

# POWERHORSE™

## Owner's Manual

### M16620B

MODEL NUMBER: 16620

### Operation, Maintenance and Safety Instructions 3in. Chipper Shredder

Make sure you completely read and understand this manual before using the chipper/shredder for the first time. If you have any questions, contact Powerhorse Product Support 1-866-443-2576.

#### **⚠ WARNING**

**READ and UNDERSTAND this manual completely before using the chipper/shredder!** Failure to properly operate, and maintain this chipper/shredder could result in *serious injury or death* to the operator or bystanders.

All machines have hazards associated with their operation. This chipper/shredder has certain special hazards that you must be aware of. As an operator or owner you have a duty to be aware of these hazards and know preventive measures to avoid them. In particular, be aware of the following:

- Keep hands and feet away from inlet and discharge openings.
- Do not allow children under the age of 18 or untrained adults to operate.
- Wear eye protection and other personal protection against flying debris.
- Check that the chipper hood is secured and locked.
- Do not attempt to perform adjustments, declog or clean unit while engine is running.
- Make sure no children or bystanders are within 100 feet of chipping/shredding operation.
- Protect cars, windows and other objects within 100 feet from flying debris.
- Be aware of potential for carbon monoxide (CO) poisoning.
- Prevent fires/explosions from fueling by using precautions described.
- Avoid burns from engine by not touching hot exhaust.
- Avoid using in slippery, muddy, wet or icy conditions where falls may occur.

These and other hazards are in this manual and summarized at the end under “Important Safety Information.”

#### **STOP!**

**ASSEMBLY REQUIRED:** This product requires assembly before use. Some of the components in this unit are heavy and cannot be lifted by one person safely. Please plan on assembling this product when another person can be available to help out. See “Assembly” section for instructions.

**ADD ENGINE OIL & FUEL:** Engine is shipped without oil. DO NOT start chipper/shredder without first adding oil.

**INSPECT COMPONENTS:** Closely inspect to make sure no components are missing or damaged. See the “Receiving Your Unit” section for instructions on whom to contact to report missing or damaged parts.

**Any Questions, Comments, Problems, or Parts Orders**  
***Call Powerhorse Product Support 1-866-443-2576***

## Hazard Signal Word Definitions






	<p>This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.</p>
	<p>DANGER (red) indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.</p>
	<p>WARNING (orange) indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.</p>
	<p>CAUTION (yellow) indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.</p>
	<p>CAUTION (yellow) used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.</p>

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## **About Your Chipper/Shredder**

### **Owner/Operator Training**

Read and follow all instructions and safety precautions presented throughout this manual. A summary of important safety information can be found at the end of the manual. Keep this manual for reference and review. If the owner of this unit is different than the operator, give a copy of this manual to any operator.

Check the manual bag of the unit to make sure the chipper/shredder and engine manuals are inside. All persons to whom you loan this chipper/shredder must have access to these manuals. Advise all persons who will operate the machine to read them. You should also provide personal instruction on how to safely operate the chipper/shredder and remain available to answer any questions a borrower might have.

### **Engine Instructions**

For detailed engine operation and maintenance information, always refer to the specific engine Owner's Manual furnished with the chipper/shredder.

### **Product Suitability**

Your Powerhorse chipper/shredder has two modes of operation. 1) Chipping – The side chute is designed to only chip wood. A chipper knife is mounted on a revolving flywheel and converts branches fed into the chipper chute into “chips”. 2) Shredding – The top hopper is designed to shred items such as leaves, newspapers, and garden waste. Four five knife shafts rotate and force the shred through a screen. Make sure you completely read and understand this manual before using the chipper/shredder for the first time.

Before using, the user shall determine the suitability of this product for the job it will be used for. The user assumes liability for any non-intended or misuse of the product.

As is common with all manufacturers, Powerhorse is constantly improving its products. The specifications outlined herein, while believed to be accurate at publication, are subject to change without prior notice or obligation. Do not modify or alter this chipper/shredder. The purchaser and/or user shall assume the potential liability for any modification and/or alterations of this equipment from its original design and manufacture.

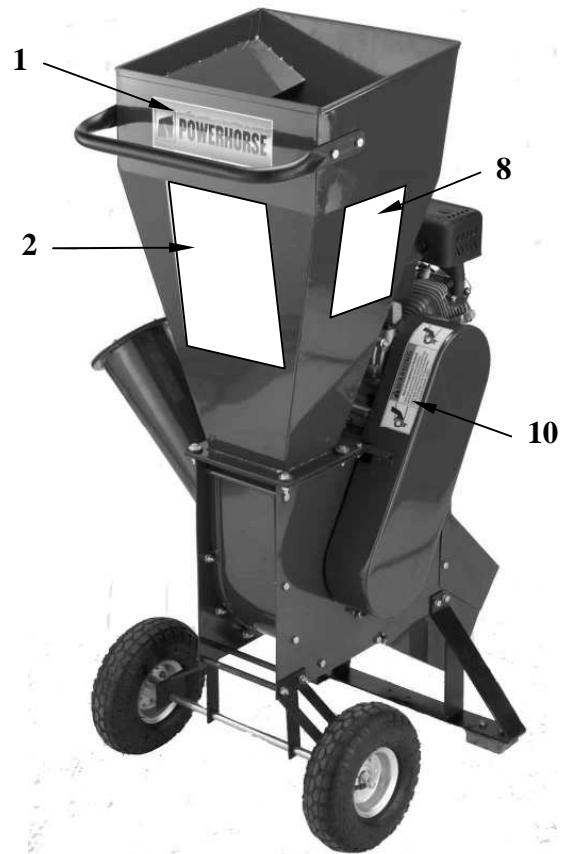
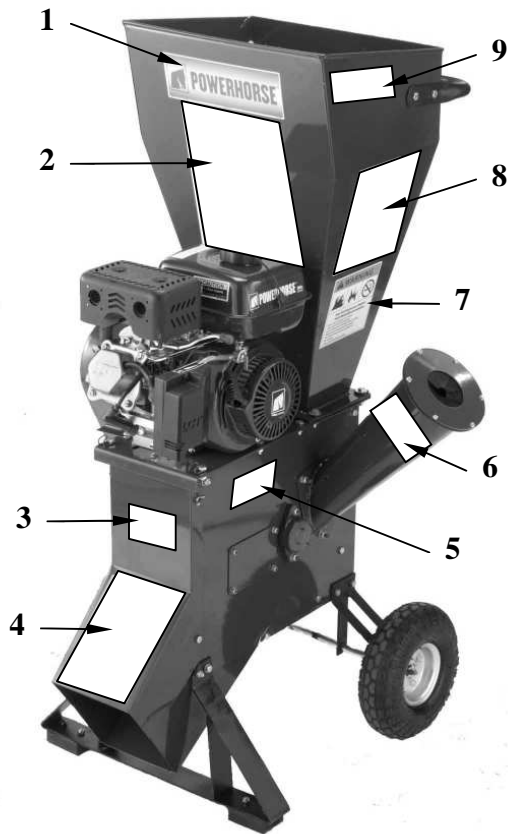
Contact Powerhorse Product Support 1-866-443-2576 for any questions about the appropriate use of this chipper/shredder or about optional accessories.

### **Warranty Registration**

Please fill out and retain the warranty statement located at the back of this manual for future reference.

## Safety Label Locations

The following safety labels appear on your chipper/shredder. These are warnings and instructions particularly important to proper safety and functionality. Other warnings and instructions also appear throughout this manual. Reading and understanding these labels below will expedite your safe use of the product. The labels on the machine will then serve to further remind you of important safety and operation procedures.



**To order Replacement Safety Labels  
call Powerhorse Product Support at 1-866-443-2576.**

### **⚠ WARNING: Replace Missing Labels**

ALWAYS make sure safety labels are in place and in good condition. If a safety label is missing or is not legible, order new labels.

## Safety Labels

Ref #	Part #	Description	Qty
1	785266 Decal Set	Powerhorse decal	2
2		Main warning	2
3		Danger discharge screen	1
4		Flying debris warning	1
6		Side feed hopper	1
7		Fire Hazard Warning	1
8		Danger infeed hazard	2
9		Top feed hopper	1
10		Belt entanglement warning	1
5		785254	Engine Instructions

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www.NorthernTool.com

Part No. 780307

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# WARNING

### General Precautions

DO NOT operate this machine unless you have read the operators manual, read decals, and have been thoroughly trained in safe operating procedures.  
 If you are renting the chipper, your rental agent should provide you with personal instructions and make sure that both the engine and chipper owner's manuals are attached to the unit.  
 Keep children away. Chipper should be operated only by property and fully trained adults.  
 Replace worn or unreadable labels or missing manuals.

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

### Personal Protection Equipment

Never attempt to use this machine without wearing proper personal protection per ANSI Z133 & OSHA 29-1910.  
 It is recommended that you wear the following:

- \* No gloves or tight fitting work gloves without cuffs.
- \* Eye & face, ear & hearing protection.
- \* A protective helmet and sturdy non-slip footwear, preferably safety boots or shoes.
- \* Tight fitting and tucked-in clothing. No long sleeve shirts with button cuffs.
- \* No jewelry or clothing with stray straps or strings.



### Preparation for Chipping/Mulching

Precautions should be taken while using chipper in other areas where persons and property might be damaged by the discharge.



- \* Keep bystanders 25 ft from machine while in use.
- \* Ensure no foreign objects or tripping hazards are in the infeed area.
- \* Ensure all guards & covers are secure and in place.

### Operating Procedure

Operate this machine only after you have read the operators manual, read and understood the labels, and have been thoroughly trained in safe operating procedures.  
 Follow the Operating Procedure label for starting and operating the chipper components.  
 Wear recommended personal protective equipment.

