

RG13II

OPERATOR • MAINTENANCE • PARTS MANUAL



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Introduction

This manual is published by Rayco Manufacturing, Inc. for the benefit of the users of Rayco products. Rayco Manufacturing, Inc. has made every effort to ensure that this manual is correct and up to date at the time of publication. However, due to continuous improvements, Rayco Manufacturing, Inc. reserves the right to make changes in the contents, at any time, without notice or obligation.

Each machine shipped contains operation, maintenance & parts manuals to familiarize the operator with the proper operating, lubricating and maintenance instructions. This helps to ensure the best possible performance and service from the machine. Read and understand all instructions before attempting to operate this machine. This manual should be

readily available for reference at all times. Additional copies of this manual may be purchased from Rayco.

This Rayco machine was designed and manufactured by Rayco Manufacturing, Inc., Wooster, Ohio. Due to continuous improvements, Rayco reserves the right to make changes in engineering, design and specifications, or discontinue manufacture, at any time, without notice or obligation.

Always have a record of the model numbers and serial numbers for your machine to specify when ordering parts. Record your machine model and serial numbers on page 4 for your personal records.

NOTICE:

Maintenance and Repairs should ONLY be performed by a trained specialists or qualified personel.

Please contact Rayco Mfg for a listing of approved maintenance facilities in your area.

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Foreword

Literature Information

The operators manual should be stored in the operator's compartment in the literature holder storage area. Rayco provides a binder to hold the Operator Service Manual, Parts Manual, Engine Manual along with other component manuals. These manuals contain safety information, operation instruction, transportation information, lubrication information and maintenance information.

Some photographs or illustrations in the publication show details of attachments that can be different from your machine. Guards and covers might have been removed for illustrative purposes. Continuing improvement may have caused changes to your machine which may not be included in this publication. Continuing improvement and advancement of product design might have caused changes to your machine which are not included in this publication. Read, study and keep this manual with the machine.

Whenever a question arises regarding your machine, of this publication, please consult your Rayco dealer for the latest available information.

Safety

The safety section lists basic safety precautions. In addition, this section may include text and locations of warning signs and labels used on the machine.

Read and understand the basic precautions listed in the safety section before operating or performing lubrication, maintenance and repair on this machine.

Parts

Parts are readily found through illustrations with accompanying Rayco part numbers. The machine assembly is listed by basic groups to enable ease of finding parts.

Please consult your local Rayco Dealer or local Engine Manufacturer Dealer for obtaining engine parts and service

Operation

The operation section is a reference for the new operator and a refresher for the experienced operator. This section includes a discussion of gauges, switches, machine controls, attachment controls, transportation and towing information. Photographs and illustrations guide the operator through correct procedures of checking, starting, operating and stopping the machine.

Operating techniques outlined in this publication are basic. Skill and techniques develop as the operator gains knowledge of the machine and its capabilities.

Maintenance

The maintenance section is a guide to equipment care. The Maintenance Interval Schedule lists the items to be maintained at a specific service interval. The Maintenance Interval Schedule lists the page number for the step-by-step instructions required to accomplish the scheduled maintenance procedure.

Maintenance Intervals

Use the service hour meter to determine servicing intervals. Calendar intervals shown (daily, weekly, monthly, etc.) can be used instead of service hour meter intervals if they provide more convenient servicing schedules and approximate the indicated service hour meter reading. Recommended service should always be performed at the interval that occurs first.

Under extremely severe, dusty or wet operating conditions, more frequent lubrication than is specified in the maintenance intervals chart might be necessary.

Perform service on items at multiples of the original requirement. For example, at every 100 service hours, also service those items listed under every 50 service hours and every 10 service hours or daily.

CALIFORNIA Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

Battery posts, terminals and related accessories contain lead and lead compounds. Wash hands after handling.

Certified Engine Maintenance

Proper maintenance and repair is essential to keep the engine and machine systems operating correctly. As the heavy duty off-road engine owner, you are responsible for the required maintenance listed in the Engine Owner Manual & Machine Operator, Maintenance & Service Manual.

Attach a “Do Not Operate” warning tag or a similar warning tag to the start switch or to the controls before you service the equipment or before you repair the equipment.

Know the width of your equipment in order to maintain proper clearance with you operate the equipment near fences or near boundary obstacles.

Be aware of high voltage power lines and power cables that are buried. If the machine comes in contact with these hazards, serious injury or death may occur from electrocution.

Wear a hard hat, protective glasses, and other protective equipment, as required.

Do not wear loose clothing or jewelry that can snag on controls or on other parts of the equipment.

Make sure that all protective guards and all covers are secured in place on the equipment.

Keep the equipment free from foreign material. Remove debris, oil, tools, and other items from the deck, from walkways, and from steps.

Secure all loose items such as lunch boxes, tools, and other items that are not a part of the equipment.

Know the appropriate work site hand signals and the personnel that are authorized to give the hand signals. Accept hand signals from one person only.

Do not smoke when you service an air conditioner. Also, do not smoke if refrigerant gas may be present. Inhaling the fumes that are released from a flame that contact air conditioner refrigerant can cause bodily harm or death. Inhaling gas from air conditioner refrigerant through a lighted cigarette can cause bodily harm or death.

Never put maintenance fluids into glass containers. Drain all liquids into a suitable container.

Obey all local regulations for the disposal of liquids.

Use all cleaning solutions with care. Report all necessary repairs.

Do not allow unauthorized personnel on the equipment.

Unless you are instructed otherwise, perform maintenance with the equipment in the servicing position. Refer to Operation and Maintenance Manual for the procedure for placing the equipment in the servicing position.

When you perform maintenance above ground level, use appropriate devices such as ladders or man lift machines. If equipped, use the machine anchorage points and use approved fall arrest harnesses and lanyards.

Machine Description Design

The RG13II STUMP CUTTER is designed for your maximum benefit per dollar spent. The machine is constructed for durability and easy maneuvering, for those hard to reach tree stumps and roots. Its 11" diameter x 3/8" thick cutting wheel with 8 replaceable carbide-tipped teeth is powerfully driven by a Honda 13 horsepower engine. The operator benefits from a steel cutting wheel guard and full protection from heavy rubber curtains below the chassis. Other special features of the RG 13 STUMP CUTTER include; an operator's presence system, adjustable handlebar positioning, centrifugal clutch for easy starting, steel guards surrounding moving parts and convenient access for tightening the V - belt.

How it works

The machine removes tree stumps by the repeated gradual sweeping of a multi-toothed high-speed rotating cutting wheel. The cutting wheel has teeth on its side, in a strategic pattern. The rotating cutting wheel takes a sweep from one side of the stump to the other, each tooth rapidly tearing and stripping away small pieces of stump. After each sweep of 1 to 2 inches of depth, the cutting wheel is advanced deeper into the stump, and the procedure is continuously repeated, under the precise control of the operator, until the stump is satisfactorily removed.



Serial Number Location & Information

Serial Numbers Location

Whenever communicating with Rayco or your Rayco dealer, have your machine serial number handy, as it can help pinpoint most exactly what information is needed in caring for your machine.

Breakdown of the serial number

For Example:RG13II 001 01 14

MWF13II - Type of Rayco equipment you have

001 - Three digit for the number of produced

01 - Two digit month, 01 = Jan., 02 = Feb., etc...


14 - Two digit year, 14 = 2014, 15 = 2015, etc

It is attached to the machine at the location shown. For ready reference, record it in the boxes provided on the inside front cover of this manual.

For reference on communication regarding the engine, record its model and serial numbers also in the boxes provided on the inside front cover of this manual. See the Engine Operator Manual for assistance in locating the numbers on the engine.

Type of Rayco Equipment 001= The three digit number of produced Production Date; 01=2 digit month; 14= 2 digit year

SN/VIN	MWF 13 II	0010114
MDL/BUILD CD	RG 13 II	
GVW/GVWR		MDL YR 2014



MODEL REF. ONLY

Serial Number Location & Information

Serial number is located as shown.

Use the below table to record identification numbers and dealer information.



Identification Numbers

	Model Number	Serial Number
Machine		
Engine		
Implement		
Implement		

Dealer Information

Name	
Address	

	Dealer Contact	Phone Number	Hours
Sales			
Parts			
Service			

Safety

Important Safety Information

Most accidents that involve product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards. This person should also have the necessary training, skills and tools to perform these functions properly.

Improper operation, lubrication, maintenance or repair of this product can be dangerous and could result in injury or death.

Do not operate or perform any lubrication, maintenance or repair on this product, until you have read and understood the operation, lubrication, maintenance and repair information.

Safety precautions and warnings are provided in this manual and on the product. If these hazard warnings are not heeded, bodily injury or death could occur to you or to other persons.

The hazards are identified by the "Safety Alert Symbol" and followed by a "Signal Word" such as **"DANGER"**, **"WARNING"** or **"CAUTION"**. The Safety Alert "WARNING" label is shown below.

Safety Warnings

To highlight specific safety information the following designations are provided to assist the reader.



This is the "Safety Alert" symbol. It is used to ALERT you to the potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



Indicates an imminently hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

A message, either written or pictorial, follows to explain the hazard. Rayco cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this

publication and on the product are therefore not all inclusive. If you desire to make use of a tool, procedure, work method, or operating technique not specifically recommended by Rayco, you must use it only if you have accurately evaluated it and found that it threatens no one's safety. You should also ensure that the product will not be damaged or made unsafe by the operation, lubrication, maintenance, or repair procedures that you choose.

The procedures described in this "Safety" section may not be fully explained here, but a more complete explanation is given in the "Operation", or in the "Maintenance" section.

The information, specifications, and illustrations in this publication are on the basis of information that was available at the time that the publication was written. The specifications, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service that is given to the product. Obtain the complete and most current information before you start any job. Rayco dealers have the most current information available.

Rayco Manufacturing, Inc. is greatly concerned with the safety of the operator, as well as all in the vicinity of his work.

Rayco has provided shields, guards, safety decals and other important safety features to aid in using the machine properly. In order to further ensure your safety we ask that you properly operate and service your machine.

This machine is capable of amputating hands and feet and throwing objects.

Failure to observe safety instructions, improper operation, lubrication, maintenance, or repair of this product could result in severe injury or death.

Do not operate or perform any lubrication, maintenance, or repair on this product, until you have read, you understand, and you decide to do so in compliance with all of the operation, lubrication, maintenance, and troubleshooting information contained in these Operator and Parts Manuals and that contained in the Engine Operator Manual, which are included with this machine. Additional manuals are available from Rayco or your Rayco dealer.

When replacement parts are required for this product Rayco recommends using Rayco replacement parts or parts with equivalent specifications including, but not limited to, physical dimensions, type, strength and material.

Failure to heed this warning can lead to premature failures, product damage, personal injury or death.

Safety

General Hazard Information



- Read, understand and follow all instructions on the machine and in the manuals before attempting to operate. Keep all manuals in a safe place for future reference and for ordering replacement parts.
- Familiarize yourself with all controls in a safe environment before operation. Know how to stop the machine and disengage the controls quickly.
- Never allow minors to operate this machine.
- Never allow anyone who has not had proper instruction to operate this machine.
- Keep bystanders, children and pets away from the machine and work area.
- Never allow anyone to ride on this machine.
- Never transport cargo, tools or wood on this machine.
- Keep the operator zone and adjacent area clear for safe, secure footing.
- Use the machine in daylight or under good artificial lighting.
- Use this machine for its intended purpose only, deviation from the machines capabilities could damage the equipment and cause injury or death.



- Engine exhaust contains products of combustion which can be harmful to your health. Always start and operate the engine in a well ventilated area. If you are in an enclosed area, vent the exhaust to the outside.

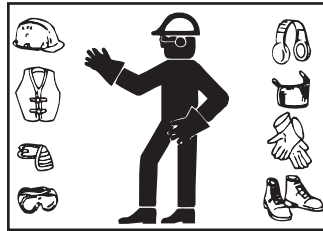
Personal Protective Equipment (PPE)

Head protection - must conform to ANSI Z89.1 and DO NOT wear under chin strapping while operating or within the operation area of the Horizontal Grinder.

Eye protection - must conform to ANSI Z87.1 and be the wrap around style. Always wear the eye protection when operating or working within the operational area of the machine.

Hearing Protection - Plug type ear protection or full ear coverage devices (muff type) shall be worn at all times when operating or within the operational area of the machine.

Gloves - When operating or handling brush within the operational area of the Horizontal Grinder, loose fitting gloves are the only gloves that should be worn. DO NOT wear gauntlet or strapped gloves.



Clothing Protection - Clothes must be close fitting, but not restrictive of movement. DO NOT wear loose fitting clothes, jewelry or long dangling clothing; i.e. neckties, long belts or chains.

Hooded sweat shirts may be worn only if the hood is tightly drawn around the face with drawstrings tucked into the outer garment when not in use. If working near traffic, wear reflective clothing.

Shoes - (Foot Protection)- Always over the ankle work boots with skid resistant soles.

Breathing Protection - When breathing protection is required the use of paper masks that can tear away if caught or entangled in material or machine must be worn.

Hooded sweat shirts may be worn only if the hood is tightly drawn around the face with drawstrings tucked into the outer garment when not in use. If working near traffic, wear

Safety

Flying Debris

Do not allow anyone to stand in front or directly behind the machine. **Flying debris could be thrown past guards and injure bystanders if they are in these areas.**

Pressurized Air and Water

Pressurized air and/or water can cause debris and/or hot water to be blown out. This could result in personal injury.

When pressurized air and/or pressurized water is used for cleaning, wear protective clothing, protective shoes, and eye protection. Eye protection includes goggles or a protective face shield.

The maximum air pressure for cleaning purposes must be reduced to 205 kPa (30 psi) when the nozzle is deadheaded and the nozzle is used with an effective chip deflector and personal protective equipment. The maximum water pressure for cleaning purposes must be below 275kPa (40 psi).

Trapped Pressure

Pressure can be trapped in a hydraulic system. Releasing trapped pressure can cause sudden machine movement or attachment movement. Use caution if you disconnect hydraulic lines or fittings. High pressure oil that is released can cause a hose to whip. High pressure oil that is released can cause oil to spray. **Fluid penetration can cause serious injury and possible death.**

Fluid Penetration

Pressure can be trapped in the hydraulic circuit long after



the engine has been stopped. The pressure can cause hydraulic fluid or items such as pipe plugs to escape rapidly if the pressure is not relieved correctly.

Do not remove any hydraulic components or parts until pressure has been relieved or personal injury may occur. Do not disassemble any hydraulic components or parts until pressure has been relieved or personal injury may occur. Refer to the Service Manual for any procedures that are required to relieve the hydraulic pressure

Always use a board or cardboard when you check for a leak. **Leaking fluid that is under pressure can penetrate body tissue. Fluid penetration can cause serious injury and possible death.** A pin hole leak can cause sever injury. If fluid is injected into your skin you must get treatment immediately. Seek treatment from a doctor that is familiar with this type of injury.

Containing Fluid Spillage

Care must be taken in order to ensure the fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the equipment. Prepare to collect the fluid with suitable containers before opening any compartment or disassembling any component that contains fluids.

- Tools that are suitable for collecting fluids and equipment that is suitable for collecting fluids
- Tools that are suitable for containing fluids and equipment that is suitable for containing fluids

Obey all local regulations for the disposal of liquids.

Asbestos Information

Rayco recommends the use of only genuine Rayco replacement parts. Use the following guidelines when you handle any replacement parts that contain asbestos or when you handle asbestos debris.

Use caution. Avoid inhaling dust that might be generated when you handle components that contain asbestos fibers. Inhaling this dust can be hazardous to your health.

