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Dear Customer,

Congratulations on purchasing a quality designed and manufactured Pik Rite cucumber harvester!

You should expect a return on your investment in the form of excellent crop recovery, affordable parts and minimum maintenance.

Should your harvester need parts or service, we have a team that is fully equipped and committed to meet your needs.

In order to maintain quality performance of your Pik Rite harvester, it is extremely important that all the information in the manual be reviewed and studied carefully before operation.

Thank you for buying a Pik Rite cucumber harvester!

Sincerely,  
Elvin Stoltzfus, President

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## **Company History**

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Pik Rite, Inc., is a designer and manufacturer of innovative, quality-built vegetable harvesting equipment, Ag manure spreader, and commercial waste handling equipment. Located 2 miles west of Lewisburg in Union County, Pennsylvania, Pik Rite operates from manufacturing facilities that encompass 33,000 square feet in addition to office space utilizing an additional 2700 square foot area. Elvin Stoltzfus and Joe Yoder, Pik Rite's original founders, have diverse backgrounds in farming and welding shop activities. Pik Rite was incorporated in July 1986 and presently employs approximately 35 people.

In 1983, the first vegetable harvesting machine was built for the purpose of providing a mechanical method of picking tomatoes for the local processing industry. After three years of testing and modifying the original machine, three Pik Rite harvesters were built in 1986. Two more machines were subsequently manufactured in 1987 and again in 1988. Activities in 1989 were limited to research and further development of the tomato harvester, with concentration in several areas, including a new forced balance shaker system. As a result of these efforts, Pik Rite now holds a patent for a Double Brush Shaker System.

During the 1990's, Pik Rite experienced steady growth in product sales, market coverage, and technological innovations. The pull-type design of the tomato harvester has allowed the growers who purchase the machines a great degree of adaptability for harvesting in different growing environments. Pik Rite has subsequently developed and added new product lines for harvesters that can be used to pick cucumbers, peppers, gourds, zucchini, squash, and pumpkins. A vine windrower was developed in 1994 to assist the growers in preparing for the harvest by rearranging vines prior to picking to allow for more efficient harvesting. In the fall of 1997, Pik Rite introduced a new product to the marketplace - a plastic lifter/wrapper. This piece of equipment will allow fast, efficient removal of plastic mulch from the fields after harvest, and will result in disposal cost savings for the grower. In 1998, Pik Rite initiated its product line diversification plans and began to manufacture vacuum tanks for use in commercial waste handling activities. In 2000, Pik Rite made the decision to manufacture the Hydra-Ram manure spreaders, formerly known as the John Deere Hydra-Push Spreader. In 2001, Pik Rite began manufacturing a vine diverter, which is used primarily in the California market to move the tomato crop from one row to the adjoining row.

### **Markets**

Pik Rite, Inc. is the preeminent seller of tomato harvesters and vegetable harvesting equipment in the Midwest and Eastern sections of North America, including Ontario, Canada. Machines are also presently being used to harvest a variety of crops in Southeastern US, Texas, New Mexico, California, Colorado, and Washington. In addition to the Canadian market, Pik Rite harvesters have also been exported to Russia, Australia, Mexico, Brazil, Israel, Turkey, Spain and Germany.

Pik Rite is currently selling its complete line of equipment throughout the United States and abroad.

As the United States manufacturing sector enters the 21st century, Pik Rite continues to lead the way with production of efficient, dependable equipment, which provides its customers with the best value for the dollar. In the agricultural area, the Commonwealth of Pennsylvania has recognized these efforts as Pik Rite, Inc. was presented with the state's Agribusiness Achievement Award in January 1997.

## - INTRODUCTION -



This safety alert symbol identifies important safety messages in this manual. When you see this symbol, be alert to the possibility of personal injury and carefully read the message that follows.

"Right-hand" and "left-hand" sides are determined by facing in the directions the cucumber harvester will travel.

Record your cucumber harvester serial number in the space provided below:

S. N. \_\_\_\_\_ Purchase Date

Please review the warranty for this cucumber harvester which appears on the harvester order that was signed when the harvester order was placed. This warranty provides you the assurance that Pik Rite will back its products where defects appear within the warranty period. Pik Rite also provides field improvements, in some circumstances without charge to the customer, even if the product's warranty is expired.

Warranty and field improvements are a part of Pik Rite's product support program for customers who operate and maintain their equipment as described in this manual. If the equipment is abused or modified causing a change in its performance beyond the original factory specifications, the warranty will become void and field improvements may be denied.

For information and service call or write to:

Pik Rite, Inc.  
60 Pik Rite Lane  
Lewisburg PA 17837  
800-326-9763 (within the US)  
570-523-8174  
[www.pikrite.com](http://www.pikrite.com)

## NOTES

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**Section 1**  
**SAFETY**

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# SAFETY

The operator's safety was one of the prime considerations in the minds of Pik Rite engineers when they designed the cucumber harvester. Shielding, simple adjustments, and other safety features were built into the cucumber harvester wherever possible.

**WARNING: Modifications to the cucumber harvester may adversely affect its safety features as well as its efficiency and longevity.**

## Recognize Safety Information

This is the safety-alert symbol. When you see this symbol on your machine or in this manual, be aware of the potential for personal injury.

**Follow recommended precautions & safe operating practices.**



## Understand Signal Words

A signal word—DANGER, WARNING or CAUTION—is used with the safety-alert symbol.

- DANGER identifies the most serious hazards.
- DANGER or WARNING safety signs are located near specific hazards. General precautions are listed on CAUTION safety signs.



## **Follow Safety Instructions**

**Carefully read all safety messages in this manual and on your machine safety signs.**

- Keep safety signs in good condition.
- Replace missing or damaged safety signs.
- Be sure that all new equipment components and repair parts include the current safety signs. *Replacement safety signs are available from Pik Rite.*
- Learn how to operate the machine and how to use controls properly.

**CAUTION:** *Do not allow anyone to operate your machine without instruction.*

- Keep your machine in proper working condition. Unauthorized modifications to the machine may impair function and/or safety and affect machine life.

**NOTE:** *If you do not understand any part of this manual and need assistance, please contact your Pik Rite representative.*



## **Operate Cucumber Harvester Safely**

All machinery must be operated by responsible persons who have been properly instructed and delegated to do so.

- Do not stand or work under discharge conveyor or header while harvester is operating.
- Do not stand between harvester and tongue while positioning tongue.

**WARNING: The harvester may move suddenly or fall while detaching. Use blocks under the wheels and release all stored energy from pickup float system before detaching harvesting unit.**

- Do not put hands or feet between tongue and frame opening while positioning tongue.
- Always operate machine at rated PTO speed.

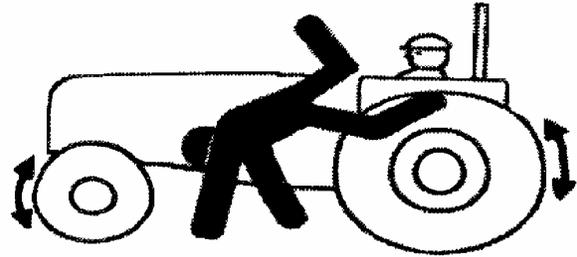
**WARNING: To avoid injury or death, disengage drives, shut off engine, and make sure electrical power off before servicing or unplugging the cucumber harvester.**

- The disks and chains can feed cucumber plants faster than you can release your grip on the plants.
- Do not use your hands or feet to feed plants into the harvester.
- Do not stand between cucumber harvester and tongue when detaching harvester.

