

# DR<sup>®</sup> 21.00 PRO-XL CHIPPER W/SHREDDER

## SAFETY & OPERATING INSTRUCTIONS



Serial No. \_\_\_\_\_

Order No. \_\_\_\_\_

DR Power Equipment  
Toll-free phone: 1-800-DR-OWNER (376-9637)  
Fax: 1-802-877-1213  
Website: [www.DRpower.com](http://www.DRpower.com)

### **WARNING**

Read and understand this manual and all instructions before operating the DR Chipper w/Shredder.

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### *Conventions used in this manual*

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#### **DANGER**

This indicates a hazardous situation, which, if not followed, will result in death or serious injury.

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#### **WARNING**

This indicates a hazardous situation, which, if not avoided, could result in death or serious injury.

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#### **CAUTION**

This indicates a hazardous situation, which, if not avoided, could result in minor or moderate injury.

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#### **NOTICE**

This information is important in the proper use of your machine. Failure to follow this instruction could result in damage to your machine or property.

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### *Serial Number and Order Number*

A Serial Number is used to identify your machine and is located on the Serial Number Label on your machine. An Order Number is used to check and maintain your order history and is located on the upper left portion of your packing slip. For your convenience and ready reference, enter the Serial Number and Order Number in the space provided on the front cover of this manual.

### *Additional Information and Potential Changes*

DR Power Equipment reserves the right to discontinue, change, and improve its products at any time without notice or obligation to the purchaser. The descriptions and specifications contained in this manual were in effect at printing. Equipment described within this manual may be optional. Some illustrations may not be applicable to your machine.

# Chapter 1: General Safety Rules

## **! WARNING**

Read this Safety & Operating Instructions Manual before you use the DR Chipper w/Shredder. Become familiar with the operation and service recommendations to ensure the best performance from your machine. If you have any questions or need assistance, please contact us at [www.DRpower.com](http://www.DRpower.com) or call Toll-Free 1-800-DR-OWNER (376-9637) and one of our Technical Support Representatives will be happy to help you.

### Labels

Your DR Chipper w/Shredder carries prominent labels as reminders for its proper and safe use. Shown below are copies of all the Safety and Information labels that appear on the equipment. Take a moment to study them and make a note of their location on your DR Chipper w/Shredder as you set up and before you operate the unit. Replace damaged or missing Safety and Information labels immediately.



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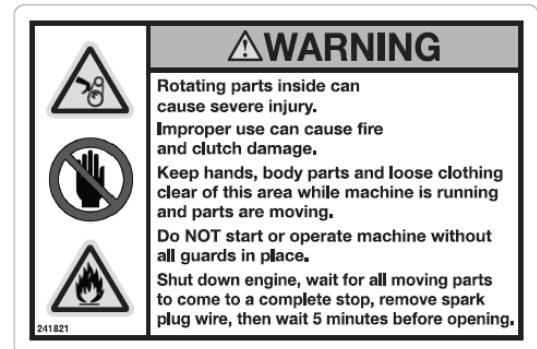
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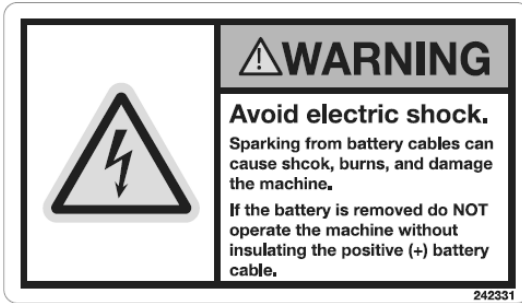
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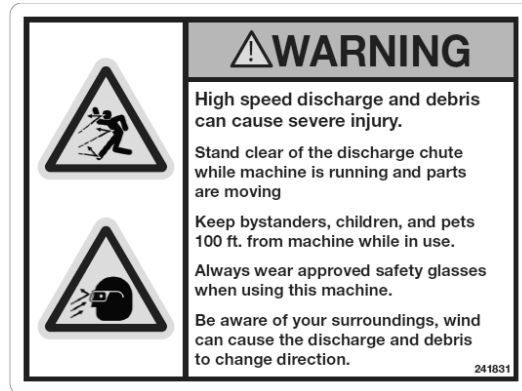
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## Protecting Yourself and Those Around You

### **WARNING**

This is a high-powered machine, with moving parts operating with high energy at high speeds. You must operate the machine safely. Unsafe operation can create a number of hazards for you, as well as anyone else in the nearby area. Always take the following precautions when using this machine:

- Always wear protective goggles or safety glasses with side shields while chipping/shredding to protect your eyes from possible thrown debris.
- Avoid wearing loose clothing or jewelry, which can catch on moving parts or the material fed into the hoppers.
- We recommend wearing gloves while chipping/shredding. Be sure your gloves fit properly and do not have loose cuffs or drawstrings.
- Wear shoes with non-slip treads when using your Chipper w/Shredder. If you have safety shoes, we recommend wearing them. Do not use the machine while barefoot or wearing open sandals.
- Wear long pants while operating the DR Chipper w/Shredder.
- Use ear protectors or ear plugs rated for at least 20 dba to protect your hearing.
- Never allow people who are unfamiliar with these instructions to use the DR Chipper w/Shredder. Allow only responsible individuals who are familiar with these rules of safe operation to use your machine.
- Never place your hands, feet, or any part of your body in the hoppers, discharge opening, or near or under any moving part while the machine is running. Keep area of discharge clear of people, animals, buildings, glass, or anything else that will obstruct clear discharge, cause injury, or damage. Wind can also change discharge direction, so be aware. If it becomes necessary to push material into the hoppers, use a small diameter stick, not your hands.
- Keep bystanders 100 feet away from your work area at all times. Wood chips exit the chipper at great speeds. To be safe, do not operate the machine near small children or pets, and never allow children to operate the DR Chipper w/Shredder. Stop the engine when another person or pet approaches.
- Never use the machine without ensuring that all guards and shields are in place, including the chipper hopper, discharge chute and blowback shield.
- Do not operate the engine with the air cleaner or the carburetor air intake cover removed. Removal of such parts could create a fire hazard. Do not use flammable solutions to clean the air filter.
- Always operate the machine from the operator zone (see chapter 4). Never pass or stand on the discharge side of the machine when the engine is running or the flywheel is turning.
- Never try to pick up, move, or transport the machine while the engine is running or the flywheel is turning.
- The muffler and engine become very hot and can cause a severe burn; do not touch.
- Clear the area of objects such as wire and rope, etc. Inserting these objects into the chipper or shredder hopper could damage the machine and/or cause injury.

Never, under any conditions, remove, bend, cut, fit, weld, or otherwise alter standard parts on the DR Chipper w/Shredder. This includes all shields and guards. Modifications to your machine could cause personal injuries and property damage and

- void your warranty.

## Safety for Children and Pets

### **WARNING**

Tragic accidents can occur if the operator is not alert to the presence of children and pets. Children are often attracted to the machine and the chipping/shredding activity. Never assume that children will remain where you last saw them. Always follow these precautions:

- Keep children and pets at least 100 feet from the working area and under the watchful care of a responsible adult.
- Be alert and turn the machine off if children or pets enter the work area.
- Never allow children to operate the DR Chipper w/Shredder.

## Safety with Gasoline - Powered Machines

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### **WARNING**

Gasoline is a highly flammable liquid. Gasoline also gives off flammable vapor that can be easily ignited and cause a fire or explosion. Never overlook the hazards of gasoline. Always follow these precautions:

- Never run the Engine in an enclosed area or without proper ventilation as the exhaust from the Engine contains carbon monoxide, which is an odorless, tasteless, and deadly poisonous gas.
  - Store all fuel and oil in containers specifically designed and approved for this purpose and keep away from heat and open flame, and out of the reach of children.
  - Replace rubber Fuel Lines and Grommets when worn or damaged and after 5 years of use.
  - Fill the Gasoline Tank outdoors with the Engine off and allow the Engine to cool completely. Don't handle gasoline if you or anyone nearby is smoking, or if you're near anything that could cause it to ignite or explode. Reinstall the Fuel Tank Cap and Fuel Container Cap securely.
  - If you spill gasoline, do not attempt to start the Engine. Move the machine away from the area of the spill and avoid creating any source of ignition until the gas vapors have dissipated. Wipe up any spilled fuel to prevent a fire hazard and properly dispose of the waste.
  - Allow the Engine to cool completely before storing in any enclosure. Never store a machine that has gas in the tank, or a Fuel Container, near an open flame or spark such as a water heater, space heater, clothes dryer or furnace.
  - Never make adjustments or repairs with the Engine running. Shut down the Engine, disconnect the Spark Plug wires, keeping them away from the Spark Plug to prevent accidental starting and wait 5 minutes before making adjustments or repairs.
  - Never tamper with the Engine's Governor setting. The Governor controls the maximum safe operation speed and protects the Engine. Over-speeding the Engine is dangerous and will cause damage to the Engine and to the other moving parts of the machine. If required, see your authorized dealer for Engine governor adjustments.
  - Keep combustible substances away from the Engine when it is hot.
  - Never cover the machine while the Muffler is still hot.
  - Do not operate the Engine with the Air Cleaner or the Carburetor Air Intake Cover removed. Removal of such parts could create a fire hazard. Do not use flammable solutions to clean the Air Filter.
  - The Muffler and Engine become very hot and can cause a severe burn; do not touch.
-

## General Safety

### **WARNING**

Operating this DR Chipper w/Shredder safely is necessary to prevent or minimize the risk of death or serious injury. Unsafe operation can create a number of hazards for you. Always take the following precautions when operating this machine:

- Your DR Chipper w/Shredder is a powerful tool, not a plaything. Exercise extreme caution at all times. The machine is designed to chip wood and shred most organic materials. Do not use it for any other purpose.
- Thoroughly inspect the area in which you will be working and remove all foreign objects. Look for rope, wire, etc., and remove these objects before chipping/shredding. Inserting these objects into the Chipper w/Shredder Hopper could damage the machine and/or cause injury.
- Know how to stop the DR Chipper w/Shredder quickly; see “Stopping the Engine” in Chapter 3.
- Never operate your unit on a slippery, wet, muddy, or icy surface. Exercise caution to avoid slipping or falling.
- See manufacturer’s instructions for proper operation and installation of accessories. Only use accessories approved by DR Power Equipment.
- Never use the machine without ensuring that all guards and shields are in place.
- Never, under any conditions, remove, bend, cut, fit, weld, or otherwise alter standard parts on the CHIPPER W/SHREDDER. This includes all shields and guards. Modifications to your machine could cause personal injuries and property damage and will void your warranty.
- Never use the machine with the Hopper(s) or Discharge Chute removed.
- Never place any part of your body in the DR Chipper w/Shredder Hopper(s), discharge opening, or near any moving part while the machine is running. Keep the area of discharge clear of anything that will obstruct a clear discharge. Wind can also change discharge direction, so be aware. If it becomes necessary to push material into the DR Chipper w/Shredder Hopper(s), use a small diameter stick, NOT WITH YOUR HANDS.
- Keep your face and body back from the DR Chipper w/Shredder Hopper(s) to avoid accidental bounce back of any material.
- Do not 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 DR Chipper w/Shredder Hopper(s).
- Allow only one person to operate the DR Chipper w/Shredder at any time.
- Always operate the machine from the Operator Zone (see **Figure 11** on page 15). Never pass or stand on the discharge side of the machine when the Engine is running or the Flywheel is turning.
- If the machine should start making an unusual noise or vibration, shut down the Engine, disconnect the Spark Plug Wires, keeping them away from the Spark Plug to prevent accidental starting, wait 5 minutes, then inspect for damage. Vibration is generally a warning of trouble. Check for damaged parts and clean, repair, and/or replace as necessary.
- Never tamper with safety devices. Check their proper operation regularly.
- Never try to pick up, move, or transport the machine while the Engine is running or the Flywheel is turning.
- Before performing any maintenance or inspection procedure on the DR Chipper w/Shredder, shut the Engine OFF, remove the Spark Plug Wire, and keep it away from the Spark Plug.
- Never allow people who do not understand and/or have not read this Safety and Operating Instructions Manual to use the DR Chipper w/Shredder. Allow only responsible individuals who are familiar with these rules of safe operation to use your machine.
- Never overload or attempt to Chip or Shred material beyond the manufacturer’s recommendation. Personal injury or damage to the machine could result.
- While using the DR Chipper w/Shredder, don't hurry or take things for granted. When in doubt about the equipment or your surroundings, stop the machine and take the time to look things over.
- Never operate the machine when under the influence of alcohol, drugs, or medication.
- Use the machine only in daylight.
- Stay alert for hidden hazards or traffic.
- Keep all nuts and bolts tight and keep the equipment in good operating condition.

## Towing

### CAUTION

- Correctly and securely attach the DR Chipper w/Shredder to the towing vehicle before towing, and be certain the safety chains are in place. Leave slack in the chains to allow for turning.
- Never allow anyone to ride on the DR Chipper w/Shredder.
- Never transport anything on the machine.
- Obey local, state, and federal regulations when you tow the DR Chipper w/Shredder on public roads and highways.
- NOTE: Some states may require that you register the machine with the state department of motor vehicles.
- Light kits, required in some states, are available from Country Home Products as optional equipment.
- Allow for added length in driving situations, e.g., when turning, parking, and crossing intersections.
- Adjust your towing speed for terrain and conditions. Do not exceed 45 mph while towing the DR Chipper w/Shredder.
- Towing the machine can affect handling of the tow vehicle:
  - The DR Chipper w/Shredder might track at an angle the tow vehicle.
  - The machine can turn tighter than the tow vehicle.
  - Never back up the tow vehicle with the DR Chipper w/Shredder attached; the machine can jackknife, causing damage to itself and/or the tow vehicle.
- Long distance towing is not recommended. The DR Chipper w/Shredder does not have springs to absorb road shock and will tend to bounce on rough roads. Extended towing can cause unnecessary wear.

