

OPERATOR'S MANUAL

Serial number 1100780 and up

BXMC3409B / **BXMC3409B Bundle** **Chipper/Shredder**

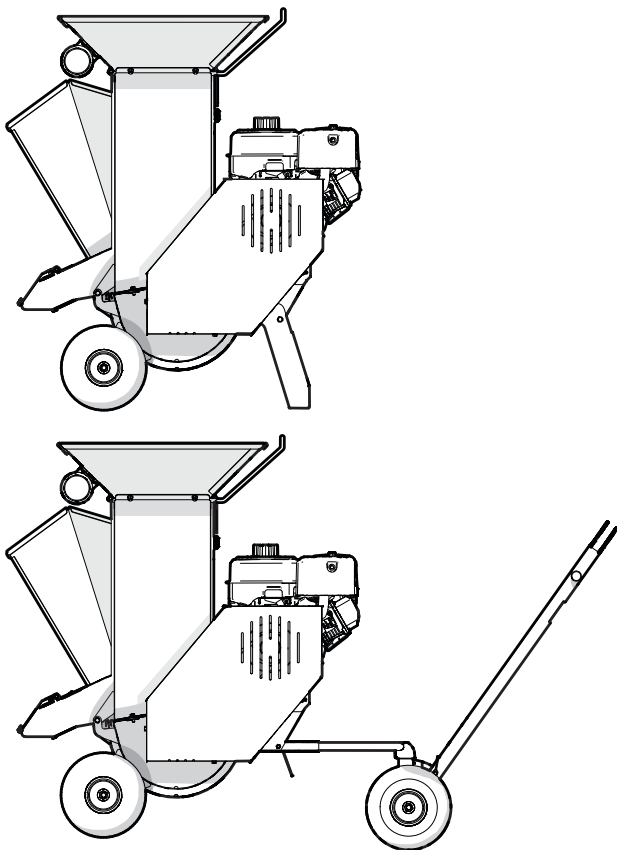


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1. Introduction



WARNING!

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

Keep this manual with the machine at all times.

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Congratulations on your choice of a Wallenstein BXMC3409B!

This high quality machine is designed and manufactured to chip and shred wood in a fast and efficient manner for homeowners and landscapers.

The BXMC3409B chipper/shredder is a compact, gas engine powered machine. The machine has a gravity-feed chipper hopper and shredder hopper. To chip wood material, the machine has a rotor with stationary knives and a ledger knife that cuts the wood material into chips. To shred wood material, the machine has a shredder chamber with swinging knives for mulching leaves and brush. The wood chips and shredded material are released through the discharge chute.

A mulch bag (included in the BXMC3409B Bundle) can be attached to the discharge chute. The jockey wheel (included in the BXMC3409B Bundle) can be used to move the machine around the work site.

The following models are covered by this manual:

Model	Features
BXMC3409B	Chipper/shredder with support stand.
BXMC3409B Bundle	Chipper/shredder with support stand, jockey wheel, and mulch collector bag.

For available accessories, go to [WallensteinEquipment.com](https://www.wallenstein-equipment.com).

For safe, efficient, and problem-free operation of this Wallenstein Equipment product, make sure that everyone who uses or maintains the machine has read and understands the information in this manual and in the engine manufacturer's manual.

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

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

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

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



1.1 Delivery Inspection Report

Wallenstein BXMC3409B and BXMC3409B Bundle Chipper/Shredder

To activate the warranty, register your product through the Support page at 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 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.
- _____ Engine starts and runs, and fluid levels are correct.
- _____ All cutting edges are sharp and in good condition.
- _____ Discharge chute and deflector move freely.
- _____ All belts are aligned and the tension is correct.
- _____ Chop block and shredder knives function correctly.
- _____ Spring-loaded shredder gate moves freely.
- _____ All fasteners are torqued to the correct specifications.
- _____ All grease points are lubricated.
- _____ Operator's Manual is in the storage tube.
- _____ Tire pressure is correct (see the tire sidewall).
- _____ Tires are in good condition.
- _____ Purchased accessories are included, if applicable.

Safety Checks

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

1.2 Serial Number Location

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

Record the model and serial number of your product here:

Model	
Serial Number	

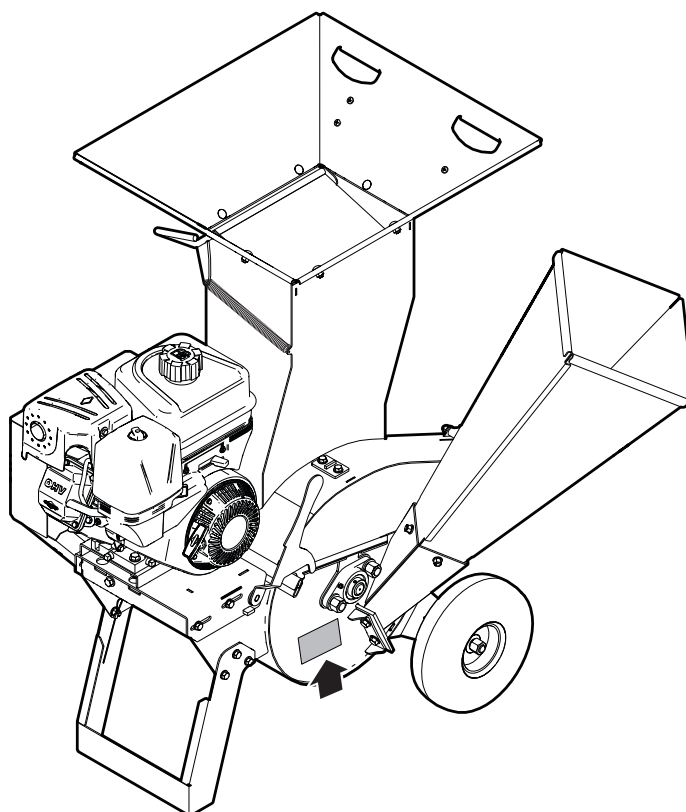


Figure 1—Serial number location

1.3 Types of Decals on the Machine

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

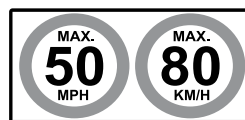
Safety labels are pictorial with a yellow background and generally two panel. They can be either vertical or horizontal.



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



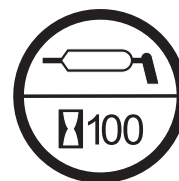
Information labels are usually pictorial with a white background and the number of panels can be different. This type of label provides information for the operator or shows the operation of a control.



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



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



For safety label definitions, see *Safety Label Definitions* on page 15. For illustrations of the labels and label locations, download the parts manual for your Wallenstein product at WallensteinEquipment.com.

2. Safety

Read and understand all safety information before operating the machine.

2.1 Safety Alert Symbol

This Safety Alert Symbol means:

ATTENTION! BE ALERT!

YOUR SAFETY IS INVOLVED!

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

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



2.2 Signal Words

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

DANGER

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

WARNING

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

CAUTION

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

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



Provides additional information that is helpful.

2.3 Why Safety is Important

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

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

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

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

2.4 Safety Rules

WARNING!

Never bypass or remove a safety function. Never operate the machine when a safety function does not work. Safety functions are intended to protect people from hazards that can cause serious injury or death. Keep safety components maintained and in working condition.

CAUTION!



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

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

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

- It is the operator's responsibility to read, understand, and follow ALL safety and operating instructions in this manual.
- If you do not understand any part of this manual or need assistance, contact your local dealer, the distributor, or Wallenstein Equipment.
- Do not allow anyone to use this machine until they have read this manual. 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 using the machine. Before operation, evaluate the physical and/or mental limitations of each operator to make sure that they can use the machine safely. Never let a child operate the machine.
- Make sure that all users understand the safety labels on the machine before operating, servicing, adjusting, or cleaning it. For safety sign 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 operating, servicing, or maintaining the machine. This includes, but is not limited to:
 - A hard hat.
 - Heavy gloves.
 - Hearing protection.
 - Protective shoes with steel toes and slip resistant soles.
 - Protective glasses, goggles, or a face shield.

- Prolonged exposure to loud noise may cause permanent hearing loss. Power equipment with or without a vehicle attached can often be noisy enough to cause permanent, partial hearing loss.



- Wear hearing protection on a full-time basis if the noise in the operator's position exceeds 80 dB. Noise over 85 dB on a long-term basis can cause severe hearing loss. Noise over 90 dB adjacent to the operator on a long-term basis may cause permanent, total hearing loss.
- Avoid wearing loose fitting clothing, loose or uncovered long hair, jewelry, and loose personal articles. These can get caught in moving parts and cause injury. Jewelry may also ground a live electrical circuit causing injury and machine damage.
- Never consume alcohol or drugs before or during machine operation. Alertness or coordination can be affected. Consult your doctor about operating this machine while taking prescription medications.
- Only use the machine in daylight or good artificial light.
- Make sure that all guards and shields are installed, and the covers are closed. If removal is necessary for repair, replace them before using the machine.
- Never allow anyone to ride on the machine during transport.
- Keep bystanders a minimum of 20 ft (6 m) from the discharge area. Mark the discharge area with safety cones.
- Before starting the engine, make sure that the machine is clear of debris.
- Do not touch hot engine parts, the muffler cover, hoses, engine body, or engine oil during operation or after the engine stops. Contact with hot surfaces can cause burns..

2.5 Equipment Safety Guidelines

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

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

- Replace safety or instruction 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).
- Never exceed the limitations of the machine. If the machine is not operating normally or you feel unsafe, stop the machine!

2.6 Safe Condition

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

Before starting any service or maintenance, complete the following:

SAFE CONDITION

1. Stop the machine.
For instructions, see *Stop the Machine on page 28*.
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 using the machine, every operator:
 - Reads and understands this manual.
 - Is instructed in the safe and correct use of the machine.
 - Understands and knows how to set the machine to a **Safe Condition**.
For instructions, see *Safe Condition*.

2.8 Sign-Off Form

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

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

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

- 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



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

2.9.1 Select a Work Site

Select a safe work area and machine location:

- The ground should be firm and level.
- Make sure that there is 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, and 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*.
- Never let people approach the work zone during machine operation. Everyone must signal and make eye contact with the operator before they approach the work zone
- Keep all bystanders in the safe zone. Never let bystanders in the work zone.
- Only the operator can let people enter the work zone. The operator must make sure that it is safe for a person to enter the work zone.
- When there are two or more workers, they must agree on a system of hand-signals to use for communication.
- When there are two or more workers, they must agree on a system of hand-signals to use for communication.

A safe work area is divided into two zones:

1. **Safe Zone** – The area outside the work zone perimeter. Bystanders or anyone not directly involved with the work is permitted to be in this area. There are minimal potential hazards in the safe zone.
2. **Work Zone** – The area where an operator must be to operate the machine. People assisting with the work who are wearing the appropriate PPE are permitted to be in this area. The operator must be aware of all the people who are in the work zone. The operator must make eye contact with people before they enter the work zone. Safety hazards are present in the work zone.

