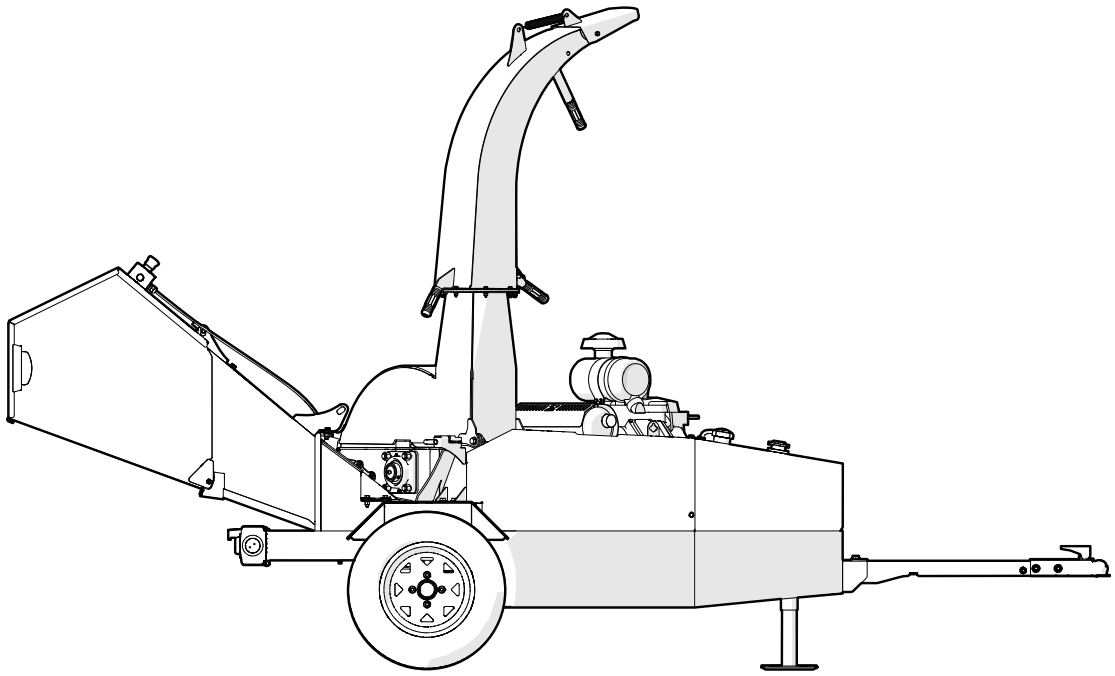
OPERATOR'S MANUAL

Serial numbers 1101426 and up

BXT72S
Wood Chipper



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WALLENSTEIN

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WallensteinEquipment.com

1. Introduction

⚠ WARNING!

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

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

W034

Congratulations on your choice of a Wallenstein BXT72S wood chipper!

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

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

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

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 Wood Chipper

To activate the warranty, register your product at WallensteinEquipment.com.

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

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

Customer

Address

City, State/Province, ZIP/Postal Code

( )
Phone Number

Contact Name

Model

Serial Number

Delivery date

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

Dealer

Address

City, State/Province, ZIP/Postal Code

( )
Phone Number

Dealer Inspection Checklist

_____ Rotor turns freely and the knife clearance is correct.
_____ All cutting edges are sharp and in working condition.
_____ Lock pins align and move freely.
_____ Discharge chute and deflector move freely.
_____ All belts are aligned and the tension is correct.
_____ All fasteners are torqued to the correct specifications.
_____ All grease points are lubricated.
_____ Engine clutch and rotor sheave align.
_____ Engine starts and operates, and fluid levels are correct.
_____ Tire pressure is correct (see the tire sidewall).
_____ Tires are in working condition.
_____ Purchased accessories are included, if applicable.
_____ Operator's Manual is in the storage tube.
_____ Battery is fully charged.
_____ The chipper hopper hinge moves freely and the latch works correctly.
_____ The wire connections are in good condition and connected correctly.

Safety Checks

_____ All safety labels are applied and legible.
_____ Operating and safety instructions were reviewed.
_____ All guards and shields are installed, and the covers are closed.
_____ Emergency stop button functions correctly.
_____ A retainer is installed through each hitch point.
_____ Safety chains are on the ball-mount hitch.
_____ Safety curtain is in the chipper hopper.
_____ Trailer jack functions correctly.
_____ Wheel lug nuts are torqued to the correct specification.
_____ All lights operate correctly (for example; running, brake, turn signal, license plate).

1.2 Serial Number Location

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

Record the serial number of your product here

Model	**BXT72S**
Serial Number	

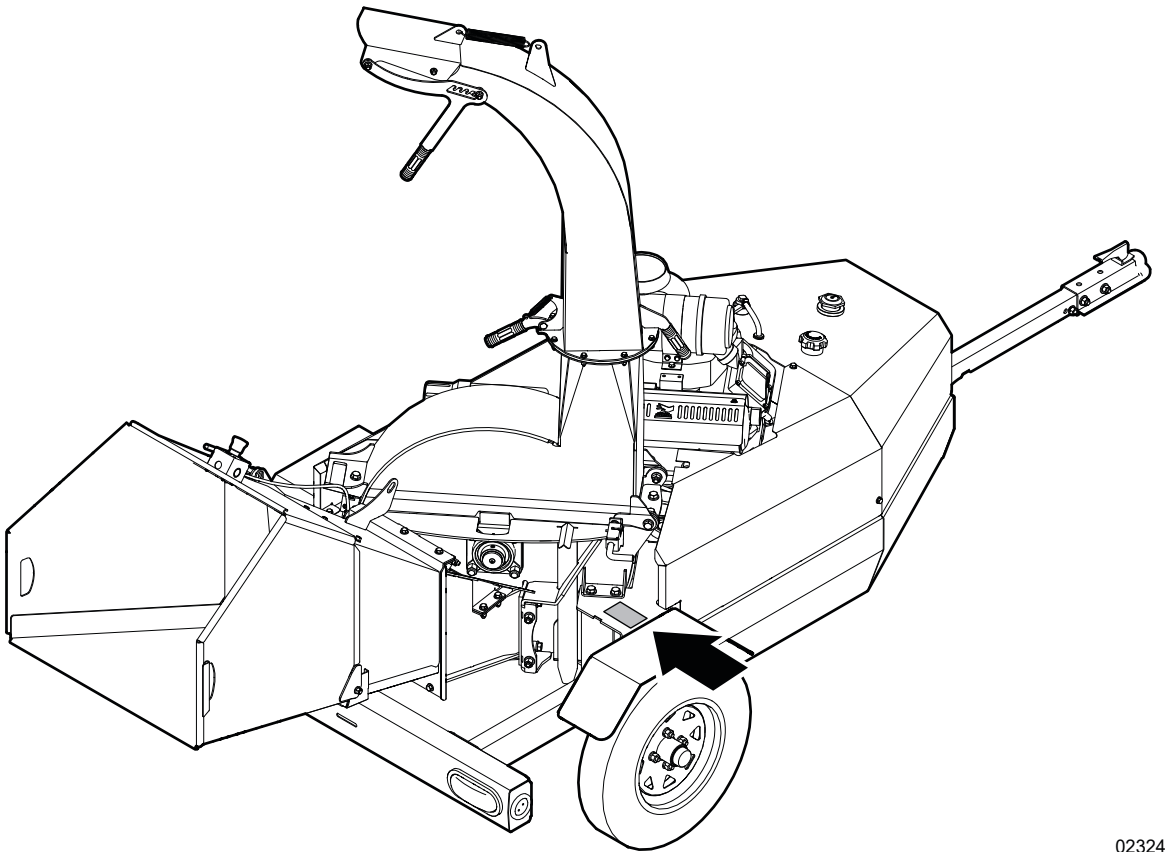


Figure 1 – Product information plate location

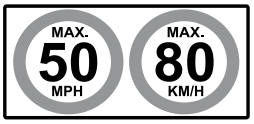
1.3 Types of Labels on the Machine

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

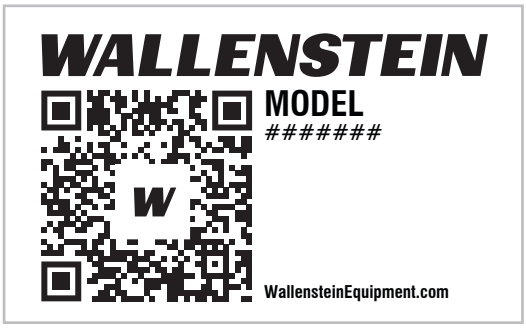
Safety labels are pictorial with a yellow background and have two panels. They can be vertical or horizontal.

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

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



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



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

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

2. Safety

Read and understand all safety information before operating the machine.

2.1 Safety Alert Symbol

This Safety Alert Symbol means:

ATTENTION! BE ALERT!

YOUR SAFETY IS INVOLVED!

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

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

2.2 Signal Words

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

DANGER

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

WARNING

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

CAUTION

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

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

☞ Provides additional information that is helpful.

2.3 Why Safety is Important

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

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

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

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

2.4 Safety Rules

⚠ WARNING!

Do not bypass or remove a safety function. Do not 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.

W111

⚠ WARNING!

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

W016

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

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

- It is the operator's responsibility to read, understand, and follow ALL safety and operating instructions in this manual.
- If you do not understand any part of this manual or need assistance, contact your local dealer, the distributor, or Wallenstein Equipment.
- Do not let anyone to use this machine until they have read this manual. The operator must have a thorough understanding of the safety precautions and how the machine works. Review the safety instructions with all users annually.
- Operators must be responsible, familiar with, and physically able to use the machine. Each operator must be trained before they use the machine. Before operation, evaluate the physical and/or mental limitations of each operator to make sure that they can use the machine safely. Do not let a child operate the machine.
- Make sure that all users understand the safety labels on the machine before they operate, service, adjust, or clean it. For safety label definitions, see *Safety Label Definitions on page 16*.
- Learn the controls and how to stop the machine quickly in the event of an emergency. For instructions, see *Emergency Stop on page 33.*
- Keep a first-aid kit available and know how to use the contents of it.

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

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

- Wear hearing protection on a full-time basis if the noise in the operator's position exceeds 80 dB. Noise over 85 dB on a long-term basis can cause severe hearing loss. Noise over 90 dB adjacent to the operator on a long-term basis can cause permanent, total hearing loss.
- Do not wear loose clothing, jewlery, or loose personal articles. Keep long hair tied up and covered. Loose items can get caught in moving parts and cause injury. Jewelry can ground a live electrical circuit which can cause injury and machine damage.
- Do not consume alcohol or drugs before or during machine operation. Alertness or coordination can be affected. When you take prescription medications, consult your doctor before you operate the machine.
- Only use the machine in daylight or good artificial light.
- Make sure that all guards and shields are installed, and the covers are closed. If removal is necessary for repair, replace them before you use the machine.
- Do not let anyone to ride on the machine during transport.
- Keep bystanders a minimum of 20 ft (6 m) from the discharge area. Mark the discharge area with safety cones.
- Before you start the machine, make sure that the engine and machine are clear of all material.
- Do not touch hot engine parts, the muffler cover, hoses, the engine body, or engine oil during operation or after the engine stops. Contact with hot surfaces can cause burns.

2.5 Equipment Safety Guidelines

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

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

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

2.6 Safe Condition

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

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

SAFE CONDITION

1. If the machine is connected to a tow vehicle, set the tow vehicle's parking brake, stop the engine, and remove the ignition key.
2. Stop the machine.
   For instructions, see *Stop the Machine on page 33*.
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. The *Sign-Off Form on page 10* can be used to keep a training record.

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

2.8 Sign-Off Form

Everyone who uses this machine must read and fully understand all safety, operation, and maintenance information in this manual. An untrained operator should not use this machine.

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

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

- ISO 4254-1:2013, Agricultural machinery - Safety - Part 1: General requirements.
- 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!

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

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2.9.1 Select a Work Site

Select a safe work area and machine location:

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

2.9.2 Create a Safe Work Area

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

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

- Use safety cones to identify the work zone perimeter. The work zone perimeter should be a minimum of 20 ft (6 m) away from any hazard in the work zone. The area outside the work zone perimeter is the safe zone.
  For more information, see *Figure 2 on page 12.*
- Do not let people approach the work zone during machine operation. Everyone must signal and make eye contact with the operator before they approach the work zone.
- Keep all bystanders in the safe zone. Do not let bystanders in the work zone.
- Only the operator can let people enter the work zone. The operator must make sure that it is safe for a person to enter the work zone.
- When there are two or more workers, they must agree on a system of hand-signals to use for communication.
- The operator must make eye contact with coworkers and use the agreed system of hand signals. The operator must always be aware of their coworkers and know where they are.

A safe work area is divided into two zones:

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

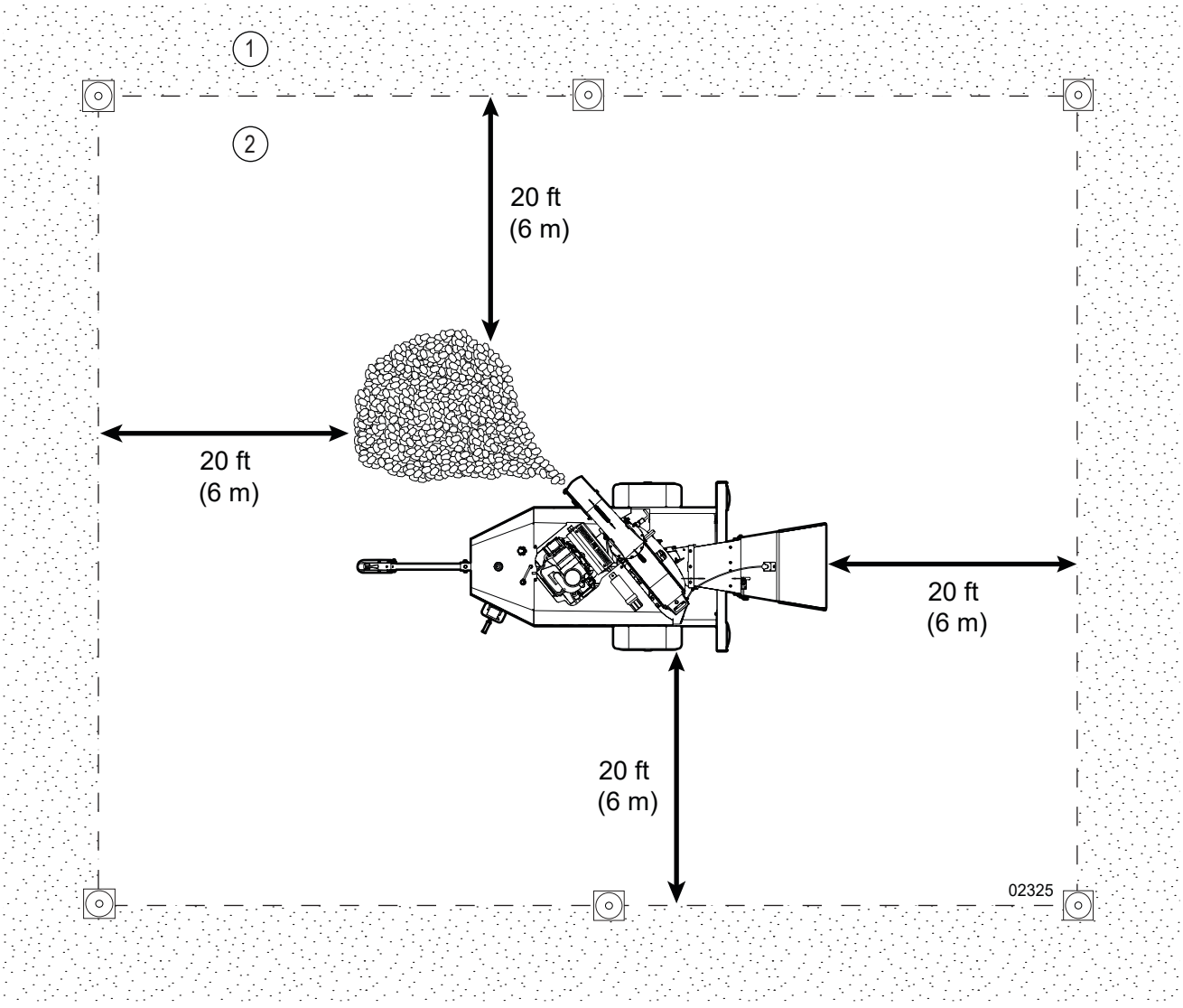


Figure 2–Example of a safe work area

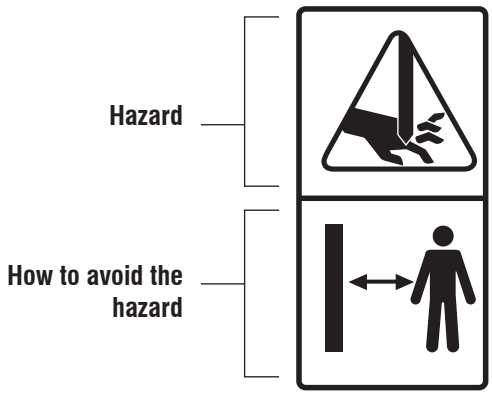
3. Safety Labels

⚠ 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.

W100

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



Think SAFETY! Work SAFELY!

