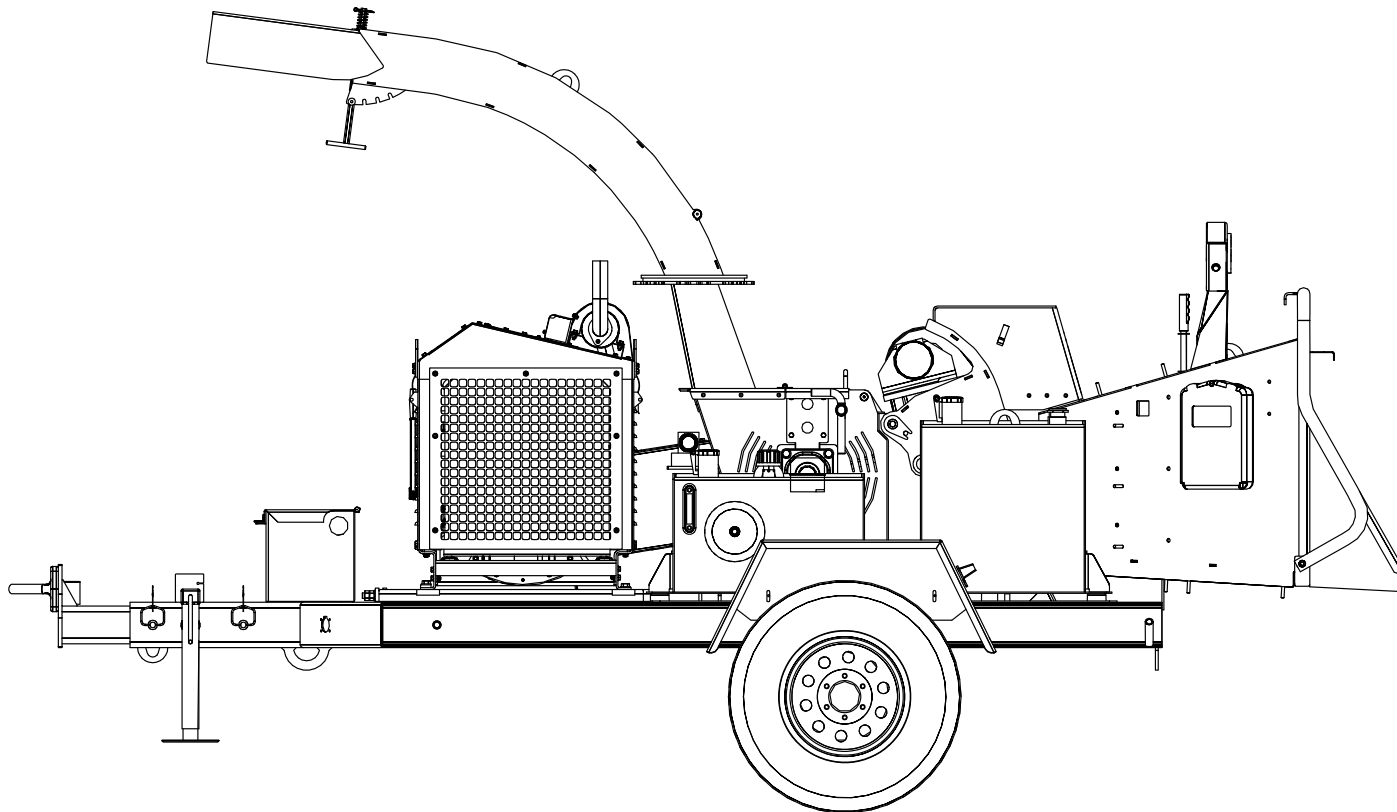


Wood Chipper



MORBARK®

S/N:32691

Read this manual before operating the chipper

**PLACE
MORBARK USB
HERE**



Wood Chipper **MORBARK**

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P. O. Box 1000
Winn, Michigan 48896

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REVISION LOG

Revision:	Date Issued:	Pages Affected:	Description of Changes:
-	March 17, 2020	All	Initial Release

Item	S/N
Axle	S/N:
Engine	S/N:
Engine Pump	P/N:
Clutch	S/N:
PTO Pump	S/N:

WARNING!

The engine exhaust from this product contains chemicals known to the state of California to cause cancer, birth defects, or other reproductive harm.

CALIFORNIA
 Proposition 65 Warning
 Diesel engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects, and other reproductive harm.

INTRODUCTION



Thank you for purchasing the Model 1215 Chipper from Morbark, LLC, the leading manufacturer of wood grinding, recycling, and chipping equipment.

Your heavy-duty Model 1215 Chipper is a rugged, reliable machine, built to give you years of productivity. It is a unique machine with features that others in its class do not have. We are proud to offer this machine and appreciate your confidence in our product.

If for any reason you need to correspond with us, or any of the Morbark dealers, please have the serial number handy. It is located on the front side of the tongue of the Model 1215 Chipper.

Your comments and suggestions are welcome and greatly appreciated. They help us develop superior products for demanding professionals like you.

Contact us at:

Address: Morbark, LLC
P.O. Box 1000
8507 S. Winn Road
Winn, MI 48896

Phone: 1-989-866-2381

Fax: 1-989-866-2280

E-mail: www.morbark.com

About this manual

This manual has been developed to make you familiar with your Model 1215 chipper.

Its unique format presents important information in two ways. Safety, use and maintenance information are combined in the Features & Function section. Additionally, general information is provided in separate, stand-alone sections.

The five distinct sections are Safety, Chipping Cycle, Features & Function, Maintenance, and Parts. If you need specific safety and maintenance information regarding a feature of the machine, look in the Features & Function section. General information about safety and maintenance can be found in their respective sections.

If you need a part, refer to the illustrations and tables in the Parts section. When ordering a part, use the Morbark part number listed next to the part description.

Every person involved with handling, operating, and maintaining the Model 1215 Chipper must read this manual and understand the information in it.



Warranty



Morbark, LLC (Morbark) warrants to the original purchaser that this product will be free from defects in materials and workmanship under normal use and operating conditions subject to the conditions and exclusions stated below. No representative, agent, dealer of Morbark, or any other person is authorized to modify, expand, or extend this warranty in any manner, or make any representation on Morbark's behalf in connection with the sale of any equipment covered by this Warranty.

Warranty Period. The Warranty period is as follows:

1. One (1) years from the date of original delivery with extended one - year warranty on Morbark manufactured components only for hand fed brush chippers.

Exclusions. This Warranty shall not apply to:

1. Equipment that has been subjected to misuse, neglect, modification, alteration, accident, or lack of normal maintenance or service.
2. Replacement of routine maintenance items and wear parts such as knives, anvils, hammers, screens, belts, bearings, etc.
3. Fire damage.
4. Components manufactured by others that are warranted by the manufacturers thereof, including engines, engine components, batteries, tires, etc.



8507 Winn Road, Winn Michigan
989•866•2381

Purchasers Exclusive Remedy. The exclusive remedy for the purchaser in the event the equipment does not conform to this Warranty, shall be the repair or replacement of the equipment is returned to Morbark's factory 8507 Winn Road, Winn, Michigan, or at such other location designated in writing by Morbark. Morbark is not responsible for the cost of transport or related charges in connection with return of any equipment to Morbark under this Warranty. Morbark shall have sole discretion to determine whether, and to what extent, the equipment is defective. If Morbark determines the equipment is not covered by this Warranty, the equipment shall be returned to the purchaser at purchasers expense.

Warranty Validation. Morbark shall be under no warranty obligation unless a Warranty Validation Report is completed and returned to Morbark, LLC, 8507 Winn Road, Winn Michigan, properly dated and signed by the purchaser within thirty (30) days of delivery of the equipment.

Disclaimer of Warranties. **This Warranty is in lieu of all other Warranties express or implied. Morbark makes no other Warranties as to the equipment, and in particular, makes no implied Warranty of merchantability or fitness for a particular purpose, which are expressly disclaimed.**

Limitation of Damages. **Morbark shall not be liable for any incidental or consequential damages, directly or by subrogation, including but not limited to any claims for lost profits, downtime, or loss of use, in the event the equipment is defective or does not comply with any Warranty.**

Warranty Claims



Morbark, LLC is committed to making sure that your machine is operational and productive at all times. We carry an extensive inventory of parts so that if a part on your machine fails, we'll get a replacement part to you as soon as possible.

To better help you please follow these steps:

1. Contact us at (800) 255-8839 and order the part
 - Let us know whether the part is under warranty. We will send to you a claim form(s) that includes instructions for filling it out.
2. Fill out the claim form(s)
 - If there are labor expenses that need to be reviewed for reimbursement, then a completed and approved "Prior Authorization" form must be attached to the warranty claim form and sent to Morbark, LLC.
 - All replacement parts are invoiced to the customer. A credit is issued after the completed warranty claim form and failed part are received at Morbark, LLC and the cause of failure determined to be a defect in materials or workmanship.
3. Install the new part and send the defective part to Morbark, LLC.

- Attach the Morbark, LLC invoice received for the replacement part. If the replacement part was purchased from a Morbark distributor, then attach the distributor's invoice. Morbark retains the right to refuse any claim when original Morbark replacement parts have not been used.
- Ship the defective part to Morbark, LLC, 8507 S. Winn Road, Winn, MI, 48896 Attention: Warranty Returns. All returned parts must be shipped freight prepaid. Use the pink copy and Morbark invoice as a packing slip. Keep the golden rod copy for your records and any future inquiries concerning the claim.
- The white, yellow, and green copies need to be mailed to Morbark Warranty, PO Box 1000, Winn, MI, 48896. Both the part and claim form need to be received for warranty consideration.

If you have any questions about the warranty claim process, please call us and ask for the warranty department.

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Safety



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Symbols, Signs, and Terms

Think Safety

Safety is a combination of common sense and alertness at all times when handling, operating, or servicing the machine.

The following symbols indicate a safety alert. It is used to alert you to potential personal injury hazards.

Obey all messages that follow the symbol to avoid possible injury or death.

Danger

Indicates a hazard or unsafe practice that will result in severe injury or death. This sign is red and white.



Warning

Indicates a hazard or unsafe practice that could result in severe injury or death. This sign is orange and black.



Caution

Indicates a hazard or unsafe practice that could result in minor injury. This sign is yellow and black.



Note Messages

Without the alert symbol indicate that a failure to follow instructions could result in damage to the machine.



Warning Symbol Graphics

Throughout this manual, and on the decals of your machine, you will find many types of safety symbols. It is essential to understand the meaning of each type of symbol and to follow their directives.

Safety symbols are important safety graphics to convey in picture form what the hazard or message is. Any symbol in a yellow triangle is meant to communicate a hazard, such as “fire hazard”. A symbol in a blue circle is meant to communicate a mandatory safety action such as “read this manual”. A symbol in a circle with a red border and a line through it is meant to communicate an action not to take, such as “no smoking”.

Examples of Hazard symbols



Examples of Mandatory Action Symbols



Examples of Action NOT to take Symbols





DANGER!

Any modification to the machine must be approved by Morbark. Unauthorized modifications to the machine may impair the function and/or safety features that could affect machine life or cause serious injury or death to personnel.

Safety is No Accident

Accidents don't just happen; they are usually caused when people make mistakes, are not properly trained, or do not have full understanding of how the machine operates.

It is mandatory that employers/owners have safety and operating procedures related to the handling, operation, and maintenance of this machine. Before a person works with this machine they must be successfully trained on these procedures.

As part of the training program all personnel must read and understand the information in this, and other, manuals related to this machine. They must also understand all safety labels and know where they are located.

This machine is designed for safe operation and handling. It is the responsibility of the owner and personnel in contact with the machine to ensure there is minimal risk and potential harm during operation, maintenance, and handling.

General safety information is presented in this section. Specific safety information regarding a feature of the machine can be found in the Features and Function section. Failure to heed these safety actions and warnings may result in fire, explosion, serious injury, or death.

Operator Training

- All personnel must be successfully trained on the handling, operation, maintenance, and safety requirements before working with the machine. Safety training should include first aid and how to respond to an emergency
- Familiarity with the machine can lead to complacency with handling and operation. Conduct regular reviews of all procedures associated with this machine

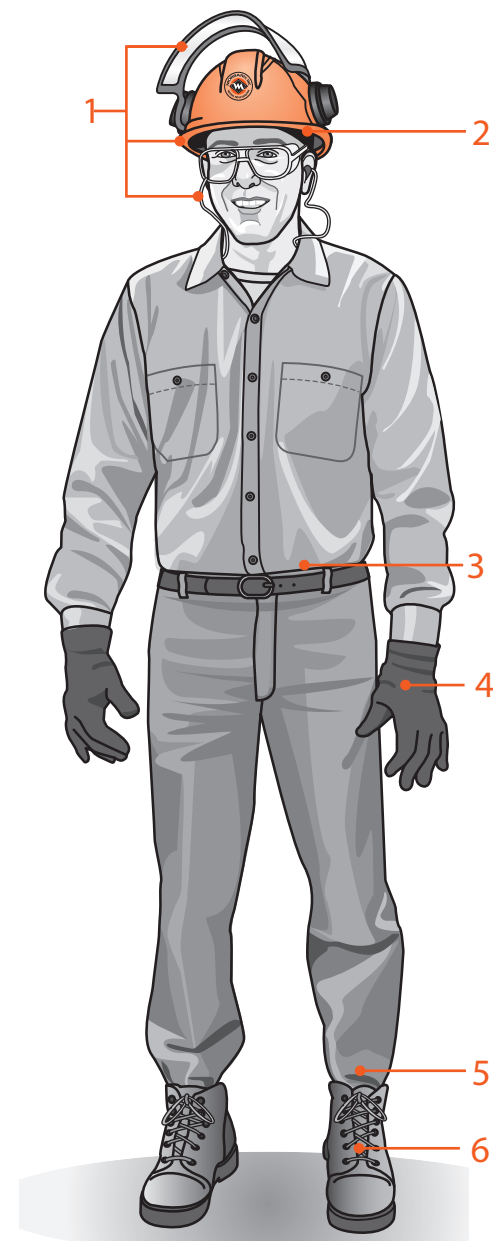
Personal Protection

Clothing and Gear

Wear proper protective equipment and clothing at all times. Follow the personal protection gear listed below:

1. Hard hat, ear muffs, or ear plugs, and a shield or safety glasses
2. Long hair should be contained in a hair net or under hard hat.
3. Shirt must be close fitting and tucked in.
4. Gloves without cuffs. Never wear gauntlet-style gloves (cuffs at the wrists).
5. Pants without cuffs.
6. Hard-toe, non-skid work boots.

• • • Figure 1.1



Operation



General Operation Standards

Before operating the machine:

- Check that all personnel are wearing proper clothing and protective gear to prevent injury from sharp or jagged edges
- At least two trained operators must be on the work site at all times. The work site is an area where the operators can see, hear, and react to an emergency in a few seconds
- Never operate the machine while under the influence of alcohol or other mind altering substances
- Conduct all maintenance (daily and periodically) before operating the machine
- Inspect the machine for damaged or excessive wear
- Inspect and prepare the work site. Designate a brush area and a chipped wood area
- Set up the machine for operation

Emergency Preparation

Have the following emergency equipment on the work site:

- An approved, charged, fire extinguisher
- Water tanks and halon gas extinguishers are recommended
- Communication device (e.g., cell phone, walkie talkie)
- Fully stocked first aid kit. (Can be ordered from Morbark P/N 59135-245)

Maintenance

- Clean dirt, oil, wood chips, and bark from engine area. Remove debris and accumulated oil, grease, and other flammable material from around the power unit and bearings daily
- Hydraulic pressure is stored in the machine after shutdown. Always test hydraulic controls and relieve pressure before conducting maintenance

* Refer to the Safety Checklist to conduct safety and maintenance checks before operating the machine.

Spectators, Children, and Untrained Individuals

- Do not allow children or spectators to operate the machine or play near the machine during operation
- All spectators must wear protective clothing and gear
- Before operating the machine ensure all untrained personnel are clear of the machine and standing at a safe distance. Alert all persons close to the machine before initiating operation

Refueling

- Turn the engine OFF and allow the machine to cool down before adding fuel
- Fuel and its vapors are highly flammable and explosive. Do not add fuel around an open flame, while smoking or where sparks may occur
- Do not store the machine with fuel in the tank. Only use approved fuel containers for storage
- Never transport flammable liquids on the machine

Machine Set Up

- Maintain a safe distance from exposed utility (e.g., gas, water, phone, and power) lines
- Always set the machine up on flat and stable ground or surface and ensure the machine is level. Do not operate the machine on unstable or sloped ground
- Do not let the machine idle with the clutch disengaged for 2 to 3 minutes or more. Damage to the clutch pilot bearing will occur
- Place wheel chocks under the tires to prevent unexpected movement during operation if unattached to tow vehicle
- Only operate the machine in a well lit and ventilated area

Handling

- Do not climb, sit, stand, or lay on the machine during operation
- Use caution when working and moving around the machine. Walk and maintain balance at all times

Moving Parts

- Keep away from all moving parts during operation
- Objects or body parts can become cut or crushed if caught in moving parts. Never attempt to touch a part that is moving until the power to the machine is shutdown and the part is completely stopped. Follow the lockout procedure when performing maintenance on the machine

Shutdown



- Always remove the ignition key and lock the engine control panel when there is a pause in operation (see Lockout Procedure)
- Parts of the machine remain hot after shutdown. Allow the machine to cool down for 15 to 20 minutes before performing maintenance
- If the machine is attached to a vehicle make sure the hitch is secure and the safety chains are properly attached
- Unattended or parked machines must have wheel chocks placed under the tires
- To minimize the risk of fire spreading, park the machine a minimum of 50 ft. from other equipment
- Clean debris from the machine after every use

Safety Checklist

Be sure to check that you have the following items at the beginning of each session or when changing operators:

- ☐ Emergency equipment on work site:
 - communication device
 - stocked first aid kit
 - approved, charged fire extinguisher, is at the work site
- ☐ Personal clothing and protective gear
 - hard hat
 - safety goggles
 - ear protection
 - hard toe work boots with non-skid soles
 - gloves without cuffs (note: Never wear gauntlet style gloves due to the possibility of snagging)
 - shirt is close fitting and tucked in
 - pants without cuffs
 - long hair is contained in a hair net or wrapped underneath the hard hat

Daily Maintenance

- ☐ All recommended grease points are greased (see Maintenance section)
- ☐ Hydraulic oil, engine oil, and fuel and radiator coolant is at their proper levels and clean

Machine Inspection

- ☐ Machine is clean and debris is removed from around the engine, muffler, chipper housing, infeed, and discharge chutes
- ☐ All safety devices and controls (e.g.: safety cables) are in good condition and operating properly
- ☐ Shields and guards are in place and in good condition
- ☐ Battery cables, electrical wiring, and connections are in good shape and do not have cracks

- ☐ Fuel and oil line connections are securely attached to the fittings and there is no sign of fluid leakage. Tubes and hoses are in good condition
- ☐ Filler caps and drain plugs are securely attached to the machine
- ☐ Hood latches and pins are in place
- ☐ Components, parts, and hinges are not broken or cracked
- ☐ Hardware (e.g., bolts, nuts, pins) are in place and tightened
- ☐ All tires are properly inflated according to the manufacturer's specifications
- ☐ All safety decals are clean and legible. If not, replace all missing or damaged labels
- ☐ The product manuals are in good shape and in the manual holder

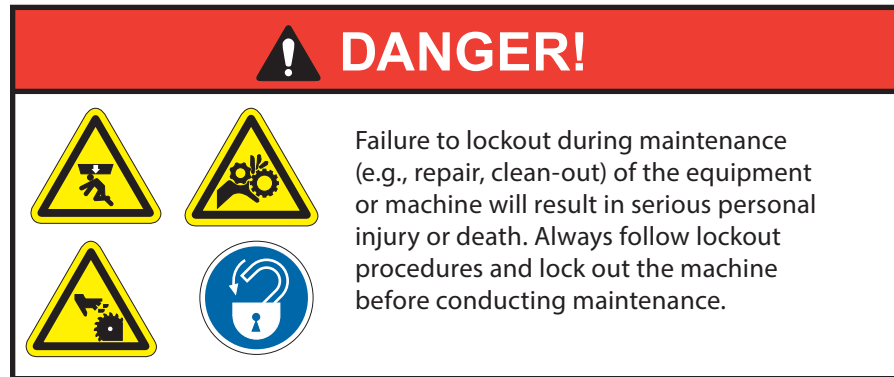
Work Site

- ☐ There are at least two trained operators at the work site. Never leave one person at the work site alone
- ☐ Foreign objects are removed from the work area
- ☐ The machine is set up in a safe environment (e.g.: no power lines) and in an area that is well lit and ventilated
- ☐ All spectators are at a safe distance from the machine and the work area is marked off with safety pylons or rope

Set Up

- ☐ The machine is set up on a flat and stable ground or surface
- ☐ If the chipper is attached to a truck or van, the hitch is secure, the safety chains are properly attached, the brake is on, and no one is in the vehicle
- ☐ If the chipper is not attached to a vehicle, ensure chocks are placed under the wheels

Lockout Procedure



Morbark chippers are custom built to customer specifications. Control panels, power configurations, and other features may differ from each machine. It is the responsibility of each employer/owner to develop and implement lockout (energy control) procedures specific to their machine.

Lockout of the machine prevents unexpected start-up or motion, release of stored energy, and operation of the machine. It is mandatory the

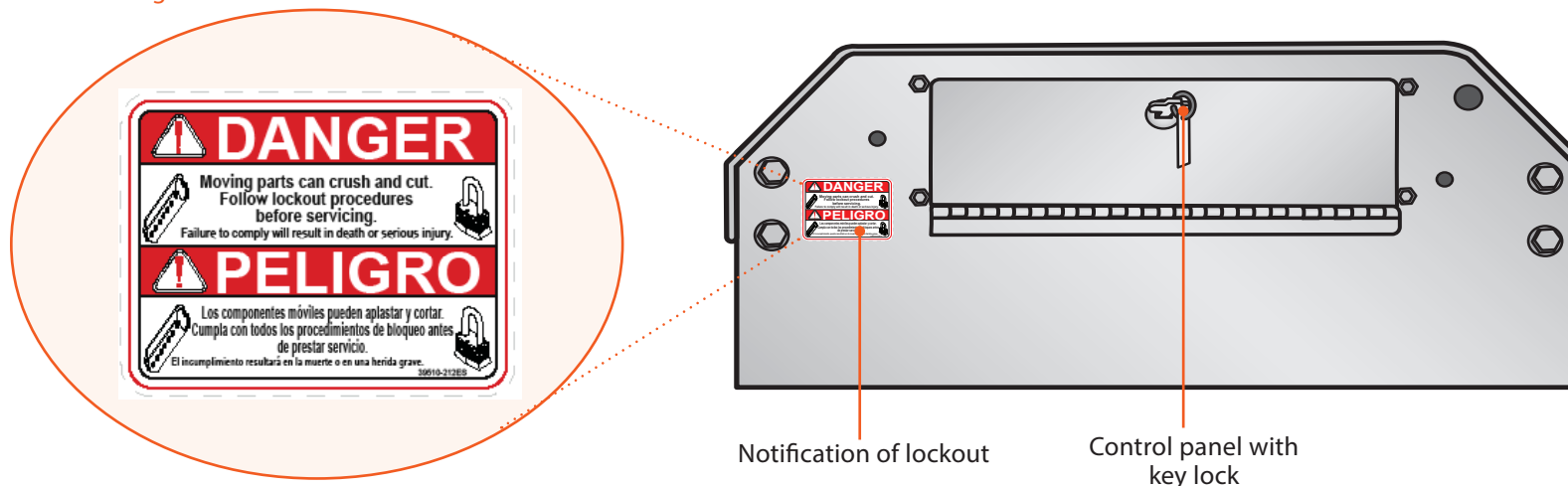
machine is locked out when left unattended, shutdown, or while performing maintenance. As a safety and crime prevention method, the power must be disconnected when the machine is being stored.

Only authorized personnel shall lockout the machine. All employees who handle, operate, and maintain the machine shall be trained on the lockout procedure in accordance with this manual, ANSI Z244.1, and OSHA requirements.

