HARLEY BY PALADIN

OPERATOR'S MANUAL

POWER BOX RAKE®
T Series (TM4 / TM5 / T6 / TM7 / TM8)

PATENTED

SERIAL NUMBER: _____

MODEL NUMBER: _____

Manual Number: 51-4777
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PREFACE

GENERAL COMMENTS

Congratulations on the purchase of your new product! This product was carefully designed and manufactured to give you many years of dependable service. Only minor maintenance (such as cleaning and lubricating) is required to keep it in top working condition. Be sure to observe all maintenance procedures and safety precautions in this manual and on any safety decals located on the product and on any equipment on which the attachment is mounted.

This manual has been designed to help you do a better, safer job. Read this manual carefully and become familiar with its contents.

WARNING! Never let anyone operate this unit without reading the "Safety Precautions" and "Operating Instructions" sections of this manual.
Always choose hard, level ground to park the vehicle on and set the brake so the unit cannot roll.

Unless noted otherwise, right and left sides are determined from the operator's control position when facing forward.

NOTE: The illustrations and data used in this manual were current (according to the information available to us) at the time of printing, however, we reserve the right to redesign and change the attachment as may be necessary without notification.

BEFORE OPERATION

The primary responsibility for safety with this equipment falls to the operator. Make sure the equipment is operated only by trained individuals that have read and understand this manual. If there is any portion of this manual or function you do not understand, contact your local authorized dealer or the manufacturer to obtain further assistance. Keep this manual available for reference. Provide the manual to any new owners and/or operators.

SAFETY ALERT SYMBOL

This is the "Safety Alert Symbol" used by this industry. This symbol is used to warn of possible injury. Be sure to read all warnings carefully. They are included for your safety and for the safety of others working with you.

SERVICE

Use only manufacturer replacement parts. Substitute parts may not meet the required standards.

Record the model and serial number of your unit on the cover of this manual. The parts department needs this information to insure that you receive the correct parts.

SOUND AND VIBRATION

Sound pressure levels and vibration data for this attachment are influenced by many different parameters: some items are listed below (not inclusive):

- prime mover type, age, condition, with or without cab enclosure and configuration
- operator training, behavior, stress level
- job site organization, working material condition, environment

Based on the uncertainty of the prime mover, operator, and job site, it is not possible to get precise machine and operator sound pressure levels or vibration levels for this attachment.

NOTE: A list of all Paladin Patents can be found at http://www.paladinattachments.com/patents.asp.

SAFETY STATEMENTS

THIS SYMBOL BY ITSELF OR WITH A WARNING WORD THROUGHOUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY OR THE SAFETY OF OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.

DANGER — **THIS SIGNAL WORD INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY.**

WARNING — **THIS SIGNAL WORD INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY.**

CAUTION — **THIS SIGNAL WORD INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN MINOR OR MODERATE INJURY.**

NOTICE — **NOTICE IS USED TO ADDRESS PRACTICES NOT RELATED TO PHYSICAL INJURY.**

GENERAL SAFETY PRECAUTIONS

WARNING! READ MANUAL PRIOR TO INSTALLATION

Improper installation, operation, or maintenance of this equipment could result in serious injury or death. Operators and maintenance personnel should read this manual, as well as all manuals related to this equipment and the prime mover thoroughly before beginning installation, operation, or maintenance. **FOLLOW ALL SAFETY INSTRUCTIONS IN THIS MANUAL AND THE PRIME MOVER'S MANUAL(S).**

READ AND UNDERSTAND ALL SAFETY STATEMENTS

Read all safety decals and safety statements in all manuals prior to operating or working on this equipment. Know and obey all OSHA regulations, local laws, and other professional guidelines for your operation. Know and follow good work practices when assembling, maintaining, repairing, mounting, removing, or operating this equipment.

KNOW YOUR EQUIPMENT

Know your equipment's capabilities, dimensions, and operations before operating. Visually inspect your equipment before you start, and never operate equipment that is not in proper working order with all safety devices intact. Check all hardware to ensure it is tight. Make certain that all locking pins, latches, and connection devices are properly installed and secured. Remove and replace any damaged, fatigued, or excessively worn parts. Make certain all safety decals are in place and are legible. Keep decals clean, and replace them if they become worn or hard to read.

GENERAL SAFETY PRECAUTIONS

WARNING! PROTECT AGAINST FLYING DEBRIS

Always wear proper safety glasses, goggles, or a face shield when driving pins in or out, or when any operation causes dust, flying debris, or any other hazardous material.

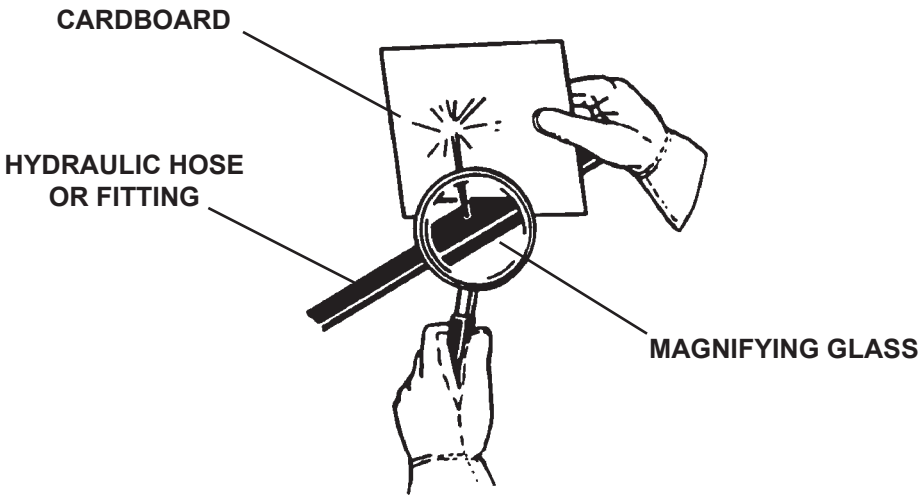
WARNING! LOWER OR SUPPORT RAISED EQUIPMENT

Do not work under raised booms without supporting them. Do not use support material made of concrete blocks, logs, buckets, barrels, or any other material that could suddenly collapse or shift positions. Make sure support material is solid, not decayed, warped, twisted, or tapered. Lower booms to ground level or on blocks. Lower booms and attachments to the ground before leaving the cab or operator's station.

WARNING! USE CARE WITH HYDRAULIC FLUID PRESSURE

Hydraulic fluid under pressure can penetrate the skin and cause serious injury or death. Hydraulic leaks under pressure may not be visible. Before connecting or disconnecting hydraulic hoses, read your prime mover's operator's manual for detailed instructions on connecting and disconnecting hydraulic hoses or fittings.

- Keep unprotected body parts, such as face, eyes, and arms as far away as possible from a suspected leak. Flesh injected with hydraulic fluid may develop gangrene or other permanent disabilities.
- If injured by injected fluid, see a doctor at once. If your doctor is not familiar with this type of injury, ask him to research it immediately to determine proper treatment.
- Wear safety glasses, protective clothing, and use a piece of cardboard or wood when searching for hydraulic leaks. **DO NOT USE YOUR HANDS! SEE ILLUSTRATION.**



GENERAL SAFETY PRECAUTIONS

WARNING!

DO NOT MODIFY MACHINE OR ATTACHMENTS

Modifications may weaken the integrity of the attachment and may impair the function, safety, life, and performance of the attachment. When making repairs, use only the manufacturer's genuine parts, following authorized instructions. Other parts may be substandard in fit and quality. Never modify any ROPS (Roll Over Protective Structure) or FOPS (Falling Object Protective Structure) equipment or device. Any modifications must be authorized in writing by the manufacturer.

WARNING!

SAFELY MAINTAIN AND REPAIR EQUIPMENT

- Do not wear loose clothing or any accessories that can catch in moving parts. If you have long hair, cover or secure it so that it does not become entangled in the equipment.
- Work on a level surface in a well-lit area.
- Use properly grounded electrical outlets and tools.
- Use the correct tools for the job at hand. Make sure they are in good condition for the task required.
- Wear the protective equipment specified by the tool manufacturer.

SAFELY OPERATE EQUIPMENT

Do not operate equipment until you are completely trained by a qualified operator in how to use the controls, know its capabilities, dimensions, and all safety requirements. See your machine's manual for these instructions.

- Keep all step plates, grab bars, pedals, and controls free of dirt, grease, debris, and oil.
- Never allow anyone to be around the equipment when it is operating.
- Do not allow riders on the attachment or the prime mover.
- Do not operate the equipment from anywhere other than the correct operator's position.
- Never leave equipment unattended with the engine running, or with this attachment in a raised position.
- Do not alter or remove any safety feature from the prime mover or this attachment.
- Know your work site safety rules as well as traffic rules and flow. When in doubt on any safety issue, contact your supervisor or safety coordinator for an explanation.

WARNING!

CALIFORNIA PROPOSITION 65 WARNING.

This product may contain a chemical known to the state of California to cause cancer, or birth defects or other reproductive harm. www.P65Warnings.ca.gov

EQUIPMENT SAFETY PRECAUTIONS

WARNING!

KNOW WHERE UTILITIES ARE

Observe overhead electrical and other utility lines. Be sure equipment will clear them. When digging, call your local utilities for location of buried utility lines, gas, water, and sewer, as well as any other hazard you may encounter.

WARNING!

EXPOSURE TO RESPIRABLE CRYSTALLINE SILICA DUST ALONG WITH OTHER HAZARDOUS DUSTS MAY CAUSE SERIOUS OR FATAL RESPIRATORY DISEASE.

It is recommended to use dust suppression, dust collection and if necessary personal protective equipment during the operation of any attachment that may cause high levels of dust.

WARNING!

REMOVE PAINT BEFORE WELDING OR HEATING

Hazardous fumes/dust can be generated when paint is heated by welding, soldering or using a torch. Do all work outside or in a well ventilated area and dispose of paint and solvent properly. Remove paint before welding or heating.

When sanding or grinding 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 area. Allow fumes to disperse at least 15 minutes before welding or heating.

WARNING!

END OF LIFE DISPOSAL

At the completion of the useful life of the unit, drain all fluids and dismantle by separating the different materials (rubber, steel, plastic, etc.). Follow all federal, state and local regulations for recycling and disposal of the fluid and components.

OPERATING THE ATTACHMENT

- Do not exceed the lifting capacity of your prime mover.
- Operate only from the operator's station.
- When operating on slopes, drive up and down, not across. Avoid steep hillside operation, which could cause the prime mover to overturn.
- Reduce speed when driving over rough terrain, on a slope, or turning, to avoid overturning the vehicle.
- An operator must not use drugs or alcohol, which can change his or her alertness or coordination. An operator taking prescription or over-the-counter drugs should seek medical advice on whether or not he or she can safely operate equipment.
- Before exiting the prime mover, lower the attachment to the ground, disengage PTO, apply the brakes, turn off the prime mover's engine and remove the key.
- PTO Operated Attachment: Rotating driveline contact can cause death. Do not operate without all driveline, tractor and equipment shields in place.
- Check driveline shields turn freely on driveline.
- Check driveline connections before operation. Be sure quick disconnect locks are operating and locked.
- Do not stand between prime mover and attachment during installation.
- Keep hands, feet and clothing away from power driven parts while tractor engine is running. Failure to do so will result in serious injury or death from rotating drum or PTO shaft.

EQUIPMENT SAFETY PRECAUTIONS

OPERATING THE ATTACHMENT

- Clear work area of all objects that could be thrown or picked up by the attachment.
- Do not raise the attachment when the drum is rotating.
- Do not exceed specified RPM of your rake.
- Be sure all guards, shields and covers are properly installed before operating attachment.
- Never try to board or exit equipment while it is running.
- Test all controls before you begin operation.
- Ballast weights may need to be added to your tractor to maintain 20% weight on front axle.
- Do not use a PTO drive adapter to attach your rake driveline to a non-matching tractor PTO.
- Never leave the attachment unattended when in the raised position.
- All bystanders should be kept a minimum of 10 feet (3 meters) away from the working area of the rake.

TRANSPORTING THE ATTACHMENT

- Travel only with the attachment in a safe transport position to prevent uncontrolled movement. Drive slowly over rough ground and on slopes.
- When transporting on a trailer: Secure attachment at recommended tie down locations using tie down accessories that are capable of maintaining attachment stability.
- When driving on public roads use safety lights, reflectors, Slow Moving Vehicle signs etc., to prevent accidents. Check local government regulations that may affect you.
- Do not drive close to ditches, excavations, etc., cave in could result.
- Do not smoke when refueling the prime mover. Allow room in the fuel tank for expansion. Wipe up any spilled fuel. Secure cap tightly when done.
- Disengage PTO before transporting.

MAINTAINING THE ATTACHMENT

- Before performing maintenance, lower the attachment to the ground, disengage PTO, apply the brakes, turn off the prime mover's engine and remove the key.
- Be sure all movement has stopped before approaching the rake.
- Never perform any work on the attachment unless you are authorized and qualified to do so. Always read the operator service manuals before any repair is made. After completing maintenance or repair, check for correct functioning of the attachment. If not functioning properly, always tag "DO NOT OPERATE" until all problems are corrected.
- Worn, damaged, or illegible safety decals must be replaced. New safety decals can be ordered from Paladin.
- Never make hydraulic repairs while the system is under pressure. Serious personal injury or death could result.
- Never work under a raised attachment unless PTO has been disengaged and rake is securely blocked. If attachment must be left raised for maintenance or any other reason, block the unit securely to prevent accidental release of the lifting mechanism. Serious damage or personal injury could result.

DECALS

DECAL PLACEMENT

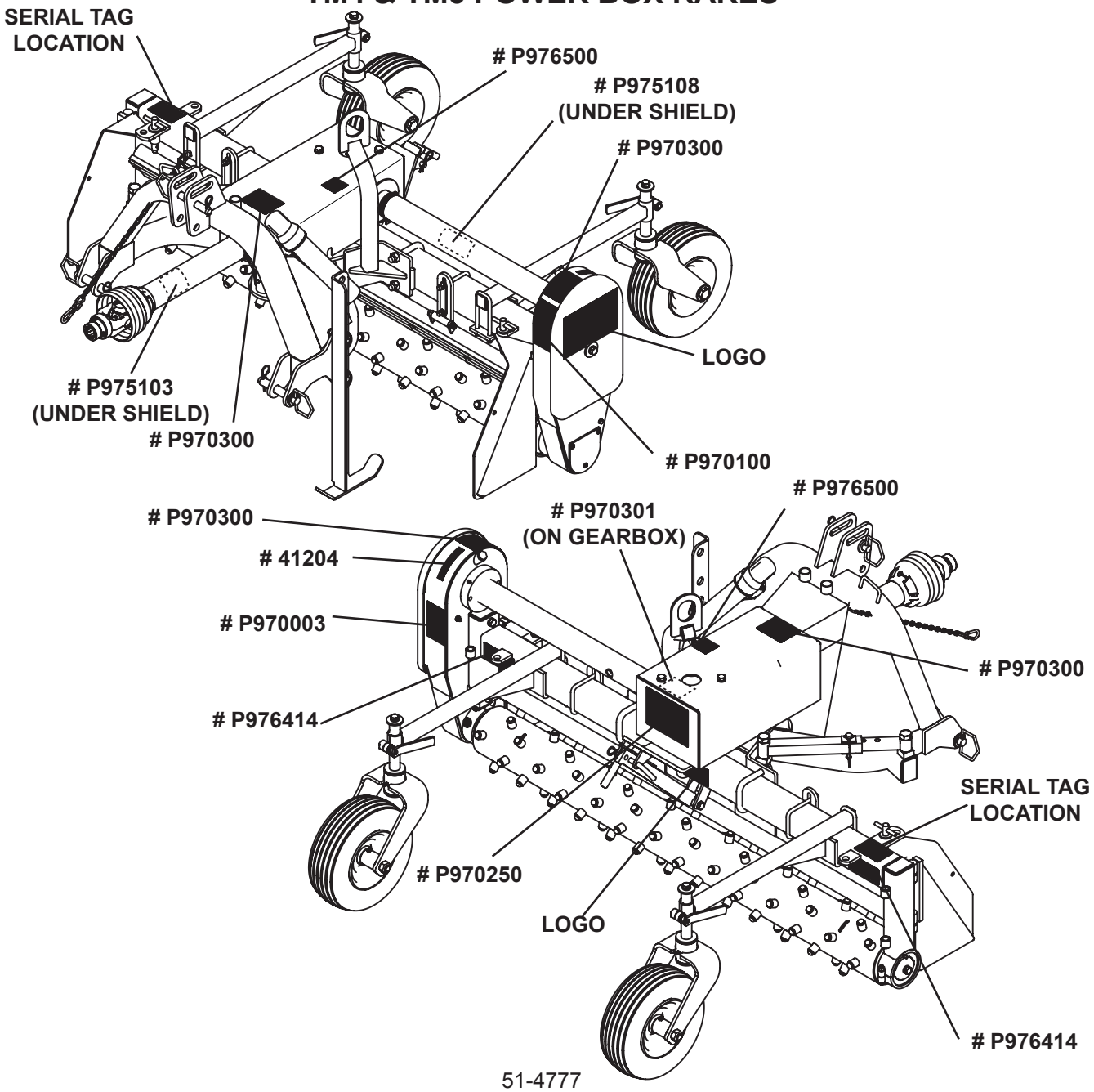
GENERAL INFORMATION

The diagrams on these pages show the location of the decals used on the T-series rakes. The decals are identified by their part numbers, with reductions of the actual decals located on the following pages. Use this information to order replacements for lost or damaged decals. Be sure to read all decals before operating the attachment. They contain information you need to know for both safety and product longevity.