3.1 Replace a Safety Label

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

3.1.1 Conditions

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

3.1.2 Tool

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

3.1.3 Procedure

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

3.2 Safety Label Locations

The numbers correspond with the *Safety Label Definitions on page 16.*

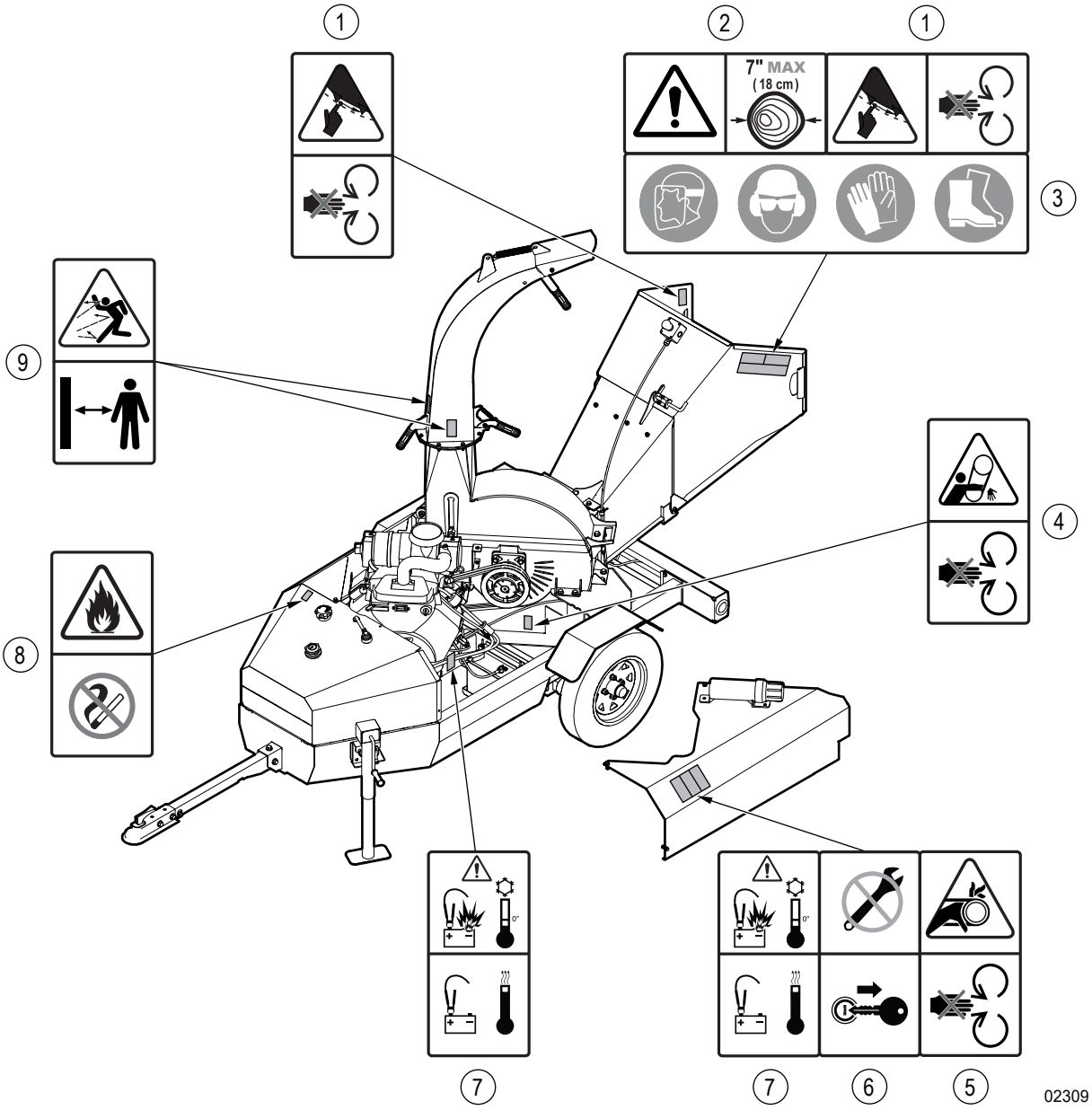


Figure 3–Safety label locations- front

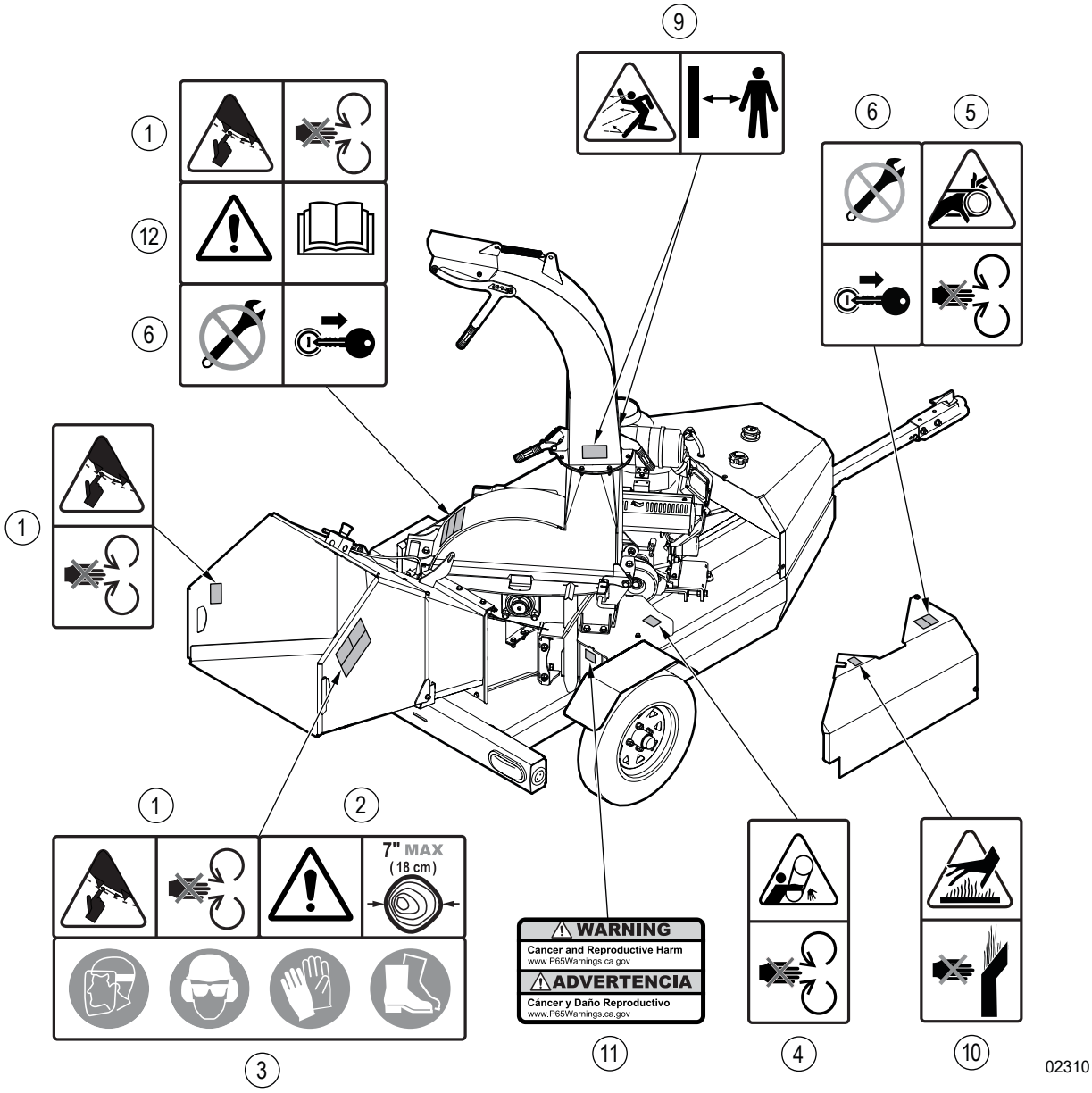


Figure 4– Safety label locations- rear

3.3 Safety Label Definitions

1. Warning!

Cut hazard

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

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

2. Warning!

Machine damage and possible entanglement hazard

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

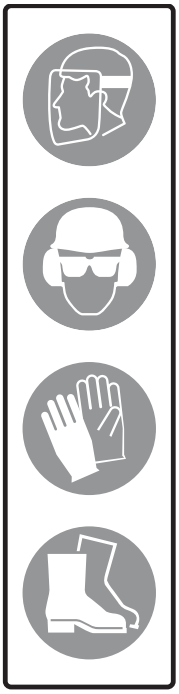
Do not put material that is larger than 7" (18 cm) in diameter into the chipper hopper. Do not try to force material into the machine.

3. Caution!

Wear the necessary PPE

For example:

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



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.

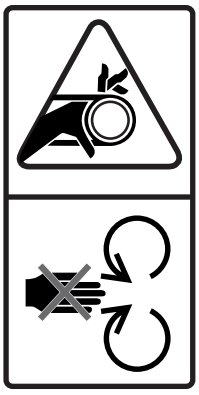
5. Warning!

Entanglement, pinch, and crush hazards

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

Do not 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.

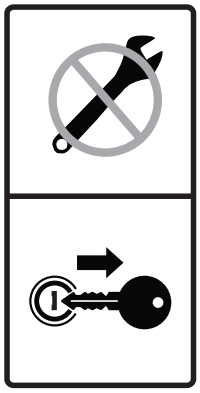


6. Warning!

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.

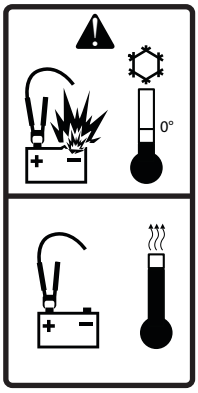


7. Warning!

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. 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.

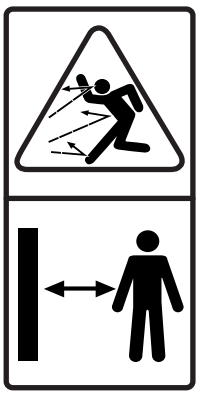
Do not smoke when you add fuel to the tank.

9. Warning!

Impact, cut, and puncture hazards

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

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



10. Warning!

Burn hazard

The area is hot and can cause burns if touched.

Keep hands and body parts away from this area. Wait for the machine to cool. Use a no-touch thermometer to measure the temperature.

11. Warning!

Risk of cancer and reproductive harm

The machine materials contain chemicals or machine operation can produce gases or dust that are identified by the state of California as causes of cancer, birth defects, or other reproductive harm.

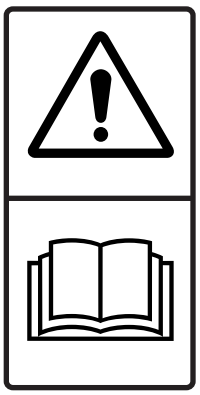
This warning is a requirement of the state of California, USA to comply with Proposition 65: the Safe Drinking Water and Toxic Enforcement Act of 1986.

12. Caution!

Read the Operator's Manual

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

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



4. Familiarization

The Wallenstein BXT52S wood chipper is designed to cut small tree trunks or branches that are a maximum of 5" (13 cm) in diameter into consistent size wood chips.

When wood material is put into the chipper hopper, the rotor pulls the material into the machine and cuts it into wood chips. The machine then blows the wood chips out the disharge chute. A Vanguard® engine provides power to the machine.

4.1 New Operator

⚠ WARNING!

All operators must understand how to put the machine in a safe condition before they service, maintain, or store the machine. For instructions, see *Safe Condition on page 9*.

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

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

4.2 Training

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

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

4.3 Operator Orientation

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

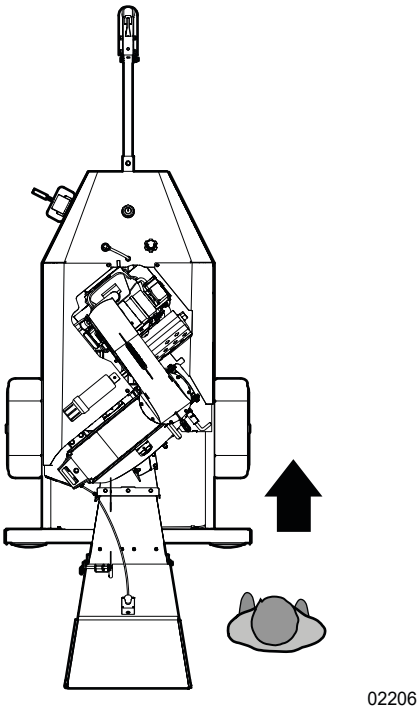


Figure 5–Direction of forward machine travel

4.4 Machine Components

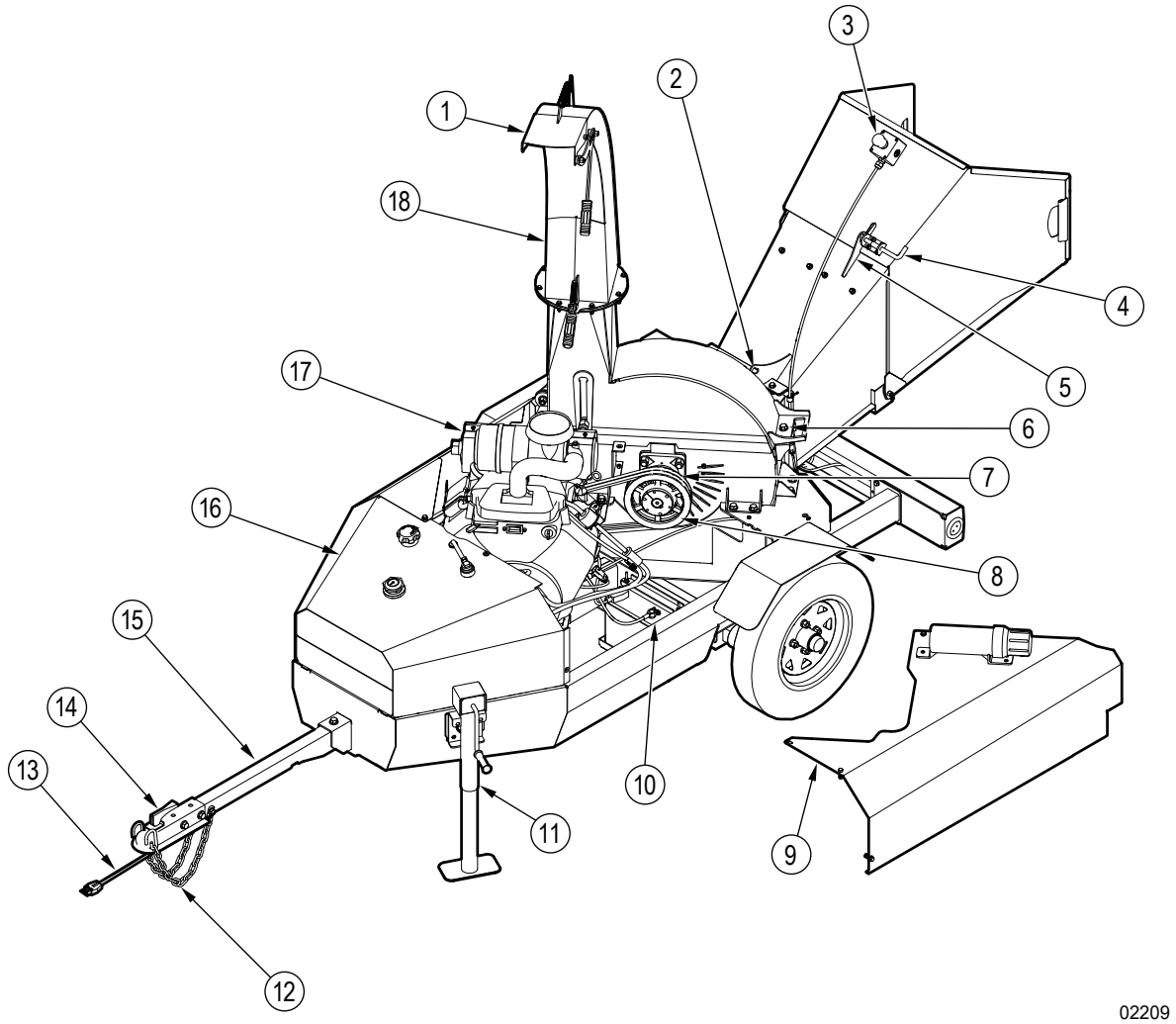


Figure 6–Machine components– front view

1. Deflector
2. Lower latch plate
3. Emergency stop button
4. Chipper-hopper latch
5. Upper latch plate
6. Upper-rotor-housing fastener
7. Drive belt
8. Rotor sheave
9. Drive-belt guard
10. Battery
11. Trailer jack
12. Safety Chains
13. Light-system electrical connector
14. Ball-mount hitch (2")
15. Trailer tongue
16. Fuel tank
17. Engine
18. Discharge chute

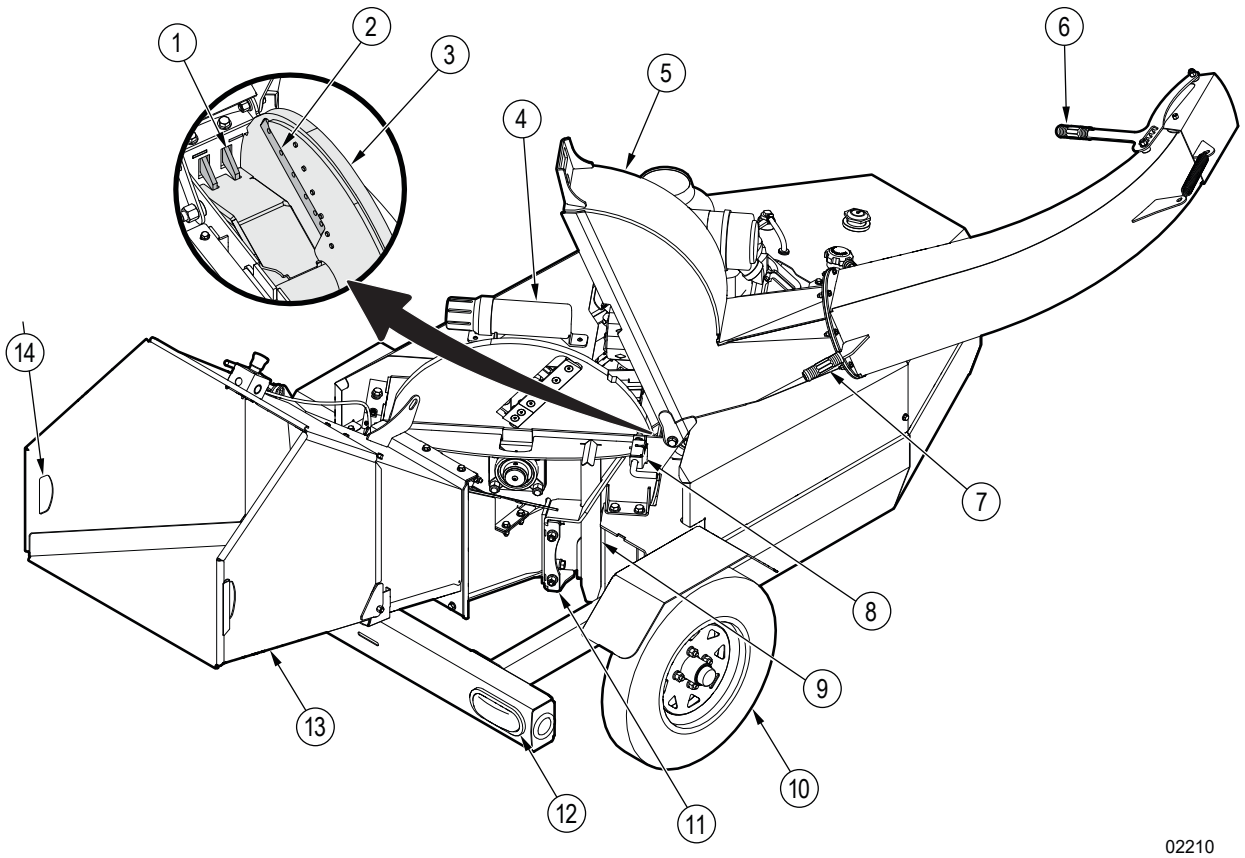


Figure 7–Machine components– rear view

1. Twig breaker
2. Rotor knife (one of two)
3. Rotor
4. Operator's Manual storage tube
5. Upper rotor housing
6. Deflector handle
7. Discharge-chute handle
8. Rotor lock
9. Ledger knife clearance guage
10. Tire (1 of 2)
11. Ledger knife
12. Rear, turn signal, and stop light (1 of 2)
13. Chipper hopper
14. Chipper-hopper handle (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 Emergency Stop Button

IMPORTANT! Only use the emergency stop button in an emergency. Frequent use of the emergency stop button can damage the machine.

