KMC
KELLEY

03-SERIES

2, 4, 6, & 8-ROW PEANUT DIGGER-SHAKER-INVERTER

FOR CHAIN & BELT CONVEYOR MACHINES

(USED ON MACHINES PRIOR TO 2015)

OPERATOR'S MANUAL

THIS MANUAL TO ACCOMPANY MACHINE

MEMBER
FEMA
FARM EQUIPMENT MANUFACTURERS ASSOCIATION
www.FarmEquip.org

PART NO. 03-OM-01
PRINTING DATE: MAY 2014

WARRANTY POLICY

KELLEY MANUFACTURING COMPANY (KMC) warrants that all goods sold to the original purchaser of any KMC product shall be free of any defects in material and workmanship if used under normal operating conditions. The warranty period begins on the date of purchase by the retail customer and ends twelve (12) months thereafter. KMC's sole responsibility is to repair and/or replace the defective part or parts at no cost to purchaser. This remedy is the **SOLE AND EXCLUSIVE REMEDY** of purchaser.

The purchaser must fill out and return the warranty registration form found in the front of the operator's manual. Failure to return the warranty registration form within 30 days shall result in the goods being sold "AS IS", and all warranties shall be excluded.

This warranty shall not apply to those items that are by nature worn in normal service, including but not limited to belts, springs, teeth, chains, etc. Items such as tires, tubes, and gearboxes and all other items warranted by the original manufacturer are warranted only to the extent of their individual manufacturer warranty, and KMC is not warranting any of said items. All warranty claims must be made through a KMC licensed dealer, and a warranty form request must be submitted to KMC within 30 days of failure or the warranty provision shall be unenforceable against KMC.

No agent or person has authority to change or add to this warranty as written.

THE ABOVE IS THE ONLY WARRANTY MADE BY KMC AND IS MADE EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. KMC MAKES NO WARRANTY OF MERCHANTABILITY AS TO ANY GOODS MANUFACTURED BY KMC AND FURTHER, KMC DOES NOT WARRANT ANY SUCH GOODS AS SUITABLE FOR ANY PARTICULAR PURPOSE TO THE RETAIL CUSTOMER. THE SUITABILITY OF GOODS FOR ANY PURPOSE PARTICULAR TO THE CUSTOMER IS FOR THE CUSTOMER, IN HIS SOLE JUDGEMENT, TO DETERMINE. KMC FURTHER MAKES NO WARRANTIES WITH RESPECT TO ITS MANUFACTURED GOODS THAT WOULD NORMALLY BE DISCLOSED BY AN EXAMINATION. THIS IS THE FULL AND FINAL EXPRESSION OF ALL WARRANTY LIABILITY OF KMC. NO OTHER WARRANTY, EITHER EXPRESSED OR IMPLIED, SHALL BE ENFORCEABLE AGAINST KMC.

Kelley Manufacturing Co.
80 Vernon Drive / Zip 31794
P.O. Drawer 1467 / Zip 31793
Tifton GA

TO THE PURCHASER

This manual has been prepared to assist you in operating and maintaining your new **KMC DIGGER-SHAKER-INVERTER** and to acquaint you with the man attachments available. Please read it thoroughly and keep it handy for reference each season. Record your machine's Model Number, Serial Number and Purchase Date for reference in procuring repair parts and accessories over the years. A Table of Contents is also provided for quick reference to these sections.

Some components of this machine are labeled left or right. The notations are determined facing the direction the

This safety alert symbol is used throughout this manual to identify safety messages. When you see this symbol, read the message which follows as it will advise you of possible injury.

Model No._____

Serial No._____

Purchase Date _____

TO THE DEALER

Please refer to this manual for pre-delivery assembly. A review of the operation and maintenance sections with your customer may eliminate needless service calls during the first few days of operation.

Left and right hand parts are determined by standing behind the machine facing the direction of travel. When ordering parts or accessories, please give the part name and part number.

SAFETY PROCEDURES

Safety and performance are the primary objectives of the designers of KMC equipment. Safety features have been incorporated into this machine where possible and warnings given in other areas. For your safety, please read and observe the following safety procedures.

1. Do not permit any one to ride on the machine.
2. Keep all persons a safe distance away from the rear and sides of the machine while it is in operation.
3. Drive safely during transport; excessive speeds while turning on rough grounds or over hills could cause tractor to tip over.
4. Make sure hitch components are attached securely before operating or transporting.
5. Be sure reflectors are located properly.
6. Use flashing warning lights when operating on highways except where prohibited by law.
7. Stop engine before leaving operator's position to adjust, lubricate, clean or unclog machine.

BEING SAFETY CONSCIOUS IS GOOD BUSINESS

2-ROW MACHINE

4-ROW MACHINE

6-ROW MACHINE

8-ROW TENTING MACHINE

TABLE OF CONTENTS

ASSEMBLY INSTRUCTIONS

TWO ROW SHAKER INVERTER WITH:

540 rpm Gear Box and Drive Line
8 x 8 Gauge Wheels
Spring Loaded Coulter
Three Wheel Dirt Knocker
26" Rodded Blades

OPTIONAL FOR TWO ROW:

8 x 10 High Flotation Gauge Wheel
1000 RPM Gear Box and Drive Line
30" Rodded Blades

MOUNTING REFLECTORS

Figure 1

Lights are mounted to the shield at the manufacturer on 2-row models. A slow moving vehicle identification emblem is mounted to the machines also.

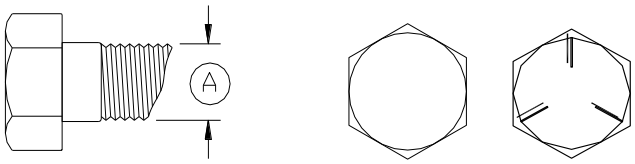
CAUTION: MOUNT REFLECTORS ON LEFT AND RIGHT SIDE OF IMPLEMENT VISIBLE TO TRAFFIC BOTH WAYS WITH YELLOW TO LEFT FRONT AND RED TO LEFT AND RIGHT REAR.

On 2-Row machines a bolt and spacer are provided for Center Mast, for a Cat III Quick Hitch. If you are not going to be using the Quick Hitch, remove the bolt and spacer when attaching in upper mast position.

IF YOU DO NOT REMOVE THIS BOLT AND SPACER, DAMAGE TO TOP LINK MAY OCCUR.

TORQUE CHART

Bolt Torque Ft. Pounds



BOLT DIAMETER "A"	GRD 2	GRD 5
1/4"	6	10
5/16"	13	20
3/8"	23	35
7/16"	35	55
1/2"	55	85
9/16"	75	130
5/8"	105	170
3/4"	185	300
7/8"	160	445

MOUNTING THE DRIVELINE

Connect machine to a 3-point hitch on a tractor. Then mount the 540 RPM shielded driveline.

NOTE: AN OPTIONAL 1000 RPM SHIELDED DRIVELINE AND GEAR BOX CAN BE USED ON A 2-ROW UPON RE QUEST.

CAUTION: CHECK AND FILL GEAR BOX TO LEVEL PLUG WITH GEAR LUBE KMC NO. (03-081-086) (80W90 WEIGHT LUBE) BEFORE OPERATING MACHINE, IF REQUIRED.

MOUNTING BLADES AND CUT RODS
(2-ROW)

First mount the blade to the cut frog which has already been assembled to the plow standard. Connect the blade to the frog with the 3/8" x 1 1/2" grd "8"plow bolt and flange hex nut. Left and right blades are assembled the same way. Next, mount the cut rods to the blade using the 3/8" x 1 1/4" reg plow bolt, washer, and flange hex nut.

CAUTION: PEANUT BLADES HAVE A SHARP EDGE WHICH CAN CAUSE SERIOUS INJURY. USE GLOVES AND HANDLE WITH CARE WHEN CHANGING OR ADJUSTING BLADES.

HINGED FENDER & VINE GUIDE ROD PATTERN
(2-ROW)

While mounting the cylinder inverter the vine guide rods can get bent out of shape. Reshape the rods to conform with the recommended vine guide rod pattern as shown in figure 3.

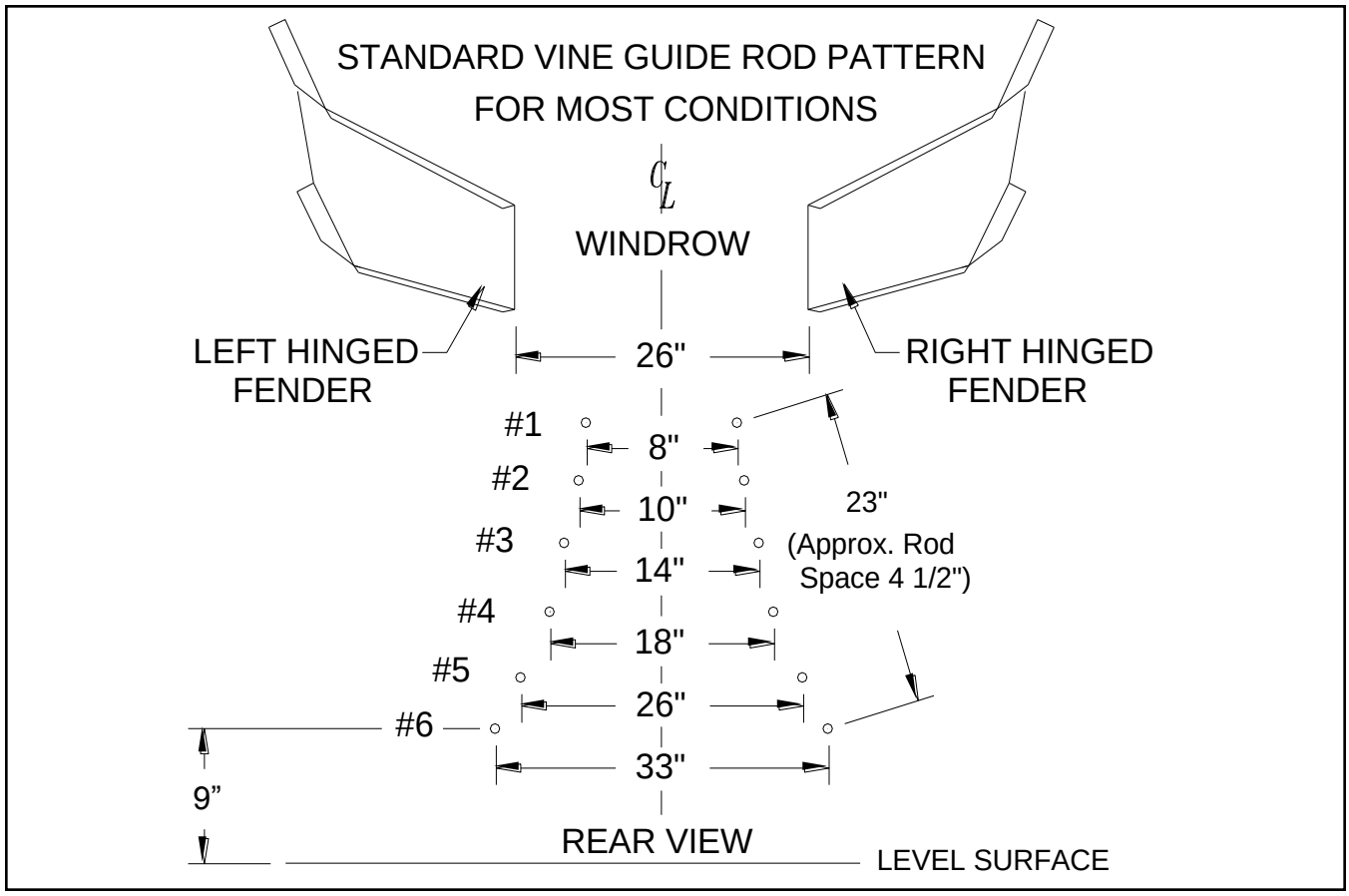


Figure 3 (For 2-Row 36" -40" Rows)

2-ROW MACHINE

On 2-row machines center the vine guide rod pattern on centerline of rattler frame as shown in figure 3.

TESTING THE MACHINE

Start tractor at low speed and check for any binding or excessive strain on moving parts. Operate at tractor PTO speed for 15 minutes, recheck for any parts that are too tight (hot), or too loose, and make necessary adjustment.

ASSEMBLY CHECK POINTS

1. Check gear box for oil
2. Check tension of drive belts for rattler and inverters.
3. Check rattler chain tension.
4. Check blade flatness (refer to page 19).
5. Check vine guide rod pattern (refer to figure 3)
6. Check center coulter, lower spring collars to have 2 1/2" of rod remaining.
7. Check driveline for bottoming out and shield disengagement in raised and working positions. See page 18 for corrective instructions.

4, 6, & 8-ROW SHAKER INVERTER

4, 6, & 8-ROW DIGGER-SHAKER-INVERTER WITH:

1000 RPM Gear Box
1000 RPM Driveline 1 3/8-21 (4-Row)
1000 RPM Driveline 1 3/4-20 (6 & 8-Row)
8 x 10 Gauge Wheel
Center Spring Loaded Coulter
Three Wheel Dirt Knocker (chain models)
Two Wheel Dirt Knocker (belt models)
26" Rodded Blades

OPTIONAL FOR 4, & 6-ROW:

30" Rodded Blades
1000 RPM Drivelines 1 3/4-20 (4-Row)
1000 RPM Drivelines 1 3/8-21 (6-Row)

On 4-row machines a bolt and spacer are provided for Cat III Quick Hitch . If you are not going to be using the Quick Hitch, remove the bolt and spacer when attaching in Upper Mast position.

IF YOU DO NOT REMOVE THIS BOLT AND SPACER, DAMAGE TO TOP LINK MAY OCCUR.

MOUNTING INVERTERS

First, mount center inverter by sliding the center inverter support onto the machine frame until it is up against the stop. Hold center drum in position with the aid of blocks and a hydraulic jack from the bottom. Remove the 1/2 x 5 1/2 Grd. "5" capscrew from the center drum.

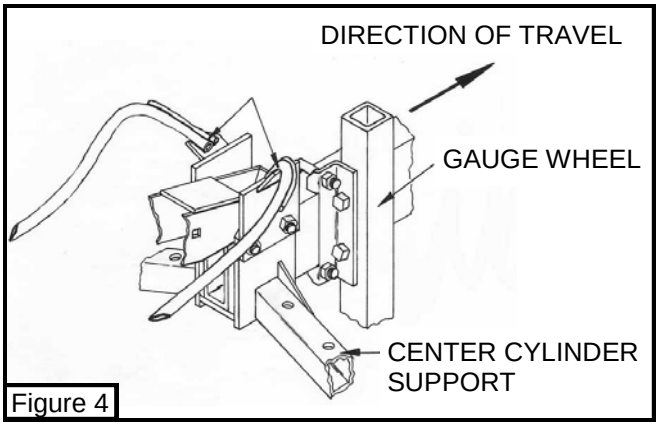


Figure 4

CAUTION: PLEASE BE CAREFUL; DO NOT ALLOW DRUM TO FALL WHICH COULD RESULT IN INJURY TO SETUP PERSONNEL.

