

RYOBI®

OWNER'S OPERATING MANUAL

PETROL CHAIN SAW

MODEL CS-4016/CS-4518/ES-4520

SPECIFICATIONS			
Model	CS-4016	CS-4518	ES-4520
Max cutting length	380mm	455mm	500mm
Engine power	2 stroke 40cc	2 stroke 45cc	2 stroke 45cc
Engine type	air cooling single cylinder		
Rated output power	1.6kW	1.8kW	1.8kW
Maximum engine speed	10000min ⁻¹		
Fuel mixing ratio	25:1		
Fuel tank capacity	580 ml		
Oil tank capacity	250 ml		
Nett weight	6.35kg	6.8kg	7kg

THANK YOU FOR BUYING A RYOBI GASOLINE CHAIN SAW

Your new petrol chain saw has been engineered and manufactured to Ryobi's high standard of dependability, ease of operation and operator safety. Properly cared for, it will give you years of rugged, trouble free performance. If you use your petrol chain saw properly and only for what it is intended, you will enjoy years of safe, reliable service.



CAUTION: Carefully read through this entire owner's manual, paying close attention to the general safety rules and rules for safe operation, before using.

KEEP THIS MANUAL FOR FUTURE REFERENCE

GENERAL SAFETY RULES

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



SAFETY ALERT SYMBOL. Indicates caution or warning. May be used in conjunction with other symbols or pictures.

Failure to obey a safety warning can 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.

Do not attempt to operate this tool until you have read thoroughly and completely understood the safety rules, etc. contained in this manual. Failure to comply can result in accidents involving fire, electric shock or serious personal injury. Save this Owners Operating Manual and review it frequently for continual safe operation and for instructing others who may use this tool.



The operation of any tool can result in foreign objects being thrown into your eyes, which can result in severe eye damage.

Before beginning power tool operation, always wear safety goggles or safety glasses with side shields and a full face shield when needed. We recommend Wide Vision Safety Mask for use over eye glasses or standard safety glasses with side shields.

Due to continued product refinement policy, product features and specifications can and will change without notice. Check current features and specifications with your retailer.

GENERAL REQUIREMENTS

1. The saw is specially designed for tree service, i.e. for off-ground working in trees, and when being used as such should only be used by trained operators.
2. One handed operation of the saw can be dangerous.
3. Be alert for the phenomena “skating” and “bouncing”, greater risk from kickback.
4. Be cautious not to lose balance of your body due to “drop” at the end of a cut.
5. If working off the ground the operator must be trained in safe climbing techniques and use all recommended safety equipment such as harness, loops, strops, ropes and karabiners for themselves and for the saw.
6. When hoisting a chain saw using a rope tied to a lifting hook for operation on a tree, ensure that the lifting hook is not strained by excessive force.

PHYSICAL CONDITION

1. Do not operate a chain saw when you are tired or under the influence of alcohol or drugs.
2. You should be in good physical and mental health in order to handle your chain saw safely. Errors in judgment or execution can be serious or fatal. If you have any physical condition which strenuous work could worsen, check with your physician before using a chain saw. Do not operate when ill or tired, or under the influence of any substance or medication which could affect your vision, dexterity or judgement.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

1. Always wear approved goggles to protect your eyes. Wood chips, dust, snapping branches and other debris can be tossed by the cutting chain into the operator’s facial area. Goggles may also offer limited protection in the event of the cutting chain hitting the operator in the eye area. If conditions warrant that a ventilated face shield should be worn, goggles must be worn underneath it.
2. We recommend wearing hearing protection at all times. If not followed, hearing loss can occur. You should reduce the risk of hearing damage by wearing either “headset” type protectors or ear plugs which are approved by an authorised organisation.
3. All persons who make part of their living using chain saws should be tested periodically for hearing deterioration.

GENERAL SAFETY RULES



CAUTION. Stuffing ears with cotton is not recommended

4. Always wear a cap or hat when working with a chain saw. A safety hard hat is highly recommended when felling or working under trees, or when objects can fall on you.
 5. Wear heavy duty, non-slip gloves for improved grip, and also for protection against cold and vibration.
 6. Safety tip shoes or boots with non-slip sole should be worn.
 7. Use eye protection and protective clothing, including gloves and foot protection suitable for tree climbing.
 8. Never wear loose clothing, unbuttoned jackets, flared sleeves and cuffs, scarfs, tie-strings, neckties, cords, chains, jewelry, etc. which could snag the saw chain or underbrush.
 9. Clothing should be sturdy, protective material. It should be snug-fitting to resist snagging, but roomy enough for freedom of movement.
 10. Trousers legs should not be flared or cuffed, and should be either tucked into the boot tops or trimmed short.
 11. Safety vests, leg chaps and logger's pants of heavy leather material are available.
 12. It is the operator's responsibility to wear such additional protection if conditions warrant it.
 13. Never operate a chain saw when you are alone. Arrange to have someone remain within calling distance in case you need help.
1. Use an appropriate fuel container type.
 2. Do not smoke or bring flame or sparks near fuel supplies.
 3. The fuel tank may be under pressure. Always loosen the fuel cap and wait for pressure to be equalized before removing the cap.
 4. When fuel tank cap or oil tank cap is difficult to remove by hand, place the attached socket wrench into the groove of cap and turn it anticlockwise.
 5. Fill the fuel tank outdoors over bare ground and install the fuel cap securely. Do not pour fuel indoors.
 6. Wipe any spilled fuel off the unit.
 7. Never refuel while the engine is still hot, or fuel a running engine.
 8. Do not store the unit with fuel in its tank, because a fuel leak could start a fire.
 9. Bring an extinguisher or shovel in case of fire. Despite the precautions which can be taken, operating a chain saw, or just working in the forest, presents dangers.
 10. After refueling, tighten fuel cap firmly and check for leakage. In case of fuel leakage, repair before starting operation since there is a danger of fire.



NOTE. Do not press socket wrench forcefully, since tank cap is plastic. Pressing forcefully can damage tank cap. If tank cap is damaged, do not start engine.

FUEL



WARNING. Petrol and fuel are extremely flammable. If spilled or ignited by ignition source, it can cause fire and serious injury or property damage. Extra caution is required, when handling petrol or fuel.

