



Tiller/Cultivator

Operator's Manual

MODEL

TC-2100 Type 1

Serial Number 011441 & Up

TC-2100 Type 1E

Serial Number 001001 & Up



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.

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 that you found in the package. You will find it easy to use and full of helpful operations tips and SAFETY messages.

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.

THE OPERATOR'S MANUAL --

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

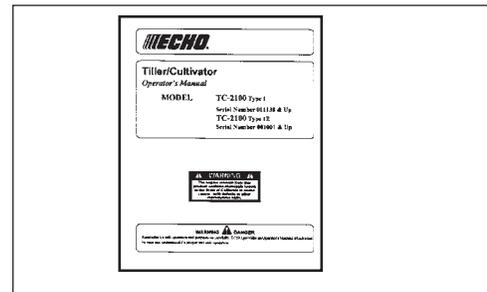


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Specifications, descriptions and illustrative material in this literature are as accurate as known at the time of publication, but are subject to change without notice. Illustrations may include optional equipment and accessories, and may not include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

SAFETY SYMBOLS AND IMPORTANT INFORMATION

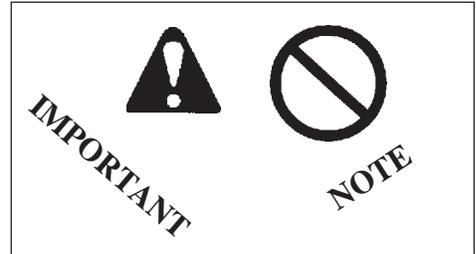
Throughout this manual and on the product itself, you will find safety alerts and helpful, information messages preceded by symbols or key words. The following is an explanation of those symbols and key words and what they mean to you.



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.

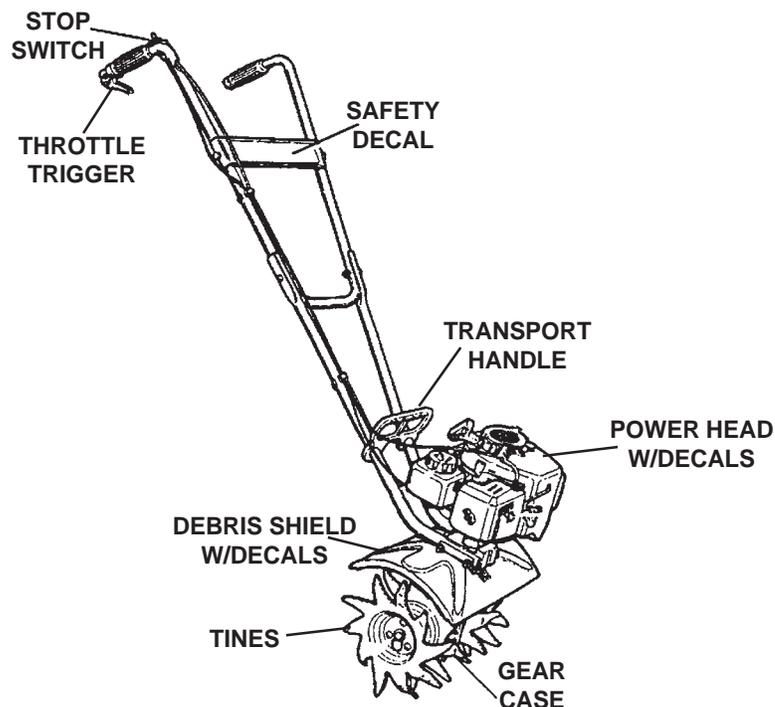
NOTE This enclosed message provides tips for use, care and maintenance of the unit.

SAFETY

GENERAL DESCRIPTION

IMPORTANT

See Description and Specification sections for full description and illustration of model.



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.

TC-2100

TO AVOID INJURY:

WARNING ▲ DANGER

• 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 50 ft. (15m) away while operating unit. • Keep away from rotating parts. • Always wear eye & hearing protection while operating machine. • Do not hold or carry unit as shown. If tines engage, serious physical injury can occur. 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 Rd. Lake Zurich, IL 60047.

WARNING-DANGER

1) Keep away from rotating tines. Rotating tines cause injury.

2) 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 jam is removed and the tine suddenly starts.

"REAR OF CULTIVATOR"
THIS LABEL AND FUEL TANK MUST FACE OPERATOR

INTERNATIONAL SYMBOLS

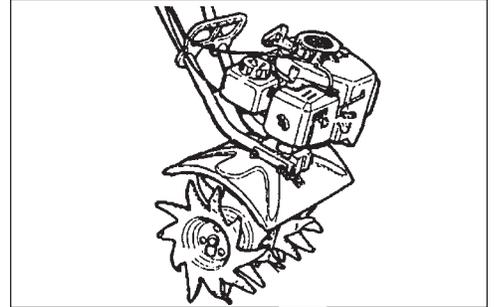
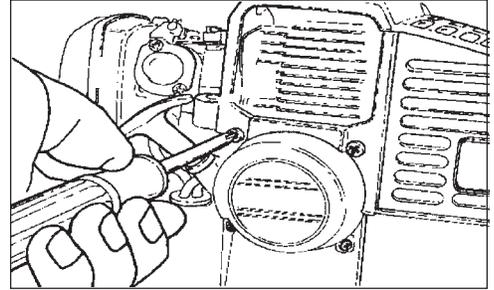
| Symbol form/shape | Symbol description/application | Symbol form/shape | Symbol description/application |
|-------------------|--|-------------------|--|
| | Read and understand Operator's Manual. | | Fuel and oil mixture |
| | Wear eyes, ears and head protection | | Finger Severing |
| | Hot Surface | | 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 | | Carburetor adjustment - High speed mixture |
| | Carburetor adjustment - Low speed mixture | | Carburetor adjustment - Idle speed |

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.



