Tiller/Cultivator

Operator's Manual

MODEL TC-210 i™

WARNING DANGER

The muffler or catalytic muffler and surrounding cover may become extremely hot.
Always keep clear of exhaust and muffler area, otherwise serious personal injury may occur.

WARNING

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

WARNING DANGER

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

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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.

THE OPERATOR'S MANUAL

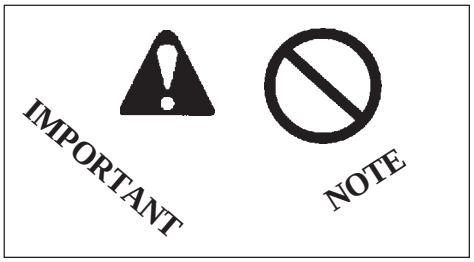
Read and understand this manual before operation. Keep it in a safe place for future reference. It contains specifications and information for operation, starting, stopping, maintenance, storage and assembly specific to this product.

TABLE OF CONTENTS

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.

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

DECALS

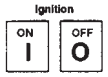
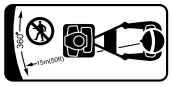
Locate these safety decals on your unit. The complete unit illustration found in the "DESCRIPTION" section, will help you locate them. Make sure the decals are legible and that you understand and follow the instructions on them. If a decal cannot be read, a new one can be ordered from your ECHO dealer. See PARTS ORDERING instructions for specific information.

P/N X505001210

TINE GUARD

INTERNATIONAL SYMBOLS

Symbol form/shape	Symbol description/application	Symbol form/shape	Symbol description/application
	Read and understand Operator's Manual.		Fuel and oil mixture
	Wear eye, hea and hearing protection		Finger Severing
	Hot Surface		Wear hand protection. Use two handed.
	Wear slip resistant foot wear.		DO NOT smoke near fuel.
	Safety/Alert		DO NOT allow flames or sparks near fuel.

Symbol form/shape	Symbol description/application	Symbol form/shape	Symbol description/application
	Avoid all power lines. This unit is not insulated against electrical current.		Emergency stop
	Engine choke control.		Ignition ON/OFF
	Primer bulb	H	Carburetor adjustment - High speed mixture
L	Carburetoradjustment - Low speed mixture	T	Carburetor adjustment - Idle speed
	Keep away from rotating tines.		Carry unit with carry handle.
		Keep bystanders a minimum of 15m (50 ft.) away while operating unit.	

SAFETY INSTRUCTION

PERSONAL CONDITION AND SAFETY EQUIPMENT

WARNING DANGER

Tiller/Cultivator users risk injury to themselves and others if the tiller/cultivator is used improperly and or safety precautions are not followed. Proper clothing and safety gear must be worn when operating a tiller/cultivator. Failure to do so can result in serious injury.

Physical Condition --

Your judgment and physical dexterity may not be good:
- if you are 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 Eye protection that meet ANSI Z87.1 or CE requirements whenever you operate the tiller/cultivator.

Hand Protection --

Wear no-slip, heavy duty work gloves in improve your grip on the Tiller/Cultivator handles. Gloves also reduce the transmission of machine vibration to your hands.

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.
- Wear hair covering to contain long hair.
- DO NOT WEAR SHORTS,
- DO NOT WEAR TIES, SCARFS, JEWELRY.

Wear sturdy work shoes with non-skid soles;
- DO NOT WEAR OPEN TOED SHOES,
- DO NOT OPERATE UNIT BAREFOOTED.

Wear no-slip, heavy duty work gloves.

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.

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.

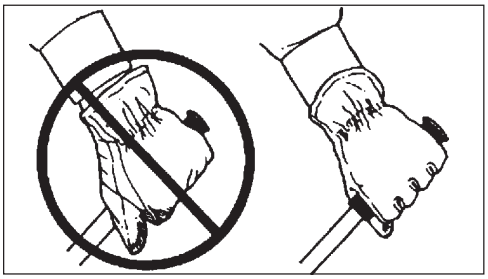
- Keep your body warm, especially the head, neck, feet, ankles, hands and wrists.
- Maintain good blood circulation by performing vigorous arm exercises during frequent work breaks and also by not smoking.
- Limit the hours of operation. Try to fill each day with jobs where operating the trimmer or other 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:

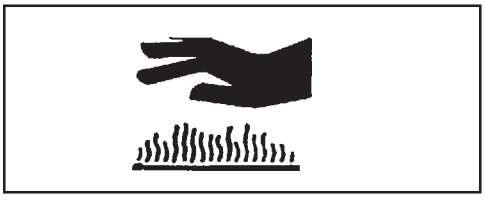
- Avoid using your wrist in a bent, extended or twisted position. Instead try to maintain a straight wrist position. Also, when grasping, use your whole hand, not just the thumb and index finger.
- Take periodic breaks to minimize repetition and rest your hands.
- Reduce the speed & force in which you do the repetitive movement.
- Do exercises to strengthen the hand and arm muscles.
- Immediately stop using all power equipment and consult 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.



EQUIPMENT

Before operation a complete check of the unit must be performed;

- Check unit for loose/missing nuts, bolts and screws. Tighten and/or replace as needed.
- Inspect fuel lines, tank and area around carburetor for fuel leaks. DO NOT operate unit if leaks are found.
- Inspect shield for damage and ensure that the shield is securely in place. Replace if shield is damaged or missing.
- Check that the tines are firmly attached and in safe operating condition.
- Keep exhaust area clear of flammable debris. Avoid contact during and immediately after operation.



SAFE OPERATION

WARNING ⚠ DANGER

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

TO AVOID INJURY :

- Read and understand the OPERATOR'S MANUAL.
- Know location and functions of all controls.
- Keep all Safety devices and shields in place.
- Never allow children or uninstructed adults to operate the unit
- Shut off engine before unclogging tines or making repairs.
- Keep bystanders and animals a minimum of 15m (50 ft.) away while operating unit.
- Keep away from rotating parts.
- Always wear eye and hearing protection while operating machine.
- Do not hold or carry unit in a manner that will permit tines to contact body parts or clothing.
- Refer to Operator's Manual for correct carrying instructions.
- BEFORE OPERATION, refer to your Operator's Manual for proper operating techniques.
- If you require a replacement manual, contact ECHO, Inc. , 400 Oakwood Road, Lake Zurich, IL 60047.
- Always empty the fuel tank before carrying unit in a car or truck. To avoid damage to engine parts always lay unit on its muffler side.
- Keep away from rotating tines. Rotating tines cause injury.
- ALWAYS STOP THE ENGINE IF A TINE JAM OCCURS.
- Never attempt removing the object causing the jam if the engine is running.
- Physical injury can occur if a tine jam is removed and the tine suddenly starts.

