BENCHMARK™ MC

212 cc/4-CYCLE GAS REAR TINE TILLER

LIMITED 5 YEAR* WARRANTY

5 Year Limited Warranty

EPA

READ ALL INSTRUCTIONS BEFORE FIRST USE.
KEEP THIS MANUAL FOR FUTURE REFERENCE.
KEEP AWAY FROM CHILDREN.

WEAR CSA APPROVED EYE PROTECTION

WEAR EAR PROTECTION

WEAR A FACE MASK

PRODUCT SPECIFICATIONS

212 cc/4-CYCLE GAS REAR TINE TILLER	
Engine	212 cc, 4 cycle
Fuel Tank Capacity	104.8 oz (3.1 L)
Oil Tank Capacity	16.9 oz (0.5 L)
Engine Speed	3600 rpm
Tilling Width	18 in (457 mm)
Tilling Depth	Up to 8 in (203 mm)
Tine Diameter	11 in (280 mm)
Wheel Spec	Air tire, 13 in (330 mm)
Tire Pressure	25 psi min. / 30 psi max.
Weight	145.7 lb (66.1 kg)

NEED ASSISTANCE?

Call us on our toll free customer support line:

1-833-818-4111 (Monday through Friday, 9am – 5pm, Eastern Standard Time)

- Technical questions
- Replacement parts
- Parts missing from package

TABLE OF CONTENTS

SAFETY INSTRUCTIONS

IMPORTANT

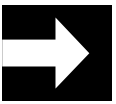
Please read these instructions fully before assembling and operating.

DESCRIPTION OF SYMBOLS

Symbols are used in this manual to attract your attention to possible risks. The safety symbols and the explanations which accompany them must be perfectly understood. The warnings themselves do not prevent the risks and cannot be a substitute for proper methods of avoiding accidents.

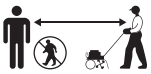
SAFETY ALERT SYMBOLS

The following symbols are used on the product and in this manual to alert the operator of potential safety hazards. Read them carefully, and understand their meaning.

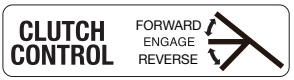
SYMBOL	MEANING
	**DANGER** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
	**WARNING!** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	**CAUTION** Indicates a potentially hazardous situation which, if not avoided, may result in minor/moderate injury.
	**NOTICE** Indicates a practice not related to personal injury which, if not avoided, may result in property damage.

The following symbols may be found on your tiller. Carefully read and understand their meaning.

SAFETY WARNING SYMBOLS

SYMBOL	MEANING
	Look for this symbol to point out important safety precautions. It means: Attention! Become Alert! Your Safety Is Involved.
	Read operator's manual before operating this machine. Failure to follow directions could result in serious injury.
	Do not use if children or bystanders are present.
	Rotating tines can cause serious injury. Keep hands, feet, and clothing away.
	Wear hearing protection.
	Wear eye protection.
	Disconnect spark plug wire when not in use or before servicing, cleaning, or performing maintenance on the unit.
	Engines emit carbon monoxide. DO NOT run in enclosed area.
	Do NOT touch hot mufler or cylinder. These parts are extremely hot from operation and may remain hot for a short time after operation.
	To reduce risk of fire, clean spilled gas and oil and keep unit free from debris. Gasoline is extremely lammable. Allow machine to cool before refueling.

CONTROL AND OPERATING SYMBOLS

SYMBOL	MEANING
	**Oil Fill Location:** Do Not Overfill.
	**Clutch Lever:** Depressing the upper lever engages the tines and drive wheels for the tilling operation. Depressing the lower lever engages the tines and drive wheels for reversing the tiller.
	Engine speed - FAST
	Engine speed - SLOW
	Engine start - Choke CLOSED.
	Fuel Shut-off - OPEN

SAFETY INSTRUCTIONS

Responsibility of Operator

1. Carefully read and follow these safety instructions. Failure to do so can result in serious injury.
2. Know your product. Read and understand this manual before use. Compare the illustrations to unit. Learn location and function of all controls. Thoroughly understanding the unit before use will result in the best performance and safety.
3. Follow all instructions when assembling the unit. If the unit was purchased in assembled condition, the operator must check the unit carefully to make sure it was assembled according the instructions in the manual before use.
4. Regularly inspect the tiller. Make sure parts are not bent, damaged, or loose.
5. Use this equipment for its intended purpose only.
6. Operate the unit only with guards, shields, and other safety items in place and working correctly.

7. Service the unit only with authorized or approved replacement parts.
8. Complete all unit maintenance and adjustments according to the instructions in this manual.

WARNING

To prevent accidental starting when setting up, transporting, adjusting or making repairs, always disconnect spark plug wire and put wire where it cannot contact the spark plug.

Preparation Safety

WARNING

1. Read, understand, and follow all instructions on the machine and in this manual. Be thoroughly familiar with the controls and the proper use of the tiller before starting. Know how to stop the engine quickly.
2. Familiarize yourself with all the safety and operating decals on this equipment.
3. Thoroughly inspect the area where the tiller is to be used and remove all foreign objects. Your equipment can propel small objects at high speed causing personal injury or property damage. Stay away from breakable objects, such as house windows, auto glass, greenhouses, etc.
4. Check that all nuts and bolts are tight and equipment is in good condition before each use.

Operation Safety

WARNING

1. Never allow children or young teenagers to operate the tiller.
2. Keep area of operation clear of all bystanders, particularly small children and pets.
3. Only allow responsible individuals, who are familiar with the instructions, to operate the tiller.
4. Do not operate the tiller while under the influence of alcohol, drugs, or other medication which can cause drowsiness or affect your ability to operate this machine safely.
5. Do not use this machine if you are mentally or physically unable to operate the machine safely.
6. Always wear ANSI compliant safety goggles or safety glasses with side shields when operating tiller to protect your eyes from foreign objects, which can be thrown from the unit.
7. Wear appropriate clothing such as a long sleeved shirt or jacket. Also wear long trousers or slacks. Do NOT wear shorts. Do NOT wear loose clothing, which could get caught in this equipment.

8. Always wear work gloves and sturdy footwear such as leather work shoes or short boots. These will protect ankles and shins from small sticks, splinters, and other flying debris, and improve traction.
9. It is advisable to wear protective headgear to protect against being struck by small flying particles, or being struck by low hanging branches, twigs, or other objects, which may be unnoticed by the operator.
10. Do not put hands or feet near or under rotating parts.
11. Exercise extreme caution when operating on or crossing gravel drives, walks, or roads. Stay alert for hidden hazards or traffic.
12. Exercise caution to avoid slipping or falling.Always be sure of your footing; keep a firm hold on the handle and walk; never run. Never operate the tiller at high transport speeds on slippery surfaces.
13. Never operate the tiller without good visibility or light.

DANGER

14. Do not run the engine indoors or inside a closed area. The exhaust fumes are dangerous, containing CARBON MONOXIDE, an ODORLESS AND DEADLY GAS.
15. Never leave the tiller unattended when the engine is running. Stop the engine and make sure all moving parts have stopped. Remove the wire from the spark plug.
16. Watch for holes, ruts, bumps, or other rough ground. Tall grass can hide obstacles.
17. Always look behind and down and use caution when using reverse or pulling the tiller towards you.
18. Never attempt to start the tiller unless both wheels are in the locked position. This acts as a brake for the tiller. Always start the tiller on the level surface.

WARNING

19. Disengage clutch lever and stop engine before leaving the tiller in operating position. Wait until the tines come to a complete stop before removing debris or making any adjustments to the tiller.

CAUTION

20. Do not attempt to till hard soil, till too deep or till at too fast a rate that can overload the tiller.
21. If the tiller should start to vibrate abnormally, stop the engine, disconnect the spark plug wire and prevent it from touching the spark plug. Check immediately for the cause. Vibration is generally a warning of trouble.

Fuel Safety

WARNING

1. Gasoline is extremely flammable, and gasoline vapors can explode if ignited. Handle with care.
2. Use an approved container.
3. Check fuel supply before each use, allowing space for expansion as the heat of the engine and/or sun can cause fuel to expand.
4. Fill fuel tank outdoors with extreme care. Never fill fuel tank indoors.
5. Never remove gas cap or add fuel with the engine running. Allow engine to cool before refueling.
6. Do not smoke while refueling.
7. After refueling, replace fuel tank cap securely and wipe up spilled fuel.
8. Never store fuel or tiller with fuel in the tank inside a building where fumes may reach an open flame.
9. Never fill gasoline containers or the tiller fuel tank inside of a vehicle or in a truck bed. Accidental electrical static discharge can ignite fuel vapors which could result in serious injury or death.