An emergency stop button (commonly called an E-stop) is located on the front of the chipper hopper.

In the event of an emergency, press the emergency stop button to immediately stop the machine. The button stays on (pressed) until it is reset.

The emergency stop button has two states:

Off	The emergency stop is off. The machine can operate.
On	The emergency stop is on (the button is pressed). The machine cannot operate. To reset (turn off) the emergency stop button, turn the button clockwise and pull.

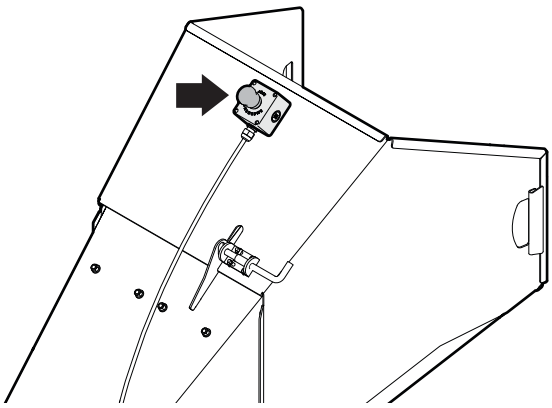


Figure 8–Emergency stop button

5.2 Engine Controls

⚠ WARNING!

Before you start the engine, read and understand the safety and operating information under *Engine Operation on page 29*.

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

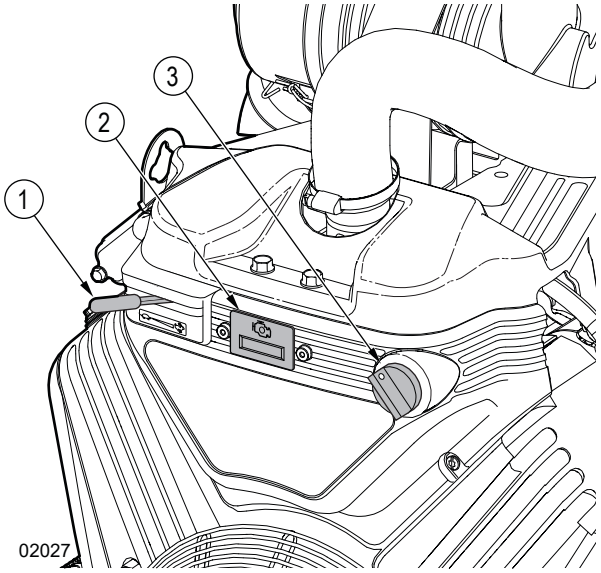


Figure 9–Engine controls

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 safe location to prevent an unauthorized person from starting the engine.

W113

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

IMPORTANT! Use the ignition switch to stop the machine, except in an emergency. When the ignition switch is in the RUN position and the engine is stopped, it can damage the battery.

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 295°. 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.

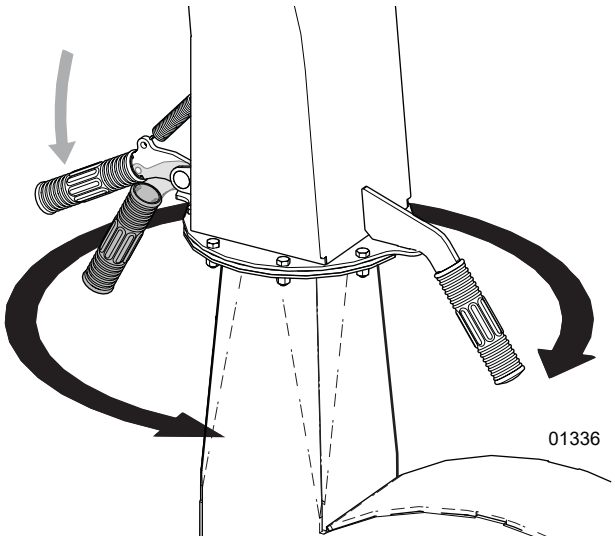


Figure 10 – Turn the discharge chute

5.4 Deflector

The discharge chute has a deflector to direct wood chips. Use the handle to change the position.

1. Pull the deflector handle down until the bolt disengages from the slot.
2. Use the handle to raise or lower the deflector.
   Align a slot with the bolt.
3. Push the deflector handle up to engage the bolt in the slot.
   The bolt holds the deflector in position.

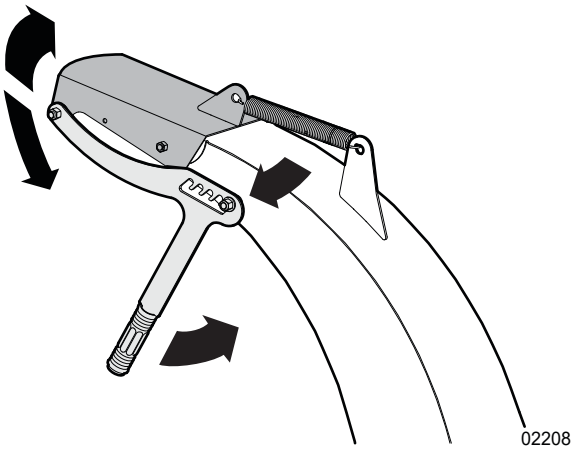


Figure 11 – Deflector

5.5 Rotor Lock

⚠ WARNING!

Engage the rotor lock when the upper rotor housing is open to prevent the rotor from moving unintentionally. Failure to engage the rotor lock when the upper rotor housing is open can result in serious injury.

W104

The rotor lock stops the rotor from turning when the upper rotor housing is open. The rotor-lock pin cannot engage with the rotor when the rotor housing is closed. The rotor lock is intended for use during maintenance or service.

For instructions, see *Rotor Safety on page 39*.

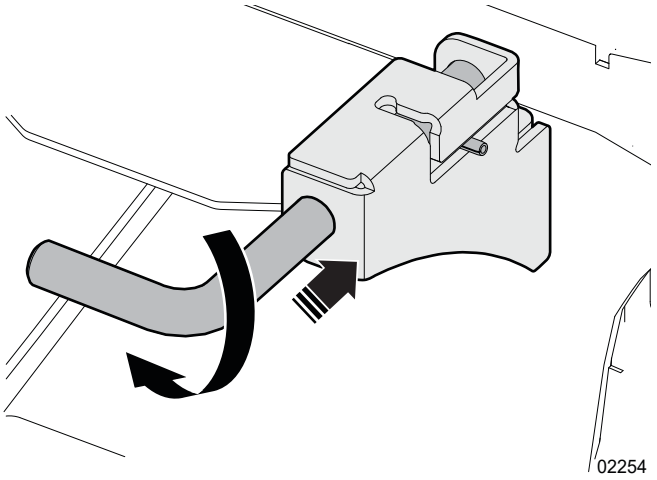


Figure 12–Engaged position

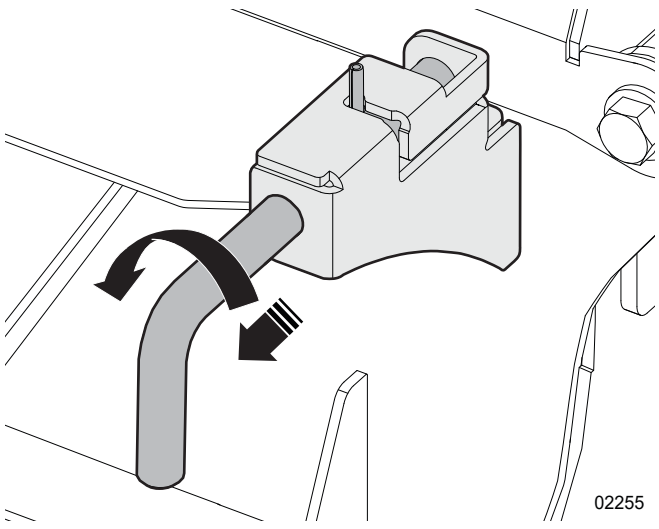


Figure 13–Disengaged position

5.6 Chipper-Hopper Latch

The chipper-hopper latch holds the chipper hopper in the open or closed (folded) position. The chipper hopper must be closed for transport or storage.

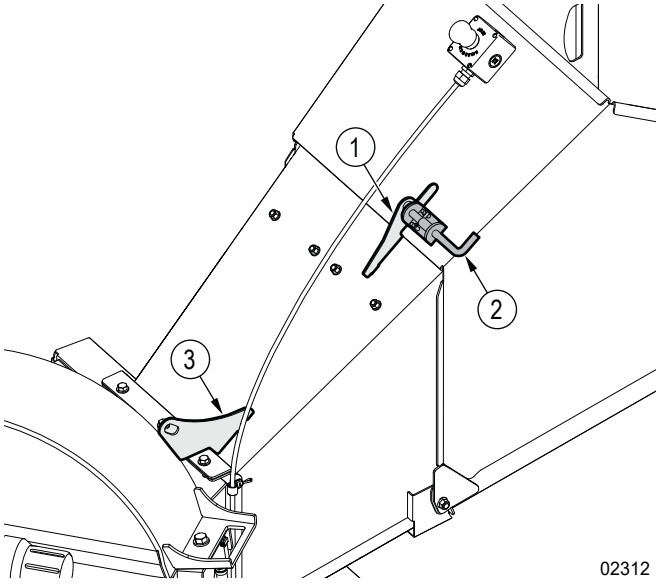


Figure 14–Chipper hopper latch

1. Upper latch plate
2. Chipper-hopper latch pin
3. Lower latch plate

5.6.1 Close the Chipper Hopper

1. Pull and hold the chipper-hopper latch pin out of the upper latch plate.
2. Tilt the chipper hopper to the closed position. See *Figure 15.*
3. Align the chipper-hopper latch pin with the hole in the lower latch plate.
4. Release the chipper-hopper latch pin.
   Make sure that the pin engages with the hole in the lower latch plate, and that the chipper hopper cannot move.

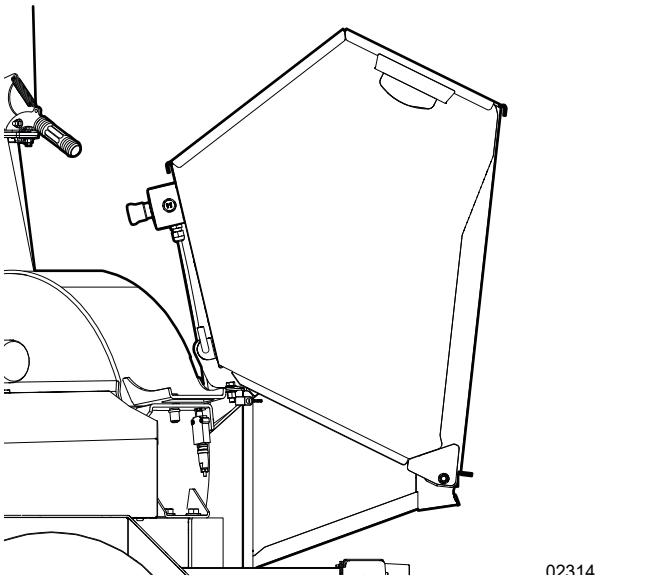


Figure 15–Closed position

5.6.2 Open the Chipper Hopper

1. Pull and hold the chipper-hopper latch pin out of the lower latch plate.
2. Tilt the chipper hopper to the open position. See *Figure 16.*
3. Align the chipper-hopper latch pin with the hole in the upper latch plate.
4. Release the chipper-hopper latch pin.
   Make sure that the pin engages with the hole in the upper latch plate, and that the chipper hopper cannot move.

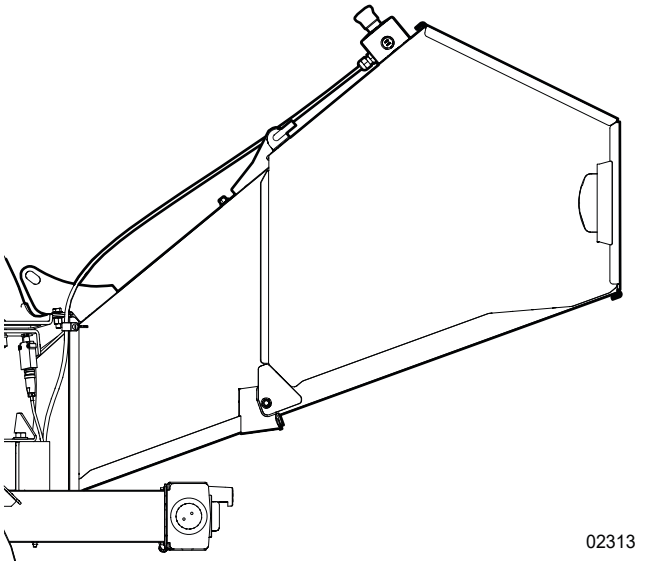


Figure 16–Open position

6. Operating Instructions

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

6.1 Operating Safety

WARNING!

Wear the personal protective equipment (PPE) that is necessary to do the work safetly.

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

W101

WARNING!

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

W062

WARNING!

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

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

W004

WARNING!

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

W006

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

If these items get into the machine, set the machine to a safe condition before you remove them. Examine the machine for damage and loose parts.

- Read and understand this manual before you start the machine. Review all safety information annually.
- Park the machine in a clear location on dry, level ground. Do not operate the machine on a hillside or area that is cluttered, wet, muddy, or icy to prevent slips, trips, and falls.
  For more information, see *Work Site on page 11.*
- Keep the work area clean and free of debris.
- Only operate the engine in a location that has good air flow. Engine exhaust gases contain carbon monoxide (an odorless gas) that can cause asphyxiation.
- Attach all guards and shields, and close all covers before you start the machine.
- Do not move or transport the machine when the engine is on.
- Stop the engine before you leave 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.
- Do not stand, sit, or climb on any part of the machine, especially while the engine is on.
- Do not operate the machine alone. Always have a minimum of two trained people:
  - There should be one operator and one spotter present during machine operation. The operator and spotter must know all the machine safety, controls, and operating functions.
  - The operator must be in control of the machine at all times. The spotter must stay outside of the hazard zone while the machine is operating.
- Keep bystanders a minimum of 20 ft (6 m) from the machine and wood chip release area. Mark the safe zone with safety cones.
- Do not reach into the chipper hopper. Keep your feet on the ground and make sure that you are stable when you put material into the chipper hopper.
- Keep your hands, feet, clothing, and long hair away from the chipper hopper. The chipper hopper can entangle hands, feet, clothing, and long hair, causing serious injury or death.

6.2 Pre-Start Checklist

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

Items to Complete	✓
Read and obey the *Operating Safety on page 27*, *Engine Operation Safety on page 29, Electronic Fuel Injection System Operation Safety on page 30,* and *Fuel Safety on page 31.*	
Check the drive belt tension and alignment. If necessary, adjust the drive belt. For instructions, see *Set the Drive Belt Tension on page 57,* and *Align the Drive Belt on page 58.*	
Check the condition and clearance of the twig breaker, rotor knives, and ledger knife. If necessary, adjust or replace them.	
Check the engine oil level. For instructions, see *Check the Engine Oil Level on page 30*. If necessary, add oil.	
Check the engine fuel level. For instructions, see *Check the Fuel Level on page 32*. If necessary, add fuel.	
Check the engine air filter. For instructions, see *Clean the Engine Air Filter on page 54*. If necessary, clean or replace the filter.	
Check the condition of the battery and electrical components. 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 49*.	
Remove anything that is entangled on the machine. For example, branches or vines.	
Remove all material from the rotor housing and discharge chute. For example, wood chips, bark, or leaves. Material in the rotor housing can cause the engine to stall when you start the machine.	
Make sure that the rotor bearings turn freely. If the bearings are damaged or do not turn freely, lubricate them or contact your local Wallenstein dealer to have them replaced.	
Make sure that all guards and shields are installed, and the covers are closed. If necessary, replace the guards, shields, or covers.	
Check the condition of the chipper hopper safety curtain. Replace the safety curtain if it is damaged. For more information, see *Safety Curtain Maintenance on page 65.*	
Check the tire air pressure, and the wheels, hubs, and axle. See the side of the tire for the correct air pressure.	
Make sure that all the fasteners are installed and torqued to the correct specifications. For more information, see *Bolt Torque on page 69* and *Lug Nut Torque on page 70.*	
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 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 22*.
4. Complete the *Pre-Start Checklist on page 28*.

