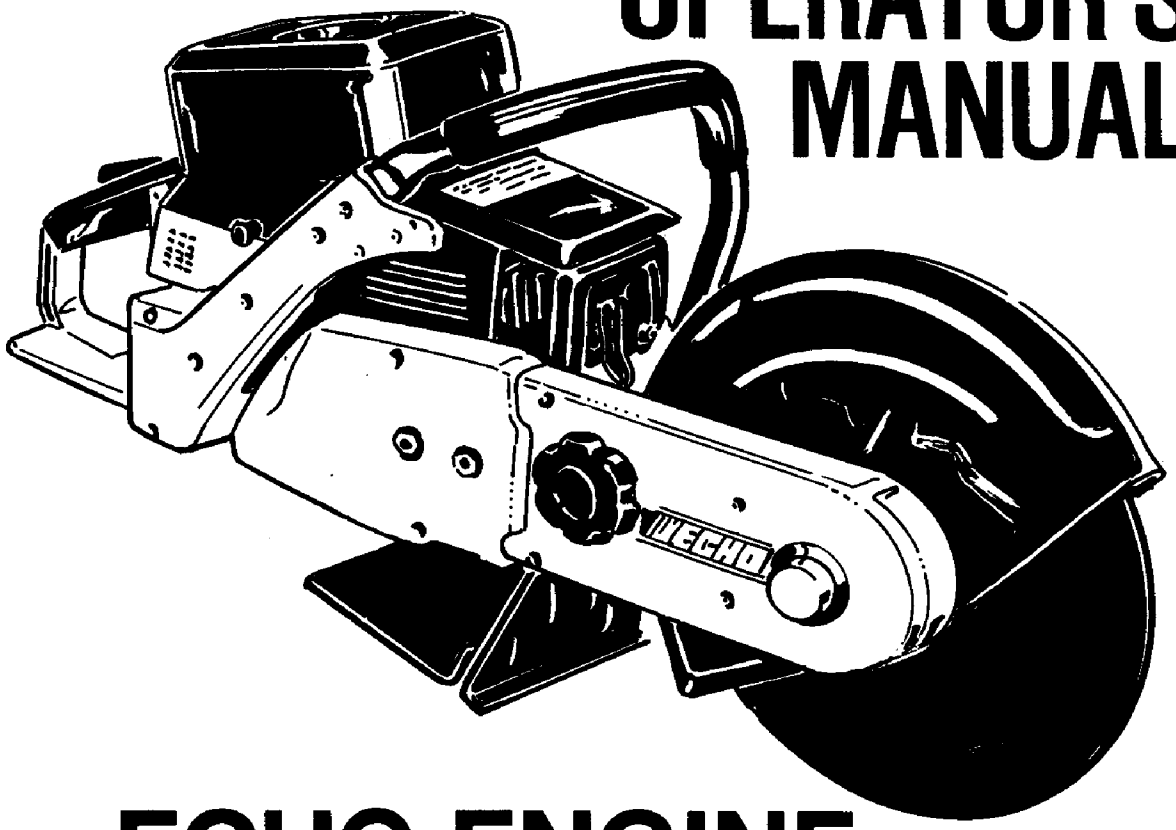
OPERATOR'S MANUAL



ECHO ENGINE CUT-OFF SAW CSG-6700

WARNING ⚠ DANGER
READ AND FOLLOW RULES FOR SAFE OPERATION AND INSTRUCTIONS CAREFULLY. FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY.

ECHO®

INTRODUCTION

The ECHO model CSG-6700 Cut-off Saw is a high-performance gasoline-powered tool designed for use with a recommended 12" x ⅛" x 20mm abrasive wheel. A water-flush attachment is available for dust control.

Use only ECHO wheels or other wheels having a minimum spindle speed rating of 6000 rpm 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 ⚠ DANGER

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.

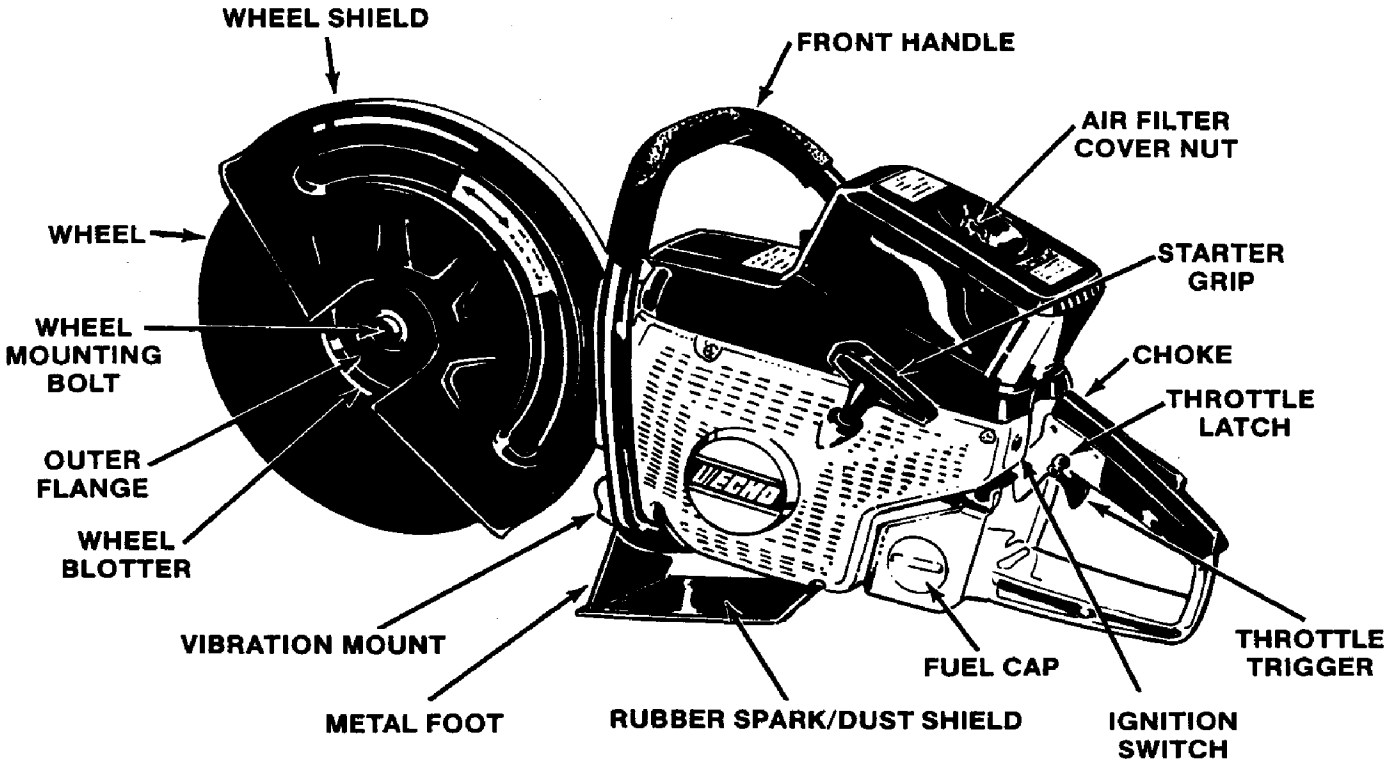
⚠ WARNING ⚠

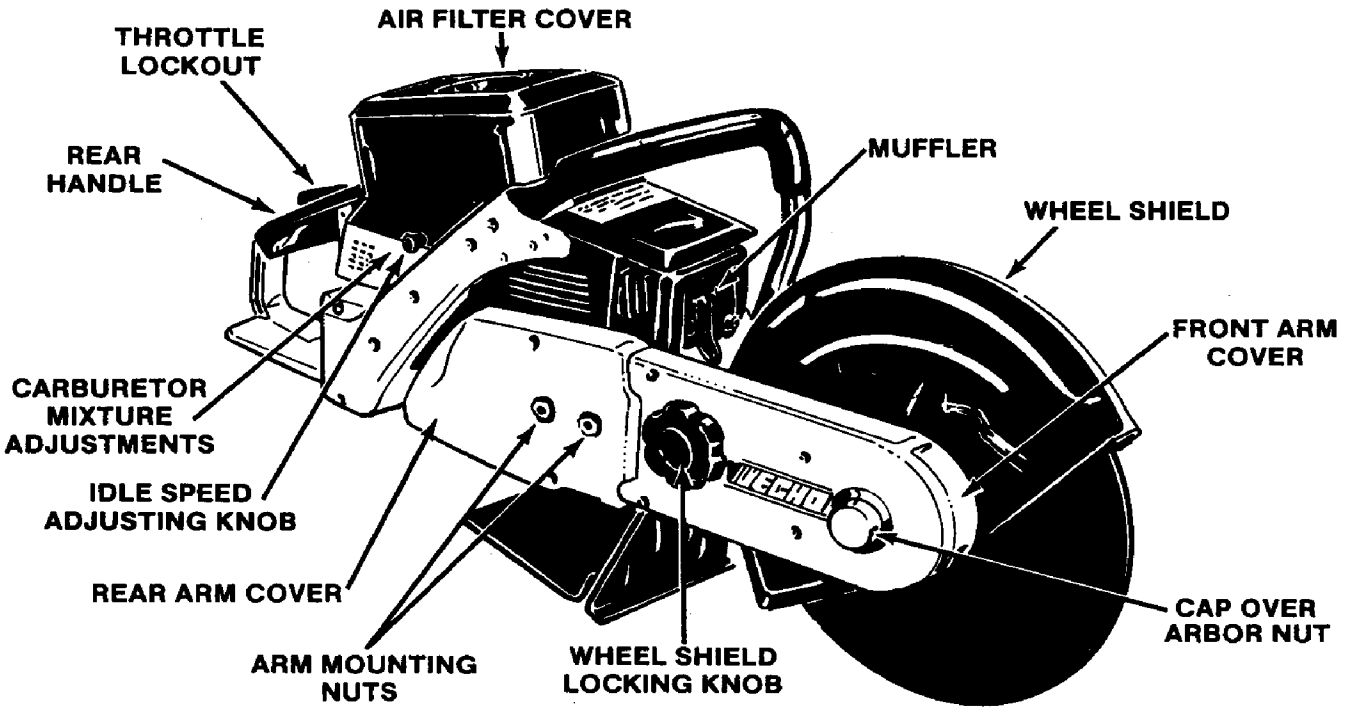
The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

