



Count on it.

Operator's Manual

Groundsmaster® 4500-D and 4700-D Traction Unit

Model No. 30873—Serial No. 315000001 and Up

Model No. 30874—Serial No. 315000009 and Up



This product complies with all relevant European directives; for details, please see the separate product specific Declaration of Conformity (DOC) sheet.

⚠ 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.

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

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

Introduction

This machine is a ride-on, rotary-blade lawn mower 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 right front frame member of the product. Write the numbers in the space provided.

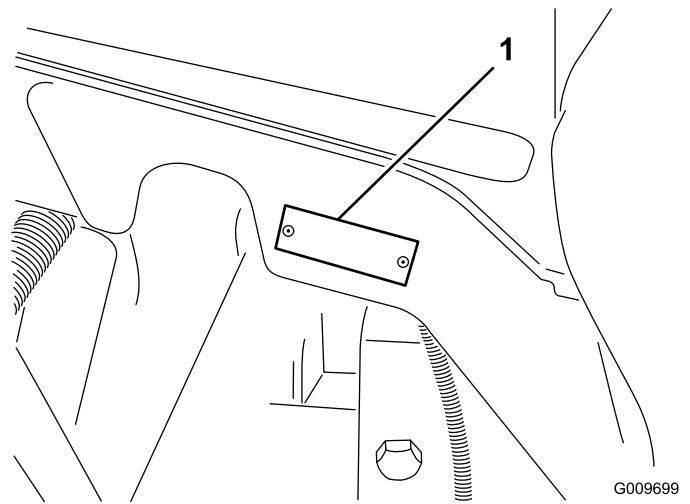


Figure 1

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 has been designed in accordance with EN ISO 5395:2013 and ANSI B71.4-2012.

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

Training

- Read the operator's manual and other training material carefully. Be familiar with the controls, safety signs, and the proper use of the equipment.
- If the operator or mechanic cannot read the language of this manual, it is the owner's responsibility to explain this material to them.
- Never allow children or people unfamiliar with these instructions to use or service the mower. Local regulations may restrict the age of the operator.
- Never mow while people, especially children, or pets are nearby.
- Do not carry passengers.
- All drivers and mechanics should seek and obtain professional and practical instruction. The owner is responsible for training the users. Such instruction should emphasize:
 - the need for care and concentration when working with ride-on machines;
 - control of a ride-on machine sliding on a slope will not be regained by the application of the brake. The main reasons for loss of control are:
 - ◇ insufficient wheel grip;
 - ◇ being driven too fast;
 - ◇ inadequate braking;
 - ◇ the type of machine is unsuitable for the task;
 - ◇ lack of awareness of the effect of ground conditions, especially slopes;
- The owner/user can prevent and is responsible for accidents or injuries occurring to people or damage to property.

Preparation

- While mowing, always wear substantial footwear, long trousers, hard hat, safety glasses, and hearing protection. Long hair, loose clothing, or jewelry may get tangled in moving parts. Do not operate the equipment when barefoot or wearing open sandals.

- Thoroughly inspect the area where the equipment is to be used and remove all objects which may be thrown by the machine.
- Replace worn or damaged silencers.
- 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.
- Check that operator's presence controls, safety switches, and shields are attached and functioning properly. Do not operate unless they are functioning properly.

Operation

- Do not operate the engine in a confined space where dangerous carbon monoxide fumes can collect.
- Mow only in daylight or in good artificial light.
- Before attempting to start the engine, disengage all blade attachment clutches, shift into neutral, and engage the parking brake.
- Do not put hands or feet near or under rotating parts. Keep clear of the discharge opening at all times.
- Remember there is no such thing as a safe slope. Travel on grass slopes requires particular care. To guard against overturning:
 - do not stop or start suddenly when going up or downhill;
 - machine speeds should be kept low on slopes and during tight turns;
 - stay alert for humps and hollows and other hidden hazards;
 - never mow across the face of the slope, unless the mower is designed for this purpose.
 - Use counterweight(s) or wheel weights when suggested in the operator's manual.
- Stay alert for holes in the terrain and other hidden hazards.
- Watch out for traffic when crossing or near roadways.
- Stop the blades from rotating before crossing surfaces other than grass.
- Never operate the machine with damaged guards, shields, or without safety protective devices in place. Be sure all interlocks are attached, adjusted properly, and functioning properly.
- Do not change the engine governor settings or overspeed the engine. Operating the engine at excessive speed may increase the hazard of personal injury.
- Before leaving the operator's position:
 - stop on level ground;
 - disengage the power take-off and lower the attachments;
 - set the parking brake;

- stop the engine and remove the key.

Important: Allow the engine to idle for 5 minutes before shutting it off after a full-load operation. Failure to do so may lead to turbocharger trouble.

- Stop the engine in the following conditions:
 - before fuelling;
 - before making height adjustments.
 - before clearing blockages;
 - before checking, cleaning, or working on the mower;
 - after striking a foreign object or if an abnormal vibration occurs. Inspect the mower for damage and make repairs before starting and operating the equipment again.
- Reduce the throttle setting during engine run-out.
- Keep hands and feet away from the cutting units.
- Look behind and down before backing up, to be sure of a clear path.
- Slow down and use caution when making turns and crossing roads and sidewalks. Stop blades from rotating.
- 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
- Lightning can cause severe injury or death. If lightning is seen or thunder is heard in the area, do not operate the machine; seek shelter.
- Use care when loading or unloading the machine into a trailer or truck
- Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.

Rollover Protection System (ROPS)—Use and Maintenance

- The ROPS is an integral and effective safety device. Keep a folding ROPS in the raised and locked position and use the seat belt when operating the machine.
- 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.
- Keep the ROPS in safe operating condition by periodically thoroughly inspecting for damage and keeping all mounting fasteners tight.
- Replace a damaged ROPS. Do not repair or revise.
- **Do not** remove the ROPS.
- Any alterations to a ROPS must be approved by the manufacturer.

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.
- If fuel is spilled on clothing, change clothing immediately.
- Never overfill fuel tank. Replace fuel cap and tighten securely.

Maintenance and Storage

- Keep all nuts, bolts and screws tight to be sure the equipment is in safe working condition.
- Never store the equipment with fuel in the tank inside a building where fumes may reach an open flame or spark.
- Allow the engine to cool before storing in any enclosure.
- To reduce the fire hazard, keep the engine, silencer/muffler, battery compartment and fuel storage area free of grass, leaves, or excessive grease.
- Keep all parts in good working condition and all hardware and hydraulic fittings tightened. Replace all worn or damaged parts and decals.
- If the fuel tank has to be drained, do this outdoors.
- Be careful during adjustment of the machine to prevent entrapment of the fingers between moving blades and fixed parts of the machine.
- On multi-spindle mowers, take care as rotating one blade can cause other blades to rotate.
- Disengage drives, lower the cutting units, set parking brake, stop engine and remove ignition key. Wait for all movement to stop before adjusting, cleaning or repairing.

- Clean grass and debris from cutting units, drives, silencers/mufflers, and engine to help prevent fires. Clean up oil or fuel spillage.
- Use jack stands to support components when required.
- Carefully release pressure from components with stored energy.
- Disconnect battery before making any repairs. Disconnect the negative terminal first and the positive last. Reconnect positive first and negative last.
- Use care when checking the blades. Wear gloves and use caution when servicing them.
- Keep hands and feet away from moving parts. If possible, do not make adjustments with the engine running.
- Charge batteries in an open well ventilated area, away from spark and flames. Unplug charger before connecting or disconnecting from battery. Wear protective clothing and use insulated tools.
- Store the machine with the cutting units in the lowered position or secure the wing decks with the storage latches to prevent them from unintentionally lowering.
- Handle fuel carefully. Wipe up any spills.
- Check the safety interlock switches daily for proper operation. If a switch should fail, replace the switch before operating the machine.
- Before starting the engine, sit on the seat.
- Using the machine demands attention. To prevent loss of control:
 - Do not drive close to sand traps, ditches, creeks, embankments, or other hazards.
 - Reduce speed when making sharp turns. Avoid sudden stops and starts.
 - When near or crossing roads, always yield the right-of-way.
 - Apply the service brakes when going downhill to keep forward speed slow and to maintain control of the machine.
- When operating a machine with ROPS (rollover protection system) never remove the ROPS and always use the seat belt.

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.
- Do not touch the engine, silencer/muffler, or exhaust pipe while the engine is running or soon after it has stopped because these areas could be hot enough to cause burns.
- On any hill, there is the possibility of tipping or rolling over, but the risk increases as the slope angle increases. Steep hills should be avoided.

Cutting units must be lowered when going down slopes to maintain steering control

- Engage the traction drive slowly; always keep your foot on the traction pedal, especially when traveling downhill. Use reverse on the traction pedal for braking.
- If the machine stalls when climbing a slope, do not turn the machine around. Always back slowly, straight down the slope.
- When a person or pet appears unexpectedly in or near the mowing area, stop mowing. Careless operation, combined with terrain angles, ricochets, or improperly positioned guards can lead to thrown object injuries. Do not resume mowing until the area is cleared.

Toro Riding Mower Safety

The following list contains safety information specific to Toro products or other safety information that you must know that is not included in the CEN, ISO, or ANSI standard.

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 user and bystanders.

▲ WARNING

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

Do not run engine indoors or in an enclosed area.

- Know how to stop the engine quickly.
- Do not operate the machine while wearing tennis shoes or sneakers.
- Wearing substantial safety shoes and long pants is advisable and required by some local ordinances and insurance regulations.

Maintenance and Storage

- Make sure all hydraulic line connectors are tight and all hydraulic hoses and lines are in good condition before applying pressure to the system.
- Keep your body and hands away from pin hole leaks or nozzles that eject hydraulic fluid under high pressure. Use paper or cardboard, not your hands, to search for leaks. Hydraulic fluid escaping under pressure can have sufficient force to penetrate the skin and cause serious

injury. Seek immediate medical attention if fluid is injected into skin.

