PALADIN
BRADCO

OPERATOR'S MANUAL

BRUSH CUTTER
MX Series

FOR MINI-EXCAVATORS

Serial Number: _____

Model Number: _____

Manual Number: OM912
Part Number: 75812
Release Date: June 2022
Rev. 2

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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.

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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

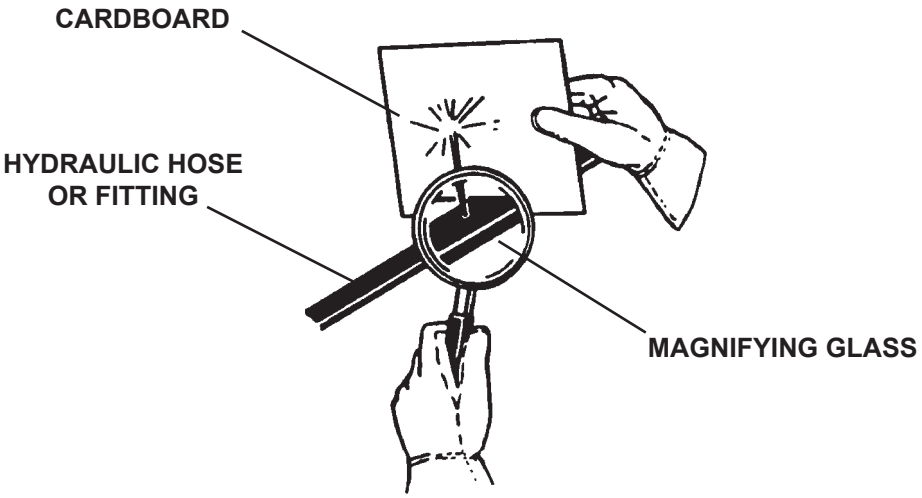
Do not work under raised booms without supporting them. Do not use support material made of concrete blocks, logs, buckets, barrels, or any other material that could suddenly collapse or shift positions. Make sure support material is solid, not decayed, warped, twisted, or tapered. Lower booms to ground 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 BRUSH CUTTER

- Block off work area from bystanders, livestock, etc. Flying debris can cause severe injury or death. The brush cutter is capable of producing large amounts of flying debris in all directions.
- A shatterproof (demolition) cab enclosure is required on the prime mover and a forestry guard package is recommended.
- Operate only from the operator's station.
- Be aware when cutting standing trees, there is a danger of the treetop falling back onto the operator's cab.
- Be sure all guards, shields, covers and deflectors are properly installed before operating unit.
- Do not contact tracks or boom during cutter operation. Do not operate the cutter with a rotator option installed on the excavator.
- Use extreme caution when operating "over the side". Machine stability is greatly reduced during "over the side" operation of an attachment.
- Do not lift loads in excess of the capacity of the prime mover. Lifting capacity decreases as the load is moved further away from the unit.
- When operating on slopes, drive up and down, not across. Avoid steep hillside operation, which could cause the prime mover to overturn. Avoid changing direction of travel on a slope. This could cause tipping or side slipping of the machine.

EQUIPMENT SAFETY PRECAUTIONS

OPERATING THE BRUSH CUTTER (Continued)

- Reduce speed when driving over rough terrain, on a slope, or turning, to avoid overturning the vehicle.
- The brush cutter should not be used as a parking brake to immobilize your prime mover or used in any way to assist in moving your prime mover. Follow the instructions in your prime mover operator's manual before leaving the operator's station.
- Always keep the blade carrier and blade bolts tight.
- 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, apply the brakes, turn off the prime mover's engine and remove the key. Be sure all rotation has stopped before approaching the brush cutter.

TRANSPORTING THE BRUSH CUTTER

- 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.
- Watch for proper clearance of the boom and cutter during transporting. Uneven ground can cause the boom to move in all directions.
- 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.

MAINTAINING THE BRUSH CUTTER

- Before performing maintenance, disengage auxiliary hydraulics, lower the attachment to the ground, apply the brakes, turn off the engine and remove the key. Be sure all rotation has stopped before approaching the brush cutter.
- Never perform any work on the attachment unless you are authorized and qualified to do so. Always read the operator's manual 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 your nearest dealer.
- Never make hydraulic repairs while the system is under pressure. Serious personal injury or death could result.
- Never work under a raised attachment.

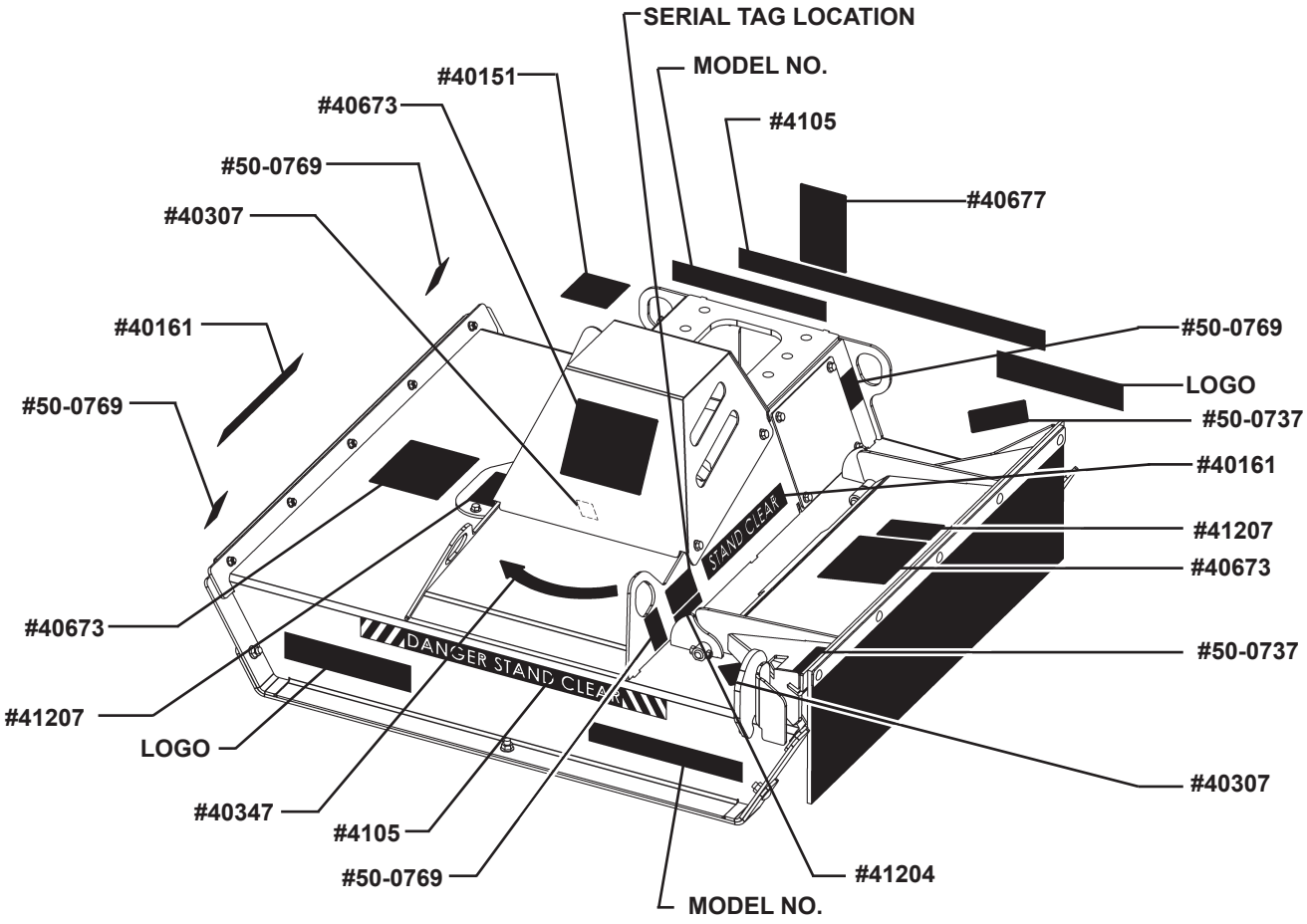
DECALS

DECAL PLACEMENT

GENERAL INFORMATION

The diagram on this page shows 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.

