



# PALADIN®

## OPERATOR'S MANUAL



## TILLER

*for Compact Tractors*

SERIAL NUMBER: \_\_\_\_\_

MODEL NUMBER: \_\_\_\_\_

Manual Number: KDK06-0228

Date: April 2024

Rev. 1



# Table of Contents



**PREFACE ..... 5**

**SAFETY STATEMENTS ..... 6**

**GENERAL SAFETY PRECAUTIONS ..... 6**

**DECALS ..... 13**

    General Information..... 13

**NOMENCLATURE..... 15**

**INSTALLATION ..... 16**

    General Information..... 16

    Installation..... 16

    Power (PTO) Shaft Adjustment ..... 17

    Detaching..... 18

**OPERATION ..... 19**

    Intended use ..... 19

    General Operation ..... 19

    Skid Adjustment ..... 20

    Rear Board Adjustment ..... 20

    Shutting Down ..... 21

    Storage..... 21

    Removal From Storage ..... 21

    Lift Points..... 22

    Tie Down Points..... 22

    Transporting..... 22

**LUBRICATION ..... 23**

    Lubrication ..... 23

    PTO Drivelines ..... 23

**MAINTENANCE..... 24**

    General Information..... 24

    Gearbox ..... 24

    Blades Replacement ..... 24

    Replacing the bearing or bevel gear ..... 26

    Transmission shaft replacement ..... 26

    PTO Cross Replacement..... 26

**TROUBLESHOOTING..... 27**

**SPECIFICATIONS ..... 28**

**BOLT TORQUE SPECIFICATIONS..... 29**

**PARTS..... 30**

**WARRANTY ..... 30**



**THIS PAGE  
IS INTENTIONALLY  
BLANK**



# 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.

### **IMPORTANT**

**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!**

INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY



## **WARNING!**

INDICATES A HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY



## **CAUTION!**

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 AND UNDERSTAND MANUAL**

- ▶ Read and understand this manual and other safety information provided with this equipment and base machine (prime mover) and be sure all controls and instructions are understood before attempting to install, operate or maintain this equipment.
- ▶ Read and follow all safety warnings and instructions.
- ▶ Do not discard safety instructions. Give to the operator.
- ▶ Improper installation, operation or maintenance of this equipment could result in serious injury, death or property damage.

### **READ AND UNDERSTAND ALL SAFETY STATEMENTS**

- ▶ Read all safety statements in this manual and on your equipment safety decals.
- ▶ Keep safety decals in good condition. Replace missing or damaged safety decals.
- ▶ Because the manufacturer cannot foresee all hazardous circumstances, the precautions listed in this manual and on the equipment are not all-inclusive. If a procedure, method, tool or part is not specifically recommended by the manufacturer, determine whether it is safe for you and others, and that the equipment will not be damaged or made unsafe as a result of your decision to implement it.



## PERSONAL PROTECTIVE EQUIPMENT (PPE)

- ▶ Always wear personal protective equipment (PPE) appropriate for the job, such as eye protection, ear protection, gloves, head protection, breathing protection and safety shoes. PPE should be worn at all times when operating, maintaining or observing the tool.
- ▶ Use PPE that conforms to standards ANSI Z87.1 (Eye and Face Protection), ANSI Z89.1 (Head Protection), ANSI Z41.1 (Foot Protection) and ANSI S12.6 (S3.19) (Hearing Protection).
- ▶ Do not wear loose fitting clothing, jewelry, long hair or gloves with cut or frayed fingers. These items can become entangled in the equipment causing hazards such as choking, scalping, lacerations, severed or broken appendages.



M003  
Wear Ear  
Protection



M004  
Wear Eye  
Protection



M016  
Wear a Mask

## KNOW YOUR EQUIPMENT

- ▶ Know your equipment's capabilities, dimensions, and controls before operating.
- ▶ Do not operate a damaged, improperly adjusted, modified or incompletely assembled tool.
- ▶ Make sure all safety guards and devices are installed.
- ▶ 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.
- ▶ Inspect the tool before each use and ensure all safety decals are in place and legible. Contact manufacturer if replacement decals are needed.
- ▶ Know and follow good work practices when assembling, maintaining, repairing, mounting, removing or operating this equipment.

## SAFELY OPERATE EQUIPMENT

- ▶ Establish a training program for all operators to ensure safe operation.
- ▶ Do not operate the tool unless thoroughly trained or under the supervision of a qualified operator or instructor.
- ▶ Know and obey all OSHA regulations, local laws, and other professional guidelines for your operation.
- ▶ Know your work site safety rules. When in doubt on any safety issue, contact your supervisor or safety coordinator.
- ▶ Assess hazards to yourself and others around you before operating the tool. Start in a work area without bystanders. A hazard to bystanders can include, but is not limited to, the risk of serious injury or death caused by the tool or accessories being dropped from an elevated height. Keep children out of the work area.
- ▶ Do not operate the equipment from anywhere other than the correct operator's position.
- ▶ Do not alter or remove any safety feature from the prime mover or tool.
- ▶ Stay alert, watch what you are doing and use common sense when operating the tool. Do not operate the tool if you are tired or under the influence of drugs, alcohol or medication. A moment of inattention while operating the tool may result in serious

# General Safety Precautions



injury.

