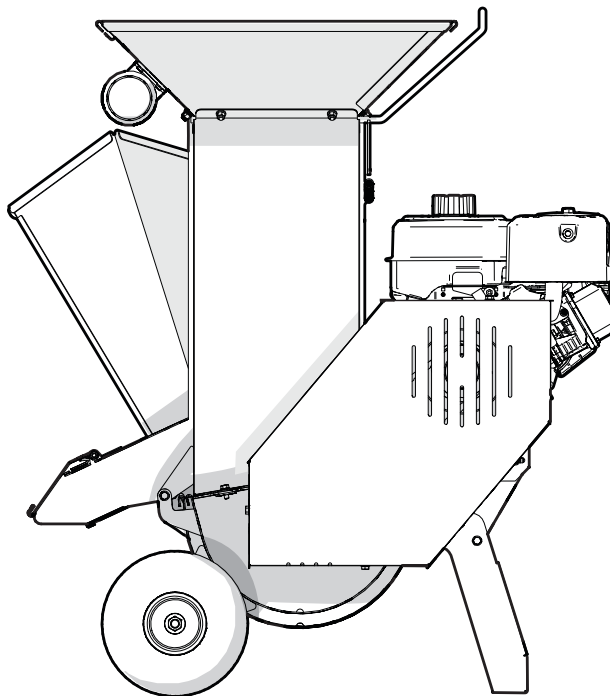


# OPERATOR'S MANUAL

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Serial number 1101752 and up

## **BXMC3409B** **Chipper / Shredder**



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# 1. Introduction



**Do not start or operate the machine before you read this manual. Make sure that you fully understand all the safety, operation, and maintenance information before you operate the machine.**

**Keep this manual with the machine at all times and available for frequent reference.**

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## **Congratulations on your choice of a Wallenstein BXMC3409B!**

The BXMC3409B chipper / shredders are high-quality, rugged machines that are designed to cut brush and branches into consistent size wood chips and mulch. Each chipper / shredder is powered by a gas engine with centrifugal clutch that transfers power to the rotor through a drive belt. The rotor knives cut the wood material into wood chips, and the shredder knives cut the material into mulch. The wood chips and mulch are blown out the discharge chute.

For safety, efficiency, and trouble-free operation of this Wallenstein product, anyone who uses or maintains the machine must read and understand the safety, operation, and maintenance information in this manual and the engine manufacturer's manual.

For information about the accessories, go to [WallensteinEquipment.com](http://WallensteinEquipment.com).

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.

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This manual is subject to change without notice. For the most current information, go to [WallensteinEquipment.com](http://WallensteinEquipment.com).



## 1.1 Delivery Inspection Report

### Wallenstein BXMC3409B Chipper / Shredder

To activate the warranty, register your product at [WallensteinEquipment.com](http://WallensteinEquipment.com).

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

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

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

Customer
Address
City, State/Province, ZIP/Postal Code
(       )
Phone Number
Contact Name
Model
Serial Number
Delivery date

Dealer
Address
City, State/Province, ZIP/Postal Code
(       )
Phone Number

### Dealer Inspection Checklist

- \_\_\_\_\_ Rotor turns freely and the knife clearance is correct.
- \_\_\_\_\_ All cutting edges are sharp and in working condition.
- \_\_\_\_\_ Discharge chute and deflector move freely.
- \_\_\_\_\_ Shredder gate functions correctly.
- \_\_\_\_\_ All belts are aligned and the tension is correct.
- \_\_\_\_\_ All fasteners are torqued to the correct specifications.
- \_\_\_\_\_ All grease points are lubricated.
- \_\_\_\_\_ Engine clutch and rotor sheave align.
- \_\_\_\_\_ Engine starts and operates, and fluid levels are correct.
- \_\_\_\_\_ Tire pressure is correct (see the tire sidewall).
- \_\_\_\_\_ Tires are in working condition.
- \_\_\_\_\_ Purchased accessories are included, if applicable.
- \_\_\_\_\_ Operator's Manual is in the storage tube.

#### Safety Checks

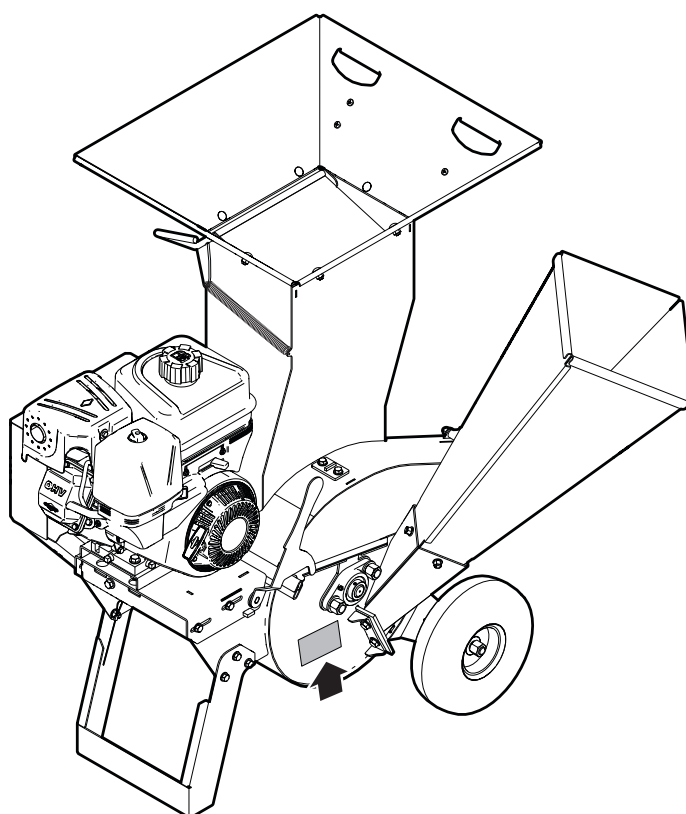
- \_\_\_\_\_ All safety labels are applied and legible.
- \_\_\_\_\_ Operating and safety instructions were reviewed.
- \_\_\_\_\_ All guards and shields are installed, and the covers are closed.
- \_\_\_\_\_ A retainer is installed through each hitch point.

## 1.2 Serial Number Location

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

**Record the serial number of your product here**

<b>Model</b>	<b>BXMC3409B</b>
<b>Serial Number</b>	

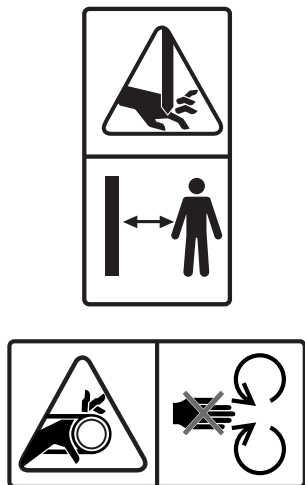


**Figure 1** – Product information plate location

## 1.3 Types of Labels on the Machine

There are different types of labels on your Wallenstein product. The labels are for safety, information, and product identification. This section explains what the labels are for and how to read them.

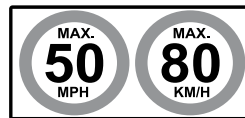
**Safety labels** are pictorial with a yellow background and have two panels. They can be vertical or horizontal.



**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.



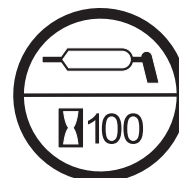
**Information labels** are usually pictorial with a white background and the number of panels can be different. This type of gives information to the operator or shows the operation of a control.



**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 15. For a complete illustration of labels and label locations, download the parts manual for your Wallenstein product at [WallensteinEquipment.com](http://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. Obey the safety best practices included in this manual when you use your machine.

**YOU** are responsible for your own safety. Obey 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

### **WARNING!**



**Wear the necessary hearing protection when you operate this machine. Prolonged exposure to loud noise can cause permanent hearing loss.**

W016

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 let anyone to use this machine until they have read this manual. The operator 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 they use the machine. Before operation, evaluate the physical and/or mental limitations of each operator to make sure that they can use the machine safely. Do not let a child operate the machine.
- Make sure that all users understand the safety labels on the machine before they operate, service, adjust, or clean it. For safety label definitions, see *Safety Label Definitions on page 15*.
- Learn the controls and how to stop the machine quickly in the event of an emergency. For instructions, see *Emergency Stop on page 29*.
- 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 you operate, service, or maintain 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 can 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 can cause permanent, total hearing loss.
- Do not wear loose clothing, jewelry, or loose personal articles. Keep long hair tied up and covered. Loose items can get caught in moving parts and cause injury. Jewelry can ground a live electrical circuit which can cause injury and machine damage.
- Do not consume alcohol or drugs before or during machine operation. Alertness or coordination can be affected. When you take prescription medications, consult your doctor before you operate the machine.
- 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 you use the machine.
- Do not let anyone to ride on the machine during transport.
- Keep bystanders a minimum of 20 ft (6 m) from the discharge area. Mark the discharge area with safety cones.
- Before you start the machine, make sure that the engine and machine are clear of all material.
- Do not touch hot engine parts, the muffler cover, hoses, the 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.

Obey the following precautions to avoid hazards. Make sure that anyone who works with you obeys them as well.

- Replace safety or instruction labels that are not readable or are missing. For locations and explanations, see *Safety Labels on page 13*.
- Do not modify the equipment in any way. Unapproved modification can result in serious injury or death. In addition, unapproved modification can cause incorrect operation and decrease the life of the machine. Unapproved modification voids the warranty.
- Make sure that the machine is correctly stationed, adjusted, and in working condition.
- Keep the machine free of accumulated grease and debris to prevent fires and machine damage.
- Make sure that the discharged wood chips do not interfere with the safe operation of the machine.
- Look for and avoid overhead hazards (for example; branches, cables, and electrical wires).
- Do not exceed the limitations of the machine. If the machine is does not operate normally or you feel unsafe, stop the machine!

## 2.6 Safe Condition

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

**Before you start any service or maintenance, do the following:**

### SAFE CONDITION

1. Stop the machine.  
For instructions, see *Stop the Machine on page 29*.
2. Wait for all moving parts to stop.
3. Disconnect the engine spark-plug wire and keep it away from the spark plug.

## 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.

- 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 anyone uses the machine, every operator does the following:
  - Reads and understands this manual.
  - Receives instruction 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 not 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:

- IISO 4254-1:2013 Agricultural machinery — Safety.
- ISO 3600 Tractors, machinery for agriculture and forestry, powered lawn and garden equipment – Operator’s manuals – Content and format.

## Training Sign-Off Form

[illegible]

## 2.9 Work Site



**The operator must be fully familiar with the work site before starting work. It is the operator's responsibility to prevent unsafe situations and make every effort to prevent accidents.**

W112

### 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 the 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 the safe operation of the machine.

### 2.9.2 Create 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 20 ft (6 m) away from any hazard in the work zone. The area outside the work zone perimeter is the safe zone.  
For more information, see *Figure 2 on page 12*.
- Do not 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. Do not 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.

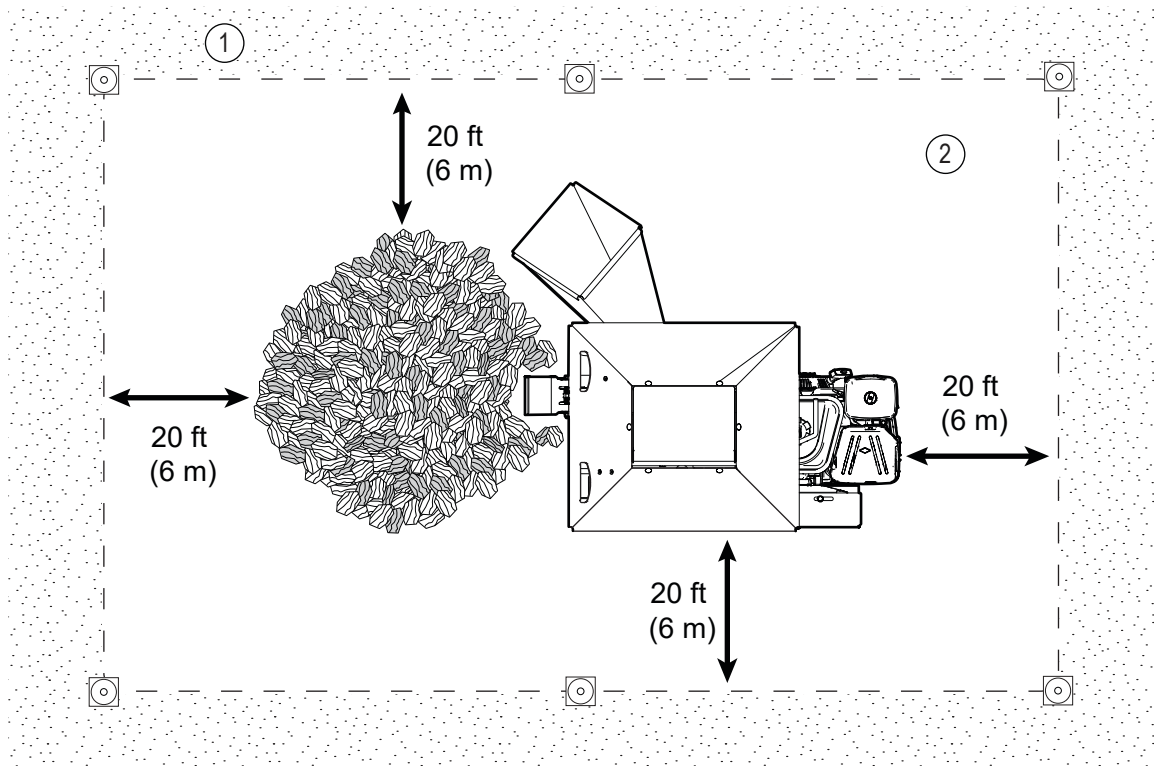


Figure 2—Safe work area example

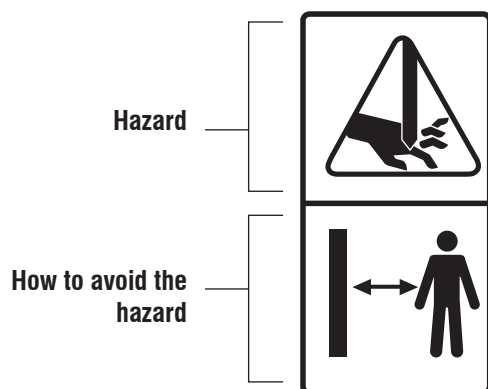
## 3. Safety Labels

### 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.**

W100

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 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.

