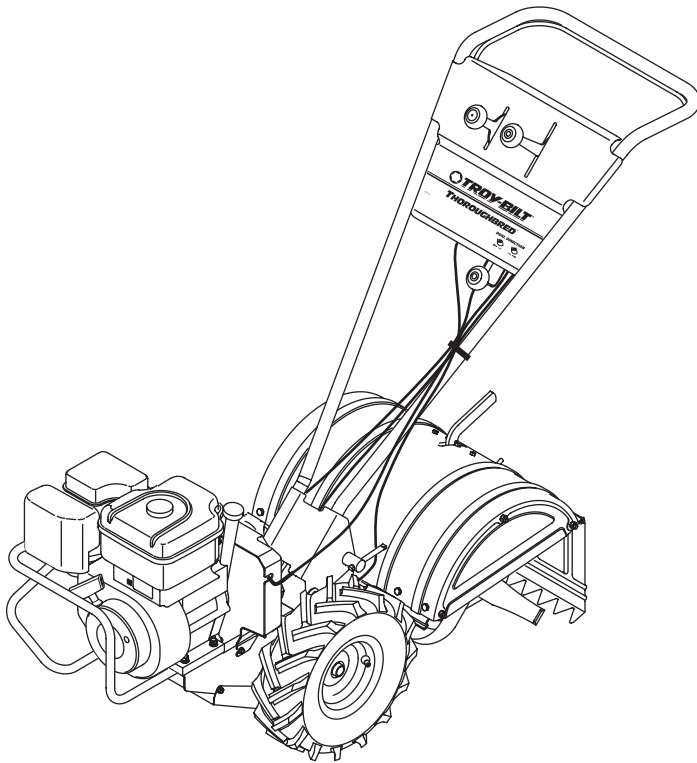




Operator's Manual

Rear-tine Tiller 654J—Thoroughbred™



IMPORTANT: READ SAFETY RULES AND INSTRUCTIONS CAREFULLY

WARNING: This unit is equipped with an internal combustion engine and should not be used on or near any unimproved forest-covered, brush-covered or grass-covered land unless the engine's exhaust system is equipped with a spark arrester meeting applicable local or state laws (if any). If a spark arrester is used, it should be maintained in effective working order by the operator. In the State of California the above is required by law (Section 4442 of the California Public Resources Code). Other states may have similar laws. Federal laws apply on federal lands. A spark arrester for the muffler is available through your nearest engine authorized service dealer or contact the service department, P.O. Box 361131 Cleveland, Ohio 44136-0019.

TROY-BILT LLC, P.O. BOX 361131 CLEVELAND, OHIO 44136-0019

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(3/17/2004)

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FINDING MODEL NUMBER

This Operator's Manual is an important part of your new rear-tine tiller. It will help you assemble, prepare and maintain the unit for best performance. Please read and understand what it says.



Before you start assembling your new equipment, please locate the model plate on the equipment and copy the information from it in the space provided below. A sample model plate is also given below. You can locate the model plate by standing behind the unit and looking down at rear surface of the tine shield. This information will be necessary to use the manufacturer's web site and/or help from the Customer Support Department or an authorized service dealer.



Copy the model number here: _____

Copy the serial number here: _____

CUSTOMER SUPPORT

Please do NOT return the unit to the retailer from where it was purchased, without first contacting Customer Support.

If you have difficulty assembling this product or have any questions regarding the controls, operation or maintenance of this unit, you can seek help from the experts. Choose from the options below:

	<p>Visit troy-bilt.com for many useful suggestions. Click on Customer Support button and you will get the four options reproduced here. Click on the appropriate button and help is immediately available.</p> <div style="text-align: center; border: 1px solid black; padding: 5px; margin: 10px auto; width: 80%;"> <p>Find Answers Click here to search our knowledge base. Search by product, keyword, or phrase.</p> <p>My Stuff Login to check the status of your questions, modify your inquiries, or update your personal profile.</p> <p>Service Locator Need local assistance? Click here to find authorized service centers in your area.</p> <p>Manuals Online Need a manual and/or parts list? Download literature from recent model years.</p> </div> <p style="text-align: center;"><i>The answer you are looking for could be just a mouse click away!</i></p>	<p><i>The answer you are looking for could be just a mouse click away!</i></p>
	<p>If you prefer to reach a Customer Support Representative, please call 1(800) 520-5520.</p>	
	<p>The engine manufacturer is responsible for all engine-related issues with regards to performance, power-rating, specifications, warranty and service. Please refer to the engine manufacturer's Owner's/Operator's Manual, packed separately with your unit, for more information.</p>	

SECTION 1: IMPORTANT SAFE OPERATION PRACTICES



WARNING: This symbol points out important safety instructions which, if not followed, could endanger the personal safety and/or property of yourself and others. Read and follow all instructions in this manual before attempting to operate this machine. Failure to comply with these instructions may result in personal injury. When you see this symbol—heed its warning.



DANGER: This machine was built to be operated according to the rules for safe operation in this manual. As with any type of power equipment, carelessness or error on the part of the operator can result in serious injury. This machine is capable of amputating hands and feet and throwing objects. Failure to observe the following safety instructions could result in serious injury or death.

California Proposition 65 Warning:



WARNING: Engine exhaust, some of its constituents, and certain vehicle components contain or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

Training

1. Carefully read this Operator's Manual, the separate Engine Owner/Operator's Manual, and any other literature you may receive. Be thoroughly familiar with the controls and the proper use of the tiller and its engine. Know how to stop the unit and disengage the controls quickly.
2. Never allow children to operate the tiller. Never allow adults to operate the tiller without proper instruction.
3. Keep the area of operation clear of all persons, particularly children and pets.
4. Keep in mind that the operator or user is responsible for accidents or hazards occurring to other people, their property, and themselves.
- b. The gas cap shall never be removed or fuel added while the engine is running. Allow the engine to cool for several minutes before adding fuel.
- c. Keep matches, cigarettes, cigars, pipes, open flames, and sparks away from the fuel tank and fuel container.
- d. Fill fuel tank outdoors with extreme care. Never fill fuel tank indoors. Use a funnel or spout to prevent spillage.
- e. Replace all fuel tank and container caps securely.
- f. If fuel is spilled, do not attempt to start the engine, but move the machine away from the area of spillage and avoid creating any source of ignition until fuel vapors have dissipated.

Preparation

1. Thoroughly inspect the area where the tiller is to be used and remove all foreign objects.
2. Be sure all control levers are released before starting the engine.
3. Do not operate the tiller without wearing adequate outer garments. Avoid loose garments or jewelry that could get caught in moving parts.
4. Do not operate the tiller when barefoot or wearing sandals, sneakers, or light footwear. Wear protective footwear that will improve footing on slippery surfaces.
5. Do not till near underground electric cables, telephone lines, pipes or hoses. If in doubt, contact your telephone or utility company.
6. Never make adjustments when engine is running (unless recommended by the Engine manufacturer).

WARNING: Handle fuel with care; it is highly flammable and its vapors are explosive. Take the following precautions:

- a. Store fuel in containers specifically designed for this purpose.

Operation

1. Do not put hands or feet near or under rotating parts.
2. Exercise extreme caution when on or crossing gravel drives, walks, or roads. Stay alert for hidden hazards or traffic. Do not carry passengers.
3. After striking a foreign object, stop the engine, thoroughly inspect the machine for any damage, and repair the damage before restarting and operating the machine.
4. Exercise caution to avoid slipping or falling.
5. If the unit should start to vibrate abnormally, stop the engine and check immediately for the cause. Vibration is generally a warning of trouble.
6. Stop the engine before unclogging the tines, or when making any repairs, adjustments or inspections.
7. Take all possible precautions when leaving the machine unattended. Stop the engine and move the Wheel Shift Lever to FORWARD.

8. Before cleaning, repairing, or inspecting, stop the engine and make certain all moving parts have stopped.
9. Always keep the tiller's rear tine shield down.
10. Never use the tiller unless proper guards, plates, or other safety protective devices are in place.
11. Do not run engine in an enclosed area. Engine exhaust contains carbon monoxide gas, a deadly poison that is odorless, colorless, and tasteless.
12. Keep children and pets away.
13. Be aware that the tiller may unexpectedly bounce upward or jump backward if the tines should strike extremely hard packed soil, frozen ground, or buried obstacles like large stones, roots, or stumps. If in doubt about the tilling conditions, always use the following operating precautions to assist you in maintaining control of the tiller:
 - a. Walk behind and to one side of the tiller, using one hand on the handlebars. Relax your arm, but use a secure hand grip.
 - b. Use slower engine speeds.
 - c. Clear the tilling area of all large stones, roots and other debris.
 - d. Avoid using downward pressure on handlebars. If need be, use slight upward pressure to keep the tines from digging too deeply.
 - e. Before contacting hard packed soil at the end of a row, reduce engine speed and lift handlebars to raise tines out of the soil.
 - f. In an emergency, stop tines and wheels by releasing the Wheel Engagement Handle. Do not attempt to restrain the tiller.
15. Do not overload the tiller's capacity by attempting to till too deeply at too fast a rate.
16. Never operate the tiller at high transport speeds on slippery surfaces. Look behind and use care when backing up.
17. Do not operate the tiller on a slope that is too steep for safety. When on slopes, slow down and make sure you have good footing. Never permit the tiller to freewheel down slopes.
18. Never allow bystanders near the unit.
19. Only use attachments and accessories that are approved by Troy-Bilt LLC.
20. Never operate the tiller without good visibility or light.
21. Never operate the tiller if you are tired, or under the influence of alcohol, drugs or medication.
22. Operators shall not tamper with the engine-governor settings on the machine; the governor controls the maximum safe operating speed to protect the engine and all moving parts from damage caused by overspeed. Authorized service shall be sought if a problem exists.
23. Do not touch engine parts which may be hot from operation. Let parts cool down
24. Please remember: You can always stop the tines and wheels by releasing the Wheel Engagement Handle.
25. Use extreme caution when reversing or pulling the machine towards you.
26. Start the engine carefully according to instructions and with feet well away from the tines.
27. Never pick up or carry a machine while the engine is running.

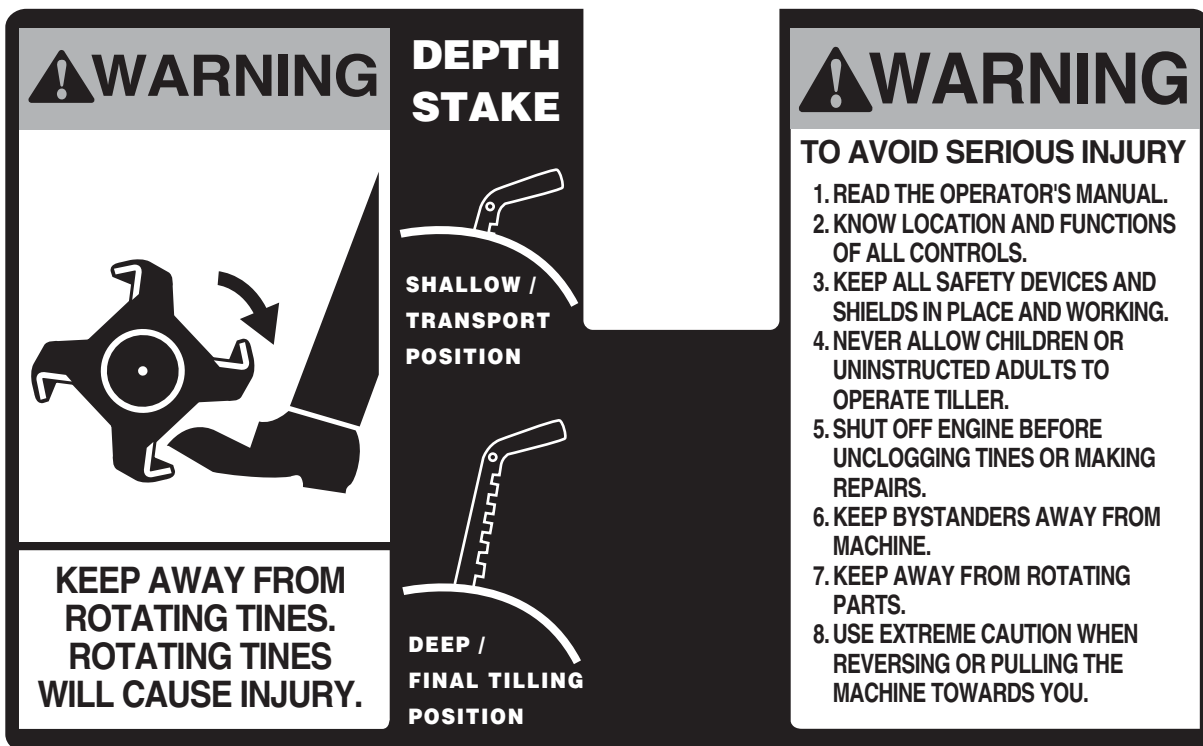
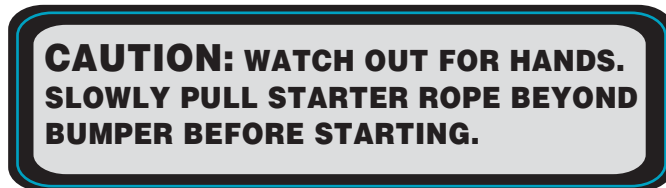
Maintenance and Storage

1. Keep the tiller, attachments and accessories in safe working condition.
2. Check all nuts, bolts, and screws at frequent intervals for proper tightness to be sure the equipment is in safe working condition.
3. Never store the tiller with fuel in the fuel tank inside a building where ignition sources are present such as hot water and space heaters, furnaces, clothes dryers, stoves, electric motors, etc.). Allow engine to cool before storing in any enclosure.
4. To reduce the chances of a fire hazard, keep the engine free of grass, leaves, or excessive grease.
5. Store gasoline in a cool, well-ventilated area, safely away from any spark- or flame-producing equipment. Store gasoline in an approved container, safely away from the reach of children.
6. Refer to the storage instructions in the Maintenance section of this Manual and the separate Engine Owner's Manual for instructions if the tiller is to be stored for an extended period.
7. If the fuel tank has to be drained, do this outdoors.

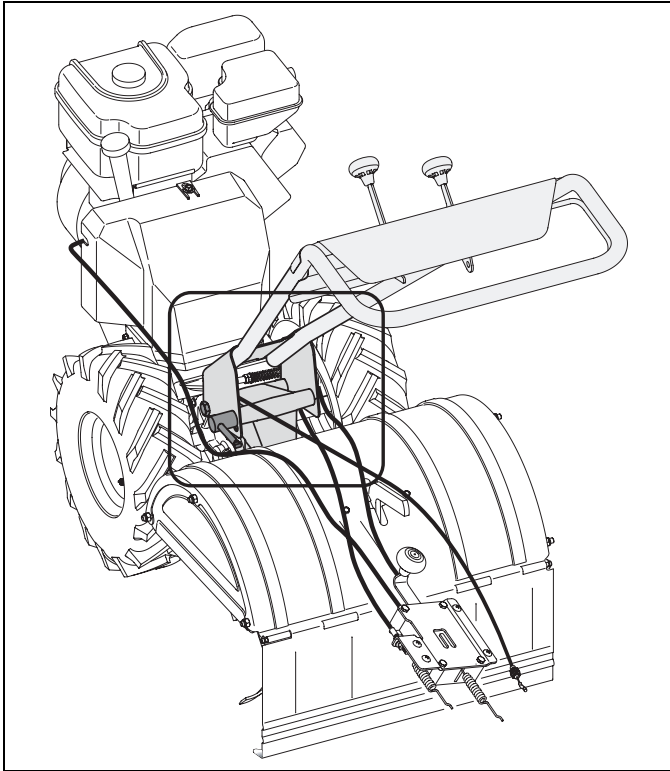


WARNING: YOUR RESPONSIBILITY Restrict the use of this power machine to persons who read, understand and follow the warnings and instructions in this manual and on the machine.

SAFETY LABELS FOUND ON YOUR TILLER



SECTION 2: ASSEMBLING THE TILLER



NOTE: All references to the RIGHT or LEFT side of the tiller are observed from operator's position.

