



Form No. 3379-664 Rev B

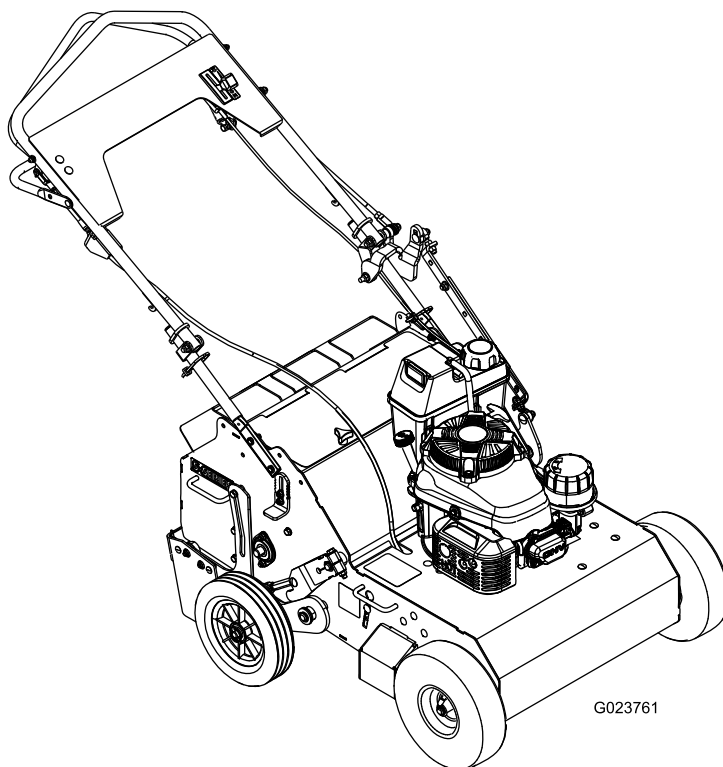
Count on it.

Operator's Manual

21in Walk-Behind Aerator

Model No. 23515—Serial No. 314000001 and Up

Model No. 33515—Serial No. 314000001 and Up



This spark ignition system complies with Canadian ICES-002.

Important: This engine is not equipped with a spark arrester muffler. It is a violation of California Public Resource Code Section 4442 to use or operate the engine on any forest-covered, brush-covered, or grass-covered land. Other states or federal areas may have similar laws.

⚠️ WARNING

CALIFORNIA
Proposition 65 Warning

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

Introduction

This aerator, which is controlled by a walking operator, is intended to be used by trained operators in residential and commercial applications. It is primarily designed for aerating small to mid-sized areas of well-maintained lawns on residential grounds, parks, sports fields, and on commercial grounds.

Read this information carefully to learn how to operate and maintain your product properly and to avoid injury and product damage. You are responsible for operating the product properly and safely.

You may contact Toro directly at www.Toro.com for product and accessory information, help finding a dealer, or to register your product.

Whenever you need service, genuine Toro parts, or additional information, contact an Authorized Service Dealer or Toro Customer Service and have the model and serial numbers of your product ready. [Figure 1](#) illustrates the location of the model and serial numbers on the product. Write the numbers in the space provided.

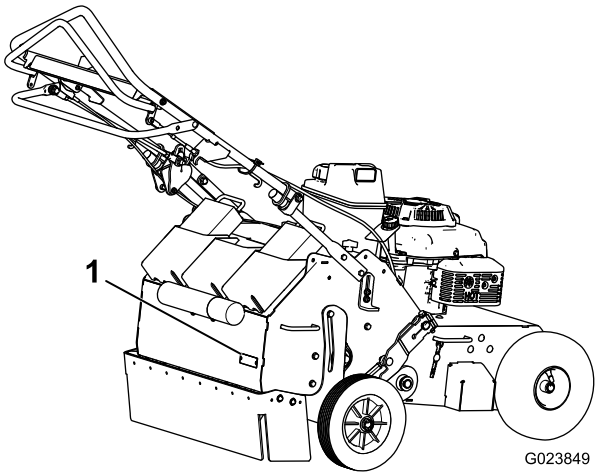


Figure 1

- 1. Location of the model and serial numbers

Model No. _____

Serial No. _____

This manual identifies potential hazards and has safety messages identified by the safety alert symbol ([Figure 2](#)), which signals a hazard that may cause serious injury or death if you do not follow the recommended precautions.



Figure 2

- 1. Safety alert symbol

This manual uses 2 words to highlight information. **Important** calls attention to special mechanical information and **Note** emphasizes general information worthy of special attention.

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Safety

Improper use or maintenance by the operator or owner can result in injury. To reduce the potential for injury, comply with these safety instructions and always pay attention to the safety alert symbol, which means **Caution**, **Warning**, or **Danger**—personal safety instruction. Failure to comply with the instruction may result in personal injury or death.

Safe Operating Practices

The following instructions are adapted from the ANSI B71.4—2004 and B71.8—2004 standard.

Training

- Read the *Operator's Manual* and other training material. If the operator(s) or mechanic(s) cannot read English it is the owner's responsibility to explain this material to them.
- Become familiar with the safe operation of the equipment, operator controls, and safety signs.
- All operators and mechanics should be trained. The owner is responsible for training the users.
- Never let children or untrained people operate or service the equipment. Local regulations may restrict the age of the operator.
- The owner/user can prevent and is responsible for accidents or injuries occurring to himself or herself, other people or property.

Preparation

- Evaluate the terrain to determine what accessories and attachments are needed to properly and safely perform the job. Only use accessories and attachments approved by the manufacturer.
- Wear appropriate clothing including safety glasses and hearing protection. Long hair, loose clothing, or jewelry may get tangled in moving parts.
- Inspect the area where the equipment is to be used and remove all objects such as rocks, toys, and wire which can be contacted by the aerator.
- Use extra care when handling gasoline and other fuels. They are flammable and vapors are explosive.
 - Use only an approved container.
 - Never remove the gas cap or add fuel with the engine running.
 - Allow the engine to cool before refueling.
 - Do not smoke.

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– Never refuel or drain the aerator indoors.

- Check that the controls, safety switches, and shields are attached and functioning properly. Do not operate unless they are functioning properly.

Operation

- Never run an engine in an enclosed area.
- Only operate in good light, keeping away from holes and hidden hazards.
- Be sure all drives are in neutral before starting engine.
- Never operate without the shields, covers, or other guards securely in place. Be sure all interlocks are functioning properly.
- Do not change the engine governor setting or overspeed the engine.
- Raise the tines, stop the machine, and stop the engine before leaving the operator's position for any reason.
- Stop the equipment and inspect the tines after striking an object or if an abnormal vibration occurs. Make necessary repairs before resuming operation.
- Keep hands and feet away from the tine area.
- Be alert, slow down, and use caution when making turns. Look behind and to the side before changing directions.
- Slow down and use caution when crossing roads and sidewalks.
- Do not operate the aerator under the influence of alcohol or drugs.
- Lightning can cause severe injury or death. If lightning is seen or thunder is heard in the area, do not operate the machine; seek shelter.
- Use extreme care when loading or unloading the aerator into a trailer or truck.
- Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.
- Always be aware of obstacles that may be in the area of operation. Plan your aeration path to avoid contact with any obstacle by you or the machine.

Slope Operation

- Do not make sudden turns or rapid speed changes.
- Reduce speed and use extreme caution on slopes.
- Remove or mark obstacles such as rocks, tree limbs, etc. from the operating area. Tall grass can hide obstacles.

Maintenance and Storage

- Wait for all movement to stop before adjusting, cleaning, or repairing. Raise the tines, stop the machine, stop the engine, and disconnect the spark plug wire.
- Clean grass and debris from the tines, drives, mufflers, and engine to help prevent fires. Clean up oil or fuel spillage.
- Let the engine cool before storing and do not store near flame.
- Shut off the fuel while storing or transporting on trailers. Do not store fuel near flames or drain indoors.
- Park the aerator on level, hard ground. Never allow untrained personnel to service it.
- Use jack stands or safety latches to support the machine when working under it.
- Remove the spark plug wire before making any repairs.
- Keep hands and feet away from moving parts. If possible, do not make adjustments with the engine running.
- Keep all parts in good working condition and all hardware tightened. Replace all worn or damaged decals.
- Use only Toro-approved attachments. The warranty may be voided if the machine is used with unapproved attachments.

Slope Indicator



Figure 3

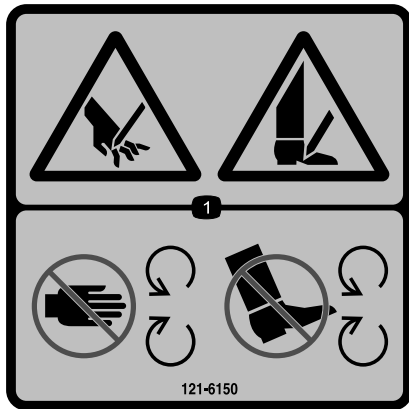
This page may be copied for personal use.

1. The maximum slope you can safely operate the machine on is **20 degrees**. Use the slope chart to determine the degree of slope of hills before operating. **Do not operate this machine on a slope greater than 20 degrees.** Fold along the appropriate line to match the recommended slope.
2. Align this edge with a vertical surface, a tree, building, fence pole, etc.
3. Example of how to compare slope with folded edge.

Safety and Instructional Decals



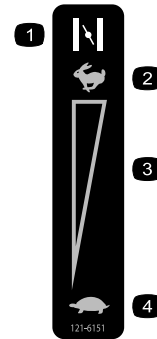
Safety decals and instructions are easily visible to the operator and are located near any area of potential danger. Replace any decal that is damaged or lost.



121-6150

1. Cutting hazard of hand and foot—stay away from moving parts.

decal121-6150



121-6151

decal121-6151

1. Choke—on
2. Throttle—fast
3. Continuous variable setting
4. Throttle—slow



119-0217

decal119-0217

1. Warning—stop the engine; stay away from moving parts; keep all guards and shields in place.

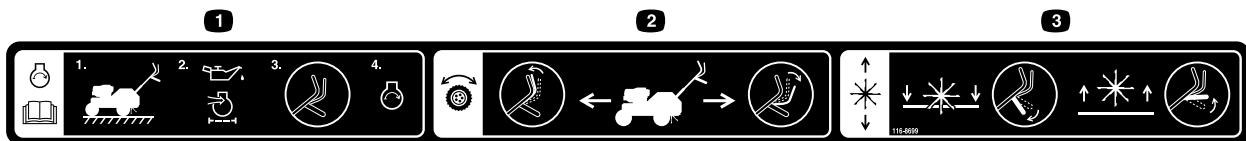
CALIFORNIA SPARK ARRESTER WARNING

Operation of this equipment may create sparks that can start fires around dry vegetation. A spark arrester may be required. The operator should contact local fire agencies for laws or regulations relating to fire prevention requirements.