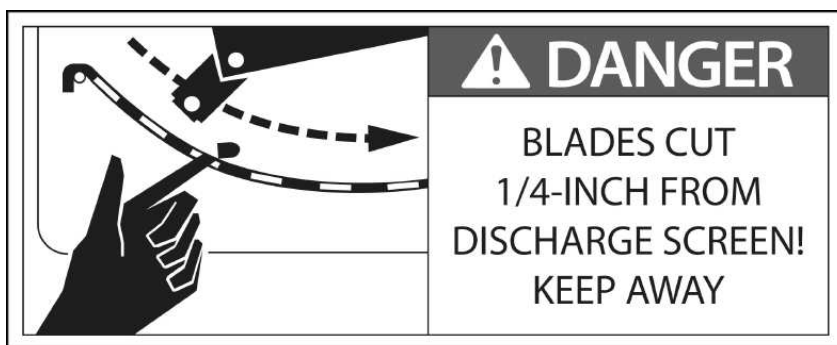



NO CUFFS

## Safety Labels

3



4



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### Engine Operation:

1. Follow all Job Site, Equipment, and Operator Safety Precautions. Read owner's manual & all decals before operating.
2. Start Engine following engine manual directions. Allow proper warm up period at idle speed before bringing engine to full speed.
3. Bring engine throttle up slowly. Listen for any sounds of foreign material in chipper (metal clanging sounds).
4. Set Engine speed at 3600 RPM

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### Chipping (Side Feed Hopper)

**Materials:** Wood products only!  
(Tree limbs, branches, etc.)

ALWAYS OBSERVE ALL SAFETY  
INSTRUCTIONS! (SEE OWNER'S MANUAL)

NOTE: IF YOU HAVE ANY QUESTIONS REGARDING THE SIZE AND  
TYPES OF MATERIALS THIS MACHINE WAS DESIGNED FOR,  
CONTACT YOUR LOCAL AUTHORIZED DEALER.

## Safety Labels

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<b>! WARNING</b>		
		
<p style="text-align: center;"><b>Fuel Fire/Explosion Hazard</b>  <b>Fuel is flammable and explosive.</b></p> <p>Never fuel a running or hot engine.            Clean up fuel spills immediately.            Ensure there are no fuel leaks before starting.            Keep sources of sparks and flames away.            Hot exhaust may also ignite spilled fuel.            No smoking.            Keep a fire extinguisher nearby.</p>		



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<b>! DANGER</b>	
<p><b>Infeed Hazard</b>  <b>No Hands, Arms, or Feet Inside the Hopper!</b>  <b>Serious Injury Or Death Can Result</b></p>	
<p>You can be drawn into the knives/flails if limbs catch gloves, hands, or loose clothing.            Long sleeve loose fitting shirts and jackets are not recommended.            Wear no gloves or wear tight fitting gloves without cuffs.            Do not reach or kick into feed hopper for any reason.</p>	
	

9

<h2 style="margin: 0;">Mulching (Top Feed Hopper)</h2>
<p><b>Materials:</b> "Shreddable" products only!            (Newspapers, leaves, straw, garden waste, etc.) No wood!</p>
<p>ALWAYS OBSERVE ALL SAFETY INSTRUCTIONS! (SEE OWNER'S MANUAL)</p> <p>NOTE: IF YOU HAVE ANY QUESTIONS REGARDING THE SIZE AND TYPES OF MATERIALS THIS MACHINE WAS DESIGNED FOR, CONTACT YOUR LOCAL AUTHORIZED DEALER.</p>

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<b>! WARNING</b>		
	<p style="text-align: center;"><b>Belt Entanglement Hazard</b></p> <p>KEEP belt guard closed while operating.            BEFORE opening guard: remove ignition key, spark plug, and disconnect positive battery cable.</p>	



# Receiving & Transporting

## Initial Inspection

You should inspect the chipper/shredder immediately after taking possession and before use. See the “Machine Component Identification” section of this manual for a diagram of the chipper/shredder and all its components.

If you have missing components, contact Powerhorse Product Support at 1-866-443-2576.



## Assembly Instructions



### WARNING

DO NOT attempt to start this machine until all assembly steps have been completed. Serious personal injury and damage to the machine and operators could occur.

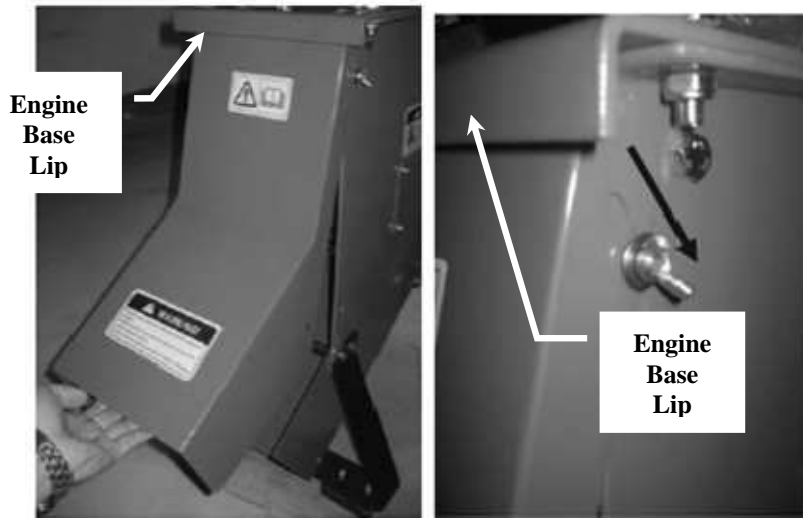
### Assembling the chipper/shredder:

<b>1. Engine off</b>	<p><b>IMPORTANT: Ensure chipper/shredder engine is off.</b> DO NOT attempt to start the chipper/shredder until all assembly steps have been completed.</p>
<b>2. Remove bolts</b>	<p><b>Tip the chipper/shredder over and remove the leg bolts and wheel assembly bolts shown in Pic.2.</b> DO NOT tip the chipper/shredder over once it has been filled with oil and gas.</p> <div style="text-align: center; margin: 10px 0;"> </div>
<b>3. Attaching the leg</b>	<p>Attach the leg with the bolts that were removed in Step 2.</p>
<b>4. Attaching the wheel assembly</b>	<p>Attach the wheel assembly with the bolts that were removed in Step 2.</p>
<b>5. Remove bolts</b>	<p>Remove the bolt, flat washer and nut on both sides of the discharge cover. Loosen the dishing nut M6 on both sides of the discharge chute.</p> <div style="display: flex; justify-content: space-around; margin-top: 10px;">   </div>

## Receiving & Transporting

### 6. Attaching the discharge cover

Attach the discharge cover under the engine base lip in the orientation shown.



### 7. Securing the discharge cover

Secure the discharge cover with the bolt, flat washer and nut removed from both sides of the discharge cover in Step 5. Tighten the dishing nut M6 on both sides of the chute that were loosened in Step 5.



### 8. Attaching the handle

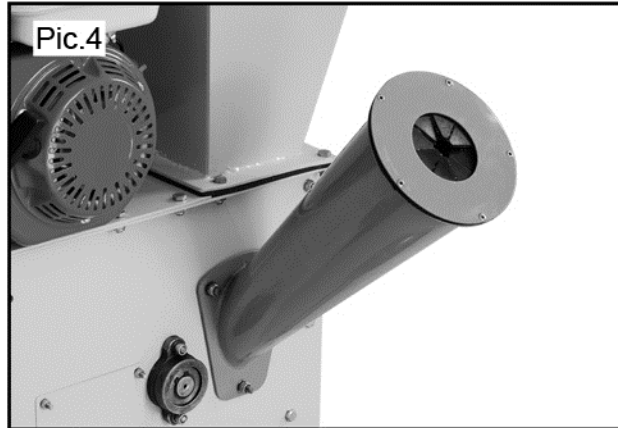
Place the handle on the hopper as shown below in Pic.3 and line up all of the holes. Secure the handle using M8 flat washers (4), M8 spring washers (4) and M8x20 bolts (4).



## Receiving & Transporting

**9. Attaching the chute assembly**

Place the chute assembly over the studs in the side of the chipper/shredder. Secure it using M8 flat washers (3), M8 spring washers (3) and M8 locknut (3).



**10. Pre-operation**

Before operating, fill the engine with oil and gas according to the instructions.

**CAUTION**

**This chipper/shredder does not ship with oil in the engine.  
Add oil before operating the chipper/shredder, or the engine will seize.**

## Moving Instructions



**WARNING**

The chipper/shredder is heavy. It can crush and cause serious injury if it rolls out of control or tips over. Follow the instructions below for safely moving the chipper/shredder.

**Moving the chipper/shredder:**

<b>1. Engine off</b>	<b>IMPORTANT: Ensure chipper/shredder engine is off.</b> Never move the chipper/shredder with its engine running
<b>2. Fuel valve off</b>	<b>Turn fuel valve off</b> to prevent carburetor flooding and reduce the chance of fuel leakage.
<b>3. Move chipper/shredder to work site</b>	<b>Move chipper/shredder by hand directly to chosen work site.</b>  (See “Before Each Use” section on selecting a work site)  <u>Important Safety Instructions:</u> <ul style="list-style-type: none"> <li>• <b>Hills.</b> Do not move the chipper/shredder up or down hills by hand.</li> <li>• <b>No riding.</b> Never allow anyone to sit or ride on the chipper/shredder.</li> <li>• <b>No cargo.</b> Never transport cargo on the chipper/shredder.</li> </ul>

# Operation

## 1. Pre-start Check List & Procedures

### **⚠ WARNING: High Energy Machine**

This is a high-powered machine. It has moving parts operating with high energy and at high speeds. Safe procedures must be used to avert serious injury or death. Unsafe operation will create serious hazards for you, as well as anyone else in the nearby area.

### **⚠ CAUTION: Add Oil to New Engine**

**A new engine is shipped without oil. Add engine crankcase oil to a new engine.** You must add the correct amount of oil to engine crankcase or engine will be damaged beyond repair.

Each time you get ready for a chipping/shredding session and before starting the engine you should follow these items:

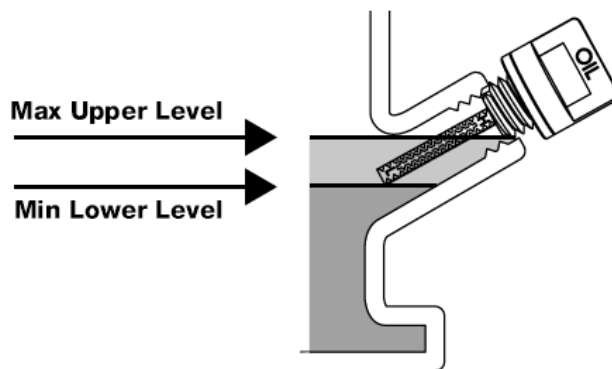
- Check/Add Engine Oil
- Fill Engine Gasoline Tank
- Inspect Fuel System for Leaks
- Wear Personal Protection
- Establish Safe Working Area
- Remove Hazardous Chipping Materials
- Only Work During Daylight

Each of these procedures is discussed below and in the engine manual.

#### **Check/add oil**

Check the oil level using the dipstick and add oil as needed daily.

Using a funnel, add oil up to the Max Upper Level.  
(See engine Owner's Manual for oil type and capacity, and more detailed oil check/fill instructions.)