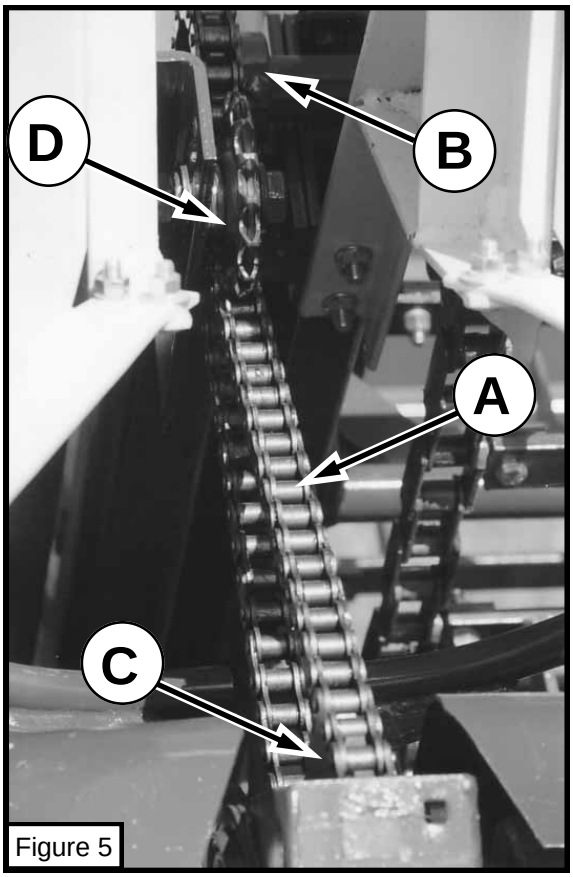


Figure 5

Place 1/2" X 5 1/2" Capscrew thru Lt. Center #1 Rod. Then run bolt thru center drum frame and over 2 x 5 tube. Place Rt. Center #1 Rod on nut side of capscrew. (See Figure 4.) Attach with 1/2 flange hex nuts. Position center drum, Lt. and Rt. Center #1 Rods correctly. Tighten 1/2 x 5 1/2 capscrews securing center drum and Center #1 Rods. Then place chain (A) around the top sprocket (B) and the center inverter drive (C). If sprockets are out of line, loosen the top sprocket (B) and align sprockets and retighten. After sprockets are aligned push the idler sprocket (D) against the chain (A) to take up the slack in the chain and tighten the idler sprocket (D). (Refer to Figure 5).

Next, mount the left and right inverters by sliding the inverter bundle on the outside frame of the machine until it is up against the stop. Then, place cylinder inverter drive belt (**A**) around the inverter sheave (**B**) make sure belt is under idler (**C**) as shown in Figure 6. If the belt is loose adjust idler with the idler push bolt (**D**).

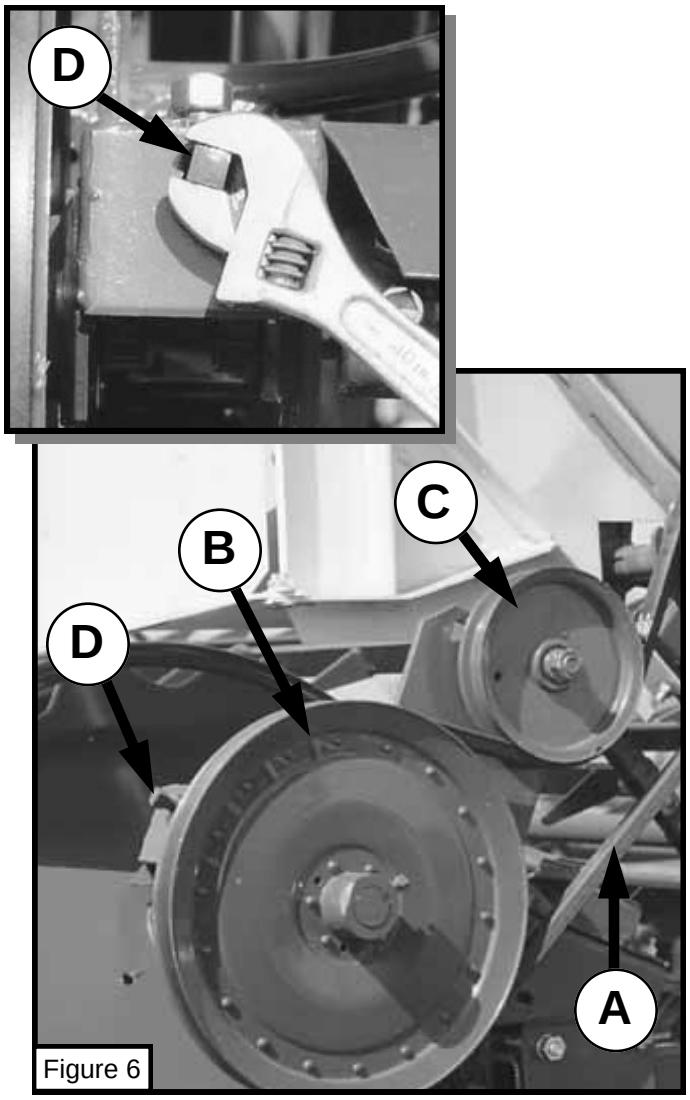


Figure 6

Next, mount the #1 rods (**A**) for the left and right inverter using 1/2" x 1" carriage bolt, lockwasher, and hex nut (**B**) in the top single hole, and the 3/8" x 1" carriage bolt, flange hex nut (**C**) in two front holes as shown in Figure 7. Refer to Pages 12 thru 14 for vine guide rod adjustment pattern.

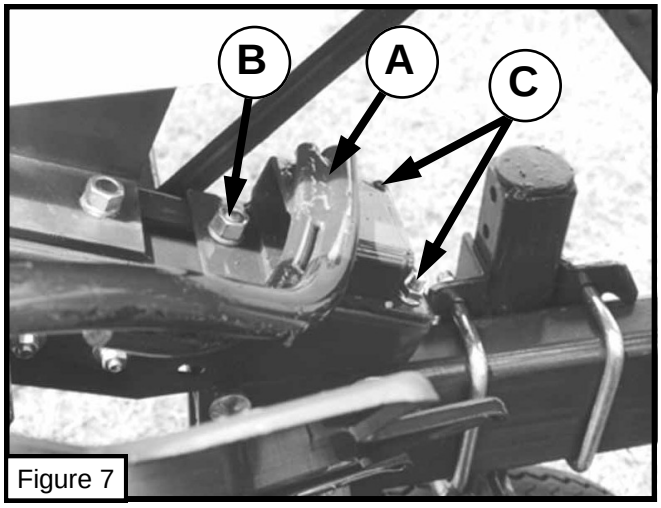


Figure 7

VINE GUIDE ROD MOUNTING INSTRUCTIONS

On 4, 6, & 8-row machines the vine guide rods (2 thru 6) are wired to the basic unit. Each rod is stamped on the mounting bracket 2L or 2R, 3L or 3R, 4L or 4R, 5L or 5R, 6L or 6R. Number 2 rods mount at the top of the inverter mounting tube and number 6 rods mount at the lower portion of the inverter mounting tube. See Pages 12 thru 14 for rod profile locations. Lt. and Rt. is determined from the rear of the machine. The mounting hardware is provided in the inverter mounting tube. Attach each rod in the correct location centering the vine rod between the inverter disc. Fine tune rod adjustment per vine guide pattern profiles on pages 12 thru 14.

REAR INVERTER FENDERS

Figure 8

Mount the cylinder inverter hinged fender bundle (**A**) to the cylinder inverter fender (**B**) using 5/16 x 1 3/4 carriage bolt, flatwasher, lockwasher and hex nut. (Refer to Figure 8.)

MOUNTING SHIELDS

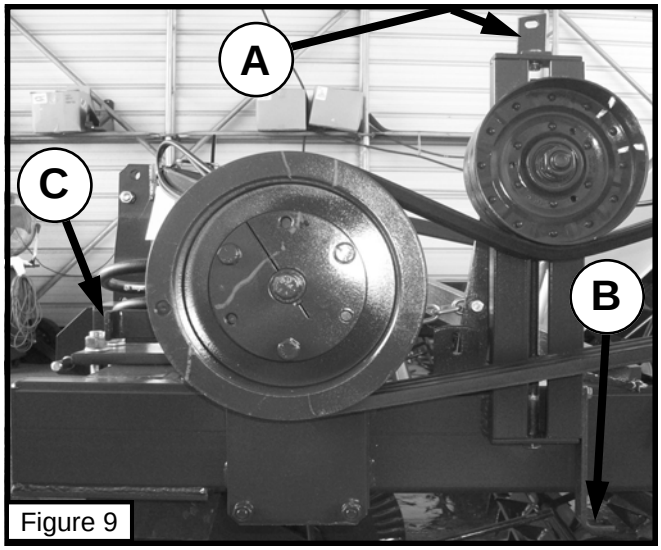


Figure 9

LEFT AND RIGHT FRONT SHIELD

Mount left and right front shield on to the front of the machine which covers the front sheaves and belt idler. Use the 5/16 x 3/4 carriage bolt, and flange hex nut to bolt shields to supports and supports to machine as shown in Figure 9.

A - Top Front Support **B** - Lower Support
C - Front Support

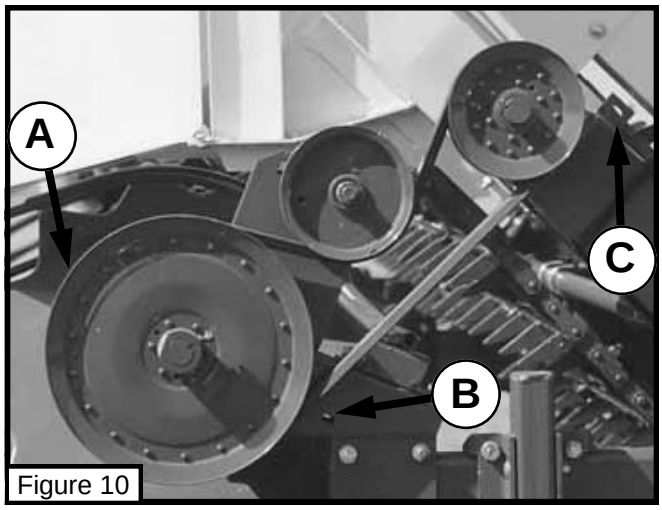


Figure 10

A - Rear Support
B - Left Shield Brace
C - 4-Row Shield Leg

LEFT AND RIGHT REAR SHIELD

Mount left and right rear shield on to the rear of the machine which cover the sheaves and the 1" x 5 1/2" idler. Use 5/16" x 3/4" carriage bolt, and flange hex nut to bolt supports on to the machine and shields to supports, as shown in Figure 10.

CENTER SHIELD

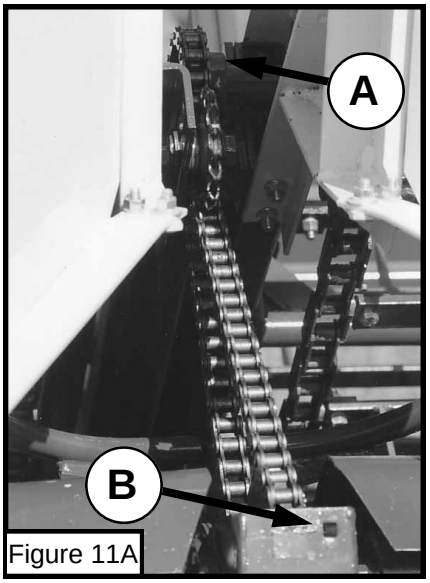


Figure 11A

Use 5/16 x 3/4 carriage bolt and flange hex nut, to mount the support to the shield. The top shield bolts to a bracket which is located behind the drive sprocket (**A**) and the rear support bolts to the inverter support (**B**). (Refer to Figure 11A)

INVERTER CONNECTOR STRAP (FOR 4-40, 6-40, & 8-40 MACHINES)

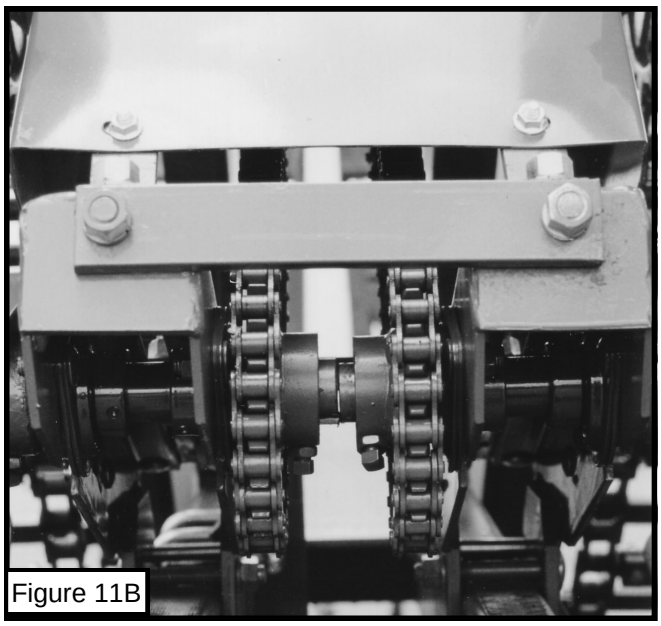
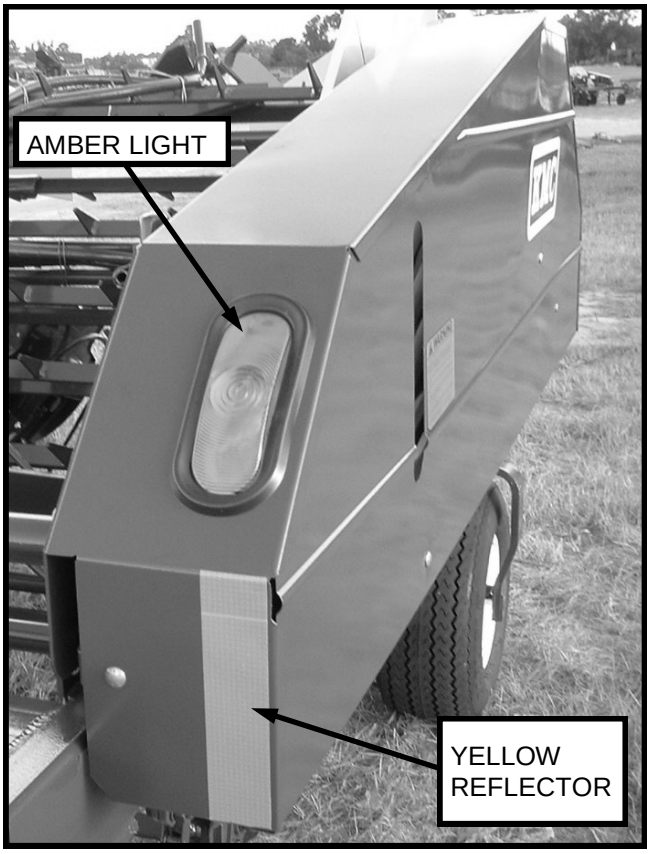