- 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 and attachments to the ground.
- Check all fuel lines for tightness and wear on a regular basis. Tighten or repair them as needed.
- 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.
- To ensure safety and accuracy, have an Authorized Toro Distributor check the maximum engine speed with a tachometer.
- If major repairs are ever needed or if assistance is desired, contact an Authorized Toro Distributor.
- Use only Toro-approved attachments and replacement parts. The warranty may be voided if used with unapproved attachments.

Sound Power Level

This unit has a guaranteed sound power level of 105 dBA, which includes an Uncertainty Value (K) of 0.7 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 90 dBA, which includes an Uncertainty Value (K) of 0.7 dBA.

Sound pressure level was determined according to the procedures outlined in EN ISO 5395.

Vibration Level

Groundsmaster 4500

Hand-Arm

Measured vibration level for right hand = 0.56 m/s^2

Measured vibration level for left hand = 0.37 m/s^2

Uncertainty Value (K) = 0.28 m/s^2

Measured values were determined according to the procedures outlined in EN ISO 5395.

Whole Body

Measured vibration level = 0.2 m/s^2

Uncertainty Value (K) = 0.1 m/s^2

Measured values were determined according to the procedures outlined in EN ISO 5395.

Groundsmaster 4700

Hand-Arm

Measured vibration level for right hand = 1.21 m/s^2

Measured vibration level for left hand = 1.25 m/s^2

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

Measured values were determined according to the procedures outlined in EN ISO 5395.

Whole Body

Measured vibration level = 0.46 m/s^2

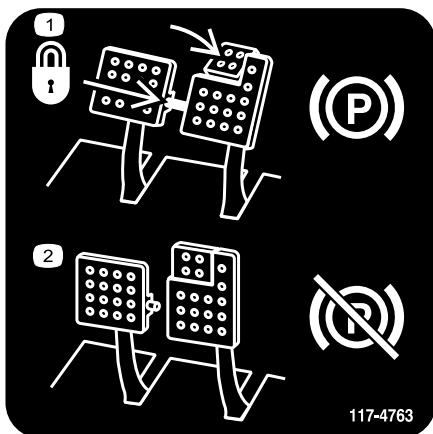
Uncertainty Value (K) = 0.5 m/s^2

Measured values were determined according to the procedures outlined in EN ISO 5395.

Safety and Instructional Decals

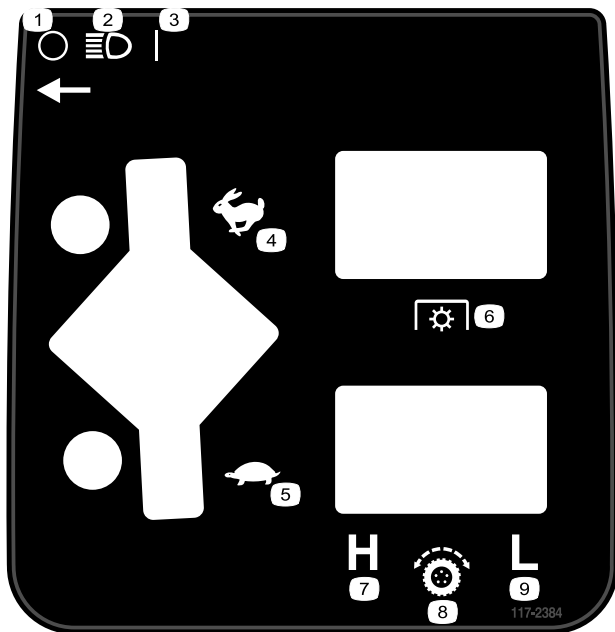


Safety decals and instructions are easily visible to the operator and are located near any area of potential danger. Replace any decal that is damaged or lost.



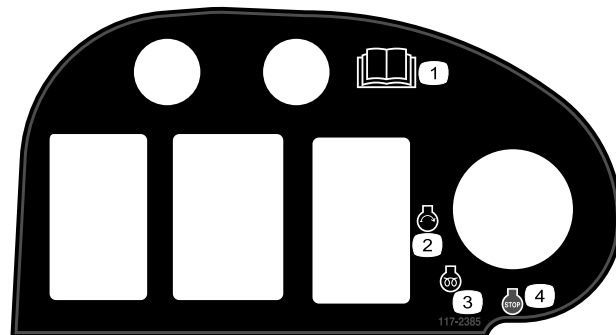
117-4763

1. To engage the parking brake, secure the brake pedals with the locking pin, press the parking brake pedals and engage the toe pedal.
2. To disengage the parking brake, disengage the locking pin and release the pedals.



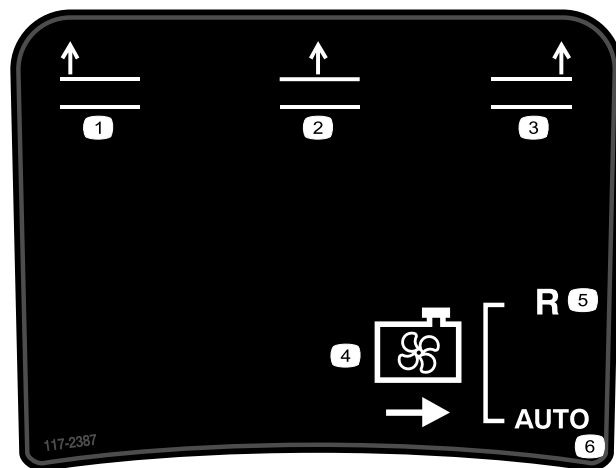
117-2384

1. Off
2. Headlights
3. On
4. Fast
5. Slow
6. Power Take-off (PTO)
7. High
8. Traction control
9. Low



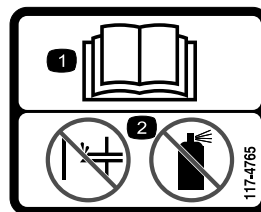
117-2385

1. Read the *Operators Manual*.
2. Engine—start
3. Engine—preheat
4. Engine—stop



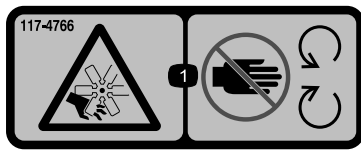
117-2387

1. Raise left deck
2. Raise center deck
3. Raise right deck
4. Cooling fan
5. Reverse
6. Automatic



117-4765

1. Read the *Operator's Manual*.
2. Do not use starting aids.



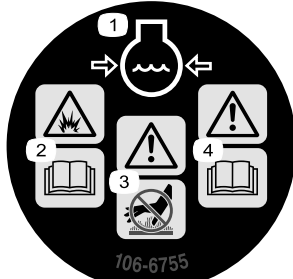
117-4766

1. Cutting/dismemberment hazard; fan—stay away from moving parts, keep all guards and shields in place.



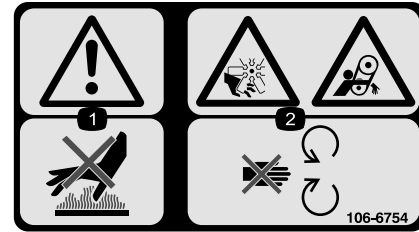
98-4387

1. Warning—wear hearing protection.



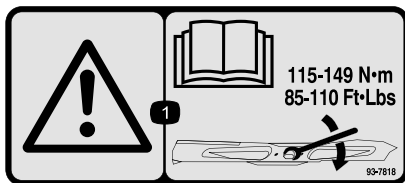
106-6755

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*.