RULES FOR SAFE OPERATION

STARTING ENGINE

1. Move the chain saw at least 3m from the fuelling point before starting the engine.
2. Do not allow other persons to be near the chain saw when you are starting or cutting with the chain saw. Keep bystanders and animals out of the work area. Do not let anyone hold wood for you to cut.
3. Do not start cutting until you have a clear work area, secure footing, and a planned retreat path from the falling tree.
4. Before you start the engine, make sure that the saw chain is not in contact with any object.
5. Keep the handles dry, clean, and free of oil or fuel mixture.

RULES FOR SAFE OPERATION

6. Operate the chain saw only in well ventilated areas. Exhaust gas, oil mist (from chain saw lubrication) or saw dust is harmful to health.
7. Starting must always be done with the chain saw break deactivated - in off position.
8. When starting the chain saw place the unit on a flat ground and hold the front handle with left hand and firmly hold the rear end or rear handle with right knee and pull starter handle with right hand.



WARNING. Do not drop start the chain saw, drop start chain saw in an insecure position can result in injury. Start the chain saw in a correct manner.

TRANSPORTATION

1. When transporting your chain saw, use the appropriate guide bar cover.
2. Carry the chain saw with the engine stopped, the guide bar and saw chain to the rear, and the silencer away from your body.

KICKBACK SAFETY PRECAUTIONS



WARNING. Avoid kickback which can result in serious injury. Kickback is the backward, upward or sudden forward motion of the guide bar occurring when the saw chain near the upper tip of the guide bar contacts any object such as a log or branch, or when the wood closes in and pinches the saw chain in the cut. Contacting a foreign object in the wood can also result in loss of chain saw control.

1. Rotational kickback can occur when the moving chain contacts an object at the upper tip of the guide bar. This contact can cause the chain to dig into the object, which stops the chain for an instant. The result is a lightning fast, reverse reaction which kicks the guide bar up and back towards the operator.
2. Pinch-kickback can occur when the wood closes in and pinches the moving saw chain in the cut along the top of the guide bar and the saw chain is suddenly stopped. This sudden stopping of the chain results in a reversal of the chain force used to cut wood and causes the saw to move in the opposite direction of the chain rotation. The saw is driven straight back towards the operator.
3. Pull-in can occur when the moving chain contacts a foreign object in the wood in the cut

along the bottom of the guide bar and the saw chain is suddenly stopped. This sudden stopping pulls the saw forward and away from the operator and could easily cause the operator to lose control of the saw.

REDUCE THE CHANCE OF KICKBACK

1. Recognise that kickback can happen. With a basic understanding of kickback, you can reduce the element of surprise which contributes to accidents.
2. Never let the moving chain contact any object at the tip of the guide bar.
3. Keep working area free from obstructions such as other trees, branches, rocks, fences, stumps, etc. Eliminate or avoid any obstruction that your saw chain could hit while cutting.
4. When cutting a branch, do not let the guide bar contact another branch or other objects around it.
5. Keep saw chain sharp and properly tensioned. A loose or dull chain can increase the chance of kickback. Follow manufacturer's chain sharpening and maintenance instructions. Check tension at regular intervals, but never with engine running. Make sure chain brake nuts are securely tightened.
6. Begin and continue cutting at full speed. If the chain is moving at a slower speed, there is greater chance of kickback occurring.
7. Use extreme caution when reentering a cut.
8. Do not attempt cuts starting with the tip of the bar (plunge cuts).
9. Watch for shifting logs or other forces that could close a cut and pinch or fall into chain.

AVOID PINCH-KICKBACK

1. Be extremely aware of situations or obstructions that can cause material to pinch the top of or otherwise stop the chain.
2. Do not cut more than one log at a time.
3. Do not twist saw as bar is withdrawn from an undercut when bucking.

AVOID PULL-IN

1. Always begin cutting with the engine at full speed and the saw housing against wood.
2. Use wedges made of plastic or wood. Never use metal to hold the cut open.

OTHER SAFETY PRECAUTIONS

It is believed that a condition called Raynaud's Phenomenon, which affects the fingers of certain individuals, may be brought about by exposure to cold and vibration. Accordingly, your chain saw has

GENERAL SAFETY RULES

shock mounts designed to reduce the intensity of vibration received through the handles. Exposure to cold and vibration may cause tingling and burning followed by loss of colour and numbness in the fingers. We strongly recommend you taking the following precautions because the minimum exposure which might trigger the ailment is unknown.

1. Keep your body warm, especially the head and neck, feet and ankles, and hands and wrists.
2. Maintain good blood circulation by performing vigorous arm exercises during frequent work breaks and also by not smoking.
3. Limit the number of hours of chain saw operation. Try to fill a part of each work day with jobs other than chain sawing.
4. If you experience discomfort, redness and swelling of the fingers, followed by whitening and loss of feeling, consult your physician before further exposing yourself to cold and vibration.

REPETITIVE STRESS INJURIES

It is believed that over using the muscles and tendons of the fingers, hands, arms and shoulders may cause soreness, swelling, numbness, weakness and extreme pain to the areas just mentioned. To reduce the risk of repetitive stress injury, do the following.

1. Avoid using your wrist in a bent, extended or twisted position. Instead, try to maintain a straight wrist position. Also, when grasping, use your whole hand, not just the thumb and index finger.
2. Take periodic break to minimise repetition and rest your hands.
3. Reduce the speed and force in which you do the repetitive movement.
4. Do exercises to strengthen the hand and arm muscles.
5. See a doctor if you feel tingling, numbness or pain in the fingers, hands, wrists or arms.

MACHINE CONDITIONS

Do not operate a chain saw that is damaged. Improperly adjusted, or not completely and securely assembled. Do not operate the chain saw with a loose or defective silencer. Be sure that the saw chain stops moving when the throttle control trigger is released.

CUTTING

1. Do not operate a chain saw in a tree unless you have been specifically trained to do so.

2. Keep all parts of your body away from the saw chain when the engine is running.
3. Use extreme caution when cutting small-size bushes and saplings because slender material may catch the saw chain and be whipped toward you or pull you off balance.
4. When cutting a limb that is under tension, be alert for spring back so that you will not be struck by the limb or chain saw when the tension in the wood fibers is released.
5. Cutting while on a ladder is extremely dangerous because the ladder can slip and your control of the chain saw is limited. Working aloft should be left to professionals.
6. Stop the engine before setting the chain saw down.