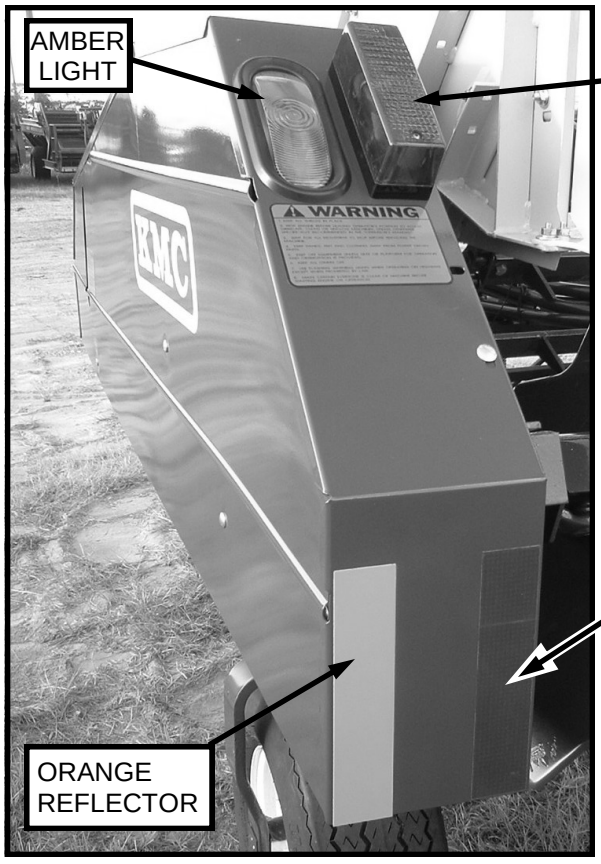
Figure 11B

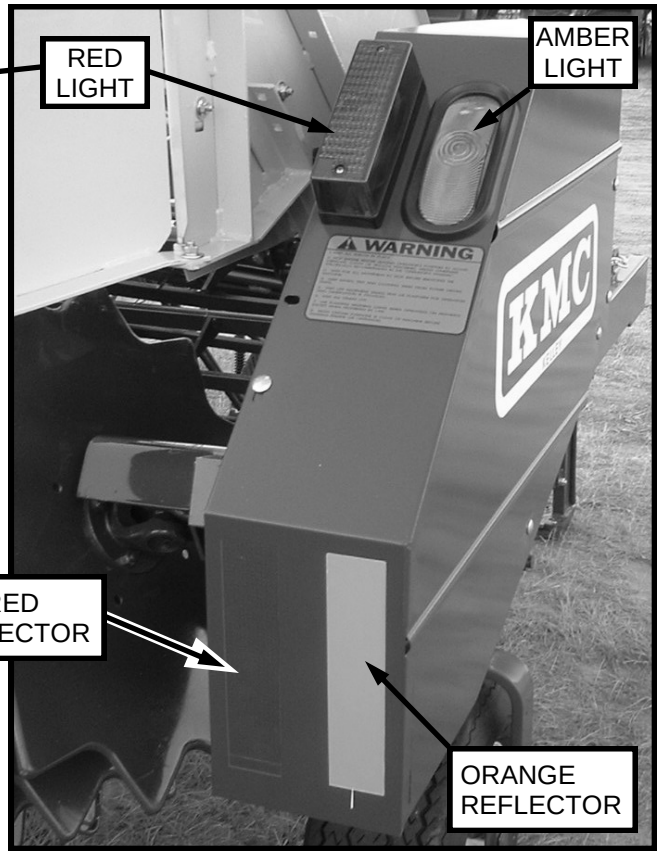
The Inverter Connector Strap (03-023-744) is used only on 4-40, 6-40, and 8-40 machines. It connects the inside Lt and Rt cylinder together to help stabilize the inverter frame, as shown in figure 11B.

LEFT AND RIGHT FRONT LIGHTS



LEFT AND RIGHT REAR LIGHTS





CENTER LIGHTS

NOTES:

MOUNTING BLADES AND CUT RODS
(4 & 6-ROW)

CAUTION: PEANUT BLADES HAVE A SHARP EDGE WHICH CAN CAUSE SERIOUS INJURY. USE GLOVES AND HANDLE WITH CARE WHEN CHANGING OR ADJUSTING BLADES.

First mount the blade to the cut frog which has already been assembled to the plow standard. Connect the blade to the frog with the 3/8" x 1 1/2" Grd 8 Plow Bolt, Flange hexnut, left and right blades are assembled the same way. Next, mount the cut rods to the blade using the 3/8" x 1 1/4" Plow Bolt, flatwasher, and flange hex nut.

CENTER BLADES
(4-ROW)

A. Mount both left and right center plow blades before tightening.
B. Use a punch to help align holes if required.
C. If the blades overlap in the front center, then loosen all eight bolts attaching both left and right center blades. Loosen only one turn, this should allow the blades to move away from each other and eliminate what may appear to be too tight a fit.
D. Re-tighten blade bolts nuts.

It is important to have a tight fit where the two center blades butt together.

It is also important to adjust the center coulter just before you completely tighten to insure that it is centered at the point or where the blades join.

MOUNTING CENTER COULTER
(4 & 6-ROW)

The 4-Row Center Coulter mounts to bottom of the mast with 3/4" x 2" Capscrew, lockwasher, and jam nut. (Refer to Figure 14A.)


Figure 14A

The 6-Row Center Coulter mounts to the bracket welded in center of the machine, as shown in Figure 14B. The coulter bracket is attached with a 5/8" x 1 3/4" capscrew, lockwasher, and jamnut in the upper holes and 3/4 x 2 capscrew, lockwasher, and jam nut in the lower holes. Nuts and lockwashers used in mounting the coulter should face to the outside of the machine. Coulter depth and spring tension should be preset with approximately 4 1/2" of rod extending above the adjustment collar. (Refer to Figure 14B)


Figure 14B

MOUNTING THE DRIVELINE
(4 & 6-ROW)

Mount the standard 1000 RPM shielded driveline. On 4-Row machines a 1 3/8-21 (1000 RPM) driveline is standard. An (optional) 1 3/4-20 (1000 RPM) driveline is available.

On 6-row machines, 1 3/4-20 (1000 RPM) driveline is standard. An optional 1 3/8-21 (1000 RPM) driveline is available.

CAUTION: CHECK AND FILL GEAR BOX TO LEVEL PLUG WITH GEAR LUBE KMC NO. (03-081-086) (80W90 WEIGHT LUBE) BEFORE OPERATING MACHINE, IF REQUIRED.

IMPORTANT: AFTER THE FIRST MONTH OF OPERATION, DRAIN AND FLUSH THE UNIT AND REFILL WITH FRESH OIL (03-081-086) THEREAFTER CHECK THE STATIC OIL LEVEL PERIODICALLY AND ADD OIL IF NEEDED. OIL CHANGES ARE SUGGESTED EACH YEAR.

4, 6, & 8-ROW HINGED FENDER & VINE GUIDE ROD PATTERN

(FOR 30” ROWS ONLY)

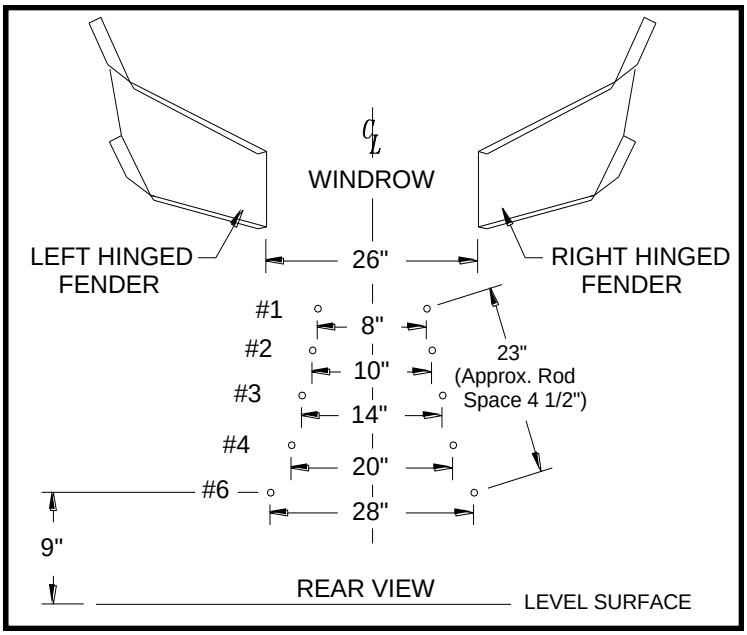


Figure 15A (For 4, 6 & 8R-31” Rows Only)

4-ROW HINGED FENDER & VINE GUIDE ROD PATTERN

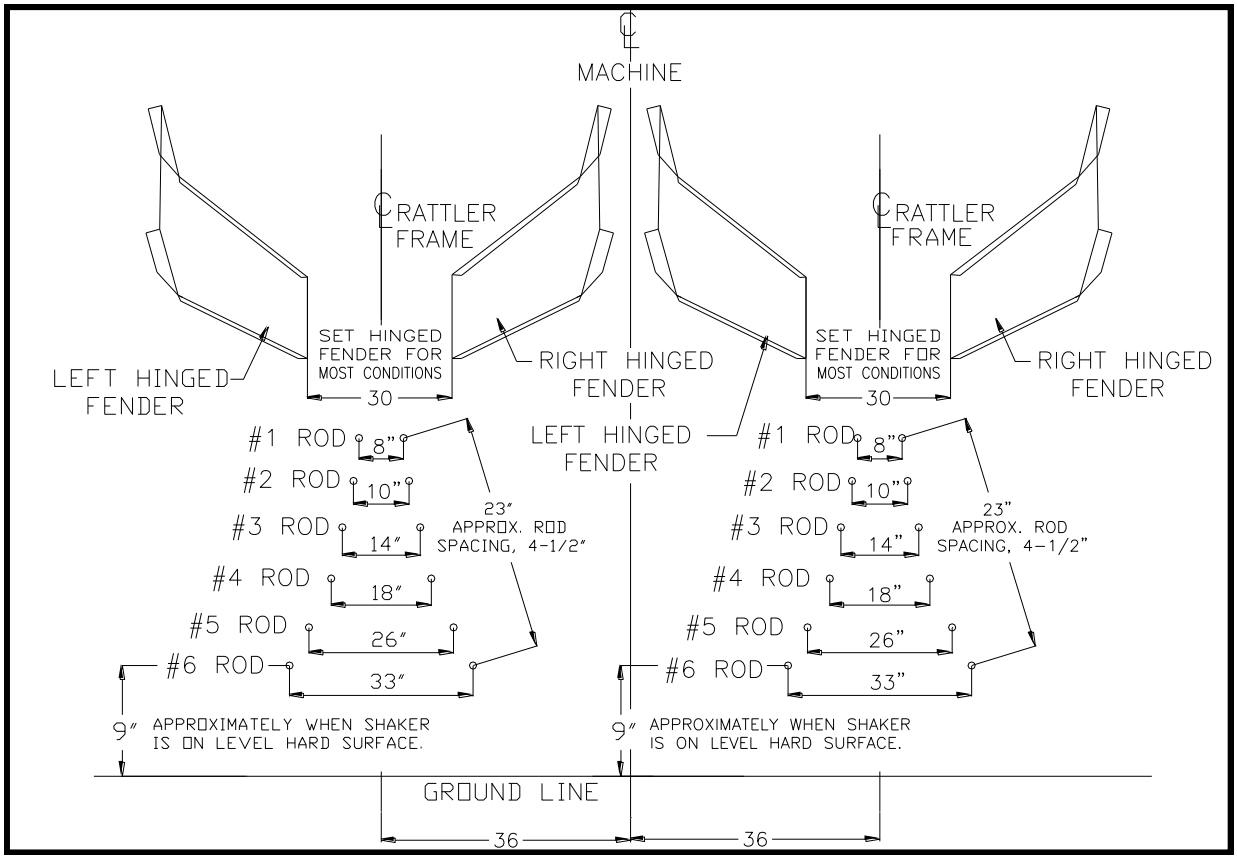


Figure 15B 4-Row Machine (4-36)

On 4-row machines center the vine guide rod patterns between the center of 2-rows that are going up Lt. and Rt. Rattler frames. This location will be the center of each rattler frame on a 4-36” planted row pattern. However, on other row spacing the rod pattern may have to be moved towards or away from the center of 4-row machine. For example on a 4-38” planted row pattern the vine guide rod pattern centers will be 2” farther to the outsides (Lt. & Rt.) of the center of the machine. (See Figure 15B)

6-ROW HINGED FENDER & VINE GUIDE ROD PATTERN

On 6-row machines the vine guide rod patterns need to be centered on the center of the 2-rows that are going up each rattler frame. The 6-row middle vine guide rod pattern will always be centered on the centerline of machine like a 2-row machine. The outside rod patterns Lt and Rt will center up on the rattler frame for 6-36" planted row patterns using a 6-36" machine. A 6-38" planted row pattern will also center up on each rattler frame using a 6-38" machine. However, if the 6-row machine is used to plow up peanuts that are on a modified row pattern or a different row spacing than intended, movement of the outside rod pattern may be required so that the windrows are piled in the proper position on the ground. Set the middle vine guide rod pattern as shown in figure 3 (on page 5) on the center of the machine. To locate the proper position of the rod patterns Lt. and Rt. of the patterns, measure from each rod (#1 thru #6) Lt. and Rt. the correct amount. This correct measurement is the distance from the centerline of the 6-row planted pattern to the center between the (2) outside rows that will be going up the outside conveyer. On a standard 6-36" planted row pattern using a standard 6-36" machine this distance is 72". On 6-34" planted row pattern this distance is 68". On 6-38" planted row pattern this distance is 76". Therefore, the distance from the #1 Lt. Rod in the middle row pattern to the #1 rod in the Lt. and Rt. Vine guide patterns will be this distance as discussed above. All other rods (#2 thru #6) need to be set this distance Lt. and Rt. from each rod in the middle pattern of vine guide rods. (See Figure 15C)

6-ROW VINE GUIDE ROD PATTERN SET-UP

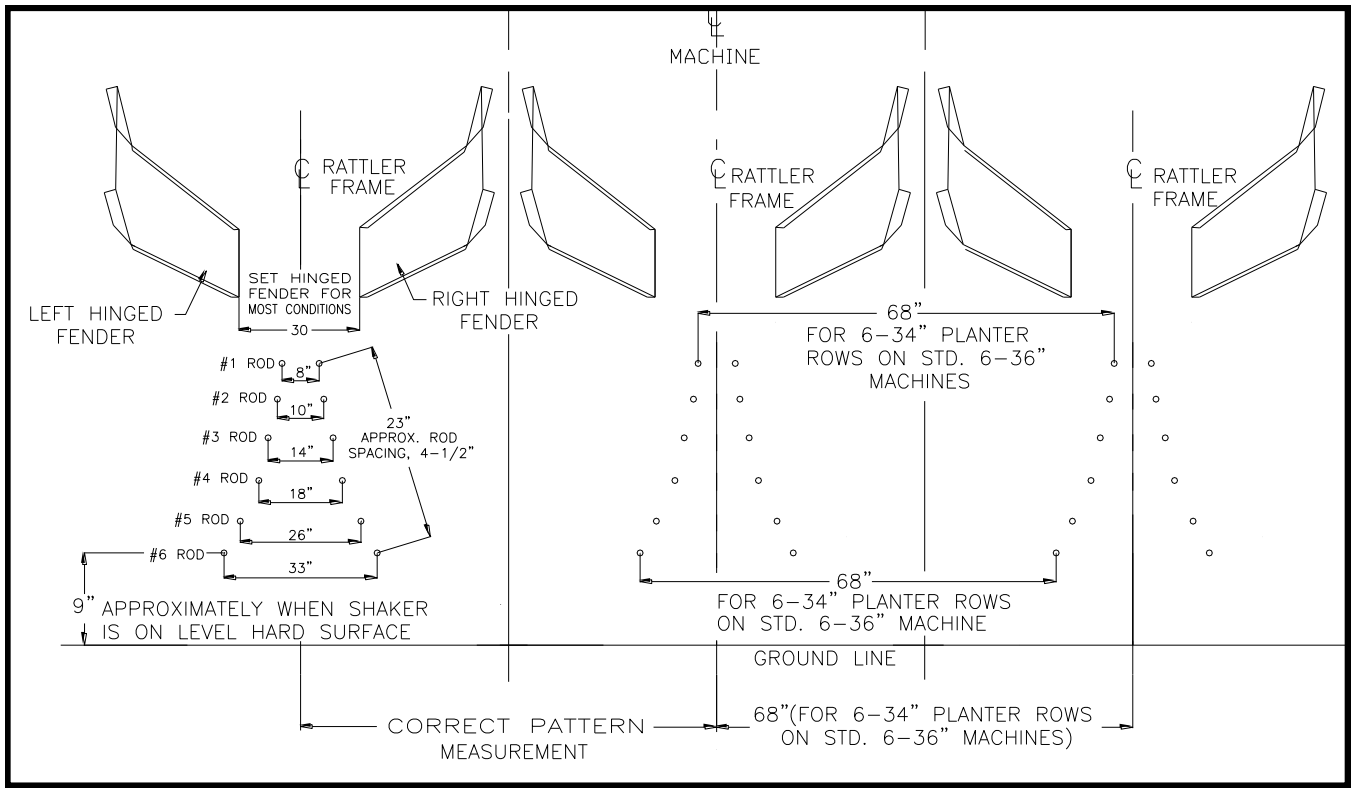


Figure 15C 6-Row Machine

STEP 1. Adjust center rod pattern like a 2-row machine.