Include the following in your lockout (energy control) procedures:

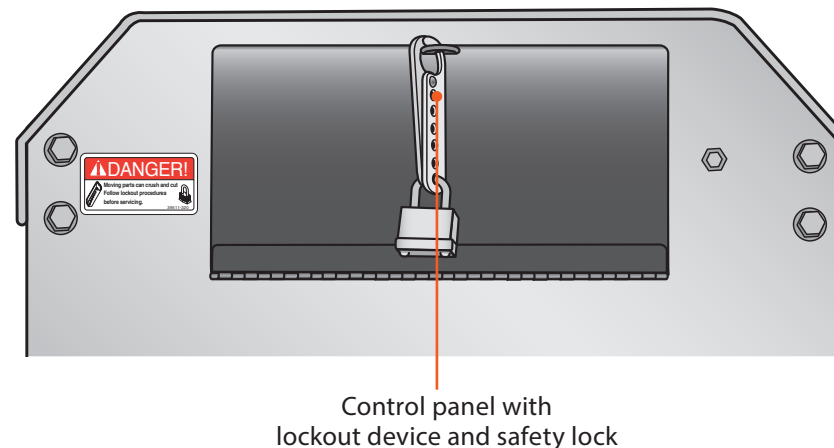
- Each person authorized to lockout the machine must have a safety lock and key dedicated to the machine lockout
- Authorized personnel must verbally notify affected employees of the machine lockout, and post a sign(s) indicating the power lockout condition near the machine controls
- The engine, electrical panel, or other power source must be locked out before adjustments or repairs are made

• • • Figure 1.2



- Equipment with main disconnect switches shall be turned off and locked in the OFF position only after the source of electrical power is shut off at the point of operational control
 - After locking out the power source, the employee shall try to start the equipment, machine, or operate the controls to ensure no unintended motion will occur or test the equipment and machine by use of appropriate test equipment to determine that the energy isolation has been effective
 - Attach lockout devices and locks to levers, switches, valves, etc. in the non-operative (OFF) position
 - When two or more employees work on the same equipment, each person is responsible for attaching his/her own lock. There shall be a separate lock for each person
 - When shift or personnel changes occur before the maintenance or servicing is finished, it is the responsibility of both authorized personnel from each shift to:
 - A. Ensure that the continuity of the lockout procedure is maintained
 - B. Decide on whether to use the same lockout device that was originally attached or use a separate device. If a change is made it shall be under the direction of the authorized personnel and should be documented
 - C. Employers must have specific procedures incorporated into the energy control program to address emergency lock removal. Employees must be trained in these procedures
- The employee(s) operating, or conducting maintenance on the machine must assure authorized personnel that all guards have been replaced and the equipment, machine, or process is ready for operation
 - Upon verification that the current control of hazardous energy sources has been effective, authorized personnel shall remove the safety lock(s) rendering the machine operational. Appropriate personnel shall be notified that power is being restored to the equipment and/or machine

● ● ● Figure 1.3

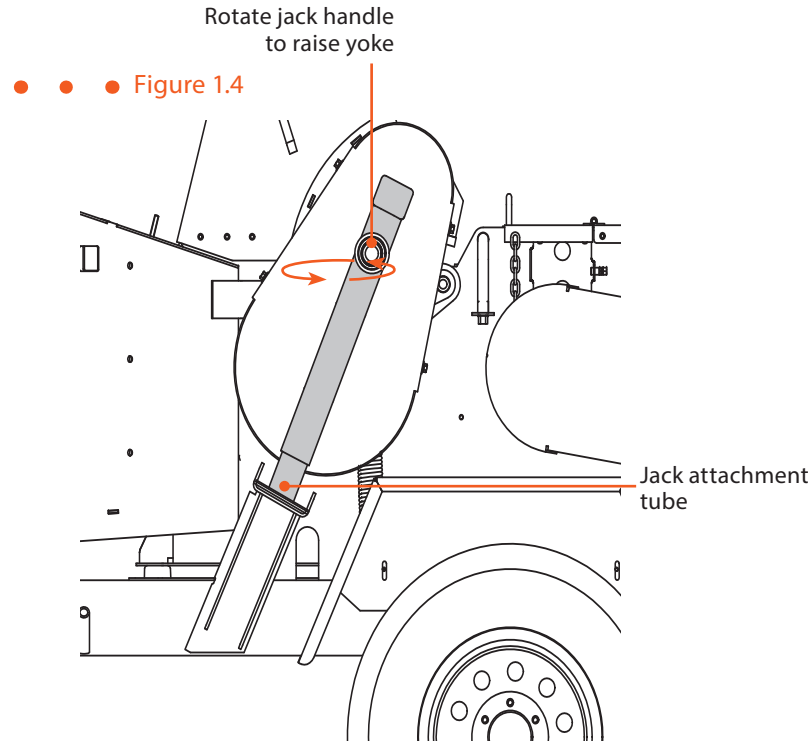


Control panel locks and locations vary depending on the model and engine type.

Safety Lockout Instructions:

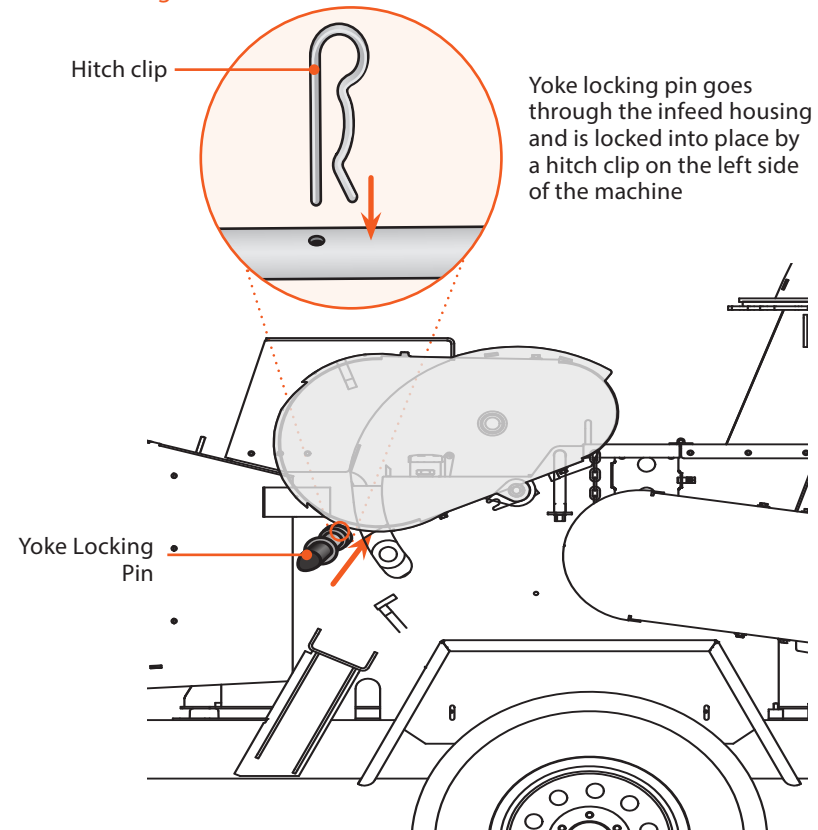
To Lockout the Yoke:

1. Make sure your chipper is securely attached to a tow vehicle and all pressure is off the tongue jack.
2. Remove jack from tongue, place on jack attachment tube under feed wheel, insert jack attachment tube into adjoining hole through the yoke belt shield.
3. With jack securely in place, rotate jack handle until you can insert yoke locking pin through yoke base in locked position.
4. The yoke locking pin is located beside the infeed chute. Insert it all the way through the yoke locking pin holes on both sides of the infeed housing.



5. Insert the hitch clip into the hole at the end of the yoke locking pin.
6. Check that the hitch clip is securely in place by pulling on the handle of the yoke locking pin, and attempt to remove it. Maintenance on the feed wheel area may begin after the machine is locked out and the yoke locking pin is securely in place.

● ● ● Figure 1.5

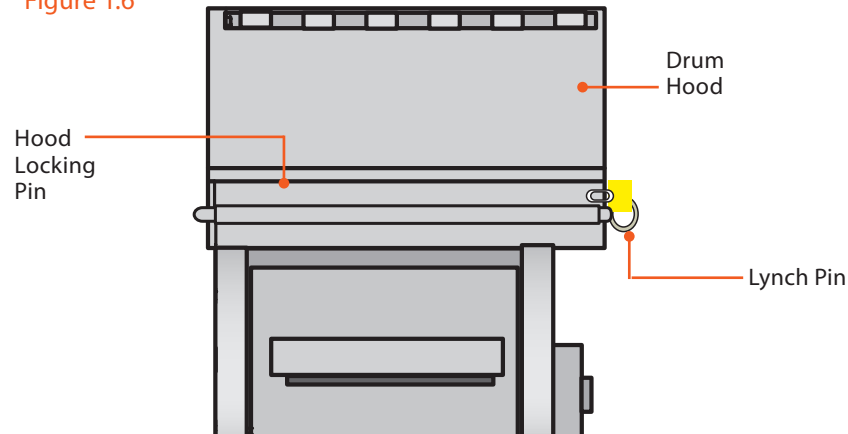


Safety • Lockout Procedure

To Lockout the drum:

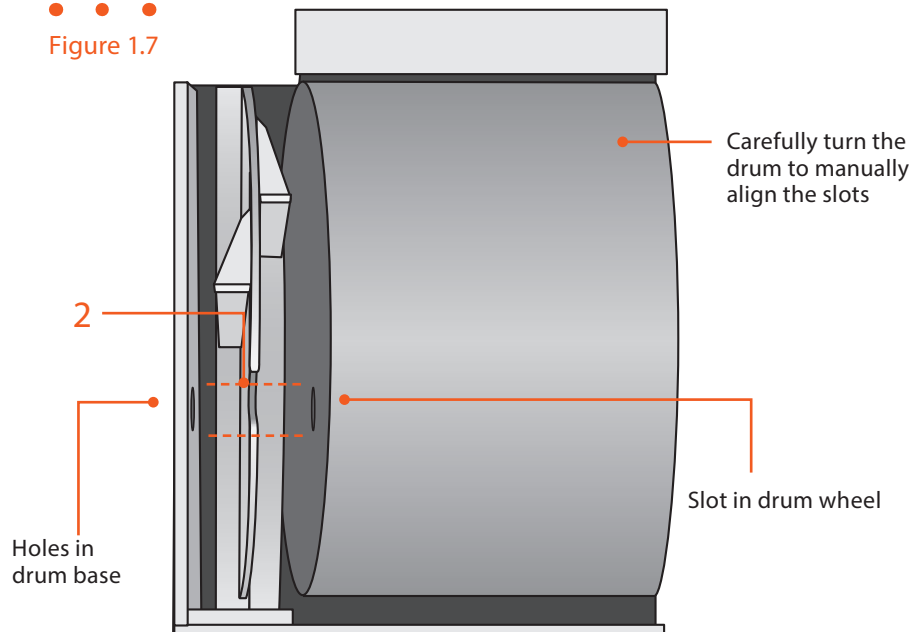
1. Remove lynch pin, slide the hood locking pin out that holds the drum hood down. Lift the drum hood open.

• • •
Figure 1.6



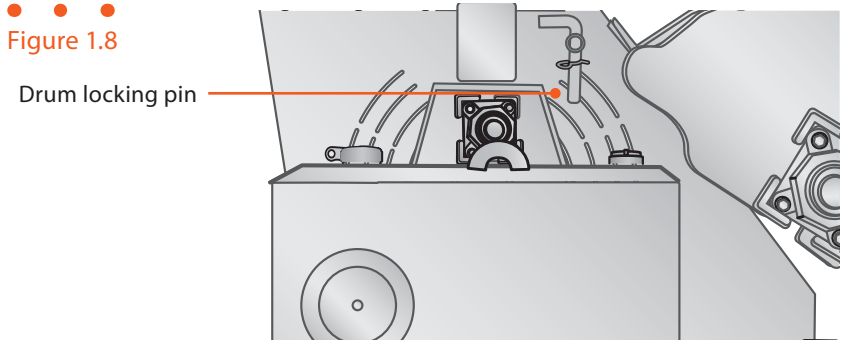
2. Turn the drum manually until the slot in the wheel is aligned with the holes on the side of the drum base.

• • •
Figure 1.7



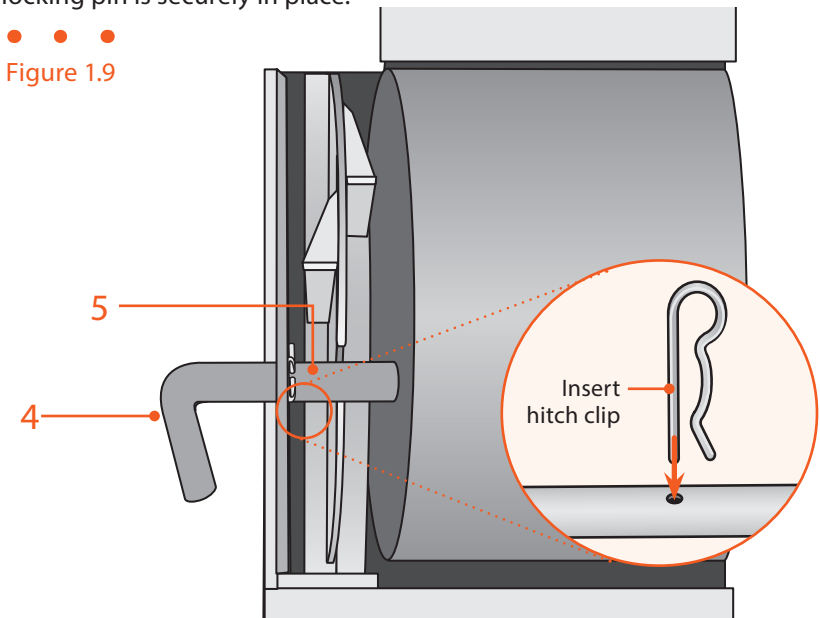
3. Remove the drum locking pin from its holder located on the right side of the base.

• • •
Figure 1.8



4. Insert the drum locking pin through the holes in the drum base and slot on the wheel.
5. Insert the hitch clip through the drum locking pin.
6. Check that the drum locking pin is securely in place by pulling on the handle of the drum locking pin and attempt to remove it. Maintenance on the drum may begin after the machine is locked out and the locking pin is securely in place.

• • •
Figure 1.9



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Crime Prevention



It has been proven that thieves are hesitant to take items that can be readily identified. Placing signs, decals, and other visible information warning potential thieves that this equipment has been marked and registered with the local law enforcement officials may help prevent a possible theft. By following the advice on this page, you can reduce vandalism, discourage theft, and help recover the machine if it is stolen.

Record Identification Numbers

- Record the serial number (S/N) of the machine and the identification numbers of the engine, clutch, hydraulic components, etc.
- Check that all serial numbers are complete, correct, and recorded in all relevant documentation (insurance, financial, warranty etc.)
- Inscribe a unique identification mark
- Participate in a government Owner Applied Numbering (OAN) program
- A key element in marking equipment is uniformity

Here are some standard guidelines:

- Locate the mark on the right side of the equipment as you are standing behind it
- On all equipment with non-removable tongues place the ID number on right side on top of tongue, 12" to rear of hitch pin
- On 3 point equipment with a tool bar, place the ID number on top of the tool bar, adjacent to the right hitch pin
- Mark your equipment in a second location known only to you. Record what the mark is and where it is located (photograph)

Maintain Documented Proof of Ownership

- Keep all documents and records (e.g., identification numbers, invoices, warranty) that accompany the machine in a safe location
- Take color photographs of the machine from all sides and angles
- Update all documents and photographs when a major change is made to the machine

- Maintain an inventory record of all equipment and machines. Regularly check to make sure that no machines have been stolen

Parking Indoors

- Remove the ignition key and place hard-to-move equipment in front of exits
- Remove the battery or any essential component in the electrical system when the machine is being stored
- Secure all openings to the storage building

Parking Outdoors

- Park the machine out of sight
- Remove the ignition key and lock the control panel and battery box
- Alert law enforcement personnel of your presence in the area and provide them with a contact person to call when there is suspicious activity
- Ask for assistance in watching the machine from neighbors and merchants who reside near the parking area

Reduce Vandalism

- Check the identification plates on all machines regularly and report any missing or destroyed plates
- Install a protection device(s) on the machine when parking the machine in high-risk areas
- Take written notes and report to law enforcement all suspicious vehicles or people

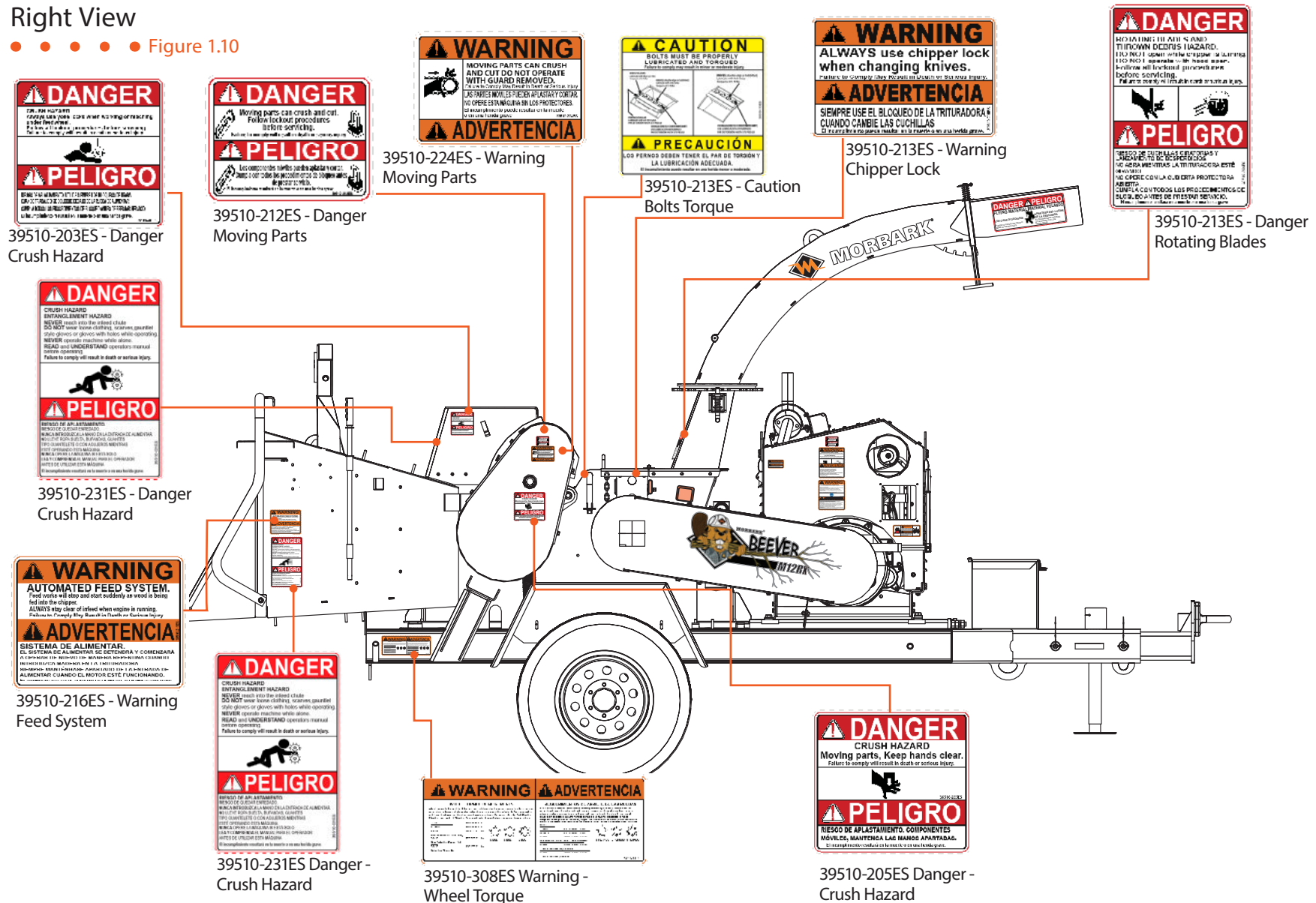
Report Theft

- Notify a law enforcement agency with jurisdiction, and your insurance carrier, when a theft occurs
- Provide a full description and complete set of serial and identification numbers (found on the tongue of the machine) to the investigating officer and insurance carrier
- Provide the investigating officer with photographs of the actual machine, manufacturer's literature, and knowledge of any identifiable marks that would help in identifying the machine
- Verify the stolen machine has been entered into the National Crime Information Center (NCIC) operated by the FBI in Washington, D.C.

Safety Decals and Locations

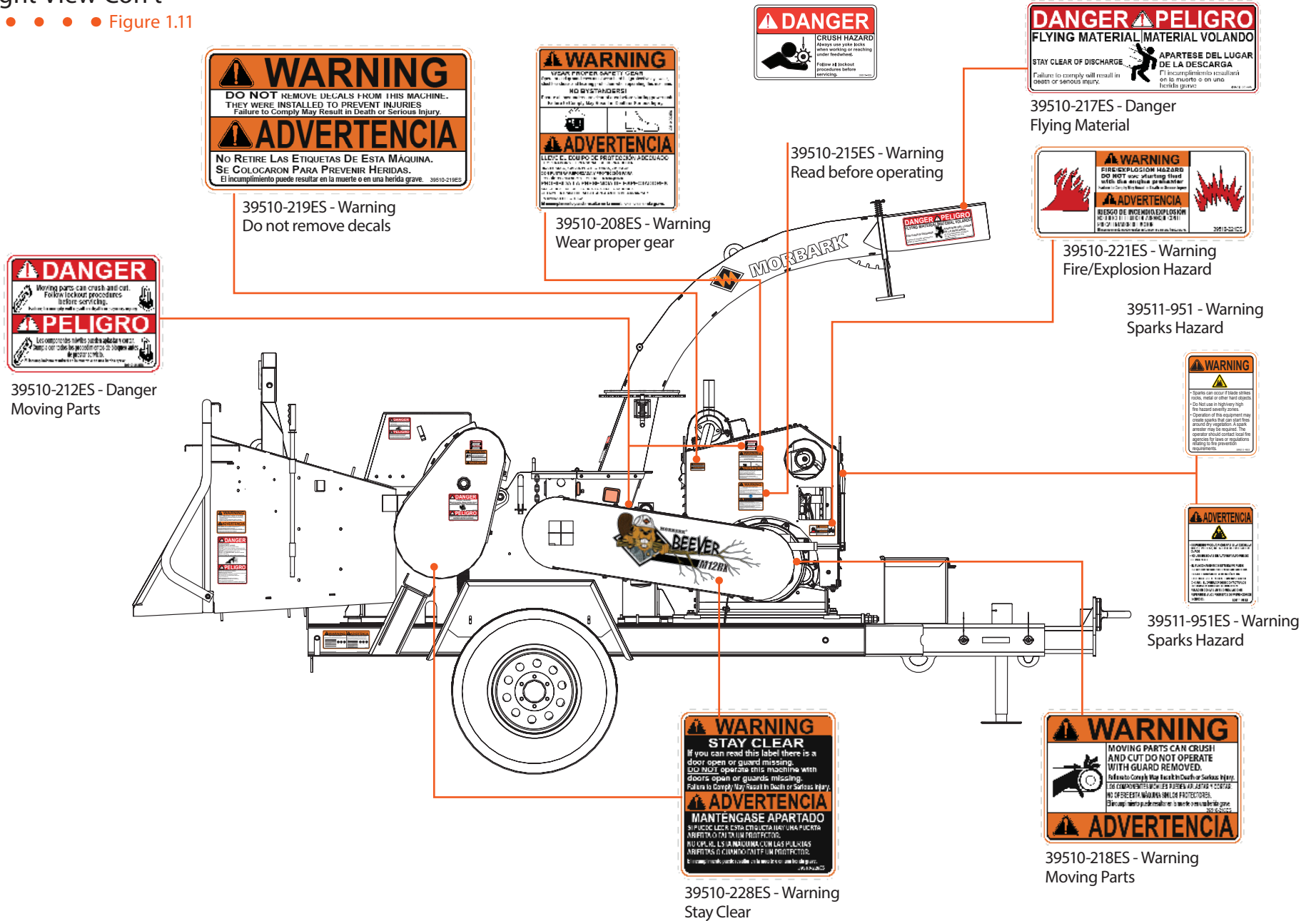
Right View

Figure 1.10



Right View Con't

• • • • • Figure 1.11



Left View

• • • • • Figure 1.12



39510-223ES Danger - Flying Material



39510-213ES - Danger
Rotating Blades



39510-205ES Danger -
Crush Hazard



39510-203ES - Danger
Crush Hazard



39511-399 - Warning
Read and Understand



39511-399S - Warning
Read and Understand



39510-216ES - Warning
Feed System



39510-222ES - Warning
Flammable

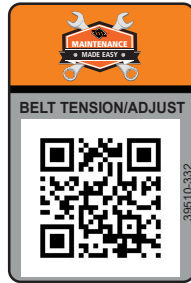


39510-249ES - Danger
Crush Hazard

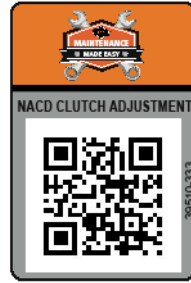
QR Codes



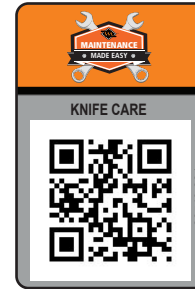
39510-331
Autofeed Setting



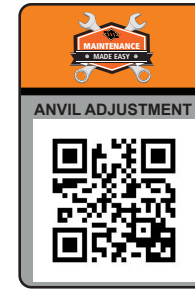
39510-332
Belt/Tension
Adjustment



39510-333
NACD Clutch
Adjustment



39510-334
Knife Care



39510-335
Anvil Adjustment

Decal List

Part Number	Quantity	Description
39510-203Es	1	Decal,Danger,Yoke Locks,Eng/Span Combo
39510-204Es	2	Decal,Danger,Thrown Debris,Eng/Span Combo
39510-205Es	3	Decal,Crush Hazard,Hands Clear,Eng/Span Combo
39510-206	10	Decal,Grease Point
39510-207	13	Decal,Grease Point
39510-208Es	1	Decal,Safety Gear,Combo
39510-209Es	1	Decal,Notice,Hydraulic Oil,Combo
39510-210Es	1	Decal ,Notice,Clutch Idle,Combo
39510-211Es	2	Decal,Notice,Before Welding,Combo
39510-212Es	6	Decal,Danger,Lock Out Tag Out,Combo
39510-213Es	1	Decal,Caution,Knife Bolt Torque,Combo
39510-214Es	1	Decal,Check Belt Tension Daily,Combo
39510-215Es	1	Decal,Read Operator's Manual,Combo
39510-216Es	2	Decal,Warning,Automated Feed System,Combo
39510-217Es	1	Decal,Danger,Flying Material,Combo
39510-218Es		Decal,Warning,Moving Parts,Crush,Combo
39510-219Es	1	Decal,Warning,Do Not Remove Decals,Combo
39510-220Es	1	Decal,Notice,Tow,Combo
39510-221Es	1	Decal,Warning,Fire Hazard,Explosion,Combo
39510-222Es	1	Decal,Warning,Flammable,No Smoking,Combo
39510-223Es	1	Decal,Danger,Flying Material,Combo
39510-224Es	1	Decal,Warning,Moving Parts,Crush,Combo
39510-225Es	1	Decal,Warning,Change Chipper Knives,Combo
39510-226Es	2	Decal,Yoke Lock,Combo
39510-227Es	1	Decal,Low Sulfur Diesel,Combo
39510-228Es	5	Decal,Stay Clear,Guard Open,Combo
39510-229Es	1	Decal,Warning,Explosion Hazard,Low Sulfur,Combo
39510-230Es	1	Decal,Patents,Combo
39510-231Es	2	Decal,Danger,Crush Hazard,Combo
39510-232Es	1	Decal,Notice,Chipper Bearings,1000Hrs,Combo
39510-234Es	2	Decal,Yoke,Up,Down,Combo
39510-235Es	1	Decal,Chipper Lock,Combo

