

OPERATOR'S MANUAL

ENGINE CUT-OFF SAW

CSG-670



WARNING

Read the instructions carefully and follow the rules for safe operation.

Failure to do so could result in serious injury.

ECHO POWER EQUIPMENT (CANADA)

501 Newbold Street, London, Ontario Canada N6E 1K4

X750-007 66 2

X750 410-450 2

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INTRODUCTION

The ECHO model CSG-670 Cut-off Saw is a high-performance gasoline-powered tool designed for use with a recommended 305 x 3.2 x 20 mm abrasive wheel.

A water-flush attachment is available for dust control.

Use only ECHO's wheels or other wheels having a minimum spindle speed rating of 6000 r/min or higher.

This manual provides the information necessary for assembly, operation and maintenance of the cut-off saw as well as the wheels available for it.

It is important that you follow this information carefully.



WARNING

Improper use or care of this unit, or failure to wear proper protection can result in serious injury.

Read the rules for safe operation and instructions in this manual. Wear eye and hearing protection and a dust mask when operating.

This spark ignition system complies with Canadian ICES-002.

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SYMBOLS AND SIGNS



DANGER

The safety alert symbol accompanied by the word "DANGER" calls attention to an act or condition which **WILL** lead to serious personal injury or death if not avoided.



WARNING

The safety alert symbol accompanied by the word "WARNING" calls attention to an act or condition which **CAN** lead to serious personal injury or death if not avoided.



CAUTION

The safety alert symbol accompanied by the word "CAUTION" calls attention to an act or condition which may lead to minor or moderate personal injury if not avoided.



CIRCLE AND SLASH SYMBOL

This symbol means the specific action shown is prohibited. Ignoring these prohibitions can result in serious or fatal injury.

NOTE

This enclosed message provides tips for use, care and maintenance of the unit.

IMPORTANT

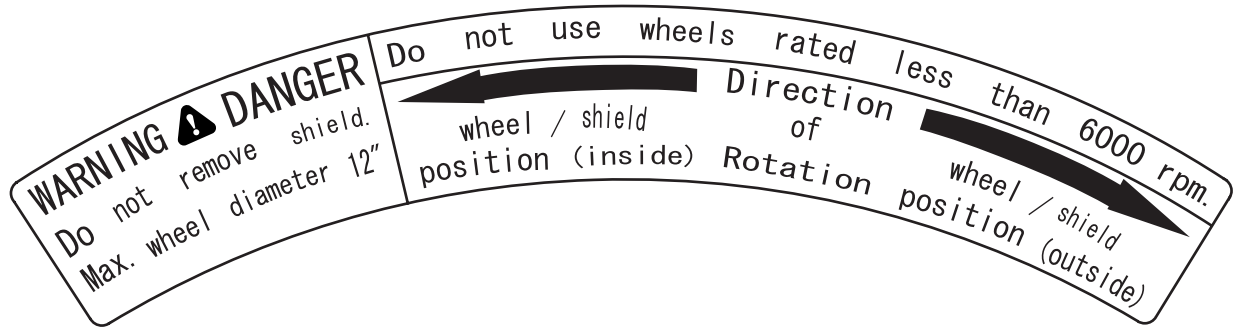
The enclosed message provides information necessary for the protection of the unit.

Specifications, descriptions and illustrations in this manual were accurate at the time of publication, and are subject to change without notice. Illustrations may include optional equipment and accessories, and may not include all standard equipment.

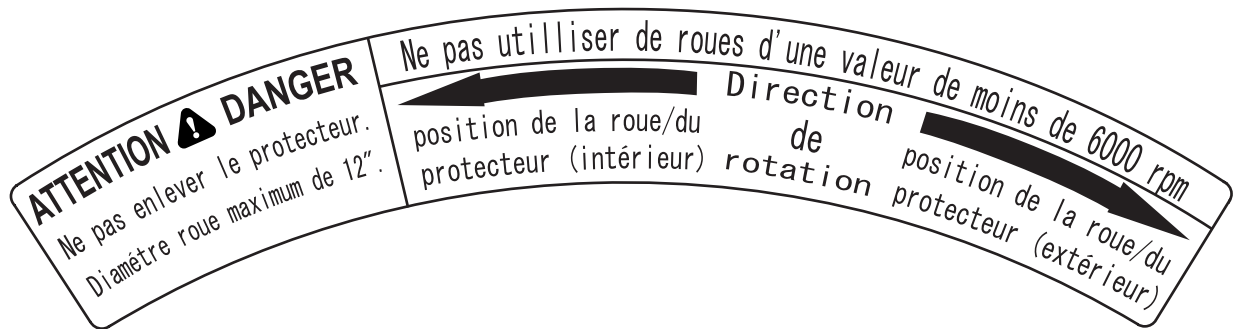
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DECALS

Part Number 890188-07060



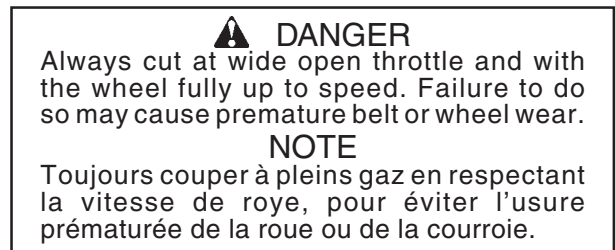
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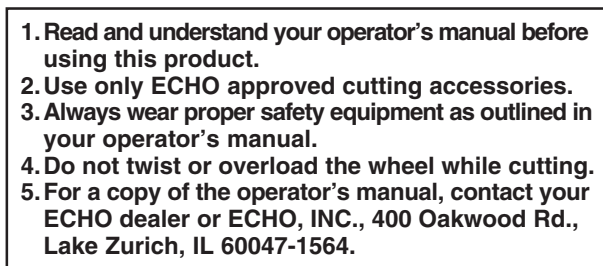
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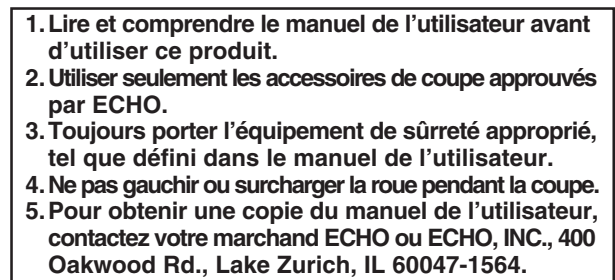
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Part Number 890178-07060



