RG55 Stump Cutter

OPERATOR ▪ SERVICE ▪ MAINTENANCE MANUAL

RAYCOMFG.COM

INDEX: OSMRG55-19

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.

TABLE OF CONTENTS

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.

Foreword

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

The RG55 stump cutter is designed for your maximum benefit for every dollar spent. The machine is constructed for durability and easy maneuvering, for those hard to reach tree stumps and roots. Its 20” diameter cutting wheel with 24 Rayco Super teeth is powerfully driven through a direct drive coupler to a 90 degree gearbox and a nickel plated chain with a 54 horsepower Kubota gasoline engine at its source. Cutting boom motion and the self-propel drive are entirely hydraulic, with 2 speeds. The hydraulic controls each include self-centering fingertip control levers.

The machine chassis features steel tubing and steel fabricated construction, mounted on extra gripping deep tread tires. The operator benefits from a swing-out steel control station which allows optimal windows of the cutting action, all while being guarded by shatter resistant and heavy rubber curtains. The RG55 has the unique ability to pass through a 36” gate under its own power. Other special features of the RG55 include dual cross travel cylinders, a slewing ring that is used to pivot the cutter boom, replaceable composite bushings on all cylinder ends, separate wheel drives for each wheel, 6.5 gallon fuel tank, steel chain guards, and an easy access ignition switch on the control panel.

An additional safety feature is the optical eye sensor on the front of the control panel. At the point that the operator steps away from the control station for more than 5 seconds, the machine will shut down.

Other options that have become standard on the RG55 are dual removable travel wheels for increased stability and travel traction, Command Cut, and additional chip guards.

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: RG55 001 01 18

RG55 - Type of Rayco equipment you have

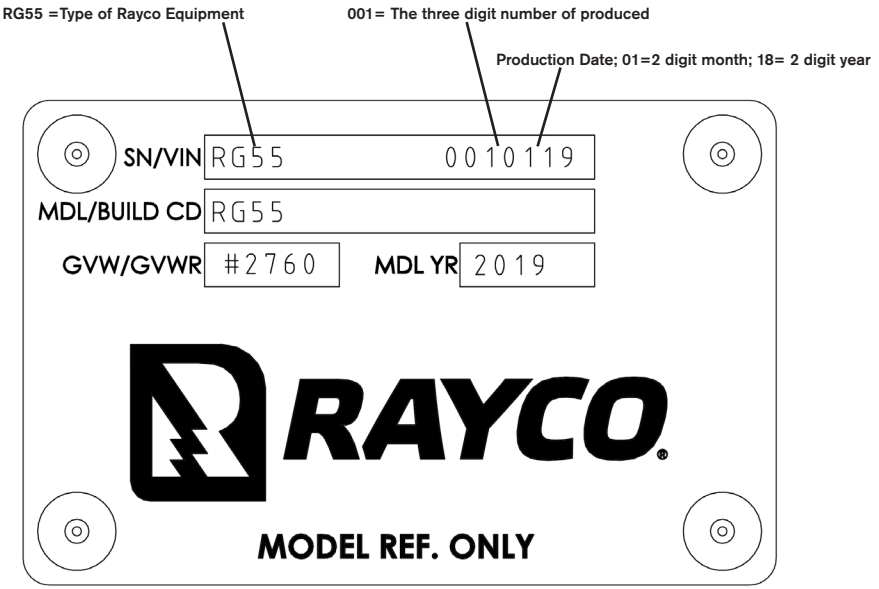
001 - Three digit for the number of produced

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

18 - Two digit year, 18 = 2018, 19 = 2019, 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.



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.

DANGER

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

WARNING

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

CAUTION

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.

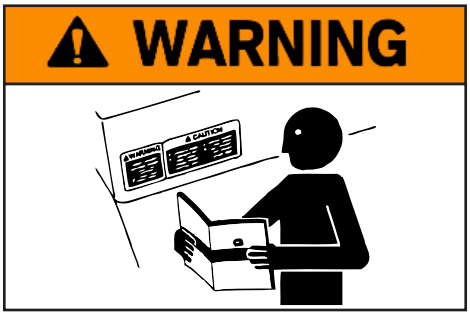
Failure to observe safety instructions, improper operation, lubrication, maintenance, or repair of this product could result in severe injury or death.

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 of death.

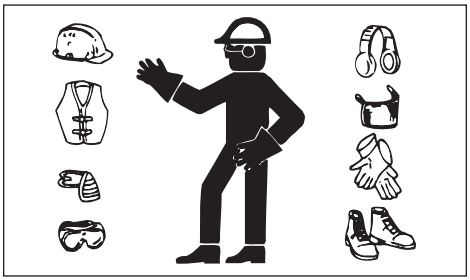
General Hazard Information



- 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



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.

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.**

Safety

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).

Never use compressed air for cleaning.

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 of 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.

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.

- 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

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:

- 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.
- 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

Respiratory Protection

Rayco recommends the use of dust masks or respirators to be worn over the nose and mouth that protect the lungs from air-borne dust and irritants. When working in activities such as chipping brush, stump grinding, working near old wood or chip piles, non-toxic nuisance dusts can be harmful.

NOTICE

Dust masks and/or particulate respirators only protect against particles (e.g., dust). They do not protect against chemicals, gases or vapors, and are intended only for low hazard levels.

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.
Obey all local regulations for the disposal of liquids.

Crushing & 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.

Fire & 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.

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

Safety

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!

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.

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 equipment 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, battery 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.

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.

Before Starting Engine

Start the engine only from the operator station or remote if equipped. 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.

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.

Operation

NOTICE

The intended use(s) of this machine e.g. Outdoor use only, Trained Operators only.

Only operate the machine controls when the engine is running.

Do not leave the operators station while machine is running unless equipped with a remote.

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.

Safety

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.

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 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.

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 operator.

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.
- 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 following areas: cutting edges, pinching surfaces, and crushing surfaces.

Equipment Lowering with Engine Stopped

Before lowering any equipment with the engine stopped, clear the area around the equipment of all personnel. The procedure to use will vary with the type of equipment to be lowered. Keep in mind this system use a high pressure fluid to raise or lower equipment. The procedure will cause high pressure hydraulic oil to be released in order to lower the equipment. Wear appropriate personal protective equipment and follow the established procedure in the Operation and Maintenance Manual.

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 energy 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 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.
- 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.

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

Safety

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.

Removal Procedure

- Lockout/tag out equipment must be removed by the worker who placed it.

Parking

Park on a level surface. If you must park on a grade, chock the machine.

1. Move the joystick control slowly to the NEUTRAL position in order to stop the machine.
2. Move the throttle control lever to the LOW IDLE position.
3. Lower all implements (if equipped) so that the work tool implement rests firmly on the ground.
4. Move the hydraulic controls to the NEUTRAL position.
5. Turn the engine start switch key to OFF position and remove the key.
6. Disconnect the operator restraint devices (if equipped) and exit the machine.

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.

Pre-Transportation Checks

- Never allow inexperienced drivers to tow the machine.
- When towing, always make sure the tow vehicle ball hitch and trailer/machine hitch coupler are the correct matching size and style.
- Always make sure the tow vehicle and the trailer/machine are on level ground and the wheels are chocked before connecting or disconnecting.
- Make sure the tow vehicle is of adequate size and has the towing capacity to safely tow the combined weight of trailer/machine.
- Never tow a machine while it is running.
- Towing will affect handling, allow for extra stopping distances. Refer to U-Haul's "Safe Trailering" Driver Education Program that is available at this website: http://www.uhaul.com/guide/index.aspx?equipment=towing-autotransport
- Make sure the towing eye is at the proper height so the machine tows level when traveling. A proper amount of tongue weight is required to allow the machine to tow properly. Too little tongue weight will result in wandering, fish-tailing, and/or axle damage.

NOTE: Use caution when backing up. The rear of the machine may not be visible from the towing vehicle. It is recommended to use a spotter outside the vehicle.

- Be aware of the length of the EQUIPMENT while turning, parking, crossing intersections, and in all driving situations. When arriving at the work site, do not set up the EQUIPMENT under a tree that is being pruned, cut, or worked on.

Important Towing Information

PREVENT WHIPPING by properly loading the auto transport trailer. Load the heaviest end (engine end) of the vehicle-in-tow to the FRONT of the trailer. Loading heavier in the rear can cause the tow vehicle and transport trailer "combination" to begin WHIPPING, which is violent and uncontrollable sway. SIDE to SIDE MOTION (SWAY) THAT BEGINS as you reach a certain speed, will likely become WHIPPING at higher speeds. If you notice sway beginning SLOW DOWN IMMEDIATELY by letting off the gas pedal. Then stop to reload the vehicle-in-tow heaviest end forward as soon as possible, and remove any cargo from the vehicle-in-tow

(vehicle carried on trailer).

IF WHIPPING or SWAY OCCURS, DO NOT steer. DO NOT apply your brakes and NEVER speed up. Let off the gas pedal and hold the steering wheel in a straight-ahead position.

A "combination disturbance" is improper handling, whipping, sway, over-steering or other deviation of the tow vehicle or trailer from their intended path, due to one or more causes (improper loading, steering inputs, excessive speed, cross winds, passing vehicles, rough roads, etc). IF A COMBINATION DISTURBANCE OCCURS, DO NOT steer or brake. Steering or braking during a disturbance can cause a loss of control or crash.

If a WHEEL GOES OFF THE PAVED ROADWAY, DO NOT steer sharply and DO NOT brake. Let off the gas pedal and slow down below 25 mph. Then steer gradually back onto the roadway. Proceed with caution entering traffic.

Loading Your Combination

⚠ DANGER

ALWAYS LOAD THE RG74T-R WITH THE OPERATOR CONTROLS IN THE OPERATING POSITION OR WITH REMOTE CONTROL IF EQUIPPED. THE CONTROLS CAN EASILY BE OPERATED WHILE WALKING ALONG SIDE THE TRAILER DURING LOADING. LOADING THE RG74T-R WITH THE OPERATOR CONTROLS LOCKED IN THE TRANSPORT POSITION COULD CAUSE SERIOUS INJURY OR DEATH CAUSING THE MACHINE TO CRUSH THE OPERATOR.

NEVER load cargo inside the vehicle-in-tow or on the trailer. Cargo inside the vehicle-in tow can cause sway or WHIPPING.

NEVER overload your tow vehicle. Do not exceed the Gross Vehicle Weight Rating (GVWR) and the Gross Axle Weight Ratings (GAWR), which are posted on a label inside the driver's door opening.

Make sure the trailer is securely attached to the tow vehicle hitch before loading and unloading.

Keep children and others at least 25 feet away during loading and unloading.

Slow Down When Towing

AVOID CRASHES by slowing down. Reduce your speed from what you would normally drive without a trailer under similar road conditions. The maximum speed is 45 mph when towing a trailer. Do not exceed any posted speed limit.

DRIVE DEFENSIVELY – anticipate stops, brake early, and never follow closely.

BEFORE going downhill, slow down and shift the transmission into a lower gear. DO NOT RIDE BRAKES on downgrades.

Slow down for curves, adverse weather, hazardous road conditions, road construction and expressway exits.

Before Towing and on the Road

Use the checklist at the end of these instructions before towing and while on the road.

Make sure your tow vehicle is properly equipped and maintained. Be sure all tires are inflated properly.

ALWAYS wear your seat belt.

DO NOT drive when you are fatigued, sleepy or distracted. Avoid driving at night.

NEVER use a cell phone when driving. If you need to use a cell phone find a safe place to exit the roadway.

NEVER drive under the influence of alcohol or any substance that might impair your vision, judgment, or ability to control the vehicle.

NEVER tow without properly installed tire straps and vehicle-in-tow security chains.

DO NOT tow the trailer unless the tongue jack is fully raised off the ground.

NEVER allow passengers to ride on the trailer.

No open or soft-top sport utility vehicle is allowed to tow a trailer, because in the event of a crash, these vehicles offer less collision and ejection protection.

Safety

Your Tow Vehicle

Refer to the owner's manual, decal instructions or an authorized automotive dealer for any specific handling characteristics of your tow vehicle.

Changes to your tow vehicle from how it was manufactured can affect its ability to tow. These changes can include different tires, suspension changes, etc. Check your owner's manual or with an authorized automotive dealer to make sure any changes to your tow vehicle are approved. DO NOT tow the trailer if your tow vehicle has changes that are not approved. Avoid driving on a compact spare tire any longer than necessary. Follow the vehicle manufacturer instructions.

Maintenance and condition of your tow vehicle's engine, transmission, steering, suspension, front-end alignment, and tires, may affect the vehicle's ability to tow the auto transport trailer. Have an authorized repair facility inspect and repair your vehicle BEFORE towing.

To find the capabilities of the engine, transmission and axles of your vehicle for towing, refer to the owner's manual, or check with an authorized dealer.

TOWING EQUIPMENT REQUIREMENTS

Hitches must be able to tow the weight of your trailer and your vehicle-in-tow .

When towing a trailer, all lights must be operational. Also, your tow vehicle may require external mirrors on both sides.

Tire Pressure

Set all tires to the proper pressure. Find the recommended COLD pressures on the tire sidewall, owner's manual, your vehicle's door decal or in the trailer manual. DO NOT put more pressure in the tire than is indicated on the tire sidewall. Tire pressures go up during driving. DO NOT let off this extra pressure.

Air pressure in the rear tires of some tow vehicles may be increased to accommodate the additional weight of the trailer. Inflate rear tires approximately 6 psi above normal, but do not exceed the pressure limit stamped on tire.

Connecting Your Trailer

Lower the coupler onto the hitch-ball and follow the instructions below to properly fasten the coupler to the hitch-ball. Do not allow your self to become distracted. Ensure that the coupler is properly fastened to the hitch-ball before moving to the next step.

COUPLER- Push down on the latch and fully open the coupling. Lower the coupler onto the hitch-ball.

Check that the ball clamp is positioned below the coupler. The coupler should completely cover and enclose the hitch-ball. Tighten the coupler latch down.

Move the tow vehicle forward slightly, or push rearward on the trailer to ensure that the hitch-ball is properly seated inside the coupler. Recheck that it is tight.

Check all connections at each stop. Make sure the hitch and hitch-ball are securely attached to your tow vehicle and the trailer coupler is properly connected to the hitch-ball. Use the checklist at the end of these instructions. If you suspect or detect something is wrong, contact the nearest Rayco Dealer.

Safety Chains

The purpose of the safety chains is to keep the trailer connected to your tow vehicle in the unlikely event the coupler comes off the ball or the ball comes off the hitch. Safety chains are attached to the trailer tongue and are equipped with hooks. DO NOT tow the trailer without the safety chains securely attached to the towing vehicle. DO NOT attempt to pull the trailer by the safety chains alone, unless this is necessary to get the combination off the roadway to a safe place.

The left chain crosses underneath the trailer tongue and hooks to the right side of the tow vehicle permanent hitch, frame 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.

Emergency Brake Cable/Chain

Trailers with brakes have a third chain, called the emergency brake chain. This chain applies the brakes automatically in the unlikely event of a separation of the trailer from the tow vehicle. Attach this chain as close to the vehicle center as possible; to the tow vehicle permanent hitch, frame or structure, or to the bumper brackets. Twist chain to take up most of the slack and secure. Some slack is necessary to prevent the emergency brake from activating on turns or inclined driveways.

Lighting Conditions

Make sure all tow vehicle and trailer lights function properly. The connecting wires need slack to allow your tow vehicle to make turns. Do not allow wires to drag on the roadway.

Loading

Load the heaviest end (engine end) of the vehicle in-tow to the FRONT of the trailer. Failure to load facing forward may result in sway or WHIPPING and lead to total loss of control. DO NOT load cargo in your vehicle-in-tow or on your trailer. Loading cargo in your vehicle-in-tow or on trailer may result in sway or WHIPPING.

