



Battle Ax

Excavator Mulching Head - 20 Series

31 • 41 • 51

Owner's Manual and Parts Book
(Originating w/Serial Number 100-351)



Model Number: _____
Serial Number: _____
Date of Purchase: _____

LOFTNESS ™

LOFTNESS SPECIALIZED EQUIPMENT, INC.

LIMITED WARRANTY POLICY

The limited warranty policy begins upon delivery of the unit to the original customers.

All Loftness products have a one (1) year limited warranty. The XLB10 Grain Bag Loader has a two (2) year limited warranty.

If any Loftness product is used as rental or leased equipment the limited warranty period is for only 30 days from the delivery date to the original customers.

Loftness Specialized Equipment, hereinafter referred to as LOFTNESS, a manufacturer of quality machinery since 1956, warrants new LOFTNESS machinery and/or attachments at the time of delivery to the original purchaser, to be free from defects in material and workmanship when properly set up and operated in accordance with the recommendations set forth in the LOFTNESS Operator's Manual.

LOFTNESS' liability for any defect with respect to accepted goods shall be limited to repairing the goods at an authorized dealer or other LOFTNESS designated location, or replacing them as LOFTNESS shall elect. The above shall be in accordance with LOFTNESS warranty adjustment policies.

WARRANTY REQUIREMENTS

Warranty registration form must be filled out and returned to Loftness Specialized Equipment to validate all warranty claims.

To receive a warranty claim, a return authorization from LOFTNESS must be obtained. The failed part may then be returned in an untampered status. This warranty does not include freight or delivery charges incurred when returning machinery for servicing. Dealer mileage, service calls and pick-up/delivery charges are the customer's responsibility.

LIMITATIONS OF WARRANTY

LOFTNESS products are designed to provide years of dependable service when proper use and maintenance is adhered to. The potential for misuse in many applications exists; therefore, a limited warranty is provided as follows.

This warranty shall not apply to any machine or attachment which shall have been repaired or altered outside the LOFTNESS factory or authorized LOFTNESS dealership or in any way so as in LOFTNESS' judgment, to affect its stability or reliability, nor which has been subject to misuse, negligence or accident, nor to any machine or attachment which shall not have been operated in accordance with LOFTNESS' printed instructions or beyond the company recommended machine rated capacity. LOFTNESS may elect to have an area representative evaluate the condition of the machine before warranty is considered.

In addition, this limited warranty provides no coverage for general wear or maintenance items, misuse, environmental conditions and/or contamination for which they were not designed or not intended, including but not limited to the following items:

- Use of machine beyond its rated capacity;
- Improper knife replacement;
- Missing knives;
- Striking foreign objects
- Lack of lubrication
- Failures caused by running in an "out-of-balance" condition;
- Tires;
- Conveyors;
- Auger wear;
- Saw blades;
- Brakes and brake pads; and
- Hydraulic hoses damaged by being caught in "pinch points" or by moving parts.

EXCLUSIONS OF WARRANTY

Except as otherwise expressly stated herein, LOFTNESS makes no representation or warranty of any kind, expressed or implied. **The implied warranty of merchantability and fitness for a particular purpose are excluded from this limited warranty.** The remedies set forth in this warranty are the only remedies available to any person under this warranty. LOFTNESS shall have no liability to any person for incidental, consequential or special damages of any description, whether arising out of express or implied warranty or any other contract, negligence, or other tort or otherwise. This exclusion of consequential, incidental and special damages is independent from and shall survive any finding that the exclusive remedy failed of its essential purpose. Upon purchase, the buyer assumes all liability, all personal injury and property damage resulting from the handling, possession or use of the goods by the buyer.

No agent, employee or representative of LOFTNESS has any authority to bind LOFTNESS to any affirmation, representation or warranty concerning its machinery and/or attachments except as specifically set forth herein. (October 2020)

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To the Dealer:

In order to ensure compatibility / performance of the Loftness attachment and the customer's power unit, it is IMPERATIVE that this Pre-Delivery Inspection ("PDI") be completed using the customer's actual power unit.

PRE-DELIVERY INSPECTION

Dealer: By initialing each line I understand and promise that I have completed the following:

- ___ Verified the attachment is set up properly for customers power unit. (check model code with manual)
- ___ Greased all grease zerks till grease purges out of bearing.
- ___ Removed all shipping brackets.
- ___ Adjusted push bar out of shipping position. (if equipped) (full forward position recommended)
- ___ Installed head on customer's unit that will be running the attachment and set hydraulic flow per power unit manufacturer owner's manual for preferred flow.
- ___ Recorded the Serial Number / Make / Model of the power unit.
Power unit. S/N _____ Make _____ Model _____
- ___ Recorded the Serial Number and Model of the Loftness attachment. S/N _____ Model _____
- ___ Verified power unit manufacturer outlined Auxiliary coupler orientation for pressure, return & case drain line.
- ___ Verified/recorded rotor RPM at full throttle per model & chart in Loftness owner's manual. RPM _____
- ___ Performed an Auxiliary system pressure stall check on the power unit only and verified that max pressure rating is achieved per power unit manufacturer specifications. Recorded pressure observed _____ PSI

PDI completed by: _____ Print

Signed/Date

Contact Loftness factory if any of the tests are not within power unit or Loftness specifications.

DELIVERY

- ___ Showed customer all grease zerks.
- ___ Showed customer adjustable push bar options. (if equipped)
- ___ Showed customer how to properly engage hydraulics to operate attachment.
- ___ Reviewed owner's manual, all on-product warnings and instructions, and safe operation with customer.
- ___ Assisted customer with completing / submitting Warranty Registration Form to Loftness by one of the below options.

Dealer also needs to submit a copy of this completed PDI to Loftness and maintain the copy in owner's manual for unit.

Mail to:

Loftness Specialized Equipment
PO Box 337
Hector, MN 55342

Delivered to Customer by: _____ Print

Signed/Date

Email to: Cheryl Schmalz

Cheryl@loftness.com

LOFTNESS COPY



To the Dealer:

In order to ensure compatibility / performance of the Loftness attachment and the customer's power unit, it is IMPERATIVE that this Pre-Delivery Inspection ("PDI") be completed using the customer's actual power unit.

PRE-DELIVERY INSPECTION

Dealer: By initialing each line I understand and promise that I have completed the following:

___ Verified the attachment is set up properly for customers power unit. (check model code with manual)

___ Greased all grease zerks till grease purges out of bearing.

___ Removed all shipping brackets.

___ Adjusted push bar out of shipping position. (if equipped) (full forward position recommended)

___ Installed head on customer's unit that will be running the attachment and set hydraulic flow per power unit manufacturer owner's manual for preferred flow.

___ Recorded the Serial Number / Make / Model of the power unit.

Power unit. S/N _____ Make _____ Model _____

___ Recorded the Serial Number and Model of the Loftness attachment. S/N _____ Model _____

___ Verified power unit manufacturer outlined Auxiliary coupler orientation for pressure, return & case drain line.

___ Verified/recorded rotor RPM at full throttle per model & chart in Loftness owner's manual. RPM _____

___ Performed an Auxiliary system pressure stall check on the power unit only and verified that max pressure rating is achieved per power unit manufacturer specifications. Recorded pressure observed _____ PSI

PDI completed by: _____ Print

_____ Signed/Date

Contact Loftness factory if any of the tests are not within power unit or Loftness specifications.

DELIVERY

___ Showed customer all grease zerks.

___ Showed customer adjustable push bar options. (if equipped)

___ Showed customer how to properly engage hydraulics to operate attachment.

___ Reviewed owner's manual, all on-product warnings and instructions, and safe operation with customer.

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PO Box 337

Hector, MN 55342

Delivered to Customer by: _____ Print

_____ Signed/Date

Email to: Cheryl Schmalz

Cheryl@loftness.com

CUSTOMER COPY

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Warranty

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Ordering Code

Battle Ax 20 Series (Example)

The ordering code will consist of two numbers (machine size), two letters (machine type), two numbers (series), one letter (cutter type), two numbers (motor system), one letter (belt/sheave combo), and one or two letters (options).

51BX20Q54A.H

SIZE

31 = 31" Cut
41 = 41" Cut
51 = 51" Cut

TYPE

BX = Battle Ax Excavator

SERIES

20 = 20 series

TOOTH

Q = 4 Point Beaver
P = Planer
S = Carbide

MOTOR SYSTEM

54 = Parker 45cc

SHEAVES/BELT COMBO

A = 8.6 Top, 6.2 Bottom
B = 8.0 Top, 6.8 Bottom
C = 7.4 Top, 7.4 Bottom
D = 6.8 Top, 8.0 Bottom
E = 6.2 Top, 8.6 Bottom

OPTIONS

T = Thumb
H = Hook



Owner Information

Thank you for your decision to purchase a Battle Ax 20 Series Excavator Mulching Head from Loftness. To ensure maximum performance of your machine, it is mandatory that you thoroughly study the owner's manual and follow its recommendations. Proper operation and maintenance are essential to prevent injury or damage and to maximize machine life.

The Loftness Battle Ax is an effective, reliable machine used for maintaining grass, weeds, brush and trees. For best results, operate the machine as low to the ground as possible without the teeth striking ground or other obstructions. Lifting or tilting the Battle Ax increases the risk of flying debris. Because of the high speed of the teeth, the life of the teeth will be reduced if it is operated in rocky terrain or in areas where many obstacles are present. Areas to be mowed should be free of debris such as rocks, bottles, large branches etc. The teeth cut and pulverize the grass, weeds and brush. The Battle Ax deposits cut material over the entire width-of cut, which eliminates bunching or windrowing behind the machine.

Operate and maintain this machine in a safe manner and in accordance with all applicable local, state, and federal codes, regulations and/or laws, and in compliance with on-product labeling and these instructions.

Make sure that all personnel have read this owner's manual and thoroughly understand safe and correct operating, installation and maintenance procedures.

Continuous improvement and advancement of Loftness products may result in changes to your equipment that may not be reflected in this publication. Loftness reserves the right to make product improvements to the machine at any time. Although great care has been taken to ensure the accuracy of this publication, Loftness does not assume any liability for errors or omissions.

Warranty Policy

Be sure to read and understand the Warranty Policy at the beginning of this manual. It is also important that you fill out the Warranty Registration form(s) completely with your dealer so as not to void the warranty.

Serial Number Location



The machine serial number is shown in the tag (1), and is also stamped into the machine frame (2).

Always use your model and serial number when requesting information or when ordering parts.

Owner's Manual Access



The Battle Ax is shipped with a printed owner's manual. The manual must be available for all operators. Keep in a safe, dry location.

To access a digital owner's manual, use a smart phone to scan the QR Code (1) located on the motor cover. This code will link to the Battle Ax owner's manual on the Loftness website.

Introduction

Battle Ax Features

- Hydraulic Driven
- 3-Band V-Belt
- Built-in Depth Gauges - *controls cutting depth*
- Two-stage Cutting Chamber - *uses 2 shear bars, producing a finer mulch with less passes*
- Fixed Displacement Gear Motor - *45cc*
- Power Requirement - *15-35 GPM at up to 4,350 PSI - 25-70 hydraulic horsepower*
- Optional Spade Hook
- Optional Mounts - Flat Plate Mount, Direct, Quick Attach or Pivoting
- 13.5 in. (34 cm) Diameter Rotor
- Efficient Staggered/Spiral Tooth Pattern
- 4 Point Beaver or Reversible Planer Teeth (sharpenable)
- 1.75 in. (44.5 mm) Piloted Double Taper Roller Bearings
- Anti Wrap Bearing Protection
- Rotor Speed 1750-2300 RPM
- Premium Strength Steel Housing
- Steel Deflector Chains

Safety First



Safety Alert Symbol

This message alert symbol identifies important safety messages on the machine and in the owner's manual. When you see this symbol, be alert to the possibility of personal injury and carefully read the message that follows.

In the owner's manual and on decals used on the machine the words **DANGER, WARNING, CAUTION, IMPORTANT, and NOTE** are used to indicate the following:

DANGER: This word warns of immediate hazards which, if not avoided, will result in severe personal injury or death. The color associated with Danger is RED.

WARNING: This word refers to a potentially hazardous situation which, if not avoided, could result in severe personal injury or death. The color associated with Warning is ORANGE.

CAUTION: This word refers to a potentially hazardous or unsafe situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices. The color associated with Caution is YELLOW.

IMPORTANT: Highlights information that must be heeded.

NOTE: A reminder of other related information that needs to be considered.

If Safety Decals on this machine are ISO two panel pictorial, decals are defined as follows:

- The first panel indicates the nature of the hazard.
- The second panel indicates the appropriate avoidance of the hazard.
- Background color is YELLOW.
- Prohibition symbols such as   and  if used, are RED.

Be certain all machine operators are aware of the dangers indicated by safety decals applied to the machine, and be certain they follow all safety decal instructions. Contact Loftness for safety decal replacement.

Loftness cannot anticipate every possible circumstance that may involve a potential hazard. The warnings in this owner's manual are not all inclusive.

Owner's Responsibility

Because of the potential safety hazard to eyes from hydraulic leaks and/or flying debris, "**USE OF PROTECTIVE EYEWEAR IS ABSOLUTELY MANDATORY**" for operator and others in the work area.

Due to the possible danger of flying debris, it is "**ABSOLUTELY MANDATORY** that **IMPACT-RESISTANT SHIELDING**" be provided on the power unit to protect the operator. The owner is responsible for providing the operator protection devices on the power unit.

Flying debris can gather on the excavator and needs to be cleaned off, especially around the radiator and oil cooler screens, engine compartment and exhaust areas. Periodic cleaning will help prevent the possibility of fire.

It is **ABSOLUTELY MANDATORY** that all personnel read and follow all safety precautions before operating the machine and attachment.

Make sure that all personnel have read this owner's manual, and thoroughly understand safe and correct installation, operation, and maintenance procedures.

Operate and maintain this machine in a safe manner and in accordance with all applicable local, state, and federal codes, regulations and/or laws; and in compliance with on-product labeling and this owner's manual instructions.

Make sure that all personnel know how to stop the machine and attachment by disengaging all controls. See "Mandatory Shut-Down Procedure" on page 6.

Make sure the attachment is installed on the machine correctly before being placed in service. At regular intervals thereafter, the attachment should be serviced in accordance with procedures outlined in this owner's manual.

Safety Instructions

Mandatory Shut-Down Procedure

- Stop the machine and attachment on a level surface and lower the attachment to the ground.
- Move throttle to idle position.
- Disengage all power to the attachment.
- Shut off engine and remove the key.

Wait until the rotor has stopped completely before inspecting the attachment.

Safety Rules

These are general safety considerations. Additional precautions may be necessary to operate your machine in a safe manner. Be certain you are operating your machine in accordance with all safety codes, OSHA rules and regulations, insurance requirements and local, state, and federal laws.

- Read and observe all warnings decals on the machine before attempting to operate the attachment. Do not attempt to operate this attachment unless all factory devices and decals are in place. Keep safety decals clean of dirt and grime. Keep all guards, shields and decals in place.
- Remove from area of operation all foreign objects such as bottles, rocks, wire, etc., that might become tangled in the rotor, causing damage to the machine or be thrown striking other objects.
- Do not allow any people and animals within 300 feet of the machine and attachment during operation.
- Do not allow anyone to operate the attachment until he or she has read the owner's manual and is completely familiar with all safety precautions. Keep the work area clear of all unauthorized personnel.
- Do not allow persons under the influence of alcohol, medications, or other drugs that can impair judgment or cause drowsiness to operate or maintain the machine.
- Always use an approved roll bar and seat belt for safe operation. Overturning a machine without a roll bar and seat belt can result in injury or death.
- Use the handholds and step plates when getting on and off the machine to prevent falls. Keep steps and platform cleared of mud and debris.
- Always have an operator in the machine while the attachment is in operation. Never leave the machine and attachment running and unattended.
- Operate the attachment only from the operator's seat.
- Keep your feet on the pedals (floor plates), seat belt fastened tightly, and seat bar lowered (if equipped), when operating the attachment.
- Never attempt to make any adjustments while the attachment is running or the key is in the "ON" position in the machine. Before leaving the operator's position, disengage power to the attachment, shut off engine and remove ignition key.
- Disengage auxiliary hydraulics and place all machine controls in neutral and engage the parking brake before starting the engine.
- Become familiar with and know how to operate all safety devices and controls on the machine and attachment before attempting to operate. Know how to stop the machine and attachment before starting it.
- Repeated impact of the knives with hard objects can cause excessive wear and damage to the power unit or attachment. Be sure to maintain recommended ground clearance as specified in this manual.
- Should excessive vibration occur, disengage the auxiliary hydraulics immediately and shut off engine. Do not continue to operate the attachment until the problem has been determined and corrected.
- Do not start, operate, or work on this attachment until you have carefully read and thoroughly understand the contents of this manual and the operator's manual for your machine.
- Keep children, bystanders and other workers off and away from the machine and attachment during operation. No riders allowed.
- Before inspecting, cleaning, lubricating, adjusting or servicing any part of the attachment, always exercise the Mandatory Shut-Down Procedure. See "Mandatory Shut-Down Procedure" on page 6. After service has been performed, be sure to restore all guards, shields and covers to their original position.

Safety Instructions

Safety Rules (Cont'd)

- Make sure the operator's area is clear of any distracting objects. Keep work areas clean and free of grease and oil to avoid slipping or falling.
- Make sure all controls, (levers, pedals and switches), are in NEUTRAL position before starting the engine.
- Before leaving the operator's position for ANY reason or allowing anyone to approach the machine and attachment, always perform the mandatory shutdown procedure.
- Do not wear loose hanging clothes, neckties or jewelry around rotating parts. Long hair is to be placed under a cap or hat. These precautions will help prevent you from becoming caught in any moving parts on the machine and attachment.
- Before working under the attachment, be certain it is securely blocked!
- Do wear safety glasses, ear protection, respirators, gloves, hard hats, safety shoes and other protective clothing when required.
- Periodically check all guards, shields and structural members. Replace or repair anything that could cause a potential hazard.
- Do not replace components or parts with other than factory-recommended service parts. To do so may decrease the effectiveness of the machine.
- It is the operator's responsibility to be aware of machine and attachment operation and work area hazards at all times.
- Never operate the attachment without adequate light and visibility.
- Keep hands and feet clear! Never step over or climb over the attachment while the rotor is engaged or the engine is running; entanglement could occur.
- Operators are responsible to know the location and function of all guards and shields including but not limited to belt drives and rotor. Operators are responsible to make certain that all guards are in place when operating the machine and attachment.
- Operators are responsible to be aware of safety hazard areas and follow instructions on warning, caution, or danger decals applied to the machine.

- Know the area before operating the machine. Be aware of power lines or other equipment.
- Do not lubricate parts while the machine is running.
- Do not smoke while servicing the machine.

Hydraulic Safety

- The hydraulic system is under high pressure. Make sure all lines and fittings are tight and in good condition. These fluids escaping under high pressure can have sufficient force to penetrate skin and cause serious injury.
- Never check for leaks by using any part of your body to feel for escaping fluid.