## California Proposition 65

### WARNING

California Proposition 65:

- Engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.
- This product contains or emits chemicals known to the State of California to cause cancer, birth defects, and other reproductive harm.

## A Note to All Users

Under California law, and the laws of some other states, you are not permitted to operate an internal combustion engine using hydrocarbon fuels without an Engine Spark Arrester. This also applies to operation on US Forest Lands. All DR Chipper w/Shredders shipped to California, New Mexico, and Washington State are provided with Spark Arresters. Failure of the owner or operator to maintain this equipment in compliance with state regulations is a misdemeanor under California law and may be in violation of other state and/or federal regulations. Contact your State Park Association or the appropriate state organization for specific information in your area.

No list of warnings and cautions can be all-inclusive. If situations occur that are not covered by this manual, the operator must apply common sense and operate this DR Chipper w/Shredder in a safe manner. Contact us at [www.DRpower.com](http://www.DRpower.com) or call Toll Free: 1-800-DR-OWNER (376-9637) for assistance.



## Chapter 2: Setting Up the DR Chipper w/Shredder

It may be helpful to familiarize yourself with the controls and features of your DR Chipper w/Shredder as shown in **Figure 1** before beginning these procedures. If you have any questions at all, please feel free to contact us at [www.DRpower.com](http://www.DRpower.com).

### DR CHIPPER W/SHREDDER Controls and Features

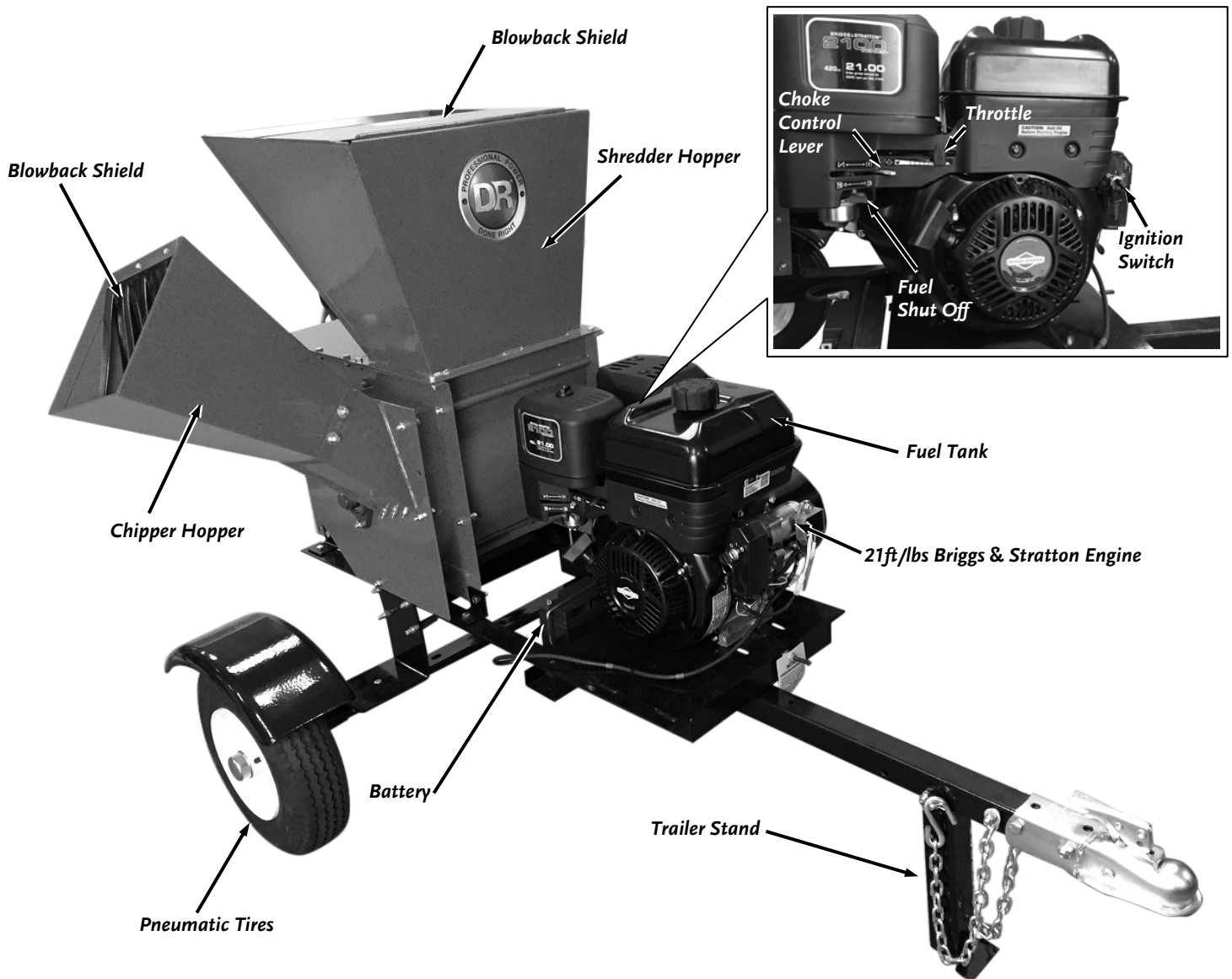


Figure 1

## Specifications

<b>Model</b>	21.00 PRO-XL
<b>Engine</b>	Briggs & Stratton (See Engine Manual for Engine Specifications)
<b>Engine Starting</b>	Electric w/Recoil Backup
<b>Chipping Capacity</b>	5" Diameter
<b>Max. Road Towing Speed</b>	45 MPH
<b>Number of Chipper Knives</b>	1
<b>Chipper Knife Size</b>	5-1/2" x 1-1/4" x 3/8"
<b>Chipper Knife Material</b>	Heat Treated Tool Steel
<b>Adjustable Knife Wear Plate</b>	Yes
<b>Chipper Flywheel</b>	14" Diameter, 3/4" Thick
<b>Flywheel Weight</b>	33 pounds
<b>Flywheel/Rotor Weight</b>	72 pounds
<b>Chipper Knife Speed</b>	100 MPH
<b>Chipper Hopper Opening</b>	9" x 13"
<b>Shredder Hopper Opening</b>	20" x 8-1/2" x 16" (Lid Closed) 20" x 18" x 16" (Lid Open)
<b>Number of Rotor Plates</b>	4
<b>Number of Hammers</b>	48
<b>Shredder Chamber Hits/Min.</b>	115,200
<b>Hammer Features</b>	Free Swinging/4 Cutting Sides
<b>Hammer Size/Type</b>	3-1/2" x 1-1/2" x 7 Ga. Heat Treated
<b>Standard Screen w/Unit</b>	1-1/2" x 5-5/8" Oval Slots
<b>Chip Discharge Control</b>	Adjustable Metal Baffle Plate
<b>Wheel Size</b>	16.5" x 4.80/4.00-8 Pneumatic-Highway

## Assembling the DR Chipper w/Shredder

Parts supplied on shipping pallet w/machine	
Description	Qty
Tow Bar	1
Shredder Hopper	1
Chipper Hopper	1
Poly Bag	1
Parts supplied in Poly Bag	
Safety & Operating Instructions Manual	1
Engine Manual	1
Warranty Card	1
Knife Gauge	1
Hardware Bag	1
Parts supplied in Plastic Bag	
5/16" - 18 x 3/4" Carriage Bolt	4
5/16" - 18 x 3/4" Bolt	4
5/16" Flat Washer, USS	4
5/16" - 18 Lock Nut	8
3/8" - 16 Lock Nut	2
3/8" - 16 x 3" Bolt	2
Pin and Hitch Clip	1
Engine Key	2

Compare the contents of the shipping pallet and the Poly Bag with the Parts Supplied list above. **If you have any questions, contact us at [www.DRpower.com](http://www.DRpower.com) or call 1-800-DR-OWNER (376-9637).** Do not discard your packaging material until you are fully satisfied with your new DR Chipper w/Shredder.

### Attaching the Tow Bar

#### Tools Needed:

- 3/4" Wrench or Socket
- Two Jack Stands

1. Place the Base on Jack Stands so that the Frame is level with the ground (**Figure 2**).
2. Position the Support Leg in the down position and secure using the Pin and Hitch Clip (**Figure 3**).
3. Attach the rear of the Tow Bar to the Rear Frame Support using a 3/8" - 16 x 3" Bolt and 3/8" - 16 Lock Nut and secure loosely.
4. Attach the Tow Bar to the Front Frame Support using a 3/8" - 16 x 3" Bolt and 3/8" - 16 Lock Nut and tighten using two 9/16" Wrenches.
5. Using two 9/16" Wrenches, Tighten the loose Bolt from Step 3 to secure the Rear of the Tow Bar.
6. Remove the Jack Stands.

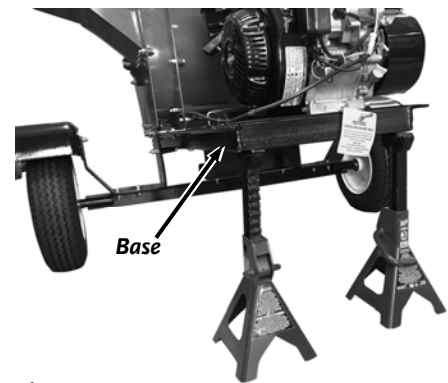


Figure 2

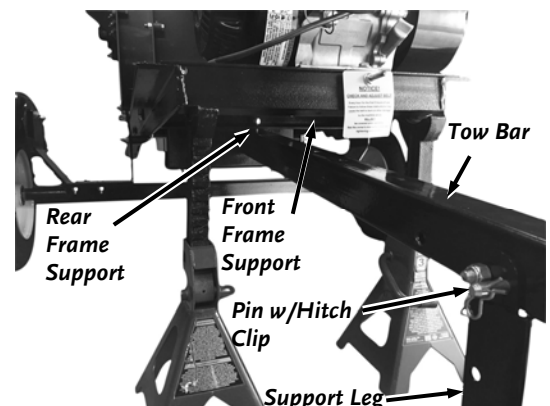


Figure 3

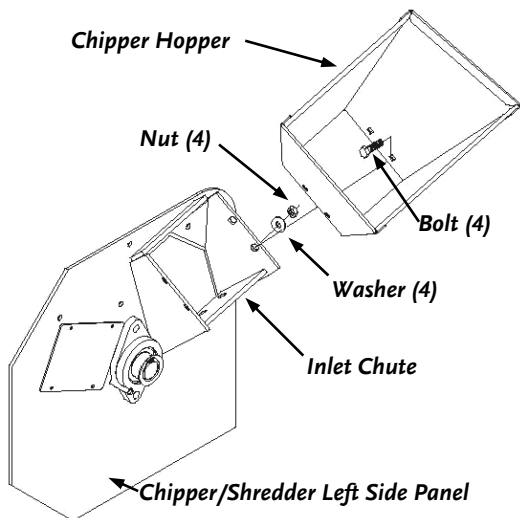


Figure 4

## Attaching the Chipper Hopper

### Tools Needed:

- 1/2" Wrench or Socket

**Tip:** Insert a towel or large rag into the opening to keep the Bolts from falling into the Chipper.

1. Attach the Chipper Hopper to the machine using four 5/16"-18 x 3/4" Carriage Bolts, four 5/16" Flat Washers and four 5/16"-18 Nylon Lock Nuts.

**NOTE:** Be sure to insert the Bolts from the inside of the Chipper Hopper so that the threads are sticking out (**Figure 4**) and the heads are flush against the Hopper. Install the Bolts, Washers and Nuts one at a time.

2. Install a Flat Washer, then a Lock Nut on each Bolt. Initially install the Bolts and Nuts finger tight and then tighten the Nuts one turn using two 1/2" Sockets or Wrenches (**Figure 4**). Check to see that the Hopper is centered on the Inlet Chute and then tighten the Nuts securely.
3. If you used a towel or rag in the Chipper opening, remove it now.

## Attaching the Shredder Hopper

### Tools Needed:

- Two 1/2" Wrenches or Sockets

1. Place Shredder Hopper onto the machine in the configuration shown. (**Figure 5**).
2. Using 1/2" Wrenches, Secure with four 5/16"-18 x 3/4" Bolts and Locknuts as shown (**Figure 5**).