EMISSION CONTROL

EPA Phase 2

The emission control system for these engines are EM (Engine Modification).

Emission Control Label (located on Engine) (EXAMPLE ONLY, information on label varies by FAMILY).

PRODUCT EMISSION DURABILITY

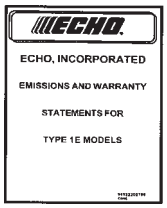
The 300 hour emission durability compliance period is the time span selected by the manufacturer certifying the engine emissions output meets applicable emissions regulations, provided that approved maintenance procedures are followed as listed in the Maintenance Section of this manual.

DESCRIPTION

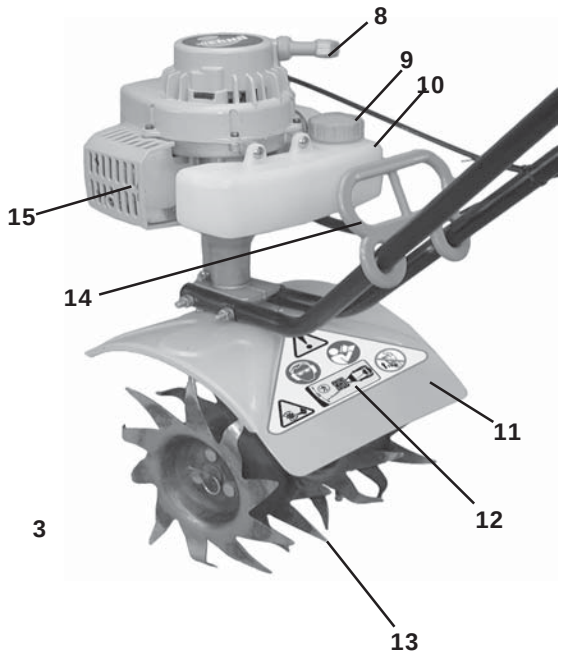
The ECHO product you purchased has been factory pre-assembled for your convenience. Due to packaging restrictions some assembly is required.

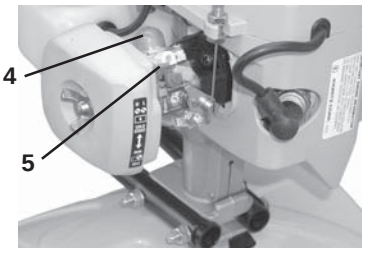
After opening the carton, check for damage. Immediately notify your retailer or ECHO Dealer of damaged or missing parts. Use the contents list to check for missing parts.

CONTENTS



_____ 1 - Power Head & Shield Assembly
_____ 1 - Upper Handle Assembly
_____ 1 - Left Lower Handle
_____ 1 - Right Lower Handle
_____ 2 - Lower Handle Mounting Eye Plates
_____ 1 - 1/4 in. x 3 in. Hex Head Shoulder Bolt
_____ 1 - 1/4 in. x 3-1/4 in. Hex Head Shoulder Bolt
_____ 2 - 1/4 in. Lock Washers
_____ 2 - 1/4 in. Lock Nuts
_____ 1 - Plastic Carry Handle
_____ 1 - Cable Tie
_____ 1 - Operator's Manual
_____ 1 - Warranty Card & Limited Warranty Statement
_____ 2 - 10mm x 30mm Carriage Bolt
_____ 2 - 10mm nut
_____ 2 - 10mm Lock Washer
_____ 1 - Echo Power Blend ™ 2-stroke oil sample





1. **STOP SWITCH** - Toggle Switch mounted on upper right handle. Move switch forward to "Start" position to run, back to "Stop" position to stop unit.

2. **THROTTLE TRIGGER** - Spring loaded to return to idle when released. When accelerating, pull trigger gradually for best operating technique. DO NOT hold trigger when starting.

3. **SPARK PLUG -** Provides spark to ignite fuel mixture.

4. **PRIMER BULB** - Pumping primer bulb before starting engine draws fresh fuel from the fuel tank priming the carburetor for starting. Pump primer bulb until fuel is visible and flows freely in the clear fuel tank return line. Pump bulb an additional 4 or 5 times.

5. **CHOKE** - The choke control is located on the side of the air filter case. Move choke to "COLD START" to close the choke for cold starting. Move choke to "RUN" position to open choke.

6. **GEAR BOX** - Houses gears for driving tines.

7. **AIR CLEANER** - Contains replaceable filter element.

8. **RECOIL STARTER HANDLE/ROPE** - Pull recoil starter handle/rope using light pulling force, approximately 2/3 (2 ft.) of rope length. Two (2) to Six (6) pulls are required to properly tension starter spring prior to automatic engine engagement. DO NOT let handle snap back or damage to unit will occur.

9. **FUEL TANK CAP** - Cover and seals fuel tank opening.

10. **FUEL TANK** - Contains fuel and fuel filter.

11. **TINE GUARD** - Used to help deflect debris away from operator and reduce accidental contact with tines.

12. **SAFETY DECAL** - Safety precautions - See Page 3.

13. **TINES** - Special 10-tooth tines are reversible for tilling or cultivating, removable for cleaning.

14. **PLASTIC CARRYING HANDLE** - Use to lift and carry unit.

15. **SPARK ARRESTOR - CATALYTIC MUFFLER / MUFFLER** - The muffler or catalytic muffler controls exhaust noise and emission. The spark arrestor screen prevents hot, glowing particles of carbon from leaving the muffler. Keep exhaust area clear of flammable debris.

