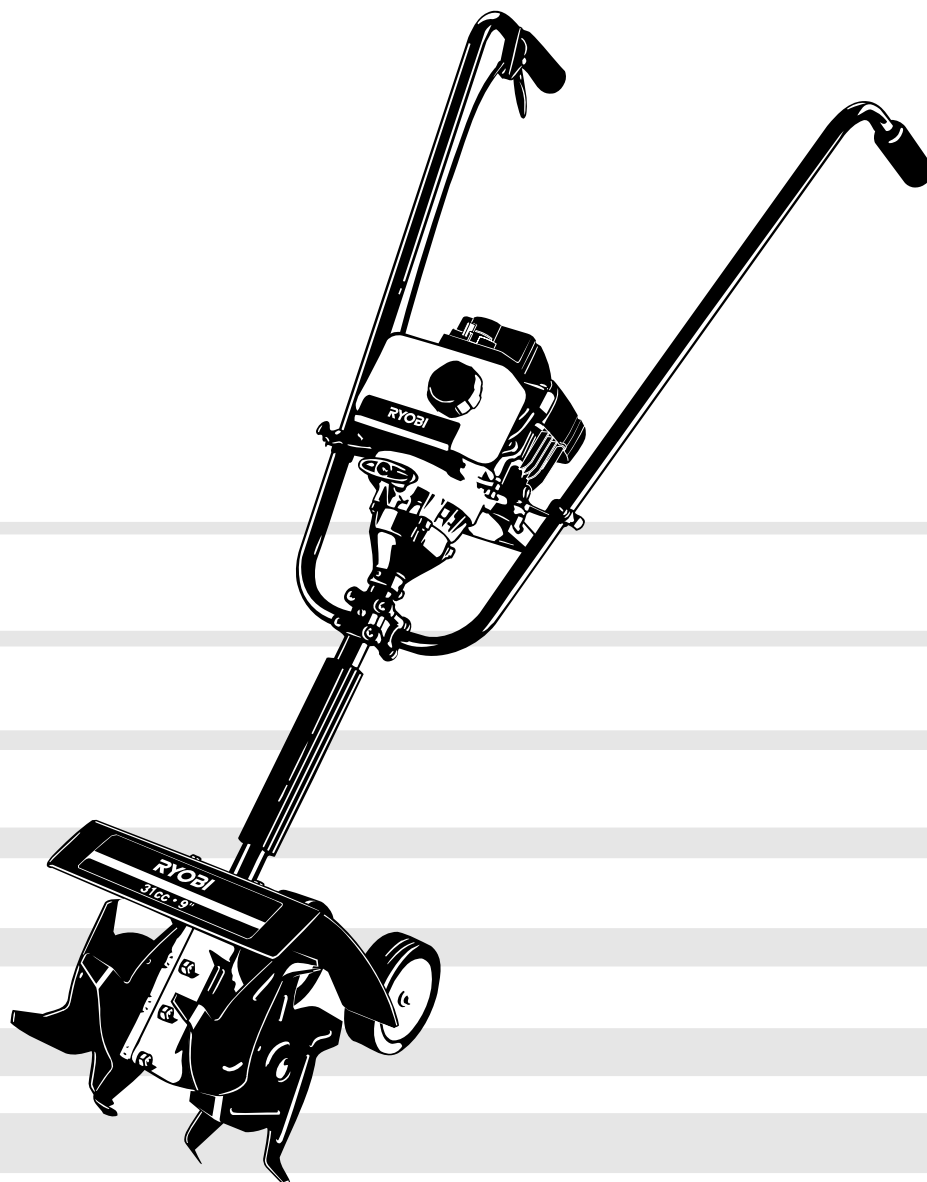


RYOBI®

410r

2-Cycle Garden Cultivator

OPERATOR'S MANUAL



FOR QUESTIONS, CALL 1-800-345-8746 in U.S. or
1-800-265-6778 in CANADA
www.ryobi.com

IMPORTANT MANUAL

DO NOT THROW AWAY

INTRODUCTION

THANK YOU

Thank you for buying this quality product. This modern outdoor power tool will provide many hours of useful service. You will find it to be a great labor-saving device.

This operator's manual provides you with easy-to-understand operating instructions. Read the whole manual and follow all the instructions to keep your new outdoor power tool in top operating condition.

The other manual that came with your power tool, the parts manual, contains all the information that you need to order parts.

PRODUCT REFERENCES, ILLUSTRATIONS AND SPECIFICATIONS

All information, illustrations and specifications in this manual are based on the latest product information available at the time of printing. We reserve the right to make changes at any time without notice.

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SERVICE INFORMATION

Service on this unit both within and after the warranty period should be performed only by an authorized and approved service dealer.

Dial:

- **1-800-345-8746** or **www.ryobi.com** on the world wide web for authorized service dealers in the United States

Or

- **1-800-265-6778** in Canada to obtain the listing of the authorized service dealer nearest you.

to obtain the listing of the authorized service dealer nearest you.

DO NOT RETURN THE UNIT TO THE RETAILER.

NOTE: PROOF OF PURCHASE WILL BE REQUIRED FOR WARRANTY SERVICE.

Make sure this manual is carefully read and understood before starting or operating this equipment.

THIS PRODUCT IS COVERED BY ONE OR MORE US PATENTS, OTHER PATENTS PENDING.

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CONTENTS OF CARTON

This unit includes the following:

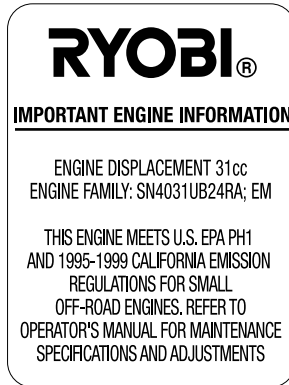
- Model 410r Garden Cultivator
- Handlebar with Clamps
- Hardware Pack
- Bottle of 2-Cycle Oil
- Operator's Manual
- Parts Manual

Examine all parts to make certain that nothing is missing and no breakage has occurred during shipping. Any damaged or missing part must be replaced before using this product.

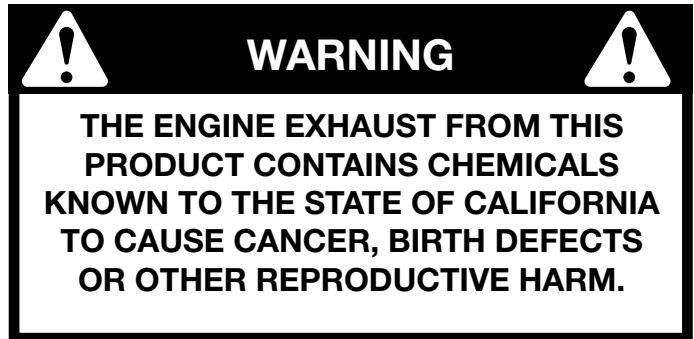
CALIFORNIA EMISSION REGULATIONS

This unit meets the 1995 to 1999 California emissions regulations for small off-road engines. These units are identified by the label on the engine of your product. A typical identification label is shown.

To ensure that your unit continues to meet these regulations, refer to the following information and instructions in this operator's manual.



California Proposition 65 Warning:



SPARK ARRESTOR

NOTE: For users on U.S. Forest Land and in the states of California, Maine, Oregon and Washington. All U.S. Forest Land and the state of California (Public Resources Codes 4442 and 4443), Oregon and Washington require, by law that certain internal combustion engines operated on forest brush and/or grass-covered areas be equipped with a spark arrestor, maintained in effective working order, or the engine be constructed, equipped and maintained for the prevention of fire. Check with your state or local authorities for regulations pertaining to these requirements. Failure to follow these requirements could subject you to liability or a fine. **This unit is not factory equipped with a spark arrestor.** If these items are required in your area, ask your LOCAL SERVICE dealer to install the **Optional Accessory Part #180030 Spark Arrestor Kit.**

FOR QUESTIONS, CALL 1-800-345-8746 IN U.S. OR 1-800-265-6778 in CANADA

WARNING!

Read the Operator's Manual(s) and follow all warnings and safety instructions. Failure to do so can result in serious injury to the operator and/or bystanders.



WARNING: The operation of any power tool can cause foreign objects to be thrown into your eyes. This can lead to severe eye damage. Before commencing power tool operation, always wear safety glasses or goggles that are marked as meeting ANSI Z87.1 standards, and a full face shield when needed.

RULES FOR SAFE OPERATION

The purpose of safety symbols is to attract your attention to possible dangers. The safety symbols, and their explanations, deserve your careful attention and understanding. The safety warnings do not by themselves eliminate any danger. The instructions or warnings they give are not substitutes for proper accident prevention measures.

SYMBOL	MEANING
	SAFETY ALERT SYMBOL: Indicates danger, warning, or caution. Attention is required in order to avoid serious personal injury. May be used in conjunction with other symbols or pictographs.
NOTE: Advises you of information or instructions vital to the operation or maintenance of the equipment.	



DANGER: Failure to obey a safety warning will result in serious injury to yourself or to others. Always follow the safety precautions to reduce the risk of fire, electric shock, and personal injury.



WARNING: Failure to obey a safety warning can result in injury to yourself and others. Always follow the safety precautions to reduce the risk of fire, electric shock, and personal injury.



CAUTION: Failure to obey a safety warning may result in property damage or personal injury to yourself or to others. Always follow the safety precautions to reduce the risk of fire, electric shock, and personal injury.

