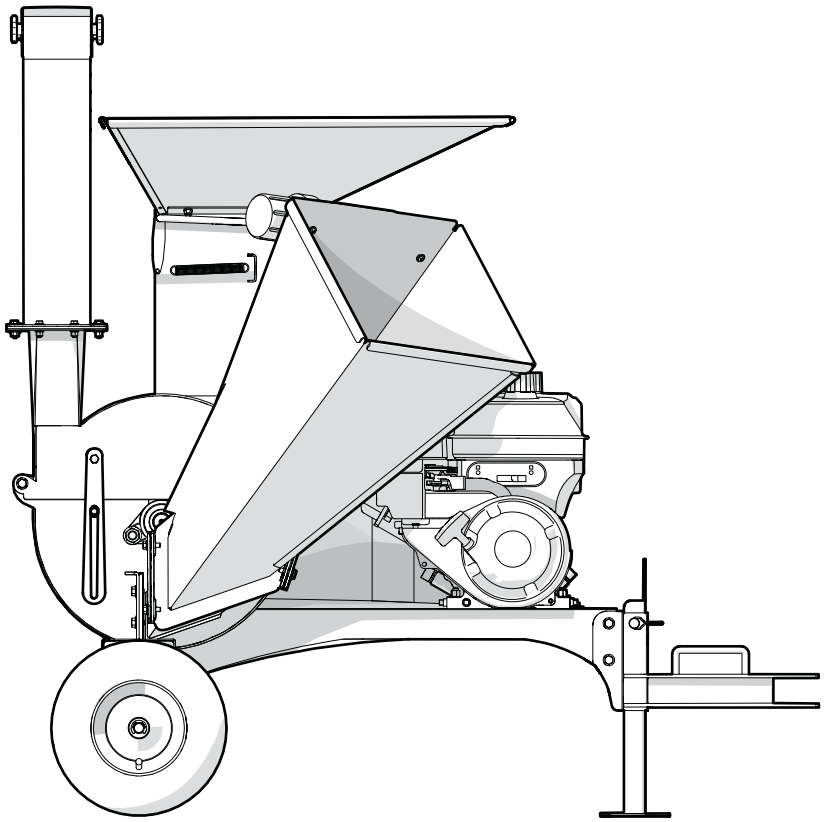
OPERATOR'S MANUAL

Serial number 1100578 and up

BXMT3209
Chipper / Shredder



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WALLENSTEIN

Table of Contents

1. Introduction

⚠ WARNING!

Do not attempt to start or operate the machine before you read this manual thoroughly. Make sure that you understand how to operate the machine correctly and safely before you use it.

Keep this manual with the machine at all times.

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Congratulations on your choice of a **BXMT3209 Wallenstein Chipper / Shredder!**

The BXMT chipper / shredders are strong, rugged machines that can provide consistent chipping and shredding of materials.

For information about the accessories, go to WallensteinEquipment.com.

Safe, efficient, and trouble-free operation of this Wallenstein Equipment product requires that anyone using or maintaining the machine reads and understands the safety, operation, and maintenance information in this manual and the engine manufacturer's manual.

Keep this manual available for frequent reference and to give to new operators or owners. Call your local Wallenstein dealer or the distributor if you need assistance, information, or additional copies of the manuals.

Units of measurement in Wallenstein technical manuals are written as: US Customary (SI metric)

For support or service, contact your local Wallenstein Equipment dealer or distributor.

This manual is subject to change without notice. For the most current information, go to WallensteinEquipment.com.

⚠ WARNING
Cancer and Reproductive Harm
www.P65Warnings.ca.gov

⚠ ADVERTENCIA
Cáncer y Daño Reproductivo
www.P65Warnings.ca.gov

1.1 Delivery Inspection Report

Wallenstein BXMT3209 Chipper / Shredder

To register your product and start the warranty, go to WallensteinEquipment.com.

This form must be completed by the dealer at the time of delivery, and then signed by the dealer and customer.

I have received the product manuals and been thoroughly instructed about the care, adjustments, safe operation, and applicable warranty policy.

Customer

Address

City, State/Province, ZIP/Postal Code

( )

Phone Number

Contact Name

Model

Serial Number

Delivery date

I have thoroughly instructed the customer about the equipment care, adjustments, safe operation, applicable warranty policy, and reviewed the manuals with them.

Dealer

Address

City, State/Province, ZIP/Postal Code

( )

Dealer Inspection Checklist

_____ Engine starts and runs, and fluid levels are correct.
_____ Rotor turns freely and the blade clearance is correct.
_____ All cutting edges are sharp and in good condition.
_____ Discharge chute and deflector move freely.
_____ All belts are aligned and the tension is correct.
_____ Engine and rotor sheaves align.
_____ Engine starts and runs, and fluid levels are correct.
_____ Chop block and shredder knives function correctly.
_____ Spring-loaded shredder gate moves freely.
_____ All fasteners are torqued to the correct specification.
_____ All grease points are lubricated.
_____ Purchased accessories are included, if applicable.
_____ Operator's Manual is in the storage tube.
_____ Tire pressure is correct (see the tire sidewall).
_____ Tires are in good condition.

Safety Checks

_____ All safety labels are applied and legible.
_____ Operating and safety instructions were reviewed.
_____ All guards and shields are installed, and the covers are closed.
_____ A retainer is installed through each hitch point.

1.2 Serial Number Location

Always provide the model and serial number of your Wallenstein product when ordering parts, or requesting service or other information. The product information plate location is shown in the following illustration.

Record the model and serial number of your product here:

Model	**BXMT3209**
Serial Number	

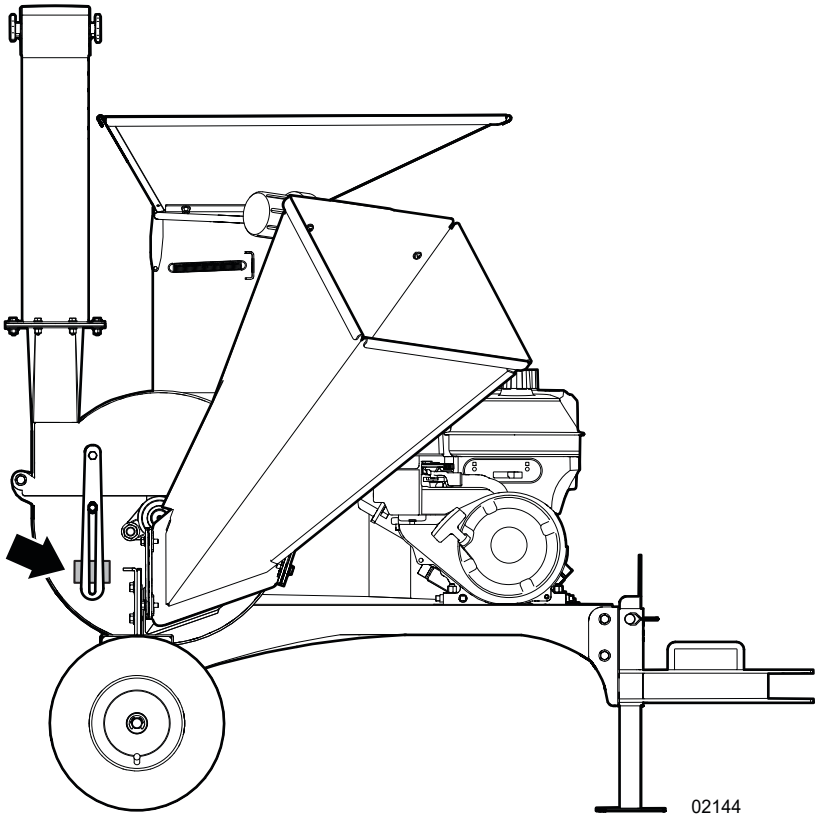


Figure 1 – Product identification location

1.3 Types of Labels on the Machine

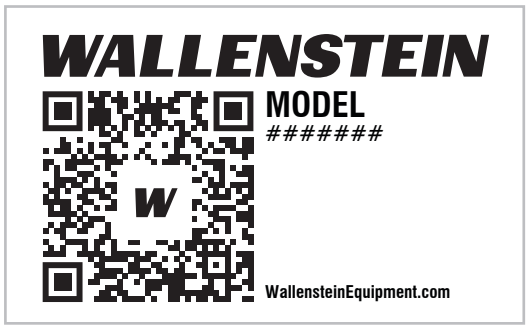
When getting familiar with the Wallenstein product, notice that there are numerous labels located on the machine. There are different types of labels for safety, information, and product identification. The following section explains what they are for and how to read them.

Safety labels have a yellow background and are generally two panel. A safety label can be vertical or horizontal.

Mandatory action labels are pictorial with a blue background and usually rectangular with single or multiple symbols. This label shows the type of personal protective equipment (PPE) that is necessary for safe operation.

Information labels are usually pictorial with a white background and the number of panels can be different. This type of label provides information for the operator or shows the operation of a control.

Product labels show the machine model and serial number. For more product information, scan the quick response (QR) code.



Maintenance labels have a green background and the number of panels can be different. This label shows the type of maintenance and how frequently it is necessary.

For safety label definitions, see *Safety Label Definitions on page 16*. For illustrations of the labels and the label locations, download the parts manual for your Wallenstein product at WallensteinEquipment.com.

2. Safety

Read and understand all safety information before operating the machine.

2.1 Safety Alert Symbol

This Safety Alert Symbol means:

ATTENTION! BE ALERT!

YOUR SAFETY IS INVOLVED!

The safety alert symbol identifies important safety messages on the machine and in the manual.

When you see this symbol, be aware of the possibility of personal injury or death. Follow the instructions in the safety message.

2.2 Signal Words

The signal words **DANGER**, **WARNING** and **CAUTION** identify the severity of a hazard to anyone who uses the machine. The applicable signal word for each message was selected using the following guidelines:

DANGER

Identifies a hazardous situation that, if not avoided, **will** result in serious injury or death. This signal word is used to tell anyone who uses the machine about the most hazardous situations and machine components that cannot be guarded against.

WARNING

Identifies a hazardous situation that, if not avoided, **could** result in serious injury or death. This signal word includes hazards that occur when guards are removed and can be used to tell anyone who uses the machine about unsafe practices.

CAUTION

Identifies a hazardous situation that, if not avoided, **could** result in minor or moderate injury. It can also be used to tell anyone who uses the machine about unsafe practices.

IMPORTANT – Identifies a situation that could result in damage to the machine or property, but is not a personal injury hazard.

☞ Provides additional information that is helpful.

2.3 Why Safety is Important

- **Accidents disable and kill people.**
- **Accidents cost money.**
- **Accidents are preventable**

YOU are responsible for the safe operation and maintenance of your Wallenstein product. **YOU** must make sure that you and anyone else who uses, maintains, or works around the machine is familiar with the operation and maintenance procedures and related **SAFETY** information contained in this manual. Follow the safety best practices included in this manual while using your machine.

YOU are responsible for your own safety. Follow safety best practices to protect yourself and the people around you. Make these practices part of your safety program. Make sure that **EVERYONE** who uses this machine is familiar with the recommended operation and maintenance procedures, and obeys all the safety instructions. Most accidents can be prevented.

Do not risk injury or death by ignoring safety instructions and best practices.

2.4 Safety Rules

⚠ CAUTION!

Hearing loss hazard. Prolonged exposure to loud noise may cause permanent hearing loss. Use suitable protection while operating the machine.

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Wallenstein Equipment puts considerable effort into designing products that are safe to use; however, it is also the responsibility of the operator to use the equipment safely.

For safety information that is specific to machine operation, service, or maintenance, see the applicable section in this manual.

- It is the operator's responsibility to read, understand, and follow ALL safety and operating instructions in this manual.
- If you do not understand any part of this manual or need assistance, contact your local dealer, the distributor, or Wallenstein Equipment.
- Do not allow anyone to use this machine until they have read this manual. Operator's must have a thorough understanding of the safety precautions and how the machine works. Review the safety instructions with all users annually.
- Operators must be responsible, familiar with, and physically able to use the machine. Each operator must be trained before using the machine. Before operation, evaluate the physical and/or mental limitations of each operator to make sure that they can use the machine safely. Never let a child operate the machine.
- Make sure that all users understand the safety labels on the machine before operating, servicing, adjusting, or cleaning it. For safety label definitions, see *Safety Label Definitions on page 16*.
- Learn the controls and how to stop the machine quickly in the event of an emergency. For instructions, see *Emergency Stop on page 28*.
- Keep a first-aid kit available and know how to use the contents of it.

- Keep a fire extinguisher available and know how to use it.

- Wear the appropriate PPE when operating, servicing, or maintaining the machine.
  This includes, but is not limited to:
  - A hard hat.
  - Heavy gloves.
  - Hearing protection.
  - Protective shoes with steel toes and slip resistant soles.
  - Protective glasses, goggles, or a face shield.
- Prolonged exposure to loud noise may cause permanent hearing loss. Power equipment with or without a vehicle attached can often be noisy enough to cause permanent, partial hearing loss.

- Wear hearing protection on a full-time basis if the noise in the operator's position exceeds 80 dB. Noise over 85 dB on a long-term basis can cause severe hearing loss. Noise over 90 dB adjacent to the operator on a long-term basis may cause permanent, total hearing loss.
- Avoid wearing loose fitting clothing, loose or uncovered long hair, jewelry, and loose personal articles. These can get caught in moving parts and cause injury. Jewelry may also ground a live electrical circuit causing injury and machine damage.
- Never consume alcohol or drugs before or during machine operation. Alertness or coordination can be affected. Consult your doctor about operating this machine while taking prescription medications.
- Only use the machine in daylight or good artificial light.
- Make sure that all guards and shields are installed, and the covers are closed. If removal is necessary for repair, replace them before using the machine.
- Never allow anyone to ride on the machine during transport.
- Keep bystanders a minimum of 10 ft (3 m) from the discharge area. Mark the discharge area with safety cones.
- Before starting the engine, make sure that the machine is clear of debris.
- Do not touch hot engine parts, the muffler cover, hoses, engine body, or engine oil during operation or after the engine stops. Contact with hot surfaces can cause burns.

2.5 Equipment Safety Guidelines

Safety is one of the main concerns in designing and developing equipment. However, every year many accidents occur which could have been avoided by a few seconds of thought and a more careful approach to handling equipment.

Avoid hazards by observing the following precautions. Insist anyone working with you follow them as well.

- Replace safety or instruction signs (decals) that are not readable or missing. For locations and explanations, see *Safety Labels on page 13*.
- Do not modify the equipment in any way. Unauthorized modification may result in serious injury or death and may impair the function and life of the equipment. Unapproved modifications void warranty.
- Make sure that the machine is correctly stationed, adjusted, and in good operating condition.
- Keep the machine free of accumulated trash, grease, and debris to prevent fires.
- Determine where wood chips will be piled and make sure it does not interfere with safe operation of the machine.
- Be aware of overhead hazards (for example; branches, cables, and electrical wires).
- Never exceed the limitations of the machine. If its ability to do the job, or to do it safely is in question–**STOP!**

2.6 Safe Condition

References are made to **safe condition** throughout this manual. Safe condition means putting the machine in a state that makes it safe to service or maintain.

Before starting any service or maintenance, complete the following:

⚠ SAFE CONDITION

1. If the machine is connected to a tow vehicle, set the tow vehicle's parking brake, turn off the engine, and remove the ignition key.
2. Stop the machine.
   For instructions, see *Stop the Machine on page 28*.
3. Disconnect the engine spark-plug wire and keep it away from the spark plug.
4. Remove all material from the chipper hopper and shredder hopper.
5. Wait for the engine and machine to cool.

2.7 Safety Training

An untrained operator can cause serious injury or death to themselves or others. Review the safety instructions with all users annually. The *Sign-Off Form on page 10* can be used to keep a training record.

- An employer has the responsibility to train employees how to operate the machine they are using. When someone does not understand the operation of a machine, they can create dangerous situations very quickly. Operators must understand the safety information in this manual and the safety labels that are on the machine
- The owner has the responsibility to provide instruction to anyone who is going to operate the machine. This machine is dangerous to anyone who is unfamiliar with its operation.
- If the machine is loaned or rented, it is the owner's responsibility to make sure that, before using the machine, every operator:
  - Reads and understands this manual.
  - Is instructed in the safe and correct use of the machine.
  - Understands and knows how to set the machine to a **Safe Condition**.
    For instructions, see *Safe Condition*.

2.8 Sign-Off Form

Everyone who uses this machine must read and fully understand all safety, operation, and maintenance information in this manual. An untrained operator should never use this machine.

Schedule an annual review of machine safety and operation for all operators. The following sign-off form can be used to record the completed training.

The design and manufacture of this product conforms to the applicable provisions in the following standards:

- ISO 11448:1997 Powered shredders and chippers — Definitions, safety requirements and test procedures.
- ISO 3600 Tractors, machinery for agriculture and forestry, powered lawn and garden equipment – Operator's manuals – Content and format.