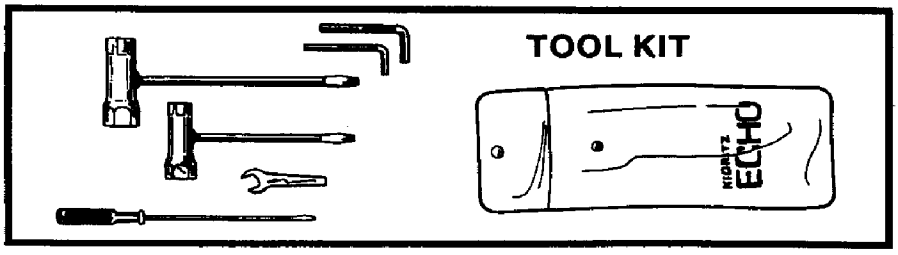
CONTENTS

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.

DESCRIPTION



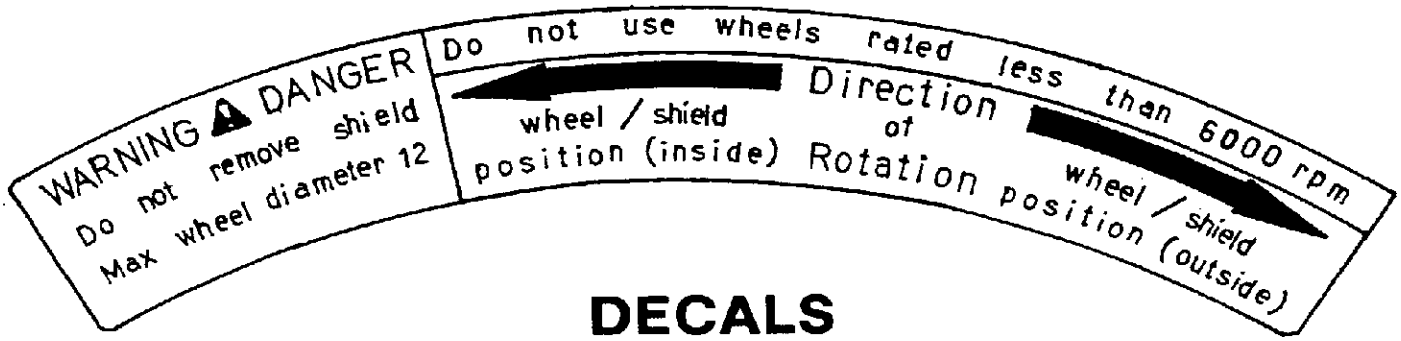




SYMBOLS AND SIGNS

This symbol and the word "DANGER" call attention to messages describing dangerous practices and what you MUST do or not do to avoid serious injury.

Circle and slash symbol means whatever is shown is prohibited.



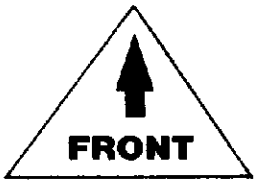
DECALS

NOTE

Always cut at wide open throttle and with the wheel fully up to speed. Failure to do so may cause premature belt or wheel wear.

CSG-6700

⚠DANGER — Read and follow all safety precautions in operator's manual. Failure to do so could result in serious personal injury.



1. **Read and understand your operator's manual before using this product.**
2. **Use only ECHO approved cutting accessories.**
3. **Always wear proper safety equipment as outlined in your operator's manual.**
4. **Do not twist or overload the wheel while cutting.**
5. **For a copy of the operator's manual, contact your ECHO dealer or ECHO, INC., 400 Oakwood Rd., Lake Zurich, IL 60047**

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 ethyl alcohol (ethanol) or methyl alcohol (methanol) 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 Z87 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 of the saw, in a 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.

Terms (Continued)

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 (rpm) 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.

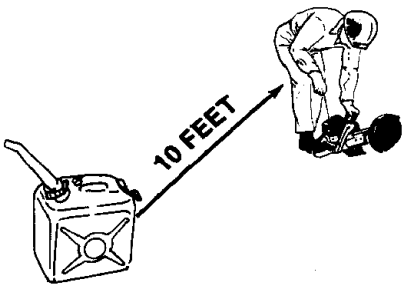
WHEEL THRUST — The force of the wheel against the work, felt by the operator as a pull of the saw.

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.

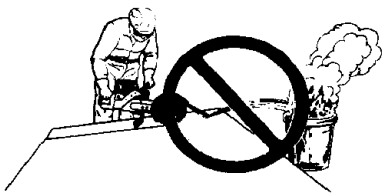
Use safety footwear, snug-fitting clothing and protective gloves. Wear eye, hearing and head protection devices. Use ballistics chaps or pants when necessary. Clothing of fire-resistant and unmeltable material should be worn by emergency crews exposed to flames or high heat conditions.



Use caution when handling fuel. Put the gas caps back tightly on both the gas can and the saw tank, move at least 10 feet 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.

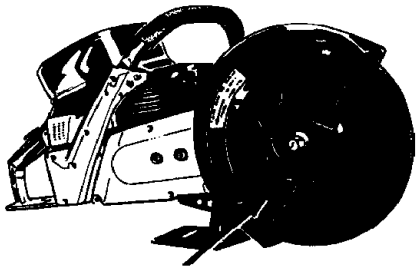
Operate this gasoline engine saw only in well-ventilated areas.

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.

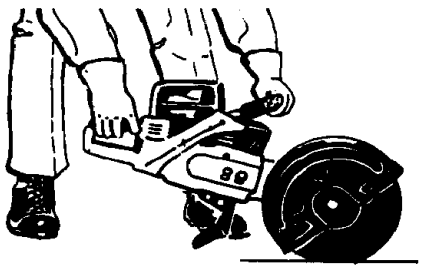
Do not allow other persons to be nearer than 30 feet when you are starting or cutting with the saw. Be aware that bystanders should wear hearing and eye protection. Do not start cutting unless you have good footing and the work area is clear.



ADJUST WHEEL SHIELD

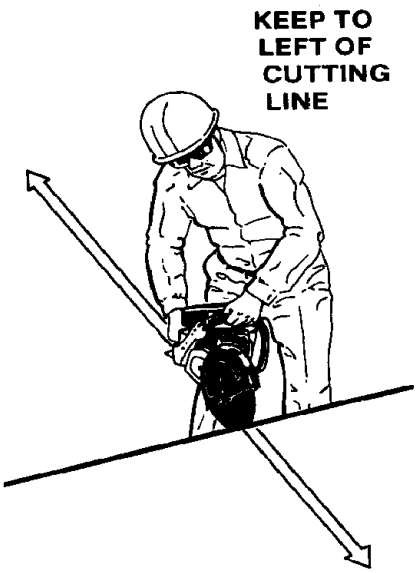
Do not let someone hold the work you are cutting.

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 kicks back toward you, or the thrust of the rotating wheel pulls it away from you. Never operate the saw with only one hand.

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.



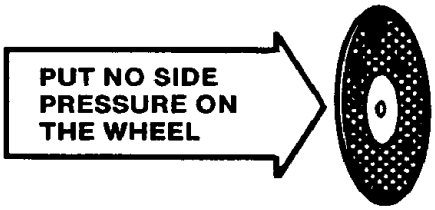
Do all cutting at full throttle speed. Cutting at less than full speed can damage the clutch by allowing it to slip. Accelerating from slow to full speed while the wheel is in cutting contact may cause a violent push or pull reaction resulting in loss of control.