## **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](http://www.P65Warnings.ca.gov)

## **DUST AND FUMES**

- ▶ **WARNING:** Dust created by power sanding, sawing, grinding, drilling, and other job site activities may contain chemicals known to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:
  - Lead from lead-based paints
  - Crystalline silica from quartz, bricks, cement and other masonry products
  - Arsenic and chromium from chemically-treated lumber
- ▶ To reduce your exposure to these chemicals: work in a well ventilated area and work with approved safety equipment, such as dust masks that are specially designed to filter out microscopic particles. Protect yourself and those around you.
- ▶ Research and understand materials you are working with.
- ▶ Follow correct safety procedures and comply with all applicable national, state or provisional health and safety regulations relating to them, including, if appropriate, arranging for the safe disposal of the materials by a qualified person.
- ▶ Use dust suppression or dust collection methods when using a tool that may cause high levels of dust.
  - Control dust or fumes at the point of emission.
  - Direct tool exhaust to minimize disturbance of dust.
  - Operate and maintain the tool as recommended in this manual to minimize dust.
  - Use respiratory protection in accordance with employers instruction or as required by occupational health and safety regulations.
  - Avoid prolonged contact with dust. Allowing dust to get into your mouth, eyes or on the skin may promote absorption of harmful chemicals.



## **SAFELY MAINTAIN AND REPAIR EQUIPMENT**

- ▶ Work in a clean and dry area.
- ▶ Keep the work area well lit.
- ▶ Work on a level surface.
- ▶ Use properly grounded electrical outlets and tools.
- ▶ Use the correct tools for the job at hand.
- ▶ Ensure tools are working properly and safely by performing preventative maintenance procedures.
- ▶ Wear protective equipment specified by the tool manufacturer.
- ▶ Do not perform any work on the tool unless you are authorized and qualified to do so. Always read the operator service manuals before any repair is made.

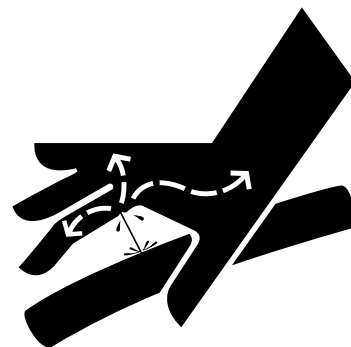




- ▶ After completing maintenance or repair, remove all maintenance tools and unused parts from equipment.
- ▶ Check for correct operation of the tool. If not operating properly, shut down the prime mover, follow proper Lock-Out / Tag-Out procedures and tag “DO NOT OPERATE” until all problems are corrected.

### **USE CARE WITH HYDRAULIC FLUID PRESSURE**

- ▶ **DO NOT** attempt to make repairs to hydraulic lines or components while the system is pressurized. Hydraulic fluid under pressure can penetrate the skin and cause serious injury or death. Follow proper procedures for relieving pressure from hydraulic system before connecting or disconnecting hydraulic lines or components.
- ▶ Wear personal protective equipment (PPE) such as safety glasses, gloves and protective clothing at all times.
- ▶ Hydraulic leaks under pressure may not be easily visible. Keep hands and other body parts away from a suspected leak. Flesh injected with hydraulic fluid may develop gangrene or other permanent disabilities. Use a piece of cardboard or wood when searching for hydraulic leaks.
- ▶ If injured by injected fluid, seek immediate medical attention.
- ▶ Hydraulic fluid can become hot during operation. **DO NOT** come in contact with hot hydraulic fluid as it could cause severe burns.
- ▶ If exposed to hydraulic fluid, wash hands immediately.
- ▶ Inspect and clean couplers before use. Replace damaged couplers immediately.
- ▶ Ensure the couplers are properly connected and are tight.
- ▶ Do not smoke while working on the hydraulic system.



### **DO NOT MISUSE OR MODIFY EQUIPMENT**

- ▶ Use and maintain the tool as stated in this manual. Misuse of the tool can cause serious injury.
- ▶ Do not modify the tool in any way. Modifications may weaken its integrity and may impair its function, safety, life and performance. When making repairs use only factory recommended replacement parts, following authorized instructions. Use of parts that are not factory approved may be substandard in fit and quality and may cause damage and void the warranty.
- ▶ Do not 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.

### **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.

# Equipment Safety

## Precautions



### **WARNING!**

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

Some dust created by power sanding, sawing, grinding, drilling, and other construction activities contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:

- ▶ Lead from lead-based paints,
- ▶ crystalline silica from bricks and cement and other masonry products, and
- ▶ arsenic and chromium from chemically-treated lumber.

Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: work in a well ventilated area, and work with approved safety equipment, such as those dust masks that are specially designed to filter out microscopic particles. Protect yourself and those around you. Research and understand the materials you are drilling. Follow correct safety procedures and comply with all applicable national, state or provisional health and safety regulations relating to them, including, if appropriate arranging for the safe disposal of the materials by a qualified person.



- ▶ When dust or fumes are created, control them at the point of emission. Direct tool exhaust to minimize disturbance of dust.
- ▶ Operate and maintain the tool as recommended in this manual to minimize dust.
- ▶ Use respiratory protection in accordance with employers instruction or as required by occupational health and safety regulations.
- ▶ Avoid prolonged contact with dust. Allowing dust to get into your mouth, eyes or lay on the skin may promote absorption of harmful chemicals.



### **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!**

### **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.

### **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.

### **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.
- ▶ Do not turn prime mover so tight as to cause hitched implement to ride up on the prime mover's rear wheel.
- ▶ 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 before operation. Be sure quick disconnect locks are operating and locked. Check driveline shields turn freely on driveline.
- ▶ 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 rotor or PTO shaft.
- ▶ Do not stand between prime mover and attachment during installation.
- ▶ Do not exceed specified RPM of your attachment.
- ▶ Clear work area of all objects that could be thrown or picked up by the attachment.
- ▶ 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 attachment driveline to a non-matching tractor PTO.