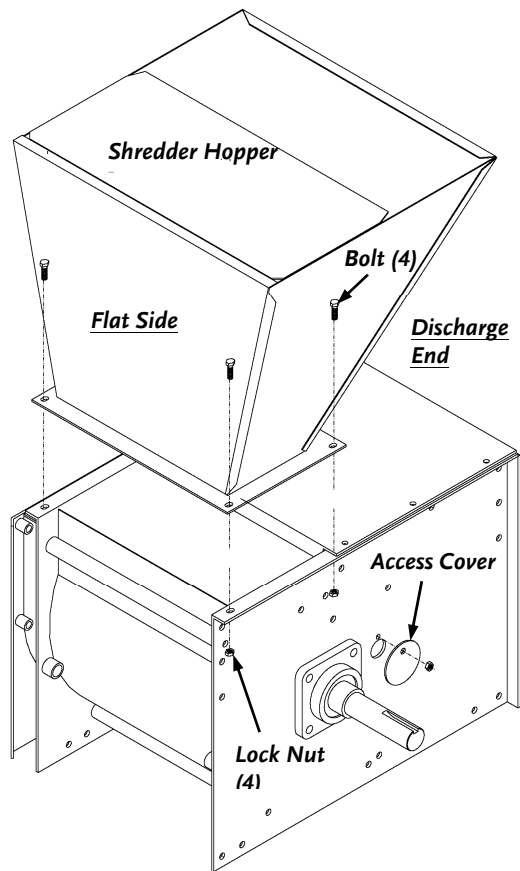


Figure 5

## Positioning the Baffle Plate

### Tools Needed

- Two 9/16" Wrenches or Sockets
1. Using 9/16" Wrenches, remove the Baffle Rod and Locknut (**Figure 6**).
  2. Reinstall the Baffle Rod and locknut underneath the Baffle Plate to hold it in the Discharge Position (**Figure 7**).

**NOTE:** There are two Discharge Positions. Move the Baffle Rod to the Alternate Baffle Rod Hole to keep discharged material in a smaller area.

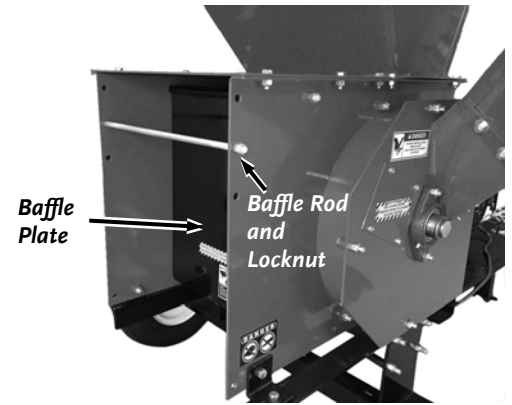


Figure 6

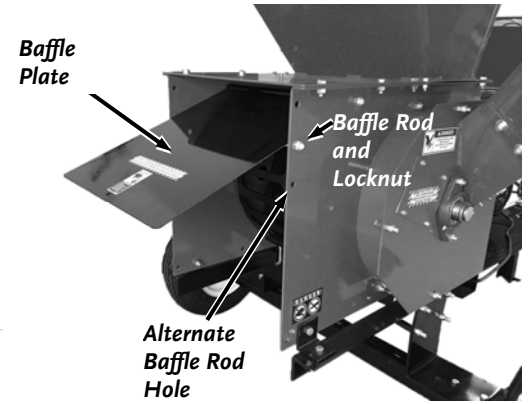


Figure 7

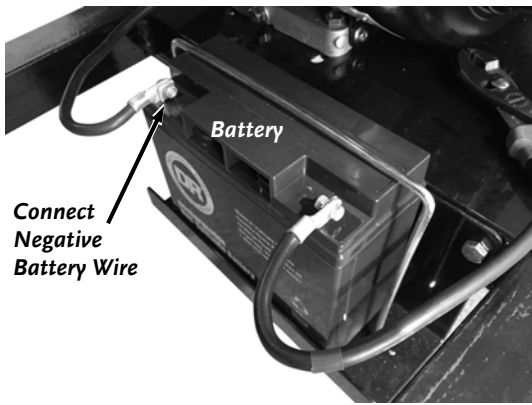


Figure 8

## Connecting the Battery Wire

We ship all DR Chipper w/Shredders with the negative terminal Battery Wire disconnected. This prevents the Battery from discharging during shipment. Before using your DR Chipper w/Shredder, you must connect the Battery Wire.

### Tools Needed:

- Two 5/16" Wrenches

1. Secure the Negative Wire to the Negative Terminal on the Battery using two 5/16" Wrenches (**Figure 8**).

## Adding Oil and Gasoline



Figure 9

### NOTICE

- You must add oil before starting the Engine. This machine is shipped without oil. Traces of oil may be in the reservoir from factory testing, but you must add oil before starting the Engine. Fill the reservoir slowly, checking the level frequently to avoid overfilling.
- To get an accurate reading when checking the oil level:
  - The Engine must be level.
  - The Dipstick must be screwed all the way in to ensure an accurate oil level reading on Briggs & Stratton Engines.

Engine Oil	SAE 30 Oil - 37 oz. (1.09 L): above 50 degrees F; 10w-30: 30-90 degrees F; 5w-30: 30 degrees F or below
Fuel	Unleaded gasoline, 7 US quarts (6.53 L)

**NOTE:** Use only the recommended high detergent Engine oil. Do not use special additives. Other types of oil could cause problems operating your machine. Please refer to your Engine Owner's Manual for more detailed oil information.

1. Place the machine on a level surface and initially add 1/2 of the SAE 30 high detergent oil recommended by the Engine Manufacturer and wait one minute for the oil to settle (**Figure 9**).
2. Screw the Dipstick in and then remove it to check the oil level (clean the Dipstick with a rag after checking) and continue adding a few ounces of oil at a time, rechecking the Dipstick until the oil reaches the FULL mark. Be careful not to overfill.
3. Replace the Dipstick and screw all the way in when full.

### ! WARNING

Add Fuel outdoors or in a well-ventilated area, away from sparks, open flames, pilot lights, heat, and other ignition sources.

4. Remove the Fuel Fill Cap and fill the Fuel Tank with fresh, unleaded gas (with a minimum of 85 Octane) to approximately 1" to 1-1/2" below the top of the Fill Neck to allow for Fuel expansion (**Figure 1** on page 9). Be careful not to overfill and reinstall the Fuel Fill Cap before starting the Engine. See your Engine Owner's Manual for more detailed information.

**NOTE:** To refill the Fuel Tank, turn the Engine OFF, and let the Engine cool at least five minutes before removing the Fuel Fill Cap.

## Check the Tire Pressure

Check the manufacturers recommended pressure that is stamped on the side of the Tire.

## Chapter 3: Operating the DR Chipper w/Shredder

This chapter covers the procedures for starting and stopping your new DR Chipper w/Shredder and discusses basic operation features. It may be helpful to better familiarize yourself with the features of your DR Chipper w/Shredder by reviewing **Figure 1** in Chapter 2 before beginning the steps outlined in this chapter.

### **⚠ WARNING**

Read and understand the warnings listed in “Chapter 1 General Safety Rules” before operating this Chipper w/Shredder.

### **Starting the Engine**

1. Check the Oil and Fuel level every time you use the DR Chipper w/Shredder.
2. Turn the Fuel Shut-Off Valve to the ON position (**Figure 10**).
3. Check Inlet Hoppers and Discharge Chute and remove any debris buildup from the machine by first unplugging the Spark Plug Wire and following the instructions on page 18.
4. Position Choke Control Lever to the left so it is in the Choke position (Leave it in the RUN position to the right if the Engine is already warm) (**Figure 10**).
5. Move the Throttle Control Lever to about half way between Slow (turtle) and Fast (rabbit) Position (**Figure 10**).
6. Turn the Key to the START position until the Engine starts, then release. The Key will snap back to the RUN position and the Engine will continue to run.
7. As the Engine warms up, slowly move the Choke to the right. Wait until the Engine runs smoothly before each Choke adjustment.
8. When the Engine is warmed up and running smoothly, ensure that the Choke is fully to the right and the Throttle Control Lever is fully to the Fast (rabbit) Position for Chipping and Shredding.

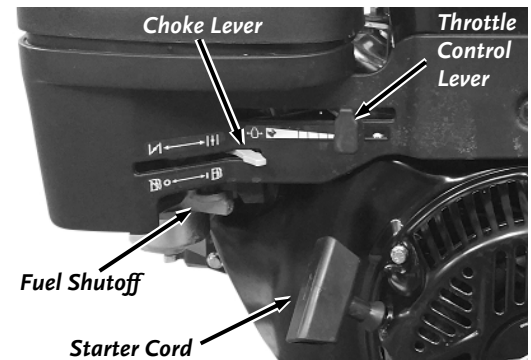


Figure 10

### **Stopping the Engine**

1. Move the Throttle Control Lever all the way to the SLOW position and then turn the Key to OFF.
2. Remove the Key for safety.

**NOTE:** Close the Fuel Shut-Off when transporting or storing the DR Chipper w/Shredder.

### **Before You Begin**

- Visually check the Chipper Knife for damage each time you use the machine.

**NOTE:** Check for shaft movement while starting the Engine. If the shaft does not turn, clean out the Chipper/Shredder Hopper(s) as instructed on page 18.

- When viewed from the Chipper Hopper side (Operator Zone, **Figure 11**), the Flywheel turns in a clockwise direction.
- NEVER assume you know where the Chipper Knife is. You don't know where it is.
- ALWAYS operate the DR Chipper w/Shredder from the Operator Zone shown in (**Figure 11**).
- ALWAYS stop the Engine when leaving the Operating Zone (**Figure 11**) or when moving the machine.

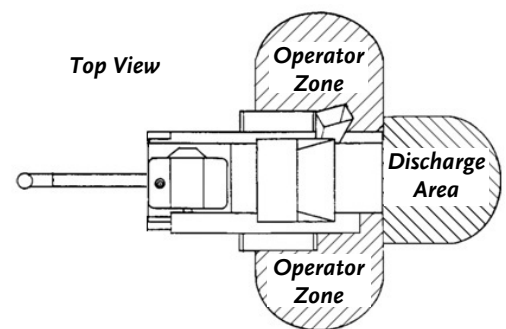


Figure 11

## Processing Material

### WARNING

Read and understand the warnings listed in “Chapter 1 General Safety Rules” before operating this Chipper w/Shredder.

- Your DR Chipper w/Shredder can process dry or green material.
- Green wood will process quicker and easier than dry wood.
- Softwood processes easier than hardwood.
- Your operator experience will teach you how different materials chip/shred and how fast you can process different materials.
- Most materials process well with the standard screen provided with the DR Chipper w/Shredder.
- It is best to trim off any side twigs from the main branch that you are chipping.
- When chipping branches, sometimes a tail will remain at the end of a branch. To avoid this, rotate the branch while feeding it into the Chipper Hopper. Rotating the branch as you feed it into the machine will improve chipping performance.
- Use caution with small diameter green saplings and branches less than 2" in diameter. Chip these grouped or bundled together to provide support for each other. If the material is 2" or larger, feed only one at a time into the Chipper Hopper.
- Make sure the DR Chipper w/Shredder finishes processing material in the Hopper(s) before shutting the Engine off.

### Using the Chipper Hopper

The Chipper Hopper is mounted on the side of the machine and is designed to chip the larger, heavier materials that the Shredder Hopper isn't designed to handle. The revolving Chipper Knife mounted on a flywheel turns branches fed into the Hopper into “chips”. The Chipper can chip twigs and branches ranging in size from 1" to 5" in diameter. Cut your materials into manageable lengths of no more than five or six feet long **before** feeding them into the Chipper Hopper.

### WARNING

The Chipper Hopper must be securely bolted to the side of your DR Chipper w/Shredder before using the machine!

- Feed the branch into Chipper Hopper keeping the branch at the same angle as the Chipper Hopper.
- As the branch becomes short and is at the outside edge of the Chipper Hopper, finish processing it by pushing it in with the next branch.
- Do not force material into the Chipper. If the machine does not chip well, the Chipper Knife may need sharpening or replaced, or the gap between the Knife and the Wear Plate needs adjusting. See page 23.
- Extremely hard knots will not process very well. Push any short stubs that have not self-fed through the Chipper with the next branch to be chipped.

### NOTICE

Never throw remaining stubs or knots into the Shredder Hopper; damage will result.

- Overloading the Chipper Hopper will cause the rotor speed to decrease. If you hear the Engine RPM decreasing, stop feeding material into the Chipper Hopper until the Engine has returned to full speed.
- NEVER allow processed material to build up within 3" of the Discharge opening. Move the DR Chipper w/Shredder or the pile as needed. Failure to do so could result in unnecessary jamming of the machine.
- To move a pile of processed material, first shut off the Engine, and use a spade, rake, or long handle tool; NEVER use your hands or feet!

### NOTICE

If you jam the machine and do not stop the Engine, it can damage the machine. This damage can be costly and not covered under warranty. See “To Free a Jammed Flywheel” on page 18.



## Using the Shredder Hopper

The Shredder Hopper is located on the top of the DR Chipper w/Shredder and is the opening into which all materials to be shredded should be fed. You can shred most organic materials. A flexible Blowback Shield is attached to the Hopper. You must push material past this flap using a wooden stick in order to enter the main Shredding Chamber where revolving steel Hammers do the shredding.

### CAUTION

The Blowback Shield is an important feature; it prevents kickback of materials! Do not use your machine unless the Blowback Shield is securely fastened in place.