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 outdoors 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

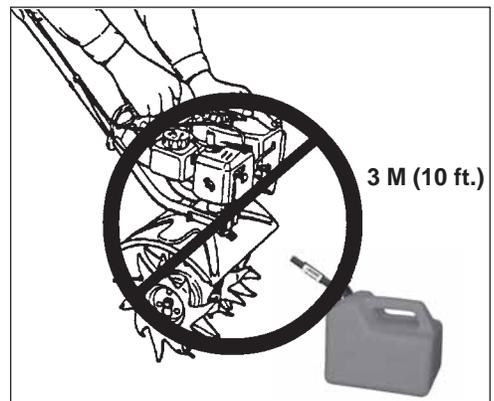
Spilled fuel is a leading cause of hydrocarbon emissions. Some states may require the use of automatic fuel shut-off containers to reduce fuel spillage. Contact your ECHO dealer for ordering information.

After Refueling;

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

After Use;

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



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.



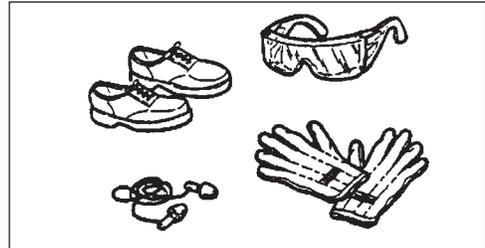
Eye Protection --

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;

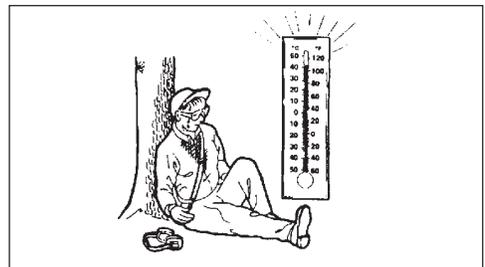
- DO NOT WEAR OPEN TOED SHOES,
- DO NOT OPERATE UNIT BAREFOOTED.

Wear no-slip, heavy duty work gloves.



Hot Humid Weather --

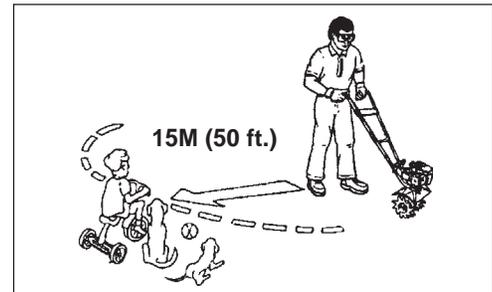
Heavy protective clothing can increase operator fatigue which may lead to heat stroke. Schedule heavy work for early morning or late afternoon hours when temperatures are cooler.



SAFE OPERATION

Determine Operation Area

- Provide all operators of this equipment with the Operator's Manual and instructions for safe operation.
- Review the area to be tilled. Look for hazards that could contribute to unsafe conditions.
- Spectators and fellow workers must be warned, and children and animals prevented from coming nearer than 15M (50 ft.) while the tiller/cultivator is in use.
- Do not operate this product indoors or in inadequately ventilated areas.

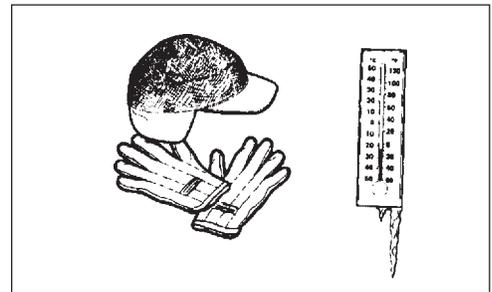


EXTENDED OPERATION/EXTREME CONDITIONS

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.

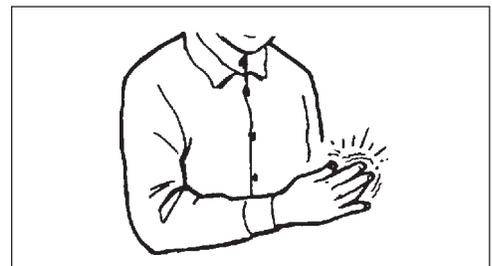
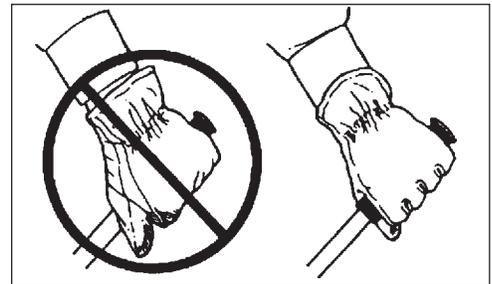
- Keep your body warm, especially the head, neck, feet, ankles, hands and wrists.
- Maintain good blood circulation by performing vigorous arm exercises during frequent work breaks and also by not smoking.
- Limit the hours of operation. Try to fill each day with jobs where operating the trimmer or other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



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.

EMISSION CONTROL -

Type 1E Models

The emission control system for this engine is EM (Engine Modification).