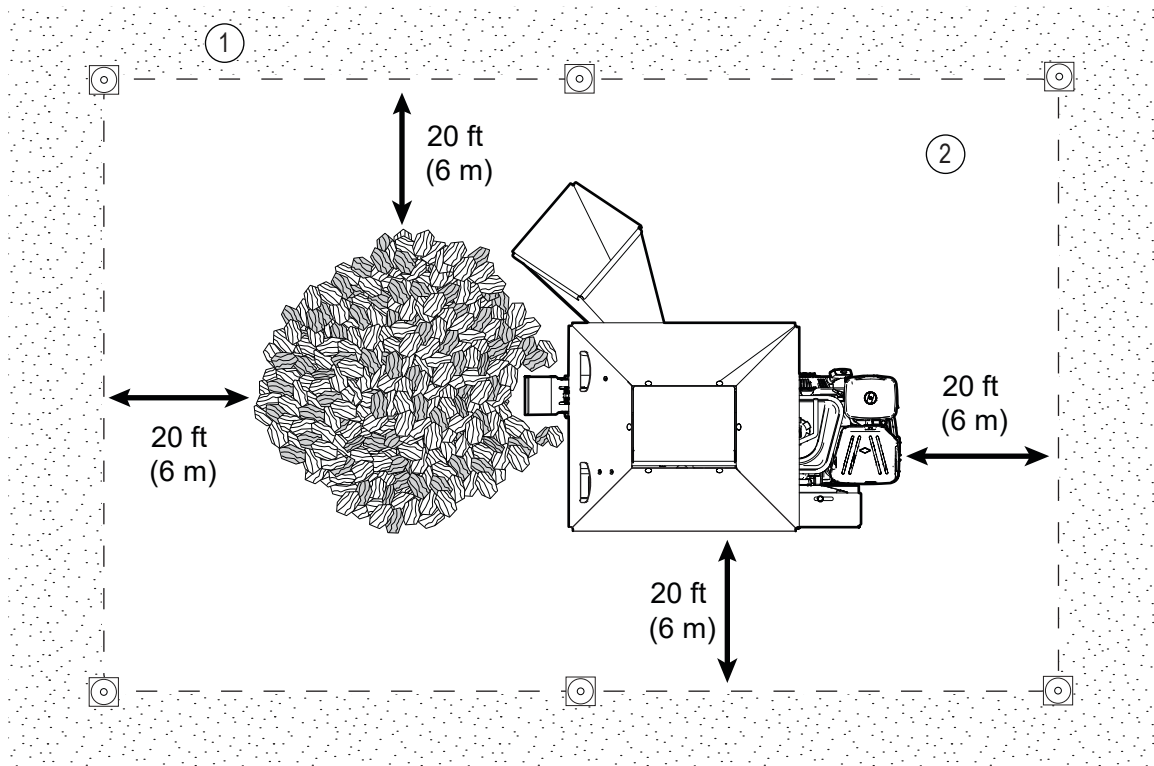


Figure 2–Safe work area example

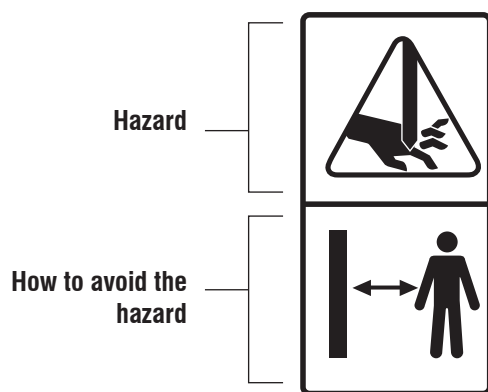
3. Safety Labels

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 Safety Label Locations

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

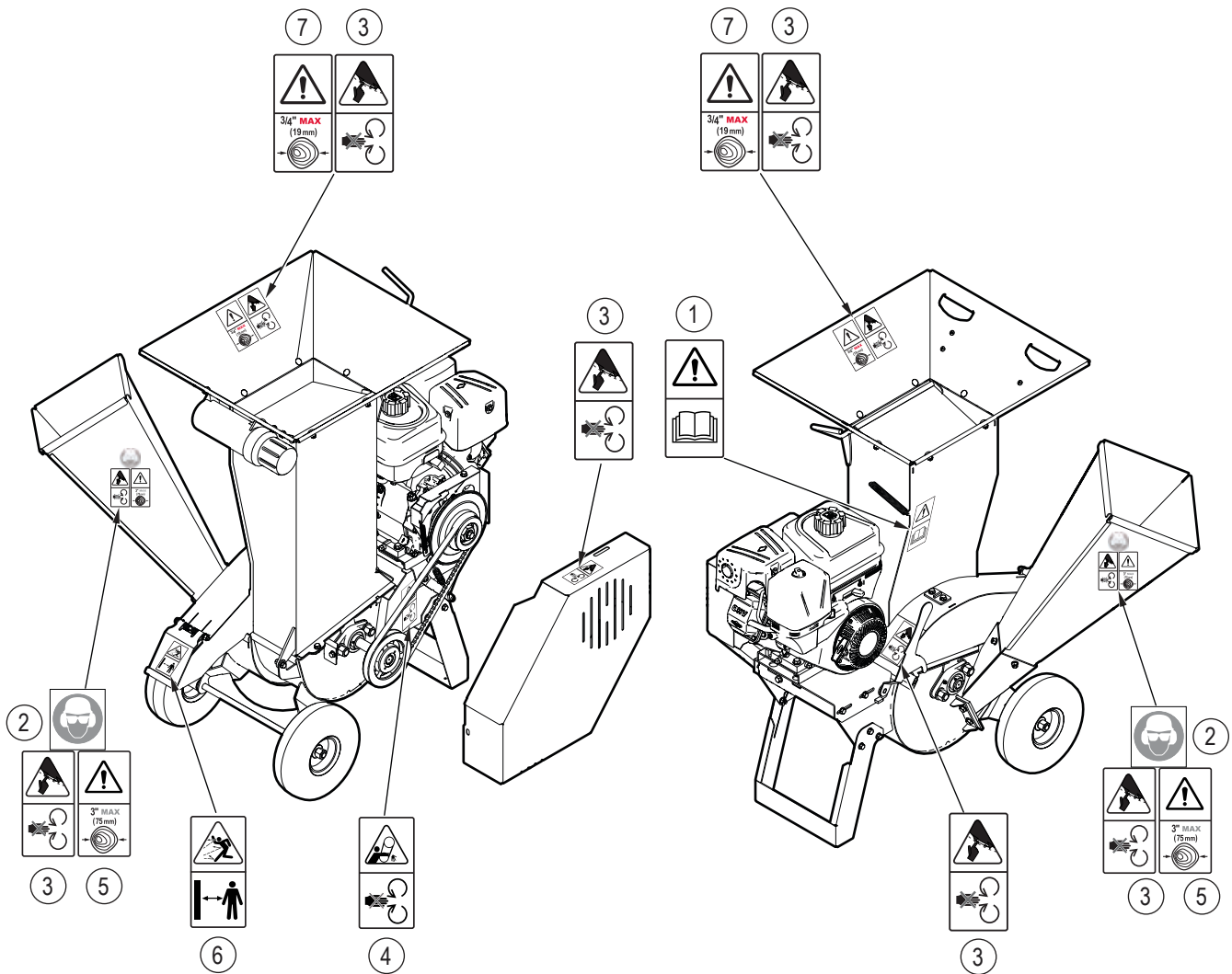


Figure 3—Safety sign locations

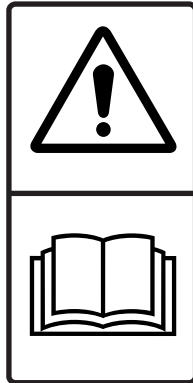
3.2 Safety Label Definitions

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

- 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.

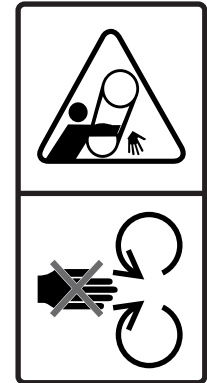


4. Warning!

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. Trying to force material into the machine can result in serious injury from a fall or entanglement.

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



6. Caution!

Impact, cut, and puncture hazards

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

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



7. Caution!

Machine damage and possible entanglement hazard

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

Do not place material that is larger than 3/4" (19 mm) in diameter into the shredder hopper. Never try to force material into the machine.



3.3 Replace a Safety Label

- Always replace safety labels that are missing or have become illegible. Replacement safety labels are available through your local Wallenstein Equipment dealer or distributor.
- Keep the safety labels clean and legible at all times.
- Parts replaced that had a safety label on them must also have the safety label replaced.

Requirements

- 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).
- A squeegee, plastic bank card, or similar tool is required to smooth out the label.

Procedure



Determine the exact position for the label before removing the backing paper. If possible, align the label with an edge on the machine.

1. Peel the label off the backing paper.
2. Position the label above the location where it is being applied to the machine.
3. Starting at one edge, carefully press the center of the exposed sticky-backing in place, smoothing it out as you work from one side to the other.
4. Use an appropriate tool to smooth out the label, working from one end to the other.

Small air pockets can be pierced with a pin and smoothed out using a piece of the label backing paper.

4. Familiarization

Wallenstein wood chipper/shredders are designed to chip and shred small trees, brush, limbs and other wood debris. The chipped material is fine enough to be composted or used as mulch.

4.1 New Operator

WARNING!

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

It is the responsibility of the owner or operator to read this manual, and to train all new operators before they start working with the machine. Follow all safety instructions.

Untrained operators are not qualified to use the machine.
They can endanger themselves and others or damage property.

4.2 Training

Each operator must be trained in the correct operating procedures before using the machine.

1. Review control locations, functions, and movement directions.
2. Move the machine to a large open area to allow the operator to become familiar with control function and machine response.
3. When the new operator is familiar and comfortable with the machine, they can proceed with the work.

4.3 Operator Orientation

IMPORTANT! Unless otherwise specified, the left hand (LH), right hand (RH), forward, and backward directions described in this manual are referenced from the operator control panel position when facing the direction of forward machine travel.

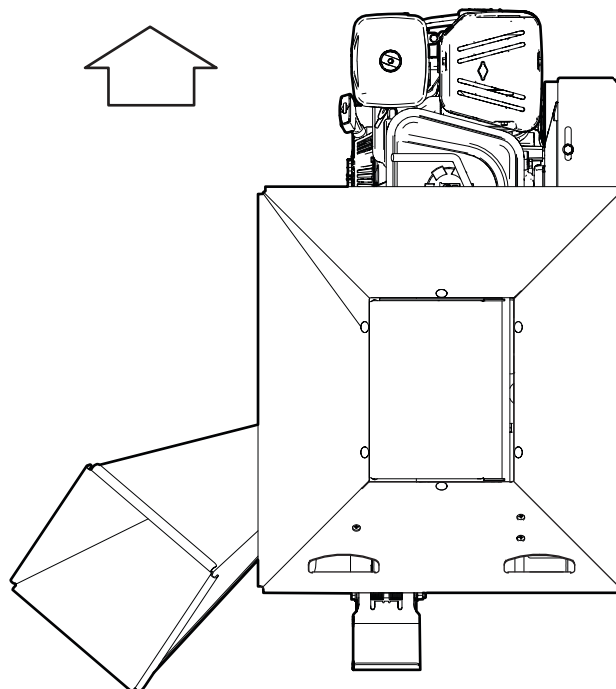


Figure 4—Direction of forward machine travel

4.4 Machine Components

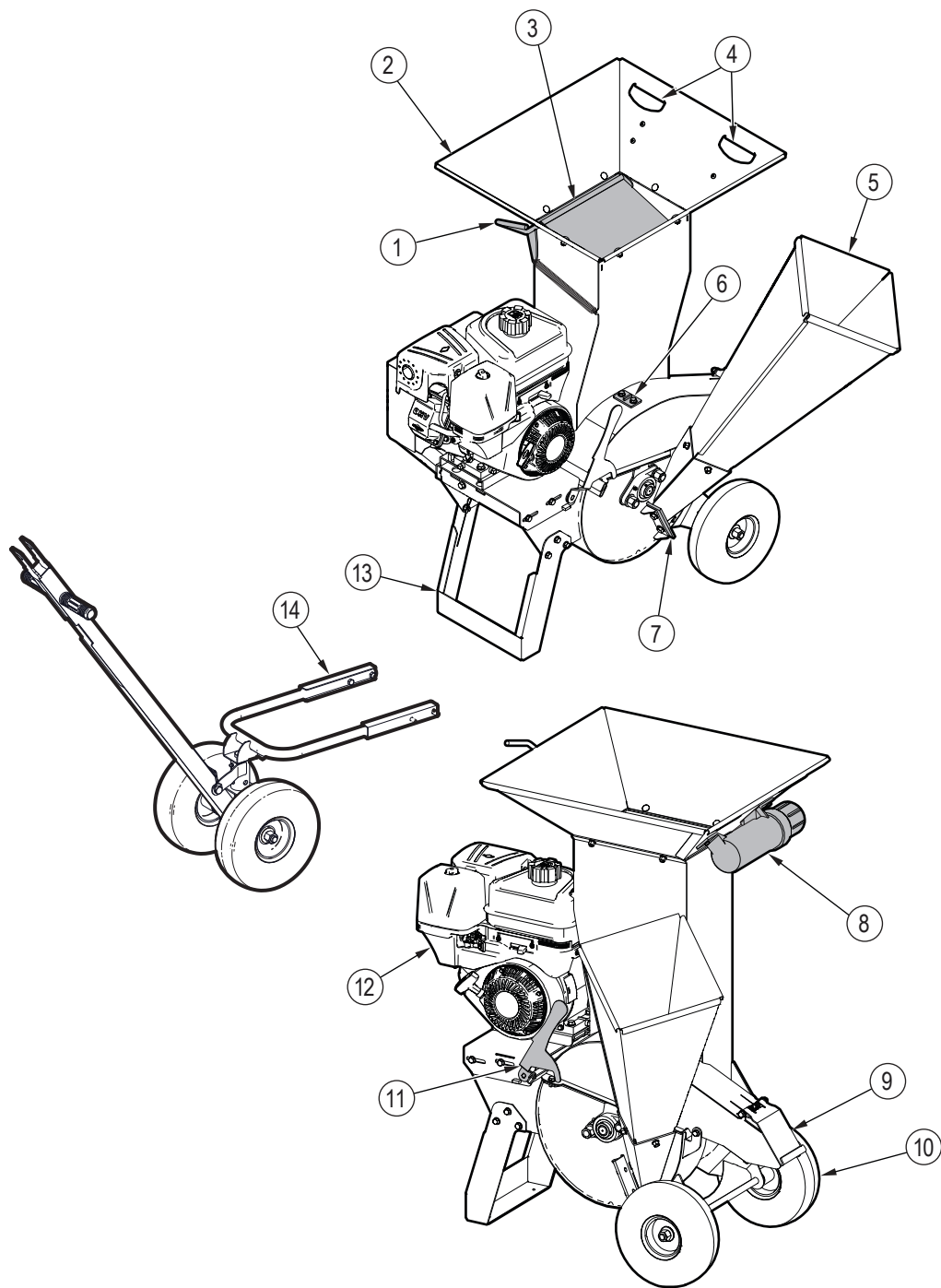


Figure 5—Machine components

- | | | |
|------------------------|---------------------------|---------------------------|
| 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 | 14. Jockey wheel |
| 5. Chipper hopper | 10. Tires (1 of 2) | 15. Mulch bag (not shown) |

