



OPERATOR'S MANUAL

MODEL
PB-2155
PB-2455



WARNING, SEE OPERATOR'S MANUAL

INTRODUCTION

Welcome to the ECHO family. This ECHO product was designed and manufactured to provide long life and on-the-job-dependability. Read and understand this manual. You will find it easy to use and full of helpful operating tips and SAFETY messages.

WARNING **DANGER**

Read rules for safe operation and instructions carefully. ECHO provides this Operator's Manual which must be read and understood for proper and safe operation.

THE OPERATOR'S MANUAL --

contains specifications and information for operation, starting, stopping, maintenance, storage and assembly specific to this product.

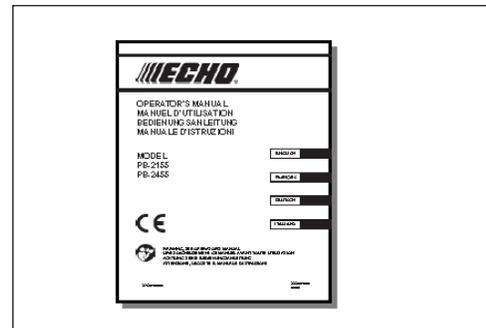


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Specifications, descriptions and illustrative material in this literature are as accurate as known at the time of publication, but are subject to change without notice. Illustrations may include optional equipment and accessories, and may not include all standard equipment.

MANUAL SAFETY SYMBOLS AND IMPORTANT INFORMATION

Throughout this manual and on the product itself, you will find safety alerts and helpful, information messages preceded by symbols or key words. The following is an explanation of those symbols and key words and what they mean to you.



This symbol accompanied by the words **WARNING** and **DANGER** calls attention to an act or condition that can lead to serious personal injury to operator and bystanders.



The circle with the slash symbol means whatever is shown within the circle is prohibited.

IMPORTANT

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

NOTE

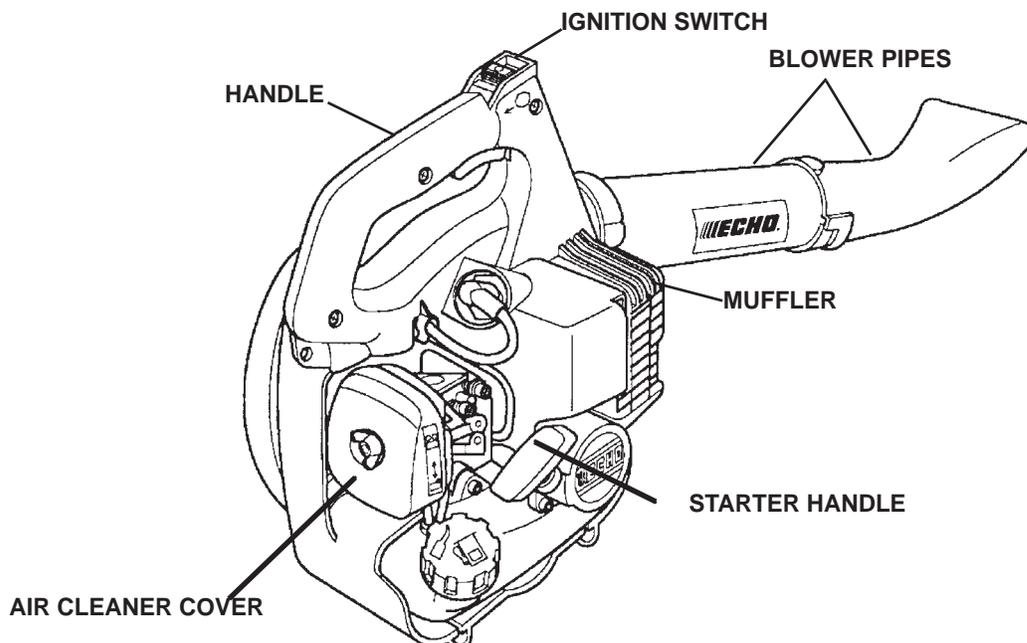
This enclosed message provides tips for use, care and maintenance of the unit.

SAFETY

GENERAL DESCRIPTION

IMPORTANT

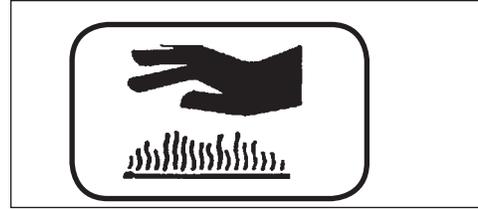
See Description and Specification sections and Decals in this section for full description and illustration of power head, and blower assembly.



DECALS

Locate these safety decals on your unit. Make sure the decals are legible and that you understand and follow the instructions on them. If a decal cannot be read, a new one can be ordered from your ECHO dealer. See PARTS ORDERING instructions for specific information.

HOT DECAL



P/N X505002310



P/N 89016009461



P/N X505001010

INTERNATIONAL SYMBOLS

Symbol form/shape	Symbol description/application	Symbol form/shape	Symbol description/application
	"WARNING, SEE OPERATOR'S MANUAL"		Petrol and oil mixture
	Wear eyes, ears and head protection		Finger Severing
	Emergency stop	L	Carburettor adjustment - Low speed mixture
	Hot Surface	H	Carburettor adjustment - High speed mixture
	Guaranteed sound power level	T	Carburettor adjustment - Idle speed
			Start Engine

EQUIPMENT CHECK



WARNING

Use only ECHO approved attachments. Serious injury may result from the use of a non-approved attachment combination. ECHO, INC. will not be responsible for the failure of cutting devices, attachments or accessories which have not been tested and approved by ECHO. Read and comply with all safety instructions listed in this manual and safety manual.

- Check unit for loose/missing nuts, bolts and screws. Tighten and/or replace as needed.
- Do not use blower if any part is missing or damaged.
- Have repairs done only by an authorized ECHO Service dealer.
- Do not use any attachment, accessory or replacement part unless it is recommended in this Operator's Manual.



WARNING

Moving parts can amputate fingers or cause severe injuries. Keep hands, clothing and loose objects away from all openings.

- **ALWAYS** stop engine, disconnect spark plug, and make sure all moving parts have come to a complete stop before removing obstructions, clearing debris, or servicing unit.
- **DO NOT** start or operate unit unless all guards and protective covers are properly assembled to unit.
- **NEVER** reach into any opening while the engine is running. Moving parts may not be visible through openings.

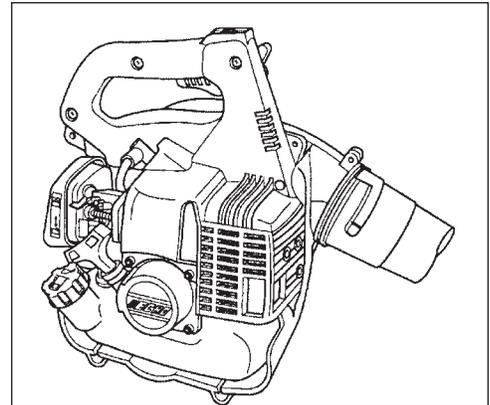


WARNING

Check fuel system for leaks due to fuel tank damage, especially if the unit is dropped. If damage or leaks are found, do not use unit, otherwise serious personal injury or property damage may occur. Have unit repaired by an authorized servicing dealer before using.