WARNING: *Contact with high pressure fluids may cause fluid penetration and burn hazards. Fluid that is under pressure can penetrate body tissue. Fluid penetration can cause serious injury and possible death. If fluid is injected into the skin, seek medical attention immediately!*

California Proposition 65 Warning



WARNING: *This product can expose you to Mineral Oil, which is known to the State of California to cause cancer. For more information, go to www.p65warnings.ca.gov.*

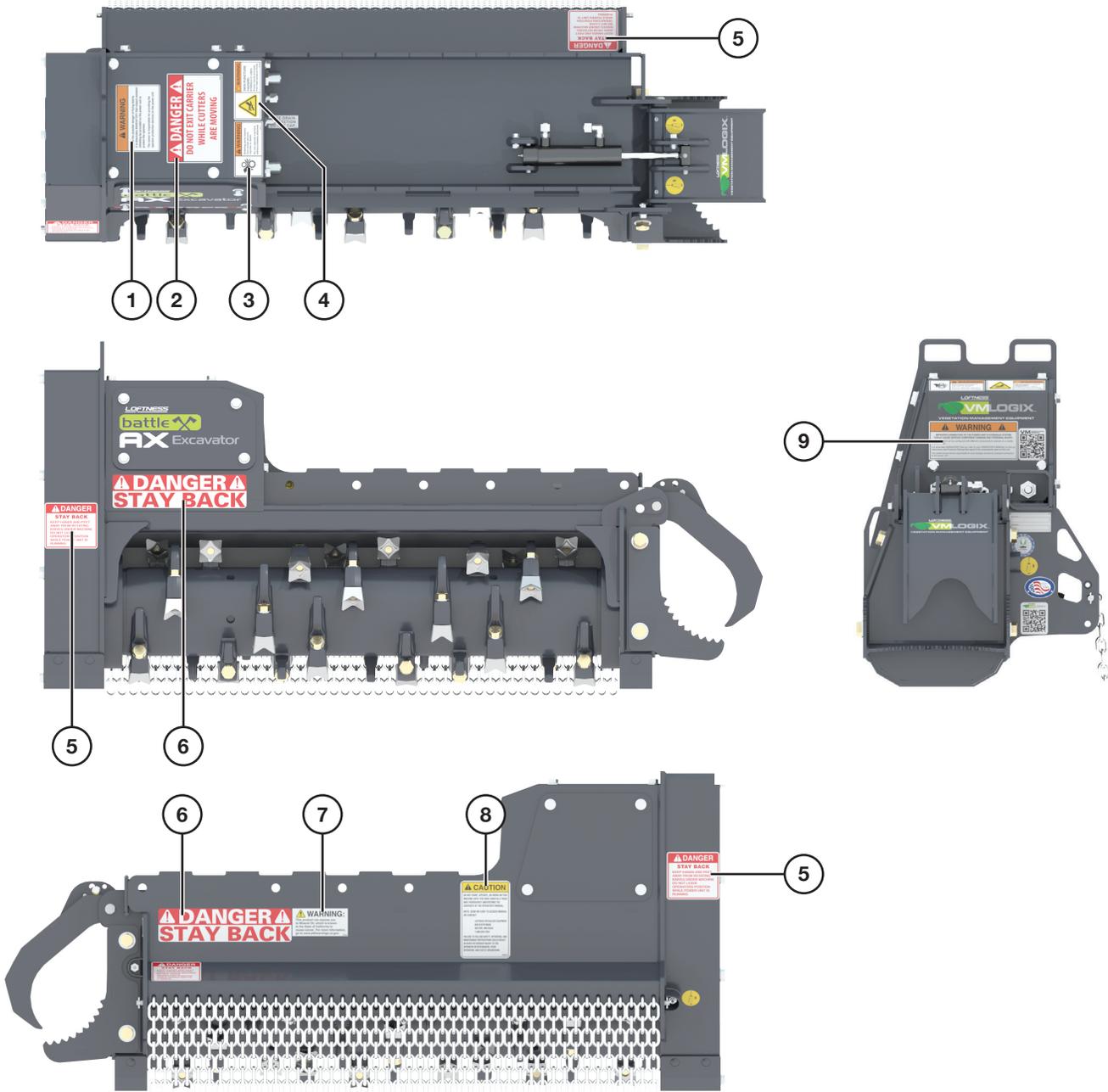
A decal with this warning statement is adhered to the machine. If the decal should become worn or missing, replace immediately.

Safety Instructions

Safety Decal Locations

Check and replace any worn, torn, hard to read or missing safety decals on your machine.

NOTE: This section shows where safety-related decals are applied on the machine. For all machine decals see “Machine Decals and Signs” on page 52.



See the following page for detailed images of the safety decals called out above.

Safety Decal Locations (Cont'd)



Part No. N17013



Part No. 4334



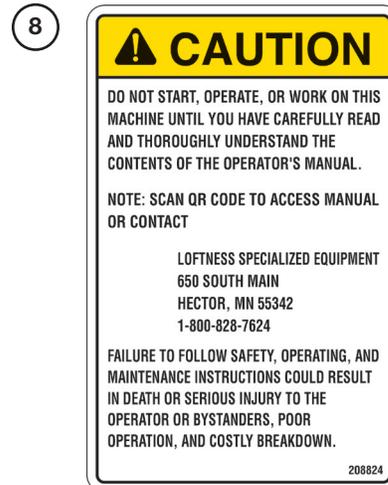
Part No. 200491



Part No. 203264



Part No. N68716



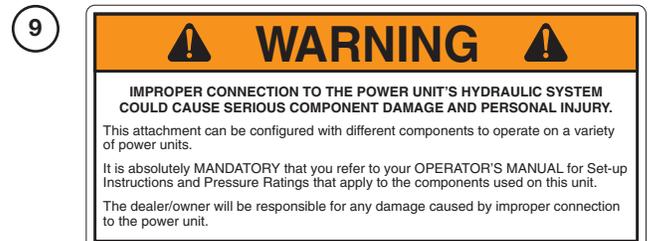
Part No. 208824



Part No. N23506



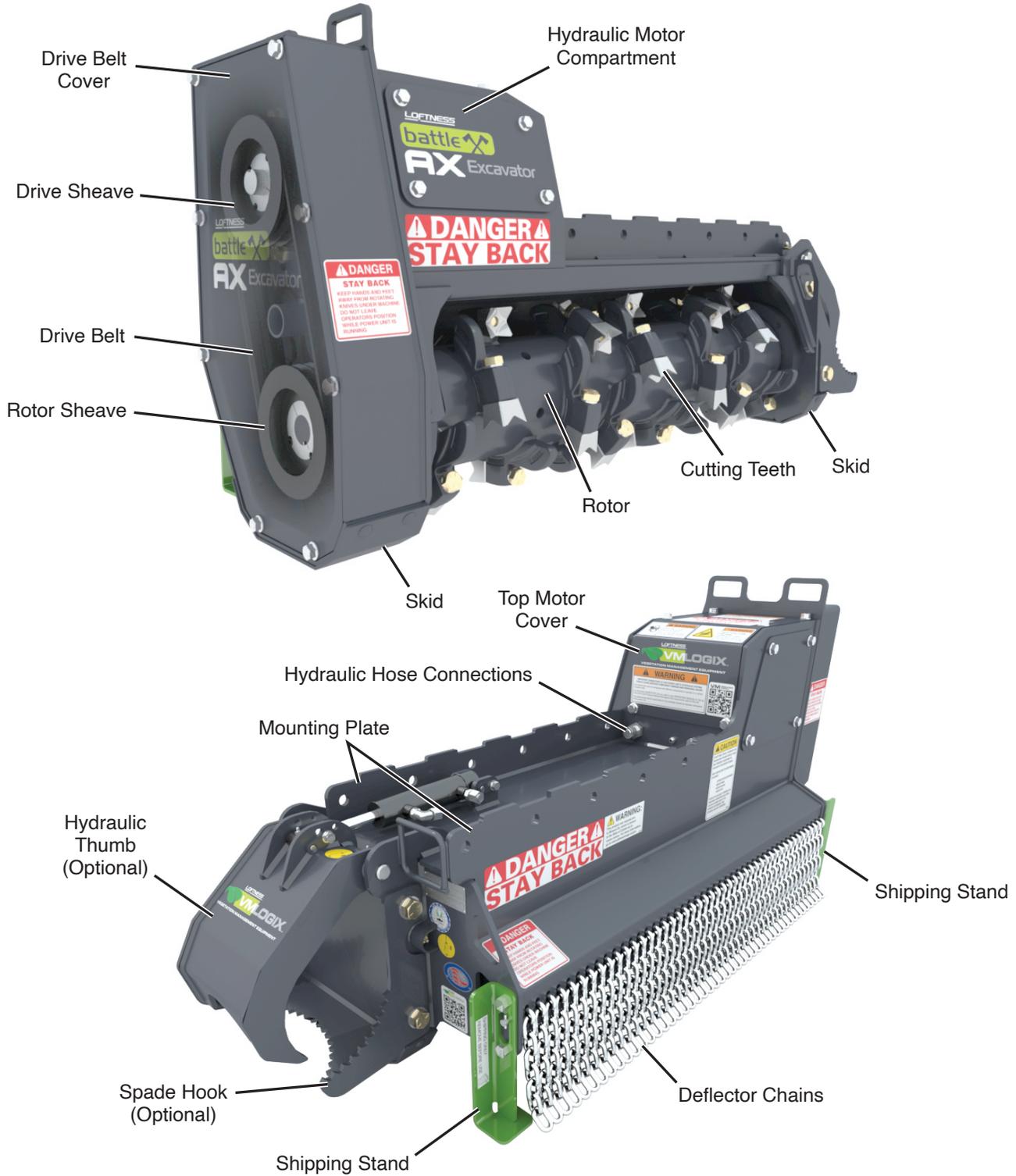
Part No. N28386



Part No. N28385

Safety Instructions

Battle Ax Identification



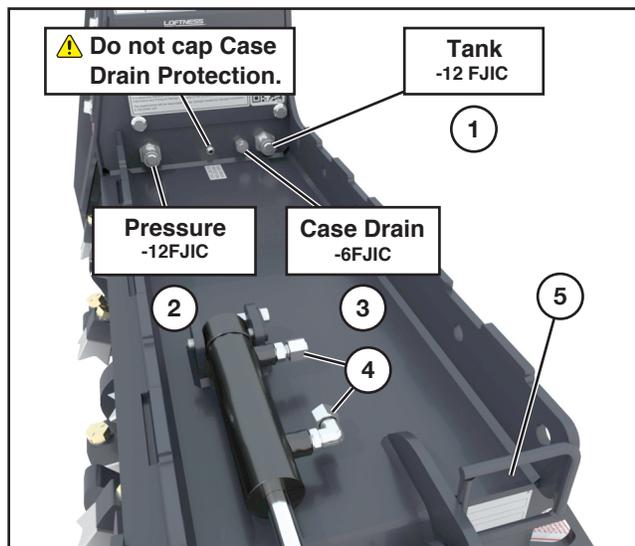
Set-up Instructions

Hydraulic Connections

NOTE: Hoses and couplers from the power unit to the Battle Ax are NOT included.



WARNING: Hydraulic Lines. Protect hands and body from high pressure fluids. Pressurized fluids can penetrate the skin. Disconnect and lock out power source before disconnecting and/or connecting hydraulic hoses.



Connect hydraulic hoses (not included with the Battle Ax) from the excavator to the Battle Ax. See below for hose requirements.

1. **Tank;** -12FJIC
2. **Pressure;** -12FJIC
3. **Case Drain;** -6FJIC
4. **Hydraulic Thumb** (if equipped); -6FJIC

NOTE: Route hoses through ring (5) on frame.

IMPORTANT: It is highly recommended that you use a case drain line, if available. Always set the auxiliary hydraulic circuit on your power unit to "One Way/Continuous Flow" mode. If your power unit does not have that mode available, you will need to add a case drain line.

Minimum case drain hose size is 1/2 in. It is recommended that the hose connects directly to the hydraulic reservoir.

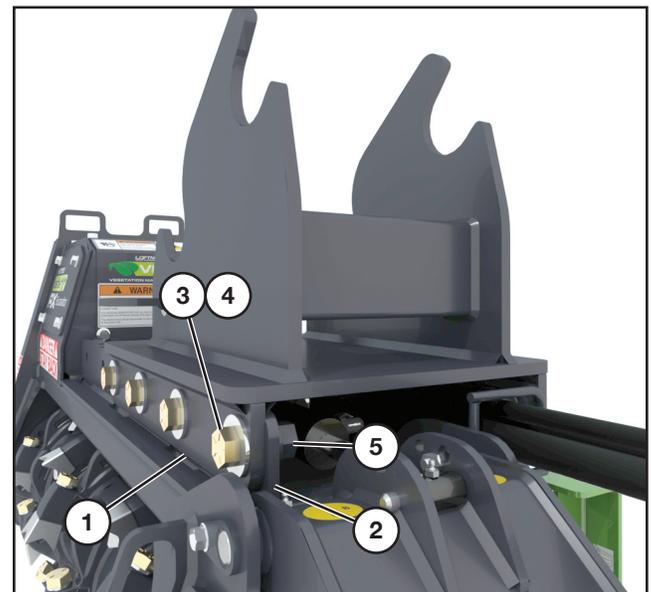
NOTE: Use 3/4" hoses for the Pressure and Tank hydraulic lines. Using smaller diameter hoses will decrease hydraulic efficiency.

IMPORTANT: It is the owner's responsibility to assure that the hydraulic hoses from the power unit to the attachment are not caught in pinch points, or in any way damaged by moving parts. Make sure hoses are secured closely to the excavator's boom to avoid getting caught in tree branches.

Mounting the Battle Ax to the Excavator

For a mounting bracket specific to your model of excavator, contact Loftness.

NOTE: Make sure hydraulic hoses are connected to the Battle Ax before installing the mounting bracket. This includes the hydraulic hoses for the optional thumb (not shown below).



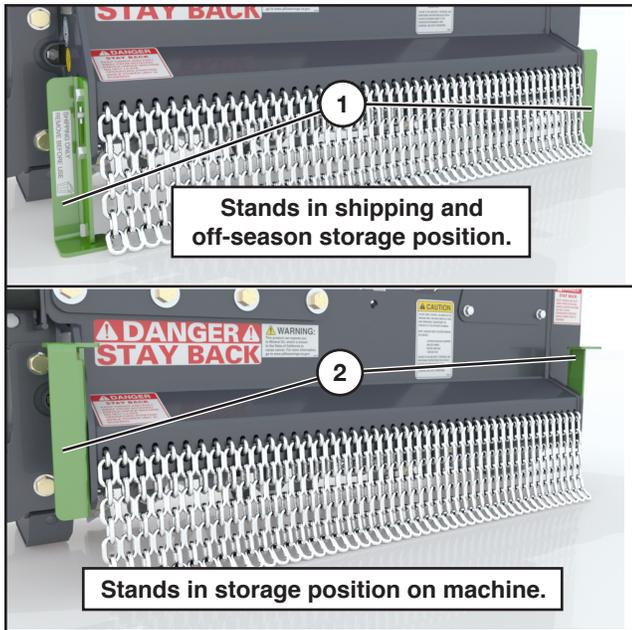
Bolt the base mount (1) to the mounting plate (2) using the eight bolts (3) with washers (4) (four on each side). Thread through the bolt plate (5) (one on each side) and tighten.

Align excavator boom and connect to the mounting bracket.

Verify connection from excavator to mounting bracket is secure.

Set-up Instructions

Shipping Stands

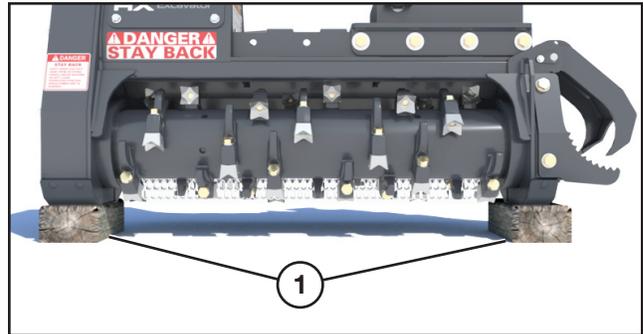
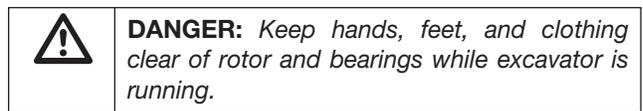


Stands (1) are secured to the Battle Ax to keep it stable during shipping. These can be removed after the unit is initially mounted to the excavator and stored in a secure location. The shipping stands can also be rotated and reinstalled in the configuration shown above to be stored on the machine.

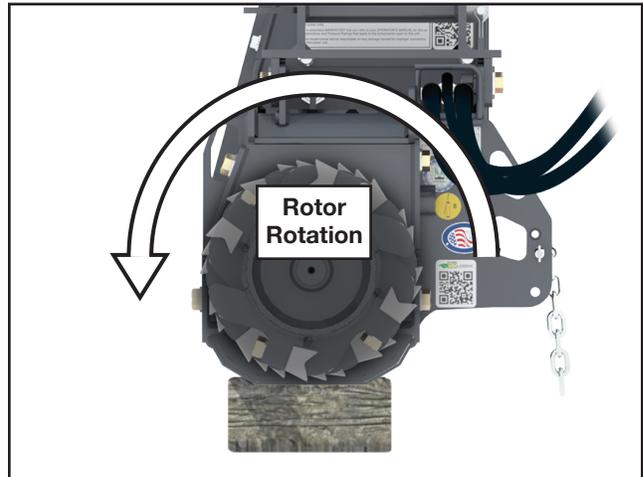
When the stands are in the shipping position, the bottom bolt uses a washer and nut. The top bolt is inserted into a weld-nut on the machine frame.

NOTE: Do not discard the shipping stands. They are used to stabilize the Battle Ax during storage. See "Storage" on page 23

Checking Rotor Rotation



Raise the Battle Ax off the ground and place blocks (1) underneath the skids. Lower the Battle Ax down on the blocks.



Engage the excavator auxiliary hydraulics, the rotor should start rotating in a forward direction as shown above.

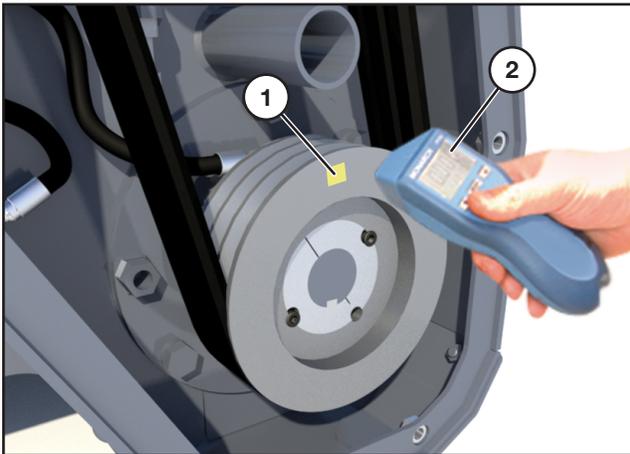
NOTE: If the rotor is rotating backward, shut down the excavator. Switch the TANK and PRESSURE connections. Once connected, restart the excavator, engage the excavator auxiliary hydraulics and test for correct rotor rotation.

Checking Rotor Speed



DANGER: Shut down power from the excavator before removing the bearing cover and applying reflective tape to rotor shaft end. Keep the Battle Ax skids on blocks for this procedure.

Remove the belt cover. See “Removing Belt Cover” on page 19 for instructions.



Apply a small piece of reflective tape (1) to the outer edge of the lower sheave.

Start the excavator and engage the excavator auxiliary hydraulics.



DANGER: Keep hands, feet, and clothing clear of rotor and bearings while excavator is running.

Point an electronic (photo) tachometer (2) towards the edge of the sheave to check the rotor speed.