- Due to the wide variety of materials that you can shred, and their very different physical characteristics, only feed limited quantities of any material into the Shredder Hopper at first. Increase the amount and length of material if you find that the material is processing without any difficulty. Your judgment and operator experience is very important. Be sure not to overload the machine by feeding too much material into the Hopper at one time. If you hear the speed of the Engine decreasing, stop feeding material into the machine at once. Do not resume feeding the machine until the Engine has returned to full speed.
- The maximum diameter of material that you can shred is 1-1/2" (including knots). Feed any larger material through the Chipper Hopper. Material larger than 1-1/2" can cause serious damage to any of the internal parts of the Shredding Chamber. Inspect the DR Chipper w/Shredder after every use for bent Hammers, missing Spacers, clogging, or damage to the Screen or any other obvious problems. If damage occurs, the Rotor Assembly can become unbalanced causing excessive vibration. If used in this condition, damage can occur. Do not use the machine if vibration is present. Vibration is generally a warning sign of trouble.
- You can feed several small branches into the Shredder Hopper at once providing their combined diameter is less than 1-1/2". Cut branches so they are shorter than three feet to make them more manageable. Allow green materials to dry, or process in small batches with dry materials to avoid winding around the Rotor Assembly.
- Wet materials will clog the machine easily. If clogging occurs, stop the Engine; remove the screen and process material without it. Processing in this way will reduce the amount of reduction, but will reduce clogging.

#### MATERIALS BEST SUITED FOR SHREDDING

Leaves	Flowers	Corn Stalks	Roots
Soil	Palm frond tops	Grass clippings	Garden debris
Potato vines	Straw and Hay	Hedge clippings	Tomato vines
Manure	Kitchen Waste	Small branches	Paper

### WARNING

The Hammers within the Shredding Chamber can tug suddenly at material fed into the Shredder Hopper. Do not hold on tightly to branches and vines, and do not feed material straight down into the Hopper with your arm pointing downward toward the opening. Instead, keep your arms parallel to the ground and several inches above the top edge of the Hopper.

## To Free a Jammed Flywheel

### **WARNING**

Before performing any maintenance procedure or inspection, stop the Engine, wait five minutes to allow all moving parts to come to a complete stop and cool. Disconnect the Spark Plug Wire, keeping it away from the Spark Plug.

1. Check the Discharge Opening for clogs. If it is clogged, clear it with a wooden stick.
2. Remove any material left in the Chipper and Shredder Hoppers.
3. Use a wooden stick to loosen and remove any material left in the Chipping/Shredding Chamber(s).
4. Start the machine and allow any remaining material in the Chipping/Shredding Chamber(s) to discharge.
5. If the Chipping/Shredding Chamber(s) does not clear and the Flywheel is still jammed, repeat the above process.
6. Be certain the Chipping/Shredding Chamber(s) is clear before trying to process more material into the Hopper(s), clogging could result in Belt or Clutch failure.

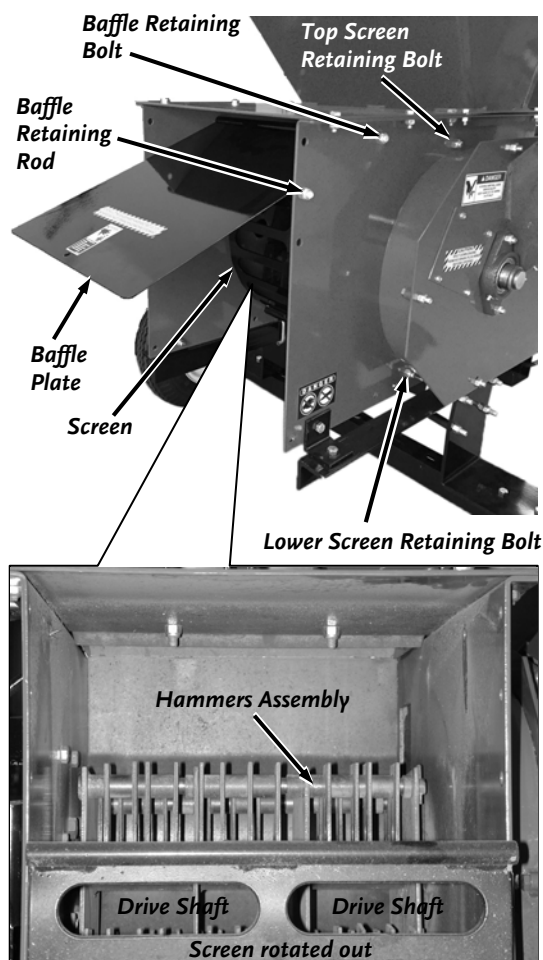


Figure 12

### **NOTICE**

Be certain the Shredding Chamber is clear before trying to process more material into the Hopper, clogging could result in Belt or Clutch failure.

## To Clean Out a Clogged Shredder

### Tools Needed

- Two 9/16" Wrenches

1. Remove the Cotter Pin at the end of the Baffle Retaining Rod and remove the Rod (**Figure 12**).
2. Remove the Baffle Retaining Bolt and Locknut using two 9/16" Wrenches and remove the Baffle.
3. Using two 9/16" Wrenches, remove the Top Screen Retaining Bolt.
4. Grasp the top of the Screen and rotate it out toward you exposing the Shredder Hammers Assembly.

**Tip:** You may have to loosen the Lower Screen Retaining Bolt to accomplish this.

5. Remove any debris wrapped around the Shredder Hammers Drive Shaft or collected in the Hammers Assembly or Screen.
6. Reposition the Shredder Screen and reinstall the Top Screen Retaining Bolt and Locknut. Retighten the Lower Screen Retaining Bolt if you loosened it.
7. Reinstall the Baffle Plate with the Baffle Retaining Bolt and Locknut.
8. Reinstall the Baffle Retaining Rod and Cotter Pin.
9. Reconnect the Spark Plug Wires, start the machine, and allow any remaining material in the Shredding Chamber to discharge.
10. If the Shredding Chamber does not clear, repeat the above process.

## Chapter 4: Maintaining the DR Chipper w/Shredder

Regular maintenance is the way to ensure the best performance and long life of your machine. Please refer to this manual and the Engine Manufacturer's Owner's Manual for maintenance procedures. Service intervals listed in the checklist below supersede those listed in the Engine Manufacturer's Owner's Manual.

### **WARNING**

Before performing any maintenance procedure or inspection, stop the Engine, wait five minutes to allow all parts to cool. Disconnect the Spark Plug Wire, keeping it away from the Spark Plug.

### **Regular Maintenance Checklist**

**NOTE:** Consider that the service intervals shown are the maximum under normal operating conditions. Increase frequencies under extremely dirty or dusty conditions.

Procedure	Before Each Use	Every 25 Hours	Every 40 Hours
Check Engine Oil Level	▲		
Check General Equipment Condition	▲		
Check that the Shaft turns freely (with a long stick only)	▲		
Inspect Knife for damage	▲		
Clean Engine Exterior and Cooling Fins	▲		
Check the Tire Pressure	▲		
Inspect or replace Air Filter and Foam Pre-cleaner	▲		
Check Knife and Wear Plate for Sharpness		▲	
Check Rotor Hammers/Spacers for Wear		▲	
Change Engine Oil	1 <sup>st</sup> time 5 hours	▲	
Check Belt Tension and Condition	1 <sup>st</sup> time 1 hour	▲	
Inspect or replace Drive Belt		▲	
Inspect or replace Spark Plug		▲	
Check/adjust Knife to Wear Plate Gap		▲	
Check the Battery Voltage (electric start only)		▲	
Check Knife and Wear Plate Attachment Screws			▲
Check Side Bearing Collar Set Screws			▲
Lubricate Side Bearings			▲

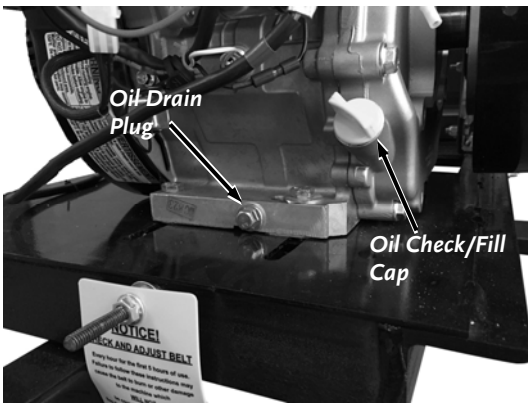


Figure 13

## Removing and Replacing the Engine Oil

### Tools and Supplies Needed:

- Rags and approved Container (for waste oil)
- 12mm Wrench
- Small funnel
- Oil Receptacle
- Engine Oil (see your Engine Manual for Oil specifications)

**Note:** Drain the oil when the engine is warm. Warm oil drains quicker and more completely.

1. Position a suitable oil receptacle under the engine oil Drain Plug and remove the Engine Oil Check/Fill Cap (**Figure 13**).
2. Remove the Oil Drain Plug from the Engine Block with a 12mm Wrench. Allow the used oil to drain completely, and then replace the Oil Drain Plug (**Figure 13**).
3. Replace the engine oil using SAE 30 HD oil (see “Adding Engine Oil and Gasoline” in Chapter 2 for instructions on adding oil).
4. Reattach the spark plug wire.

**Note:** Be sure to use environmentally safe procedures when disposing of the used oil.

### Grease Fittings

Your DR CHIPPER W/SHREDDER was greased at the Factory. The operator needs to lubricate the Chipper Side and Drive Side Bearings periodically.

### Tools and Supplies Needed:

- Flexible hose grease gun
- Lithium grease
- Clean cloth
- 1/8" Allen Wrench
- Loctite® 243 (if needed)

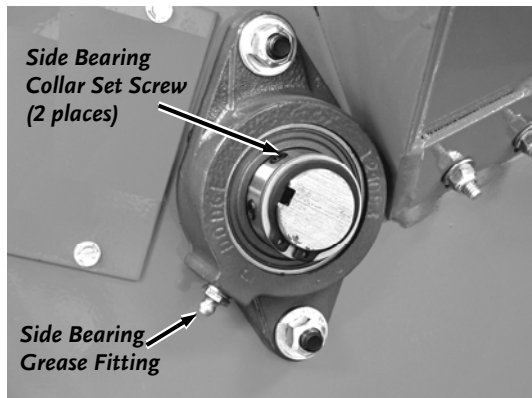


Figure 14

1. Wipe all dirt, etc., from the Grease Fitting(s) with a clean cloth (**Figure 14**).
2. Apply no more than three pumps of quality general-purpose lithium grease with a hand-pumped grease gun to each Grease Fitting, one on the Chipper Side Bearing, and one on the Drive Side Bearing (not shown). To access the Drive Side Bearing, you will have to remove the Belt Guard (see Drive Belt Maintenance section).
3. After greasing, check the Side Bearing Collar Set Screws (**Figure 14**) for tightness with a 1/8" Allen Wrench. There are two Set Screws per Bearing. If they are loose, reset them with Loctite® 243, obtainable at most hardware stores.

## NOTICE

Over lubrication can damage Bearings.

## Drive Belt Maintenance

### Tools Needed:

- Two 1/2" Wrenches
- 7/16" Wrench
- Straight Edge

### CHECKING AND ADJUSTING BELT TENSION

1. Using a 1/2" Wrench, remove the three Bolts, Lock Washers, and Flat Washers supporting the Belt Guard and place the Belt Guard aside. (**Figure 15**).
2. Place a Straight Edge on the bottom of the Belt from the Clutch Pulley to the Drive Pulley (**Figure 16**).
3. Push up on the Belt using approximately ten pounds of force. The Belt should deflect away from the straight edge approximately 3/8".
4. If the Belt deflection is close to the 3/8" as desired, adjustment is not needed. If it is not close to 3/8", continue to the next step.
5. Loosen the four Engine Bolts (two in the Front and two in the Rear) using two 1/2" Wrenches (**Figure 17**).

**Note:** If you are replacing the Belt, loosen the Adjust Nut counterclockwise to move the Engine back far enough so you can remove the Belt. Install a new DR Belt over the Clutch and Drive Pulley and perform tension adjustment.

6. Tighten or loosen the Tension Adjust Nut using a 1/2" Wrench to get the proper tension as described in Step 3 (**Figure 17**).
7. Tighten the Engine Bolts and install Belt Guard when finished.

**Note:** Check and re-tighten the Drive Belt, every hour for the first 5 hours of operation when a new Belt has been installed.