# Equipment Safety Precautions



## **WARNING!**

### **OPERATING THE ATTACHMENT**

- ▶ 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 tiller.
- ▶ Before making changes in direction, turns or going in reverse, slightly lift the tiller from the ground after disengaging the power take-off, to avoid damage to the machine.
- ▶ Prolonged use of the tiller can cause gearbox to overheat. Do not touch the gearbox during use and immediately after, it could be extremely hot and cause severe burns.

### **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.
- ▶ The implement may be wider than the tractor. Pay attention during transporting to persons, animals or obstacles exposed.
- ▶ 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 attachment.
- ▶ 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 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.

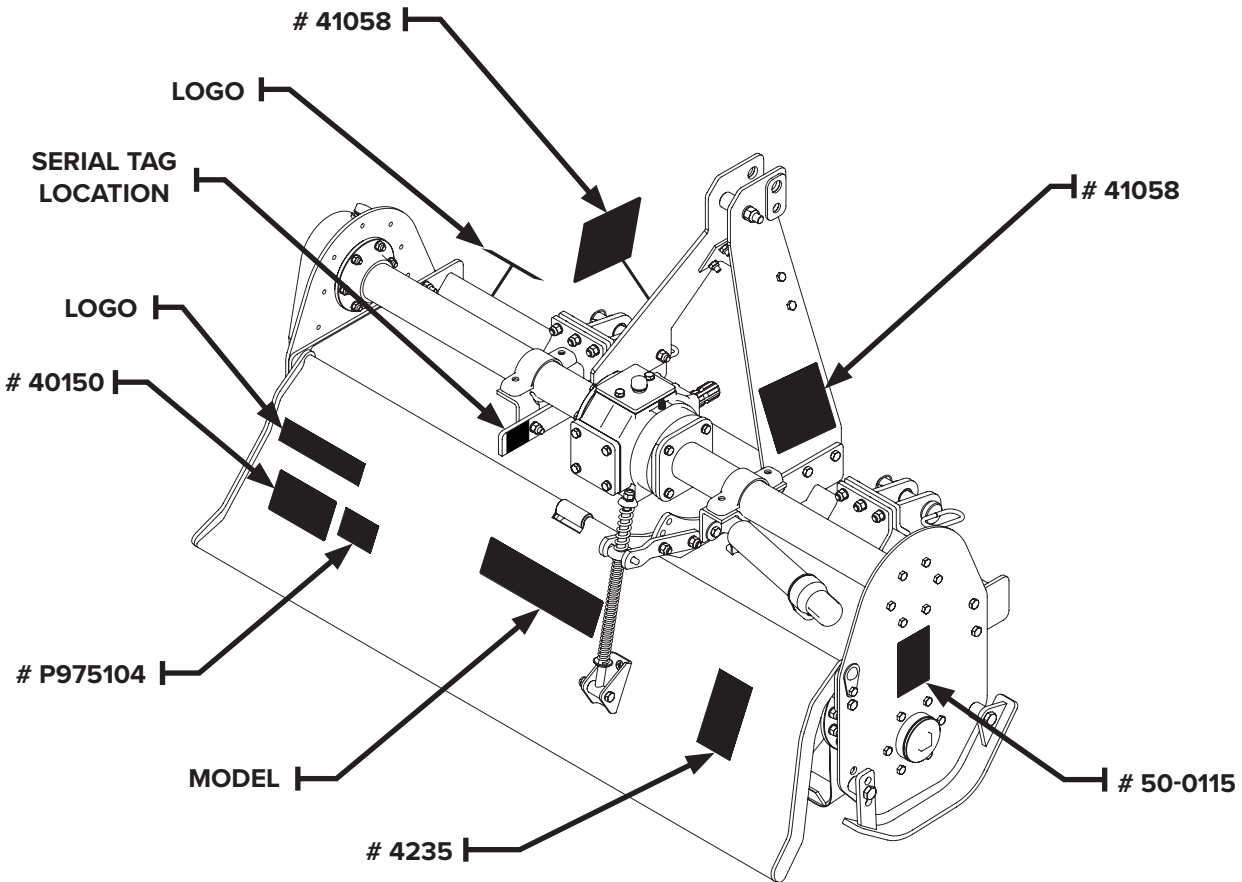


# Decals

## Decal Placement

### GENERAL INFORMATION

The diagrams on this page show the location of the decals used on your attachment. The decals are identified by their part numbers, with reductions of the actual decals located on the following page. 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.