Training Sign-Off Form

Date	Owner's signature	Operator or technician's signature

2.9 Work Site

⚠ CAUTION!

It is the responsibility of the operator to be fully familiar with the work site before starting work. Prevent unsafe situations and make every effort to prevent accidents.

2.9.1 Select a Work Site

Select a safe work area and machine location:

- The ground should be firm and level.
- Make sure that there is a sufficient amount of space and clearance for the operator, the machine, and wood chip discharge.
- Remove all stones, branches, or hidden obstacles that might cause a tripping, hooking, or snagging hazard.
- Make sure that there are no overhead hazards such as branches, cables, or electrical wires.
- Select a location for the discharged wood chips. Make sure that the wood chips do not interfere with safe operation of the machine

2.9.2 Set Up a Safe Work Area

Read and obey the instructions for safe operation of the machine.

Keep bystanders and workers safe from hazards. Obey the following guidelines:

- Use safety cones to identify the work zone perimeter. The work zone perimeter should be a minimum of 10 ft (3 m) away from any hazard in the work zone. The area outside the work zone perimeter is the safe zone.
- Never let people approach the work zone during machine operation. Everyone must signal and make eye contact with the operator before they approach the work zone.
- Keep all bystanders in the safe zone. Never let bystanders in the work zone.
- Only the operator can let people enter the work zone. The operator must make sure that it is safe for a person to enter the work zone.
- When there are two or more workers, they must agree on a system of hand-signals to use for communication.
- The operator must make eye contact with coworkers and use the agreed system of hand signals. The operator must always be aware of their coworkers and know where they are.

A safe work area is divided into two zones:

1. **Safe Zone**
   The safe zone is the area outside the work zone perimeter. All people who are not directly involved with the work can be in this area. There are minimal hazards in the safe zone.
2. **Work Zone**
   The work zone is the area where the operator must be to operate the machine. People who are helping with the work and wearing the necessary PPE can be in this zone. The operator must know where all the people in the work zone are. The operator must make eye contact with people before they enter the work zone. There are possible hazards in the work zone.

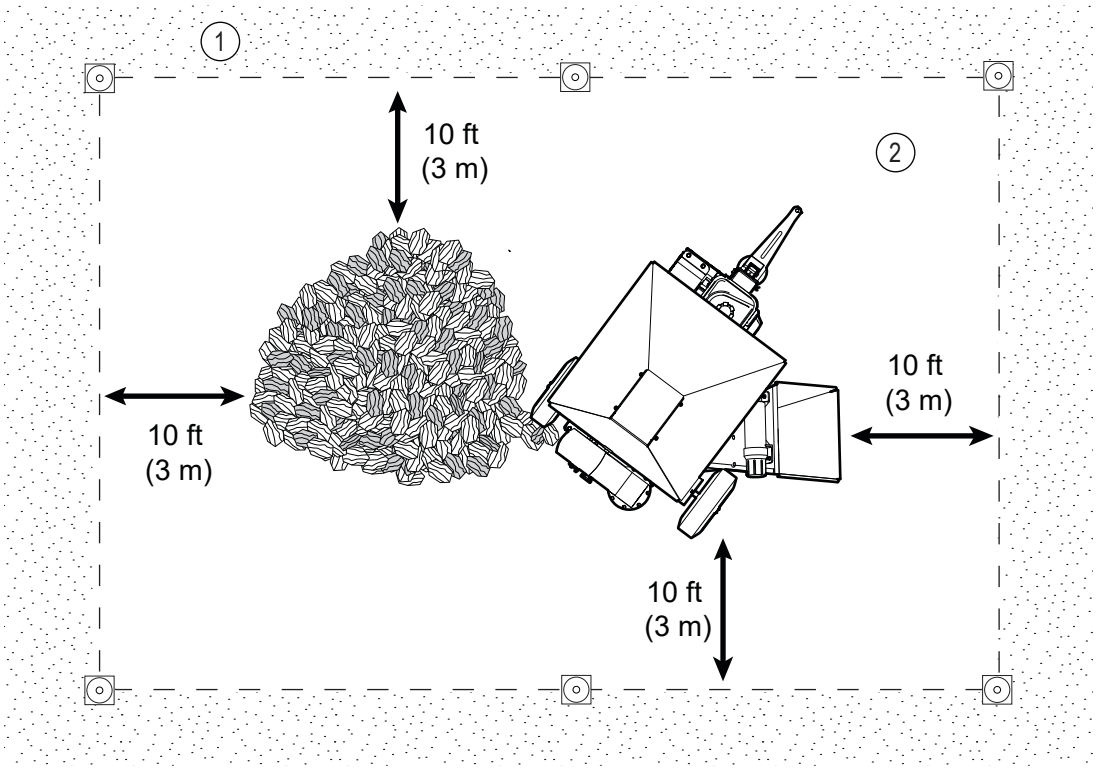

Figure 2–Safe work area example

3. Safety Labels

⚠ WARNING!

Replace all safety labels that are missing, damaged, or illegible. If a component is replaced and it has a safety label on it, apply a safety label to the new component. Operating the machine with missing, damaged, or illegible safety labels puts the operator at risk of serious injury or death.

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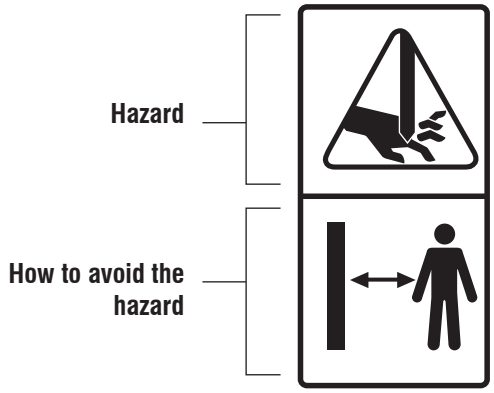
Learn what the safety labels mean and know the safety hazards.

A safety label can be vertical or horizontal. Vertical safety labels have a top panel and a bottom panel. Horizontal safety labels have a left side panel and a right side panel.

The top or left side panel shows the safety alert (possible hazard), and the bottom or right side panel shows the action message (how to prevent illness, injury, or death).



Think SAFETY! Work SAFELY!

3.1 Safety Label Locations

Numbers correspond with the *Safety Label Definitions on page 16*.

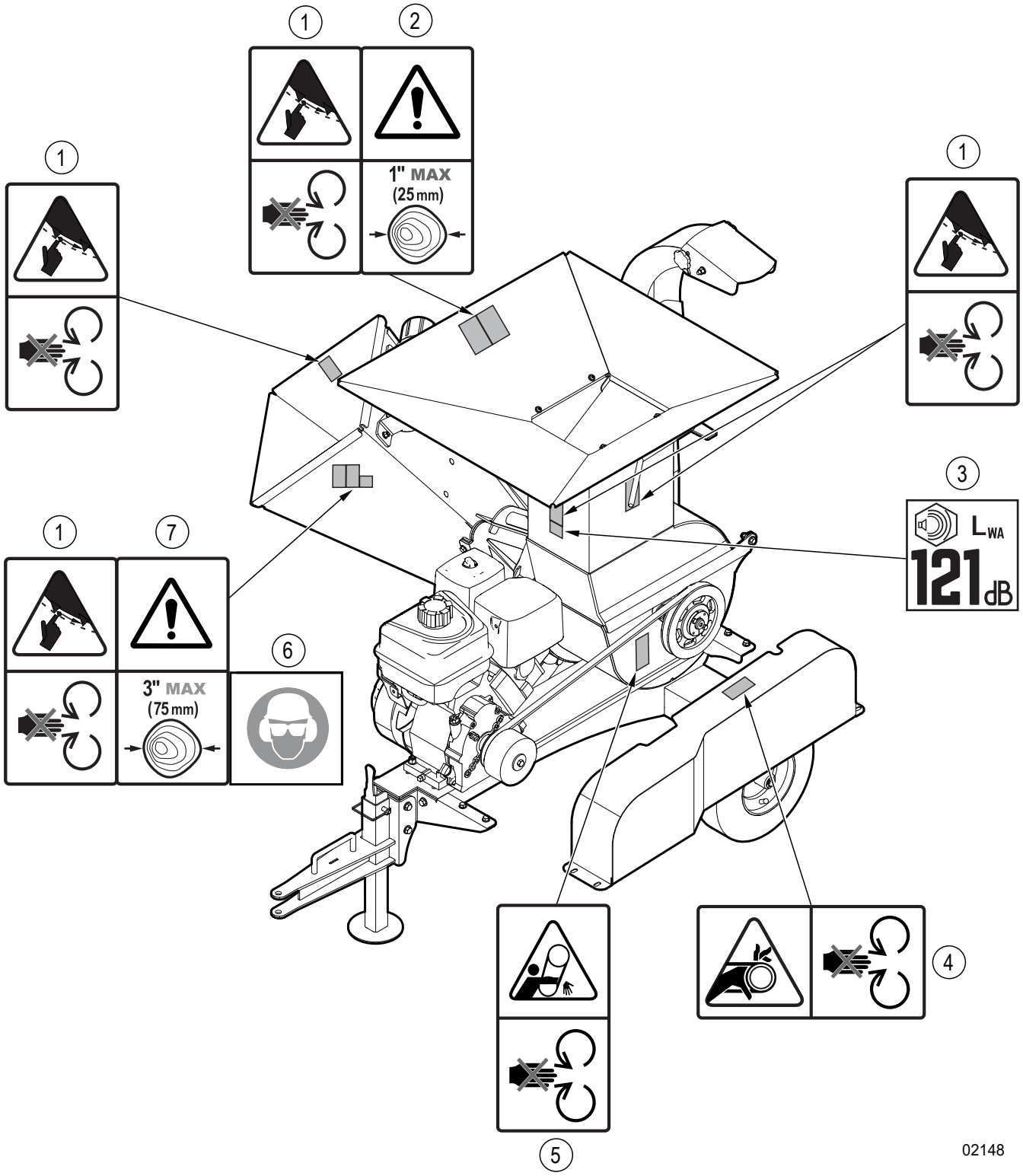


Figure 3 – Safety labels - front

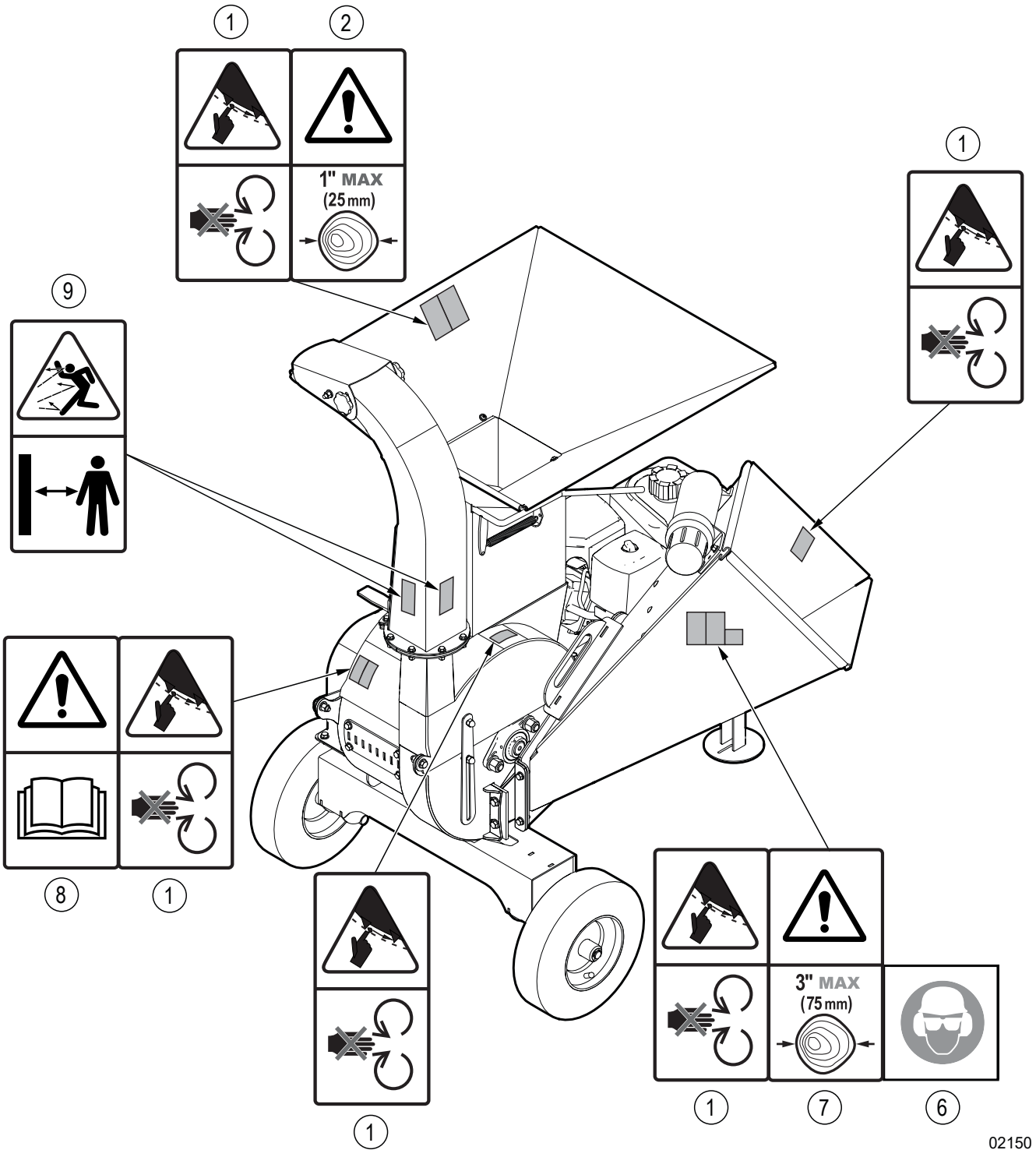


Figure 4– Safety labels - rear

3.2 Safety Label Definitions

1. Warning!

Cut hazard

Sharp rotating parts can cut or sever fingers, hands, toes, or feet.

Keep hands and feet out of the chipper hopper or discharge chute when the machine is on and not in a safe condition.

2. Warning!

Machine damage and possible entanglement hazard

Oversize material will overload the machine, which can stall the engine or cause machine damage. Trying to force material into the machine can result in serious injury from a fall or entanglement.

Do not place material that is larger than 1" (25 mm) in diameter into the shredder hopper. Never try to force material into the machine.

3. Caution!

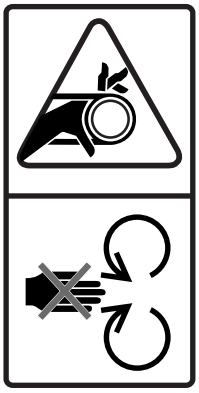
Noise hazard

Sound power (L_{WA}) from the machine can be up to 121 decibels (dB) at close range.

Being within range of noise that is more than 85 dB on a long-term basis can cause severe hearing loss. Over an extended length of time, noise levels that are more than 90 dB can cause permanent, total hearing loss.

4. Warning!

Entanglement, pinch, and crush hazards



Keep hands away from this area. Do not put your hands inside the guard.

Never operate the machine with a guard removed. Make sure that all guards and shields are installed, and the covers are closed before you start the machine.

Rotating parts that can entangle, pinch, or crush fingers and hands are exposed when the guard is removed.

5. Warning!

Entanglement, pinch, and crush hazards

Rotating parts can pull in, pinch, and crush fingers and hands. Install the guard when work is complete.

Keep your hands away from the drive belt. Turn off the machine and put it in a safe condition before service or maintenance. Wear heavy gloves and use caution when working in this area.

6. Warning!

Wear the necessary PPE

- A hard hat.
- Heavy gloves.
- Hearing protection.
- Protective goggles or a face shield.

7. Warning!

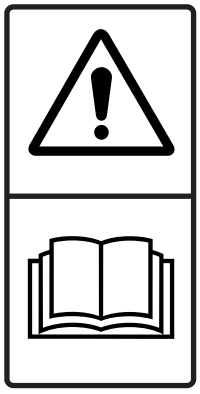
Machine damage and possible entanglement hazard

Oversize material will overload the machine, which can stall the engine or cause machine damage. Trying to force material into the machine can result in serious injury from a fall or entanglement.

Do not place material that is larger than 3" (75 mm) in diameter into the chipper hopper. Never try to force material into the machine.

8. Caution!

Read the Operator's Manual



There is important safety information and instructions in the Operator's Manual.

Read all the safety information and instructions in the Operator's Manual. Know what all the safety labels mean.

9. Caution!

Impact, cut, and puncture hazards

The machine expels wood chips fast enough to cause personal injury and property damage.

Stay away from the area around the discharge chute and never point the discharge chute at people, animals, or structures.