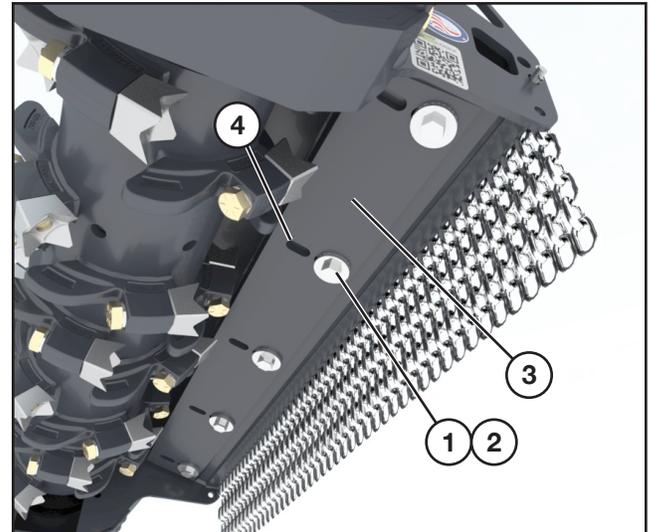
NOTE: The tachometer shown is not supplied with the Battle Ax.

Test the rotor RPM with excavator engine at full throttle.

Shut down the excavator when done.

See “Motor & Sheave Selection Chart” on page 24 for rotor RPM. If it is outside this recommended range, it may be necessary to disconnect the Battle Ax and test the hydraulic output of the excavator with a flow meter to see if it corresponds with the factory specifications.

Cutter Bar Adjustment



NOTE: The cutter bar can be adjusted back or forward to increase or decrease the distance between the bar and the rotor.

Most operators find the best performance is achieved by adjusting the cutter bar as close as the slots will allow (approximately a 1/4" gap from knife to cutter bar). A wider gap generally increases finished partical size and horsepower requirements.



WARNING: Shut down and disconnect the hydraulic hoses from the excavator before adjusting the cutter bar.

Loosen the series of bolts (1) with washers (2) securing the cutter bar (3) to the frame. Move the cutter bar either forward or back making sure the distance moved is consistent through the entire length of the cutter bar. Retighten bolts.

Over time, the cutter bar edge will become worn and rounded from use. There are a total of 4 wear edges available by removing and flipping the bar, side to side and front to back.



CAUTION: If adjusting the cutter bar after the machine has been used, the cutter bar should be completely removed to clear any debris away from contact surfaces before assembly and tightening. FAILURE TO DO SO COULD RESULT IN SEVERE DAMAGE TO THE MACHINE!



Operating Instructions

Getting Started

Visually inspect the unit before starting the machine up. Check for loose or missing parts. Check all bolts for tightness.

For best results, the areas to be mowed should be free of debris such as bottles, metal objects, rocks, wire, etc.

For first-time users, start the machine in a clear, open area and become familiar with the controls. Run throttle at half speed and travel at a low speed. Raise the mulching head only slightly until comfortable with the machine.



WARNING: Due to the potential danger of flying debris, it is the owner's responsibility and is "ABSOLUTELY MANDATORY that IMPACT-RESISTANT SHIELDING" be installed on the machine to protect the operator.



WARNING: Lifting or tilting the Battle Ax increases the risk of flying debris.



DANGER: Keep hands and feet out! Do not step on or climb over the unit while machine is in operation, or engine is running. Do not carry passengers.



WARNING: Do not operate the attachment above the rated RPM. Check with your Loftness dealer to be sure your attachment is set-up with the correct hydraulic motor to match the hydraulic flow GPM (Gallons Per Minute) of your machine.



WARNING: Flying debris can gather on the excavator and needs to be cleaned off, especially around the radiator and oil cooler screens, engine compartment and exhaust areas. Periodic cleaning will help prevent the possibility of fire.



DANGER: DO NOT allow ANY people or animals within 300 feet of the work area while operating this machine.

Operation



WARNING: Always stop engine and remove key before leaving operators seat.

Lower mulching head so skids are on ground.

Set engine speed to one-third throttle and engage the mulching head.

Slowly increase engine speed to high idle.

NOTE: Always position head to discharge away from power unit and operator.

Operating Tips

To reduce rotor jams, approach brush and trees at a slow speed.

When operating the mulching head near the ground, keep as low to the ground as possible without the teeth striking ground or other obstructions.

NOTE: Because of the high speed of the rotor, the life of the teeth will be reduced if it is operated in rocky terrain or in areas where many obstacles are present.

For tall brush, raise the mulching head and start mulching the top, then proceed lower and work down to the ground. Raise the mulching head, then move forward and repeat.

When mulching large trees, work from the top down.

In wet conditions, operate at a slower speed and periodically inspect the mulching head for caking and clogging in the rotor area.

Clearing Jams

If the rotor stalls, or gets jammed with debris, stop rotor and turn rotor backwards by rolling on ground or stump. Start rotor again to free debris.



WARNING: Do not attempt to dislodge jams by hand while the excavator is running. Shut down and lock out power from the excavator before attempting to remove debris by hand.

Operating Instructions

Thumb (Optional)

IMPORTANT: *Disengage hydraulic power to rotor before lifting logs and brush with thumb.*



Tilt front end of the mulching head up and use the thumb to lift and move logs and rocks.

Detaching Battle Ax

Park excavator on a dry level surface. Turn power off to the Battle Ax and install shipping stands. See “Shipping Stands” on page 12 for reference.

Lower the Battle Ax to the ground.

Shut off engine and remove key.

Disconnect hydraulic hoses.

Detach excavator boom from the mounting bracket.



WARNING: *Do not attempt to detach the Battle Ax or add the shipping stands while the excavator is running. Shut down and lock out power from the excavator before detaching.*

General Maintenance

To ensure efficient operation, you should inspect, lubricate, and make necessary adjustments and repairs at regular intervals. Parts that are starting to show wear should be ordered ahead of time, before a costly breakdown occurs and you have to wait for replacement parts. Keep good maintenance records, and adequately clean your Battle Ax after each use.

Proper lubrication is important. Too little lubricant will cause premature failure of a bearing. Too much lubrication usually causes high operating temperature and early failure of seals. Follow all lubrication instructions and schedules included in this section.

Maintenance Schedule

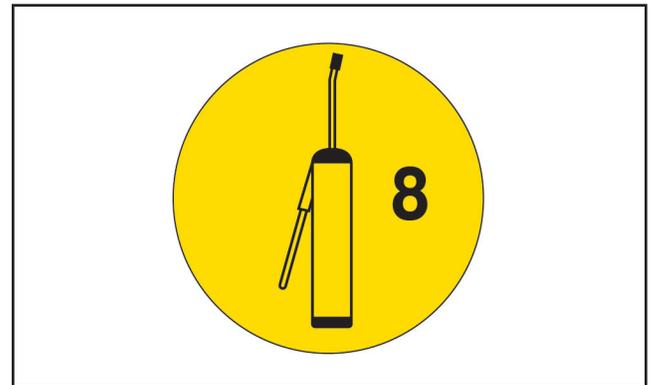
HOURS	SERVICE POINTS	SERVICE REQUIRED					
		CHECK	CLEAN	CHANGE	GREASE	ADJUST	OIL
Every 8	Machine		X				
	Loose Bolts					X	
	Hoses and Wiring	X					
	Oil Leaks	X					
	Rotor Bearing				X		
	Teeth	X					
Every 100	Safety Labels	X					
Every 500	Hydraulic Motor	X					X

Lubrication

Grease Points Location

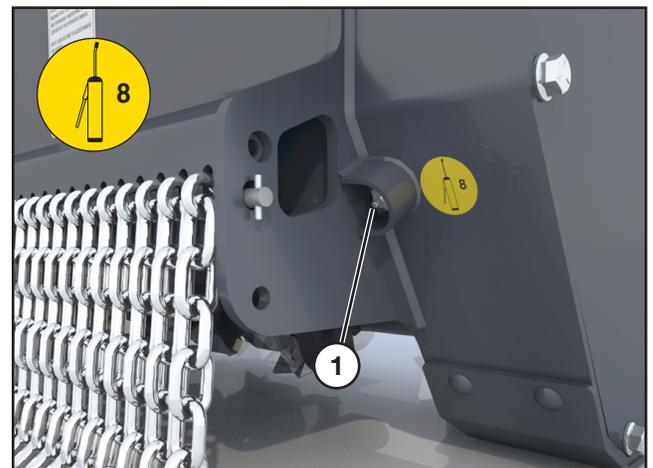
Use a #2 general purpose lithium based grease unless noted otherwise.

NOTE: Replace any broken or missing grease fittings. Be sure to clean fittings before greasing.



NOTE: Lubricate the grease point every "X" hours indicated on the decal adjacent to the grease point.

See "Battle Ax Identification" on page 10 for component location and identification.



Location: Belt end rotor bearing (1).

Interval: Every 8 hours of operation.

Maintenance

Lubrication (Cont'd)

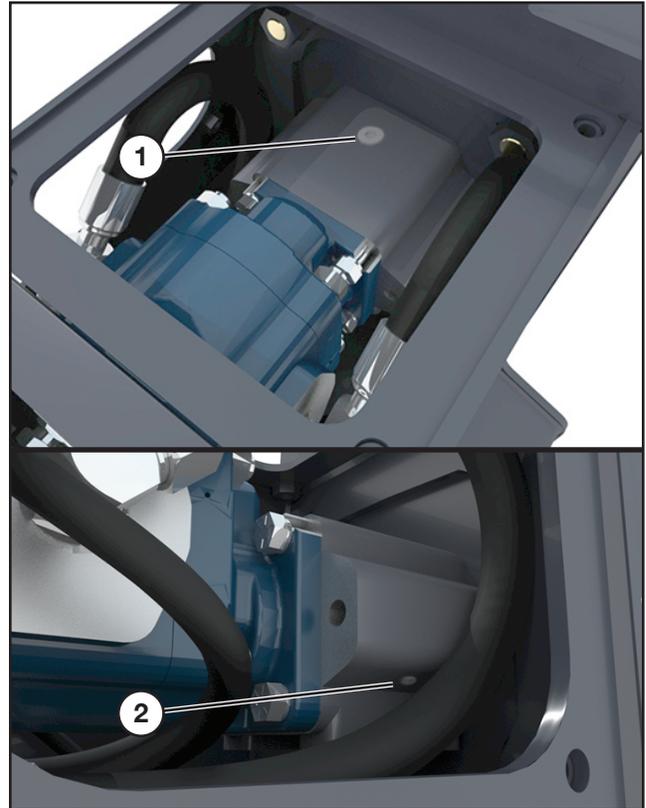
Grease Points Location (Cont'd)



Location: Hook end rotor bearing (2).
Interval: Every 8 hours of operation.

Overhung Load Adapter

The motor covers must be removed to access the overhung load adapter. Refer to “Removing Motor Access Covers” on page 19 for instructions.



Remove the plug from the port (1) located on the top of the overhung load adapter, and the plug from the lower port (2) located on the back side.

Partially tilt the Battle Ax to drain the hydraulic oil.

Reinsert the lower plug and tighten.

Using a funnel placed into the top port of the overhung load adapter, add 4 oz. of universal hydraulic fluid.

Return the plug back into the top port and tighten.

NOTE: *If replacing bearings or seals in the overhung load adapter, be certain to refill with hydraulic fluid after reassembly.*

Removing Belt Cover



DANGER: Shut down and lock out power from the excavator before removing the belt cover. Failure to do so could result in serious injury or death.



To remove the belt cover (1), unscrew the eight bolts (2) and lift the cover off of the frame.



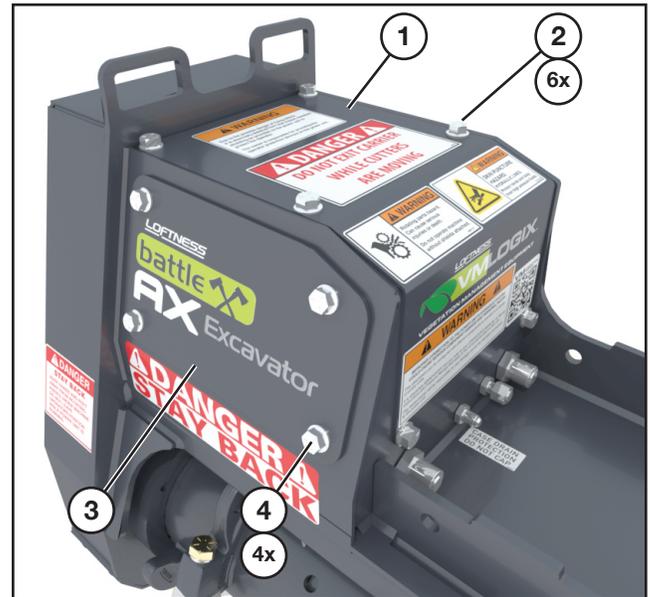
CAUTION: The belt cover is heavy. Support the cover when removing.

When maintenance/repairs are complete, return the covers back into position and tighten and secure all bolts.

Removing Motor Access Covers

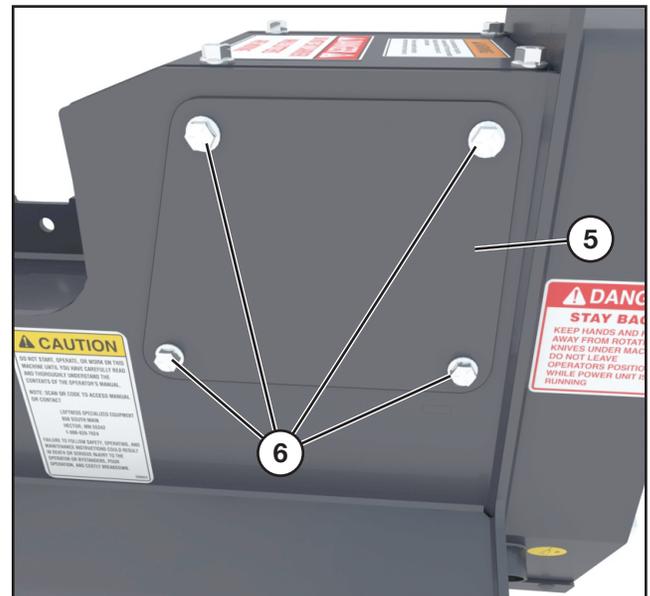


DANGER: Shut down and lock out power from the excavator before removing the top motor cover. Failure to do so could result in serious injury or death.



To remove the top motor access cover (1), unscrew the six bolts (2) and lift the cover off of the frame.

To remove the front motor access cover (3), unscrew the four bolts (4) and lift the cover off of the frame.



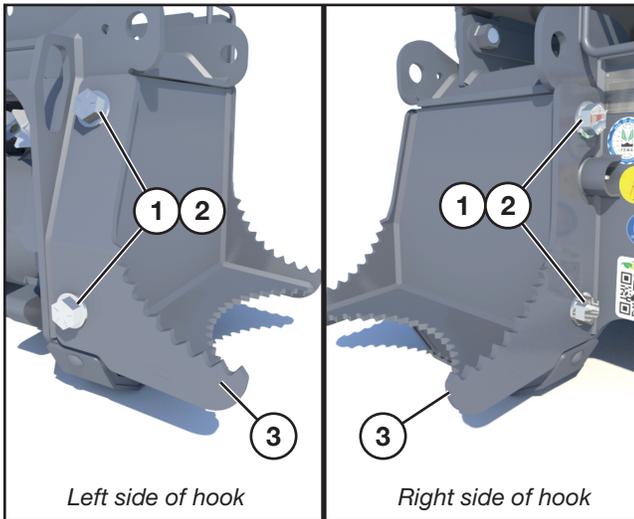
To remove the rear motor access cover (5), unscrew the four bolts (6) and lift the rear cover off of the frame.

When maintenance/repairs are complete, return the cover back into position and tighten and secure all bolts.

Maintenance

Removing Hook

 **DANGER:** Shut down and lock out power from the excavator before removing the hook. Failure to do so could result in serious injury or death.



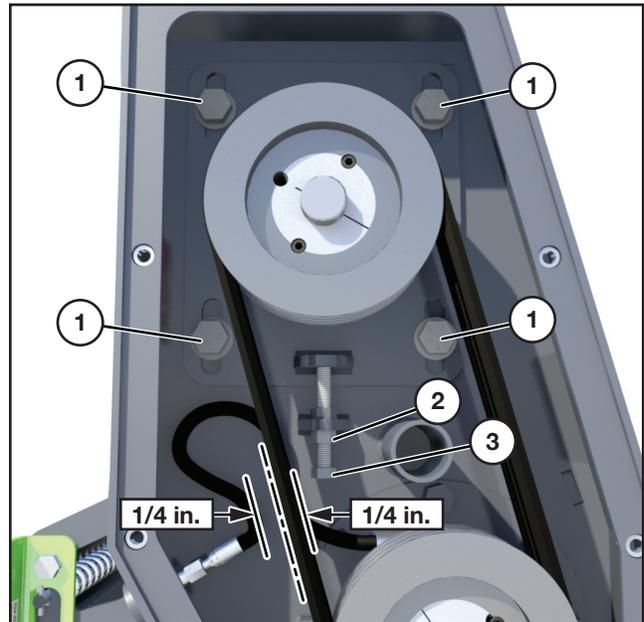
Remove the four bolts (1) with washers (2) - [two on each side] and lift the hook (3) off of the frame.

 **CAUTION:** The hook is heavy. Support the hook when removing.

Belt Adjustment

 **WARNING:** Shut down and lock out power from the excavator before adjusting the drive belt. Failure to do so could result in serious injury or death.

Remove the belt cover. Refer to “Removing Belt Cover” on page 19 for instructions.



Loosen the four overhung load adapter support bolts (1) on the motor mount bracket.

Loosen the jam nut (2).

Turn the hex nut (3) to either increase or decrease belt tension. Tighten the jam nut to lock

Belt should move no more than 1/4 in. (6.35 mm) to the left, and no more than 1/4 in. (6.35 mm) to the right when pressure applied at the midpoint.

Retighten overhung load adapter support bolts.

Replacing Belt

To replace the belt, follow the procedures for “Belt Adjustment” preceding this subsection and decrease the belt tension additionally to allow the belt to slide over the top sheave.

NOTE: When replacing or installing a new belt, align the grooves in the belt with the upper and lower pulleys.

Install the belt and adjust the tension accordingly. Refer again to the “Belt Adjustment” procedure and follow the instructions completely.

Sheave Removal

The steps to remove either the upper or lower sheave are identical. For this procedure the upper sheave is discussed. Follow the same procedure to remove the lower sheave.

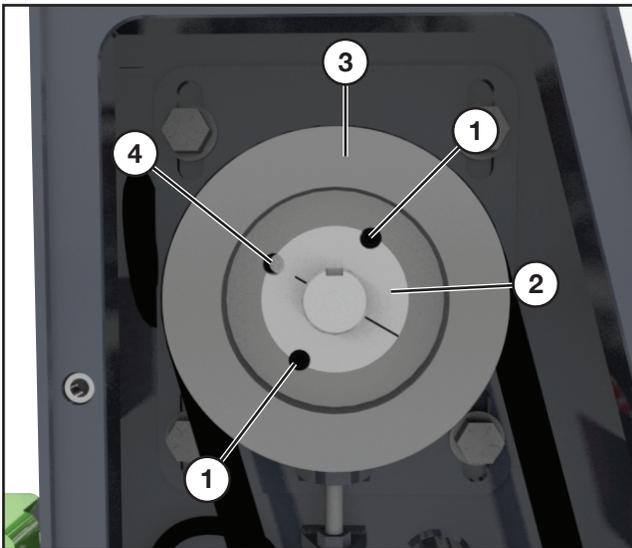
NOTE: See pages 41 through 45 for an exploded view and parts listing for all belt/sheave combinations.