### **⚠ WARNING: Burn hazard**

**Never open the oil fill port while engine is running. Hot oil can spray over face and body.**

## Operation

<p><b>Fill chipper/shredder fuel tank(s)</b></p>	<p>Check the fuel level in the chipper/shredder's fuel tank.          If needed, fill tank with fresh fuel from a portable container, after first reading the following warnings and instructions.          Do NOT fill the fuel tank to the top. Fuel may spill when operating on a slope.          Do NOT overfill the fuel tank. Allow at least 1 in. of empty space below the fill neck to allow for fuel expansion.</p>
	<p><b>⚠ WARNING: Gasoline fire/explosion hazard</b></p> <p>Gasoline is highly flammable and explosive. Heat, sparks, and flames can ignite gasoline vapors, which can become widespread during fueling. A flash fire ignition and/or explosion could result and cause serious injury or death. The following conditions could result in gasoline ignition/explosion:</p> <ul style="list-style-type: none"> <li>• Gasoline vapor collection inside enclosures</li> <li>• Static electric sparks</li> <li>• Sparks from electric wiring, batteries, or running engines</li> <li>• Sources of heat (such as a hot engine or exhaust)</li> <li>• Open flames, including pilot lights</li> </ul>
<p><b>Inspect Fuel System for Leaks</b></p>	<p>Inspect fuel system &amp; check for leaks BEFORE starting chipper/shredder.</p> <p><b>⚠ WARNING: Fuel leak hazard</b></p> <p>A leaking fuel line no matter how small can be the source of a fire or explosion when starting or operating the engine.</p> <p>Look for: Signs of leaks or deterioration, a chafed or spongy fuel hose, loose connections, loose or missing fuel hose clamps, a damaged gasoline tank, or a defective gasoline shut-off valve.</p> <p>If chipper/shredder is in an enclosed area and you smell gas, DO NOT start engine! DO NOT light a match. DO NOT flip on an electrical switch. Exit area immediately leaving doors open and call fire department for assistance.</p>
<p><b>Wear Personal Protection</b></p>	<p>Use approved protective clothing and approved protective equipment when using the machine.</p> <ul style="list-style-type: none"> <li>• Wear ANSI-approved and OSHA-compliant safety glasses with side shields and a hard hat.</li> <li>• Use of earplugs or another hearing protection device if working within 15-20 feet of the running chipper/shredder for longer than a few minutes. Hearing can be damaged from prolonged close-range exposure to the type of noise produced by this chipper/shredder.</li> <li>• Wear long pants to protect legs from flying debris and hot engine.</li> <li>• Wear gloves with no cuffs.</li> <li>• Never wear jewelry or loose-fitting clothing when starting or operating the chipper/shredder or any mechanical device. Loose or dangling apparel, jewelry or hair can become entangled in moving parts.</li> </ul>

## Operation

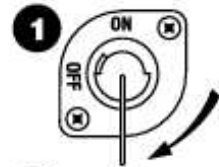
<b>Establish Safe Working Area</b>	<p>Layout a safe working area that best fits your project and/or situation by:</p> <ul style="list-style-type: none"> <li>• Using safety tools such as barricade signs, safety cones and caution tape.</li> <li>• Determining placement of equipment and brush pile (i.e., on or off the street) that will minimize interference with auto traffic.</li> <li>• Keeping children, pets and onlookers at a safe distance.</li> </ul>
<b>Remove Hazardous Chipping Materials</b>	<p>Thoroughly inspect the area where you will be working and remove all foreign objects.</p> <p>Look for rope, wire, etc. and remove these objects before chipping. (Inserting these objects into the chipper/shredder could damage the machine and/or cause injury)</p>
<b>Work During Daylight Hours</b>	<p>Use the machine only in daylight or in well-lit conditions. Never operate the chipper/shredder after dark.</p>

## 2. Starting the Chipper/Shredder

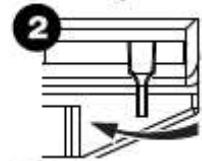
**For detailed engine operation and maintenance information, always refer to the specific engine's Owner's Manual furnished with the chipper/shredder.**

### Starting

Place the fuel valve to the ON position (if applicable).



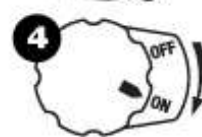
To start a cold engine, move the choke lever to the ON position.



Move the throttle lever away from the SLOW position, about 1/3 of the way toward the FAST position.



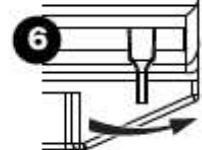
Turn the engine switch to the ON position.



Pull the recoil handle.



If the choke lever has been moved to the ON position to start the engine, gradually move it to the opposite position as the engine warms up.

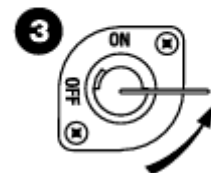
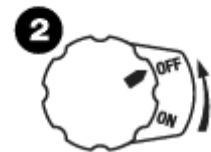


## Operation

<b>Warm-Up Checks</b>	<ul style="list-style-type: none"><li>• Slowly bring the engine throttle up.</li><li>• Listen for any unusual metal to metal sounds as chipper wheel is rotating.</li><li>• Listen for any belt squealing indicating belt needs to be tightened or replaced</li><li>• (Unusual sounds may mean a need for repair or cleaning out foreign material stuck in chipper. STOP engine and refer to “Maintenance and Repairs” section of this manual)</li><li>• If you don’t hear any unusual sounds, slowly bring engine up to full throttle. This should be at the FAST or RUN position.</li></ul>
<b>Normal Operation</b>	Operate the engine with the throttle in the FAST or RUN position and with the choke pushed fully to the RUN position. Proper chipping requires this fast revolution.

### 3. Stopping the Engine

- Move the throttle lever to the SLOW position and allow the engine to run slowly for cool down. This reduces the chance of backfire.
- Turn the engine switch to the OFF position.
- Turn the fuel valve lever to the OFF position.



#### **⚠ DANGER: Amputation Hazard**

Chipper knives will continue to rotate for a short time.

#### **⚠ WARNING: Fire Hazard**

Allow the engine to cool for at least 5 minutes before moving to storage. A hot engine can be a fire hazard.

# Operation

## 4. Feeding Material/ Clearing Jam

### Feeding Material

#### **DANGER: Amputation Hazard**

Never place your hands, feet or any part of your body in the chipper hopper, discharge opening, or near any moving part while the machine is running. If a feeding problem should occur shut the machine down and see Maintenance and Repair” section to address the problem.

#### **WARNING: Feed brush from the side of the chute**

Never stand directly in front of hopper opening. This will reduce the risk of you being caught and dragged into the machine.

#### **WARNING: Flying Debris Hazard**

Stones, chips, and debris can cause serious injury or property damage. Debris can fly 100ft. in any direction out of the chute and bounce off objects and hit operator, bystanders or breakable objects.

#### Chipping - Side Feed Chute

- This chipper is designed to accept wood only.
- Feed branches in butt end first to keep the chipper from getting jammed and to reduce the kickback of material.
- Let go of the material as soon as the knives get hold of it.
- Use a push stick to help feed small pieces and brush through the chipper to keep you at a distance from the machine’s moving parts. Do not push material into the chute with your hands or feet, pitch fork, etc. Lay shorter pieces on top of longer branches and feed them through the machine.
- Do not force material into the chipper. If the machine does not chip well, the chipper knife may need to be sharpened or replaced, or the belts may need to be replaced or tightened.
- Overloading the chipper chute will cause the rotor speed to decrease. If you hear the engine RPM decreasing, stop feeding material into the chute until the material already in the machine is chipped and the engine has returned to full speed.
- Never allow an accumulation of processed material to build up in the discharge area as this will prevent proper discharge and can result in kickback from the chipper chute.

#### Shredding - Top Feed Hopper

- This shredder is designed to accept “Shreddable” products only (NO WOOD).
- Place shreddable product in top feed hopper.
- Use a push stick to help feed small pieces through the shredder to keep you at a distance from the machine’s moving parts. Do not push material into the hopper with your hands or feet, pitch fork, etc.
- Overloading the shredder hopper will cause the rotor speed to decrease. If you hear the engine RPM decreasing, stop feeding material into the hopper until the material already in the machine is shredded and the engine has returned to full speed.
- Never allow an accumulation of processed material to build up in the discharge area as this will prevent proper discharge and can result in kickback from the shredder hopper.



## Operation

### Clearing Jam

#### **WARNING: Shut Off Engine to Clear Jam**

Before attempting to unclog debris or clear a jam: shut off the engine, disconnect spark plug wire, and wait for all moving parts to come to a complete stop.

1. Remove the top shredder hopper.
2. Wearing gloves and using a piece of wood, push/pull clogged material up and out of the knife rest area.
3. Reinstall top shredder hopper before operating.
4. Remove outlet body loosen bolts.
5. Expose the screen and loosen wing nuts.
6. Rotate screen expose blockage..

## 5. Refueling On Site

#### **WARNING: Static Electric Spark Hazard**

A static electric spark can explosively ignite gasoline vapor, resulting in a flash fire that could cause serious injury or death. See attached description of Static Electric Spark Hazards.

#### **WARNING: Hot Engines Can Ignite Fuel**

- Turn engine off and allow to cool for at least five minutes before removing fuel cap.
- Remove engine fuel cap.
- Add gasoline through the fill opening:
  - Use only an UL-approved portable gasoline container to transfer gasoline.
  - Follow the safety warning and instructions below for avoiding static electric sparking.
- Clean up gasoline spills /splashes immediately.
  - If possible, move the chipper/shredder away from spilled gasoline on the ground.
  - Wipe up spilled gasoline. Wait 5 minutes for gasoline to evaporate before starting engine.
  - Gasoline soaked rags are flammable and should be disposed of properly.
  - If gasoline is spilled on your skin or clothes, change clothes and wash skin immediately.
- Replace gasoline cap securely before starting engine.
- Store extra gasoline in a cool, dry place in an UL-approved, tightly sealed container.

## Operation

### 6. Refueling at Service Stations

To avoid static electric sparking while filling the gasoline tank at service stations:

- Never fill the chipper/shredder's gas tank directly from the fuel pump without grounding it. The chipper/shredder's tank is not grounded and high velocity flow from the pump can cause static electricity build-up and eventual ignition of gas vapors. Unless the chipper/shredder's gas tank has been grounded, use an approved portable container to transfer gas to the chipper/shredder's tank.
- Never fill a portable gas container while it is sitting inside a vehicle, trailer, trunk, or pick-up truck bed. ALWAYS place container on the ground to be filled.
- Keep gasoline nozzle in contact with container while filling. Do not use a nozzle lock-open device.
- Use a portable container made of metal or conductive plastic. This is preferred because it dissipates electrical charges to ground more readily.