SERVICES

All chain saw service, other than items listed in the operator's manual maintenance instruction, should be performed by competent service personnel. (For example, if improper tool is used to hold the flywheel in order to remove the clutch, structural damage to the flywheel could occur and subsequently could cause the flywheel to burst).

WOOD PRACTICES

1. Operating a chain saw safely requires a chain saw in proper working order, sound judgment, and knowledge of the methods which should be applied in each cutting situation.
2. Do not let any person use your saw unless they have read this operator's manual and fully understands its instructions.
3. Never let children operate the saw.
4. Use your saw only to cut wood or wood products. Do not cut solid metal, sheet metal, plastics or any non-wood materials.
5. Stay on the uphill side when bucking or lambing logs which might roll when cut.
6. Keep both feet on the ground. Do not work from off the ground positions.

CHAIN BRAKE

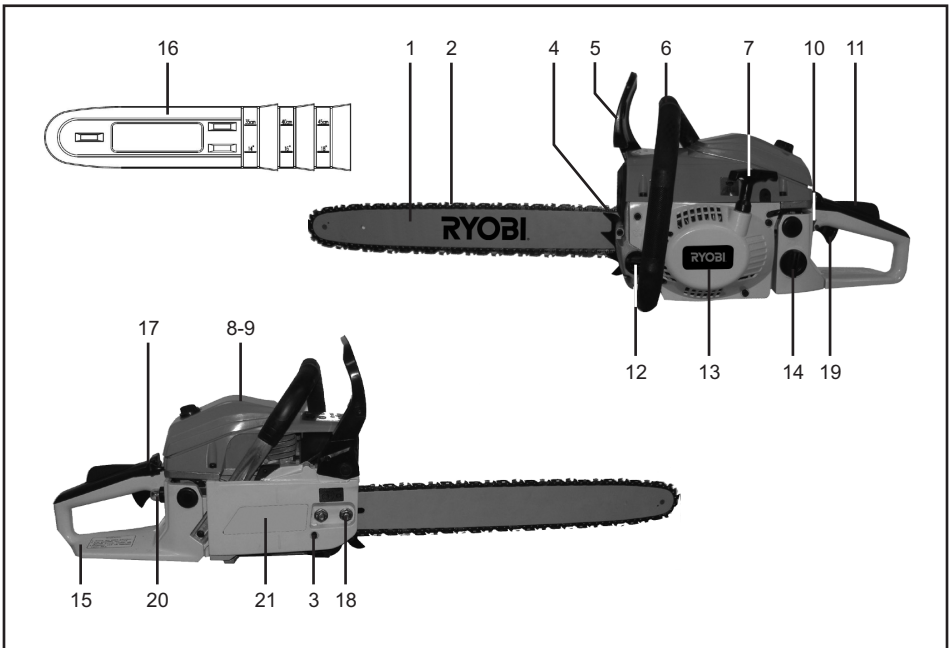
Always check that the chain brake works properly before use. The chain brake's function is to stop chain rotation after a kickback. It neither prevents nor reduces kickback. Do not depend on the chain brake for protection against kickback. Even with a chain brake, depend on your own good sense and proper cutting methods just as though there was chain brake. Even with normal use and proper maintenance, the response time of the brake may lengthen.

RULES FOR SAFE OPERATION

The following may interfere with the brake's ability to protect the operator:

1. Saw wrongly held too close to the operator's body. Kickback time may be too fast even for a perfectly maintained brake to work in time.
2. The operator's hand may not be in position to contact the hand guard.
3. Brake will not be tripped.
4. Lack of proper maintenance lengthens the brake's stopping time, making it less effective.
5. Dirt, grease, oil, pitch, etc. getting into the working parts of the mechanism may lengthen the stopping time.
6. Wear and fatigue of the activating brake spring, and wear of the brake/clutch drum and pivot point may lengthen the brake's stopping time.
7. A damaged hand guard and lever may render the brake inoperative.

DESCRIPTION

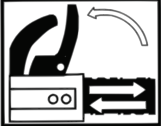


1. Chain bar
2. Saw chain
3. Chain tensioning screw
4. Bucking spikes
5. Chain brake lever / front hand guard
6. Front handle
7. Starter handle
8. Spark plug (under the air filter cover)
9. Air filter cover
10. Ignition switch
11. Safety lock
12. Oil tank cap
13. Fan housing
14. Fuel tank cap
15. Rear handle / bootstrap
16. Chain guard
17. Choke / (carburettor setting)
18. Bar fastening nuts
19. Throttle lever
20. Primer bulb
21. Chain brake / clutch cover

ASSEMBLY

MOUNTING GUIDE BAR AND CHAIN

The unit is delivered with guide bar and saw chain separated. Install guide bar and chain as follows:



WARNING. Check that the chain brake is released before proceeding. The clutch cover cannot be removed until the chain brake is released. Do this

by pulling the front hand guard towards the choke lever - CHAIN BRAKE RELEASE POSITION.



WARNING. Do not start the engine until the saw is fully assembled. Wear protective gloves at all times when handling the chain.

1. Unscrew the two bar fastening nuts situated next to the chain tensioning screw. (Fig.1)
2. Remove clutch cover by pressing the back end of the cover and pulling it off simultaneously. (Fig.2)
3. Attach the bucking spikes to the front of the saw body so the spikes point upward. (Fig.2)
4. Slip the bar under the edge of the clutch and then over the mounting studs. (Fig.3-A)
Note the position of the tension adjusters hole in the bar (Fig.3-B). This hole will need to be lined up with the tension adjustment pin when the clutch cover is refitted.
5. Lay the chain around the sprocket (Fig.4-A)
Check that the tangs of the chain links are sitting correctly in the slots in the sprocket and then lay the chain around the bar.

NOTE: The cutting edge of the chain must face in the direction indicated. (Fig.4-C)



WARNING. Before using a new chain / bar for the first time liberally lubricate the chain and bar by hand using chain oil.

