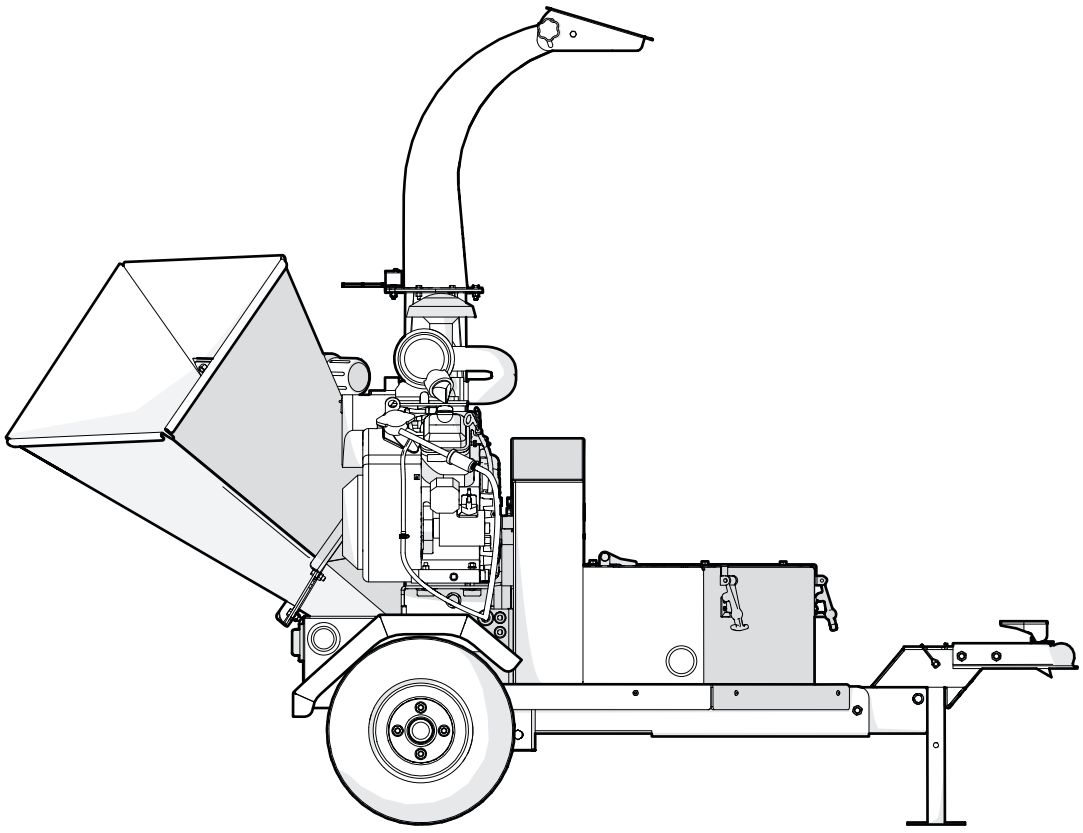
OPERATOR'S MANUAL

BXT4224 – S/N 2E9US1118PS040232, 1100000 and up
BXT6238 – S/N 2E9US1117NS060159 to 2E9US1114PS060171, 1100000 and up

BXT4224 / BXT6238
Wood Chipper



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WALLENSTEIN

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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 BXT Series Wood Chipper!

The BXT series wood chippers are towable, gas engine powered machines. The machines have gravity-feed chipper hoppers. The rotor and ledger knives cut the wood material into chips that are released through the discharge chute.

This manual covers the following Wallenstein models:

BXT4224	Vanguard® 23 hp (627 cc) EFM
BXT6238	Vanguard® 40 hp (993 cc) EFI

For available accessories, go to WallensteinEquipment.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.

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

1.1 Delivery Inspection Report

Wallenstein BXT4224 and BXT6238 Wood Chippers

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

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

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

Customer

Address

City, State/Province, ZIP/Postal Code

( )

Phone Number

Contact Name

Model

Serial Number

Delivery date

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

Dealer

Address

City, State/Province, ZIP/Postal Code

( )

Phone Number

Dealer Inspection Checklist

_____ Engine starts and runs, and fluid levels are correct.

_____ Rotor turns freely and the knife clearance is correct.

_____ All cutting edges are sharp and in good condition.

_____ Discharge chute and deflector move freely.

_____ All belts are aligned and the tension is correct.

_____ Engine and rotor sheaves align.

_____ All fasteners are tightened to the correct torque.

_____ 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, shields, and covers are installed and secure.

_____ A retainer is installed through each hitch point.

_____ Safety chains are on the ball-mount hitch.

_____ Wheel lug nuts are tightened to the correct torque.

_____ All lights operate correctly (for example; running, brake, turn signal, license plate).

_____ Safety flap is present in the chipper hopper.

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	

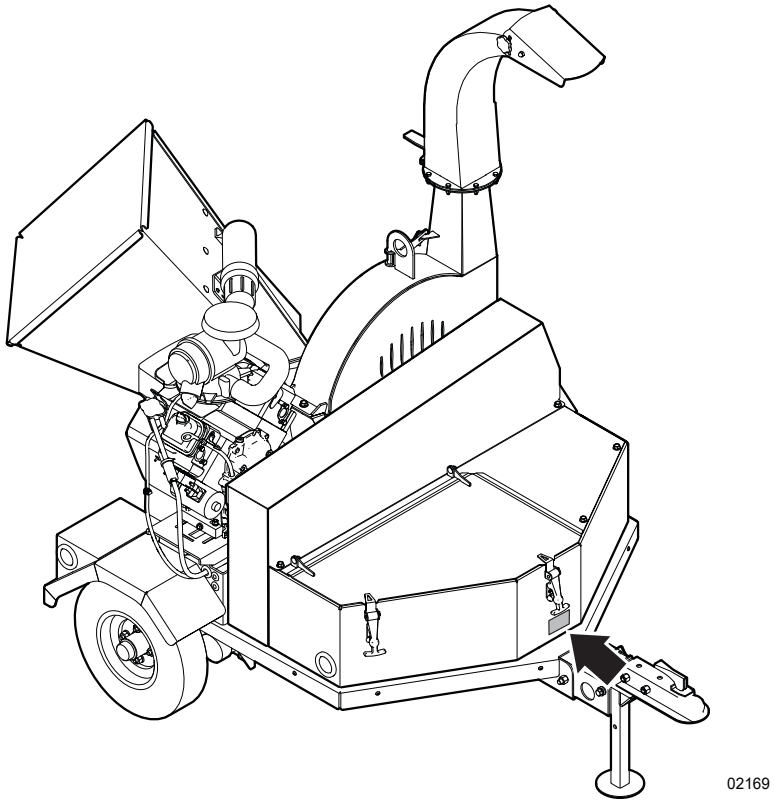


Figure 1 – Product identification plate location (Typical)

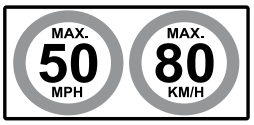
1.3 Types of Labels on the Machine

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

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

Mandatory action labels are pictorial with a blue background and generally 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 indicate the machine model and serial number. For more product information, scan the quick response (QR) code.

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

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

2. Safety

Read and understand all safety information before operating the machine.

2.1 Safety Alert Symbol

This Safety Alert Symbol means:

ATTENTION! BE ALERT!

YOUR SAFETY IS INVOLVED!

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

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

2.2 Signal Words

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

DANGER

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

WARNING

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

CAUTION

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

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

☞ Provides additional information that is helpful.

2.3 Why Safety is Important

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

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

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

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

2.4 Safety Rules

⚠ 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 label definitions, see *Safety Label Definitions on page 16.*
- Learn the controls and how to stop the machine quickly in the event of an emergency. For instructions, see *Emergency Stop on page 32.*
- 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

The term **Safe Condition** is referenced throughout this manual. What this means is setting the machine in a state that makes it safe to load, service, maintain, or prepare for storage.

Complete the following to place the machine in a Safe Condition before performing any service, maintenance work, or storage preparation:

SAFE CONDITION

1. If the machine is attached to a tow vehicle, set the tow vehicle's parking brake, stop the tow vehicle, and remove the ignition key.
2. Stop the machine.
   For instructions, see *Stop the Machine on page 32.*
3. Disconnect the engine spark-plug wire and keep it away from the spark plug.
4. Disconnect the cable from the negative (-) battery terminal and keep it away from the battery.
5. Remove all material from the chipper hopper.
6. Wait until the engine and machine are cool.

2.7 Safety Training

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

- An employer has the responsibility to train employees how to operate the equipment they are using. When someone does not understand the basic operation of a piece of equipment, they can create dangerous situations very quickly. Operators must completely understand the safety section of this manual and the safety labels on the machine
- Provide instruction to anyone else who is going to operate the machine. This equipment 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, prior to using the machine, every operator:
  - Reads and understands this manual.
  - Is instructed in the safe and correct use of the machine and related equipment.
  - Understands and knows how to complete the **Safe Condition** procedure on *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:

- ANSI/ASAE S318.17 JUN2009 Safety for Agricultural Field Equipment.
- ISO 3600 Tractors, machinery for agriculture and forestry, powered lawn and garden equipment – Operator's manuals – Content and format.

Training Sign-Off Form

Date	Owner's signature	Operator or technician's signature

2.9 Work Site

⚠ CAUTION!

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

2.9.1 Select a Work Site

Select a safe work area and machine location:

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

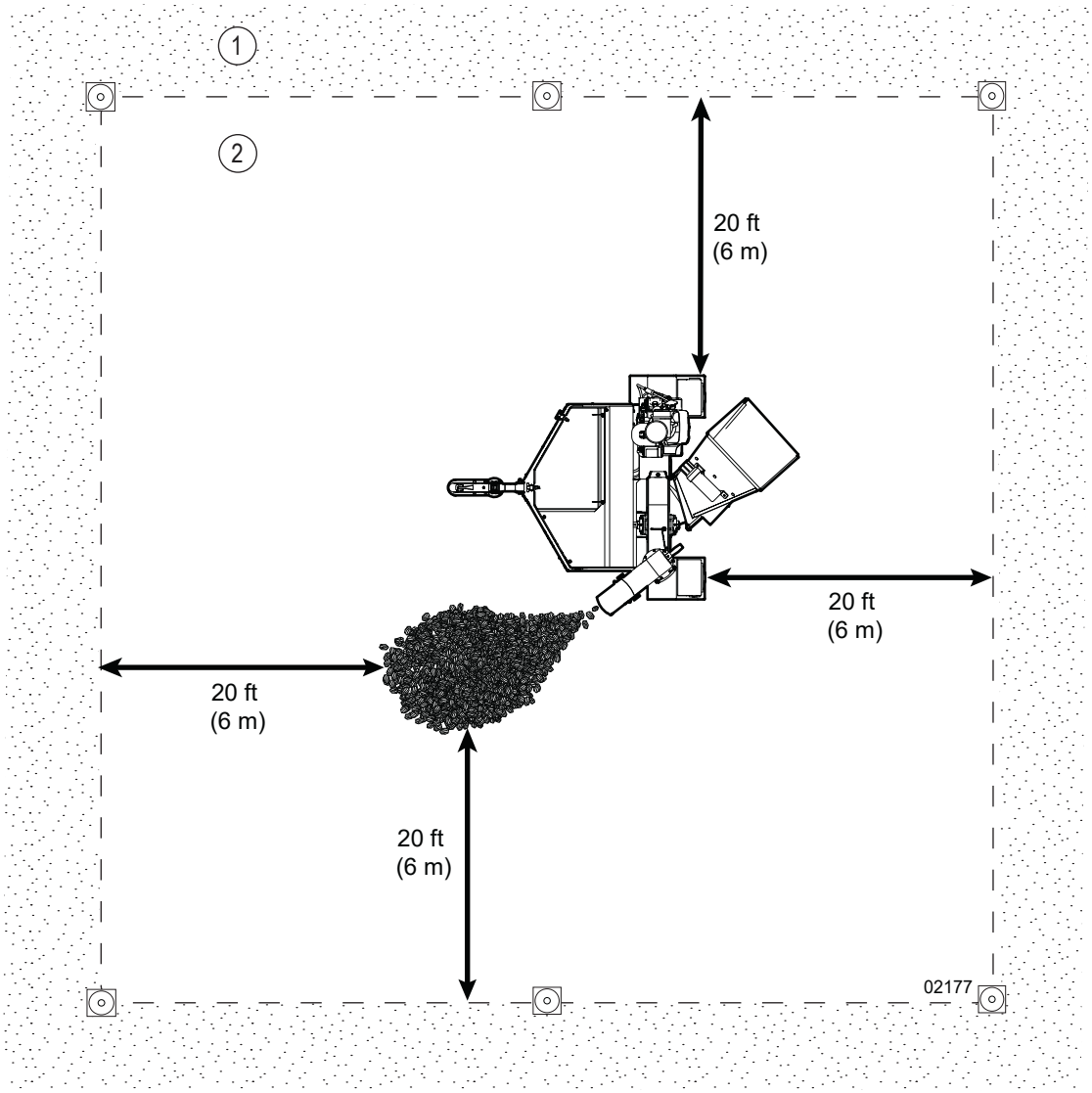

Figure 2–Safe work area

3. Safety Labels

⚠ WARNING!

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

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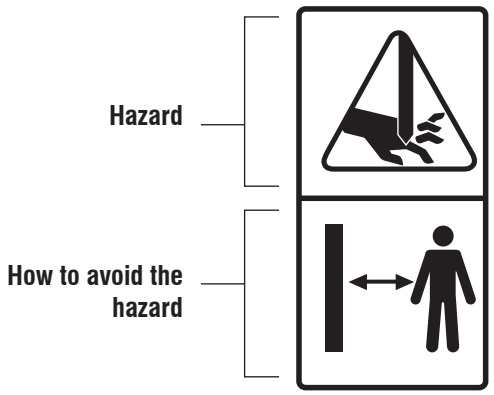
Learn what the safety labels mean and know the safety hazards. A safety label can be vertical or horizontal. Vertical safety labels have a top panel and a bottom panel. Horizontal safety labels have a left side panel and a right side panel.
The top or left side panel shows the safety alert (possible hazard), and the bottom or right side panel shows the action message (how to prevent illness, injury, or death).



Think SAFETY! Work SAFELY!