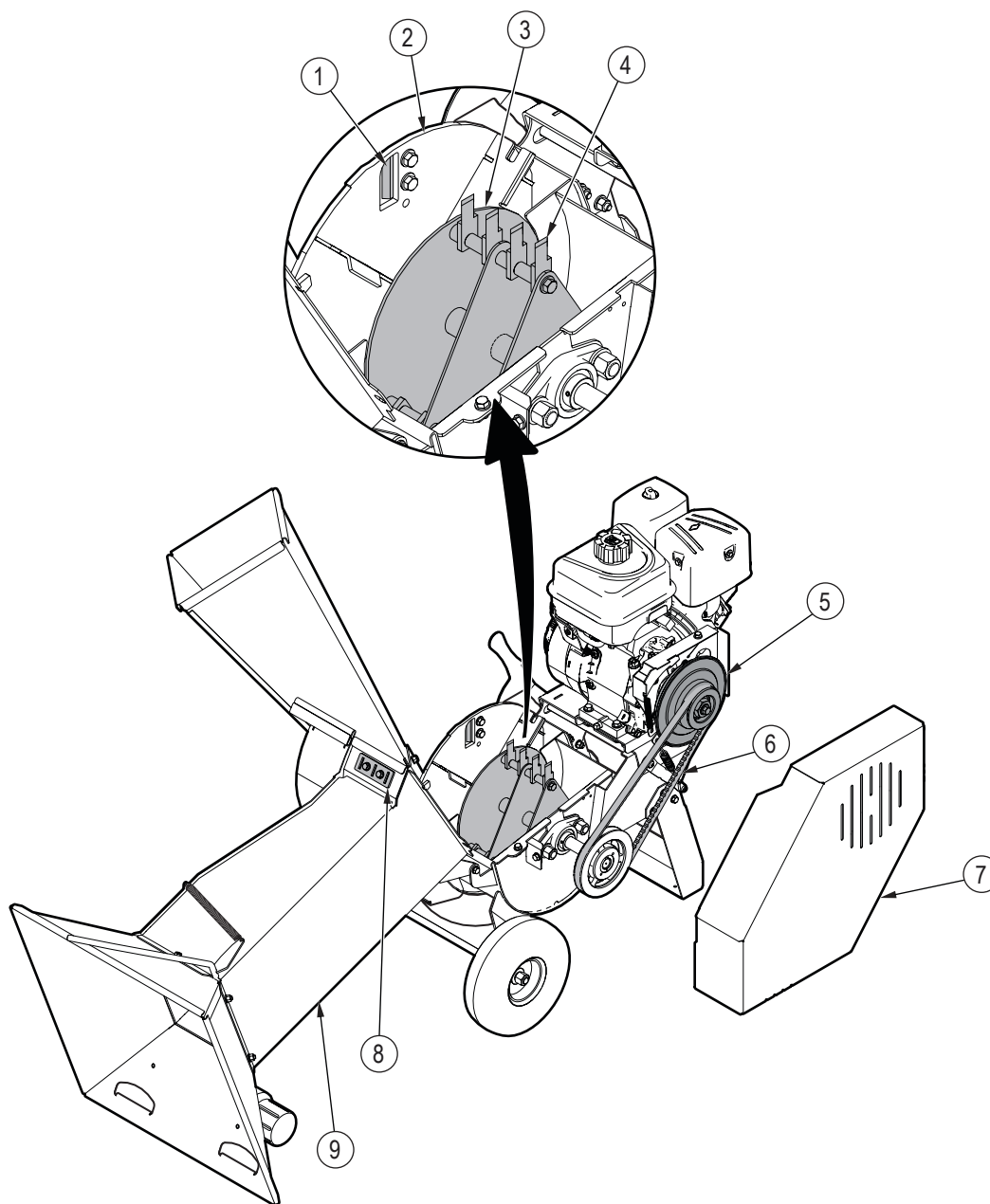


Figure 6—Machine components continued

- | | | |
|-------------------|--------------------|------------------------|
| 1. Rotor knife | 4. Shredder knives | 7. Drive belt guard |
| 2. Rotor | 5. Brake 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.

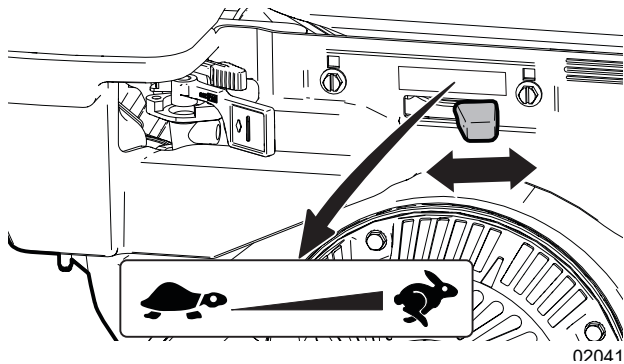


Figure 7—Engine throttle control

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.

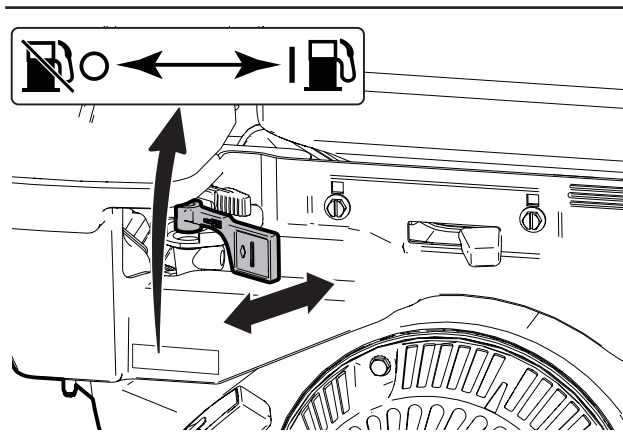
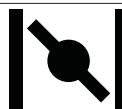


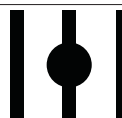
Figure 8—Engine fuel shutoff

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.

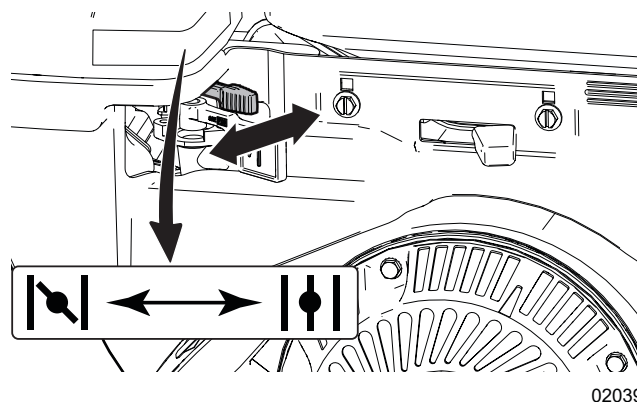


Figure 9—Engine choke control

5.1.4 Recoil Starter

WARNING!

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

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

W102

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

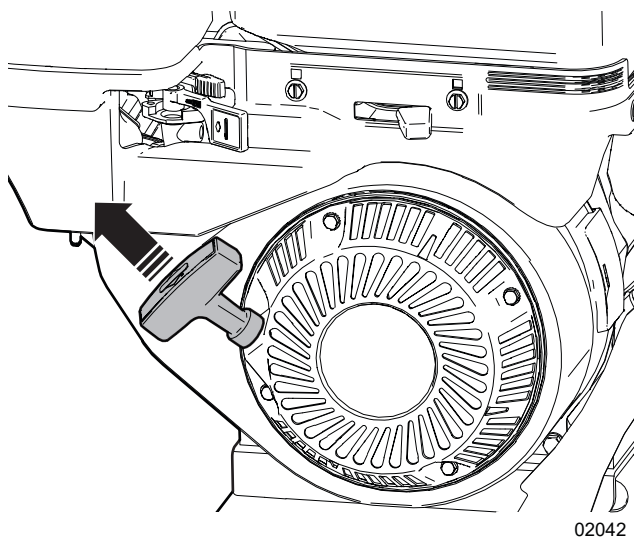


Figure 10—Starter cord

5.2 Shredder Gate Lever

The shredder has a spring-loaded gate.

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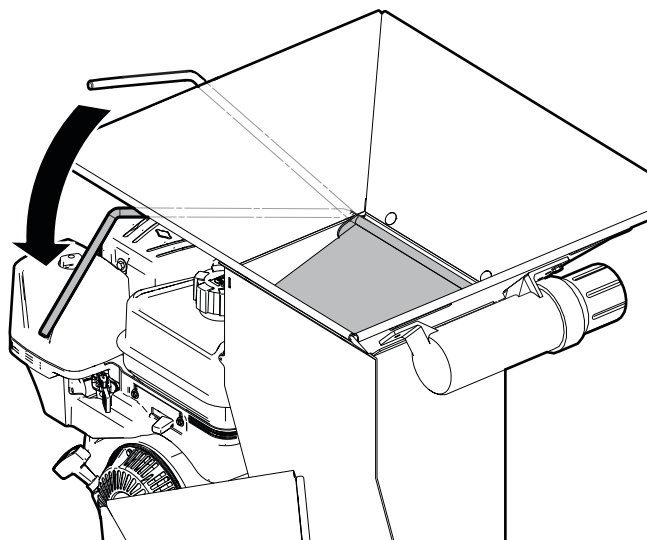


Figure 11—Open the shredder gate

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, on one side of the shredder hopper.

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

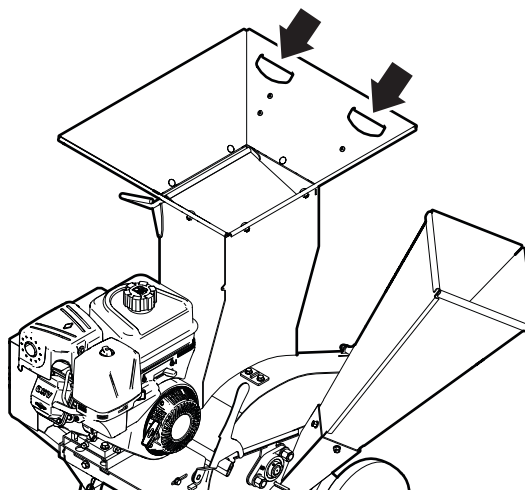


Figure 12—Handles

5.4 Clutch Handle

The clutch handle engages or disengages the clutch to start or stop the rotor rotation. 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.

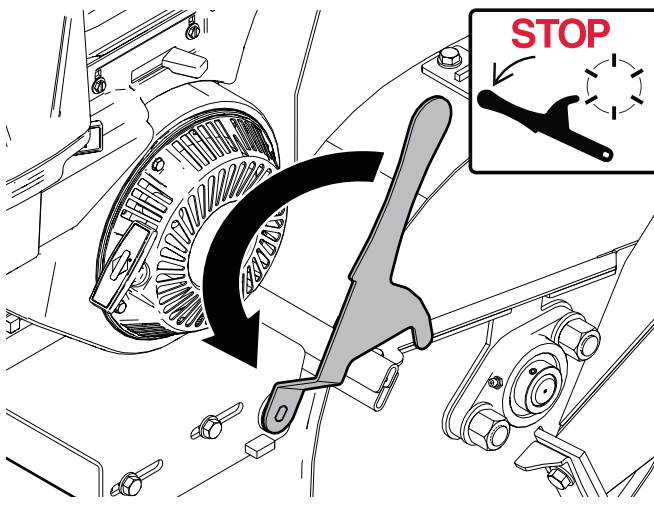


Figure 13—Disengage the clutch

5.4.2 Start Position



Move the clutch handle slowly to engage the clutch. Quick movement of the clutch handle may 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.

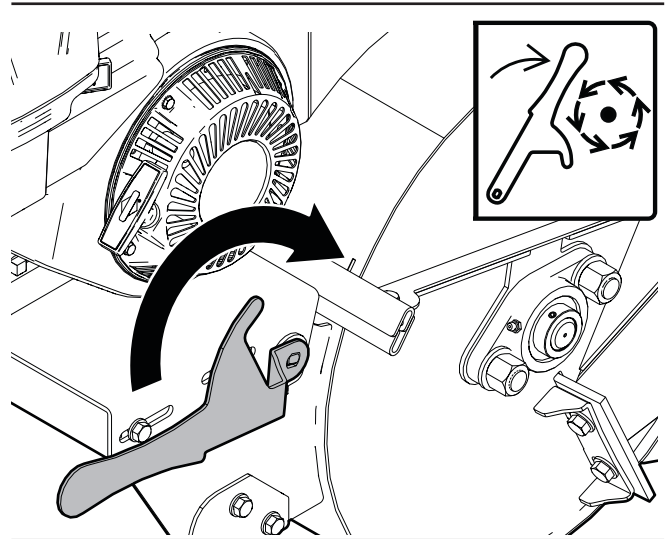


Figure 14—Engage the clutch

6. Operating Instructions

Read and understand the operating instructions before using the machine.