Storage and Maintenance Safety

WARNING

1. Always refer to the operator's manual instructions for important details if the tiller is to be stored for an extended period.
2. Never store the tiller with fuel in the fuel tank inside a building where ignition sources are present such as water heaters, space heaters, clothes dryers, etc.
3. To reduce fire hazard, keep tiller free of grass, leaves, or other debris buildup.
4. Allow the engine to cool before storing in any enclosure.
5. After striking a foreign object, stop the engine. Remove the wire from the spark plug and keep the wire away from the plug to prevent accidental starting. Thoroughly inspect the tiller for any damage. If damaged, have the equipment repaired by a trained technician before restarting and operating.
6. Stop the engine before cleaning, repairing, or inspecting the unit. Make sure all moving parts have stopped. Let the engine cool, disconnect the spark plug wire and move it away from the spark plug.
7. Never attempt to make any adjustments while the engine is running except when specifically recommended by the manufacturer.
8. Keep the tiller in safe working condition. Check all fasteners at frequent intervals for proper tightness.

9. When servicing or repairing the tiller, do not tip the machine over or up unless specifically instructed to do so in this manual. Service and repair procedures can be done with the tiller in an upright position. Some procedures will be easier if the machine is lifted on a raised platform or working surface.
10. Use only original equipment or authorized replacement parts.
11. Never tamper with safety devices. Check their proper operation regularly.
12. Do not change the engine governor setting or over-speed engine.
13. Clean and replace safety and instruction decals as necessary.
14. To guard against engine over-heating, always have engine debris filter mounted and clean.

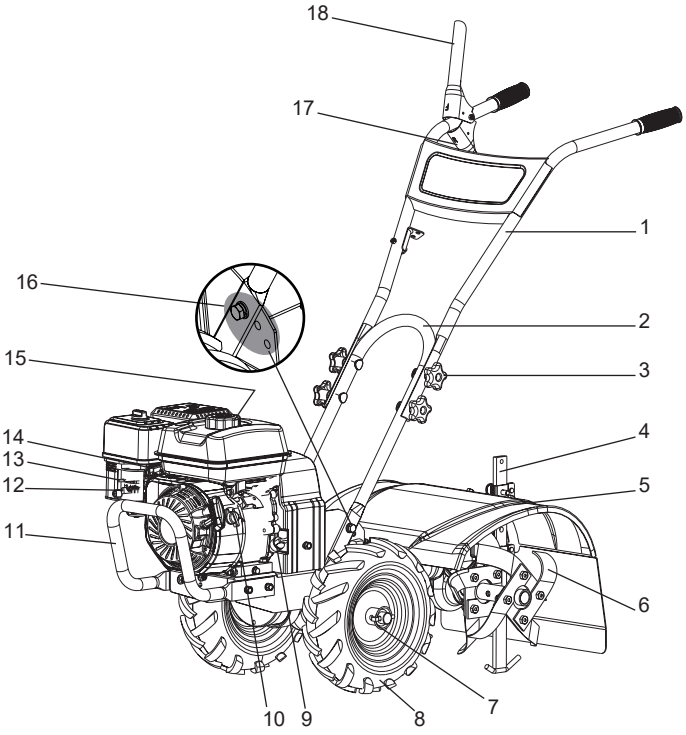
Children Safety

WARNING

1. Tragic accidents can occur if the operator is not alert to the presence of children. Children are often attracted to the tiller and the tilling activity.
2. Keep children out of the tilling area and under the watchful care of a responsible adult.
3. Never assume that children will remain where you last saw them.
4. Be alert and turn tiller off if children enter the area.
5. Before and while moving backwards, look behind and down for small children.
6. Never allow children to operate the tiller.
7. Use extra care when operating near blind corners, shrubs, trees, or other objects that may obstruct vision.

KNOW YOUR TILLER

Read the owner's manual and safety rules carefully before operating your gas rear tine tiller. Compare the illustration below the actual unit in order to familiarize yourself with the location of the various controls and adjustments. Save this manual for future reference.

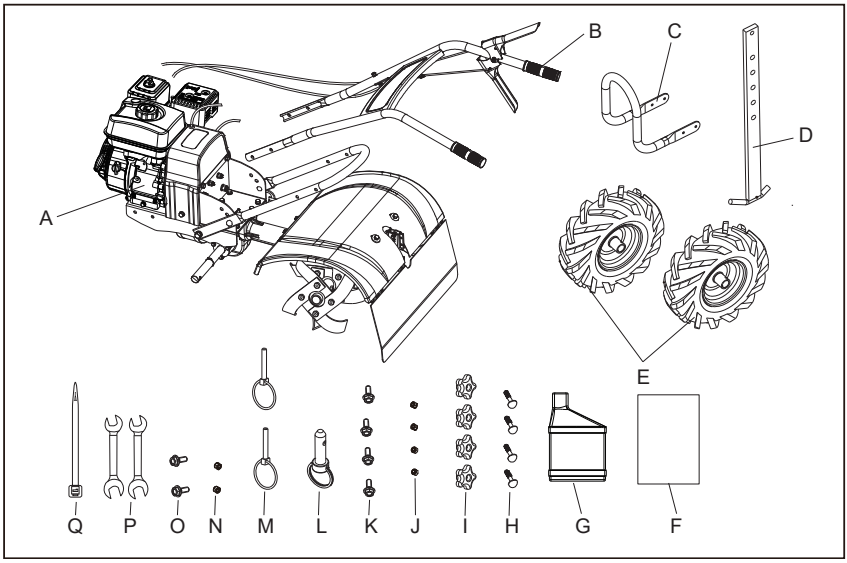


1. Upper handle
2. Lower handle
3. Handle knobs
4. Depth regulator lever
5. Tine shield
6. Tines
7. Wheel lock pin
8. Tires
9. Dipstick
10. Engine switch
11. Front guard
12. Fuel valve lever
13. Choke lever
14. Throttle lever
15. Fuel cap
16. Height adjustment holes
17. Reverse lever
18. Forward lever

PARTS LIST

Carefully remove the tiller from its packaging and check that the following parts are included:

A. Tiller 1pc
B. Upper handle assembly 1pc
C. Front guard 1pc
D. Depth regulator bar 1pc
E. Tire 2pcs
F. Manual 2pcs
G. Bottle of engine oil 1pc
H. Bolt M8 x 50 4pcs
I. Handle knob 4pcs
J. Nut M8 4pcs
K. Bolt M8 x 20 4pcs
L. Pin 1pc
M. Wheel lock pin 2pcs
N. Nut M10 2pcs
O. Bolt M10 x 25 2pcs
P. Wrench 2pcs
Q. Cable tie 1pc



WARNING

If any parts are damaged or missing, do not operate this tiller until the missing parts are replaced. Failure to heed this warning could result in serious personal injury.

NOTICE

Always recycle the packaging in accordance with local recycling programs.

INTENDED USE

1. This gas-powered rear tine rotary tiller has been designed for tilling.
2. The machine is to be used only for its prescribed purpose. Any other use is deemed to be a case of misuse.
3. The user/operator and not the manufacturer will be liable for any damage or injuries of any kind caused as a result of this.
4. Please note that our equipment has not been designed for use in commercial, trade or industrial applications. Our warranty will be voided if the machine is used in commercial, trade or industrial businesses or for equivalent purposes.

ASSEMBLY

Read and follow the assembly instructions. Do not discard, any parts or materials until the unit is assembled.

References to the right or left side of the tiller are from the viewpoint of the operator's position behind the tiller.

WARNING

- Do not operate tiller if it is damaged or not completely and correctly assembled.
- Before doing any assembly or maintenance to the unit, remove the wire from the spark plug.
- Always wear ANSI compliant safety glasses with side shields while assembling the tiller.

