Form No. 3396-206 Rev A

TORO®

Count on it.

Operator's Manual

Groundsmaster® 3500-G Rotary Mower

Model No. 30809—Serial No. 315000001 and Up

Register at www.Toro.com.
Original Instructions (EN)

3396-206 A

⚠ WARNING

CALIFORNIA
Proposition 65 Warning

This product contains a chemical or chemicals known to the State of California to cause cancer, birth defects, or reproductive harm.

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

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.

Introduction

This machine is a ride-on, rotary-blade lawnmower intended to be used by professional, hired operators in commercial applications. It is primarily designed for cutting grass on well-maintained lawns in parks, golf courses, sports fields, and on commercial grounds. It is not designed for cutting brush, mowing grass and other growth alongside highways, or for agricultural uses.

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 identifies the location of the model and serial numbers on the product. Write the numbers in the space provided.

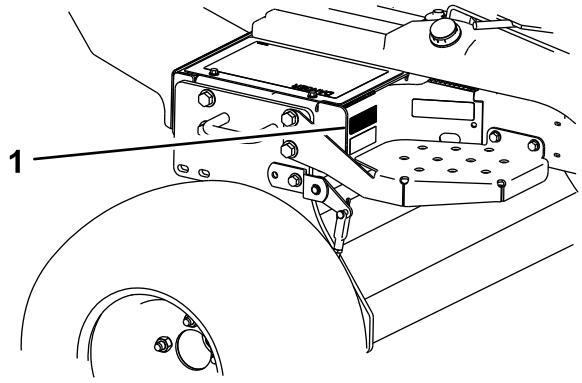


Figure 1

1. Model and serial number location

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

This machine meets or exceeds ANSI B71.4-2012 specifications when equipped with required weight as listed in Rear Ballast section.

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 ANSI standard B71.4-2012.

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 people or damage to 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.
- Inspect the area where the equipment is to be used and remove all objects such as rocks, toys and wire which can be thrown by the machine.
- Check that operator's presence controls, safety switches and shields are attached and functioning properly. Do not operate unless they are functioning properly.

Operation

- This product is capable of amputating hands and feet, and throwing objects. Always follow all safety instructions to avoid serious injury or death.
- Use of this product for purposes other than its intended use could prove dangerous to the user and bystanders.
- Do not operate the engine in a confined space where dangerous carbon monoxide and other exhaust gasses can collect.
- Only operate in good light, keeping away from holes and hidden hazards.
- Be sure all drives are in neutral and parking brake is engaged before starting engine. Only start engine from the operator's position.
- Always wear substantial, slip-resistant footwear, long trousers, hard hat, safety glasses, and hearing protection while mowing. Long hair, loose clothing, or jewelry may get tangled in moving parts. Do not operate the machine when barefoot or wearing open sandals.
- Slow down and use extra care on hillsides. Be sure to travel side to side on hillsides. Turf conditions can affect the machine's stability. Use caution while operating near drop-offs.
- Slow down and use caution when making turns and when changing directions on slopes.
- Never raise deck with the blades running.
- Never operate with the PTO shield, or other guards not securely in place. Be sure all interlocks are attached, adjusted properly, and functioning properly.
- Never operate with the discharge deflector raised, removed or altered, unless using a grass catcher.
- Do not change the engine governor setting or overspeed the engine.
- Before leaving the operator's position for any reason including emptying the catchers or unclogging the chute, stop on level ground, disengage drives, engage parking brake (if provided), shut off engine and remove the key from the ignition.
- Stop equipment and inspect blades after striking objects or if an abnormal vibration occurs. Make necessary repairs before resuming operations.
- Look behind and down before backing up to be sure of a clear path.
- Keep pets and bystanders away.
- Slow down and use caution when making turns and crossing roads and sidewalks. Stop blades if not mowing.
- Be aware of the mower discharge direction and do not point it at anyone.
- Do not operate the mower under the influence of alcohol or drugs.
- Use care when loading or unloading the machine into or from a trailer or truck.
- Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.
- 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.
- Know how to stop the machine and engine quickly.
- Keep hands, feet, and clothing away from moving parts and the cutting unit.

- Check the safety interlock switches daily for proper operation. If a switch should fail, replace the switch before operating the machine.
- When starting the engine, engage the parking brake, put the traction pedal in neutral, and disengage the blade drive. After the engine starts, release the parking brake and keep your foot off of the traction pedal. The machine must not move. If movement is evident, refer to the Maintenance section of this manual to adjust the traction drive.
- Use extreme caution when operating close to sand traps, ditches, creeks, steep hillsides, or other hazards.
- Reduce speed when making sharp turns.
- Do not turn on hills.
- Do not operate on a side hill that is too steep. A rollover may occur before losing traction.
- The slope angle at which the machine will tip is dependent on many factors. Among these are mowing conditions such as wet or undulating terrain, speed (especially in turns), position of the cutting-units (with the Sidewinder), tire pressure, and operator experience. At side hill angles of 20 degrees or less, the risk of a rollover is low. As the slope angle increases to a recommended maximum limit of 25 degrees, the risk of a rollover increases to a moderate level. **Do not exceed a 25 degree side hill slope angle because the risk of a rollover and serious injury or death is very high.**
- For steering control, lower the cutting-units when going down slopes.
- Avoid sudden stops and starts.
- Use the reverse pedal for braking.
- Watch for traffic when near or crossing roads. Always yield the right-of-way.
- Raise the cutting-units when driving from one work area to another.
- Do not touch the engine, muffler, exhaust pipe, or hydraulic tank while the engine is running or soon after it has stopped. These areas could be hot enough to cause burns.
- This machine is not designed or equipped for on-road use and is a slow-moving vehicle. If you must cross or travel on a public road, you should be aware of and comply with local regulations, such as required lights, slow moving vehicle signs, and reflectors.

Rollover Protection System (ROPS) - Use and Maintenance

- The ROPS is an integral and effective safety device.
- **Do not** remove the ROPS.
- Be certain that the seat belt can be released quickly in the event of an emergency.
- Check carefully for overhead clearances (i.e. branches, doorways, electrical wires) before driving under any objects and do not contact them.
- Any alterations to a ROPS must be approved by the manufacturer.
- Keep the ROPS in safe operating condition. Thoroughly inspect for damage periodically and always keep all mounting fasteners tight.
- Replace a damaged ROPS. Do not repair or revise.

Safe Handling of Fuels

- To avoid personal injury or property damage, use extreme care in handling gasoline. Gasoline is extremely flammable and the vapors are explosive.
- Extinguish all cigarettes, cigars, pipes, and other sources of ignition.
- Use only an approved fuel container.
- Never remove fuel cap or add fuel with the engine running.
- Allow engine to cool before refueling.
- Never refuel the machine indoors.
- Never store the machine or fuel container where there is an open flame, spark, or pilot light such as on a water heater or on other appliances.
- Never fill containers inside a vehicle or on a truck or trailer bed with a plastic liner. Always place containers on the ground away from your vehicle before filling.
- Remove equipment from the truck or trailer and refuel it on the ground. If this is not possible, then refuel such equipment with a portable container, rather than from a fuel dispenser nozzle.
- 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 a nozzle lock-open device.
- Fill the fuel tank until level is 6 to 13 mm (1/4 to 1/2 inch) below the bottom of the filler neck. Do not overfill.
- If fuel is spilled on clothing, change clothing immediately.
- Never overfill fuel tank. Replace fuel cap and tighten securely.

Maintenance and Storage

- Disengage drives, set parking brake, stop engine and remove key or disconnect spark plug wire. Wait for all movement to stop before adjusting, cleaning, or repairing.
- Clean grass and debris from cutting unit, drives, mufflers, and engine to help prevent fires. Clean up oil or fuel spillage.
- Let engine cool before storing and do not store near flame.
- Shut off fuel while storing or transporting. Do not store fuel near flames or drain indoors.
- Park machine on level ground. Set parking brake.
- Never allow untrained personnel to service machine.
- Use jack stands to support components when required.

- Carefully release pressure from components with stored energy.
- Disconnect the battery or remove spark plug wire before making any repairs. Disconnect the negative terminal first and the positive last. Reconnect the positive first and negative last.
- Use care when checking blades. Wrap the blade(s) or wear gloves, and use caution when servicing them. Only replace blades. Never straighten or weld them.
- 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 worn or damaged decals.
- Keep your body and hands away from pin-hole leaks or nozzles that eject hydraulic fluid under high pressure. If fluid is injected into the skin, it must be surgically removed within a few hours, by a doctor familiar with this form of injury or gangrene may result.
- Hydraulic fluid escaping under pressure can have sufficient force to penetrate the skin and cause serious injury. Use paper or cardboard, not your hands, to search for leaks.
- Before disconnecting or performing any work on the hydraulic system, all pressure in the system must be relieved by stopping the engine and lowering the cutting-units to the ground.
- Make sure that all hydraulic-line connectors are tight and all hydraulic hoses and lines are in good condition before applying pressure to the system.
- If the engine must be running to perform a maintenance adjustment, keep hands, feet, clothing, and any parts of the body away from the cutting-units, attachments, and any moving parts. Keep everyone away.
- Do not overspeed the engine by changing governor settings. To ensure safety and accuracy, have an Authorized Toro Distributor check the maximum engine speed with a tachometer.
- The engine must be shut off before checking the oil or adding oil to the crankcase.
- If major repairs are ever needed or if assistance is desired, contact an Authorized Toro Distributor.
- To ensure optimum performance and continued safety certification of the machine, use only genuine Toro replacement parts and accessories. Replacement parts and accessories made by other manufacturers could be dangerous, and such use could void the product warranty.

Hauling

- Use care when loading or unloading the machine into a trailer or truck.
- Use full width ramps for loading machine into trailer or truck.
- Tie the machine down securely using straps, chains, cable, or ropes. Both front and rear straps should be directed down and outward from the machine.

Sound Power Level

This unit has a guaranteed sound power level of 106 dBA, which includes an Uncertainty Value (K) of 1 dBA.

Sound power level was determined according to the procedures outlined in ISO 11094.

Sound Pressure Level

This unit has a sound pressure level at the operator's ear of 93 dBA, which includes an Uncertainty Value (K) of 1 dBA.

Sound pressure level was determined according to the procedures outlined in EN 836.

Vibration Level

Hand-Arm

Measured vibration level for right hand = 0.5 m/s^2

Measured vibration level for left hand = 0.7 m/s^2

Uncertainty Value (K) = 0.5 m/s^2

Measured values were determined according to the procedures outlined in EN 836.

Whole Body

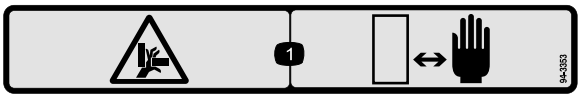
Measured vibration level = 0.44 m/s^2

Uncertainty Value (K) = 0.5 m/s^2

Measured values were determined according to the procedures outlined in EN 836.

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.

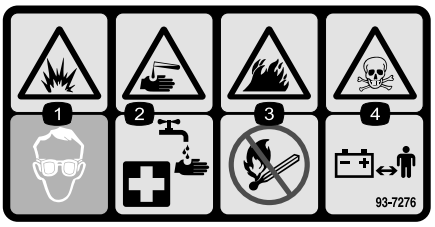


94-3353

1. Crushing hazard of hand—keep your hands a safe distance away.

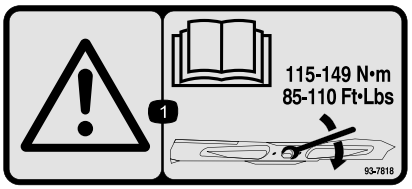


100-4837



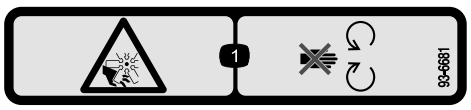
93-7276

1. Explosion hazard—wear eye protection.
2. Caustic liquid/chemical burn hazard—to perform first aid, flush with water.
3. Fire hazard—no fire, open flames, or smoking.
4. Poison hazard—keep children a safe distance from the battery.



93-7818

1. Warning—read the *Operator's Manual* for instructions on torquing the blade bolt/nut to 85-110 ft-lb (115-149 N-m).



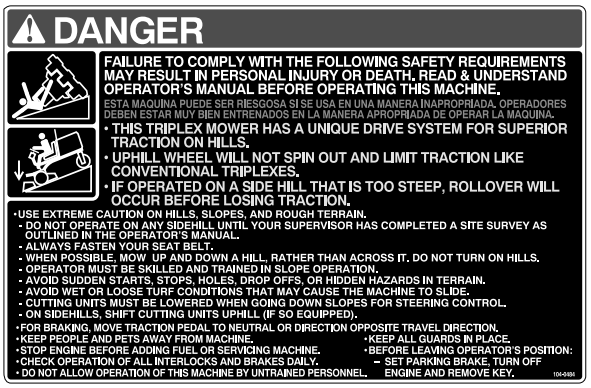
93-6681

1. Cutting/dismemberment—hazard, fan-stay away from moving parts.

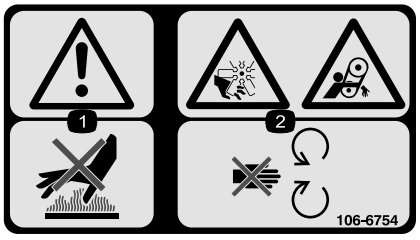


106-6755

1. Engine coolant under pressure.
2. Explosion hazard—read the *Operator's Manual.*
3. Warning—do not touch the hot surface.
4. Warning—read the *Operator's Manual.*



104-0484



106-6754

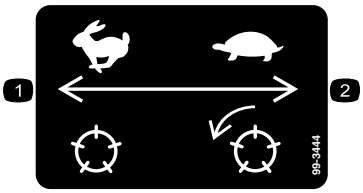
1. Warning—do not touch the hot surface.
2. Cutting/dismemberment hazard, fan and entanglement hazard, belt—stay away from moving parts.



Battery Symbols

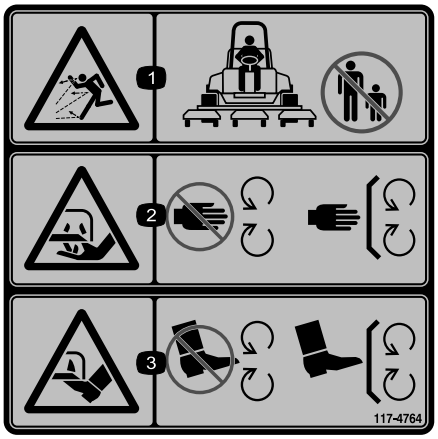
Some or all of these symbols are on your battery

1. Explosion hazard
2. No fire, open flame, or smoking.
3. Caustic liquid/chemical burn hazard
4. Wear eye protection
5. Read the *Operator's Manual.*
6. Keep bystanders a safe distance from the battery.
7. Wear eye protection; explosive gases can cause blindness and other injuries
8. Battery acid can cause blindness or severe burns.
9. Flush eyes immediately with water and get medical help fast.
10. Contains lead; do not discard.



99-3444

1. Transport speed—fast
2. Mowing speed—slow

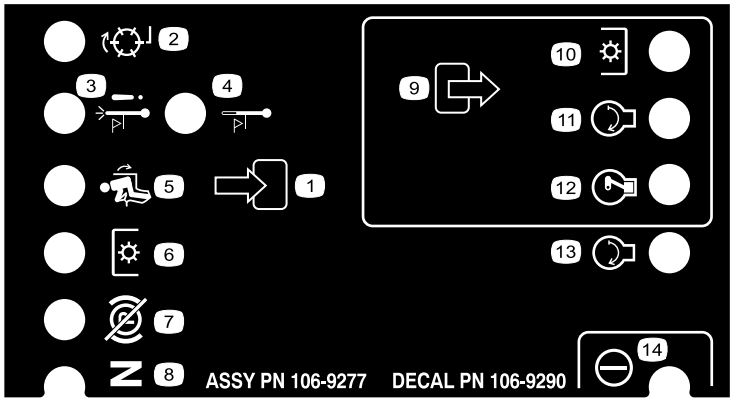


117-4764

1. Thrown object hazard—keep bystanders a safe distance from the machine.
2. Cutting hazard of hand, mower blade—stay away from moving parts, keep all guards and shields in place.
3. Cutting hazard of foot, mower blade—stay away from moving parts, keep all guards and shields in place.