3.1 Safety Label Locations

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

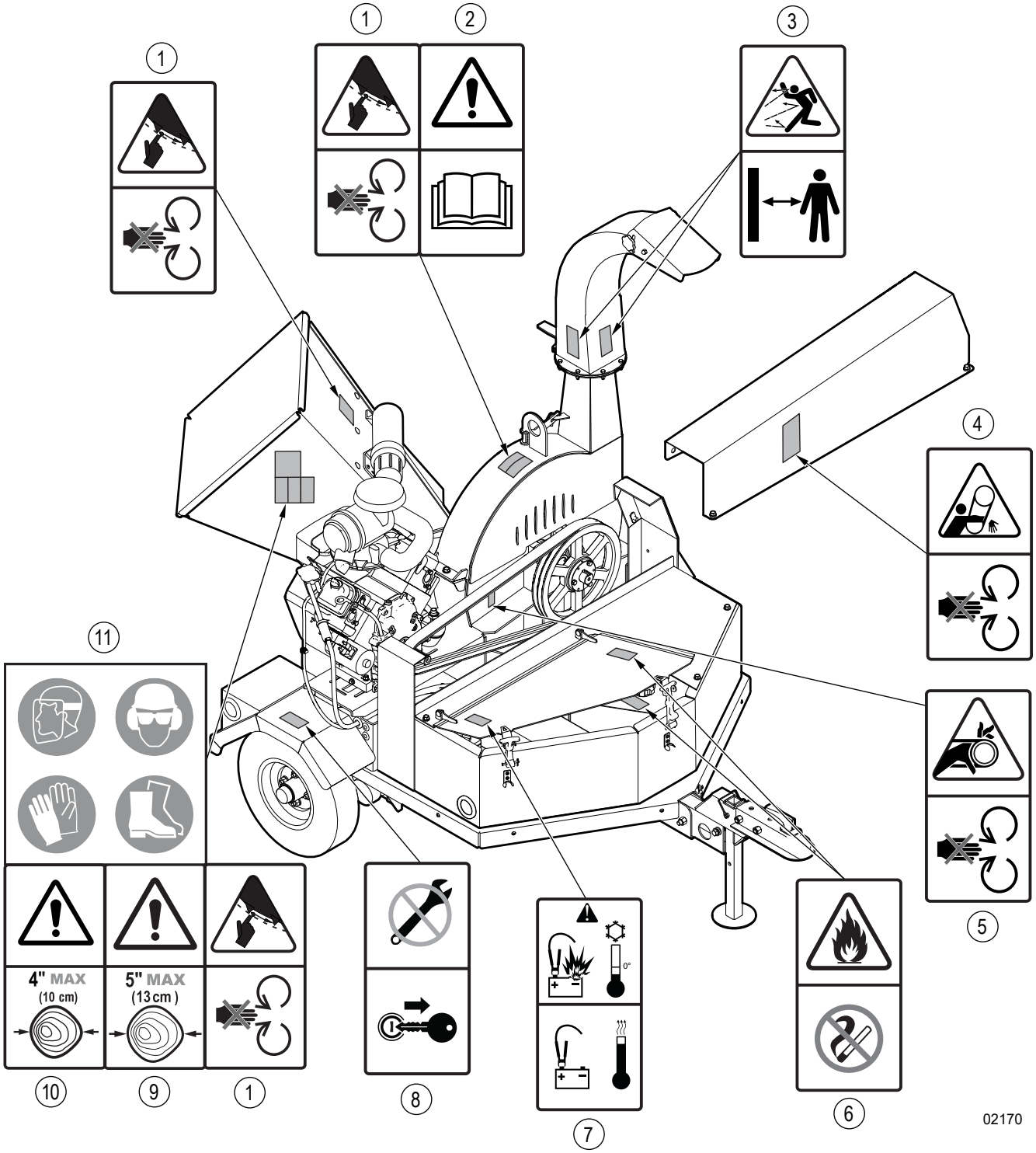


Figure 3– Safety label locations - right side (typical)

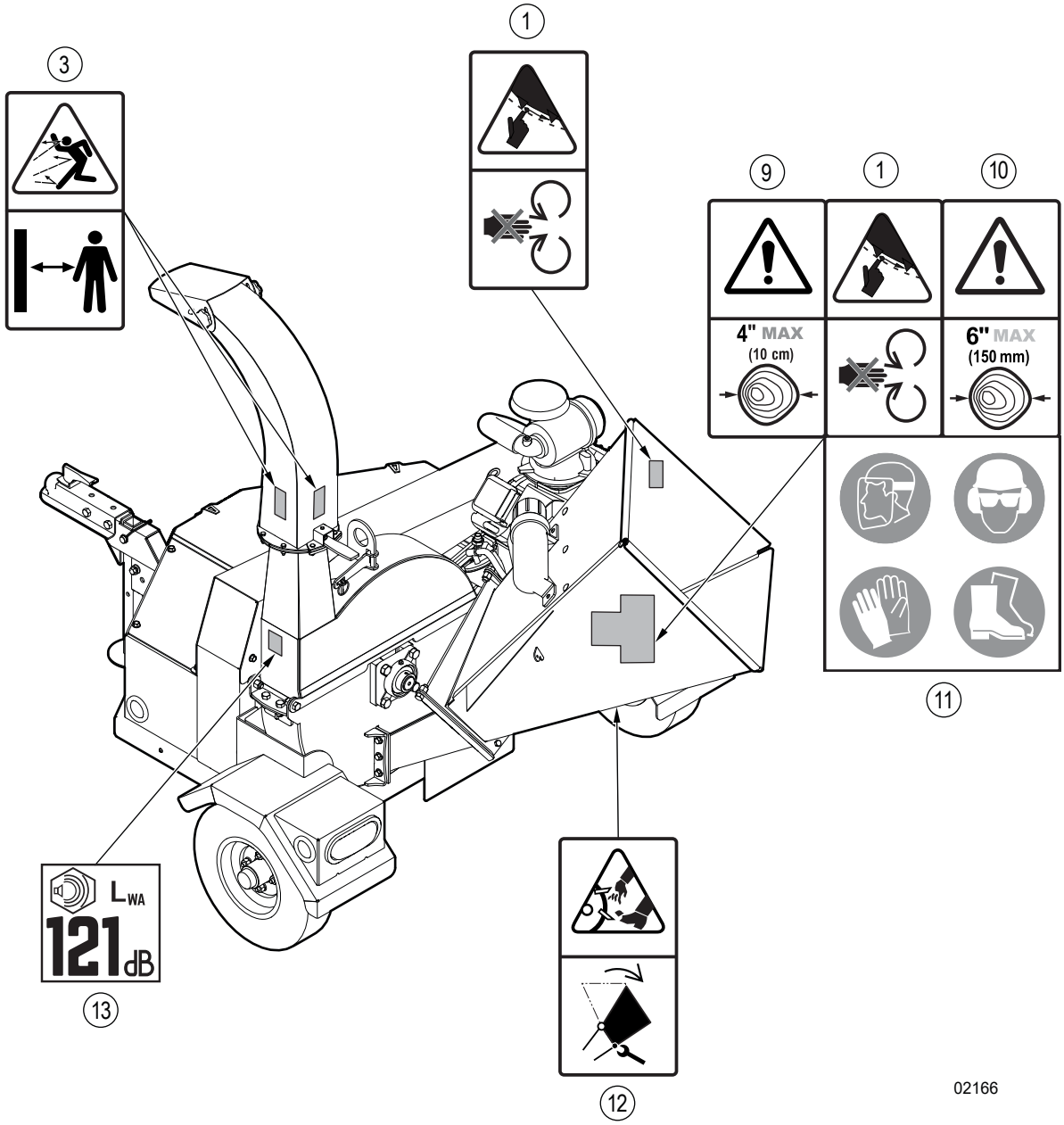


Figure 4–Safety label locations - left side (typical)

3.2 Safety Label Definitions

1. CAUTION!

Cut hazard

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

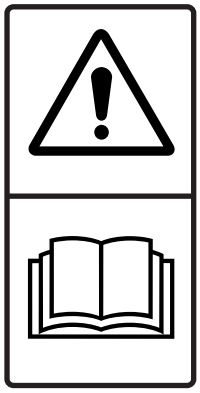
Keep hands and feet out of the chipper hopper or discharge chute when the machine is on and not in a safe condition.

2. WARNING!

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.

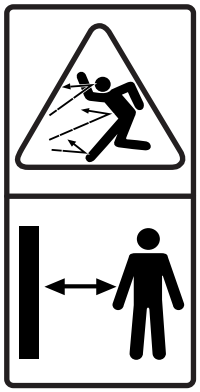


3. CAUTION!

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.

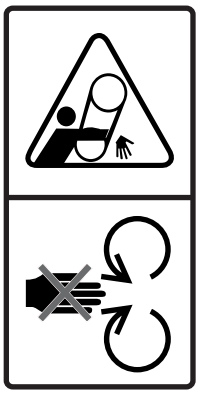


4. WARNING!

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.



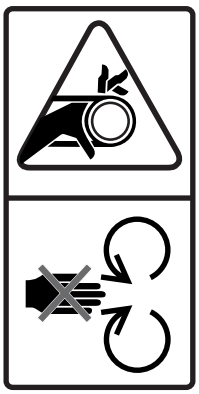
5. CAUTION!

Entanglement, pinch, and crush hazards

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

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

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



6. WARNING!

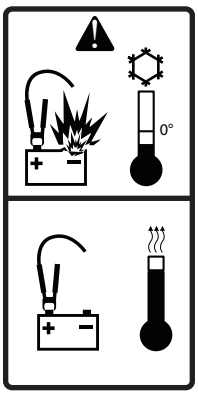
Explosion hazard

Smoking, flames, sparks, or other sources of ignition can cause an explosion. An explosion can cause serious injury or death from projectiles, extreme heat, chemicals, and loud noise.

Do not smoke when you add fuel to the tank.

7. WARNING!

Explosion hazard

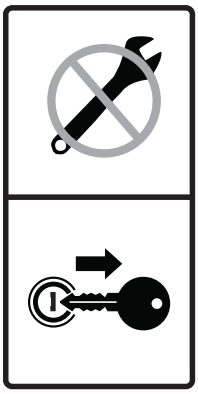


Attempting to charge a frozen battery can cause it to explode. An explosion can cause serious injury or death from projectiles, extreme heat, chemicals, and loud noise.

Warm the battery to a minimum of 60 °F (16 °C) before charging it.

8. CAUTION!

Turn off the machine before service or maintenance



Working on a machine that it is not in a safe condition can cause serious injury or death.

Stop the engine, remove the key, and disconnect the spark-plug wire before starting any service or maintenance procedures.

9. WARNING!

Machine damage and possible entanglement hazard

Oversize material will overload the machine, which can stall the engine or cause machine damage. Trying to force material into the machine can result in serious injury from a fall or entanglement. Reverse the roller feed and carefully remove oversize material from the machine.

Do not place material that is larger than 4" (10 cm) in diameter into the chipper hopper. Never try to force material into the machine.

10. WARNING!

Machine damage and possible entanglement hazard

Oversize material will overload the machine, which can stall the engine or cause machine damage. Trying to force material into the machine can result in serious injury from a fall or entanglement. Reverse the roller feed and carefully remove oversize material from the machine.

Do not place material that is larger than 6" (15 cm) in diameter into the chipper hopper. Never try to force material into the machine.

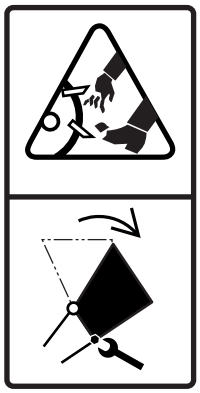
11. WARNING!

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.

12. WARNING!

Crush and sever hazard



Hands or feet can be crushed or severed if the machine is operated with the chipper hopper in the transport position.

Never operate the wood chipper with the feed hopper in the transport position. The chipper hopper must be lowered and installed in the operating position.

13. CAUTION!

A noise declaration label indicates the sound power (LWA) emitted by the machine when operating. For this chipper, it can be up to 121 decibels at close distances.

Always wear hearing protection when near the operating machine. Noise exposure over 85 dB on a long-term basis can cause severe hearing loss. Exposure over 90 dB over a long-term basis may cause permanent, total hearing loss.

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

The Wallenstein BXT series wood chippers are strong, rugged machines that is designed to cut small tree trunks or branches into consistent size wood chips. A gas engine supplies power to the machines.

4.1 New Operator

⚠ WARNING!

Make sure all operators understand how to place the machine in a safe condition before performing any service, maintenance work, or storage preparation. For instructions, see *Safe Condition on page 9*.