**WARNING: This cucumber harvester is intended for mobile field operation only. Never use machine in a stationary position or modify it to be used as one.**

### **Keep Riders Off Machine and Tractor**

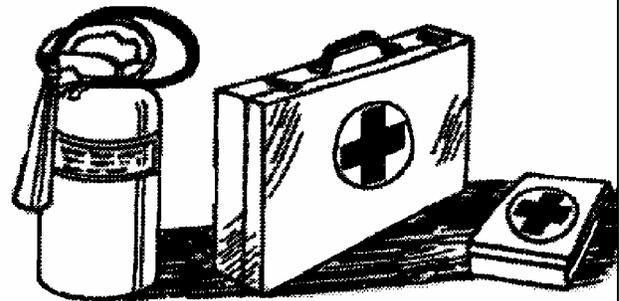
- Allow *only* the operator on the tractor and *only* the laborers in the places designed for them. Keep riders off.
- *Riders on machine are subject to injury such as being struck by foreign objects and being thrown off of the machine.*
- *Riders also obstruct the operator's view resulting in the machine being operated in an unsafe manner.*



### **Prepare for Emergencies**

Be prepared if a fire starts.

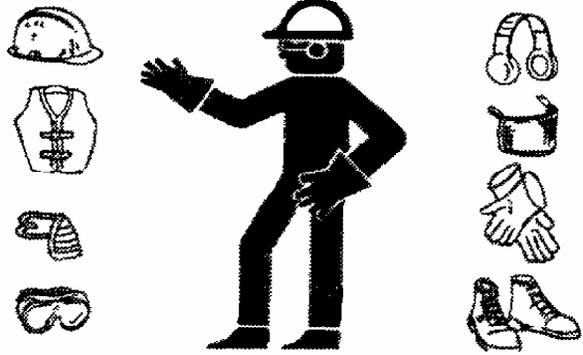
- Keep a first aid kit and fire extinguisher handy.
- Keep emergency numbers for the ambulance service, hospital, fire department, and doctors near your telephone.



### Wear Protective Clothing

- Wear close fitting clothing and safety equipment appropriate to the job.

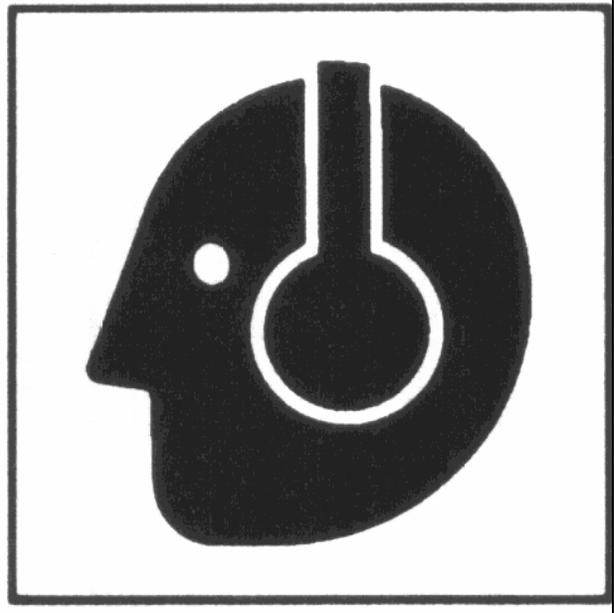
**CAUTION:** *Do not wear radio or music headphones while operating machine. Operating equipment safely requires the full attention of the operator.*



### Protect Against Noise

**WARNING:** Prolonged exposure to loud noise can cause impairment or loss of hearing.

- Wear a suitable hearing protective device such as earmuffs or earplugs to protect against objectionable or uncomfortable loud noises.

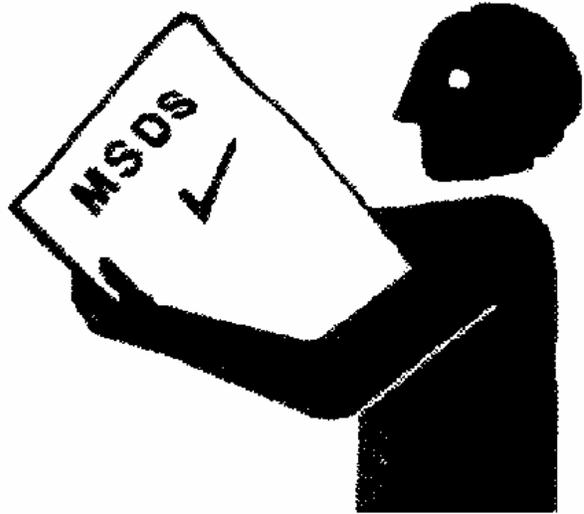


### Handle Chemical Products Safely

**WARNING:** Direct exposure to hazardous chemicals can cause serious injury. Potentially hazardous chemicals used with Pik Rite equipment include *lubricants* and *paints*.

- A Material Safety Data Sheet (MSDS) provides specific details on chemical products: physical and health hazards, safety procedures, and emergency response techniques.
- Check the MSDS before you start any job using a hazardous chemical. That way you will know exactly what the risks are and how to do the job safely. Then follow the advised procedures and make use of the recommended equipment.

**NOTE:** Contact the Pik Rite Lewisburg, PA office for MSDSs on chemical products used with Pik Rite equipment.



### Stay Clear of Rotating Drive lines

**WARNING: Entanglement in rotating driveline can cause serious injury or death.**

- Keep the tractor master shield and drive line shields in place at all times. Make certain that rotating shields turn freely.
- Wear close fitting clothing. Stop the engine and be sure that the PTO drive line is stopped before making adjustments, connections, or cleaning out the PTO-driven equipment.

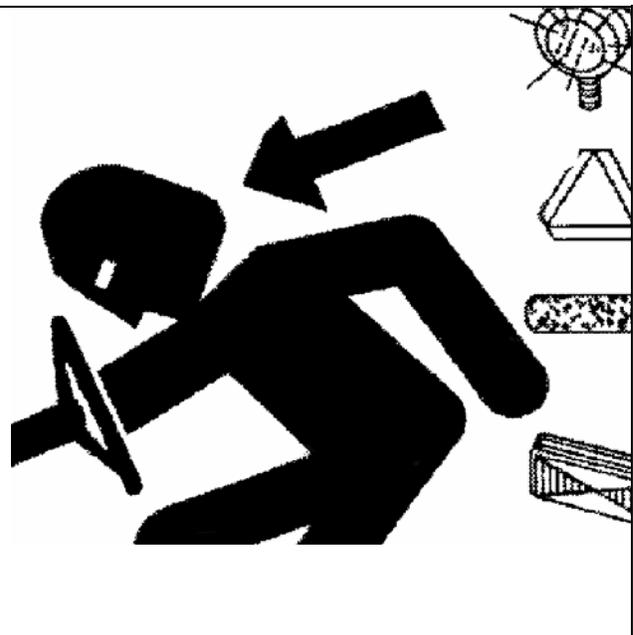


### Use Safety Lights & Devices

**WARNING: Slow moving tractors and towed implements are difficult to see, especially at night, and may create a hazard when driven on public roads.**

*Avoid personal injury or death resulting from collision with a vehicle.*

- Use flashing warning lights and turn-signals when driving on public roads.
- To increase visibility, use the lights provided with your machine.