#### 3.1.1 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).

#### 3.1.2 Tool

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

#### 3.1.3 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.

## 3.2 Safety Label Locations

Numbers correspond with the *Safety Label Definitions* on page 15.

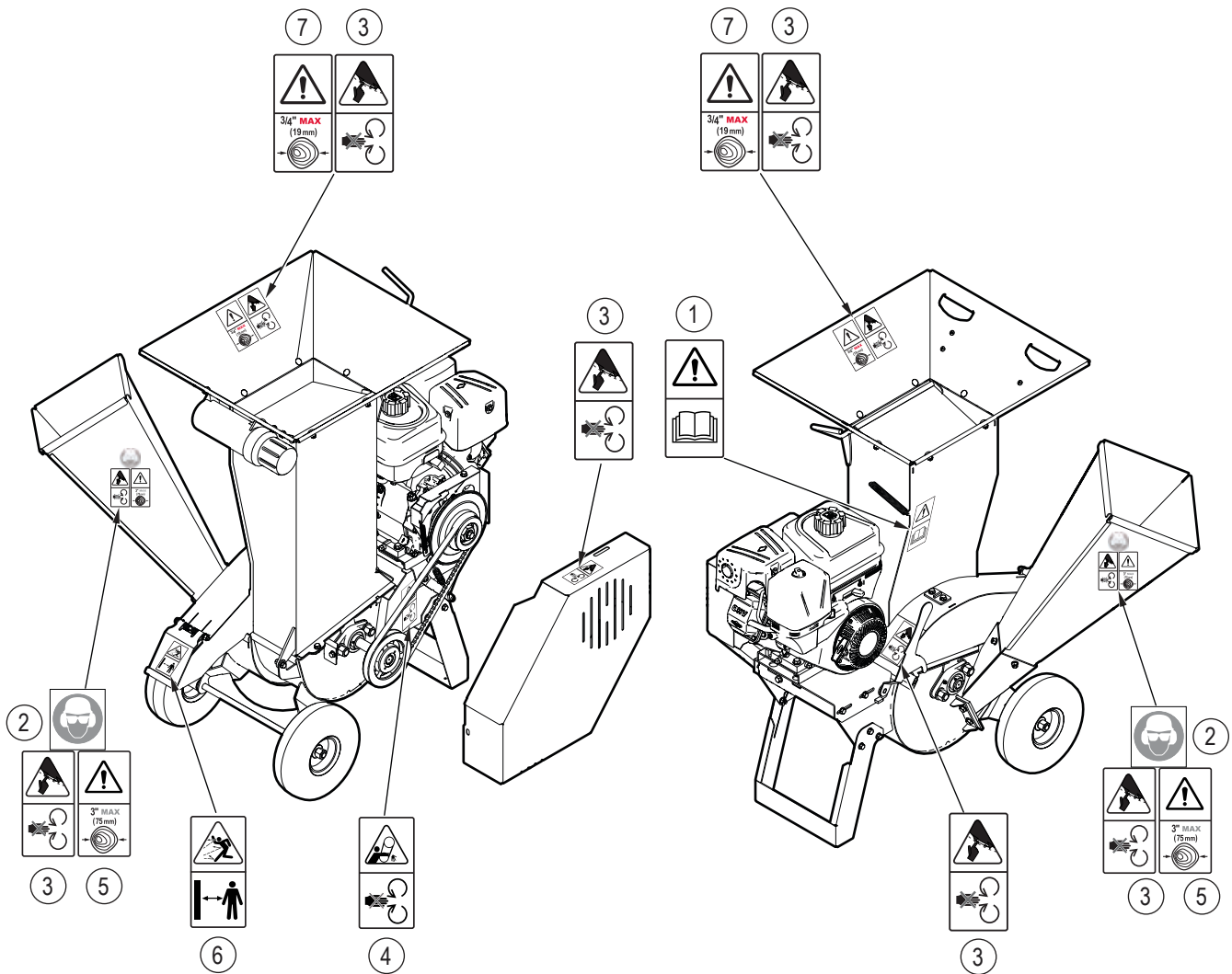


Figure 3—Safety sign locations

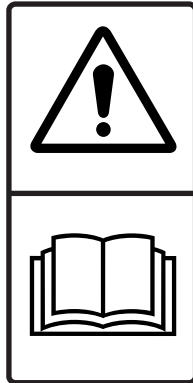
## 3.3 Safety Label Definitions

### 1. 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.



### 2. Caution!

#### Wear the necessary PPE

For example:

- A hard hat.
- Heavy gloves.
- Hearing protection.
- Protective footwear with steel toes and slip resistant soles.
- Protective goggles or a face shield

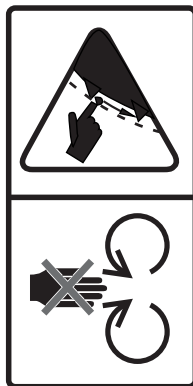


### 3. Warning!

#### 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.



### 4. 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.



### 5. Caution!

#### Machine damage and possible entanglement hazard

Oversize material will overload the machine, which can stall the engine or cause machine damage. If you try to force material into the machine, it can result in serious injury from a fall or entanglement. Carefully remove oversize material from the machine.

Do not put material that is larger than 3" (8 cm) in diameter into the chipper hopper. Do not try to force material into the machine.



### 6. Caution!

#### Impact, cut, and puncture hazards

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

Stay away from the discharge chute and the area where the discharge chute is pointed. Do not point the discharge chute at people, animals, or structures.



## 7. Caution!

### Machine damage and possible entanglement hazard

Oversize material will overload the machine, which can stall the engine or cause machine damage. If you try to force material into the machine, it can result in personal injury. Carefully remove oversize material from the machine.

Do not put material that is larger than 3/4" (1.9 cm) in diameter into the shredder hopper. Do not try to force material into the machine.





## 4. Familiarization

The Wallenstein BXMC3409B chipper / shredder is designed to chip or shred small scrap lumber, small trees, brush, branches, leaves, and other wood material.

When wood material is put into the chipper hopper, the rotor pulls the material into the machine and cuts it into wood chips. When brush, bark, or leaves enter the machine through the shredder hopper, the shredder knives cut the material into mulch. The machine then blows the wood chips or mulch out the discharge chute. A Vanguard® engine provides power to the machine.

### 4.1 New Operator

#### **WARNING!**

**All operators must understand how to put the machine in a safe condition before they service, maintain, or store the machine. 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 themselves and others, and can cause property damage.

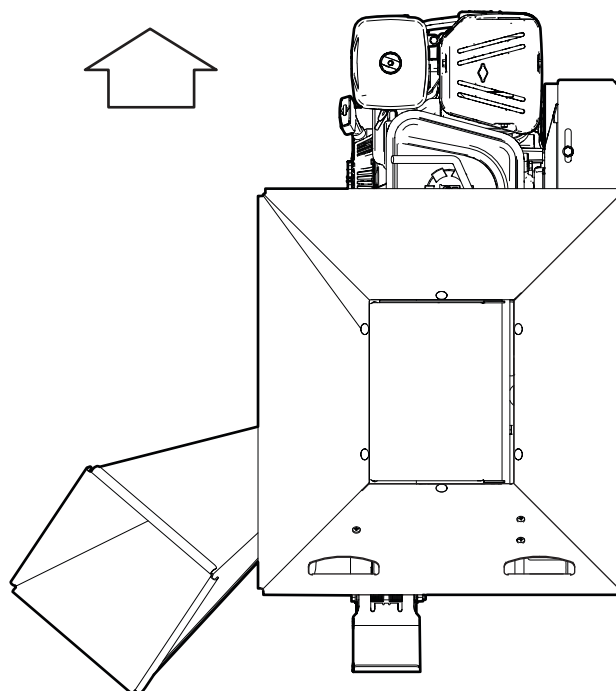
### 4.2 Training

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.

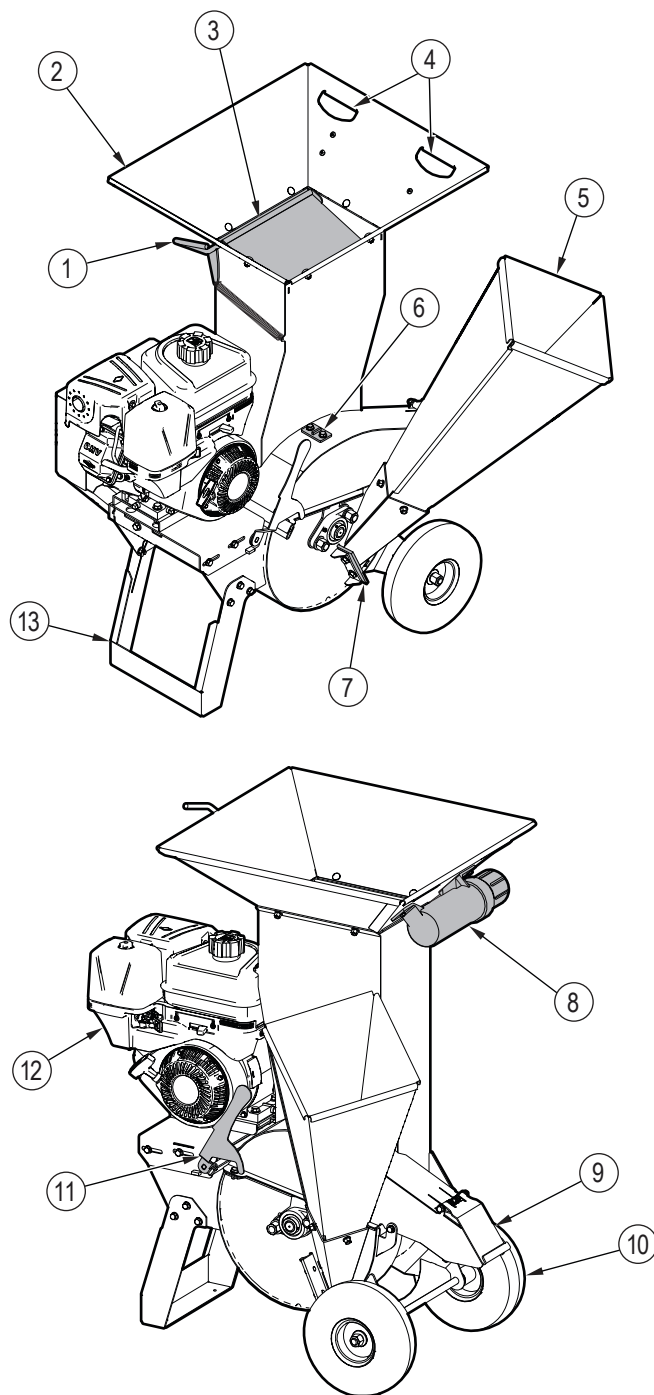
### 4.3 Operator Orientation

**IMPORTANT!** When describing controls throughout this manual, the directions for left side, right side, front, and rear are determined when standing at the operator controls, facing the direction of forward machine travel.



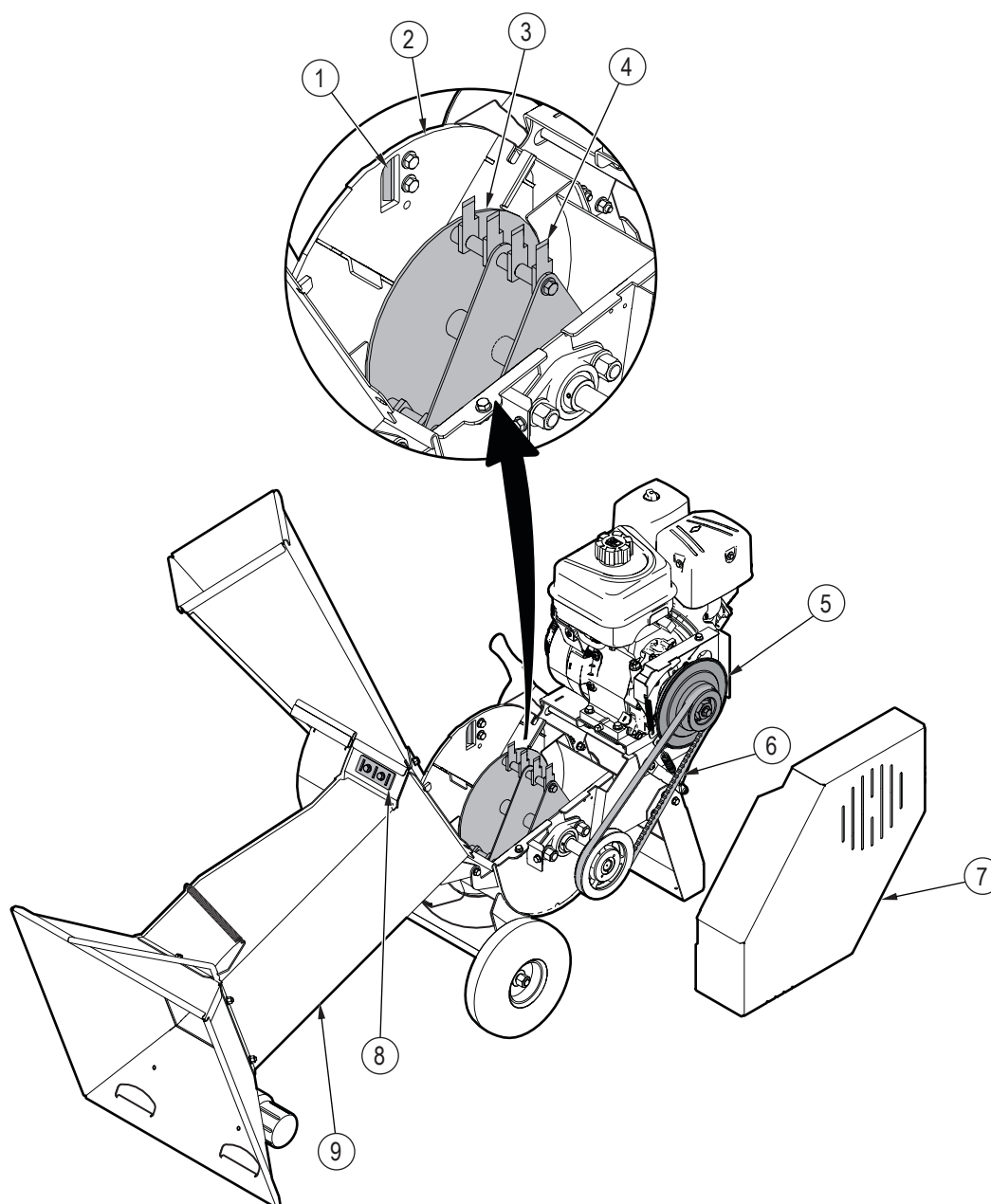
**Figure 4**—Direction of forward machine travel