117-2718

117-2718

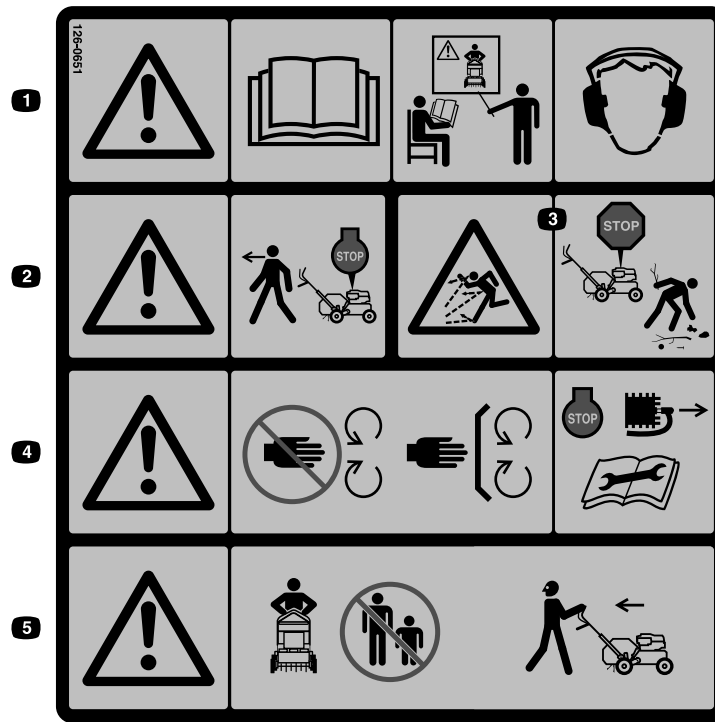
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116-8699

decal116-8699

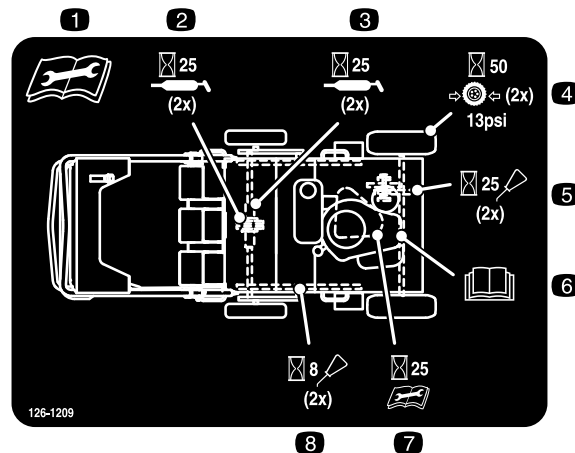
1. To start the engine, read the *Operator's Manual*—(1) Park the machine on a level surface (2) Fill the engine with oil (3) Move the control bars to a neutral position (4) Start the engine.
2. Traction drive—move the traction control lever forward to move the machine forward; move the traction control lever backward to move the machine backward.
3. Raising/Lowering the tines—push the control lever down to lower the tines; pull the control lever up to raise the tines.



decal126-0651

126-0651

1. Warning—read the *Operator's Manual*. Do not operate this machine unless you are trained. Wear hearing protection.
2. Warning—disengage the tines and stop the engine before leaving the operator's position.
3. Thrown object hazard—pick up objects before operating.
4. Warning—stay away from moving parts; keep all guards in place. Stop the engine and remove the spark plug before adjusting, servicing, or cleaning.
5. Warning—do not operate when people and pets are in the area. Look behind you when backing up.



decal126-1209

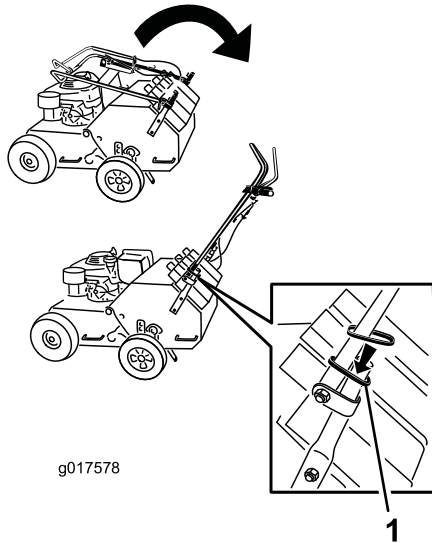
126-1209

1. Read and understand the operator's manual before servicing this machine
2. Grease tine shaft bearings (2x) every 25 hours
3. Grease tine assembly idlers (2x) every 25 hours
4. Check tire pressure - 13 psi (2x) every 50 hours
5. Clean and oil chains (2x) every 25 hours
6. See engine owner's manual for service
7. Check transmission belt drive tension every 25 hours
8. Clean and oil chains and check chain tension (2x) every 8 hours

Setup

Unfolding the Handle

1. Raise the handle to the operating position.

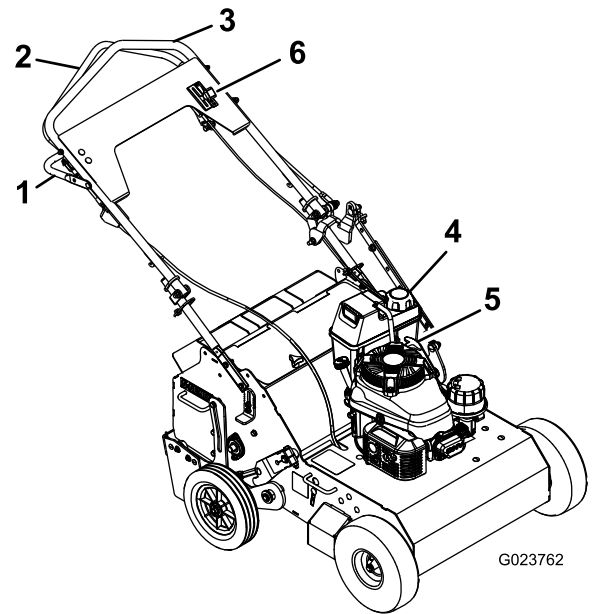


2. Slide the oval locking rings down each side of the upper handle over the lower handle, locking the handle sections together.

Checking the Oil Level

Before operating, check the engine oil level to ensure that it has enough oil. Refer to [Checking the Engine Oil Level \(page 10\)](#), for oil specifications and instructions.

Product Overview



- | | |
|---------------------------|-------------------|
| 1. Tine-control lever | 4. Fuel tank |
| 2. Traction-control lever | 5. Recoil starter |
| 3. Handle | 6. Throttle lever |

Controls

Recoil Starter

Pull the recoil starter handle to start engine ([Figure 5](#)).

Fuel Shut-off Valve

Close the fuel shut-off valve when transporting or storing the machine.

Throttle Lever

Before starting a cold engine, move the throttle lever ([Figure 5](#)) forward to the Choke position. After the engine starts, pull the throttle lever back to the Fast position.

Note: A warm engine requires little or no choking.

Traction-Control Lever

The traction-control lever controls the forward, reverse, and neutral actions of the machine. Refer to [Driving the Machine \(page 12\)](#) for more information.

Tine-Control Lever

The tine-control lever lifts the rear wheels, causing the rear of the machine to be supported on the aerating

tines. Push the tine control lever down to lift the wheels and drop the tines. Pull it up to lower the wheels and raise the tines out of the ground.

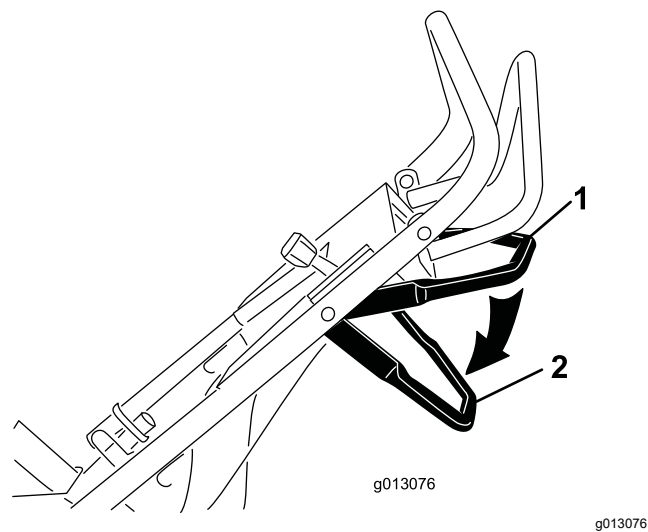


Figure 6

1. Tine-control lever—raised position 2. Tine-control lever—lowered position

Specifications

Length (handle in lowest position)	147 cm (58 inches)
Length (handle in middle position)	150 cm (59 inches)
Length (handle in highest position)	155 cm (61 inches)
Length (with handle stored)	107 cm (42 inches)
Width	79 cm (31 inches)
Height (handle in lowest position)	122 cm (48 inches)
Height (handle in middle position)	127 cm (50 inches)
Height (handle in highest position)	132 cm (52 inches)
Height (with handle stored)	86 cm (34 inches)
Weight (as shipped with 2 weights)	172.4 kg (380 lb)

Attachments/Accessories

A selection of Toro approved attachments and accessories is available for use with the machine to enhance and expand its capabilities. Contact your Authorized Service Dealer or Distributor or go to www.Toro.com for a list of all approved attachments and accessories.

Operation

Note: Determine the left and right sides of the machine from the normal operating position.

Adjusting the Handle

The height of the handle can be adjusted for comfortable operation. Stand behind the handle to determine the appropriate height settings.

1. To adjust the handle height, position the hardware into one of three sets of holes on each side of the mainframe as shown in Figure 7, Figure 8, and Figure 9.