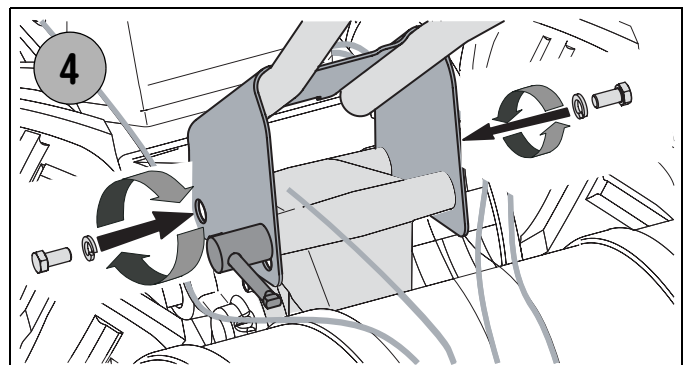
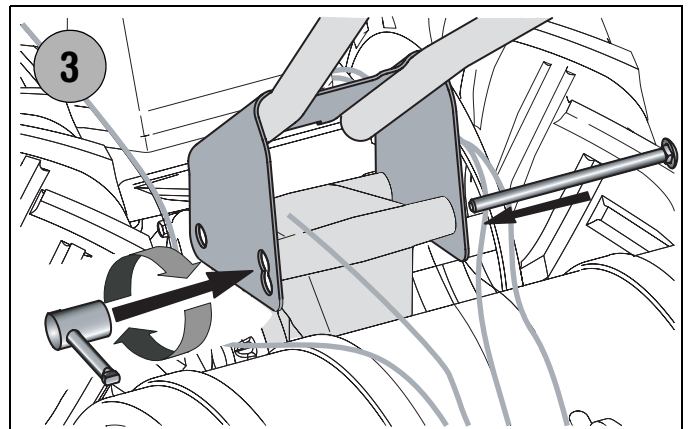
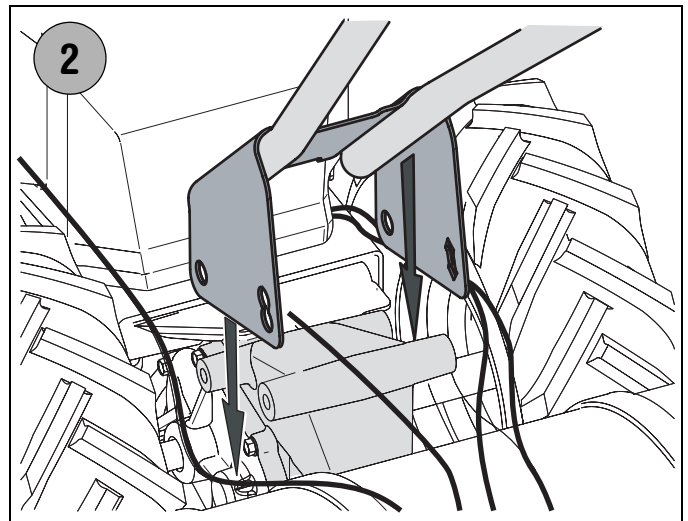
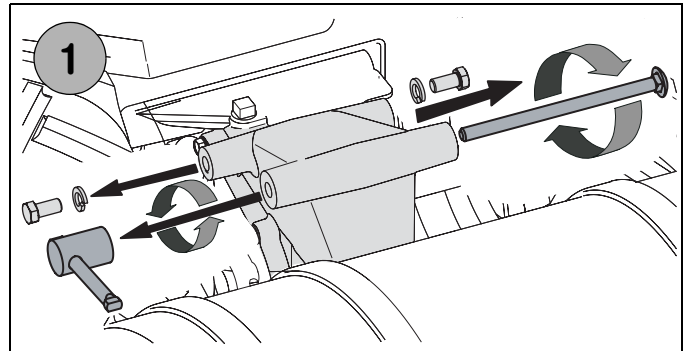
Tools Needed for Assembly

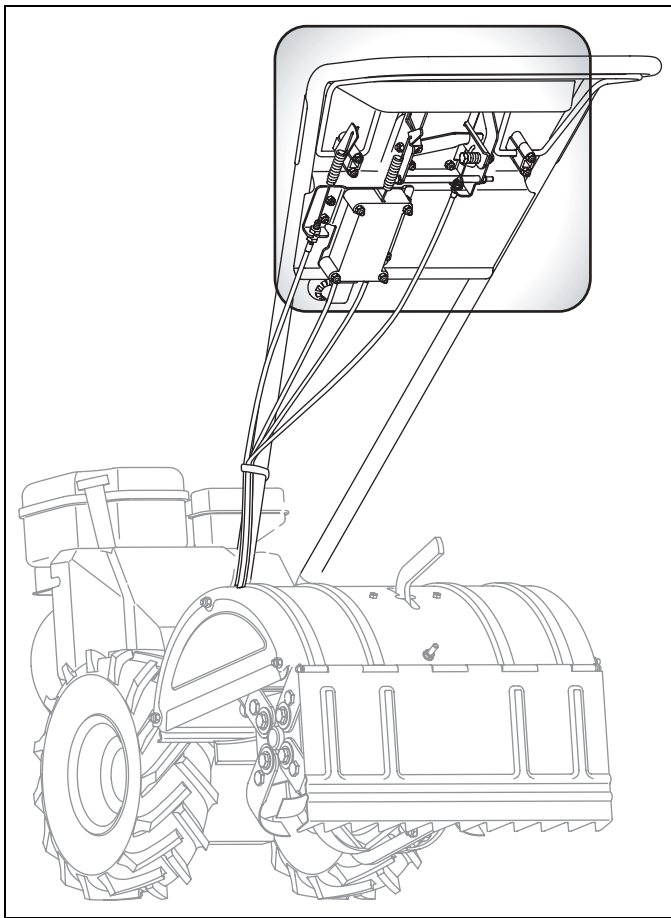
- 9/16" Wrench (Handle Mount Bracket)
- 7/16" Wrench or Nutdriver (Control Box)
- Two 1/2" Wrenches (Threaded Cable Adjuster)
- Phillips Screwdriver (Control Box)

Attaching the Handle

NOTE: Before beginning assembly, unfasten the cables and lay them across the back of the tiller. Having an assistant will ease completion of the following steps.

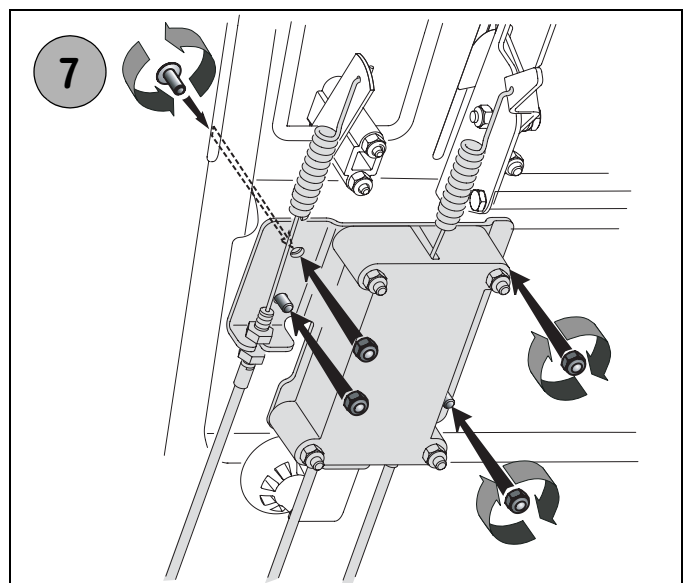
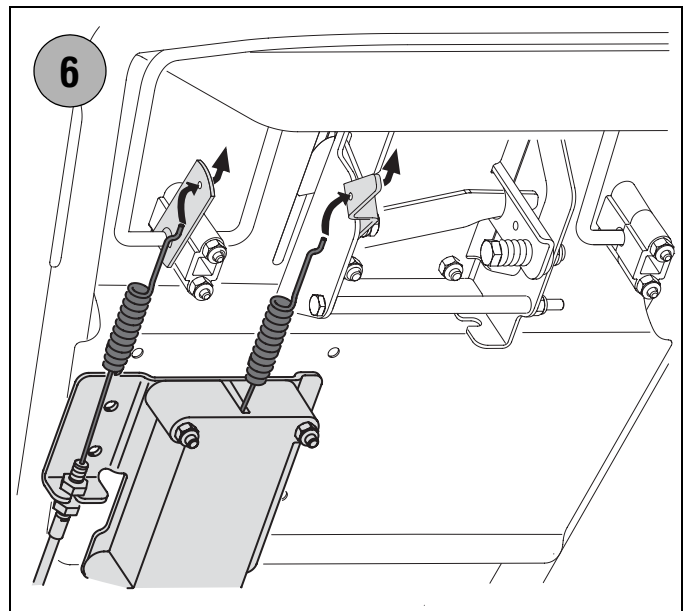
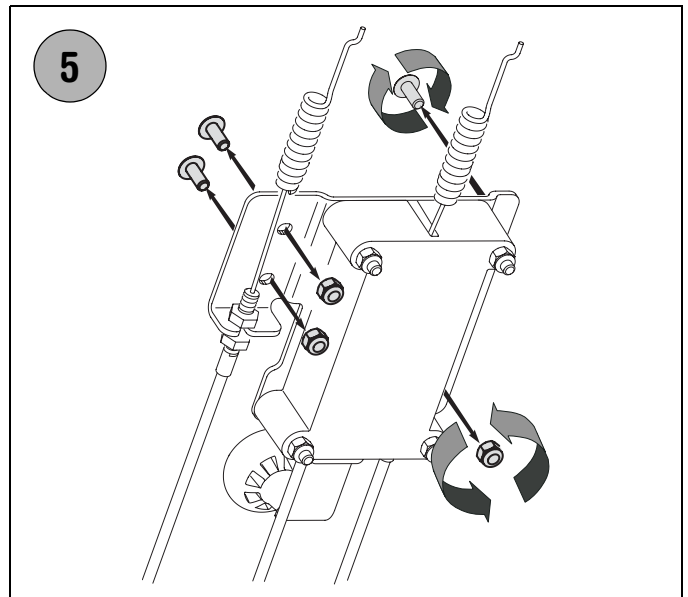
1. Remove the lower handle hardware (two hex screws, two lock washers, one carriage screw & one handle crank) from the tiller's frame.
2. Position the handle mount bracket over the tiller frame.
3. Align the handle mount bracket's rear holes (either upper or lower, depending on the operator's height) with the holes in the tiller frame. Insert the carriage bolt through the holes from right to left and secure it with the handle crank.
4. Align the handle mount bracket's front holes with the holes in the tiller frame. Using a 9/16" wrench, secure the handle mount bracket to the tiller frame with the hex screws and lock washers removed earlier.

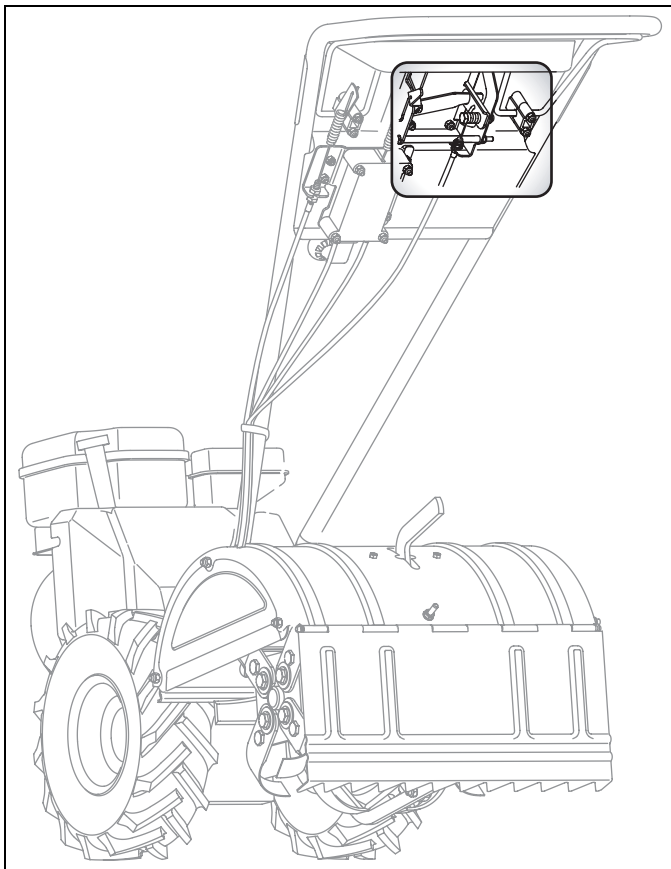




Attaching the Control Box

5. Remove the four Phillips screws and lock nuts from the control box plate.
6. Insert the ends of the two springs into the holes found in the control levers located on the underside of the handle panel.
7. Using a Phillips screwdriver and a 7/16" wrench, secure the control box to the underside of the handle panel with the four screws and lock nuts removed earlier.





Attaching the Shift Cable

8. Place the shift lever in the forward position. Insert the end of the shift cable into the hole in shift lever located on the underside the handle panel.
9. Position the shift cable's threaded adjuster in the slot found on the shift lever mount bracket. (one nut below the mount bracket and the flat washer, lock washer and second nut above the mount bracket. See Inset).
10. Adjust the shift cable as follows:
 - a. Using a $\frac{1}{2}$ " wrench, thread the bottom nut upward until the cable is taut.
 - b. Using a $\frac{1}{2}$ " wrench, thread the top nut downward to secure the adjuster to the mount bracket.

Position the shift cable (and three other cables) against the left handle tube. Secure them to the handle with the cable tie provided as shown in the illustration at the top of the page.

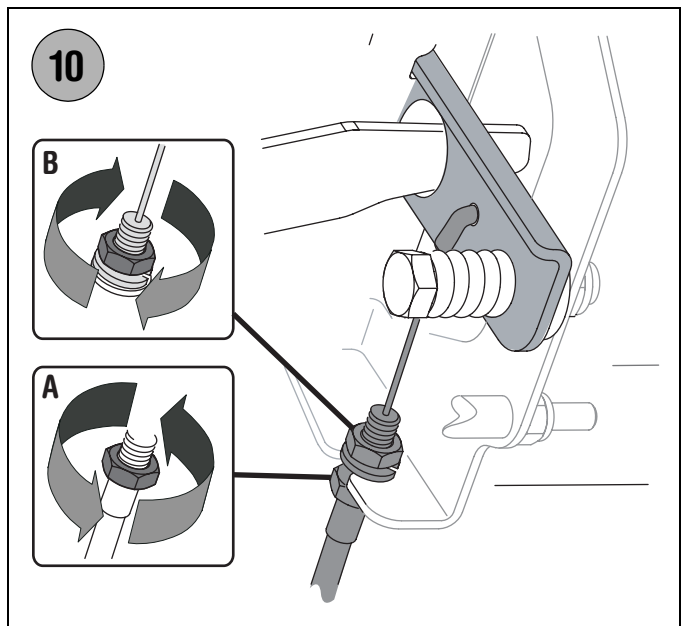
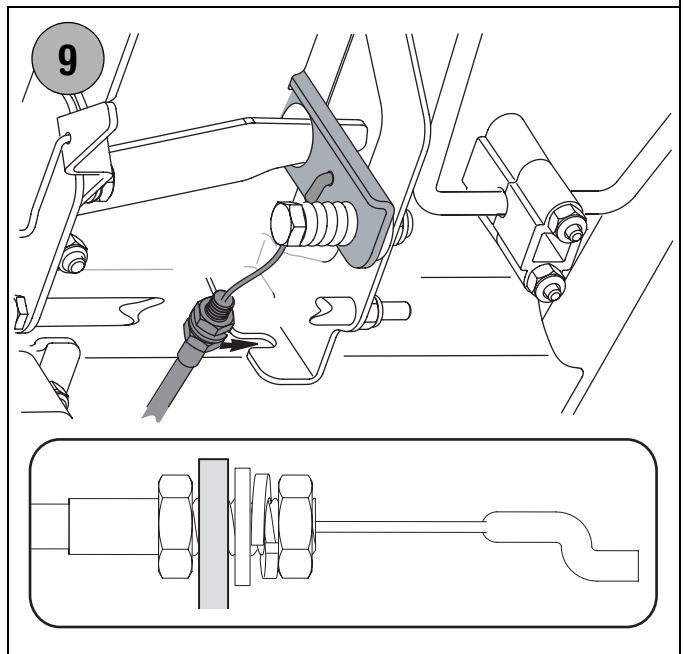
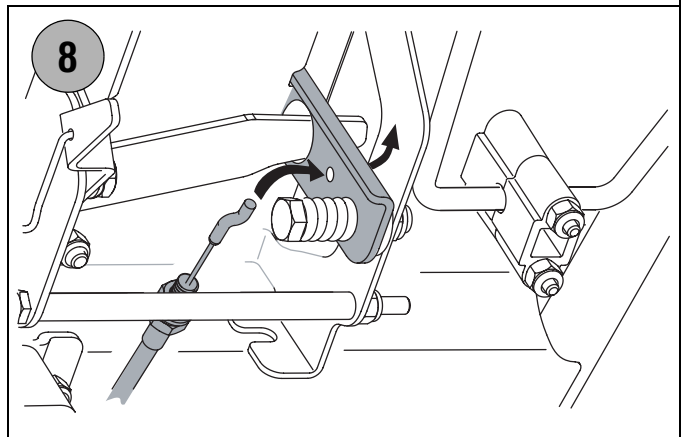
Gas and Oil Fill-up