• IMPORTANT SAFETY INFORMATION •

READ ALL INSTRUCTIONS BEFORE OPERATING

- Read the instructions carefully. Be familiar with the controls and proper use of the unit.
- Do not operate this unit when tired, ill, or under the influence of alcohol, drugs, or medication.
- Children and teens under the age of 15 must not use the unit, except for teens guided by an adult.
- All guards and safety attachments must be installed properly before operating the unit.
- Inspect the unit before use. Replace damaged parts. Check for fuel leaks. Make sure all fasteners are in place and secure. Replace parts that are cracked, chipped, or damaged in any way. Do not operate the unit with loose or damaged parts.
- Carefully inspect the area before starting the unit. Remove all debris and hard or sharp objects such as glass, wire, etc.
- Clear the area of children, bystanders, and pets. At a minimum, keep all children, bystanders and pets outside a 50 feet (15 m) radius; there still may be a risk to bystanders from thrown objects. Bystanders should be encouraged to wear eye protection. If you are approached, stop the unit immediately.
- Squeeze the throttle control and check that it returns automatically to the idle position. Make all adjustments or repairs before using unit.

SAFETY WARNINGS FOR GAS UNITS

WARNING: Gasoline is highly flammable, and its vapors can explode if ignited. Take the following precautions:

- Store fuel only in containers specifically designed and approved for the storage of such materials.
- Avoid creating a source of ignition for spilled fuel. Do not start the engine until fuel vapors dissipate.

- Always stop the engine and allow it to cool before filling the fuel tank. Never remove the cap of the fuel tank, or add fuel, when the engine is hot. Never operate the unit without the fuel cap securely in place. Loosen the fuel tank cap slowly to relieve any pressure in the tank.
- Mix and add fuel in a clean, well-ventilated area outdoors where there are no sparks or flames. Slowly remove the fuel cap only after stopping engine. Do not smoke while fueling or mixing fuel. Wipe up any spilled fuel from the unit immediately.
- Move the unit at least 30 feet (9.1 m) from the fueling source and site before starting the engine. Do not smoke, keep sparks and open flames from the area while adding fuel or operating the unit.

WHILE OPERATING

- Never start or run the unit inside a closed room or building. Breathing exhaust fumes can kill. Operate this unit only in a well ventilated area outdoors.
- Wear safety glasses or goggles that are marked as meeting ANSI Z87.1 standards, and ear/hearing protection when operating this unit. Wear a face or dust mask if the operation is dusty.
- Wear heavy, long pants, boots, gloves and long sleeve shirt. Do not wear, short pants, sandals or go barefoot.
- To reduce the risk of injury associated with objects being drawn into rotating parts, do not wear loose clothing, jewelry, scarves, etc. Secure hair above shoulder level.
- Use the unit only in daylight or good artificial light.
- Keep outside surfaces free from oil and fuel.
- This unit has a clutch. The tines remain stationary when the engine is idling. If they do not, have the unit adjusted by an authorized service technician.

RULES FOR SAFE OPERATION

- Be sure the tines are not in contact with anything before starting the unit.
- Avoid accidental starting. Be in the starting position whenever pulling the starter rope. The operator and unit must be in a stable position while starting. See Starting/Stopping Instructions.
- Use the right tool. Only use this tool for the purpose intended.
- Do not force unit. It will do the job better and with less likelihood of injury at a rate for which it was designed.
- Use extreme caution when reversing or pulling the unit towards you.
- Do not overreach, take extra care when working on steep slopes or inclines. Always keep proper footing and balance.
- Always hold the unit with both hands when operating. Keep a firm grip on the handlebar grips.
- Keep hands, face, and feet at a distance from all moving parts. Do not touch or try to stop the tines when they are rotating. Do not operate without guards in place.
- Do not touch the engine, muffler or gearbox. These parts get extremely hot from operation. When turned off they remain hot for a short time.
- Do not operate the engine faster than the speed needed to do the job. Do not run the engine at high speed when not in use.
- Always stop the engine when operation is delayed or when walking from one location to another.
- Stop the engine for maintenance, repair, to install or remove the tines. The unit must be stopped and the tines no longer turning to avoid injury.
- The tines become very sharp from use. Always wear heavy gloves when handling, removing, installing or cleaning the tines.
- Use only genuine Ryobi replacement parts and accessories for this unit. These are available from your authorized service dealer. Use of any non Ryobi parts or accessories could lead to serious injury to the user, or damage to the unit, and void your warranty.
- Keep unit clean of vegetation and other materials. They may become lodged between the tines and gearbox or guard.
- To reduce fire hazard, replace faulty muffler and spark arrestor, keep the engine and muffler free from grass, leaves, excessive grease or carbon build up.

OTHER SAFETY WARNINGS

- Never store the unit, with fuel in the tank, inside a building where fumes may reach an open flame or spark.
- Allow the engine to cool before storing or transporting. Be sure to secure the unit while transporting.
- Store the unit in a dry place, either locked up or up high to prevent unauthorized use or damage. Keep out of the reach of children.
- Clean the tines with a hose and water. Wipe the tines with a light machine oil to prevent rust.
- Never douse or squirt the engine with water or any other liquid. Keep handles dry, clean and free from debris. Clean after each use, see **Cleaning and Storage** instructions.
- Keep these instructions. Refer to them often and use them to instruct other users. If you loan someone this unit, also loan them these instructions.

SAVE THESE INSTRUCTIONS

SAFETY AND INTERNATIONAL SYMBOLS

This operator's manual describes safety and international symbols and pictographs that may appear on this product. Read the operator's manual for complete safety, assembly, operating and maintenance and repair information.

SYMBOL

MEANING



• SAFETY ALERT SYMBOL

Indicates danger, warning, or caution. May be used in conjunction with other symbols or pictographs.



• WARNING - READ OPERATOR'S MANUAL

Read the Operator's Manual(s) and follow all warnings and safety instructions. Failure to do so can result in serious injury to the operator and/or bystanders.



• FOR SERVICE INFORMATION, CALL:

USA: 1-800-345-8746
CANADA: 1-800-265-6778

RULES FOR SAFE OPERATION

SYMBOL

MEANING



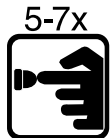
• WEAR EYE AND HEARING PROTECTION

WARNING: Thrown objects and loud noise can cause severe eye injury and hearing loss. Wear eye protection meeting ANSI Z87.1 standards and ear protection when operating this unit.



• KEEP BYSTANDERS AWAY

WARNING: Keep all bystanders, especially children and pets, at least 50 feet (15 m) from the operating area.



• PRIMER

Push primer bulb, fully and slowly, 5 to 7 times.



• UNLEADED FUEL

Always use clean, fresh unleaded fuel.



• OIL

Refer to operator's manual for the proper type of oil.



• THROWN OBJECTS CAN CAUSE SEVERE INJURY

WARNING: Do not operate unit without proper attachments and guards in place.



• ON/OFF STOP CONTROL

ON / START / RUN



• ON/OFF STOP CONTROL

OFF OR STOP



• HOT SURFACE WARNING

Do not touch a hot muffler, cylinder or gearbox. You may get burned. These parts get extremely hot from operation. When turned off they remain hot for a short time.



• CHOKE CONTROL

A • **FULL** choke position.
B • **PARTIAL** choke position.
C • **RUN** position.



• GARDEN CULTIVATORS – ROTATING TINES CAN CAUSE SEVERE INJURY

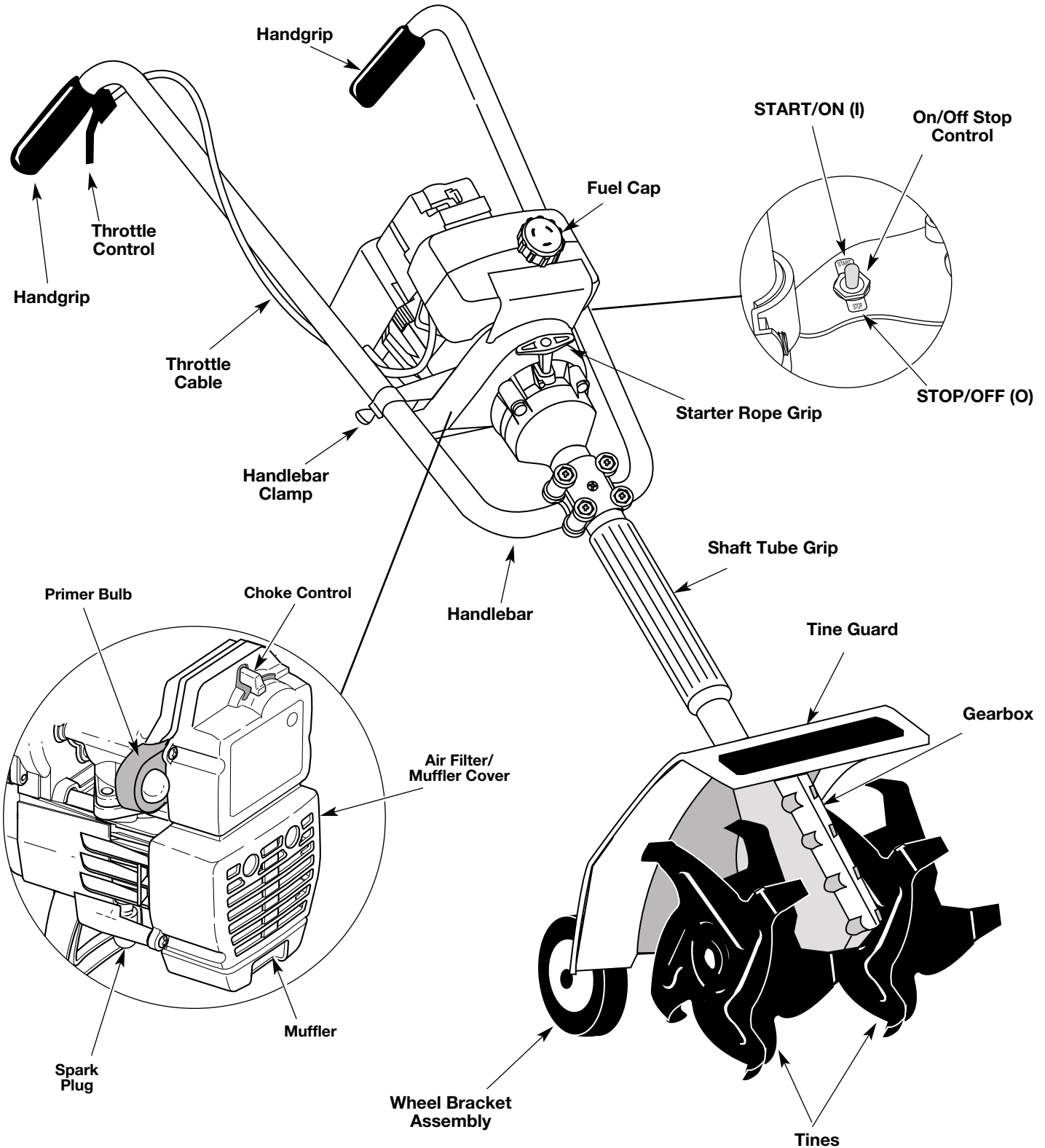
WARNING: Stop the engine and allow the tines to stop before installing or removing tines, or before cleaning or performing any maintenance. Keep hands and feet away from rotating tines.