# Decals

## Decal Placement



# 40150 - READ MANUAL



# 41058 - AVOID SERIOUS INJURY



# P975104 - DO NOT EXCEED 540 RPM.



# 50-0115 - ROTATING DRIVELINE



# 4235 - MOVING PADDLES

### NOTE

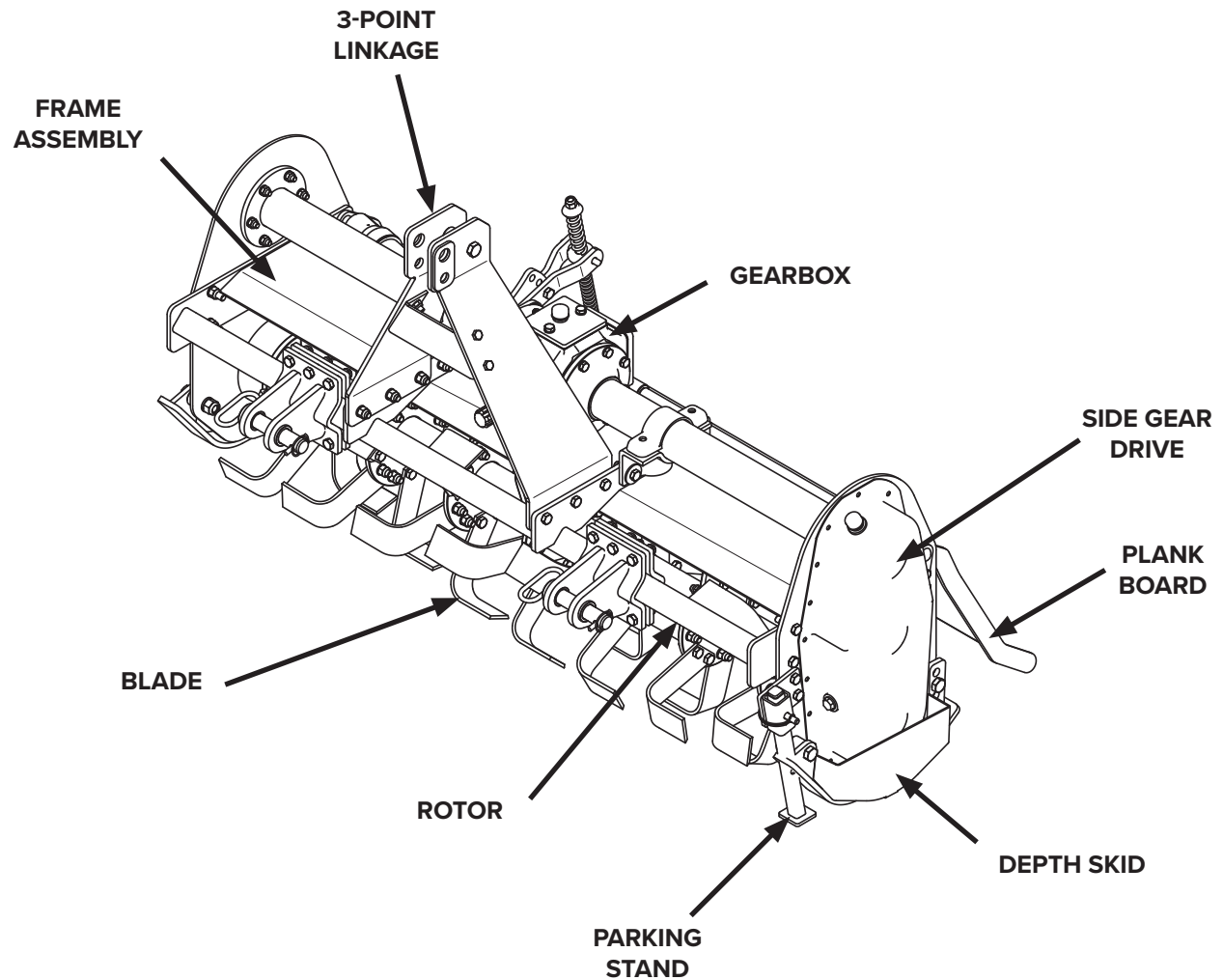
Contact your local dealer for model number and logo decals



# 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



## GENERAL INFORMATION

The following instructions will help you set up and install the tiller onto your tractor. Read all safety warnings, decals and operating instructions before operating the tiller. If there is any portion of this manual that you do not understand, contact your dealer.

The tiller should be shipped completely assembled other than the PTO driveline. If your unit was not, refer to the parts manual at [www.paladinattachments.com](http://www.paladinattachments.com) for part locations and required hardware. Torque all hardware to specifications. (See Bolt Torque Specifications)



### **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).**

## 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 tiller. 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 allow anyone between the tractor and the tiller while tractor is running.**

3. Turn off the prime mover and ensure all movement has stopped. 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 frame using the pin provided.
6. Attach the PTO from the tiller to the prime mover. (Slide the front section of the PTO into the back section that is already attached to the tiller.) 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.

## 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”.

## 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.*

*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.*



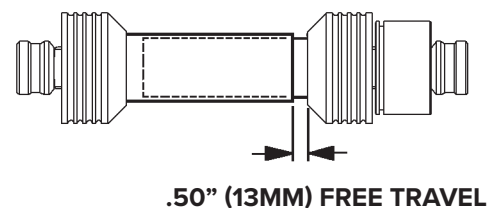
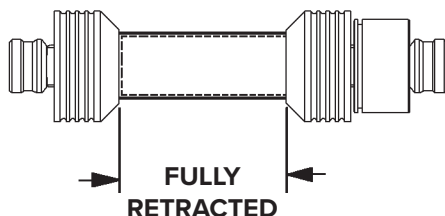
## WARNING!

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

7. Attach the driveline chains to the tiller and tractor to prevent shields from turning. **NOTE: If chains are damaged or missing; replace before operating.**
8. 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  $\frac{1}{3}$  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.



# Installation



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.

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. Lower jack stand to storage position.
2. 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.
3. Disconnect driveline from tractor PTO shaft and support with storage chain.
4. Disconnect 3-point upper and lower links from tiller.



# Operation



## INTENDED USE

This tiller is designed solely for horticultural, agricultural, or commercial applications; to till soil. 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.

### NOTE:

**Never attempt to adjust the rotary tiller while the tractor is running. Do not allow the tractor engine or rotary tiller to bog down or stall. This causes undue wear and tear on the tiller and tractor. If this continues to happen reduce ground speed and raise tilling depth of rotary tiller. Never attempt to remove objects from the rotor bar until the tractor has been shut down and movement has completely stopped.**

## GENERAL OPERATION

The main purpose of the tiller is to cultivate soil. The tines are sharpened on one side only and therefore the tiller can only be operated when traveling in a forward direction.

Before operating your attachment, ensure that driveline is properly attached and locked onto the PTO shaft by pushing and pulling the yoke several times.