IMPORTANT: Keep all safety decals clean and legible. Replace all missing, illegible, or damaged safety decals. When replacing parts with safety decals attached, the safety decals must also be replaced. Safety decals are available, free of charge, from your local dealer or Paladin.

REPLACING SAFETY DECALS: Clean the area of application with nonflammable solvent, then wash the same area with soap and water. Allow the surface to fully dry. Remove the backing from the safety decal, exposing the adhesive surface. Apply the safety decal to the position shown in the diagram above and smooth out any bubbles.

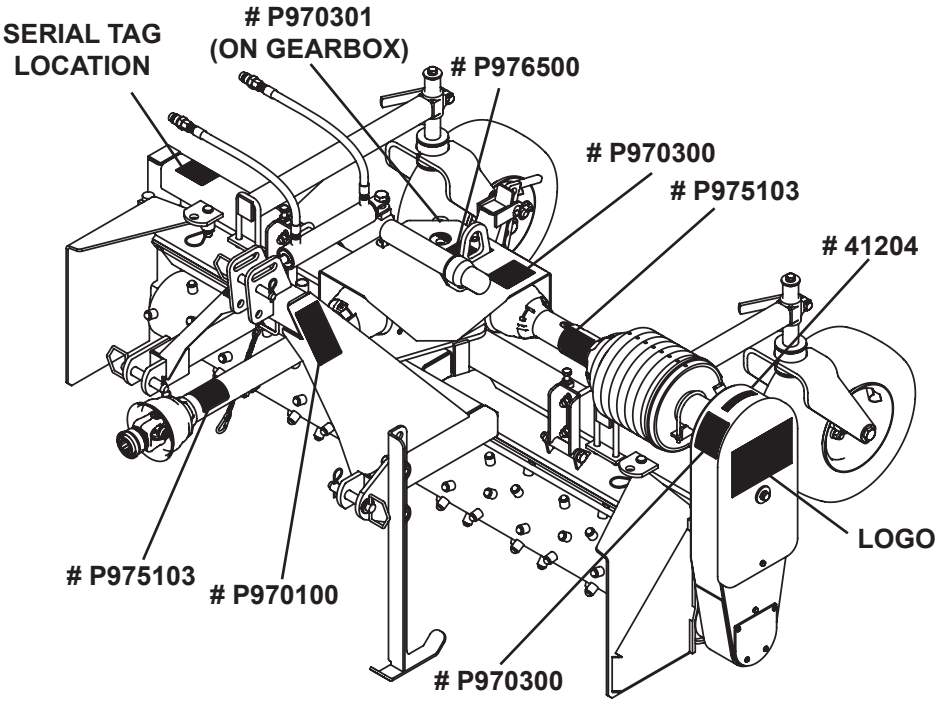
TM4 & TM5 POWER BOX RAKES

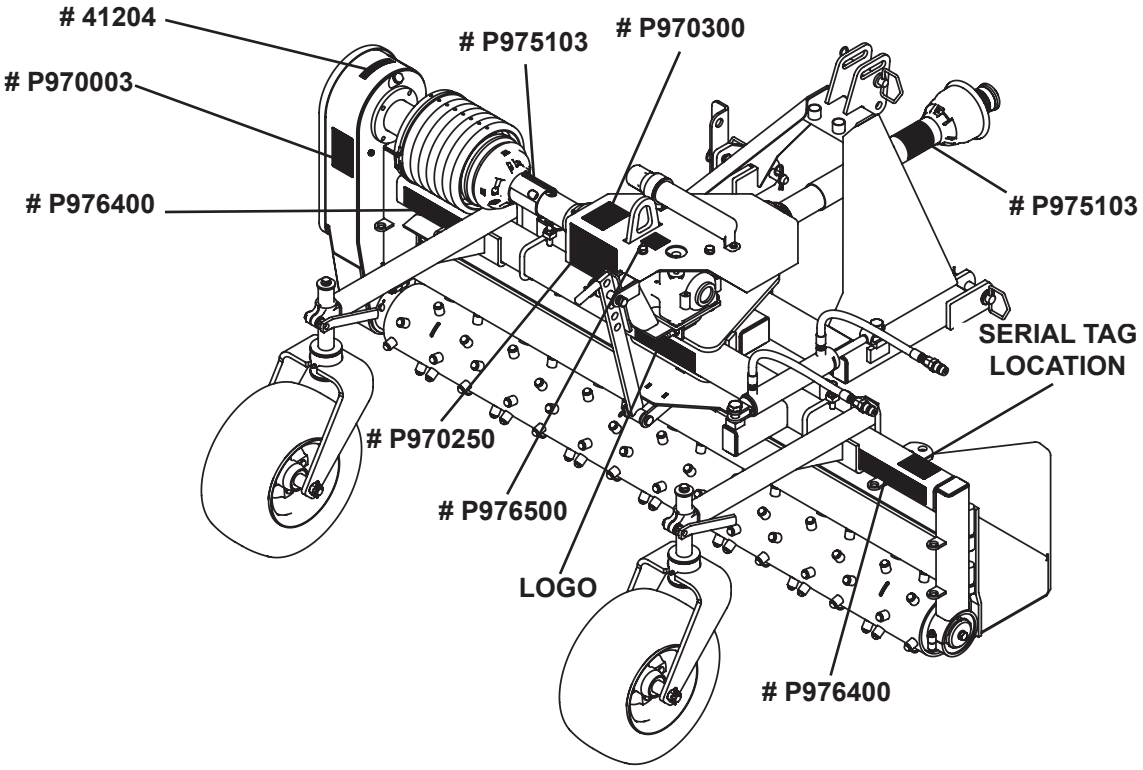


DECALS

DECAL PLACEMENT

T6 POWER BOX RAKE

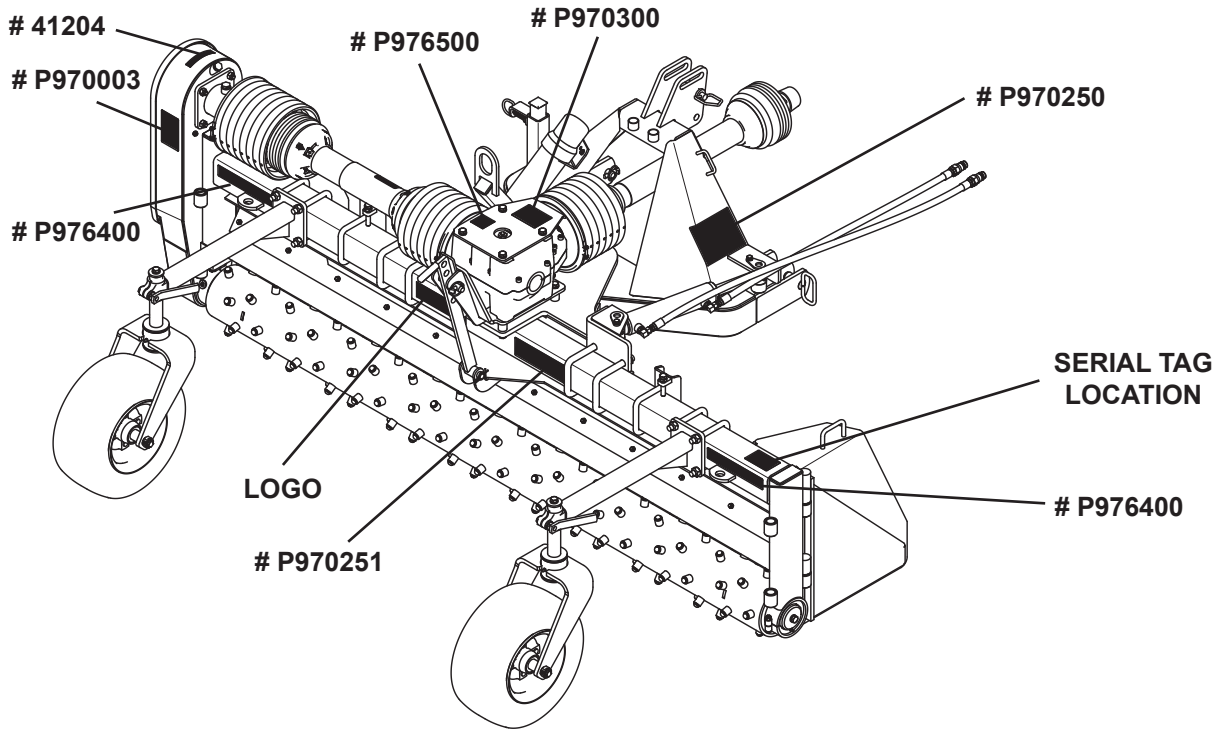


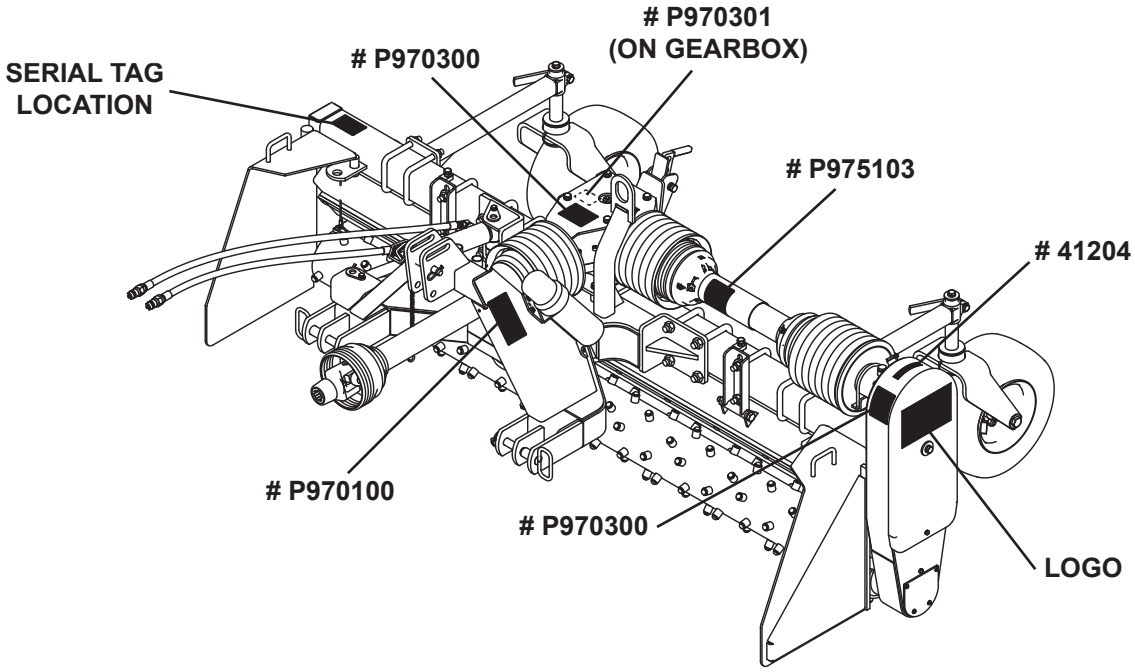


DECALS

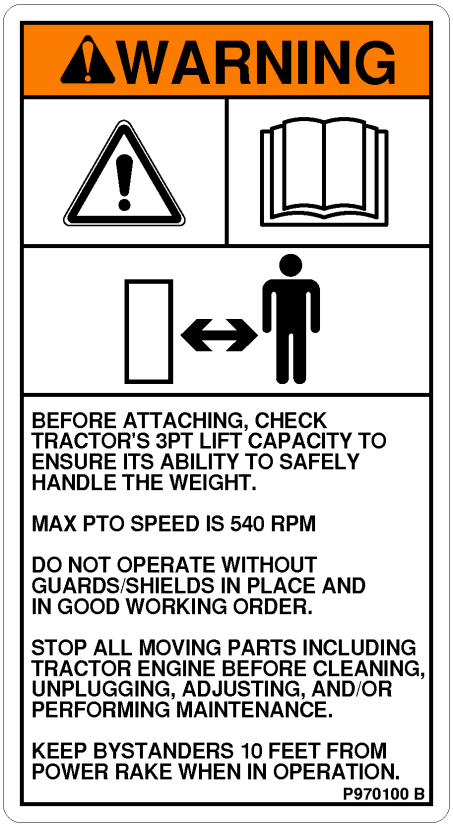
DECAL PLACEMENT

TM7 & TM8 POWER BOX RAKES



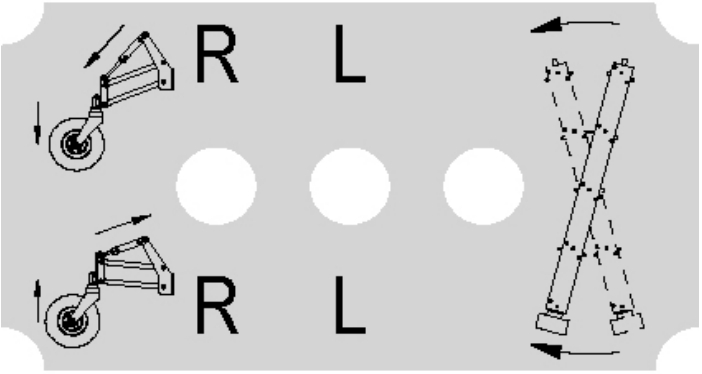


DECALS



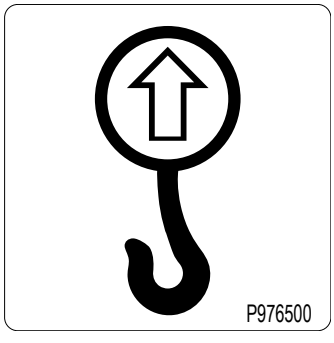
 # P970100 WARNING! SAFETY

 # P975108 DANGER! GUARD MISSING



 # P975990 - CONTROL BOX
(LOCATED ON CONTROL BOX, IF SO EQUIPPED)

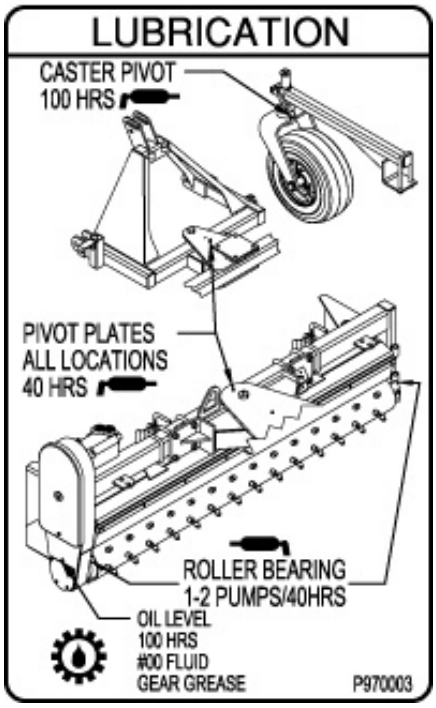
 # P970251 DANGER! FLYING OBJECTS AND ROTATING PARTS