RULES FOR SAFE OPERATION

KNOW YOUR UNIT

APPLICATION

Use this unit for cultivating sod and light to medium soil. Also for cultivating in garden areas, around trees, etc.



ASSEMBLY INSTRUCTIONS

ASSEMBLING THE UNIT

Your yard and garden cultivator has been completely assembled except for the handlebar, throttle cable and wheel bracket assembly. A large phillips screwdriver is needed for assembly.

Unpacking

1. Carefully unpack the contents and insure that nothing is damaged. Unwrap the throttle cable without bending or kinking it.



WARNING: Do not cut the plastic strap off the handle bar. The strap is under tension and can cause serious personal injury if cut.

2. Squeeze the handle bar and slide the plastic strap down and off (Fig. 1).

NOTE: Do not squeeze the handlebar too tight. Excessive squeezing can cause the handlebar to kink.

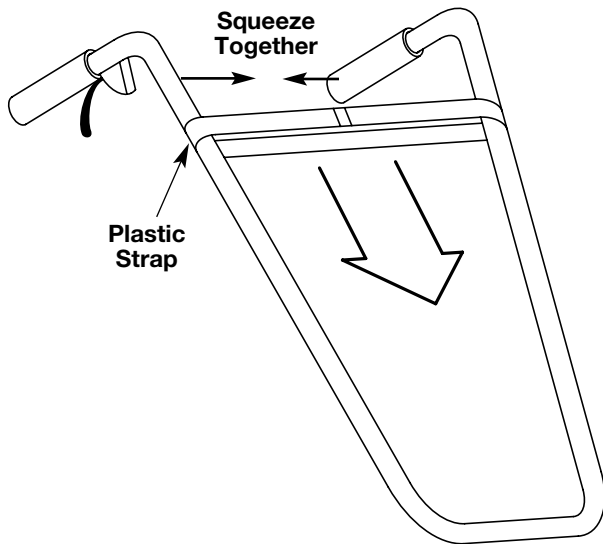


Fig. 1

INSTALLING THE WHEEL BRACKET ASSEMBLY



WARNING: To avoid injury from the tines, wear heavy gloves and a long sleeve shirt when installing the wheel bracket assembly.

1. With the unit on it's side, place the wheel bracket assembly on the underside of the tine guard (Fig. 2).
2. Install a carriage bolt through each of the slotted holes in the wheel bracket and into the tine guard.
3. On the top side of the tine guard, install a lock washer and a wing nut onto each of the bolts (Fig. 2).
4. Make sure the square shoulder of the bolts are through the slotted holes in the wheel bracket. Tighten the wing nuts (Fig. 3).

NOTE: Do not over tighten the wing nuts. Loosening the wing nuts allow the wheel height to be adjusted.

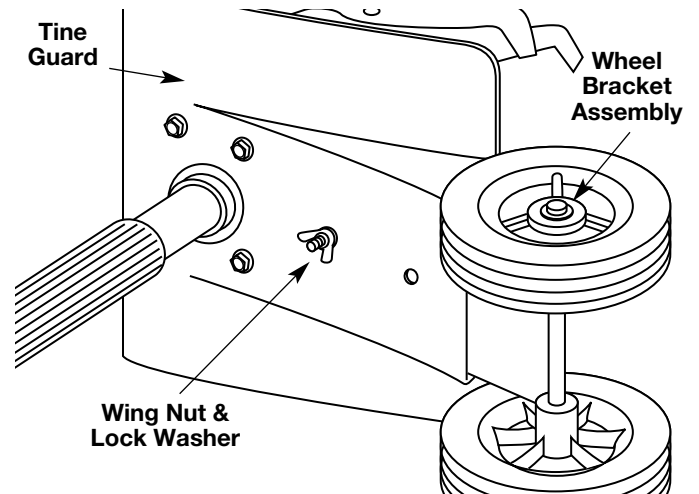


Fig. 2

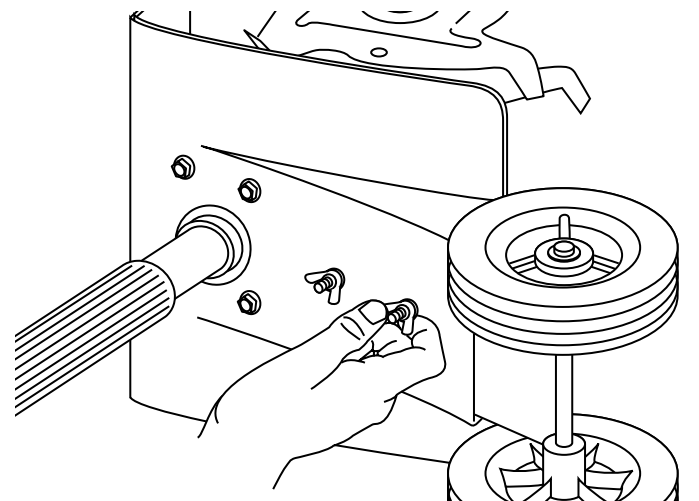


Fig. 3

ASSEMBLY INSTRUCTIONS

INSTALLING THE HANDLEBAR

1. Place the handlebar between the bottom and middle clamp pieces (Fig. 4).
2. While holding the three pieces together, position the handlebar underneath the shaft tube and align with the top clamp.

NOTE: The holes in the clamp assembly will line up only when assembled correctly.

3. One at a time, hold a hex nut in the bottom clamp recess with a finger and install a screw through the clamp assembly. Start screw with a large Phillips screwdriver. Do the same with the other three (3) nuts and screws. Do not tighten until you make the handle adjustment.
4. Position the two (2) handlebar clamps with one on each side near the top of the handlebar. Swing the handlebar up until it sets to the outside of the two mounting brackets on the engine (Fig.5).

NOTE: Positioning the handlebar onto the mounting brackets may require slightly spreading the handlebar.

5. Slide the two (2) handlebar clamps down over the mounting brackets (Fig. 6).

NOTE: It may be required to loosen or remove the thumb screws on the handlebar clamps to spread them to fit over the mounting brackets.

6. Center the handlebar and tighten the two (2) mounting bracket clamps and the four (4) handlebar clamp screws evenly until the handlebar is secure. (Figs. 6 and 7).