### 7. Storing the Chipper/Shredder

#### Short Term

- **Cool engine before storage.**
- **Clean the chipper/shredder.**
- **Inspect for worn or damaged parts.**
- **Choose a covered storage location.**
- **Prevent accidental starting.**

#### Additional Long Term Procedures

- **Perform pre-storage maintenance (see below)**
- **Plan on exercising the engine regularly unless the chipper/shredder is prepared for long-term storage.**

#### Short Term Storage Procedures

<b>Cool engine</b>	<b>Let engine cool for at least five minutes before storing. A hot engine can be a fire hazard.</b>
<b>Clean chipper/shredder</b>	Clean any dirt, debris and other foreign matter from the machine, side chute and top hopper.
<b>Inspect chipper/shredder</b>	Inspect the machine for worn or damaged parts and tighten any nuts or screws that may have become loose.
<b>Choose a storage location</b>	Store the chipper/shredder in a location that is: <ul style="list-style-type: none"> <li>• Clean and dry.</li> <li>• Away from sources of heat, open flames, sparks, or pilot lights, even if the chipper/shredder's gas tank is empty. Residual gasoline could ignite.</li> <li>• Away from extreme high or low temperatures.</li> <li>• Covered for extra protection</li> </ul>
<b>Remove spark plug wire(Long-Term Storage)</b>	Remove spark plug wire in order to ensure the chipper/shredder cannot be started in a storage location or by untrained persons or children.


# Operation

## Additional Long Term Storage Procedures

If you have been using your chipper/shredder regularly, this is a good time to perform your regular maintenance before storing your unit.

<b>Perform pre-storage maintenance</b>	<ul style="list-style-type: none"> <li>• Change the oil.</li> <li>• Change the fuel filter.</li> <li>• Clean or replace the air filter. (see Engine manual)</li> <li>• Lubricate all grease fittings (see “Maintenance &amp; Repair: Lubrication”).</li> <li>• Check drive belt for wear and chipping knife, shredding knife, shredding hammer for nicks and wear (see “Maintenance &amp; Repair”).</li> </ul>
<b>Start chipper/shredder every 4 weeks</b>	<p>The chipper/shredder should be started regularly. At least every four weeks, start the engine and let it run for 10 to 15 minutes.</p> <p>Monthly exercising of the chipper/shredder will dry out any moisture that has accumulated, lubricate cylinders, and clean out old gas in the carburetor. Moisture, old gas and dry mechanical parts cause deterioration and hard starting of stored engines.</p> <p>Completely fill the tank with fresh, unleaded gas and add the appropriate amount of stabilizer or gasoline additive. Run the engine for a short time to allow the additive to circulate. Close the fuel shut-off valve to prevent carburetor overflow and potential leakage.</p>
<b>Prepare engine for long term (seasonal) storage if needed</b>	<p>If you will not be able to start the chipper/shredder regularly, you must prepare the engine for long term storage to prevent gum deposits from forming and causing malfunction of the engine.</p> <p>Prepare engine for long term storage by:</p> <p>Removing all gasoline from the tank and carburetor OR Adding fuel stabilizer to the gasoline (following manufacturer’s instructions)</p> <p>Fuel stabilizer steps:</p> <ul style="list-style-type: none"> <li>• Ensure gas tank is full.</li> <li>• Add fuel stabilizer to fuel tank.</li> <li>• Run engine at least 10 minutes after adding stabilizer to allow it to enter the fuel system.</li> <li>• Shut off engine</li> <li>• Disconnect spark plug wires and remove spark plugs.</li> <li>• Add one teaspoon oil through spark plug holes.</li> <li>• Place rag over spark plug holes and turn starter a few times to lubricate the combustion chamber.</li> <li>• Replace spark plug, but do not reconnect the spark plug wire.</li> </ul>

## Operation

** WARNING: Gasoline fire/explosion hazard**

Gasoline is highly flammable and explosive. Drain the fuel into an approved container OUTDOORS and far away from open flame. NEVER store an engine with fuel in the tank indoors or in poorly ventilated spaces where fuel vapor can come in contact with:

- Static electric sparks
- Sparks from electric wiring, batteries, or running engines
- Sources of heat (such as a hot engine or exhaust)
- Open flames, including pilot lights

## Maintenance and Repair

### **WARNING**

ALWAYS shut off the engine, make sure the engine is cool, and disconnect the spark plug before cleaning, adjusting, or servicing the chipper/shredder. Make sure all guards and shields are replaced before using.

<b>Maintenance safety rules</b>	<p>Read and follow these safety rules whenever you will be servicing the chipper/shredder:</p> <ul style="list-style-type: none"> <li>• <b>Turn off chipper/shredder.</b> Always turn off chipper/shredder and remove spark plug before working on the engine or chipper/shredder.</li> <li>• <b>Replace guards/shields.</b> Make sure all guards and shields are replaced after servicing the chipper/shredder.</li> <li>• <b>Burns.</b> Muffler may be hot even if unit is stopped. Allow unit to cool before servicing.</li> <li>• <b>Repair.</b> Major service, including the installation or replacement of parts, should be performed only by a qualified service technician. Obtain factory approved parts from Powerhorse Product Support at <b>1-866-443-2576</b>.</li> <li>• <b>Replacement parts.</b> If a part needs replacement, only use factory-approved repair parts. Replacement parts that do not meet specifications may result in a safety hazard or poor operation of the chipper/shredder and will void the warranty.</li> <li>• <b>After servicing.</b> Make sure all tools and wrenches have been removed. Start engine and run chipper/shredder at low RPM. Listen for any metal against metal noise or squealing noises from belts. If you should hear any foreign noise stop engine and solve problems. Re-start and slowly bring engine to full RPM and run for 10 minutes to assure that repair was successful.</li> </ul>
<b>Engine maintenance</b>	<p>Perform engine maintenance as specified in the engine owner's manual. Engine maintenance items include:</p> <ul style="list-style-type: none"> <li>• Lubrication</li> <li>• Oil and oil filter changing</li> <li>• Air filter check/replacement</li> <li>• Spark plug cleaning and replacement</li> <li>• Fuel filter check/replacement</li> <li>• Fuel tank cleaning.</li> </ul>
<b>Fuel system leak checks</b>	<p>Inspect the fuel system and check for leaks on a regular basis. Look for: signs of leaks or deterioration, chafed or spongy fuel hose, loose connections, loose or missing fuel hose clamps, damaged gasoline tank</p>
<b>Checking and adjusting belt tension</b>	<p>Drive Belts: Check and adjust according to <b>pg. 24</b>.</p>

## Maintenance and Repair

### 1. Chipping Knives

There are chipping knives that are mounted on the large spinning knife rest/wheel which drives the knives past the incoming material at a high rate of speed and causes the “chipping” action. Routine inspection of the chipping knives for sharpness will ensure the chipper/shredder is operating at full efficiency. Operating with a worn or damaged knife will cause extreme stress and vibration to the machine and make chipping difficult for the operator.

While the chipper knives are made from the highest grade of chipper steel, which is heat treated and ground to a very sharp edge, their life is relative to what they chip. They may dull the first day or last for months. The life span depends on the amount of dirt and rocks that enter the chipper. Sometimes trees will have nails or wire embedded into the surface.

Knives should be checked for damage before each use. They should be turned or changed as necessary. Dull knives:

- Cause excessive fuel consumption.
- Cause unnecessary stress and strain on the machine.
- Produce poor quality chips.
- Reduce production rate slowing the feed rate.
- Actually wear further and faster.

To check, turn or change the chipper/shredder knives remove the side cover plate to expose the knives.

### Changing or Turning the Chipper Knives

<b>Chipper Knives</b>	<p><b>To turn or change the knives:</b></p> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"> <p><b>⚠ CAUTION:</b></p> </div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"> <p><b>Wear gloves while changing knives.</b></p> </div> <ul style="list-style-type: none"> <li>• Disconnect spark plug wire</li> <li>• Remove patch plate</li> <li>• Remove screen cover.</li> <li>• Rotate screen down.</li> <li>• Remove first chipping knife. Hold bolt heads stationary with 5mm hex wrench and loosen nuts with an open end wrench.</li> <li>• Clean the chipping knife and the chipping knife mounts on flywheel.</li> <li>• If the chipping knife has nicks or damage, replace the chipping knife or have it professionally sharpened.</li> <li>• Install all (3) knife bolts before tightening. Hold bolt heads stationary with 5/16in. hex wrench and tighten nuts to 20 ft. lbs.</li> <li>• Repeat the process for the second chipping knife.</li> </ul>
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## Maintenance and Repair

### 2. Shredding Hammers/Knives

There are four shafts attached to the flywheel. Each shaft has 5 hammers/knives. As the large spinning wheel rotates, the hammers/knives rotate and pulverize the shreddable material. The material is broken down and passes through the shredding screen and exits the machine. Routinely inspecting the hammers/knives and shredder screen for damage will ensure the shredder is operating correctly. Operating with a worn or damaged hammers/knives or shredder screen will cause extreme stress and vibration to the machine and make shredding less efficient.

The shredding hammers/knives life is relative to what they shred. Non-shreddable items like wood or rocks that enter the shredder will shorten the life of the hammers/knives and shredder screen.

Hammers/knives should be checked for damage before each use. They should be turned or changed as necessary. Damaged hammers/knives:

- Cause excessive fuel consumption.
- Cause unnecessary stress and strain on the machine.
- Reduce the production rate.

### Changing or Turning Shredding Hammers/Knives

#### Shredding Hammers and Knives

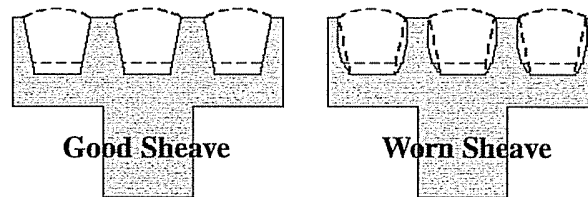
- Disconnect spark plug wire
- Remove shredder hopper and chipping chute.
- Use punch and hammer to remove spring pin from end of shaft.
- Slide shaft out through chipping chute hole.
- Turn or replace hammers/knives.
- Re-install shaft through hammers/knives and spacers.
- Secure shaft by re-installing the spring pin.
- Repeat for remainder of shafts.