1. Disconnect or turn off all power to the Battle Ax.



DANGER: Shut down and lock out power from the excavator before removing sheaves. Failure to do so could result in serious injury or death.

Remove the drive belt by following the instructions in "Belt Adjustment" and "Replacing Belt" on page 20.



2. Remove the two screws (1) from the taper lock bushing (2) of the sheave (3).
3. Insert one of the screws into the threaded hole (4).
4. Tighten the screw until bushing grip is released. (If excessively tight, lightly hammer face of sheave using drift pin or sleeve).

NOTE: Never hit sheave directly with hammer.

5. Replace the sheave by cleaning the shaft, bore of bushing, outside of bushing and hub bore of all oil, paint and dirt. File away any burrs.

6. Insert bushing into hub. Match the hole pattern, not threaded holes (each complete hole will be threaded on one side only).
7. Apply a thread-locking compound to screws and thread into the two opposing holes.
8. Position assembly on shaft and alternately torque screws to 35 ft.-lbs.
9. To increase gripping force, hammer face of bushing using drift or sleeve.

NOTE: Do not hit bushing directly with hammer.

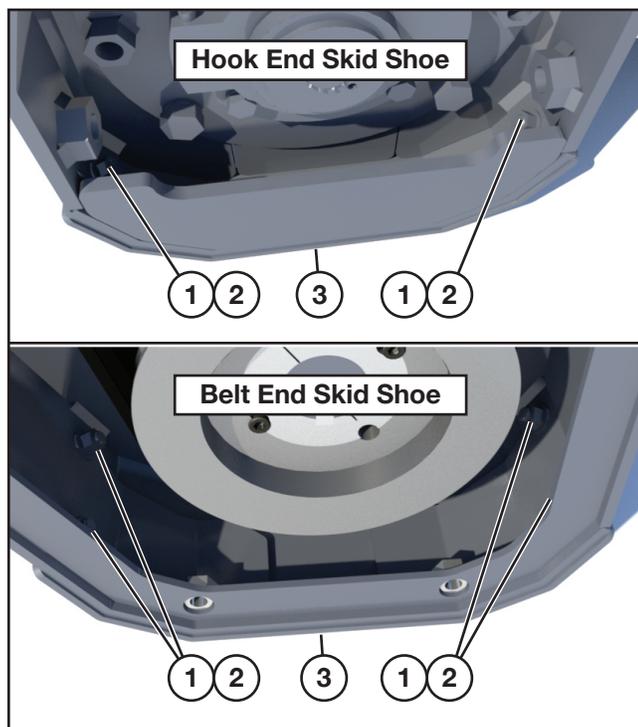
10. Re-torque screws after hammering.
11. Recheck screw torque after initial run-in, and periodically thereafter, repeat steps 4, 5 & 6 if loose.
12. Check alignment of the sheave. Repeat sheave removal and assembly procedures if necessary.

Maintenance

Skid Removal/Replacement

 **WARNING:** Shut down and lock out power from the excavator before removing skids.

Lift the Battle Ax off of the ground about 6 inches. Place blocks under the rotor (not under teeth) to support the shredder when lowered. DO NOT place blocks under the skids.



For the hook end skid shoe, first remove the hook. Refer to “Removing Hook” on page 20 for instructions.

For the belt end skid shoe, first remove the belt cover. Refer to “Removing Belt Cover” on page 19 for instructions.

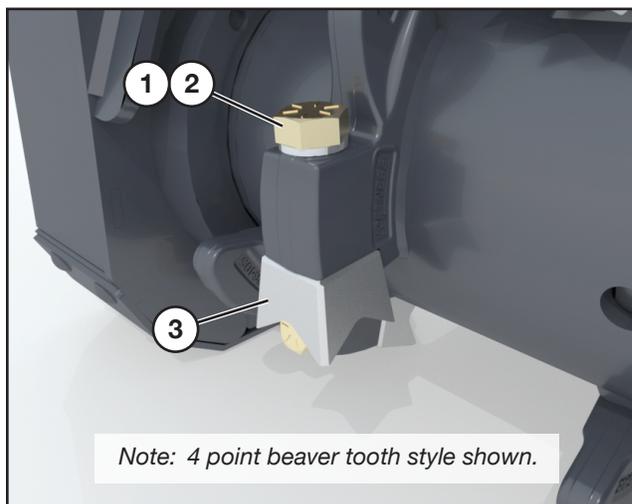
Remove nuts (1) and slide carriage bolts (2) out. Lower the skid (3) and remove.

NOTE: There are two sets of hardware on the hook end skid shoe, and four sets of hardware on the belt end skid shoe.

To install new or repaired skid shoe, align holes in skid shoe with holes on frame. Re-install the bolts, add the nuts and tighten securely.

Tooth Removal and Installation

 **DANGER:** Shut down and lock out power from the excavator before removing teeth. Failure to do so could result in serious injury or death.



Remove the bolt (1), washer (2), and tooth (3).

Use copper based anti-seize when reinstalling the bolts. Torque to 200 ft.-lbs.

IMPORTANT: When a damaged tooth is replaced, the tooth directly opposite (180 degrees) must be replaced at the same time to retain balance.

Tooth Sharpening

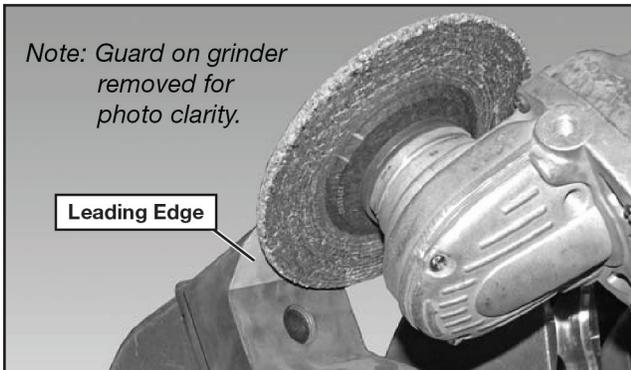
NOTE: The teeth need to be kept sharp to maintain the most effective operation of the attachment. Daily inspection and touch up is recommended.

NOTE: The teeth can either be removed from the attachment or remain installed for sharpening.

 **WARNING:** Rotor must be stabilized to prevent accidental rotation any time the rotor is exposed for service work.

(Procedure continued on following page.)

Tooth Sharpening (Cont'd)

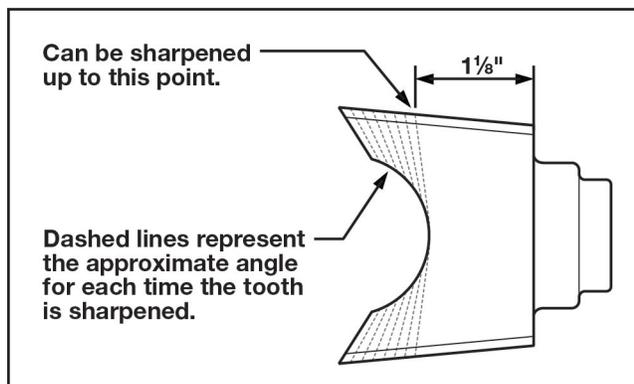


NOTE: The cutter teeth have been heat treated to a specific hardness. Care must be taken to avoid overheating the leading edge of the tooth while sharpening. If the coloring in the tooth changes to either a blue or brown during the sharpening, you have removed the temper and the tooth will not hold its cutting edge.

NOTE: When re-sharpening teeth using machine shop equipment, avoid overheating the teeth by using a flood coolant system.

NOTE: When re-sharpening teeth using a hand grinder, avoid overheating the tooth by lightly grinding each tooth, moving across the entire row of teeth before returning to the first tooth to repeat the procedure.

NOTE: Sharpen each tooth equally to maintain rotor balance. Always return tooth to its original location if it is removed from the rotor for sharpening.



NOTE: It is not necessary to match the factory angle on the underside of the cutting edge when re-

sharpening. Sharpen each tooth at a slight angle for each successive sharpening (represented by the dashed lines shown in the illustration above). When the cutting edge of the tooth is 1-1/8 in. from the back side of the tooth, the tooth must be replaced.

Storage

End of Season

- Place stands in off-season storage position. See "Shipping Stands" on page 12.
- Clean entire Battle Ax thoroughly.
- Lubricate all parts of the machine. See "Lubrication" on page 17.
- Make a list of all worn or damaged parts and replace them.
- Paint all parts that are worn or rusted.
- Store Battle Ax in a clean, dry area.
- Review the Battle Ax operator's manual.

Beginning of the Season

- Review the Battle Ax operator's manual.
- Lubricate all parts of the machine. See "Lubrication" on page 17.
- Tighten all bolts, nuts, and set screws. See "Torque Specifications" on page 57.
- Replace all damaged, worn or missing decals.
- Install the Battle Ax on an excavator and test for proper operation.
- Ensure stands are stored away or placed into storage position. See "Shipping Stands" on page 12.



WARNING: DO NOT allow ANY people or animals within 300 feet of the work area while operating this machine.

Maintenance

Motor & Sheave Selection Chart

GPM	DISPLACEMENT	LOFTNESS PART NUMBER	ROTOR RPM	TOP SHEAVE (LOFTNESS NUMBER) BOTTOM SHEAVE (LOFTNESS NUMBER) BELT LENGTH (LOFTNESS NUMBER)
15	45cc (2.75ci)	208355	1751	Top Sheave 8.6" N16134 1.5" Taperlock 8126 Bottom Sheave 6.2" N34043 1.75" Taperlock 8127 Belt 8403 Model Code "A"
16			1867	
17			1984	
18			2100	
19			2217	
20			1979	Top Sheave 8.0" N17045 1.5" Taperlock 8126 Bottom Sheave 6.8" N11421 1.75" Taperlock 8127 Belt 8403 Model Code "B"
21			2079	
22			2178	
23			2276	Top Sheave 7.4" N34689 1.5" Taperlock 8126 Bottom Sheave 7.4" N34689 1.75" Taperlock 8127 Belt 8403 Model Code "C"
24			2019	
25			2103	
26			2187	
27			2271	Top Sheave 6.8" N11421 1.5" Taperlock 8126 Bottom Sheave 8.0" N17045 1.75" Taperlock 8127 Belt 8403 Model Code "D"
28			2002	
29			2073	
30			2145	
31			2217	Top Sheave 6.2" N34043 1.5" Taperlock 8126 Bottom Sheave 8.6" N16134 1.75" Taperlock 8127 Belt 8403 Model Code "E"
32			1941	
33			2001	
34			2062	
35	2122			

Troubleshooting

PROBLEM	CAUSE	SOLUTION
Excessive vibration.	Broken or missing teeth.	Replace teeth.
	Mud and/or debris wrapped around the rotor.	Clean the Battle Ax.
	Faulty rotor bearing.	Replace bearing(s).
	Damage to rotor (includes bent end of shafts, missing balance weights, or actual rotor deformity from striking rocks, etc.)	Consult factory.
Uneven cutting.	Teeth dull or worn excessively.	Replace teeth.
	Engine RPM too slow.	Adjust machine RPM to full throttle.
	Travel speed too fast.	Reduce travel speed.
Rotor will not turn, or turns slowly.	Low oil.	Check oil level in excavator. Add if necessary.
	Low oil flow.	Check flow control on excavator.
	Oil filter plugged.	Replace excavator oil filter.
	Faulty rotor bearing.	Replace bearing(s).
	Rotor jammed.	Remove material from rotor. See "Clearing Jams" on page 15.

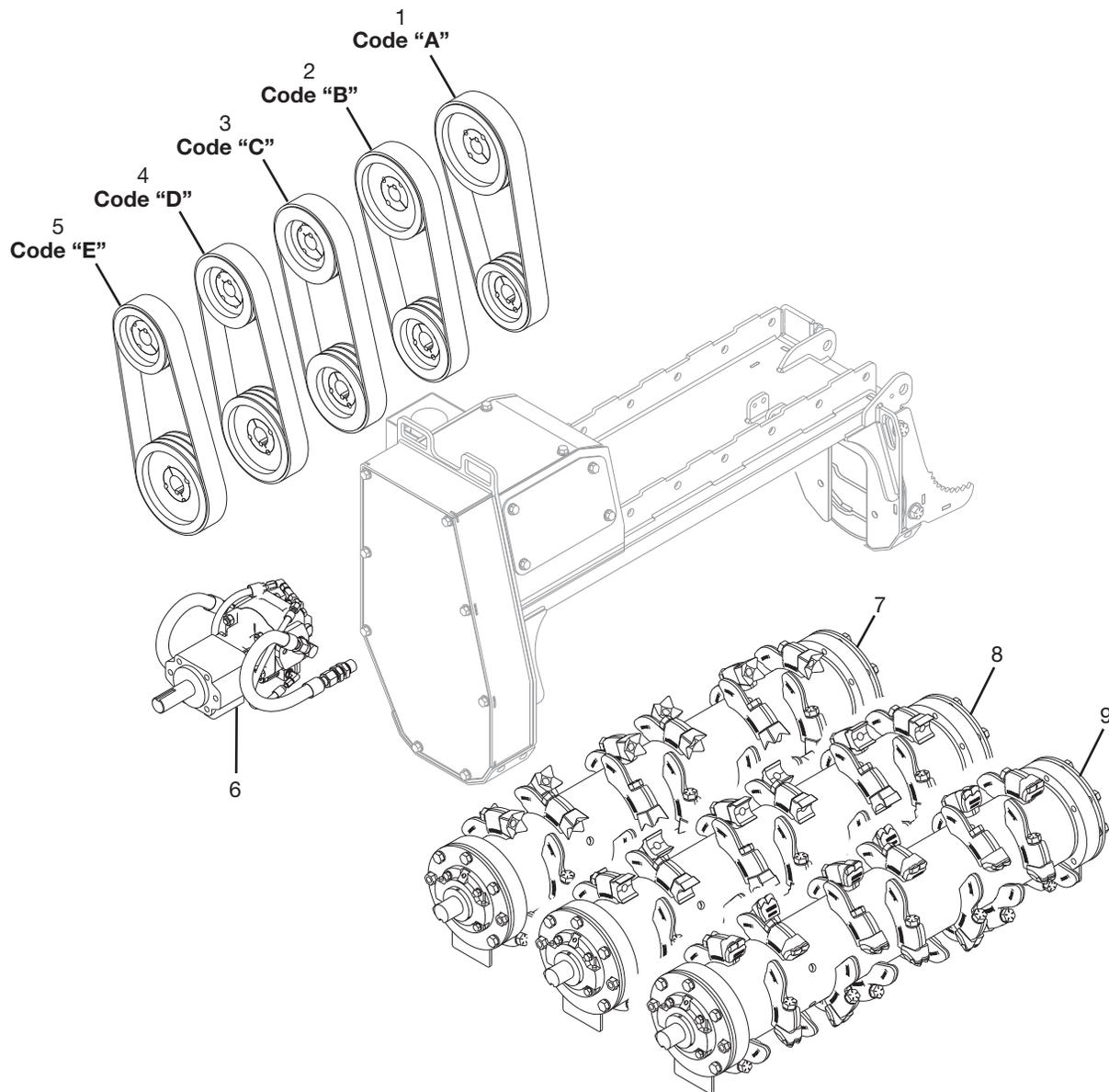




PARTS IDENTIFICATION

Parts Identification

Battle Ax 20 Series, Complete



Detailed parts breakdowns of the assemblies (items) are listed on the following pages:

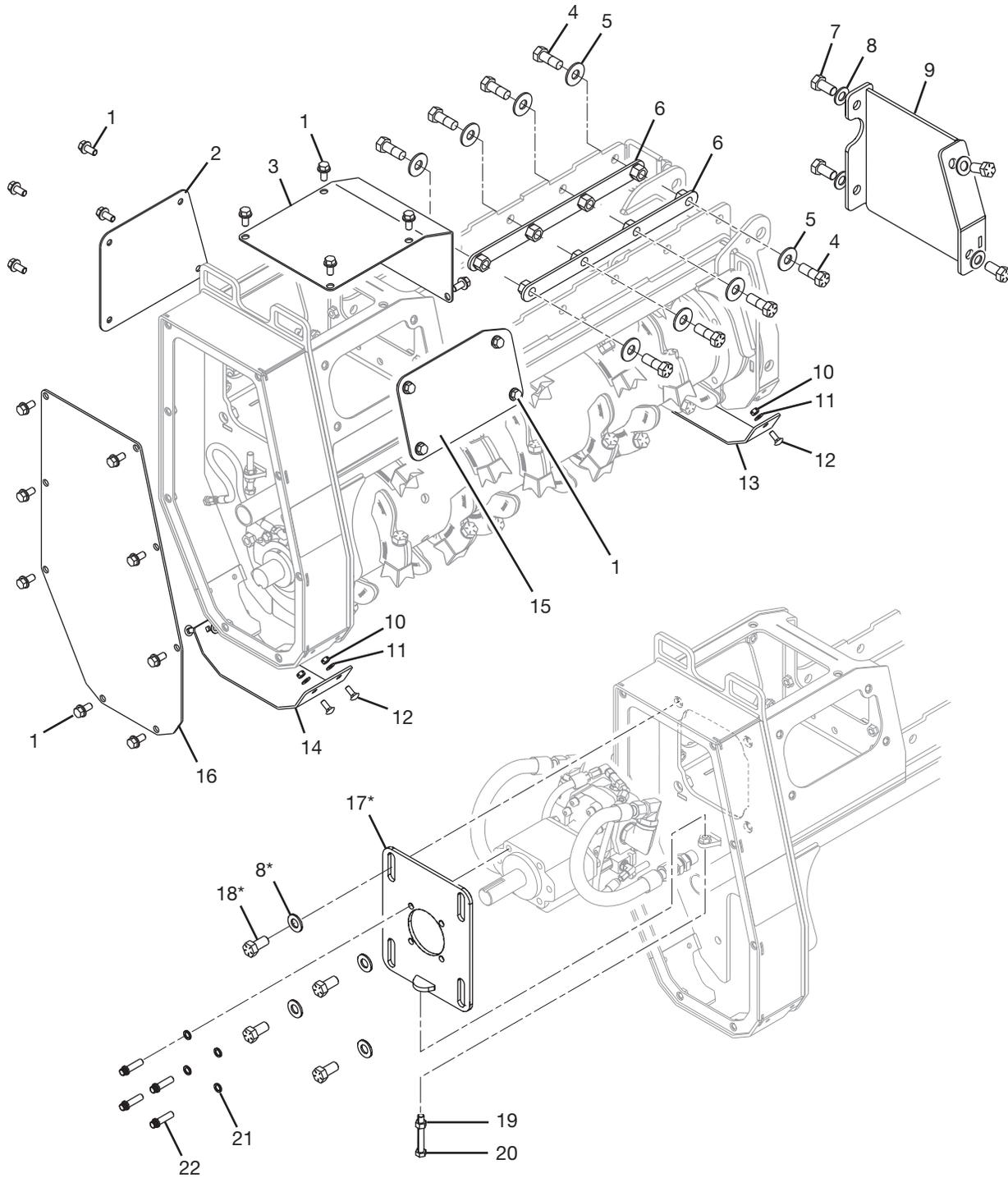
- Item 1 - Belt/Sheave Assembly, Code "A" (207947) - See page 41.
- Item 2 - Belt/Sheave Assembly, Code "B" (207943) - See page 42.
- Item 3 - Belt/Sheave Assembly, Code "C" (207944) - See page 43.
- Item 4 - Belt/Sheave Assembly, Code "D" (207945) - See page 44.
- Item 5 - Belt/Sheave Assembly, Code "E" (207946) - See page 45.
- Item 6 - Motor Assembly (208154) - See page 46.
- Item 7 - 31", 41, 51" Rotor Assembly - 4 Point Beaver Teeth - See page 34.
- Item 8 - 31", 41, 51" Rotor Assembly - Reversible Planer Teeth - See page 36.
- Item 9 - 31", 41, 51" Rotor Assembly - Double Carbide Teeth - See page 39.