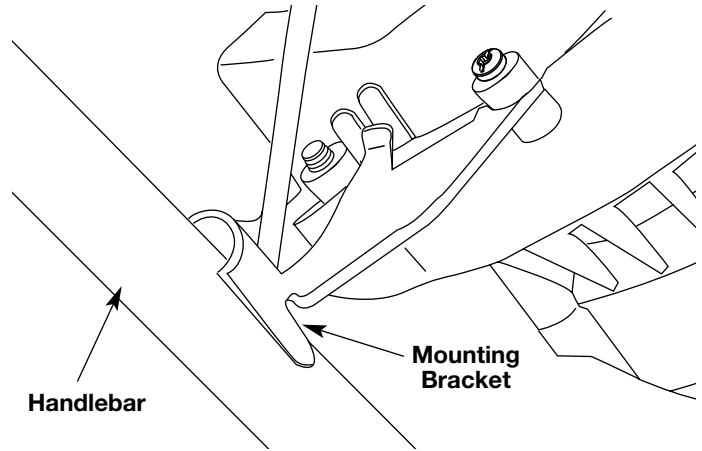


Fig. 5

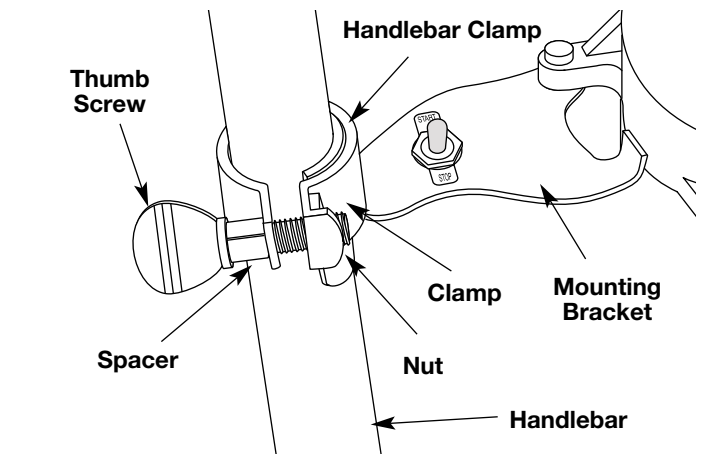


Fig. 6

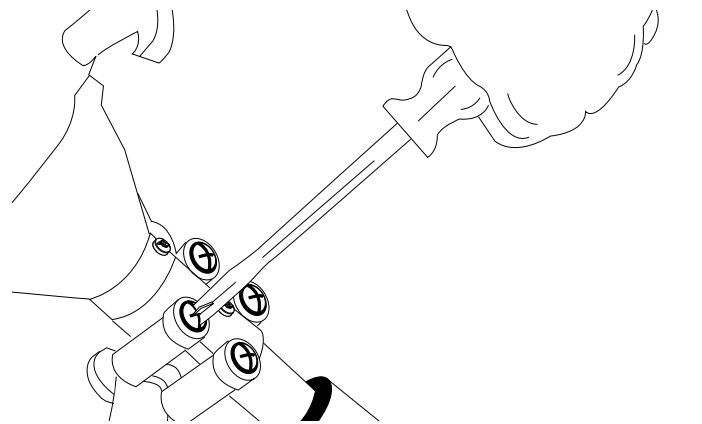


Fig. 7

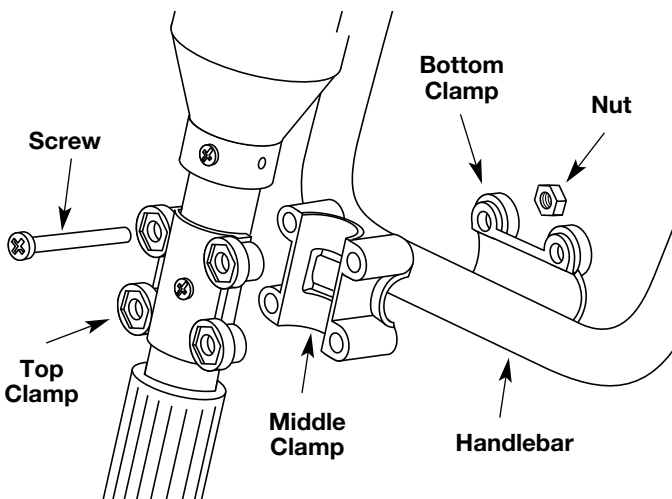


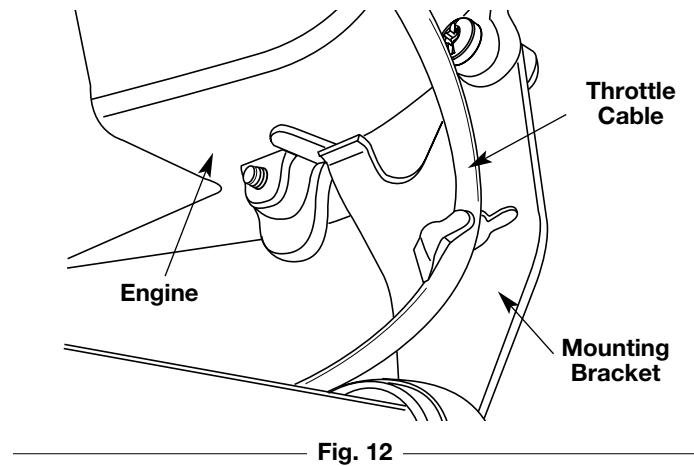
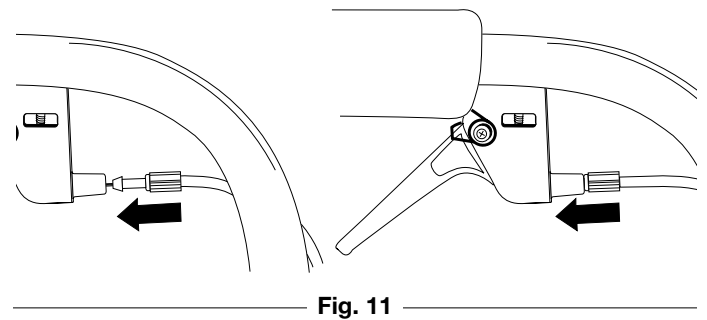
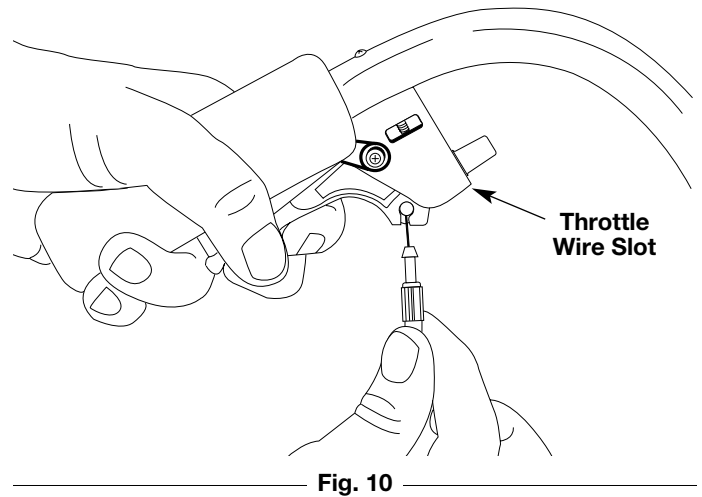
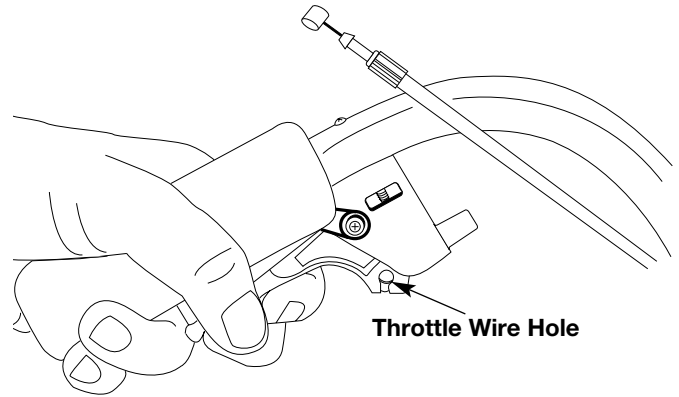
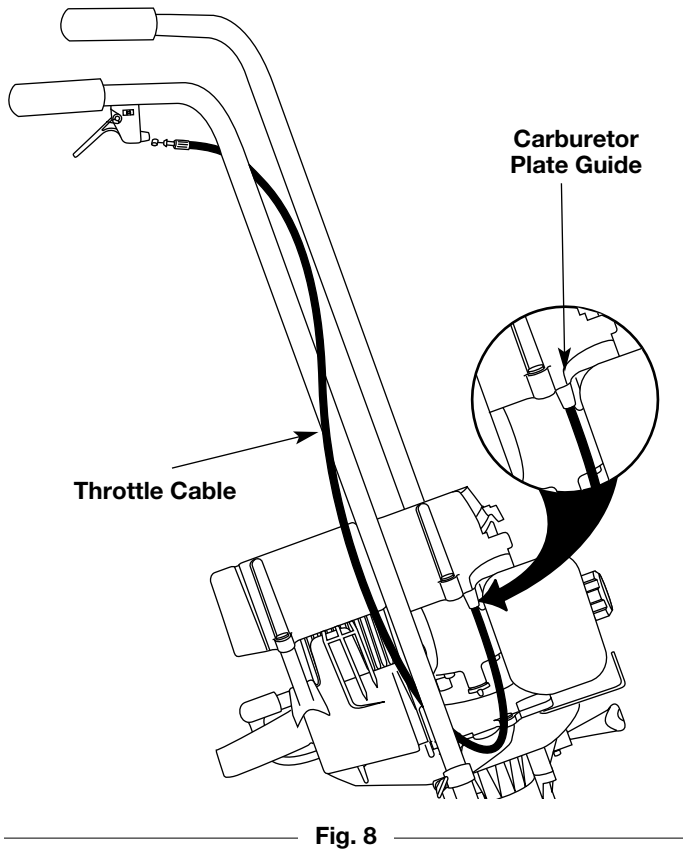
Fig. 4

ASSEMBLY INSTRUCTIONS

THROTTLE CABLE ASSEMBLY

1. Wrap the throttle wire once around the handlebar (Fig. 8).
2. Depress the throttle trigger and locate hole for the throttle wire (Fig. 9).
3. With the throttle trigger depressed, place the barrel end of the throttle wire inside the hole of the trigger (Fig. 10).
4. Release the throttle trigger and guide the cable up into the slot of the trigger housing.
5. Push the throttle cable housing into the trigger housing until it snaps into place (Fig. 11).
6. Route the throttle cable through the clip on the right handlebar mounting bracket (Fig. 12).

NOTE: Ensure the throttle cable is fitting into the guide at the carburetor plate on the engine. If it does not, the throttle will not work properly (Fig. 8).



OIL AND FUEL INFORMATION

OIL AND FUEL MIXING INSTRUCTIONS

Old and/or improperly mixed fuel are the main reasons for the unit not running properly. Be sure to use fresh, clean unleaded fuel. Follow the instructions carefully for the proper fuel/oil mixture.

