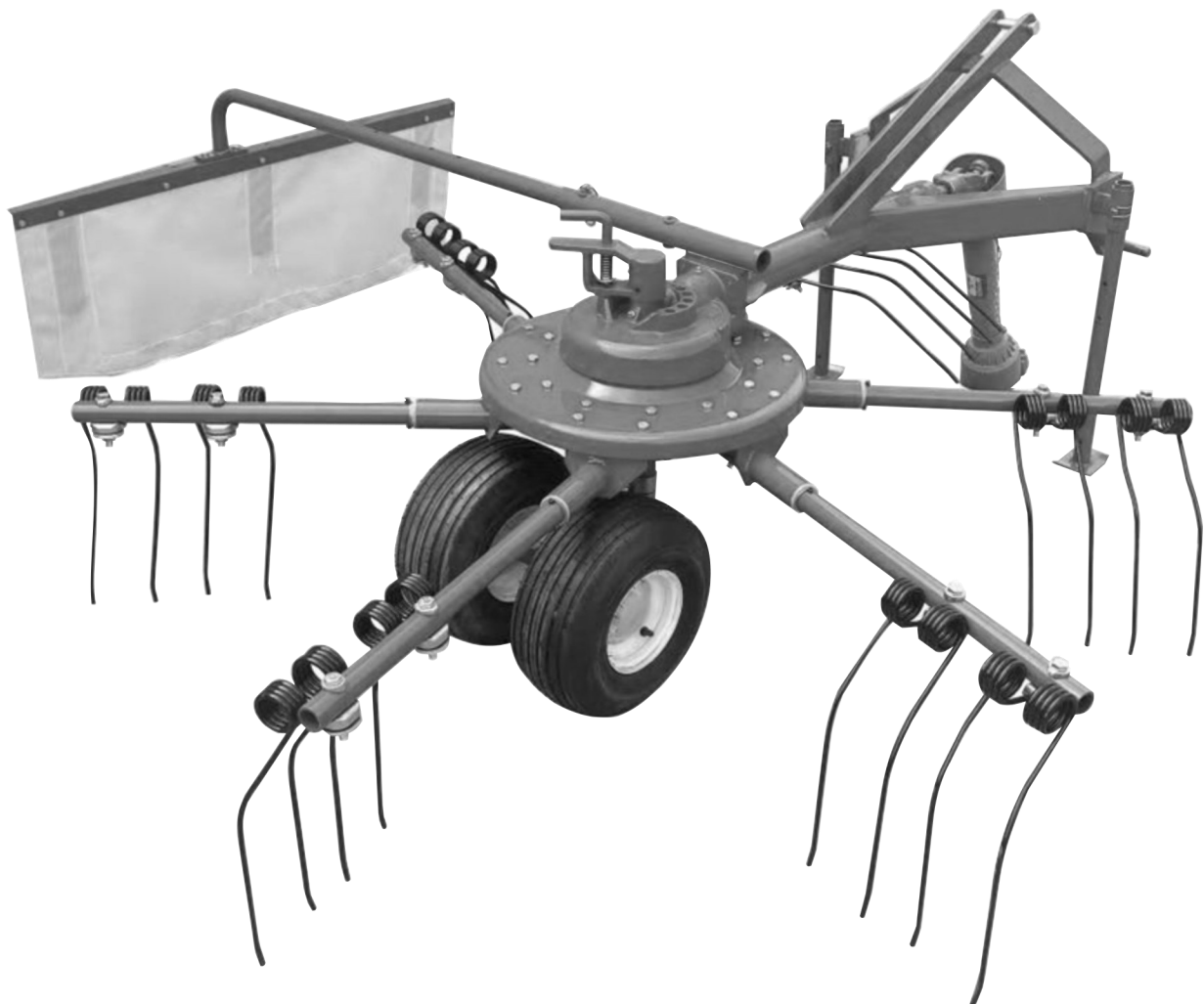




Rotary Rake

RR-248



Operator's Manual

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TO THE DEALER:

Assembly and proper installation of this product is the responsibility of the Tar River dealer. Read manual instructions and safety rules. Make sure all items on the Dealer’s Pre-Delivery and Delivery Check Lists in the Owner’s/Operator’s Manual are completed before releasing equipment to the owner.

TO THE OWNER:

Read this manual before operating your Tar River equipment. The information presented will prepare you to do a better and safer job. Keep this manual handy for ready reference. Require all operators to read this manual carefully and become acquainted with all the adjustment and operating procedures before attempting to operate. Replacement manuals can be obtained from your selling dealer. The equipment you have purchased has been carefully engineered and manufactured to provide dependable and satisfactory use. Like all mechanical products, it will require cleaning and upkeep. Lubricate the machine as specified. Observe all safety information in this manual and safety decals on the equipment. For service, your authorized Tar River dealer has trained mechanics, genuine Tar River service parts, and the necessary tools and equipment to handle all your needs. Use only genuine Tar River service parts. Substitute parts will void the warranty and may not meet standards required for safe and satisfactory operation.

Record your machine model and serial number in the space provide below. Your dealer will need this information to give you prompt, efficient service.

Model Number: _____

Serial Number: _____

Date Purchased: _____

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Introduction

Thank you for purchasing the RR-248 Rotary Rake. The RR-248 was designed with the needs of the small hay farmer in mind. With a 98” working width, this rotary rake is capable of delivering an excellent quality or performance while still being compact enough to be used with a 20 HP tractor.

The high-quality but affordable materials makes this rake durable and a great choice for budget farms. With the RR-248’s combination of performance, durability, and affordability, it is the next-best-thing for small hay farms.

Technical Specifications

	RR-248
Weight	364 lbs.
Working width	98”
# of Tine arms	6
# of Tines	12

Important Safety Information

Safety

It is important that you read the entire manual and to become familiar with this product before you begin using it. This product is designed for certain applications only. The manufacturer cannot be responsible for issues arising from modification. We strongly recommend this product not be modified and /or used for any application other than that for which it is designed. If you have any questions relative to a particular application, DO NOT use the product until you have first contacted us to determine if it can or should be performed on the product.

Read and understand this manual and all safety signs before operating and maintaining. Review the safety instructions and precautions annually.

Safety Signal Words

TAKE NOTE! This safety alert symbol found though out this manual is used to call you attention to instructions involving you personal safety and the safety of others. Failure to follow these instructions can result in injury or death.



**This symbol means:
Attention!
Become alert!
Your safety is involved!**

Note the use of the signal words, DANGER, WARNING and CAUTION with the safety messages. The appropriate signal word for each has been selected using the following guidelines:



DANGER: Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations typically for machine components which, for functional purposes, cannot be guarded.



WARNING: Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.



CAUTION: Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Important Safety Information

General Safety Guidelines

Safety of the operator is one of the main concerns in designing and developing a new piece of equipment. Designers and manufacturers build in as many safety features as possible. However, every year many accidents occur which could have been avoided by a few seconds of thought and a more careful approach to handling equipment. You, the operator, can avoid many accidents by observing the following precautions in this section. To avoid personal injury, study the following precautions and insist those working with you, or for you, follow them.

Replace any **DANGER, WARNING, CAUTION** or instruction safety decal that is not readable or is missing. Location of such decals are indicated in this manual. Do not attempt to operate this equipment under the influence of drugs or alcohol.

Review the safety instructions with all users annually.

This equipment is dangerous to children and persons unfamiliar with its operation. The operator should be a responsible adult familiar with farm machinery and trained in this equipment's operations. **Do not allow persons to operate or assemble this machine until they have read this manual and have developed a thorough understanding of the safety precautions and of how it works.**

To prevent injury of death, use a tractor equipped with a Roll Over Protection System (ROPS). Do not paint over, remove or deface any signs or warning decals on your equipment. Observe all safety signs and practice the instructions on them.

Never exceed the limits of a piece of machinery. If its ability to do a job, or to do so safely, is in question - **Don't try it!**



Safety Decal Care

- Keep safety signs clean and legible at all times.
- Replace safety signs that are missing or have become illegible.
- Replaced parts that displayed a safety sign should also display the current safety sign
- Safety signs are available from your Distributor or Dealer Parts Department or the factory.

Important Safety Information

How to Install Safety Signs

- Be sure that the installation area is clean and dry.
- Decide on the exact position before you remove the backing paper.
- Remove the smallest portion of the split backing paper.
- Align the decal over the specified area and carefully press the small portion with the exposed sticky backing in place.
- Slowly peel back the remaining paper and carefully smooth the remaining portion of the decal in place.
- Small air pockets can be pierced with a straight pin and smoothed out using the piece of decal backing paper.



Before Operation

- Carefully study and understand this manual.
- Do not wear loose-fitting clothing, which may catch in moving parts.
- Always wear protective clothing and substantial shoes.
- Assure that all tires are inflated evenly.
- Give the machine a visual inspection for any loose bolts, worn parts or cracked welds, and make necessary repairs. Follow the maintenance safety instructions included with this manual.
- Be sure that there are no tools lying on or in the equipment.
- Do not use the machine until you are sure that the area is clear, especially of children and animals.
- Don't hurry the learning process or take the machine for granted. Ease into it and become familiar with your new equipment.
- Practice operation of your equipment and its attachments. Completely familiarize yourself and other operators with its operation before using.
- Use a tractor equipped with a Roll Over Protection System (ROPS) and fasten your seat belt prior to starting engine.
- The manufacturer does not recommend usage of tractor with ROPS removed.
- Move tractor wheels to the widest recommended settings to increase stability.
- Securely attach to towing unit. Use a high strength, appropriately sized hitch pin with a mechanical retainer and attach safety chain.
- Do not allow anyone to stand between the tongue or hitch and the towing vehicle when backing up to the equipment.

Important Safety Information



During Operation

- Children should not be allowed on the product.
- Clear the area of small children and bystanders before moving the machine.
- If using a towing unit, securely attach machine by using a hardened 3/4" pin, a metal retainer, and safety chains if required. Shift towing unit to a lower gear before going down steep downgrades, thus using the engine as a retarding force. Keep towing vehicle in gear at all times. Slow down for corners and rough terrain.
- Make sure you are in compliance with all local and state regulations regarding transporting equipment on public roads and highways. Lights and slow moving signs must be clean and visible by overtaking or oncoming traffic when machine is transported.
- Beware of bystanders, **particularly children!** Always look around to make sure that it is safe to start the engine of the towing vehicle or move the machine. This is particularly important with higher noise levels and quiet cabs, as you may not hear people shouting.
- **NO PASSENGERS ALLOWED!** Do not carry passengers anywhere on, or in, the tractor or equipment, except as required for operation.
- Keep hands and clothing clear of moving parts.
- Do not clean, lubricate or adjust your equipment while it is moving.
- When halting operation, even periodically, set the tractor or towing vehicle brakes, disengage the PTO, shut off the engine and **remove the ignition key.**
- Be especially observant of the operating area and terrain. Watch for holes, rocks or hidden hazards. Always inspect the area prior to operation.
- **DO NOT** operate near the edge of drop-offs or banks.
- **DO NOT** operate on steep slopes as overturns may result.
- Operate up and down (not across) intermediate slopes. Avoid sudden starts and stops.



Warning: Never backup with the machine on the ground! This will cause damage to the machine. Always lift the machine high enough to clear the ground before backing up.

Important Safety Information



Highway and Transport Operations

- Adopt safe driving practices.
- Keep the brake pedals latched together at all times. **Never use independent braking with machine in tow as loss of control and/or upset of machine can result.**
- Always drive at a safe speed relative to local conditions and ensure that your speed is low enough for an emergency stop to be safe and secure. Keep speed at a minimum.
- Reduce speed prior to turns to avoid the risk of overturning.
- Avoid sudden uphill turns on steep slopes.
- Always keep the tractor or towing vehicle in gear to provide engine braking when going downhill. Do not coast.
- Do not drink and drive!
- Comply with state and local laws governing highway safety and movement of farm machinery on public roads.
- Use approved accessory lighting flags and necessary warning devices to protect operators of other vehicles on the highway during daylight and nighttime transport. Various safety lights and devices are available from your dealer.
- The use of flashing amber lights is acceptable in most localities. However, some localities prohibit their use. Local laws should be checked for all highway and marking requirements.
- When driving the tractor and equipment on the road or highway under 40 kph (20 mph) at night or during the day, use the amber warning lights and a slow moving vehicle (SMV) identification emblem.
- Plan your route to avoid heavy traffic.
- Be a safe and courteous driver. Always yield to oncoming traffic in all situations, including narrow bridges, intersections, etc.
- Be observant of bridge loading ratings. Do not cross bridges rated at lower than the gross weight at which you are operating.
- Watch for obstructions overhead and to the side while transporting.
- Always operate in a position to provide maximum visibility at all times. Make allowances for increased length and weight of the equipment when making turns, stopping the machine, etc.
- Pick the most level route when transporting across fields. Avoid the edges of ditches or gullies and steep hillsides.
- Be extra careful when working in inclines.

