Form No. 3366-779 Rev B

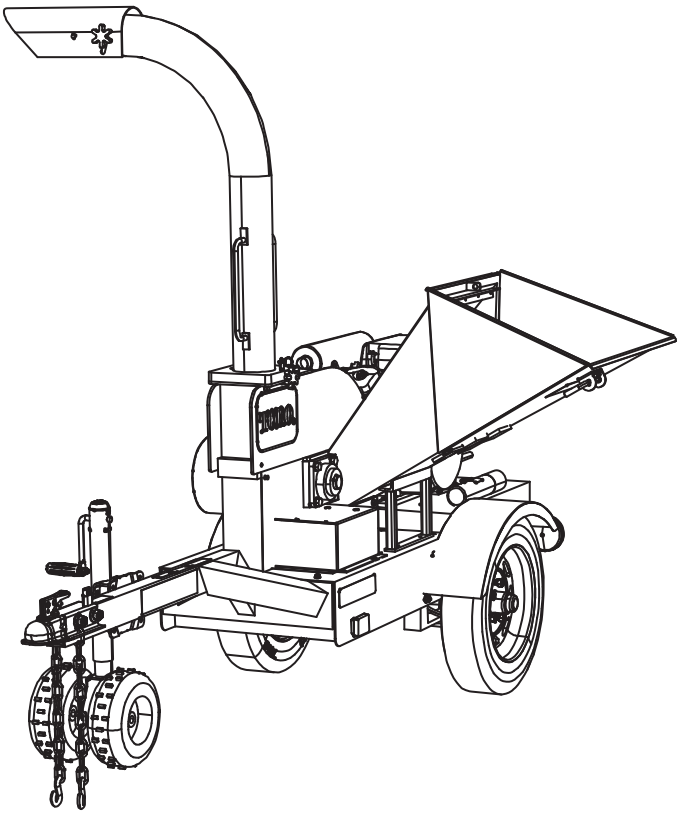
TORO®

Count on it.

Operator's Manual

Brush Chipper

Model No. 22604-Serial No. 310000001 and Up
Model No. 22604THD-Serial No. 310000001 and Up



Register your product at www.Toro.com

Original Instructions (EN)

This product complies with the US National Highway Traffic Safety Administration (NHTSA) regulations for street legal trailers.

⚠WARNING

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

This spark ignition system complies with Canadian ICES-002.

In some areas, there are local, state, or federal regulations requiring that a spark arrester be used on the engine of this machine. A spark arrester is not incorporated with the muffler assembly.

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 without a spark arrester muffler maintained in working order, or the engine constricted, equipped, and maintained for the prevention of fire. Other states or federal areas may have similar laws.

The enclosed Engine Owner's Manual is supplied for information regarding the US Environmental Protection Agency (EPA) and the California Emission Control Regulation of emission systems, maintenance, and warranty. Replacements may be ordered through the engine manufacturer.

INTRODUCTION

This brush chipper is designed to chip branches, vines, leaves, and small tree limbs up to 6 in. (15.24 cm) in diameter. It is not intended to chip rocks, wire, metal, or any materials other than wood. The brush chipper can be towed behind a vehicle equipped with an appropriate ball hitch.

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

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.

Whenever you need service, genuine Toro parts, or additional information, contact an Authorized Service Dealer or Toro Customer Care and have the model and serial numbers of your product ready. Write the numbers in the space provided.

Model No. _____

Serial No. _____

This Manual identifies potential hazards and has safety messages identified by the safety alert symbol, (Figure 1) which signals a hazard that may cause serious injury or death if you do not follow the recommended precautions.

Figure 1

1. Safety alert symbol

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

Tire Information

The tire identification number (TIN) is branded into the sidewall of all street legal tires (Figure 2).

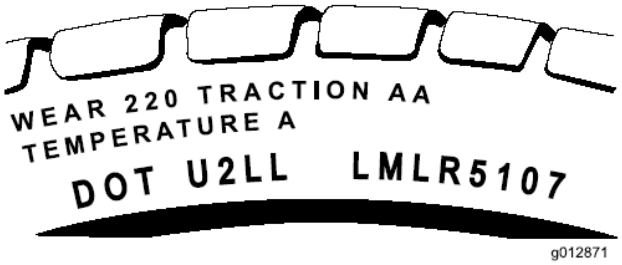


Figure 2

1. Tire identification number (TIN)

SAFETY

Hazard control and accident prevention are dependent upon the awareness, concern, and proper training of the personnel involved in the operation, transport, maintenance, and storage of the machine. Improper use or maintenance of the machine can result in injury or death. To reduce the potential for injury or death, comply with the following safety instructions.

Safe Operating Practices

This product is capable of crushing and amputating hands and feet. Always follow all safety instructions to avoid serious injury or death.

⚠WARNING

Engine exhaust contains carbon monoxide, an odorless, deadly poison that can kill you.

Do not run the engine indoors or in an enclosed area.

If you believe that your vehicle* has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying The Toro Company.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a

8111 Lyndale Avenue South
Bloomington, MN 55420

www.Toro.com.
Printed in the USA.

group of vehicles*, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or The Toro Company.

To contact NHTSA, you may call the Vehicle Safety Hotline toll-free at 1–888–327–4236 (TTY: 1–800–424–9153); go to *http://www.safercar.gov* ; or write to: Administrator, NHTSA, 400 Seventh Street, SW., Washington, DC 20590. You can also obtain other information about motor vehicle safety from *http://www.safercar.gov.*

* brush chipper trailer

Training

- Read the *Operator's Manual* and other training material. If the operator(s) or mechanic(s) can not read English, it is the owner's responsibility to explain this material to them.
- Do not allow anyone to operate the machine who has not read the *Operator's Manual* or has not been instructed on the safe use of the machine.
- Never let children or untrained people operate or service the equipment. Local regulations may restrict the age of the operator.
- All operators and mechanics should be trained. The owner is responsible for training the users.
- Keep the operator zone and adjacent area clear for safe, secure footing.

Towing

Check with your local county or state safety towing regulations, in addition to meeting Department of Transportation (DOT) Safety Towing Regulations, before towing the machine.

- In order to reduce the possibility of an accident while transporting the machine on public roads, ALWAYS make sure the towing vehicle is mechanically sound and in good operating condition.
- ALWAYS shutdown engine before transporting the machine.
- ALWAYS inspect the hitch and coupling for wear. NEVER tow the machine with defective hitches, couplings, chains, etc.
- Check the tire air pressure on both towing vehicle and machine. The tires should be inflated to 60 psi (410 kpa) cold.
- Check the tire tread for wear.
- ALWAYS properly attach the safety chains to towing vehicle.
- ALWAYS make sure that the towing vehicle's directional, backup, and brake lights are working properly.
- Avoid sudden stops and starts. This can cause skidding, or jack knifing. Smooth, gradual starts and stops will improve towing.
- Avoid sharp turns to prevent rolling. Tow only with a vehicle that has a hitch designed for towing. Do not attach towed equipment except at the hitch point.

Before towing check to make certain your machine is correctly and securely attached to the towing vehicle.

- Be sure that the ball hitch you are using is the proper size for the hitch coupler on the machine.
- Be sure the safety chains are properly hooked to the vehicle leaving enough slack for turning.
- Be sure the jack stand is secured in the UP position.
- Do not tow the machine faster than 45 mph (75 km/h).
- Use caution when backing up; use a spotter outside the vehicle to guide you.
- Do not allow anyone to sit or ride on unit when towing.
- Never carry any cargo or wood on unit when towing.
- Always disconnect the unit from the tow vehicle before using it.
- Place chock blocks underneath wheel to prevent rolling while unit is parked.

Preparation

Become familiar with the safe operation of the equipment, operator controls, and safety signs.

- Always wear safety glasses or safety goggles while operating this machine.
- Wear tight fitting gloves without draw strings or loose cuffs.
- Never wear jewelry or loose clothing that might become entangled in moving or rotating parts of the machine.
- Wear shoes with non-slip treads when using your machine. If you have safety shoes, we recommend wearing them. Do not use the machine while barefoot or wearing open sandals.
- Wear long pants while operating the machine.
- Use ear protectors or ear plugs to protect your hearing.
- Make sure the machine is on level surface before operating.
- Always operate the machine from the side of the hopper.
- Block the wheels of the machine to prevent unintended movement.
- Use extra care when handling gasoline and other fuels. They are flammable and vapors are explosive.
- Use only an approved fuel container.
- Never remove the gas cap or add fuel when the engine is running. Allow the engine to cool before refueling. Do not smoke.
- Never refuel or drain the machine indoors.
- Replace gasoline cap and tighten securely.
- Keep container nozzle in contact with the tank during filling.
- If gasoline is spilled, wipe it off the engine and equipment.

Operation

Before every use:

- Inspect the coupler, ball and hitch.
- Always use safety chains.
- Verify all lights are functioning properly.
- Verify the tires are properly inflated as recommended.
- Verify lug nuts are tight and torqued properly.
- Machine is properly secured.
- Before starting this machine, review the "Safety Instructions." Failure to follow these rules may result in serious injury to the operator or bystanders.