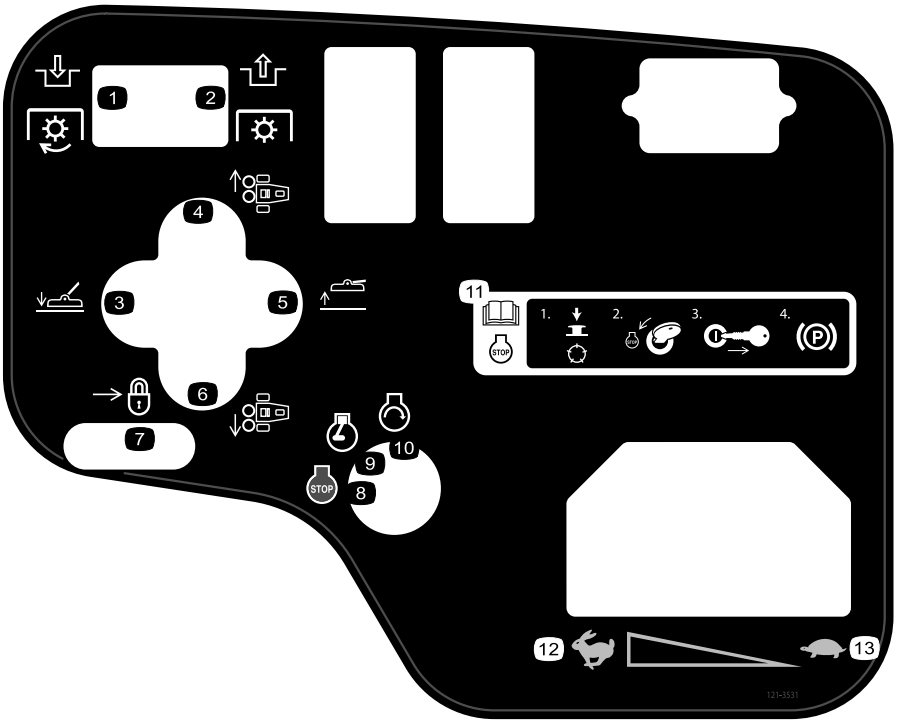


107–1971



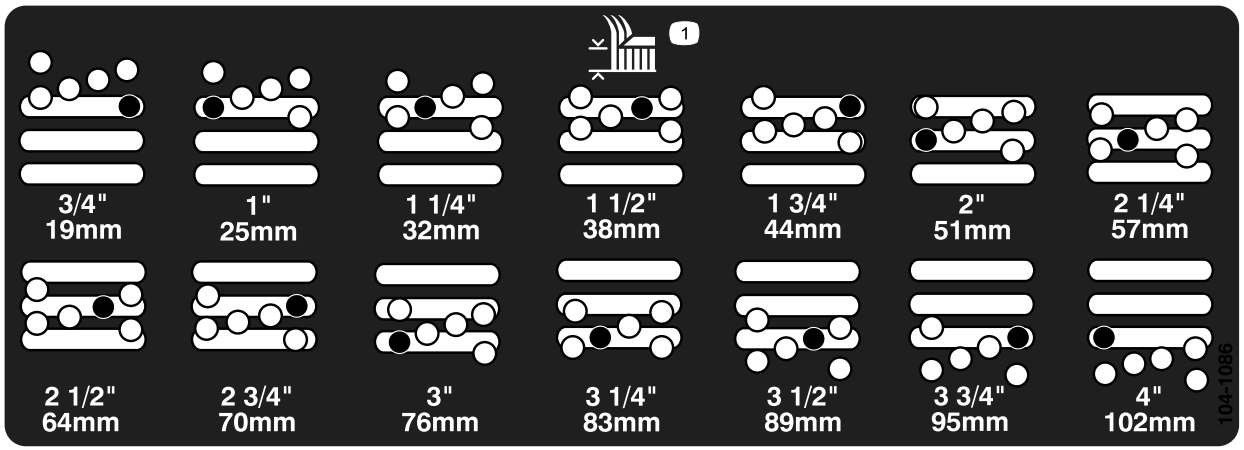
106-9290

1. Inputs
2. Not active
3. High-temperature shutdown
4. High-temperature warning
5. In seat
6. Power Take-off (PTO)
7. Parking brake Off
8. Neutral
9. Outputs
10. Power Take-off (PTO)
11. Start
12. Energize to Run (ETR)
13. Start
14. Power



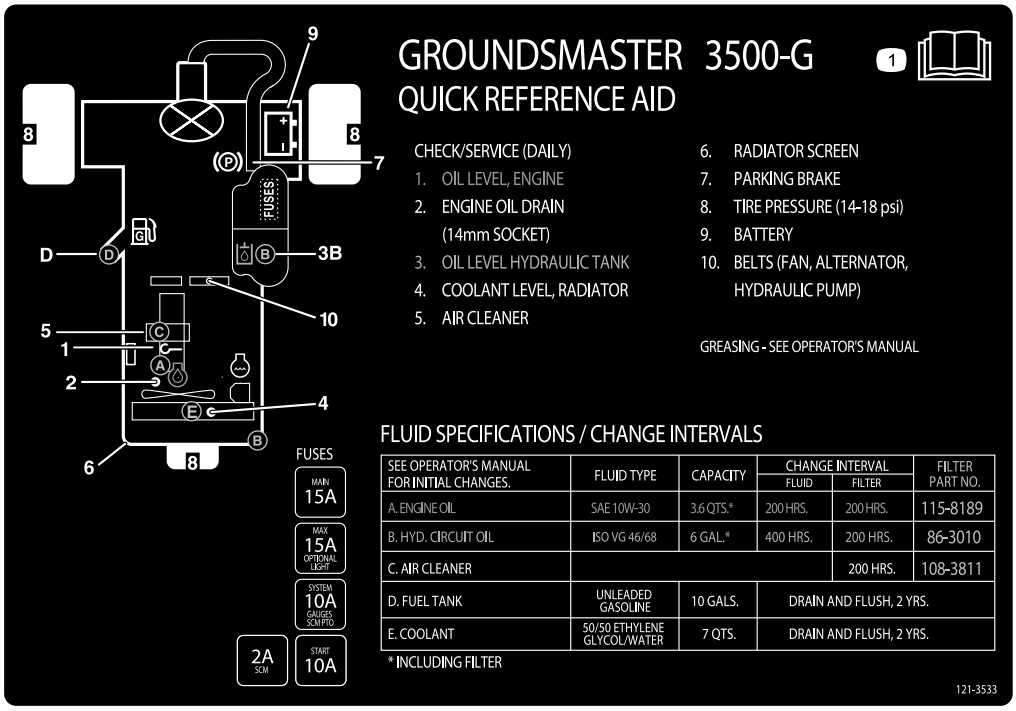
121–3531

1. Engage PTO
2. Disengage PTO
3. Lower cutting unit
4. Move right
5. Raise cutting unit
6. Move left
7. Lock
8. Engine—stop
9. Engine—run
10. Engine—start
11. Read the *Operator's Manual* for information on stopping the engine—1) Disengage the reel; 2) Move the key to the engine stop position; 3) Remove the key from the ignition; 4) Engage the parking brake.
12. Fast
13. Slow



104-1086

1. Height of cut



121–3533

1. Read the *Operator's Manual* for information on maintenance.

Setup

Loose Parts

Use the chart below to verify that all parts have been shipped.

Procedure	Description	Qty.	Use
1	No parts required	–	Activate, charge, and connect the battery.
2	No parts required	–	Check the angle indicator.
3	No parts required	–	Adjust the lift arms.
4	No parts required	–	Adjust the carrier frame.
5	No parts required	–	Adjust the height of cut.
6	No parts required	–	Check the fluid levels.
7	No parts required	–	Adjust the optional roller scraper.
8	No parts required	–	Install the optional mulching baffle.

Media and Additional Parts

Description	Qty.	Use
Ignition keys	2	Start the engine.
Operator's Manual Engine Operator's Manual	1 1	Read before operating the machine.
Parts Catalog	1	Use to look up and order parts.
Operator video	1	View before operating the machine.

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

1

Activating, Charging, and Connecting the Battery

No Parts Required

Procedure

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.

Note: If the battery is not filled with electrolyte or activated, bulk electrolyte with 1.260 specific gravity must be purchased from a local battery supply outlet and added to the battery.

⚠ DANGER

Battery electrolyte contains sulfuric acid which is a deadly poison and causes severe burns.

- **Do not drink electrolyte and avoid contact with skin, eyes, or clothing. Wear safety glasses to shield your eyes and rubber gloves to protect your hands.**
- **Fill the battery where clean water is always available for flushing the skin.**

1. Open the hood.
2. Remove the battery cover (Figure 3).

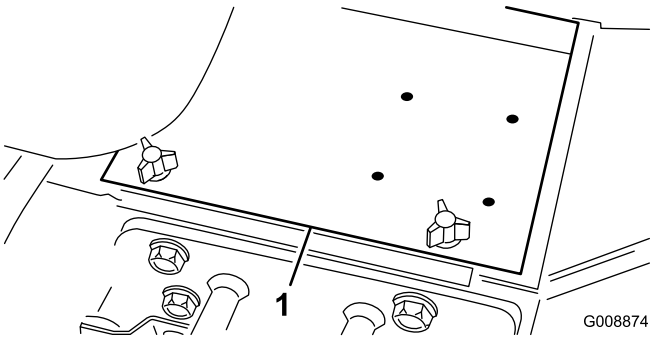


Figure 3

1. Battery cover

3. Remove the filler caps from the battery and slowly fill each cell until electrolyte is just above the plates.
4. Install the filler caps and connect a 3 to 4 amp battery charger to the battery posts. Charge the battery at a rate of 3 to 4 amperes for 4 to 8 hours.

⚠ WARNING

Charging the battery produces gasses that can explode.

- **Keep sparks and flames away from battery.**
- **Never smoke near the battery.**

5. When the battery is charged, disconnect the charger from the electrical outlet and battery posts.
6. Remove the filler caps. Slowly add electrolyte to each cell until the level is up to the fill ring. Install the filler caps.

Important: Do not overfill the battery. Electrolyte will overflow onto other parts of the machine and severe corrosion and deterioration will result.

7. Install the positive cable (red) to the positive (+) terminal and the negative cable (black) to the negative (–) terminal of the battery and secure them with bolts and nuts (Figure 4). Make sure that the positive (+) terminal is all of the way onto the post and the cable is positioned snug to the battery. The cable must not contact the battery cover.

⚠ WARNING

Incorrect battery cable routing could damage the traction unit and cables causing sparks. Sparks can cause the battery gasses to explode, resulting in personal injury.

- **Always disconnect the negative (black) battery cable before disconnecting the positive (red) cable.**
- **Always connect the positive (red) battery cable before connecting the negative (black) cable.**

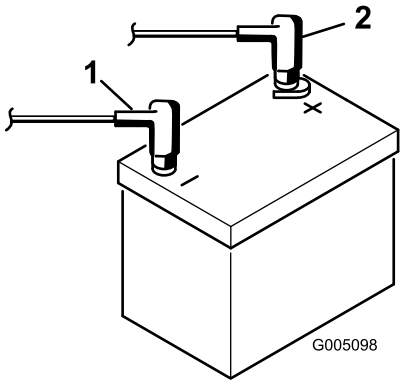


Figure 4

1. Positive (+) battery cable
2. Negative (–) battery cable

Important: **If the battery is ever removed, make sure that the battery clamp bolts are installed with the bolt heads positioned on the bottom side and the nuts on the top side. If the clamp bolts are reversed, they may interfere with the hydraulic tubes when shifting the cutting-units.**

8. Coat both battery connections with Grafo 112X (skin over) grease, Toro Part No. 505-47, petroleum jelly, or light grease to prevent corrosion.
9. Slide the rubber boot over the positive terminal to prevent a possible short from occurring.
10. Install the battery cover.

2

Checking the Angle Indicator

No Parts Required

Procedure

⚠ DANGER

Do not operate the machine on side hills steeper than 25º to reduce risk of injury or death due to rollover.

1. Park the machine on a flat, level surface.
2. Verify that the machine is level by placing a hand held inclinometer (supplied with the machine) on the frame cross rail, by the fuel tank (Figure 5). The inclinometer should read zero degrees when viewed from the operator's position.

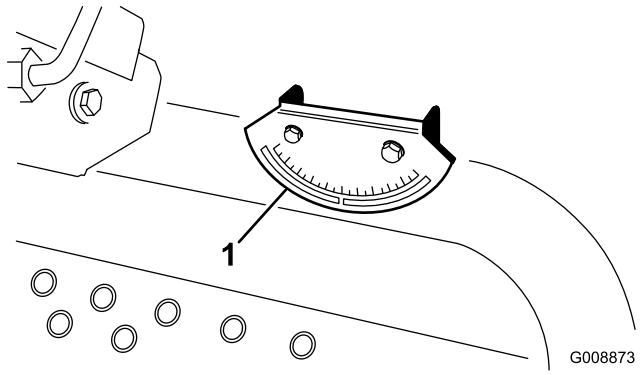


Figure 5

1. Angle indicator

3. If the inclinometer does not read zero degrees, move the machine to a location where a zero degree reading is obtained. The angle indicator, mounted on the machine, should now read zero degrees as well.
4. If the angle indicator does not read zero degrees, loosen the 2 screws and nuts securing the angle indicator to the mounting bracket, adjust the indicator to obtain a zero degree reading, and tighten the bolts.

3

Adjusting the Lift Arms

No Parts Required

Procedure

1. Start the engine, raise the cutting-units, and check to ensure that the clearance between each lift arm and the floor-plate bracket is 5 to 8 mm (0.18 to 0.32 inch) as shown in Figure 6.

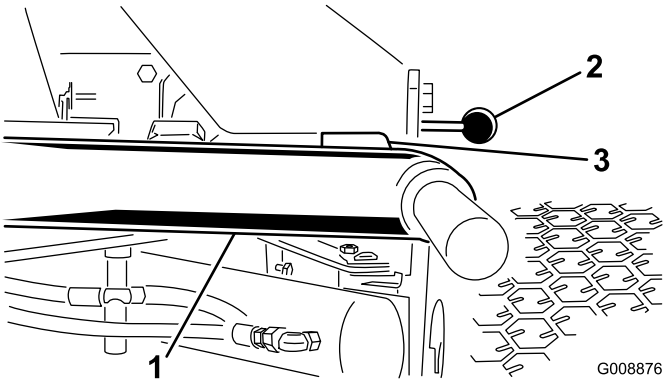


Figure 6

cutting-units removed for clarity

1. Lift arm
2. Floor-plate bracket
3. Clearance

If the clearance is not in this range, adjust it as follows:

A. Back off the stop bolts (Figure 7).

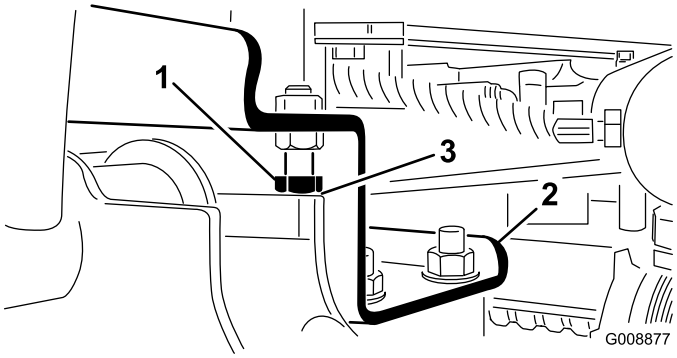


Figure 7

1. Stop bolt
2. Lift arm
3. Clearance

B. Back off the jam nut on the cylinder (Figure 8).

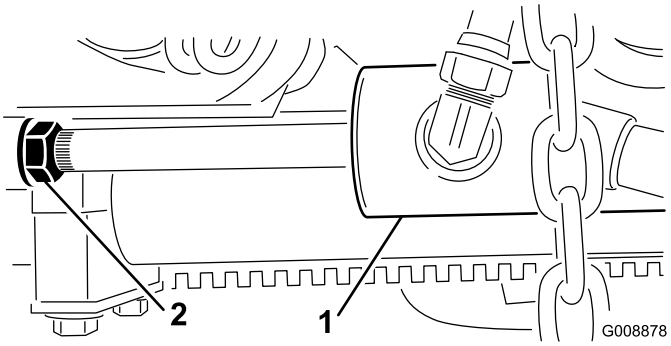


Figure 8

1. Front cylinder
2. Jam nut

C. Remove the pin from the rod end and rotate the clevis.

D. Install the pin and check the clearance. Repeat the procedure if required.

E. Tighten the clevis-jam nut.

2. Check to make sure that the clearance between each lift arm and stop bolt is 0.13 to 1.02 mm (0.005 to 0.040 inch) as shown in Figure 7. If the clearance is not in this range, adjust the stop bolts to attain clearance.
3. Start the engine, raise the cutting units, and check to make sure that the clearance between the wear strap on the top of the rear cutting unit wear bar and the bumper strap is 0.51 to 2.54 mm (0.02 to 0.10 inch) as shown in Figure 9.

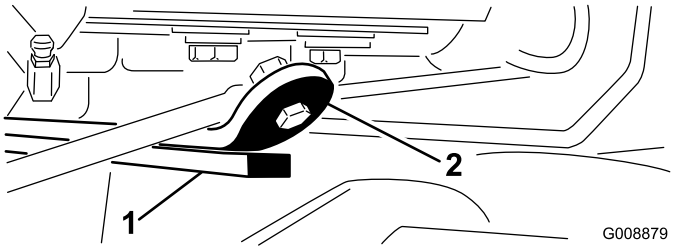


Figure 9

1. Wear bar
2. Bumper strap

If the clearance is not in this range, adjust the rear cylinder as follows:

Note: If the rear lift arm clunks during transport, clearance can be reduced.

A. Lower the cutting-units and back off the jam nut on the cylinder (Figure 10).

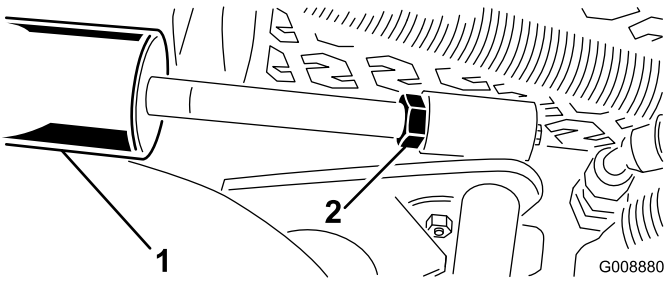


Figure 10

1. Rear cylinder
2. Adjusting nut

B. Grasp the cylinder rod close to the nut with a pliers and rag, and rotate the rod.

C. Raise the cutting-units and check the clearance. Repeat the procedure if required.

D. Tighten the clevis-jam nut.

Important: Lack of clearance at the front stops or rear wear bar could damage the lift arms.

4

Adjusting the Carrier Frame

No Parts Required

Adjusting the Front Cutting Unit

The front and rear cutting units require different mounting positions. The front cutting unit has 2 mounting positions depending on what height of cut and degree of rotation you desire.

1. For a height of cut in the 2 to 7.6 cm (3/4 to 3 inch) range, mount the front carrier frames in the lower, front mounting holes (Figure 11).

   Note: This permits more up travel of the cutting unit relative to the traction unit when approaching quick uphill changes in terrain. It does however limit the clearance of the chamber to the carrier when cresting sharp knolls.

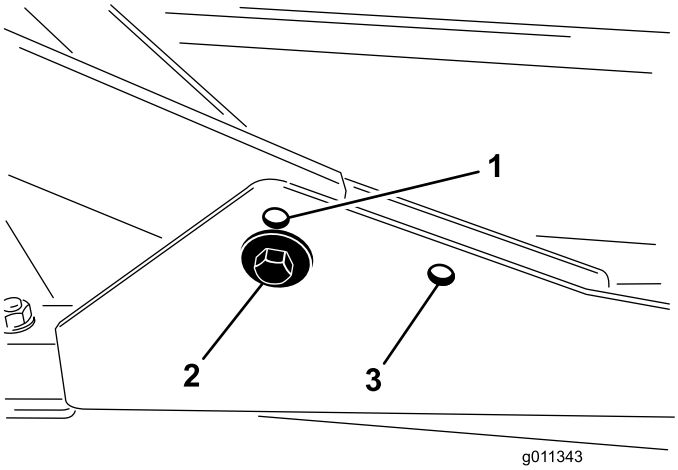


Figure 11

1. Upper, front mounting hole
2. Lower, front mounting hole
3. Rear mounting hole

2. For a height of cut in the 6.3 to 10 cm (2-1/2 to 4 inch) range, mount the front, carrier frames in the upper, front mounting holes (Figure 11).

   Note: This increases the chamber-to-carrier clearance due to the higher position of the cutting chamber, but will cause the cutting unit to reach their maximum up travel sooner.

Adjusting the Rear, Cutting Unit

The front and rear, cutting units require different mounting positions. The rear cutting unit has one mounting position for proper alignment with the sidewinder-under frame.

For all heights of cut, mount the rear cutting unit in the rear mounting holes (Figure 11).