3.3 Replace a Safety Label

- Always replace safety labels that are missing or have become illegible. Replacement safety labels are available from your local Wallenstein Equipment dealer or distributor.
- Keep the safety labels clean and legible at all times.
- When a part that has a safety label on it is replaced, the correct safety label must be applied to the replacement part.

3.3.1 Conditions

- The installation area must be clean and dry.
- The application surface must be clean and free of grease or oil.
- The ambient temperature must be above 50 °F (10 °C).

3.3.2 Tool

Use a squeegee, plastic card, or similar tool to smooth out the label.

3.3.3 Procedure

1. Identify the label location.
2. Peel the label off the backing paper.
3. Hold the label above the location where you are going to apply it.
   Align the edges of the label with an edge of the machine.
4. Start at one edge and carefully press the center of the adhesive side of the label onto the machine.
5. Use an appropriate tool to smooth the label. Work from one side to the other.
6. If there are small air pockets:
   a. Use a pin to pierce the air pocket.
   b. Use a piece of the label backing paper to smooth the air pocket.

4. Familiarization

The BXMT3209 chipper/shredder chips or shreds limbs, branches, bark, or leaves into wood chips or mulch. A gas engine supplies power to the machine.

4.1 New Operator

⚠ WARNING!

Make sure that all operators understand how to set the machine to a safe condition before they start service, maintenance, or storage procedures. For instructions, *see Safe Condition on page 9*.

It is the responsibility of the owner and the operator to read this manual, and to train all operators before they work with the machine. Obey all safety instructions.

Only a fully trained operator is approved to use the machine. A person who operates the machine without the correct training is a danger to them self and others, and can cause property damage.

4.2 Training

Each operator must be trained in the correct operating procedures before using the machine. The *Sign-Off Form on page 10* can be used to keep a training record.

1. Teach the new operator the control locations, functions, and movement directions.
2. Put the machine in a large open area and let the new operator learn the control functions and machine responses.
3. After the new operator knows and is comfortable with the machine, they can start work.

4.3 Operator Orientation

IMPORTANT! When describing controls throughout this manual, the directions for left hand (LH), right hand (RH), backward, and forward are determined when standing at the operator controls facing the direction of forward machine travel.

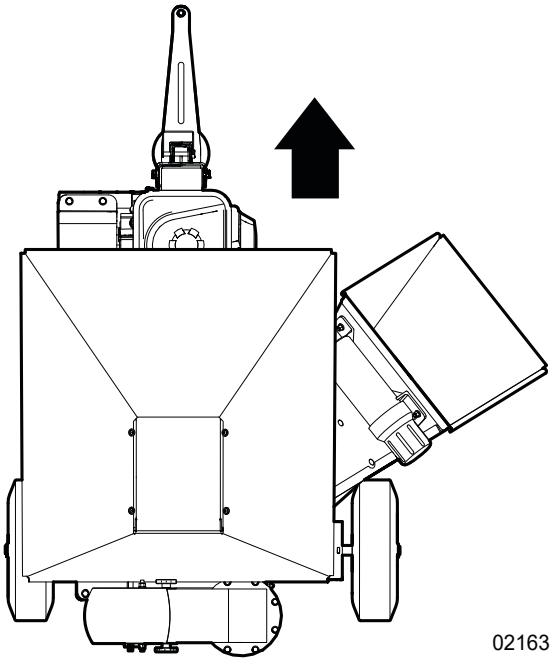


Figure 5–Operator orientation

4.4 Machine Components

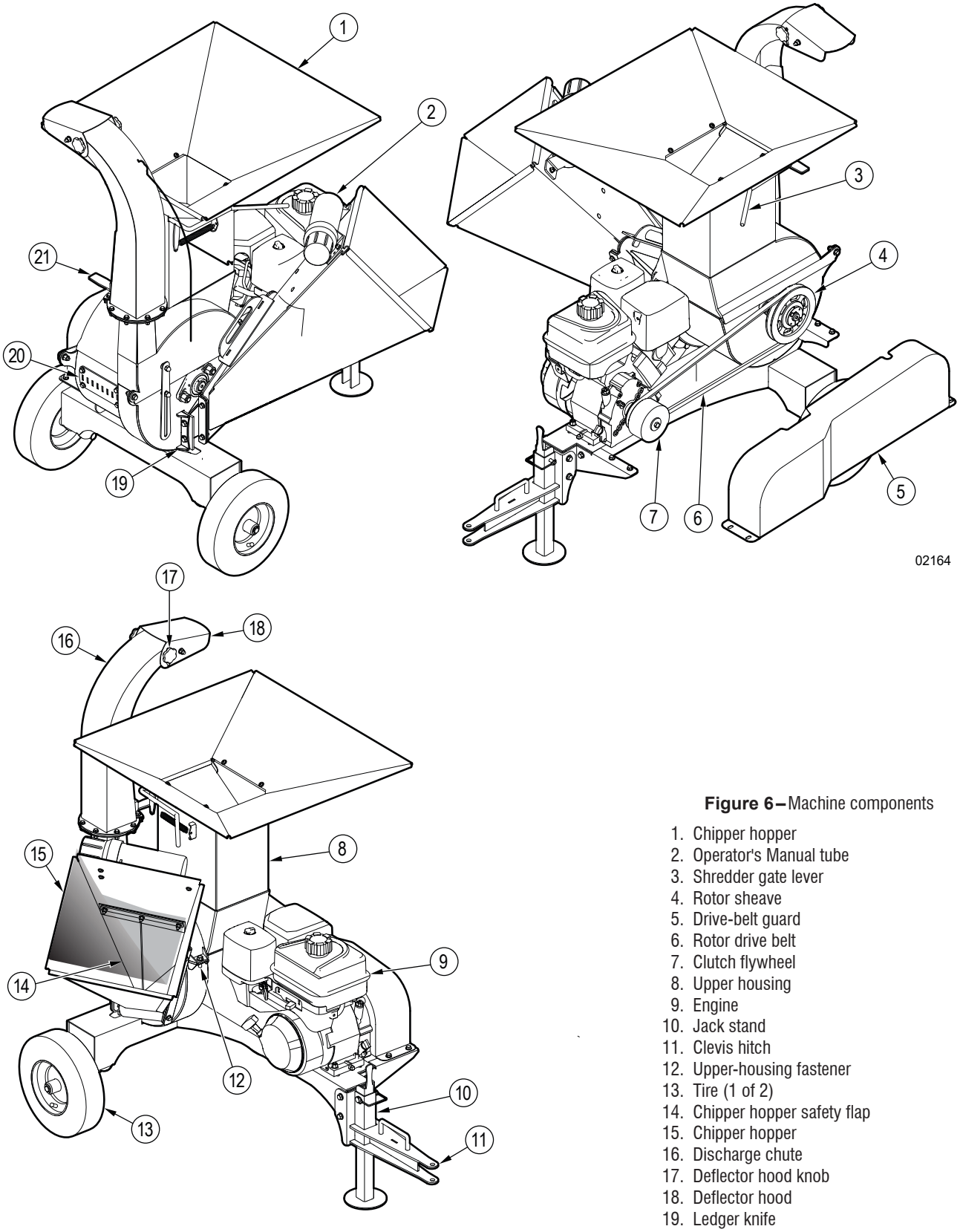


Figure 6–Machine components

1. Chipper hopper
2. Operator's Manual tube
3. Shredder gate lever
4. Rotor sheave
5. Drive-belt guard
6. Rotor drive belt
7. Clutch flywheel
8. Upper housing
9. Engine
10. Jack stand
11. Clevis hitch
12. Upper-housing fastener
13. Tire (1 of 2)
14. Chipper hopper safety flap
15. Chipper hopper
16. Discharge chute
17. Deflector hood knob
18. Deflector hood
19. Ledger knife
20. Chop block
21. Discharge-chute latch handle

5. Controls

WARNING!

Do not operate the machine until you are thoroughly familiar with the position and function of the various controls. Read the operator's manual thoroughly. Your safety is involved!

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5.1 Engine Controls

WARNING!

Before starting the engine, read and understand the safety and operating information under *Engine Operation on page 25*.

IMPORTANT! For full information about the engine controls, see the engine manufacturer's manual.

5.1.1 Throttle Lever

The throttle control lever has the following functions:

Fast
Engine speed is fast.

Slow
Engine speed is slow.

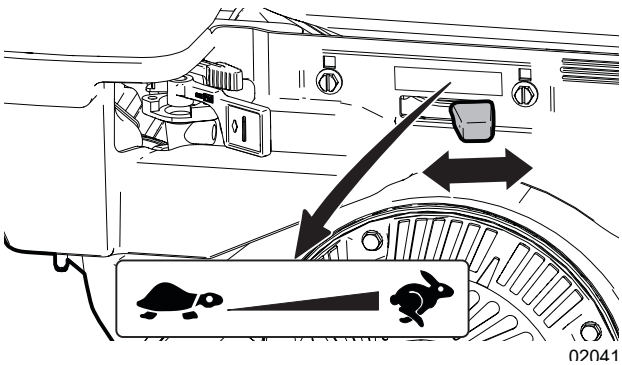


Figure 7–Engine throttle control

5.1.2 Fuel Shut-off Valve

The fuel shut-off valve has the following functions:

Fuel shutoff closed
Fuel valve is closed. The engine is off.

Fuel shutoff open
Fuel valve is open. The engine can be started.

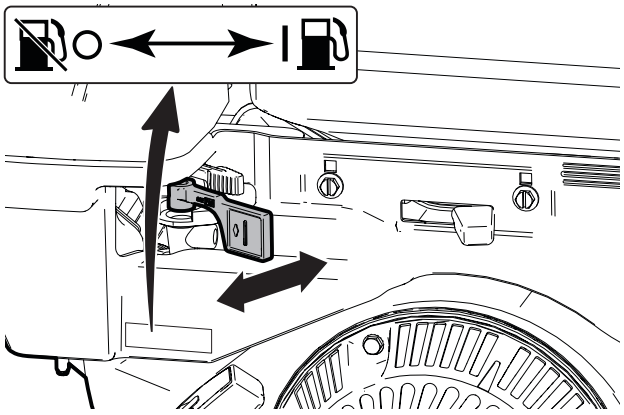
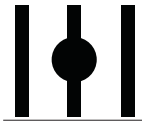


Figure 8–Engine fuel shutoff

5.1.3 Choke Lever

The choke control lever has the following functions:

Closed
Close the choke to start a cold engine.



Open
Open the choke when the engine is warm.

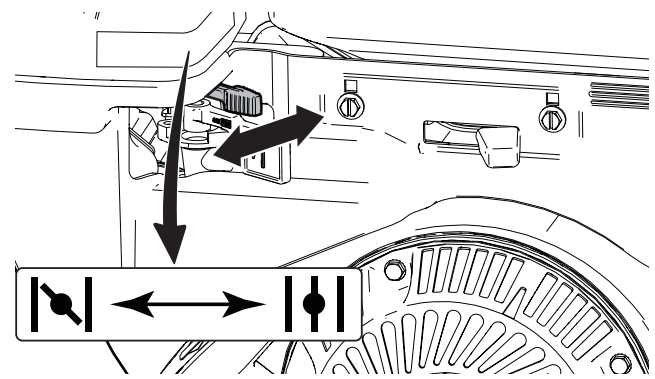


Figure 9–Engine choke control

5.1.4 Recoil Starter

WARNING!

Fast retraction of the starter cord (called kickback) pulls your hand and arm toward the engine faster than you can let go of the handle. Serious bodily harm (for example; bruises, sprains, fractures, and broken bones) can result.

When starting the engine, pull the starter cord slowly until you feel resistance, and then pull it rapidly to avoid kickback.

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The engine is a recoil-start. An operator grips the starter-cord handle to pull the starter cord and start the engine.

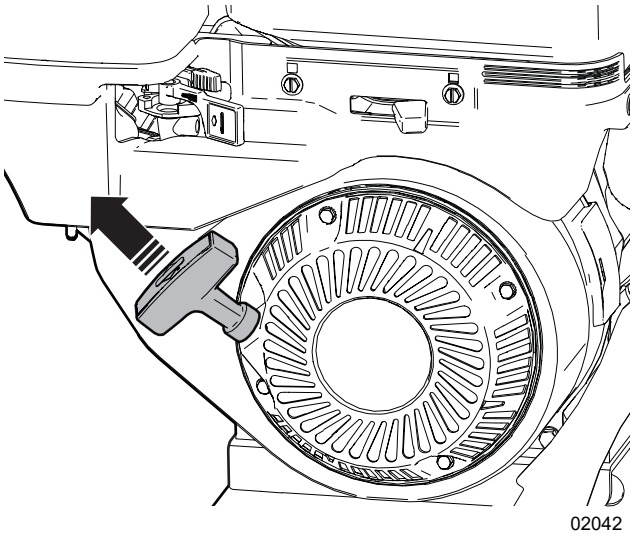


Figure 10 – Starter cord

5.2 Shredder Gate Lever

The shredder has a spring-loaded gate.

Open the gate	Push down on the lever. The gate opens and material in the shredder hopper falls through the chute into the machine.
Close the gate	Release the lever. The spring closes the gate.

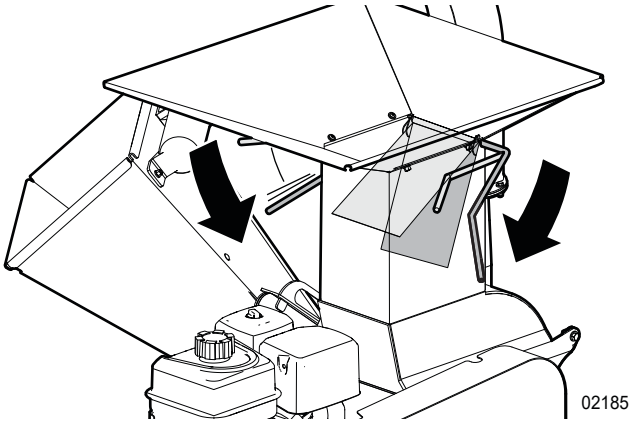


Figure 11 – Shredder gate levers

5.3 Discharge Chute

The discharge chute can rotate 270°. A spring-loaded latch handle locks it in position when released.

1. Lift the latch handle up until the chute lock pin disengages.
2. Rotate the chute to the required position.
3. Release the latch handle.
   Make sure that the latch handle locks the discharge chute into position at the nearest lock point.

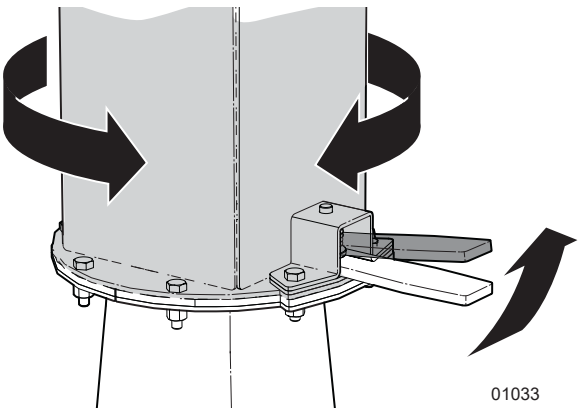


Figure 12 – Discharge chute

5.4 Hood Deflector

The discharge chute has a deflector on the end to direct wood chips. Use the hand knobs on each side to change the position.

1. Loosen the two hand knobs (turn them counterclockwise).
2. Rotate the deflector.
3. Tighten the hand knobs (turn them clockwise).

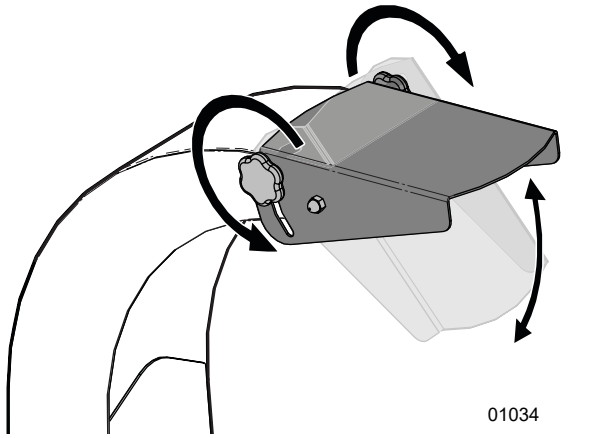


Figure 13–Hood deflector

5.5 Jack Stand

Use the jack stand to support the front of the machine when the machine is not attached to a tow vehicle.

For instructions, see *Lower the Jack Stand on page 32* or *Lift the Jack Stand on page 33*.