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.

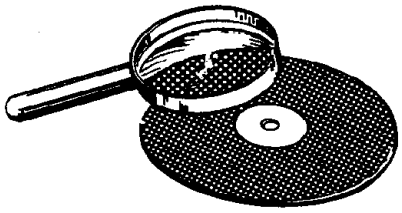
Remove the wheel from the saw prior to transport or storage. Store wheels properly to avoid damage from uneven pressure, moisture and extreme temperatures.

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.

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



CHECK FOR
WHEEL DAMAGE

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.

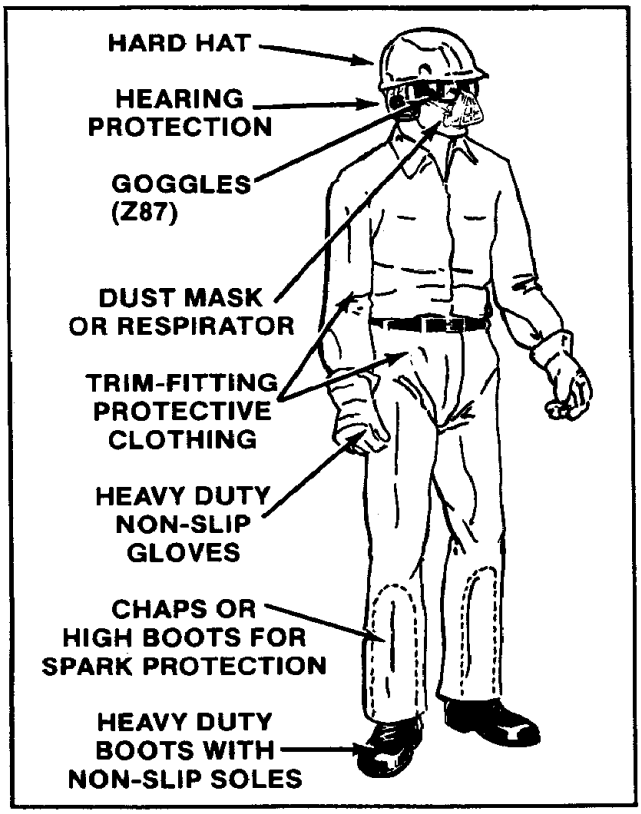
Overspeeding of the engine, or wrong size pulleys in the belt transmission can result in dangerously high wheel speeds. Install only the proper diameter pulleys in the belt transmission. The engine **no load** maximum speed is controlled by a vibration-sensitive governor. Check speed with a tachometer,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

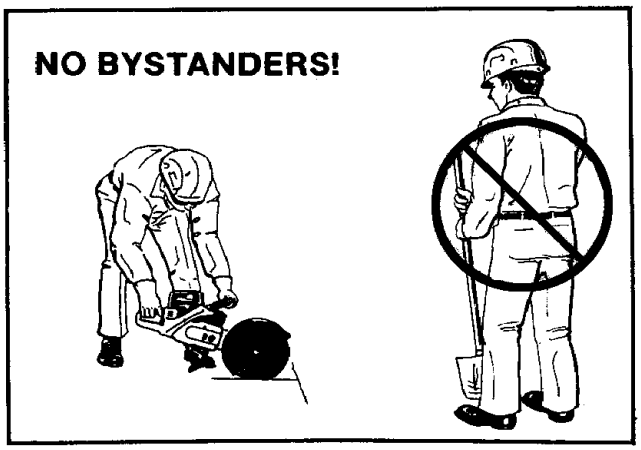
PREPARING FOR USE

WARNING ⚠ DANGER
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 Z87. (Z87 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 "WARNING/DANGER," page 18.)
- 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

Spectators, children and fellow workers must be warned to come no nearer than 30 feet while the saw is in use. Shut off the saw immediately if someone moves closer to you than 30 feet. 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

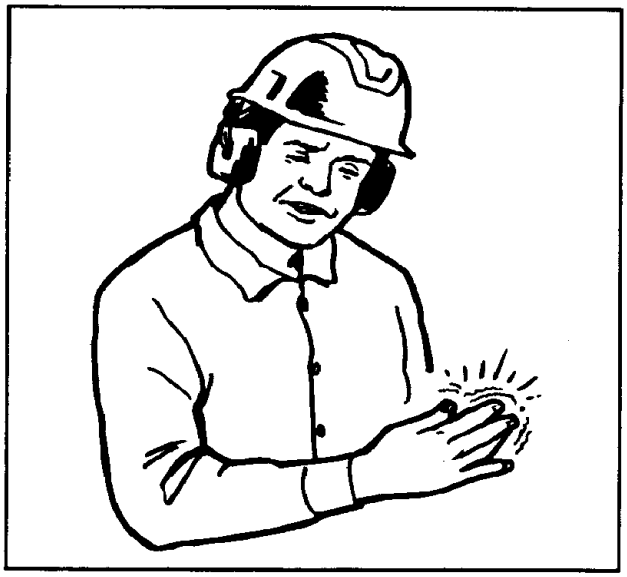
Your judgement and/or dexterity may be impaired if you are ill or have taken alcohol or other substances known to affect the way you would function normally. Operate only when sound in mind and body.

WARNING ⚠ DANGER

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 is 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

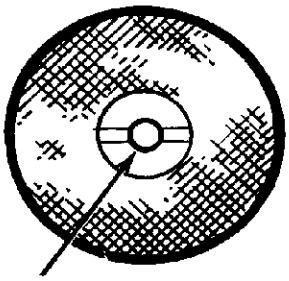
ECHO Wheels are labeled for the type of materials they are designed to cut. The types of wheels identified below, and other types, may be available from your ECHO dealer.

Labeled Application	Prime Use	Other Uses	Dry or Water Flush
METAL	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
RAILTRACK	Heat treated, wear hard-ened 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

ECHO REINFORCED WHEELS

WHEEL SPEED RATING

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



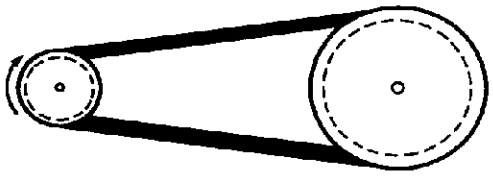
READ LABEL ON THE WHEEL

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 rpm if the wheel speed is rated at 6000 rpm. (See "Engine Speed and Wheel Speed," below.)

ENGINE SPEED AND WHEEL SPEED

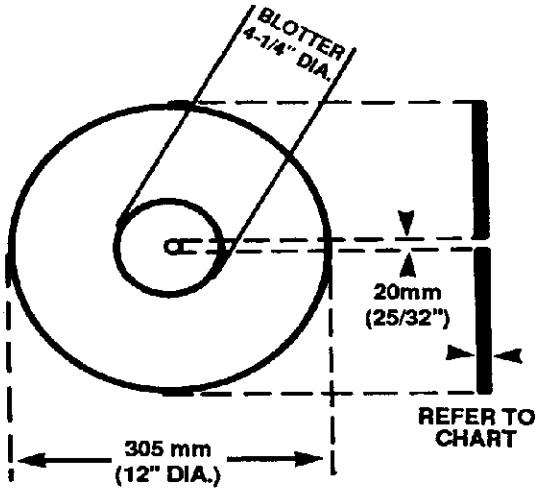
Since the reduction ratio of the engine drive pulley to the large driven pulley is about 2 to 1, the wheel speed will be half whatever the engine drive pulley speed is.



ENGINE DRIVE PULLEY
10,000 RPM ± 500 RPM = 4750-5250 RPM
WHEEL SPEED

The unit has a governor system designed to govern the engine high speed, at no load, to within 500 rpm of 10,000 rpm, at which the wheel speed should range between 4750 and 5250 rpm. – safely inside the 6000 rpm limit. If the engine exceeds this speed limit, take it to your nearest ECHO servicing dealer for service.

WHEEL DIMENSIONS			
	WHEEL DIA.	MOUNTING HOLE DIA.	THICKNESS
ABRASIVE WHEELS:	305mm (12")	20mm (25/32")	3.2mm (1/8")
DIAMOND WHEEL:	305mm (12")	20mm (25/32")	2.7mm (.106")



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 4-1/4" 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.

EMERGENCY APPLICATIONS

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.

WARNING ⚠ DANGER
Do not grind with a cut-off wheel or put pressure on the sides.

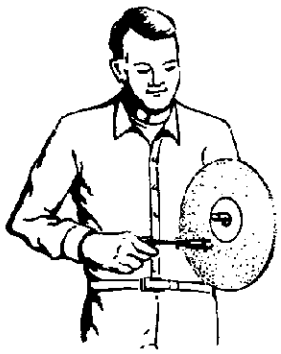
WARNING ⚠ DANGER
Do not mount wheel if blotters are damaged. Do not destroy cushioning effect by making mounting bolts too tight. Proper torque is 15 ft. lbs. (20.3 Nm).