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

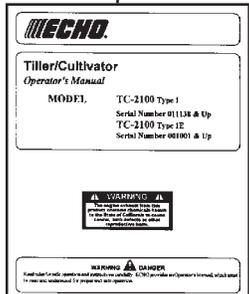
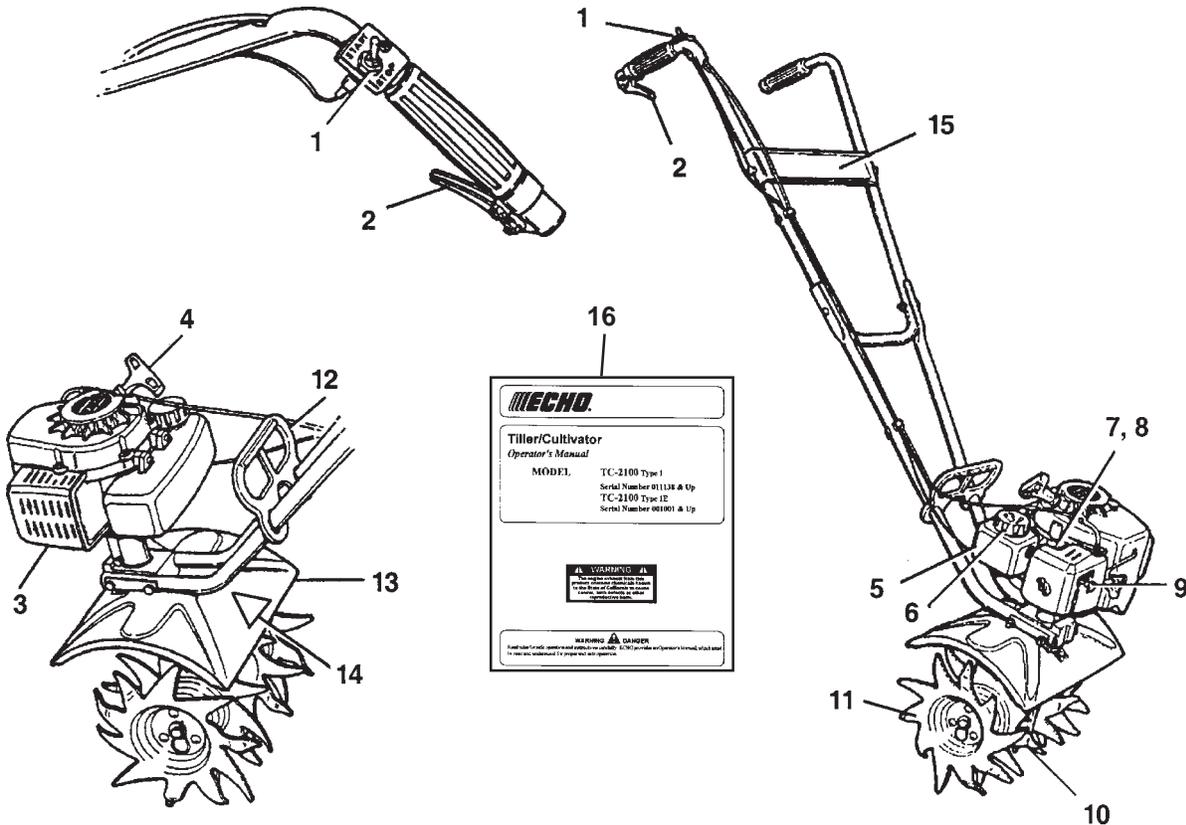
IMPORTANT ENGINE INFORMATION

ENGINE FAMILY : TEH021UB24RA
 DISPLACEMENT : 21.2cc
 THIS ENGINE MEETS U.S. EPA PHI AND 1995 - 1999 CALIFORNIA EMISSION REGULATIONS FOR ULGE ENGINES. REFER TO OWNER'S MANUAL FOR MAINTENANCE SPECIFICATIONS AND ADJUSTMENTS.

E **KOHATZ CORP.** **311**

CONTENTS LIST

- | | |
|---|--|
| ___ 1 - Power Head & Shield Assembly | ___ - Carry Handle |
| ___ 1 - Upper Handle Assembly | ___ - Cable Tie |
| ___ 1 - Left Lower Handle | ___ - Operator's Manual |
| ___ 1 - Right Lower Handle | ___ - Hardware Bag |
| ___ 2 - Lower Handle Mounting Brackets | ___ - 2, 10mm x 30mm Carriage Bolt |
| ___ 1 - Plastic Bag (Co-Pack) | ___ - 2, 10mm nut |
| ___ - 1, 1/4" x 3" Hex Head Shoulder Bolt | ___ - 2, 10mm Lock Washer |
| ___ - 1, 1/4" x 3-1/4" Hex Head Shoulder Bolt | ___ - Warranty Card & Limited Warranty Statement |
| ___ - 2, 1/4" Lock Washers | ___ - Bottle 2-Cycle Engine Oil |
| ___ - 2, 1/4" Lock Nuts | |



1. **STOP SWITCH** - "Toggle Switch" mounted on top of Throttle Trigger Housing. Move switch Forward to Run, Back to Stop.
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. **MUFFLER/SPARK ARRESTOR** - The muffler controls the exhaust noise while the spark arrestor prevent hot, flowing particles of carbon from leaving the muffler where they could possibly start a fire.
4. **RECOIL STARTER HANDLE** - Pull recoil handle slowly until starter engages, then pull quickly and firmly. When engine starts, return handle slowly. **DO NOT** let handle snap back or damage to unit will occur.
5. **FUEL TANK** - Contains fuel and fuel filter.
6. **FUEL TANK CAP** - Cover and seals fuel tank opening.
7. **PRIMER BULB** - Before starting and after filling the fuel tank, pump primer bulb 10 times or until a steady stream of fresh fuel is visible through the "clear" fuel return line.
8. **AIR CLEANER** - Contains replaceable filter element.
9. **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.
10. **GEAR BOX** - Houses gears for driving tines.
11. **TINES** - Used to till or cultivate soil. Removable for cleaning.
12. **CARRYING HANDLE** - Use for convenient transportation.
13. **TINE GUARD** - Used to help deflect debris away from operator and reduce accidental contact of tines.
14. **SAFETY DECAL** - See Description on Page 4.
15. **SAFETY DECAL** - See Description on Page 4.
16. **OPERATOR'S MANUAL** - Read and understand this manual before operation. Keep manual in a safe location for future reference, i.e., operation, maintenance, storage and specifications.

IMPORTANT This spark ignition system system complies with Canadian ICES-002.