The components that may contain asbestos fibers are brake pads, brake bands, lining material, clutch plates, and some gaskets. The asbestos that is used in these components is usually bound in a resin or sealed in some way. Normal handling is not hazardous unless airborne dust that contains asbestos is generated.

If dust that may contain asbestos is present, there are several guidelines that should be followed:

- Never use compressed air for cleaning.
- Avoid brushing materials that contain asbestos.
- Avoid grinding materials that contain asbestos.
- Use a wet method in order to clean up asbestos material.
- A vacuum cleaner that is equipped with a high efficiency particulate air filter (HEPA) can also be used.
- Use exhaust ventilation on permanent machining jobs.
- Wear an approved respirator if there is no other way to control the dust.

Safety

- Comply with applicable rules and regulations for the work place. In the United States, refer to Occupational Safety and Health Administration (OSHA) requirements.
- Obey environmental regulations for the disposal of asbestos.
- Stay away from areas that might have asbestos particles in the air

Dispose of Waste Properly

Improperly disposing of waste can threaten the environment. Potentially harmful fluids should be disposed of according to local regulations.

Always use leak proof containers when you drain fluids. Do not pour waste onto the ground, down a drain, or into any source of water.

Crushing Prevention and Cutting Prevention

Support the equipment properly before you perform any work or maintenance beneath that equipment. Do not depend on the hydraulic cylinders to hold up the equipment. Equipment



can fall if a control is moved, or if a hydraulic line breaks.

Do not perform any work until you have read and followed the proper "Lock-Out / Tag-Out" procedures.

Do not work beneath the cab of the machine unless the cab is properly supported.

Unless you are instructed otherwise, never attempt adjustments while the machine is moving or while the engine is running.

Never jump across the starter solenoid terminals in order to start the engine. Unexpected machine movement could result.

Whenever there are equipment control linkages, the clearance in the linkage area will change with the movement of the equipment or the machine. Stay clear of areas that may have a sudden change in clearance with machine movement or equipment movement.

Avoid contact with the rotating feed wheel, cutter wheel and rotor.

Always shut-off the engine and wait for all moving parts, belts, fans, rotors, drums, cutting wheels (etc.) to come to a complete stop before opening access covers and/or guards.

Stay clear of all rotating and moving parts. A moving belt, pulley, sprocket and chain can suddenly pull a limb into them causing loss or severe injury.

If it is necessary to remove guards in order to perform maintenance, always install the guards after the maintenance is performed.

Keep objects away from moving fan blades. The fan blade will throw or cut objects.

Do not use a kinked wire cable or a frayed wire cable. Wear gloves when you handle wire cable.

When you strike a retainer pin with force, the retainer pin can fly out. The loose retainer pin can injure personnel. Make sure that the area is clear of people when you strike a retainer pin. To avoid injury to your eyes, wear protective glasses when you strike a retainer pin.

If equipment is unhitched from the tow vehicle for operation, always block the wheels and support the tongue weight with blocking to prevent unintended movement. Do not use only the jack stand to support the tongue while in operation.

Safety

Burn Prevention



Do not touch any part of an operating engine. Allow the engine, radiator, exhaust and hydraulic reservoir to cool before any maintenance is performed. Relieve all pressure in the air system, oil system, lubrication system, fuel system, and/or in the cooling system before any lines, fittings or related items are disconnected.

In addition, avoid contact with other related hot engine parts such as exhaust manifolds, turbochargers and mufflers.

External exhaust parts become very hot during operation. Paper, cloth, and wooden materials could ignite if they come in contact with these parts.

Coolant



When the engine is at operating temperature, the engine coolant is hot. The coolant is also under pressure. The radiator and all lines to the heaters or to the engine contain hot coolant.

Any contact with hot coolant or with steam can cause severe burns. Allow cooling system components to cool before the cooling system is drained.

Check the coolant level only after the engine has been stopped.

Ensure that the filler cap is cool before removing the filler cap. The filler cap must be cool enough to touch with a bare hand. Remove the filler cap slowly in order to relieve pressure.

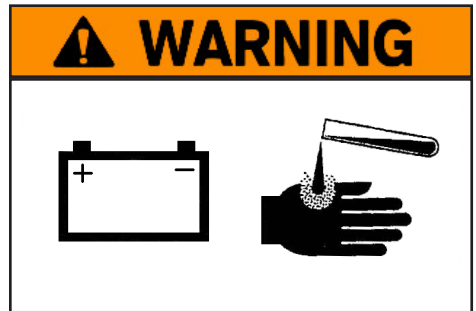
Cooling system conditioner contains alkali. Alkali can cause personal injury. Do not allow alkali to contact the skin, the eyes or the mouth.

Oils

Hot oil and hot components can cause personal injury. Do not allow hot oil to contact the skin. Also, do not allow hot components to contact the skin.

Remove the hydraulic tank filler cap only after the engine has been stopped. The filler cap must be cool enough to touch with a bare hand. Follow the standard procedure in this manual in order to remove the hydraulic tank filler cap.

Batteries



Electrolyte is an acid. Electrolyte can cause personal injury. Do not allow electrolyte to contact the skin or the eyes. Always wear protective glasses for servicing batteries. Wash hands after touching the batteries and connectors. Use of gloves is recommended.

Tires

Tire explosion can result if the following procedures are not followed:

- Check for and maintain correct tire pressure.
- Do not inflate the tires above the recommended pressure.
- Replace any wheel with cuts, bubbles, or damaged rims.
- Do not weld or heat the wheel assembly. Heating will increase tire pressure.

Fire Prevention and Explosion Prevention

All fuels, most lubricants, and some coolant mixtures are flammable.

Flammable fluids that are leaking or spilled onto hot surfaces or onto electrical components can cause a fire. Fire may cause personal injury and property damage.

Remove all flammable materials such as fuel, oil, and debris from the machine. Do not allow any flammable materials to accumulate on the machine. Serious personal injury can occur when fuel or oil is spilled on yourself or your clothes, which can ignite.

Store fuels and lubricants in properly marked containers away from unauthorized persons. Store oily rags and any flammable materials in protective containers. Do not smoke in areas that are used for storing flammable materials.

Do not operate the machine near any flame.

Extinguish all cigarettes, cigars, pipes and other sources of ignition.

Exhaust shields (if equipped) protect hot exhaust components from oil spray or fuel spray in case of a break in a line, in a hose, or in a seal. Exhaust shields must be installed correctly.

Do not weld on lines or on tanks that contain flammable fluids. Do not flame cut lines or tanks that contain flammable fluid. Clean any such lines or tanks thoroughly with a nonflammable solvent prior to welding or flame cutting.

Check all electrical wires daily. Repair any wires that are loose or frayed before you operate the machine. Clean all electrical connections and tighten all electrical connections.

Dust that is generated from repairing nonmetallic hoods or non metallic fenders can be flammable and/or explosive. Repair such components in a well ventilated area away from open flames or sparks.

Inspect all lines and hoses for wear or for deterioration. The hoses must be properly routed. The lines and the hoses must have adequate support and secure clamps. Tighten all connections to the recommended torque. Leaks can cause fires.

Use caution when you are refueling a machine. Do not smoke while you are refueling a machine. Do not refuel a machine near open flames or sparks. Always stop the engine before refueling. Fill the fuel tank outdoors.

Gases from a battery can explode. Keep any open flames or sparks away from the top of a battery. Do not smoke in battery charging areas.

Never check the battery charge by placing a metal object across the terminal posts. Use a voltmeter or a hydrometer.

Improper jumper cable connections can cause an explosion that can result in injury. Refer to the Operation Section of this manual for specific instructions.

Do not charge a frozen battery. This may cause an explosion.

Fire Extinguisher

Make sure that a fire extinguisher is available. Be familiar with the operation of the fire extinguisher. Inspect the fire extinguisher and service the fire extinguisher regularly. Obey the recommendations on the instruction plate.

Fire Extinguisher Location

Make sure that a fire extinguisher is on the machine. Make sure that you are familiar with the operation of the fire extinguisher. Inspect the fire extinguisher and service the fire extinguisher. Obey the recommendations on the instruction plate.

Mount the fire extinguisher in an easily accessible place on the machine, for crawlers mount on the left side of the cab behind the seat. Consult your Rayco dealer for the proper procedure of mounting the fire extinguisher.

Safety

Ether Starting Fluid

Ether is flammable and poisonous.

Use ether in well ventilated areas. Do not smoke while you are replacing an ether cylinder or while you are using an ether spray.

Do not store ether cylinders in living areas or in the operator compartment of a machine. Do not store ether cylinders in direct sunlight or in temperatures above 49 °C (120 °F). Keep ether cylinders away from open flames or sparks.

Dispose of used ether cylinders properly. Do not puncture an ether cylinder. Keep ether cylinders away from unauthorized personnel.

Do not spray ether into an engine if the machine is equipped with a thermal starting aid for cold weather starting.

Lines, Tubes and Hoses



Do not bend high pressure lines. Do not strike high pressure lines. Do not install any lines that are bent or damaged.

Repair any lines that are loose or damaged. Leaks can cause fires. Consult your Rayco dealer for repair or for replacement parts.

Check lines, tubes and hoses carefully. Do not use your bare hand to check for leaks. Use a board or cardboard to check for leaks. Tighten all connections to the recommended torque.

Replace the parts if any of the following conditions are present:

- End fittings are damaged or leaking
- Outer coverings are chafed or cut.
- Wires are exposed.
- Outer coverings are ballooning.
- Flexible part of the hoses are kinked.
- Outer covers have embedded armoring.
- End fittings are displaced. Make sure that all clamps, guards, and heat shields are installed correctly. During

machine operation, this will help to prevent vibration, rubbing against other parts, and excessive hear.

Electrical Storm Injury Prevention

When lightning is striking in the vicinity of the machine, the operator should never attempt to operate the machine. If you are on the ground during an electrical storm, stay away from the vicinity of the machine!

While Operating the Machine

All personnel using this Machine must be trained in the operation, safety and maintenance repair procedures. Careless use of this Equipment could result in serious injury or even death.

ALL PROCEDURES IN THE SAFETY AND OPERATION SECTIONS OF THIS MANUAL MUST BE READ AND UNDERSTOOD BEFORE STARTING THIS MACHINE.

- All operators must be wearing the proper Personal Protective Equipment before attempting to start and operate this machine.
- Do not allow children or other spectators to standby and watch the machine in operation.
- Familiarize yourself with all of the controls in a safe environment before starting to work with this machine.
- Always have more than one person at the job site. If an accident occurs, someone is there to assist or obtain help.
- Never operate or allow someone to operate the machine while under the influence of alcohol, drugs, or any medication that could affect the operator's performance and concentration. Maintain a drug-free work place.
- Always operate this machine with all safety equipment in place and working. Make sure all controls are properly adjusted for safe operation.
- Do not change the engine governor settings or over speed the engine. The governor controls the maximum safe operating speed of the engine
- Never leave this machine unattended with the engine running.
- Use only your hand to operate the controls. Never use a foot, knee, rope or any extension device.
- Never hand-feed this machine for any reason.
- Contact with moving parts, belts or rotating cutter wheels can kill, injure or dismember.
- Turn off engine and wait for all movement to stop before working on this machine. Lock-out/Tag Out all controls.
- If equipped, the Emergency Stop buttons must be operating properly. These should each be checked and

Safety

verified to shut down the engine by the operator prior to performing any work.



- **CAUTION! FLYING DEBRIS!** NEVER stand or allow anyone else to be directly in front of machine.
- Material being discharged from machine can cause severe injury, blindness or death.
- Always operate this machine from the operator area. Never stand directly in front of machine as flying objects could be thrown during operation.
- Never move this machine, or make adjustments or repairs, while the engine is running.

While Servicing and Performing Maintenance on the Machine

- ALWAYS Block the wheels to prevent unintended movement.
- Adhere to your LOCK-OUT/TAG-OUT procedure when performing maintenance or repairs to this machine. Locking and tagging out equipment safeguards those working on equipment from being injured by its unexpected energized or releasing stored energy.
- To prevent fires, clean debris and chaff from the engine and muffler areas.
- Periodically check that all nuts and bolts, hose clamps, and hydraulic fittings are tight.
- When removing the fuel cap, unscrew it slowly, and hold it firmly. The cap may otherwise be thrown due to pressure buildup caused by an increase in temperature.
- For your safety, repair or replace all damaged or worn parts immediately. Replacement parts which are authorized by Rayco are the only parts which should be used for repair or replacement on this machine.
- Altering this equipment, or using this equipment in such a way as to circumvent its design capabilities and capacities, could result in serious injury or fatality and **WILL VOID THE WARRANTY.**
- Do not alter this machine in any manner. Alterations such as attaching a rope to the control bar may result in personal injury or death.
- NEVER remove the cap from the hydraulic tank or reservoir while the machine is running. Hot oil under pressure will cause injury.
- Relieve hydraulic system pressure before repairing or adjusting fittings, hoses, tubing, or other system components.

Before Starting Engine

Start the engine only from the operator compartment. Never short across the starter terminate or across the batteries. Shorting could damage the electrical system by bypassing the engine neutral start system.

Before you start the engine and before you move the machine, make sure that no one is underneath the machine, around the machine, or on the machine. Make sure that the area is free of personnel.

Visibility Information

Before you start the machine, perform a walk-around inspection in order to ensure that there are no hazards around the machine.

While the machine is in operation, constantly survey the area around the machine in order to identify potential hazards as hazards become visible around the machine.

It may not be possible to provide direct visibility on large machines to all areas around the machine. Appropriate job site organization is required in order to minimize hazards that are caused by restricted visibility. Job site organization is a collection of rules and procedures that coordinates machines and people that work together in the same area. Examples of job site organization include the following:

- Safety instructions
- Controlled patterns of machine movement and vehicle movement
- Workers that direct traffic to move when it is safe
- Restricted areas
- Operator training
- Warning symbols or warning signs on machines or on vehicles
- A system of communication
- Communication between workers and operators prior to approaching the machine

Modifications of the machine configuration by the user that result in a restriction of visibility shall be evaluated.

Safety

Engine Starting

If a warning tag is attached to the start switch or to the controls, do not start the engine. Also, do not move any controls.

Move all hydraulic controls to the NEUTRAL position before you start the engine.

Diesel engine exhaust contains products of combustion which can be harmful to your health. Always start the engine in a well ventilated area. Always operate the engine in a well ventilated area. If you are in an enclosed area, vent the exhaust to the outside.

Before Operation

Safety information is available in English for this machine. A list of some of the material is available in the Operation and Maintenance Manual, "Reference Material". Consult your Rayco dealer in order to obtain copies of the material. The information should be reviewed by every person that operates the machine.

Clear all personnel from the machine and from the area.

Clear all obstacles from the path of the machine. Beware of hazards such as wires, ditches, etc.

Make sure that all windows are clean. Secure all doors in the closed position. Secure the windows in the open position or in the shut position.

Call 811 Before You Dig. One free, easy call gets your utility lines marked and helps protect you from injury and expense. Know whats below, before you dig. Go to www.call811.com for more details.

Operation

Only operate the machine controls when the engine is running. Do not leave the operators station while machine is running.

Before you move the machine, you must be certain that no one will be endangered.

While you operate the machine and the work tool slowly in an open area, check for proper operation of all controls and all protective devices.

Do not allow riders on the machine.

Note any needed repairs during machine operation. Report any needed repairs to certified service technician.

Use only Rayco Approved Work Tools on this machine. Obey all the lift restrictions. Refer to Operation and Maintenance Manual, "Rayco Approved Work Tools" for the approved work tools and the lift restriction information.

Do not go close to the edge of a cliff, an excavation, or an overhang.

If the machine begins to sideslip downward on a grade, immediately turn the machine downhill.