Definition of Blended Fuels

Today's fuels are often a blend of gasoline and oxygenates such as ethanol, methanol or MTBE (ether). Alcohol-blended fuel absorbs water. As little as 1% water in the fuel can make fuel and oil separate. It forms acids when stored. When using alcohol-blended fuel, use fresh fuel (less than 60 days old).

Using Blended Fuels

If you choose to use a blended fuel, or its use is unavoidable, follow recommended precautions.

- Always use fresh fuel mix per your operator's manual.
- Use the fuel additive STA-BIL® or an equivalent.
- Always agitate the fuel mix before fueling the unit.
- Drain the tank and run the engine dry before storing the unit.

Using Fuel Additives



The use of fuel additive, such as STA-BIL® Gas Stabilizer or an equivalent, will inhibit corrosion and minimize the formation of gum deposits. Using a fuel additive can keep fuel from forming harmful deposits in the carburetor for up to six (6) months. Add 0.8 oz. (23 ml.) of fuel additive per gallon of fuel according to the instructions on the container. NEVER add fuel additives directly to the unit's fuel tank.



CAUTION: For proper engine operation and maximum reliability, pay strict attention to the oil and fuel mixing instructions on the 2-cycle oil container. Using improperly mixed fuel can severely damage the engine.

Thoroughly mix the proper ratio of 2-cycle engine oil with unleaded gasoline in a separate fuel can. Use a 32:1 fuel/oil ratio. Do not mix them directly in the engine fuel tank. See the table below for specific gas and oil mixing ratios.

NOTE: One gallon (3.8 liters) of unleaded gasoline mixed with one 4 oz. (120 ml.) bottle of RYOBI 2 CYCLE OIL makes a 32:1 fuel/oil ratio.

	+	
UNLEADED GAS		RYOBI 2 CYCLE OIL
1 US. GALLON + 4.0 FL. OZ. (3.8 LITERS) (120 ml)		
1 LITER + 30 ml		
MIXING RATIO - 32:1		



WARNING: Gasoline is extremely flammable. Ignited Vapors may explode. Always stop the engine and allow it to cool before filling the fuel tank. Do not smoke while filling the tank. Keep sparks and open flames at a distance from the area.



WARNING: Remove fuel cap slowly to avoid injury from fuel spray. Never operate the unit without the fuel cap securely in place.



WARNING: Add fuel in a clean, well ventilated area outdoors. Wipe up any spilled fuel immediately. Avoid creating a source of ignition for spilt fuel. Do not start the engine until fuel vapors dissipate.

NOTE: Dispose of the old fuel/oil mix in accordance to Federal, State, and Local regulations.

FILLING THE FUEL TANK

Fill or add fuel to the tank only when the cultivator is in a horizontal position (Fig. 13).

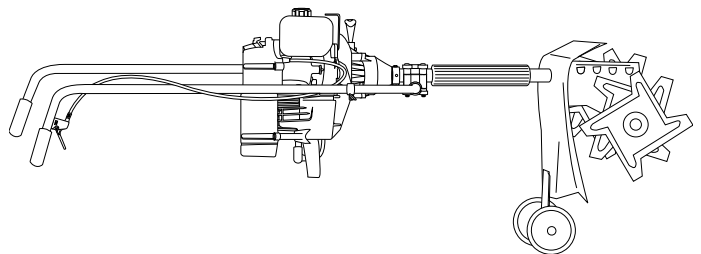


Fig. 13

STARTING/STOPPING INSTRUCTIONS

STARTING INSTRUCTIONS



WARNING: Avoid accidental starting. Be in the starting position when pulling the starter rope (Fig. 16). The operator and unit must be in a stable position while starting to avoid serious personal injury.



WARNING: Operate this unit only in a well ventilated area outdoors. Carbon monoxide exhaust fumes can be lethal in a confined area.

1. Mix gas with oil. Fill fuel tank with fuel/oil mixture. See Oil and Fuel Mixing Instructions Pg. 11.
2. Put the On/Off Stop Control in the START (I) position (Fig. 14).
3. Fully press and release primer bulb slowly 5 to 7 times. Fuel should be visible in the bulb (Fig. 15). If fuel is not visible, press three (3) more times, or until it is.
4. Place the choke lever in the FULL choke position (A |←|) (Fig. 15).
5. With the unit on the ground, squeeze the throttle control and pull starter rope briskly (Fig. 16). Continue pulling until the engine sounds as though it wants to run (normally 2 to 5 pulls).

NOTE: Squeeze the throttle control until the engine has started and warmed up.

6. Place the choke lever in the PARTIAL choke position (B |↘|) (Fig. 15).

NOTE: The unit will not run in the FULL choke position (A |←|).

7. Pull starter rope briskly 1 to 3 times to start the engine (Fig. 16).
8. If the engine does not start, repeat steps 4 through 7.

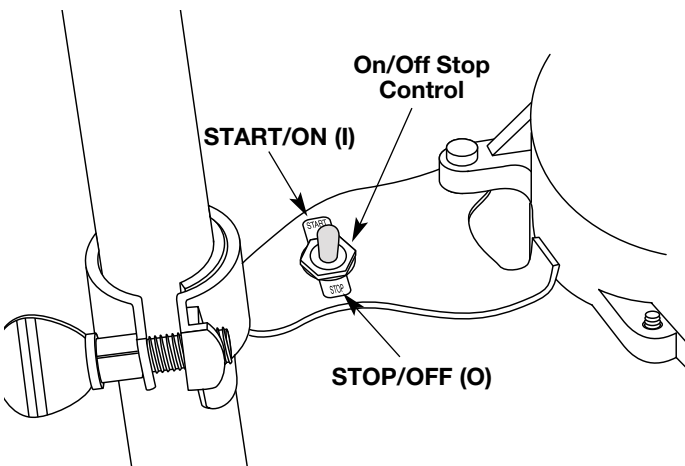


Fig. 14

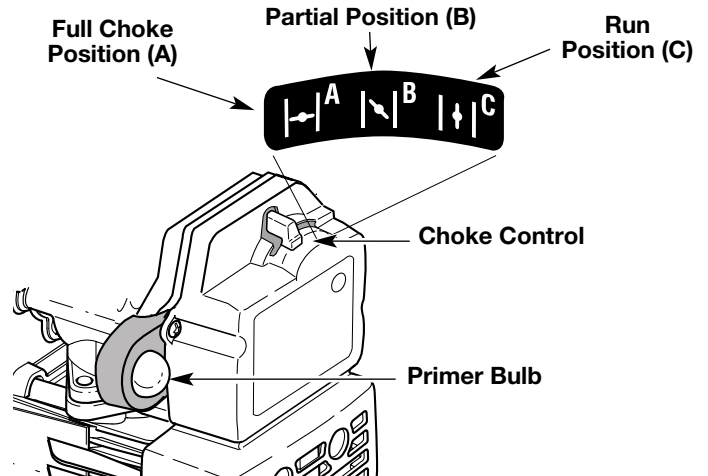


Fig. 15

NOTE: If the engine floods while trying to start, place the choke lever in the RUN position (C |↑|) (Fig. 15). Squeeze the throttle control. Pull the starter rope briskly. The engine should start within three (3) to eight (8) pulls.

9. Squeeze the throttle control to warm up engine for 5 to 10 seconds. Place the choke lever in the RUN position (C |↑|) (Fig. 15).

NOTE: Choking is unnecessary when starting a warm engine. Put the On/Off Stop Control in the START (I) position (Fig. 14), and start in PARTIAL Choke position (B |↘|) (Fig. 15).

STOPPING INSTRUCTIONS

1. Release your hand from the throttle control (Fig. 16). Allow the engine to cool down by idling.
2. Put the On/Off Stop Control in the STOP (O) position (Fig. 14).

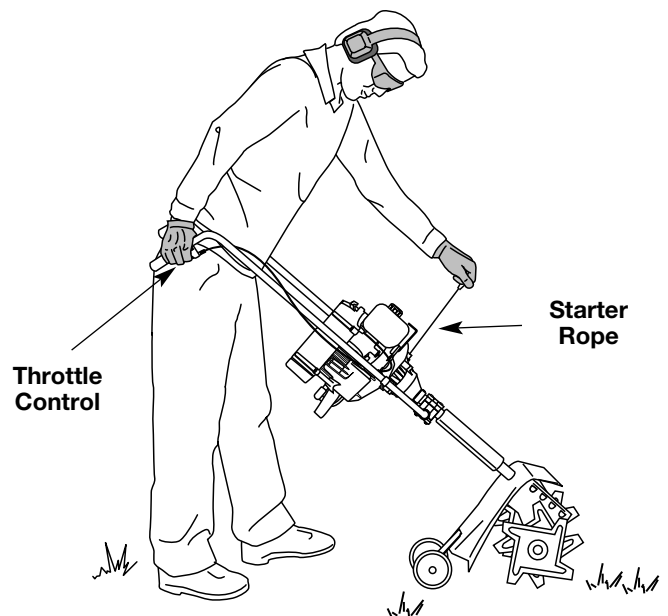


Fig. 16

OPERATING INSTRUCTIONS

OPERATING TIPS



WARNING: Dress properly to reduce the risk of injury when operating this unit. Do not wear loose clothing or jewelry. Wear eye and ear/hearing protection. Wear heavy, long pants, boots and gloves. Do not wear short pants, sandals or go barefoot.

