



Rotary Rake Model HR24TS

Serial Numbers 87500 and up

Operator's Manual



THIS MANUAL MUST BE READ AND UNDERSTOOD BEFORE ANYONE OPERATES THIS MACHINE!

Manual# 990032
Revised 03/2013

YOU MUST FILL OUT YOUR WARRANTY REGISTRATION TO ACTIVATE YOUR WARRANTY AND TO QUALIFY FOR PARTS AND SERVICE!!

To the Owner;

Thank-You for choosing a quality rotary rake from Pequea Machine, Inc. We strive to give you the best equipment and the best level of service of any company. With a little care and maintenance this machine will do your work for you for many years. In this manual, we make an effort to get you better acquainted with the rake so you can achieve maximum performance. We design and build all of our equipment with the end user in mind so we welcome any suggestions or ideas for improvement.

Please take a few minutes to fill out the area below. This information will be helpful when ordering parts or requesting service from your dealer.

Dealer Name:_____

Dealer Phone Number:_____

Service Manager/Technician:_____

Model# and Description:_____

Serial Number:_____

Date of Purchase:_____

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INTRODUCTION

Thank-You for choosing a Pequea Rotary Rake. Your rake is the result of years of research and development work. This Operator's Manual will familiarize the operator with the safety and operation of the machine. Included are complete instructions for set-up, operation, lubrication, and maintenance procedures. Understanding and following these procedures will result in years of maximum performance from your Pequea Rake.

Read entire manual before operating. Failure to follow the instructions outlined in this manual may result in personal injury and/or damaged equipment, and could void the warranty.

Rake Serial Number












The rake's serial number can be found near the tongue on the main frame of the machine. Please use this number when requesting service, seeking information, or ordering parts. For the operator's convenience, space to record the serial number, model number, purchase date, and dealer has been provided inside the front cover of this manual.

All pictures and instructions in this manual assume that the right and left side of the machine are that of someone standing behind the rake facing forward.






Specifications

Specifications	HR930	HR1140	HR24TS
Working Width	10' 8"	13'	27'
Raking Width	9'	11'	24'
Transport Width	9' 4"	59"	101"
Gear Box	Enclosed Oil Bath		Sealed/Greasable
Gear Reduction	9.7 to 1		
Tine Arms	9	11	13
Double Tines per Arm	3	4	4
PTO HP Requirement	30 HP - 540 RPM	40 HP - 540 RPM	50 HP - 540 RPM
Hydraulic Requirement	1200 psi		1800 psi
Direction of Raking Action	Left	Left	Left
Weight	1050 lbs	1550 lbs	3840 lbs.
Tandem Axles	Standard	Standard	Standard
Wheels & Tires	18.5 x 8 Flotation Tire/Painted Steel 4-Bolt Rim		

SAFETY

-  ***This symbol precedes specific safety instructions throughout this manual. When reading the manual pay close attention to the information that follows this symbol.***
-  FAILURE TO FOLLOW INSTRUCTIONS IN THIS MANUAL COULD RESULT IN PERSONAL INJURY OR DEATH. READ ENTIRE MANUAL BEFORE OPERATING ROTARY RAKE.
-  Keep hands, feet and clothing away from the machine's input power take-off (PTO) and any other moving parts until the machine has been shut down and the power source has been locked out. (Refer to Power Source Safety)
-  Do not adjust, unclog, lubricate, or service the machine until it has been shut down and the power source has been locked out. (Refer to Power Source Safety)
-  Do not lubricate or adjust the machine while it is in motion.
-  Support the rake securely while working under it.
-  Do not stand between the tractor and the rake while attaching or detaching the rake unless the tractor engine is shut off and the parking brake has been set.
-  Be certain all bystanders and animals are a safe distance away from the rake before raising or lowering it. Never allow anyone to ride on the rake or the tractor.
-  When transporting, never exceed a speed of 20 MPH and avoid sudden turns which may compromise the operator's control of the tractor.
-  Be constantly aware of the location of the ends of the rake to avoid collision with other objects.
-  When moving the machine on public roads use the proper reflectors, lights, and slow moving vehicle signs required by local government agencies.

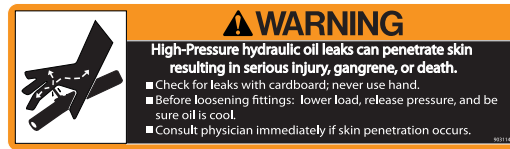
Power Source Safety

-  Do not use a rake power take-off (PTO) shaft without a rotating shield in good working order. Make sure drive system safety shields are in place for both the power source and the rake.
-  The rake input PTO must be securely attached to both the power source and the input shaft.
-  Do not overextend the input PTO shaft.
-  Make sure PTO is disengaged before starting power source.
-  PTO shield chains must be attached to the tractor and the rake to keep the shield from rotating.

SAFETY CONT'D

Safety Decals and Reflectors

Decals and reflectors are for the protection of yourself and others. If they are missing, faded, or not readable, get replacements from your dealer immediately.



SET-UP

Rear Hay Curtain

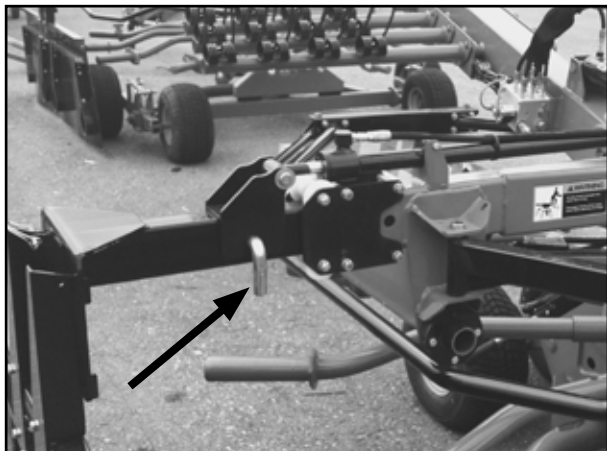


Figure 1

The rear curtain mount must be extended manually before the tine arms are installed. Pull the locator pin, extend the arm to the operating position, and reinsert the pin. The curtain can then be adjusted hydraulically to control the windrow width.