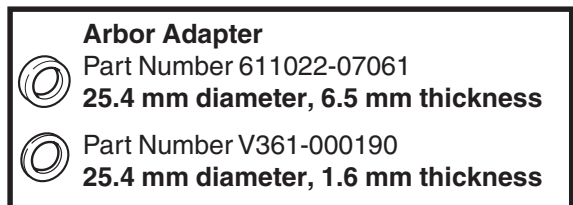
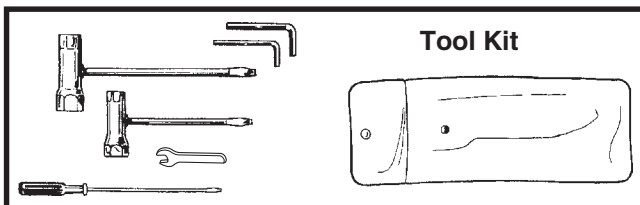
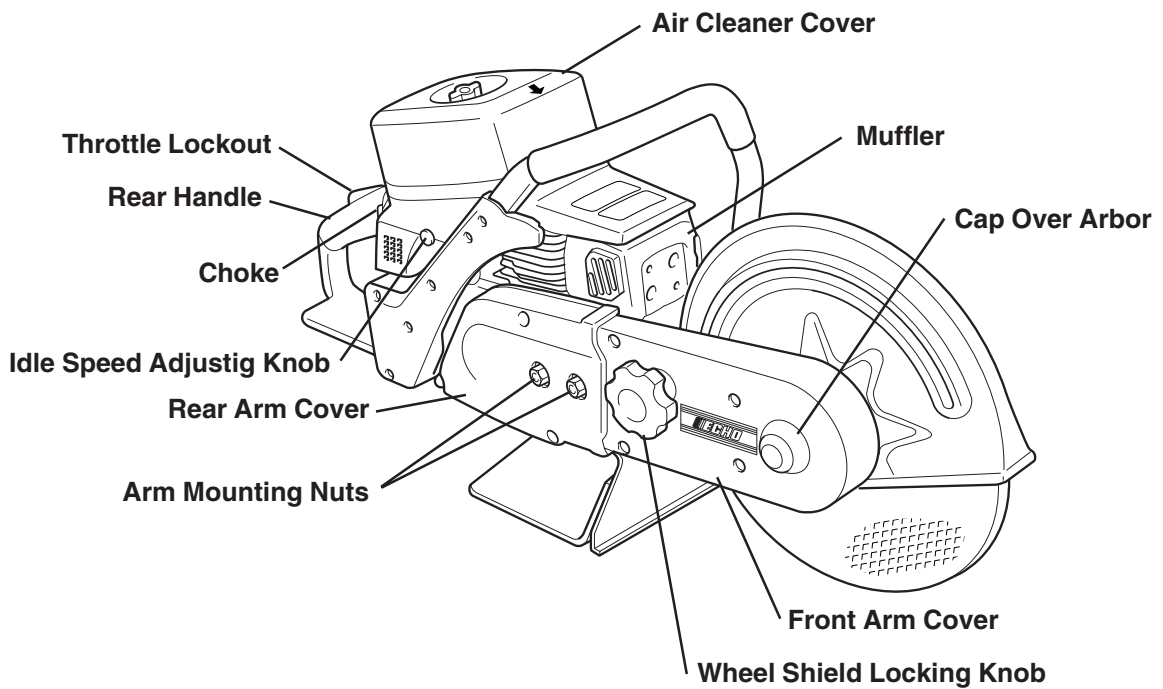
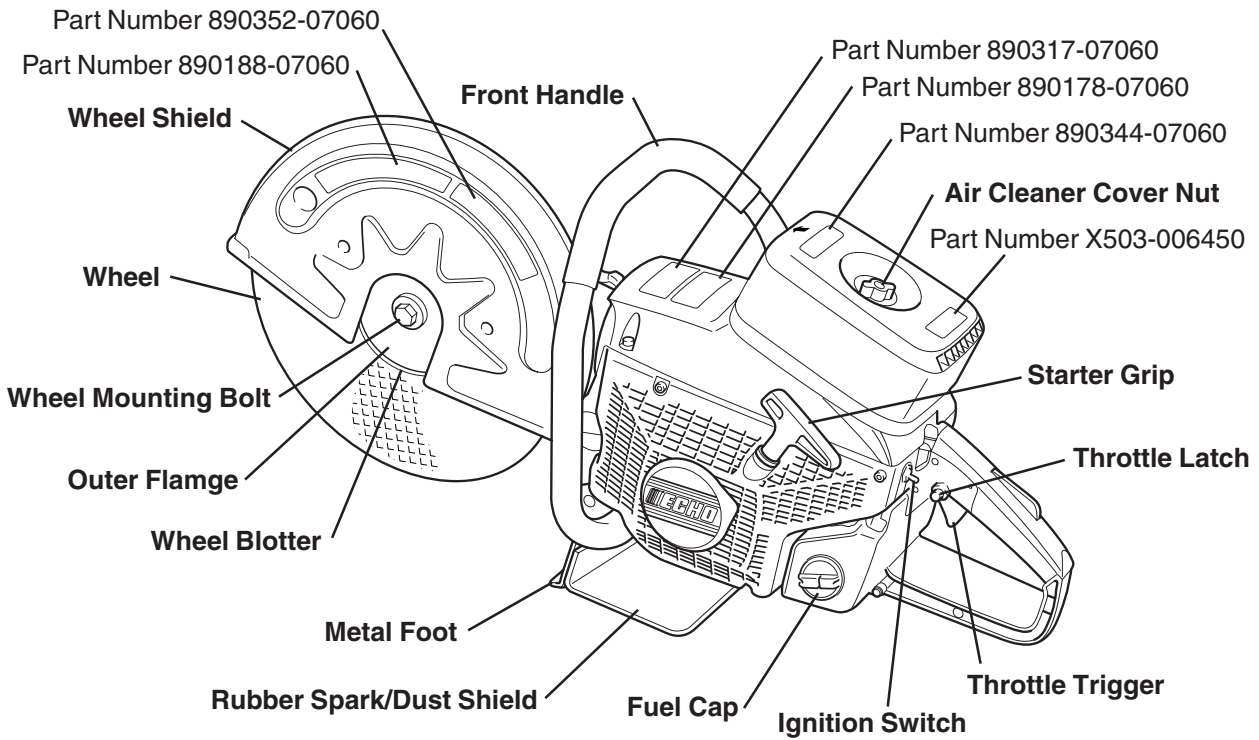
Part Number 890317-07060



Locate this safety decal on your unit. The complete unit illustration found in the "DESCRIPTION" section will help you locate them.

Make sure the decal is legible and that you understand and follow the instructions on it. If a decal cannot be read, a new one can be ordered from your ECHO dealer.

DESCRIPTION



DEFINITION OF TERMS

ANSI – American National Standards Institute.

Arbor – A spindle or axle.

Arbor Hole – The mounting hole in the abrasive wheel.

Automatic Belt Tensioner – This feature, a spring-loaded device in the wheel arm, maintains belt tension.

Blotters – Discs of soft material placed between wheel and mounting flanges to equalize pressure against the wheel, and to avoid wear on the flanges if slipping occurs.

Chaps – Protective covers for the legs.

Choke Control – The device used to enrich the fuel/air mixture when starting the engine.

Cold Start – Starting sequence required whenever engine is not warm enough from previous operation to be started without choking.

Drop-Start – An improper variation of starting while holding saw in the air. Do not start saw in the air.

Dust Mask – A device worn to prevent breathing in dust.

Engine Speed – The speed of the engine output shaft.

Face Shield – A device worn in front of the eyes, and all or part of the face, to supplement the protection afforded by a primary protective device.

Gasohol – Gasoline containing methyl alcohol (methanol) or more than 10 % of ethyl alcohol (ethanol) that is harmful to internal engine parts.

Goggles – A device, with impact-resistant lenses, intended to protect the eyes from the front, top and sides. The goggles are stamped Z 87 for qualification.

Governor – A device which limits the speed of the engine.

Idle Speed – An engine speed which is slow enough that the clutch does not engage.

Ignition Switch – The device which allows the operator to run or stop the engine.

Kickback – A dangerous reaction and movement off the saw, in an upward arc towards the operator, caused by contact with an object at the front segment of the wheel.

No Load Speed – The speed of the engine when no load is applied.

Reduction Ratio – The ratio between the engine speed and the spindle speed.

Reinforced Wheel – Abrasive wheels bonded on both sides with layers of a fiber mesh material.

Spindle – An axle or arbor.

Spindle Speed – The speed at which the spindle or wheel axle rotates.

Throttle Latch – A device used to latch the throttle trigger in a position for starting the engine.

Throttle Trigger Lockout Lever – A lever on the rear handle grip which the operator must hold depressed for control of the throttle trigger, and when released will lock the throttle control in the idle position.

Throttle Trigger – The device in the rear handle used to control the speed of the engine.

Two-Stroke Fuel – Fuel containing the lubricant for two-stroke engines. It is made by mixing 2-stroke engine oil with gasoline.

Water-Flush – Constantly spraying the stone or masonry surface during cutting, in order to reduce exposure to dust, and also cool the wheel.

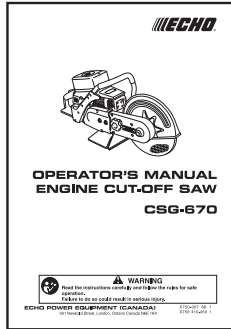
Wheel Guard – A wheel shield which is intended to protect the operator from wheel contact, and also direct debris away from the operator.

Wheel Speed – The speed (r/min) of the shaft (spindle, arbor) on which the cutting wheel is mounted.

Wheel Speed Rating – The speed printed on the label of the wheel by the manufacturer is the maximum allowable wheel speed.

Wheel Thrust – The force of the wheel against the work, felt by the operator as a pull of the saw.

OPERATOR SAFETY PRECAUTIONS



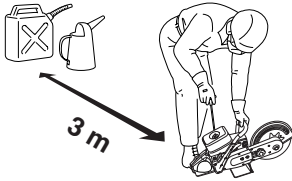
Read this cut-off saw operator's manual carefully. Be sure you understand how to operate this saw properly before you use it.

Establish a training program for cut-off saw operators.

Use safety footwear, snug-fitting clothing and protective gloves.

Wear eye, hearing and head protection devices. Use ballistic chaps or pants when necessary. Clothing of fire-resistant and unmeltable material should be worn by emergency crews exposed to flames or high heat conditions.

Use caution when handling fuel. Put the gas caps back tightly on both the gas can and the saw tank, move at least 3 m from the fueling point, and be sure there is no leakage of fuel from the gas cap or the fuel system before starting the engine. Avoid ignition from sparks.



DANGER

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.

IMPORTANT

- Check before every use.
- After refueling, make sure fuel does not leak from around fuel pipe, fuel grommet or fuel tank cap.
- In case of fuel leakage there is a danger of fire. Stop using the machine immediately and request your dealer to inspect or replace.
- It is not permitted to fill fuel above the shoulder level of fuel tank.



Operate this gasoline engine saw only in well-ventilated areas.

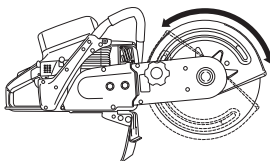
Do not cause sparks in any area where there are flammable materials.