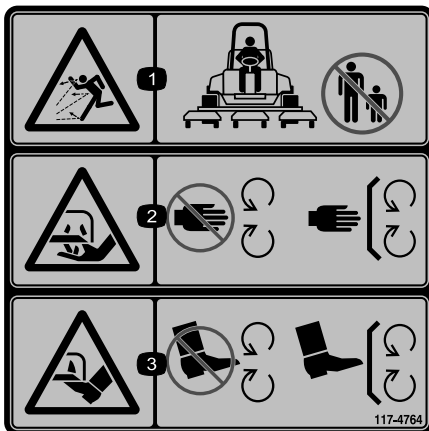
106-6754

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



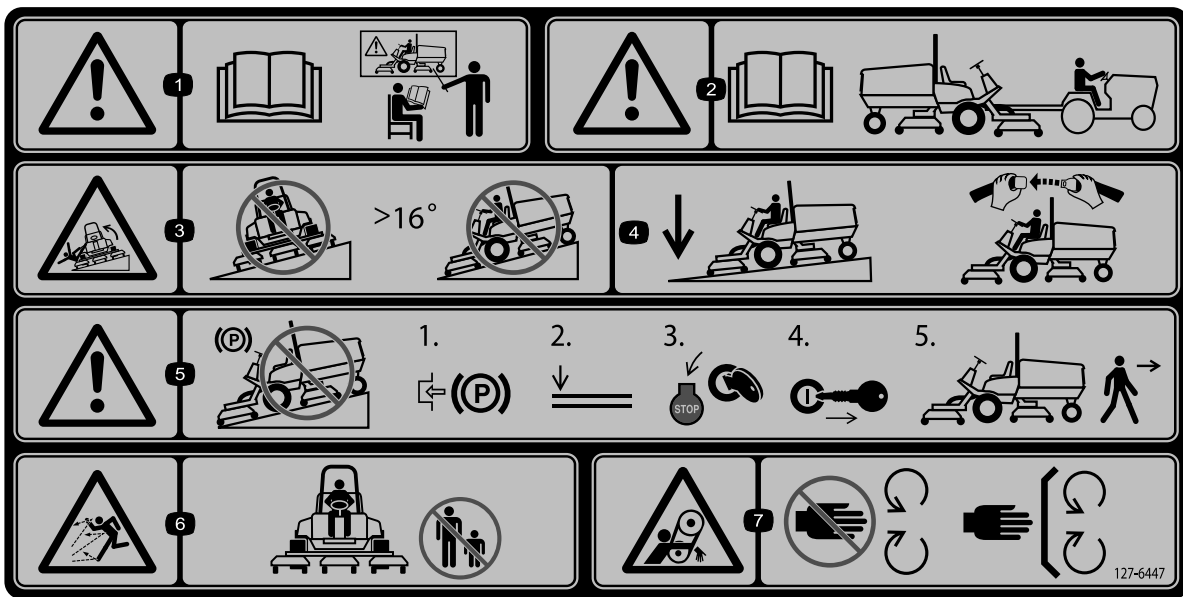
93-7818

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



117-4764

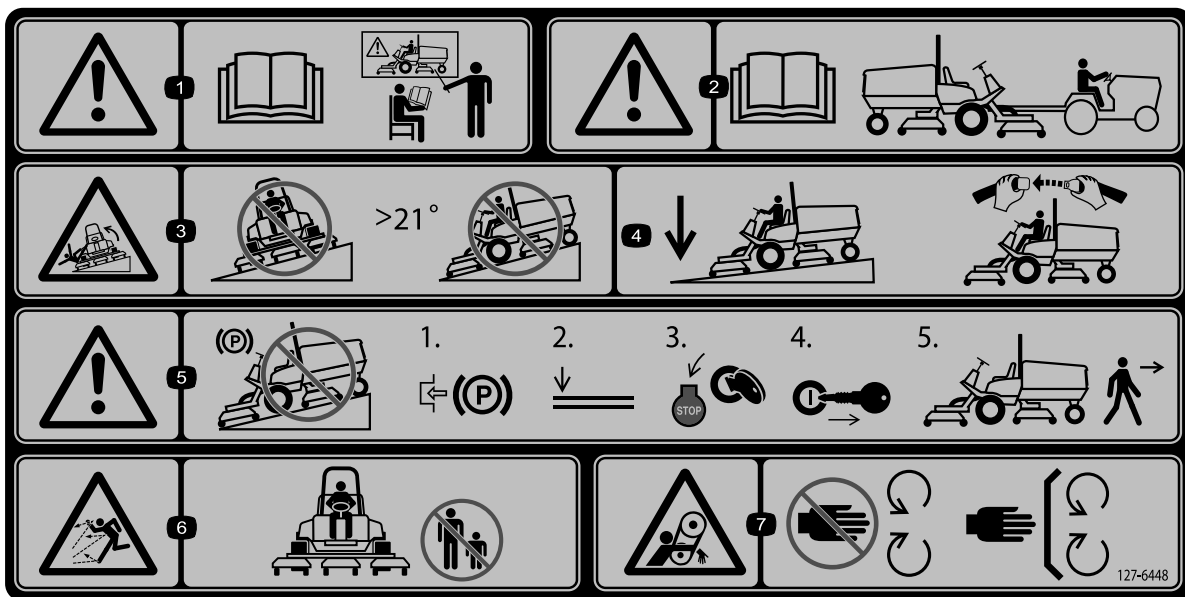
1. Thrown object hazard—keep bystanders a safe distance from the machine.
2. Cutting hazard of hand, mower blade—stay away from moving parts, keep all guards and shields in place.
3. Cutting hazard of foot, mower blade—stay away from moving parts, keep all guards and shields in place.



127-6447

For model number 30873

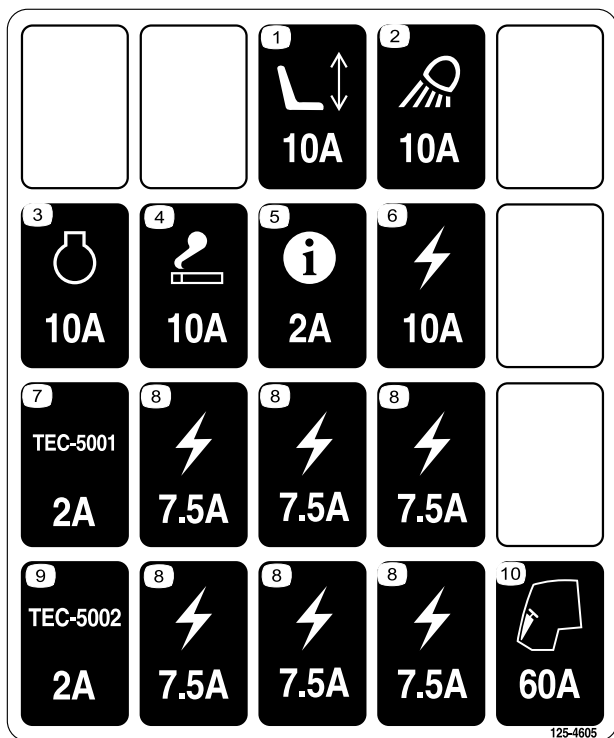
1. Warning—read the *Operator's Manual*; do not operate the machine unless you have received training.
2. Warning—read the *Operator's Manual* for information on towing.
3. Tipping hazard—do not drive on slopes greater than 16 degrees.
4. Keep the decks lowered while driving down slopes; always wear a seat belt when operating the machine.
5. Warning—do not park on slopes; 1) Engage the parking brake, 2) Lower the decks, 3) Turn off the engine. 4) Remove the key from the ignition, 5) Leave the machine.
6. Thrown object hazard—keep bystanders away from the machine.
7. Entanglement hazard, belt—keep away from moving parts; keep all guards and shields in place.



127-6448

For model number 30874

1. Warning—read the *Operator's Manual*; do not operate the machine unless you have received training.
2. Warning—read the *Operator's Manual* for information on towing.
3. Tipping hazard—do not drive on slopes greater than 21 degrees.
4. Keep the decks lowered while driving down slopes; always wear a seat belt when operating the machine.
5. Warning—do not park on slopes; 1) Engage the parking brake, 2) Lower the decks, 3) Turn off the engine. 4) Remove the key from the ignition, 5) Leave the machine.
6. Thrown object hazard—keep bystanders away from the machine.
7. Entanglement hazard, belt—keep away from moving parts; keep all guards and shields in place.



125-4605

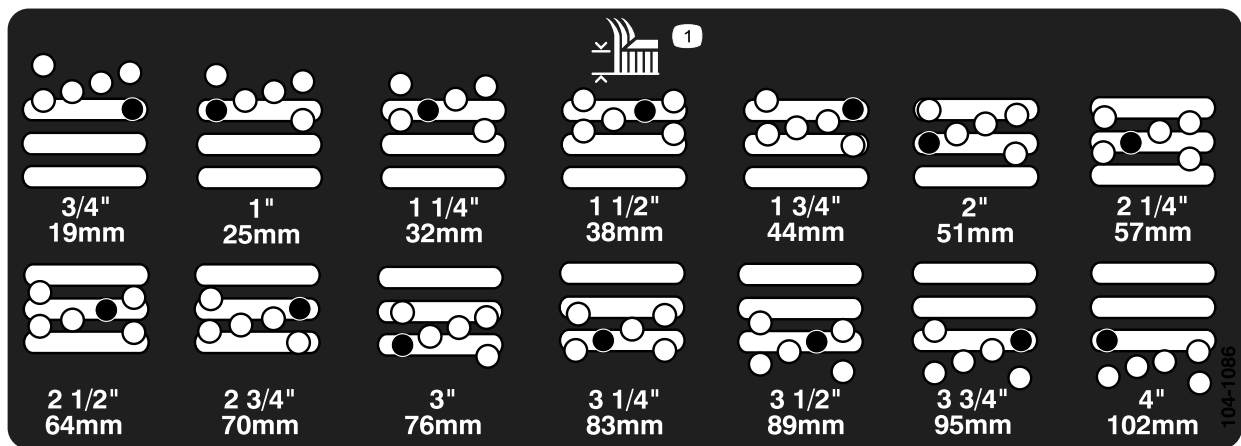
1. Power seat, 10A
2. Work light, 10A
3. Engine, 10A
4. Cigarette lighter, 10A
5. Infocenter, 2A
6. Power supplied, 10A
7. GM4700 controller, 2A
8. Power supplied, 7.5A
9. GM4500 controller, 2A
10. Engine preheat, 60A



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.



104-1086

1. Height of cut

GROUNDMASTER 4500/4700

QUICK REFERENCE AID

CHECK/SERVICE (DAILY)

1. ENGINE OIL LEVEL
2. HYDRAULIC OIL FLUID LEVEL
3. ENGINE COOLANT LEVEL
4. FUEL - DIESEL ONLY
5. FUEL/WATER SEPARATOR
6. RADIATOR SCREEN
7. AIR CLEANER
8. BRAKE FUNCTION
9. TIRE PRESSURE: 20 PSI/1.40 BAR
WHEEL NUT TORQUE: 93 FT/LB (127 N-m)

CHECK/SERVICE

(SEE OPERATOR'S MANUAL)

10. BATTERY
11. BELTS (FAN, ALT.)
12. PLANETARY GEAR DRIVE
13. INTERLOCK SYSTEM
14. REAR AXLE
15. ENGINE OIL DRAIN
16. GREASING

(SEE OPERATOR'S MANUAL)

SPECIFICATIONS/CHANGE INTERVALS

SEE OPERATOR'S MANUAL FOR INITIAL CHANGES.	FLUID TYPE	CAPACITY	CHANGE INTERVAL		FILTER PART NO.
			FLUID	FILTER	
(A) ENGINE OIL	15W-40 CH-4	10 QUARTS	150 HOURS	150 HOURS	104-5169
(B) HYDRAULIC FLUID	ISO VG 46/68	8.25 GALLONS	800 HOURS	800 HOURS	75-1310
(C) HYDRAULIC FILTER				800 HOURS	94-2621
(D) HYDRAULIC BREATHER				800 HRS/YRLY	68-5150
(E) FUEL SYSTEM	> 32 F NO. 2 DIESEL	22 GALLONS	800 HOURS DRAIN/FLUSH	400 HOURS/ YEARLY	110-9049
	< 32 F NO. 1 DIESEL				
(F) ENGINE COOLANT	50% WATER 50% ETHYL GLYCOL	13 QUARTS	DRAIN & FLUSH EVERY 2 YRS.		
(G) PRIMARY AIR FILTER				SEE SERVICE INDICATOR	108-3814
(H) SAFETY AIR FILTER				SEE OPERATOR'S MANUAL	108-3816
(I) REAR AXLE	85W-140	80 OUNCES	800 HOURS		110-4812 VENT
(J) PLANETARY DRIVE	85W-140	16 OUNCES	800 HOURS		

117-4758

117-4758

Setup

Loose Parts

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

Procedure	Description	Qty.	Use
1	Warning decal	1	Used only on machines requiring European CE Compliance.
2	Lock bracket Rivet Washer Screw, 1/4 x 2 inches Locknut, 1/4 inch	1 2 1 1 1	Install the Hood Latch (CE).
3	Throttle stop Setscrew	1 1	This procedure applies only to machines requiring European CE Compliance when installing optional high-lift blades.
4	No parts required	–	Adjust the height-of-cut
5	No parts required	–	Adjust the roller scraper (Optional)
6	No parts required	–	Install the mulching baffle (Optional)
7	No parts required	–	Grease the machine.
8	No parts required	–	Check the rear-axle lubricant, hydraulic-fluid, and engine-oil levels

Media and Additional Parts

Description	Qty.	Use
Operator's Manual	1	Read this before operating the machine.
Engine Operator's Manual	1	Read this before operating the engine.
Parts Catalog	1	Use this to reference part numbers.
Operator Training Material	1	View this before operating the machine.