Tine Arms



Figure 2

Remove rubber caps from gearbox stub shaft. Remove tine arms from storage position and slide onto gearbox stub shaft (Figure 2). Insert tab on tine arm into slot and insert locking pin. Rotate gearbox installing tine arms until complete. Do not operate without all arms installed correctly.

The stub shafts are greased at the factory with an anti-rust lubricant. You will need to regrease periodically to keep the surface from getting rusty. Surface rust will make it nearly impossible to remove the arms. The rake must never be stored with any of the arms installed on the stub shafts or they will seize up and will be nearly impossible to remove. ***Always store the rake with all arms in the transport position!!***

Guards



Figure 3

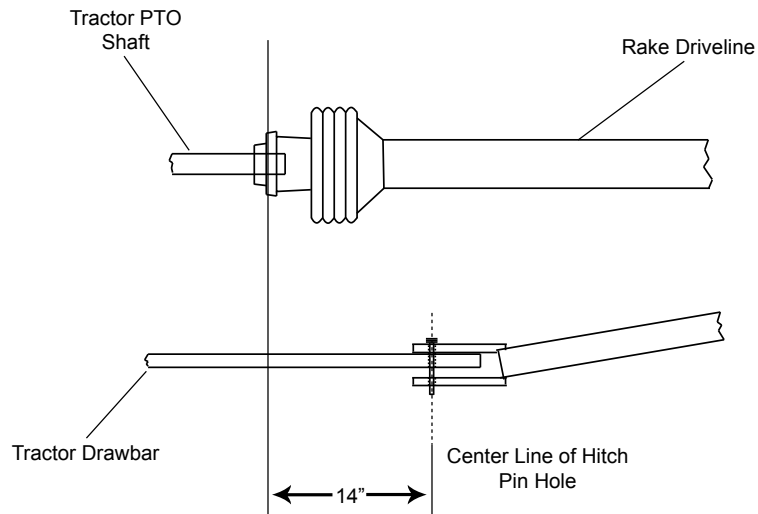
Pull the guard locking pin (indicated with arrow) and expand the guard to its widest position and then insert the pin to lock them into position. Always collapse the guards before transporting the rake.

HITCHING

Tractor Requirements

The Pequea Rake is designed to be used with a tractor having a 540 RPM PTO. The hitch pin hole on the tractor should be 14" (35cm) from the groove in the PTO output shaft. (See illustration below)

NOTE: If the hitch pin hole is located well behind the tractor tires there is the potential of making a sharp enough turn to damage the rake PTO shaft.



Hitching

Align the hole in the tractor draw bar with the hole in the rake tongue and insert an approved hitch pin. Lock hitch pin with a safety clip to insure that it cannot work its way out.

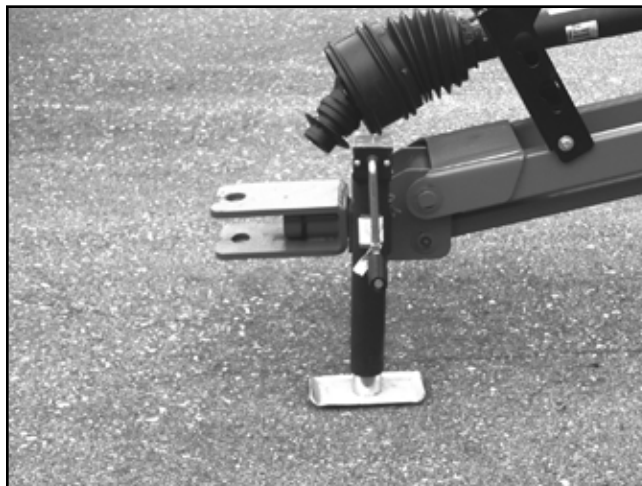


Figure 4

HITCHING, CONT'D

With PTO shaft connected to the rake, slide shaft safety collar back and slide the tractor side of the PTO shaft onto the tractor drive shaft. Release the shaft safety collar. Insure that the PTO shaft is securely locked onto the tractor drive shaft. Fold the PTO stand down onto the frame to avoid damaging the PTO shaft shielding. (Figure 5)

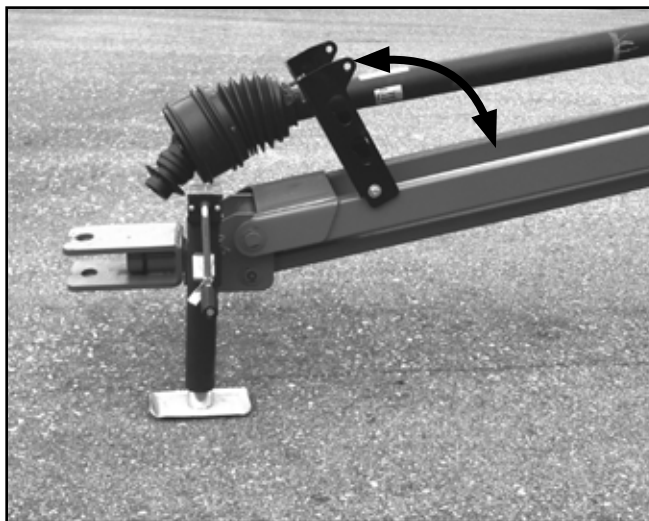


Figure 5

Connect the rake hydraulic lines to the tractor implement hydraulic output. Two sets of hydraulic remotes are required. One set of remotes will raise and lower the rake. The other set of remotes controls two functions; position the rear rotor and swing the rear hay curtain. A switch box with a two position switch allows you to select from these two functions.

Plug the electrical harness into the tractor to operate the lights and electric/hydraulic functions.

Crank the rake jack off the ground and remove the locking pin. Pull the jack off of the mount, place in storage position on the main frame, and reinsert locking pin.