Battle Ax 20 Series, Complete

#	QTY.	PART #	DESCRIPTION
1	1	207947	BELT ASSY, 3/B 8.6 TOP 6.2 BOTTOM (CODE "A")
2	1	207943	BELT ASSY, 3/B 8.0 TOP 6.8 BOTTOM (CODE "B")
3	1	207944	BELT ASSY, 3/B 7.4 TOP 7.4 BOTTOM (CODE "C")
4	1	207945	BELT ASSY, 3/B 6.8 TOP 8.0 BOTTOM (CODE "D")
5	1	207946	BELT ASSY, 3/B 6.2 TOP 8.6 BOTTOM (CODE "E")
6	1	208154	MOTOR ASSY, #54 PARKER 45CC
7	1	207694	ROTOR, 31" BATTLE AX WITH 4 POINT BEAVER TOOTH
		208003	41"
		207971	51"
8	1	208088	ROTOR, 31" BATTLE AX WITH REVERSIBLE PLANER TOOTH
		208090	41"
		208092	51"
9	1	208943	ROTOR, 31" BATTLE AX WITH DOUBLE CARBIDE TOOTH
		208945	41"
		208947	51"

Parts Identification

Covers, Skid Shoes, Hitch Mount, and Manual Holder



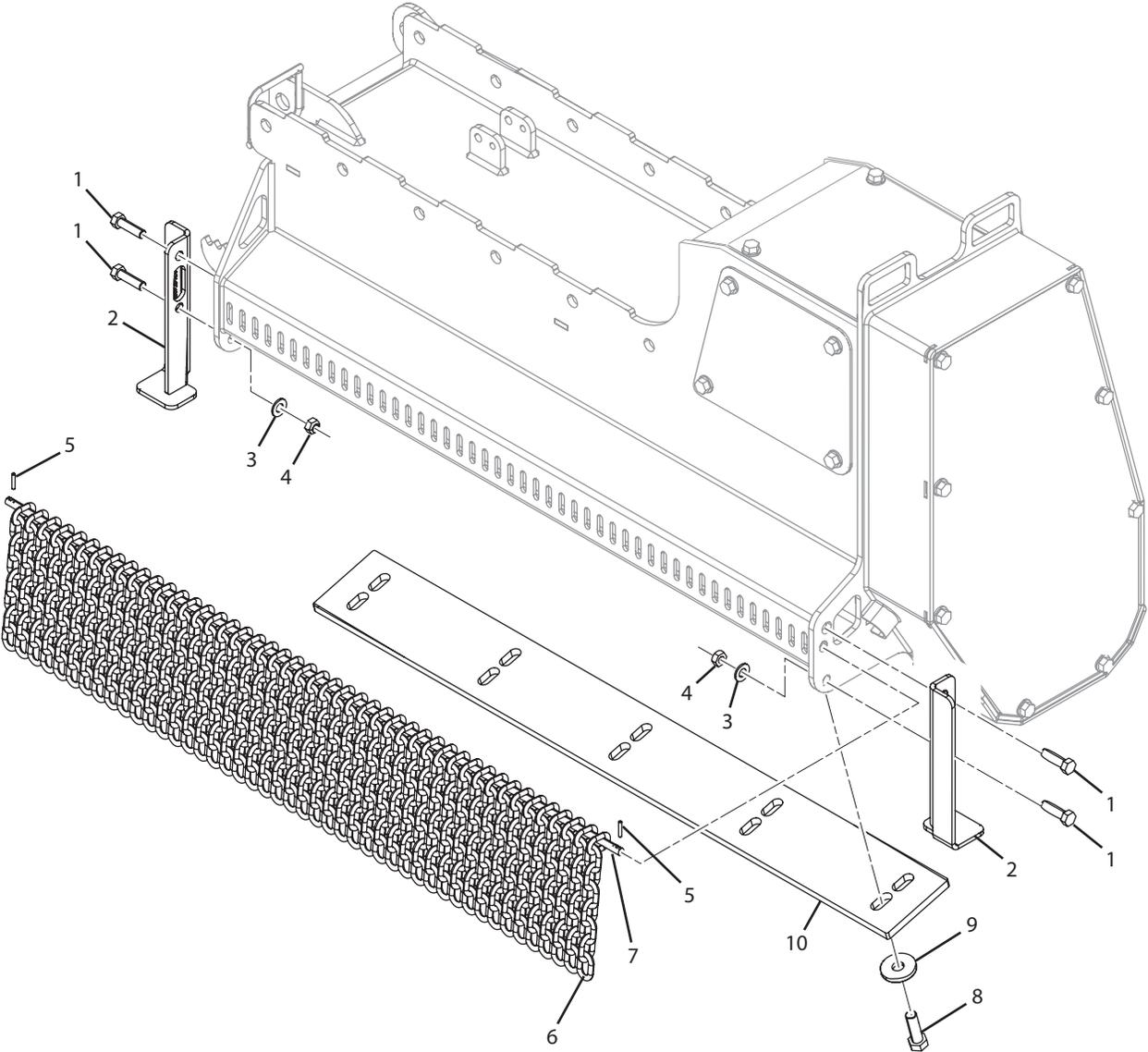
* This mounting hardware and the 17* motor mount are also shown with the Motor Assembly on page 46.

Covers, Skid Shoes, Hitch Mount, and Manual Holder

#	QTY.	PART #	DESCRIPTION
1	22	N26748	BOLT, 1/2" X 1" SER FLG
2	1	207890	COVER, ACCESS REAR
3	1	208168	COVER, MOTOR W/DECALS
4	8	207903	BOLT, MOD 3/4 X 2.06FN TH GR8
5	8	N16474	WASHER, NORDLOCK 3/4
6	2	208080	PLATE, MOUNT W/NUTS
7	4	4542	BOLT, 3/4" X 1-1/2"
8	8	N28567	WASHER, 3/4 NORDLOCK SP
9	1	207917	COVER, DRIVEN END
10	6	4052	NUT, LOCK 3/8"
11	6	N31741	WASHER, FLAT 3/8" SAE
12	6	4034	BOLT, CARRIAGE 3/8" X 1" GR. 5
13	1	207886	SKID SHOE, NARROW
14	1	207877	SKID, WIDE
15	1	208171	COVER, ACCESS FRONT
16	1	207883	COVER, BELT
17	1	207736	MOUNT, MOTOR
18	4	208781	BOLT, 3/4" X 2-1/4 GRD 8
19	1	4250	NUT, STANDARD 1/2
20	1	208081	BOLT, 1/2 X 3-1/2 GRD 5 FL THD
21	10	N16472	WASHER, 1/2 NORDLOCK
22	4	N31536	BOLT, 1/2 X 1-3/4 12 PT GRD8

Parts Identification

Cutter Bar, Deflector Chains, and Shipping Stands

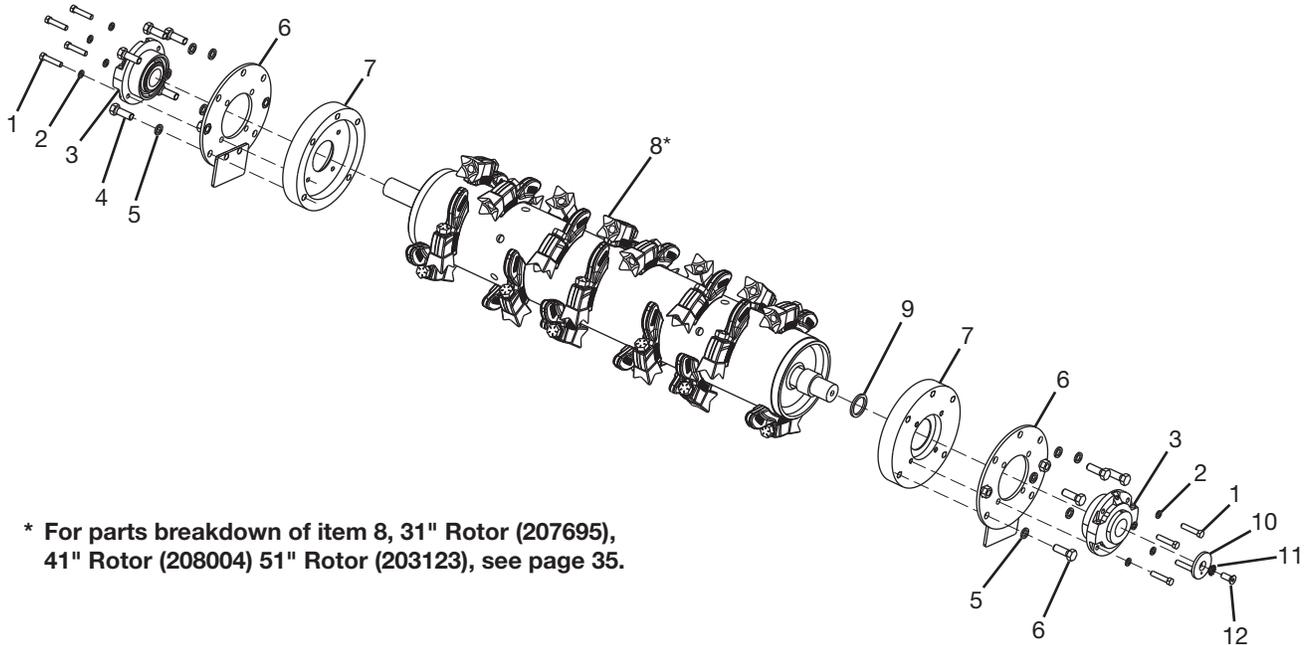


Cutter Bar, Deflector Chains, and Shipping Stands

#	QTY.	PART #	DESCRIPTION
1	4	4014	BOLT, 1/2" X 1-3/4" GRADE 5
2	2	207849	STAND, SHIPPING W/ DECAL
3	2	4068	WASHER, 1/2" SAE FLAT
4	2	4054	NUT, LOCK 1/2" TOP
5	2	4375	PIN, ROLL 3/16" X 1"
6	36	N15589	CHAIN, 5/16 DEFLECTOR 8 LINK (31")
	46		(41")
	56		(51")
7	1	201338	ROD, CARBIDE 31" CHAIN
	1	N49019	ROD, CARBIDE 41" CHAIN
	1	N49273	ROD, CARBIDE 51" CHAIN
8	4	4042	BOLT, 5/8" X 2" FINE THRD. GR.8 (31")
	5		(41")
	6		(51")
9	4	208800	WASHER, 2" OD X 11/16" ID X 1/4T (31")
	5		(41")
	6		(51")
10	1	201337	PLATE, RECUTTER 31"
	1	N49010	PLATE, RECUTTER 41"
	1	207972	PLATE, RECUTTER 51"

Parts Identification

Rotor Assembly with 4 Point Beaver Teeth; 31" (207694), 41" (208003), 51" (207971)

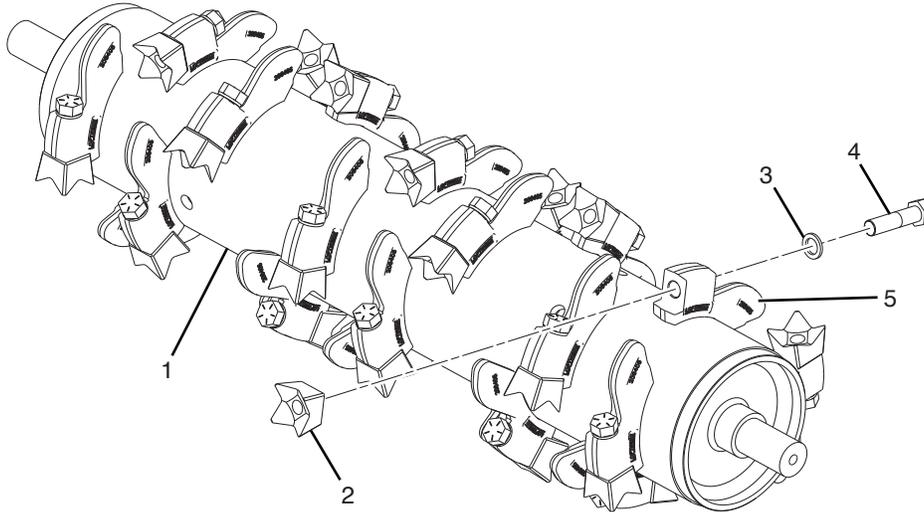


* For parts breakdown of item 8, 31" Rotor (207695), 41" Rotor (208004) 51" Rotor (203123), see page 35.

#	QTY.	PART #	DESCRIPTION
1	8	201358	BOLT, 7/16" X 2" GR 8 FN TH
2	8	N16471	WASHER, 7/16 NORDLOCK
3	2	201356	BEARING, 1-3/4" PILOT ROLLER
4	10	N13747	BOLT, 5/8" X 1-3/4" FN TH GR 8
5	10	N16473	WASHER, 5/8 NORDLOCK
6	2	207874	MOUNT, BEARING WELDMENT
7	2	201357	ANTIWRAP, 1 PIECE CARBIDE 8"
8	1	207695	ROTOR, 31" BA W/4 POINT BEAVER
	1	208004	ROTOR, 41" BA W/4 POINT BEAVER
	1	203123	ROTOR, 51" BA W/4 POINT BEAVER TOOTH
9	1	207741	BUSHING, 1-3/4"ID X 2-1/4"OD (31")
	1	201359	BUSHING, 1-3/4"ID X 2-1/4"OD (41")
	1	201359	BUSHING, 1-3/4"ID X 2-1/4"OD (51")
10	1	4075	WASHER, 2-5/8" OD
11	1	4076	WASHER, 1/2" EXT CNTSK LOCK
12	1	4468	BOLT, 1/2-20UNF X 1-1/4 FL HD

Parts Identification

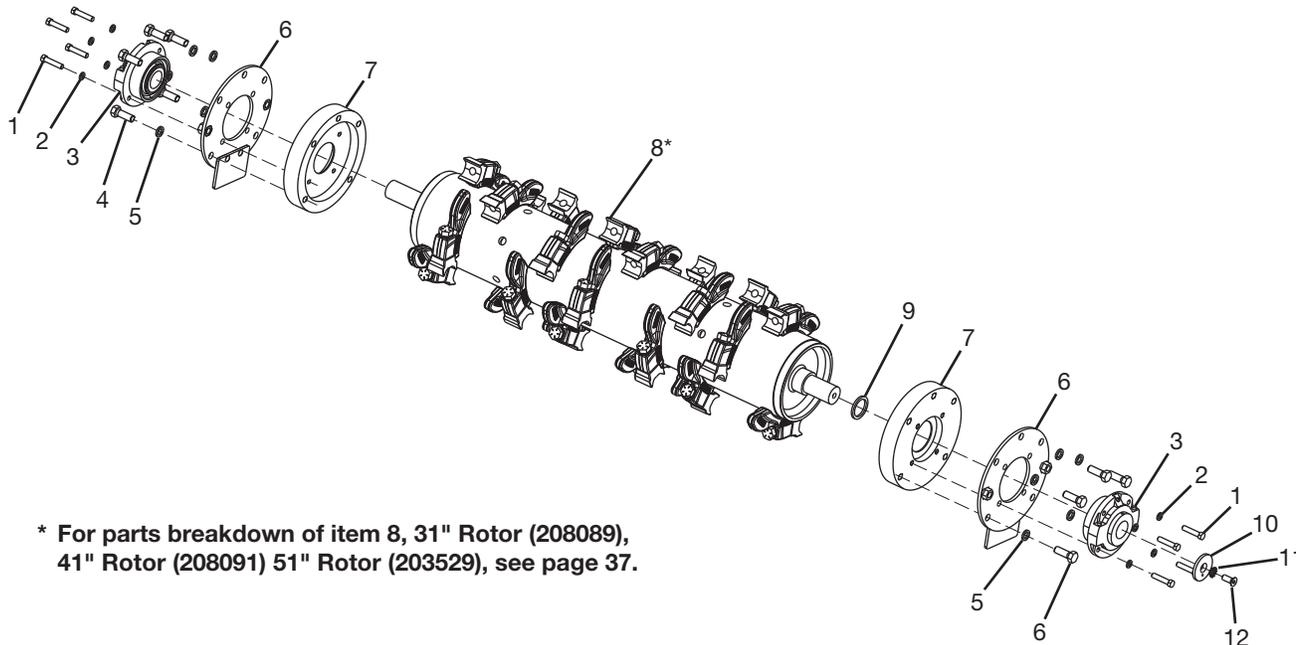
Rotor with 4 Point Beaver Teeth; 31" (207695), 41" (208004), 51" (203123),



#	QTY.	PART #	DESCRIPTION
1	1	207696	ROTOR, 31" BA SPIRAL W/O CUTTER 8"
	1	208005	ROTOR, 41" BA SPIRAL W/O CUTTER 8"
	1	203122	ROTOR, 51" BA SPIRAL W/O CUTTER 8"
2	20	N156042	TOOTH, 4 POINT BEAVER (31")
	26		(41")
	32		(51")
3	20	N16474	WASHER, 3/4 NORDLOCK (31")
	26		(41")
	32		(51")
4	20	N21308	BOLT, 3/4" X 3" FN THRD GR 8 (31")
	26		(41")
	32		(51")
5	20	206405	HOLDER, BXL TOOTH HOLDER (31")
	26		(41")
	32		(51")

Parts Identification

Rotor Assembly with Reversible Planer Teeth; 31" (208088), 41" (208090), 51" (208092)

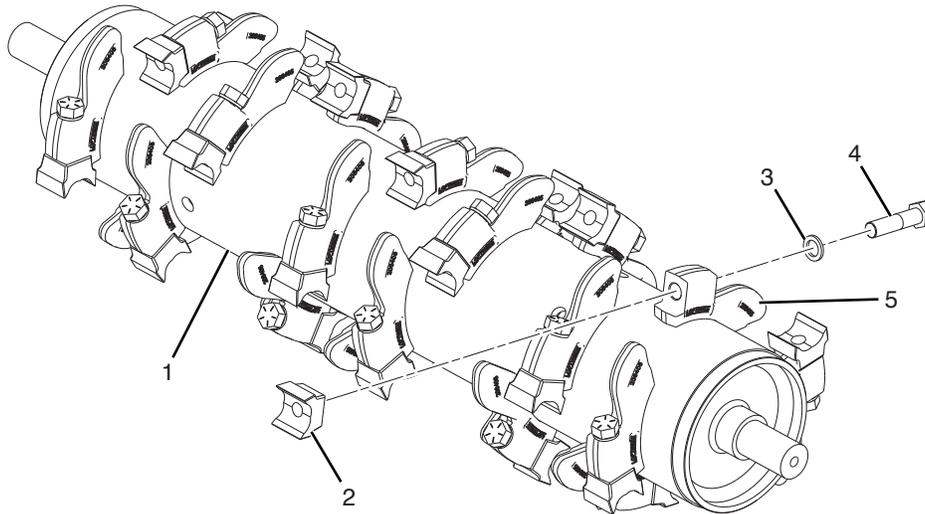


* For parts breakdown of item 8, 31" Rotor (208089), 41" Rotor (208091) 51" Rotor (203529), see page 37.