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

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

4.2 Training

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

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

4.3 Operator Orientation

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

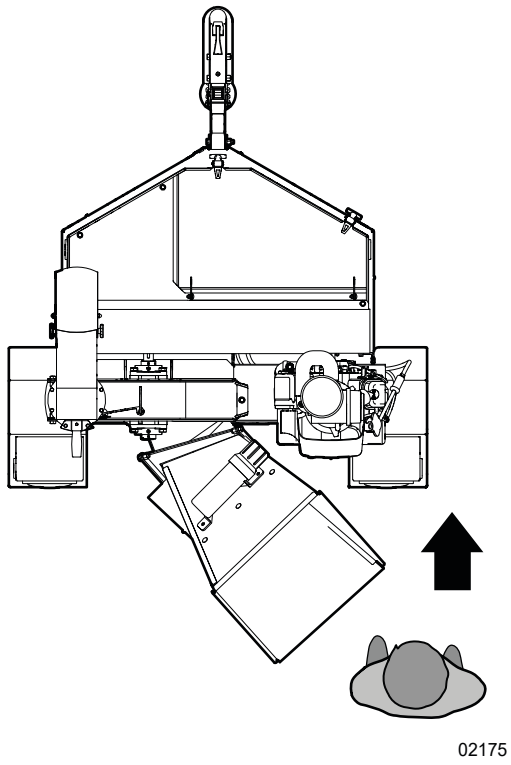


Figure 5–Direction of forward machine travel

4.4 Machine Components

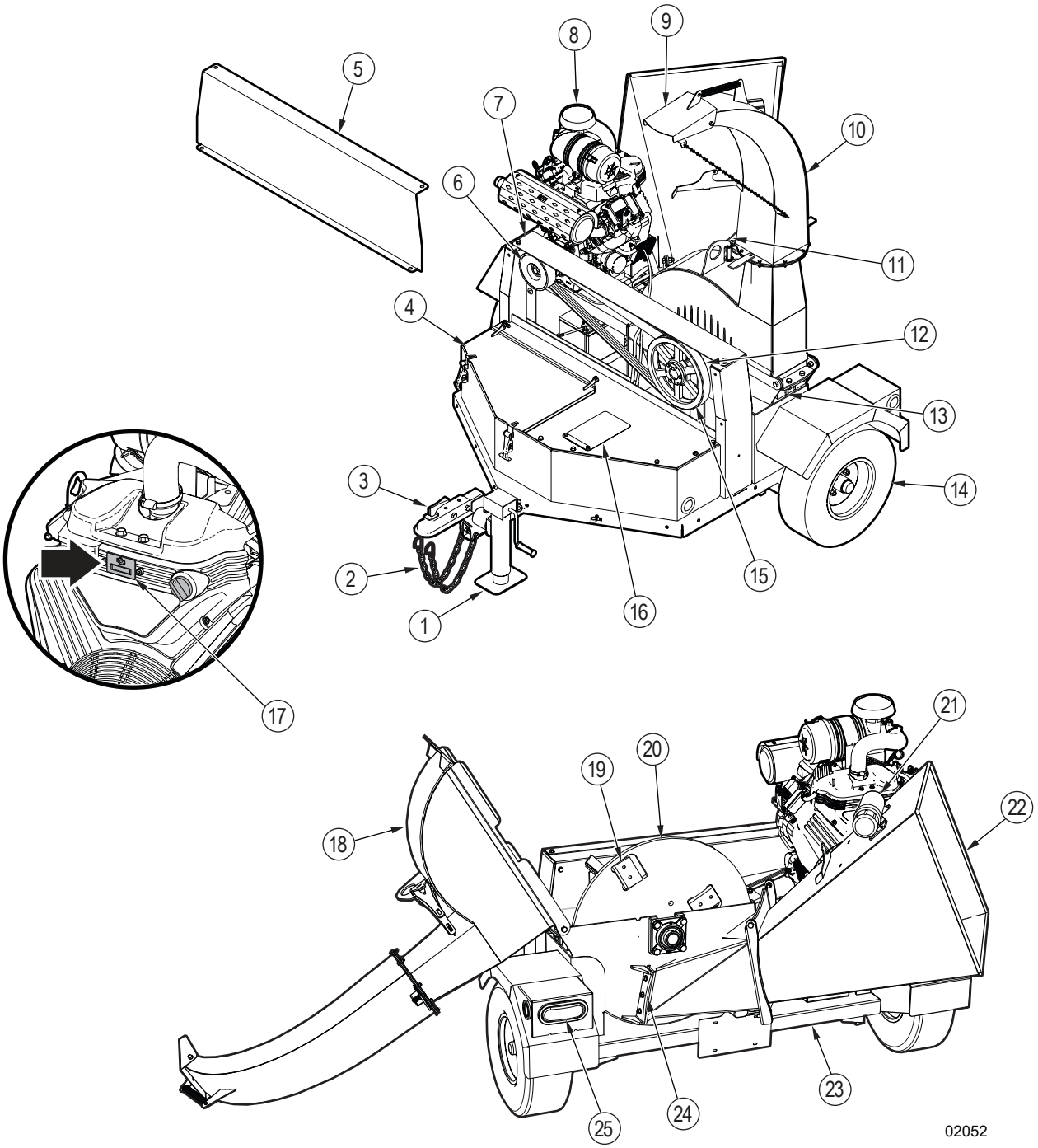


Figure 6–Machine components

1. Jack stand
2. Safety chains
3. Hitch coupler
4. Fuel tank - BXT4224
   Storage compartment - BXT6238
5. Drive-belt guard
6. Centrifugal clutch
7. Upper drive-belt guard
8. Engine
9. Hood deflector
10. Discharge chute
11. Feed hopper transport latch
12. Drive belt
13. Twig breaker
14. Tire (1 of 2)
15. Rotor sheave
16. Fuel tank - BXT6238
17. Hour meter and tachometer
18. Upper rotor housing
19. Rotor knife
20. Rotor
21. Operator's Manual tube
22. Chipper hopper
23. Axle
24. Ledger knife
25. Light - rear, brake, signal (1 of 2)

5. Controls

WARNING!

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

W065

5.1 BXT4224 Engine Controls

WARNING!

Before you start the engine, read and understand the safety and operating information under *Engine Operation Safety on page 27*.

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

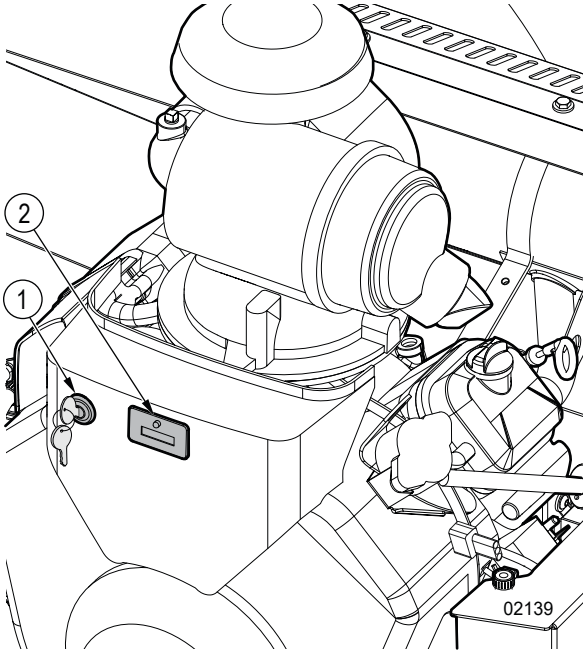


Figure 7–Engine controls

1. Ignition switch
2. Tachometer, hour meter, and check engine light

5.1.1 Throttle Control

The throttle controls the engine speed. An operator can set the engine to the minimum speed (**Slow**), the maximum speed (**Fast**), or to any speed that is between the minimum and maximum.

Slow
Engine speed is slow.

Fast
Engine speed is fast.

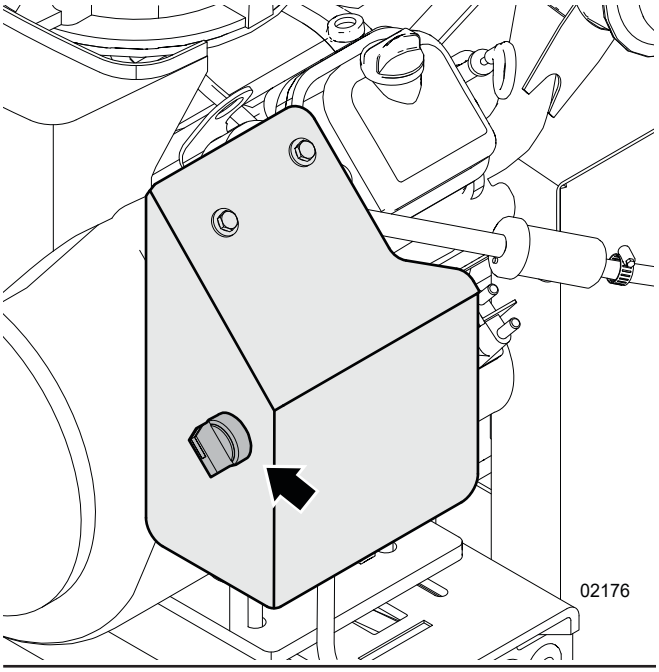


Figure 8–Throttle control switch

5.1.2 Tachometer and Hour Meter Display

Tachometer	When the engine is on (the ignition switch is in the RUN position), the display shows the current engine revolutions per minute (RPM).
Hour meter	While the engine is in the process of starting or stopping the display shows the total number of hours that the engine has been on since it was manufactured. This number cannot be reset.

5.1.3 Check Engine Light

The red check engine light communicates the following information:

Light	Engine Status
On	The engine is in the process of starting or stopping.
Flashing	There is an electronic fuel management (EFM) malfunction.
Off	The engine is off or on.

5.1.4 Ignition Switch

WARNING!

The engine can cause serious bodily harm or death to a person who is not trained in the correct operation. Always remove the key and keep it in a secure location to prevent an unauthorized person from starting the engine.

IMPORTANT! Long start cycles may decrease the life of the starter. Use short start cycles (five seconds maximum) and wait one minute between cycles.

The key-operated ignition switch controls the electric power to the engine. The ignition switch has the following positions:

STOP
The engine is off and the fuel shut-off valve is closed.

RUN
The engine is on.

START
Engine ignition.
When the engine starts, the key turns to the RUN position.

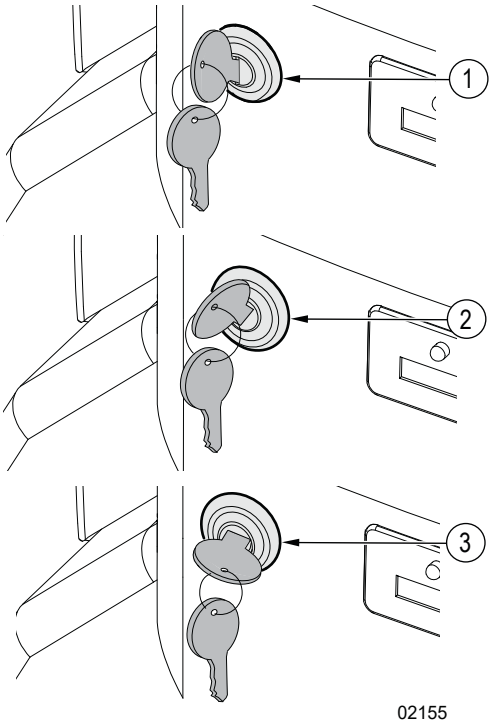


Figure 9– Ignition switch positions

1. STOP position
2. RUN position
3. START position

5.2 BXT6238 Engine Controls

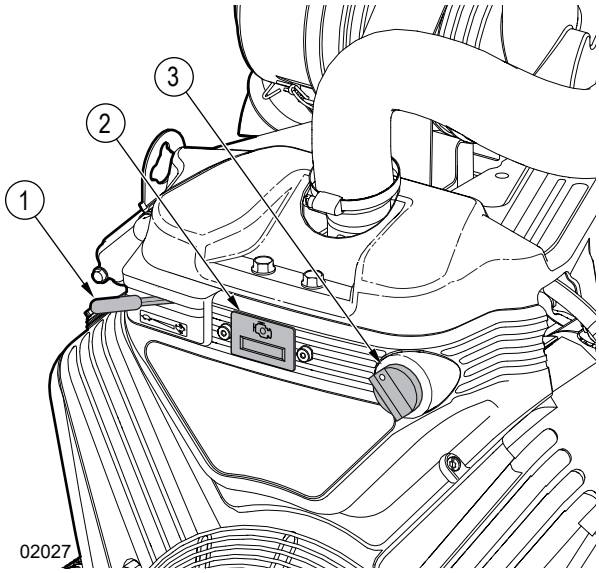


Figure 10–Engine controls

1. Throttle control
2. Tachometer, hour meter, and check engine light
3. Ignition switch

5.2.1 Throttle Control

The throttle controls the engine speed. An operator can set the engine to the minimum speed (**Slow**), the maximum speed (**Fast**), or to any speed that is between the minimum and maximum.

	**Slow** Engine speed is slow.
	**Fast** Engine speed is fast.

5.2.2 Tachometer and Hour Meter Display

Tachometer	When the engine is on (the ignition switch is in the RUN position), the display shows the current engine revolutions per minute (RPM).
Hour meter	While the engine is in the process of starting or stopping the display shows the total number of hours that the engine has been on since it was manufactured. This number cannot be reset.

5.2.3 Check Engine Light

The red check engine light communicates the following information:

Light	Engine Status
On	The engine is in the process of starting or stopping.
Flashing	There is an electronic fuel injection (EFI) malfunction.
Off	The engine is off or on.

5.2.4 Ignition Switch

WARNING!

The engine can cause serious bodily harm or death to a person who is not trained in the correct operation. Always remove the key and keep it in a secure location to prevent an unauthorized person from starting the engine.

IMPORTANT! Long start cycles may reduce the life of the starter. Use short start cycles (five seconds maximum) and wait one minute between cycles.

The key-operated ignition switch controls the electric power to the engine. The ignition switch has the following positions:

	**STOP** The engine is off and the fuel shut-off valve is closed.
	**RUN** The engine is on.
	**START** Engine ignition. When the engine starts, the key turns to the RUN position.

5.3 Discharge Chute

The discharge chute directs the wood chips in the selected direction. The discharge chute can be turned 270°. The latch-handle pin holds the discharge chute in position.

1. Push and hold the latch handle down until the pin disengages from the hole in the round plate.
2. Use the handle to turn the discharge chute to the position you want.
3. Release the latch handle.
   Make sure that the pin engages with a hole in the round plate to hold the discharge chute in position.

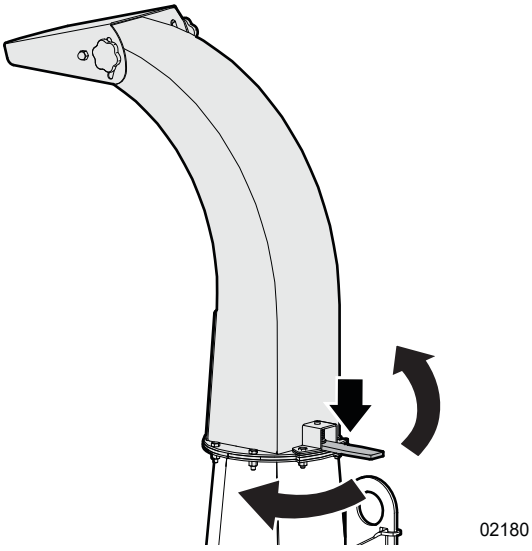


Figure 11 – Turn the discharge chute

5.4 Hood Deflector

The hood deflector is located on the end of the discharge chute. It directs the wood chips closer to or further from the machine. The slotted-position handle holds the hood deflector in the set position.

1. Turn the hood deflector knobs to loosen the hood deflector.
2. Raise or lower the deflector hood.
3. Turn the hood deflector knobs to lock the deflector hood in the position you want.

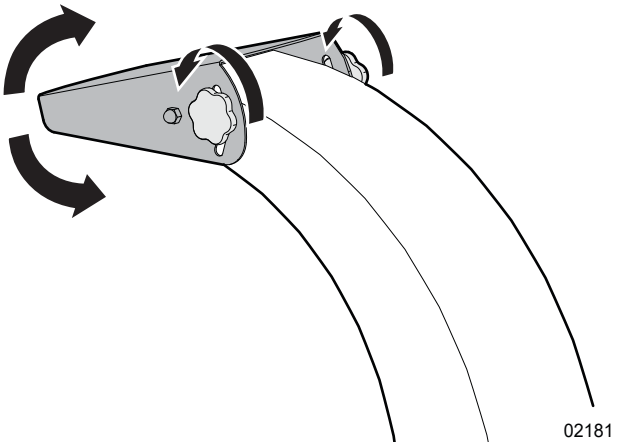


Figure 12 – Adjust the hood deflector

6. Operating Instructions

Read and understand the operating instructions before using the machine.

6.1 Operating Safety

⚠ WARNING!

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

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

W101

⚠ WARNING!

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

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

W004

⚠ WARNING!

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

W006

⚠ CAUTION!

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

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

W024

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

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

- Read and understand this manual before you start the machine. Review all safety information annually.
- Park the machine in a clear location on dry, level ground. Do not operate the machine on a hillside or area that is cluttered, wet, muddy, or icy to prevent slips, trips, and falls.
  For more information, see *Work Site on page 11.*
- Keep the work area clean and free of debris.
- Only operate the engine in a location that has good air flow. Engine exhaust gases contain carbon monoxide (an odorless gas) that can cause asphyxiation.
- 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. Keep your feet on the ground and make sure you are stable when you put material into the chipper hopper.