Spark Arrestor Muffler

- The spark arrestor muffler controls the exhaust noise and prevents hot, glowing particles of carbon from leaving the muffler. Make sure the spark arrestor screen is in good repair and properly seated in the muffler. (Refer to Exhaust System Maintenance.)



PERSONAL CONDITION AND SAFETY EQUIPMENT**WARNING  DANGER**

Power Blower users risk injury to themselves and others if the power blower is used improperly and or safety precautions are not followed. Proper clothing and safety gear must be worn when operating a blower.

Physical Condition

Your judgment and physical dexterity may not be good:

- if you are over tired or sick,
- if you are taking medication,
- if you have taken alcohol or drugs.

Operate unit only if you are physically and mentally well.

Eye Protection

Wear goggles that meet ANSI Z 87.1 eye protection requirements whenever you operate the blower.

Hand Protection

Wear no-slip, heavy duty work gloves to improve your grip on the blower handle. Gloves also reduce the transmission of machine vibration to your hands.

Breathing Protection

Wear a face mask to protect against dust.

Hearing Protection

ECHO recommends wearing hearing protection whenever unit is used.

Proper Clothing

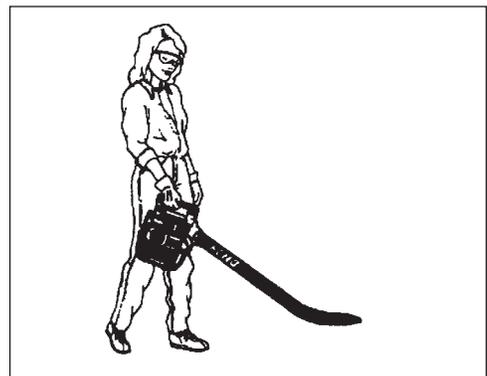
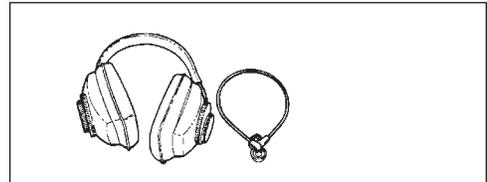
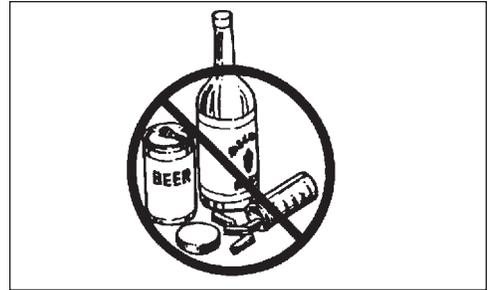
Wear snug fitting, durable clothing;

- Pants should have long legs, shirts with long sleeves.
- DO NOT WEAR SHORTS,
- DO NOT WEAR TIES, SCARVES, JEWELRY, or clothing with loose or hanging items that could become entangled in moving parts or surrounding growth.

Wear sturdy work shoes with nonskid soles;

- DO NOT WEAR OPEN TOED SHOES,
- DO NOT OPERATE UNIT BAREFOOTED.

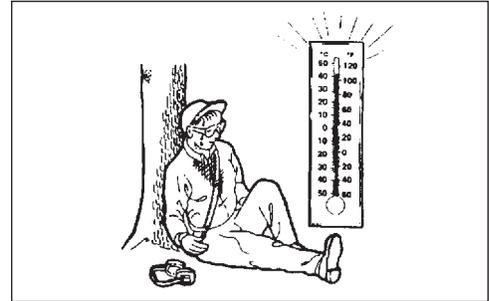
Keep long hair away from engine and blower intake. Retain hair with cap or net.

** WARNING**

The ignition components of this machine generate an electromagnetic field during operation which may interfere with some pacemakers. To reduce the risk of serious or fatal injury, persons with pacemakers should consult with their physician and the pacemaker manufacturer before operating this machine. In the absence of such information, ECHO does not recommend the use of ECHO products by anyone who has a pacemaker.

Hot Humid Weather

Heavy protective clothing can increase operator fatigue which may lead to heat stroke. Schedule heavy work for early morning or late afternoon hours when temperatures are cooler.



SAFE OPERATION

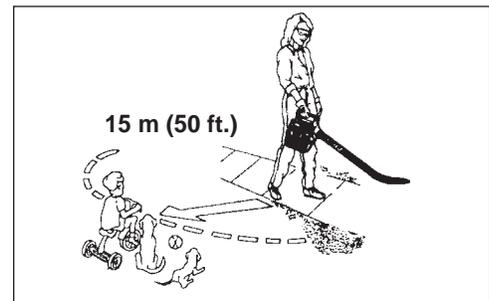


DANGER

Do not operate this product indoors or in inadequately ventilated areas. Engine exhaust contains poisonous emissions and can cause serious injury or death.

Setup/Check Operation Area

- Review area to be cleared. Look for potential hazards such as stones or metal objects.
- Spectators and fellow workers must be warned, and children and animals prevented from coming nearer than 15 m while the blower is in use.
- Operate only in well ventilated areas: do not operate in enclosed areas such as inside garages, sheds or buildings.
- Take wind conditions into account: avoid open doors and windows.



Use Proper Clothing and Equipment

- Before starting the unit, equip yourself and any other person working within the 15 m Safety Zone with the required Protective Equipment and clothing.
- Start unit on ground with throttle at idle. Check that blower pipe is not blocked by the ground or by any objects.
- Do not point blower at people or animals.



Keep A Firm Grip and Solid Stance

- Hold handle with fingers together encircling the handle.
- Maintain footing and balance at all times. Do not stand on slippery, uneven or unstable surfaces. Do not work in odd positions or on ladders.
- Do not perform Maintenance or Assembly procedures with engine running.

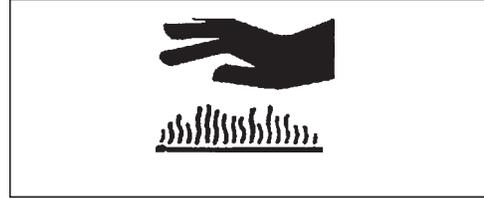
Noise Control

- Follow local noise regulations on sound levels and hours of operations. Use only during appropriate hours.
- Never use a higher speed setting than necessary to perform a task. The higher the engine speed the louder the blower noise.
- Be a good neighbor.