Start the saw on the ground with the cutting wheel completely in the clear. Do not drop-start the saw, or start it if the wheel is obstructed by the ground or any other object.

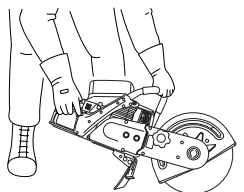
Do not allow other persons to be nearer than 9 m when you are starting or cutting with the saw. Be aware that bystanders should wear hearing and eye protection. Do not start cutting unless you have good footing and the work area is clear.

Do not let someone hold the work you are cutting.

Adjust Wheel Shield

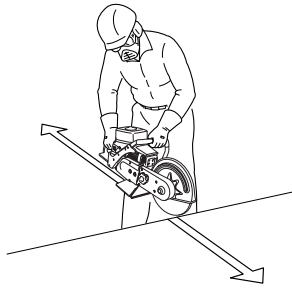


Adjust the wheel shield to a position where the sparks and debris from the wheel will be thrown away from you. Do not operate if the wheel shield is damaged, missing from the unit, improperly positioned, or cannot be locked in proper position.



Keep a firm grip on the saw with both hands, the right hand on the rear handle, and the left hand on the front handle when the engine is running. Use a firm grip with thumbs and fingers encircling the saw handles. A firm grip will help you to keep control if the saw kickback toward you, or the thrust of the rotating wheel pulls it away from you. Never operate the saw with only one hand.

Keep to Left of Cutting Line



Keep to the left of the saw so that no part of your body is in line with the cutting wheel. Keep all parts of your body away from the cutting wheel when the engine is running.

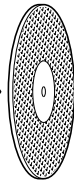
Do all cutting at full throttle speed. Cutting at less than full speed can damage the clutch by allowing it to slip. Accelerating from slow to full speed while the wheel is in cutting contact may cause a violent push or pull reaction resulting in loss of control.

It will take time for the wheel to coast to a stop after the throttle trigger is released. Be sure to wait for rotation to stop before releasing your grip on the saw handles. Always shut off the engine before setting down the saw.

Always carry the saw with the engine stopped and the hot muffler away from your body. Do not touch a hot muffler or cylinder.

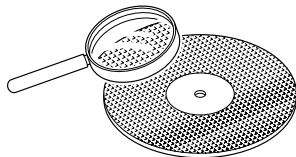
Remove the wheel from the saw prior to transport or storage. Store wheels properly to avoid damage from uneven pressure, moisture and extreme temperatures.

Put no Side Pressure on the Wheel



Do not grind on the side of an abrasive cut-off saw wheel, or put any side pressure on the wheel during cutting. Avoid letting the saw tilt or wobble off line.

Use new, properly qualified wheels of correct diameter, thickness and mounting hole size. The wheel blotters and the mounting flanges should be in good condition, and the mounting bolt should be tightened to the proper torque.



Check for Wheel Damage

Inspect the wheel carefully for cracks, edge damage and warping before use. Do not use any wheel that has been dropped.

All items of adjustment and maintenance given in this operator's manual should be performed as necessary, and may be done by the saw owner. All required items of service or adjustment not listed in this manual should be performed only by a qualified ECHO servicing dealer.

Over speeding of the engine, or wrong size pulleys in the belt transmission can result in dangerously high wheel speeds. Install only the proper diameter pulleys in the belt transmission. The engine **no load** maximum speed is controlled by a vibration-sensitive governor. Check speed with a tachometer, or contact your ECHO dealer if you suspect the governor is not working properly.

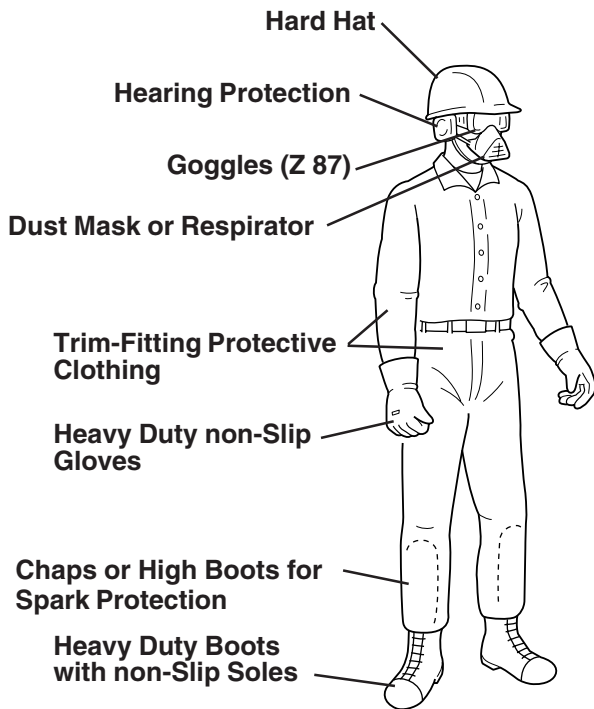
PREPARING FOR USE



WARNING

Cut-off saw users risk injury if the saw is used improperly, and/or safety precautions are not followed. Protective clothing and safety gear must be worn when operating a cut-off saw.

PROTECTIVE EQUIPMENT



- You must wear eye protection goggles qualified to the latest ANSI Standard Z 87. (Z 87 is stamped on the goggles). These goggles also must be worn under a face screen if one is used. A face screen should be worn when there is a risk from flying debris.
- Hearing protection should be worn. (See “DANGER” page 16)
- Wear a respirator or dust mask when cutting concrete, stone, brick or other materials where fine dust is produced while cutting. Use water flush to keep down the dust.
- Clothing should be made from fabric containing natural fibers that resist catching fire and do not melt. The clothing should cover as much skin area as possible. Clothing should offer freedom of movement, but should not be too loose or baggy. Do not wear ties or jewelry.
- Wear heavy duty boots with non-slip soles. The boots should be high enough for shin protection, or you should wear chaps for shin protection.
- Wear non-slip, heavy duty work gloves to improve your grip on the saw handles. The gloves also help to reduce the transmission of machine vibrations to your hands.

PROTECTING OTHERS

No Bystanders!



Spectators children and fellow workers must be warned to come no nearer than 9 m while the saw is in use. Shut off the saw immediately if some one moves closer to you than 9 m. Persons working in the area near you should wear the same protective equipment as the saw operator if endangered by risky flying debris.

PHYSICAL CONDITION



Your judgment and/or dexterity may be impaired if you are ill or have taken alcohol or other substances known to affect the way you would function normally. Operate only when sound in mind and body.

⚠ WARNING

PRECAUTIONS AGAINST VIBRATION AND COLD

It is believed that a condition called **Raynaud's Phenomenon** which affects the fingers of certain individuals is brought about by exposure to cold and vibration. Accordingly, your **ECHO Cut-off Saw** has shock mounts designed to reduce the intensity of vibration received through the saw handles. Exposure to cold and vibration may cause tingling and burning, followed by loss of color and numbness, in a person's fingers. We strongly recommend your taking the following precautions because the minimum exposure which might trigger the ailment is unknown.

- Keep your body warm – especially head, neck, feet and ankles, and hands and wrists.
- Maintain good blood circulation by performing vigorous arm exercises during frequent work breaks, and also by not smoking.
- Limit the number of hours of cut-off saw operation. Try to fill a part of each work day with jobs where operating this saw or other hand-held power tools are not required.
- If you experience discomfort, redness and swelling of the fingers, followed by whitening and loss of feeling, consult your physician before exposing yourself further to cold and vibration.

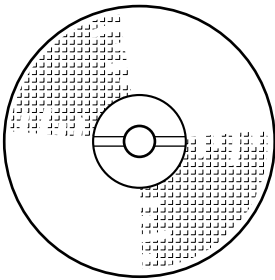
ABRASIVE WHEEL TYPES AND USES

ECHO REINFORCED WHEELS

ECHO Wheels are labeled for the type of materials they are designed to cut. The types of wheels identified below, and other types, may be available from ECHO dealer.

Labeled Application	Prim Use	Other Uses	Dry or Water Flush
Metl	General purpose mild and stainless steel: re-bar, pipe and structural steel	Aluminum and soft brass. Does not cut non-metals very well	Dry
Ductile	Ductile or cast Iron and concrete lined pipe	All except very hard metals	Dry. Does not cut well when wet
Rail Track	Heat treated, wear hardened and alloyed steel	Not for non-metals	Dry
Masonry	All masonry, concrete and stone products and asphalt	Not for metals	Constant Water Flush or Dry
Diamond Wheel	Rock, block, stone, tile	Not for metal or reinforced concrete	Dry

WHEEL SPEED RATING



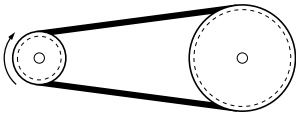
Read Label on the Wheel

The speed rating printed on these reinforced wheels could range from 6000 to 6300 r/min. This is the minimum acceptable wheel speed rating for this unit. Wheels rated less than 6000 r/min must not be used on this saw.