### DANGER!

**All safety guards, shields and devices must be installed and inspected daily for missing or broken components. Replace broken, missing or worn items at once to reduce personal injury or death from thrown objects, entanglement, or tine contact.**



### WARNING!

**Exceeding the rated PTO speed for your attachment (540 RPM) can result in serious injury or death along with driveline and attachment damage.**

When deciding how to set up the tiller for your desired outcome (how much to “break up” the soil) you must take into consideration the soil type (mixed, sandy, clay dry, etc.) and depth. Then adjust the skid shoes and rear leveling plate to obtain your desired results.

After preparing the work area you are ready to begin. Although the performance of the tiller can vary significantly depending upon the way it is used, we recommend a maximum ground speed of 5 MPH (8km/h) and adhering to the following operating procedure for maximum productivity.

1. Following the prime mover manual’s operating and safety procedures, start the prime mover and position the tiller at the starting location with the skid shoes parallel to the ground.
2. Engage PTO to begin tiller rotation. Gradually lower the tiller into the soil while traveling slowly in a forward direction.

# Operation



## CAUTION!

Be prepared for sudden prime mover movement when lowering the tiller into the ground. Rotating tines are capable of pushing the prime mover.

## NOTE:

It is recommended after the first 50 feet to stop and check tiller depth and your finished results. Make any necessary adjustments.

3. Do not turn or reverse tractor with tiller in the ground or with PTO engaged. To prevent damage to the tiller, disengage PTO before raising the tiller for turning or backing up.

## NOTICE:

*To prevent damage to tiller components: NEVER raise the unit with tiller running. Disengage PTO before lifting.*

## NOTE:

Tilling should not be done in wet conditions, as soil will stick to the blades.

## SKID ADJUSTMENT

The working depth of the tiller is determined by the position of the depth skids. It may be increased by raising the skids, and decreased by lowered them. It's important that both skids are adjusted at the same height.

To adjust the working depth, perform the following steps:

1. Raise attachment, lower stands, disengage PTO, apply the brakes, turn off the prime mover's engine and remove the key.
2. Loosen the bolt in the front of the skid.
3. Loosen and remove the bolt on the rear of the skid.
4. Adjust the height of the skid through the holes, as desired.
5. Tighten hardware.


When finished, verify that both skids are at same level, and check if the front of the tiller is leveled to the back, when lowered to the ground. Adjust with the 3-point top link if necessary.

## REAR BOARD ADJUSTMENT

The position of plank board is adjustable by varying the hole position on shocker mounting plate. Lowering the hole will increase pressure of tension shocker assembly on plank board which result soil compaction while upper hole position will reduce the pressure.

To adjust the plank board position, perform the following steps:



- 
1. Loosen and remove the hardware of the shocker holding clamp.
  2. Adjust the upper and lower clamps against shocker mounting plate as required.
  3. Tighten Hardware.

## **SHUTTING DOWN**

1. Disengage PTO and allow all movement to stop.
2. With attachment raised, lower stands.
3. Lower the attachment to the ground.
4. After all movement has stopped, follow your prime mover operator's manual for safely shutting down and exiting the prime mover.

## **STORAGE**

- ▶ Clean the unit thoroughly, removing all snow, 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.
- ▶ Lubricate grease fittings.
- ▶ Seal hydraulic system from contaminants and secure all hydraulic hoses off the ground to help prevent damage.
- ▶ Disconnect control box & store in a safe location.
- ▶ 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.

### **Additional Precautions for Long Term Storage:**

- ▶ Touch up all unpainted surfaces with paint to prevent rust.

## **REMOVAL FROM STORAGE**

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

# Operation



## 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.

- ▶ 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.



### 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. See Diagram

- ▶ 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 handbook when transporting your attachment.

To set the tiller for transportation, perform the following steps:

1. Idle tractor engine, disengage tractor PTO, and wait for all movement to stop.
2. Lift the tiller to the transport position, ensure the PTO shaft does not contact tractor or tiller. A minimum gap of 2cm should be between the tubes, tractor, and tiller.
3. Lock the tractor lifting hydraulics, disengage PTO, apply the brakes, turn off the prime mover's engine and remove the key.
4. Adjust the parking stand to the highest position, to prevent damage during transport. When driving on public roads, follow all local government regulations.



# 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 daily or every 8 hours of operation, whichever comes first, with SAE Multi-Purpose Lubricant or an equivalent SAE Multi-Purpose type grease.

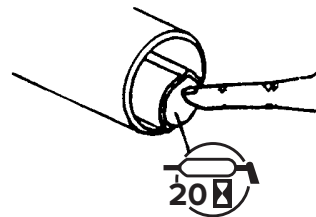


Lubricate twice a week or every 20 hours of operation, whichever comes first, with SAE Multi-Purpose Lubricant or an equivalent SAE Multi-Purpose type grease.

## 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.

GREASE INSIDE OF  
OUTER TELESCOPING TUBE  
(EVERY 20 HOURS)

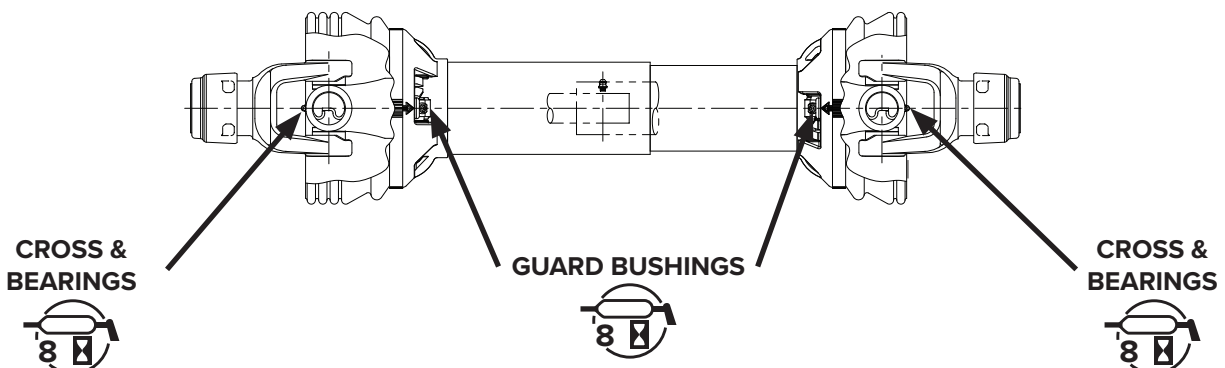


### NOTE:

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.

