18 Male JIC To O-Ring
	GR1045	-	O-Ring
9.	G6801-08	2	Elbow W/O-Ring, 90°, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
10.	G6408-H06-O	2	Hex Socket Head Plug W/O-Ring, 9/16"-18 O-Ring
	GR1045	-	O-Ring
11.		-	See "Hose Take-Up", Pages P42 And P43
12.	GD12818	-	Terminal Strip Mount
13.	G11068	2	Phillips Flat Head Machine Screw, No. 10-24 x 5/8", Stainless Steel
14.	GA9098	-	Terminal Strip W/Screws, No. 6, 8 Terminal
	GR1635	-	Screw, No. 6-32 x 1/4"
15.	G11065	2	Phillips Pan Head Machine Screw, No. 8-32 x 5/8", Stainless Steel
16.		-	See "Electrical Components", Pages P96 And P97

SOLENOID VALVE

VVB019(TWL27c/TWL18/PLTR75c/A9481)

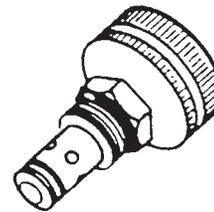
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR0761	1	Special Hex Nut, 1/2"-20
2.	G1K274	1	Coil Kit W/Coil, Contacts, Housings And Fork Terminals
	GD9529	2	Housing, Black
	GD9530	2	Contact
	G10996	2	Fork Terminal
3.	GR0763	1	Cartridge
A.	G1K275	-	Solenoid Valve Kit W/Solenoid Valve, Contacts, Housings And Fork Terminals
	GD9529	2	Housing, Black
	GD9530	2	Contact
	G10996	2	Fork Terminal
B.	GR0764	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring



FLOW CONTROL VALVE

VVB020(TWL28)

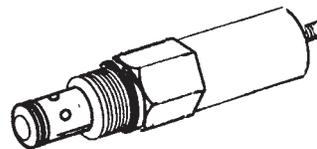
ITEM	PART NO.	QTY.	DESCRIPTION
A.	GA3413	-	Flow Control Valve
B.	GR0764	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring



PRESSURE RELIEF VALVE

VVB020(TWL29)

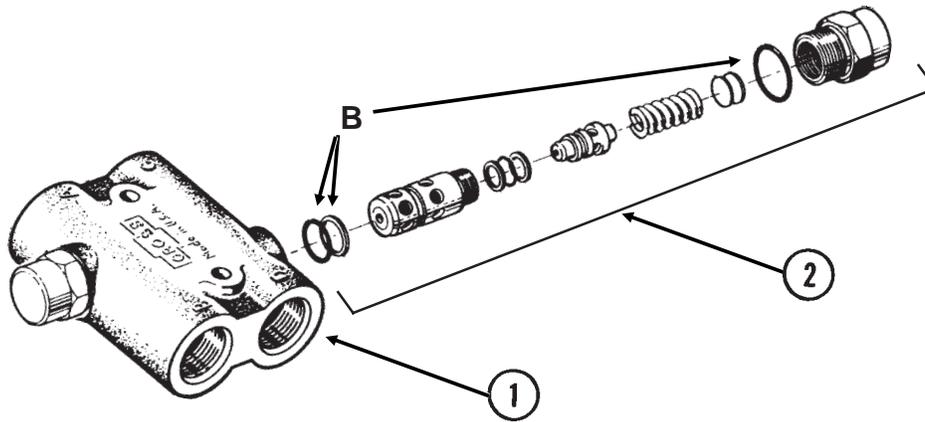
ITEM	PART NO.	QTY.	DESCRIPTION
A.	GA3407	-	Pressure Relief Valve, 1000 PSI
B.	GR0764	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring



RELIEF VALVE (Located On Hitch) 8, 12 AND 16 ROW (IF APPLICABLE)

(TWL147)

STYLE A

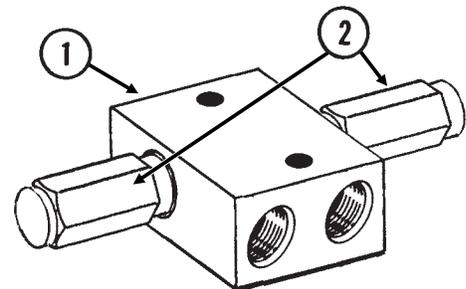


ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1402	1	Body
2.	GR1403	2	Cartridge
A.	GA8129A	-	Relief Valve Complete
B.	GR1404	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring

STYLE B

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1513	1	Body
2.	GR1514	2	Cartridge
A.	GA8129B	-	Relief Valve Complete
B.	GR1515	-	Seal Kit, Includes: (2) O-Rings, (2) BU Rings

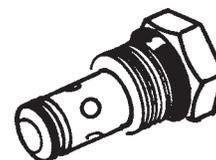
(TWL171)



CHECK VALVE

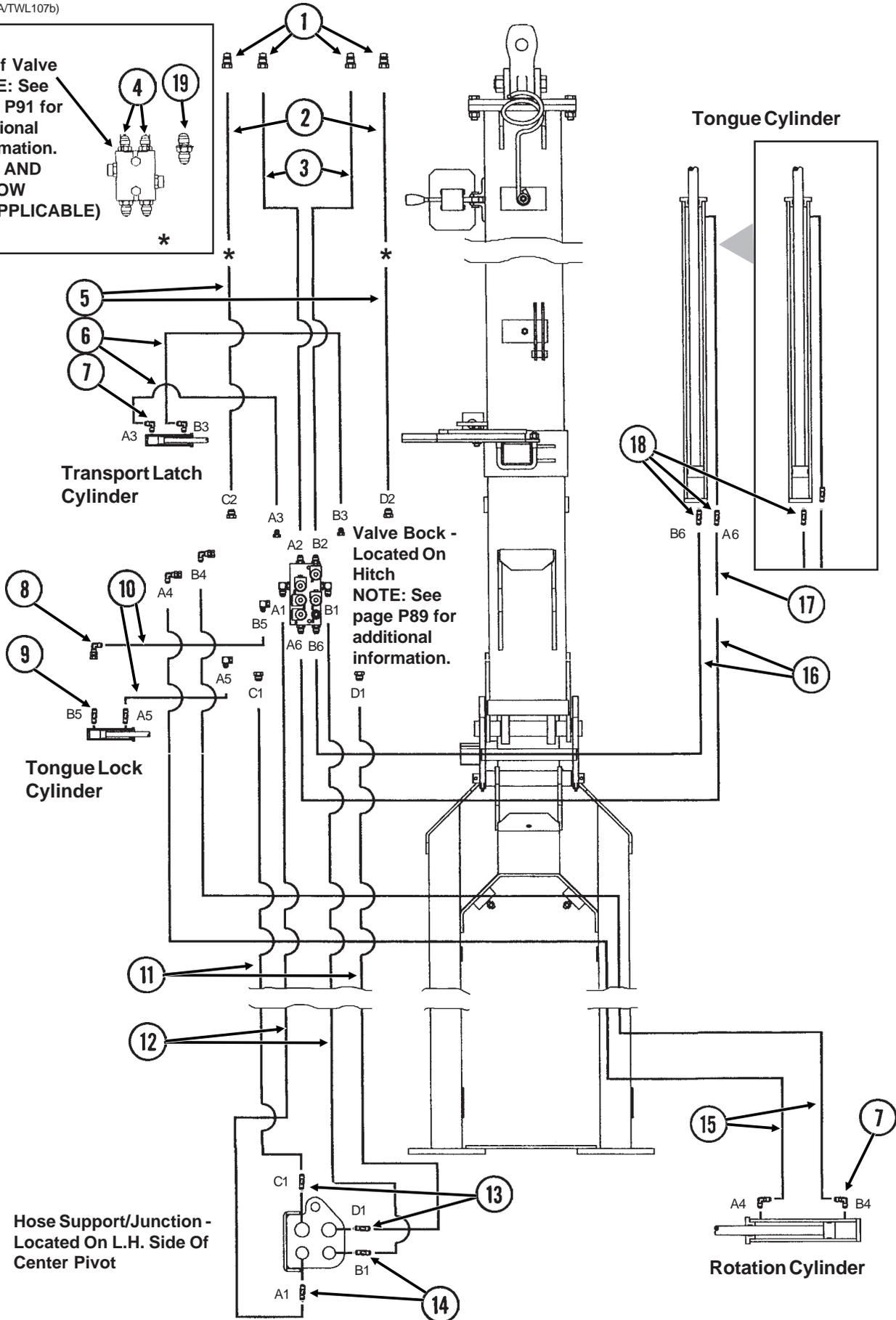
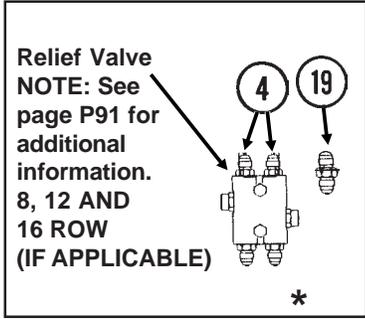
ITEM	PART NO.	QTY.	DESCRIPTION
A.	GA4293	-	Check Valve
B.	GR0764	-	Seal Kit, Includes: (2) O-Rings, (1) BU Ring

VVB020(TWL30)



HYDRAULIC HOSES AND FITTINGS ON HITCH

(TWL107A/TWL107b)



HYDRAULIC HOSES AND FITTINGS ON HITCH

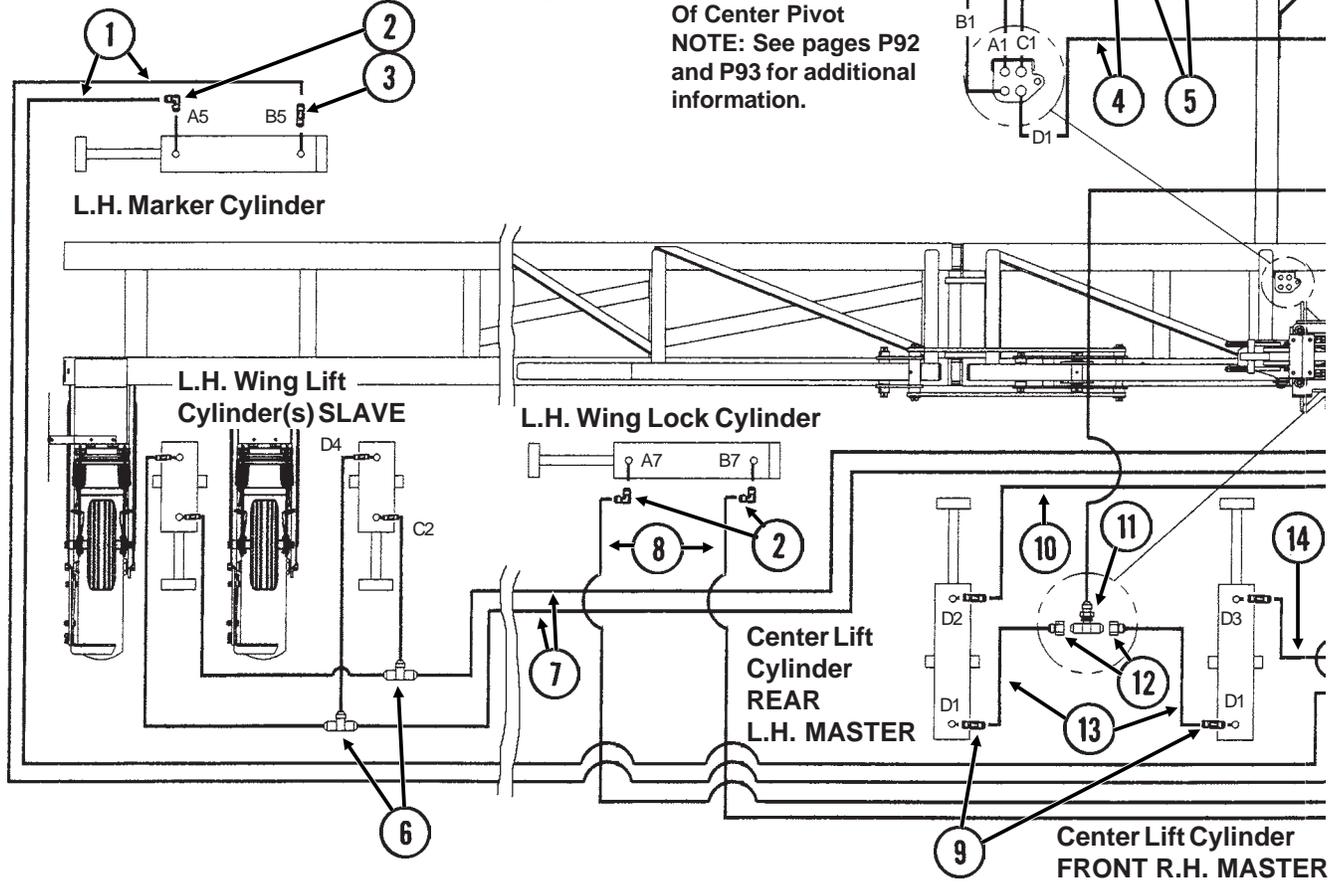
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GD4086	4	ISO Coupler
2.	*A1417	2	Hose Assembly, 1/2" x 138", 8 Row 36"/38" "Y" Hitch
	*A8204	2	Hose Assembly, 1/2" x 159", 8 Row 36"/38" "T" Hitch
	*A8206	2	Hose Assembly, 1/2" x 147", 12 Row 30" "Y" Hitch
	*A8205	2	Hose Assembly, 1/2" x 182", 12 Row 30" "T" Hitch
	*A8200	2	Hose Assembly, 1/2" x 178", 12 Row 36"/38" And 16 Row 30" "Y" Hitch
	*A8207	2	Hose Assembly, 1/2" x 209", 12 Row 36"/38" And 16 Row 30" "T" Hitch
3.	*A1075	2	Hose Assembly, 3/8" x 156", 8 Row 36"/38" "Y" Hitch
	*A3182	2	Hose Assembly, 3/8" x 203", 8 Row 36"/38" "T" Hitch
	*A3133	2	Hose Assembly, 3/8" x 191", 12 Row 30" "Y" Hitch
	*A1032	2	Hose Assembly, 3/8" x 240", 12 Row 30" "T" Hitch
	*A3183	2	Hose Assembly, 3/8" x 246", 12 Row 36"/38" And 16 Row 30" "Y" Hitch
	*A3184	2	Hose Assembly, 3/8" x 300", 12 Row 36"/38" And 16 Row 30" "T" Hitch
4.	G6400-10	4	Connector W/O-Ring, 7/8"-14 Male JIC To O-Ring
	GR1466	-	O-Ring
5.	*A8202	2	Hose Assembly, 1/2" x 17", 8 Row 36"/38" "Y" Hitch
	*A8203	2	Hose Assembly, 1/2" x 43", 8 Row 36"/38" "T" And 12 Row 30" "Y" Hitch
	*A1463	2	Hose Assembly, 1/2" x 68", 12 Row 30" "T" Hitch, 12 Row 36"/38" "Y" Hitch And 16 Row 30" "Y" Hitch
	*A8201	2	Hose Assembly, 1/2" x 90", 12 Row 36"/38" "T" Hitch And 16 Row 30" "T" Hitch
6.	*A1170	2	Hose Assembly, 1/4" x 90", 8 Row 36"/38" "Y" Hitch
	*A1106	2	Hose Assembly, 1/4" x 130", 8 Row 36"/38" "T" Hitch
	*A1103	2	Hose Assembly, 1/4" x 110", 12 Row 30" "Y" Hitch
	*A1183	2	Hose Assembly, 1/4" x 157", 12 Row 30" "T" Hitch And 12 Row 36"/38" "Y" Hitch
	*A1156	2	Hose Assembly, 1/4" x 204", 12 Row 36"/38" "T" Hitch
	*A1129	2	Hose Assembly, 1/4" x 168", 16 Row 30" "Y" Hitch
	*A1119	2	Hose Assembly, 1/4" x 216", 16 Row 30" "T" Hitch
7.	G6801-06-08	4	Elbow W/O-Ring, 90°, 9/16"-18 Male JIC To 3/4"-16 O-Ring
	GR1037	-	O-Ring
8.	G6502-06	1	Swivel Elbow, 45°, 9/16"-18 Male JIC To Female
9.	G6400-06-08	2	Connector W/O-Ring, 9/16"-18 Male JIC To 3/4"-16 O-Ring
	GR1037	-	O-Ring
10.	*A1181	2	Hose Assembly, 1/4" x 32", 8 Row 36"/38" "Y" Hitch
	*A1139	2	Hose Assembly, 1/4" x 40", 8 Row 36"/38" "T" Hitch, 12 Row 30" "Y"/"T" Hitch, 12 Row 36"/38" "Y"/"T" Hitch And 16 Row 30" "Y"/"T" Hitch
11.	*A1494	2	Hose Assembly, 1/2" x 112", 8 Row 36"/38" "Y" Hitch
	*A1463	2	Hose Assembly, 1/2" x 68", 8 Row 36"/38" "T" Hitch
	*A1464	2	Hose Assembly, 1/2" x 72", 12 Row 30" "T" Hitch
	*A1467	2	Hose Assembly, 1/2" x 120", 12 Row 30"/36"/38" "Y" Hitch
	*A1462	2	Hose Assembly, 1/2" x 78", 12 Row 36"/38" And 16 Row 30" "T" Hitch
	*A1478	2	Hose Assembly, 1/2" x 128", 16 Row 30" "Y" Hitch
12.	*A1024	2	Hose Assembly, 3/8" x 116", 8 Row 36"/38" "Y" Hitch
	*A1039	2	Hose Assembly, 3/8" x 76", 8 Row 36"/38" "T" Hitch
	*A3129	2	Hose Assembly, 3/8" x 79", 12 Row 30" "T" Hitch
	*A1011	2	Hose Assembly, 3/8" x 125", 12 Row 30"/36"/38" "Y" Hitch
	*A3113	2	Hose Assembly, 3/8" x 84", 12 Row 36"/38" And 16 Row 30" "T" Hitch
	*A1041	2	Hose Assembly, 3/8" x 130", 16 Row 30" "Y" Hitch
13.	G2700-10	2	Bulkhead Tube Union, 7/8"-14 Male JIC
14.	G2700-08	2	Bulkhead Tube Union, 3/4"-16 Male JIC
15.	*A1105	2	Hose Assembly, 1/4" x 125", 8 Row 36"/38" "Y" Hitch
	*A1114	2	Hose Assembly, 1/4" x 85", 8 Row 36"/38" And 12 Row 30" "T" Hitch
	*A1106	2	Hose Assembly, 1/4" x 130", 12 Row 30"/36"/38" "Y" Hitch
	*A1102	2	Hose Assembly, 1/4" x 95", 12 Row 36"/38" "T" Hitch And 16 Row 30" "T" Hitch
	*A1116	2	Hose Assembly, 1/4" x 136", 16 Row 30" "Y" Hitch
16.	*A1022	2	Hose Assembly, 3/8" x 60", 8 Row 36"/38" "Y" Hitch
	*A1087	2	Hose Assembly, 3/8" x 74", 8 Row 36"/38" "T" Hitch
	*A3156	2	Hose Assembly, 3/8" x 68", 12 Row 30"/36"/38" "Y" Hitch
	*A3159	2	Hose Assembly, 3/8" x 97", 12 Row 36"/38" And 16 Row 30" "T" Hitch
	*A3129	2	Hose Assembly, 3/8" x 79", 12 Row 30" "T" Hitch
	*A3118	2	Hose Assembly, 3/8" x 80", 16 Row 30" "Y" Hitch
17.	*A1072	1	Hose Assembly, 3/8" x 48", 8 Row 36"/38" "Y" Hitch (If Applicable)
	*A3215	1	Hose Assembly, 3/8" x 72", 8 Row 36"/38" "T" And 12 Row 30" "Y" Hitch (If Applicable)
	*A3216	1	Hose Assembly, 3/8" x 96", 12 Row 36"/38" "Y" Hitch, 12 Row 30" "T" Hitch And 16 Row 30" "Y" Hitch (If Applicable)
18.	G6400-08	1-2	Connector W/O-Ring, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
19.	G2403-10	2	Union, 7/8"-14 Male JIC

* Hydraulic hose is not stocked by KINZE® Repair Parts, but can be made available on a special order basis. Call for quote.

HYDRAULIC HOSES AND FITTINGS ON PLANTER FRAME

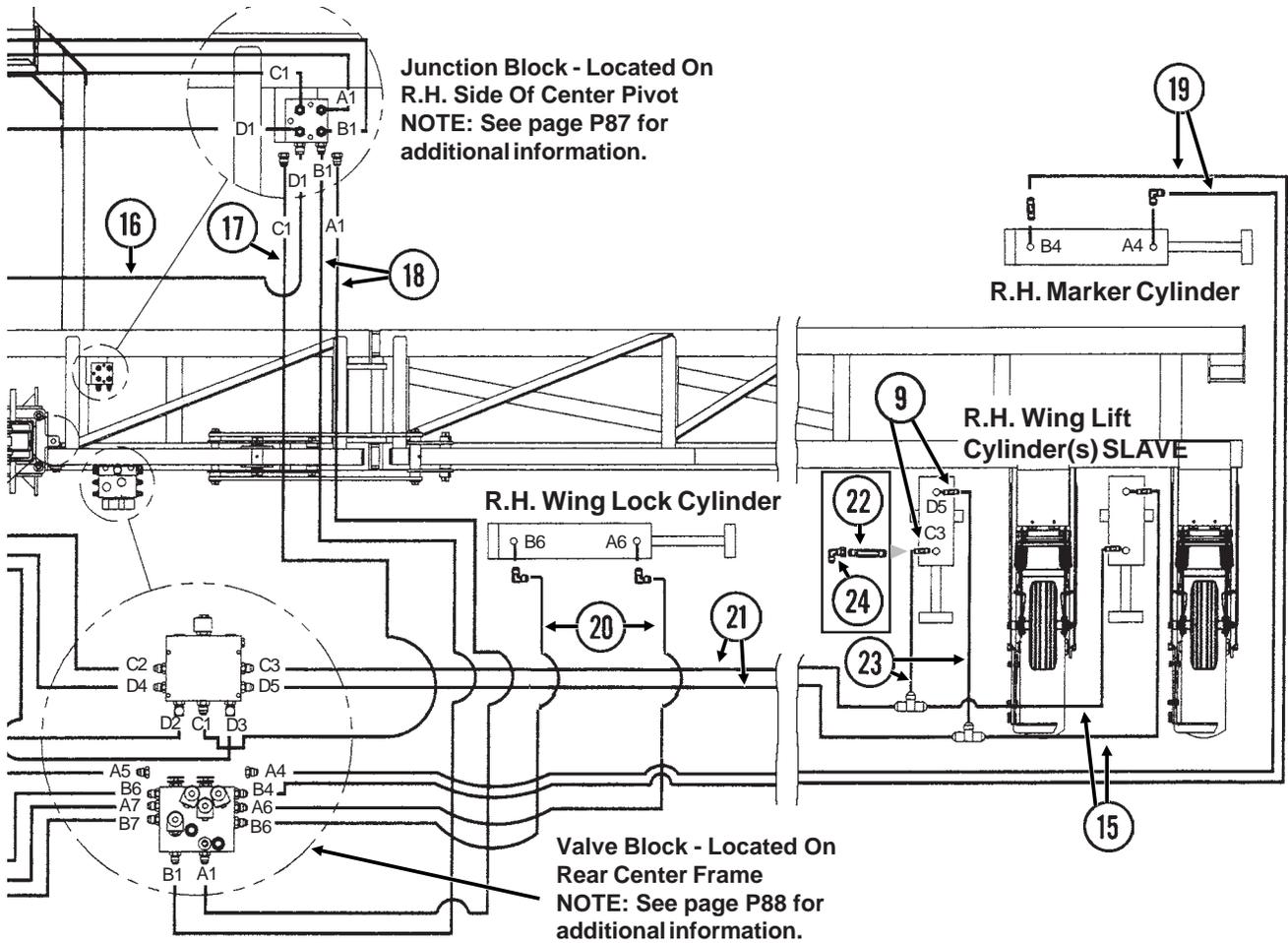
(TWL105A)

16 Row Shown (Two Wing Lift Cylinders Per Wing)
 8 And 12 Row (One Wing Lift Cylinder Per Wing)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	*A3141	2	Hose Assembly, 3/8" x 260", 8 Row 36"/38"
	*A1034	2	Hose Assembly, 3/8" x 272", 12 Row 30"
	*A3106	2	Hose Assembly, 3/8" x 318", 12 Row 36"/38"
	*A3181	2	Hose Assembly, 3/8" x 332", 16 Row 30"
2.	G6801-08	6	Elbow W/O-Ring, 90°, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
3.	G6400-08-04	2	Connector W/O-Ring, 3/4"-16 Male JIC To 7/16"-20 O-Ring
	GR1465	-	O-Ring
4.	*A1425	2	Hose Assembly, 1/2" x 60", 8 Row 36"/38" And 12 Row 36"/38"
	*A1403	2	Hose Assembly, 1/2" x 56", 12 Row 30" And 16 Row 30"
5.	*A1022	2	Hose Assembly, 3/8" x 60", 8 Row 36"/38" And 12 Row 36"/38"
	*A1021	2	Hose Assembly, 3/8" x 56", 12 Row 30" And 16 Row 30"
	G2603-08	4	Tee, 3/4"-16 Male JIC, 16 Row 30"
7.	*A1093	2	Hose Assembly, 3/8" x 230", 8 Row 36"/38"
	*A1033	2	Hose Assembly, 3/8" x 250", 12 Row 30"
	*A3185	2	Hose Assembly, 3/8" x 284", 12 Row 36"/38"
	*A1034	2	Hose Assembly, 3/8" x 272", 16 Row 30"
8.	*A1055	2	Hose Assembly, 3/8" x 66"
9.	G6400-08	4-12	Connector W/O-Ring, 3/4"-16 Male JIC To O-Ring
	GR1037	-	O-Ring
10.	*A3131	1	Hose Assembly, 3/8" x 42"
11.	G2703-10	1	Bulkhead Tee, 7/8"-14 Male JIC
12.	G2406-10-08	2	Reducer, 7/8"-14 Female JIC To 3/4"-16 Male JIC
13.	*A1076	2	Hose Assembly, 3/8" x 30"

HYDRAULIC HOSES AND FITTINGS ON PLANTER FRAME

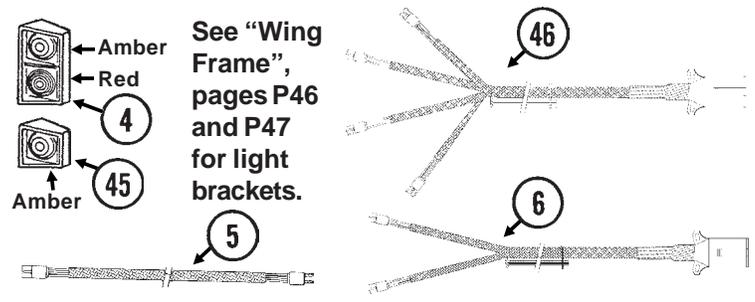
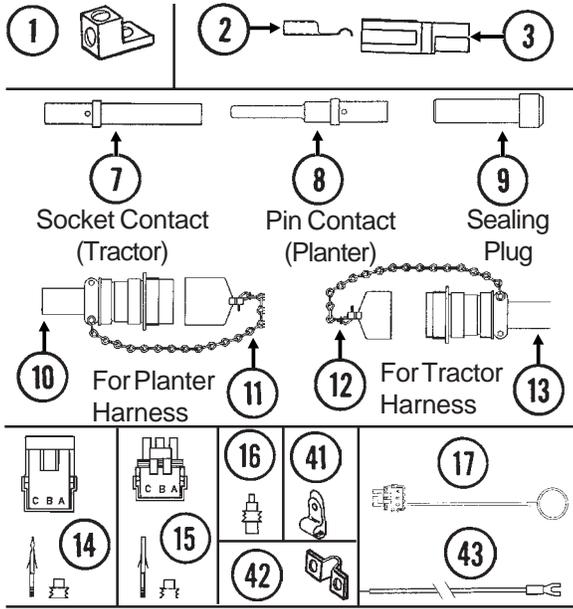


ITEM	PART NO.	QTY.	DESCRIPTION
14.	*A3128	1	Hose Assembly, $\frac{3}{8}$ " x 52"
15.	*A1018	4	Hose Assembly, $\frac{3}{8}$ " x 40", 16 Row 30"
16.	*A1404	1	Hose Assembly, $\frac{1}{2}$ " x 41"
17.	*A1424	1	Hose Assembly, $\frac{1}{2}$ " x 30"
18.	*A1076	2	Hose Assembly, $\frac{3}{8}$ " x 30"
19.	*A1054	2	Hose Assembly, $\frac{3}{8}$ " x 204", 8 Row 36"/38"
	*A3163	2	Hose Assembly, $\frac{3}{8}$ " x 225", 12 Row 30"
	*A1036	2	Hose Assembly, $\frac{3}{8}$ " x 280", 12 Row 36"/38"
	*A1097	2	Hose Assembly, $\frac{3}{8}$ " x 288", 16 Row 30"
20.	*A1076	2	Hose Assembly, $\frac{3}{8}$ " x 30"
21.	*A3101	2	Hose Assembly, $\frac{3}{8}$ " x 168", 8 Row 36"/38"
	*A1028	2	Hose Assembly, $\frac{3}{8}$ " x 186", 12 Row 30"
	*A1031	2	Hose Assembly, $\frac{3}{8}$ " x 234", 12 Row 36"/38"
	*A1057	2	Hose Assembly, $\frac{3}{8}$ " x 216", 16 Row 30"
22.	G6400-L-08	-	Long Connector W/O-Ring, $\frac{3}{4}$ "-16 Male JIC To O-Ring
	GR1037	-	O-Ring
23.	*A3122	4	Hose Assembly, $\frac{3}{8}$ " x 10 $\frac{1}{2}$ ", 16 Row 30"
24.	G6500-08	-	Swivel Elbow, 90°, $\frac{3}{4}$ "-16 Male JIC To Female

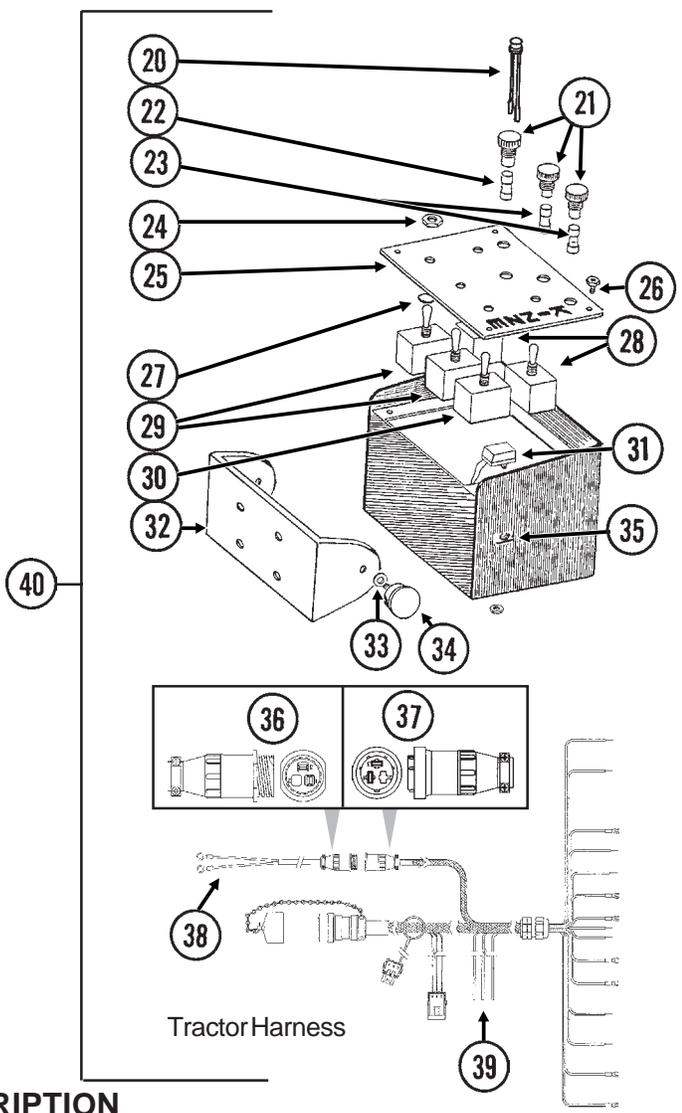
* Hydraulic hose is not stocked by KINZE® Repair Parts, but can be made available on a special order basis. Call for quote.