TO REMOVE TILLER FROM CARTON

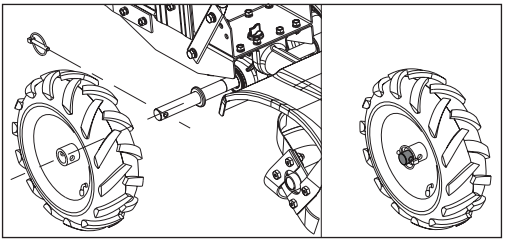
1. Remove all parts and packaging components.
2. Use a utility knife to cut all four vertical edges and lay the side panels flat around the tiller.
3. Remove any remaining packaging.

The tiller comes fully assembled except for a few parts. The following instructions will help you complete the tiller assembly.

INSTALLING THE WHEELS

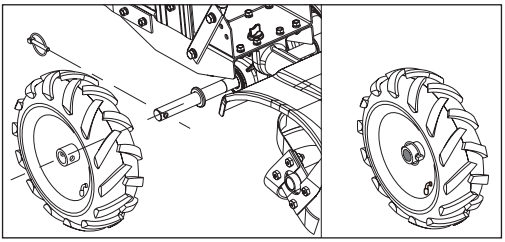
Free-wheel Position For Transport

1. Remove lock pin. Slide wheel inward toward machine.
2. Insert pin in axle only, fold lock pin ring to secure pin to axle.
3. Wheel should turn freely on axle.



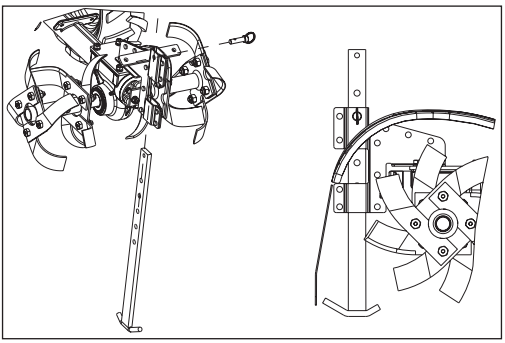
Tilling Position

1. Ensure cupped washer is installed onto wheel axle.
2. The tiller wheels are directional. For best performance install the wheels with the tire thread facing the direction as shown.
3. Slide the wheel hub onto the wheel axle.
4. Align the wheel hub hole with the hole in the axle and insert the locking pin.
5. Rotate the locking pin ring to lock the pin in position.



INSTALLING THE DEPTH REGULATOR

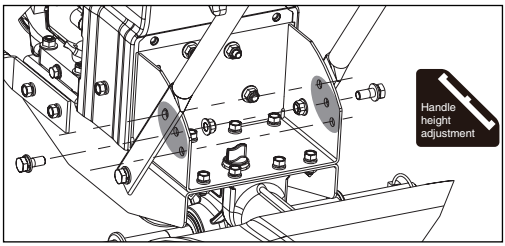
1. Insert the depth regulator from the bottom of the depth regulator bracket.
2. Insert the pin through the bracket and lever.



ATTACHING LOWER HANDLE

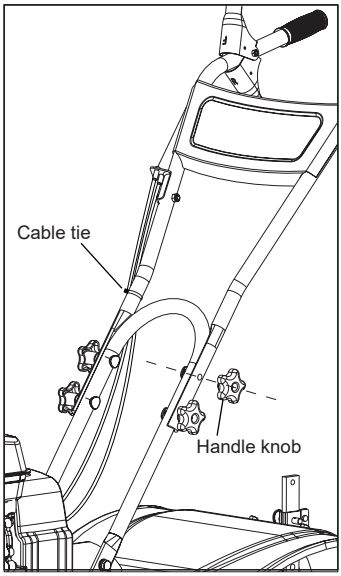
1. Loosen the lower handle bolts, if required.
2. Align the lower handle holes to the middle height adjustment holes in the transmission cover and install the M10 X 25 mm bolts, lock washers, lash washers and nuts. Tighten all four bolts at this time.

NOTE: There are three holes for handle height adjustment to help get the desire handle height for operation.



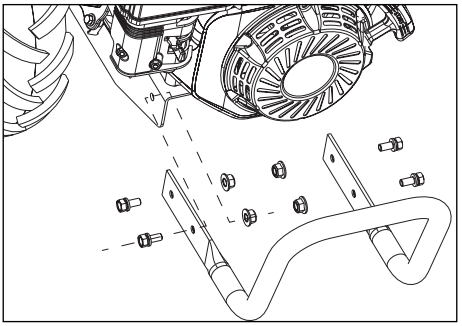
ATTACHING UPPER HANDLE

1. Slide the upper handle down over the lower handle and align the holes.
2. Insert the saddle bolts into the holes as shown and secure with the handle knobs.
3. Tighten the handle knobs securely.
4. Secure control cables to handle using cable tie.



INSTALLING FRONT GUARD

Install guard using four M8 x 20 mm hex head bolts, split lock washers, flat washers and nuts.

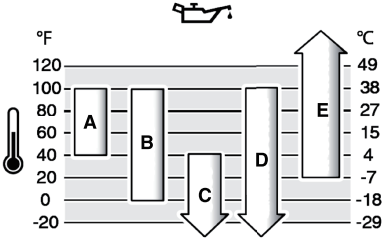


Engine Preparation

NOTICE

Engine shipped without oil. Failure to add oil will result in serious engine damage.

A bottle of engine oil is included with your tiller. Refer to the chart on the right for alternative oil types to use at different temperatures. Always use a high quality detergent oil classified “For Service, SG, SH, SJ” or higher. Do NOT use special additives.



A SAE 30 - Below 40 °F (4 °C) the use of SAE 30 will result in hard starting.

B 10W-30 - Above 80 °F (27 °C) the use of 10W-30 may cause increased oil consumption. Check oil level more frequently.

C 5W-30

D Synthetic 5W-30

E Synthetic 15W-50

NOTICE

Always use recommended oil type. Using dirty oil or incorrect oil type such as 2-stroke engine oil will shorten engine life.

NOTE: Engine Oil Capacity is 500 ml. Do not overfill.

CHECKING AND FILLING ENGINE OIL

WARNING

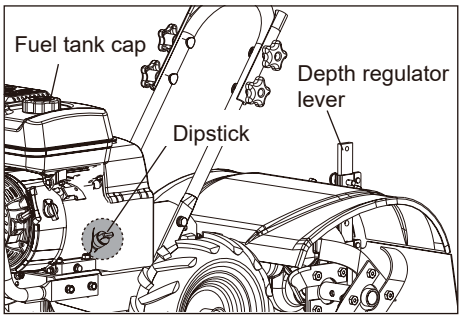
1. Place the tiller on a level surface and make sure the depth regulator lever is set so the main frame of the tiller is level.
2. Remove the dipstick and wipe clean with cloth.
3. Insert dipstick into fill spout but do NOT screw in. Remove dipstick and check oil level.
4. When oil level is full, the oil will be at upper limit on dipstick. If oil level is near or below the lower limit, oil must be added.
5. Add oil slowly until the oil level reaches the upper limit of the dipstick. Use a funnel or nozzle to reduce spillage.

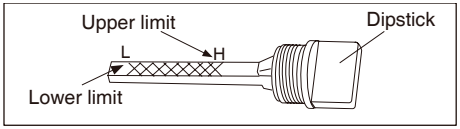
NOTICE

Frequently check oil level while filling. DO NOT OVERFILL. DO NOT UNDER FILL. Running engine at improper oil level will seriously damage engine.

6. Replace and tighten dipstick.
7. Clean up any spilled oil.

NOTE: The transmission comes from the factory with the proper amount and type of gear oil.





OPERATION

PRE-START INSPECTION

1. Make sure all safety guards are in place and all nuts and bolts are secure. Verify the air pressure in both tires is 25- 30 psi before each use.
2. Check oil level in engine crankcase. See your engine manual for procedure and specifications.
3. Inspect air cleaner for cleanliness. See your engine manual for procedure.
4. Check the fuel supply. Use fresh unleaded gasoline with an octane rating of 87 or higher. Do not use gasoline containing more than 10% ethanol. Use of non-ethanol fuel is best. We recommend the continuous use of a fuel additive / stabilizer to counteract the effects of ethanol. These additives also prolong the shelf life of gasoline. Fill the fuel tank no closer than 1 inch from top of tank to provide space for expansion. See your engine manual for fuel recommendations.
5. Be sure spark plug wire is attached and spark plug is tightened securely.
6. Check position of wheels and wheel lockouts.
7. Check depth regulator lever position.
8. Examine underneath and around engine for signs of oil or fuel leaks.
9. Inspect fuel hoses for tightness and fuel seepage.
10. Look for signs of engine damage.
11. Remove excessive debris from muffler area and recoil starter.