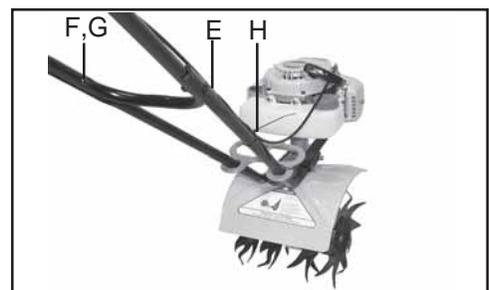
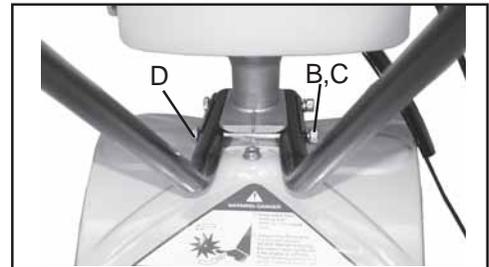
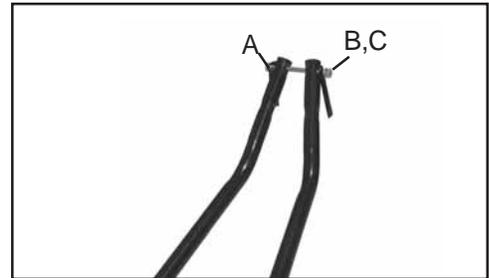
SPECIFICATIONS

| MODEL | TC-2100 |
|-----------------------------------|---|
| Length | 1130 mm (44.48 in.) |
| Width | 340 mm (13.36 in.) |
| Height | 1010 mm (39.76 in.) |
| Weight (dry) w/Tines | 8.62 kg (19 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/pprimer bulbs |
| Ignition System | Flywheel magneto, capacitor discharge ignition type |
| Spark Plug | NGK BPMR-7A Gap 0.65 mm (0.026 in.) |
| Fuel | Mixed (Gasoline and Two-stroke Oil) |
| Fuel/Oil Ratio | 50:1 ECHO High Performance, 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 | 50:1 ECHO High Performance, two-stroke air cooled engine oil |
| Fuel Tank Capacity | 0.5 lit. (17.0 US fl. oz.) |
| Recoil Starter System | Automatic Rewind Starter |
| Clutch | Centrifugal Type |
| Gear Case | Worm Gear Type (42:1 Ratio) |
| Tines | Special 10 Tooth Design |
| | •229 mm (9") Cultivating swath 1/4 tines |
| | •229 mm (9") Diameter |
| Idle Speed | 3000 +/- 250 RPM |
| Wide Open Throttle Speed (W.O.T.) | 11000 - 12000 RPM |

ASSEMBLY

Tools Required: (2) 11mm (7/16in.) Wrenches

1. Support powerhead assembly upright on tines. Place top handle assembly to rear.
2. Loosley assemble lower handles using 6.35 x 76mm (1/4in. x 3in.) hex head shoulder bolt (A), lockwasher (B), and locknut (C) in front handle end mounting hole as shown.
3. Slide open end of lower handle assembly, front to rear, beneath powerhead and throttle linkage/ignition wires.
4. Place handle tubes into gearcase handle mounting grooves and assemble using 6.35 x 82.5mm (1/4in. x 3-1/4in) hex head shoulder bolt (D), lockwasher (B), and locknut (C) in rear handle mounting holes. **DO NOT TIGHTEN BOLTS.**
5. Slide carry handle onto lower handle tubes.
6. Place top handle assembly between lower handles, align mounting holes and install (2) 10 x 30mm carriage bolts (E), (2) lockwashers (F), and (2) nuts (G). Carriage bolts should be installed from the outside through the lower handle then upper handle tube.
7. Securely tighten lower handle bolts first, then the upper handle bolts.
8. 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] gasoline or gasohol known to be good quality. Gasohol may contain up to 10% Ethyl (grain) alcohol or 15% MTBE (methyl tertiary-butyl ether). Gasohol containing methanol (wood alcohol) is **NOT** approved.

Two-Stroke Oil - A two-stroke engine oil meeting ISO-L-EGD Standard (ISO/CD 13738), must be used. Echo brand Premium 50:1 oil meets this standard. Engine problems due to inadequate lubrication caused by failure to use an ISO-L-EGD approved oil, such as Echo Premium 50:1 Two-stroke Oil, 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 EPA Phase I/ California Emission Defect Warranty Explanation.)

Mixing - Follow directions on the oil container.

Handling Fuel

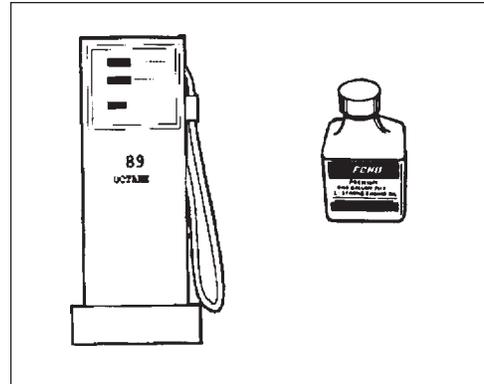
WARNING DANGER

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 outdoors 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;

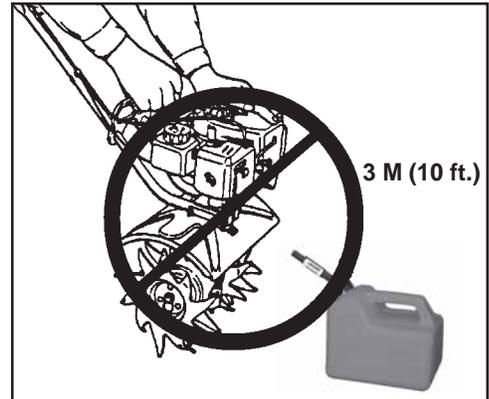
- Wipe any spilled fuel from the unit.
- Move at least 3 M (10 ft.) from refueling location before starting the engine.

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.

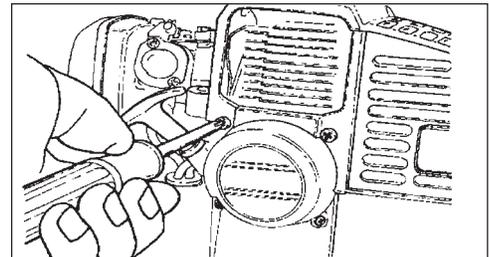
IMPORTANT
Stored two-stroke fuel may separate. ALWAYS shake fuel container thoroughly before each use.

| S | M | T | W | T | F | S |
|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | | | | |

EQUIPMENT CHECK

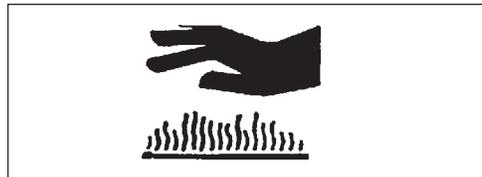
Before operation a complete check of the unit must be performed;

- 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 guard for damage and ensure that it is securely in place. Replace guard if damaged or missing.
- Check that the tines are firmly attached and in safe operating condition



OPERATION

- Provide all operators of this equipment with the Operator's Manual and instructions for safe operation.
- Before starting the unit, equip yourself and any other person working within the 15M (50 ft.) Safety Zone with the required Protective Equipment and clothing.
- During operation, the complete unit, especially the engine and the gear housing may become very hot, too hot to touch. Avoid contact during and immediately after operation.
- Do not operate this product indoors or in inadequately ventilated areas.