 # P976500 - LIFT POINT

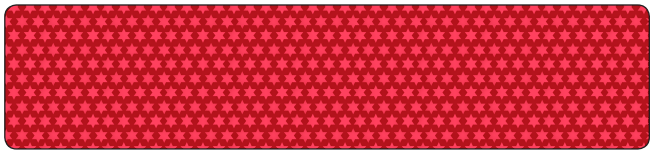
DECALS

 # P970250 - DANGER! FLYING OBJECTS AND ROTATING PARTS



 # P970003 LUBRICATION

 # P975103 DANGER! ROTATING DRIVELINE



 # P976400 - REFLECTIVE TAPE - RED
 # P976414 - REFLECTIVE TAPE - RED

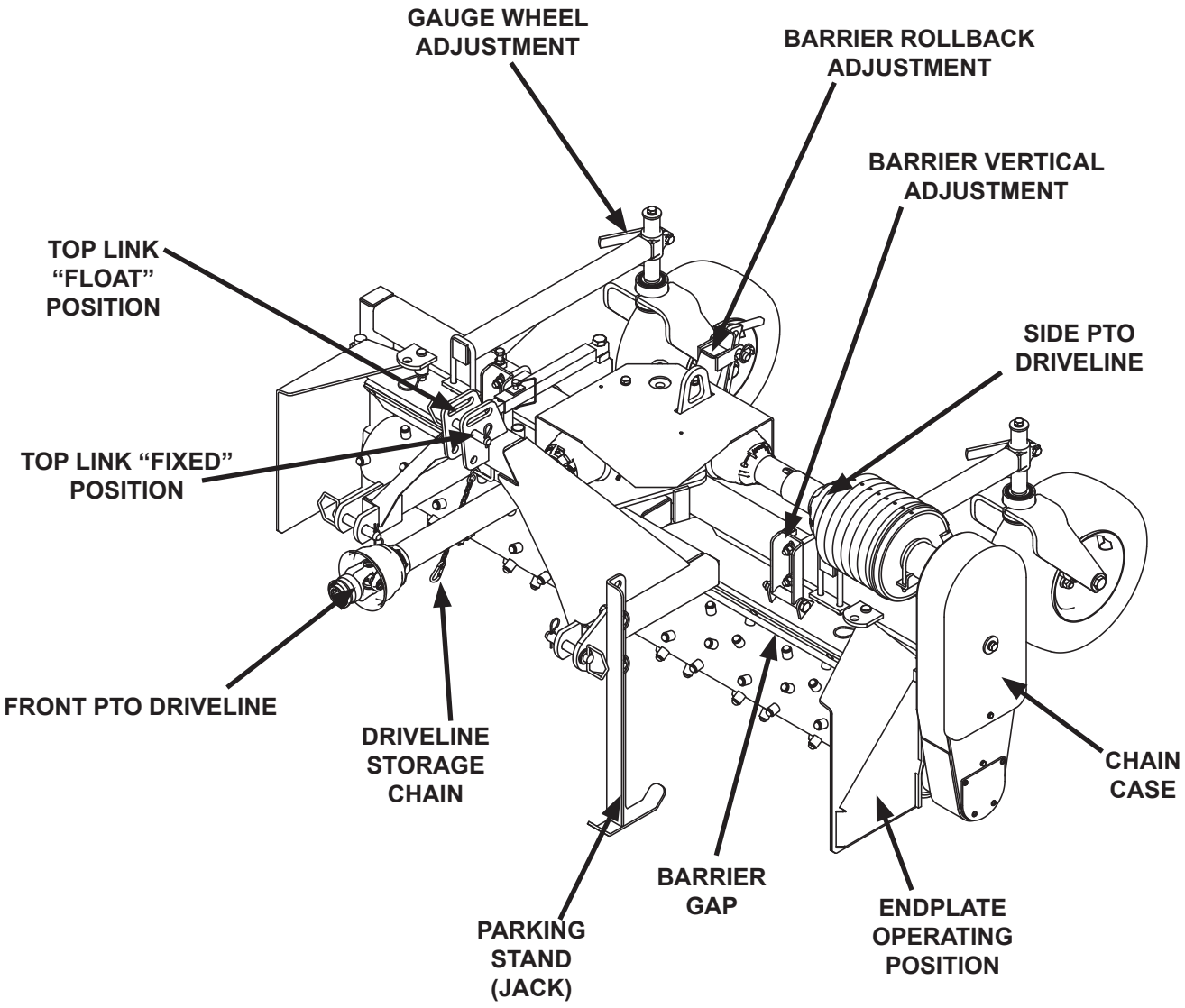
 # P970300 DANGER! ROTATING PART HAZARD
 # P970301 DANGER! ROTATING PART HAZARD
(SMALLER SIZE, LOCATED DIRECTLY ON GEARBOX)

 # 41204 PATENT WEBSITE

NOTE: CONTACT YOUR LOCAL DEALER FOR MODEL NUMBER AND LOGO DECALS

NOMENCLATURE

Throughout this manual, reference is made to various compactor components. Study the following diagrams to acquaint your self with the various names of these components. This knowledge will be helpful when reading through this manual or when ordering service parts.



INSTALLATION

PRIME MOVER

Your prime mover must be equipped with an SAE Category I hitch for the TM4, TM5 and T6 Series Rakes and either a Category I or II for TM7 and TM8 Series rakes. Check Specifications at the back of this manual for Horsepower and lift requirements for your rake.

SET-UP INSTRUCTIONS

The power rakes are shipped partially assembled. Select a suitable work area with a mechanical lifting device to assist in removing the attachment from the crate. Install and extend the caster/gauge wheels out to the operating position. Refer to Bolt Torque Specifications for all hardware unless otherwise noted.

INSTALLATION

1. Remove any attachment from the rear 3-point hitch of the prime mover.
2. Move the prime mover into position in front of the rake. Back up slowly and carefully with the lower 3-point hitch arms positioned at the same height and to the outside of the hitch pin ears on the mast frame.

WARNING: DO NOT ALLOWING ANYONE BETWEEN THE TRACTOR AND THE RAKE WHILE TRACTOR IS RUNNING.

3. Turn off the prime mover and relieve pressure to the auxiliary hydraulic lines. Following the safety shut down procedure for your prime mover, shut down and exit the operator's station.
4. Attach the 3-point hitch arms to the rake and install the hitch pin provided.
5. Attach the top link to the upper hitch point of the mast frame using the pin provided. Use either the "fixed" or "float" position depending on your application.
6. Adjust the lower link sway chains to prevent the rake from swaying side to side.
7. Attach the PTO from the rake to the prime mover. (Slide the front section of the PTO into the back section that is already attached to the rake.) Attach PTO to the rear of the prime mover. (Pull back on the driveline yoke collar and align the splines of the yoke with the PTO shaft. Push yoke onto the PTO shaft releasing the locking collar.) Push and pull the driveline back and forth until locked in place.

WARNING! The locking collar must slide freely and the locking balls seated in the groove on the tractor PTO shaft before operating. A driveline not attached correctly could come loose from the tractor resulting in personal injury and damage to the attachment.

8. Attach the driveline chains to the rake and tractor to prevent shields from turning. **NOTE: If chains are damaged or missing replace before operating.**

NOTE: It may be necessary to shorten the telescoping shaft. The shaft must slip freely as the attachment is raised and lowered. Raise and lower the attachment slowly to check that the telescoping shaft is the proper length. See "Power (PTO) Shaft Adjustment".

INSTALLATION

NOTICE! Avoid driveline damage. Check the length of the telescoping members to insure the driveline will not bottom out or separate when turning and/or going over rough terrain.

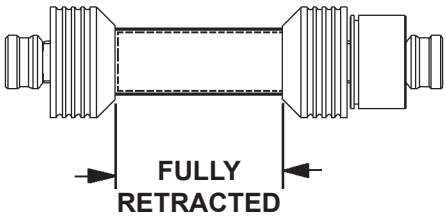
NOTICE! The PTO is customized for your specific application. If the PTO shaft is too long, severe PTO and gearbox damage is possible. DO NOT FORCE THE PTO TO FIT. Warranty is void if the correct PTO is not installed. There should never be less than .50" of overlap within the PTO.

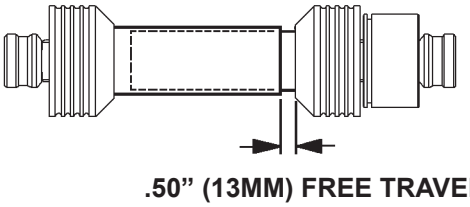
WARNING! Do not use a PTO adapter to attach your sweeper to a non-matching tractor PTO. Serious personal injury and/or equipment failure can result. Consult an authorized dealer for assistance if the sweeper PTO does not match the tractor PTO.

9. **For Hydraulic Models Only:** After making sure that the hydraulic couplers are free from any foreign material or contaminants, connect the couplers to the auxiliary hydraulic system of your prime mover.
10. Raise jack stand and secure in operating position.
11. **For Flex Models Only:** Mount the angle control switch in a convenient, easy-to-reach location. The switch bracket is magnetic and will attach to any flat steel surface. Connect the power cord to the cable coming from the switch. Route the cable in such a fashion to avoid sharp edges and moving parts.
12. Following the safety start up procedure for your prime mover, start the prime mover and run all cylinders on the attachment to purge any air from the system. Check for proper hydraulic connection, hose routing and hose length.
13. Attachment installation is complete.

POWER (PTO) SHAFT ADJUSTMENT

Confirm the minimum and maximum working lengths of the driveshaft. The telescoping tubes must overlap by at least ⅓ of their length while in use. The (PTO) drive assembly may need to be shortened to fit up to your tractor correctly and to prevent the drive assembly from "bottoming out" and causing extensive damage to the tractor PTO drive assembly.





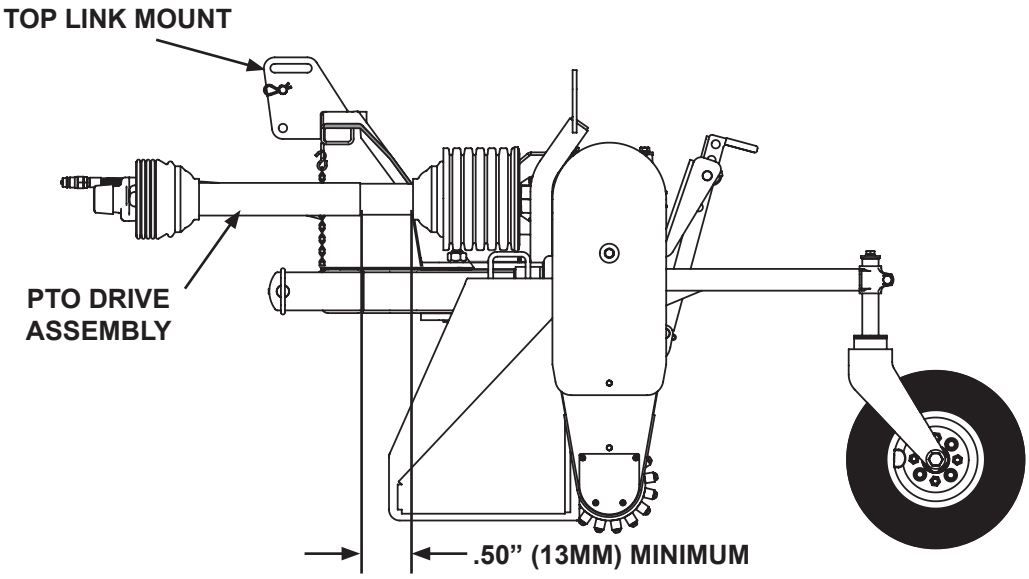
The shaft assembly is shortest when the shaft is straight inline with the attachment. There should be a minimum of .50" (13mm) of free travel before the shaft is fully retracted. To check:

1. Lower the attachment until the shaft is parallel to the ground and is straight inline with the attachment gearbox.
2. Check to see if there is a minimum of .50" free travel.

INSTALLATION

If there is not at least .50" (13mm) of free travel **DO NOT OPERATE ATTACHMENT.**

NOTICE! If the drive shaft "bottoms out" before it is straight inline with the attachment or has less than 5" of overlap, stop and call your nearest dealer or the attachment manufacturer before operating.



CAUTION! **Failure to have the required distance of clearance will damage the power take off (PTO) of your tractor. The minimum and maximum length of the PTO must be checked whenever this attachment is used on a different tractor.**

DETACHING

1. Place the endplates in the storage position for added stability (towards the prime mover). See Endplates.
2. Lower jack stand to storage position.
3. Before exiting the prime mover, lower the attachment to the ground, disengage PTO, apply the brakes, turn off the prime mover's engine and remove the key.
4. **For Hydraulic Models Only:** Follow prime mover operator's manual to relieve pressure in the hydraulic lines.
5. Disconnect driveline from tractor PTO shaft and support with storage chain.
6. **For Hydraulic Models Only:** Disconnect hoses from the auxiliary hydraulics on the prime mover. Connect hydraulic couplers together or install caps to prevent contaminants from entering the hydraulic system. Store hoses off of the ground to help prevent damage.
7. **For Flex Models Only:** Disconnect power cord cable from the switch.
8. Disconnect 3-point upper and lower links from power rake.

OPERATION
CONTROLS

POWER ROLLER

Roller should be level with the ground. The power rake should also be level with the ground front to back. To accomplish this, adjust the tractor 3-point hitch and/or raise or lower gauge wheels. Because the chain case end of roller weighs more, the tire closest to the chain case should be set 1” lower than the opposite tire. This will give an even grade when landscaping.

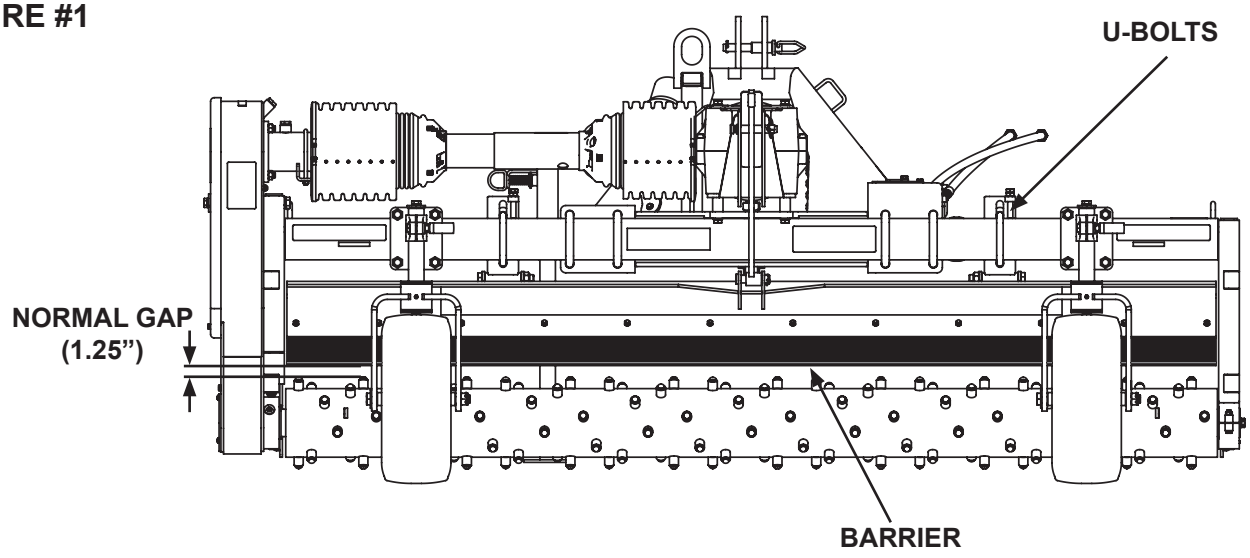
On standard models, to allow the roller to penetrate deeper into the ground, loosen the handle and raise the gauge wheels. On flex models, position toggle switch to raise gauge wheels. To achieve the opposite, lower the gauge wheels. Be sure to check the air pressure in each tire regularly so that an even, consistent grade will be maintained.