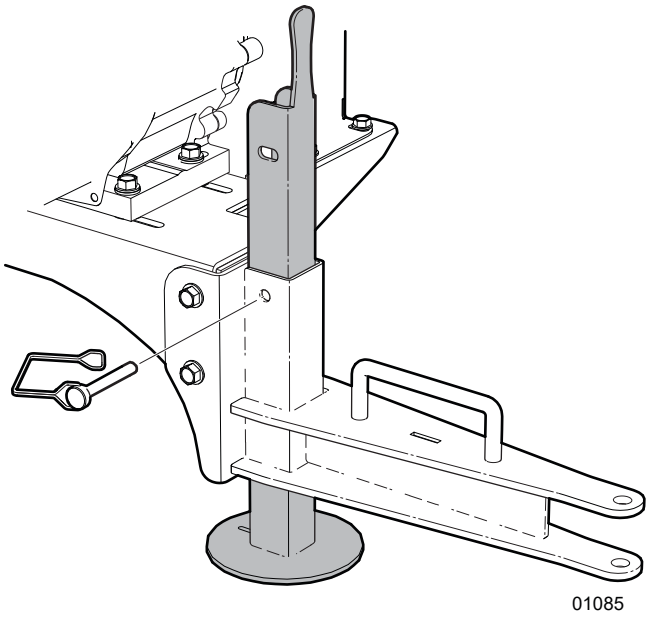


Figure 14–Jack stand

6. Operating Instructions

Read and understand the operating instructions before using the machine.

6.1 Operating Safety

⚠ WARNING!

Wear the personal protective equipment (PPE) that is required to complete the work safely.

This includes, but is not limited to a hard hat, hearing protection, a face shield, protective footwear, a respirator, and heavy gloves.

W101

⚠ WARNING!

Never reach into the feed hopper. There are sharp knives that can trap, cut, and/or sever your fingers or hand. Use a stick or branch to push material that does not move into the machine.

If the machine is jammed, set the machine to a safe condition, and then clear the jam.

W004

⚠ WARNING!

Always use the machine outdoors and park the machine in a position where the prevailing winds blow the engine exhaust away from the operator. Exhaust from the engine contains carbon monoxide (CO) that can accumulate to a dangerous level, even in an area with good air flow.

W006

⚠ CAUTION!

Maintain a safe distance from the area where the machine expels the wood chips. Use the discharge chute and/or hood deflector to direct the expelled material away from the work area, all people, animals, and objects.

The machine can expel wood chips fast enough to cause eye, cut, and impact injuries and/or property damage.

W024

IMPORTANT! Do not put metal objects, bottles, cans, rocks, glass, or other unapproved material into the wood chipper. These items will damage the machine.

If these items get into the wood chipper, stop the machine. Set the machine to a safe condition before removing the items. Examine the machine for damage and loose parts.

- Read and understand this manual before you start the machine. Review all safety information annually.
- Park the machine in a clear location on dry, level ground. Do not operate the machine on a hillside or area that is cluttered, wet, muddy, or icy to prevent slips, trips, and falls.
  For more information, see *Work Site on page 11*.
- Keep the work area clean and free of debris.
- Only operate the engine in a location that has good air flow. Engine exhaust gases contain carbon monoxide (an odorless gas) that can cause asphyxiation..
- Do not move or transport the machine when the engine is on.
- Stop the engine before leaving the machine unattended.
- Cut large, curved branches into smaller, straighter sections. Some branches and brush move in unpredictable directions when they enter the machine. Move away from the chipper hopper after you put material into the machine.
- Never stand, sit, or climb on any part of the machine, especially while the engine is on.
- Never operate the machine alone. Always have a minimum of two trained people:
  - There should be one operator and one spotter during machine operation. The operator and spotter must know all the machine safety, controls, and operating functions.
  - The operator must be in control of the machine at all times. The spotter must stay outside of the hazard zone while the machine is operating.
- Keep bystanders a minimum of 10 ft (3 m) from the machine and wood chip discharge area. Mark the safe zone with safety cones.
- Do not reach into the chipper hopper or shredder hopper. Keep your feet on the ground and make sure that you are stable when you put material into the chipper hopper or shredder hopper.

6.2 Pre-Start Checklist

Complete the following before you start the machine the first time and every time thereafter:

Items to Complete	✓
Read and obey the *Operating Safety on page 23* and *Engine Operation Safety on page 25*.	
Check the rotor drive belt tension and alignment. Adjust if necessary. For instructions, see *Drive Belt Maintenance on page 40*.	
Check the condition and clearance of the twig breaker, rotor knives, and ledger knife. Adjust or replace them if necessary.	
Check the engine oil and fuel levels. If necessary, add engine oil or fuel.	
Make sure that the engine spark plug, muffler, fuel cap, and air filter cover are attached and tight.	
Make sure that the machine is lubricated, as specified in the *Maintenance Schedule on page 38*.	
Remove anything that is entangled on the machine. For example, branches or vines.	
Remove all material from the rotor housing and discharge chute. For example, wood chips, bark, or leaves. Material in the rotor housing can cause the engine to stall when you start the machine.	
Make sure that the rotor bearings turn freely. If the bearings are damaged or do not turn freely, lubricate them or contact your local Wallenstein dealer to have them replaced.	
Make sure that all guards and shields are installed, and the covers are closed. Replace guards, shields, or covers, if necessary.	
Check the tires, wheels, axle, and hubs. Inflate, repair, or replace, as necessary.	
Make sure that all of the fasteners are installed and torqued to the correct specification. For more information, see *Bolt Torque on page 53*.	
Make sure that the operator and spotter are wearing the necessary PPE. The PPE must be in good condition.	
Make sure that the operator and spotter are not wearing loose-fitting clothing or jewelry, and long hair is tied up.	
Make sure that there are no bystanders inside the work zone and the spotter is not near a hazard. For zone definitions, see *Set Up a Safe Work Area on page 11*.	

6.3 Machine Break-In

Before and during the first eight hours of operation, do the following tasks.

6.3.1 Before Initial Startup

1. Read and understand all safety and break-in information in this manual and the engine manufacturer's manual.
2. Review the *Machine Components on page 19*.
3. Review the operation and function of the *Controls on page 20*.
4. Complete the *Pre-Start Checklist*.

6.3.2 After One to Five Hours of Operation

Complete each of the following:

- Check the fasteners and make sure that they are torqued to the correct torque. For more information, see *Bolt Torque on page 53*.
- Check the engine oil and fuel levels. If necessary, add engine oil or fuel.
- Check the rotor drive belt tension and alignment. Adjust if necessary.
- Check the condition of the rotor bearings. Make sure that the rotor bearings turn freely.
- Check the condition and clearance of the twig breaker, rotor knives, and ledger knife. Adjust or replace them if necessary.
- Check the tire air pressure, and the wheels, hubs, and axle. See the side of the tire for the correct air pressure.
- Remove anything that is entangled on the machine. For example, branches or vines. Remove debris from the rotor housing and discharge chute.

6.3.3 After Eight Hours of Operation

1. Complete the tasks listed under *After One to Five Hours of Operation*.
2. Complete the *Pre-Start Checklist on page 24*.

6.4 Engine Operation

⚠ CAUTION!

Before you start the engine, review the safety, operating, and maintenance instructions in the engine manual.

W019

6.4.1 Engine Operation Safety

⚠ WARNING!

Do not operate the engine indoors. Park the machine outdoors in a position where the prevailing winds blow the exhaust away from you.

Engine exhaust contains carbon monoxide (CO) that can quickly accumulate to a dangerous level. Carbon monoxide can cause illness, unconsciousness, or death.

W072

IMPORTANT! In some regions, when an engine is used on any forest covered, brush covered, or grass covered unimproved land it is necessary by law to have a spark arrestor installed on the muffler. A spark arrestor traps exhaust particles that are expelled from the engine. It is the responsibility of the operator to comply with the local laws and regulations. To purchase a spark arrestor, contact your local Wallenstein dealer or distributor.

- Keep the cylinder fins and engine shrouds free of debris to prevent the engine from overheating.
- Keep the engine free from wood chips and other debris that can affect the engine speed.
- Use fresh fuel (less than three months old). Stale fuel creates deposits that cause the carburetor to be clogged and leak.
- Check the fuel lines and fittings for cracks or leaks on a regular basis. Replace damaged fuel lines or fitting if necessary.
- Store fuel away from all wood material.
- Do not choke the carburetor to stop the engine. Whenever possible, gradually reduce the engine speed before stopping.
- Do not tamper with governor springs, governor links or other parts that may increase the governed speed. Engine speed is selected by the original equipment manufacturer.
- Only operate the engine in a location that has good air flow. Engine exhaust gases contain carbon monoxide (an odorless gas) that can cause asphyxiation.
- Do not put your hands or feet near moving parts.
- Do not check for a spark with the spark plug or spark plug wire removed.
- Do not hit the flywheel with a hard object or metal tool. This can cause the flywheel to shatter during operation. Use the correct tools to service the engine.
- Do not touch a hot muffler, cylinder, or fins. Contact with hot engine parts can cause burns. Wait for the machine to cool. Use a no-touch thermometer to measure the temperature.
- Do not operate the engine in the following situations:
  - When there is an accumulation of wood chips, dirt, or other combustible materials in the muffler area.
  - In an area where there is a fuel spill. Move the machine away from the fuel spill until the fuel evaporates. Make sure that there are no sources of ignition in the area of the fuel spill.
  - With the air filter or air filter cover removed. This can damage the engine.
  - Without a muffler or heat shield. Inspect the muffler and heat shield on a regular basis. Replace a muffler or heat shield that is damaged.

6.4.2 Check the Engine Fuel Level

⚠ CAUTION!

Check the fuel level outdoors or in an area where there is good air flow. Fuel vapors are very toxic. Breathing fuel vapors can cause irritation, illness, or unconsciousness.

Check the fuel level before each use.

Starting work with a full tank helps to eliminate or reduce operating interruptions for refueling. Avoid running the tank dry.

1. Park the machine on level ground.
2. Stop the machine.
   For instructions, see *Stop the Machine on page 28.*
3. Wait a minimum of five minutes for the engine to cool.
4. Turn the fuel cap counterclockwise to remove it.
5. Do one of the following:
   - If there is enough fuel in the tank, install and secure the fuel cap to prevent spillage.
   - If there is not enough fuel in the tank, add fuel. For instructions, see *Add Fuel to the Engine*.

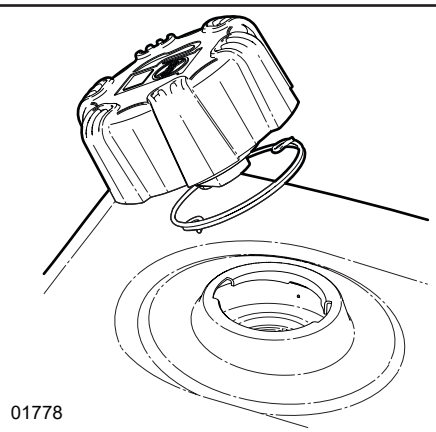


Figure 15–Fuel cap

6.4.3 Add Fuel to the Engine

⚠ CAUTION!

Add fuel to the engine outdoors or in an area where there is good air flow. Fuel vapors are very toxic. Breathing fuel vapors can cause irritation, illness, or unconsciousness.

The engine requires clean, fresh, unleaded gasoline with a pump octane rating of 87 or higher (research octane number [RON] of 91 or higher). Gasoline with up to 10% ethanol (gasohol) is acceptable. For more information, see *Engine Fuel on page 37*.

For information about use at high altitudes, see the engine manufacturer's manual.

Fuel tank capacity: **0.95 US gal (3.6 L).**

1. Stop the machine.
   For instructions, see *Stop the Machine on page 28.*
2. Wait a minimum of five minutes for the engine to cool.
3. Turn the fuel cap counterclockwise to remove it.
4. Add the correct type and amount of fuel to the tank until the fuel level is visible) 1/2 inch (12 mm) below the filler neck. Leave room for expansion. **Do not overfill the tank.**
5. If fuel is spilled, carefully clean it up and wait until the fuel drys before starting the engine.
6. Install and secure the fuel cap to prevent spillage.

6.4.4 Check the Engine Oil Level

IMPORTANT! For more information about engine oil, see the engine manufacturer's manual and *Engine Fuel on page 37.*

Operating the engine with a low oil level can cause engine damage that is not covered by the warranty.

The engine must be in a level position for the dipstick to show the oil level correctly.

Check the engine oil level before each use.

1. Park the machine on level ground.
2. Stop the machine.
   For instructions, see *Stop the Machine on page 28*.
3. Pull out the oil-level dipstick and wipe it clean.
4. Fully reinsert the oil-level dipstick.
5. Pull out the oil-level dipstick and check the oil level.
   The oil level is correct when oil is visible on the dipstick from the end to the full (upper) mark.
6. Complete one of the following:
   - If the oil level is correct, continue with step 7.
   - If the oil level is low, add oil until the oil-level is at the full (upper) mark. For instructions, see *Add Oil to the Engine.*
7. Insert and secure the oil-level dipstick.

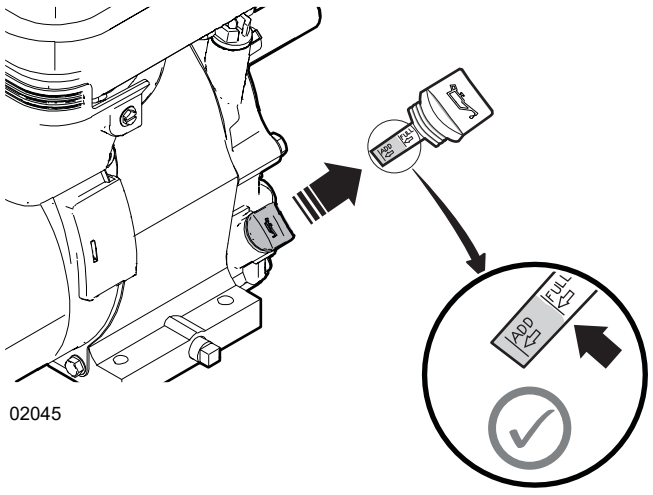


Figure 16– Check the engine oil level

6.4.5 Add Oil to the Engine

IMPORTANT! For more information about engine oil, see the engine manufacturer's manual and *Engine Fuel on page 37.*

The engine has two oil-fill locations. The oil-fill locations are shown in the following image.

1. Check the engine oil level to make sure that the oil level is low. For instructions, see *Check the Engine Oil Level on page 27*.
2. Turn an oil-fill cap counterclockwise to remove it.
3. Use a clean funnel to slowly add the correct type and amount of oil. **Do not overfill.**
4. Wait a minimum of one minute.
5. Remove the funnel, and then check the engine oil level.
6. Install and secure the oil-fill cap to prevent spillage.

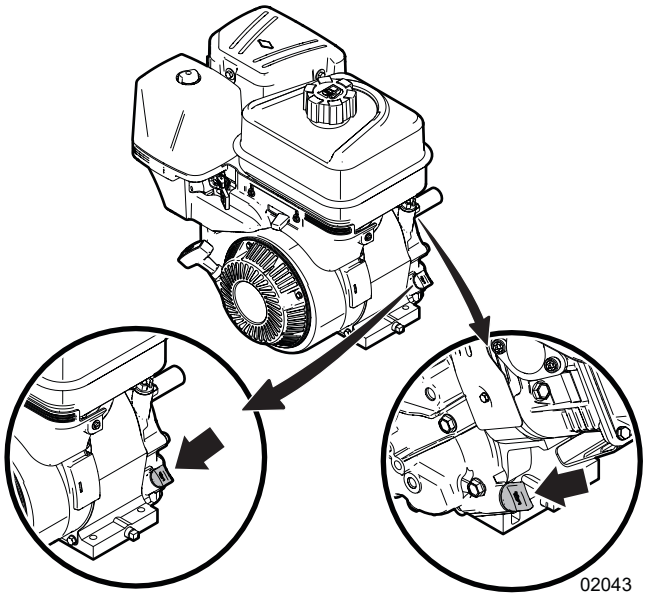


Figure 17– Engine oil-fill locations

6.5 Start the Machine

WARNING!

Before you start the machine, read and understand all of the safety information in this manual and the engine manufacturer's manual.

IMPORTANT! Use short starting cycles (maximum five seconds) and wait one minute between cycles. If the engine does not start after repeated attempts, contact your local dealer or go to VanguardPower.com**.**

1. Before you start the machine, see the information under *Controls on page 20*.
2. Complete the *Pre-Start Checklist on page 24.*
3. Make sure that the machine is level and in a stable position.
4. Move the choke control to the **Closed** position.
5. Move the throttle control to the **Fast** position.
6. Firmly grip the starter-cord handle.
7. Pull the starter cord out slowly until you feel resistance, then pull rapidly.
8. As the engine warms up, move the choke control to the **Open** position.

6.6 Stop the Machine

1. Stop putting material into the machine.
2. Wait for a minimum of 30 seconds to let all the material blow out of the machine.
   Material in the rotor housing can cause the engine to stall the next time you start the machine.
3. On the engine, move the throttle lever to the **SLOW** position.
4. Wait a minimum of one minute for the engine to decrease the rotor speed.
5. Move the fuel shut-off valve to the **Fuel shutoff closed** position to stop the engine and close the fuel shut-off valve.