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

1

Replacing the Warning Decal for CE Compliance

Parts needed for this procedure:

1	Warning decal
---	---------------

Procedure

On machines requiring European CE Compliance, replace the warning decal, part no. 112-5297 with the warning decal part no. 112-5298.

2

Installing the Hood Latch (CE only)

Parts needed for this procedure:

1	Lock bracket
2	Rivet
1	Washer
1	Screw, 1/4 x 2 inches
1	Locknut, 1/4 inch

Procedure

1. Unhook the hood latch from the hood-latch bracket.

2. Remove the 2 rivets securing the hood-latch bracket to the hood ([Figure 3](#)).

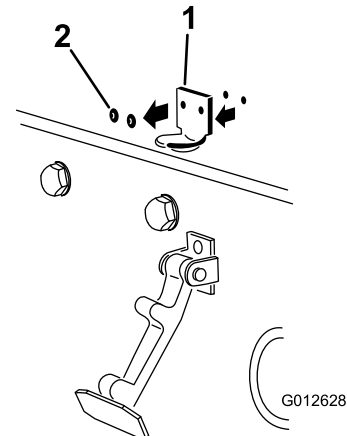


Figure 3

1. Hood-latch bracket
2. Rivets

3. Remove the hood-latch bracket from the hood.
4. While aligning the mounting holes, position the CE lock bracket and the hood-latch bracket onto the hood.

Note: The lock bracket must be against the hood ([Figure 4](#)). Do not remove the bolt and nut assembly from the lock-bracket arm.

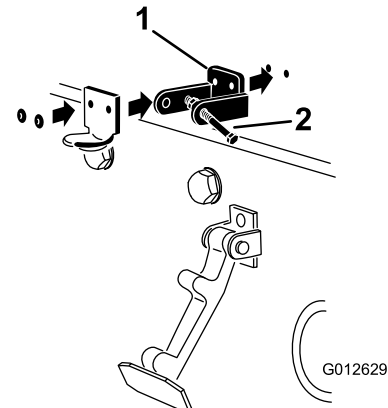


Figure 4

1. CE lock bracket
2. Bolt and nut assembly

5. Align the washers with the holes on the inside of the hood.
6. Rivet the brackets and the washers to the hood ([Figure 4](#)).
7. Hook the latch onto the hood-latch bracket ([Figure 5](#)).

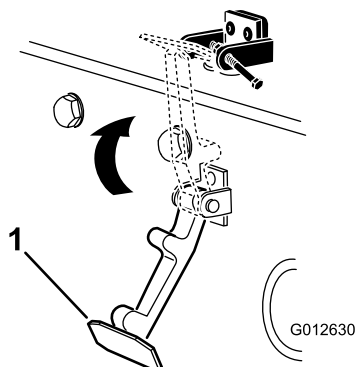


Figure 5

1. Hood latch

8. Screw the bolt into the other arm of hood-lock bracket to lock the latch in position (Figure 6).

Note: Tighten the bolt securely but do not tighten the nut.

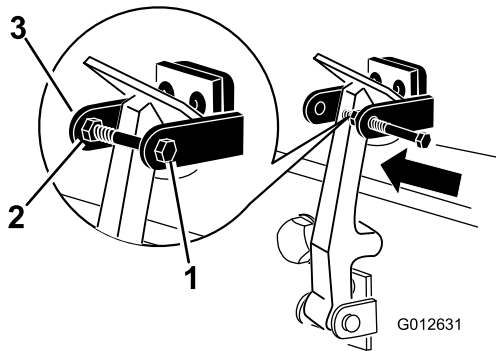


Figure 6

1. Bolt
2. Nut
3. Arm of hood-lock bracket

3

Installing the Throttle Stop for CE Compliance

Parts needed for this procedure:

1	Throttle stop
1	Setscrew

Procedure

1. Loosen the setscrew on the throttle stop (Figure 7).
2. Slide the throttle stop onto the high-idle stop screw (Figure 7). Ensure that the chamfered end of the throttle stop is outward.

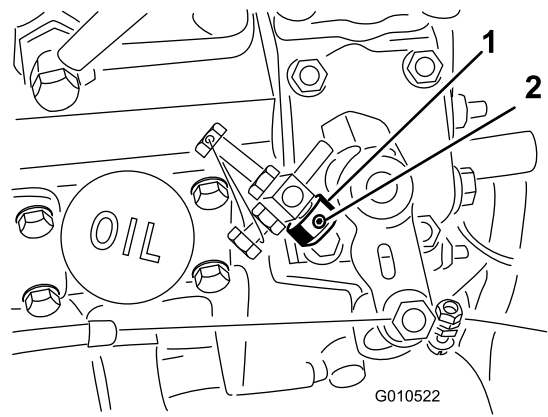


Figure 7

1. Throttle stop
2. Setscrew

3. Start the engine and allow it to run for 5 to 10 minutes.
4. Adjust the high idle to 2650 rpm with the cutting units disengaged.
5. Tighten the setscrew.
6. Apply adhesive into the setscrew to prevent tampering.

4

Adjusting the Height-of-Cut

No Parts Required

Procedure

Important: This cutting deck 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 these rotary cutting deck's bench set 6 mm (1/4 inch) above that of reels cutting in the same area.

Important: Access to the rear cutting units is greatly improved by removing the cutting unit from the tractor. 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 deck to the ground, stop the engine, and remove the key from ignition switch.
2. Loosen the bolt securing each height-of-cut bracket to the height-of-cut plate (front and each side) (Figure 8).
3. Beginning with front adjustment, remove the bolt.

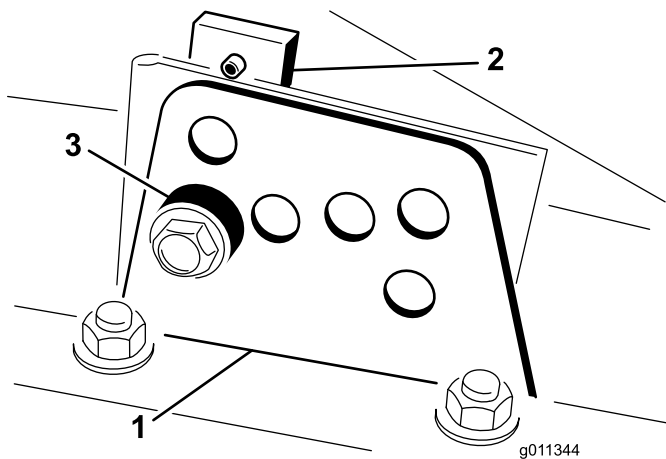


Figure 8

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

4. While supporting the chamber, remove the spacer (Figure 8).
5. Move the chamber to the desired height-of-cut and install a spacer into the designated height-of-cut hole and slot (Figure 9).

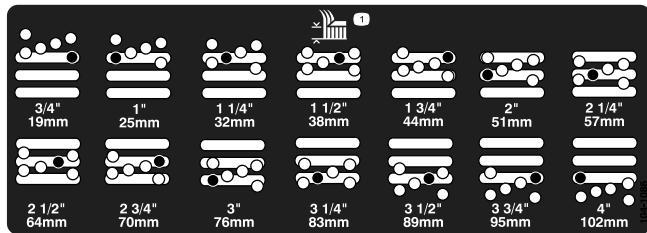


Figure 9

6. Position the tapped plate in line with the spacer.
7. Install the bolt finger tight.
8. Repeat steps 4-7 for each side adjustment.
9. Tighten all three 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 inches) may require temporary assembly to an intermediate height to prevent binding (e.g. changing from 3.1 to 7 cm (1.25 to 2.75 inch) height-of-cut).

5

Adjusting the Roller Scraper (Optional)

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 10).

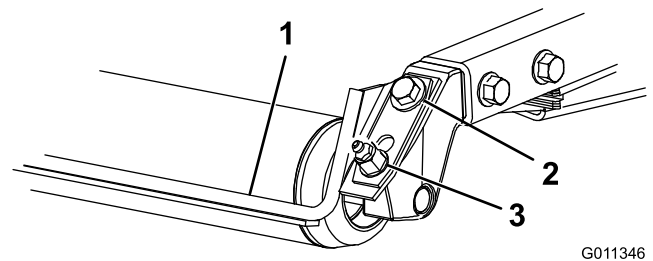


Figure 10

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.

6

Installing the Mulching Baffle (Optional)

No Parts Required

Procedure

1. Thoroughly clean debris from the mounting holes on the rear wall and left side wall of the chamber.
2. Install the mulching baffle in the rear opening and secure it with 5 flange head bolts (Figure 11).