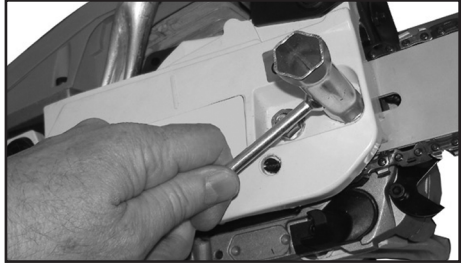


Fig. 1

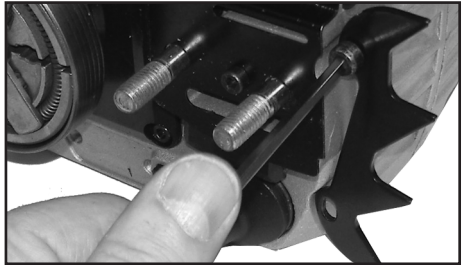


Fig. 2

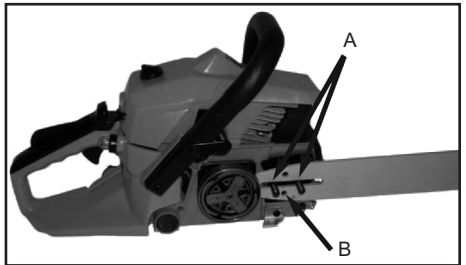


Fig. 3

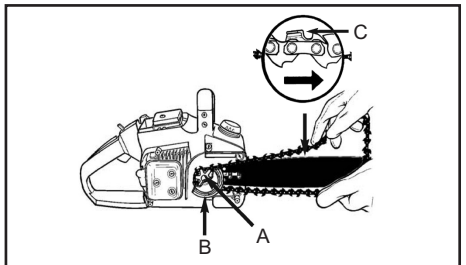


Fig. 4

ASSEMBLY

- Align the chain tensioning pin and the hole in the bar and then fit the clutch cover and bar fastening nuts finger tight only.
- Adjust the chain tension screw (Fig.5) so that if the chain is pulled down with the fingers at the centre of the bar the gap between the chain and the bar is 2 to 3 mm. (Fig.6)
- At this point double check to see if the chain is sitting correctly on the sprocket and bar. Do not proceed until they are sitting correctly. Firmly tighten the bar fastening nuts.



WARNING. Saw chain stretches during use, particularly when it is new, and it will occasionally be necessary to adjust and tighten it. New chain will require adjustment in less than 5 cuts. Re adjust it as often as necessary.



CAUTION. For your own safety, always stop the engine before performing any adjustments. Always wear gloves when working on the chain. Do not operate with a loose chain.

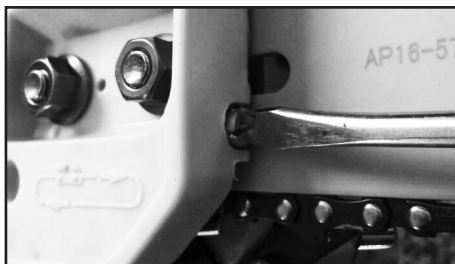


Fig. 5

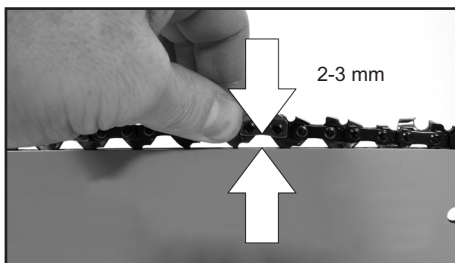


Fig. 6

FUEL MIXING AND CHAIN LUBRICATION

FUEL AND LUBRICANT

- The fuel for this machine is a mixture of unleaded petrol and an air-cooled 2-stroke oil of a reputable brand name. Do not use fuel containing methyl alcohol or more than 10% ethyl alcohol.
- Recommended mixture ratio 25:1.
- Do not mix directly in the engine fuel tank. Mix fuel with 2-stroke oil in an approved container, shake gently and ensure a thorough mix, and pour into the fuel tank. Any spilled fuel should be wiped clean immediately.
- Do not store unused fuel for too long as the petrol and oil mixture separates, causing damage to the engine.



WARNING. Never use raw fuel with out oil in your unit. This will cause permanent engine damage and void the your warranty for that product. Never use a fuel mixture that has been stored for over 90 days.



WARNING. The 2 stroke oil must be a premium grade oil for 2-cycle air cooled engines and must be mixed at a 25:1 ratio with the fuel. Mixing the fuel at a greater ratio than 25:1 provides insufficient lubrication and will cause engine damage and voids your engines warranty.



WARNING. Handle petrol with care as it is highly flammable.

CHAIN LUBRICANT

- Proper lubrication of the chain while in operation reduces the friction between the chain and the guide bar and assures a longer tool life. Use only special chain oil of a high quality for this purpose.
- Do not use any waste or reclaimed oil as this could cause various problems with the oil pump.
- Whenever you refill the fuel tank with petrol you must also top up the level of chain oil in the chain oil tank.

FUEL MIXING AND CHAIN LUBRICATION

SAW CHAIN / BAR LUBRICATION

Adequate lubrication of the saw chain is essential at all times to minimize friction with the guide bar.

Never starve the bar and chain of oil. Running the saw with too little oil will decrease cutting efficiency, shorten saw chain life, cause rapid dulling of chain, and cause excessive wear of bar from overheating. Too little oil is evidenced by smoke, bar discoloration or pitch build-up. New chains/bars should be lubricated by hand before starting.

AUTOMATIC OILER

Your chain saw is equipped with an automatic oiler system. The oiler automatically delivers the proper amount of oil to the bar and chain. As the engine speed increases, so does the oil flow to the bar pad. The oil tank should be checked and topped up each time the fuel tank is refilled.

Check the operation of the oil pump by running the saw at a medium speed. There should be visible spatters of oil coming from tip of the saw about 30 second after starting the saw.



WARNING. During normal operation the chain brake, clutch cover, bar and chain are lubricated with chain oil. After use oil will drain for many weeks and pool on the surface underneath the chainsaw. Place the chainsaw on a protected surface to contain the draining lubricating oil when not being used.



CAUTION. Whenever opening up the fuel tank, always loosen the cap very slowly and wait for the tank pressure to equalise before removing the cap completely.

OPERATION

GETTING STARTED

Before starting check the operation to the chain brake.

1. The chain brake lever (Fig.7-A) should click between positions (B) and (C). Leave it in position (C) for starting.
NOTE: The brake lever should snap into both positions. If strong resistance is felt, or lever does not move into either position, do not use your saw. Take it immediately to a professional Service Centre for repair.
2. Fill The fuel tank (Fig.8-A) with 25:1 fuel oil mix.
3. Fill The oil tank (Fig.8-B) with chain oil.
NOTE: Whenever you refill the fuel tank with fuel you must also top up the level of chain oil in the chain oil tank.