Before loading your vehicle-in-tow, make sure the trailer is

securely attached to your tow vehicle hitch. Make sure the safety chains are properly connected. During the loading process, keep bystanders at least 25 feet away.

Make sure that the entire width of the tires will be on the ramps before driving on the ramps.

Approach ramps slowly, check angle of machine to insure proper alignment with trailer, then proceed to drive up ramps into trailer.

1. Drive the machine forward and align it with the trailer.
2. Unlock and lower the trailer ramps.
3. Drive the machine forward so that the front wheels enter the trailer channels, and continue driving the machine up the ramps until the rear drive wheels are on the trailer.
4. Remove the machine tie-down pin from the storage sleeve on the trailer and insert it through the matching holes in the machine and the trailer.
5. Raise the trailer ramps and lock them in the travel position with the lock bars and associated retaining pins.

Secure the Load

Secure the vehichle-in -tow to the trailer with necessary straps and chains to prevent movement or load shifting during transport.

Unloading the Machine From the Rayco Trailer (optional equipment)

1. Remove the ramp lock bar retaining pins, and lower the loading ramps.
2. Remove the tie-down pin from the bumper of the machine and store it in the sleeve on the trailer.
3. Start the engine. (See “Starting the Engine” and “Pre-operation Warm up”.)
4. Position the engine throttle on low idle
5. Slowly back the machine off of the trailer, until the machine is on the ground.

⚠ WARNING

DO NOT RELEASE OR JERK THE FORWARD/ REVERSE LEVER UNTIL THE MACHINE IS COMPLETELY UNLOADED, OR THE STUMP CUTTER MAY TIP OVER IN RESULT.

6. To drive the machine, set the engine at the desired speed, and use the machine controls to steer the machine in the desired direction.

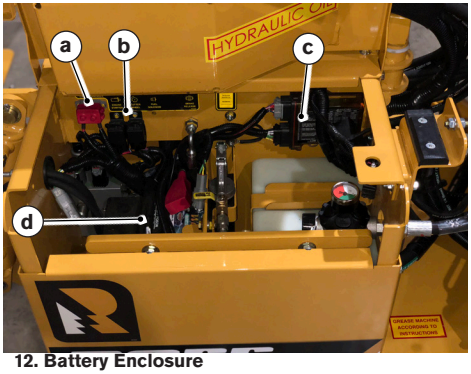
Operation

1. Operator Panel
2. Blade
3. Safety Curtains
   (unroll before cutting stump)
4. Cutter Wheel
5. Battery / Hydraulic Tank
6. Tires

Operation

7. Cutter Boom Belt
8. Engine
9. Swing Out Arm
10. Battery / Hydraulic Tank
11. Air FIlter

Operation



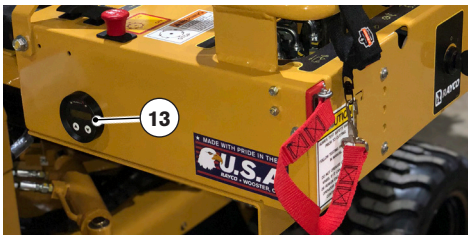
12. Battery Enclosure

a. 12v Circuit Breaker

b. Relays

c. LCM (Logic Control Module)

d. Battery



13. Display - See pages 28-32 for display operating instructions.

14. Operator Panel

a: Move Forward/Reverse - Move machine towards/away from stump with lever.

b: Steering - Steer machine Left/Right with lever.

c: Cutter Boom Lift - Raise/Lower with the lever.

d: Cutter Boom Swing/ Blade - Swing the cutter boom Left/Right with lever.

NOTICE

The control levers will re-center themselves in a neutral position when released. No movement should occur, if you observe any movement when controls are in nuetral position, please contact a service technician immediately and follow the tag-out procedure outlined in the safety section of this manual.

e: Emergency shut down.-(NOTE: To reset emergency stop, turn switch top clockwise.)

f: Engine throttle toggle.

g: Travel speed - Rayco recomends only using the fast speed while traveling between stumps.

h: Blade / Boom Swing - To switch between operating the blade or the cutter wheel, press the toggle to the desired operation.

i: Cutter Wheel On/Off Button - Pull up to turn cutter wheel on, press down on the button to shut the cutter wheel off.

Cutter Wheel Engagement

When engaging the Cutter Wheel reduce the engine RPM to idle. This will give the clutch the maximum service life.

NOTICE

Continue use of the machine while the Check Engine light is illuminated may cause other damages and/or failure to the machine. Resulting in void of warranty. See warranty rules and guidelines on page 63

j: Check Engine Light - In the event the Check Engine Light would illuminate, immediately stop operating the RG55. Make sure there are no potential hazards, leaking fluid of any kind. Check the display panel on the left side of the operator station. (Reference pages 28-32 to navigate through the display panel options.)

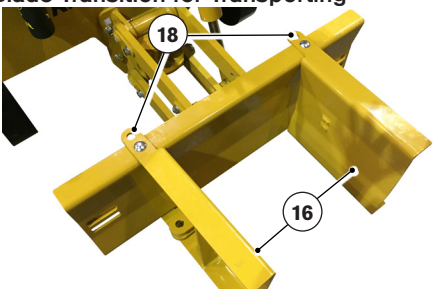
Contact your dealer, or Rayco Service Dept ASAP.

Command Cut ®

To adjust the command cut speed when using a RG55, adjust the needle valve (15) below the operator panel. If the cutter boom lunges while cutting the stump the command cut is set too slow. If machine stalls or is too agressive command cut is set too fast. Additional adjustments can be made while cutting the stump.

Note: Command Cut is only ON when the cutter wheel is engaged. Settings will return to factory default when key switch is turned to the off position.

Blade Transition for Transporting



The RG55 comes equipped with a 50 1/2" wide blade. For convenience of trasporting through gates, or to load and unload on and off a trailor, the blade has wings (16) that can swing in to be only 34 1/2" wide.

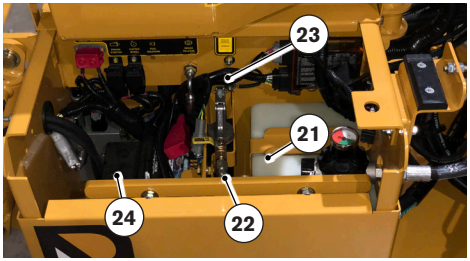
To swing the blade wings inward, pull the clevis pins (17) located on the back side of the blade. Simply turn the wings inward, reinstall the clevis pins at holes (18) located on top of blade to ensure they stay folded in.

Operation

Transporting in Freewheel Mode

In the event of a machine malfunction, the stump cutter may be towed a short distance by using the wheel drive disconnect. This procedure should be used to move the machine in the event that it can not power itself to the desired spot to be repaired. Before using the freewheel disconnect make sure the wheels are choked.

Disable The Wheel Motors



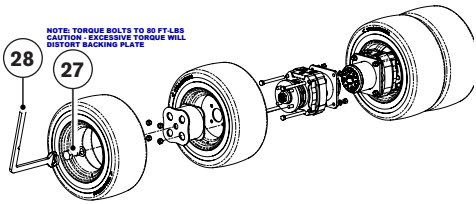
To disengage the wheel drive motors perform the following steps:

1. In the tool box, located the hydraulic pump gun and allen wrench (21), the hydraulic fitting wrench (22) the brake release fitting (23) and needle valve screw (24).
2. Using the allen wrench, loosen the needle valve screw on the hydraulic block by backing it out 2 complete turns. Do not remove. (24).
3. Loosen the hydraulic brake release fitting (23) using the supplied wrench (22) and push the hose aside, taking care to prevent excessive fluid spillage.
4. Keeping the gun inverted, use the wrench to tighten the gun on the brake release fitting (25).
5. Open the valve on the gun (26) (turn in-line with the barrel), and pump 10-15 times.
6. Immediately close the valve (cross-ways with the barrel) on the gun to hold pressure in the line.
7. The machine can now be towed or pushed to a location for service. Great care should be taken when loading on a trailer.
8. During transport on a trailer, the brakes should be re-engaged to properly secure the machine (see steps below to re-engage the brakes).

Re-engage The Wheel Motors

1. Reopen the valve on the gun. This will allow the charged hydraulic fluid to drain back into the gun.
2. Disconnect the gun from the brake release fitting using the wrench.
3. You may now empty the remaining fluid back into the plastic bottle from the gun.
4. Reconnect hydraulic hose the brake release fitting you removed earlier in step 3.
5. Tighten the needle valve screw loosened in step 2.
6. If the proper repairs have been made to the machine, you may follow the starting procedure outline in this manual.

Dual Wheels



The dual wheels provide increased stability & traction, yet can be easily removed for maneuvering machine through tight spots. To remove a wheel:

- Drive the rear inside wheel onto a small wooden board so that the outer wheel is slightly raised off of the ground.
- Loosen the bolt (27) using the provided tool (28).
- Remove the outer wheel.
- Place the outer wheel, washer and bolt in safe-keeping until needed again.
- To remount the wheel, reverse the above procedure. Tighten the bolt firmly but do not exceed 80 ft/lbs.

Note: In instances where the above procedure is not possible, a 4x4 (or similar material) can be placed under the blade to aid in lifting the machine. Use extreme caution when doing so as this decreases machine stability.

Operation

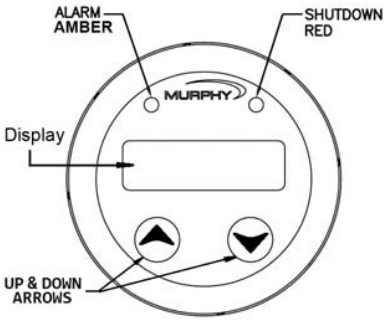
Operation

Introduction

The PV25 diagnostic device is an economical, compact package with advanced features. This J1939-compliant device provides parameter data, displays active and stored fault messages, provides Tier4/Euro Stage IIIB features, and tracks machine and engine hours.

The PV25 is equipped with two buttons to quickly access a convenient menu, a graphic display, and two LEDs to indicate Active-fault Alarm or Shutdown status in a sealed enclosure that matches the PowerView line of displays.

Basic Functions



Access all menus and functions of the PV25 by using the **UP** and **DOWN** arrows on the front of the gauge.

When power is first applied to the PV25, **Parameter** readings begin to display.

Wait to Start - PV25 supports 'Wait to Start' - if the ECU broadcasts a wait to start message, the screen shows 'Wait to Start' and both LEDs light. Once the ECU discontinues the message, the signal becomes inactive, and the message is replaced with parameter readings.

DM13 - PV25 supports DM13. For more information, see page 9.

Up	Down	Either

Arrows in the Display field (beside the text information) indicate available movement options – up, down, or either way.

Main Menu

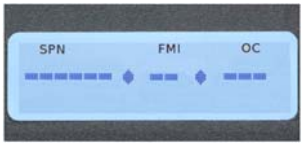
This section describes the items listed in the **Main Menu**. All interface with the PV25 is through the **Up/Down Arrows**. When power is applied to the unit, the Murphy logo displays first, and then the Parameter list begins to display. The default display at start up is always the Parameter List.

Press both arrows simultaneously and then release to reach the **Main Menu**. Use the **Up** and **Down Arrows (buttons)** to scroll through the items.

The **Main Menu** consists of *Show 1-up, Active Faults, Stored Faults, Set Units, Set 1-up, Scroll ON/OFF, Machine Hours ON/OFF, Tier 4 ON/OFF, Set Tier 4*, and *Backlight*. To **return** to the **Parameter** list, scroll to **Show 1-up** and momentarily press both arrows, release and parameter readings begin to display.

Menu Item	Options	Action
Show 1-up	Switch to the parameter display.	Momentarily hold the **Up & Down** arrows, when released, broadcast parameters begin to display.
Active Faults	 The Active Fault (Active FLTS) menu shows the **SPN** (Suspect Parameter Number), **FMI** (Failure Mode Identifier), and **OC** (Occurrence Count) for faults currently broadcasting on the CANBus. When a new fault message is received, the PV25 automatically switches to **Active Faults**.	The **Amber** (left) or **Red** (right) LED lights to indicate the status of the fault – Warning or Shutdown. If there is more than one fault, the PV25 automatically scrolls through each fault. To return to the **Main Menu** press the **Up & Down** arrows simultaneously and release.

Operation

Menu Item	Options	Action
Stored Faults	The **Stored Faults** (Stored FLTS) menu shows the SPN, FMI, and OC for any stored faults. A message is sent to the ECU, and the ECU responds with what is in history. If there are no stored faults, you will see this: 	Use the **Up & Down** arrows to scroll through the list if there is more than one stored fault. To return to the **Main menu** press the **Up & Down** arrows simultaneously and release.
Set Units	The **Set Units** Config menu will allow the user to select between the following unit settings: English Metric kPa Metric BAR Exit An asterisk to the right of a setting indicates it is the current setting.	To enter the **Set Units** menu, momentarily press both arrows and release. Scroll through the options using the Down arrow. Choose a unit by momentarily pressing the Up/Down arrows. An asterisk displays at the right. To leave this menu, scroll down to **EXIT**, press both arrows and release.

Menu Item	Options	Action
Set 1-up	Use this menu to set the parameters you want to monitor. For a full list of the parameters available, see page 8. An (*****) asterisk to the right of the parameter indicates it is selected.	Pressing the **Up/Down** arrows at the same time selects the currently displayed parameter. Pressing the **Up/Down arrows** at the same time while **Exit** is displayed returns you to the main menu. **Exit** is the last item in the parameter list.
Scroll ON/OFF	When **Scroll** is **ON**, the Parameters you selected to display automatically scroll with about 5 seconds on each parameter reading. If **Scroll** is **OFF**, view parameters manually by pressing the **Up** or **Down** arrow.	To toggle **ON** or **OFF**, press the **Up/Down** arrows at the same time.
Machine Hours ON/OFF	When set to **ON**, machine hours are calculated by the PV25 once the RPM is above 100.	Scroll to Machine Hours. To toggle **ON** or **OFF**, press the **Up/Down** arrows at the same time.
Tier 4 ON/OFF	When **Tier 4** is set to **OFF**, other Tier 4 menu items are not available. For more information about Tier 4, see Tier 4 and EU Emissions Standard – Stage IIIB on page 10.	To toggle **ON** or **OFF**, press the **Up & Down** Arrows at the same time. If Tier 4 is **ON**, and there is Tier 4 activity, the Tier 4 symbols show at the left of the screen beside the parameter data.

Operation

Menu Item	Options	Action
Set Tier 4	**Auto** – Automatically displays all Tier 4 information (symbols) from the CAN and allows for Auto Regeneration of a Tier 4 engine through CAN messaging. **Request** – Sends a request to the ECU to perform a regeneration. **Inhibit** – Sends a message to the ECU to prevent a regeneration from occurring. **None** – Not sending any Tier 4 messages. **Exit** – Return to the **Main** menu.	Momentarily press the **Up & Down** arrows to reach the Tier 4 menu. Select and set a Tier 4 choice by pressing the **Up/Down** arrows. An asterisk shows next to the selection.
Backlight	The **Backlight** menu allows you to select the desired backlight level. The range is 0-100% and it changes in 5% increments. This value also broadcasts a CAN message that can set the backlights on optional PVCAN gauges in the panel to the same intensity.	Pressing the **Up/Down** buttons at the same will toggle into and out of the adjustment screen.

Parameter Menu

The following lists the parameters that can be viewed on the PV25.