1. Move the cultivator to the work area prior to starting the engine. The cultivator may be transported by pushing it on wheels or carrying it by the shaft tube grip.



WARNING: To prevent serious personal injury, never pick-up or carry the unit while the engine is running.

2. Start the unit per Starting Instructions.
3. With the engine running and the tines off the ground, depress the throttle control to increase the engine speed.
4. Holding both of the handlebar grips firmly, slowly lower the cultivator until the tines make contact with the ground (Fig. 17).
5. As cultivating action begins, pull back on the cultivator so that the tines can penetrate the ground.
6. Once the ground has been broken, continue at a moderate pace until you are familiar with the controls and the handling of the cultivator.
7. Pull the cultivator backwards to improve the depth of cultivation and reduce your effort.
8. If the tines are digging too deep or not deep enough, adjust the tines per Adjusting Tine Depth.



Fig. 17

ADJUSTING TINE DEPTH

Tine adjustment will vary depending on the type of soil being cultivated and how it will be used. Generally, adjusting the tines to break the soil 4 to 6 inches is recommended for most gardens. Adjust the tines as follows:

1. Stop the engine and disconnect the plug wire.
2. Loosen (do not remove) the two wing nuts on the tine guard (Fig. 18).
3. Slide the wheel bracket assembly down for shallower and up for deeper tine penetration.
4. Once the tines are in the desired position, tighten the wing nuts, making sure that the carriage bolts are seated properly through the bracket.
5. If the tine depth is not correct, repeat steps 2 to 4.

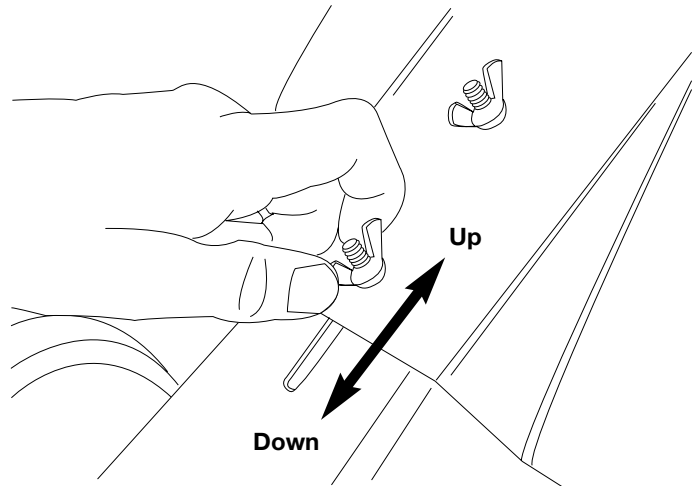


Fig. 18

Transporting the Unit



WARNING: To prevent serious personal injury, always stop the engine when operation is delayed or when transporting the unit from one location to another.

1. Stop the engine.
2. Slide the wheel bracket assembly all the way down.
3. Tilt the unit back until the tines clear the ground.
4. Push or pull the unit to the next location to be cultivated.

MAINTENANCE AND REPAIR INSTRUCTIONS

NOTE: Some maintenance procedures may require special tools or skills. If you are unsure about these procedures take your unit to an authorized service dealer.



WARNING: To prevent serious injury, never do maintenance or repairs with unit running. Always do maintenance and repairs on a cool unit. Disconnect spark plug wire to ensure the unit will not start.

MAINTENANCE SCHEDULE

These required maintenance procedures should be performed at the frequency stated in the table. They should also be included as part of any seasonal tune-up.

FREQUENCY	MAINTENANCE REQUIRED	REFER TO:
Before Starting Engine	Fill fuel tank with correct oil and fuel mixture.	Page 11
Every 10 Hours	Clean and re-oil air filter.	Page 15
Every 50 Hours	Check spark plug condition and gap.	Page 16

TINE REMOVAL AND REPLACEMENT

All 4 tines should be replaced at the same time because they will wear evenly through normal use. Work on one side at a time.



WARNING: To prevent serious personal injury, always wear heavy gloves when handling the tines.

1. Put the On/Off Stop Control in the STOP (O) position and disconnect the spark plug wire.
2. Remove the clevis pin clips and clevis pins (Fig. 19).
3. Remove the tines and felt cushions from the shaft.
4. Clean and oil the shaft.
5. Replace the tines and felt cushions by reversing steps 2 and 3 (Fig. 20).

NOTE: When installed correctly, the hubs on the tines will face each other and the letter "R" stamped on the tines will appear on the right side of the cultivator and the letter "L" will appear on the left side from the normal operating position. It is important that the tines are installed correctly.

6. Repeat this procedure on the opposite side.

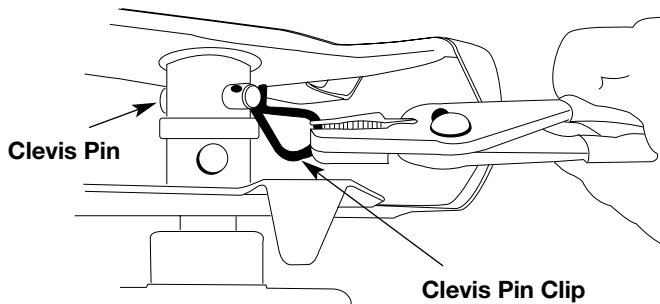


Fig. 19

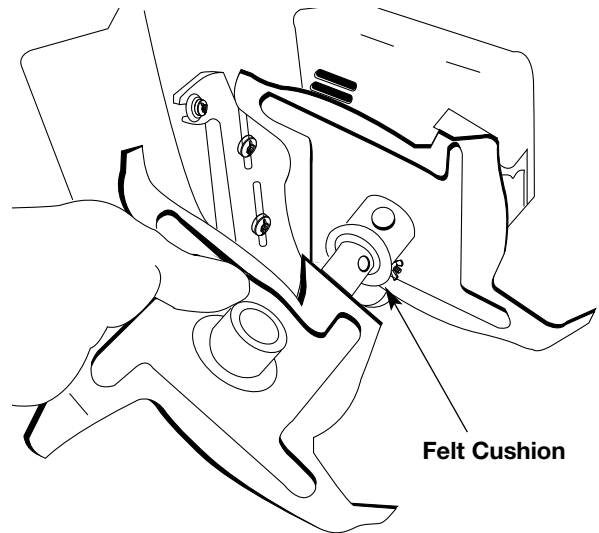


Fig. 20

AIR FILTER MAINTENANCE

Removing the Air Filter/Muffler Cover



WARNING: To avoid serious personal injury, always turn the unit off and allow it to cool before you clean or perform any maintenance on it.

1. Place the choke control in the **PARTIAL** choke position (B).

NOTE: The choke control must be in the **PARTIAL** choke position (B) (Fig. 21) to remove the air filter/muffler cover.

2. Remove the four (4) screws securing the air filter/muffler cover (Fig. 21). Use a flat blade or # T20 Torx bit screwdriver.
3. Pull the cover from the engine. Do not force.

MAINTENANCE AND REPAIR INSTRUCTIONS

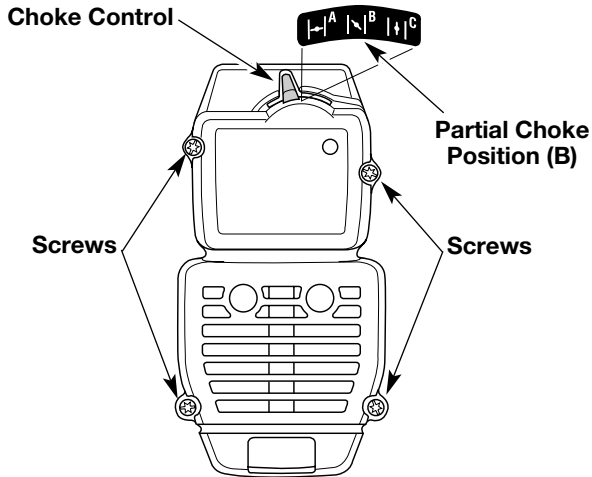


Fig. 21

Cleaning the Air Filter



WARNING: To avoid serious personal injury, always turn the unit off and allow it to cool before you clean or perform any maintenance on it.

Clean and re-oil the air filter every 10 hours of operation. It is an important item to maintain. Not maintaining the air filter will **VOID** the warranty.

1. Remove the air filter/muffler cover. See **Removing the Air filter/Muffler Cover**.
2. Remove the air filter from behind the air filter/muffler cover. (Fig. 22).

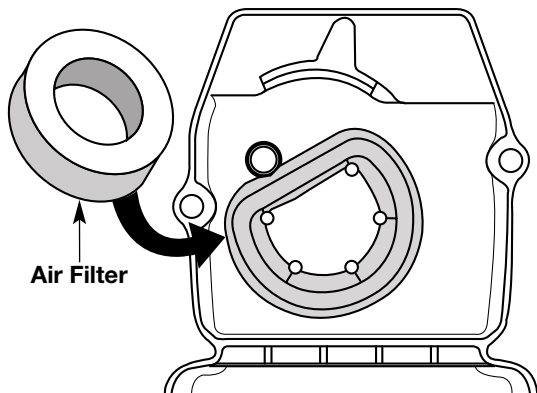


Fig. 22

3. Wash the filter in detergent and water (Fig. 23). Rinse the filter thoroughly. Squeeze out excess water. Allow it to dry completely.
4. Apply enough clean SAE 30 oil to lightly coat the filter (Fig. 24).
5. Squeeze the filter to spread and remove excess oil (Fig. 25).
6. Replace the air filter in the air filter/muffler cover (Fig. 22).