STARTING

1. Push the chain brake lever forward to engage the chain brake. (Fig.9)

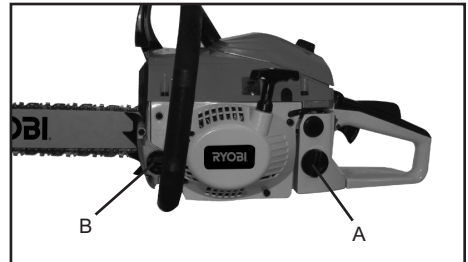


Fig. 8

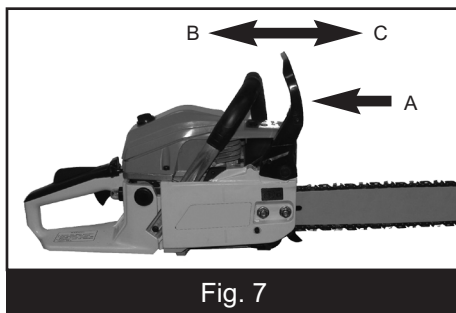


Fig. 7

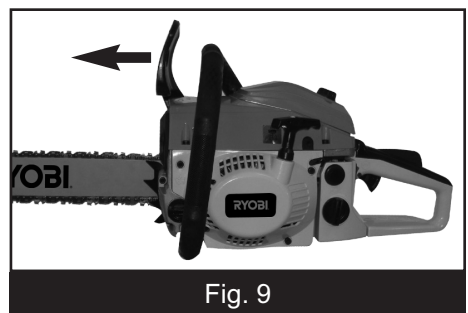


Fig. 9

OPERATION

2. Pull the choke lever fully out. (Fig.10-A)
3. Press the primer bulb 3 to 5 times. (Fig.10-B)
4. Set the ignition switch to the "I" ON position. (Fig.11)
5. Place the saw on a firm and level surface. Hold the saw securely with your foot as illustrated in Fig.12. Pull the starter 3 to 5 times. Stop when the engine tries to fire. Push the choke knob back in (Fig.10-A) and then pull the starter again several times until the motor starts.
6. When the motor starts let it idle of a couple of seconds to warm up. Apply part throttle (Fig.13) and maintain the unit at a low to Medium speed for a further 10 seconds.
7. Disengage the chain brake by pulling back the chain brake lever and bringing the motor to cutting speed. (Fig.14)

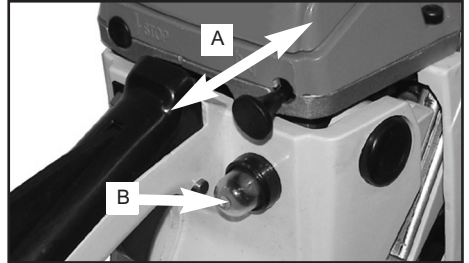


Fig. 10

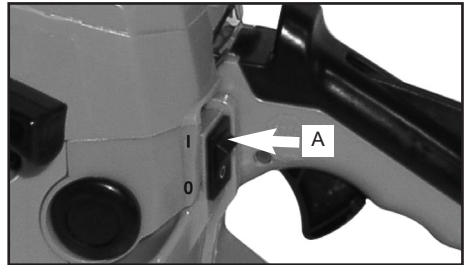


Fig. 11



NOTE. To stop the engine in an emergency, activate the chain brake and switch the ignition switch the "0" OFF position.

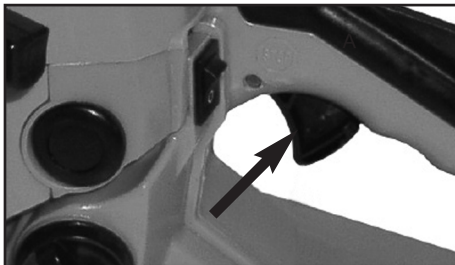


Fig. 13



Fig. 12

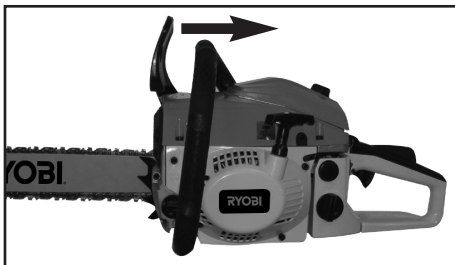


Fig. 14

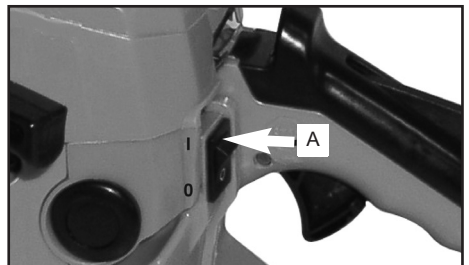


Fig. 15

OPERATION

OPERATION

The following section on the operation of the chain saw is a general guide only. The use of a chain saw by an inexperienced person can be extremely dangerous. If you are unsure, please seek the assistance of a professional or get suitable training before using the chain saw.



WARNING. Before every use check the operation of the chain break and oil pump.

BUCKING SPIKES

The chainsaw has bucking spikes (Fig.16-A) to assist with cutting and reduce the chance of kickback. Keep the bucking spikes touching the wood when cutting will help prevent any pinching or kick-back.

BUCKING

Bucking is cutting a log into lengths for easier handling. To saw a log lying on the ground, first saw halfway, then roll the log over and cut from the opposite side (Fig.17). To saw the end of a log supported off the ground, first saw up from the bottom one-third through the log then finish by sawing down from the top. To saw a log in the middle of two supports holding it off the ground, first saw down from the top one-third through the log then finish by sawing up from the bottom (Fig.18). When bucking on a slope, always stand on the uphill side.



WARNING. Be careful that the chain does not cut into the ground when bucking as this causes rapid dulling of the chain.

LIMBING

Limbing is the process of removing the branches from a fallen tree. Check the direction in which a branch will bend before cutting it. Always cut on the opposite side to the bending direction so that the guide bar is not pinched in the cut. For large limbs that cannot be removed in one cut, make an initial cut from the bent side and finish by sawing from the opposite direction (Fig.19). Do not remove limbs that are supporting the fallen tree on the ground until the tree has been cut into lengths.



WARNING. Always keep a well balanced stance. Do not stand on the log. Be alert to the fact that the log may roll over. When working on a slope, always stand on the uphill side of the log.