ELECTRICAL COMPONENTS

(TWL19a/TWL18/ELC14/ELC3a/ELC5c/MTR27a/ELC39/TWL26e/ELC8/A9481/ELC12/ELC12b/ELC4/FF27b/FF27c/ELC38/A9201/A9202/TWL20f/ELC34/ELC35/ELC10c)



See "Wing Frame", pages P46 and P47 for light brackets.



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA3584	-	Ground Clamp
2.	GD9530	-	Contact
3.	GD9529	-	Housing, Black
	GD12726	-	Housing, Red
4.	GA6699	1	Double Light Assembly (Shown)
	GA6700	1	Double Light Assembly
	GR1203	-	Red Lens
	GR1204	-	Amber Lens
	GR1205	-	Cover
	GR1206	-	Rubber Grommet (4)
	GR1207	-	Lamp Unit
	GR1208	-	Bulb
5.	GA9096	-	Harness Extension, 42"

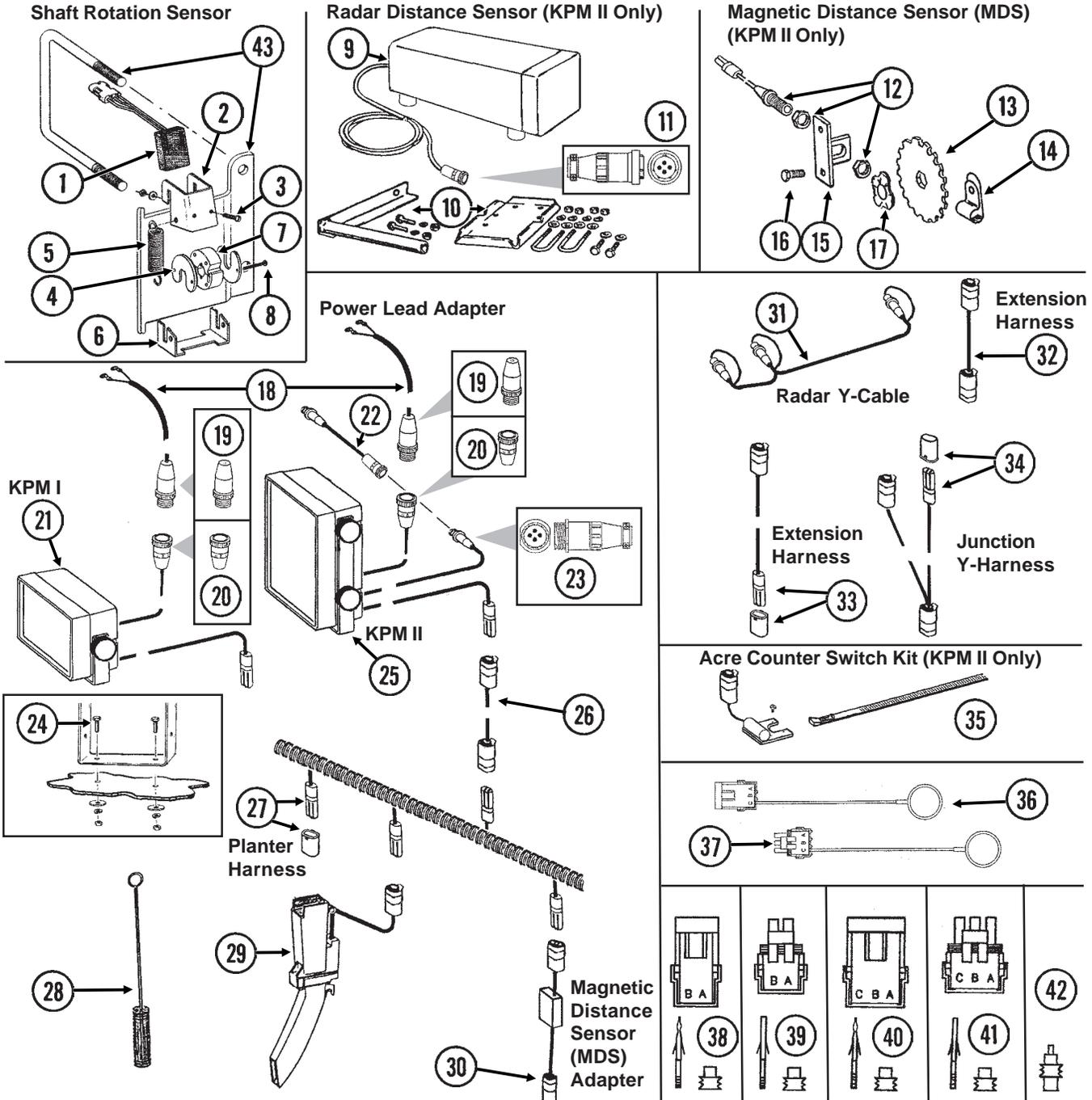
ELECTRICAL COMPONENTS

ITEM	PART NO.	QTY.	DESCRIPTION
6.	GA9202	-	Wiring Harness W/7 Terminal Female Connector, 786" (2 Light Connections), 12 Row 30"
	GA9204	-	Wiring Harness W/7 Terminal Female Connector, 882" (2 Light Connections), 16 Row 30"
	GA5385	-	7 Terminal Female Connector
7.	GD8740	-	Socket Contact, No. 14
8.	GD8741	-	Pin Contact, No. 14
9.	GD8739	-	Sealing Plug, No. 12
10.	GA6109	1	Connector W/Cable Clamp, 23 Pin Capacity
11.	GA7862	-	Dust Cap W/Chain
12.	GA7863	-	Dust Cap W/Chain
13.	GA6108	1	Connector W/Cable Clamp, 23 Socket Capacity
14.	G1K248	-	3-Pin Female Connector Kit (Black), Includes: (3) 3-Pin Female Housings, (9) Pin Contacts, (9) Seals
15.	G1K252	-	3-Pin Male Connector Kit (Black), Includes: (3) 3-Pin Male Housings, (9) Socket Contacts, (9) Seals
16.	GD11089	-	Sealing Plug
17.	GA8047	-	Dust Plug (Black)
18.	GA7366	1	Wiring Harness W/Dust Cap, 480", 8 Row 36"/38" And 12 Row 30"
	GA7367	-	Wiring Harness W/Dust Cap, 600", 12 Row 36"/38" And 16 Row 30"
19.	GA7399	-	Harness Extension W/Dust Caps, 180"
20.	GA7077	1-4	Indicator Light
21.	GA2612	3-5	Fuse Holder W/Spade, 1 ³³ / ₅₀ "
22.	GD2829	1-2	Fuse, 15 Amp, Type AGC
23.	GD10243	2-6	Fuse, MDL 10 Amp Delay Action
24.	GR1363	5	Hex Face Nut, ¹⁵ / ₃₂ "-32
	GR1364	5	Internal Tooth Lock Washer, ¹⁵ / ₃₂ "
25.	GA8734	1	Cover Plate (Shown)
	GA8735	-	Cover Plate, Planters Equipped With Two-Speed Point Row Clutch
26.	GR1292	4	Pan Head Screw, No. 8-32 x 1/2"
27.	GD3860	-	O-Ring (If Applicable)
28.	GA2528	2	Switch, 3 Position Toggle, On-Off-On
29.	GA6978	2	Switch, 3 Position Toggle, Momentary On-Off-Momentary On
30.	GA6977	1-2	Switch, 2 Position Toggle, On-Off
31.	GA8731	1	Switch, Push Button W/Transformer
32.	GD9896	1	Mounting Bracket
33.	G10211	4	Washer, 1/4" SAE
34.	GA6975	2	Knob
35.	GR1290	2	Cage Nut, 1/4"-20
36.	G1K267	-	Power Lead Adapter Connector Kit, Includes: (1) 3-Pin Connector, (1) Cable Clamp, (3) Male Terminal Pins
37.	G1K268	-	Console Cable Connector Kit, Includes: (1) 3-Pin Connector, (1) Cable Clamp, (1) Lock Ring, (3) Female Terminal Pins
38.	GA7856	1	Power Lead Adapter
39.	GA8729	1	Wiring Harness W/Dust Cap And Power Cable
40.	G7633X	-	Backlit Control Console Assembly W/Mounting Brackets, Short
	G7639X	-	Harness W/Dust Cap And Power Cable
	G7639X	-	Backlit Control Console Assembly W/Mounting Brackets, Short Harness W/Dust Cap And Power Cable, Planters Equipped With Two-Speed Point Row Clutch
41.	GD6291	-	Insulated Clamp, ³ / ₈ "
	GD13348	-	Insulated Clamp, ¹¹ / ₁₆ "
42.	GD13310	-	Jumper
43.	GA9481	-	Jumper Wire W/Fork Terminal, 13"
	G10996	-	Fork Terminal
44.	GA9112	1	Wiring Harness W/Dust Cap, 516", 8 Row 36"/38" And 12 Row 30"
	GA9113	-	Wiring Harness W/Dust Cap, 636", 12 Row 36"/38" And 16 Row 30"
45.	GA6701	1	Single Amber Light Assembly
	GR1204	-	Amber Lens
	GR1206	-	Rubber Grommet (2)
	GR1207	-	Lamp Unit
	GR1208	-	Bulb
46.	GA9201	1	Wiring Harness W/7 Terminal Female Connector, 714" (4 Light Connections), 8 Row 36"/38"
	GA9203	-	Wiring Harness W/7 Terminal Female Connector, 870" (4 Light Connections), 12 Row 36"/38"
	GA5385	-	7 Terminal Female Connector

NOTE: See "Point Row Clutch" or "Two-Speed Point Row Clutch" for R.H. and L.H. Wiring Harness for the point row clutches. See "KPM I/KPM II Electronic Seed Monitor" or "KPM II Stack-Mode Electronic Seed Monitor" for those components.

KPM I/KPM II ELECTRONIC SEED MONITOR

(MTR43c)



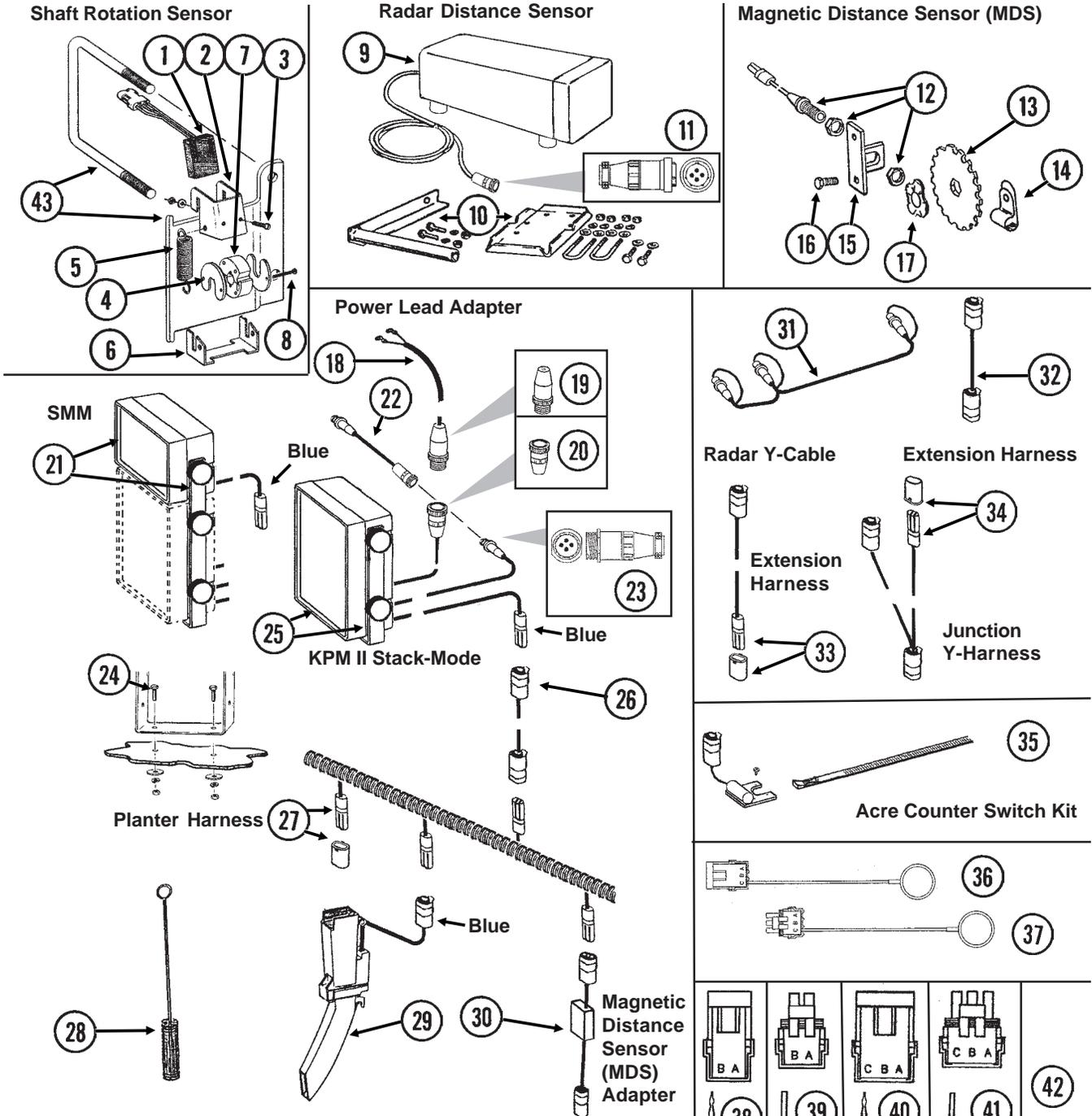
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1415	1	Rotation Sensor
2.	GD11169	1	Mount
3.	G10757	2	Pan Head Screw, No. 10-32 x 1 1/4"
	G10243	2	Washer, No. 10 SAE
	G10758	2	Hex Nut, No. 10-32
4.	GD11474	2	Cover
5.	GD5857	2	Spring
6.	GD11170	1	Spring Mount
7.	GR1414	1	Actuator
8.	G10927	2	Pan Head Machine Screw, No. 8-32 x 1 1/4", Stainless Steel
	G10931	2	Lock Washer, No. 8, Internal/External, Stainless Steel
	G10928	2	Hex Nut, No. 8-32, Stainless Steel
9.	GA7858	-	Radar Distance Sensor W/20' Cable
10.	GA8026	-	Radar Sensor Pipe/Mounting Bracket Package

KPM I/KPM II ELECTRONIC SEED MONITOR

ITEM	PART NO.	QTY.	DESCRIPTION
11.	G1K323	-	4-Pin Connector Kit W/Female Housing, 4 Pins And Cable Clamp
12.	GA5600	1	Magnetic Distance Sensor
13.	GD8751	-	Magnetic Distance Sensor Pulse Wheel
14.	GD6291	-	Insulated Clamp, 3/8"
15.	GD8770	1	Bracket
16.	G10001	2	Hex Head Cap Screw, 3/8"-16 x 1"
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
17.	GD8771	1	Spring Wave Washer
18.	GA7856	1	Power Lead Adapter
19.	G1K267	-	Power Lead Adapter Connector Kit, Includes: (1) Cable Clamp, (1) 3-Pin Connector, (3) Male Terminal Pins
20.	G1K268	-	Console Cable Connector Kit, Includes: (1) Cable Clamp, (1) 3-Pin Connector, (1) Lock Ring, (3) Female Terminal Pins
21.	GA10570	1	KPM I Backlit Console W/Mounting Bracket, Fuse Holder And Fuse, Power Lead Adapter (Item 18), Brush (Item 28) And Dust Plug (Item 36)
	GR1390	-	Mounting Bracket, KPM I
	GR1392	-	Console Mounting Bracket Hardware Package (Includes 2 Knobs And 1/4" Hardware)
	GA10601	-	Fuse Holder
	GD7639	-	Fuse
22.	GA9144	-	Monitor/Radar Adapter, 10"
23.	G1K322	-	4-Pin Connector Kit W/Male Housing, 4 Female Socket Contacts And Cable Clamp
24.	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
25.	GA10575	-	KPM II Backlit Console W/Mounting Bracket, Fuse Holder And Fuse, Power Lead Adapter (Item 18), Brush (Item 28), Dust Plug (Item 36) And Monitor/Radar Adapter, 10" (Item 22)
	GR1391	-	Mounting Bracket, KPM II
	GR1393	-	Console Mounting Bracket Hardware Package (Includes 4 Knobs And 1/4" Hardware)
	GA10601	-	Fuse Holder
	GD7639	-	Fuse
26.		-	Included In Tractor/Planter Wiring Harnesses, See Items 18, 39 And 44 On Pages P96 And P97
27.	GA8022	-	Planter Harness W/Dust Caps, 6 Row (9 Connectors)
	GA7850	-	Planter Harness W/Dust Caps, 8 Row (12 Connectors)
	GA7851	-	Planter Harness W/Dust Caps, 12 Row (16 Connectors)
	GA7852	-	Planter Harness W/Dust Caps, 16 Row (20 Connectors)
	GD11993	-	Dust Cap
28.	GR0594	-	Brush
29.	GA8495	-	Seed Tube W/Computerized Sensor
	GR1395	-	Sensor Only
	GR1461	-	Seed Tube (With Holes For Computerized Sensor Installation)
	GD2117	-	Tie Strap, 14 1/2"
30.	GA7859	1	Magnetic Distance Sensor Adapter (Analog To Digital)
31.	GR0586	1	Radar Y-Cable (Used To Connect Radar Distance Sensor For Multiple Functions)
32.	GA7857	-	Extension Harness, 1'
33.	GA7854	-	Extension Harness W/Dust Cap, 15'
	GA7855	-	Extension Harness W/Dust Cap, 30'
	GD11993	-	Dust Cap
34.	GA7853	-	Junction Harness W/Dust Cap
	GD11993	-	Dust Cap
35.	G1K249	-	Acre Counter Switch Kit (Used W/KPM II Console Only)
36.	GA8046	-	Dust Plug (Black)
37.	GA8047	-	Dust Plug (Black)
38.	G1K321	-	2-Pin Female Connector Kit (Black), Includes: (3) 2-Pin Female Housings, (6) Pin Contacts, (6) Seals
39.	G1K320	-	2-Pin Male Connector Kit (Black), Includes: (3) 2-Pin Male Housings, (6) Socket Contacts, (6) Seals
40.	G1K248	-	3-Pin Female Connector Kit (Black), Includes: (3) 3-Pin Female Housings, (9) Pin Contacts, (9) Seals
41.	G1K252	-	3-Pin Male Connector Kit (Black), Includes: (3) 3-Pin Male Housings, (9) Socket Contacts, (9) Seals
42.	GD11089	-	Sealing Plug
43.	G1K364	-	Rotation Sensor Mount Kit, Includes: (2) Mounts, (2) GD1113 5" x 7" U-Bolts, (4) G10230 Lock Washers, (4) G10104 Hex Nuts, (1) Instruction
A.	GA6147	-	Magnetic Distance Sensor And Mounting Package (Items 12-17)

KPM II STACK-MODE ELECTRONIC SEED MONITOR

(MTR43)



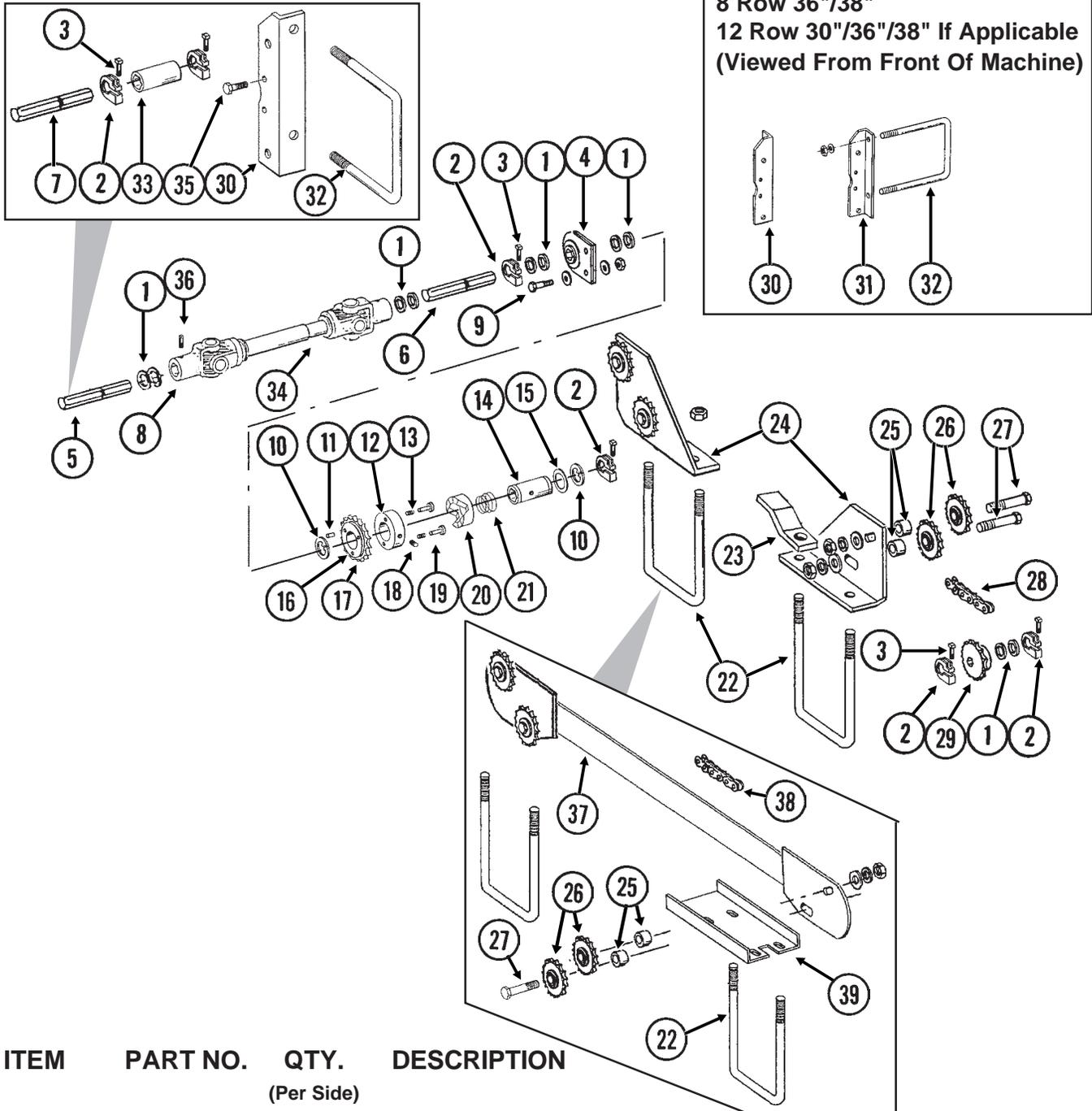
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1415	1	Rotation Sensor
2.	GD11169	1	Mount
3.	G10757	2	Pan Head Screw, No. 10-32 x 1 1/4"
	G10243	2	Washer, No. 10 SAE
	G10758	2	Hex Nut, No. 10-32
4.	GD11474	2	Cover
5.	GD5857	2	Spring
6.	GD11170	1	Spring Mount
7.	GR1414	1	Actuator
8.	G10927	2	Pan Head Machine Screw, No. 8-32 x 1 1/4", Stainless Steel
	G10931	2	Lock Washer, No. 8, Internal/External, Stainless Steel
	G10928	2	Hex Nut, No. 8-32, Stainless Steel
9.	GA7858	-	Radar Distance Sensor W/20' Cable
10.	GA8026	-	Radar Sensor Pipe/Mounting Bracket Package
11.	G1K323	-	4-Pin Connector Kit W/Female Housing, 4 Pins And Cable Clamp

KPM II STACK-MODE ELECTRONIC SEED MONITOR

ITEM	PART NO.	QTY.	DESCRIPTION
12.	GA5600	1	Magnetic Distance Sensor
13.	GD8751	-	Magnetic Distance Sensor Pulse Wheel
14.	GD6291	-	Insulated Clamp, 3/8"
15.	GD8770	1	Bracket
16.	G10001	2	Hex Head Cap Screw, 3/8"-16 x 1"
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
17.	GD8771	1	Spring Wave Washer
18.	GA7856	1	Power Lead Adapter
19.	G1K267	-	Power Lead Adapter Connector Kit, Includes: (1) Cable Clamp, (1) 3-Pin Connector, (3) Male Terminal Pins
20.	G1K268	-	Console Cable Connector Kit, Includes: (1) Cable Clamp, (1) 3-Pin Connector, (1) Lock Ring, (3) Female Terminal Pins
21.	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)
22.	GA9144	-	Monitor/Radar Adapter, 10"
23.	G1K322	-	4-Pin Connector Kit W/Male Housing, 4 Female Socket Contacts And Cable Clamp
24.	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
25.	GA10575	-	KPM II Backlit Console W/Mounting Bracket, Fuse Holder And Fuse, Power Lead Adapter (Item 18), Brush (Item 28), Dust Plug (Item 36) And Monitor/Radar Adapter, 10" (Item 22)
	GR1391	-	Mounting Bracket, KPM II
	GR1393	-	Console Mounting Bracket Hardware Package (Includes 4 Knobs And 1/4" Hardware)
	GA10601	-	Fuse Holder
	GD7639	-	Fuse
26.		-	Included In Tractor/Planter Wiring Harnesses, See Items 18, 39 And 44 On Pages P96 And P97
27.	GA8022	-	Planter Harness W/Dust Caps, 6 Row (9 Connectors)
	GA7850	-	Planter Harness W/Dust Caps, 8 Row (12 Connectors)
	GA7851	-	Planter Harness W/Dust Caps, 12 Row (16 Connectors)
	GA7852	-	Planter Harness W/Dust Caps, 16 Row (20 Connectors)
	GD11993	-	Dust Cap
28.	GR0594	-	Brush
29.	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"
30.	GA7859	1	Magnetic Distance Sensor Adapter (Analog To Digital)
31.	GR0586	1	Radar Y-Cable (Used To Connect Radar Distance Sensor For Multiple Functions)
32.	GA7857	-	Extension Harness, 1'
33.	GA7854	-	Extension Harness W/Dust Cap, 15'
	GA7855	-	Extension Harness W/Dust Cap, 30'
	GD11993	-	Dust Cap
34.	GA7853	-	Junction Y-Harness W/Dust Cap
	GD11993	-	Dust Cap
35.	G1K249	-	Acre Counter Switch Kit
36.	GA8046	-	Dust Plug (Black)
	GA9978	-	Dust Plug (Blue)
37.	GA8047	-	Dust Plug (Black)
	GA9979	-	Dust Plug (Blue)
38.	G1K321	-	2-Pin Female Connector Kit (Black), Includes: (3) 2-Pin Female Housings, (6) Pin Contacts, (6) Seals
39.	G1K320	-	2-Pin Male Connector Kit (Black), Includes: (3) 2-Pin Male Housings, (6) Socket Contacts, (6) Seals
40.	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
41.	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
42.	GD11089	-	Sealing Plug
43.	G1K364	-	Rotation Sensor Mount Kit, Includes: (2) Mounts, (2) GD1113 5" x 7" U-Bolts, (4) G10230 Lock Washers, (4) G10104 Hex Nuts, (1) Instruction
A.	GA6147	-	Magnetic Distance Sensor And Mounting Package (Items 12-17)