STEP 2. Calculate correct pattern measurement distance from center of 6-Row planted row pattern to center between (2) outside rows that will be going up the outside rattler frames Lt. & Rt.

STEP 3. Set Lt. and Rt. vine guide profiles using center profiles as reference. Set each vine guide rod the calculated pattern measurement Lt. and Rt. of the center pattern of vine guide rods.

8-ROW HINGED FENDER & VINE GUIDE ROD PATTERN

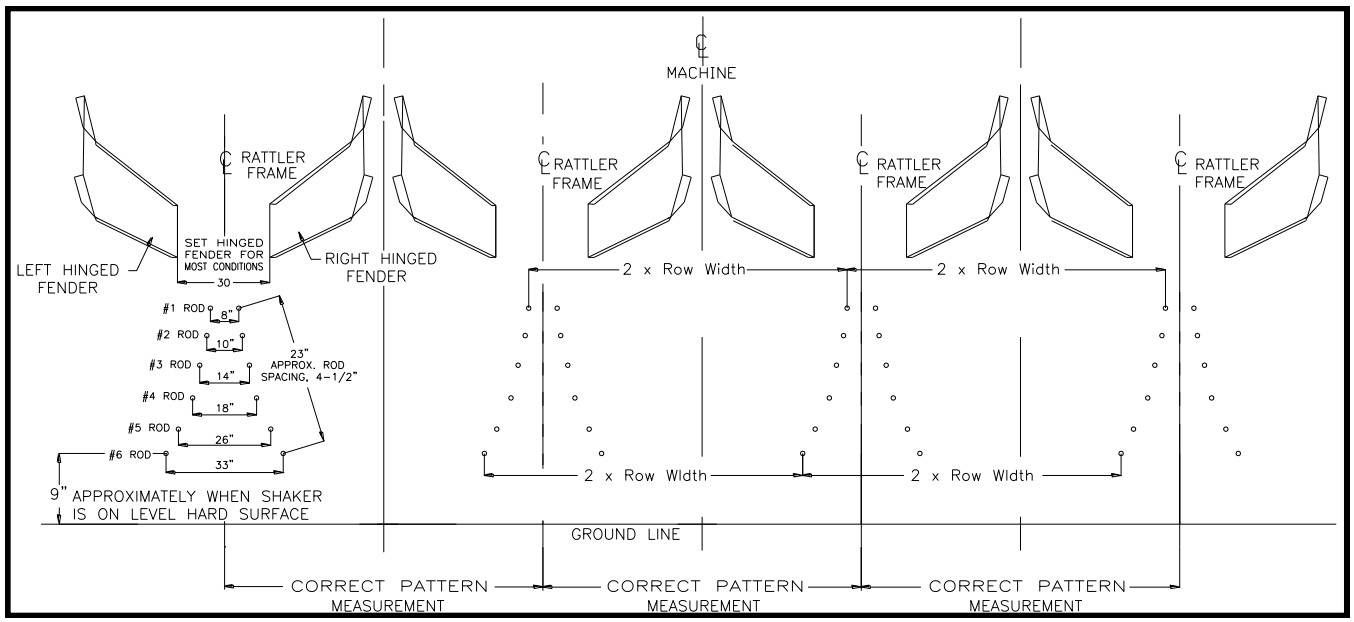


Figure 15D (8-Row Machine)

On 8-row machines the vine guide rod patterns need to be centered on the center of the 2-rows that are going up each rattler frame. The outside rod patterns Lt & Rt will center up on the rattler frame for standard planted row patterns using a standard machine setup for that row pattern. However, if the 8-row machine is used to plow up peanuts that are on a modified row pattern or a different row spacing than intended, movement of the outside rod pattern may be required so that the windrows are piled in the proper position on the ground. To locate the proper position of the rod patterns Lt and Rt of the patterns, measure from each rod (#1 thru #6) Lt and Rt the correct amount. This correct measurement is two times row width (60", 72", 76", & 80") See 6-row Fender and vine guide rod pattern on page 13.

HYDRAULIC DRIVE SCHEMATICS

2 & 4-ROW HYDRAULIC DRIVE
(End Mount)

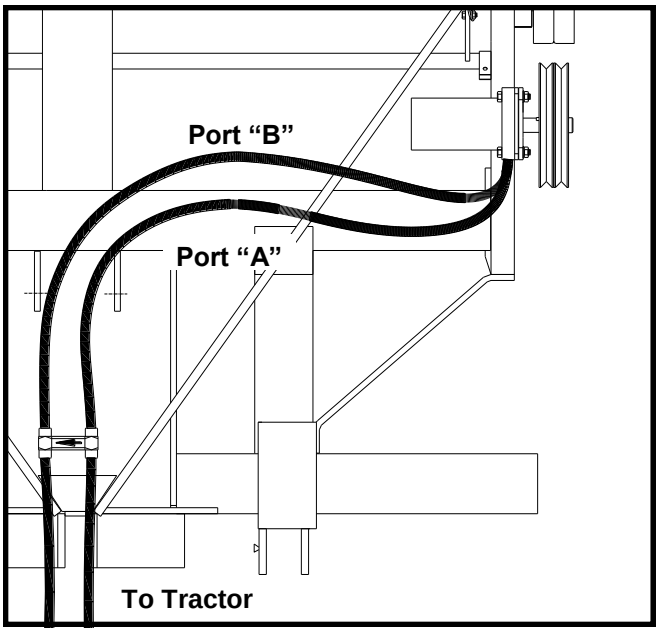


Figure 16A

NOTE: ARROW MUST POINT TOWARD PORT"B" ON HYDRAULIC MOTOR.

4-40 ROW HYDRAULIC DRIVE
(Center Mount)

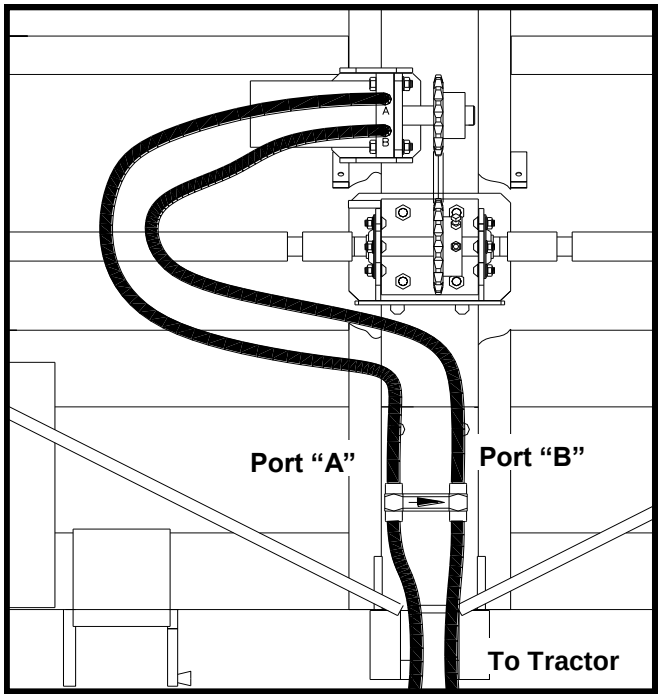


Figure 16B

6-ROW HYDRAULIC DRIVE
(Center Mount)

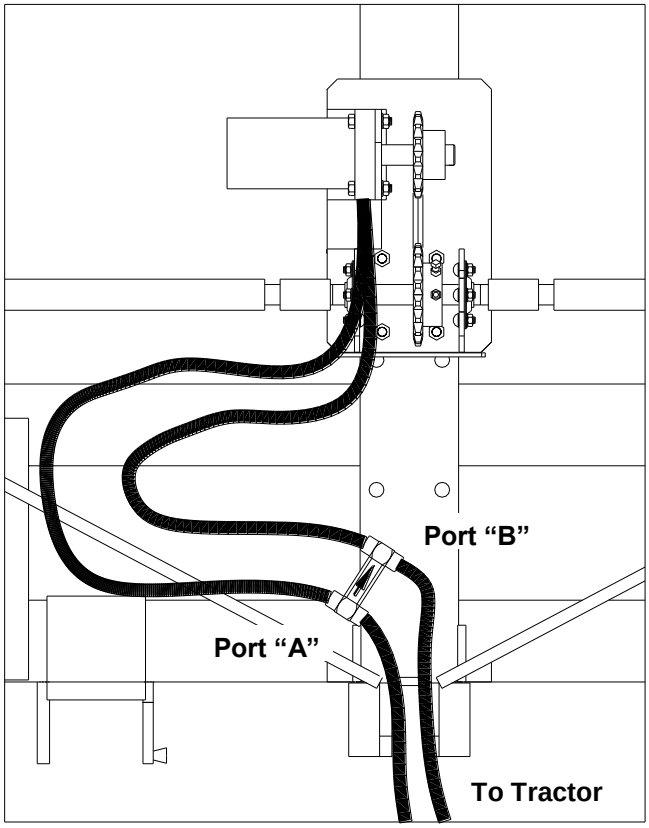


Figure 16C

NOTE: ARROW MUST POINT TOWARD PORT"B" ON HYDRAULIC MOTOR.

TESTING THE MACHINE

Start tractor at low speed and check for any binding or excessive strain on moving parts. Operate at tractor PTO speed for 15 minutes, recheck for any parts that are too tight (hot), or too loose, and make necessary adjustments.

ASSEMBLY CHECK POINTS

1. Check gear box for oil.
2. Check tension of drive belts for rattler and inverters
3. Check rattler chain or belt tension.
4. Check blade flatness (Refer to page 19).
5. Check vine guide rod pattern (refer to Figure 15A,15B, 15C, or 15D)
6. Check center coulter. Set upper spring collars to have 4 1/2" of rod remaining on 4, 6, & 8-row machines.
7. Check driveline for bottoming out and shield disengagement in raised and working position See page 18 for corrective instructions.

8-ROW HYDRAULIC DRIVE
(End Mount)

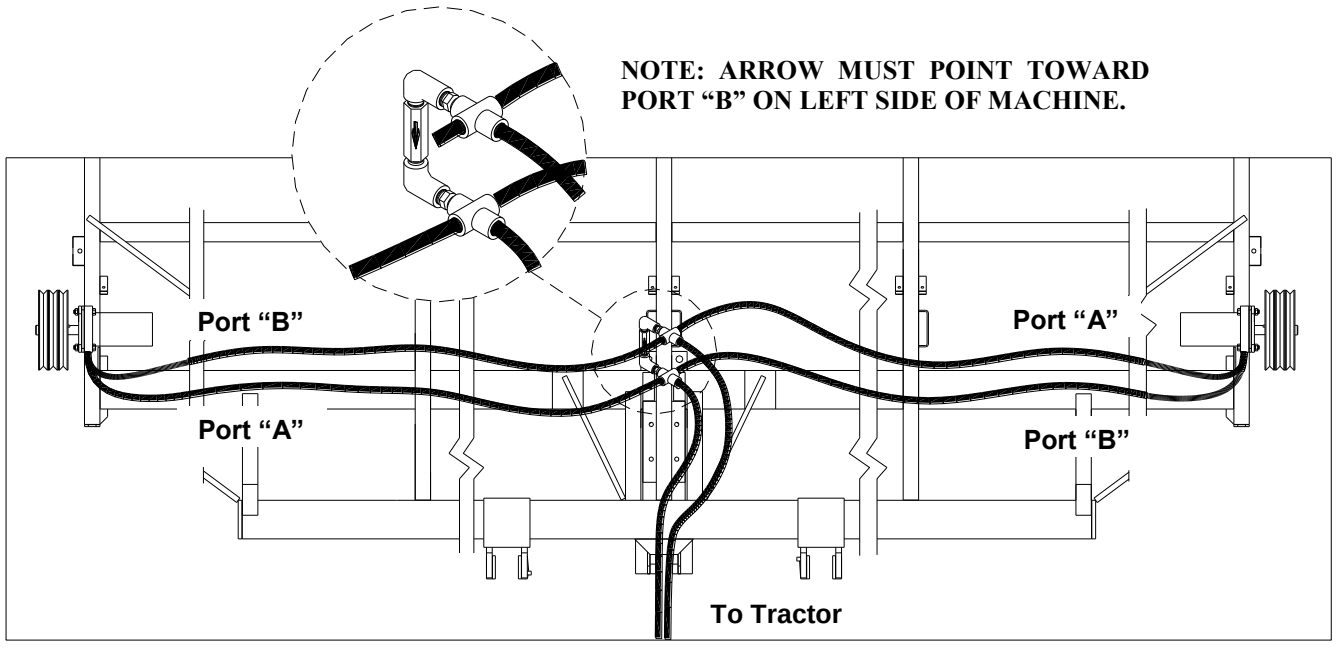


Figure 16D

4-ROW MACHINE WITH ALL COULTERS ATTACHED

(NO COULTERS REQUIRED ON TRACTOR)

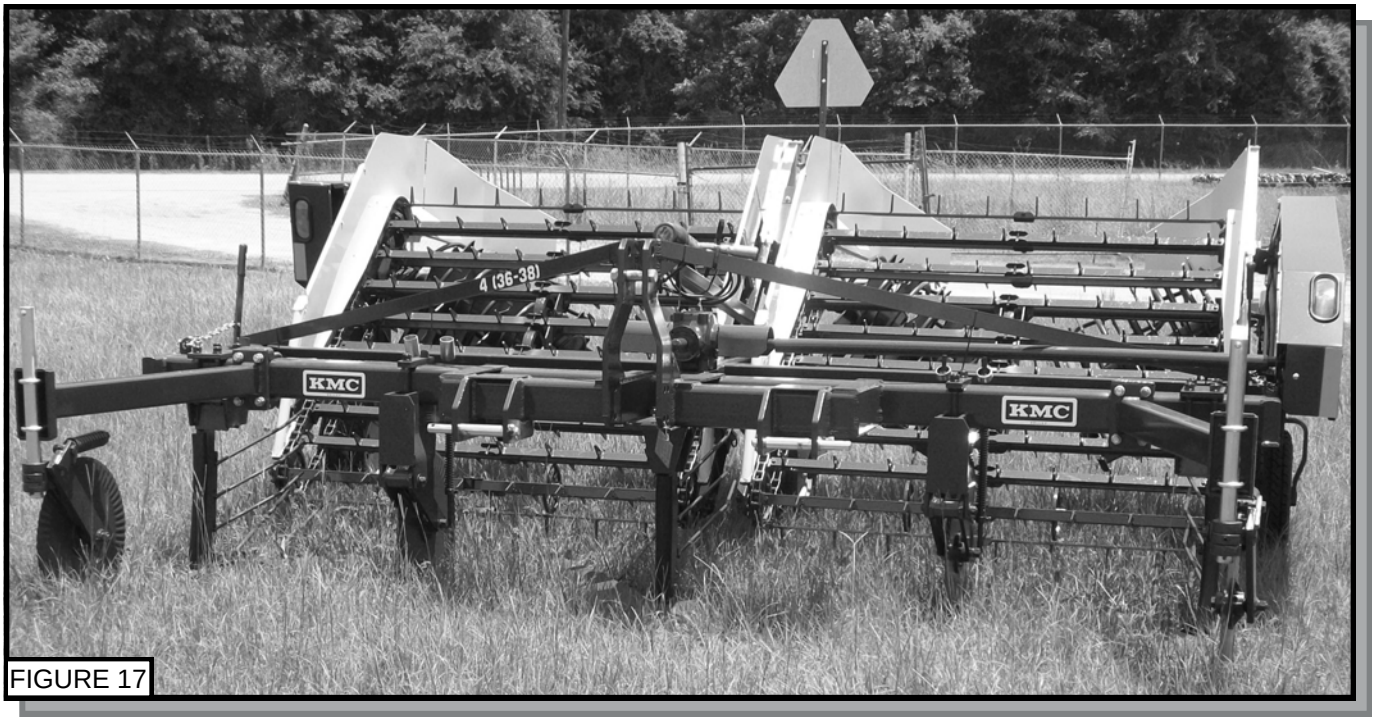


FIGURE 17

6-ROW MACHINE WITH ALL COULTERS ATTACHED

(NO COULTERS REQUIRED ON TRACTOR)

FIGURE 18

1. Mount both Coulter Support Arms (03-082-308) inside the two (2) outside plow standards as shown in Figure 18. Fasten bolts securely.