Avoid any conditions that can lead to tipping the machine. The machine can tip when you work on hills, on banks and on slopes. Also, the machine can tip when you cross ditches, ridges or other unexpected obstacles.

Avoid operating the machine across the slope. When possible, operate the machine up the slopes and down the slopes.

Maintain control of the machine. Do not overload the machine beyond the machine capacity.

Never straddle a wire cable. Never allow personnel to straddle a wire cable.

Know the maximum dimensions of your machine.

Observe all applicable local government regulations when you use this machine.

Slope Operation

Machines that are operating safely in various applications depend on these criteria: the machine model, configuration, machine maintenance, operating speed of the machine, conditions of the terrain, fluid levels, and tire inflation pressures. The most important criteria are the skill and judgment of the operation.

A well trained operator that follows the instructions in the Operation and Maintenance Manual has the greatest impact on stability. Operator training provides a person with the following abilities: observation of working and environmental conditions, feel for the machine, identification

of potential hazards, and operating the machine safely by making appropriate decisions.

When you work on side hills and when you work on slopes, consider the following important points:

- Speed of travel – At higher speeds, forces of inertia tend to make the machine less stable.
- Roughness of terrain or surface – The machine may be less stable with uneven terrain.
- Direction of travel – Avoid operation the machine across the slope. When possible, operate the machine up the slopes and operate the machine down the slopes.
- Place the heaviest end of the machine uphill when you are working on an incline.
- Mounted equipment – Balance of the machine may be impeded by the following components: equipment that is mounted on the machine, machine configuration, weights, and counterweights.
- Nature of surface – Ground that has been newly filled with earth may collapse from the weight of the machine.

Safety

- Surface material – Rocks and moisture of the surface material may drastically affect the machine's traction and machine's stability. Rocky surfaces may promote side slipping of the machine.
- Slippage due to excessive loads – This may cause downhill tracks or downhill tires to dig into the ground, which will increase the angle of the machine.
- Width of tracks or tires – Narrower tracks or narrower tires further increase the digging into the ground which causes the machine to be less stable.
- Implements attached to the machine hitch or drawbar – This may decrease the weight on the uphill tracks. This may also decrease the weight on the uphill tires. The decreased weight will cause the machine to be less stable.
- Height of machine working load. When the working loads are in higher positions, machine stability is reduced.
- Operated equipment – Be aware of performance features of the equipment in operation and the effects on machine stability.
- Operating techniques – Keep all attachments or pulled loads low to the ground for optimum stability.
- Machine systems have limitations on slopes – Slopes can affect the proper function and operation of the various machine systems. These machine systems are needed for machine control on slopes.
- Note: Safe operation on steep slopes may require special machine maintenance. Excellent skill of the operator and proper equipment for specific applications are also required. Consult the Operation and Maintenance Manual sections for the proper fluid level requirements and intended machine use.

Work Tool options - Attachments

Only use work tools that are approved by Rayco for use on Rayco machines. Refer to the Operation and Maintenance Manual, Rayco options".

If you are in doubt about the compatibility of a particular work tool with your machine, consult your Rayco dealer.

Make sure that all necessary guarding is in place on the host machine and on the work tool.

Always wear protective glasses. Always wear the protective equipment that is recommended in the work tool's operation manual. Wear any other protective equipment that is required for the operating environment.

To prevent personnel from being struck by flying objects, ensure that all personnel are out of the work area.

While you are performing any maintenance, any testing, or any adjustments to the machine, stay clear of the follow-

ing areas: cutting edges, pinching surfaces, and crushing surfaces.

Sound Level Information

The operator Equivalent Sound Pressure Level is used to measure a work cycle sound exposure level

Hearing protection may be needed when the machine is operated with an open operator station for extended periods in a noisy environment. Hearing protection may be needed when the machine is operated.

Vibration Data Information concerning hand/arm vibration level

When the machine is operated according to the intended use, the hand/arm vibration of this machine is rated by meter per second squared.

Note: Vibration levels are influenced by many different parameters listed below.

- Operator training, behavior, mode, and stress
- Job site organization, preparation, environment, weather and material
- Machine type, attachments, and condition of the equipment.

Guidelines for Reducing Vibration Levels on Equipment

Properly adjust machines. Properly maintain machines. Operate machines smoothly. Maintain the conditions of the terrain. The following guidelines can help reduce the whole body vibration level:

1. Use the right type and size of machine, equipment, and attachments.
 - a. Tire pressures
 - b. Brake and steering systems
 - c. Controls, hydraulic system and linkages
2. Maintain machines according to the manufacturer's recommendations.
 - a. Remove any large rocks or obstacles.
 - b. Fill any ditches and holes.
 - c. Provide machines and schedule time in order to maintain the conditions of the terrain.
3. Keep the terrain in good condition.
 - a. Adjust the seat and suspension for the weight and the size of the operator.
4. Use a seat that meets "ISO 7096". Keep the seat maintained and adjusted.
 - a. Adjust the seat and suspension for the weight and the size of the operator.

Safety

- b. Inspect and maintain the seat suspension and adjustment mechanisms.
5. Perform the following operations smoothly.
 - a. Steer
 - b. Brake
 - c. Accelerate
 - d. Shift the gears
6. Move the attachments smoothly.
7. Adjust the machine speed and the route in order to minimize the vibration level.
 - a. Drive around obstacles and rough terrain.
 - b. Slow down when it is necessary to go over rough terrain.
8. Minimize vibrations for a long work cycle or a long travel distance.
 - a. Haul the machines between workplaces.

Guards (Operator Protection)

There are different types of guards that are used to protect the operator. The machine and the machine application determines the type of guard that should be used.

A daily inspection of the guards is required in order to check for structures that are bent, cracked or loose. Never operate a machine with a damaged structure.

The operator becomes exposed to a hazardous situation if the machine is used improperly or if poor operating techniques are used. This situation can occur even though a machine is equipped with an appropriate protective guard.

Other Guards (If Equipped)

Protection from flying object and/or falling objects is required for special applications. Logging applications and demolition applications are two examples that require special protection.

A front guard needs to be installed when a work tool that creates flying objects is used. Mesh front guards that are approved by Rayco or polycarbonate front guards that are approved by Rayco are available for machines with a cab or an open canopy. On machines that are equipped with cabs, the windshield should also be closed. Safety glasses are recommended when flying hazards exist for machines with cabs and machines with open canopies.

If the work material extends above the cab, top guards and front guards should be used.

Additional guards may be required for specific applications or work tools. The Operation and Maintenance Manual for your machine or your work tool will provide specific

requirements for the guards. Consult your Rayco dealer for additional information.

Precautions for Welding on FRAME with ENGINE/MACHINE Electronic Control Unit (ECU)

Important: ALWAYS disconnect Electronic Control Unit (ECU) connectors and engine control system-to-machine ground before welding on engine or machine.

High currents or electrostatic discharge in electronic components from welding may cause permanent damage

Safety Decals

The safety decals located on this machine contain useful and important information which will help you to operate your machine safely. The complete decal kit and location of each decal is given in the "Parts" manual. For your protection, familiarize yourself with each label until you completely understand the warning intended. Do not violate any such warnings!

Keep all decals in place and in good condition:

- Use soap and water to keep decals clean. DO NOT use mineral spirits, abrasive cleaners or other similar cleaners which will damage the decals.
- Replace any damaged or missing decals. Before attaching decals, the surface temperature of the metal must be at least 40 degrees. The metal should also be clean and dry before attaching the decal.
- If a machine component to which a decal is attached is replaced, be sure to replace the decal as well.
- Replacement decals may be purchased from Rayco Mfg or your Rayco dealer.

LOCK-Out / Tag-Out Guidelines

Always practice lock out tag out procedures when working on this machine.

Locking and tagging out equipment safeguards those working on the equipment from being injured by its unexpected energized or releasing stored energy. This section summarizes the applicable requirements for lockout/ tag out procedures, and its intent to comply with OSHA regulations.

Lock Out Procedure

- All affected persons are to be notified that the equipment will be off and locked out.
- All energy sources for the equipment should be identified.
- The equipment shall be shut off or otherwise deenergized, being careful to de-energize all energy sources. This includes all valves, switches, breakers, or other controls

Safety

that supplies energy to the equipment. In case of mechanical energy, a block may be used to stop the release of stored energy.

- A lock is to be placed on each energy source disconnect or energy release block.
 1. The lock is to be placed directly on the equipment if provided with an integral locking device.
 2. If there is no integral lockout device on the equipment, securely attach an independently manufactured lockout device on the equipment and then place the lock on the lockout device.
 3. If none of the above are possible, use the tag out procedure.
- A tag to be secured to the lock indicating that the equipment is not to be energized and who owns the lock.
- It should be safely tested and verified that the lockout does prevent the release of energy.

Tag Out Procedure

- This procedure is to be used only if it is not reasonable to use the lockout procedure.
- All affected persons are to be notified that the equipment will be shut off and tagged out.
- All energy sources for the equipment should be identified.
- The equipment shall be shut off or otherwise de-energized, being careful to de-energize all energy sources. This includes all valves, switches, breakers, or other controls that supplies energy to the equipment. In case of mechanical energy, a block may be used to stop the release of stored energy.
- Securely place a tag on each energy source disconnect or energy release block.

Removal Procedure

- Lockout/tag out equipment must be removed by the worker who placed it.
- Before the removal of a lockout/tag out the following must be completed:
 1. Removal of all non essential items.
 2. Check to see that all workers and bystanders are located in a safe position.
 3. Inform all affected personnel.
- If a worker who applied the lockout/tag out is not present, and his supervisor deems it necessary to energize the equipment, the following must be done by the supervisor.
 1. Make all reasonable effort to contact the worker who placed the tag.

2. Determine the purpose of the lockout/tag out, and whether it is safe to operate the equipment in its current condition.

3. Remove all non essential items.

4. Inform all affected personnel.

5. Check to see that all affected persons are located in a safe position.

6. Inform the worker of the lockout/tag out removal before the worker starts to work for his/her next shift.

7. When more than one person works on the same equipment, multiple lock/tag outs must be used. Only when all locks are removed can the equipment be energized.

or structure, or to the tow vehicle bumper brackets. Do not attach chains to the ball or to a ball mount that is removable. The right chain hooks to the left side in the same manner. Crossing the chains under the tongue allows the minimum amount of slack for turning. Control slack by hooking the chain back to itself or by twisting the links to shorten chain. Be sure the hooks are secured.

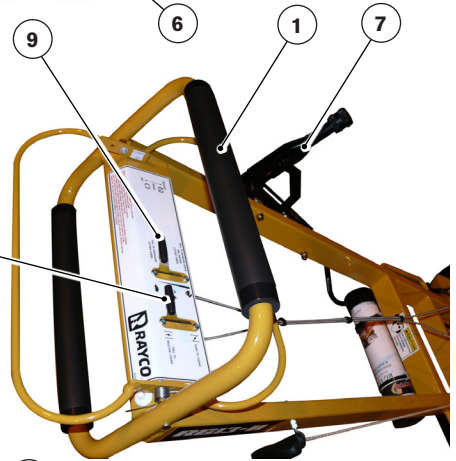
The chains need slack to allow your vehicle to make turns. Make sure these chains attach securely to your tow vehicle and do not drag on the roadway.

Getting to know your machine



General Identification:

- 1) **Operator Presence Control** - This handle must be depressed to start and run engine. When released it automatically shuts off the engine.
- 2) **Handle Bar Assembly**
- 3) **Gasoline Tank**
- 4) **Engine**
- 5) **Cutter Wheel**
- 6) **Wheels**
- 7) **Brake Lever** - Pulling this lever back will set the brake for the machine. Pushing it down will release it.
- 8) **Engine Switch (RUN: ON/OFF)** - See the "Normal start up" section for instructions on how to start engine.
- 9) **Throttle** - Move forward to increase engine speed, pull back to decrease engine speed.
- 10) **Choke** - See the "Normal start up" section for instructions on how to start engine.



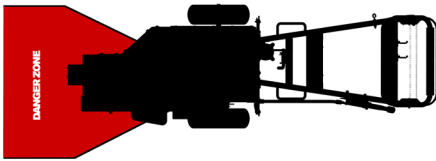
Operation

Before Operating the Machine

⚠ WARNING

BEFORE OPERATING THIS POWERFUL MACHINE, PLEASE CONSULT THE SAFETY SECTION FOR VITAL INFORMATION RELATED TO OPERATING.

- 1) Review all of the safety decals that are placed on the machine for your safety and convenience. See "Parts" manual for aid in locating all decals on machine.
- 2) Make sure that all shields, guards and curtains are in place, and in good condition prior to operating the machine.
- 3) Only responsible, properly instructed individuals should operate this machine. Inexperienced operators must always be carefully supervised.
- 4) Check cutting wheel for damaged or missing teeth, and replace as necessary.
- 5) Make sure that no one is working on, underneath or close to the machine before starting the engine or beginning to move the machine. Make sure that the area is free of personnel.
- 6) Check stumps to be removed for embedded nails, wire, metal fence posts, and other metallic objects, and for rocks or other buried impediments which may become dangerously thrown or cause unexpected machine movements when hit by cutting wheel.



- 7) Ensure that everyone in the vicinity is aware of the DANGER ZONE associated with this machine. (See diagram above.) You and they must avoid the DANGER ZONE at all times when the machine is in operation.
- 8) Make no alterations or modifications to your Rayco stump cutter unless requested or recommended by Rayco Manufacturing Inc.
- 9) Check with the local utilities for the locations of buried pipes and cables where applicable, before operating the machine.

NOTICE

To ensure the long life and economical operation of your stump cutter, we highly recommend that the operator be well instructed in both the operation and maintenance of this machine. Inspect the machine and perform each of the "10 Service Hours or Daily" (See "Maintenance" section) maintenance inspections and services as found necessary before operating the machine.

Starting the Engine

Understand and heed to the "Safety" section of this manual, in its entirety, before proceeding.

⚠ CAUTION

WHEN THE ENGINE IS BEING STARTED, THE CUTTER WHEEL MAY BEGIN TO ROTATE. BE SURE TO HAVE THE CUTTER WHEEL OFF THE GROUND WHEN ATTEMPTING TO START.

⚠ WARNING

DO NOT START THE ENGINE UNTIL THE MACHINE IS IN CUTTING POSITION, NEXT TO THE STUMP!

- 1) Lock the travel wheel by pulling the brake lever fully back.
- 2) Make sure the engine switch is "ON".
- 3) Make sure the throttle is in "SLOW" position.
- 4) If the engine is cold, move the choke lever to the closed position.
- 5) Depress the operator presence lever.
- 6) Raise the cutter wheel off the ground 4" to 5" by pushing

⚠ CAUTION

THE NEXT STEPS MAY CAUSE THE CUTTER WHEEL TO ROTATE. KEEP EVERYONE AWAY!

- downward on the control handle. Hold in that position.
- 7) Pull the starter rope lightly until resistance is felt, then pull briskly.
 - 8) When the engine starts, move the choke lever to the open position.
 - 9) Move the throttle to the "FAST" position. If the engine is cold, allow the engine to idle (throttle set to "SLOW" position) for a few minutes before cutting.

Operation

While in Operation

- 1) Know how to shut the machine off in an emergency.
- 2) The operator must never leave the controls while the machine is in operation.
- 3) Never let clothing, long hair, jewelry, etc. hang loosely. It is possible that they can become dangerously entangled in the moving parts or the controls of the machine.
- 4) Keep head, hands and feet away from moving parts at all times.
- 5) The engine should not be started within a building unless it is properly ventilated so as to eliminate the breathing of exhaust fumes, which can cause death.
- 6) Check for proper operation of all controls and protective devices while operating them slowly.
- 7) Extreme caution must be exercised when cutting stumps on slopes, as machine may shift or slide unpredictably. Never attempt to cut with the machine uphill or downhill from your person. The machine may slide toward you, or you may fall toward the machine. Cut only on a slope from the side. Never attempt to cut on a slope exceeding 15 degrees.