MAXIMUM ALLOWABLE WHEEL SPEED

The wheel rotates at the same speed as the spindle (arbor) on which it is mounted. The wheel must never be allowed to rotate faster than 6000 r/min if the wheel speed is rated at 6000 r/min. (See “Engine Speed and Wheel Speed”, below.)

ENGINE SPEED AND WHEEL SPEED

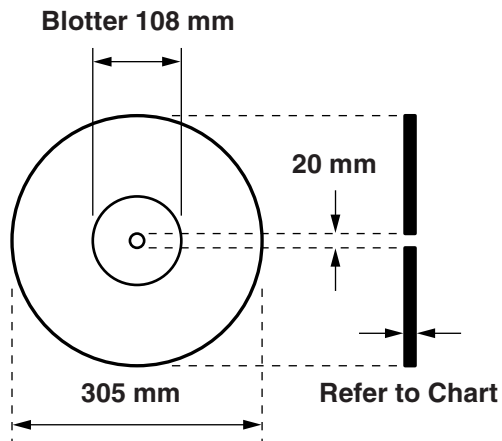


Engine Drive Pully
10000 r/min \pm 500 r/min
= between 4750 and
5250 r/min
Wheel Speed

Since the reduction ratio of the engine drive pulley to the large driven pulley is about 2 to 1, the wheel speed will be half whatever the engine drive pulley speed is.

The unit has a governor system designed to govern the engine high speed, at no load, to within 500 r/min of 10000 r/min, at which the wheel speed should range between 4750 and 5250 r/min. – safety inside the 6000 r/min limit. If the engine exceeds this speed limit, take it to your nearest ECHO servicing dealer for service.

WHEEL BLOTTERS AND MOUNTING FLANGES



Wheel blotters attached to both sides of reinforced wheels are cushions needed to equalize the pressure of the mounting flanges from wear if slippage between the wheel and the flanges occurs. The blotters are 108 mm diameter. Take care that the blotters do not become gouged or deeply scratched and that there is no foreign material on them when mounting the wheel.

* Mounting hole diameter; 25.4 mm with adapter
Abrasive wheel adapter; Thickness 6.5 mm
Diamond wheel adapter; Thickness 1.6 mm

Wheel Dimensions			
	Wheel Dia.	Mounting Hole Dia.	Thickness
Abrasive Wheel:	305 mm	20 mm	3.2 mm
Diamond Wheel:	305 mm	20 mm	2.7 mm

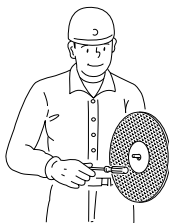
EMERGENCY APPLICATIONS

⚠ WARNING

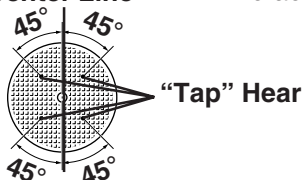
- Do not grind with a cut-off wheel or put pressure on the sides.
- Do not mount wheel if blotters are damaged. Do not destroy cushioning effect by making mounting bolts too tight. Never fasten while applying your weight. Otherwise the thread could be broken. Proper torque is 20 N•m.
- Examine wheel carefully before use. Do not use if wheel is warped, damp, cracked, chipped or cutting area shows heat discoloration.
- A wheel once dropped cannot be trusted. Discard a wheel if you drop it.

The cut-off saw has applications in fire fighting and rescue work. An ECHO QUIK-VENT roof venting saw is also available. Both of these units, however, can cause sparks and should not be used in an explosive atmosphere or where they could start a fire.

RING TESTING WHEELS



Center Line



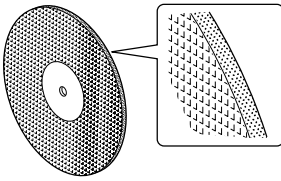
Cracks or defects in a wheel may not be visible. To help in verifying that a wheel is ok to use, a “ring test” must be made immediately before mounting all new or used wheels.

Put your finger through the mounting hole to support the wheel. Use a non-metallic handle of any small tool or a small piece of wood to lightly tap (do not hit) the wheel in the locations shown in the illustration. Do not tap wheel on the edge. Uncracked wheels will make a ringing sound, wheels with cracks or concealed cracks will make a dull “clunk”.

IMPORTANT

If a wheel being “ring tested” is dirty or damp or is tapped at the vertical center line, the resulting sound will be muffled and not reliable.

FACTS ABOUT ABRASIVE WHEELS



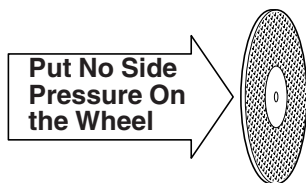
ECHO wheels are made by laying a strong fiber mesh material into a form, pouring a mixture of resin and the abrasive grit particles over the mesh, and adding a second layer of mesh over the mixture. Then the resin and reinforcing mesh are bonded together and cured.

The wheel's ability to cut certain materials are due to the type abrasive, size of the grit and it's spacing. The reinforcement on both sides adds strength and rigidity.

Always read the label on the wheel. If the wheel does not cut well, it may be the wrong type for the material. Forcing it to cut may result in shattering of the wheel and serious injury to the operator.

WARNING

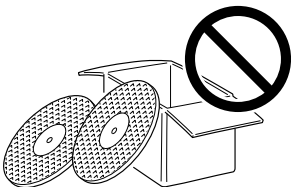
Do not grind with a cut-off wheel or put pressure on the sides. Use only ECHO reinforced wheels, or wheels approved for this saw by ECHO. Wheels that are too thick or fit the arbor improperly may shatter, causing serious personal injury. So may wheels of low speed rating or those that are cracked, wrapped, out-of-round or edge-damaged.



A wheel can stand a lot of cutting pressure as long as the pressure is straight on and not from the side of the wheel. This is why you always must make only straight line cuts, by avoiding saw tilt or wobbling off line during a cut.

Saws intended for forcible entry should be equipped with new wheels for each use. If the used wheels can pass the ring test (page 11) and close inspection, they may be use in training emergency crews.

HANDLING AND STORAGE OF WHEELS



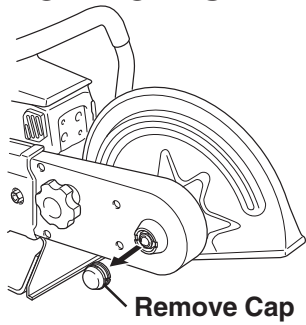
Check every wheel for warping, cracks and broken edges before mounting on the saw.

Warped wheels do not cut properly and may be stressed to the point of breaking. Always store your wheels sown flat on a smooth, flat and dry surface. When stacking many wheels, place cardboard or paper spacers between them as a cushion.

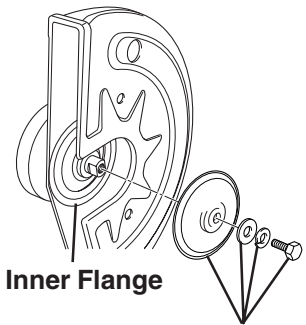


Moisture and heat both can cause wheel damage. Do not let wheels lie in the sun or expose them to high heat. Keep wheels dry at all times, and store in an area of low humidity and moderate temperature. Protection from moisture damage applies during water-flush cutting. To keep water from penetrating the wheel, bring wheel up to cutting speed before turning on water, and maintain wheel rotation for 10 seconds after shutting off water.

HOW TO INSTALL THE WHEEL



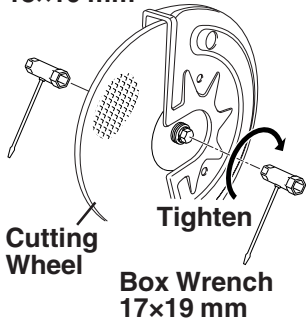
Remove Cap



Inner Flange

Remove Wheel Bolt,
Washers and Outer
Flange

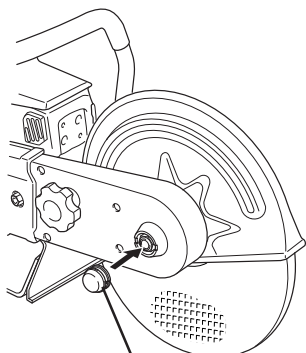
Box Wrench
13x19 mm



Cutting
Wheel

Tighten

Box Wrench
17x19 mm



Snap Cap in Place

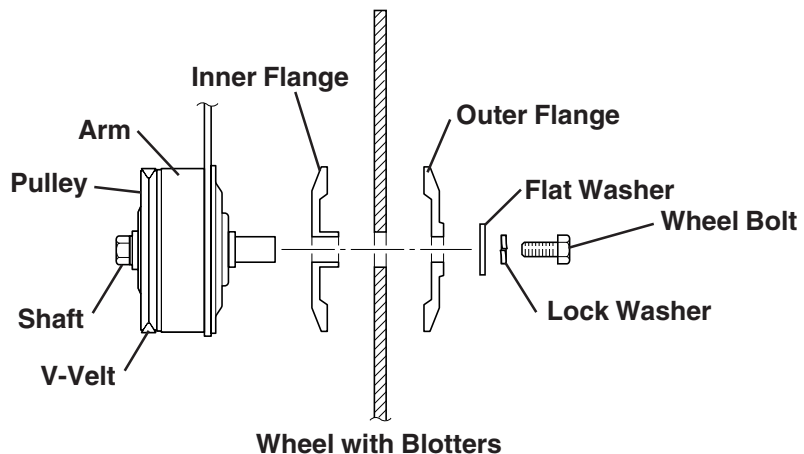
1. Remove the cap from the arm for access to the shaft at front of the arm.
2. Two combination (17 mm, 19 mm) box wrenches are supplied. Use one wrench to keep shaft from turning. Unscrew wheel mounting bolt with the other wrench or your fingers.
3. Remove wheel bolt, washers and outer flange, leaving inner flange place. Mount wheel on arbor between the two flanges. Install flat washer, lock washer and wheel bolt. Tighten bolt securely and snap cap in place.