PGN	Description	Notes
Internal	Machine hours	If set to OFF, the machine hours do not increment. However, if at any point machine hours were accumulated, that hour value maintains through power cycles.
61444	Engine Speed (Eng RPM)	
65263	Engine Oil Pressure (Oil Pres)	
65262	Engine Coolant Temperature (Cool Tmp)	
65271	Voltage (Sys Volt)	
65271	Battery Potential (Switched) (Bat Volt)	
65253	Total Engine Hours (Eng Hrs)	
61443	Percent Load at Current RPM (Load @ RPM)	
65257	Total Fuel Used	
65266	Average Fuel Economy (Avg Econ)	
65257	Trip Fuel	
65262	Engine Oil Temperature(Oil Temp)	
65270	Exhaust Gas Temperature (Exh Tmp)	
65270	Air Filter Differential Pressure (AirDifPr)	
64891	Percent Soot (Soot Lvl)	Only available if Tier 4 is **ON** in the Main menu.
65110	Catalyst Temperature (Cat Temp)	Only available if Tier 4 is **ON** in the Main menu.
64891	Percent Ash Ash Lvl)	Only available if Tier 4 is **ON** in the Main menu.
64947	Exhaust Filter Outlet Temp (ExOutTmp)	Only available if Tier 4 is **ON** in the Main menu.
64948	Exhaust Filter Inlet Temp (ExhInTmp)	Only available if Tier 4 is **ON** in the Main menu.
65110	Catalyst Tank Level (DEFLvl)	Only available if Tier 4 is **ON** in the Main menu.

Operation

Faults, Warnings and Indicators

The PV25 provides two means for displaying faults and warnings: visual LEDs on the casing (*Amber* at the upper left, and *Red* at the upper right), and **Active Warning** screens listing the SPN, FMI, and OC. In addition, **Tier 4/Euro State IIIB** symbols display to indicate Tier 4 status if Tier 4 is set to **ON**.

Visual Indication

- Amber LED (Warning)
- Red LED (Derate / Shutdown)

Indicators for Active Fault Codes

Tier 4 Indicators display at the left of the screen. The current gauge readings continue to display on the right.

Warning or Shutdown Screens

Active Shutdown or **Warning** screens display when a fault occurs. The screen lists the SPN, FMI, and Occurrence Count. If there is more than one fault, PV25 automatically scrolls through all faults.

DM13 – Start/Stop Broadcast

This message is used to stop or start broadcast messages and may not completely prevent all messages. Critical messages indicating unsafe or damaging operating conditions will still be seen and require a response. The DM13 can only be initiated when the engine is at zero RPM. DM13 is used when diagnostic procedures are performed.

PV25 responds to an incoming DM13 message by suspending outgoing data transmissions. To maintain a suspended transmission event, the hold signal must be sent once every 5 seconds. If the hold signal disappears for more than 6 seconds, the system reverts to a normal state.

Operation

Operation

Pre-Starting Inspection

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.

⚠ WARNING

UNDERSTAND AND HEED TO THE INSTRUCTIONS LISTED IN THE SAFTEY SECTION OF THE MANUAL. IN IT'S ENTIRETY, BEFORE OPERTING STUMP CUTTER MACHINE.

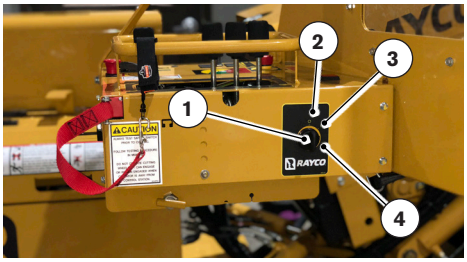
Inspect the hydraulic system for leaks. Check the hydraulic oil level. Inspect the machine and perform each of the "Daily Inspections listed in the The Maintenance Manual as needed before operating this machine.

Starting the Engine

If the key switch is released before the engine starts, wait until the starter and the engine stops turning before trying again. This will prevent possible damage to the starter and/or flywheel.

If the temperature is extremely cold, it may be necessary to use cold weather starting aids. Follow the manufacturer's recommended procedure when using starting aids.Always change the hydraulic oil filter at the proper times. Do not allow the engine to run without the filter installed. Failure to heed either directive will result in poor machine performance and severe damage.

Start-Up



1. Insert the key (1), and turn the ignition switch to the Run Position (3) position for 10 seconds.

Note: (2) in the above picture is the Off position.

3. Turn ignition switch to START (4) position. Release the key upon starting.

Note: If the engine is cold, allow the engine to idle (throttle in slow position), for a few minute to warm up the engine before using the machine.

1. Allow the engine to warm up at low idle for two minutes.
2. To warm up the hydraulic oil, move the engine throttle

NOTICE

DO NOT operate the starter for more than 10 seconds at a time. If the engine does not start, allow a 60 second cool-down period before re-attempting to start. FAILURE TO FOLLOW THESE GUIDELINES MAY CAUSE STARTER MOTOR FAILURE.

to medium engine speed. Run the engine for about two minutes while intermittently holding the cutting wheel raise lever in the RAISE position.

3. Move the engine throttle to the maximum engine speed. Run the engine for an additional two minutes while intermittently holding the cutting wheel raise lever in the RAISE position. This will allow the oil to reach relief pressure, which causes it to warm up more rapidly.
4. Cycle all the controls to allow warm oil to circulate through all the cylinders and lines.

Rear Blade Operation

The RG55 can be started and moved with the Swing Out Arm (SOA) in the transport position with the operator standing at the rear of the machine. When the SOA is in the transport position, the blade will not function until the SOA is rotated outward in the operating position. This is a built in safety feature to prevent the operator from accidently crushing his/her feet while loading or unloading the machine.

NOTICE

The SOA in the transport position should only be used when moving the machine from stump to stump or loading on a trailer. The SOA in the transport mode does not allow the operator a clear line of sight to the cutter wheel.

Starting With Jumper Cables

1. On the stalled machine, turn the start switch to OFF.
2. Move the boost machine near enough to the stalled machine for cables to reach, but DO NOT ALLOW THE MACHINES TO TOUCH.
3. Stop the engine on the boost machine.
4. Open the battery covers of both machines to purge flammable fumes.
5. Remove all of the battery caps from the batteries (if not maintenance-free type) on both machines, allowing explosive vapors to disperse.
6. Connect jumper cables:

   a. Connect the red positive (+) jumper cable to the positive (+) terminal of battery of the stalled machine, where the battery red positive (+) cable is already connected. (Pull back rubber boot to gain access.)

   b. Connect the other end of the red positive (+) jumper cable to the positive (+) terminal of the battery of the boost machine.

   c. Connect the black negative (-) jumper cable to the negative (-) terminal of the boost machine battery.

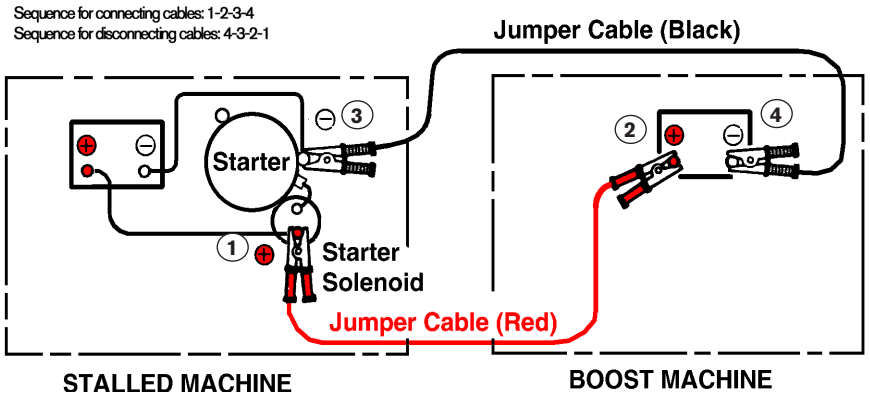
   d. Connect the other end of the black negative (-) jumper cable to the negative post of the stalled machine, where the battery black negative (-) cable is already connected.
7. Start the engine on the boost machine and allow it to run at high idling speed for about ten minutes. This will partially charge the stalled engine's battery.
8. Start the stalled engine.
9. Immediately after starting the stalled engine, disconnect the jumper cables, in reverse order.
10. Reinstall the battery caps and battery covers.
11. After completion of the above procedure, perform failure analysis on the starting/charging system of the stalled machine as required.

NOTICE

Before attempting to start an engine that has been in storage, check that all fluids are topped off and clean.

⚠ WARNING

DO NOT ALLOW JUMPER CABLE CLAMPS TO TOUCH THE OTHER SOLENOID TERMINAL. UNCONTROLLED STARTING OF THE ENGINE WOULD OCCUR, WHICH COULD CAUSE SEVERY INJURY OR DEATH!



Operation

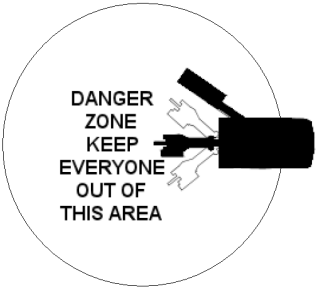
Removing Stumps

Call 8-1-1 Before You Dig

811 Know what's below. Call before you dig.

⚠ WARNING

BEFORE ENGAGING THE CUTTER WHEEL, THE OPERATOR MUST ENSURE THE AREA IS CLEAR OF ANYONE OR ANYTHING THAT MAY BE HARMED BY THE CUTTER WHEEL, OR FLYING DEBRIS.



⚠ DANGER

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

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

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

NOTICE

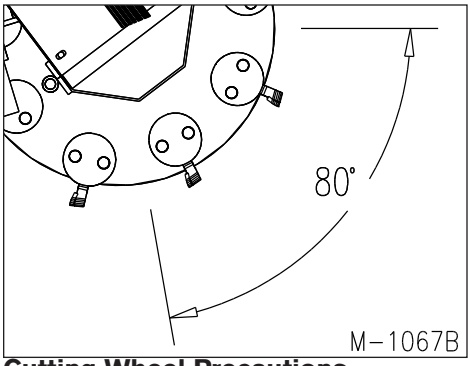
When swinging the cutting wheel, DO NOT use the cutting wheel or boom to stop the swinging motion. Inspect the machine for damage if the boom as been swung too hard into the stump or side of a hole.

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.

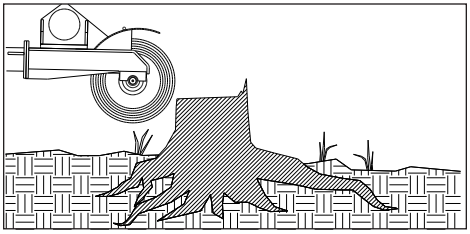


Cutting Wheel Precautions

- 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.

Stump Removal Procedure

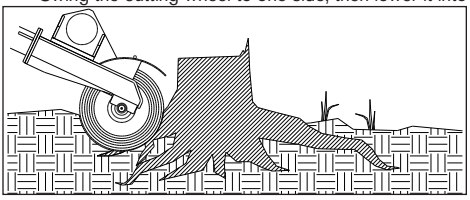
1: Prepare the machine at the stump:



- 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:

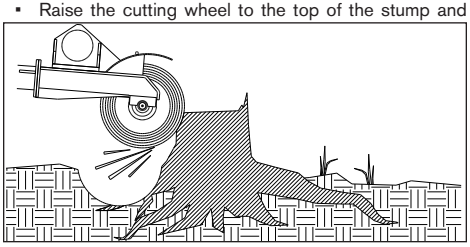
- Swing the cutting wheel to one side, then lower it into



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

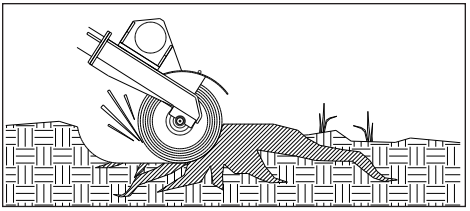


advance the machine to a combined position where the center of the shaft remains just above the top of the stump, such that upon swinging the cutting wheel, a bite approximately 4" deep may be taken.

- 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,

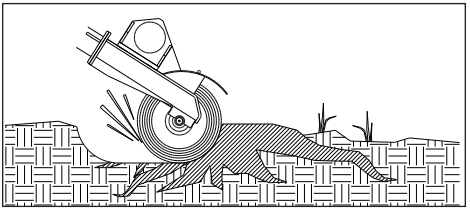


advance the machine slightly (about 2") and repeat STEP 3.

Repeat STEP 4 consecutively

5: Cut Remaining Roots:

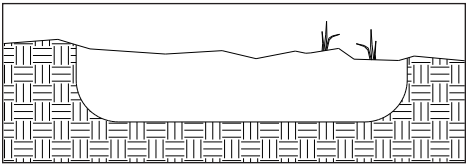
- Cut the remaining roots as described in STEP 1 until the entire stump is satisfactorily removed.



- 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

Stopping The Machine

⚠ WARNING

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

1. When stopping the machine after normal operation, lower the engine speed to SLOW, and cycle each of the hydraulic controls slowly for about 30 seconds each to help the hydraulic components to cool slowly.
2. Flip the cutting wheel ON/OFF Switch down to the OFF position, stopping the cutting wheel rotation.

Engine Stopping

1. Reduce the engine speed to IDLE.
2. Turn the engine start switch to the OFF position to stop the engine. Remove the engine start key.

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.

Parking The Machine

Park on a level surface if possible. If it is necessary to park on a grade, block the wheels securely. Do not park sideways on a hill, side-sliding could occur.

- Lower the engine speed control slightly to reduce engine rpm.
- Center the cutter boom, using the joystick.
- Turn off the cutting wheel using the cutter wheel On/Off switch
- Lower the attachment slowly with the Right Joystick until the cutting wheel rests on the ground.

Machine Storage

Preparing for Storage

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.

All exposed hydraulic cylinder rods should be coated with Valvoline Tectyl 506 oil or equivalent. Rusty or pitted cylinder rods will damage O-Rings and cause leakage.

Lubricate all parts that have grease fittings, as outlined in the "Maintenance Intervals" section of the Maintenance manual, to prevent rust.

With the engine OFF, remove any pressure from the hydraulic cylinders by working the control levers back and forth.

Store the battery inside where temperatures do not drop below 32° F. Place the battery on wood, not on a concrete floor or steel table. Always keep the battery fully charged. DO NOT store where an open flame or sparks might occur.

Check your machine for any worn or broken parts at this time. By ordering replacement parts now, you can avoid unnecessary delays when you remove the machine from storage.

1. Store the machine in a flat place and remove the key from the engine.
2. Do not store the machine in a place that has flammable material such as dry grass or straw.
3. When covering the engine for storage, allow the engine and muffler to cool off completely.
4. Operate the engine after checking and repairing damaged wirings or pipes, and clearing flammable materials that may have accumulated while in storage (such as debris brought in by mice).

Removal from Storage

- Remove all coverings. Wipe excess oil from hydraulic cylinder rods.
- Lubricate machine entirely, as instructed in the "Maintenance Intervals" section of this manual.
- Check the hydraulic hoses and fuel lines for deterioration, and replace as necessary.
- Tighten all nuts, bolts and hydraulic fittings.
- Replace the hydraulic filter and fuel filter. After prolonged storage, change the hydraulic oil, engine oil, and fuel (if a storage aid was not used).
- Check cutter boom drive belt tension. Belt can loosen if left in storage for an extended time. Replace if belt is older than 6 years from purchase date.
- 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 of this manual, and perform all maintenance services necessary as described in the Maintenance section's "10 Service Hours or Daily" section before starting the engine.
- Start the machine according to the "Starting the Engine" and "Pre-Operation Warm-up" sections of this manual

Transporting the Machine

The stump cutter should not be transported in a pickup truck

⚠ DANGER

ALWAYS LOAD THE RG55 WITH THE OPERATOR CONTROLS IN THE OPERATING POSITION. THE CONTROLS CAN EASILY BE OPERATED WHILE WALKING ALONG SIDE THE TRAILER DURING LOADING. LOADING THE RG55 WITH THE OPERATOR CONTROLS LOCKED IN THE TRANSPORT POSITION COULD CAUSE SERIOUS INJURY OR DEATH CAUSING THE MACHINE TO CRUSH THE OPERATOR.

bed. The preferred method is towing it on a Rayco trailer (available from Rayco). Comply with all local laws dealing with the towing of a trailer.