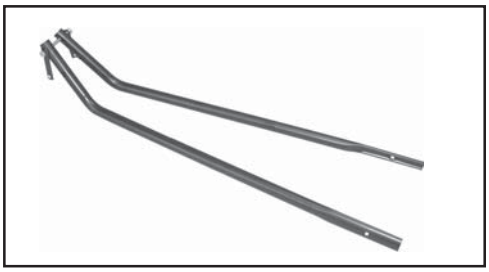
SPECIFICATIONS

MODEL	**TC-210 i™**
Length	1130 mm (44.48 in.)
Width	340 mm (13.36 in.)
Height	1010 mm (39.76 in.)
Weight (dry) w/Tines	9.08 kg (20.0 lb.)
Engine Type	Air cooled, two-stroke, single cylinder gasoline engine
Bore	32.2 mm (1.268 in.)
Stroke	26.0 mm (1.04 in.)
Displacement	21.2 cc (1.29 cu. in.)
Exhaust	Spark Arrestor Muffler
Carburetor	Zama diaphragm model C1U w/primer bulb
Ignition System	Flywheel magneto, capacitor discharge ignition type
Spark Plug	NGK BPM-8Y Gap 0.65 mm (0.026 in.)
Fuel	Mixed (Gasoline and Two-stroke Oil)
Fuel/Oil Ratio	50:1 two-stroke air cooled engine oil
Gasoline	89 Octane unleaded. DO NOT use fuel containing methyl alcohol, more than 10% ethyl alcohol or 15% MTBE.
Oil	Power Blend™ Premium Universal 2-Stroke Oil
Fuel Tank Capacity	0.5 lit. (17.0 US fl. oz.)
Recoil Starter System	i™ - Start Automatic Rewind Starter
Clutch	Centrifugal Type
Gear Case	Worm Gear Type (42:1 Ratio)
Tines	Special 10 Tooth Design
Tilling/Cultivating	229 mm (9 in.) x 15-20 mm (6-8 in.)
Tine Diameter	229 mm (9 in.)
Idle Speed	2700 - 3300 RPM
Wide Open Throttle Speed (W.O.T.)	9000 - 11000 RPM

ASSEMBLY

Tools Required: (2) 7/16 in. Wrenches

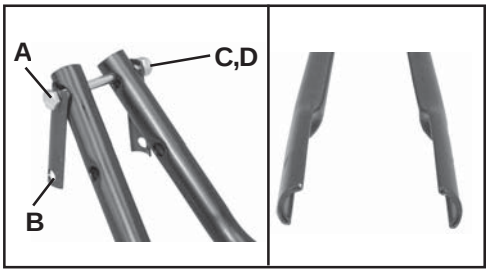
1. Support powerhead assembly upright on tines. Place top handle assembly to rear.



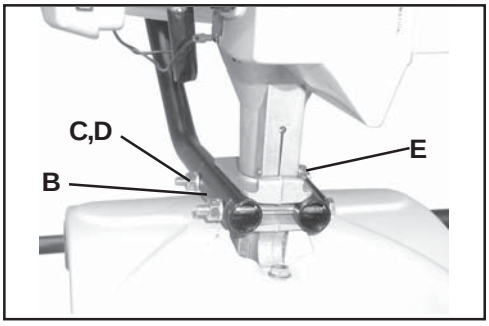
NOTE
Make sure inside curves at handle ends are facing each other.

2. Loosely assemble lower handles using short 1/4 in. x 3 in. long hex head shoulder bolt (A), eye plates (B), lockwasher (C), and locknut (D) in front handle end mounting hole as shown.

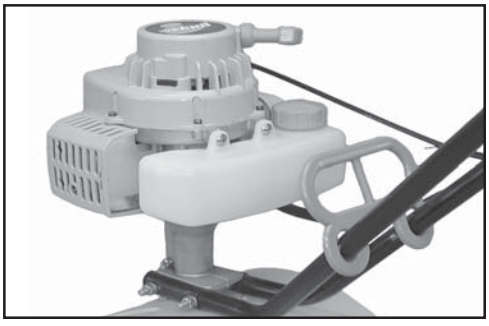
3. Slide lower handle assembly under power head and throttle linkage/ignition wires, and position in mounting groove.



4. Assemble using long 1/4 in. x 3-1/4 in. hex head shoulder bolt (E), eye plate (B), lockwasher (C), and locknut (D) in rear handle mounting holes. DO NOT TIGHTEN BOLTS.



5. Slide plastic carry handle onto lower handle tubes.

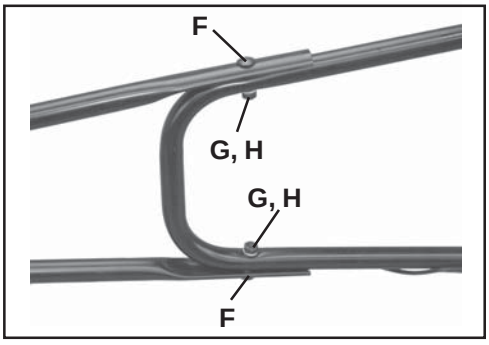


6. Remove (2) 10mm x 30mm carriage bolts (F), (2) lockwashers (G), and (2) nuts (H) from top handle assembly.

7. Place top handle assembly between lower handles, align mounting holes and install (2) 10mm x 30mm carriage bolts (F), (2) lockwashers (G), and (2) nuts (H). Carriage bolts must be installed from the outside through square holes in the lower handle, then through upper handle tube.

8. Securely tighten lower handle bolts first, then the upper handle bolts.

9. Secure throttle linkage and stop switch lead midway on right lower handle with cable tie.



PRE-OPERATION

FUEL

Fuel Requirements

Gasoline - Use 89 Octane [R+M/2] (mid grade or higher) gasoline known to be good quality. Gasoline may contain up to 15% MTBE (methyl tertiary-butyl ether). Gasohol containing methyl (wood) alcohol is **NOT** approved.

Two Stroke Oil - A two-stroke engine oil meeting ISO-L-EGD (ISO/CD 13738) and J.A.S.O. FC Standards must be used. Echo brand premium Power Blend ™ Universal 2-Stroke Oil meets these standards. Engine problems due to inadequate lubrication caused by failure to use an ISO-L-EGD and J.A.S.O. FC certified oil, such as Echo premium Power Blend ™, will void the two-stroke engine warranty. (Emission related parts only are covered for two years, regardless of two-stroke oil used, per the statement listed in the Emission Defect Warranty Explanation.)

IMPORTANT
Echo premium Power Blend ™ Universal 2-Stroke Oil may be mixed at 50:1 ratio for application in all Echo engines sold in the past regardless of ratio specified in those manuals.

Mixing Instructions

1. Fill an approved fuel container with half of the required amount of gasoline.
2. Add proper amount of 2-stroke oil to gasoline.
3. Close container and shake to mix oil with gasoline.
4. Add remaining gasoline and remix.
5. Install fuel container cap and wipe any spilled fuel from container and surrounding area.

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!
- NEVER refuel a unit with the engine running.
- DO NOT fill fuel tanks indoors. ALWAYS fill fuel tanks out doors over bare ground.
- Securely tighten fuel cap after refueling.
- Inspect for fuel leakage. If fuel leakage is found, do not start or operate unit until leakage is repaired.

IMPORTANT
Spilled fuel is a leading cause of hydrocarbon emissions. Some states may require the use of automatic fuel shut-off containers to reduce fuel spillage. Contact your ECHO dealer for ordering information.

After Refueling;

- Wipe any spilled fuel from the unit.
- Move at least 3 m (10 ft.) from refueling location before starting the engine.