Gasoline

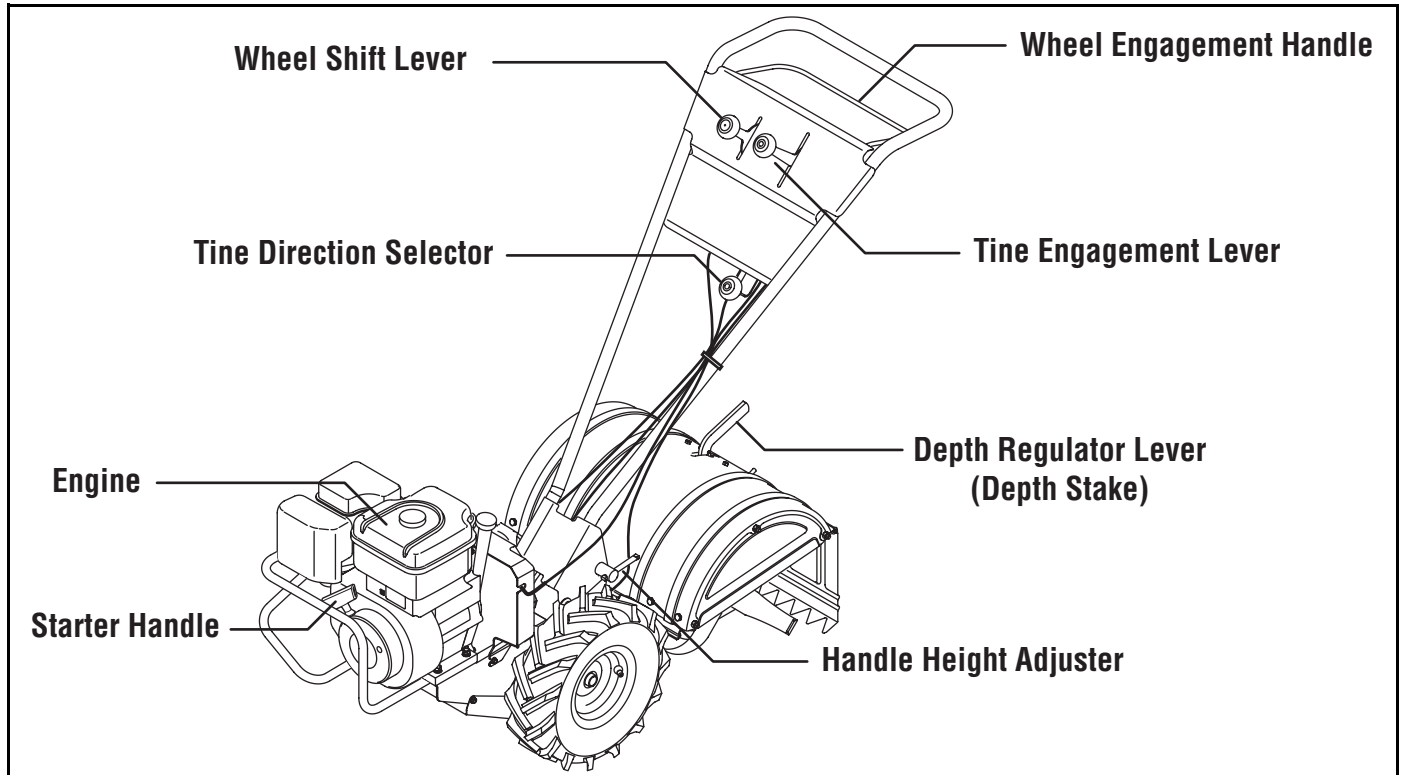
Service the engine with gasoline as instructed in the separate *Briggs & Stratton* Operator/Owner Manual packed with your tiller. Read instructions carefully.

Oil

IMPORTANT: Pour the **entire contents** of the provided oil bottle into the engine's oil fill.



SECTION 3: KNOW YOUR TILLER



Read this operator's manual and safety rules before operating your tiller. Compare the illustrations above with your unit to familiarize yourself with the location of various controls. Save this manual for future reference.

Engine

See the *Briggs & Stratton* Owner/Operator manual packed with your unit for the location and function of the controls on the engine.

Starter Handle

The starter handle is located on the engine. Pull the starter handle to start engine.

Wheel Shift Lever

The shift lever is located on the right side of the handle panel and has three positions, FORWARD, NEUTRAL and REVERSE. Place the wheel shift lever in either FORWARD or REVERSE before engaging the drive handle. Always bring the tiller to a complete stop prior to moving the shift lever from FORWARD to REVERSE or vice-versa.

IMPORTANT: Never force the shift lever. Doing so may result in serious damage to the tiller's transmission.



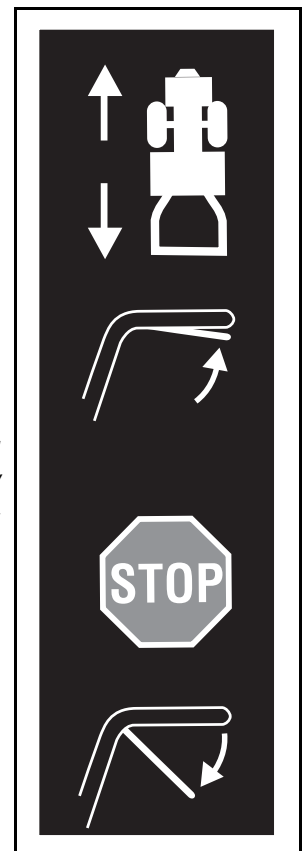
Wheel Engagement Handle

The wheel engagement handle is located below the tiller's upper handle.

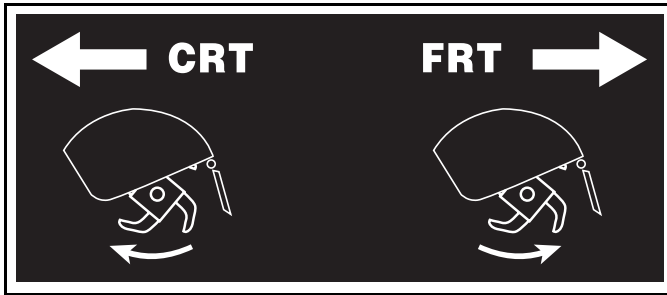
Closing the wheel engagement handle with the wheel shift lever in either FORWARD or REVERSE will cause the tiller's wheels to drive.

Releasing/Opening the wheel engagement handle automatically stops the tiller's wheels from driving

NOTE: If the tiller's tines *and* wheels are engaged, releasing/opening the wheel engagement handle automatically stops *BOTH* the tiller's tines and the tiller's wheels from driving.



Tine Direction Selector



The tine direction selector (found in the lower left area the handle panel) is used to alternate tine rotation between FRT mode (Forward Rotating Tines) to CRT mode (Counter Rotating Tines).

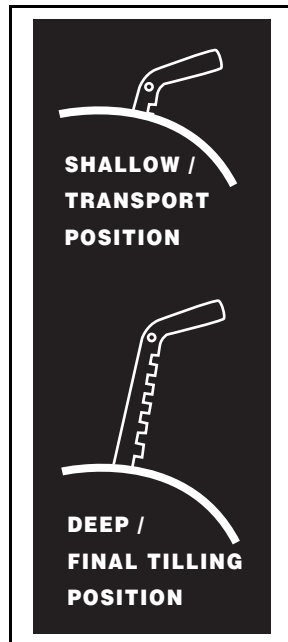
- Operate the tiller in CRT mode when tilling virgin ground, sod or hard soil.
- Operate the tiller in FRT mode when cultivating or tilling soft ground or previously tilled soil.

IMPORTANT: When operating the tiller in FRT mode, always lower the depth regulator lever (for a shallower tilling depth).

Depth Regulator Lever

The highest notch (lever all the way down) raises the tines approximately 1/2-inch off the ground. This “travel” position allows the tiller to be moved without the tines digging into the ground.

Moving the lever up increases the tilling depth. The lowest notch allows a tilling depth of approximately six to eight inches, depending on soil conditions.



Tine Engagement Lever

The tine engagement lever is located on the left side of the handle panel and has two positions, ON and OFF. To engage the tines and begin tilling, place the lever in the ON position. To disengage the tines, move the lever into the OFF position.

NOTE: *The tine engagement lever cannot be placed in the ON position without first closing the wheel engagement handle. Also, the tine engagement lever cannot be placed in the ON position unless the wheel shift lever is in the FORWARD position. Refer to Safety Interlock System on Page 11.*



Handle Height Adjuster

The handle mount bracket can be adjusted downward (for shorter operators) or upward (for taller operators) using the handle height adjuster. Align the handle mount bracket's rear holes with the holes in the tiller frame. Insert the carriage bolt through the holes from right to left and secure it with the handle crank.

SECTION 4: OPERATING YOUR TILLER



WARNING: Read, understand, and follow all instructions and warnings on the machine, in this manual and the *Briggs & Stratton* Owner/Operator manual packed with your unit before operating the tiller.

Safety Interlock System

IMPORTANT: Your tiller is equipped with an interlock system for the protection of the operator. If the interlock system should ever malfunction, do not operate the tiller. Contact an authorized service dealer.

- The Wheel Engagement Handle must be in the closed position in order to engage the tines
- The Wheel Shift Lever must be in the FORWARD position in order to engage the tines.
- The Wheel Shift Lever cannot be moved out of the FORWARD position unless the Tine Engagement Lever is in the OFF position.
- The tines will automatically stop if the operator releases the Wheel Engagement Handle.
- The wheels will automatically stop if the operator releases the Wheel Engagement Handle.



WARNING: Do not operate the tiller if the interlock system is malfunctioning. This system was designed for your safety and protection.

Pre-Start Checklist

Do the following before starting the engine.

1. Check unit for loose or missing hardware. Service as required.
2. Check motor oil level. Refer to separate *Briggs & Stratton* Operator/Owner Manual.
3. Check that all safety guards and covers are in place.
4. Check air cleaner and engine cooling system. Refer to separate *Briggs & Stratton* Operator/Owner Manual.
5. Select a tine direction (Refer to **Tine Direction Selector** on page 10).
6. Fill the fuel tank with gasoline as instructed in the separate *Briggs & Stratton* Operator/Owner Manual packed with your tiller. Read instructions carefully.



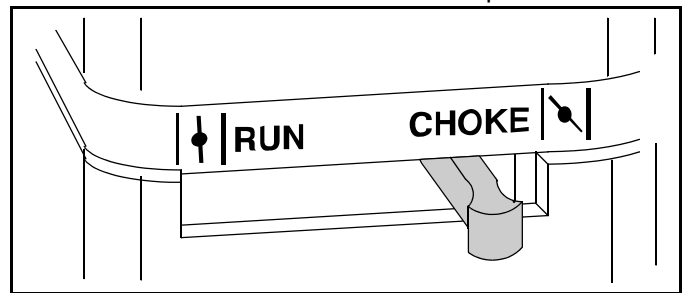
WARNING: Gasoline is highly flammable and its vapors are explosive. Follow gasoline safety rules found on Page 3 in this manual, and in the separate *Briggs & Stratton* Operator/Owner Manual. Failure to follow gasoline safety instructions can result in serious personal injury and property damage.

7. Set the tilling depth by moving the depth regulator lever rearward, then either up or down into the desired depth setting. Refer to **Depth Regulator Lever** on Page 10.

NOTE: Move the Depth Regulator Lever into the “travel” position (lever all the way down) so that the tines clear the ground. Use this position when practicing with or transporting the tiller. When you are ready to begin tilling, move the Depth Regulator Lever into the desired depth setting. Refer to **Depth Regulator Lever** on Page 10.

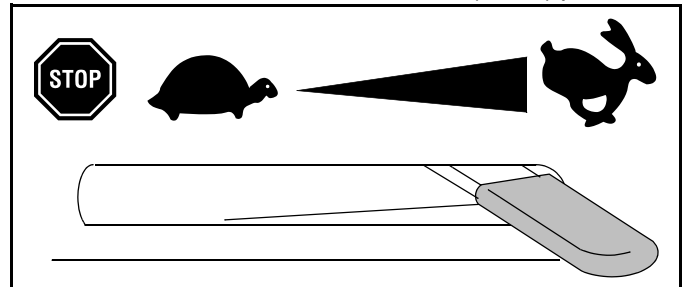
Starting Engine

- Move choke control lever to CHOKE position.



NOTE: A warm engine may not require choking.

- Move throttle control lever to FAST (rabbit) position.



- Grasp the starter handle and pull the rope out slowly until resistance is felt. When it becomes slightly harder to pull the rope, slowly allow the rope to recoil. Then pull rope with a rapid, continuous, full arm stroke. Keep a firm grip on starter handle.
- Maintain a grip on the starter handle and allow the rope to recoil slowly.
- Repeat the previous steps until engine starts. When engine starts, move choke control gradually toward the RUN position until the engine is running smoothly.



WARNING: Never run the engine indoors or in a poorly ventilated area. Engine exhaust contains carbon monoxide, an odorless and deadly gas.

Stopping Engine

- Move throttle control lever to STOP position. See Figure 1.

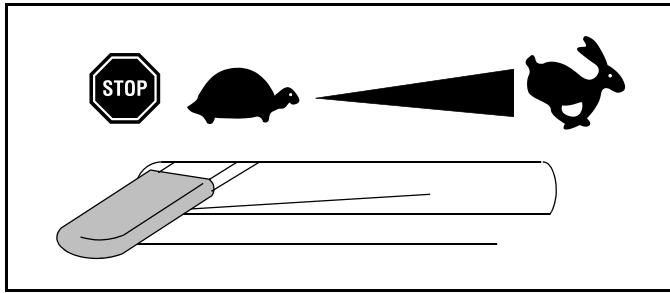


Figure 1



CAUTION: Never stop the engine by moving the choke lever into the CHOKE position. Backfire, fire or engine damage could result.

Operating the Tiller



WARNING: Before tilling new ground, contact your telephone and utilities company to inquire if underground lines are on the property.

The following pages provide guidelines to using your tiller effectively and safely in various gardening applications. Be sure to read *Tilling Tips & Techniques* in this Section before you actually put the tines into the soil.

1. Follow the **Pre-Start Checklist** on page 11. Be sure that the wheel shift lever is in the NEUTRAL position.
2. Start the engine and allow it to warm up for a few minutes. Move the throttle control into the FAST speed setting.

IMPORTANT: Always operate the tiller with the throttle in the FAST (rabbit) position.

3. For forward or reverse motion of the wheels and no power to the tines:
 - a. Place the tine engagement lever in the OFF position.
 - b. Place the wheel shift lever in either the FORWARD position or REVERSE position.

NOTE: If you encounter difficulty repositioning the wheel shift lever from FORWARD or REVERSE into NEUTRAL or vice-versa, gently rock the tiller (slightly push-and-pull the handlebar forward and backward) prior to moving the wheel shift lever. Doing so will help fully disengage the transmission's internal drive clutch.

- c. Close the wheel engagement handle against the handlebar to cause the wheels to drive. To stop the wheels, release the wheel engagement handle.

4. For forward motion of the wheels and power to the tines:
 - a. Place the tine direction selector in either the CRT position or FRT position.

NOTE: Operate the tiller in CRT mode when tilling virgin ground, sod or hard soil. Operate the tiller in FRT mode when cultivating or tilling soft ground or previously tilled soil.

- b. Place the wheel shift lever in the FORWARD position.
- c. Close the wheel engagement handle against the handlebar to cause the wheels to drive.
- d. Place the tine engagement lever in the ON position to begin tilling.

IMPORTANT: To stop the wheels and tines, release the wheel engagement handle.



WARNING: Do not push down on the handlebar to try to make the tiller till more deeply. Doing so prevents the wheels from holding the tiller back and can allow the tines (in CRT mode) to rapidly propel the tiller backward toward the operator, which could result in loss of control, property damage, or personal injury.