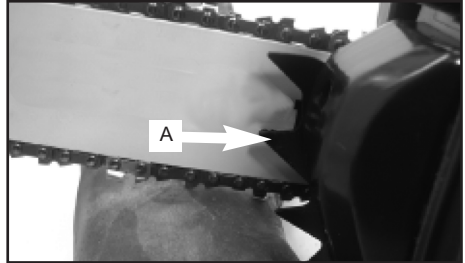


Fig. 16

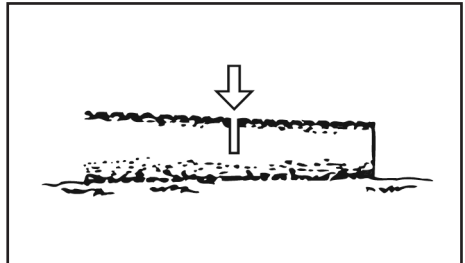


Fig. 17

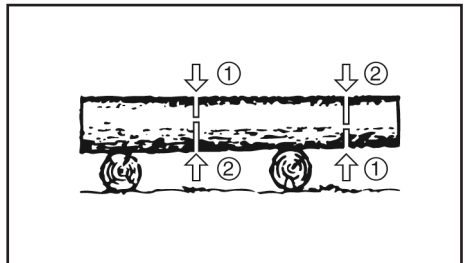


Fig. 18

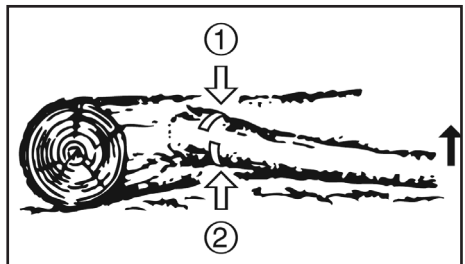


Fig. 19

OPERATION

PRUNING

Pruning is the removal of a limb or branch from a standing tree.



WARNING. Do not use an unstable foothold or ladder. Do not overreach. Do not saw above shoulder height. Always use both hands to hold the saw. First cut up from the bottom and finish down from the top.

FELLING

Felling is the term for cutting down a tree. Small trees up to 6-7 inches (15-18cm) in diameter are usually cut in a single cut. Larger trees require notch cuts. Notch cuts determine the direction the tree will fall.



WARNING. Do NOT fell trees unless you have received the appropriate training.

A retreat path (Fig.21- A) should be planned and cleared as necessary before cuts are started. The retreat path should extend back and diagonally to the rear of the expected line of fall, as illustrated.



NOTE: Direction of fall (Fig.21-B) is controlled by the notching cut. Before any cuts are made, consider the location of larger branches and natural lean of the tree to determine the way the tree will fall.

GENERAL GUIDELINES FOR FELLING TREES

Normally felling consists of 2 main cutting operations, notching (Fig.22-C) and making the felling cut (Fig.22-D).

Start making the upper notch cut (Fig.22-C) on the side of the tree facing the felling direction (Fig.22-E).

Be sure you don't make the lower cut too deep into the trunk.

The notch (Fig.22-C) should be deep enough to create a hinge (Fig.22-F) of sufficient width and strength. The notch should be wide enough to direct the fall of the tree for as long as possible.

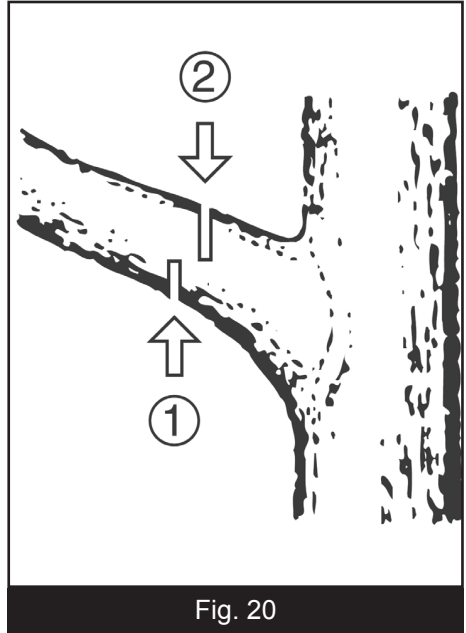


Fig. 20

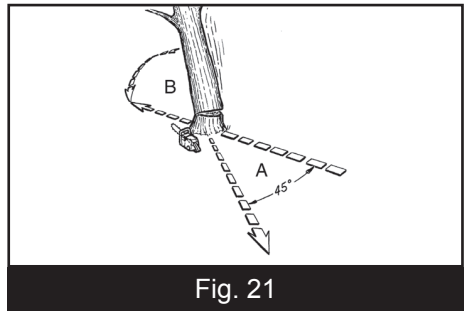


Fig. 21

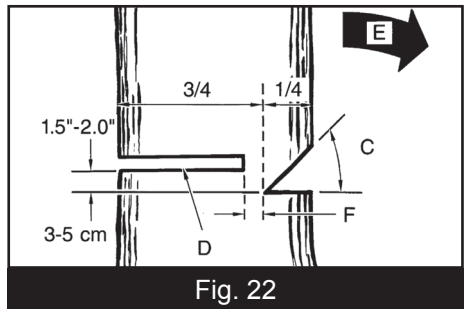


Fig. 22

OPERATION

Use wooden or plastic wedges (Fig. 23-A) to prevent pinching the bar and chain (Fig. 23-B) in the cut. Wedges also control felling.

When diameter of wood being cut is greater than the bar length, make 2 cuts as shown (Fig 24).



WARNING. Before making the final cut, always recheck the area for bystanders, animals or obstacles.



WARNING: Never saw completely through the trunk. Always leave a hinge (Fig. 22-F). The hinge guides the tree. If the trunk is completely cut through, control over the felling direction is lost. Insert a wedge or felling lever in the cut well before the tree becomes unstable and starts to move. This will prevent the bar from binding in the felling cut if you have misjudged the falling direction. Make sure no bystanders have entered the range of the falling tree before you push it over.



WARNING: As the felling cut gets close to the hinge, the tree should begin to fall. When tree begins to fall, remove saw from cut, stop engine, put chain saw down, and leave area along retreat path (Fig 17-A).