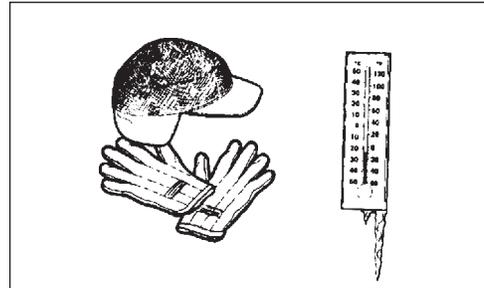
Avoid Hot Surfaces

- During operation, the exhaust area may become very hot, too hot to touch. Avoid contact during and immediately after operation.

**EXTENDED OPERATION/EXTREME CONDITIONS****Vibration and Cold --**

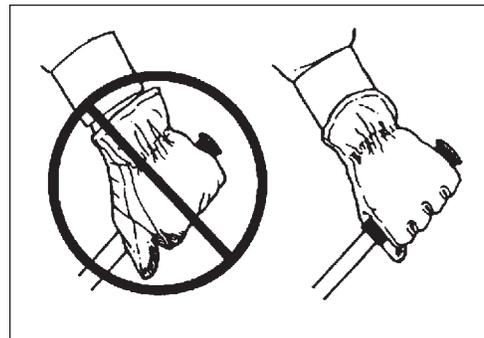
It is believed that a condition called Raynaud's Phenomenon, which affects the fingers of certain individuals may be brought about by exposure to vibration and cold. Exposure to vibration and cold may cause tingling and burning sensations followed by loss of color and numbness in the fingers. The following precautions are strongly recommended because the minimum exposure which might trigger the ailment is unknown.

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

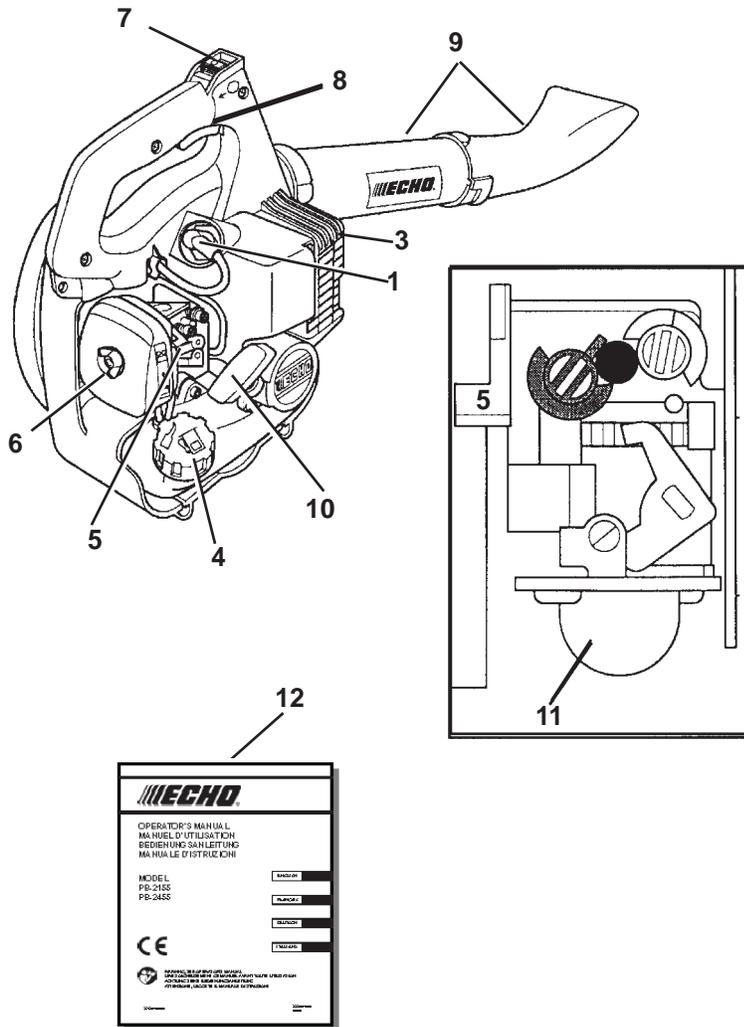
**Repetitive Stress Injuries --**

It is believed that overusing the muscles and tendons of the fingers, hands, arms and shoulders may cause soreness, swelling, numbness, weakness and extreme pain in those areas. Certain repetitive hand activities may put you at a high risk for developing a Repetitive Stress Injury (RSI). An extreme RSI condition is Carpal Tunnel Syndrome (CTS), which could occur when your wrist swells and squeezes a vital nerve that runs through the area. Some believe that prolonged exposure to vibration may contribute to CTS. CTS can cause severe pain for months or even years. To reduce the risk of RSI/CTS, do the following:

- Avoid using your wrist in a bent, extended or twisted position. Instead try to maintain a straight wrist position. Also, when grasping, use your whole hand, not just the thumb and index finger.
- Take periodic breaks to minimize repetition and rest your hands.
- Reduce the speed and force in which you do the repetitive movement.
- Do exercises to strengthen the hand and arm muscles.
- See a doctor if you feel tingling, numbness or pain in the fingers, hands, wrists or arms. The sooner RSI/CTS is diagnosed, the more likely permanent nerve and muscle damage can be prevented.

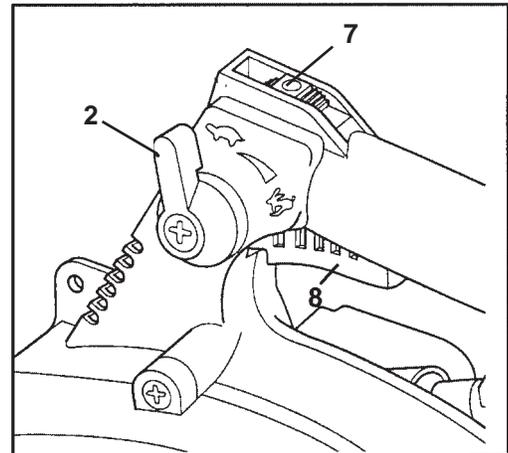


DESCRIPTION



CONTENTS

- 1- Power Head
- 1- Blower Pipe Assembly
- 1- Plastic Bag
- 1- Operator's Manual
- 1- Assembly Tool (s)



1. **SPARK PLUG** - Provides spark to ignite fuel mixture.
2. **THROTTLE POSITION LEVER** - Pull back to increase engine speed. Friction washers maintain throttle trigger setting.
3. **MUFFLER/SPARK ARRESTER** - The spark arrester muffler controls the exhaust noise while the spark arrester prevents hot, glowing particles of carbon from leaving the muffler.
4. **FUEL TANK CAP** - For closing the fuel tank.
5. **CHOKE LEVER** - Lever is located on right side of the air cleaner. Move lever **DOWN** to close choke (starting position) and for emergency stopping. Lift up to open choke (run position).
6. **AIR CLEANER** - Contains replaceable felt element.
7. **IGNITION SWITCH** - "SLIDE SWITCH" mounted on top of handle. Slide **forward** to **start** and **run**. Slide **back** to stop.
8. **THROTTLE TRIGGER** - Spring loaded to return to idle when released if throttle position lever is not engaged.
9. **BLOWER PIPES** - Twist lock design.
10. **STARTER HANDLE** - Pull handle to start the engine. **DO NOT** let handle snap back or damage to unit will occur.
11. **PURGE BULB** - Pumping purge bulb before starting draws fresh fuel from fuel tank to carburettor replacing air and old fuel. Before starting, pump repeatedly (normally 3-4 times) until fuel is visible in "Clear" fuel return line.
12. **OPERATOR'S MANUAL** - Included in plastic bag (co-pack). Read before operation and keep in a safe place for future reference, i.e., operation, maintenance, storage and specifications.