6.3.2 After One to Five Hours of Operation

- Check the drive belt tension and alignment. If necessary, adjust the drive belt.
  For instructions, see *Drive Belt Maintenance on page 56*.
- Check the condition and clearance of the twig breaker, rotor knives, and ledger knife. If necessary, adjust or replace them.
- Check the engine oil level. If necessary, add oil. For instructions, see *Check the Engine Oil Level on page 30*.
- Check the engine fuel level. If necessary, add fuel. For instructions, see *Check the Fuel Level on page 32*.
- Make sure that all of the electrical components are in working condition and the connectors are connected.
- Check the condition of the rotor bearings. Make sure that the rotor bearings turn freely.
- Check the fasteners and make sure that they are torqued to the correct specifications. For more information, see *Bolt Torque on page 69* and *Lug Nut Torque on page 70.*
- Check the tire air pressure, and the wheels, hubs, and axle. See the side of the tire for the correct air pressure.
- Remove material that is entangled on the machine.
- Remove material from the rotor housing and discharge chute.

6.3.3 After Eight hours of Operation

1. Complete the tasks listed under *After One to Five Hours of Operation*.
2. Torque the wheel lug nuts to the correct specification. For more information, see *Lug Nut Torque on page 70.*
3. Continue with the regular *Maintenance Schedule on page 49*.

6.4 Engine Operation

CAUTION!

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

W019

6.4.1 Engine Operation Safety

WARNING!

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

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

W072

WARNING!

Keep 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.

W115

CAUTION!

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

W114

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

- Keep the cylinder fins and engine shrouds free of debris to prevent the engine from overheating.
- Keep the engine free of wood chips and other debris that can affect the engine speed.
- Use fresh fuel (less than three months old). Stale fuel creates deposits that cause the carburetor to be blocked and leak.
- Check the fuel lines and fittings on a regular basis for cracks or leaks. Replace damaged fuel lines or fittings if necessary.
- Store fuel away from all wood material.
- Only operate the engine in a location that has good air flow. Engine exhaust gases contain carbon monoxide (an odorless gas) that can cause asphyxiation.
- Do not put your hands or feet near moving parts.
- Do not tamper with governor springs, governor links or other parts that may increase the governed speed. Engine speed is selected by the original equipment manufacturer.
- Do not check for a spark with the spark plug or spark plug wire removed.
- Do not attempt to start the engine with the spark plug removed. If the engine floods, set the throttle control to **Fast**, and then try to start the engine again.
- Do not hit the flywheel with a hard object or metal tool. This can cause the flywheel to shatter during operation. Use the correct tools to service the engine.
- Do not touch a hot muffler, cylinder, or fins. Contact can cause burns. Wait for the machine to cool. Use a no-touch thermometer to measure the temperature.
- Do not operate the engine in the following situations:
  - When there is an accumulation of wood chips, dirt, or other combustible materials in the muffler area.
  - In an area where there is a fuel spill. Move the machine away from the spill until the fuel evaporates. Make sure that 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. Examine the muffler and heat shield on a regular basis. Replace a muffler or heat shield that is damaged.

6.4.2 Electronic Fuel Injection System Operation Safety

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

- Do not start the engine if the battery cables are loose.
- Turn the key to the **STOP** position or remove the starter switch before disconnecting, removing and/or installing the battery.
- Do not use a battery charger to start the engine.
- Do not 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 **STOP** position and disconnect the negative (-) battery cable from the battery.
- Do not spray water directly on the Electronic Control Unit.

6.4.3 Check the Engine Oil Level

IMPORTANT! For more information about engine oil, see the engine manufacturer's manual and *Engine Oil on page 48*.

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 33*.
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, *Add Oil to the Engine on page 31*.
7. Install the oil-level dipstick and make sure that it is tight.

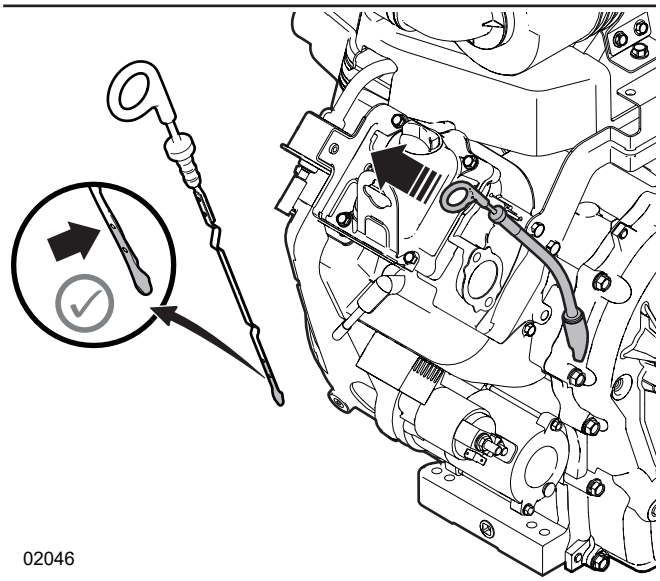


Figure 17–Check the engine oil level

6.4.4 Add Oil to the Engine

IMPORTANT! For more information about engine oil, see the engine manufacturer's manual and *Engine Oil on page 48*.

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 30*.
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.

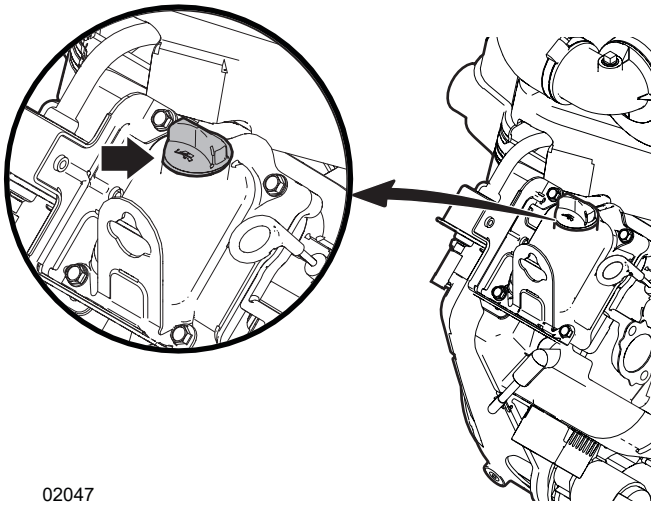


Figure 18–Engine oil-fill location

6.5 Engine Fuel Tank

The fuel tank is located at the front of the machine, behind the trailer tongue.

6.5.1 Fuel Safety

⚠ WARNING!

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

W027

⚠ WARNING!

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

W116

⚠ CAUTION!

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

W117

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

6.5.2 Check the Fuel Level

Check the engine fuel level before each use.

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

1. Park the machine on level ground.
2. Stop the machine.
   For instructions, see *Stop the Machine on page 33.*
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 inch (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 Engine on page 32*.

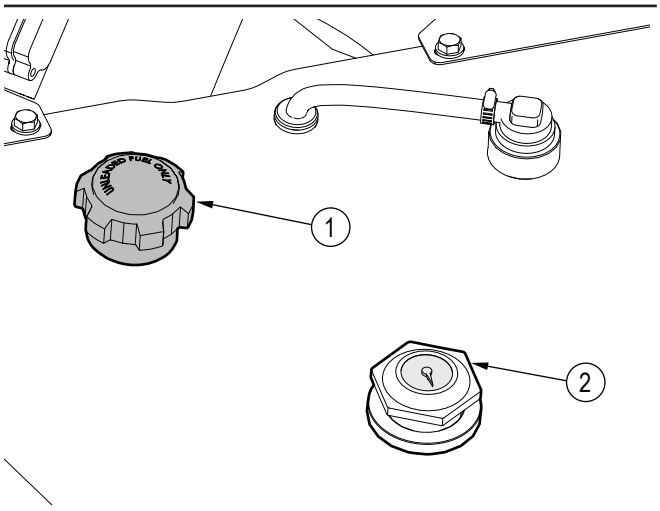


Figure 19–Fuel tank

1. Fuel cap
2. Fuel gauge

6.5.3 Add Fuel to the Engine

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 48*.

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

Fuel tank capacity: **12.2 US gal (46.4 L).**

1. Stop the machine.
   For instructions, see *Stop the Machine on page 33*.
2. Wait a minimum of five minutes for the engine to cool.
3. Clean the area around the fuel cap.
4. Turn the fuel cap counterclockwise to remove it.
5. Use a clean funnel to add the correct type and amount of fuel to the tank. Add fuel until the fuel level is visible 1/2 inch (12 mm) below the filler neck. Leave room for expansion. **Do not overfill the tank.**
6. Carefully remove any spilled fuel, and then wait until any remaining fuel dries before you start the engine.
7. Install the fuel cap and make sure that it is tight.

6.6 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.

W118

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 22* and *Engine Operation Safety on page 29*.

1. Complete the tasks described in the *Pre-Start Checklist on page 28*.
2. Set up the machine.
   For instructions, see *Set Up the Machine on page 34*.
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.

6.7 Stop the Machine

IMPORTANT! Use the ignition switch to stop the machine, except in an emergency. When the ignition switch is in the RUN positon and the engine is stopped, it damages the battery.

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.

6.8 Emergency Stop

In an emergency:

1. Press the **emergency stop** button.
2. When it is safe to do so, turn the engine 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.

6.9 Set Up the Machine

⚠ WARNING!

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

W006

For more information, see *Figure 20 on page 35.*

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 42*.
   - 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.
   For instructions, see *Lower the Trailer Jack on page 43.*
4. Move the chipper hopper to the open position.
   For instructions, see *Open the Chipper Hopper on page 26.*
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. Adjust the deflector to direct the wood chips further from or closer to the machine.
   For instructions, see *Deflector on page 24.*
7. Make sure that the upper rotor housing is closed and the fastener is tight.
8. Make sure that all of the guards and shields are installed and the covers are closed.
9. Make sure that the emergency stop button is **off**.
   If the emergency stop button is **on** (pressed), turn it clockwise and pull.
   For more information, see *Emergency Stop Button on page 22.*

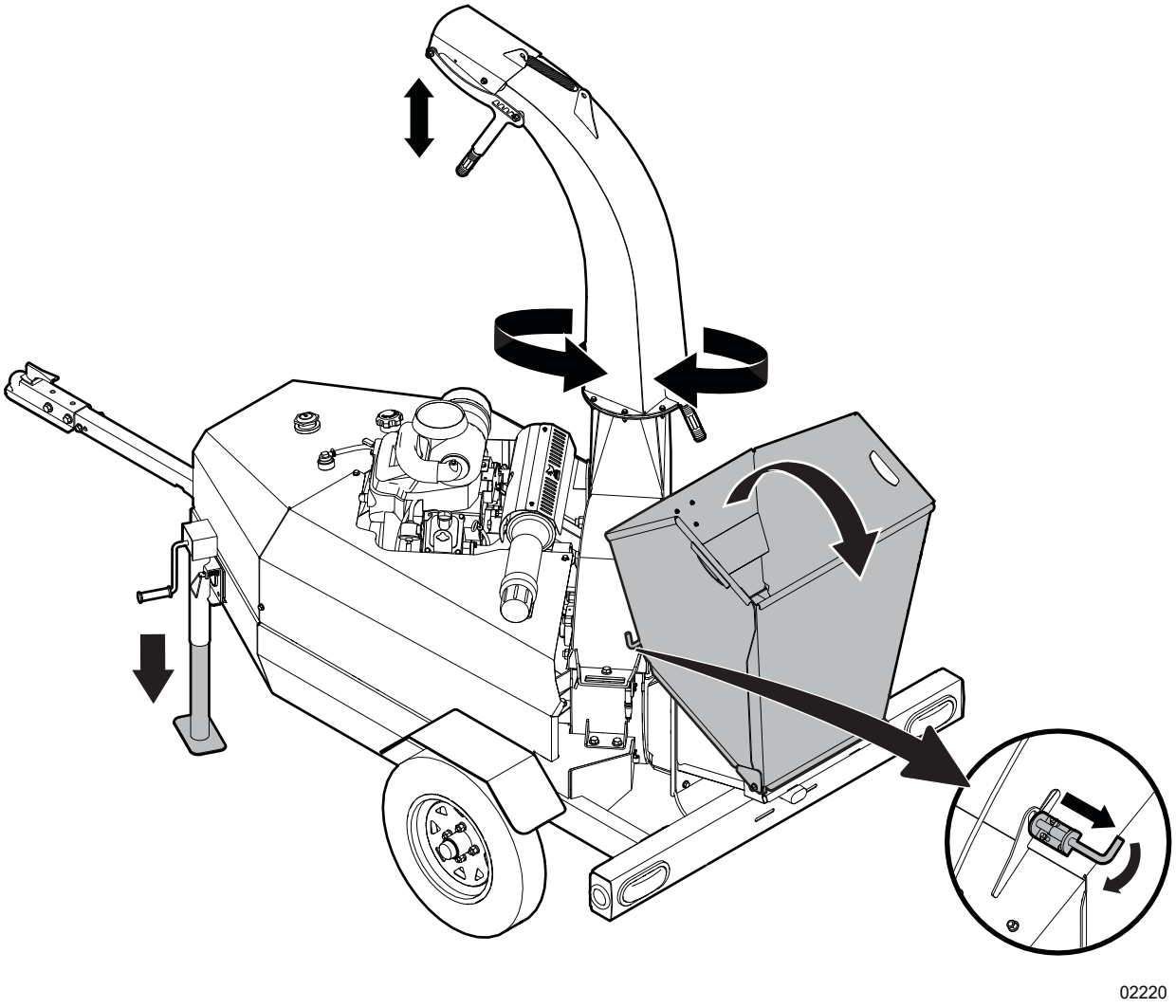


Figure 20–Set up the machine

6.10 Operate the Wood Chipper

⚠ WARNING!

Wear the personal protective equipment (PPE) that is necessary to do the work safely.

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

W101

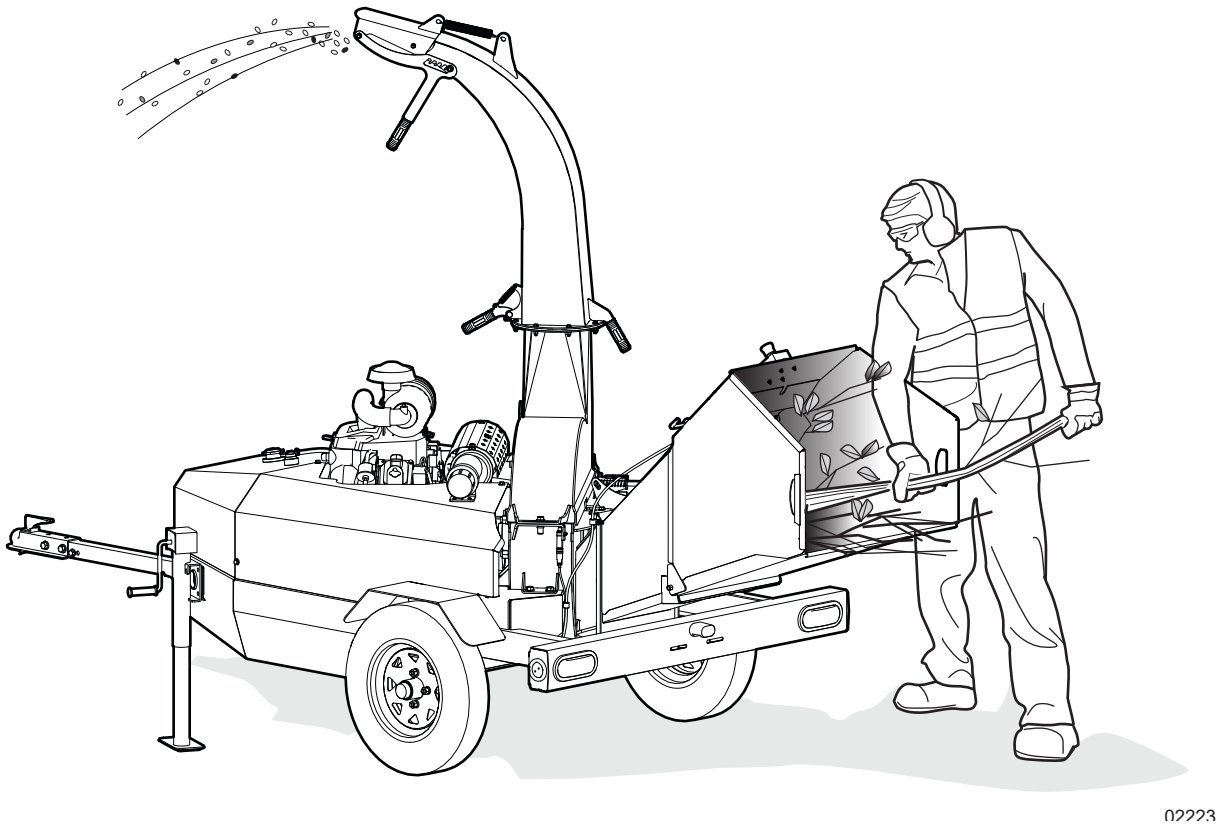
⚠ CAUTION!

Do not operate the machine without the safety curtain installed in the chipper hopper. Replace the safety curtain if it is damaged or missing. The safety curtain prevents wood chips from being blown out of the chipper hopper. The machine can release wood chips fast enough to cause personal injury and property damage.