6.2 Pre-Start Checklist

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

Items to Complete	✓
Read and obey the *Operating Safety on page 25*, *Engine Operation Safety on page 27, Electronic Fuel Management System Operation Safety on page 28, and Electronic Fuel Injection System Operation Safety on page 28*.	
Check the drive belt tension and alignment. Adjust if necessary. For instructions, see *Set the Drive Belt Tension on page 52.*	
Check the condition and clearance of the twig breaker, rotor knives, and ledger knife. Adjust or replace them, if necessary.	
Check the engine oil and fuel levels. If necessary, add engine oil or fuel.	
Make sure that the engine spark plug, muffler, fuel cap, and air filter cover are attached and tight.	
Check the battery and electrical harness. Make sure that all of the electrical components are in working condition and the connectors are connected. Replace damaged or corroded electrical components.	
Make sure that the machine is lubricated, as specified in the *Maintenance Schedule on page 43*.	
Remove anything that is entangled on the machine. For example, branches or vines.	
Remove all material from the rotor housing and discharge chute. For example, wood chips, bark, or leaves. Material in the rotor housing can cause the engine to stall when you start the machine.	
Make sure that the rotor bearings turn freely. If the bearings are damaged or do not turn freely, lubricate them or contact your local Wallenstein dealer to have them replaced.	
Make sure that all guards and shields are installed, and the covers are closed. Replace guards, shields, or covers, if necessary.	
Make sure that all of the fasteners are installed and torqued to the correct torque. For more information, see *Bolt Torque on page 62* and *Lug Nut Torque on page 63.*	
Make sure that the operator and spotter are wearing the necessary PPE. The PPE must be in good condition.	
Make sure that the operator and spotter are not wearing loose-fitting clothing or jewelry, and long hair is tied up.	
Make sure that there are no bystanders inside the work zone and the spotter is not near a hazard. For zone definitions, see *Work Site on page 11.*	

6.3 Machine Break-In

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

6.3.1 Before Initial Startup

1. Read and understand all safety and break-in information in this manual and the engine manufacturer's manual.
2. Review the *Machine Components on page 20.*
3. Review the operation and function of the *Controls on page 21.*
4. Complete the *Pre-Start Checklist.*

6.3.2 After One to Five Hours of Operation

Complete each of the following:

- Check the fasteners and make sure that they are torqued to the correct torque. For more information, see *Bolt Torque on page 62* and *Lug Nut Torque on page 63.*
- Check the electrical system components. Make sure that they are in working condition and the connectors are connected.
- Check the engine oil and fuel levels. If necessary, add engine oil or fuel.
- Check the drive belt tension and alignment. Adjust if necessary.
- Check the condition of the rotor bearings. Make sure that the rotor bearings turn freely.
- Check the condition and clearance of the twig breaker, rotor knives, and ledger knife. Adjust or replace them, if necessary.
- Check the tire air pressure, and the wheels, hubs, and axle. See the side of the tire for the correct air pressure.
- Remove anything that is entangled on the machine. For example, branches or vines.
- Remove 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.

6.3.3 After Eight Hours of Operation

1. Complete the tasks listed under *After One to Five Hours of Operation.*
2. Tighten the wheel lug nuts to the correct torque. For more information, see *Lug Nut Torque on page 63.*
3. Complete the *Pre-Start Checklist.*

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 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 the end of a disconnected battery cable away from the battery. Electricity can arc from the battery to the end of a battery cable and cause the battery to explode. An explosion can cause serious injury or death from heat, impact, and chemical hazards.

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

- Keep the cylinder fins and engine shrouds free of debris to prevent the engine from overheating.
- Keep the engine free of wood chips and other debris that can affect the engine speed.
- Use fresh fuel (less than three months old). Stale fuel creates deposits that cause the carburetor to be 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 tamper with governor springs, governor links or other parts that may increase the governed speed. Engine speed is selected by the original equipment manufacturer (only applies to the BXT4224).
- 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 throttle control to **Fast**, and then try to start the engine again.
- Do not hit the flywheel with a hard object or metal tool. This can cause the flywheel to shatter during operation. Use the correct tools to service the engine.
- Do not touch a hot muffler, cylinder, or fins. Contact may cause burns. Wait for the machine to cool. Use a no-touch thermometer to measure the temperature.
- Do not operate the engine in the following situations:
  - When there is an accumulation of wood chips, dirt, or other combustible materials in the muffler area.
  - In an area where there is a fuel spill. Move the machine away from the spill until the fuel evaporates.Make sure that are no sources of ignition in the area of the fuel spill.
  - With the air filter or air filter cover removed. This can damage the engine.
  - Without a muffler or heat shield. Inspect the muffler and heat shield on a regular basis. Replace muffler or heat shield that is damaged.

6.4.2 Electronic Fuel Management System Operation Safety

This section applies to the BXT4224.

The engine has an electronic fuel management (EFM) system that monitors the engine speed, temperature, and battery voltage. The EFM system cannot be adjusted.

- Never start the engine if the battery cables are loose.
- Turn the key to the OFF position or remove the starter switch before disconnecting, removing and/or installing the battery.
- Never use a battery charger to start the engine.
- Never disconnect the battery cables while the engine is running.
- When connecting the battery cables, first connect the positive (+) cable and then connect the negative (-) cable to the battery.
- When charging the battery, turn the ignition switch to the off position and disconnect the negative (-) battery cable from the battery.
- Do not spray water directly on the Electronic Control Unit.

6.4.3 Electronic Fuel Injection System Operation Safety

This section applies to the BXT6238.

The engine has an electronic fuel injection (EFI) system that monitors the engine speed, temperature, and battery voltage. The EFI system cannot be adjusted.

- Make sure that the battery cables are tight before starting the engine.
- When connecting the battery cables to the battery, first connect the positive (+) cable, and then connect the negative (-) cable.
- Turn the key to the STOP position before disconnecting, removing, or installing the battery.
- Never use a battery charger to start the engine.
- Never disconnect the battery cables while the engine is on.
- Before charging the battery, turn the ignition switch to the STOP position, and then disconnect the negative (-) battery cable from the battery.
- Do not spray water directly on the electronic control module.

6.4.4 Check the Engine Oil Level

IMPORTANT! For more information about engine oil, see the engine manufacturer's manual and *Engine Oil on page 42*.

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 32.*
3. Remove the oil-level dipstick and clean it.
4. Fully insert the oil-level dipstick.
5. Remove the oil-level dipstick and check the oil level.
   The oil level is correct when the oil is visible on the dipstick from the end to the full (upper) mark.
6. Do one of the following:
   - If the oil level is correct, continue with step 7.
   - If the oil level is low, add oil until the oil level is at the full (upper) mark. For instructions, see *Add Oil to the Engine on page 29.*
7. Install the oil-level dipstick and make sure that it is tight.

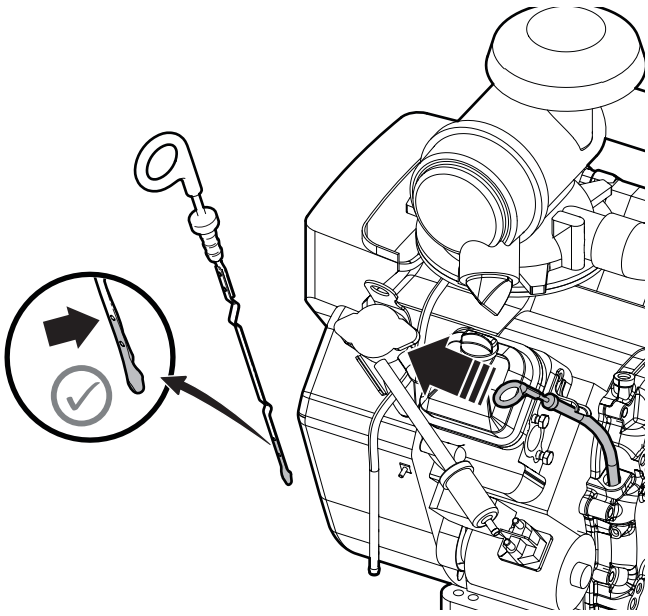


Figure 13–Engine oil level check (typical)

6.4.5 Add Oil to the Engine

IMPORTANT! For more information about engine oil, see the engine manufacturer's manual and *Engine Oil on page 42*.

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 28.*
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.

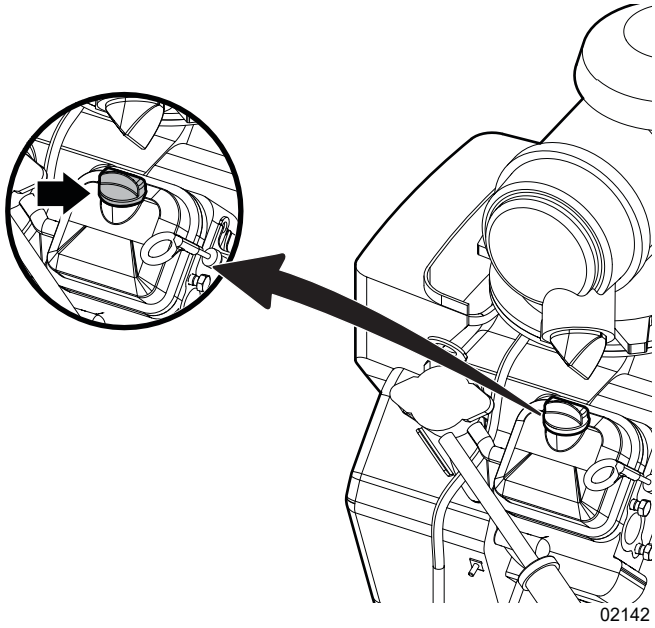


Figure 14–Engine oil-fill location (typical)

6.5 Engine Fuel Tank

On the BXT4224, the fuel tank is located at the front of the machine on the right side of the trailer tongue, inside the storage compartment.

On the BXT6238, the fuel tank is located at the front of the machine on the left side of the trailer tongue.

6.5.1 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

6.5.2 Check the Fuel Level

Check the fuel level before each use.

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

1. Park the machine on level ground.
2. Stop the machine.
   Stop the Machine on page 32.
3. Wait a minimum of five minutes for the engine to cool.
4. Turn the fuel cap counterclockwise to remove it.
5. Check the fuel level. The fuel tank is full when the fuel level is visible 1/2" (12 mm) below the filler neck. There must be room for fuel expansion.
6. Do one of the following:
   - If the fuel level is sufficient, install and the fuel cap and make sure that it is tight.
   - If the fuel level is not sufficient, add fuel to the tank. For instructions, see *Add Fuel to the Tank*.

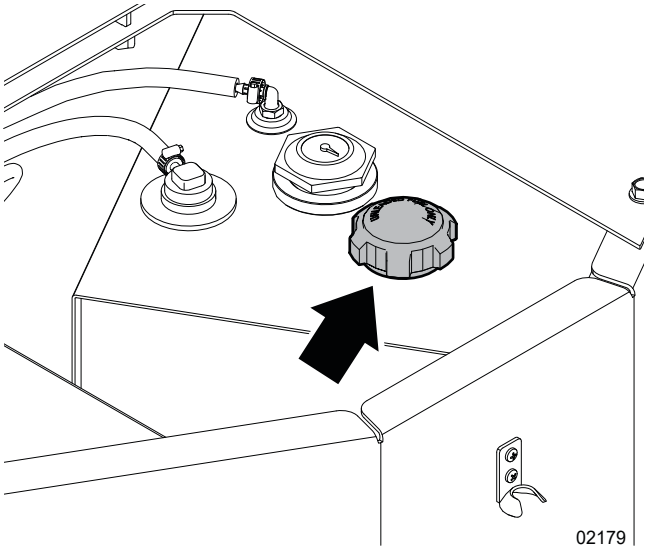


Figure 15–Fuel filler cap (BXT4224)

6.5.3 Add Fuel to the Tank

The engine needs 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 42.*

For information about the fuel that is necessary for engine use at high altitudes, see the engine manufacturer's manual.

Fuel Tank Capacity

- BXT4224 - **4.8 US gal (23 L)**
- BXT6238 - **5.5 US g (25 L)**

Procedure

1. Stop the machine.
   For instructions, see *Stop the Machine on page 32.*
2. Wait a minimum of five minutes for the engine to cool.
3. Clean the area around the fuel filler cap. See *Figure 15.*
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.

6.6 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

1. Select a work site and set up a safe work area.
   For more information, see *Work Site on page 11.*
2. Do one of the following:
   - Disconnect the machine from the tow vehicle.
     For instructions, see *Disconnect from a Ball-mount Hitch on page 37.*
   - If more stability is necessary, leave the machine attached to the tow vehicle. Set the tow vehicle's parking brake, stop the engine, and then remove the key from the ignition.
3. Lower the trailer jack to support the machine in a level position. The machine should be as level with the ground as possible.
4. Put the chipper hopper in the operating position:
   a. Remove the fasteners on the chipper hopper.
   b. Remove the pin from the chipper hopper latch
   c. Lower the chipper hopper into the operating position.
   d. Attach the chipper hopper to the machine frame. Install the fasteners.
   e. Use a callibrated torque wrench to torque the fasteners to **80 lbf•ft (110 N•m)**.
5. Turn the discharge chute to direct the wood chips away from the operator and in the direction of the wind.
   For instructions, see *Discharge Chute on page 24.*
6. Move the hood deflector to direct the wood chips further away from or closer to the machine.
   For instructions, see *Hood Deflector on page 24.*
7. Connect the battery cable.
8. Make sure that the upper rotor housing is closed and the fastener is tight.
9. Make sure that all of the guards and shields are installed and the covers are closed.

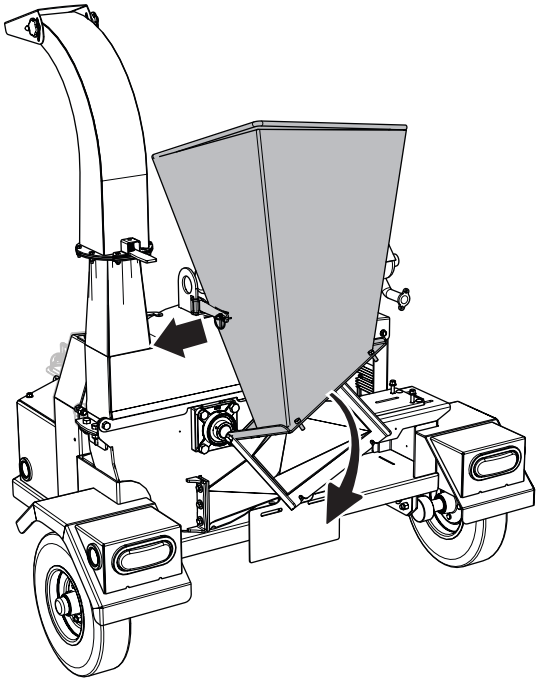


Figure 16–Set up the machine

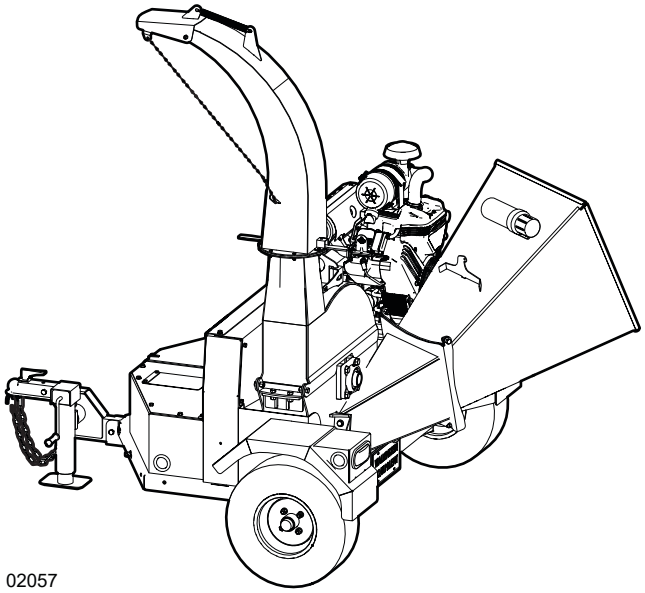


Figure 17–Operating position

6.7 Start the Machine

WARNING!