2. Mount the swivel vine cutter coulters by sliding between bracket and u-bolts installed on front of support arm. Height of coulter blade can be adjusted by loosening the u-bolts and sliding the shank of the coulter up or down to desired height and re-tighten hex nuts on u-bolts.

8-ROW MACHINE WITH ALL COULTERS ATTACHED

(NO COULTERS REQUIRED ON TRACTOR)

FIGURE 19

OPERATING INSTRUCTIONS

HITCHING SHAKER TO TRACTOR

Two Row KMC Shakers are designed for Cat II tractors. Cat III tractors can be used with the two row machine when hitch bushings are used in the lower hitch and top link balls of the tractor. If your Cat III Quick Hitch will assemble to Cat III Narrow (32" inside), it will attach to the 2-row machine.

Four Row KMC Shakers are designed for Cat II, Cat III and Cat III quick hitch. Step hitch pins and klik pins are furnished for the lower hitches. On Cat II tractors the lower links of the tractor assemble on the smaller diameter of the pin with the lift arms against the inside of the lower hitches. Cat III lower hitch spacer is not required on Cat II hitch-up. On Cat III tractors the lower links of the tractor assemble on the larger diameter of the pin with the arms against the outside of the lower hitches. The Cat III hitch bushing is assembled on the pin to the inside of the lower links and acts as a spacer to keep the lower lift arms spread to the correct distance for Cat III. When assembling hitch pin for Cat III, insert short turned down ends of step pin thru hitch and into hitch ball. When assembling hitch pin for Cat II, insert long turned down end of step pin thru hitch and into hitch ball. On both Cat II and Cat III hitch-ups be sure that all klik pins for top link and lower hitches are secured in proper position. Only use the heavy duty pins furnished with the implement. For quick hitch connections on four row, insert short turned down end of step pin into hitch. Use 1 1/4" O.D. mast spacer positioned in lower mast hole with 1" bolt for attachment of coupler for top link. Six and eight row machines are designed only for Cat. III and Cat.III Quick Hitch. The Lower and top link pins are furnished with each six-row machine.

The KMC Peanut Digger-Shaker-Inverters are designed to operate in a wide range of field conditions. Peanut field soil and vine conditions will vary greatly from one year to the next. Conditions will also differ even from one field to the next. Therefore slight adjustments may be required to the machine from time to time to make the unit do the best possible job of inverting peanuts, shaking dirt from the vines, and saving the maximum amount of peanuts. Listed below are standard adjustments that are recommended for best results under **most normal soil and vine conditions.**

STANDARD SET-UP RECOMMENDATIONS

LEVELING THE MACHINE:

1. Hitch Implement to the tractor three-point hitch and connect PTO from the shaker to the tractor. **IMPORTANT: PTO SHAFTS MAY BE TOO LONG OR SHORT ON SOME TRACTORS. RAISE AND LOWER IMPLEMENT TO OPERATING POSITION, CHECKING CLOSELY TO MAKE SURE DRIVELINE DOES NOT BOTTOM OUT OR PROTECTIVE SHIELD DISENGAGE. IF DRIVELINE BOTTOMS OUT, CUT EQUAL AMOUNTS OFF MALE AND FEMALE TUBES AND PROTECTIVE SHIELDS. IF SHAFTS ARE TOO SHORT CONTACT KMC FOR A LONGER DRIVELINE. LEVEL FRONT TOOL BAR WITH THE LIFT ARM ADJUSTMENTS ON THE TRACTOR.** Leveling the machine is best accomplished by placing tractor and unit on a level surface, preferably on a concrete slab. Make sure rear tire inflation pressure is the same on both rear tires. Level the machine by standing at the rear of the machine with the implement raised and sight top of tool bar with top of tractor axle. Adjust lift arms until front tool bar is parallel with tractor axle.

REAR GAUGE WHEELS

2. Rear gauge wheels are usually mounted with two holes showing in stem at the top for the 8 x 10 gauge wheel and one hole showing for 8 x 8 gauge wheel. (8 x 10 shown in Figure 20.) This position usually places unit at approximately the correct depth in most field conditions. The rear gauge wheel can be mounted on the outside or inside of 2 x 5 side frame member. Mounting the wheel on the outside of the frame member will center wheel in middles for 36" rows. Mounting the wheel to the inside will move the wheel approximately 4" to the inside for narrow row patterns.

Figure 20

PLOW STANDARD PLACEMENT:

3. Center of plow standard should normally be placed 9" from the row for Spanish type peanuts and 13" from the row for Runner type peanuts.

ADJUSTMENT OF TOP LINKS:

4. Adjust tractor top link so that the machine rests on the front tip of the blade and the rear gauge wheel when the unit is resting on a concrete slab or level ground.

BLADES AND CUT FROGS:

5. 3/8" x 5" blades with 26" cut frogs are recommended for generally all conditions. The 26" cut frog pushes the soil and peanuts less than the 30" cut frog and therefore does a better job of plowing up and inverting.

ADJUSTING BLADE PITCH:

6. Adjust the pitch of the plow blades to provide 3/4" clearance between the rear end of the plow blade and the ground or concrete. This is accomplished by loosening the 5/8" capscrews that connect frogs to plow standards and adjusting screws against frogs. Tighten all bolts securely.

PLOW DEPTH:

7. To properly invert peanuts the vines must flow up the rattler in generally the same width pattern that they grow on the ground and land as high on the inverter cylinders as the row width permits. To assure that the plows do not move peanut vines to the center of shaker always be sure you are plowing deep enough and with a sharp plow blade. **WHEN SHAKER IS PUT INTO OPERATION, PLOWING TOO SHALLOW OR WITH A DULL BLADE CAUSES EXCESSIVE PEANUT LOSS.**

***** Operate tractor 3-PT. Lift in position control and let lift all the way down and shorten top link to put unit deeper; lengthen top link to put unit shallower.

PLOW ADJUSTMENT IN HARD DRY SOIL:

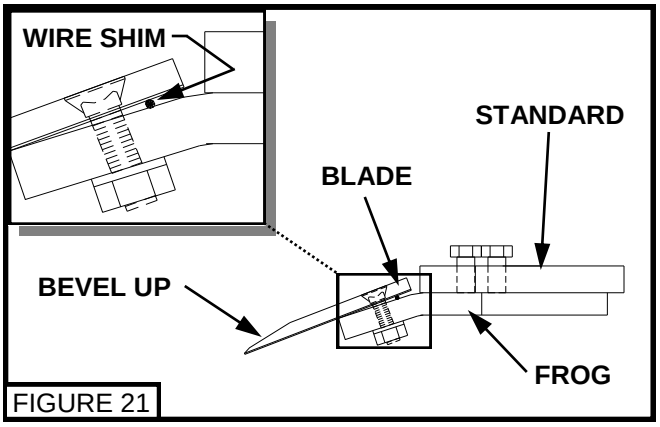


FIGURE 21

8. Some KMC customers report that increasing the pitch will significantly increase peanut blade life in hard dry soils. Follow these steps below to increase side pitch on peanut blades.

   (1) For dry hard soil the peanut blade should be installed with the beveled side of blade up. This gives the cutting edge of the blade a better attack angle on entry into the ground.
   (2) If after placing the blades on as recommended above and the machine will still not take the ground, we recommend placing more attack angle in the blade. This can be accomplished by placing a piece of 1/8" wire between the frog and the blade. The wire should be placed above the (3) bolts that attach the blade to the frog. Refer to Figure 21.

<u>CAUTION!</u> WHEN THE SOIL CONDITIONS IMPROVE DUE TO A RAIN OR THE MACHINE IS PLACED IN A SOFTER SOIL CONDITION, REMOVE THE WIRE SHIMS. IF THE WIRE SHIMS ARE NOT REMOVED WHILE IN NORMAL SOIL CONDITIONS, THE MACHINE WILL TEND TO PLOW TOO DEEP AND THE BLADES WILL TRY TO CARRY TOO MUCH SOIL CAUSING PEANUT LOSS AND MORE SOIL LEFT IN THE PLOWED-UP WINDROW.

CENTER SPRING LOADED COULTER:

9. Normally the spring rod top adjusting collars should be located 4 1/2" from the rod end for 2, 4, 6 and 8-rows. If the tractor lift system fails to lift the coulter blade high enough off the ground, lower the top adjusting collars. The bottom adjusting collars should be set for ample spring pressure to cut the vines. **FAILURE TO CUT THESE VINES IS THE MOST COMMON CAUSE OF INVERTER COMPLAINTS.**

TOOLBAR MOUNTED SWIVEL SPRING COULTER:

Adjust stem of coulter assembly so that coulter runs deep enough in the ground to cut the vines but not so deep that the fork drags in the dirt. Adjustment is made by loosening the two setscrews on the side of the mounting bracket and retightening once adjustment has been made. **FAILURE TO CUT PEANUT VINES IS THE MOST COMMON CAUSE OF INVERTER COMPLAINTS.**

RATTLER CONVEYOR ADJUSTMENT:

10. Adjust rattler low enough to pick up the vines with an even flow but not low enough to push the soil. When the plows are operating at the proper depth the rattler bar teeth should just clear the soil.

A recommended starting point is when the conveyor is at 43° to the main frame or when rattler frame and side frame support are parallel. See Figure 22. When rattler is operated at too steep an angle small peanut vines will tend to fall back down the conveyor.

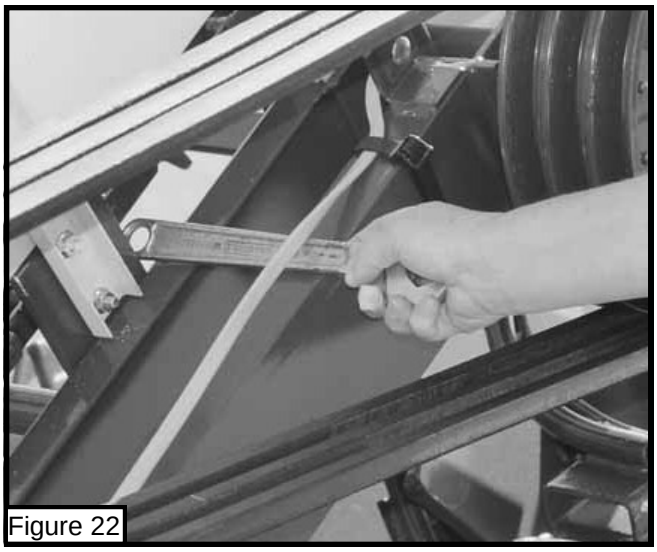


Figure 22

TRACTOR SPEED

11. Select the proper gear and PTO speed to synchronize ground speed with rattler speed. If ground speed is too fast, the rattler over-runs the vines, causing an uneven flow up the rattler frame. If ground speed is too low vines will be jerked off the plows. Speed is also important in controlling vine flow from the rattler frame to the inverter. Select a speed for uniform flow of vines from the plows to the drop off area of the inverter. The recommended operating tractor R.P.M. should be approximately 70-75% of rated tractor P.T.O. R.P.M. The recommended R.P.M. of the top rear 1 1/4" drive shaft should be 100 to 110 R.P.M. on both hydraulic and PTO driven machines. The tractor ground speed should be between 3 to 3 1/2 M.P.H. The recommended speed for Tenting Machine is 3-1/2 to 5-1/2 MPH. Faster or slower speeds maybe required for different digging conditions.

DIRT KNOCKER FOR CHAIN INVERTERS

12. The degree of rattler bar agitation can be varied by adjusting knocker wheels up or down. Adjust the knocker wheels to strike rattle bars with sufficient force to shake soil from the peanuts. This will vary with soil and moisture conditions.

Figure 23

DIRT KNOCKER FOR BELT INVERTERS

The degree of conveyor bar agitation can be varied by adjusting knocker wheels up or down. Adjust the knocker wheels to strike conveyor bars with sufficient force to shake soil from the peanuts. This will vary with soil and moisture conditions.

