Pik Rite, Inc.

Carrot Harvester 8100

Operators Manual 2010

September 2008

60 PIK RITE LANE, LEWISBURG PA 17837
PHONE: 570-523-8174 FAX: 570-523-8175
EMAIL: frontdsk@pikrite.com WEBSITE: www.pikrite.com

Dear Customer,

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

Sincerely,
Elvin Stoltzfus, President

Company History

Pik Rite, Inc. is a designer and manufacturer of innovative, quality-built vegetable harvesting equipment, ag manure spreaders, commercial waste handling equipment, and hydro seeding units. Located in Central Pennsylvania, Pik Rite operates from manufacturing facilities that encompass 33,000 square feet, in addition to office space utilizing an additional 2,700 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 tomato harvester was built for the purpose of providing a mechanical method of picking tomatoes. After a few years of testing and modifying the original machine, three Pik Rite harvesters were built in 1986. Pik Rite now holds a patent for a Double Brush Shaker System.

Since the 1990's, Pik Rite has experienced steady growth in sales, market coverage, and technological innovations. Pik Rite has subsequently developed and added equipment that can be used to harvest cucumbers, peppers, gourds, zucchini, squash, pumpkins and carrots. A vine windrower, which rearranges vines prior to picking, was developed in 1994. A new product to the marketplace - a plastic lifter/wrapper, was introduced in 1997.

Pik Rite initiated its product line diversification plans and began to manufacture commercial waste handling vacuum tanks in 1998. In 2000, Pik Rite introduced the Hydra-Ram Manure Spreader, formerly known as the John Deere Hydra-Push. A vine diverter, which is used to move the tomato crop from one row to the adjoining row, was first manufactured by Pik Rite in 2001. In 2002, Pik Rite sold its first HC290 tomato harvester, designed for the larger tomato grower.

A municipal leaf collection / compacting unit was added to Pik Rite's line of equipment in 2005. In an effort to maintain continual growth, Pik Rite manufactured and sold a carrot harvester in 2006. Also in 2006, Pik Rite introduced and sold hydro seeding units. Pik Rite strives to be a major contender in the field of hydro seeding equipment.

Markets

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

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 carrot harvester will travel.

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

S. N._____ Purchase Date

Please review the warranty for this carrot 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

NOTES

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SECTION 1
SAFETY

SAFETY

The operator's safety was one of the prime considerations in the minds of Pik Rite engineers when they designed the carrot harvester. Shielding, simple adjustments, and other safety features were built into the carrot harvester wherever possible. **WARNING: Modifications to the carrot 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 Carrot 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 is off before servicing or unplugging the carrot harvester. The belts and chains can feed carrot 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 carrot harvester and tongue when detaching harvester.

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

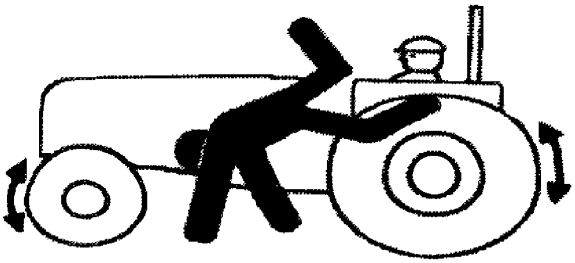
WARNING: Keep away from Header Belts and Sizing Unit when operating.

Keep Riders Off Machine and Tractor

- Allow *only* the operator on the tractor and *only* the observers in the places designed for them. Keep riders off.

  CAUTION: *Observation Deck is built on the Pik Rite Carrot Harvester to ensure that authorized observers can safely stand while observing.*

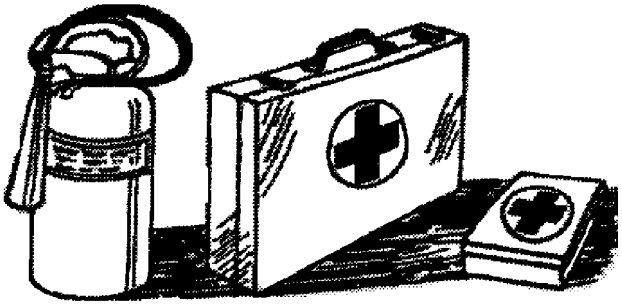
  - *Riders on machine are subject to injury such as being struck by foreign objects and being thrown off of the machine.*
  - *Riders also obstruct the operator's view resulting in the machine being operated in an unsafe manner.*



Prepare for Emergencies

Be prepared if a fire starts.