SPECIFICATIONS

		PB-2155	PB-2455
Dimensions :			
Length x Width x Height	mm	220 x 330 x 340	220 x 330 x 340
Weight	kg	4.1	4.1
Engine :		Air cooled Two stroke single cylinder	
Type			
Engine displacement	mL (cm ³)	21.2	23.6
Maximum power	kW	0.50	0.66
Engine speed max	r/min	7,000	7,000
Engine idle speed	r/min	2,700	2,700
Carburettor		Diaphragm model	
Ignition		Flywheel magneto - CDI system	
Spark plug		NGK BPMR7A	
Starter		Automatic recoil system	
Air Volume at pipe :	m ³ /min	7.0	7.6
Fuel :		Regular grade petrol. Minimum 89 Octane unleaded petrol is recommended. Do not use fuel containing methyl alcohol or more than 10 % of ethyl alcohol.	
Oil		Two stroke, air cooled engine oil. ISO-L-EGD Standard (ISO/CD 13738), JASO FC/FD grade and ECHO Premium 50 : 1 oil.	
Ratio		50 : 1 (2 %)	
Tank Capacity :	L	0.5	
Sound Pressure Level :			
ISO 22868 LpAav =	dB (A)	87.5	91.7
Guaranteed Sound Power Level :			
(2000/14/EC) LWA =	dB (A)	107	109
Vibration : ISO 22867 / A(8)	m/s ²	6.6/2.9	7.8/3.4
Blower pipe		Standard	
Vacuum kit		Optional	

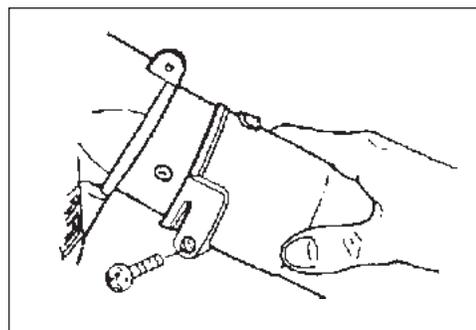
ASSEMBLY

WARNING DANGER

Never perform maintenance or assembly procedures with engine running or serious personal injury may result.

INSTALL BLOWER PIPES

1. Remove tube retaining screw from blower housing. Align grooves in straight pipe with pegs of blower housing and slide pipe onto housing.



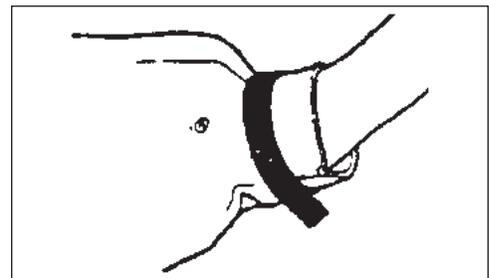
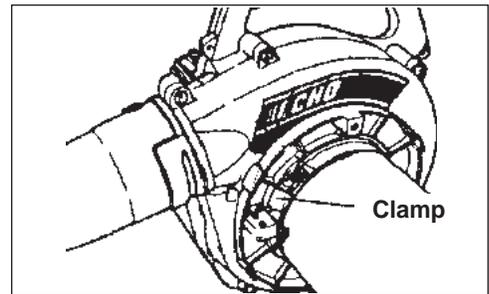
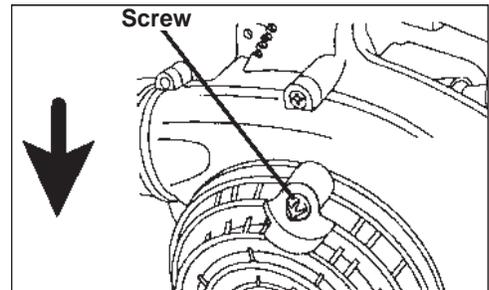
2. Turn straight pipe clockwise to lock it into place.
3. Tighten screw securely.
4. Remove tube retaining screw from the straight tube. Align grooves in fan head nozzle with pegs on straight pipe and slide fan head nozzle onto straight pipe.
5. Turn fan head nozzle clockwise to lock it into place.
6. Tighten screw securely.

INSTALL VACUUM TUBE (OPTIONAL)

WARNING  **DANGER**

Never perform maintenance or assembly procedures with engine running. When removing grid, stop engine. When applying as blower, fasten grid securely.

1. Remove screw in fan grid. Pull fan grid out for access to tube clamp.
2. Loosen screw in clamp.
3. Hold the fan grid open, and slide the vacuum tube into the housing mount until completely seated. Position the tube so that the bevel faces down in the operating position.
4. Secure vacuum tube with clamp by tightening screw in clamp.
5. Align grooves in vacuum elbow with pegs on air outlet and install vacuum elbow.
6. Turn vacuum elbow clockwise to lock it into place, pointing backward.
7. Place vacuum bag opening over end of vacuum elbow and secure with velcro strap.



PRE-OPERATION



WARNING

Moving parts can amputate fingers or cause severe injuries. Keep hands, clothing and loose objects away from all openings. Always stop engine, disconnect spark plug, and make sure all moving parts have come to a complete stop before removing obstructions, clearing debris, or servicing unit. Blower housing may contain shredder blades and other sharp edges that can cause serious injuries if touched, even if engine is off and blades are not moving. Wear gloves to protect hands from sharp edges and hot surfaces.



WARNING

Operation of this equipment may create sparks that can start fires around dry vegetation. This unit is equipped with a spark arrestor and a spark arrestor may be required. The operator should contact local fire agencies for laws or regulations relating to fire prevention requirements.

NOTICE: Use of unmixed, improperly mixed, or fuel older than 90 days, (stale fuel), may cause hard starting, poor performance, or severe engine damage and void the product warranty. Read and follow instructions in the Storage section of this manual.

FUEL



WARNING

Alternative fuels, such as E-15 (15% ethanol), E-85 (85% ethanol) or any fuels not meeting ECHO 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, carburetors and other engine components.

Fuel Requirements --

Petrol - Fuel is a mixture of regular grade petrol and an air-cooled 2-stroke engine oil of reputable brand name. Minimum 89 Octane unleaded petrol is recommended. Do not use fuel containing methyl alcohol or more than 10 % of ethyl alcohol.

Two Stroke Oil - Recommended mixture ratio; 50 : 1 (2 %) for ISO-L-EGD Standard (ISO/CD 13738), JASO FC/FD grade and ECHO Premium 50 : 1 oil.