W119

6.10.1 Prepare the Material

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



02223

Figure 21 – Operate the wood chipper

6.10.2 Chip Wood

WARNING!

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

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

W004

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

If these items get into the machine, set the machine to a safe condition before you remove them. Examine the machine for damage and loose parts.

The operator is responsible to be familiar with and obey all operating and safety procedures.

1. Set up the machine.
   For instructions, see *Set Up the Machine on page 34*.
2. Prepare the material.
   For instructions, see *Prepare the Material on page 36.*
3. Start the machine.
   For instructions, see *Start the Machine on page 33*.
4. Make sure that the engine speed is set to **FAST** and the rotor is at full speed (wait three minutes).
5. Slowly, put material (branches and brush) into the chipper hopper until it engages with the rotor.
   The rotor will draw the material into the machine. Do not attempt to force the material into the rotor housing.

6.11 Remove a Blockage

WARNING!

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

W120

CAUTION!

The rotor knives are very sharp. Be careful when you remove a blockage from the lower rotor housing.

W026

CAUTION!

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

W121

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

1. Set the machine to a safe condition.
   For instructions, see *Safe Condition on page 9*.
2. Remove all of the material from the chipper hopper.
3. Remove material from the discharge chute and deflector.
   Use a stick to pull material out of the discharge chute. Make sure that the discharge chute and 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 *Remove an Internal Blockage on page 38.*

6.11.1 Remove an Internal Blockage

1. Set the machine to a safe condition.
   For instructions, see *Safe Condition on page 9*.
2. Remove the upper-rotor-housing fastener, and then open the upper rotor housing. See *Figure 22.*
3. Engage the rotor lock.
   For instructions, see *Engage the Rotor Lock on page 39.*
4. Remove material from the upper rotor housing and discharge chute.
5. Remove material from the lower rotor housing.
   If necessary, turn the rotor to remove material from the lower rotor housing:
   a. Disengage the rotor lock (do not close the upper rotor housing).
      For instructions, see *Disengage the Rotor Lock on page 39*.
   b. Carefully and slowly, turn the rotor in each direction 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.
   c. Engage the rotor lock.
      For instructions, see *Engage the Rotor Lock on page 39.*
6. Remove any remaining material and debris from the lower rotor housing.
7. Disengage the rotor lock.
   For instructions, see *Disengage the Rotor Lock on page 39*.
8. Close the upper rotor housing.
9. Install the upper-rotor-housing fastener. See *Figure 22.*
   Use a calibrated torque wrench to torque the fastener to **80 lbf•ft (110 N•m)**.
10. Start the machine to see if the blockage is cleared.
    If the machine does not operate, do steps 1 to 9 again until the blockage is cleared.

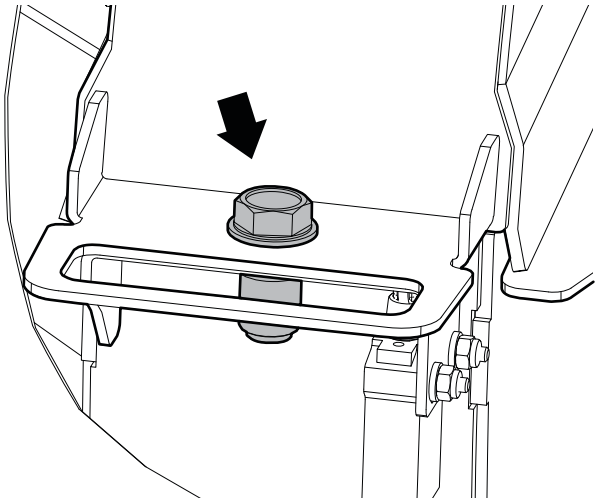


Figure 22–Upper-rotor-housing fastener

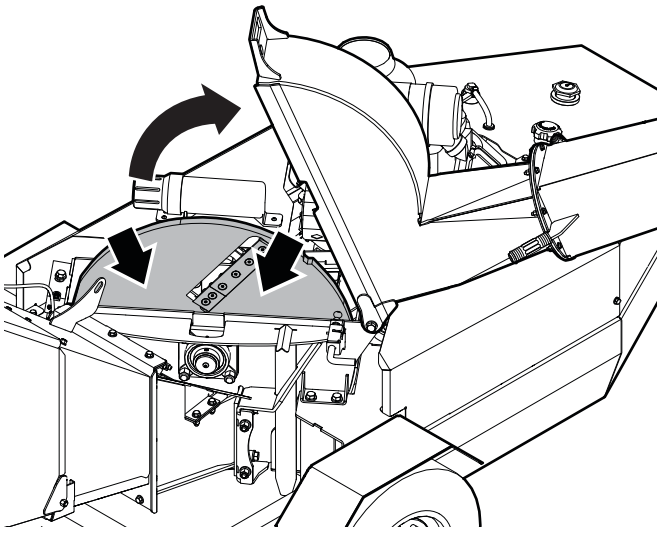


Figure 23–Open the upper rotor housing

6.12 Rotor Safety

⚠ WARNING!

Engage the rotor lock when the upper rotor housing is open to prevent the rotor from moving unintentionally. Failure to engage the rotor lock when the upper rotor housing is open can result in serious injury.

W104

⚠ WARNING!

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

W003

The rotor lock is a safety device that prevents the rotor from moving. The rotor lock can only be engaged when the upper rotor housing is open. After the rotor lock is engaged, it must be disengaged to close the upper rotor housing.

6.12.1 Engage the Rotor Lock

1. Set the machine to a safe condition.
   For instructions, see *Safe Condition on page 9*.
2. Remove the upper-rotor-housing fastener. See *Figure 22 on page 38*.
3. Open the upper rotor housing.
4. Pull the rotor-lock pin toward you, turn it clockwise 90 degrees and hold it away from the rotor.
   Make sure that the latch pin is in the horizontal slot.
5. Slowly and carefully, turn the rotor by hand until the hole in the rotor aligns with the rotor-lock pin.
6. Push the rotor-lock pin into the hole in the rotor.
   Make sure that the rotor-lock pin is fully inserted into the rotor and the rotor cannot move.

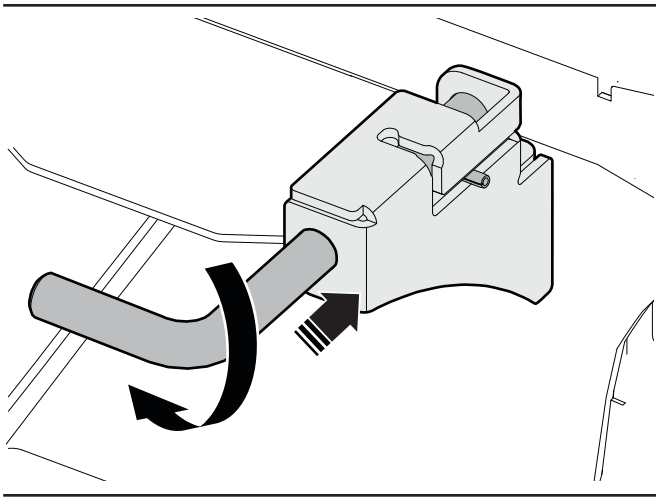


Figure 24–Engage the rotor lock

6.12.2 Disengage the Rotor Lock

1. Set the machine to a safe condition.
   For instructions, see *Safe Condition on page 9*.
2. Pull the rotor-lock pin out of the rotor until the latch pin aligns with the vertical slot.
3. Turn the rotor-lock pin counterclockwise 90 degrees to the disengaged position.
   Make sure that the latch pin holds the rotor-lock pin in the disengaged position.
4. Close the upper rotor housing.
5. Install the upper-rotor-housing fastener. See *Figure 22 on page 38*.
6. Use a calibrated torque wrench to torque the fastener to **80 lbf•ft (110 N•m)**.

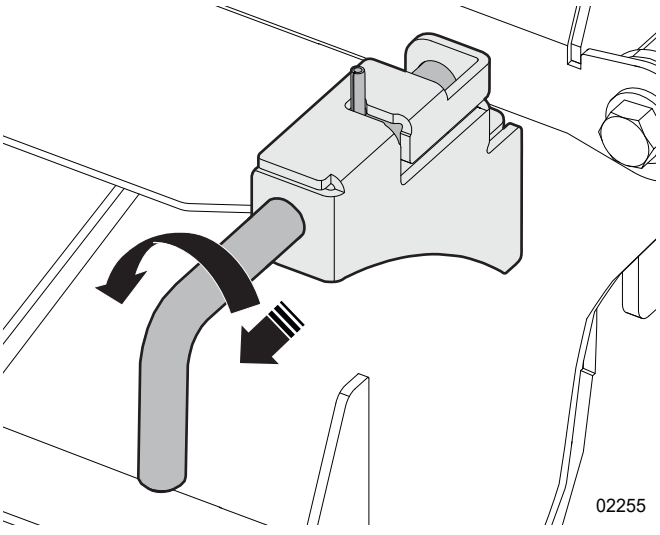


Figure 25–Disengage the rotor lock

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 that it has the necessary lighting, reflectors, and markings, and that they are in good, working condition.

This machine includes lights, reflectors, and markings; however, it does not have a vehicle identification number (VIN). For the specific requirements to license the machine, 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.
- Do not let people ride on the machine.
- Do not exceed a safe travel speed. Decrease your speed for rough terrain and around corners.
- Plan your route to avoid heavy traffic.
- Do not transport or move the machine with the engine on.
- Make sure that the fuel tank cap is on and tight.
- Examine the wheel rims for damage, and torque the wheel lug nuts to the correct specifications. For more information, see *Lug Nut Torque on page 70*.
- 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 leaks or is damaged.
- Make sure that 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.

7.2 Prepare the Machine for Transport

1. Stop the machine.
   For instructions, see *Stop the Machine on page 33*.
2. Remove all material from the chipper hopper.
3. Close the chipper hopper.
   For instructions, see *Close the Chipper Hopper on page 26.*
4. Turn the discharge chute toward the rear 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 fastener is installed and torqued to the correct specification.
6. Attach the machine to a tow vehicle.
   For instructions, see *Connect to a Ball-Mount Hitch on page 42*.

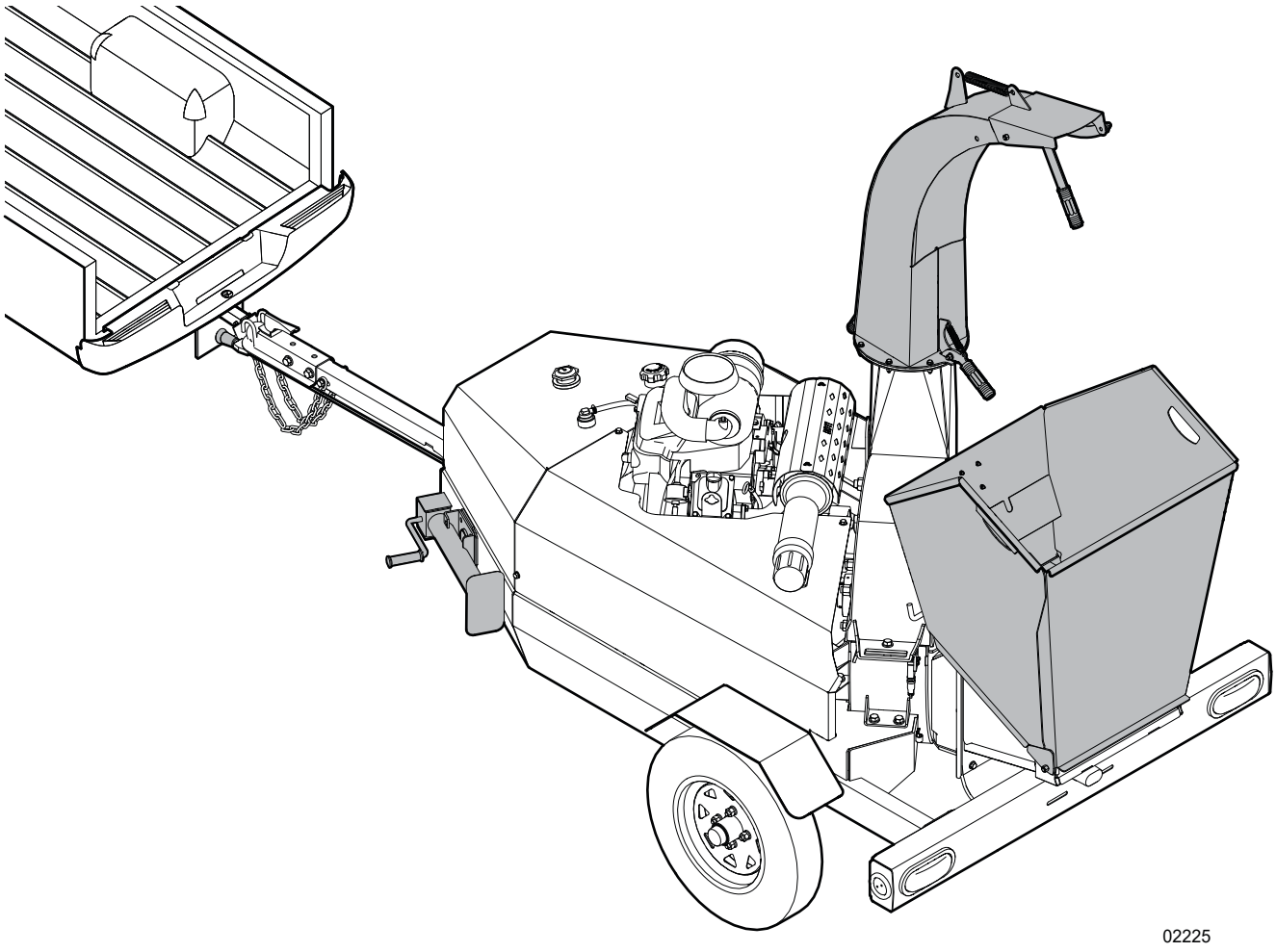


Figure 26– Transport position

7.3 Connect to a Ball-Mount Hitch

WARNING!

Before you tow the machine, make sure that the safety chains are correctly attached.

W103

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

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

1. Reverse the tow vehicle to the machine. Stop 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 *Stow the Trailer Jack on page 43.*
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).

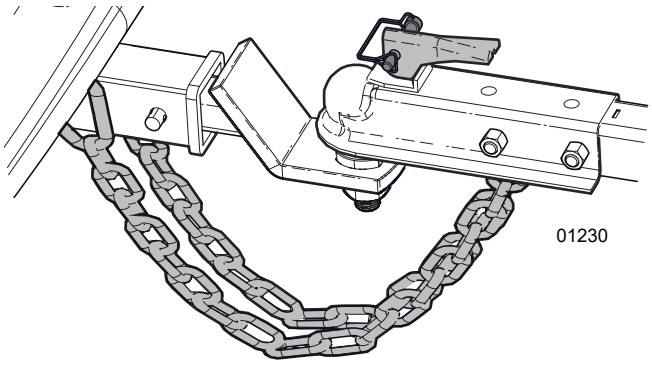


Figure 27 – Ball-mount hitch connection

7.4 Disconnect from a Ball-Mount Hitch

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

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

1. Stop the tow vehicle in a location where it and the machine are on dry, level ground. 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 43*.
3. Remove the two safety chains from the tow vehicle and stow them safely on the machine.
4. Remove the pin from the hitch-coupler latch. Lift the latch to the vertical (unlocked) position.
5. Use the trailer jack to lift the trailer tongue until the hitch coupler is higher than the ball-mount hitch.
6. Slowly, drive the tow vehicle forward until the ball-mount hitch is clear of the hitch coupler.
7. Stop the tow vehicle and apply the parking brake.
8. Use the trailer jack to lower the machine until it is level with the ground.
9. Lower the hitch-coupler latch to the locked position. Install the pin through the latch.

7.5 Trailer Jack

WARNING!

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.

W122

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.

7.5.1 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.

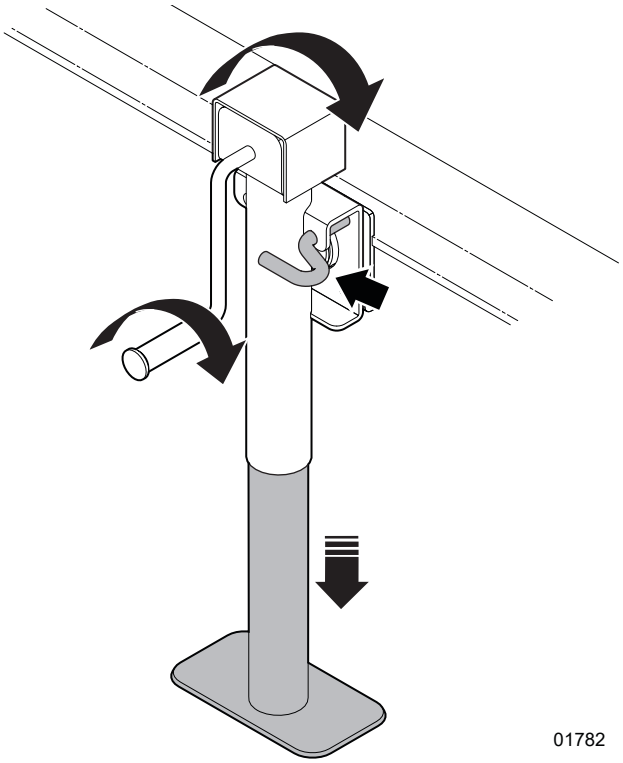


Figure 28 – Trailer jack in the lowered position

7.5.2 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.