## 4.4 Machine Components



**Figure 5—Machine components**

- |                        |                           |                   |
|------------------------|---------------------------|-------------------|
| 1. Shredder-gate lever | 6. Twig breaker           | 11. Clutch lever  |
| 2. Shredder hopper     | 7. Ledger knife           | 12. Engine        |
| 3. Shredder gate       | 8. Operator's manual tube | 13. Support stand |
| 4. Handles             | 9. Discharge chute        |                   |
| 5. Chipper hopper      | 10. Tires (1 of 2)        |                   |



**Figure 6—Machine components continued**

- |                   |                    |                        |
|-------------------|--------------------|------------------------|
| 1. Rotor knife    | 4. Shredder knives | 7. Drive-belt guard    |
| 2. Rotor          | 5. Engine clutch   | 8. Chop block          |
| 3. Shredder plate | 6. Drive belt      | 9. Upper rotor housing |

## 5. Controls

Before operating the machine, be familiar with the location and function of the controls.

### 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 complete 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.

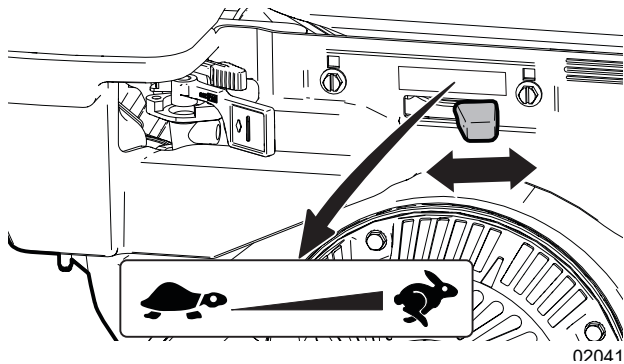


Figure 7—Engine throttle control

#### 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.

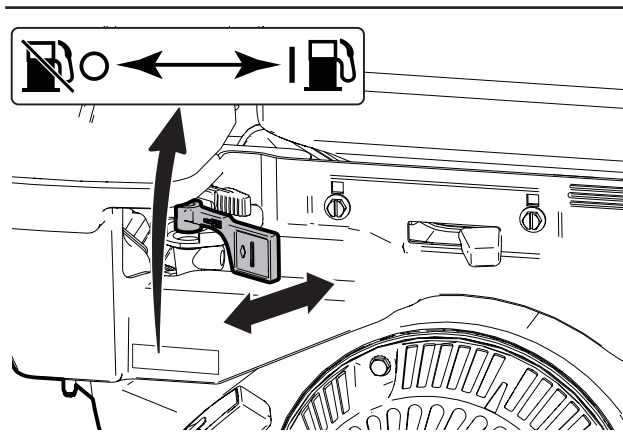
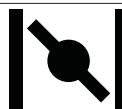


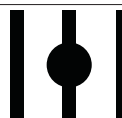
Figure 8—Engine fuel shutoff

#### 5.1.3 Choke Lever

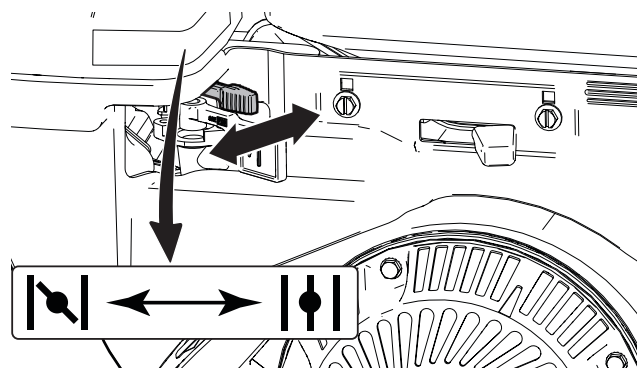
The choke control lever has the following functions:



**Choke closed**  
Close the choke to start a cold engine.



**Choke open**  
Open the choke when the engine is warm.



02039

Figure 9—Engine choke control

## 5.1.4 Recoil Starter

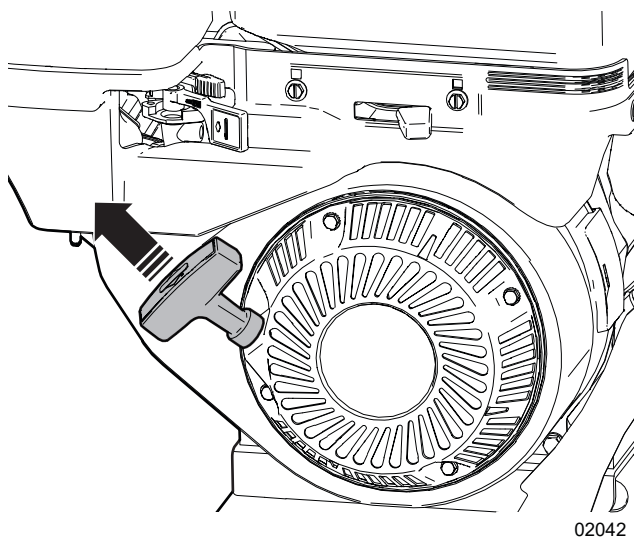
### **WARNING!**

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

W102

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



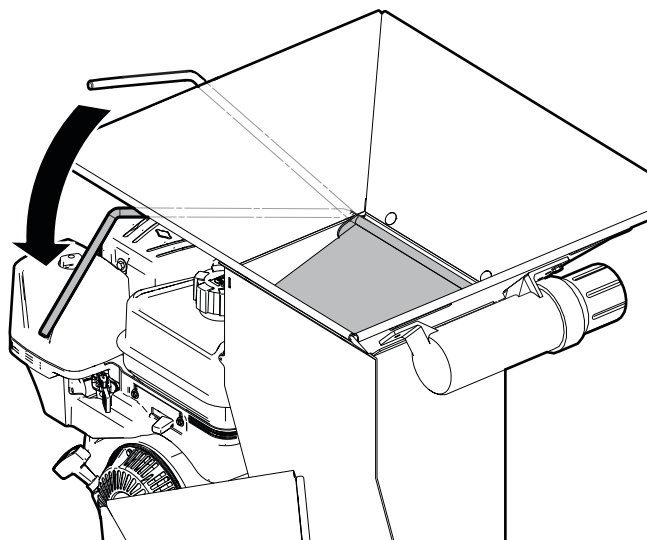
02042

**Figure 10**—Starter cord

## 5.2 Shredder Gate

The shredder gate keeps material in the shredder hopper until you open the shredder gate. A spring holds the shredder gate in the closed position.

<b>Open</b>	<p>Pull the shredder-gate lever down to open the shredder gate.</p> <p>Material that is in the shredder hopper falls into the rotor housing.</p>
<b>Closed</b>	<p>Release the shredder-gate lever to close the shredder gate.</p> <p>The spring lifts the shredder gate to the closed position.</p>



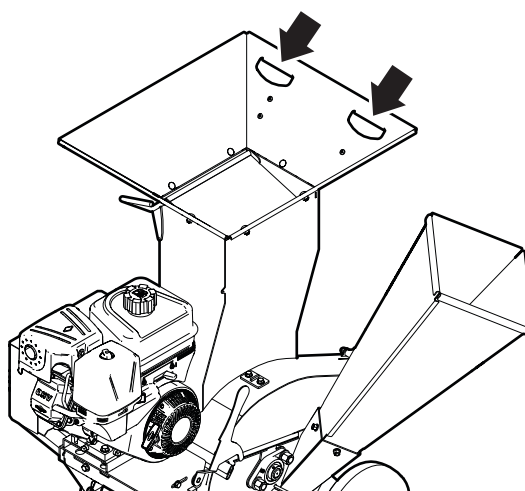
**Figure 11**—Open the shredder gate

## 5.3 Handles

**IMPORTANT!** Do not tilt the machine when the engine is on. Tilting the engine changes the fluid levels, which can cause damage when the engine is on.

The machine has two handles, both on one side of the shredder hopper.

For instructions, see *Use the Handles* on page 34.



**Figure 12**—Handles

## 5.4 Clutch Handle

The clutch handle engages or disengages the clutch to start or stop turning the rotor. A clutch and brake system controls the power that transfers from the engine, through the drive belt, to the rotor.

### 5.4.1 Stop Position

**IMPORTANT!** When the clutch disengages, the brake automatically engages.

When the clutch handle is in the STOP position, the clutch is disengaged. Power from the engine does not transfer to the drive belt. The drive belt and the rotor come to a stop (it takes approximately five seconds for the rotor to come to a full stop after you move the clutch handle to the STOP position).

Spring tension holds the clutch handle in the STOP position until the operator moves it to the START position.

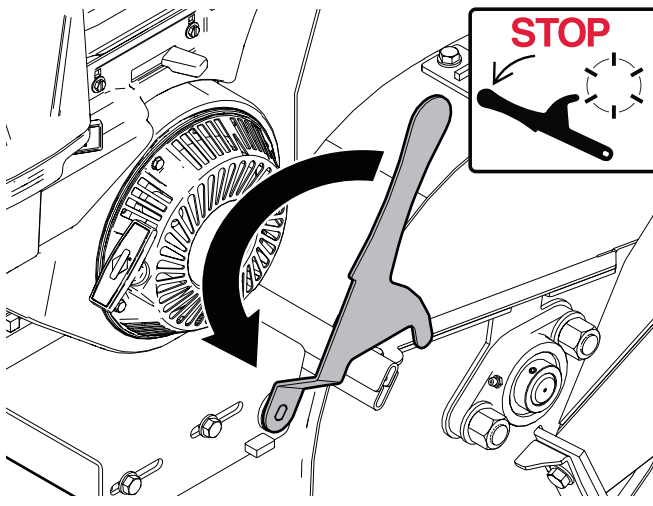


Figure 13—Disengage the clutch

### 5.4.2 Start Position



Move the clutch handle slowly to engage the clutch. Quick movement of the clutch handle can cause the engine to stall.

When the clutch handle is in the START position, the clutch is engaged. Power from the engine transfers through the drive belt to turn the rotor.

Spring tension holds the clutch handle in the START position until the operator moves it to the STOP position.

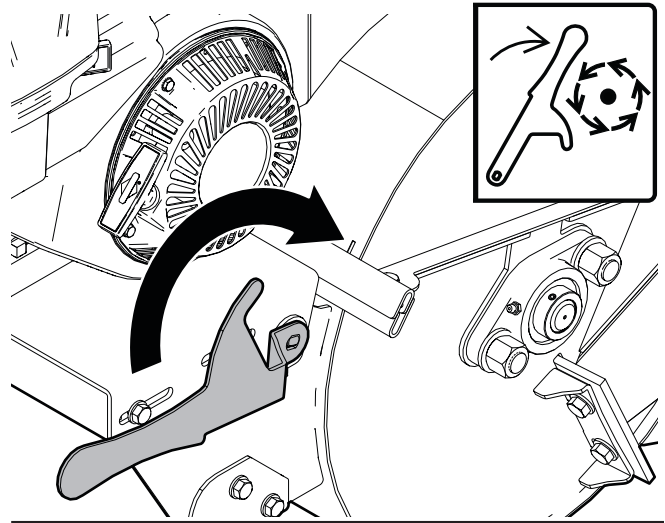


Figure 14—Engage the clutch

## 6. Operating Instructions

The operator is responsible to be familiar with and obey all operating and safety procedures. Read and understand all the safety information in this manual before you operate the machine.

### 6.1 Operating Safety

#### **WARNING!**

**Wear the personal protective equipment (PPE) that is necessary to do 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!**

**Stay away from the discharge chute and the area where the discharge chute is pointed. Do not point the discharge chute at people, animals, or structures. The machine releases wood chips fast enough to cause personal injury and property damage.**

W062

#### **WARNING!**

**Do not reach into the chipper hopper. There are sharp knives that can trap, cut, and/or sever your fingers or hand. Use a stick or branch to pull material that does not move out of the discharge chute.**

**If there is a blockage, set the machine to a safe condition, and then remove the material.**

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

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

**If these items get into the machine, set the machine to a safe condition before you remove them. 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.
- Attach all guards and shields, and close all covers before you start the machine.
- 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 unpredictable directions when they enter the chipper hopper. 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.
- Do not operate the machine alone. Always have a minimum of two trained people:
  - There should be one operator and one spotter present 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 20 ft (6 m) from the machine and wood chip release 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 you are stable when you put material into the chipper hopper or shredder hopper.
- Keep your hands, feet, clothing, and long hair away from the chipper hopper. The chipper hopper can entangle hands, feet, clothing, and long hair, causing serious injury or death.