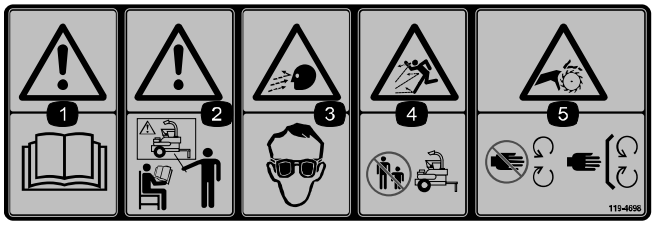
- Never leave this machine unattended with the engine running.
- Never operate machine while under the influence of alcohol, drugs, or medication.
- Never allow anyone to operate this machine without proper instruction.
- Always operate this machine with all safety equipment in place and working.
- Do not change the engine governor setting or over speed the engine.
- Never place your hands, feet, or any part of your body in the hopper, discharge chute opening, or near or under any moving part while the machine is running.
- Keep area of discharge clear of people, animals, buildings, glass, or anything else that will obstruct clear discharge, cause injury, or damage. Wind can also change discharge direction, so be aware. If it becomes necessary to push material into the hopper, use a small diameter stick, not your hands.
- Never use the machine with the hopper or discharge chute removed.
- Always operate the machine from along side the hopper. Never pass or stand on the discharge side of the machine when the engine is running or the flywheel is turning.
- Clear the area of objects such as wire, rope, etc. Inserting these objects into the hopper could damage the flywheel and/or cause injury.
- Keep your face and body back from the hopper to avoid accidental bounce back of any material.
- If you hear or see material being kicked back against the rubber flap shut the feeder chute door until the debris has passed.
- When feeding material into the hopper, be extremely careful that pieces of metal, rocks or other foreign objects are not included. Personal injury or damage to the machine could result.
- Whenever you leave the operating position or if you have to remove processed material, leaves, or debris from the machine, always shut off the engine and wait five minutes to make certain the flywheel and all moving parts have come to a complete stop and cool. Remove the key, disconnect the spark plug wires and keep the wire away from the spark plug to prevent accidental starting before adjusting the machine.
- If the cutting mechanism strikes a foreign object or if your machine should start making an unusual noise or vibration, stop the engine and wait five minutes for all moving parts to come to a complete stop and cool. Vibration is generally a warning of trouble. Disconnect the spark plug wires and inspect for clogging or damage. Clean and repair and/or replace damaged parts.
- Do not touch parts that may be hot from operation. Allow them to cool before attempting to maintain, adjust, or service.
- Never run an engine in an enclosed area.
- Never move this machine while the engine is running.
- 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.
- Do not touch the engine or muffler while the engine is running or soon after it is stopped. These areas could be hot enough to cause a burn.

Maintenance and Storage

- Stop the engine and remove the spark plug wires before making any repairs. Wait for all movement to stop before adjusting, cleaning, or repairing.
- Inspect the machine before each use. Make sure all nuts, bolts, screws, hydraulic fittings, hose clamps, are securely tightened.
- Clean debris from the muffler and engine to help prevent fires. Clean up oil or fuel spillage.
- Let the engine cool before storing and do not store near flame.
- Do not store fuel near flames or drain indoors.
- Park the machine on level ground. Never allow untrained personnel to service the machine.
- 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 extra care when handling gasoline and other fuels. They are flammable and vapors are explosive.
- Never store the machine or fuel container inside where there is an open flame, such as near a water heater or furnace.
- Use only genuine Toro replacement parts to ensure that original equipment standards are maintained.

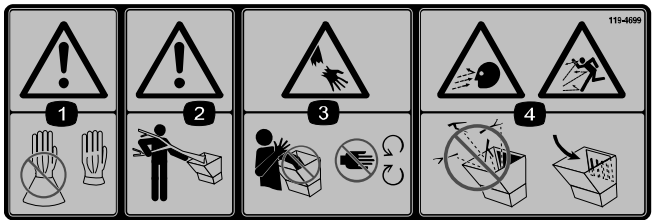
Safety and Instructional Decals

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.



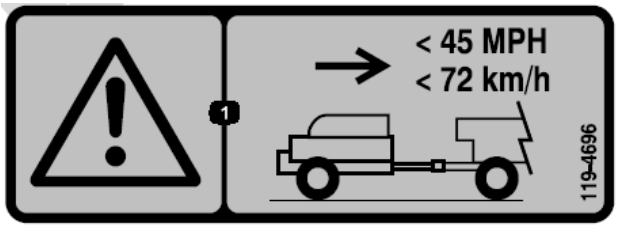
119-4698

1. Warning – read the *Operator's Manual*.
2. Warning – do not operate the brush chipper unless you have been trained.
3. Thrown object hazard – wear safety glasses.
4. Thrown object hazard – keep bystanders a safe distance from the machine.
5. Rotating flywheel hazard – keep hands away from moving parts.



119-4699

1. Warning – wear leather gloves with narrow cuffs.
2. Warning – operate from the side of the hopper.
3. Severed hand hazard – keep hands out of the hopper
4. Thrown object hazard – keep bystanders a safe distance from the machine.



119-4696

1. Warning – do not exceed 45 mph (72 km/h) when transporting the machine.

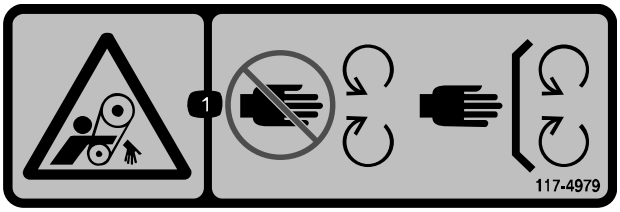
117-1754

1. Rotation – direction of flywheel.

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

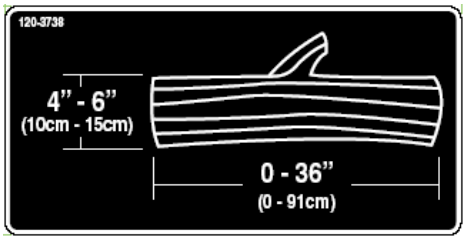


117-4979

1. Belt entanglement hazard – keep hands away from moving parts.

119-4720

1. Cut hand hazard and thrown object hazard –
   1 – stop the engine and remove the key
   2 – wait for all moving parts to stop rotating
   3 – before opening cover

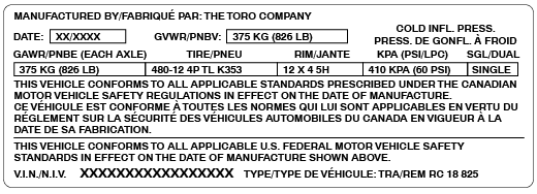


120-3738

1. Maximum log size

***Kohler Part Number 24 113 176**

1. Torque air filter nut to 60 in. lbs.


MANUFACTURED BY/FABRIQUÉ PAR: THE TORO COMPANY

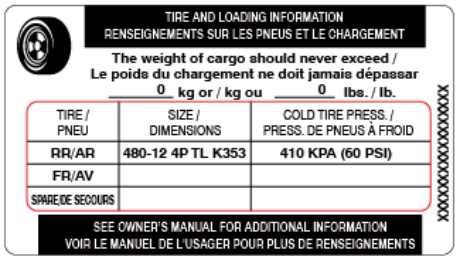
DATE: XX/XXXX GVWR/PNBV: 375 KG (826 LB) COLD INFL. PRESS. PRESS. DE GONFL. À FROID

GAWR/PNBE (EACH AXLE)	TIRE/PNEU	RIM/JANTE	KPA (PSI/LPC)	SGL/DUAL
375 KG (826 LB)	480-12 4P TL K353	12 X 4 5H	410 KPA (60 PSI)	SINGLE

THIS VEHICLE CONFORMS TO ALL APPLICABLE STANDARDS PRESCRIBED UNDER THE CANADIAN MOTOR VEHICLE SAFETY REGULATIONS IN EFFECT ON THE DATE OF MANUFACTURE.
CE VÉHICULE EST CONFORME À TOUTES LES NORMES QUI LUI SONT APPLICABLES EN VERTU DU RÈGLEMENT SUR LA SÉCURITÉ DES VÉHICULES AUTOMOBILES DU CANADA EN VIGUEUR À LA DATE DE SA FABRICATION.

THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

V.I.N./N.I.V. XXXXXXXXXXXXXXXXX TYPE/TYPE DE VÉHICULE: TRA/REM RC 18 825


TIRE AND LOADING INFORMATION
RENSEIGNEMENTS SUR LES PNEUS ET LE CHARGEMENT

The weight of cargo should never exceed /
Le poids du chargement ne doit jamais dépassar
0 kg or / kg ou 0 lbs. / lb.