### IMPORTANT

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

# 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	EVERY 8 HOURS (DAILY)	EVERY 40 HOURS (WEEKLY)	EVERY 100 HOURS (MONTHLY)
Check prime mover hydraulic system to ensure an adequate level and cleanliness of hydraulic oil.	✓		
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.	✓		
Inspect attachment for any worn parts or cracked welds. Repair as required.	✓		
Check for worn blades, replace as necessary.	✓		
Lubricate grease fittings & PTO U-Joints.	✓		
Check oil in PTO gearbox & transmission casing, refill as necessary.		✓	
Change oil in gearbox & transmission casing.			✓

## GEARBOX

The gearbox has minimal maintenance, but should be checked weekly to be sure that the oil level is maintained at half full. SAE 140 EP Grade Oil or equivalent is recommended for use in the gearbox. Oil should be changed after 100 hours or 30 days of operating. 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.

## BLADES REPLACEMENT

Check the condition of the blades each day for wear. If blades become bent or damaged replace immediately.

### Identify Blades:

Mount the new blade in exactly the same position as the old one. If several blades must be replaced, remove and assemble one blade at a time in order to prevent positioning errors. The tillers are equipped with 6 blades per flange.

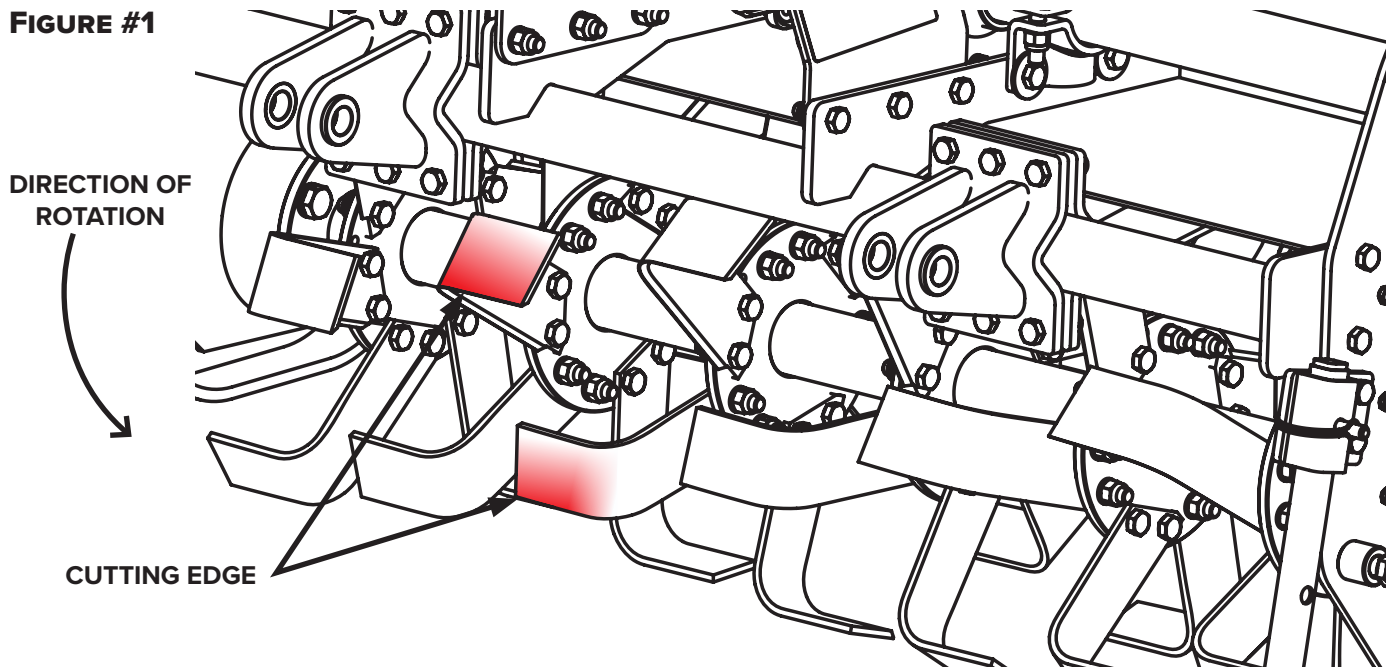




## Installing New Blades:

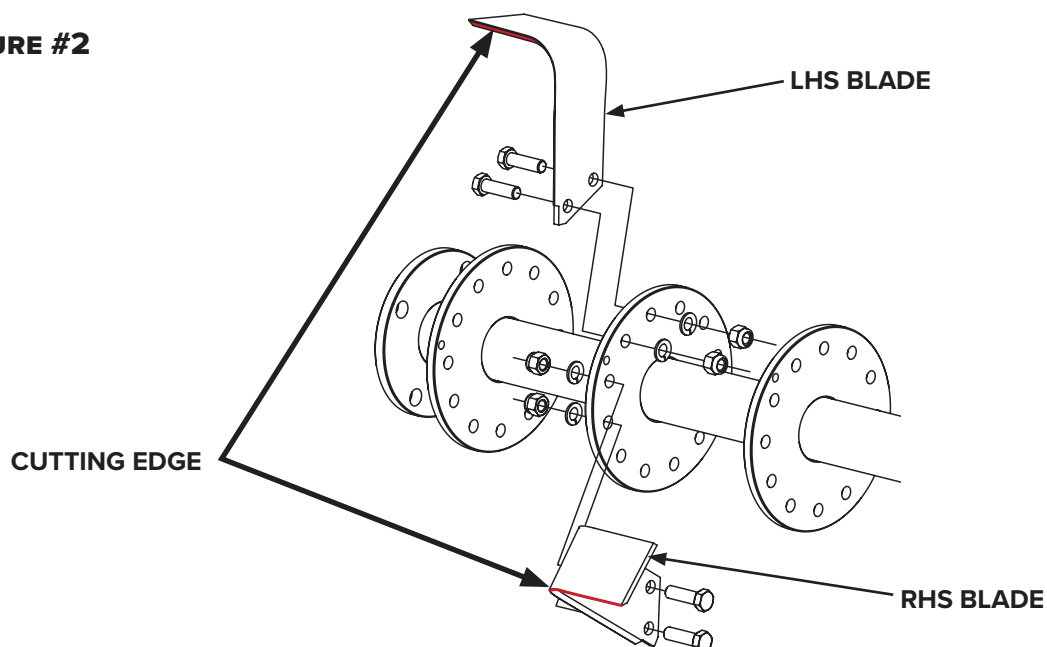
1. Raise tiller with a safe lifting device.
2. Put safety stands or blocks under tiller.
3. Stand facing rear of tiller and note placement and direction of blades. See Figure #1