- As the tiller moves forward, relax and let the wheels pull the unit along while the tines dig.
 - Walk behind, and a little to one side of the tiller.
 - Use a light but secure grip with one hand on the handlebars, but keep your arm loose.
 - Let the tiller move ahead at its own pace. Do not push down on the handlebar in an attempt to force the tiller to dig deeper. If necessary, stop the tiller, turn off the engine and reposition the depth regulator lever to adjust tilling depth before restarting and operating the tiller.
5. To turn the tiller around:
 - a. Practice turning in a level, open area with **the tines not engaged**.
 - b. To start a turn, carefully raise the handlebar until the engine and tines are balanced over the wheels.
 - c. With the tiller balanced, push sideways on the handlebar to move the tiller in the direction of the turn. After completing the turn, slowly lower the tines into the soil.

Stopping the Tiller and Engine

1. To stop the wheels and tines, release /open the wheel engagement handle.
2. To stop the engine, move the engine throttle lever to STOP. Refer to Figure 1.

TILLING TIPS & TECHNIQUES

Tilling Depths



WARNING: Before tilling, contact your telephone or utilities company and inquire if underground equipment or lines are used on your property. Do not till near buried electric cables, telephone lines, pipes or hoses.

- This tiller can be operated in CRT (counter-rotating tine) mode. As the wheels pull forward, the tines rotate backward. This creates an “uppercut” tine action which digs deeply, uprooting soil and weeds. Don’t overload the engine when operating in CRT mode, but dig as deeply as possible on each pass. On later passes, the wheels may tend to spin in the soft dirt. Help them along by lifting up slightly on the handlebar (or simply switch to operating in FRT mode).
- Avoid the temptation to push down on the handlebar in an attempt to force the tiller to dig deeper. Doing so takes the weight off the powered wheels, causing them to lose traction. Without the wheels to hold the tiller back, the tines will attempt to propel the tiller backward, towards the operator. (Sometimes, slight downward pressure on the handlebar will help get through a particularly tough section of sod or unbroken ground, but in most cases this won’t be necessary.)
- When cultivating (breaking up surface soil around plants to destroy weeds), adjust the tines to dig only 1" to 2" deep. Using shallow tilling depths helps prevent injury to plants whose roots often grow close to the surface. If needed, lift up on the handlebar slightly to prevent the tines from digging too deeply. (Cultivating on a regular basis not only eliminates weeds, it also loosens and aerates the soil for better moisture absorption and faster plant growth.) Watering the garden area a few days prior to tilling will make tilling easier, as will letting the newly worked soil set for a day or two before making a final, deep tilling pass.

Choosing Correct Tine Depth & Rotation With experience, you will find the “just right” tilling depth and tine rotation combination that is best for your garden under specific conditions.

- Operate the tiller in CRT mode when tilling virgin ground, sod or hard soil.
- Operate the tiller in FRT mode when cultivating or tilling soft ground or previously tilled soil.

IMPORTANT: When operating the tiller in FRT mode, always lower the depth regulator lever (for a shallower tilling depth).

Let the Tiller Do the Work

While tilling, relax and let the wheels pull the tiller along while the tines do the digging. Walk on the side that is not yet finished (to avoid making footprints in the freshly tilled soil) and lightly, but securely grip the handlebar with just one hand. Always operate the tiller with the throttle in the FAST (rabbit) position.

Avoid Making Footprints

Whenever possible, walk on the untilled side of the unit to avoid making footprints in your freshly tilled or cultivated soil. Footprints cause soil compaction that can hamper root penetration and contribute to soil erosion. They can also “plant” unwanted weed seeds back into the freshly tilled ground.

Avoid Tilling Soggy, Wet Soil

Tilling wet soil often results in large, hard clumps of soil that can interfere with planting. If time permits, wait a day or two after heavy rains to allow the soil to dry before tilling. Test soil by squeezing it into a ball. If it compresses too easily, it is too wet to till.

Preparing Seedbeds

• When preparing a seedbed, go over the same path twice in the first row, then overlap one-half the tiller width on the rest of the passes (see Seedbed 1). When finished in one direction, make a second pass at a right angle (Seedbed 2). Overlap each pass for best results (in very hard ground, it may take three or four passes to thoroughly pulverize the soil.)

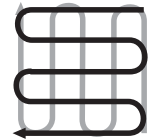
• If the garden size will not permit lengthwise and then crosswise tilling, then overlap the first passes by one-half a tiller width, followed by successive passes at one-quarter width (see Seedbed 3).



Seedbed 3



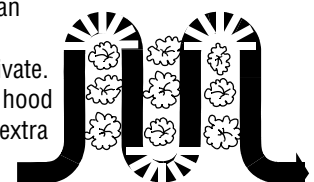
Seedbed 1



Seedbed 2

Cultivating

With planning, you can allow enough room between rows to cultivate. Leave room for the hood width, plus enough extra room for future plant growth.



TILLING TIPS & TECHNIQUES (CON'T)

Tilling On Slopes

Read the following recommendations before tilling on slopes:

If you must garden on a moderate slope, please follow two very important guidelines:

1. Till only on moderate slopes, never on steep ground where footing is difficult (review safety rules in Section 1: *Safety* of this manual).
2. We recommend tilling up and down slopes rather than terracing. Tilling vertically on a slope allows maximum planting area and also leaves room for cultivating.

IMPORTANT: When tilling on slopes, be sure the correct oil level is maintained in the engine (check every one-half hour of operation). The incline of the slope will cause the oil to gravitate away from its normal level and this can starve engine parts of required lubrication. Keep the motor oil level at the full point at all times!

Tilling Up and Down Slopes (Vertical Tilling)

- To keep soil erosion to a minimum, be sure to add enough organic matter to the soil so that it has good moisture-holding texture and try to avoid leaving footprints or wheel marks.
- When tilling vertically, try to make the first pass uphill as the tiller digs more deeply going uphill than it does downhill. In soft soil or weeds, you may have to lift the handlebars slightly while going uphill. When going downhill, overlap the first pass by about one-half the width of the tiller.



WARNING: Do not operate tiller on a slope too steep for safe operation. Till slowly and be sure you have good footing. Never permit tiller to freewheel down slopes. Failure to follow this warning could result in personal injury.

Clearing the Tines

The tines have a self-clearing action which eliminates most tangling of debris in the tines. However, occasionally dry grass, stringy stalks or tough vines may become tangled. Follow these procedures to help avoid tangling and to clean the tines, if necessary.

- To reduce tangling, set the depth regulator deep enough to get maximum "chopping" action as the tines chop the material against the ground. Also, try to till under crop residues or cover crops while they are green, moist and tender.
- While tilling, try swaying the handlebars from side to side (about 6" to 12"). This "fishtailing" action often clears the tines of debris.
- If tangling occurs, lift the tines out of the soil and run the tiller in reverse for a few feet. This reversing action should unwind a good deal of debris.

- It may be necessary to remove the debris by hand (a pocket knife will help you to cut away the material).



WARNING: Before clearing the tines by hand, stop the engine, allow all moving parts to stop. Failure to follow this warning could result in personal injury.

Loading and Unloading the Tiller



WARNING: Loading and unloading the tiller into a vehicle is potentially hazardous. Doing so is NOT recommend unless absolutely necessary, as this could result in personal injury or property damage. However, if you must load or unload the tiller, follow the guidelines given next.

- Before loading or unloading, stop the engine, wait for all parts to stop moving and allow the engine and muffler cool.
- The tiller is too heavy and bulky to lift safely by one person. Two or more people should share the load.
- Use sturdy ramps and manually (engine shut off) roll the tiller into and out of the vehicle. Two or more people are needed to do this.
- The ramps must be strong enough to support the combined weight of the tiller and any handlers. The ramps should provide good traction to prevent slipping; they should have side rails to guide the tiller along the ramps; and they should have a locking device to secure them to the vehicle.
- The handlers should wear sturdy footwear that will help to prevent slipping.
- Position the loading vehicle so that the ramp angle is as flat as possible (the less incline to the ramp, the better). Turn the vehicle's engine off and apply its parking brake.
- When going up ramps, stand in the normal operating position and push the tiller ahead of you. Have a person at each side to turn the wheels.
- When going down ramps, walk backward with the tiller following you. Keep alert for any obstacles behind you. Position a person at each wheel to control the speed of the tiller. Never go down ramps tiller-first, as the tiller could tip forward.
- Place wooden blocks on the downhill side of the wheels if you need to stop the tiller from rolling down the ramp. Also, use the blocks to temporarily keep the tiller in place on the ramps (if necessary), and to chock the wheels in place after the tiller is in the vehicle.
- After loading the tiller, prevent it from rolling by placing the wheel shift lever in the FORWARD position. Chock the wheels with blocks and securely tie the tiller down.

SECTION 5: MAINTENANCE AND ADJUSTMENTS



WARNING: Before performing any maintenance, or repairs, turn the engine off and allow it to cool, move the tiller to a level surface, place the wheel shift lever in the FORWARD position and chock the tiller's wheels.

MAINTENANCE SCHEDULE

PROCEDURE	NOTES
Check motor oil level	2, 3
Clean engine	2, 7
Check drive belt tension	1, 4
Check nuts and bolts	1, 4
Change motor oil	1, 4, 6
Lubricate tiller	4, 8
Service foam pre-cleaner air filter	7
Service paper air filter	7
Check gear oil level in transmission	1, 5
Check tines for wear	5
Check air pressure in tires	5
Service spark plug	7
Clean tiller	8

NOTES

1. After first 2 hours of break-in operation.
2. Before each use.
3. Every 5 operating hours.
4. Every 10 operating hours.
5. Every 30 operating hours.
6. Change more frequently in dusty or dirty conditions.
7. See Engine Owner's Manual for service recommendations.
8. After each use.

Engine

Check **engine oil level** before each use as instructed in the *Briggs & Stratton* Operator/Owner Manual packed with your unit. **Follow the instructions carefully.**

Engine Oil

Refer to the *Briggs & Stratton* Operator/Owner Manual packed with your unit for instruction on changing the engine oil and for information regarding the quantity and proper weight of motor oil.

Air Cleaner

Service the pre-cleaner, if so equipped, and cartridge/air cleaner element as instructed in the *Briggs & Stratton* Operator/Owner Manual packed with your unit.

Spark Plugs

The spark plug should be cleaned and the gap reset once a season. Refer to the *Briggs & Stratton* Operator/Owner Manual for correct plug type and gap specifications.

Cleaning the Tiller

Any fuel or oil spilled on the machine should be wiped off promptly. Do NOT allow mud and debris to accumulate around the cooling fins of the engine or on any other part of the machine, especially around the bottom frame cover, under the belt cover, around the belts, pulleys, shifter linkage and other moving parts.

- Remove the belt cover at least once a season and clean any debris away from belts and pulleys
- Clean around the bottom frame cover and the underside of the tine shield and with a garden hose after each use.

IMPORTANT: Thoroughly dry the tine shield and entire machine after each cleaning. Lubricate any pivot points and all axles to inhibit rust from forming and metal parts from corroding and seizing over time.

Lubrication



WARNING: Before performing any maintenance or repairs, turn the engine off and allow it to cool, move the tiller to a level surface, place the wheel shift lever in the FORWARD position and chock the tiller's wheels.

Engine

Lubricate the engine with motor oil as instructed in the *Briggs & Stratton* Operator/Owner Manual packed with your unit.

Pivot Points & Linkage

Lubricate all the pivot points on the depth regulator lever, handle height adjuster and levers (found on underside of the handle panel) at least once a season with light oil. Remove the belt cover at least once a season and clean any debris away from belts and pulleys before lubricating pivot points on pulley brackets with a light oil.

Axles (Wheel & Tine)

Remove each wheel and tine holder from its axle at least once a season and before extended storage. Clean each axle and lubricate with an all-purpose grease before reinstalling each wheel and tine holder.

Transmission

Checking for Oil Leaks

Before each use, check your tiller for signs of an oil leak—usually a dirty, oily accumulation either on the unit or on the floor where it has been parked.

A little seepage around a cover or oil seal is usually not a cause for alarm. If a small puddle forms below the tiller within hours, however, then service is required.

Ignoring a leak can result in severe transmission damage. If a cover leaks, try tightening any loose screws or bolts. If the fasteners are tight, a new gasket or oil seal may be required. If the leak is from around a shaft and oil seal, the oil seal probably needs to be replaced. See an authorized service dealer.

Changing Oil

Oil level should be visually checked if evidence of a leak is present. Oil should be added in such cases, but changing the transmission oil as part of general maintenance is unnecessary

Checking Oil Level

Check the oil level after every 30 hours of operation and whenever there is any oil leakage.

IMPORTANT: Never operate the tiller if the transmission is low on oil.

1. Position the tiller on a level surface.
2. Remove the fill plug found on the front of the transmission. See Figure 2.

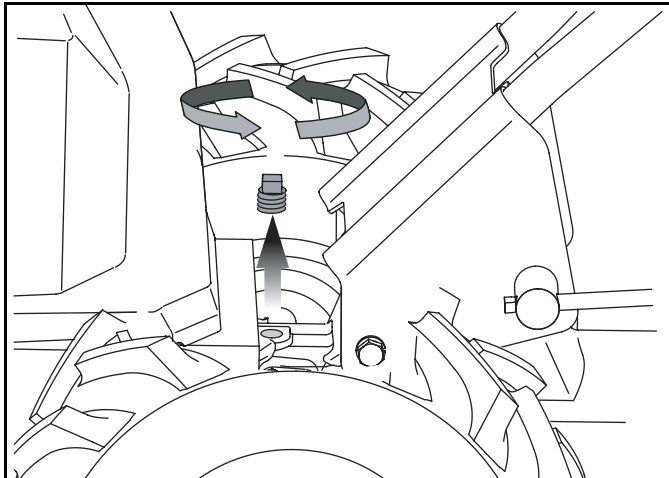


Figure 2

3. The drive shaft (visible through the transmission plug opening) should be half-submerged. If necessary, slowly add SAE 85W140 oil until the drive shaft is approximately half-submerged.

IMPORTANT: Do **NOT** add oil to the top of the transmission housing. Do **NOT** fully submerge the drive shaft with oil. Doing so will not allow for oil expansion and may result in serious damage to the transmission .

Checking Hardware

Check the unit for loose or missing hardware after every 10 operating hours. Loose or missing hardware can lead to equipment failure, poor performance, or oil leaks.

Be sure to check the three mounting screws located on each of two end caps found at the rear of the transmission (See Figure 3). Lift the tine flap to service those screws.

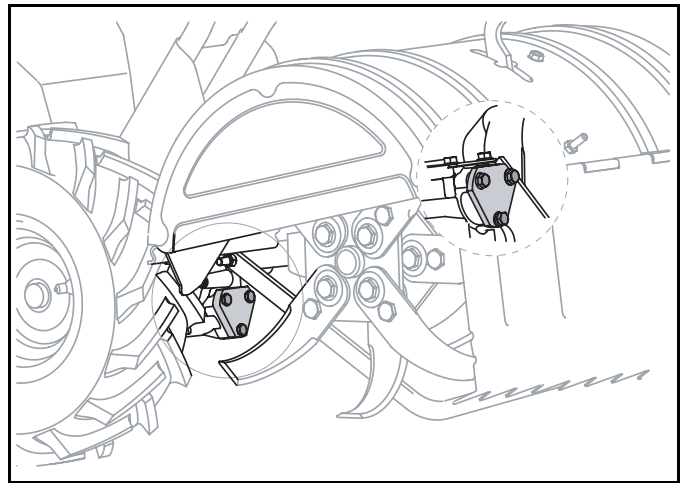


Figure 3

IMPORTANT: If loosened or removed, a sealant (Loctite Ultra Black™ Silicone 5900) must be applied to these screws before they can be reused without risking the loss of transmission oil.

Adjustments



WARNING: Before performing any maintenance or repairs, turn the engine off and allow it to cool, move the tiller to a level surface, place the wheel shift lever in the FORWARD position and chock the tiller's wheels.

Handle Height

The handle mount bracket can be adjusted downward (for shorter operators) or upward (for taller operators) using the handle height adjuster.

- Unthread the handle crank and remove the carriage bolt which secures handle mount bracket to the tiller frame. See Figure 4.
- Pivot the handlebar upward or downward to align the handle mount bracket's rear holes (either upper or lower) with the holes in the tiller frame.
- Re-insert the carriage bolt through the holes from right to left and secure it with the handle crank.