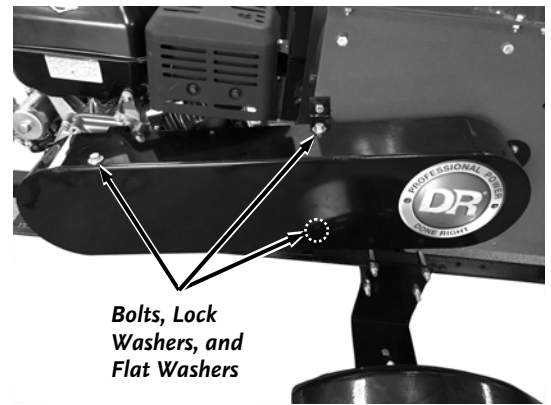


Figure 15

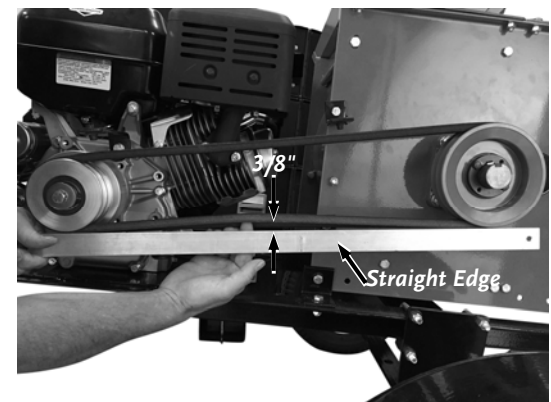


Figure 16

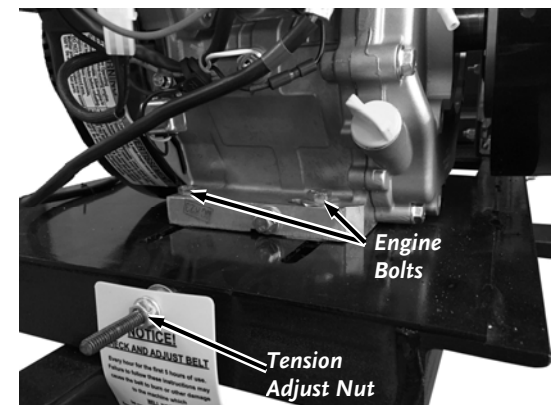


Figure 17

## BELT ALIGNMENT

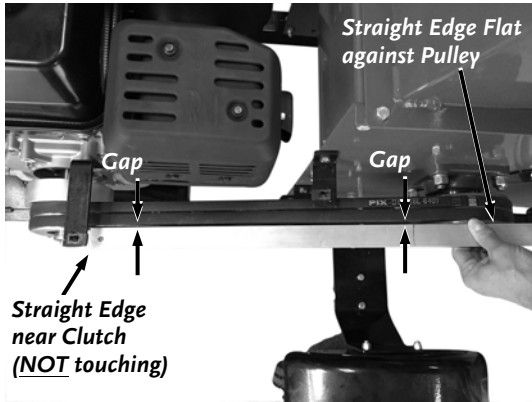


Figure 18

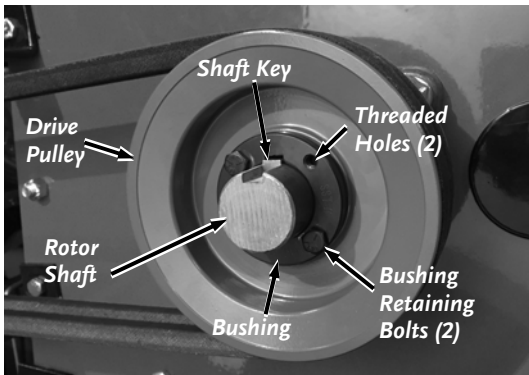


Figure 19

### NOTICE

Never make Belt adjustments by moving the Clutch on the Engine Shaft.

1. Check the alignment between the Clutch and the Drive Pulley by placing one end of a Straight Edge flat against the face of the Drive Pulley with the other end near the top portion of the Clutch (next to the Belt but not touching the Clutch) (Figure 18).
2. The Gap measurement between the straight edge and Belt should be the same at both ends (the straight edge should be parallel with the Belt). If the straight edge and Belt are parallel, no adjustment is needed. If the straight edge and Belt are not parallel, continue to the next step.
3. Remove the Bushing Retaining Bolts with a 7/16" Wrench (Figure 19).

**Note:** The Bushing has four holes. Two holes for securing the Pulley to the Bushing (threads are in the Pulley) and two holes for separating the Pulley from the Bushing (threads are in the Bushing).

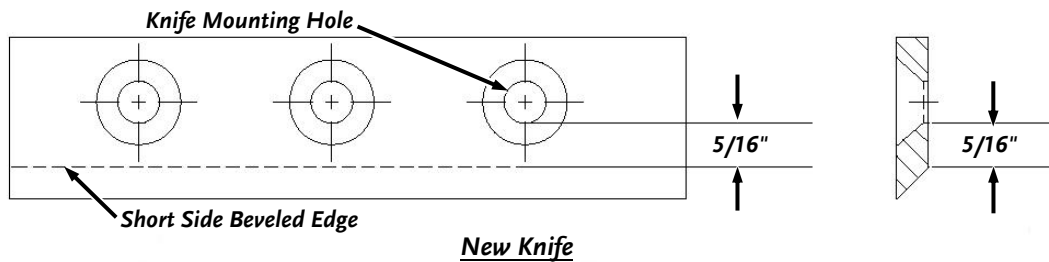
4. Reinstall the two bolts in the Threaded Holes adjacent the two holes you just removed the Bolts from (Figure 19).
5. Slowly tighten the Bolts about a 1/4 to 1/2 turn evenly and alternately until the Bushing releases from the Rotor Shaft (Figure 19).
6. When the Pulley is loose, remove the two Bolts and reinsert them into the original Retaining Bolt Holes by hand.
7. Using the Straightedge, align the Clutch and Pulley by moving the bushing in or out on the Rotor Shaft.

**Note:** The Pulley will move slightly onto the Bushing when tightening the Bolts. You may need to compensate for this movement when positioning the Bushing on the Shaft.

8. Slowly tighten the Bushing Retaining Bolts evenly and alternately (1/4 to 1/2 turn). The bolts only need to be snug. Do not over tighten.
9. Recheck the Belt alignment and repeat alignment procedures as needed.
10. Reinstall the Belt Guard.

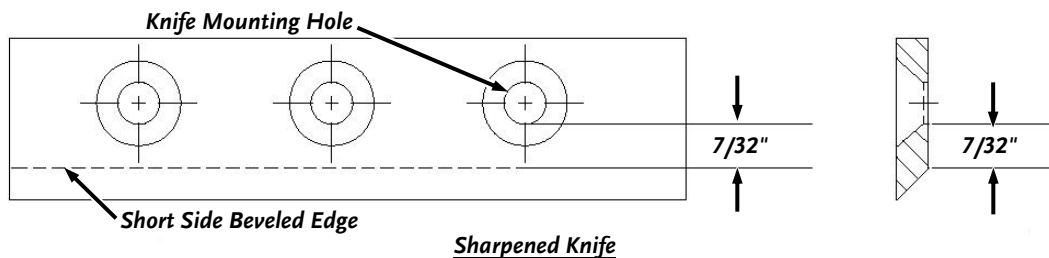
## Knife Sharpening

- You should never attempt to sharpen the Chipper Knife freehand; take the Knife to a machine shop for proper sharpening.
- It is extremely important to consistently maintain the 45-degree angle for proper performance.
- Excessive heat generated during the sharpening process will damage Knives and weaken the metal.
- How many times a Knife can be sharpened is determined by how much material needs to be taken off to sharpen or to compensate for dents or gouges.
- A new Chipper Knife has a  $5/16$ " measurement between the short side bevel edge and the Knife mounting holes (**Figure 20**).



**Figure 20**

- The knife should never be sharpened to the extent that more than  $3/32$ " is taken off this measurement.
- Once this measurement is below  $7/32$ " (**Figure 21**), or if you are unable to remove dents or gouges with these guidelines, replace the Knife.



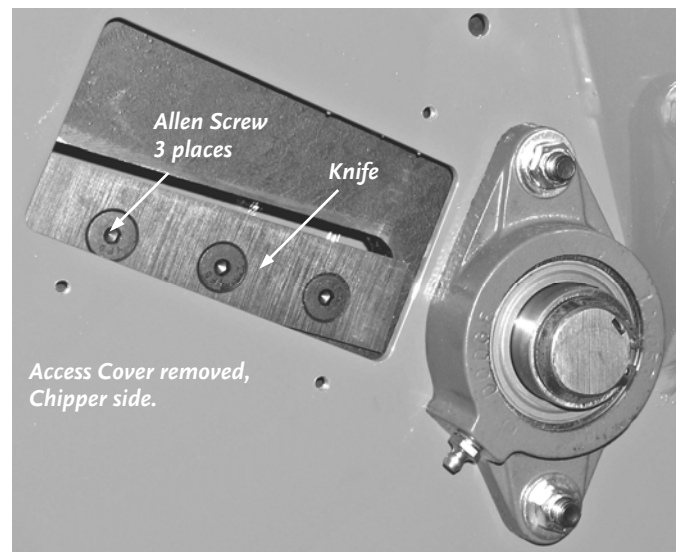
**Figure 21**

## Removing and Replacing the Chipper Knife

### Tools and Supplies needed:

- $5/16$ " Wrench
- $3/16$ " Allen Wrench
- Awl
- Propane Torch
- Gloves
- Loctite® 243

1. Using a  $5/16$ " Wrench, remove the Access Cover (**Figure 22**) on the Chipper Side.
2. Rotate the Chipper Disk using a stick until the three countersunk Allen Screws attaching the Knife to the Flywheel are visible through the Access Opening.
3. Clean out the heads of the Allen Screws with an Awl or sharp tool.



**Figure 22**

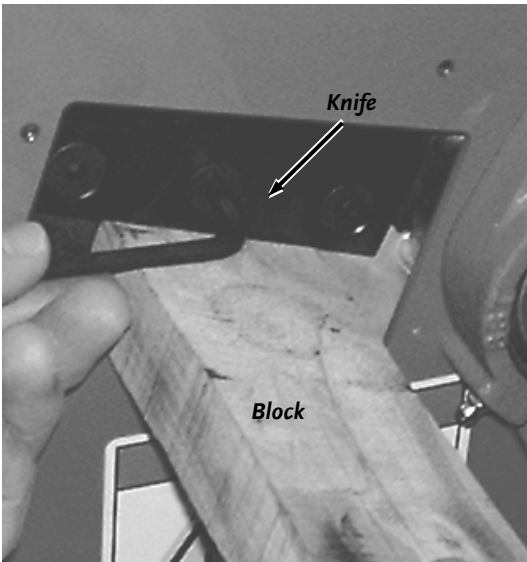


Figure 23

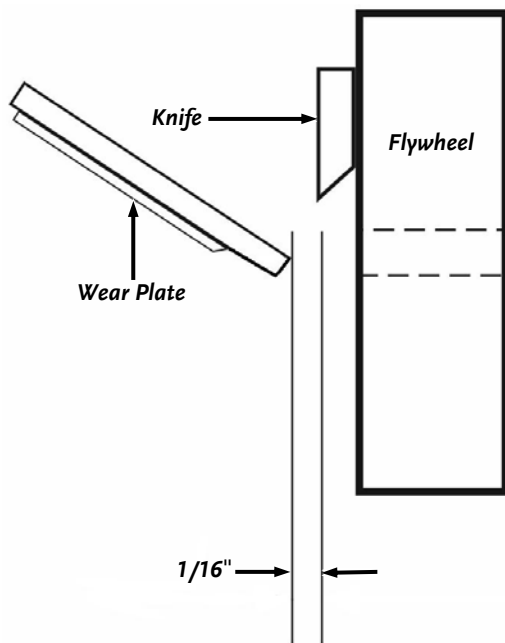


Figure 24

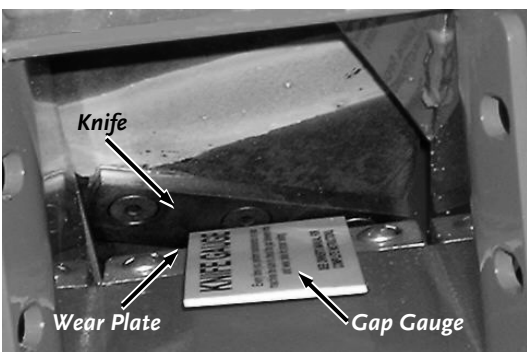


Figure 25

4. Insert a Block of Wood to prevent the Flywheel from moving, and remove the Screw using a 3/16" Allen Wrench (**Figure 23**).

**NOTE:** The Screws were installed with Loctite®. If necessary, apply heat from a propane torch to the Screw then remove the Screw.

5. Repeat Step 4 for the remaining two Allen Screws.
6. Remove the dull or damaged Knife and visually inspect the Chipper Disk Slot and Knife mounting area and be sure they are clean. Metal burrs may need filing so that the replacement Knife will be able to mount flush against the Chipper Disk.
7. Apply Loctite® 243 to the three new Allen Screws supplied with a new Knife or to the original screws if replacing with a sharpened Knife.
8. Install the new or sharpened Knife and finger tighten the Allen Screws to hold the Knife to the Chipper Disk.
9. Using a 3/16" Allen Wrench, tighten the center Screw, then tighten the outer Screw, and finally tighten the inner Screw.
10. Double-check all three Screws for tightness one more time.
11. Reinstall the Access Cover.
12. Check the gap between the Knife and Wear Plate and adjust if required.

### **Check and Adjusting the Knife to Wear Plate Gap**

When you replace the Knife, check and set the clearance between the Knife and Wear Plate. Use the Gap Gauge to set this clearance to 1/16" (**Figure 24**). If the gap between the Wear Plate and the Knife is not set correctly, you will have excessive vibration when chipping and the Knife will seem to be dull. The Wear Plate should have a square edge and be free of dents or gouges. The Wear Plate can be hand sharpened. Be careful not to overheat it during the sharpening process. This will change the characteristics of the steel and you will then have to replace the Wear Plate.

#### **Tools Needed:**

- Two 1/2" Wrenches or Sockets
- 7/16" Wrench or Socket
- Gap Gauge (provided with machine)

1. To prevent accidental Starter engagement, disconnect the Battery at the negative terminal.
2. Remove the Chipper Hopper by performing the steps on page 12 in the reverse order.
3. Using a stick, rotate the Chipper Disk until the Knife is opposite the Wear Plate (**Figure 25**).
4. Slide the Gap Gauge between the Knife and Wear Plate (**Figure 25**). If the gap is set correctly, the Gap Gauge will lightly touch both the Knife and Wear Plate. If the gap is too small, you will not be able to get the Gauge between the Knife and Wear Plate. If the gap is too large, there will be excess room between Gap Gauge, Knife, and Wear Plate.