**FIGURE #1**



4. Remove hardware and blade.
5. Install new blade. Ensure cutting edge direction is the same. See Figure #2

**FIGURE #2**



# Maintenance



## REPLACING THE BEARING OR BEVEL GEAR

1. Open the gearbox cover to check the wear of the teeth.
2. If the gear teeth are broken the set needs to be replaced.
3. Pull out the gear box and open the big flange & remove the back plate.
4. Using hammer or press machine, pull out the pinion shaft.
5. Replace the bearing, gear and seals.
6. Using hammer or press machine, reinsert the pinion shaft.
7. Verify the gear rotates freely.
8. Reassemble gearbox & verify breather valve is clean.
9. Refill gearbox oil. The gearbox should be half-full of SAE 140 EP Grade Oil or equivalent.

## TRANSMISSION SHAFT REPLACEMENT

1. Unbolt & remove the depth skid on the gear drive side, followed by the gear drive cover.
2. Unpin & remove the castle nut from the transmission shaft and take the gear off the shaft.
3. Unbolt the clamp and plates securing the gearbox & transmission shaft to the tiller.
4. Follow steps 1-4 for replacing the bearing or bevel gear.
5. Using hammer or press machine, pull out the pinion shaft.
6. Replace the transmission shaft using a hammer or press machine.
7. Verify the gear rotates freely.
8. Reassemble gearbox & drive box.
9. Refill oil.

## PTO CROSS REPLACEMENT

1. Take the P.T.O shaft and check the crosses on both sides by rotating shaft by hand.
2. Remove the lock of the cross which is broken.
3. Gently tap the cross with a hammer to remove.
4. Insert the new one and lock it in place.
5. Verify yoke rotates freely.
6. Grease the yoke & PTO shaft.