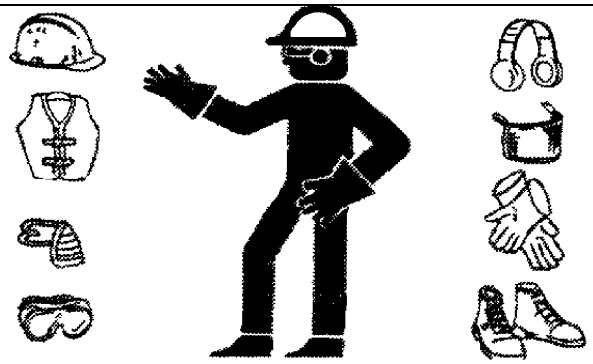
- Keep a first aid kit and fire extinguisher handy.
- Keep emergency numbers for the ambulance service, hospital, fire department, and doctors near your telephone.



Wear Protective Clothing

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

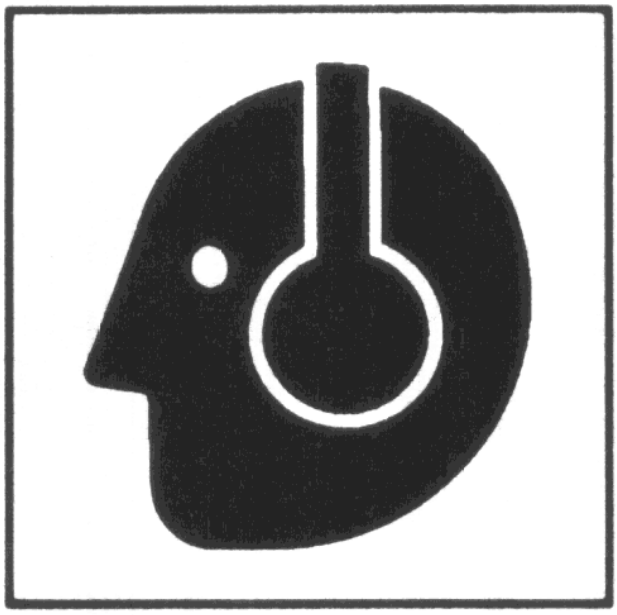
  CAUTION: *Do not wear radio or music headphones while operating machine. Operating equipment safely requires the full attention of the operator*.



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 uncomfortably loud noises.



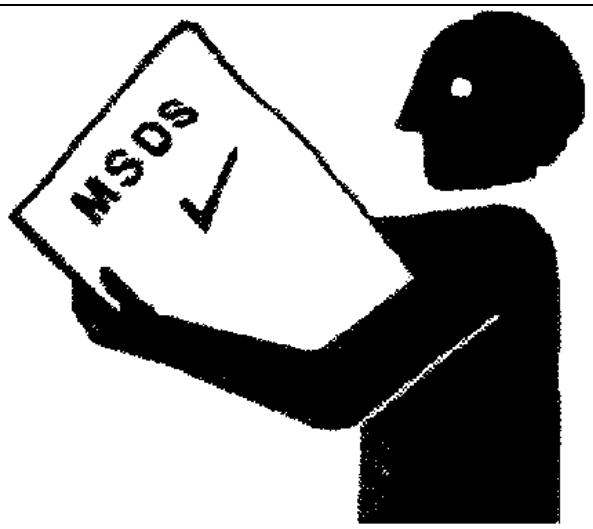
Handle Chemical Products Safely

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 MSDS's 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.

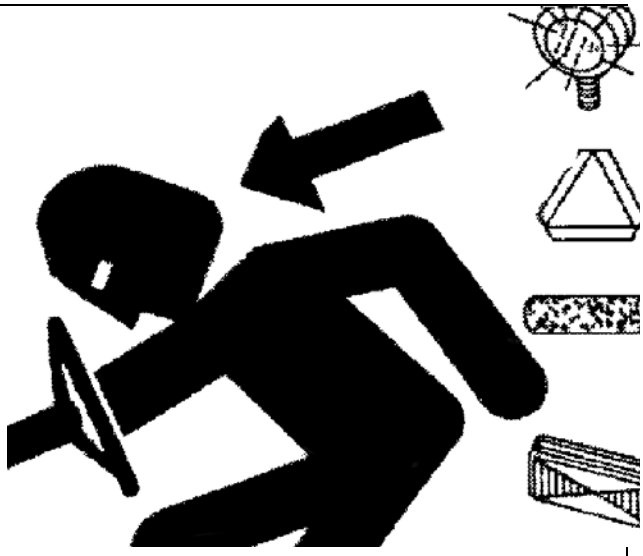
- Wear close fitting clothing. Stop the engine and be sure that the PTO drive line is stopped before making adjustments, connections, or cleaning out the PTO-driven equipment.