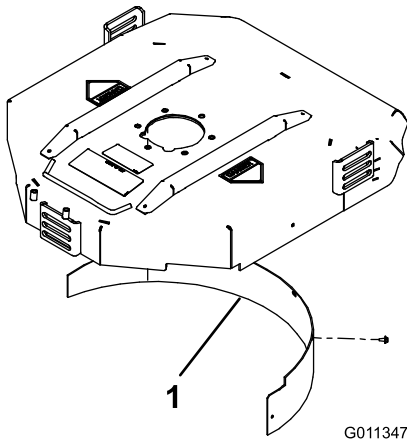


Figure 11

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.

7

Greasing the Machine

No Parts Required

Procedure

Before the machine is operated, it must be greased to ensure proper lubrication. Refer to [Lubrication \(page 38\)](#). Failure to properly grease the machine will result in premature failure of critical parts.

8

Checking Fluid Levels

No Parts Required

Procedure

1. Check the rear-axle lubricant level before the engine is first started, refer to Checking the Rear Axle Lubricant.
2. Check the hydraulic-fluid level before the engine is first started, refer to Checking the Hydraulic Fluid Level.

3. Check the engine-oil level before and after the engine is first started, refer to Checking the Engine Oil Level.

Product Overview

Controls

Brake Pedals

Two foot pedals (Figure 12) operate individual wheel brakes for turning assistance and to aid in obtaining better side hill traction.

Pedal Locking Latch

The pedal locking latch (Figure 12) connects the pedals together to engage the parking brake.

Parking Brake Pedal

To engage the parking brake, (Figure 12) connect the pedals together with the pedal locking latch, push down on the right brake pedal while engaging the toe pedal. To release the parking brake, press one of the brake pedals until the parking brake latch retracts.

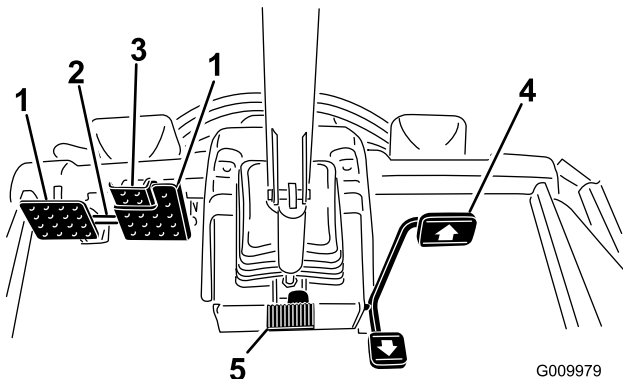


Figure 12

- | | |
|------------------------|------------------------|
| 1. Brake pedal | 4. Traction pedal |
| 2. Pedal locking latch | 5. Tilt steering pedal |
| 3. Parking brake pedal | |

Traction Pedal

The traction pedal (Figure 12) controls forward and reverse operation. Depress the top of the pedal to move forward and the bottom to move backward. Ground speed depends on how far the pedal is depressed. For no load, maximum ground speed, fully depress the pedal while the throttle is in Fast.

To stop, reduce your foot pressure on the traction pedal and allow it to return to the center position.

Tilt Steering Pedal

To tilt the steering wheel towards you, press the foot pedal (Figure 12) down, and pull the steering tower toward you to the most comfortable position and then release the pedal.

Speed Limiter Screws

Adjust the screw(s) (Figure 13) to limit the amount the traction pedal can be depressed in the forward or reverse direction to limit speed.

Important: The speed limiter screw must stop the traction pedal before the pump reaches full stroke or damage to the pump may occur.

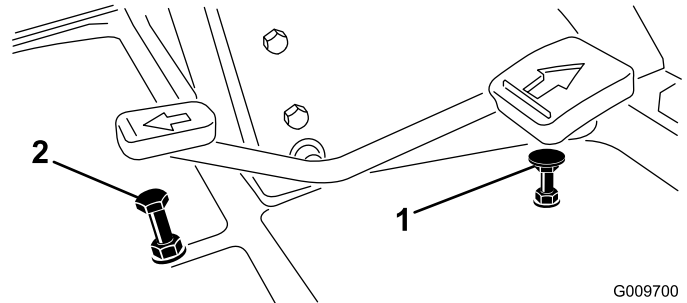


Figure 13

- | | |
|--------------------------------|--------------------------------|
| 1. Forward speed limiter screw | 2. Reverse speed limiter screw |
|--------------------------------|--------------------------------|

Key Switch

The key switch (Figure 14) has 3 positions: Off, On/Preheat, and Start.

PTO Switch

The PTO switch (Figure 14) has 2 positions: Out (start) and In (stop). Pull the PTO button out to engage the cutting unit blades. Push in the button to disengage the cutting unit blades.

High-low Speed Control

The switch (Figure 14) allows the speed range to increase for transport of the machine. The cutting decks will not operate in the high-speed range. Also, the decks cannot be lowered from the transport position when the switch is in the high range.

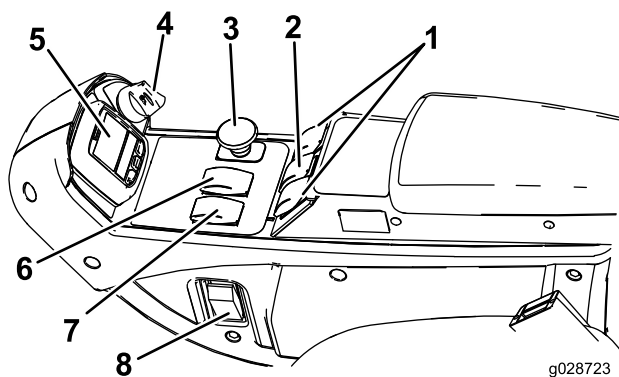


Figure 14

- | | |
|---------------------------------------|------------------------|
| 1. Lift switches (GM 4700-D only) | 5. InfoCenter only) |
| 2. Lift switch (GM 4500-D and 4700-D) | 6. Hi-Lo speed control |
| 3. PTO Switch | 7. Engine speed switch |
| 4. Key switch | 8. Light switch |

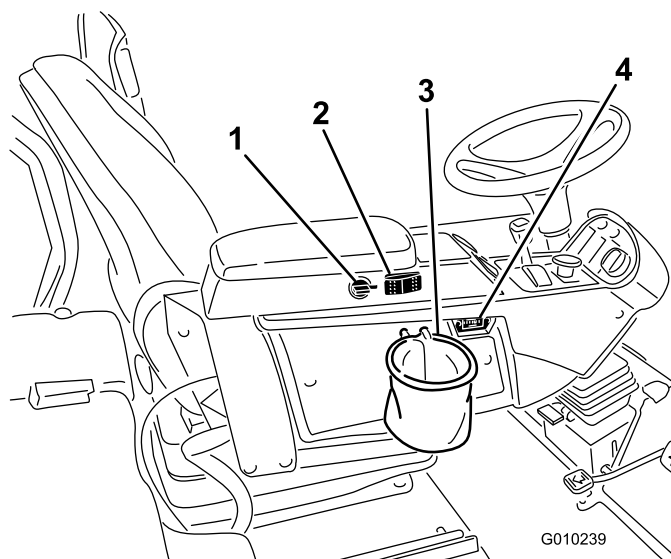


Figure 15

- | | |
|------------------------------|---------------|
| 1. Power point | 3. Bag holder |
| 2. Engine-cooling-fan switch | 4. Hour meter |

Engine Speed Switch

The engine speed switch (Figure 14) has two modes to change the engine speed. By momentarily tapping the switch, the engine speed can be increased or decreased in 100 rpm increments. By holding the switch down the engine will automatically move to High or Low idle, depending on which of the switch is depressed.

Lift Switches

The lift switches (Figure 14) raise and lower the cutting units. Press the switches forward to lower the cutting units and backward to raise the cutting units. When starting the machine, with the cutting units in the down position, press the lift switch down to allow the cutting units to float and mow.

Note: The decks will not lower while in the high-speed range, and they will not raise or lower if the operator is out of the seat when the engine is running.

Light Switch

Press the lower edge of the switch (Figure 14) to turn on the lights. Press the upper edge of the switch to turn off the lights.

Power Point

The power point (Figure 15) is used to power optional 12-volt electrical accessories.

Engine-cooling-fan Switch

The machine is equipped with a hydraulically driven auto-reversing engine-cooling fan. The fan switch (Figure 15) has 2 positions: R (manual reverse) and Auto (normal). Refer to [Operating the Engine Cooling Fan](#) (page 32).

Bag Holder

Use the bag holder (Figure 15) for storage.

Hour Meter

The hour meter (Figure 15) shows the total hours that the machine has been operated.

Fuel Gauge

The fuel gauge (Figure 16) indicates the level of fuel in the tank.

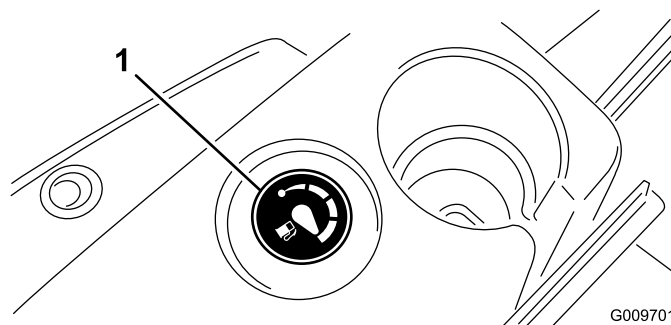


Figure 16

1. Fuel gauge

Seat Adjustments

Fore and Aft Adjusting Lever

Pull out on the lever to slide the seat fore or aft (Figure 17).

Seat Armrest Adjusting Knob

Rotate the knob to adjust the seat armrest angle (Figure 17).

Seat-back Adjusting Lever

Move the lever to adjust the seat-back angle (Figure 17).

Weight gauge

Indicates when the seat is adjusted to the weight of the operator (Figure 17). You can make height adjustments by positioning the suspension within the range of the green region.