Figure 6

TRANSPORTING

Field Transport

Make sure that the rake is raised into the transport position.

Make sure that the rotors are positioned properly for transport. The rear rotor must be following directly behind the front rotor.

Never allow any riders on the rake or the tractor.

Avoid tight turns to reduce the possibility of loss of control or PTO shaft damage.

Remain fully aware of the width of the rake in relation to the objects you are passing, either stationary or moving.

Never travel at speeds over 10 MPH (16km/hr.) in the field.

Road Transport

Adhere to all suggestions for transport in the field listed above.

Collapse the guards to reduce the overall width of the rake.

Remove the tine arms off the sides of both rotors. The tine arms on the front and rear of each rotor do not need to be removed for transport if the rotary lock is engaged to keep the rotor from turning.

Never operate the hydraulics while transporting the rake. One wrong move could swing the rear rotor over into oncoming traffic.

Follow all local regulations for moving agricultural equipment on public roads, especially those related to reflectors, SMV (slow moving vehicle) symbols and safety markers.

Never travel at speeds over 20 MPH (32km/hr.) on the road.

FIELD ADJUSTMENTS

⚠ Never attempt to make any adjustments while the rake or the tractor is running. All power sources must be completely shut off and parking brakes applied.

Height Adjustment

Correct tine clearance cannot be stressed enough as it is essential to minimize crop loss, prevent premature wear of tines, and decreases crop contamination which can result in premature wear of your processing equipment. Fine tuning is easy with the turnbuckle height/leveling system. Simply turn the ratchet until you reach the desired height. As a rule, one inch of ground clearance is a good setting. Adjustments must be made if raking on uneven ground or when raking hay that has been compacted by rain or other haying equipment. Both sides must be adjusted the same amount or the rake will be tilted and will not pick up the hay as well

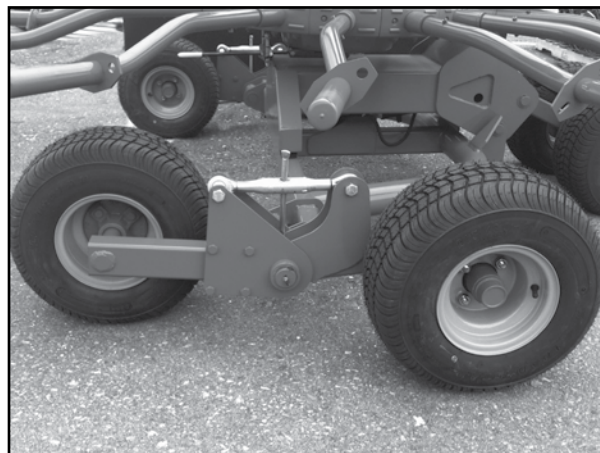


Figure 7

Leveling the Rake

The front rotor has a threaded leveling device built into the cylinder. (Figure 8) Turn the handle clockwise to raise the front of the rake and counterclockwise to lower it. The rake should be level or tilted forward slightly in the front for the best performance.



Figure 8

The rear rotor has an extra set of wheels (Figure 9) just ahead of the tandem axles to help the rake follow the contour of the ground. This extra set of wheels also serves as the leveling system for the rear axles and is adjusted by a ratchet screw. The rear rotor should also be run level or tilted forward slightly.

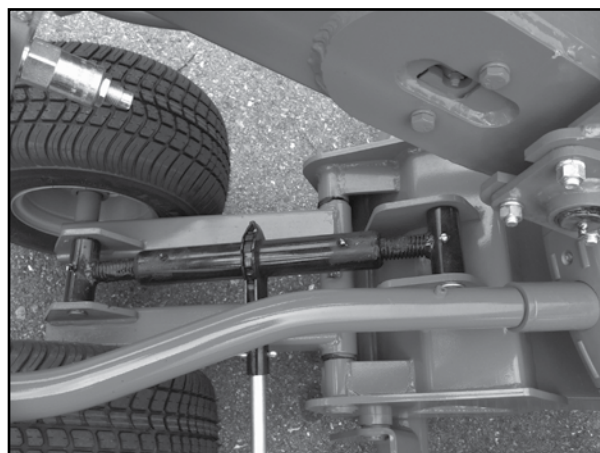


Figure 9

FIELD ADJUSTMENTS

Front Hay Curtain

The front hay curtain (Figure 10) can be adjusted horizontally to adjust the windrow width and also to accept different crop types and volume. To adjust, disengage the locking handle and leave it in the relaxed position. Lift up on the support handle and slide the curtain to the desired position then engage the locking handle. The curtain for the front rotor should be removed when raking both swaths into one windrow.



Figure 10

Rear Hay Curtain

The rear hay curtain is adjusted hydraulically to control the width of the windrow. However, the curtain arm must be retracted manually when the rake is broken down for transport.



Figure 11

Gearbox Pitch Adjustment

Both gearboxes have an adjustment lever (Figure 12) to rotate the center cam track. The cam track rotates each tine arm to raise and lower the tines as it revolves. Rotating the cam track several degrees will determine the position of the rising and falling of the tines and will determine the width and consistency of your windrow. Example: for a heavy crop rotate the handle to the left so the hay is released quicker.

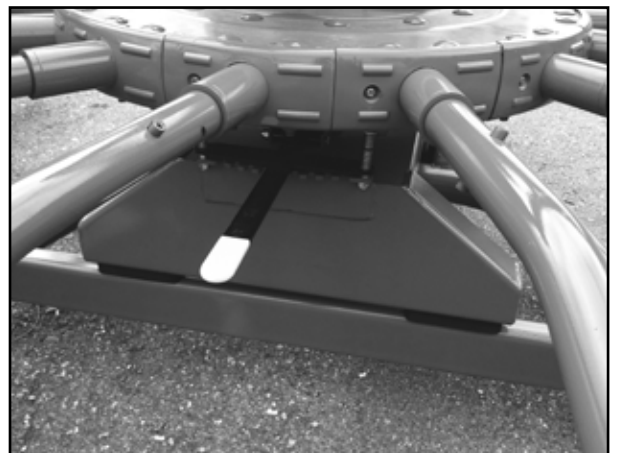


Figure 12

OPERATION

Having made adjustments (where necessary) described in the previous sections, drive the tractor to where you will begin raking. With the tractor standing still, lower the rake to its operating position. Engage the tractor's PTO at a low RPM, (this is especially important on a tractor with an electric clutch) and without getting off the tractor seat, visually determine that the rake is properly adjusted. You may hear the slip clutch popping momentarily at startup, especially if the tractor RPM is too high. If further adjustments are required, disengage the PTO and stop the tractor's engine and adjust where needed.