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

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

Before you start the machine, see the information under *Controls on page 21.*

1. Do the tasks described in the *Pre-Start Checklist on page 26.*
2. Make sure that the machine is set up correctly, and is in a level, stable position.
3. Move the throttle control to the **FAST** position.
4. Insert the key, and then turn the ignition switch clockwise to the **START** position. When the engine starts or after five seconds, release the key.
   The ignition switch automatically turns counterclockwise to the **RUN** position.
5. Do one of the following:
   - If the engine starts, continue with step 6.
   - If the engine does not start, wait a minimum of one minute, and then return to step 4.
6. Wait a minimum of three minutes for the rotor speed to increase.

6.8 Stop the Machine

1. Stop putting material into the machine.
2. Wait for a minimum of 30 seconds to let all the material blow out of the machine.
   Material in the rotor housing can cause the engine to stall the next time you start the machine.
3. Move the throttle control to the **SLOW** position.
4. Wait a minimum of one minute for the engine to decrease the rotor speed.
5. Turn the ignition switch to the **STOP** position.
6. Remove the key.
   Keep the key away from unapproved users and children

6.9 Emergency Stop

In an emergency:

1. Stop putting material into the machine.
2. On the engine, turn the ignition switch to the **STOP** position.
3. Remove the key and keep it with you.
   Do not let anyone start the machine until the emergency is resolved.

6.10 Operate the Wood Chipper

⚠ 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

6.10.1 Prepare the Material

- Remove the limbs from large branches and trees. The limbs on large branches that stick out of the chipper hopper can cause damager or injury.
- Cut large, curved branches into smaller, straighter sections. Some branches and brush move in unpredictable directions when they enter the roller feed.
- Hold small diameter branches together in a bundle and put them into the chipper hopper together.

6.10.2 Chip Wood

⚠ 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!

Keep hands, feet, clothing, and long hair away from the feed rollers when the machine is operating. Never climb on the feed table or hopper. The feed rollers can entangle and crush causing serious injury or death.

W023

⚠ CAUTION!

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

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

W024

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

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

1. Set up the machine.
   For instructions, see *Set Up the Machine on page 31.*
2. Prepare the material.
   For instructions, see *Prepare the Material.*
3. Start the machine.
   For instructions, see *Start the Machine on page 32.*
4. Make sure that the engine speed is set to **FAST** and the rotor is at full speed (wait three minutes).
5. Put material (branches and brush) into the chipper hopper, through the safety flap, and into the rotor. The rotor will draw material into the machine.
   Do not force material into the machine. Use a stick or branch to push any piece of material into the rotor that does not move on its own.
6. Continue to put material into the hopper at a slow, steady rate.
   If the rotor begins to slow down, stop putting material in. Let the rotor regain full speed, and then continue.

6.11 Clear a Blockage

WARNING!

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

CAUTION!

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

W003

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

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

6.11.1 Clear an Internal Blockage

WARNING!

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

CAUTION!

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

W003

IMPORTANT! Do not operate the chipper with the toplink connected to the bridge. It can cause damage to the machine.

1. Set the machine to a safe condition.
   For instructions, see *Safe Condition on page 9.*
2. Remove the upper-rotor-housing retainer bolt, and then open the upper rotor housing.
3. Remove material from the upper rotor housing and discharge chute. See *Figure 18 on page 35.*
4. Remove the fasteners from the chipper hopper.
5. Open the chipper hopper.
6. Attach the chipper hopper to the chipper hopper latch bar. Install the linchpin.
7. Remove the material from lower rotor housing.
8. 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.
9. Close the upper rotor housing.
10. Install the upper-rotor-housing retainer bolt.
    Use a calibrated torque wrench to torque the bolt to **80 lbf•ft (110 N•m)**.
11. Remove the snap-lock pin from the chipper hopper latch bar. Close the chipper hopper.
12. Install the chipper hopper fasteners.
    Use a calibrated torque wrench to torque the bolts to **80 lbf•ft (110 N•m).**
13. Start the machine to see if the blockage is cleared.
    If the machine does not operate, do steps 1-12 again until the blockage is cleared.

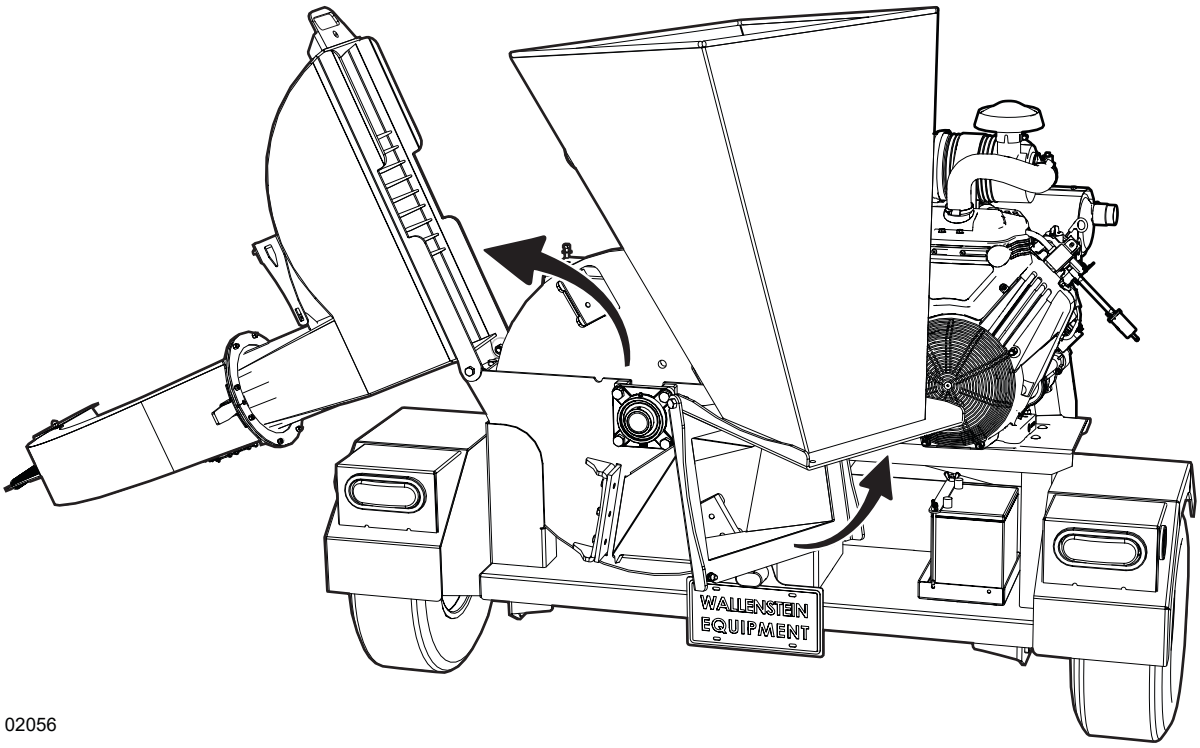


Figure 18–Clear an internal blockage

7. Transport

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

Before taking the machine on a public roadway, make sure it has the necessary lighting, reflectors, and markings, and that they are in good, working condition.

For specific requirements, contact your local transportation authority.

7.1 Transport Safety

- Make sure that the machine is safely attached to the tow vehicle with a retainer through the hitch.
- Always attach the safety chains between the machine and the tow vehicle.
- Never allow riders on the machine.
- Do not exceed a safe travel speed. Decrease your speed for rough terrain and around corners.
- Plan your route to avoid heavy traffic.
- Do not transport or move the machine with the engine on.
- Make sure that the fuel tank cap is on and tight.
- Examine wheel rims for damage, and torque the wheel lug nuts to the specified torque. For more information, see *Lug Nut Torque on page 63.*
- Examine the tires for cuts or damage.
- Make sure that the tires are filled to the specified pressure. For the correct tire pressure, see the tire sidewall.
- Examine the axle dust caps for leaks and damage. Replace a dust cap that is leaking or damaged.
- Make sure the tow vehicle has the correct size ball-mount hitch (2 inches).
- Make sure that the trailer jack is stowed.
- Make sure that all of the guards and shields are installed and the covers are closed.
- Remove all debris from the machine.
- After the machine is ready for transport, do a circle check to make sure that everything is safe and the lights function correctly.

7.2 Prepare the Machine for Transport

1. Stop the machine.
   For instructions, see *Stop the Machine on page 32.*
2. Remove all material from the chipper hopper.
3. Remove the fasteners from the chipper hopper. Open the chipper hopper and attach it to the chipper hopper latch bar. Install the linchpin.
4. Turn the discharge chute toward the back of the machine to decrease the machine width.
   For instructions, see *Discharge Chute on page 24.*
5. Make sure that the upper rotor housing is closed, and the retainer bolt is installed and tight.
6. Attach the machine to a tow vehicle.
   For instructions, see *Attach to a Tow Vehicle on page 37.*

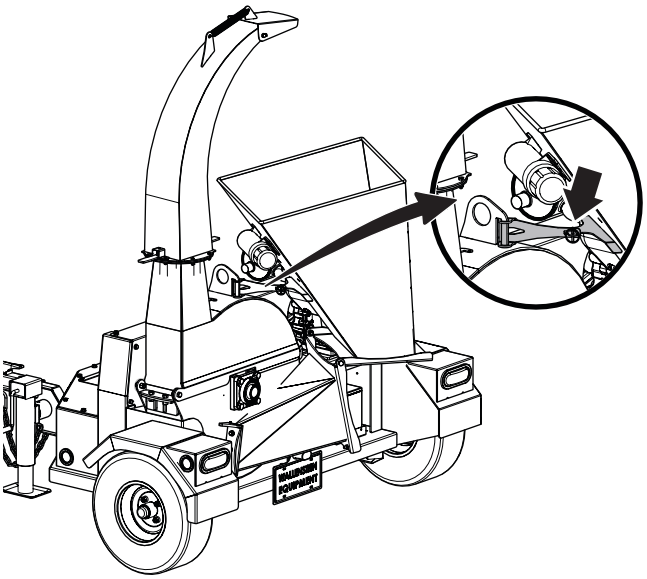


Figure 19– Attach the chipper hopper to the latch bar

7.3 Attach to a Tow Vehicle

WARNING!

Before moving the tow vehicle, make sure the safety chains are securely attached.

W103

Always park the machine on level, dry ground that is free of debris and other objects before connecting or disconnecting a hitch.

The machine has a trailer tongue with a two-inch ball-mount hitch coupler.

7.3.1 Connect to a Ball-mount Hitch

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

1. Reverse the tow vehicle to the machine. Stop approximately 1 ft (30 cm) away from the hitch coupler. If a back-up camera is not available, have another person guide you.
2. Use the trailer jack to lift the trailer tongue until the hitch coupler is higher than the ball-mount hitch.
3. Remove the pin from the hitch-coupler latch. Lift the latch to the vertical (unlocked) position.
4. Slowly, reverse the tow vehicle until the ball-mount hitch is below the hitch coupler.
5. Stop the tow vehicle and apply the parking brake.
6. Use the trailer jack to lower the machine and attach the hitch coupler to the ball-mount hitch.
7. Lower the hitch-coupler latch to the locked position. Install a pin through the latch to hold the hitch coupler on the ball-mount hitch.
8. Retract and stow the trailer jack.
   For instructions, see *Trailer Jack on page 38*.
9. Cross the two safety chains below the trailer tongue, and then attach them to the tow vehicle (one on each side of the ball-mount hitch).
10. Do the following:
    a. Connect the light-bar cable harness to the tow vehicle. Make sure the cables can make turns without tension and do not touch the ground.
    b. Operate each light and have another person make sure that it functions correctly.

7.3.2 Disconnect from a Ball-mount Hitch

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

1. Stop the tow vehicle in a location where it and the machine are on dry, level ground. Stop the engine and apply the parking brake.
2. Turn and lower the trailer jack to support the machine.
   For instructions, see *Lower the Trailer Jack on page 38*.
3. Disconnect the light-bar cable harness from the tow vehicle. Stow the cable harness on the machine in a location that prevents damage.
4. Remove the two safety chains from the tow vehicle and stow them safely on the machine.
5. Remove the pin from the hitch-coupler latch. Lift the latch to the vertical (unlocked) position.
6. Use the jack to lift the trailer tongue until the hitch coupler is higher than the ball-mount hitch.
7. Slowly, drive the tow vehicle forward until the ball-mount hitch is clear of the hitch coupler.
8. Stop the tow vehicle and apply the parking brake.
9. Use the trailer jack to lower the machine until it is level with the ground.
10. Lower the hitch-coupler latch to the locked position. Install the pin through the latch.

7.4 Trailer Jack

CAUTION!

Do not pull the pin out of a trailer jack when there is weight on the jack. The machine can move unexpectedly and cause minor to severe injuries. Attach the machine to a tow vehicle or put blocks under the trailer tongue to hold the weight before you remove the pin from a trailer jack.

The trailer jack has two functions. It supports the machine when it is not attached to a tow vehicle or helps to keep the machine stable when it is attached to a tow vehicle.

7.4.1 Lower the Trailer Jack

1. Pull the pin out of the bracket.
2. Turn the trailer jack to the vertical position.
3. Insert the pin through the bracket to hold the trailer jack in the vertical position.
4. Turn the handle clockwise to lower the base.

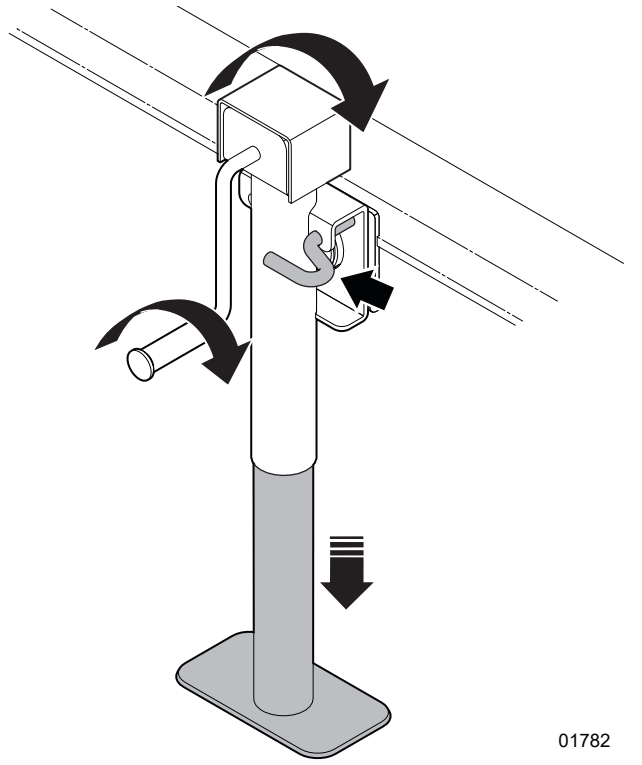


Figure 20 – Trailer jack in the lowered position

7.4.2 Stow the Trailer Jack

1. Support the machine to remove weight from the trailer jack. Attach the machine to a tow vehicle or support the trailer tongue with blocks.
2. Turn the handle counterclockwise to retract the base.
3. Pull the pin out of the bracket.
4. Turn the trailer jack to the horizontal position.
5. Insert the pin through the bracket to hold the trailer jack in the horizontal position.