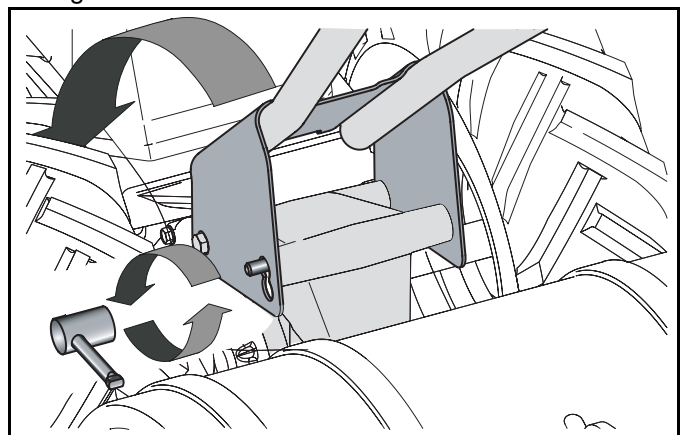


Figure 4

Shift Cable

If the tiller's wheels do not "freewheel" when the wheel shift lever is in the NEUTRAL position, the shift cable is in need of adjustment. Refer to Step 10 on Page 8 for detailed instructions.

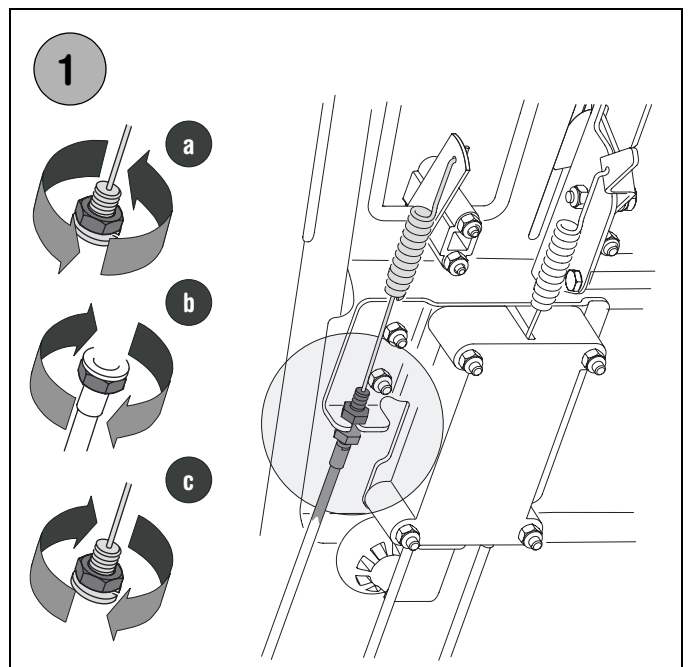
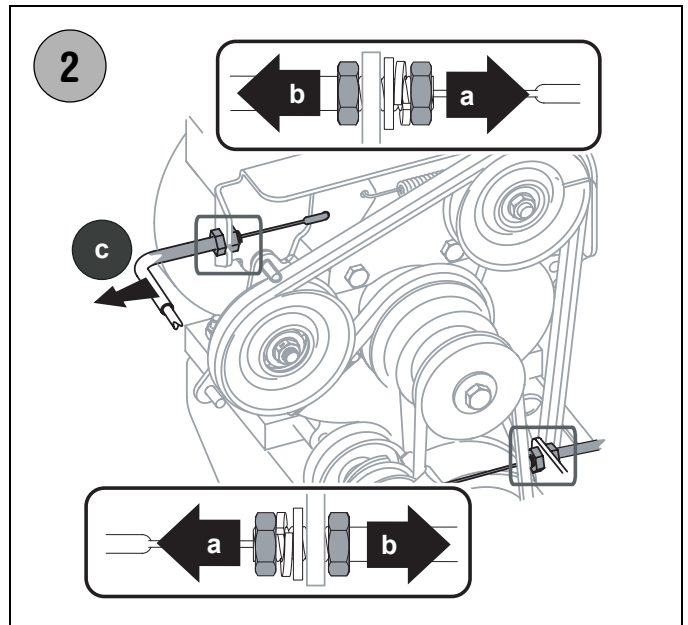
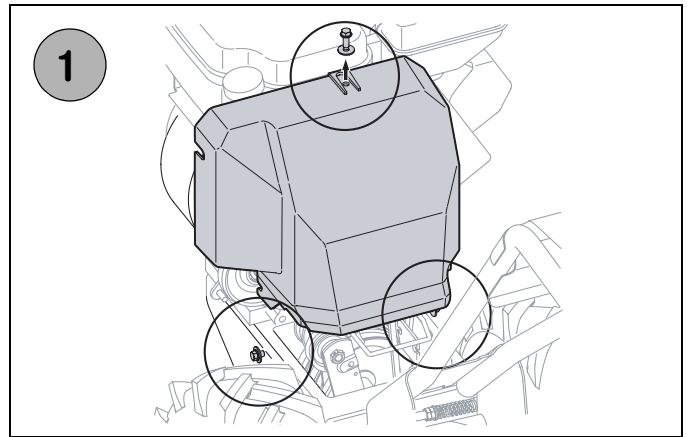
Tine Engagement Cables

If the tines fail to drive when the tine engagement lever is placed in the ON position, or if the tines fail to stop when the tine engagement lever is placed in the OFF position, DO NOT OPERATE THE TILLER. The tine engagement cable is in need of adjustment.

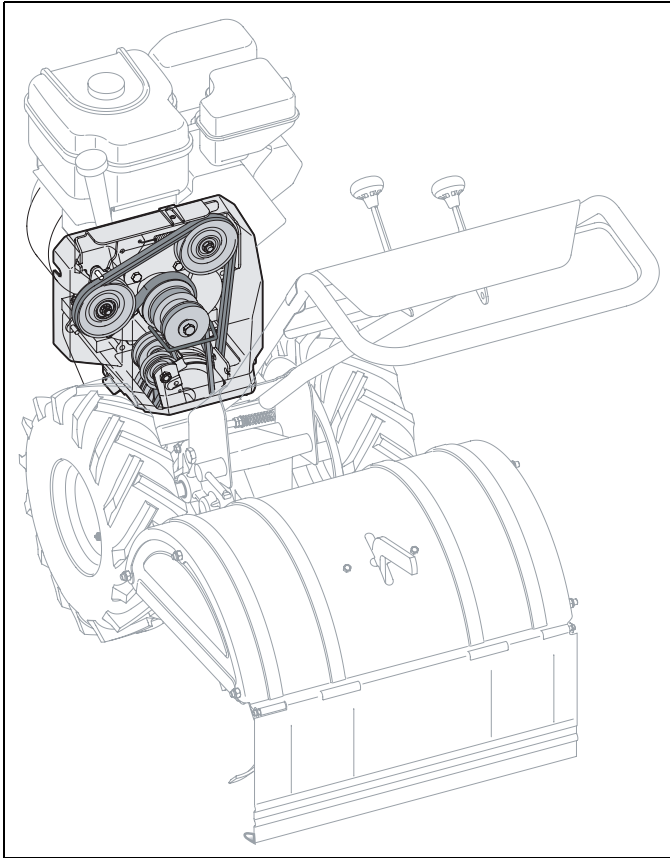
1. Remove the belt cover by removing the top screw and washer (and loosening the side screws) which secure it.
2. To adjust the cable:
 - a. Loosen the inside hex nut found on the cable adjuster.
 - b. Loosen the outside hex nut found on the cable adjuster.
 - c. Grasp the metal cable housing and gently pull outward to take up slack (usually no more than 1/4-inch) in the cable before retightening both hex nuts loosened earlier.

Wheel Engagement Cable

1. Adjust the wheel engagement cable as follows:
 - a. Using a 1/2" wrench, loosen the upper hex nut found on the cable adjuster.
 - b. Loosen the lower hex nut found on the cable adjuster.
 - c. Grasp the metal cable housing and gently pull outward to take up slack (usually no more than 1/4-inch) in the cable before retightening both hex nuts loosened earlier.



SECTION 6: SERVICE



Changing the Belts



WARNING: Position the tiller on flat, level surface, chock the wheels, shut the engine off and allow it to cool before removing the belt(s).

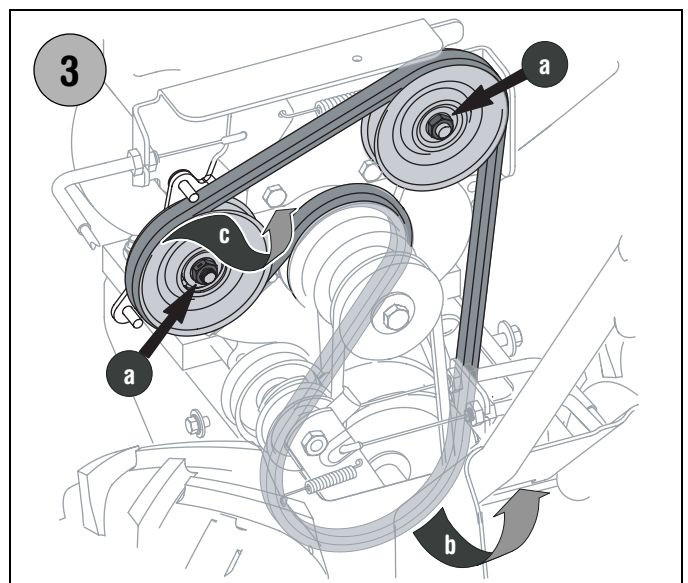
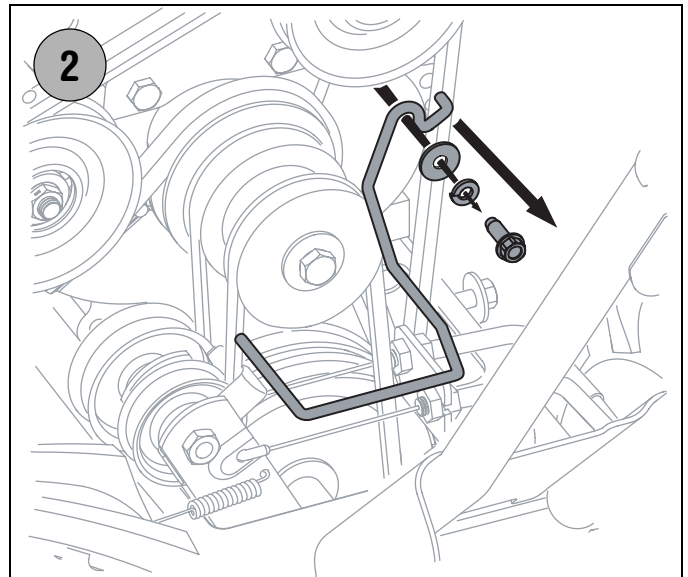
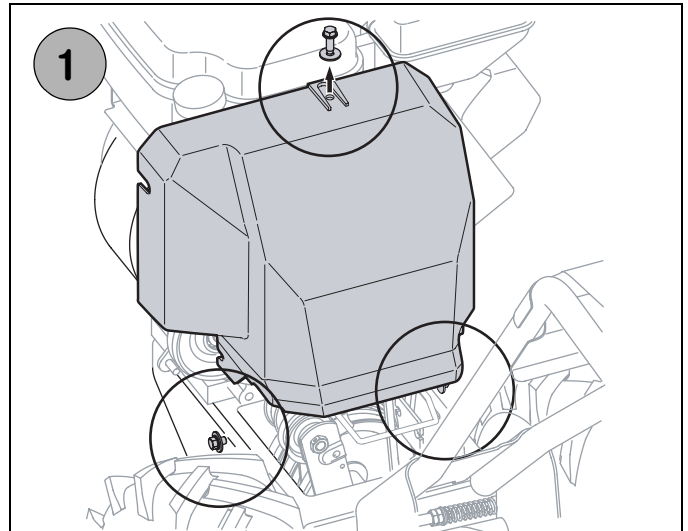
All belts on your tiller are subject to wear and should be replaced if any signs of wear are present.

IMPORTANT: The belts found on your tiller are specially designed to engage and disengage safely. A substitute (non-OEM) belt can be dangerous by not disengaging completely. For a proper working machine, always use factory approved belts.

To replace the belts on your tiller, proceed as follows:

Tine Drive Belts

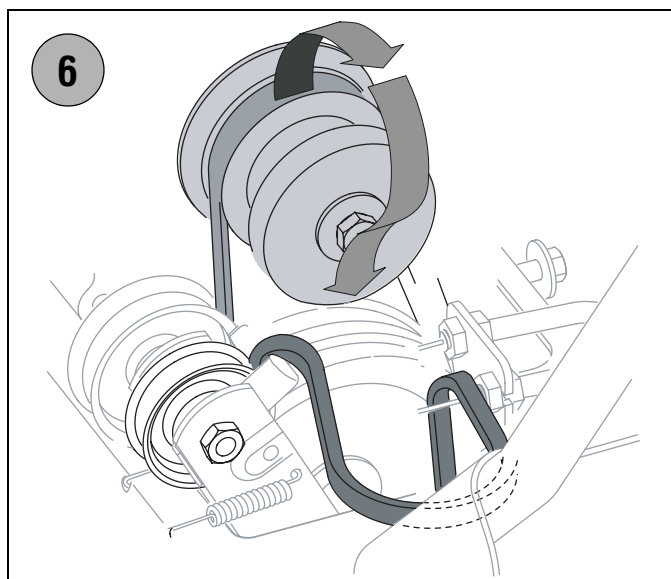
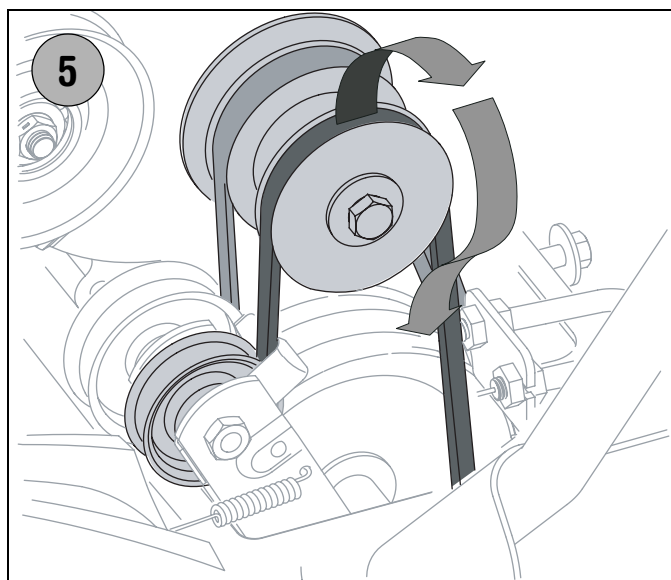
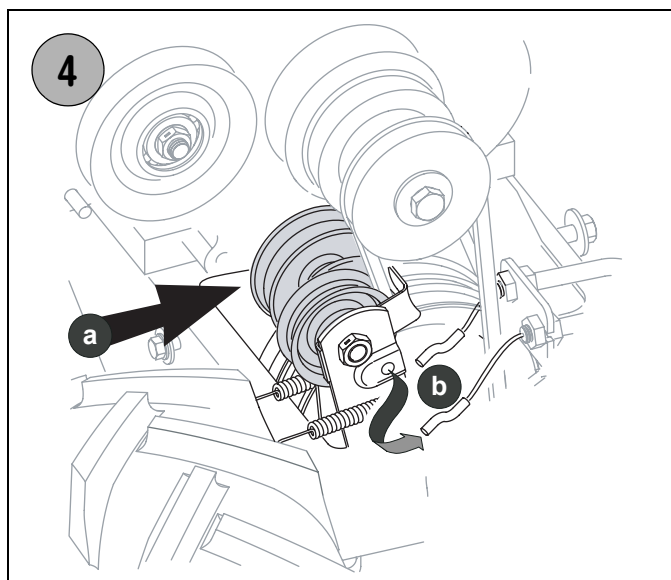
1. Remove the belt cover by removing the top screw and washer (and loosening the side screws) which secure it.
2. Remove the belt keeper rod by removing the screw and washers which secure it.
3. Remove the forward tine belt as follows:
 - a. Loosen, but do not remove, the hex nuts which secure the two idler pulleys.
 - b. Unloop the belt from around the bottom pulley.
 - c. Unloop the belt from around the two idler pulleys.