⚠ WARNING

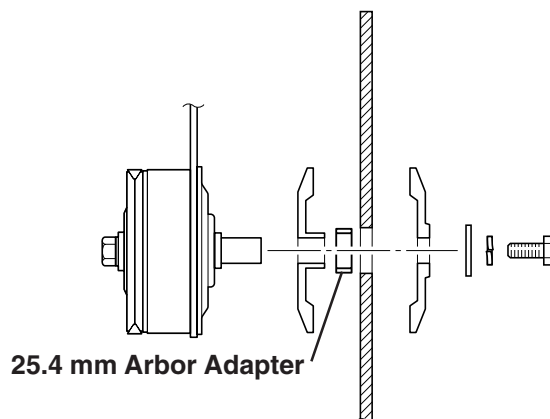
- Before tightening, check that flanges are properly seated and not cocked on the mount or bolt threads. Do not make bolt so tight as to destroy the cushion supplied by the wheel blotters. Never fasten while applying your weight. Otherwise the thread could be broken. Do not tighten more than 20 N•m (15 ft. lbs.).
- Inner and outer flanges are not interchangeable. Reversing positions may cause wheel damage and lock the wheel.

NOTE

Arm may be removed and remounted with wheel on the outboard side of the arm as required for certain procedures. See page 19 for details.



Wheel with Blotters



25.4 mm Arbor Adapter

OPERATION

2-STROKE FUEL

WARNING

Alternative fuels, such as E-20 (20 % ethanol), E-85 (85 % ethanol) or any fuels not meeting above requirements are NOT approved for use in ECHO 2-stroke gasoline engines.

Use of alternative fuels may cause performance problems, loss of power, overheating, fuel vapor lock, and unintended machine operation, including, but not limited to, improper clutch engagement. Alternative fuels may also cause premature deterioration of fuel lines, gaskets, carburetor and other engine components.

(50 : 1 RATIO) ECHO OIL

- Use a mixture of 50 parts unleaded regular grade gasoline (minimum octane 89) and one part 50 : 1 ECHO 2-stroke Oil (2 %).

Do not use fuel containing methyl alcohol or more than 10 % of ethyl alcohol.

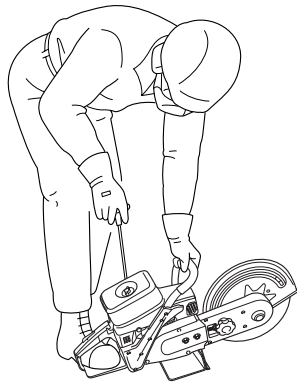
1. Pour 1/2 of the gasoline into a safe container.
2. Add oil to the gasoline and mix them.
3. Add remaining gasoline and mix again.
4. Install fuel cap and wipe spilled fuel from saw, container and the area.

IMPORTANT

Do not mix fuel in engine fuel tank.

STARTING AND STOPPING

SAFE STARTING TECHNIQUES



Set saw down on level ground with wheel or saw blade in the clear. Grasp front handle with left hand, and hold down rear handle with toe of your boot. Never “drop-start” the saw.

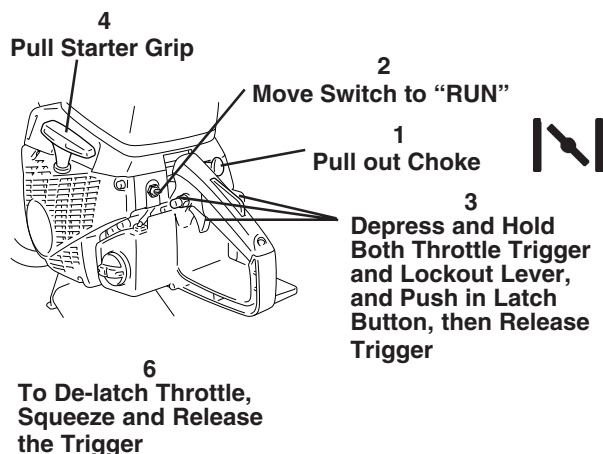
WARNING

Wheel will rotate when engine is started at latched throttle setting. Keep cutting wheel in the clear.

IMPORTANT

- Check unit for loose nuts, bolts and screws before starting.
- Always clear work area of debris before starting operation.
- Always hold the unit firmly.
- When pulling starting rope, use short pulls, 1/2 to 2/3 of rope length.
- Do not allow the starter grip to snap back against the housing.

STARTING COLD ENGINE



1. Pull out choke all the way.
2. Move ignition switch to “RUN” position.
3. Depress and hold throttle trigger and lockout while pushing in latch button to latch throttle for starting.
4. Crank engine. Pull starter grip briskly, but only 1/2 to 2/3 its full length. Pulling rope to the end may damage the starter.
5. Push in the choke the first time engine fires, and crank until engine starts and runs. In cold weather you should keep the choke out just a little until the engine gets very warm. But, do not operate with the choke out.
6. Squeeze and release trigger when engine runs. You now have trigger control of the throttle speed.

STOPPING ENGINE

Move ignition switch down to “STOP” position. Keep wheel in the clear until all movement stops.

If engine does not stop, pull choke control knob out fully to stop engine. The choked engine will slow to a stop. Be sure to keep the wheel in the clear until all movement stops.

WARNING

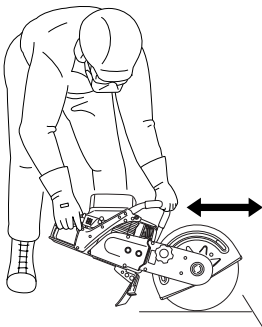
With trigger latched, wheel will rotate as soon as engine starts. Keep wheel in the clear.

Wheel will rotate for some time after the trigger is released. Keep wheel in the clear until all movement stops.

RESTARTING WARM ENGINE

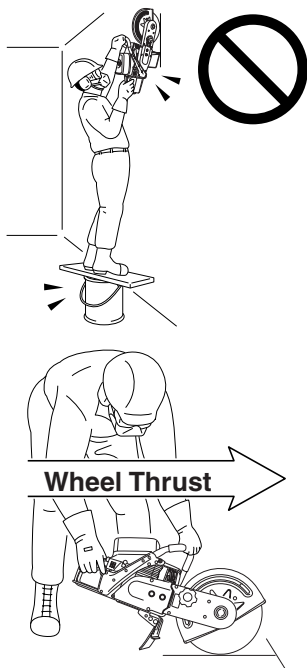
When engine is warm from previous running, move ignition switch to “RUN” position. And push choke control knob all the way in. Try cranking at idle throttle without latching it. If this does not work, try again with throttle latched. Choking may be needed if the engine has cooled. But, to avoid the possibility of over-choking and flooding, always first try to start a warm engine without choking it.

SEQUENCE AFTER STARTING ENGINE



1. Squeeze and release trigger to unlatch it and take control of the throttle.
2. Let engine warm to operating temperature before doing any cutting.
3. Take cutting stance on left side of saw. Never get any part of your body behind the saw. Hold the saw firmly with both hands. Throttle up to cutting speed and make gentle wheel contact with the work.