5. To adjust the Wear Plate Gap, loosen the three 1/4" Nuts using a 7/16" Wrench (**Figure 26**). Now slide the Wear Plate up or down (in or out) to achieve the correct gap setting.
6. Tighten the Nuts when the Wear Plate is in the correct position (**Figure 25**)
7. Replace the Chipper Hopper.

**NOTE:** After any Knife or Wear Plate maintenance or adjustment, rotate the Chipper Disk and watch and listen carefully for any unusual noises, clicking or vibration. If you detect any of these, inspect the machine for damage, or any loose parts. Repair or replace any damaged parts and tighten any loose parts before starting the DR Chipper w/Shredder.

8. Re-connect the negative Battery Terminal Wire and Spark Plug Wires.

### Adjusting the Shredder Hammers

When the hard steel Hammers of the Rotor Assembly become dull or round on the cutting edge, they may be rotated or reversed.

**NOTE:** The Hammers have four cutting edges that may be used before replacement is necessary. To reverse the Hammers, proceed as follows:

#### Tools and Part Required

- Two 1/2" Wrenches
- Hammer and Punch
- Four Grooved Pin, P/N 186180
- Vise Grips

1. Remove the Belt Guard as described on page 21.
2. Loosen the 5/16" Nut and rotate the round Access Cover Plate on the side of the Housing to expose the Access Hole (**Figure 5** on page 13).
3. Using two 1/2" Wrenches, remove the Shredder Hopper by removing the four Bolts and Locknuts.
4. Remove the four 5/16" Bolts and remove the Top Plate (reference Chipper/Hammer Schematic on page 35).
5. Remove the Baffle Plate and Screen (reference **To Clean Out a Clogged Shredder**, steps 1 - 3 on page 18)
6. Rotate the Hammer(s) Rod until the Deep Grooved end of the Groove Pin at the end of the Rod is pointing down (**Figure 27**).
7. While holding the Hammer(s) Rod in place with Vise Grips, drive out the Groove Pin with a punch (**Figure 27**).
8. Rotate the Hammer assembly until the Rod is lined up with the Access Hole.
9. Carefully remove the Rod through the Access Hole and at the same time remove the Hammers and spacers from the Rod leaving them in the same order as you removed them.
10. Now reverse each Hammer (end to end) by using the lower hole in the Hammer.
11. Slide the Rod back through the Access Hole and reinstall the Hammers and Spacers in the same order as removed.

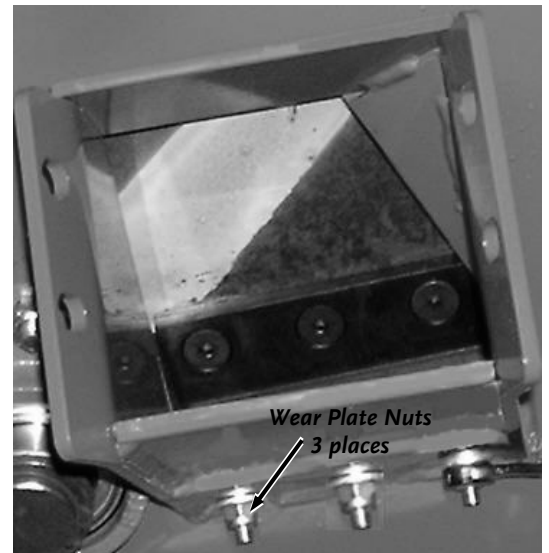


Figure 26

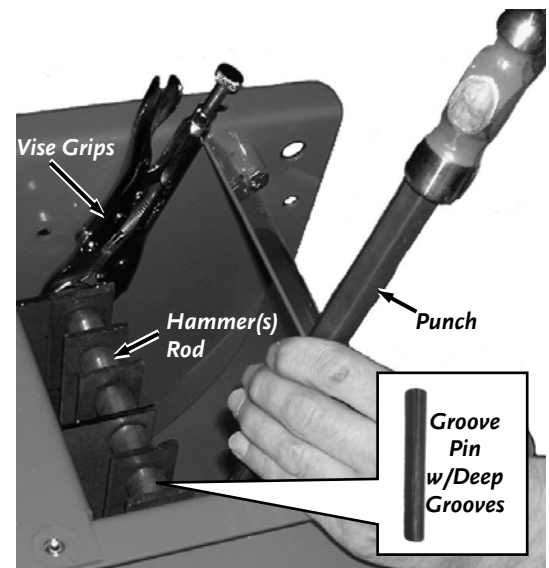


Figure 27

**NOTE:** Be sure you reinstall the Hammers and Spacers in exactly the same order that they were removed. Refer to the Rotor Assembly Schematic on page 37 for the correct order.

12. Replace the old Groove Pin (small grooved end in first) with a new one.

13. Repeat steps 4 through 10 for the remaining three Hammer(s) Rods.

**Tip:** To remember which Hammer(s) Rod you have reworked, it may be helpful to mark the end of the Rods with a marker or tape.

14. Reinstall the Top Plate, Shredder Hopper, Access Cover Plate, Belt Guard, Screen, and the Baffle Plate.

### **Removing and Replacing the Clutch**

The design of the Clutch on your machine is for rugged, dependable service, however, it is important to understand the limitations of a Clutch. The Clutch provides load free starting of the Engine and provides slippage under excessive overloading of the driven application. These features help protect the Engine from damages such as broken crankshafts and starters. The Clutch on this machine is permanently lubricated and does not require oil or grease. The Drum, Shoes, and Springs in the Clutch are normal wear items. If you notice decreased performance of the Clutch, check and replace it if necessary.

The Clutch obtains its power from the Engine RPM. The lower the engagement speed, and the higher the maintained Engine speed, the more torque the Clutch can transfer to the driven unit. **NEVER operate the DR Chipper w/Shredder Engine at less than full RPM.**

**Note:** At engine start-up, the engine of your chipper operates under no load until approximately 1800 RPM, at which speed the centrifugal clutch engages and begins driving the rotor.

---

## **NOTICE**

- Do not tamper with the engine's governor setting. The governor controls the maximum safe operation speed and protects the engine. Over-speeding the engine is dangerous and will cause damage to the engine and to the other moving parts of the machine. See your authorized dealer for any engine governor adjustments.
  - Become familiar with successful operating conditions and avoid those that can overload and damage the machine.
  - Do not overload or attempt to chip material beyond manufacturers recommendation. Personal injury or damage to the machine could result. Learn to recognize the sound of the machine during an overload condition. Only your operator experience will tell you how fast you can successfully feed material into the machine.
  - If overloading or any other cause jams the machine, stop the machine immediately. If you jam the machine and do not stop the engine, it can burn the drive belt and/or ruin the clutch. Clutch damage can be costly and it may not be covered under warranty. For this reason, it is important that you immediately shut off the machine if it becomes jammed.
  - The centrifugal clutch on this machine is permanently lubricated and does not require oil or grease. If, after long periods of use, the drum wobbles excessively, replace the clutch assembly. Always replace shoes and springs in sets. Whenever shoes are changed, replace all springs.
- 

### Installing a new Clutch Assembly

**Note:** If a Clutch part malfunctions, it could jeopardize the integrity of other Clutch components. If you have problems with the Clutch, a Clutch Kit is available, but we recommend replacing your Clutch as a complete assembly.

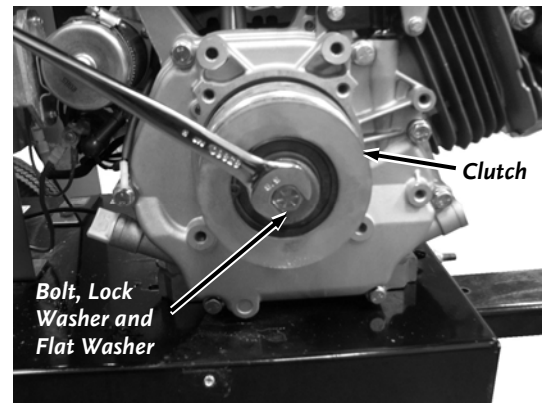
#### **Tools and Supplies Needed:**

- 5/8" Wrench or Air Wrench and Socket
- Anti-seize compound

1. Remove the Belt Guard and Belt (see "Removing and Replacing the Drive Belt" in this Chapter).

**Note:** You may need to use an Air Wrench to break the Clutch Bolt loose depending how tight it is on the Engine shaft.

2. With a 5/8" Wrench, remove the Clutch Bolt, Lock Washer and Washer and then slide the Clutch from the Crankshaft (**Figure 28**).
3. Remove the Key from the keyway in the Engine Crankshaft and set it aside.
4. Clean the engine crankshaft and remove any burrs, then apply Anti-seize compound to the Crankshaft.
5. Install the Key in the keyway of the new Clutch hub, align the Key with the slot in the Engine Crankshaft, and slide the new Clutch Assembly onto the shaft.
6. Secure the Clutch with the Washer, Lock Washer and Clutch Bolt using a 5/8" Wrench.
7. Reinstall the Drive Belt and set the Drive Belt tension and alignment (see "Removing and Replacing the Drive Belt" in this Chapter).
8. Reinstall the Belt Guard (see "Removing and Replacing the Drive Belt" in this Chapter).



**Figure 28**

### **Battery Care**

Proper care can extend the life of a Battery. Follow these recommendations to ensure your Battery's best performance and long life:

- Do not allow the Battery charge to get too low. If the machine is not used, charge the Battery every 4 – 6 weeks. Operate the Engine for at least 45 minutes to maintain proper Battery charge.
- Store an unused Battery in a dry area that does not freeze.
- Do not charge an already charged Battery. In theory, you cannot overcharge our Battery with a trickle charger; however, when a Battery is fully charged and the Charger is still on, it generates heat that could be harmful to the Battery. A fully charged Battery will read 12V-13.2V with a voltmeter.
- Do not continue to crank your Engine when the Battery charge is low.

### **Charging the Battery**

Operate the Engine for at least 45 minutes to maintain proper Battery charge. If the Battery loses its charge, you will need to use a trickle charger (like the DR Battery Charger) to recharge it. The Charger should have an output of 12 volts at no more than 2 amps.

- At 1 amp, the Battery may need to be charged for as long as 48 hours.
- At 2 amps, the Battery may need to be charged for as long as 24 hours.

To connect a Battery Charger to your DR Chipper w/Shredder, follow the steps listed below.

1. Attach the black (-) Battery Charger wire to the Battery negative (-) terminal, and attach the red (+) Battery Charger wire to the Battery positive (+) terminal.
2. Plug the Battery Charger into an outlet.

### **NOTICE**

When you are finished charging the Battery, disconnect the Charger from the outlet first, then disconnect the Battery Charger wires from the Battery. If you leave the Battery Charger wires connected to the Battery, the Battery will discharge itself back into the Charger.

## ***Recycling a Used Battery***

Please dispose of your used batteries responsibly by recycling them. Call your local Solid Waste Management District or your local waste handler to locate the collection site nearest you. Some collection sites recycle batteries year-round; others collect them periodically.

You can also visit the Website of Earth 911 for more information ([www.earth911.org](http://www.earth911.org)). Once there, click the Municipal HHW link under Hazardous Household Waste, and enter your zip code. The site lists recycling centers located near you.

For a fee, you can recycle your batteries with the International Metals Reclamation Company. Visit them at [www.inmetco.com](http://www.inmetco.com) and click Services, then click Battery Recycling; or contact them at:

INMETCO, PO Box 720, 245 Portersville Road, Ellwood City, PA 16117

(724) 758-2800; fax (724) 758-2845

To learn more about hazardous waste recycling, visit the Website for Battery Council International ([www.batterycouncil.org](http://www.batterycouncil.org)) or for the Environmental Protection Agency ([www.epa.gov](http://www.epa.gov)).

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### **NOTICE**

Please dispose of used batteries responsibly, according to your local hazardous Materials regulations. Never throw away used batteries in your household trash.

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## Chapter 5: Troubleshooting

Most problems are easy to fix. Consult the Troubleshooting Table below for common problems and their solutions. If you continue to experience problems, contact us at [www.DRpower.com](http://www.DRpower.com) or call toll-free 1-800-DR-OWNER (376-9637) for support.

### **WARNING**

Shut down the Engine, remove the Spark Plug Wire, and wait 5 minutes before performing any maintenance procedure or inspection on the Chipper w/Shredder.