Important Safety Information

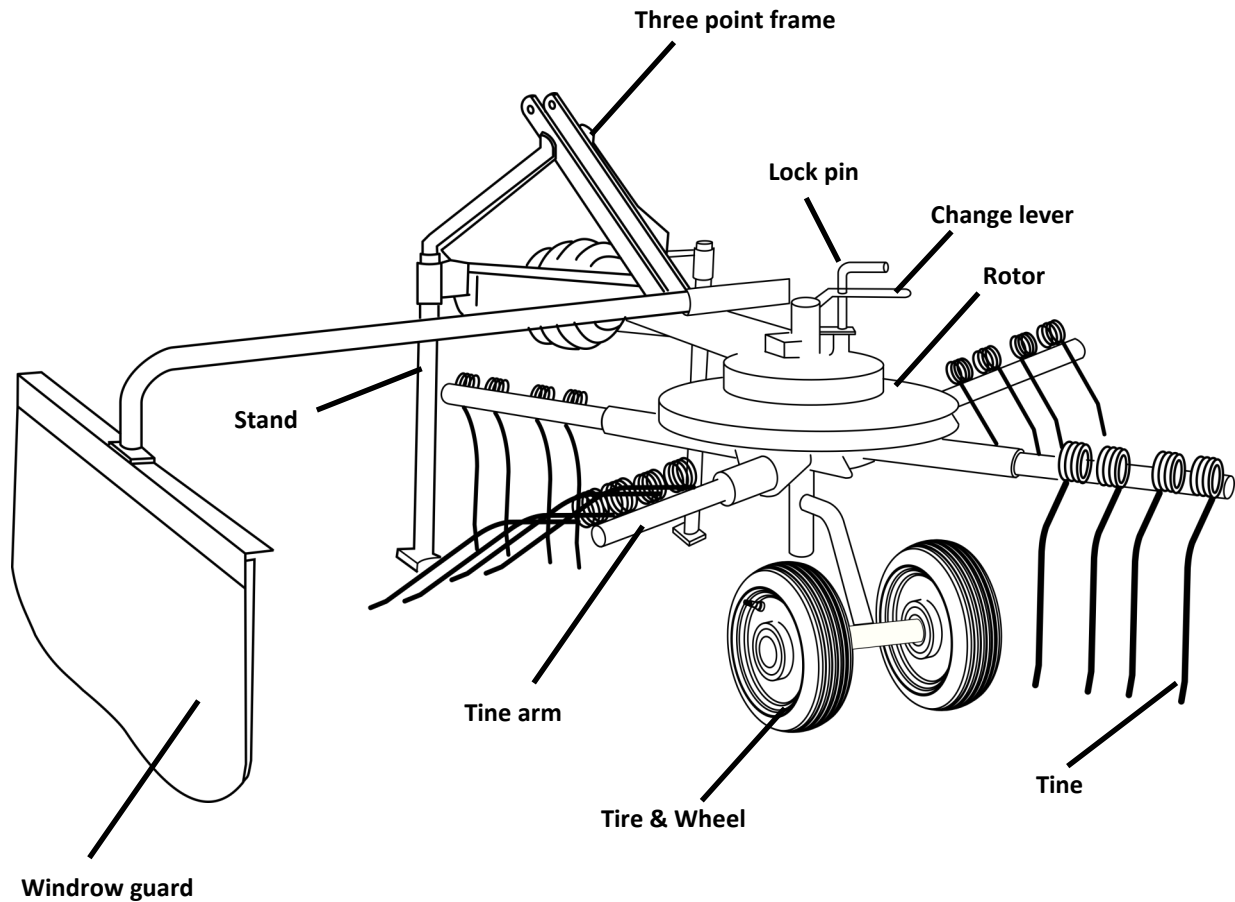


Highway and Transport Operations

- Maneuver the tractor or towing vehicle at safe speeds.
- Avoid overhead wires or other obstacles. Contact with overhead lines could cause serious injury or death.
- Avoid loose fill, rocks and holes, they can be dangerous for equipment operation or movement.
- Allow for machine length when making turns,
- Operate the towing vehicle from the operator's seat only.
- Never stand alongside of machine with engine running or attempt to start engine and/or operate machine while standing alongside of machine.
- Never leave running equipment attachments unattended.
- As a precaution, always recheck the hardware on equipment following every 100 hours of operation. Correct all problems. Follow the maintenance safety procedures.

Assembly Instructions

Components and their functions



- **Universal joint:**
Power is transmitted from tractor to Rotary Rake.
- **Three point frame:**
Connects Rotary Rake to a tractor.
- **Windrow guard:**
Working width can be adjusted by removing locking pin from frame, sliding windrow guard in or out. Re-insert pin before beginning or continuing operation.
- **Rotor:**
Working position such as raking, tedding, spreading and transportation is changed by lifting locking pin and turning change lever on rotor.
- **Wheel:**
Adjust ground clearance height by changing the combination of the three height adjustment collars depending on working conditions.

Assembly Instructions

Applicable tractor size

This machine is designed to operate using the recommended size tractor. Attaching to an improper size tractor could result in damage to the machine, tractor and cause serious injury or death. This will result in voiding the Warranty.

The suitable tractor horse power for this machine is as follows:

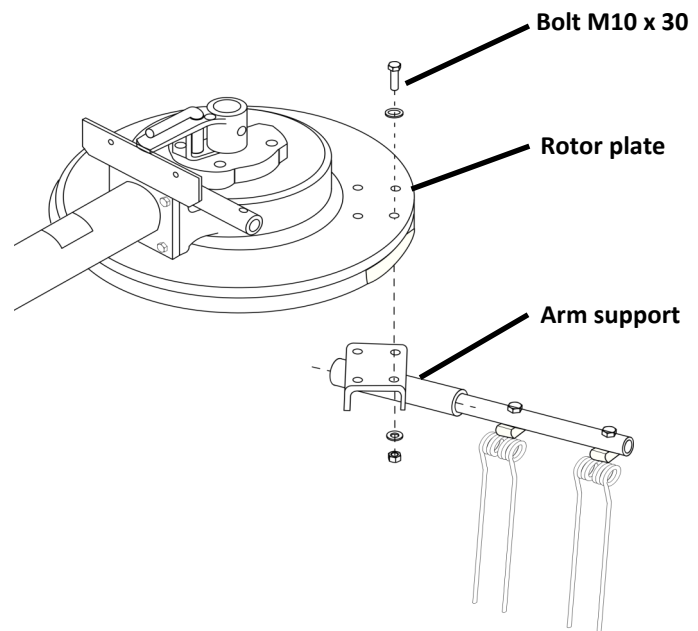
Model	Applicable Tractor
RR-248	11 - 22kW (15-30 HP)

If a tractor smaller than the applicable size is used with this machine, there may not be sufficient power to operate the machine.

If a tractor larger than the applicable size is used, there will be too much power for the load causing damage to the machine, tractor and possible serious injury or death.

Assembly

- Open package:
Remove the parts that are fastened to the wooden or metal crate.
- Details of packaged parts:
Make sure all of the required parts that are listed on the packing list have been included in the package.
- Assembly:
(1) Attach arm support to rotor plate using supplied hardware.

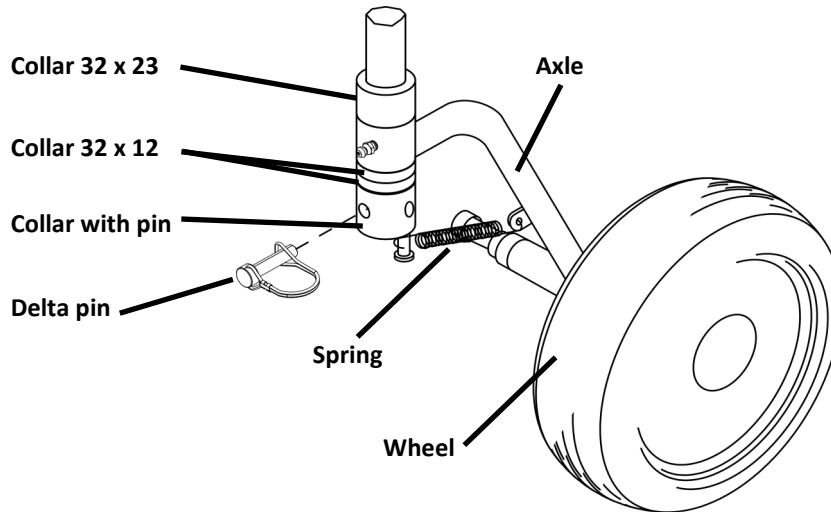


Assembly Instructions

(2) Attach wheel

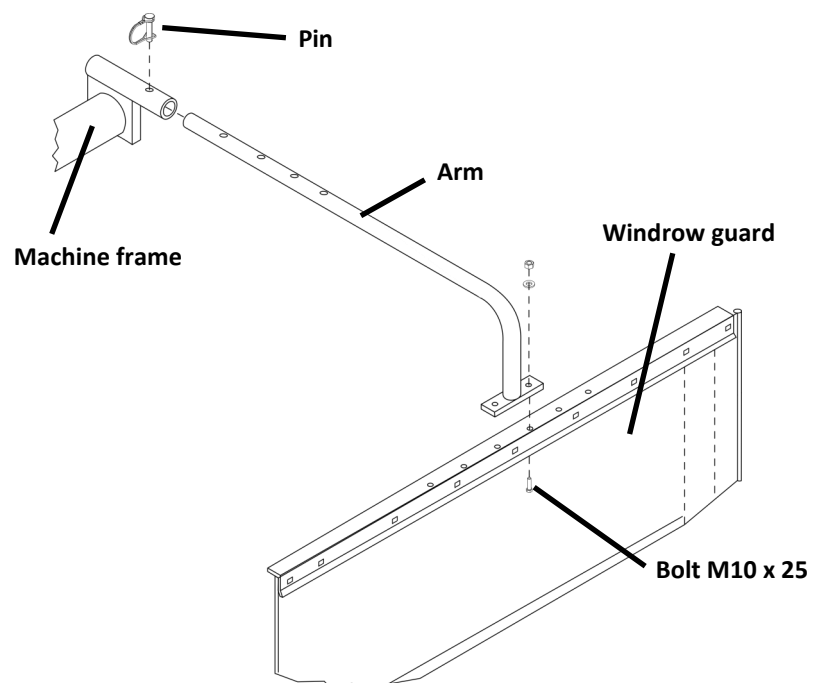
Standard attaching position of collar is as follows:

Attach collar with pin when Change Lever is shifted to raking position.



(3) Attach windrow guard

Slide the windrow guard arm into the frame of machine. Select hole that sets width of the windrow desired. Do not operate the machine until the locking pin is secure.



Attaching to tractor

Attachment to tractor



Warning: Never allow bystanders between the tractor and the machine when moving the tractor to attach or detach the machine. Serious injury or death is possible. Never allow anyone between the tractor and the machine.



Caution: Do not attach or detach the machine to the tractor on an incline or soft/unstable ground. This could result in an unforeseeable accident due to unexpected movement of the tractor or the machine.

Attaching or detaching the machine should always be performed on level, solid ground.

A counter-weight may be required for lighter tractors to prevent unstable handling of the tractor.