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, air tight container. Store in a well ventilated, unoccupied building, away from sparks and flames. Do not store fuel longer than 30 days.

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.

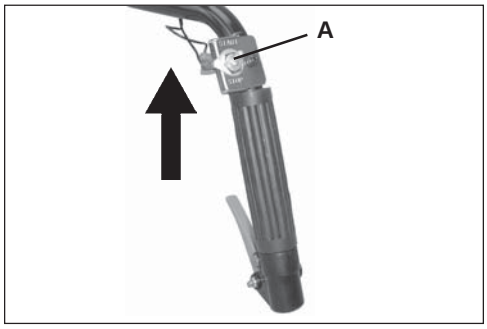
IMPORTANT
Stored two-stroke fuel may separate. ALWAYS shake fuel container thoroughly before each use.

OPERATION

STARTING COLD ENGINE

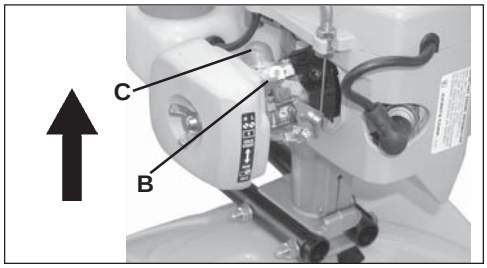
WARNING DANGER

The tines should not move at idle. If tines move, readjust carburetor according to "Carburetor Adjustment" instructions in this manual or see your ECHO Dealer, otherwise serious personal injury may result.



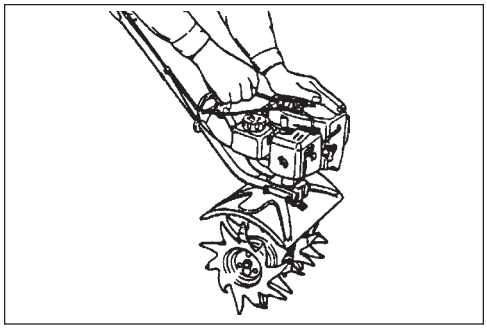
1. *Stop Switch*
   Move Stop Switch (A) to "START" position.

2. *Choke*
   Move choke (B) to "COLD START" position. Throttle must remain at idle position for starting.



3. *Primer*
   Pump primer bulb (C) until fuel is visible and flows freely in the clear fuel tank return line. Pump bulb an additional 4 or 5 times.

NOTE
Energy is stored in the starter spring each time the handle/rope is pulled. Generally two to six pulls, using light pulling forces, will store enough energy to engage the starter and spin the engine. Do not pull the rope out to end stop.



4. *Recoil Starter*
   Gently pull recoil starter handle/rope (D) until engine fires or 2 to 3 engine engagements.

5. *Choke*
   After engine fires or 2 to 3 engine engagements, move choke (B) to RUN (open) position.

6. *Recoil Starter*
   Pull recoil starter rope until engine starts.

NOTE
If engine does not start with choke in “Run” position after 5 engine engagements, repeat instructions.

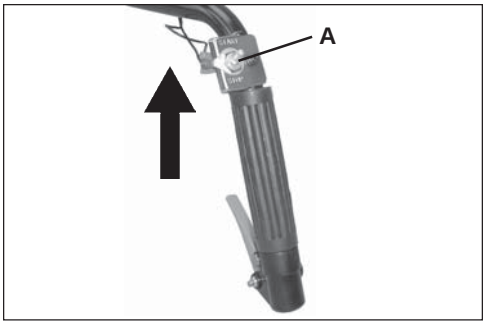
7. After engine warm up, gradually depress throttle trigger to increase engine RPM to operating speed.

STARTING WARM ENGINE

The starting procedure is the same as cold start except DO NOT close the choke (B).

NOTE
If engine does not start after 5 engine engagements, use Cold Start Procedure.

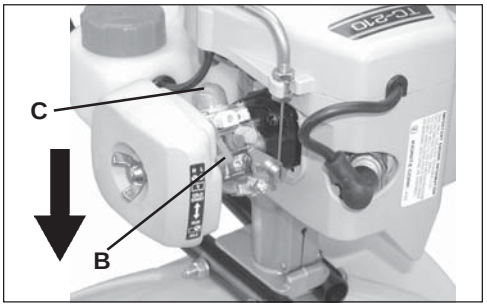
1. *Stop Switch*
   Move Stop Switch (A) to START position. Throttle trigger must remain at idle position for starting.



2. *Primer*
   Pump primer bulb (C) until fuel is visible and flows freely in the clear fuel tank return line. Pump bulb an additional 4 or 5 times.

3. *Choke*
   Be certain choke (B) is in "RUN" position.

4. *Recoil Starter*
   Pull recoil starter rope until engine starts.



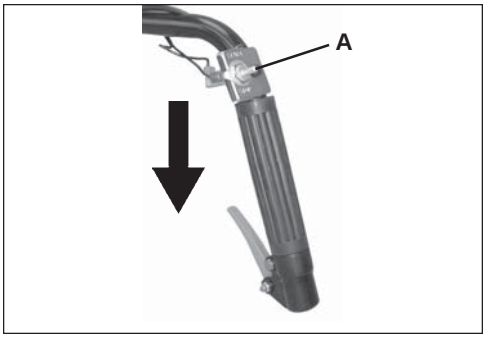
STOPPING ENGINE

1. *Throttle Trigger*
   Release throttle and allow engine to return to idle before shutting engine off.

2. *Stop Switch*
   Move stop switch to "STOP" position (A).

WARNING DANGER

If engine does not stop when stop switch is moved to STOP position, close choke - COLD START position - to stall engine. Have your ECHO dealer repair stop switch before using tiller/ cultivator again.

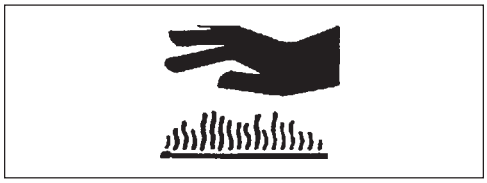


TILLING/CULTIVATING

WARNING ⚠ DANGER

Do not operate this unit indoors or in inadequately ventilated areas.