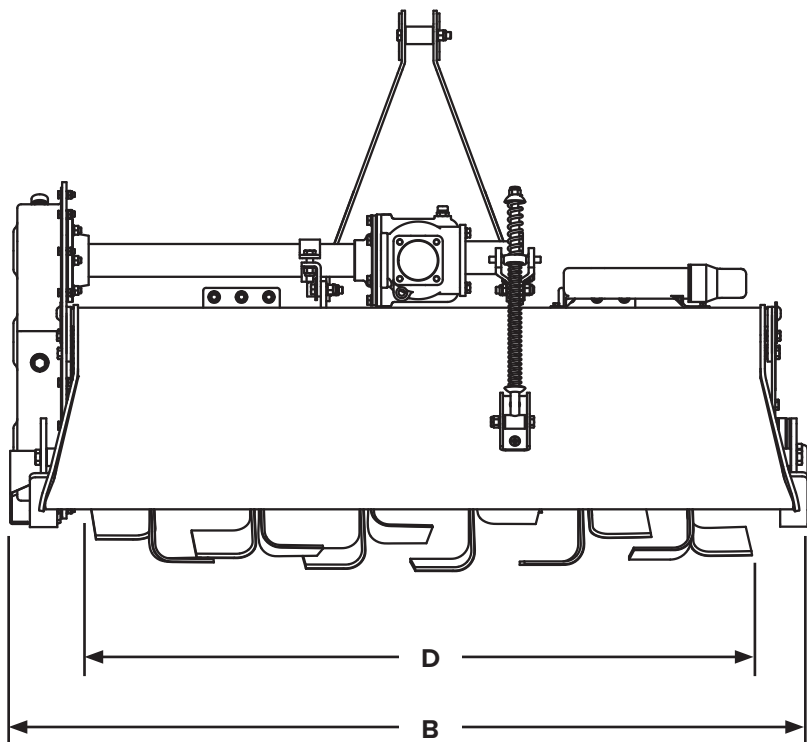


# Troubleshooting

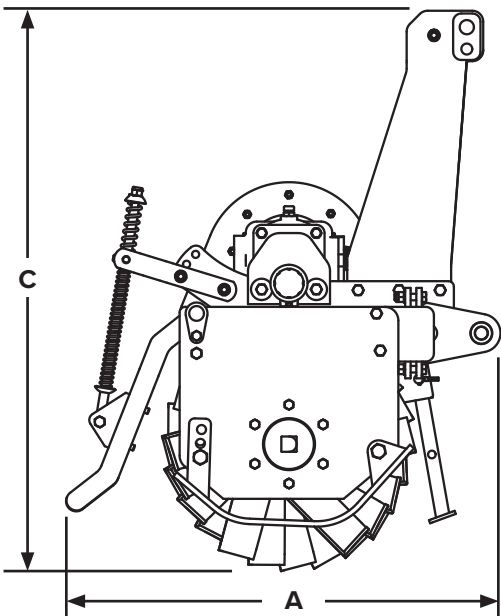


PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
TILLER WILL NOT TURN	Tractor PTO not engaged.	Check control lever.
	Obstruction between roller and barrier.	Check and clear obstruction.
	Chain broken.	Replace chain.
	Gearbox damaged.	Check that output shaft rotates.
	Broken safety bolt.	Replace broken safety bolt.
PTO SHAFT MAKES NOISE AND/OR VIBRATES	PTO cross is broken.	Replace broken cross. See PTO Cross Replacement.
YOKE DOES NOT FIT ON PINION SHAFT	Yoke pin is broken.	Replace yoke pin.
TILLER NOT REACHING PROPER DEPTH	Skid shoes not adjusted properly.	Adjust skid shoes. See Skid Shoe Adjustment.
UNEVEN TILLING	Linkage is not adjusted properly.	Tighten linkage. There should not be more than 1.5" (38mm) of play.
		Tiller should be level when attaching.
		Adjust skid shoes. See Skid Shoe Adjustment.
GEARBOX MAKES NOISE	Play in bearing or broken teeth.	Replace bearing or bevel gear. See Replacing the bearing or bevel gear.
GEAR SHAFTS ROTATE BUT NOT ROTOR	Transmission shaft is broken.	Replace shaft. See Transmission Shaft Replacement

# Specifications



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



TILLER			
DESCRIPTION	48"	60"	72"
A. Overall Length	31.48"	31.60"	31.48"
B. Overall Width	57.40"	65.30"	81.02"
C. Overall Height	40.34"	40.90"	46.21"
D. Cutting Width	47.59"	55.50"	71.17"
Weight (lbs)	493.79#	617.66#	708.03#
Maximum RPM ..... 540 RPM			



# Bolt Torque Specifications

## GENERAL TORQUE SPECIFICATION TABLES

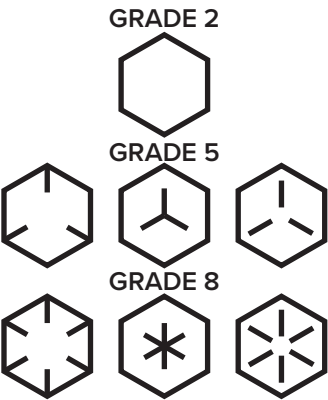
Use the following charts when determining bolt torque specifications when special torques are not given. Always use grade 5 or better when replacing bolts.

### SAE BOLT TORQUE SPECIFICATIONS

#### IMPORTANT

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				SAE GRADE 8 TORQUE			
		POUNDS FEET		NEWTON-METERS		POUNDS FEET		NEWTON-METERS	
Inches	Millimeters	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.

Size of Bolt	Grade No.	Pitch (mm)	Pounds Feet	Newton-Meters	Pitch (mm)	Pounds Feet	Newton-Meters
M6	5.6	1.0	3.6-5.8	4.9-7.9	-	-	-
	8.8		5.8-4	7.9-12.7		-	-
	10.9		7.2-10	9.8-13.6		-	-
M8	5.6	1.25	7.2-14	9.8-19	1.0	12-17	16.3-23
	8.8		17-22	23-29.8		19-27	25.7-36.6
	10.9		20-26	27.1-35.2		22-31	29.8-42
M10	5.6	1.5	20-25	27.1-33.9	1.25	20-29	27.1-39.3
	8.8		34-40	46.1-54.2		35-47	47.4-63.7
	10.9		38-46	51.5-62.3		40-52	54.2-70.5
M12	5.6	1.75	28-34	37.9-46.1	1.25	31-41	42-55.6
	8.8		51-59	69.1-79.9		56-68	75.9-92.1
	10.9		57-66	77.2-89.4		62-75	84-101.6
M14	5.6	2.0	49-56	66.4-75.9	1.5	52-64	70.5-86.7
	8.8		81-93	109.8-126		90-106	122-143.6
	10.9		96-109	130.1-147.7		107-124	145-168
M16	5.6	2.0	67-77	90.8-104.3	1.5	69-83	93.5-112.5
	8.8		116-130	157.2-176.2		120-138	162.6-187
	10.9		129-145	174.8-196.5		140-158	189.7-214.1
M18	5.6	2.0	88-100	119.2-136	1.5	100-117	136-158.5
	8.8		150-168	203.3-227.6		177-199	239.8-269.6
	10.9		175-194	237.1-262.9		202-231	273.7-313
M20	5.6	2.5	108-130	146.3-176.2	1.5	132-150	178.9-203.3
	8.8		186-205	252-277.8		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](http://www.paladinattachments.com). 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.

## IMPORTANT

**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](mailto: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](http://www.paladinattachments.com).





**THIS PAGE  
IS INTENTIONALLY  
BLANK**



**PALADIN®**