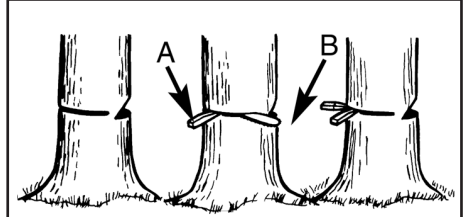


Fig. 23

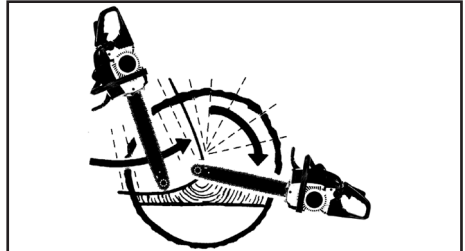


Fig. 24

MAINTENANCE



WARNING. All maintenance work on the chainsaw apart from the work described in this manual may only be carried out by authorised after-sales service personnel.

- Do not make any adjustments while the motor is in motion.
- Do not modify the chain saw as this could jeopardise your safety and will make the warranty null and void.
- Check the chain saw for damage. Any damaged safety devices and parts must be repaired or replaced immediately.
- After use, check your tool to keep it in top condition.
- Keep the cooling vents on the motor housing clean and unobstructed at all times. Clean out accumulated dust.

Regularly check for obvious defects such as loose, dislodged or damaged cutting device, loose fixings and worn or damaged components.

Check that covers and guards are undamaged and correctly fitted. Carry out necessary maintenance or repairs before using the product.

Spark plug	Check every 25 hours
Spark plug	Clean every 25 hours
Spark plug	Replace whenever necessary
Air filter	Check before/after each use
Air filter	Clean every 10 hours
Air filter	Replace whenever necessary
Cutting device	Check before/after each use
Cutting device	Lubricate before/after each use
Cutting device	Clean before/after each use
Cutting device	Replace whenever necessary
Valve play	Check 100 hours/once a year

MAINTENANCE

CHAIN BRAKE OPERATIONAL TEST

Test the chain brake periodically to ensure proper function. Perform a chain brake test prior to initial cutting, following extensive cutting, and definitely following any Chain brake service.

1. Place saw on a clear, firm, flat surface.
2. Start engine.
3. Grasp the rear handle (Fig.25-A) with your right hand.
4. With your left hand, hold the front handle (Fig 25-B) [not chain brake lever (Fig.25-C)] firmly.
5. Squeeze the throttle trigger to 1/3 throttle, then immediately activate the chain brake lever (Fig.25-C).
6. Chain should stop abruptly. When it does, immediately release the throttle trigger.
7. If chain brake functions properly, turn the engine off and return the chain brake to the DISENGAGED position.



WARNING. If chain does not stop, turn engine off and take your unit to the nearest authorised service centre for service.

AIR FILTER

Do not operate saw without the air filter. Dust and dirt will be drawn into engine and damage it. The air filter must be cleaned after 20 hours of service.

CLEANING THE AIR FILTER (FIG.26-C)

Remove the top cover by undoing the cover fastening screw on the cover. You can then remove the cover.

Lift out the air filter and wash filter in clean, warm, soapy water. Rinse in clear, cool water. Air dry completely.

Refit the filter, fit the cover for the engine/air filter.

Make sure that the cover fits perfectly when you do so. Tighten the fastening screw for the cover.

SPARK PLUG (FIG.26-D)

To ensure that the saw's engine retains its power, the spark plug must be clean and have the correct electrode gap (0.6 mm). The spark plug must be cleaned or replaced after every 20 hours of service.

Set the On/Off switch to Stop (0).

Remove the top cover by undoing the fastening screw on the cover. You can then remove the cover.

Disconnect the ignition cable from the spark plug by pulling and twisting it simultaneously. Remove the spark plug using a spark plug wrench. DO NOT USE ANY OTHER TOOLS. Clean the spark plug with a copper wire brush or fit a new one.

CARBURETTOR SETTING

The carburettor has been factory set. If it requires adjusting, take the saw to your nearest authorized after-sales service outlet.

CHAIN BAR

Turning the chain bar. The bar should be reversed every 8 working hours to ensure uniform wear. Keep the bar groove and lubrication hole clean. Check the bar rails frequently for wear and, if necessary, remove the bars and square-up the rails using the flat file.



WARNING. Never fit a new chain to a worn chain bar.

SPROCKET

This sprocket is subjected to especially high wear and tear. If you notice deep wear marks on the teeth, the sprocket must be replaced. A worn sprocket curtails the service life of the chain saw. Have the sprocket replaced by an authorised service centre.

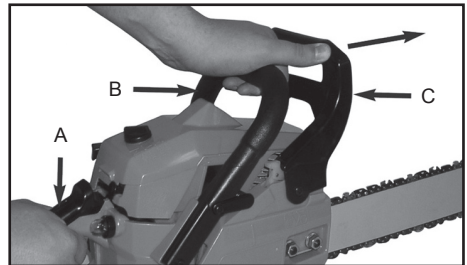


Fig. 25

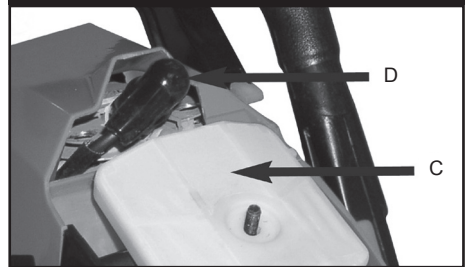


Fig. 26

MAINTENANCE

SHARPENING THE CHAIN SAW



WARNING. We advise you to have deep or important sharpening carried out by a service agent who is equipped with an electric sharpener.

When the chain penetrates into wood with difficulty, it needs to be sharpened as follows:

1. Put the chain under tension.
2. Fasten the bar in a vice so that the chain can slide (Fig.27)
3. File with forward strokes only until all the worn out parts of the cutting edge is removed.
4. Count the number of strokes given to the cutter as a reference basis and file away the same number of strokes on all other cutters.
5. If after sharpening a few times, the depth gauge protrudes from the template, you must reset its level using a flat file. (Fig.28)
6. Finally round off the depth gauge. (Fig.29)

GUIDE BAR

The guide bar is subjected to especially severe wear and tear at the nose and the bottom. To avoid one-sided wear and tear, turn the guide bar over every time you sharpen the chain.