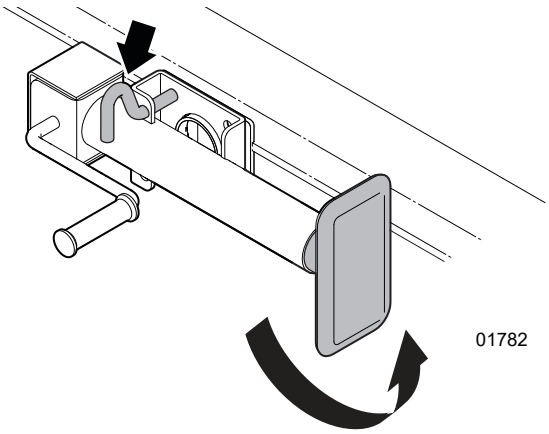


Figure 21 – Trailer jack in the stowed position

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 of the moving parts and remove all entangled material.
3. Clean the machine.
   For instructions, see *Clean the Machine on page 50.*
4. Start the machine, let it run for a few minutes to remove any moisture, and then stop the machine.
5. Do step 1 again.
6. Examine the machine fully, including internal components. Replace or repair any worn or damaged components.
7. Paint scratches and dents to prevent rust.
8. Do one of the following:
   - If the machine will be in storage for one to three months, add stabilizer to the engine fuel, and then operate the engine for a minimum of three minutes to move the stabilizer through the engine.
   - If the machine will be in storage for longer than three months, replace the engine fuel with an alkylate or appropriate engineered fuel. These fuel types prevent the buildup of deposits in the engine.
     For more information, see *Engine Fuel on page 42.*
     For instructions, see *Replace the Engine Fuel on page 40.*
9. Park the machine in the storage location.
10. Disconnect the tow vehicle.
    For instructions, see *Disconnect from a Ball-mount Hitch on page 37.*
11. Adjust the trailer jack to make the machine as level as possible.
    If the machine must be on soft ground, put boards or plates under the jack stand to increase the surface area.
12. Block the machine wheels to prevent accidental movement and increase the wheel bearing life.
13. Remove the battery.
    Store the battery in a cool, dry place, where it cannot freeze. Connect a battery maintainer to keep it at full charge. For instructions, see *Remove the Battery on page 49.*
14. If the machine must be stored outdoors, cover the machine with a waterproof tarp.
    The machine should be stored indoors, if possible.

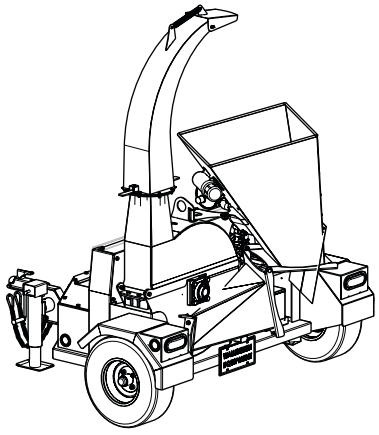


Figure 22–Storage position

8.3 Remove the Machine from Storage

1. Install the battery.
   For instructions, see *Install the Battery on page 49.*
2. Do the *Pre-Start Checklist on page 26*.
3. Do the necessary maintenance.
   For necessary maintenance, see the *Maintenance Schedule on page 43*.

8.3.1 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 32*.
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 Tank on page 30*.
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 32*.
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 32*.

9. Service and Maintenance

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

9.1 Service and Maintenance Safety

⚠ WARNING!

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

W033

⚠ WARNING!

Before you start service or maintenance work:

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

W041

⚠ WARNING!

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

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

W101

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

SAFE CONDITION

1. If the machine is attached to a tow vehicle, set the tow vehicle's parking brake, stop the tow vehicle, and remove the ignition key.
2. Stop the machine.
   For instructions, see *Stop the Machine on page 32*.
3. Disconnect the engine spark-plug wire and keep it away from the spark plug.
4. Disconnect the cable from the negative (-) battery terminal and keep it away from the battery.
5. Remove all material from the chipper hopper.
6. Wait until the engine and machine are cool.

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

9.2 Fluids and Lubricants

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

9.2.1 Lubricant Handling and Storage

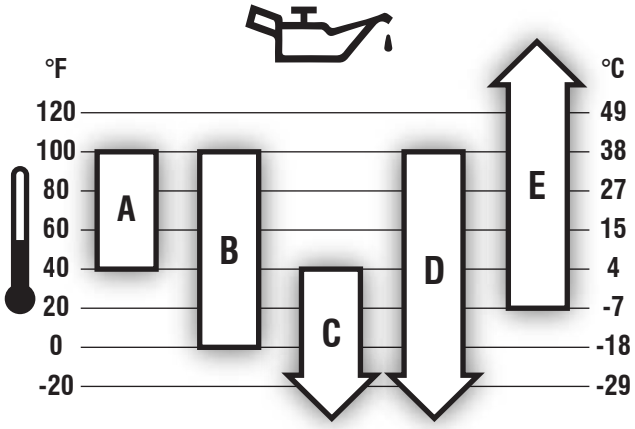
For optimal machine efficiency, use clean lubricants and clean containers to handle all lubricants. Store lubricants in a location that is protected from dust, moisture, and other contaminants.

9.2.2 Engine Oil

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

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

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



A **SAE 30** – Below 40 °F (4 °C) the use of SAE 30 results in hard starting.

B **10W-30** – Above 80 °F (27 °C) the use of 10W-30 can cause increased oil consumption. Check the oil level frequently.

C **5W-30**

D **Synthetic 5W-30**

E **Vanguard® Synthetic 15W-50**

9.2.3 Engine Fuel

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

Fuel must meet the following specifications:

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

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

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

For instructions, see *Replace the Engine Fuel on page 40*.

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 chain saw maintenance requirements, see the chain saw manufacturer's manual.

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	250 hours or annually	400 hours or annually	Reference
Check the engine oil level and quality.	●					See *page 28.*
Check the engine fuel level.	●					See *page 30.*
Clean the engine around the muffler and controls.	●					N/A[1].
Check that all fasteners are torqued to the specified torque.	●					See *page 62.*
Check that the wheel lug nuts are torqued to the specified torque.	●					See *page 63.*
Remove all debris and entangled material.	●					N/A.
Check the drive belt operation.	●					See *page 51.*
Check the rotor knife, ledger knife, and twig breaker sharpness.		●				See *page 55.*
Check the battery condition.		●				See *page 49.*
Lubricate pivot points and hinges.		●				See *page 46.*
Grease the machine.		●				See *page 45.*
Check the drive belt tension and alignment.		●				See *page 51.*
Check the tire pressure.			●			See the tire sidewall.
Clean the machine.			●			See *page 50.*
Clean the engine air filter.[2]			●			See *page 48.*
Service the engine exhaust system.			●			See the engine manual.
Change the engine oil and replace the oil filter.			●			See the engine manual.
Replace the engine spark plug.			●			See the engine manual.
Check the valve clearance.				●		See the engine manual.
Replace the engine fuel filter.					●	See the engine manual.
Service the engine cooling system.[2]					●	See the engine manual.
Replace the engine air filter.[3]					●	See the engine manual.
Clean the oil-cooler fins.[2]					●	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.
3 Every third air filter change, replace the air safety filter.

9.4 Grease Points

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

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

For grease specifications, see *Grease on page 42*.

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

9.4.1 Grease Fitting Locations

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

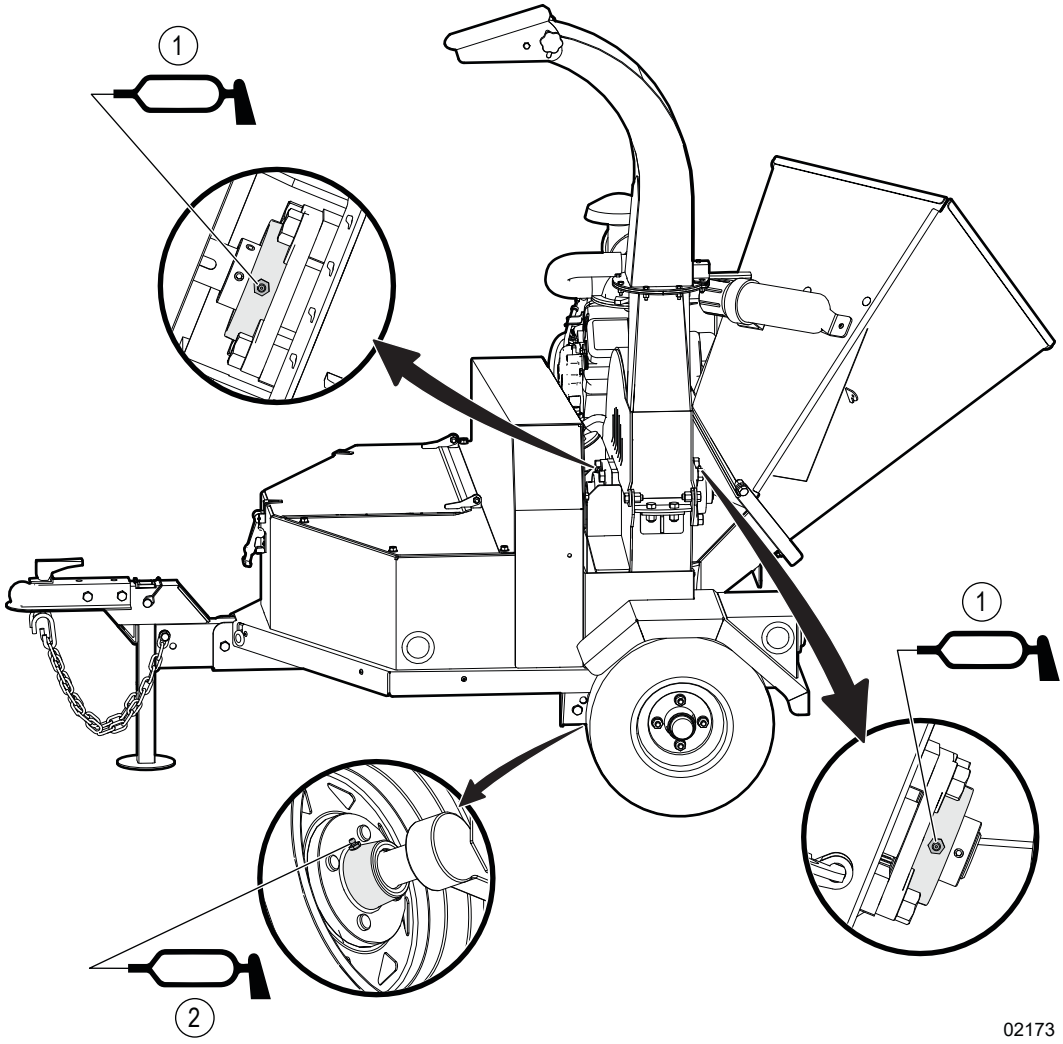


Figure 23– Grease fitting locations - left side

9.4.2 Hinge and Pivot Point Locations

Item	Location	Frequency	Number of Locations
1	Discharge chute and hood deflector	50 hours or annually	2
2	Trailer jack and hitch coupler	50 hours or annually	2

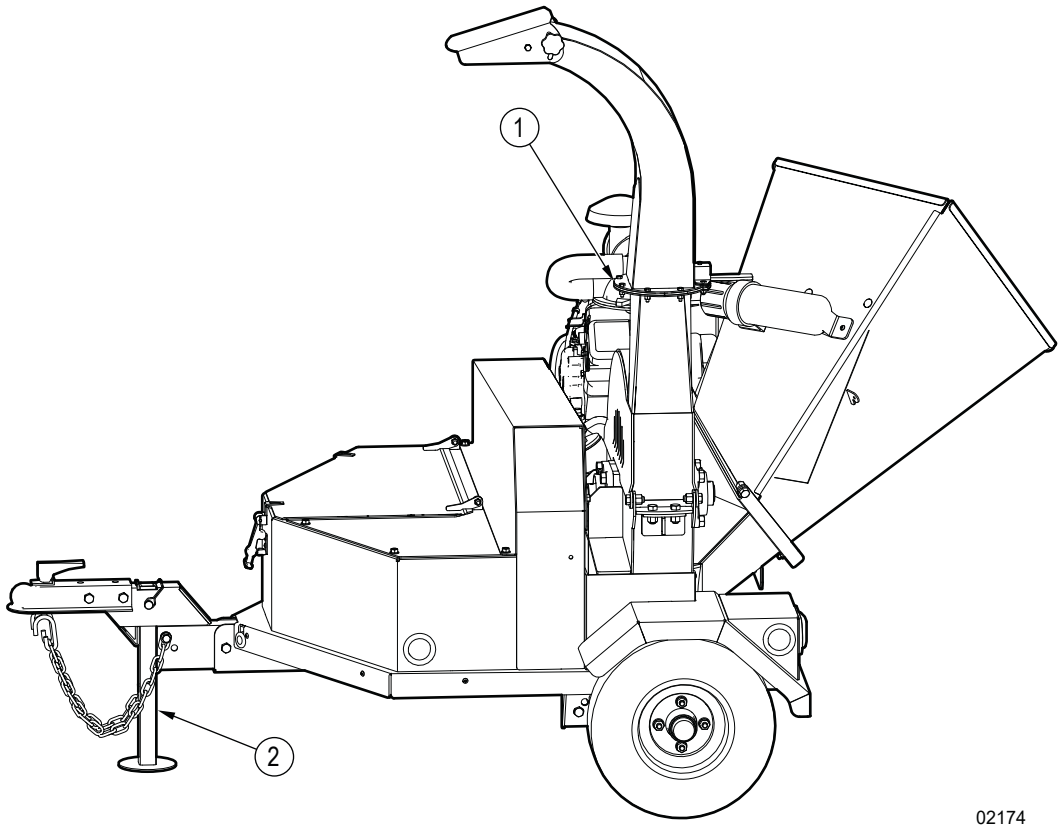


Figure 24–Hinge and pivot point greasing locations

9.5 Engine Maintenance

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

9.5.1 Engine Maintenance Safety

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 the end of a disconnected battery cable away from the battery. Electricity can arc from the battery to the end of a battery cable and cause the battery to explode. An explosion can cause serious injury or death from heat, impact, and chemical hazards.