The rear rotor can be swung to the left to make one windrow while raking up to 24' clean sweep, or, the rear rotor can be swung to the right to make two windrows with up to 12' clean sweep per windrow (see diagram below). The gauge decal (Figure 13) on the front pivot shows your current raking formation and also helps to perfectly line up the rotors for transport. NOTE: The rear rotor must always trail directly behind the front rotor when transporting the rake.

The hay curtain on the rear rotor extends hydraulically from the transport position to the operating position. This function is on the same hydraulic circuit as the rear rotor swing cylinder. The small control box with a single switch (Figure 14) enables you to toggle between these two functions.

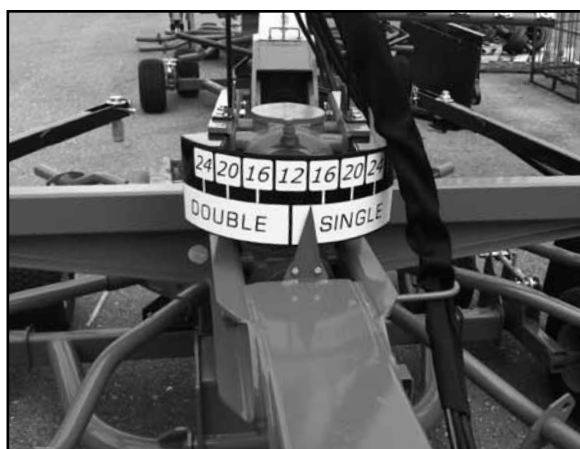
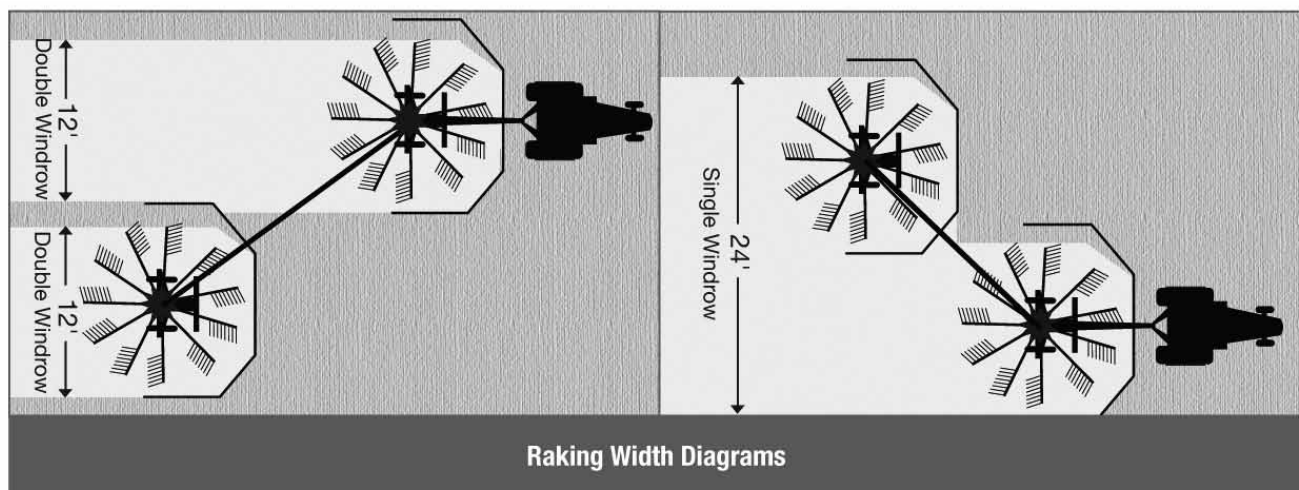


Figure 13



Figure 14

OPERATION, Cont'd

When ready, increase PTO speed to the desired RPM and engage the tractor's forward gear. Remember, ground speed and PTO speed, along with the proper adjustment for height and level, will play a large role in making a clean sweep and a nice even windrow. 6 MPH (9.6 km/hr.) ground speed and 400 PTO RPMs is the ideal combination for fluffy windrows. Adhere to all safety requirements as listed previously for field operation.

Always operate the rake at the lowest RPM possible that allows you to rake cleanly at your chosen ground speed. Higher speeds result in more leaf loss and lower quality hay, especially if you are raking dry hay. Higher speeds will also cause more wear on the rake.

While operating the rake you must constantly be aware of all your surroundings. The guards are designed for human safety and will not withstand a collision with a stationary object such as a fence post or a tree. If such a collision does occur and you cannot stop before the tine arms hit the obstacle, the radial pin clutch on the gearbox input shaft will engage and should protect the gearbox from any serious damage. The slip clutch will not engage fast enough to protect the tine arms.

This rake has been designed to withstand a fair amount of abuse due to rough field conditions. However, this is no excuse for careless operation and it is the operator's sole responsibility to avoid conditions such as washouts, ditches, animal dens, or sink holes. These hazards can cause severe damage to the rake. Damages incurred due to carelessness will not be covered under warranty by the manufacturer.

When finished, reduce PTO speed before disengaging. Disengage PTO, move rear rotor to central position and raise rake into transport position before leaving field.

LUBRICATION

It is extremely important to keep your rake properly lubricated at all times. Failure to do so will greatly decrease the performance and the life of the machine.

Never lubricate or perform any maintenance, adjustments or repairs with the machine running. The PTO must be disengaged and the tractor's engine must be shut off.