⚠ WARNING

REFER TO THE SAFETY SECTION FOR IMPORTANT PRECAUTIONS TO OBSERVE WHILE CUTTING ON A SLOPE.

- 8) Wear appropriate safety equipment, including protective eyeglasses, face shield, protective footwear, and hearing protection.
- 9) Ensure that everyone in the vicinity is aware of the DANGER ZONE associated with this machine. Everyone must avoid the DANGER ZONE at all times when the machine is in operation.
- 10) For safety, local or state codes or job site operating directives may require a greater distance from obstacles.
- 11) Keep eye contact with the cutting wheel at all times that it is rotating.
- 12) Use only the front lower portion of the cutting wheel below the shaft. Never undercut the stump, or use the upper portion of the wheel for cutting purposes.
- 13) Occasionally a curtain may become displaced in such a way as to leave a normally covered area exposed. Shut down machine immediately if it occurs, and reposition curtain before continuing operation.

Call 8-1-1 Before You Dig

Visit www.call811.com for details.



One free, easy call gets your utility lines marked AND helps protect you from injury and expense.

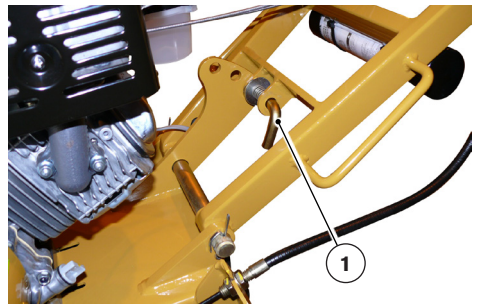
Safe Digging Is No Accident

Always Call 811 Before You Dig

Know what's below. Always call 811 before you dig.

visit www.call811.com for more information

Set Handle Bar Height



Set the Handle Bar to a comfortable height before and during use. The height can be easily adjusted by pulling the release pin (1) and selecting the appropriate hole location in the center bar as shown above.

Operation

Removing Stumps

⚠ WARNING

BEFORE OPERATING, PLEASE CAREFULLY REVIEW THE "SAFETY" SECTION FOR VITAL INFORMATION RELATED TO OPERATING THIS POWERFUL MACHINE!

NOTICE

Remove all loose pieces of wood, stones, wire and other debris from the work area before beginning stump removal.

NOTICE

Wind direction should be considered, as it influences the direction that dust and wood chips will be directed.

NOTICE

Never operate the machine after dark. Night time operation will not allow the operator to see the stump and the danger zone adequately enough for safe operation.

NOTICE

Always allow a cold engine time to warm up before cutting a stump.

Helpful Tips for Operating Machine

- Use smooth, comfortable speeds while operating.
- When it is desired to cut smaller roots, it may be more effective to do so before, rather than after, cutting the stump.
- Should the chip buildup become excessive when cutting, shut off the machine, wait for the cutting wheel to stop rotation, retract the machine from the stump, and rake away the chips.
- On larger stumps, when cutting from one side, eventually a tire may tend to roll into the hole. This may be prevented by moving the machine to another side of the stump to continue removal, or by filling the hole with chips before continuing.

Cutting Wheel Precautions

⚠ WARNING

THE STUMP CUTTER'S CUTTING WHEEL IS EXTREMELY POWERFUL. CONTACT WITH THE CUTTING WHEEL WILL RESULT IN SERIOUS INJURY OR DEATH.

⚠ WARNING

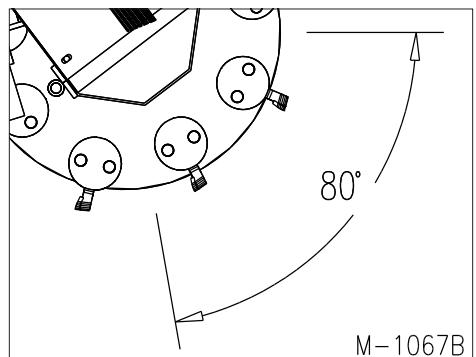
NEVER LEAVE THE CONTROLS WHEN THE CUTTING WHEEL IS ROTATING.

NOTICE

The speed at which the blade moves is dependant on the position of the throttle. To increase the rate of blade movement, increase the engine RPM's by adjusting th throttle higher. Decrease the engine RPM's to decrease the rate of blade movement.

NOTICE

ONLY THE PORTION OF CUTTING WHEEL WITHIN THE 80° AREA SHOWN ABOVE SHOULD ENGAGE STUMP. NEVER UNDERCUT THE STUMP OR USE THE BOTTOM OF THE CUTTING WHEEL FOR CUTTING PURPOSES.

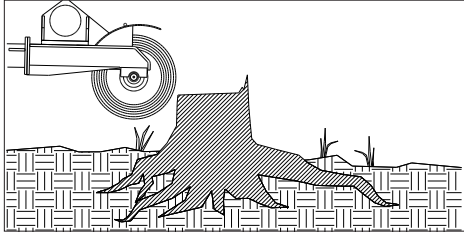


- NEVER go near the cutting wheel when the machine is turned on. Turn off the machine first.
- Always cut with the machine downhill, below the stump.
- Use extreme caution on slopes. Slopes, combined with less than ideal traction (ice, snow, gravel, leaves, wet grass) can allow the machine to move unexpectedly.

Operation

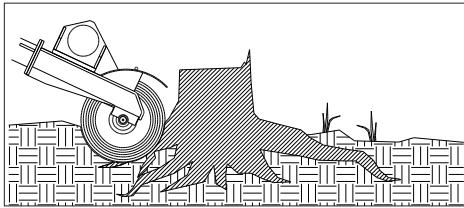
Stump Removal Procedure

1: Prepare the machine at the stump:



- Drive the machine into position with the cutting wheel near the top edge of the stump.
- Move the engine throttle to IDLE.
- Start cutting wheel rotation
- Increase the engine to increase the cutter wheel.

2: Remove the roots:

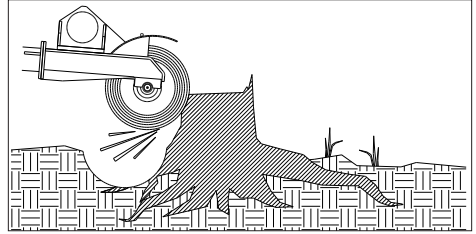


- Swing the cutting wheel to one side, then lower it into the nearside roots that may be buried at the foot of the stump, and swing the cutting wheel across them until they are sufficiently removed

3: Cutting the stump properly:

- Raise the cutting wheel to the top of the stump and advance the machine to a combined position where the center of the shaft remains just above the top of the stump, such that upon swinging the cutting wheel, a bite approximately 4" deep may be taken.
- Sweep the cutting wheel across the stump, taking an approximately 2.75" deep bite.
- After the first bite is taken, lower the cutting wheel about 2" while is off to the side and swing the cutting wheel across for another bite.
- Continue repeating this procedure until all of the amount of stump in the path of the downward swing of the cutting wheel is gone.

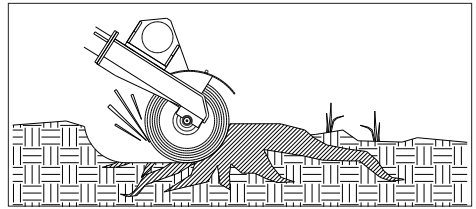
4: Cut another level of the stump:



- Raise the cutting wheel above the stump once again, and starting with the cutting wheel swung to one side, advance the machine slightly (about 2") and repeat STEP 3.

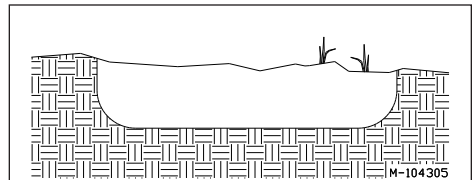
Repeat STEP 4 consecutively

5: Cut Remaining Roots:



- Cut the remaining roots as described in STEP 1 until the entire stump is satisfactorily removed.
- After the stump has been fully removed, stop the cutting wheel rotation. Raise and center the cutting wheel.
- Machine is ready for travel to the next destination

6: Once the Stump is completely cut:



- Reduce the throttle to IDLE and shut off the cutting wheel rotation.
- Stop the cutting wheel rotation quickly by gently lowering the cutting wheel into the soil.
- Fully raise and center the cutting wheel. The machine may then be self-propelled to the next destination

Operation

Normal Shutdown Procedure

WARNING

DUE TO HIGH SPEED LOW-FRICTION ROTATION, THE CUTTING WHEEL MAY CONTINUE TO ROTATE, EVEN AFTER THE ON/OFF SWITCH HAS BEEN FLIPPED OFF, AND EVEN AFTER THE ENGINE HAS STOPPED. BE SURE THE CUTTING WHEEL ROTATION IS AT A COMPLETE STOP BEFORE MOVING THE MACHINE OR LEAVING THE CONTROLS!

NOTICE

Before stopping an engine that has been operating at working load, allow the engine to continue to run with the throttle midway between slow and fast, for at least 15 seconds.

In consideration of your own safety as well as that of others, you should always use the following normal shutdown procedures before departing from the controls for any reason, including cleaning, servicing, transporting, or inspecting the stump cutter. Never deviate from this procedure unless so instructed in this manual or an emergency requires it.

- 1) Move the engine throttle speed to the slow position.
- 2) Release operator presence control.
- 3) Set the park brake before leaving controls.
- 4) Turn the engine start key to the "OFF" position.
- 5) Remove the key from the engine start switch, and put it in safekeeping.

Emergency Shutdown Procedure

- 1) Immediate release of the operator presence control will automatically disable machine.
- 2) Be sure to allow all moving parts to come to a complete stop.
- 3) Correct the emergency situation, and return to normal operation.

Storing the Machine

- Store the machine in a dry protected place. If the machine must be stored outside, cover it with a waterproof canvas or other material.
- Clean all grease, dirt, mud and other foreign matter from the machine. Wash the machine. Start and operate machine to help rid it of puddled or excess water. To inhibit rusting, paint all exposed surfaces.

- Remove drive belts, and store in wrapped condition. Spray grooves of belt sheaves with an anti-corrosive agent.
- Store the battery inside where temperatures do not drop below 32° F. Place the battery on wood, not on concrete floor or steel table. Always keep the battery fully charged. Store it away from wherever an open flame or sparks might occur.
- Information on preparing the engine for storage is contained in the "Storage" section of the Honda Engine Operation Manual, shipped with this machine.
- Check your machine for any worn or broken parts at this time. By ordering and installing replacement parts now, you can avoid unnecessary delays when you remove the machine from storage.

Removing the Machine from Storage

- Remove all coverings.
- After prolonged storage inspect wheels and brakes. Check tires for proper inflation.
- Check fuel lines for deterioration, and replace as necessary. Tighten all nuts, bolts and replace fuel filter.
- Information on removing the engine from storage can be found in the "Storage" section of the Honda Engine Operation Manual, shipped with this machine.
- Wipe off anti-corrosive agent from grooves of belt sheaves and re-mount the belts.
- Adjust the tension of the belts in accordance with the instructions contained in this manual's "Every 50 Service Hours" section.
- Mount the battery and connect the cables to the machine.
- Review the machine according to the "Before Starting the Engine" as found in the "Safety" section, and perform all maintenance services necessary as described in the "10 Service Hours or Daily" interval of the "Maintenance" section before starting the engine.

Maintenance

Certified Engine Maintenance

Proper maintenance and repair is essential to keep the engine and machine systems operating correctly. As the heavy duty off-road engine owner, **you are responsible** for the required maintenance listed in the Engine Owner Manual & Machine Operator, Maintenance & Service Manual.

Attach a "Do Not Operate" warning tag or a similar warning tag to the start switch or to the controls before you service the equipment or before you repair the equipment.

Know the width of your equipment in order to maintain proper clearance with you operate the equipment near fences or near boundary obstacles.

Be aware of high voltage power lines and power cables that are buried. If the machine comes in contact with these hazards, serious injury or death may occur from electrocution.

Wear a hard hat, protective glasses, and other protective equipment, as required.

Do not wear loose clothing or jewelry that can snag on controls or on other parts of the equipment.

Make sure that all protective guards and all covers are secured in place on the equipment.

Keep the equipment free from foreign material. Remove debris, oil, tools, and other items from the deck, from walk-

ways, and from steps.

Secure all loose items such as lunch boxes, tools, and other items that are not a part of the equipment.

Know the appropriate work site hand signals and the personnel that are authorized to give the hand signals. Accept hand signals from one person only.

Do not smoke when you service an air conditioner. Also, do not smoke if refrigerant gas may be present. Inhaling the fumes that are released from a flame that contact air conditioner refrigerant can cause bodily harm or death. Inhaling gas from air conditioner refrigerant through a lighted cigarette can cause bodily harm or death.

Never put maintenance fluids into glass containers. Drain all liquids into a suitable container.

Obey all local regulations for the disposal of liquids.

Use all cleaning solutions with care. Report all necessary repairs.

Do not allow unauthorized personnel on the equipment.

Unless you are instructed otherwise, perform maintenance with the equipment in the servicing position. Refer to Operation and Maintenance Manual for the procedure for placing the equipment in the servicing position.

When you perform maintenance above ground level, use appropriate devices such as ladders or man lift machines. If equipped, use the machine anchorage points and use approved fall arrest harnesses and lanyards.

CALIFORNIA Proposition 65 Warning

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

NOTICE:

Maintenance and Repairs should ONLY be performed by a trained specialists or qualified person.

Please contact Rayco Mfg for a listing of approved maintenance facilities in your area.

Maintenance

Maintenance Log			
Date of Service	Machine Hours	Description of Service/ Maintenance	Notes

Maintenance

Maintenance Item	Daily or Every 10hrs	First 20hrs	First 50hrs	Every 50hrs	First 100hrs	Every 100hrs	Yearly or Every 300hrs
Engine Oil Level - Check	X	X	X	X	X	X	X
Fuel Tank - Fill	X	X	X	X	X	X	X
Remove Grease & Oil Buildup	X	X	X	X	X	X	X
Cutter Wheel - Check Wheel & Teeth	X	X	X	X	X	X	X
Cutter Wheel Bearings - Lubricate	X	X	X	X	X	X	X
Air Filter - Check	X	X	X	X	X	X	X
Air Filter - Clean				X	X	X	X
Air Filter - Replace							X
Walk Around Inspection	X	X	X	X	X	X	X
Engine Leaks - Check			X				X
Engine Oil - Change		X				X	X
Engine Mounts - Check		X		X	X	X	X
V-Belt Tension - Check		X		X	X	X	X
Brake - Adjust		X					X
Brake Lining - Check							X
Tire Condition - Check							2 years
Spark Plug - Clean & Re-adjust						X	X
Spark Plug - Replace							X
Sediment Cup - Clean						X	
Idle Speed - Check & Adjust							X
Valve Clearance - Check & Adjust							X
Fuel Tank & Strainer - Clean							X
Fuel Line - Check							X

Maintenance

Walk-Around Inspection

- 1) Inspect and remove any chip or residue buildup in and around the engine.
- 2) Be sure covers and guards are firmly in place. Inspect for damage.
- 3) Inspect the tires and rims for damage and inflation. Maintain inflation indicated on the tire. Replace worn tires.
- 4) Inspect for loose or missing fasteners. Tighten or replace.
- 5) Inspect belts for wear. Replace if frayed or cracked.