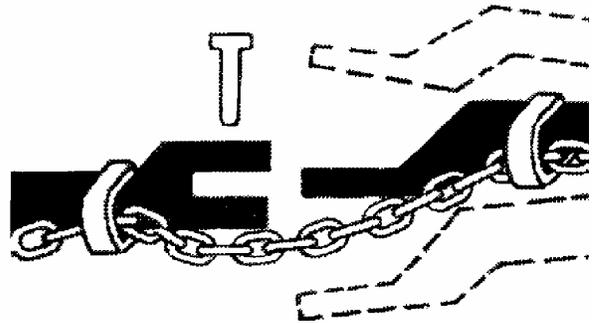


### **Use a Safety Chain**

A safety chain will help control drawn equipment if it accidentally separates from the drawbar.

- Attach the chain to the harvester main frame and the tractor drawbar support or another specified anchor location. Provide only enough slack in the chain to permit turning.
- Use a chain with a strength rating *equal to or greater than the gross weight of the cucumber harvester* (approximately 24,000 lbs.).

**CAUTION:** *Do not use the safety chain for towing.*

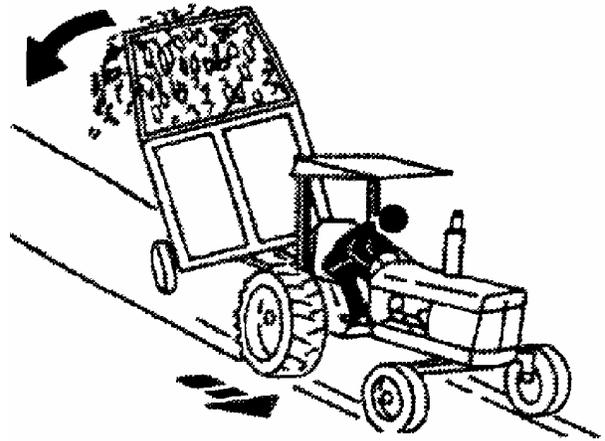


### Reduce Speed When Towing Loads

**DANGER:** Braking to stop towed loads from transport speeds can cause the towed load to swerve and upset. Reduce speed if towed load weighs more than the tractor and/or the tractor is not equipped with brakes.

Follow recommended speed-weight ratio guidelines:

- Maximum speed is 20 mph (32 km/h) when towing a load equal to or less in weight than the tractor.
- Reduce speed to 10 mph (16 km/h) when towing a load up to double the tractor weight.
- Do not tow loads exceeding double the tractor weight.
- Use additional caution when towing loads under adverse surface conditions, when turning, and on inclines.



## **Practice Safe Maintenance**

Understand service procedure before doing work. Maintain cleanliness and dryness in work area.

- Never lubricate or service the machine while it is in motion.

**WARNING: Be sure to keep hands, feet, and clothing away from power-driven parts.**

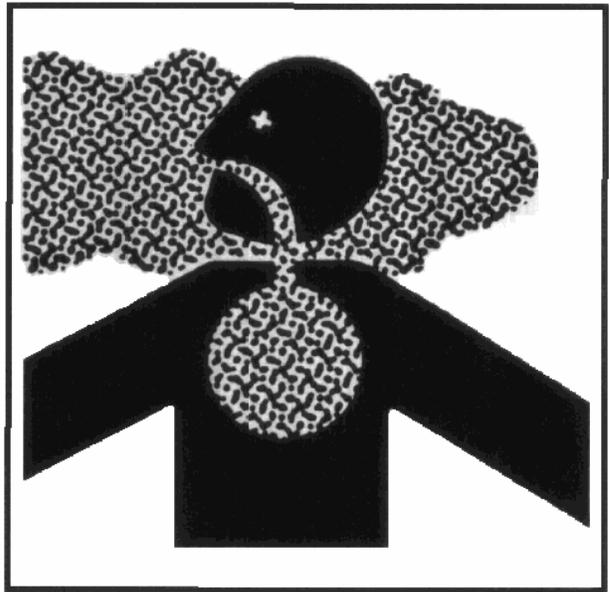
1. Disengage all power and manipulate controls to relieve pressure.
  2. Lower equipment to the ground.
  3. Stop the engine.
  4. Remove the key.
  5. Allow machine to cool.
- Securely support any machine elements that must be raised for service work.
  - Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Remove any buildup of grease, oil, or debris.
  - Disconnect battery ground cable (-) and unplug main power supply cord on sorter before making adjustments on electrical systems or welding on machine.



### **Remove Paint Before Welding or Heating**

**WARNING:** Avoid potentially toxic fumes and dust. Hazardous fumes can be generated when paint is heated by welding, soldering or using a torch.

- Do all work outside or in a well-ventilated area. Dispose of paint and solvent properly.
- Remove paint before welding or heating.
- If you sand or grind paint, avoid breathing the dust. Wear an approved respirator.
- If you use solvent or paint stripper, remove stripper with soap and water before welding.
- Remove solvent or paint stripper containers and other flammable material from the area.
- Allow fumes to disperse at least 15 minutes before welding or heating.



**Avoid Heating Near Pressurized Fluid Lines**

**WARNING:** Flammable spray can be generated by heating near pressurized fluid lines, resulting in severe burns to you and bystanders.

- Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials. Pressurized lines can be accidentally cut when heat goes beyond the immediate flame area.

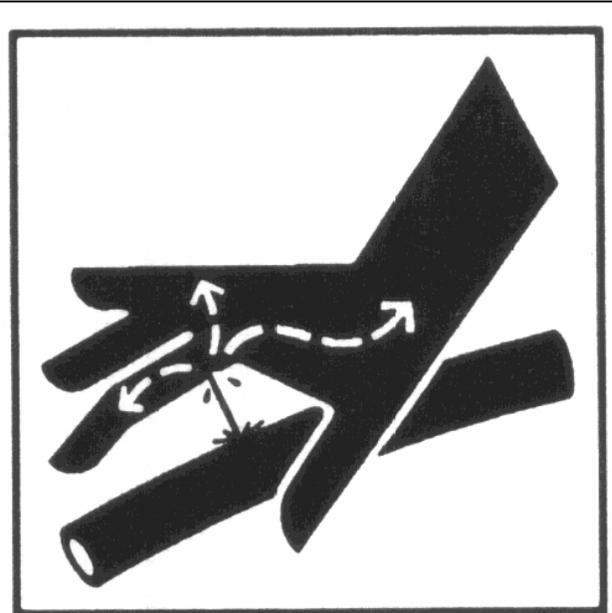


**Avoid High-Pressure Fluids**

**WARNING:** Fluid escaping under pressure carries the potential to penetrate the skin resulting in serious injury.

- Avoid this hazard by relieving pressure before disconnecting hydraulic or other lines. Tighten all connections before applying pressure.
- Search for leaks with a piece of cardboard.
- Protect hands and body from high-pressure fluids.
- If an accident occurs, see a doctor immediately.

**WARNING:** Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source.



## NOTES

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**Section 2**  
**PREPARATION, OPERATION & MAINTENANCE**

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# PREPARING THE TRACTOR

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## **2 - 1: Remove Tractor Drawbar**

The harvester is attached to the 3 point arms. When the tractor is shut down, it is best to remove the drawbar to avoid damage to the PTO shaft when the arms drift down. The harvester is designed to use either Category 2 Heavy duty or Category 3 and most of the “quick attach” designs associated with Category 3. 1-7/16” pins are supplied with the machine. The top link of the 3 point tractor system is not used however when using “quick attach” systems. The top adjusting arm may need to be adjusted all the way in (shortest position). This will avoid interference of the top hook with the machines hydraulic hoses.