Decal List Con't

Part Number	Quantity	Description
39510-236Es	1	Decal,Fuel Shutoff,Combo
39510-237Es	1	Decal,Diesel Fuel,Combo
39510-238Es	1	Decal,Hydraulic Oil,Combo
39510-240Es	2	Decal,Cntrl Bar Position,Combo
39510-241Es	2	Decal,Cntrl Bar Position,Combo
39510-242Es	1	Decal,Notice,Oil Shutoff,Combo
39510-248Es	1	Gasoline,Eng/Span Combo
39510-249Es	1	Decal,Danger,Crush Hazard,Eng/Span Combo
39510-250Es	2	Decal,Warning,Raise Infeed Tray
39510-251Es	1	Decal,3/4 Full,Eng/Span Combo
39510-252Es	1	Decal,3/4 Full,Eng/Span Combo
39510-253Es	1	Decal,Nacd Clutch Adjust/Lube
39510-254Es	1	Decal, Notice,Belt Tension 24 Hrs.,Eng/Span Combo
39510-258Es	1	Decal,Throttle,Eng/Span Combo
39510-298Es	1	Decal,Raise Infeed Tray
39510-300	1	Decal,Spark Arrestor
39510-301S	1	Decal,Spark Arrestor
39510-308Es	1	Decal,Warning,Dexter Axle Torque
39510-322Es	1	Decal,Auto Feed T4i,T4f
39510-331	1	Decal,Qr Code,Autofeed Setting
39510-332	1	Decal,Qr Code,Belt Tension
39510-333	1	Decal,Qr Code,Nacd Clutch Adj.
39510-334	1	Decal,Qr Code, Knife Care
39510-335	1	Decal,Qr Code,Anvil Adjustment
39511-010Es	1	Decal,Manufactured In Usa
39511-187	1	Decal,Auto Feed
39511-187Es	1	Decal,Auto Feed
39511-312	1	Decal,Safety Control Bar
39511-312Es	1	Decal,Safety Control Bar
39511-399	1	Decal,Operator-Parts,Container
39511-399Es	1	Decal,Operator-Parts,Container
39511-752	1	Decal,Morthane Paint

The Chipping Cycle



Preparation

Preparation and Set-up 2.2

Start-up

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Preparation



This section is an overview of the chipping process. It is mandatory that all personnel handling, operating, and maintaining this machine read the manual completely and be properly trained on its use. Operators should also review the manual on a regular basis. Specific information on safety, function, use, and maintenance of a machine feature is also located in the Features and Function section.

Preparation and Set-up

Preparation is the cornerstone for safe, efficient, operation of the chipper.

The operator must conduct all safety measures, wear proper protective gear, prepare the machine for operation, and understand the process of chipping wood as described in this manual.

However, before any chipping can begin, there are three important areas to inspect, set-up, and prepare each time you use the chipper. They are; the work site, the brush, and the chipper.

Work Site Preparation

- Clear objects containing metal, stones, etc. that may damage the machine
- Clear any objects that may trip or entangle the operator
- Check that the area is clear of utility and power lines
- Be sure the area is well lit with good ventilation (when indoors)
- Set-up a sufficient space to work in
- Designate an area for the brush pile and chipped wood
- Create a clear walking path for loading the brush
- Ensure emergency equipment is available on the work site
- Always have two trained personnel dressed in safety gear on the work site at all times

Brush Preparation

DANGER!



Foreign material (metal, stones, glass) in the chipper will cause damage and potentially shatter the cutting blades resulting in property damage, serious injury, or death.



Vines left on the wood may cause entanglement of operating personnel, or hide foreign material resulting in equipment damage, serious injury, or death. Always remove vines from the material to be chipped. Do not leave vines in the work area or place vines in the chipper.

CAUTION

Lifting heavy objects may cause serious back injury. Always use proper lifting technique or the winch (optional feature) designed for the machine.

Proper preparation and organization of the brush and branches will provide an efficient chipping process, as well as creating safe working conditions and reducing the possibility of unexpected maintenance expenses.

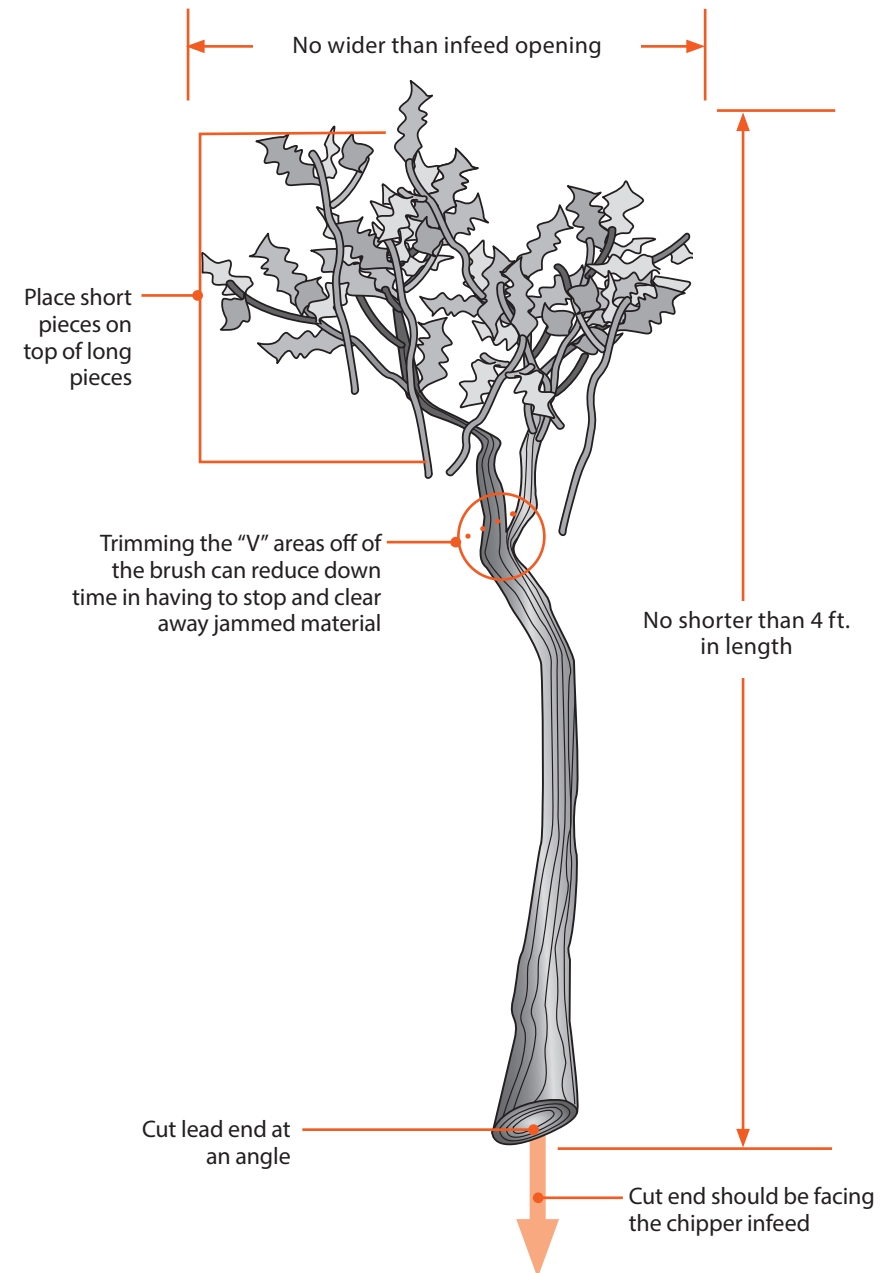
To prepare the wood and brush:

- Cut the lead end of the brush at an angle. This will help ease the feed rollers open and facilitate feeding
- Cut the brush into lengths long enough to be safely fed into the chipper without the operator hands entering the infeed. The average length should be no shorter than 4 feet

NOTE: Place short pieces on top of longer pieces.

- Cut the wood into a weight that can be easily lifted without injury to the operator
- The chipper is designed to process clean wood. Brush and wood should be clear of debris and dirt, or any items that may damage the machine

• • • Figure 2.1



Machine Preparation



Before starting operation the chipper must first be placed on a stable surface and secured so that it does not move. The chipper can be mounted on a surface by using two methods; hitched to a tow vehicle or in a stand alone position with the jack supporting it.

When the chipper is hitched to a tow vehicle:

- The towing vehicle must be capable of handling your machine
- Park the vehicle and the chipper on a level surface
- The vehicle must be completely stopped, with the parking brake on
- There must NOT be a driver in the vehicle
- The hitch must be properly secured to the vehicle with locking pins installed
- Connect safety chains and cables to the vehicle. Two lengths of chain must be used. The lengths of chains should be equal in length and properly affixed to the towing vehicles the chain shall be hooked through the hitch plate in such a way as to allow the operator to turn the vehicle and not drag the chains on the ground
- Hook up electrical connections and check that tail lights and turn signals are in working order
- The chipper must be level, with the machine parallel to the ground

Adjust discharge chute

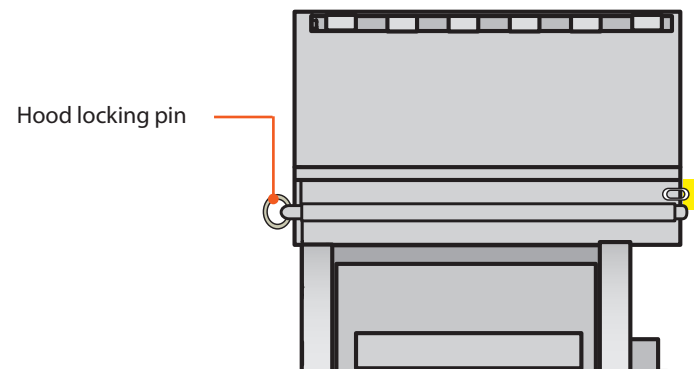
Once you have the machine secured and level, the next step in machine preparation is setting up the discharge chute. See page Features and Function section for more detail.

- Ensure the infeed spout is clear of any debris
- Rotate the discharge chute in the direction you want the wood chips projected. The discharge chute can rotate 360°
- Adjust the deflector for the desired angle of projection. Direct chips away from the work area and bystanders

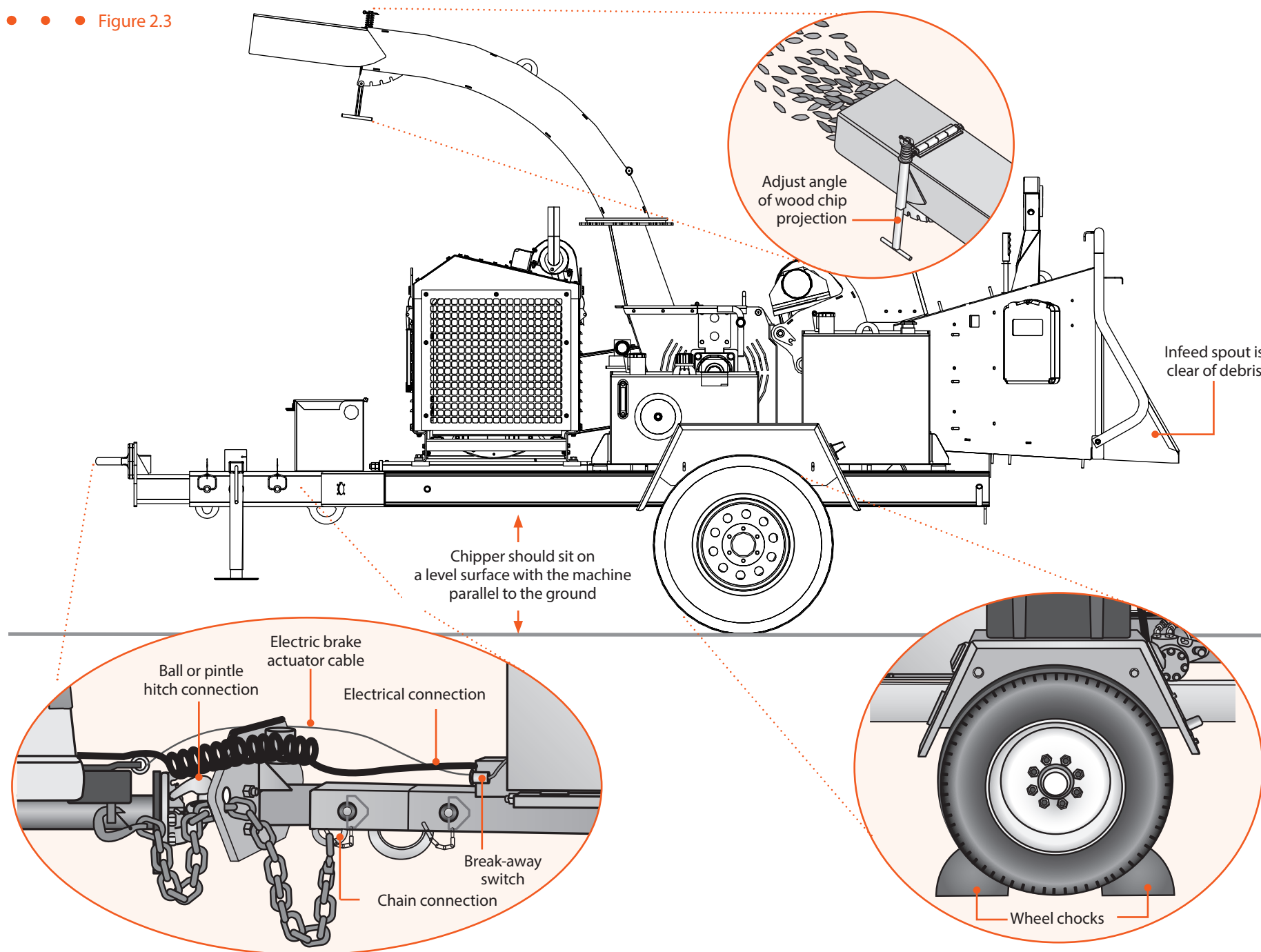
Chipper Hood

NOTE: Be sure the chipper hood is closed and secured with the locking pin. (See Safety Section for more information.)

● ● ● Figure 2.2



• • • Figure 2.3



Start-up



DANGER!



Exposing diesel fuel to an ignition source such as a flame or spark will result in explosion, fire, serious injury, or death. Never smoke, light a flame, or create a spark around the fuel tank. Store the machine and extra fuel away from any ignition sources.



After use of the machine hydraulic oil becomes extremely hot and under pressure, which will burn or puncture the skin if not handled properly. Allow the hydraulic oil to cool down and relieve built up pressure before performing maintenance.

NOTE

Do not allow the engine to idle with the clutch disengaged for longer than 2-3 minutes. Failure to the pilot bearing will occur.

Shut the engine down immediately if you hear a noise that might indicate loose or broken parts. Have the engine checked by qualified personnel.

In cooler weather let your hydraulic system run for approximately 15 minutes prior to operation. Extremely cold oil will cavitate causing noise, loss of capacity, and damaging the motors and pumps.

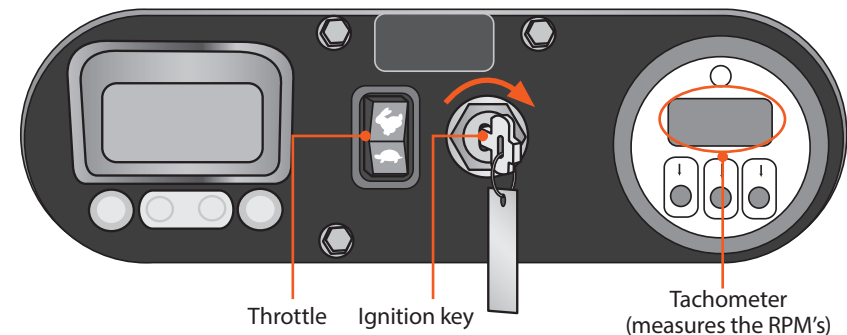
Fluid Levels

Before you start the machine it is important to check the fuel, hydraulic oil, and radiator coolant levels. Allow the machine to cool down before adding oil, fuel, or radiator coolant. Remove the cap slowly to relieve pressure.

Engine start-up:

1. Place the safety control bar into the stop position.
2. Place all hydraulic valves in the neutral position.
3. Consult your engine operators manual for specific directions on starting your engine

• • • Figure 2.4 Typical control panel



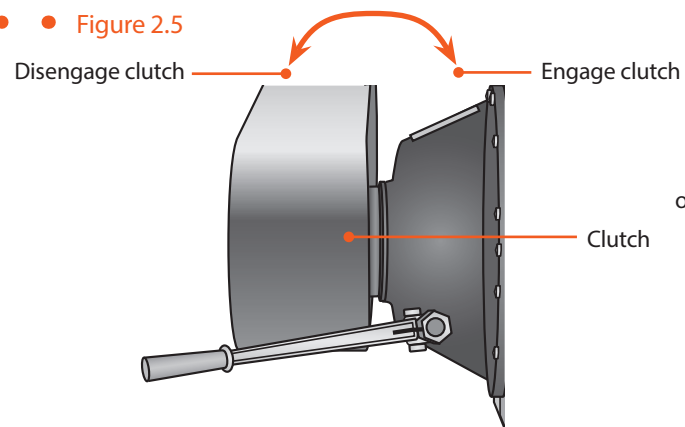
Aviso: Do not allow the engine to idle with the clutch disengaged for longer than 2-3 minutes. Failure to the pilot bearing will occur.

4. Start engine, wait 1 minute, and engage the clutch by moving the clutch to engage the engine for 2 to 3 seconds, then move the clutch handle away disengaging the clutch. Wait until the engine regains RPM's then repeat 2 more times until drum is spinning at full RPM's. Then fully engage the clutch handle. Let the engine warm up according to your engine operators manual until the engine stabilizes.
5. Place the safety control bar into the feed position. This position pulls the material into the feed wheel.
6. Allow the engine to warm-up.

After Engine warm-up: Auto Clutch

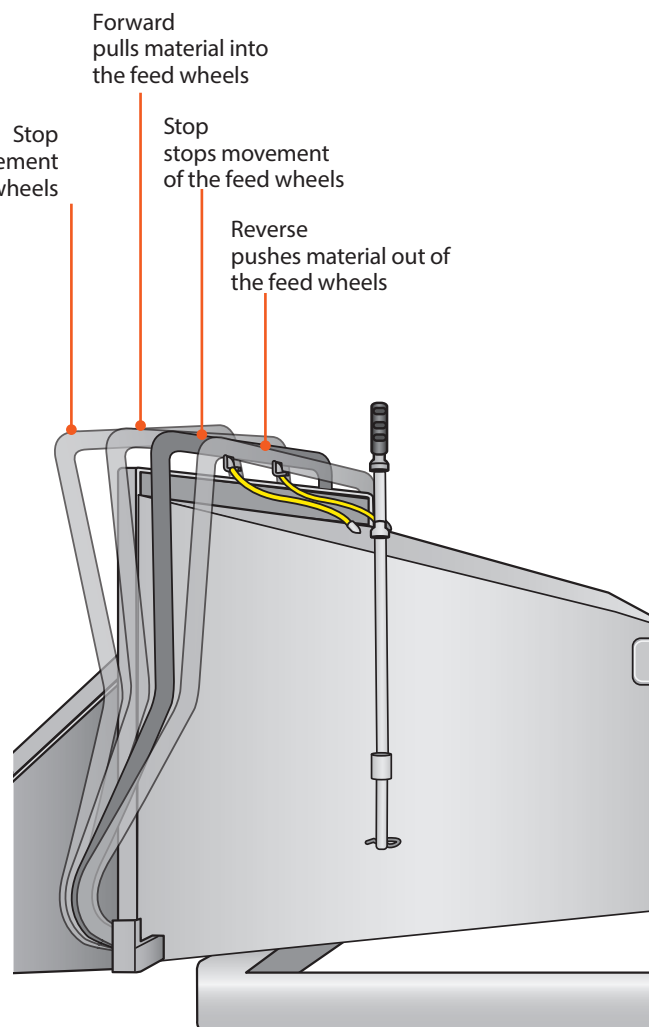
1. Position the throttle in acceleration mode. Keep it at this speed during the chipping process.

• • • Figure 2.5



2. Begin loading the brush. (see next page).

• • • Figure 2.6



Chipping Wood

Feeding Brush into the Chipper

When you are about to feed brush into the chipper, position the throttle at full RPM's with the safety control bar in the feed position, as discussed on the previous page.

NOTE: At least two trained operators must be on the work site at all times. The work site is an area where the operators can see, hear, and react to a emergency in a few seconds.

To Feed the brush:

1. Pick up a limb from the brush pile that is light enough to easily maneuver. Keep your back straight and lift with your legs. The cut-end should be facing towards the infeed.

NOTE: When breaking in a machine, it is recommended that you begin by feeding 6" - 7" diameter pieces into the chipper, gradually working up to the larger diameter pieces during the first 4-8 hours of work.

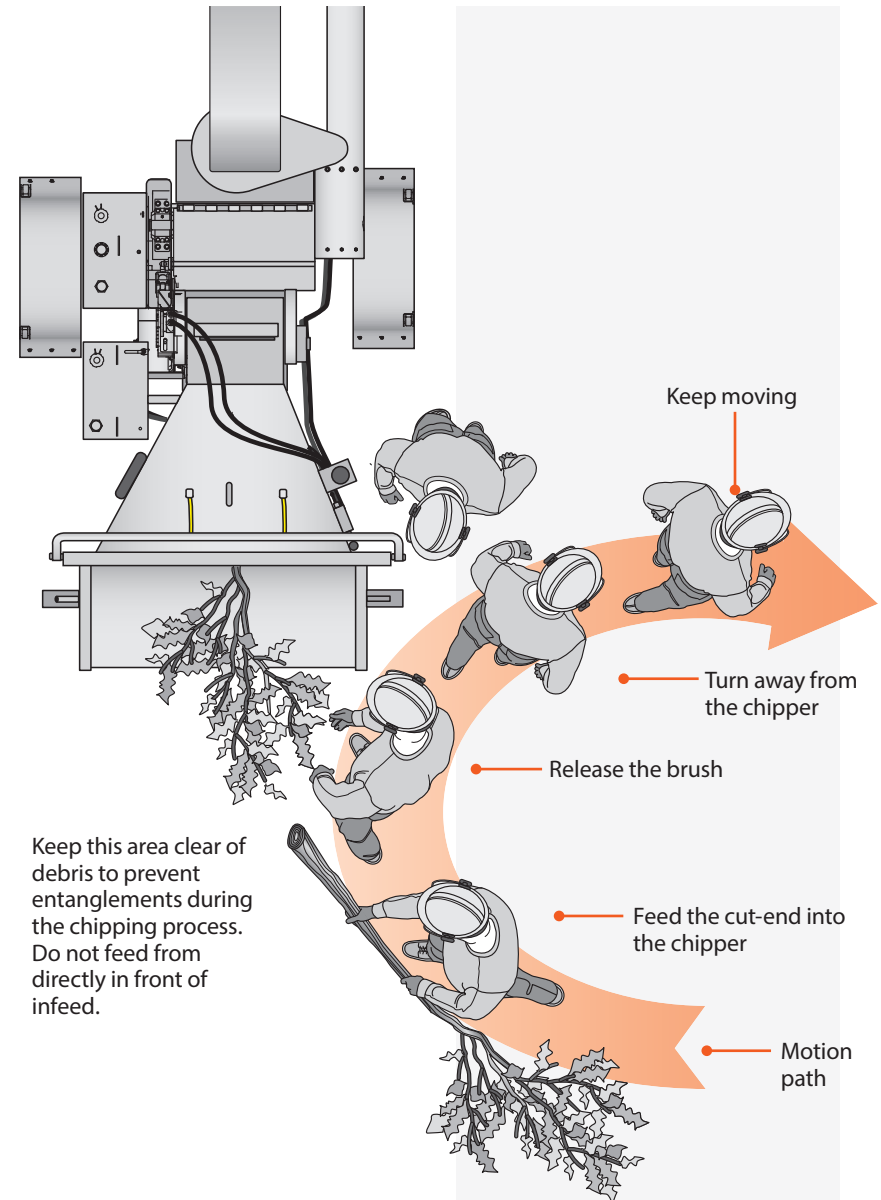
2. Insert the brush onto the infeed tray making sure your hands do not enter the infeed chute area. When you feel the material pull away, release the material and let it pull through the feed wheels.