Fuel Tank - Fill



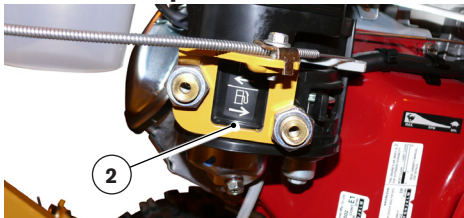
With the engine stopped and on level ground, remove the fuel cap (1) slowly. Carefully fill tank to the bottom of the maximum fuel level limit of the tank with unleaded gasoline (octane rating 86 or higher) and replace cap. Do not overfill. Wipe up any spilled fuel before starting the engine.

See "System Fluids Specifications" in this "Maintenance" section for more information.

Fuel Line - Check

Follow the directions found in the *Honda Engine Operation Manual*.

Sediment Cup - Clean



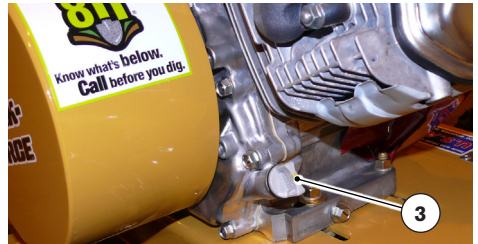
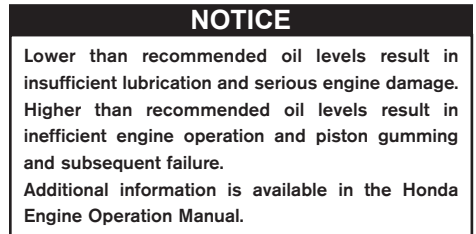
- 1) Close the throttle (engine fuel valve) to the OFF position.
- 2) Remove the fuel sediment cup (2) and o-ring.
- 3) Wash the sediment cup in nonflammable solvent and dry it thoroughly.
- 4) Place o-ring in the fuel valve and install the sediment cup. Tighten the sediment cup securely.
 - 5. Open the throttle (engine fuel valve) to the ON position and check for leakage.

Follow the directions found in the *Honda Engine Operation Manual*.

Fuel Tank and Strainer - Clean

Follow the directions found in the *Honda Engine Operation Manual*.

Engine Oil Level - Check



The oil level must be checked when the engine is level and has not been in operation for at least 10 minutes.


Add or remove oil gradually, until proper level is reached. The engine oil fill neck and dipstick (2) is located on the bottom of the engine toward the belt side of the machine. See the *Honda Engine Operation Manual* for specifications on the engine oil and engine fuel.

Engine Oil - Change

Follow the directions found in the *Honda Engine Operation Manual*.

Maintenance

Grease and Oil Buildup - Remove


WARNING

ACCUMULATED GREASE AND OIL ON A MACHINE IS A FIRE HAZARD. REMOVE SUCH DEBRIS WITH STEAM CLEANING OR HIGH PRESSURE WATER.

NOTICE

When cleaning the machine the use of mild soap and water must be used for the first 90 days. Harsh cleansers or solvents will strip paint off machine. After 90 days stronger cleaners may be used.

For cleaning with a hot water cleaning device, use a spray steam with a pressure not exceeding 426 psi (2937 kPa) to prevent damage to painted areas of the components.

Cutting Wheel - Check

One of the most critical elements of the stump cutter are the cutting teeth. They are also the most subject to damage and wear. In the course of cutting stumps they not only make contact with wood, but also encounter a numerous assortment of abrasives and objects in the stump's environment, such as dirt, stones, and occasionally a large rock or buried scrap.

The loss of and wear of teeth can significantly impair the efficiency of a stump cutter and also result in overexposure of other teeth, resulting in premature failure or wear. Therefore it is important to make frequent observation of the condition of all of the cutting teeth, and replace or have sharpened any missing and significantly worn teeth, as soon as feasible.

Read all of the instructions on the following pages before beginning to change cutting teeth.

Using Rayco Teeth

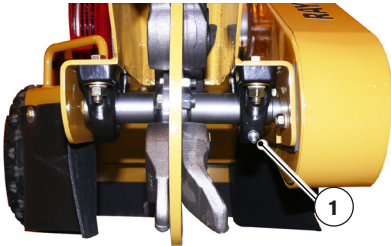
Rayco Manufacturing Inc. recommends only genuine Rayco Cutting Tools for use on Rayco Stump Cutters and Forestry Mowers. The use of non-Rayco cutting tools or cutting wheels will void the machine warranty. Rayco's cutting tools, cutting wheels, and mower rotors are specifically designed to provide optimum performance in many ways. The use of non-Rayco parts will compromise this optimum performance.

- **Safety:** Rayco's cutting tools are always attached with at least two fasteners. This redundant fastening system is far safer than those systems employing only one fastener. Rayco's cutting tools are also more visible than some of the other cutting tools that are available. Some of the cutting wheels available today are "transparent" which can lead to an operator or bystander becoming confused as to the actual limits of the cutter tool.
- **Proper Balance:** Rayco's cutting wheels and mower rotors are designed to achieve a dynamic balance that avoids vibration. Using other cutting tools can set up vibrations that will harm the machine's structure & reduce bearing life.
- **Number of Teeth for Depth of Cut:** Rayco's cutter wheels are designed to provide an economical cutting wheel assembly solution. The teeth are spaced to provide a maximum depth of cut for the number of teeth on the wheel. Some of the wheels available today use a large quantity of teeth to get the same depth of cut that a Rayco wheel will achieve with half the teeth. While the individual tooth cost may be less, the overall costs are more. Additionally, having too many teeth in the stump at any one time can lead to aggressive "grabbing" of the stump, causing the stump cutter to violently hop. This can cause injury to both man & machine.
- **Tooth Projection:** Rayco's stump cutter teeth are specifically designed to ensure that the carbide tip can

Lubricate the Fittings

NOTICE

Pump grease in slowly, and carefully to prevent damage to the bearing seals. Use extreme caution when using a high pressure or high volume grease gun.



Lubricate the two fittings as shown(1) (One on each cutting wheel bearing). Slowly add grease until you see new grease purging out of side bearing. Performing this procedure every 10 hours will prevent debris and moisture from entering and damaging the bearing.

Lubricating Grease

All Rayco stump cutters are completely serviced at the factory before shipping. The operator should check all grease fittings to familiarize himself with their location and acquaint himself with the correct service schedule.

Use the normal shutdown procedure (See "Operating Instructions"), before lubricating the machine.

Maintenance

remove a clear “kerf” from the stump without the body of the tooth ever contacting the stump. This concept reduces drag, which maximizes the use of the machine’s horsepower. This also reduces wear on the tooth body and on the attachment hardware. Many of the other cutting tool systems available today do not address this important aspect of cutting.

- **Cutting Tool Dimensions:** Rayco’s stump cutting teeth are carefully designed to have the proper size of carbide tip. Carbide tips ultimately become dull, and using large, oversized carbide tips will induce extreme impact energies into the machine’s structure.
- **Debris Retention:** Rayco’s cutting tool patterns are designed to minimize the retention of debris in between the cutting tools. This debris can cause imbalance. This debris can also become a dangerous projectile. Non-Rayco cutting tools may retain more debris.

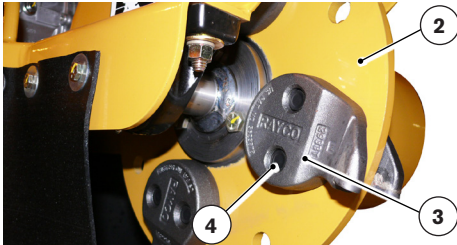
- 5) Position teeth as shown in the diagram in the Parts manual. Straight and angled teeth should be staggered as shown in the drawing.
- 6) When using Rayco brand square-shanked teeth, set the extreme edge of each tooth 1/4” away from the edge of the pocket.
- 7) When using Rayco SUPERTEETH, because of one piece construction, no pre-setting of the tooth is required.
- 8) Make sure teeth are placed in coordination with wheel rotation.
- 9) After setting each tooth pair, tighten the socket head bolts to 135 to 145 foot-pounds.

Changing Teeth

NOTICE

Read all of the following instructions before beginning to change cutting wheel teeth.

Support the cutter wheel in a raised position when changing teeth.



- 1) Clean all dirt from the cutting wheel (2) and teeth (3).
- 2) Remove the socket head bolts (4) from the teeth (3). (The 1/2” hex key provided with the machine may be used.)
- 3) Check the cutting wheel for cracks. Replace the wheel if it is cracked.

NOTICE

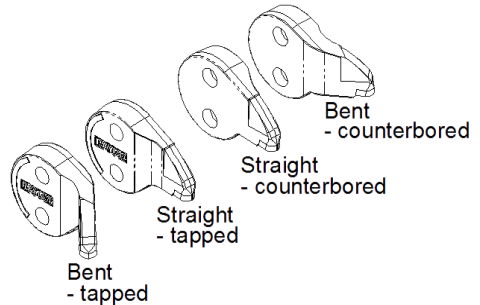
The drawing in the Parts manual represents the exact location required for positioning each tooth. When followed exactly, optimum cutting wheel performance is attained.

- 4) Carefully select and properly position each tooth according to diagrams.

NOTICE

Do not hammer the tip of a tooth. Due to the super hardness of the tooth, it is brittle and may chip from such treatment.

Replacement teeth and pockets are available from your Rayco dealer or direct from Rayco. Refer to the Parts manual for part numbers.



There are four types of Superteeth, as shown in the above diagram. The counter bored teeth are on one side of the cutting wheel, the tapped teeth on the opposite side. The tips of the bent teeth will always point away from the cutting wheel.

Sharpening Teeth

NOTICE

Sharpening cemented carbide cutting teeth requires a special process. Have your teeth sharpened only by a qualified machinist for obtaining a proper edge and to avoid injury.

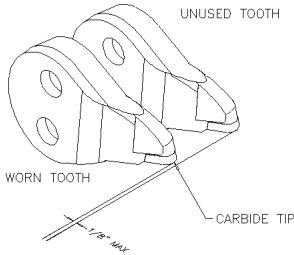
Do not allow any tooth to wear too much before sharpening. Discard any tooth that has lost more than 1/8” of original bite.

The teeth must be removed from the cutting wheel for proper sharpening.

Maintenance

Tooth Sharpening Guidelines

- 1) Obtain an unused tooth for comparison.
- 2) Discard any tooth that has lost more than 1/8" of original bite, whether lost through usage or grinding.
- 3) Grind off a minimal amount from the end, just enough to restore the original taper and radius on the end. The end of the cemented carbide tip and the end of the steel shank should be flush after grinding.



Engine Combustion Air Cleaner - Check

A dirty air cleaner will restrict air flow to the carburetor, reducing engine performance. If you operate the engine in very dusty areas, clean the air filter more frequently. Do not operate the engine without an air filter, or with a damaged air filter as this would allow dirt and abrasive debris into the engine causing rapid wear and reduced engine life.

To check the air filter, remove the air cleaner cover and inspect the condition of the dual filter elements. Always replace dirty or damaged filter elements.

- 1) 1. Remove the top wing nut from the air cleaner cover, and remove the cover.
- 2) 2. Remove the second wing nut from the air filter, and remove the filter.
- 3) 3. Remove the foam outer filter from the paper inner filter.
- 4) 4. Inspect both air filter elements, and replace them if they are damaged. Always replace the paper air filter element at the scheduled interval or sooner if operated in very dusty areas.
- 5) 5. Clean the air filter elements if they are to be reused:

a. Paper air filter element: Tap the filter element several times on a hard surface to remove dirt, or blow compressed air (10-30 psi max) through the filter element from the inside. (Never try to brush dirt; brushing will force dirt into the fibers).

b. Foam air filter element: Clean in warm soapy water, rinse and allow to dry

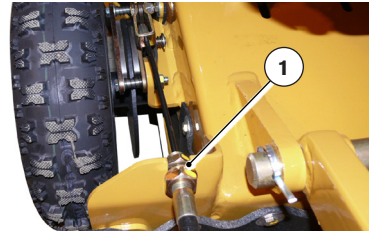
- 6) Remove the 3 pan-head screws from the pre-cleaner cap, then remove the cyclone housing and air guide. Wash the parts with water, dry them thoroughly, and reassemble them.
- 7) Be sure to install the air guide as shown in the illustration.
- 8) Install the cyclone housing so the air intake tab fits into the groove in the pre-cleaner cap.
- 9) Wipe off any dirt from the inside of the air cleaner base and cover using a moist rag. Be careful to prevent dirt from entering the air duct that leads to the carburetor.
- 10) Place the foam air filter element over the paper element, and reinstall the assembled air filter. Be sure the gasket is in place beneath the air filter. Tighten the air filter wing nut securely.
- 11) Install the air cleaner cover and tighten the wing nut securely.

Follow the directions found in the Honda Engine Operation Manual.

Air Intake - Check

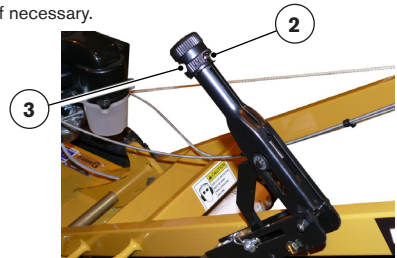
Follow the directions found in the Honda Engine Operation Manual.

Park Brake Adjustment - Check



For coarse adjustment, loosen the jam nuts (1) on the hub at the lower end of the cable. Adjust the jam nuts as necessary and re-tighten.

For fine adjustment at the Hand Lever, first remove the set screw (2) and turn the brake lever knob (3) clockwise, one revolution while the brake lever is in the released position as shown. Then apply the brake lever to check operation. The wheel should lock completely. Repeat the adjustment if necessary.



Maintenance

Drive Belts

WARNING

BEFORE BEGINNING TO CHECK OR ADJUST THE BELT: SHUTDOWN THE MACHINE, ENSURE THAT ALL MOVING PARTS HAVE COME TO A HALT, REMOVE THE KEY FROM THE ENGINE START SWITCH, AND PLACE THE KEY IN SAFEKEEPING.

DANGER

EXTREME CAUTION MUST BE USED TO AVOID DEATH OR SERIOUS INJURY. STAY CLEAR OF BELTS AND CHAINS AND CUTTING WHEEL WHEN THEY ARE MOVING!

NOTICE

To extend belt life proper tension must be maintained. A loose belt will cause excessive cutting wheel slippage and belt failure. A belt that is too tight can cause bearing, shaft and belt failure.

The cutting wheel is driven by the engine via a v-belt.

V-Belt Tension - Check

Drive belts are properly tensioned when 10 pounds of pressure at the center of the span produces 5/32" deflection.

To adjust tension, loosen the engine mounting bolts, and loosen the lock nut on

Air Cleaner Element - Service

Follow the directions found in the Honda Engine Operation Manual.

Spark Plug - Check & Replace

Remove the spark plug and check condition and gap (.028"-.031"). Follow the directions found in the Honda Engine Manual.

Air Cleaner - Replace

Follow the directions found in the Honda Engine Operation Manual.

Spark Plug - Replace

Follow the directions found in the Honda Engine Operation Manual.

Idle Speed - Check

Follow the directions found in the Honda Engine Operation Manual.

Valve Clearance - Check and Adjust

Follow the directions found in the Honda Engine Operation Manual.