5

Adjusting the Height of Cut

No Parts Required

Procedure

Important: This cutting unit often cuts approximately 6 mm (1/4 inch) lower than a reel-cutting unit with the same bench setting. It may be necessary to have the rotary-cutting unit bench set 6 mm (1/4 inch) above that of a reel-cutting unit in the same area.

Important: Access to the rear, cutting units is greatly improved by removing the cutting unit from the traction unit. If the unit is equipped with a Sidewinder®, sidewind the cutting units to the right, remove the rear cutting unit, and slide it out to the right side.

1. Lower the cutting unit to the ground, stop the engine, and remove the key from the ignition.
2. Loosen the bolt securing each height of cut bracket to the height of cut plate (front and each side) as shown in Figure 12.
3. Beginning with front adjustment, remove the bolt.

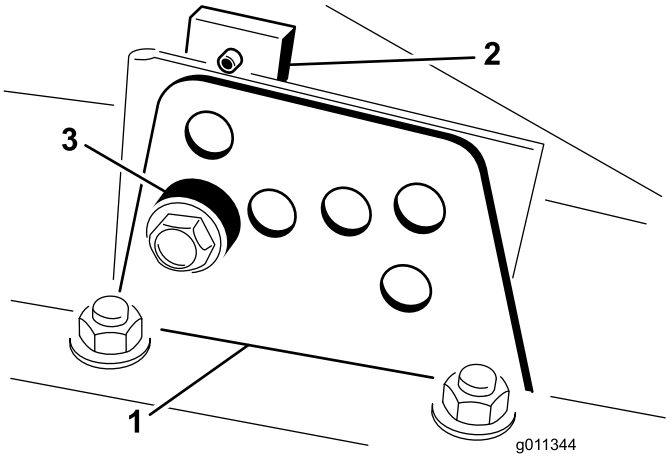


Figure 12

1. Height of cut bracket
2. Height of cut plate
3. Spacer

4. While supporting the chamber, remove the spacer (Figure 13).
5. Move the chamber to the desired height of cut and install a spacer into the designated height of cut hole and slot (Figure 13).

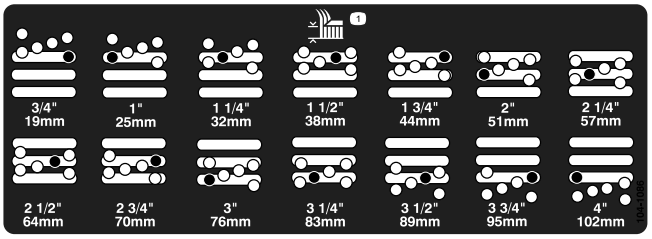


Figure 13

6. Position the tapped plate in line with the spacer.
7. Hand-tighten the bolts.
8. Repeat steps 4-7 for each side adjustment.
9. Tighten all 3 bolts to 41 N-m (30 ft-lb). Always tighten the front bolt first.

Note: Adjustments of more than 3.8 cm (1-1/2 inch) may require temporary assembly to an intermediate height to prevent binding.

6

Checking the Machine before Operation

No Parts Required

Procedure

Perform the following check before operation:

- Checking the Engine-Oil Level (page 19)
- Checking the Cooling System (page 22)
- Checking the Hydraulic System (page 22)
- Checking the Tire Pressure (page 23)
- Torquing the Wheel Nuts (page 40)

7

Adjusting the Optional Roller Scraper

No Parts Required

Procedure

The optional rear-roller scraper is designed to work best when there is an even gap of 0.5 to 1 mm (0.020–0.040 inch) between the scraper and roller.

1. Loosen the grease fitting and the mounting screw (Figure 14).

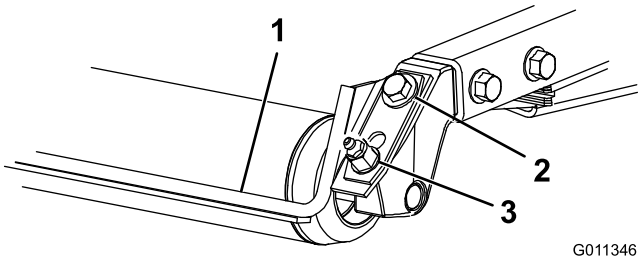


Figure 14

1. Roller scraper
2. Mounting screw
3. Grease fitting

2. Slide the scraper up or down until a gap of 0.5 to 1 mm (0.020 to 0.040 inch) is achieved between the rod and the roller.
3. Secure the grease fitting and screw to 41 N-m (30 ft-lb) in an alternating sequence.

8

Installing the Optional Mulching Baffle

No Parts Required

Procedure

1. Thoroughly clean debris from the mounting holes on the rear and left, side walls of the chamber.
2. Install the mulching baffle in the rear opening and secure it with 5 flange-head bolts (Figure 15).

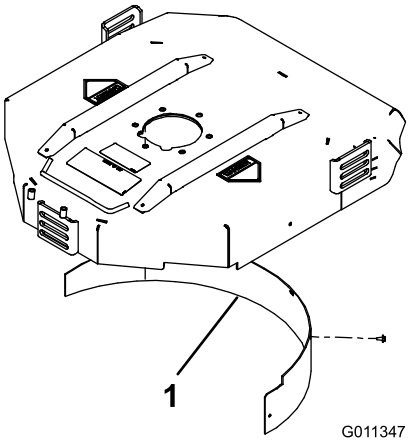


Figure 15

1. Mulching baffle

3. Verify that mulching baffle does not interfere with the tip of the blade and does not protrude inside the surface of the rear, chamber wall.

⚠ WARNING

Do not use the high-lift blade with the mulching baffle. The blade could break, resulting in personal injury or death.

Product Overview

Controls

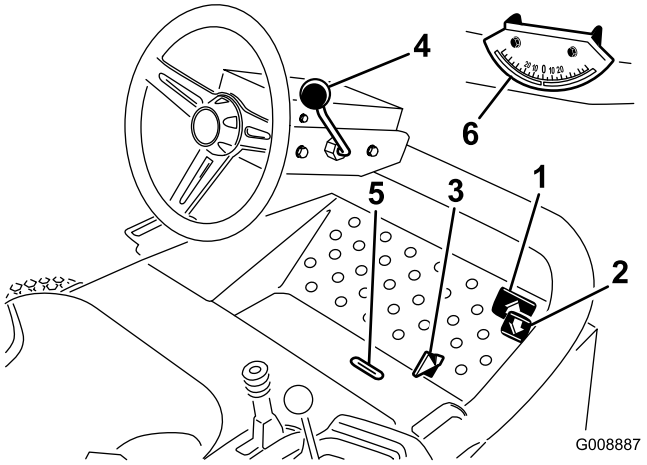


Figure 16

1. Forward-traction pedal
2. Reverse-traction pedal
3. Mow/transport slide
4. Tilt-steering lever
5. Indicator slot
6. Angle indicator

Traction Pedals

Press the forward-traction pedal (Figure 16) to move forward. Press the reverse-traction pedal (Figure 16) to move backward or to assist in stopping when moving forward. To stop the traction unit, move the pedal to, or allow it to move to, the neutral position.

Mow/Transport Slide

Using your heel to move the Mow/Transport slide (Figure 16) to the left to transport, and to the right to mow. **The cutting-units will only operate in the Mow position.**

Note: The mowing speed of the machine is set at the factory to 9.7 km/h (6 mph). The mowing speed can be increased or decreased by adjusting the speed-stop screw (Figure 17).

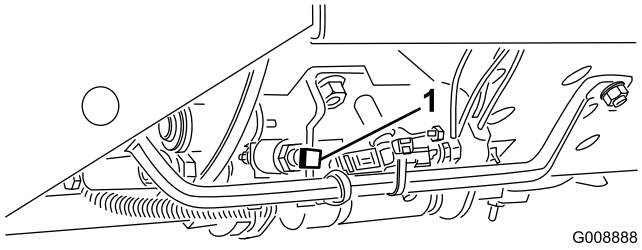


Figure 17

1. Speed-stop screw

Tilt-Steering Lever

Pull the tilt-steering lever (Figure 16) back to tilt the steering wheel to the desired position. Push the lever forward to lock the steering wheel into position.

Indicator Slot

The slot in the operator platform (Figure 16) indicates when the cutting-units are in the center position.

Angle Indicator

The angle indicator (Figure 16) indicates the side-hill angle of the machine in degrees.

Ignition Switch

Use the ignition switch (Figure 18) is used to start and stop the engine. The 3 positions of the switch are; Off, On, and Start. Rotate the key to the Start position to start the engine. Release the key when the engine starts. The key automatically moves to the On position when you release it. To shut the engine off, rotate the key to the Off position. Remove the key from the ignition to prevent someone from starting the machine unintentionally.

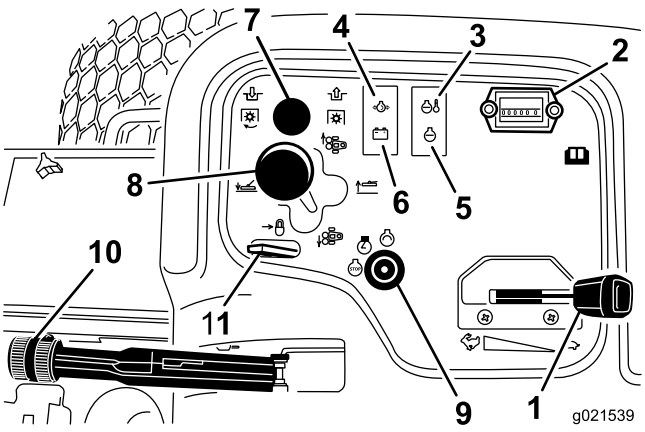


Figure 18

1. Throttle
2. Hour meter
3. Temperature light
4. Oil pressure light
5. Check engine light
6. Alternator light
7. PTO switch
8. Cutting-unit shift lever
9. Ignition switch
10. Parking brake
11. Lift lever lock

Throttle

Move the throttle (Figure 18) forward to increase the engine speed and rearward to decrease the engine speed.

PTO Switch

The PTO switch (Figure 18) has 2 positions: Out (start) and In (stop). Pull the PTO switch out to engage the cutting-unit blades. Push the switch in to disengage the cutting-unit blades.

Hour Meter

The hour meter (Figure 18) indicates the total hours of machine operation. The hour meter starts to function whenever the key switch is in the On position.

Cutting-Unit Lever

To lower the cutting units to the ground, move the cutting-unit lever (Figure 18) forward. The cutting units will not drop unless the engine is running. To raise the cutting units, pull the lever rearward to the Raise position.

Note: The lever does not have to be held in the forward position while the cutting units are lowered.

Move the lever to the right or left, to move the cutting units to the right or left. This should only be done when the cutting units are raised or if they are on the ground and the machine is moving.

⚠ DANGER

Shift the cutting units to the uphill side of the machine when on the side of a hill.

Using the cutting units on the downhill side of the machine can decrease stability. This could cause a rollover, which may result in personal injury or death.

Coolant-Temperature Light

The coolant-temperature light (Figure 18) will turn on if the coolant temperature raises above a set level. The engine will stop if the coolant temperature raises another 10° F.

Oil-Pressure Light

The oil-pressure light (Figure 18) will turn on if the oil pressure drops below a set level.

Alternator Light

Check or repair the charging system if the alternator light turns on when the engine is running (Figure 18).

Check-Engine Light

Check or repair the engine if the check-engine light turns on when the engine is running (Figure 18). Refer to the Service Manual for possible causes.

Parking Brake

Engage the parking brake whenever the engine is shut off (Figure 18). Pull up on the lever to engage the parking brake.

Note: The engine will stop if you press the traction pedal with the parking brake engaged.

Lift-Lever Lock

Move the lift-lever lock (Figure 18) rearward to prevent the cutting units from dropping.

Fuel Gauge

The fuel gauge (Figure 19) indicates the amount of fuel in the fuel tank.

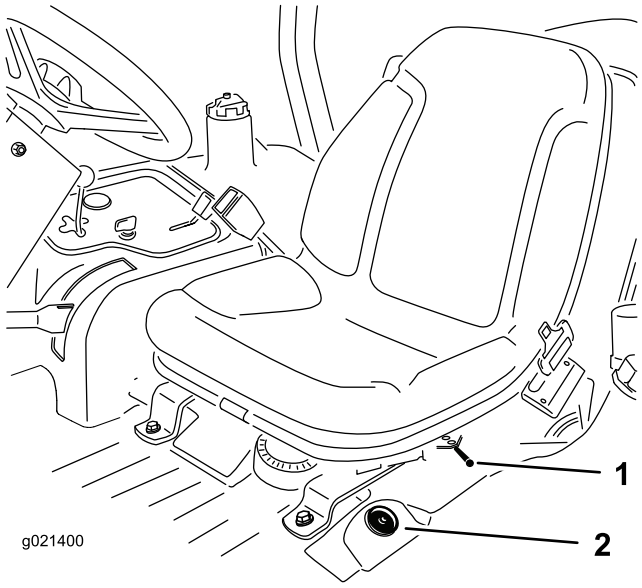


Figure 19

1. Seat-lock lever
2. Fuel gauge

Adjusting the Seat Forward or Backward

Move the lever (Figure 19) on the side of the seat outward and slide the seat to the desired position. Release the lever to lock the seat into position.

Specifications

Note: Specifications and design are subject to change without notice.

Overall Width	182 cm (71.8 inch)
Width of Cut	173 cm (68 inch)
Length	295 cm (116 inch)
Height to top of ROPS	180 cm (70.8 inch)
Wheel base	149 cm (58.5 inch)
Track width	145 cm (57 inch)
Ground clearance	15.3 cm (6 inch)
Weight with cutting units	963 kg (2,124 lb)

Cutting Deck	
Length	86.4 cm (34 inch)
Width	86.4 cm (34 inch)
Height	24.4 cm (9.6 inch) to carrier mount 26.7 cm (10–1/2 inch) at 3/4 inch height of cut 34.9 cm (13–3/4 inch) at 4 inches height of cut
Weight	88 kg (195 lb)

Attachments/Accessories

To best protect your investment and maintain optimal performance of your Toro equipment, count on Toro genuine parts. When it comes to reliability, Toro delivers replacement parts designed to the exact engineering specification of our equipment. For peace of mind, insist on Toro genuine parts.

Operation

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

Think Safety First

Carefully read all safety instructions and symbols in the safety section. Knowing this information could help you or bystanders avoid injury.

⚠ DANGER

Operating on wet grass or steep slopes can cause sliding and loss of control.

Wheels dropping over edges can cause rollovers, which may result in serious injury, death, or drowning.

Use the seat belt.

Read and follow the rollover protection instructions and warnings.

To avoid loss of control and possibility of rollover:

- **Do not operate near drop-offs or near water.**
- **Do not operate on slopes greater than 25º.**
- **Reduce speed and use extreme caution on slopes.**
- **Avoid sudden turns or rapid speed changes.**

⚠ CAUTION

This machine produces sound levels that can cause hearing loss through extended periods of exposure.

Wear hearing protection when operating this machine.

The use of protective equipment for eyes, ears, hands, feet, and head is recommended.

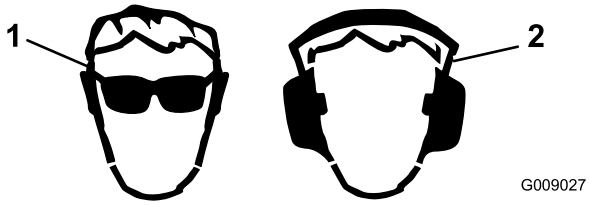


Figure 20

1. Wear safety glasses.
2. Wear hearing protection.

Checking the Engine-Oil Level

Service Interval: Before each use or daily

The engine is shipped with oil in the crankcase; however, the oil level must be checked before and after the engine is first started.

Crankcase capacity is approximately 3.3 L (3.5 US qt) with the filter.

Note: Toro Premium Engine oil is available from your distributor in either 15W-40 or 10W-30 viscosity. See the parts catalog for part numbers.

Note: 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 Add mark on the dipstick, add oil to bring the oil level to the Full mark. **Do not overfill.** If the oil level is between the Full and Add marks, additional oil is not required.

The engine uses any high-quality 10W-30 detergent oil having the American Petroleum Institute (API) service classification SJ, SK, SL, SM, or higher. Choose a viscosity according to the table in Figure 21.

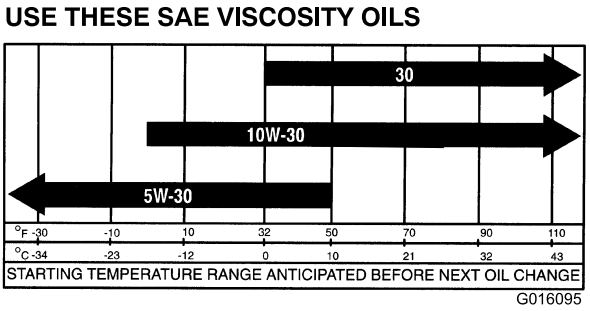


Figure 21

1. Position the machine on a level surface and open the hood.
2. Remove the dipstick (Figure 22) and wipe it with a clean rag. Insert the dipstick into the tube and make sure that it is seated fully. Remove dipstick and check the level-of-the-oil.

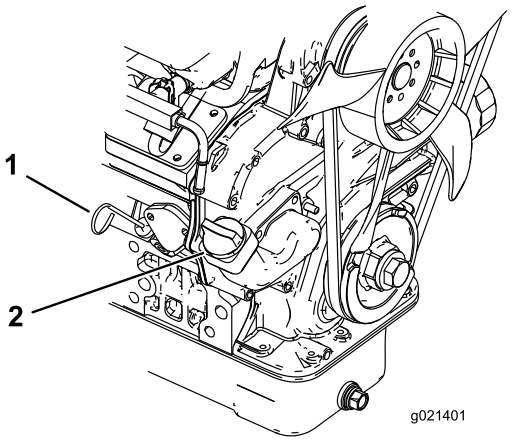


Figure 22

1. Dipstick
2. Filler cap

3. If the oil level is low, remove the filler cap (Figure 22) and add enough oil to raise the level-of-the-oil to the Full mark on the dipstick.

   Note: When adding oil, remove dipstick to allow proper venting. Pour oil slowly and check the level-of-the-oil often during this process. Do not overfill.

   Important: When adding engine oil or filling oil, there must be clearance between the oil fill device and the oil fill hole in the valve cover as shown in Figure 23. This clearance is necessary to permit venting when filling, which prevents oil from overrunning into the breather.