IMPORTANT: Engine is shipped from factory without oil. You must add engine oil before starting engine.

⚠ CAUTION

Please do not start your tiller until you have read the manual that came with your tiller, and the sections in this manual tiller controls, adjustments and safety. If you have read these, follow the steps below to start your tiller. Always perform this pretart checklist before starting the engine.

⚠ WARNING

Gasoline is highly flammable and must be handled with care. Never fill the tank when the engine is hot orrunning.Always move outdoors to fill tank.

Wheels must always be locked in the tilling position when engine is running. Do not operate the tiller with the wheel lockouts unlocked. Always set the wheels in tilling position before starting engine.

Always put depth regulator lever in the transport position before starting engine. Tines should clear ground.

DANGER

Always keep hands and feet clear of rotating machine parts.

TO START THE ENGINE

The controls required to start and run the tiller are located on the engine and are marked with the icon for choke, slow and fast for the throttle, and on/off fuel valve. A more detailed description of engine operation and all related precautions and procedures can be found in the engine manufacturer's manual that accompanies each tiller.

COLD START

1. Turn the engine switch to the "on" position.
2. Move the fuel valve lever to the right for "on" position.
3. Move choke lever to the left for full choke "start" position.
4. Move throttle lever to "fast" position.
5. Pull starting rope out slowly one time and allow to return normally.
6. Pull starting rope out rapidly, and allow rope to return normally.
7. When engine starts, gradually move choke lever to the right for "run" position and increase throttle speed.

RESTARTING A WARM ENGINE

1. Restarting an engine that is already warm from previous running does not normally require use of the choke.
2. Move throttle lever to "fast" position.
3. Pull starting rope out rapidly until engine starts. Allow rope to return normally. Repeat until engine starts.
4. Adjust throttle speed to "fast" for best tiller performance.

IDLE SPEED

Use the "slow" position on the throttle lever to reduce stress on the engine when tilling is not being performed. Lowering the engine speed to "idle" will help extend the life of the engine, as well as conserve fuel and reduce the noise level of the equipment.

OPERATING SPEED

For normal tilling, set the throttle lever to "fast".

SHUTTING DOWN

To stop wheels and tines at any time, release clutch control lever to neutral position. To stop the engine at any time, turn engine switch to the off position.

TILLING

1. Adjust the depth regulator lever to desired tilling depth.

WARNING

Raise depth regulator up one hole at a time, testing tiller operation after each raise. Raising depth regulator too high can result in loss of control of tiller!

2. Move the throttle control to fast.
3. Place the tiller in forward by pushing down on the clutch control lever (FORWARD)--this will engage the wheels and tines.

NOTE: You can slow the tiller's forward advance at any time by putting slight downward pressure on the handlebars. You can stop the tiller by releasing the drive safety control levers to the neutral position.

NOTICE

Always press the forward or reverse clutch levers down completely onto the handle bar. Failure to do so may result in excessive drive belt wear and premature drive belt failure.

WARNING

Temperature of muffler and nearby areas may exceed 150°F. Avoid these areas. Do not move choke control to stop engine, backfire or engine damage may occur. To stop wheels and tines at any time, release clutch control levers to neutral position. Always release clutch control levers to neutral position AND STOP THE ENGINE before adjusting the depth of the regulator lever.

DANGER

Engine and surrounding parts become extremely hot during normal use and will cause serious burn injuries if touched before the engine has cooled. Allow engine to cool completely before touching these hot surfaces.

IMPORTANT: Practice operating the controls and tiller with tines out of ground before beginning to till. It is important that you know how to use the tiller properly, keep control at all times, stop the tines and wheels from turning, and stop the engine if necessary. If you do not know how to do these things, read the controls, adjustments and safety sections before proceeding.

CLUTCH CONTROL LEVERS

CAUTION

Do not operate both FORWARD" and "REVERSE" clutch control levers at the same time.

This information is provided here only to introduce the controls. Do not start the engine at this time. Please read all operating and safety instructions before starting your tiller.

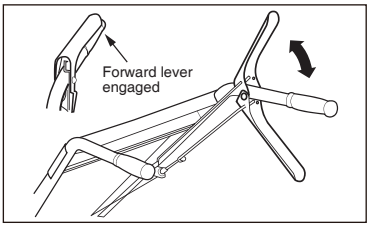
As a safety precaution, the clutch control levers will not lock in the forward or reverse position.

WARNING

Do not fix the forward or reverse clutch levers in the drive position by any other means than manually using your right hand. Do not tie or otherwise secure the levers in the drive position. To stop the wheels and tines at any time release the clutch control levers.

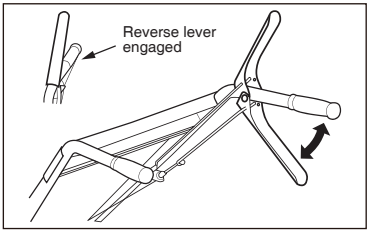
FORWARD LEVER

Engages wheels and tines into forward. Pushing down the clutch control lever (FORWARD) toward the handlebar engages the wheels and tines. Releasing the lever stops the wheels and tines and brings the tiller to a complete stop.



REVERSE LEVER

Engages wheels and tines into reverse. Pulling the drive safety control lever (REVERSE) toward the handlebar reverses the tiller. Releasing the lever stops the wheels and tines.



ADJUSTMENT

WARNING

Engine should be off before adjusting any controls.

Extreme caution should be used when operating tiller in the reverse direction.

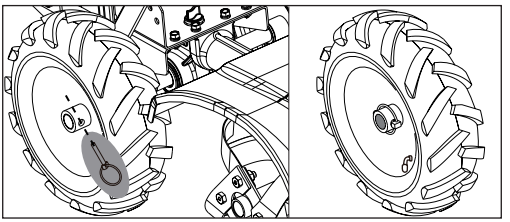
WHEEL LOCK PINS

Place wheels in tilling position.

1. Remove lock pin. Align hole in axle with hole in wheel hub.
2. Insert lock pin through holes of axle and wheel hub, fold lock pin ring to secure pin to axle.
3. Firmly lock wheel and axle together before tilling.
4. Repeat for other wheel.

WARNING

Always have both wheel lock pins in to place the wheels in the tilling position. Do not operate tiller with only one wheel locked.

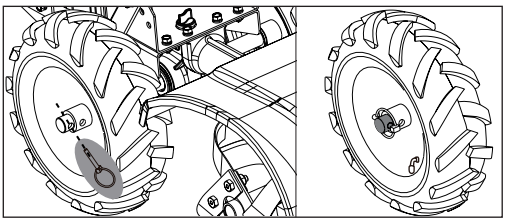


Place wheels in free-wheel position.

1. Remove lock pin. Slide wheel inward toward machine.
2. Insert pin in axle only, fold lock pin ring to secure pin to axle.
3. Wheel should turn freely on axle.

WARNING

Always have both wheel lock pins in to place the wheels in the free-wheel position for transport.



HANDLEBAR ADJUSTMENT

The ideal height of the handlebar varies with operator height and the depth of tilling.

To adjust handlebar height:

1. Unscrew and remove the top bolts and nuts on the lower handle on each side.
2. Loosen the lower bolts. Do not remove.
3. Align handlebar to desired holes on the lower handlebar mount.
4. Install bolts and nuts. Retighten all four bolts securely.

DEPTH REGULATOR

Tilling depth is controlled by the height of the depth regulator. To adjust tilling depth:

1. Remove pin.
2. Raise the depth regulator to position tines at chosen tilling depth.
3. Align hole in depth regulator with hole in depth regulator bracket and replace pin.

Depth Regulator Down = Shallower tilling.

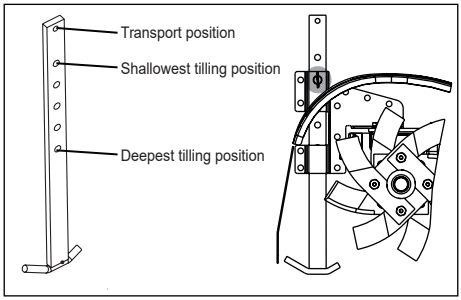
Place the pin in the top hole of the depth regulator for shallowest tilling.