Tire Condition - Inspect

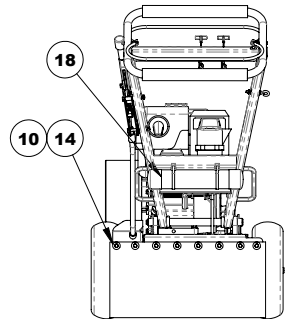
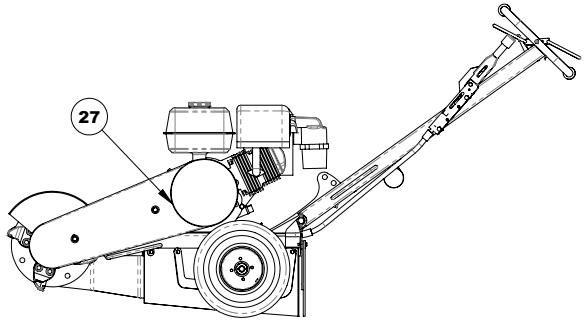
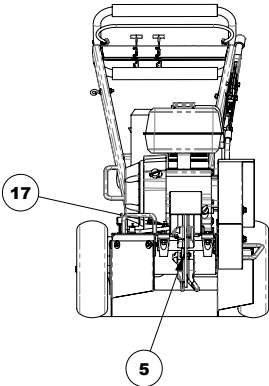
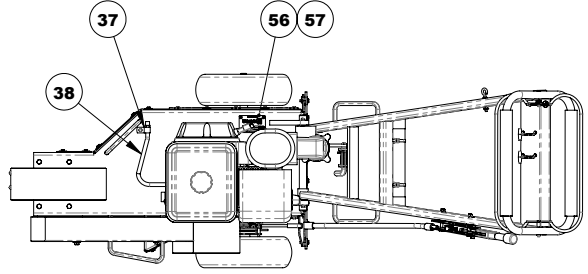
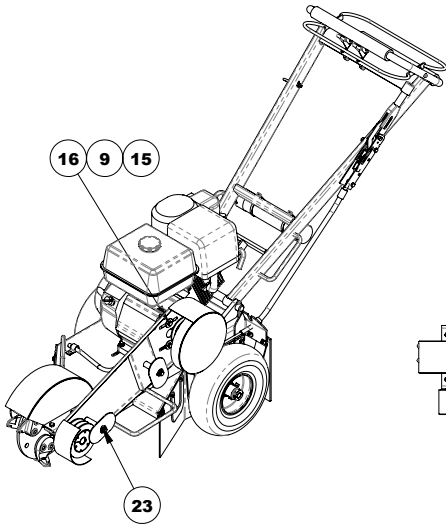
Inspect tires and wheels for wear and damage.

Main Assembly

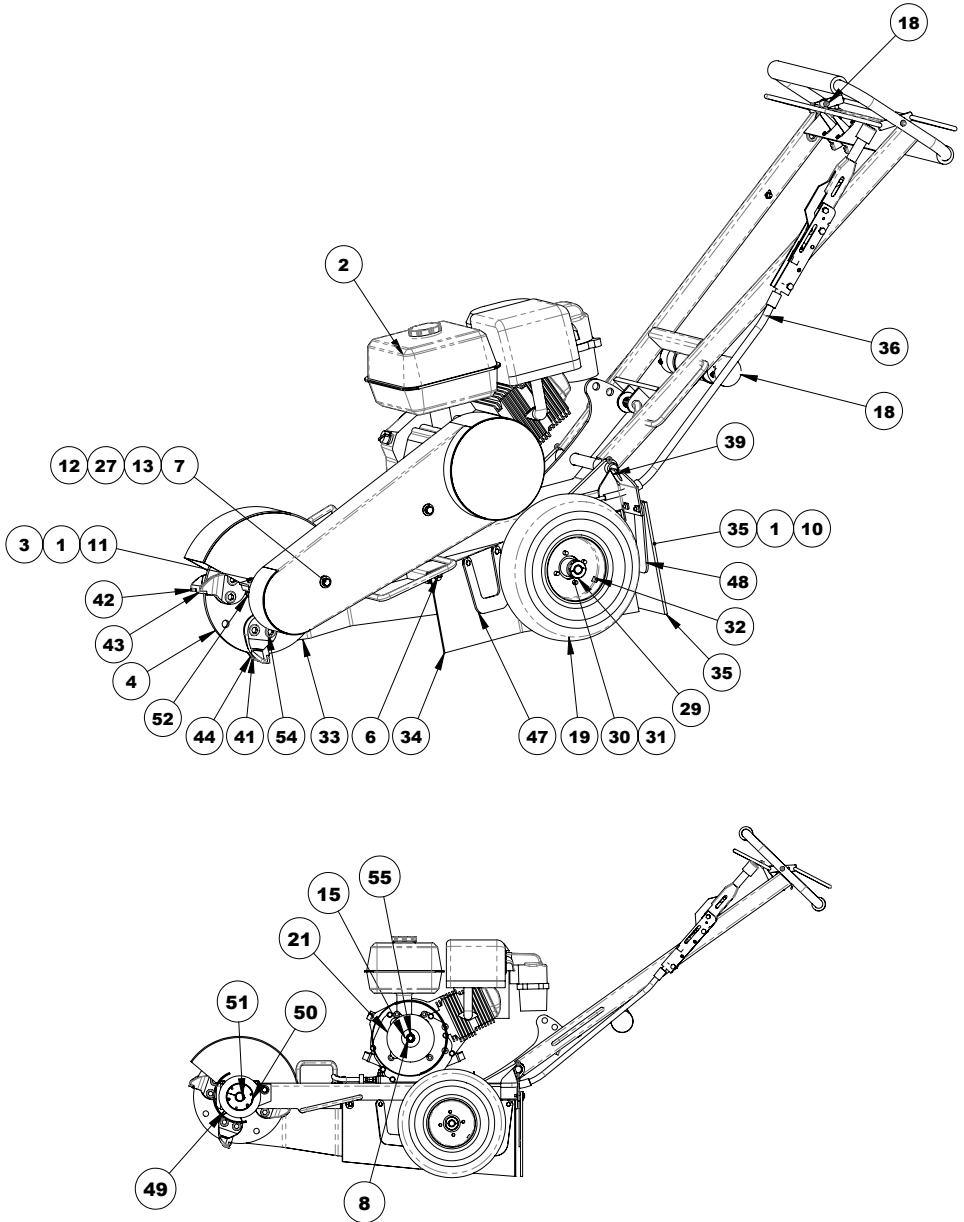
ITEM	QTY.	PART #	DESCRIPTION
1	1	10749	MAIN FRAME WELDMENT
2	1	762251	ENGINE-HONDA 13H.P.
3	2	761637	BEARING-PB 1"
4	1	10371	CUTTER WHEEL, 3/8 x 11 8T
5	1	10380	SHAFT WELD, CUTTER WHEEL
6	16	722103	BOLT HEX 1/4-20 X 3/4 GR8
7	3	722303	BOLT-HEX 3/8-16 X 1
8	1	722100	BOLT HEX 3/8-24X1-1/4GR8
9	2	750521	BOLT HEX 5/16-24 X 3/4 GR8
10	8	722104	BOLT HEX 1/4-20 X 1 GR8
11	4	722305	BOLT-HEX 3/8-16 X 1 1/2
12	6	726301	WASHER FLAT 3/8 USS
13	11	726302	WASHER-LOCK 3/8
14	24	726607	FENDER WASHER
15	3	4900-35	WASHER 14 GA. .375 X 1.25
16	2	726202	WASHER LOCK 5/16" PLATED
17	8	724301	NUT HEX 3/8-16 GR8
18	1	10831	HANDLE BAR ASSY.
19	2	761671	TIRE 4.10 x 6 x 12.8 DIA,
20	1	762266	WHEEL, THREE PIECE 6"
21	1	761636	CLUTCH, CENTRIFUGAL
22	1	10388	BACK-BELT GRD. WELD.
23	1	10392	SPACER - VBG
24	1	1525	CURTAIN - BELT GUARD BUF- FER
25	4	761581	BEARING, WHEEL
26	2	10438	PLATE WELD, BACK-UP ENG.
27	1	10389	BELT GUARD WELD
28	1	761585	BRAKE MECHANISM

29	2	761779	COLLAR-CLAMP 3/4
30	1	10795	WHEEL WELD. BRAKE
31	1	762266-2	INNER - RIM HALF
32	1	762266-3	INNER - RIM HALF
33	1	10819	CURTAIN - SIDE
34	1	10821	CURTAIN, SIDE GUARD
35	1	10823	CURTAIN, BACK
36	1	10419	CABLE-BRAKE
37	1	730051	CLAMP-VINYL COVERED 5/8"
38	1	750546	HOSE-OIL DRAIN
39	1	11159	PIN - HINGE
40	2	960200	PIN-COTTER 1/4" x 2"
41	2	2933c	TOOTH, ONE PIECE, C-BORED
42	2	2933t	TOOTH, ONE PIECE, TAPPED
43	2	3144C	TOOTH, ONE PIECE, C-BORED
44	2	3144T	TOOTH, ONE PIECE, TAPPED
45	1	12114	SIDE-CURTAIN RETAIN
46	1	12111	SIDE-BRAKE CURTAIN RETAIN
47	1	12112	SIDE,U-CURTAIN RETAIN
48	1	12113	REAR-CURTAIN RETAIN
49	1	763066	SHEAVE-2B46SDS
50	1	800246	BUSHING SDS X 1"
51	1	2581-03	1/4 keystock x 2
52	3	724300	NUT-HNML 3/8-16 GR8 ZP
53	3	722304	BOLT-HEX 3/8-16 X 1 1/4
54	8	750949	BOLT-POCKET 1-1/2 1960 S
55	1	2581-11	1/4 keystock x 3
56	1	26965	TAG- SN/VIN RAYCO
57	4	750463	RIVET-3/16 X 3/8 STLMAND

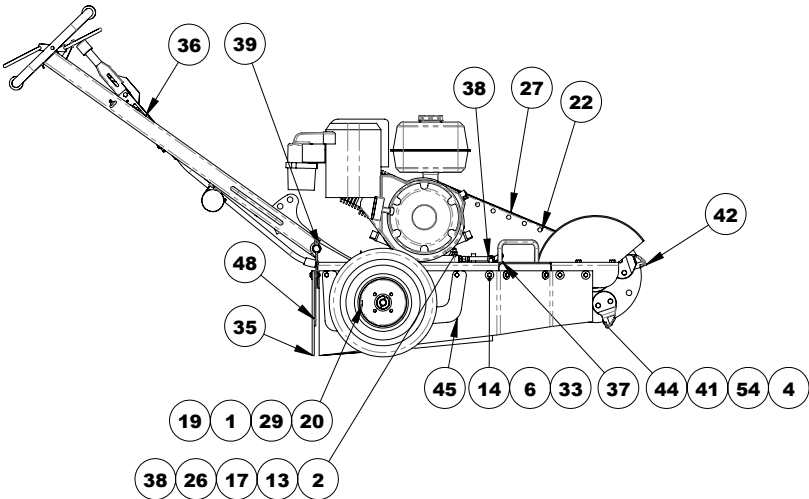
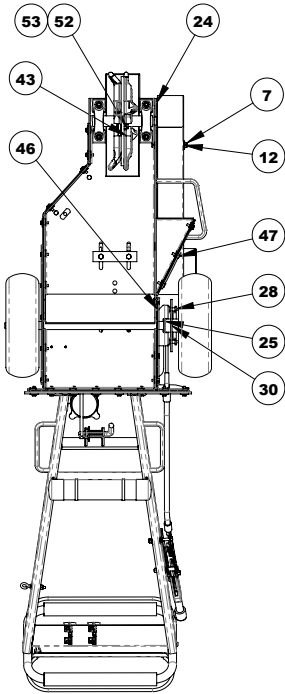
Main Assembly