## Maintenance and Repair

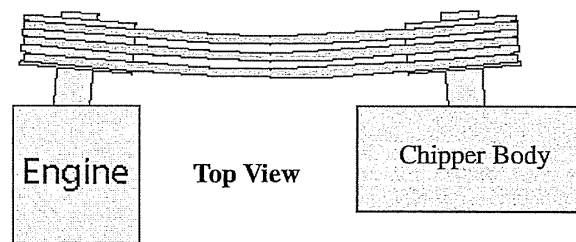
### 3. Belt and Sheave Care

Proper belt tension and sheave alignment is vital to chipper/shredder performance. Here are a few problems that can occur when belts and sheaves are not properly maintained or cared for.

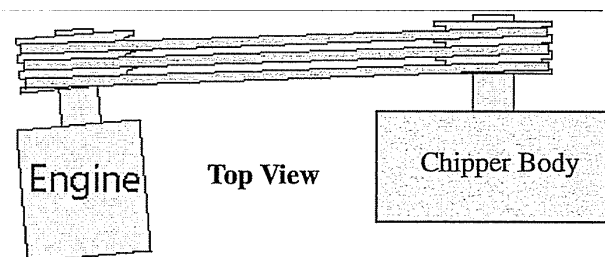
Loose Belt: A loose belt will slip and then glaze over. Once this happens the belt will not transmit power to the knife rest which can cause the chipper/shredder to clog and also cause excess sheave wear.



Over-tightened Belt: You can break the crankshaft of the engine from too much side load. Too much belt tension can cause premature bearing wear. When the belts are worn out from over-tightening they will cause the sheaves to wear.



Misaligned Sheaves: When sheaves are not aligned properly the belts will glaze very quickly and slipping will occur. This will also cause the belt to bounce or vibrate causing metal stress on the machine.





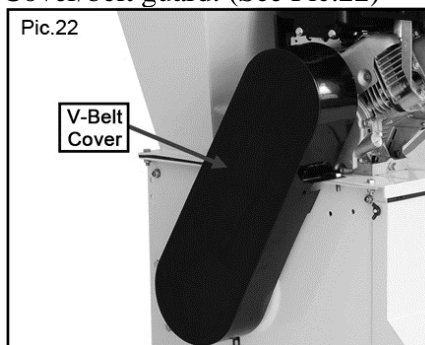
## Maintenance and Repair

### Chipper/Shredder Belt Tension Adjustment

*Note: Belt tension and alignment are inter-related. Do not adjust one without checking the other.*

#### **New Belt:**

1. Turn the engine off; allow all moving parts to come to a complete stop.
2. Disconnect the spark plug wire.
3. Remove V-Belt Cover/belt guard. (See Pic.22)



4. Loosen four engine bolts and slide engine towards flywheel shaft.
5. Remove old belt and install new belt
6. Pull engine away from flywheel shaft to tension belt. Proper belt tension is when 6.7 lbs of force at the mid-point of the belt results in a deflection of 1/4in.
7. Re-tighten engine bolts.
8. Replace V-Belt Cover/belt guard and reconnect the spark plug wire.

#### **To Retighten Belt:**

1. Turn the engine off; allow all moving parts to come to a complete stop.
2. Disconnect the spark plug wire.
3. Remove V-Belt Cover/belt guard. (See Pic.22)
4. Loosen four engine bolts and slide engine away from flywheel shaft to tension belt. Proper belt tension is when 4.6 lbs of force at the mid-point of the belt results in a deflection of 1/4in.
5. Re-tighten engine bolts.
6. Replace V-Belt Cover/belt guard and reconnect the spark plug wire.

*Note: Proper alignment is for the front and back of both sheaves (all 4 faces need to be in a straight line). Use a long straight edge to check alignment.*

#### **⚠ WARNING:**

Do not operate the machine without making sure all guards are in place after servicing.

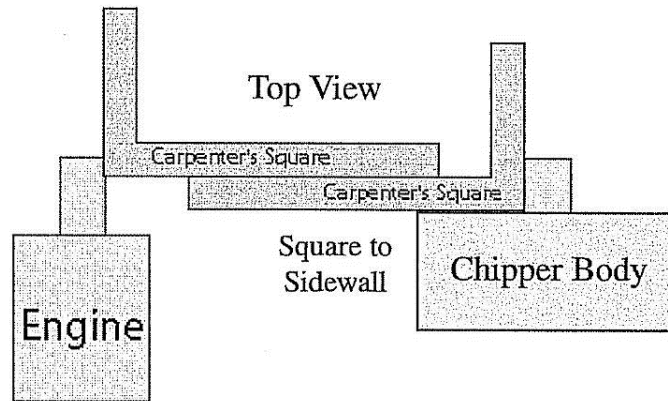
*Note: New belts require a “break-in” period of approximately 2 hours. Readjustment may be necessary after “break-in.”*

*Note: Use only factory recommended belts. Contact Powerhorse Product Support at 1-866-443-2576.*

## Maintenance and Repair

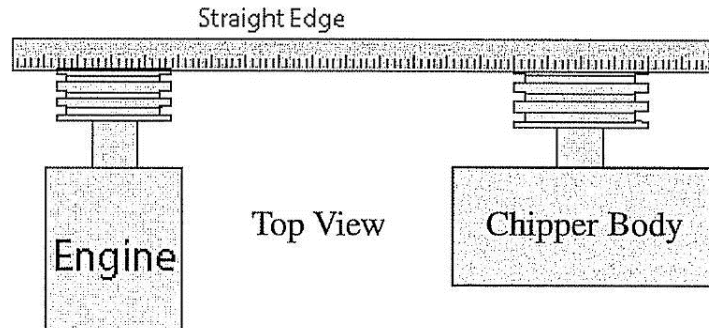
### Sheave Installation & Alignment

Before installing sheaves, make sure the chipper/shredder shaft and engine shaft are clean and square or parallel to each other. This can be done by using two large contractor's squares.



Assemble bushings into sheaves by leaving them loose, then slide them on the shafts and install the key. Be sure to consider belt guard and cover clearance.

Slide the sheaves on and off the shafts of the engine and chipper/shredder body as needed to make sure they are in line. Use a long straight edge to align them with each other.



Tighten all setscrews evenly.

Tighten belts keeping sheaves properly aligned.

## Maintenance and Repair

### 4. Maintenance Schedule

**⚠ CAUTION:**

Before attempting any maintenance, be sure that the engine is shut off and the spark plug wire is removed, and the engine is cool to the touch!

Item (What to check or action required)	Daily	Each Use	10 hours	40 hours	2x/year
Bearings, Shaft - Grease			X		
Bearings, Wheel – Grease					X
Belt Tension				X	
Bolts – Tightness		X			
Discharge Screen - Condition		X			
Engine – See manual					
Gasoline – Amount		X			
Knives, Washer, and Bolts – Condition		X			
Warning Decals – Legible	X				
Tires, Flaps – Condition	X				

**IMPORTANT:**

If a part needs replacement, only use parts that meet the manufacturer’s specifications. Replacement parts that do not meet specifications may result in a safety hazard or poor operation of the chipper/shredder.

**Contact Powerhorse Product Support at 1-866-443-2576  
for any questions, problems, or parts orders.**

## Maintenance and Repair

### 5. Troubleshooting

Symptom	Possible Cause	Possible Solution
Engine will not start.	<ol style="list-style-type: none"> <li>1. Control levers are not in correct positions for starting.</li> <li>2. Spark plug wire is not connected to the spark plug, or the spark plug is bad or loose.</li> <li>3. No gas, or gas is old and stale.</li> <li>4. Air filter is dirty.</li> <li>5. Engine oil is low.</li> <li>6. Blocked fuel line.</li> </ol>	<ol style="list-style-type: none"> <li>1. Make sure the ON/OFF switch is ON, the fuel shut-off valve is open, and the choke and throttle controls are in the start position.</li> <li>2. Connect the spark plug wire, replace the spark plug, or tighten spark plug.</li> <li>3. If empty, fill the tank. If full, drain the gas, then fill the tank with fresh gas.</li> <li>4. Clean out the air filter.</li> <li>5. Add oil to the engine.</li> <li>6. Clean out the fuel line.</li> </ol>
Engine does not run smoothly.	<ol style="list-style-type: none"> <li>1. Engine is warm, and the choke is still in the CHOKE position.</li> <li>2. Air filter is dirty.</li> <li>3. Stale fuel, water or dirt in fuel, blocked fuel line.</li> </ol>	<ol style="list-style-type: none"> <li>1. Move the choke to the RUN position.</li> <li>2. Clean the air filter.</li> <li>3. Drain the fuel tank, clean out the fuel line, and fill the tank with fresh gas.</li> </ol>
Engine overheats.	<ol style="list-style-type: none"> <li>1. Chips and sawdust around the motor.</li> <li>2. Dirty air filter.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean off the motor.</li> <li>2. Clean out the air filter.</li> </ol>
Machine vibrates or makes unusual noises.	<ol style="list-style-type: none"> <li>1. Loose or damaged parts.</li> <li>2. Knives have woody residue or chunks stuck to them.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the knives, hammers, and all connections. Tighten, repair, or replace any loose or damaged parts.</li> <li>2. Clean the knives.</li> </ol>
Chipper/shredder no longer chips or shreds well.	<ol style="list-style-type: none"> <li>1. Dull or damaged knives and hammers.</li> <li>2. Loose, worn, or damaged V-belt.</li> </ol>	<ol style="list-style-type: none"> <li>1. Sharpen or replace knives and check the hammers for damage.</li> <li>2. Replace or tighten V-belt.</li> </ol>
Chips do not come out of the discharge chute or come out slowly.	<ol style="list-style-type: none"> <li>1. Discharge chute or hopper is clogged.</li> <li>2. Insufficient motor RPM's.</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn <b>OFF</b> the motor, disconnect the spark plug, then clean out the machine</li> <li>2. Move the throttle to FAST.</li> </ol>

## Specifications

### UNIT

Length	36.22in.
Width	28.35in.
Height	55.90in.
Weight	178.50 lbs.
Tires, Size	10in.

### ENGINE

Size	Powerhorse 208cc OHV 4-stroke with low oil shutdown
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### CHIPPER (SIDE) CHUTE

Size	3in.
Feed Opening	3in.
Capacity	2 1/2in.