40” BRUSH CUTTER



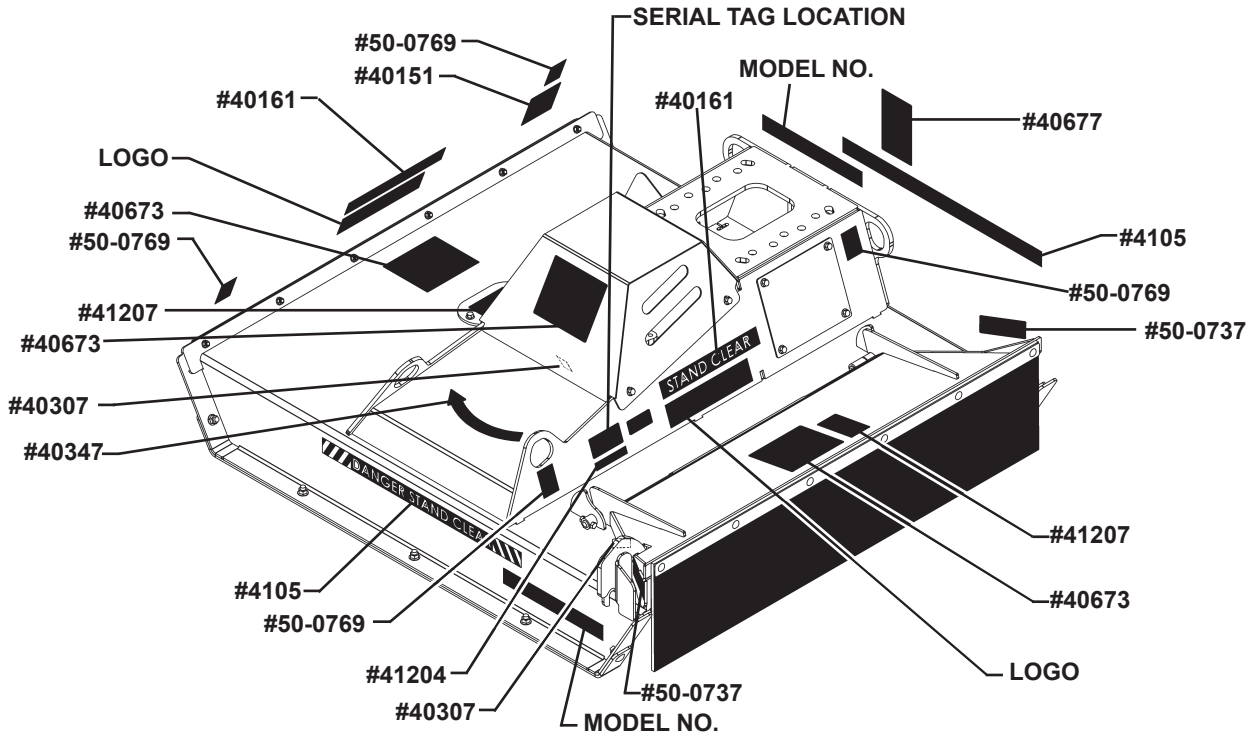
IMPORTANT: Keep all safety signs clean and legible. Replace all missing, illegible, or damaged safety signs. When replacing parts with safety signs attached, the safety signs must also be replaced.

REPLACING SAFETY SIGNS: 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 sign, exposing the adhesive surface. Apply the safety sign to the position shown in the diagram above and smooth out any bubbles.

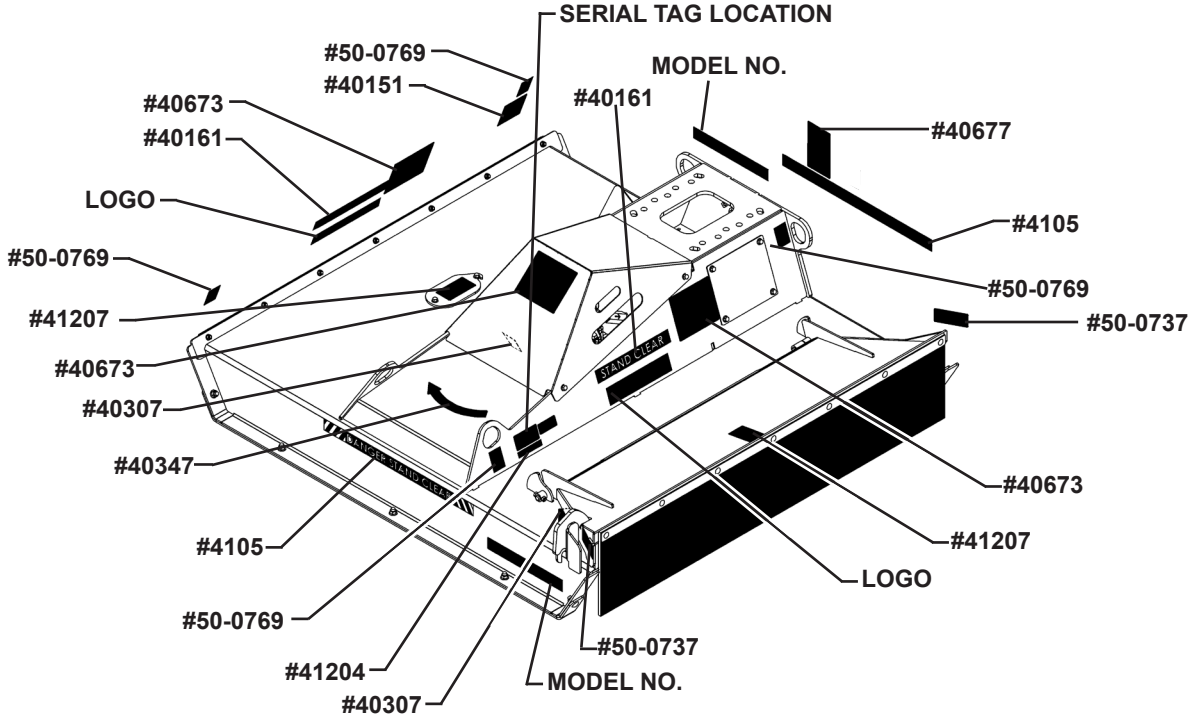
DECALS

DECAL PLACEMENT

50” BRUSH CUTTER



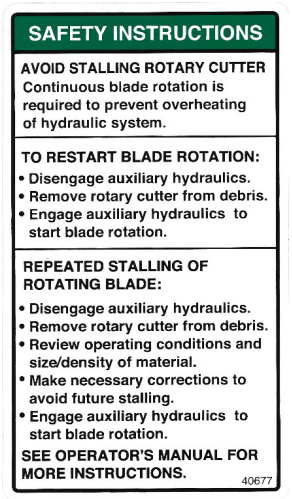
60” BRUSH CUTTER



DECALS

DANGER! ROTATING BLADES
PART #40673

WARNING! MOVING PARTS
PART #41207



SAFETY INSTRUCTIONS
PART #40677

WARNING! HIGH PRESSURE FLUID
PART #40151

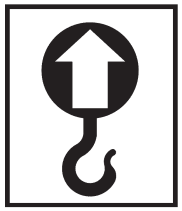
WARNING! PINCH POINT
PART #50-0737

STAND CLEAR
PART #40161

PALADIN PATENTS
PART #41204

DANGER STAND CLEAR
PART #4105

DIRECTION OF ROTATION
PART #40347



LIFT POINT
PART #50-0769

DANGER! GUARD MISSING
PART #40307

NOTE: CONTACT YOUR LOCAL DEALER TO PURCHASE MODEL NUMBER AND LOGO DECALS.

INSTALLATION

GENERAL INFORMATION

The MX Series Brush Cutters are designed to be easy to use and maintain. They are operated by the prime mover's auxiliary hydraulics. Due to the various prime movers that they can be mounted on they are shipped without hydraulic hoses. These can be purchased from your local dealer. The hoses must be long enough not to bind or pinch during operation and rated for the maximum hydraulic pressure of your prime mover's hydraulic system. Although a case drain line is not required, it is recommended to connect to port "CD" on the larger motors and case drain plug on smaller motors, and then to the case drain line on the prime mover, if available, for maximum motor life.

DANGER! **This attachment is capable of producing large amounts of flying debris in all directions. To avoid serious personal injury or death the prime mover is required to have a shatterproof front shield. It is recommended to also install a forestry package to provide a safe operating environment.**

Remember to read all safety warnings, decals and operating instructions before operating the attachment. If there is any portion of this manual that you do not understand, contact your dealer.

NOTE: Before attaching the brush cutter to your prime mover, make sure a shatterproof front shield or forestry package has been installed onto your prime mover.

1. Remove any attachment from the front of the prime mover.
2. Install the prime mover mount to the brush cutter using the hardware provided for your application. Torque to specifications. See Bolt Torque Specifications
3. Following all standard safety practices and the instructions for installing an attachment in your prime mover operator's manual, install the attachment onto your prime mover.