ROLLER BARRIER

The roller barrier on the T-series rakes can be adjusted allowing for the operator to choose the size of material left on the seedbed. The gap between the roller and barrier and the angle of the barrier. (The barrier is stiff enough for pushing but also flexible enough to allow debris to pass depending on how the material should be handled by the roller.)

GAP ADJUSTMENT: The normal gap between the roller and barrier is approximately 1.25”. This gap can be adjusted by loosening the U-bolts that hold the barrier mount and tightening/loosening the adjustment screws on top of the U-bolt mount. A wider opening allows more dirt and rock to pass through and reducing the opening allows for finer raking. Take care to ensure that the roller does not hit the barrier and that the gap is equal all the way across to roller. See Figure #1

FIGURE #1



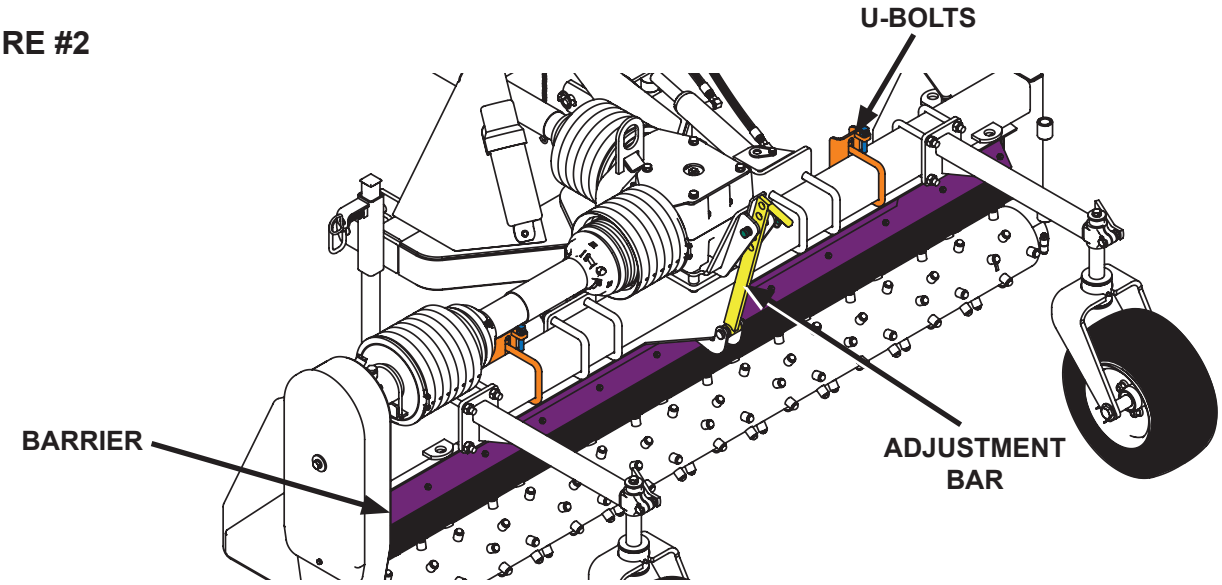
NOTE: Changing the angle position of the roller barrier will change the gap measurement. Verify the roller does not contact the barrier after changing the angle position.

ANGLE ADJUSTMENT: The roller barrier has 5 separate angle positions. These will allow for versatility in how the material is processed and dispensed. Adjusting the angle allows the operator to open up muddy jobsites quickly. Remove hitch pin from the barrier adjustment bar and select a position. See Figure #2

NOTE: Roller barrier angle adjustment is not available on the TM4 Power Box Rake®.

OPERATION
CONTROLS

FIGURE #2



DIRECTION CONTROL SWITCH

For Hydraulic Models Only: with the power rake angle cylinder connected to a tractor hydraulic control valve, move tractor control valve to select the desired angle. Return the tractor control to neutral to maintain the selected angle.

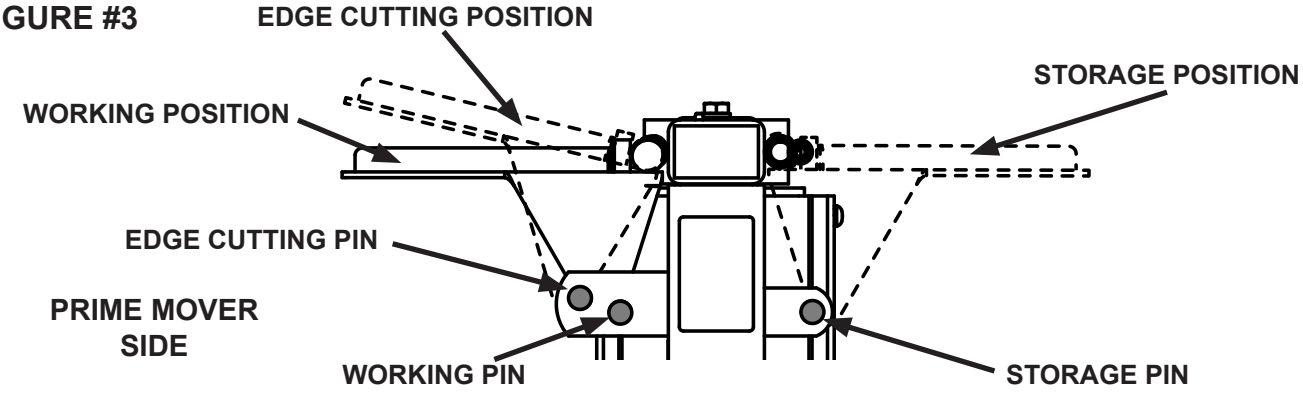
For Flex Models Only: A control box is provided to angle the rake left or right. The control box is equipped with a magnetic mount and may be attached to a convenient steel surface near the operator. The direction valve uses a small amount of hydraulic oil and will only operate with the prime mover auxiliary hydraulic system engaged.

With the prime mover auxiliary hydraulic system engaged, move the spring loaded switch in one direction and the rake will angle left or right. Return the switch to center position and rake will maintain the angle selected. Pivot rake to place the windrow left or right of the prime mover.

ENDPLATES

The function of the endplates is to contain the material in front of the roller while the clean material passes between the roller and barrier. See Figure #3

FIGURE #3



NOTICE! Edge Cutting Position is only on the right side on TM4 & TM5 model rakes

OPERATION
CONTROLS

With the endplates mounted in the working position (parallel with prime mover tires) and the roller straight, material can be moved along, filling in the low spots.

When windrowing along an edge, the endplates can be moved from their working position outward slightly to the Edge Cutting position to allow for the rake to ride along the edge of the work area.

These plates can be mounted to the front or back of the power rake, depending on the raking direction. When you move the endplates from front to back, you must move the left endplate to the right side and the right endplate to the left side.

When disconnecting the attachment, place the power rake on a hard level surface and position the endplates in the storage position to ensure stability.

FLEX MODEL CONTROLS

The flex model allows for individual control of each gauge wheel to tilt the roller for creating sloped or contoured areas. To operate in flex mode, move top link to the “float“ position on the mast frame and engage the float function on your three-point hitch. Refer to your prime mover operator’s manual, on some prime movers you may need to release the lower link arms from the lift bars.

The control box allows you to control each wheel by activating the corresponding switch as directed on decal. The tractor auxiliary hydraulic circuit must be engaged to operate these functions. The angle switch controls the rake angle as indicated on the decal.

OPERATION

INTENDED USE

This Power Box Rake® is designed solely for removing rock, small debris, and thatching. Use in any other way is considered contrary to intended use. Compliance with and strict adherence to operation, service and repair conditions, as specified by the manufacturer, are essential elements of intended use.

GENERAL OPERATION

The PTO drives the roller, which digs into the ground, cultivating and pulling up rocks, roots, and debris. The clean soil goes between the roller and barrier, while the rocks, roots, and debris work to the side in a windrow. With the endplates mounted in the working position and the rake straight (endplates parallel with prime mover tires), material can be moved along, filling in the low spots. Also, rocks, roots, and debris can be collected and moved to another location for hauling away. The power rake allows fast raking of large areas of ground.

When power raking, the depth will determine how much dirt is carried ahead of the roller. The ideal depth will vary with conditions and can be anywhere from skimming the surface to approximately 3” deep. See Power Roller Controls to set roller depth.

When windrowing, the level of dirt may be halfway up on the barrier. The volume or density of the material being raked will dictate how many times a windrow can be moved. When moving the windrow the level of the dirt may be to the top of the barrier. Try to prevent material from flowing over the top.

NOTE: Soil can be removed from the windrow of rocks by moving it back and forth a few times onto the clean area. If dirt clods are a problem, running the tractor tire over the windrow and then moving it a final time will help to break up and cut down on dirt clods.

Perform “Clutch Run-In” before using your new power rake (See Maintenance Section for Clutch Run-In procedure.) Failure to follow this procedure will VOID warranty and may result in pre-mature driveline failure.

1. Start the prime mover following the safety start up procedure in your operator’s manual.
2. Lower power rake slowly to the ground.
3. Engage tractor PTO and hydraulic control lever for auxiliary attachment.
4. Increase engine RPM to give desired RPM at the roller. Normal operating speed must not exceed 540 RPM. If operating in heavy rock, reduce the speed slightly.

NOTICE! Do not exceed a PTO operating speed of 540 RPM.

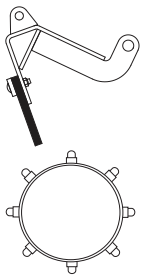
5. Move the prime mover forward or backward as desired. Ground speed should be between 3 and 5 MPH under normal conditions. In heavy rock, reduce the ground speed to 1 to 3 MPH. For the roller to operate effectively, it must rotate in the opposite direction of the prime mover wheels when raking forward. Lift the power rake off the ground when reversing.

OPERATION

OPERATING TIPS

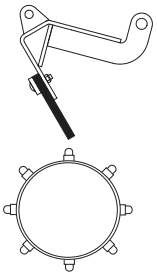
ROLLER BARRIER ADJUSTMENT (TM5 – TM8)

Make any necessary adjustments to the roller barrier for the soil type and the desired finish product (see Controls.) Each angle position of the roller barrier has a different effect on your end results.



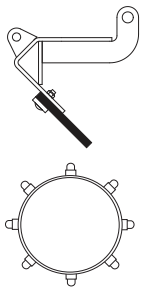
POSITION 1

Optimal for moving/carrying soils or material. (Helps prevent material from building into a large packed pile unable to “breath and dry”.)



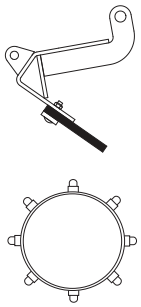
POSITION 2

Allows for an increased “grinding” effect on the material.



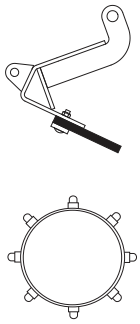
POSITION 3

More aggressive handling of clumps of material. Reduced particle sizes will slip over the roller.



POSITION 4

More material and less horsepower required to pull the rake. Travel speed and productivity increased. (Best position where soils have less rock and debris and are not hard and chunky.)



POSITION 5

Optimal for opening-up and drying muddy conditions. Great for reconditioning stone roads and parking lots. (Best position for soil conditioning.)

PULVERIZING TOPSOIL

- Install the top link in the “fixed” position to allow for down pressure to be applied.
- Shorten top link to lift gauge wheels off the ground.
- Remove endplates to allow material to be moved out and not slow the raking process.
- Open barrier to allow material to flow over the roller.
- Angle rake as needed to control material (angled or straight).
- Maintain sufficient RPM and travel speed to prevent stalling.

OPERATION

DEBRIS REMOVAL

- Lower 3-point hitch to allow gauge wheels to control the depth of the roller
- Install the top link in the “float” position to begin early stages of final grading.
- Remove endplates and angle rake to windrow debris.
- Install endplates in operating position (or edge cutting position if so equipped) for collecting debris.
- Increase travel speed.

FINISH GRADING

For finish grading you will collect the material from the high spots and deposit it in the low areas. Position of the roller and endplates will be determined by your worksite.

- Install the top link in the “float” position.
- Install endplates in the working position and the rake straight.
- Tilt the rake forward so the teeth on the roller are barely touching the ground.
- Increase travel speed.

SPREADING FILL AND TOPSOIL

- Install the top link in the “fixed” position.
- Tilt the rake so it is riding on the gauge wheels. (Depth of cut is not the objective.)
- Install endplates in the working position.
- Angle rake as needed to control material movement.

CHANGING GRADE

Changing the grade can be accomplished during finish grading by angling rake to collect and windrow the maximum amount of material towards targeted areas.

For Flex Model Only: Changing the grade can be accomplished by raising one gauge wheel and lowering the opposite gauge wheel.

THATCHING EXISTING GRASS AREAS

- Install the top link in the “fixed” position to allow for accurate depth control.
- Lengthen top link to support the rake on the gauge wheels and lift roller so teeth are just grazing the surface.
- Maintain a slow travel speed.

SHUTTING DOWN

1. Disengage PTO and turn off hydraulic flow to your attachment and allow all movement to stop.
2. Lower the attachment to the ground and relieve hydraulic pressure.
3. After all movement has stopped, follow your prime mover operator’s manual for safely shutting down and exiting the prime mover.

NOTICE! Do not disconnect hydraulic lines until all system pressure is relieved. Lower unit to ground, stop engine, and operate all hydraulic control levers.

OPERATION

STORAGE

The following storage procedure will help you to keep your product in top condition. It will also help you get off to a good start the next time your attachment is needed. We therefore strongly recommend that you take the extra time to follow these procedures whenever your unit will not be used for an extended period of time.

IMPORTANT: When detaching your unit for short or long term storage be sure to follow the Detaching Instruction in the Installation Section of this manual.

- Clean the unit thoroughly, removing all mud, dirt and grease.
- Inspect for visible signs of wear, breakage or damage. Order any parts required and make the necessary repairs to avoid delays upon removal from storage.
- Tighten loose nuts, capscrews and hydraulic connections.
- Coat exposed portions of the cylinder rods with grease (if so equipped).
- Lubricate grease fittings.
- Seal hydraulic system from contaminants and secure all hydraulic hoses off the ground to help prevent damage.
- Replace decals that are damaged or in unreadable condition.
- Store unit in a dry and protected place. Leaving the unit outside will materially shorten its life.
- Store control box in a safe and protected location (if so equipped).

Additional Precautions for Long Term Storage:

- Touch up all unpainted surfaces with paint to avoid rust.
- Inflate tires to recommended tire pressure.
- Fill oil in chain case to maximum.

REMOVAL FROM STORAGE:

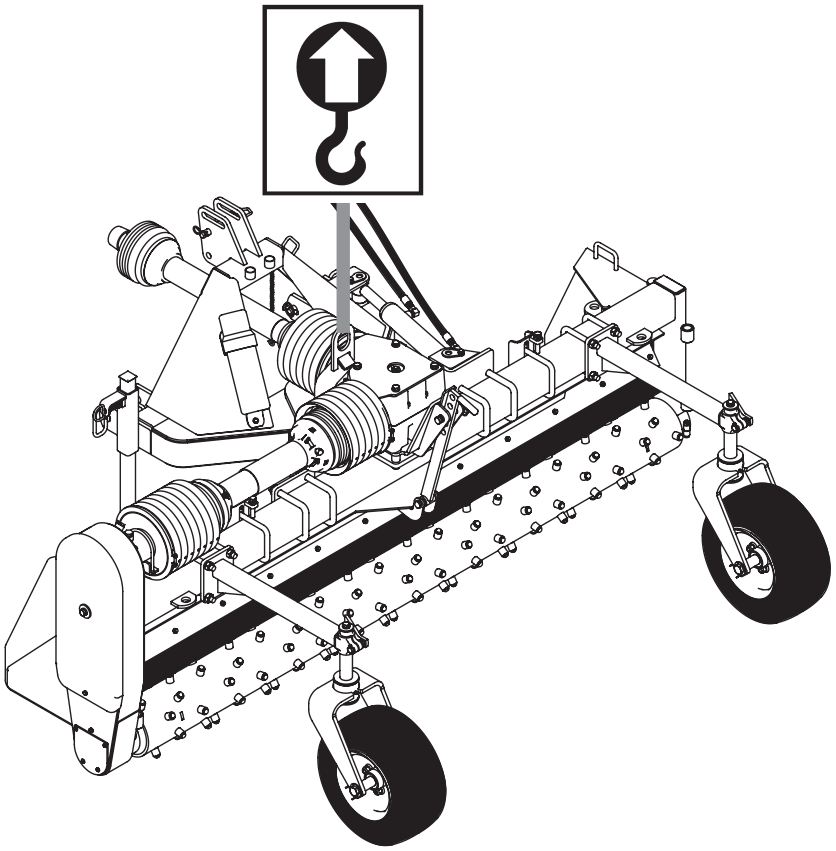
- Wash unit and replace any damage and/or missing parts.
- Lubricate grease fittings.
- Check hydraulic hoses for damage and replace as necessary.