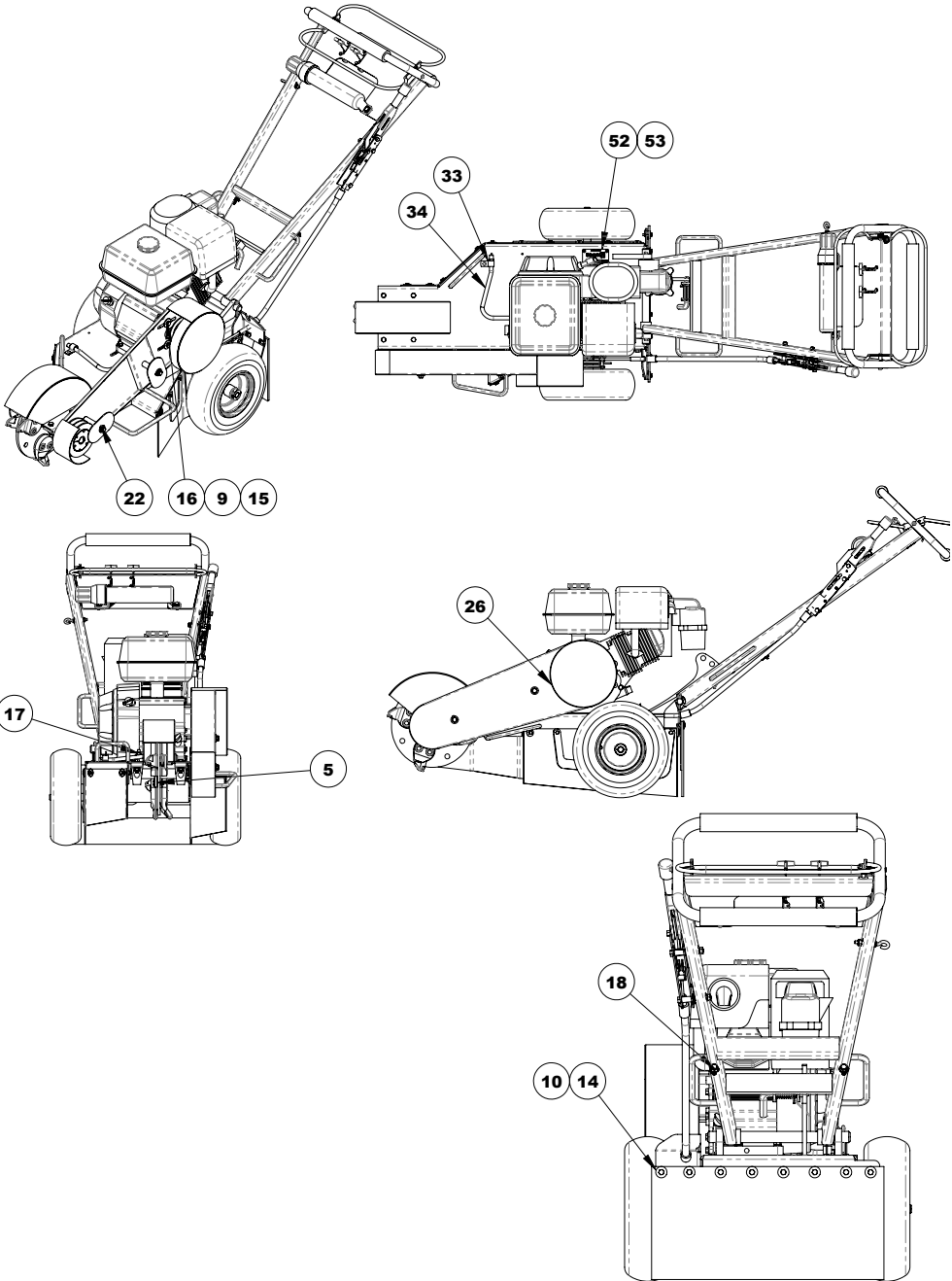
Main Assembly



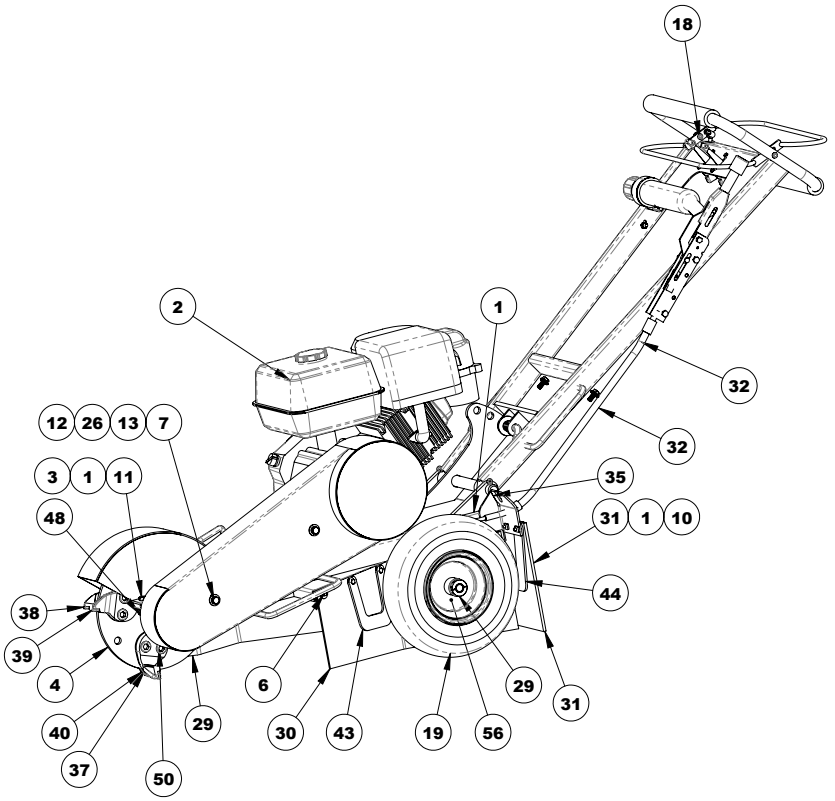
Main Assembly



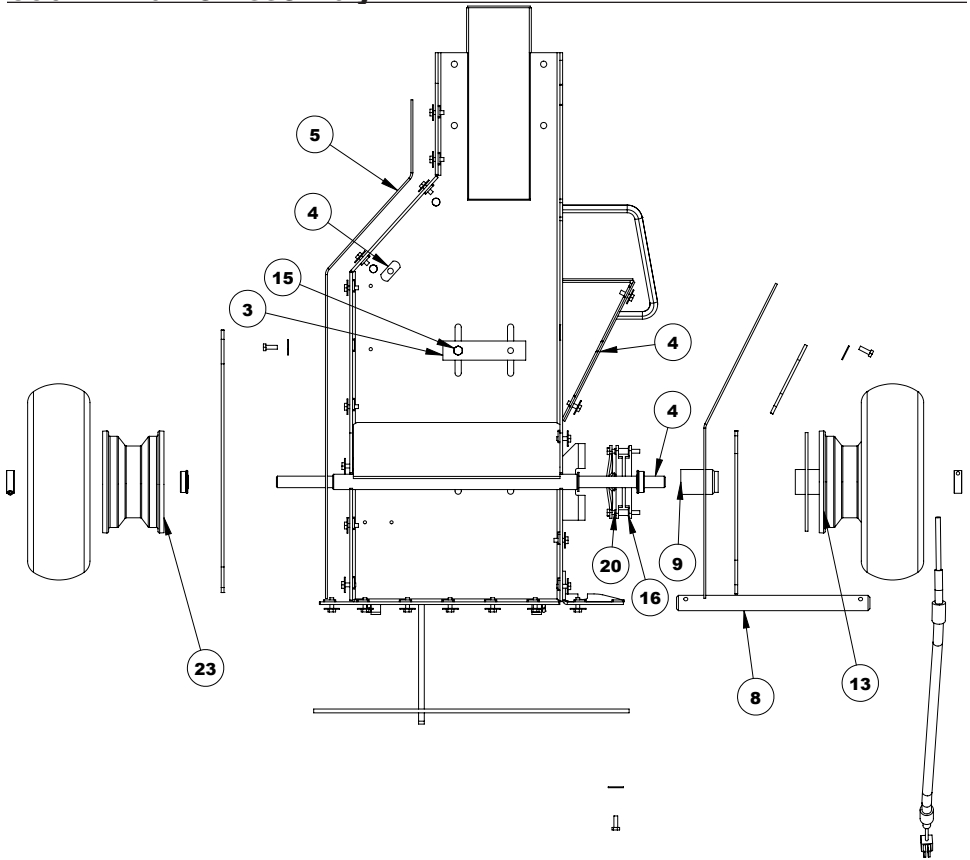
Main Assembly



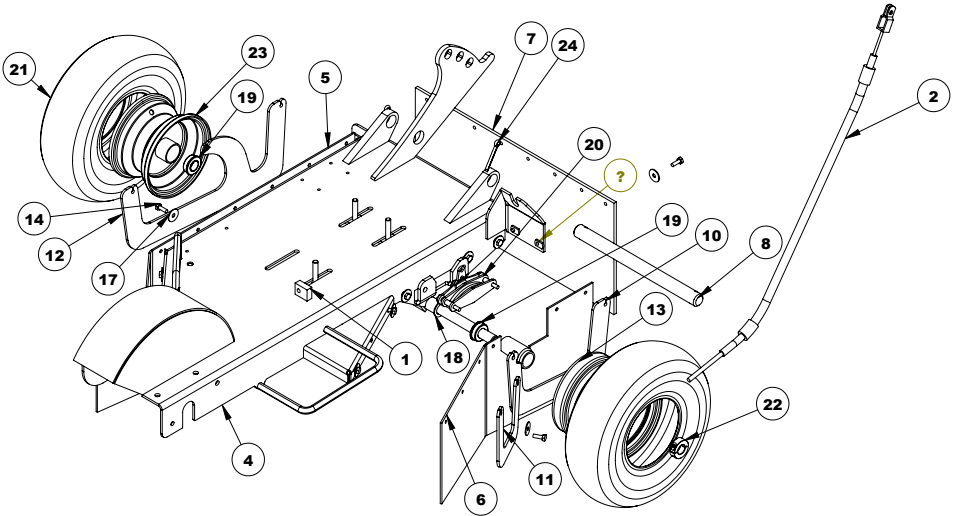
Main Assembly



39017 Frame Assembly



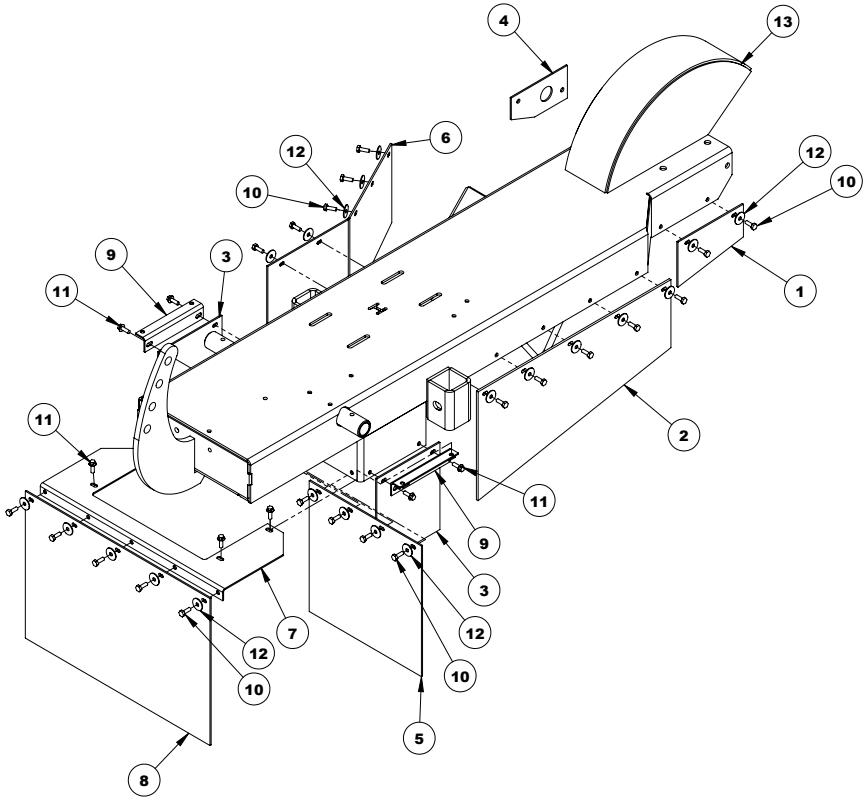
39017 Frame Assembly



ITEM	QTY.	PART #	DESCRIPTION
1	1	1479	ADJUSTMENT TAB
2	1	10419	CABLE-BRAKE
3	2	10437	PLATE BACK-UP ENGINE
4	1	10749	MAIN FRAME WELDMENT
5	1	10819	CURTAIN - SIDE
6	1	10821	CURTAIN, SIDE GUARD
7	1	10823	CURTAIN, BACK
8	1	11159	PIN - HINGE
9	1	11450	SPACER, HUB
10	1	12111	SIDE-BRAKE CURTAIN RETAIN
11	1	12112	SIDE,U-CURTAIN RETAIN

12	1	12114	SIDE-CURTAIN RETAIN
13	1	36063	WHEEL, BRAKE WELD RG13-II
14	24	722103	BOLT HEX 1/4-20 X 3/4 GR8
15	4	722307	BOLT-HEX 3/8-16 X 2
16	2	726203	WASHER FLAT 3/16 USS PL
17	24	726607	FENDER WASHER
18	1	726803	WASHER, FLAT 3/4-14GA
19	2	761581	BEARING, WHEEL
20	1	761585	BRAKE MECHANISM
21	2	761671	TIRE 4.10 x 6 x 12.8 DIA,
22	2	761779	COLLAR-CLAMP 3/4
23	1	804875	WHEEL-ONE PIECE 6"
24	2	960200	PIN-COTTER 1/4" x 2"

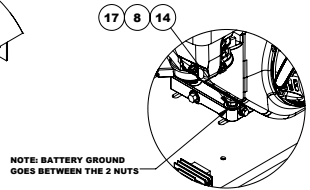
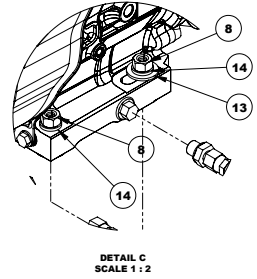
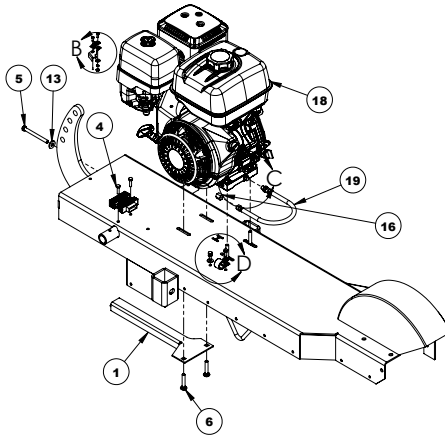
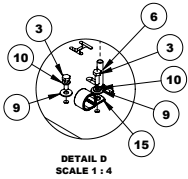
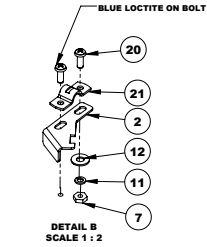
Curtain Kit (5133-A)



ITEM	QTY.	PART #	DESCRIPTION
1	1	1521	CURTAIN
2	1	1522	CURTIAN - SIDE
3	2	1524	CURTAIN
4	1	1525	CURTAIN - BELT GUARD BUFFER
5	1	1526	CURTAIN
6	1	5132	CURTAIN SIDE

7	1	6172	REAR CHIP GUARD WELD
8	1	6173	CURTAIN - REAR
9	2	12397	BRKT-MTG, CURTAIN WELD.
10	21	722103	BOLT HEX 1/4-20 X 3/4 GR8
11	8	722110	BOLT WHIZ 1/4-20 X 3/4
12	21	726607	FENDER WASHER
13	1	REF.	WELDMENT MAIN FRAME

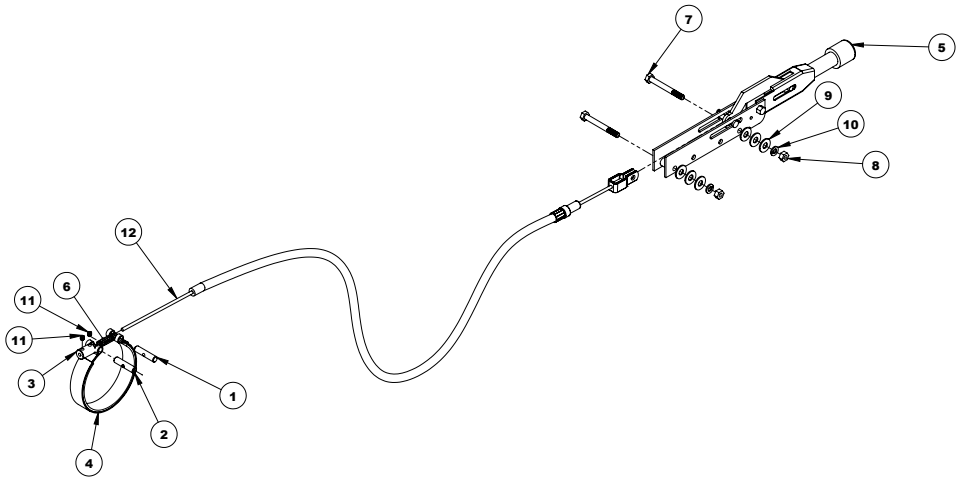
Engine Assembly (5095-D)



ITEM	QTY.	PART #	DESCRIPTION
1	1	5097	BRACKET, ADJ., ENGINE, WELD.
2	1	23833	MOUNT, CHOKE CABLE
3	2	722103	BOLT HEX 1/4-20 X 3/4 GR8
4	2	722104	BOLT HEX 1/4-20 X 1 GR8
5	1	722310	BOLT TAP 3/8-16 X 4 GR2
6	4	722333	BOLT CAR 3/8-16 X 2
7	1	724102	NUT HEX #10-24
8	4	724301	NUT HEX 3/8-16 GR8
9	2	726101	WASHER FLAT 1/4 USS
10	2	726102	WASHER-LOCK, 1/4"

11	1	726103	WASHER LOCK #10
12	1	726203	WASHER FLAT 3/16 USS PL
13	3	726301	WASHER FLAT 3/8 USS
14	4	726302	WASHER-LOCK 3/8
15	1	730025	CLAMP-VINYL COVERED 1"
16	1	738204	CAP-HEX -4
17	1	750061	NUT-WHIZ 3/8-16 SERR FLANGE L/N GR8 ZN
18	1	750527	ENGINE-13HP HONDA ELEC.
19	1	760766	HOSE-OIL DRAIN
20	2	762771	SCREW-#10-24 X 1/2 PAN BL
21	1	765004	CLAMP-CABLE 3 SERIES MWF

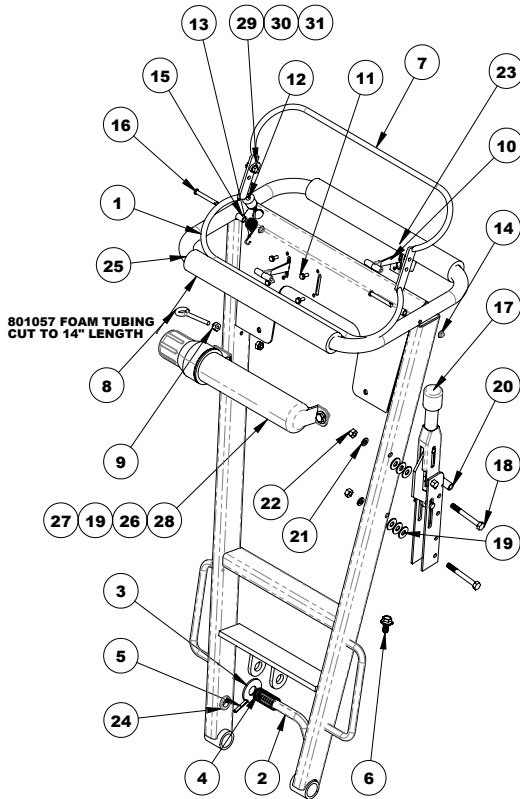
Brake Assembly (1705-E)