WARNING! **To avoid serious personal injury, make sure the attachment is securely latched to the attachment mechanism of your unit. Failure to do so could result in separation of the attachment from the prime mover.**

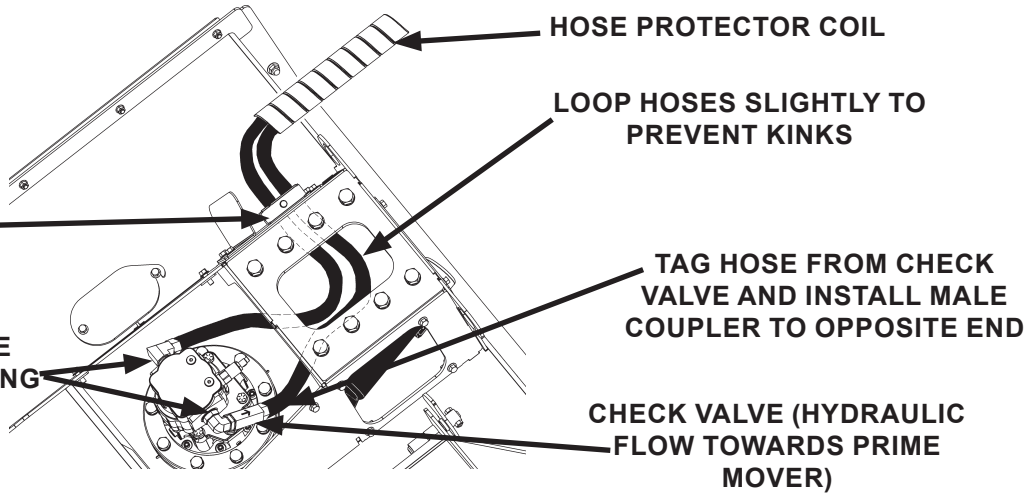
4. Lower the unit to the ground and relieve pressure to the auxiliary hydraulic lines.
5. Following the safety shut down procedure for your prime mover, shut down and exit the prime mover.

NOTE: The power and return hoses and couplers must be purchased from your dealer. The hoses must be long enough not to bind or pinch during operation and rated for the maximum hydraulic pressure of your prime mover's hydraulic system with a 12MBo end to connect to the hydraulic motor on the brush cutter. Although a case drain line is not required, it is recommended to connect to port "CD" on the larger motors and case drain plug on the smaller motors, and then to the case drain line on the prime mover, if available, for maximum motor life.

6. Remove the motor cover and left shield from the brush cutter to gain access to the motor compartment. Remove hose protector coil from compartment. See Figure #1
7. Remove the plug from the end of the elbow fitting on the right side and from the check valve on the left side of the motor. See Figure #1
8. Install the power and return hoses to the hydraulic motor fittings. See Figure #1

INSTALLATION

FIGURE #1



NOTE: It is important that you do not loosen the 90° elbows when tightening the hoses.

9. Tag the hose connected to the check valve as the return line. The male coupler should be connected to this hose. See Figure #1
10. Remove the .31” capscrew from the hose clamp on the right shield. Route the hoses through the hose clamp, leaving a little extra within the compartment, and reinstall the clamp plate, capscrew and washer.
11. Install the hose protector coil onto the power and return hoses. It helps to start the coil around the hoses in the middle and work your way up and down the hoses.

NOTE: Connect the case drain line and coupler to the case drain on your motor and prime mover (if so equipped). The case drain line must be connected first, then the power and return hoses. When disconnecting the hoses it is recommended to disconnect the case drain line last.

12. 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. Route the hoses in such a fashion to prevent pinching or chafing. Be sure the tagged hose goes to the return circuit. Check for leaks.
13. Following the standard start up procedure for your prime mover, start the prime mover. Check for leaks, proper hydraulic connection, hose routing and hose length.
14. Reinstall the motor cover and left shield using the existing hardware removed in Step #6.
15. Attachment installation is complete.

DETACHING

1. Before exiting the prime mover, lower the attachment to the ground, apply the brakes, turn off the prime mover’s engine, and remove the key. Make sure all rotation has stopped before approaching the brush cutter.
2. Follow prime mover operator’s manual to relieve pressure in the hydraulic lines.
3. Disconnect the power and return hoses from the auxiliary hydraulics. Disconnect the case drain line. **NOTE: It is recommended to disconnect the case drain line last.**
4. Follow your prime mover operator’s manual for detaching (removing) an attachment.
5. 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.

OPERATION

INTENDED USE: The MX Series Brush Cutters are designed for over-fence brush management, embankment and ditch management and rail right-of-way management along with cutting tall grass, brush and small trees (per specification). Use in any other way is considered contrary to its intended use. Compliance with and strict adherence to operation, service and repair conditions, as specified by the manufacturer, are essential elements of intended use.

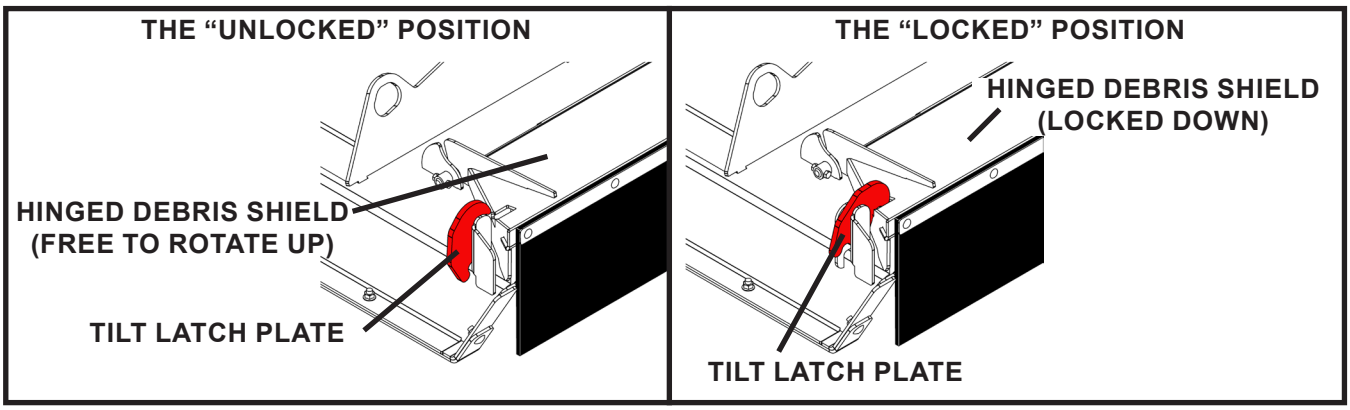
GENERAL INFORMATION

Reviewing the following operating tips before operation will assist in early identifying problems/issues and knowing what to do in order to get the best production results from the MX Series brush cutter.

TILT LATCH PLATE OPERATION

The cutter tilt latch plate is designed to automatically lock the hinged debris shield in the down position whenever the cutter is operated at a 45° angle or more to protect the operator from flying debris. The tilt latch plate must be “unlocked” when cutting standing trees.

FIGURE #1

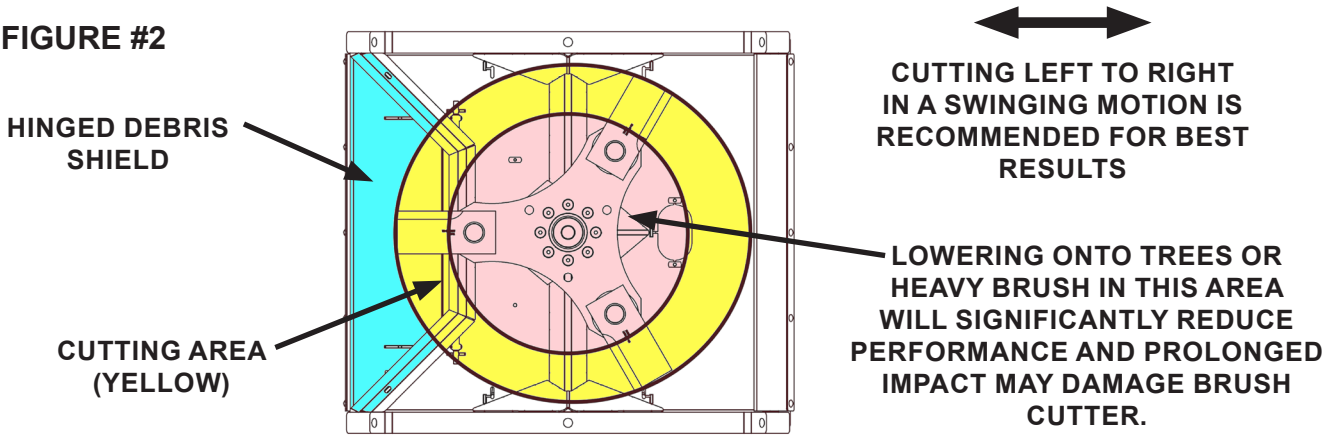


IMPORTANT: The MX Series Brush Cutters must be operated in “Two-Way Flow Mode”. To increase motor life do NOT throttle down while auxiliary hydraulics are activated. Internal valving will brake the motor quickly.