INTERPLANT® PUSH ROW UNIT DRIVE

PTD073/PTD076(RU134/TWL33c/TWL33i)



ITEM	PART NO.	QTY.	DESCRIPTION
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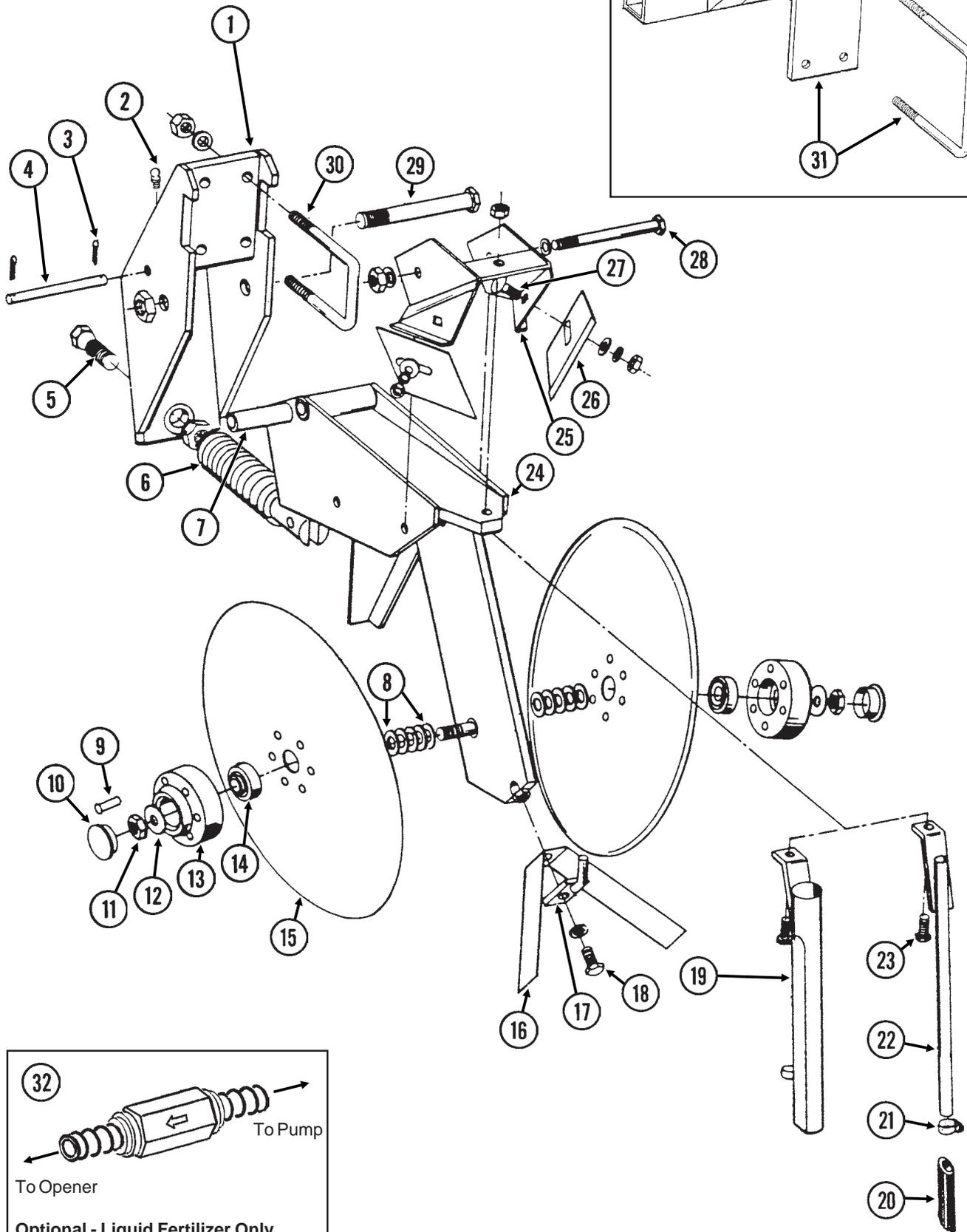
1.	G10233	-	Machine Bushing, 1", 10 Gauge (As Required)
2.	GD11045	-	Lock Clamp
3.	G10130	-	Square Head Machine Bolt, $\frac{5}{16}$ "-18 x $1 \frac{3}{4}$ "
	G10923	-	Flange Nut, $\frac{5}{16}$ "-18, No Serration
4.	GA2180	-	Hanger Bearing, $\frac{7}{8}$ " Hex Bore
5.	GD0914-55	1	Hex Shaft, $\frac{7}{8}$ " x 55" (No Holes), R.H. Side, 8 Row 36"/38"
	GD0914-84	1	Hex Shaft, $\frac{7}{8}$ " x 84" (No Holes), L.H. Side, 8 Row 36"/38"
	GD0914-48	-	Hex Shaft, $\frac{7}{8}$ " x 48" (No Holes), R.H. Side, 12 Row 30" And 16 Row 30"
	GD0914-66	-	Hex Shaft, $\frac{7}{8}$ " x 66" (No Holes), L.H. Side, 12 Row 30" And 16 Row 30"
	GD0914-55	-	Hex Shaft, $\frac{7}{8}$ " x 55" (No Holes), R.H. Side, 12 Row 36"/38"
	GD0914-84	-	Hex Shaft, $\frac{7}{8}$ " x 84" (No Holes), L.H. Side, 12 Row 36"/38"
6.	GD0914-49	1	Hex Shaft, $\frac{7}{8}$ " x 49" (No Holes), Both Sides, 8 Row 36"/38"
	GD0914-90	-	Hex Shaft, $\frac{7}{8}$ " x 90" (No Holes), Both Sides, 12 Row 30"
	GD0914-108	-	Hex Shaft, $\frac{7}{8}$ " x 108" (No Holes), Both Sides, 12 Row 36"/38"
	GD0914-124	-	Hex Shaft, $\frac{7}{8}$ " x 124" (No Holes), R.H. Side, 16 Row 30"
	GD0914-138	-	Hex Shaft, $\frac{7}{8}$ " x 138" (No Holes), L.H. Side, 16 Row 30"

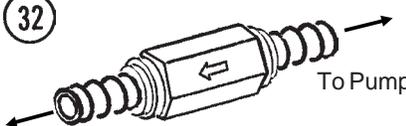
INTERPLANT® PUSH ROW UNIT DRIVE

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Side)	
7.	GD0914-24	-	Hex Shaft, 7/8" x 24" (No Holes), 12 Row 30" W/Even-Row Push Row Unit
	GD0914-33	-	Hex Shaft, 7/8" x 33" (No Holes), 16 Row 30" W/Even-Row Push Row Unit
8.	GA7053	1	U-Joint W/Grease Fitting, Female, 18 1/8" Long, 8 Row 36"/38" And 12 Row 36"/38"
	GA7052	-	U-Joint W/Grease Fitting, Female, 10 1/4" Long, 12 Row 30" And 16 Row 30"
	GR1557	-	Grease Fitting, 45°, Metric
	GR1297	-	Inboard Yoke And Outer Profile (10 1/4" U-Joint)
	GR1298	-	Inboard Yoke And Outer Profile (18 1/8" U-Joint)
	GR1294	-	Cross And Bearing Kit
	GR1293	-	Yoke, 7/8" Hex
9.	G10004	-	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10210	-	Washer, 3/8" USS
	G10229	-	Lock Washer, 3/8"
	G10101	-	Hex Nut, 3/8"-16
10.	G10496	2	External Inverted Snap Ring, 1 1/2"
11.	G10968	1	Spring Pin, 5/32" x 7/16"
12.	GR1405	1	Lock Collar
13.	GR1413	1	Spring
14.	GR1407	1	Drive Shaft
15.	GR1411	1	Shim
16.	GR1406	1	Bushing
17.	GR1412	1	Sprocket, 19 Tooth
18.	G10535	1	Hex Socket Set Screw, 3/8"-16 x 3/4"
19.	GR1410	1	Pin
20.	GR1409	1	Knurled Collar
21.	GR1408	1	Compression Spring
22.	GD8306	2	U-Bolt, 7" x 5" x 1/2"-13
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
23.	GD10204	1	Hose Retainer
24.	GD11569	2	Mount
25.	GD9229	4	Spacer, 1 1/4" O.D. x 1/2" Long (If Applicable)
26.	GA7154	4	Sprocket W/Bearing, 18 Tooth
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"
	G10168	4-8	Machine Bushing, 1/2", 7 Gauge
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
28.	G3310-208	1	Chain, No. 40, 208 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
29.	GA5107	2	Sprocket, 19 Tooth
30.	GD11972	-	Support Angle, R.H.
31.	GD11973	-	Support Angle, L.H.
32.	GD1113	-	U-Bolt, 5" x 7" x 5/8"-11
	G10230	-	Lock Washer, 5/8"
	G10104	-	Hex Nut, 5/8"-11
33.	GD1719	-	Coupler, 4"
34.	GA7051	1	U-Joint W/Grease Fitting, Male, 12 1/4" Long
	GR1557	-	Grease Fitting, 45°, Metric
	GR1296	-	Inner Profile
	GR1295	-	Inboard Yoke
	GR1301	-	Spring Pin, 8mm x 50mm
	GR1294	-	Cross And Bearing Kit
	GR1293	-	Yoke, 7/8" Hex
35.	G10752	-	Hex Head Cap Screw, 5/8"-18 x 2 1/4"
	GD7805	-	Special Washer, 5/8", Hardened
	G10412	-	Lock Nut, 5/8"-18
36.	G10688	-	Square Head Set Screw, 3/8"-16 x 5/8"
37.	GA9138	1	Mount
38.	G3310-226	1	Chain, No. 40, 226 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
39.	GD14417	1	Hose Protector
A.	GA8092	-	Clutch Sprocket Assembly, 19 Tooth (Items 10-21)
B.	G1K269	-	Lock Clamp Kit (Items 2 And 3)
C.	G1K331	-	Clutch Sprocket Kit (Items 11, 16 And 17)

DOUBLE DISC FERTILIZER OPENER AND MOUNT

FOC007(PT25e/TWL34a/FRTZ208)





 To Opener To Pump

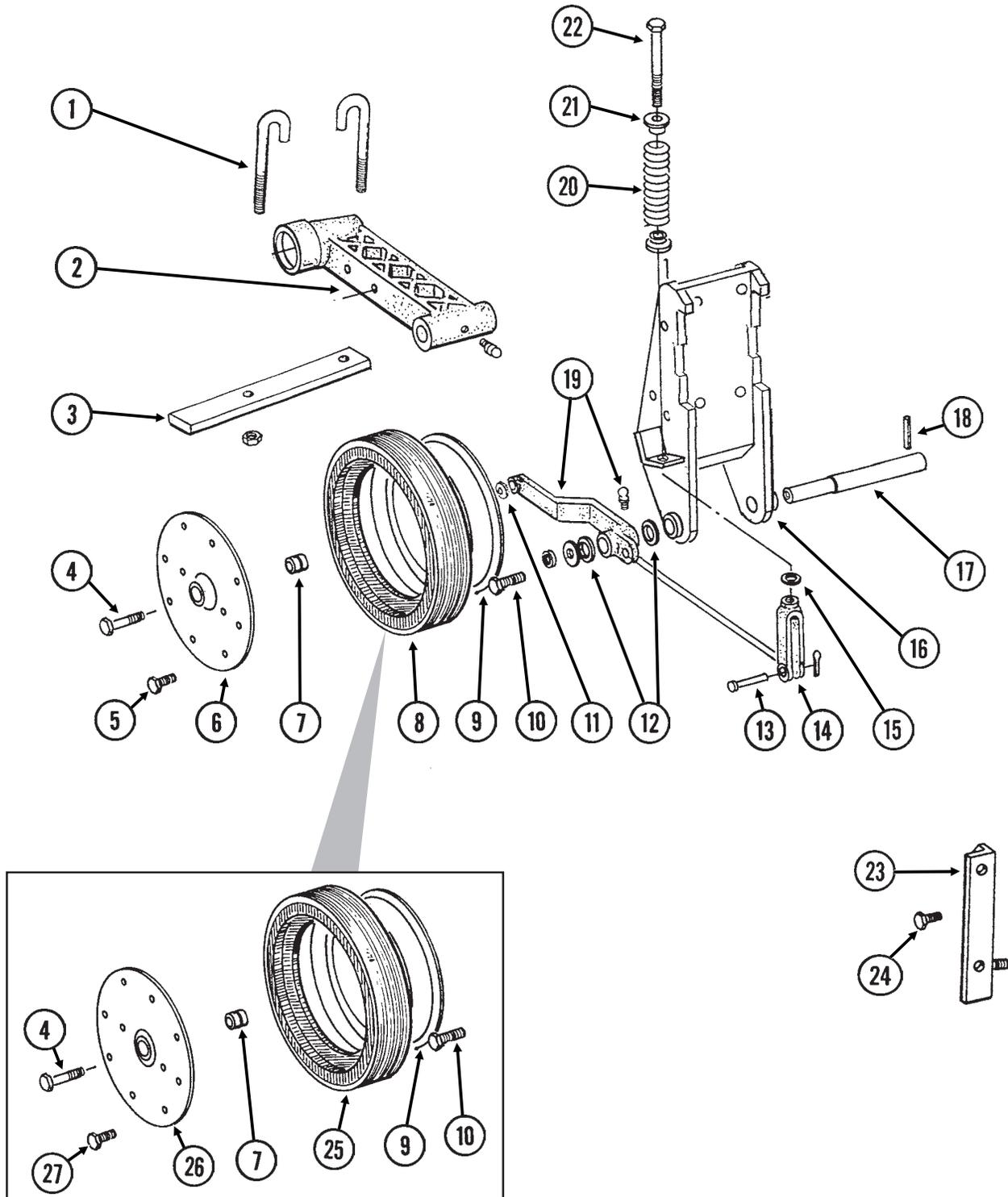
Optional - Liquid Fertilizer Only

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	1	Washer, 5/16" SAE
	G10109	1	Lock Nut, 5/16"-18
24.	GA9195	1	Shank
25.	GA0810	1	Scraper Mount
26.	GD1673	2	Scraper
27.	G10305	2	Carriage Bolt, 3/8"-16 x 1"
	G10210	2	Washer, 3/8" USS
	G10229	2	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
28.	G10045	1	Hex Head Cap Screw, 1/2"-13 x 4 1/2"
	G10111	1	Lock Nut, 1/2"-13
29.	G10046	1	Hex Head Cap Screw, 5/8"-11 x 5"
	G10107	1	Lock Nut, 5/8"-11
30.	GD1138	2	U-Bolt, 2 1/2" x 2 1/2" x 1/2"-13
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
31.	GA7135	1	Mount (One Per Opener) W/U-Bolts
	GD1113	2	U-Bolt, 5" x 7" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
32.	GA8983	-	Check Valve, Low Rate
A.	GA8845	-	Disc Blade And Bearing Assembly (Items 9 And 13-15)

HD SINGLE DISC FERTILIZER OPENER (Soil Press Wheel)

FOC016/FOC007(TWL35b/TWL35c)

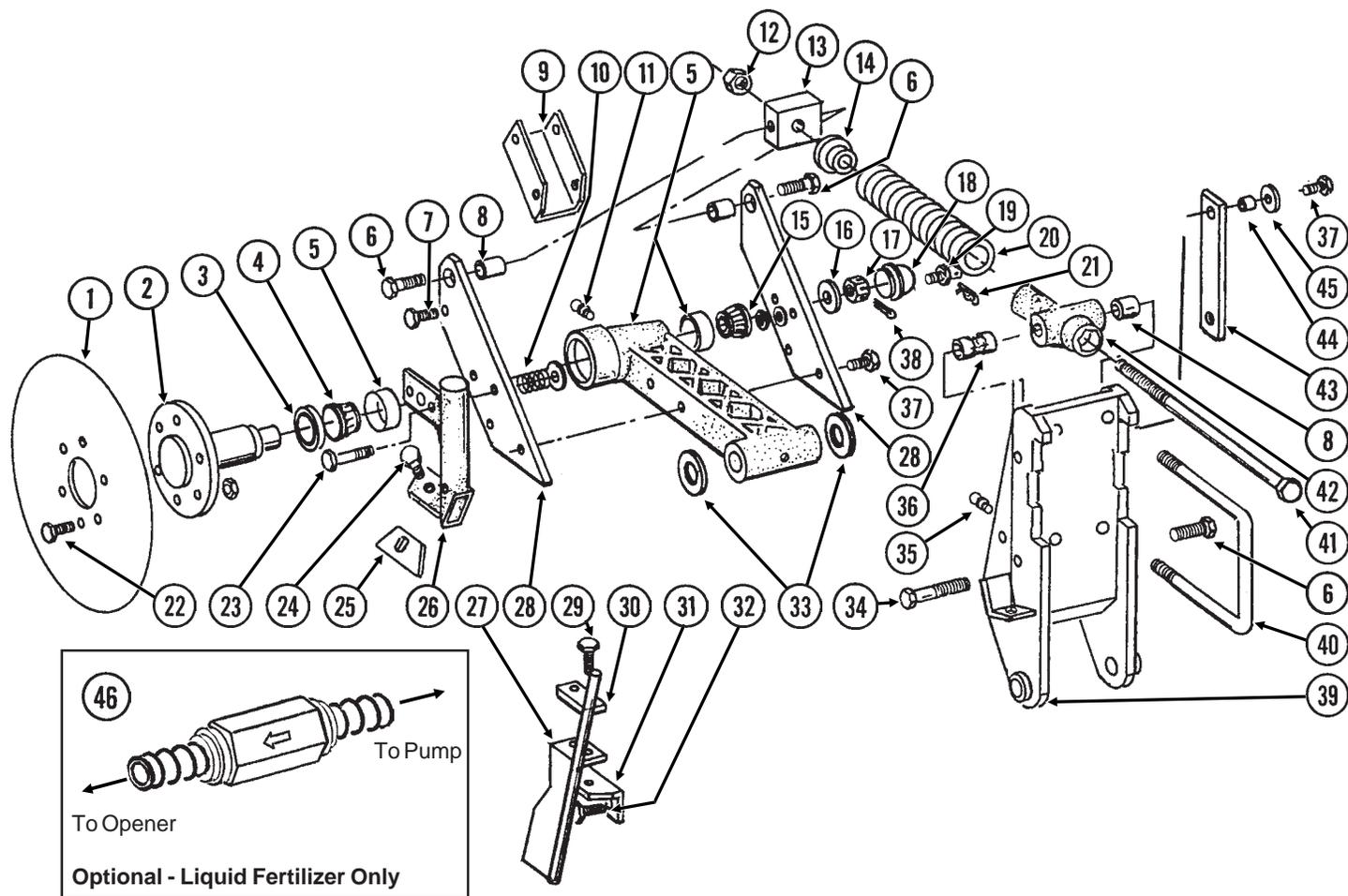


HD SINGLE DISC FERTILIZER OPENER (Soil Press Wheel)

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 P108 And P109
3.	GD9706	1	Lockup Bar
4.	G10010	1	Hex Head Cap Screw, 5/8"-11 x 3"
5.	G10018	11	Hex Head Cap Screw, 5/16"-18 x 5/8"
	G10109	11	Lock Nut, 5/16"-18
6.	GD4888	1	Half Wheel Cover, Metal
7.	GA6171	1	Bearing
8.	GD4850	1	Offset Tire
9.	GD11423	1	Half Wheel
10.	G10438	1	Hex Head Cap Screw, 1/2"-13 x 3/4"
	G10228	1	Lock Washer, 1/2"
	G10216	1	Washer, 1/2" USS
11.	G10230	1	Lock Washer, 5/8"
12.	G10526	10	Machine Bushing, 1" (.048" Thick)
13.	G10560	1	Clevis Pin, 1/2" x 1 3/4"
	G10456	1	Cotter Pin, 1/8" x 3/4"
14.	GD8218	1	Yoke
15.	G10205	1	Washer, 5/8" SAE
16.		-	See "HD Single Disc Fertilizer Opener (Blade And Drop Tube)", Pages P108 And P109
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.	GA6345	-	Mounting Angle, L.H. (As Required) (Shown)
	GA6344	-	Mounting Angle, R.H. (As Required)
24.	G10005	-	Hex Head Cap Screw, 5/8"-11 x 1 3/4"
	G10230	-	Lock Washer, 5/8"
	G10104	-	Hex Nut, 5/8"-11
25.	GD11953	1	Offset Tire
26.	GD11954	1	Half Wheel Cover, Nylon
27.	G10961	11	Flanged Whiz-Lock Screw, 5/16"-18 x 3/4", No Serration
	G10620	11	Flange Nut, 5/16"-18
A.	G1K215	-	Lockup Kit (Items 1 And 3)
B.	GA8877	-	Gauge Wheel Complete (Items 7, 9 And 25-27)

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, 21/32" I.D. x 7/8" O.D. x 19/32" Long
9.	GD8238	1	Channel
10.	GD7962	2	Spring
11.	G10641	2	Grease Fitting, 1/8" NPT
12.	G10105	3	Hex Nut, 3/4"-10
13.	GD7908	1	Tap Block
14.	GB0213	1	Spring Seat
15.	GA0237	1	Bearing
16.	G10220	1	Machine Bushing, 1 1/16", 10 Gauge
17.	G10507	1	Slotted Nut, 1"-14
18.	GD1104	1	Dust Cap

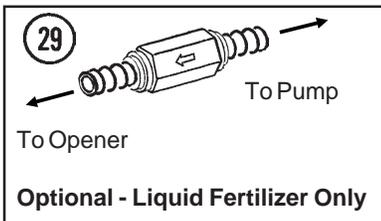
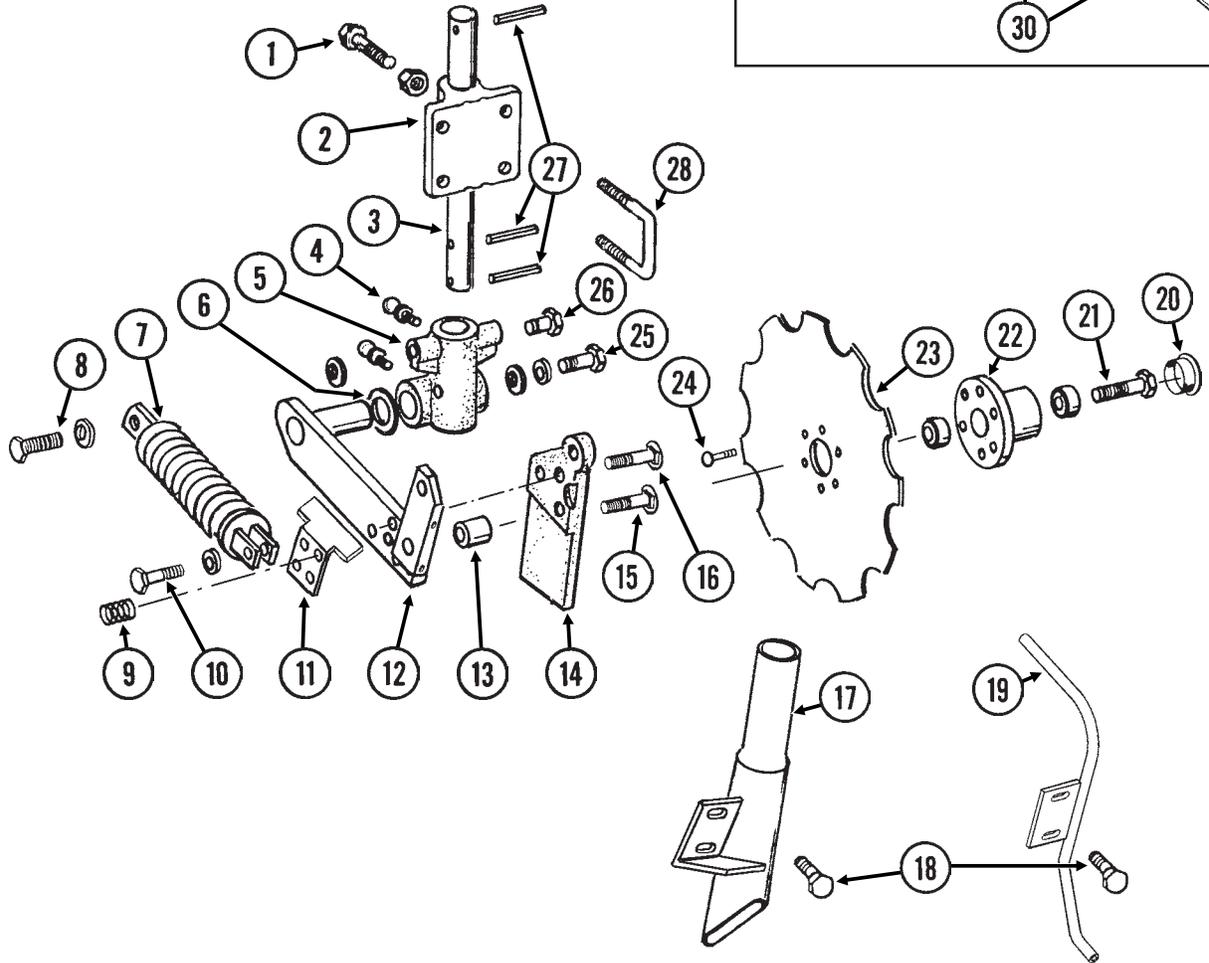
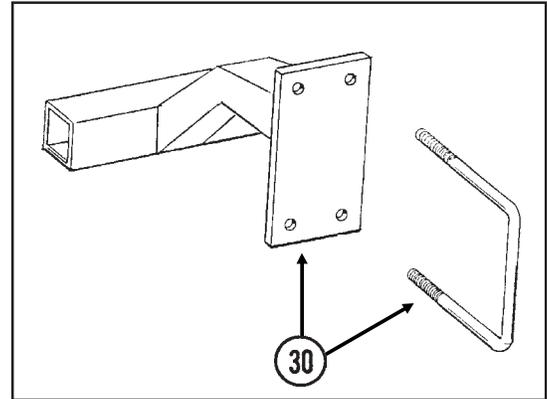
HD SINGLE DISC FERTILIZER OPENER (Blade And Drop Tube)

ITEM	PART NO.	QTY.	DESCRIPTION
(Per Assy.)			
19.	GD8276	1	Pin
	G10237	1	Lock Washer, 7/16"
	G10100	1	Hex Nut, 7/16"-14
20.	GD10273	1	Compression Spring
21.	G10592	1	Hair Pin Clip, No. 11
22.	G10594	6	Bolt, 1/2"-13 x 1 1/2"
	G10111	6	Lock Nut, 1/2"-13
23.	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(TWL34a/PT67b/FRTZ208)