#	QTY.	PART #	DESCRIPTION
1	8	201358	BOLT, 7/16" X 2" GR 8 FN TH
2	8	N16471	WASHER, 7/16 NORDLOCK
3	2	201356	BEARING, 1-3/4" PILOT ROLLER
4	10	N13747	BOLT, 5/8" X 1-3/4" FN TH GR 8
5	10	N16473	WASHER, 5/8 NORDLOCK
6	2	207874	MOUNT, BEARING WELDMENT
7	2	201357	ANTIWRAP, 1 PIECE CARBIDE 8"
8	1	208089	ROTOR, 31" BA W/REVERSIBLE PLANER TOOTH
	1	208091	ROTOR, 41" BA W/REVERSIBLE PLANER TOOTH
	1	203529	ROTOR, 51" BA W/REVERSIBLE PLANER TOOTH
9	1	207741	BUSHING, 1-3/4"ID X 2-1/4"OD (31")
	1	201359	BUSHING, 1-3/4"ID X 2-1/4"OD (41")
	1	201359	BUSHING, 1-3/4"ID X 2-1/4"OD (51")
10	1	4075	WASHER, 2-5/8" OD
11	1	4076	WASHER, 1/2" EXT CNTSK LOCK
12	1	4468	BOLT, 1/2-20UNF X 1-1/4 FL HD

Parts Identification

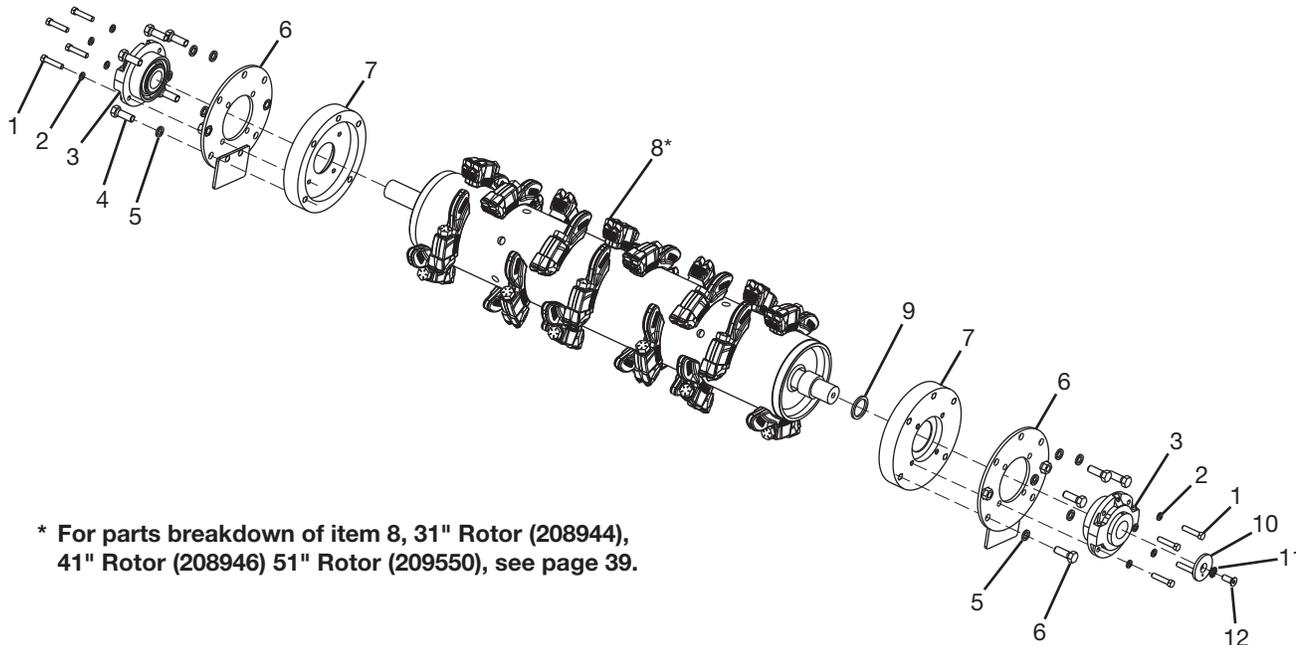
Rotor with Reversible Planer Teeth; 31" (208089), 41" (208091), 51" (203529),



#	QTY.	PART #	DESCRIPTION
1	1	207696	ROTOR, 31" BA SPIRAL W/O CUTTER 8"
	1	208005	ROTOR, 41" BA SPIRAL W/O CUTTER 8"
	1	203122	ROTOR, 51" BA SPIRAL W/O CUTTER 8"
2	20	202970	TOOTH, REVERSIBLE PLANER (31")
	26		(41")
	32		(51")
3	20	N16474	WASHER, 3/4 NORDLOCK (31")
	26		(41")
	32		(51")
4	20	N21308	BOLT, 3/4" X 3" FN THRD GR 8 (31")
	26		(41")
	32		(51")
5	20	206405	HOLDER, BXL TOOTH HOLDER (31")
	26		(41")
	32		(51")

Parts Identification

Rotor Assembly with Double Carbide Teeth; 31" (208943), 41" (208945), 51" (208947)

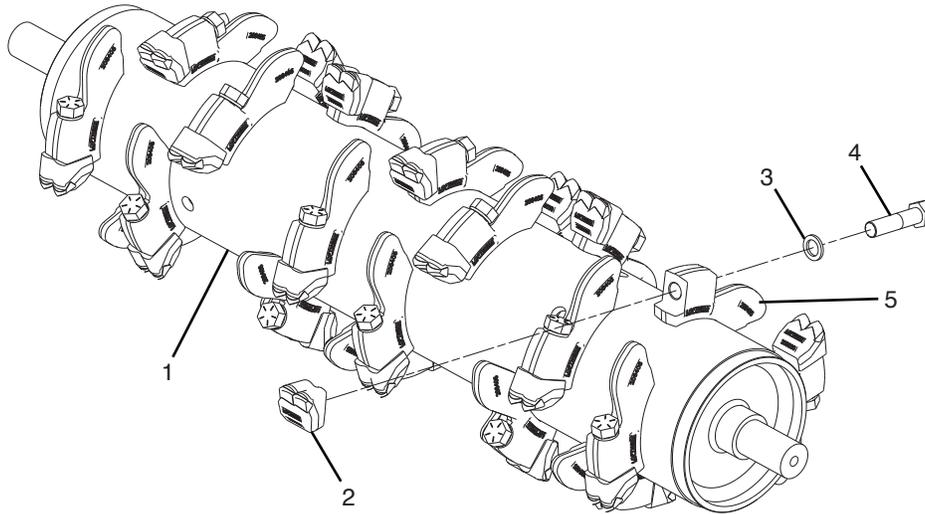


* For parts breakdown of item 8, 31" Rotor (208944), 41" Rotor (208946) 51" Rotor (209550), see page 39.

#	QTY.	PART #	DESCRIPTION
1	8	201358	BOLT, 7/16" X 2" GR 8 FN TH
2	8	N16471	WASHER, 7/16 NORDLOCK
3	2	201356	BEARING, 1-3/4" PILOT ROLLER
4	10	N13747	BOLT, 5/8" X 1-3/4" FN TH GR 8
5	10	N16473	WASHER, 5/8 NORDLOCK
6	2	207874	MOUNT, BEARING WELDMENT
7	2	201357	ANTIWRAP, 1 PIECE CARBIDE 8"
8	1	208944	ROTOR, 31" BA W/CARBIDE TOOTH
	1	208946	ROTOR, 41" BA W/CARBIDE TOOTH
	1	209550	ROTOR, 51" BA W/CARBIDE TOOTH
9	1	207741	BUSHING, 1-3/4"ID X 2-1/4"OD (31")
	1	201359	BUSHING, 1-3/4"ID X 2-1/4"OD (41")
	1	201359	BUSHING, 1-3/4"ID X 2-1/4"OD (51")
10	1	4075	WASHER, 2-5/8" OD
11	1	4076	WASHER, 1/2" EXT CNTSK LOCK
12	1	4468	BOLT, 1/2-20UNF X 1-1/4 FL HD

Parts Identification

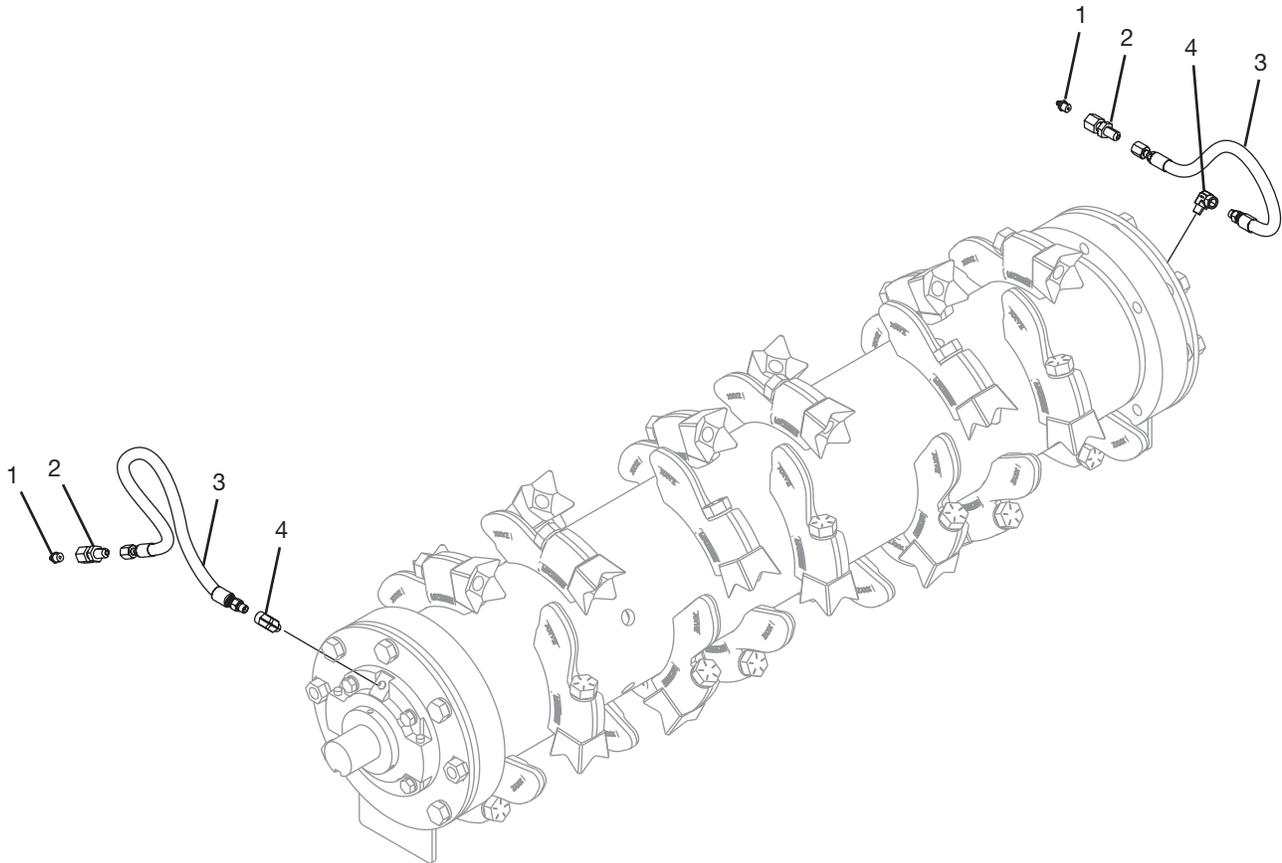
Rotor with Double Carbide Teeth; 31" (208944), 41" (208946), 51" (209550),



#	QTY.	PART #	DESCRIPTION
1	1	207696	ROTOR, 31" BA SPIRAL W/O CUTTER 8"
	1	208005	ROTOR, 41" BA SPIRAL W/O CUTTER 8"
	1	203122	ROTOR, 51" BA SPIRAL W/O CUTTER 8"
2	20	209036	TOOTH, REVERSIBLE PLANER (31")
	26		(41")
	32		(51")
3	20	N16474	WASHER, 3/4 NORDLOCK (31")
	26		(41")
	32		(51")
4	20	N21308	BOLT, 3/4" X 3" FN THRD GR 8 (31")
	26		(41")
	32		(51")
5	20	206405	HOLDER, BXL TOOTH HOLDER (31")
	26		(41")
	32		(51")

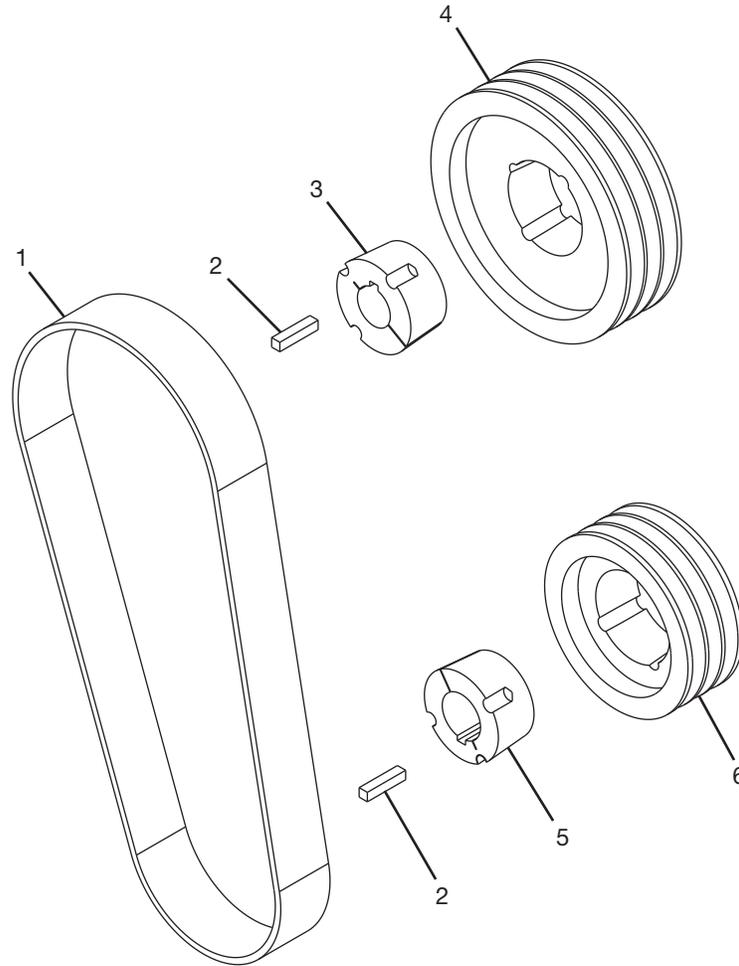
Parts Identification

Lubrication



#	QTY.	PART #	DESCRIPTION
1	2	N17007	GREASEZERK, 1/8" NPT
2	2	4304-10	BULKHEAD, FITTING-GREASE HOSE
3	2	4304	HOSE, GREASE 1/8 X 15
4	2	4472	ELBOW, 1/8" 90 DEG.STREET

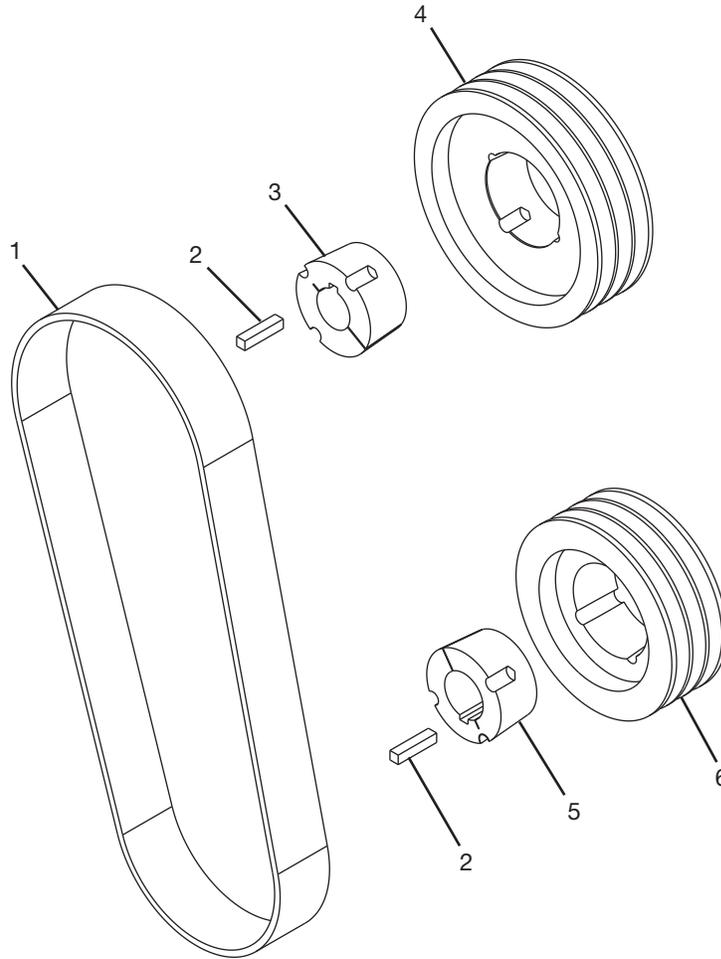
Belt and Sheave, 3/B "A" (8.6" Top, 6.2" Bottom) (207947)



#	QTY.	PART #	DESCRIPTION
1	1	8403	BELT, 3/B 51
2	2	7121-02	KEY, 3/8" X 1-3/4"
3	1	8126	BUSHING, 1-1/2" TAPERLOCK
4	1	N16134	SHEAVE, 3B X 8.6" TAPERLOCK
5	1	8127	BUSHING, 1-3/4" TAPERLOCK
6	1	N34043	SHEAVE, 3B X 6.2" TAPERLOCK

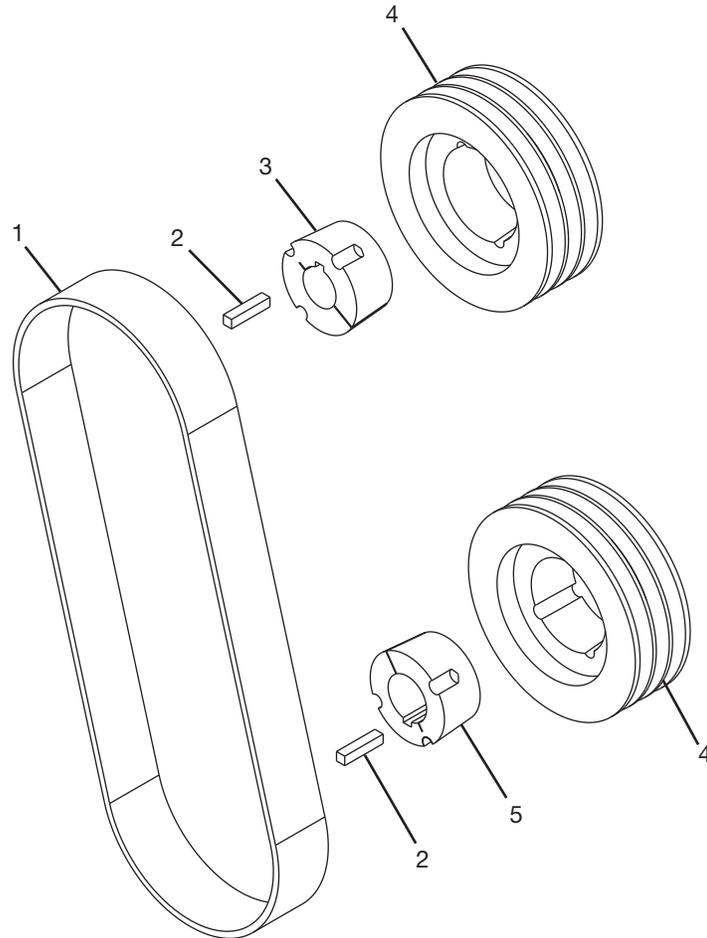
Parts Identification

Belt and Sheave, 3/B "B" (8.0" Top, 6.8" Bottom) (207943)