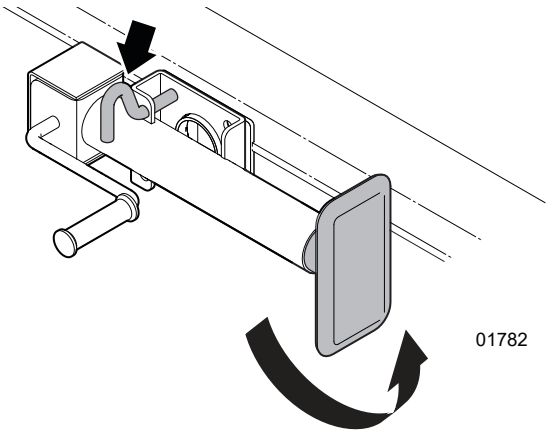


Figure 29 – Trailer jack in the stowed position

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.

For reference, see *Figure 30 on page 45*.

8.1 Storage Safety

⚠ WARNING!

Do not let children play on or around the stored machine. If children play on or around the machine it can result in serious injury or death.

W105

⚠ CAUTION!

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

W123

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

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

8.2 Put the Machine in Storage

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

1. Set the machine to a safe condition.
   For instructions, see *Safe Condition on page 9.*
2. Check all of the moving parts and remove all entangled material.
3. Clean the machine.
   For instructions, see *Clean the Machine on page 64*
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 48*.
     For instructions, see *Replace the Engine Fuel on page 46*.
9. Park the machine in the storage location.
10. Disconnect the tow vehicle.
    For instructions, see *Disconnect from a Ball-Mount Hitch on page 42*.
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 trailer jack to increase the surface area.
12. Block the machine wheels to prevent accidental movement and increase the wheel bearing life.
13. Close the chipper hopper.
    For instructions, see *Close the Chipper Hopper on page 26.*
14. 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. See *Figure 30 on page 45.*
    For instructions, see *Remove the Battery on page 55.*
15. If the machine must be stored outdoors, cover the machine with a waterproof tarp.
    The machine should be stored indoors, if possible.

8.3 Remove the Machine from Storage

1. Install the battery.
   For instructions, see *Install the Battery on page 55.*
2. Do the *Pre-Start Checklist on page 28*.
3. Do the necessary maintenance.
   For necessary maintenance, see the *Maintenance Schedule on page 49*.

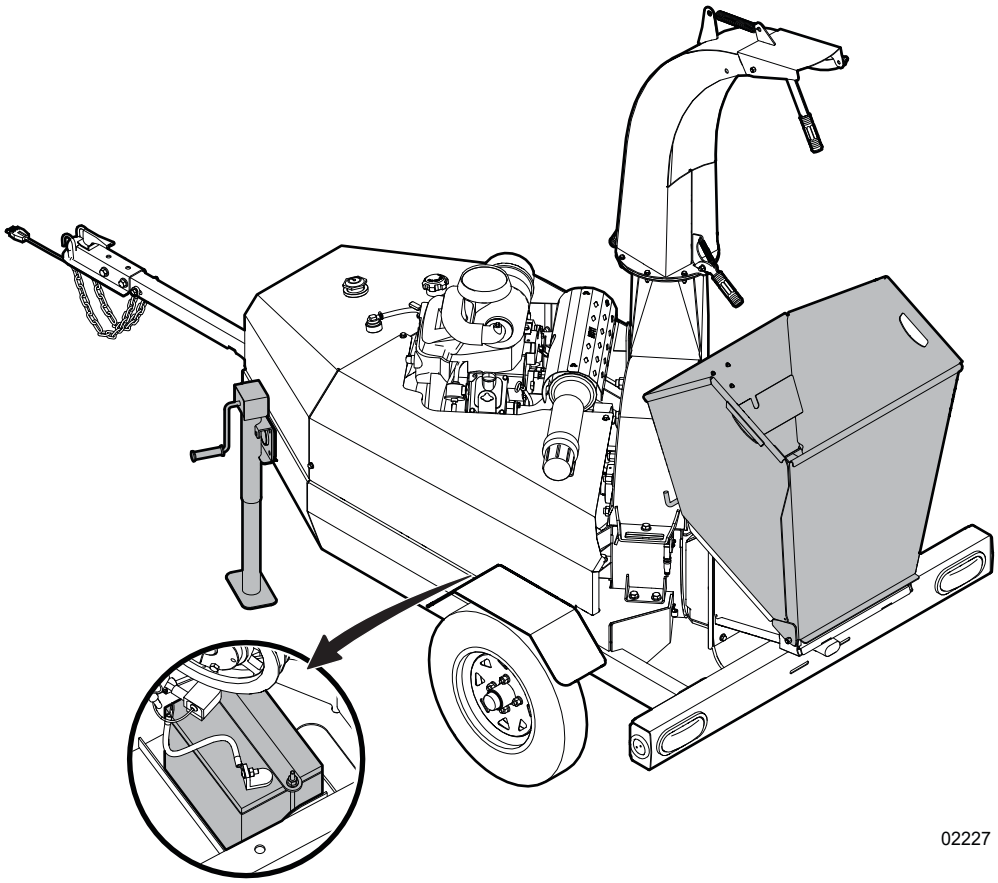


Figure 30 – Storage position

8.4 Replace the Engine Fuel

WARNING!

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

W027

WARNING!

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

W116

CAUTION!

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

W117

1. Stop the machine.
   For instructions, see *Stop the Machine on page 33.*
2. Wait for the engine and fluids to cool.
3. Remove the current fuel from the engine.
   Operate the machine until the fuel tank is empty or drain the fuel tank and properly dispose of the fuel.
4. Add new fuel to the engine.
   For instructions, see *Add Fuel to the Engine on page 32*.
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 33*.
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 33*.

9. Service and Maintenance

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

9.1 Service and Maintenance Safety

⚠ WARNING!

Before you start service or maintenance work:

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

W041

⚠ WARNING!

Wear the personal protective equipment (PPE) that is necessary to do the work safetly.

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

W101

⚠ WARNING!

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

W110

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

SAFE CONDITION

1. If the machine is connected to a tow vehicle, set the tow vehicle's parking brake, stop the engine, and remove the ignition key.
2. Stop the machine.
   For instructions, see *Stop the Machine on page 33*.
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 sufficient light for good visibility.
- Use tools that are in working condition and correct for the task. Make sure that you know how to use the tools before you use them.
- Only operate the engine in a location that has good air flow. Engine exhaust gases contain carbon monoxide (an odorless gas) that can cause asphyxiation.
- Do not work under equipment unless it is safely supported with blocks.
- Do not do service or maintenance work alone. Always have a minimum of two people in case an emergency situation occurs.
- Keep a fire extinguisher and first aid kit available at all times.
- When service or maintenance is complete, do the following:
  - Replace all guards and shields, and close the covers.
  - Torque the fasteners to the correct specifications.
  - Make sure that all the electrical, hydraulic, and fuel connections are connected in a safe working condition.
- Do not use gasoline or diesel fuel to clean parts. Use the correct cleaning product.
- When replacement parts are necessary, use genuine factory replacement parts to restore your machine to the original specifications. The manufacturer cannot be responsible for injuries or damages caused by use of unapproved parts and/or accessories.

9.2 Fluids and Lubricants

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

9.2.1 Lubricant Handling and Storage

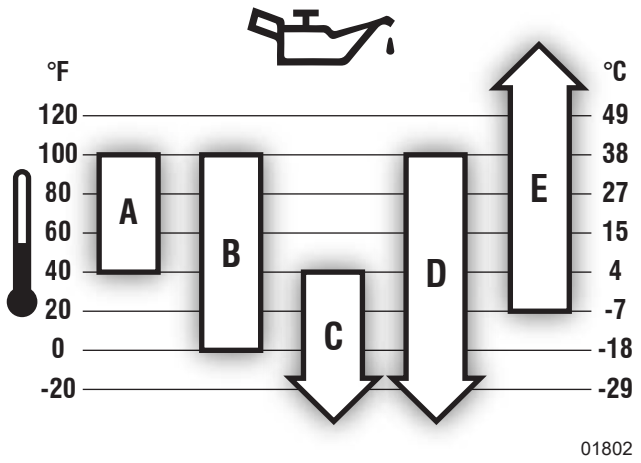
For optimum machine efficiency, use clean lubricants and clean containers to handle all lubricants. Store lubricants in an area that is protected from dust, moisture, and other contaminants.

9.2.2 Engine Oil

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

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

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



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

9.2.3 Engine Fuel

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

Fuel must meet the following specifications:

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

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

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

For instructions, see *Replace the Engine Fuel on page 46*.

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.

9.2.5 Rust Protection Oil

Use a good quality rust protection oil and lubricant that is intended for use on metal.

9.3 Maintenance Schedule

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

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

Task	8 hours or daily	50 hours or annually	100 hours or annually	250 hours	400 hours or annually	600 hours or annually	Reference
Check the engine oil level and quality.	●						See *page 30.*
Check the engine fuel level.	●						See *page 32.*
Clean the engine around the muffler and controls.	●						N/A[1].
Check that all the fasteners are torqued to the correct specifications.	●						See *page 69.*
Check that the wheel lug nuts are torqued to the correct specifications.	●						See *page 70.*
Remove all debris and entangled material.	●						N/A.
Check the drive belt operation.	●						See *page 56.*
Check the rotor knife, ledger knife, and twig breaker sharpness.		●					See *page 60.*
Check the battery condition.		●					See *page 54.*
Lubricate pivot points and hinges.		●					See *page 52.*
Grease the machine.		●					See *page 51.*
Check the drive belt tension and alignment.		●					See *page 56.*
Check the tire pressure.			●				See the tire sidewall.
Clean the machine.			●				See *page 64.*
Clean the engine air filter.[2]			●				See *page 54.*
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.
Replace the air filter safety filter.						●	See the engine manual.

1 N/A indicates that a reference is not applicable.
2 In dusty conditions or when airborne debris is present, clean more often.
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 identifies a grease point and shows the greasing interval in hours.

For grease specifications, see *Grease on page 48.*

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

9.4.1 Grease Fitting Locations

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

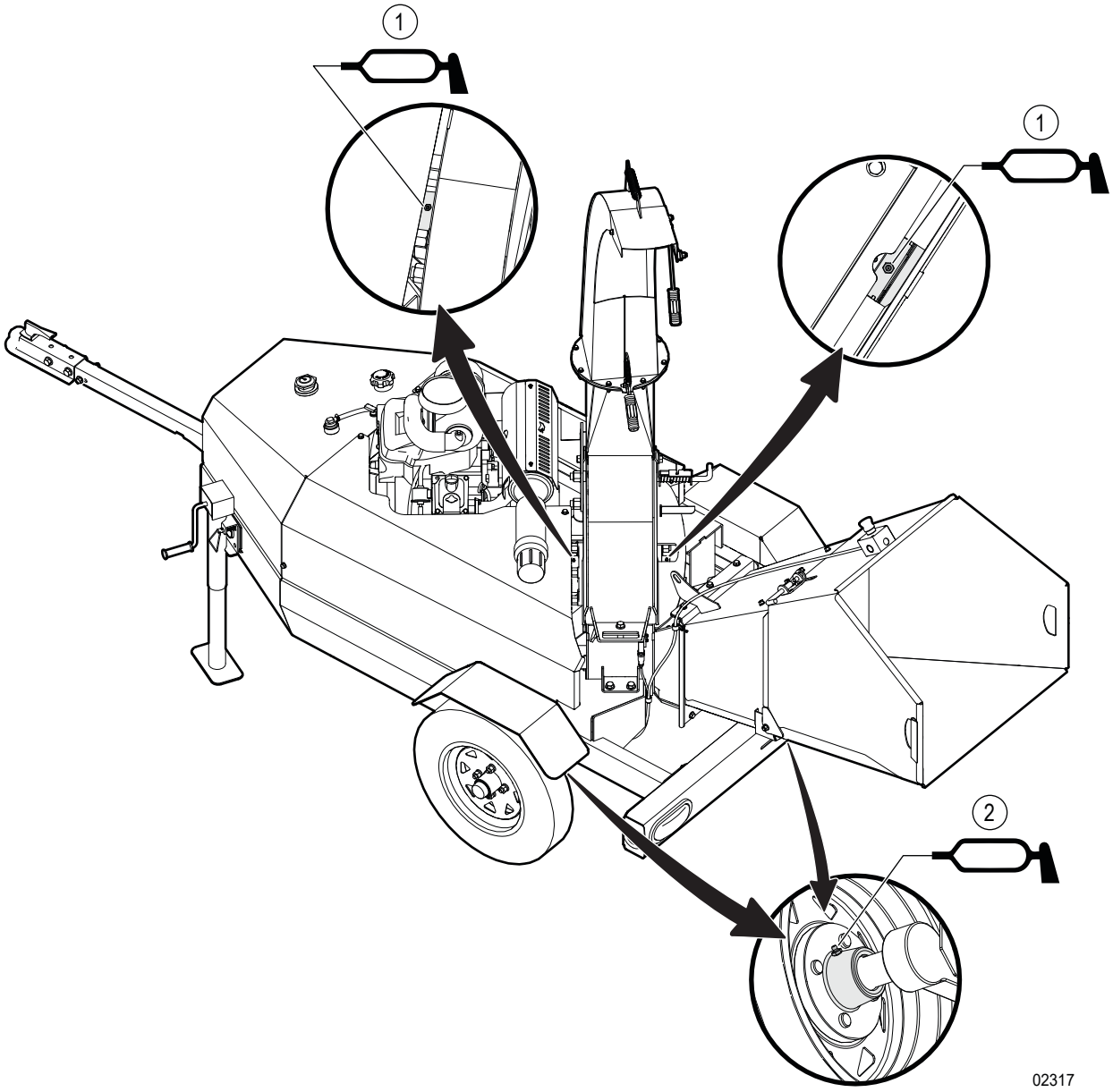


Figure 31 – Grease fitting locations

9.4.2 Hinge and Pivot Point Locations

Hinge and pivot points can rust and become difficult to move without the correct maintenance. Apply a small amount of rust-prevention oil to the following locations:

Item	Location	Frequency	Number of Locations
1	Discharge chute	50 hours or annually	2
2	Deflector	50 hours or annually	1
3	Trailer jack	50 hours or annually	1
4	Hitch coupler	50 hours or annually	1

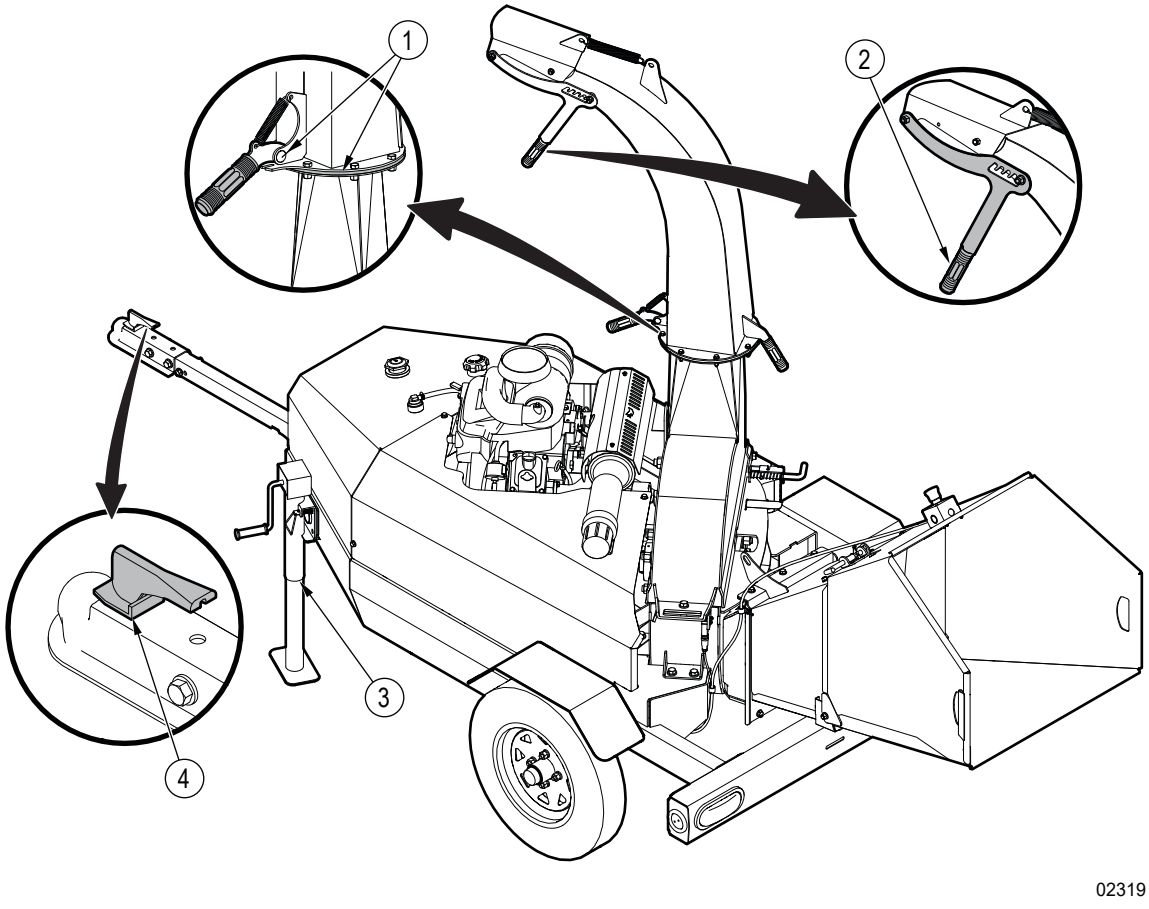


Figure 32–Hinge and pivot point grease locations

9.5 Engine Maintenance

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

9.5.1 Engine Maintenance Safety

WARNING!

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

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

W072

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.

W115

For more information, see *Engine Operation Safety on page 29.*

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

9.5.2 Electronic Fuel Injection System Maintenance Safety

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 30.*

- Do not start the engine if the battery cables are loose.
- Turn the key to the **STOP** position or remove the starter switch before disconnecting, removing, or installing the battery.
- Do not use a battery charger to start the engine.
- Do not 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 **STOP** position and disconnect the negative (-) battery cable from the battery.
- Do not spray water directly on the Electronic Control Unit.