6.7 Emergency Stop

In an emergency:

1. Stop putting material into the machine.
2. Move the fuel shut-off valve to the **Fuel shutoff closed** position to stop the engine and close the fuel shut-off valve.
3. Do not let anyone start the machine until the emergency is resolved.

6.8 Set Up the Machine

WARNING!

Always use the machine outdoors and park the machine in a position where the prevailing winds blow the engine exhaust away from the operator. Exhaust from the engine contains carbon monoxide (CO) that can accumulate to a dangerous level, even in an area with good air flow.

W006

For more information, see *Figure 18 on page 29*.

1. Select a work site and set up a safe work area.
   For more information, see *Work Site on page 11*.
2. Do one of the following:
   - Disconnect the machine from the tow vehicle.
     For instructions, see *Disconnect from a Tow Vehicle on page 32*.
   - If more stability is necessary, leave the machine attached to the tow vehicle. Set the tow vehicle's parking brake, stop the engine, and then remove the key from the ignition.
3. Lower the jack stand to support the machine in a level position. The machine should be as level with the ground as possible.
   For instructions, see *Lower the Jack Stand on page 32*.
4. Turn the discharge chute to direct the wood chips away from the operator and in the direction of the wind.
   For instructions, see *Discharge Chute on page 21*.
5. Move the hood deflector to direct the wood chips further away from or closer to the machine.
   For instructions, see *Hood Deflector on page 22*.
6. Make sure that the rotor housing is closed and the fastener is tight.
7. Make sure that all guards and shields are installed, and the covers are closed.

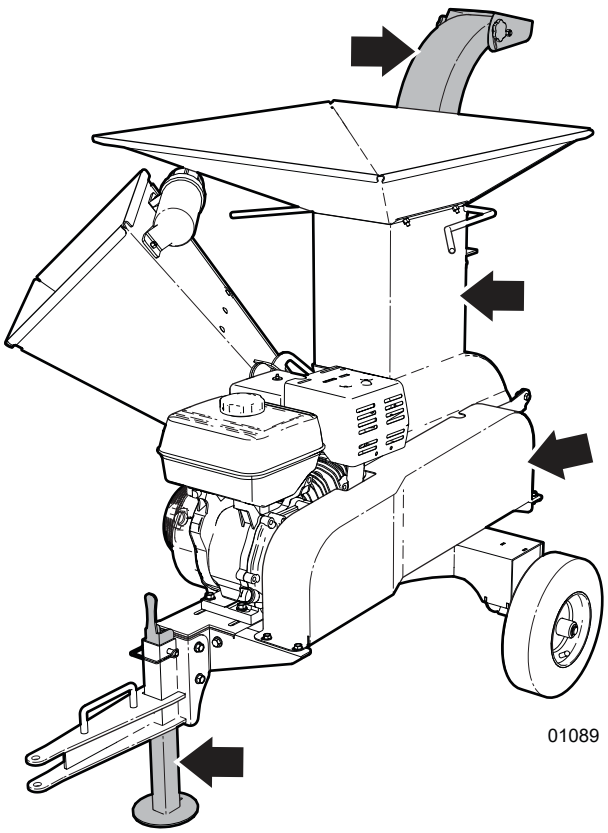


Figure 18–Machine setup

6.9 Operate the Machine

⚠ WARNING!

Wear the personal protective equipment (PPE) that is required to complete the work safely.

This includes, but is not limited to a hard hat, hearing protection, a face shield, protective footwear, a respirator, and heavy gloves.

W101

⚠ WARNING!

Never reach into the feed hopper. There are sharp knives that can trap, cut, and/or sever your fingers or hand. Use a stick or branch to push material that does not move into the machine.

If the machine is jammed, set the machine to a safe condition, and then clear the jam.

W004

⚠ CAUTION!

Maintain a safe distance from the area where the machine expels the wood chips. Use the discharge chute and/or hood deflector to direct the expelled material away from the work area, all people, animals, and objects.

The machine can expel wood chips fast enough to cause eye, cut, and impact injuries and/or property damage.

W024

⚠ CAUTION!

Keep shredder gate closed between feeds to keep flying material contained in the shredder housing. Do not prop open the gate. Material can fly out causing injury.

W071

⚠ CAUTION!

Risk of personal injury! Do not overload the machine by placing material into the feed hopper larger than the size stated on the decal.

Machine damage could also result.

W063

IMPORTANT! Do not put metal objects, bottles, cans, rocks, glass, or other unapproved material into the chipper hopper. These items will damage the machine.

If these items get into the machine, stop the machine. Set the machine to a safe condition before removing the items. Examine the machine for damage and loose parts.

- Be aware of how much material you put in the machine. If the engine speed decreases, reduce the amount of material or stop putting material in the machine.
- If the material is not pulled into the machine, use a stick or branch to push the material. **Never reach into the chipper hopper or shedder hopper.**
- Keep the wood-chip pile contained to one area.
- If the machine is blocked, stop putting material in. For instructions, see *Clear a Blockage on page 31*.

Maximum material diameter

- Chipper hopper: 3" (7.5 cm)
- Shredder hopper: 1" (2.5 cm)

6.9.1 Chip Wood

1. Set up the machine.
   For instructions, see *Set Up the Machine on page 28*.
2. Start the machine.
   For instructions, see *Start the Machine on page 28*.
3. Wait until the rotor is at full speed (wait a minimum of three minutes).
4. Put material (branches or brush) into the chipper hopper. Do not force material into the machine. Use continuous, light pressure to guide the material. Gravity and the rotor pull the material into the machine.
   For more information, see *Figure 19*.

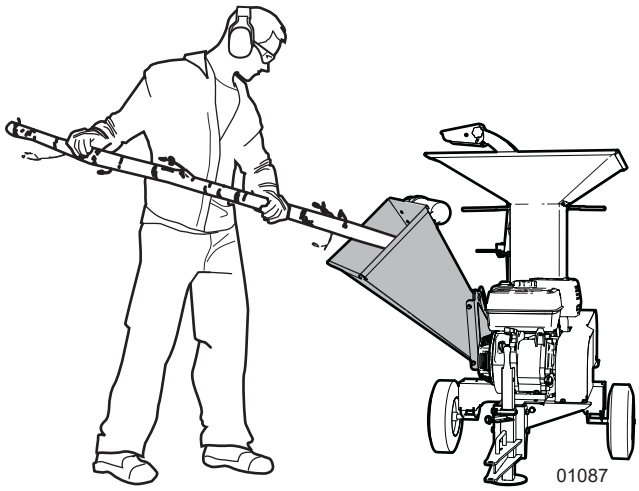


Figure 19 – Chip wood

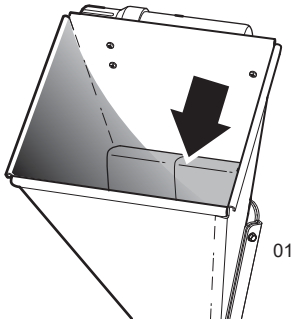


Figure 20 – Chipper hopper safety flap

6.9.2 Shred Wood

1. Set up the machine.
   For instructions, see *Set Up the Machine on page 28*.
2. Start the machine.
   For instructions, see *Start the Machine on page 28*.
3. Wait until the rotor is at full speed (wait a minimum of three minutes).
4. Put leafy or small diameter material into the shredder hopper.
5. Use the shredder gate lever to open the shredder gate.
6. When the material falls into the shredder chute, release the shredder gate lever. The shredder gate closes.
   Always close the shredder gate to keep flying material contained in the machine. **Never use something to hold the shredder gate open.**

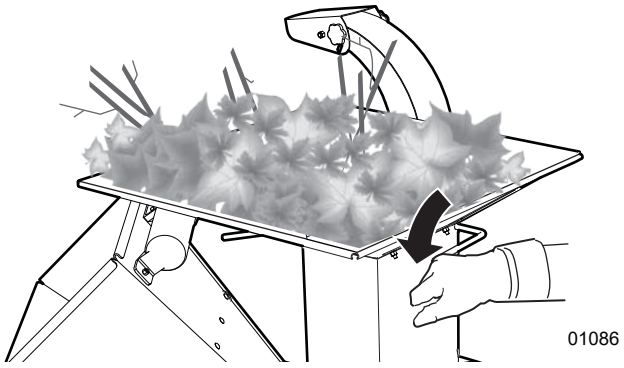


Figure 21 – Shredder gate lever

6.10 Clear a Blockage

⚠ WARNING!

Put the machine in a safe condition before you clear a blockage. Do not reach into the machine when it is not in a safe condition. When the machine is not in a safe condition, there are crush, sever, and entanglement hazards that can cause serious injury or death.

⚠ CAUTION!

Avoid reaching into the rotor housing. The rotor and ledger knives are very sharp. If it is necessary to reach into the rotor housing, set the machine to a safe condition, wear heavy gloves, and use extreme caution.

W003

The machine is designed to handle a wide range of materials. However, if material collects in the machine, follow this procedure to clear the blockage:

1. Set the machine to a safe condition.
   For instructions, see *Safe Condition on page 9*.
2. Remove all of the material from the chipper hopper and shredder hopper.
3. Remove material from the discharge chute and hood deflector.
   Use a stick to loosen the blockage. Make sure that the discharge chute and hood deflector are clear.
4. Start the machine to see if the blockage is cleared.
   If the machine does not operate, the blockage must be removed from inside the machine.
   For instructions, see *Clear an Internal Blockage on page 31.*

6.10.1 Clear an Internal Blockage

1. Set the machine to a safe condition.
   For instructions, see *Safe Condition on page 9*.
2. Remove the upper rotor housing fastener, and then open the upper rotor housing.
   For more information, see *Figure 22*.
3. Remove material from the upper rotor housing and discharge chute.
4. Use a tool or stick to remove material and any blockage from inside the lower housing.
5. Carefully and slowly, turn the rotor to make sure that there is not a blockage between the rotor and ledger knife.
   Do not reach into the rotor housing while the rotor is moving.
6. Close the upper rotor housing.
7. Install the upper rotor housing fastener.
8. Use a calibrated torque wrench to torque the upper rotor housing fastener to **33 lbf•ft (45 N•m)**.

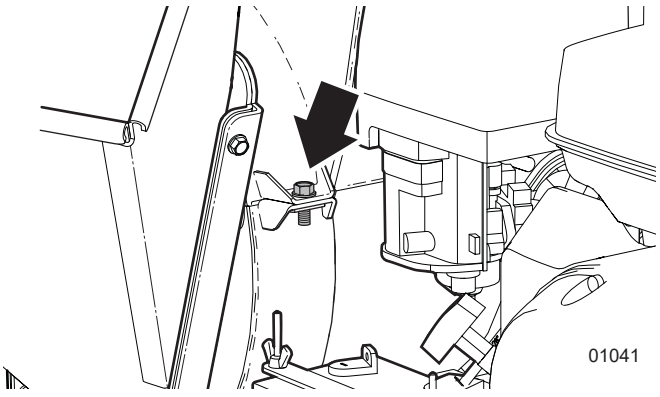


Figure 22–Upper rotor housing fastener

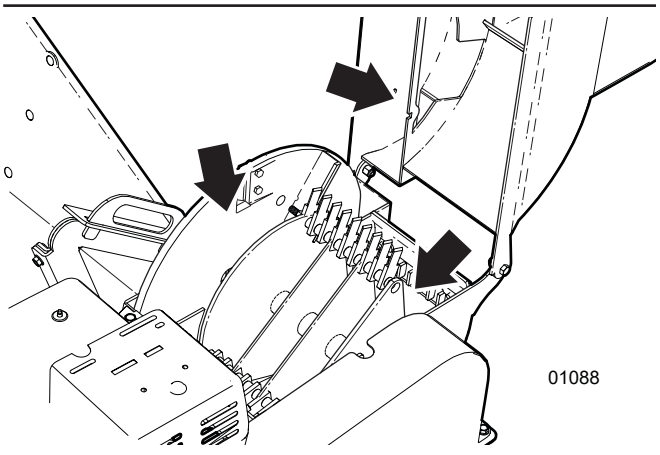


Figure 23–Remove all material from the lower housing

7. Transport

IMPORTANT! Equipment that is transported on a public roadway must comply with the local laws that govern the safety and transport of machinery.

The machine is not intended for use or transport on public roadways. Therefore, it does not include the required lights, reflectors, and markings.

Before taking the machine on a public roadway, install the required lighting, reflectors, and markings, and make sure that they are in good working condition. For specific requirements, contact your local transportation authority.

7.1 Transport Safety

- Make sure that the machine is safely attached to the tow vehicle with a retainer through the hitch.
- Never allow riders on the machine.
- Do not exceed a safe travel speed. Decrease your speed for rough terrain and around corners.
- Plan your route to avoid heavy traffic.
- Do not transport or move the machine with the engine on.
- Make sure that the fuel tank cap is on and tight.
- Examine the tires for cuts or damage.
- Make sure that the tires are filled to the specified pressure. For the correct tire pressure, see the tire sidewall.
- Make sure that the jack stand is lifted.
- Make sure that all guards and shields are installed, and the covers are closed.
- Remove all debris from the machine.
- When the machine is ready for transport, do a circle check to make sure that everything is safe.

7.2 Prepare the Machine for Transport

1. Stop the machine.
   For instructions, see *Stop the Machine on page 28*.
2. Remove all material from the chipper hopper and shredder hopper.
3. Turn the discharge chute to above the machine to decrease the machine width.
   For instructions, see *Discharge Chute on page 21*.
4. Make sure that the upper rotor housing is closed, and the upper rotor housing fastener is installed and torqued.
5. Attach the machine to a tow vehicle.
   For instructions, see *Connect to a Tow Vehicle on page 32*.

7.3 Connect to a Tow Vehicle

Make sure that there is space and clearance to safely reverse the tow vehicle to the machine.

1. Reverse the tow vehicle to the machine. Stop about 1 ft (30 cm) away from the hitch.
2. Use the handle on the machine tongue to align the hitch with the tow vehicle draw bar.
3. Insert the hitch pin through the hitch and draw bar. Install the snap-lock pin to make the connection safe.
4. Lift and the jack stand.
   For instrucitons, see *Lift the Jack Stand on page 33.*

7.4 Disconnect from a Tow Vehicle

Make sure that there is space and clearance to safely drive the tow vehicle forward, away from the machine.

1. Stop the tow vehicle in a location where it and the machine are on dry, level ground. Turn off the tow vehicle engine and apply the parking brake.
2. Lower the jack stand to support the machine.
   For instrucitons, see *Lower the Jack Stand on page 32*.
3. Remove the snap-lock pin from the hitch pin. Remove the hitch pin from the hitch and draw bar.
4. Slowly, drive the tow vehicle forward until the draw bar is clear of the hitch.
5. Stop the tow vehicle and apply the parking brake.
6. Install the hitch pin through hitch. Install the snap-lock pin through the hitch pin.
7. Use the jack stand to adjust the machine until it is level with the ground.

7.5 Lower the Jack Stand

For more information, see *Figure 14 on page 22*.

1. Remove the snap-lock pin from the frame and jack stand.
2. Lower the jack stand to the ground.
3. Insert the snap-lock pin through the frame and top hole on the jack stand.

7.6 Lift the Jack Stand

For more information, see *Figure 14 on page 22*.

1. Attach the machine to a tow vehicle or put blocks under the tongue to support the machine.
   For instructions, see *Connect to a Tow Vehicle on page 32*.
2. Remove the snap-lock pin from the frame and jack stand.
3. Lift the jack stand.
4. Insert the snap-lock pin through the frame and bottom hole on the jack stand.

8. Storage

At the end of the season or when the machine is not going to be used for an extended length of time, store the machine correctly to prevent damage.

8.1 Storage Safety

⚠ WARNING!

Do not permit children to play on or around stored machinery or equipment. Sharp edges, unexpected movement, trips, falls, and other hazards can cause serious injury or death.

W105

⚠ WARNING!

Store the machine away from furnaces, stoves, water heaters, or other appliances that have a pilot light or other ignition source. A pilot light or other source of ignition can ignite fuel vapors.

IMPORTANT! A pressure washer can damage the machine's product identification plate and make it unreadable. Do not direct the spray from a pressure washer onto the product identification plate. Use a clean, soft cloth that is dampened with water to remove dirt.

- Store the machine in a dry, level location away from human activity.
- Store the machine indoors, if possible.
- Support the with blocks for stability, if necessary.

8.2 Put the Machine in Storage

For information about engine storage, see the engine manufacturer's manual.