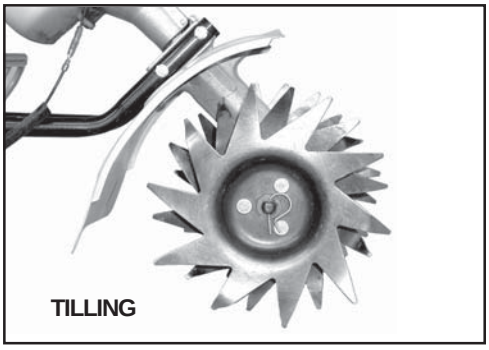
- Carry unit to tilling/cultivating area using plastic carry handle and upper handle. Avoid contact with tines or hot engine parts.
- Check the area to be tilled or cultivated. Look for any hazards and obstructions that could contribute to unsafe conditions.
- Remove all rocks, debris, and other materials that could become jammed in the tines.
- Do not till or cultivate in areas where there may be hidden hazards, such as sprinkler heads and pipes, buried power cables or gas lines, or other similar hazards.
- Start the unit as shown in "Starting" instructions.
- Hold unit securely, using both hands to grip hand grips.
- Depress throttle trigger gradually to begin operation.
- Release throttle trigger to stop tines.
- Allow engine to return to idle, and move switch to "Stop" position to stop engine.



TILLING – Recommended tilling depth is 6 – 8 inches

Install Tines with individual tines angled forward, toward front of unit. **(See Tine Removal/Cleaning/Installation, page 20)**

- Use a forward/backward motion to till soil. Allow tines to dig into soil, then pull unit back to break up and pulverize clumps. Tilling depth is controlled by the number of times the forward/backward motion is used in an area.
- Controlling tilling depth :
- Shallow tilling: Move tiller over soil surface quickly. Tines should be in cultivating position.
- Deeper tilling: Move tiller over soil slowly. Allow tiller to work the same area until desired depth is reached.
- Big Weeds/Tough Roots: Rock tiller back and forth over tough spot until the tines slice through the roots or weeds.
- Digging Holes: Hold tiller in place, and allow tines to dig down into the soil. Allow tines to dig approximately 6 – 8 inches deep, then lift unit up and out. Remove loose soil with shovel or rake. Resume digging with rotating tiller tines until desired depth is reached.

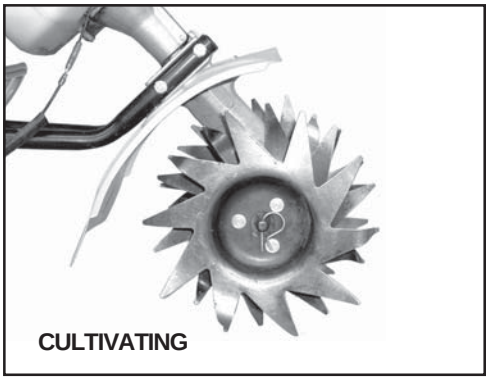


TILLING

CULTIVATING – Recommended cultivating depth is 2 – 3 inches

Install Tines with individual tines angled rearward, toward the operator. **(See Tine Removal/Cleaning/Installation, page 20)**

Allow unit to move forward slowly. Pull unit back to cut vegetation and cultivate soil to desired depth. Repeat forward/backward motion as needed.



CULTIVATING

MAINTENANCE

Your ECHO tiller/cultivator is designed to provide many hours of trouble free service. Regular scheduled maintenance will help your tiller/cultivator 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 the task is not listed, see your ECHO dealer for repairs.

SKILL LEVEL

Level 1 = Easy to do. Most required tools come with unit.
Level 2 = Moderate difficulty. Some specialized tools may be required.
Level 3 = Experience required. Specialized tools are required. ECHO recommends that the unit be returned to your ECHO Dealer for service.

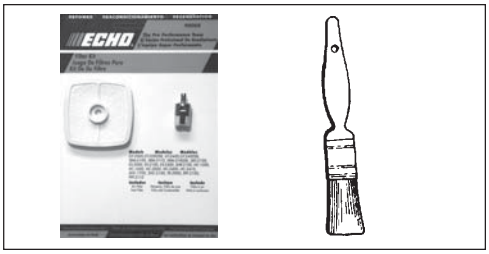
ECHO offers **REPOWER™** Maintenance Kits and Parts to make your maintenance job easier. Just below each task heading are listed the various part numbers required for that task. See your ECHO dealer for these parts.

MAINTENACE INTERVALS

COMPONENT/ SYSTEM	MAINTENANCE PROCEDURE	REQ'D SKILL LEVEL	DAILY OR BEFORE USE	EVERY REFUEL	3 MONTHS OR 90 HOURS	6 MONTHS OR 270 HOURS	YEARLY 600 HOURS
Recommended Echo Dealer Maintenance Procedures							
Cylinder Exhaust Port	Inspect/Clean/Decarbon	3			I / C		
Do-It-Yourself Maintenance Procedures							
Air Filter	Inspect/Clean/Replace	1	I / C		R*		
Choke	Inspect/Clean	2	I / C				
Fuel Filter	Inspect/Replace	1			I		R *
Fuel System, leaks	Inspect/Replace	1	I *	I*			
Cooling System	Inspect/Clean	2	I / C				
Muffler Spark Arrestor	Inspect/Replace	2			I *		
Gear Housing	Grease	2			I (1)		
Tines	Inspect/Clean	1	I / C				
Recoil Starter Rope	Inspect/Clean	1	I / C *				
Spark Plug	Inspect/Clean	2			I / C	R *	
Screws/Nuts/Bolts	Inspect/Tighten/Replace	1	I / R *				

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) Apply ECHO® LUBE™ every 25 hours.
***** All recommendations to replace are based on the finding of damage or wear during inspection..

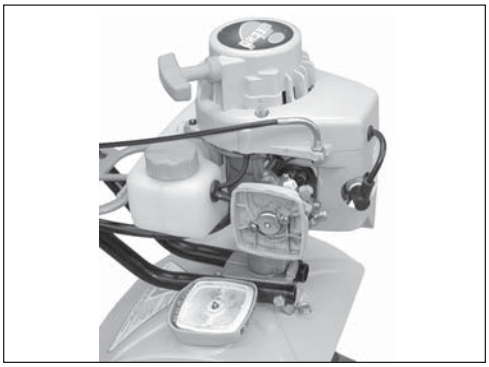
AIR FILTER



Level 1.

Tools required: 25-50mm (1-2 in.) medium bristle paint brush.

Parts required: 90008 REPOWER™ AIR & FUEL FILTER KIT.



1. Close choke (Cold Start Position). This prevents dirt from entering the carburetor throat when the air filter is removed. Brush accumulated dirt from the air cleaner area.

2. Remove the air cleaner cover. Clean and inspect the element for damage. If element is fuel soaked and very dirty, replace.

3. If element can be cleaned and reused, be certain it:
   -still seals the cavity in the air cleaner cover.
   -is installed with the original side out.