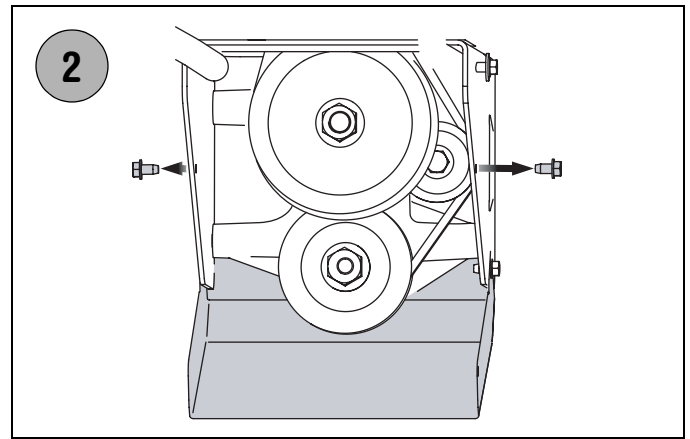
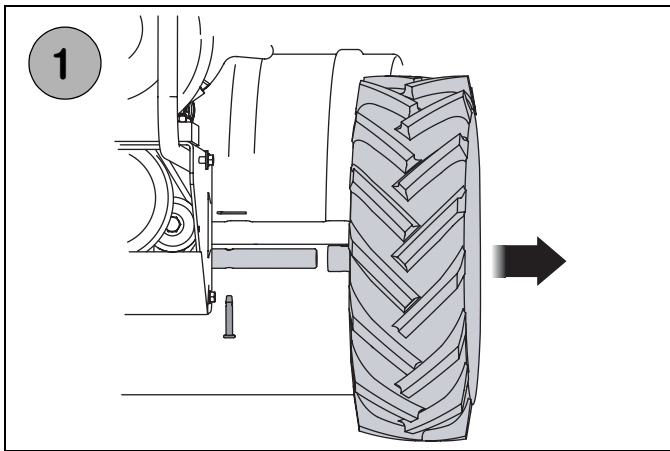


4. Begin the removal the reverse tine belt as follows:
 - a. Apply pressure on the idler pulleys to relieve tension on the reverse tine cable and the wheel drive cable.
 - b. Carefully unhook each cable-end.
5. Unloop the wheel drive belt from around the engine pulley.
6. Unloop the reverse tine belt from the engine pulley.

NOTE: Replace the reverse tine belt first and the forward tine belt second. Lastly, reattach the wheel drive belt to the engine pulley or proceed by replacing it.

NOTE: To install replacement belts, perform steps 1-6 in reverse order.



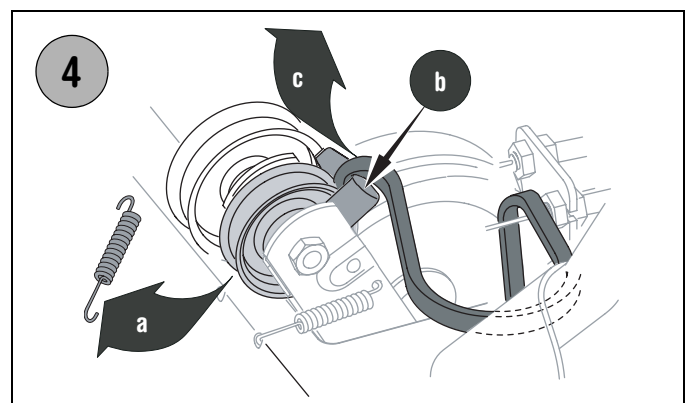
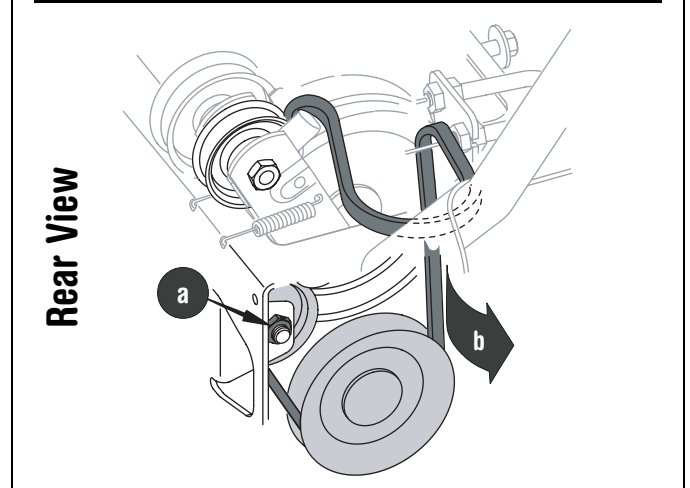
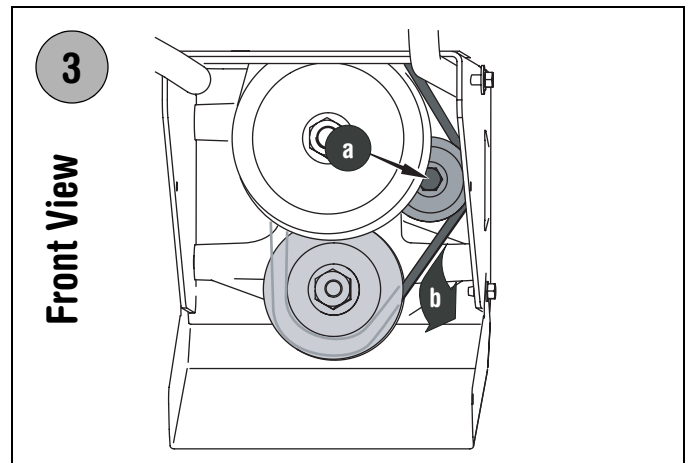


Wheel Drive Belt

NOTE: The wheel drive belt is under the least amount of load and will wear at a slower rate. It may not be necessary to replace the wheel drive belt as often as the tine belts. Inspect the belt and read the following steps before proceeding.

1. Remove the left wheel by removing the cotter pin and clevis pin which secure it. Use a jack stand or wood blocks to secure the left wheel axle and stabilize the tiller.
2. Remove the upper two screws which secure the bottom frame cover and pivot it downward.
3. Remove the wheel drive belt from around the lower idler pulley as follows:
 - a. Loosen, but do not remove, the hex bolt which secures the lower idler pulley.
 - b. Unloop the belt from around the lower idler pulley and transmission pulley.
4. Remove the wheel drive belt from around the upper idler pulley as follows:
 - a. Carefully remove the small spring from the upper pulley's idler bracket.
 - b. Gently pry the belt keeper tab upward with a flathead screwdriver.
 - c. Carefully unloop the wheel drive belt from around the upper idler pulley.

NOTE: To install a replacement belt, perform steps 1-4 in reverse order.



Tines

The tines will wear with use and should be inspected at the beginning of each tilling season and after every 30 operating hours.



WARNING: Position the tiller on flat, level surface, chock the wheels, shut the engine off and allow it to cool before inspecting or removing the tines.

NOTE: The tine shield end-covers (left side and right side) must be removed in order to take off either a single tine holder or individual tines. The end-covers are secured to the tine shield housing with three hex nuts each.

Tine Inspection

With use, the tines will become shorter, narrower and pointed. Badly worn tines will result in a loss of tilling depth and reduced effectiveness when chopping up and turning under organic matter.

Removing and Installing Tines

1. Use a pair of pliers to remove the internal cotter pin and clevis pin that secures each tine holder to the tine shaft.
2. Use a rubber mallet to tap the tine holder free of the tine axle and slide the tine assembly off the tine axle.

NOTE: The tine shield and handlebar are not shown for clarity. It is NOT necessary to remove the tine shield and handlebar to service the tiller tines.

3. Use a 9/16" socket wrench, and a 9/16" box wrench to remove the hex nuts, washer(s) and bolts that secure each tine to the tine holder.

NOTE: It is recommended that tines be changed one at a time for ease in reassembling

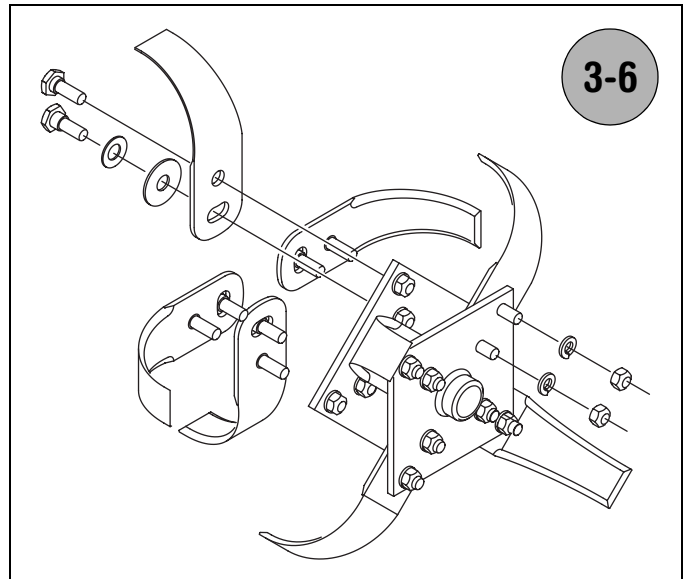
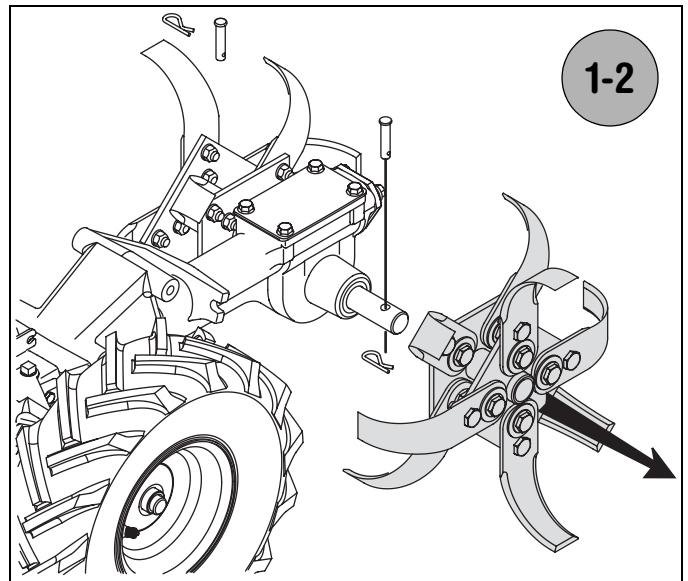
4. Install a replacement tine *in the exact orientation* as the tine just removed. Note the location and orientation of washers were applicable.
5. Repeat Steps 1-through-4 above to remove the other tine assembly and individual tines.
6. When reinstalling the tine assemblies onto the tine axles, be sure to first remove any rust, uneven spots or burrs from the tine axle, using fine sandpaper. Then grease the tine axle before reinstalling the tine assemblies.

Tires



WARNING: Never exceed the maximum inflation pressure shown on the sidewall of the tire.

Refer to the tire sidewall for exact tire manufacturer's recommended or maximum psi. Do not overinflate.



Off-season Storage

When the tiller won't be used for extended periods, prepare it for storage as follows:

- Clean and lubricate the tiller as instructed in **Section 7: MAINTAINING YOUR TILLER** on page 15.
- Check for loose parts and hardware (see **Checking Hardware** on page 16).
- Protect the engine by performing the engine storage instructions in the separate *Briggs & Stratton Operator/Owner Manual* packed with your tiller.
- Store unit in a clean, dry area.



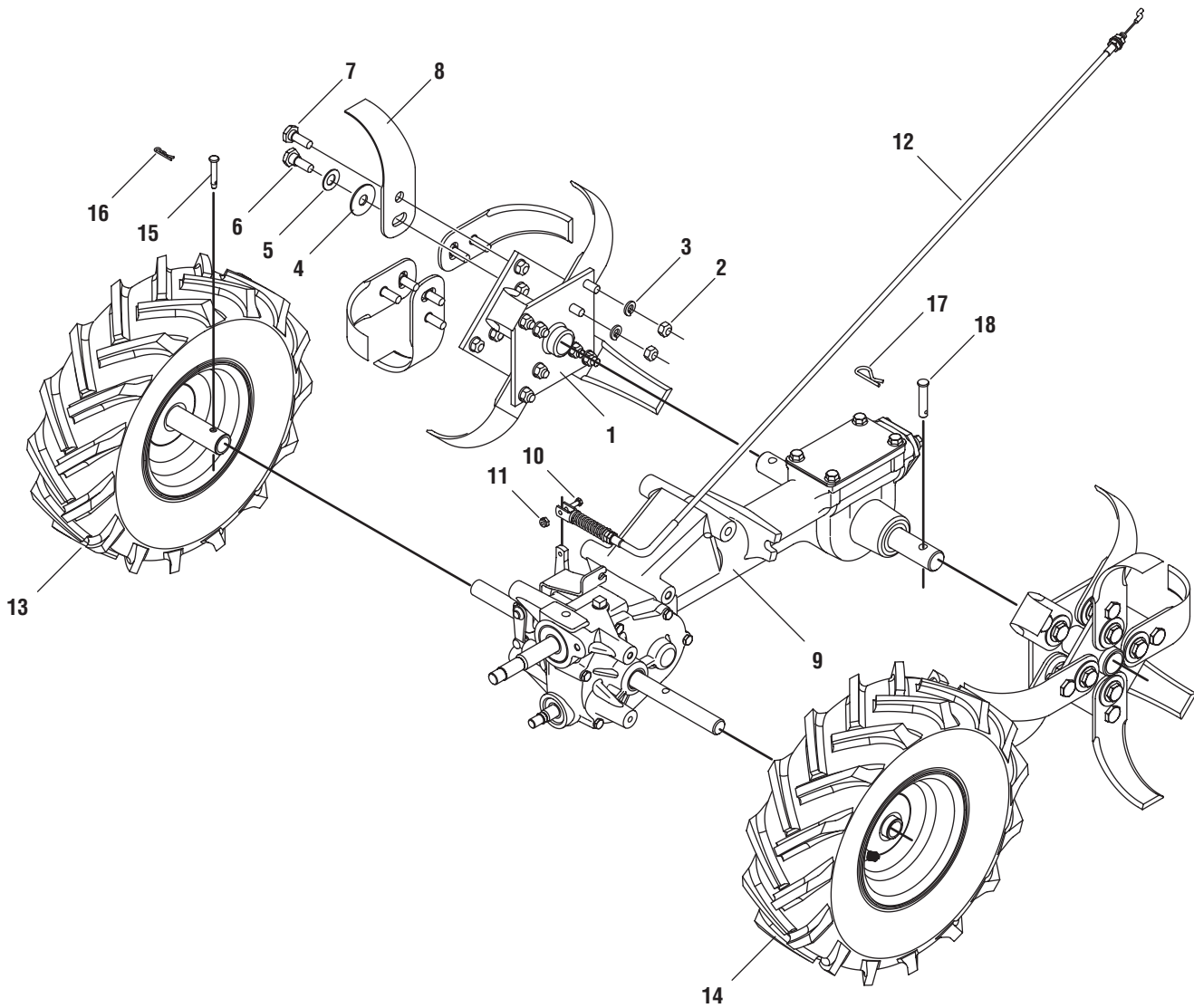
WARNING: Never store the machine or fuel container indoors where there is an open flame, spark or pilot light such as on water heater, furnace, clothes dryer or other gas appliance.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	CORRECTION
Engine does not start	<ol style="list-style-type: none"> 1. Spark plug wire disconnected. 2. Engine Throttle Control Lever incorrectly set. 3. Fuel tank empty. 4. Choke control in incorrect position. 5. Stale gasoline. 6. Dirty air filter. 7. Fouled or incorrectly gapped spark plug. 8. Carburetor out of adjustment. 9. Misadjusted throttle control. 10. Dirt or water in fuel tank. 	<ol style="list-style-type: none"> 1. Reconnect wire. (See Engine Owner's Manual) 2. Put lever in START position. 3. Add fuel. 4. See Page 11, Starting the Engine. 5. Drain fuel and add fresh fuel. 6. Clean or replace filter. 7. Inspect spark plug (see Engine Owner's Manual) 8. See Engine Service Dealer. 9. See Engine Service Dealer 10. See Engine Service Dealer.
Engine runs poorly.	<ol style="list-style-type: none"> 1. Fouled or incorrectly gapped spark plug. 2. Dirty air filter(s). 3. Carburetor out of adjustment. 4. Stale gasoline. 5. Dirt or water in fuel tank. 6. Engine cooling system clogged. 	<ol style="list-style-type: none"> 1. Inspect spark plug (see Engine Owner's Manual). 2. Clean or replace (see Engine Owner's Manual). 3. See Engine Service Dealer. 4. Replace with fresh gasoline. 5. See Engine Service Dealer. 6. Clean air cooling system (see Engine Owner's Manual).
Engine overheats.	<ol style="list-style-type: none"> 1. Engine cooling system clogged. 2. Carburetor out of adjustment. 3. Oil level is low. 	<ol style="list-style-type: none"> 1. Clean air cooling area (see Engine Owner's Manual). 2. See Engine Service Dealer. 3. Check oil level (see Engine Owner's Manual).
Engine does not shut off	<ol style="list-style-type: none"> 1. Misadjusted throttle control. 	<ol style="list-style-type: none"> 1. See Engine Owner's Manual or Engine Service Dealer.
Wheels and Tines will not turn	<ol style="list-style-type: none"> 1. Improper use of controls. 2. Worn, Broken or misadjusted belt(s). 3. Internal transmission wear or damage. 4. Bolt and key loose in transmission pulley. 	<ol style="list-style-type: none"> 1. Review Section 3 and Section 4. 2. Review Section 5 to adjust or replace belt. 3. Contact local dealer or the factory. 4. Tighten bolt. Check that key is in place.
Tines turn, but wheels don't.	<ol style="list-style-type: none"> 1. Wheel Drive Pins not in axle. 2. Internal transmission wear or damage. 3. Wheel drive belt slipping 4. Worn, Broken or misadjusted belt. 5. Wheel drive cable broken 	<ol style="list-style-type: none"> 1. Replace Wheel Drive Pins 2. Contact authorized service dealer 3. Review Section 5 to adjust wheel drive cable 4. Review Section 5 to adjust or replace belt. 5. Contact authorized service dealer.
Wheels Turn, but Tines Don't.	<ol style="list-style-type: none"> 1. Tine holder mounting hardware missing. 2. Internal transmission wear or damage. 	<ol style="list-style-type: none"> 1. Replace hardware. 2. Contact local Dealer or the Factory.
Poor tilling performance.	<ol style="list-style-type: none"> 1. Worn tines. 2. Improper Depth Regulator setting. 3. Belt(s) slipping. 	<ol style="list-style-type: none"> 1. See "Tines" (Section 5). 2. See "Tilling Tips & Techniques," Section 4. 3. See Section 5 to adjust tine cable(s) or replace belt.