OPERATING TIPS

- Know your cutting zone. See Figure #2

FIGURE #2



OPERATION

- The MX Series cutters are designed for continuous operation horizontally or up to a 45° angle. Higher angle operation should only be momentary to prevent damage to cutter bearings.
- If the blade carrier does not rotate, the hydraulics may not be set up correctly for your prime mover's direction of flow. Relieve system hydraulic pressure and reverse the hoses at the coupler end.
- Continuous rotation of the blade is required to prevent overheating of the hydraulic system. Blade rotation is maintained by monitoring the system pressure and oil temperature on your prime mover and operating the attachment at pressures below relief valve setting.

NOTICE: Continual monitoring of hydraulic oil and water temperature of the prime mover is required during operation. If temperature rises too high, remove the cutter from brush/debris and return the prime mover to an idle until it has cooled down sufficiently to continue operation.

NOTE: Unlike most motors, the MX Series motors should have auxiliary hydraulics shut off while engine is still throttled up. Internal valving with brake the motor quickly.

DANGER! **ROTATING BLADE HAZARD! STAY BACK!**

OBJECTS CAN BE THROWN!
DO NOT operate near bystanders.
DO NOT place hands or feet under deck while in operation or with engine running.
DO NOT operate without a shatterproof cab enclosure installed on your prime mover.

WARNING! **Before exiting the prime mover, lower the attachment to the ground, apply the brakes, turn off the prime mover's engine and remove the key. Be sure all rotation has stopped before approaching the brush cutter.**

Never drive your prime mover with the front of the brush cutter tilted to the point your view is obstructed. Always make sure you can see what you are cutting.

Check the work area. Never operate the brush cutter in populated areas where thrown objects could injure persons or damage property.

Never raise the unit and expose yourself or anyone else to the rotating blades. If you can see the blades then the unit is raised too high or at an improper angle.

AVOID STALLING BRUSH CUTTER: Continuous rotation during operation is required to prevent overheating of the hydraulic system. Refer to "**OPERATING TIPS**". If the brush cutter stalls see "**TO RESTART BLADE ROTATION**".

OPERATION

TO RESTART BLADE ROTATION: Disengage auxiliary hydraulics and then throttle down the engine. Remove brush cutter from debris. Engage auxiliary hydraulics to restart blade rotation. (Be sure the brush cutter is operating smoothly, increase throttle to full speed, then start operation while monitoring system pressure and temperature.)

REPEATED STALLING OF ROTATING BLADES: Disengage auxiliary hydraulics and then throttle down the engine. Remove brush cutter from debris. Review operating conditions and the size/density of material being cut. Ensure cutter is clear of any debris or lodged materials. Make necessary corrections. Engage auxiliary hydraulics to restart blade rotation. (Be sure the brush cutter is operating smoothly, increase throttle to full speed, and then start cutting operation while monitoring system pressure and temperature.)

TROUBLESHOOTING OPERATING CONDITIONS:

Below are listed a few operating conditions that may cause repeated stalling of your brush cutter, and suggestions on how to correct them.

GRASS TOO LONG OR THICK: If cutting heavy vegetation, you may need to slow travel speed or make smaller passes (less than full cut) to prevent overloading and stalling the unit.

BRUSH TOO BIG IN DIAMETER: The brush cutter is NOT designed to cut trees larger in diameter than listed in the specifications for your model. If brush is smaller than specified and the cutter is stalling, check sharpness of the blades (see “Maintenance”) and cut using the following procedures described in this section for “**CUTTING LARGE BRUSH**” and “**TREES**”.

BRUSH TOO THICK OR HEAVY: If cutting heavy or thick brush, you may need to slow cutter travel speed or make smaller passes (less than full cut), to prevent overloading. If the blades seem to be unable to handle the volume of brush, slow down the travel speed until the unit reaches full speed before proceeding.

SCALPING THE GROUND or BOTTOMING OUT: Be aware of changes in the terrain. Stay alert for drop-offs and holes. Check the terrain and the deck position before restarting and continuing cutting.

STRIKING FOREIGN OBJECTS: Stay alert for rocks, fencing, abandoned wells, septic tanks or other foreign objects. If the brush cutter comes into contact with a foreign object, stop the unit, shut off the engine and disconnect the hydraulic couplers from the prime mover. Inspect the unit and repair any damage before restarting and continuing cutting. (Never try to weld or straighten damaged blades.) Inspect the work area for any other items, and if they are too large to be removed from the area, they should be clearly flagged and avoided.

CUTTING OPERATION

Clear the area of all bystanders, children, livestock and vehicles. Never operate in a populated area where thrown objects could injure people or damage property.

Inspect the work site, removing all foreign objects, rocks and debris that the blades could come into contact with. If objects are too big to remove, mark the area clearly and avoid blade contact.

OPERATION

1. Activate the auxiliary hydraulics with the engine at idle and then slowly increase engine speed.
2. Be sure the brush cutter is operating smoothly and at full speed before starting the cutting operation.

NOTICE: If excessive noise or vibration, disengage auxiliary hydraulics and shut down the prime mover immediately. Determine the cause of the problem and correct before continuing operation.

IMPORTANT: Operation should be stopped immediately if operator's vision becomes obstructed by dust or debris.

3. Cut in a sweeping motion moving the brush cutter in/out and following the same path until desired results are achieved. It is recommended to start close to the prime mover and gradually move out (away from the prime mover).
4. Always deactivate the auxiliary hydraulics and then return engine to idle.
5. Before exiting the prime mover, lower the attachment to the ground, apply the brakes, turn off the prime mover's engine and remove the key. Be sure all rotation has stopped before approaching the brush cutter.

NOTE: Hydraulic braking brings the blades to a complete stop in 10-15 seconds. If your blades take a minute or more to "coast" to a stop, verify prime mover is in "Two-Way Flow" mode, check cartridge valve on motor and replace if necessary.

NOTICE: Continual monitoring of hydraulic oil temperature and water temperature of the prime mover is required during operation. If temperature rises too high, remove the cutter from brush/debris and the prime mover returned to an idle until it has cooled down sufficiently to continue operation.

SMALL BRUSH, EMBANKMENT AND DITCH MANAGEMENT

Inspect the work site. If grass, weeds and brush are too high it is recommended to cut the area approximately knee-high and then remove the smaller debris and cut again at a lower height.

NOTICE: ALWAYS make sure you can see what you are cutting.

1. Position cutter at a sufficient height for material to be cleared with the deck level or lower in the back (towards operator) to direct debris away from the operator. After first pass lower deck and follow in the same path to mulch debris.
2. Never raise the unit and expose yourself or anyone else to the rotating blades. If you can see the blades then the back of the unit is raised too high or tilted incorrectly.
3. Activate the auxiliary hydraulics with the engine at idle and then increase engine speed.
4. Be sure the brush cutter is operating smoothly and at full speed, and then start cutting operation.

OPERATION

5. Cut in a sweeping motion moving the brush cutter in/out and following the same path until desired results are achieved. It is recommended to start close to the prime mover and gradually move out (away from the prime mover).
6. Always deactivate the auxiliary hydraulics and then return engine to idle.
7. Before exiting the prime mover, lower the attachment to the ground, apply the brakes, turn off the prime mover's engine and remove the key. Be sure all rotation has stopped before approaching the brush cutter.

NOTE: Hydraulic braking brings the blades to a complete stop in 10-15 seconds. If your blades take a minute or more to "coast" to a stop, verify prime mover is in "Two-Way Flow" mode, check cartridge valve on motor and replace if necessary.

LARGE BRUSH

Depending on the density and size of the brush, we recommend starting at the top right and using a sweeping motion, swing the unit to the left (allowing the hinged debris shield to rotate up cutting the large diameter brush in the same fashion as trees. Swing the cutter back and forth through the brush while lowering at a pace that will not decrease the motor RPM. Once the brush has been cleared, maintain a consistent cutter height and sweep from side to side for a more finished result.

NOTICE: ALWAYS make sure you can see what you are cutting.