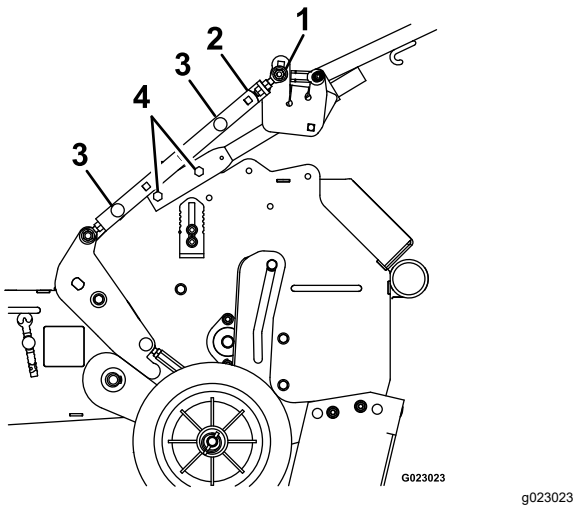


Figure 7

Front handle position — Lowest height

1. Trunnion bracket—bottom 3. Mounting bolt location hole
2. Lift link straps 4. Handle hardware—front holes

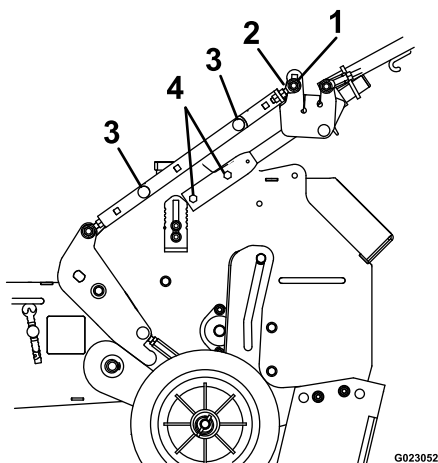


Figure 8

Middle handle position

- | | |
|---------------------------------|---------------------------------|
| 1. Trunnion bracket—bottom hole | 3. Mounting bolt location hole |
| 2. Lift link straps | 4. Handle hardware—middle holes |

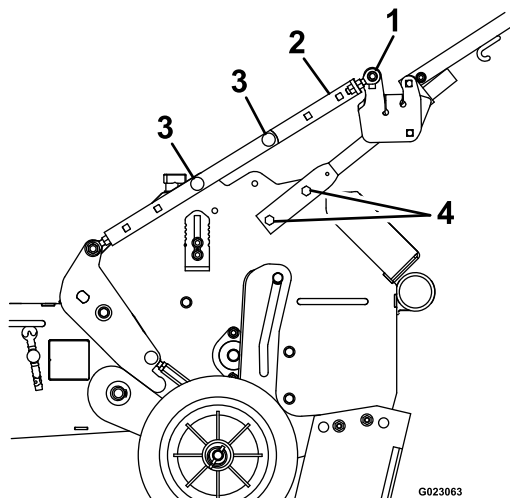


Figure 9

Rear handle position — Highest height

- | | |
|------------------------------|--------------------------------|
| 1. Trunnion bracket—top hole | 3. Mounting bolt location hole |
| 2. Lift link straps | 4. Handle hardware—rear holes |

2. Secure the handle with both mounting bolts.
3. Adjust the tine-control lever; refer to [Adjusting the Tine-Control Lever \(page 14\)](#).

Checking the Engine Oil Level

Service Interval: Before each use or daily

The engine crankcase can hold 0.55 liters (20 ounces) of oil. Use only high-quality SAE 10W-30 weight

detergent oil that has the American Petroleum Institute (API) service classification SH, SJ, SI or higher.

Note: When the crankcase is empty, pour about 3/4 of the crankcase capacity of oil in the crankcase, then follow the procedure in this section.

1. Move the machine to a level surface.
2. Clean around the dipstick ([Figure 10](#)).

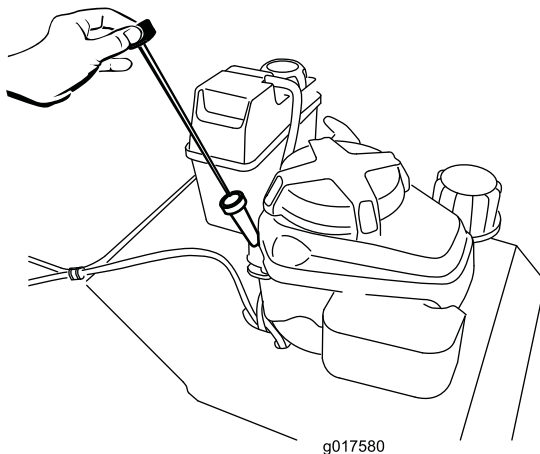


Figure 10

3. Remove the dipstick by rotating the cap counterclockwise and pulling it out.
 4. Wipe the dipstick clean with a clean cloth.
 5. Insert the dipstick into the filler neck, but **do not rotate the cap clockwise to secure it**, then remove it.
 6. Read the oil level on the dipstick.
 7. If the oil level reading is below the lower limit mark on the dipstick, remove the dipstick and **slowly** pour only enough oil into the filler hole to raise the oil level to the upper limit mark on the dipstick.
- Important:** Do not overfill the crankcase with oil and run the engine; engine damage will result. Drain the excess oil until the oil level reaches the upper limit mark on the dipstick.
8. Insert the dipstick into the filler neck and rotate the cap clockwise until it is tight.

Filling the Fuel Tank with Gasoline

- **Fuel tank capacity:** 3.76 L (0.99 US gallon)
- **Recommended Fuel:**
 - For best results, use only clean, fresh (less than 30 days old), unleaded gasoline with an octane rating of 87 or higher ((R+M)/2 rating method).
 - **Ethanol:** Gasoline with up to 10% ethanol (gasohol) or 15% MTBE (methyl tertiary butyl ether) by volume is acceptable. Ethanol and MTBE are not the same. Gasoline with 15% ethanol (E15) by volume is not approved for use. **Never use gasoline that contains more than 10% ethanol by volume**, such as E15 (contains 15% ethanol), E20 (contains 20% ethanol), or E85 (contains up to 85% ethanol). Using unapproved gasoline may cause performance problems and/or engine damage which may not be covered under warranty.
 - **Do not** use gasoline containing methanol.
 - **Do not** store fuel either in the fuel tank or fuel containers over the winter unless a fuel stabilizer is used.
 - **Do not** add oil to gasoline.

Important: Do not use fuel additives other than a fuel stabilizer/conditioner. Do not use fuel stabilizers with an alcohol base such as ethanol, methanol, or isopropanol.

⚠ DANGER

In certain conditions, gasoline is extremely flammable and highly explosive. A fire or explosion from gasoline can burn you and others and can damage property.

- Fill the fuel tank outdoors, in an open area, and when the engine is cold. Wipe up any gasoline that spills.
- Do not fill the fuel tank completely full. Add gasoline to the fuel tank until the level is 6 to 13 mm (1/4 to 1/2 in) below the bottom of the filler neck. This empty space in the tank allows the gasoline to expand.
- Never smoke when handling gasoline, and stay away from an open flame or where a spark may ignite the gasoline fumes.
- Store gasoline in an approved fuel container and keep it out of the reach of children.
- Never buy more than a 30-day supply of gasoline.

⚠ DANGER

When fueling, under certain circumstances, a static charge can develop, igniting the gasoline. A fire or explosion from gasoline can burn you and others and damage property.

- Always place gasoline containers on the ground and away from your vehicle before filling.
- Do not fill gasoline containers inside a vehicle or on a truck or trailer bed because interior carpets or plastic truck bed liners may insulate the container and slow the loss of any static charge.
- When practical, remove gasoline-powered equipment from the truck or trailer and refuel the equipment with its wheels on the ground.
- If this is not possible, then refuel such equipment on a truck or trailer from a portable container, not from a gasoline dispenser nozzle.
- If you must use a gasoline dispenser nozzle, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete.

1. Clean around the fuel tank cap (Figure 11).

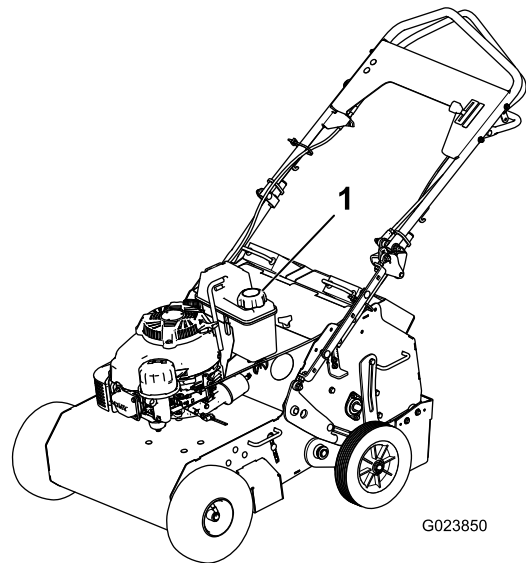


Figure 11

1. Fuel tank cap
2. Remove the cap from the tank.
3. Fill the fuel tank with unleaded gasoline to within 6 to 13 mm (1/4 to 1/2 inch) from the top of the tank. **Do not fill into the filler neck.**

Important: Do not fill the tank more than 6 mm (1/4 inch) from the top of the tank because the gasoline must have room to expand.

4. Install the fuel tank cap and wipe up any spilled gasoline.

Starting the Engine

1. Connect the wire to the spark plug.
2. Open the fuel valve by turn it in-line with the fuel hose (Figure 12).

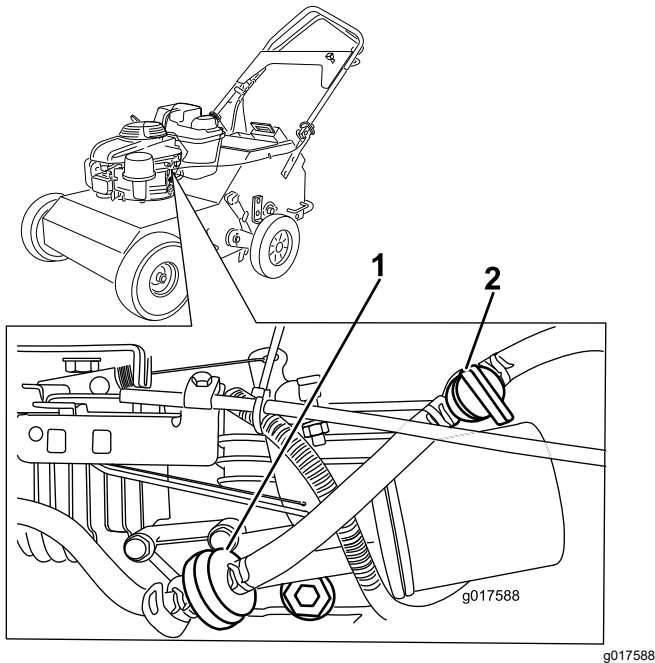


Figure 12

1. Fuel filter
2. Fuel valve—off position

3. Move the throttle control all the way forward to the Choke position (Figure 12).

Note: Do not use the choke when the engine is warm.

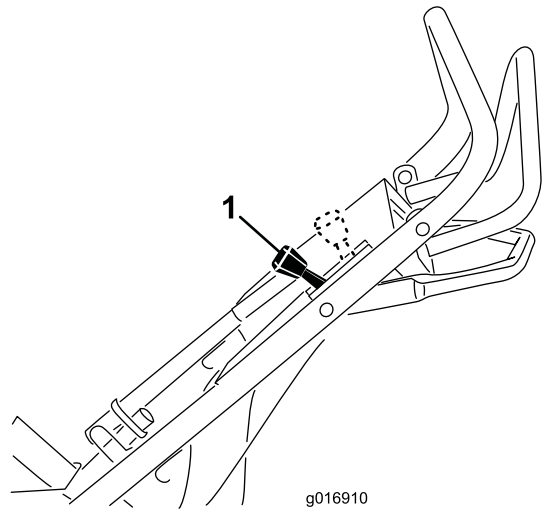


Figure 13

1. Throttle control

4. Pull the starter handle lightly until you feel resistance, then pull it sharply. Allow the rope to return to the handle slowly.
5. When the engine starts, move the throttle control to the Fast position.

Note: The throttle setting governs the maximum drive speed of the aerator.