WARNING ⚠ DANGER
Examine wheel carefully before use. Do not use if wheel is warped, damp, cracked, chipped or cutting area shows heat discoloration.

⚠ WARNING DANGER	**A wheel once dropped can not be trusted. Discard a wheel if you drop it.**

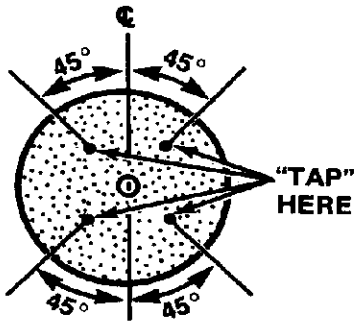
RING TESTING WHEELS

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.

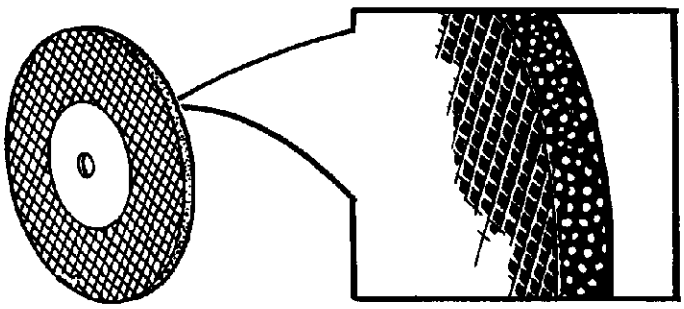


Put your finger through the mounting hole to support the wheel. Use a non-metallic handle of any small tool or a small piece of wood to lightly tap (do not hit) the wheel in the locations shown in the illustration. Do not tap wheel on the edge. Uncracked wheels will make a ringing sound, wheels with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

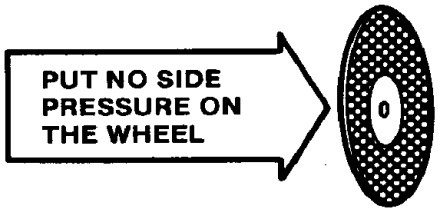
The wheel's ability to cut certain materials is due to the type abrasive, size of the grit and it's spacing. The reinforcement on both sides adds strength and rigidity.

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.

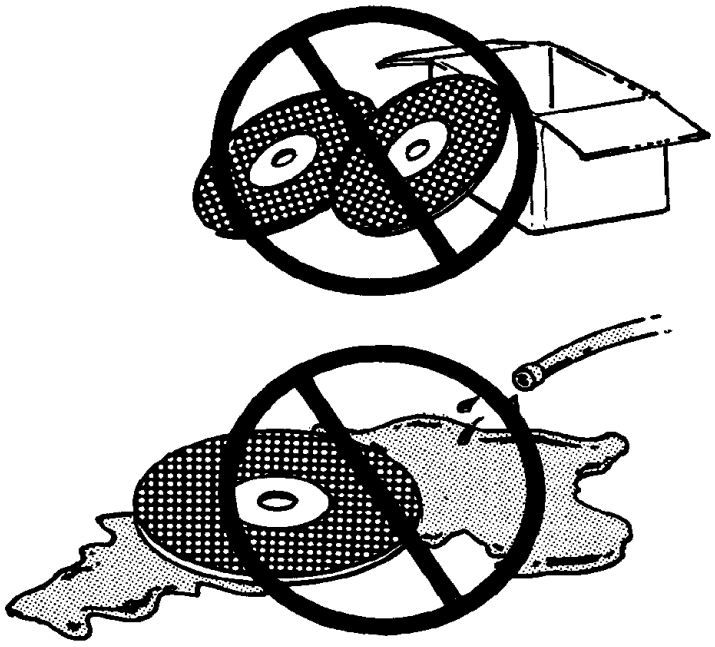
WARNING ⚠ DANGER
Do not grind with a cut-off wheel or put pressure on the sides.

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.

WARNING ⚠ DANGER
Use only ECHO reinforced wheels, or wheels approved for this saw by ECHO, Inc. 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, wraped, out-of-round or edge-damaged.



Saws intended for forcible entry should be equipped with new wheels for each use. If the used wheels can pass the ring test (page 13) and close inspection, they may be of use in training emergency crews.



HANDLING AND STORAGE OF WHEELS

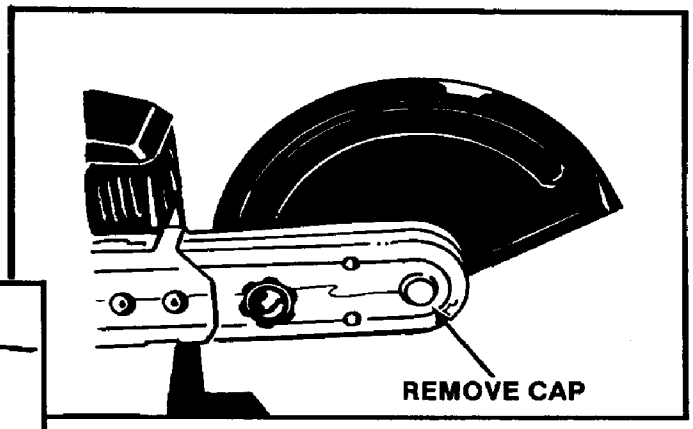
Check every wheel for warping, cracks and broken edges before mounting on the saw.

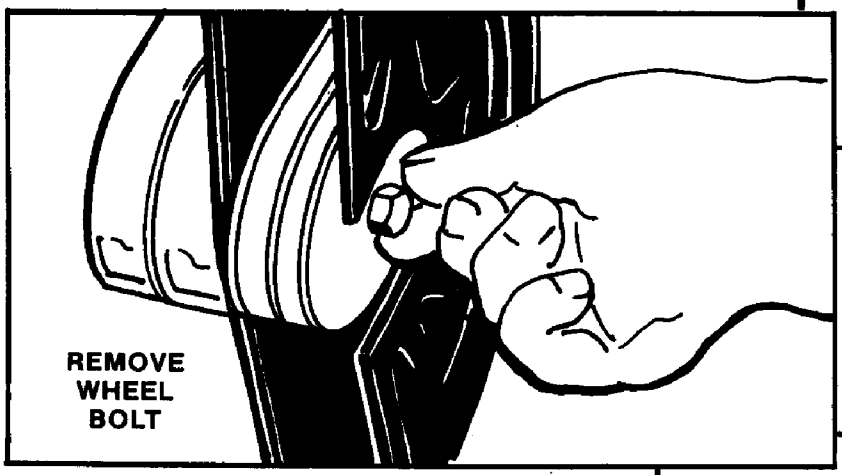
Warped wheels do not cut properly and may be stressed to the point of breaking. Always store your wheels down flat on a smooth, flat and dry surface. When stacking many wheels, place cardboard or paper spacers between them as a cushion.

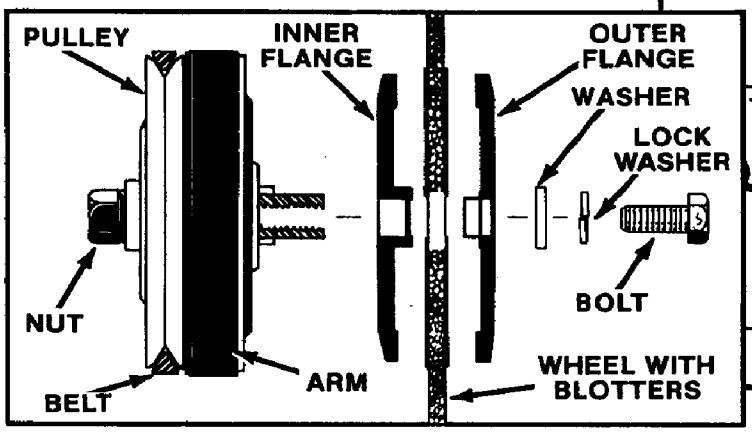
Moisture and heat both can cause wheel damage. Do not let wheels lie in the sun or expose them to high heat. Keep wheels dry at all times, and store in an area of low humidity and moderate temperature. Protection from moisture damage applies during water-flush cutting. To keep water from penetrating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

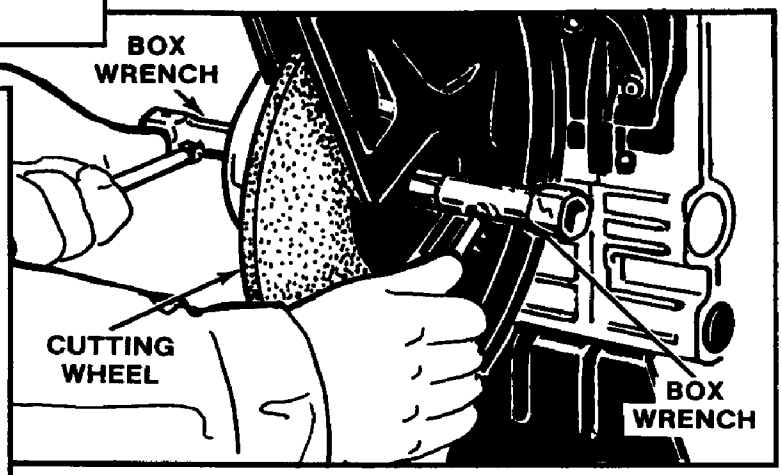
HOW TO INSTALL THE WHEEL

1. Remove the cap from the arm for access to the nut at front of the arm.
2. Two combination (17mm/19mm) box wrenches are supplied. Use one wrench to keep nut from turning. Unscrew wheel mounting bolt with the other wrench or your fingers. Remove wheel bolt, washers and outer flange, leaving inner flange in 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.