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.

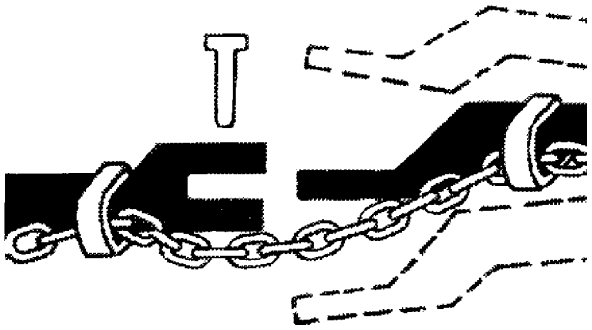
- Use flashing warning lights and turn-signals when driving on public roads.
- To increase visibility, use the lights provided with your machine.



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 carrot harvester* (approximately 20,000 lbs.).
  CAUTION: *Do not use the safety chain for towing.*

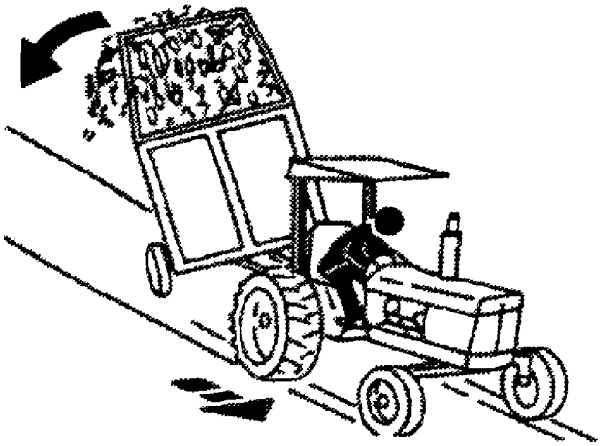


Reduce Speed When Towing Loads

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.

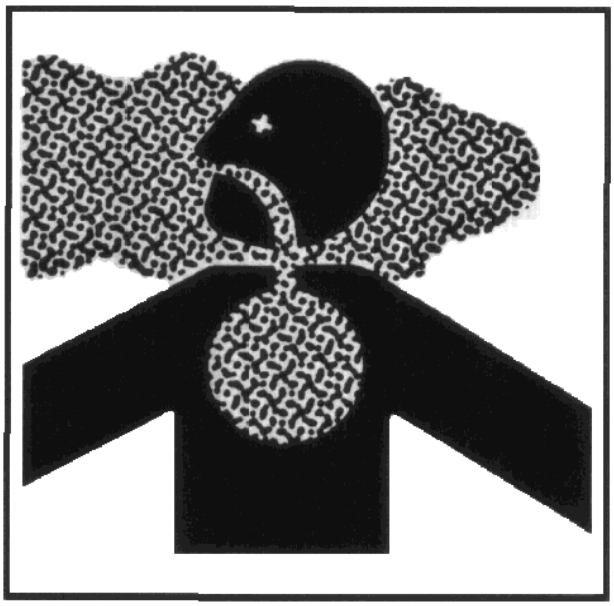
- Securely support any machine elements that must be raised for service work.

- 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.

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.

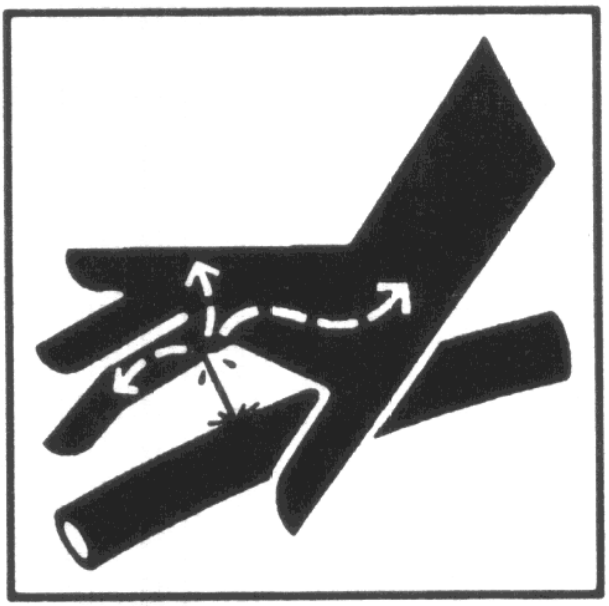
- Do not heat by welding, soldering, or using a torch near pressurized fluid lines or other flammable materials. Pressurized lines can be accidentally cut when heat goes beyond the immediate flame area.