1. When you have finished working, clean out the groove and the oil passages, with a special scraping hook. (Fig.30).
2. Periodically trim the sides of the rails using a flat file. If not done in the long run the "feathered edges" might break away and damage the bar. (Fig.31)

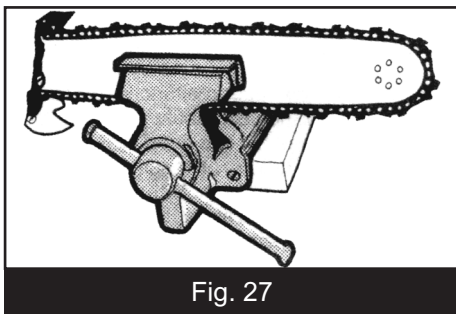


Fig. 27

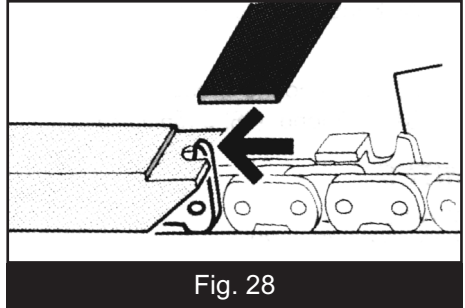


Fig. 28

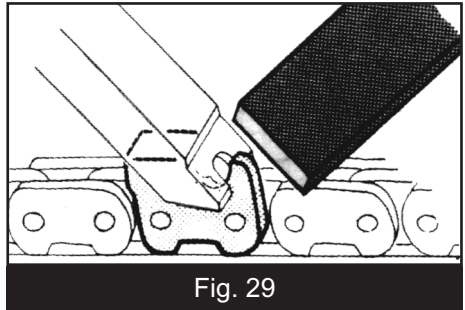


Fig. 29

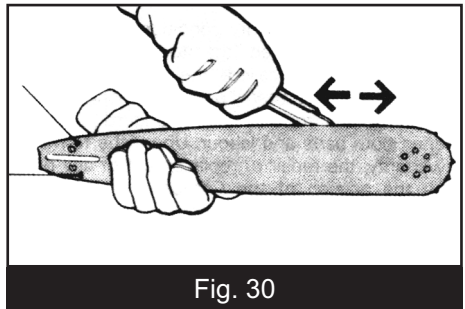


Fig. 30

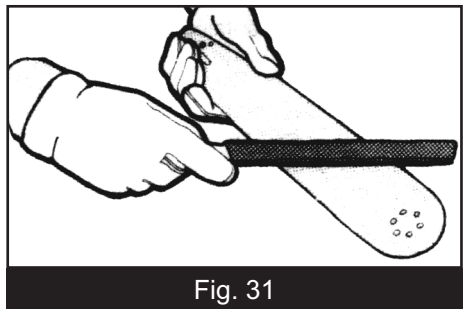


Fig. 31

MAINTENANCE

- If one rail is higher than the other one, it is necessary to make it even with a flat file and then smooth them with a file or fine grain abrasive paper. (Fig.32)

CHAIN TENSION

Check the chain tension frequently and adjust as often as necessary to keep the chain snug on the bar, if the chain is pulled down with the fingers at the centre of the bar the gap between the chain and the bar should be 2 to 3mm.

NEW CHAINS

A new chain will need to be readjusted after as few as 5 cuts. This is normal during the break in period, future adjustments will be required less often.

OIL PASSAGES

Oil passages on the bar should be cleaned to ensure proper lubrication of the bar and chain during operation.

NOTE. The condition of the oil passages can be easily checked. If the passages are clear, the chain will automatically give off a spray of oil within seconds of starting the saw. Your saw is equipped with an automatic oiler system.

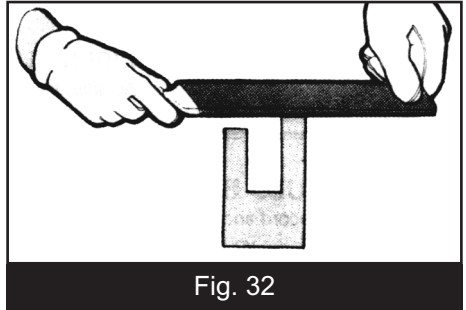


Fig. 32

STORAGE

Never put a chain saw into storage for longer than 30 days without carrying out the following steps.

- Remove the fuel tank cap slowly to release any pressure in tank.
- Carefully drain the fuel tank.
- Start the engine and let it run until the unit stops to remove fuel from carburettor.
- Allow the engine to cool (approx. 5 minutes).



WARNING. During normal operation the chain brake, clutch cover, bar and chain are lubricated with chain oil. After use oil will drain for many weeks and pool on the surface underneath the chainsaw.

Place the chainsaw on a protected surface to contain the draining lubricating oil when not being used.

RETURNING THE SAW BACK INTO OPERATION













- Remove spark plug.
- Clean the spark plug and check that the electrode gap is correct.
- Fill fuel tank with proper fuel / oil mixture.
- Fill the chain oil tank.

SERVICE

Now that you have purchased your tool, should a need ever exist of repair or service, simply contact your nearest Ryobi Authorised Service Centre or other qualified service organisation. Be sure to provide all pertinent facts when you call or visit.

MAINTENANCE

Some of the following symbols may be used on this product. Please study them and learn their meaning. Proper interpretation of these symbols will allow you to operate the product better and safer.

SYMBOL	NAME	DESIGNATION/EXPLANATION
	Safety Alert	Indicates a potential personal injury hazard.
	Read Operator's Manual	To reduce the risk of injury, user must read and understand operator's manual before using this product.
	Wear Eye, Hearing, and Head Protection	Wear eye protection with side shields marked to comply with ANSI Z87.1 as well as hearing and head protection when operating this equipment.
	No Smoking	No smoking, sparks, or open flame.
	Operate With Two Hands	Hold and operate the saw properly with both hands.
	One Handed	Do not operate the saw using only one hand.
	Carbon Monoxide	Engines produce carbon monoxide which is an odorless, deadly poison. Do not operate in an enclosed area.
	Kickback	DANGER! Beware of kickback.
	Bar Nose Contact	Avoid bar nose contact.
	Wear Gloves	Wear non-slip, heavy-duty protective gloves when handling the chain saw.
	Gasoline and Lubricant	Use unleaded petrol intended for motor vehicle use with an octane rating of 87 [(R + M)/2] or higher. This product is powered by a 2-cycle engine and requires pre-mixing petrol and 2-cycle lubricant.
	Keep Bystanders Away	Keep all bystanders and animals at least 50 ft. away.

NOTES

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