STYLE A



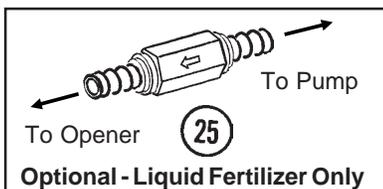
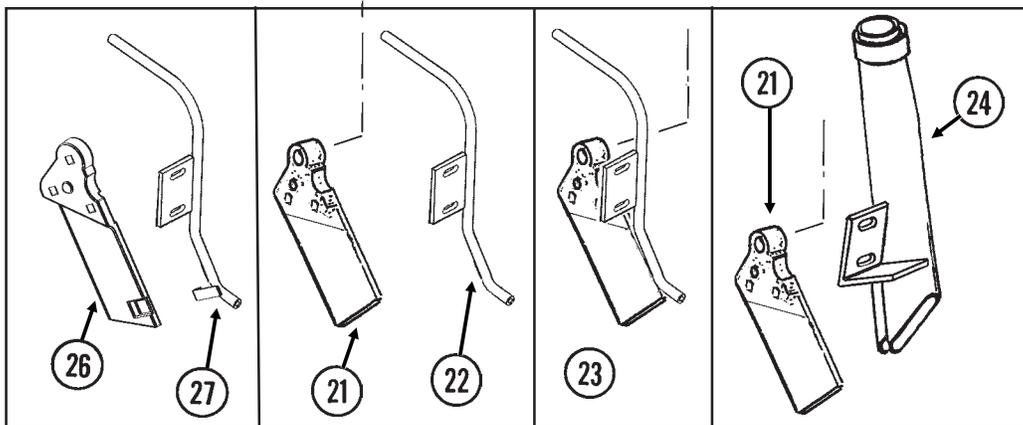
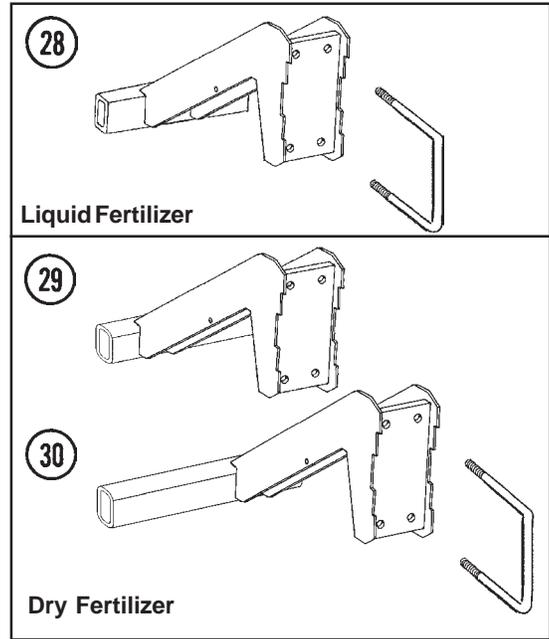
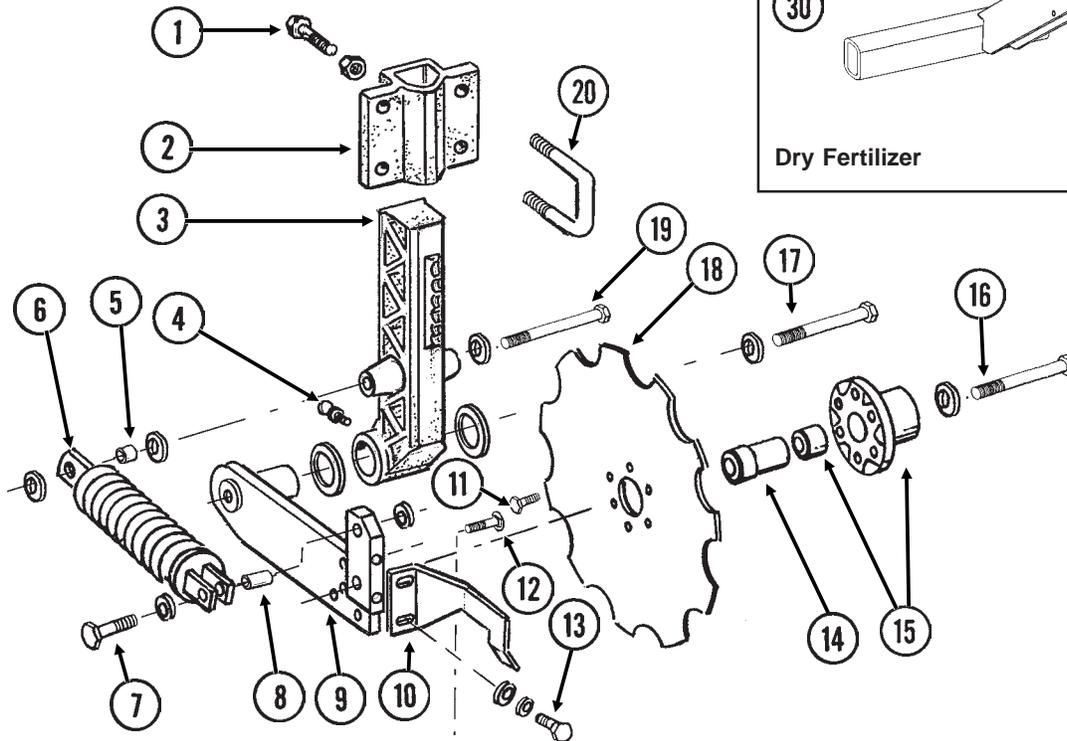
NOTCHED SINGLE DISC FERTILIZER OPENER

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, 11/16" 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 GA10047) (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	1	Mount W/U-Bolts
	GD1113	2	U-Bolt, 5" x 7" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11

NOTCHED SINGLE DISC FERTILIZER OPENER

FOC018(TWL34c/TWL34f/TWL34g/FRTZ209z/FRTZ208)

STYLE B



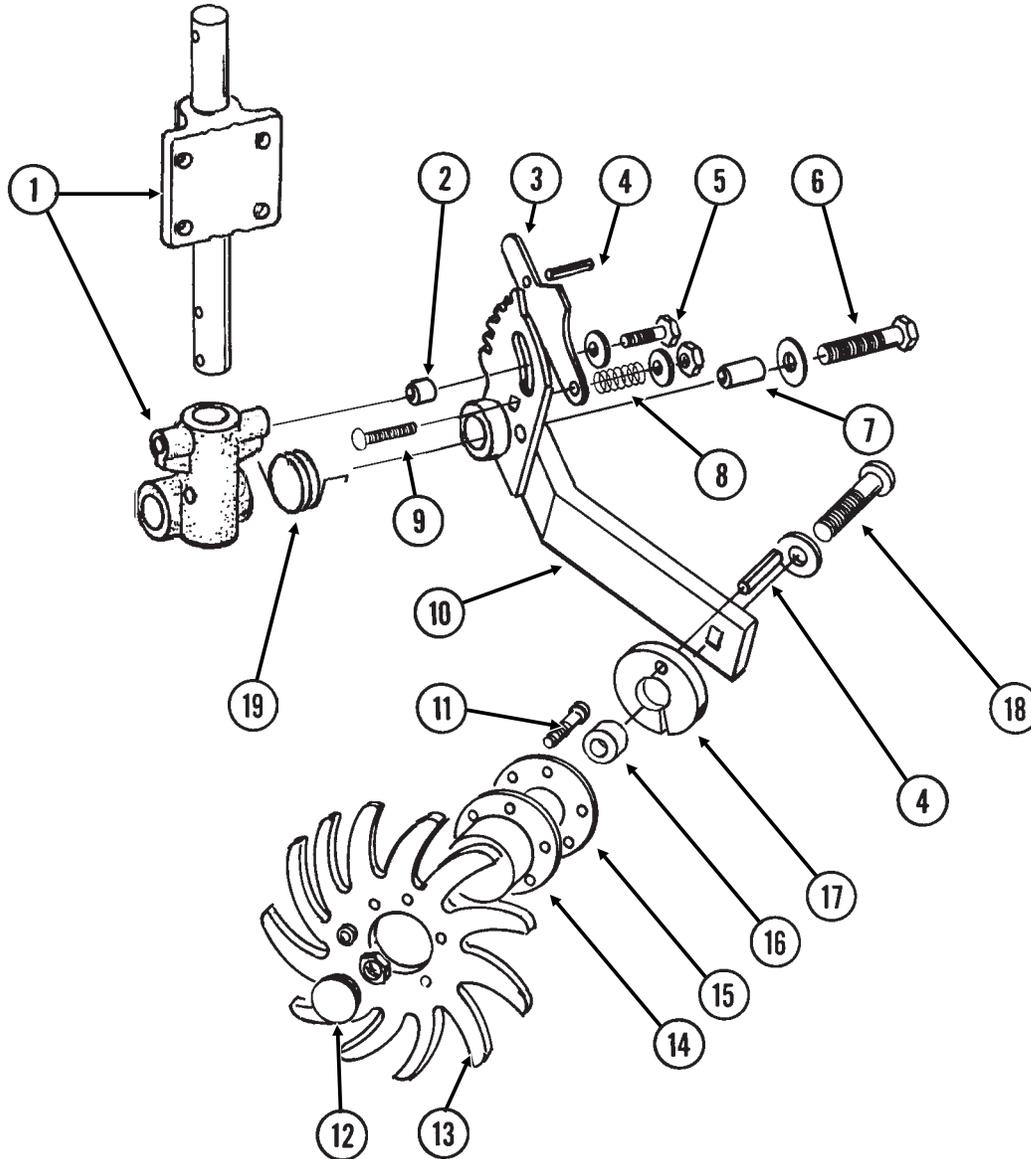
NOTCHED SINGLE DISC FERTILIZER OPENER

ITEM	PART NO.	QTY.	DESCRIPTION
(Per Assy.)			
1.	G10017	3	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10102	3	Hex Nut, 1/2"-13
2.	GB0297	1	Mount
3.	GB0296	1	Arm, 13 1/2"
4.	G10640	1	Grease Fitting, 1/4"-28
5.	GD12685	1	Bushing, 3/4" O.D. x 1/2" Long
6.	GA6966	1	Compression Spring Assembly
7.	G10047	1	Hex Head Cap Screw, 3/8"-16 x 1 3/4"
	G10210	2	Washer, 3/8" USS
	G10108	1	Lock Nut, 3/8"-16
8.	GD1026	1	Sleeve, 1 3/16" Long
9.	GA9433	1	Pivot Arm, L.H. (Shown)
	GA9434	-	Pivot Arm, R.H.
10.	GD11557	1	Scraper, L.H. (Shown)
	GD11558	-	Scraper, R.H.
11.	G10002	6	Hex Head Cap Screw, 3/8"-16 x 3/4"
12.	G10306	3	Carriage Bolt, 3/8"-16 x 2"
	G10108	3	Lock Nut, 3/8"-16
13.	G10991	2	Hex Head Cap Screw, 5/16"-18 x 7/8"
	G10232	2	Lock Washer, 5/16"
	G10219	6	Washer, 5/16" USS
14.	GD12679	1	Stepped Spacer, 3" Long
15.	GA9437	1	Hub W/Bearing
	GA8603	-	Double Row Bearing
16.	G10011	1	Hex Head Cap Screw, 5/8"-11 x 5 1/2"
	GD12677	1	Washer, 1 1/2" O.D., 7 Gauge, Hardened
	G10107	1	Lock Nut, 5/8"-11
17.	G10046	1	Hex Head Cap Screw, 5/8"-11 x 5"
	G10217	1	Washer, 5/8" USS
	G10450	2	Machine Bushing, 1 1/2", 18 Gauge (As Required)
	G10107	1	Lock Nut, 5/8"-11
18.	GD12676	1	Disc Blade, Notched, 16 3/4"
19.	G10871	1	Hex Head Cap Screw, 1/2"-13 x 6"
	G10206	3	Washer, 1/2" SAE
	G10111	1	Lock Nut, 1/2"-13
20.	GD13287	2	U-Bolt, 1 1/2" x 2 1/2" x 1/2"-13
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
21.	GB0249	1	Knife, L.H. (Shown)
	GB0248	-	Knife, R.H.
22.	GA8399	-	Drop Tube, L.H., Liquid Fertilizer (Shown)
	GA8398	1	Drop Tube, R.H., Liquid Fertilizer
23.	GA9461	1	Knife/Drop Tube, L.H., Liquid Fertilizer (Shown) (Sub GA8399 And GB0249)
	GA9462	1	Knife/Drop Tube, R.H., Liquid Fertilizer (Sub GA8398 And GB0248)
24.	GA10047	-	Drop Tube, L.H., Dry Fertilizer (Shown)
	GA10048	1	Drop Tube, R.H., Dry Fertilizer
25.	GA8983	-	Check Valve, Low Rate
26.	GB0323	1	Knife, L.H. (Shown)
	GB0322	-	Knife, R.H.
27.	GA10213	-	Drop Tube, L.H., Liquid Fertilizer (Shown)
	GA10214	1	Drop Tube, R.H., Liquid Fertilizer
28.	GA9565	1	Mount W/U-Bolts
	GD1113	2	U-Bolt, 5" x 7" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
29.	GA9821	-	Mount W/U-Bolts, L.H.
	GD1113	2	U-Bolt, 5" x 7" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
30.	GA9822	-	Mount W/U-Bolts, R.H.
	GD1113	2	U-Bolt, 5" x 7" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11

RESIDUE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER

DFC024(FRTZ165i)

FOR USE WITH STYLE A
NOTCHED SINGLE DISC FERTILIZER OPENER



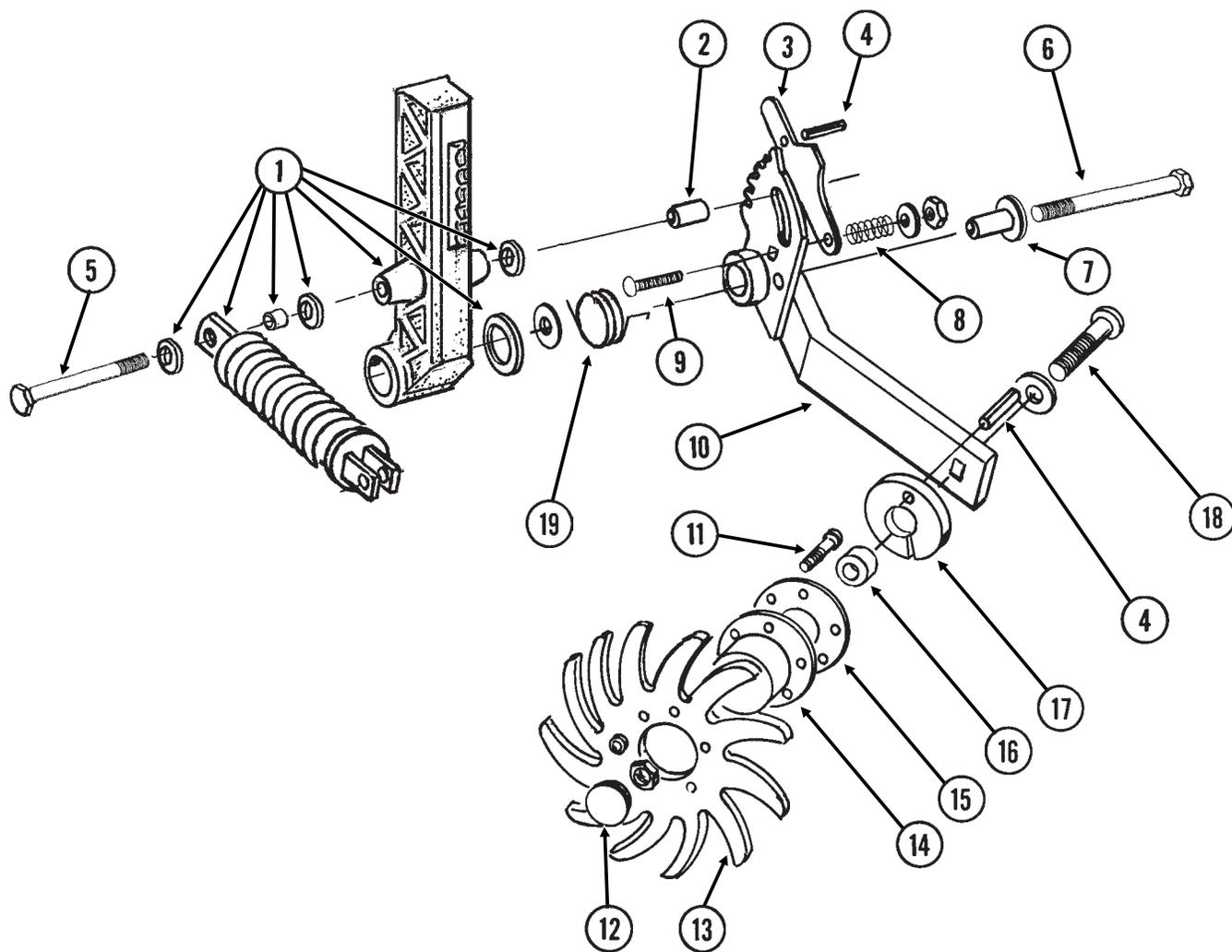
RESIDUE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.		-	See "Notched Single Disc Fertilizer Opener", Pages P110 And P111
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
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



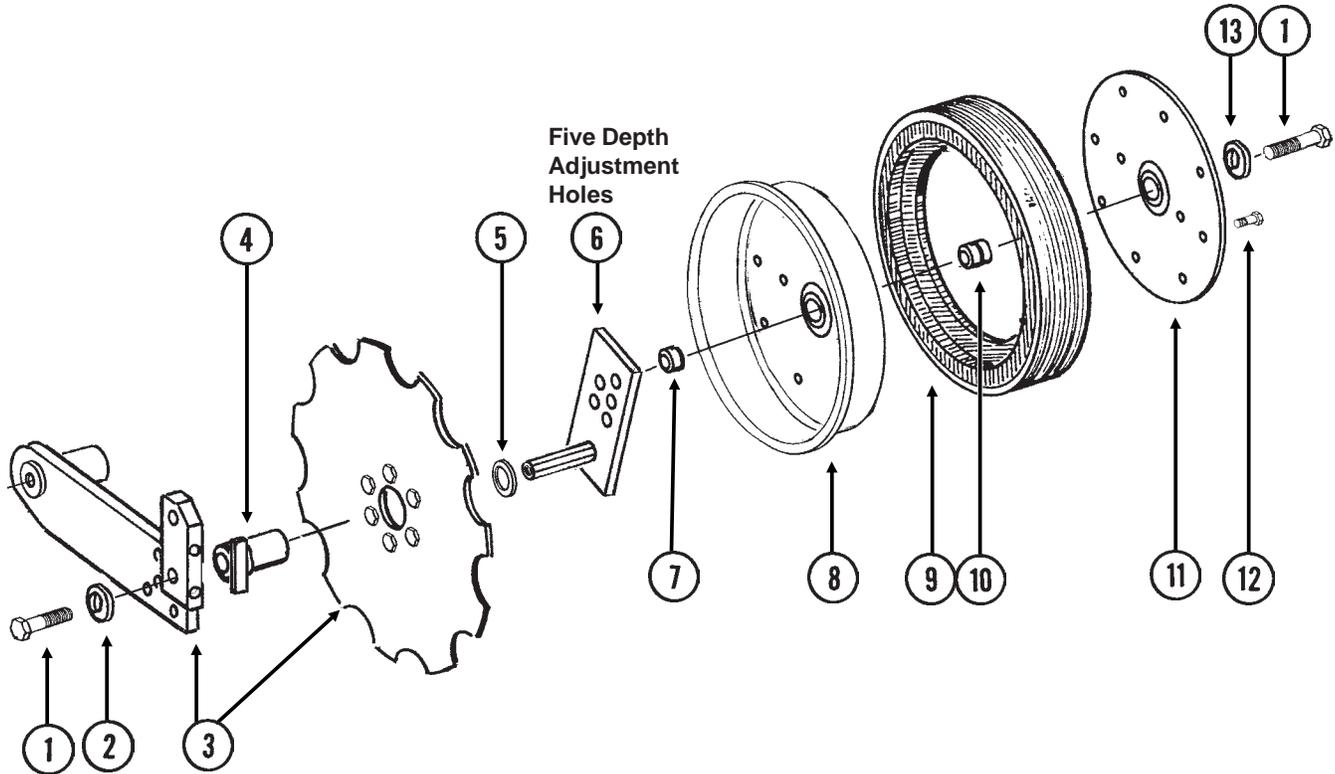
RESIDUE WHEEL ATTACHMENT FOR NOTCHED SINGLE DISC FERTILIZER OPENER

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.		-	See "Notched Single Disc Fertilizer Opener", Pages P112 And P113
2.	GD12684	1	Bushing, 1 1/3" Long
3.	GD11178	1	Adjustment Lever
4.	G10603	2	Spring Pin, 1/4" x 1 1/4"
5.	G11034	1	Hex Head Cap Screw, 1/2"-13 x 7"
	G10111	1	Lock Nut, 1/2"-13
6.	G10830	1	Hex Head Cap Screw, 5/8"-11 x 7 1/2"
	GD7805	1	Special Washer, 5/8", Hardened
	G10107	1	Lock Nut, 5/8"-11
7.	GD11836	1	Sleeve, 2 1/8" Long
8.	GD7962	1	Spring
9.	G10306	1	Carriage Bolt, 3/8"-16 x 2"
	G10203	1	Washer, 3/8" SAE
	G10108	1	Lock Nut, 3/8"-16
10.	GA7999	1	Mount W/Grease Fitting, L.H. (Shown)
	GA7998	-	Mount W/Grease Fitting, R.H.
	G10640	-	Grease Fitting, 1/4"-28
11.	G10133	6	Hex Head Cap Screw, 5/16"-18 x 1 1/2"
	G10109	6	Lock Nut, 5/16"-18
12.	GD1132	2	Dust Cap
13.	GD10552	2	Wheel, 12 Tine, 3/8" x 12"
14.	GA5654	1	Hub W/Bearings
	GA2014	-	Bearing
15.	GD9724	1	Backing Plate
16.	GD7817-04	1	Spacer, 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

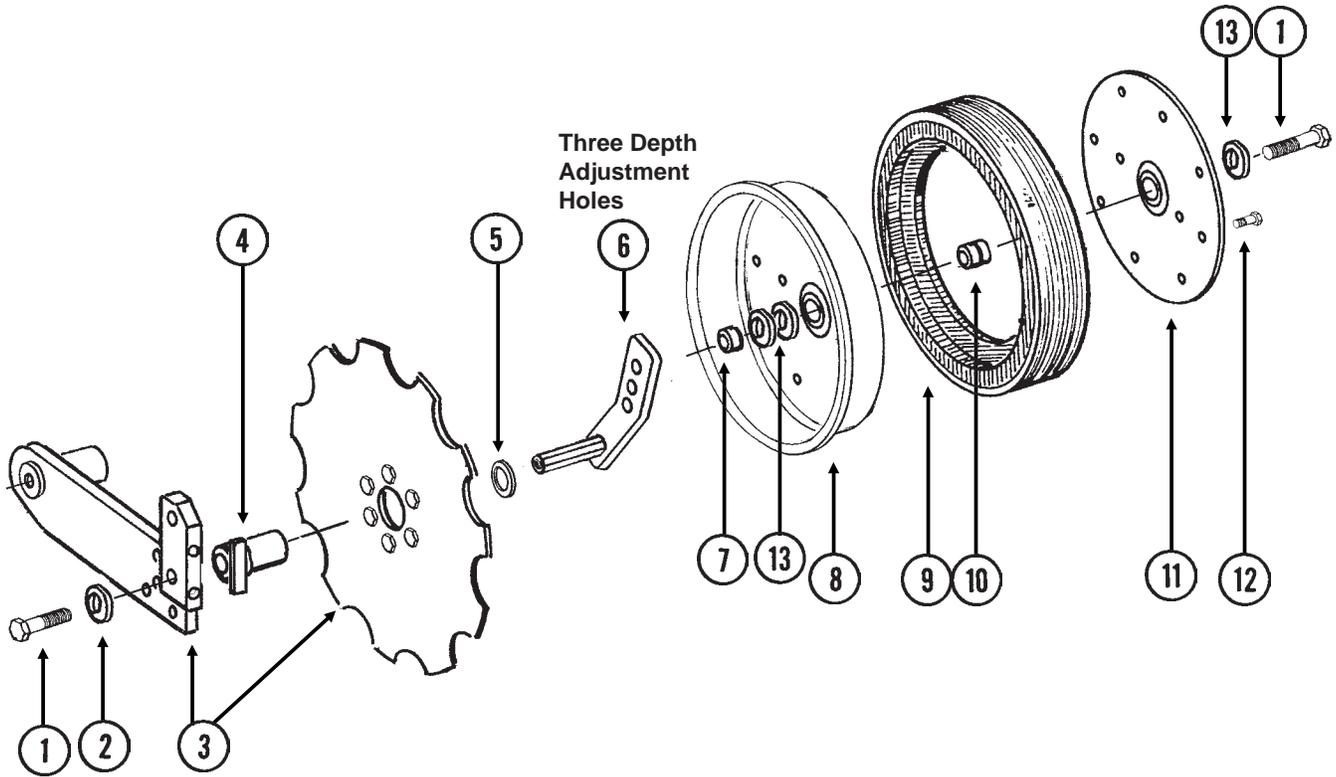


ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Assy.)	
1.	G10010	2	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 3"
2.	GD7805	1	Special Washer, $\frac{5}{8}$ ", Hardened
3.		-	See "Notched Single Disc Fertilizer Opener", Pages P112 And P113
4.	GA9472	1	Blade Mount
5.	G10233	1	Machine Bushing, 1", 10 Gauge
6.	GA9473	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)

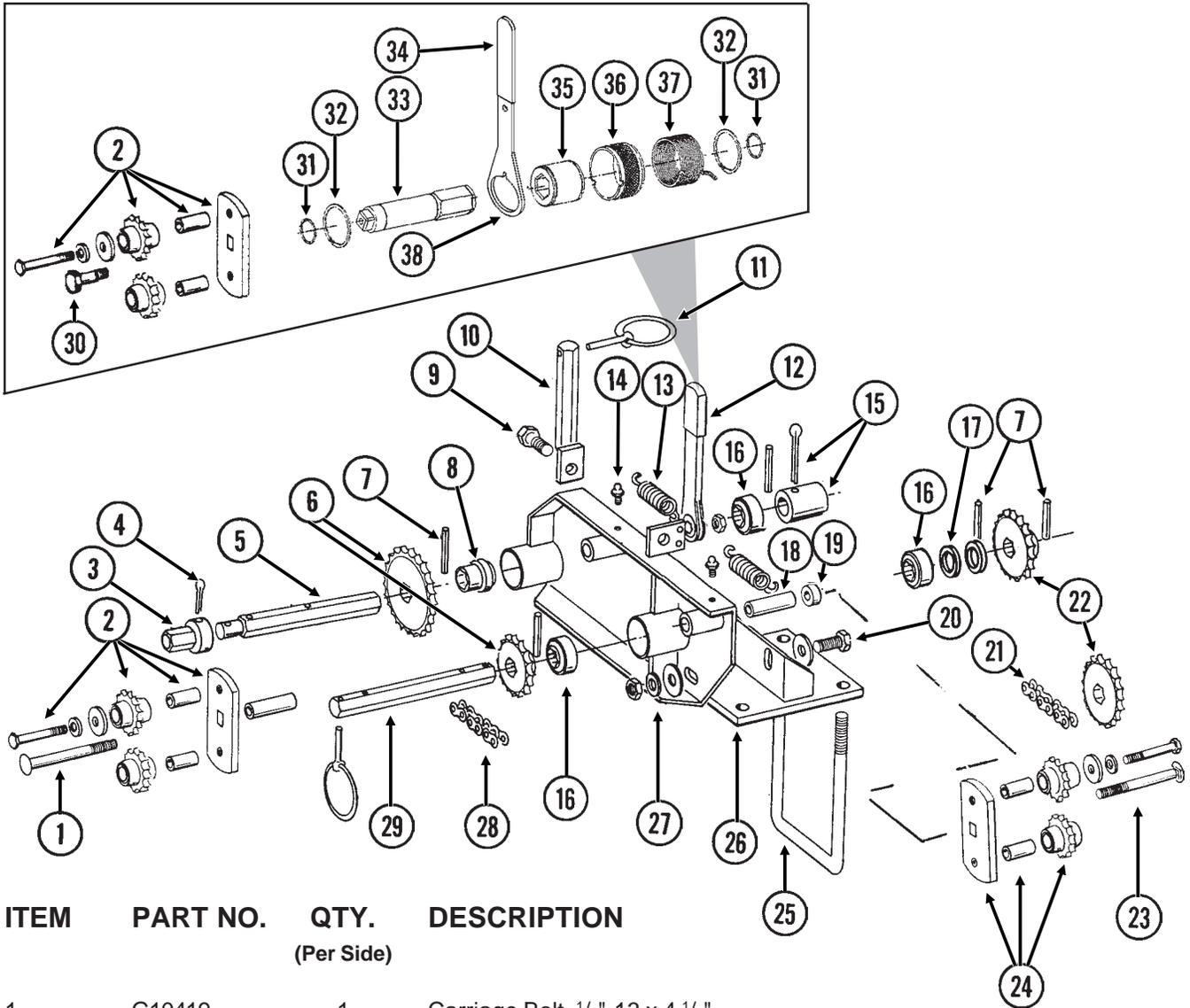
FOR USE WITH STYLE B
NOTCHED SINGLE DISC FERTILIZER OPENER



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 P112 And P113
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 DRIVE

DFC016/PTD079(TWL37c/TWL14g)