Before towing the machine on the Rayco trailer (optional equipment), make sure of the following:

1. The trailer is hitched to the towing vehicle with the safety pin in place, safety chains are in use, and the jack is raised and pivoted away from the ground.
2. The tail lights on the trailer are operating properly and the loading ramps are raised and held up by the lock bars and retaining pins.
3. The machine lock pin is installed to prevent the machine from falling off the trailer

While traveling with the machine loaded and secured according to the list above, position the control panel to the farthest slot as shown in the picture. This will help prevent any type of wind catching the glass windshield that could potentionally cause damage to the machine.

Maintenance

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.

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 to service the equipment.

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.

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.

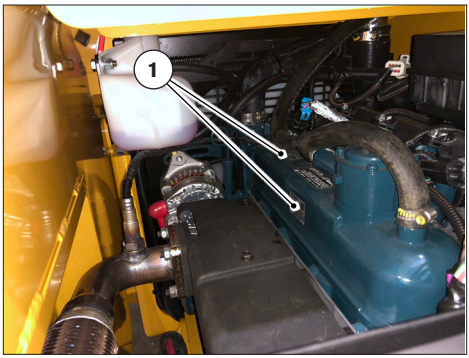
NOTICE:

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

Engine Identification



When contacting your certified Kubota dealer to service the engine, always specify engine model name, code number and serial number.

The engine model, code number and it's serial number need to be identified before the engine can be serviced or parts replaced. The Engine Model Name and Number Label (1) has this information conveniently located on the engine as shown above.

Note: Rayco recommends writing these numbers down inside all three manuals (Operator Booklet, Operator Service Maintenance Manual, Parts Manual) that are provided with your RG55.

⚠ WARNING

UNDERSTAND AND HEED TO THE INSTRUCTIONS LISTED IN THE SAFTEY SECTION OF THE MANUAL. IN IT'S ENTIRETY, BEFORE SERVICING THE MACHINE.

NOTICE

Park the machine on stable and level ground before service or maintenance is performed.

NOTICE

Let the temperature of the engine decrease before you start the job.

NOTICE

Stop the engine, remove the key, hang a DO NOT OPERATE tag at the operator station.

NOTICE

Do not make unauthorized modifications to the RG55 or the engine. This can cause damage, decrease engine life, void any warranty.

Maintenance

Maintenance Log

Date of Service	Machine Hours	Description of Service/ Maintenance	Notes

Maintenance

Maintenance Log

Date of Service	Machine Hours	Description of Service/ Maintenance	Notes

Maintenance

ITEM	SERVICE INTERVAL								
	DAILY EVERY 8HRS	WEEKLY EVERY 50HRS	EVERY 100HRS	EVERY 200HRS	EVERY 500HRS	EVERY 1000HRS	EVERY 2000HRS	YEARLY	EVERY 2YRS
CHECK ENGINE OIL LEVEL	●								
CHECK & FILL FUEL TANK LEVEL	●								
CHECK & FILL COOLANT LEVEL	●								
CHECK & CLEAN AIR CLEANER ELEMENT	○		●						
CHECK & REMOVE GREASE & OIL BUILD-UP	○								
CHECK CUTTER WHEEL FOR DAMAGE	●								
CHECK CUTTER WHEEL TEETH BOLT TORQUE	●								
CHECK & SHARPEN CUTTER WHEEL TEETH	○								
LUBRICATE CUTTER WHEEL BEARINGS	Φ								
LUBRICATE SLEWING RING	●								
LUBRICATE STEER WHEEL PIVOTS	●								
CHECK BRAKES	●								
CHECK & REPLACE SPIDER COUPLER	○								
CHANGE ENGINE OIL		□		●					
REPLACE OIL FILTER CARTRIDGE		□		●					
CHECK GASOLINE HOSE & CLAMP		●							
HYDRAULIC OIL & FILTER		□							
CHECK & REPLACE CYLINDER BUSHINGS		○							
CHECK CUTTER BOOM BELT TENSION		●							
CLEAN SPARK PLUGS			●						
CHECK FUEL FILTER			●						
CHECK FAN BELT TENSION & DAMAGE			●						
REPLACE FUEL FILTER			○					●	
CHECK & REPLACE TIRES & RIMS			○						
CLEAN BATTERY TERMINALS						●		●	
CHANGE CUTTER BOOM SPROCKET					○			●	
REPLACE FAN BELT					●				
CHECK RADIATOR HOSES & CLAMPS				●					
CHECK PCV VALVE						●			
CHECK VALVE CLEARANCE						●			
REPLACE SPARK PLUGS							●		
REPLACE AIR CLEANER ELEMENT								●	
REPLACE GASOLINE HOSE & CLAMPS								●	
CLEAN GASOLINE FUEL TANK INSIDE								●	
CLEAN WATER JACKET & RADIATOR								●	
REPLACE INTAKE AIR LINE									●
REPLACE BREATHER HOSE									●
REPLACE RADIATOR HOSES & CLAMPS									●
REPLACE LOCKOFF VALVE FILTER									●
CHANGE COOLANT									●
CHANGE BATTERY									●

○ **Indicates to replace or clean if necessrary;** □ **Change the engine oil and filter cartridge after the first 50hrs.**

Φ **Indicates to lubricate every two hours. Rayco recomendes this to prevent dirt from entering bearing.**

***** CHANGE THE AIR CLEANER ELEMENT MORE FREQUENTLY THAN THE ABOVE SCHEDULE INDICATES WHEN OPERATING UNDER DUSTY CONDITIONS*****

Engine Oil Level

⚠ CAUTION

BE SURE TO SHUT DOWN THE MACHINE, AND ENGINE BEFORE CHANGING ENGINE OIL AND/OR FILTER.

NOTICE

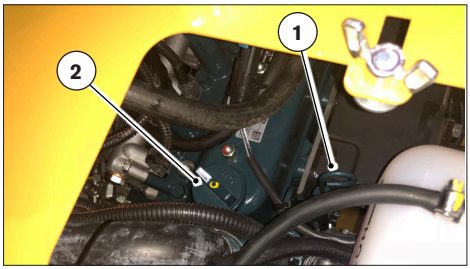
Check only when the engine is in a level position.

NOTICE

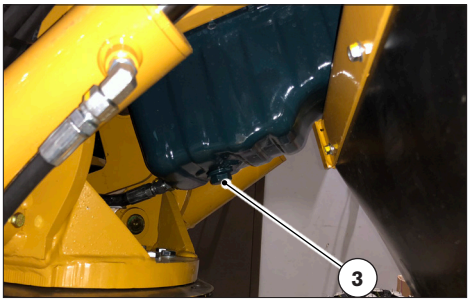
Use the proper SAE engine oil according to ambient temperatures.

NOTICE

If using an oil from a different maker, or different viscosity is needed, be sure to drain old oil completely. Do Not mix two different types of oil.

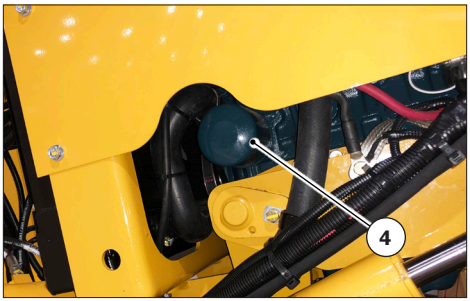


To access the engine oil fill cap and dipstick (1), remove the cover on top of the engine enclosure near the radiator cap. The engine oil cap (2) will be available after the cover is removed from the top of the engine enclosure.



Place a container to catch the used oil underneath the bottom of the oil pan.
Loosen the plug (3) to drain the oil is located as shown. Be sure to tighten the fitting securely back ontot the oil pan before filling engine with new oil.

Engine Oil Filter -



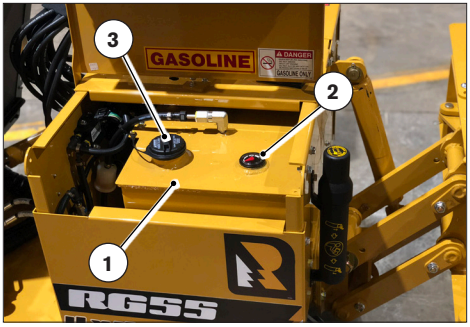
Remove the oil filter (4) with a filter wrench. When installing a new filter, apply a slight coat of oil onto the gasket of the new filter. Screw the new filter in by hand. Do not overtighten the filter, this could cause deformation of the rubber gasket. After the new filter has been successfully installed and ensured that there are not any leaks. Check the oil level on the dipstick, fill oil to the specified level.
More information and instructions can be found in your Kubota Engine Operator Manual.

Maintenance

Fuel Tank - Check Level, Fill & Drain

⚠ WARNING

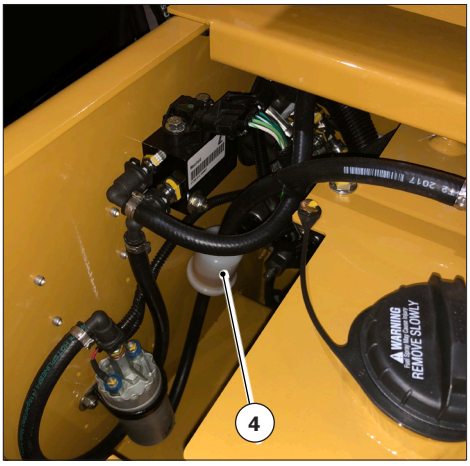
GASOLINE IS HIGHLY COMBUSTIBLE. DO NOT SPILL IT ON THE ENGINE. LET THE ENGINE COOL BEFORE REFUELING. DO NOT SMOKE OR ALLOW ANY HOT OBJECTS NEARBY WHEN REFUELING.



The fuel tank (1) is located on the left side of the RG55. View the fuel level gauge on the tank (2). If fuel level is low, remove the fuel cap (3), carefully fill the fuel tank with gasoline fuel only, and replace cap.

Note: ALWAYS use GASOLINE Fuel.

Fuel FIlter



The fuel filter (4) is located to the left of the fuel tank as shown. Loosen the hose clamps and pull the fuel line away from the filter on both ends. Replace the fuel filter (see quick reference part #s listed in back of manual) Inspect the fuel lines, to be sure of no cracks or sign of dry-rotting.

Note: Fuel lines should be replaced every year to meet emissions requirements.

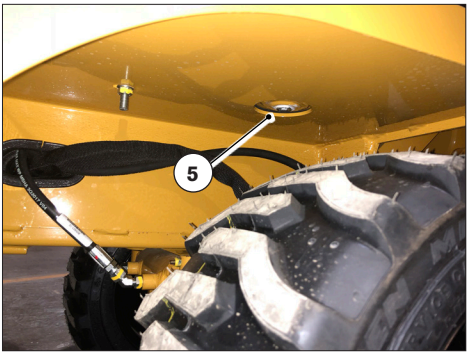
⚠ CAUTION

DO NOT REMOVE FUEL HOSE FOR AT LEAST 3 MINUTES AFTER STOPPING THE ENGINE.

Draining the Fuel Tank

NOTICE

Do Not wash the inside of the tank with water, or a pressure hose of any kind.



Rayco recommends draining the fuel tank once a year, especially if the RG55 will be in storage for longer than a month. To drain the tank, remove the fuel cap (3) to assist in draining. Place a container under the tank on level ground, and remove the fuel tank drain plug (5). Once the fuel has been drained to best of its ability, insert drain plug back in its location and tighten it securely. Be sure there is no fuel leaking from drain plug when refilling the tank.

Maintenance

Air Cleaner

- Clean or replace the filter cartridges if the indicator (5) is illuminated. Clean the outer air filter cartridge (Rayco part number 800276) every 100 hours and replace it every year.
- Unfasten the clamps (6) holding the end cap of the air cleaner and remove. After replacing the cartridges), replace the end cap of the air cleaner and lock the clamps so that the dust ejector valve (7) is positioned as shown.
- Replace the inner safety filter cartridge (Rayco part number 800277) every 600 hours, or with every other air filter cartridge replacement.
- Discharge the dust ejector valve (7).

Perform this procedure more frequently under extremely dusty or dirty conditions.

More information and instructions can be found in your Kubota Engine Operator Manual.

Radiator / Coolant

⚠ CAUTION

DO NOT REMOVE THE RADIATOR CAP UNTIL COOLANT TEMPERATURE IS BELOW ITS BOILING POINT. THEN LOOSEN CAP SLIGHTLY TO RELIEVE ANY EXCESS PRESSURE BEFORE REMOVING THE CAP ENTIRELY.

NOTICE

During filling the coolant, air must be vented from the engine coolant passages. The air vents by jiggling the radiator's upper and lower hoses.

NOTICE

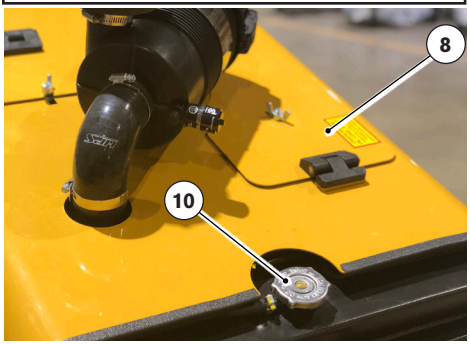
Be sure to close the radiator cap securely. If the cap is loose or improperly closed, coolant may leak out and the engine could overheat.

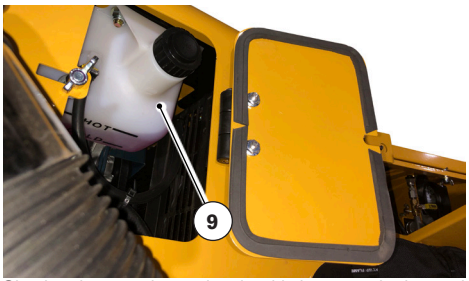
NOTICE

The coolant expansion bottle & radiator level should be checked daily.

NOTICE

Do not mix the different type or brand of L.L.C



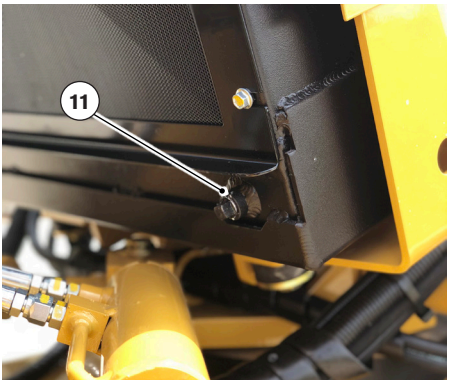


Check to be sure the coolant level is between the hot and cold markers on the reservoir (9). The coolant reservoir is located inside the engine enclosure, to view this open the access cover (8) by loosening the wing nut. If the coolant level is too low, before adding more coolant, check all hoses and radiator cap for any possible leaks. If leaks are discovered, contact your local authorized service dealer to be serviced. If the coolant level is too low due to evaporation, fill back to level with only fresh, soft water.

Maintenance

Flush & Refill

- Remove the radiator cap (10 on previous page).



- Place a container under the radiator drain and loosen the drain plug 11).
- When the radiator is empty, re-tighten the radiator drain plug (11).
- When refilling the radiator, see your Kubota Engine Manual for coolant specifications.
- Replace the radiator cap (10 on previous page).
- Fill the reservoir to 3/4 full.
- With the radiator cap removed, start the engine.
- Check the amount of fluid in the radiator, adding coolant as necessary.
- When the coolant level in the radiator remains constant, replace the cap on the reserve bottle and re-secure the cover to the top of the engine enclosure.

Cutting Wheel & Teeth

Among the most critical elements of the stump cutter are the cutting teeth. They are also the most subject to damage and wear, as in the course of cutting stumps they may 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 any missing or significantly worn teeth, as soon as feasible. Read all of the instructions which follow before changing cutting teeth.