LIFT POINTS

Lifting points are identified by lifting decals where required. Lifting at other points is unsafe and can damage attachment. Do not attach lifting accessories around cylinders or in any way that may damage hoses or hydraulic components. See Diagram.

- Attach lifting accessories to unit at recommended lifting points.
- Bring lifting accessories together to a central lifting point.
- Lift gradually, maintaining the equilibrium of the unit.

OPERATION



WARNING! Use lifting accessories (chains, slings, ropes, shackles and etc.) that are capable of supporting the size and weight of your attachment. Secure all lifting accessories in such a way to prevent unintended disengagement. Failure to do so could result in the attachment falling and causing serious personal injury or death.

TIE DOWN POINTS

Tie down points are identified by tie down decals where required. Securing to trailer at other points is unsafe and can damage attachment. Do not attach tie down accessories around cylinders or in any way that may damage hoses or hydraulic components.

- Attach tie down accessories to unit as recommended.
- Check unit stability before transporting.

WARNING! Verify that all tie down accessories (chains, slings, ropes, shackles and etc.) are capable of maintaining attachment stability during transporting and are attached in such a way to prevent unintended disengagement or shifting of the unit. Failure to do so could result in serious personal injury or death.

TRANSPORTING

"Follow all local government regulations that may apply along with recommended tie down points and any equipment safety precautions at the front of this manual when transporting your attachment."

LUBRICATION

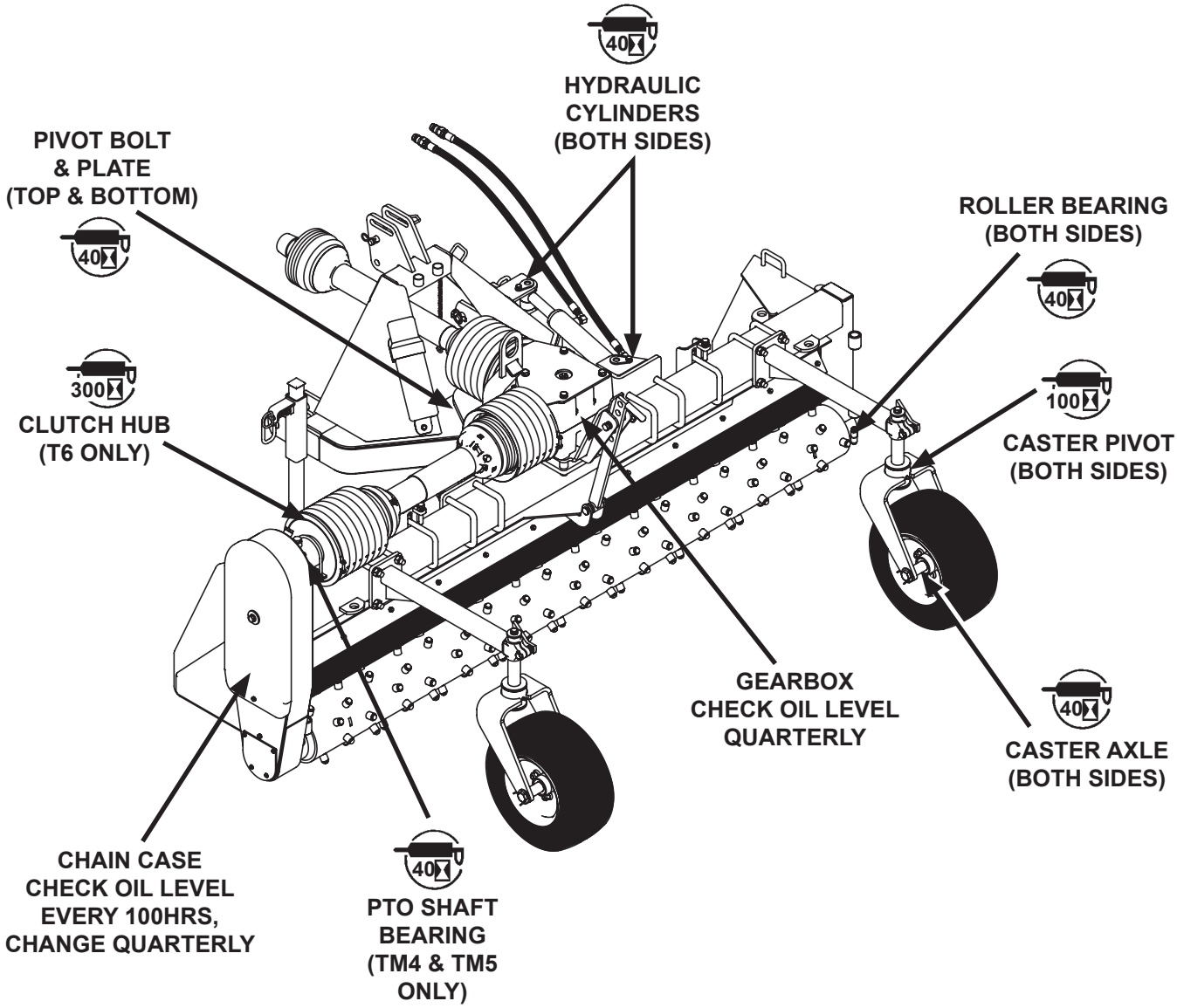
LUBRICATION

All parts provided with grease fittings should be lubricated as indicated. If any grease fittings are missing, replace them immediately. Clean all fittings thoroughly before using grease gun.

Lubricate weekly or every 40 hours of operation, whichever comes first, with SAE Multi-Purpose Lubricant or an equivalent SAE Multi-Purpose type grease.

Lubricate monthly or every 100 hours of operation, whichever comes first, with SAE Multi-Purpose Lubricant or an equivalent SAE Multi-Purpose type grease.

Lubricate quarterly or every 300 hours of operation, whichever comes first, with SAE Multi-Purpose Lubricant or an equivalent SAE Multi-Purpose type grease.

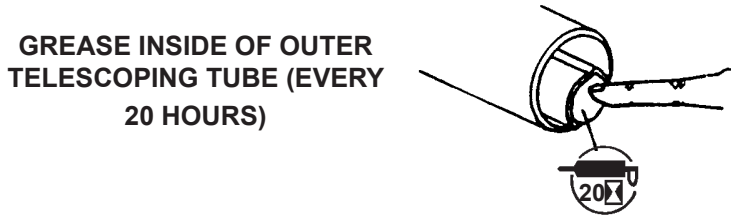


IMPORTANT: Avoid excessive greasing. Dirt collects on exposed grease and greatly increases wear. After greasing, wipe off excessive grease from fittings.

LUBRICATION

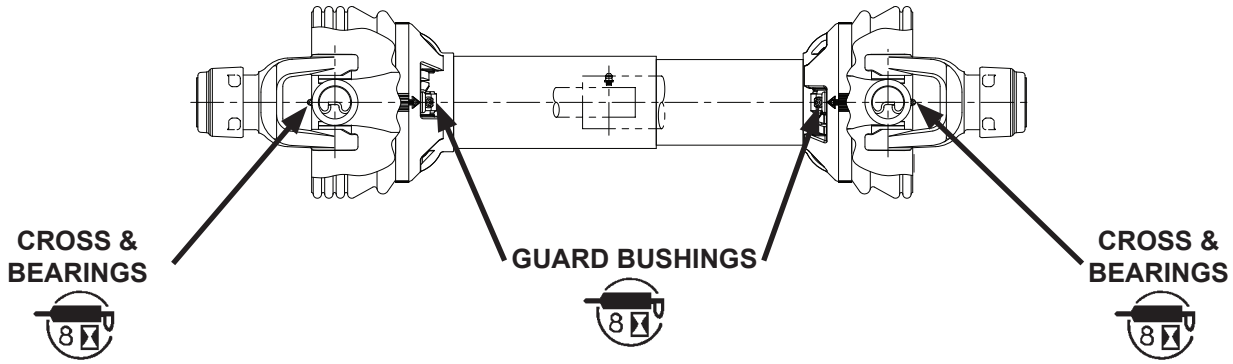
PTO DRIVELINES

- Lubricate the outboard hub and the PTO every (8) eight hours.
- Grease PTO driveline inner tube before putting attachment into operation and every (20) twenty hours thereafter.



NOTE: When used in winter the outer tube must be greased to prevent it freezing solid!

IMPORTANT: Avoid excessive greasing. Dirt collects on exposed grease and greatly increases wear. After greasing, wipe off excessive grease from fittings.



NOTE: It is recommended to use NLGI #2 grease or equivalent for all grease points.

GEARBOX

To check gearbox lubricant level, remove the plug located top of the gearbox.

- Lubricant should half-fill the gearbox.
- If not, add multipurpose 80-weight gear lubricant.

MAINTENANCE

GENERAL INFORMATION

Regular maintenance is the key to long equipment life and safe operation. Maintenance requirements have been reduced to an absolute minimum. However, it is very important that these maintenance functions be performed as described below.

PROCEDURE	DAILY (EVERY 8 HOURS)	WEEKLY (EVERY 40 HOURS)	MONTHLY (EVERY 100 HOURS)	QUARTERLY (EVERY 3 MONTHS)
Check prime mover hydraulic system to ensure an adequate level and cleanliness of hydraulic oil.	✔			
Check hydraulic fittings for leaks or damage. Replace or tighten as necessary.	✔			
Check for missing or loose hardware. Replace or tighten as necessary. See Bolt Torque Specifications	✔			
Check for missing or damaged safety decals and replace as necessary.	✔			
Lubricate PTO U-Joints.	✔			
Check tire pressure. (20 psi cold)		✔		
Lubricate caster axle, pivot plate, pivot bolt, & roller bearing.		✔		
Lubricate caster pivot.			✔	
Inspect drive chain for correct tension.			✔	
Check oil level in chain case.			✔	
Change lubrication in chain case. (Add 1.5 pints of #00 fluid gear grease)				✔
Check oil level in PTO gearbox and bearing housing.				✔
T6 Only: Lubricate Clutch Hub.				✔

BREAK-IN PERIOD

Change oil in gearbox after the first 100 hrs or 30 days of operating and then quarterly.

WARNING! **Escaping hydraulic / diesel fluid under pressure can penetrate the skin causing serious injury. Fluid escaping from a very small hole can be almost invisible. Use a piece of cardboard or wood, rather than hands to search for suspected leaks.**

Keep unprotected body parts, such as face, eyes, and arms as far away as possible from a suspected leak. Flesh injected with hydraulic fluid may develop gangrene or other permanent disabilities. If injured by injected fluid, see a doctor at once.

Stop the engine and relieve pressure before connecting or disconnecting lines. Tighten all connections before starting engine or pressurizing lines.

MAINTENANCE

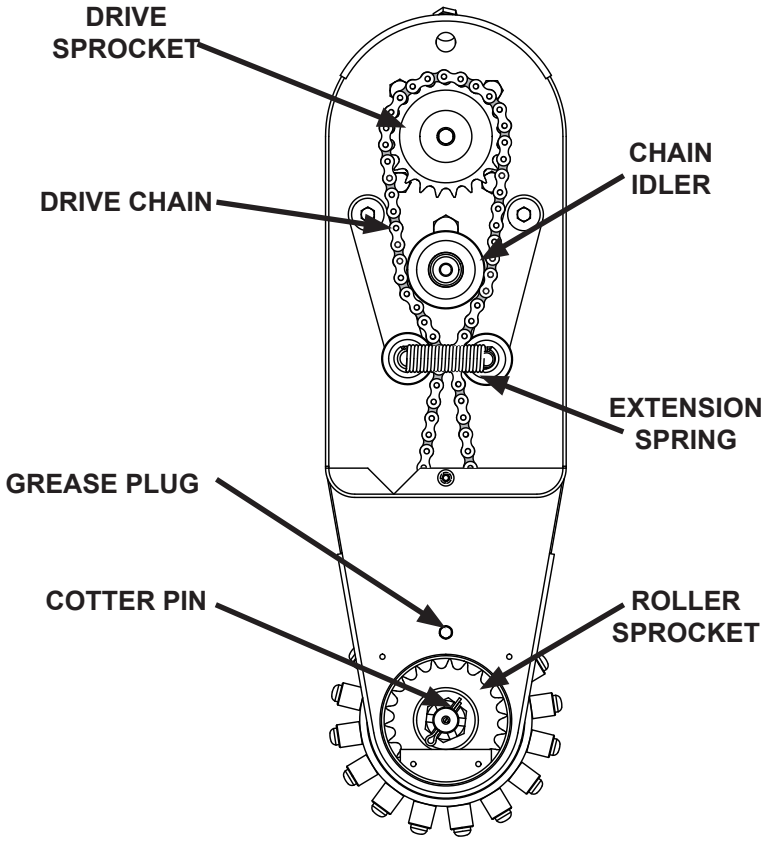
CHAIN MAINTENANCE

The drive chain should be inspected monthly. A new chain has a tendency to stretch, so it is necessary to check the chain tension to prevent excessive play, thus causing potential problems.

Inspect the sprockets along with the drive chain to ensure the slotted hex nut or hex bolt is tight, the cotter pin is in place, and the sprocket cannot move on shaft.

Chain tension is preset with the extension spring. If the chain becomes excessively loose, it may be necessary to remove one link (two pitches). Disconnect chain at the master link and remove one link (2 pitches). If unable to reassemble, add an offset link to lengthen the chain. See Figure #1

FIGURE #1



NOTICE! Replacement chain should be only high quality original equipment chain for longer life.

When being stored for a long period or at end of season, change the oil, adding #00 fluid gear grease, and rotate the roller several times allowing the chain to be coated with lubricant, enhancing chain life. With the hydraulic hoses connected together, rotate the roller periodically to maintain lubrication.

GEARBOX

The gearbox has minimal maintenance, but should be checked quarterly to be sure that the oil level is maintained at half full. EP 80-90 wt. gear lube is recommended for use in the gearbox. Oil should be changed after the first 100 hours or 30 days of operating & then quarterly. In the case of seasonal usage, it is best to change the oil at the end of the season to remove moisture and corrosive contaminants.

It should be noted that the gearbox only exceeds its thermal capacity when the oil temperature exceeds 200°F.

MAINTENANCE

ROLLER BEARINGS

Highest quality triple-seal bearings are used on the power rake. Lubrication of the bearings will vary considerably with conditions. As a rule, bearings should be under-lubricated rather than over-lubricated. Over lubrication can cause seal damage.

NOTICE! Replacement bearings should be only high quality original equipment bearings for longer life.