### Troubleshooting Table

SYMPTOM	POSSIBLE CAUSE
<p><i>The Engine will not start.</i></p> <p><i>(Please refer to the Engine Owner's Manual for Engine-specific procedures.)</i></p>	<ul style="list-style-type: none"> <li>⇒ Check all the items under the section "Starting the Engine" on page 15.</li> <li>⇒ Check that the Spark Plug Wire is attached.</li> <li>⇒ Check the wiring behind the Key Switch; it may have vibrated off the Switch Terminals.</li> <li>⇒ Check the wire connections—especially the ground connection, the large black wire coming from the Battery, where it connects to the Engine.</li> <li>⇒ Make sure that the Battery is charged. See the Battery Care section on page 28.</li> <li>⇒ The Air Filter may be dirty; change it following the procedure in the Engine Owner's Manual.</li> <li>⇒ The gas may be old; change it if necessary. Use a fuel stabilizer if you keep gas longer than one month.</li> <li>⇒ The Spark Plug may be dirty or cracked; change them if necessary. If there are oily, leave them out, hold a rag over the Plug Holes and crank the Engine several times to blow out any oil in the Cylinders, then wipe off the Plug and reinsert it. NEVER run the engine with a cracked spark plug.</li> <li>⇒ If your Engine still won't start, visit our website at <a href="http://www.DRpower.com">www.DRpower.com</a>.</li> </ul>
<p><i>The Engine lacks power or is not running smoothly.</i></p> <p><i>(Please refer to the Engine Owner's Manual for engine-specific procedures.)</i></p>	<ul style="list-style-type: none"> <li>⇒ Make sure the Choke Lever is pushed in all the way to the RUN position.</li> <li>⇒ Make sure that the Throttle Lever is all the way up to the FAST position.</li> <li>⇒ The Air Filter may be dirty; change it following the procedure in the Engine Owner's Manual.</li> <li>⇒ The Spark Plug may be dirty or cracked; change them if necessary. If there are oily, leave them out, hold a rag over the Plug Holes and crank the Engine several times to blow out any oil in the Cylinders, then wipe off the Plug and reinsert it. NEVER run the engine with a cracked spark plug.</li> <li>⇒ The gas may be old; change it if necessary. Use a fuel stabilizer if you keep gas longer than one month.</li> <li>⇒ The Engine oil may be dirty. Change it if necessary.</li> <li>⇒ Check that the Cooling Fins are clean and free of debris. Clean as needed.</li> <li>⇒ If your Engine still lacks power, visit our website at <a href="http://www.DRpower.com">www.DRpower.com</a>.</li> </ul>
<p><i>Engine smokes.</i></p> <p><i>(Please refer to the Engine Owner's Manual for engine-specific procedures.)</i></p>	<ul style="list-style-type: none"> <li>⇒ Check the oil level and adjust as needed.</li> <li>⇒ You may be operating the machine on too great an incline. The machine should be level.</li> <li>⇒ The Air Filter may be dirty; change it following the procedure in the Engine Owner's Manual.</li> <li>⇒ You may be using the wrong oil - too light for the temperature. Refer to your Engine Owner's Manual for detailed information.</li> <li>⇒ Check that the Cooling Fins are clean and free of debris. Clean as needed.</li> <li>⇒ If your Engine still smokes, visit our website at <a href="http://www.DRpower.com">www.DRpower.com</a>.</li> </ul>

## Troubleshooting Table (Continued)

### **WARNING**

Shut down the Engine, remove the Spark Plug Wire, and wait 5 minutes before performing any maintenance procedure or inspection on the Chipper w/Shredder.

SYMPTOM	POSSIBLE CAUSE
<i>The Engine runs but the Flywheel doesn't rotate.</i>	<ul style="list-style-type: none"> <li>⇒ The Throttle Lever should be in the FAST position to engage the Clutch.</li> <li>⇒ The Drive Belt is loose, off or broken. Reinstall, re-tension, or change Belt (refer to "Chapter 4: Maintaining the DR Chipper w/Shredder").</li> <li>⇒ Remove any built-up debris from the Chipper w/Shredder Hopper Inlet(s) and Discharge Chute.</li> <li>⇒ The inner Shoes of the Clutch are worn and/or the Clutch Shoe Retaining Springs are weak or broken. Change the Clutch (refer to "Chapter 4: Maintaining the DR Chipper w/Shredder").</li> </ul>
<i>Shredding and chipping action seems too slow or flywheel stalling.</i>	<ul style="list-style-type: none"> <li>⇒ The Engine speed is too slow causing the Belt to slip. Run the Engine at full throttle (FAST).</li> <li>⇒ Check for loose or damaged Drive Belt; tighten or replace.</li> <li>⇒ Check for a dull or damaged Knife; sharpen or replace the Knife.</li> <li>⇒ Check for a clogged Shredder Screen, clean if necessary.</li> </ul>
<i>Belt frays or falls off frequently.</i>	<ul style="list-style-type: none"> <li>⇒ The Drive Pulley or Clutch groove may be nicked. Check the Drive Belt for wear and hard spots. File off any nicks on the Drive Pulley or Clutch.</li> <li>⇒ The Drive Belt may be stretched; readjust or replace it.</li> </ul>
<ul style="list-style-type: none"> <li>- Clutch overheats.</li> <li>- Belt burns.</li> <li>- Flywheel won't turn.</li> </ul>	<ul style="list-style-type: none"> <li>⇒ Immediately stop the Engine and remove the Spark Plug Wire.</li> <li>⇒ Turn the Flywheel with a wooden stick to be sure it turns freely.</li> <li>⇒ Check the Drive Belt tension.</li> <li>⇒ Remove any built-up debris from the Chipper w/Shredder Hopper Inlet(s) and Discharge Chute.</li> </ul>
<i>The machine has excessive vibration.</i>	<ul style="list-style-type: none"> <li>⇒ Check for a dull or damaged Knife; sharpen or replace the Knife.</li> <li>⇒ The Rotor is out of balance. Check the Rotor Assembly for any missing or broken Hammers or Spacers; replace if necessary.</li> <li>⇒ The Knife may not be seated properly on the Flywheel. Loosen the Knife mounting screws, reset the Knife, and tighten the screws. Also, check the Knife to Wear Plate Gap.</li> <li>⇒ If your machine still exhibits excessive vibration, visit our website at <a href="http://www.DRpower.com">www.DRpower.com</a>.</li> </ul>
<i>When chipping, the log seems to vibrate excessively and "hammers" my hands.</i>	<ul style="list-style-type: none"> <li>⇒ The Knife is dull; sharpen or replace it.</li> <li>⇒ The gap between the Knife and Wear Plate is too great; adjust the Gap.</li> </ul>
<i>Chipper Knife is hitting the Wear Plate.</i>	<ul style="list-style-type: none"> <li>⇒ The gap between the Knife and the Wear Plate is set incorrectly; adjust the Knife to Wear Plate Gap.</li> </ul>
<i>The machine's wheels track left or right while being towed.</i>	<ul style="list-style-type: none"> <li>⇒ Check the tire pressure and set to the recommended pressure stamped on the side of the tire.</li> </ul>



## Chapter 6: Parts Lists and Schematic Diagrams

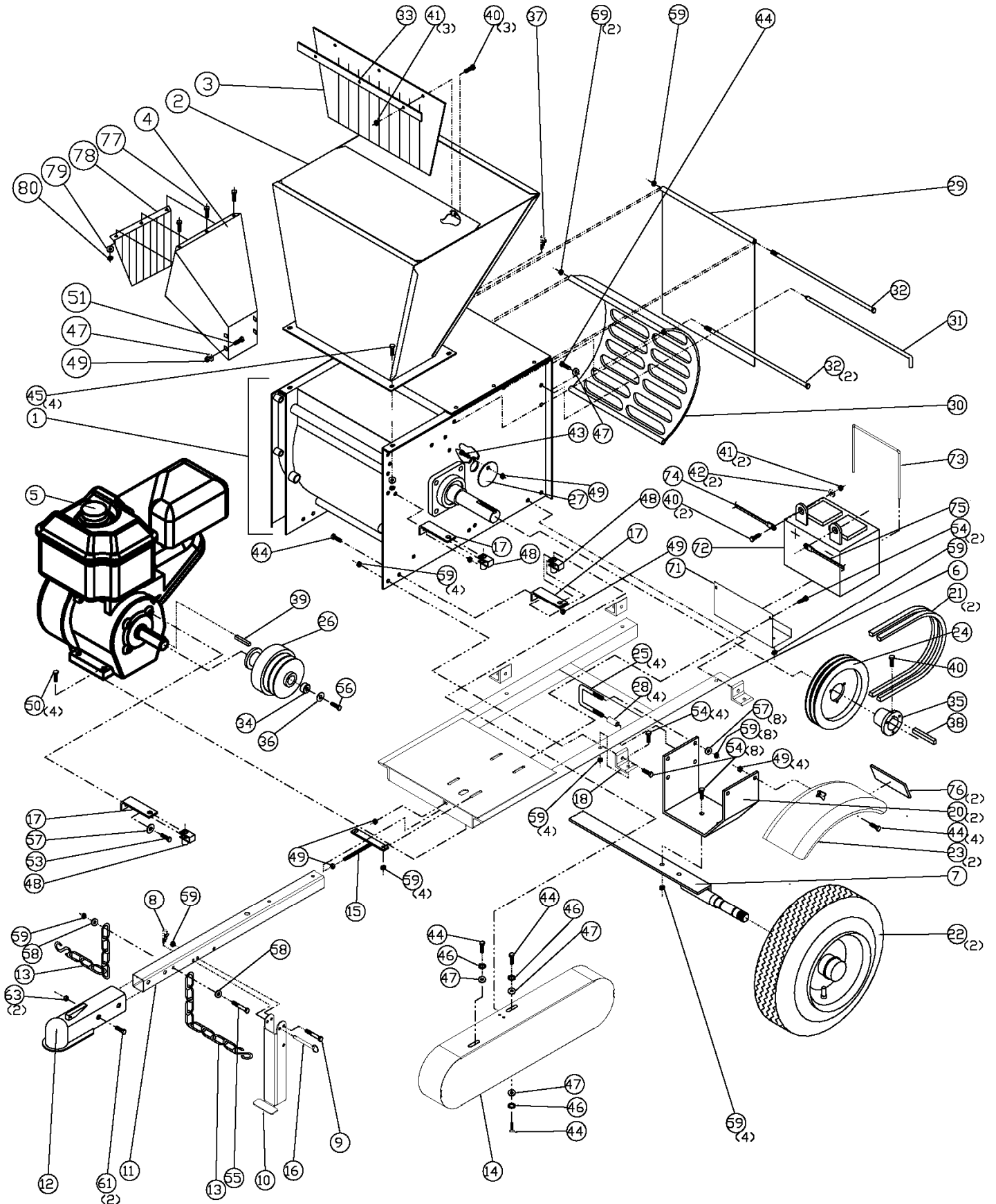
### Parts List – DR CHIPPER W/SHREDDER ASSEMBLY

**NOTE:** Part numbers listed are available through DR Power Equipment.

<u>Ref#</u>	<u>Part#</u>	<u>Description</u>	<u>Ref#</u>	<u>Part#</u>	<u>Description</u>
01	21692	Basic Machine	37	14585	Hair Spring, 3/16"
02	37539	Shredder Hopper	38	16612	Key, Shaft, Square, 3/8" x 1-1/2"
03	18580	Guard, Flex	39	14444	Key, Shaft, Square, 1/4" x 2"
04	37540	Chipper Hopper	40	11983	Bolt, HHCS, 1/4"-20 x 3/4", GR5
05	37541	Engine, B&S, 2100 Series, E/S	41	14340	Nut, Nylon Lock, 1/4" - 20
06	37542	Frame	42	15480	Washer, Flat, 1/4", USS
07	20166	Axle	43	14964	Bolt, HHCS, 5/16"-18 x 5/8", GR5
08	18258	Hair Spring, 1/8"	44	14605	Bolt, HHCS, 5/16"-18 x 1", GR5
09	21714	Bolt, HHCS, 3/8-16 x 3"	45	13443	Bolt, HHCS, 5/16"-18 x 1-1/2", GR5
10	37543	Hitch Leg	46	15510	Washer, Lock, Split, 5/16"
11	37544	Hitch Tube	47	14515	Washer, Flat, 5/16", USS
12	16101	Trailer Hitch	48	18589	J-Nut, 5/16"-18
13	14891	Trailer Safety Chain, 3/16", Class 1	49	14313	Nut, Lock, Nylon, 5/16"-18
14	37545	Belt Guard	50	14517	Bolt, HHCS, 5/16"-18 x 2", GR5
15	15418	Belt Tensioner	51	14529	Bolt, Carriage, 5/16"-18 x 3/4"
16	37546	Ring Pin, 3/8" x 2-3/4"	53	12335	Bolt, HHCS, 3/8"-16 x 3/4"
17	37547	L - Bracket	54	12334	Bolt, HHCS, 3/8"-16 x 1-1/4"
18	37548	Angle, Basic to Frame (Matched Set of 2)	55	15389	Bolt, HHCS, 3/8"-16 x 3-1/2"
20	16793	Formed Bracket	56	16791	Bolt, HHCS, 3/8"-24 x 1-1/2"
21	38125	Belt, 5L640	57	21651	Washer, Lock, Split, 3/8"
22	14919	Wheel and Tire Assembly w/Hub	58	14516	Washer, Flat, 3/8", USS
23	24259	Fender	59	15448	Nut, Lock, Nylon, 3/8"-16
24	37549	Sheave, 2 Groove	61	14241	Bolt, HHCS, 1/2"-13 x 3"
25	20032	U - Bolt, 3/8"-16 x 3" x 2" between	63	14240	Nut, Lock, Nylon, 1/2"-13
26	37550	Clutch, 2 Groove, A/B	71	16796	Battery Box
27	18594	Plate, Cover	72	10483	Battery
28	37562	Spacer	73	16799	Battery Hold Down
29	18597	Baffle	74	37552	Cable, Battery, Positive
30	37551	Bar Screen	75	37553	Cable, Battery, Negative
31	18598	Screen and Baffle Rod	76	14233	Decal, Reflector
32	18599	Tie Rod, HHCS, 3/8"- 6 x 15"	77	25368	Screw, HHMS, 10-24 x 3/4"
33	18581	Bar, Retaining	78	20015	Shield, Blow Back, Chipper Hopper
34	16207	Spacer	79	37554	Washer, .205 ID x 3/4" OD x .060
35	35341	Bushing, Taper Lock, 1610 x 1-7/16" ID	80	20212	Nut, Lock, Nylon, 10-24
36	16208	Washer, 3/8"			