NOTE
Carburetor adjustment may be needed after air filter cleaning/ replacement. See Carburetor Adjustment Section.

FUEL FILTER

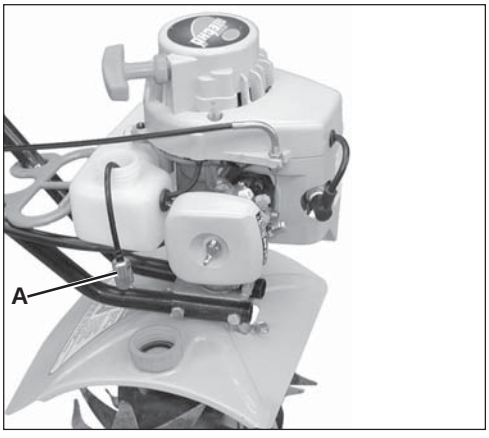
Level 1.

Tools required: Fuel line hook. 200-250mm (8-10 in.) length of wire with one end bent into a hook. Clean rag, funnel, and an approved fuel container.

Parts required: 90008 REPOWER™ AIR & FUEL FILTER KIT

WARNING DANGER

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

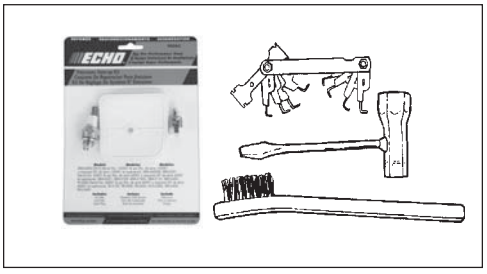


1. Use a clean rag to remove loose dirt from around fuel cap and empty fuel tank.

2. Use the “fuel line hook” to pull the fuel line and filter (A) from the tank.

3. Remove the filter (A) from the line and install the new filter.

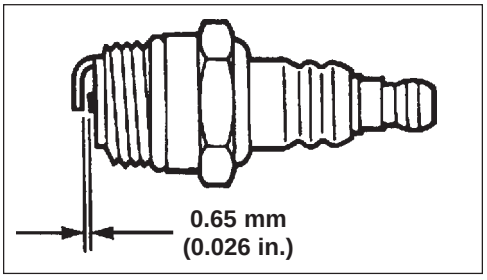
SPARK PLUG



Level 2.

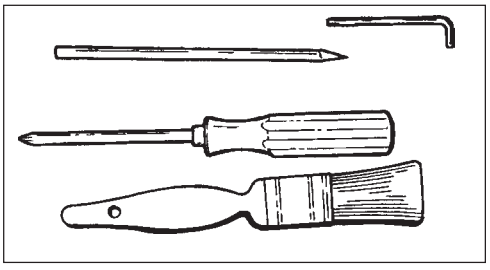
Tools Required: Spark Plug socket wrench and screw driver, Feeler gauge. Preferably a wire gauge.

Parts Required: REPOWER™ Tune-Up Kit P/N 90074



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.
4. Tighten spark plug to 145-155 kg/cm (125-135 in. lb.).

COOLING SYSTEM CLEANING



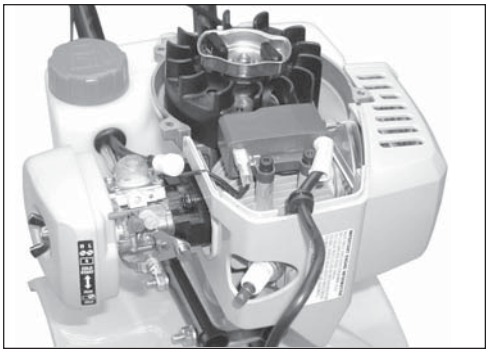
Level 2.

Tools required: Cross Head Screwdriver, 3mm Hex wrench, Pointed Wood Stick, 25-50mm (1-2 in.) medium bristle paint brush.

Parts Required: None.

IMPORTANT
To maintain proper engine operating temperatures, cooling air must pass freely through the cylinder fin area. This flow of air carries combustion heat away from the engine.

Overheating and engine seizure can occur when:
- Air intakes are blocked, preventing cooling air from reaching the cylinder.
- Dust and grass build up on the outside of the cylinder. This build up insulates the engine and prevents the heat from leaving.



Removal of cooling passage blockages or cleaning of cooling fins is considered “Normal Maintenance.” Any failure attributed to lack of maintenance is not warranted.

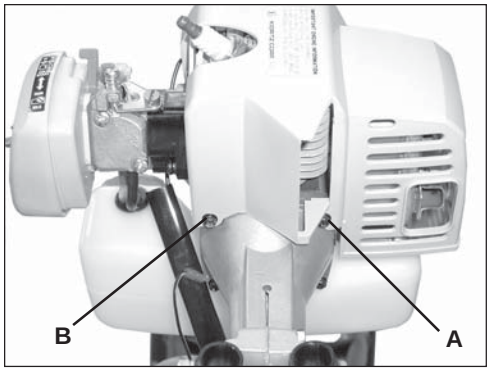
1. Disconnect spark plug lead. Remove spark plug and throttle cable end from the carburetor swivel.
2. Remove four screws from starter cover, lift the cover from the engine and lay to the side.

NOTE
The throttle cable remains assembled to the cover.

3. Remove bottom left (A) and bottom right (B) screws from cylinder cover.

4. Carefully pull cylinder cover forward, disengaging muffler gasket tabs and ignition lead, and lay aside.

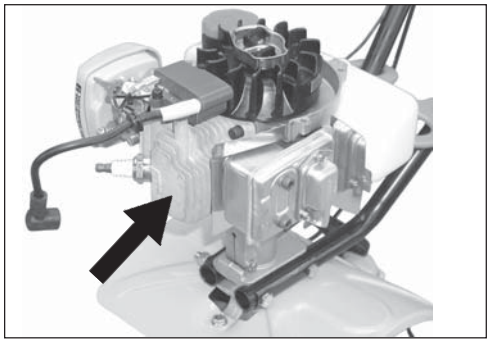
5. Use brush to remove dirt from cylinder fins.



IMPORTANT
DO NOT use a metal scraper to remove dirt from the cylinder fins.

6. Assemble components in reverse order.

NOTE
When installing the cylinder cover, be certain the muffler gasket tabs are locked into the muffler grill slots and the stop switch lead is seated in the relief notch.



Cylinder Exhaust Port

Level 3.

IMPORTANT
The cylinder exhaust port must be inspected and cleaned of excess carbon every 3 months or 90 hours of operation in order to maintain this engine within the emissions durability period. ECHO strongly recommends that you return your unit to your ECHO dealer for this important maintenance service.