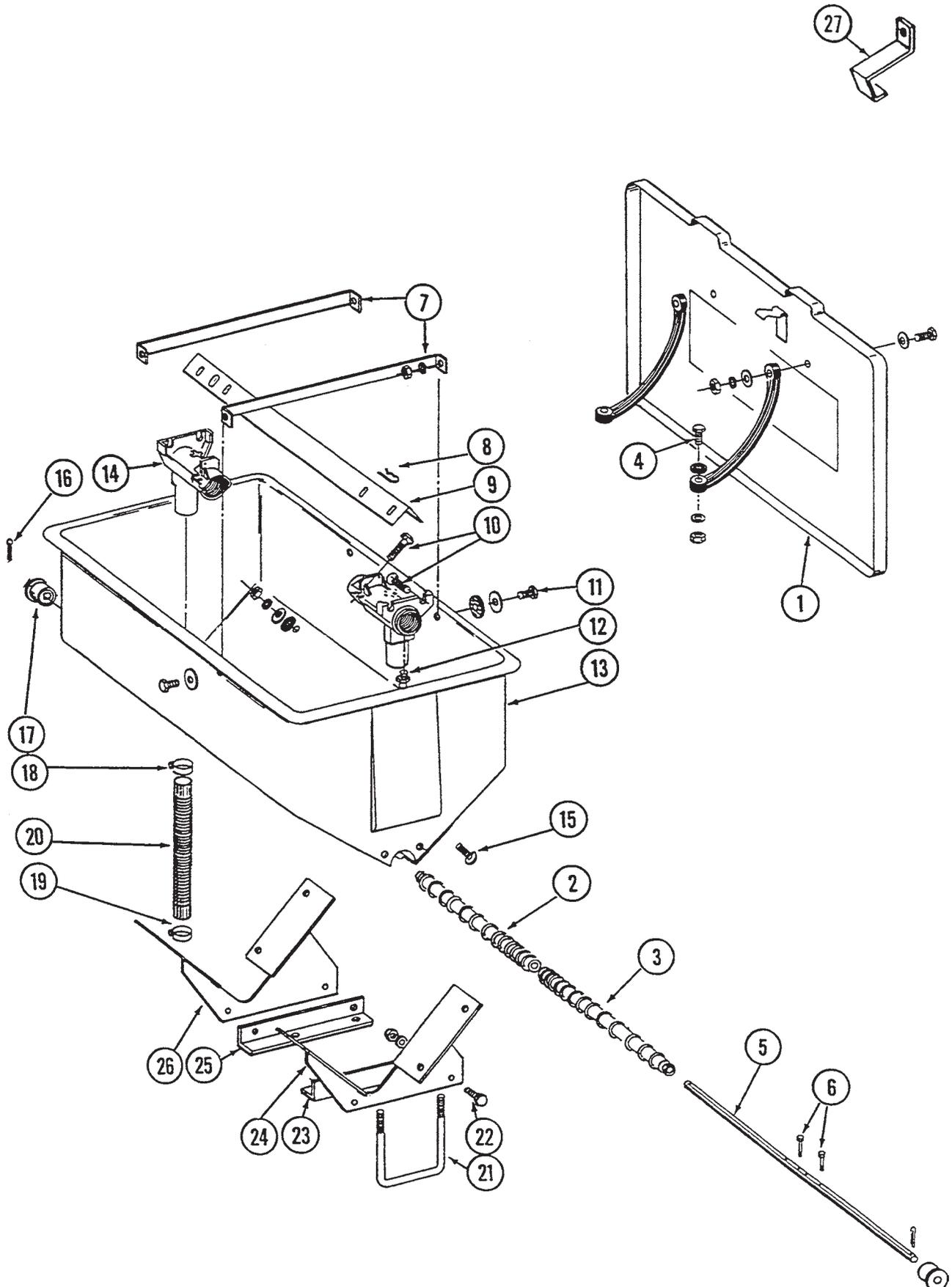
ITEM	PART NO.	QTY. (Per Side)	DESCRIPTION	
1.	G10419	1	Carriage Bolt, 1/2"-13 x 4 1/2"	
	GD3180-16	1	Sleeve, 5/8" I.D. x 7/8" O.D. x 2 13/16" Long	
	G10111	2	Lock Nut, 1/2"-13	
2.	GA7336	1	Idler W/Bolt-On Sprockets	
	GD7426	-	Sprocket, 12 Tooth	
	GD1026	-	Sleeve, 1 3/16" Long	
	G10210	-	Washer, 3/8" USS	
	G10229	-	Lock Washer, 3/8"	
	G10047	-	Hex Head Cap Screw, 3/8"-16 x 1 3/4"	
	G10047	-	Hex Head Cap Screw, 3/8"-16 x 1 3/4"	
3.	GD7127	1	Shear Coupler	
4.	G10462	1	Cotter Pin, 3/16" x 2"	
5.	GD7866	1	Shaft, 7/8" x 7 1/2"	
6.	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	
	7.	G10602	6	Spring Pin, 1/4" x 1 1/2"
	8.	GA5624	1	Special Bearing, 7/8" Hex Bore x 1.6"
9.	G10037	1	Hex Head Cap Screw, 1/2"-13 x 1 1/4"	
	G10111	1	Lock Nut, 1/2"-13	

DRY FERTILIZER DRIVE

ITEM	PART NO.	QTY. (Per Side)	DESCRIPTION
10.	GA5229	1	Sprocket Storage Rod
11.	GD2558	3	Lynch Pin, 1/4"
12.	GA4235	1	Ratchet Arm W/Protective Closure
	G10445	-	Protective Closure
13.	GD5857	2	Spring
14.	G10640	2	Grease Fitting, 1/4"-28
15.		-	See "Dry Fertilizer Couplers/Shafts", Pages P124 And P125
16.	GA5116	3	Bearing, 7/8" Hex Bore, Cylindrical
17.	G10233	2	Machine Bushing, 1", 10 Gauge
18.	GD3180-10	1	Sleeve, 5/8" I.D. x 7/8" O.D. x 3 1/4" Long
19.	GD2734-08	1	Sleeve, 1 1/4" O.D. x 5/8" Long
20.	G10017	2	Hex Head Cap Screw, 1/2"-13 x 1 1/2"
	G10206	4	Washer, 1/2" SAE
	G10228	2	Lock Washer, 1/2"
	G10102	2	Hex Nut, 1/2"-13
21.	G3310-130	1	Chain, No. 40, 130 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
22.	GA5109	2	Sprocket, 24 Tooth
23.	G10419	1	Carriage Bolt, 1/2"-13 x 4 1/2"
	G10206	1	Washer, 1/2" SAE
	G10111	1	Lock Nut, 1/2"-13
24.	GA7396	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"
	G10049	-	Hex Head Cap Screw, 3/8"-16 x 2 1/2"
	G10108	-	Lock Nut, 3/8"-16
25.	GD1134	2	U-Bolt, 7" x 5" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
26.	GA7129	1	Mount, L.H. (Shown)
	GA7130	-	Mount, R.H.
27.	GA5671	1	Transmission Plate, L.H. (Shown)
	GA5672	-	Transmission Plate, R.H.
28.	G3310-88	1	Chain, No. 40, 88 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
29.	GD10119	1	Shaft, 7/8" x 7 7/16"
30.	G11100	1	Hex Socket Button Head Screw, 1/4"-20 x 1 1/2", Grade 8
	G10227	1	Lock Washer, 1/4"
	G10209	1	Washer, 1/4" USS
31.	G11075	2	Internal Inverted Snap Ring, 7/8"
32.	G10496	2	External Inverted Snap Ring, 1 1/2"
33.	GD14427	1	Tightener Shaft, 4 7/8"
34.	G11078	1	Vinyl Cap
35.	GD14432	1	Sleeve, 1 1/4"
36.	GD14430	1	Release Collar, Gold, R.H. (Shown)
	GD14429	-	Release Collar, Silver, L.H.
37.	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)
38.	GD14431	1	Handle
A.	G1K378	1	Wrap Spring Wrench Replacement Kit, Gold Collar, R.H. (Items 30-38) (Shown)
	G1K379	-	Wrap Spring Wrench Replacement Kit, Silver Collar, L.H. (Items 30-38)

DRY FERTILIZER HOPPER AND MOUNTS

DFC009/DFC018(TWL36)

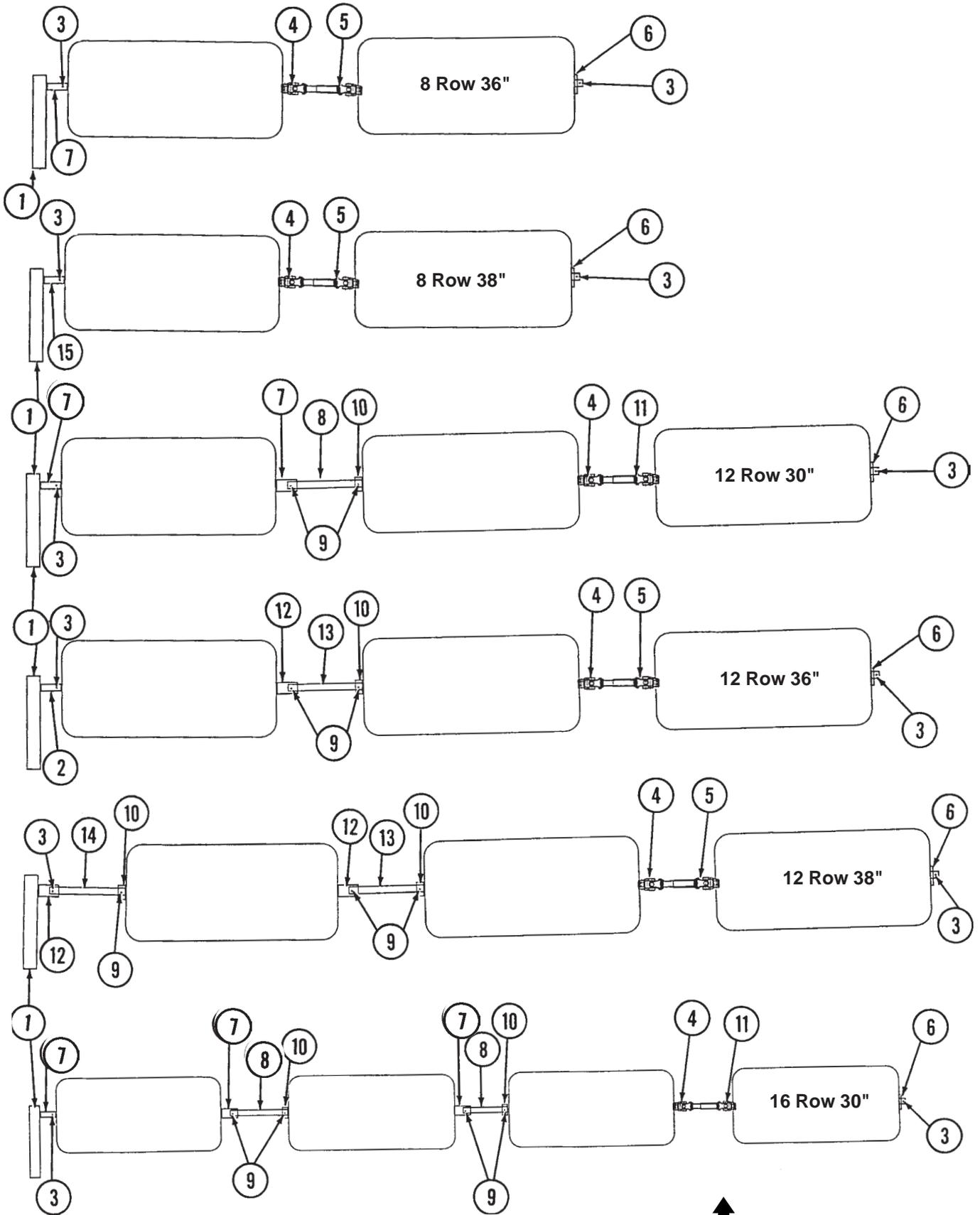


DRY FERTILIZER HOPPER AND MOUNTS

ITEM	PART NO.	QTY. (Per Hopper)	DESCRIPTION
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	4	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 1 $\frac{1}{2}$ "
	G10228	4	Lock Washer, $\frac{1}{2}$ "
	G10102	4	Hex Nut, $\frac{1}{2}$ "-13
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)

DRY FERTILIZER COUPLERS/SHAFTS

RH100594(TWL38a)



L.H. Side Of Machine Shown

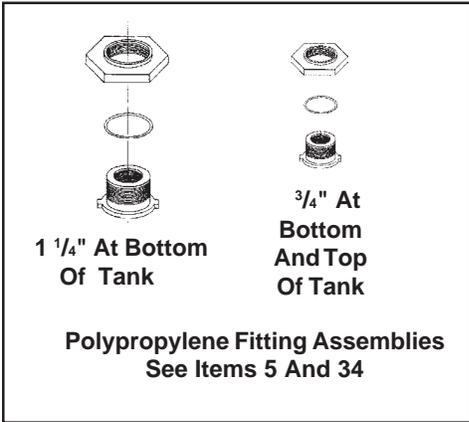
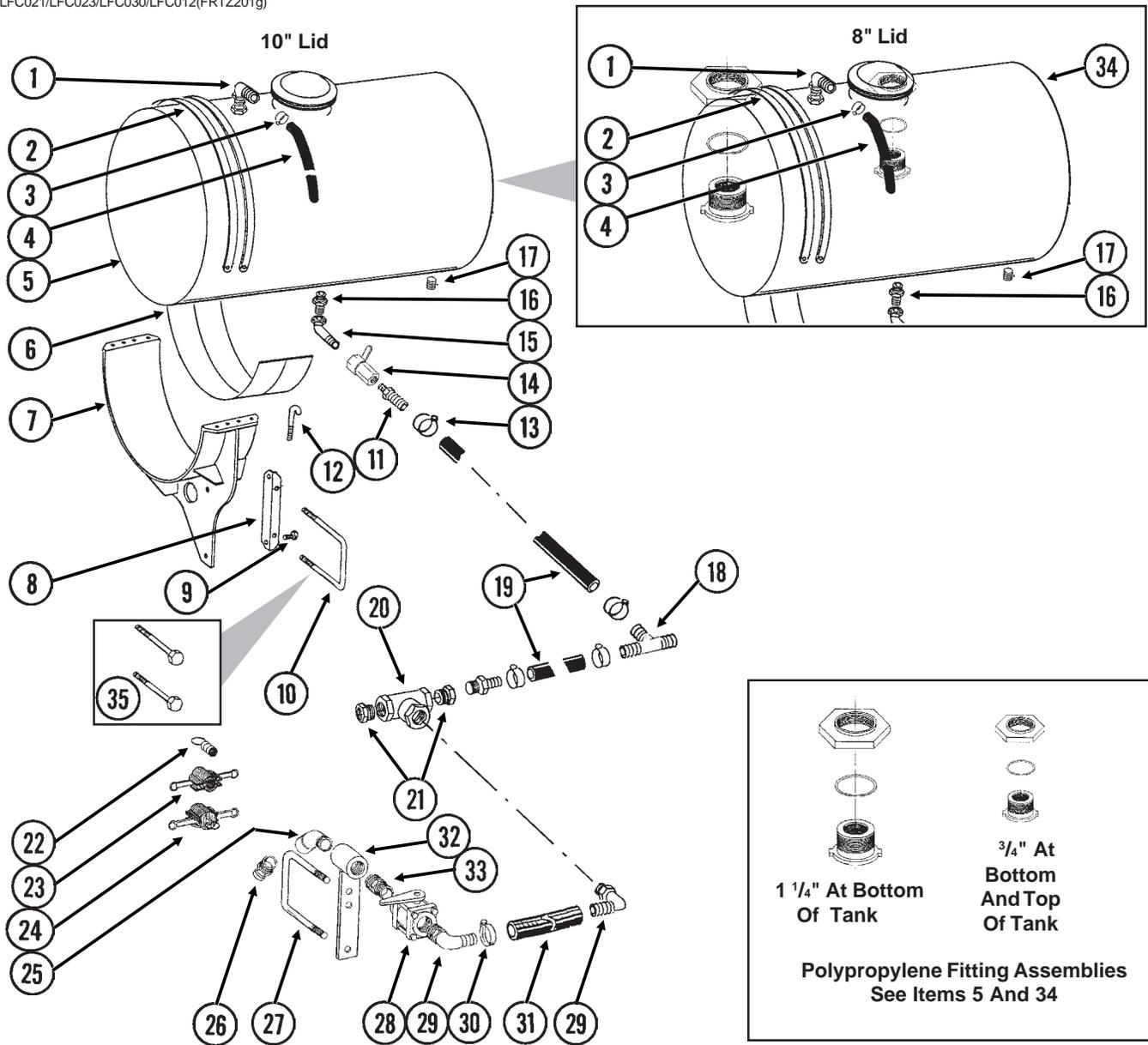
Direction Of Travel

DRY FERTILIZER COUPLERS/SHAFTS

ITEM	PART NO.	QTY.	DESCRIPTION
1.		-	See "Dry Fertilizer Drive", Pages P120 And P121
2.	GD10109	-	Coupler, 6"
3.	G10460	-	Cotter Pin, 1/4" x 2"
4.	GA7051	-	U-Joint W/Grease Fitting, Male, 12 1/4" Long
	GR1293	-	Yoke, 7/8" Hex
	GR1294	-	Cross And Bearing Kit
	GR1295	-	Inboard Yoke
	GR1296	-	Inner Profile
	GR1557	-	Grease Fitting, 45°, Metric
	GR1301	-	Spring Pin, 8mm x 50mm
5.	GA7146	-	U-Joint W/Grease Fitting, Female, 22 1/16" Long
	GR1293	-	Yoke, 7/8" Hex
	GR1294	-	Cross And Bearing Kit
	GR1299	-	Inboard Yoke And Outer Profile
	GR1557	-	Grease Fitting, 45°, Metric
6.	G10233	-	Machine Bushing, 1", 10 Gauge
7.	GD7867	-	Coupler, 3"
8.	GD2548-15.5	-	Hex Shaft, 7/8" x 15 1/2" (1 Hole)
9.	G10602	-	Spring Pin, 1/4" x 1 1/2"
10.	GD5886	-	Coupler, 1 3/4"
11.	GA7052	-	U-Joint W/Grease Fitting, Female, 10 1/4" Long
	GR1293	-	Yoke, 7/8" Hex
	GR1294	-	Cross And Bearing Kit
	GR1297	-	Inboard Yoke And Outer Profile
	GR1557	-	Grease Fitting, 45°, Metric
12.	GD10126	-	Coupler, 4"
13.	GD2548-24.5	-	Hex Shaft, 7/8" x 24 1/2" (1 Hole)
14.	GD2548-13.5	-	Hex Shaft, 7/8" x 13 1/2" (1 Hole)
15.	GD10773	-	Coupler, 10 3/4"
16.	G10688	-	Square Head Set Screw, 3/8"-16 x 5/8"

LIQUID FERTILIZER TANKS, SADDLES, SADDLE MOUNTS AND HOSES

LFC021/LFC023/LFC030/LFC012(FRTZ201g)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10917	2	Elbow, 90°, 3/4" NPT To Barb
2.	GD1520	-	Band, 30" (4 Per Tank)
3.	G10278	2	Hose Clamp, No. 16
4.	G4205-11	-	Hose, 3/4" x 72" (One Per Tank)
5.	GD1812	-	Tank W/Lid And Fittings, 30" x 150 Gallon, 8 Row Sizes (Qty. 2), 12/16 Row Sizes (Qty. 4)
	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)

LIQUID FERTILIZER TANKS, SADDLES, SADDLE MOUNTS AND HOSES

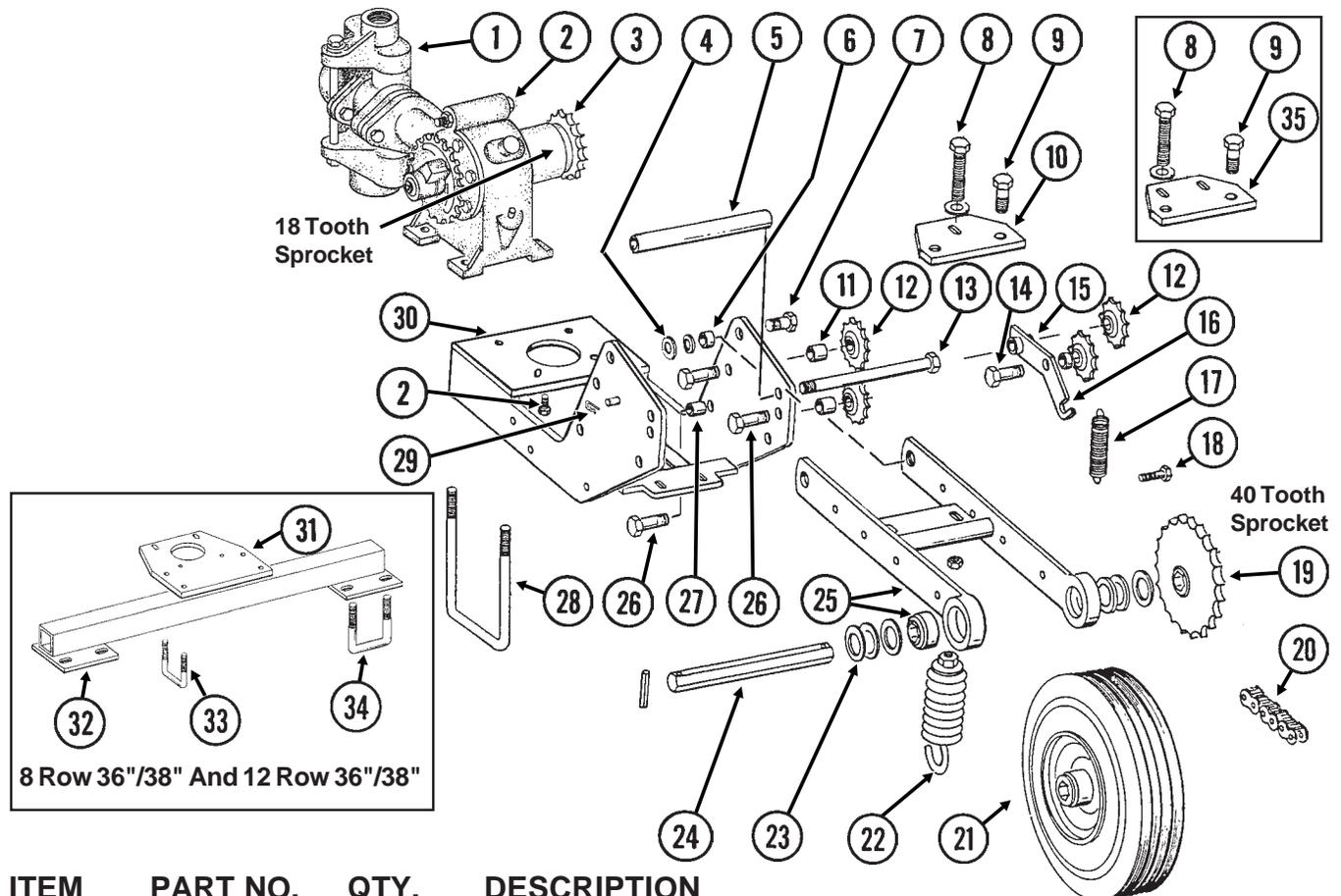
ITEM	PART NO.	QTY.	DESCRIPTION
6.	GD1862	-	Pad, 8" x 14' (For Two 30" Tanks)
7.	GA7133	-	Tank Mount (2 Per Tank)
8.	GD10110	-	Mounting Angle (2 Per Tank)
9.	G10007	-	Hex Head Cap Screw, ⁵ / ₈ "-11 x 1 1/2"
	G10230	-	Lock Washer, ⁵ / ₈ "
	G10104	-	Hex Nut, ⁵ / ₈ "-11
10.	GD1747	-	U-Bolt, 5" x 7" x ³ / ₄ "-10
	G10231	-	Lock Washer, ³ / ₄ "
	G10105	-	Hex Nut, ³ / ₄ "-10
11.	G10626	-	Adapter, 1 1/4" NPT To Barb
12.	GD1337	-	J-Bolt, ⁵ / ₁₆ "-18 (8 Per Tank)
	G10109	-	Lock Nut, ⁵ / ₁₆ "-18 (8 Per Tank)
13.	G10674	-	Hose Clamp, No. 24
14.	GA4976	-	Shutoff Valve, 1 1/4" NPT
	GR1015	-	Body O-Ring
	GR1016	-	Stem O-Ring
	GR1017	-	Teflon Seat
	GR1018	-	Ball
	GR1019	-	Handle
15.	G10887	-	Elbow, 90°, 1 1/4" Male NPT To Female
16.	G10619	-	Close Nipple, 1 1/4" NPT
17.	G10096	-	Pipe Plug, ³ / ₄ " NPT
18.	G10633	-	Tee, 1 1/4" Barb
19.	G4200-03	1	Hose, 1 1/4" x 32', 8 Row 36"/38" And 12 Row 30"
	G4200-06	-	Hose, 1 1/4" x 40', 12 Row 36"/38" And 16 Row 30"
20.	G10888	-	Tee, 2" Female NPT
21.	G10616	-	Reducing Bushing, 2" Male NPT To 1 1/4" Female
22.	GD10777	-	Dust Plug, 2" Male Cam Lock
23.	GD3622	-	Adapter, 2" Female NPT To Cam Lock
24.	GD3951	-	Dust Cap, 2" Cam Lock
25.	G10889	-	Elbow, 45°, 2" Male NPT To Female
26.	GD3623	-	Adapter, 2" Male NPT To Cam Lock
27.	GD1113	-	U-Bolt, 5" x 7" x ⁵ / ₈ "-11
	G10230	-	Lock Washer, ⁵ / ₈ "
	G10104	-	Hex Nut, ⁵ / ₈ "-11
28.	GA2660	-	Shutoff Valve, 2" NPT
29.	G10630	-	Elbow, 90°, 2" NPT To Barb
30.	G10676	-	Hose Clamp, No. 36
31.	G4201-02	-	Hose, 2" x 12', 8 Row
	G4201-03	-	Hose, 2" x 18', 12/16 Row
32.	GA7845	-	Quick Fill Mount, 2"
33.	G10623	-	Close Nipple, 2" NPT
34.	GA9905	-	Tank W/Lid And Fittings, 30" x 150 Gallon, 8 Row Sizes (Qty. 2), 12/16 Row Sizes (Qty. 4)
	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)
35.	G10342	-	Hex Head Cap Screw, ³ / ₄ " - 10 x 8"
	G10218	-	Washer, ³ / ₄ " USS
	G10231	-	Lock Washer, ³ / ₄ "
	G10105	-	Hex Nut, ³ / ₄ " - 10

LIQUID FERTILIZER PISTON PUMP MOUNT AND CONTACT DRIVE WHEEL

LFC028(TWL43k/TWL88)

Model LM-2455-R

40 Tooth Drive Sprocket And 18 Tooth Driven Sprocket



ITEM	PART NO.	QTY.	DESCRIPTION
1.		-	See "Liquid Fertilizer Piston Pump (Cylinder Assembly)", Pages P136 And P137
2.		-	See "Liquid Fertilizer Piston Pump (Crankcase Assembly)", Pages P134 And P135
3.		-	Sprocket, 18 Tooth, See "Liquid Fertilizer Piston Pump (Crankcase Assembly)", Pages P134 And P135
4.	GD7805	2	Special Washer, $\frac{5}{8}$ ", Hardened
5.	GD10165	1	Sleeve, $6 \frac{3}{4}$ "
6.	GB0218	2	Bushing, $2\frac{1}{32}$ " I.D. x $\frac{7}{8}$ " O.D. x $\frac{19}{32}$ " Long
7.	G10005	2	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x $1 \frac{3}{4}$ "
	G10235	2	Machine Bushing, $\frac{7}{8}$ ", 14 Gauge
	G10107	2	Lock Nut, $\frac{5}{8}$ "-11
8.	G10371	1-2	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 3", Full Thread
	G10206	1-2	Washer, $\frac{1}{2}$ " SAE
	G10102	1-2	Hex Nut, $\frac{1}{2}$ "-13
9.	G10039	2	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x $1 \frac{3}{4}$ "
	G10206	2	Washer, $\frac{1}{2}$ " SAE
	G10228	2	Lock Washer, $\frac{1}{2}$ "
	G10102	2	Hex Nut, $\frac{1}{2}$ "-13
10.	GD10156	1	Spring Mount
11.	GD10007	2	Spacer, $1 \frac{1}{8}$ "
12.	GA7154	4	Sprocket W/Bearing, 18 Tooth
13.	G10819	1	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x $8 \frac{1}{2}$ "
	G10228	1	Lock Washer, $\frac{1}{2}$ "
	G10102	1	Hex Nut, $\frac{1}{2}$ "-13