### SHREDDER (TOP) HOPPER

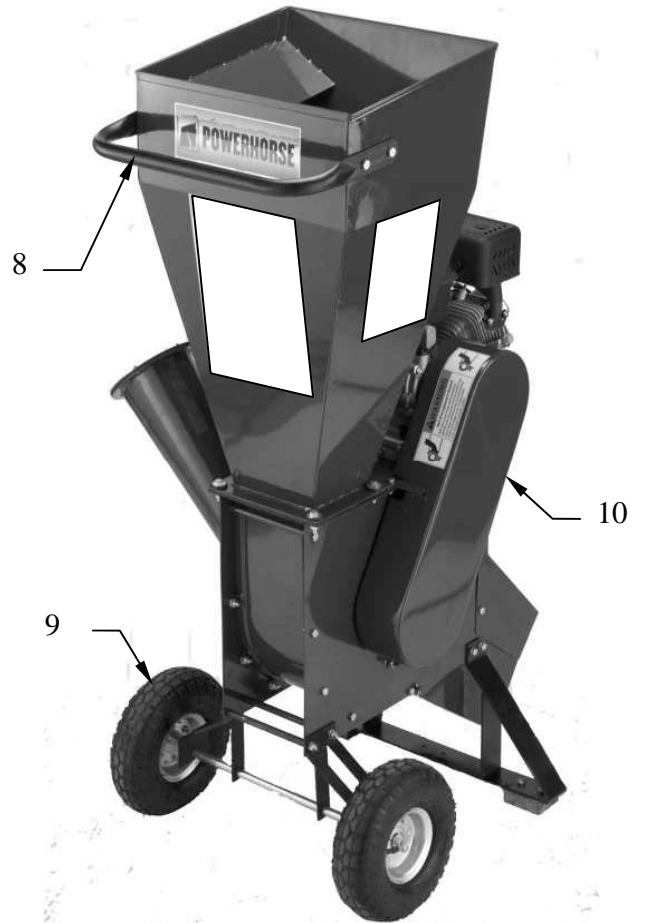
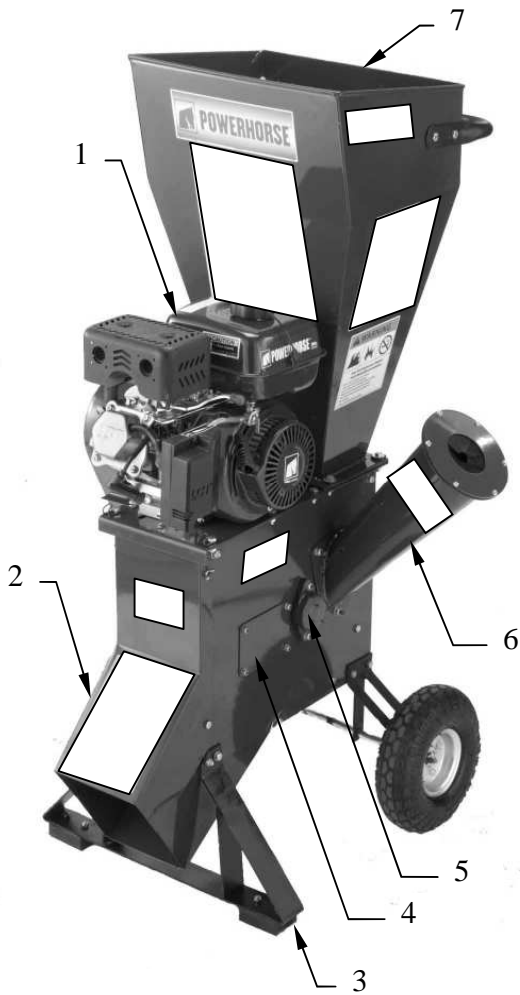
Size	7 1/2in. x 6 1/2in.
Feed Opening	6 1/2in. x 4 1/2in.

### KNIVES, HAMMERS

Chipping Knives	Qty. 2
Shredding Knives	Qty. 10
Shredding Hammers	Qty. 10

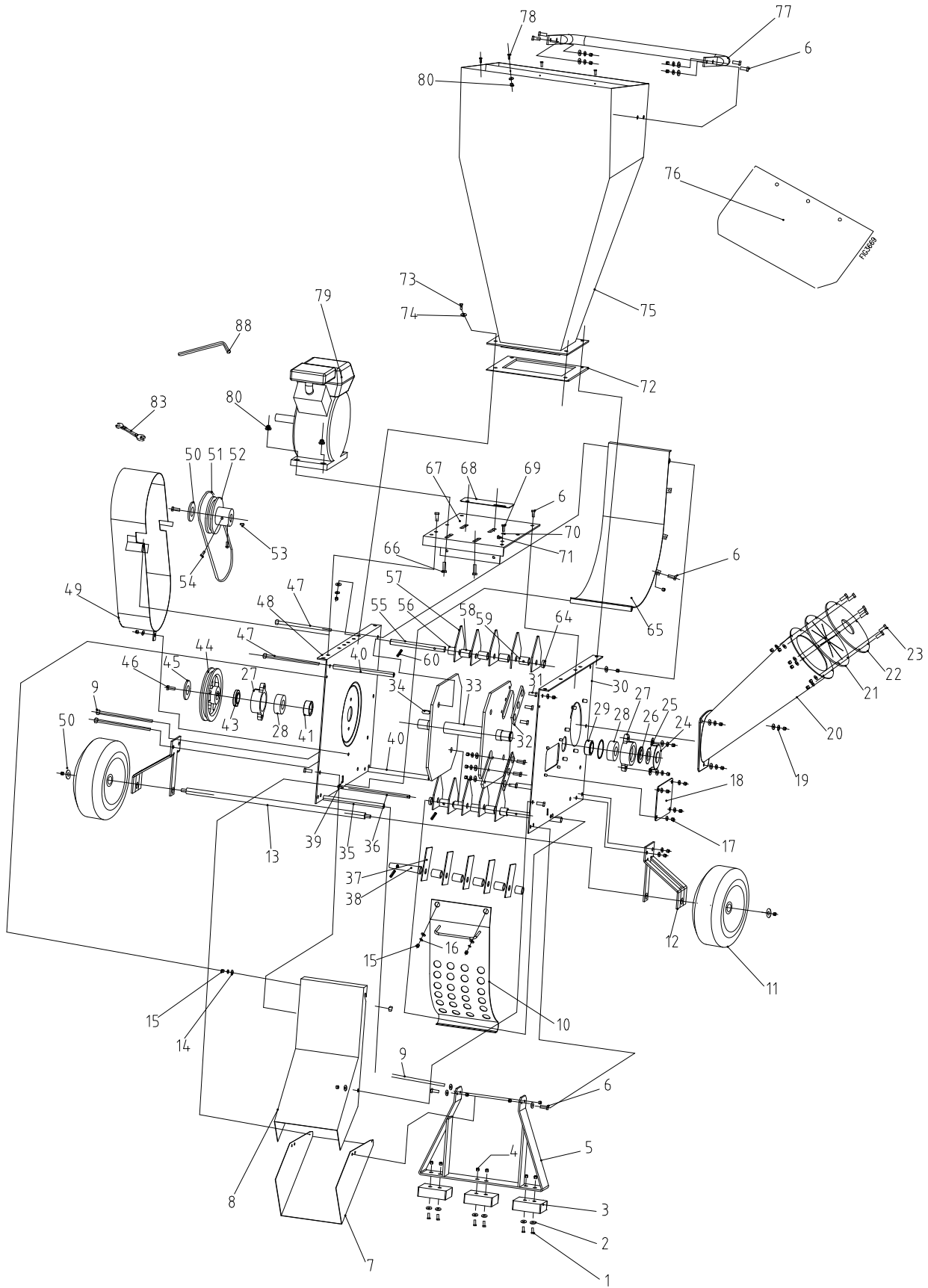
**Contact Powerhorse Product Support at 1-866-443-2576  
for any questions, problems, or parts orders.**

## Machine Component Identification



Ref #	Component	Description
1	Engine	Air cooled, gas engine operates at 3600 RPM.
2	Outlet	Debris exits the machine here.
3	Leg	Stabilizes the front of the unit to eliminate tipping.
4	Side Cover Plate	Allows access to the chipping knives.
5	Bearing	Bearings for the rotating knife rest.
6	Chipping Chute	Brush enters machine here for chipping. Maximum size is 2-1/2in. diameter.
7	Shredder Hopper	Brush enters machine here for shredding.
8	Handle	Used to tilt and move the unit.
9	Wheel	Allows for unit mobility.
10	Belt Guard	Prevents access to belts and moving parts