TIRE / PNEU	SIZE / DIMENSIONS	COLD TIRE PRESS. / PRESS. DE PNEUS À FROID
RR/AR	480-12 4P TL K353	410 KPA (60 PSI)
FR/AV		
SPARE/DE SECOURS		

SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION
VOIR LE MANUEL DE L'USAGER POUR PLUS DE RENSEIGNEMENTS

XXXXXXXXXXXXXXXXX

Product Overview

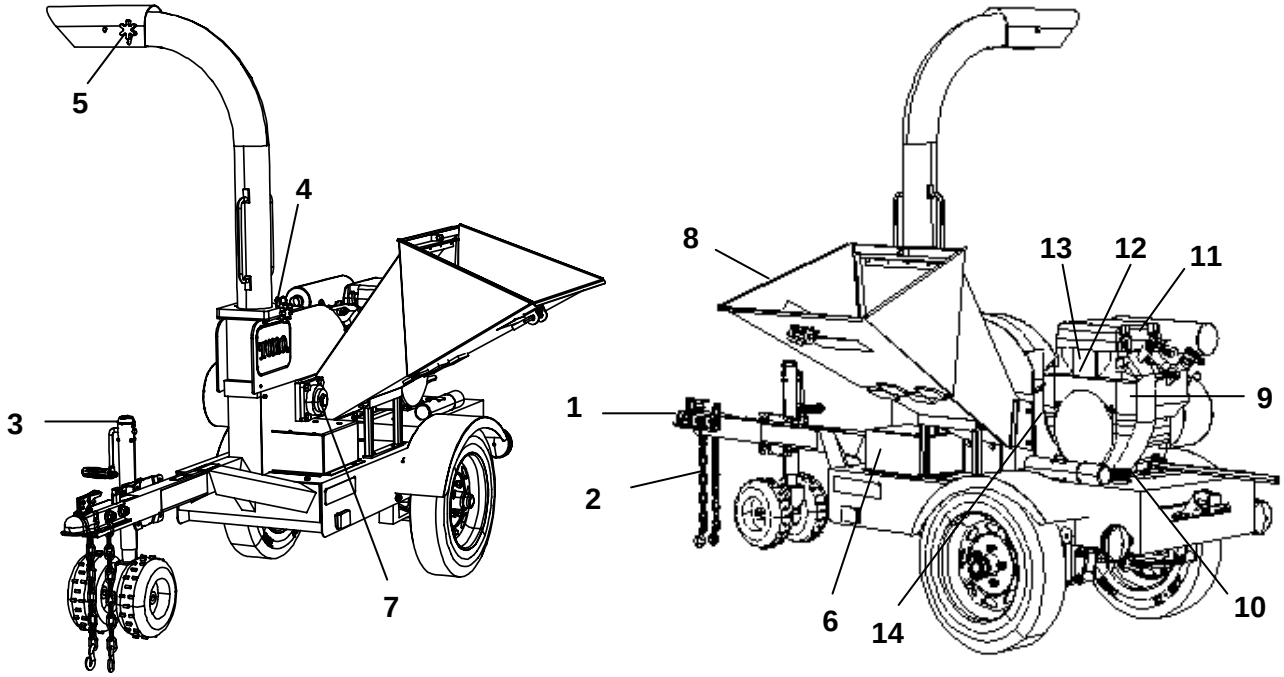


Figure 3

1. Coupler
2. Safety Chains
3. Jack stand
4. Chute locking pin
5. Deflector locking knob
6. Battery box
7. Flywheel bearing
8. Hopper
9. Key switch
10. Fuel cap
11. Air filter
12. Throttle
13. Choke
14. Fuel filter

Controls

Hopper Latch

The hopper, mounted on the side of the machine, swings down for machine operation. The revolving blades mounted on a flywheel behind the hopper turns branches fed into the hopper into “chips”. The chipper can chip branches and vines ranging in size up to 6” in diameter.

To release the hopper latch (Figure 4), pull on the handle and rotate up or down to engage latch pin behind stop.

Pull hopper down to open.

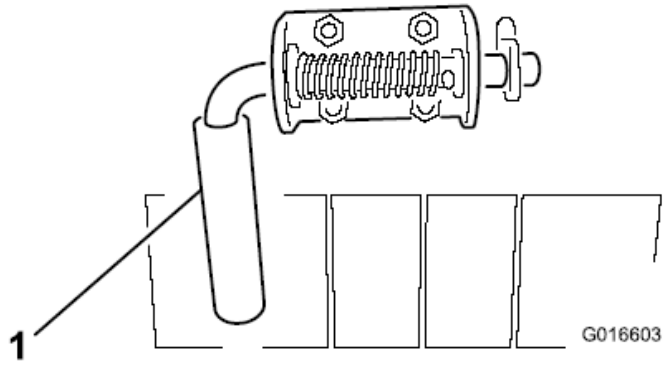


Figure 4

1. Hopper latch

Specifications

Engine	25 HP (18.6 kW) Kohler
Hopper Opening	6 inch (15 cm) maximum
Wheels & Tires	High-Speed, 4.80 x 12
Hitch Coupler	2 inch (5 cm)
Safety Chains	Standard
Jack Stand with two caster wheels	4.10/3.50 x 4
Fuel Tank Capacity	5.5 Gal. (20.8 L)
Length	101 inches (256 cm)
Width	35.5 inches (90 cm)
Height	79.4 inches (202 cm)
Weight	1056 lbs (478 Kg)

Towing

⚠ WARNING

Do not tow over 45 mph (75 km/h).

IMPORTANT Always turn fuel valve to the OFF position before transporting the machine.

1. Raise hopper and lock into the up position. Rotate the chute toward the rear of the machine, lock in position with the chute locking pin and tighten chute locking knob.

2. Crank the handle of the lift jack to align the coupler with the ball of the tow vehicle.

3. Remove the locking pin from the lever, squeeze the latch lock and lift the lever up to open the coupler (Figure 5).

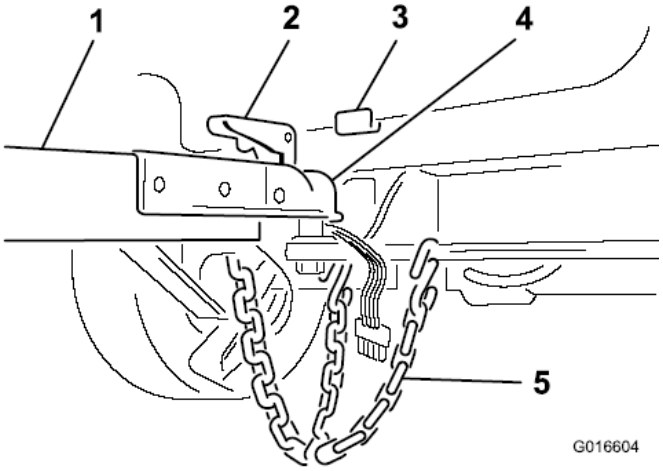


Figure 5

1. Tongue
2. Lever in locked position
3. Locking pin
4. Coupler
5. Safety chains

4. Attach coupler to a class I or higher 2 inch (50.8 mm) ball on a towing vehicle and latch securely.
- If coupler does not fit over the ball, turn adjustment nut one turn counter-clockwise.
- If coupler hitch is too loose on the ball, turn adjustment nut one turn clockwise.

⚠ WARNING

Failure to properly engage the hitch ball in the coupler ball socket and securely lock the coupler latch mechanism can cause the unit to become detached from the tow vehicle while traveling, which may cause serious injury and property damage.

5. Install the locking pin to secure the lever (Figure 5).

6. Cross or “X” the safety chains and attach them to the holes on the hitch.

7. Plug tail light wire harness connector to the tow vehicle connector. Check to make sure the brake lights illuminate properly with the brake pedal applied and the taillights flash when the turning signals are use.

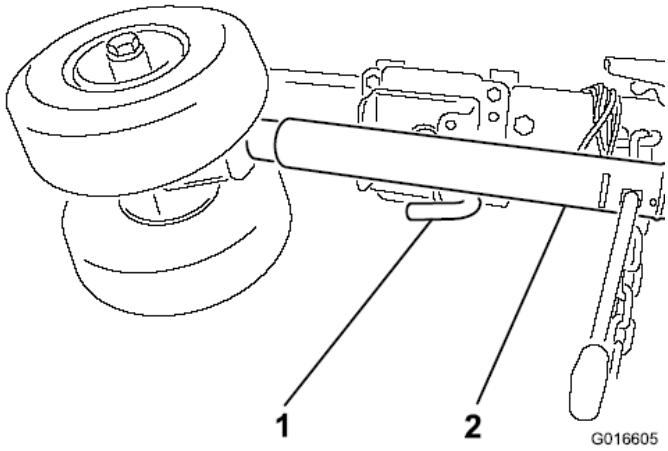


Figure 6

1. Release pin
2. Jack stand

8. Raise jack stand (Figure 6) so caster wheels are free of the ground, pull the release pin and rotate wheels rearward and lock in the horizontal position.

Tires and Wheels

The most common cause of tire trouble is under-inflation. It is important that you maintain full air pressure as indicated by the tire manufacturer on the tire’s sidewall or on the trailer manufacturer’s certification label.

Inflate main axle tires to ..... 60 psi (410 kpa)

Check the torque of the wheel lug nuts initially and after the first 10 hours of operation.

Torque wheel lug nuts to .... 80-90 ft. lbs (108-122 N·m)

Operation

Before You Start

Review all the machine's safety decals.

Disconnect the unit from the tow vehicle, position it on a level location and block the wheels front and back to prevent it from moving.

Ensure you are familiar with safety regulations and shutdown procedures described in the *Operator's Manual*.