Stopping the Engine

1. Release the traction control lever and allow it to return to neutral.
2. Move the throttle lever all the way rearward to stop the engine.

Driving the Machine

- To move forward, press the control lever forward (Figure 14). The further forward you push it, the faster the machine will travel.
- To move in reverse, pull the control lever rearward (Figure 14). The further rearward you pull it, the faster the machine will travel.

⚠ WARNING

The aerator tines are sharp and can puncture your feet or other body parts.

Use extreme care when moving in reverse so that you do not allow your feet to go close to the tines. Watch for and avoid obstacles you could trip over.

- To turn the machine, move slowly and press down on the handles; turn the machine in the desired direction then resume normal operation.

- To make zero turns, pull up on the tine ground engagement lever and raise the tines.

Important: Do not make a zero turn when the tines are down. Turning with the tines down will result in turf tearing.

- To stop, release the control lever (Figure 14).

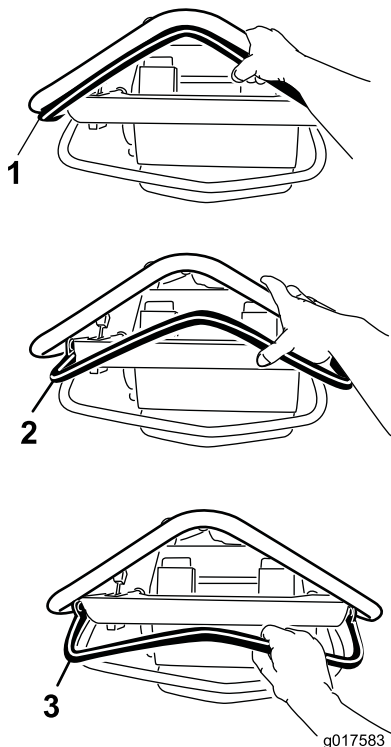


Figure 14

- Forward
- Neutral (Stop)
- Reverse

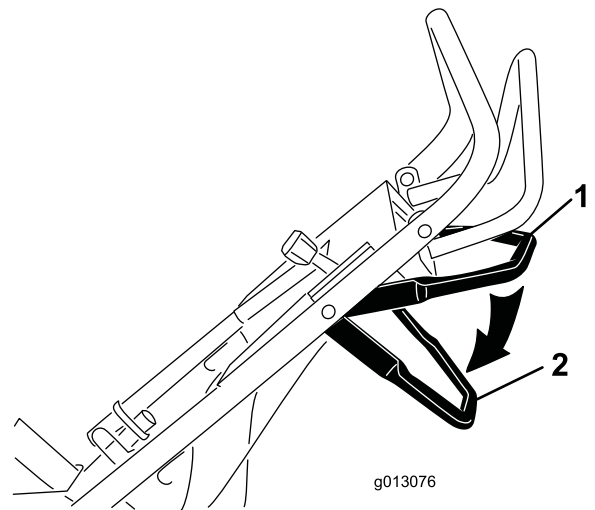


Figure 15

- Tine control lever—tines disengaged from the ground
- Tine control lever—tines engaged into the ground

- Drive the machine to aerate the desired area.

Note: The machine with aerate in both forward and reverse.

- When finished, stop the machine and pull the tine control lever rearward and up to lower the rear wheels and lifts the tines out of the ground.

Important: Do not drive the machine across pavement or other hard surfaces without first raising the tines. Crossing hard surfaces with the tines lowered will damage the tines.

Aerating

- Drive the machine to the desired location and stop it.
- Push the tine control lever down and forward to raise the rear wheels and engage the tines.

Adding Weight

To ensure that the tines penetrate fully into the soil, you can add weight to the back of the machine. The machine has three weight pockets that hold the weights (Figure 16). When placing weight, ensure that you have a balanced load; if using only one weight, place it in the center pocket and if using two, place them in the side pockets.

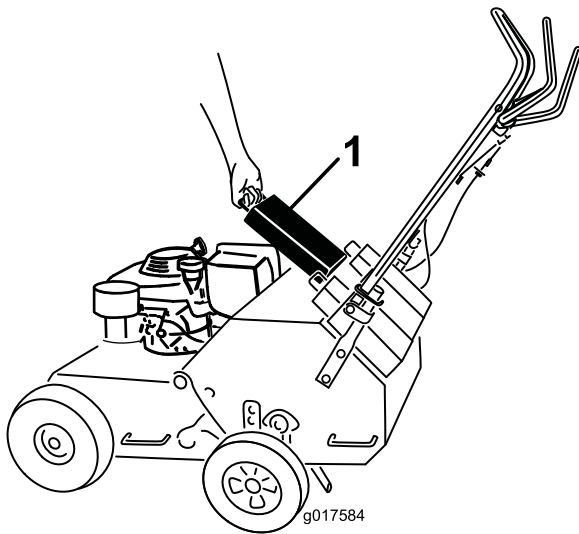


Figure 16

1. Weight

Adjusting the Coring Depth

A coring depth of 6.35 cm (2-1/2 inches) is recommended, but you can change the depth as follows:

1. Stop engine, wait for all moving parts to stop.
2. Disconnect the wire from the spark plug.
3. Loosen the nuts securing the wheel stop on the right side of the machine (see Figure 17).

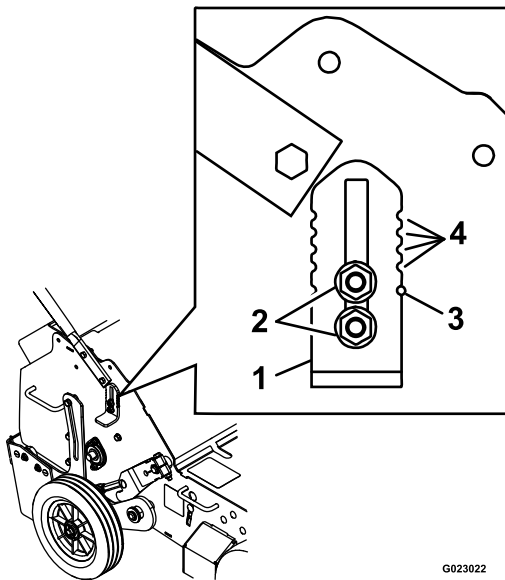


Figure 17

1. Wheel stop
2. Nuts
3. Indicator hole
4. Indicator notches

4. Lower the wheel stop to reduce the depth. Raise it to increase the coring depth and as required.

Note: To ensure that the tines penetrate fully into the soil, weights can be added to the back of the machine. The machine has three weight pockets that hold the weights. When placing weight, ensure that the load is balanced; if using only one weight, place it in the center pocket and if using two, place them in the side pockets.

Note: The removable weights are heavy. Use care when lifting them. Make sure that you can hold them securely before lifting them. Use caution when positioning your hands so that you do not set them down on your hands or fingers.

5. Tighten the nuts securely to lock the wheel stop in place.
6. Repeat steps 3 through 5 for the wheel stop on the left side of the machine. Use the visual indicator notches in the wheel stop and indicator holes in the frame to set the wheel stops to the same height on each side (see Figure 17).

Adjusting the Tine-Control Lever

1. Stop engine, wait for all moving parts to stop.
2. Disconnect the wire from the spark plug.
3. Raise the tines to the transport position.
4. The wheel arm and the pivot shaft assembly should have surface-to-surface contact. If not, check the distance of the lower lift linkage and adjust if necessary.

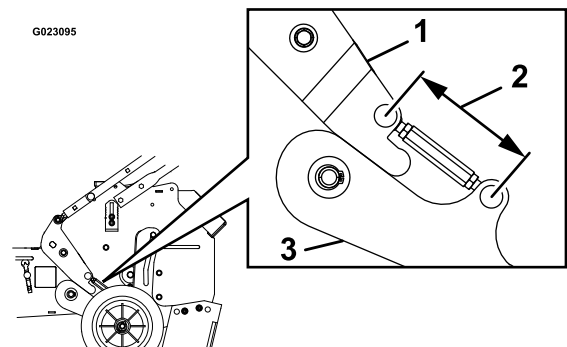


Figure 18

1. Pivot shaft assembly
2. 4.8 inches (12 cm)
3. Wheel arm assembly

5. The lower ball joint bolt, on the upper link rod, should be offset 1/4 inch (6 mm) from the handle pivot bolt. If not, loosen the lock nuts on the lift link strap ball joints, adjust as necessary, and retighten locknuts.

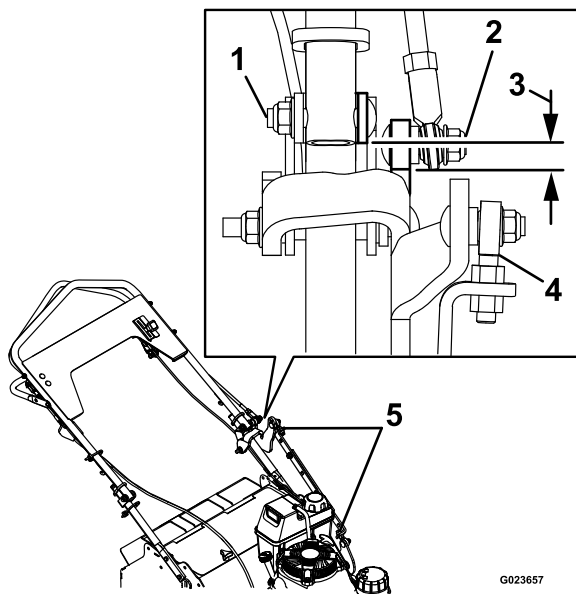


Figure 19

1. Handle pivot bolt
2. Lower ball joint bolt
3. 1/4 inch (6 mm)
4. Lift link strap ball joint
5. Adjust here

6. Slide the oval locking rings upward on the handle and fold the handle towards the engine.
7. The ball joint on the tine-control lever should contact the handle firmly; if not, proceed to step 8.

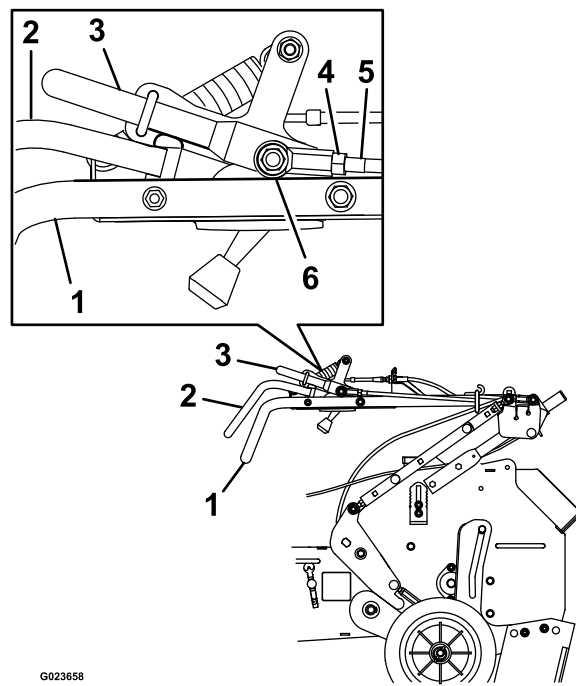


Figure 20

1. Handle
2. Self-propel drive bail
3. Tine-control lever
4. Jam nut
5. Link rod
6. Ball joint contacts handle

8. Loosen both jam nuts, on both ends of the link rod, next to the ball joints.
9. Turn the link rod, by hand, until the ball joint on the tine-control lever is tight against the handle.
10. Tighten both jam nuts on the link rod next to the ball joints.