TREES (UP TO THE DIAMETER LISTED FOR YOUR CUTTER)

WARNING! **Trees can fall in any direction. It is the operator's responsibility to be certain the area is safe and clear of utility lines, people, animals and personal property.**

DANGER! **To prevent serious injury from electrocution keep a safe distance from all electrical lines. Be sure trees and equipment will clear overhead electrical lines.**

1. The size and height of the tree will determine the cutting process. Taller trees may be cut in sections and smaller trees in one cut. If mulching, we recommend you cut off the top and then position the cutter over the standing tree with the trunk of the tree towards the outside edge (cutting area). Tilt up slightly, which will direct the debris away from the operator, and slowly lower the brush cutter while cutting the remaining portion of the tree.
2. Position the cutter to the right of the tree and parallel to the ground. Lead with the hinged debris shield side of the cutter.

OPERATION

NOTE: The hinged debris shield will lift up when pressed against a tree, exposing the blades to allow for aggressive cutting into the trunk. If the shield does not rotate up, make sure the cutter is horizontal. If the debris shield still does not rotate up, d*isengage auxiliary hydraulics and shut down the prime mover. Determine the problem with the tilt latch plate and correct before continuing operation.*

3. The shield and cutter deck will apply pressure to the tree and bend it to the left as the blades cut.
4. Once the tree is down you will be able to remove the branches and limbs using the same procedure as large brush. Lead with the hinged debris shield side of the cutter.

RAIL RIGHT-OF-WAY

Follow previous detailed instructions for clearing the embankments on each side of the rail right-of-way along with overgrown brush or trees hanging over the rail right-of-way.

IMPORTANT: Although the cutter may be positioned at high angles momentarily to reach branches above the prime mover and rail right-of-way, operating at high angles for extended periods of time will cause cutter damage.

NOTICE: Operating at high angles could affect oil circulation and cause drive bearing housing to overheat.

OVER-THE-FENCE

NOTICE: ALWAYS make sure you can see what you are cutting.

1. Position the cutter on the opposite side of the fence.
2. For tall overgrowth: roll the cutter back and start blade rotation. Move the cutter back and forth cutting branches, vines and taller brush while slowly lowering the boom. Start back at the top and roll the cutter out while repeating the back and forth motion.
3. For small brush, grass and weeds: Position the cutter on the opposite side and next to the fence. Slowly drive forward taking extra care not to catch the brush cutter on fence or posts.

STORAGE:

- 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.
- 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.

OPERATION

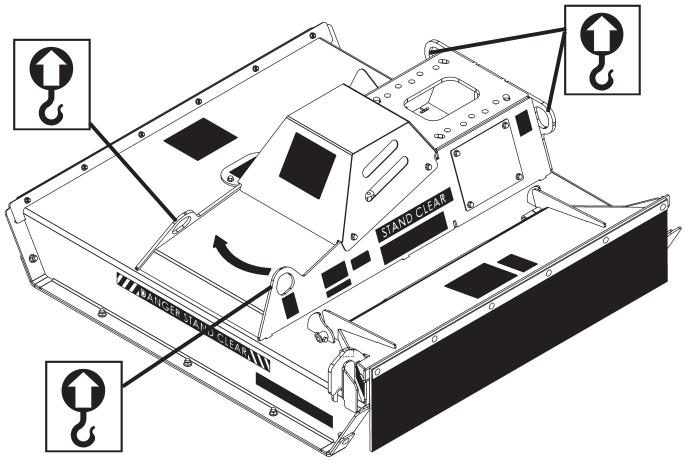
Additional Precautions for Long Term Storage:
- Touch up all unpainted surfaces with paint to prevent rust.

REMOVAL FROM STORAGE:
- Wash unit and replace any damaged and/or missing parts.
- 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.



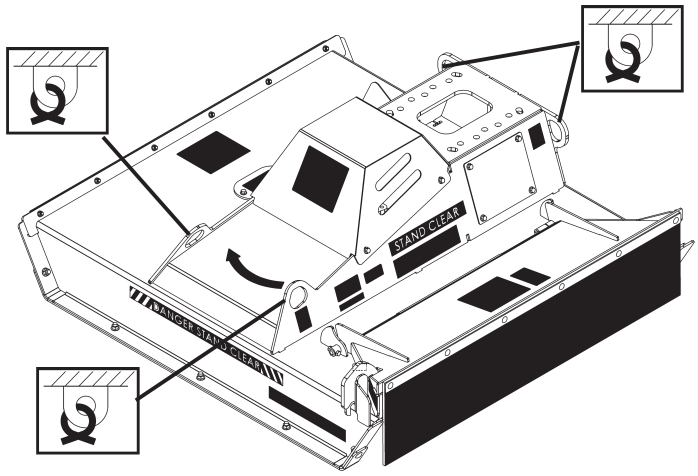
WARNING! Use lifting accessories (chains, slings, ropes, shackles and etc.) that are capable of supporting the size and weight of your attachment. Secure all lifting accessories in such a way to prevent unintended disengagement. Failure to do so could result in the attachment falling and causing serious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

OPERATION

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."

MAINTENANCE AND SERVICE

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.

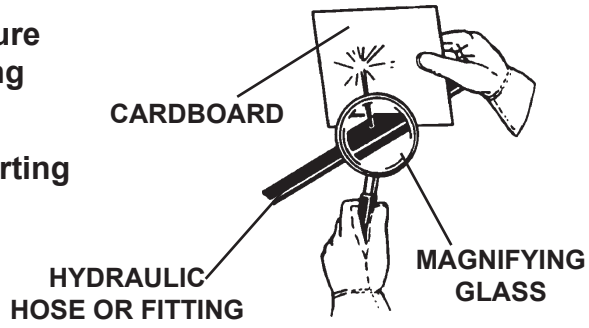
Procedure	Daily	Every 40 Hours	1200 Hours
Check all bolts and nuts for tightness. Tighten as needed. See Bolt Torque Specifications.	✔		
Replace any missing bolts or nuts with approved replacement parts.	✔		
Check hydraulic system for hydraulic oil leaks. See procedure below.	✔		
Visually inspect the machine for worn parts or cracked welds, and repair as needed.	✔		
Check blades for damage and replace or sharpen as needed.	✔		
Check for missing or illegible Safety / Warning Decals.	✔		
Re-torque mounting bolts. See Bolt Torque Specifications.		✔	
Check blade, carrier, bearing housing and motor bolts for tightness. Torque to specification, See Maintenance and Service.		✔	
Check oil level in Bearing Housing and add if necessary.		✔	
Change oil in Bearing Housing.			✔

WARNING! **Escaping fluid under pressure can have sufficient force to penetrate the skin causing serious personal 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 AND SERVICE

WARNING! Avoid serious injury. Lower the brush cutter so both skid shoes are on the ground, set the parking brake, stop the engine and remove the key before leaving the operator's seat. Be sure all rotation has stopped before making adjustments or repairs. If unit must be left raised for maintenance, block the unit securely to prevent accidental release of the lifting mechanism. Disconnect the hydraulic couplers.

REPLACING BLADES

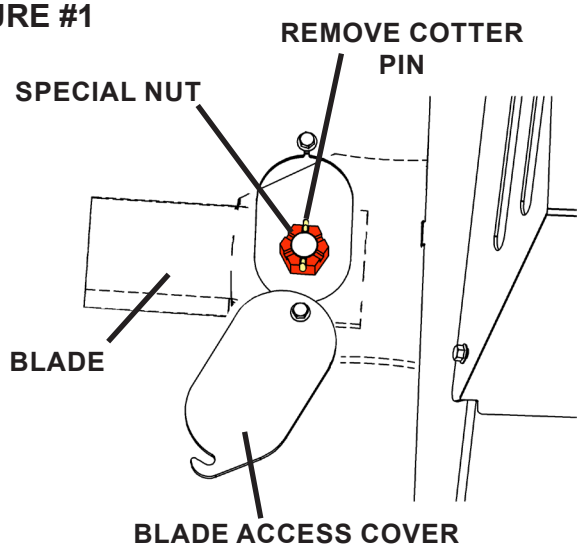
When replacing, or sharpening the blades, the unit must be blocked securely off the ground to gain access to the blades.

The blades should be inspected regularly (every 8 hours) to ensure they are sharp, tightened correctly, and intact. Always replace all three blades at the same time and NEVER try to weld or straighten damaged blades, as loss of blade integrity may result.

Removing Blades:

1. With unit securely blocked off the ground and hydraulic couplers disconnected, loosen the capscrews on the blade access cover and swing cover open. See Figure #1
2. Position one of the blades under the access panel and remove the cotter pin and special nut. You can now remove the blade mounting bolt and the blade.
3. Repeat step #2 for the remaining blades.