NOTE
Arm may be removed and remounted with wheel on the outboard side of the arm as required for certain procedures. See page 17 for details.

WARNING ⚠ DANGER
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. [Do not tighten more than 15 ft. lbs. (20 Nm)].

WARNING ⚠ DANGER
Inner and outer flanges are not interchangeable. Reversing positions may cause wheel damage and lock the wheel.

OPERATION

2-STROKE FUEL

50:1 Mixture
Mix one part, "specially blended ECHO branded 50:1 two cycle engine oil," with 50 parts unleaded gasoline, (minimum octane - 87).

ALTERNATE 2-STROKE FUEL

32:1 Mixture
Mix one part, "specially blended ECHO branded 32:1 two cycle engine oil," with 32 parts unleaded gasoline, (minimum octane - 87).

NOTE
Do not use gasohol or alcohol-blended fuels in this engine.

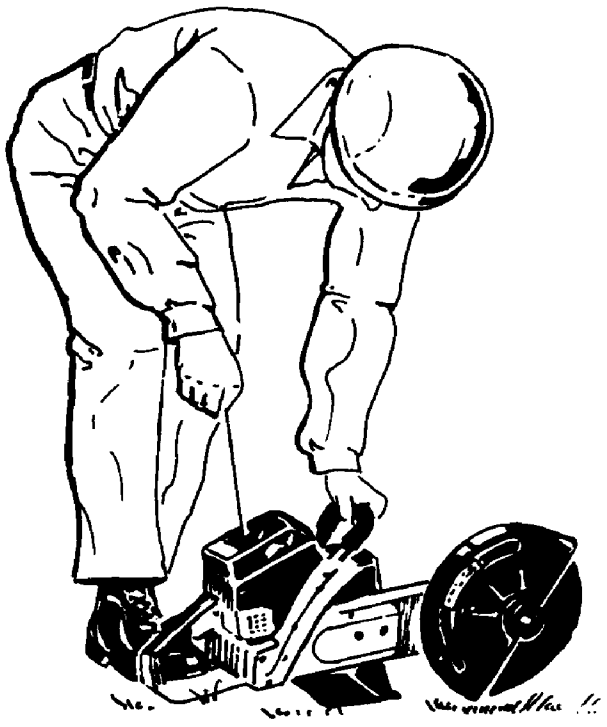
MIXING FUEL

NOTE
Use only fuels recommended in this section.

IMPORTANT
Do not mix fuel in engine fuel tank.

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

STARTING AND STOPPING

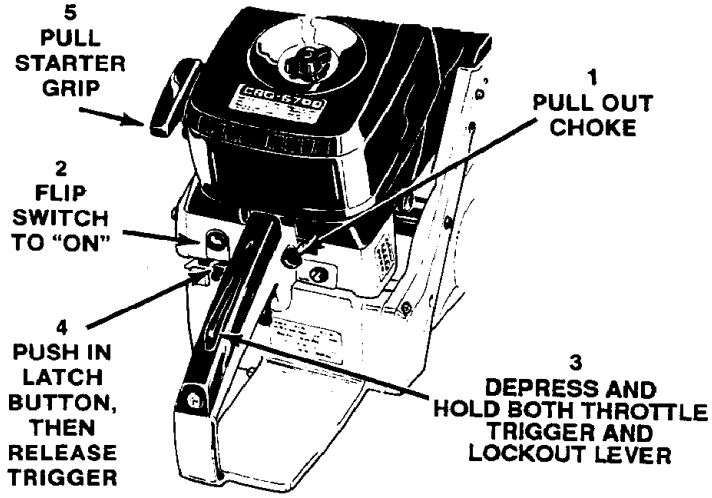


SET SAW DOWN ON LEVEL GROUND WITH WHEEL OR SAW BLADE IN THE CLEAR. GRASP FRONT HANDLE WITH LEFT HAND, AND HOLD DOWN REAR HANDLE WITH TOE OF YOUR BOOT. NEVER "DROP-START" THE SAW.

SAFE STARTING TECHNIQUES

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.

WARNING ⚠ DANGER
WHEEL WILL ROTATE WHEN ENGINE IS STARTED AT LATCHED THROTTLE SETTING. KEEP CUTTING WHEEL IN THE CLEAR.



STARTING COLD ENGINE

1. Pull out CHOKE all the way.
2. Flip SWITCH to "ON."
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

Flip SWITCH down to stop the engine. Keep wheel in the clear until all movement stops.

If engine fails to stop when switch is flipped down, PULL OUT THE CHOKE. The choked engine will slow to a stop. Be sure to keep the wheel in the clear until all movement stops.

WARNING ⚠ DANGER

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

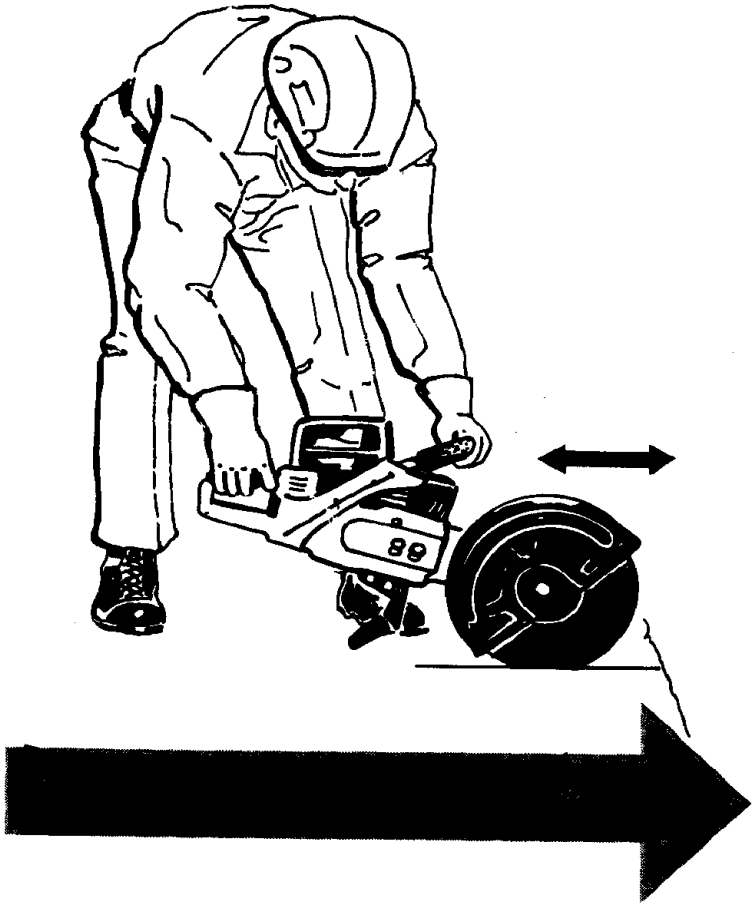
Wheel will rotate for some time after the trigger is released. Keep wheel in the clear until all movement stops.

RESTARTING WARM ENGINE

When engine is warm from previous running, flip SWITCH to "ON." and push CHOKE 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

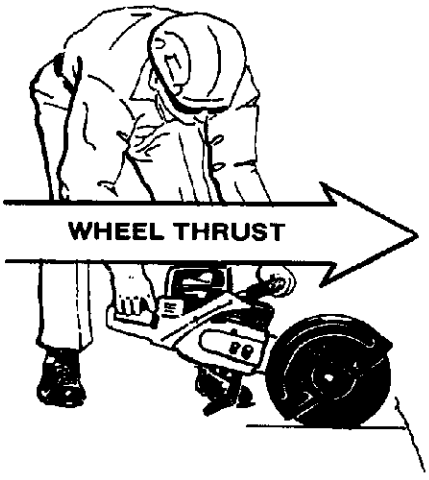
Old, cold and hardened asphalt paving can be cut with a masonry wheel with good results and little trouble with tarring of the wheel. Fresh asphalt and tarred surfaces can gum up the wheel and slow its cutting action. Some tar or resin-impregnated materials also may present problems of this sort.