With a clean cloth wipe off both the grease fitting and the tip of the grease gun. This will eliminate any chance of dirt or dust particles getting inside and damaging the bearings or friction surfaces.

Do not over grease the sealed bearings. Over greasing could rupture the seals exposing the bearing to a lot of dust particles. Roller bearings are sealed and are generally maintenance free. The friction bearing points cannot be overgreased.

Gearbox Lubrication

There are two grease fittings on top of each rotary gearbox (Figure 15). The one on the very top of the gearbox (A) lubricates the pinion bearings and will need very little grease. The other one (B) lubricates the ring gear and should be greased after every 10 hours of use. There are no grease points on the horizontal gearbox arms. These arms are encased in plastic bushings and do not need to be greased.

The pivoting drive gearbox is an oil bath gearbox and the proper oil level must be maintained in both the upper and lower gearbox. Use 80W90 gear oil in both sections. Remove check plug periodically to make sure the oil level is high enough and add more if needed. There is a drain plug at the bottom of each gearbox so the oil can be drained and replaced if necessary. Note that the gear configuration in the lower gearbox section is different thus the check plug is higher than the one pictured below in Figure 16

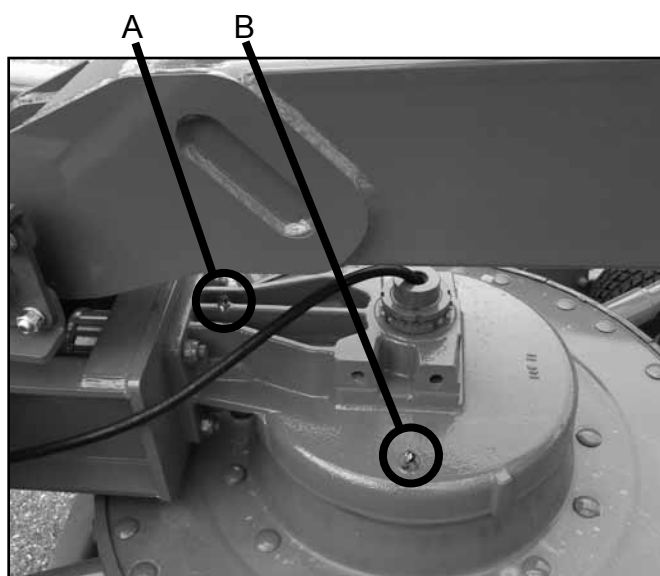


Figure 15

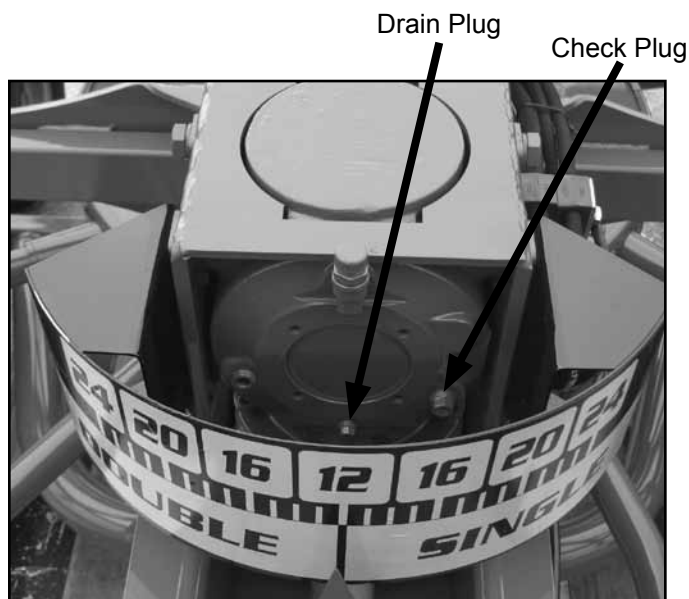


Figure 16

LUBRICATION

PTO Lubrication

There are grease fittings on both the tractor end and the rake end of the PTO shaft. Grease these after every 8 hours of operation. Use a high quality lithium grease. Also keep all the telescoping surfaces well lubricated.

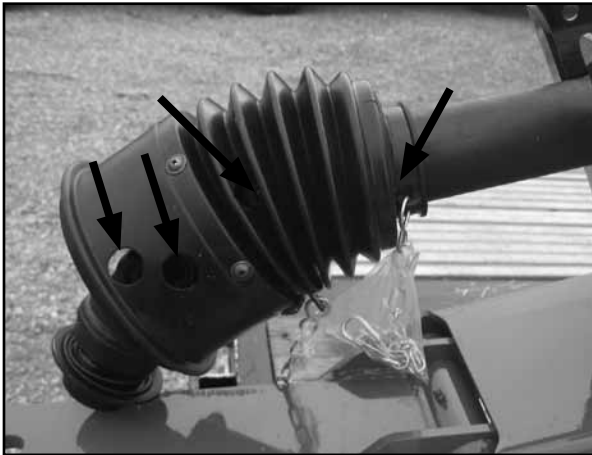


Figure 17



Figure 18

Tine Arms

The inside surface of the tine arm must be greased periodically to avoid surface rust which will make it difficult or nearly impossible to remove the arms for storage. A generous dab of anti-seize grease twice a year should be sufficient for a rake that is stored indoors. If the rake is stored outside you will need to regrease more frequently.

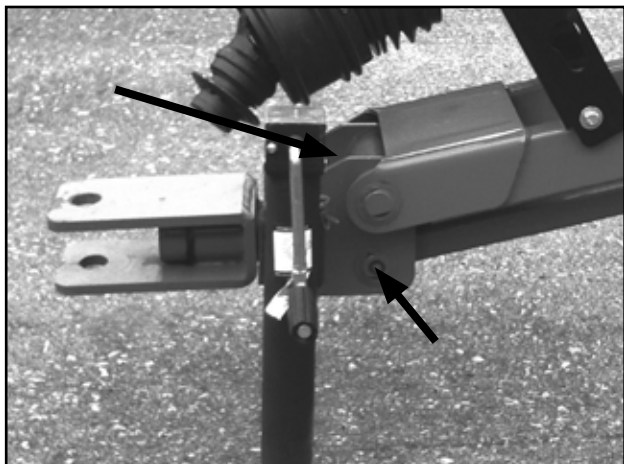
Wheel Bearings

Wheel bearings should be cleaned and repacked with fresh grease once per season. If the bearings appear to be worn or loose, order replacements from your dealer to avoid a costly in-season breakdown.