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

Section 2
PREPARATION, OPERATION & MAINTENANCE
PREPARING THE TRACTOR

The tractor tire inflation pressures specified in the tractor operator's manual will apply.

2 - 1: Adjusting Tractor Goose Neck Hitch Machine

-Hitch height should be set with PTO running level or as straight as possible.

2 - 2: Power Take-Off Shaft Standard Hitch Machine

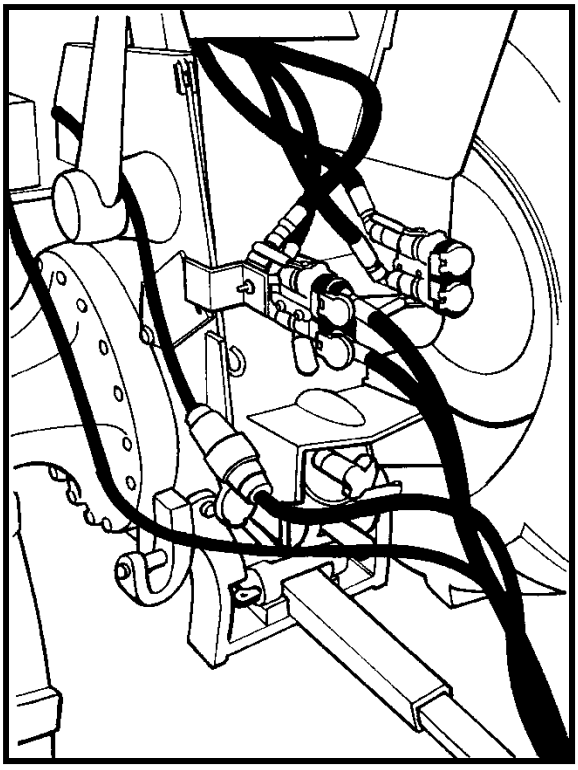
The tractor must have a PTO speed of 1000 RPM to match the power shaft speed of the harvester. The harvester can operate between 600 RPM (min.) and 1000 RPM (max.).. . [Note: This is assuming that pumps, motors, and other components are NOT excessively worn (after hours of use) and are operating correctly.] PTO energy consumption is at approx. 75 HP at 1000 RPM. A 140 HP tractor is the minimum required.

The Pik Rite harvester uses a 21 spline, 1-3/8 inch diameter PTO yoke. The 1-3/4 - 20 spline PTO shaft can be special ordered, Note double pump machines are standard 1-3/4 PTO ONLY

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.

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.



Pik Rite designs the harvester for operation in the *closed center flow mode.*
The Pik Rite Carrot Harvester requires a...

- Minimum of 5 gallons per minute & 1500 PSI
- Maximum of 15 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 Tomato Harvester.

NOTE: These valves are recommended to be operated in the closed center mode. There are several hydraulic systems used on American tractors. The most popular ones include the **CASE IH 7200 series** and the **John Deere 7000 series**. Both use *a load sensing closed center system.* The earlier John Deere models used a *pressure compensating closed center system* and earlier IH models used both *open center* and *closed center* systems. All of the closed center systems may be used closed and have adjustable flow rates. However, some types have priority valves or adjustable detents that require adjustment to avoid overheating. Some need special kits, which are available at the tractor dealer.

NOTE: Reference your tractor manuals or dealers for more information. If you experience problems with your hydraulic system, contact Pik Rite for other options.

*__NOTE__: **Always check with your dealer before connecting your hydraulics.**
In a few rare exceptions, some manufacturers use a special system for a term. Generally, these odd systems are identified within a segment of serial numbers, and kits are available for these tractors.

2 - 4: Electrical Power

The Pik Rite Harvester relies on the tractor's electrical system. At the minimum, an 80-amp alternator is required to keep the voltage constant during night-time operations. Operating during the day without the lights requires less amperage. One hook up to the battery is all that is necessary to operate lights, electro-hydraulics, and conveyor shut-off switches.

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.

3 - 1: 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. Turn all of the flow controls to the 0 or off position. There are 10 to 15 controls, depending on how the machine is equipped.

3 - 2: 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.

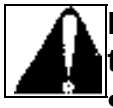
3. Check to be sure that the oil cooler fan located on the top of the machine is turning counterclockwise therefore blowing air upward.

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

CAUTION: *Operating the Pik Rite Harvester requires much attention to detail. The operator must remain attentive to avoid injury to the crew and 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 600 (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 four pump sections; hence there are four hydraulic circuits (Excluding the hydraulic lift cylinder circuits). An exception being that double pump machines have 6 pump sections total. 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. 15 or 20 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.