## 6.2 Pre-Start Checklist

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

Items to Complete	✓
Read and obey the <i>Operating Safety on page 23</i> , <i>Engine Operation Safety on page 25</i> , and <i>Fuel Safety on page 26</i> .	
Check the drive belt tension and alignment. If necessary, adjust the drive belt. For instructions see <i>Set the Drive Belt Tension on page 43</i> and <i>Align the Drive Belt on page 44</i> .	
Check the condition and clearance of the twig breaker, rotor knives, and ledger knife. If necessary, adjust or replace them.	
Check the condition of the shredder knives and chop block. If necessary, adjust or replace them.	
Check the engine oil level. For instructions, see <i>Check the Engine Oil Level on page 27</i> . If necessary, add oil.	
Check the engine fuel level. For instructions, see <i>Check the Engine Fuel Level on page 26</i> . If necessary, add fuel.	
Check the engine air filter. For instructions, see <i>Clean the Engine Air Filter on page 42</i> . If necessary, clean or replace the filter.	
Make sure that the machine is lubricated as specified in the <i>Maintenance Schedule on page 39</i> .	
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. If necessary, replace the guards, shields, or covers.	
Check the condition of the shredder gate. Replace the shredder gate or spring if it is damaged. For more information, see <i>Shredder Gate on page 21</i> .	
Check the tire air pressure, and the wheels, hubs, and axle. See the side of the tire for the correct air pressure.	
Make sure that all the fasteners are installed and torqued to the correct specifications. For more information, see <i>Bolt Torque on page 56</i> .	
Make sure that the operator and spotter are wearing the necessary PPE. The PPE must be in good condition	
Make sure 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 <i>Work Site on page 11</i> .	

## 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 information in this manual and the engine manufacturer's manual.
2. Review the *Machine Components on page 18*.
3. Review the operation and function of the *Controls on page 20*.
4. Complete the *Pre-Start Checklist on page 24*.

### 6.3.2 After One to Five Hours of Operation

Do each of the following:

- Check the drive belt tension and alignment. If necessary, adjust the drive belt.  
For instructions, see *Drive Belt Maintenance on page 43*.
- Check the condition and clearance of the twig breaker, rotor knives, and ledger knife. If necessary, adjust or replace them.
- Check the condition of the shredder knives and chop block. If necessary, adjust or replace them.
- After five hours of operation, change the engine oil. For instructions, see the engine manufacturer's manual.
- Check the engine oil level. If necessary, add oil. For instructions, see *Check the Engine Oil Level on page 27*.
- Check the engine fuel level. If necessary, add fuel. For instructions, see *Check the Engine Fuel Level on page 26*.
- Check the condition of the rotor bearings. Make sure that the rotor bearings turn freely.
- Check the fasteners and make sure that they are torqued to the correct specifications. For more information, see *Bolt Torque on page 56*.
- Check the tire air pressure, and the wheels, hubs, and axle. See the side of the tire for the correct air pressure.
- Remove material that is entangled on the machine.
- Remove material from the rotor housing and discharge chute.

### 6.3.3 After 10 Hours of Operation

1. Do the tasks listed under *After One to Five Hours of Operation*.
2. Continue with the regular *Maintenance Schedule on page 39*.



## 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

#### WARNING!

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

#### CAUTION!

Use a spark arrestor in areas where the forest, brush, or grass is dry to prevent forest fires. Check your local forest fire regulations and forest fire danger rating before you start the machine.

W114

**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 of 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 blocked and leak.
- Check the fuel lines and fittings on a regular basis for cracks or leaks. Replace damaged fuel lines or fittings if necessary.
- Store fuel away from all wood material.
- 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 choke the carburetor to stop the engine. When it is possible, gradually reduce the engine speed before you stop the engine.
- 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.
- Do not attempt to start the engine with the spark plug removed. If the engine floods, set the choke control to **Open** set the throttle control to **Fast**, and then try to start the engine again.
- 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 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 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 Fuel Safety

### WARNING!



Do not smoke or vape when you handle fuel. Fuel vapours can explode causing serious injury or death. Keep sparks, flames, or hot components away from fuel.

W027

### WARNING!

Fuel and vapors are very 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.

W116

### 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.

W117

- Engine fuel is highly flammable. Handle it carefully.
- Stop the engine and let it cool before you add fuel to the tank.
- Do not overfill the fuel tank.
- Carefully remove any spilled fuel, and then wait until any remaining fuel dries before you start the engine.
- After you add fuel to the tank, make sure that the fuel cap is tight.

## 6.4.3 Check the Engine Fuel Level

Check the engine fuel level before each use.

Start work with a full fuel tank to decrease operating interruptions. Do not let the fuel tank become empty.

1. Park the machine on level ground.
2. Stop the machine.  
For instructions, see *Stop the Machine* on page 29.
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*.



01778

Figure 15–Fuel cap

## 6.4.4 Add Fuel to the Engine

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 38.

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 29.
2. Wait a minimum of five minutes for the engine to cool.
3. Clean the area around the fuel cap.
4. Turn the fuel cap counterclockwise to remove it.
5. Use a clean funnel to add the correct type and amount of fuel to the tank. Add fuel until the fuel level is visible 1/2 inch (12 mm) below the filler neck. Leave room for expansion. **Do not overfill the tank.**
6. Carefully remove any spilled fuel, and then wait until any remaining fuel dries before you start the engine.
7. Install the fuel cap and make sure that it is tight.

## 6.4.5 Check the Engine Oil Level

**IMPORTANT!** For more information about engine oil, see the engine manufacturer's manual and *Engine Oil* on page 38.

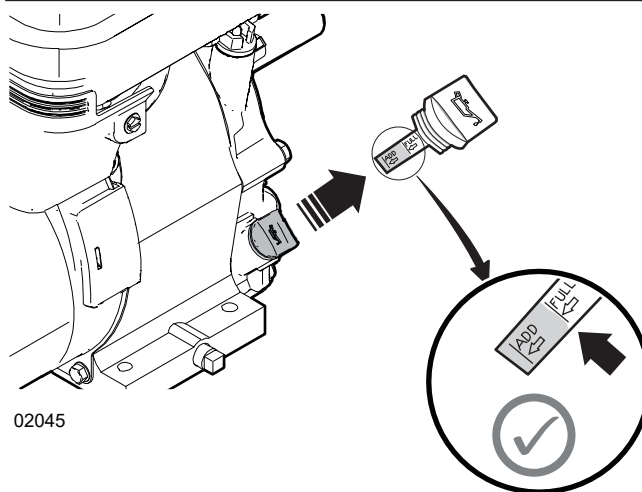
**Operating the engine with a low oil level can cause engine damage that is not covered by the warranty.**



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 29.
3. Remove the oil-level dipstick and clean it.
4. Fully insert the oil-level dipstick.
5. Remove the oil-level dipstick and check the oil level.  
The oil level is correct when the oil is visible on the dipstick from the end to the full (upper) mark.
6. Do 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* on page 28.
7. Install the oil-level dipstick and make sure that it is tight.



02045

**Figure 16**—Check the engine oil level

## 6.4.6 Add Oil to the Engine

**IMPORTANT!** For more information about engine oil, see the engine manufacturer's manual and *Engine Oil on page 38*.

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 the 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 the oil-fill cap and make sure that it is tight.

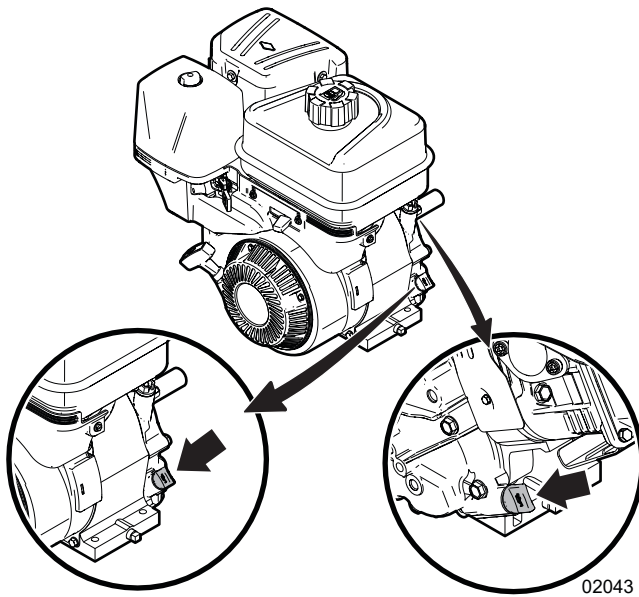


Figure 17—Engine oil-fill locations

## 6.5 Start the Machine

### **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 you start the engine, pull the starter cord slowly until you feel resistance, and then pull it rapidly to avoid kickback.**

W102

**IMPORTANT!** For additional engine information, refer to the engine manufacturer owner's manual in the manual tube.

Before you start the machine, see the information under *Controls on page 20*.

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

## 6.6 Stop the Machine

**IMPORTANT!** Do not choke the carburetor to stop the engine.

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. Move the **clutch handle** to the **STOP** position.
4. Move the **throttle control** to the **STOP** position to turn off the engine and close the fuel shut-off valve.
5. Wait 10 seconds for the drive belt and rotor to stop.

## 6.7 Emergency Stop

**In an emergency:**

1. Stop putting material into the machine.
2. Move the **clutch handle** to the **STOP** position.
3. Move the **throttle control** to the **STOP** position to turn off the engine and close the fuel shut-off valve.
4. Wait 10 seconds for the drive belt and rotor to stop.
5. Remove the key and keep it with you.  
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

### **CAUTION!**

Make sure that the machine is stable and on the level ground before operation. Operating the machine on uneven ground can cause the machine to tip over, which may result in personal injury or machine damage.

W038

**IMPORTANT!** Put the machine in a position so that the prevailing wind blows engine exhaust away from the operator.

1. Select a work site and set up a safe work area.  
For more information, see *Work Site on page 11*.
2. Make sure that the machine is level and stable, and the work area is free of debris.
3. Make sure that the chipper and shredder hoppers are free of debris.

## 6.9 Operate the Machine

### **WARNING!**

**Wear the personal protective equipment (PPE) that is necessary to do 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

### **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 chipper hopper and shredder 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 you put in 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 shredder hopper.**
- Keep the wood-chip pile contained to one area.
- If the machine is blocked, stop putting material into the machine.  
For instructions, see *Remove a Blockage on page 32*.

## 6.9.1 Prepare the Material

- Cut large, curved branches into smaller, straighter sections. Some branches and brush move in unpredictable directions when they enter the rotor housing.
- Hold small diameter branches together in a bundle and put them into the chipper hopper together.
- Put short branches on top of longer branches to avoid reaching into the chipper hopper.
- Put large branches and trees into the chipper hopper one at a time.

## 6.9.2 Chip Wood

### **WARNING!**

Do not reach into the chipper hopper. There are sharp knives that can trap, cut, and/or sever your fingers or hand. Use a stick or branch to pull material that does not move out of the discharge chute.

If there is a blockage, set the machine to a safe condition, and then remove the material.

W004



Delimb branches that are larger than 1" (2.5 cm) in diameter before you put them into the chipper hopper. This can help to prevent blockages in the chipper hopper.

**Chipper hopper maximum material diameter: 3" (8 cm).**

1. Set up the machine.  
For instructions, see *Set Up the Machine* on page 29.
2. Prepare the material.  
For instructions, see *Prepare the Material* on page 30.
3. Start the machine.  
For instructions, see *Start the Machine* on page 28.
4. Make sure that the engine speed is set to **FAST** and the rotor is at full speed (wait one minute).
5. Slowly, put material (branches and brush) into the chipper hopper until it engages with the rotor.  
The rotor will draw the material into the machine. Do not attempt to force the material into the rotor housing.

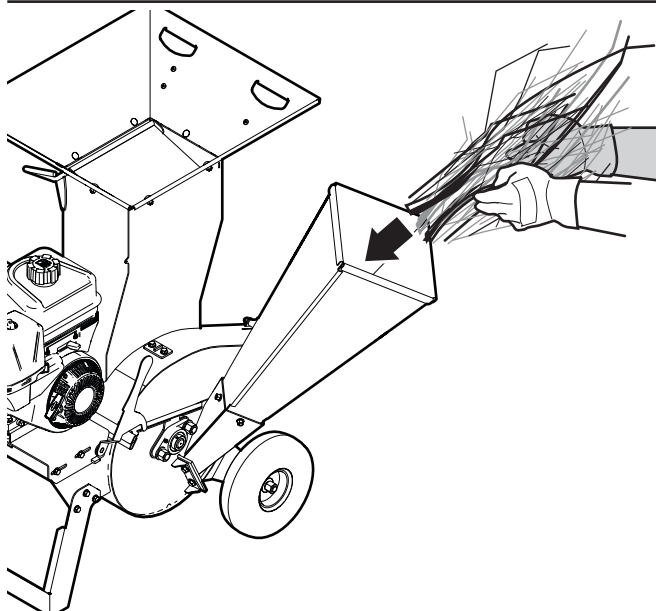


Figure 18—Chip wood

## 6.9.3 Shred Material

### **WARNING!**

Do not reach into the shredder hopper. There are sharp rotating parts that can trap, cut, and/or sever your fingers or hands. Use a stick or branch to push material that does not move into the machine.