Securing the Machine for Transport

When transporting the machine on a trailer, always use the following procedure:

Important: Do not operate or drive the machine on roadways.

1. Drive the machine onto that trailer, stop the machine, stop the engine, turn off the fuel valve, and disconnect the spark plug wire.

Important: If you do not turn off the fuel valve, the engine may flood during transport.

2. Secure the machine to the trailer with chains or straps using the tie-down/lift loops ([Figure 5](#)).

Operating Tips

- For best performance and maximum tine penetration, water the turf thoroughly the day before aerating.
- Clean the area of debris before using the machine.
- Mark and avoid shallow obstacles such as sprinkler heads and invisible fence wires.

Maintenance

Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first 5 hours	• Change the engine oil.
Before each use or daily	• Check the engine oil level. • Check the condition and tension of the tine drive chains. • Check the condition of the front drive chains. • Check the condition of the drive chain sprockets. • Lubricate the tine drive chains. • Check the condition of the coring tines and replace any that are damaged or excessively worn. • Check for loose fasteners. • Clean the engine and exhaust system area. • Clean grass and debris buildup from the machine.
Every 25 hours	• Grease tine shaft bearings. • Grease tine assembly idlers. • Lubricate the front drive chains. • Clean the foam pre-cleaner (more frequently in dusty conditions). • Check the tension of the hydrostatic drive belt.
Every 50 hours	• Change the engine oil. • Check the spark arrester (if equipped). • Check for leaks in the fuel systems and/or deteriorating fuel hose. • Check the tire pressures.
Every 100 hours	• Change the oil filter. • Inspect, clean, and adjust the spark plug; replace it if necessary. • Clean the fuel filter element. • Change the hydraulic transmission fluid.
Every 200 hours	• Replace the spark plug.
Every 250 hours	• Replace the fuel filter. (More frequently in dusty conditions.)
Every 300 hours	• Replace the air cleaner elements (more frequently in dusty conditions).
Yearly or before storage	• Touch up chipped paint.

CAUTION

If you leave the spark plug wire connected, someone could accidentally start the engine and seriously injure you or other bystanders.

Before performing any maintenance, park the unit on a level surface, stop the engine, and disconnect the spark plug wire. Set the wire aside so that it does not accidentally contact the spark plug.

Pre-Maintenance Procedures

Accessing the Tines

The machine has a rear access panel that you can remove to access and maintain the tines (Figure 21).

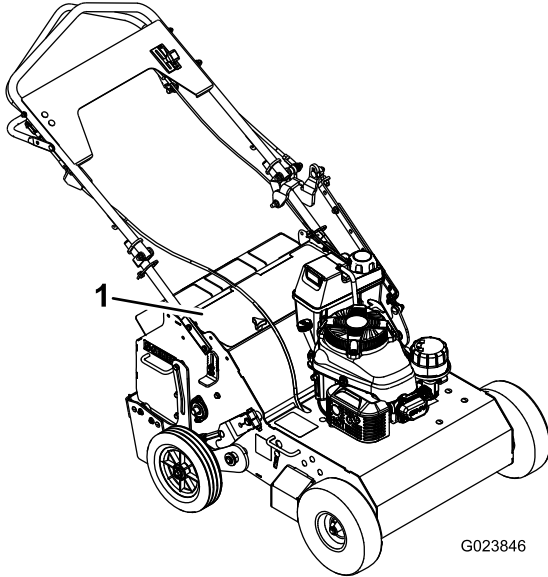


Figure 21

1. Rear access panel

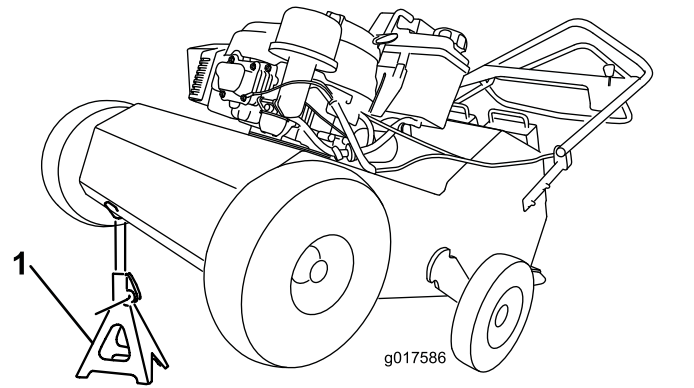


Figure 22

1. Jack stand

⚠ WARNING

Mechanical or hydraulic jacks may fail to support machine and cause a serious injury.

- Use jack stands when supporting machine.
- Do not use hydraulic jacks.

⚠ WARNING

If you operate the machine with the rear access panel removed, some one could be severely injured by contact with the moving tines or by flying debris.

Always securely install the rear access panel before operating the machine.

Tipping the Machine

If you need to work on the underside of the machine, you can tip it backward (Figure 22). Do not tip the machine forward or you will foul the air cleaner with gasoline. Secure the machine with a jack stand before working under it.

Lubrication

Greasing the Tine Shaft Bearings

Service Interval: Every 25 hours

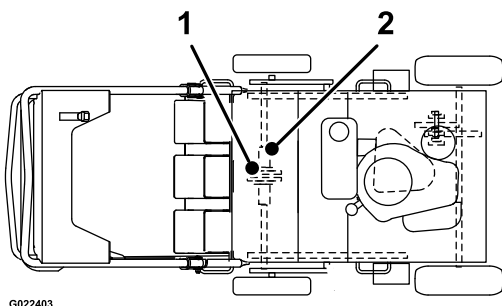
Every 25 hours

1. Raise the tines, stop the machine, stop the engine, and disconnect the spark plug wire.
2. Remove the rear access panel; refer to [Accessing the Tines \(page 18\)](#)
3. Lubricate fittings with NGLI grade #2 multi-purpose gun grease.

Refer to the following chart for fitting locations and lubrication schedule.

Lubrication Chart

Fitting Locations	Initial Pumps	Number of Places	Service Interval
1. Tine Shaft Bearings	1	2	25 hours
2. Tine Assembly Idlers	1-2	2	25 hours



Lubricating and Checking the Drive Chains and Sprockets

Service Interval: Before each use or daily—Check the condition and tension of the tine drive chains.

Before each use or daily—Check the condition of the front drive chains.

Before each use or daily—Check the condition of the drive chain sprockets.

Before each use or daily—Lubricate the tine drive chains.

Every 25 hours

1. Raise the tines, stop the machine, stop the engine, and disconnect the spark plug wire.

2. Raise the front of the machine to gain access to the chains ([Figure 22](#)) and block it in place.

CAUTION

If you do not securely block the up the front of the machine, the machine could fall on you during service, injuring you.

Ensure that you place a jack-stand or block under the front of the machine to hold it up securely.

Important: Do not raise the rear of the machine. Raising the rear of the machine will cause the engine to flood and the air cleaner to be fouled with gasoline.

3. Rotate the front wheels and apply oil or chain lubricant onto the links of the lower spans of the front drive chains ([Figure 23](#)).

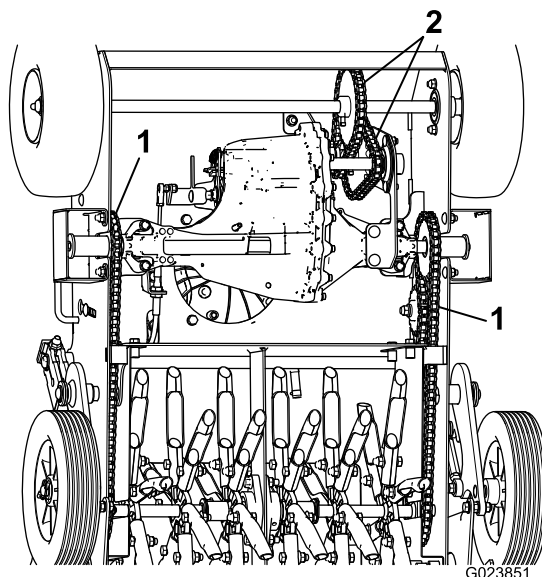


Figure 23

1. Tine drive chains
2. Front drive chains

4. Check the front drive chains ([Figure 23](#)) for wear, damage, and proper tension. If chains pop or snap, replace the sprockets and chains.
5. Rotate tine shafts and apply oil or chain lubricant onto all the links of the lower spans of the tine drive chains ([Figure 23](#)).
6. Check the chains on both sides of the unit for wear, damage, and proper tension. The chains should be able to move up and down 1/4 inch (6 mm) maximum.

If chains are not tight enough or they pop or snap adjust the chain tension; refer to [Adjusting the Tension of Tine Drive Chains \(page 24\)](#).
7. Inspect all chain sprockets for wear and replace them as required.

8. Wipe up any oil that spilled and lower the machine to the ground when finished.

Engine Maintenance

Servicing the Air Cleaner

Service Interval: Every 25 hours—Clean the foam pre-cleaner (more frequently in dusty conditions).

Every 300 hours—Replace the air cleaner elements (more frequently in dusty conditions).

Important: Do not operate the engine without the air filter assembly; extreme engine damage may occur.

1. Stop the engine and wait for all moving parts to stop.
2. Disconnect the wire from the spark plug.
3. Remove the cover and clean it thoroughly (Figure 24).

Note: Be careful to prevent dirt and debris from falling into the base.

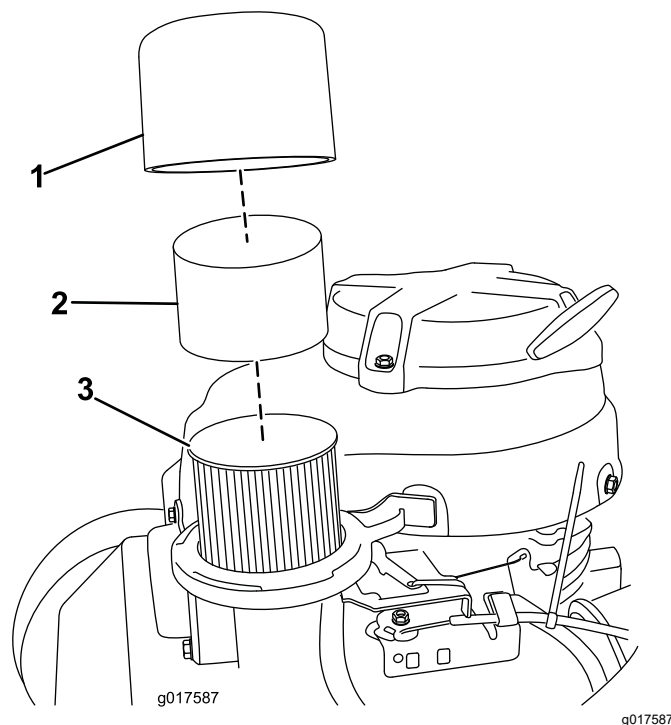


Figure 24

- | | |
|---------------------|---------------------|
| 1. Cover | 3. Paper air filter |
| 2. Foam pre-cleaner | |

-
4. Remove the foam pre-cleaner and wash it with a mild detergent and water, then blot it dry (Figure 24).
 5. Remove and inspect the paper air filter (Figure 24); discard it if it is excessively dirty.