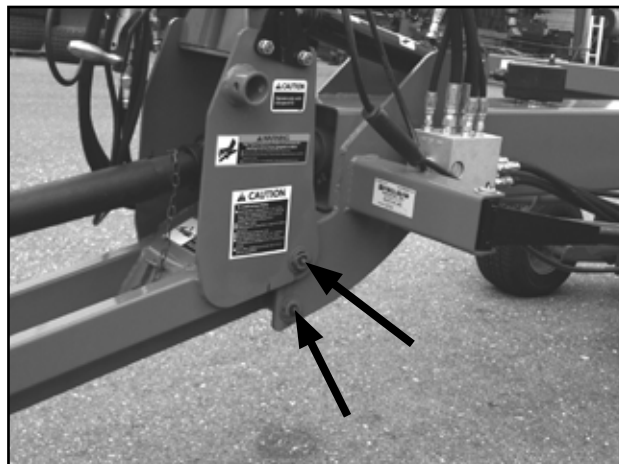
General Lubrication

All other grease fittings should be lubricated after every 50 hours of operation. Use a high quality gear grease for the grease fittings on top of the gearbox. For all other bearings, joints, and pivot points, use either a lithium or a gear grease. In dry, dusty conditions it may be necessary to grease more than every 50 hours. In the following pages we show the location of the grease fittings.

LUBRICATION



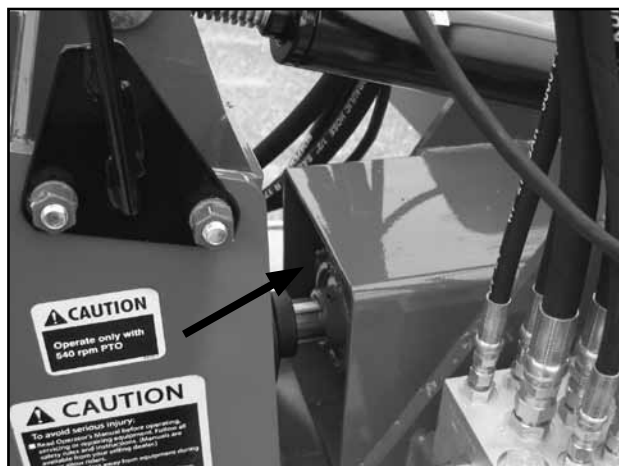
Tongue leveling pivot, front



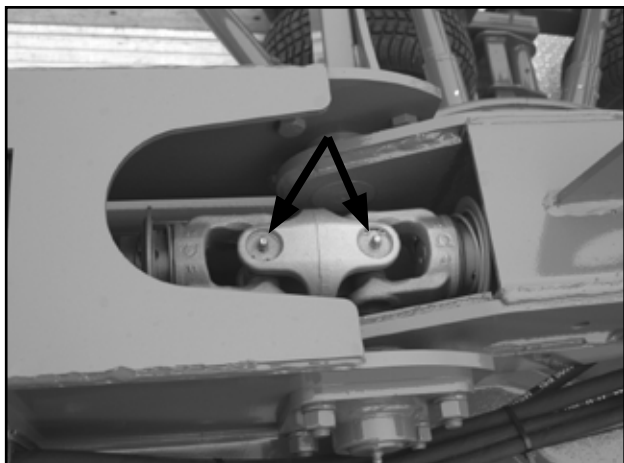
Tongue leveling pivot, rear



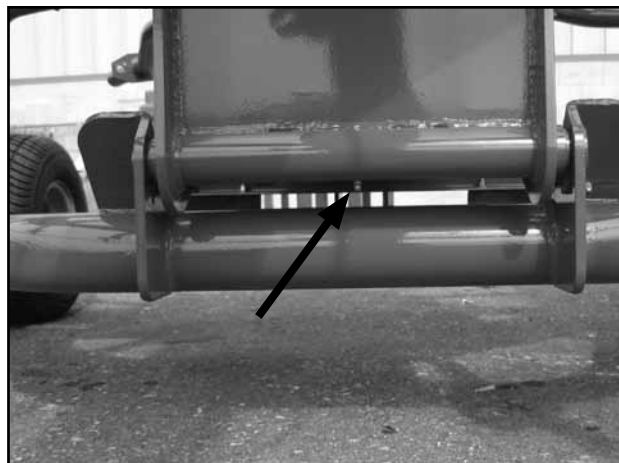
Adjustment screw



Flange bearing on drive shaft

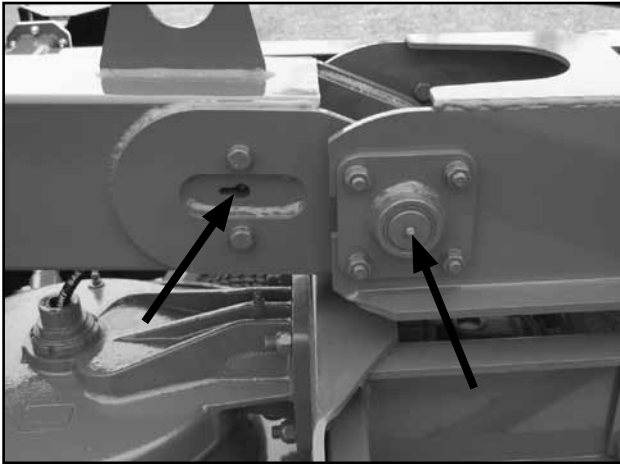


Universal joint on pivot gearbox output (only one shown)
Also one on the rear end of the bridge frame not shown