6.1 Operating Safety

WARNING!

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

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

W101

WARNING!

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

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

W004

WARNING!

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

W006

CAUTION!

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

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

W024

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

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

- Read and understand this manual before you start the machine. Review all safety information annually.
- Park the machine in a clear location on dry, level ground. Do not operate the machine on a hillside or area that is cluttered, wet, muddy, or icy to prevent slips, trips, and falls.
For more information, see *Work Site* on page 11.
- Keep the work area clean and free of debris.
- Only operate the engine in a location that has good air flow. Engine exhaust gases contain carbon monoxide (an odorless gas) that can cause asphyxiation.
- Attach all guards and shields, and close all covers before starting the machine. If a guard, shield, or cover was removed, install it.
- 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.
- Never 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 discharge area. Mark the safe zone with safety cones.
- Do not reach into the chipper hopper or shredder hopper. Keep your feet on the ground and make sure you are stable when you put material into the chipper hopper or shredder hopper.

6.2 Pre-Start Checklist

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

Items to Complete	✓
Review the <i>Operating Safety</i> on page 23, and <i>Engine Operation Safety</i> on page 25	
Check the tension and alignment of the drive belt. Adjust as necessary. For instructions, see <i>Set the Drive Belt Tension</i> on page 43 and <i>Align the Drive Belt</i> on page 44.	
Check the engine oil and fuel levels. If necessary, add engine oil or fuel.	
Make sure that the machine is lubricated as specified in the <i>Maintenance Schedule</i> on page 40.	
Check the rotor knife sharpness. For instructions, see <i>Rotor Knife Maintenance</i> on page 47.	
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.	
Check the condition and clearance of the twig breaker, rotor knives, and ledger knife. Adjust or replace them, as necessary.	
Make sure that the rotor bearings turn freely. If the bearings are damaged or do not turn freely, lubricate them or contact your local Wallenstein dealer to have them replaced.	
Make sure that all guards and shields are installed, and the covers are closed. Replace guards, shields, or covers, if necessary.	
Make sure the tires are filled to the specified pressure. For correct tire pressure, see the tire sidewall.	
Make sure that all of the fasteners are installed and torqued to the correct specification. For more information, see <i>Bolt Torque</i> on page 56.	
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</i> on page 11.	

6.3 Machine Break-In

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

6.3.1 Before Initial Startup

1. Read and understand all safety 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:

- Make sure that all of the fasteners are installed and torqued to the correct specification. For more information, see *Bolt Torque* on page 56.
- 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.
- Check the condition and clearance of the twig breaker, rotor knives, and ledger knife. Adjust or replace them, as necessary.
- 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.
- Check the engine oil and fuel levels. If necessary, add engine oil or fuel.
- Make sure the tires are filled to the specified pressure. For correct tire pressure, see the tire sidewall.
- Check the tension and alignment of the drive belt. Adjust as necessary. For instructions, see *Set the Drive Belt Tension* on page 43 and *Align the Drive Belt* on page 44.
- Make sure that all guards and shields are installed, and the covers are closed. Replace guards, shields, or covers, if necessary.

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 40.

6.4 Engine Operation

CAUTION!

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

W019

6.4.1 Engine Operation Safety

WARNING!



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

W027

WARNING!

Never 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.

- Remove the wire from the spark plug before servicing the engine or equipment to prevent accidental starting.
- Keep the cylinder fins and engine shrouds free of debris to prevent the engine from overheating.
- Examine the muffler periodically to make sure it is functioning effectively. Repair or replace a worn or leaking muffler.
- Use fresh fuel (less than three months old). Stale fuel creates deposits that cause the carburetor to be clogged and leak.
- Check the fuel lines and fittings 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 choke the carburetor to stop the engine. Whenever possible, gradually reduce the engine speed before stopping.
- Do not tamper with governor springs, governor links or other parts that may increase the governed speed. Engine speed is selected by the original equipment manufacturer.
- Do not check for a spark with the spark plug or spark plug wire removed.
- 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 starting 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 may cause burns. Wait for the machine to cool. Use a no-touch thermometer to measure the temperature.
- Do not operate the engine in any of the following situations:
 - With an accumulation of wood chips, dirt, or other combustible materials in the muffler area.
 - In an area where fuel is spilled. Move the machine away from the spill until the fuel evaporates. Do not create any sources of ignition in the spill area.
 - With the air cleaner or air cleaner cover removed. Doing this can damage the engine.
 - Without a muffler or heat shield. Inspect the muffler and heat shield periodically. Replace a damaged muffler or heat shield.

6.4.2 Fuel Safety

WARNING!



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

W027

WARNING!

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

CAUTION!

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

- Engine fuel is highly flammable. Handle it with care.
- Turn off the engine and let it cool before adding 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 refueling, make sure that the fuel cap is tight

6.4.3 Check the Engine Fuel Level

CAUTION!

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

Check the fuel level before each use.

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

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



01778

Figure 15–Fuel cap

6.4.4 Add Fuel to the Engine



CAUTION!

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

The engine requires clean, fresh, unleaded gasoline with a pump octane rating of 87 or higher (research octane number [RON] of 91 or higher). Gasoline with up to 10% ethanol (gasohol) is acceptable. For more information, see *Engine Fuel* on page 39.

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

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

1. Stop the machine.
For instructions, see *Stop the Machine* on page 28.
2. Wait a minimum of five minutes for the engine to cool.
3. Clean the area around the fuel filler 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 39.

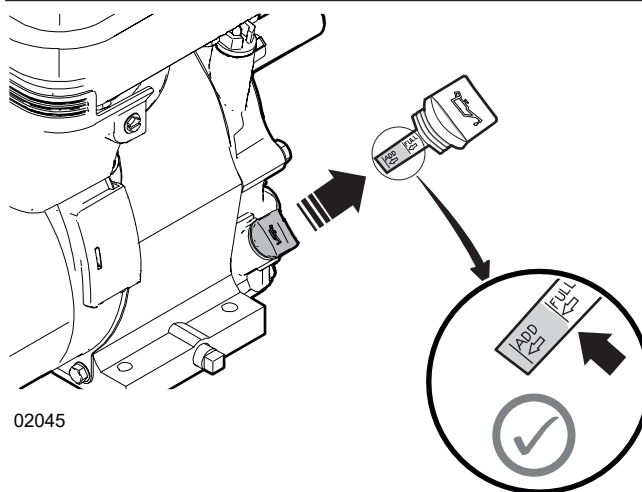
Operating the engine with a low oil level can cause engine damage that is not covered by the warranty.



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

Check the engine oil level before each use.

1. Park the machine on level ground.
2. Stop the machine.
For instructions, see *Stop the Machine* on page 28.
3. Pull out the oil-level dipstick and clean it.
4. Fully insert the oil-level dipstick.
5. Pull out the oil-level dipstick and check the oil level.
The oil level is correct when oil is visible on the dipstick from the end to the full (upper) mark.
6. Complete one of the following:
 - If the oil level is correct, continue with step 7.
 - If the oil level is low, add oil until the oil-level is at the full (upper) mark. For instructions, see *Add Oil to the Engine* 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 39*.

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.

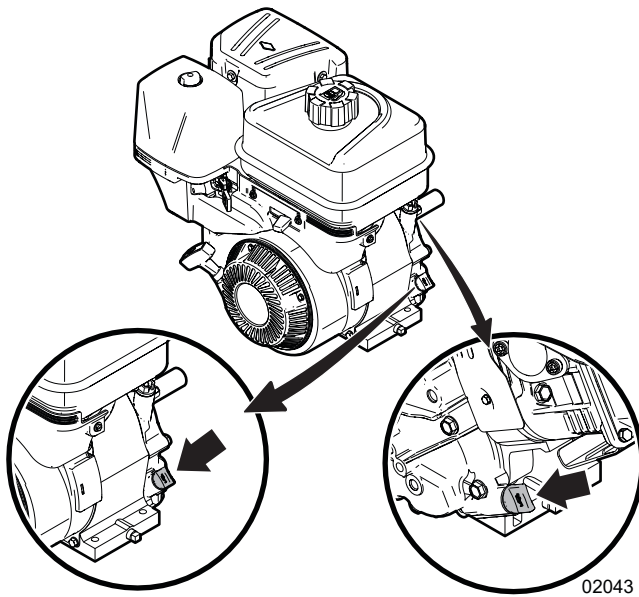


Figure 17—Engine oil-fill locations

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 starting 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. Move the **clutch handle** to the **STOP** position.
2. Move the **throttle control** to the **STOP** position to turn off the engine and close the fuel shut-off valve.
3. Wait 10 seconds for the drive belt and rotor to stop.
4. 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! Position the machine so the prevailing wind blows engine exhaust away from the operator.

1. Put the chipper/shredder at the work site close to the brush pile.
2. Make sure that the machine is level and stable, and the work area is free of debris.
3. If the machine is attached to a lawn tractor, apply the lawn tractor parking brake, stop the engine, and then remove the key from the ignition.
4. 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 required to complete the work safely.

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

W101

WARNING!

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

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

W004

CAUTION!

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

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

W024

CAUTION!

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

W071

CAUTION!

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

Machine damage could also result.

W063

IMPORTANT! Do not put metal objects, bottles, cans, rocks, glass, or other unapproved material into the chipper hopper 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 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 in. For instructions, see *Clear a Blockage on page 33*.

Maximum material diameter

- Chipper hopper: 3" (7.5 cm)
- Shredder hopper: 3/4" (1.9 cm)

6.9.1 Chip Wood



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 the branch from becoming jammed in the chipper hopper.

1. Set up the machine.
For instructions, see *Set Up the Machine*.
2. Start the machine.
For instructions, see *Start the Machine on page 28*.
3. Wait one minute for the rotor to turn at full speed.
4. Put material (branches or brush) into the chipper hopper. Do not force material into the machine. Use continuous, light pressure to guide the material. Gravity and the rotor pull the material into the machine.
5. Continue to put material into the chipper hopper at a slow, steady rate.
If the rotor slows down, stop putting material into the chipper hopper. Let the rotor regain full speed, and then continue.

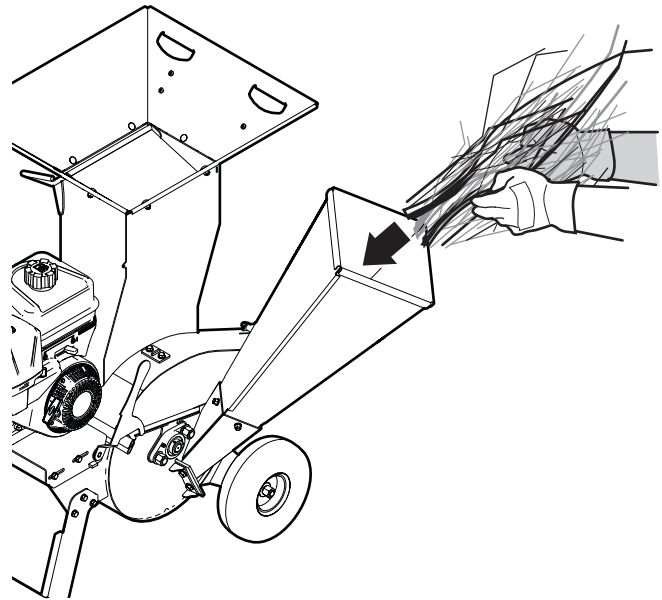


Figure 18—Operate the chipper

6.9.2 Shred Wood

1. Set up the machine.
For instructions, see *Set Up the Machine on page 29*.
2. Start the machine.
For instructions, see *Start the Machine on page 28*.
3. Wait a minute for the rotor to turn at full speed.
4. Carefully, put the material into the shredder hopper. The shredder knives will draw the material into the machine.
When putting material into the machine, do not reach below the shredder gate.
5. Push the shredder gate lever down to open the shredder gate.
For more information, see *Shredder Gate Lever on page 21*.
6. Release the shredder gate lever to close the shredder gate.
7. Repeat steps 4 and 5 to continue shredding material.
If the shredder slows down, stop putting material into the shredder hopper. Close the shredder gate and let the shredder regain full speed before continuing.