9.5.3 Clean the Engine Air Filter

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

Clean the air filter every 100 hours of operation or annually.

A dirty air filter can restrict air flow to the engine and decrease 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.

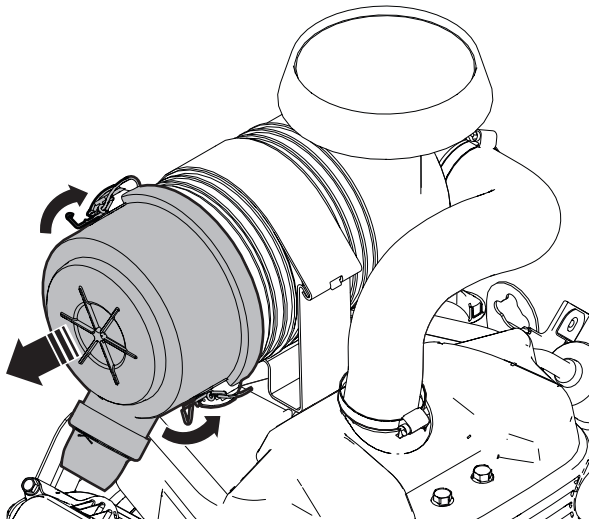


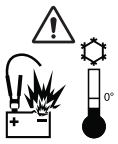
Figure 33–Remove the air-filter cover

9.6 Battery Maintenance

The battery provides power to the electrical components on the machine and the engine.

9.6.1 Battery Safety

⚠ WARNING!



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

W030

⚠ CAUTION!

Wash your hands thoroughly after handling a battery. Avoid contact with the battery posts, terminals, and related accessories. They contain lead and lead compounds that are known to cause cancer and birth defects or other reproductive harm.

W031

⚠ WARNING!

Wear the necessary PPE and handle batteries carefully. The electrolyte in the battery is poisonous and very corrosive . If electrolyte touches skin, eyes, or clothing it can cause severe burns or other personal injury. If you touch battery electrolyte, get immediate medical attention.

W020

⚠ WARNING!

Do not let metal objects touch the battery terminals. Cover the battery terminals when servicing the battery or the drive belt guard is removed. Electricity can arc from the battery terminal to the metal object and cause a fire or explosion. An explosion can cause serious injury or death from heat, impact, and chemical hazards.

W021

⚠ 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.

W115

- 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 eye wear, or a face shield when you work with or near batteries.
- Use a battery carrier to lift the battery or put your hands on opposite corners of the battery. Keep the battery level 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 medical attention and clean any spilled electrolyte immediately.
- Disconnect the battery ground cable before servicing any part of the electrical system. A spark or short circuit can cause personal injury.

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.
   Use a battery carrier to lift the battery or put your hands on opposite corners of the battery. Keep the battery level to avoid spilling battery acid through the vents.

9.6.3 Install the Battery

1. Put the battery in 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. Apply a coat of baking soda to the battery terminals and battery-cable ends.
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. Do not use a charger that is higher than 10 A.

Always read and obey 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 on page 55*.
2. Use a battery carrier to lift the battery or put your hands on opposite corners of the battery.
   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 and Safety

WARNING!

Take the machine to a qualified dealer or distributor to have a tire mounted on a wheel or rim. Do not mount a tire on a wheel or rim without the correct equipment and experience. Incorrectly mounting a tire can cause an explosion that can result in serious injury or death.

W124

IMPORTANT! Replace worn tires with tires that meet the original tire specifications. Do not undersize tires.

- Torque the wheel lug nuts to the correct specification daily. For torque specifications, see *Lug Nut Torque on page 70.*
- Check the tire pressure before towing the machine on a roadway. See the tire sidewall for the correct pressure.
- At a minimum, check the tire pressure every 100 hours of operation or annually.

9.8 Drive Belt Maintenance

WARNING!

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

W109

WARNING!

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

W001

9.8.1 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 engine guard fasteners and the guard.
2. Remove the drive-belt guard fasteners and the guard.
3. Loosen (do not remove) the four bolts that attach the engine mount to the machine frame. See *Figure 39 on page 58.*
4. Turn the drive-belt tensioning bolts to move the engine and remove tension from the drive belt. See *Figure 38 on page 58*.
5. Remove the drive belt.
6. Install a new drive belt on the rotor sheave and the clutch flywheel.
7. Align the drive belt.
   For instructions, see *Align the Drive Belt on page 58.*
8. Set the drive belt tension.
   For instructions, see *Set the Drive Belt Tension on page 57.*
9. Install the drive-belt guard, the engine guard, and the fasteners.
10. Use a calibrated torque wrench to torque the fasteners to **19 lbf•ft (25 N•m)**.

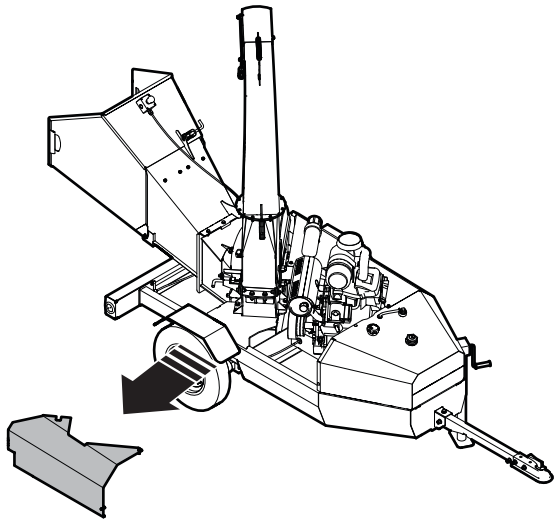


Figure 34–Remove the engine guard

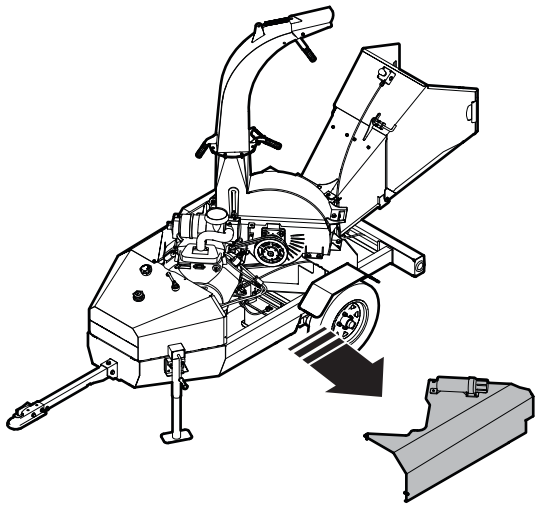


Figure 35–Remove the drive-belt guard

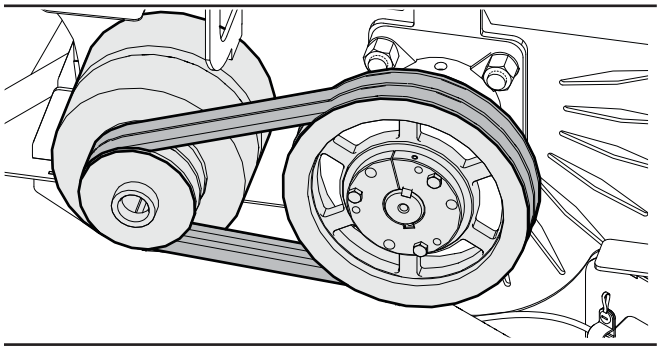


Figure 36–Drive belt

9.8.2 Set the Drive Belt Tension

IMPORTANT! Adjust the drive belt tensioning bolts evenly. If the bolts are unevenly adjusted, you may have to align the engine.

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

Check 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 37 on page 58*.
2. Do one of the following:
   - If the drive belt movement measures **between 1/4" (6 mm) and 3/8" (10 mm)**, the drive belt tension is correct. You do not need to set the drive belt tension.
   - If the drive belt tension is not correct, continue with the following steps to set the drive belt tension.
3. Loosen (do not remove) the four bolts that attach the engine mount to the machine frame. See *Figure 39 on page 58.*
4. Use the drive-belt tensioning bolts to set the drive belt tension. See *Figure 38 on page 58*.
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 to 7 again.
9. Align the drive belt.
   For instructions, see *Align the Drive Belt on page 58.*
10. Use a calibrated torque wrench to torque the four engine mount bolts to **19 lbf•ft (25 N•m)**.
11. Check the drive belt tension again after 10 hours of operation.

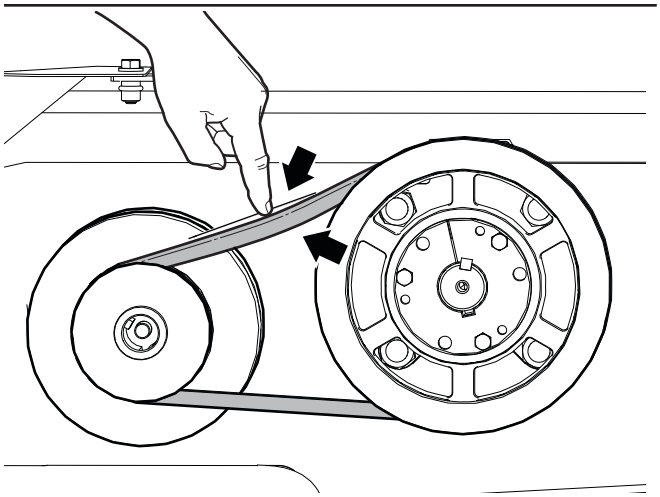


Figure 37 – Check the drive belt tension

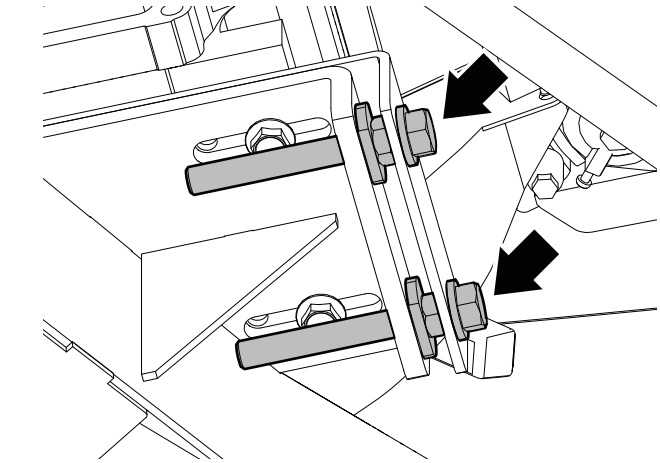


Figure 38 – Drive belt tensioning bolts

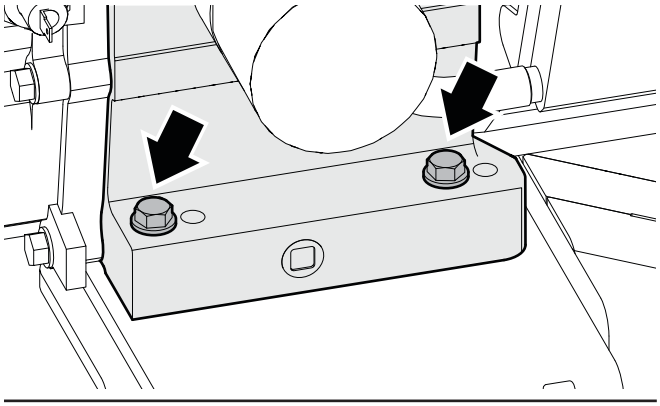


Figure 39 – Engine mount bolts (two of four)

9.8.3 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. Put a straight-edge tool across the face of the rotor sheave. Point the opposite end of the straight-edge toward the engine clutch flywheel.
   Make sure that the straight-edge is parallel with the face of the rotor sheave. See *Figure 40.*
2. Do one of the following:
   - If the edge of the engine clutch flywheel aligns with the straight-edge, the drive belt is aligned. The following steps are not necessary. See *Figure 40.*
   - If the edge of the engine clutch flywheel is parallel to the straight-edge tool, but is not aligned with the rotor sheave, align the rotor sheave. See *Figure 42 on page 56.*
     For instructions, see *Align the Rotor Sheave on page 59.*
   - If the edge of the engine clutch flywheel is not parallel (is on an angle) to the straight-edge tool, align the engine clutch. See *Figure 41 on page 55.*
     For instructions, see *Align the Engine Clutch on page 59.*
3. Do steps 1 and 2 again to make sure the drive belt is aligned.

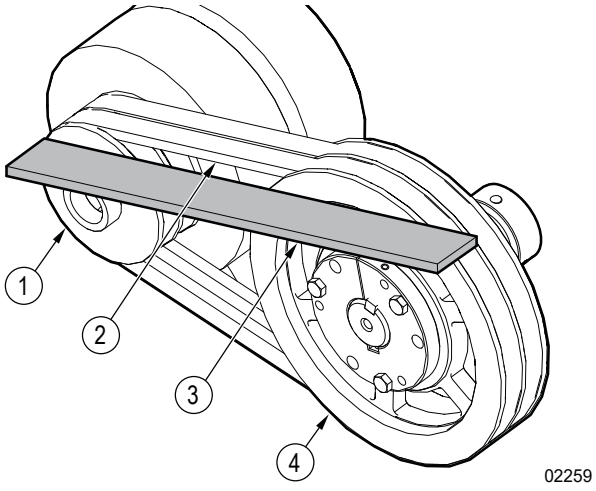


Figure 40 – Check the drive belt alignment

1. Engine clutch flywheel
2. Point of alignment
3. Straight edge
4. Rotor sheave

9.8.4 Align the Engine Clutch

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

1. Loosen (do not remove) the four engine mount bolts. See *Figure 39 on page 58.*
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 58.*
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 to 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 to 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 57.*

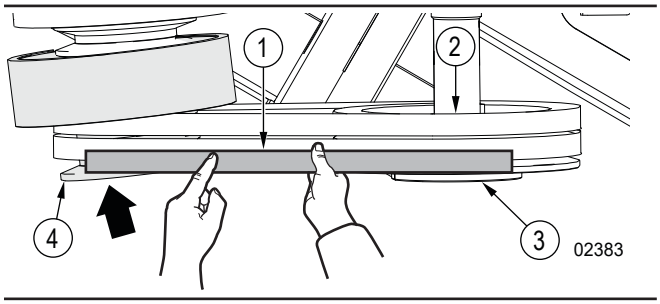


Figure 41 – Align the engine clutch

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

9.8.5 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 43 on page 60.*

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 58.*
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 to 8.
9. Remove the sheave bolts from the puller holes.
   Turn them counterclockwise in 1/4 turn increments.
10. Install the sheave bolts in the sheave hub.
11. Do step 4 until the sheave bolts are tight.
12. Install and then tighten the set screw (1).
13. Do step 6 again.
14. Do one of the following:
    - If the belt alignment is correct, continue with step 15.
    - If the belt alignment is not correct, do steps 1 to 14.
15. Use a calibrated torque wrench to torque the three sheave bolts to **9 lbf•ft (12 N•m)**.
16. Check the drive belt tension.
    For instructions, see *Set the Drive Belt Tension on page 57.*

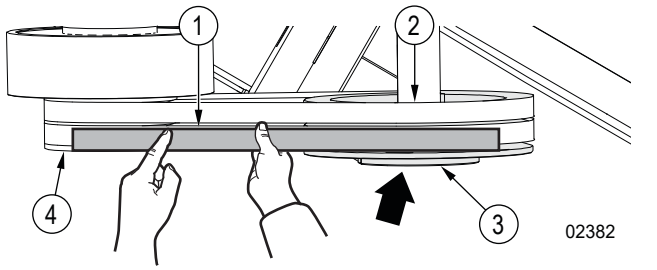


Figure 42–Align the rotor sheave

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

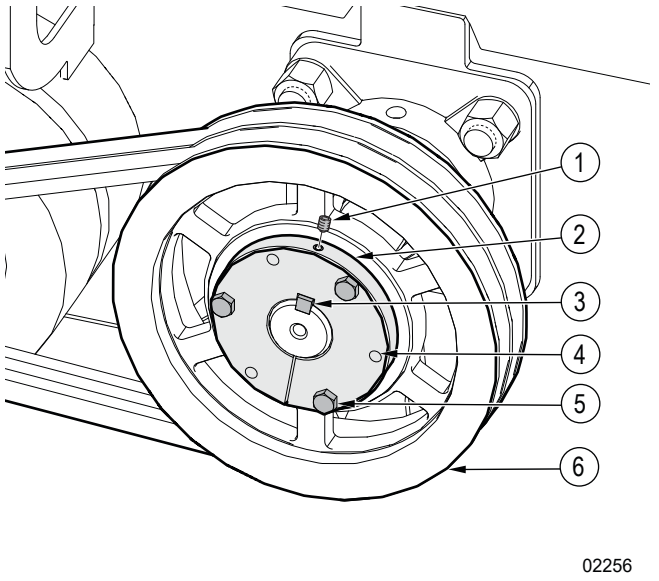


Figure 43–Rotor sheave

1. Set screw
2. Sheave hub
3. Shaft key
4. Puller hole (1 of 3)
5. Sheave bolt (1 of 3)
6. Sheave

9.9 Rotor Knife Maintenance

⚠ WARNING!

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

W001

⚠ WARNING!

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

W003

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.

9.9.1 Replace a Rotor Knife

1. Stop the engine. Wait for the rotor to stop turning.
   For instructions, see *Stop the Machine on page 33.*
2. Remove the fastener that holds the upper rotor housing closed. See *Figure 22 on page 38.*
3. Open the upper rotor housing.
4. Turn the rotor to access one of the rotor knives.
5. Use the rotor-lock pin to prevent the rotor from turning. Make sure that the rotor cannot move.
   For instructions, see *Engage the Rotor Lock on page 39.*
6. Remove the rotor knife fasteners.
7. Carefully, remove the rotor knife.
8. Clean the rotor knife recess.
9. Apply blue 242 thread locker to the threads of each rotor knife fastener.
10. Put the rotor knife in the recess and align the fastener holes.
11. Install the rotor knife fasteners. See *Figure 44 on page 61.*
12. Use a calibrated torque wrench to torque the fasteners to **45 lbf•ft (63 N•m)**.
13. Do steps 4 to 12 again for each rotor knife.
14. Disengage the rotor-lock pin to release the rotor. Make sure that the rotor can turn freely.
    For instructions, see *Disengage the Rotor Lock on page 39.*

15. Turn the rotor to check the ledger knife clearance for each of the rotor knives.
    Make sure that the rotor knives do not touch the ledger knife.
16. Close the upper rotor housing.
17. Install the fastener that holds the upper rotor housing closed. See *Figure 22 on page 38.*
18. Use a calibrated torque wrench to torque the fastener to **80 lbf•ft (110 N•m)**.