Important: Do not try to clean a paper filter.

6. Wipe dirt from the base and the cover with a moist rag.
Note: Be careful to prevent dirt and debris from entering the air duct leading to the carburetor.
7. Install the foam pre-cleaner onto the paper air filter.
Note: Use a new paper air filter if you discarded the old one.
8. Install the air filter assembly and cover.

Changing the Engine Oil

Service Interval: After the first 5 hours
Every 50 hours

Oil Capacity	
With oil filter	0.85 L (29 ounces)
Without oil filter	0.65 L (22 ounces)

1. Run the engine to warm the engine oil.

Note: Warm oil flows better and carries more contaminants.

⚠ WARNING

Oil may be hot after engine has been run, and contact with hot oil can cause severe personal injury.

Avoid contacting the hot engine oil when you drain it.

2. Stop the engine and wait for all moving parts to stop.
3. Disconnect the wire from the spark plug.
4. Place a drain pan on the ground to the right of the machine.
5. Remove the dipstick ([Figure 25](#)).

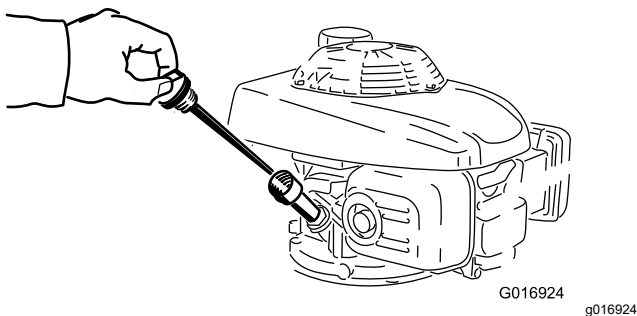


Figure 25

6. Remove the drain plug ([Figure 26](#)) and tip the machine so the oil flows to the pan.

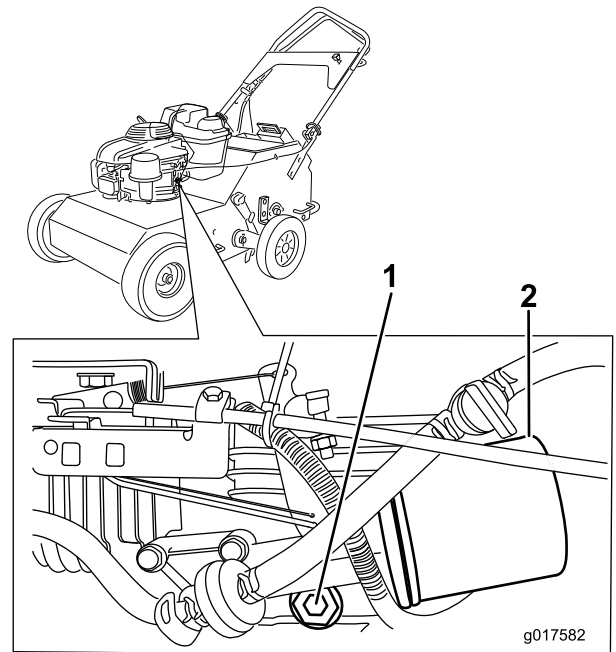


Figure 26

1. Oil drain plug
2. Oil filter

7. Tip the machine upright again, clean the oil from the frame with a rag and replace the drain plug.
8. Insert the dipstick into the filler neck and rotate the cap clockwise until it is tight.
9. **Slowly** pour oil into the oil fill tube, periodically checking the level with the dipstick, until the dipstick indicates that the engine is full. **Do not overfill.** (Max. fill: 0.55 L (20 oz), type: SAE 30W detergent oil with an API service classification of SH, SJ, SL, or higher.)
Note: If you overfill the engine, pour some oil out of it.
10. Install the dipstick securely.
11. Recycle the used oil according to local codes.

Changing the Oil Filter

Service Interval: Every 100 hours

1. Drain the engine oil; refer to [Changing the Engine Oil](#) (page 21).
2. Place a rag under the oil filter ([Figure 26](#)) to catch any oil that may leak out as you remove the filter.
3. Remove the oil filter.
4. Use your finger to coat the gasket on the new filter with oil ([Figure 27](#)).

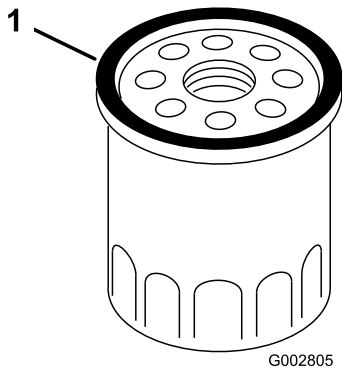


Figure 27

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because grit entering the cylinder can damage the engine.

5. Set the gap on the plug to 0.76 mm (0.030 inch) (Figure 28).

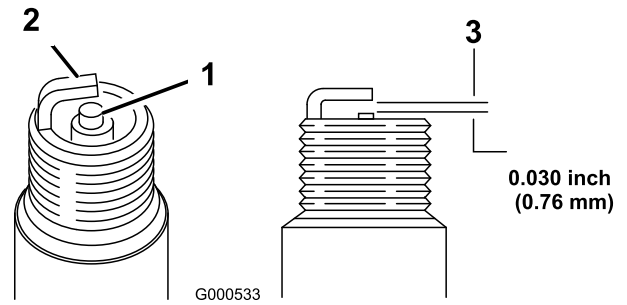


Figure 28

r:\g000533

1. Center electrode insulator
2. Side electrode
3. Air gap (not to scale)

5. Install the new filter and hand tighten it 2/3 turn only.
6. Insert the dipstick into the filler neck and rotate the cap clockwise until it is tight.
7. **Slowly** pour oil into the oil fill tube, periodically checking the level with the dipstick, until the dipstick indicates that the engine is full. **Do not overfill.** (Max. fill: 0.55 L (20 oz), type: SAE 30W detergent oil with an API service classification of SH, SJ, SL, or higher.)
Note: If you overfill the engine, pour some oil out of it.
8. Install the dipstick securely.
9. Connect the wire to the spark plug.
10. Run the engine for about 3 minutes.
11. Stop the engine, wait for all moving parts to stop, and check for oil leakage around the filter.
12. Check and add oil to compensate for the oil in the oil filter. **Do not overfill.**
13. Recycle the used oil filter according to local codes.

6. Carefully install the spark plug by hand (to avoid cross threading) until it is hand tight.
7. Tighten the spark plug an additional 1/2 turn if it is new; otherwise, tighten it an additional 1/8 to 1/4 turn.

Important: A loose spark plug can become very hot and can damage the engine; overtightening a spark plug may damage the threads in the cylinder head.

8. Connect the wire to the spark plug.

Check the Spark Arrestor (if equipped)

Service Interval: Every 50 hours

⚠ WARNING

Hot exhaust system components may ignite gasoline vapors even after the engine is stopped. Hot particles exhausted during engine operation may ignite flammable materials. Fire may result in personal injury or property damage.

Do Not refuel or run engine unless spark arrester is installed.

1. Raise the tines, stop the machine, stop the engine, and disconnect the spark plug wire.
2. Wait for the muffler to cool.
3. If you observe any breaks in the screen or welds, replace the spark arrester.

Servicing the Spark Plug

Service Interval: Every 100 hours—Inspect, clean, and adjust the spark plug; replace it if necessary.

Every 200 hours—Replace the spark plug.

Use an **NGK BPR6ES** spark plug or equivalent.

1. Stop the engine and wait for all moving parts to stop.
2. Disconnect the wire from the spark plug.
3. Clean around the spark plug.
4. Remove the spark plug from the cylinder head.

Important: Replace a cracked, fouled, or dirty spark plug. Do not clean the electrodes

4. If you observe plugging of the screen, remove the spark arrester, shake the loose particles out of it, and clean the screen with a wire brush (soak in solvent if necessary). Replace the spark arrester when finished.

Fuel System Maintenance

Emptying the Fuel Tank and Cleaning the Fuel Filter

Service Interval: Every 100 hours

The fuel filter (screen) element is located inside the fuel tank.

1. Stop the engine and wait for it to cool down.
Note: Drain gasoline for a cold engine only.
2. Disconnect the wire from the spark plug.
3. Close the fuel valve ([Figure 29](#)).
4. Disconnect the fuel line by loosening the tube clamp at the carburetor.
5. Open the fuel valve by turning the lever to the open position.
6. Drain the gasoline completely from the tank and fuel line into an approved fuel container.
7. Remove the fuel tank from the machine.
8. Close the fuel valve.
9. Pour a small amount of fuel in the fuel tank, move the fuel around in the tank, and pour it out into an approved fuel container.
10. Install the fuel tank and fuel line.

Replacing the Fuel Filter

Service Interval: Every 250 hours (More frequently in dusty conditions.)

1. Stop the engine and wait for it to cool down.
Important: Drain gasoline from a cold engine only.
2. Disconnect the wire from the spark plug.
3. Close the fuel valve.
4. Clamp off the fuel line on either side of the fuel filter ([Figure 29](#)) to prevent fuel from leaking out when you remove the filter.

Drive System Maintenance

Checking the Tire Pressure

Service Interval: Every 50 hours

Maintain the air pressure in the tires as specified. Check the tires when they are cold to get the most accurate reading.

Pressure: 83-97 kPa (12-14 psi)

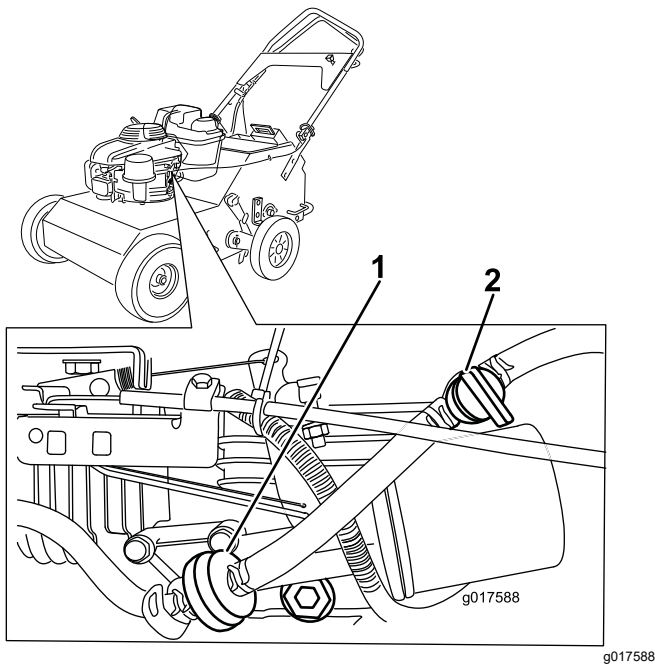


Figure 29

1. Fuel filter 2. Fuel valve

5. Squeeze the ends of the hose clamps together and slide them away from the filter (Figure 29).
6. Remove the filter from the fuel lines.
7. Install a new filter and move the hose clamps close to the filter (Figure 29).
8. Remove the clamps from the fuel lines.
9. Open the fuel shutoff valve.