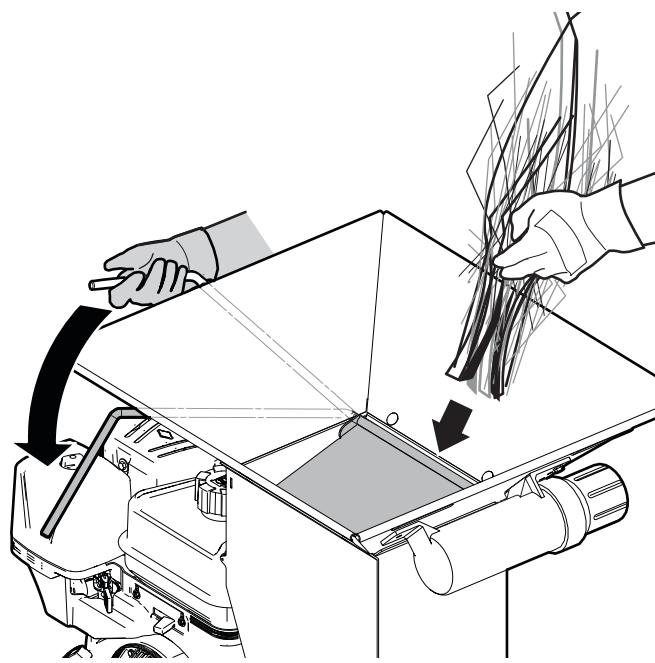


Figure 19—Operate the shredder

6.10 Mulch Collector Bag

A mulch collector bag can be attached to the discharge chute.

If you purchased a BXMC3409B Bundle, the mulch collector bag is included with your machine. To purchase a mulch collector bag separately, contact your local Wallenstein Equipment dealer or distributor.

The mulch bag holds 2.7 ft³ (28 L) of material and is made of a mildew-resistant, synthetic material. The porous fabric allows air from the rotor to pass through it without restricting collection of the wood chips.

6.10.1 Install a Mulch Collector Bag

1. Lift the discharge chute deflector to the upright position.
2. Put the open end of the mulch collector bag over the end of the discharge chute.
3. Tighten the strap on the bag around the discharge chute.
4. Make sure that the zipper on the bottom of the bag is closed.

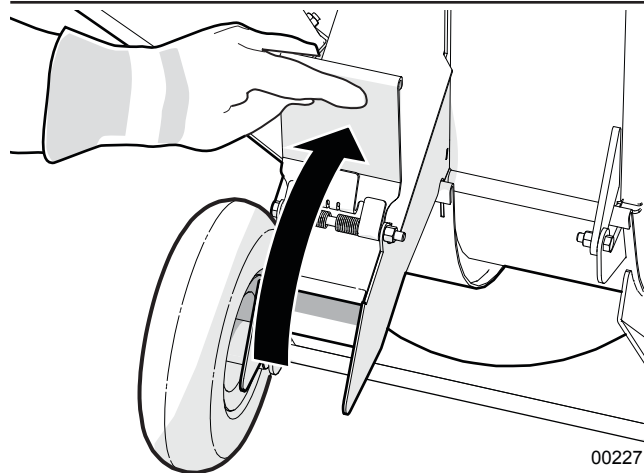


Figure 20—Lift the discharge chute deflector

6.10.2 Remove a Mulch Collector Bag

When the mulch collector bag is full or you are finished chipping wood:

1. Loosen the mulch collector bag strap.
2. Carefully, slide the mulch collector bag off of the discharge chute.
3. Lower the discharge chute deflector to the downward position.
4. To empty the mulch collector bag, unzip the bottom of the bag.

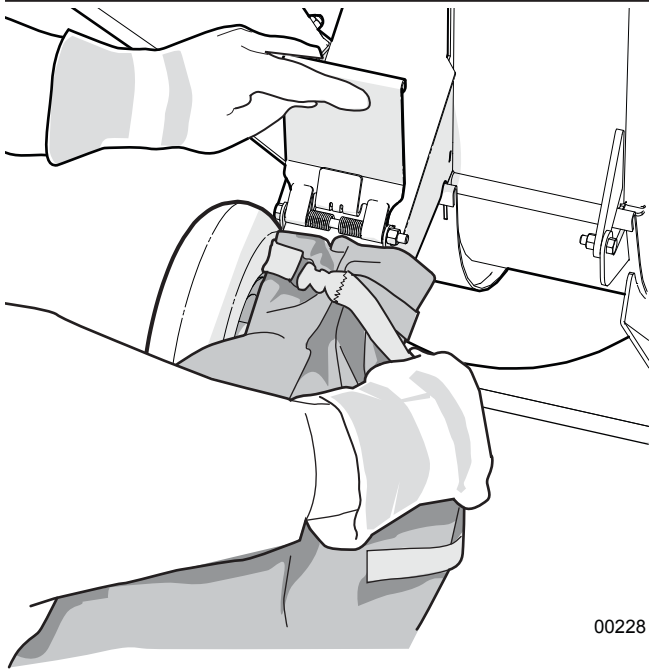


Figure 21—Install the collector bag

6.11 Jockey Wheel

A jockey wheel can be installed on the front of the machine.

If you purchased a BXC3409B Bundle, the jockey wheel is included with your machine. To purchase a jockey wheel separately, contact your local Wallenstein Equipment dealer or distributor.

A jockey wheel makes the machine easier to move. The jockey-wheel handle can be attached to a clevis hitch to tow the machine behind a small lawn tractor. For movement and towing instructions, see *Transport* on page 34.

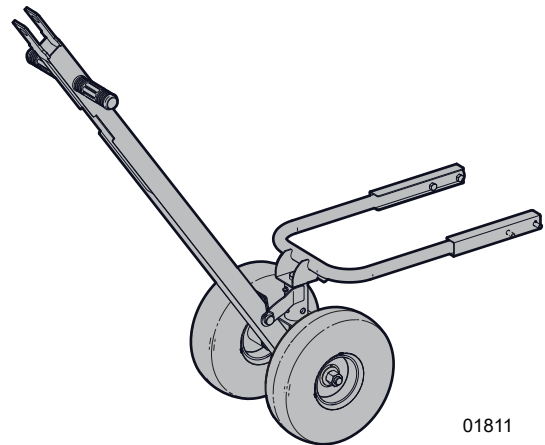


Figure 22—Jockey wheel

6.12 Clear a Blockage



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

W003

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

1. Set the machine to a safe condition.
For instructions, see *Safe Condition on page 9*.
2. Remove all of the material from the chipper and shredder hoppers.
Make sure that nothing is blocking the opening or the rotor and ledger knives.
3. Remove all of the material from the discharge chute.
Use a stick to loosen the blockage. Make sure that the discharge chute is clear.
4. 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 *Clear an Internal Blockage*.

6.12.1 Clear an Internal Blockage

1. Set the machine to a safe condition.
For instructions, see *Safe Condition on page 9*.
2. Remove the upper rotor housing fasteners, and then open the upper rotor housing.
3. Remove all of the material from inside the rotor housing.
4. Clean the discharge area and rotor.
5. Carefully and slowly, turn the rotor to make sure that there is not a blockage between the rotor and ledger knife. Do not reach into the rotor housing while the rotor is moving..
6. Close the upper rotor housing.
7. Install the upper rotor housing fasteners .
Use a calibrated torque wrench to torque the bolt to **19 lbf•ft (25 N•m)**.
8. Start the machine to see if the blockage is cleared.
If the machine does not operate, do steps 1 through 7 again until the blockage is cleared.

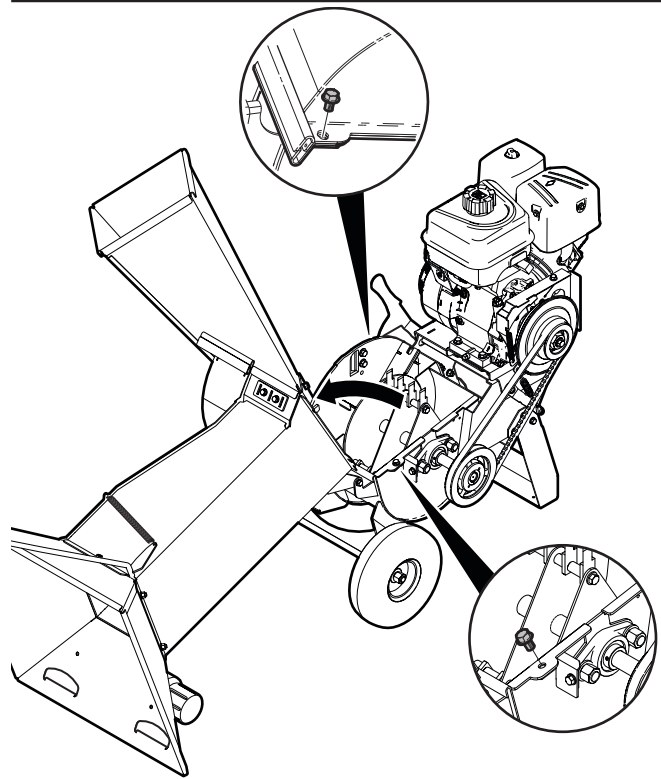


Figure 23—Clear a blockage

7. Transport

WARNING!

Do not tow this machine on a roadway. If transport to another location is required, secure it to the bed of a licensed truck or trailer.

7.1 Transport Safety

- If applicable, make sure that the machine is safely attached to the tow vehicle with a retainer through the hitch.
- Never allow riders on the machine.
- Do not exceed a safe travel speed. Decrease your speed for rough terrain and around corners.
- Do not transport or move the machine with the engine on.
- Make sure that the fuel-filler cap is on and tight.
- Inspect the tires for cuts or damage.
- Make sure the tires are filled to the specified pressure. For correct tire pressure, see the tire sidewall.
- Make sure that all guards and shields are installed, and the covers are closed. Replace guards, shields, or covers, if necessary.
- Make sure that the fuel cap is installed and tight (to prevent spills during transport).
- Remove all debris from the machine.
- After the machine is prepared for transport, complete a circle check to make sure that everything is safe.

7.2 Use the Handles

IMPORTANT! Turn off the engine before moving or tilting the machine. Tilting the engine causes the fluid levels to change and the oil level may become low. Operating an engine with a low oil level can damage the engine.

IMPORTANT! When you move the machine, avoid sharp turns. Sharp or abrupt turns can damage the tires.

The machine has two handles, on one side of the shredder hopper. Use the handles to move the machine. The machine is balanced for ease of movement.

1. Stop the machine.
For instructions, see *Stop the Machine* on page 28.
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.

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

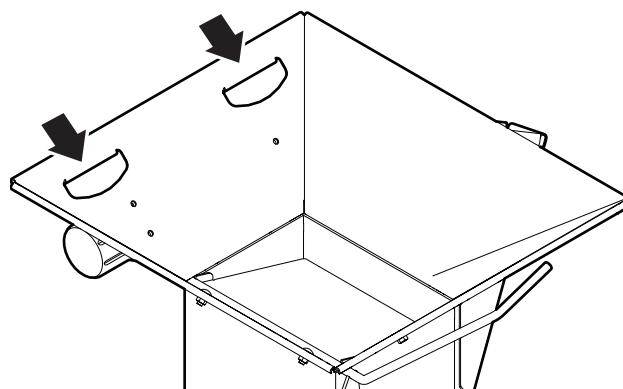


Figure 24—Handles

7.3 Use the Jockey Wheel

1. Stop the machine.
For instructions, see *Stop the Machine on page 28*.
2. Hold onto the jockey-wheel handle grips.
3. Pull the machine to move it to where you want it.
Make sure that the machine is parked on level ground during operation.

7.4 Tow the Machine

When a jockey wheel is installed on the machine, the machine can be attached to a clevis hitch on a small tow vehicle (for example, a small lawn tractor or light utility vehicle).

7.4.1 Connect to a Tow Vehicle

1. Stop the machine.
For instructions, see *Stop the Machine on page 28*.
2. Park the machine near the tow vehicle hitch.
3. Remove the snap pin from the base of the jockey-wheel handle.
4. Lower the jockey-wheel handle and align the holes in the handle with the tow vehicle hitch.
5. Insert a hitch pin through the tow vehicle hitch and jockey-wheel handle. Insert a hitch-pin clip through the hitch pin.
6. Make sure that the machine is correctly attached to the tow vehicle before towing.

7.4.2 Disconnect From a Tow Vehicle

1. Remove the hitch pin from the vehicle hitch and jockey-wheel handle.
2. Lift the jockey-wheel handle to align the holes in the base of the handle with the jockey-wheel bracket.
3. Insert the snap pin through the bracket and handle.

8. Storage

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

8.1 Storage Safety

WARNING!

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

W105

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.

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

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

8.2 Put the Machine in Storage

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

1. Set the machine to a safe condition.
For instructions, see *Safe Condition on page 9*
2. Check all moving parts and remove all material from the machine.
3. Remove the mulch collector bag, if installed. Clean it and store in a dry location.
4. Clean the machine.
For instructions, see *Clean the Machine on page 52*.
5. Start the machine, let it run for a few minutes to remove any moisture, and then stop the machine.
6. Do step 1 again.
7. Examine the machine fully, including internal components. Replace or repair any worn or damaged components.
8. Paint scratches and dents to prevent rust.
9. 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 39*.
For instructions, see *Replace the Engine Fuel on page 37*.
10. Put the machine in the storage location.
11. Disconnect the tow vehicle, if necessary.
For instructions, see *Disconnect From a Tow Vehicle on page 35*.
12. Block the machine wheels to prevent accidental movement and increase the wheel bearing life.
13. If the machine must be stored outdoors, cover the machine with a waterproof tarp.
The machine should be stored indoors, if possible.

8.2.1 Replace the Engine Fuel

WARNING!