NOTE: To safely feed shorter pieces; as the longer material enters the feed wheels place the safety control bar into the stop position. Lay the shorter material on top of the longer material, (without entering the infeed chute!) then place the safety control bar back into the forward position and begin the chipping process again.

3. Quickly turn, and face away from the infeed. Keep moving along your motion path.
4. During the feeding process, monitor the gauges, standing at the side of the machine.
5. Check the discharge chute and make sure the wood chips are projecting at the correct angle. If necessary adjust the discharge chute.

NOTE: It is the operators responsibility to keep all bystanders away from the work site.

• • • Figure 2.7



Shut-down



DANGER!



A rotating chipper drum may cause entanglement, crush, or mutilation of body parts resulting in serious injury or death. Always wait for the chipper drum to completely stop after shutting the machine OFF and before opening the chipper hood.



Foreign material such as stones, wire, or metal will cause blade failure causing serious injury. Do not sweep or rake the work site and put this material into the chipper.

NOTE



To keep the machine free of vandalism, always lock and secure the machine using the lockout procedure.

Machine Shut-down

1. Place the safety control bar into the stop position.
2. Place the throttle switch to the throttle down mode.
3. When the engine has reached an idle, disengage the clutch.
4. Turn the ignition off.
5. Fires can start after engine shut-down therefore, the operator should watch and check the equipment for 15-20 minutes after shut-down to ensure the machine is completely cooled.

Lock-up

After the machine is shut-down it is important for safety and security reasons to follow the lock-out procedure in the Safety section, page 1.7. The following components must be locked at the end of each work period:

- Engine control panel
- Battery box
- Tool box

If you are towing the machine, be sure the hitch is properly secured to the towing vehicle and that the taillights are working. If you are not towing the machine, it's best to remove the battery and any other essential electrical components and store them off site.

Clean-up

When cleaning the work site, never attempt to feed handfuls of twigs, leaves, and other material that have been raked up. It is impossible to feed it into the chipper without violating all safety rules or damaging the machine. Place all small brush in the chipper pile after the chipping process is complete.

Be sure the infeed is clear of all debris before transporting the machine. Loose debris, especially large pieces, in the infeed can dislodge and cause damage to vehicles behind the towed chipper.

Now that you've become familiar with the entire chipping process, use the checklists below at the beginning and end of each cycle.

Checklist



Start-up

- ☐ Emergency equipment is on the work site
- ☐ At least two trained personnel are on the work site
- ☐ All personnel are outfitted with proper protective clothing and gear
- ☐ Work site is inspected
- ☐ Work site is prepared
- ☐ Chipper is inspected for worn, damaged, missing, or loose parts
- ☐ Chipper set-up for operation
- ☐ Infeed is clear of debris
- ☐ All shields and hoods are secured with locking pins
- ☐ Tire pressure (if applicable) is checked for proper inflation
- ☐ Daily maintenance is conducted. (see maintenance schedule)

Shut-down

- ☐ Safety control bar is in the stop position
- ☐ The ignition key is out of the machine and control panel is locked
- ☐ The chipper drum has completely stopped rotating
- ☐ The machine has cooled down for 15-20 minutes
- ☐ All storage areas and covers are locked and secured
- ☐ The work site is cleared of all debris
- ☐ Infeed is clear of debris
- ☐ If towing, the tongue is properly hitched to the towing vehicle
- ☐ Chipper set-up for operation

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Features and Function

Section 3

The Basics

Right View	3.2
Left View	3.4

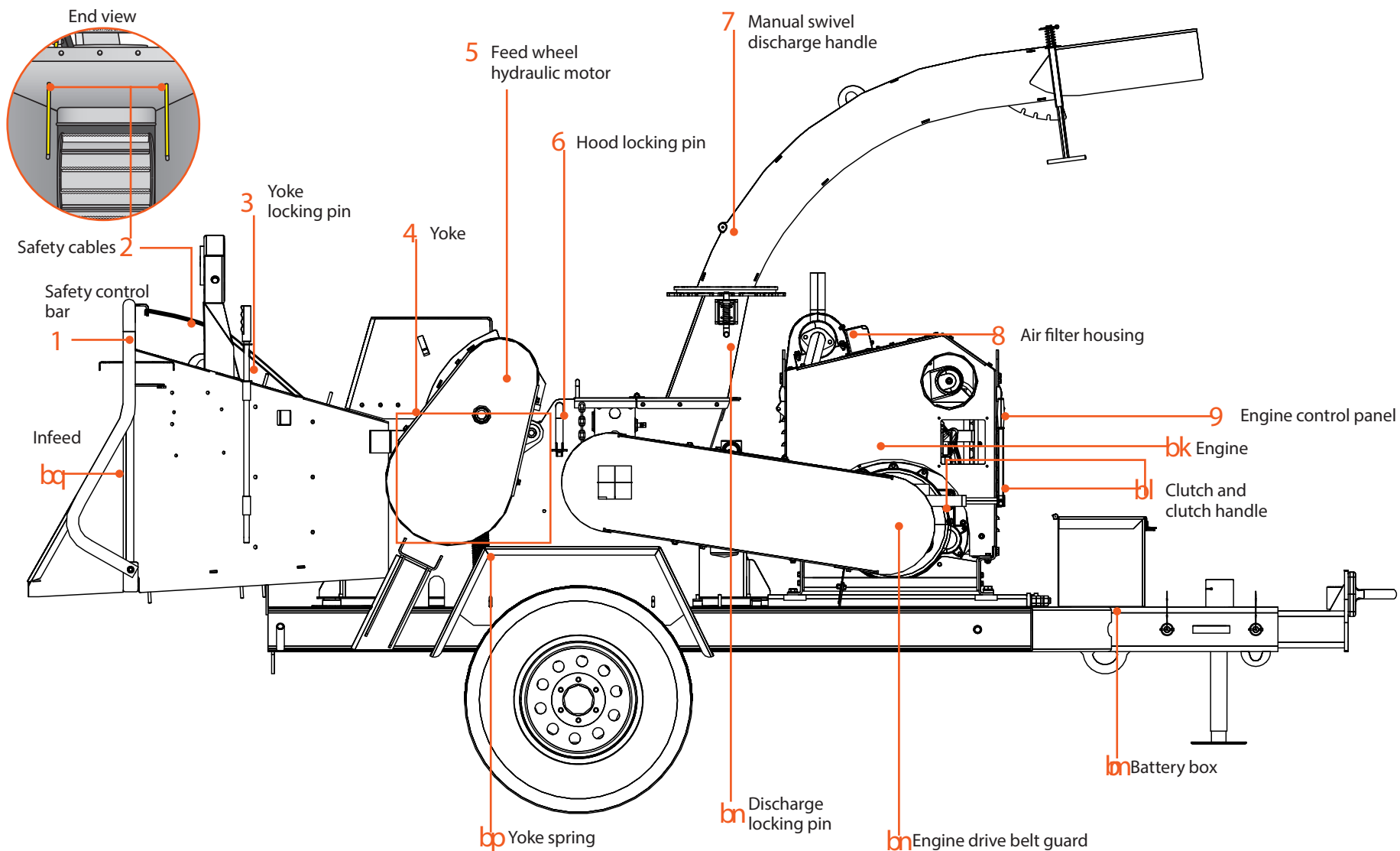
Components

Infeed	3.6
Feed Wheels and Chipper Drum	3.8
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Valve Banks	3.12
Discharge Chute	3.14
Discharge Chute Cleaning	3.16
Hydraulic Oil and Fuel Tank	3.18
Engine Belt Drive	3.20
Engine	3.22
Hitch, Chains, and Jack	3.24
Battery	3.26

Model 1215 Specifications	3.27
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The Basics

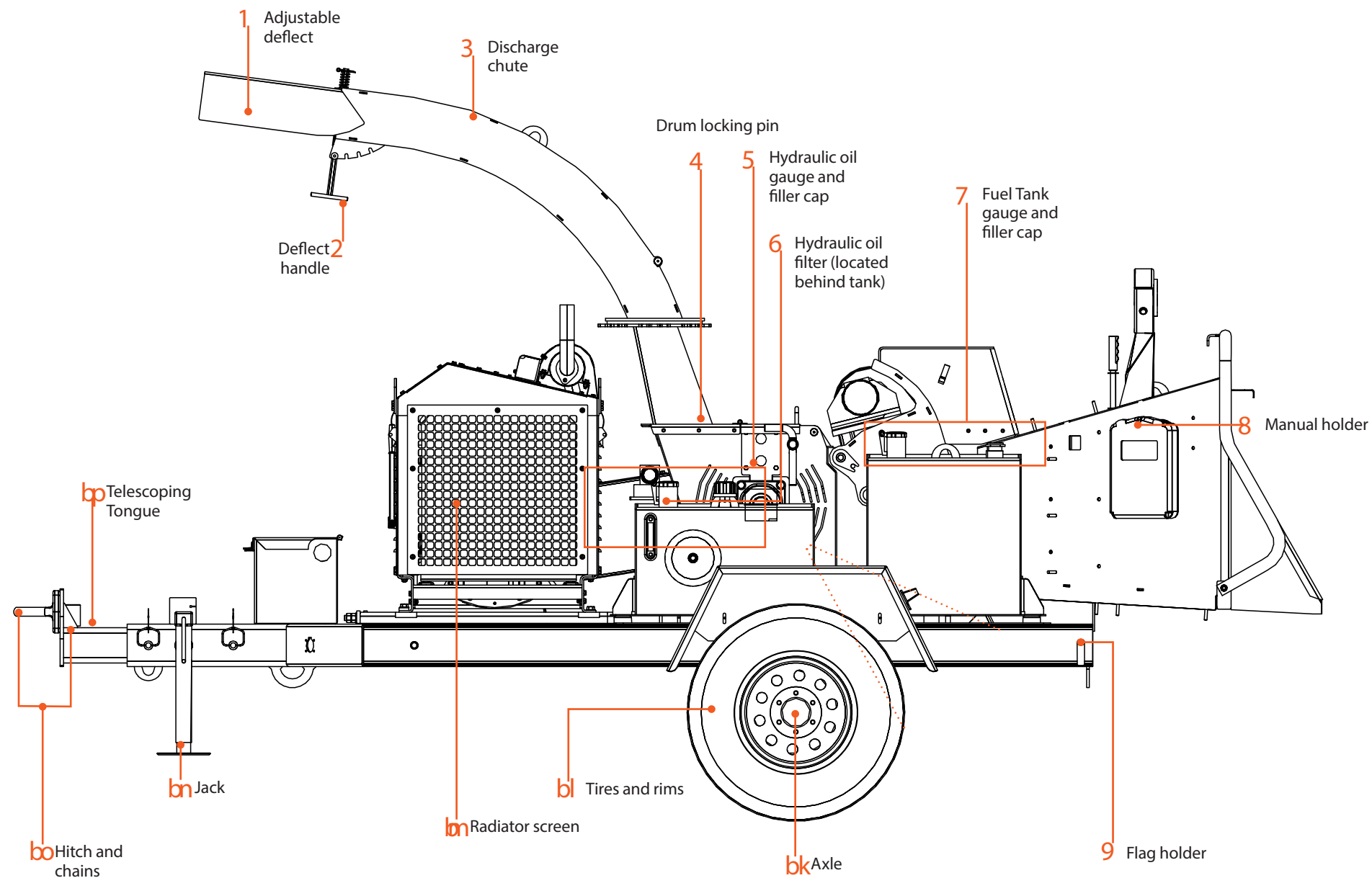
Figure 3.1
Right View



1. Safety control bar
Controls forward, stop, and reverse action of the feed wheels.
2. Safety cables
Reverses the feed when the cables are pulled. Important safety feature.
3. Yoke locking pin
Prevents accidental lowering of the top feed wheel when performing maintenance. This is a critical safety lockout feature.
4. Yoke
Housing for the feed wheel.
5. Feed wheel hydraulic motor
Provides power to the feed wheel.
6. Hood locking pin
Secures hood and engages hood safety switch. Important safety feature.
7. Manual swivel discharge handle
Used to manually rotate the discharge chute 360°.
8. Air filter housing
The air filter is located inside this housing. It protects the engine from air-borne contaminants.
9. Engine control panel
Primary controls for the power unit.
10. Engine
Provides power to the chipper. Available in a variety of manufacturers and models.
11. Clutch and clutch handle
Used to engage and disengage power to the chipper.
12. Battery box
Container where the battery is stored.
13. Engine drive belt guard
Protects the operator during operation of the machine. The guard must be attached during operation.
14. Discharge locking pin
Locks discharge chute in position.
15. Yoke spring
Aides in providing down pressure to the yoke wheel.
16. Infeed
Allows unrestricted flow of material and keeps operator away from feed system.

Left View

• • • • • • • • • • Figure 3.2



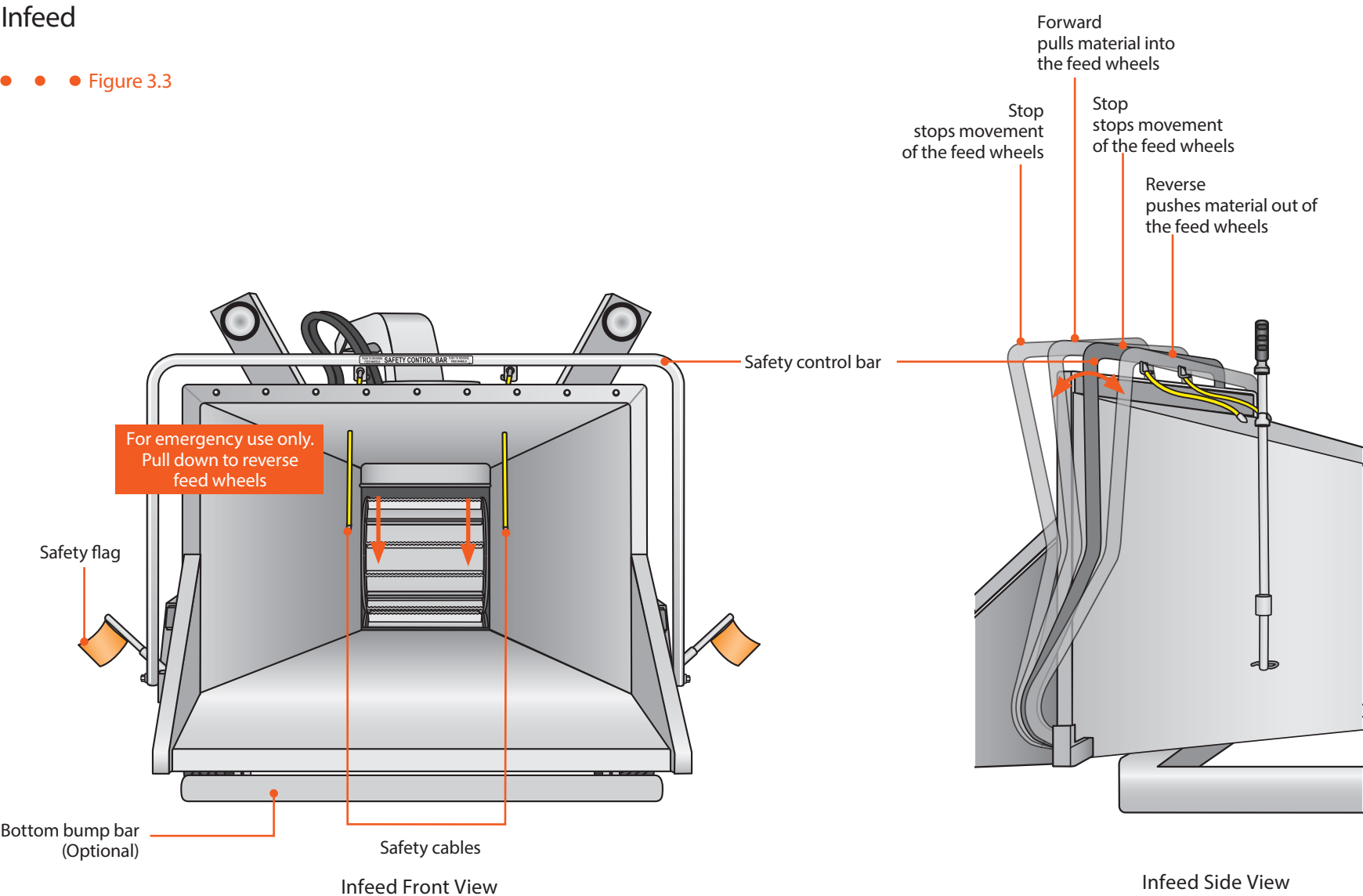
1. Adjustable deflect
Easily adjustable discharge deflect with four locking positions.
2. Deflect handle
Changes the angle of the adjustable deflect.
3. Discharge chute
Used to change the direction of the discharge. Capable of 360° rotation.*
4. Drum locking pin
Prevents chipper drum from turning when performing knife maintenance. This is a critical safety lockout feature.
5. Hydraulic oil gauge and filler cap
The oil gauge indicates the level of fluid in the tank. The filler cap is where the hydraulic oil is added.
6. Hydraulic oil filter
Helps keep oil clean.
7. Fuel gauge and filler cap
The fuel gauge indicates the level of fluid in the tank. The filler cap is where the fuel is added.
8. Manual holder
Storage compartment for product manuals. Keep all the manuals with the machine at all times. Use the manuals to refer to safety, features and functions, parts, and maintenance.
9. Flag holder
Holds safety clearance flags.
10. Axle
Provides suspension and braking for the chipper.
11. Tire and rims
12. Radiator screen
The screen keeps debris from plugging the engine radiator.
13. Jack
Lifts and levels the chipper during the towing/hook-up process.
14. Hitch and chains
Fastens the chipper to a towing vehicle.
15. Telescoping tongue
Adjusts to match tongue length with towing vehicle.

Components



Infeed

• • • Figure 3.3



Safety


DANGER!



Movement or placement of any part of the body inside the infeed will result in dismemberment, mutilation, serious injury, or death. Keep all parts of the body (hands, feet, head) outside the infeed.


CAUTION

Ensure the infeed is clear of all debris before transporting the machine. Loose debris, especially debris in the infeed can dislodge and cause damage to vehicles behind the towed chipper.

Function

The infeed acts as a safety barrier between the operator and the feed wheels during the chipping process. The tray of the infeed can also be used to rest the end of a limb prior to feeding it into the wood chipper. The safety control bar controls the direction of the feed wheels.

Use

When feeding material into the infeed, keep all body parts outside of the infeed chute. To safely accomplish this the material being fed should be no shorter than 4' long.

The brush being fed into the infeed should be no shorter than 4 ft. and no wider than 52".

The bar running around the outside of the infeed is the safety control bar. The safety control bar has four positions. Furthest back position is Stop, this position stops the feedwheels, the second position is Forward, this position pulls material into the feed wheels. The third is Stop, the fourth is Reverse, this position reverses the feed wheels and pushes material out of the feed wheel.

The infeed is equipped with two bright yellow emergency safety cables, which are located inside the infeed. The safety cables are there in case the operator is accidentally pulled into the infeed. When the safety cable is pulled the feed wheels will set into the reverse direction.

Maintenance

- Keep the infeed clear of any debris (stones, glass, metal, etc.) that may damage the machine
- Clean the infeed only when the ignition key is out, all covers are locked, and the machine is stable
- Clear the infeed of all debris before towing

*Feature varies depending on the model you have ordered, see Options tabs for details on your model.

[illegible]

Safety


DANGER!



Movement or placement of any part of the body inside the feed wheels and chipper drum will result in mutilation, serious injury, or death. Keep all parts of the body (hands, feet, head) outside of the yoke.



Opening the chipper hood while the chipper drum is moving will result serious injury or death. Do not open the chipper hood when the chipper drum is moving. Turn off the engine and lock the hood before servicing.


CAUTION




Always wear leather gloves and protective clothing when changing or servicing the chipper knife and anvil. Serious injury could occur.

Function

Feed wheel: Feeds brush at a steady rate into the chipper drum.

Chipper Drum: Reduces brush, limbs, and logs into chip size material.

Chipping Flow Path:

1. Brush enters the infeed.
2. The teeth of the feed wheel grabs the brush and pulls the brush into the chipper drum at a steady rate.
3. The chipper drum cuts the brush against the anvil.
4. The two knife pockets accumulate the chips.
5. The rotation of the drum and the air impeller system (this system helps blow chips up into the discharge chute) provides steady air flow to carry the chips up into the discharge chute.

Use

The feed wheel operates in two directions, forward and reverse. The safety control bar and the emergency cables located on the infeed control the direction of the feed wheels.

When the chipper drum is moving the chipper hood **MUST** be closed and locked in place using the hood locking pin. To insure that the chipper hood is locked, the machine is equipped with a hood safety switch. The switch will not allow the machine to start with the hood open or the pin pulled.

● ● ● Figure 3.5



Maintenance

Follow these steps to achieve good quality chips, eliminate stress on the chipper as well as reducing down time due to clogged components:

- Knives must be made of the correct steel composition and hardness
- Always maintain proper cutting angle and sharpening techniques
- Change the knives frequently
- Maintain correct anvil/knife clearances
- Keep the anvil square
- Use matched sets of knives on the chipper drum
- Do not use knives that are too narrow
- Keep anvil and chipper knife bolts tight
- Clean holder pocket when changing knives
- Protect blades when not in chipper

See the Maintenance section for detailed information on maintaining all feed wheel and chipper drum components.

Feed Wheel Drive



Safety

		DANGER!
	Moving components will cause serious injury or death. Do not operate without the guards in place. Do not attempt to touch, check, clean, or adjust the chain during operation.	

Function

The feed wheel drive assembly provides power to the top feed wheel. The drive assembly consists of the chain, bushing, sprocket, hydraulic motor, and the chain guard.

Use

The feed wheel chain drive is housed inside the chain guard. Never remove the chain guard unless you are changing, servicing or cleaning the components inside the guard. To remove the chain guard, loosen and remove the bolts and washers on the sides of the guard. Lift the guard off the machine. Always replace the chain guard and secure with the bolts and washers after the work is completed.

Maintenance

- Inspect components for wear or damage

Yoke



Safety

**DANGER!**



Movement or placement of any part of the body inside the yoke will result in mutilation, serious injury, or death. Keep all parts of the body (hands, feet, head) outside of the yoke.

Function

The yoke houses the top feed wheel, its primary function is to aid in feeding material into the chipper. When maintenance or repairs are needed on the feed wheels and chipper drum, the yoke raises and lowers, allowing easy access to the interior of the chipper base.

Use

To raise and lower the yoke, use the hydraulic handles on the valve bank.

NOTE: The direction of movement (left-right, up-down) depends on the specific machine configuration that was ordered with your chipper. Refer to the decal next to the yoke control valve for exact handle direction.

When the yoke is raised, it **MUST** be locked in place with the yoke locking pin. The locking pin is located on the curb side of the machine, next to the valve bank. To lock the yoke, raise the yoke. Then insert the locking pin in the yoke locking hole, making sure it goes all of the way through both sides of the infeed, then release the valve bank lever. Secure with the hitch clip at end of the locking pin.

Maintenance

Grease the yoke cylinder pin and the yoke pivot pin every 8 hours. See the Maintenance section for more detail.

Valve Banks



Safety



Function

The hydraulic valve bank controls operate the machine. The auto reverse valve stops the feed wheel when low RPM's are detected from the motor. It allows for smooth shifts in direction (forward or reverse) of the feed wheels.