Handling Fuel

WARNING DANGER

Fuel is VERY flammable. Use extreme care when mixing, storing or handling or serious personal injury may result.

- Use an approved fuel container.
- DO NOT smoke near fuel.
- DO NOT allow flames or sparks near fuel.
- Fuel tanks/cans may be under pressure. Always loosen fuel caps slowly allowing pressure to equalize.
- NEVER refuel a unit when the engine is HOT or RUNNING!
- DO NOT fill fuel tanks indoors. ALWAYS fill fuel tanks outdoors over bare ground.
- DO NOT overfill fuel tank. Wipe up spills immediately.
- Securely tighten fuel tank cap and close fuel container after refueling.
- Inspect for fuel leakage. If fuel leakage is found, do not start or operate unit until leakage is repaired.
- Wipe any spilled fuel from the unit. It is not permitted to fill fuel above the shoulder level of fuel tank. (Shoulder level)
- Move at least 3 m from refuelling location before starting the engine.



Fuel to Oil Mix - 50:1 Ratio

U.S.		METRIC	
GAS	OIL	GAS	OIL
Gallons	Fl. oz.	Liter	cc.
1	2.6	4	80
2	5.2	8	160
5	13	20	400

Mixing Instructions

1. Fill an approved fuel container with half of the required amount of gasoline.
2. Add the proper amount of 2-stroke oil to gasoline.
3. Close container and shake to mix oil with gasoline.
4. Add remaining gasoline, close fuel container, and remix.

After use

- DO NOT store a unit with fuel in its tank. Leaks can occur. Return unused fuel to an approved fuel storage container.

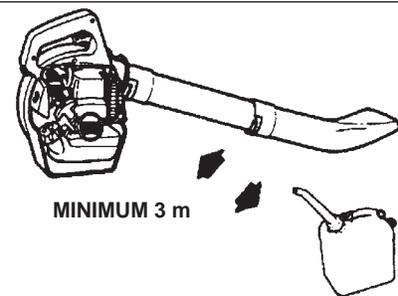
Storage - Fuel storage laws vary by locality. Contact your local government for the laws affecting your area. As a precaution, store fuel in an approved, airtight container. Store in a well-ventilated, unoccupied building, away from sparks and flames.

IMPORTANT

Stored fuel ages. Do not mix more fuel than you expect to use in thirty (30) days, ninety (90) days when a fuel stabilizer is added.

IMPORTANT

Stored two-stroke fuel may separate. ALWAYS shake fuel container thoroughly before each use.



OPERATION

- Provide all operators of this equipment with the Operator's Manual and instructions for safe operation.

IMPORTANT

Check unit for loose nuts, bolts and screws daily.

IMPORTANT

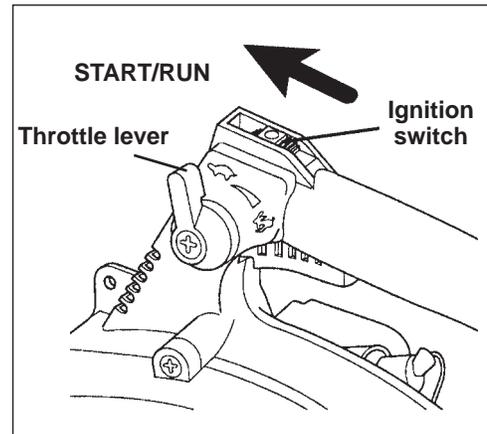
Recoil starter: Use short pulls - only 1/2-2/3 of rope length for starting. Do not allow the rope to snap back in. Always hold the unit firmly.

STARTING COLD ENGINE

1. Move ignition switch to START/RUN position.
2. Move throttle lever to IDLE position.
3. Push purge bulb 3-4 times (or until fuel is visible in fuel return line).
4. Close choke (move choke lever up) and pull starter handle until engine fires.
5. Open choke and if necessary, restart engine.

NOTE

Allow engine to warm up before use.

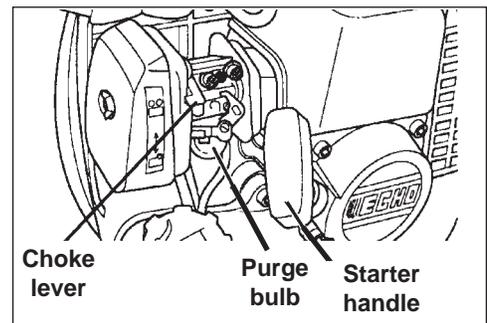


STARTING WARM ENGINE

1. Move throttle lever to IDLE position.
2. Move ignition switch to start, pull starter handle 1-3 times and engine should start. Do not use choke.

NOTE

If engine does not start after 4 pulls, use cold start procedures.

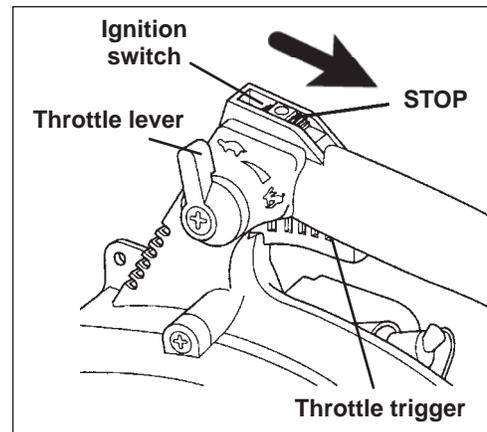


STOPPING ENGINE

1. Release throttle trigger and allow engine to run at idle for a few minutes.
2. Move throttle lever to IDLE position.
3. Move ignition switch to "STOP" position.

WARNING DANGER

If engine does not stop, shift choke lever to closed position. Check and repair ignition switch before starting engine again or serious personal injury may result.



OPERATING BLOWER

WARNING **DANGER**

Engine exhaust IS HOT, and contains Carbon Monoxide (CO), a poison gas. Breathing CO can cause unconsciousness, serious injury, or death. Exhaust can cause serious burns. ALWAYS position unit so that exhaust is directed away from your face and body.

WARNING **DANGER**

Always wear safety glasses, hearing protection and a face filter mask or serious personal injury may result.

Do not point the blower pipe in the direction of people or pets.

IMPORTANT

Use reduced speed only when performing light-duty tasks or to comply with local noise regulations. Continuous low speed operation may allow fuel/oil residue to build-up on the piston and cause rapid build-up of carbon on the spark arrestor screen, resulting in overheating and engine damage. To reduce harmful build-up, run engine at wide open throttle for at least 5 minutes every hour, and inspect/clean the spark arrestor screen after approximately 40 hours of operation.

Read the Safety Section carefully.