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

W027

WARNING!

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

CAUTION!

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

1. Stop the machine.
For instructions, see *Stop the Machine* on page 28.
2. Wait for the engine and fluids to cool.
3. Remove the current fuel from the engine.
Operate the machine until the fuel tank is empty or drain the fuel tank and 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 28.

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 40.

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 required to complete the work safely.

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

W101



WARNING!

When service or maintenance work is complete, install all guards and/or shields that were removed. Operating a machine with a guard or shield removed can cause serious injuries and/or machine damage.

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 28.
 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 adequate light for good visibility.
 - Never operate an engine inside a closed building. The exhaust fumes may cause asphyxiation.
 - Never work under equipment unless it is securely supported with blocks.
 - Always have a minimum of two people present during maintenance or service. Do not work alone in case an emergency situation occurs.
 - Keep a fire extinguisher and first aid kit readily accessible at all times.
 - Do not use gasoline or diesel fuel to clean parts. Use a regular cleanser.
 - When replacement parts are necessary, use genuine factory replacement parts to restore your equipment to original specifications. The manufacturer cannot be responsible for injuries or damages caused by use of unapproved parts or accessories.
 - Check all of the fasteners after the work is complete. Tighten any loose bolts, nuts, or screws.
 - Check all electrical and fuel connections to make sure that they are secure and the machine is in a safe working condition.
 - Use tools that are in good condition and correct for the task. Make sure that you understand how to use the tools before performing any service work.

9.2 Fluids and Lubricants

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

9.2.1 Lubricant Handling and Storage

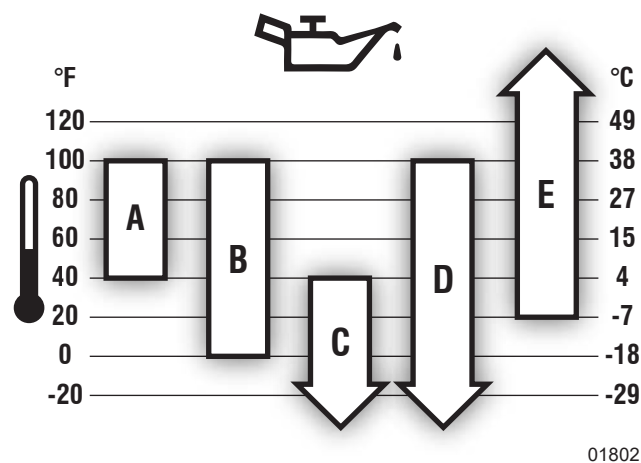
For optimum machine efficiency, use clean lubricants and clean containers to handle all lubricants. Store lubricants in an area that is protected from dust, moisture, and other contaminants.

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 required engine oil viscosity. Select the best oil viscosity for the expected outdoor temperature range. Use the following chart as a guide:



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

9.2.3 Engine Fuel

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

Fuel must meet the following specifications:

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

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

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

For instructions, see *Replace the Engine Fuel* on page 32.

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 ¹
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 51.
Check drive belt alignment.			●				See page 44.
Grease the rotor bearings.			●				See page 41.
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 ² .				●			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.

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

² In dusty conditions or when airborne debris is present, clean more often.

9.4 Grease Points

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



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

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

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

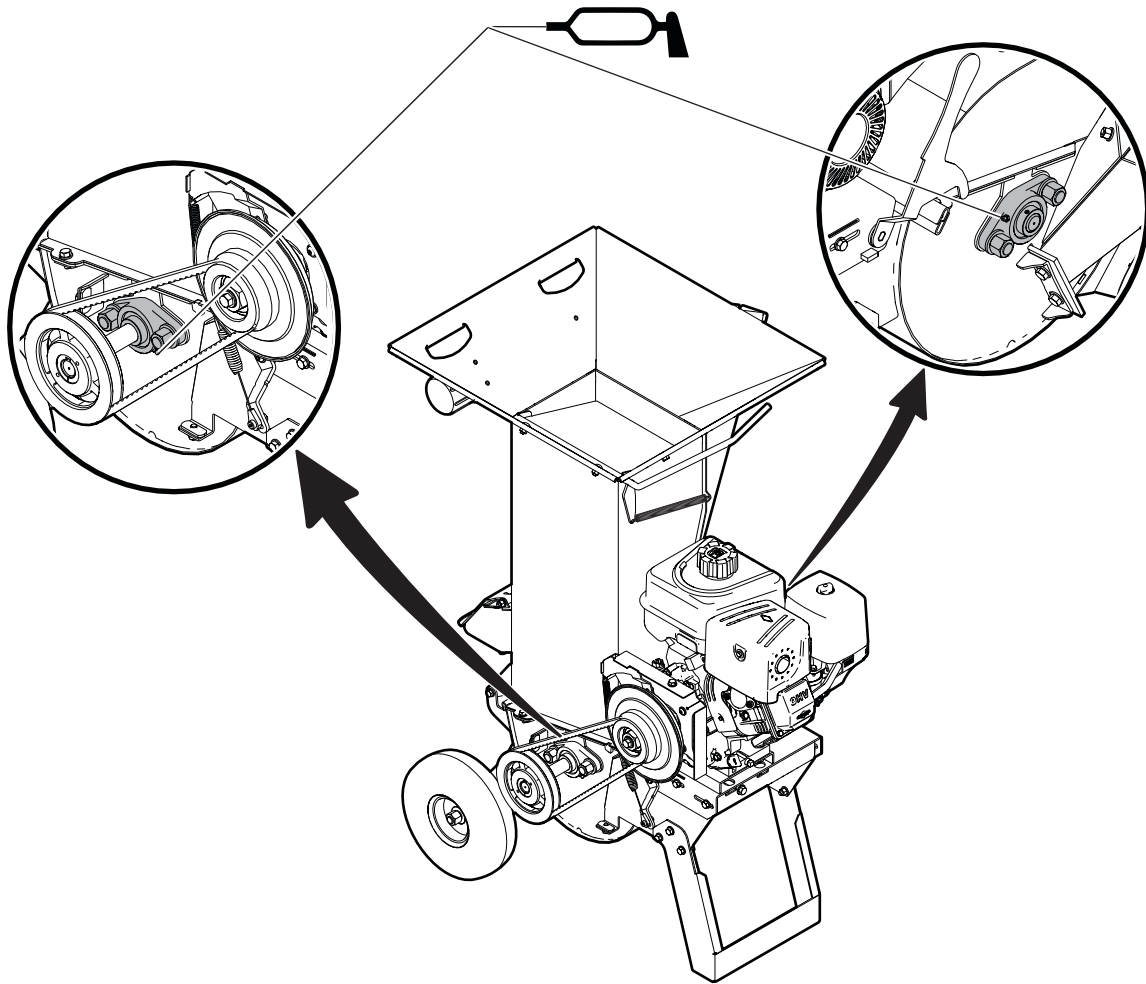


Figure 25—Grease points (drive belt guard removed)

9.5 Clean the Engine Air Filter

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

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

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

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

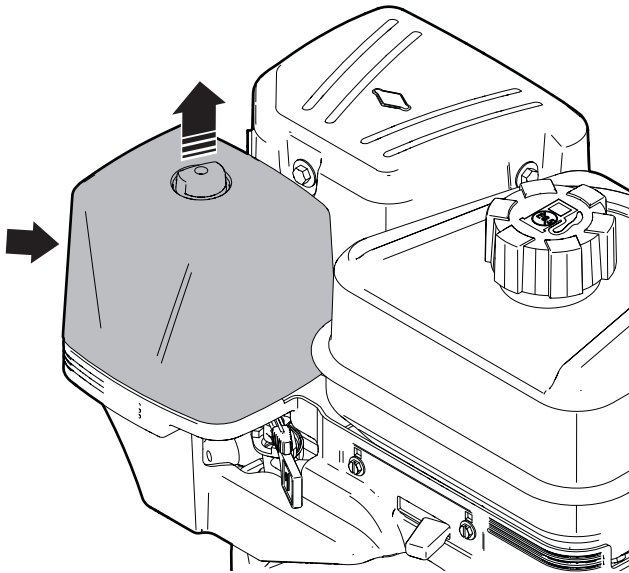


Figure 26—Remove the air filter

9.6 Drive Belt Maintenance

! WARNING!

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

! WARNING!

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

W001

9.6.1 Replace the Drive Belt

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

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

The machine has a clutch mounted on the engine shaft that drives the rotor sheave. When the drive belt is loose or in disrepair, the ability of the engine to efficiently drive the rotor may be affected. Therefore, it is important to check the drive belt condition and tension on a regular basis. Replace the drive belt if it is frayed, cracked, or worn.

Procedure:

1. Remove the drive-belt guard fasteners and the guard.
2. Loosen (do not remove) the four bolts that attach the engine mount to the machine frame.
3. Turn the drive-belt tensioning bolt to move the engine and remove tension from the drive belt.
4. Remove the drive belt.
5. Install a new drive belt on the rotor sheave and the clutch flywheel.
6. Align the drive belt.
For instructions, see *Align the Drive Belt* on page 44.
7. Set the drive belt tension.
For instructions, see *Set the Drive Belt Tension* on page 43.
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)**.

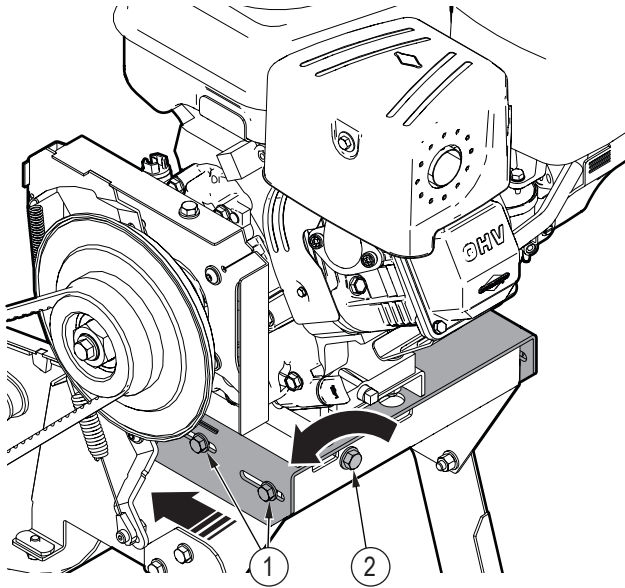


Figure 27—Loosen the drive belt tension

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

9.6.2 Set the Drive Belt Tension

WARNING!

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

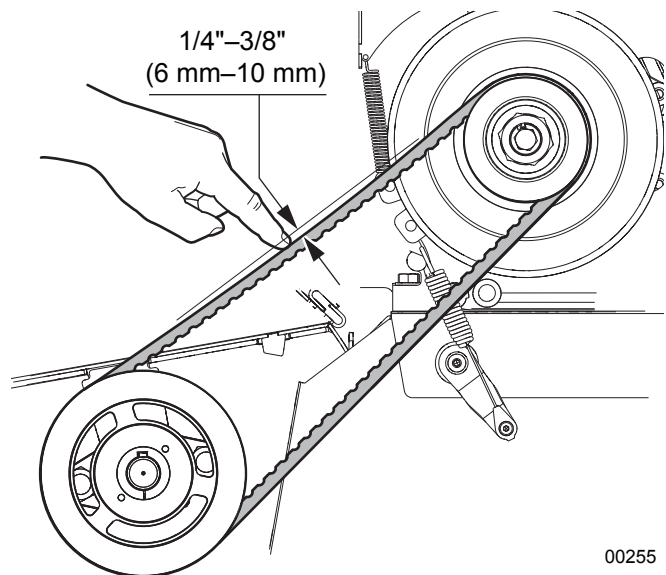
W001

Check drive belt tension every 100 hours of operation.

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

1. Press on the top centre of the rotor drive belt and measure the distance it moves. .
2. Do one of the following:
 - If the drive belt movement measures **between 1/4" (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* on page 44.
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.