Rayco Teeth

NOTICE

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

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.

Changing Teeth

⚠ CAUTION

BLOCK OR OTHERWISE SECURELY SUPPORT THE CUTTING BOOM WHEN CHANGING TEETH.

NOTICE

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

NOTICE

The following illustrations represents the exact location required for positioning each tooth. Please follow the diagrams very closely for good cutting wheel performance.

Remove the socket head bolts from the teeth. (Use the 1/2” hex key provided with the machine.)

- Clean all dirt from the cutting wheel and teeth.
- Check the cutting wheel for cracks. Replace the wheel if it is cracked.
- Carefully select and insert new cutting teeth, properly positioning each tooth as shown in the diagram on the next page.
- Bolt the teeth to the cutting wheel (but not tightly until the pattern has been double-checked).
- After setting each tooth pair, tighten the socket head bolts to 135 to 145 foot-pounds.

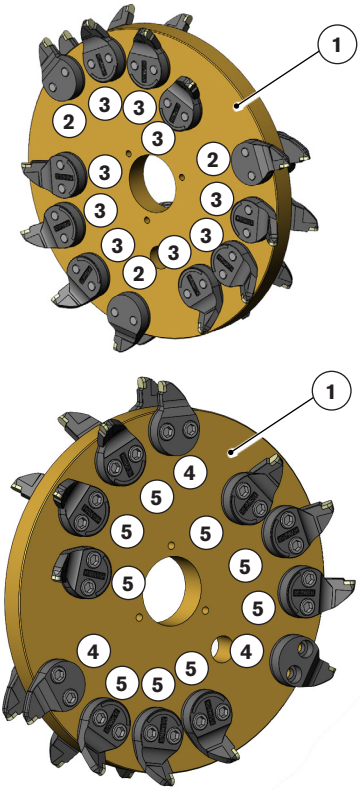
Replacement teeth are available from your Rayco dealer or direct from Rayco. Refer to the Parts manual for part numbers The Cutter Wheel (1) Rayco part# 35244 on the RG55 uses 6 different types of SuperTeeth as shown below:

2)Straight Tooth - Part# 3144T (threaded) Qty of 3

3)Angle-Out Tooth - Part# 2933T (threaded) Qty of 9.

4)Straight Tooth - Part# 3144C (countersunk) Qty of 3.

5)Angle-Out Tooth - Part# 2933C (countersunk) Qty of 9



NOTICE

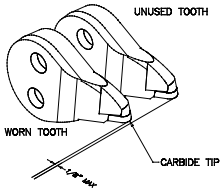
DO NOT hammer the tip of a tooth. Due to the super hardness of the tooth, it is brittle and may chip from such treatment.

Maintenance

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. Remove the tooth from the cutting wheel to be sharpened.

Tooth Sharpening Guidelines:

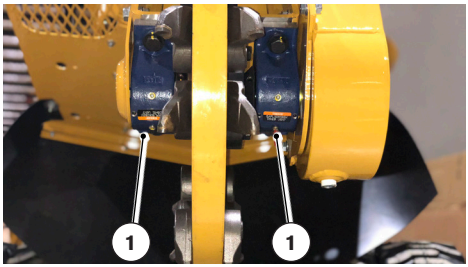
1. Obtain an unused tooth for comparison.
2. Discard any tooth that has lost more than 1/8" of original bite, whether lost through usage or grinding.
3. Grind off a minimal amount from the end, just enough to restore the original taper and radius on the end. The end of the cemented carbide tip and the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

Cutter Wheel Bearings

Lubricate

⚠ CAUTION

BE SURE TO SHUT DOWN THE MACHINE, AND ENGINE BEFORE LUBRICATING THE CUTTER WHEEL BEARINGS



Lubricate both cutter wheel bearings zerks(1) fitting DAILY. There is a cutter wheel bearing on each side of the cutter wheel.

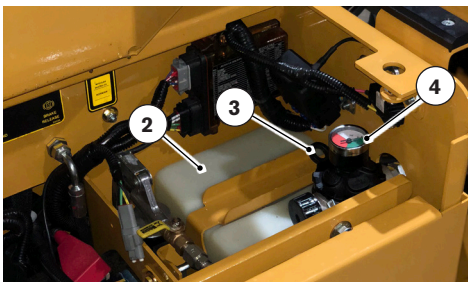
- Fill with high-temperature **(NLGI 2)** grease until you can visually see the old grease purge itself out all the way around the seal diameter and new grease beginning to purge out.

This will ensure that the dirt and debris that gets collected inside the seal area is flushed away from the internal bearings thus providing longevity to the bearing and races.

Hydraulic Oil

NOTICE

Replace oil if it smells burnt or appears to be dirty. Use only clean, fresh hydraulic oils, free of bubbles. (bubbles indicate low hydraulic oil level.)



The hydraulic oil tank (reservoir) (2) is located next to the battery. The oil level can be determined by a visual check (3). The oil level should be 1-1/2" to 2-1/2" from the top of the reservoir or just touching the hydraulic dipstick. Add oil

if it is below this level.

Keep the top breather clean and threaded tightly. A 10 micron return filter (4) is used on this machine. It is located on the hydraulic tank and filters oil entering the tank.

Check the oil level only when the machine on level ground.

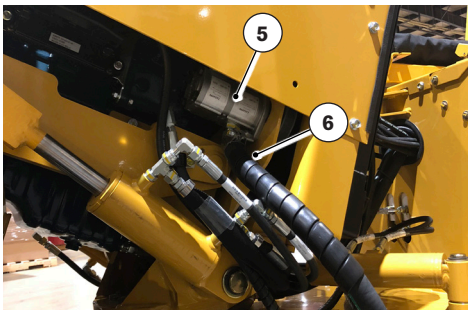
Changing the Hydraulic Oil

NOTICE

Keep the interior of all hydraulic components clean as they are installed. The machine must not be operated without the filter in place, or sever damage to the major hydraulic compnents will likely occur.

Drain the Oil:

1. Place the machine on level ground, lower the cutter boom to the ground. SHUT MACHINE OFF.



2. Locate the hydraulic pump (5) which is located t the front of the engine as shown above.
3. Remove the bottom hose (6) from the pump and allow the oil to drain into a container (you may use a hose with a threaded fitting to assist in draining the fluid.
4. Clean and install the hose.
5. Loosen the hose fittings on the cylinders, and drain as much fluid as feasible.
6. Replace and tighten fittings.

Dispose of drained oil according to local environment protection regulations.

Re-filling the Hydraulic Oil Tank:

NOTICE

Prior to filling with fluid, make certain all system components (reservoir, hoses, valves, fittings, pump, etc.) are clean.
Care must be taken to not run the pump or hydraulic motor without the sufficient amount of fluid.

1. Clean all surrounding debris and dirt off of the tank fill opening area. (Hydraulic fluid must be kept completely clean!)
2. Unscrew the filter cap (4) and pull out the filter.

Start-Up Procedure

1. Fill the tank until the oil level shows to the line on the dipstick
2. Replace the filter and cap.
3. Make sure all fittings are tight.
4. Fill the reservoir with the recommended hydraulic oil (see “System Fluid Specifications”), which should be passed through a 10 micron (nominal) non-bypass filter prior to entering the reservoir. Never reuse fluid.

Before operating, please consult the “Safety” section for vital information related to operating this powerful machine!

5. Crank the engine, using the starter, for a short period of time. This allows the system to begin filling with fluid. Start the engine and run at the lowest possible speed. Shut down the engine within 40 seconds if the pump or motor begin making an unusual noise, indicating a lack of oil, and be sure the reservoir is full and all the hoses are properly connected.
6. Set the engine throttle at approximately 50% of maximum throttle for a few minutes. This will purge trapped air from the pump/control valve circuit.
7. Cycle the self-propel drive lever, two or three times, to purge all remaining trapped air from the self-propel motor circuit.

The hydraulic motor is now ready for operation.

8. Now the hydraulic cylinders circuits may be prepared. Run the engine at normal operating speed. Using the cutting boom motion lever, cycle the cylinders through all their motions until all the air is bled off. The motions will be smooth and powerful when all of the air is bled off.
9. Check the reservoir level, and add more clean fluid if necessary.

The hydraulic system is now completely ready for operation.

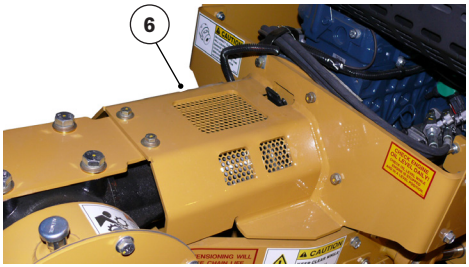
10. Clean up any spilled hydraulic fluid.

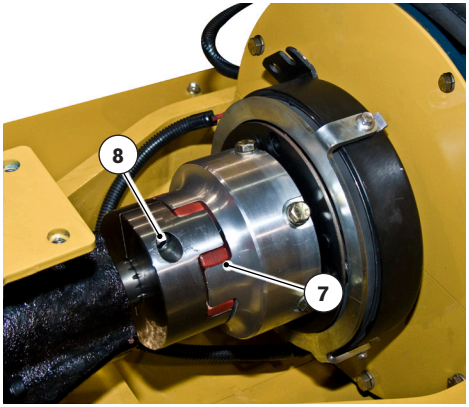
Maintenance

Clutch Spider Coupler

NOTICE

Description: It is crucial that the coupler hub is properly aligned and shimmed else premature wear may occur to the spider. These instructions are applicable to replacement or adjustment of the spider coupler.





Inspect the Polyurethane Spider Coupler (7) through the vented cover (6) daily for signs of any abnormal wear. Check the gearbox coupler clamping bolt (8) for correct torque (40-45 ft lbs) which could allow spider to walk out of pocket. There should be no or a very slight gap observed between spider coupler and mating sides as viewed through the top of the clutch shield screen. Replace the Polyurethane Spider (RED) if excessive wear is observed.

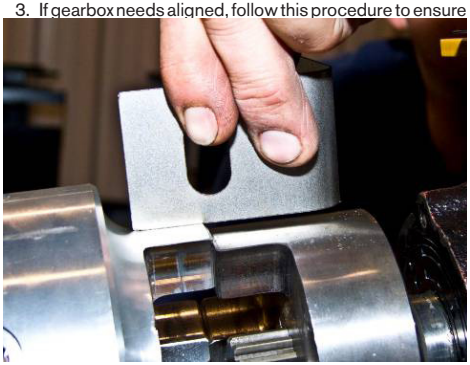
Alignment

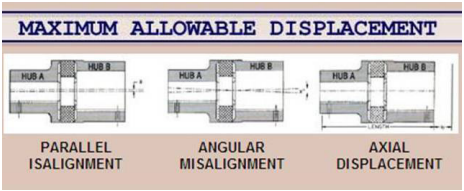
Parts / Tool List

- 3/8 socket w/short Extension (to remove clutch cover)
- Feeler gage & straight-edge
- 7/16" - 13 tap
- 3/8 HEX and M16 socket
- Optional shim kit (if needed)

Procedure

1. There should be an equal gap between the coupling and drive dogs (~0.020"). If a large or uneven gap is observed proceed to step 3. If gap appears within spec, proceed to step 2.
2. Check the alignment between the coupler and the gear box. If they do not align, proceed to step 3.
3. If gearbox needs aligned, follow this procedure to ensure





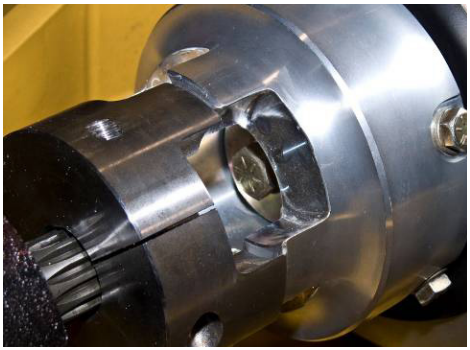
correct shaft alignment.

4. Remove the coupler hub from the gearbox and clean hub threads with a 7/16" - 13 tap.
5. Install coupler onto the gear box shaft but do not tighten the locking bolt. Tightening locking bolt on gearbox may

misalign the coupler on the splines - this will lead to

improper alignment in the following steps.

6. Install bolts loosely in the gearbox and push the drive



dogs of each coupler together to check for proper alignment.

7. Align the gearbox so that the sides of each coupler

are parallel with each other, and then check the height difference between the two couplers. Check the misalignment with a straight edge and a feeler gauge, and shim as needed (use optional shims in addition to the 14ga shims installed on the machine).

8. After the correct shims are installed hand tighten the

gearbox bolts (M16) in a star pattern and recheck to make sure the couplers are still aligned. Unit requires 763434 (5/8 washer) and 726702 (5/8 Lock Washer)

Note: if no shims are needed, install 2-1/2" washers (in addition to 763434) to prevent dust from entering the holes.

9. Check the coupler a second time. If it is still aligned, torque the gearbox bolts in a star pattern to 120 lb-ft.

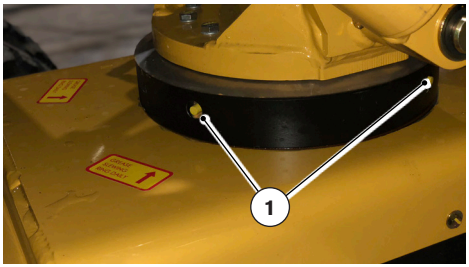
10. Insert the spider into the coupling and insert the drive dogs into the coupling leaving an equal gap between them (~0.020").

11. Check alignment and torque the locking bolt (3/8 HEX) to 45 lb-ft with "Blue" med strength Loctite.

Maintenance

Slewing Ring

Check



1. Lower the cutter wheel to the ground.
2. Visually check the slewing ring.
3. Using the cutter boom, slowly raise and lower the rear wheels while watching the slewing ring. Have your machine serviced if any excessive movement is observed.
4. Check the torque on all mounting bolts to insure they are tight. Set torque wrench to 40 ft-lbs (54.2 Nm) and check each bolt.

Lubricate

Lubricate the grease fittings (1) on the Slewing Ring. (there should be a grease zerk on each side of ring)

Note: Ensure bearing is accepting grease, if not remove grease zerk and clear grease port.

Cutting Wheel Belt - Check & Adjust Tension

⚠ WARNING

BEFORE BEGINNING TO CHECK OR ADJUST BELTS OR CHAINS: SHUT DOWN THE MACHINE, ENSURE THAT ALL MOVING PARTS HAVE COME TO A HALT, REMOVE THE KEY FROM THE ENGINE START SWITCH. EXTREME CAUTION MUST BE USED TO AVOID DEATH OR SERIOUS INJURY. STAY CLEAR OF BELTS AND CHAINS AND THE CUTTING WHEEL WHEN THEY ARE MOVING!

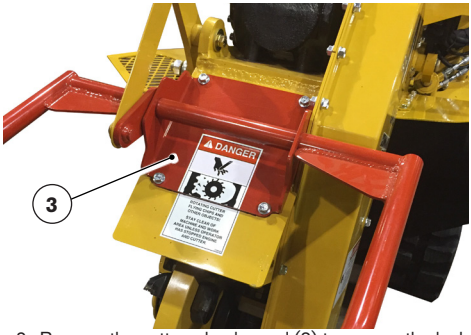
Using a belt gauge, check the Belt tension by depressing the Belt at the center of the span.

1. Remove the Belt guard cover (2). The cutting wheel must be free to rotate (eg. not resting on ground).

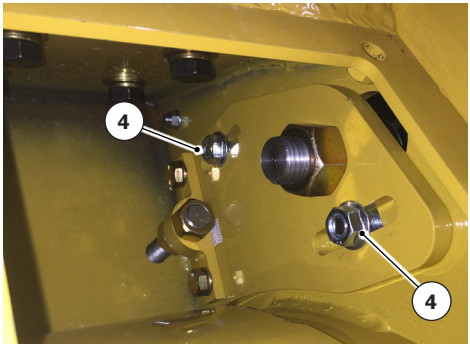
   ▪ The belt should deflect 3/8”-1/2” when 20 lbs. force is applied.