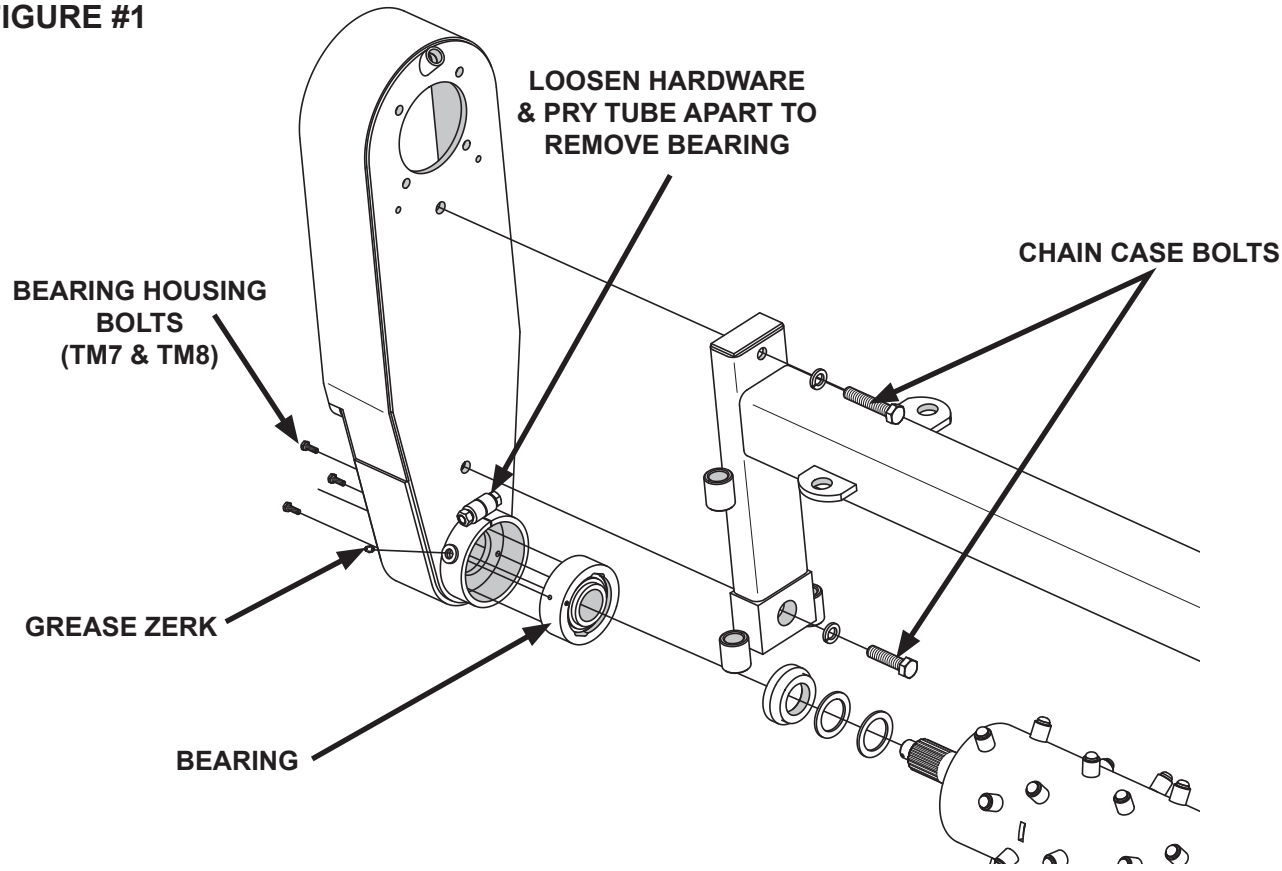
Install new complete bearing housing if needed or just replace the bearing insert. The shafts should be straight, free of burrs, and up to size. If shaft is worn, replace or have the shaft built up to standard prior to completing assembly.

The special protective collars protect bearings from vine, wire wrap, and dirt buildup next to the bearing seal. The bearing protector is sandwiched onto the shaft which rotates within a close clearance from the outer race of the bearing. Grease coming from the bearing oozes into the protecting collar, keeping dust and particles from entering the seal area, increasing the bearing life.

Left Roller Bearing Replacement

1. Remove upper and lower chain case covers. Remove tension spring and drive chain.
2. Remove lower sprocket by removing cotter pin, slotted hex nut and washers.
3. Support roller with blocks and remove the two bolts holding the chain case to the frame. See Figure #1

FIGURE #1



4. Slide chain case and bearing off roller shaft.

NOTE: The top driveline shaft will come off with chain case on most units.

5. Remove the grease fitting on the bearing housing (if so equipped).
6. Loosen bolt on the bearing tube that holds the bearing in place and pry tube apart to remove bearing.
7. Remove the three bolts securing bearing to chain case (TM7 and TM8 ONLY).
8. Remove bearing.
9. Install the new bearing:
   a. Install the O-ring on the bearing.
   b. Apply a coat of grease on O-ring.
   c. Slide the bearing into bearing tube.
   d. Apply a moderate amount of pressure so the O-ring will seat into the bearing and spread slightly keeping the oil in the chain case from escaping through the bearing.
   e. Secure in place with bolts removed in Step #7 on the TM7 and TM8.

NOTE: Be sure all parts, hardware and wear surfaces are thoroughly clean and in good condition.

10. Using Loctite #262 RED, tighten bolt on the bearing tube securing bearing in place. Torque to 90 ft. lbs.
11. Reinstall grease fitting (if so equipped).
12. Slide the chain case and bearing back onto the roller shaft. Using the existing bolts and Loctite #262 RED secure the chain case to the frame. On the TM4 and TM5 rakes torque to 90 ft. lbs. and on the T6, TM7 and TM8 torque to 175 ft. lbs.
13. Reinstall the lower sprocket using the existing cotter pin, slotted hex nut and washers. Torque the slotted hex nut on the TM4 and TM5 to 75-85 ft. lbs. and on the T6, TM7 and TM8 to 90-100 ft. lbs.
14. Reinstall the drive chain and tension spring.
15. Reinstall the upper and lower chain case covers.

Right Roller Bearing Replacement

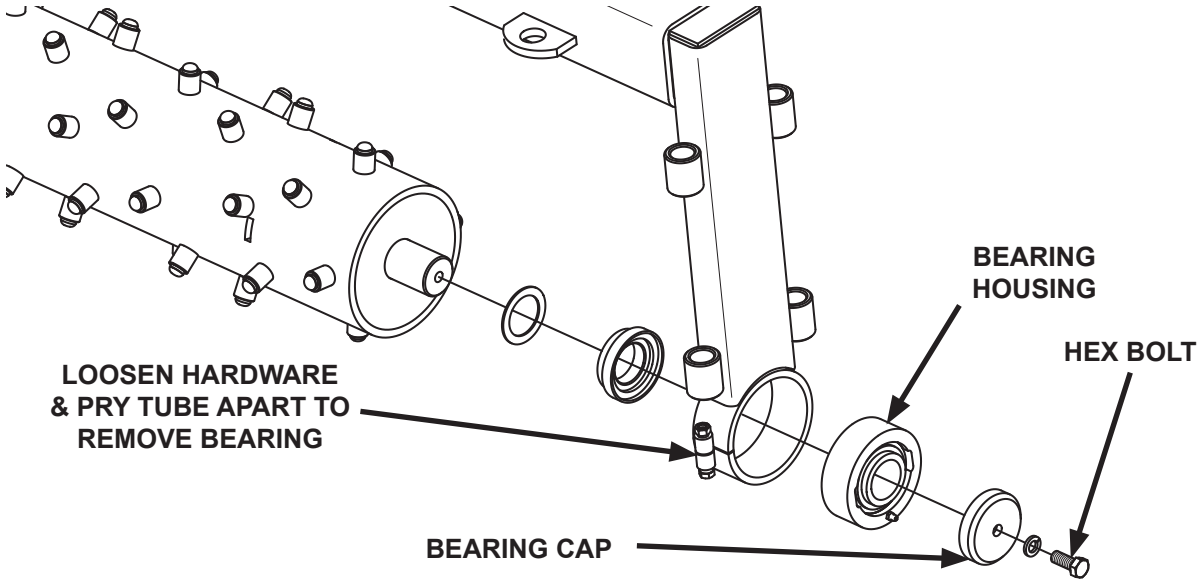
1. Remove the hex bolt and bearing cap from outside of bearing. See Figure #2
2. Loosen bolt on the bearing tube that holds the bearing in place and pry tube apart to remove bearing.
3. Remove the bearing.
4. Install the new bearing.

NOTE: Be sure all parts, hardware and wear surfaces are thoroughly clean and in good condition.

5. Using Loctite #262 RED, tighten bolt on the bearing tube securing bearing in place. Torque to 90 ft. lbs.
6. Reinstall the bearing cap using the existing hardware and Loctite #262 RED.

MAINTENANCE

FIGURE #2

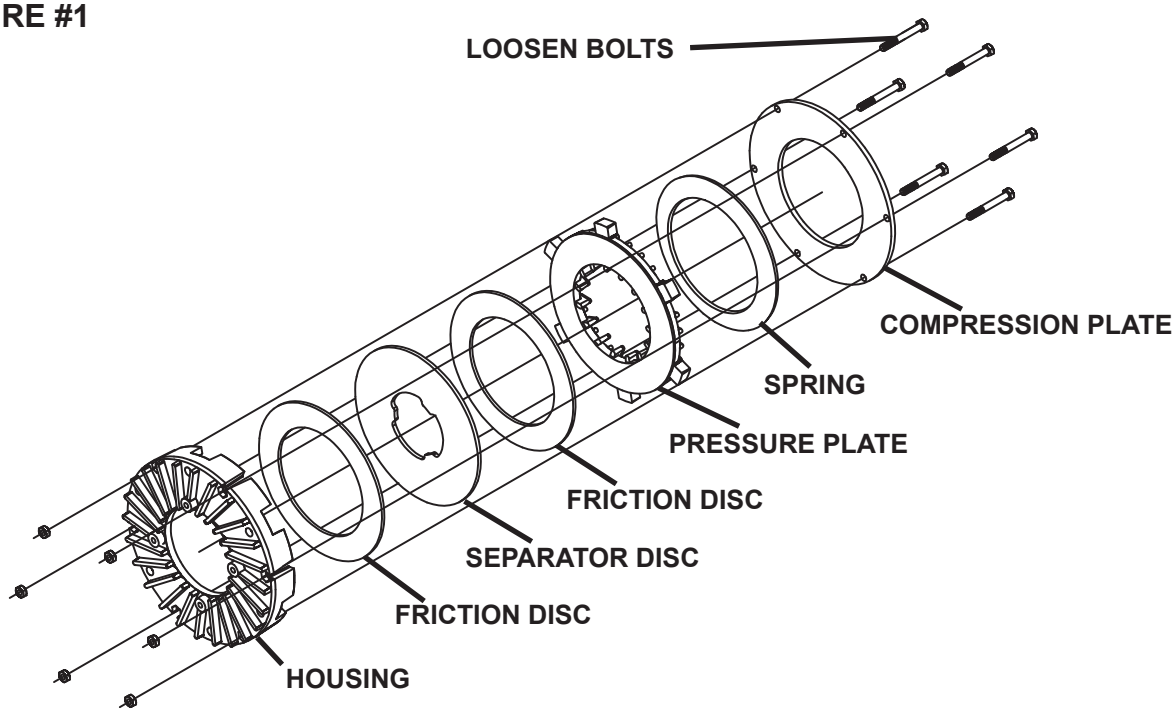


CLUTCH RUN-IN

If the rake has not been used or has not been operated for one year, the following run-in procedure is recommended. The Weasler TorQmaster clutch is a pre-set, nonadjustable friction disc clutch. Follow the directions below for run-in and clutch maintenance.

1. Make sure tractor is off and the PTO disengaged.
2. Disconnect the driveline from the tractor.
3. Remove the clutch shield clamp and slide the shield over to expose the clutch.
4. Locate the six bolts on the clutch pack. Loosen the bolts until they rotate freely, finger tighten each bolt, and then tighten each bolt one-half turn. See Figure #1

FIGURE #1

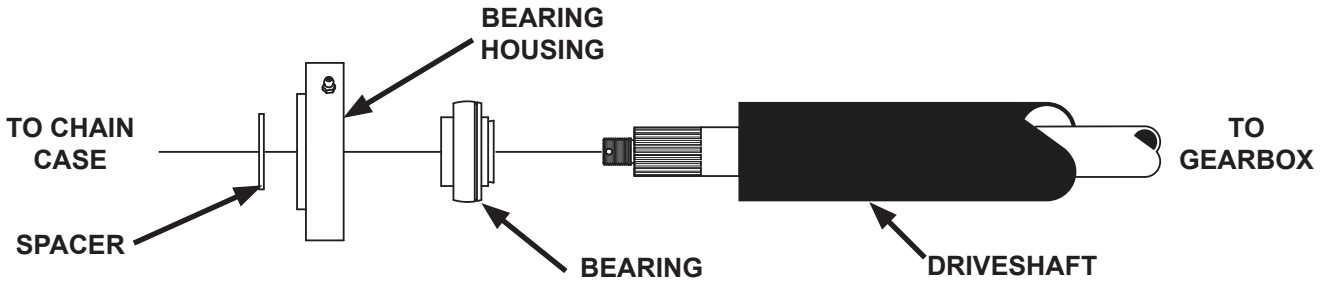


5. Replace shield back over the clutch and clamp in place.
6. Attach the driveline to the tractor and start the tractor. Engage the tractor PTO and run for a few seconds, or until the friction clutch visibly smokes.
7. Disengage the tractor PTO and shut the tractor off. Keep clear of the machine until all parts stop moving.
8. Disconnect the driveline from the tractor.
9. Tighten the six bolts on the clutch pack until the compression plate is in contact with the housing. Torque to 30 ft. lbs.
10. Locate the four bolts that attach the yoke and hub to the clutch pack and verify 30 ft. lbs. of torque.
11. Replace the clutch shield and clamp in place.

PTO BEARING SERVICE

TM4 AND TM5 SERVICE ONLY

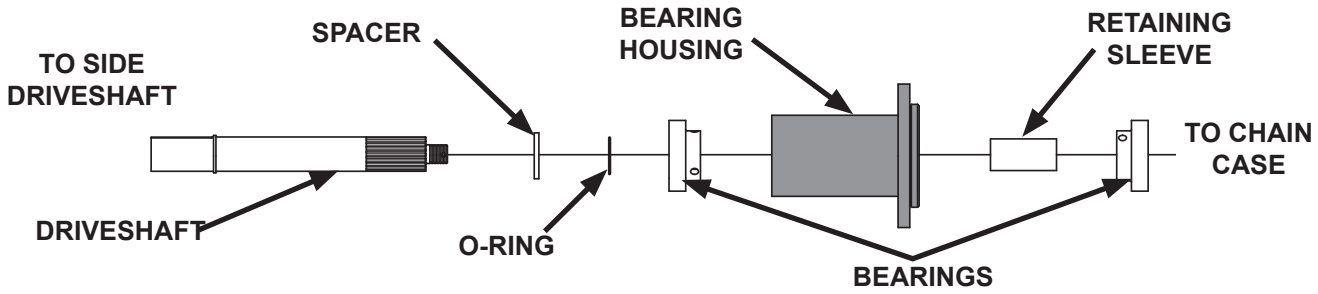
1. Remove the drive chain. Then remove the upper sprocket by removing cotter pin, slotted hex nut, and washers.
2. Remove the four bolts mounting the gearbox to the frame and slide the gearbox, clutch, and driveshaft away from the chain case until the top bearing is cleared.



3. Remove the two bolts mounting the bearing to the chain case. Replace the bearing, apply sealant to the mating face of the bearing housing to seal the chain case.
4. Secure the bearing into the chain case using the hardware exsisting hardware.
5. Slide the driveshaft into the bearing and chain case. Mount the gearbox onto the frame with the hardware removed in step #2.
6. Reattach sprockets & drive chain.

T6 SERVICE ONLY

1. Remove chain from top sprocket, cotter pin, slotted nut, and washer.
2. Remove the clutch shield and side PTO.
3. Remove the four bolts holding the bearing housing to the chain case.
4. Remove plug and drain oil.
5. Slide shaft out of tube end of housing, while retaining sleeve and O-ring for reassembly.
6. Press on end of shaft with dimple hole, forcing the shaft to come out. Use a large punch to push each bearing out.
7. Press bearing in bearing holder with collar of bearing to the center of the holder. Press only on the outer bearing race until the bearing hits the shoulder and stops.
8. Insert the shaft in the bearing with the spline end at the flange end of the holder.
9. Slide the sleeve over the shaft and into the bearing holder.