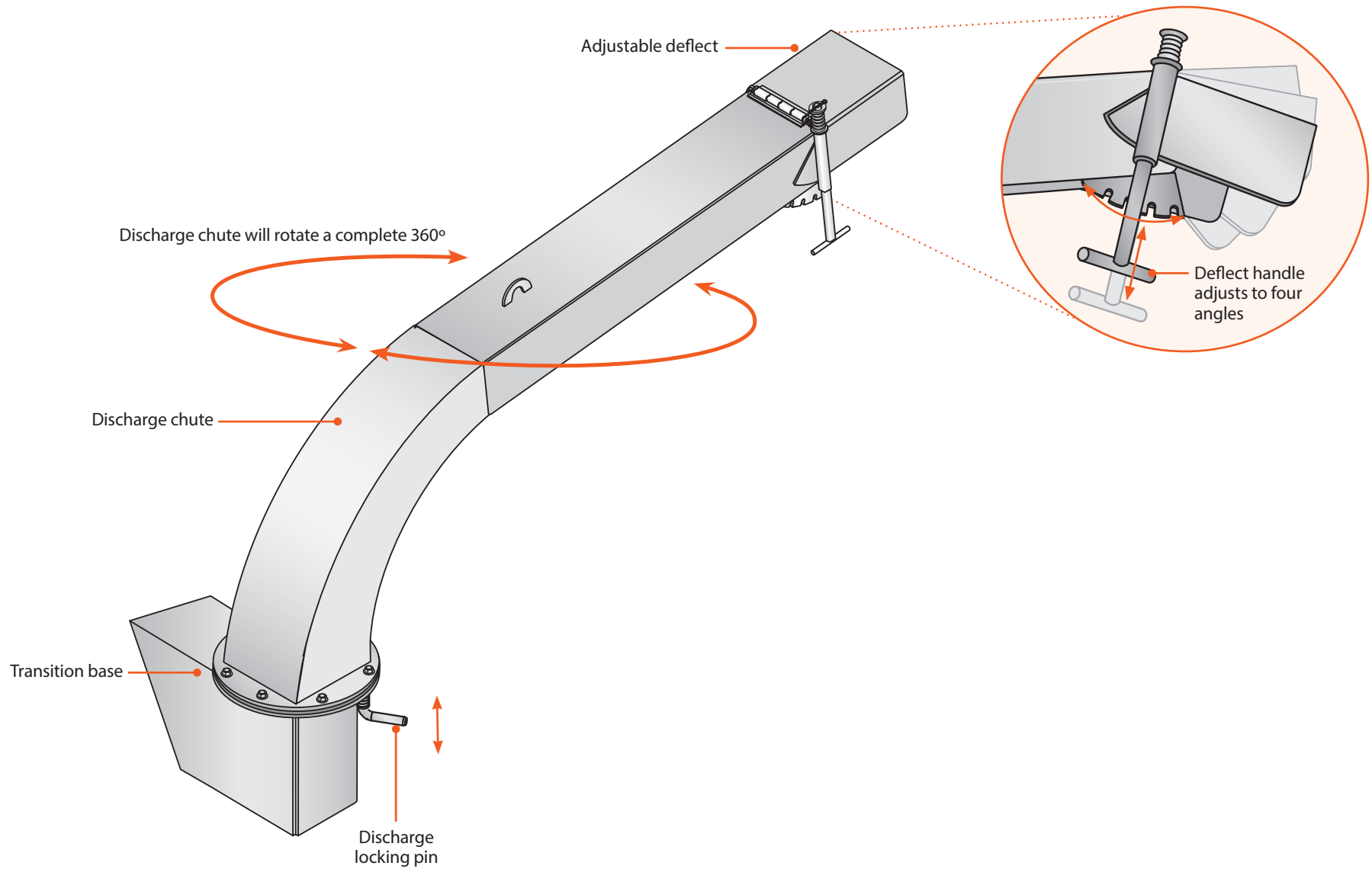
Maintenance

- Check fittings and hoses for leaks
- Check coils for tightness
- Check for wear on wiring

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Discharge Chute

• • • • • • • • Figure 3.6



Safety



DANGER!



Contact with the discharge chute while it's in motion will cause serious injury or death. Do not stand or position yourself near the discharge chute during operation. Move spectators or bystanders away from the discharge chute.



Transporting the chipper when the discharge chute is not centered with the width of the machine will cause serious injury. Always center the discharge chute with the width of the machine before transporting.



Flying debris will cause serious injury or death. Never stand in front of the discharge chute. Direct discharge away from people and animals.



Conducting maintenance with the engine on will cause serious injury or death. Turn off the engine and lockout the machine before servicing.



CAUTION



Machine components may be hot or have sharp edges which could cause serious injury. Always wear protective gear during operation and maintenance.

Function

The purpose of the discharge chute is to project chipped wood away from the machine and into a designated chipped wood area.

Use

The discharge chute has two adjustments to help in discharging the chipped wood. The first is the rotation of the entire discharge chute and the second adjustment is setting the discharge deflect.

To rotate the chute:

1. Pull down on the discharge locking pin.
2. Manually position the discharge chute to point in the desired direction. The discharge chute will rotate a full 360°.
3. Push the discharge locking pin back up into place.

To adjust the discharge deflect:

1. Pull the handle towards you, far enough for the pin on the handle to clear the adjustment bracket.
2. Move the deflect handle to the desired position. The deflect has four angles of projection.

Maintenance

- Check that the discharge chute is free of debris that may cause blockages before start-up

Safety


DANGER!



Never attempt to remove material by starting the machine and engaging the chipper to blow material out. This is a very dangerous and unsafe practice!



Two (2) people shall be involved when attempting to lower the discharge chute. The chute must be securely supported while removing rear support bolts. Never stand directly under the chute as it can fall, causing injury.


CAUTION



Machine components may be hot or have sharp edges which could cause serious injury. Always wear protective gear during operation and maintenance.

Plugging is mainly caused by the engine RPM's dropping too low. This drop can be caused by running the unit at less than full RPM's, by dull knives that do not chip the wood efficiently or by trying to overfeed material that is either too large or too soft, which prevents chipping. If the unit has autofeed it should be set high enough to prevent a low RPM situation.

To clean out the chute:

1. Complete lockout/tagout.
2. Inspect to make sure drum/disc has stopped turning.
3. Pull material out from the open end of the discharge.
4. If unit has a clean out door, open and remove any material that is accessible.
5. For units without a clean out door or that still have material that is unreachable through the clean out door, the chute should be lowered to gain access to the clogged area.

 **DANGER:** Two (2) People shall be involved when attempting to lower the discharge chute. The chute must be securely supported while removing rear support bolts. Never stand directly under the chute as it can fall, causing serious injury or death.

6. Once the chute is lowered any remaining clogged material may then be removed from the discharge area and chipper housing.

 **DANGER:** Never attempt to remove material by starting the machine and engaging the chipper to blow material out. This is a very dangerous and unsafe practice.

7. Reinstall components and attempt chipping again using small material to determine if chipper discharges properly.

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A 3D perspective diagram of a rectangular hydraulic oil tank. The tank is light gray with black outlines. On the top surface, from left to right, there is a sight gauge (a vertical tube with a float), a hydraulic oil filler cap (a hexagonal cap), and a hydraulic oil vent cap (a smaller hexagonal cap). To the right of the vent cap is a hydraulic oil filter (a cylindrical component with a black hose). On the front-left face, there is a circular inspection cover. On the front-right face, there is a rectangular access panel. A double-headed arrow at the bottom indicates the length of the tank. Red leader lines connect the labels to their respective components.

Hydraulic oil filler cap

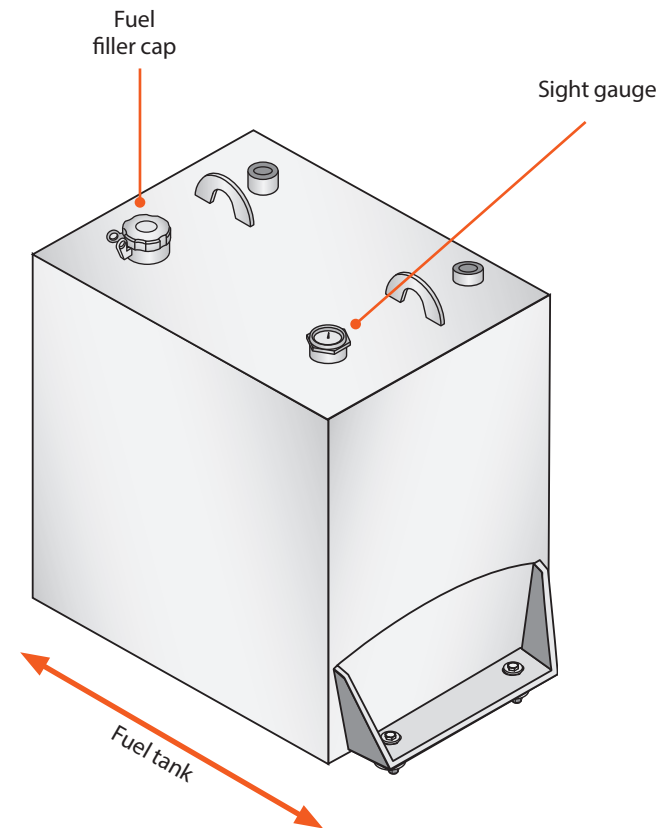
Hydraulic oil filter

Hydraulic oil vent cap

Sight gauge

Inspection cover

Hydraulic oil tank



3.18

Safety


DANGER!





Exposing fuel to an ignition source such as a flame or spark will result in explosion, fire, serious injury, or death. Never smoke, light a flame, or create a spark around the fuel tank. Store the machine and extra fuel away from ignition sources.

After use of the machine hydraulic oil becomes extremely hot and is pressurized which will burn or puncture the skin if not handled properly. Allow the hydraulic oil to cool down and relieve built up pressure before conducting maintenance, such as adding oil.

Function

The large, 24 gallon tank, is used for storing and monitoring fuel. The smaller, 17 gallon tank, is used for storing and monitoring the hydraulic oil.

Use

On the top of the fuel tank and on the side of the hydraulic tank is a sight gauge. The gauges show you the amount of oil, or fuel, that is in the tank. Allow the machine to cool down before adding hydraulic oil or fuel. Remove the filler cap slowly to relieve any pressure that may be built up.

When adding fuel, leave space in the tank for vapor to expand. A completely full tank could overflow if exposed to a rise in air temperature. Screw the filler cap back on and tighten until it seals.

Below the hydraulic tank, and behind the machine frame is the hydraulic oil shut-off valve. Close these valves to avoid spilling fuel or oil during maintenance.

Each tank has a filter. The hydraulic oil filter is located on the side of the hydraulic oil tank. The fuel filter is located in the engine enclosure. See your engine operator manual for more detail.

Over time hydraulic oil will create a sludge. This is a fluid transformation where the oil will become thick and sticky, contaminating good oil if left in the tank too long. The inspection cover allows access to the inside of the hydraulic oil tank for cleaning out the sludge deposits. To remove the inspection cover, drain the tank, remove the bolts and washers, and remove the cover from the tank.

Maintenance

- Replace the fuel and oil filters every six months or as recommended by your engine manufacturer
- Use only original manufacturer parts when replacing filters
- Inspect and clean the inside of the hydraulic tank when sludge deposits accumulate

*Feature varies depending on the model you have ordered, see the options tabs for details on your model.

Engine Belt Drive



Safety

WARNING!

Moving belts can cause serious injury or death. Do not operate without the guards in place. Do not attempt to touch, check, clean, or adjust the belts during operation. Turn off the engine and lock-out the machine before servicing.

Never use flammable cleaning solvents on the belt, friction may cause a fire. Use non-flammable cleaners.

Function

The engine belt drive provides power to the chipper drum. The belt drive consists of the belt, two sheaves, two bushings, and the belt guard.

Use

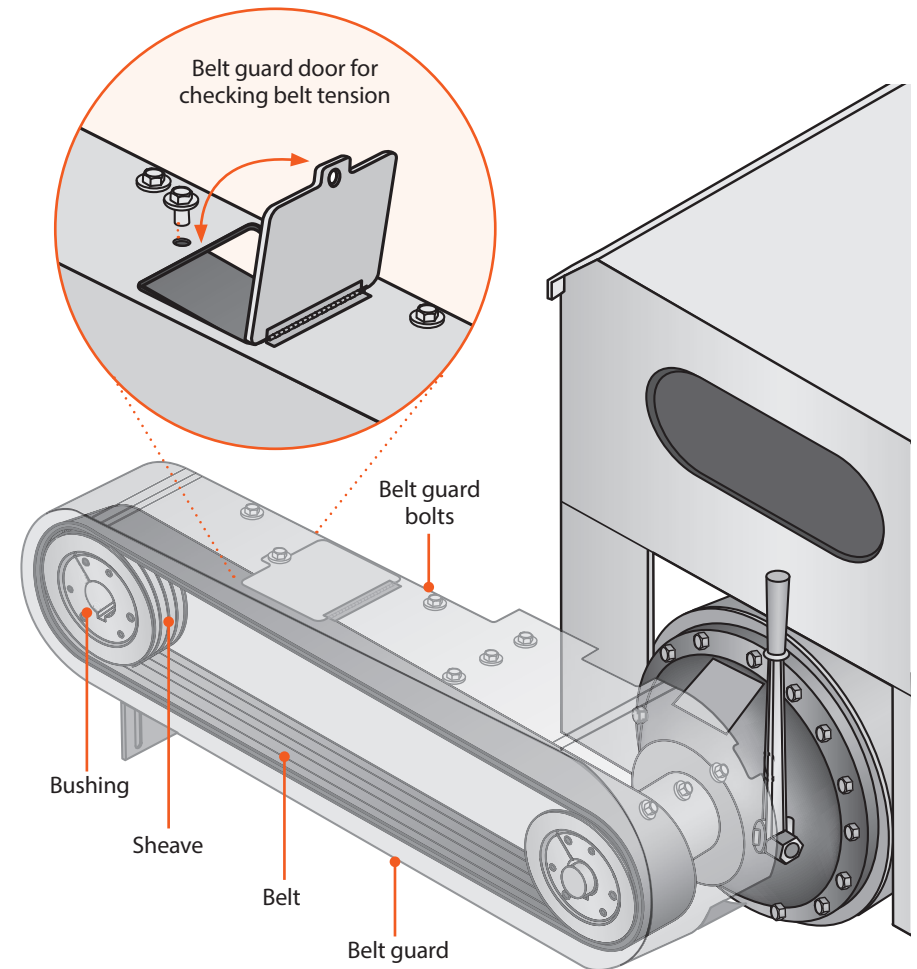
The engine drive belt is housed inside the belt guard. Never remove the belt guard unless you are changing or servicing the belt. To remove the belt guard, loosen the bolts and washers on the top and sides of the guard, lift the top of the guard off the guard base. Always replace the belt guard and secure with the bolts and washers after the work is completed.

To get top performance from the drive belt, it is important that the belt tension is adjusted properly. At the top of the belt guard, is a door for checking belt tension. To open the door, remove the bolt and lift open. See Maintenance section for checking and tightening the belt tension and replacing belts.

Maintenance

- Grease and oil can penetrate the belt, remove grease and oil from belt as soon as possible
- Clean the belt with a clean cloth and non-flammable cleaning solution. Soap and a mild detergent will work, but a non-flammable cleaner is best
- Inspect sheaves for wear or damage when replacing the belt

• • • Figure 3.8



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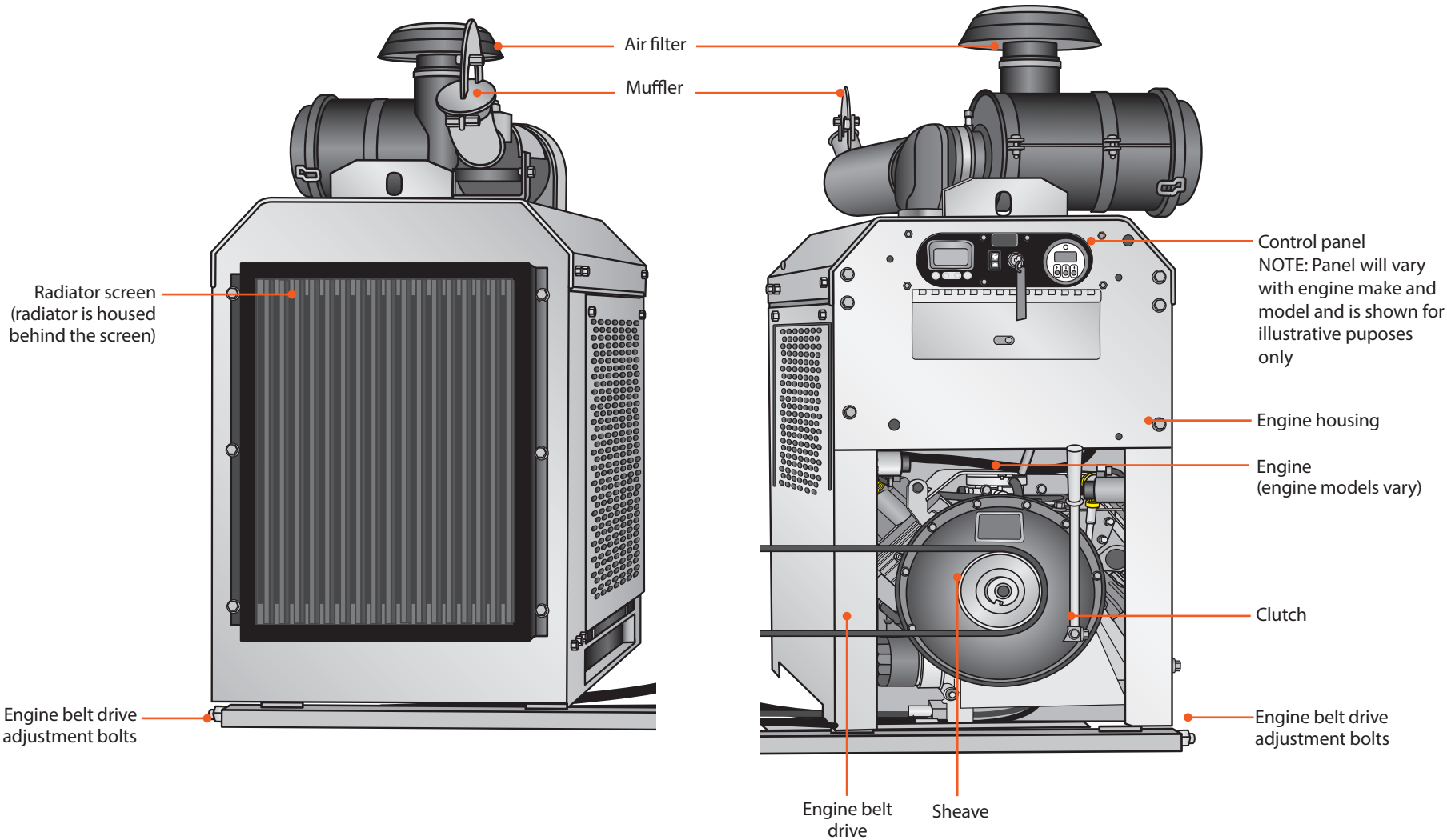
Engine

● ● ● Figure 3.9 Typical Engine Configuration

Left View



Right View



Safety



WARNING!



Loose clothing, long hair, dangling jewelry may get entangled in moving parts and cause serious injury. Do not get near or wear loose items near moving parts.



The muffler becomes hot during operation. Contact with the muffler may cause burns.



Removing the radiator cap while the engine is hot can cause the coolant to spray out, seriously scalding you. Always let the engine cool down before removing the radiator cap.

NOTE

Follow the manufacturers recommended procedure when using starting aids in cold temperatures.

Use of plain water alone as a coolant will result in liner pitting and corrosion. Always have the proper mix of coolant. Artificially softened water should not be used in the radiator.

Moisture in the fuel system has an impact on engine performance and results in corrosion.

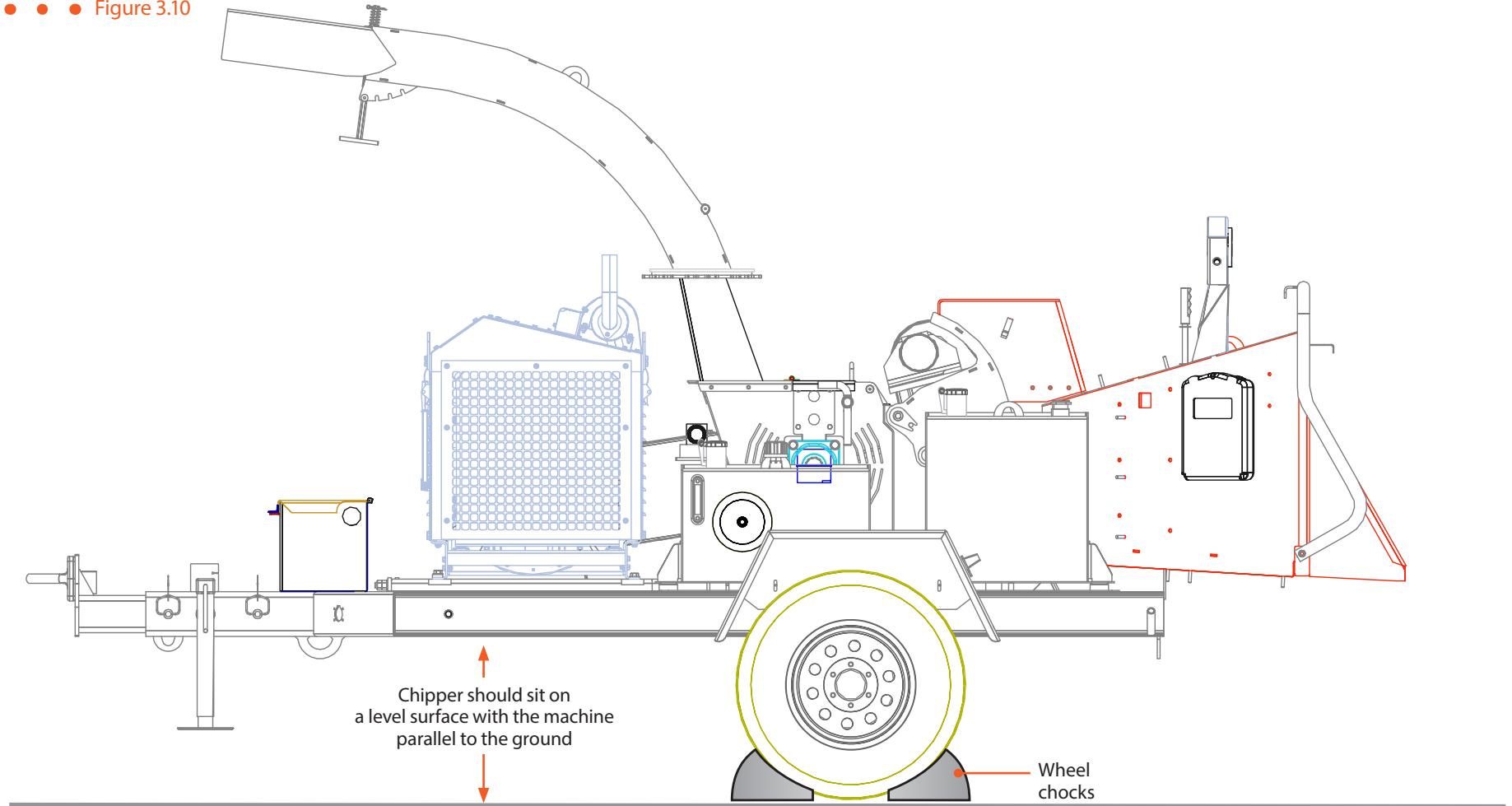
Function

The engine is the source of power for the machine.

This chipper has many options for its engine. Consult the engine manufacturers manual for the safety, use and maintenance of your specific engine. The engine drive belt, sheaves, air filter, and muffler will vary with each model. See the Parts section for part numbers on the engines and their components.

Hitch, Chains, and Jack

• • • Figure 3.10



Safety


DANGER!



Before operating always block the wheel, support the tongue and secure the chipper when not attached to a vehicle. Failure to do so will result in unexpected movement, serious injury, or death.

Check your break-away system periodically to insure that wiring and connections are secure. A short or an open circuit will result in your brakes not working causing serious injury or death.

NOTE

To avoid frame damage; always tow machine with frame level, check axles, tires, hitch, tongue, rims, and safety chains for loose bolts, cracks, and damaged equipment before towing. Make the necessary adjustments to the hitch.

You must re-insert the pin on the break-away switch after use. Failure to do so may drain battery source potentially damaging the battery.

Function

The hitch and chains are used to secure the chipper to a towing vehicle during operation and towing. The tongue, located at the front of the frame, can be extended when being used with a towing vehicle to provide clearance. The jack is used to level and stabilize the chipper.

Use

The chipper can stand by itself with the support of the jack or it can be attached to a towing vehicle. There are two styles of hitch: pintle or ball.

When the chipper is standing alone with jack support:

- The chipper must be placed on a level surface
- Wheel chocks must be placed under both wheels to keep the chipper from moving
- The chipper must be level or parallel with the ground

When the chipper is attached to a towing vehicle:

- The towing vehicle must be capable of handling your chipper
- Park the vehicle and the chipper on a level surface
- During the chipping process the towing vehicle must have the parking brake on
- There must NOT be a driver in the vehicle
- Adjustments to the tongue should be made before attaching the chipper to the towing vehicle
- The hitch must be properly secured to the vehicle with locking pins installed
- Connect the safety chains and breakaway cables to the vehicle. The chains should be equal in length and shall be hooked through the hitch plate in such a way as to allow the operator to turn the vehicle and not drag the chains on the ground
- Hook up electrical connections and check that tail lights and turn signals are in working order
- The chipper must be level or parallel with the ground
- Secure loose end of the actuator cable to the towing vehicle making sure the cable does not drag, has no strain or restriction, and the line is unobstructed of pull in the event of vehicle separation

Maintenance

- Check tire pressure for proper inflation. You can find this information on the side of your tires
- Before moving the chipper, check wheel rims for loose lugnuts
- Clear the infeed of all debris before towing
- Inspect the adjustable tongue for cracks around the bolt holes. If cracks or stress marks are present, replace immediately

*Feature varies depending on the model you have ordered, see the Options tabs for details on your model.