If the machine is blocked, set the machine to a safe condition, and then clear the blockage.

### **CAUTION!**

Do not operate the machine without the shredder gate installed in the shredder hopper. Replace the shredder gate if it is damaged or missing. The shredder gate prevents material from being blown out of the rotor housing. The machine can release material fast enough to cause personal injury and property damage.

### **CAUTION!**

Only open the shredder gate to let material fall into the machine. Do not use an object to hold the shredder gate open. The machine can release material fast enough to cause personal injury and property damage.

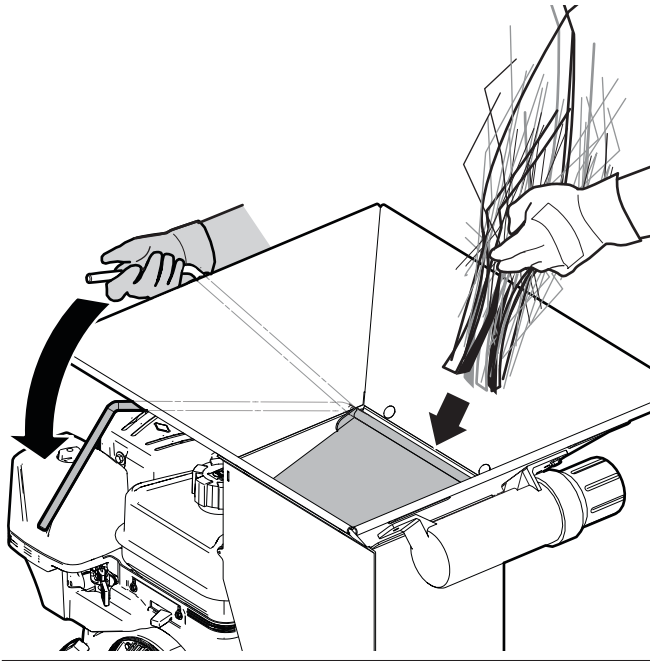
W071

**Shredder maximum material diameter: 3/4" (1.9 cm).**

1. Set up the machine.  
For instructions, see *Set Up the Machine* on page 29.
2. Prepare the material.  
For instructions, see *Prepare the Material* on page 30.
3. Start the machine.  
For instructions, see *Start the Machine* on page 28.
4. Make sure that the engine speed is set to **FAST** and the rotor is at full speed (wait one minute).
5. Put small leafy branches or small diameter wood material into the shredder hopper.  
Do not put too much material into the shredder hopper. Material falls into the machine more easily when the hopper is less full.
6. Use the shredder-gate lever to open the shredder gate.  
For more information, see *Shredder Gate* on page 21.



7. When the shredder hopper is empty, release the shredder-gate lever.  
Monitor the amount of material you put into the machine. If the engine speed starts to decrease, stop putting material into the machine. Wait until the rotor speed increases to continue.
8. As necessary, repeat steps 5 to 7.



**Figure 19**—Shred material

## 6.10 Remove a Blockage

### **WARNING!**

**Put the machine in a safe condition before you remove 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.**

W120

### **CAUTION!**

**Be careful when you remove a blockage from the lower rotor housing and chop block. The rotor and shredder knives are very sharp.**

### **CAUTION!**

**Wear thick work gloves to remove a blockage. Thick work gloves give some protection from sharp objects and splinters.**

W121

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.
3. Remove all of the material from the shredder hopper.
4. Remove material from the discharge chute.  
Use a stick to pull material out of the discharge chute. Make sure that the discharge chute is clear.
5. Start the machine to see if the blockage is cleared.  
If the machine does not operate, remove the blockage from inside the machine.  
For instructions, see *Remove an Internal Blockage* on page 33.



## 6.10.1 Remove 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 fasteners, and then open the upper rotor housing.
3. Remove material from the upper rotor housing and discharge chute.
4. Carefully, remove material from the lower rotor housing and chop block.
5. **If necessary**, turn the rotor to remove material from the lower rotor housing. **Do not reach into the rotor housing while the rotor is moving.**
6. Carefully and slowly, turn the rotor in each direction to make sure that there is not a blockage between the rotor and ledger knife.
7. Remove any remaining material and debris from the lower rotor housing.
8. Close the upper rotor housing.
9. Install the upper rotor housing fasteners .  
Use a calibrated torque wrench to torque the bolt to **19 lbf•ft (25 N•m)**.
10. Start the machine to see if the blockage is cleared.  
If the machine does not operate, do steps 1 to 9 again until the blockage is cleared.

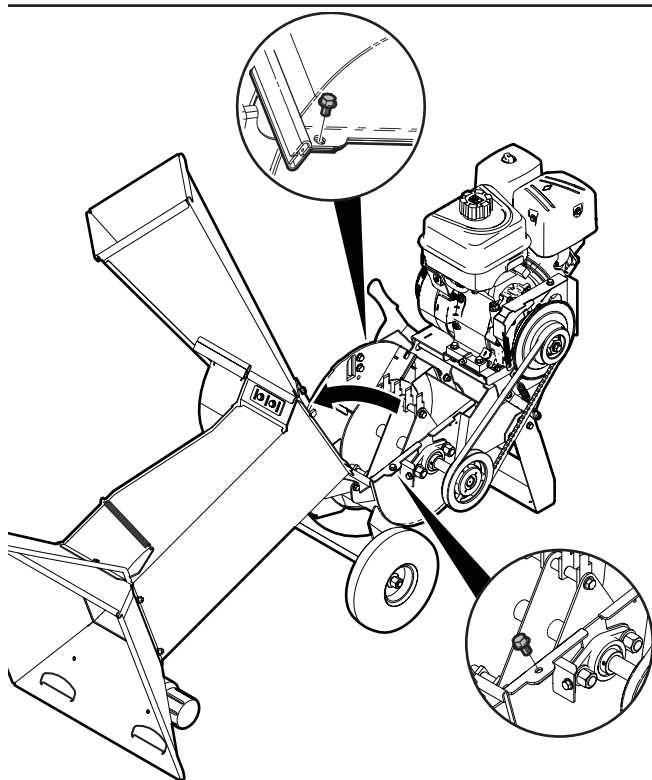


Figure 20—Remove a blockage

## 7. Transport

### **WARNING!**

Do not tow this machine on a roadway. If transport to another location is necessary, attach the machine safely to the bed of a licensed truck or trailer.

### 7.1 Transport Safety

- Do not let people ride on the machine.
- Do not run while you transport the machine.
- Do not transport or move the machine with the engine on.
- Make sure that the fuel tank cap is on and tight.
- Examine the wheel rims for damage.
- 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 all of the guards and shields are installed and the covers are closed.
- Remove all debris from the machine.

### 7.2 Use the Handles

**IMPORTANT!** Stop the engine before you move or tilt the machine. Tilting the engine causes the fluid levels to change and the oil level can become low. If you operate the engine with a low oil level it can damage the engine.

The machine has two handles, on one side of the shredder hopper. Use the handles to move the machine.

Make sure that the machine is parked on level ground during operation.

1. Stop the machine.  
For instructions, see *Stop the Machine* on page 29.
2. Hold both of the handles on the shredder hopper.
3. Carefully, tilt the machine to lift the support stand off the ground.
4. Roll the machine forward or backward to move it to where you want it.
5. Carefully, tilt the machine to the vertical position.  
Make sure that the support stand is firmly on the ground.

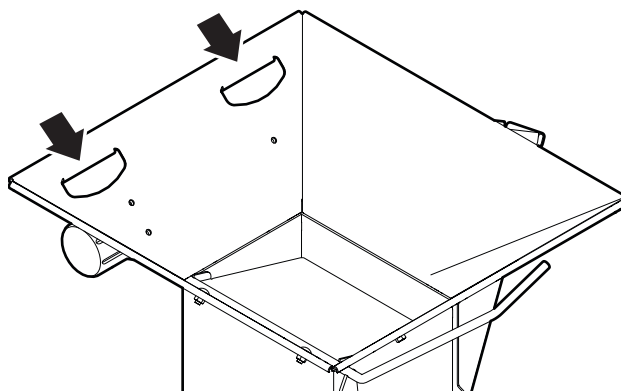


Figure 21 – Handles

## 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 let children play on or around the stored machine. If children play on or around the machine it can result in serious injury or death.**

W105

#### **CAUTION!**

**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.**

W123

**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.
- If necessary, support the machine with blocks for stability.

### 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 moving parts and remove all material from the machine.
3. Clean the machine.  
For instructions, see *Clean the Machine on page 52*.
4. Start the machine, let it run for a few minutes to remove any moisture, and then stop the machine.
5. Do step 1 again.
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 38*.  
For instructions, see *Replace the Engine Fuel on page 36*.
9. Put the machine in the storage location.
10. Block the machine wheels to prevent accidental movement and increase the wheel bearing life.
11. If the machine must be stored outdoors, cover the machine with a waterproof tarp.  
The machine should be stored indoors, if possible.

## 8.2.1 Replace the Engine Fuel

### **WARNING!**



Do not smoke or vape when you handle fuel. Fuel vapours can explode causing serious injury or death. Keep sparks, flames, or hot components away from fuel.

W027

### **WARNING!**

Fuel and vapors are very 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.

W116

### **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.

W117

## 8.3 Remove the Machine from Storage

1. Do the *Pre-Start Checklist* on page 24.
2. Do the necessary maintenance.  
For maintenance requirements, see the *Maintenance Schedule* on page 39.

1. Stop the machine.  
For instructions, see *Stop the Machine* on page 29.
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 properly dispose of the fuel.
4. Add new fuel to the engine.  
For instructions, see *Add Fuel to the Engine* on page 27.
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 go through the engine.
9. Stop the machine.  
For instructions, see *Stop the Machine* on page 29.

## 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!**

**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 necessary to do 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!**

**After service and maintenance, install all of the guards and shields, and close all of the covers. Do not operate the machine with any guard or shield removed, or cover open.**

W110

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

**Put the machine in a safe condition before you start any service or maintenance:**

#### **SAFE CONDITION**

1. Stop the machine.  
For instructions, see *Stop the Machine* on page 29.
  2. Wait for all moving parts to stop.
  3. Disconnect the engine spark-plug wire and keep it away from the spark plug.
- 
- Follow good shop practices:
    - Keep the work area clean and dry.
    - Ground electrical outlets and tools.
    - Have sufficient 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.
  - Do not work under equipment unless it is safely supported with blocks.
  - Do not 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 specifications.
    - Make sure that all the electrical, hydraulic, and fuel connections are connected in a safe working condition.
  - Do not use gasoline or diesel fuel to clean parts. Use the correct cleaning product.
  - 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 and/or accessories

## 9.2 Fluids and Lubricants

The machine needs the correct fluids and lubricants for operation and maintenance.

### 9.2.1 Lubricant Handling and Storage

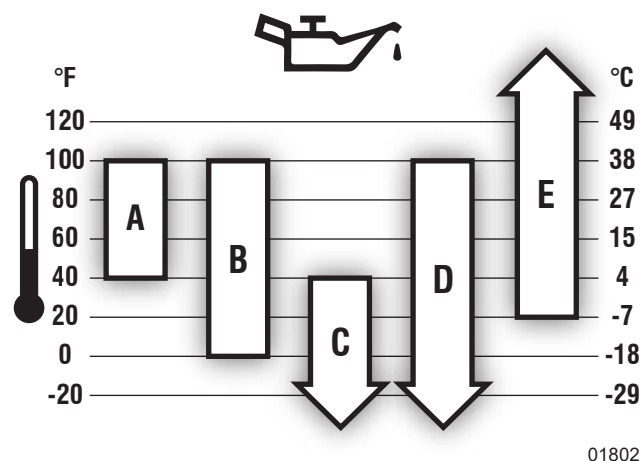
For optimum machine efficiency, use clean lubricants and clean containers to handle all lubricants. Store lubricants in an area that is protected from dust, moisture, and other contaminants.

### 9.2.2 Engine Oil

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

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

Outdoor temperatures determine the necessary engine oil viscosity. Select the best oil viscosity for the expected outdoor temperature range. Use the following chart as a guide:



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

### 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 insoluble solids (deposits).

For instructions, see *Replace the Engine Fuel* on page 36.

### 9.2.4 Grease

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

## 9.3 Maintenance Schedule

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

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

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 44.
Clean the engine air-intake grill.	●						N/A <sup>1</sup>
Check that all the fasteners are tightened to the specified torque.	●						See page 56.
Check the drive belt tension.		●					See page 43.
Check the rotor knife sharpness.		●					See page 47.
Check the ledger knife sharpness.		●					See page 48.
Check the shredder knife sharpness.		●					See page 50.
Check the twig breaker for damage.		●					See page 52.
Check drive belt alignment.			●				See page 44.
Grease the rotor bearings.			●				See page 40.
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 52.
Clean the engine air filter <sup>2</sup> .				●			See page 42.
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.

<sup>1</sup> N/A indicates that a reference is not applicable.

<sup>2</sup> In dusty conditions or when airborne debris is present, clean more often.

## 9.4 Grease Points

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



Look for this type of label on the machine. Each label identifies a grease point and shows the greasing interval in hours.

For grease specifications, see *Grease on page 38*.

- Use a clean cloth to clean each grease fitting before you apply grease. This prevents grease and dirt from getting inside the component.
- Use a hand-held grease gun to apply **one pump** of grease to each grease point.
- If a grease fitting is damaged, replace it immediately.
- If a grease fitting does not accept grease:
  - a. Remove the grease fitting.
  - b. Clean the passageway behind the grease fitting.
  - c. Clean the grease fitting thoroughly or get a new grease fitting.
  - d. Install the grease fitting.