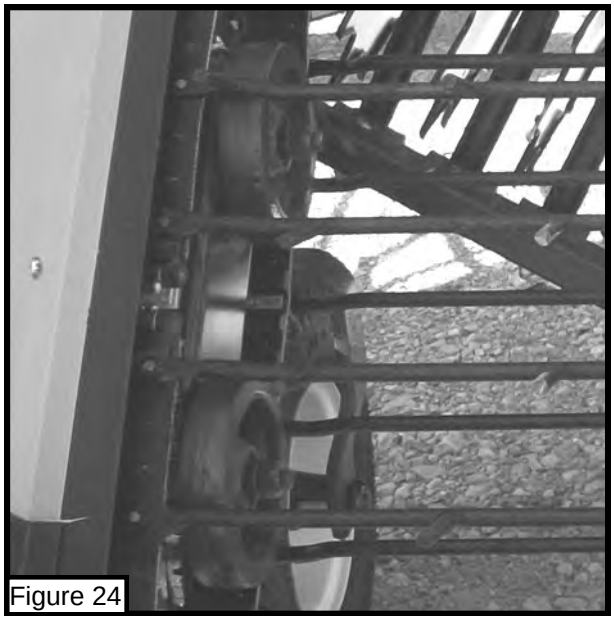


Figure 24

CONVEYOR FRAME ADJUSTMENT FOR CHAIN INVERTERS:

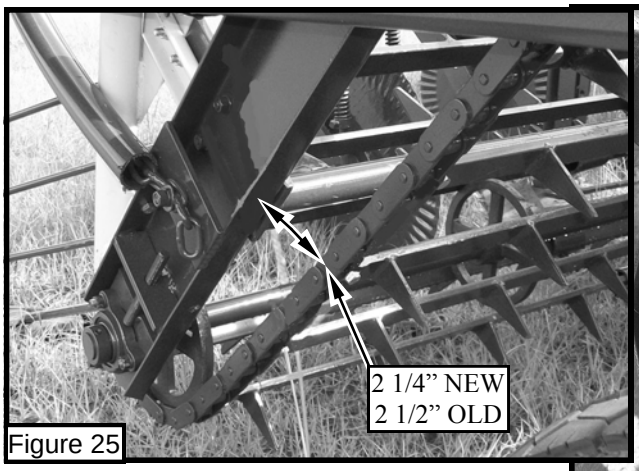


Figure 25

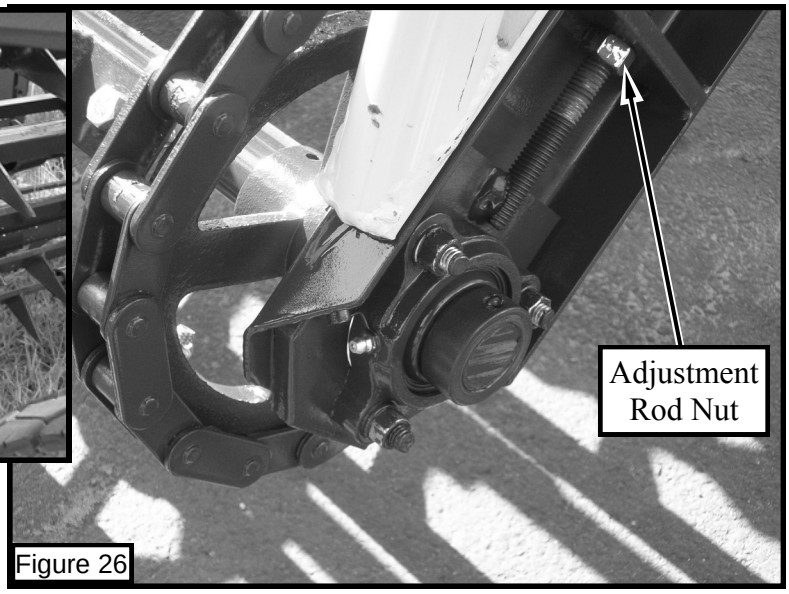


Figure 26

13. The adjustment rod nut is used to tighten or loosen the tension on the inverter chain. Refer to figure 26. A new chain is preset at the manufacture at approximately 2 1/4". Older chain will require a 2 1/2" dimension. Slack is measured at a location just under the cross brace as shown in figure 25.

CONVEYOR FRAME ADJUSTMENT FOR BELT INVERTERS:

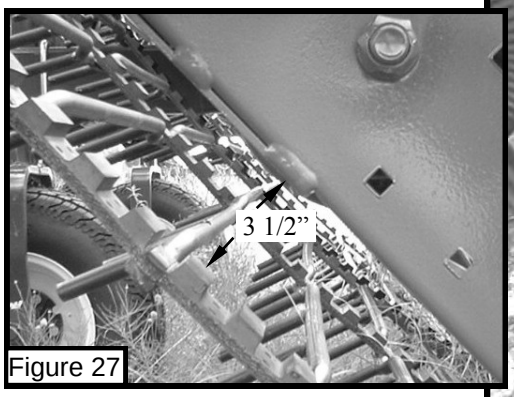


Figure 27

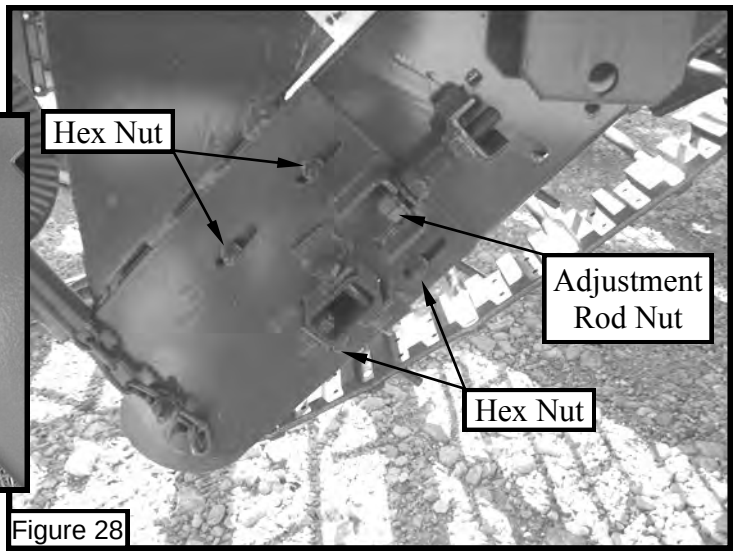


Figure 28

The Adjustment Rod Nut is used to tighten or loosen the tension on the inverter belt. First loosen the (4) flange hex nuts on both sides of the rattler side frame. To remove slack, turn Adjustment Rod Nut counter-clockwise to tighten belt assembly. To increase slack, turn Adjustment Rod Nut clockwise to loosen belt assembly. When the desired tension is reached, retighten the (4) flange hex nuts on both sides of the rattle side frame, then tighten adjustment rod nut so that it will be locked into position. Refer to figure 28. A new belt assembly is preset at the manufacture at approximately 3 1/2". Slack is measured at a location at the edge of the sheet metal strap on the bottom of the rattle side frame as shown in figure 27.

TRACTOR MOUNTED VINE CUTTER:

14. The use of properly adjusted vine cutters in each middle assures that a more complete job of plowing up and inverting peanuts can be accomplished. With the use of vine cutters, plows run cleaner pulling off less peanuts and also peanut vines may be inverted much easier.

A. Set the coulter as close to the row as feasible to shear off as much vine as possible without cutting off peanuts. (Normally 1" to 2" outside of front tip of plow blade in most field conditions.)

B. Adjust spring pressure to assure that vines are properly cut in soft and hard soil.

C.  **WARNING! THE COULTERS MUST BE RAISED WHEN TURNING OR REVERSING THE TRACTOR TO PREVENT SERIOUS DAMAGE.**

15 A. Before making any adjustments on the inverter, make sure other shaker components are performing properly such as coulters, plows and rattler conveyor. Peanut vines must flow smoothly from the plows up the rattler with the rows spaced apart and vines cut between them before the inverter can satisfactorily invert them.

B. Check recommended vine guide rod pattern as shown on pages 12 - 14.

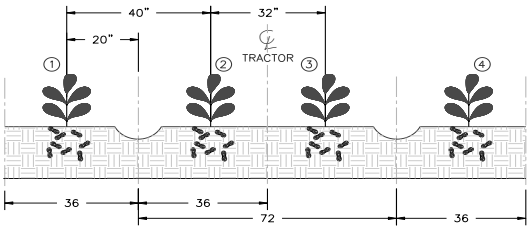
C. Check recommended hinged fender setting as shown on pages 12 - 14.

D. The inverter will not properly invert peanuts if the vines are not released from the rattler conveyor at the correct time. If you encounter this problem, check the inverter drive belts for tightness and check to determine if the rattler bars were installed correctly with the slopped side of the teeth to the rear of the machine. In some cases it may be necessary to increase the tractor P.T.O. speed to assure smooth flow of vines from the rattler conveyor to the inverting cylinders.

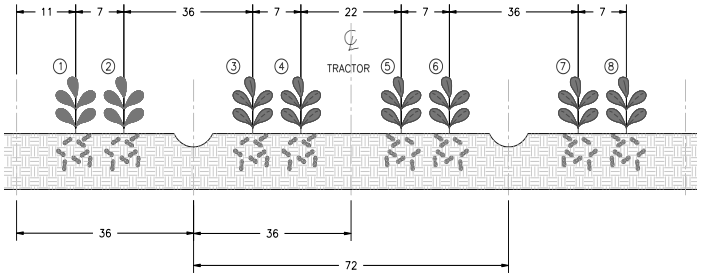
VINE HOLD DOWN RODS

Vine hold down rods were designed to reduce the amount of roll back due to small vines or hilly land causing vines to roll down the conveyor. They are adjustable from side to side to position the rod above the tap root as well as vertical for the thickness of the vine mass. Rods are to be positioned so that they are directly above the tap root for single or twin row peanuts. We have found out that a single rod will work for twin rows but recommend 2 rods for better performance in twin row peanuts. Machines are shipped with rods installed approximately where the tap root should be but may need some additional movement to position them directly over the tap root of each row depending on what spacing was used when planting the peanuts. To install the rods in the correct position, determine the row spacing used for the location of the tap root based on the spacing used for planting as shown in the figures below.

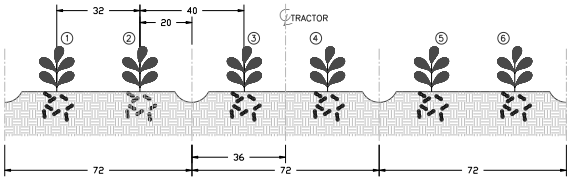
4 Row Machine
Single Rows on 72" Beds



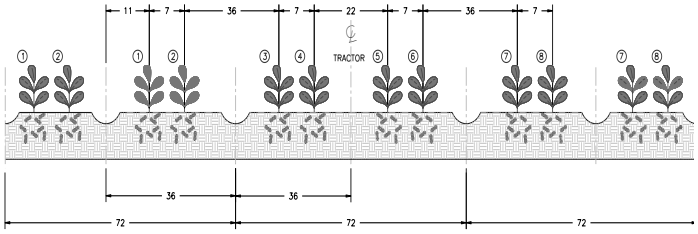
4 Row Machine
Twin Rows on 72" Beds



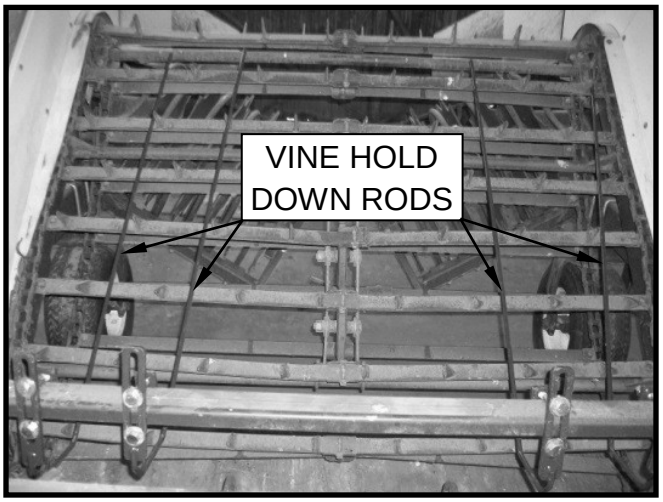
6 Row Machine
Single Rows on 72" Beds



6 Row Machine
Twin Rows on 72" Beds



Starting from the center of the machine layout the row spacing on the 2 ½ x 1 ½ tube used to mount the rod. Once the position of each rod has been marked install the rods to the tube as shown below. The rods can be easily adjusted once digging in a field has been started to insure they are located above the tap root and at a height that allows the vines to flow freely up the conveyor without hanging on the rod.



Bolt and flatwasher are to be installed on slotted plate side which is on front side of tube. Cap, lockwasher and nut are to be installed on back side of tube. When installing the rod leave the lower bolt, flatwasher, lockwasher, nut and cap loose to make it easier to place around tube and install upper hardware.

MAINTENANCE INSTRUCTIONS

Every 8 Hours or Daily . . . . . .

Grease front and rear universal joints and universal telescoping section. Inverter Universals - Inverter only.

Every 50 Hours or Weekly . . . . . .

Grease Jackshaft coupling. Check gear box; use 80w90 weight gear lubricant. (KMC 03-081-086).

After First Month . . . . . .

After the first month of operation drain and flush the unit and refill with fresh oil. Thereafter check the static oil level periodically and add oil if needed. Oil changes are suggested each year.

Annually . . . . . .

Check Gauge Wheel Hubs for grease and pack if necessary.

PERIODIC CHECK POINTS FOR CHAIN INVERTERS

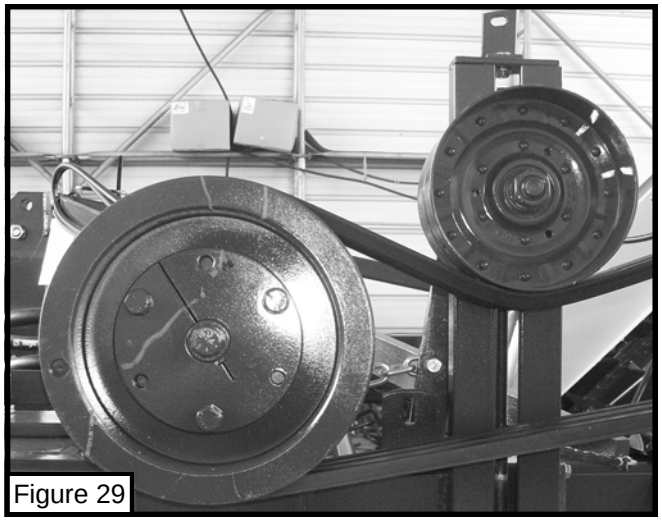


Figure 29

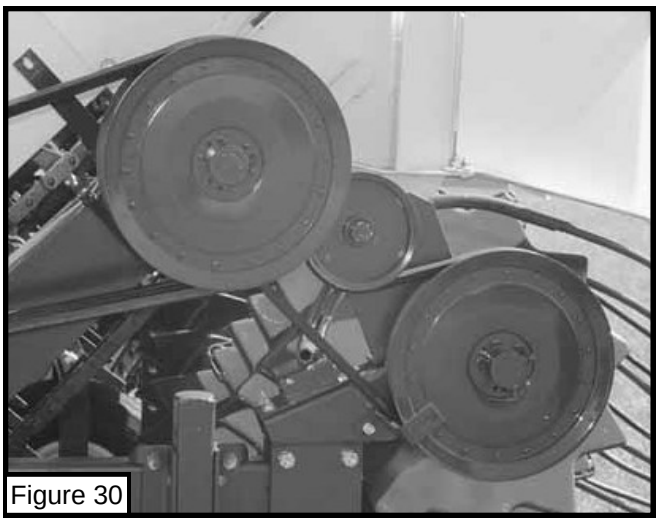


Figure 30

1. After 10 to 15 acres of running machine check all conveyor and inverter "V" belt drives to be sure that belt tension is adequate so that slippage does not occur. Check complete machine for any loose nuts, rattler bars, or excessively worn parts that may be due to misalignment.

2. Check rattler chain tightness approximately every 100 acres. Do not allow conveyor chain to become so loose that the drive sprocket tries to jump teeth. This could influence chain and sprocket wear. Running rattler chain too tight can also cause excessive chain and sprocket wear. Readjust old worn chain to 2 1/2" dimension as shown in Figure 31. When installing a new replacement chain adjust to 2 1/4" dimension.

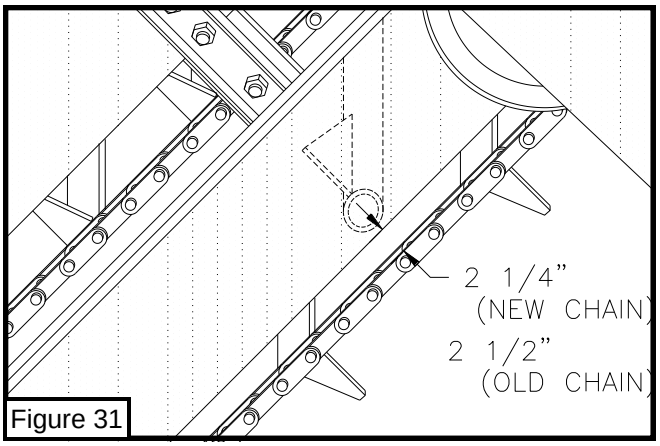


Figure 31

3. Check blade sharpness daily and in dry hard conditions check blades more often. Worn out or dull blades will greatly effect the machine's plowing-up and inverting performance. Dull blade should be sharpened or replaced.