CUTTING ASPHALT, TAR AND REINFORCED MATERIALS



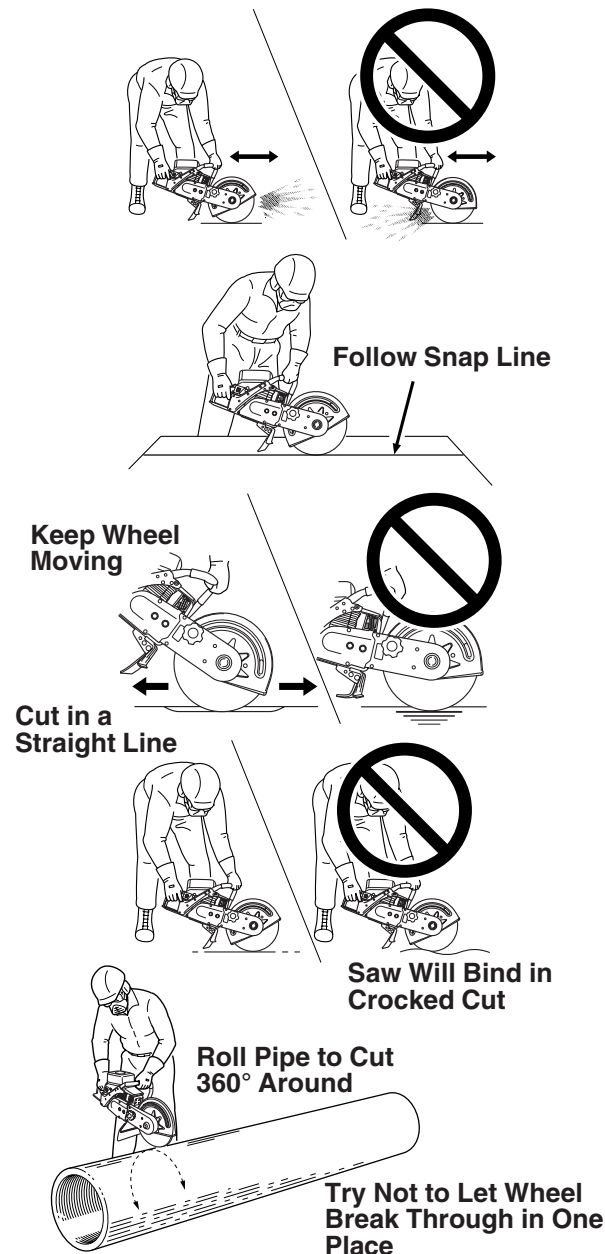
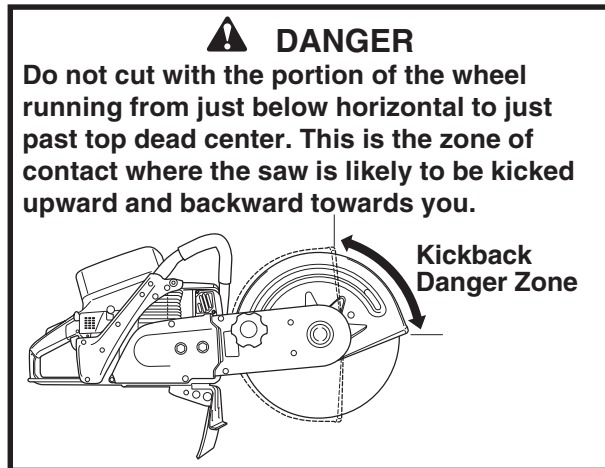
Old, cold and hardened asphalt paving can be cut with a masonry wheel with good results and little trouble with tarring of the wheel. Fresh asphalt and tarred surfaces can gum up the wheel and slow its cutting action. Some tar or resin-impregnated materials also may present problems of this sort.

Masonry containing metal reinforcement is best cut with a masonry wheel which can cut through the reinforcing steel better than a wheel designed for metal can cut the masonry. Expect faster than normal wheel wear.

DANGER

- **Do not raise saw above chest height, because the saw is hard to control when held up high, and dust or sparks will fall on you.**
- **Wear hearing protection. Without it you risk hearing loss, especially where bounce-back of sound waves off nearby surfaces increases the noise.**
- **Do not take awkward or risky operating positions. Find solid footing for both feet, and always hold the saw firmly with both hands. Never make one-handed cuts.**
- **When the wheel engages the work, the thrust will exert a forward pull which you must be ready to control. Keep bystanders out of the way.**

CUTTING TECHNIQUE



The main objectives are to avoid overheating the wheel, and to prevent it from being pinched or trapped or stressed in any way.

- Adjust position of wheel guard to direct the discharge away from you.
- Prepare to make straight cuts only. Use a snap-line to mark long cuts, and follow the marked line carefully.
- Take a balanced, comfortable stance on the left side of the saw. Hold saw firmly with both hands.
- Always throttle up to cutting speed before letting the wheel make contact. The saw may be jerked forward, causing loss of control, if wheel is in contact during throttling up. Carefully let cutting edge of wheel make light contact with the work. Do not push or bounce the wheel onto the work. Hold saw steady. Do not let it tilt or wobble.
- Do not let the wheel stop in one place, but keep it moving - in one direction, or back and forth, along the line of cut. Cutting in one spot causes heat build-up which can damage or glaze the wheel. Too much cutting pressure also causes overheating.
- Cut as shallow and straight a groove as you can. If you cut a curve, the wheel will start to bind as the cut deepens.
- Go over and over the groove you have started until the cut is completed.
- On cuts of long duration, remove saw from cut often to let the wheel cool.
- Never put any side pressure on a cut-off saw wheel, grind on the side of it or use it to flick away debris.
- When cutting large diameter pipe, cut 360 degrees around and try not to cut through. If a large segment of the wheel breaks through, the wheel may catch and kick out at lightning-fast speed.
- Before cutting materials which are not supported along their entire length, provide support to prevent binding. Also be aware that the top section will settle on the wheel if a column is cut in two.

NOTE

Always cut at full throttle. Cutting at less than full throttle may harm the clutch as it will overheat during slippage.

TROUBLESHOOTING CUTTING PROBLEMS

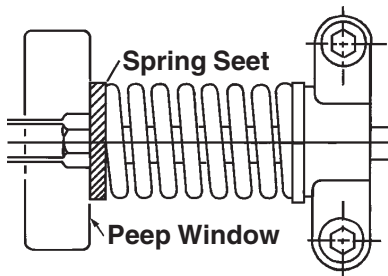
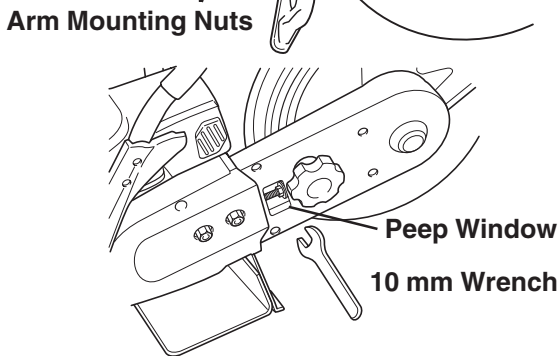
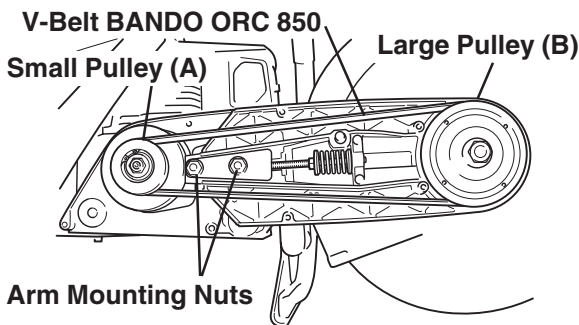
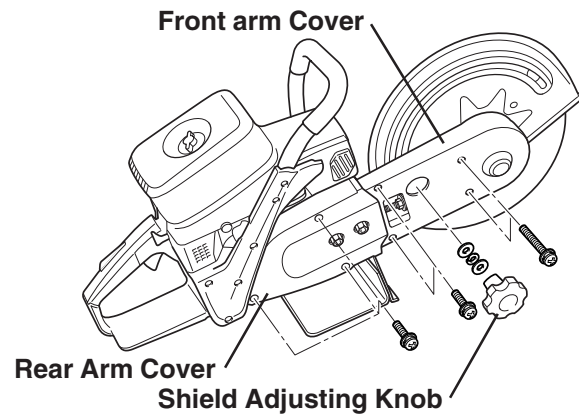
Trouble	Probable Cause	Remedy
Wheel stops when cutting pressure is applied	<ol style="list-style-type: none"> 1. Bearing down too hard. 2. Binding in crooked cut. 3. Binding in closing cut. 4. Loose V-belt. 	<ol style="list-style-type: none"> 1. Ease up cutting pressure. 2. Lay out and follow a straight line. 3. Support material so cut will open. 4. Increase belt tension.
Belt slips and cannot be tensioned properly	Belt worn beyond the limit.	Replace V-Belt.
Poor cutting - wheel discolored at outer area	Heat damage.	Replace wheel. Do not cut long in one spot. Water flush when recommended.