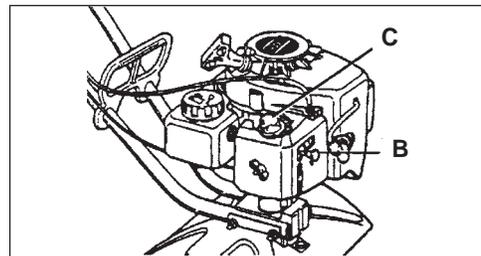
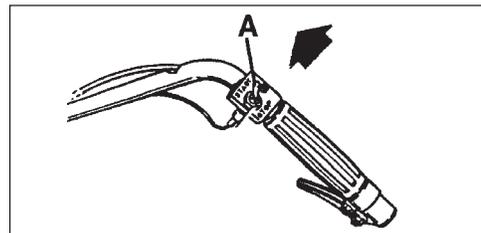


STARTING COLD ENGINE

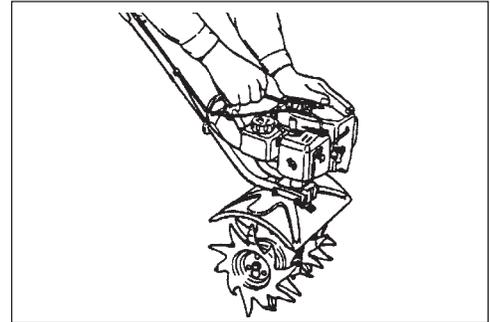
WARNING DANGER

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. STOPSWITCH-START.**
Move Stop Switch (A) to START position.
- 2. CLOSE CHOKE-COLDSTART.**
Move choke (B) to START (closed) position. Throttle must remain at idle for starting.
- 3. PRIMER-PUMBULB.**
Pump primer bulb (C) 10 times, until fuel is visible in the "Clear" fuel return line.



4. **START - PULL ROPE.**
Pull recoil starter rope until engine fires.
5. **OPEN CHOKE - RUN.**
Move choke (B) to RUN (open) position.
6. **RESTART ENGINE - PULL ROPE.**
Pull recoil starter rope until engine fires.



WARNING DANGER

When engine starts, the tines may move even with the throttle trigger in idle (released) position.

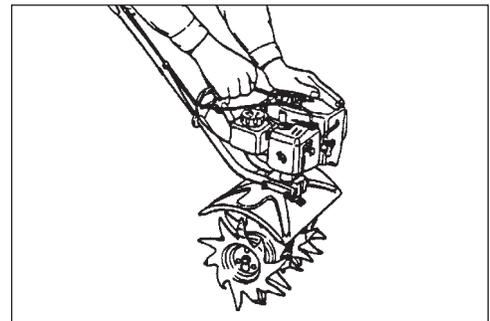
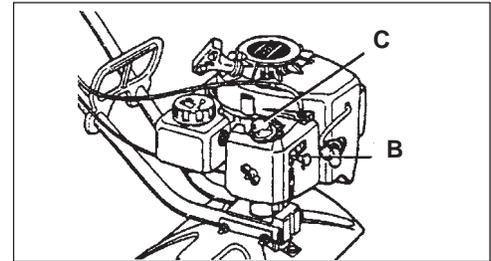
STARTING WARM ENGINE

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

NOTE

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

1. **STOP SWITCH - START.**
Place Stop Switch (A) in START position.
2. **PRIMER - PUMP BULB** Pump primer bulb (C) until fuel is visible in the "Clear" fuel return line.
3. **CHOKE - OPEN.**
Be certain choke (B) is open.
4. **START - PULL ROPE.**
Pull recoil starter rope.
5. **START ENGINE.**
Start engine at idle.

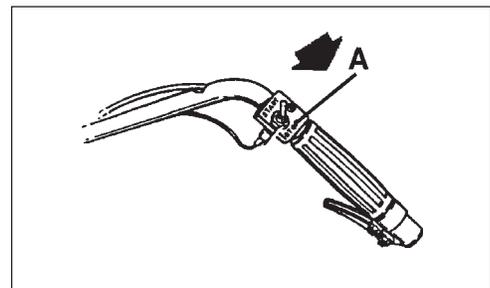


STOPPING ENGINE

1. **RELEASE THROTTLE TRIGGER.**
Release throttle trigger and allow engine to idle for a minute.
2. **STOP SWITCH - STOP.**
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.



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-YOUR-SELF 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.

MAINTENANCE INTERVALS

| Component/System | Maintenance Procedure | Daily or Before Use | Every Refuel | 3 Months or 90 Hours | 6 Months or 300 Hours | Yearly or 600 Hours |
|------------------------|-------------------------|---|--------------|----------------------|-----------------------|---------------------|
| Air Filter | Clean/Replace | I / C | | R | | |
| Fuel Strainer | Inspect/Replace | | | I | | R |
| Fuel Line | Inspect/Replace | I | I | | | |
| Carburetor | Inspect/Rebuild/Replace | | | | C | R (1) |
| Choke System | Inspect/Replace | | I | | | |
| Cooling System | Inspect/Clean | I/C | | | | |
| Muffler Spark Arrestor | Clean/Replace | | | I / C | | |
| Gear Housing | Grease | | | I* | | |
| Tines | Inspect/Clean | I | | | | |
| Recoil Starter Rope | Inspect/Clean | I | | | | |
| Fuel Leaks | Inspect/Repair | I | I | | | |
| Spark Plug | Clean/Replace | | | I / C | R | |
| Ignition System | Clean/Replace | No Maintenance required for coil and flywheel | | | | |
| Screws/Nuts/Bolts | Inspect/Tighten/Replace | I | I | | | |

I = INSPECT, R = REPLACE, C = CLEAN

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

*Or 50 hours, whichever occurs first.