4. When replacing the rattler bars be sure to place bars on correctly. The side of the tooth with the slope or angle should engage or contact the vines.

5. Check wear of all center coulters and vine cutters every 100 acres. As coulter diameter decreases the depth that the coulter is running to cut the vines also decreases. If coulter is not cutting the vines properly, poor plowing up and inverting may result. Therefore, check and adjust as required.

6. Grease lower rattler frame bearing daily before using machine. Grease fitting is shown in figure 32.

Figure 32

7. See your local **KMC** Dealer for repair parts and service for your Peanut-Digger-Shaker-Inverter.

PERIODIC CHECK POINTS FOR BELT INVERTERS

1. After 10 to 15 acres of running machine, check all conveyor and inverter drives to be sure that tension is adequate so that slippage does not occur. Check complete machine for any loose nuts, bars, belt linkage or excessively worn parts that may be due to misalignment. Shown in Figure 29 & 30 on Page 23
2. Check conveyor belt tightness approximately every 100 acres. Do not allow conveyor belt to become so loose that the drive sprocket tries to jump teeth. Running conveyor belt too tight can also cause excessive belt and sprocket wear. Readjust stretched belt to 3 1/2" dimension as shown in Figure 33. When installing a new replacement conveyor belt, adjust to 3 1/2" dimension.

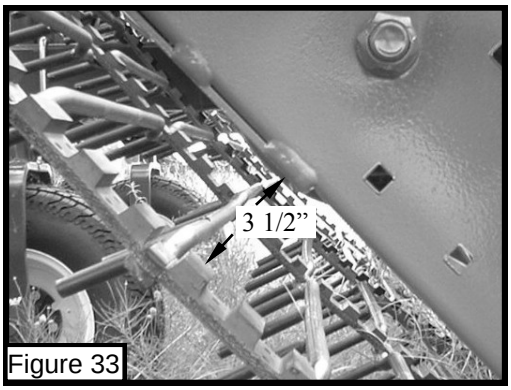


Figure 33

3. Check blade sharpness daily and in dry hard conditions check blade more often. Worn out or dull blades will greatly affect the machine's plowing up and inverting performance. Dull blades should be sharpened or replaced.
4. When replacing conveyor bars be sure to place bars on correctly. The bar should be placed so that the pins are at the correct angle to engage or contact the vines.
5. Check wear of all center coulters and vine cutters every 100 acres. As coulter diameter decreases the depth that the coulter is running to cut the vines also decreases. If coulter is not cutting the vines properly, poor plowing up and inverting may result. Therefore, check and adjust as required.

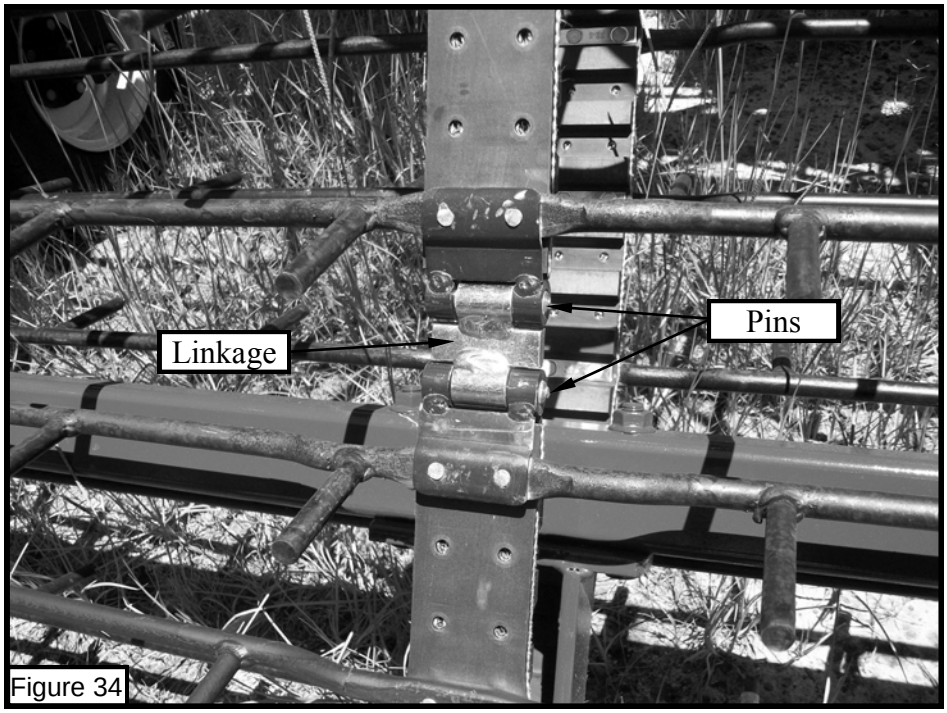


Figure 34

6. Check the conveyor belt linkage for wear and proper alignment before staring up inverter each day. If linkage pin comes out of hole, loosen belt tension and pull each end of belt to realign hole so pin can be reinserted. If pin is bent or worn replacement of pin and linkage may be required before operating the machine. Refer to figure 34.
7. See your local KMC Dealer for repair parts and service for your Peanut-Digger-Shaker-Inverter.

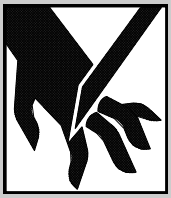
STORAGE TIPS FOR MACHINE

1. Wash machine clean of dirt and vines.
2. Loosen all "V" belt drives taking tension off belts during storage.
3. Pour light coat of used motor oil on rattler chains, vine coulters, plow blades and inverting rods to protect from rust during storage.
4. Coat exposed rams of vine cutter cylinder with grease to protect from rust when not in use. If rust builds up on rod, cylinder ram seals can be damaged.
5. Store machine under a shed where it will be kept dry and protected from direct contact with the elements.
6. Remove conveyor belts and store inside away from direct sunlight if not able to store machine under a shed.

*** Addition of black plastic polyethylene tubing to the inverter rods will in extremely dry conditions improve the performance of the machine.**

WARNING

1. KEEP ALL SHIELDS IN PLACE.
2. STOP ENGINE BEFORE LEAVING OPERATOR'S POSITION TO ADJUST, LUBRICATE, CLEAN OR UNCLOG MACHINES, UNLESS OTHERWISE SPECIFICALLY RECOMMENDED IN THE "**OPERATOR'S MANUAL**".
3. WAIT FOR ALL MOVEMENT TO STOP BEFORE SERVICING THE MACHINE.
4. KEEP HANDS, FEET AND CLOTHING AWAY FROM POWER DRIVEN PARTS.
5. KEEP OFF EQUIPMENT UNLESS SEAT OR PLATFORM FOR OPERATION AND OBSERVATION IS PROVIDED.
6. KEEP ALL OTHER OFF.
7. USE FLASHING WARNING LIGHTS WHEN OPERATING ON HIGHWAYS EXCEPT WHEN PROHIBITED BY LAW.
8. MAKE CERTAIN EVERYONE IS CLEAR OF MACHINE BEFORE STARTING ENGINE OR OPERATION.



CAUTION

EDGE SHARP
HANDLE WITH GLOVES
HEAT TREATED
MADE IN INDIA

CAUTION

DAMAGE TO TOP LINK MAY OCCUR

REMOVE BOLT AND SPACER WHEN ATTACHING IN UPPER MAST POSITION.

CAUTION

MOUNT REFLECTORS ON LEFT & RIGHT SIDE OF IMPLEMENT VISIBLE TO TRAFFIC BOTH WAYS WITH YELLOW TO LEFT FRONT AND RED TO LEFT & RIGHT REAR.

VINE CUTTER ASSEMBLY INSTRUCTIONS

FRONT TRACTOR MOUNTED

1. Bolt the appropriate tractor mounting bracket on both sides of the tractor using at least two (2) bolts on each side approximately ten (10) or more inches apart as shown in Figure 35. The short bracket (03-082-167), shown in Figure 35, is used on all John Deere tractors; most Case-International tractors and most later model Fords. The short bracket (03-082 -167) is also used on all Massey Ferguson tractors with certain ones requiring an additional special adaptor bracket as shown in Figures 41, 42, and 43.

A long tractor mounting bracket (03-082-164) is used on some smaller and older Ford tractors, smaller International tractors, and older Case tractors. The mounting procedure is very similar to that for the short bracket.

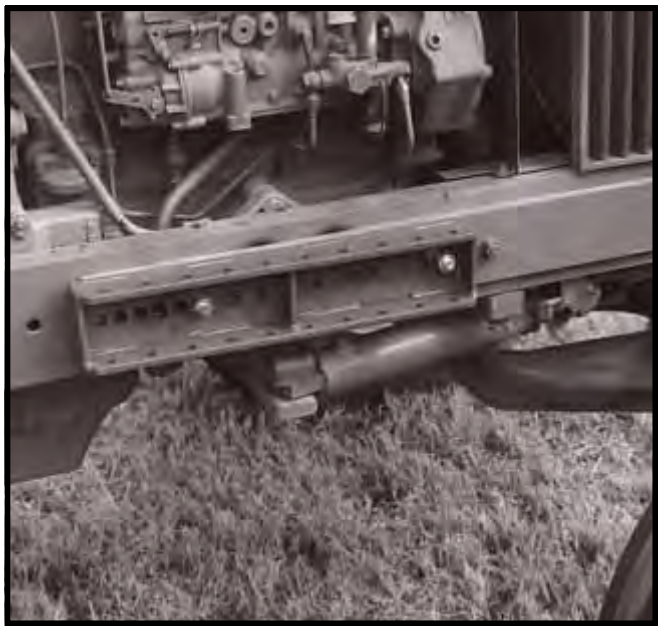


Figure 35

2. Mount the support arms right and left as shown in Figures 36 and 37 with six (6) 1/2 x 1 1/2 capscrews provided. The longer support arm should be mounted on the right side of the tractor. The support arms should be aligned and set at the same height. The center of each arm should be at least seven (7) inches behind the front tractor tires to provide clearance. Tighten all bolts securely.

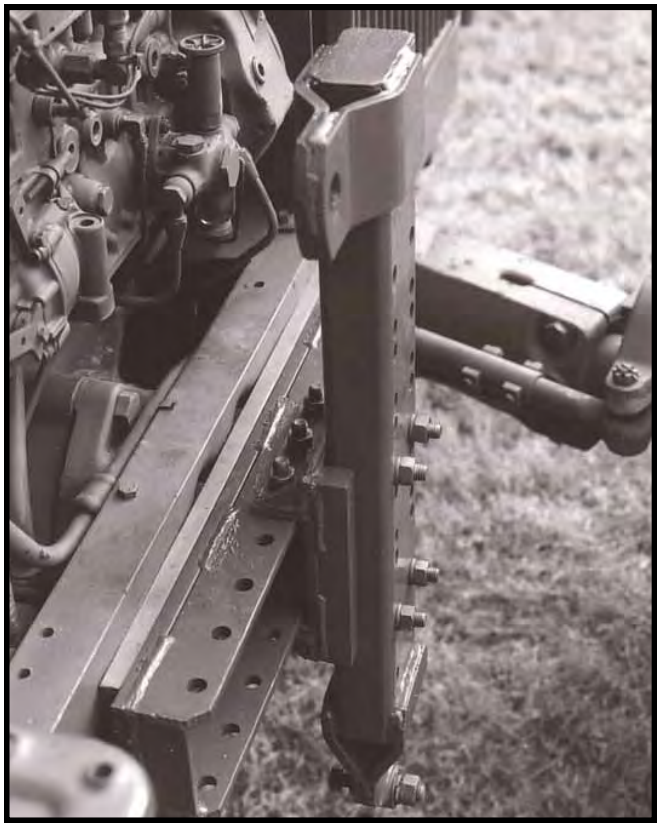


Figure 36

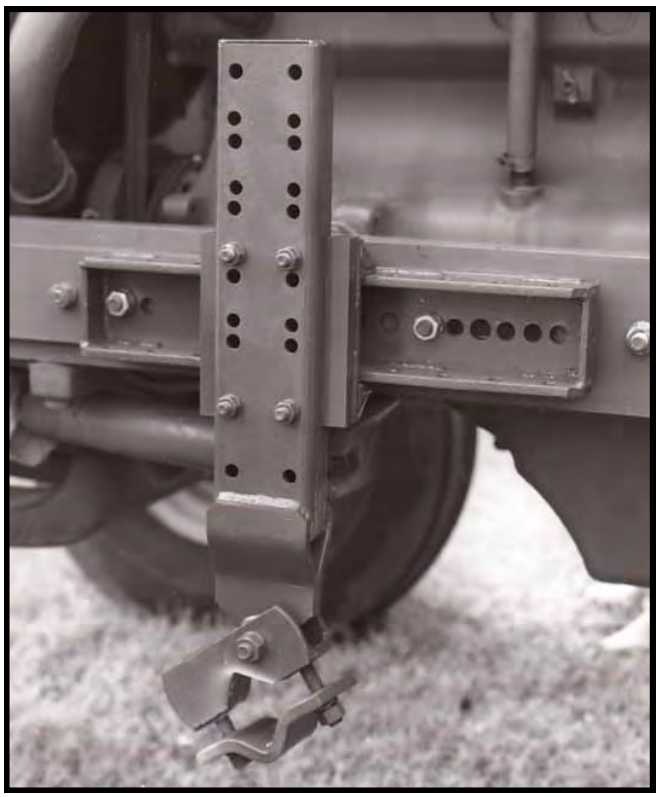


Figure 37

3. Next, mount the coulter tool bar and hydraulic cylinder as shown in Figures 38 and 39. Tighten all bolts securely.

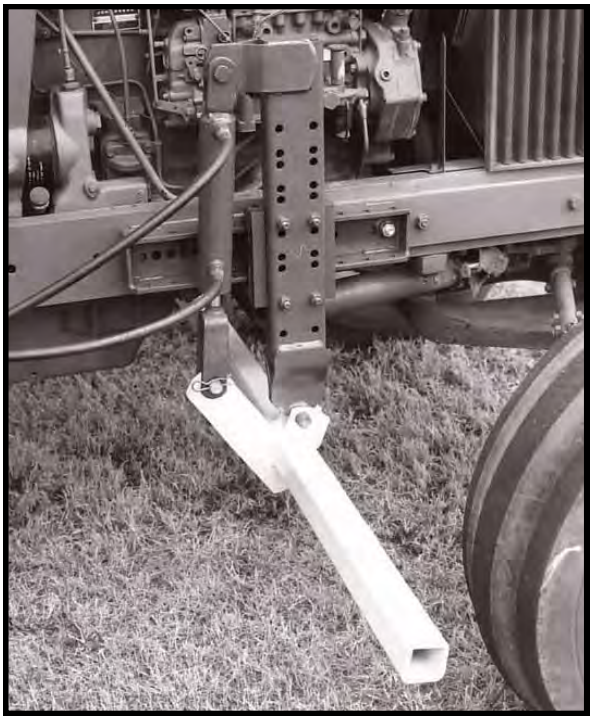


Figure 38

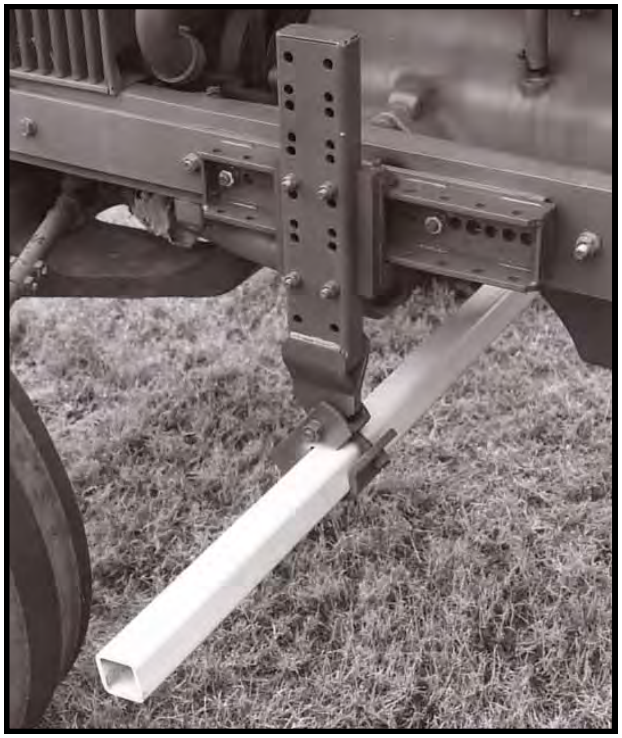


Figure 39

4. Mount the vine cutter coulters on the tool bar in the desired locations and clamp securely as shown. The height of the coulter blade and the spring pressure may be adjusted by repositioning the four (4) setscrew collars on the spring rods.