FIGURE #1



Installing Blades:

1. With unit securely blocked off the ground and hydraulic couplers disconnected, loosen the capscrews on the blade access cover and swing cover open.
2. Position the blade under the carrier and either prop up in place or have an assistant hold in place. Install the blade mounting bolt up through the blade and carrier while the special nut is installed onto the bolt through the blade access panel. Torque nut to a minimum of 450 ft. lbs. continue to torque to line up and install cotter pin.
3. Repeat step #1 and #2 for the remaining blades.
4. Rotate cover closed, apply Loctite 262 to hardware and torque to specification. See Bolt Torque Specifications.

HYDRAULIC MOTOR OUTPUT SHAFT SEAL ASSEMBLY

The hydraulic motor output shaft seal is part of an assembly that cannot be replaced while the motor is in warranty because of the need to disassemble the motor itself. Call Factory

REPLACING HYDRAULIC MOTOR

When replacing the complete hydraulic motor assembly, the unit should be positioned firmly on the ground with the hydraulic couplers disconnected. **Be sure all rotation has stopped before making any adjustments or repairs.**

MAINTENANCE AND SERVICE

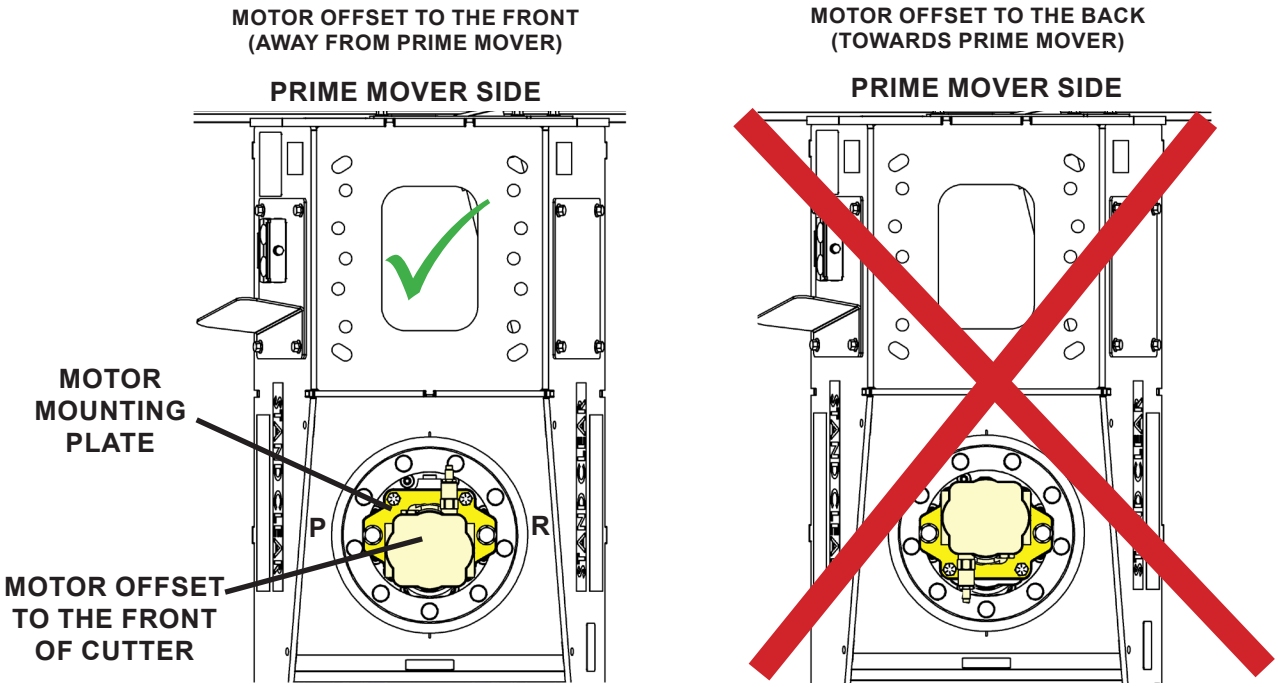
NOTE: Field replacement of the internal motor seals voids warranty.

1. Remove motor cover.
2. Tag and remove hydraulic hoses from motor (Power and Return).

IMPORTANT: If couplers were not disconnected prior to disconnecting from the motor, oil will drain from the prime mover causing extensive oil loss.

IMPORTANT: Orientation of the hydraulic motor and fitting installation is extremely important. Take notice and install fittings and new motor in the same orientation and location. See Figure #2

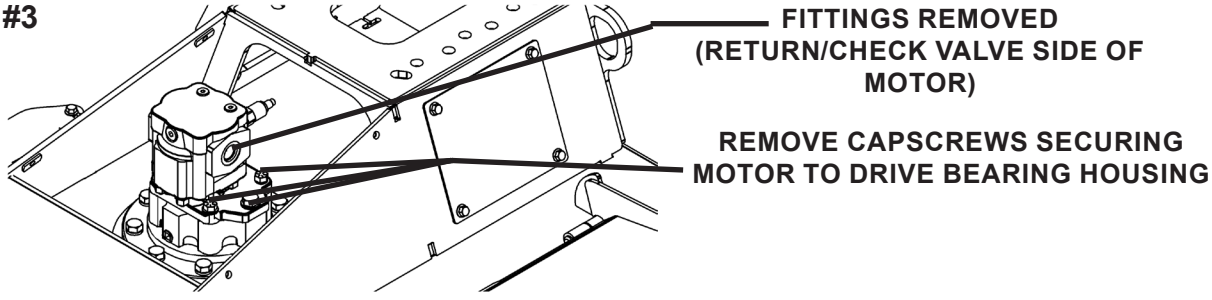
FIGURE #2



THE HYDRAULIC MOTOR IS A GEAR MOTOR AND OFFSET ON MOUNTING PLATE TO THE FRONT OF THE CUTTER (FITTINGS REMOVED FOR CLARITY.)

3. Remove the fittings and the capscrews holding the motor to the drive bearing housing, and remove the motor. Check motor seal for damage and replace if required. See Figure #3

FIGURE #3



MAINTENANCE AND SERVICE

NOTE: If motor seal was damaged you will need to drain the existing oil from the drive bearing housing and replace with new before installing the new motor. See instructions for Changing Oil in Drive Bearing Housing.

4. Grease the new motor spline shaft and install the new motor with o-ring onto the drive bearing housing using the existing hardware and Loctite 262. Torque all .62” mounting capscrews to 160 ft. lbs. and all .50” mounting capscrews to 80 ft. lbs.
5. Re-install the existing fittings and hoses onto the new motor. (Ensure that the check valve and return hose are installed on the left side.)
6. Re-install motor cover using existing hardware with Loctite 262 and torque to specification. See Bolt Torque Specifications.

REPLACING DRIVE BEARING HOUSING

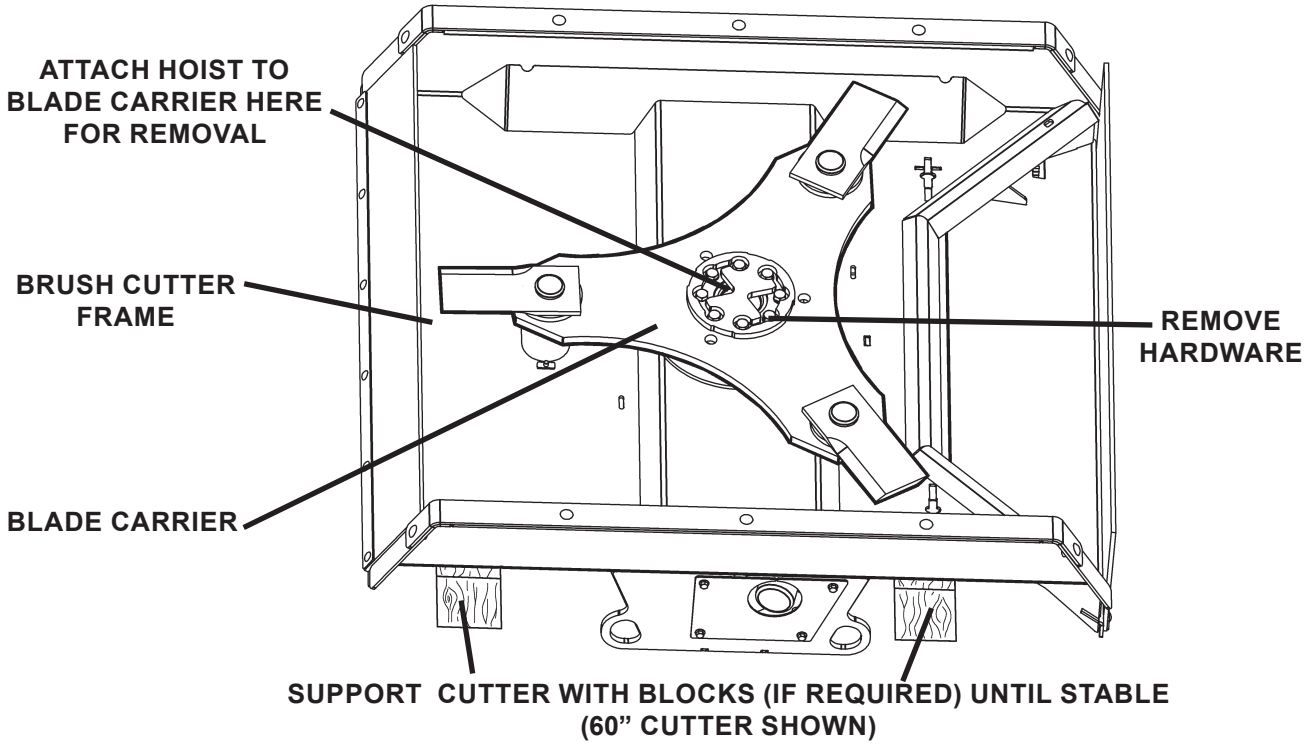
When replacing the drive bearing housing, the unit must be detached from the prime mover in a clean, open location with a hoist available that has adequate lift capacity for lifting the attachment. **Be sure all rotation has stopped before making any adjustments or repairs.**