00255

Figure 28—Checking the drive belt tension

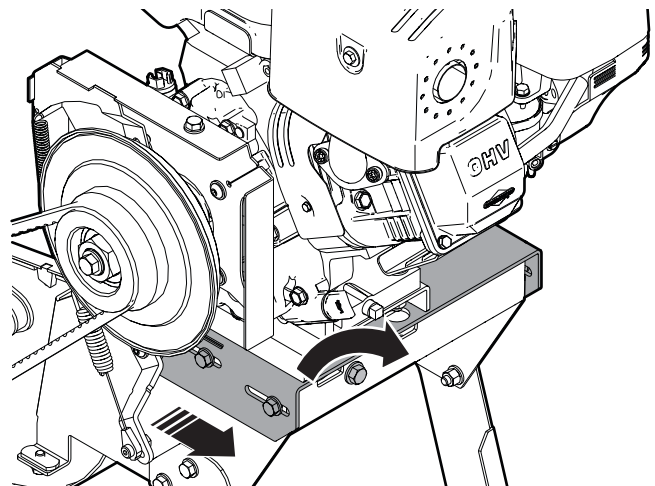


Figure 29—Adjusting the drive belt tension

9.6.3 Align the Drive Belt

Check the drive belt alignment after every 8 hours of operation

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

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

1. Align a laser beam or straight edge (alignment tool) with the back edge of the rotor sheave and the engine clutch flywheel.
2. Examine the distance between the drive belt and the alignment tool, along the length of the drive belt.
3. Do one of the following:
 - If the distance between the drive belt and the alignment tool is the same along the length of the drive belt, the drive belt is aligned. The following steps are not necessary.
 - If the distance between the drive belt and the alignment tool are not the same along the length of the drive belt, continue with the following steps to align the drive belt.
4. Measure the distance between the drive belt and the alignment tool at the rotor sheave and at the engine clutch.
5. Subtract the low number from the high number.
6. Do one of the following:
 - If the calculated number is less than or equal to the maximum misalignment, the drive belt is aligned. Do steps 11 and 12 of *Replace the Drive Belt* on page 42.
 - If the calculated number is more than the maximum misalignment, continue with the following steps to align the drive belt.
7. Find the cause of the misalignment, and then adjust one of the following:
 - The engine mount.
For instructions, see *Align the Engine Mount* on page 45.
 - The rotor sheave.
For instructions, see *Align the Rotor Sheave* on page 46.

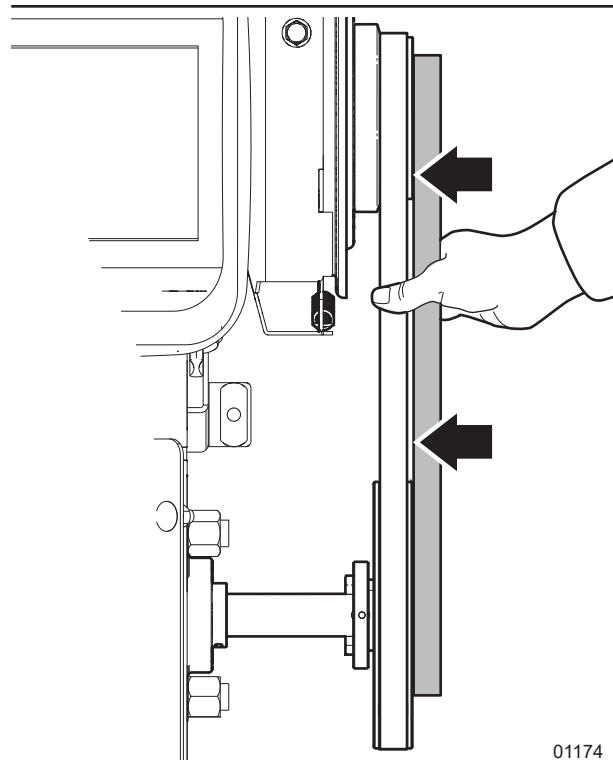


Figure 30—Drive belt alignment

01174

9.6.4 Align the Engine Mount

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

The maximum angle of engine mount misalignment is 0.5 degrees.

1. Loosen (do not remove) the four engine mount bolts.
2. Turn the engine a small amount to adjust the clutch and align the belt.
3. Check the drive belt alignment.
For instructions, see *Align the Drive Belt on page 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*.

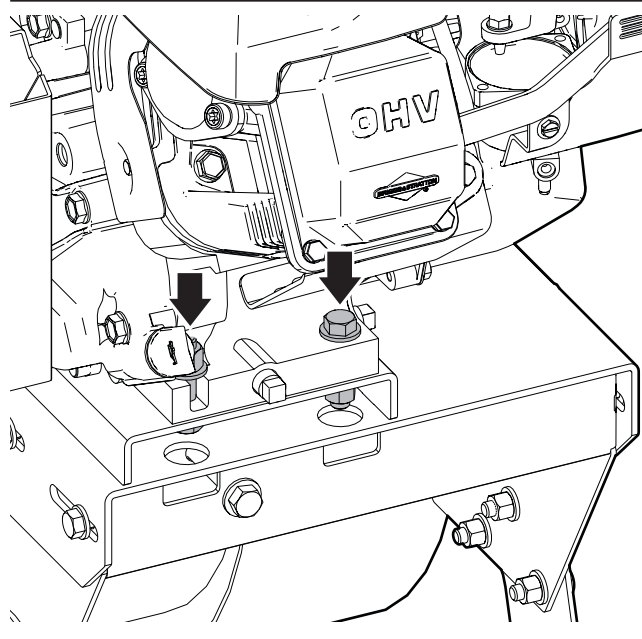


Figure 32—Engine mount bolts

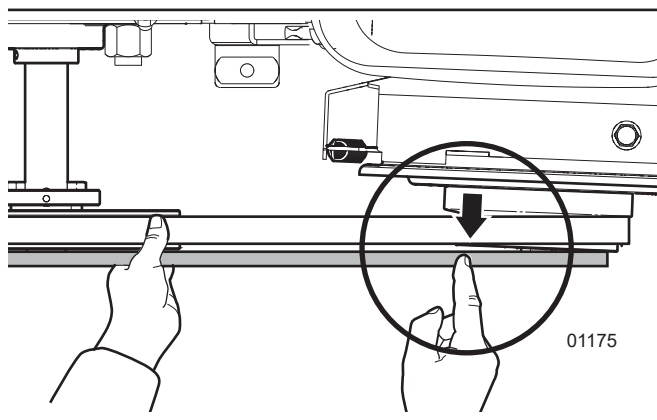


Figure 31—Engine mount misalignment

9.6.5 Align the Rotor Sheave

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

1. Remove the set screw (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. Insert, 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*.

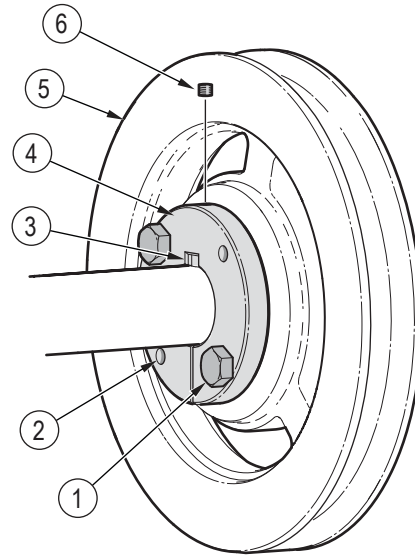


Figure 33—Rotor sheave

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

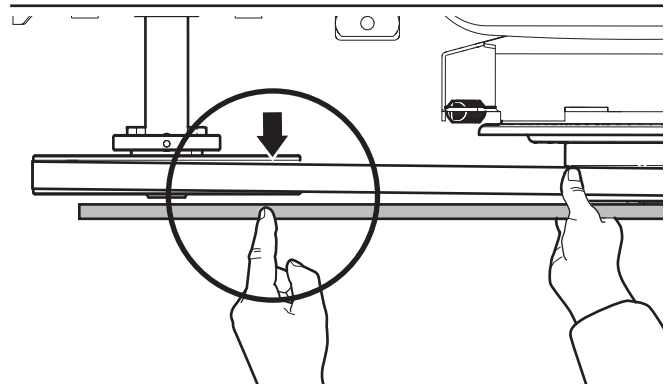


Figure 34—Rotor sheave misalignment

9.7 Rotor Knife Maintenance

WARNING!

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

W001

CAUTION!

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

W032

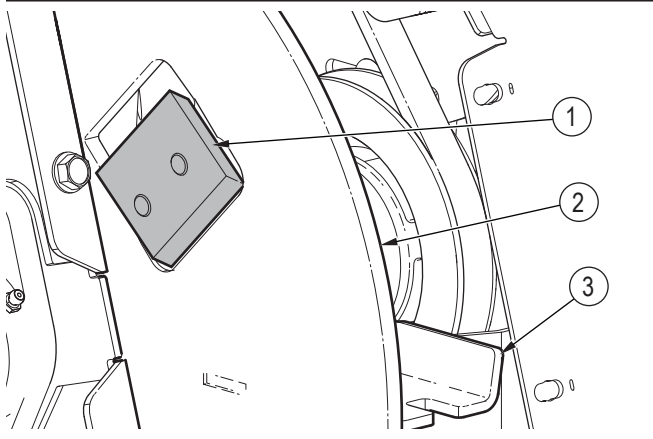


Figure 35—Rotor knife

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.

9.7.1 Replace a Rotor Knife

1. Stop the engine. Wait for the rotor to stop turning.
For instructions, see *Stop the Machine on page 28*.
2. Remove the fasteners and open the upper rotor housing.
3. Turn the rotor to access one of the rotor knives.
4. Prevent the rotor from turning.
Make sure that the rotor cannot move.
5. Remove the rotor knife fasteners.
6. Carefully remove the rotor knife.
7. Clean the rotor knife recess.
8. Do one of the following:
 - If the rotor knife has a sharp edge, install the rotor knife with the cutting edge facing toward the ledger knife.
 - If the rotor knife does not have a sharp edge, sharpen or replace the rotor knife.For instructions, see *Sharpen a Rotor Knife on page 48*.
9. Apply blue 242 thread locker to the threads of each rotor knife fastener.
10. Put the rotor knife in the recess and install the rotor knife fasteners.
11. Use a calibrated torque wrench to torque the fasteners to **45 lbf•ft (63 N•m)**.
12. Do steps 3 to 11 again for each rotor knife.
13. Release the rotor.
Make sure that the rotor can turn freely.
14. Close the upper rotor housing and install the fasteners.
15. Use a calibrated torque wrench to torque the fasteners **19 lbf•ft (25 N•m)**.

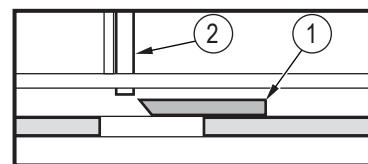
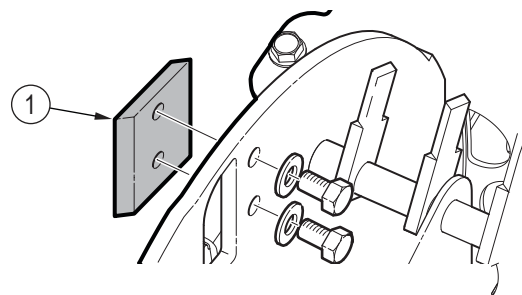


Figure 36— Replace a rotor knife

1. Rotor knife
2. Ledger knife

9.7.2 Sharpen a Rotor Knife

CAUTION!

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

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

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

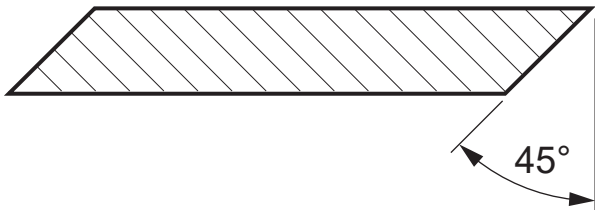


Figure 37—Sharpen a rotor knife

9.8 Ledger Knife Maintenance

WARNING!

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

W001

CAUTION!

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

W003

9.8.1 Replace a Ledger Knife

1. Stop the engine. Wait for the rotor to stop turning.
For instructions, see *Stop the Machine on page 28*.
2. Remove the fasteners and open the upper rotor housing.
3. Remove the three ledger knife fasteners.
4. Carefully remove the ledger knife.
5. Do one of the following:
 - If the ledger knife has a square (90-degree) edge, install the ledger knife with the square edge pointing toward the rotor knife.
 - If the ledger knife does not have a square edge, sharpen or replace the ledger knife.
For instructions, see *Sharpen a Ledger Knife on page 49*.
6. Align the ledger knife with the bolt holes in the lower rotor housing.
7. Install the ledger knife fasteners.
8. Set the ledger knife clearance.
For instructions, see *Set the Ledger Knife Clearance on page 49*.
9. Use a calibrated torque wrench to torque the fasteners to **45 lbf•ft (63 N•m)**.
10. Close the upper rotor housing and install the fasteners.
11. Use a calibrated torque wrench to torque the fasteners to **19 lbf•ft (25 N•m)**.

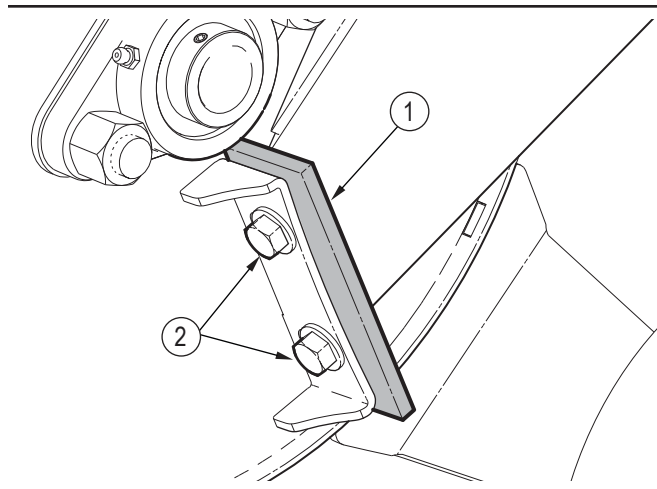
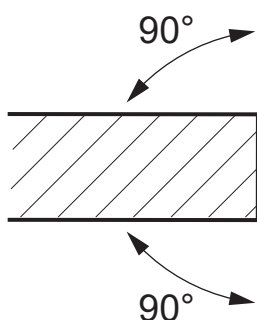


Figure 38—Ledger knife in the lower rotor housing

1. Ledger knife
2. Ledger knife fasteners

9.8.2 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.
6. Do steps 4 and 5 for the opposite cutting edge.