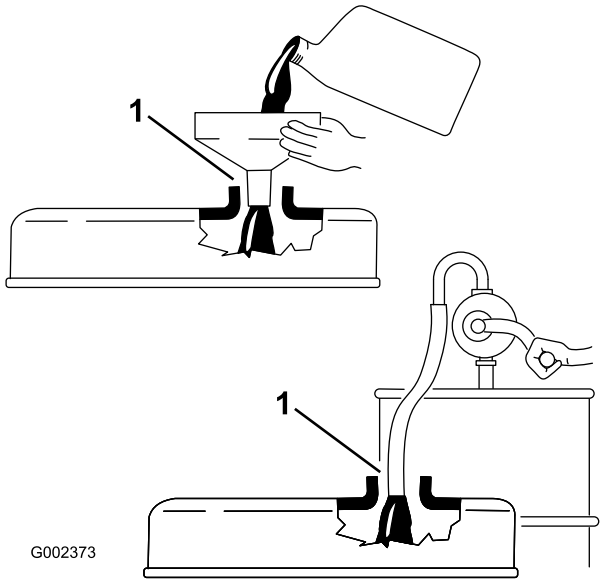


Figure 23

1. Note clearance

4. Install the dipstick firmly in place.
5. Install the oil-fill cap and close the hood.

Filling the Fuel Tank

- **Fuel tank capacity:** 38 L (10 US gallons)
- **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.

1. Clean the area around the fuel-tank cap (Figure 24).
2. Remove the fuel-tank cap.
3. Fill the tank to the bottom of the filler neck. **Do not overfill.** Install the cap.
4. To prevent a fire hazard, wipe up any fuel that may have spilled.

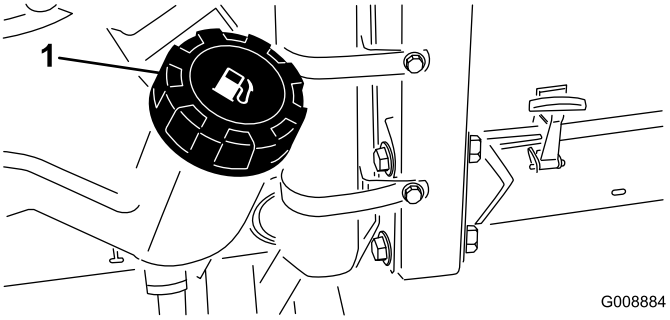


Figure 24

1. Fuel-tank cap

⚠ 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.

- **Before removing the fuel-tank cap, make sure that the vehicle is positioned on a level surface. Open the fuel-tank cap slowly.**
- **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 6 to 13 mm (1/4 to 1/2 inch) 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.**

⚠ DANGER

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 the gasoline containers on the ground away from your vehicle before filling.**
- **Do not fill the 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 the wheels on the ground.**
- **If this is not possible, 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.**

Checking the Cooling System

Service Interval: Before each use or daily

The capacity of the cooling system is approximately 5.7 L (6 US qt).

Clean debris off of the radiator/oil cooler daily (Figure 25).

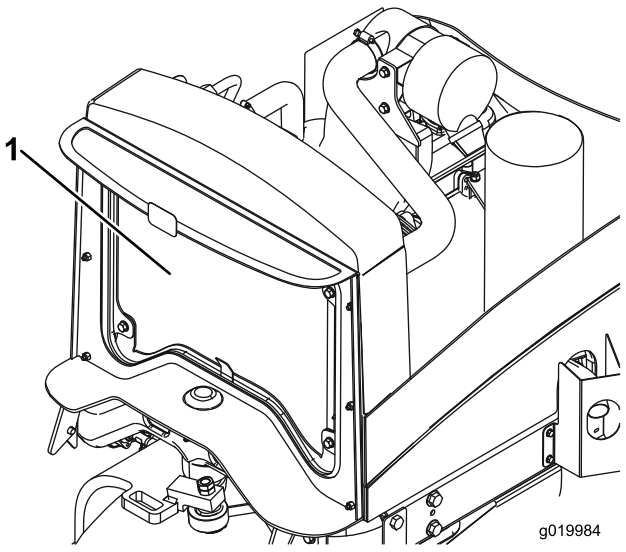


Figure 25

1. Radiator/Oil cooler

Clean the radiator/oil hourly if conditions are extremely dusty or dirty; refer to Cleaning the Engine Cooling System (page 41).

The cooling system is filled with a 50/50 solution of water and permanent ethylene glycol antifreeze. Check the coolant level at the beginning of each day, before starting the engine.

⚠ CAUTION

If the engine has been running, the pressurized-hot coolant can escape and cause burns.

- **Do not open the radiator-cap when the engine is running.**
- **Use a rag to opening the radiator-cap, and open the cap slowly to allow the steam to escape.**

1. Check the coolant level in the expansion tank (Figure 26). With a cold engine, the coolant level should be approximately midway between the marks on the side of the tank.
2. If the coolant level is low, remove the expansion-tank cap and replenish the system. **Do not overfill.**
3. Install the expansion-tank cap.

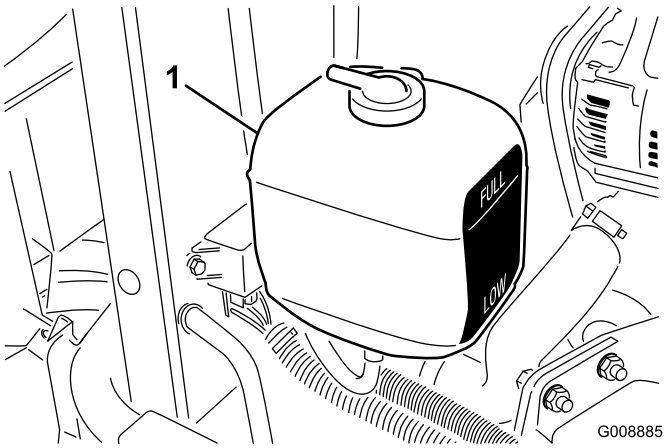


Figure 26

1. Expansion tank

Checking the Hydraulic System

Service Interval: Before each use or daily—Check the hydraulic fluid level.

The traction unit reservoir is filled at the factory with approximately 22.7 L (6 US gallons) of high-quality hydraulic fluid. **Check the level of the hydraulic fluid before the engine is first started and daily thereafter.** The recommended replacement fluid is **Toro Premium All Season Hydraulic Fluid** available in 5-gallon pails or 55-gallon drums. See your Authorized Toro Distributor.

Alternate fluids: If the Toro fluid is not available, you may use other fluids provided that they meet all the following material properties and industry specifications. Toro does not recommend the use of synthetic fluid. Consult with your lubricant distributor to identify a satisfactory product. Note: Toro will not assume responsibility for damage caused by improper substitutions, so use only products from reputable manufacturers who will stand behind their recommendation.

High Viscosity Index/Low Pour Point Anti-wear Hydraulic Fluid, ISO VG 46

Material Properties:

Viscosity, ASTM D445	cSt @ 40°C 44 to 48 cSt @ 100°C 7.9 to 8.5
Viscosity Index ASTM D2270	140 to 160
Pour Point, ASTM D97	-34°F to -49°F

Industry Specifications:

Vickers I-286-S (Quality Level), Vickers M-2950-S (Quality Level), Denison HF-0

Premium Biodegradable Hydraulic Fluid-Mobil EAL EnviroSyn 46H

Important: Mobil EAL EnviroSyn 46H is the only synthetic biodegradable fluid approved by Toro. This fluid is compatible with the elastomers used in Toro hydraulic systems and is suitable for a wide-range of temperature conditions. This fluid is compatible with conventional mineral oils, but for maximum biodegradability and performance the hydraulic system should be thoroughly flushed of conventional fluid. The oil is available in 5 gallon pails or 55 gallon drums from your Mobil Distributor.

Important: Many hydraulic fluids are almost colorless, making it difficult to spot leaks. A red dye additive for the hydraulic system oil is available in 20 ml (2/3 oz) bottles. One bottle is sufficient for 15 to 22 L (4 to 6 gallons) of hydraulic oil. Order part no. 44-2500 from your authorized Toro distributor.

1. Position the machine on a level surface, lower the cutting units, and stop the engine.
2. Clean the area around the filler neck and cap of the hydraulic tank (Figure 27). Remove the cap.

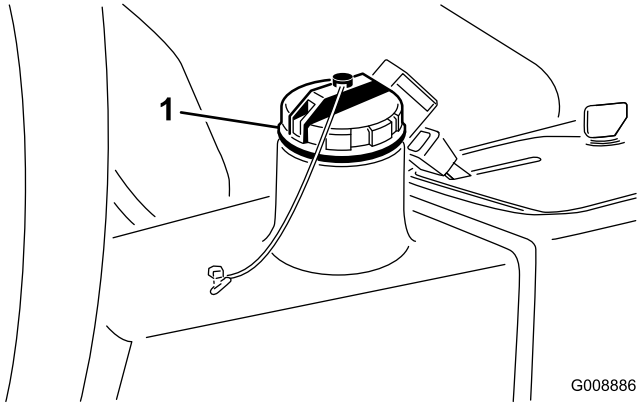


Figure 27

1. Hydraulic tank cap

3. Remove the dipstick from the filler neck and wipe it with a clean rag.
4. Insert the dipstick into the filler neck, then remove it and check the fluid level.

   Note: The fluid level should be within the marks on the dipstick.
5. If the level is low, add the appropriate amount of fluid to raise the level to the full mark.
6. Install the dipstick and cap onto the filler neck.

Checking the Tire Pressure

Service Interval: Before each use or daily

The tires are over-inflated for shipping. Therefore, release some of the air to reduce the pressure. The correct air pressure in the tires is 97 to 124 kPa (14 to 18 psi).

Note: Maintain the recommended pressure in all tires to ensure a good quality of cut and proper machine performance.

⚠ DANGER

Low tire pressure decreases machine side hill stability. This can cause a rollover, which can result in personal injury or death.

Do not under-inflate the tires.

Rear Wheel Ballast

The machine conforms to ANSI standard B71.4-2012 standard when 22.6 kg (50 lb) of calcium-chloride ballast is added to the rear wheels.

Important: If a puncture occurs in a tire containing calcium chloride, remove the machine from the turf as quickly as possible. Immediately soak the affected area with water to prevent possible damage to the turf.

Starting and Stopping the Engine

Starting the Engine

1. Be sure that the parking brake is set and the cutting unit drive switch is in the Disengage position.
2. Remove your foot from the traction pedal and make sure that the pedal is in the Neutral position.
3. Move the throttle lever to the 1/2 throttle position.
4. Insert the key into the switch and rotate it to the Start position to engage the starter motor.

   Note: Release the key when the engine starts. The key moves automatically to the On/Run position.

Important: To prevent overheating of the starter motor, do not engage the starter longer than 15 seconds. After 15 seconds of continuous cranking, wait 60 seconds before engaging the starter motor again.

Stopping the Engine

1. Move the throttle control to the Idle position.
2. Move the cutting-unit drive switch to Disengage.
3. Rotate the starter key to Off.
4. Remove the key from the ignition switch.

Checking the Interlock System

Service Interval: Before each use or daily

1. Make sure that all bystanders are away from the area of operation.

   Note: Keep hands and feet away from the cutting units.

   Note: While sitting on the seat, the engine must not start with either the cutting-unit switch engaged or the traction pedal engaged. Correct the problem if it is not operating properly.

2. While sitting on the seat, put the traction pedal in the Neutral position, the parking brake in the Off position, and the cutting-unit switch in the Off position.

   Note: The engine should start.

3. Rise from the seat and slowly press the traction pedal.

   Note: The engine should stop in 1 to 3 seconds. Correct the problem if it is not operating properly.

Note: The engine stops when you press the traction pedal and engage the parking brake.

Towing the Traction Unit

In case of an emergency, the machine can be towed for a short distance.

Important: Do not tow the machine faster than 3 to 4 km/h (2 to 3 mph) because the drive system may become damaged. If the machine must be moved a considerable distance, transport it on a truck or trailer.

1. Locate the bypass valve on the pump (Figure 28) and rotate it 90°.

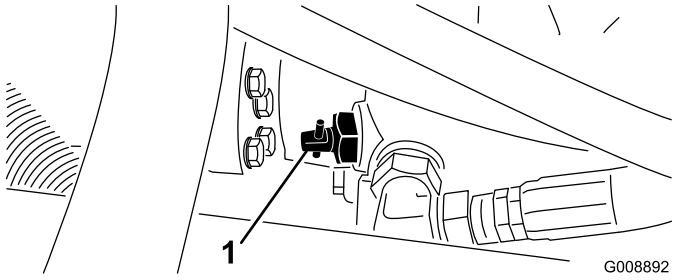


Figure 28

1. Bypass valve

2. Before starting the engine, close the bypass valve by rotating it 90° (1/4 turn).

   Note: Do not start the engine when the valve is open.

Standard Control Module (SCM)

The Standard Control Module is a potted electronic device produced in a one size fits all configuration. The module uses solid state and mechanical components to monitor and control standard electrical features required for safe product operation.

The module monitors inputs including neutral, parking brake, PTO, start, backlap, and high temperature. The module energizes outputs including PTO, Starter, and ETR (energize to run) solenoid.

The module is divided into inputs and outputs. Inputs and outputs are identified by green LED indicators.

The start circuit input is energized by 12 VDC. All other inputs are energized when the circuit is closed to ground. Each input has an LED that is illuminated when the specific circuit is energized. Use the input LEDs to troubleshoot switches and input circuits.

Output circuits are energized by an appropriate set of input conditions. The 3 outputs are PTO, ETR, and START. The output LED indicates the presence of voltage at the relay.

Output circuits do not determine the integrity of the output device. Troubleshooting the electrical integrity of an output circuit should include the output LED, the device, and the wiring harness. Measure disconnected component impedance, impedance through the wiring harness (disconnect at SCM), or by temporarily "test energizing" the specific component.

The SCM does not connect to an external computer or hand-held device, it cannot be re–programmed, and it does not record intermittent fault troubleshooting data.

The decal on the SCM only includes symbols. There are 3 LED output symbols are shown in the output box. All other LEDs are inputs. The chart (Figure 29) identifies the symbols.

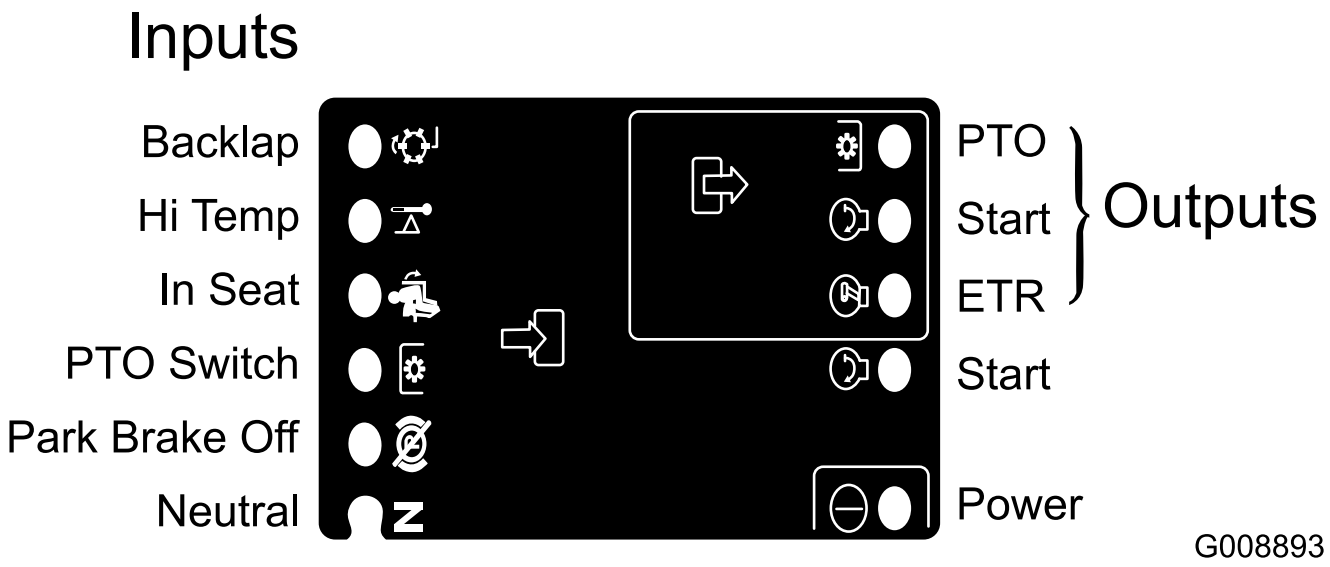


Figure 29

Here are the logical troubleshooting steps for the SCM device.

1. Determine the output fault you are trying to resolve (PTO, START, or ETR).
2. Move key switch to the On position and ensure that the red power LED is illuminated.
3. Move all input switches to ensure all LEDs change state.
4. Position input devices at appropriate position to achieve the appropriate output. Use the following logic chart to determine the appropriate input condition.
5. If specific output LED is illuminated without appropriate output function, check the output harness, the connections, and the component. Repair as required.
6. If specific output LED is not illuminated, check both of the fuses.
7. If specific output LED is not illuminated and the inputs are in an appropriate condition, install a new SCM and determine if the fault disappears.

Each row in the logic chart below identifies the input and output requirements for each specific function. The functions are listed in the left column. The symbols identify specific circuit condition including: energized to voltage, closed to ground, and open to ground.

- (–) Indicates a circuit closed to ground. – LED ON
- (O) Indicates a circuit open to ground or de–energized – LED OFF
- (+) Indicates an energized circuit (clutch coil, solenoid, or start input) LED ON.
- A Blank indicates a circuit that is not involved with the logic.

INPUTS									OUTPUTS		
Function	Power ON	In Neutral	Start ON	Brake ON	PTO ON	In Seat	Hi Temp	Backlap	Start	ETR	PTO
Start	—	—	+	O	O	—	O	O	+	+	O
Run (Off Unit)	—	—	O	O	O	O	O	O	O	+	O
Run (On Unit)	—	O	O	—	O	—	O	O	O	+	O
Mow	—	O	O	—	—	—	O	O	O	+	+
Backlap	—	—	O	O	—	O	O	—	O	+	+
Hi Temp	—		O				—		O	O	O

To troubleshoot, turn the key to the On position. Identify the specific function that is not operating properly and work across the logic chart. Inspect the condition of each of the input LEDs to ensure it matches the logic chart.

If the input LEDs are correct, check the output LEDs. If the output LEDs are illuminated but the device is not energized, measure the available voltage at the output device, continuity of the disconnected device, and potential voltage on the ground circuit (floating ground). Repairs will vary depending on your findings.