1. With the unit disconnected from the prime mover, attach a hoist to the two front lift locations on the brush cutter and slowly lift the brush cutter and place it upside down with the blade carrier exposed.

NOTE: Be prepared for possible shifting of the brush cutter as it is clears the ground. Block the cutter, if required, to ensure it is completely stable before proceeding.

2. Remove the hardware securing the drive bearing housing to the blade carrier. See Figure #4

FIGURE #4



3. Attach the hoist to the blade carrier assembly and remove from the brush cutter and set aside. **(NOTE: The blade carrier weighs approximately 100 lbs (45 kg) on the 40", 150 lbs (68 kg) on the 50" and 200 lbs. (91 kg) on the 60" cutter.)**
4. With the blade carrier assembly removed, attach the hoist onto the front lifting holes and set the unit back onto the skid shoes.
5. Remove motor cover.
6. Remove the capscrews holding the motor to the drive bearing housing, and remove the motor, setting it into a clean container to help prevent any contaminants from entering the hydraulic system. Check motor o-ring for damage and replace if required.
7. Remove the capscrews securing the drive bearing housing to the cutter deck and install new housing using the existing hardware. Torque to 160 ft. lbs.
8. Remove plug from top of housing and fill with a mild extreme pressure lubricant API-GL-5, No. 80 or 90 weight gear lubricant. Replace plugs.
9. Grease the hydraulic motor spline shaft and install the motor assembly and o-ring onto the drive bearing housing using the existing hardware. Torque all .62" mounting cap-screws to 160 ft. lbs. and all .50" mounting hardware to 80 ft. lbs.
10. Re-install motor cover using existing hardware and Loctite 262 and torque to specification. See Bolt Torque Specifications.
11. Re-attach the hoist to the two front lift locations and slowly lift the brush cutter and place it upside down.

NOTE: Be prepared for possible shifting of the brush cutter as it is clears the ground. Block the cutter, if required to ensure it is completely stable before proceeding.

12. Attach the hoist to the blade carrier assembly and set it into place aligning the holes on the blade carrier to the ones on the bearing housing. **(NOTE: The blade carrier weighs approximately 100 lbs (45 kg) on the 40", 150 lbs (68 kg) on the 50" and 200 lbs. (91 kg) on the 60" cutter.)**
13. Reinstall the existing hardware securing the drive bearing housing to the blade carrier using Loctite 262. Torque all .62" mounting hardware to 160 ft. lbs.
14. Attach the hoist onto the front lifting holes and set the unit back onto the skid shoes.

Follow the installation procedure for attaching the unit onto your prime mover.

REPLACING RUBBER DEFLECTORS

1. Position the cutter firmly on the ground with the hydraulic couplers disconnected. Be sure all rotation has stopped before making any adjustments or repairs.
2. Remove the clamp plate while retaining the hardware for installing the new rubber deflector.
3. Remove the rubber deflector and dispose of according to city and federal regulations.
4. Position the new rubber deflector on the cutter and secure in place using the clamp plate and hardware removed in Step #2.

MAINTENANCE AND SERVICE

REPLACING SKID SHOE WEAR PLATES

1. Block the cutter firmly off the ground with the hydraulic couplers disconnected. Be sure all rotation has stopped before making any adjustments or repairs.
2. Unbolt existing wear plates from the cutter.
3. Install new wear plates using new carriage bolts and lock nuts supplied with wear plate kit. Torque all hardware to specification. See Bolt Torque Specifications.

REPLACING CARTRIDGE VALVES ON MOTOR

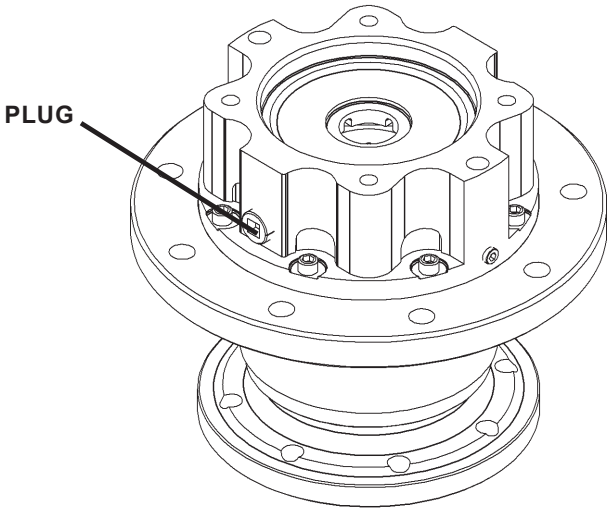
When replacing the cartridge valves or valve seals, the unit should be positioned firmly on the ground with the hydraulic couplers disconnected. **Be sure all rotation has stopped before making any adjustments or repairs.**

1. Remove motor cover.
2. Remove cartridge valve to be replaced and install new cartridge valve. **NOTE: On larger motors with two cartridge valves the Braking Cartridge Valve is marked RV2 on the manifold and the Main Relief Cartridge Valve is marked RV1.**
3. Torque to 25 ft. lbs. on motors with one cartridge valve and torque to 35 ft. lbs. on larger motors with two cartridge valves.
4. Reinstall motor cover using existing hardware.

CHANGING OIL IN DRIVE BEARING HOUSING

When changing the oil in the drive bearing housing the unit should be positioned firmly on the ground with the hydraulic couplers disconnected. We recommend removing the existing oil with a fluid removal pump.

1. Remove one of the plugs in the drive bearing housing and place the extraction hose into the housing so that it reaches the bottom.
2. Place the output hose into an approved container or drum that will hold the waste oil.
3. Following the instructions for your fluid removal pump, remove all oil from the drive bearing housing. Once the oil has been drained from the housing, remove the pump.
4. Fill the housing up to the plug with a mild extreme pressure lubricant API-GL-5, No. 80 or 90 weight gear lubricant.
5. Replace plug. Torque to specification. See Bolt Torque Specifications