Depth Regulator Up = Deeper tilling.

Place the pin in the bottom hole of the depth regulator for deepest tilling.

WARNING

Do not adjust tilling depth unless clutch control levers are released to neutral position. Always set the depth regulator in the transport position before starting engine, that is, place the detent pin in the highest hole of the depth regulator.



TILLING TIPS

The key to successful tilling is to begin with a shallow cut on the first pass, and then work an inch or two deeper on each successive pass.

1. Tiling depth will vary with ground conditions.
2. When beginning to till in unbroken ground or in extremely hard soil, set the pin in the highest hole of the depth regulator (follow instructions under Tilling section). This will allow for shallow tilling. With the depth regulator in this position, make several light passes over the area to be tilled. Reset for deeper depths with successive passes.
3. If tiller jumps or skids uncontrollably, lower the depth regulator by placing the pin in a higher hole. This will allow for shallower tilling. Hold firmly to the handlebars to control sudden lurches.
4. If weeds, tall grasses, vines, or other materials clog or jam the tines, reverse the tiller to unwind vegetation.

WARNING

Immediately release the clutch levers if the tines jam or you strike a foreign object. With clutch levers in neutral position, stop the engine. Disengage the spark plug wire. When tines have stopped, remove foreign objects and check for damage.

WARNING

Extreme caution must be taken in selecting tilling depth. If you attempt to till too deeply for soil conditions (with the depth regulator lever in too high a position) loss of control could result.

If removing material from the t ines by hand, stop engine and remove spark plug wire first.

CULTIVATING TIPS

If you plan to use your tiller for cultivating:

1. Plant rows on 20" - 22" centers for ease of turning.
2. Set the depth regulator lever with the detent pin in one of the higher holes. This will allow for shallow cultivation necessary to turn over weeds, and break up and aerate the soil.

MAINTENANCE AND STORAGE

MAINTENANCE SCHEDULE

WARNING

Before performing any maintenance, turn engine off and remove the wire from the spark plug to prevent accidental starting and serious injury.

IMPORTANT: THE WARRANTY ON THIS TILLER DOES NOT COVER ITEMS THAT HAVE BEEN SUBJECTED TO OPERATOR ABUSE OR NEGLIGENCE. TO RECEIVE FULL VALUE FROM THE WARRANTY, THE OPERATOR MUST MAINTAIN THE TILLER AS INSTRUCTED IN THIS MANUAL, AND ONLY USE GENUINE REPLACEMENT PARTS. THE FOLLOWING TABLE LISTS REQUIRED PERIODIC MAINTENANCE.

PERIODIC MAINTENANCE SCHEDULE TABLE

Service records-fill in dates as you complete regular service	Before each use	After every 10	After every 25 Hours of use	After every 50 Hours of use	After every 100 Hours of use	Before each season	Before storage	See note below
Check air pressure in tires	√							
Check engine oil level, fill to proper level	√					√		
Clean debris from unit	√					√	√	
Lubricate all pivot points		√				√	√	
Check fasteners for tightness		√				√		1
Check drive belts replace if necessary		√				√		
Check tines for wear or damage replace if necessary		√				√		

Check fuel line replace if necessary			√			√		
Lubricate wheel axles			√			√	√	
Check spark plug			√			√		
Change engine oil				√		√	√	2,3
Clean air filter replace if necessary			√			√		4
Replace spark plug					√			
Clean combustion deposits from cylinder, piston, and valves					√			
Check transmission oil			√			√		

CAUTION

IMPORTANT NOTES ABOUT MAINTENANCE SCHEDULE:

1. Re-check tightness of all fasteners after first 2 hours of initial use.
2. Change engine oil after first 5-8 hours of initial use.
3. Change oil every 25 hours if operating under heavy load or in high temperatures.
4. Clean air filter every 10 hours if operating under dusty conditions

WARNING

Use only GENUINE replacement parts. Other parts may damage the unit or result in injury.

SERVICING THE TILLER

The following information will help you make the necessary checks and perform the procedures required to follow the normal care recommendations made for your tiller unit. If you prefer, your local authorized dealer can make these checks and perform the required procedures for you.

WARNING

To prevent accidental starting:

Engine must be turned off and cool. The spark plug wire must be removed and secured from spark plug before checking and adjusting engine or equipment.

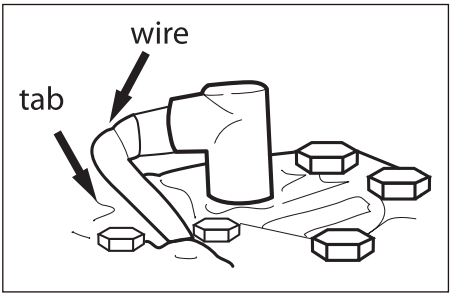
CHANGING FORWARD/REVERSE BELTS

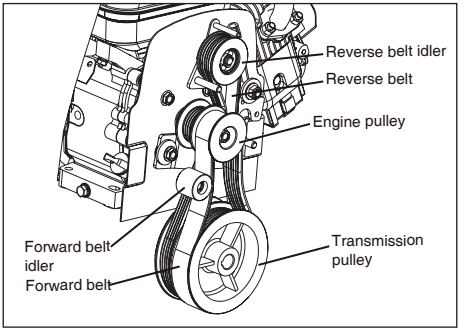
1. Turn off engine. Engine must cool completely before proceeding.
2. Remove spark plug wire and secure away from spark plug.
3. Reduce the belt tension by loosening the forward and reverse cable lower jam nut.
4. Remove the upper and lower belt guards.
5. To remove the reverse drive belt:
   - 5.1. Remove the reverse belt idler.
   - 5.2. Slide the belt free of the reverse belt guides and engine pulley.
   - 5.3. Pull belt down and away from the transmission pulley.
6. To remove the forward drive belt:
   - 6.1. Remove the two forward belt guide studs and forward belt idler assembly.
   - 6.2. Slide the belt free of the engine pulley.
   - 6.3. Pull the belt down and away from the transmission pulley.
7. To install the forward drive belt:
   - 7.1. Insert the belt from underneath the unit and up around the rearward portion on the engine pulley.
   - 7.2. Place the lower loop of the belt around the rearward portion of the transmission pulley.
   - 7.3. Replace the two forward belt guide studs and forward belt idler assembly.
8. To install the reverse drive belt:
   - 8.1. Insert the belt from underneath the unit and up around the reverse belt idler.
   - 8.2. Place the lower loop of the belt around the forward portion of the transmission pulley.
   - 8.3. Replace the reverse belt idler into the reverse belt idler bracket. The belt should not go around the engine pulley. Be sure the belt is inside of the reverse belt guide studs.
9. Tighten the forward and reverse lower jam nut.
10. Check the belt tension. The belts should be loose with the clutch levers disengaged.

11. Replace the upper and lower belt guards.
12. Re-attach the spark plug wire to the spark plug.
13. Follow Operating Instructions--start the engine and operate the forward clutch lever to check for proper cable adjustment and belt tension.
14. Start the engine and operate the reverse clutch lever to check for proper cable adjustment and belt tension

WARNING

The tines or wheels should not rotate with the engine running, the depth regulator set at transport height (lowest height) and the clutch lever not engaged.





ENGINE MAINTENANCE

Refer to the engine manual included in your parts packet for information on engine maintenance. Your engine manual provides detailed information and a maintenance schedule for performing the following tasks:

1. Check oil level before each use or after every 8 hours of operation.
2. Change oil after first 5-8 hours of operation. Change oil while engine is warm. Refill with new oil of recommended grade.
3. Check spark plug yearly or every 100 hours of operation.

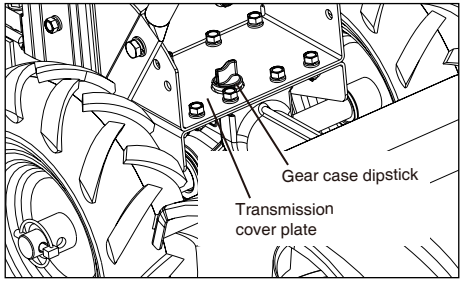
4. Service air cleaner.
5. Keep engine and parts clean.
6. Check engine and equipment often for loose nuts and bolts, keep these items tightened.