Choosing Accessories

Optional Equipment Configurations

	Angle Sail Blade	**High Lift Parallel Sail Blade** *Do not use with the mulching baffle*	**Mulching Baffle**	**Roller Scraper**
Height of Cut 1.9 to 4.4 cm (0.75 to 1.75 inches)	Recommended in most applications	May work well in light or sparse turf	Has been shown to improve dispersion and after cut performance on northern grasses that are cut at least three times per week and when less than 1/3 of the grass blade is removed *Do not use with the high lift parallel sail blade*	Can be used any time that rollers build up with grass or large flat grass clumps are seen The scrapers may actually increase clumping in certain applications
Height of Cut 5 to 6.4 cm (2.00 to 2.50 inches)	Recommended for thick or lush turf	Recommended for light or sparse turf		
Height of Cut 7 to 10 cm (2.75 to 4.00 inches)	May work well in lush turf	Recommended in most applications		
Leaf Mulching	Recommended for use with the mulching baffle	**Not Allowed**	Use with combination sail or angle sail blade only	
Pros	Even discharge at a low height of cut Cleaner look around bunkers and fairways Lower power requirements	More lift and higher discharge velocity Sparse or limp turf is picked up at a high height of cut Wet or sticky clippings are discharged efficiently	May improve dispersion and appearance in certain grass cutting applications Very good for leaf mulching	Reduces roller buildup in certain applications
Cons	Does not lift the grass well at a high height of cut Wet or sticky grass has a tendency to build up in the chamber, leading to poor quality of cut and higher power requirements	Requires more power to run in some applications Tends to windrow at a low height of cut in lush grass *Do not use with the mulching baffle*	Grass will build up in the chamber if attempting to remove too much grass with baffle in place	

Selecting a Blade

Standard Combination Sail

This blade was designed to provide excellent lift and dispersion in almost any condition. If more or less lift and discharge velocity is required, consider a different blade.

Attributes: Excellent lift and dispersion in most conditions.

Angled Sail

The blade generally performs best at a lower height of cut, 1.9 to 6.4 cm (3/4 to 2–1/2 inches).

Attributes:

- Discharge remains more evenly at a lower height of cut.
- Discharge has less tendency to throw left and thus a cleaner look around bunkers and fairways.
- Lower power requirement at a lower height of cut in dense turf.

High Lift Parallel Sail

The blade generally performs better at a higher height of cut, 7 to 10 cm (2 to 4 inches).

Attributes:

- More lift and higher discharge velocity.
- Sparse or limp turf is picked up significantly at a higher height of cut.
- Wet or sticky clippings are discharged more efficiently, reducing congestion in the deck.

- Requires more horsepower to run.
- Tends to discharge further left and can tend to windrow at a lower height of cut.

⚠ WARNING

Do not use the high-lift blade with the mulching baffle. The blade could break, resulting in personal injury or death.

Atomic Blade

This blade was designed to provide excellent leaf mulching.

Attributes: Excellent leaf mulching

Operating Tips

General Tips

- Practice operating the machine and become thoroughly familiar with it.
- Start the engine and run it at half idle until it warms up. Push the throttle lever all the way forward, lift the cutting units, disengage the parking brake, press the forward traction pedal, and carefully drive to an open area.
- Practice moving forward and reverse, and starting and stopping the machine. To stop, take your foot off the traction pedal and let it return to neutral or press down on the reverse pedal to stop. Going down a hill, you may need to use the reverse pedal to stop.
- When driving on slopes, drive slowly to maintain steering control and avoid turns to prevent rollovers. In side hill situations, shift the sidewinder cutting units to the uphill side to give you more stability. Conversely, shifting the cutting units to the down hill side will give you less stability. This should always be done before going on a side hill.
- When possible, mow up and down hills rather than across them. Have the cutting units lowered when going down a hill to maintain steering control. Do not attempt to turn on a hill.
- Practice driving around obstacles with the cutting units up and down. Be careful when driving between narrow objects so you do not damage the machine or the cutting units.
- On the Sidewinder unit, get a feel for the reach of the cutting units so that you do not hang them up or damage them in any way.
- Do not shift the cutting units from side to side, unless the cutting units are down and the machine is moving, or the cutting units are up in the transport position. Shifting the cutting units when they are down and the machine is not moving may cause turf damage.
- Always drive slowly in rough areas.
- If a person appears in or near the operating area, stop the machine, and do not start it again until the area is cleared. The machine is designed for 1 person. Never let anyone else ride on the machine with you. This is extremely dangerous and could result in serious injury.
- Accidents can happen to anyone. The most common causes are excessive speed, sudden turns, terrain (not knowing which slopes and hills can be mowed safely), not stopping the engine before leaving the operator's seat, and drugs, which impair your alertness. Cold capsules or prescription drugs may cause drowsiness, as can alcohol and other drugs. Stay alert and stay safe. Failure to do so could result in serious injury.
- The Sidewinder offers up to a maximum of 33 cm (13 inch) of overhang, allowing you to trim closer to the edge of sand traps and other obstacles, while at the same time keeping the tires as far away from the edge of traps or water hazards as possible.
- If an obstacle is in the way, shift the cutting units to easily mow around it.
- When driving the machine from one work area to another, raise the cutting units to the fully-up position, move the Mow/Transport slide to the left to Transport, and place the throttle to the Fast position.

Mowing Patterns

Change mowing patterns often to minimize aftercut appearance issues that are induced by repetitive mowing in only one direction.

Counterbalance

The counterbalance system maintains hydraulic back pressure on the cutting unit lift cylinders. This counterbalance pressure transfers cutting-unit weight to the traction-unit drive wheels to improve traction. The counterbalance pressure has been factory set to an optimal balance of aftercut appearance and traction capability in most turf conditions. Decreasing the counterbalance setting can produce a more stable cutting unit, but can decrease the traction capability. Increasing the counterbalance setting can increase the traction capability, but may result in aftercut appearance issues. Reference the service manual for your traction unit for instructions to adjust counterbalance pressure.

Resolving Aftercut Appearance

Reference the Aftercut Appearance Troubleshooting Guide available at www.Toro.com

Mowing Techniques

- To begin cutting, engage the cutting units, then approach the mowing area slowly. Once the front cutting units are over the mowing area, lower the cutting units.
- To achieve the professional straight-line cut and striping that is desirable for some applications, find a tree or other object in the distance and drive straight toward it.

- As soon as the front cutting units reach the edge of the mowing area, lift the cutting units and perform a teardrop-shaped turn to quickly line you up for your next pass.
- To mow around bunkers, ponds, or other contours easily, use the Sidewinder and move the control lever left or right, depending on your mowing application. The cutting units can also be shifted to vary tire tracking.
- The cutting units tend to throw grass to the left side of the machine. If trimming around bunkers, it is best to mow in a clockwise direction to prevent throwing clippings into the bunker.
- The cutting units can be equipped with bolt-in mulching baffles. The mulching baffles perform well when turf is maintained on a regular schedule to avoid removing more than 25 mm (1 inch) of growth per cutting. When too much growth is cut with the mulching baffles installed, aftercut appearance may deteriorate and the observed power to cut the turf increases. The mulching baffles also perform well for shredding leaves in the fall.

Mow When Grass Is Dry

Mow either in the late morning to avoid the dew, which causes grass clumping, or in late afternoon to avoid the damage that can be caused by direct sunlight on the sensitive, freshly cut grass.

Select the Proper Height of Cut Setting to Suit Conditions

Remove approximately 25 mm (1 inch) or no more than 1/3 of the grass blade when cutting. In exceptionally lush and dense grass, you may have to raise your height of cut setting to a higher setting.

Always Start Mowing with Sharp Blades

A sharp blade cuts cleanly and without tearing or shredding the grass blades like a dull blade. Tearing and shredding causes the grass to turn brown at the edges which impairs growth and increases susceptibility to diseases. Make sure that the blade is in good condition and a full sail is present.

Check Condition of Cutting Unit

Make sure that cutting chambers are in good condition. Straighten any bends in chamber components to ensure correct blade tip/chamber clearance.

After Mowing

At the completion of mowing operation, thoroughly wash the machine with a garden hose without a nozzle so that excessive water pressure will not contaminate and damage the seals and bearings. Make sure that the radiator and oil cooler are kept free of dirt or grass clippings. After cleaning, inspect the machine for possible hydraulic-fluid leaks, damage, or wear to the hydraulic and mechanical components, and check the cutting-unit blades for sharpness.

Important: After washing the machine, move the Sidewinder mechanism from left to right several times to remove water between the bearing blocks and cross tube.

Maintenance

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

Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first hour	• Torque the wheel nuts.
After the first 8 hours	• Check the condition and tension of all belts.
After the first 10 hours	• Torque the wheel nuts. • Change the hydraulic filter.
After the first 50 hours	• Change the oil and oil filter.
Before each use or daily	• Check the engine oil level. • Check the engine coolant level. • Check the hydraulic fluid level. • Check the tire pressure. • Check the interlock system. • Clean debris off of the radiator and oil cooler. • Check the hydraulic lines and hoses. • Check the blade-stopping time.
Every 25 hours	• Check the electrolyte level. (If machine is in storage, check every 30 days.)
Every 50 hours	• Lubricate all bearings and bushings. (Lubricate all bearings and bushings daily when conditions are dusty and dirty.)
Every 200 hours	• Service the Air Cleaner (More frequently in extreme dusty or dirty conditions) • Change the oil and oil filter. • Torque the wheel nuts. • Check the parking brake adjustment. • Check the condition and tension of all belts. • Change the hydraulic filter.
Every 400 hours	• Replace the spark plugs. • Replace the fuel-pump filter. • Check the fuel lines and connections. • Change the hydraulic fluid.
Every 500 hours	• Grease the bearings in the rear axle.
Every 2 years	• Drain and clean the fuel tank. • Flush the cooling system and replace fluid.

⚠ CAUTION

If you leave the key in the ignition switch, someone could accidently start the engine and seriously injure you or other bystanders.

Remove the key from the ignition before you do any maintenance.

Daily Maintenance Checklist

Duplicate this page for routine use.

Maintenance Check Item	For the week of: Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.
Check the safety interlock operation.							
Check the brake operation.							
Check the engine oil level.							
Check the cooling system fluid level.							
Check the air filter, dust cup, and burp valve.							
Check for unusual engine noises.[2]							
Check the radiator and screen for debris.							
Check for unusual operating noises.							
Check the hydraulic system oil level.							
Check the hydraulic hoses for damage.							
Check for fluid leaks.							
Check the fuel level.							
Check the tire pressure.							
Check the instrument operation.							
Check the height of cut adjustment.							
Lubricate all the grease fittings.[2]							
Touch-up any damaged paint.							

[1]Check the glow plug and injector nozzles if starting is hard, there is excess smoke, or rough running is noted.

[2]Immediately **after every** washing, regardless of the interval listed.

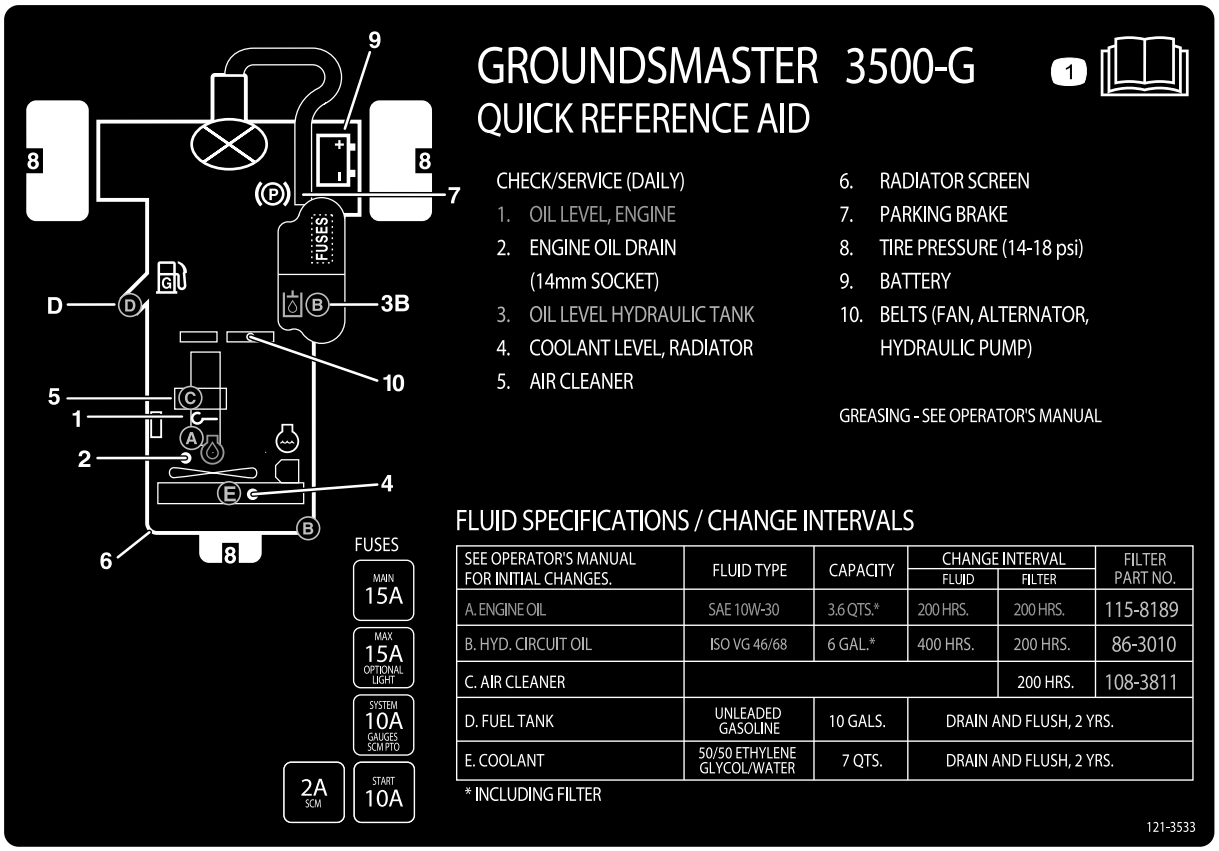
Important: Refer to your engine *Operator's Manual* for additional maintenance procedures.

Note: Looking for an *Electrical Schematic* or *Hydraulic Schematic* for your machine? Download a free copy of the schematic by visiting www.Toro.com and searching for your machine from the Manuals link on the home page.

Notation for Areas of Concern

Inspection performed by:		
Item	**Date**	**Information**

Service Interval Chart



SEE OPERATOR'S MANUAL FOR INITIAL CHANGES.	FLUID TYPE	CAPACITY	CHANGE INTERVAL		FILTER PART NO.
			FLUID	FILTER	
A. ENGINE OIL	SAE 10W-30	3.6 QTS.*	200 HRS.	200 HRS.	115-8189
B. HYD. CIRCUIT OIL	ISO VG 46/68	6 GAL.*	400 HRS.	200 HRS.	86-3010
C. AIR CLEANER				200 HRS.	108-3811
D. FUEL TANK	UNLEADED GASOLINE	10 GALS.	DRAIN AND FLUSH, 2 YRS.		
E. COOLANT	50/50 ETHYLENE GLYCOL/WATER	7 QTS.	DRAIN AND FLUSH, 2 YRS.		

* INCLUDING FILTER

Figure 30

Premaintenance Procedures

Removing the Hood

The hood may be easily removed to ease maintenance procedures in the engine area of the machine.

1. Unlatch and raise the hood.
2. Remove the hairpin cotter securing the hood pivot to the mounting brackets (Figure 31).

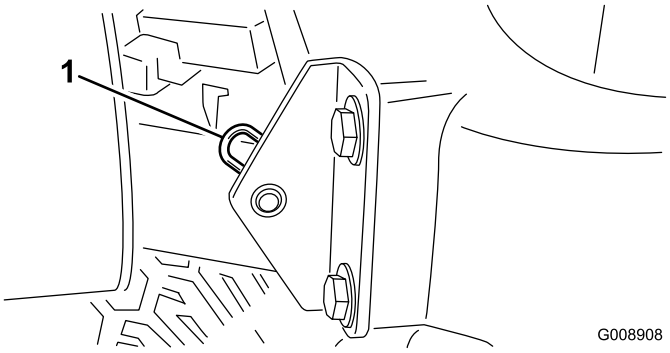


Figure 31

1. Hairpin cotter

3. Slide the hood to the right side, lift the other side, and pull it out of the brackets.

Note: Reverse the procedure to install the hood.

Using the Cutting-Unit Service Latch

When servicing the cutting units, use the service latch to prevent injury.

1. Center the cutting unit sidewinder with the traction unit.
2. Raise the cutting units to the transport position.
3. Set the parking brake and turn off the machine.
4. Release the latch rod (Figure 32) from the front carrier frame retainer.

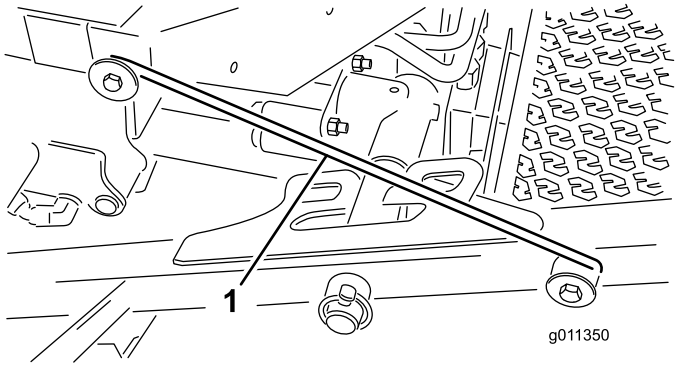


Figure 32

1. Latch hook

5. Lift the outside of the front cutting units and place the latch over the frame pin mounted on the front of the operator's platform (Figure 32).
6. Sit on the operator seat and start the machine.
7. Lower the cutting units to the mow position.
8. Turn off the machine and remove the key from the ignition.
9. Reverse this procedure to unlatch the cutting units.

Lubrication

Greasing the Bearings And Bushings

Service Interval: Every 50 hours (Lubricate all bearings and bushings daily when conditions are dusty and dirty.)

Every 500 hours/Yearly (whichever comes first)

Lubricate grease fittings regularly with Number 2 general-purpose, lithium-based grease. Lubricate the bearings and bushings daily when operating conditions are extremely dusty or dirty. Dusty or dirty operating conditions could cause debris to get into the bearings and bushings, resulting in accelerated wear. Lubricate grease fittings immediately after every washing, regardless of interval specified.