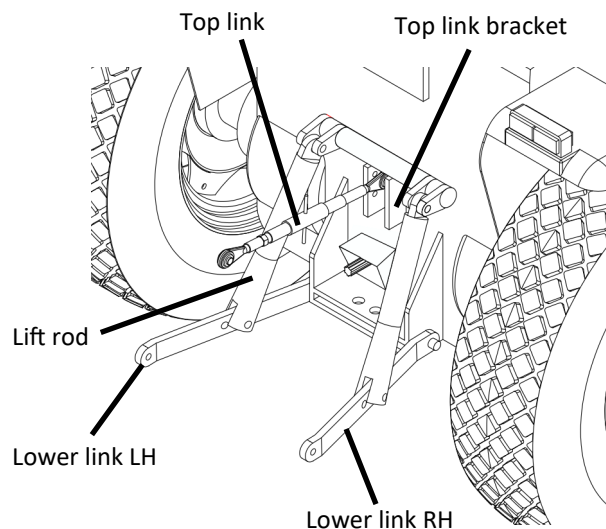
Before attachment:

The machine should be attached to the standard tractor three point linkages.

If the machine can not be lowered enough, lift rod of lower link are should be moved to the forward hole.

Attaching to a tractor 3 point

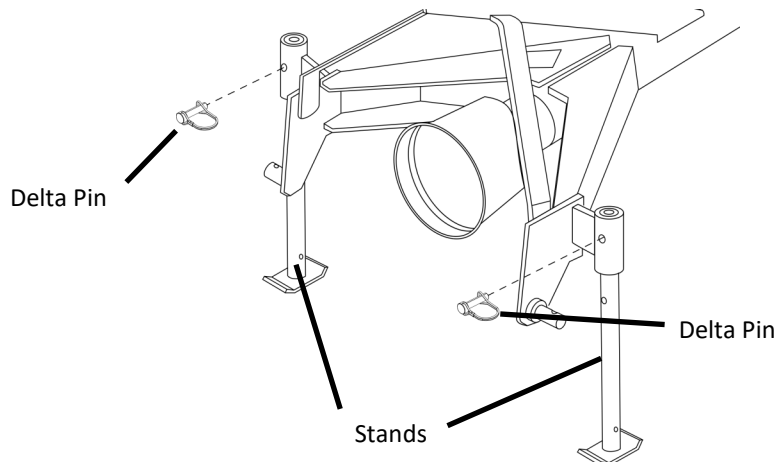
- Start the tractor and reverse the tractor until the end of the tractor's lower links line up with the left and right lower link pins of the machine. Stop the tractor, turn off engine, remove key and apply parking brake.
- Connect the left lower link, then insert the locking pin into the lower link pin to secure the machine to the tractor. Repeat for the right side.
- Connect the top link by inserting pin, then insert the locking pin into the top link pin to secure the machine to the tractor.
- Adjust the left and right lower link so they are the same height with the adjustment screw located on the right lift rod of the tractor.
- The center of driveline should be located close to the center of the tractor by setting the check chain to prevent the machine from moving horizontally.
- Pull up the stand and fasten it by the delta pin.



Caution: Some tractors have an automatic 3 point quick rising mechanism by an electrical switch. Make sure the tractor and the machine do not interfere by manual operation and limit height of lower link to have enough space between the tractor and the machine.

Attaching to tractor

- Pull up the stand and fasten it by the locking pin.
- Lower the machine by operation of the 3 point hitch until it comes into working position.



Attachment of the universal joint

If the universal joint is used without a safety cover, there is a possibility of becoming entangled and injured. Do not use a universal joint without a safety cover.



Danger:

- If the universal joint is used without a safety cover, there is a possibility of becoming entangled and injured. Do not use a universal joint without a safety cover.
- If the universal joint is used with a damaged cover, there is a possibility of becoming entangled and injured. If the cover becomes damaged, replace it immediately. Check for damage before use.
- When attaching the universal joint to the machine and tractor or when detaching from tractor and the machine, there is a possibility of injury if the universal joint is operated unknowingly by a third person. Disengage PTO and turn off the tractor engine before performing attachment.
- If the universal joint is used without installing the chains for the cover, there is a possibility that the cover could turn and the operator could become entangled and injured.
- Connect the chains on both the tractor side and machine side so the cover does not turn.



Caution:

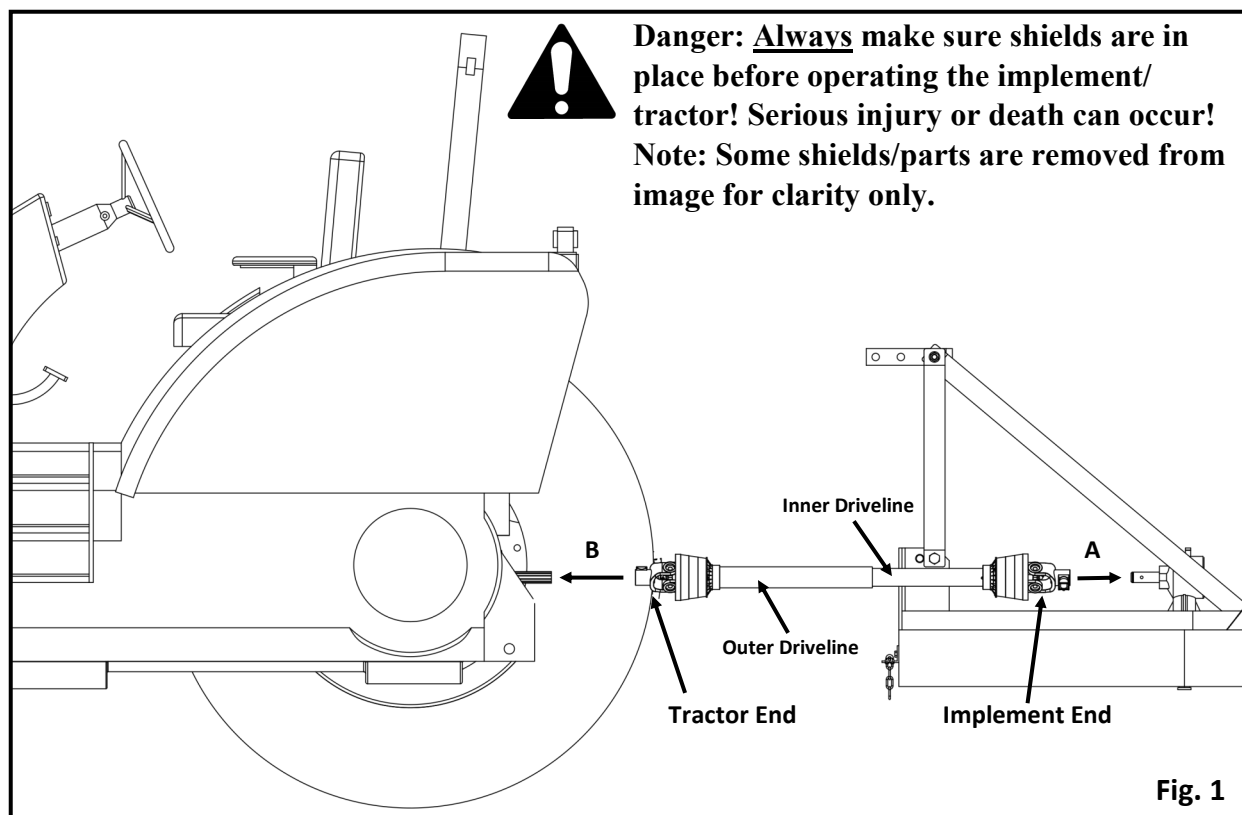
- If the overlap of the inner and outer pipes of the universal joint is less than 100 mm when fully extended, there is a possibility of damage or injury.
- If the space between the inner and outer pipes of the universal joint is less than 25mm when fully retracted, then both pipes could hit each other and cause damage or injury.
- Make sure if the overlap of the pipes is proper.

PTO Driveline Instructions

Instructions for Installing a PTO Driveline:

(Refer to Fig. 1)

1. Begin by parking the tractor and implement on a level, solid surface. Attach the implement to the tractor's hitch arms, upper and lower. Adjust the tractor's 3-point hitch so that the tractor's output shaft is level with the implement's input shaft.
2. Leave the tractor in gear, shut off the tractor engine, remove the key and set the park brake. Block the implement to prevent it from falling over or shifting.
3. Slide the inner yoke of the PTO shaft 'A' (implement end) onto the input shaft of the implement. Make sure the yoke is securely locked in place.
4. Slide the outer yoke of the PTO shaft 'B' (tractor end) onto the tractor input shaft. Make sure the yoke is securely locked in place.
5. Because of differences in tractor 3-point arms and implements, it may be necessary to shorten the PTO Driveline. See page 4 for "**Instructions for Shortening a PTO Driveline**".
6. Check that the PTO Driveline yokes are securely attached to the tractor and implement before operating. PTO Drivelines not attached properly can cause serious injury or death!
7. If your PTO Driveline shields are equipped with chains, secure the chain to the tractor and or implement to prevent the shield from rotating.
8. Before starting tractor and engaging the PTO Driveline, make certain there are no people or animals between tractor and implement. Rotating PTO Drivelines can cause serious injury or death!



PTO Driveline Instructions

Instructions for Shortening a PTO Driveline:

(Refer to Fig. 2)



Note: If you are not confident modifying the PTO Driveline, you should contact a Qualified Professional.

1. Separate the inner and outer PTO Drivelines. Leave separated at this time.
2. Attach the outer PTO Driveline to the tractor implement input shaft and inner PTO driveline to the implement input shaft.
3. With the drivelines parallel to one another, measure 1" (dim. 'B') back from the outer PTO Driveline shield (see fig. 2) and make a mark on the inner PTO Driveline.
4. Measure 1" (dim 'B') back from the inner PTO Driveline shield (see fig. 2) and make a mark on the outer PTO Driveline.
5. Remove the drivelines from the tractor and implement.
6. Measure from the end of the inner shield to the scribed mark (dim. "C"). Cut the inner shield at that mark. Cut the same amount off the inner shaft (dim. "C1").
7. Measure from the end of the outer shield to the scribed mark (dim. "D"). Cut the outer shield at that mark. Cut the same amount off the inner shaft (dim. "D1").
8. Clean off all burrs from both drivelines.
9. Refer to "Checking PTO Driveline Extended Length" section next.

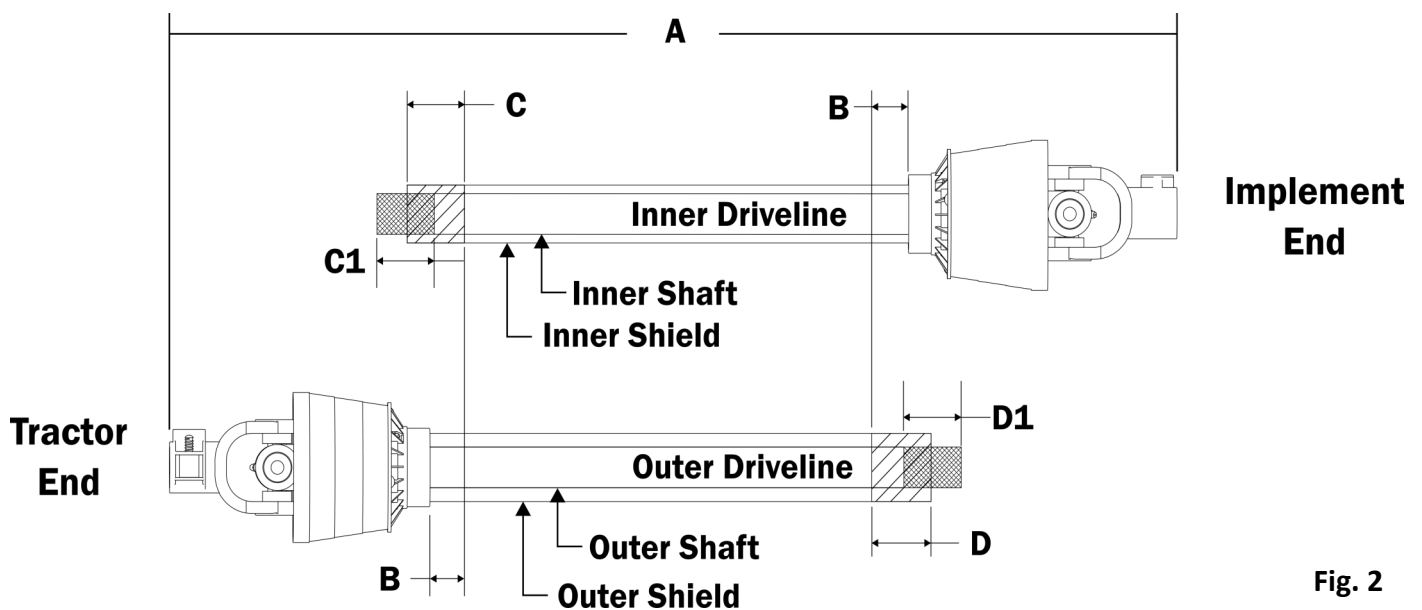


Fig. 2

PTO Driveline Instructions

Checking PTO Driveline Extended Length:

(Refer to Fig. 3)

1. Apply multi-purpose grease to the outside of the inner driveline section. Assemble the outer and inner drivelines.
2. When fully extended, the maximum allowable length must have a minimum overlap of $\frac{1}{3}$ the free length of the inner and outer sections. Measure and record the maximum extended length for future reference.
3. Attach the outer PTO Driveline to the tractor implement input shaft and inner PTO driveline to the implement input shaft.
4. Pull both yoke ends to make sure they are properly seated on the input shafts. **Warning:** If the drive lines are not properly seated, they can separate from the tractor or implement, causing extensive damage and possibly serious injury or death.
5. Raise and lower the implement to determine the maximum extended length. Make sure the maximum extended length does not exceed the maximum length determined from step 2.