LIQUID FERTILIZER PISTON PUMP MOUNT AND CONTACT DRIVE WHEEL

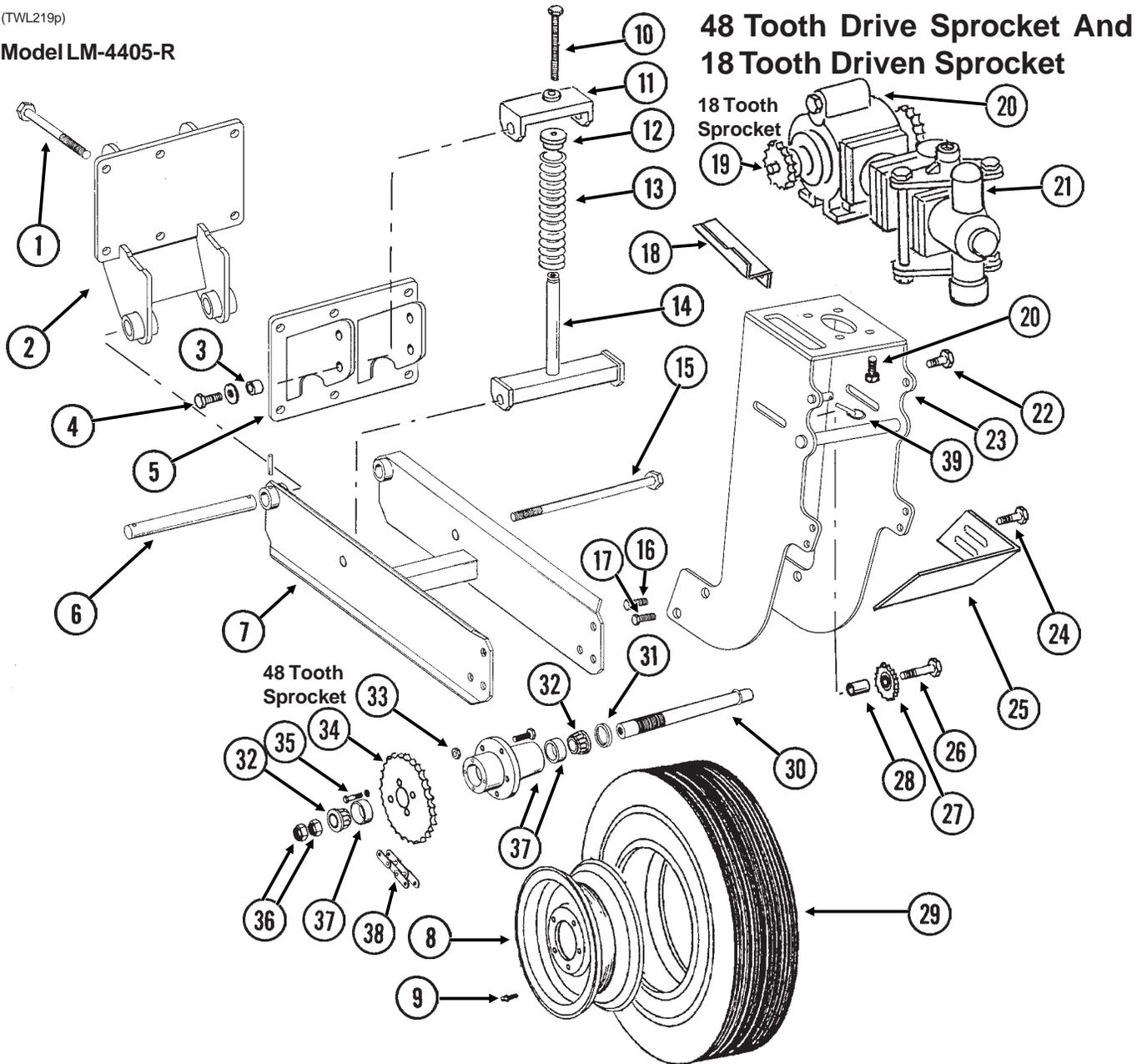
ITEM	PART NO.	QTY.	DESCRIPTION
14.	G10016	1	Hex Head Cap Screw, 1/2"-13 x 2"
	G10228	1	Lock Washer, 1/2"
	G10102	1	Hex Nut, 1/2"-13
15.	GD10161	1	Spacer, 3/8"
16.	GA7179	1	Idler Arm
17.	GD5857	1	Spring
18.	G10003	1	Hex Head Cap Screw, 3/8"-16 x 1 1/2"
	G10229	1	Lock Washer, 3/8"
	G10101	2	Hex Nut, 3/8"-16
19.	GA7180	1	Sprocket, 40 Tooth
20.	G3310-160	1	Chain, No. 40, 160 Pitch Including Connector Link, 12 Row 30" And 16 Row 30"
	G3310-210	-	Chain, No. 40, 210 Pitch Including Connector Link, 8 Row 36"/38" And 12 Row 36"/38"
	GR0912	-	Connector Link, No. 40
21.	GA5090	1	Tire And Rim Assembly (Specify Brand*)
	GD5753	-	Tire, 4.10" x 6" (Specify Brand*)
	GD5752	-	Inner Tube
22.	GA2068	1-2	Spring W/Plug
23.	G10233	5	Machine Bushing, 1", 10 Gauge
24.	GD5797	1	Hex Shaft, 7/8" x 10"
	G10602	2	Spring Pin, 1/4" x 1 1/2"
25.	GA6415	1	Wheel Arm W/Bearings
	GA5116	-	Bearing, 7/8" Hex Bore, Cylindrical
26.	G10038	3	Hex Head Cap Screw, 1/2"-13 x 3"
	G10228	3	Lock Washer, 1/2"
	G10102	3	Hex Nut, 1/2"-13
27.	GD7904-04	-	Sleeve, 1/2" x 1 1/8" Long
28.	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
29.	G10670	1	Hair Pin Clip, No. 3
30.	GA8486	1	Pump Mount W/Sleeve And Sleeve Mounting Hardware
31.	GD10642	1	Plate, 8 Row 36"/38" And 12 Row 36"/38"
32.	GA7507	1	Pump Mount, 8 Row 36"/38" And 12 Row 36"/38"
33.	GD2721	2	U-Bolt, 2" x 2" x 1/2"-13
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
34.	GD4743	2	U-Bolt, 3" x 3" x 1/2"-13
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
35.	GD13268	-	Spring Mount

* 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.

LIQUID FERTILIZER PISTON PUMP MOUNT AND GROUND DRIVE WHEEL

(TWL219p)

Model LM-4405-R



ITEM	PART NO.	QTY.	DESCRIPTION
1.	G10830	6	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 7 $\frac{1}{2}$ "
	G10230	6	Lock Washer, $\frac{5}{8}$ "
	G10104	6	Hex Nut, $\frac{5}{8}$ "-11
2.	GA10624	1	Wheel Arm Mount
3.	GB0218	2	Bushing, $\frac{21}{32}$ " I.D. x $\frac{7}{8}$ " O.D. x $\frac{19}{32}$ " Long
4.	G10005	2	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 1 $\frac{3}{4}$ "
	GD7805	2	Special Washer, $\frac{5}{8}$ ", Hardened
	G10107	2	Lock Nut, $\frac{5}{8}$ "-11
5.	GA10622	1	Spring Mount
6.	GD2681	1	Pin, 1 $\frac{1}{4}$ " x 13 $\frac{1}{2}$ "
	G10460	2	Cotter Pin, $\frac{1}{4}$ " x 2"
7.	GA10621	1	Arm W/Grease Fittings
	G10641	2	Grease Fitting, $\frac{1}{8}$ " NPT
8.	GA0241	1	Wheel, 5" x 15"

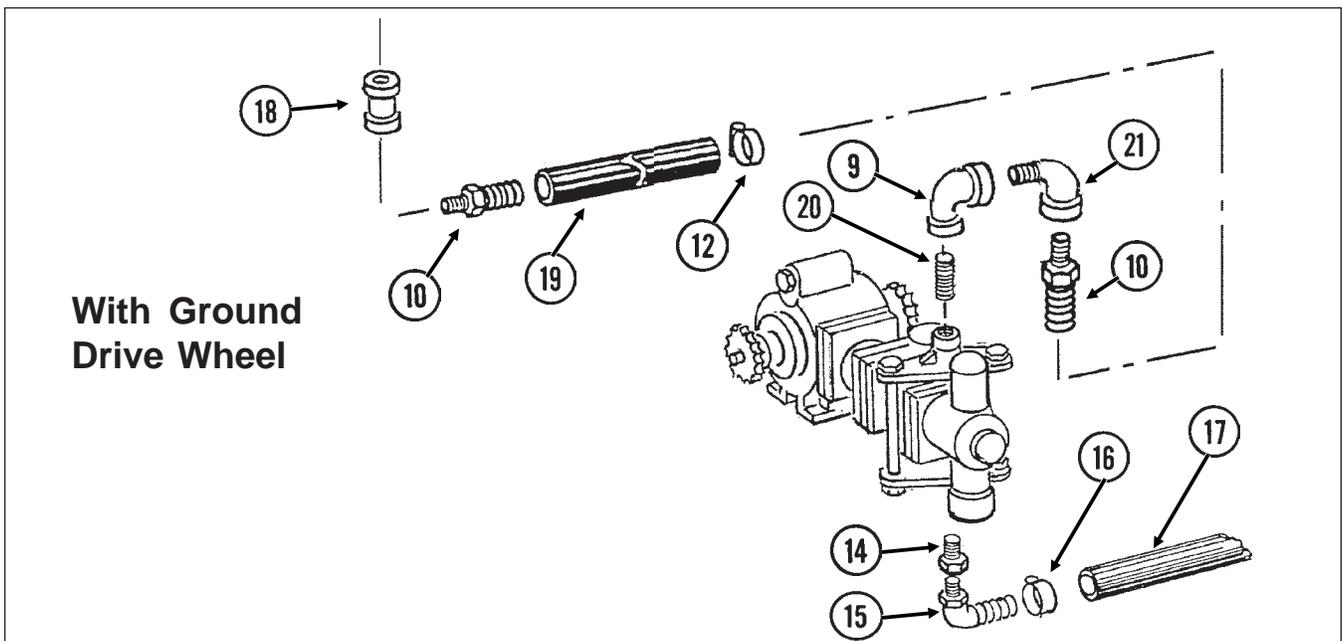
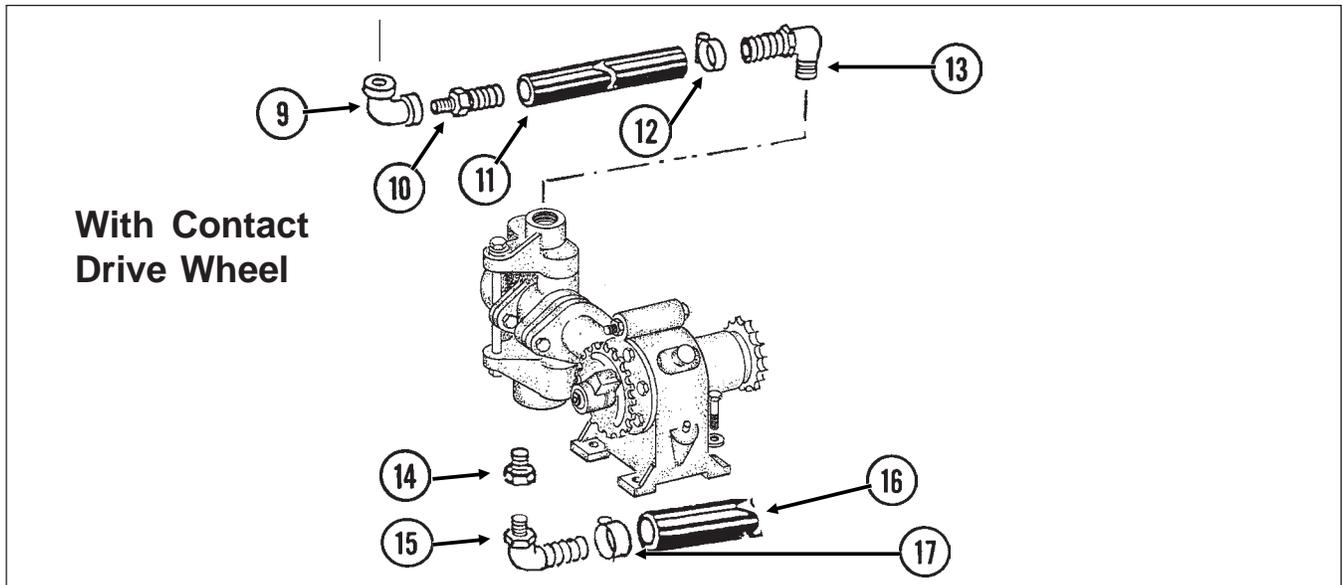
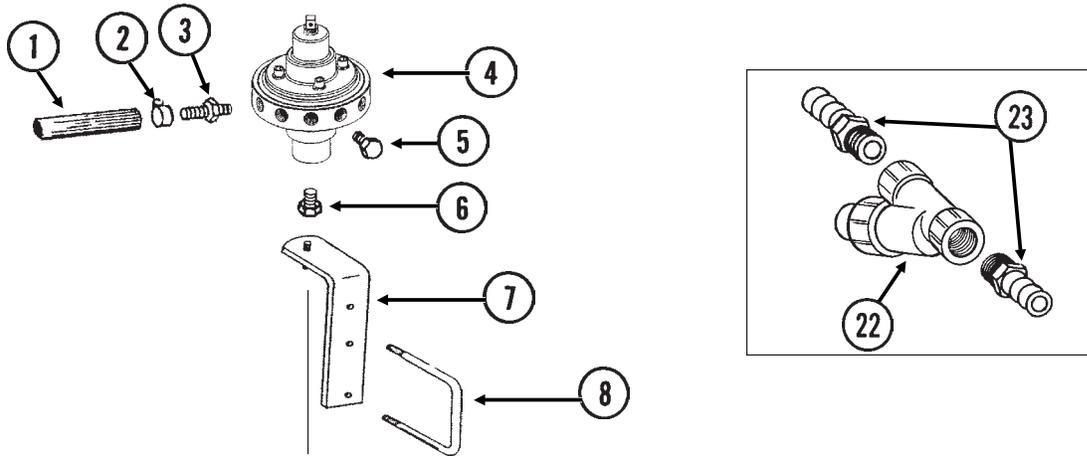
LIQUID FERTILIZER PISTON PUMP MOUNT AND GROUND DRIVE WHEEL

ITEM	PART NO.	QTY.	DESCRIPTION
9.	GD1166	1	Valve Stem
10.	G10012	1	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 6 $\frac{1}{2}$ "
	GD7805	1	Special Washer, $\frac{5}{8}$ ", Hardened
11.	GA6308	1	Spring Mount
12.	GB0196	1	Washer
13.	GD7831	1	Compression Spring
14.	GA6309	1	Spring Guide
15.	G11122	1	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 12"
	G10107	1	Lock Nut, $\frac{5}{8}$ "-11
16.	G10026	2	Hex Head Cap Screw, $\frac{3}{4}$ "-10 x 2"
	G10231	2	Lock Washer, $\frac{3}{4}$ "
17.	G11042	2	Hex Head Cap Screw, $\frac{3}{4}$ "-10 x 1 $\frac{3}{4}$ "
	G10231	2	Lock Washer, $\frac{3}{4}$ "
	G10105	2	Hex Nut, $\frac{3}{4}$ "-10
18.	GD13744	1	Hose Holder
19.	GR1146	1	Sprocket, 18 Tooth
20.		-	See "Liquid Fertilizer Piston Pump (Crankcase Assembly)", Pages P138 And P139
	GR0200	1	Offset Link, No. 2050
21.		-	See "Liquid Fertilizer Piston Pump (Cylinder Assembly)", Pages P140 And P141
22.	G10007	2	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 1 $\frac{1}{2}$ "
	G10217	2	Washer, $\frac{5}{8}$ " USS
	G10230	2	Lock Washer, $\frac{5}{8}$ "
	G10104	2	Hex Nut, $\frac{5}{8}$ "-11
23.	GA10480	1	Pump Mount
24.	G10017	2	Hex Head Cap Screw, $\frac{1}{2}$ "-13 x 1 $\frac{1}{2}$ "
	G10216	2	Washer, $\frac{1}{2}$ " USS
	G10228	2	Lock Washer, $\frac{1}{2}$ "
	G10102	2	Hex Nut, $\frac{1}{2}$ "-13
25.	GD13328	1	Scraper
26.	G10013	1	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 3 $\frac{1}{2}$ "
	G10205	1	Washer, $\frac{5}{8}$ " SAE
	G10230	1	Lock Washer, $\frac{5}{8}$ "
	G10104	1	Hex Nut, $\frac{5}{8}$ "-11
27.	GA0262	1	Idler Sprocket W/Bearing, 15 Tooth
28.	GD7817-05	1	Spacer, $\frac{11}{16}$ " I.D. x 1 $\frac{1}{4}$ " Long
29.	GD0844	1	Tire, 7.60" x 15", 8 Ply (Specify Brand*)
30.	GA2559	1	Spindle
31.	GA0252	2	Seal
32.	GA0251	2	Bearing
33.	GR0267	5	Lug Nut, $\frac{1}{2}$ "-20
34.	G2500-84	1	Sprocket, 48 Tooth
35.	G10019	4	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x 1"
	G10232	4	Lock Washer, $\frac{5}{16}$ "
36.	GD0831	2	Shoulder Nut, 1 $\frac{1}{4}$ "-12 UNF-2A
37.	GA0547	1	Hub W/Cups And Studs, 5 Bolt
	GR0190	2	Cup
	GR0204	5	Stud
38.	G3200-62	1	Chain, No. 2050, 62 Pitch Including Connector Link And Offset Link
	GR0195	1	Connector Link, No. 2050
39.	GD2558	1	Lynch Pin, $\frac{1}{4}$ "

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LIQUID FERTILIZER FLOW DIVIDER MOUNT AND HOSES

(FRTZ215d/FRTZ215e/FRTZ215f/FRTZ215k)



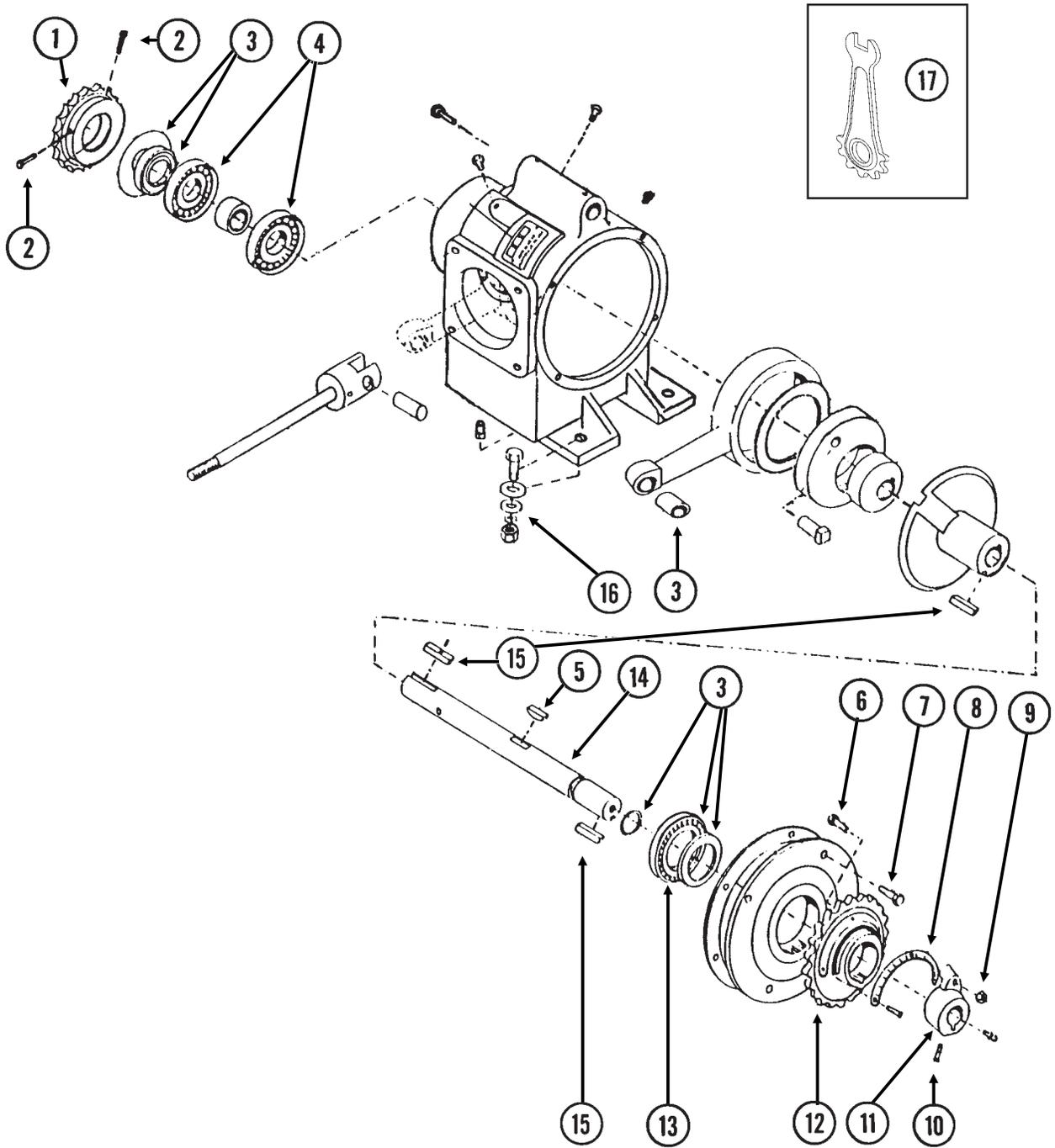
LIQUID FERTILIZER FLOW DIVIDER MOUNT AND HOSES

ITEM	PART NO.	QTY.	DESCRIPTION
1.	G4301-06	1	Hose, 3/8" x 160', 12 Row 30"
	G4301-05	1-2	Hose, 3/8" x 120', 8 Row 36"/38", 12 Row 36"/38" And 16 Row 30"
2.	G10681	-	Hose Clamp, No. 6
3.	GD11700	-	Adapter, 1/4" NPT To 3/8" Barb
4.		-	See "Liquid Fertilizer Flow Divider", Pages P142-P145
5.	G10292	-	Pipe Plug, 1/4" NPT
6.	G10737	1	Reducing Bushing, 1 1/4" Male NPT To 3/4" Female (If Applicable)
	G10995	-	Reducing Bushing, 1" Male NPT To 3/4" Female, Stainless Steel (If Applicable)
7.	GA6527	1	Support, 3/4" NPT
8.	GD1113	1	U-Bolt, 5" x 7" x 5/8"-11
	G10230	2	Lock Washer, 5/8"
	G10104	2	Hex Nut, 5/8"-11
9.	G10733	1	Elbow, 90°, 3/4" Female NPT
10.	G10734	-	Adapter, 3/4" NPT To Barb
11.	G4205-02	-	Hose, 3/4" x 62"
12.	G10278	-	Hose Clamp, No. 16
13.	G10896	1	Elbow, 90°, 1" NPT To 3/4" Barb
14.	G10615	1	Reducing Bushing, 1 1/2" Male NPT To 1 1/4" Female
15.	G10629	1	Elbow, 90°, 1 1/4" NPT To Barb
16.		-	1 1/4" Hose, See "Liquid Fertilizer Tanks, Saddles, Saddle Mounts And Hoses", Pages P126 And P127
17.	G10674	2	Hose Clamp, No. 24
18.	G11083	1	Coupler, 3/4" Female NPT
19.	G4205-10	-	Hose, 3/4" x 200"
20.	G10389	1	Pipe Nipple, 3/4" NPT x 1 1/2" Long
21.	G10735	1	Elbow, 90°, 3/4" Male NPT To Female
22.	GA3893	1	Strainer Complete
	GR0880	-	Screen, No. 40 Mesh
	GR0881	-	Gasket
	GR0882	-	Y-Body
	GR0883	-	End Cap
23.	G10626	2	Adapter, 1 1/4" NPT To Barb

LIQUID FERTILIZER PISTON PUMP (Crankcase Assembly) Uses 18 Tooth Sprocket

JB-L4400-991/CCU077(FRTZ172a/GR1424)

Model LM-2455-R



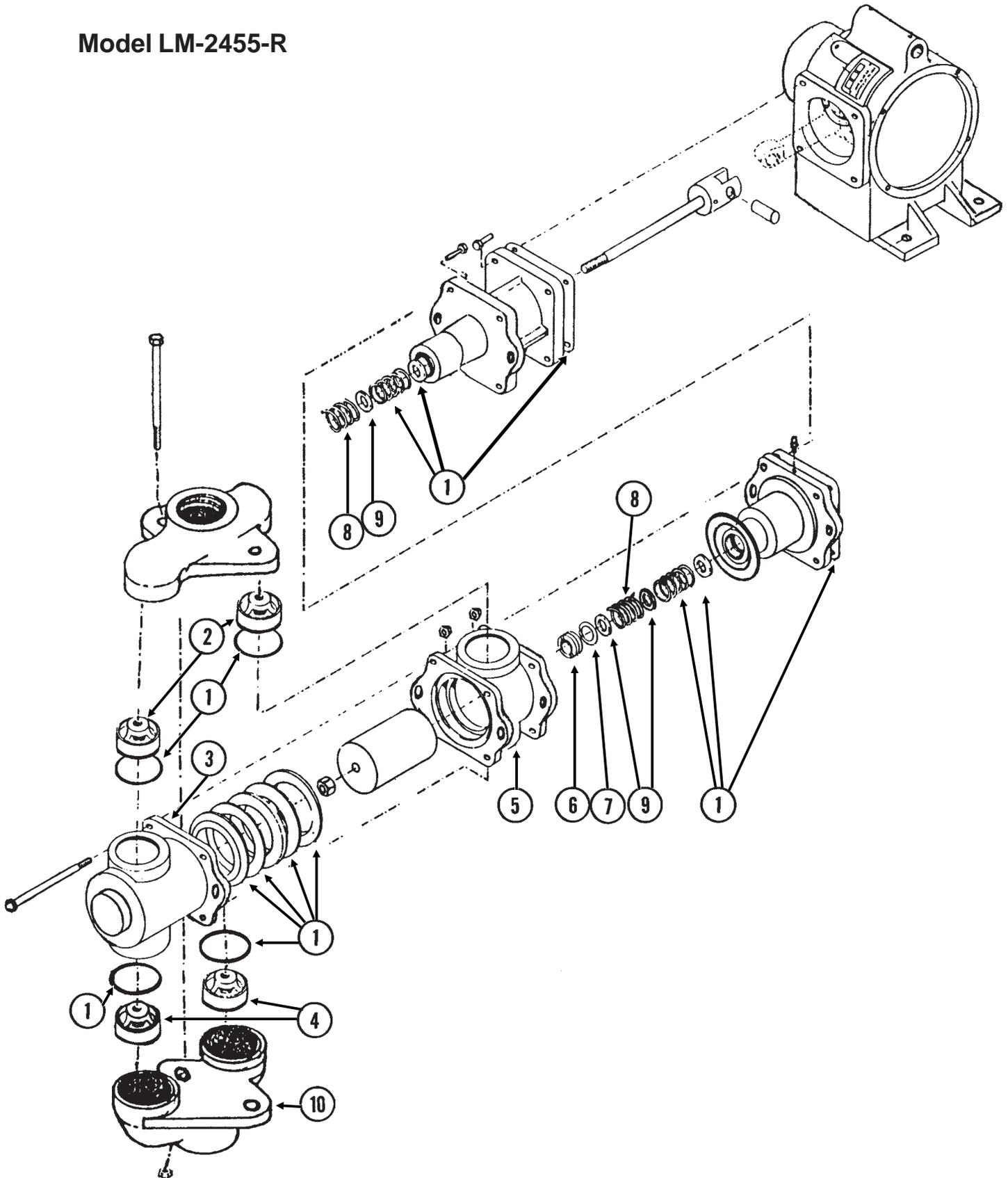
LIQUID FERTILIZER PISTON PUMP (Crankcase Assembly) Uses 18 Tooth Sprocket

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 P136 And P137
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.	G10003	4	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{1}{2}$ "
	GR1122	4	Mounting Pad
	G10210	4	Washer, $\frac{3}{8}$ " USS
	G10229	4	Lock Washer, $\frac{3}{8}$ "
	G10101	4	Hex Nut, $\frac{3}{8}$ "-16
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 P136 And P137

LIQUID FERTILIZER PISTON PUMP (Cylinder Assembly) Uses 18 Tooth Sprocket

JB-L2190-991(FRTZ171)