The grease fitting locations and quantities are as follows:

- Rear cutting unit pivot (Figure 33)

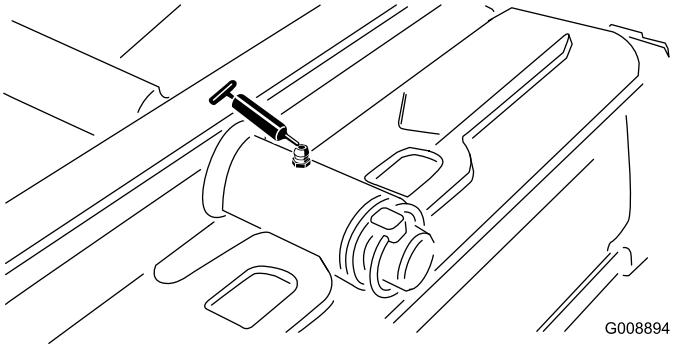


Figure 33

- Front cutting unit pivot (Figure 34)

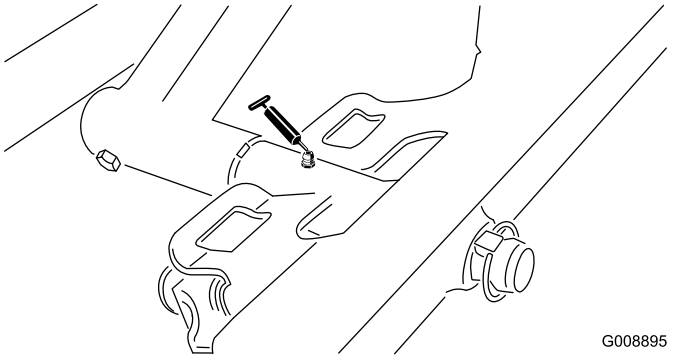


Figure 34

- SideWinder cylinder ends 2 (Figure 35)

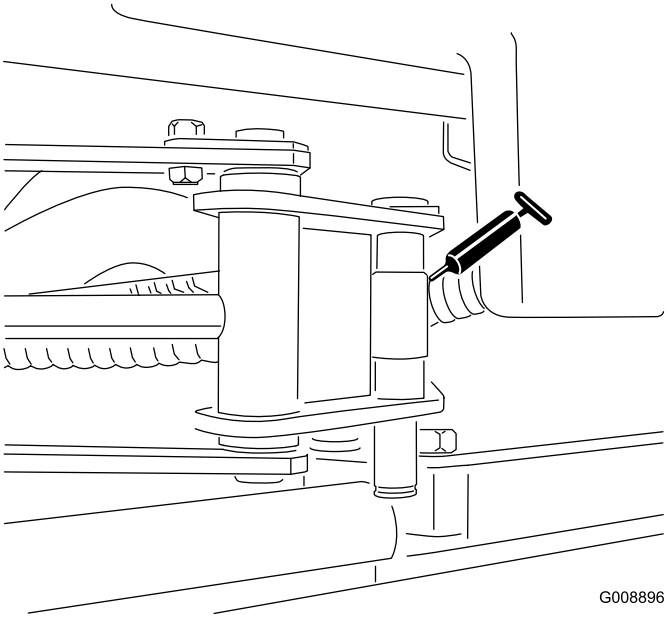


Figure 35

- Steering pivot (Figure 36)

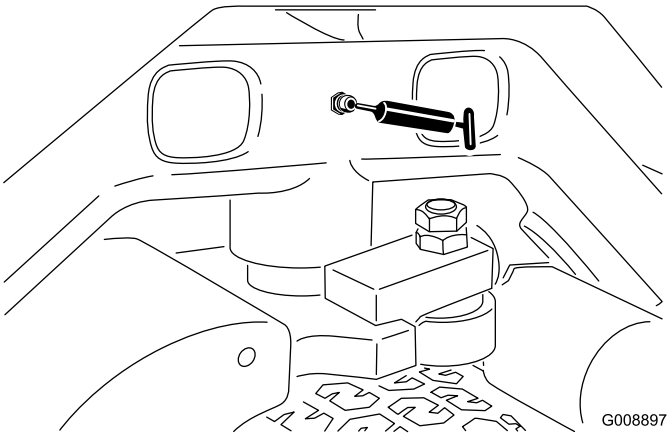


Figure 36

- Rear lift-arm pivot and lift cylinder 2 (Figure 37)

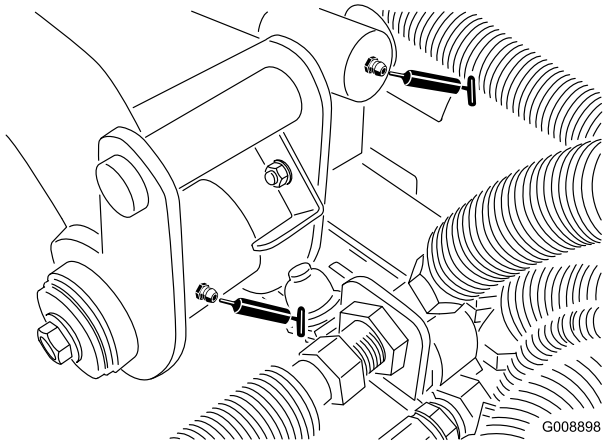


Figure 37

- Left front lift-arm pivot and lift cylinder 2 (Figure 38)

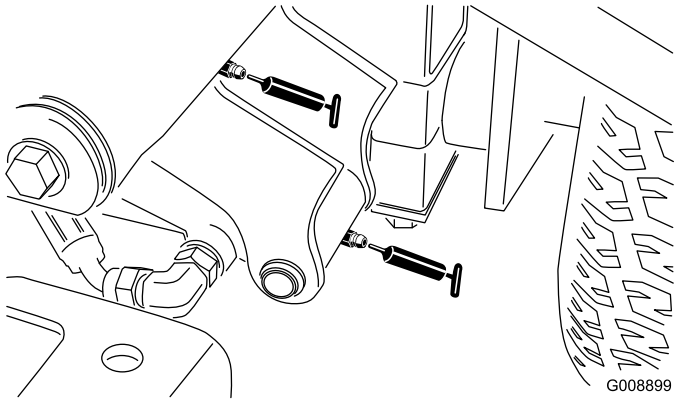


Figure 38

- Right front lift-arm pivot and lift cylinder 2 (Figure 39)

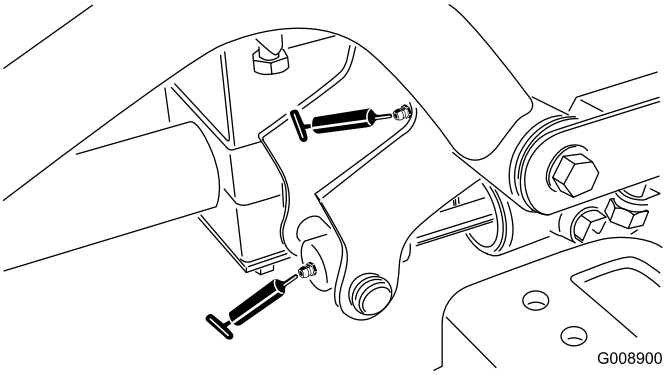


Figure 39

- Neutral-adjust mechanism (Figure 40)

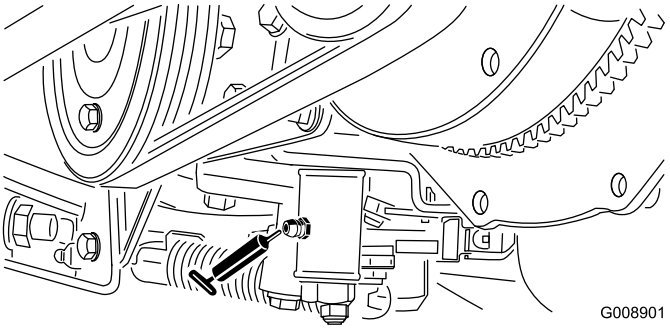


Figure 40

- Mow/Transport slide (Figure 41)

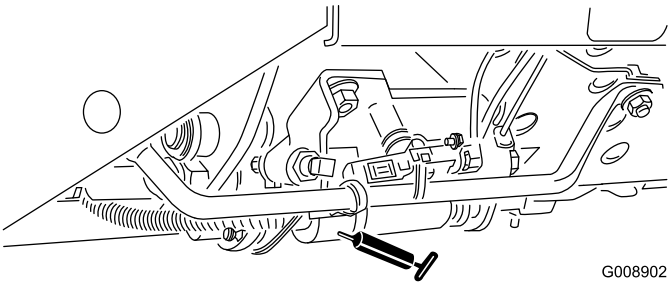


Figure 41

- Belt-tension pivot (Figure 42)

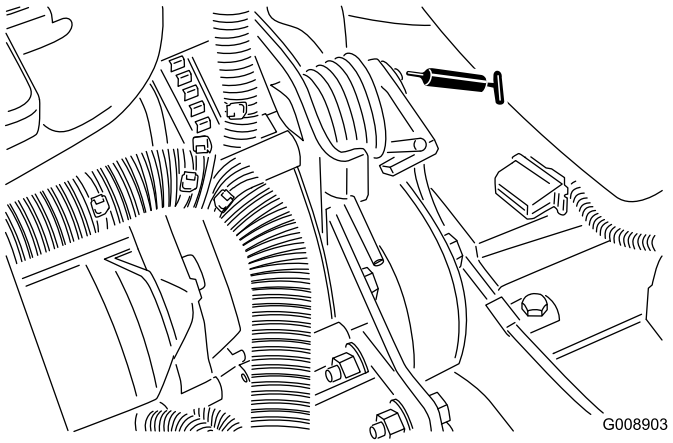


Figure 42

- Steering cylinder (Figure 43).

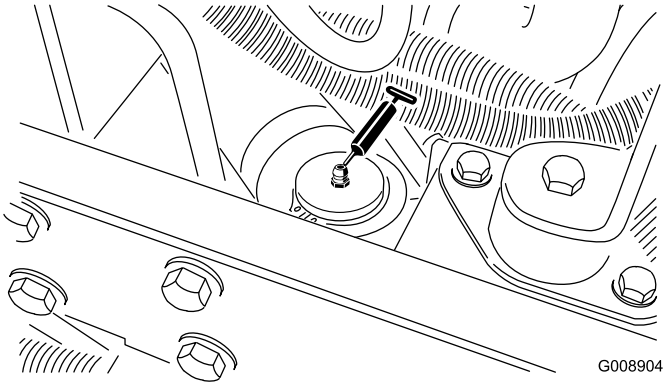


Figure 43

Note: If desired, install an additional grease fitting in the other end of the steering cylinder. Remove the tire, install the fitting, grease the fitting, remove the fitting, and install the plug (Figure 44).

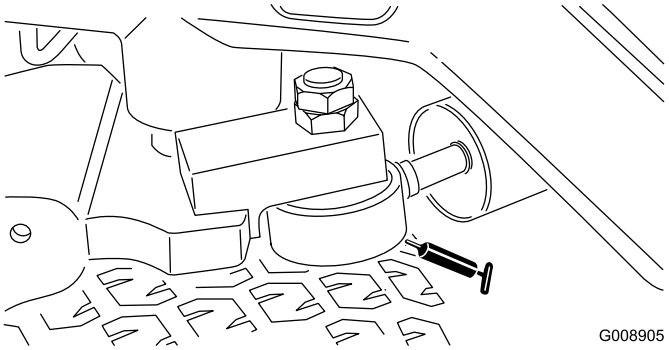


Figure 44

- Cutting unit spindle-shaft bearings (2 per cutting unit) (Figure 45)

Note: Either fitting can be used, which ever is more accessible. Pump grease into the fitting until a small amount appears at bottom of the spindle housing (under the cutting unit).

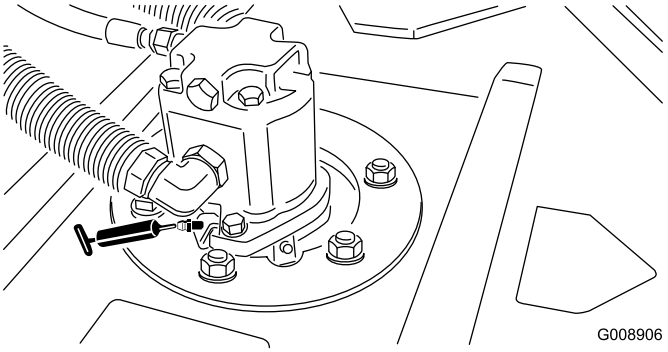


Figure 45

- Rear roller bearings (2 per cutting unit) (Figure 46)

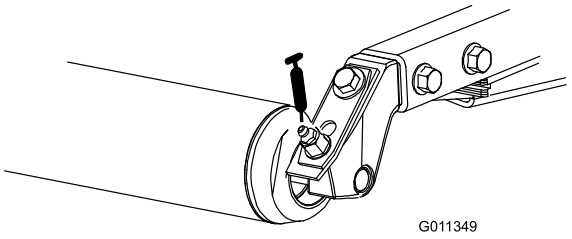


Figure 46

Note: Make sure that the grease groove in each roller mount aligns with the grease hole in each end of the roller shaft. To help align the groove and hole, there is also an alignment mark on 1 end of the roller shaft.

Engine Maintenance

Servicing the Air Cleaner

Service Interval: Every 200 hours (More frequently in extreme dusty or dirty conditions)

Inspect the air cleaner and hoses periodically to maintain maximum engine protection and to ensure maximum service life. Check the air-cleaner body for damage, which could cause an air leak. Replace a damaged air-cleaner body.

Inspect and change the air-cleaner filter as described in the following procedure:

1. Pull the latch outward and rotate the air-cleaner cover counterclockwise.

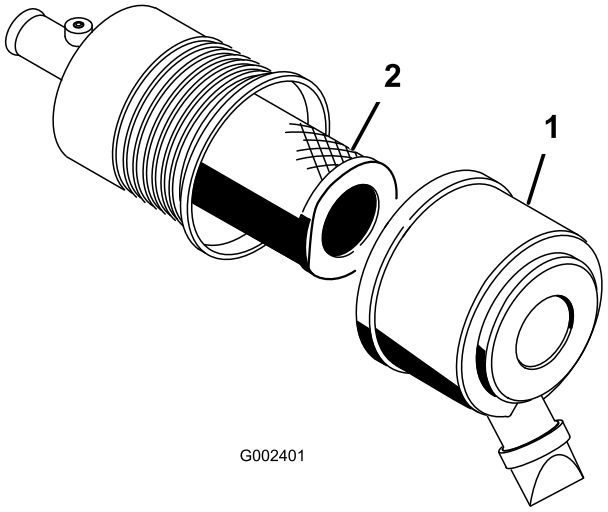


Figure 47

1. Air-cleaner cover 2. Filter

2. Before removing the filter, use low-pressure air (40 psi, clean and dry) to help remove large accumulations of debris packed between the outside of the primary filter and the canister.

   Important: Avoid using high-pressure air which could force dirt through the filter into the intake tract. This cleaning process prevents debris from migrating into the intake when you remove the primary filter.

3. Remove and replace the primary filter.

   Note: Cleaning of the used element is not recommended due to the possibility of damage to the filter media.

4. Inspect the new filter for shipping damage, checking the sealing end of the filter and the body.

   Important: Do not use a damaged filter.

5. Insert the new filter by applying pressure to the outer rim of the element to seat it in the canister.

6. Clean the dirt ejection port located in the removable cover. Remove the rubber outlet valve from the cover, clean the cavity, and replace the outlet valve.
7. Install the cover orienting the rubber, outlet valve in a downward position, between approximately 5 o'clock to 7 o'clock when viewed from the end (Figure 47).
8. Secure the cover latches.

Changing the Engine Oil and Filter

Service Interval: After the first 50 hours

Every 200 hours

1. Remove the drain plug (Figure 48) and let oil flow into a drain pan. When the oil stops flowing, install the drain plug.

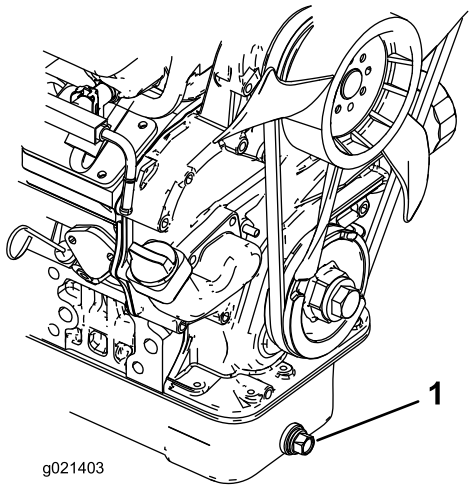


Figure 48

1. Engine oil drain plug

2. Remove the oil filter (Figure 49). Apply a light coat of clean oil to the new filter seal before installing the filter. **Do not overtighten.**

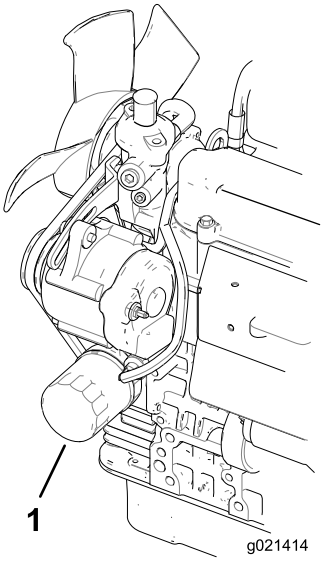


Figure 49

1. Engine oil filter

3. Add oil to the crankcase; refer to Checking the Engine-Oil Level (page 19).

Replacing the Spark Plugs

Service Interval: Every 400 hours

The spark plugs usually last a long time; however, remove and check the plugs whenever the engine malfunctions or every 400 hours. Replace the spark plugs to ensure proper engine performance and reduce exhaust emission level.

The correct spark plug to use is a Champion RC 14YC or NGK BPR 4ES.

1. Clean the area around the spark plugs so foreign matter cannot fall into the cylinder when you remove the spark plug.
2. Pull the wires off the spark plugs and remove the plugs from the cylinder head.
3. Check the condition of the side electrode, center electrode, and center-electrode insulator to ensure that there is no damage.

   Important: A cracked, fouled, dirty, or otherwise malfunctioning spark plug must be replaced. Do not sand blast, scrape, or clean electrodes by using a wire brush because grit may eventually release from the plug and fall into the cylinder. The result is usually a damaged engine.

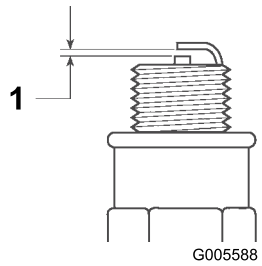


Figure 50

1. Air gap at 0.81 mm (0.032 inch)

4. Set the air gap on each plug between the center and side electrodes to 0.81 mm (0.032 inch).
5. Install the correctly-gapped spark plugs and tighten them to 24.5 to 29 N-m (18 to 22 ft-lb). If you cannot use a torque wrench, tighten the plugs firmly.
6. Install the spark-plug wires.