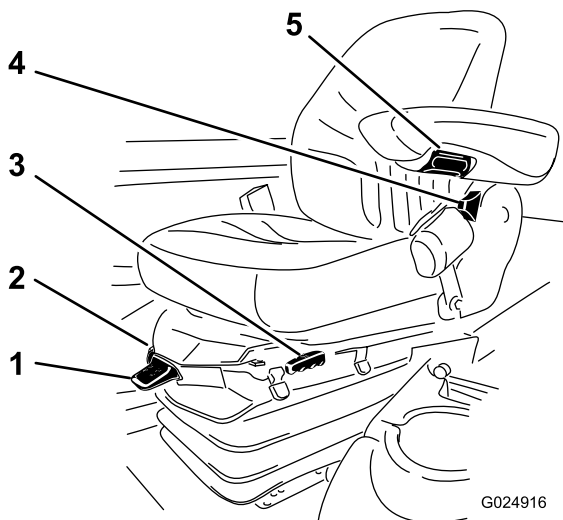


Figure 17

- | | |
|---------------------------------|------------------------------|
| 1. Weight-adjusting lever | 4. Seat-back adjusting lever |
| 2. Weight gauge | 5. Armrest adjusting knob |
| 3. Fore and aft adjusting lever | |

Weight-adjusting Lever

Adjust for operator weight (Figure 17). Pull up on the lever to increase the air pressure and push down to decrease the air pressure. The proper adjustment is attained when the weight gauge is in the green region.

Using the InfoCenter LCD Display

The InfoCenter LCD display shows information about your machine such as the operating status, various diagnostics and other information about the machine (Figure 18). There is a splash screen and main information screen of the InfoCenter. You can switch between the splash screen and main information screen, at any time, by pressing any of

the InfoCenter buttons and then selecting the appropriate directional arrow.

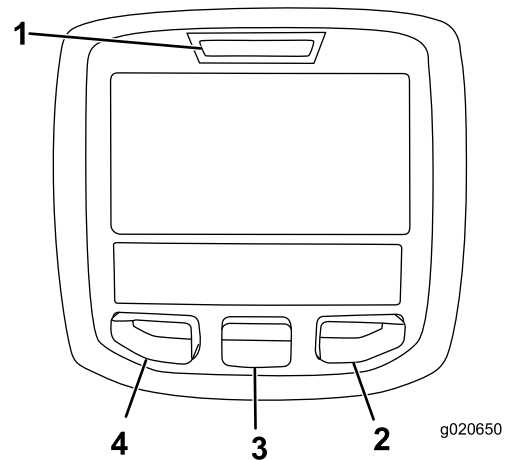


Figure 18

- | | |
|--------------------|------------------|
| 1. Indicator light | 3. Middle button |
| 2. Right button | 4. Left button |

- Left Button, Menu Access/Back Button—press this button to access the InfoCenter menus. You can use it to back out of any menu you are currently using.
- Middle Button—use this button to scroll down menus.
- Right Button—use this button to open a menu where a right arrow indicates additional content.
- Beeper—activated when lowering the decks or for advisories and faults.

Note: The purpose of each button may change depending on what is required at the time. Each button will be labeled with an icon displaying its current function.








InfoCenter Icon Description

SERVICE DUE	Indicates when scheduled service should be performed
	Engine RPM/status—indicates the engine RPM
	Info icon
	Sets the maximum traction speed
	Fast
	Slow
	Fan Reversal—indicates when the fan is reversed
	Stationary regeneration required
	Air intake heater is active
	Raise left deck
	Raise center deck
	Raise right deck
	Operator must sit in seat
	Parking Brake Indicator—indicates when the parking brake is On
H	Identifies the range as High
N	Neutral
L	Identifies the range as Low
	Coolant Temperature—indicates the engine coolant temperature in either °C or °F
	Temperature (hot)
	Traction or Traction Pedal
	Denied or not allowed
	Engine Start

InfoCenter Icon Description (cont'd.)

	PTO—indicates the PTO is On
	Stop or shutdown
	Engine
	Key switch
	Indicates when the cutting units are being lowered
	Indicates when the cutting units are being raised
	PIN passcode
	Hydraulic Oil Temperature—indicates the hydraulic oil temperature
CAN	CAN bus
	InfoCenter
Bad	Bad or failed
Ctr	Center
Rht	Right
Left	Left
	Bulb
OUT	Output of TEC controller or control wire in harness
HI	High: over allowed range
LO	Low: under allowed range
HI / LO	Out of range
	Switch
	Operator must release switch
	Operator should change to indicated state
Symbols are often combined to form sentences. Some examples are shown below	

InfoCenter Icon Description (cont'd.)

	Operator should put machine in neutral
	Engine start denied
	Engine shutdown
	Engine coolant too hot
	Hydraulic oil too hot
	DPF ash accumulation notification. Refer to Servicing the Diesel Particulate Filter (DPF) in the maintenance section for details.
	Sit down or set parking brake

Using the Menus

To access the InfoCenter menu system, press the menu access button while at the main screen. This will bring you to the main menu. Refer to the following tables for a synopsis of the options available from the menus:

Main Menu	
Menu Item	Description
Faults	The Faults menu contains a list of the recent machine faults. Refer to the Service Manual or your Authorized Toro Distributor for more information on the Faults menu and the information contained there.
Service	The Service menu contains information on the machine such as hours of use and other similar numbers.
Diagnostics	The Diagnostics menu lists various states that the machine currently has. You can use this to troubleshoot certain issues as it will quickly tell you which machine controls are on and which are off.

Settings	The Settings menu allows you to customize and modify configuration variables on the InfoCenter display.
About	The About menu lists the model number, serial number, and software version of your machine.

Service	
Menu Item	Description
Hours	Lists the total number of hours that the machine, engine and fan have been on, as well as the number of hours the machine has been transported and overheated.
Counts	Lists the number of starts, deck PTO cycles and fan reversals the machine has experienced.

Diagnostics	
Menu Item	Description
Left Deck Center Deck Right Deck Traction Pedal Traction HI/LO Range PTO Engine Run	Refer to the Service Manual or your Authorized Toro Distributor for more information on the Engine Run menu and the information contained there.

Settings	
Menu Item	Description
Units	Controls the units used on the InfoCenter. The menu choices are English or Metric.
Language	Controls the language used on the InfoCenter*.
LCD Backlight	Controls the brightness of the LCD display.
LCD Contrast	Controls the contrast of the LCD display.
Protected Menus	Allows the maintenance director to access protected menus by inputting a passcode.
Protect Settings	Allows the ability to change the settings in the protected settings.
Auto Idle	Controls the amount of time allowed before idling the engine when the machine is not in use.
Mow Speed	Controls the maximum speed while in mow (low range).

Trans. Speed	Controls the maximum speed while in transport (high range).
Counterbalance	Controls the amount of counterbalance applied by the decks.

* Only "operator-faced" text is translated. Faults, Service, and Diagnostics screens are "service-faced". Titles will be in the selected language, but menu items are in English.

About	
Menu Item	Description
Model	Lists the model number of the machine.
SN	Lists the serial number of the machine.
S/W Rev	Lists the software revision of the master controller.

Protected Menus

There are 5 operating configuration settings that are adjustable within the Settings Menu of the InfoCenter: auto idle, maximum mowing ground speed, maximum transport ground speed, Smart Power, and deck counter balance. These settings are in the Protected Menu.

Accessing the Protected Menu Settings

To access the Protected Menu Settings

- From the Main Menu, scroll down to the Settings Menu and press the right button.
- In the Settings Menu, scroll down to the Protected Menu and press the right button.
- To enter the passcode, use the center button to set the first digit then press the right button to move on to the next digit.
- Use the center button to set the second digit then press the right button to move on to the next digit.
- Use the center button to set the third digit then press the right button to move on to the next digit.
- Use the center button to set the fourth digit then press the right button.
- Press the middle button to enter the code.

The ability to view and change the settings in the Protected Menu can be changed. Once the Protected Menu has been accessed, scroll down to Protect Settings. Using the right button, changing Protect Settings to OFF will allow the ability to view and change the settings in the Protected Menu without entering the passcode. Changing Protect Settings to ON will hide the protected options and will require entering a passcode to change the setting in the Protected Menu. After the passcode has been set, the key switch must be turned off and back on to enable and save this feature.

To Set the Auto Idle

- In the Settings Menu, scroll down to Auto Idle
- Press the right button to change the auto idle time between OFF, 8S, 10S, 15S, 20S, & 30S.

To Set the Maximum Allowed Mow Speed

- In the Settings Menu, Scroll down to Mow Speed and press the right button.
- Use the right button to increase the max full mow speed (50%, 75%, or 100%).
- Use the center button to decrease the max full mow speed (50%, 75%, or 100%).
- Press the left button to exit.

To Set the Maximum Allowed Transport Speed

- In the Settings Menu, scroll down to Transport Speed and press the right button.
- Use the right button to increase the max transport speed (50%, 75%, or 100%).
- Use the center button to decrease the max transport speed (50%, 75%, or 100%).
- Press the left button to exit.

To Turn Smart Power ON/OFF

- In the settings menu, scroll down to Smart Power.
- Press the right button to switch between ON and OFF.
- Press the left button to exit.

To Set the Counterbalance

- In the Settings Menu, scroll down to Counter Balance and press the right button.
- Press the right button to switch between Low, Med, and High.

When finished with the Protected Menu, press the left button to exit to the Main Menu, then press the left button to exit to the Run Menu.

Stationary Regeneration

If the Stationary Regeneration icon appears on the InfoCenter, refer to the Service Manual or contact your Toro Distributor for the maintenance procedure.

DPF Ash Level

The DPF ash level may be checked by entering the PIN as described in Accessing the Protected Menu Settings and navigating to the service section.