### 9.4.1 Grease Fitting Locations

Item	Location	Frequency	Number of Locations
1	Rotor-shaft bearings	50 hours or annually	2

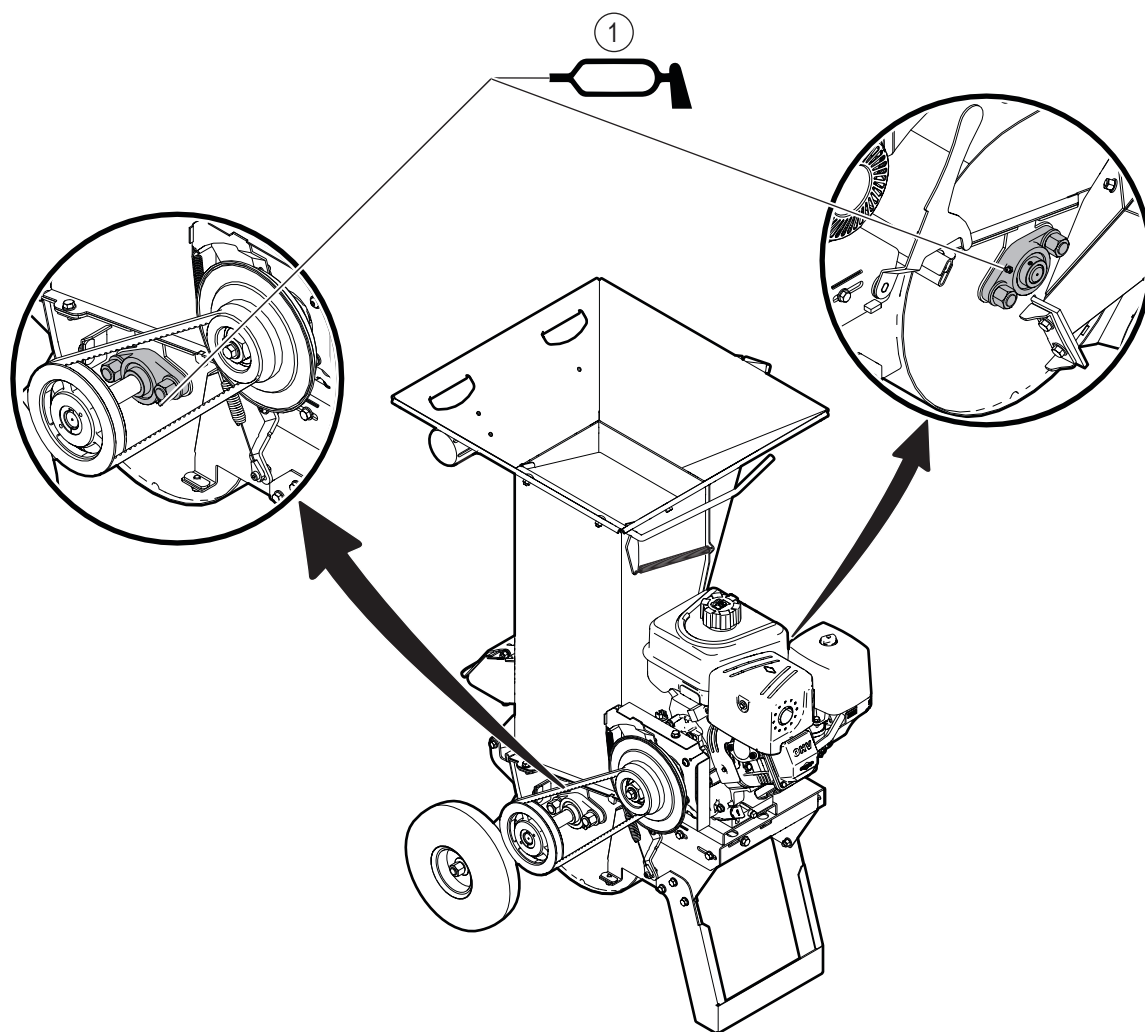


Figure 22—Grease fitting locations

## 9.5 Engine Maintenance

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

### 9.5.1 Engine Maintenance 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

For more information, see *Engine Operation Safety* on page 25.

- Remove the wire from the spark plug before servicing the engine or equipment to prevent the engine from starting.
- Examine the muffler on a regular basis to make sure that it operates effectively. Repair or replace a muffler that is worn or leaks.
- Before storage, replace fuel that contains ethanol with an alkylate or appropriate engineered fuel to prevent the buildup of deposits.
- Check the fuel lines and fittings frequently for cracks or leaks. Replace fuel lines or fittings that are damaged.
- Store fuel away from all wood material.
- 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 can cause burns.

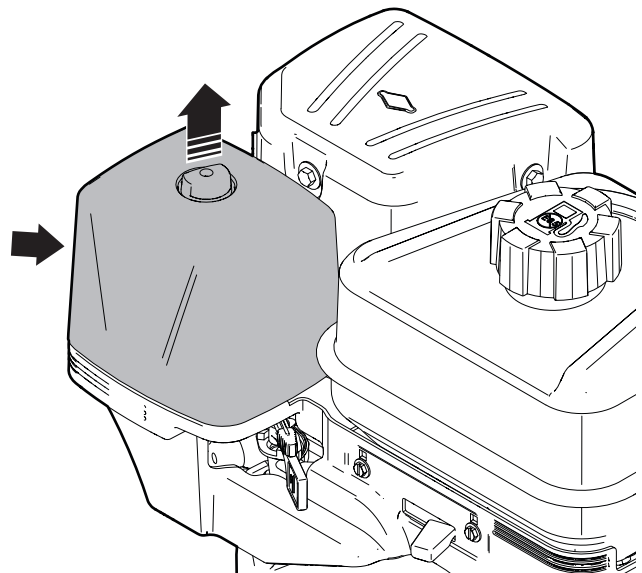
## 9.6 Clean the Engine Air Filter

**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 23**—Remove the air filter

## 9.7 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.

W109

### **WARNING!**

Do not operate the machine with any of the guards or shields removed. The machine is shown with guards or shields removed for illustrative purposes only.

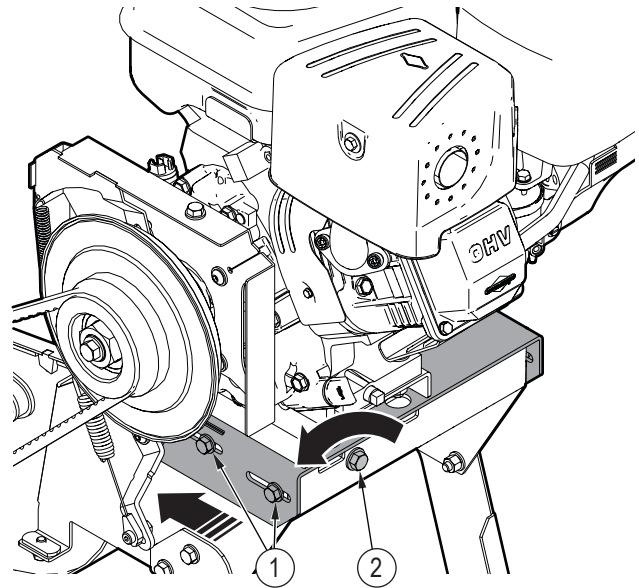
W001

### 9.7.1 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.

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 *Align the Drive Belt* on page 44.
7. Set the drive belt tension.  
For instructions, see *Set the Drive Belt Tension*.
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)**.



**Figure 24**—Loosen the drive belt tension

1. Engine mount bolts
2. Drive-belt tensioning bolt

### 9.7.2 Set the Drive Belt Tension

#### **WARNING!**

Do not operate the machine with any of the guards or shields removed. The machine is shown with guards or shields removed for illustrative purposes only.

W001



A drive-belt tension gauge, ruler, or tape measure is necessary for this procedure. A drive-belt tension gauge is the most accurate tool.

**Check drive belt tension every 100 hours of operation.**

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 1/4" (6 mm) and 3/8" (10 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*.
10. Use a calibrated torque wrench to torque the four engine mount bolts to **19 lbf•ft (25 N•m)**.
11. Check the drive belt tension again after 10 hours of operation.

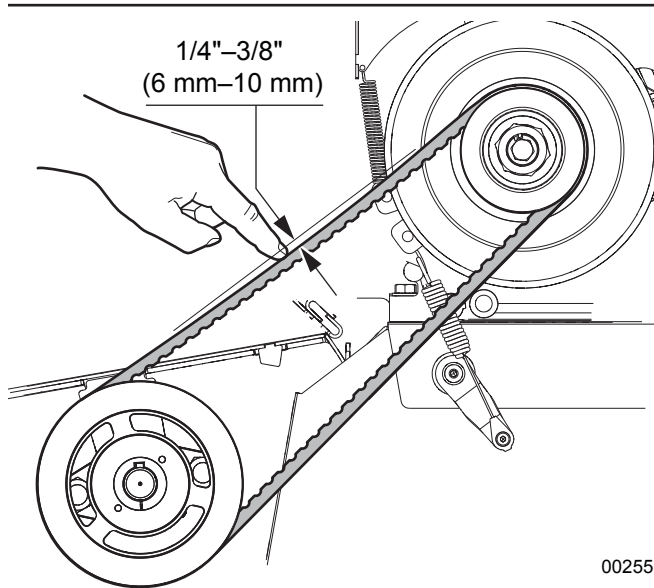


Figure 25—Check the drive belt tension

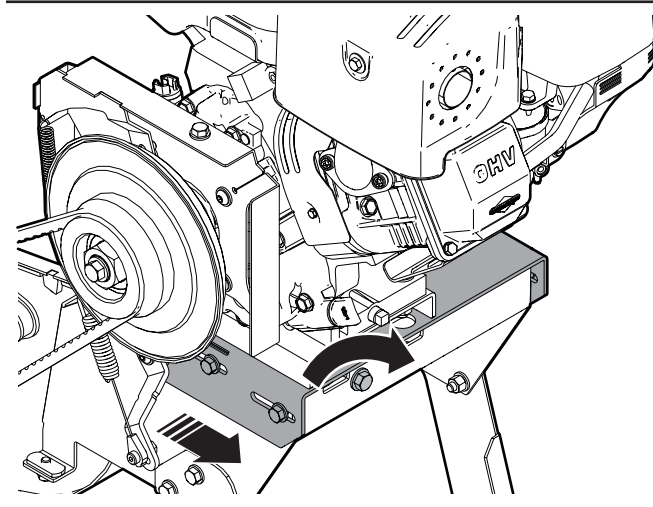


Figure 26—Adjust the drive belt tension

### 9.7.3 Align the Drive Belt

Check the drive belt alignment after every 8 hours of operation

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

Put a straight-edge tool across the face of the rotor sheave. Point the opposite end of the straight-edge toward the engine clutch flywheel. Make sure that the straight-edge is parallel with the face of the rotor sheave. See *Figure 27*.

1. Do one of the following:

- If the edge of the engine clutch flywheel aligns with the straight-edge, the drive belt is aligned. The following steps are not necessary. See *Figure 27*.
- If the edge of the engine clutch flywheel is parallel to the straight-edge tool, but is not aligned with the rotor sheave, align the rotor sheave. See *Figure 31 on page 46*.  
For instructions, see *Align the Rotor Sheave on page 46*.
- If the edge of the engine clutch flywheel is not parallel (is on an angle) to the straight-edge tool, align the engine clutch. See *Figure 28 on page 45*.  
For instructions, see *Align the Engine Clutch on page 45*.

2. Do steps 1 and 2 again to make sure the drive belt is aligned.

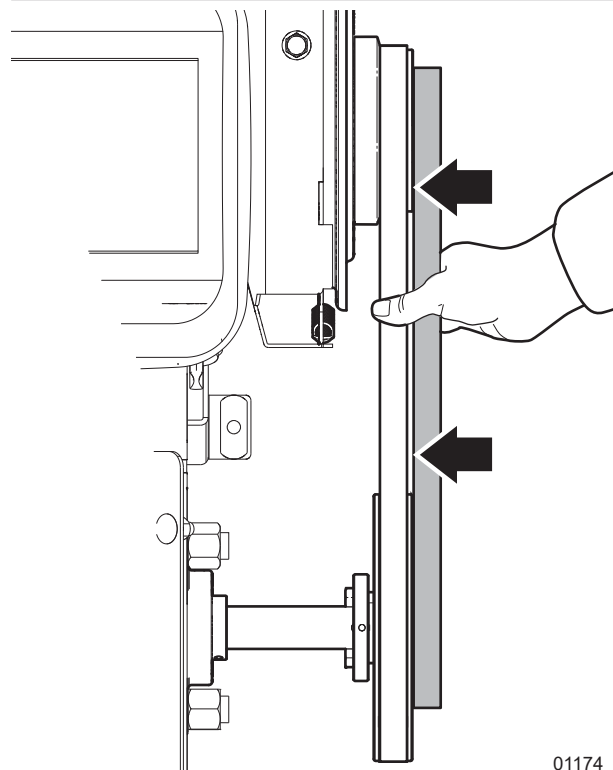


Figure 27—Drive belt alignment

## 9.7.4 Align the Engine Clutch

The engine mount can move and cause drive-belt misalignment.

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 44*.
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 **19 lbf•ft (25 N•m)**.
9. Check the drive-belt tension.  
For instructions, see *Set the Drive Belt Tension on page 43*.