Fuel System Maintenance

Replacing the Fuel-Pump Filter

Service Interval: Every 400 hours

⚠ 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

- **Drain gasoline from the fuel tank when the engine is cold. Do this outdoors, in an open area. Wipe up any gasoline that spills.**
- **Never smoke when draining gasoline, and stay away from an open flame or where a spark may ignite the gasoline fumes.**

1. Remove the seat from the traction unit to access the fuel pump (Figure 51).

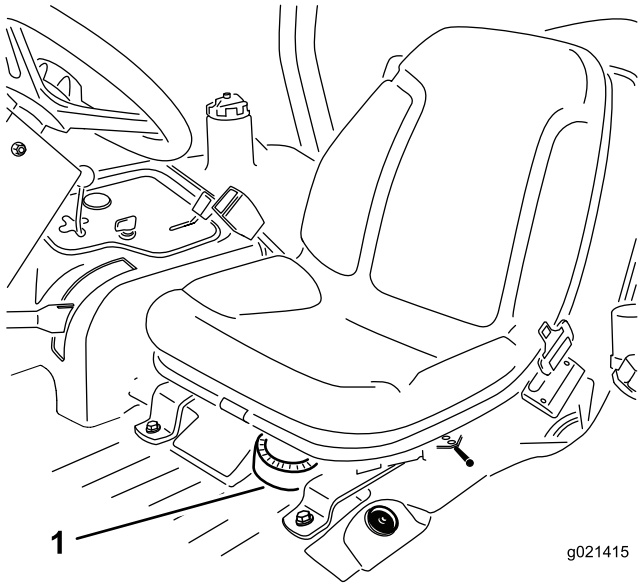


Figure 51

1. Fuel pump

2. Unplug the wiring-harness connectors from the fuel pump (Figure 52).
3. Remove the fuel pump assembly and the fuel filter from the tank (Figure 52).
4. Remove the clamp that secures the fuel-filter hose to the fuel-pump fitting. Remove the hose from the fitting (Figure 52).

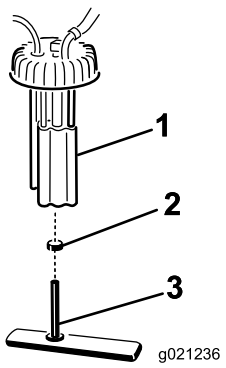


Figure 52

1. Fuel pump
2. Hose clamp
3. Fuel line/fuel filter

5. Insert the new hose clamp onto the new fuel-filter hose.
6. Insert the hose onto the fuel pump and secure the clamp.
7. Insert the assembly into the fuel tank and tighten the cap to 20 to 22 N-m (175 to 200 in-lb).
8. Connect the wires and secure the hose with the hose clamp.
9. Install the seat.

Servicing the Fuel Tank

Service Interval: Every 2 years—Drain and clean the fuel tank.

Drain and clean the tank if the fuel system becomes contaminated or if the machine will be stored for an extended period of time. Use clean fuel to flush out the tank.

Inspecting the Fuel Lines and Connections

Service Interval: Every 400 hours/Yearly (whichever comes first)

Inspect the fuel lines and connections for deterioration, damage, or loose connections.

Electrical System Maintenance

Caring for the Battery

Service Interval: Every 25 hours—Check the electrolyte level. (If machine is in storage, check every 30 days.)

The battery electrolyte level must be properly maintained and the top of the battery kept clean. If the machine is stored in a location where temperatures are extremely high, the battery will run down more rapidly than if the machine is stored in a location where temperatures are cool.

Maintain the cell level with distilled or demineralized water. Do not fill the cells above the bottom of the split-ring inside each cell. Install the filler caps with the vents pointing to the rear (toward the fuel tank).

⚠ DANGER

Battery electrolyte contains sulfuric acid which is a deadly poison and causes severe burns.

- **Do not drink electrolyte and avoid contact with skin, eyes or clothing. Wear safety glasses to shield your eyes and rubber gloves to protect your hands.**
- **Fill the battery where clean water is always available for flushing the skin.**

Keep the top of the battery clean by washing it periodically with a brush dipped in ammonia or bicarbonate of soda solution. Flush the top surface with water after cleaning. Do not remove the filler caps while cleaning.

The battery cables must be tight on the terminals to provide good electrical contact.

⚠ WARNING

Incorrect battery cable routing could damage the traction unit and cables causing sparks. Sparks can cause the battery gasses to explode, resulting in personal injury.

- **Always *disconnect* the negative (black) battery cable before disconnecting the positive (red) cable.**
- **Always *connect* the positive (red) battery cable before connecting the negative (black) cable.**

If corrosion occurs at the terminals, disconnect the cables, negative (–) cable first, and scrape the clamps and terminals separately. Connect the cables, positive (+) cable first, and coat the terminals with petroleum jelly.

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.

Fuses

The fuses for the traction unit electrical system are located under the console cover.

Drive System Maintenance

Torquing the Wheel Nuts

Service Interval: After the first hour

After the first 10 hours

Every 200 hours

Torque the wheel nuts to 61 to 88 N-m (45 to 65 ft-lb).

⚠ WARNING

Failure to maintain proper torque of the wheel nuts can result in personal injury.

Adjusting the Traction Drive for Neutral

If the traction unit moves when the traction pedal is in the neutral position, the traction cam must be adjusted.

1. Position the throttle lever rearward so it stops against the control panel slot.
2. Loosen the throttle-cable connector on the injection-pump lever arm (Figure 53).

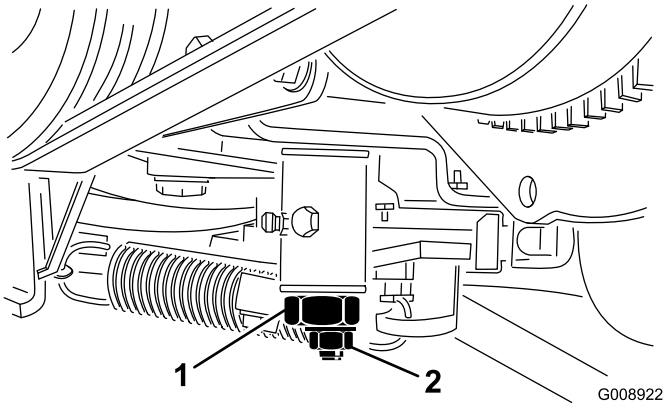


Figure 53

1. Injection-pump lever arm

3. Hold the injection-pump lever arm against the low idle stop and tighten the cable connector.
4. Loosen the screws securing the throttle control to the control panel.
5. Push the throttle-control lever all of the way forward.
6. Slide the stop plate until it contacts the throttle lever and tighten the screws securing the throttle control to the control panel.
7. If the throttle does not stay in position during operation, tighten the locknut on the throttle-lever friction device to 5 to 6 N-m (40 to 55 in-lb) The

maximum force required to operate the throttle lever should not exceed 27 N-m (20 ft-lb).

Cooling System Maintenance

Cleaning the Engine Cooling System

Service Interval: Before each use or daily

Every 2 years

Remove debris from the radiator/oil cooler daily. Clean the radiator/oil more frequently in dirty conditions.

1. Turn the engine off and allow it to cool.
2. Raise the hood.
3. Remove debris from the engine.
4. Clean both sides of the radiator/oil cooler area thoroughly with water or compressed air (Figure 54).

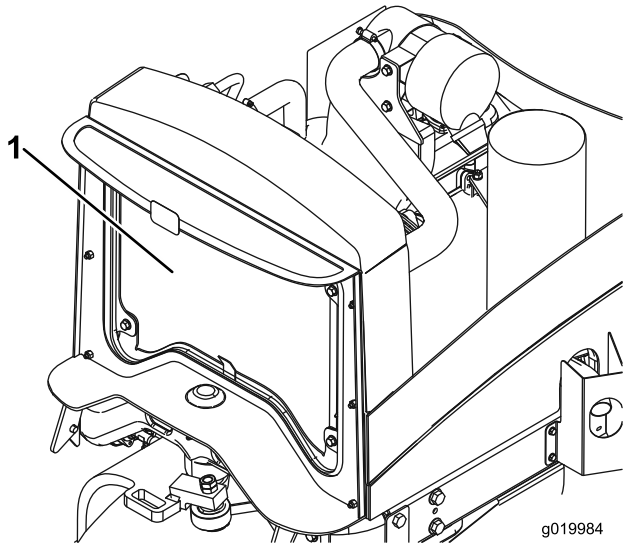


Figure 54

1. Radiator/oil cooler

5. Close the hood.

Brake Maintenance

Adjusting the Parking Brake

Service Interval: Every 200 hours—Check the parking brake adjustment.

1. Loosen the set screw securing the knob to the parking-brake lever (Figure 55).

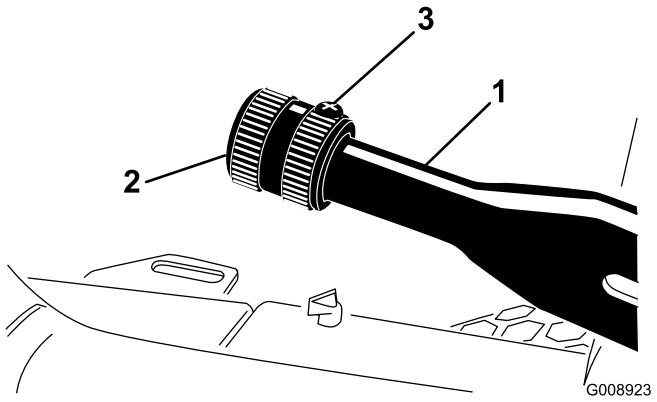


Figure 55

1. Parking-brake lever
2. Knob
3. Set screw

2. Rotate the knob until a force of 41–68 N-m (30–40 lb) is required to actuate the lever.
3. Tighten the set screw after the adjustment has been attained.

Belt Maintenance

Servicing the Engine Belts

Service Interval: After the first 8 hours—Check the condition and tension of all belts.

Every 200 hours—Check the condition and tension of all belts.

Tensioning the Alternator/Fan Belt

1. Open the hood.
2. Check the tension by pressing the belt midway between the alternator and crankshaft pulleys with 30 N-m (22 ft-lb) of force. A new belt should deflect 8 to 12 mm (0.3 to 0.5 inch). A used belt should deflect 10 to 14 mm (0.4 to 0.55 inch). If the deflection is incorrect, proceed to the next step. If correct, no further action is required.

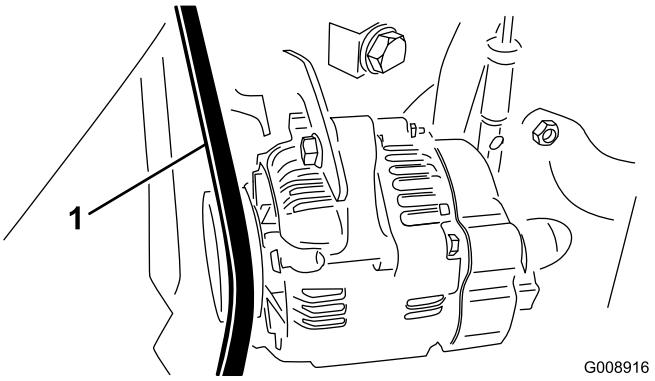


Figure 56

1. Alternator/fan belt

3. To adjust belt tension, complete the following:
   A. Loosen the 2 alternator mounting bolts.
   B. Using a bar, rotate the alternator until the proper belt tension is attained, then tighten the mounting bolts.

Replacing the Hydrostat Drive Belt

1. Insert a nut driver or small piece of tubing onto the end of the belt tensioning spring.

⚠ WARNING

Use caution when de-tensioning the spring, as it is under a heavy load.

2. Push down and forward on the spring end (Figure 57) to unhook it from the bracket and release tension on the spring.

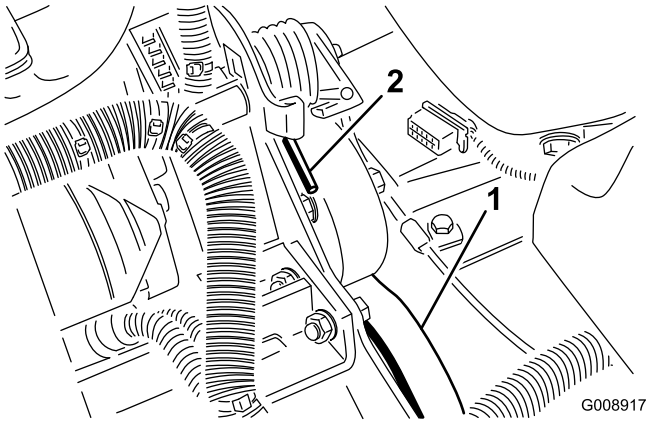


Figure 57

1. Hydrostat drive belt
2. Spring end

3. Replace the belt.
4. Reverse the procedure to tension the spring.

Hydraulic System Maintenance

Changing the Hydraulic Filter

Service Interval: After the first 10 hours

Every 200 hours/Yearly (whichever comes first)

⚠ WARNING

Hydraulic fluid escaping under pressure can penetrate skin and cause injury.

- **Make sure that all hydraulic fluid hoses and lines are in good condition and all hydraulic connections and fittings are tight before applying pressure to the hydraulic system.**
- **Keep your body and hands away from pin hole leaks or nozzles that eject high pressure hydraulic fluid.**
- **Use cardboard or paper to find hydraulic leaks.**
- **Safely relieve all pressure in the hydraulic system before performing any work on the hydraulic system.**
- **Seek immediate medical attention if fluid is injected into skin.**

Use a genuine Toro replacement filter, Part No. 86-3010.

Important: Use of any other filter may void the warranty on some components.

1. Position the traction unit on a level surface, lower the cutting units, stop the engine, engage the parking brake, and remove the key from the ignition.
2. Pinch off the hose to the filter mounting plate.
3. Clean around the filter mounting area. Place a drain pan under the filter (Figure 58) and remove the filter.

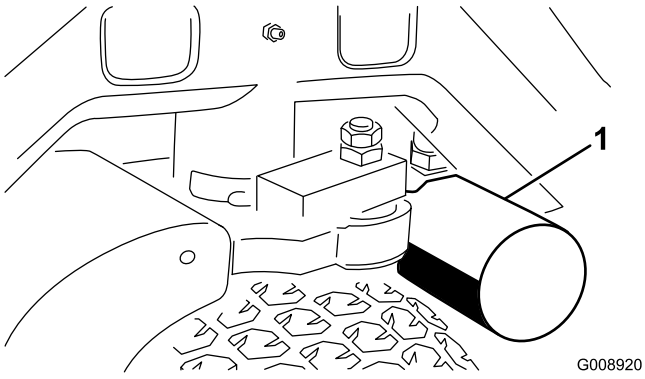


Figure 58

1. Hydraulic filter

4. Lubricate the new filter gasket and fill the filter with hydraulic fluid.

5. Ensure that the filter mounting area is clean. Screw the filter on until the gasket contacts the mounting plate; then tighten the filter 1/2 turn.
6. Release the hose to the filter mounting plate.
7. Start the engine and let it run for about 2 minutes to purge air from the system. Stop the engine and check for leaks.

Changing the Hydraulic Fluid

Service Interval: Every 400 hours

If the fluid becomes contaminated, contact your local Toro distributor because the system must be flushed. Contaminated fluid looks milky or black when compared to clean oil.

1. Turn the engine off and raise the hood.
2. Disconnect the hydraulic line (Figure 59) or remove the hydraulic filter (Figure 58) and let the hydraulic fluid flow into a drain pan. Install the hydraulic line when hydraulic fluid stops draining.

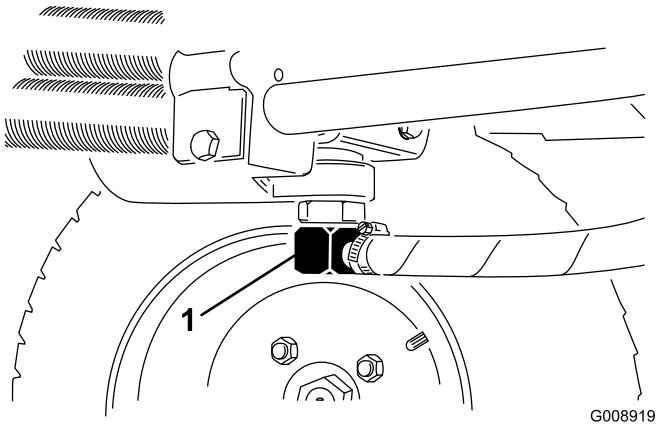


Figure 59

1. Hydraulic line

3. Fill the reservoir (Figure 60) with approximately 22.7 L (6 US gallons) of hydraulic fluid; refer to Checking the Hydraulic System (page 22).

   Important: Use only the hydraulic fluids specified. Other fluids could cause system damage.

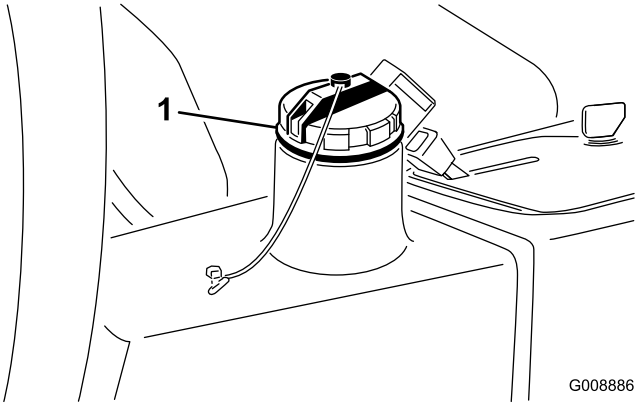


Figure 60

1. Hydraulic fill cap

4. Install the reservoir cap. Start the engine and use all of the hydraulic controls to distribute the hydraulic fluid throughout the system. Also check for leaks; then stop the engine.
5. Check the fluid level and add enough to raise the level to between marks on the dipstick. **Do not overfill.**

Checking the Hydraulic Lines and Hoses

Service Interval: Before each use or daily

Check hydraulic lines and hoses for leaks, kinked lines, loose mounting supports, wear, loose fittings, weather deterioration, and chemical deterioration. Make all necessary repairs before operating.

Maintaining the Cutting Unit

Separating the Cutting Unit from the Traction Unit

1. Position the traction unit on a level surface, lower the cutting units to the ground, shut the engine off, and engage the parking brake.
2. Disconnect and remove the hydraulic motor from the cutting unit (Figure 61). Cover the top of the spindle to prevent contamination.