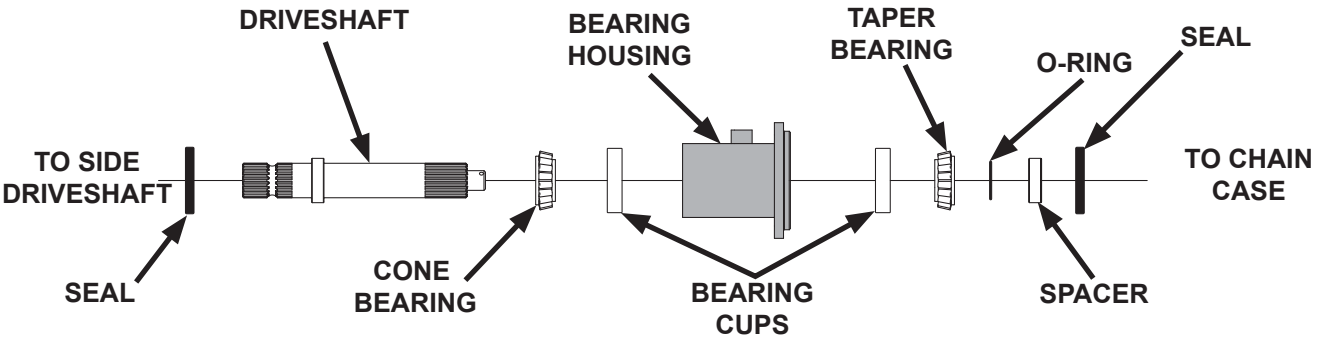
10. Press bearing into the bearing holder with the collar part of the bearing facing toward the center of the holder. Press on both the outer and inner bearing race rests on the sleeve.
11. Replace O-ring and O-ring space. Check O-ring for cuts or nicks.
12. Apply a liberal amount of silicone sealer to the inside of the flange. Attach the bearing holder to the chain case with four bolts and lock washers.
13. Slide the top sprocket, hub first on the shaft. Use machine bushings on the inside or out-side of the sprocket for proper alignment.

NOTICE! At least one machine bushing MUST be placed between the sprocket and the bearing to prevent damage to the bearing.

14. Replace washers, slotted hex nut, and cotter pin. Replace chain, PTO, and clutch guard.

TM7 AND TM8 SERVICE ONLY

1. Remove chain from top sprocket, cotter pin, slotted nut, and washer.
2. Remove the clutch shield and side PTO.
3. Remove the four bolts holding the bearing housing to the chain case.
4. Remove plug and drain oil.
5. Slide shaft out of tube end of housing, while retaining sleeve and O-ring for reassembly.
6. Remove seals, these must be replaced.
7. Place taper bearings into cup.
8. Insert shaft through tube end of housing.
9. Place O-ring over threaded end of shaft, seating O-ring against bearing.
10. Place sleeve over threaded end of shaft, seating sleeve against O-ring.



11. Carefully press new seals in housing, open faces inward.
12. Apply a liberal amount of silicone sealer to the inside of the flange. Attach the bearing housing to the chain case with the four bolts and lock nuts.
13. Slide the top sprocket, hub first on the shaft.
14. Replace washer, slotted nut, and cotter pin. Do not over tighten slotted nut. Shaft must turn freely.
15. Install chain, PTO, and clutch guard.

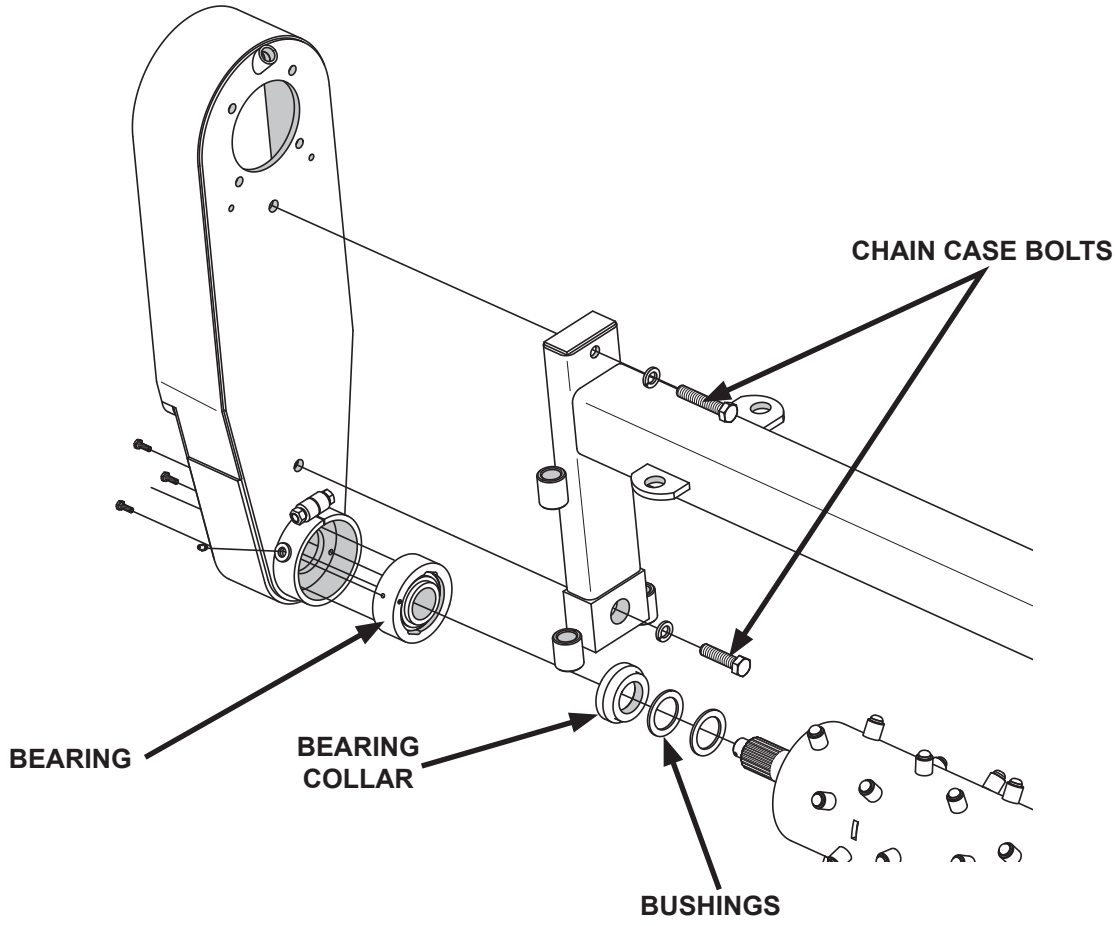
MAINTENANCE

ROLLER REPLACEMENT

NOTICE! It will be necessary to have a lifting device or additional help while removing and replacing the roller. The roller weighs more than 80 lbs.

1. Remove upper and lower chain case covers. Remove tension spring and drive chain.
2. Remove lower sprocket by removing cotter pin, slotted hex nut and washers.
3. Support roller with blocks and remove the spacers behind the lower sprocket.
4. Remove the two bolts holding the chain case to the frame.
5. Slide chain case with PTO bearings and roller bearing off roller shaft. See Figure #1

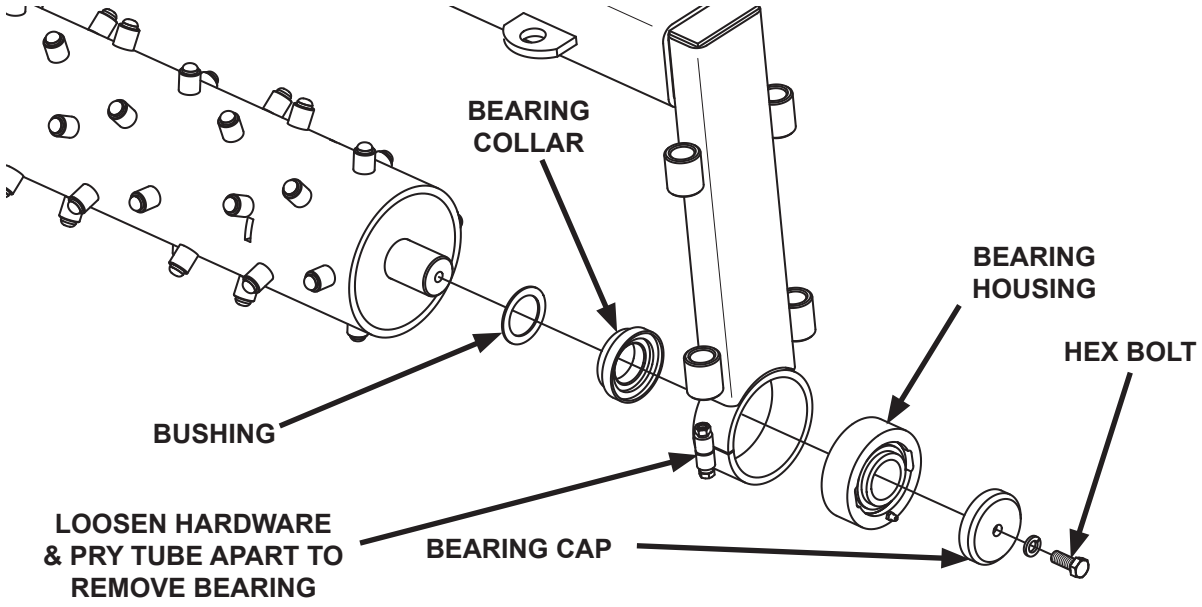
FIGURE #1



6. Loosen bolt on the bearing tube on the opposite end of the frame (non-drive end). Pry tube apart and slide roller and bearing out of the frame. See Figure #2

MAINTENANCE

FIGURE #2



7. Remove bearing cap, bearing and protective collar from roller.
8. Install the existing machine bushing and protective collar against the end plate onto the new roller.
9. Place bearing and bearing cap onto the new roller. Secure with existing hardware and Loctite #262 RED.
10. Slide roller and bearing into bearing tube on the non-drive end of frame. Do not tighten bearing tube.
11. Place spacer, protective collar and O-ring from the splined end of the old roller onto the new roller. Check O-ring for nicks and cuts and replace if necessary.
12. Apply anti-seize to bearing area on roller shaft.
13. Slide chain case back onto roller and bolt to frame using the existing bolts and Loctite #262 RED. On the TM4 and TM5 rakes torque to 90 ft. lbs. and on the T6, TM7 and TM8 torque to 175 ft. lbs.
14. Reinstall the lower sprocket using the existing cotter pin, slotted hex nut and washers. Torque the slotted hex nut on the TM4 and TM5 to 75-85 ft. lbs. and on the T6, TM7 and TM8 to 90-100 ft. lbs.
15. Check that roller clears the frame on both ends and adjust if necessary.
16. Tighten bolt on the bearing tube on the non-drive end of frame using Loctite #262 RED and torque to 90 ft. lbs.
17. Reinstall the drive chain and tension spring.
18. Reinstall the lower chain case cover using existing hardware and removable thread lock. Be careful not to pinch the O-ring.
19. Fill the chain case with 1.5 pints of #00 fluid gear grease.
20. Reinstall upper cover using existing hardware.
21. Run power rake and watch for any interference between roller and frame. Adjust if necessary.

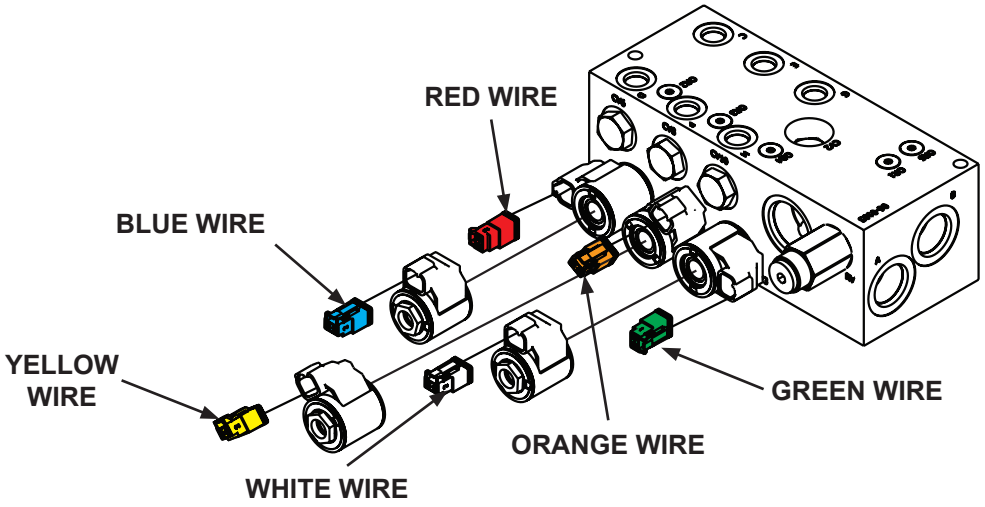
MAINTENANCE

DIRECTIONAL CONTROL VALVE (FLEX MODEL ONLY)

A three position switch is used to operate the direction control valve. Control power (12 volt) is supplied by the power cord attached to the prime mover electrical system. The switch wires are connected to the direction control valve as shown in Figure #1.

The direction control valve uses hydraulic oil provided by the prime mover. The prime movers auxiliary hydraulic system must be connected and engaged to provide angle direction adjustment. The roller must be rotating clockwise when viewed from the left side.

FIGURE #1



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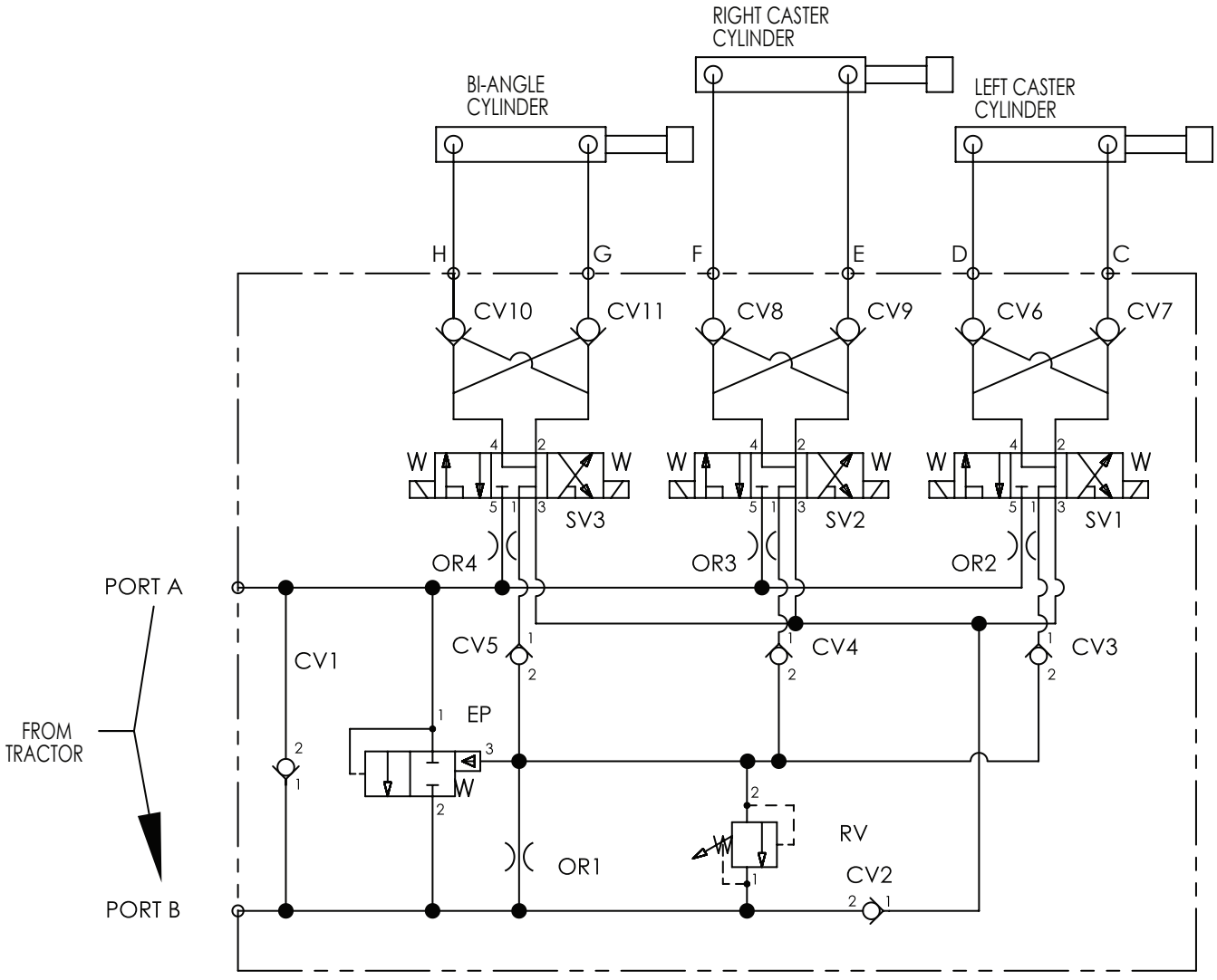
TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
ROLLER WILL NOT TURN	Tractor PTO not engaged.	Check control lever.
	Clutch friction discs worn.	Check and replace.
	Obstruction between roller and barrier.	Check and clear obstruction.
	Chain broken.	Replace chain.
	Gearbox damaged.	Check that output shaft rotates.
HYDRAULIC CYLINDER WILL NOT EXTEND OR RETRACT	Hydraulic couplers not completely engaged.	Check connections.
	Insufficient oil in tractor hydraulic system.	Check fluid level per prime mover operator's manual.
	Air in hydraulic system.	Cycle lever back and forth several times to purge air.
	Broken hose.	Check for leaks.
	Worn, insufficient, or inadequate hydraulic pump.	Check flow and pressure output of prime mover hydraulics.
FLEX MODEL NOT FUNCTIONING	Cylinder not activating.	Check 12 volt supply to control box.
		Check individual signal to each coil on manifold.
		Check that auxiliary hydraulics are activated.
OIL LEAKS	Worn or damaged seal.	Inspect and replace.
	Loose or damaged hoses or connections.	Check for leaks and repair or replace.
	Worn or damaged housing.	Inspect and replace if required.