#	QTY.	PART #	DESCRIPTION
1	1	8403	BELT, 3/B 51
2	2	7121-02	KEY, 3/8" X 1-3/4"
3	1	8126	BUSHING, 1-1/2" TAPERLOCK
4	1	N17045	SHEAVE, 3B X 8.0 TAPERLOCK
5	1	8127	BUSHING, 1-3/4 TAPERLOCK
6	1	N11421	SHEAVE, 3B X 6.8 TAPERLOCK

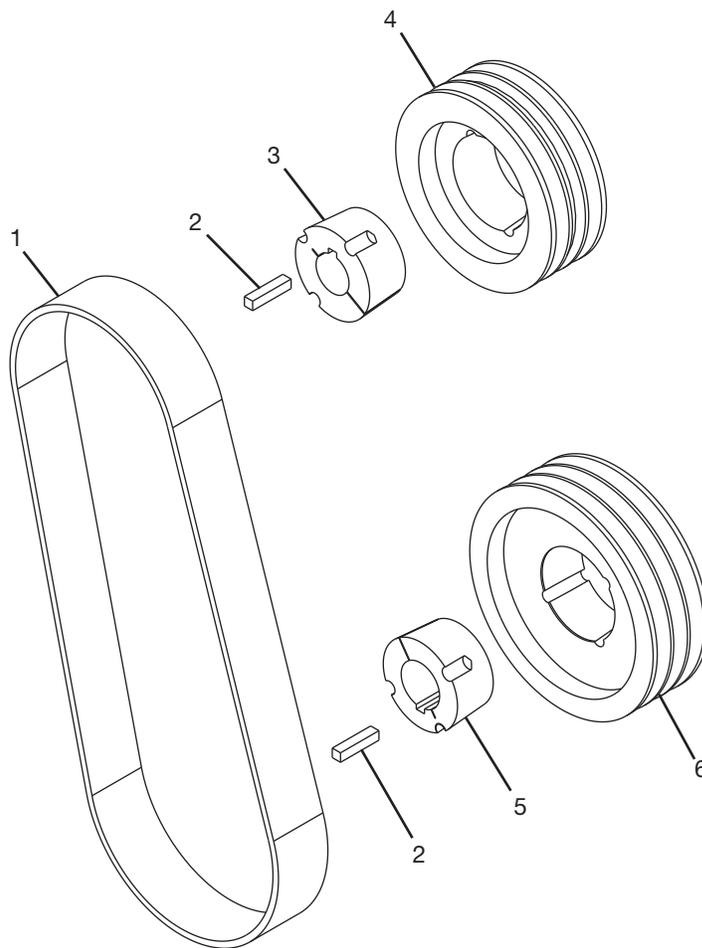
Belt and Sheave, 3/B "C" (7.4" Top, 7.4" Bottom) (207944)



#	QTY.	PART #	DESCRIPTION
1	1	8403	BELT, 3/B 51
2	2	7121-02	KEY, 3/8" X 1-3/4"
3	1	8126	BUSHING, 1-1/2" TAPERLOCK
4	2	N34689	SHEAVE, 3B X 7.4 TAPERLOCK
5	1	8127	BUSHING, 1-3/4 TAPERLOCK

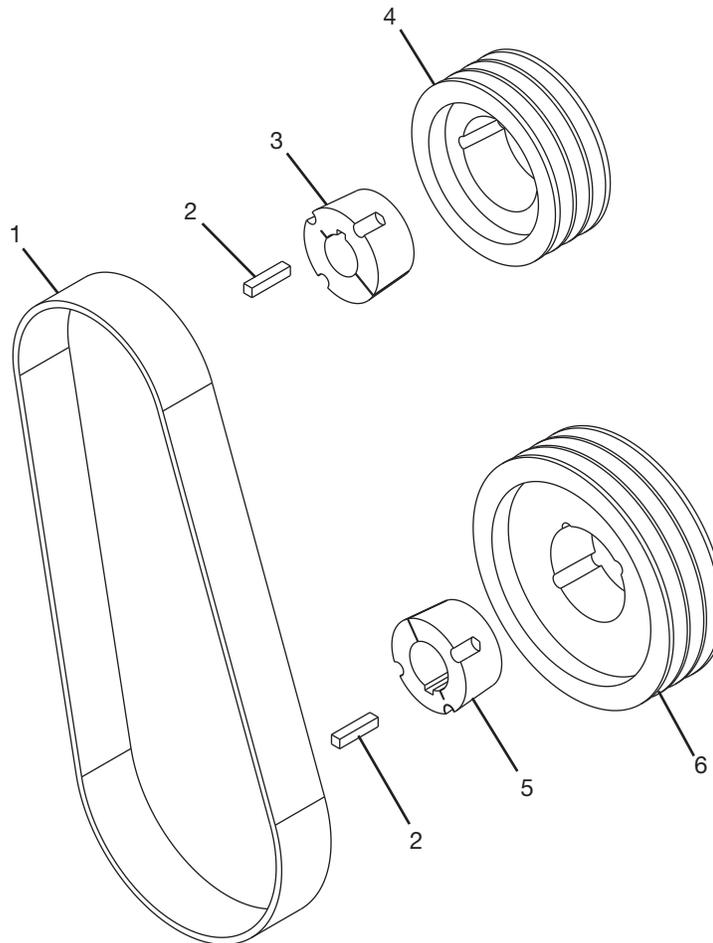
Parts Identification

Belt and Sheave, 3/B "D" (6.8" Top, 8.0" Bottom) (207945)



#	QTY.	PART #	DESCRIPTION
1	1	8403	BELT, 3/B 51
2	2	7121-02	KEY, 3/8" X 1-3/4"
3	1	8126	BUSHING, 1-1/2" TAPERLOCK
4	1	N11421	SHEAVE, 3B X 6.8 TAPERLOCK
5	1	8127	BUSHING, 1-3/4 TAPERLOCK
6	1	N17045	SHEAVE, 3B X 8.0 TAPERLOCK

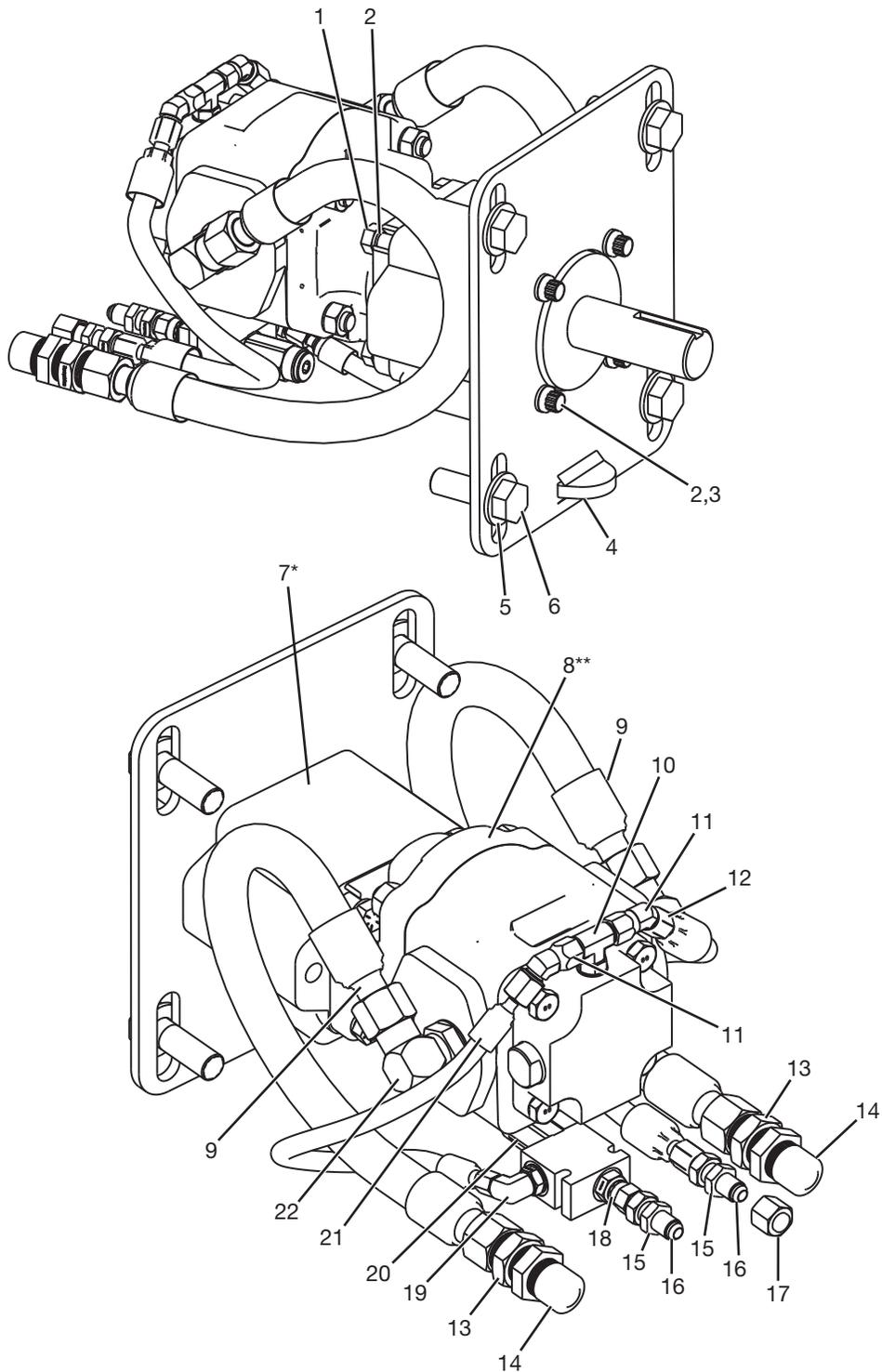
Belt and Sheave, 3/B "E" (6.2" Top, 8.6" Bottom) (207946)



#	QTY.	PART #	DESCRIPTION
1	1	8403	BELT, 3/B 51
2	2	7121-02	KEY, 3/8" X 1-3/4"
3	1	8126	BUSHING, 1-1/2" TAPERLOCK
4	1	N34043	SHEAVE, 3B X 6.2 TAPERLOCK
5	1	8127	BUSHING, 1-3/4 TAPERLOCK
6	1	N16134	SHEAVE, 3B X 8.6" TAPERLOCK

Parts Identification

Motor Assembly, #54 Parker 45cc (208154)



* For parts breakdown of item 7, Overhung Load Adapter (N16416), see page 48.

** For partial parts breakdown of item 8, Motor with Check and Relief Valve (208355), see page 49.

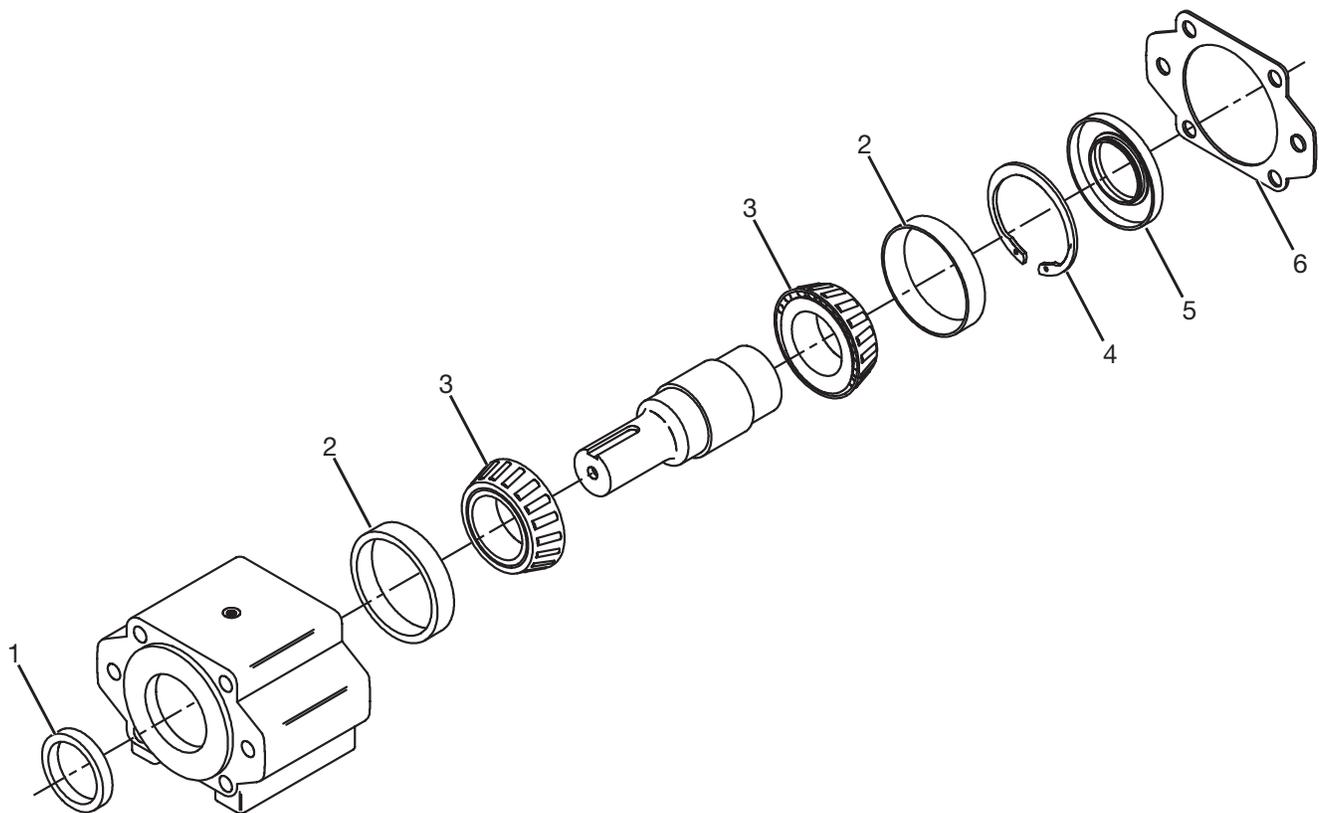
Parts Identification

Motor Assembly, #54 Parker 45cc (208154)

#	QTY.	PART #	DESCRIPTION
1	4	4513	BOLT, 1/2" X 1-1/4" GRADE 8
2	8	N16472	WASHER, 1/2 NORDLOCK
3	4	N31536	BOLT, 1/2 X 1-3/4 12 PT GRD8
4	1	207736	MOUNT, MOTOR
5	4	N28567	WASHER, 3/4 NORDLOCK SP
6	4	208781	BOLT, 3/4" X 2-1/4" GRADE 8
7	1	N16416	ADAPTER, OVERHUNG LOAD MOTOR #2
8	1	208355	MOTOR, 45CC W CHECK & RELIEF
9	2	208074	HOSE, 3/4 X 21 -12FJIC -12FJIC
10	1	N28917	TEE, 6MJIC-6MJIC-6MOR
11	2	N28837	ELBOW, 45 DEG - 6MJIC -6FJIC
12	1	207742	HOSE, 3/8 X 17 -6FJIC -6FJIC
13	2	N28816	ADAPTER, BULKHEAD -12MJIC
14	2	N16068	CAP, 12FJIC
15	2	N24780	NUT, LOCK BULKHEAD -6
16	2	N24775	ADAPTER, BULKHEAD - 6MJIC
17	1	N11590	CAP, 6FJIC
18	1	N28832	ADAPTER, 6MOR - 6FJIC
19	1	208077	ELBOW, 90DEG -4MJIC-6MORB
20	1	203637	VALVE, RELIEF 400 PSI
21	1	207746	HOSE, 1/4 X 16 -4FJIC -6FJIC
22	2	N11945	ELBOW, 90 DEG 12MOR - 12MJIC

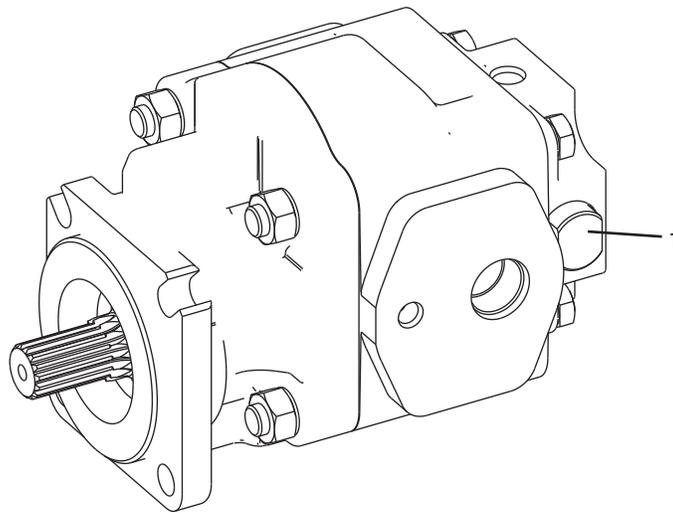
Parts Identification

Overhung Load Adapter (N16416)



#	QTY.	PART #	DESCRIPTION
1	1	N14151	SEAL, FRONT (1.50" I.D. X 2.13" O.D. X .312" THK)
2	2	N14152	CUP, BEARING
3	2	N14153	CONE, BEARING
4	1	N14156	RING, RETAINING
5	1	N14157	SEAL, REAR (55MM X 90MM X 10MM)
6	1	N14158	GASKET

Motor, 45cc with Check and Relief Valve (208355)

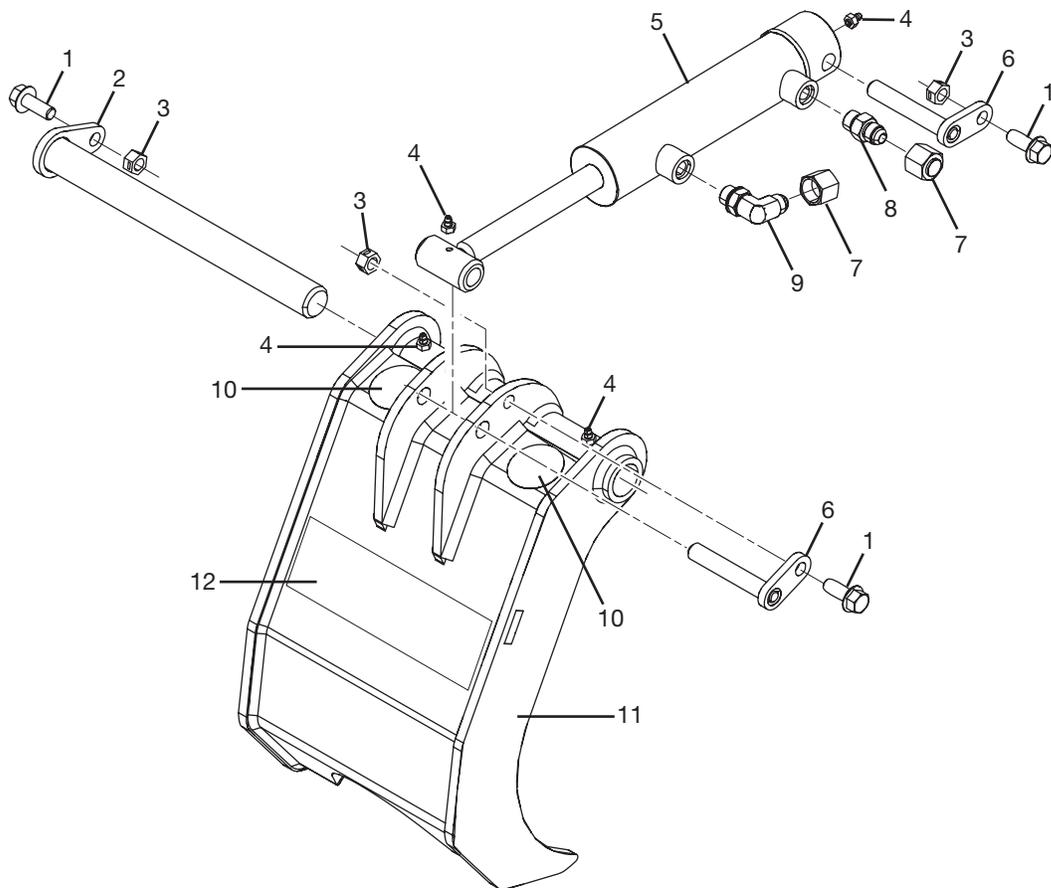


NOTE: Seal kit available (not shown). See parts list for part number.