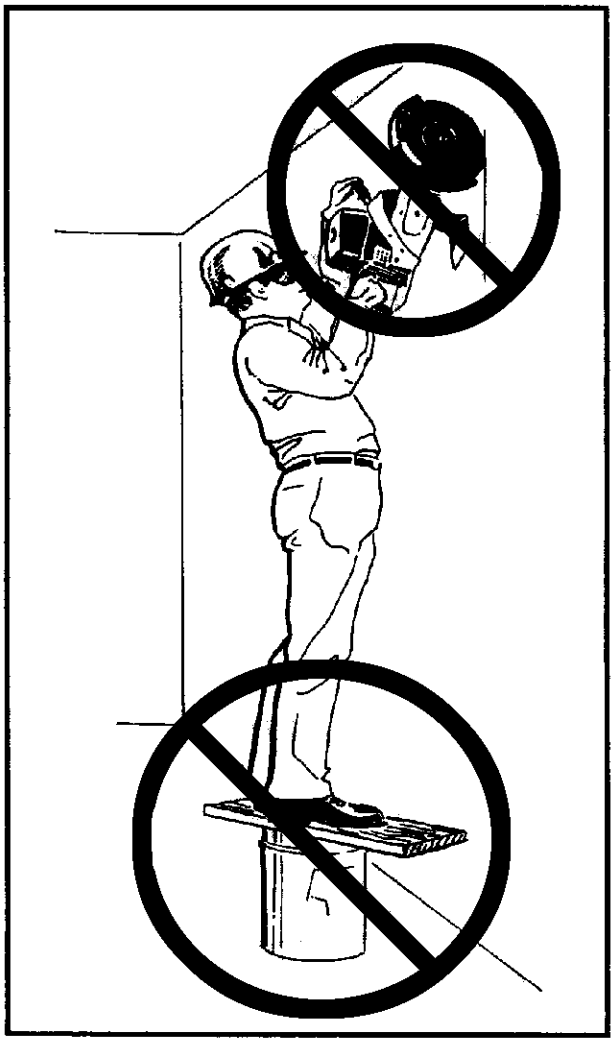
Masonry containing metal reinforcement is best cut with a masonry wheel which can cut through the reinforcing steel better than a wheel designed for metal can cut the masonry. Expect faster than normal wheel wear.

WARNING ⚠ 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.

WARNING ⚠ DANGER
Wear hearing protection. Without it you risk hearing loss, especially where bounce-back of sound waves off nearby surfaces increases the noise.

WARNING ⚠ DANGER
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.





WARNING ⚠ DANGER
When the wheel engages the work, the thrust will exert a forward pull which you must be ready to control. Keep by-standers 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.

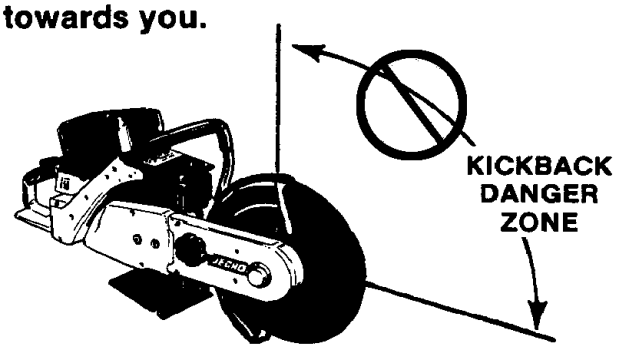
- Adjust position of wheel guard to direct the discharge away from you.
- Prepare to make straight cuts only. Use a snap-line to mark long cuts, and follow the marked line carefully.
- Take a balanced, comfortable stance on the left side of the saw. Hold saw firmly with both hands.
- Always throttle 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.

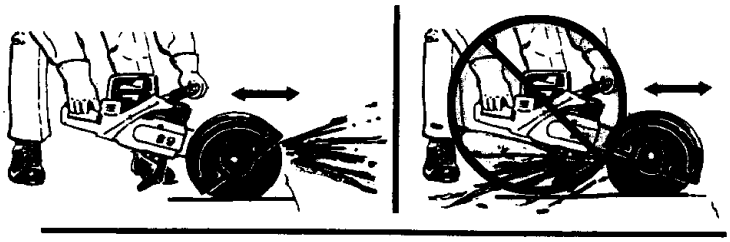
NOTE

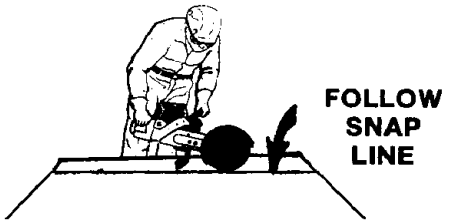
Always cut at full throttle. Cutting at less than full throttle may harm the clutch as it will overheat during slippage.

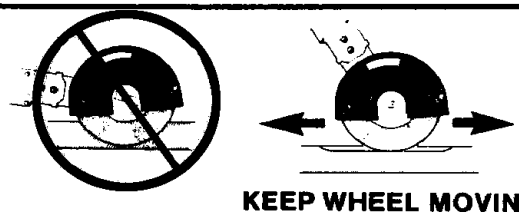
WARNING ⚠ DANGER

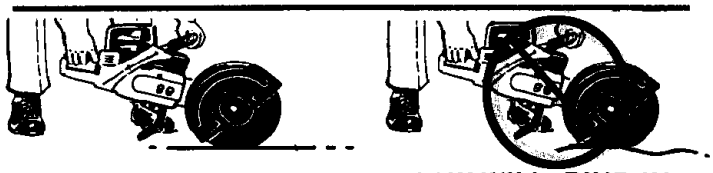
Do not cut with the portion of the wheel running from just below horizontal to just past top dead center. This is the zone of contact where the saw is likely to be kicked upward and backward towards you.

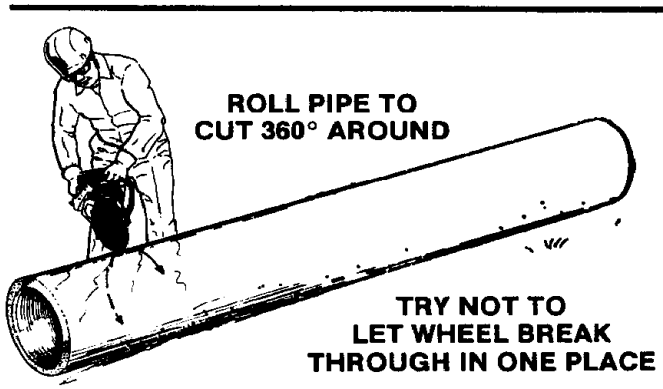












TROUBLESHOOTING CUTTING PROBLEMS

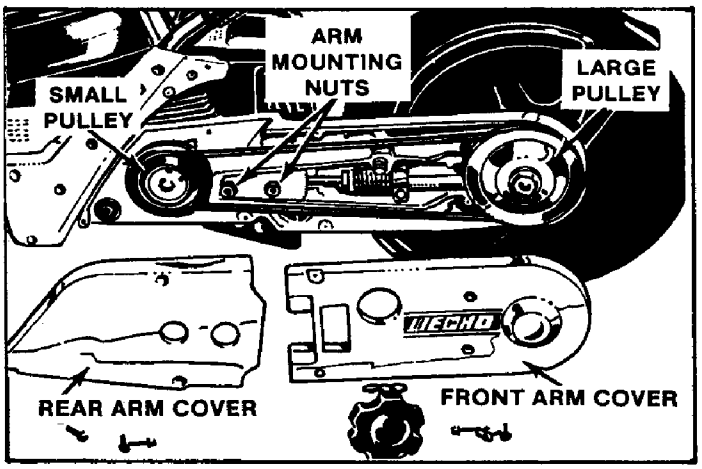
TROUBLE	PROBABLE CAUSE	REMEDY
WHEEL STOPS WHEN CUTTING PRESSURE IS APPLIED	1. Bearing down too hard. 2. Binding in crooked cut. 3. Binding in closing cut. 4. Loose V-belt	1. Ease up cutting pressure. 2. Lay out and follow a straight line. 3. Support material so cut will open. 4. Increase belt tension.
BELT SLIPS AND CANNOT BE TENSIONED PROPERLY	Belt worn beyond the limit.	Replace V-Belt.
POOR CUTTING—WHEEL DIS-COLORED AT OUTER AREA	Heat damage.	Replace wheel. Do not cut long in one spot. Water flush when recommended.