The sway blocks on the tractor 3 point arms must be adjusted to ½” or less sway when attached to the harvester. Shims can be placed on the 1-7/16” connecting pins of the machine or the tractor manufacturer can supply the proper sway blocks. The maximum measurement on the harvester at the 1-7/16” pins is 44.00 inches and the minimum is 32.00 inches. After the proper adjustments to the 2 arms and the safety bolts are secured on the 1-7/16” pins, the machine can be lifted by raising the 3 point arms.

## **2 - 2: Power Take-Off Shaft**

The tractor must have a PTO speed of 1000 RPM to match the power shaft speed of the harvester. The harvester operates at 1000 RPM (max.). Optimum speed is 850 RPM. That generally means operating the tractor engine at 1900 - 2200 RPM. [Note: This is assuming that Pumps, Motors, and other Components are NOT excessively worn (after hours of use) and are operating correctly.] PTO energy consumption is at approx. 135 HP at 1000 RPM. A 190 HP tractor is the minimum required.

The Pik Rite uses a 1-3/4 - 20 spline PTO yoke.

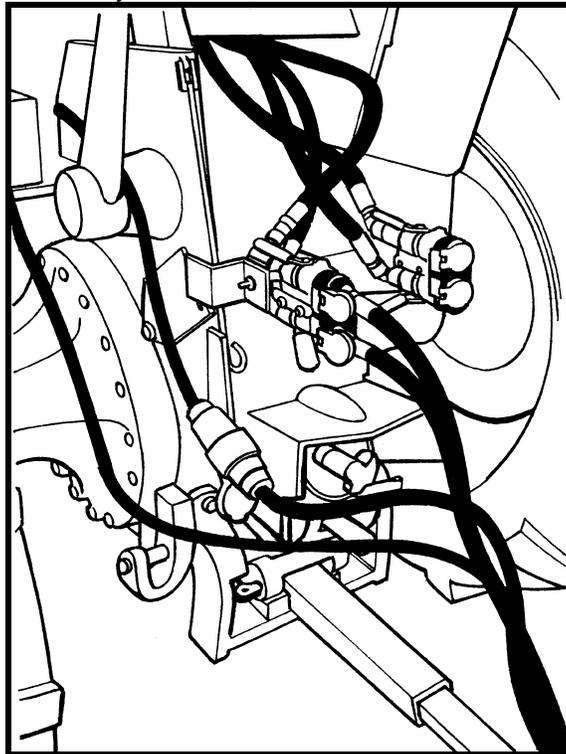
1. Before attaching the PTO to the tractor, be sure that the shaft is greased & can slide freely in the tube.
2. Attach the PTO to the tractor.
3. Be sure that the PTO lock pin or latches are securely locked into the tractor's PTO shaft.
4. For longer PTO life, it should operate in the straightest position possible. However it can be operated safely with the rear PTO yoke approx. 3” lower or higher.



**CAUTION:** The machine operator must be aware of the height of the 3 point arms and be within this range or damage may occur to the PTO shaft.

## **2 - 3: Hydraulic Power**

The Pik Rite harvester relies on the tractor hydraulics to control the machine cylinder functions. A valve body located on the machine is equipped with an in-and-out hose that must be connected to the hydraulic outlets at the rear of the tractor.



In order to make the harvester compatible with any brand of tractor\*, Pik Rite designs the harvester for operation in the *continuous flow mode*. This allows the farmer to use any brand of tractor\*. The Pik Rite Cucumber Harvester requires a...

- Minimum of 12 gallons per minute & 2500 PSI
- Maximum of 18 gallons per minute & 3000 PSI
- The back pressure of the return line should not exceed 200 PSI

Follow the tractor manufacturer's instructions for:

### **CONNECTING AN ORBITAL HYDRAULIC MOTOR**

Connecting a hydraulic motor is identical to connecting the hydraulics to the Pik Rite Cucumber Harvester.

## **2 - 4: Electrical Power (2 Hook Ups)**

The Pik Rite Harvester relies on the tractor's electrical system. At the minimum, a 150-amp alternator is required to keep the voltage constant during night-time operations. Operating during the day without the lights requires less amperage. The connection uses the 7 pin plug outlet at the rear of the tractor. This supplies electricity to the warning flasher and to the electric over hydraulic valve.

With the tractor engine running at PTO speed, and lights, air conditioner, and other high Volts/Amp components switched ON, check the voltage at the battery. The voltage should be between +12.5 Volts D.C. to +14.5 Volts D.C.

Also check for AC current. This must not exceed .05 Volts AC Voltage above this indicates that the "Ground" to the battery may be faulty and/or NOT functioning properly or the tractor alternator has a bad rectifier & needs replacement.

- A *Fluke meter* is the preferred tester, accurate enough to test AC stray voltage.

### **To trouble shoot the magnetic sensors:**

The magnetic sensors located at the various shaft locations must be 1/8" clearance between the rotating magnet and the stationary plastic sending unit.

# PREPARING THE HARVESTER

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## **3 - 1: Unpacking the harvester**

1. Slide and unfold the outside deck and secure.
2. Install the hand rail.

**WARNING:** Raise elevation first. Unfold bin and flip side panels into place.

## **3 - 2: Oil Levels**

1. Be sure the main hydraulic reservoir is above the low line on the level / temperature indicator located at the front of the reservoir.
2. Check oil in the 2 pad gear box at the hydraulic plugs.
3. Turn all of the flow controls to the off position (turned all the way in). There are approx. 17 controls, depending on how the machine is equipped.

## **3 - 3: Final Preparations**

1. Start the PTO at low RPM.



**CAUTION:** *Always have a tractor operator on the seat and prepared to disengage the PTO when making the following observations and flow control adjustments.*

2. Check for oil leaks in the event that a hydraulic fitting is loose or broken.
3. Check to be sure that the oil cooler fan located on the top of the machine is turning counterclockwise therefore blowing air upward.
4. One by one, open each flow control to the #1 position and observe how it functions. Be sure the component runs freely and without misalignment.
5. Slowly increase the speed to the desired setting. Later, while in actual field conditions, fine adjust to meet requirements.

# OPERATING THE HARVESTER

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**CAUTION:** *Operating the Pik Rite Harvester requires much attention to detail. The operator must remain attentive to avoid injury to the crew or damage to the machine!*



**DANGER:** To preserve life and limbs of crew cleaning the machine, the tractor operator must always warn them before engaging the PTO.

- This warning needs to be understood by all crew members.
- The harvester comes equipped with an alarm on the harvester and in the operator's Control Box (in the tractor).
- Operators should sound the Alarm or a signal from the tractor when ready to start and then wait for an "all clear" response from the crew before engaging the PTO.
- Crew members working on the harvester should sound the Alarm by pulling on Alarm Cord, located directly above the sorting area, to inform the operator and/or other crew member of Danger

## 4 - 1: Starting Speed Settings

Speeds of conveyors and components will vary a great deal with field conditions. There is no prescribed speed at which to set the flow controls. However, there is an approximate start-up setting, and the operator needs to adjust as needed for conditions.



**CAUTION:** *Never leave the machine running while getting off the tractor and adjusting the speed setting. Unless a technician on the machine is prepared to make the adjustment while running, always stop the PTO while making adjustments.*

The Pik Rite Harvester may be operated at a maximum speed of 1000 PTO RPM or a minimum of 800 (Ideal field & harvester conditions) PTO RPM.