ITEM	QTY.	PART #	DESCRIPTION
1	1	1504	PIN BRAKE
2	1	1505	PIN BRAKE W/SET SCREW
3	1	1506	LOCK COLLAR
4	1	610000	BRAKE - STRAP
5	1	610005	LEVER-BRAKE
6	1	610035	SPRING-BRAKE RETURN

7	2	722204	BOLT HEX 5/16-18 X 2 3/4 GR8
8	2	724201	NUT HEX 5/16"-18 GR8
9	6	726201	WASHER - FLAT 5/16
10	2	726202	WASHER LOCK 5/16" PLATED
11	2	730009	SCREW-SET 1/4 COUNTER PT
12	1	736067	CABLE-BRAKE RG12/20

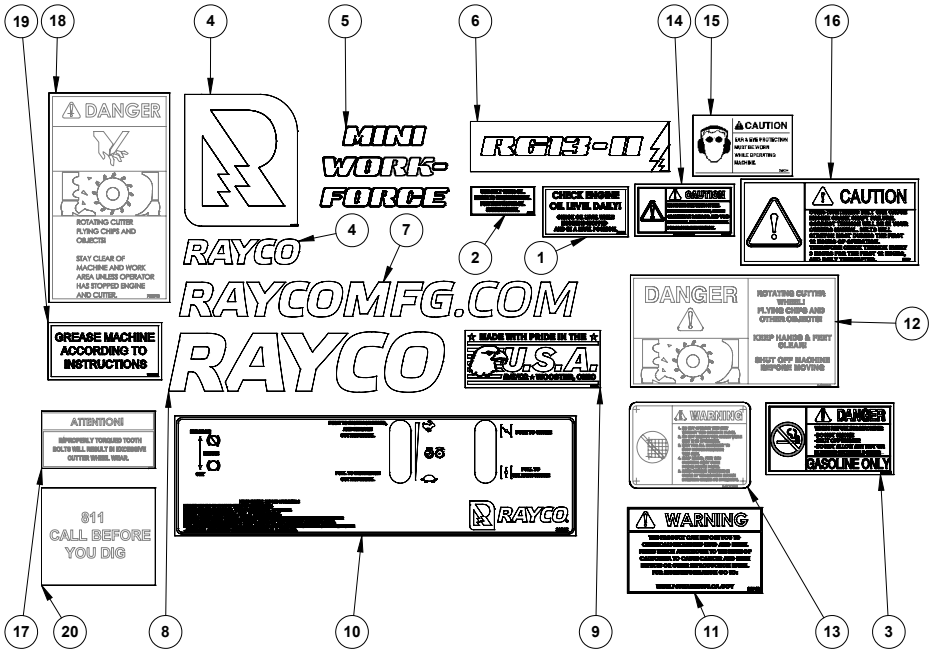
Handle Bar Assembly (10831-E)



ITEM	QTY.	PART #	DESCRIPTION
1	1	10762	HANDLE BAR WELD
2	1	10830	PIN, LOCK
3	1	726701	WASHER FLAT - 5/8"
4	1	630012	SPRING - LOCK 3/4"
5	1	730095	PIN-ROLL, 3/16 x 1-1/4
6	2	722114	BOLT WHIZ 3/8-16 X 3/4 GR8.2 ZP
7	1	1601	HANDLE, BAIL - WELD.
8	1	722711	BOLT EYEBOLT 1/4-20
9	2	724508	NUT LOCK 1/4-20 NYLOCK
10	2	762140	THROTTLE - ACTUATOR
11	4	750456	SCREW-#10-24 X1/2 HH MACH
12	1	630010	SWITCH-DEADMAN
13	1	10431	SPRING-TORSION
14	2	630013	NUT PUSH - 1/4"
15	2	7013-04	SPACER - 7/16 OD x 0.272 ID

16	2	728014	PIN, CLEVIS 1/4 X 2
17	1	610005	LEVER-BRAKE
18	2	722204	BOLT HEX 5/16-18 X 2 3/4 GR8
19	8	726201	WASHER - FLAT 5/16
20	1	2541-09	1/2 OD x 14 GA. WALL TUBING
21	2	726202	WASHER LOCK 5/16" PLATED
22	2	724201	NUT HEX 5/16"-18 GR8
23	4	724102	NUT HEX #10-24
24	2	730100	GROMMET-RUBBER 9/16" ID
25	2	23323	TUBING, FOAM 1" ID X .300" WALL
26	2	722203	BOLT HEX 5/16-18X 3/4 GR8
27	2	750050	NUT LOCK 5/16-18 NYLON
28	1	802998	TUBE-MANUAL 2" DIA X 12.5" LONG
29	1	34772	CONTACT SWITCH TAB
30	1	722110	BOLT WHIZ 1/4-20 X 3/4
31	1	750768	NUT-WHIZ 1/4-20 A563 GR-A

Decal Kit (26947)



ITEM	QTY.	PART #	DESCRIPTION
1	1	3080	DECAL-CHECK ENGINE OIL LEVEL
2	1	4989	DECAL-MOTOR OIL SPEC
3	1	8153	DECAL-GASOLINE
4	1	30177	DECAL- RAYCO VERT LOCKUP 6" H
5	1	30190	DECAL- MINI WORK-FORCE
6	2	30197	DECAL- RG13-II OUTLINE
7	1	30212	DECAL- RAYCOMFGCOM 1.25" H
8	1	30219	DECAL- RAYCO WORDMARK 10" H
9	1	30224	DECAL- MADE IN USA 2013 LOGO

10	1	30255	DECAL - CONSOLE RG13-II
11	1	39748	DECAL-LEAD AND DIESEL WARNING
12	1	640055	DECAL -CAUTION REVOLVE CW
13	1	640056	DECAL - WARNING 1.DO NOT
14	1	640058	DECAL-EXCESSIVE BELT TENSION
15	1	732008	DECAL-CAUTION EAR & EYE
16	1	732009	DECAL - CAUTION OVER TIGHTENING
17	1	732014	DECAL-TOOTH BOLT TORQUE
18	1	732018	DECAL-DANGER ROTATING CW
19	1	732026	DECAL- GREASE MACHINE
20	1	801777	DECAL, 811 CALL BEFORE YOU DIG

Specifications

GENERAL

Weight	262 lbs. (119kg)
Length	79.75" (202.6cm)
Height.....	50" (127cm)
Width.....	25" (63.5cm)
Frame	7 ga. hot-rolled steel
Control bar.....	2" (5cm) rectangular steel tubing
Tires.....	4.10 x 6 (10.4 - 15cm)
Brake	Disc type, lever mounted on control bar

ENGINE

Make.....	Honda
Model	GX390
Type	4-cycle, overhead valve
# of cylinders	1
Bore.....	3.5" (8.8cm)
Stroke.....	2.5" (6.4cm)
Displacement.....	23.7 cubic inches (389cc)
Maximum no load rpm	3600
Gross power at 3,600 rpm	13 hp (9.7kw)
Maximum rated torque.....	19.5 ft.-lbs. @ 2500 rpm (26.5 Nm)
Cooling medium.....	Air
Air cleaner	Dual element
Fuel consumption	0.4 gallon/hr. (1.5 liters/hr.) @ 2500 rpm
Fuel tank capacity	1.72 gallons (6.5 liters)

CUTTER WHEEL

Wheel diameter.....	11" (28cm)
Wheel thickness	3/8" (.95cm)
Bearings	(2) 1" (3 cm) pillow block with lip contact seals
Speed.....	3,480 rpm (w/engine at 3,900 rpm)
Drive belts	2 section banded v-belt
Belt guard.....	Electrically welded steel fully enclosed
Cutter teeth.....	(8) RAYCO SUPERTEETH
Chip deflection.....	Steel, fabric impregnated rubber
Clutch.....	Centrifugal
Additional safety features	Steel guard, operator presence engine shut down, low oil pressure engine shut down

CUTTING RANGE

Below ground level	13" (33cm)
Above ground level	22" (56cm)
Stump diameter	No limitation

OPTIONS

- Replacement teeth.

WARRANTIES

- RAYCO® provides a two year warranty on main frame and control bar.
- Standard warranty on components (engine, battery, tires, etc.) furnished by the manufacturer.

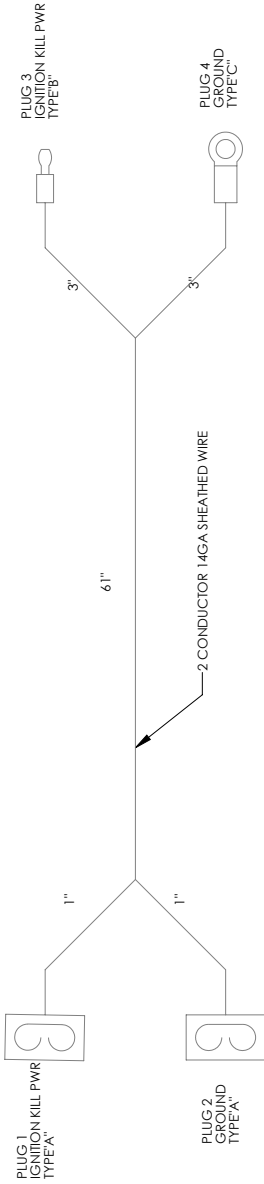
CE SPECIFICATIONS

Operator Ear Sound Pressure (db A-ambient 57.6) dB (Low Idle).....	73.2
dB (High Idle).....	93.1
dB (High Idle Cutting).....	94.4
Operator Controls Vibration (meter/sec ²) RMS (Low Idle).....	2.1
RMS (High Idle).....	19.9
RMS (High Idle Cutting).....	38.5

Wire Harness 40029

Terminal Legend

- A - FEMALE BLADE .25" FULLY INSULATED
- B - FEMALE BLADE .25" FULLY INSULATED
- C - RING TERMINAL FOR 1/4" STUD FULLY INSULATED



ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE:

FRACTIONAL	± .02
DECIMAL	± .005
ANGULAR	± 1°
MAXIMUM	-

FINISH WEIGHT SCALE 1:2
0.000

FROM PLUG#	FROM PIN#	WIRE DESCRIPTION (FUNCTION IMPRINT)	GAUGE	COLOR	TO PLUG#	TO PIN#
1		IGNITION KILL POWER	14GA	WHITE	3	
2		GROUND	14GA	BLACK	4	

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Operator Controls Vibration (meter/sec ²) RMS (Low Idle).....	2.1
RMS (High Idle).....	19.9
RMS (High Idle Cutting).....	38.5

A. General Outline

Rayco Manufacturing, Inc. warrants to the first user that the products it supplies will be free from defects in material and workmanship under normal and proper usage for a period of 365 days from the date of delivery to the first user. In addition, with respect to "Mini Work-Force" models, the mainframe and control bar will be free from defects in material and workmanship under normal and proper usage for a period of two (2) years from said date of delivery.

This warranty does not cover and Rayco makes no warranties with respect to (i) any product that has been subject to abuse, misuse, misapplication, neglect, alteration or accident; to improper or incorrect repair or maintenance; or to abnormal conditions of use, temperature, moisture, dirt or corrosive matter; and (ii) any material, parts or other components that are manufactured by someone other than Rayco, which items carry only the manufacturer's warranty, if any. Furthermore, this warranty does not cover expendable parts.

Individual components such as engines, engine drive systems, batteries, and hydraulic components, etc. shall be covered by standard warranties of their respective manufacturers. Any claims must be submitted within 30 days of the repair.

B. Individual Components

1. Engines

- a. All engines have specific warranties issued by OEM and honored thru their respective dealer.

2. Hydraulic Components

- a. Hydraulic components have variable warranties. Rayco must preauthorize all hydraulic component product warranties prior to removal from the machine, and all warranty considerations are the sole responsibility of the manufacturer.

3. Batteries

- a. Batteries have a warranty that is honored thru manufacturer. For warranty service, the purchaser is to contact manufacturer directly.

4. Various Components

- a. Belts will be covered under warranty only if Rayco receives warranty from their supplier.
- b. Sprockets Sheaves have a six month limited warranty.
- c. Electric clutches have a six month limited warranty.
- d. Hydraulic Cylinders will be covered under warranty only if Rayco receives warranty from their supplier.

5. Pockets and Teeth

- a. Pockets and Teeth will be covered under warranty only if they are defective before they are mounted on a stump grinder. Once they are used, all warranty stops.

C. Items not Covered

Rayco is not responsible for the following:

1. Premiums charged for overtime labor requested by the purchaser.

2. Transporting the product to and from the place at which warranty work is performed.
3. Any product that has been altered or modified in ways not approved by Rayco.
4. Depreciation or damage caused by normal wear, lack of reasonable and proper maintenance, failure to follow operating instructions, misuse, lack of proper protection during storage, or accident.

D. Unapproved Service Modification

Rayco is relieved of its obligation under this warranty if:

1. Service (other than normal maintenance and replacement of service items) is performed by someone other than an authorized Rayco dealer; or
2. The product is modified or altered in ways not approved by Rayco.

E. Obtaining Warranty Service

To obtain performance of this warranty, the original retail purchaser must request warranty service from a Rayco dealer authorized to sell the product to be serviced. When making such a request, the purchaser must present evidence of the product's delivery date, make the product available at the dealer's place of business, and inform the dealer in what way the purchaser believes the product to be defective.

Warranty repairs can be made in the field if the purchaser and servicing dealer so desire. However, travel time expense to and from the job site will be purchaser or dealer responsibility.

F. No Implied Warranty or Other Representation

Where permitted by law, neither Rayco nor any company affiliated with it makes any warranties, representations or promises, expressed or implied, as to the quality or performance, or freedom from defect of its products other than those set forth above, and **NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS IS MADE.**

G. Limitation of Purchaser's Remedies

Where permitted by law, the purchaser's only remedies in connection with the branch of performance on any warranty on any Rayco product are those set forth on this page. In no event will the dealer and or Rayco be liable for incidental or consequential damages, including but not limited to: loss of profits, rental of substitute equipment, or other commercial loss.

H. No Dealer Warranty

The selling dealer makes no warranty of his own on any item warranted by Rayco, and makes no warranty on other items unless he delivers to the purchaser a separate written warranty certificate specially warranting the item. A dealer has no authority to make any representation to promise on behalf of Rayco, or to modify the terms or limitations of this warranty in any way.

If you have a situation where you are not sure if a component is covered under warranty, please do not hesitate to contact us. Rayco wants you and your customer to be 100% satisfied with our products and service.

Read and understand all instructions before attempting to operate this machine. This manual should be readily available for reference at all times.

Additional copies of this manual may be purchased. Contact your Authorized Rayco Dealer or Rayco Manufacturing Inc.

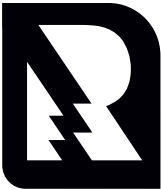
RAYCO Manufacturing, Inc.
4255 E Lincoln Way
Wooster, OHIO 44606 U.S.A.
800.392.2686
raycomfg.com

Think Smart, Think Safe.....

We care about your safety. When operating your RAYCO® machinery always wear an approved helmet complete with ear muffs, face shield and the proper eye wear. Never operate under the influence of alcohol or drugs. Know your RAYCO, read and understand your owner's manual cover to cover.

RAYCO Manufacturing Inc. retains the right to make changes in design and specifications; engineering; add or remove features; add improvements; or discontinue manufacturing at any time without notice or obligation.

Thank you for buying and using RAYCO Equipment.



"The Stump Cutter People"

RAYCOMFG.COM