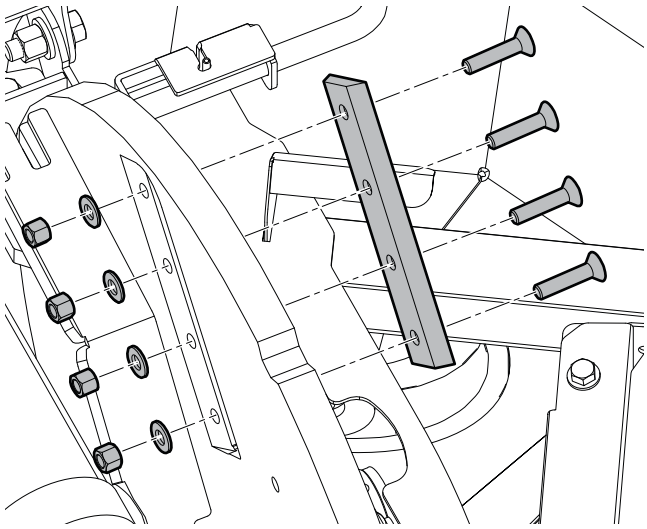


Figure 44–Install a rotor knife

9.9.2 Sharpen a Rotor Knife

CAUTION!

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

W126

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

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

1. Remove the rotor knife from the machine.
   For instructions, see *Replace a Rotor Knife on page 60.*
2. Clean the rotor knife.
3. Examine the rotor knife for damage. If the rotor knife is damaged, replace all the rotor knives.
4. Put the rotor knife in a bench vice with the cutting edge facing up.
   Make sure that the rotor knife is clamped safely in the bench vice.
5. Use a grinder to sharpen the cutting edge of the rotor knife. Sharpen the cutting edge to a 45-degree angle. See *Figure 45.*
6. Do steps 4 and 5 again for the opposite cutting edge.
7. Do steps 1 to 5 again for the remaining rotor knives.

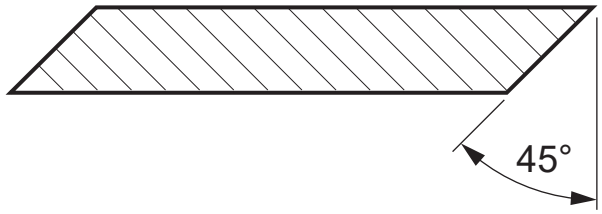


Figure 45–Sharpen to a 45° angle

9.10 Ledger Knife Maintenance

WARNING!

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

W001

WARNING!

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

W003

9.10.1 Replace a Ledger Knife

1. Stop the engine. Wait for the rotor to stop turning.
   For instructions, see *Stop the Machine on page 33.*
2. Remove the fastener that holds the upper rotor housing closed. See *Figure 22 on page 38.*
3. Open the upper rotor housing.
4. Remove the two ledger knife fasteners.
5. Carefully, remove the ledger knife.
6. Do one of the following:
   - If the ledger knife has a square (90-degree) edge, install the ledger knife with the square edge pointing toward the rotor knife.
   - If the ledger knife does not have a square edge, sharpen or replace the ledger knife.

     For instructions, see *Sharpen a Ledger Knife.*
7. Align the ledger knife with the bolt holes in the lower rotor housing.
8. Install the ledger knife fasteners.
9. Set the ledger knife clearance.
   For instructions, see *Set the Ledger Knife Clearance on page 63.*
10. Use a calibrated torque wrench to torque the fasteners to **115 lbf•ft (155 N•m).**
11. Close the upper rotor housing.
12. Install the fastener that holds the upper rotor housing closed. See *Figure 22 on page 38.*
13. Use a calibrated torque wrench to torque the fastener to **80 lbf•ft (110 N•m).**

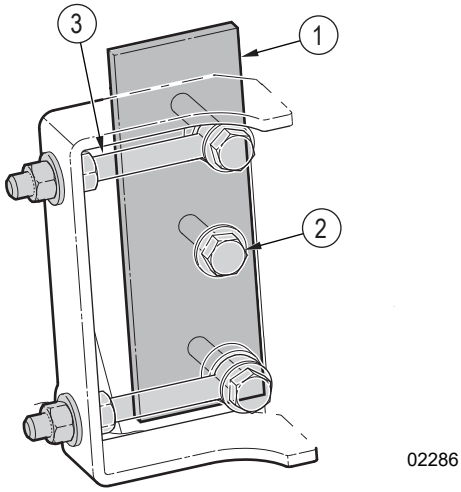


Figure 46–Ledger knife adjustment assembly (typical)

1. Ledger knife
2. Ledger knife fastener
3. Ledger knife adjustment rod

9.10.2 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 62.*
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 47.*
6. Do steps 4 and 5 for the opposite cutting edge.

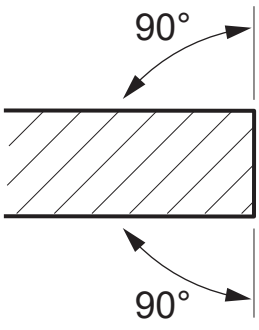


Figure 47–Sharpen to a 90° angle

9.10.3 Set the Ledger Knife Clearance

1. Stop the engine. Wait for the rotor to stop turning.
   For instructions, see *Stop the Machine on page 33.*
2. Remove the fastener that holds the upper rotor housing closed. See *Figure 22 on page 38.*
3. Open the upper rotor housing.
4. Turn the rotor to align a rotor knife with the ledger knife. Select the rotor knife with the smallest space between the rotor knife and the ledger knife.
5. Loosen the ledger knife fasteners.
6. Use the ledger knife adjustment rod to set the position. Do one of the following:
   - Insert a ledger knife clearance gauge between the rotor knife and the ledger knife.
     Tighten or loosen the nuts on the ledger knife adjustment rod until the ledger knife touches the ledger knife clearance gauge.
   - Tighten or loosen the nuts on the ledger knife adjustment rod to set the clearance between 1/32" and 1/16" (1 mm and 1.5 mm).
7. Use a calibrated torque wrench to torque the fasteners to **115 lbf•ft (155 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. Turn the rotor to check the ledger knife clearance for each of the rotor knives.
   Make sure that the rotor knives do not touch the ledger knife.
10. Close the upper rotor housing.
11. Install the fastener that holds the upper rotor housing closed. See *Figure 22 on page 38.*
12. Use a calibrated torque wrench to torque the fastener to **80 lbf•ft (110 N•m).**

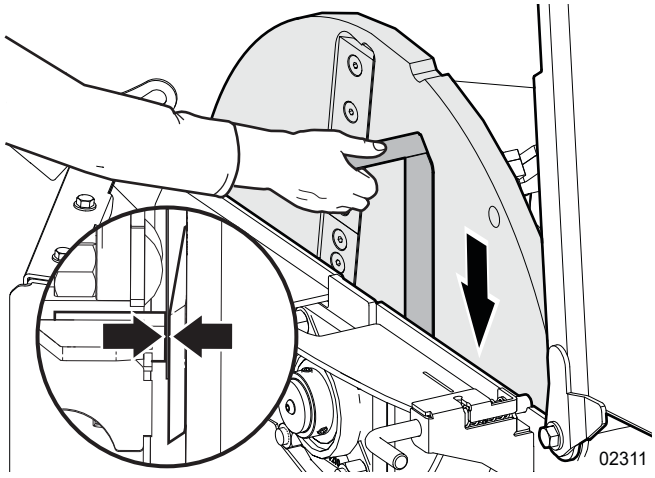


Figure 48–Set the ledger knife clearance

9.11 Twig Breaker Maintenance

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

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

Use the following procedure to replace the twig breaker:

1. Stop the engine. Wait for the rotor to stop turning.
   For instructions, see *Stop the Machine on page 33.*
2. Remove the fasteners that attach the twig breaker to the rotor housing.
3. Put the twig breaker in position.
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).**

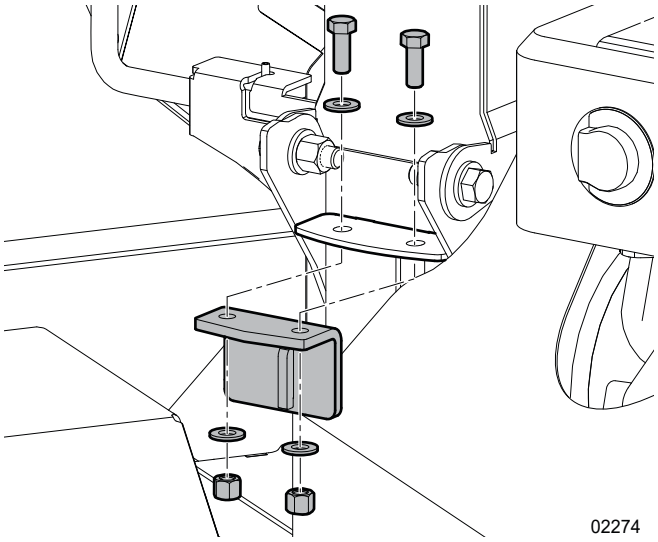


Figure 49–Install a twig breaker

9.12 Clean the Machine

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

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

- **The product identification plate.**
- **Bearings.**
- **Electrical components, including the emergency stop button, electrical cables, and electronic control unit.**

A pressure washer can damage these components.

1. Use a hose or pressure washer and mild detergent to remove dust, dirt, and debris.
2. Use a clean, soft cloth, that is dampened with water to remove dirt from the product identification plate.
3. Start the machine.
   For instructions, see *Start the Machine on page 33.*
4. Let the engine run for a few minutes to dry.
5. Stop the machine.
   For instructions, see *Stop the Machine on page 33.*
6. Apply grease to the areas where the pressure washer possibly removed it.
   For instructions, see *Grease Points on page 50.*

9.13 Safety Curtain Maintenance

CAUTION!

Do not operate the machine without the safety curtain installed in the chipper hopper. Replace the safety curtain if it is damaged or missing. The safety curtain prevents wood chips from being blown out of the chipper hopper. The machine can release wood chips fast enough to cause personal injury and property damage.

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The safety curtain is located on the inside of the chipper hopper. It prevents wood chips from blowing out of the chipper hopper. Do not use the machine without the safety curtain installed.

Use the following procedure to replace the safety curtain:

1. Set the machine to a safe condition.
   For instructions, see *Safe Condition on page 9.*
2. Remove the fasteners that attach the safety curtain to the chipper hopper.
3. Put the new safety curtain in position.
4. Install the fasteners that attach the safety curtain to the chipper hopper.
5. Use a calibrated torque wrench to torque the fasteners to **19 lbf•ft (25 N•m)**.

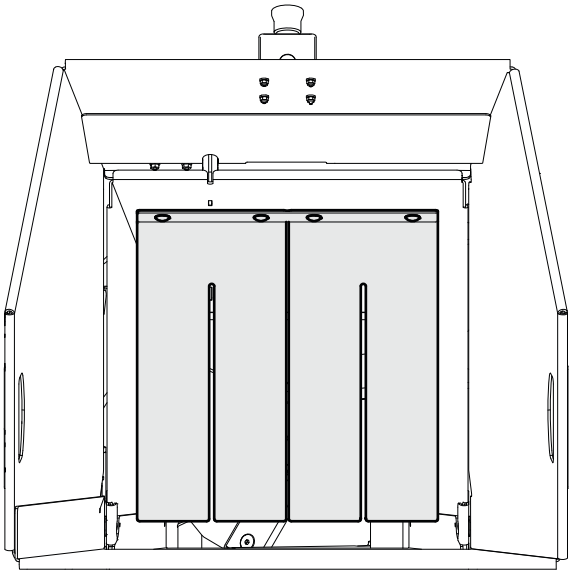


Figure 50–Safety curtain

10. Troubleshooting

WARNING!

Before troubleshooting, read and understand the *Service and Maintenance Safety on page 47.* Set the machine to a safe condition.

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

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

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

Problem	Possible cause	Solution
The rotor does not turn.	The discharge chute is obstructed.	Remove all material from the discharge chute. For instructions, see *page 37.*
	The rotor is blocked.	Remove the blockage. For instructions, see *page 37.*
	The drive belt is loose or broken.	Set the drive belt tension. For instructions, see *page 57.*
	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 23.*
	The knives are not sharp or the clearance is incorrect.	Check the rotor and ledger knives. If necessary, rotate, sharpen, or replace the knives. For instructions, see *page 60* and *page 62.*
	The rotor knife angle is incorrect.	Sharpen the rotor knives to the specified 45° angle and check that the knives are installed correctly. For instructions, see *page 61.*
	The discharge chute is blocked.	Remove all material from the discharge chute. For instructions, see *page 37.*
There is unusual machine vibration during operation.	A rotor knife is broken or missing.	Check the rotor knives. If necessary, rotate, sharpen, or replace the knives. For instructions, see *page 60.*
	The rotor could be 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 torque the fasteners to the correct specifications. See *page 69.*
The engine does not start.	The emergency stop button is on.	Reset (turn off) the emergency stop button. Turn the button clockwise and pull. See *page 22.*
	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.	Check the rotor and ledger knives. If necessary, rotate, sharpen, or replace the knives. For instructions, see *page 60* and *page 62.*
	The drive belt is loose or worn.	Examine the drive belt. If necessary, adjust the tension or replace the drive belt. For instructions, see *page 56.*
	The material being chipped is poor quality.	The material is small or rotting. Mix the material with higher quality material.
	The ledger knife clearance is incorrect.	Set the ledger knife clearance. For instructions, see *page 63.*

Problem	Possible cause	Solution
The machine needs more power or the engine stalls.	The discharge chute is blocked.	Remove all material from the discharge chute. For instructions, see *page 37.*
	Too much material is being put into the chipper hopper.	Put smaller amounts of material in the chipper hopper.
	Material is being put into the chipper hopper too quickly.	Put large material into the chipper hopper slowly.
	The rotor is blocked.	Remove the blockage. For instructions, see *page 37.*
	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.	Set the ledger knife clearance. For instructions, see *page 63.*
	The knives are not sharp or the clearance is incorrect.	Check the rotor and ledger knives. If necessary. rotate, sharpen, or replace the knives. For instructions, see *page 60* and *page 62.*
	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. If necessary, adjust the tension or replace the drive belt. For instructions, see *page 56.*
	An incorrect replacement belt was installed.	Replace the drive belt. For instructions, see *page 56.*
	The rotor sheave is misaligned.	Check the rotor sheave alignment. If necessary, adjust the alignment. For instructions, see *page 59.*
	The rotor is blocked.	Remove the blockage. For instructions, see *page 37.*
	The rotor sheave is worn.	Examine the rotor sheave and bearings. If necessary, replace the components.
	There is lubricant (for example, oil or grease) on the drive system components.	Find the source of the lubricant and correct the situation. Clean the drive system components. If necessary, replace the drive belt.
	The rotor bearings are worn or damaged.	Examine the rotor bearings. Replace a bearing that is worn or damaged
The battery power decreases quickly.	Frequent use of the emergency stop.	Only use the emergency stop button in an emergency. When the ignition switch is in the RUN position and the engine is stopped, it can damage the battery.

11. Specifications

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

For available accessories, go to WallensteinEquipment.com

11.1 Machine Specifications[1]

Parameter	BXT72S
Chipper type	Disc
Feed system	Gravity (manual) feed
Engine	Vanguard® 40 hp (993 cc) EFI
Chipper hopper opening (height x width)	26.7" x 24" (68 cm x 61 cm)
Rotor housing opening (height x width)	7.3" x 11" (18 cm x 28 cm)
Number of rotor knives	2
Rotor diameter	28" (71 cm)
Rotor weight	247 lb (112 kg)
Discharge chute height	89" (226 cm)
Discharge chute rotation	295°
Drive system	Centrifugal clutch and drive belt
Engine speed	3,600 RPM
Rotor speed	2,000 RPM
Tires	5.30 x 12
Hitch	2" ball coupler
Total weight	1464 lb (664 kg)
Dimensions (legnth x width x height)	150" x 54" x 90" (381 cm x 137 cm x 229 cm)
Fuel tank capacity	12.2 US gal (46.4 L)
Capacity: round material (diameter)	7" (18 cm)
Capacity: flat material (width)	11" (28 cm)
Knife material	Hardened tool steel
Tongue weight	142 lb (64 kg)

1 Specifications are subject to change without notice.

11.2 Bolt Torque

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

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

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

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

Imperial Bolt Torque Specifications

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

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.

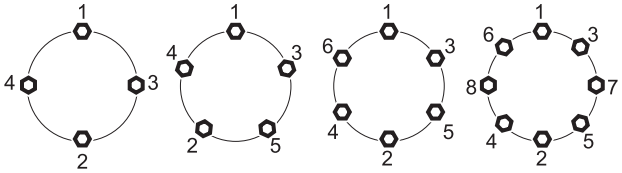
Tighten wheel lug nuts to the correct torque before the first use and after each wheel removal. After a wheel is installed, check and torque the lug nuts after the first 10 miles (16 km), 25 miles (40 km), and 50 miles (80 km). Check the lug nut torque periodically thereafter.

- 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. Warranty

LIMITED WARRANTY

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

Five Years for Consumer Use

Two Years for Commercial/Rental Use

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

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

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

This warranty does not cover the following:

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

rev. Nov-2018

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