**CAUTION:** *Idle the tractor down to engage and disengage the PTO. If the PTO is engaged or disengaged at high RPM, the pressure spikes may cause unnecessary wear to the hydraulic pump.*

Speed control valves control all of the hydraulic motors except the cooling fan motor. These valves control speed by monitoring the amount of oil that is allowed to pass through the motor. The unused oil is passed around the motor. Both the bypassed oil and the oil that has passed through the motor flow together down-line to the next flow control valve, where the process is repeated.

- There are six pump sections; hence there are six hydraulic circuits (Excluding the hydraulic lift cylinder circuits). Each circuit has three to seven motors running in series.
- The pump is a *constant displacement* pump, which means that when the PTO is engaged, each section is pumping approx. 12 or 24 GPM, depending on the gear width and PTO RPM. It pumps the same amount of oil at high or low pressures. Consequently, the pumped oil must always have a channel to return to the reservoir because it is constantly moving through the circuit.
- All six of the circuits empty into the oil coolers (mounted on top of the machine), are cooled, and sent through the filter back to the oil reservoir.
- Because the hydraulic motors are controlled by flow control valves, operating the tractor at higher RPM speeds will not necessarily result in faster operation of the harvester. *Higher operating speed is obtained by setting the flow control lever to a higher number.*
- Ideally, the operator should set the flow controls to the desired speed and match the tractor RPM to the amount of oil required. Higher engine speed only causes more oil to bypass the motor, resulting in a waste of energy, more heat in the system, more wear, and general inefficiency.

The estimated start-up settings are as indicated in chart 4A. They are given in number of rotations from the closed position and in inches of threads showing above the jamb nut. (i.e. 4 Rotations – ¼")

**Chart 4A**

**Flow control setting**

Disk Pickup Header	4 R- 1/4 +
Header Chain	4 R- 1/4 +
Powered Dirt Vibrators	3 R- 1/4 -
Primary Shaker Rotator	1/2 R- 1/16"
Secondary Shaker Rotator	1/2 R- 1/16"
Primary Shaker Weights	3 R- 3/16"
Secondary Shaker Weights	3 R- 3/16"
Transfer/Cross Conveyor	4 R- 1/4 +
Debris Fan	3-1/2 R-1/4"
Elevation Conveyor	3 R- 3/16"
Vine Chain	4 R- 1/4 +

**NOTE:** More detailed settings are described in the following sections.

## **4 - 2: Disk Pickup Header**

**It is important to keep a steady-to-thin flow of cucumber plants through the header.**

- The Disk Pickup Header is to skim the ground just under the cucumber plants taking in as little of dirt/mud as possible without product loss.
- Each gathering disk is independently controlled and thus the header flexes from side to side controlling the depth of each disk independently. *The operator must watch closely and control both the right and left gathering disks.*



**CAUTION:** *The header on your machine has been designed to flex for better operations. However, flexing the head in excess will cause stress and premature damage to your machine.*

- *The maximum difference from side to side should not exceed 6 inches.*
- *To avoid uneven drifting of the hydraulics, rest the header on the ground when parking the machine.*

## **4 - 3: Header Chain**

Adjust to keep steady flow of vines feeding shaker.

## **4 - 4: Powered Dirt Vibrators (Header & Transfer)**

As the vines and cucumbers travel up the header chain, they go through the dirt vibrator tunnel (or the Overhead Vine Assist Option). The operating speed of the vibrator varies according to field conditions and vine mass.

**CAUTION:** *The operator must prevent rollback or bunching of the vines as well as over-speeding the vibrator. The bunching of vines results in inefficiency and fruit loss as it passes through the harvester. Over-speeding the vibrator causes excessive wear to the header chain and vibrator rollers.*

## **4 - 5: Primary Shaker**

The Pik Rite Harvester is designed to allow the operator to observe the rotation and movement of the *primary and secondary shakers* from the tractor seat. There are two points of control on these shakers: 1) weight speed and 2) rotation speed.

1. The weight speed controls the *intensity* of the shake (more RPM = more vigorous shake).
2. Rotation speed controls the *speed* of the entire shaker drum, thus controlling how long the vines remain on the shaker. With slower rotation speeds, the tomato vines take longer to ride over and out of the shaker.

3. Initial start settings: for primary weights, set flow control in middle. For primary rotation of drum, begin at one revolution every 10-12 seconds or 5 to 6 RPM.

### Special Conditions

Conditions vary drastically according to the field, the day, and the variety of cucumber plant. By keenly observing the shaker and outflow of vines, the operator will learn very quickly how and when to make minor adjustments.

- In viney weed conditions (morning glory), slow the shaker rotation.
- In heavy cucumber vines increase the primary shaker rotation speed, thus keeping a thinner layer of vines on the shaker.
- Regularly clean the dirt build-up from the shaker drum & side panels.

Primary Shaker Hood: Generally, the hood must be very close ( $\frac{1}{2}$ " to 1") to the shaker tines; some conditions require it to be lifted 3 to 4 inches higher.



**CAUTION:** Never allow the hood to operate while touching the tines. This will wear both the tines & hood prematurely.

### 4 - 6: Secondary Shaker

**CAUTION:** *If the secondary shaker rotation speed is too high, it may cause dragging under or wrapping of vines, etc. around the drum. For optimum performance adjust the rotation speed according to the speed of the Vine Chain.*

For additional information, refer to the preceding item **4 - 5: Primary Shaker**.

### 4 - 7: Transfer & Cross Conveyor

These conveyors are hard to see from the tractor seat but generally require little or no attention. Nevertheless, be aware of these suggestions:

- There is a pipe roller under the drive end of both of these conveyors. These rollers are equipped with scrapers on the bottom side to keep them clean. The operator should regularly clean the pinch point between the roller and scraper.

### 4 - 8: Debris Fan



**CAUTION:** *It is possible to over-speed the debris fan when operating high tractor PTO RPM.*

- Operate the *debris fan* at a speed that satisfactorily removes the vines and debris. *Do not over-speed or damage may occur. Max. speed: 1,800 RPM.*
- The operator can see from the tractor seat if all is well with the debris removal system and should regularly observe it as he travels down the row.
- Dirt buildup must be removed to keep the fan efficient.

#### **4 - 9: Vine Chain and Rear Transfer Conveyor**

These two conveyors in the shaker chamber work together to provide better separation of product and vines. The wide spacing of the bars, of the Vine Conveyor, allows product to fall from among the vines as soon as separated by the Primary Shaker and also around the Secondary Shaker. Operate the Vine Chain at a speed as to keep a consistent flow of vines flowing through the shakers.

#### **4 - 10: Hydraulic System**

The operator should periodically observe the normal running pressures of the hydraulic pumps as he moves down the row. A high-pitched squeal (Flow Control with Relief) or hissing sound indicates that a relief valve in the hydraulic system is opening because a conveyor or other component has stalled out. By installing a pressure gauge at one of the test ports and using the process of elimination, the operator can identify the problem component. When a jam-up occurs, the motors require more power and thus the pressure gauge registers more pressure.

To avoid problems:

- Keep oil cooler fans clean. Check weekly.
- Maintain hydraulic oil temperature at 150-160 degrees.
- Keep hydraulic oil level within 10" of top of reservoir.
- Change hydraulic oil filters each season. Check for water in oil by removing the magnetic plug at bottom of the reservoir. Also check for wear metals. Test Kits are available from your Pik Rite Dealer.