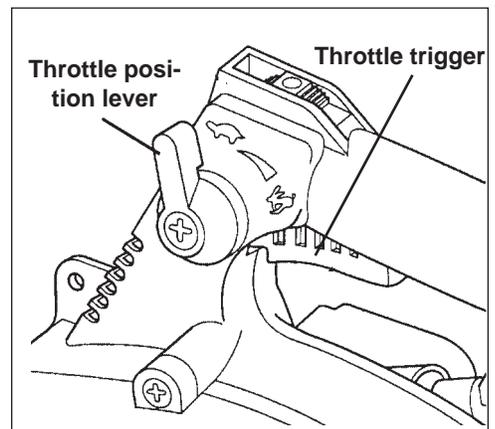
IMPORTANT

To avoid engine damage due to over revving, do not block blower pipe.

1. Use only during appropriate hours.
2. Allow the engine to warm up at a fast idle for a few minutes.
3. Control engine speed with throttle trigger, or for continuous use, set engine speed with throttle position lever. Rotate throttle position lever forward for lower speed, back for higher speed.
4. Use lower speed to blow debris from hard surfaces.
5. Additional speed may be necessary to clean debris, snow, etc. from lawns and flowerbeds.

NOTE

Never use a higher speed setting than necessary to perform a task. Remember, the higher the engine speed, the louder the blower noise. Minimize dust by using blower at lower speeds. Keep debris on your property.
Be Smart - be a good neighbor.



OPERATING VACUUM (OPTION)

WARNING **DANGER**

- Always wear safety glasses and use a face filter mask. (Read the safe operation section carefully.)
- Do not point the blower pipe in the direction of people or pets.
- Never operate unit without fan grid secured by thumb nut, otherwise bodily harm may result.

NOTE

Do not block blower pipe to avoid engine damage due to over speed.

1. Allow the engine to warm up at a fast idle for a few minutes.
2. Make sure bevel at end of pipe faces downward.
3. Engine speed can be easily controlled by throttle trigger with fingers or throttle position lever.

NOTE

Never use a higher speed setting than necessary to perform a task. Remember, the higher the engine speed, the louder the blower noise.

MAINTENANCE



WARNING

Moving parts can amputate fingers or cause severe injuries. Keep hands, clothing and loose objects away from all openings. Always stop engine, disconnect spark plug, and make sure all moving parts have come to a complete stop before removing obstructions, clearing debris, or servicing unit. Allow unit to cool before performing service. Wear gloves to protect hands from sharp edges and hot surfaces.

Your ECHO blower is designed to provide many hours of trouble free service. Regular scheduled maintenance will help your blower achieve that goal. If you are unsure or are not equipped with the necessary tools, you may want to take your unit to an ECHO Service Dealer for maintenance. To help you decide whether you want to DO-IT-YOURSELF or have the ECHO Dealer do it, each maintenance task has been graded. If task is not listed, see your ECHO Dealer for repairs.

SKILL LEVEL

Level 1 = Easy to do. Common tools may be required.

Level 2 = Moderate difficulty. Some specialized tools may be required.

MAINTENANCE INTERVALS

COMPONENT / SYSTEM	MAINTENANCE PROCEDURE	REQ'D SKILL LEVEL	DAILY OR BEFORE USE	EVERY REFUEL	3 MONTHS OR 90 HOURS	YEARLY 600 HOURS
Air Filter	Inspect/Clean	1	I / C *		R *	
Choke Shutter	Inspect/Clean	1	I / C			
Fuel Filter	Inspect/Replace	1			I *	I / R *
Fuel Cap Gasket	Inspect/Replace	1			I *	R *
Fuel System	Inspect/Replace	1	I (1) *	I (1) *		
Spark Plug	Inspect/Clean/Replace	1			I / C / R *	
Cooling System	Inspect/Clean	2	I / C			
Muffler Spark Arrestor	Inspect/Clean/Replace	2			I / C / R *	
Cylinder Exhaust Port	Inspect/Clean/Decarbon	2			I / C	
Recoil Starter Rope	Inspect/Clean	1	I / C *			
Vacuum Bag	Inspect/Replace	1	I / R			
Screws/Nuts/Bolts	Inspect/Tighten/Replace	1	I *			

MAINTENANCE PROCEDURE LETTER CODES: I = INSPECT, R = REPLACE, C = CLEAN

IMPORTANT NOTE - Time intervals shown are maximum. Actual use and your experience will determine the frequency of required maintenance.

MAINTENANCE PROCEDURE NOTES:

(1) Low evaporative fuel tanks DO NOT require regular maintenance to maintain emission integrity.

* All recommendations to replace are based on the finding of damage or wear during inspection.

AIR FILTER

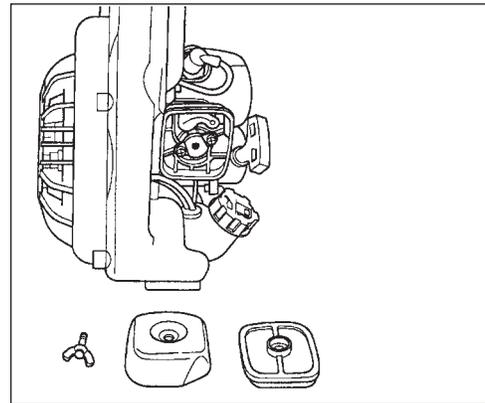
Level 1.

Parts required: Air Filter

NOTE

Clean daily.

1. Close choke, remove wing nut, air cleaner cover and air filter.
2. Brush dust off filter.



CARBURETTOR ADJUSTMENT - GENERAL

Engine Break-In

New engines must be operated a minimum duration of two tanks of fuel break-in before carburetor adjustments can be made. During the break-in period your engine performance will increase and exhaust emissions will stabilize. Idle speed can be adjusted as required.

High Altitude Operation

This engine has been factory adjusted to maintain satisfactory starting, emission, and durability performance up to 1,100 feet above sea level (ASL) (96.0 kPa). To maintain proper engine operation and emission compliance above 1,100 feet ASL the carburetor may need to be adjusted by an authorized ECHO service dealer.

IMPORTANT

If the engine is adjusted for operation *above* 1,100 feet ASL, the carburetor must be re-adjusted when operating the engine *below* 1,100 feet ASL, otherwise severe engine damage may result.

Level 2.

Parts required: none.

NOTE

Do not adjust carburetor unless necessary. If you have difficulty, see your ECHO dealer.

Adjusters

- Idle Speed Adjuster (T) Control throttle opening at idle.
- Low Speed Mixture Adjuster (L) Controls amount of fuel at low speed and supplementary fuel for smooth progression from idle to high speed.
- High Speed Mixture Adjuster (H) Controls amount of fuel at full throttle

Before Adjustment

Check that:

- Air filter is clean and properly installed.
- Spark arrestor screen and exhaust port are free of carbon
- Blower pipes are installed

Initial Adjustment

1. With engine off, turn H adjuster anticlockwise to stop.
2. Turn L adjuster midway between stops.
3. Turn T adjuster until tip of adjuster just touches throttle plate; then turn three turns clockwise.