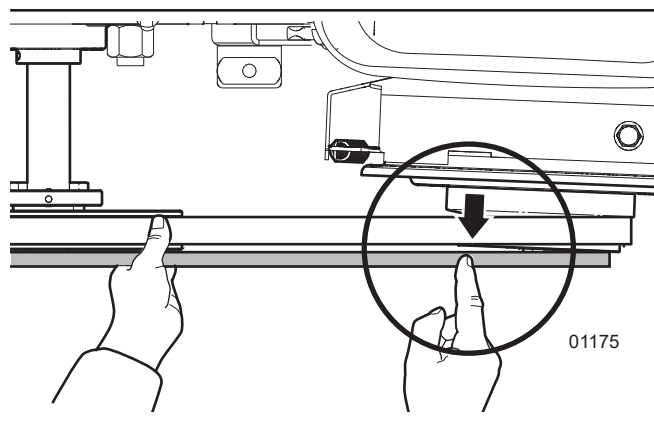


Figure 28—Align the engine clutch

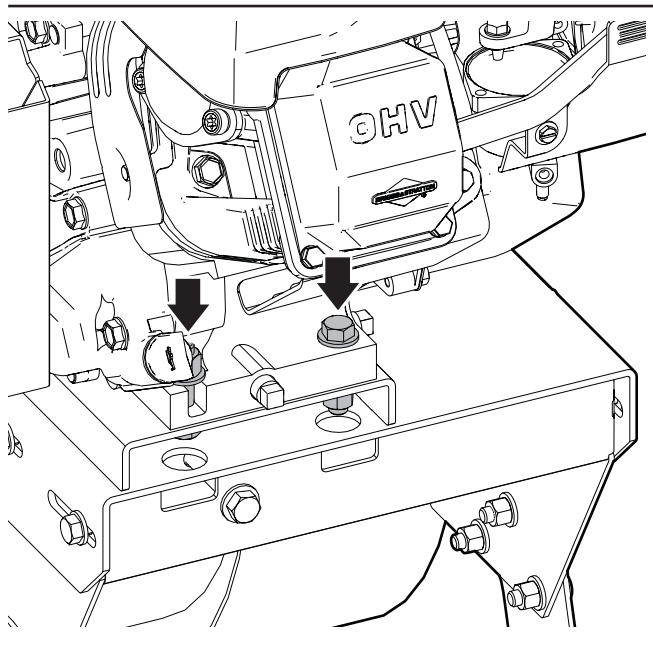
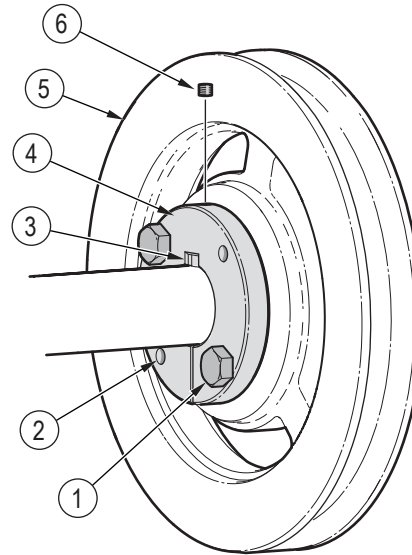


Figure 29—Engine mount bolts

## 9.7.5 Align the Rotor Sheave

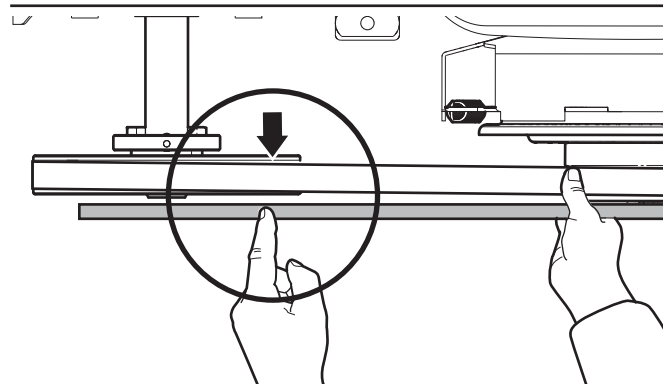
The rotor sheave can become loose on the shaft and cause drive-belt misalignment.

1. Remove the set screw (6) from the sheave (5).  
Put the set screw aside. It is necessary for assembly.
2. Remove the sheave bolts (1).
3. Thread the sheave bolts into the puller holes (2) on the sheave hub (4).
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 44*.
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. Install and then tighten the set screw (1).
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 43*.



**Figure 30—Rotor sheave**

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



**Figure 31—Align the rotor sheave**

## 9.8 Rotor Knife Maintenance

### **WARNING!**

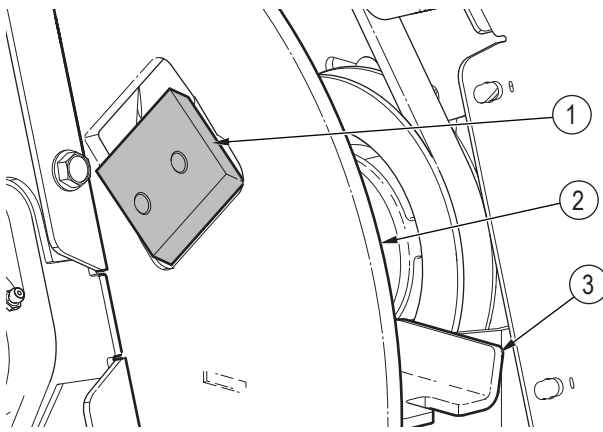
**Do not operate the machine with any of the guards or shields removed. The machine is shown with guards or shields removed for illustrative purposes only.**

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



**Figure 32—Rotor knife**

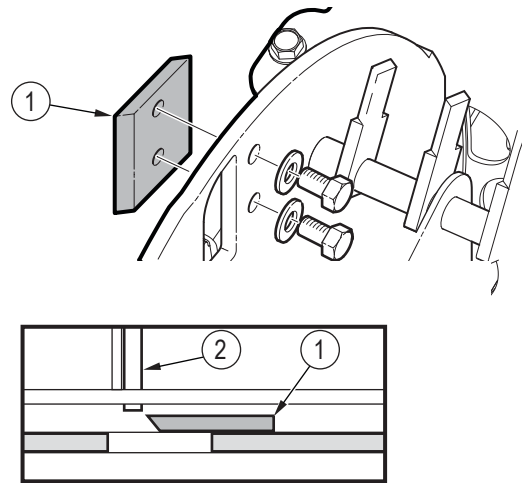
1. Rotor knife
2. Rotor
3. Rotor paddle

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.

### 9.8.1 Replace a Rotor Knife

1. Stop the engine. Wait for the rotor to stop turning.  
For instructions, see *Stop the Machine* on page 29.
2. Remove the fasteners that hold the upper rotor housing closed.
3. Open the upper rotor housing.
4. Turn the rotor to access one of the rotor knives.
5. Prevent the rotor from turning.  
Make sure that the rotor cannot move.
6. Remove the rotor knife fasteners.
7. Carefully remove the rotor knife.

8. Clean the rotor knife recess.
9. Apply blue 242 thread locker to the threads of each rotor knife fastener.
10. Put the rotor knife in the recess and align the fastener holes.
11. Install the rotor knife fasteners.
12. Use a calibrated torque wrench to torque the fasteners to **45 lbf•ft (63 N•m)**.
13. Do steps 3 to 11 again for each rotor knife.
14. Release the rotor.  
Make sure that the rotor can turn freely.
15. Turn the rotor to check the ledger knife clearance for each of the rotor knives.  
Make sure that the rotor knives do not touch the ledger knife.
16. Close the upper rotor housing.
17. Install the fasteners that hold the upper rotor housing closed.
18. Use a calibrated torque wrench to torque the fasteners **19 lbf•ft (25 N•m)**.



**Figure 33— Replace a rotor knife**

1. Rotor knife
2. Ledger knife



## 9.8.2 Sharpen a Rotor Knife

### CAUTION!

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

W126

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



Remove the same amount of material from each of the rotor knives.

1. Remove the rotor knife from the machine.  
For instructions, see *Replace a Rotor Knife on page 47*.
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.
5. Use a grinder to sharpen the cutting edge of the rotor knife. Sharpen the cutting edge to a 45-degree angle. See *Figure 34*.
6. Do steps 4 and 5 for the opposite cutting edge.
7. Do steps 1 to 6 for the remaining rotor knives.



**Figure 34**—Sharpen a rotor knife

## 9.9 Ledger Knife Maintenance

### WARNING!

Do not operate the machine with any of the guards or shields removed. The machine is shown with guards or shields removed for illustrative purposes only.

W001

### WARNING!

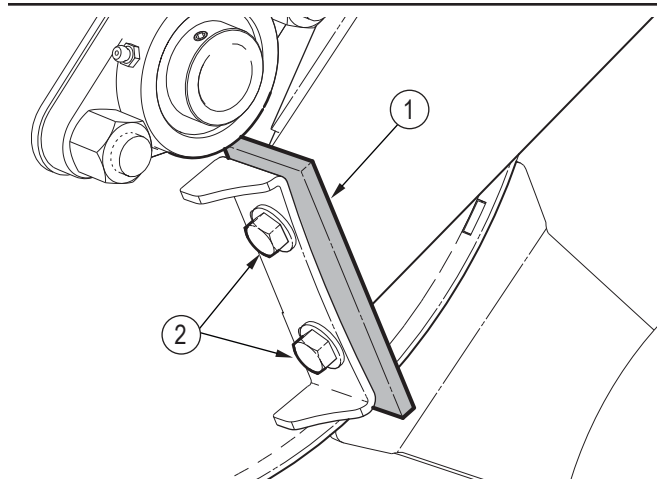
Do not reach into the rotor housing. The rotor and ledger knives are very sharp. If it is necessary to reach into the rotor housing, set the machine to a safe condition, wear heavy gloves, and be very careful.

W003

### 9.9.1 Replace a Ledger Knife

1. Stop the engine. Wait for the rotor to stop turning.  
For instructions, see *Stop the Machine on page 29*.
2. Remove the fasteners that hold the upper rotor housing closed.
3. Open the upper rotor housing.
4. Remove the two ledger knife fasteners.
5. Carefully remove the ledger knife.
6. 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 49*.
7. Align the ledger knife with the bolt holes in the lower rotor housing.
8. Install the ledger knife fasteners. See *Figure 35 on page 49*.
9. Set the ledger knife clearance.  
For instructions, see *Set the Ledger Knife Clearance on page 49*.
10. Use a calibrated torque wrench to torque the fasteners to **45 lbf•ft (63 N•m)**.
11. Close the upper rotor housing.
12. Install the fasteners that hold the upper rotor housing closed.
13. Use a calibrated torque wrench to torque the fasteners to **19 lbf•ft (25 N•m)**.



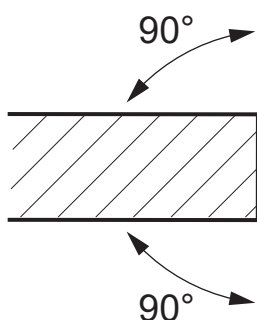


**Figure 35**—Ledger knife in the lower rotor housing

1. Ledger knife
2. Ledger knife fasteners

### 9.9.2 Sharpen a Ledger Knife

1. Remove the ledger knife from the machine.  
For instructions, see *Replace a Ledger Knife on page 48*.
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. See *Figure 36*.
6. Do steps 4 and 5 for the opposite cutting edge.



01098

**Figure 36**—Sharpen a ledger knife

### 9.9.3 Set the Ledger Knife Clearance

1. Stop the engine. Wait for the rotor to stop turning.  
For instructions, see *Stop the Machine on page 29*.
2. Remove the fasteners that hold the upper rotor housing closed.
3. Open the upper rotor housing.
4. 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.
5. Loosen the ledger knife fasteners.
6. 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 clearance between 1/32" and 1/16" (1 mm to 1.5 mm).
7. Tighten the ledger knife fasteners.
8. Use a calibrated torque wrench to torque the fasteners to **45 lbf•ft (63 N•m)**.
9. 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 10.
10. Close the upper rotor housing.
11. Install the fasteners that hold the upper rotor housing closed.
12. Use a calibrated torque wrench to torque the fasteners to **19 lbf•ft (25 N•m)**.

## 9.10 Shredder Knife Maintenance



### WARNING!

Do not operate the machine with any of the guards or shields removed. The machine is shown with guards or shields removed for illustrative purposes only.

W001

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

There are three sets of shredder knives attached to the shredder rotor. Each shredder knife has an edge that cuts and chops the material. The chop block breaks the material into smaller pieces to make it mulch when the shredder knives move through it.

Each shredder knife has two sharp edges that can be sharpened. Replace a shredder knife that is damaged or cannot be sharpened.

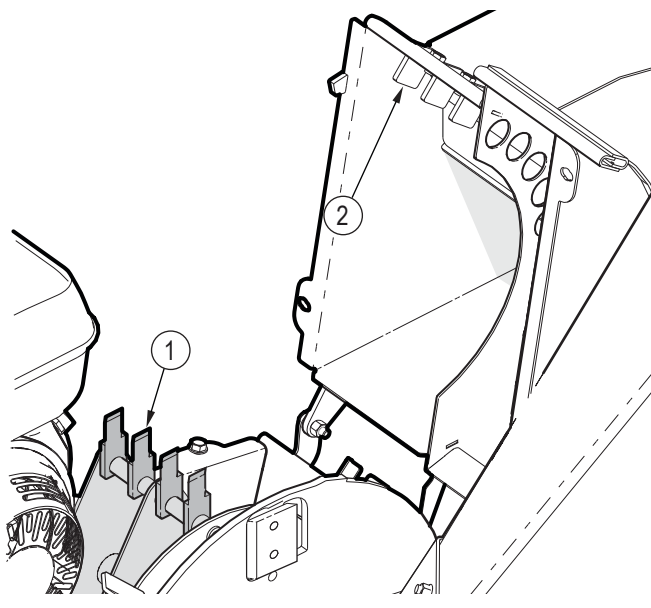


Figure 37—Shredder knives and chop block

1. Shredder knives
2. Chop block

### 9.10.1 Replace a Shredder Knife

1. Stop the engine. Wait for the rotor to stop turning.  
For instructions, see *Stop the Machine* on page 29.
2. Remove the fasteners that hold the upper rotor housing closed.
3. Open the upper rotor housing
4. Turn the rotor to access one set of shredder knives.
5. Loosen the bolt that holds a set of shredder knives and spacers to the shredder rotor.
6. Slowly, remove the shredder-knife fastener while you collect the shredder knives and spacers.
7. Turn, sharpen, or replace the shredder knives.  
For more information, see *Sharpen a Shredder Knife* on page 51.
8. Apply blue 242 thread locker to the shredder knife bolt.
9. Install the shredder-knife fastener through the shredder rotor, spacers, and shredder knives.
10. Use a calibrated torque wrench to torque the fasteners to **45 lbf•ft (63 N•m)**.
11. Do steps 4 to 10 again on each set of shredder knives.
12. Close the upper rotor housing.
13. Install the fasteners that hold the upper rotor housing closed.
14. Use a calibrated torque wrench to torque the fasteners to **19 lbf•ft (25 N•m)**.