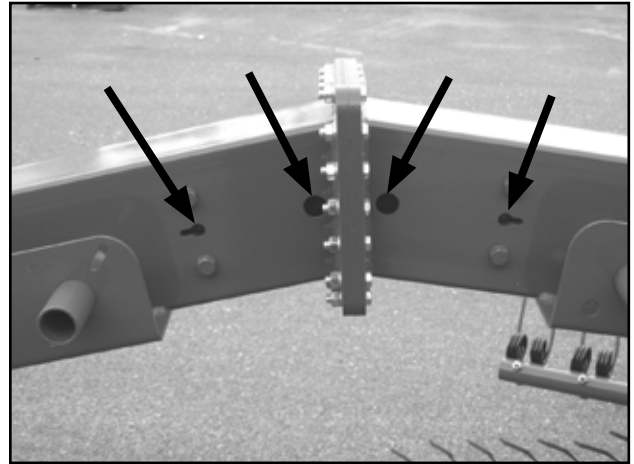


Axle pivot for front rotor

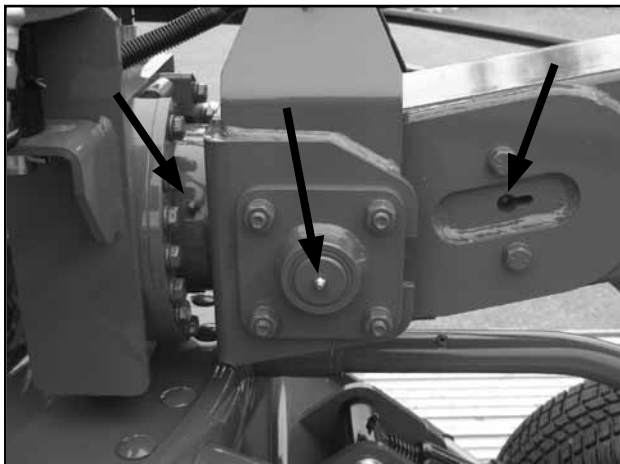
LUBRICATION



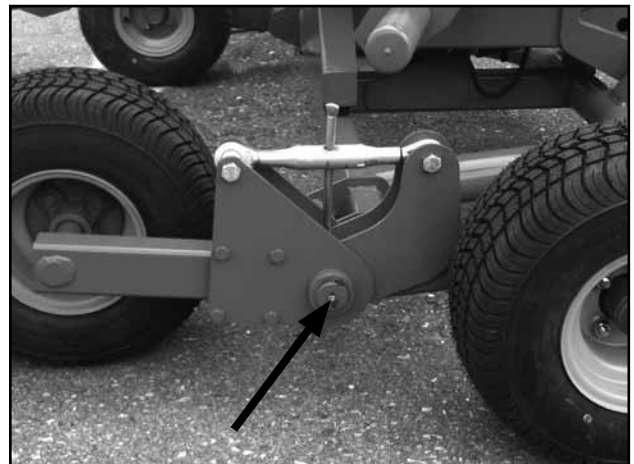
Bridge frame front pivot and drive shaft bearing



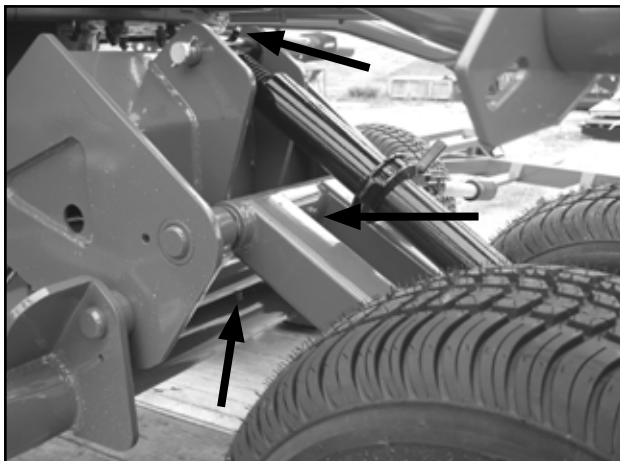
Drive shaft bearings and universal joint



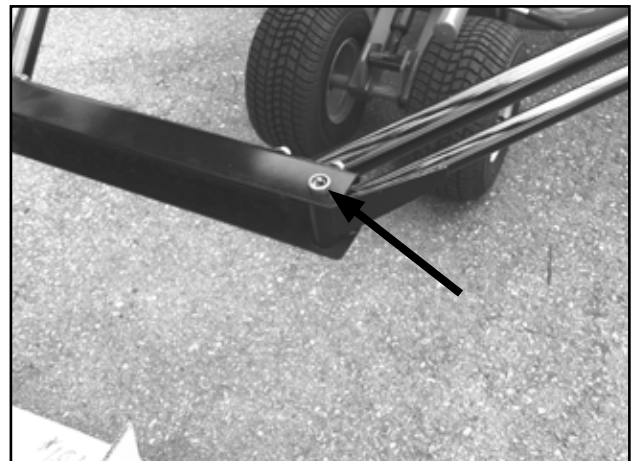
Bridge frame rear pivot & swivel and drive shaft bearing



Axle tandem beams



Rear rotor leveling pivot and rear axle pivot



Curtain pivot points

MAINTENANCE

Check and replace any safety decals that are damaged or missing.

Thoroughly inspect all bolts and nuts after the first use. Retighten any loose hardware and check periodically thereafter.

Check the air pressure of the tires. They should be inflated to approx. 25 psi.

Inspect the tines and replace any broken, missing, or bent tines.

Visually inspect condition of the hay curtain. Replace if necessary.

Periodically pressure wash your equipment and touch up any scratches with high quality rust resistant paint.

Apply a light weight oil to all moving parts not specified in other lubrication instructions in this manual.

STORING YOUR RAKE

Before winter storage, perform all lubrication and other maintenance procedures as previously described.

Remove tine arms and put them in their proper storage position.