Battery

• • • •

Safety

 WARNING!	
	The battery generates explosive gas during normal operation. Keep ignition sources away at all times.
	Battery acid can cause severe burns. Wear protective gear when handling the battery.
NOTE	
Charging the battery with cables connected can damage the machines electronic system. Disconnect both cables before connecting the battery to a charger.	

Function

The battery is the electrical power source for the machine. It is stored inside the metal battery box located on the tongue of the machine.

Use

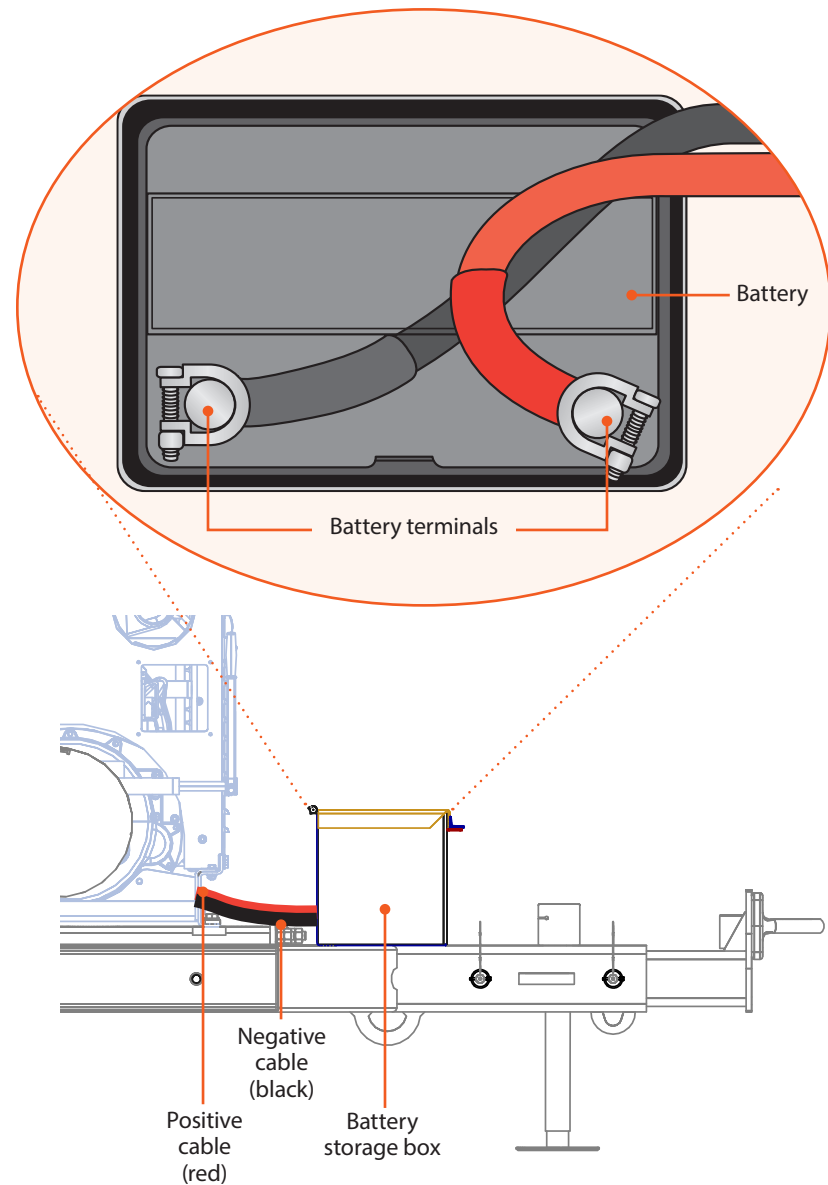
When handling the battery, make sure the engine is OFF. Access the battery by removing the lock at the side of the box, and open the lid. When connecting or disconnecting the cables, always handle the negative (-) terminal first.

After completing the connection, reconnect and tighten the cables to the terminals. Apply grease to the terminals to prevent corrosion. Close the battery box cover and lock.

Maintenance

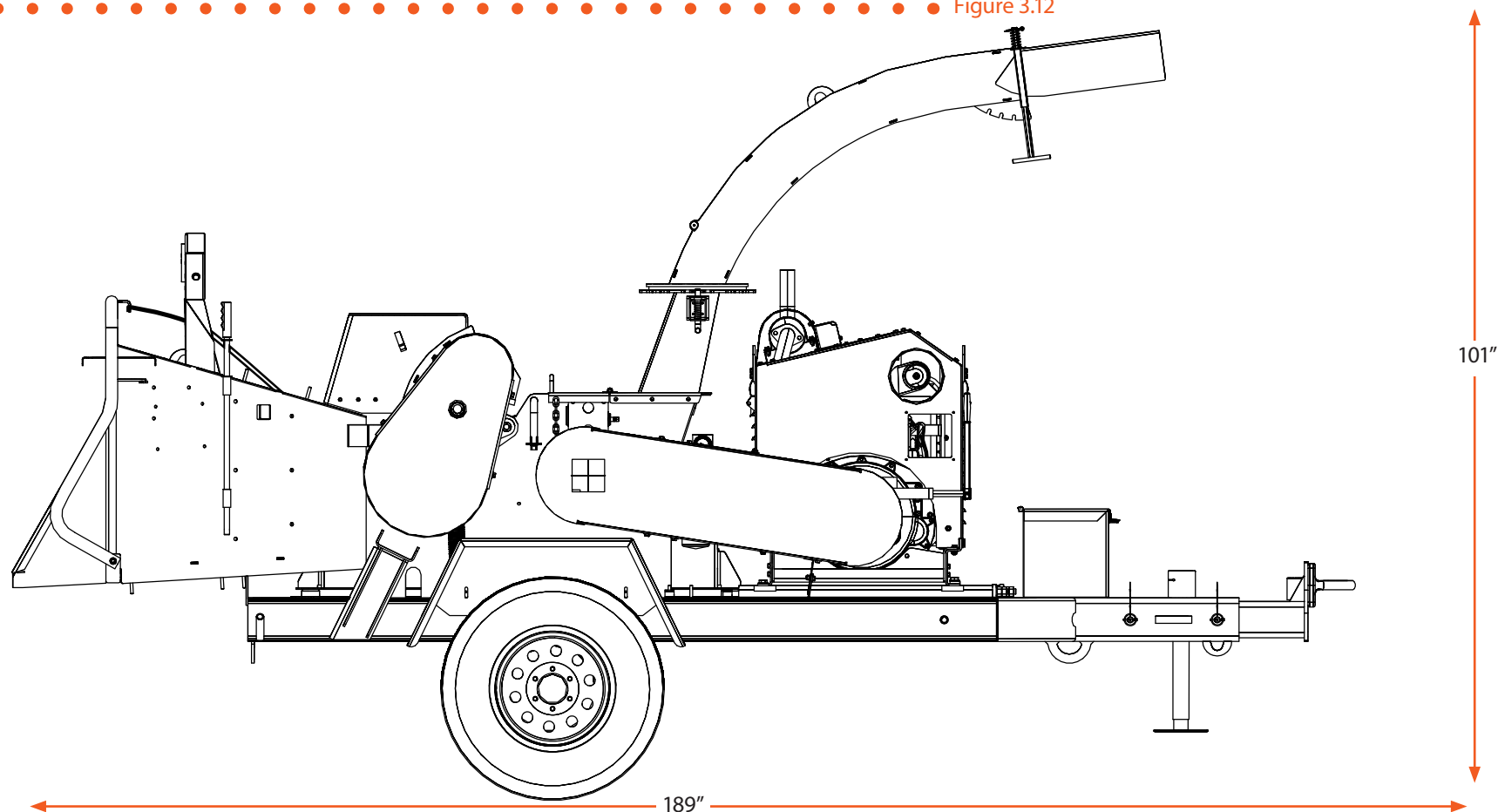
- Check the battery terminals for corrosion (white or yellowish powder)
- Remove corrosion by covering the terminals with a solution of baking soda and water. After the mixture bubbles and turns brown, wash it off with water. If there is severe corrosion, clean with a wire brush, and dry with a paper towel

• • • Figure 3.11



Model 1215 Specifications

Figure 3.12



General

Length 189 inches
 Transport Width 72 inches
 Transport Height 101 inches
 Gross Weight 5,200 lb.
 Electrical System 12 volt

Chipper

Drum diameter 20 inches
 Drum width 14 inches
 Knife length 10.5 inches
 Knife configuration 2
 Capacity 12 inch round wood

Tank Capacities

Diesel Fuel 25.5 gallon
 Hydraulic Fluid 16 gallon

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General Maintenance



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Maintenance Overview

Table 4.1 • Routine Maintenance Schedule

Chipper Component	Required Maintenance	Start Up	8 hours	40 hours	120 hours	400 hours
Complete machine	Visual inspection (see Safety section)	X	X			
	Clean machine		X			
Extended Tongue	Remove and inspect for cracks along bolt holes, replace if cracks are present				X	
Fasteners (except drum knife bolts)	Assemble using Loc-Tite 242 (blue)					
Engine oil	Maintain according to OEM manual	X	X			
Engine coolant	Maintain according to OEM manual	X	X			
Engine air pre-cleaner	Tap filter & blow out with compressed air		X			
Engine air filter	Clean when indicator (optional feature) is red ¹					
Radiator screen	Tap screen & blow out with compressed air		X			
Clutch	Adjust ² , and grease according to OEM manual					
Drum knives	Inspect, sharpen, or replace when chip quality deteriorates.		X			
Drum knife bolts	Inspect when checking the drum knives, replace when worn or damaged ³					
Drum knife clearance	Adjust when changing knives			X		
Drum anvil	Inspect when changing knives, adjust or replace when worn or damaged			X		
Drum drive belts	Inspect, tighten to proper tension, replace when worn ⁴		X	X		
Feed wheel teeth	Cut off and replace when worn					
Tires	Check air pressure before moving					
Chain drives	Check tension, alignment, and lubrication	X	X			
Oil filters	Replace					X
Hydraulic oil	Replace, check, increase to 3/4 full ⁵					

1. The indicator may change due to engine compression. Reset by pressing the rubber button before cleaning pre-cleaner or changing air filters.
2. Adjustment of new clutch must be done several times within a short period of time to insure proper operation. See OEM manual for adjustment procedures.
3. Apply a coating of anti-seize lubricant before tightening.
4. Check the belts every 8 hours during the first week of operation. After the first week of operation check the belts weekly. See this section for adjustment information.
5. Change every 2,000 hours.

Air Filter

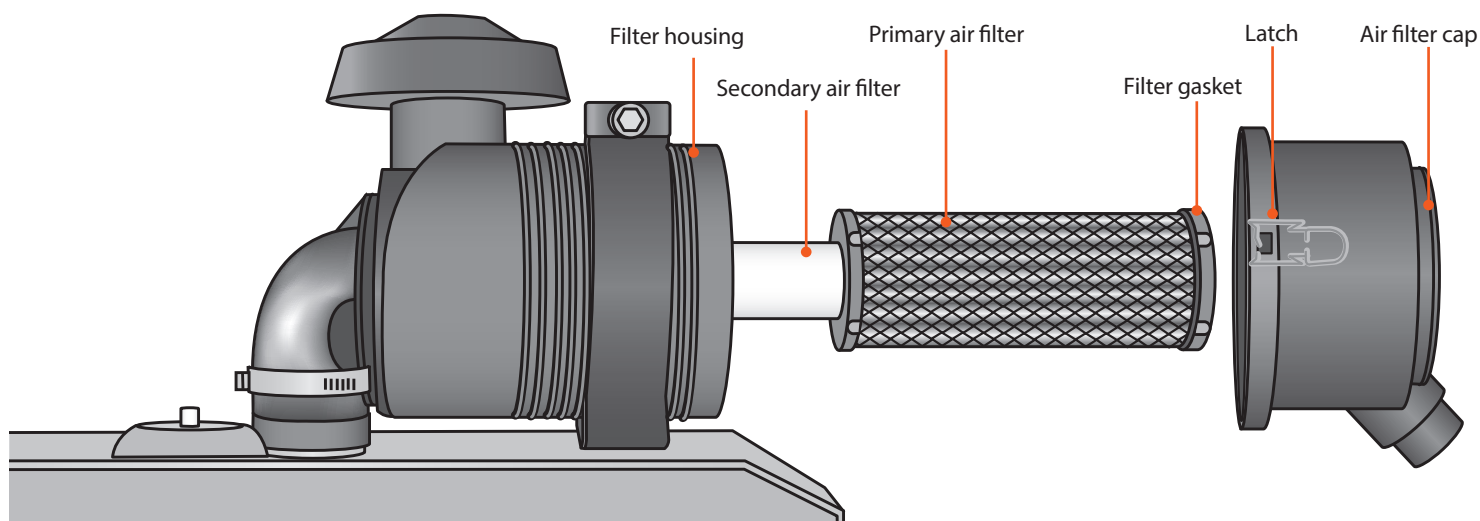
A clean air filter is critical to the performance of the chipper and the life of the engine. Dirt inside the engine will ruin it. The filter should be maintained, changed when necessary. At a minimum, changing should occur every 200 hours or at the time of an oil change. Only use the correct model filter.

To replace the air filter:

1. Inspect the outside of the housing and air transfer tubing for cracks, dents, or holes. Check that all connection points from the filter housing to the engine are tight and sealed. Dust trails indicate leaks.
2. Unlatch the air filter cap from the filter housing. Gently remove the old filter to avoid dirt and dust dropping inside the clean side of the filter housing and causing contamination.
3. Remove the filter and clean the inside of the housing and gasket seal using a clean damp cloth. Make sure all hardened dirt ridges are removed. Wipe every surface inside the housing.
4. Inspect the old filter for evidence of dust leakage and gasket sealing problems. If you see a pattern on the elements clean side, it is a sign that the old filter was not firmly sealed or a dust leak exists. Identify the cause and fix it before placing the new filter in the housing.
5. When installing the filter back into the housing make sure it is seated evenly. If it is not seated evenly, the engine will not be protected from dirt and dust.
6. Ensure the housing, connections, and ducts (e.g.: clamps, flange joints and air cleaner mounting bolts) are air-tight.

NOTE: The gasket on the filter is one of the most important features of the filter. Make sure it is a highly compressible gasket that springs back promptly when you release it from finger pressure.

● ● ● Figure 4.1



Lubrication



Lubricating the machine is vital to its operation. There are many points of lubrication on the machine. These include the wheel axle, feed wheel bearings, yoke cylinder pins, yoke pivot pins, clutch, discharge chute swivel and crank handle, chipper drum bearings, control bar, and battery box. Lubricate the grease points as outlined on the schedule below.

NOTE: The following maintenance intervals apply for normal operating conditions only. Intervals are hours of operation based on 8 hours per day, 5 days per week. If your operating conditions are difficult, adjust the specified intervals.

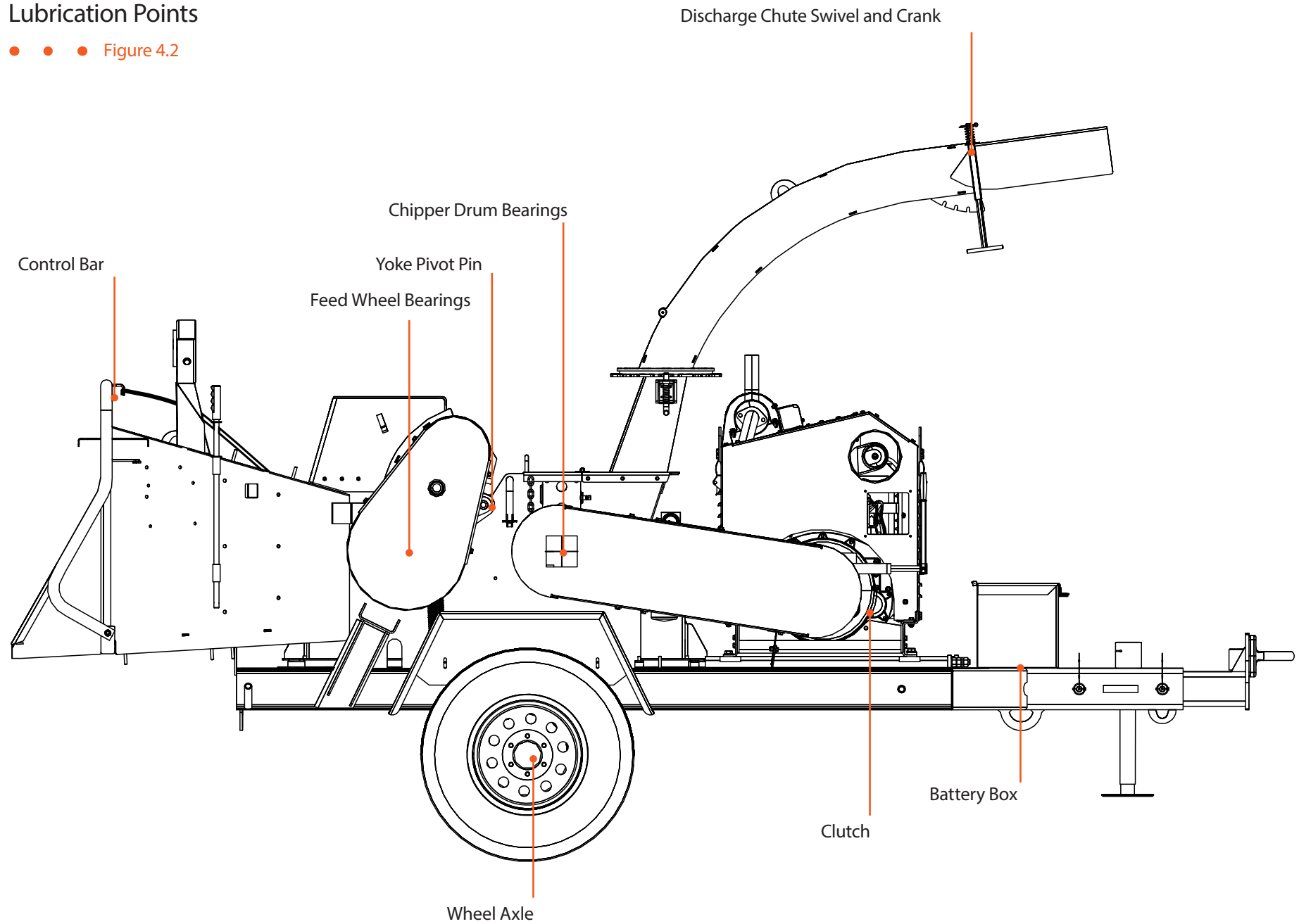
Table 4.2 • Routine Lubrication Schedule

Description	Number of locations	Start up	8 hours	40 hours
Wheel axle	2		See OEM manual	
Feed wheel bearings	2			X
Yoke pivot pin	2			X
Clutch	4		See OEM manual	
Discharge chute swivel	2			X
Chipper drum bearings	2		X	
Control bar	2	X	X	
Battery box	2			X

Key:
X = 1 shot of grease (Use only EP rated grease)

Lubrication Points

● ● ● Figure 4.2



Bolts & Torque



Making sure that all the bolts are regularly checked and tightened to the proper torque is critical. The chart below shows the proper torque relative to the bolt size and type. When using this chart, keep the following guidelines in mind:

- The values in the chart are based on use of clean, dry threads
- Use the next higher torque value when specific torque values are not available
- When replacing a cap screw with a higher grade, use the torque specifications of the new screw

- Do not use the torque values shown in this chart in place of those specified in other sections of the manual
- When oil is used as a lubricant, reduce the torque by 10%
- When using new plated cap screws, reduce the torque by 20%
- Use the Grade 5 torque chart when using cap screws that are threaded into aluminum. These may require reductions in torque of 30% or more and must attain two cap screw diameters of thread engagement
- When using rivet nuts, do not exceed 25 ft-lb of torque

Table 4.3 • Torque Guides

Grade 5 - Coarse Thread

Size	Clamp Load	Plain	Plated
1/4-20 (.250)	2,025	8 ft-lb	76 in-lb
5/16-18 (.3125)	3,338	17 ft-lb	13 ft-lb
3/8-16 (.375)	4,950	31 ft-lb	23 ft-lb
7/16-14 (.4375)	6,788	50 ft-lb	37 ft-lb
1/2-13 (.500)	9,075	76 ft-lb	57 ft-lb
9/16-12 (.5625)	11,625	109 ft-lb	82 ft-lb
5/8-11 (.625)	14,400	150 ft-lb	112 ft-lb
3/4-10 (.750)	21,300	266 ft-lb	200 ft-lb
7/8-9 (.875)	29,475	430 ft-lb	322 ft-lb
1-8 (1.000)	38,625	644 ft-lb	483 ft-lb
1 1/8-7 (1.125)	42,375	794 ft-lb	596 ft-lb
1 1/4-7 (1.250)	53,775	1120 ft-lb	840 ft-lb
1 3/8-6 (1.375)	64,125	1470 ft-lb	1102 ft-lb
1 1/2-6 (1.500)	78,000	1950 ft-lb	1492 ft-lb

Grade 5 - Fine Thread

Size	Clamp Load	Plain	Plated
1/4-28 (.250)	2,325	10 ft-lb	87 in-lb
5/16-24 (.3125)	3,675	19 ft-lb	14 ft-lb
3/8-24 (.375)	5,588	35 ft-lb	26 ft-lb
7/16-20 (.4375)	7,575	55 ft-lb	41 ft-lb
1/2-20 (.500)	10,200	85 ft-lb	64 ft-lb
9/16-18 (.5625)	12,975	122 ft-lb	91 ft-lb
5/8-18 (.625)	16,350	170 ft-lb	128 ft-lb
3/4-16 (.750)	23,775	297 ft-lb	223 ft-lb
7/8-14 (.875)	32,475	474 ft-lb	355 ft-lb
1-12 (1.000)	42,300	705 ft-lb	529 ft-lb
1-14 (1.000)	32,275	721 ft-lb	541 ft-lb
1 1/8-12 (1.125)	47,475	890 ft-lb	668 ft-lb
1 1/4-12 (1.250)	59,550	1241 ft-lb	930 ft-lb
1 3/8-12 (1.375)	72,975	1672 ft-lb	1254 ft-lb
1 1/2-12 (1.500)	87,750	2194 ft-lb	1645 ft-lb

Grade 8 - Coarse Thread

Size	Clamp Load	Plain	Plated
1/4-20 (.250)	2,850	12 ft-lb	9 ft-lb
5/16-18 (.3125)	4,725	25 ft-lb	18 ft-lb
3/8-16 (.375)	6,975	44 ft-lb	33 ft-lb
7/16-14 (.4375)	9,600	70 ft-lb	52 ft-lb
1/2-13 (.500)	12,750	106 ft-lb	80 ft-lb
9/16-12 (.5625)	16,350	153 ft-lb	115 ft-lb
5/8-11 (.625)	20,325	212 ft-lb	159 ft-lb
3/4-10 (.750)	30,075	376 ft-lb	282 ft-lb
7/8-9 (.875)	41,550	606 ft-lb	454 ft-lb
1-8 (1.000)	54,525	909 ft-lb	682 ft-lb
1 1/8-7 (1.125)	68,700	1288 ft-lb	966 ft-lb
1 1/4-7 (1.250)	87,225	1817 ft-lb	1363 ft-lb
1 3/8-6 (1.375)	103,950	2382 ft-lb	1787 ft-lb
1 1/2-6 (1.500)	126,450	3161 ft-lb	2371 ft-lb

Grade 8 - Fine Thread

Size	Clamp Load	Plain	Plated
1/4-28 (.250)	3,263	14 ft-lb	10 ft-lb
5/16-24 (.3125)	5,113	27 ft-lb	20 ft-lb
3/8-24 (.375)	7,875	49 ft-lb	37 ft-lb
7/16-20 (.4375)	10,650	78 ft-lb	58 ft-lb
1/2-20 (.500)	14,400	120 ft-lb	90 ft-lb
9/16-18 (.5625)	18,300	172 ft-lb	129 ft-lb
5/8-18 (.625)	23,025	240 ft-lb	180 ft-lb
3/4-16 (.750)	33,600	420 ft-lb	315 ft-lb
7/8-14 (.875)	45,825	668 ft-lb	501 ft-lb
1-12 (1.000)	59,700	995 ft-lb	746 ft-lb
1-14 (1.000)	61,125	1019 ft-lb	764 ft-lb
1 1/8-12 (1.125)	77,025	1444 ft-lb	1083 ft-lb
1 1/4-12 (1.250)	96,600	2012 ft-lb	1509 ft-lb
1 3/8-12 (1.375)	118,350	2712 ft-lb	2034 ft-lb
1 1/2-12 (1.500)	142,275	3557 ft-lb	2668 ft-lb

Belt Tension



DANGER!



Moving belts and chipper drum can pinch body parts, entangle loose clothing, jewelry, and long hair which may result in cuts, mutilation, serious injury, or death. Shut down the engine, wait for the belts and chipper drum to completely stop rotating before initiating maintenance. Always have belt guards attached to the machine before initiating operation.