## MAINTAINING THE HARVESTER

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*Preventative maintenance is better than emergency repairs.*

### OPERATING AND MAINTENANCE TIPS:

- The nose cones of the gathering chains should not plow dirt. In elevated beds, the noses need to extend down into the furrows and lift the vine.
- Adjust the disk scrapers to eliminate dirt build up.

### 5 - 1: Gathering Chains

- Be sure the lap splice belts are not broken or worn.
- Keep the belt tension just tight enough to running smoothly--free and straight.

**CAUTION:** *Over-tensioning will wear all components prematurely.*

- Keep grass and vines from wrapping on drive sprockets and clean the build up at the pinch points. Grass and vines that wrap around the shafts at the bearings will damage the bearing seal and cause the bearings to fail.

### 5 - 2: Header

- Clean out build-up at pinch points.
- Check bolts on lap splices of header conveyor and gathering chains. These bolts, when dragged through the dirt and rocks, sometimes wear off prematurely.
- Lube roller chains daily (Conklin Lube Oil is recommended).
- Grease bearings once a week. You will find two grease fittings on the bearings of the drive shaft.

**REMINDER:** When harvesting in rocky fields, increase the clearance between the bottom of the disks and the top of the header chain by adjusting the header chain nose rollers down. This greater clearance allows rocks to pass around the nose rollers without pinching the header chain and disks.

### **5 - 3: Vibrators (Header & Transfer)**

The *vibrator* is an effective, high-wear tool. Use it with discretion, adjusting speeds to match the requirements of the job.

- Check regularly for loose or lost rollers.
- In the vibrator area, you will find *four* rollers. These rollers, which are adjustable in height, carry the weight of the chain.

**CAUTION:** *If the vibrator shaft rollers are too low, they will hit the conveyor chain too hard and cause rotating difficulty, especially if operating at low RPMs.*

### **5 - 4: Transfer Chain**

Check drive sprockets and lap splice bolts or clips for wear. Keep Return Roller area free of excessive mud and debris to avoid premature wear to the Roller, Chain bars and Clips, and to avoid restrictions of the air flow at the Debris Fan outlet.

### **5 - 5: Cross Conveyor**

Check drive sprockets and lap splice bolts or clips for wear. Keep Return Roller area free of excessive mud and debris to avoid premature wear to the Roller, Chain bars and Clips.

### **5 - 6: Primary Shaker**

The *primary shaker* is important in...

- Keep shaker drum clean.

**NOTE:** In some ground conditions, dirt builds up between shaker tine groups on the drum. This build up should not exceed 1" in thickness. Also, dirt builds up on the side of the shaker chamber. If not removed, it will wear flat spots on the outside shaker tines. Remove this dirt with a scraper.

- Always replace broken tines as soon as possible. The shaker loses efficiency when tines are broken.

**NOTE:** Before installing a new tine, be sure that the hole in the rubber holder is clean and free of dirt.

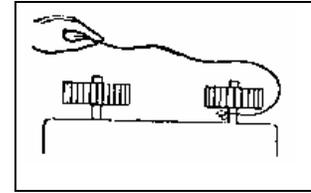
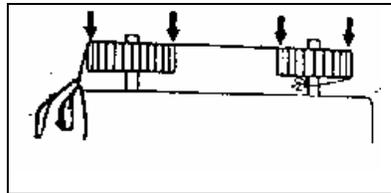
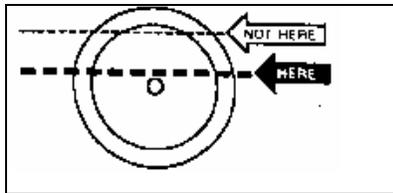
- When installing the new tine be sure to prevent the inner fiberglass rod from sliding into the rubber holder without the plastic coating.

- The primary shaker can be adjusted either forward or backward from the header chain.

**NOTE:** If harvesting in rocky fields, the gap should be widened to help avoid broken shaker tines. However, if the gap is widened too much, some plant varieties tend to fall down in front of the shaker and escape the separating action.

**NOTE:** If the conditions require, the Primary shaker may need to be adjusted forward by the turnbuckle at each side.

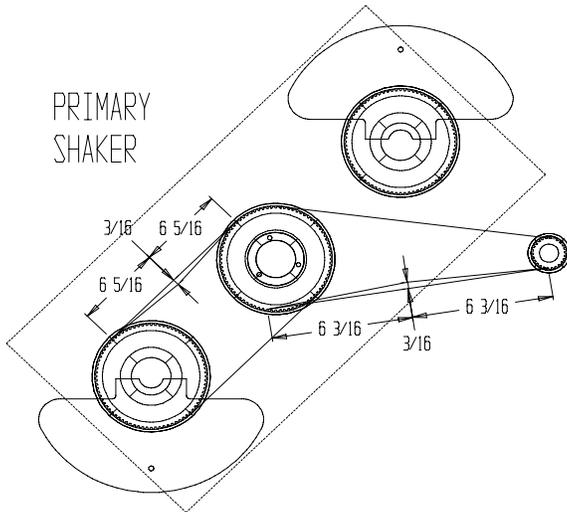
- Adjust shaker hood to 1" clearance above shaker tines; More clearance in heavy vines.
- *Daily:* Check the bolts on the rubber shaker drive at the motor.
- *Weekly:* Grease shaker bearings, check tension on drive belts, and watch for loose set collars or bolts (*refer to following shaker timing belt alignment diagram*).



**CAUTION:** Do not pry or otherwise force the belt onto the sprockets, as this can result in permanent damage to the belt. For easy installation, reduce the center distance between the sprockets.

## 5 - 6a: Shaker Belt Tensioning Procedure

Note: this procedure is for determining the proper belt tension for belts labeled (RPP Plus).



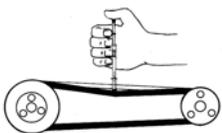
When belt replacement is necessary, refer to the Pik Rite service video for belt installation and weight timing procedures. Note that pulleys must be parallel. Misalignment causes uneven pressure on the teeth of the belt, uneven loading of the tensile member and extreme edge wear on the belt which can result in premature belt failure. Never pry or otherwise force belts onto pulleys as this can result in permanent damage to the belt.

Proper belt tension is chosen so as to avoid possible problems.

1. (Tooth Jump) assure that the belt is tensioned adequately to prevent tooth jump under the most severe load conditions that the drive will encounter.
2. (Extremely High Belt Tension) avoid extremely high tension which results in elevated noise levels and reduced belt and bearing life.

Getting started you will need a belt tension spring scale (Pik Rite Part # TL-470), a tape measure and a straight edge. Starting with one of the weight pulleys, position the weight in the box as to apply pressure to the belt and simulate belt load. At the center of the belt span, use your spring scale and measure the force to deflect the belt the dimension shown in the table below.

The drive belt should be measured on the bottom side of the belt. This is the torque side of the belt if the weights are spinning counterclockwise looking at the box. At the center of the belt span, use your spring scale and measure the force to deflect the belt the dimension shown in the table below.



**Belt Tension Spring Scale,**  
Pik Rite Part # TL-470

### Weight Belts

	Primary Shaker 35mm or 1 3/8" x 1280mm
Deflection using spring scale, in.	3/16
Force required for deflection, lb.	4 1/2 ± 1/2

### Drive Belts

	Primary Shaker 35mm or 1 3/8" x 1280mm
Deflection using spring scale, in.	3/16
Force required for deflection, lb.	4 1/2-1/2+0

## **5 - 7: Secondary Shaker**

Refer to Primary Shaker maintenance, section 5-7.