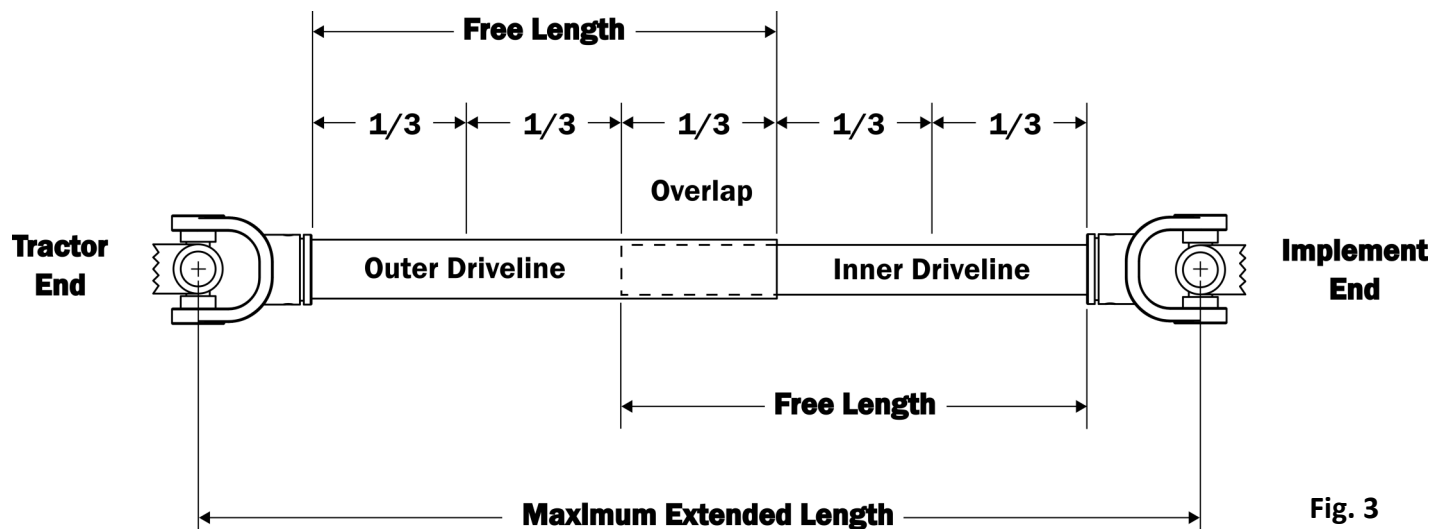


Fig. 3



Danger: Always make sure shields are in place before operating the implement/tractor! Serious injury or death can occur!

Note: Some shields/parts are removed from image for clarity

PTO Driveline Instructions

Checking for PTO Driveline Interference:

(Refer to Fig. 4)

1. Begin with the PTO Driveline level (0 degrees). Raise the implement at an angle no greater than 25 degrees from level. Check for any interference and the length of the PTO Driveline extended. Do not exceed the maximum extended length!
2. Next lower the PTO Driveline at an angle no greater than 25 degrees from level. Check for any interference and the length of the PTO Driveline extended. Do not exceed the maximum extended length!

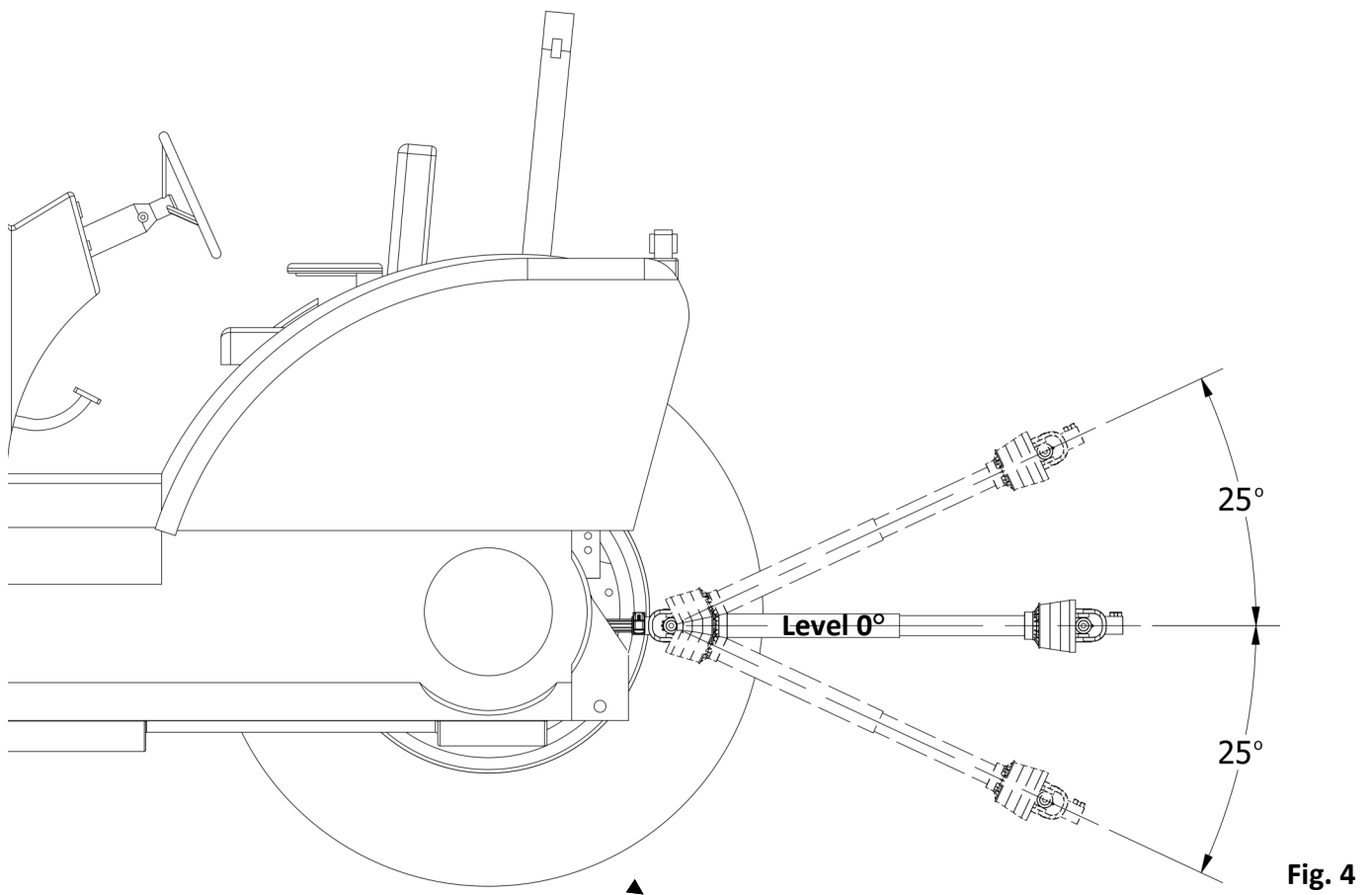


Fig. 4



Danger: Always make sure shields are in place before operating the implement/tractor! Serious injury or death can occur!

Note: Some shields/parts are removed from image for clarity

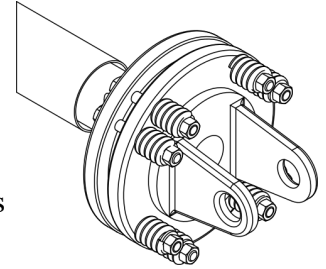
	⚠ DANGER
	<ul style="list-style-type: none"> • Keep away from rotating driveline. • Keep driveline shields, implement shields, and tractor PTO master shield in place and in good repair. • Operate only with 540 rpm PTO.

PTO Driveline Instructions

Adjustments for Slip clutch equipped PTO Drivelines:

The slip clutch must be adjusted before first use or after a storage period.

1. Using a marker, scribe a line across the exposed edges of the clutch plate and friction discs.
2. Back off compression nuts to free friction discs by turning each nut *exactly* 2 revolutions.
3. Start the tractor and run the driveline at a low idle to slip the friction discs. This will remove the dirt, corrosion and surface floss from the clutch plate faces.
4. Disengage PTO, shut down tractor and wait for all components to come to a complete stop.
5. Inspect the clutch and ensure that the scribed markings on the disc and plates have changed position. If any two marks are still aligned, this is an indication that these discs have not slipped. It may be necessary to completely disassemble the clutch to free them up.
6. After ensuring all discs are free, tighten the compression nuts, uniformly, *exactly* 2 revolutions to reset the clutch original pressure.



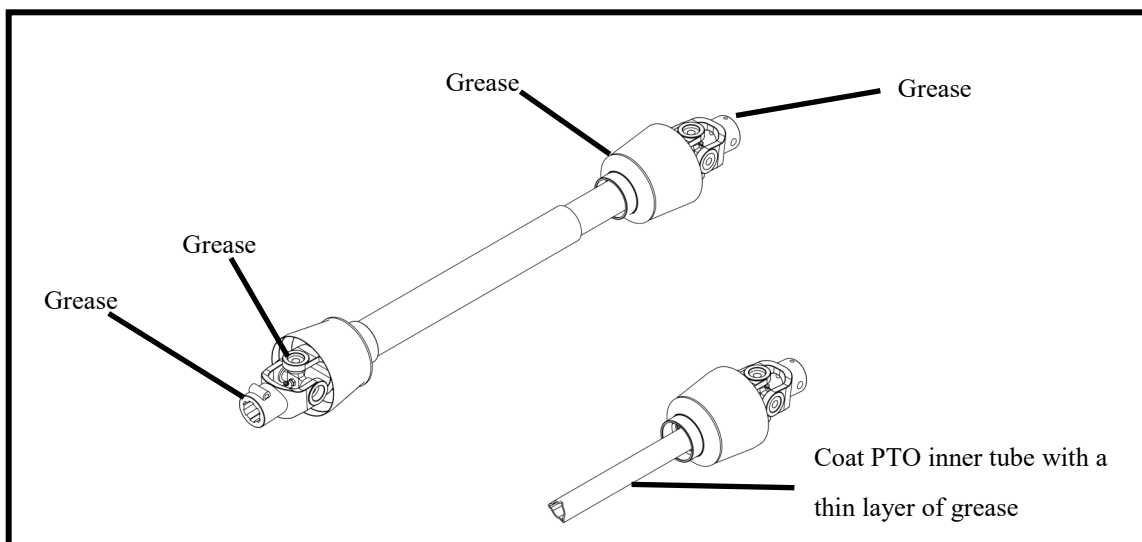
Caution: Slip Clutches may become hot. Do Not Touch. Keep the slip clutch area clear of material that may catch fire. Slip clutches have adjustable torque settings. The torque setting varies with the different compression of each spring. All the springs should have an equal amount of compression.