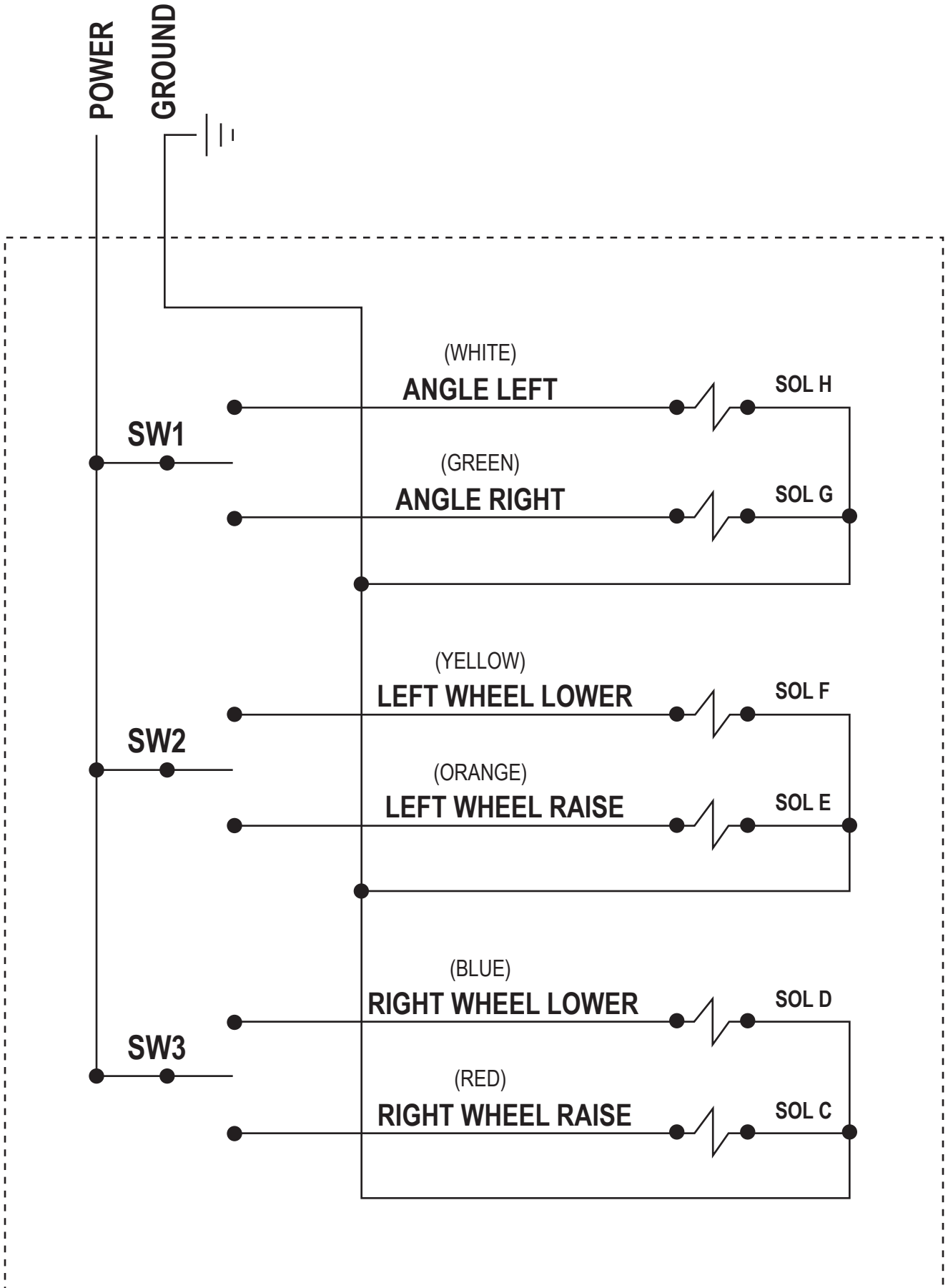
TROUBLESHOOTING

Flex Model Hydraulic Diagram

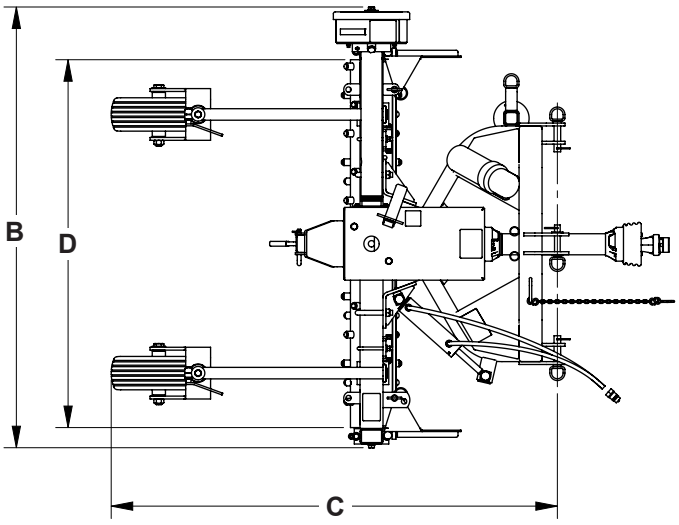


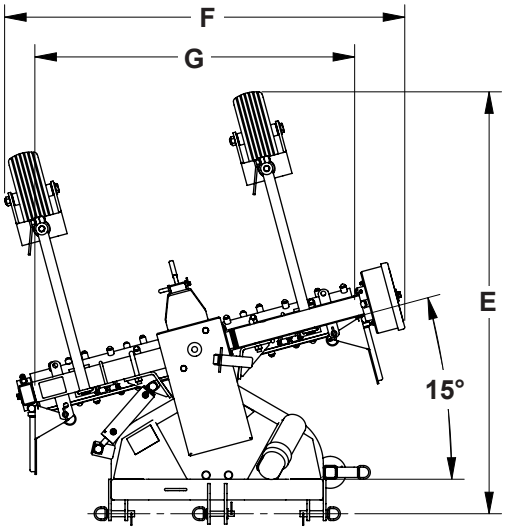
TROUBLESHOOTING

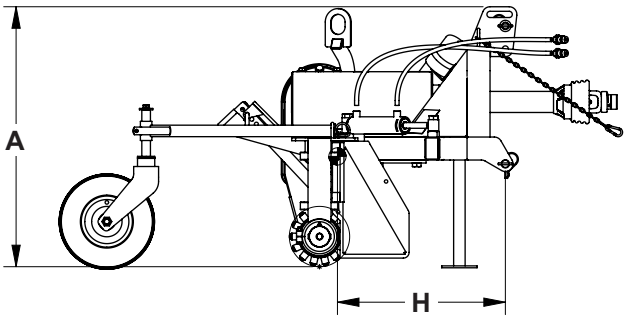
Flex Model Electrical Diagram



SPECIFICATIONS







SPECIFICATIONS AND DESIGN ARE SUBJECT TO CHANGE WITHOUT NOTICE AND WITHOUT LIABILITY THEREFOR.

(HYDRAULIC ANGLE SHOWN)

SPECIFICATIONS

HYDRAULIC ANGLE

DESCRIPTION	TM4	TM5	T6	TM7	TM8
A. Overall Height	33.90”	33.90”	40.20”	43.70”	43.70″
B. Overall Width	57.50”	69.50”	82.60”	94.60”	100.50″
C. Overall Length	58.20”	58.20”	63.50”	68.90”	68.90″
D. Cutting Width	48.00”	60.00”	72.00”	84.00”	90.00″
E. Overall Length @ 15°	61.20”	62.50”	68.50”	75.10”	75.90″
F. Overall Width @ 15°	58.00”	68.60”	80.50”	92.10”	98.00″
G. Raking Width @15°	46.40”	58.00”	69.50”	81.10”	86.90″
H. Center of Gravity - Horizontal	21.90”	21.70”	25.60”	27.10”	27.20″
Weight (lbs)	525#	560#	865#	1290#	1345#
Horsepower (HP) Range	15-22	18-32	30-40	42-80	42-80
Tractor 3-Point Mount Category	CAT I	CAT I	CAT I	CAT I-II	CAT I-II
ASAE Minimum Lift Requirement	504#	504#	903#	1510#	1510#

MANUAL ANGLE

DESCRIPTION	TM4	TM5	T6
A. Overall Height	33.90”	33.90”	40.20”
B. Overall Width	57.50”	69.50”	82.60”
C. Overall Length	58.20”	58.20”	63.50”
D. Cutting Width	48.00”	60.00”	72.00”
E. Overall Length @ 15°	61.20”	62.50”	68.50”
F. Overall Width @ 15°	58.00”	68.60”	80.50”
G. Raking Width @15°	46.40”	58.00”	69.50”
H. Center of Gravity - Horizontal	22.00”	21.80”	25.60”
Weight (lbs)	525#	555#	865#
Horsepower (HP) Range	15-22	18-32	30-40
Tractor 3-Point Mount Category	CAT I	CAT I	CAT I
ASAE Minimum Lift Requirement	504#	504#	903#

BOLT TORQUE SPECIFICATION

GENERAL TORQUE SPECIFICATION TABLES

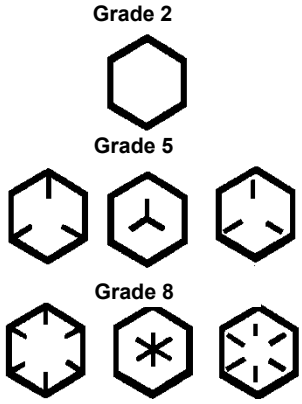
Use the following charts when determining bolt torque specifications, when special torques are not given. Always use grade 5 or better when replacing bolts.

SAE BOLT TORQUE SPECIFICATIONS

Note: The following torque values are for use with extreme pressure lubricants, plating or hard washer applications. Increase torque 15% when using hardware that is unplated and either dry or lubricated with engine oil.

Bolt Size		SAE GRADE 5 TORQUE Ft-lbs		SAE GRADE 5 TORQUE Newton-Meter		SAE GRADE 8 TORQUE Ft-lbs		SAE GRADE 8 TORQUE Newton-Meter	
Inches	mm	UNC	UNF	UNC	UNF	UNC	UNF	UNC	UNF
1/4	6,35	8	9	11	12	10	13	14	18
5/16	7,94	14	17	19	23	20	25	27	34
3/8	9,53	30	36	41	49	38	46	52	62
7/16	11,11	46	54	62	73	60	71	81	96
1/2	12,70	68	82	92	111	94	112	127	152
9/16	14,29	94	112	127	152	136	163	184	221
5/8	15,88	128	153	174	207	187	224	254	304
3/4	19,05	230	275	312	373	323	395	438	536
7/8	22,23	340	408	461	553	510	612	691	830
1	25,40	493	592	668	803	765	918	1037	1245
1-1/8	25,58	680	748	922	1014	1088	1224	1475	1660
1-1/4	31,75	952	1054	1291	1429	1547	1700	2097	2305
1-3/8	34,93	1241	1428	1683	1936	2023	2312	2743	3135
1-1/2	38,10	1649	1870	2236	2535	2686	3026	3642	4103

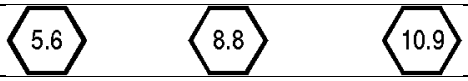
Bolt head identification marks as per grade.
NOTE: Manufacturing Marks Will Vary



METRIC BOLT TORQUE SPECIFICATIONS

NOTE: The following torque values are for use with metric hardware that is unplated and either dry or lubricated with engine oil. Reduce torque 15% when using hardware that has extreme pressure lubricants, plating or hard washer applications.

Bolt head identification marks as per grade.



Bolt Size	Grade No.	Pitch (mm)	Ft-lbs	Newton-Meter	Pitch (mm)	Ft-lbs	Newton-Meter
	5.6		3.6-5.8	4,9-7,9		-	-
M6	8.8	1,0	5.8-.4	7,9-12,7	-	-	-
	10.9		7.2-10	9,8-13,6		-	-
	5.6		7.2-14	9,8-19		12-17	16,3-23
M8	8.8	1,25	17-22	23-29,8	1,0	19-27	25,7-36,6
	10.9		20-26	27,1-35,2		22-31	29,8-42
	5.6		20-25	27,1-33,9		20-29	27,1-39,3
M10	8.8	1,5	34-40	46,1-54,2	1,25	35-47	47,4-63,7
	10.9		38-46	51,5-62,3		40-52	54,2-70,5
	5.6		28-34	37,9-46,1		31-41	42-55,6
M12	8.8	1,75	51-59	69,1-79,9	1,25	56-68	75,9-92,1
	10.9		57-66	77,2-89,4		62-75	84-101,6
	5.6		49-56	66,4-75,9		52-64	70,5-86,7
M14	8.8	2,0	81-93	109,8-126	1,5	90-106	122-143,6
	10.9		96-109	130,1-147,7		107-124	145-168
	5.6		67-77	90,8-104,3		69-83	93,5-112,5
M16	8.8	2,0	116-130	157,2-176,2	1,5	120-138	162,6-187
	10.9		129-145	174,8-196,5		140-158	189,7-214,1
	5.6		88-100	119,2-136		100-117	136-158,5
M18	8.8	2,0	150-168	203,3-227,6	1,5	177-199	239,8-269,6
	10.9		175-194	237,1-262,9		202-231	273,7-313
	5.6		108-130	146,3-176,2		132-150	178,9-203,3
M20	8.8	2,5	186-205	252-277,8	1,5	206-242	279,1-327,9
	10.9		213-249	288,6-337,4		246-289	333,3-391,6

PARTS

In order to provide you with the most UP-TO-DATE part information, all parts for this attachment have been moved to our website at ***www.paladinattachments.com/Manuals***. Please use these diagrams and parts lists to locate replacement parts.

When servicing your attachment, remember to use only original manufacturer replacement parts. Substitute parts may not meet the standards required for safe, dependable operation.

To facilitate parts ordering when contacting the factory, please have the product control number (PCN or C/N) or model and serial number of your product ready to ensure that you receive the correct parts for your specific attachment.

The product control number, model and serial number for your attachment should be recorded in the space provided on the cover of this manual. This information may be obtained from the serial number identification plate located on your attachment.

NOTE: Most daily and emergency parts orders (in stock) received by 10:30 A.M. (Eastern Standard Time) will be shipped UPS Ground the same day received. UPS Next Day orders must be received by 1:30 PM (Eastern Standard Time.)

SERVICE DEPARTMENT
(734) 996-9116
(800) 456-7100

For Fax and E-mail Orders
PLC_Sales@paladinattachments.com
(734) 996-9014

WARRANTY

In order to provide you with the most UP-TO-DATE Warranty information, Paladin Warranty Statement and Warranty Procedures along with Warranty Registration and Claim Forms have been moved to our website at ***www.paladinattachments.com***.