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Figure 39—Sharpen a ledger knife

9.8.3 Set the Ledger Knife Clearance

1. Stop the engine. Wait for the rotor to stop turning.
For instructions, see *Stop the Machine on page 28*.
2. Remove the fasteners and open the upper rotor housing.
3. Turn the rotor to align a rotor knife with the ledger knife.
Select the rotor knife that has the least space between the rotor knife and the ledger knife.
4. Loosen the ledger knife fasteners.
5. Do one of the following:
 - Insert a ledger knife clearance gauge between the rotor knife and the ledger knife.
Move the ledger knife to set the position. Move the ledger knife until the ledger knife touches the ledger knife clearance gauge.
 - Move the ledger knife to set the position. Move the ledger knife to set the clearance between 1/32" and 1/16" (1 mm to 1.5 mm).
6. Tighten the ledger knife fasteners.
7. Use a calibrated torque wrench to torque the fasteners to **45 lbf•ft (63 N•m)**.
8. Do one of the following:
 - If you are using a ledger knife clearance gauge, remove it and then put it in the holder.
 - If you are not using a ledger knife clearance gauge, continue with step 9.
9. Close the upper rotor housing and install the fasteners.
10. Use a calibrated torque wrench to torque the fasteners to **19 lbf•ft (25 N•m)**.

9.9 Shredder Knife Maintenance



WARNING!

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

W001

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

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

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

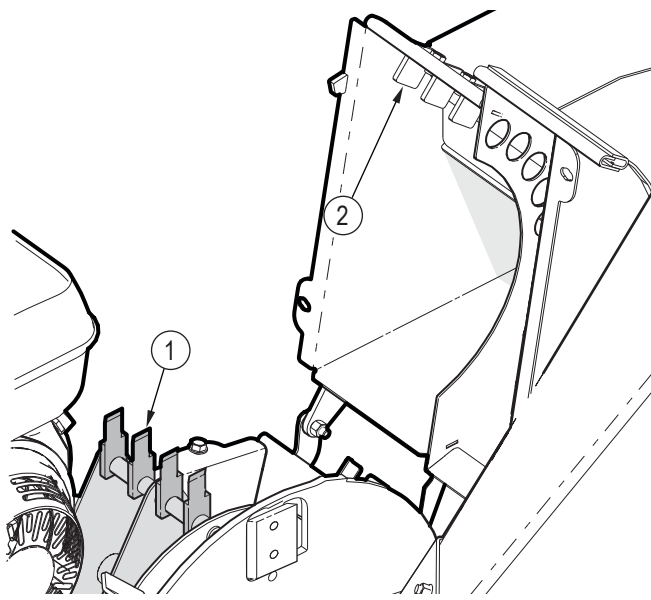


Figure 40—Shredder knives and chop block

1. Shredder knives
2. Chop block

9.9.1 Replace a Shredder Knife

1. Stop the engine. Wait for the rotor to stop turning. For instructions, see *Stop the Machine* on page 28.
2. Remove the fasteners and open the upper rotor housing.
3. Turn the rotor to access one of the shredder knives.
4. Loosen the bolt that holds the set of shredder knives and spacers to the shredder plate.
5. Slowly remove the shredder knife bolt.
6. Remove the spacers and shredder knives.
7. Reverse, replace, or sharpen the shredder knives. Sharpen the shredder knives to a 45° angle.
8. Apply blue 242 thread locker to the shredder knife bolt.
9. Install the shredder knife bolt through the shredder knives, spacers, and rotor.
10. Use a calibrated torque wrench to torque the fasteners to **45 lbf•ft (63 N•m)**.
11. Repeat steps 4 to 10 for second and third sets of shredder knives.
12. Close the upper rotor housing and install the fasteners.
13. Use a calibrated torque wrench to torque the fasteners to **19 lbf•ft (25 N•m)**.

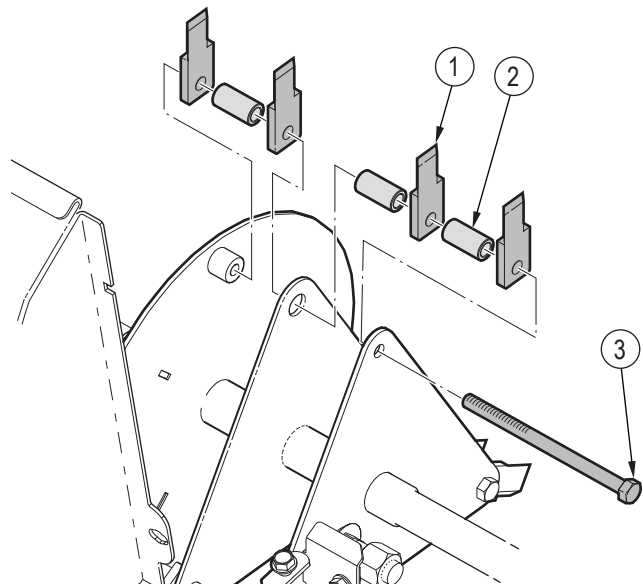


Figure 41—Shredder Knives

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

9.9.2 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.
4. Put the shredder knife in a bench vice with the cutting edge facing up.
Make sure that the shredder knife is clamped safely in the bench vice.
Remove the same amount of material from all the shredder knives.
5. Use a grinder to sharpen the cutting edge of the shredder knife. Sharpen the cutting edge to a 45-degree angle.
6. Do steps 4 and 5 for the opposite cutting edge.
7. Do steps 1 to 5 for the remaining shredder knives.

9.10 Chop Block Maintenance

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

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

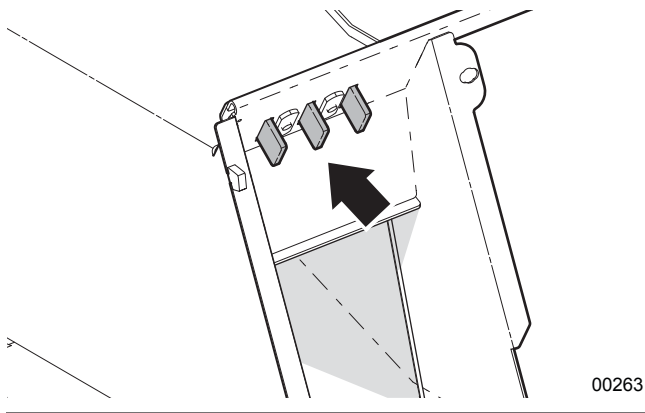


Figure 42—Chop block on upper rotor housing

9.11 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.

Use the following procedure to replace the twig breaker:

1. Stop the engine. Wait for the rotor to stop turning.
For instructions, see *Stop the Machine on page 28*.
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)**.

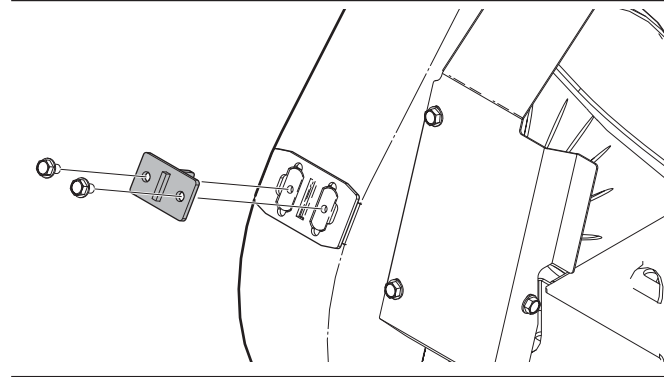


Figure 43—Twig breaker

9.12 Tire Maintenance and Safety



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.

9.13 Clean the Machine

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

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

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

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

10. Troubleshooting



WARNING!

Before troubleshooting, read and understand the Service and Maintenance Safety on page 38. Set the machine to a safe condition.

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

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

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

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

Problem	Possible cause	Solution
The rotor does not turn.	The discharge chute is obstructed.	Clear debris from the discharge chute.
	The rotor is blocked	Clear the blockage. For instructions, see <i>page 33</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. Replace the spring, if necessary.
Material is moving in too slowly.	The engine or rotor speed is too slow.	Set the engine throttle to Fast to increase the rotor RPM. See <i>page 20</i> .
	The knives are not sharp or the clearance is incorrect.	Check the rotor and ledger knives. Rotate, sharpen, or replace the knives, as necessary. See <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 mulch collector bag is full.	Empty the mulch collector bag. For instructions, see <i>page 32</i> .
	The discharge chute is obstructed.	Clear all debris from the discharge chute.
Unusual machine vibration while operating.	The ledger knife is damaged or missing.	Inspect the ledger knife. Replace the ledger knife if it is damaged or missing. See <i>page 48</i> .
	The rotor is bent.	Check the rotor rotation to see if there is wobble. If the rotor wobbles, contact your local dealer or distributor to replace the rotor.
	The rotor bearings failed.	Replace the rotor bearings.
	The fasteners are loose.	Use a calibrated torque wrench to tighten the fasteners to the specified torque. For specifications, see <i>page 56</i> .
The mulch is too coarse.	The chop block or twig breaker is damaged.	Inspect the chop block and twig breaker for damage. Replace the parts as necessary.
	The ledger knife is broken or missing.	Replace the ledger knife. For instructions, see <i>page 48</i> .
	The shredder knives are broken or missing.	Replace the shredder knives. For instructions, see <i>page 50</i> .
	The shredder knives are installed improperly.	Check the shredder knives and adjust them if necessary. See <i>page 50</i> .

Problem	Possible cause	Solution
Machine requires excessive power or stalls.	The discharge chute is obstructed.	Clear all debris from the discharge chute.
	The clutch is being engaged too quickly.	Move the clutch handle to the START position slowly. Make sure that the rotor housing and, the chipper hopper, and the shredder hopper are clear before starting the machine.
	The mulch collector bag is full.	Empty the mulch collector bag. For instructions, see <i>page 32</i> .
	Too much material is being put into the machine.	Put smaller amounts of material into the machine.
	Material is being put into the machine too quickly.	Put large material into the machine slowly.
	The rotor is blocked.	Clear the blockage. For instructions, see <i>page 33</i> .
	The ledger knife clearance is incorrect.	Use a ledger-knife clearance gauge to set the correct clearance. For instructions, see <i>page 49</i> .
	The knives are not sharp.	Rotate, sharpen, or replace the knives, as necessary. For instructions, see <i>page 47</i> .
	There is a problem with the engine.	See the engine manufacturer's manual.
Noisy drive belt or premature wear on the drive belt.	The drive belt is loose or worn.	Inspect the drive belt. Adjust the tension or replace the drive belt, as necessary. For instructions, see <i>page 42</i> .
	An incorrect replacement drive belt was installed.	Replace the drive belt. For instructions, see <i>page 42</i> .
	The rotor is blocked.	Clear the blockage. For instructions, see <i>page 33</i> .
	A rotor bearing is worn or damaged.	Inspect the rotor bearings. Replace a bearing that is worn or damaged.
Poor wood chip quality.	The knives are not sharp.	Rotate, sharpen, or replace the knives, as necessary. For instructions, see <i>page 47</i> .
	The drive belt is loose or worn.	Inspect the drive belt. Adjust the tension or replace the drive belt, as necessary. For instructions, see <i>page 42</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.	Use a ledger-knife clearance gauge to set the correct clearance. For instructions, see <i>page 49</i> .

11. Specifications

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

For available accessories, go to WallensteinEquipment.com.

11.1 Machine Specifications¹

Parameter	BXMC3409B and BXMC3409B Bundle
Engine make/ horsepower/ displacement	Vanguard® 10 hp (305 cc)
Drive system	Brake clutch with drive belt
Number of rotor knives	Two
Number of shredder knives	12 (Three sets of four knives)
Rotor and shredder knife material of construction	Hardened tool steel
Rotor diameter	16 in (406 mm)
Rotor weight	40 lb (18.2 kg)
Shredder hood opening	3-1/2 x 5 in (9 x 13 cm)
Shredder material maximum diameter	3/4 in (19 mm)
Chipper hood opening	6 x 7 in (15 x 18 cm)
Chipper material maximum diameter	3 in (8 cm)
Material discharge	Blower discharge
Feed system	Manual (gravity)
Tires	4.10 x 3.5 rubber
Dimensions Length x Width x Height	45 x 39 x 49 in (114 x 99 x 125 cm)
Weight	295 lb (134 kg)
Only included with the BXMC3409B Bundle	Mulch collector bag (Z99006) Jockey wheel (C500)

¹ Specifications are subject to change without notice.

11.2 Bolt Torque

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

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



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

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

Imperial Bolt Torque Specifications

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



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

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