Important: Do not over-tighten the compression nuts as this may impair performance or cause premature wearing of the slip clutch.

Lubrication:

Every 8 hours:

Grease the PTO shaft and apply a light layer of grease on the inner tube.



Operating Instructions

Inspection before operation

Inspection should be performed before operation in order to assure long life of the machine.

Inspecting tractor

- Inspect the tractor as described in the operation manual for the tractor.

Inspecting the connection of the 3 point linkages

- Has the locking pin been inserted into the hole for the lower link?
- Has the delta pin been inserted into the hole of the top link pin?
- Are the check chains stretched properly?
- If any problems are found, handle them as described in “Connection to the 3 point linkage.”

Inspecting the universal joint

Is the clamp pin seated in the groove of the PTO shaft?

Is the stopper ring of the pin fitted in the slot of the yoke with plain hole?

Is there too much slack in the chains attached to the joint covers? Is there enough slack?

Are joint covers damaged? If there is any damage, immediately replace the cover.

If any problems are found, handle them as described in section, “Attachment of the Universal Joint.”

Inspecting the machine

Check all hardware for proper torque. See “Torque Specifications” on page 27.

Are all moving parts lubricated or greased properly? If not, lubricate them or apply grease as described in section, “List of Places Requiring Lubrication”.

Check air pressure in tires and adjust according to the tire manufactures recommendation.

Inspecting tractor engine operation.



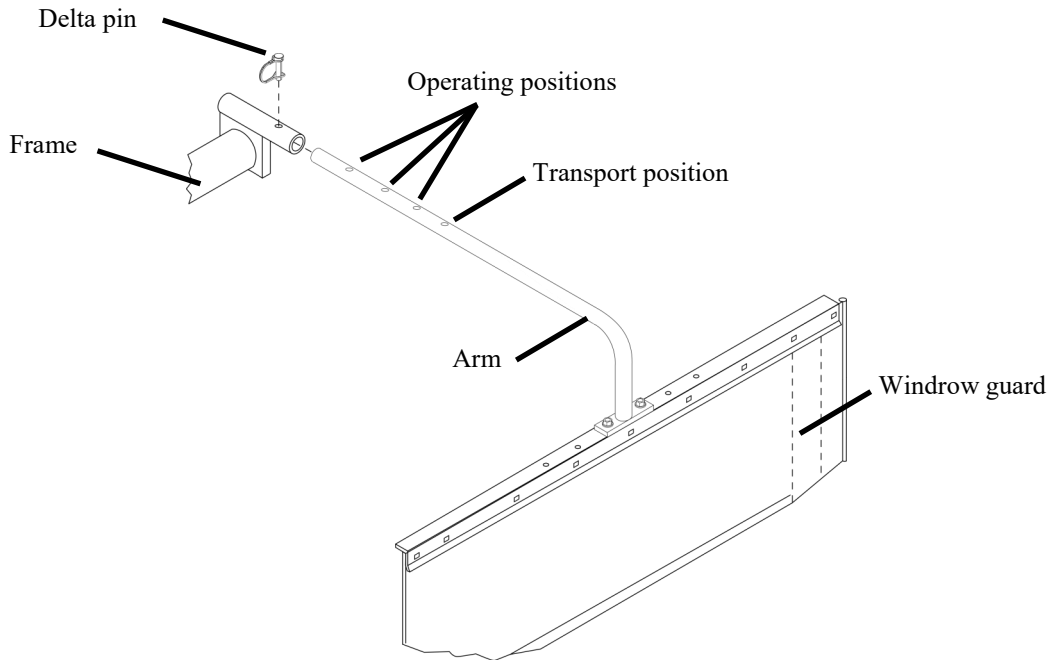
Caution: Never start tractor engine with PTO engaged. When the tractor engine is running and PTO is engaged, there is a possibility for bystanders to be seriously injured or killed. Never allow anyone near a running tractor with the PTO engaged.

Operating Instructions

Adjustment of windrow guard.

It can be adjusted in three stages, depending on type of material.

Windrow guard should be turned upward during spreading and tedding.

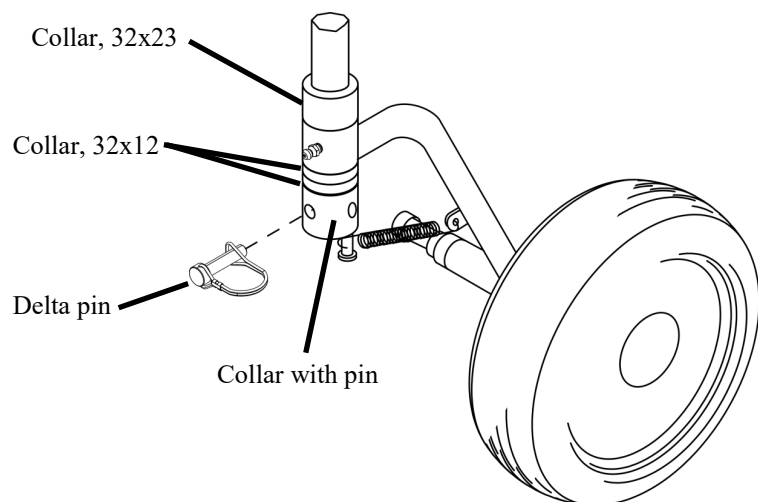


Adjustment of wheel height

Lift the machine using the tractor three point linkage. Remove the delta pin and adjust the height of the wheels using the collars provided.

Standard height is as follows: Clearance between ground and tine is changed depending on the height of the wheel. Adjust this clearance by tractor top link.

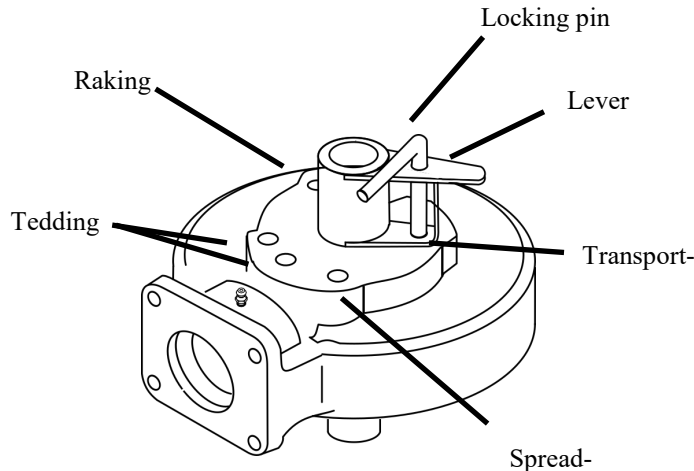
Caution: Make sure the pin on the collar is facing the rear of the machine as shown in the illustration below.



Operating Instructions

Tine motion adjustment

Shift the position of the lever according to the work desired. Make sure the locking pin is seated in the proper hole. See illustration below.



Operation

Caution: During operation or while machine is rotating, coming in contact with the rotor can result in entanglement and cause serious injury.

Warning: During operation or while machine is rotating, there is the possibility of injury due to thrown objects such as, rocks, sticks, etc. Never allow bystanders near the machine while in operation. There is the possibility of serious injury or death. Damage to the machine is possible if the PTO is operated beyond the recommended rpms.

Do not exceed the recommended rpms.

Operate machine at a low speed when on an incline. Excessive speed can cause the tractor and machine to tip over, causing damage to tractor, the machine, serious injury or death to the operator.

Before operating on an incline, shift tractor into a lower gear and slower throttle speed.

Attention: Never make adjustments to the wheels or operation change lever without first stopping the tractor engine, setting the parking brake. Be sure all moving parts have stopped before attempting any adjustments or repairs. Rotating parts can cause serious injury or death.

- Tedding should be done as soon as possible after cutting material, grass, hay, to accelerate drying time.
- It is better to run a tractor over the row after cutting grass, straw, or windrow after raking when tedding.
- If there is a small amount of material, gather two or three small rows into one for better productivity.
- Windrows should be uniform and small for best results.
- There is greater moisture content in the night air.
- There is a greater chance that the material will contain a higher concentration of moisture.
- To prevent excessive moisture, make windrows before stopping in the evening.
- Windrows will also aid in keeping moisture down if it rains.

Operating Instructions

Operation method

Purpose of this machine

- This machine is designed for spreading, tedding and raking of grass, paddy straw and wheat straw. Do not use this machine beyond its intended purpose.
- Do not operate the machine in a field after a rain or during wet, muddy conditions.

Type of operation

- Raking:
Windrow is made by raking, spreading grass
- Spreading:
Windrow is spread again for accelerating the drying process
- Tedding:
To accelerate the drying process, the material should be turned over multiple times a day depending on the moisture content of the grass.

Adjustment for operation

Type of work		Working speed	PTO revolution	
Spreading or Tedding	High moisture, long & heavy	3-4 mph	500-540 rpm	
	Low moisture, low density	4-5 mph	450-500 rpm	Increase tractor speed and slow PTO revolution for dryer material
Raking		3-5 mph	350-540 rpm	Decrease tractor speed when raking thick, heavy material

Operating Instructions

After operation

Maintain the machine to ensure long life.

Attention: Never attempt to remove blocked tangled material from the machine while running. Disengage PTO, stop tractor engine, set tractor parking brake, make sure that all moving parts are stopped before clearing material.

Maintenance after operation

1. Remove material from the machine in the field.
Remove grass and straw from the rotating parts completely to prevent oil seal, bearing, etc. from damage. Replace any missing or damaged hardware, nuts, bolts, washers or pins. Inspect machine from any loose hardware or pins. Torque hardware to recommended specifications.
2. Tines are consumable goods. It is recommended to keep spare tines on hand.
3. Apply grease to unpainted surfaces of the PTO shaft, PIC shaft and universal spline to prevent rust.
4. When storing, make sure to lower and set the machine stands. Never store machine elevated. Set the change lever to the transport position before moving.

Detaching from a tractor

1. Slide the stands down and insert pins in the highest hole.
2. Lower hydraulic control lever of tractor until tires of the machine contact the ground.
3. Stop the tractor engine and set the parking brake.
4. Detach universal joint from the tractor PTO shaft.
5. Detach right side of lower link, left side of lower link and top link.

Storage in season and out.

1. Clean every part of the machine thoroughly.
2. Replace worn and damaged parts with new OEM parts.
3. Apply grease or oil in accordance with Lubrication points table. Apply oil to rotating, pivoting parts and sliding parts. Apply grease on PTO shaft, PIC shaft and universal joint spline.
4. Apply a thick coat of grease/oil on damaged surfaces to prevent rust.
5. Store the machine in a well ventilated area, shelter or shop.
6. If there is no option but to store machine outside, cover with a plastic sheet or tarp.

Inspection & Maintenance

Inspection and Maintenance

Inspection and maintenance should be done on a regular basis to keep the machine in excellent working order. Well maintained machines will have a longer life and operate more efficient.

Inspect and maintain each part in accordance with the Inspection and Maintenance table to prevent damage to machine and aid in long life of the machine.

Replace tines as needed with new OEM ones.

Never inspect, maintain or repair machine with tractor engine running. Always wait for any moving parts to stop before performing any operation to the machine.

Attention: When inspecting, maintenance and adjustments are done after lifting the machine by three point linkage, there is the possibility for the machine to fall causing serious injury or death.

The machine should always be supported properly to prevent accidents caused by the machine falling.

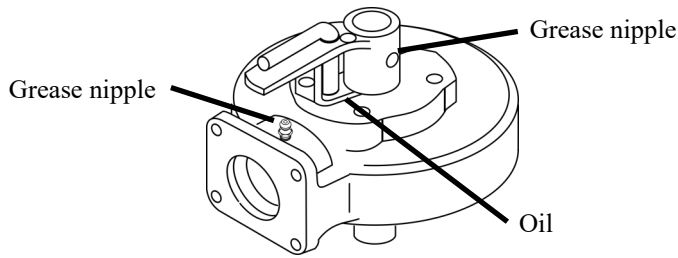
Lock the hydraulics of the tractor three point linkage before inspecting the machine.