## **5 - 8: Debris Elimination System**

The Debris Elimination System etc. ...

- Check daily for cucumbers or dirt, both inside of and at the bottom of the fan housing.
- For peak efficiency, keep the housing and diffuser clean and smooth.
- Wash out the system with water periodically.

**CAUTION:** *Dirt build-up decreases the efficiency of the fan and cause vibration.*

- Watch out for build-up on the fan paddle assembly.
- Check the pipe-roller and scraper on top of the fan for dirt build up.
- Check the large debris belt to be sure it is turning freely.
- Clean the dirt build-up off of the top deflector hood.

## **5 - 9: Electro-hydraulic Valve & Control**

The electro-hydraulic valve is located at the front of the machine. A standard machine consists of 8 portions. Starting from the top, they include the following:

U - Unload with inlet & outlet ports

#1 – Upper Elevation

#2 – Middle Elevation

#3 – Dirt Gap

#4 – Outer Bin

#5 – Inner Bin

#6 - Sliding Hitch

#7 - Header Height (*outside*)

#8 - Header Height (*inside*)

The Machine is to be operated in *open center* mode only.

- For *open center*, the coil and cartridge should be installed in the unload section with the appropriate wire attached to the coil.
- A *check valve* in the inlet line permits the oil to flow through the valve in the correct direction. If the oil is flowing in the wrong direction, the valve will not work. A *high-pressure filter* in the inlet line removes dirt coming from the tractor. If the filter becomes clogged and oil bypasses the filter, a *bypass* (signified by a red pin on the top of the filter) pops up.
- In an *open center* application, tractor hydraulic oil is free flowing through the harvester valve body. When the electric switch is activated, an *electric coil* opens the spool to send oil to the hydraulic cylinder. However, the oil is still flowing freely.

Consequently, the *unload coil* must be employed at the same time to temporarily stop the free-flowing oil in order to build up the pressure needed to move the cylinder. The unload coil, therefore, is activated and deactivated simultaneously with the electric switch. (There are electrical diodes in the control box preventing electrical feedback through to other inactivated functions).

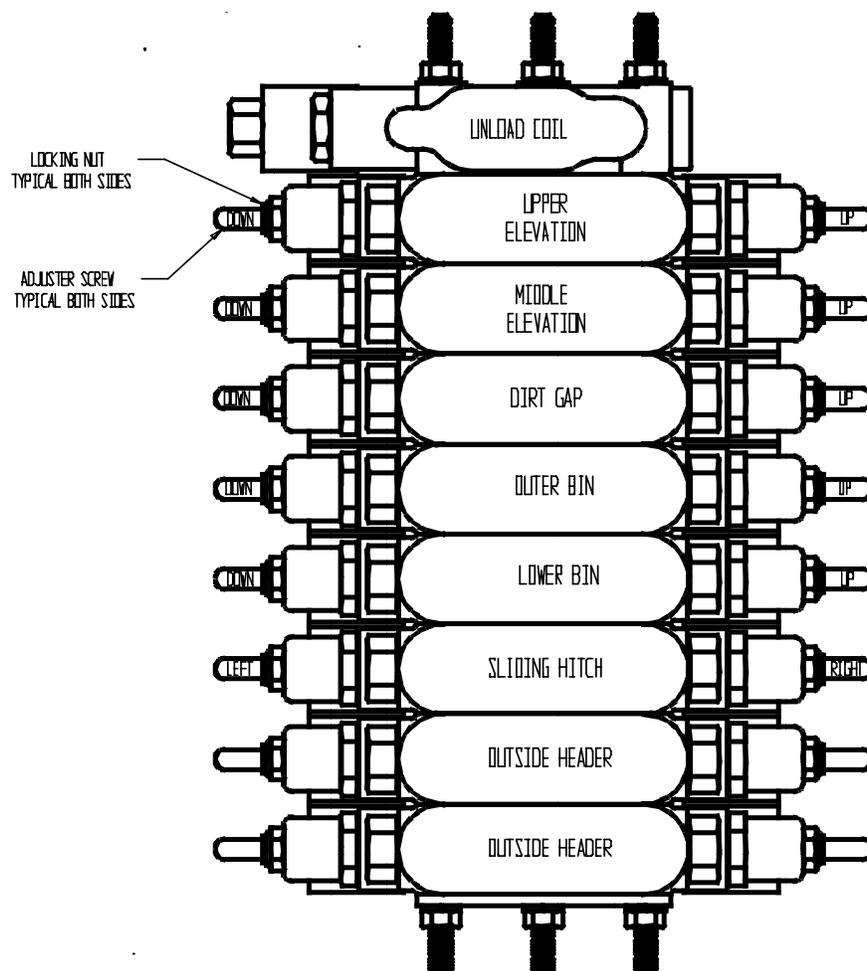
**NOTE:** In order to make the harvester compatible with any brand of tractor\*, Pik Rite designs the harvester for hydraulic operation in the open center mode. This allows the farmer to use any brand of tractor\* without the complications of changing the harvester valve body when switching tractors. The Pik Rite Cucumber Harvester requires the following:

- Minimum of 12 gallons per minute and 2500 PSI
- Maximum of 18 gallons per minute and 3000 PSI

**CAUTION:** *The backpressure of the return line should not exceed 200 PSI*

### CONNECTING AN ORBITAL HYDRAULIC MOTOR

Connecting a hydraulic motor is identical to connecting the hydraulics to the Pik Rite Cucumber Harvester.



## Cylinder Speed Adjustment:

To adjust cylinder speed, follow these steps:

1. Loosen locking nut (shown above).
2. To *decrease* cylinder speed: Turn adjuster screw (shown above) *clockwise* until desired speed is achieved.
3. To *increase* cylinder speed: Turn adjuster screw *counterclockwise* until desired speed is achieved.

## 5 - 10: Lubrication and Oils

1. Grease Points and Roller Chain Lubrication
2. Machine Hydraulic Oil and Maintenance

### Oil Specification

**NOTE:** *Viscosity and cleanliness are the most important items to consider in order to maintain long life in the hydraulic system.*

- Pik Rite recommends \*Hydrocarbon-based oils that will maintain a viscosity of 80-100 SUS (15-20CST) at operating temperatures.
- Start-up viscosity must not exceed 7500 SUS (1600 CST) and also must maintain \*ISO cleanliness levels of 19/17/14 or better.

### 1. Viscosity Requirements

Definitions:

- *Viscosity* is the measure of how a fluid resists flow.
- *Operating temperature viscosity* is the temperature at which oil does its work.

When viscosity *increases*, fluid becomes *thicker*, as the temperature *decreases*, fluid becomes *thinner*. This may cause problems.

**CAUTION:** *A viscosity must be selected that will flow freely and yet be thick enough to lubricate the moving parts in the pump and motors.*

- Pik Rite Harvesters are shipped with ISO grade 46 with viscosity index of a minimum of 90. Additives need to include rust and oxidation inhibitors and foam depressant. This is good grade oil for average daytime temperatures at harvest time.

- Any good quality, ISO, grade 46 oil or SAE 10 motor oil is acceptable, providing that the viscosity is within specification at operating temperatures and start-up temperature.
- If average daytime temperatures are above 95 degrees F and the machine's hydraulic oil temperature rises to 180 degrees F, Grade #46 viscosity may be too low. If this oil is too thin (viscosity too low), oil with ISO grade of 68 or SAE 15 may need to be installed.
- Mixing thicker oil (higher viscosity), such as SAE 30 or ISO 100, is a means of increasing the operating viscosity. After this is done, an oil sample should be sent to a lab for testing to insure proper viscosity.