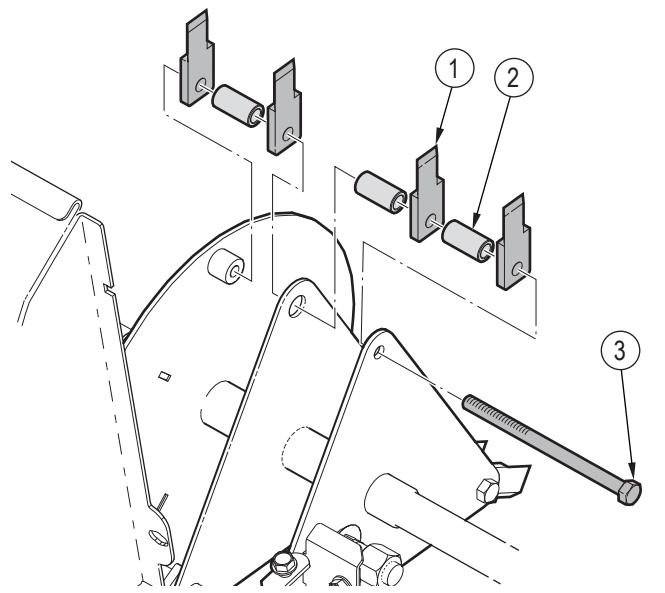


Figure 38—Shredder knives

1. Shredder knives
2. Spacers
3. Shredder-knife bolt

## 9.10.2 Sharpen a Shredder Knife

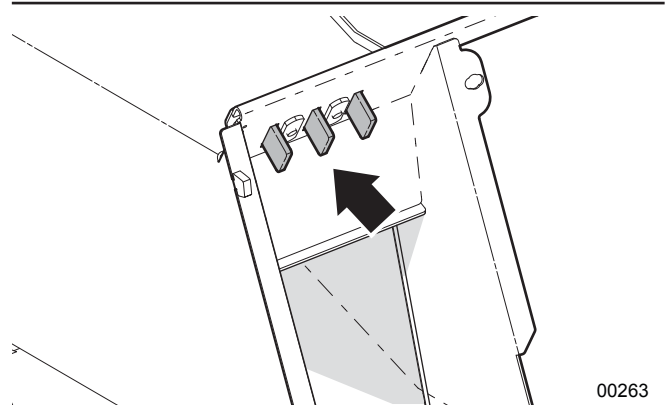
1. Remove the shredder knife from the machine.  
For instructions, see *Replace a Shredder Knife on page 50*.
2. Clean the shredder knife.
3. Examine the shredder knife for damage. If the shredder knife is damaged, replace it.  
Make sure that the shredder knives are the same size.
4. Put the shredder knife in a bench vice with the cutting edge facing up.  
Make sure that the shredder knife is clamped safely in the bench vice.
5. Use a grinder to sharpen the cutting edge of the shredder knife. Sharpen the cutting edge to a 45-degree angle. See *Figure 34 on page 48*.
6. Do steps 4 and 5 again for the opposite cutting edge.
7. Do steps 1 to 5 again for the remaining shredder knives.

## 9.11 Chop Block Maintenance

**Check the chop block after every 50 hours of operation.**

The chop block is located on the upper rotor housing. The chop block breaks the material into smaller pieces to make it mulch when the shredder knives move through it.

If the chop block is not sharp, remove it, and then install it with the opposite side facing up. Replace the chop block if the two sides are not sharp or it is damaged.



**Figure 39**—Chop block on upper rotor housing

The following procedure describes how to replace a chop block:

1. Stop the engine. Wait for the rotor to stop turning.  
For instructions, see *Stop the Machine on page 29*.
2. Remove the fasteners that hold the upper rotor housing closed.
3. Open the upper rotor housing.
4. Remove the two chop block fasteners.
5. Carefully, remove the chop block.
6. Do one of the following:
  - Install the chop block with the opposite side facing up.
  - Install a new chop block.
7. Install the chop block fasteners.
8. Use a calibrated torque wrench to torque the fastener to **19 lbf•ft (25 N•m)**.
9. Close the upper rotor housing.
10. Install the fasteners that hold the upper rotor housing closed.
11. Use a calibrated torque wrench to torque the fasteners to **19 lbf•ft (25 N•m)**.

## 9.12 Twig Breaker Maintenance

The twig breaker is located on the side of the lower rotor housing. When the rotor turns, the discharge paddles on the rotor push the material to the twig breaker. The twig breaker breaks the material into smaller pieces to make mulch.

Examine the twig breaker for damage on a regular basis. Replace a twig breaker that has cut, broken, or bent teeth.

The following procedure describes how to replace a twig breaker:

1. Stop the engine. Wait for the rotor to stop turning.  
For instructions, see *Stop the Machine* on page 29.
2. Remove the fasteners that attach the twig breaker to the rotor housing, and remove the twig breaker.
3. If necessary, replace the twig breaker.
4. Install the fasteners to attach the twig breaker to the rotor housing,
5. Use a calibrated torque wrench to torque the fasteners to **19 lbf•ft (25 N•m)**.

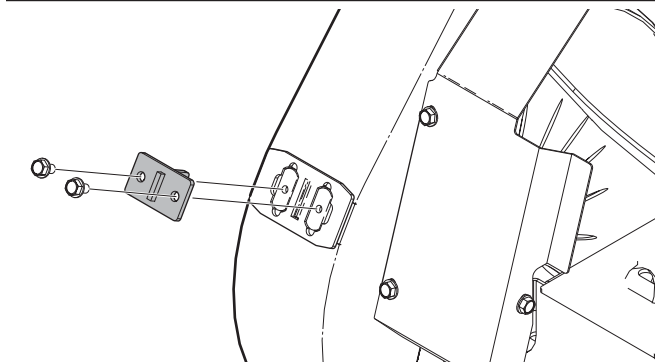


Figure 40—Twig breaker

## 9.13 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.

## 9.14 Clean the Machine

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

**IMPORTANT!** Do not direct the spray from a pressure washer onto the following components:

- The product identification plate.
- Bearings

**A pressure washer can damage these components.**

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. Start the machine.  
For instructions, see *Start the Machine* on page 28.
4. Let the engine run for a few minutes to dry.
5. Stop the machine.  
For instructions, see *Stop the Machine* on page 29.
6. Apply grease to the areas where the pressure washer possibly removed it.  
For instructions, see *Grease Points* on page 40

## 10. Troubleshooting



### WARNING!

**Before troubleshooting, read and understand the *Service and Maintenance Safety* on page 37. Set the machine to a safe condition.**

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

The following table lists some of the problems that can occur and gives possible causes and solutions.

If you find a problem that is difficult to solve, even after reading this information, please contact your local dealer, the distributor, or Wallenstein Equipment. When you contact someone, please have the serial number of your product available. To find the serial number on your machine, see *Serial Number Location* on page 5.

Problem	Possible cause	Solution
<b>The rotor does not turn.</b>	The discharge chute is blocked.	Remove all debris from the discharge chute. For instructions, see <i>page 32</i> .
	The rotor is blocked	Remove the blockage. For instructions, see <i>page 32</i> .
	The drive belt is loose or broken.	Set the drive belt tension or replace the drive belt. For instructions, see <i>page 43</i> .
	The brake clutch spring is broken.	Remove the drive belt guard and inspect the spring. If necessary, replace the spring.
<b>Material is moving into the machine too slowly.</b>	The engine or rotor speed is too slow.	Set the engine throttle to <b>Fast</b> to increase the rotor RPM. See <i>page 20</i> .
	The knives are not sharp or the clearance is incorrect.	Check the rotor and ledger knives. If necessary, rotate, sharpen, or replace the knives. For instructions, see <i>page 47</i> and <i>page 48</i> .
	The rotor knife angle is incorrect.	Sharpen the rotor knives to the specified 45° angle and check that knives are installed correctly. See <i>page 47</i> .
	The discharge chute is blocked.	Remove all debris from the discharge chute. For instructions, see <i>page 32</i> .
<b>There is unusual machine vibration during operation.</b>	The ledger knife is damaged or missing.	Examine the ledger knife. Replace the ledger knife if it is damaged or missing. See <i>page 48</i> .
	The rotor could be bent.	Turn the rotor to see if it wobbles. If the rotor wobbles, replace the rotor.
	The rotor bearings failed.	Replace the rotor bearings.
	The fasteners are loose.	Use a calibrated torque wrench to torque the fasteners to the correct specifications. See <i>page 56</i> .
<b>The engine does not start.</b>	There is a problem with the engine.	See the engine manufacturer's manual.
	The clutch is seized.	Replace the clutch.
<b>The wood chip quality is poor.</b>	The knives are not sharp.	Check the rotor and ledger knives. If necessary, rotate, sharpen, or replace the knives. For instructions, see <i>page 47</i> .
	The drive belt is loose or worn.	Examine the drive belt. If necessary, adjust the tension or replace the drive belt. For instructions, see <i>page 43</i> .
	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.	Set the ledger knife clearance. For instructions, see <i>page 49</i> .
<b>The mulch is too coarse.</b>	The chop block is damaged.	Examine the chop block for damage. If necessary, turn or replace the chop block. For instructions, see <i>page 51</i> .
	The ledger knife is broken or missing.	Replace the ledger knife. For instructions, see <i>page 48</i> .
	One or more of the shredder knives are broken or missing.	Replace the shredder knives. For instructions, see <i>page 50</i> .
	The shredder knives are installed incorrectly.	Check the shredder knives and, if necessary, adjust them. For instructions, see <i>page 50</i> .

Problem	Possible cause	Solution
<b>The machine needs more power or the engine stalls.</b>	The discharge chute is blocked.	Remove all debris from the discharge chute. For instructions, see <i>page 32</i> .
	The clutch is being engaged too quickly.	Move the clutch handle to the <b>START</b> position slowly. Make sure that the rotor housing, the chipper hopper, and the shredder hopper are not blocked 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.	Remove the blockage. For instructions, see <i>page 32</i> .
	The ledger knife clearance is incorrect.	Set the ledger knife clearance. For instructions, see <i>page 49</i> .
	The knives are not sharp or the clearance is incorrect.	Check the rotor and ledger knives. If necessary, rotate, sharpen, or replace the knives. For instructions, see <i>page 47 and page 49</i> .
	There is a problem with the engine.	See the engine manufacturer's manual.
<b>The drive belt is noisy or there is premature wear.</b>	The drive belt is loose, worn, or the tension is too tight.	Examine the drive belt. If necessary, adjust the tension or replace the drive belt. For instructions, see <i>page 43</i> .
	An incorrect replacement belt was installed.	Replace the drive belt. For instructions, see <i>page 43</i> .
	The rotor sheave is misaligned.	Check the rotor sheave alignment. If necessary, adjust the alignment. For instructions, <i>page 46</i> .
	The rotor is blocked.	Remove the blockage. For instructions, see <i>page 32</i> .
	The rotor sheave is worn.	Examine the rotor sheave and bearings. If necessary, replace the components.
	There is lubricant (for example, oil or grease) on the drive system components.	Find the source of the lubricant and correct the situation. Clean the drive system components. If necessary, replace the drive belt.
	A rotor bearing is worn or damaged.	Examine the rotor bearings. Replace a bearing that is worn or damaged.

## 11. Specifications

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

For available accessories, go to [WallensteinEquipment.com](http://WallensteinEquipment.com).

### 11.1 Machine Specifications<sup>1</sup>

Parameter	BXMC3409B
Chipper type	Disc
Shredder type	Hammer mill
Feed system	Gravity
Engine	Vanguard® 10 hp (305 cc)
Chipper hopper opening (height x width)	10" x 10" (25 cm x 25 cm)
Chipper rotor opening (height x width)	3" x 5" (8 cm x 13 cm)
Shredder hopper opening (height x width)	25" x 25" (64 cm x 64 cm)
Shredder housing opening (height x width)	6" x 7" (15 cm x 18 cm)
Number of rotor knives	2
Number of shredder knives	12
Rotor diameter	16" (41 cm)
Rotor weight	40 lb (18 kg)
Drive system	Centrifugal clutch, belt drive
Engine speed	3600 RPM
Rotor speed	2180 RPM
Tires	4.10 x 3.5
Total weight	295 lb (134 kg)
Dimensions (length x width x height)	45" x 39" x 49" (114 x 99 x 125 cm)
Fuel tank capacity	0.95 US gal (3.6 L).
Chipper capacity (diameter)	3" (8 cm)
Shredder capacity (diameter or width)	3/4" (1.9 cm)

<sup>1</sup> 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 give 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



SAE Gr. 2



SAE Gr. 5



SAE Gr. 8

### 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



8.8



10.9



## 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](http://www.wallensteinequipment.com)

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