1. Set the machine to a safe condition.
   For instructions, see *Safe Condition on page 9*.
2. Check all of the moving parts and remove all entangled material.
3. Clean the machine.
   For instructions, see *Clean the Machine on page 49*.
4. Start the machine, let it run for a few minutes to remove any moisture, and then stop the machine.
5. Repeat step 1.
6. Examine the machine fully, including internal components. Replace or repair any worn or damaged components.
7. Paint scratches and dents to prevent rust.
8. Do one of the following:
   - If the machine will be in storage for one to three months, add stabilizer to the engine fuel, and then operate the engine for a minimum of three minutes to move the stabilizer through the engine.
   - If the machine will be in storage for longer than three months, replace the engine fuel with an alkylate or appropriate engineered fuel. These fuel types prevent the buildup of deposits in the engine.
     For more information, see *Engine Fuel on page 37*.
     For instructions, see *Replace the Engine Fuel on page 35*.
9. Park the machine in the storage location.
10. Disconnect the tow vehicle.
    For instructions, see *Disconnect from a Tow Vehicle on page 32*.
11. Adjust the jack stand to make the machine as level as possible.
    If the machine must be on soft ground, put boards or plates under the jack stand to increase the surface area.
12. Block the machine wheels to prevent accidental movement and increase the wheel bearing life.
13. If the machine must be stored outdoors, cover the machine with a waterproof tarp.
    The machine be stored indoors, if possible.

8.3 Remove the Machine from Storage

1. Complete the *Pre-Start Checklist on page 24*.
2. Do the necessary maintenance.
   For maintenance requirements, see the *Maintenance Schedule on page 38*.

8.4 Replace the Engine Fuel

WARNING!

Never smoke or vape while working with fuel. Fuel vapors can explode causing injury or death. Keep sparks, flames, and hot components away.

W027

WARNING!

Fuel and vapors are extremely flammable and explosive. Fire or explosion can cause severe burns, bodily harm, or death. Keep fuel away from sparks, open flame, pilot lights, heat, and any other source of ignition.

CAUTION!

Fuel vapors are very toxic. Breathing fuel vapors can cause irritation, illness, or unconsciousness. Check the fuel level or add fuel to the engine outdoors or in an area that has good air flow.

1. Stop the machine.
   For instructions, see *Stop the Machine on page 28*.
2. Wait for the engine and fluids to cool.
3. Remove the current fuel from the engine.
   Operate the machine until the fuel tank is empty or drain the fuel tank and dispose of the fuel correctly.
4. Add new fuel to the engine.
   For instructions, see *Add Fuel to the Engine on page 26*.
5. Carefully remove any spilled fuel, and then wait until any remaining fuel dries.
6. Tighten the fuel cap.
7. Start the machine.
   For instructions, see *Start the Machine on page 28*.
8. Wait five to 10 minutes for the fuel to flush the carburetor.
9. Stop the machine.
   For instructions, see *Stop the Machine on page 28*.

9. Service and Maintenance

Maintenance is your responsibility. Regular preventive maintenance can improve performance and prolong the life of the machine.

9.1 Service and Maintenance Safety

WARNING!

Risk of serious personal injury. Stop engine before performing ANY service or maintenance procedure. Reinstall all covers and shields removed before putting machine back into service.

W033

WARNING!

Before you start service or maintenance work:

- **Set the machine to a safe condition.**
- **Wait for the machine to cool down. Engine components and fluids may be hot enough to cause burns.**
- **Read and understand all of the service and maintenance safety information.**

W041

WARNING!

Wear the personal protective equipment (PPE) that is required to complete the work safely.

This includes, but is not limited to a hard hat, hearing protection, a face shield, protective footwear, a respirator, and heavy gloves.

W101

IMPORTANT! See the engine manufacturer's manual for maintenance and service information.

- Follow good shop practices:
  - Keep the work area clean and dry.
  - Ground electrical outlets and tools.
  - Have adequate light for good visibility.
- Use tools that are in working condition and correct for the task. Make sure that you know how to use the tools before you use them.
- Only operate the engine in a location that has good air flow. Engine exhaust gases contain carbon monoxide (an odorless gas) that can cause asphyxiation.
- Never work under equipment unless it is safely supported with blocks.
- Always have a minimum of two people present during maintenance or service. Do not work alone in case an emergency situation occurs.
- Never do service or maintenance work alone. Always have a minimum of two people in case an emergency situation occurs.
- Keep a fire extinguisher and first aid kit available at all times.
- When service or maintenance is complete, do the following:
  - Replace all guards and shields, and close the covers.
  - Torque the fasteners to the correct torque.
- Do not use gasoline or diesel fuel to clean parts. Use a regular cleanser.
- When replacement parts are necessary, use genuine factory replacement parts to restore your machine to the original specifications. The manufacturer cannot be responsible for injuries or damages caused by use of unapproved parts or accessories.

Set the machine to a safe condition before you start any service or maintenance:

SAFE CONDITION

1. If the machine is connected to a tow vehicle, set the tow vehicle's parking brake, turn off the engine, and remove the ignition key.
2. Stop the machine.
   For instructions, see *Stop the Machine on page 28*.
3. Disconnect the engine spark-plug wire and keep it away from the spark plug.
4. Remove all material from the chipper hopper and shredder hopper.
5. Wait for the engine and machine to cool.

9.2 Fluids and Lubricants

The machine needs various fluids and lubricants for operation and maintenance.

9.2.1 Lubricant Handling and Storage

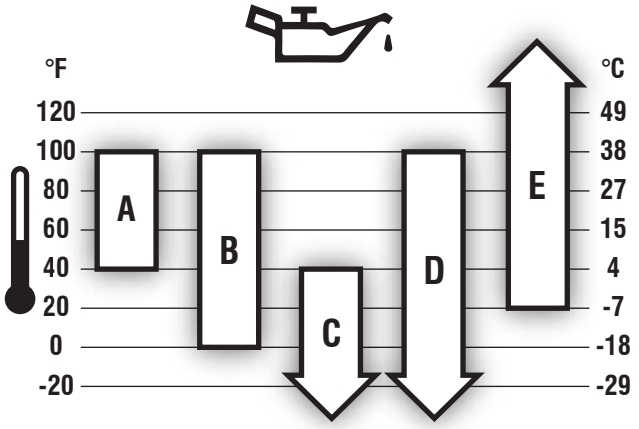
For optimal machine efficiency, use clean lubricants and clean containers to handle all lubricants. Store lubricants in a location that is protected from dust, moisture, and other contaminants.

9.2.2 Engine Oil

For engine maintenance and service information, see the engine manufacturer's manual.

For the best engine performance, use Briggs & Stratton® Warranty Certified oils. Other high-quality detergent oils are permitted if they are classified for service SF, SG, SH, SJ, or higher. Do not use special additives.

Use the correct oil viscosity for the expected outdoor temperature range. The following chart is a guide:



A	**SAE 30** – Below 40 °F (4 °C) the use of SAE 30 results in hard starting.
B	**10W-30** – Above 80 °F (27 °C) the use of 10W-30 can cause increased oil consumption. Check the oil level frequently.
C	**5W-30**
D	**Synthetic 5W-30**
E	**Vanguard® Synthetic 15W-50**

9.2.3 Engine Fuel

For complete fuel information and use at high altitudes, see the engine manufacturer's manual.

Fuel must meet the following specifications:

- Clean, fresh, unleaded gasoline.
- Minimum of 87 octane / 87 AKI (91 RON).
- Gasoline with up to 10% ethanol (gasohol) is acceptable if the fuel is fresh (less than three months old).

If the machine will be in storage for longer than three months, replace the fuel with one of the following fuel types:

- An alkylate fuel.
- An engineered fuel that is high octane, ethanol-free, and formulated with power detergent to prevent the buildup of deposits.

For instructions, see *Replace the Engine Fuel on page 35*.

9.2.4 Grease

Use an SAE multipurpose high temperature grease with extreme pressure (EP) performance. An SAE multipurpose lithium-based grease is an acceptable substitute.

9.3 Maintenance Schedule

Complete maintenance tasks at the specified time or hour interval, whichever comes first.

IMPORTANT! For more information, see the engine manufacturer's manual.

Task	8 hours or daily	50 hours or annually	100 hours or annually	200 hours or annually	Annually	600 hours or every three years	Reference
Check the engine oil level and quality.	●						*See page 27*
Check the engine fuel level.	●						See *page 26*
Clean around the muffler and controls.	●						See the engine manual.
Check the drive belt condition.	●						*See page 40*
Clean the engine air-intake grill.	●						N/A[1]
Check that all the fasteners are tightened to the specified torque.	●						*See page 53*
Check the drive belt tension.		●					See *page 41*
Check the rotor blade sharpness.		●					See *page 46*
Check the ledger knife sharpness.		●					See *page 47*
Check the shredder knife sharpness.		●					See *page 48*
Check the chop block for damage.		●					See *page 49*
Check drive belt alignment.			●				See *page 42*
Grease the rotor bearings.			●				See *page 39*
Check the tire pressure.			●				See the tire sidewall.
Service the engine exhaust system.			●				See the engine manual.
Clean the machine. Remove debris and entangled material.			●				See *page 49*
Clean the engine air filter[2].				●			See *page 40*
Change the engine oil.				●			See the engine manual.
Service the engine fuel system.					●		See the engine manual.
Service the engine cooling system.					●		See the engine manual.
Replace the spark plug.					●		See the engine manual.
Replace the engine air filter.						●	See the engine manual.

1 N/A indicates that a reference is not applicable.
2 In dusty conditions or when airborne debris is present, clean more often.

9.4 Grease Points

IMPORTANT! Do not over-grease the bearings. Too much grease can cause the bearing seals to fail.

Look for this label on the machine. It indicates a grease point and the interval in hours.

Apply one pump of grease to each rotor bearing every 100 hours of operation or annually.

- Use a hand-held grease gun for all greasing. Apply one pump per location.
- Wipe each grease fitting with a clean cloth before greasing to avoid injecting dirt and grit.
- Replace or repair broken fittings immediately.
- If a fitting does not take grease, remove and clean the fitting thoroughly. Also, clean the lubricant passageway. If necessary, replace the fitting.

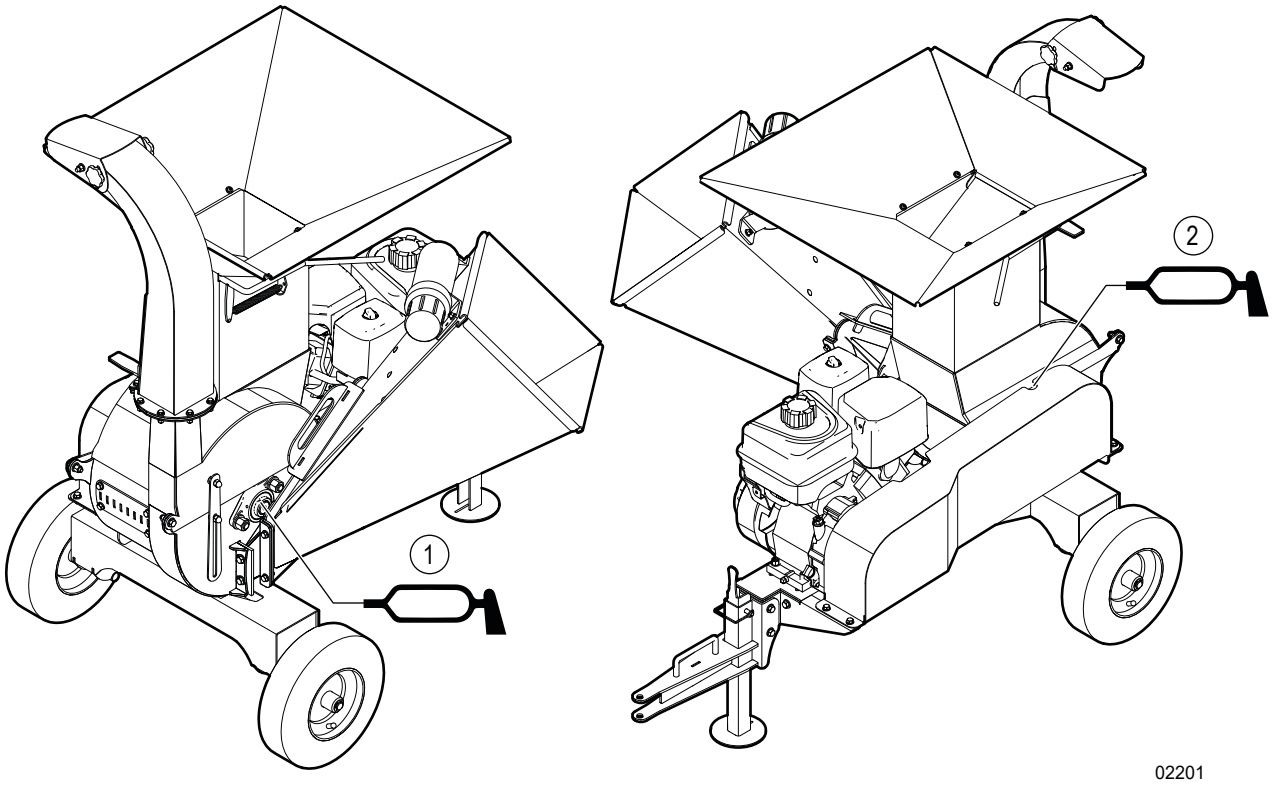


Figure 37 – Grease points

9.5 Clean the Engine Air Filter

IMPORTANT! Operating the engine without an air filter, or with a damaged air filter, can allow dirt to enter the engine, causing rapid engine wear. This type of damage is not covered by warranty.

Clean the air filter after every 50 hours of operation or annually.

A dirty air filter can restrict air flow to the carburetor, reducing the engine performance. If the engine is operated in very dusty areas, clean the air filter more often than specified.

1. Loosen the air-filter cover fastener.
2. Remove the cover.
3. Remove the air filter.
4. Gently tap the air filter on a hard surface to loosen and remove dust and debris.
5. If the air filter is excessively dirty or damaged, replace it with a new air filter.
6. Install the air filter in the engine.
7. Install the cover.
8. Tighten the air-filter cover fastener.

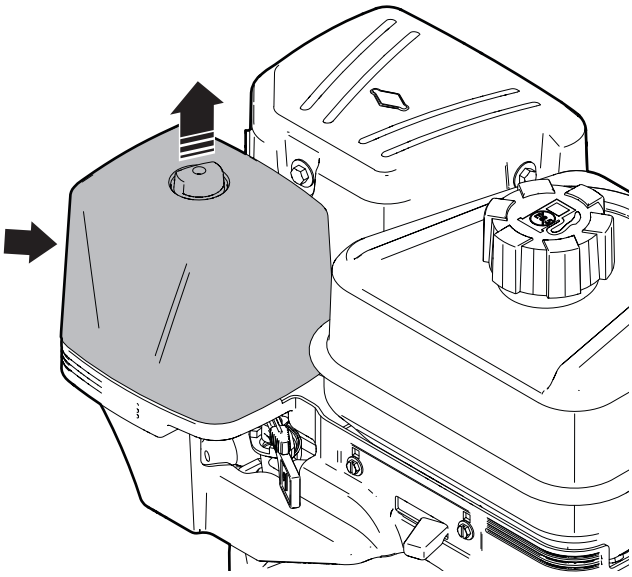


Figure 24–Remove the air filter

9.6 Drive Belt Maintenance

WARNING!

Wait for hot machine components to cool before you work on the machine. Hot machine components can cause serious burns or start a fire. Do not touch hot machine components. Use a no-touch thermometer to measure the temperature.

WARNING!

Never operate a machine with any guards or shields removed. The machine is shown here with guards and/or shields removed for illustrative purposes only.

W001

9.6.1 Replace the Drive Belt

IMPORTANT! After the drive belt is replaced, set the correct tension, and align the engine and rotor sheave.

IMPORTANT! Make sure the engine is off and components are cool to touch before replacing the drive belt.

Procedure:

1. Remove the drive-belt guard fasteners and the guard.
2. Loosen (do not remove) the four bolts that attach the engine mount to the machine frame.
3. Turn the drive-belt tensioning bolt to move the engine and remove tension from the drive belt.
4. Remove the drive belt.
5. Install a new drive belt on the rotor sheave and the clutch flywheel.
6. Align the drive belt.
   For instructions, see see *Align the Drive Belt on page 42*.
7. Set the drive belt tension.
   For instructions, see *Set the Drive Belt Tension on page 41*.
8. Install the drive-belt guard and fasteners.
9. Use a calibrated torque wrench to torque the bolts to **19 lbf•ft (25 N•m)**.

9.6.2 Set the Drive Belt Tension

WARNING!

Never operate a machine with any guards or shields removed. The machine is shown here with guards and/or shields removed for illustrative purposes only.

W001

Check drive belt tension every 100 hours of operation.

For accurate measurement, use a drive-belt tension gauge. If a gauge is not available, the following method can be used.