Always make sure the tractor and machine is on a level, solid surface before performing inspection or maintenance.

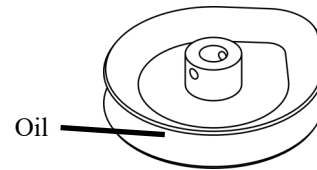
Inspection and Maintenance Table

Hours	Items for checking	Solution
After initial one hour of operation	Check all hardware for looseness	Tighten to proper torque specifications
Before operation After operation	Clean machine	
	Check tines for wear	Replace as needed
	Check tire pressure	40 PSI
	Looseness of hardware including pins	Tighten to proper torque specifications
	Abnormal noise or vibration	Adjust as needed
	Breakage of universal joint, cover or chain	Replace
	Lubrication of rotating and moving parts	Lubricate with proper oil or grease
Out of season	Broken parts	Replace with OEM parts
	Tine wear	Replace with OEM parts
	Cleaning machine parts	
	Damage to painted parts	Paint or apply oil/grease to prevent rust of painted parts
	Worn pivoting parts of pins	Replace worn parts with new OEM parts

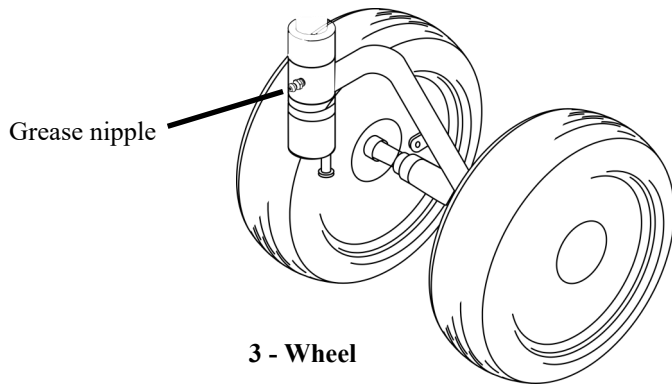
Lubrication



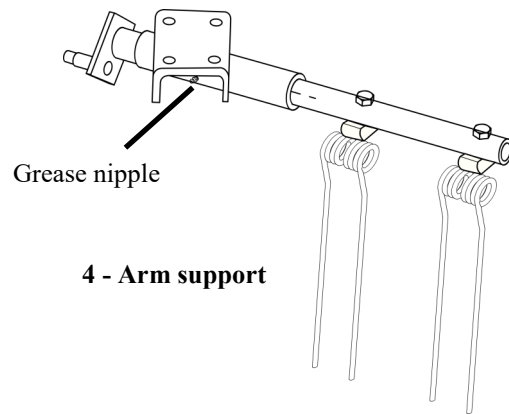
1 - Rotor gear case



2 - Cam

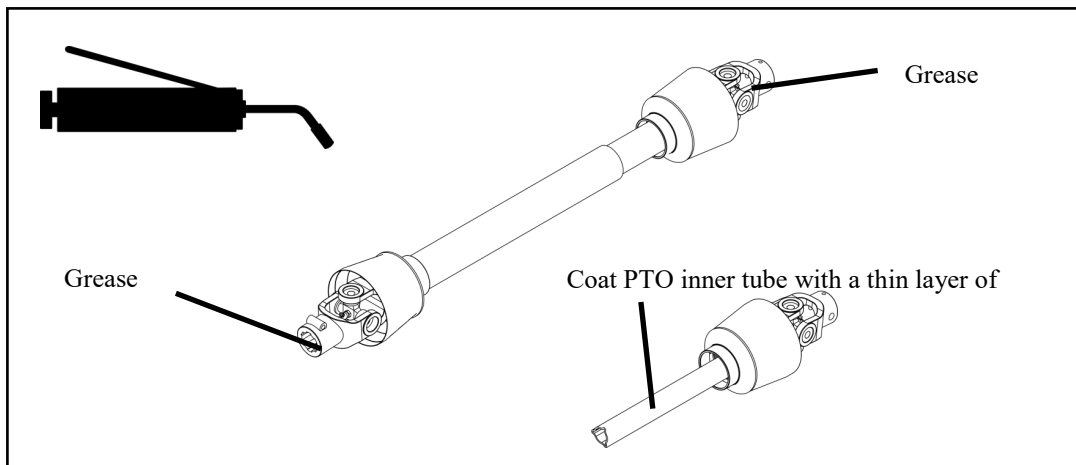


3 - Wheel



4 - Arm support

5 - Universal joint



	Lubrication	Point	Type of Lubrication	Change frequency	Quantity	Remarks
1	Rotor gear case	3	Grease/Oil	20-30 hours of the initial operation. Afterwards, seasonally.	As required	Grease nipple
2	Cam	-	Grease	After operation	As required	Grease
3	Wheel	1	Grease	After operation	As required	Grease nipple
4	Arm support	4	Grease	After operation	As required	Grease nipple
5	Universal joint	-	Grease	After operation	As required	Grease nipple

Trouble Shooting

Trouble Shooting

If the machine is not operating at optimal performance, adjust according to the following instructions.

Attention: If the machine is supported by the tractor three point linkages, there is a possibility of serious injury or death from the machine falling. Do not allow bystanders near the machine when it is supported by tractor three point linkages.

Lock the tractor hydraulics before inspecting or repairing.

Always inspect the machine on level, dry, solid ground to prevent machine or tractor shifting.

Always disengage the PTO, shut off tractor engine, set tractor park brake and make sure all parts of the machine including the driveline have stopped moving.

	Fault	Possible cause	Solution
Rotor parts	Abnormal noise	Insufficient grease in rotor gear case	Add applicable grease
		Tine hardware loose	Tighten to proper torque specifications
		Tine breakage	Replace with new OEM tines
	Material not picked up cleanly	Wrong working position of machine	Adjust handle to correct position
		Traveling speed too fast	Reduce traveling speed
	Uneven windrows	Traveling speed too fast	Reduce traveling speed
		Rotor revolution too fast	Reduce speed of rotor revolution
		Windrow width too narrow	Widen windrow width
		Tine breakage	Replace with new OEM tines
	Material is winding on rotor	Wheel height too low	Adjust wheel height up
Traveling speed too fast		Reduce traveling speed	
Universal joint	Abnormal noise	Insufficient lubrication	Apply grease to moving parts
		Too great of angle of universal joint	Adjust tractor linkage
		Windrow width too narrow	Widen windrow width
		Tine breakage	Replace with new OEM tines

Torque Specifications

Torque Specifications for Common Bolt Sizes															
Inches		Bolt Head Identification						Metric		Bolt Head Identification					
										5.8		8.8		10.9	
Bolt size (inches)	Thread pitch	Grade 2		Grade 5		Grade 8		Class 5.8		Class 8.8		Class 10.9			
		N.m	ft-lb	N.m	ft-lb	N.m	ft-lb	N.m	ft-lb	N.m	ft-lb	N.m	ft-lb		
1/4"	20	7	5	11	8	16	12	M5	0.08	4	3	6	4	9	7
1/4"	28	8	6	13	10	19	14	M6	1	6	4	10	7	15	11
5/16"	18	15	11	24	17	33	25	M8	1.25	16	12	25	18	36	27
5/16"	24	17	13	26	19	37	27	M8	1	17	13	26	19	38	28
3/8"	16	27	20	42	31	59	44	M10	1.5	31	23	48	35	71	52
3/8"	24	31	23	47	35	67	49	M10	1.25	33	24	51	38	75	55
7/16"	14	43	32	67	49	95	70	M10	1	35	26	53	39	78	58
7/16"	20	48	36	75	55	106	78	M12	1.75	54	40	84	62	123	91
1/2"	13	66	48	102	75	144	106	M12	1.5	56	41	87	64	128	94
1/2"	20	75	55	115	85	163	120	M12	1.25	59	44	90	66	133	98
9/16"	12	95	70	147	109	208	154	M14	2	84	62	133	98	195	144
9/16"	18	106	79	164	121	232	171	M14	1.5	94	69	142	105	209	154
5/8"	11	132	97	203	150	287	212	M16	2	131	97	206	152	302	223
5/8"	18	149	110	230	170	325	240	M16	1.5	141	104	218	161	320	236
3/4"	10	233	172	361	266	509	376	M18	2.5	181	133	295	218	421	310
3/4"	16	261	192	403	297	569	420	M18	2	196	145	311	229	443	327
7/8"	9	226	167	582	430	822	606	M18	1.5	203	150	327	241	465	343
7/8"	14	249	184	642	473	906	668	M20	2.5	256	189	415	306	592	437
1"	8	339	250	873	644	1232	909	M20	1.5	288	212	454	335	646	476
1"	12	371	273	955	704	1348	995	M22	2.5	344	254	567	418	807	595
1-1/8"	7	480	354	1077	794	1746	1288	M22	1.5	381	281	613	452	873	644
1-1/8"	12	539	397	1208	891	1958	1445	M24	3	444	327	714	526	1017	750
1-1/4"	7	677	500	1519	1120	2463	1817	M24	2	488	360	769	567	1095	808
1-1/4"	12	750	553	1682	1241	2728	2012	M27	3	656	484	1050	774	1496	1103
1-3/8"	6	888	655	1992	1469	3230	2382	M27	2	719	530	1119	825	1594	1176
1-3/8"	12	1011	746	2268	1673	3677	2712	M30	3.5	906	668	1420	1047	2033	1499
1-1/2"	6	1179	869	2643	1949	4286	3161	M30	2	1000	738	1600	1180	2250	1659
1-1/2"	12	1326	978	2974	2194	4823	3557	M36	4	1534	1131	2482	1830	3535	2607

Notes:

This chart is an approximate estimate of torque values.

Always tighten hardware to these values unless a different torque value or tightening procedure is listed for a specific application.

Fasteners must always be replaced with the same grade as specified in the manual.

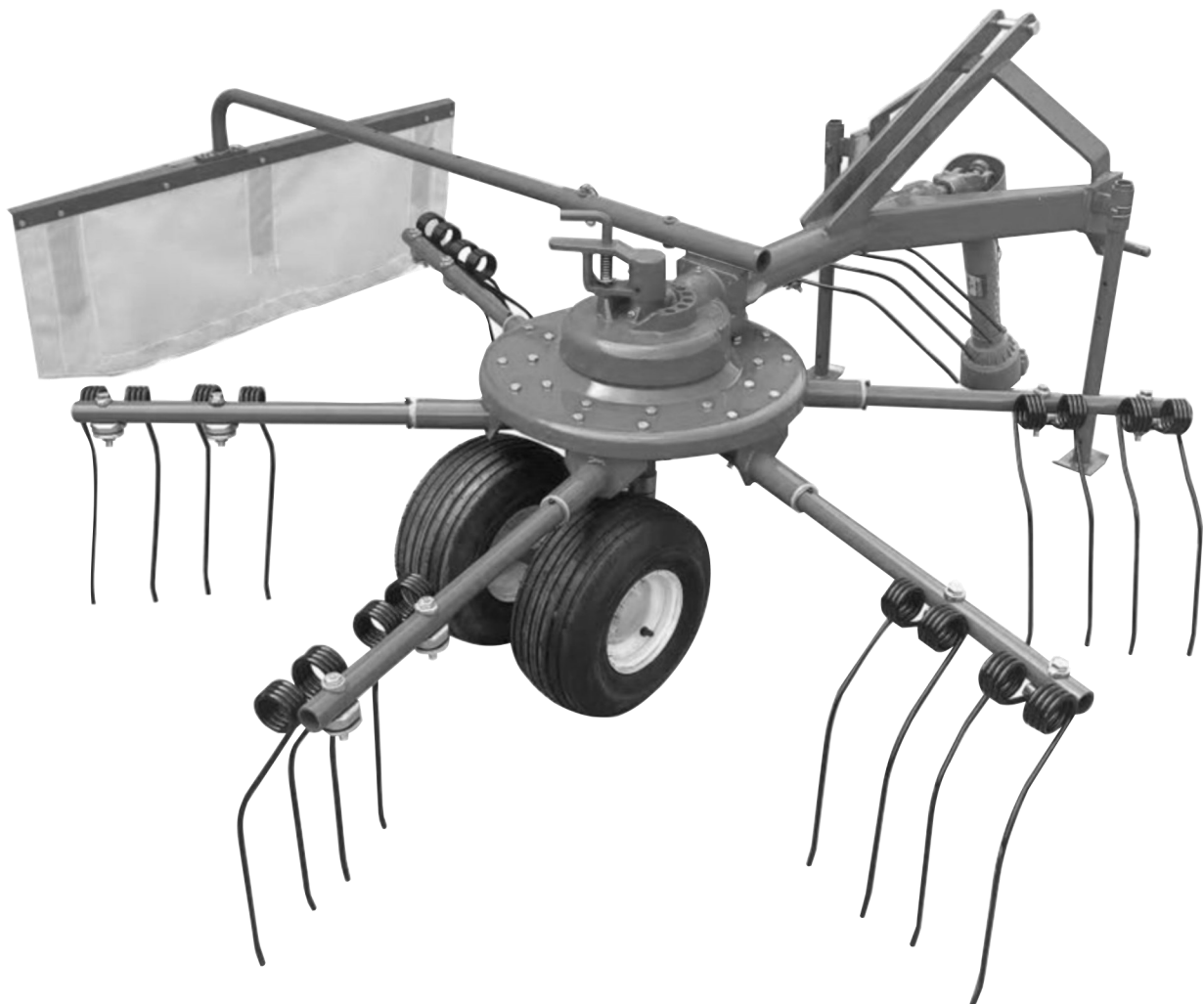
Always use the proper tool for tightening hardware: SAE for SAE hardware and Metric for Metric hardware.