Before operating the brush chipper, always wear protective gear, such as safety goggles, face shield, hearing protection, tight fitting gloves without draw strings or loose cuffs.

Check the fuel and oil level of the engine, and the hydraulic fluid in the reservoir.

Adding Fuel

Use unleaded gasoline (87 pump octane minimum). Leaded, regular gasoline may be used if unleaded us not available.

⚠WARNING

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, when the engine is cold. Wipe up any gasoline that spills.**
- **Never fill the fuel tank inside an enclosed trailer.**
- **Do not fill the fuel tank completely full. Add gasoline to the fuel tank until the level is 1/4 to 1/2 inch (6 to 13 mm) below the bottom of the filler neck. This empty space in the tank allows gasoline to expand.**
- **Never smoke when handling gasoline, and stay away from an open flame or where gasoline fumes may be ignited by a spark.**
- **Store gasoline in an approved container and keep it out of the reach of children. Never buy more than a 30-day supply of gasoline.**
- **Do not operate without entire exhaust system in place and in proper working condition.**

⚠WARNING

In certain conditions during fueling, static electricity can be released causing a spark which can ignite the gasoline vapors. A fire or explosion from gasoline can burn you and others and can damage property.

- **Always place gasoline containers on the ground 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 gas-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, rather than from a gasoline dispenser nozzle.**
- **If a gasoline dispenser nozzle must be used, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete.**

Do not use methanol, gasoline containing methanol, or gasohol containing more than 10% ethanol because the fuel system could be damaged. Do not mix oil with gasoline.

Using Stabilizer/Conditioner

Use a fuel stabilizer/conditioner in the machine to provide the following benefits:

- Keeps gasoline fresh during storage of 90 days or less. For longer storage it is recommended that the fuel tank be drained.
- Cleans the engine while it runs.
- Eliminates gum-like varnish buildup in the fuel system, which causes hard starting.

Do not use fuel additives containing methanol or ethanol.

Add the correct amount of gas stabilizer/conditioner to the gas.

A fuel stabilizer/conditioner is most effective when mixed with fresh gasoline. To minimize the chance of varnish deposits in the fuel system, use fuel stabilizer at all times.

Filling the Fuel Tank

1. Park the machine on a level surface and stop the engine.
2. Allow the engine to cool.
3. Clean around the fuel tank cap and remove it (Figure 7).

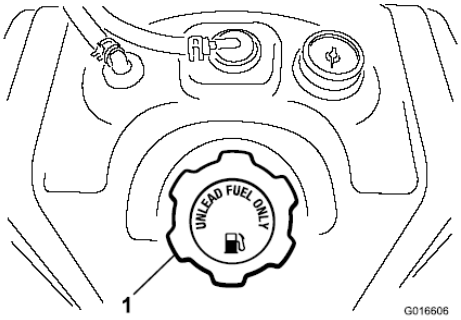


Figure 7

1. Fuel tank cap

4. Only fill tank to bottom of the fill neck tube, do not overfill.

Hour Meter

The hour meter records the number of hours the engine has operated. It operates when the engine is running.

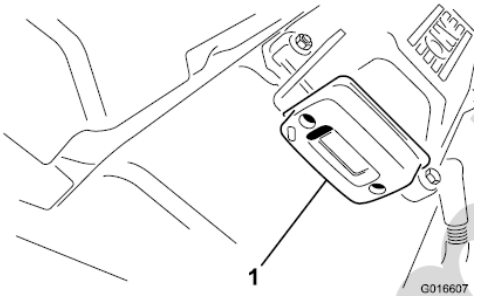


Figure 8

1. Hourmeter

Checking the Engine Oil Level

The best time to check the engine oil is when the engine is cool before it has been started for the day. If it has already been run, allow the oil to drain back down to the sump for at least 10 minutes before checking. If the oil level is at or below the “L” mark on the dipstick, add oil to bring the oil level to the “H” mark. **Do not overfill.** If the oil level is between the “H” and “L” marks, no oil addition is required.

1. Place the machine on a flat level surface, and stop the engine.
2. Allow the engine to cool.
3. Clean around the oil dipstick.
4. Remove the dipstick and wipe the end clean.
5. Slide the dipstick fully into the dipstick tube without threading it into the filler neck.
6. Pull the dipstick out and look at the end. The oil should be to the top of the upper limit range (Figure 9).

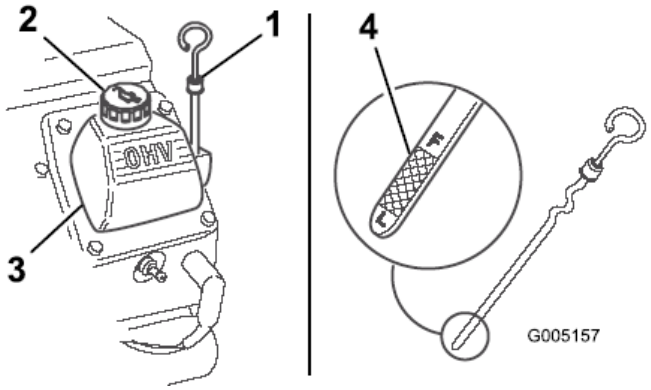


Figure 9

1. Oil dipstick
2. Oil Fill
3. Valve cover
4. Metal end

Running the engine with low oil level can cause engine damage. This type of damage is not covered by warranty.

7. If the oil level is low, slowly pour only enough oil into the crankcase to raise the level to the upper limit. See Maintenance section for oil specifications.

Do not overfill the crankcase with oil because the engine may be damaged.

8. Replace the dipstick.

Changing the Chute Position

The chute on this machine can be rotated to use in various positions. Rotate to the side, away from the hopper when using the machine.

1. To rotate, loosen the clamp knob, then press the spring-loaded button on the locking pin handle IN and pull the locking pin from the chute plate (Figure 10).
2. Set the chute in the position desired and secure with clamp knob.

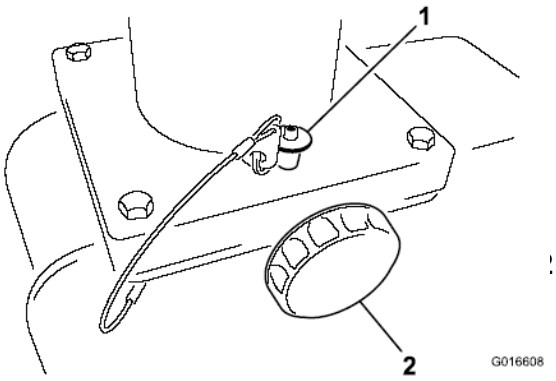


Figure 10

1. Locking Pin - Button
2. Clamp knob

Changing the Deflector Position

The deflector on the end of the chute can be rotated up and down to direct the discharge of chips.

1. Loosen the deflector knob and rotate the chute into the desired position (Figure 11).
2. Tighten the deflector knob.

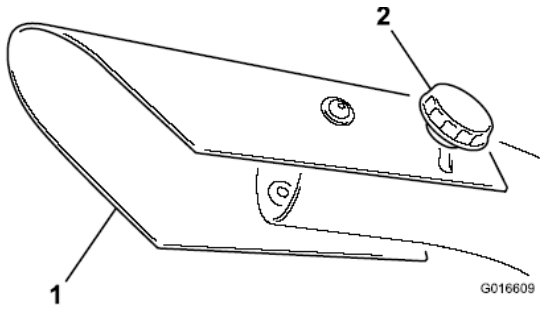


Figure 11

1. Chute deflector
2. Knob

Starting and Stopping the Engine

Starting the Engine

1. Move the choke lever left to the ON position if you are starting a cold engine (Figure 12). A warm or hot engine may not require choking.
2. Move the throttle lever 1/3 way to the FAST position (Figure 12).

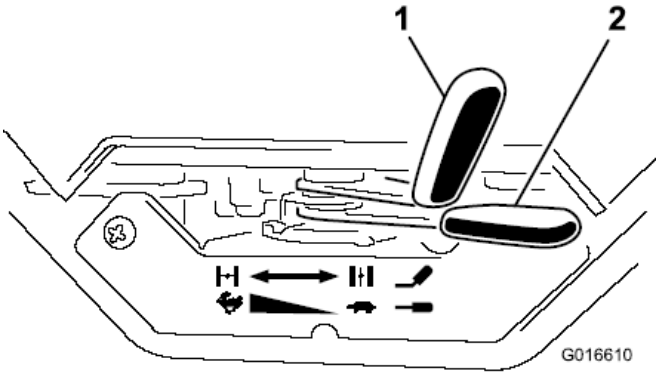


Figure 12

1. Choke 2. Throttle

3. Turn the engine ignition switch to the START position (Figure 13).

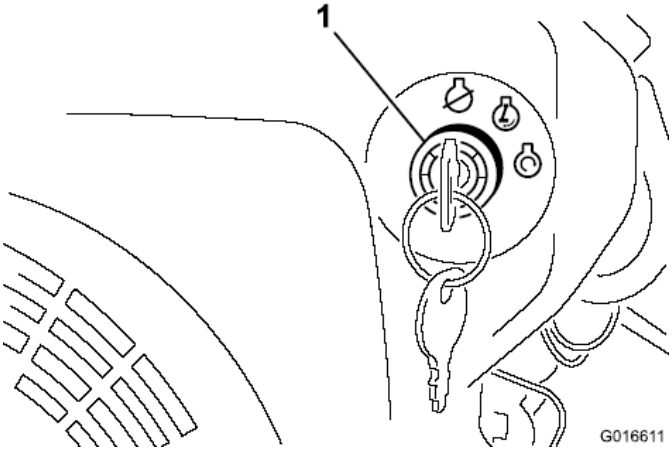


Figure 13

1. Ignition Switch

6. After the engine starts, release key to the RUN position.
7. Gradually move the choke lever back to the Off position. If the engine stalls or hesitates, move the choke back to On again until the engine warms up. Then move it to the Off position.
8. When ready to chip brush, move the throttle lever to the FAST position.