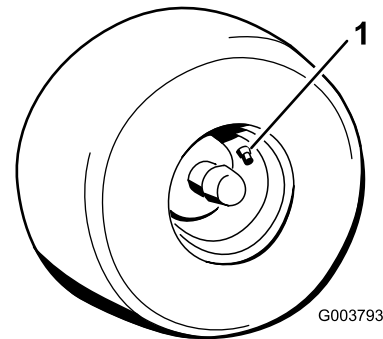


Figure 30

1. Valve stem

Adjusting the Tension of Tine Drive Chains

1. Raise the tines, stop the machine, stop the engine, and disconnect the spark plug wire.
2. Raise the front of the machine to gain access to the chains and block it in place.

⚠ CAUTION

If you do not securely block the up the front of the machine, the machine could fall on you during service, injuring you.

Ensure that you place a jackstand or block under the front of the machine to hold it up securely.

Important: Do not raise the rear of the machine. Raising the rear of the machine will casue the engine to flood and the air cleaner to be fouled with gasoline.

3. Pull down on each chain near the opening in the frame with 9 kg (20 pounds) of force (Figure 31). If a chain flexes more than 3 mm (1/8 inch), tighten it as follows:

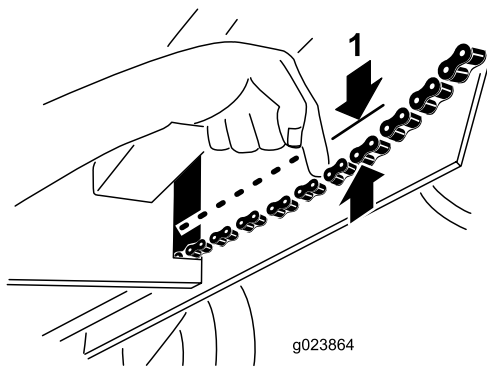


Figure 31

1. Flex in the chain

- A. Loosen the nut securing the idler sprocket of the chain you are tensioning (Figure 32).

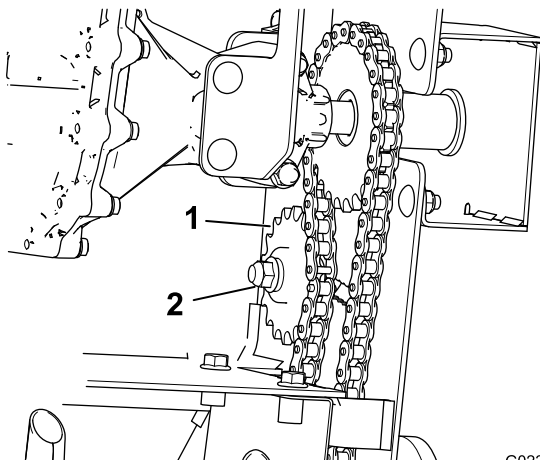


Figure 32

1. Idler sprocket
2. Nut

- B. Pull down on the idler sprocket until the slack is taken out of the chain.
- C. Tighten the idler sprocket nut and torque it to 40.6 N-m (30 ft-lb).
4. Repeat step 3 to test the chain tension and tighten it as needed.
5. Repeat this procedure for the other tine drive chain.

Belt Maintenance

Checking the Hydrostatic Drive Belt

Service Interval: Every 25 hours

1. Raise the tines, stop the machine, stop the engine, and disconnect the spark plug wire.
2. Raise the front of the machine to gain access to the pump drive belt and block it in place.

CAUTION

If you do not securely block the up the front of the machine, the machine could fall on you during service, injuring you.

Ensure that you place a jack stand or block under the front of the machine to hold it up securely.

Important: Do not raise the rear of the machine. Raising the rear of the machine will cause the engine to flood and the air cleaner to be fouled with gasoline.

3. Push on a span of the drive belt with 9 kg (20 pounds) of force (Figure 33). If the belt flexes more than 3 mm (1/8 inch), tighten it as follows:

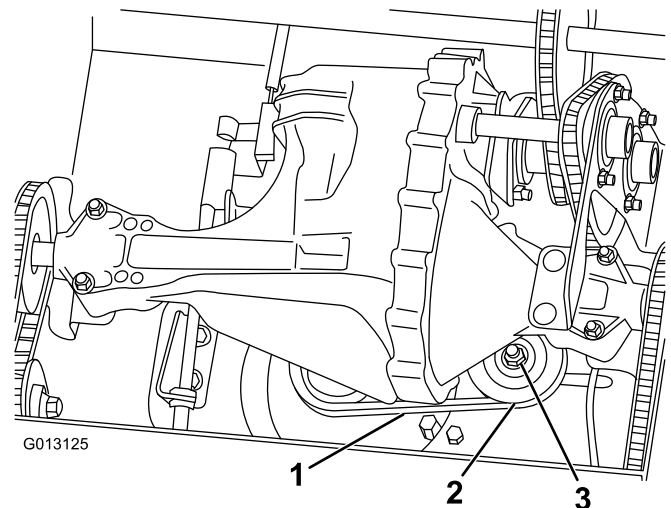


Figure 33

1. Pump drive belt
2. Idler pulley
3. Idler pulley nut

- A. Loosen the nut securing the idler pulley (Figure 33).
- B. Push the idler pulley to the left to tighten the belt .
- C. Tighten the idler pulley nut and torque it to 40.6 N-m (30 ft-lb).

Controls System Maintenance

Adjusting the Self-Propel Drive

1. Raise the tines, stop the machine, stop the engine, and disconnect the spark plug wire.
2. Squeeze the self-propel bail to the handle until the transmission is fully stroked.

If the bail contacts the handle, release the bail. Loosen the top adjustment nut one turn and tighten the bottom adjustment nut. Squeeze the bail to the handle. Repeat this step until there is a gap (up to 3 mm (1/8 inch)) between the self-propel bail and the handle.

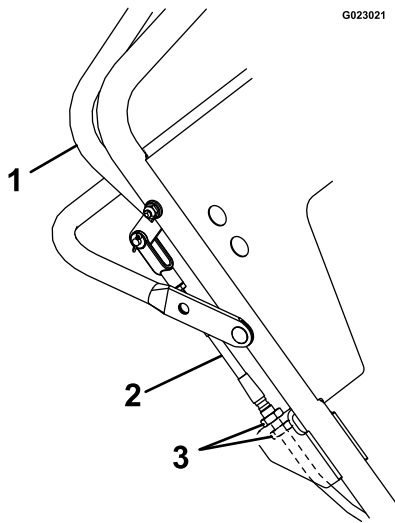


Figure 34

- | | |
|---------------------------|-------------------------------|
| 1. Self-propel drive bail | 3. Top/Bottom adjustment nuts |
| 2. Cable | |

Hydraulic System Maintenance

Changing the Hydraulic Transmission Fluid

Service Interval: Every 100 hours

1. Raise the tines, stop the machine, stop the engine, and disconnect the spark plug wire.
2. Drain the fuel from the fuel tank.
3. Slide the oval locking rings on the handle upward, and fold the handle towards the engine.
4. Slowly lift the front of the machine until the back of the machine and weight pockets are resting on the ground. Stabilize the machine with an overhead hoist.

Note: Using two people or an overhead hoist to lift the machine will make this easier.

5. Remove the transmission from the machine (Figure 35).

Note: It will take two people or a second hoist to safely remove the transmission.

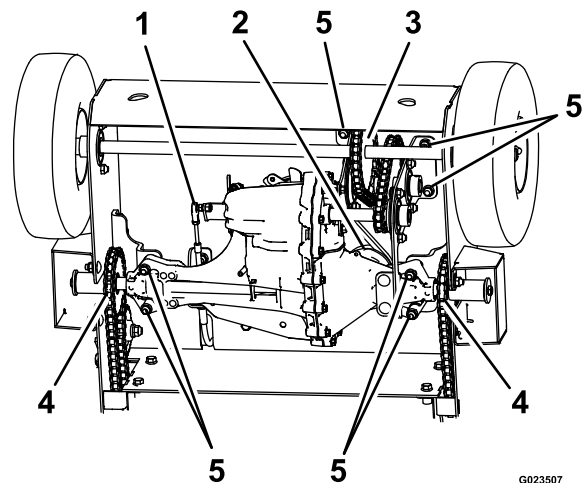


Figure 35

- | | |
|---|------------------------------------|
| 1. Self-propel drive bail cable | 4. Drive chain |
| 2. Idler pulley and transmission drive belt | 5. Mounting hardware (7 locations) |
| 3. Front axle chain sprocket | |

- A. Disconnect the self-propel drive bail cable from the transmission.
- B. Remove the drive belt from the transmission pulley by loosening the nut on the idler pulley.

- C. Remove and retain the connecting link from the front axle chain sprocket, and remove the chain.
 - D. Loosen the drive chain idler sprockets on each side of the unit. Remove and retain the connecting link from the drive chains, and remove the drive chain from the transmission sprockets.
 - E. Support the transmission, remove and retain its mounting hardware, and carefully lower the transmission to the ground.
6. Carefully clean the area around the expansion tank and oil-fill port. It is important that no dirt or contamination enter the hydraulic system.
 7. Remove and retain the oil-fill port fitting and position the transmission so the oil will drain completely out of the housing.
 8. When all the oil has drained from the transmission, remove and retain the #10-32 x 1/2 inch self-tapping screw and ratchet fastener holding the expansion tank to the housing.
 9. Remove the expansion tank and drain the oil.

Note: Do not remove the vent cap from the tank.

Note: Do not remove the tank hose or O-ring unless a replacement is needed.
 10. Inspect the belt, pulleys, sprockets, and bearings; replace as required.
 11. Install the previously removed expansion tank by first inserting the hose into the tank. Place the tank opening over the O-ring and push down to ensure a proper seal. Install the #10-32 x 1/2 inch self tapping screw and torque it to 2.8 N-m (25 in-lb).
 12. Fill the transmission at the oil-fill port until the oil level is 13-32 mm (1/2-1 1/4 inches) below the top of the fill port.