   ▪ Use 20 lbs. at 3/8” deflection when installing a new belt. After approximately 5-10 hours it will begin to seat in and drop down into the 12-15 lbs. range at 1/2” deflection. If the tension is acceptable, ignore steps 2-7. If the tension is too low, follow steps 2-7. If Tension is too low

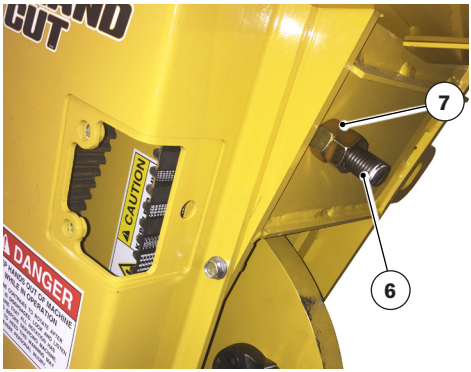
Maintenance



2. Remove the cutter wheel guard (3) to access the lock nuts (4).



3. Loosen the two lock nuts (5) on the idler plate
4. Back-off the jacking screw lock nut (6) one full turn.



5. Tighten the inner nut (7) until desired tension is reached.
6. When the tension is correct, tighten the idler plate nuts and jacking screw lock nuts, and reinstall the Belt guard.
7. Check after 10 hours run time, and adjust if needed.

Smart Tension App

Attention iPhone users. Mitsuboshi as designed an app for Apple iPhone users to use for checking tension for timing belts, V-Ribbed Belts, Flat Belts, etc.

Open your Smart Tension App

- Select the “Other” option
- Select the “Timing Belt” option
- Tap on Belt Type, then choose the “GigaTorque GX” belt.
- Tap on Belt Profile, then choose “G14M”.
- Tap on Belt Width, then choose “37”.
- Tap in the Span Length box. The span length on your RG55 will be 21.635”, or 549.529mm.
- The start screen will appear, to start the measurement: Tap “Start” and hold the iPhone at the measuring position, before the belt is made to vibrate. “Start” button changes to measuring..... and the microphone starts to pick up a sound wave.

Note: Hold the microphone of the (bottom of the phone) iPhone roughly 1/4 - 3/8” (10mm) from the center of the span length.

- Simply flick the belt with your finger or softly tap it with a wrench to make your belt vibrate.

When the microphone picks up a sound wave, the sound pressure level meter flashes and the detected frequency and the calculated belt tension will display. When the measurement is completed, “Done” will appear.

There are more instructions available on the app itself.

NOTICE

DO NOT OVERTIGHTEN THE CHAIN TENSION! Premature wearing of chain, bearings, and/or sprockets will occur.

Maintenance

PTO Clutch Brake Air Gap

Parts that DO NOT require maintenance

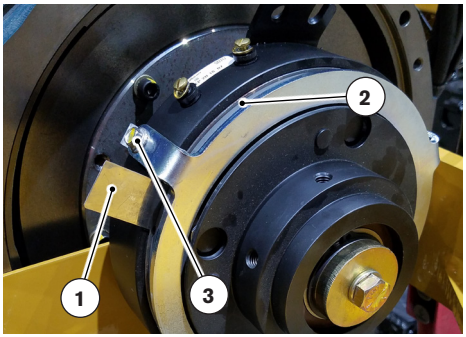
- Bearings - sealed for life of the clutch
- Armature, Rotors, Brake - wear evenly and can not be replaced individually.
- Coil - can not be removed.

⚠ CAUTION

FOLLOW PROPER LOCK OUT TAG OUT PROCEDURE BEFORE PERFORMING ANY REPAIR OR SERVICE.

Adjustment for Wear

- The clutch is adjustable for wear and can be adjusted to extend overall life
- If a clutch fails to pull in or will not continue to pull in when it gets hot, the air gap may need adjustment
- 3 feeler gauges .015 thick (1) and an Open end box wrench is all that is needed
- There are three inspection slots (2) on the brake shroud
- Place three gauges in the slots between the armature and rotor and loosen the three adjustment bolts (3).



- Energize the clutch with the gauges in place and tighten down the three adjustment bolts.
- De-energize the clutch and remove the gauges.
- Check for the proper gap 0.010”-0.020”
- Re-install covers and guards before operating machine

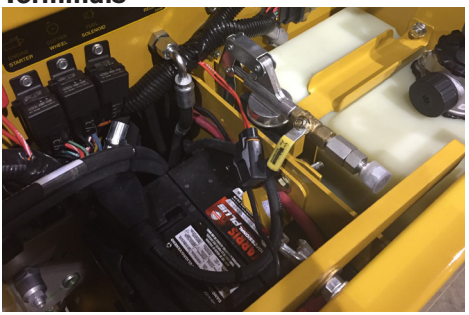
Battery - Change Every 2 Years

⚠ WARNING

ALWAYS WEAR PROTECTIVE CLOTHING AND EYEGLASSES WHEN WORKING WITH BATTERY. FOR FURTHER IMPORTANT BATTERY SAFETY INFORMATION, CONSULT THE SAFETY SECTION OF THIS MANUAL, AND THE KUBOTA ENGINE OPERATOR MANUAL.

Follow the directions found in the Kubota Engine Operator Manual.

Terminals



1. Raise the tool box lid.
2. Remove the black negative (-) cable.
3. Clean the terminal and clamp of any oxidation buildup with a stiff wire brush. (Stroke the brush away from your body to avoid hazardous particles.)
4. Apply a light coat of petroleum jelly around the base of the terminal.
5. Replace the cable.
6. Repeat the same procedure for the red positive (+) cable.

Steer Wheel Pivot

Lubricate

Lubricate the grease fittings (1) on the steer axle pivots.

One on each side.

Brakes

This machine is required to have a daily inspection of the ground-drive brake. This check should be done by the operator every day, before using the machine.

The ground-drive brake on this machine is a spring-activated, hydraulically-released unit. This means that anytime the unit is not being moved with hydraulic pressure, the spring-applied brake should engage. The machine should never visibly "creep" when it is not being moved.

The machine can be tested on any slope, but the simplest inspection can be done when unloading or loading the machine onto its trailer, or into a pickup truck. When the drive wheels are on the ramps, bring the machine to a halt, and observe the drive wheels. The wheels should not turn at all. No "creep" should be evident.

If the machine can be observed to be creeping down the ramp, check the following items:

- All wheel drives are engaged.
- No oil leaks are present in the ground-drive circuit.

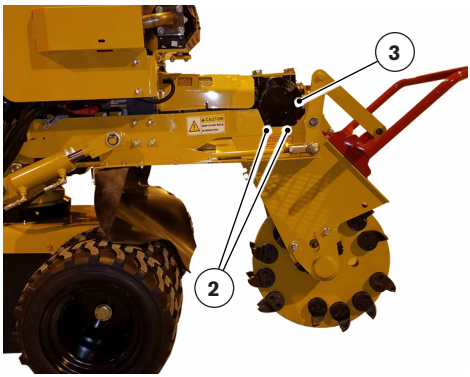
Correct all of these items and retest the machine. If the machine still creeps, then the spring-activated brake has been damaged. The drive motor must be replaced. Failure to keep the ground-drive brake in working condition can result in a machine moving unexpectedly, causing injury or death. The machine must be taken out of service until the ground-drive motor is repaired or replaced.

Tires and Rims

- Check tires for correct pressure. Inflate to 22psi (1.5 bar)
- Check tires and rims for damage or uneven wear
- Check lug nuts for tightness. Torque to 85 ft-lb. (115nm)

Cutter Wheel Gear Box

The cutter wheel gear box on the RG55 is equipped with two drain plugs (2) and one fill plug (3).



Drain

To drain the oil out of the gear box, place the machine on a solid level surface and have an approved catch pan placed under the machine to collect the used oil.

- Lower the cutter wheel down so that the wheel makes contact with the ground and the gear box is level.
- Remove the fill plug (3) to allow the gearbox to vent.
- Remove one of the drain plugs (2) and let all of the used oil to drain out.
- Reinstall the drain plug (2).

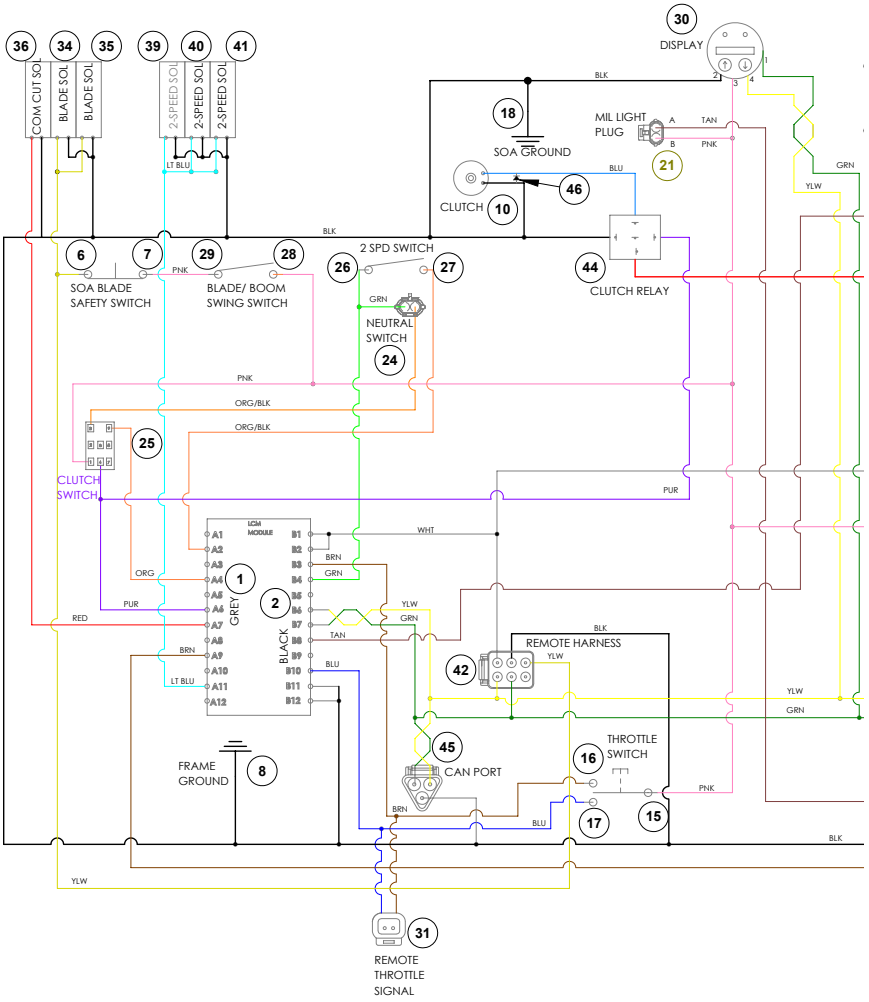
Fill

When filling the gear box use 90W synthetic gear oil.

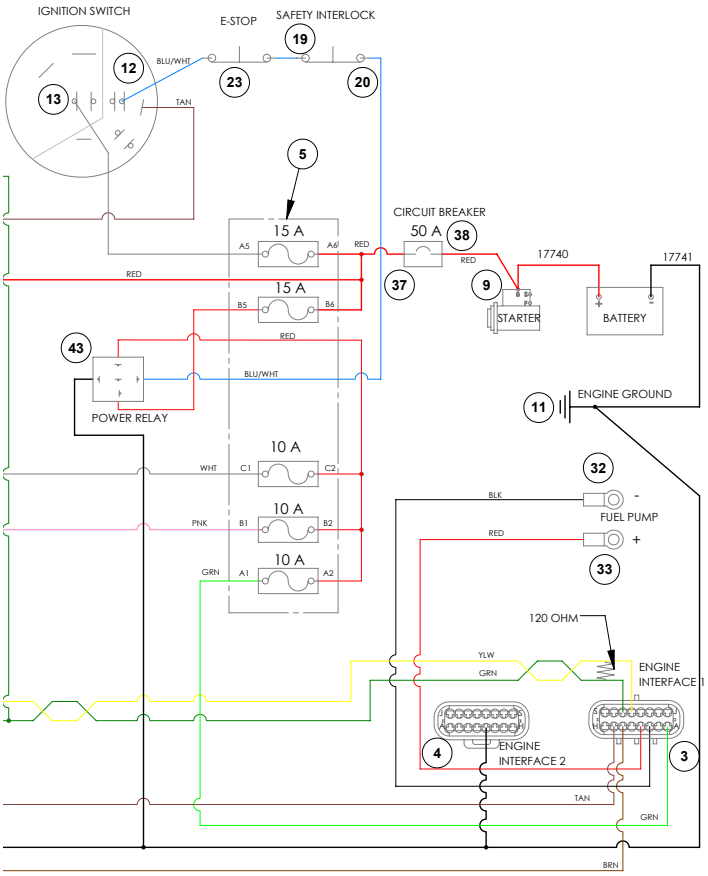
- Using the above oil fill gear box until oil seeps out of the fill hole.
- Reinstall fill plug (3).

Once the plugs have all been installed, remove any oil from the boom and surrounding areas and dispose of used oil according to local regulations.

38468 Main Wiring Schematic Rev B.



38468 Main Wiring Schematic Rev B.



Specifications

Lubricating Grease

All Rayco products are completely serviced at the factory before shipping. The operator should check all grease fittings to familiarize with the location and correct service schedule plan.

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

Apply grease using a standard low pressure/low volume grease gun. Do not use a pneumatic grease gun.

Lubricate with a high quality NLGI No.2 multipurpose bearing grease having rust inhibitors, good water resistance, antioxidant additives, and a minimum viscosity of 150 cSt at 40°C and suitable to operate continuously at 212°F / 100°C or higher.

Rayco recommends the following bearing grease that meets this spec:

Chevron Delo EP2……..189 cSt @ 40°C / 17.5 cSt @ 100°C / Temp range -40°C to 177°C (-40°F to 350°F)
Texaco Multifak EP2……..173 cSt @ 40°C / 15.6 cSt @ 100°C / Temp range -34°C to 121°C (-30°F to 250°F)
Citgo Premium Lithium EP2….173 cSt @ 40°C / 14.9 cSt @ 100°C / Temp range -15°C to 121°C (5°F to 250°F)
Shell Alvania EP2……..……..189 cSt @ 40°C / 15.6 cSt @ 100°C / Temp range -20°C to 100°C (-4°F to 212°F)

Note: for extreme cold temperature areas a No. 0 grade grease may be used.

Before lubricating make sure all grease fittings and the nozzle of the grease gun is clean.

Cold Weather Lubricants

Before attempting to start the engine, make sure that the oil in the engine, the transmission and the hydraulic system are fluid enough to flow. Check the oil by removing the dipsticks. If the oil will drip from the dipstick, then the oil is fluid enough to start the engine. Do not use oil that has been diluted with kerosene. Kerosene will evaporate in the engine.

If the viscosity of the oil is changed for colder weather, also change the filter element. If the filter is not changed, the filter element and the filter housing can become a solid mass. Drain all hydraulic cylinders and lines. After you change the oil, operate the equipment in order to circulate the thinner oil.

If continuous ambient operating temperatures are below -10°C (+14°F), oil change intervals should be increased. Consult the Engine Operator Manual for details.

When you start an engine or when you operate an engine in ambient temperatures that are below -20°C (-4°F), use base oils that can flow in low temperatures. These oils have lubricant viscosity grade of SAE 0W or SAE 5W.

When you start an engine or when you operate an engine in ambient temperatures that are below -30°C (-22°F), use a Synthetic base stock multigrade oil. The oil should have lubricant viscosity grade of 0W or 5W. Use an oil with a pour point that is 5-10 degrees lower than the coldest ambient temperature.