Stopping the Engine

1. Move the throttle lever to the SLOW position. If the engine has been working hard or is hot, let it run for a minute before turning off. This helps to cool the engine before stopping. In an emergency, the engine may be stopped immediately.
2. Turn the ignition switch to the OFF position.

Using the Brush Chipper

⚠ WARNING

Do not attempt to operate the brush chipper without fully understanding all instructions, safety precautions, and/or warnings.

• Always wear protective gear, such as safety goggles or face shield, hearing protection, tight-fitting gloves without draw strings or loose cuffs when using the machine.

• Make sure you are standing in the safe operating area, as shown in pictures (Figure 15 and 16).

• Never place any part of your body into a position that causes an unsafe operating condition.

1. Place the brush chipper on level, dry ground, disconnect from tow vehicle, and block the front and back of both wheels to prevent any movement.
2. Make sure you read all the recommendations from the “Safety” section before using the brush chipper.
3. Start the engine; refer to Starting the Engine and allow engine to warm up at idle for two minutes.
4. Lower the hopper (Figure 14).

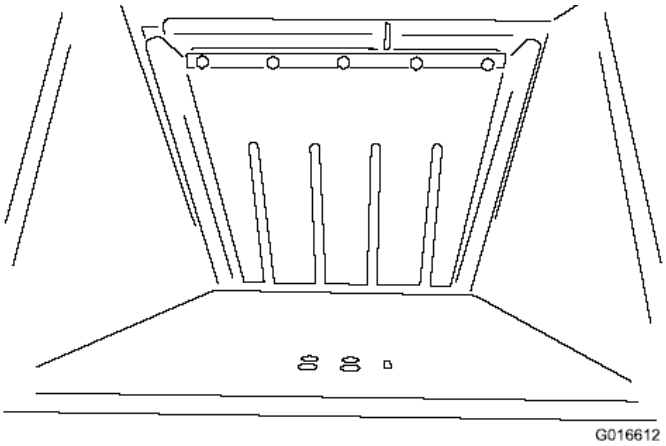


Figure 14

IMPORTANT:

• Do not force material into the chipper. If the machine does not chip well, the chipper knife or cutter block may need to be sharpened or replaced.

• Extremely hard knots will not process very well. Short stubs that have not self-fed through the chipper can be pushed through with the next branch to be chipped, or simply close the upper chute.

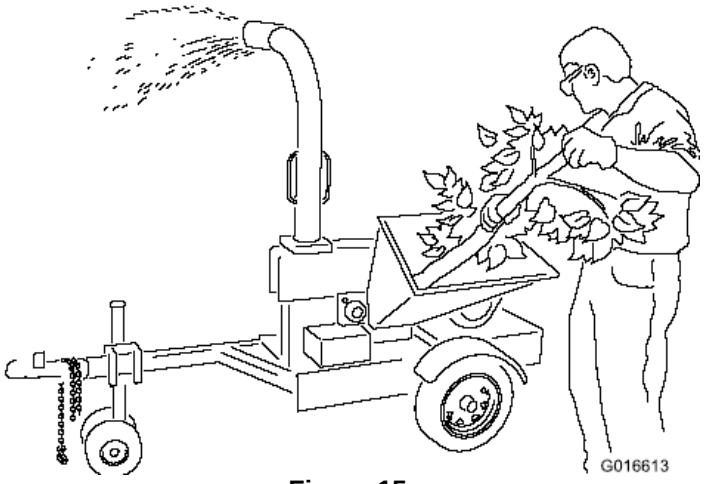


Figure 15

- Overloading the hopper will cause the rotor speed to decrease. If you hear the engine RPM decreasing, stop feeding material into the hopper until the engine has returned to full speed (Figure 15).
- If you jam the machine and do not stop the engine, it can damage the machine (Figure 16). For this reason, it is important that you immediately stop the engine if the machine becomes jammed, wait five minutes to make certain the flywheel and all moving parts have come to a complete stop and cool. Disconnect the spark plug wires, keeping them away from the spark plugs to prevent accidental starting.

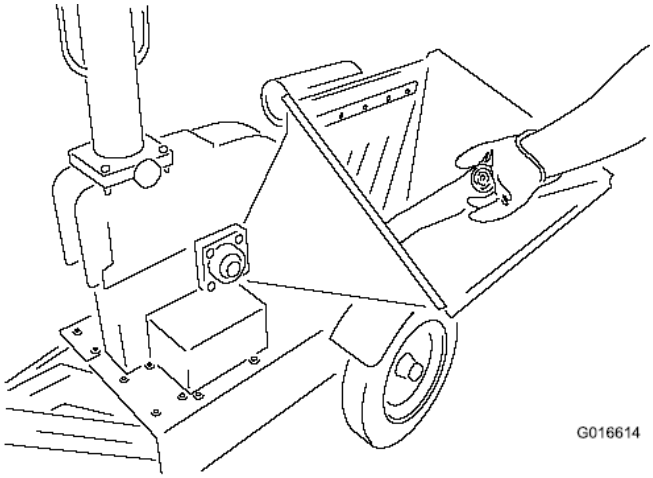


Figure 16

- Never allow processed material to build up within 3in. (76.2 mm) of the discharge chute opening. Move the Brush Chipper or the pile as needed. Failure to do so could result in unnecessary jamming of the machine.
- To move a pile of processed material, use a spade, rake, or long handle tool. Never use you hands or feet!
- To stop the machine; refer to Stopping the Engine.

Maintenance

Maintenance Schedule

Daily - before each use	Check the engine oil level Lubricate the cutter wheel bearings Check the drive belt tension and condition Remove debris from the unit Check for loose fasteners or damaged components Check cutter blades and clean inside the upper cutter housing
Every 25 hours	Clean the foam pre-cleaner Check the air filter
First 50 hours	Change the engine oil and oil filter
Every 100 hours	Change the engine oil Change the oil filter Replace the air filter Check/replace drive belt Check tire pressure
Every 200 hours	Check and adjust the spark plugs Replace the fuel filter
Every 500 hours	Replace the spark plugs Grease wheel bearings

Servicing the Air Cleaner

Foam pre-filter: Clean every 25 hours.
Paper Filter: Check every 25 operating hours. Replace the air filter every 100 hour.

Note: Service the air cleaner more frequently if operating conditions are extremely dusty or sandy.

Removing the Filters

1. Clean around the air cleaner to prevent dirt from getting into the engine and causing damage.
2. Unscrew the knob and remove the air cleaner cover (Figure 17).

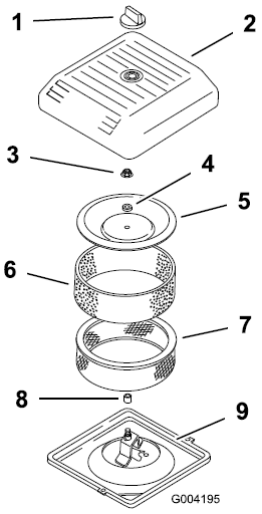


Figure 17

1. Knob
2. Air cleaner cover
3. Cover nut
4. Spacer
5. Cover
6. Foam pre-filter
7. Paper filter
8. Rubber seal
9. Air cleaner base

3. Carefully slide the foam pre-filter off of the paper element (Figure 17).
4. Unscrew the cover nut and remove the cover, spacer and paper filter (Figure 17).

Cleaning/Replacing the Filters

Service Interval: Clean every 25 hours
Replace every 100 hours.
Important: Replace the foam element if it is torn or worn.

1. Wash the foam pre-filter in liquid soap and warm water. When clean, rinse it thoroughly.
2. Dry the pre-filter by squeezing it in a clean cloth (do not wring).
3. Put one or two ounces of oil on the pre-filter (Figure 18).

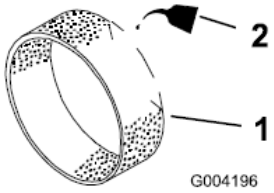


Figure 18

1. Foam element
2. Oil

4. Squeeze the pre-filter to distribute the oil.
5. Lightly tap the paper filter on a flat surface to remove dust and dirt (Figure 19).

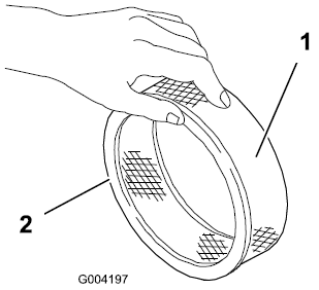


Figure 19

1. Paper element
2. Rubber seal

6. Inspect the paper filter for dirt, tears, an oily film, and damage to the rubber seal.

Important: Never clean the paper element. Replace the paper element if it is dirty or damaged.