Figure 40

SPECIAL BRACKETS

5. Most older Massey Ferguson tractors require a special weld-on plate (03-023-226, comes with short bracket) so four (4) mounting bolts can be used instead of just two (2) as shown in Figure 41.

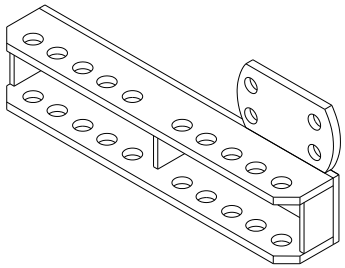


Figure 41

Massey Ferguson tractor models 2705 and 2675 require the special adaptor bracket (03-082-168) shown in Figure 42. The short tractor mounting bracket (03-082-167) then bolted to the adaptor bracket as shown.

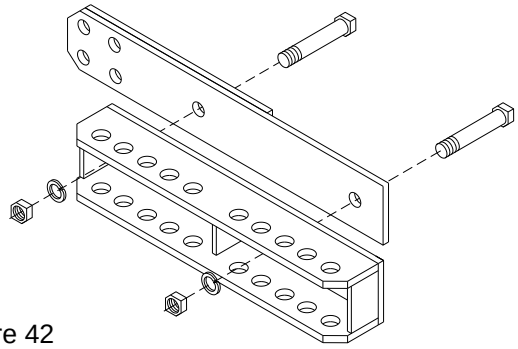


Figure 42

Massey Ferguson eight (8) cylinder tractor models 1150 and 1155 require a special adaptor bracket (03-082-165) as shown in Figure 43. Models 2745 and 2805 require a very similar adaptor bracket (03-082-166). The short tractor mounting bracket (03-082-167) is then bolted to the adaptor brackets as shown.

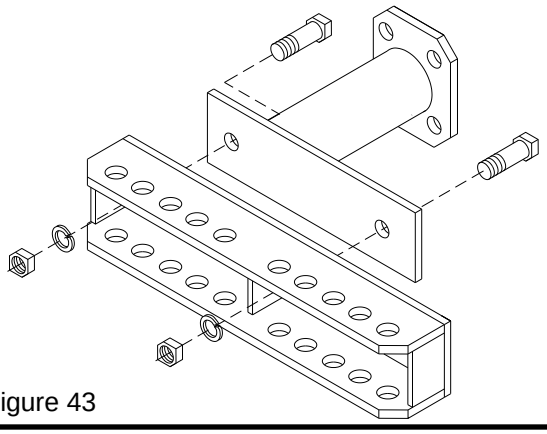


Figure 43

INSTALLATION OF VINE CUTTERS ON 60 SERIES JOHN DEERE TRACTORS

With the introduction of John Deere 60 Series tractors, the question of attaching vine cutters to these tractors arises. The attachment of the vine cutters is not a problem, you will use the same 03-082-167 tractor mounting bracket as with other John Deere tractors. The problem that occurs is that the access step to the tractor cab must be removed for the vine cutters to operate properly. To facilitate the operator getting into the cab, we are offering a step bundle to be attached to the vine cutters as shown below. The bundle number is 03-082-195 and can be ordered through our Customer Service Department.

To access the tractor cab, we are recommending that the operator use the step mounted to the front axle left hand side and hand rails provided by John Deere to reach top of the axle. Then stop onto our step, then onto the platform outside the cab door. Although this may be a little inconvenient, it will provide a greater degree of safety.

DO NOT USE THE TOOLBAR OR COULTER ASSEMBLY AS A STEP. SERIOUS PERSONAL INJURY COULD RESULT FROM SUCH ACTION!

FIGURE 44

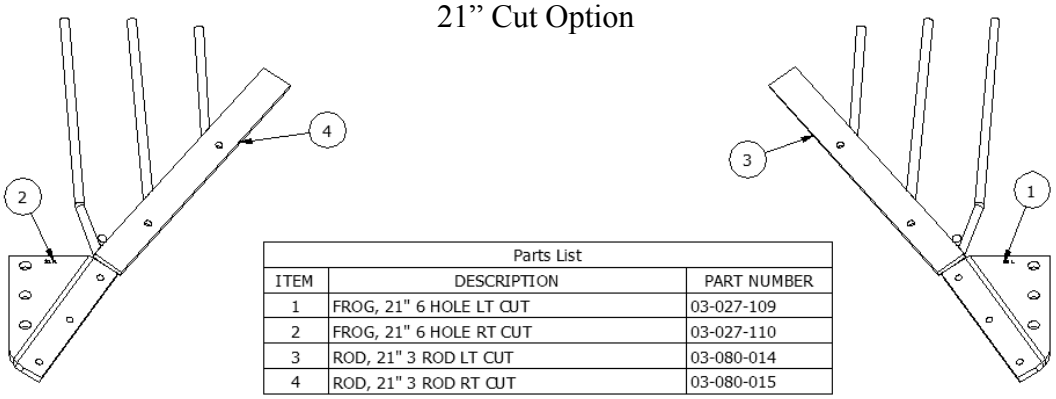
03-082-167 Vine Cutter Bracket with 03-082-195 Step Bundle attached.

Front Axle Step (in foreground) and 03-082-195 (in background).

CUT FROG AND ROD OPTIONS

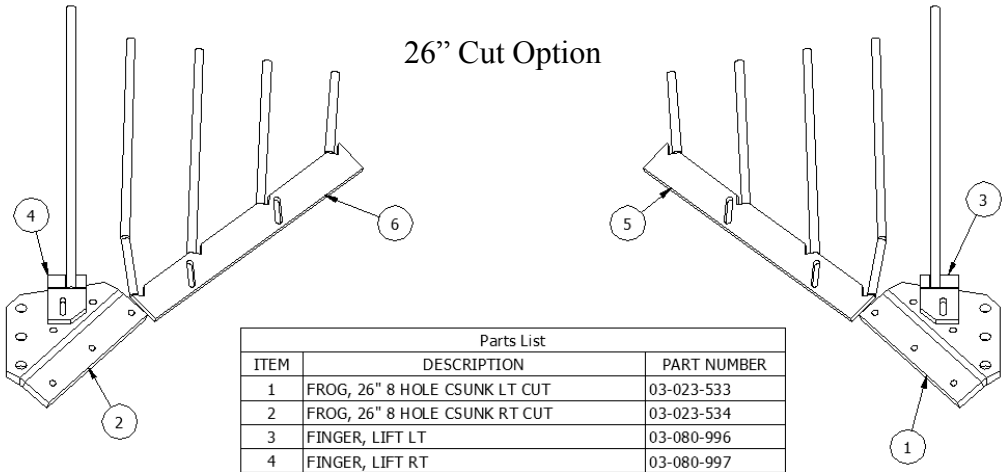
We offer different cut length options for the cut frogs to mount the blades and cut rods used to transfer the peanut vines to the conveyor. Shown below are all the different options we offer with a detailed description and visual of each one to better understand the repair parts needed when replacement is necessary. The cut frogs and rods used for the standard shanks are shown first for each different cut length that is available.

21” Cut Option



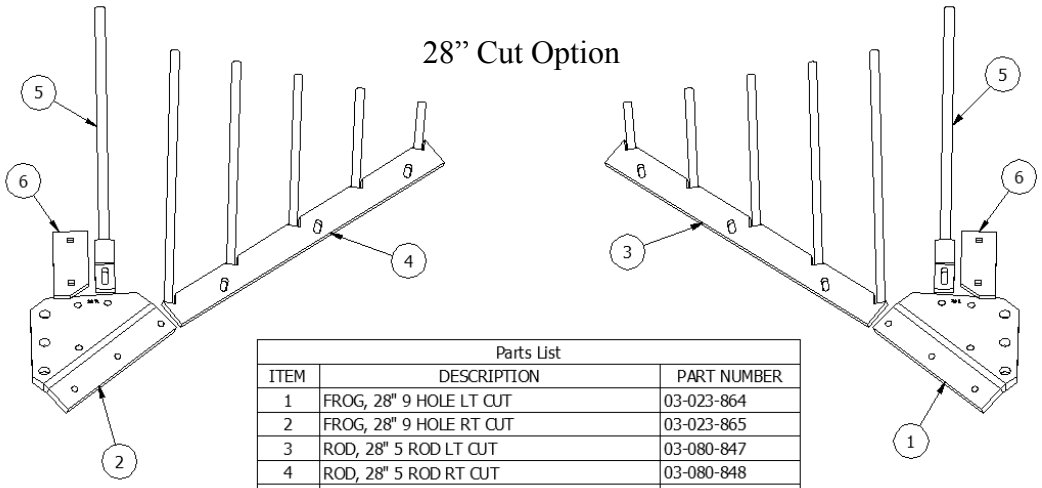
Parts List		
ITEM	DESCRIPTION	PART NUMBER
1	FROG, 21" 6 HOLE LT CUT	03-027-109
2	FROG, 21" 6 HOLE RT CUT	03-027-110
3	ROD, 21" 3 ROD LT CUT	03-080-014
4	ROD, 21" 3 ROD RT CUT	03-080-015

26” Cut Option



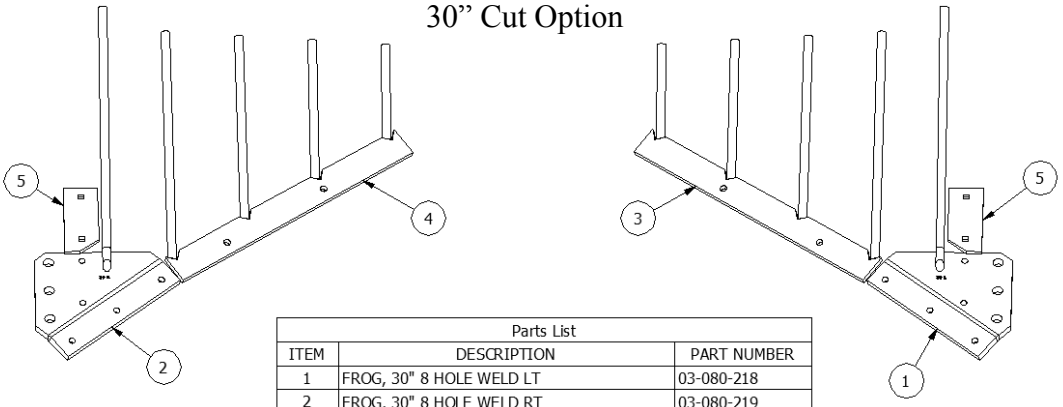
Parts List		
ITEM	DESCRIPTION	PART NUMBER
1	FROG, 26" 8 HOLE CSUNK LT CUT	03-023-533
2	FROG, 26" 8 HOLE CSUNK RT CUT	03-023-534
3	FINGER, LIFT LT	03-080-996
4	FINGER, LIFT RT	03-080-997
5	ROD, 26" 1 BENT, LG SLOT LT CUT	03-080-834
6	ROD, 26" 1 BENT, LG SLOT RT CUT	03-080-835

28” Cut Option



Parts List		
ITEM	DESCRIPTION	PART NUMBER
1	FROG, 28" 9 HOLE LT CUT	03-023-864
2	FROG, 28" 9 HOLE RT CUT	03-023-865
3	ROD, 28" 5 ROD LT CUT	03-080-847
4	ROD, 28" 5 ROD RT CUT	03-080-848
5	ROD, 28" FROG BOLT ON	03-080-849
6	SLIDE, 30" FROG	03-027-259

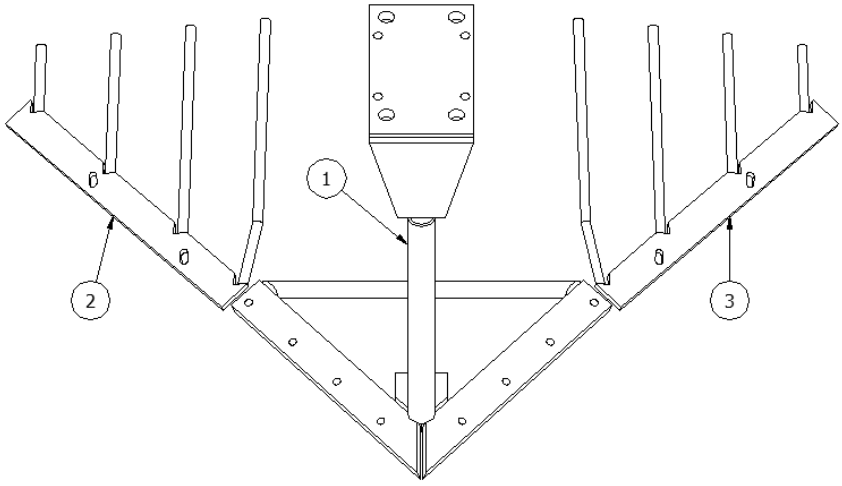
30” Cut Option



Parts List		
ITEM	DESCRIPTION	PART NUMBER
1	FROG, 30" 8 HOLE WELD LT	03-080-218
2	FROG, 30" 8 HOLE WELD RT	03-080-219
3	ROD, 30" 4 ROD STR LT CUT	03-080-220
4	ROD, 30" 4 ROD STR RT CUT	03-080-221
5	SLIDE, 30" FROG	03-027-259

Machines that use a rigid v-shank instead of the standard shank with cut frogs use a different cut rod that is mounted to the blade. It is shown below to show the differences between it and the other cut rods that are available.

Parts List		
ITEM	DESCRIPTION	PART NUMBER
1	SHANK, 26" RIGID	03-080-832
2	ROD, 26" 1 BENT SM SLOT LT CUT	03-080-071
3	ROD, 26" 1 BENT SM SLOT RT CUT	03-080-072



The following is a list of serial numbers issued to our machines at the beginning of each year. To determine when a unit was made, find the range within which the particular serial number falls. It would have been produced between January 1 to December 31 of that year.

YEAR	SERIAL NUMBERS
1985	27986-29695
1986	29696-31095
1987	31096-33234
1988	33235-35548
1989	35549-38496
1990	38497-41771
1991	41772-44466
1992	44467-47001
1993	47002-48750
1994	48751-51549
1995	51551-54262
1996	54263-56661
1997	56662-59465
1998	59466-62097
1999	62098-63986
2000	63987-65692
2001	65693-67340
2002	67341-68699
2003	68700-70482
2004	70483-72646
2005	72647-74866
2006	74867-76368
2007	76369-77883
2008	77884-79891
2009	79892-80944
2010	80945-81775
2011	81776-83453
2012	83454-85092
2013	85093-86418
2014	86419-

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