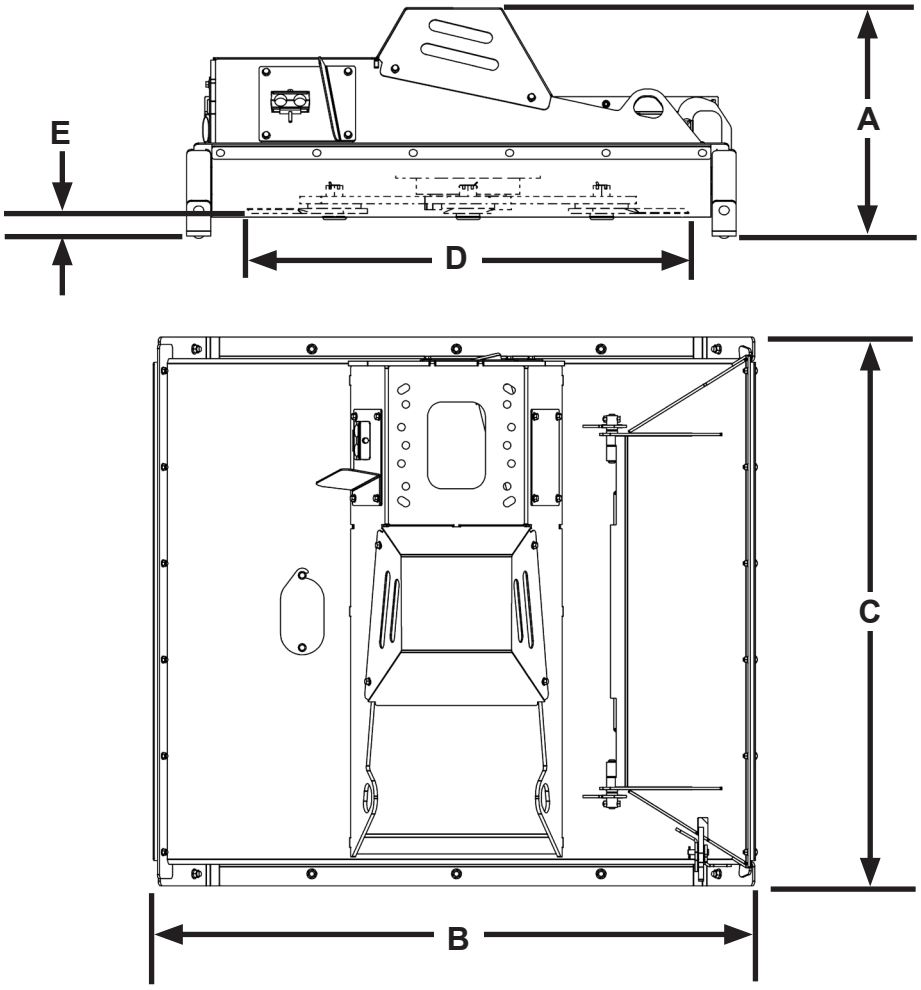
TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
EXCESSIVE VIBRATION	Blade bent.	Replace blades. (We recommend replacing all blades and blade hardware at the same time to maintain balance.)
	Blade missing, damaged or worn.	Replace blades. (We recommend replacing all blades and blade hardware at the same time to maintain balance.)
	Bearing failure. (To diagnose bearing failure; rotate blade carrier slowly and listen for bearing noise. Look for oil leak due to seal failure.)	Replace drive bearing housing. Determine cause of failure and correct. (See Drive Bearing Shaft Seal Failure at end of this section.)
	Foreign material in blade carrier assembly.	Remove any foreign material from blade carrier assembly.
	Loose hardware.	Check hardware and torque to specification as required. (Blades, blade carrier, bearing housing & motor.)
BLADES NOT ROTATING	Auxiliary hoses not hooked up to the prime mover correctly.	Check coupler engagement.
	Power and return hoses reversed.	Check flow direction and switch hydraulic couplers. (Return hose should have male coupler and be connected to the check valve on cutter motor.)
	Foreign material in blade carrier assembly.	Remove any foreign material from blade carrier assembly.
	Main relief cartridge valve failure (large motors only).	Replace as required.
	Check valve installed incorrectly.	Verify Check valve is installed on return side of motor and with hydraulic flow going towards prime mover.
	Hydraulic motor damaged.	Call Paladin service department for instructions.
	Bearing failure. (To diagnose bearing failure; rotate blade carrier slowly and listen for bearing noise. Look for oil leak due to seal failure.)	Replace drive bearing housing. Determine cause of failure and correct. (See Drive Bearing Shaft Seal Failure at end of this section.)
	Obstruction in hydraulic line.	Clear obstruction. Replace as required.
BLADE ROTATION DOES NOT STOP 10–15 SECONDS AFTER SHUT DOWN	Braking cartridge valve failure in motor.	Replace braking cartridge valve.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
OIL LEAKING	Hydraulic hose damaged.	Replace hose.
	Hydraulic fittings loose or damaged.	Tighten or replace. Check o-ring on fitting and replace if necessary.
	Hydraulic motor damaged.	Call Paladin service department for instructions.
	Motor shaft seal damaged.	Call Paladin service department for instructions.
	Drive bearing shaft seal damaged.	Call Paladin service department for instructions.
CUTTER STALLS TOO EASILY OR LOSS OF POWER	Bearing failure. (To diagnose bearing failure; rotate blade carrier slowly and listen for bearing noise. Look for oil leak due to seal failure. Bearing failure will reduce power available to function correctly.)	Replace drive bearing housing. Determine cause of failure and correct. (See Drive Bearing Shaft Seal Failure at end of this section.)
	Foreign material in blade carrier assembly.	Remove any foreign material from blade carrier assembly.
	Main relief cartridge valve failure (large motors only).	Replace as required.
	Obstruction in hydraulic line.	Clear obstruction. Replace as required.
BLADES NOT ROTATING AT FULL RPM	Insufficient hydraulic flow.	Refer to prime mover manual. Verify hydraulic flow using inline flow meter or other attachment.
	Damaged quick coupler.	Replace damaged coupler.
	Hydraulic motor damaged.	Call Paladin service department for instructions.
	Bearing failure. (To diagnose bearing failure; rotate blade carrier slowly and listen for bearing noise. Look for oil leak due to seal failure.)	Replace drive bearing housing. Determine cause of failure and correct. (See Drive Bearing Shaft Seal Failure at end of this section.)
	Cartridge valve failure.	Replace as required.
DRIVE BEARING SHAFT SEAL FAILURE ***(NOTE: REPLACING SHAFT SEAL WILL VOID WARRANTY.)***	Foreign material in blade carrier assembly.	Remove any foreign material from blade carrier assembly. Call Paladin service department for instructions.
	Bearing failure.	Call Paladin service department for instructions.
	Hydraulic motor shaft seal failure.	Call Paladin service department for instructions.
	Low oil level in bearing housing. (Over vertical operation)	Add oil. See Maintenance and Service. Use correct operating procedure.

SPECIFICATIONS



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

DESCRIPTION	40”	50”	60”
A. Overall Height	23.20” (584mm)	23.70” (602mm)	25.47” (647mm)
B. Overall Width	52.75” (1340mm)	62.67” (1592mm)	72.46” (1840mm)
C. Overall Length	47.00” (1194mm)	57.00” (1448mm)	67.00” (1702mm)
D. Cutting Width	40.00” (1016mm)	50.00” (1270mm)	60.00” (1524mm)
E. Min. Cutting Height (Skid Shoes On Ground)	2.25” (57mm)	2.25” (57mm)	2.25” (57mm)
Weight (LBS) (without Mounting)	625# (283kg)	1030# (467kg)	1275# (578kg)
Cutting Capacity (Maximum Tree Diameter)	4.00” (102mm)	5.00” (127mm)	6.00” (152mm)
Excavator Tonnage	3-5 mT	5-8 mT	8-10 mT
Recommended Hydraulic Flow			
125140A (BC40MX10)	13-19 GPM (49-72 LPM)		
125140B (BC40MX20)	19-26 GPM (72-98 LPM)		
125150A (BC50MX10)	17-22 GPM (64-83 LPM)		
125150B (BC50MX20)	22-34 GPM (83-129 LPM)		
125160A (BC60MX10)	20-28 GPM (76-106 LPM)		
125160B (BC60MX20)	28-35 GPM (106-132 LPM)		
Operating Pressure (Attachment)	3500 PSI (241 BAR)		

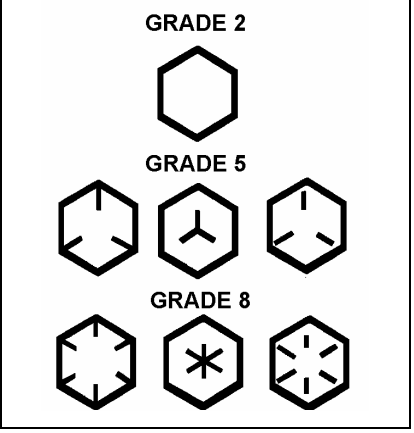
BOLT TORQUE SPECIFICATIONS

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

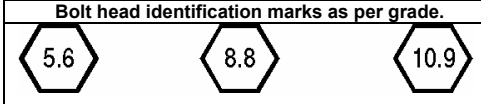
NOTE: The following torque values are for use with extreme pressure lubricants, plating or hard washer applications Increase torque 15% when using hardware that is unplated and either dry or lubricated with engine oil.

Bolt Size		SAE GRADE 5 TORQUE Pounds Feet		SAE GRADE 5 TORQUE Newton-Meters		SAE GRADE 8 TORQUE Pounds Feet		SAE GRADE 8 TORQUE Newton-Meters		Bolt head identification marks as per grade. NOTE: Manufacturing Marks Will Vary
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	

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
	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 model and serial number of your product ready to ensure that you receive the correct parts for your specific attachment.

The product control number (PCN), 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

We Encourage Fax and E-mail Orders
PLC_Sales@paladinattachments.com
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