Installing the Filters

Important: To prevent engine damage, always operate the engine with the complete foam and paper air cleaner assembly installed.

1. Carefully slide the foam pre-filter onto the paper filter (Figure 17).
2. Place the air cleaner assembly onto the air cleaner base (Figure 17).
3. Install the cover, spacer and secure it with the cover nut (Figure 17). Torque the nut to 60 in-lb (6.8 N·m).
4. Install the air cleaner cover and secure it with the knob (Figure 17).

Servicing the Engine Oil

Change oil and filter after the first 50 operating hours and then every 100 operating hours thereafter.
Note: Change oil more frequently when operating conditions are extremely dusty or sandy.
Oil Type: Detergent oil (API service SG, SH, SJ, or higher)
Crankcase Capacity: w/filter, 2 qt. (1.9 l)
Viscosity: See table Figure 20).

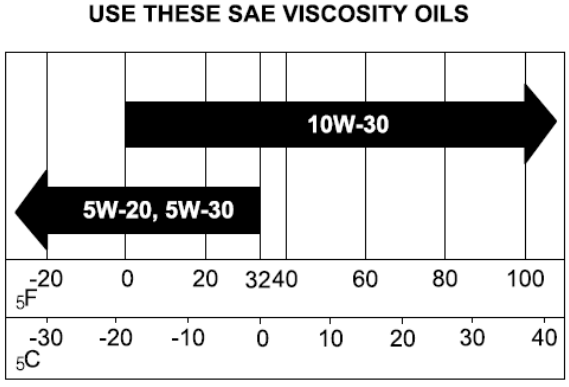


Figure 20

Changing the Oil and Filter

Service Interval: After the first 50 hours
Every 100 hours

1. Start the engine and let it run five minutes. This warms the oil so it drains better.
2. Park the traction unit so that the drain side is slightly lower than the opposite side to ensure that the oil drains completely.
3. Place one end of a hose on the drain valve and the other end in a pan (Figure 21).
4. Open the drain valve by turning it counterclockwise, pulling out as you turn it (Figure 21).

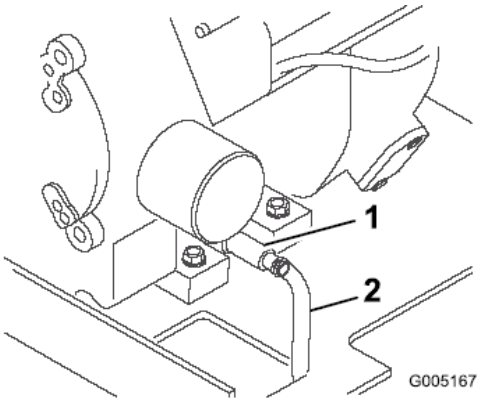


Figure 21

1. Oil drain valve 2. Hose

5. When the oil has drained completely, close the drain valve and remove the hose.

Note: Dispose of the used oil at a certified recycling center.

6. Remove the old filter and wipe the filter adapter (Figure 22) gasket surface.

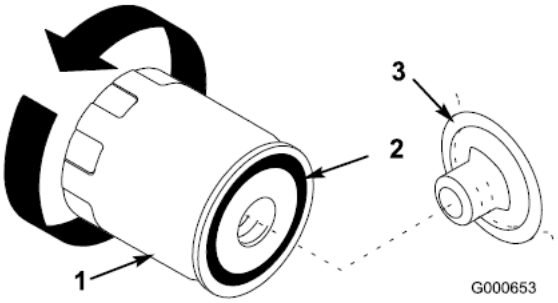


Figure 22

1. Oil filter 2. Adapter
3. Gasket

7. Pour new oil of the proper type in through the center hole of the filter. Stop pouring when the oil reaches the bottom of the threads.
8. Allow a minute or two for the oil to be absorbed by filter material, then pour off the excess oil.
9. Apply a thin coat of new oil to the rubber gasket on the replacement filter (Figure 22).
10. Install the replacement oil filter to the filter adapter. Turn the oil filter clockwise until the rubber gasket contacts the filter adapter, then tighten the filter an additional 3/4 turn (Figure 22).
11. Remove the oil fill cap and slowly pour approximately 80% of the specified amount of oil in through the valve cover.
12. Check the oil level; refer to Checking the Oil Level, Operation (page 9).
13. Slowly add additional oil to bring the level to the F (full) mark on the dipstick.
14. Replace the fill cap.

Servicing the Spark Plug

Service Interval: Check the spark plugs every 200 hours.
Replace the spark plugs every 500 hours.

Type: Champion RC12YC or equivalent
Air Gap: 0.28–0.32 inch (0.70-0.80 mm)

Removing the Spark Plugs

1. Pull the wires off spark plugs (Figure 23).

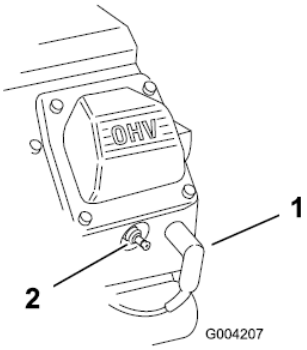


Figure 23

1. Spark plug wire 2. Spark plug

2. Clean around spark plugs.
3. Remove both spark plugs and metal washers.

Checking the spark Plugs

Service Interval: Every 200 Hours

1. Look at the center of both spark plugs (Figure 24). If you see light brown or gray on the insulator, the engine is operating properly. A black coating on the insulator usually means the air cleaner is dirty.

Important: Never clean the spark plugs. Always replace the spark plugs when they have a black coating, worn electrodes, an oily film, or cracks.

2. Check the gap between the center and side electrodes (Figure 24).
3. Bend the side electrode (Figure 24) if the gap is not correct.

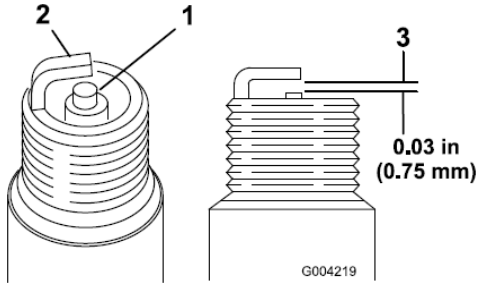


Figure 24

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

Installing the spark Plugs

1. Thread the spark plugs into the spark plug holes.
2. Torque the spark plugs to 18-22 ft.-lb (24.4-29.8 N·m).
3. Push the wires onto the spark plugs (Figure 23).

Changing the Fuel Filter

Service Interval: Replace the fuel filter every 200 hours.

Important: Never install a dirty filter.

1. Clamp the fuel line between the carburetor and the fuel filter to block the fuel flow.
2. Squeeze the ends of the hose clamps together and slide away from the fuel filter (Figure 25).

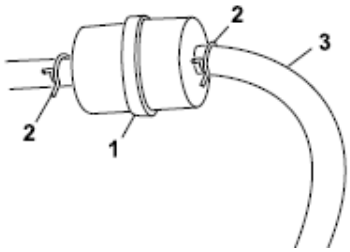


Figure 25

1. Fuel filter
2. Hose clamp
3. Fuel hose

3. Place a drain pan under the fuel lines to catch any leaks, then remove the filter from the fuel lines (Figure 25).
4. Install a new filter, with arrow pointing toward the carburetor, and move the hose clamps close to the filter.
5. Remove the clamp blocking fuel flow and open the fuel valve.

Charging the Battery

WARNING

CALIFORNIA
Proposition 65 Warning

Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.

⚠ DANGER

Charging the battery produces gases that can explode. Never smoke near the battery and keep sparks and flames away from battery.

Important: Always keep the battery fully charged (1.265 specific gravity). This is especially important to prevent battery damage when the temperature is below 32F (05C).

1. Remove the battery cover.
2. Clean the top of the battery with a paper towel.
3. Check the electrolyte level of each cell.
4. Remove the filler caps from the battery.
5. Slowly pour distilled water into each battery cell until the electrolyte level is up to the Upper line on the battery case.

Important: Do not overfill the battery because electrolyte (sulfuric acid) can cause severe corrosion and damage to the chassis.

6. Wait five to ten minutes after filling the battery cells. Add distilled water, if necessary, until the electrolyte level is up to the Upper line on the battery case.
7. Install the battery filler caps.

⚠ DANGER

Charging the battery produces gases that can explode.
Never smoke near the battery and keep sparks and flames away from battery.

8. Make sure the filler caps are installed in the battery.

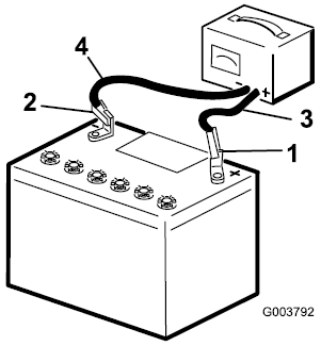


Figure 26

1. Positive battery post
2. Negative battery post
3. Red (+) charger lead
4. Black (-)charger lead

9. Charge the battery for 10 to 15 minutes at 25 to 30 amps or 30 minutes at 4 to 6 amps (Figure 26). Do not overcharge the battery.
10. When the battery is fully charged, unplug the charger from the electrical outlet, then disconnect the charger leads from the battery posts (Figure 26).
11. Install the battery cover.