NOTE: Operating the unit without the air filter and air filter/muffler cover assembly, will **VOID** the warranty.

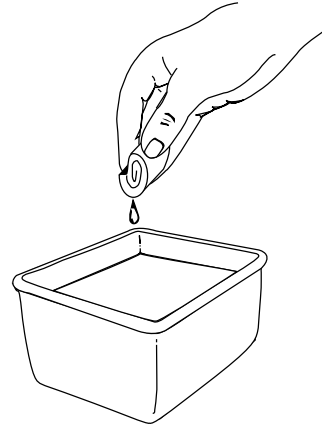


Fig. 23

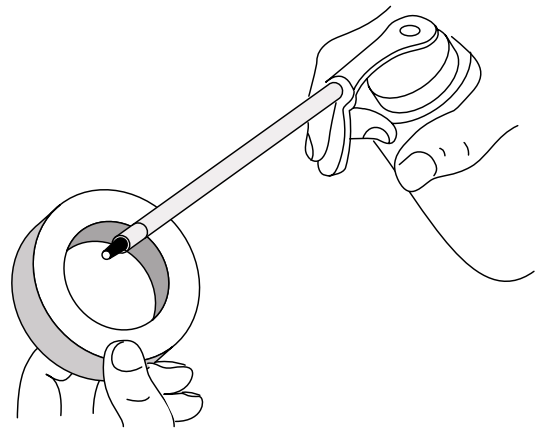


Fig. 24

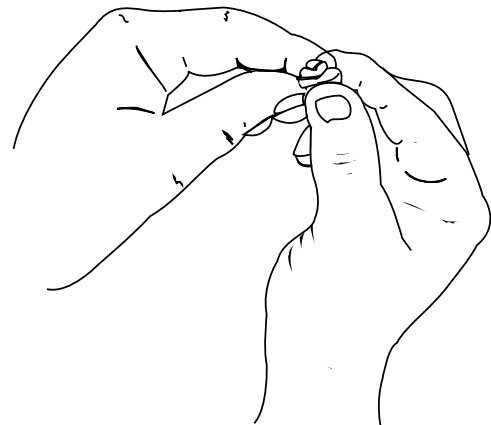


Fig. 25

Reinstalling the Air filter/Muffler Cover

1. Place the air filter/muffler cover over the back of the carburetor and muffler.

NOTE: The choke control must be in the **PARTIAL** choke position (B) (Fig. 21) to install the air filter/muffler cover.

2. Insert the four (4) screws into the holes in the air filter/muffler cover (Fig. 21) and tighten. Use a flat blade or # T20 Torx bit screwdriver. Do not over tighten. Do not force.

MAINTENANCE AND REPAIR INSTRUCTIONS

CARBURETOR SETTING

The idle speed adjuster of the engine is adjustable through the Air filter/muffler cover (Fig 26).

NOTE: Careless adjustments can seriously damage your unit. An authorized service dealer should make carburetor adjustments.

Check Fuel Mixture

Old and/or improperly mixed fuel is usually the reason for the unit not running properly. Drain and refill the tank with fresh, properly mixed fuel prior to making any adjustments. Refer to **Oil and Fuel Information**, Pg. 11.

Clean Air Filter

The condition of the air filter is important to the operation of the unit. A dirty air filter will restrict air flow and change the air/fuel mixture. This is often mistaken for an out of adjustment carburetor. Check the condition of the air filter before adjusting the idle speed adjuster. Refer to **Air Filter Maintenance** Pg. 14.

Adjust Idle Speed Adjuster



WARNING: This unit will need to be running during idle speed adjustment. Wear protective clothing and observe all safety instructions to prevent serious personal injury.

If after checking the fuel mixture and cleaning the air filter the engine still will not idle, adjust the idle speed screw as follows.

1. Start the engine and let it run at a high idle for a minute to warm up. See **Starting/Stopping Instructions**, Pg. 12.

NOTE: Ensure the tines are not in contact with the ground when adjusting the idle.

2. Release the throttle control and let the engine idle. If the engine stops, insert a small phillips or flat blade screwdriver into the hole in the air filter/muffler cover (Fig. 26). Turn the idle speed screw in, **clockwise**, 1/8 of a turn at a time (as needed) until the engine idles smoothly.

NOTE: The tines should not rotate when the engine idles.

3. If the tines rotate when the engine idles, turn the idle speed screw **counterclockwise** 1/8 of a turn at a time (as needed), to reduce idle speed.

Checking the fuel mixture, cleaning the air filter, and adjusting the idle speed screw should solve most engine problems.

If not and:

- The engine will not idle,
- The engine hesitates or stalls on acceleration,
- There is a loss of engine power,

have the carburetor adjusted by an authorized service dealer.

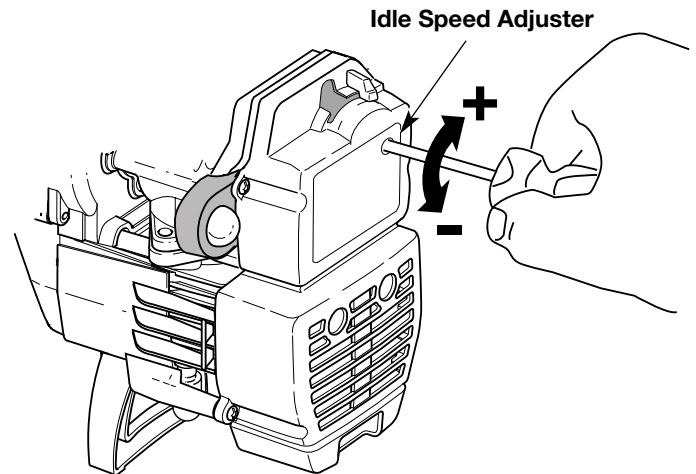


Fig. 26

REPLACING THE SPARK PLUG

Use a Champion RDJ7Y spark plug (or equivalent). The correct air gap is 0.020 in. (0.5 mm.). Remove the plug after every 50 hours of operation to check its condition.

1. Stop the engine and allow it to cool. Grasp the plug wire firmly and pull the cap from the spark plug.
2. Clean dirt from around the spark plug. Remove the spark plug from the cylinder head by turning a 5/8 in. socket counterclockwise.

NOTE: Replace cracked, fouled or dirty spark plug.

3. Set the air gap at 0.020 in. (0.5 mm.) using a feeler gauge (Fig. 27).

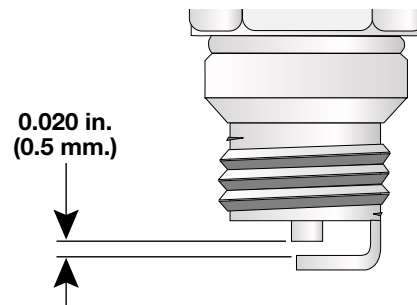


Fig. 27



CAUTION: Do not sand blast, scrape, or clean electrodes. Grit in the engine could damage the cylinder.

4. Install a correctly gaped spark plug in the cylinder head. Tighten by turning the 5/8 in. socket clockwise until snug.

If using a torque wrench torque to:

110-120 in. •lb.. (12.3-13.5 N•m).

Do not over tighten.

CLEANING AND STORAGE

CLEANING THE UNIT



WARNING: To avoid serious personal injury, always turn the unit off and allow it to cool before you clean or perform any maintenance on it.

- Use a small brush to clean off the outside of the unit and to keep the air vents free of obstructions.
- Do not use strong detergents or petroleum based cleaners, such as kerosene. Some household cleaners contain aromatic oils such as pine and lemon that can damage the plastic housings or handles. Wipe off any moisture with a soft cloth.

STORAGE

- Never store the unit with fuel in the tank where fumes may reach an open flame or spark.
- Allow the engine to cool before storing.
- Store the unit in a locked up area to prevent unauthorized use or damage.
- Store the unit in a dry, well ventilated area.
- Store the unit out of the reach of children.

ACCESSORIES/REPLACEMENT PARTS

2-Cycle Oil	147543
Spark Plug	610311
Fuel Cap	180000
Tine (Left Outer or Right Inner)	147471
Tine (Right Outer or Left Inner)	147472
Clevis Pin with Clip	147473

LONG TERM STORAGE

If the unit will be stored for an extended time,

1. Drain all fuel from the fuel tank into a container. Do not use fuel that has been stored for more than 60 days. Dispose of the old fuel in accordance to local regulations.
2. Start the engine and allow it to run until it stalls. This ensures that all fuel has been drained from the carburetor.
3. Allow the engine to cool. Remove the spark plug and put 1 oz. (30 ml.) of high quality motor oil into the cylinder. Pull the starter rope slowly to distribute the oil. Reinstall the spark plug.

NOTE: Remove the spark plug and drain all of the oil from the cylinder before attempting to start the unit after storage.

4. Thoroughly clean the unit and inspect for any loose or damaged parts. Repair or replace damaged parts and tighten loose screws, nuts or bolts. The unit is ready for storage.

TRANSPORTING

- Allow the engine to cool before transporting.
- Secure the unit while transporting.
- Drain the fuel tank before transporting.
- Tighten fuel cap before transporting.