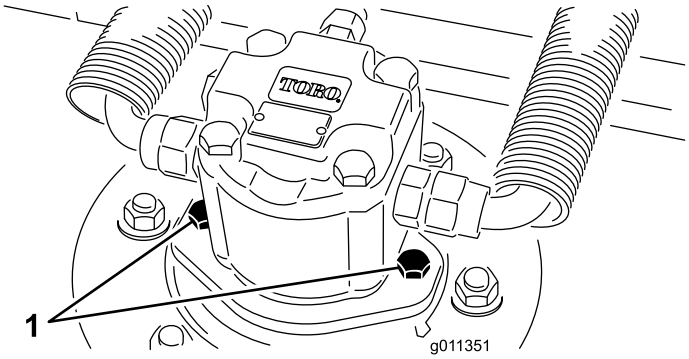


Figure 61

1. Motor-mounting bolts

3. Remove the lynch pin securing the cutting unit carrier frame to the lift-arm pivot pin (Figure 62).

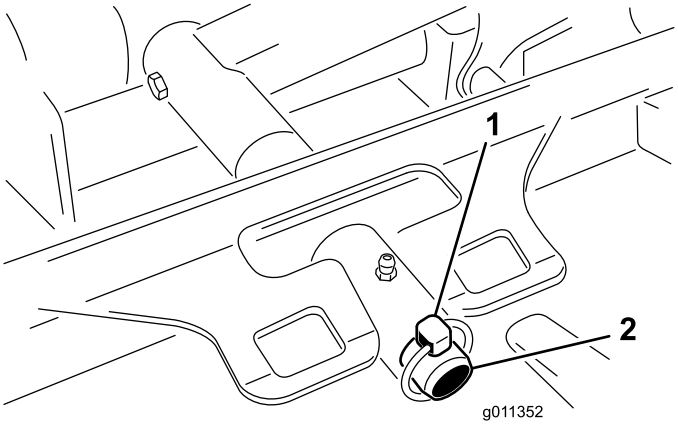


Figure 62

1. Lynch pin
2. Lift-arm pivot pin

4. Roll the cutting unit away from the traction unit.

Mounting the Cutting Units to the Traction Unit

1. Position the traction unit on a level surface and shut off the engine.
2. Move the cutting unit into position in front of the traction unit.
3. Slide the cutting unit carrier frame onto the lift-arm pivot pin. Secure with the lynch pin (Figure 62).
4. Install the hydraulic motor to the cutting unit (Figure 61). Make sure that the O-ring is in position and not damaged.
5. Grease the spindle.

Servicing the Blade Plane

The cutting unit comes from the factory preset to a 5 cm (2.00 inch) height of cut and a blade rake of 7.9 mm (0.310 inch). The left and right heights are also preset to within +/- 0.7 mm (0.030 inch).

The cutting unit is designed to withstand blade impacts without deformation of the chamber. If a solid object is struck, inspect the blade for damage and the blade plane for accuracy.

Inspecting the Blade Plane

1. Remove the hydraulic motor from the cutting unit and remove the cutting unit from the traction unit.
2. Use a hoist (or minimum of 2 people) and place the cutting unit on a flat table.
3. Mark one end of the blade with a paint pen or marker. Use this end of the blade to check all heights.
4. Position the cutting edge of the marked end of the blade at 12 o'clock (straight ahead in the direction of mowing) and measure height from table to cutting edge of blade (Figure 63).

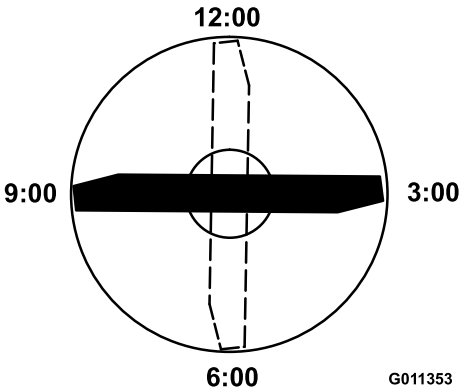


Figure 63

5. Rotate the marked end of the blade to the 3 and 9 o'clock positions and measure the heights (Figure 63).

6. Compare the 12 o'clock measured height to the height of cut setting. It should be within 0.7 mm (0.030 inch). The 3 and 9 o'clock heights should be 3.8 +/- 2.2 mm (0.150 +/- 0.090 inch) higher than the 12 o'clock setting and within 2.2 mm (0.090 inch) of each other.

If any of these measurements are not within specification, proceed to Adjusting the Blade Plane (page 46).

Adjusting the Blade Plane

Start with the front adjustment (change one bracket at a time).

1. Remove the height of cut bracket, (front, left, or right) from the cutting unit frame (Figure 64).
2. Adjust 1.5 mm (0.060 inch) shims and/or 0.7 mm (0.030 inch) shim between the cutting unit frame and bracket to achieve the desired height setting (Figure 64).

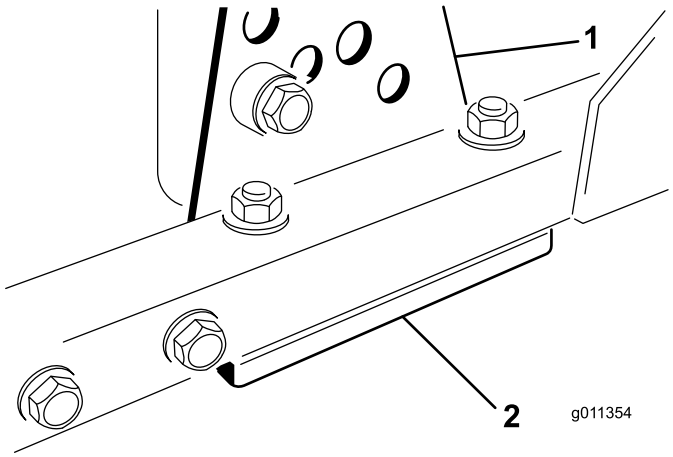


Figure 64

1. Height of cut bracket
2. Shims

3. Install the height of cut bracket to the cutting unit frame with the remaining shims assembled below the height of cut bracket.
4. Secure the socket-head bolt/spacer and flange nut.

   Note: Socket-head bolt/spacer are held together with removable thread-locking compound to prevent the spacer from falling inside the cutting-unit frame.
5. Verify the 12 o'clock height and adjust if needed.
6. Determine if only one or both (right-hand and left-hand) height of cut brackets need to be adjusted. If the 3 or 9 o'clock side is 3.8 +/- 2.2 mm (0.150 +/- 0.090 inch) higher than the new front height then no adjustment is needed for that side. Adjust the other side to within +/- 2.2 mm (0.090 inch) of the correct side.
7. Adjust the right and/or left height of cut brackets by repeating steps 1 through 3.
8. Secure the carriage bolts and flange nuts.
9. Again, verify the 12, 3, and 9 o'clock heights.

Servicing the Cutter Blade

Removing the Cutter Blade

The blade must be replaced if a solid object is hit, the blade is out-of-balance, or if the blade is bent. Always use genuine Toro replacement blades to be sure of safety and optimum performance. Never use replacement blades made by other manufacturers because they could be dangerous.

1. Raise the cutting unit to the highest position, shut the engine off, and engage the parking brake.

   Note: Block the cutting unit to prevent it from falling accidentally.
2. Grasp the end of the blade using a rag or thickly-padded glove. Remove the blade bolt, anti-scalp cup, and blade from the spindle shaft (Figure 65).

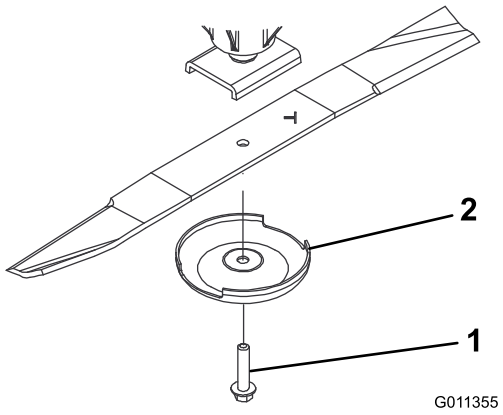


Figure 65

1. Blade bolt
2. Anti-scalp cup

3. Install the blade, sail facing toward the cutting unit, with the anti-scalp cup and blade bolt (Figure 65). Tighten the blade bolt to 115–149 N-m (85–110 ft-lb).

⚠ DANGER

A worn or damaged blade can break, and a piece of the blade could be thrown into the operator's or bystander's area, resulting in serious personal injury or death

- **Inspect the blade periodically for wear or damage.**
- **Never weld a broken or cracked blade.**
- **Always replace a worn or damaged blade.**

Inspecting and Sharpening the Blade

1. Raise the cutting unit to the highest position, shut the engine off, and engage the parking brake.

   Note: Block the cutting unit to prevent it from falling accidentally.
2. Examine the cutting ends of the blade carefully, especially where the flat and curved parts of the blade

meet (Figure 66). Since sand and abrasive material can wear away the metal that connects the flat and curved parts of the blade, check the blade before using the machine. If you notice wear (Figure 66), replace the blade; refer to Removing the Cutter Blade (page 46).

⚠ DANGER

If the blade is allowed to wear, a slot will form between the sail and flat part of the blade (Figure 66). Eventually a piece of the blade may break off and be thrown from under the housing, possibly resulting in serious injury to yourself or bystanders.

- **Inspect the blade periodically for wear or damage.**
- **Always replace a worn or damaged blade.**

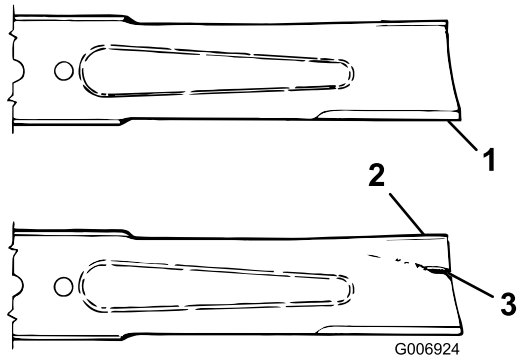


Figure 66

1. Cutting edge
2. Sail
3. Wear/slot/crack

3. Inspect the cutting edges of all blades. Sharpen the cutting edges if they are dull or nicked. Sharpen only the top of the cutting edge and maintain the original cutting angle to ensure sharpness (Figure 67). The blade will remain balanced if the same amount of metal is removed from both cutting edges.



Figure 67

1. Sharpen at this angle only

4. To check the blade for being straight and parallel, lay the blade on a level surface and check its ends. The ends of the blade must be slightly lower than the center, and the cutting edge must be lower than the heel of the blade.

   Note: This blade will produce good quality of cut and require minimal power from the engine. By contrast a blade that is higher at the ends than the center, or if cutting edge is higher than the heel, the blade is bent or warped and must be replaced.

5. Install the blade, with sail facing away from the ground when you are mowing, the anti-scalp cup, and blade bolt.
6. Tighten the blade bolt to 115–149 N-m (85–110 ft-lb).

Checking the Blade Stopping Time

Service Interval: Before each use or daily

The blades of the cutting unit should come to a complete stop in approximately 5 seconds after you shut down the cutting unit engagement switch.

To verify this stopping time, have another person stand back from the cutting units at least 6 m (20 feet) and watch a blade on a cutting unit. Have the operator disengage the cutting units and record the time it takes for the blades to come to a complete stop. If this time is greater than 7 seconds, the braking valve needs to be adjusted. Call your Toro Distributor for assistance in making this adjustment.

Note: Make sure that the cutting-units are lowered onto a clean section of turf or clean hard surface to avoid thrown dust and debris.

Servicing the Front Roller

Inspect the front roller for wear, excess wobble, or binding. Service or replace the roller or components if any of these conditions exist.

Disassembling the Front Roller

1. Remove the roller mounting bolt (Figure 68).
2. Insert a punch through the end of the roller housing and drive the opposite bearing out by alternating taps to the opposite side of inner bearing race. There should be a 1.5 mm (0.060 inch) lip of inner race exposed.

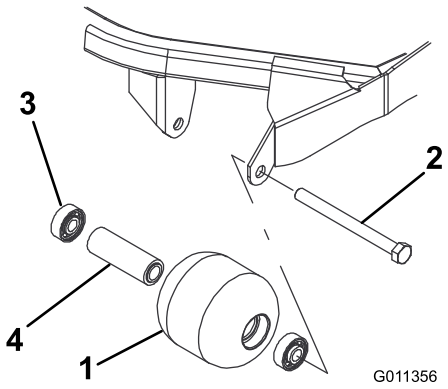


Figure 68

1. Front roller
2. Mounting bolt
3. Bearing
4. Bearing spacer

3. Push the second bearing out in a press.
4. Inspect the roller housing, bearings, and bearing spacer for damage (Figure 68). Replace damaged components and assemble.

Assembling the Front Roller

1. Press the first bearing into the roller housing (Figure 68). Press on the outer race only or equally on the inner and outer race.
2. Insert the spacer (Figure 68).
3. Press the second bearing into the roller housing (Figure 68).Pressing equally on the inner and outer race until the inner race comes in contact with the spacer.
4. Install the roller assembly into the deck frame.
5. Verify that there is no more than a 1.5 mm (0.060 inch) gap between roller assembly and the roller mount brackets of the deck frame. If there is a gap over 1.5 mm (0.060 inch), install enough 5/8 inch diameter washers to take up the slop.

   Important: Securing the roller assembly with a gap larger than 1.5 mm (0.060 inch) creates a side load on the bearing and can lead to premature bearing failure
6. Tighten the mounting bolt to 108 N-m (80 ft-lb).

Storage

Storing the Battery

If the machine will be stored more than 30 days, remove the battery and charge it fully. Store the battery in a cool atmosphere to avoid quick deterioration of the charge in the battery. To prevent the battery from freezing, make sure that it is fully charged. The specific gravity of a fully charged battery is 1.265–1.299.

Preparation for Seasonal Storage

Follow these procedures anytime you will be storing the machine for more than 30 days.

Engine

1. Drain the engine oil from the oil pan and replace the drain plug.
2. Remove and discard the oil filter. Install a new oil filter.
3. Refill the oil pan with 3.3 L (3.5 US qt) of motor oil.
4. Start the engine and run it at idle speed for approximately 2 minutes.
5. Stop the engine.
6. For storage over 30 days, prepare the fuel system as follows:
   - Add a petroleum based stabilizer/conditioner to fuel in the tank.

     Follow the mixing instructions from stabilizer manufacturer. Do not use an alcohol based stabilizer (ethanol or methanol).

     Note: A fuel stabilizer/conditioner is most effective when mixed with fresh gasoline and used at all times.
   - Run the engine to distribute conditioned fuel through the fuel system for approximately 5 minutes.
   - Stop the engine, allow it to cool, and drain the fuel tank.
   - Restart the engine and run it until it stops.
   - Start and run the engine until it will not start again.
   - Dispose of fuel properly. Recycle as per local codes

     Important: Do not store stabilizer/conditioned gasoline over 90 days
7. Remove the spark plugs and check their condition; refer to Replacing the Spark Plugs (page 37).
8. With the spark plugs removed from the engine, pour 2 tablespoons of engine oil into the spark plug hole.
9. Use the starter to crank the engine and distribute the oil inside the cylinder.
10. Install the spark plugs and tighten to recommended torque; refer to Replacing the Spark Plugs (page 37).

    Note: Do not install the wires on the spark plugs.
11. Check anti-freeze protection and add as needed for expected minimum temperature in your area.
12. Secure all fuel system fittings.
13. Thoroughly clean and service the air cleaner assembly.
14. Seal the air cleaner inlet and the exhaust outlet with weatherproof tape.

Notes:

Notes:

Toro General Commercial Product Warranty

A Two-Year Limited Warranty

Conditions and Products Covered

The Toro Company and its affiliate, Toro Warranty Company, pursuant to an agreement between them, jointly warrant your Toro Commercial product ("Product") to be free from defects in materials or workmanship for two years or 1500 operational hours*, whichever occurs first. This warranty is applicable to all products with the exception of Aerators (refer to separate warranty statements for these products). Where a warrantable condition exists, we will repair the Product at no cost to you including diagnostics, labor, parts, and transportation. This warranty begins on the date the Product is delivered to the original retail purchaser.
* Product equipped with an hour meter.

Instructions for Obtaining Warranty Service

You are responsible for notifying the Commercial Products Distributor or Authorized Commercial Products Dealer from whom you purchased the Product as soon as you believe a warrantable condition exists. If you need help locating a Commercial Products Distributor or Authorized Dealer, or if you have questions regarding your warranty rights or responsibilities, you may contact us at:

Toro Commercial Products Service Department
Toro Warranty Company
8111 Lyndale Avenue South
Bloomington, MN 55420-1196

952–888–8801 or 800–952–2740
E-mail: commercial.warranty@toro.com

Owner Responsibilities

As the Product owner, you are responsible for required maintenance and adjustments stated in your *Operator's Manual*. 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 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, or modified non-Toro branded accessories and products. A separate warranty may be provided by the manufacturer of these items.
- Product failures which result from failure to perform recommended maintenance and/or adjustments. Failure to properly maintain your Toro product per the Recommended Maintenance listed in the *Operator's Manual* can result in claims for warranty being denied.
- 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, brake pads and linings, clutch linings, blades, reels, rollers and bearings (sealed or greasable), bed knives, spark plugs, castor wheels and bearings, tires, filters, belts, and certain sprayer components such as diaphragms, nozzles, and check valves, etc.
- Failures caused by outside influence. Conditions considered to be outside influence include, but are not limited to, weather, storage practices, contamination, use of unapproved fuels, coolants, lubricants, additives, fertilizers, water, or chemicals, etc.
- Failure or performance issues due to the use of fuels (e.g. gasoline, diesel, or biodiesel) that do not conform to their respective industry standards.
- Normal noise, vibration, wear and tear, and deterioration.
- Normal "wear and tear" includes, but is not limited to, damage to seats due to wear or abrasion, worn painted surfaces, scratched decals or windows, etc.

Parts

Parts scheduled for replacement as required maintenance are warranted for the period of time up to the scheduled replacement time for that part. Parts replaced under this warranty are covered for the duration of the original product warranty and become the property of Toro. Toro will make the final decision whether to repair any existing part or assembly or replace it. Toro may use remanufactured parts for warranty repairs.

Deep Cycle and Lithium-Ion Battery Warranty:

Deep cycle and Lithium-Ion batteries have a specified total number of kilowatt-hours they can deliver during their lifetime. Operating, recharging, and maintenance techniques can extend or reduce total battery life. As the batteries in this product are consumed, the amount of useful work between charging intervals will slowly decrease until the battery is completely worn out. Replacement of worn out batteries, due to normal consumption, is the responsibility of the product owner. Battery replacement may be required during the normal product warranty period at owner's expense. Note: (Lithium-Ion battery only): A Lithium-Ion battery has a part only prorated warranty beginning year 3 through year 5 based on the time in service and kilowatt hours used. Refer to the *Operator's Manual* for additional information.

Maintenance is at Owner's Expense

Engine tune-up, lubrication, cleaning and polishing, replacement of filters, coolant, and completing recommended maintenance are some of the normal services Toro products require that are at the owner's expense.

General Conditions

Repair by an Authorized Toro Distributor or 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. Except for the Emissions warranty referenced below, if applicable, there is no other express 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.

Note regarding engine 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) and/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 Engine 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.

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