# 16620 Parts Explosion - Rev B



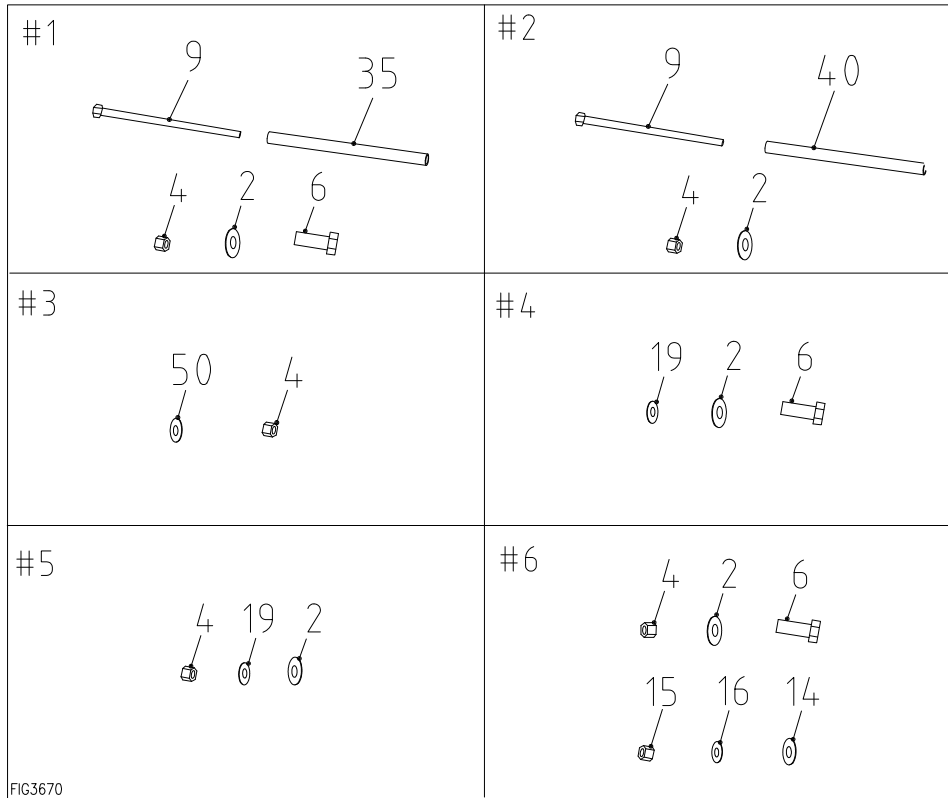
## 16620 Parts Explosion - Rev B

Item	Part #	Description	Qty	
1	785631	Screw M8x25 SHCS	4	
2	785632	Washer 8	49	
3	785633	Rubber Foot	2	
4	785634	Locknut M8	45	
5	785506	Front leg	1	
6	785635	Screw M8x20 HHCS	19	
7	785636	Discharge Chute	1	
8	785637	Discharge Cover Board	1	
9	785638	Bolt M8x200	3	
10	785639	Screen	1	
11	785640	10" Pneumatic Tire	2	
12	785641	Wheel Support	2	
13	785642	Axle	1	
14	82053	Flat Washer 6	4	
15	785643	Dishing Nut M6	4	
16	785644	Spring Washer 6	4	
17	785645	Locknut M6	4	
18	785646	Chipping Knife Cover Plate	1	
19	785647	Spring Washer 8	17	
19	785648	Spring Washer 8	4	
20		Chipper Chute	1	
21		Rubber Grid	1	
22		Cover Board	1	
23		Rivet 4x15	6	
24	785649	Bearing Cover	1	
25		Circlip	1	
26		Retainer Ring(Left)	1	
27		Bearing Seat	1	
28		Bearing	1	
29		Space Ring(Left)	1	
30	N/A	Box Frame Side Left	1	
31	785650	Screw M8x25	6	
32	785651	Chipping Knife	2	
33	785652	Knife Rest/Wheel	1	
34	785653	Flat Key 8x7x22	1	
35	785654	Support Tube 2	1	
36	785655	Knighthead	1	
37	785656 (2 kits)	Shredding Hammer	5	
38		Spacer 5	1	
55		Hammer Axle	1	
58		Spacer 3	3	
59		Spacer 2	1	
60		Spring Pin 5x25	1	
64		Spacer 1	1	
39		82139	Hatch Pin 1/8" x 1"	2
40		785657	Support Tube 1	3
27		785658	Bearing Seat	1
28	Bearing		1	
41	Spacer(Right)		1	
43	Space Ring(Right)		1	
45	Gasket 10		1	
46	Screw M10x15		1	

Item	Part #	Description	Qty	
44	785659	Big Pulley	1	
47	785660	Bolt M8x190	3	
48	N/A	Box Frame Side Right	1	
49	785661	Strap Cover	1	
51	785662	Strap	1	
6	785663	Screw M8x20 HHCS	1	
50		Gasket Ø8.4xØ24x2	3	
52		Small Pulley	1	
53	785664 (2 kits)	Flat Pin 4.78x5x40	1	
54			Screw M6x25	2
47		Bolt M8x190	1	
55	785665 785666 N/A	Hammer Axle	1	
56		Spacer 4	1	
57		Shredding Knives	5	
58	785667	Spacer 3	3	
59	82045	Spacer 2	1	
60	785668	Spring Pin 5x25	1	
64	785669	Spacer 1	1	
65		Rear Board	1	
66		Screw M8x40 Carriage Bolt	4	
67		Engine Plate	1	
68		Guard	1	
69		Screw M8x25 HHCS	2	
70		Taper Gasket 8	4	
71		Pothook	2	
72		785670	Hopper Gasket	1
73		785671	Screw M8x30 HHCS	4
74	785672	Rubber Grommet	4	
75	785673	Hopper	1	
76	785674	Hopper Guard	1	
2	785675	Washer 8	4	
4		Locknut M8	4	
77		Handle	1	
78	780150 785676 785677	Screw M8x16	3	
80		Nut M8	3	
79		Engine - LCT Powerhorse 208cc	1	
80	785678	Nut M8	4	
83		Wrench 10-13	2	
88		Spanner M6	1	
88		Spanner M6	1	



## 16620 Parts Explosion - Rev B



Kit Number and Description	Part Number	Item	Part Description	Qty
#1 Bracket Hardware Kit	785693	9	Bolt M8x200	1
		35	Support Tube 2	1
		6	Screw M8x20	3
		4	Locknut M8	4
		2	Washer 8	4
#2 Wheel Support Hardware Kit	785694	9	Bolt M8x200	2
		40	Support Tube 1	2
		4	Locknut M8	2
		2	Washer 8	2
#3 Wheel Hardware Kit	785695	50	Gasket Ø8.4xØ24x2	2
		4	Locknut M8	2
#4 Handle Hardware Kit	785696	6	Screw M8x20	4
		19	Spring Washer 8	4
		2	Washer 8	4
#5 Chipper Chute Hardware Kit	785697	4	Locknut M8	3
		19	Spring Washer 8	3
		2	Washer 8	3
#6 Discharge Cover Hardware Kit	785698	6	Screw M8x20	2
		4	Locknut M8	2
		2	Washer 8	2
		14	Flat Washer 6	2
		16	Spring Washer 6	2
		15	Dishing Nut M6	2

## Summary of Important Safety Information

This section provides a summary of the various safety procedures and measures that have been presented throughout the manual. Keep this summary handy and refer to it to refresh your memory about how to safely use your chipper/shredder.

### WARNING

Carefully read and make sure you understand the following safety information before using the chipper/shredder. Improper use or maintenance of the chipper/shredder can result in serious injury or death from amputation, lacerations, entanglement, burns, or fire/explosion. Damage can also occur to windows, siding, vehicles, and bystanders from chips and debris which can become projectiles.

### Prohibition Against Modifications

- **Never modify or alter the chipper/shredder in any way.** Modifications can create serious safety hazards and will also void the warranty.
- **Fuel/exhaust system.** Never modify the exhaust system, fuel tanks, or fuel lines. Carbon monoxide poisoning, fire, or explosion could result.
- **Engine.** Do not tamper with the engine's governor setting. Over-speeding the machine is dangerous and will cause damage to the engine and other moving parts of the chipper/shredder.
- **Guards.** Do not operate chipper/shredder unless all guards and cover shields, which prevent access to moving parts and entanglement and pinch points, are in place. Failure to guard the power transmission mechanisms may result in serious injury or death.

## Safety – Before Use

### General

- **Instruct operators.** The chipper/shredder owner or rental company must instruct all operators in safe chipper/shredder set-up and operation. Do not allow anyone to operate the chipper/shredder who has not read the Owner's Manual and been instructed on its safe use. Make sure Owner's manual is with the chipper/shredder.
- **Adults only.** Only trained adults should operate and service the chipper/shredder. Do not let children operate.
- **Under the influence.** Never operate, or let anyone else operate, the chipper/shredder while under the influence of alcohol, drugs, or medication.
- **Intended use.** Use this machine only for chipping wood and shredding shreddable items. Do not use for other purposes, as unforeseen hazards or equipment damage may result.
- **Controls and safety labels.** Learn how to use the machine and its controls safely. Understand and follow all safety labels. Replace any labels that are missing or have become unreadable.
- **Weather.** Never use in foul, bad or questionable weather, which causes a slippery ground condition.

### Getting Ready

- **Tripping.** Clear all brush and debris from work walking area to eliminate tripping hazards.
- **Flying debris.** Clear area of foreign objects such as wire, rope, etc. that could become caught in moving machine parts and ejected as a projectile. Inserting these objects into the chipper hopper could damage the flywheel and cause injury.
- **Operate OUTSIDE only – dangerous carbon monoxide exhaust!** Engines give off carbon monoxide exhaust, a poisonous gas that can kill. You CANNOT smell it, see it, or taste it. ONLY run chipper/shredder outdoors and away from building air intakes. NEVER run chipper/shredder engine inside homes, garages, sheds, or other semi-enclosed spaces. These spaces can trap poisonous gases.
- **Cooling ventilation.** The chipper/shredder needs adequate, unobstructed flow of air to allow for proper cooling of engine and chipper/shredder. Do not allow debris to accumulate and block airflow.
- **Transporting.** During transporting, take precautions to make sure chipper/shredder will not tip over and cause a fuel leak hazard. Never move, load or transport the chipper/shredder while the engine is running or flywheel is turning. Shut down the engine, wait for all moving parts to come to a complete stop, disconnect the spark plug and then wait five minutes before moving.

## Summary of Important Safety Information

- **Hot exhaust - fires.** Exhaust from engine can be extremely hot and cause fire. Position muffler at least 7ft. from combustible objects during operation.
- **Spark Arrestor.** Equip engine with a spark arrestor if chipper/shredder will be used near any ignitable forest, brush or grassy land. Make sure you comply with applicable local, state and federal codes.
- **Fire extinguisher.** Keep a fire extinguisher rated “ABC” by the National Fire Protection Association nearby. Keep it properly charged and be familiar with its use.
- **Passengers.** Never carry passengers or allow people to sit on the chipper/shredder while it is running or being transported.

### Personal Protective Equipment

- **Eye protection.** Wear ANSI-approved eye protection when operating the chipper/shredder.
- **Hearing protection.** The use of ear plugs or other hearing protection device is recommended for those in close proximity to the chipper/shredder while it is operating.
- **Head protection.** Wear a hard hat to protect your head from material that may be kicked out of the machine.
- **Hand protection.** Wear snug-fitting gloves. Do not wear gloves with loose cuffs.
- **Loose / dangling.** Loose or dangling apparel, jewelry or hair can become entangled in moving parts. Never wear jewelry or loose-fitting clothing when operating the chipper/shredder.
- **Long pants.** Wear long, heavy-duty pants to protect legs from ejected materials.
- **Sturdy Shoes.** Wear sturdy, non-slip shoes to help you keep a firm footing on the ground and reduce the risk of slipping and falling into the chipper/shredder. Do not use the machine while barefoot or wearing open sandals.

### Gasoline Safety

- **Gasoline is highly flammable and explosive.** You can be burned or seriously injured when handling fuel. Use extreme care when handling gasoline:
- **Fuel outdoors.** Fill fuel tank outdoors – never indoors. Gasoline vapors can ignite if they collect inside an enclosure. Explosion can result.
- **Use approved container.** Never pump fuel directly into engine at gas station. Static charge can build and ignite fuel. Use an UL approved fuel container to transfer gas to the engine.
- **Running / hot engine.** A running engine is hot enough to ignite fuel. Never add fuel or remove gas cap if engine is running or still hot. Stop the engine and allow to cool at least five minutes before adding fuel.
- **Heat / flames / sparks.** Keep sources of heat, flame, or sparks away while adding fuel.
- **Don't overfill.** DO NOT overfill the gas tank. Allow at least 1in. of empty space below the fill neck to allow for fuel expansion.
- **Replace cap.** Replace gas cap securely before starting engine.
- **Spills.** Clean up fuel spills immediately. Move chipper/shredder away from spilled fuel on the ground. Wipe fuel off engine and wait 5 minutes for excess fuel to evaporate before starting engine. Gas soaked rags should be disposed of properly.
- **On skin / clothes.** If gasoline is spilled on your skin or clothes, change clothes and wash skin immediately.
- **Inspect fuel system.** Check fuel system on a regular basis. Look for signs of leaks, deterioration, chafed or spongy fuel hose, loose or missing fuel hose clamps, damaged fuel tank, or a defective fuel shut-off valve. Do not start chipper/shredder until needed repairs have been completed.
- **Gasoline storage.** Store gasoline in a cool, dry place in an UL-approved, tightly sealed container away from children.