**Schematic – DR CHIPPER W/SHREDDER ASSEMBLY**

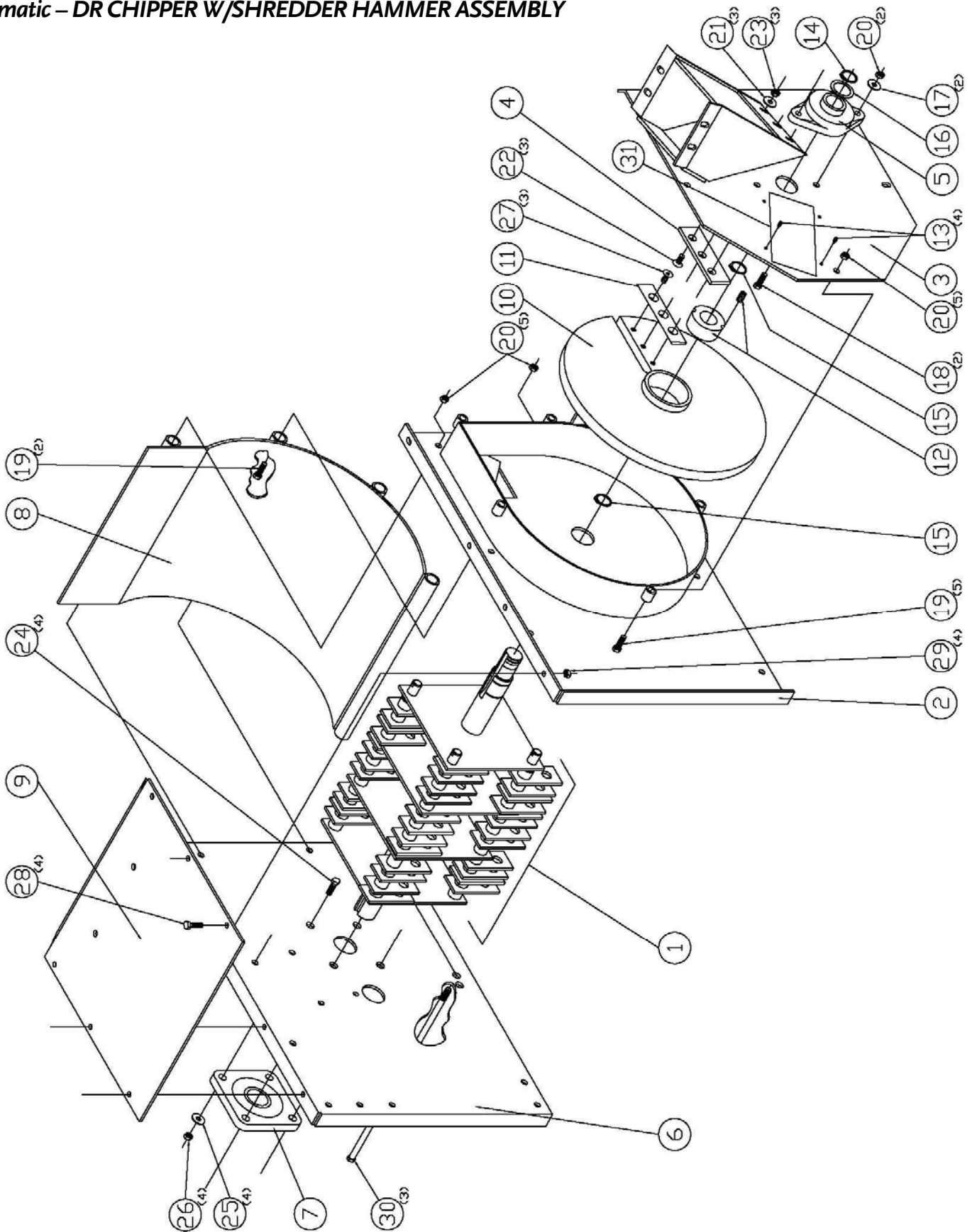


## Parts List – DR CHIPPER W/SHREDDER HAMMER ASSEMBLY

**NOTE:** Part numbers listed are available through DR Power Equipment.

<u>Ref#</u>	<u>Part#</u>	<u>Description</u>
01	18601	Rotor Assembly w/Hammers
02	37555	Chipper Side Plate
03	37556	Chipper Chute Plate
04	37557	Wear Plate Kit
05	18605	2 Bolt Bearing, 1-3/16" Bore
06	37558	Drive Side Plate
07	18607	4 Bolt Bearing, 1-7/16" Bore
08	37559	Scroll
09	37560	Top Plate
10	37561	Chipper Disc w/Knife
11	16764	Knife, Chipper
12	18592	Taper Lock Bushing, 1-7/16" ID
13	15512	Self-Tapping Screw, 10-32 x 3/8"
14	15295	Retaining Ring, 1-3/16"
15	21716	Retaining Ring, 1-7/16"
16	15526	Washer, 1.565" OD x 1.192" ID x .050" Thick
17	14515	Washer, Flat, 5/16" USS
18	15449	Bolt, HHCS, 3/8"-16 x 1-1/4"
19	11985	Bolt, HHCS, 3/8"-16 x 1-1/2"
20	21639	Nut, Lock, 3/8"-16
21	14339	Washer, Flat, 1/4" SAE
22	19566	Bolt, Carriage, 1/4"-20 x 1"
23	14340	Nut, Lock, Nylon, 1/4"-20
24	18611	Bolt, HHCS, 1/2"-13 x 1-1/2"
25	18612	Washer, Lock, 1/2" Split
26	14240	Nut, Lock, 1/2"-13
27	14067	Screw, Allen Head, 5/16"-18 x 1"
28	16779	Bolt, HHCS, 5/16"-18 x 3/4"
29	18613	Nut, Lock, 5/16"-18
30	18599	Tie Rod, HHCS, 3/8"-16 x 15"
31	16798	Cover, Access

**Schematic – DR CHIPPER W/SHREDDER HAMMER ASSEMBLY**

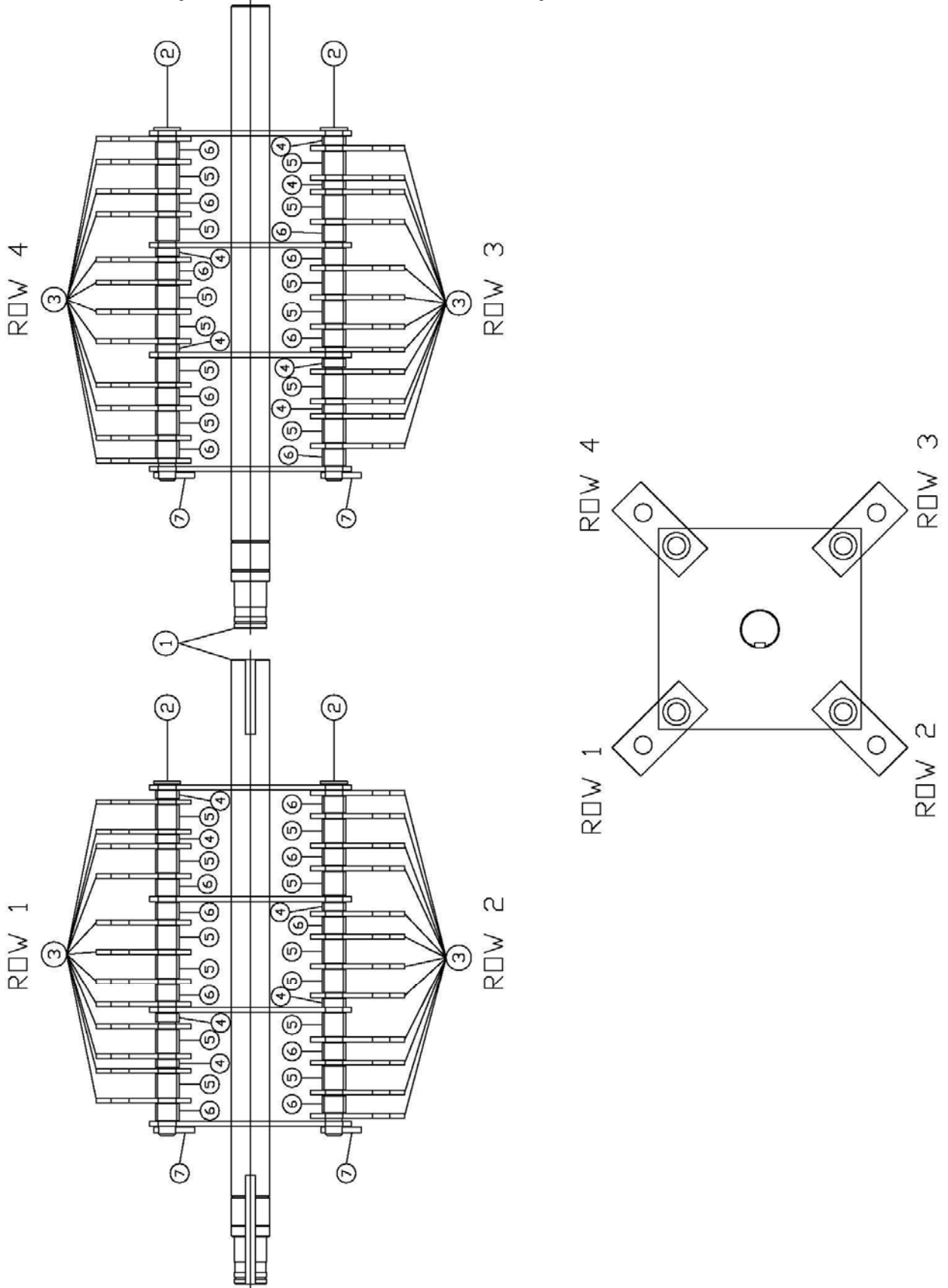


## **Parts List – DR CHIPPER W/SHREDDER ROTOR ASSEMBLY w/HAMMERS**

**NOTE:** Part numbers listed are available through DR Power Equipment.

<b>Ref#</b>	<b>Part#</b>	<b>Description</b>
01	18614	Weldment, Rotor
02	18615	Rod, Hammer
03	18579	Hammer
04	18616	Spacer, 5/16"
05	18617	Spacer, 7/8"
06	15853	Spacer, 5/8"
07	18618	Pin, Groove, 13/64" Dia. x 1-1/2" L

**Schematic – DR CHIPPER w/SHREDDER ROTOR ASSEMBLY w/HAMMERS**



**NOTES:**

**NOTES:**

## Daily Checklist for the DR CHIPPER W/SHREDDER

To help maintain your DR Chipper w/Shredder for optimum performance, we recommend you follow this checklist each time you use your Chipper w/Shredder.

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### WARNING

Before performing any maintenance procedure or inspection, stop the Engine, wait five (5) minutes to allow all parts to cool. Disconnect the Spark Plug Wire keeping it from the Spark Plug

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- [ ] Check the Engine oil and Fuel Tank levels
- [ ] Check that the Engine is clean and free of debris.
- [ ] Inspect the Hopper(s) for accumulated debris.
- [ ] Check the general condition of the Chipper w/Shredder, e.g.; nuts, bolts, welds, etc.
- [ ] Check the Belt for wear and/or stretching.
- [ ] Check Tire Pressures and wear.
- [ ] Check the Chipper Knife for tightness, nicks and wear.
- [ ] Check the Wear Plate for tightness and nicks; the edge should be square.
- [ ] Check the Debris Guard for wear and damage.
- [ ] Remove any debris wrapped around the Hammer(s) Rotor.

### End of Season and Storage

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### WARNING

Before performing any maintenance procedure or inspection, stop the Engine, wait five (5) minutes to allow all parts to cool. Disconnect the Figure 18

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**NOTE:** Please refer to the Engine Owner's Manual for Engine-specific procedures.

- Change the Engine oil and Oil Filter.
- Clean or replace the Air Filter and Fuel Filter (if equipped).
- Check the Chipper Knife, Hammers, and Wear Plate for nicks and wear.
- Remove any debris wrapped around the Hammer(s) Rotor.
- If your DR Chipper w/Shredder will be idle for more than 30 days, we recommend using a gas stabilizer. This will prevent sediment from gumming up the Carburetor. If there is dirt or moisture in the gas or tank, remove it by draining the tank. 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 leakage.
- Clean the exterior of the unit to remove all dirt, grease, and any other foreign material. To prevent rust, touch up painted surfaces that have been scratched or chipped.
- Be sure all nuts, bolts, and screws are securely fastened.
- Inspect moving parts and the Drive Belt for damage and wear; replace if necessary.
- Remove the Spark Plug and pour about 1 ounce of motor oil into the cylinder hole. Reinstall the Plug and engage the Electric Starter for a few seconds. This will coat the pistons and seat the valves to prevent moisture buildup.
- If possible, store the Chipper w/Shredder in a dry, protected place. If it is necessary to store the machine outside, after the DR Chipper w/Shredder has cooled, cover the machine with a suitable protective cover that does not retain moisture. Do not use plastic as this material cannot breathe; it also allows condensation to form, which will cause your machine to rust.
- Remove the Battery or store your DR Chipper w/Shredder in a dry environment where the temperature is between -10° F (-23° C) and +85° F (+23° C). Make sure the storage temperatures will never be outside these limits.



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