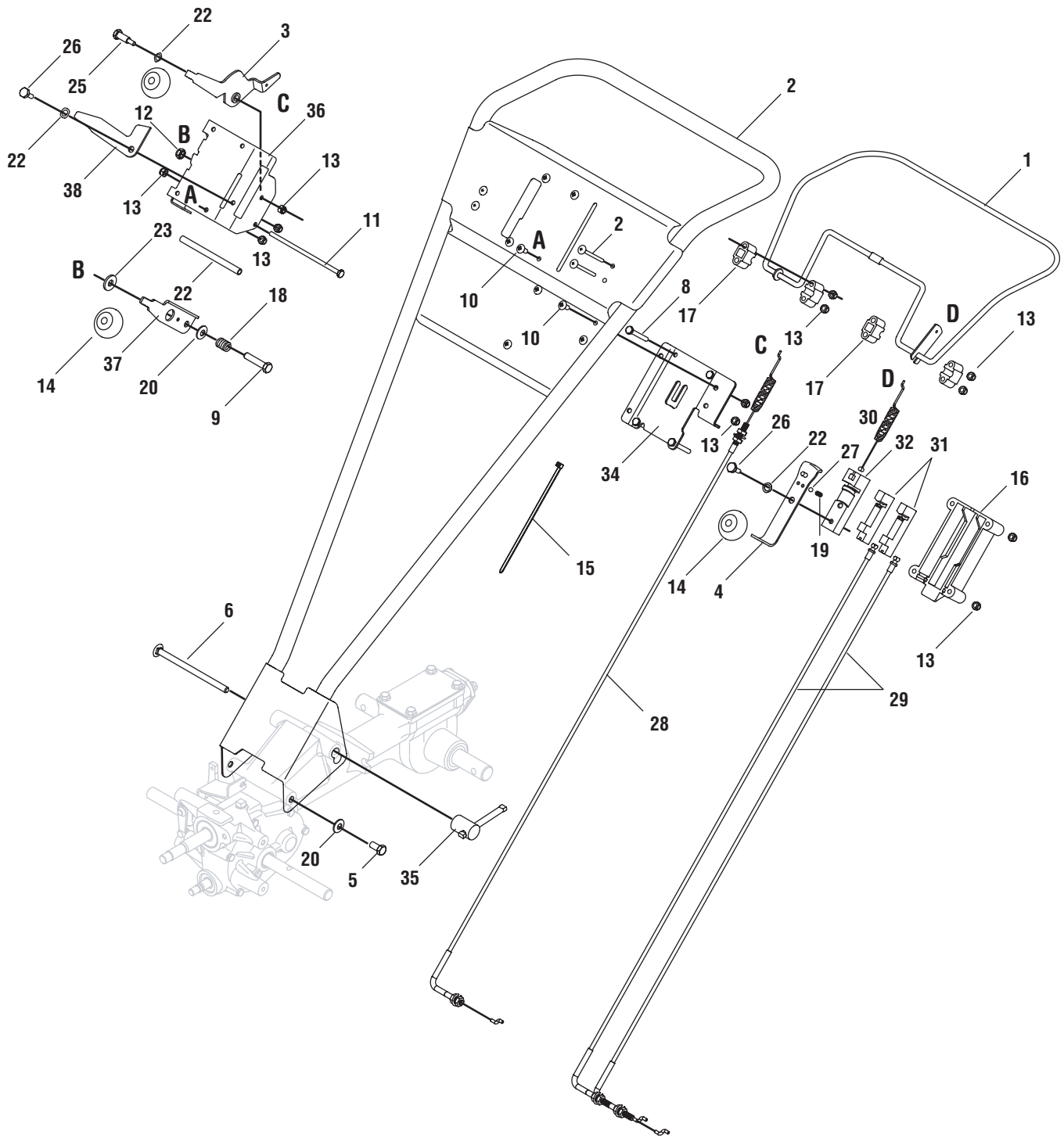
SECTION 7: MODEL 654J PARTS LIST

Wheels and Tines



REF NO.	PART NO.	DESCRIPTION	REF NO.	PART NO.	DESCRIPTION
1	642-04015	Adapter Assembly, Tine	10	710-1194	Screw, Machine, #10-24, 1.00, Gr5
2	712-3054	Nut, 3/8-24, Hex, Lock	11	712-0161	Nut, Hex Lock, #10-24, Gr2, Nylon
3	736-0169	Washer, Lock, 3/8, Regular Duty	12	746-04150	Cable, Shift, Wheel
4	736-0208	Washer, Flat, .51 x 1.5 x .07	13	634-0240	Wheel, Complete, 14 x 4.5 x 6, RH, Gray
5	736-0253	Washer, Bell, .525 x 1.00 x .050	14	634-0241	Wheel, Complete, 14 x 4.5 x 6, LH, Gray
6	738-0688	Screw, Shoulder 1/2 Dia x .325	15	711-1017	Pin, Clevis, .250 x 1.53
7	738-0689	Screw, Shoulder 1/2 Dia x .180, 3/8-2	16	714-0104	Pin, Cotter, .072 Dia. x 1.13 Lg
8	742-0305	Tine, Articulating	17	714-0149B	Internal Cotter Pin
9	618-04120	Transmission Assembly, Dual Direction	18	711-0415	Pin, Clevis, 3/8, 1.75

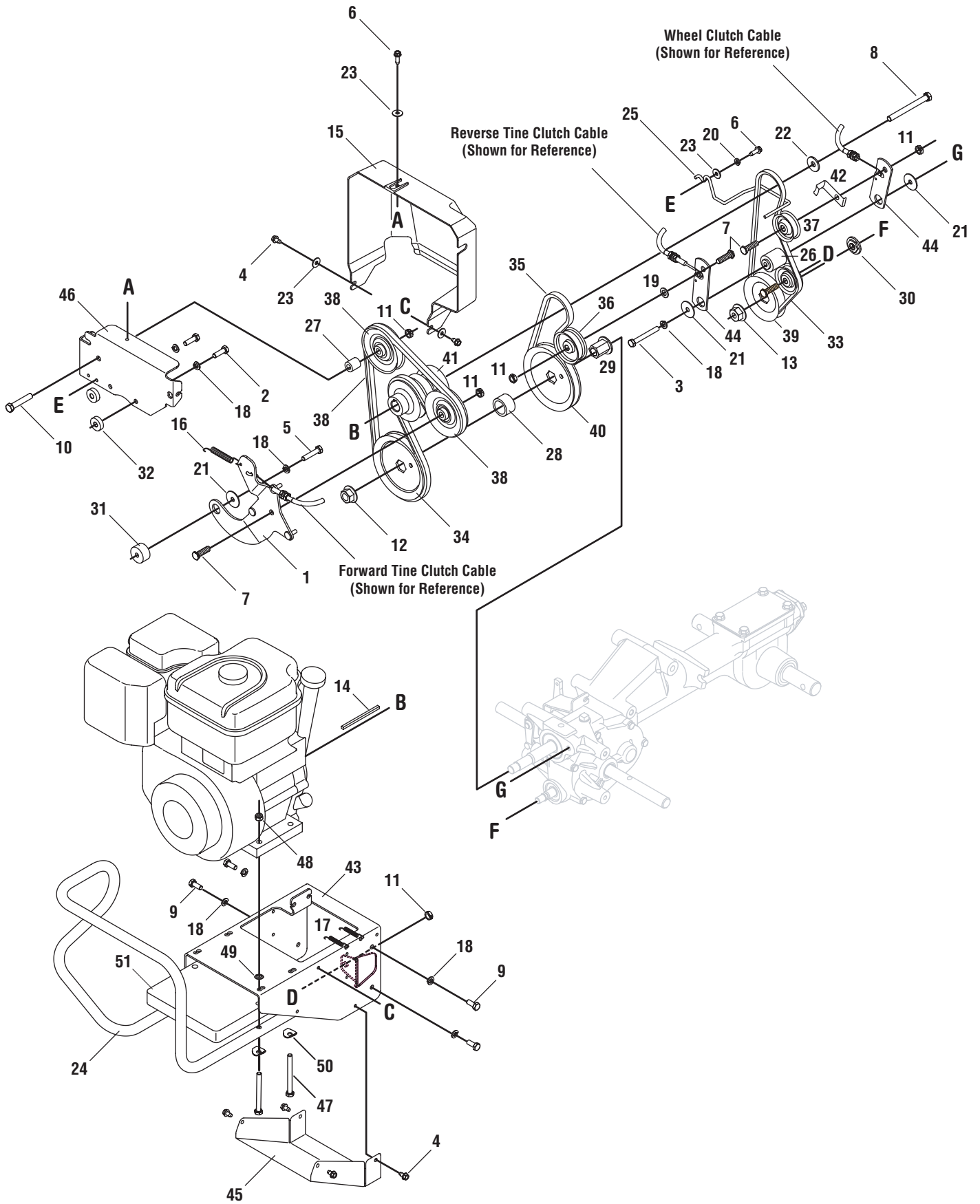
Handlebar and Controls



Handlebar and Controls

REF NO.	PART NO.	DESCRIPTION
1	647-04026	Bail Assembly, Control, Wheel
2	649-04014	Handle Assembly, Loop
3	686-04038	Lever Assembly, Control, Tine
4	686-04040	Lever Assembly, Pivot
5	710-3119	Hex Screw, 3/8-16, .75, Gr5
6	710-04198	Screw, Carriage, 3/8-16, 6.00, Gr5
7	710-04202	Screw, Machine, 1/4-20, 2.500
8	710-0501	Hex Screw, 1/4-20, 2.0, Gr5
9	710-0539	Hex Screw, 3/8-24, 1.75, Gr5
10	710-0946	Screw, Machine, 1/4-20, 0.625
11	710-1656	Hex Screw, 1/4-20, 6.00, Gr5
12	712-0116	Nut, Jam Lock, 3/8-24, Gr5, Nylon
13	712-0324	Nut, Hex Lock, 1/4-20, Gr8, Nylon
14	720-04039	Knob, Shift
15	725-0157	Cable, Tie, 3/16 x .05 x 7.4
16	731-04616	Box, Control, Select, Tine
17	731-04644	Block, Mounting, Bail
18	732-0193	Spring, Compression, .39x.60 x .88 Lg
19	732-0590A	Spring, Compression
20	736-0105	Washer, Bell, .375 x .870 x .063
22	736-3012	Washer, Wave, .390 x .625 x .016
23	736-3052	Washer, Flat, .406 x 1.00 x .105
25	738-04072	Screw, Shoulder, .373 x .830, 1/4-20
26	738-04088	Screw, Shoulder, .373 x .180 x 1/4-20
27	741-0862	Ball, Detent, .250
28	746-04098	Cable, Clutch, Drive, Wheel
29	746-04099	Cable, Clutch, Drive, Tine
30	746-04100	Cable, Engagement, Tine
31	746-04107	Block, Control, Select, Tine
32	746-04108	Block, Control, Engage, Tine
33	750-04226	Spacer, .270 x .375 x 5.00 Lg
34	786-04162	Bracket, Mounting, Control
35	786-04199	Crank, Adjustment, Handle
36	786-04212	Bracket, Mounting, Control
37	786-04213	Lever, Shift
38	786-04214	Bracket, Pivot, Interlock