Lubricate the Cutter Wheel Bearings

Service Interval: Lubricate before every use.
The cutter wheel bearings should be lubricated with No. 2 General Purpose lithium base grease (Figure 27).

1. Clean around grease zerk with a rag and lift the plastic cap off the grease zerk.
2. Using a grease gun, pump several shots of grease into the fitting until it starts to ooze out of the bearing.

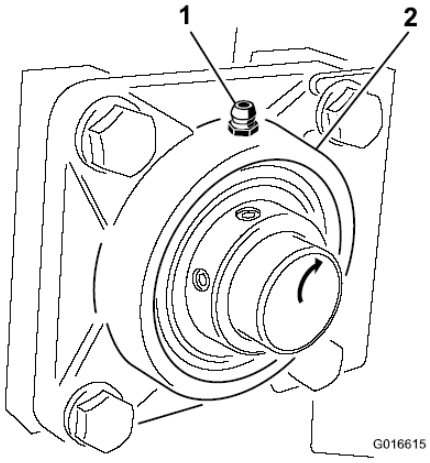


Figure 27

1. Cutter wheel bearing 2. Grease zerk

Replacing and Adjusting the Drive Belt

Service Interval: Check belt before every use.
Replace when worn or every 100 hours.
1. Remove the nuts, washers, and top bolts securing the belt guard to machine.
2. Remove the belt guard (Figure 28).

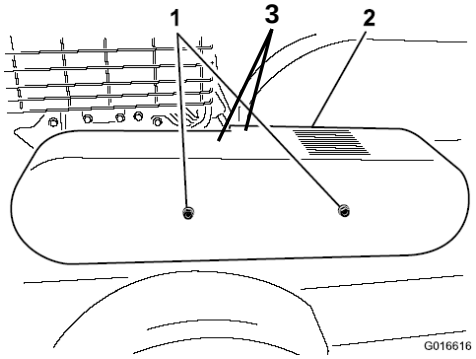


Figure 28

1. Nuts and washers 2. Belt guard
3. Bolts

3. Loosen four (4) engine plate mounting bolts and four (4) bolts securing the rear of the belt guard to the engine.
4. Loosen the belt tension bolt and jam nut, slide the engine toward the flywheel housing to loosen belt (Figure 29).

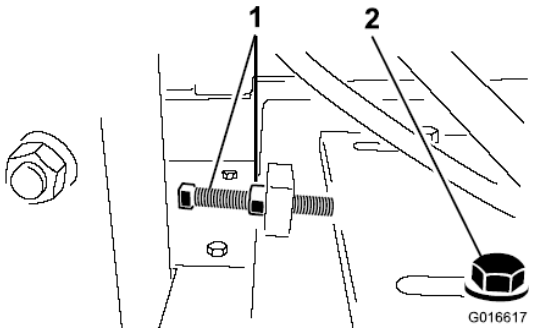


Figure 29

1. Tension bolt and jam nut 2. Engine mounting bolt

5. Replace drive belt.
6. Adjust the drive belt tension by tightening tension bolt and jam nut against the engine mounting plate.
7. Lay a straightedge across clutch and flywheel pulleys, tighten belt tension bolt so there is 0.40 inch (1 cm) of flex in the belt when pushing down with 15 lb. (6.8 kg) pressure, at mid-span.

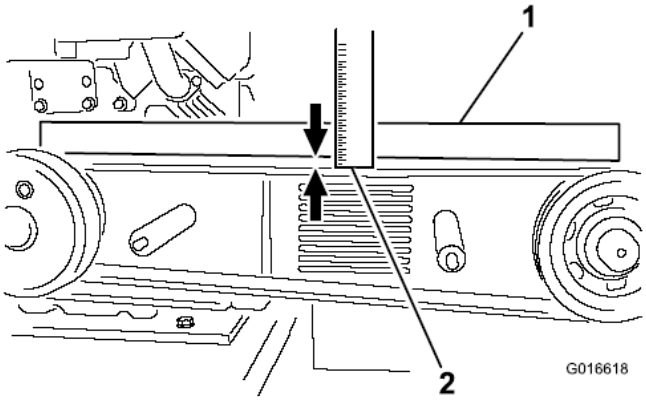


Figure 30

1. Straightedge 2. Flex of 0.40 in (1 cm)

8. Tighten the four (4) engine plate mounting bolts and four (4) bolts securing the rear of the belt guard to the engine.
9. Install belt guard and secure with previously removed washers and nuts.

Replacing the Cutter Blades

Service Interval: Before each use check the cutter blades for nicks and sharpness.

NOTE: Using a dull knife will decrease performance and cause excessive vibrations that will cause damage to the Brush Chipper or engine.

⚠ WARNING
Before performing any maintenance procedure or inspection, stop the engine, wait five minutes to allow all moving parts to come to a complete stop and cool. Disconnect the spark plug wires, keeping them away from the spark plugs.

1. Remove the bolt and washer securing the flywheel housing cover, swing it forward to expose the flywheel.
2. Rotate the flywheel using a stick until the bolts and lock nuts attaching the cutter blades to the flywheel are accessible (Figure 31).

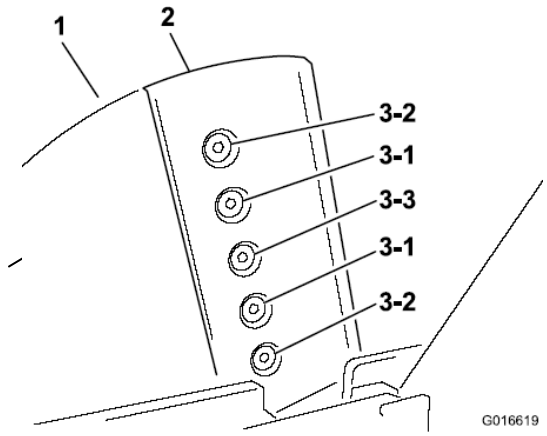


Figure 31

1. Flywheel 2. Blade
3. Sequence for tightening (3-1, 3-2, 3-3)

3. Reverse the cutting edge of the blades or remove the dull or damaged cutter blades. Visually inspect the flywheel slots for damage. The blade mounting areas must be clean so the blades mount flush against the flywheel.

IMPORTANT: It is extremely important to consistently maintain the 35-degree angle for proper chipping performance.

4. Install reversed, new, or sharpened blades and finger tighten the bolts and lock nuts to hold the blades to the flywheel.
5. Tighten the center screws and nuts first, then tighten the outer screws and nuts, and finally tighten the inner screw and nut. See sequence for tightening (Figure 31).
6. Torque the blade bolts to 37-48 ft. lbs (51-65 N·m).
7. Scrape any sap, mulch, and dirt from inside the top cover of the housing to prevent the flywheel from rubbing on it.

Inspecting the Cutter Block

Check the gap between the blade and cutter block.

Make sure the cutter block has a crisp edge and is no farther than 1/8” (3.2 mm) away from the blade (Figure 32). If the cutter block is worn or chipped it should be replaced.

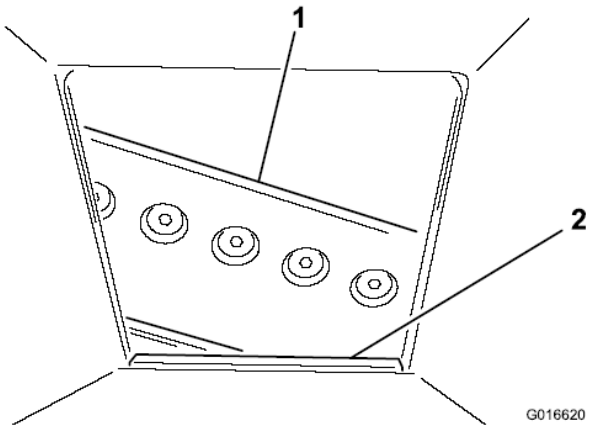


Figure 32

1. Blade 2. Cutter block

Lubricate the Wheel Bearings

Service Interval: Every 500 hours.
Lubricate the wheel bearings with several pumps of No. 2 General Purpose lithium base grease (Figure 33).

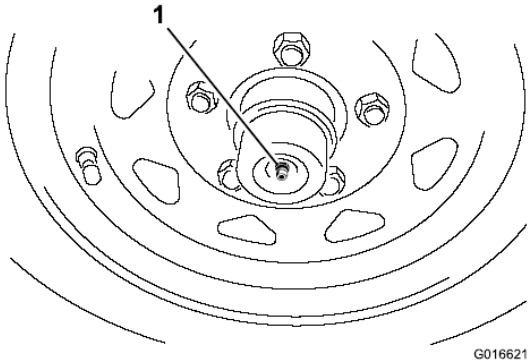


Figure 33

1. Grease zerk

Inspecting the Tires

Service Interval: Every 100 hours.

IMPORTANT Keep tires properly inflated. Failure to maintain correct pressure may result in tire failure and loss of control resulting in serious injury and property damage.