Store in a dry, covered place with the rake lowered into the raking position. Storing in the raised (transport) position exposes the cylinder rods to dust and other elements that could cause it to rust.

TORQUE SPECIFICATIONS

The torque chart below lists the standard torque values for all attachment hardware on the rake unless otherwise specified in this manual.

Standard Torque Chart

BOLT SIZE	GRADE 5 BOLTS		GRADE 8 BOLTS	
	TORQUE (DRY) FT.LBS.	LUBRICATED FT.LBS.	TORQUE (DRY) FT.LBS.	LUBRICATED FT.LBS.
1/4 20	8	6	12	9
1/4 28	10	7	14	10
5/16 20	17	13	24	18
5/16 24	19	14	27	20
3/8 16	30	23	45	35
3/8 24	35	25	50	35
7/16 14	50	35	70	50
7/16 20	55	40	80	60
1/2 13	75	55	110	80
1/2 20	85	65	120	90
9/16 12	110	80	150	110
9/16 18	120	90	170	130
5/8 11	150	110	210	160
5/8 18	170	130	240	180
3/4 10	260	200	380	280
3/4 16	300	220	420	310
7/8 9	430	320	600	450
7/8 14	470	350	670	500
1-8	640	480	910	680
1-14	720	540	1,020	760

TORQUE SPECIFICATIONS

Metric Torque Chart

BOLT SIZE & PITCH	CLASS	NEWTON METERS (NM)		FOOT POUNDS (FT. LBS.)	
		PLATED	UNPLATED	PLATED	UNPLATED
M4 x .70	8.8	3.10	2.20	2.30	1.65
M5 x .80	8.8	6.10	5.50	4.58	4.13
M6 x 1.00	8.8	10.40	9.50	7.80	7.13
M7 x 1.00	8.8	17.00	15.50	12.75	11.63
M8 x 1.25	8.8	25.00	23.00	18.75	17.25
M8 x 1.00	8.8	27.00	24.50	20.25	18.38
M10 x 1.50	8.8	51.00	46.00	38.25	34.50
M10 x 1.25	8.8	54.00	49.00	40.50	36.75
M10 x 1.00	8.8	57.00	52.00	42.75	39.00
M12 x 1.75	8.8	87.00	79.00	65.25	59.25
M12 x 1.50	8.8	92.00	83.00	69.00	62.25
M12 x 1.25	8.8	96.00	87.00	72.00	65.25
M14 x 2.00	8.8	140.00	125.00	105.00	93.75
M14 x 1.50	8.8	150.00	135.00	112.50	101.25
M16 x 2.00	8.8	215.00	195.00	161.25	146.25
M18 x 2.50	8.8	300.00	280.00	225.00	210.00
M20 x 2.50	8.8	430.00	390.00	322.50	292.50
M22 x 2.50	8.8	580.00	530.00	435.00	397.50
M24 x 3.00	8.8	740.00	670.00	555.00	502.50
M6 x 1.00	10.9	15.50	14.00	11.63	10.50
M8 x 1.25	10.9	37.00	34.00	27.75	25.50
M10 x 1.50	10.9	75.00	68.00	56.25	51.00
M12 x 1.75	10.9	160.00	117.00	97.50	87.75
M14 x 2.00	10.9	205.00	185.00	153.75	138.75
M16 x 2.00	10.9	310.00	280.00	232.50	210.00

Pequea Machine's Limited Warranty

Pequea Machine Company warrants to the original Purchaser all Machinery, Equipment, or Trailers manufactured by it, to be free from defects in material and workmanship under normal use and service. Its obligation under this Warranty shall be limited to replacement or repair of any parts thereof, free of charge to the original Purchaser, at its place of business, provided, however, that the part(s) to be replaced or repaired, shall within one (1) year after delivery to the original Purchaser, be demonstrated to be defective; which determination shall be made by the Company. The said components or parts must be returned through the Selling dealer or distributor directly to the Company with all transportation charges prepaid. Notice of defect shall be furnished in writing to the Seller and to the agent through whom the machinery was received, disclosing in full all known defects and failure in operation and use, and reasonable time shall be given to the Seller to remedy any such defects and failures. Failure to make such trial or give such notice shall be deemed an absolute acceptance by the Buyer and satisfaction in full of this Limited Warranty.

This Warranty does not cover, under any circumstances, any parts, components, or materials which, in the opinion of the Seller and Company, have been subjected to neglect, misuse, alteration, accident, or if repaired, with parts other than those manufactured by and obtained from Pequea Machine Company.

This Warranty does not cover components which are already covered by a separate Warranty provided by the supplier of said parts or components.

The Company's obligation under this Warranty is limited to repair or replacement, free of charge to the original Purchaser, of any part which in judgment of the Company is defective. This Warranty does not cover normal wear and tear.

THIS WARRANTY IS MADE EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR USE AND PURPOSE AND OF ALL OTHER OBLIGATIONS OR LIABILITIES ON ITS PART AND ANY IMPLIED WARRANTY. AND IT NEITHER ASSUMES NOR AUTHORIZES ANY OTHER LIABILITY IN CONNECTION WITH A SALE OF THIS MACHINE. THIS WARRANTY SHALL NOT APPLY TO THIS MACHINE OR TO ANY PART THEREOF WHICH HAS BEEN SUBJECT TO ACCIDENT, NEGLIGENCE, ALTERATION, ABUSE, OR MISUSE.

The Company makes no Warranty whatsoever in respect to accessories or parts not supplied by the Company. The term "original Purchaser" as used in this warranty, shall be deemed that person for whom the Machine, Equipment, or Trailer is originally supplied. This Warranty shall apply only within the boundaries of the continental United States.

Under this Warranty, the Company cannot guarantee that existing conditions beyond its control will not affect its ability to obtain materials or manufacture necessary replacement parts.

No one is authorized to alter, modify, or change the terms of this Warranty in any manner.

The Company warrants the Construction of the equipment sold herein and will replace at its expense for a period of (1) year from the date hereof, any parts which prove defective as determined under the terms of this Limited Warranty.



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