**NOTE #1:** ISO standards allow up to 10% variation from a specification. An ISO grade 46 hydraulic oil can actually be 42 or 50 and be considered a grade 46.

**NOTE #2:** When using motor oils, non-detergent oil is preferred; however, detergent oil is not harmful. The detergents will tend to hold or suspend any moisture in the oil. Many hydraulic oils include in the additives a demulsifier which will encourage the water to separate and be drained off the bottom of the reservoir.

## 2. Cleanliness Requirements

- The components on the harvester must have an \*ISO cleanliness level of 19/17/14. This means that there must be fewer than 150 parts per milliliter in the 5 micron or greater size and fewer than 200 parts per milliliter in the 15 micron or greater size. (A human hair is about 70 microns in diameter and talcum powder is 10 microns.)
- Filters must maintain this level of cleanliness. Any filter may be used providing that the above results are achieved. The hydraulic oil must be "clear" and not "milky". A "milky" looking oil is a good indication that excessive water is present.
- To determine cleanliness level, send oil samples to a lab for analysis (a common procedure).

\*International Standards Organization

The most accepted fluid system contamination level designation in use today is the ISO "Solid Contamination Code" (ISO #4406). This format plots cleanliness levels (ISO Codes) based on particle counts at 5 and 15 micrometers per 100 ml of fluid under evaluation. An additional count at 2 microns is under review by ISO and likely to be adopted soon. Pik Rite has accepted this as a standard as of 4/15/95.

\*Hydrocarbon based

Hydrocarbon- (petroleum) based hydraulic fluids and straight oils are the most common fluids for hydraulic systems. The difference between a hydrocarbon-based hydraulic fluid and straight oil is generally the additive. Some automotive or crankcase motor oils with the proper additives can be acceptable.

## **5 - 11: Hydraulic Pump**

The Hydraulic system can be diagnosed and analyzed with some basic information. A phone call to a service man with this information may prevent breakdowns or permanent damage to the machine.

### **A. Analyzing Hydraulic Pump Pressures**

**NOTE:** Hydraulic pump pressures should be analyzed at operating temperature.

Observe and record the following:

1. Approximate outside temperature at time of tests \_\_\_\_\_
2. Approximate operating PTO RPM \_\_\_\_\_
3. Operator's customary engine speed when engaging the PTO \_\_\_\_\_
4. Machine's hydraulic oil temperature \_\_\_\_\_
5. Return filter pressure (located on filter base) \_\_\_\_\_
6. Machine's hydraulic pressures while running in the field \_\_\_\_\_
7. Stall-out pressures of each pump section (relief valve setting) \_\_\_\_\_

**NOTE:** Pressure ports are on main relieve valve manifold.

**NOTE:** Stall out pressures can be determined by stalling a motor in the section tested.

**CAUTION:** *Before attempting to stall out any motor, disengage PTO and turn the Flow Control to off position.*

- Use a pipe wrench on the motor coupler, start PTO at low RPM, and open Flow Control slowly.
- Observe the pressure, and record it.
- Call or send this information to a Pik Rite service technician. This information will help in determining the condition of the hydraulic system.

### **B. Setting Pressures on Hydraulic Relief Valves**

- Oil temperature should be approximately 100°.
- PTO speed should be approximately 900 RPM.
- Install the P valve gage on the various test ports located at the front of the harvester.
- Pressures are Factory Set; Consult Pik-Rite/Dealer before resetting.

### **C. Analyzing Hydraulic Pump Flows**

Install a flow meter at the pump and record pump output (GPM) at different pressures; i.e. 1500 PSI, then 2500 PSI, etc., note the GPM's at each pressure setting.

**NOTE:** Pik Rite service personnel have flow meters.

**NOTE:** Test should be performed with PTO at aprox. 900 RPM and oil temperature at 100 degrees or more and with flow controls wide open on the components being checked.

## **5 - 12: Checklist**

**NOTE:** *Owner / operator may add to this list at his own discretion*

### Daily

- ▶ For all safety shields/decals in place, and harvester is in safe working condition including lights and horn
- ▶ Grease all (10) hour grease points
- ▶ Tires
- ▶ All belted chain rollers for rotation, and excessive wear
- ▶ Bent belted chain rods
- ▶ Wear of vibrator rollers
- ▶ Shaker belt alignment, tension and weight timing (primary & secondary)
- ▶ Weight belt pulley teeth clean and free of debris
- ▶ Shaker fingers, tips and broken
- ▶ Fins on oil cooler for cleanliness
- ▶ Flat conveyor belts for tension, alignment/wear (edges and v-guide)
- ▶ Roller chain sprockets set screws/ taper bushing secure, also assure key is in place
- ▶ Oil level and temperature in oil reservoir
- ▶ Assure all points such as belted chains etc Are not rubbing side panels, shields or other that could cause premature wear

### Weekly

- ▶ Grease all (50) hour grease points
- ▶ Lubricate roller chains (when chains are warm if possible), disk drive (2) header drive (1) header return roller drive (1) cross return roller drive (1) aftersort rolling shaft drive (1) and other options if equipped
- ▶ All tire pressures
- ▶ Wear on header return roller (adjust hold up rollers on belted chain to prevent wear)
- ▶ Alignment of belted chain and sprockets within the conveyor
- ▶ Tension and wear of roller chains
- ▶ Shaker drive coupler bolts, and rubber donut wear/alignment
- ▶ Taper lock bolts on shaker center shafts
- ▶ Center rocker bolts (center of big wheel rockers) (2) places
- ▶ Tension on air compressor drive belts
- ▶ Adjustment on header disk scrapers above and below disks
- ▶ Wear of header disks

- ▶ Alignment of motor drive couplers (non solid/rigid)
- ▶ Tighten disk motor bolts



### Yearly

- ▶ Inspect and lubricate all wheel bearings
- ▶ **Recheck weekly and extended season list**
- ▶ Replace hydraulic oil filters (2 oil tank, 1 breather for oil tank, 1 high pressure for cylinder valve) hydraulic oil sample test kits are available if desired
- ▶ Check pressure and flow of the four pump sections
- ▶ Condition of belted chains
- ▶ Check all roller chain and belted chain sprockets rubbing, wearing, etc)
- ▶ **Clean and paint any metal that has been rubbed or scuffed**



### Keep These Areas Clean

- ▶ Front header chain area (cross pieces)
- ▶ Wheel area
- ▶ Shaker chamber including inside of panels, and header delivery area onto transfer chain
- ▶ Vine chain rollers/plastic shields area around secondary shaker
- ▶ Debris fan intake (front and rear), paddles, and inside of hood
- ▶ Elevation hold down rollers and plastic shields



### Extended Season Maintenance / 300+ Hours or Adverse Conditions

- ◄ Belted chain con rods, clips, bolts and rivets
- ◄ Wear on roller chain, and belted chain sprockets for wear
- ◄ Bar cleaner sprockets for wear
- ◄ Maintain shaker weight bearing bolts for tightness
- ◄ All motor drive couplers
- ◄ Steel/rubber belted chain return rollers for wear
- ◄ **Aftersort belt lacer and lacer pin for wear**



### End of Season Maintenance

- ▶ Lubricate all rollers with moisture displacing lubricant or a good quality penetrating oil
- ▶ Grease bearings