TROUBLESHOOTING ENGINE PROBLEMS

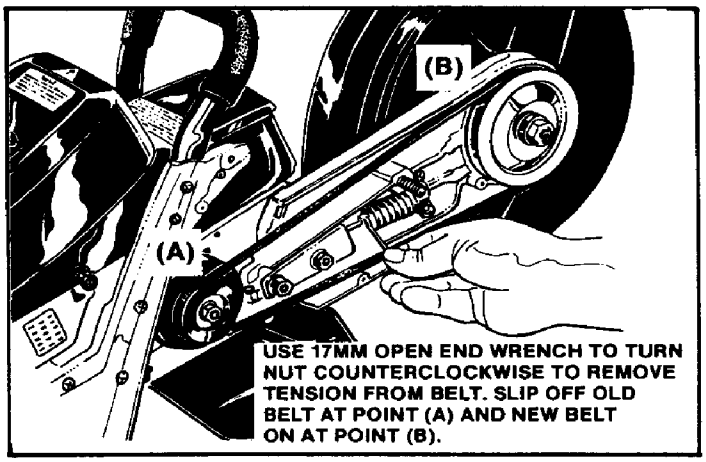
TROUBLE	PROBABLE CAUSE	REMEDY
ENGINE WILL NOT START	1. Out of fuel. 2. Switch not on. 3. Engine flooded. 4. Fuel strainer clogged. 5. Spark plug fouled or cracked. 6. Ignition magneto or spark plug wire faulty.	1. Fill fuel tank. 2. Flip switch to "ON." 3. Remove spark plug. Turn switch off and crank 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. Replace plug. 6. Contact nearest authorized ECHO servicing dealer.
ENGINE HARD TO START	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.	1. See remedies above. 2. Fill tank with clean, fresh fuel mixture. 3. If overchoked 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	1. Dirt in carburetor or fuel line. 2. Carburetor out of adjustment. 3. Weak or intermittent spark.	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	1. Not enough oil. 2. Air passages around cylinder clogged. 3. Carburetor main adjustment is set too "Lean."	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

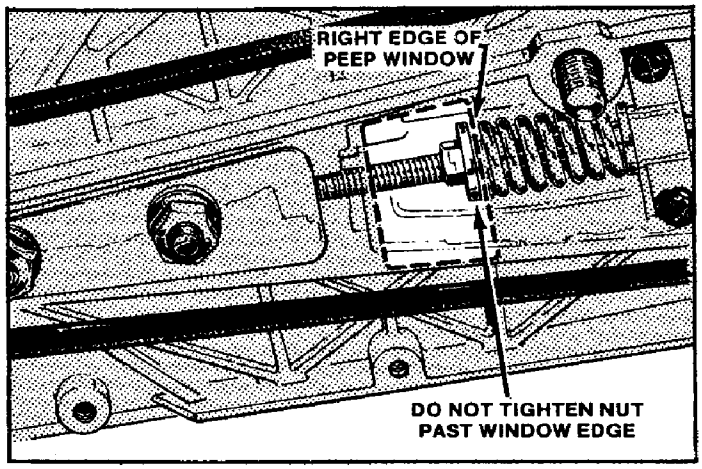
V-BELT CHANGE AND ADJUSTMENT



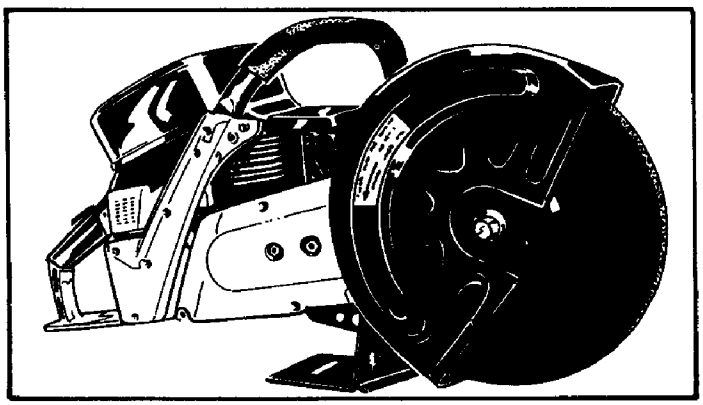
1. Disconnect the spark plug wire from the spark plug. Remove wheel shield adjusting knob, the lock washer and two flat washers.
2. Remove rear arm cover and front arm cover. (Save the seven screws.)
3. Use the 17mm end of the box wrench to loosen arm mounting nuts just a little.
4. Remove belt tension (with 10mm open end wrench) by turning the nut counterclockwise as far as it will travel. (See drawings.)



5. Push arm towards small pulley. Pull belt off pulley at point (A) and slip new belt onto large pulley. At point (A), start belt over the rim and onto the small pulley.
6. 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. (See drawing.)
7. Lightly swing the tip of the arm up and down several times. This sets the tension automatically.
8. Tighten the arm mounting nuts fully, and reinstall the wheel shield adjusting knob.

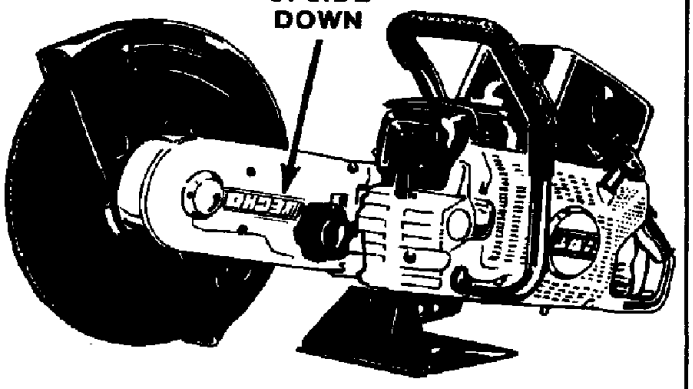


REMOUNTING ARM FOR FLUSH CUTTING



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.



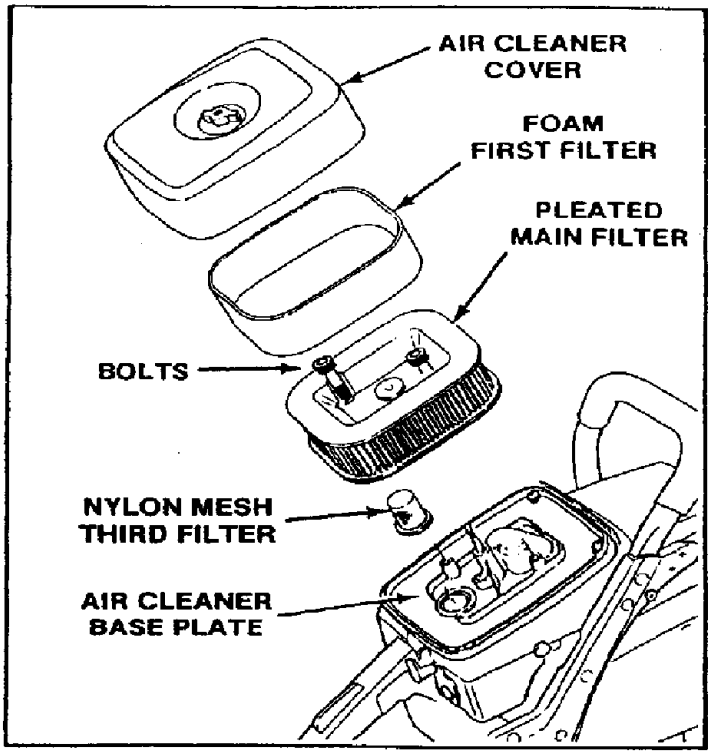
ARM MOUNTED UPSIDE-DOWN FOR FLUSH CUTTING ON RIGHT SIDE OF SAW.

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 on page 21 to mount and tension the V-belt.
4. Reinstall all parts previously removed, and tension the belt as on page 21.
5. Note that the ECHO decal on the wheel shield is now upside-down, and the shield needs to be positioned for flush cutting. (Refer to instructions on curved decal on the wheel shield.)

AIR CLEANER MAINTENANCE

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.

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.

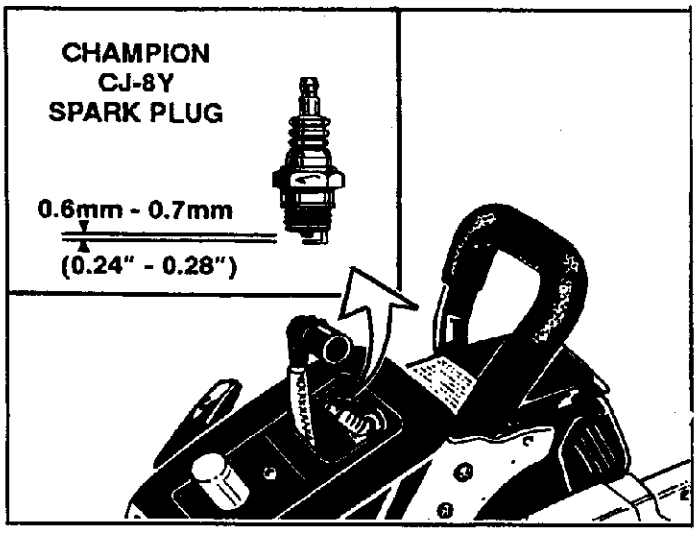


IMPORTANT
Excess oil will contaminate the paper (main) filter, shortening its life.