Toro Premium Hydro Oil is recommended. Mobil 1 15W50 is an acceptable alternative.
 13. Install the previously removed oil-fill port fitting.
 14. Install the previously removed transmission.
 - A. With the transmission belt on the engine pulley and the idler pulley, loosely install the transmission using the previously removed mounting hardware.
 - B. Install the transmission belt on the transmission pulley.
 - C. Install the drive chains onto the idler and transmission sprockets.
 - D. Install the chain on the front axle sprocket. Ensure that the front axle sprocket is aligned with the sprocket on the transmission.
 - E. Tighten the 7 transmission mounting bolts.
 - F. Tension the transmission belt; refer to [Checking the Hydrostatic Drive Belt \(page 25\)](#).
 - G. Tension the tine drive chains; refer to [Adjusting the Tension of Tine Drive Chains \(page 24\)](#).
 - H. Connect the self-propel drive bail cable.
15. Carefully remove the jackstands, lower the machine to the ground, and remove the overhead hoist hooks.
 16. Raise and lock the handle into the operating position.
 17. Check the gap between the handle and the bail. If the handle contacts the bail or if there is more than a 3mm (1/8 inch) gap, refer to [Adjusting the Self-Propel Drive \(page 26\)](#).

Tine Maintenance

Checking/Replacing Tines

Service Interval: Before each use or daily

1. Raise the tines, stop the machine, stop the engine, and disconnect the spark plug wire.
2. Remove the rear access panel; refer to [Accessing the Tines \(page 18\)](#)
3. Manually rotate the tines on the shaft, inspecting them for wear or damage.
4. If any are damaged or broken, remove the nut and bolt securing the tine to the tine assembly ([Figure 36](#)).

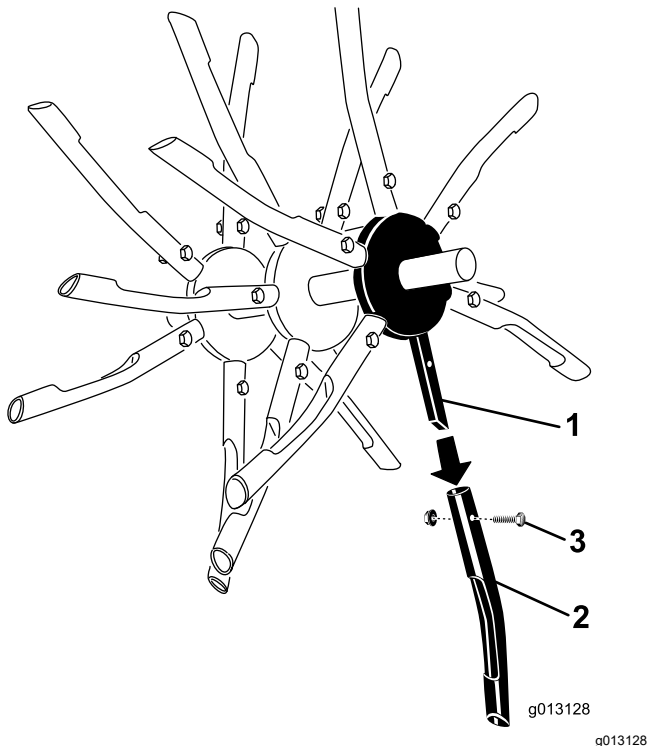


Figure 36

- | | |
|------------------|-----------------|
| 1. Tine assembly | 3. Bolt and nut |
| 2. Tine | |
-
5. Remove the tine and replace it with a new one. Ensure that the new tine is facing the same direction as the other tines on the assembly.
 6. Secure the new tine with the bolt and nut you removed previously and torque them to 40.6 N-m (30 ft-lb).
 7. When all tines have been inspected and replaced as needed, lower the machine to the ground and engage the hydrostatic drive.

Storage

1. Raise the tines, stop the machine, stop the engine, and disconnect the spark plug wire.
2. Remove dirt and grime from the entire machine.

Important: You can wash the machine with mild detergent and water. Do not pressure wash the machine. Avoid excessive use of water, especially near the engine and hydrostatic drive.

3. Service the air cleaner; refer to [Servicing the Air Cleaner \(page 20\)](#).
4. Grease the chains and floating tine assemblies; refer to [Lubrication \(page 19\)](#).
5. Change the engine oil; refer to [Changing the Engine Oil \(page 21\)](#).
6. Check and tighten all bolts, nuts, and screws. Repair or replace any part that is damaged.
7. Paint all scratched or bare metal surfaces. Paint is available from your Authorized Service Dealer.
8. Store the machine in a clean, dry garage or storage area.
9. Cover the machine to protect it and keep it clean.

Troubleshooting

Problem	Possible Cause	Corrective Action
Engine will not start.	1. The throttle lever is in the Off position. 2. The spark plug is disconnected. 3. The fuel is turned off. 4. The traction lever is not in neutral.	1. Move the throttle lever to the Choke position. 2. Connect the spark plug. 3. Open the fuel valve. 4. Release the traction lever so it returns to neutral.
The machine vibrates abnormally.	1. Loose bolts and/or broken parts.	1. Stop the machine and engine immediately. Replace any broken or missing parts.
The machine will not pull itself up hills.	1. The drive belt to the hydrostatic pump is loose.	1. Check and tighten the pump drive belt.
The front wheels move but the tines do not.	1. A chain or drive sprocket is broken.	1. Replace the broken chain or sprocket.
The engine smokes when starting.	1. The engine was tipped forward.	1. Check the air cleaner and replace it if it is fouled. Always tip the machine back when servicing.
The engine is hard to start after transporting it.	1. The fuel valve was not closed before transport and the engine is flooded.	1. Always close the fuel valve before transporting the machine.
The ground speed is slow.	1. The drive or pump belt is worn, loose, or broken. 2. The engine idle is not set properly. 3. The chains are not properly tensioned.	1. Check and tighten the pump drive belt, or change the belt. 2. Contact an Authorized Service Dealer. 3. Adjust the tine drive chain.
The tines drop out of transport when the handle is folded over.	1. Tine-control lever is out of adjustment.	1. Adjust the tine-control lever.

Notes:

Notes:



The Toro Warranty

A limited warranty (see warranty periods below)

SWS
Turf Renovation
and
Tree Care

Conditions and Products Covered

The Toro Company and its affiliate, Toro Warranty Company, pursuant to an agreement between them, jointly warrant your Toro Products listed below to be free from defects in materials or workmanship.

This warranty covers the cost of parts and labor, but you must pay transportation costs.

The following time periods apply from the date of purchase:

Products	Warranty Period
Turf Renovation	
Walk-Behind Aerator	1 year
• Engine	2 years
Stand-On Aerator	1 year
• Battery	90 days Parts and Labor
	1 year Parts Only
• Engine	2 years
Dethatcher	1 year
• Engine	2 years
Turf Seeder	1 year
• Engine	2 years
Tree Care	
Log Splitter	1 year
• Battery	90 days Parts and Labor
	1 year Parts Only
• Engine	2 years
Stump Grinder	1 year
• Engine	2 years
Brush Chipper	1 year
• Battery	90 days Parts and Labor
	1 year Parts Only
• Engine	3 years
Walk-Behind Rotary Broom	1 year
• Engine	2 years

Where a warrantable condition exists, we will repair the Product at no cost to you including diagnosis, labor, and parts.

Instructions for Obtaining Warranty Service

If you think that your Toro Product contains a defect in materials or workmanship, follow this procedure¹:

1. Contact any Authorized Servicing Outlet to arrange service at their dealership. To locate one convenient to you, access our website at www.Toro.com. Select "Where to Buy" and select "Contractor" under product type. You may also call our toll free number below.
2. Bring the product and your proof of purchase (sales receipt) to them.
3. If for any reason you are dissatisfied with the Service Outlet's analysis or with the assistance provided, contact us at:

SWS Customer Care Department
Toro Warranty Company
8111 Lyndale Avenue South
Bloomington, MN 55420-1196
Toll Free: 888-384-9940

¹Toro Authorized Rental Customers who have purchased products directly from Toro and have signed the Toro Rental Customer Agreement have the ability to perform their own warranty work. Please visit Toro's Rental Portal for electronic warranty claim filing procedures or call the toll free number above.

Countries Other than the United States or Canada

Customers who have purchased Toro products outside the United States or Canada should contact their Toro Distributor (Dealer) to obtain guarantee policies for your country, province, or state. If for any reason you are dissatisfied with your Distributor's service or have difficulty obtaining guarantee information, contact the Toro importer. If all other remedies fail, you may contact us at Toro Warranty Company.

Australian Consumer Law: Australian customers will find details relating to the Australian Consumer Law either inside the box or at your local Toro Dealer.

Owner Responsibilities

You must maintain your Toro Product by following the maintenance procedures described in the *Operator's Manual*. Such routine maintenance, whether performed by a dealer or by you, is at your expense. Parts scheduled for replacement as required maintenance ("Maintenance Parts"), are warranted for the period of time up to the scheduled replacement time for that part. Failure to perform required maintenance and adjustments can be grounds for disallowing a warranty claim.

Items and Conditions Not Covered

Not all product failures or malfunctions that occur during the warranty period are defects in materials or workmanship. This express warranty does not cover the following:

- Product failures which result from installation and use of add-on, modified, or unapproved accessories
- Failure to perform required maintenance and/or adjustments
- Repairs necessary due to failure to follow recommended fuel procedure (consult *Operator's Manual* for more details)
 - Removing contaminants from the fuel system is not covered
 - Use of old fuel (more than one month old) or fuel which contains more than 10% ethanol or more than 15% MTBE
 - Failure to drain the fuel system prior to any period of non-use over one month
- Product failures which result from operating the product in an abusive, negligent or reckless manner
- Parts subject to consumption through use unless found to be defective. Examples of parts which are consumed, include, belts, cutters, blades, teeth, spark plugs, tires, filters, etc.
- Failures caused by outside influence include, weather, storage, contamination, lubricants, additives, or chemicals, etc.
- Normal "wear and tear" items includes painted surfaces and scratched decals, etc.
- Any component covered by a separate manufacturer's warranty
- Pickup and delivery charges

General Conditions

Repair by an Authorized Servicing Outlet or Self-Service as an Authorized Rental Customer is your sole remedy under the warranty.

Neither The Toro Company nor Toro Warranty Company is liable for indirect, incidental or consequential damages in connection with the use of the Toro Products covered by this warranty, including any cost or expense of providing substitute equipment or service during reasonable periods of malfunction or non-use pending completion of repairs under this warranty. All implied warranties of merchantability and fitness for use are limited to the duration of this express warranty. Some states do not allow exclusions of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above exclusions and limitations may not apply to you.

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

Except for the engine warranty coverage and the Emissions warranty referenced below, if applicable, there is no other express warranty. The Emissions Control System on your Product may be covered by a separate warranty meeting requirements established by the U.S. Environmental Protection Agency (EPA) or the California Air Resources Board (CARB). Refer to the California Emission Control Warranty Statement supplied with your Product or contained in the engine manufacturer's documentation for details.