CHECKING TILLER TRANSMISSION OIL

IMPORTANT: Tiller transmission is shipped from factory with the proper amount of oil. When replacing oil, the tiller transmission holds 27-30 ounces. Do not overfill.

Check the oil level annually. To check the oil level:

1. Move tiller to level ground.
2. Remove oil level dipstick located between the handlebar mounts on the engine mount. If the oil level is near or below the lower limit, fill the oil to recommended level with SAE 85W-140 / 90W-140.
3. Replace oil level dipstick in the filler hole.
4. Note that the drive wheel transmission and rear tine transmission are one common reservoir. When you add to the front transmission, you must wait a short period of time for the oil to flow rearward and equalize in both front and rear. The dipstick will read correctly on level ground for both gear units.



CHECKING TIRE PRESSURE

Recommended tire pressure is 25-30 PSI. If tires do not have equal pressure, tiller will pull to one side. Low tire pressure may result in damage to tire tube.

LUBRICATION

Proper lubrication of moving mechanical parts is critical for proper care and maintenance. Oil the moving parts shown at 10 hour intervals using a 30 weight oil.

CLEAN TINE AXLE SHAFT

1. Turn off engine. Engine must be cool.
2. Remove spark plug wire and secure from spark plug.
3. Tip the tiller forward. Block the tiller in position so that it rests on the engine mount and the tines are exposed.
4. Remove all vegetation, string, wire, and other material that may have accumulated on the axle between the inside set of tines and the seal cover on the transmission housing.
5. Tip the tiller back to a level position.
6. Replace spark plug wire.

STORING THE TILLER

WARNING

Never store the tiller indoors with fuel in the fuel tank. Never store in an enclosed, poorly ventilated area where fumes could reach an open flame, a spark or a pilot light as on a furnace, water heater or clothes dryer. Allow the engine to cool before storing the unit.

WARNING

Do not remove gasoline while inside a building, near a fire, or while you smoke. Gasoline fumes can causean explosion or a fire.

NOTE: A yearly checkup or tune-up at an authorized service center will make sure that the tiller will provide maximum performance for the next season.

When the tiller is put in storage for thirty days or more, the following steps should be followed to make sure the tiller is in good condition the next season. To prevent fuel gum deposits and corrosion in the unit's carburetor and fuel system, it is highly recommended using a fuel additive/stabilizer formulated for ethanol fuels. Follow the stabilizer manufacturer's instructions. Run the engine for at least 5 minutes after adding stabilizer.

1. Let the engine run until it is out of gasoline. Remove the carburetor screw from bowl and drain fuel. Tilt unit slightly to remove all fuel. Reinstall the screw.
2. Change the oil.
3. Remove the spark plug from the cylinder. Pour one ounce of 4-stroke oil into the cylinder. Slowly pull the recoil-start handle so that the oil will protect the cylinder. Check and reinstall the spark plug in the cylinder. Pull the starter handle slowly a few times to distribute oil. Pull recoil slowly until resistance is felt. This will close the cylinder valves.

WARNING

Do not attach spark plug wire to spark plug when storing the unit.

4. Clean tiller. Remove all dirt, leaves, debris, grease, etc. from the tiller — including cylinder cooling fans, recoil starter cover holes, under fuel tank, and under muffler.
5. Check the tiller for worn or damaged parts. Have damaged parts replaced if necessary.
6. Tighten any loose hardware.
7. Apply lubrication as directed in Maintenance section.
8. Put the unit in a building that has good ventilation.
9. Cover the tiller with a breathing material.

TRANSPORTING THE TILLER

Empty the gas tank. Always let the engine run until it has used up the remainder of gas in the tank. Empty the engine oil from the warm engine. Remove the spark plug cover from the spark plug. Clean the cooling fins of the cylinder and the housing. Use the original packaging to ship whenever possible.

TROUBLESHOOTING

WARNING

Before performing any maintenance or cleaning work, switch off the engine and wait until the blade has come to a stop.

CAUTION

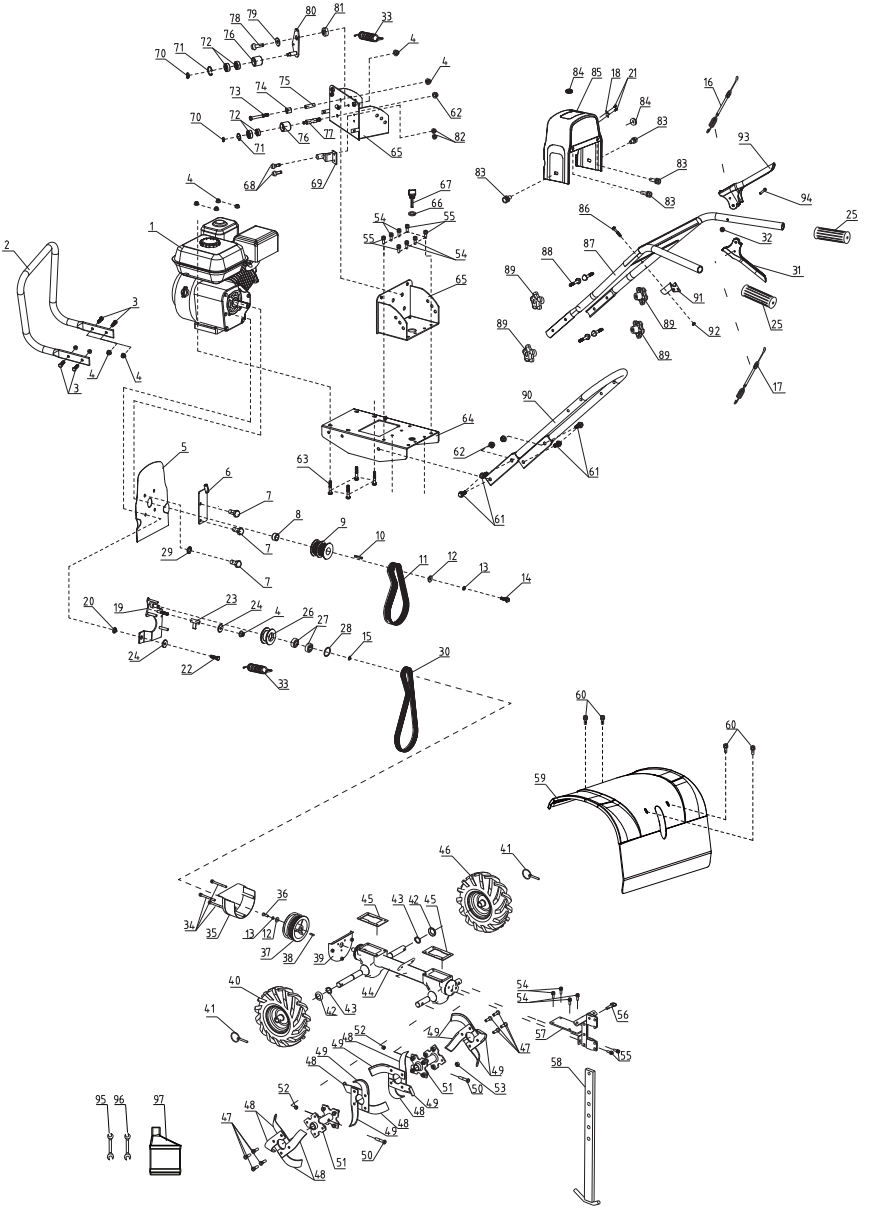
Improper repairs can result in the product functioning unsafely. This endangers yourself and your environment.

Faults which cannot be rectified with the aid of the following table may require service by an authorized technical support service center. Please be aware that any improper repairs will also invalidate the warranty and additional costs may be incurred.