Debris may be projected during the maintenance of the chipper knives and result in eye injury, skin punctures, and cuts. Always wear protective equipment and gear such as goggles and work gloves.



Performing maintenance with the engine ON may cause serious injury or death. Turn the engine OFF and lock out the machine before servicing it.

NOTE

Cleaning belts with flammable solvents will cause the belt to deteriorate. Use a non-flammable cleaner or soap to remove grease and oil.

Use of hard tools, such as screwdrivers, crowbars, and wedges to place a belt on the sheave can result in damage to the belt and drive.

Failure to follow the preceding guidelines may result in premature belt failure, belt rollover, and PTO bearing failure.

Before adjusting the belt tension:

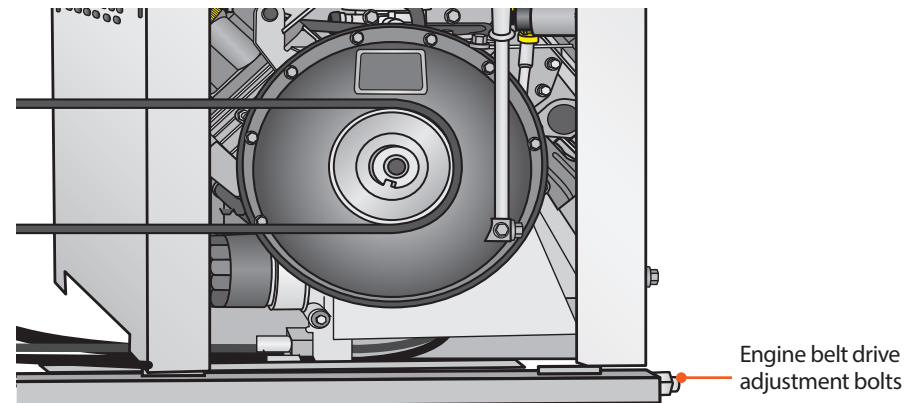
1. Throttle the engine down and disengage the clutch.
2. Shut off the engine, remove the key and conduct machine lockout.
3. Remove the belt guard.
4. If maintenance is required, loosen the engine bolts, remove the belt and fix before setting belt tension.
5. Inspect and/or repair the following:
 - Grease and oil on the belt: Grease and oil on a belt will cause rapid deterioration. Clean oil and grease from the sheaves, wipe the belt with a clean cloth
 - Burrs and rust in the sheave grooves: Remove burrs and rust
 - Wear, damage and misalignment of the sheaves and sprockets: Replace if excessively worn, frayed, or soft
 - Belt clearance and shaft misalignment: Adjust belt guard and shaft

Use a V-Belt tension gauge to set the belt tension by following these steps:

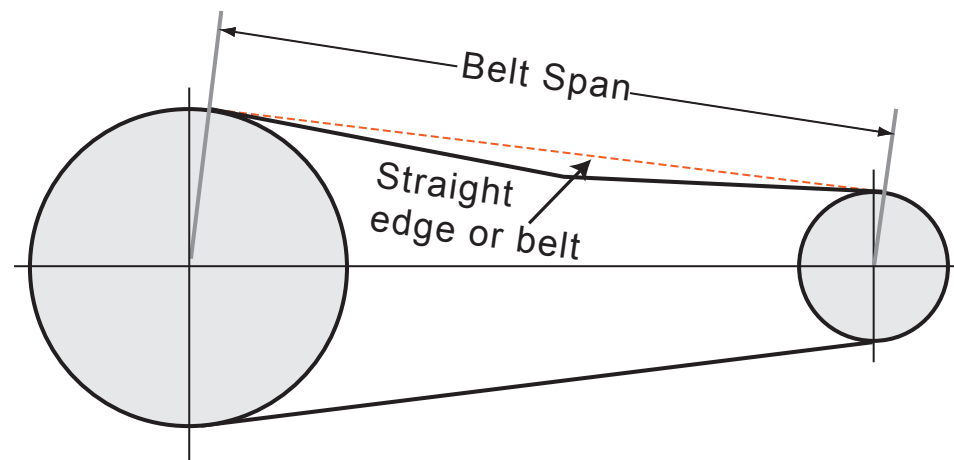
NOTE: Always install a matched set when installing new belts.

1. Turn the engine belt drive adjustment bolts until the belt is fairly tight.

• • • Figure 4.3



● ● ● Figure 4.4



2. Measure the belt span length of the drive, and lay a straight edge across the drive (see Figure 4.4).
3. Set the large rubber O-ring on the body of the tension gauge at the dimension equal to span length (See inset in Figure 4.5).
4. Set the small O-ring on the plunger to "0" against the body of the tension gauge (see Figure 4.5).
5. With the tension gauge perpendicular to the span, apply force to the belt in the center of the span. Deflect the belt until the bottom of the large O-ring is even with the bottom of the straightedge laid across the top of the drive. Release the pressure and read the pounds of force used at the O-ring on the plunger (See inset in Figure 4.5).
6. Compare the result with the ranges in Table 4.4. The proper tension is the lowest tension at which the belts won't slip under peak load conditions.
7. Tighten the engine adjustment bolts until the belt tension is in the recommended range. Put the belt guard on.

NOTE: Adjust both sides evenly to ensure proper sheave alignment.

NOTE: Tension on newly installed belts drops rapidly during the first hours of operation. Check and adjust frequently during the first 24 hours. It is recommended the tensioning deflection force should fall between the minimum and maximum values shown Table 4.4.

● ● ● Figure 4.5

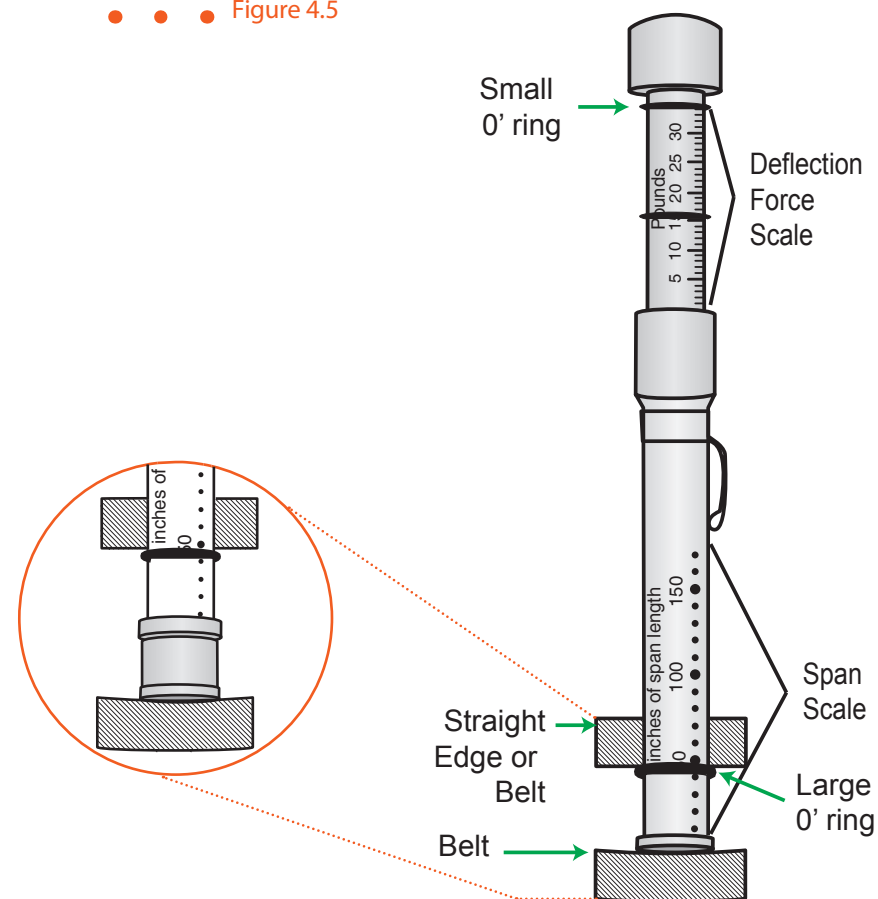


Table 4.4 • Recommended Belt Tension

V-belt- Section	Speed Range	Small Sheave Diameter	Deflection force in lbs. for Drive Speed Ratio of;			
			1.0	1.5	2.0	4.0+
5VX	1200 - 3600	4.4	6.5	7.5	8.0	9.0
	1200 - 3600	5.2	8.0	9.0	9.5	10.0
	1200 - 3600	6.3	9.5	10.0	11.0	12.0
	1200 - 3600	7.1	10.0	11.0	12.0	13.0
	900 - 1800	9.0	12.0	13.0	14.0	15.0
	900 - 1800	14.0	14.0	15.0	16.0	17.0

Chipper Knives



DANGER!

A rotating chipper drum can pinch body parts, entangle loose clothing, jewelry, and long hair which will result in cuts, mutilation, serious injury, or death. Before initiating maintenance throttle the engine down and shut the engine OFF. Wait for the chipper drum to completely stop rotating and insert the drum lock pin.

The chipper drum will coast for several minutes after the machine is shut off. Do not open the chipper hood until the drum rotation has completely stopped. Serious injury, mutilation, or death will occur.

Debris may be projected during the maintenance of the chipper knives and result in eye injury, skin punctures, and cuts. Always wear protective equipment and gear such as goggles and work gloves.

NOTE

Excessive heat, indicated by discoloration of the knife edge, will lead to microscopic cracks that can cause the knife to break when it is put back into service. Do not use knives that have been exposed to excessive heat from sharpening.

To ensure maximum efficiency of the chipping operation the chipper knives must be properly maintained. The time between sharpening or replacement will depend on the type of wood and operating conditions. Indication of dull knives include poor quality, excessive oversize chips, and poor feed characteristics. Always maintain proper knife sharpness. It is important to follow these guidelines to ensure efficient chipping:

- Use original Morbark LLC. knives with the correct steel composition and hardness. Immediately replace worn knives
- Keep the knife edge sharp and anvil square. Use matched sets
- Maintain the proper clearance between the chipper knife and anvil
- Use the correct hardware to mount the knife to the holder and maintain the correct torque to the bolt. Keep the knife pocket and holder clean and free of debris

1. Place the safety control bar into the stop position.
2. Throttle the engine down.
3. When the engine has reached an idle, disengage the clutch.
4. Turn the ignition OFF and lockout the machine.

DANGER: Make sure disc has come to a complete stop before opening chipper disc hood.

NOTE: Panel will vary with engine make and model and is shown for illustrative puposes only.

5. Pull back the chipper hood locking pin and lift the chipper hood.

Before inspecting or maintaining the chipper knives:

6. Slowly rotate the chipper drum by hand so the first knife is accessible.

DANGER: Keep loose clothing, jewelry, long hair, and body parts away from rotating parts!

7. Insert the chipper drum locking pin.

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WARNING!

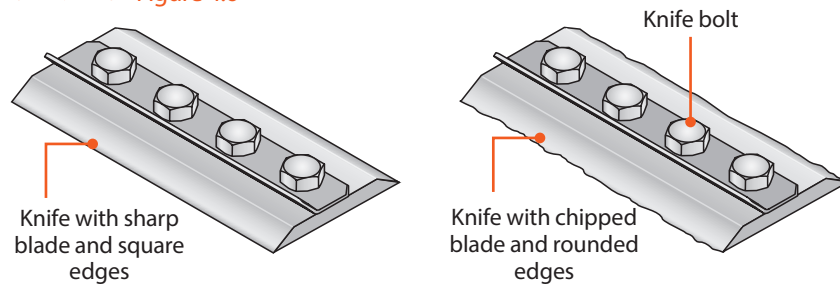



Sharp edges and flying debris may cause serious injury. Always wear protective gloves and goggles while maintaining the chipper knives.

Inspect the knife assembly:

1. Check that the corners of the knife are square and the edge is sharp. Remove the knife if sharpening or replacement is needed.
2. Check that the torque on the knife bolts is 375 ft/lbs. Retorque if necessary.

● ● ● Figure 4.6



3. Remove the drum lock pin and rotate the chipper drum to the next knife. Re-insert the drum lock pin. Repeat steps 1 & 2.
4. If there is no need to turn, sharpen, or replace a knife then close the chipper hood and put the hood locking pin back in place.

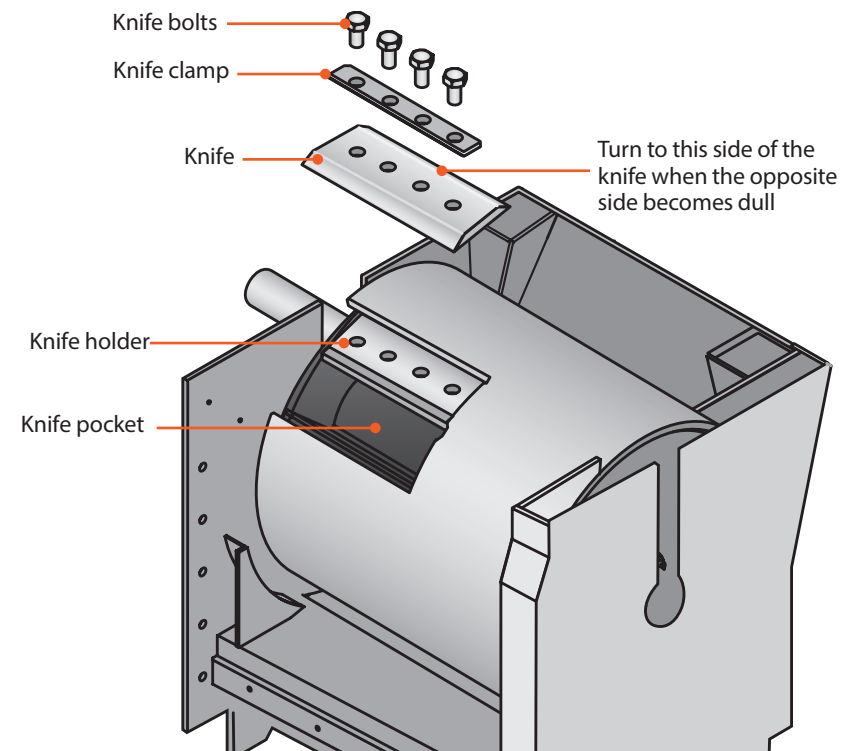
To Turn or Replace the Knives:

1. Remove the four knife bolts.
2. Clean debris from the knife and knife pocket with a wire brush.
3. Inspect the knife holder, knife clamp, knife bolt, and threads for wear or damage.

NOTE: If the knife holder face has a groove worn more than a 1/4" from the leading edge, it must be replaced.

4. When replacing the knife, apply a coat of anti seize to each bolt before assembly and torque to 375 ft/lbs.
5. Each knife is double-edged and may be turned when one knife edge becomes dull.

● ● ● Figure 4.7



To Sharpen the Knife Edge:

When sharpening the knife edge, use proper grinding techniques (hand file, power belt sander with fine paper, or conventional knife grinder with coolant system) to reduce the possibility of excessive heat build up and provide a good cutting edge. Do not use straight wheel grinding. This method will result in a hollow or concave effect and shorten the life of the knife.

Use a non-petroleum base coolant such as De Santo (orange label) grinding coolant when using a grinding machine. Mix approximately one part coolant to 50 parts of water. The coolant should be applied on the wheel about 1" above the knife with full pressure. This will keep the wheel clear and free to cut without burning or damaging knives. Do not overfeed the grinding machine.

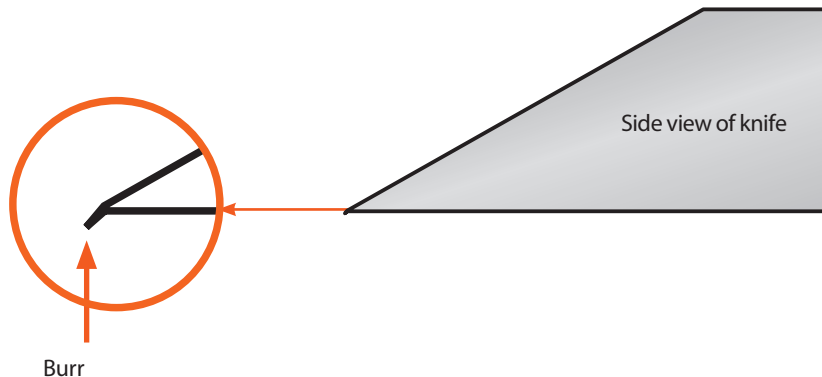
1. Grind the angle of the knife edge to 31°. Note: Under exceptional conditions an angle between 29° and 31° may improve performance. Never grind the angle greater than 31°.

● ● ● Figure 4.8



2. Run deburring tool alongside bottom of knife to remove burr caused by sharpening.

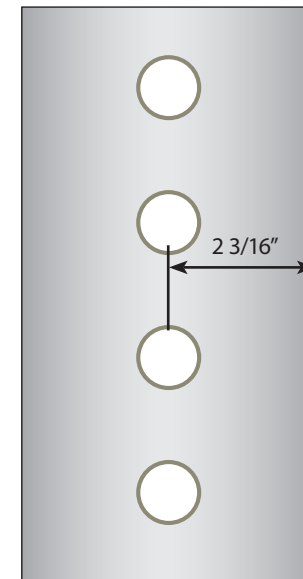
● ● ● Figure 4.9



3. Place the knife back onto the knife holder. Apply a light coat of anti-seize lubricant to the bolts and clamp.
4. Slide the knife back (away from the anvil) against the knife bolts. Tighten the bolt to the 375 ft/lbs.
5. Remove the drum lock pin and rotate the chipper drum to the next knife. Re-insert the drum lock pin. Repeat steps 1-4 for both chipper knives.

NOTE: When the distance from the outside of the knife to the center of the mounting holes reaches 2 3/16", the knife must be replaced.

● ● ● Figure 4.10

**After Replacing, Turning or Sharpening the Knives:**

1. Close the chipper hood and put the hood lock pin back in place after maintaining the chipper knives.
2. Before conducting chipping operation the clearance between the knives and anvil must be set. (See Knife Anvil page.)

Knife Anvil




DANGER!



Failure to lockout the machine (e.g. yoke, shut power off) will result in unexpected operation and cause serious injury or death. Always lockout the machine before conducting maintenance (see Section One, Safety Lockout Procedure).



A rotating chipper drum can pinch body parts, entangle loose clothing, jewelry, and long hair which will result in cuts, mutilation, serious injury, or death. Shut down the engine, wait for the chipper drum to completely stopped rotating and insert the drum lock pin before initiating maintenance.

NOTE

Incorrect clearance between a chipper knife and anvil will result in poor chipping performance, damage to the chipper knives, and undue stress on the chipper. Always maintain the proper knife-anvil clearance.

The anvil is located under the machine, and behind the infeed. The anvil and chipper drum work together in chipping the brush, therefore it is important the clearance between the anvil and knife are accurate. See this section for the anvil location.

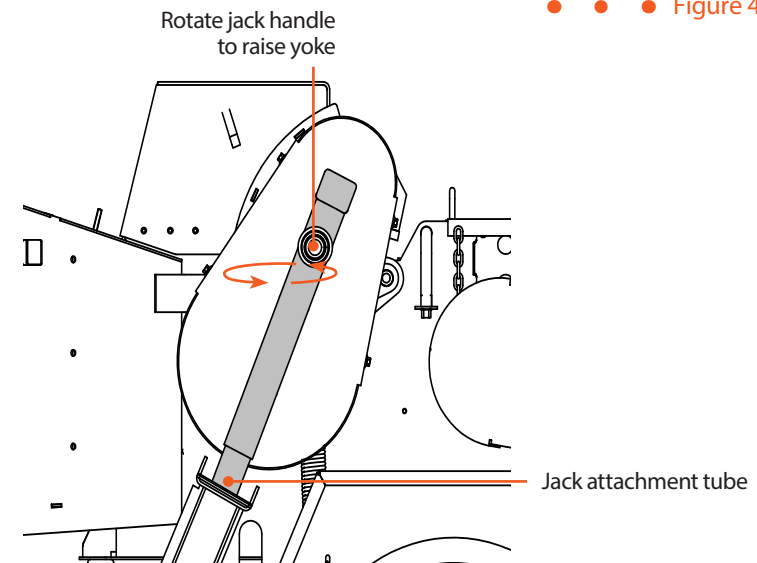
To ensure maximum efficiency of the chipping operation the anvil must be properly maintained. It is important to follow these guidelines to ensure efficient chipping:

- Keep the anvil square
- Maintain the proper clearance between the chipper knife and anvil
- Two people are required to adjust the anvil

Before inspecting or maintaining the anvil:

1. Raise the yoke and insert locking pin (see Lockout Procedure in Safety Section).
2. Follow steps in Safety Section to shut-down the machine.

• • • Figure 4.11



Yoke locking pin goes through the infeed housing and is locked into place by a hitch clip on the left side of the machine.

Inspect the anvil:

1. Inspect the anvil for wear and damage. The anvil edge should be square.

• • • Figure 4.12

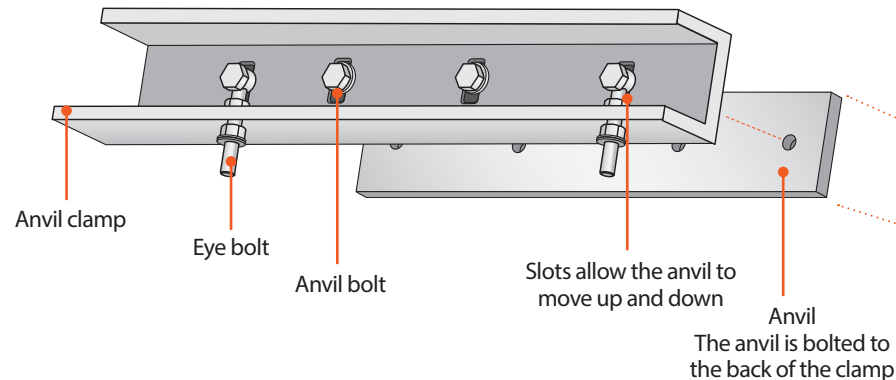


2. Check the torque on the bolts that hold the anvil. Tighten if necessary (see torque chart).

To Flip or Replace the Anvil:

1. Remove the six anvil bolts.
2. Clean debris from the anvil and anvil clamp slots with a wire brush.
3. If the anvil edge is rounded, flip to a new edge or replace. Anvil can be flipped 4 times.
4. Place the anvil back onto the anvil slot. Apply a light coat of Loc-tite lubricant to the bolts and insert.

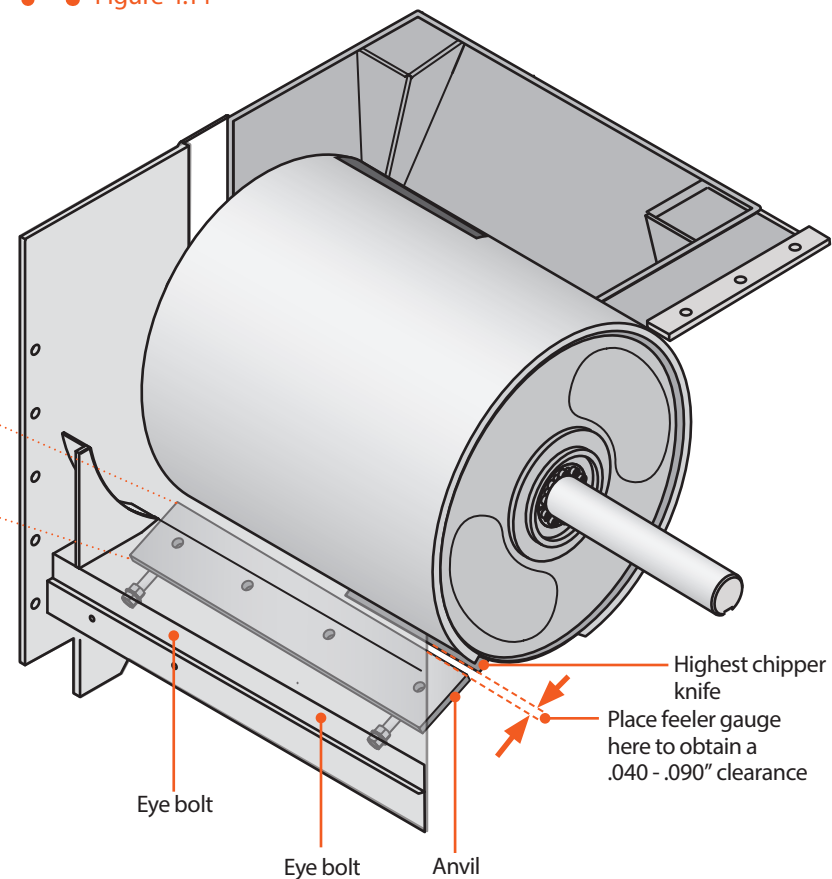
• • • Figure 4.13



To Set the Chipper Drum Knife/Anvil Clearance:

1. Reach into the infeed and slowly rotate the chipper drum so the highest chipper knife closest to the anvil is positioned over the anvil.
2. With a feeler gauge, check the clearance between the chipper knife and anvil. It should be set between .040" and .090".
3. If necessary, loosen the six anvil bolts until the anvil is loose.
4. Turn the two eye bolts behind until the anvil is set to the correct clearance.
5. Rotate the chipper drum backwards to the next knife and check and check the clearance of the next knife.
6. Tighten the bolts to 150 ft/lbs.