TROUBLESHOOTING

ENGINE WILL NOT START

CAUSE

On/Off Stop Control in the STOP position
Empty fuel tank
Primer bulb wasn't pressed enough
Engine flooded

Old or improperly mixed fuel
Fouled spark plug

ACTION

Turn the On/Off Stop Control to START
Fill fuel tank
Press primer bulb fully and slowly 5-7 times
Use starting procedure with choke control in the RUN position, Pg. 12
Drain fuel tank / Add fresh fuel mixture
Replace or clean the spark plug

ENGINE WILL NOT IDLE

CAUSE

Air Filter is Plugged
Old or improperly mixed fuel
Improper carburetor adjustment

ACTION

Replace or clean the air filter
Drain fuel tank / Add fresh fuel mixture
Adjust per instruction Pg. 16

ENGINE WILL NOT ACCELERATE

CAUSE

Old or improperly mixed fuel
Improper carburetor adjustment

ACTION

Drain fuel tank / Add fresh fuel mixture
Take to an authorized service dealer for carburetor adjustment

ENGINE LACKS POWER OR STALLS WHEN UNDER LOAD

CAUSE

Old or improperly mixed fuel
Improper carburetor adjustment

Cultivator tines bound with dirt or grass

ACTION

Drain fuel tank / Add fresh fuel mixture
Take to an authorized service dealer for carburetor adjustment
Stop the unit, switch the On/Off Stop Control to STOP, clean and remove any debris binding the tines

SPECIFICATIONS

ENGINE

Engine Type	Air-Cooled, 2-Cycle
Displacement	31 cc
Idle Speed RPM	2,800-3,600 rpm
Operating RPM	6,700-9,000 rpm
Clutch Type	Centrifugal
Ignition Type	Electronic
On/Off Stop Control	Toggle Switch
Spark Plug Gap	0.020 inch (0.5 mm)
Lubrication	Fuel/Oil Mixture
Fuel/Oil Ratio	32:1
Carburetor	Diaphragm, All-Position
Starter	Auto Rewind
Muffler	Baffled with Guard
Throttle	Spring Return
Fuel Tank Capacity	14 ounces (415 ml)
Fuel Tank	HD Polyethylene

DRIVE SHAFT AND CULTIVATOR

Drive Shaft Tube	Steel Tube
Throttle Control	Finger-Tip Trigger
Cultivating Path Width (Maximum)	9 inches (22.86 cm)
Cultivating Depth (Maximum)	6 inches (15.24 cm)
Weight (no fuel)	22.5 lb. (11.2 kg)

NOTES

CALIFORNIA EMISSION CONTROL WARRANTY STATEMENT

YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board and Ryobi Outdoor Products (ROP), are pleased to explain the emission control system warranty on your 1995 and later small off-road engine. In California, new small off-road engines must be designed, built and equipped to meet the State's stringent anti-smog standards. ROP must warrant the emission control system on your small off-road engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your small off-road engine.

Your emission control system may include parts such as the carburetor or fuel injection system, the ignition system, and catalytic converter. Also included may be hoses, belts, connectors and other emission-related assemblies.

Where a warrantable condition exists, ROP will repair your small off-road engine at no cost to you including diagnosis, parts and labor.

The 1995 and later small off-road engines are warranted for two years. If any emission-related part on your engine is defective, the part will be repaired or replaced by ROP.

OWNER'S WARRANTY RESPONSIBILITIES:

- As the small off-road engine owner, you are responsible for the performance of the required maintenance listed in your operator's manual. ROP recommends that you retain all receipts covering maintenance on your small off-road engine, but ROP cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.
- As the small off-road engine owner, you should however be aware that ROP may deny you warranty coverage if your small off-road engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.
- You are responsible for presenting your small off-road engine to a Ryobi Authorized Service Center as soon as a problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.

If you have any questions regarding your warranty rights and responsibilities, you should call 1-800-345-8746.

MANUFACTURER'S WARRANTY COVERAGE:

- The warranty period begins on the date the engine or equipment is delivered to the retail purchaser.
- The manufacturer warrants to the initial owner and each subsequent purchaser, that the engine is free from defects in material and workmanship which cause the failure of a warranted part for a period of two years.
- Repair or replacement of warranted part will be performed at no charge to the owner at an Authorized Ryobi Service Center. For the nearest location, please contact Ryobi at: 1-800-345-8746.
- Any warranted part which is not scheduled for replacement, as required maintenance which is scheduled only for regular inspection to the effect of "Repair or replace as necessary" is warranted for the warranty period. Any warranted part which is scheduled for replacement as required maintenance will be warranted for the period of time up to the first scheduled replacement point for that part.
- The owner will not be charged for diagnostic labor which leads to the determination that a warranted part is defective, if the diagnostic work is performed at an Authorized Ryobi Service Center.
- The manufacturer is liable for damages to other engine components caused by the failure of a warranted part still under warranty.
- Failures caused by abuse, neglect or improper maintenance are not covered under warranty.
- The use of add-on or modified parts can be grounds for disallowing a warranty claim. The manufacturer is not liable to cover failures or warranted parts caused by the use of add-on or modified parts.
- In order to file a claim, go to your nearest Authorized Ryobi Service Center. Warranty services or repairs will be provided at all Authorized Ryobi Service Centers.
- Any manufacturer approved replacement part may be used in the performance of any warranty maintenance or repair of emission related parts and will be provided without charge to the owner. Any replacement part that is equivalent in performance or durability may be used in non-warranty maintenance or repair and will not reduce the warranty obligations of the manufacturer.
- The following components are included in the emission related warranty of the engine, air filter, carburetor, primer, fuel lines, fuel pick up/fuel filter, ignition module, spark plug and muffler.

LIMITED TWO-YEAR WARRANTY

RYOBI OUTDOOR PRODUCTS warrants each new RYOBI Product for two (2) years according to the following terms.

This warranty extends to the original retail purchaser only and commences on the date of original retail purchase.

Any part of the RYOBI Product manufactured or supplied by RYOBI and found in the reasonable judgement of RYOBI to be defective in material or workmanship will be repaired or replaced by an authorized RYOBI service dealer without charge for parts and labor.

The RYOBI Product including any defective part must be returned to an authorized service dealer within the warranty period. The expense of delivering the RYOBI Product to the dealer for warranty work and the expense of returning it back to the owner after repair or replacement will be paid for by the owner. RYOBI's responsibility in respect to claims is limited to making the required repairs or replacements and no claim of breach of warranty shall be cause for cancellation or rescission of the contract of sale of any RYOBI Product. Proof of purchase will be required by the dealer to substantiate any warranty claim. All warranty work must be performed by an authorized RYOBI service dealer.

This warranty is limited to ninety (90) days from the date of original retail purchase for any RYOBI Product that is used for rental or commercial purposes, or any other income-producing purpose.

This warranty does not cover any RYOBI Product that has been subject to misuse, neglect, negligence, or accident, or that has been operated in any way contrary to the operating instructions as specified in the RYOBI Operator's Manual. This warranty does not apply to any damage to the RYOBI Product that is the result of improper maintenance or to any RYOBI Product that has been altered or modified so as to adversely affect the product's operation, performance or durability or that has been altered or modified so as to change its intended use. The warranty does not extend to repairs made necessary by normal wear or by the use of parts or accessories which are either incompatible with the RYOBI Product or adversely affect its operation, performance or durability.

In addition, this warranty does not cover:

- A. Tune-ups - Spark Plugs, Carburetor Adjustments, Filters
- B. Wear items - Starter Pulley, Starter Ropes, Tines

RYOBI reserves the right to change or improve the design of any RYOBI Product without assuming any obligation to modify any product previously manufactured.

ALL IMPLIED WARRANTIES ARE LIMITED IN DURATION TO THE TWO (2) YEAR WARRANTY PERIOD OR NINETY (90) DAYS FOR PRODUCTS USED FOR ANY COMMERCIAL PURPOSE. ACCORDINGLY, ANY SUCH IMPLIED WARRANTIES INCLUDING MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE, ARE DISCLAIMED IN THEIR ENTIRETY AFTER THE EXPIRATION OF THE APPROPRIATE TWO-YEAR OR NINETY DAY WARRANTY PERIOD. RYOBI'S OBLIGATION UNDER THIS WARRANTY, IS STRICTLY AND EXCLUSIVELY LIMITED TO THE REPAIR OR REPLACEMENT OF DEFECTIVE PARTS, AND ROP DOES NOT ASSUME OR AUTHORIZE ANYONE TO ASSUME FOR THEM ANY OTHER OBLIGATION. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

RYOBI ASSUMES NO RESPONSIBILITY FOR INCIDENTAL, CONSEQUENTIAL OR OTHER DAMAGES INCLUDING, BUT NOT LIMITED TO EXPENSE OF RETURNING THE RYOBI PRODUCT TO AN AUTHORIZED SERVICE DEALER AND EXPENSE OF DELIVERING IT BACK TO THE OWNER, MECHANIC'S TRAVEL TIME, TELEPHONE OR TELEGRAM CHARGES, RENTAL OF A LIKE PRODUCT DURING THE TIME WARRANTY SERVICE IS BEING PERFORMED, TRAVEL, LOSS OR DAMAGE TO PERSONAL PROPERTY, LOSS OF REVENUE, LOSS OF USE OF THE PRODUCT, LOSS OF TIME, OR INCONVENIENCE. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

This warranty applies to all RYOBI Products manufactured by RYOBI and sold in the United States and Canada.

To locate your nearest service dealer dial 1-800-345-8746 in the United States or 1-800-265-6778 in Canada.

RYOBI®

RYOBI OUTDOOR PRODUCTS

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RYOBI CANADA INC.

275 Industrial Rd
Cambridge, Ontario N1R 6K2 CANADA

SAVE THESE INSTRUCTIONS FOR FUTURE REFERENCE.

FOR QUESTIONS CALL 1-800-345-8746 IN U.S.

OR 1-800-265-6778 IN CANADA