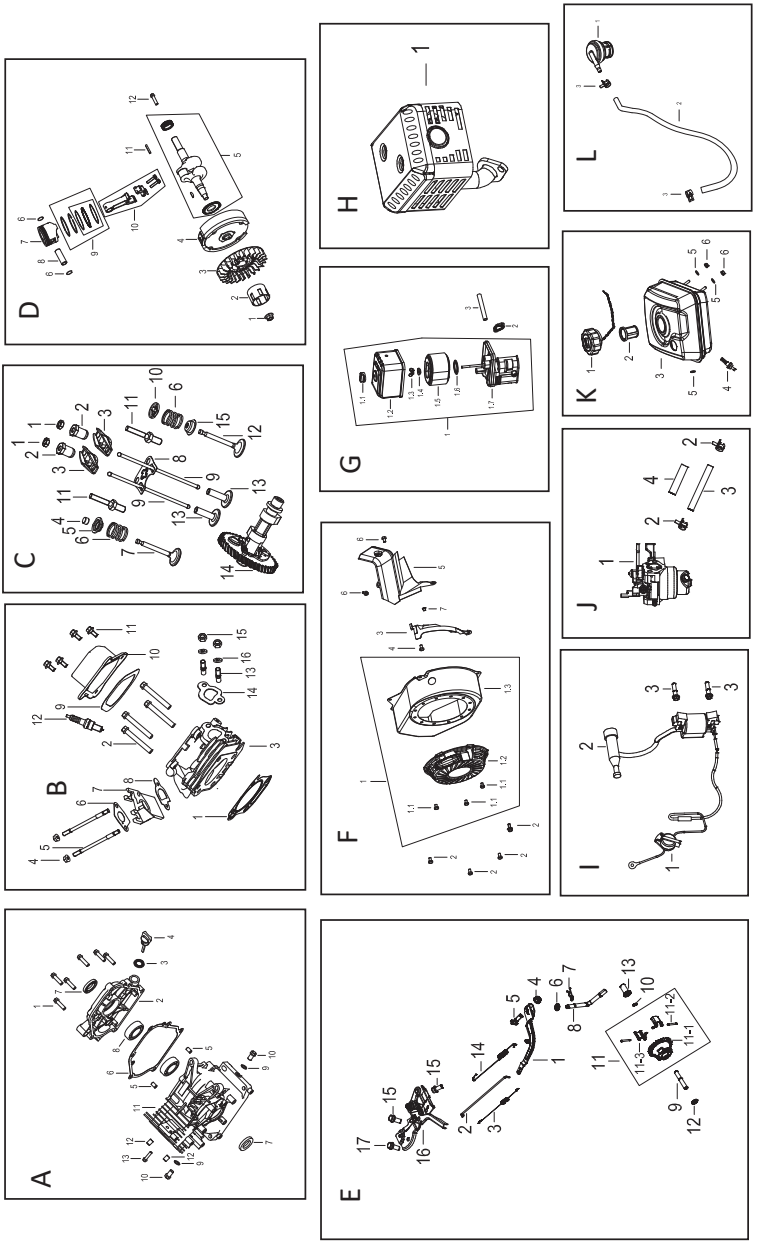
Fault/Malfunction	Cause(s)	Solution(s)
Engine difficult to start	1. Out of fuel 2. Engine Switch Off 3. Engine is not primed 4. Spark plug wire disconnected 5. Fouled spark plug 6. Dirty Carburetor 7. Clogged air filter 8. Contaminated Fuel	1. Add fresh fuel 2. Turn engine switch on 3. Move choke lever to ON position. 4. Attach spark plug wire to spark plug 5. Remove spark plug. Inspect. Replace if necessary 6. Take unit to an authorized service center for Carburetor cleaning 7. Remove and clean air filter 8. Drain fuel tank. Clean fuel tank. Fill with fresh fuel
Engine Problems: 1. Engine smokes excessively 2. Engine runs very “rough” 3. Engine runs erratically 4. Engine cannot maintain full speed	1. No Engine Oil 2. Engine oil not at proper level 3. Fouled spark plug 4. Clogged air filter 5. Contaminated Fuel 6. Carburetor out of adjustment	1. Add engine oil 2. Check engine oil. Add or drain engine oil if necessary 3. Remove spark plug. Inspect. Replace if necessary 4. Remove and clean air filter 5. Drain fuel tank. Clean fuel tank. Fill with fresh fuel 6. Take unit to an authorized service center for carburetor adjustment

Excessive vibration / noise	1. Loose parts 2. Engine problems (above) 3. Abnormal noise or squeal coming from belt drive	1. Tighten all fasteners 2. Refer to engine solutions (above) 3. Normally due to belt/pulley break in period. Refer to Belt Tension Adjustment section.
Tines will not rotate	1. Debris interfering with tines 2. Tines loose 3. Improper drive cable adjustment 4. Damaged drive belts	1. Remove debris from around tines 2. Replace tine bolts and nuts 3. Refer to “Belt Tension Adjustment” section to decrease belt tension 4. Replace drive belts
Tines continue to rotate when clutch lever is not engaged	1. Improper drive cable adjustment 2. Damaged drive belts	1. Refer to “Belt Tension Adjustment” Section to decrease belt tension 2. Replace drive belts
Engine will not stop	Check switch	Replace switch
Tines will not cut properly	Tines assembled incorrectly	Refer to "Install the Tines" Section
Frequent engine stalling	1. Excessive tilling speed / depth 2. Engine problems (above)	1. Till at a moderate pace. Make multiple passes. 2. Refer to engine solutions (above)

EXPLODED VIEW



ENGINE



PARTS LIST

Number	Part sku	Part name	Quantity
1	AVCO031001	Engine	1
2	AVCO031002	Bumper	1
3	AVCO031003	Bolt M8*20	4
4	AVCO031004	Lock nut M8	11
5	AVCO031005	Belt guard	1
6	AVCO031006	(Reverse) cable mounting plate	1
7	AVCO031007	Bolt M8*16	3
8	AVCO031008	Crankshaft sleeve	1
9	AVCO031009	Drive pulley	1
10	AVCO031010	Flat key	1
11	AVCO031011	Forward belt 3WG3.8.01-06	1
12	AVCO031012	Flat washers	2
13	AVCO031013	Spring pad Ø8	2
14	AVCO031014	Flange face bolts 5/16-24X25	1
15	AVCO031015	Shaft ring Ø10	1
16	AVCO031016	Forward gear control cable	1
17	AVCO031017	Reverse gear control cable	1
18	AVCO031018	Snap	1
19	AVCO031019	(Reverse) tensioner mounting bracket	1
20	AVCO031020	Steering bushing	1
21	AVCO031021	Screw ST4.2*9.5	2
22	AVCO031022	Bolt M8*25	1
23	AVCO031023	Reverse belt pressure plate	1
24	AVCO031024	Large flat pad Ø8.5*Ø24*2	2
25	AVCO031025	Handle sleeve	2
26	AVCO031026	Reverse gear tensioner	1
27	AVCO031027	Bearing	2
28	AVCO031028	Retaining ring for hole Ø30	1
29	AVCO031029	Flat pad Ø8	1
30	AVCO031030	Reverse belt 3WG3.8.02-12	1
31	AVCO031031	Reverse clutch handle	1
32	AVCO031032	Nut M6	1
33	AVCO031033	Tension spring	2

34	AVCO031034	Hexagon head combination bolt M8*90	3
35	AVCO031035	Rear lower belt cover	1
36	AVCO031036	Hexagon head bolt M8*25	1
37	AVCO031037	Driven pulley	1
38	AVCO031038	Flat key	1
39	AVCO031039	Front lower belt cover	1
40	AVCO031040	Left Pneumatic wheel	1
41	AVCO031041	Pin with ring	2
42	AVCO031042	Axle washer	2
43	AVCO031043	Shaft ring Ø25	2
44	AVCO031044	Gearbox assembly	1
45	AVCO031045	Gear box paper pad	2
46	AVCO031046	Right pneumatic wheel	1
47	AVCO031047	Bolt M8*25	16
48	AVCO031048	Tiller (left)	8
49	AVCO031049	Tiller (right)	8
50	AVCO031050	Hexagon head bolt M10*50	2
51	AVCO031051	Tool holder welding components	2
52	AVCO031052	Lock nut M10	2
53	AVCO031053	Lock nut M8	16
54	AVCO031054	Bolt M8*25	8
55	AVCO031055	Bolt M8*20	6
56	AVCO031056	Safety pin	1
57	AVCO031057	Resistance bar mount	1
58	AVCO031058	Resistance rod	1
59	AVCO031059	Main fender	1
60	AVCO031060	Bolt (flat washer enlarged) M8*20	4
61	AVCO031061	Bolt M10*25	4
62	AVCO031062	Lock nut M10	3
63	AVCO031063	Bolts M8*35	4
64	AVCO031064	Power mount	1
65	AVCO031065	Armrest mount assembly	1
66	AVCO031066	Oil dipstick gasket	1
67	AVCO031067	Dipstick	1
68	AVCO031068	Bolt M6*20	2