### Safety – During Use

- **Safety equipment / controls.** Always operate the chipper/shredder with all safety covers, guards, and barriers in place and in good working order, and all controls properly adjusted for safe operation.
- **Guard chipper discharge.** Never use the machine with the chipper hopper or discharge chutes removed.
- **Controls.** Stay in the OPERATOR POSITION while actuating controls.
- **Know how to stop.** Be thoroughly familiar with proper use of the equipment and all chipper/shredder controls. Know how to stop the chipper/shredder quickly.
- **Feeding branches.** Never stand directly in front of the hopper opening. Stand to the side of the chipping hopper when feeding brush into the chipper. Feed material only when chipper is operating at full operating speed.
- **Climbing on.** Never climb or sit on the chipper/shredder while it is running.

## Summary of Important Safety Information

- **“Bounceback”**. Keep your face and body away from the chipper hopper in the event of accidental bounce back of any material.
- **Slipping/Falling**. Operating in slippery, muddy, wet or icy conditions could lead to losing your footing and slipping or falling.
- **Damaged**. Do not operate the chipper/shredder with damaged, missing, incorrectly adjusted, or broken parts.
- **Check for gas leak before starting**. After opening gasoline valve, smell for gas before starting engine. If you smell gas, DO NOT start engine. DO NOT light a match. DO NOT flip on an electrical switch. Exit area immediately and call fire department.
- **Carbon monoxide exhaust**. The running engine gives off carbon monoxide, a poisonous gas that can kill you. You CANNOT smell it, see it, or taste it. If you start to feel sick, dizzy, or weak while using the chipper, shut off the engine and get to fresh air RIGHT AWAY. See a doctor. You may have carbon monoxide poisoning.
- **Other exhaust dangers**. This product contains or emits chemicals known to the State of California to cause cancer, birth defects or other reproductive harm. Avoid inhalation of exhaust.
- **Smoking/sparks**. Never smoke near the running chipper/shredder, and never operate near sources of sparks or flames.
- **Hot muffler**. Never touch hot muffler or hot exhaust manifold. Exhaust and engine parts can be very hot and will burn you.
- **Machine’s moving parts**. Keep hands, feet, and apparel away from knives, belts, flywheel, and other moving parts. Never remove any drive belt or guard while the unit is operating. Contact with belt or knives will cause personal injury.
- **Refueling**. DO NOT refuel the engine until it has cooled at least five minutes.
- **Malfunction during operation**. Always shut the machine off if any unusual noise or vibration occurs.
- **Vibration**. Overexposure to machine vibration on a daily basis may lead to circulatory or nerve damage.
- **Adjusting/repairing**. Always turn off chipper/shredder and remove spark plug or spark plug wire before working on the chipper/shredder to prevent accidental starting.

### Safety – After use

- **Cool engine before storing**. Let engine cool for at least five minutes before storing. A hot engine can be a fire hazard.
- **Shut off fuel supply**. Make sure gasoline shut-off valve is in the OFF position.
- **Prevent accidental starting**. When chipper/shredder is not in use, remove spark plug in order to ensure that chipper/shredder cannot be started in a storage location or by untrained persons.
- **Storage location**. Store the chipper/shredder in a dry location away from sources of heat, open flames, sparks or pilot lights – such as water heaters, space heaters, furnaces, clothes dryers, or other gas appliances – EVEN IF the chipper’s gas tank is empty. Residual gasoline could ignite.
- **Operate engine regularly**. Operate chipper/shredder engine every four weeks to dry out moisture that accumulated, lubricate cylinders, and clean out old gas in the carburetor. If chipper/shredder cannot be exercised on a regular basis, prepare chipper/shredder for long term storage.

### Safety - Inspection/Maintenance

- Inspect and maintain your chipper/shredder on a regular basis and repair as needed to keep it in safe working condition:
- **Turn off chipper/shredder**. Always turn off chipper/shredder and remove spark plug — to prevent accidental starting — before working on the engine or chipper/shredder.
- **Replace guards / shields**. Make sure all guards and shields are replaced after servicing the chipper/shredder.
- **Burns**. Do not touch hot muffler. Muffler may be hot even if unit is stopped. Allow unit to cool before servicing.
- **Replacement parts**. If a part needs replacement, only use parts specified by the manufacturer. Replacement parts that do not meet specifications may result in a safety hazard or poor operation of the chipper/shredder and will void the warranty.

## Special Safety Information on Static Electricity

### Static electricity and filling gasoline:

**Static electricity can initiate from ungrounded gasoline tanks or containers, from flowing gasoline, and from persons carrying a static electric charge.**

Static electricity can explosively ignite gasoline vapors that are present during the fueling process, resulting in serious burns to all nearby persons. To avoid static electricity while fueling, certain steps must be followed before and during the fueling process in order to minimize and safely dissipate static charge build-up.

### **Filling Portable Containers at Service Stations:**

**Use a portable container to fill chipper/shredder tank. Never fill the chipper/shredder's gas tank directly from the service station's fuel dispenser pump – the chipper/shredder's tank is not grounded and the high velocity flow of gasoline from a fuel pump can cause static electric build-up. Use an approved portable container to transfer gasoline to the chipper/shredder's tank.**

- ***Use a portable container made of metal or conductive plastic.*** It will dissipate charge to ground more readily.
- ***Fill container on the ground.*** Never fill the portable gas container while it is sitting inside a vehicle, trailer, trunk, or pick-up truck bed. ALWAYS place container on the ground to be filled.
- ***Touch a grounded metal object before starting.*** Always dissipate static charge from your body before beginning the fueling process by touching a grounded metal object at a safe distance away from fuel sources.
- ***Keep nozzle in contact with container.*** Keep fuel dispenser nozzle in contact with the portable container at all times while filling at a service station. Do not use the nozzle lock-open device on the dispenser hose.

### **About static electricity and fueling**

Many common objects can accumulate and retain a static electric charge. Objects made of non-conductive materials (e.g. plastics) easily accumulate and retain static electric charge, as can objects made of conductive material (e.g. metal, water) if they are not electrically grounded. The static electric charge on an object, such as a human body or plastic fuel tank/container, can reach as high as several thousand volts!

A static electric spark can be generated if the static electric charge stored on an object “jumps” to another, less charged object. Such a spark can ignite invisible gasoline vapors that are present during fueling situations.

### **Typical sources of static electric hazards during fueling**

The following objects can accumulate a static electric charge and cause an ignition spark in typical fueling situations:

**Ungrounded tanks/containers.** Any ungrounded fuel tank or container can accumulate a static electric charge as a result of contact with other objects or friction during transportation. This static electricity can discharge as a spark to the grounded gasoline dispenser nozzle, as the nozzle is first brought close to the tank/container at the beginning of the fueling process.

**Flowing gasoline.** Most people are not aware that gasoline accumulates static electric charge while flowing through a hose or pipe. This charge then transfers to and accumulates in the gas tank or container that is being filled. The total amount of charge accumulation depends on the amount of gas pumped into the container, the speed with which it is pumped, and whether or not the tank/container is grounded. If sufficient static electric charge accumulates in the fuel tank or container during the fueling process, the tank/container may discharge a spark to the grounded gasoline dispenser nozzle.

**Persons.** A person dispensing the gasoline can carry a static electric charge on their body, typically resulting from contact with their car seat or electronics. The static electricity can discharge as a spark between that person's hand and either the grounded dispenser nozzle or the fuel tank opening.

## Limited Warranty Policy

Dear Valued Customer:

The Powerhorse Product you just purchased is built with the finest material and craftsmanship. Use this product properly and enjoy the benefits from its high performance. By purchasing a Powerhorse product, you show a desire for quality and durability.

Like all mechanical equipment this unit requires a due amount of care. Treat this unit like the high-quality piece of machinery it is. Neglect and improper handling may impair its performance. Please thoroughly read the instructions and understand the operation before using your product.

### **Limited Warranty**

Powerhorse shall warranty any piece of equipment manufactured, or parts of equipment manufactured, to be free from defects in material or workmanship for a period of 2 years for noncommercial/nonrental use and a period of 90 days for commercial/rental use from the date of purchase by user. This warranty applies to the original purchaser of the equipment and is non transferable. Verification of purchase is the responsibility of the buyer. Parts will be replaced or repaired at no charge, except when the equipment has failed due to lack of proper maintenance. Any misuse, abuse, alteration or improper installation or operations will void warranty. Determining whether a part is to be replaced or repaired is the sole decision of Powerhorse.

**NOTE:** Some services performed by parties other than Powerhorse may void warranty.

**This warranty covers parts only. It will not provide for replacement of complete products due to defective parts. Components not manufactured by Powerhorse are guaranteed by their manufacturer and can be serviced at factory-authorized locations near you. Any costs incurred due to replacement or repair of items outside of a Powerhorse approved facility is the responsibility of the buyer and not covered under warranty. Powerhorse can supply you with the service center location in your area.**

This warranty specifically excludes the following; failure of parts due to damage caused by accident, fire, flood, windstorm, acts of God, applications not approved by Powerhorse in writing, corrosion caused by chemicals, use of replacement parts which do not conform to manufacturer's specifications, and damage caused by vandalism. Additional exclusions: loss of running time, inconvenience, loss of income, or loss of use, including any implied warranty of merchantability of fitness for a specific use.

Warranty does not cover items subject to normal wear such as tires, receptacles or any part subject to direct physical contact by the public. This warranty does not cover any personal injury or damage to surrounding property caused by failure of any part.

This warranty is in lieu of any other warranty expressed or implied and Powerhorse assumes no other responsibility or liability outside that expressed within this warranty.

Please fill in the following information and have it on hand when you call in on a warranty claim.

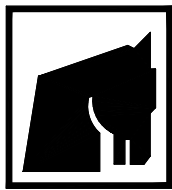
Customer Number: \_\_\_\_\_

Date of Purchase: \_\_\_\_\_

Powerhorse Serial Number: \_\_\_\_\_

Item Number : \_\_\_\_\_

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