(1) Replacement will be required for commercial use after 600 hours. For Consumer use, cleaning every 6 months is required. Cleaning includes Rebuild Kits.

AIR FILTER

Level 1.

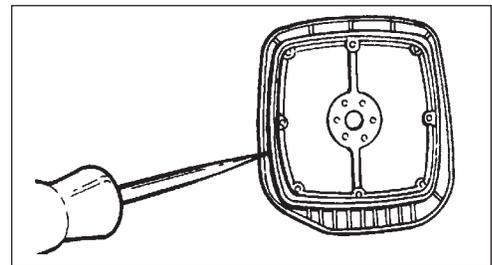
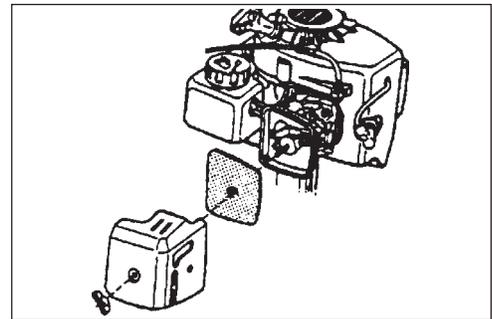
Tools required: 25mm-50mm (1in.-2in.) medium bristle paint brush.

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.

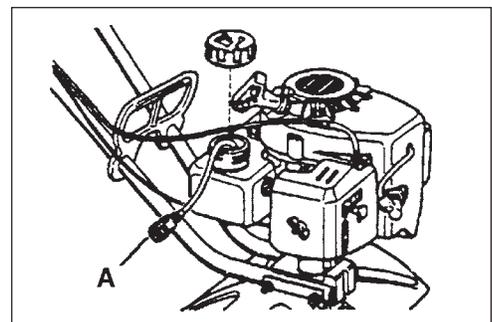
Tools required: Fuel line hook. 203-254mm (8in.-10in.) length of wire with one end bent into a hook. Clean rag, funnel, and an approved fuel container.

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.



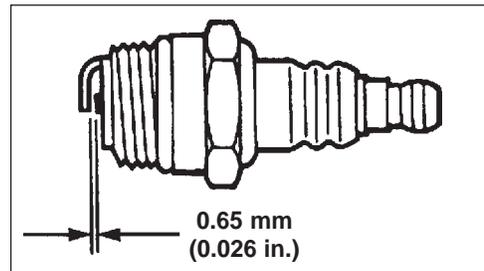
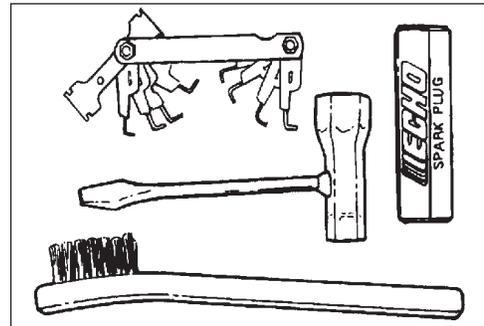
SPARK PLUG

Level 2.

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

Parts Required: Spark Plug, NGK - BPMR-7A

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 3.

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

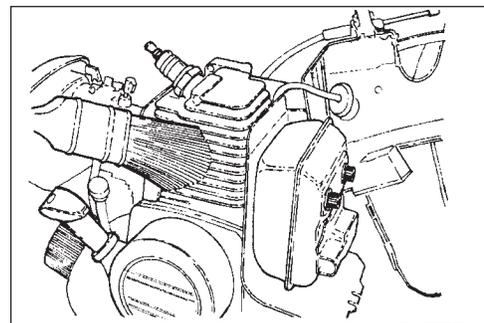
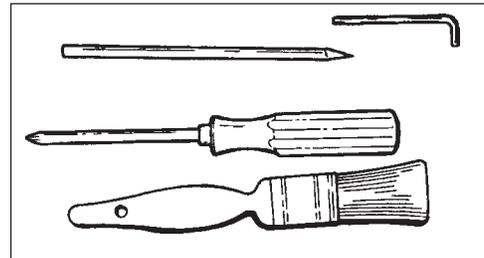
- Air intakes are blocked, preventing cooling air from reaching the cylinder.
- Dust and grass build up on the outside of the cylinder. This build up insulates the engine and prevents the heat from leaving.

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. Remove spark plug lead and throttle cable end from the carburetor swivel.
2. Remove the four screws that retain the cover. Two at the top of the recoil starter, two on either side of the front. Lift the cover from the engine and lay to the front of the tiller/cultivator.

NOTE

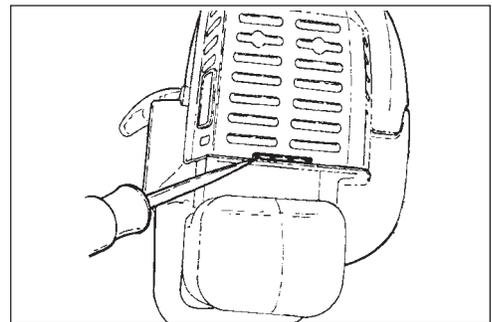
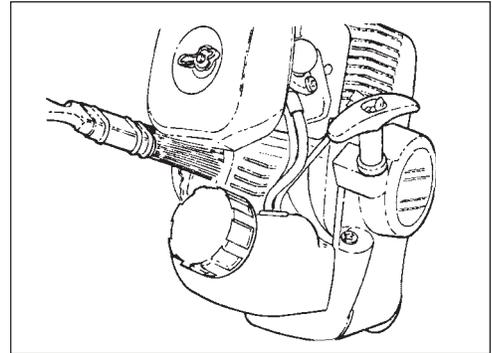
The throttle linkage remains assembled to the cover and the spark plug lead and grommet remain installed.