TROUBLESHOOTING ENGINE PROBLEMS

Trouble	Probable Cause	Remedy
Engine will not start	<ol style="list-style-type: none"> 1. Out of fuel. 2. Switch not on. 3. Engine flooded. 4. Fuel strainer clogged. 5. Air filter blocked. 6. Spark plug fouled or cracked. 7. Ignition magneto or spark plug wire faulty. 	<ol style="list-style-type: none"> 1. Fill fuel tank. 2. Move switch to "RUN" position. 3. Remove spark plug. Turn switch off and crank engine to expel the fuel. Install clean, dry, properly gapped spark plug. 4. Install clean fuel strainer. Check that fuel pick-up line is not leaking or clogged. Clean fuel tank. 5. Clean or replace air filter element. 6. Replace plug. 7. Contact nearest authorized ECHO servicing dealer.
Engine hard to start	<ol style="list-style-type: none"> 1. See reasons under "Will Not Start". 2. Water in fuel or fuel has gone stale or sour. 3. Engine not getting the proper fuel/air mixture. 4. Carburetor out of adjustment. 	<ol style="list-style-type: none"> 1. See remedies above. 2. Fill tank with clean, fresh fuel mixture. 3. If over-choked and flooded, remove plug and crank engine before installing clean, dry plug. If not choked enough, set controls properly for starting. 4. See "Carburetor Adjustment" or seek authorized dealer for adjustment.
Engine misses	<ol style="list-style-type: none"> 1. Dirt in carburetor or fuel line. 2. Carburetor out of adjustment. 3. Weak or intermittent spark. 	<ol style="list-style-type: none"> 1. Contact nearest authorized servicing dealer. 2. Adjust, or seek dealer service. 3. Contact nearest authorized servicing dealer.
Engine overheats and/or stalls under cutting load	<ol style="list-style-type: none"> 1. Not enough oil. 2. Air passages around cylinder clogged. 3. Carburetor main adjustment is set too "Lean". 	<ol style="list-style-type: none"> 1. Use proper amount of oil in fuel mixture. 2. Clean air intake grid on starter side, flywheel, cylinder fins and surrounding area. 3. See "Carburetor Adjustment" or seek authorized dealer for adjustment.

MAINTENANCE AND ADJUSTMENT

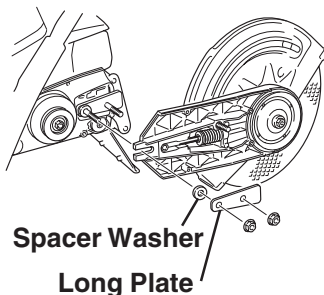
V-BELT CHANGE AND ADJUSTMENT



1. Move ignition switch down "STOP" position.
2. Remove wheel shield adjusting knob, the lock washer and two flat washers.
3. Remove rear arm cover and front arm cover. (Save the seven screws.)
4. Use the 13 mm end of the box wrench to loosen arm mounting nuts just a little.
5. Remove belt tension (with 10 mm open end wrench) by turning the nut counterclockwise as far as it will travel.
6. Push arm towards small pulley. Pull belt off pulley at point (B) and slip new belt onto large pulley. At point (A), start belt over the rim and onto the small pulley.
7. Turn the tension adjusting nut clockwise finger tight. Then reinstall the covers. Turn the adjusting nut until a part of the spring seat is hidden by the forward edge of the peep window.
8. Lightly swing the tip of the arm up and down several times. This sets the tension automatically.
9. Tighten the arm mounting nuts fully, and reinstall the wheel shield adjusting knob.

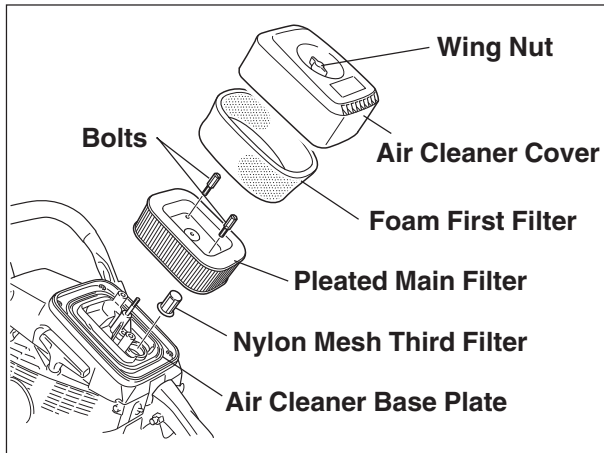
REMounting ARM FOR FLUSH CUTTING

When necessary to cut up close to a barrier, invert and remount the arm so the wheel is on the outboard side.



1. Refer to "V-belt Change and Adjustment" to remove the belt. This time, remove the arm mounting nuts, the long plate and the two spacer washers.
2. Use the parts removed in step one to remount the arm – this time in the inverted position.
3. Push the wheel shield and arm through loop of the V-belt. Follow instructions to mount and tension the V-belt.
4. Reinstall all parts previously removed, and tension the belt.

AIR FILTER



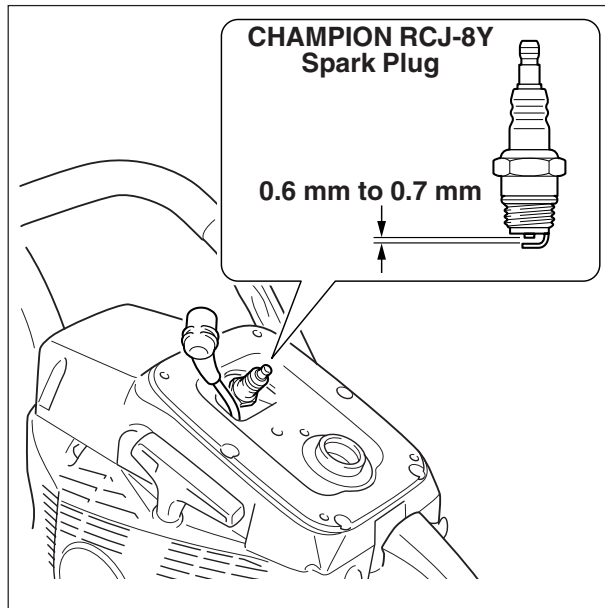
Dust from cutting must be prevented from entering the engine. The three (3) filters in the Air Cleaner System can do this if they are properly maintained and correctly installed. The foam, first filter when used dry should be removed and cleaned each time the fuel tank is refilled. If the foam filter is oiled [recommended to prolong main (paper) filter life], cleaning may be required more frequently if a noticeable drop in power due to a clogged air filter is noted.

IMPORTANT

Excess oil will contaminate the paper (main) filter, shortening its life.

1. Close the choke (pull out knob) before removing the air cleaner cover to prevent debris from entering the carburetor.
2. Loosen the wing nut and remove air cleaner cover.
3. Before removing the filters, clean the accumulated dust from the filters and air cleaner base plate with a soft brush or by gently blowing (Do not use compressed air).
4. The third (nylon mesh) filter should be removed only when cleaning is necessary. When re-installing, be sure filter base is properly installed in the rubber connector.
5. Clean the foam (first) filter and nylon (third) filter in water/detergent solution. Wrap the foam filter in a clean cloth and squeeze (Do not wring) dry.
6. If foam (first) filter is to be oiled, soak it in clean 20W or 30W engine oil. Again wrap the filter in a clean dry cloth and squeeze (Do not wring) until the filter appears dry.
7. Clean the main filter by gently tapping filter flat against a flat surface. Do not brush or wet the paper, harsh cleaning methods will damage the filter. Fasten firmly the main filter mounting bolts.
8. Examine all three filters for cracks or tears. Replace any filter that is, or appears, clogged or damaged after cleaning.

SPARK PLUG



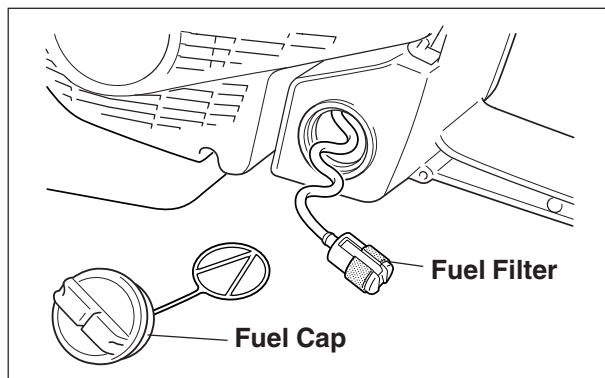
1. Clean the outside of the saw. Then follow instructions to disassemble the air cleaner.
2. Remove five screws and lift off the air cleaner base plate to expose the spark plug. Pull off the cap and remove the plug.
3. The proper spark plug for this engine is CHAMPION RCJ-8Y. The firing gap between the electrodes should be adjusted to 0.6 mm - 0.7 mm before use.
4. Install the spark plug. Proper tightness with a cold engine is 15 to 17 N•m.
5. Many failed plugs can be restored by filing or scraping the electrodes down to bare metal, cleaning all deposits off the porcelain insulation around the center electrode, then re-gapping.



WARNING

Fuel vapors are extremely flammable and may cause fire and/or explosion. Never test for ignition spark by grounding spark plug near cylinder plug hole, otherwise serious personal injury may result.