- Three of the four circuits empty into the oil cooler (mounted on top of the machine), are cooled, and sent through the filter back to the oil reservoir. The remaining circuit empties into the return line just before the filter and then flows into the oil reservoir (Double pump machines use two coolers with three pumps going to each cooler.

- 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.*

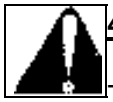
- Ideally, the operator should set the flow controls to the desired speed and match the tractor RPM to the amount of oil required. Higher engine speed only causes more oil to bypass the motor, resulting in a waste of energy, more heat in the system, more wear, and general inefficiency.

The estimated start-up settings are as indicated in chart 4A:

Chart 4A

	Flow control setting
Powered Rollers	2
Header Belts	8
Powered Dirt Vibrator	2
Topper Sizers	5
Topper Cutting Disk	3
Cross Conveyor	5
Star Cleaning Table	5
Observation Table	5
Debris Fan	5
Elevation Conveyor	5
Discharge	5

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



4 - 2: 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 the hydraulic pump 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 magnetic plug at bottom of reservoir. Also check for wear metals. Test Kits are available from your Pik Rite Dealer.

MAINTAINING THE HARVESTER

Preventative maintenance is better than emergency repairs.

5 - 1: Discharge Conveyor

The *discharge conveyor* …

- Check the lap splice belts daily.
- Keep belt running freely between the rollers.
- Check the basket sides.

NOTE: The discharge conveyor is designed so that it does not damage other components. If an operator accidentally bends the conveyor, it can be straightened out rather easily: simply pull it in the opposite direction that it was bent.

5 - 2: Electro-hydraulic Valve & Control

- 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.

- (There are electrical diodes in the control box preventing electrical feedback through to other inactivated functions).

- Minimum of 5 gallons per minute and 1500 PSI
- Maximum of 15 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 Tomato Harvester

Several other hydraulic systems are used on American tractors. The most popular ones include the CASE IH 7200 series and the John Deere 7000 series. Both use a *load-sensing closed center* system.

- Earlier John Deere models use a *Pressure Compensating Closed Center System*
- Earlier IH models used both open center and closed center systems. The closed center systems, which have adjustable flow rates, may be used with either the open or the closed system. However, some types have priority valves or adjustable detents that require adjustment to avoid overheating. Some need special kits, which are available at the tractor dealer.

NOTE: For more information, reference your tractor manuals or your dealers. If you experience problems with your hydraulic system, contact Pik Rite for additional options.

NOTE: In rare cases manufacturers may have used a special system for a term. Generally, these odd systems are identified within a segment of serial numbers, and kits are usually available for these tractors. Always check with your dealer before connecting your hydraulics.

Cylinder Speed Adjustment:

To adjust cylinder speed, follow these steps:

1. Loosen locking nut
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 - 3: Lubrication and Oils

1. 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 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 -4: 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) _____

Observe and record the following:

Section #1: Port closest to tractor on bottom side of pump:
Average Pressure____ Highest Pressure____ Stall out Pressure____

Section #2: Port closest to the tractor on the topside of pump:
Average Pressure____ Highest Pressure____ Stall out Pressure____

Section #3: Port Located on the bottom-rear of pump:
Average Pressure____ Highest Pressure____ Stall out Pressure____

Section #4: Port located top-rear of pump:
Average Pressure____ Highest Pressure____ Stall out Pressure____

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

- Use a pipe wrench on the motor coupler and start PTO at low RPM.
- 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 100º.
- PTO speed should be approximately 900 RPM.
- Pressures are Factory Set; Consult Pik-Rite/Dealer before resetting.

Section #1 *(bottom front pump port): Set pressure relief to 2500 psi*

Section #2 *(top front pump port):*

A. Stall out the debris fan motor applying a pipe wrench on the shaft, and then slowly start the PTO. Set pressure relief to 2750 PSI.

B. Set the Flow Control Stop (mounted on the debris fan Flow Control) ¾" from center bolt to end of slot.

Section #3 *(bottom rear pump port set): Set pressure relief to 2500 psi*

Section #4 *(top rear pump port): Set pressure relief to 2500 psi*

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 - 5: 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
▶ 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
▶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
▶Alignment of motor drive couplers (non solid/rigid)

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

▶Debris fan intake (front and rear), paddles, and inside of hood
▶Elevation hold down rollers and plastic shields
▶Discharge basket area

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
▶All motor drive couplers
▶Steel/rubber belted chain return rollers for wear

End of Season Maintenance

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