• • • Figure 4.14



After Maintaining the Anvil:

1. Remove the yoke locking pin.
2. Lower the yoke by activating the yoke valve bank handle.

Chipper Flange Bearing



**WARNING!**



Performing maintenance with the power source ON may result in unexpected operation of the machine and may cause serious injury or death. Turn OFF and lock out the power source before servicing.

The chipper flange bearings support the chipper drum shaft and should be greased according to the maintenance schedule.

Before performing maintenance on the chipper bearings:

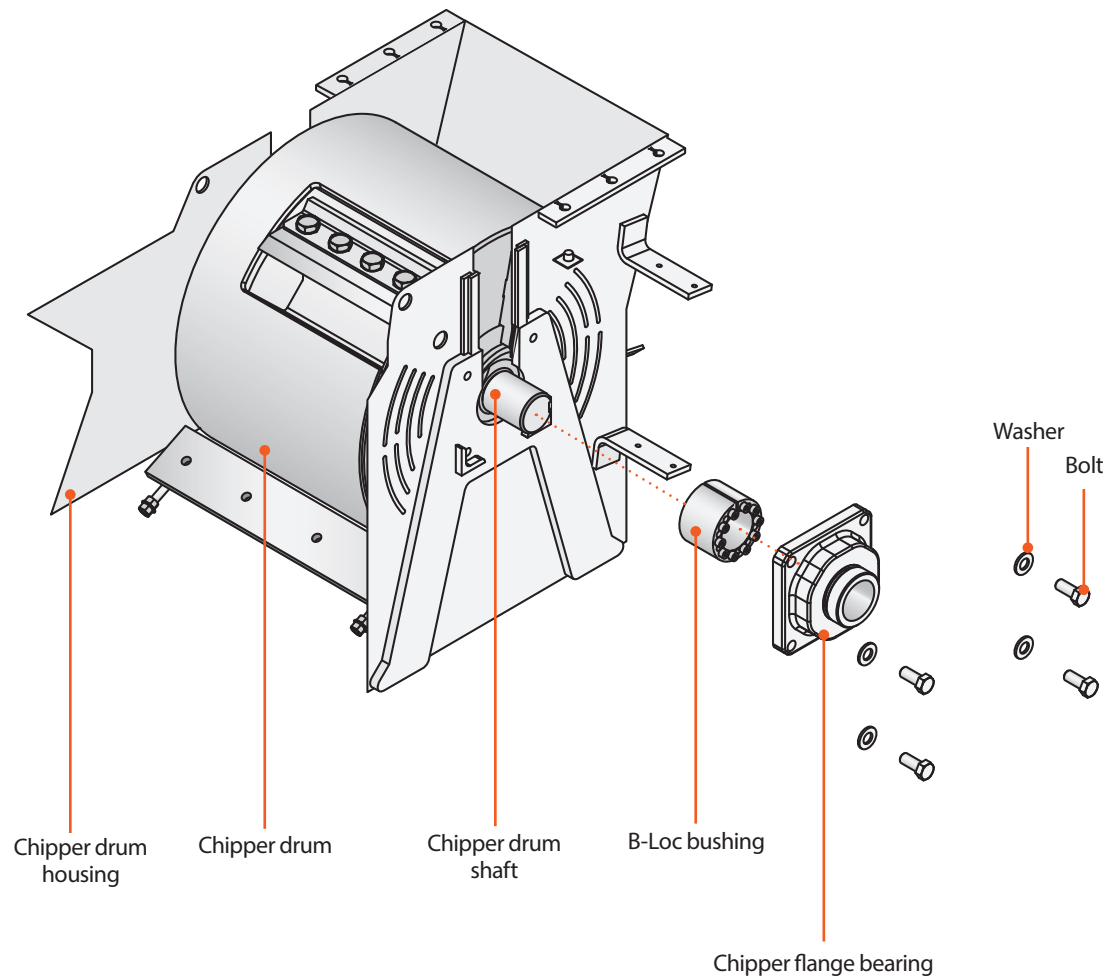
1. Follow steps in Safety Section to shut-down the machine.
2. Inspect the chipper drum shaft. Ensure that it is smooth, free of any nicks or cuts, straight, and clean.
3. Inspect the flange bearing for contamination.
4. Protect the flange bearing from exposure to dirt or moisture.

To Maintain the Bearings:

1. Slide the flange bearings onto the drum shaft (both sides).
2. Place the drum into the base until the tapped holes in the base align with the holes in the flange bearings. Start all bolts on both bearings before tightening.
3. Using a pry bar force the drum towards the drive side of the base.
4. With a marking stick against the shaft on the outside of the bearing, rotate drum and mark the location on the shaft.
5. With the pry bar move the drum to the opposite side of the base.
6. Note of the distance between the two points and move the drum back the other way half the distance.
7. Install the lock collars onto the drum shaft both sides.

8. Tighten the lock collars onto the flange bearing by driving them in the direction the drum is turning (counter clockwise).
9. Remove the allen head screws and drill the shaft enough to seat the screws into the shaft (about 1/8 inch), apply Loc-tite to the allen head screws and tighten.

● ● ● Figure 4.15



Hydraulics



⚠ WARNING!



Hydraulic oil will vaporize and potentially ignite resulting in explosion, fire, and possible serious injury. Keep hydraulic oil away from ignition sources (e.g.: flame, smoking, etc.).



Hydraulic oil leaks will result in puddles and slippery conditions which may result in serious injury. Always clean up spills and fix leaks immediately.



Pressure may be stored in the hydraulic system even after the power unit is turned OFF. Relieve hydraulic pressure and lockout the machine before conducting maintenance.



Hydraulic oil is under pressure. Spraying fluid from a leak can burn or penetrate the skin and cause serious injury. If fluid penetrates the skin, immediately seek medical attention to have it surgically removed!



The hydraulic components (pump, motor) and oil are hot during operation and can cause severe burns. Always wear protective face gear and clothing during operation and maintenance.

NOTE

Increasing factory hydraulic settings will void manufacturer's warranty.

When conducting maintenance on the hydraulic system be cautious of leaks, hot components (pumps, motors, relief valves) and stored energy. Always follow safety warnings and procedures when conducting maintenance on the hydraulic system.

Before Conducting Maintenance:

- Allow the machine to cool down
- Relieve pressure within the hydraulic system. Examples of where energy may be stored include: stalled feed wheels, suspended loads, charged accumulators, and electric voltage
- Check for leaks. Use a piece of cardboard to check for leaks
Never use your hand!

The hydraulic system provides the fluid that powers certain parts of the machine's operation. The main components requiring maintenance includes the hydraulic oil, filter, and pump.

Hydraulic Oil

The hydraulic oil should be tested every 250 hours or if there are signs of oil degradation. Signs of degradation include:

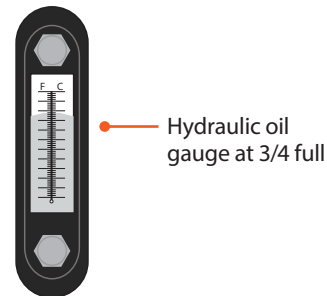
- A change in oil color
- Bad aroma to the oil
- Dirty or gritty feel to the oil
- Regular hydraulic component failure
- Louder than normal operation sound

The oil quality may be checked using a commercially available test kit or a simple Blotter Spot test. The Blotter Spot test consists of placing a drop of oil on a piece of blotter paper. If the blotter remains colorless or develops only a light yellow ring, oxidation is under control. Even when color develops but is uniform throughout, the oil is serviceable. If the sample shows distinct rings,

the fluid should be changed. When a dark spot remains in the middle but lighter-colored oil migrates outward in the blotter paper, the oil has or is about to dump sludge or other products into the system. This indicates that the time for fluid replacement has passed.

Under normal conditions hydraulic oil should be changed every 2000 operating hours or yearly, whichever comes first. In more severe conditions it should be changed every 1000 hours or six months. Always use hydraulic oil that contains anti-wear additives. Always keep the level of oil in the tank at 3/4 full. Failure to do so can result in air getting into the pump, a reduction of oil pressure, and slow operation.

● ● ● Figure 4.16



Hydraulic Oil Filter

The hydraulic oil filter should be replaced after 500 hours of operation or when the hydraulic oil is changed. Always use a filter rated at 10 micron.

Hydraulic Oil Pump

The hydraulic pump is critical to the operation of the chipper. Operators should always be alert for possible problems with the pump during operation. Symptoms indicating problems with the pump include (see Table 4.6):

- A noisy pump
- Overheating
- High discharge pressure
- Pump not pumping
- Low system pressure
- Sluggish start-up

Troubleshooting the hydraulic system involves talking with the operators, understanding the schematics, and inspection of the machine. After identifying the problem determine the root causes. It is possible there is more than one cause of the malfunction.

Start by creating a list of possible causes. Put the easiest ones to eliminate and do not require dis-assembly or down time first. Systematically test, eliminate, or repair possible causes.

Initiate corrective action to avoid future maintenance problems and operation downtime.

Table 4.5 • Hydraulic System Maintenance Schedule

Item	Maintenance	Schedule
Oil	Maintain level at 3/4 full	Daily or as needed
	Test	250 hours or signs of degradation
	Change (under normal conditions)	2,000 hours or yearly
	Change (under severe conditions)	As needed
Filter	Replace (with filter rated 10 micron)	400 hours or with change
Pump	As needed	See troubleshooting chart
Hoses & Fittings	Replace	When worn or damaged

Table 4.6 • Hydraulic Pump Troubleshooting Guide

Symptom	Possible Cause	Corrective Action
Noisy Pump	Air in the system	Tighten loose fittings. Replace cracked hoses and damaged parts. Maintain hydraulic oil level in tank. Keep 3/4 full.
	Cavitation (vacuum in pump)	Open clogged or restricted intake line or plugged air vent in tank.
	Loose or worn parts	Replace worn gaskets. Ensure the oil is the proper type and clean.
	Stuck pump vanes, valves, pistons	Dis-assemble pump and clean with solvent and dry thoroughly before reassembling. Do not use hard tools, files, or emery cloth on machined surfaces. Replace rusted parts.
	Pump/Drive misalignment	Maintain constant oil temperature.
Overheating	Outside temperature thickens oil	Use oil with higher viscosity index. See fluid manufacturers recommendations.
	Low oil	Maintain hydraulic oil level in tank. Keep 3/4 full.
High discharge pressure	Parts misalignment	Check parts for excessive friction. Replace if necessary. Ensure all parts are aligned.
Pump not pumping	Shaft turning in wrong direction	Shut the machine off immediately! Replace existing pump with one that turns in the correct direction.
	Intake clogged	Clean tank and maintain oil at 3/4 full.
	Air leak in intake	Tighten or replace fittings, hose, or damaged parts.
	Oil too thick	Drain tank and replace with oil of the proper viscosity.
Low system pressure	Relief valve setting too low	Block pressure line beyond relief valve and check line pressure with a pressure gauge, adjust relief valve setting so fluid flows to point of use.
	Relief valve stuck open	Clean dirty relief valve. Check oil for dirt and deterioration. Change if necessary.
	Broken, worn, or stuck parts	Block pressure line beyond relief valve and check line pressure with a pressure gauge. No pressure buildup and functional relief valve indicate mechanical problems. Inspect pump for worn or broken parts. Replace if necessary.
	Valves sticking or binding	Check oil for deterioration (e.g.: dirt, sludge, varnishes, and lacquers). Change if necessary.
		Inspect pump parts for misalignment, wear, or damage. Replace if necessary.
Sluggish start-up	Oil too thick at starting temperature	Run the machine for short period and see if the oil thins out. If not, change the oil to a lighter viscosity. See fluid manufacturers recommendations.

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Engine

**WARNING**



Wood dust and chipping material in the engine area may ignite and result in fire, burns, or serious injury. Clean the engine area before operation of the machine and when excessive material build-up occurs. Do not clean the engine area with the engine running!

Sparks can occur if blade strikes rocks, metal, or other hard objects. Do not use in high/very high fire hazard severity zones. Operation of this equipment may create sparks that can start fires around dry vegetation.

A Spark Arrestor may be required. The operator should contact local fire agencies for laws or regulations relating to fire prevention requirements.

Refer to the engines OEM manual for specific maintenance guidelines and procedures. Failure to follow the engine OEM guidelines and procedures may result in a void of the engine OEM warranty.

The engine area should be cleaned before every use and if there is excessive material build-up (wood, dust, chips) during operation. Always turn the engine OFF before cleaning the engine area.

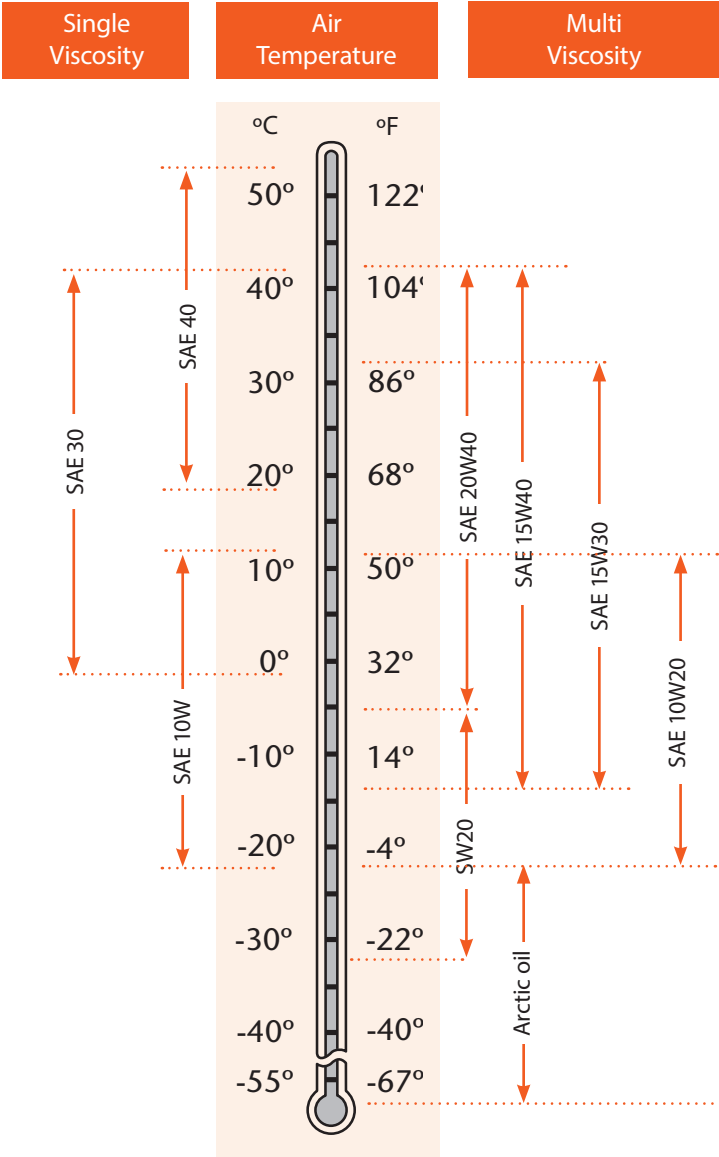
Engine Oil

Refer to the engine OEM manual for drain intervals. Quality engine oils are blended so additives are neither required or recommended. Match the choice of oil viscosity to the air temperature the chipper will be operating in (see Chart 4.1). Use only premium engine oils that meet OEM performance requirements.

Spark Arrestor

It may be illegal to operate this machine without an approved spark arrestor! Many localities require spark arrestors on naturally aspirated engines to reduce the risk of fire when working in areas where combustible vegetation exists. If you are unsure about the regulations in your area, check with local fire agencies before beginning work. Your Morbark dealer can provide information about a spark arrestor suitable for use with the power unit installed in this machine.

Chart 4.1 Oil Viscosity



Fuel



DANGER



Ignition sources (e.g: lit cigarettes, open flame, sparks, excessive heat) will ignite diesel fuel and result in burns or serious injury. Always stop the engine and keep away from ignition sources when refueling. Do not smoke while refueling!



WARNING



Ultra Low Sulfur Diesel (ULSD) poses a greater static ignition hazard than earlier diesel fuels with higher sulfur content. Avoid death or serious injury from fire or explosion. Consult with your fuel or fuel system supplier to ensure the delivery system is in compliance with fueling standards for proper grounding and bonding practices.

Fuel Specifications

Use No. 2-D diesel fuel (reference ASTM D975) under normal operating conditions. In extremely cold conditions No. 1-D diesel fuel is recommended. Refer to the engine OEM manual for specific information regarding the type of fuel to use. Always purchase the fuel from a reputable supplier. Sulfur content relates to fuel emission and control. ULSD or Ultra Low Sulfur Diesel has 15 ppm (part per million) is suitable for all diesel engines. LSD or Low Sulfur Diesel may have 500 ppm and permanently damage emission control equipment.

Ultra Low Sulfur Diesel (ULSD) Fuel Hazard

Ultra Low Sulfur and other components in ULSD fuel decreases its conductivity and increases its ability to store static charge. Refineries may have treated the fuel with a static dissipating additive. However, there are many factors that can reduce the effectiveness of the additive over time.

Static charges can build up in ULSD fuel while it is flowing through fuel delivery systems. Static electricity discharge when combustible vapors are present could result in a fire or explosion.

Therefore, it is important to ensure that the entire system used to refuel your machine (fuel supply tank, transfer pump, transfer hose, nozzle, and others) is properly grounded and bonded. Consult with your fuel or fuel system supplier to ensure the delivery system is in compliance with fueling standards for proper grounding and bonding practices and read OEM information on refueling ULSD fuel included in your packet.

Filling & Storage of Fuel

Fuel should be stored in approved containers and kept in a clean, protected environment. Avoid storing fuel over a long period of time. The fuel tank should be filled 3/4 full at the end of each days operation. This will help prevent condensation as the air cools and allow for vapor expansion when the temperature rises. The fuel could overflow if the tank is filled completely and there is an increase in temperature.

Tires



**WARNING!**



Over inflated tires may cause a tire to explode and result in serious injury or death. Always maintain a safe distance away from the tire during inflation. Use a hose with a pressure gauge. Never over inflate a tire!



Improper support of the chipper during a tire change may result in the machine tipping over and causing serious injury or death. Always set up on a flat, solid surface and ensure the machine is properly supported.

Maintaining proper air pressure in the machine's tires is critical to safe operation. Correct air pressure provides balance and stability during transportation and operation. Never exceed maximum inflation pressures when sealing tire beads on rims.

To add air to the tires remove the stem cap and place the air pump nozzle securely on the stem. Avoid twisting or bending the stem while adding air. Inflate the tire to the recommended pressure listed on the tire. After inflating the tire, replace the stem cap. Doing so will prevent loss of air pressure.

Repairing or replacing a tire should only be done by an individual that has the proper equipment and training. In the absence of either always have a qualified tire repair service conduct the maintenance. Detailed tire mounting instructions, including safety precautions, are available from the Rubber Manufacturers Association or the tire manufacturer.

The chipper comes with high-grade tires. Replace with a similar grade.

• • • Figure 4.17

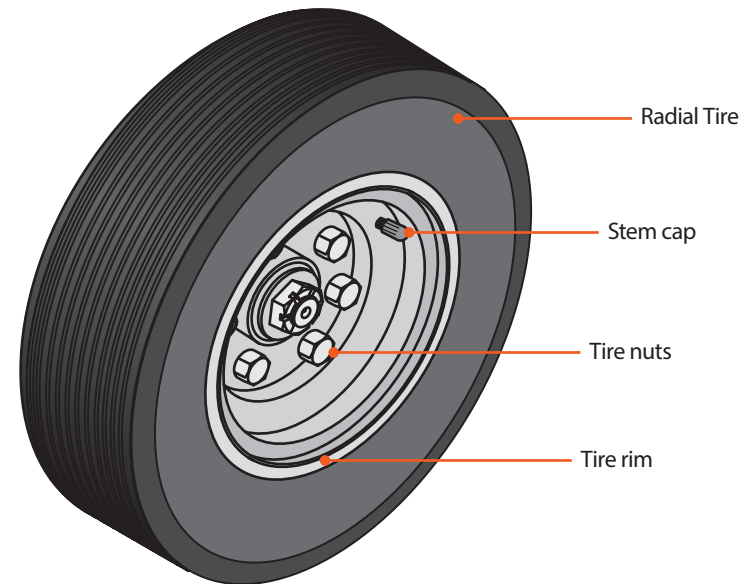


Table 4.7 • Chipper Troubleshooting Guide

Problem	Probable Cause	Corrective Action
Chipper will not feed properly	Dull chipper knives	Turn, sharpen, or replace knives
	Loose belts	Check for proper belt tension
	Knives ground at incorrect angle	Grind knives at 31°
	Obstruction in infeed spout	Raise the yoke and insert yoke lock pin. Turn OFF the engine and lockout the machine. Wait for the chipper drum to come to a complete stop. Carefully remove the obstructing material from the infeed.
Chipper bearing running to hot (210° F maximum)	Not enough or too much lubrication	Lubricate according to manufacturers recommendations
	Drum RPM too high	Do not exceed 2,484 RPM
Discharge spout plugged	Obstruction in discharge spout	Lower discharge or if equipped open clean out door and clean out
	Chipper drum RPM too low	Always run the chipper at full throttle when chipping
Chipper drum wobbles	Bushings are loose	Torque to 80 ft-lb
	Bearing cap is loose	Torque to 80 ft-lb
	Chipper bearings are worn or damaged	Replace bearings
	Knife pockets are plugged with material	Unplug pockets
Chipper drum will not turn	Obstruction in chipper housing	Turn OFF the engine and lockout the machine. Carefully remove the obstructing material from the chipper housing.
	Drum bearings have seized up	Check chipper bearings and lubricate or replace
Contaminates in chipper bearing	Loss of grease seal between Ler ring and shaft	Lubricate drum bearing Ler ring

Table 4.8 • Pressure Guide

Model	Main Relief	Feed Wheel RPM
		Top
Model 1215	2,000 psi	21-25

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Appendix A

ECCENTRIC LOCK COLLAR INSTALLATION PROCEDURE

NOTE: It is important to correctly install eccentric lock collars to avoid possible damage to components of your machine from occurring.

This procedure describes the correct way to install eccentric lock collars on to flange block and/or pillow block bearings. Refer to this procedure as required/where applicable when performing maintenance actions on your machine.

1. See Figures 1 and 2. Install eccentric lock collar onto shaft over inner race, as shown.
2. Manually rotate lock collar in the same direction the shaft turns during normal operation, until eccentrics are engaged.
3. See Figure 3. Insert drift pin in the blind hole of the lock collar.
4. Using a hammer, strike the end of the punch to further turn/tighten the lock collar (Note: Always tighten lock collar in the same direction the shaft turns during normal operation).
5. Refer to Torque Table below. Torque set screw per specification.

Eccentric Locking Recommended Torque		
Screw Size	Hex Size	Inch-Pounds
1/4-28	1/8	65 - 85
5/16-24	5/32	125 - 165
3/8-24	3/16	230 - 300
7/16-20	7/32	350 - 450
1/2-20	1/4	500 - 650
5/8-18	5/16	1100 - 1440

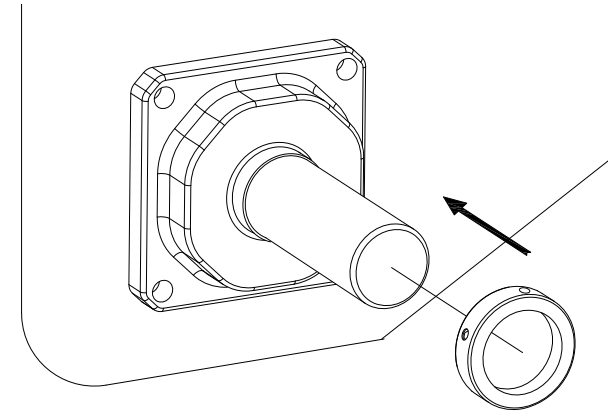


Figure 1



Figure 2

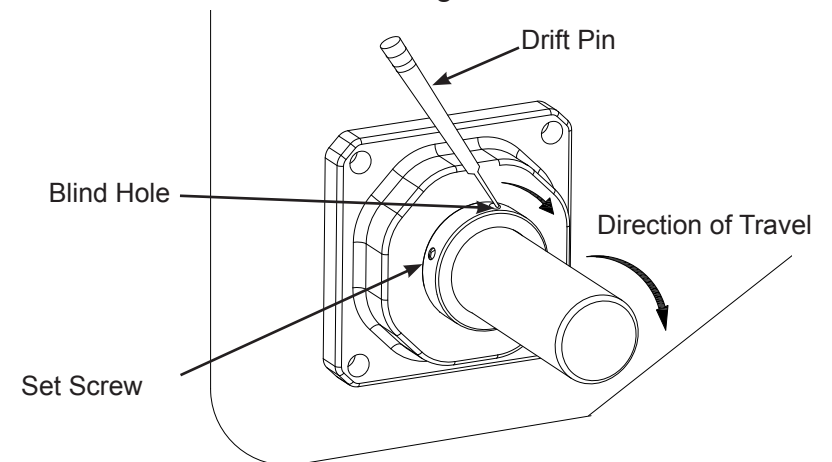


Figure 3

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