For more information, see *Engine Operation on page 27.*

- Remove the wire from the spark plug before servicing the engine or equipment to prevent the engine from starting.
- Examine the muffler on a regular basis to make sure that it operates effectively. Repair or replace a worn or leaking muffler.
- Before storage, replace fuel that contains ethanol with an alkylate or appropriate engineered fuel to prevent the buildup of deposits.
- Check the fuel lines and fittings frequently for cracks or leaks. Replace damaged fuel lines or fittings, if necessary.
- Store fuel away from all wood material.
- Do not check for a spark with the spark plug or spark plug wire removed.
- Do not hit the flywheel with a hard object or metal tool. This can cause the flywheel to shatter during operation. Use the correct tools to service the engine.
- Do not touch a hot muffler, cylinder, or fins. Contact can cause burns.

9.5.2 Electronic Fuel Management System Maintenance Safety

This section applies to the BXT4224.

The engine has an electronic fuel management (EFM) system that monitors the engine speed, temperature, and battery voltage. The EFM system cannot be adjusted.

For more information, see *Electronic Fuel Management System Operation Safety on page 28.*

- Never start the engine if the battery cables are loose.
- Turn the key to the OFF position or remove the starter switch before disconnecting, removing and/or installing the battery.
- Never use a battery charger to start the engine.
- Never disconnect the battery cables while the engine is running.
- When connecting the battery cables, first connect the positive (+) cable and then connect the negative (-) cable to the battery.
- When charging the battery, turn the ignition switch to the off position and disconnect the negative (-) battery cable from the battery.
- Do not spray water directly on the Electronic Control Unit.

9.5.3 Electronic Fuel Injection System Maintenance Safety

This section applies to the BXT6238.

The engine has an electronic fuel injection (EFI) system that monitors the engine speed, temperature, and battery voltage. The EFI system cannot be adjusted.

For more information, see *Electronic Fuel Injection System Operation Safety on page 28.*

- When connecting the battery cables to the battery, first connect the positive (+) cable, and then connect the negative (-) cable.
- Turn the key to the **STOP** position before disconnecting, removing, or installing the battery.
- Never use a battery charger to start the engine.
- Never disconnect the battery cables when the engine is on.
- Before charging the battery, turn the ignition switch to the **STOP** position, and then disconnect the negative (-) battery cable from the battery.
- Do not spray water directly on the electronic control module.

9.5.4 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 100 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. Open the two air-filter cover latches.
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. Close the two air-filter cover latches.

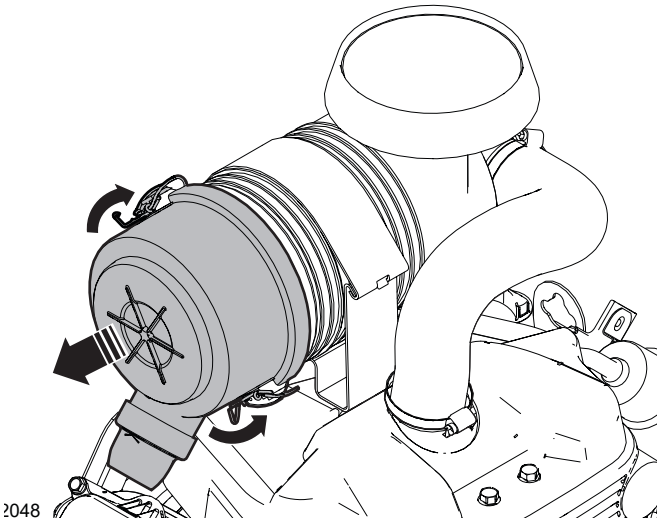


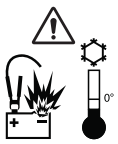
Figure 25–Remove the air-filter cover

9.6 Battery Maintenance

For more information, see *Electronic Fuel Management System Maintenance Safety on page 47 and Electronic Fuel Injection System Maintenance Safety on page 47.*

9.6.1 Battery Safety

WARNING!



Charging a frozen battery can cause it to explode. Warm the battery to 60 °F (16 °C) before charging.

W030

CAUTION!

Risk of burns! Battery electrolyte is extremely corrosive and poisonous. Contact with the eyes, skin, or clothing can result in severe burns or other serious personal injury. If contact occurs seek medical attention immediately. Handle batteries carefully.

W020

CAUTION!

Risk of explosion or fire! Do not let metal objects come in contact with the battery terminals. Arcing can cause a fire or explosion. Cover terminals if working near batteries.

W021

- Keep all sparks and flames away from batteries. Electrolyte fumes are explosive.
- Do not jump start a frozen battery. The battery can explode.
- Wear the appropriate gloves and protective glasses, goggles, or a face shield when working on or near batteries.
- Use a battery carrier to lift the battery or place your hands at opposite corners to avoid spilling acid through the vents.
- Avoid contact with battery electrolyte:
  - **External contact**: flush immediately with water.
  - **Eye contact**: flush with water for 15 minutes. Get prompt medical attention. Clean up spilled electrolyte immediately.
- Avoid contact with the battery posts, terminals, and related accessories. They contain lead and lead compound chemicals that are known to cause harm if they are ingested. Wash your hands immediately after handling a battery.

- To avoid injury from a spark or short circuit, disconnect the battery ground cable before servicing any part of the electrical system.

9.6.2 Remove the Battery

1. Disconnect the battery cable from the negative (–) battery terminal.
2. Disconnect the battery cable from the positive (+) battery terminal.
3. Remove the battery hold-down bracket.
4. Remove the battery from the machine.

9.6.3 Install the Battery

1. Put the battery on the machine.
2. Install the battery hold-down bracket.
   Make sure that the battery cannot move.
3. Connect the positive (+) battery cable (usually red) to the positive (+) battery terminal.
4. Connect the then negative (–) battery cable (usually black) to the negative (–) battery terminal.
5. Apply a coat of dielectric grease or petroleum jelly to each battery terminal.

9.6.4 Clean the Battery

When the battery cable ends are not connected to the battery terminals, keep them away from the battery.

1. Disconnect the battery cable from the negative (–) battery terminal.
2. Disconnect the battery cable from the positive (+) battery terminal.
3. Coat the battery terminals and battery-cable ends with baking soda.
4. Pour a small amount of water over the baking soda.
5. Use a wire brush to clean the battery cable ends and the terminals.
6. Rinse the battery cable ends and terminals with clean water.
7. Wait until all of the water evaporates or use compressed air to remove the water. Make sure that the battery cable ends and terminals are fully dry before connecting them.
8. Connect the positive (+) battery cable (usually red) to the positive (+) battery terminal.
9. Connect the negative (–) battery cable (usually black) to the negative (–) battery terminal.
10. Apply a coat of dielectric grease or petroleum jelly to each battery terminal.

9.6.5 Charge the Battery

IMPORTANT! Do not fast charge the battery. Use a battery charger that is between 4 A and 7.5 A. Never use a charger that is higher than 10 A.

Always read and follow the information that is provided with the battery and the battery charger. For more information and instructions, contact the battery manufacturer and battery charger manufacturer.

1. Remove the battery from the machine.
   For instructions, see *Remove the Battery*.
2. Use a battery carrier or put your hands on opposite corners to lift the battery out of the machine.
   Keep the battery level to avoid spilling battery acid through the vents.
3. Put the battery in a dry, cool place that is away from activity and has good air flow.
4. Use a battery charger to charge the battery.
   For instructions, see the battery charger manufacturer information.

9.7 Tire Maintenance

WARNING!

Failure to follow the proper 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 every 100 hours of operation or annually.

- Tighten the wheel lug nuts to the correct torque daily. For torque specifications, see *Lug Nut Torque on page 63*.
- Check the tire pressure before towing the machine on a roadway. See the tire sidewall for the correct pressure.

9.8 Clean the Machine

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

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 bearings. Do not direct the spray from a pressure washer directly onto bearings.

IMPORTANT! Do not spray water directly on any electrical components, including the engine's EFM or EFI electronic control module, or any electrical cables.

1. Use a hose or pressure washer and mild detergent to remove dust, dirt, and debris.
2. Use a clean, soft cloth, that is dampened with water to remove dirt from the product identification plate.
3. Start the machine.
   For instructions, see *Start the Machine on page 32*.
4. Let the engine run for a few minutes to dry.
5. Stop the machine.
   For instructions, see *Stop the Machine on page 32*.
6. Apply grease to the areas where the pressure washer may have removed it.
   For instructions, see *Grease Points on page 44*.

9.9 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

9.9.1 Replace the Drive Belt

IMPORTANT! After the rotor drive belt is replaced, set the belt tension and make sure that the alignment is correct.

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. See *Figure 26.*
3. Turn the drive-belt tensioning bolt to move the engine and remove tension from the drive belt. See *Figure 27*.
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 52.*
7. Set the drive belt tension.
   For instructions, see *Set the Drive Belt Tension on page 52.*
8. Install the drive-belt guard and fasteners.
9. Use a calibrated torque wrench to torque the bolts to **33 lbf•ft (45 N•m)**.

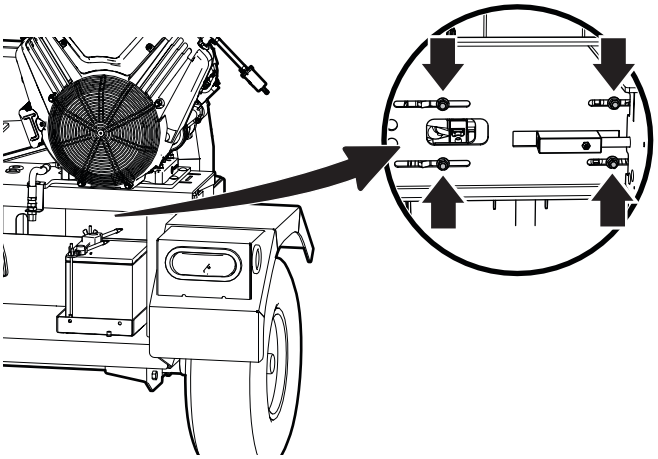


Figure 26–Engine mount bolts

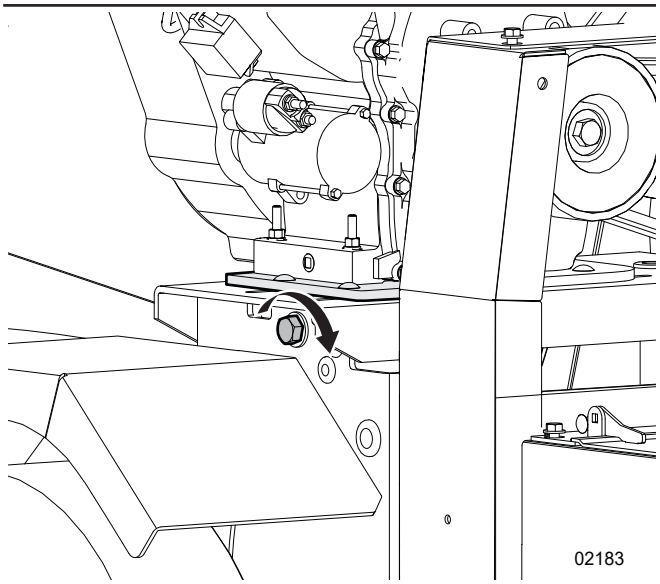


Figure 27–Drive belt tensioning bolt

9.9.2 Set the Drive Belt Tension

Check the drive belt tension after every 100 hours of operation.

1. Press on the top centre of the rotor drive belt and measure the distance it moves. See *Figure 28 on page 53.*
2. Do one of the following:
   - If the drive belt movement measures **between 3/8" (10 mm) and 7/16" (12 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. See *Figure 26 on page 51.*
4. Use the drive-belt tensioning bolt to set the drive belt tension. See *Figure 27*.
5. Do steps 1, 2, and 4 again, until the drive belt tension is correct.
6. Tighten the four engine mount bolts.
7. Do step 1 again.
8. Do one of the following:
   - If the belt tension is correct, continue with step 9.
   - If the belt tension is not correct, do steps 3 through 7 again.
9. Align the drive belt.
   For instructions, see *Align the Drive Belt.*
10. Use a calibrated torque wrench to torque the four engine mount bolts to **19 lbf•ft (25 N•m)**.
11. Check the drive belt tension again after 10 hours of operation.

9.9.3 Align the Drive Belt

A laser alignment tool or 50" (127 cm) straight edge is necessary for this procedure. A laser alignment tool is the most accurate.

Check the drive belt alignment after every 8 hours of operation.

The maximum 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. See *Figure 29 on page 53.*
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 51.*
   - 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 53.*
   - The rotor sheave.
     For instructions, see *Align the Rotor Sheave on page 54.*

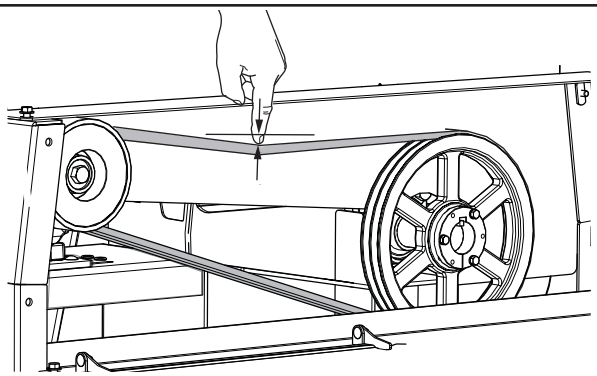


Figure 28–Check the drive belt tension

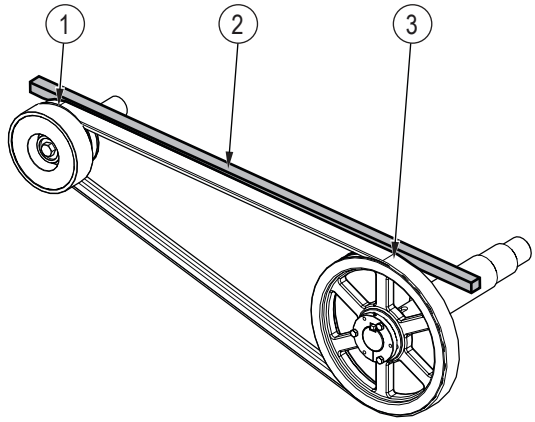


Figure 29–Check the drive belt alignment

1. Clutch flywheel
2. Straight edge
3. Rotor sheave

9.9.4 Align the Engine Mount

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

1. Loosen (do not remove) the four engine mount bolts. See *Figure 26 on page 51.*
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 52.*
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 52.*

9.9.5 Align the Rotor Sheave

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

The numbers in brackets refer to *Figure 30.*

1. Remove the set screw (1) from the sheave (6).
   Put the set screw aside. It is necessary for assembly.
2. Remove the sheave bolts (5).
3. Thread the sheave bolts into the puller holes (4) on the sheave hub (2).
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 52.*
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 three sheave bolts to **19 lbf•ft (25 N•m)**.
16. Check the drive belt tension.
    For instructions, see *Set the Drive Belt Tension on page 52.*

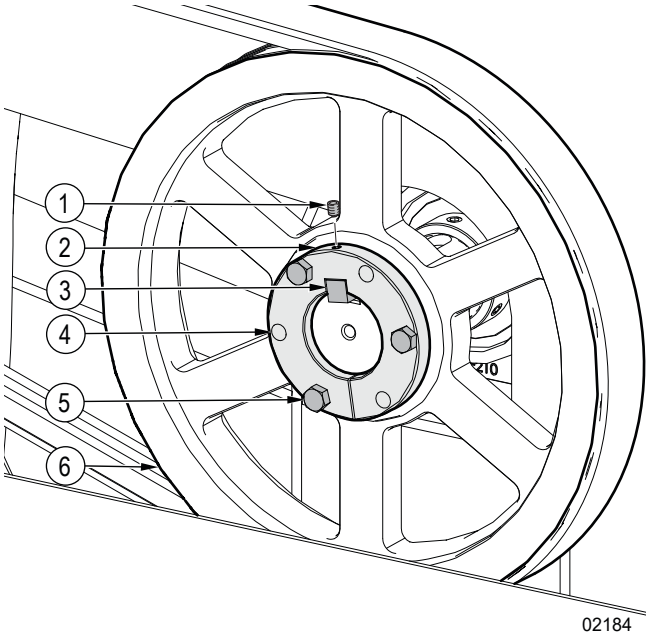


Figure 30 – Rotor sheave

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

9.10 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!