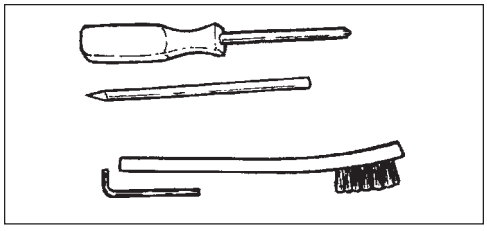
EXHAUST SYSTEM

Spark Arrestor Screen

Level 2.

Tools Required: Cross Head Screwdriver. 3mm Hex wrench. Soft metal brush. Wooden carbon scraper.

Parts Required: Spark Arrestor Screen, Gasket



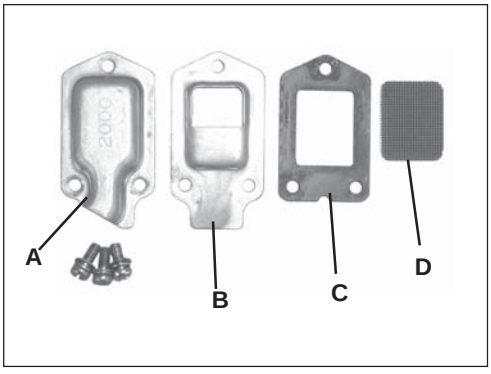
1. Remove starter cover and cylinder cover as shown in "Cooling System Cleaning", pages 17 & 18.

2. Remove screen cover (A), screen holder (B), gasket (C), and spark arrestor screen (D) from muffler body.

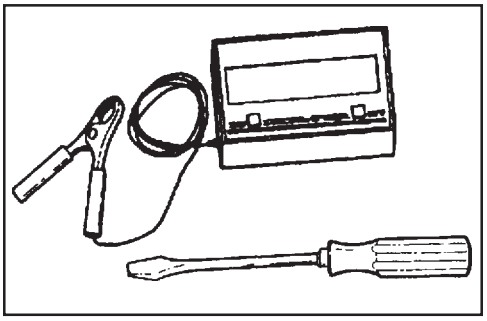
3. Clean carbon deposits from and muffler components.

4. Replace screen if it is cracked, plugged or has holes burned through.

5. Install with new gaskets.



CARBURETOR ADJUSTMENT



Level 2.

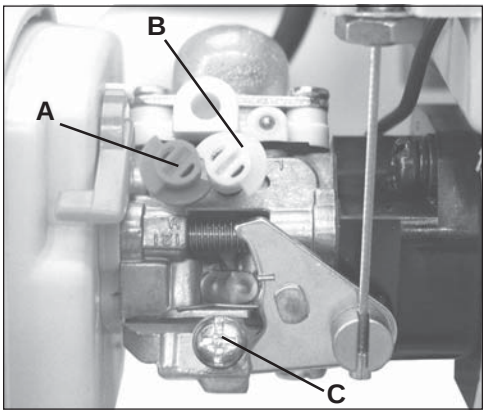
Tools required: Screwdriver, Tachometer (ECHO P/N 99051130017).

Parts required: None.

NOTE
Every unit is run at the factory and the carburetor is set in compliance with emission regulations. In addition, the carburetor is equipped with HI (A) and LO (B) needle adjustment limiters that prevent settings outside acceptable limits.

1. Before adjusting the carburetor, clean or replace the air filter and spark arrestor screen.

WARNING ⚠ DANGER
Sharp rotating tines! Do not allow tines to touch anything during carburetor adjustment. Contact with revolving tines will cause severe injury.



2. Start engine and run for several minutes to reach operating temperature.

3. Stop engine. Turn HI (A) speed needle CCW (counter clockwise) to stop. Turn LO (B) speed needle midway between full CCW and CW (clockwise) stops.

4. Idle Speed Adjustment.
-Start engine and turn idle speed adjustment screw (C), CW until the tines begin to turn, then turn the screw CCW until tines stop turning. Turn screw CCW an additional 1/4 turn.

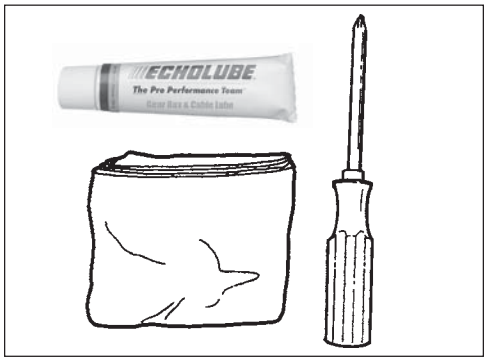
5. Accelerate to full throttle for 2-3 seconds to clear excess fuel from engine then return to idle. Accelerate to full throttle to check for smooth transition from idle to full throttle. If engine hesitates, turn LO (B) needle CCW an additional 1/8 turn and repeat acceleration. Continue adjusting until smooth acceleration results.

6. Check HI (A) speed RPM at W.O.T. (Wide Open Throttle). HI speed RPM should be set to specifications found on page 9 "Specifications" of this manual.

7. Check idle speed and reset if necessary. If a tachometer is available, idle speed should be set to the specification found on page 9 "Specifications" of this manual.

WARNING ⚠ DANGER
When carburetor adjustment is completed, tines should not move at idle, otherwise serious personal injury may result.

LUBRICATION



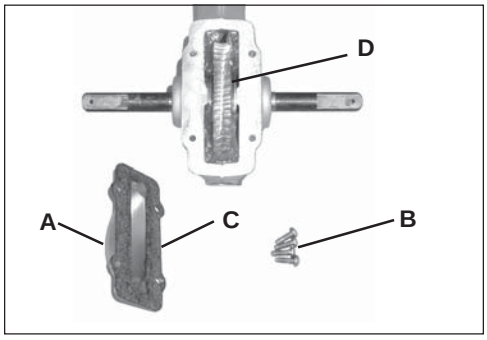
Level 1.

Tools Required: Crosshead Screw Driver, Clean Rag

Parts Required: ECHO® LUBE™ 8 oz. (P/N 91014) or Lithium Base Grease.

Gear Housing

1. Remove tines (See Tine Removal/Cleaning - Installation below).
2. Clean dirt from area around gear cover (A) and remove four (4) crosshead screws (B). Be careful not to tear sealing gasket (C).
3. Support tiller with exposed gear case (D) upward. Add grease until nearly level with top of gear case (D).