REPLACE FUEL FILTER



(CHECK PERIODICALLY)

1. Do not allow dust to enter fuel tank.
2. Clogged filter will cause difficulty in starting engine or abnormalities in engine performance.
3. Pull the fuel filter out through fuel inlet port with a piece of steel wire or the like.
4. When the filter is dirty, replace it.
5. When the inside of the fuel tank is dirty, rinsing the tank out with gasoline can clean it.



WARNING

Check condition of fuel cap and gasket. Be sure the cap fits tightly and there is no fuel leak.

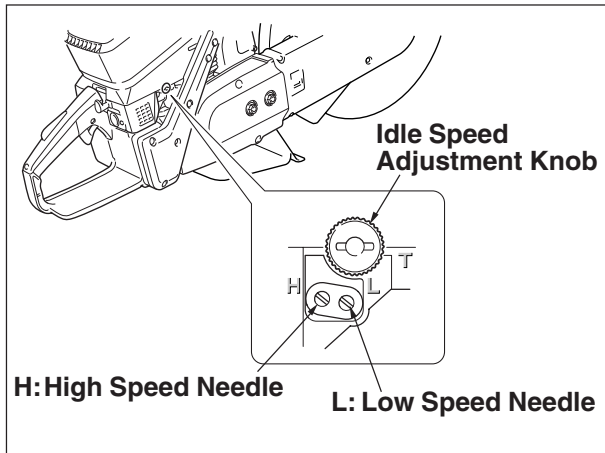
WHEEL SHIELD TIGHTNESS

The wheel shield mount includes a metal spacer. The metal spacer should be removed, when tightening of the wheel shield locking knob no longer locks the guard in position.

1. Remove abrasive wheel and both flanges.
2. Remove the circular metal plate and the wheel shield, held by three small screws.
3. Remove the metal spacer, and reinstall the metal plate and shield.
4. Reinstall wheel between inner and outer flanges.

NOTE: Hub of outer flange fits inside larger hub of inner flange. Do not reverse flange position or the wheel will be locked.

CARBURETOR ADJUSTMENT



Every unit is run at the factory and the carburetor is set in compliance with Emission Regulations. In addition, the carburetor is equipped with "H" (High Speed) and "L" (Low Speed) needle adjustment limiters that prevent settings outside acceptable limits.

1. Before adjusting carburetor clean or replace air filter and muffler "Spark Arrestor Screen".
2. Start engine and run several minutes to bring to operating temperature. Flash choke twice during warm-up to clear any air from the fuel system.
3. Stop engine.
Turn "H" speed needle counterclockwise (CCW) to stop.
Turn "L" speed needle midway between full clockwise (CW) stop and CCW stop.
4. Idle Speed Adjustment:
 - Start engine, turn "Idle" speed adjustment knob CW until the wheel begins to turn, then turn knob out CCW until the wheel stops turning.
Turn knob out, CCW, an additional 1/4 turn.



WARNING

Cutting attachment must not move when unit is idling.

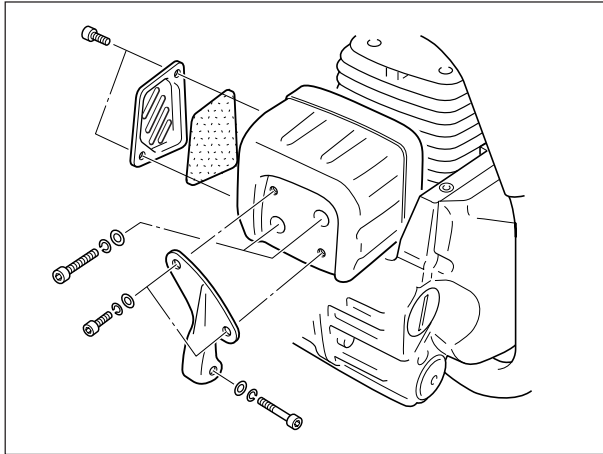
5. Accelerate to full throttle for 2 - 3 seconds to clear any excess fuel in the engine, then return to idle.
Accelerate engine to full throttle to check for smooth transition from idle to high speed.
If engine hesitates turn "L" needle CCW 1/8 turn and repeat acceleration.
Continue adjustment until smooth acceleration results.
6. Check idle speed and reset if necessary as described in item 4. If a tachometer is available idle speed should be set to 2600 - 2800 r/min.



CAUTION

When starting, idling adjustment speed should be adjusted not to rotate the wheel. Correct idle speed is adjusted 2600 to 2800 r/min. Or 1/4 turn CCW from the point the wheel stops moving. When you experience trouble with the carburetor, contact your dealer.

CLEAN MUFFLER AND COOLING SYSTEM



The dust created in cutting is drawn into the cooling system by the rotor fan. It can cover the cooling fins and clog the air passages. Unless the system is cleaned in time, the engine will run too hot. Whenever cleaning the cooling system, take advantage of the necessary removal of the covers, and check the muffer at the same time.

1. Always begin cleaning by blowing or wiping down the outside of the unit before doing any disassembly.
2. Remove the parts of the air cleaner necessary to expose the cylinder for cleaning. (See drawing, page 20) Be careful to clean out the air cleaner base plate if any dirt falls into it.
3. Clean all dust and grime out of the cooling system passageways, and scrape the cylinder cooling fins down to bare metal.
4. Clean deposits from silencer and tighten bolts. Use only parts in good condition when reassembling.
5. Reassemble the air cleaner on the saw.

CLUTCH AND MAXIMUM SPEED CHECKS

CLUTCH

Slipping of the clutch under a cutting load is not the only thing that can happen to a clutch. Another problem may appear during setting of the carburetor for proper idling speed. The clutch may be at fault if an adjustment high enough for stable idling results in wheel rotation. Such a condition should be checked out by your servicing dealer before any further use of the saw.



WARNING

To ensure the wheel does not over speed, the engine no load speed must be adjusted to a maximum of 10500 r/min. Use a tachometer to measure speed. If engine speed exceeds 10500 r/min, have the unit serviced by your nearest ECHO servicing dealer before further use.

SPEED

Whenever activated, the vibration-sensitive governor in the carburetor high speed fuel circuit supplies more fuel than the engine can burn. Consequently, the engine has to purge itself of the extra fuel and slows down in the process.

Proper high speed adjustment (see page 22) of the carburetor should result in engine high speed, no load, operation within the desired range. This range is 10000 r/min \pm 500 r/min, which is required for the proper wheel spindle speed range of 4850 - 5250 r/min.

STORAGE AFTER USE

- Inspect and adjust every part of the cut-off saw.
 - Completely clean every part and repair if necessary.
 - Apply thin coating of oil on metal parts to prevent rust.
- Remove cutting wheel.
- Drain fuel tank, pull starter slowly a few times to drain fuel from carburetor.
- Pour a small amount of clean motor oil into spark plug hole, pull starter and crank the engine until piston reaches: TOP DEAD CENTER.
- Store in a dry area, free from dust.



WARNING

Do not store in enclosure where fuel fumes may accumulate or reach an open flame or spark.



CAUTION

Do not lend or rent your cut-off saw without the operator's manual.

NOTE

- For future reference, you should keep this operator's manual.
- If this operator's manual has become illegible or is lost, please purchase a new one from your ECHO dealer.

SPECIFICATIONS

Dimensions Length × Width × Height	730 mm × 250 mm × 360 mm
Mass	10.8 kg dry mass w/o cutting wheel
Engine Displacement Bore Stroke Compression ratio Intake Carburetor Ignition system Spark plug Muffler	Air-cooled, 2-stroke, single cylinder gasoline engine 66.8 mL 50.0 mm 34.0 mm 7.3 : 1 Piston valve WALBRO diaphragm type with speed limiter Flywheel magneto, capacitor discharge ignition type CHAMPION RCJ-8Y Spark arrestor muffler
Throttle control	Throttle trigger with throttle lockout and throttle latch
Fuel tank capacity	650 mL
Fuel Fuel oil ratio Gasoline	Mixed fuel 50 : 1 ratio with ECHO Power Blend X™, ISO-L-EGD (ISO/CD 13738) and JASO M345-FC/FD two-stroke, air-cooled engine oil. Use 89 octane unleaded. Do not use fuel containing methyl alcohol, more than 10 % ethyl alcohol or 15 % MTBE. Do not use alternative fuels such as E-20 or E-85.
Starter system	Automatic rewind starter
Clutch	Clutch Centrifugal type
Engine speed	Idle: 2700 r/min Clutch engagement: 3800 r/min Wide open throttle: 9500 to 10500 r/min
Cutting device Belt Pulley ratio tensioner Cutting wheel	BANDO ORC 850 2 : 1 Spring 305 mm × 20 mm diameter 305 mm × 25.4 mm diameter with adapter
Vibration reduction system	Rubber isolaters mounted between the engine and the handles
Air cleaner	3 stage type: sponge filter, bellows type paper filter and nylon mesh filter
Attachment Water kit Cart kit	Option Option

* Technical data subject to change without notice.