Model LM-2455-R



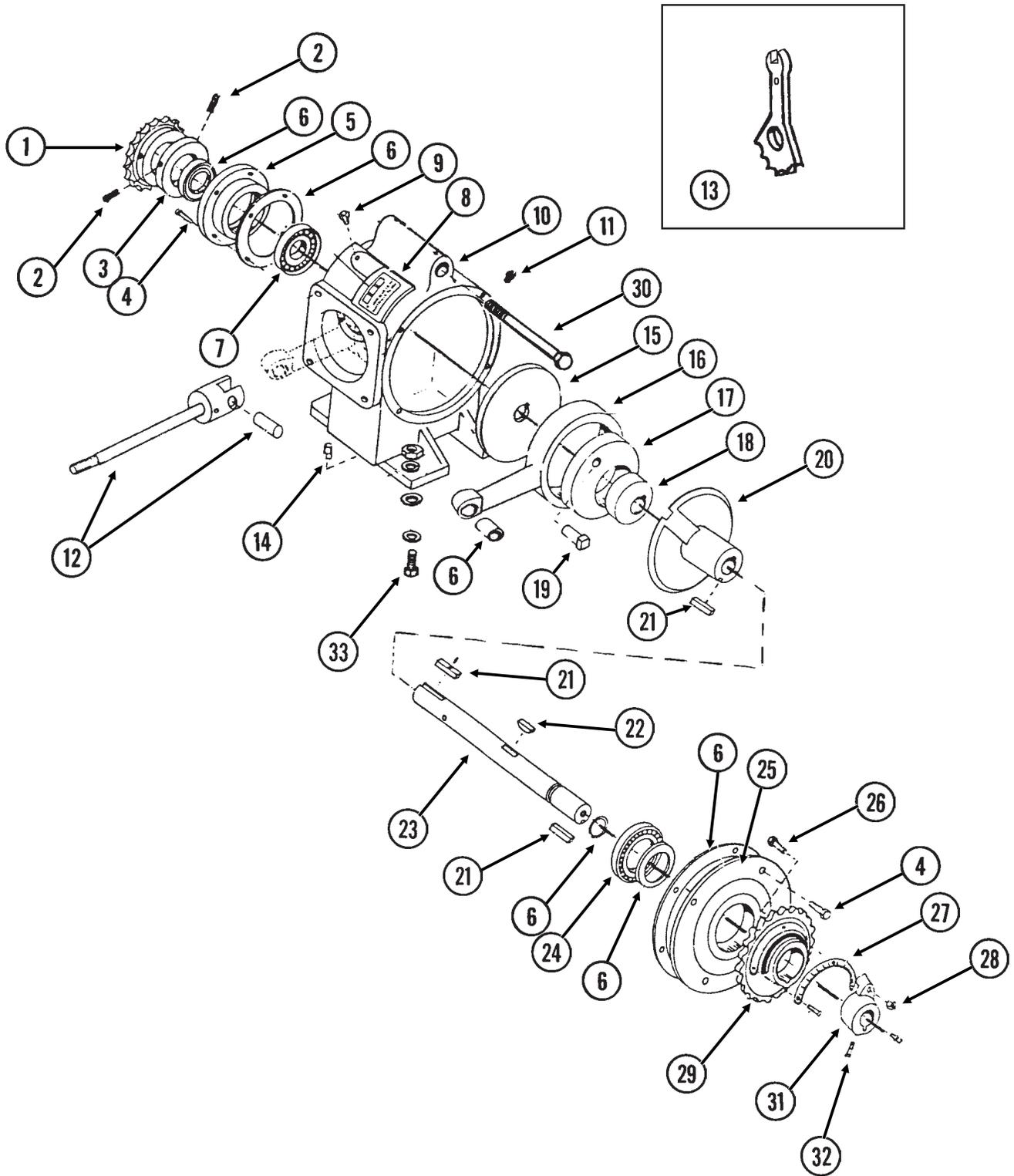
LIQUID FERTILIZER PISTON PUMP (Cylinder Assembly) Uses 18 Tooth Sprocket

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1425	1	Repair Kit, Includes Item 3 On Pages P134 And P135
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 (Crankcase Assembly)

(PT38a/GR1100)

Model L-4405



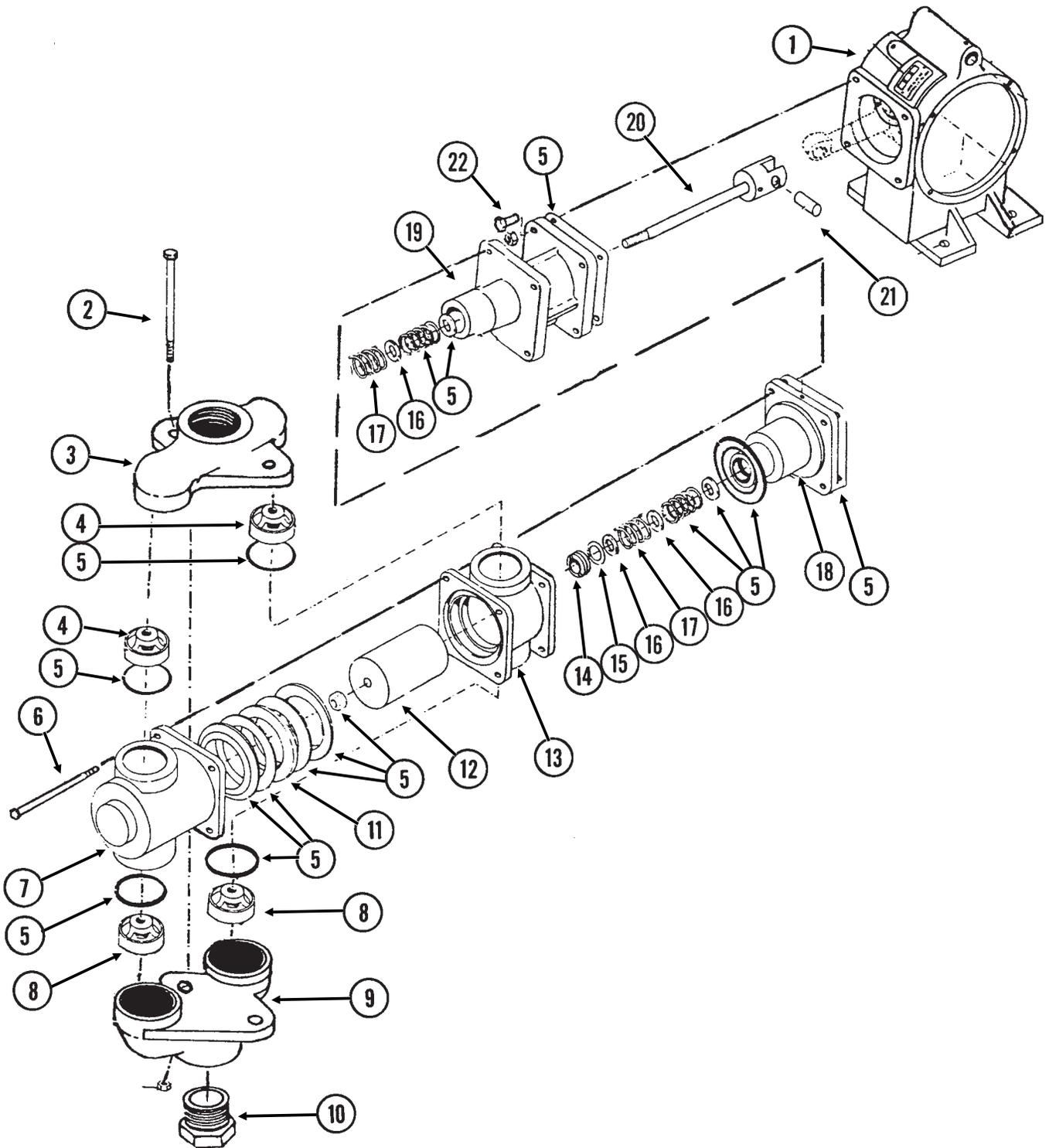
LIQUID FERTILIZER PISTON PUMP (Crankcase Assembly)

ITEM	PART NO.	QTY.	DESCRIPTION
1.		-	See "Liquid Fertilizer Piston Pump Mount And Ground Drive Wheel", Pages P130 And P131
2.	G10688	2	Square Head Set Screw, $\frac{3}{8}$ "-16 x $\frac{5}{8}$ "
3.	GR1147	1	Spacer
4.	G10019	4	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x 1"
5.	GR1102	1	Housing
6.	GR1173	-	Repair Kit, Includes Item 5 On "Liquid Fertilizer Piston Pump (Cylinder Assembly)", Pages P140 And P141
7.	GR1104	1	Bearing
8.	GR1105	1	Name Plate
9.	G10054	2	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x $\frac{1}{2}$ "
10.	GR1106	1	Crankcase
11.	GR1107	1	Vent Plug
12.		-	See "Liquid Fertilizer Piston Pump (Cylinder Assembly)", Pages P140 And P141
13.	GR1100	1	Adjustment Wrench
14.	GR1123	3	Plug
15.	GR1108	1	Disc
16.	GR1109	1	Connecting Rod
17.	GR1110	1	Large Eccentric
18.	GR1111	1	Small Eccentric
19.	GR1120	1	Eccentric Pin
20.	GR1119	1	Sleeve
21.	GR1118	3	Setting Arm Key
22.	GR1112	1	Woodruff Key
23.	GR1148	1	Crankshaft
24.	GR1116	1	Bearing
25.	GR1166	1	Cover Plate
26.	GR1167	1	Square Head Bolt, $\frac{3}{8}$ "-16 x 1 $\frac{3}{4}$ "
27.	GR1168	1	Scale
28.	G10108	1	Lock Nut, $\frac{3}{8}$ "-16
29.	GR1114	1	Flange
30.	G10318	1	Hex Head Cap Screw, $\frac{5}{8}$ "-11 x 4 $\frac{1}{2}$ "
	G10104	1	Hex Nut, $\frac{5}{8}$ "-11
31.	GR1165	1	Arm
32.	G10693	4	Hex Socket Head Set Screw, $\frac{5}{16}$ "-18 x $\frac{3}{8}$ "
33.	G10003	4	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{1}{2}$ "
	GR1122	4	Rubber Washer
	G10210	8	Washer, $\frac{3}{8}$ " USS
	G10229	4	Lock Washer, $\frac{3}{8}$ "
	G10101	4	Hex Nut, $\frac{3}{8}$ "-16
A.	GA6154	1	Piston Pump Complete Less Sprocket (L-4405), Includes Crankcase (Items 2-33 On This Page) And Cylinder Assemblies (Items 1-22 On Pages P140 And P141)

LIQUID FERTILIZER PISTON PUMP (Cylinder Assembly)

(PT39a)

Model L-4405



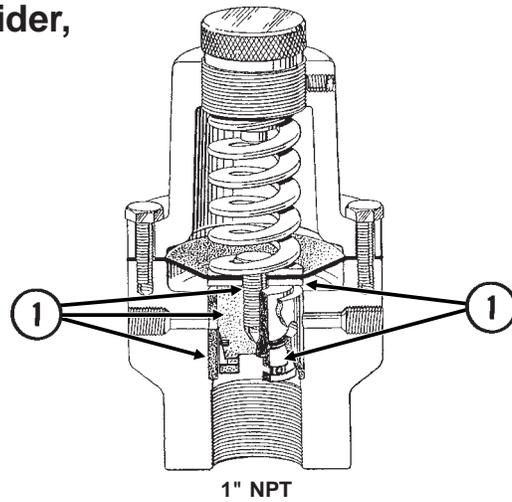
LIQUID FERTILIZER PISTON PUMP (Cylinder Assembly)

ITEM	PART NO.	QTY.	DESCRIPTION
1.		-	See "Liquid Fertilizer Piston Pump (Crankcase Assembly)", Pages P138 And P139
2.	G10686	2	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 8"
	G10101	2	Hex Nut, $\frac{3}{8}$ "-16
3.	GR1145	1	Discharge Manifold
4.	GR1144	2	Discharge Valve
5.	GR1173	-	Repair Kit, Includes Item 6 On "Liquid Fertilizer Piston Pump (Crankcase Assembly)", Pages P138 And P139
6.	G10687	4	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 5 $\frac{1}{2}$ "
	G10101	4	Hex Nut, $\frac{3}{8}$ "-16
7.	GR1143	1	Outboard Cylinder
8.	GR1142	2	Suction Valve
9.	GR1140	1	Suction Manifold
10.		-	See "Liquid Fertilizer Piston Pump Mount And Ground Drive Wheel", Pages P130 And P131
11.	GR1137	1	Flange Packing Washer
12.	GR1136	1	Plunger
13.	GR1135	1	Inboard Cylinder
14.	GR1134	1	Stuffing Box Insert
15.	GR1133	1	Retaining Ring
16.	GR1129	3	Washer
17.	GR1130	2	Packing Spring
18.	GR1132	1	Outboard Stuffing Box
19.	GR1127	1	Crosshead Guide
20.	GR1125	1	Piston Rod
21.	GR1124	1	Pin
22.	G10019	4	Hex Head Cap Screw, $\frac{5}{16}$ "-18 x 1"

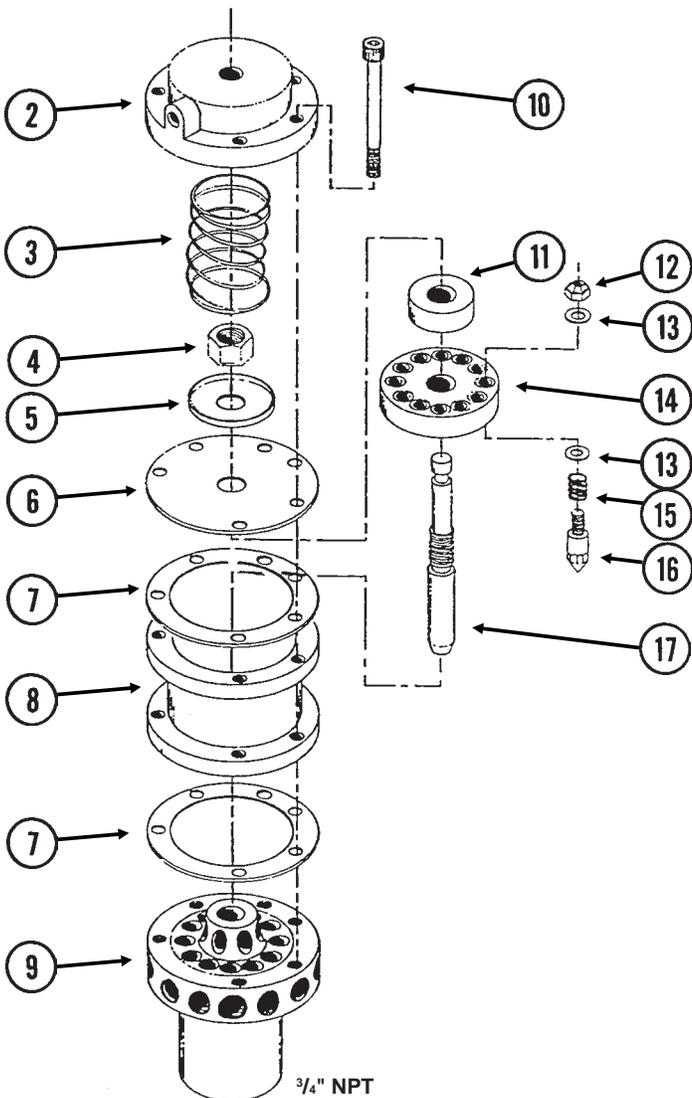
LIQUID FERTILIZER PISTON PUMP FLOW DIVIDER

(FRTZ159/PT40a/FRTZ202c)

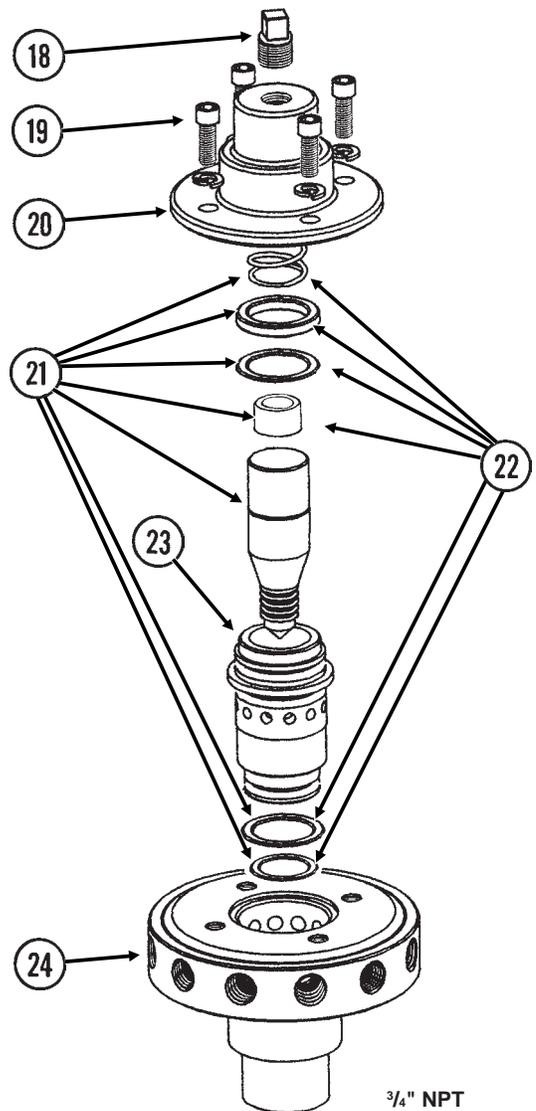
Model 70-12 Flow Divider, 12 Outlet



Model L-2190 Flow Divider, 12 Outlet



Model FD-1200 Flow Divider, 12 Outlet



LIQUID FERTILIZER PISTON PUMP FLOW DIVIDER

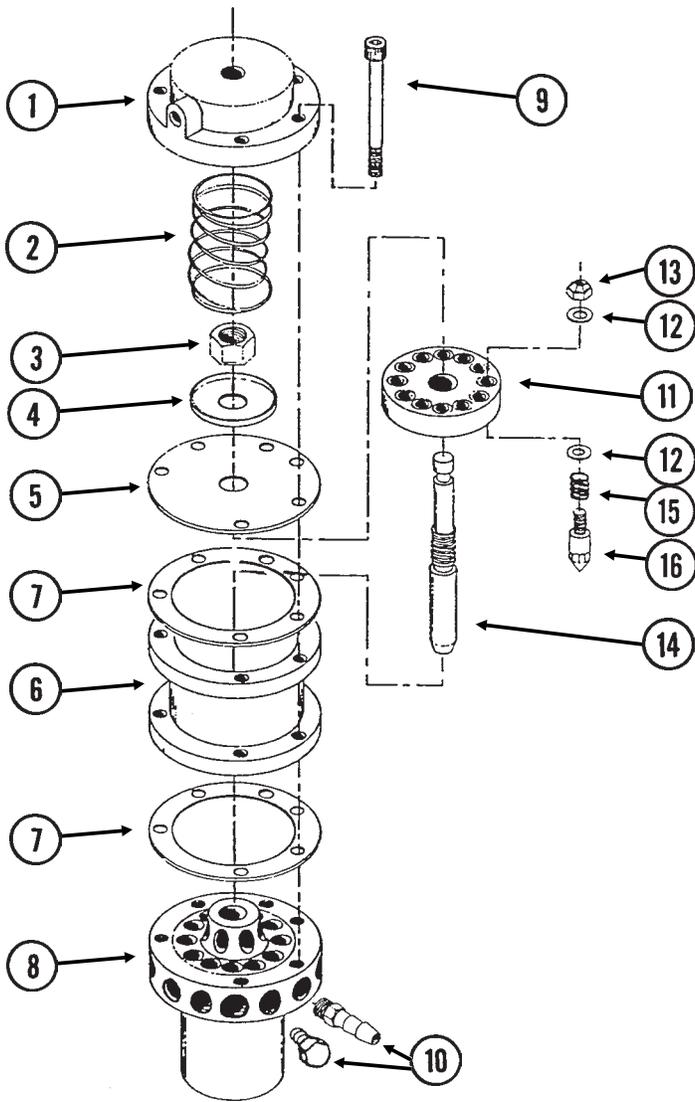
ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1388	1	Repair Kit, Includes: (2) Washers, (1) Piston, (1) O-Ring, (1) Piston Bolt, (1) Piston Ring
2.	GR1150	1	Cap
3.	GR1151	1	Spring
4.	G10358	1	Hex Nut, ⁹ / ₁₆ "-18
5.	GR1152	1	Plate
6.	GR1153	1	Diaphragm
8.	GR1154	1	Housing
7.	GR1155	2	Gasket
9.	*	1	Manifold
10.	GR1157	6	Socket Screw, 1/4"-20
11.	GR1158	1	Lock
12.	*	12	Valve Nut
13.	*	24	Stainless Steel Washer
14.	*	1	Disk
15.	*	12	Spring
16.	*	12	Valve
17.	GR1162	1	Plunger
18.	GR1543	1	Plug
19.	GR1542	4	Hex Socket Head Screw, 1/4"-20 x 3/4", Stainless Steel
	GR1541	4	Lock Washer, 1/4", Stainless Steel
20.	GR1540	1	Cap
21.	GR1544	1	Needle Assembly W/Seal Kit (Item 22)
22.	GR1545	1	Seal Kit, Includes: (3) O-Rings, (1) Seal, (1) Spring, (1) Stainless Steel Sleeve
23.	GR1535	1	Sleeve
24.	GR1533	1	Body
A.	GA8068	1	Liquid Fertilizer Piston Pump Flow Divider Complete, 12 Outlet (Model 70-12 Or Model L-2190) (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 PISTON PUMP FLOW DIVIDER, 16 ROW SIZE

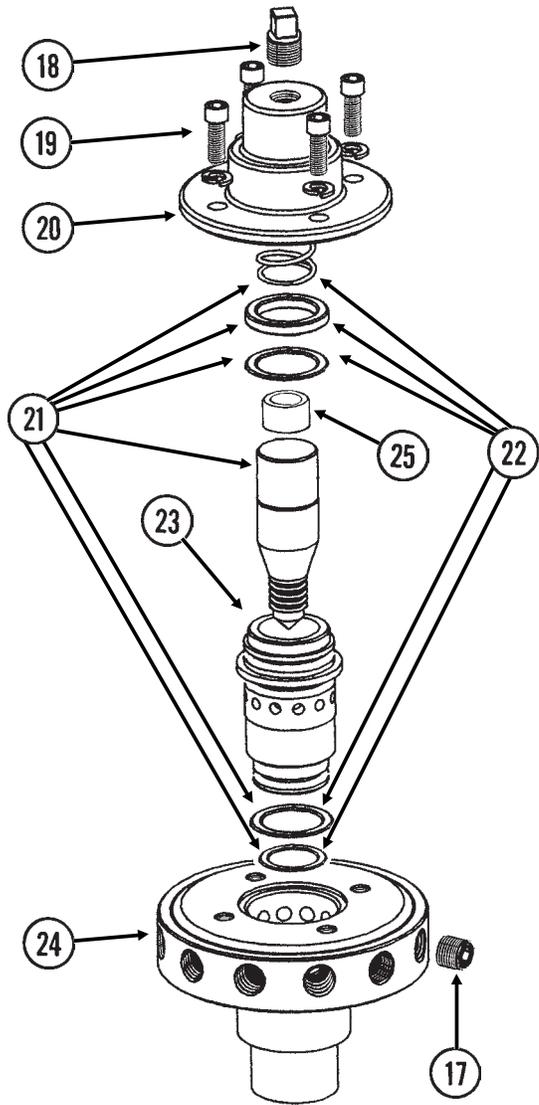
JB-L2190-991(PT40b/FRTZ202d)

Model L-1195 Flow Divider, 16 Outlet



1 1/4" NPT

Model FD-2000 Flow Divider, 20 Outlet



1" NPT

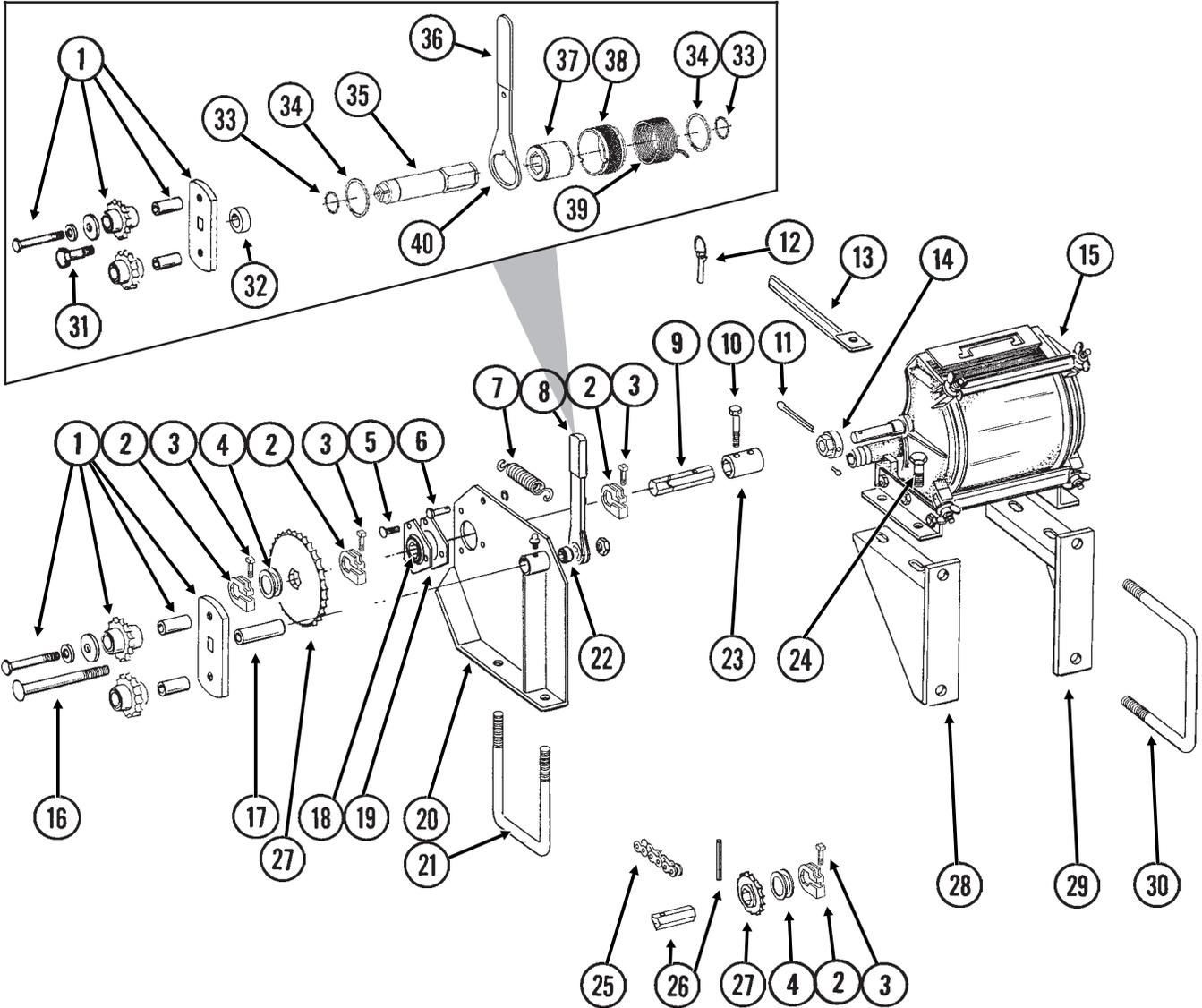
LIQUID FERTILIZER PISTON PUMP FLOW DIVIDER, 16 ROW SIZE

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR1188	1	Cap
2.	GR1189	1	Spring
3.	G10358	1	Hex Nut, 9/16"-18
4.	GR1190	1	Plate
5.	GR1191	1	Diaphragm
6.	GR1192	1	Housing
7.	GR1193	2	Gasket
8.	*	1	Manifold
9.	GR1195	6	Socket Screw, 1/4"
10.		-	See "Liquid Fertilizer Flow Divider Mount And Hoses", Pages P132 And P133
11.	*	1	Disk
12.	*	24	Stainless Steel Washer
13.	*	12	Valve Nut
14.	GR1199	1	Plunger
15.	*	12	Spring
16.	*	12	Valve
17.	G10350	4	Hex Socket Head Plug, 1/4" NPT, Stainless Steel
18.	GR1543	1	Plug
19.	GR1542	4	Hex Socket Head Screw, 1/4"-20 x 3/4", Stainless Steel
	GR1541	4	Lock Washer, 1/4", Stainless Steel
20.	GR1566	1	Cap
21.	GR1567	1	Needle Assembly W/Seal Kit (Item 22)
22.	GR1568	1	Seal Kit, Includes: (3) O-Rings, (1) Seal, (1) Spring
23.	GR1561	1	Sleeve
24.	GR1559	1	Body
25.	GR1574	1	Sleeve, 1" O.D. x 1/2" Long, Stainless Steel
A.	GA6570	1	Liquid Fertilizer Piston Pump Flow Divider Complete, 16 Outlet (Model L-1195) (Sub GA9407 And G10995)
B.	GA9407	1	Liquid Fertilizer Piston Pump Flow Divider Complete, 20 Outlet (Model FD-2000)

* **Factory calibration required on Model L-1195. Replacement not recommended. Always be sure timing marks on disk and manifold line up.**

LIQUID FERTILIZER SQUEEZE PUMP DRIVE

LFC022/LFC029(TWL14h/TWL46b)