Make sure that fastener threads are clean and that you properly start thread engagement.



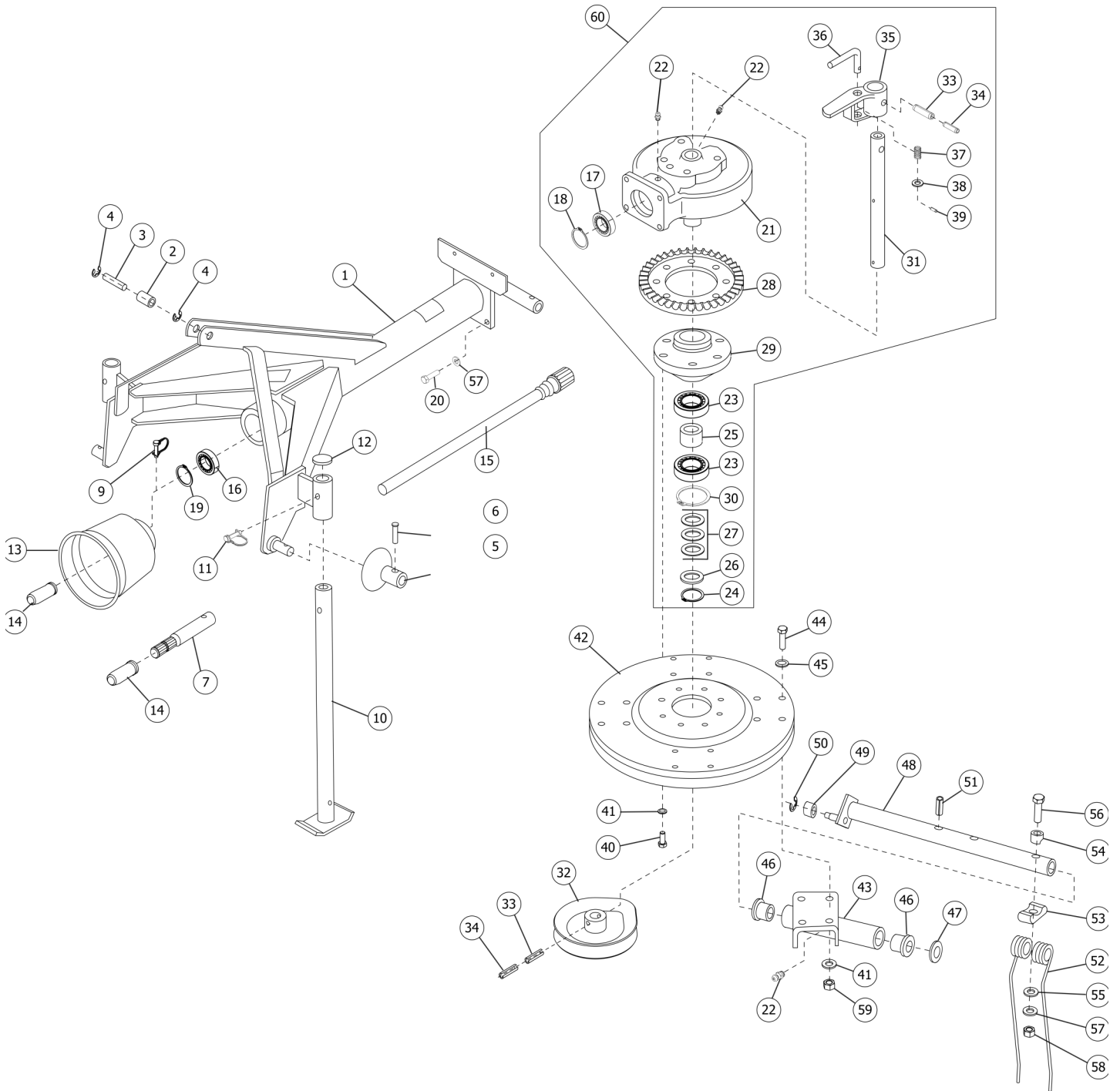
Rotary Rake

RR-248



Parts Manual

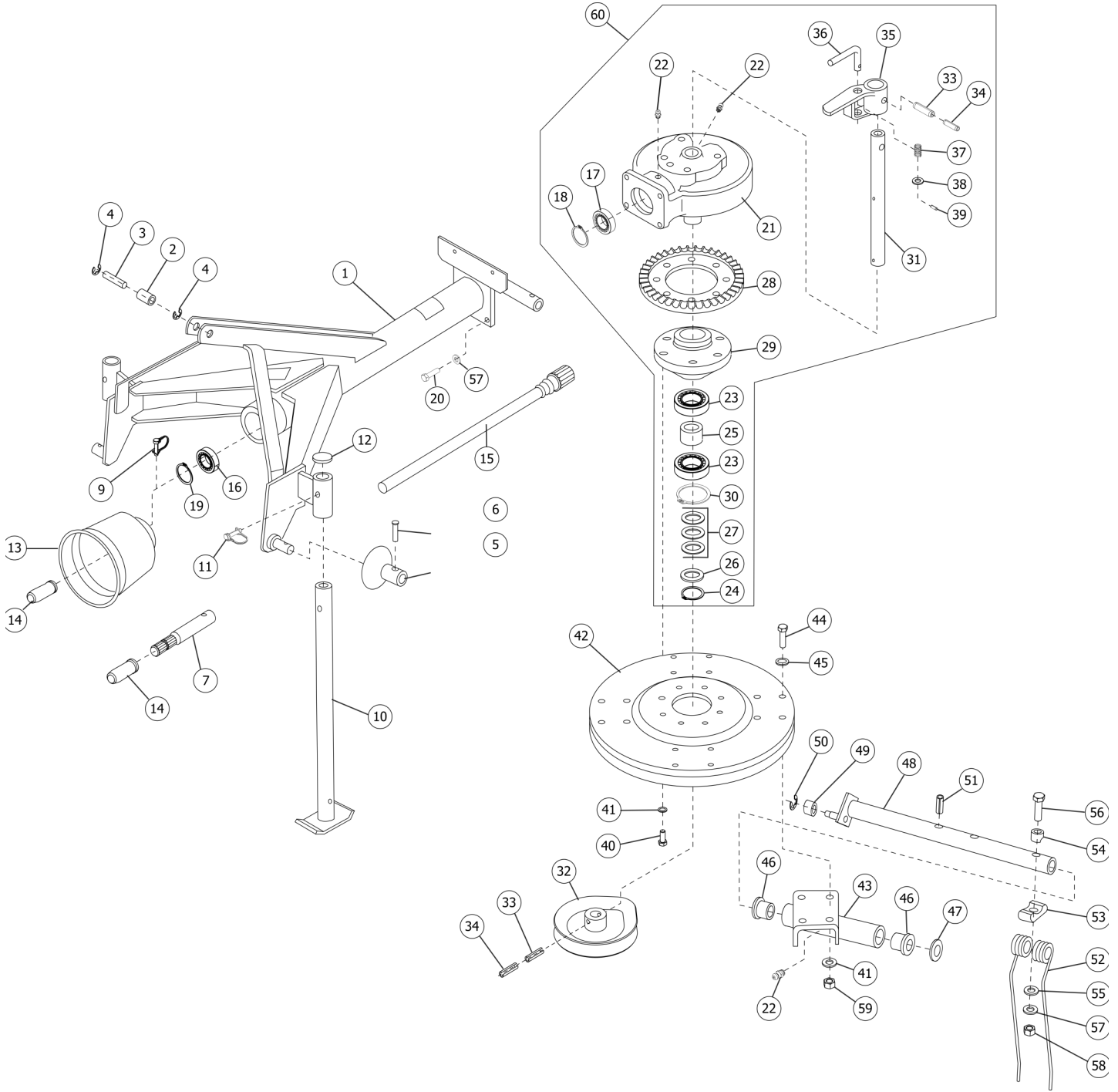
Main Frame



Main Frame

Item	Part #	Description	Qty.
1	RR10000	Frame CP	1
2	RR10001	Bushing	1
3	RR10002	Upper pin	1
4	RR10003	Snap ring	2
5	RR10004	Hub	2
6	RR10005	Pin	1
7	RR10006	Spindle	1
8			
9	RR10008	Pin	1
10	RR10009	Stand CP	2
11	RR10010	Delta pin2	2
12	RR10011	Cap	2
13	RR10012	PIC cover	1
14	RR10013	PIC cap	2
15	RR10014	Pinion shaft	1
16	B6305	Bearing B6305 2RS	1
17	B6208	Bearing 6208	1
18	SRE-40	Snap ring M40 (External)	1
19	SRE-62	Snap ring M62 (External)	1
20	BM1212540	Bolt M12x40 (8.8)	4
21	RR10015	Rotor gear case	1
22	GN061S	Grease nipple M6x1.00 straight	6
23	B6010	Bearing B6010	2
24	SRE-50	Snap ring	1
25	RR10016	Collar	1
26	RR10017	Spacer	1
27	RR10018	Shim	-
28	RR10019	Rotor gear	1
29	RR10020	Rotor housing	1
30	SRE-80	Snap ring M80 (External)	1
31	RR10021	Shaft	1
32	RR10022	Cam	1
33	RR10023	Spring pin	2
34	RR10024	Spring pin	2
35	RR10025	Lever	1
36	RR10026	Lock pin	1
37	RR10027	Spring	1
38	FW16	Washer M16	1
39	RR10028	Spring pin 5x32	1