1. Press on the top centre of the rotor drive belt and measure the distance it moves. .
2. Do one of the following:
   - If the drive belt movement measures **between 1/2" (12 mm) and 5/8" (16 mm)**, the drive belt tension is correct. You do not need to set the drive belt tension.
   - If the drive belt tension is not correct, continue with the following steps to set the drive belt tension.
3. Loosen (do not remove) the four bolts that attach the engine mount to the machine frame.
4. Use the drive-belt tensioning bolt to set the drive belt tension.
5. Do steps 1, 2, and 4 again, until the drive belt tension is correct.
6. Tighten the four engine mount bolts.
7. Do step 1 again.
8. Do one of the following:
   - If the belt tension is correct, continue with step 9.
   - If the belt tension is not correct, do steps 3 through 7 again.
9. Align the drive belt.
   For instructions, see *Align the Drive Belt on page 42*.
10. Use a calibrated torque wrench to torque the four engine mount bolts to **33 lbf•ft (45 N•m)**.
11. Check the drive belt tension again after 10 hours of operation.

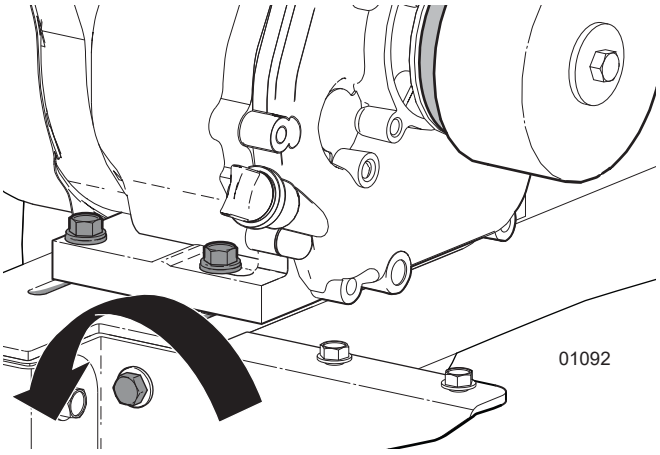


Figure 25–Rotor drive-belt tensioning bolt

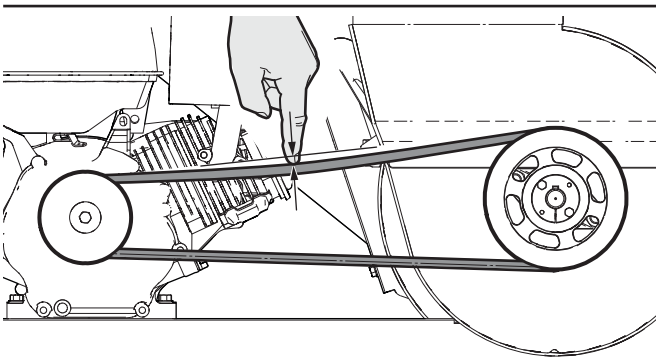


Figure 26–Check the rotor drive-belt tension

9.6.3 Align the Drive Belt

Check the drive belt alignment after every 8 hours of operation

For accurate measurement, use a laser alignment tool. If a laser alignment tool is not available, the following method can be used.

The maximum offset (misalignment) is 1/32" (1 mm).

1. Align a laser beam or straight edge (alignment tool) with the back edge of the rotor sheave and the engine clutch flywheel.
2. Examine the distance between the drive belt and the alignment tool, along the length of the drive belt.
3. Do one of the following:
   - If the distance between the drive belt and the alignment tool is the same along the length of the drive belt, the drive belt is aligned. The following steps are not necessary.
   - If the distance between the drive belt and the alignment tool are not the same along the length of the drive belt, continue with the following steps to align the drive belt.
4. Measure the distance between the drive belt and the alignment tool at the rotor sheave and at the engine clutch.
5. Subtract the low number from the high number.
6. Do one of the following:
   - If the calculated number is less than or equal to the maximum misalignment, the drive belt is aligned. Do steps 11 and 12 of *Replace the Drive Belt on page 40.*
   - If the calculated number is more than the maximum misalignment, continue with the following steps to align the drive belt.
7. Find the cause of the misalignment, and then adjust one of the following:
   - The engine mount.
     For instructions, see *Align the Engine Mount on page 43*.
   - The rotor sheave.
     For instructions, see *Align the Rotor Sheave on page 44.*

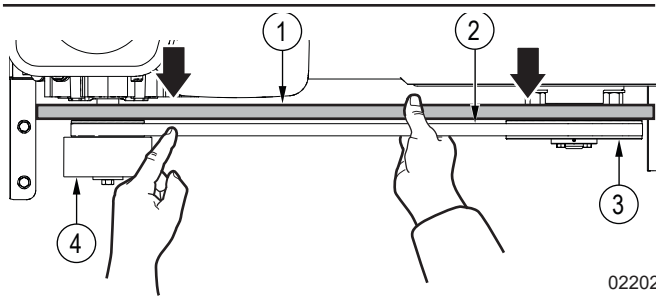


Figure 27–Drive belt alignment

1. Straight edge
2. Drive belt
3. Rotor sheave
4. Engine clutch

9.6.4 Align the Engine Mount

After changing the drive belt or loosening the engine mounts, the drive belt may become misaligned.

The maximum angle of engine mount misalignment is 0.5 degrees.

1. Loosen (do not remove) the four engine mount bolts.
2. Turn the engine a small amount to adjust the clutch and align the belt.
3. Check the drive belt alignment.
   For instructions, see *Align the Drive Belt on page 42*.
4. Do one of the following:
   - If the belt alignment is correct, continue with step 5.
   - If the belt alignment is not correct, do steps 2 through 4 again.
5. Tighten the four engine mount bolts.
6. Do steps 3 and 4 again.
7. Do one of the following:
   - If the belt alignment is correct, continue with step 8.
   - If the belt alignment is not correct, do steps 1 through 4 again.
8. Use a calibrated torque wrench to torque the four engine mount bolts to **33 lbf•ft (45 N•m)**.
9. Check the drive-belt tension.
   For instructions, see *Set the Drive Belt Tension on page 41.*

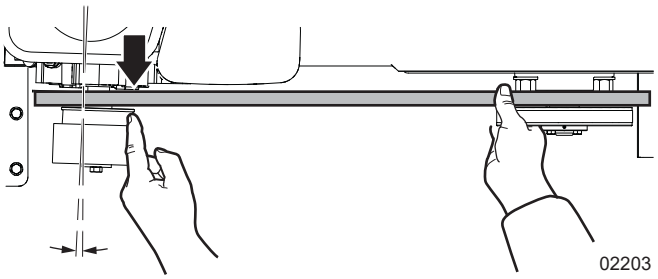


Figure 28–Engine mount alignment

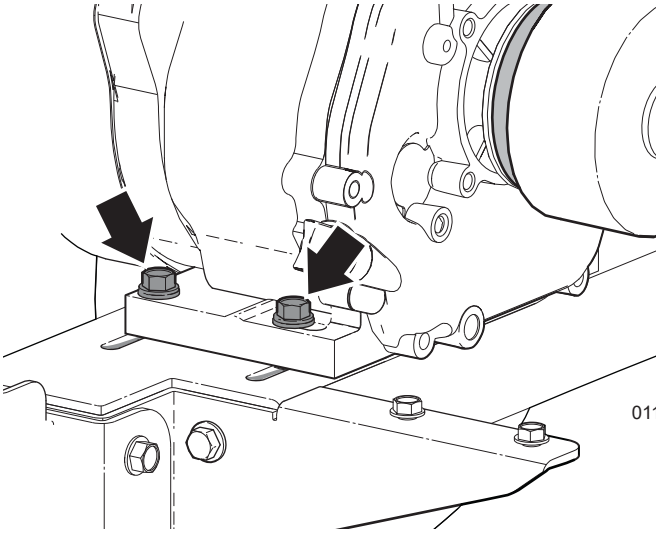


Figure 29–Engine Mount Bolts

9.6.5 Align the Rotor Sheave

The rotor sheave can become loose on the shaft and cause drive-belt misalignment.

1. Remove the set screw (2) from the sheave (1).
   Put the set screw aside. It is necessary for assembly.
2. Remove the sheave bolts (4).
3. Thread the sheave bolts into the puller holes (6) on the sheave hub (5).
4. In an even pattern, turn each of the bolts clockwise in 1/4 turn increments.
5. Do step 4 until there is space between the sheave hub and the sheave, and they can move on the shaft.
6. Lightly tap the sheave hub with a small rubber mallet to move it on the shaft and align the drive belt.
7. Check the drive belt alignment.
   For instructions, see *Align the Drive Belt on page 42*.
8. Do one of the following:
   - If the belt alignment is correct, continue with step 9.
   - If the belt alignment is not correct, do steps 6 through 8.
9. Remove the sheave bolts from the puller holes.
   Turn them counterclockwise in 1/4 turn increments.
10. Install the sheave bolts in the sheave hub.
11. Do step 4 until the sheave bolts are tight.
12. Insert, and then tighten the set screw (2).
13. Do step 6 again.
14. Do one of the following:
    - If the belt alignment is correct, continue with step 15.
    - If the belt alignment is not correct, do steps 1 through 14.
15. Use a calibrated torque wrench to torque the sheave bolts to **9 lbf•ft (12 N•m)**.
16. Check the drive belt tension.
    For instructions, see *Set the Drive Belt Tension on page 41.*

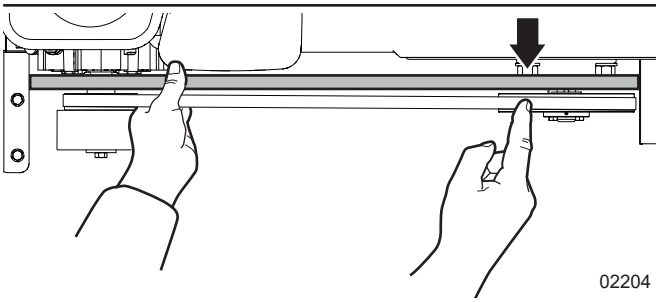


Figure 30 – Rotor sheave alignment

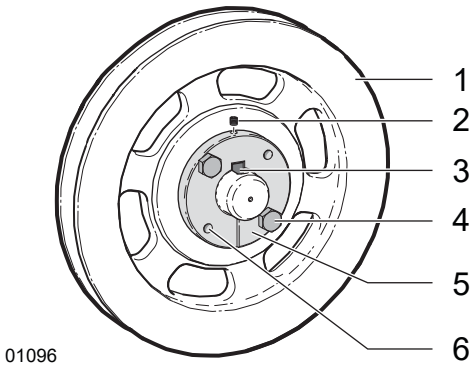


Figure 31 – Rotor Sheave

1. Sheave
2. Set screw
3. Shaft key
4. Sheave bolts
5. Sheave hub
6. Threaded puller holes

9.7 Rotor Knife Maintenance

⚠ WARNING!

Never operate a machine with any guards or shields removed. The machine is shown here with guards and/or shields removed for illustrative purposes only.

W001

⚠ CAUTION!

Wear heavy gloves, turn the rotor slowly, and be aware of your hand positions. The rotor knives are sharp and can cause cuts. Finger and hands can become pinched or wedged between the rotor and the rotor housing.

W032

There are two offset, evenly-spaced rotor knives attached to the rotor. There is one ledger knife attached to the bottom of the rotor housing.

9.7.1 Replace a Rotor Knife

1. Stop the engine. Wait for the rotor to stop turning.
   For instructions, see *Stop the Machine on page 28.*
2. Remove the fasteners and open the upper rotor housing.
3. Turn the rotor to access one of the rotor knives.
4. Prevent the rotor from turning.
   Make sure that the rotor cannot move.
5. Remove the rotor knife fasteners.
6. Carefully remove the rotor knife.
7. Clean the rotor knife recess.
8. Do one of the following:
   - If the rotor knife has a sharp edge, install the rotor knife with the cutting edge facing toward the ledger knife.
   - If the rotor knife does not have a sharp edge, sharpen or replace the rotor knife.

     For instructions, see *Sharpen a Rotor Knife on page 46.*
9. Apply blue 242 thread locker to the threads of each rotor knife fastener.
10. Put the rotor knife in the recess and install the rotor knife fasteners.
11. Use a calibrated torque wrench to torque the fasteners to **45 lbf•ft (63 N•m)**.
12. Do steps 3 to 11 again for each rotor knife.
13. Release the rotor.
    Make sure that the rotor can turn freely.
14. Close the upper rotor housing and install the fasteners.
15. Use a calibrated torque wrench to torque the fasteners **33 lbf•ft (45 N•m)**.

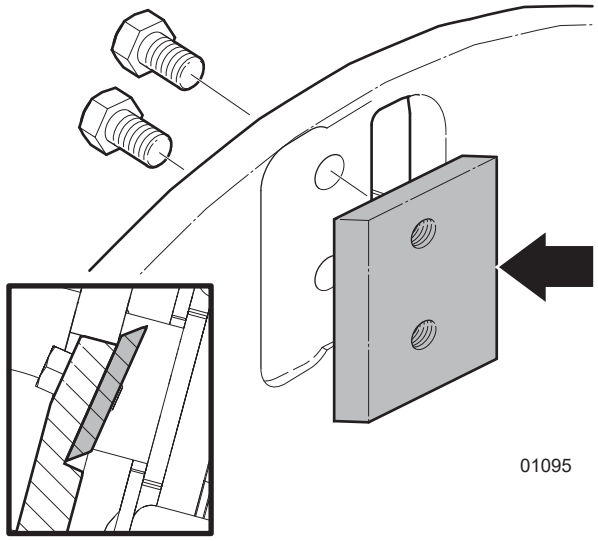


Figure 32–Rotor blade leading edge outward

9.7.2 Sharpen a Rotor Knife

CAUTION!

Wear heavy gloves and handle the rotor knives with care. The rotor knives are sharp.

IMPORTANT! If the rotor knife gets hot during sharpening, stop and wait for the rotor knife to cool.

1. Remove the rotor knife from the machine.
   For instructions, see *Replace a Rotor Knife on page 45.*
2. Clean the rotor knife.
3. Examine the rotor knife for damage. If the rotor knife is damaged, replace all the rotor knives.
4. Put the rotor knife in a bench vice with the cutting edge facing up.
   Make sure that the rotor knife is clamped safely in the bench vice.
   Remove the same amount of material from all the rotor knives.
5. Use a grinder to sharpen the cutting edge of the rotor knife. Sharpen the cutting edge to a 45-degree angle.
6. Do steps 4 and 5 for the opposite cutting edge.
7. Do steps 1 to 5 for the remaining rotor knives.

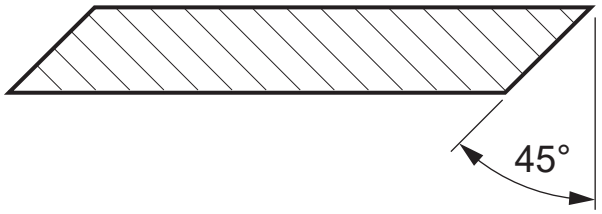


Figure 33–Sharpen a rotor knife

9.8 Ledger Knife Maintenance

WARNING!

Never operate a machine with any guards or shields removed. The machine is shown here with guards and/or shields removed for illustrative purposes only.

W001

CAUTION!

Avoid reaching into the rotor housing. The rotor and ledger knives are very sharp. If it is necessary to reach into the rotor housing, set the machine to a safe condition, wear heavy gloves, and use extreme caution.

W003

9.8.1 Replace a Ledger Knife

1. Stop the engine. Wait for the rotor to stop turning.
   For instructions, see *Stop the Machine on page 28.*
2. Remove the fasteners and open the upper rotor housing.
3. Remove the three ledger knife fasteners.
4. Carefully remove the ledger knife.
5. Do one of the following:
   - If the ledger knife has a square (90-degree) edge, install the ledger knife with the square edge pointing toward the rotor knife.
   - If the ledger knife does not have a square edge, sharpen or replace the ledger knife.

     For instructions, see *Sharpen a Ledger Knife on page 47.*
6. Align the ledger knife with the bolt holes in the lower rotor housing.
7. Install the ledger knife fasteners.
8. Set the ledger knife clearance.
   For instructions, see *Set the Ledger Knife Clearance on page 47.*
9. Use a calibrated torque wrench to torque the fasteners to **45 lbf•ft (63 N•m).**
10. Close the upper rotor housing and install the fasteners.
11. Use a calibrated torque wrench to torque the fasteners to **33 lbf•ft (45 N•m)**.

9.8.2 Sharpen a Ledger Knife

1. Remove the ledger knife from the machine.
   For instructions, see *Replace a Ledger Knife on page 46.*
2. Clean the ledger knife.
3. Examine the ledger knife for damage. If a ledger knife is damaged, replace the ledger knife.
4. Put the ledger knife in a bench vice with the cutting edge facing up.
   Make sure that the ledger knife is clamped safely in the bench vice.
5. Use a grinder to sharpen the cutting edge of the ledger knife to a 90-degree angle.
6. Do steps 4 and 5 for the opposite cutting edge.