7. Clean the main filter by gently tapping filter flat against a flat surface. Do not brush or wetten the paper, harsh cleaning methods will damage the filter.
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 on page 22 to disassemble the air cleaner.

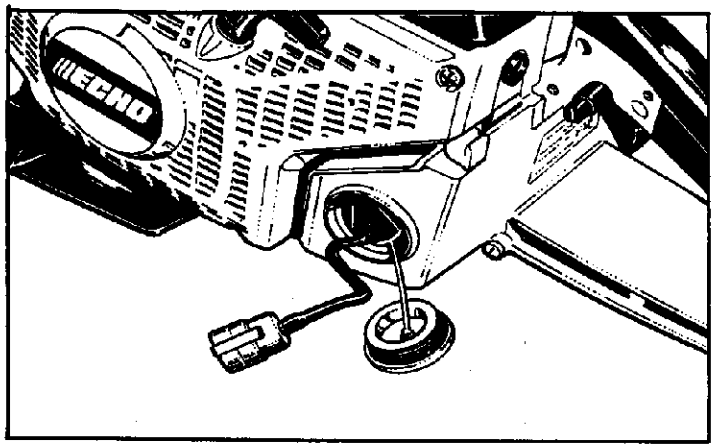


2. Remove three screws and lift off the carburetor chamber cover to expose the spark plug. Pull off the cap and remove the plug.
3. The proper spark plug for this engine is Champion CJ-8Y. The firing gap between the electrodes should be adjusted to 0.6mm-0.7mm (0.24"-0.28") before use.
4. Install the spark plug. Proper tightness with a cold engine is 125-135 in. lbs. (14-15 Nm).
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.

REPLACE FUEL FILTER (CHECK PERIODICALLY)

1. Unscrew fuel cap.
2. Draw the filter out through the filler hole by hooking the fuel line with your finger or a stiff wire.
3. Remove and replace the filter element with a clean one.
4. Drop filter back into tank, and screw on the fuel cap.

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



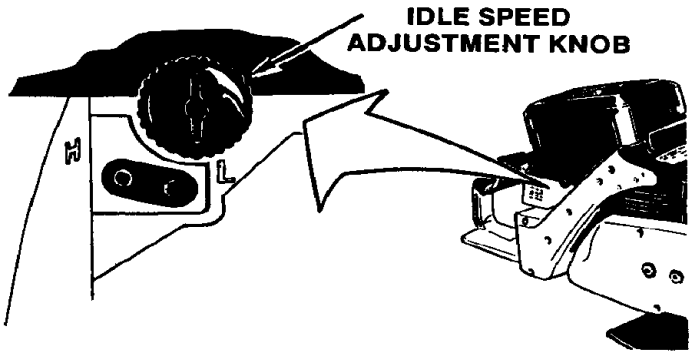
WHEEL SHIELD TIGHTNESS

The wheel shield mount includes two metal spacers. One of these 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 sheild, held by three small screws.
3. Remove one of the metal spacers, 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 (ONLY AS NEEDED)

NOTE
Three external adjustments for the carburetor are shown in the drawing.



IDLE SPEED SCREW (THE LARGE KNOB)

This adjustment holds the throttle shutter partly open as required for idling. If the idle is too fast and the wheel turns with the throttle trigger released, turn the KNOB (counter-clockwise) slowly to the left, to lower the speed until the wheel stops.

ADJUSTMENTS WHEN ENGINE IS HARD TO START

The adjustments may be so far out as to prevent starting. In this case, make these settings to get the engine started, and go on from there.

NOTE
Mixture adjustment needle tips are small and sharp, and must not be screwed hard into their seats or both carburetor and needles will be damaged.

1. Turn idle speed adjustment knob (screw) counterclockwise until resistance is felt, DO NOT FORCE. Then turn 1-1/4 turns clockwise.
2. Turn the idle (LO) mixture needle and high (HI) speed needle clockwise until lightly seated.
3. Open (turn counterclockwise) the idle (LO) mixture needle one (1) turn.
4. Start engine and allow it to run at idle until it reaches full operating temperature.

NOTE
If engine stalls, turn idle speed adjustment knob further clockwise.

LOW SPEED MIXTURE ADJUSTMENT

The idle (LO) mixture NEEDLE controls the supply of fuel in the idle speed range, and also while the engine is accelerating to higher speed.

1. Turn the LO slowly clockwise and note its position when the engine starts to drop in speed.
2. Turn the LO slowly counterclockwise and note its position when the engine again starts to drop in speed.
3. Set the LO midway between positions noted in steps 1 and 2.
4. Turn the IDLE SPEED KNOB (screw) slowly clockwise until the cutting wheel begins to rotate. Then turn it back 1/2 turn to stop wheel rotation.

HIGH SPEED ADJUSTMENT

WARNING ⚠ DANGER
To ensure the wheel does not overspeed, the engine no load speed must be adjusted to a maximum of 10,500 rpm. Use a tachometer to measure speed. If engine speed exceeds 10,500 rpm, have the unit serviced by your nearest ECHO servicing dealer before further use.

NOTE
Engine must be at normal operating temperature for this adjustment, but do not run the engine at full throttle longer than 4-5 seconds without pausing.

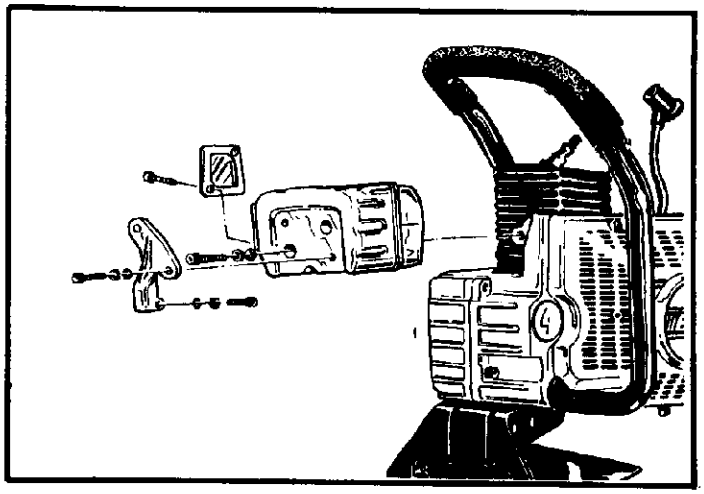
1. Remove the plug from the high (HI) speed needle opening.
2. Open (turn counterclockwise) the high (HI) speed needle 1/2 turn.
3. Adjust high (HI) speed needle for best performance while cutting.

NOTE
Resetting of the idle speed may be necessary. (See "Low Speed Adjustment.)

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 muffler 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 18.) Be careful to clean out the carburetor chamber 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. Disassemble the muffler. (See drawing.) Check the baffles and spark screen for deterioration. 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 ⚠ DANGER
To ensure the wheel does not over-speed, the engine no load speed must be adjusted to a maximum of 10,500 rpm. Use a tachometer to measure speed. If engine speed exceeds 10,500 rpm, 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 24) of the carburetor should result in engine high speed, no load, operation within the desired range. This range is 10,000 rpm =/- 500 rpm, which is required for the proper wheel spindle speed range of 4850-5250 rpm.

SPECIFICATIONS
MODEL CSG-6700

Dimensions	
Length	730 mm (28.7 in.)
Height	360 mm (14.2 in.)
Width	250 mm (9.8 in.)
Weight (dry weight, w/o cutting wheel)	10.7 kg (23.6 lbs.)
Engine	Air-cooled, 2-stroke, single cylinder gasoline engine
Displacement	66.8 cc (4.07 cu. in.)
Bore	50 mm (1.97 in.)
Stroke	34 mm (1.34 in.)
Compression Ratio	7.3 : 1
Governed Speed	10,000 RPM
Carburetor	Diaphragm Type
Intake	Piston Valve
Fuel	Mixed Fuel 32 : 1 ratio or 50 : 1 ratio with special oil approved by ECHO
Ignition System	Capacitor discharge ignition system
Spark Plug	CHAMPION CJ-8Y
3 Stage Air Filter	Standard
Muffler	Spark Arresting System
Throttle Control	Throttle trigger with throttle control lockout and throttle latch
Fuel Tank Capacity	0.65 lit. (22.0 U.S. fluid ounces)
Cutting Device	
Belt	7M 850
Pulley ratio	2 : 1
Belt Tensioner	Spring (auto type)
Arm length	305 mm
Cutting Wheel	305 mm x 20.0 mm dia.
Spark Deflector	Standard
Reversible Arm	Standard
Vibration isolated system	Rubber isolators mounted between the engine and the handles
Attachment	
Water Kit	Option
Cart Kit	Option

PARTS BOOKS

To obtain a replacement parts book, complete this order form and enclose a check or money order for $2.00. Make payable to ECHO, INCORPORATED and mail to:

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ECHO Model No. CSG-6700

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