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

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

9.10.1 Replace a Rotor Knife

1. Stop the engine. Wait for the rotor to stop turning.
   For instructions, see *Stop the Machine on page 32.*
2. Remove the fastener 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 56.*
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. See *Figure 31.*
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 fastener.
15. Use a calibrated torque wrench to torque the fastener **80 lbf•ft (110 N•m)**.

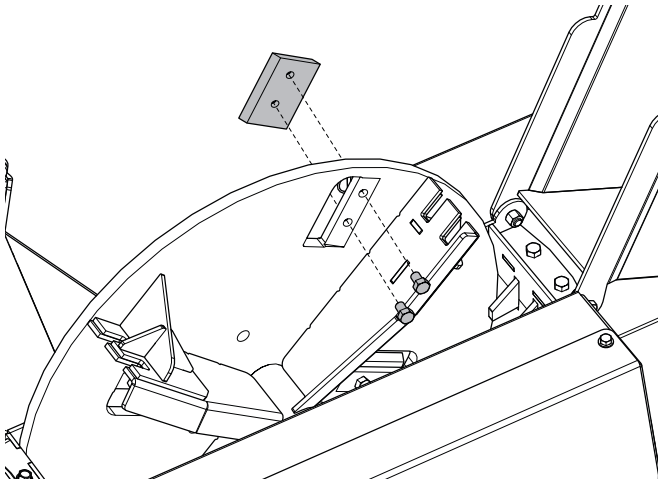


Figure 31 – Install a rotor knife

9.10.2 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 55.*
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. See *Figure 32.*
6. Do steps 4 and 5 for the opposite cutting edge.
7. Do steps 1 to 5 for the remaining rotor knives.

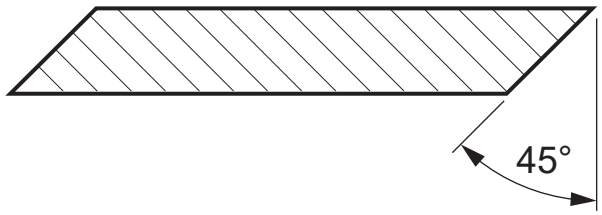


Figure 32– Sharpen rotor knives to a 45° angle

9.11 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

9.11.1 Replace a Ledger Knife

1. Stop the engine. Wait for the rotor to stop turning.
   For instructions, see *Stop the Machine on page 32.*
2. Remove the fastener 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 57.*
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 57.*
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 fastener.
11. Use a calibrated torque wrench to torque the fastener to **80 lbf•ft (110 N•m).**

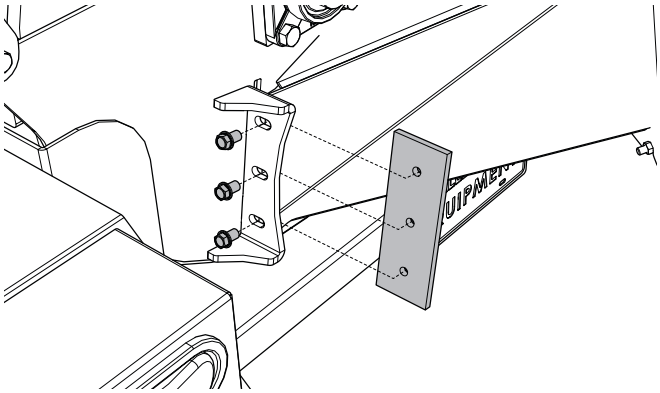


Figure 33–Install a ledger knife

9.11.2 Sharpen a Ledger Knife

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

1. Remove the ledger knife from the machine.
   For instructions, see *Replace a Ledger Knife on page 56.*
2. Clean the ledger knife.
3. Examine the ledger knife for damage. If a ledger knife is damaged, replace the ledger knife.
4. Put the ledger knife in a bench vice with the cutting edge facing up.
   Make sure that the ledger knife is clamped safely in the bench vice.
5. Use a grinder to sharpen the cutting edge of the ledger knife to a 90-degree angle. See *Figure 34.*
6. Do steps 4 and 5 for the opposite cutting edge.

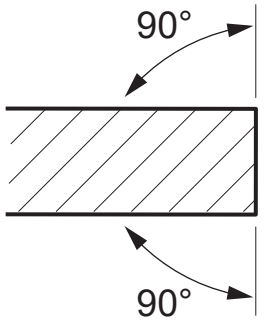


Figure 34–Sharpen a ledger knife

9.11.3 Set the Ledger Knife Clearance

1. Stop the engine. Wait for the rotor to stop turning.
   For instructions, see *Stop the Machine on page 32.*
2. Remove the fastener 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 fastener.
10. Use a calibrated torque wrench to torque the fastener to **80 lbf•ft (110 N•m)**.

9.12 Twig Breaker Maintenance

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

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

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 32.*
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 **80 lbf•ft (110 N•m).**

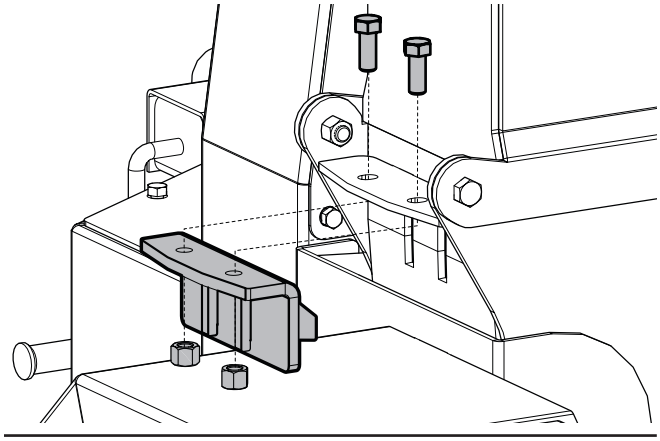


Figure 35–Install a twig breaker

10. Troubleshooting

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*.

Problem	Possible cause	Solution
The rotor does not turn.	The discharge chute is obstructed.	Clear debris from the discharge chute.
	The rotor is blocked.	Clear the blockage. For instructions, see *page 34*.
	The drive belt is loose or broken.	Set the drive belt tension. For instructions, see *page 52*.
	The clutch is seized.	Replace the clutch.
Material is moving into the machine too slowly.	The engine or rotor speed is too slow.	Set the engine throttle to **Fast** to increase the rotor RPM. See *page 21*.
	The knives are not sharp or the clearance is incorrect.	Check the rotor and ledger knives. Rotate, sharpen, or replace the knives, if necessary. For instructions, see *page 56* and *page 57*.
	The rotor knife angle is incorrect.	Sharpen the rotor knives to the specified 45° angle and check that knives are installed correctly. For instructions, see *page 56*.
	The discharge chute is obstructed.	Clear all debris from the discharge chute.
There is unusual machine vibration during operation.	A rotor knife is broken or missing.	Check the rotor knives. Rotate, sharpen, or replace the knives, if necessary. For instructions, see *page 55*.
	The rotor may be bent.	Turn the rotor to see if it wobbles. If the rotor wobbles, replace the rotor.
	The rotor bearings failed.	Replace the rotor bearings.
	Fasteners are loose.	Use a calibrated torque wrench to tighten the fasteners to the specified torque. For specifications, see *page 62*.
The engine does not start.	The upper rotor housing is open.	Close the upper rotor housing and install the fastener.. Make sure that the safety-interlock switch cable is connected.
	There is a problem with the engine.	See the engine manufacturer's manual.
	The clutch is seized.	Replace the clutch.
The wood chip quality is poor.	The knives are not sharp.	Rotate, sharpen, or replace the knives, if necessary. For instructions, see *page 55* and *page 56*.
	The rotor drive belt is loose or worn.	Inspect the rotor drive belt. Adjust the tension or replace the rotor drive belt, if necessary. For instructions, see *page 51*.
	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 space. For instructions, see *page 57*.

Problem	Possible cause	Solution
The machine needs excessive power or the engine stalls.	The discharge chute is obstructed.	Clear all debris from the discharge chute.
	Too much material is being put into the chipper hopper.	Place smaller amounts of material in the chipper hopper.
	Material is being put into the chipper hopper too quickly.	Place large material into the chipper hopper slowly.
	The rotor is blocked.	Clear the blockage. For instructions, see *page 34*.
	Wet (green) material does not discharge.	Wait for the material to dry or alternate between dry and wet material.
	The ledger knife clearance is incorrect.	Use a ledger-knife clearance gauge to set the correct space. For instructions, see *page 57*.
	The knives are not sharp or the clearance is incorrect.	Check the rotor and ledger knives. Rotate, sharpen, or replace the knives, if necessary. For instructions, see *page 55* and *page 56*.
	There is a problem with the engine.	See the engine manufacturer's manual.
The drive belt is noisy or there is premature wear.	The drive belt is loose, worn, or the tension is too tight.	Examine the drive belt. Adjust the tension or replace the drive belt, if necessary. For instructions, see *page 51*.
	An incorrect replacement belt was installed.	Replace the drive belt. For instructions, see *page 51*.
	The rotor sheave is misaligned.	Check the rotor sheave alignment. Adjust the alignment, if necessary. For instructions, see *page 54*.
	The rotor is blocked.	Clear the blockage. For instructions, see *page 34*.
	The rotor sheave is worn.	Inspect the rotor sheave and bearings. Replace components, if necessary.
	There is lubricant (for example, oil or grease) on the drive system components.	Find the source of the lubricant and correct the situation. Clean the drive system components. The drive belt may need to be replaced.
	The rotor bearings are worn or damaged.	Inspect the rotor bearings. Replace a worn or damaged bearing.

11. Specifications

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

For available accesories, go to WallensteinEquipment.com.

11.1 Machine Specifications[1]

Parameter	BXT4224	BXT6238
Engine make and horsepower (displacement)	Vanguard® 23 hp (627 cc) EFM	Vanguard® 40 hp (993 cc) EFI
Fuel tank capacity	4.8 US g (23 L)	5.5 US g (25 L)
Drive system	Belt drive, centrifugal clutch	
Chipper capacity	4" diameter (10.1 cm) Max. 10" slab (25.4 cm)	6" diameter (15.2 cm) Max. 12" slab (30.5 cm)
Chipper housing opening	4" x 10" (10.1 cm x 25.4 cm)	6-½" x 12" (16.5 cm x 30.5 cm)
Rotor diameter	25" (63.5 cm)	30" (76.2 cm)
Number of rotor knives	Two	Four, segmented
Knife type	Hardened tool steel	
Rotor weight	74 lb (33.6 kg)	197 lb (89.4 kg)
Feed system	Self-feed	
Mounting system	Trailer	
Dimensions: folded (L x W x H)	92" x 59" x 71-½" (234 cm x 150 cm x 181 cm)	102" x 74-½" x 90" (259 cm x 189 cm x 229 cm)
Tongue weight	24 lb (19 kg)	80 lb (36 kg)
Hopper opening (L x W)	20" x 20" (51 cm x 51 cm)	25" x 25" (64 cm x 64 cm)
Discharge chute rotation	270 degrees	
Discharge chute height	71-½" (181 cm)	90" (229 cm)
Rated speed	1280 rpm	
Weight	825 lb (374 kg)	1385 lb (629 kg)
Tire size	4.8 x 8	20.5 x 8-10

1 Specifications are subject to change without notice.

11.2 Bolt Torque

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

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

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

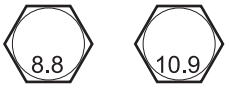
These bolt torque specification tables provide the correct torque settings for common bolts and capscrews. Tighten all bolts to the torque that is specified in the table, unless otherwise indicated. Check the bolt tightness periodically.

Imperial Bolt Torque Specifications

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

Metric Bolt Torque Specifications

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



11.3 Lug Nut Torque

⚠ WARNING!

Wheel lug nuts must be installed and kept at the correct torque to prevent loose wheels, broken studs, or possible separation of a wheel from the axle.

It is an extremely important safety procedure to apply and maintain the correct torque on lug nuts that secure the wheel to the trailer axle. A calibrated torque wrench is the best tool to make sure that the correct amount of torque is applied to a fastener.

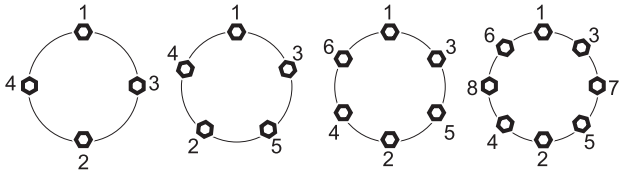
Tighten wheel lug nuts to the correct torque before the first use and after each wheel removal. After a wheel is installed, check and torque the lug nuts after the first 10 miles (16 km), 25 miles (40 km), and 50 miles (80 km). Check the lug nut torque periodically thereafter.

- Start all lug nuts onto the threads by hand.
- Tighten lug nuts in stages, following the pattern shown below the Lug Nut Torque Specifications table.

Lug Nut Torque Specifications

Wheel size	Units	First stage	Second stage	Third stage
8 inch	lbf•ft N•m	12–20 16–26	30–35 39–45.5	45–55 58.5–71.5
12 inch	lbf•ft N•m	20–25 26–32.5	35–40 45.5–52	50–60 65–78
13 inch	lbf•ft N•m	20–25 26–32.5	35–40 45.5–52	50–60 65–78
14 inch	lbf•ft N•m	20–25 26–32.5	50–60 65–78	90–120 117–156
15 inch	lbf•ft N•m	20–25 26–32.5	50–60 65–78	90–120 117–156
16 inch	lbf•ft N•m	20–25 26–32.5	50–60 65–78	90–120 117–156

Lug nut torque pattern:



4 bolts 5 bolts 6 bolts 8 bolts

12. Product 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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13. Index

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