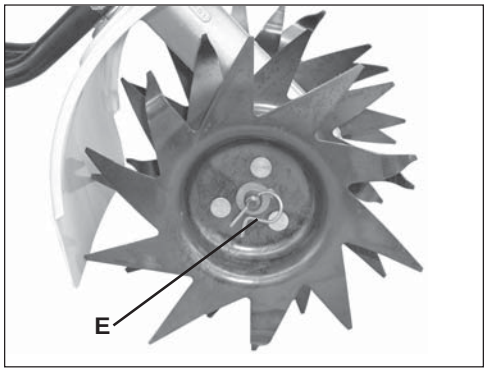
IMPORTANT
Do not over fill. Too much grease will cause pressure and possible seal failure.

TINE REMOVAL/CLEANING - INSTALLATION

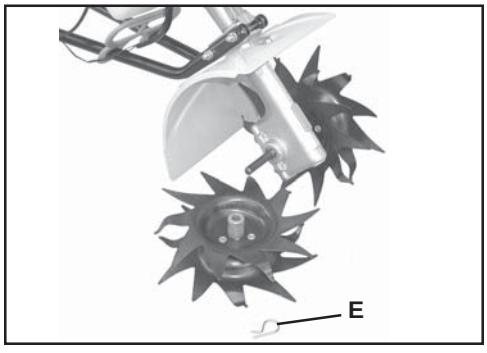
(After Each Use)

NOTE
Always wear gloves to protect hands from sharp blades.

WARNING ⚠ DANGER
Stop engine and disconnect spark plug wire before removing or installing tines. Contact with revolving tines will cause severe injury.



1. Remove retaining pin (E) and slide tine from shaft.
2. Remove weeds, etc. from tines and wash dirt from unit.
3. Clean accumulated dirt and debris form gear housing and tine shaft.
4. Select "Tilling" or "Cultivating" position, and install tines facing forward (tilling) or rearward (cultivating) see page 14.
5. Slide tine on shaft, long hub first. D-hole (hole with flat on one side) goes to the outside. (D-hole in outer hub aligns with flat on shaft.)
6. Install retaining pin (E).



TROUBLESHOOTING

ENGINE PROBLEM TROUBLESHOOTING CHART

Problem	Check	Status	Cause	Remedy
Engine cranks - starts hard/ doesn't start	Fuel at carburetor	No fuel at carburetor	Fuel strainer clogged Fuel line clogged Carburetor	Clean or replace Clean or replace See your Echo dealer
	Fuel at cylinder	No fuel at cylinder	Carburetor	See your Echo dealer
		Muffler wet with fuel	Fuel Mixture too rich	Open choke Clean/replace air filter Adjust carburetor See your Echo dealer
	Spark at end of plug wire	No spark	Stop switch off Electrical problem Interlock switch	Turn switch to ON See your Echo dealer See your Echo dealer
	Spark at plug	No spark	Spark gap incorrect Covered with carbon Fouled with fuel Plug defective	Adjust to .65mm (0.026 in.) Clean or replace Clean or replace Replace plug
Engine runs, but dies or does not accelerate properly	Air filter	Air filter dirty	Normal wear	Clean or replace
	Fuel filter	Fuel filter dirty	Contaminants/residues in fuel	Replace
	Fuel vent	Fuel vent plugged	Contaminants/residues in fuel	Clean or replace
	Spark Plug	Plug dirty/worn	Normal wear	Clean and adjust or replace
	Carburetor	Improper adjustment	Vibration	Adjust
	Cooling System	Excessive dirt/debris	Extended operation in dirty/dusty locations	Clean
	Spark Arrestor Screen	Screen cracked, plugged, or perforated	Normal wear	Replace
Engine does not crank	N/A	N/A	Internal engine problem	See your Echo dealer

WARNING DANGER

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

STORAGE

Long Term Storage (over 30 days)

WARNING DANGER

During operation the muffler or catalytic muffler and surrounding cover become hot. Always keep exhaust area clear of flammable debris during transportation or when storing, otherwise serious property damage or personal injury may result.

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 stop switch in the "OFF" 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 the screws and nuts.
6. **Drain** the fuel tank **completely** and pull the recoil starter handle several times to remove fuel from the carburetor.
7. Remove the spark plug and pour 7 cc (1/4 oz.) of fresh, clean, two-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 spark plug cable).

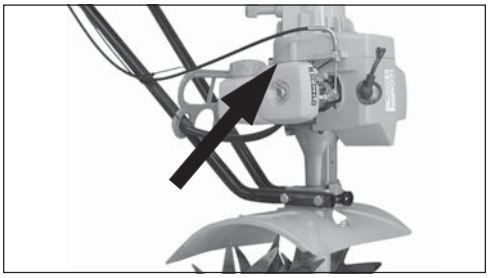
NOTES

SERVICING INFORMATION

PARTS

Genuine ECHO Parts and ECHO REPOWER™ Parts and Assemblies for your ECHO products are available only from an Authorized ECHO Dealer. When you do need to buy parts **always** have the Model Number and Serial Number of the unit with you. You can find these numbers on the engine housing. For future reference, write them in the space provided below.

Model No. _____ SN. _____



DEALER?
Call
1-800-432-ECHO
or
www.echo-usa.com

CONSUMER PRODUCT SUPPORT
1-800-673-1558
8:30 - 4:30 Mon - Fri C.S.T.

SERVICE

Service of this product during the warranty period must be performed by an Authorized ECHO Service Dealer. For the name and address of the Authorized ECHO Service Dealer nearest you, ask your retailer or call: 1-800-432-ECHO (3246). Dealer information is also available on our Web Site. When presenting your unit for Warranty service/repairs, proof of purchase is required.

ECHO CONSUMER PRODUCT SUPPORT

If you require assistance or have questions concerning the application, operation or maintenance of this product you may call the ECHO Consumer Product Support Department at 1-800-673-1558 from 8:30 am to 4:30 pm (Central Standard Time) Monday through Friday. Before calling, please know the model and serial number of your unit to help your Consumer Product Support Representative.

WARRANTY REGISTRATION

You may register your Echo equipment using the warranty registration card or register on-line at www.echo-usa.com. Registering provides a direct link between you and ECHO if we find it necessary to contact you.

ADDITIONAL OR REPLACEMENT MANUALS

Safety Manuals in English/Spanish or English/French are available, free of charge, from your ECHO dealer or at www.echo-usa.com.

Operator's and Parts Manuals are available by:

- Downloading free from www.echo-usa.com
- Purchasing from your Echo Dealer.
- Manuals are available by sending a written request stating the model number and serial number of your Echo unit, part number of the manual, your name and address, and mail to the address below.

Safety Videos are available from your Echo dealer. A $5.00 shipping charge will be required for each video.

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08001001/08999999