Specifications

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

Traction Unit Specifications

	4500-D	4700-D
Width of cut	2.8 m (109 inches)	3.8 m (150 inches)
Overall width, cutting units down	286 cm (112.8 inches)	391 cm (153.8 inches)
Overall width, cutting units up (transport)	224 cm (88.25 inches)	224 cm (88.25 inches)
Overall length	370 cm (145.8 inches)	370 cm (145.8 inches)
Height with ROPS	216 cm (85 inches)	216 cm (85 inches)
Ground clearance	15 cm (6 inches)	15 cm (6 inches)
Track width, front	224 cm (88.25 inches)	224 cm (88.25 inches)
Track width, rear	141 cm (55.5 inches)	141 cm (55.5 inches)
Wheel base	171 cm (67.5 inches)	171 cm (67.5 inches)
Net weight (with cutting units and no fluids)	1995 kg (4400 lb)	2245 kg (4950 lb)

Cutting Unit Specifications

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

Attachments/Accessories

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

Operation

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

⚠ CAUTION

This machine produces sound levels in excess of 85 dBA at the operator's ear and can cause hearing loss through extended periods of exposure.

Wear hearing protection when operating this machine.

⚠ CAUTION

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

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

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.

The crankcase capacity is approximately 9.5 L (10 US qt) with the filter.

Use high-quality engine oil that meets the following specifications:

- API Classification Level Required: CH-4, CI-4, or higher.
- Preferred oil: SAE 15W-40 (above -18°C [0°F])
- Alternate oil: SAE 10W-30 or 5W-30 (all temperatures)

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, no oil addition is required.

1. Park the machine on a level surface.
2. Unlock the engine cover latches and open the engine cover.
3. Remove the dipstick, wipe it clean, install the dipstick into the tube, and pull it out again.

The oil level should be in the safe range (Figure 19).

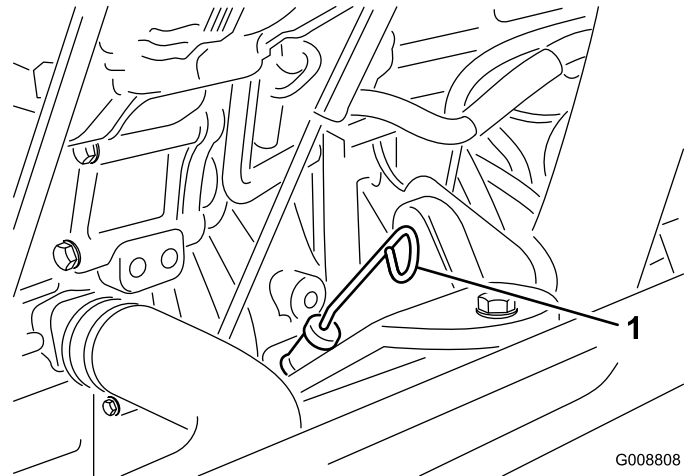


Figure 19

1. Dipstick

4. If the oil is below the safe range, remove the fill cap (Figure 20) and add oil until the level reaches the Full mark. **Do not overfill.**

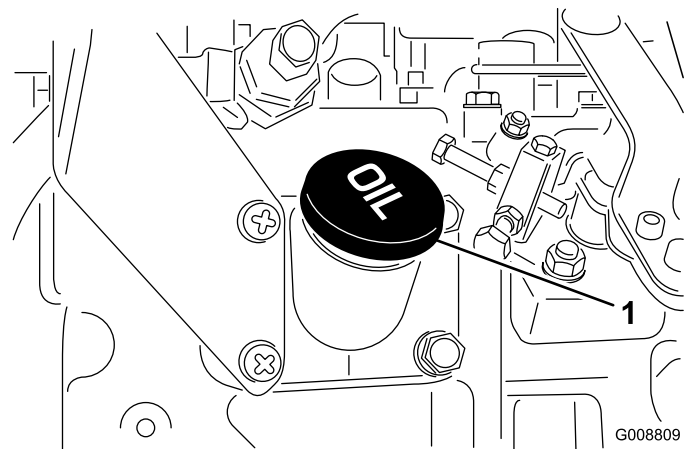


Figure 20

1. Oil-fill cap

Note: When using different oil, drain all old oil from the crankcase before adding new oil.

5. Install the oil fill cap and dipstick.
6. Close the engine cover and secure it with the latches.

Checking the Cooling System

Service Interval: Before each use or daily

Check the coolant level at the beginning of each day. The capacity of the system is 12.3 L (13 US qt).

1. Carefully remove the radiator cap.

⚠ 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 when opening the radiator cap, and open the cap slowly to allow steam to escape.

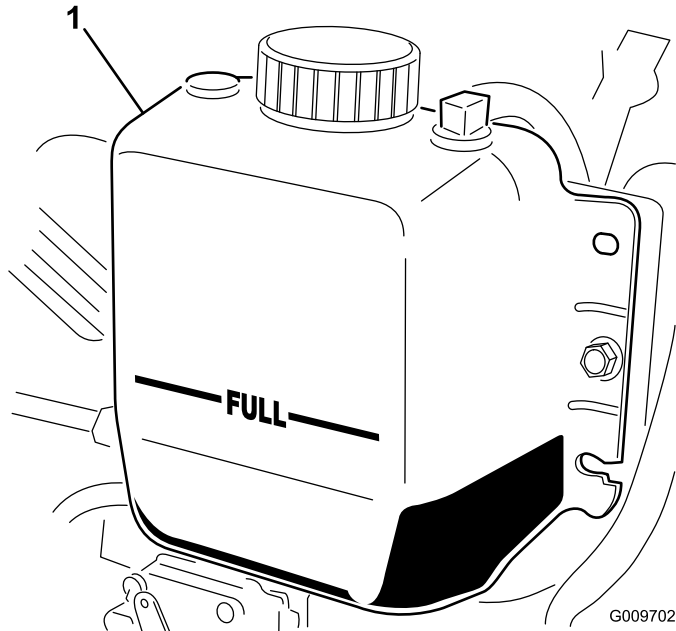


Figure 21

1. Expansion tank

2. Check the coolant level in the radiator.

Note: The radiator should be filled to the top of the filler neck and the expansion tank filled to the Full mark (Figure 21).

3. If the coolant is low, add a 50/50 mixture of water and ethylene glycol antifreeze.

Important: Do not use water only or alcohol/methanol-based coolants.

4. Install the radiator cap and the expansion-tank cap.

Filling the Fuel Tank

Use only clean, fresh diesel fuel or biodiesel fuels with low (<500 ppm) or ultra-low (<15 ppm) sulfur content. The minimum cetane rating should be 40. Purchase fuel in quantities that can be used within 180 days to ensure fuel freshness.

Fuel tank capacity: 83 L (22 US gallons)

Use summer-grade diesel fuel (Number 2-D) at temperatures above -7°C (20°F) and winter-grade diesel fuel (Number 1-D or Number 1-D/2-D blend) below -7°C (20°F). Use of winter-grade fuel at lower temperatures provides a lower flash point and cold-flow characteristics which will ease starting and reduce fuel-filter plugging.

Use of summer-grade fuel above -7°C (20°F) will contribute toward longer fuel-pump life and increased power compared to winter-grade fuel.

Important: Do not use kerosene or gasoline instead of diesel fuel. Failure to observe this caution will damage the engine.

⚠ WARNING

Fuel is harmful or fatal if swallowed. Long-term exposure to vapors can cause serious injury and illness.

- Avoid prolonged breathing of vapors.
- Keep face away from nozzle and gas tank or conditioner opening.
- Keep fuel away from eyes and skin.

Biodiesel Ready

This machine can also use a biodiesel blended fuel of up to B20 (20% biodiesel, 80% petrodiesel). The petrodiesel portion should be low or ultra-low sulfur. Observe the following precautions:

- The biodiesel portion of the fuel must meet specification ASTM D6751 or EN14214.
- The blended fuel composition should meet ASTM D975 or EN590.
- Painted surfaces may be damaged by biodiesel blends.
- Use B5 (biodiesel content of 5%) or lesser blends in cold weather.
- Monitor seals, hoses, and gaskets in contact with fuel as they may be degraded over time.
- Fuel-filter plugging may be expected for a time after converting to biodiesel blends.
- Contact your distributor if you wish for more information on biodiesel.

▲ DANGER

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

- Use a funnel and fill the fuel tank outdoors, in an open area, when the engine is cold. Wipe up any fuel that spills.
- Never fill the fuel tank inside an enclosed trailer.
- Do not fill the fuel tank completely full. Add fuel to the fuel tank until the level is 6 to 13 mm (1/4 to 1/2 inch) below the top of the tank, not the filler neck. This empty space in the tank allows the fuel to expand.
- Never smoke when handling fuel, and stay away from an open flame or where fuel fumes may be ignited by a spark.
- Store fuel in an approved container and keep it out of the reach of children. Never buy more than a 180-day supply of fuel.
- Do not operate without the entire exhaust system in place and in proper working condition.

1. Remove the fuel-tank cap (Figure 22).

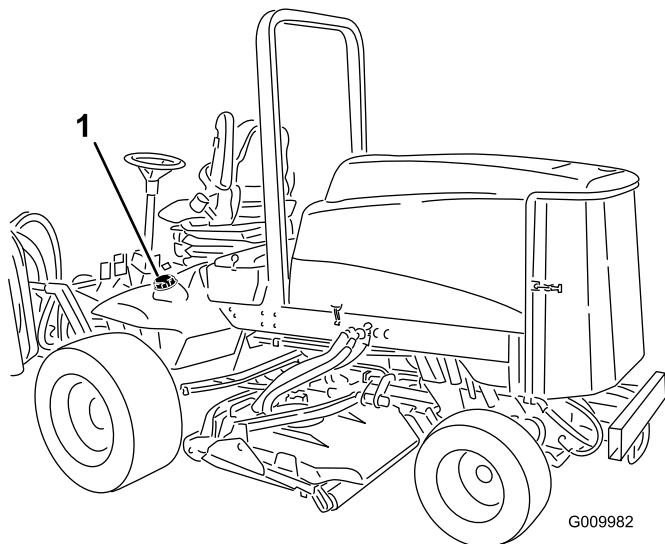


Figure 22

1. Fuel-tank cap

2. Fill the tank to about 6 to 13 mm (1/4 to 1/2 inch) below the top of the tank, not the filler neck, with Number 2-D diesel fuel. Then install the cap.