69	AVCO031069	Reverse guide arm	1
70	AVCO031070	Shaft ring Ø8	2
71	AVCO031071	Retaining ring for hole Ø24	2
72	AVCO031072	Bearing 628-2RS	4
73	AVCO031073	Flange face bolts M8*65	1
74	AVCO031074	Belt press	1
75	AVCO031075	Spacer	1
76	AVCO031076	Forward gear tensioner	2
77	AVCO031077	Forward tensioner shaft	1
78	AVCO031078	Flange face bolts M8*30	1
79	AVCO031079	Flat washer Ø8.5*Ø30*3	1
80	AVCO031080	Clutch rocker	1
81	AVCO031081	Clutch rocker arm positioning sleeve	1
82	AVCO031082	Lock nut M6	2
83	AVCO031083	Bolt M8*16	4
84	AVCO031084	Rubber band	2
85	AVCO031085	Belt cover welding assembly	1
86	AVCO031086	Bolt M6*40	1
87	AVCO031087	Upper handle assembly	1
88	AVCO031088	Tubular bolts	4
89	AVCO031089	Pentagonal knob assembly	4
90	AVCO031090	Lower handle	1
91	AVCO031091	Fixed plate	1
92	AVCO031092	Lock nut M6	1
93	AVCO031093	Forward clutch handle	1
94	AVCO031094	Bolt M6*50	1
95	AVCO021070	Wrench 13_16	1
96	AVCO031096	Wrench 12_14	1
97	AVCO031097	Bottle of engine oil	1
Engine			
A			
1	AVCO031095	Bolt	6
2	AVCO031096	Cover, crankcase	1
3	AVCO031097	Oil seal, dipstick	1
4	AVCO031098	Dipstick	1

5	AVCO031099	Guide dowel	2
6	AVCO031100	Gasket, crankcase	1
7	AVCO031101	Oil seal	2
8	AVCO031102	Bearing	2
9	AVCO031103	Washer, drain plug	2
10	AVCO031104	Drain plug	2
11	AVCO031105	Crankcase assy	1
12	AVCO031106	Guide dowel	2
13	AVCO031107	Bolt	1
B			
1	AVCO031108	Gasket, cylinder head	1
2	AVCO031109	Bolt, cylinder head	4
3	AVCO031110	Cylinder head assembly	1
4	AVCO031111	Nut	2
5	AVCO031112	Double end stud	2
6	AVCO031113	Gasket, intake 2	1
7	AVCO031114	Spacer, heat insulating	1
8	AVCO031115	Gasket, intake 1	1
9	AVCO031116	Gasket, cylinder head cover	1
10	AVCO031117	Cylinder head cover	1
11	AVCO031118	Bolt	4
12	AVCO031119	Spark plug	1
13	AVCO031120	Double end stud	2
14	AVCO031121	Vent-pipe washer	1
15	AVCO031122	Nut	2
16	AVCO031123	Spring washer	2
C			
1	AVCO031124	Adjust nut, valve clearance	2
2	AVCO031125	Buttonhead, arm	2
3	AVCO031126	Arm	2
4	AVCO031127	Cap, exhaust rod	1
5	AVCO031128	Upper retainer, exhaust valve spring	1
6	AVCO031129	Spring, valve	2
7	AVCO031130	Valve, exhaust	1
8	AVCO031131	Guide plate, connecting stud	1

9	AVCO031132	Rod, connecting	2
10	AVCO031133	Upper retainer, intake valve spring	1
11	AVCO031134	Adjusting stud, valve clearance	2
12	AVCO031135	Valve, intake	1
13	AVCO031136	Stud, connecting	2
14	AVCO031137	Camshaft	1
15	AVCO031138	Oil seal, valve	1
D			
1	AVCO031139	Nut, clamp	1
2	AVCO031140	Start-up ratchet gear	1
3	AVCO031141	Fan wheel	1
4	AVCO031142	Fly wheel	1
5	AVCO031143	Crankshaft	1
6	AVCO031144	Circlip, piston pin	2
7	AVCO031145	Piston	1
8	AVCO031146	Pin, piston	1
9	AVCO031147	Piston ring assembly	1
10	AVCO031148	Connecting rod assembly	1
11	AVCO031149	Key	1
12	AVCO031150	Bolt	1
E			
1	AVCO031151	Arm	1
2	AVCO031152	Rod, tension	1
3	AVCO031153	Spring 2, tension	1
4	AVCO031154	Nut	1
5	AVCO031155	Bolt, square	1
6	AVCO031156	Spacer 2	1
7	AVCO031157	Hair pin	1
8	AVCO031158	Governor crank	1
9	AVCO031159	Pin	1
10	AVCO031160	Circlip	1
11	AVCO031161	Adjustment, centrifugal	1
11-1	AVCO031162	Body, centrifugal governer	1
11-2	AVCO031163	Pin	2
11-3	AVCO031164	Pawl	2

12	AVCO031165	Spacer 3	1
13	AVCO031166	Cover, push rod	1
14	AVCO031167	Spring 1, tension	1
15	AVCO031168	Bolt	2
16	AVCO031169	Rpm adj mechanism	1
17	AVCO031170	Bolt	1
F			
1	AVCO031171	Starter assy	1
1.1	AVCO031172	Bolt	3
1.2	AVCO031173	Recoil starter assembly	1
1.3	AVCO031174	Engine side cover assembly	1
2	AVCO031175		4
3	AVCO031176	Shield 1	1
4	AVCO031177	Bolt	1
5	AVCO031178	Shield 2	1
6	AVCO031179	Bolt	2
7	AVCO031180	Rubber plug	1
G			
1	AVCO031181	Air filter assembly	1
1.1	AVCO031182	Fastening knob	1
1.2	AVCO031183	Air filter cover	1
1.3	AVCO031184	Butterfly nut	1
1.4	AVCO031185	Seal assy, filter element	1
1.5	AVCO031186	Filter element	1
1.6	AVCO031187	Spacer	1
1.7	AVCO031188	Lower cover,air filter	1
2	AVCO031189	Spacer	1
3	AVCO031190	Breather tube	1
H			
1	AVCO031191	Muffler assy	1
I			
1	AVCO031192	Switch assy, ignition	1
2	AVCO031193	Ignition coil	1
3	AVCO031194	Bolt m6x25	2
J			

1	AVCO031195	Carburetor assembly	1
2	AVCO031196	Clamp, fuel line,	2
3	AVCO031197	Hose	1
4	AVCO031198	Jacket	1
K			
1	AVCO031199	Fuel tank cap	1
2	AVCO031200	Filter gauze	1
3	AVCO031201	Fuel tank	1
4	AVCO031202	Vitta tie-in assy	1
5	AVCO031203	Shock absorption washer	3
6	AVCO031204	Nut	2
L			
1	AVCO031205	Dump valve assy	1
2	AVCO031206	Hose	1
3	AVCO031207	Clamp, fuel line,	2

WARRANTY

BENCHMARK GAS REAR TINE TILLER WARRANTY

This Benchmark™ tool has a five (5) year repair warranty. If this tool fails due to a defect in material or workmanship within five years from the date of purchase, call the customer service number with the original bill of sale for service. This warranty does not include expendable parts including but not limited to blades, brushes, belts, light bulbs and/or batteries. This warranty covers defects in material or workmanship only. It does not cover normal wear and tear, failure due to abuse/misuse, or defects caused by careless or accidental mishandling. If this Benchmark product is used for commercial or rental purposes, this warranty does not apply.

212 cc/4-CYCLE GAS REAR TINE TILLER

5 Year Limited Warranty

BENCHMARK™ MC

5140-011

Made in China

BENCHMARK TOOLS CANADA
ST. JACOBS, ONTARIO N0B 2N0

CUSTOMER SERVICE/TECH SUPPORT
1-833-818-4111

LIMITED 5 YEAR* WARRANTY

* This Benchmark™ product carries a five (5) year LIMITED warranty against defects in workmanship and materials. See Owner's Manual for full details.

EPA

READ ALL INSTRUCTIONS BEFORE FIRST USE.
KEEP THIS MANUAL FOR FUTURE REFERENCE.
KEEP AWAY FROM CHILDREN.

WEAR CSA APPROVED EYE PROTECTION

WEAR EAR PROTECTION

WEAR A FACE MASK