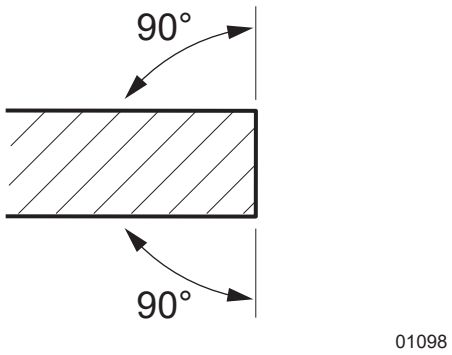


Figure 34–Sharpen a ledger knife

9.8.3 Set the Ledger Knife Clearance

1. Stop the engine. Wait for the rotor to stop turning.
   For instructions, see *Stop the Machine on page 28*.
2. Remove the fasteners and open the upper rotor housing.
3. Turn the rotor to align a rotor knife with the ledger knife. Select the rotor knife that has the least space between the rotor knife and the ledger knife.
4. Loosen the ledger knife fasteners.
5. Do one of the following:
   - Insert a ledger knife clearance gauge between the rotor knife and the ledger knife.
     Move the ledger knife to set the position. Move the ledger knife until the ledger knife touches the ledger knife clearance gauge.
   - Move the ledger knife to set the position. Move the ledger knife to set the clearance between 1/32" and 1/16" (1 mm to 1.5 mm).
6. Tighten the ledger knife fasteners.
7. Use a calibrated torque wrench to torque the fasteners to **45 lbf•ft (63 N•m).**
8. Do one of the following:
   - If you are using a ledger knife clearance gauge, remove it and then put it in the holder.
   - If you are not using a ledger knife clearance gauge, continue with step 9.
9. Close the upper rotor housing and install the fasteners.
10. Use a calibrated torque wrench to torque the fasteners to **33 lbf•ft (45 N•m)**.

9.9 Shredder Knife Maintenance

WARNING!

Never operate a machine with any guards or shields removed. The machine is shown here with guards and/or shields removed for illustrative purposes only.

W001

Monitor the shredder knife performance during operation. Check the shredder knife sharpness after every 50 hours of operation.

There are three sets of knives mounted on the shredder rotor. Each knife has an edge that cuts, chops and mulches. As the knives pass the chop block, the material is mulched.

Shredder knives can be reversed when dull, or removed and sharpened. If the knives are damaged or cannot be sharpened, they should be replaced.

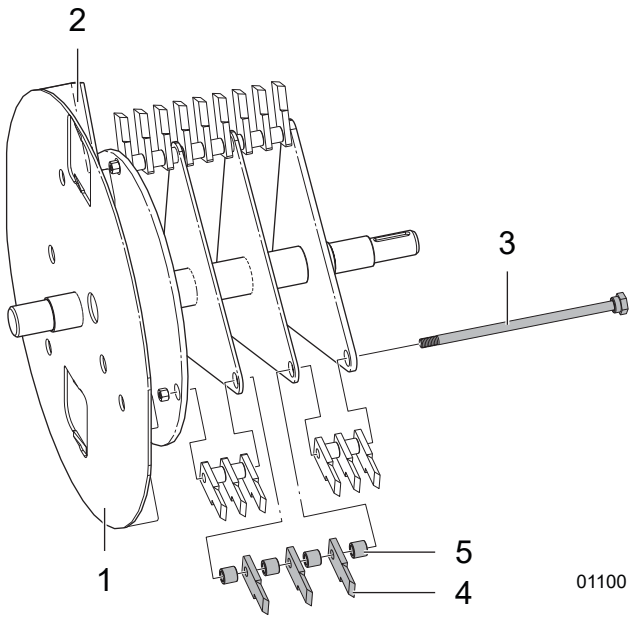


Figure 35–Rotor Assembly

1. Rotor
2. Rotor paddle
3. Shredder knife bolt
4. Shredder knife
5. Spacer

9.9.1 Replace a Shredder Knife

1. Stop the engine. Wait for the rotor to stop turning.
   For instructions, see *Stop the Machine on page 28*.
2. Remove the fasteners and open the upper rotor housing.
3. Turn the rotor to access one of the shredder knives.
4. Loosen the bolt that holds the set of shredder knives and spacers to the shredder plate.
5. Slowly remove the shredder knife bolt.
6. Remove the spacers and shredder knives.
7. Reverse, replace, or sharpen the shredder knives.
   Sharpen the shredder knives to a 45° angle.
8. Apply blue 242 thread locker to the shredder knife bolt.
9. Install the shredder knife bolt through the shredder knives, spacers, and rotor.
10. Use a calibrated torque wrench to torque the fasteners to **33 lbf•ft (45 N•m)**.
11. Repeat steps 4 to 10 for second and third sets of shredder knives.
12. Close the upper rotor housing and install the fasteners.
13. Use a calibrated torque wrench to torque the fasteners to **33 lbf•ft (45 N•m)**.

9.9.2 Sharpen a Shredder Knife

1. Remove the shredder knife from the machine.
   For instructions, see *Replace a Shredder Knife on page 48.*
2. Clean the shredder knife.
3. Examine the shredder knife for damage. If the shredder knife is damaged, replace it.
4. Put the shredder knife in a bench vice with the cutting edge facing up.
   Make sure that the shredder knife is clamped safely in the bench vice.
   Remove the same amount of material from all the shredder knives.
5. Use a grinder to sharpen the cutting edge of the shredder knife. Sharpen the cutting edge to a 45-degree angle.
6. Do steps 4 and 5 for the opposite cutting edge.
7. Do steps 1 to 5 for the remaining shredder knives.

9.10 Chop Block

Observe chop block function at each use. Sharpen or rotate every 50 hours of operation.

The Chop Block is attached to the upper rotor housing. As the shredder knives pass through the chop block, the chop block teeth break material into smaller pieces and turn it into mulch.

Examine the chop block for damage on a regular basis. Replace a chop block that has cut, broken, or bent teeth. The chop block can be reversed when dull.

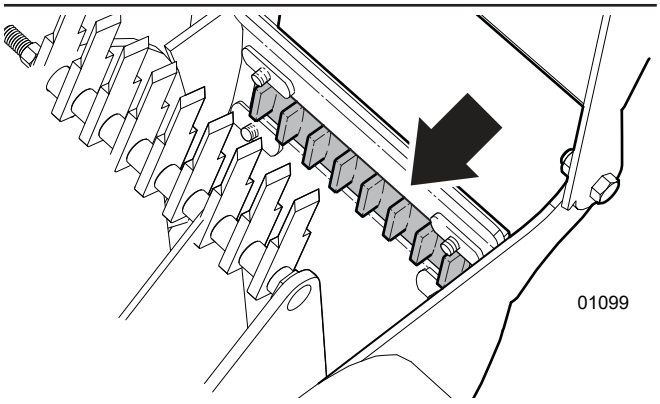


Figure 36–Chop Block in Rotor Housing

9.11 Tire Maintenance and Safety

⚠ WARNING!

Failure to follow the correct procedures when mounting a tire on a wheel or rim can produce an explosion, which may result in serious injury or death. Do not attempt to mount a tire unless you have the correct equipment and experience. Have a qualified tire dealer or repair service perform tire maintenance.

IMPORTANT! Replace worn tires with tires that meet the original tire specifications. Never undersize tires.

- Check the tire pressure on a regular basis. See the tire sidewall for the correct pressure.
- At a minimum, check the tire pressure after every 100 hours of operation or annually.

9.12 Clean the Machine

IMPORTANT! Using harsh chemicals can damage the machine finish. Do not use gasoline, diesel fuel, or thinners for cleaning.

IMPORTANT! A pressure washer can damage the machine's product identification plate and make it unreadable. Do not direct the spray from a pressure washer onto the product identification plate.

IMPORTANT! A pressure washer can damage the bearings. Do not direct the spray from a pressure washer directly onto the bearings.

1. Use a hose or pressure washer and mild detergent to remove dust, dirt, and debris.
2. Use a clean, soft cloth, that is dampened with water to remove dirt from the product identification plate.
3. Apply grease to the rotor bearings.
4. Start the machine, let the engine run for a few minutes to dry, and then stop the machine.

10. Troubleshooting

⚠ WARNING!

Before troubleshooting, read and understand the *Service and Maintenance Safety on page 36*. Set the machine to a safe condition.

The following table lists some of the problems that you may encounter and provides possible causes and solutions.

If you encounter a problem that is difficult to solve, even after reading this information, please contact your local dealer, the distributor, or Wallenstein Equipment. Before you call, please have the serial number for your product handy.

To find the serial number on your machine, see *Serial Number Location on page 5*.

For engine troubleshooting, see the engine manufacturer's manual.

Problem	Possible cause	Solution
The rotor does not turn.	The discharge chute is obstructed.	Clear debris from the discharge chute.
	The rotor is blocked.	Clear the blockage. For instructions, see *page 31*.
	The drive belt is loose or broken.	Set the drive belt tension or replace the drive belt. For instructions, see *page 40*.
	The brake clutch spring is broken.	Remove the drive belt guard and inspect the spring. Replace the spring, if necessary.
Material is moving in too slowly.	The engine or rotor speed is too slow.	Set the engine throttle to **Fast** to increase the rotor RPM. See *page 20*.
	The knives are not sharp or the clearance is incorrect.	Check the rotor and ledger knives. Rotate, sharpen, or replace the knives, as necessary. See *page 45* and *page 46*.
	The rotor knife angle is incorrect.	Sharpen the rotor knives to the specified 45° angle and check that knives are installed correctly. See *page 46*.
	The discharge chute is obstructed.	Clear all debris from the discharge chute.
Unusual machine vibration while operating.	The ledger knife is damaged or missing.	Inspect the ledger knife. Replace the ledger knife if it is damaged or missing. See *page 46*.
	The rotor is bent.	Check the rotor rotation to see if there is wobble. If the rotor wobbles, contact your local dealer or distributor to replace the rotor.
	The rotor bearings failed.	Replace the rotor bearings.
	The fasteners are loose.	Use a calibrated torque wrench to tighten the fasteners to the specified torque. For specifications, see *page 53*.
The mulch is too coarse.	The chop block is damaged.	Inspect the chop block for damage. Replace the part as necessary.
	The ledger knife is broken or missing.	Replace the ledger knife. For instructions, see *page 46*.
	The shredder knives are broken or missing.	Replace the shredder knives. For instructions, see *page 48*.
	The shredder knives are installed improperly.	Check the shredder knives and adjust them if necessary. See *page 48*.

Problem	Possible cause	Solution
Machine requires excessive power or stalls.	The discharge chute is obstructed.	Clear all debris from the discharge chute.
	The clutch is being engaged too quickly.	Move the clutch handle to the **START** position slowly. Make sure that the rotor housing and, the chipper hopper, and the shredder hopper are clear before starting the machine.
	Too much material is being put into the machine.	Put smaller amounts of material into the machine.
	Material is being put into the machine too quickly.	Put large material into the machine slowly.
	The rotor is blocked.	Clear the blockage. For instructions, see *page 31.*
	The ledger knife clearance is incorrect.	Use a ledger-knife clearance gauge to set the correct clearance. For instructions, see *page 47.*
	The knives are not sharp.	Rotate, sharpen, or replace the knives, as necessary. For instructions, see *page 45.*
	There is a problem with the engine.	See the engine manufacturer's manual.
Noisy drive belt or premature wear on the drive belt.	The drive belt is loose or worn.	Inspect the drive belt. Adjust the tension or replace the drive belt, as necessary. For instructions, see *page 40.*
	An incorrect replacement drive belt was installed.	Replace the drive belt. For instructions, see *page 40.*
	The rotor is blocked.	Clear the blockage. For instructions, see *page 31.*
	A rotor bearing is worn or damaged.	Inspect the rotor bearings. Replace a bearing that is worn or damaged.
Poor wood chip quality.	The knives are not sharp.	Rotate, sharpen, or replace the knives, as necessary. For instructions, see *page 45.*
	The drive belt is loose or worn.	Inspect the drive belt. Adjust the tension or replace the drive belt, as necessary. For instructions, see *page 40.*
	The material being chipped is poor quality.	The material is small or rotting. Mix the material with higher quality material.
	The ledger knife clearance is incorrect.	Use a ledger-knife clearance gauge to set the correct clearance. For instructions, see *page 47.*

11. Specifications

For engine specifications, see the engine manufacturer's manual.

For available accessories, go to WallensteinEquipment.com.

11.1 Machine Specifications[1]

Parameter	BXMT3209
Chipper type	Disc
Shredder type	Hammer mill
Feed system	Gravity
Engine	Vanguard® 10 hp (305 cc)
Chipper hopper opening (height x width)	10" x 13" (29 cm x 32 cm)
Chipper housing opening (height x width)	3" x 6" (8 cm x 15 cm)
Shredder hopper opening (height x width)	28" x 30" (71 cm x 76 cm)
Shredder housing opening (height x width)	10" x 10" (25 cm x 25 cm)
Number of rotor knives	2
Number of shredder knives	27
Rotor diameter	18" (45 cm)
Rotor weight	70 lb (32 kg)
Discharge chute height	56" (142 cm)
Discharge chute rotation	270°
Drive system	Centrifugal clutch, belt drive
Engine speed	3,600 RPM
Rotor speed	1,600 RPM
Tires	4.10 X 6
Total weight	400 lb (181 kg)
Dimensions (length x height x width)	44" x 58" x 56" (112 cm x 147 cm x 142 cm)
Fuel tank capacity	1.59 US gal (6 L)
Capacity: chipper (diameter)	3" (8 cm)
Capacity: shredder (diameter)	1" (3 cm)
Tongue weight	84 lb (38 kg)

1 Specifications are subject to change without notice.

11.2 Bolt Torque

IMPORTANT! If you replace hardware, use fasteners of the same grade.

IMPORTANT! The torque specifications in these tables are for non-greased or non-oiled threads. Do not grease or oil fastener threads unless otherwise indicated. When using a thread lock, increase the specified torque 5%.

☞ Bolt grades are identified by the marks on top of the bolt head.

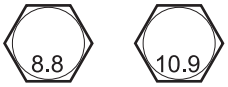
These bolt torque specification tables provide the correct torque settings for common bolts and capscrews. Tighten all bolts to the torque that is specified in the table, unless otherwise indicated. Check the bolt tightness periodically.

Imperial Bolt Torque Specifications

Bolt Diameter	Torque					
	SAE Gr. 2		SAE Gr. 5		SAE Gr. 8	
	lbf•ft	N•m	lbf•ft	N•m	lbf•ft	N•m
1/4 inch	6	8	9	12	12	17
5/16 inch	10	13	19	25	27	36
3/8 inch	20	27	33	45	45	63
7/16 inch	30	41	53	72	75	100
1/2 inch	45	61	80	110	115	155
9/16 inch	60	95	115	155	165	220
5/8 inch	95	128	160	215	220	305
3/4 inch	165	225	290	390	400	540
7/8 inch	170	230	420	570	650	880

Metric Bolt Torque Specifications

Bolt Diameter	Torque			
	Gr. 8.8		Gr. 10.9	
	lbf•ft	N•m	lbf•ft	N•m
M3	0.4	0.5	1.3	1.8
M4	2.2	3	3.3	4.5
M6	7	10	11	15
M8	18	25	26	35
M10	37	50	52	70
M12	66	90	92	125
M14	83	112	116	158
M16	166	225	229	310
M20	321	435	450	610
M30	1,103	1,495	1,550	2,100



12. Warranty

LIMITED WARRANTY

Wallenstein products are warranted to be free of defects in materials and workmanship under normal use and service, for a period of

Five Years for Consumer Use

Two Years for Commercial/Rental Use

from the date of purchase, when operated and maintained in accordance with the operating and maintenance instructions supplied with the unit. Warranty is limited to the repair of the product and/or replacement of parts.

This warranty is extended only to the original purchaser and is not transferable.

Repairs must be done by an authorized dealer. Products will be returned to the dealer at the customer's expense. Include the original purchase receipt with any claim.

This warranty does not cover the following:

1) Normal maintenance or adjustments
2) Normal replacement of wearable and service parts
3) Consequential damage, indirect damage, or loss of profits
4) Damages resulting from:
   - Misuse, negligence, accident, theft or fire
   - Use of improper or insufficient fuel, fluids or lubricants
   - Use of parts or aftermarket accessories other than genuine Wallenstein parts
   - Modifications, alteration, tampering or improper repair performed by parties other than an authorized dealer
   - Any device or accessories installed by parties other than an authorized dealer
5) Engines. Engines are covered by the manufacturer of the engine for the warranty period they specify. For the details of your engine warranty, see your engine owner's manual. Information about engine warranty and service is also available in the FAQ section at www.wallensteinequipment.com

rev. Nov-2018

13. Index

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