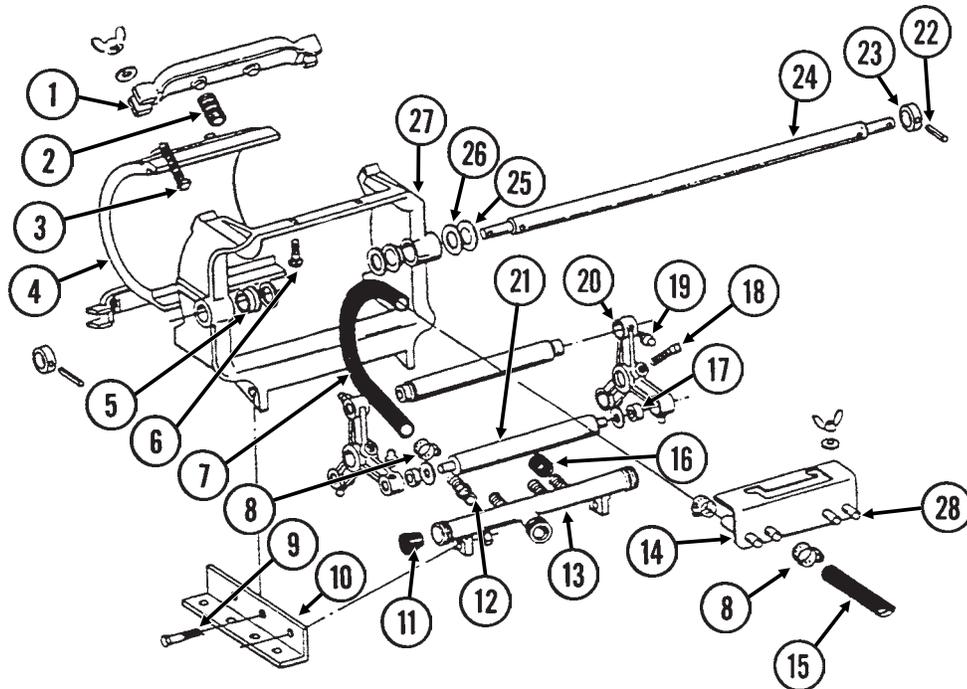
ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Side)	
1.	GA7336	1	Idler W/Bolt-On Sprockets
	GD7426	-	Sprocket, 12 Tooth
	GD1026	-	Sleeve, 1 3/16" Long
	G10210	-	Washer, 3/8" USS
	G10229	-	Lock Washer, 3/8"
	G10047	-	Hex Head Cap Screw, 3/8"-16 x 1 3/4"
2.	GD11045	4	Lock Clamp
3.	G10130	4	Square Head Machine Bolt, 5/16"-18 x 1 3/4"
	G10923	4	Flange Nut, 5/16"-18, No Serration
4.	G10233	-	Machine Bushing, 1", 10 Gauge (As Required)
5.	G10303	3	Carriage Bolt, 5/16"-18 x 1"
	G10219	3	Washer, 5/16" USS
	G10232	3	Lock Washer, 5/16"
	G10106	3	Hex Nut, 5/16"-18
6.	G10478	1	Clevis Pin, 5/16" x 1"
	G10409	1	Retaining Ring, 5/16"
7.	GD5857	1	Spring
8.	GA4235	1	Ratchet Arm W/Protective Closure
	G10445	-	Protective Closure

LIQUID FERTILIZER SQUEEZE PUMP DRIVE

ITEM	PART NO.	QTY.	DESCRIPTION
		(Per Side)	
9.	GD2548-48	1	Hex Shaft, 7/8" x 48" (1 Hole), 8 Row
	GD2548-54	-	Hex Shaft, 7/8" x 54" (1 Hole), 12/16 Row
10.	G10339	1	Hex Head Cap Screw, 5/16"-18 x 2"
	G10232	1	Lock Washer, 5/16"
	G10106	1	Hex Nut, 5/16"-18
11.	G10462	1	Cotter Pin, 3/16" x 2"
12.	GD2558	1	Lynch Pin, 1/4"
13.	GA5229	1	Sprocket Storage Rod
14.	GD7127	1	Shear Coupler
15.		-	See "Liquid Fertilizer Squeeze Pump", Pages P148-P151
16.	G10865	1	Carriage Bolt, 1/2"-13 x 4"
	G10111	1	Lock Nut, 1/2"-13
17.	GD3180-04	1	Sleeve, 5/8" I.D. x 7/8" O.D. x 2 1/8" Long
18.	G2100-03	1	Bearing, 7/8" Hex Bore, Spherical
19.	G3400-01	2	Flangette
20.	GA4617	1	Drive Plate W/Grease Fitting
	GA4618	-	Drive Plate W/Grease Fitting (Shown)
	G10640	-	Grease Fitting, 1/4"-28
21.	GD1134	1	U-Bolt, 7" x 5" x 5/8"-11
	G10230	2	Lock Washer, 5/8"
	G10104	2	Hex Nut, 5/8"-11
22.	GD10161	1	Spacer, 3/8"
23.	GD6924	1	Coupler
24.	G10004	4	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10210	4	Washer, 3/8" USS
	G10229	4	Lock Washer, 3/8"
	G10101	4	Hex Nut, 3/8"-16
25.	G3310-170	1	Chain, No. 40, 170 Pitch Including Connector Link
	GR0912	-	Connector Link, No. 40
26.		-	See "Transmission And Row Unit Drill Shafts", Pages P58 And P59
27.	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)
28.	GA4619	1	Pump Mount, L.H.
29.	GA4620	1	Pump Mount, R.H.
30.	GD1113	2	U-Bolt, 5" x 7" x 5/8"-11
	G10230	4	Lock Washer, 5/8"
	G10104	4	Hex Nut, 5/8"-11
31.	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
32.	GD2734-08	1	Sleeve, 1 1/4" O.D. x 5/8" Long
33.	G11075	2	Internal Inverted Snap Ring, 7/8"
34.	G10496	2	External Inverted Snap Ring, 1 1/2"
35.	GD14427	1	Tightener Shaft, 4 7/8"
36.	G11078	1	Vinyl Cap
37.	GD14432	1	Sleeve, 1 1/4"
38.	GD14429	-	Release Collar, Silver, L.H. (Shown)
	GD14430	1	Release Collar, Gold, R.H.
39.	GD14414	1	Torsion Spring, R.H. (Used On L.H. Wrap Spring Wrench) (Shown)
	GD14413	-	Torsion Spring, L.H. (Used On R.H. Wrap Spring Wrench)
40.	GD14431	1	Handle
A.	G1K269	-	Lock Clamp Kit (Items 2 And 3)
B.	G1K379	-	Wrap Spring Wrench Replacement Kit, Silver Collar, L.H. (Items 31-40) (Shown)
	G1K378	1	Wrap Spring Wrench Replacement Kit, Gold Collar, R.H. (Items 31-40)

LIQUID FERTILIZER SQUEEZE PUMP, 8 ROW SIZES

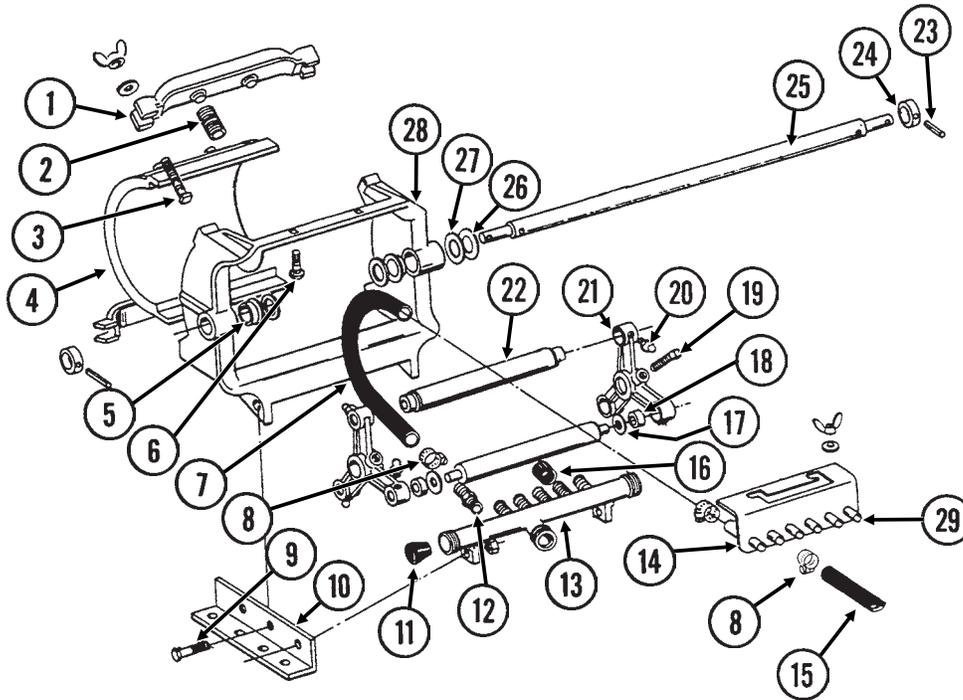
LFC011(PT46a)



ITEM	PART NO.	QTY.	DESCRIPTION
1.	GR0216	2	Spring Anchor Bar
2.	GR0214	4	Spring
3.	G10130	4	Square Head Machine Bolt, $\frac{5}{16}$ "-18 x 1 $\frac{3}{4}$ "
	G10219	4	Washer, $\frac{5}{16}$ " USS
	G10144	4	Wing Nut, $\frac{5}{16}$ "-18
4.	GR0212	1	Plate
5.	GR0207	2	Nylon Bushing
6.	G10303	2	Carriage Bolt, $\frac{5}{16}$ "-18 x 1"
	G10219	2	Washer, $\frac{5}{16}$ " USS
	G10144	2	Wing Nut, $\frac{5}{16}$ "-18
7.	GR0215	4	Metering Hose, $\frac{1}{2}$ " x 13"
8.	G10681	-	Hose Clamp, No. 6
9.	G10004	4	Hex Head Cap Screw, $\frac{3}{8}$ "-16 x 1 $\frac{1}{4}$ "
	G10101	4	Hex Nut, $\frac{3}{8}$ "-16
10.	GR0213	2	Angle
11.	GR0217	2	Manifold Plug
12.	GR0232	4	Adapter
13.	GR0228	1	Intake Manifold
14.	GR1484	1	Discharge Manifold Less Hose Barbs
15.	G4301-05	1	Hose, $\frac{3}{8}$ " x 120'
16.	GR0211	-	Rubber Cap
17.	GR0227	6	Nylon Washer
18.	G10131	2	Square Head Set Screw, $\frac{5}{16}$ "-18 x $\frac{3}{4}$ "
19.	G10640	2	Grease Fitting, $\frac{1}{4}$ "-28
20.	GR0223	2	Roller Arm
21.	GR0209	3	Roller
22.	G10718	2	Spring Pin, $\frac{5}{16}$ " x 1 $\frac{1}{8}$ "
23.	GD9109	2	Sleeve
24.	GD9107	1	Shaft
25.	GR0226	2	Shim, $\frac{3}{64}$ "
26.	GR0225	2	Shim, $\frac{1}{32}$ "
27.	GR0208	1	Frame
28.	GR1577	4	Nylon Hose Barb, $\frac{1}{2}$ " x $\frac{3}{8}$ " (If Applicable)
A.	GA8690	2	Squeeze Pump Complete, 4 Rows (Items 1-14, 16-21 And 24-28)

LIQUID FERTILIZER SQUEEZE PUMP, 12 ROW SIZES

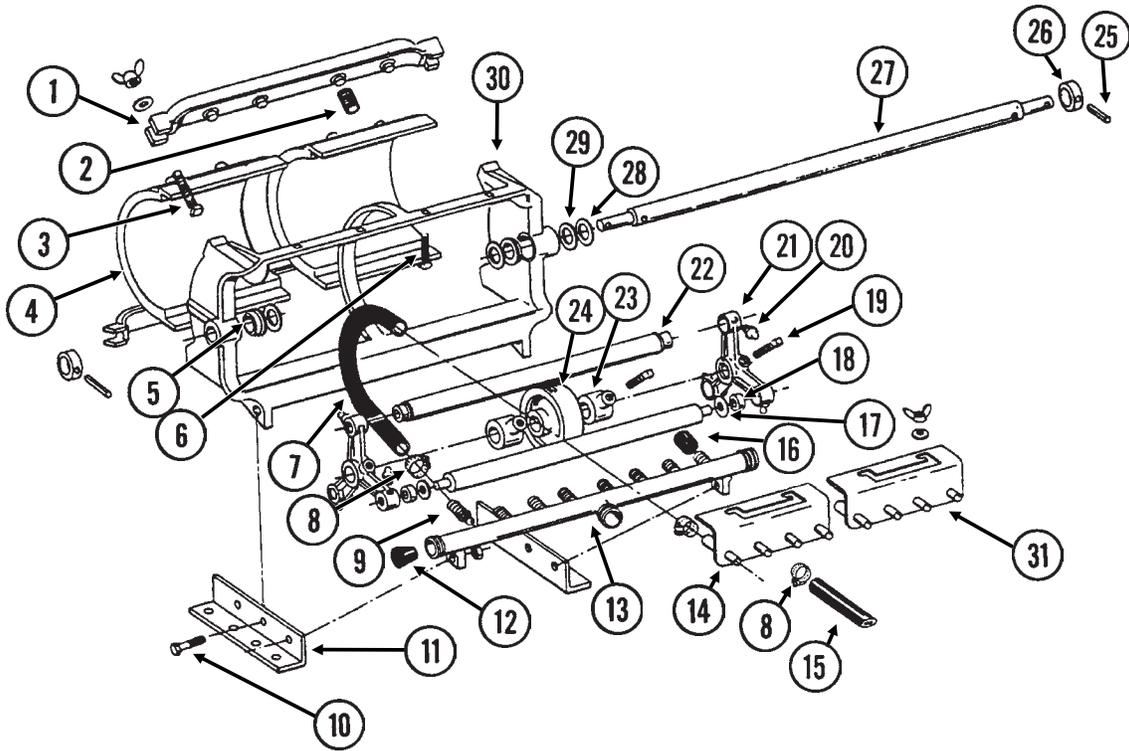
LFC011/LFC011(PT47a)



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.	G4301-06	1	Hose, $\frac{3}{8}$ " x 160', 12 Row 30"
	G4301-05	2	Hose, $\frac{3}{8}$ " x 120', 12 Row 36"/38"
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	2	Squeeze Pump Complete, 6 Rows (Items 1-13, 15-22 And 25-29)

LIQUID FERTILIZER SQUEEZE PUMP, 16 ROW SIZE

LFC010(PT48a)

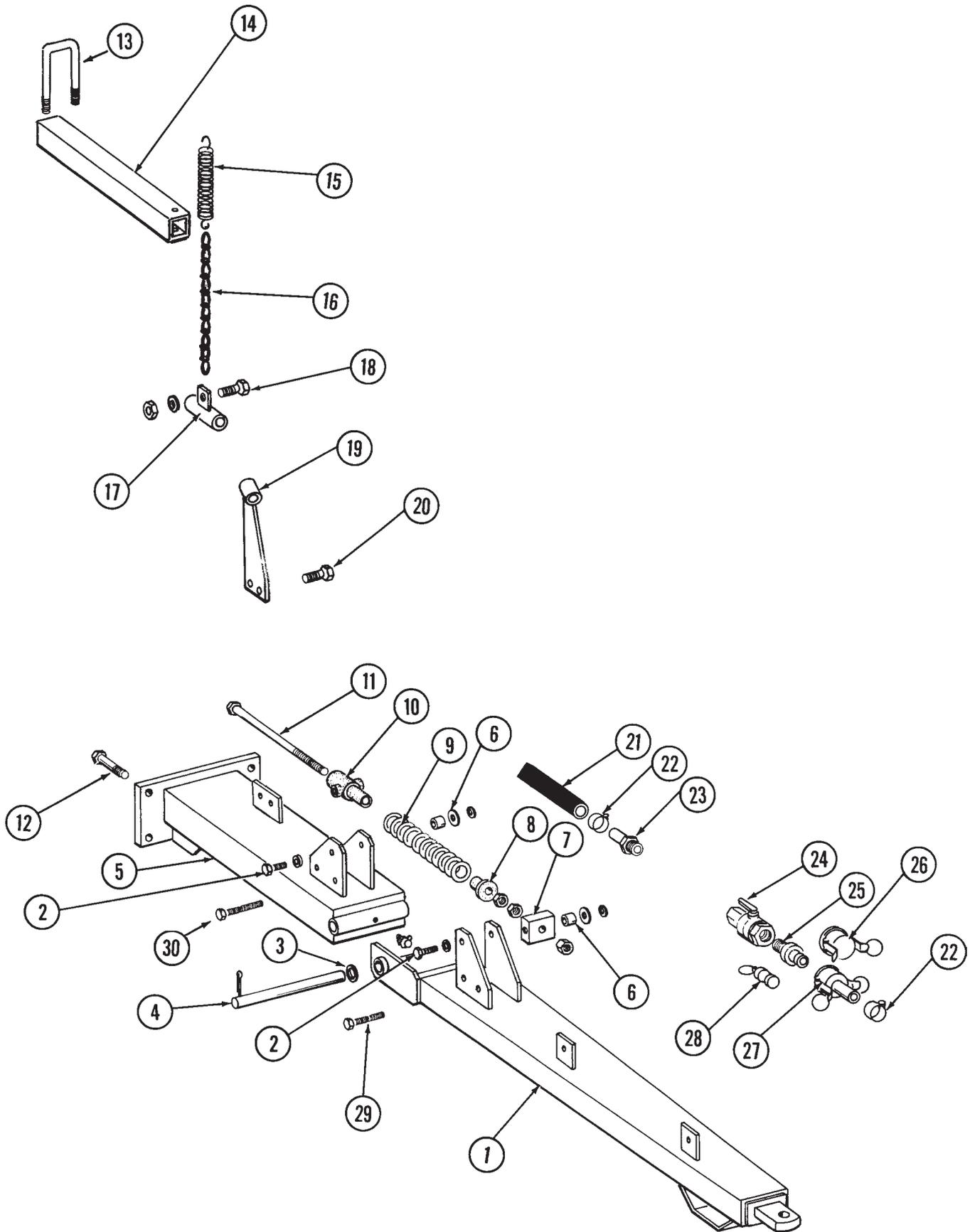


LIQUID FERTILIZER SQUEEZE PUMP, 16 ROW SIZE

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.	G4301-05	1	Hose, $\frac{3}{8}$ " x 120'
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	2	Squeeze Pump Complete, 8 Rows (Items 1-14, 16-24 And 27-31)

REAR TRAILER HITCH

PHA032/LFC003(TWL47a)



REAR TRAILER HITCH

ITEM	PART NO.	QTY.	DESCRIPTION
1.	GA6961	1	Hitch
2.	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"
3.	G10226	2	Washer, 1 1/4" SAE
4.	GD3547	1	Pin, 1 1/4" x 12 3/4"
	G10460	2	Cotter Pin, 1/4" x 2"
5.	GA6960	1	Hitch
6.	GB0218	4	Bushing, 21/32" I.D. x 7/8" O.D. x 19/32" Long
7.	GD7908	1	Tap Block
8.	GB0213	1	Spring Seat
9.	GD2115	1	Spring
10.	GB0206	1	Rod Guide
11.	GD7907	1	Special Bolt
	G10105	3	Hex Nut, 3/4"-10
12.	G10826	5	Hex Head Cap Screw, 1"-8 x 2 1/2"
	G10396	5	Lock Nut, 1"-8
13.	GD2721	2	U-Bolt, 2" x 2" x 1/2"-13
	G10228	4	Lock Washer, 1/2"
	G10102	4	Hex Nut, 1/2"-13
14.	GD10196	-	Hanger Tube
15.	GD0829	-	Spring
16.	G3305-03	-	Twin Loop Chain, 15 Links
17.	GA7209	-	Hose Support
18.	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
19.	GA7208	-	Hose Support
20.	G10004	2	Hex Head Cap Screw, 3/8"-16 x 1 1/4"
	G10108	2	Lock Nut, 3/8"-16
21.	G4200-01	1	Hose, 1 1/4" x 22'
22.	G10672	6	Hose Clamp, No. 28
23.	G10626	1	Adapter, 1 1/4" NPT To Barb
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.	GD1514	1	Adapter, 1 1/4" Male NPT To Cam Lock
26.	GD1515	1	Dust Cap, 1 1/4" Cam Lock
27.	GD1516	1	Adapter, 1 1/4" Barb To Female Cam Lock
28.	GD1517	1	Dust Plug, 1 1/4" Male Cam Lock
29.	G10172	1	Hex Head Cap Screw, 3/8"-16 x 5"
	G10229	1	Lock Washer, 3/8"
	G10101	1	Hex Nut, 3/8"-16
30.	G10756	1	Hex Head Cap Screw, 3/8"-16 x 6"
	G10229	1	Lock Washer, 3/8"
	G10101	1	Hex Nut, 3/8"-16

DECALS, PAINT AND MISCELLANEOUS



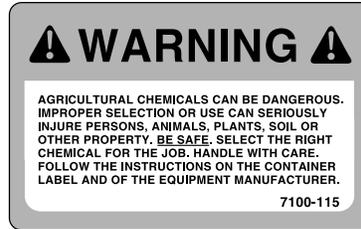
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2



3



4



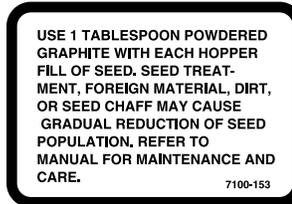
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6



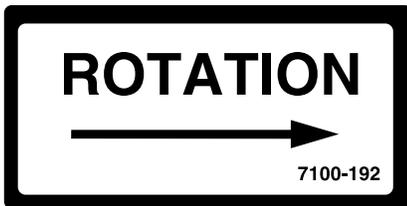
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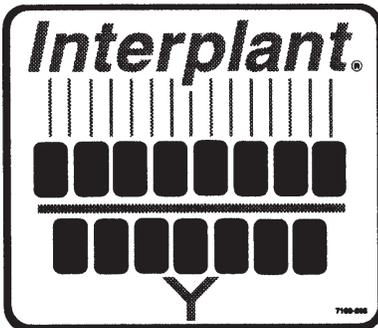
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11



12



13

TRANSMISSION RATE REDUCTION

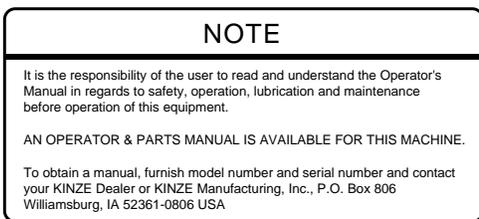
DRIVE	DRIVEN	% REDUCTION IN POPULATION
15	30	50
17	30	43
23*	30	23
24	30	20
25*	30	17
26*	30	13
27	30	10

* Use sprockets off seed drive transmission

14



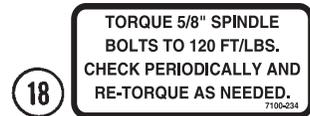
15



16



17



18

KINZE 3600

19



20

DECALS, PAINT AND MISCELLANEOUS

IMPORTANT
SEED METER ALIGNMENT TO DRIVE CLUTCH IS CRITICAL. REFER TO OPERATOR'S MANUAL FOR INSTRUCTIONS.

7100-248

21

CAUTION

SET DOWN PRESSURE SPRINGS TO MINIMUM. LOWER PLANTER TO GROUND AND EMPTY SEED HOPPERS. REQUIRES 90 LB MIN TO LIFT.

7100-249

22

WARNING

TO AVOID INJURY -- STAND CLEAR--KEEP OTHERS AWAY WHEN RAISING OR LOWERING MARKERS. BEFORE TRANSPORTING PLANTER FULLY EXTEND HYDRAULIC CYLINDERS AND INSTALL LOCKING PINS WHERE PROVIDED.

7100-42

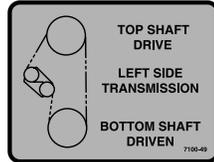
23

WARNING

1. Read and understand the Operator's Manual.
2. Stop the tractor engine before leaving the operator's platform.
3. Keep riders off the machine.
4. Make certain everyone is clear of the machine before starting the tractor engine and operating.
5. Keep all shields in place.
6. Never lubricate, adjust, unclog or service the machine with tractor engine running.
7. Wait for all movement to stop before servicing.
8. Keep hands, feet and clothing away from moving parts.
9. Use flashing warning lights when operating on highways except when prohibited by law.

7100-46

24



25

WARNING

USE SAFETY CHAINS PROVIDED. TOW ONLY WITH FARM TRACTOR.

7100-302

26

CAUTION

REAR OF PLANTER SWINGS WIDE IN TURNS. ALWAYS ALLOW SUFFICIENT ROOM TO CLEAR OBSTACLES WHEN TURNING.

7100-63

27

WARNING

NEVER WALK UNDER OR WORK ON PLANTER WHEN IT IS RAISED WITHOUT SUPPORTING THE FRAMES WITH ADDITIONAL SUPPORTS.

7100-68

28

CAUTION

AVOID UNEVEN LOADING OF HOPPERS, ESPECIALLY DURING TRANSPORT

7100-75

29

WARNING

TO AVOID INJURY ALWAYS USE HYDRAULIC CYLINDER SAFETY LOCKOUT CHANNELS WHEN TRANSPORTING PLANTER ON THE ROAD. AFTER USE RETURN TO STORAGE LOCATION.

7100-83

30

DANGER

THIS PLANTER IS DESIGNED TO BE DRIVEN BY GROUND TIRES ONLY. THE USE OF HYDRAULIC, ELECTRIC OR PTO DRIVES MAY CREATE SERIOUS SAFETY HAZARDS TO YOU AND THE PEOPLE NEARBY. IF YOU INSTALL SUCH DRIVES YOU MUST FOLLOW ALL APPROPRIATE SAFETY STANDARDS AND PRACTICES TO PROTECT YOU AND OTHERS NEAR THIS PLANTER FROM INJURY.

7100-89

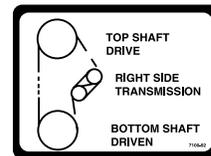
31

WARNING

THIS MACHINE HAS BEEN DESIGNED AND BUILT WITH YOUR SAFETY IN MIND. DO NOT MAKE ANY ALTERATIONS OR CHANGES TO THIS MACHINE. ANY ALTERATION TO THE DESIGN OR CONSTRUCTION MAY CREATE SAFETY HAZARDS.

7100-90

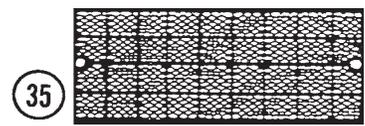
32



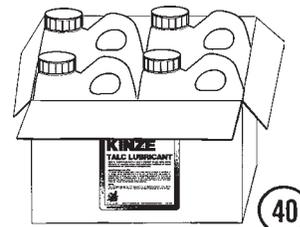
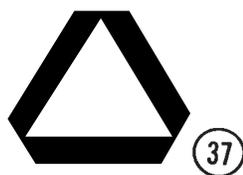
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36



ROTATE KNURLED COLLAR ON WRAP SPRING TIGHTENER TO RELEASE SPRING TENSION

7100-295

44

DECALS, PAINT AND MISCELLANEOUS

ITEM	PART NO.	QTY.	DESCRIPTION
1.	G7100-02	3	Decal, Warning
2.	G7100-110	-	Decal, Grease Weekly
3.	G7100-111	-	Decal, Oil Daily
4.	G7100-115	-	Decal, Warning (1 Per Granular Chemical Hopper)
5.	G7100-116	-	Decal, Grease Daily
6.	G7100-117	1	Decal, Danger
7.	G7100-123	1	Decal, Attention
8.	G7100-153	-	Decal, Information (1 Per Brush-Type Seed Meter)
9.	G7100-177	1	Decal, Twin-Line®, 3/4" x 3"
10.	G7100-192	-	Decal, Point Row Clutch Rotation
11.	G7100-200	-	Decal, Warning
12.	G7100-201	1	Decal, Information
13.	G7100-208	-	Decal, Interplant®
14.	G7100-214	-	Decal, Two-Speed Point Row Clutch Rate Reduction
15.	G7100-215	1	Decal, Danger
16.	G7100-217	-	Decal, Note
17.	G7100-219	-	Decal, Warning
18.	G7100-234	-	Decal, Bolt Torque
19.	G7100-245	2	Decal, KINZE® 3600
20.	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)
21.	G7100-248	-	Decal, Meter Alignment (1 Per Row Unit)
22.	G7100-249	-	Decal, Caution
23.	G7100-42	4	Decal, Warning
24.	G7100-46	1	Decal, Warning
25.	G7100-49	1	Decal, Left Side Transmission
26.	G7100-302	1	Decal, Warning
27.	G7100-63	2	Decal, Caution
28.	G7100-68	3	Decal, Warning
29.	G7100-75	4	Decal, Caution
30.	G7100-83	2	Decal, Warning (1 Per Marker Lockup)
31.	G7100-89	2	Decal, Danger
32.	G7100-90	1	Decal, Warning
33.	G7100-92	1	Decal, Right Side Transmission
34.	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
35.	G7200-03	-	Reflector, Red
	G7200-04	-	Reflector, Amber
36.	GD1512	-	Tie Strap, 7 1/2"
	GD2117	-	Tie Strap, 14 1/2"
	GD1162	-	Tie Strap, 28"
	GD2984	-	Tie Strap, 34"
37.	GD2199	1	SMV Sign
38.	GR0146	-	Powdered Graphite, 1 Pound Container
	GR0146MPP	-	Powdered Graphite, Twenty-Four 1 Pound Containers
39.	GR0155	-	Blue Paint, Aerosol Can
	GR0155MPP	-	Blue Paint, Twelve Aerosol Cans
40.	GR1570MPP	-	Talc Lubricant, Four 8 Pound Containers
41.	GM0167	-	Operator & Parts Manual, Model 3600
42.	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)
43.	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)
44.	G7100-295	-	Decal, Spring Tension Release

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