Final Adjustment

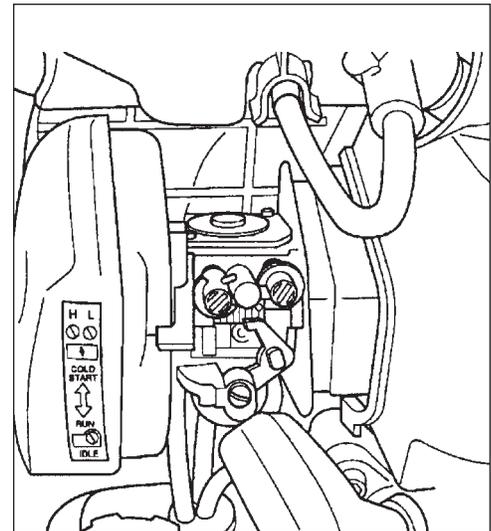
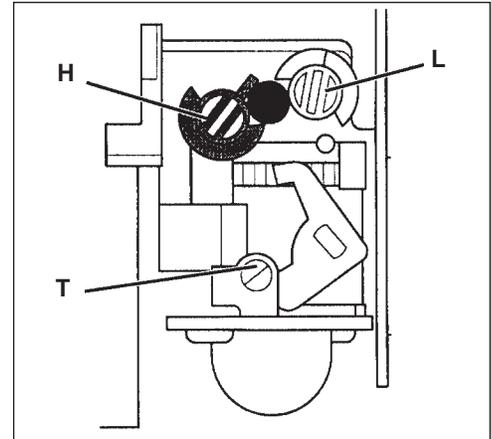
IMPORTANT

Limiter caps prevent exceeding emission limits and over rich adjustment, but not over lean adjustment, which can cause engine failure: Do not exceed recommended high speed engine rev during operation, or for long periods during adjustment.

1. Start engine, run at idle for one minute.
2. Complete warm up by running at full throttle for 5 minutes, operating choke twice to clear air from carburettor chambers.
3. Run at idle and accelerate to check for smooth transition from idle to high speed; if engine hesitates, turn L adjuster anticlockwise 1/8 turn at a time until acceleration is smooth.
4. Adjust T adjuster to 2,700 r/min, using tachometer.

NOTE

When there is some trouble with the carburettor, contact your distributor or dealer.



COOLING SYSTEMS

Level 2.

Parts Required: None if you are careful.

IMPORTANT

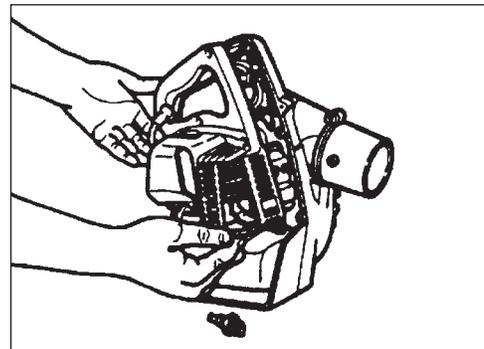
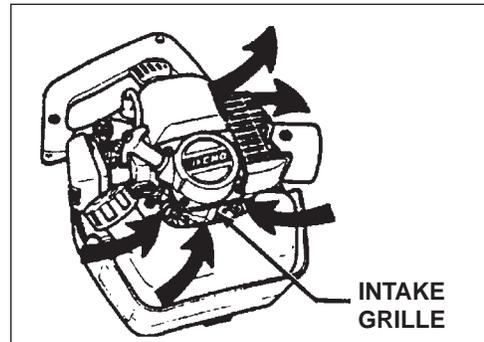
To prevent overheating and engine seizure, cooling air comes through the grille and is pushed by a cooling fan through the cylinder fin area to an opening in the front of the engine cover, taking away combustion heat. The grille and cylinder fins must be kept clean of grass, dust and any debris. Engine failure due to lack of this "Normal Maintenance" is not covered by warranty.

Cleaning Grille

Remove accumulated debris from crankcase intake grille above the fuel tank.

Cleaning Cylinder Fins

1. Remove spark plug.
2. Remove engine cover and clean cylinder fins to allow cooling air to pass freely.



EXHAUST SYSTEM

Level 2.

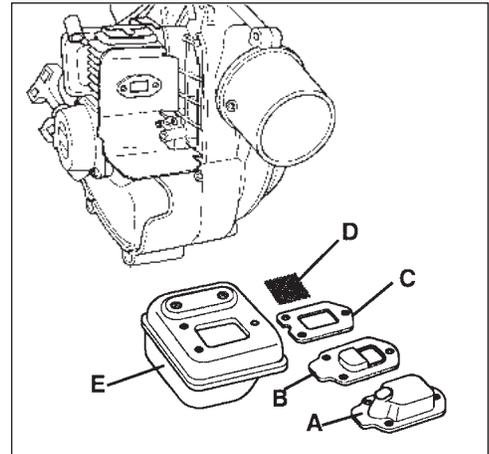
Parts Required: Spark arrester screen, gasket.

Muffler Spark Arrester

IMPORTANT

Carbon deposits in cylinder exhaust port and muffler will cause a drop in engine output and overheating. Muffler exhaust port and spark arrester screen must be checked periodically.

1. Remove spark plug and engine cover.
2. Remove spark arrester cover (A), exhaust diffuser (B), gasket (C) and spark arrester screen (D) from muffler (E). Replace screen if plugged with carbon deposits.
3. Install spark arrester screen, gasket, diffuser and cover.
4. Be sure gasket seals muffler spark arrester screen to muffler.



Exhaust Port Cleaning

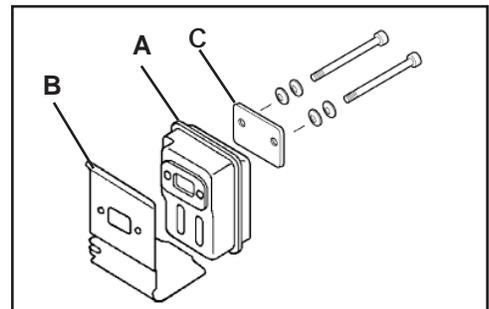
Level 2.

Parts Required: As needed: Heat Shield

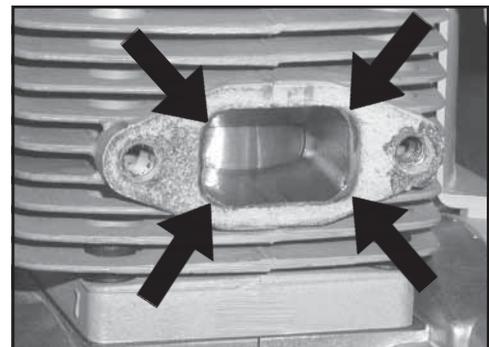
1. Remove engine cover.
2. Place piston at top dead center. Remove muffler (A), heat shield (B), and eyeplate (C).
3. Use a wood or plastic scraping tool to clean deposits from cylinder exhaust port.

IMPORTANT

Never use a metal tool to scrape carbon from the exhaust port. Do not scratch the cylinder or piston when cleaning the exhaust port. Do not allow carbon particles to enter the cylinder.