Operating accidents can damage a tire or rim, so inspect tire condition after an accident.

Check the tire pressure frequently to ensure proper inflation. If the tires are not inflated to the correct pressure, the tires will wear prematurely.

Always replace worn or damaged tires with DOT approved tires.

See (Figure 34) for the location of the tire identification numbers.

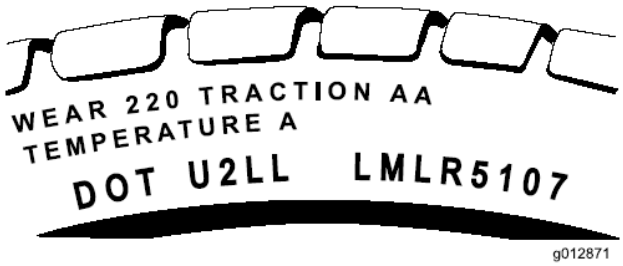


Figure 34

Figure 35 is an example of tire wear caused by under inflation.

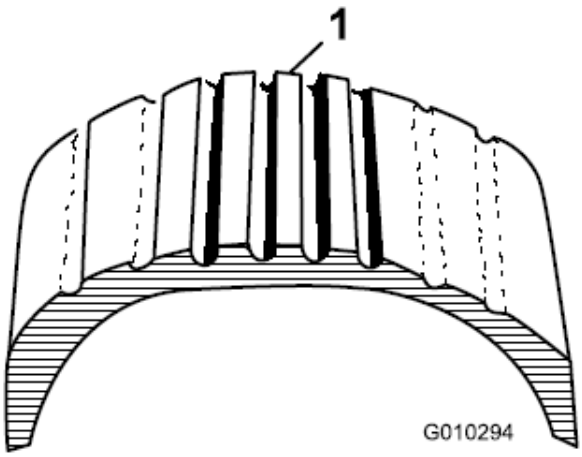


Figure 35

1. Under inflated tire

Figure 36 is an example of tire wear caused by over inflation.

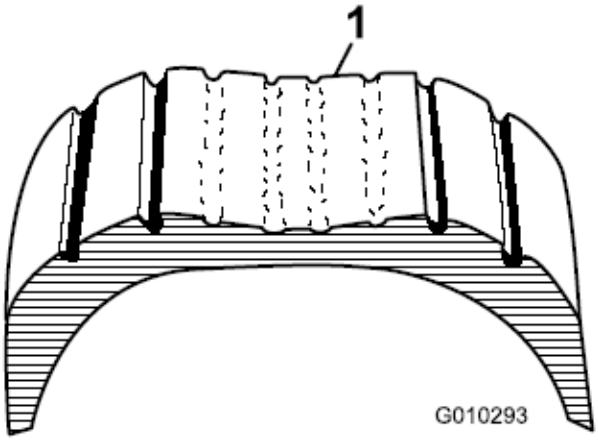


Figure 36

1. Over inflated tire

Storage

For storage over 30 days, prepare the unit as follows:

1. Remove dirt and grime from the external parts of the entire unit, especially the engine. Clean dirt and wood chips from the outside of the engine cylinder head fins and blower housing.
2. Add a petroleum based stabilizer/conditioner to fuel in the tank. Follow mixing instructions from stabilizer manufacturer. (1 oz per US gallon). **Do not use an alcohol based stabilizer (ethanol or methanol).**

NOTE: Fuel stabilizer/conditioner is most effective when mixed with fresh gasoline and used at all times.

3. Run the engine to distribute conditioned fuel through the fuel system (5 minutes).
4. Stop the engine, allow it to cool and drain the fuel tank using a pump type siphon. Dispose of fuel properly. Recycle as per local codes.

IMPORTANT: Do not store stabilizer/conditioned gasoline over 90 days.

5. Restart the engine and run it until it stops.
6. Choke the engine.
7. Start and run the engine until it will not start again.
8. Change the fuel filter; refer to Changing the Fuel Filter.
9. Service the air cleaner; refer to Servicing the Air Cleaner.
10. Service the engine oil and filter; refer to Changing the Engine Oil and Filter.
11. Remove the spark plugs and check the condition; refer to Servicing the Spark Plug.
12. With the spark plugs removed from the engine, pour two tablespoons of engine oil into each spark plug hole.
13. Place rags over the spark plug holes to catch any oil spray, then use the starter to crank the engine and distribute the oil inside the cylinder.
14. Install the spark plugs, but do not install the wires on the spark plugs.
15. Check and tighten all bolts, nuts, and screws. Repair or replace any damaged parts.
16. Paint all scratched or bare metal surfaces. Paint is available from your Authorized Service Dealer.
17. Store the unit in a clean, dry garage or storage area.
18. Cover the unit to protect it and keep it clean.

Troubleshooting

Problem	Cause	Remedy
The engine will not start.	1. The engine switch is in the Off position. 2. The choke is open. 3. The fuel tank is empty 4. Throttle is not in correct position. 5. The spark plug(s) are fouled, wire is loose or disconnected.	1. Turn the engine switch to the ON position. 2. Close the choke when starting a cold engine. 3. Fill tank with fresh fuel. 4. Move throttle to correct position. 5. Check the electrode gap and clean or replace the spark plug.
The engine runs rough.	1. The choke is on. 2. The air filter is clogged. 3. The fuel filter is clogged. 4. There is water or contaminants in the fuel. 5. The spark plug(s) are worn or have buildup on the electrodes.	1. Open the choke. 2. Clean or replace the air filter. 3. Clean the fuel filter. 4. Drain and fill the tank with fresh fuel. Clean the fuel filter. 5. Check electrode gap and clean or replace the spark plug.
Chipping action seems slow or flywheel stalling.	1. The engine speed is too slow causing the clutch to slip. 2. Check for loose or damaged drive belt. 3. Check for a dull or damaged blades.	1. Run the engine at full throttle. 2. Tighten or replace drive belt. 3. Replace with sharp blades.
Flywheel does not turn.	1. Build-up of chips and debris around flywheel. 2. Check for loose or damaged drive belt. 3. Clutch overheated or damaged.	1. Remove any built-up debris from the hopper inlet, flywheel housing, and discharge chute. 2. Check the drive belt tension. 3. Replace clutch.
Drive belt worn, burned, or jumps off of pulley.	1. Improper drive belt adjustment. 2. The drive belt may be stretched. 3. Pulleys out of alignment.	1. Check the drive belt tension. 2. Replace drive belt. 3. Align engine/clutch pulley with flywheel.
The machine has excessive vibration.	1. Check for a dull or damaged blades. 2. Blades may not be properly seated on the flywheel. 3. Gap between the blades and cutter block is too great.	1. Replace with sharp blades. 2. Loosen the blade mounting screws, reset the blades and tighten the screws. 3. Adjust the cutter block clearance or replace the cutter block.

Notes:

Toro Compact Utility Equipment Warranty

A One-Year Limited Warranty

CUE Products

Conditions and Products Covered

The Toro® Company and its affiliate, Toro Warranty Company, pursuant to an agreement between them, jointly warrant your Toro Compact Utility Equipment ("Product") to be free from defects in materials or workmanship. The following time periods apply from the date of purchase:

Products	Warranty Period
Loaders, Trenchers, Stump Grinders, Chippers, Log Splitters, and Attachments	1 year or 1000 operating hours, whichever occurs first
Kohler Engines	3 years
All other Engines	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 procedure:

1. Contact any Authorized Toro Compact Utility Equipment (CUE) Service Dealer to arrange service at their dealership. To locate a dealer convenient to you, access our website at www.Toro.com. You may also call our Toro Customer Care Department toll free at 888-865-5676 (U.S. customers) or 888-865-5691 (Canadian customers).
2. Bring the product and your proof of purchase (sales receipt) to the Service Dealer.
3. If for any reason you are dissatisfied with the Service Dealer's analysis or with the assistance provided, contact us at:

   LCB Customer Care Department
   Toro Warranty Company
   8111 Lyndale Avenue South
   Bloomington, MN 55420-1196
   Toll Free: 888-865-5676 (U.S. customers)
   Toll Free: 888-865-5691 (Canada customers)

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 the use of non-Toro replacement parts, or from installation and use of add-on, modified, or unapproved accessories
- Product failures which result from failure to perform required maintenance and/or adjustments
- 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, or used up, during normal Product operation include, but are not limited to, teeth, tines, blades, spark plugs, tires, tracks, filters, chains, etc.
- Failures caused by outside influence. Items considered to be outside influence include, but are not limited to, weather, storage practices, contamination, use of unapproved coolants, lubricants, additives, or chemicals, etc.
- Normal "wear and tear" items. Normal "wear and tear" includes, but is not limited to, worn painted surfaces, scratched decals or windows, etc.
- Any component covered by a separate manufacturer's warranty
- Pickup and delivery charges

General Conditions

Repair by an Authorized Toro Compact Utility Equipment (CUE) Service Dealer is your sole remedy under this 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). The hour limitations set forth above do not apply to the Emissions Control System Warranty. Refer to the California Emission Control Warranty Statement supplied with your Product or contained in the engine manufacturer's documentation for details.

Countries Other than the United States or Canada

Customers who have purchased Toro products exported from 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.