Hydraulic and track drive oil should meet all previous specifications and have a pour point at least 7.8°C (14°F) lower than the coldest expected ambient temperature.

Specifications

RAYCO LUBRICATION & FLUID SPECIFICATIONS

Engine Oil

During the initial break-in period, the engine will consume more oil than usual.
Check the engine oil level daily.
See the Engine Operator Manual for engine oil specifications.

Engine Fuel

See the Engine Operator Manual for engine fuel specifications.
USE GASOLINE ONLY.

Hydraulic Oil (Petroleum-Mineral Base)

Your Rayco machine is filled at the factory with Conoco Powerflow AW HVI 32 Hydraulic Fluid. This oil is formulated to provide the proper operating characteristics in a wide range of climates. When refilling, always use Conoco Powerflow AW HVI 32 or one of the recommended brands below. Failure to use the proper hydraulic oil can lower performance and shorten the life of critical components. Do NOT mix different types of hydraulic fluids!
Rayco's oil specifications address the following concerns:

- High-temperature viscosity
- Low-temperature flow properties
- Viscosity lifespan
- High-pressure wear characteristics
- Filterability
- Multi-metal compatibility in the presence of water

Rayco recommends the following hydraulic oils for your Rayco machine:
Conoco-Phillips MegaFlow AW HVI 32……..…Viscosity 6.0 cSt @ 100°C / 32 cSt @ 40°C / Pour -51°C (-60°F)
Shell Tellus T 32 ……..Viscosity 6.1 cSt @ 100°C / 32 cSt @ 40°C / Pour -39°C (-38°F)
Mobil DTE 13M……...Viscosity 6.5 cSt @ 100°C / 33 cSt @ 40°C / Pour -46°C (-51°F)
If choosing an oil other than those recommended above, the following specifications should be used:

- Kinematic Viscosity: 6-7 cSt @ 100°C / 32-33 cSt @ 40°C
- Pour point: -35° F (-37° C) or colder
- Viscosity stabilizers, excellent resistance to viscosity breakdown (shear).
- Anti-wear, Anti-foam formulation, for use in all pump types at all pressures.
- Low-zinc additives; zinc levels should not exceed .08% of total weight

Clean hydraulic oil is critical to achieve high performance and get long life from your hydraulic system. The oil and filter should be changed in accordance with the instructions contained in the "Maintenance Intervals" section of your manual. The hydraulic oil should be changed immediately if it appears dirty or smells burnt.

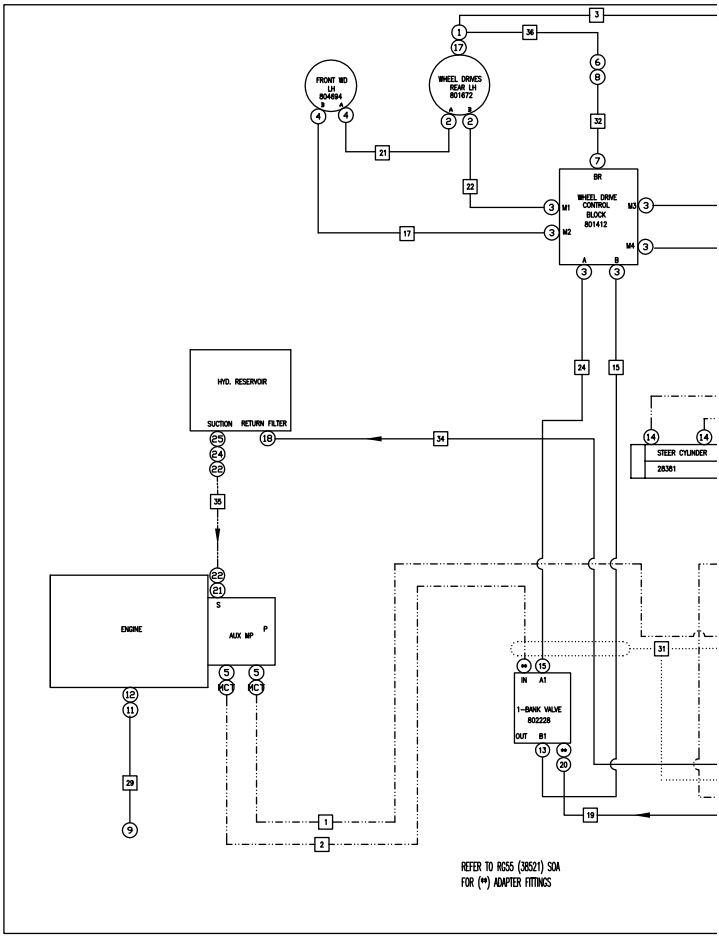
Biodegradable Hydraulic Oil

Panolin HLP Synthetic Ester Base VG32 is the only approved Bio-Degradable Hydraulic oil for Rayco machines. All mineral base oils must be completely drained out of system and components before refilling with Panolin HLP Synthetic VG32 Bio-degradable oil.

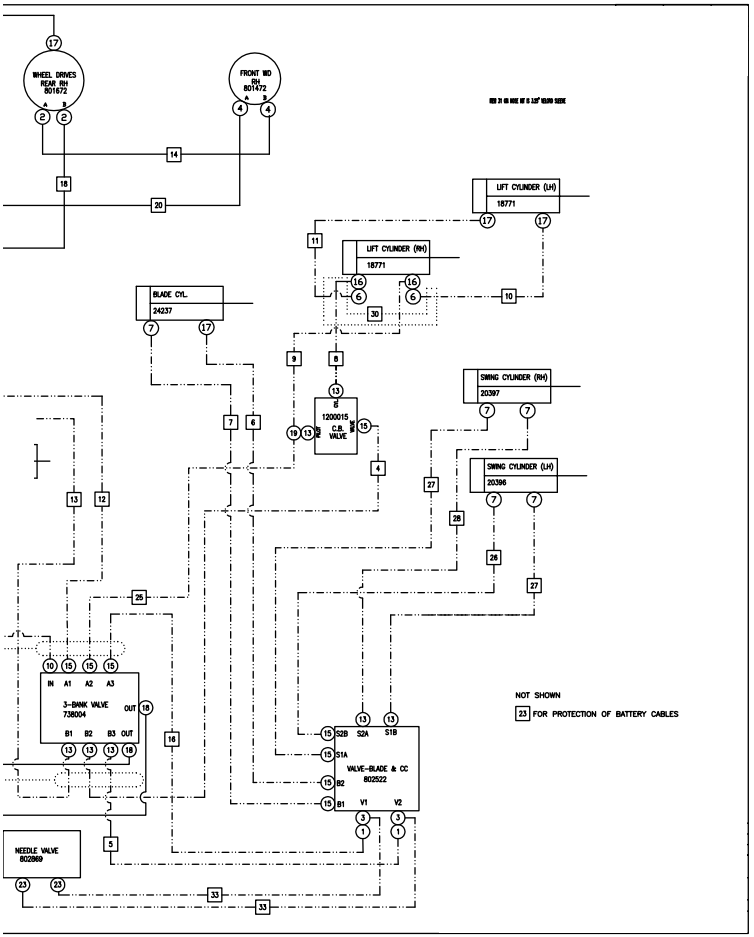
Final Drive Gear Oil

SAE-30-CD : Amount - 330cm³.

Hydraulic Schematic 805921



Hydraulic Schematic 805921



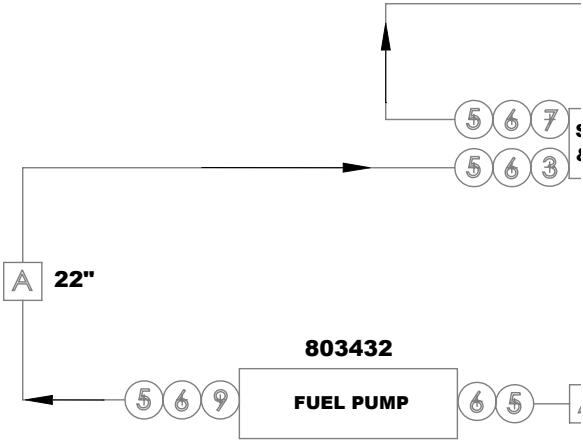
Hydraulic Hose Kit 805921H Rev B

ITEM	QTY	PART #	DESCRIPTION
1	1	HOSE	4R1T-6FFX-4FFX90-131"
2	1	HOSE	4R2T-6FFX-4FFX-133"
3	1	HOSE	4R1T-4FFX-4FFX-18"
4	1	HOSE	4R1T-4FFX-4FFX90-60"
5	1	HOSE	4R1T-4FFX-4FFX90-53"
6	1	HOSE	4R17-4FFX-4FFX-38"
7	1	HOSE	4R17-4FFX-4FFX90-30"
8	1	HOSE	4R17-4FFX-4FFX90-74" W/FABRIC HOSE GUARD
9	1	HOSE	4R17-4FFX-4FFX-88" W/FABRIC HOSE GUARD
10	1	HOSE	4R17-4FFX-4FFX-44"
11	1	HOSE	4R17-4FFX-4FFX-34"
12	1	HOSE	4R17-4FFX-4FFX-74"
13	1	HOSE	4R17-4FFX-4FFX90-77"
14	1	HOSE	4R2T-6FFX-4FFX45-60" W/FABRIC HOSE GUARD
15	1	HOSE	4R2T-4FFX-4FFX90-69"
16	1	HOSE	4R1T-4FFX-4FFX-51"
17	1	HOSE	4R2T-4FFX-4FFX45-44"
18	1	HOSE	4R2T-6FFX-4FFX-65" W/FABRIC HOSE GUARD
19	1	HOSE	8R1T-8FFX-8FFX90-22"
20	1	HOSE	4R2T-4FFX-4FFX45-46"
21	1	HOSE	4R2T-6FFX-4FFX45-67" W/FABRIC HOSE GUARD
22	1	HOSE	4R2T-6FFX-4FFX-66" W/FABRIC HOSE GUARD
23	1	HOSE	B16150-PLAIN-PLAIN-50" (PROTECTION FOR BATTERY CABLES)
24	1	HOSE	4R2T-4FSX-4FSX-66"
25	1	HOSE	4R1T-4FSX-4FSX-55"
26	1	HOSE	4R17-4FFX-4FFX45-13"
27	2	HOSE	4R17-4FFX-4FFX45-16"
28	1	HOSE	4R17-4FFX-4FFX45-20"
29	1	HOSE	143-06-6MP-6FJX-22"
30	1	WRAP	PWLD-16-15"
31	1	SLEEVE	TQS-3.25-25" (3 1/4" VELCRO SLEEVE)
32	1	HOSE	4R2T-4FFX-4FFX90-13"
33	2	HOSE	4R17-4FSX-4FSX90-52"
34	1	HOSE	8R1T-8FFX-8FFX90-57"
35	1	HOSE	12R4F-PLAIN-PLAIN-50"
36	1	HOSE	4R2T-4FFX-4FFX45-68" W/FABRIC HOSE GUARD

Hydraulic Adapter Kit 805921A

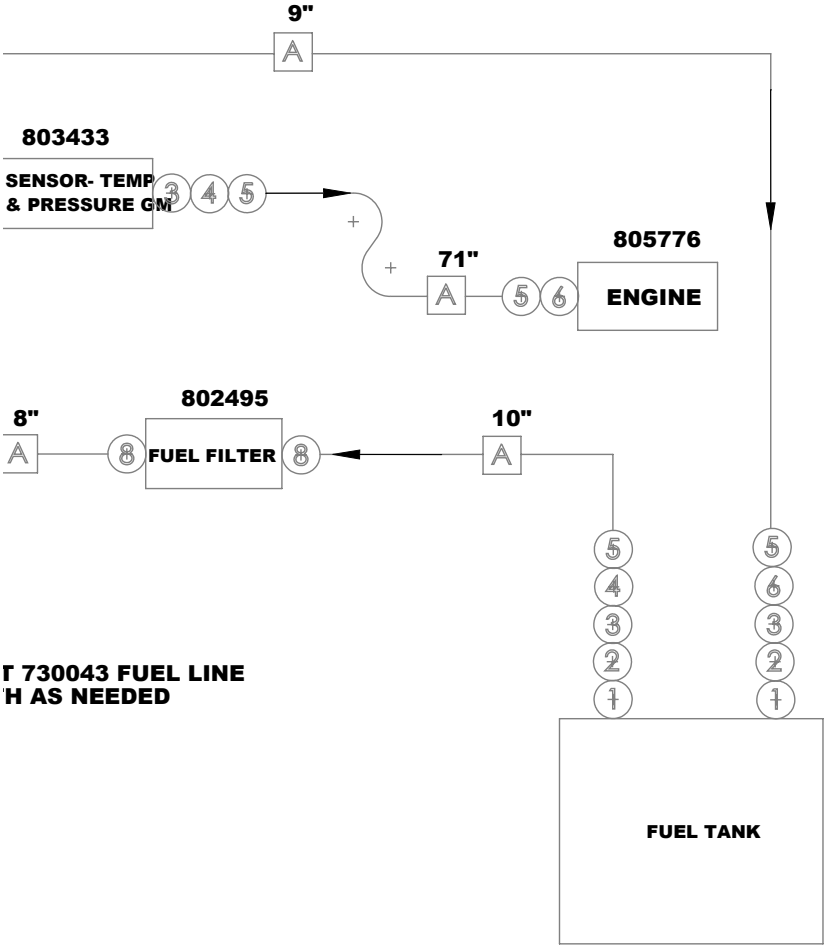
ITEM	QTY	PART #	DESCRIPTION
1	3	FF6602-04-04-04	TEE RUN -4MFFX-4MFFX-4FFFX
2	4	FF6802-06-10	ELBOW 45 DEG -6MFFX-10MOR
3	8	FF6802-04-06	ELBOW 45 DEG -4MFFX-6MOR
4	4	FF6400-04-10	CONNECTOR -4MFFX-10MOR
5	2	FF6801-06-06	ELBOW 90 DEG - FIT -6MFFX-6MOR
6	3	FF6500-04-04	ELBOW 90 DEG -4MFFX-4FFFX
7	6	FF6400-04-04	CONNECTOR -4MFFX-4MOR
8	1	FF2700-04-04LH	BULKHEAD UNION
9	1	5406-C-6	CAP-6FP
10	1	FF6400-04-08	CONNECTOR -4MFFX-8MOR
11	1	9500-12MM	WASHER 12MM
12	1	9605-06-12x1.25	CONNECTOR -6MJ-12MMX1.25MMT
13	8	FF6400-04-06	CONNECTOR -4MFFX-6MOR
14	2	FF6802-04-04	ELBOW 45 DEG -4MFFX-4MOR
15	9	FF6801-04-06	ELBOW 90 DEG -4MFFX-6MOR
16	2	FF6804-04-04-04	TEE RUN -4MFFX-4MFFX-4MOR
17	5	FF6801-04-04	ELBOW 90 DEG -4MFFX-4MOR
18	3	FF6400-08-08	CONNECTOR -8MFFX-8MOR
19	1	FF6600-04-04-04	TEE -4MFFX-4MFFX-4FFFX
20	1	FF6500-08-08	ELBOW 90 DEG -8MFF-8FFFX
21	1	4603-12-10	ELBOW 45 DEG -12BARB-10MOR
22	2	SUPRA W2 29-31	MIKALOR SUPRA W2 29-31 (RANGE 1.15-1.22)
23	2	FF2501-04-04	ELBOW 90 DEG -04MORFS X 04MP
24	1	4501-12-12	ELBOW 90 DEG 12BARB-12MPT
25	1	5405-08-12	CONNECTOR 08MPT X 12FPT

Fuel System Assembly 38605 Rev B



**NOTE: CUT
TO LENGTI**

Fuel System Assembly 38605 Rev B



Specifications

Lubricating Grease

All Rayco products are completely serviced at the factory before shipping. The operator should check all grease fittings to familiarize with the location and correct service schedule plan.