Main Frame



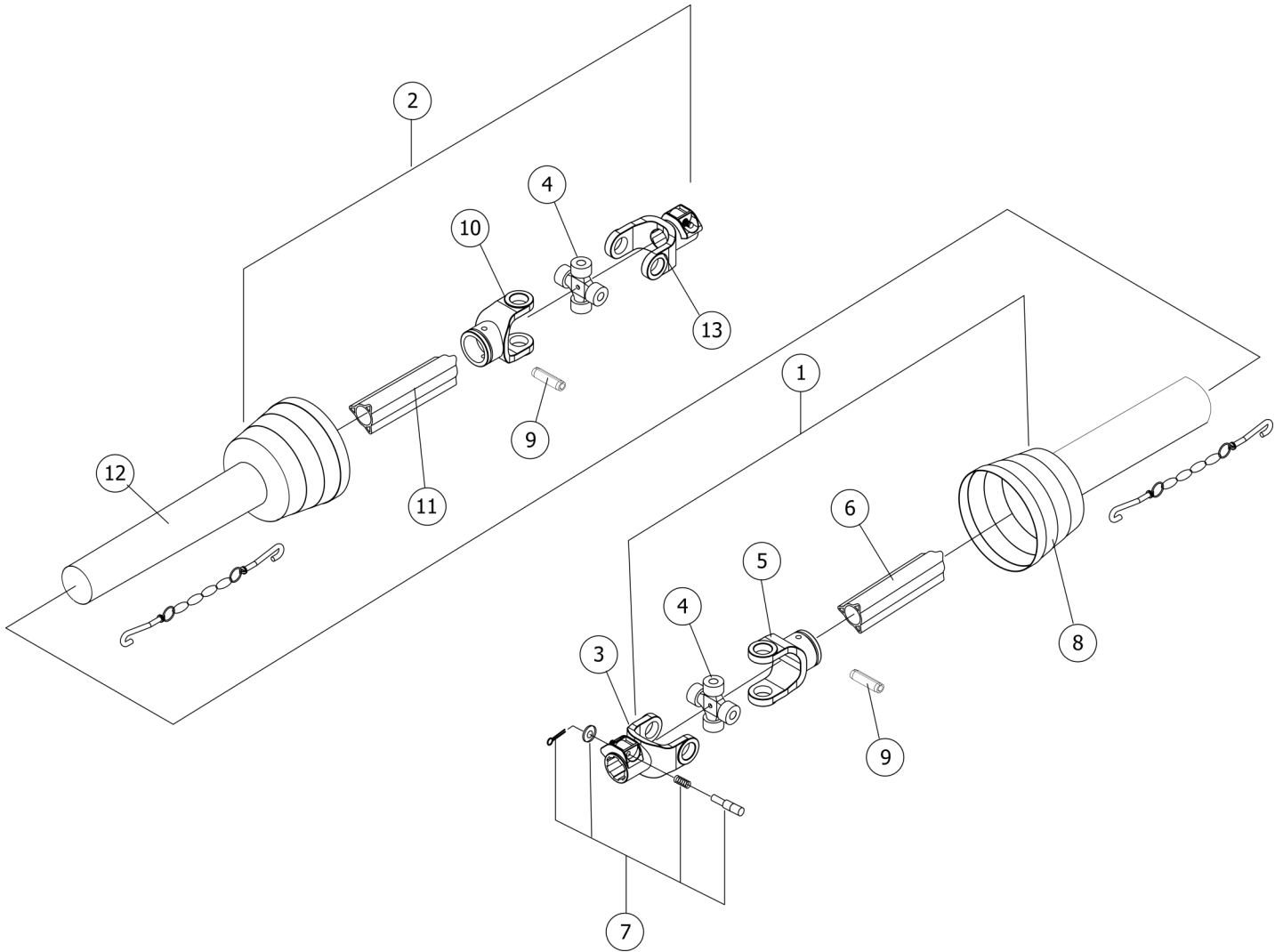
Main Frame

Item	Part #	Description	Qty.
40	BM101540	Bolt M10-1.5x40 (8.8)	8
41	FW10	Washer M10	16
42	RR10029	Rotor plate	1
43	RR10030	Arm support	4
44	BM101530	Bolt M10-1.5x30 (8.8)	16
45	LW10	Washer M10	16
46	RR10031	Nylon bushing	8
47	RR10032	Shim 35 x 12	4
48	RR10033	Tine arm	4
49	JSBX0126LLU	Bearing JBX0126LLU	4
50	SRE10	Snap ring	4
51	RR10034	Spring pin	4
52	RR10035	Tine	8
53	RR10036	Tine washer lower	8
54	RR10037	Tine washer upper	8
55	FW12	Washer M12	8
56	BM1217580	Bolt M12-1.75x80 (8.8)	8
57	LW12	Spring washer M12	8
58	FNM12175	Flange nylon nut M12	8
59	NM1015	Nut M10-1.5	16
60	RR10072	Gearbox complete, RR-248	1

Wheel Components/Windrow Guard

Item	Part #	Description	Qty.
1	RR10052	Axle CP	1
2	RR10053	Collar	2
3	RR10054	Collar	1
4	GN061S	Grease nipple (M6-1.0)	1
5	RR10010	Delta pin	1
6	RR10055	Collar	2
7	B62052RS	Bearing B6205 2RS	4
8	RR10056	Cap	2
9	RR10057	Wheel	2
10	RR10058	Valve	2
11	RR10059	Tire	2
12	RR10060	Cap	2
13	FW14	Flat Washer M14	2
14	NM1420	Nut HH M14-2.0	2
15	LW14	Lock washer M14	2
16	RR10061	Delta pin (#12)	1
17	RR10062	Arm	1
18	RR10063	Angle	1
19	BM1012525	Bolt HH M10-1.25x25	2
20	RR10064	Windrow guard	1
21	RR10065	Stay	1
22	RR10066	Leaf spring	3
23	RR10067	Square neck bolt M8x20	7
24	RR10068	Spring nut	7
25	RR10069	Collar	1
26	RR10070	Spring	1
27	NM10125	Nut M10-1.25	2
28	LW10	Lock washer M10-1.25	2
	RR10071	Tire complete (includes 9, 10 &11)	2

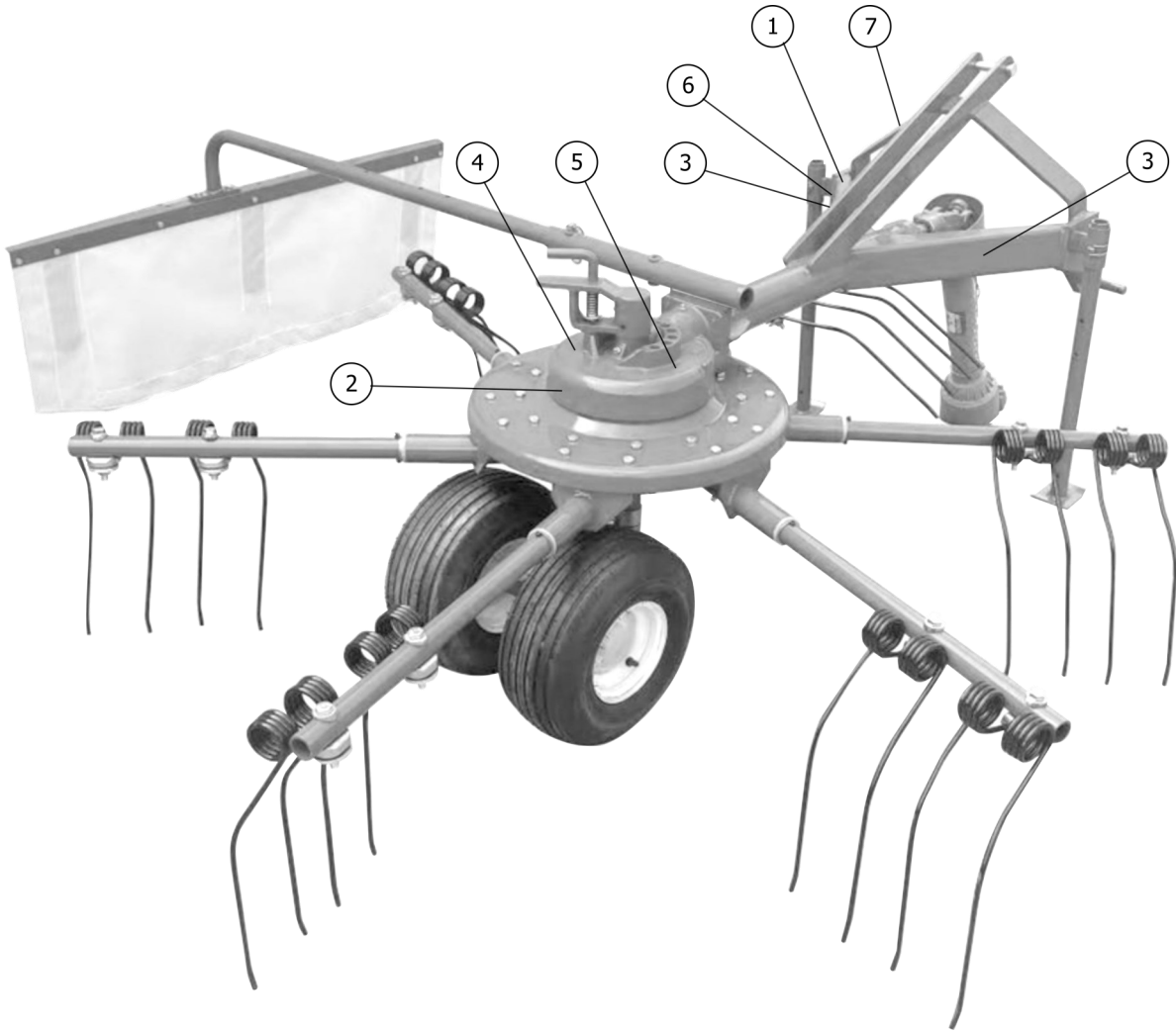
PTO



PTO

Item	Part #	Description	Qty.
1	RR10038	Joint (inner assembly)	1
2	RR10039	Joint (outer assembly)	1
3	RR10040	Yoke with pin (SSB)	1
4	RR10041	Spider assembly	1
5	RR10042	Fitting yoke (inner SSB)	1
6	RR10043	Pipe	1
7	RR10044	Clamp pin assembly	1
8	RR10045	Safety cover (inner)	1
9	RR10046	Spring pin (20x50)	2
10	RR10047	Fitting yoke (outer SSB)	1
11	RR10048	Pipe (outer)	1
12	RR10049	Safety cover (outer)	1
13	RR10050	Yoke	1
	RR10051	PTO Complete	1

Decals



Decals

Item	Part #	Description	Qty.
1	9270146	Decal Danger "Rotating driveline"	1
2	D1003	Decal Warning "Thrown objects"	1
3	D1015	Decal "Tar River Implements" (small 3"x9")	2
4	D1326	Decal "Spreading"	1
5	D1327	Decal "Raking"	1
6	D1015	Decal Caution "To avoid serious injury"	1
7		Decal "Serial number"	1

Warranty

LIMITED WARRANTY

Belco Resources Equipment warrants to the original purchaser of any new piece of machinery from Belco Resources Equipment, purchased from an authorized Belco Resources Equipment dealer, that the equipment be free from defects in material and workmanship for a period of one (1) year for non-commercial, state, and municipalities' use, ninety (90) days for commercial use from date of retail sale. Warranty for rental purposes is thirty (30) days. The obligation of Belco Resources Equipment to the purchaser under this warranty is limited to the repair or replacement of defective parts.

Replacement or repair parts installed in the equipment covered by this limited warranty are warranted for ninety (90) days from the date of purchase of such part or to the expiration of the applicable new equipment warranty period, whichever occurs later. Warranted parts shall be provided at no cost to the user at an authorized Belco Resources Equipment dealer during regular working hours. Belco Resources Equipment reserves the right to inspect any equipment or parts, which are claimed to have been defective in material or workmanship.

This limited warranty does not apply to and excludes wear items such as shear pins, tires, tubes knives, blades or other wear items. Oil or grease is not covered by this warranty.

All obligations of Belco Resources Equipment under this limited warranty shall be terminated if:

- Proper service is not performed on the machine.

- The machine is modified or altered in any way.

- The machine is being used or has been used for purposes other than those for which the machine was intended.

DISCLAIMER OF IMPLIED WARRANTIES & CONSEQUENTIAL DAMAGES

Belco Resources Equipment obligation under this limited warranty, to the extent allowed by law, is in lieu of all warranties, implied or expressed, including implied warranties of merchantability and fitness for a particular purpose and any liability for incidental and consequential damages with respect to the sale or use of the items warranted. Such incidental and consequential damages shall include but not be limited to: transportation charges other than normal freight charges; cost of installation other than cost approved by Belco Resources Equipment; duty; taxes; charges for normal service or adjustment; loss of crops or any other loss of income; rental of substitute equipment, expenses due to loss, damage, detention or delay in the delivery.

REGISTRATION

The online Warranty Registration must be completed in order to qualify for coverage on this Limited Warranty. Visit br-equipment.com, click on "Warranty Registration" and completely fill out the form to register the new piece of equipment.

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