#	QTY.	PART #	DESCRIPTION
1	1	208393	RELIEF, CHECK VALVE
*	1	208397	KIT, 640 MOTOR 500PSI

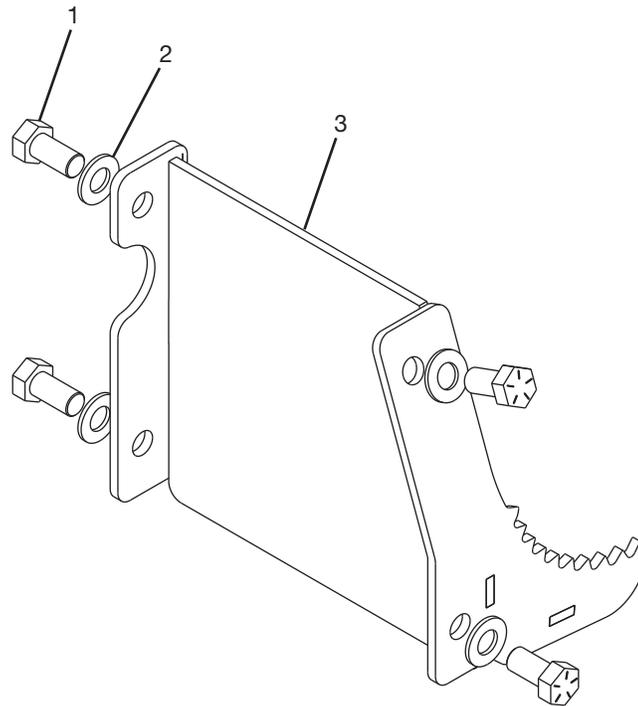
Parts Identification

Thumb Assembly (207729) - (Optional)



#	QTY.	PART #	DESCRIPTION
1	3	N26743	BOLT, 3/8" X 1" SER FLG
2	1	207757	PIN, THUMB
3	3	4052	NUT, LOCK 3/8"
4	4	4105	GREASE-ZERK, 1/4" SCREW-IN
5	1	207740	CYLINDER, 1"X 4" HYD 10" COMP
6	2	207887	PIN, THUMB
7	2	N11590	CAP, 6FJIC
8	1	N29847	RESTRICTOR, 6MJIC - 6MOR -.062
9	1	N24734	ELBOW, 90 -6MJIC-6MORB .062OR
10	2	N28010	DECAL, GREASE GUN 8
11	1	207752	WELDMENT, BXL THUMB
12	1	N28577	DECAL, VMLOGIX SMALL

Hook - (Optional)



#	QTY.	PART #	DESCRIPTION
1	4	4542	BOLT, 3/4" X 1-1/2"
2	4	N28567	WASHER, 3/4 NORDLOCK SP
3	1	207731	HOOK, BATTLEAX 20 SERIES

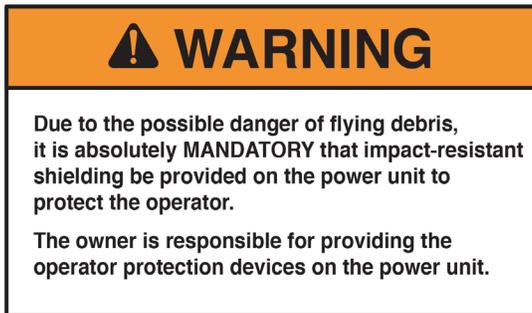
Parts Identification

Machine Decals and Signs

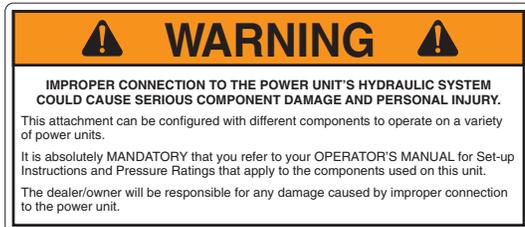
NOTE: All safety related decals are also shown in the Safety Instructions Section along with their location on the machine. See "Safety Decal Locations" on page 8.

Check and replace any worn, torn, hard to read or missing decals on your machine.

Part No. N17013



Part No. N28385



Part No. 4334



Part No. N23506



Part No. N28386



Part No. 200491



Part No. 208824



Part No. N68716



Machine Decals and Signs (Cont'd)

Part No. 203264



Part No. N13721



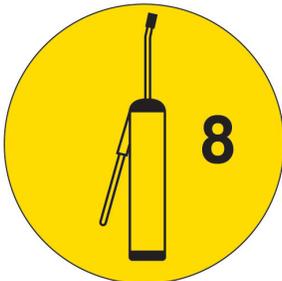
Part No. 207851



Part No. N49281 - (Small)



Part No. N28010



Part No. N33105



Part No. N28577 - (Small)



Part No. N13517



Part No. 4138



Part No. 209499



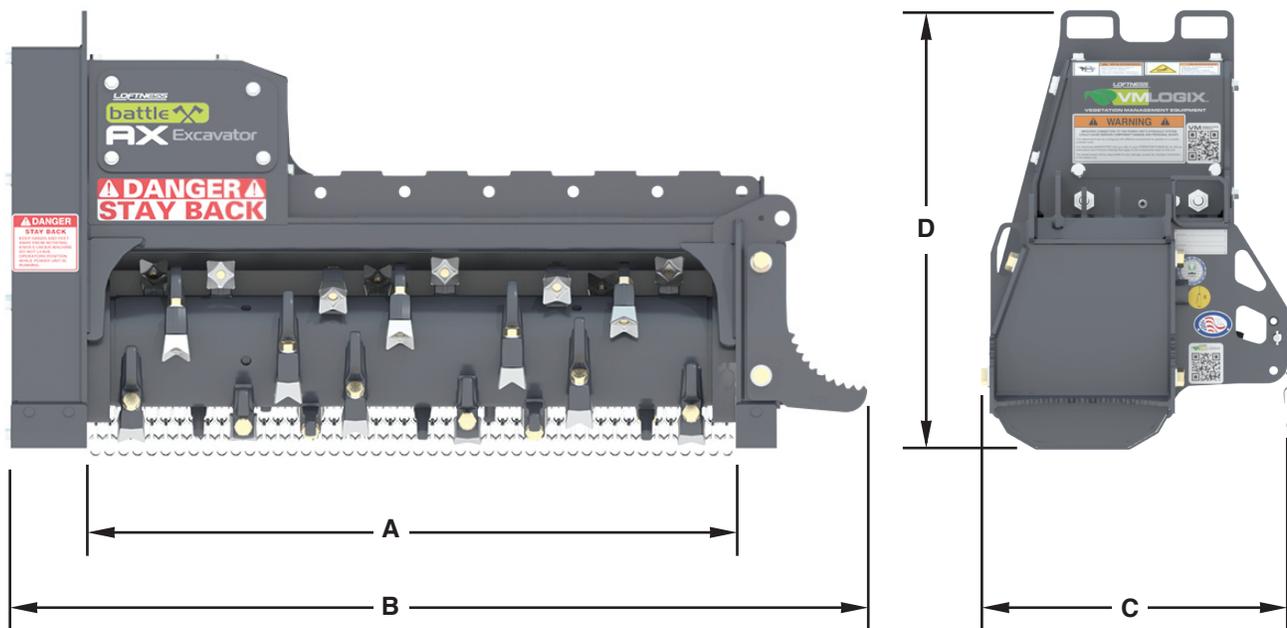


Specifications

DESCRIPTION	BATTLE AX 20 SERIES		
	31"	41"	51"
Cutting Width	31.0 in. (78.7 cm)	41.0 in. (104.1 cm)	51.0 in. (129.5 cm)
Operating Capacity	6 in. (15.2 cm) Continuous		
	8 in. (20.3 cm) Intermittent		
Motor	Fixed Displacement Gear Motor - 45cc (2.75 ci)		
Rotor Bearings	1.75 in. Piloted Double Taper		
Rotor Tip Diameter	13.5 in. (34.3 cm)		
Mount	Excavator Make/Model Specific - Direct, Quick Attach, or Pivoting		
Shear Bar	Adjustable		
Knives	4 Point Beaver or Reversible Planer Teeth		
Skid Shoes	Stationary		
Deflector	Steel Chain		
Anti-Wrap Protection	Bearing		

Appendix

Dimensions



DESCRIPTION	BATTLE AX 20 SERIES		
	31"	41"	51"
Cutting Path (A)	31.0 in. (78.7 cm)	41.0 in. (104.1 cm)	51.0 in. (129.5 cm)
Overall Length (B)	46.25 in. (117.4 cm)	56.25 in. (142.8 cm)	66.25 in. (168.2 cm)
Overall Width (C)	21.06 in. (53.49cm)		
Overall Height (without thumb) (D)	31.18 in. (79.2 cm)		
Number Of Teeth	20	26	32
Weight (without mount or thumb)	~879 lbs. (398.7 kg)	~1,084 lbs. (491.6 kg)	~1,218 lbs. (552.4 kg)
Crated Weight	~978 lbs. (443.6 kg)	~1,183 lbs. (536.6 kg)	~1,317 lbs. (597.4 kg)

Torque Specifications

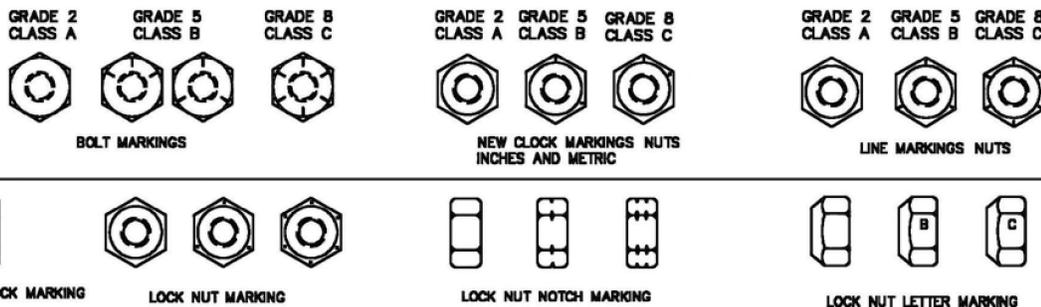
Inches Hardware and Lock Nuts

TORQUE CHARTS

Minimum Hardware Tightening Torques

Normal Assembly Applications
(Standard Hardware and Lock Nuts)

SAE Gr. 2 Nominal Size	SAE Grade 5		SAE Grade 8		LOCK NUTS			
	Unplated or Plated Silver	Plated W / ZnCr Gold	Unplated or Plated Silver	Plated W / ZnCr Gold	Unplated or Plated Silver	Plated W / ZnCr Gold	Grade W / Gr. 5 Bolt	Grade W / Gr. 8 Bolt
1/4	55 in.-lb. (6.2 N•m)	72 in.-lb. (8.1 N•m)	86 in.-lb. (9.7 N•m)	112 in.-lb. (12.6 N•m)	121 in.-lb. (13.6 N•m)	157 in.-lb. (17.7 N•m)	61 in.-lb. (6.9 N•m)	86 in.-lb. (9.8 N•m)
5/16	115 in.-lb. (13 N•m)	149 in.-lb. (17 N•m)	178 in.-lb. (20 N•m)	229 in.-lb. (26 N•m)	250 in.-lb. (28 N•m)	324 in.-lb. (37 N•m)	125 in.-lb. (14 N•m)	176 in.-lb. (20 N•m)
3/8	17 ft.-lb. (23 N•m)	22 ft.-lb. (30 N•m)	26 ft.-lb. (35 N•m)	34 ft.-lb. (46 N•m)	37 ft.-lb. (50 N•m)	48 ft.-lb. (65 N•m)	19 ft.-lb. (26 N•m)	26 ft.-lb. (35 N•m)
7/16	27 ft.-lb. (37 N•m)	35 ft.-lb. (47 N•m)	42 ft.-lb. (57 N•m)	54 ft.-lb. (73 N•m)	59 ft.-lb. (80 N•m)	77 ft.-lb. (104 N•m)	30 ft.-lb. (41 N•m)	42 ft.-lb. (57 N•m)
1/2	42 ft.-lb. (57 N•m)	54 ft.-lb. (73 N•m)	64 ft.-lb. (87 N•m)	83 ft.-lb. (113 N•m)	91 ft.-lb. (123 N•m)	117 ft.-lb. (159 N•m)	45 ft.-lb. (61 N•m)	64 ft.-lb. (88 N•m)
9/16	60 ft.-lb. (81 N•m)	77 ft.-lb. (104 N•m)	92 ft.-lb. (125 N•m)	120 ft.-lb. (163 N•m)	130 ft.-lb. (176 N•m)	169 ft.-lb. (229 N•m)	65 ft.-lb. (88 N•m)	92 ft.-lb. (125 N•m)
5/8	83 ft.-lb. (112 N•m)	107 ft.-lb. (145 N•m)	128 ft.-lb. (174 N•m)	165 ft.-lb. (224 N•m)	180 ft.-lb. (244 N•m)	233 ft.-lb. (316 N•m)	90 ft.-lb. (122 N•m)	127 ft.-lb. (172 N•m)
3/4	146 ft.-lb. (198 N•m)	189 ft.-lb. (256 N•m)	226 ft.-lb. (306 N•m)	293 ft.-lb. (397 N•m)	319 ft.-lb. (432 N•m)	413 ft.-lb. (560 N•m)	160 ft.-lb. (217 N•m)	226 ft.-lb. (306 N•m)
7/8	142 ft.-lb. (193 N•m)	183 ft.-lb. (248 N•m)	365 ft.-lb. (495 N•m)	473 ft.-lb. (641 N•m)	515 ft.-lb. (698 N•m)	667 ft.-lb. (904 N•m)	258 ft.-lb. (350 N•m)	364 ft.-lb. (494 N•m)
1	213 ft.-lb. (289 N•m)	275 ft.-lb. (373 N•m)	547 ft.-lb. (742 N•m)	708 ft.-lb. (960 N•m)	773 ft.-lb. (1048 N•m)	1000 ft.-lb. (1356 N•m)	386 ft.-lb. (523 N•m)	545 ft.-lb. (739 N•m)



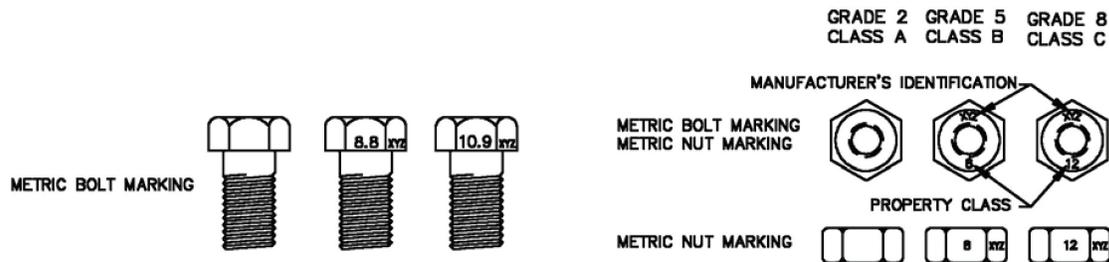
Appendix

Torque Specifications (Cont'd)

Metric Hardware and Lock Nuts

TORQUE CHARTS Minimum Hardware Tightening Torques Normal Assembly Applications (Metric Hardware and Lock Nuts)

Nominal Size	Class 5,8		Class 8,8		Class 10,9		Lock nuts Class 8 W / CL. 8,8 Bolt
	Unplated or Plated Silver	Plated W / ZnCr Gold	Unplated or Plated Silver	Plated W / ZnCr Gold	Unplated or Plated Silver	Plated W / ZnCr Gold	
M4	1.7 N•m (15 in.-lb.)	2.2 N•m (19 in.-lb.)	2.6 N•m (23 in.-lb.)	3.4 N•m (30 in.-lb.)	3.7 N•m (33 in.-lb.)	4.8 N•m (42 in.-lb.)	1.8 N•m (16 in.-lb.)
M6	5.8 N•m (51 in.-lb.)	7.6 N•m (67 in.-lb.)	8.9 N•m (79 in.-lb.)	12 N•m (102 in.-lb.)	13 N•m (115 in.-lb.)	17 N•m (150 in.-lb.)	6.3 N•m (56 in.-lb.)
M8	14 N•m (124 in.-lb.)	18 N•m (159 in.-lb.)	22 N•m (195 in.-lb.)	28 N•m (248 in.-lb.)	31 N•m (274 in.-lb.)	40 N•m (354 in.-lb.)	15 N•m (133 in.-lb.)
M10	28 N•m (21 ft.-lb.)	36 N•m (27 ft.-lb.)	43 N•m (32 ft.-lb.)	56 N•m (41 ft.-lb.)	61 N•m (45 ft.-lb.)	79 N•m (58 ft.-lb.)	30 N•m (22 ft.-lb.)
M12	49 N•m (36 ft.-lb.)	63 N•m (46 ft.-lb.)	75 N•m (55 ft.-lb.)	97 N•m (72 ft.-lb.)	107 N•m (79 ft.-lb.)	138 N•m (102 ft.-lb.)	53 N•m (39 ft.-lb.)
M16	121 N•m (89 ft.-lb.)	158 N•m (117 ft.-lb.)	186 N•m (137 ft.-lb.)	240 N•m (177 ft.-lb.)	266 N•m (196 ft.-lb.)	344 N•m (254 ft.-lb.)	131 N•m (97 ft.-lb.)
M20	237 N•m (175 ft.-lb.)	307 N•m (226 ft.-lb.)	375 N•m (277 ft.-lb.)	485 N•m (358 ft.-lb.)	519 N•m (383 ft.-lb.)	671 N•m (495 ft.-lb.)	265 N•m (195 ft.-lb.)
M24	411 N•m (303 ft.-lb.)	531 N•m (392 ft.-lb.)	648 N•m (478 ft.-lb.)	839 N•m (619 ft.-lb.)	897 N•m (662 ft.-lb.)	1160 N•m (855 ft.-lb.)	458 N•m (338 ft.-lb.)





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