IMPORTANT

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

3. Use the wooden stick or brush to remove dirt from the cylinder fins.
4. Remove grass and leaves from the grid between the recoil starter and fuel tank.
5. When installing the cover, be certain the tab of the metal deflector shield is in the slot of the cover.



EXHAUST SYSTEM

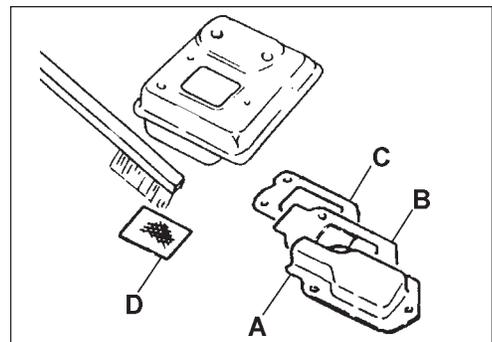
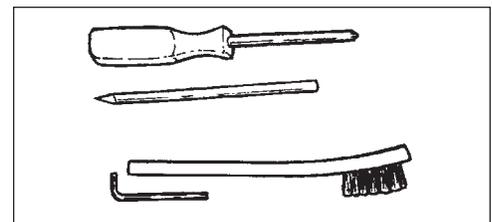
Spark Arrestor Screen

Level 3.

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

Parts Required: P/N 13001642031 Spark Arrestor Screen
P/N 14586642031 Screen Holder

1. Remove screen cover (A), screen holder (B), and gasket (C) from muffler body.
2. Clean carbon deposits from screen (D) and muffler components.
3. Replace screen if it is cracked, plugged or has holes burned through.
4. Install with new gaskets.



CARBURETOR ADJUSTMENT

Emission Models

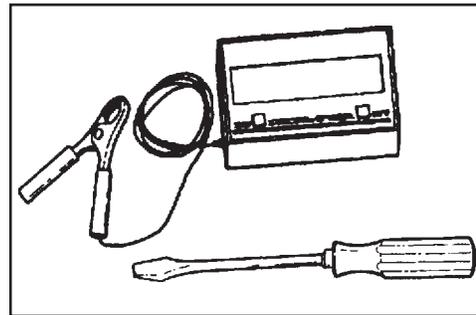
Level 2.

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

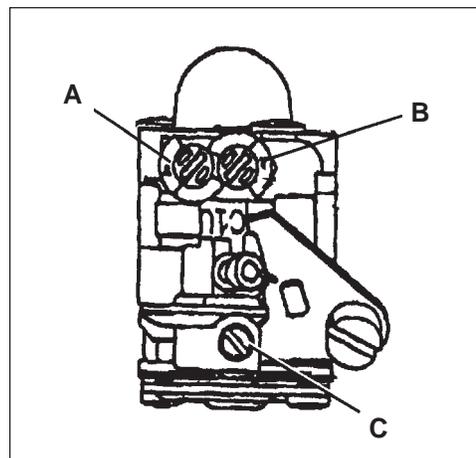
Parts required: None.

NOTE

Every unit is run at the factory and the carburetor is set in compliance with EPA Phase 1 and California 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 arrester screen.
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 (C) speed adjustment screw 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 10 "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 10 "Specifications" of this manual.



WARNING **DANGER**

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

CARBURETOR ADJUSTMENT

Non-Emission Models (Without Limiter Caps)

Level 2

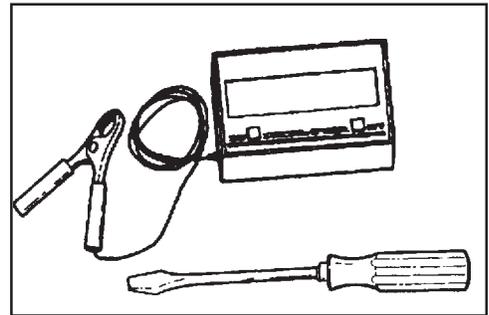
Tools Required: Screwdriver, Tachometer (ECHO P/N 90051130017).

NOTE

If carburetor has limiter caps follow "Carburetor Adjustment" procedures for emission models on previous page.

Idle Speed Adjustment

Turn "idle" speed adjustment screw (C) CW (clockwise) until tines begin to turn, then turn screw out CCW (counter clockwise) until tines stop turning. Turn screw out, CCW an additional 1/4 turn.



WARNING DANGER

Tines must not turn when unit is idling, otherwise serious personal injury may result.

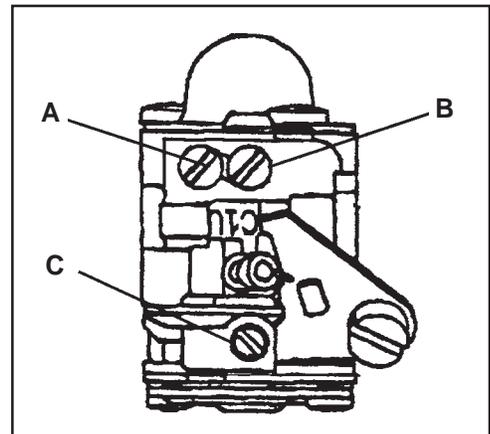
Basic Setting

1. Stop engine and turn both LO (B) and HI (A) needles in, CW until they stop and are lightly seated.

IMPORTANT

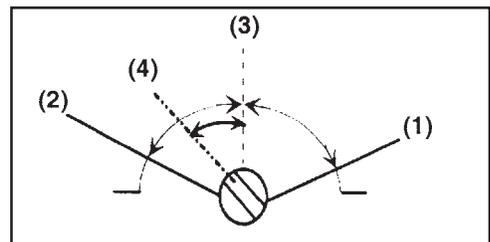
DO NOT over tighten needles. Forcing them to tighten will damage the carburetor.