4. Inspect heat shield, and replace if damaged.
5. Install heat shield, muffler, and eyeplate.
6. Tighten muffler mounting bolts (or nuts) to 80-95 in•lbf (90-110 kgf•cm).
7. Install engine cover and attach spark plug lead.
8. Start engine, and warm to operating temperature.
9. Stop engine, and re-tighten mounting bolts (or nuts) to specifications.

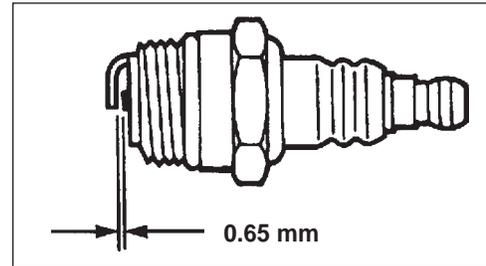


SPARK PLUG

Level 2.

Parts Required: Spark Plug, NGK BPMR7A

1. Remove spark plug and check for fouling, worn and rounded center electrode.
2. Clean the plug or replace with a new one. DO NOT sand blast to clean. Remaining sand will damage engine.
3. Adjust spark plug gap by bending outer electrode.



FUEL FILTER

Level 1.

Parts required: Fuel Filter

NOTE

Check fuel filter periodically.

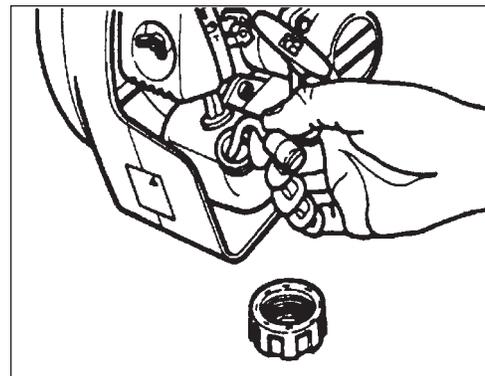
IMPORTANT

Keep fuel tank clean - do not allow dirt or debris to enter fuel tank.

NOTE

A clogged fuel filter will cause hard starting or poor engine performance.

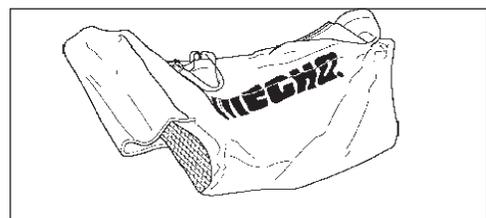
1. Pick up the fuel filter through fuel tank opening with a piece of steel wire.
2. Remove old filter.
3. Install new filter.



VACUUM BAG (OPTIONAL)

Shake dust from bag and inspect for holes or tears.

Inspect zipper and clean debris from teeth to assure complete closing of zipper.



TROUBLESHOOTING

Trouble			Cause	Remedy
Engine - starts hard - does not start				
Engine Cranks	Fuel at carburettor	No fuel at carburettor	<ul style="list-style-type: none"> • Fuel filter clogged • Fuel line clogged • Carburettor 	<ul style="list-style-type: none"> • Clean or replace. • Clean. • See your Echo dealer.
	Fuel at cylinder	No fuel at cylinder Silencer wet with fuel	<ul style="list-style-type: none"> • Carburettor • Fuel mixture is too rich 	<ul style="list-style-type: none"> • See your Echo dealer. • Open choke. • Clean/replace air filter. • Adjust carburettor. • See your Echo dealer.
	Spark at end of plug wire	No spark at end of plug wire	<ul style="list-style-type: none"> • Ignition switch off • Electrical problem • Safety interlock 	<ul style="list-style-type: none"> • Turn switch on. • See your Echo dealer. • Tighten grid cover, check vacuum not engaged tube attachment
	Spark at plug	No spark at plug	<ul style="list-style-type: none"> • Spark gap incorrect • Covered with carbon • Fouled with fuel • Spark plug defective 	<ul style="list-style-type: none"> • Adjust 0.6-0.7 mm • Clean or replace. • Clean or replace. • Replace plug.
Engine does not crank			<ul style="list-style-type: none"> • Internal engine problem 	<ul style="list-style-type: none"> • See your Echo dealer.
Engine runs	Dies or accelerates poorly		<ul style="list-style-type: none"> • Air filter dirty • Fuel filter dirty • Fuel vent blocked • Spark plug • Carburettor • Cylinder fins blocked • Exhaust port/spark arrestor screen blocked 	<ul style="list-style-type: none"> • Clean or replace. • Clean or replace. • Clean. • Clean and adjust/replace. • Adjust. • Clean. • Clean.

WARNING  **DANGER**

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.

STORAGE

Long Term Storage (Over 30 Days)

Do not store your unit for a prolonged period of time (30 days or longer) without performing protective storage maintenance which includes the following:

1. Store unit in a dry, dust free place, out of the reach of children.

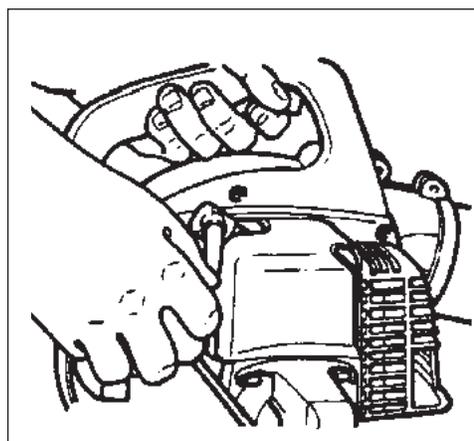
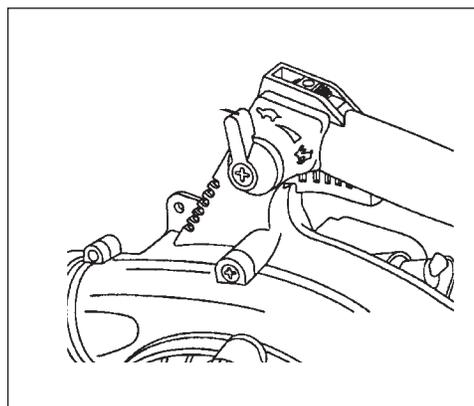
WARNING



DANGER

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

2. Place the ignition switch in the "STOP" position.
3. Remove accumulation of grease, oil, dirt and debris from exterior of unit.
4. Perform all periodic lubrication and services that are required.
5. Tighten all screws and nuts.
6. **Drain** the fuel tank **completely** and pull the recoil starter handle several times to remove fuel from the carburettor.
7. Remove the spark plug and pour 7cc (1/4 oz.) of fresh, clean ECHO 2-stroke engine oil into the cylinder through the spark plug hole.
 - A. Place a clean cloth over the spark plug hole.
 - B. Pull the recoil starter handle 2-3 times to distribute the oil inside the engine.
 - C. Observe the piston location through the spark plug hole. Pull the recoil starter handle slowly until the piston reaches the top of its travel and leave it there.
8. Install the spark plug (do not connect ignition cable).
9. Remove blower pipe assembly from unit.



MEMORANDUM

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