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

Apply grease using a standard low pressure/low volume grease gun. Do not use a pneumatic grease gun.

Lubricate with a high quality NLGI No.2 multipurpose bearing grease having rust inhibitors, good water resistance, antioxidant additives, and a minimum viscosity of 150 cSt at 40°C and suitable to operate continuously at 212°F / 100°C or higher.

Rayco recommends the following bearing grease that meets this spec:

Chevron Delo EP2……..189 cSt @ 40°C / 17.5 cSt @ 100°C / Temp range -40°C to 177°C (-40°F to 350°F)
Texaco Multifak EP2……..173 cSt @ 40°C / 15.6 cSt @ 100°C / Temp range -34°C to 121°C (-30°F to 250°F)
Citgo Premium Lithium EP2….173 cSt @ 40°C / 14.9 cSt @ 100°C / Temp range -15°C to 121°C (5°F to 250°F)
Shell Alvania EP2……..……..189 cSt @ 40°C / 15.6 cSt @ 100°C / Temp range -20°C to 100°C (-4°F to 212°F)

Note: for extreme cold temperature areas a No. 0 grade grease may be used.

Before lubricating make sure all grease fittings and the nozzle of the grease gun is clean.

Cold Weather Lubricants

Before attempting to start the engine, make sure that the oil in the engine, the transmission and the hydraulic system are fluid enough to flow. Check the oil by removing the dipsticks. If the oil will drip from the dipstick, then the oil is fluid enough to start the engine. Do not use oil that has been diluted with kerosene. Kerosene will evaporate in the engine.

If the viscosity of the oil is changed for colder weather, also change the filter element. If the filter is not changed, the filter element and the filter housing can become a solid mass. Drain all hydraulic cylinders and lines. After you change the oil, operate the equipment in order to circulate the thinner oil.

If continuous ambient operating temperatures are below -10°C (+14°F), oil change intervals should be increased. Consult the Engine Operator Manual for details.

When you start an engine or when you operate an engine in ambient temperatures that are below -20°C (-4°F), use base oils that can flow in low temperatures. These oils have lubricant viscosity grade of SAE 0W or SAE 5W.

When you start an engine or when you operate an engine in ambient temperatures that are below -30°C (-22°F), use a Synthetic base stock multigrade oil. The oil should have lubricant viscosity grade of 0W or 5W. Use an oil with a pour point that is 5-10 degrees lower than the coldest ambient temperature.

Hydraulic and track drive oil should meet all previous specifications and have a pour point at least 7.8°C (14°F) lower than the coldest expected ambient temperature.

Specifications

RAYCO LUBRICATION & FLUID SPECIFICATIONS

Engine Oil

During the initial break-in period, the engine will consume more oil than usual.
Check the engine oil level daily.
See the Engine Operator Manual for engine oil specifications.

Engine Fuel

See the Engine Operator Manual for engine fuel specifications.
USE GASOLINE ONLY.

Hydraulic Oil (Petroleum-Mineral Base)

Your Rayco machine is filled at the factory with Conoco Powerflow AW HVI 32 Hydraulic Fluid. This oil is formulated to provide the proper operating characteristics in a wide range of climates. When refilling, always use Conoco Powerflow AW HVI 32 or one of the recommended brands below. Failure to use the proper hydraulic oil can lower performance and shorten the life of critical components. Do NOT mix different types of hydraulic fluids!
Rayco's oil specifications address the following concerns:

- High-temperature viscosity
- Low-temperature flow properties
- Viscosity lifespan
- High-pressure wear characteristics
- Filterability
- Multi-metal compatibility in the presence of water

Rayco recommends the following hydraulic oils for your Rayco machine:
Conoco-Phillips MegaFlow AW HVI 32……..…Viscosity 6.0 cSt @ 100°C / 32 cSt @ 40°C / Pour -51°C (-60°F)
Shell Tellus T 32 ……..Viscosity 6.1 cSt @ 100°C / 32 cSt @ 40°C / Pour -39°C (-38°F)
Mobil DTE 13M……...Viscosity 6.5 cSt @ 100°C / 33 cSt @ 40°C / Pour -46°C (-51°F)
If choosing an oil other than those recommended above, the following specifications should be used:

- Kinematic Viscosity: 6-7 cSt @ 100°C / 32-33 cSt @ 40°C
- Pour point: -35° F (-37° C) or colder
- Viscosity stabilizers, excellent resistance to viscosity breakdown (shear).
- Anti-wear, Anti-foam formulation, for use in all pump types at all pressures.
- Low-zinc additives; zinc levels should not exceed .08% of total weight

Clean hydraulic oil is critical to achieve high performance and get long life from your hydraulic system. The oil and filter should be changed in accordance with the instructions contained in the "Maintenance Intervals" section of your manual. The hydraulic oil should be changed immediately if it appears dirty or smells burnt.

Biodegradable Hydraulic Oil

Panolin HLP Synthetic Ester Base VG32 is the only approved Bio-Degradable Hydraulic oil for Rayco machines. All mineral base oils must be completely drained out of system and components before refilling with Panolin HLP Synthetic VG32 Bio-degradable oil.

Specifications

Model	WG1605-G-E3 Gasoline fuel	WG1605-L-E3 LPG fuel
Number of Cylinder	4	
Type	Vertical, water cooled, 4-cycle Gasoline engine	Vertical, water cooled, 4-cycle LPG engine
Bore × Stroke	79.0 × 78.4 mm (3.11 × 3.09 in.)	
Total Displacement	1.537 L (93.79 cu.in.)	
SAE Gross Intermittent	42.5 kW (57.0 HP) / 3600 min^{-1} (rpm) 37.0 kW (49.6 HP) / 3000 min^{-1} (rpm)	41.0 kW (55.0 HP) / 3600 min^{-1} (rpm) 36.0 kW (48.3 HP) / 3000 min^{-1} (rpm)
ISO / SAE Net Intermittent	38.5 kW (51.6 HP) / 3600 min^{-1} (rpm) 33.5 kW (44.9 HP) / 3000 min^{-1} (rpm)	37.1 kW (49.8 HP) / 3600 min^{-1} (rpm) 32.5 kW (43.6 HP) / 3000 min^{-1} (rpm)
ISO Net Continuous	30.8 kW (41.3 HP) / 3600 min^{-1} (rpm) 26.8 kW (35.9 HP) / 3000 min^{-1} (rpm)	29.7 kW (39.8 HP) / 3600 min^{-1} (rpm) 26.1 kW (35.0 HP) / 3000 min^{-1} (rpm)
Maximum Bare Speed	3575 to 3625 min^{-1} (rpm) 2975 to 3025 min^{-1} (rpm)	
Minimum Bare Idling Speed	725 to 775 min^{-1} (rpm)	
Cylinder Head	Overhead-Valve	
Ignition System	Full Transistor Battery Ignition Type	
Governor	Electronic Governor	
Direction of Rotation	Counter-Clockwise (Viewed from Flywheel Side)	
Spark Plug Type / Spark Plug Gap	NGK IFR6F8DN 0.70 to 0.80 mm (0.028 to 0.031 in.)	
Ignition Timing	0.45 rad (26 °) before T.D.C. / 3000 min^{-1} (rpm), 3600 min^{-1} (rpm) 0.17 rad (10 °) before T.D.C. / 750 min^{-1} (rpm), 800 min^{-1} (rpm)	0.35 rad (20 °) before T.D.C. / 3000 min^{-1} (rpm), 3600 min^{-1} (rpm) 0.17 rad (10 °) before T.D.C. / 750 min^{-1} (rpm), 800 min^{-1} (rpm)
Firing Order	1-3-4-2	
Compression Ratio	9.1: 1	
Lubricating System	Forced Lubrication by Trochoid Pump	
Oil Pressure Indication	Electrical Type Switch	
Lubricating Filter	Full Flow Paper Filter (Cartridge Type)	
Cooling System	Pressurized Radiator, Forced Circulation with Water Pump	
Starting System	Electric Starting with Starter	
Starting Motor	12 V, 1.0 kW	
Battery	12 V, 52 AH or Equivalent	
Charging Alternator	12 V, 480 W, 720 W	
Fuel	*Unleaded Automobile Gasoline	Commercial LPG
Lubricating Oil	Better than SL Class (API) SAE 10W-30	
Lubricating Oil Capacity	6.0 L (1.6 U.S.gals)	
Catalytic Muffler / Converter	Three Way Catalyst	
Weight (Dry)	119 kg (262 lbs)	120 kg (265 lbs)
Application	General Power Source	

*The specification described above is of the standard engine of each model.
*Conversion Formula: HP = 0.746 kW, PS = 0.7355 kW

***KUBOTA RECOMMENDED LPG FUEL SPECIFICATIONS**

- Commercial Propane gas only.
- Equivalent to Propanes H-D-5 of GPA* standards.

(vol %)

C_3H_8	C_3H_6	C_4H_{10}	Others
≥ 90 %	≤ 5 %	≤ 2.5 %	–

*GPA means Gas Processors Association (U.S.A.)

Engine Troubleshoot

Engine

Use the following information to determine the source and solution to problems you may encounter related to the engine. This information can also be found in the Kubota Engine Operator's Manual that shipped with this machine.

Symptom	Probable Cause	Solution
Engine Will Not Turn Over	Engine jammed	Check engine to find the problem and repair it
	Battery discharged	Charge
	Starter malfunctioning	Repair or replace
	Wires disconnected	Reconnect
Engine Turns Over Slowly but Does Not Start	Increased resistance of moving parts	Repair or replace
	Excessively high viscosity engine oil at low temperature	Use specified engine oil
Engine Turns Over at Normal Speed but Does Not Start	Compression leak	Check the compression pressure and repair
	Improper valve clearance	Adjust
	Damaged ignition coil	Replace
	Damaged spark plug	Adjust spark plug gap or replace
	Clogged air cleaner	Clean or replace
Rough Low-Speed Running and Idling	Damaged ignition coil	Replace
	Damaged spark plug	Adjust spark plug gap or replace
	Improper valve clearance	Adjust
Rough High-Speed Running	Damaged spark plug	Adjust spark plug gap or replace
	Damaged ignition coil	Replace
Engine Speed Does Not Increase	Clogged air cleaner	Clean or replace
	Damaged ignition coil	Replace
	Damaged throttle body	Replace
	Breather tube has separated	Attach correctly
	Improper input signal to ECU	Check the wire harness
Deficient Output	Improper intake or exhaust valve sealing	Replace
	Improper valve clearance	Adjust
	Piston ring and cylinder worn	Replace
	Clogged air cleaner	Clean or replace
Engine Noise	Improper valve clearance	Adjust
	Spark knock due to low-octane fuel or carbon	Use higher-octane fuel and remove carbon
	Rattles from loosely mounted external components	Retighten

Machine Specs

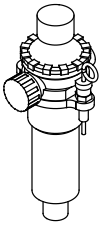
General
Weight: 2760 Lbs Maximum
Length: 121.5" Maximum
Height: 72.625" Maximum (Operator's Shield), 57" (Air FIlter)
Width: 35.5" Maximum, 53" Maximum with Single Bolt Dual Wheels
Ground Drive: Self-propelled hydraulic , 4-wheel drive, variable speed
Chip Collection Capacity: 11cu. Ft. Minimum
Swing Pivot Bearings: 13" diameter slewing ring
Toolbox: Required
Hydraulic Backfill Blade: 50" Expanded 35" Retracted
Tires: 18 x 8.5-10 R4 4 ply Rear - (4) Front - (2)
Swing-out Control Station Viewing area: 18x24" Height: 45½" Heavy duty rubber debris curtain Perimeter Photo-eye Safety Shutdown
Ground Pressure: 9.7 PSI
Engine
Model: Kubota WG1605, EPA/CARB compliant, Vertical 4-cycle, liquid Cooled gasoline
Number of cylinders: 4
Bore: 3.07" Minimum
Stroke: 3.09 Minimum
Displacement: 91.41 cu. In Minimum
Gross HP at maximum no load RPM: 53.4HP Minimum
Maximum rated torque: 89ft lbs @2400 RPM Minimum
Cooling medium: liquid cooled
Air Cleaner: Dual Element, Dry type
Oil Filter: Spin-on type
Fuel Tank Capacity: 8.5 gallons
Electrical System: 12 volts/40 AMP Alternator
Hydraulic System - Cutter
Pump Displacement: 4.27cc / 2.13cc Minimum
Pump Gallonage: 3.6 / 1.8 GPM @ 3000 RPM Minimum
System Pressure Relief: 3500 PSI Minimum
Oil Filter: 10 Micron Full Flow
Hydraulic Reservoir: 2 Gallons
Oil Type: ISO 32
Lift & swing cylinders: 2 ½" bore x 7-3/8" stroke, 1-1/8" rod
Valving: (1) Single Function, (1) 3 Function Monoblock Spring-Centered Series
Command Cut: Swing speed control and horsepower optimizer.
Lift Cylinders: (2) 2 ½" bore x 4" stroke, 1.25" rod
Swing Cylinders: (2) 2" bore x 6" stroke, 1.125" rod
Blade Cylinder: (1) 2" Bore x 10" Stroke, 1.125" rod
Steer Cylinder: (1) 2" Bore x 4" Stroke, 1.25" rod
Hydraulic Wheel Drive: (4) 335cc, (2) with Integrated Brake
Fittings: O-ring faced seal
Cutting Wheel
Wheel Diameter: 20" Maximum
Wheel Thickness: 1-1/2" Minimum
Cutting Wheel Bearings: 1 3/4" diameter Pillow Block Minimum
Hub: Bolt-in required
RPM: 905 @ 3200 engine RPM
Primary Drive: Clutch to 90deg. Gear box
Drive Belt: Heavy Duty Carbon Cord with Low Sprocket Wear Material
Cutting Teeth: RAYCO Super tooth™ forged, One-piece, with tungsten carbide tips.
Cutter Teeth Quantity: 24 Maximum
Belt Guard: Steel, one piece
Chip Retaining Curtains: Fold Down, Fabric impregnated rubber
Cutter Wheel Engagement: Electromagnetic with brake system
Cutting Range (without repositioning)
Below Ground Level: 14"
Above Ground Level: 24.5"
True Cutting Width (NOT ARC): 60"
Forward-Backward: Self-propelled unlimited in drive mode
Options
TRSJRWB Trailer
TR100L
CHIP GUARD,EXTENSION - 34764
DUAL FRONT WHEEL ASSEMBLY - 29503FO
MACHINE LIFT - 29488

Service Parts

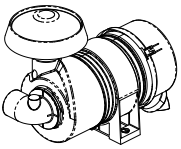
Engine Oil Filter - 800275

Fuel Filter - 802495

Hydraulic Return Filter Assembly- 803604
Filter Element - 761908
Dipstick - 761910
Restriction Indicator - 761909



Outer Air Filter Cartridge - 800276
Inner Air Filter Cartridge - 800277
Service indicator - 803067

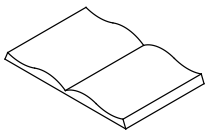


Fuel Cap - 801682

Engine Key - 764136

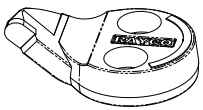
Parts Manual - PMRG55

Operation Manual - OBRG55



Operation & Service Manual - OSMRG55

CUTTER WHEEL TEETH
Straight Counter bore - 3144C
Straight Threaded - 3144T
Angle-Out Counter bore - 2933C
Angle-Out Threaded - 2933T



RAYCO WARRANTY CERTIFICATE

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.

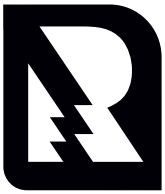
Additional copies of this manual may be purchased. Contact your Authorized Rayco Dealer or Rayco Manufacturing Inc.

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.



RAYCOMFG.COM