2. Turn LO (B) needle out, CCW 2-1/2 turns. Turn HI (A) needle out CCW 2-3/4 turns.



Fine Tuning (Requires Accurate Tachometer)

1. Start engine and allow to warm to operating temperature (minimum 2 - 3 minutes) varying engine speed from idle to full throttle.
2. Always begin fine tuning with LO (B) needle.
 - a. Lean drop-off - With engine idling, turn LO (B) needle slowly CW (in) to lean drop-off point. RPM will increase, then abruptly drop-off. Note this position. (1)
 - b. Rich drop-off - With engine idling, slowly turn LO (B) needle CCW (out) to rich drop-off point. RPM will increase then gradually slow and drop-off. Note this position. (2)
 - c. Final setting - Set needle at mid point between lean rich drop-off points. (3)
 - d. Turn needle 1/8 turn CCW (out) making mixture slightly richer. (4)
3. HI speed adjustment.
Adjust HI (A) needle with tachometer. Refer to Wide Open Throttle RPM settings listed in "Specifications" on page 10.
4. Check idle speed and reset if necessary. If tachometer is available, idle speed should be set to the specifications found on page 10 "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

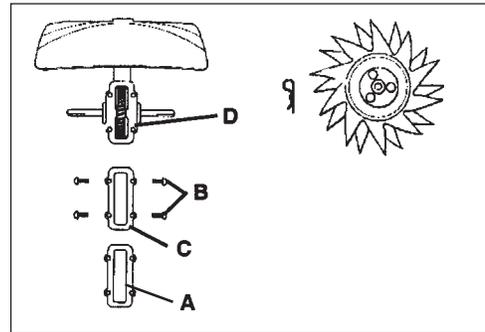
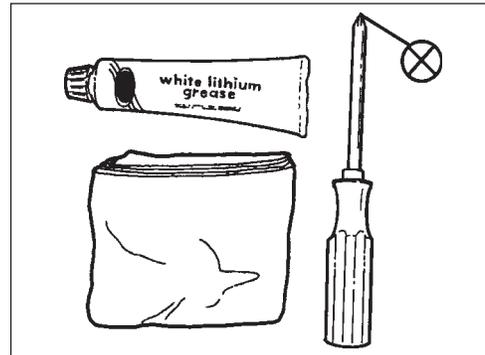
Parts Required: Lithium Base Grease.

Gear Housing

1. Remove tines (See Tine Removal - Installation).
2. Clean dirt from area around gear cover (A) and remove four (4) crosshead screw (B). Be careful not to tear sealing gasket (C).
3. Support tiller with exposed gear case (D) upward. Add #0 lithium 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.



Cleaning Tines (After Each Use)

NOTE

Wear gloves to protect hands from sharp blades.

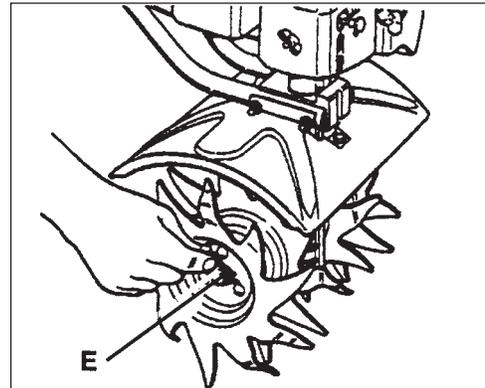
1. Remove weeds, etc. from tines and wash dirt from unit.

Tine Removal - Installation

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. Clean accumulated dirt and debris from gear housing and tine shaft.
3. Slide tine on shaft, D-hole (hole with flat on one side) goes to the outside, install retaining pin.



TROUBLESHOOTING

| Problem | | | | |
|--------------------------|---------------------------------|------------------------------|--|--|
| Engine -- starts hard | | | | |
| Engine -- does not start | | | Cause | Remedy |
| Engine Cranks ↓ | Fuel at carburetor | No fuel at carburetor | Fuel strainer clogged Fuel line clogged Carburetor | Clean Clean See your ECHO dealer |
| | Fuel at cylinder | No fuel at cylinder | Carburetor | See your ECHO dealer |
| | | Muffler wet with fuel | Fuel Mixture is too rich | Open choke Clean/replace air filter Adjust carburetor See your ECHO dealer |
| | Spark at end of plug wire | No spark at end of plug wire | Stop switch off Electrical problem Interlock switch | Turn switch on See your ECHO dealer See your ECHO dealer |
| | Spark at plug | No spark at plug | Spark gap incorrect Covered with carbon Fouled with fuel Spark plug defective | Adjust 0.65mm (0.026in.) Clean or replace Clean or replace Replace plug |
| Engine does not crank | | | Internal engine problem | See your ECHO dealer |
| Engine runs ↓ | Dies or accelerates poorly ↓ | | Air filter dirty Fuel filter dirty Fuel vent plugged Spark plug Carburetor Cooling system plugged Exhaust port/spark arrestor screen plugged | Clean or replace Replace Replace 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 against cylinder, otherwise serious personal injury may result.

STORAGE

Long Term Storage (over 30 days)

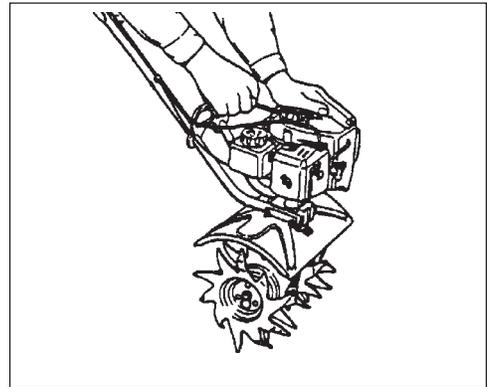
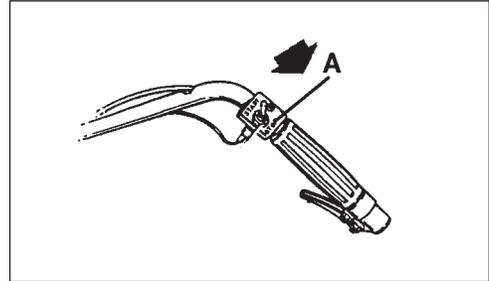
Do not store your unit for a prolonged period of time (30 days or longer) without performing protective storage maintenance which includes the following:

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. Failure to do so could result in serious personal injury or property damage.

2. Place the stop switch in the "OFF" (A) 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 7cc (1/4 oz., 1/2 tablespoon) 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 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).



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