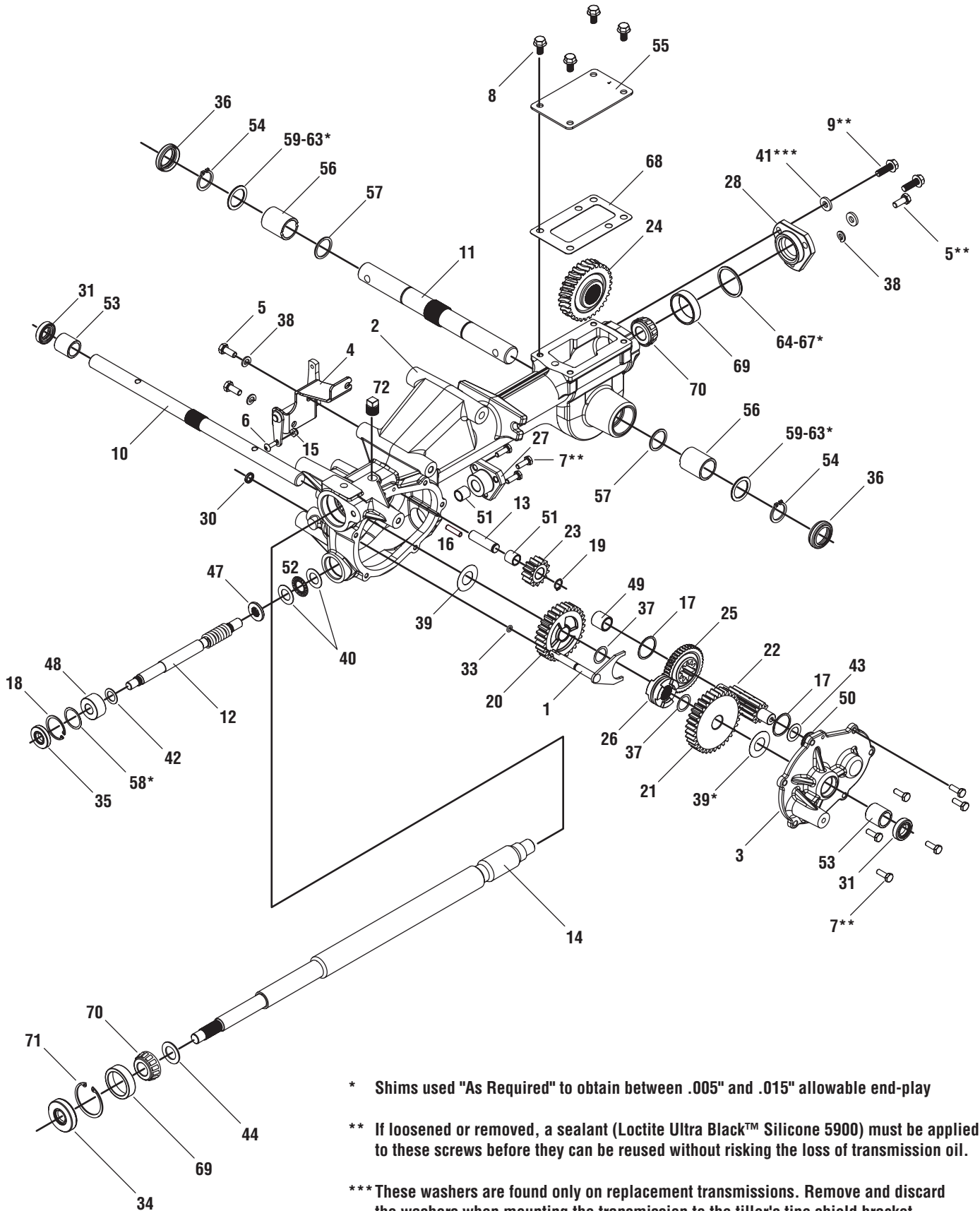
Drive System



Drive System

REF NO.	PART NO.	DESCRIPTION	REF NO.	PART NO.	DESCRIPTION
1	686-04034	Bracket Assembly, Clutch	27	750-04223	Spacer, .390 x .750 x .812
2	710-0117	Hex Screw, 5/16-24, 1.00, Gr5	28	750-04225	Spacer, 1.030 x 1.375 x .830 Lg
3	710-0378	Hex Screw, 5/16-18, 2.50, Gr5	29	750-04258	Hub, Pulley, Input, 5/8
4	710-0599	Screw, Self-tapping, 1/4-20, 0.500	30	750-04259	Hub, Pulley, Input, 1/2
5	710-0624	Hex Screw, 5/16-24, 1.50, Gr5	31	750-04261	Spacer, .330 x 1.250 x .845
6	710-0642	Screw, Self-tapping, 1/4-20, 0.750	32	750-0943	Spacer .33 x 1.0 OD
7	710-0723	Hex Screw, 3/8-16, 1.25, Gr5	33	754-0346	V-belt
8	710-0902	Hex Screw, 3/8-24, 3.75, Gr5	34	754-04036	Belt
9	710-3008	Hex Screw, 5/16-18, .75, Gr5	35	754-04056	Belt
10	710-3144	Hex Screw, 3/8-16, 2.00, Gr5	36	756-0137	Pulley, Idler, Flat w/ Flange 2.25 OD
11	712-0266	Nut, Jam Lock, 3/8-16, Gr2	37	756-0313	Pulley, Idler, Flat 1.88 OD
12	712-0700	Nut, Flange, 9/16-18, Gr2	38	756-0399	Pulley, Idler, V-type 3.5 Dia
13	712-0702	Nut, Flange, 7/16-20, Gr2	39	756-04081	Pulley, 3l, 3.088 Eff Dia
14	714-04032	Key, Square, .1875 x 3.625	40	756-04082	Pulley, 4l, 5.0 Eff Dia
15	731-04590	Cover, Belt	41	756-04090	Pulley, Engine, 3 Belt
16	732-0320	Spring, Extension, .38 x 3.25	42	786-0149	Keeper, Belt, Idler
17	732-0545	Extension Spring .35 x 1.14	43	786-04177	Frame, Engine
18	736-0119	Washer, Lock, 5/16, Regular Duty	44	786-04178	Bracket, Clutch, Forward
19	736-0185	Washer, Flat, .375 x .738 x .063	45	786-04180	Cover, Bottom, Frame, Engine
20	736-0329	Washer, Lock, 1/4, Regular Duty	46	786-04182	Bracket, Mounting, Cover, Belt
21	736-0362	Washer, Flat, .330 x 1.25 x .06, Ht	47	710-3056	Hex Screw, 5/16-18, 3.25, Gr5
22	736-0452	Washer, Bell, .396 x 1.140 x .095	48	712-0429	Nut, Hex Lock, 5/16-18, Gr5, Nylon
23	736-3090	Washer, Flat, .260 x .720 x .060	49	726-0201	Nut, Speed, .3125 ID
24	1918749	Bumper	50	736-0451	Saddle Washer, 320 x .93 x .060
25	747-04191	Keeper, Belt	51	786-04223	Weight
26	750-04221	Spacer, .330 x 1.25 x 1.605			

Transmission



* Shims used "As Required" to obtain between .005" and .015" allowable end-play

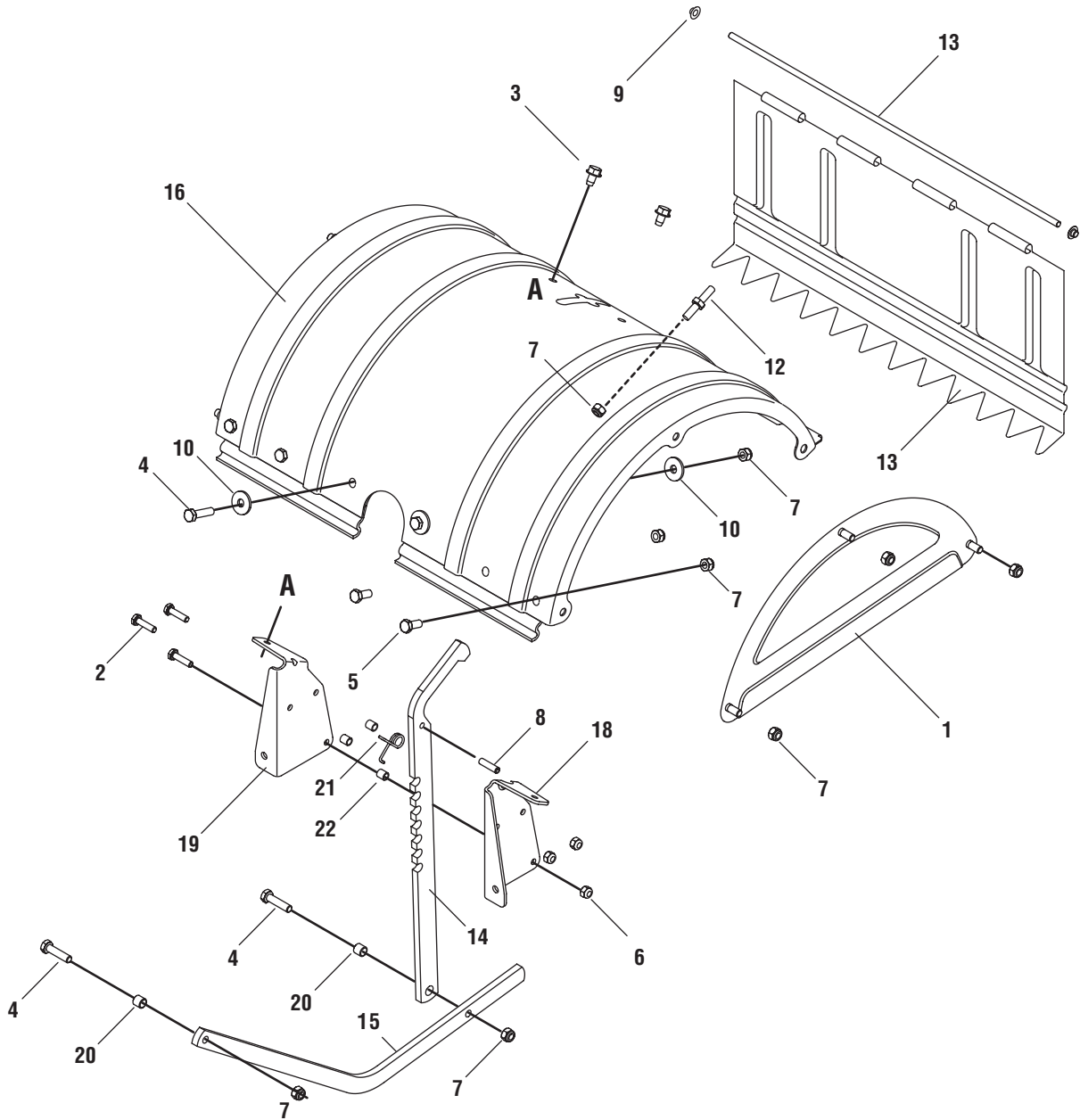
** If loosened or removed, a sealant (Loctite Ultra Black™ Silicone 5900) must be applied to these screws before they can be reused without risking the loss of transmission oil.

***These washers are found only on replacement transmissions. Remove and discard the washers when mounting the transmission to the tiller's tine shield bracket.

Transmission

REF NO.	PART NO.	DESCRIPTION	REF NO.	PART NO.	DESCRIPTION
1	611-04033	Shaft Assembly, Detent	38	736-0119	Washer, Lock, 5/16, Regular Duty
2	619-04069	Housing, Transmission	39	736-0492	Washer, Flat, .760 x 1.500 x .010
3	619-04070	Cover, Housing, Transmission	40	736-0419	Washer, Flat, .62 x 1.12 x .03
4	686-04039A	Link Assembly, Shift	41	736-3008	Washer, Flat, .344 x .750 x .120
5	710-1880	Hex Screw, 5/16-18, .75, Gr5, Patch	42	736-04102	Washer, Flat, .5685 x .875 x .04
6	710-0425	Screw, Machine, #10-24, 0.625	43	736-0495	Washer, Thrust, 1.00 x .632 x .025
7	710-3015	Hex Screw, 1/4-20, .75, Gr5	44	736-0617	Washer, Thrust, .750 x 1.250 x .0615
8	710-04049	Flange Screw, 5/16-18, .625, Gr5	45	737-0356	Grease, Seal
9	710-04048	Flange Screw, 5/16-18, 1.0, Gr5	46	737-0353	Oil, 85w 140
10	711-04261	Shaft, Wheel, .750 Dia x 15.46 Lg	47	741-04077	Bearing, Hub
11	711-04263	Shaft, Tiller, Tine	48	741-04075	Bearing, 9/16 x 1.25 x .650 Lg
12	711-04178	Shaft, Worm, Drive	49	741-0973	Bearing, Sleeve, .627 x .81 x .80
13	711-04177	Shaft, Idler, .500 Dia x 1.823 Lg	50	741-0336	Bearing, Flange, 5/8 x 3/4 x 3/4
14	711-04168	Shaft, Drive	51	741-0678	Bearing, Sleeve, .503 x .626 x .600
15	712-0161	Nut, Hex Lock, #10-24, Gr2, Nylon	52	741-0469	Bearing, Thrust, Roller .625x1.125x.078
16	715-0221	Pin, Dowel, 3/16 x 3/4	53	741-0340	Bearing, Sleeve, .75 x 1.00 x 1.00
17	716-04026	Ring, Retaining, External, 1.188 Dia Shaft	54	1909950	Ring, Heavy, External, .984 ID
18	716-04027	Ring, Retaining, Int, 1.25 Dia Bore	55	1918377	Housing, Cover
19	716-0865	Ring, Snap, .500	56	GW-1086	Bushing, 1.005 x 1.25 x 1.5
20	717-04088	Gear, Spur, 30t	57	GW-1132-2	Washer, Flat, 1.015 x 1.234 x .062
21	717-04084	Gear, Spur, 34t	58	GW-1132-3	Washer, Flat, 1.015 x 1.234 x .010
22	717-04083	Gear, Spur, 10t	59	GW-1166-1	Washer, Flat, 1.015 x 1.375 x .062
23	717-04087	Gear, Spur, 13t	60	GW-1166-2	Washer, Flat, 1.015 x 1.375 x .030
24	717-04093	Gear, Worm, 30t	61	GW-1166-3	Washer, Flat, 1.015 x 1.375 x .015
25	717-04090	Gear, Worm, 40t	62	GW-1166-4	Washer, Flat, 1.015 x 1.375 x .010
26	718-04074	Collar, Clutch	63	GW-1166-5	Washer, Flat, 1.015 x 1.375 x .005
27	718-04065	Cover, Bearing, Rear	64	GW-1224-1	Washer, Flat, 1.50 x 1.75 x .010
28	718-04008	Cover, Bearing, Rear	65	GW-1224-2	Washer, Flat, 1.50 x 1.75 x .030
30	721-0212	Oil Seal x .375	66	GW-1224-3	Washer, Flat, 1.50 x 1.75 x .005
31	721-04073	Seal, Oil, .750 Shaft x 1.125 Bore	67	GW-1224-4	Washer, Flat, 1.50 x 1.75 x .062
33	721-04069	O-Ring, 1/4 x 3/8 x .07	68	GW-50032	Gasket, Gear Housing
34	721-04065	Seal, .750 Shaft x 1.783 Bore x .375	69	GW-9400	Cup, Bearing
35	721-04064	Seal, .563 Shaft x 1.25 Bore x .25	70	GW-9401	Bearing, Cone
36	721-04036	Seal, Oil, 1.00 Shaft x 1.500 Bore	71	GW-9517	Ring, Retaining, Internal
37	736-04153	Washer, Flat, .751 x .975 x .01	72	GW-9727	Plug, Pipe, 3/8

Tine Shield



REF NO.	PART NO.	Description	REF NO.	PART NO.	Description
1	686-0044A	Cover Assembly, End	12	747-0432	Rod, Tiller Flap
2	710-0597	Hex Screw, 1/4-20, 1.00, Gr5	13	786-0113	Shield, Tine, Rear
3	710-0604	Screw, Self-tapping, 5/16-18, 0.625,	14	786-04171	Bar, Depth
4	710-0874	Hex Screw, 5/16-18, 1.25, Gr5	15	786-04172	Bar, Drag, Depth
5	710-3039	Hex Screw, 5/16-18, .50, Gr5	16	786-04179	Shield, Tine
6	712-0324	Nut, Hex Lock, 1/4-20, Gr8, Nylon	17	786-04184	Bracket, Shield, Tine
7	712-0429	Nut, Hex Lock, 5/16-18, Gr5, Nylon	18	786-04215	Bracket, Mounting, Bar, Depth, LH
8	715-0108	Pin, Spring, 1/4 Dia x 1.00 Lg	19	786-04216	Bracket, Mounting, Bar, Depth, RH
9	726-0106	Nut, Speed, Cap 1/4 Rod	20	GW-55088	Bush, .438 x .323 x .400
10	736-3089	Washer, Flat, .345 x 1.00 x .100	21	GW-9384	Spring Torsion
11	738-0849	Screw, Hex, 5/16-18 x .75	22	GW-9534	Spacer, .350 x .268 x .375

NOTES

TROY-BILT TILLER LIFETIME LIMITED WARRANTY

WHAT PRODUCT IS COVERED All Troy-Bilt branded rear tine walk-behind tillers with gear drive transmissions. This warranty begins on the date of purchase and is warranted by Troy-Bilt LLC for the life of the tiller, to the original purchaser only.

WHAT IS COVERED BY THIS WARRANTY Troy-Bilt LLC will, at its option, repair or replace any part found to be defective in material or workmanship without charge for parts and labor

This limited lifetime warranty also applies to non-powered attachments and accessories. Powered attachments and accessories are warranted separately by their manufacturers. Refer to the applicable manufacturer's warranty on these items for terms and conditions.

WHAT IS NOT COVERED BY THIS WARRANTY This warranty does not apply to parts that have been damaged by accident, alteration, misuse, abuse, neglect, improper maintenance, vandalism, theft, fire, water, or damage because of peril or other natural disaster.

The following items are not covered after the first year of this residential use limited warranty: belts, batteries, bushings, seals, tines, tires, wheels, paint, appearance items, and similar items that are normally replaced through periodic maintenance.

Charges for pick-up, delivery, and service calls are not covered by this warranty.

Service completed by someone other than an authorized service dealer is not covered by this warranty.

Parts that are not genuine Troy-Bilt LLC service parts are not covered by this warranty.

The engine is warranted separately by the engine manufacturer. Refer to the engine manufacturer's warranty for terms and conditions.

LIMITED COMMERCIAL USE WARRANTY If used for commercial, institutional, industrial, rental, or demonstrator purposes, the warranty on the tiller is limited in duration to 90 days from the date of purchase.

This warranty does not apply to parts that have been damaged by accident, alteration, misuse, abuse, neglect, improper maintenance, vandalism, theft, fire, water, or damage because of peril or other natural disaster.

HOW TO OBTAIN SERVICE Warranty service is available, **with proof of purchase**, through your local authorized service dealer. To locate a dealer in your area, consult your Yellow Pages, or contact Troy-Bilt LLC at P.O. Box 361131, Cleveland, Ohio 44136-0019, 1-866-840-6483, or log on to our Web site at www.troybilt.com.

The provisions set forth in this warranty provide the sole and exclusive remedy arising from the sale. Troy-Bilt LLC shall not be liable for any incidental or consequential damage or expense of any kind, including but not limited to cost of equipment rental, loss of profits, or costs of hiring services to perform tasks normally performed by the equipment.

Any implied warranties, including any implied warranty of merchantability or fitness for a particular purpose, shall be limited in duration to the period of ownership by the original purchaser (and a maximum of 90 days from the date of sale if the tiller is purchased for commercial or other non-residential use).

Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above exclusions or limitations may not apply to you.

This limited warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

For customer assistance, contact your nearest authorized dealer, or contact us at:

TROY-BILT LLC, P.O. Box 361131, Cleveland, Ohio 44136-0019, 1-866-840-6483

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