Note: If possible, fill the fuel tank after each use; this will minimize possible buildup of condensation inside the fuel tank.

▲ DANGER

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

- Always place fuel containers on the ground away from your vehicle before filling.
- Do not fill fuel 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 equipment from the truck or trailer, and fuel the equipment with the wheels on the ground.
- If this is not possible, then fuel such equipment on a truck or trailer from a portable container, rather than from a fuel-dispenser nozzle.
- If a fuel-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 Hydraulic-fluid Level

Service Interval: Before each use or daily

The reservoir is filled at the factory with approximately 28.4 L (7.5 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 as follows:

Toro Premium All Season Hydraulic Fluid (Available in 19 L (5 US gallon) pails or 208 L (55 gallon) drums. See the parts catalog or Toro distributor for part numbers)

Alternative fluids: If the Toro fluid is not available, other **conventional, petroleum-based** fluids may be used, provided they meet all of the following material properties and industry specifications. Check with your oil supplier to see whether the oil meets these specifications. 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 (104°F) 44 to 48 cSt @ 100°C (212°F) 7.9 to 9.1
Viscosity Index ASTM D2270	140 or higher
Pour Point, ASTM D97	-37°C to -45°C (-34°F to -49°F)
FZG, Fail stage	11 or better
Water content (new fluid):	500 ppm (maximum)

Industry Specifications:

Vickers I-286-S, Vickers M-2950-S, Denison HF-0, Vickers 35 VQ 25 (Eaton ATS373-C)

The proper hydraulic fluids must be specified for mobile machinery (as opposed to industrial plant usage), multi-weight type, with ZnDTP or ZDDP anti-wear additive package (not an ashless-type fluid).

Toro Synthetic Biodegradable Hydraulic Fluid (Available in 19 L (5 US gallon) pails or 208 L (55 US gallon) drums. See parts documentation or Toro distributor for part numbers)

This high quality synthetic, biodegradable fluid has been tested and found compatible for this Toro model. Other brands of synthetic fluid may have seal compatibility problems and Toro cannot assume responsibility for unauthorized substitutions.

Important: This synthetic fluid is not compatible with the Toro Biodegradable Fluid previously sold. See your Authorized Toro Distributor for more information.

Alternative biodegradable fluids:

Mobil EAL EnviroSyn H 46 (US)

Mobil EAL Hydraulic Oil 46 (International)

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 fl oz) bottles. One bottle is sufficient for 15 to 22 L (4 to 6 US gallons) of hydraulic oil. Order part 44-2500 from your authorized Toro distributor.

1. Position the machine on a level surface, lower the cutting units, stop the engine, and remove the key.
2. Clean the area around the filler neck and the cap of the hydraulic tank (Figure 23).

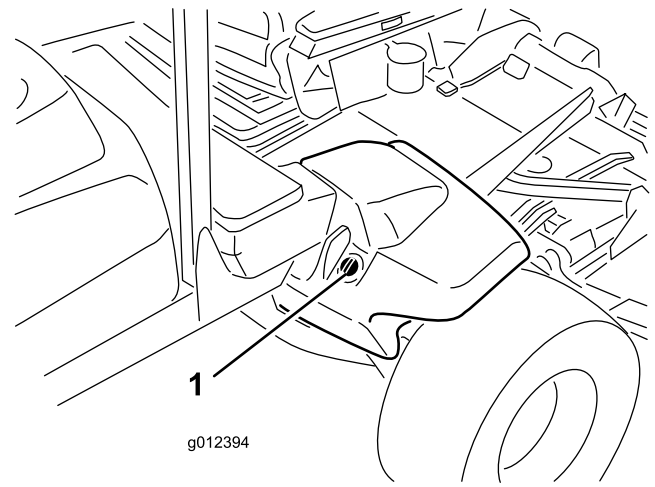


Figure 23

1. Hydraulic-tank cap

3. Remove the cap from the filler neck.
4. Remove the dipstick from the filler neck and wipe it with a clean rag.
5. Insert the dipstick into the filler neck; then remove it and check the fluid level.
Note: The fluid level should be between the 2 marks on the dipstick.
6. If the level is low, add the appropriate fluid to raise the level to the upper mark.
7. 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 138 kPa (20 psi). Check the tire pressure daily.

Important: Maintain the recommended pressure in all tires to ensure a good quality of cut and proper machine performance. Do not under-inflate the tires.

Starting and Stopping the Engine

Starting the Engine

Important: The fuel system must be bled if any of the following situations have occurred:

- The engine has ceased running due to lack of fuel.
 - Maintenance has been performed upon the fuel system components.
1. Remove your foot from the traction pedal and ensure that it is in neutral. Ensure that the parking brake is set.

2. Move the throttle control to the low idle position.
3. Turn the ignition key to the Run position. The glow indicator will light.
4. When the glow indicator dims, turn the ignition key to the Start position.

Important: Do not run the starter motor more than 15 seconds at a time or premature starter failure may result. If the engine fails to start after 15 seconds, turn the key to the Off position, check the controls and procedures, wait 15 additional seconds, and repeat the starting procedure.

5. Release the key immediately when the engine starts and allow it to return to the Run position.
6. Move the throttle control to the desired position.

When the temperature is less than -7°C (20°F), the starter motor can be run for 30 seconds on then 60 seconds off for 2 attempts.

⚠ CAUTION

Shut the engine off and wait for all moving parts to stop before checking for oil leaks, loose parts, and other malfunctions.

Stopping the Engine

Important: Allow the engine to idle for 5 minutes before shutting it off after a full-load operation. This allows the turbocharger to cool down before shutting the engine off. Failure to do so may lead to turbocharger trouble.

Note: Lower cutting units to the ground whenever machine is parked. This relieves the hydraulic load from the system, prevents wear on system parts, and also prevents accidental lowering of the cutting units.

1. Move the throttle control backward to the Slow position.
2. Move the PTO switch to the Off position.
3. Set the parking brake.
4. Rotate the ignition key to the Off position.
5. Remove the key from the switch to prevent accidental starting.

Checking the Interlock Switches

Service Interval: Before each use or daily

⚠ CAUTION

If safety interlock switches are disconnected or damaged the machine could operate unexpectedly causing personal injury.

- Do not tamper with the interlock switches.
- Check the operation of the interlock switches daily and replace any damaged switches before operating the machine.

The machine has interlock switches in the electrical system. These switches are designed to stop the engine when operator rises from the seat while pressing the traction pedal. However, the operator may rise from the seat while the engine is running and the traction pedal is in neutral. Although the engine will continue to run if the PTO switch is disengaged and the traction pedal is released, stop the engine before rising from the seat.

To check the operation of the interlock switches, perform the following procedure:

1. Drive the machine slowly to a large, relatively open area. Lower the cutting unit, stop the engine, and apply the parking brake.
2. Sit on the seat and depress the traction pedal. Try to start the engine. The engine should not crank. If the engine cranks, there is a malfunction in the interlock system that should be corrected before beginning operation.
3. Sit on the seat and start the engine. Rise from the seat and move the PTO switch to On. The PTO should not engage. If the PTO engages, there is a malfunction in the interlock system that should be corrected before beginning operation.
4. Sit on the seat, engage the parking brake and start the engine. Move the traction pedal out of the neutral position. The engine should kill. If the engine does not kill, there is a malfunction in the interlock system that should be corrected before beginning operation.

Pushing or Towing the Machine

In an emergency, you can move the machine forward by actuating the bypass valve in the variable displacement hydraulic pump and pushing or towing the machine. Do not push or tow the machine for more than 0.4 km (1/4 mile).

Important: Do not push or tow the machine faster than 3 to 4.8 km/h (2 to 3 mph), because internal transmission damage may occur. The bypass valve must be open whenever the machine is pushed or towed.

Important: If the machine must be pushed or towed in reverse, the check valve in the 4-wheel-drive manifold must also be bypassed. To bypass the check valve, connect a hose assembly (hose part 95-8843, coupler fitting 95-0985 [qty 2], and hydraulic fitting 340-77 [qty 2]) to the reverse traction pressure test port and the reverse 4-wheel-drive pressure port.

1. Open the hood and remove the center shroud
2. Rotate the bypass valve 90° (1/4 turn) in either direction to open and allow oil to bypass internally (Figure 24).

Note: Because fluid is bypassed, the machine can be slowly moved without damaging the transmission. Note the position of the valve when opening or closing.

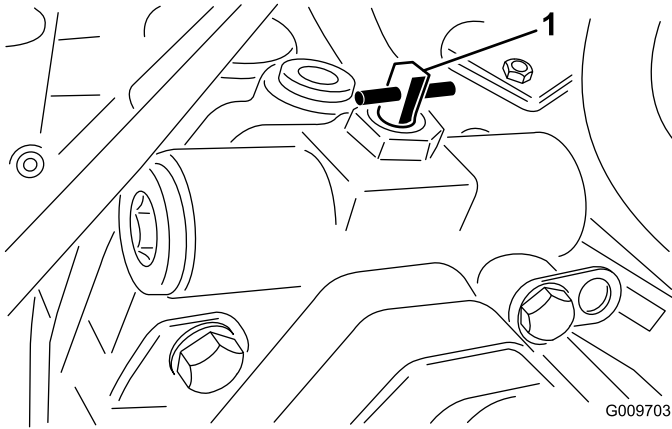


Figure 24

1. Bypass valve

3. Rotate the bypass valve 90° (1/4 turn) back before starting the engine. Do not exceed 7 to 11 N-m (5 to 8 ft-lb) torque to close the valve.

Locating the Jacking Points

- On the front of the machine on the frame on the inside of each drive tire
- On the rear of the machine at the center of the axle

Locating the Tie Downs

- On each side of the frame under the front steps
- The rear bumper

Operating the Engine Cooling Fan

The engine cooling fan switch has 2 positions for controlling the operation of the fan. The 2 positions are R and Auto. The fan has the ability to reverse to blow debris off the rear screen. Under normal operating conditions, the switch should be in the Auto position. In Auto, the fan speed will be controlled by the coolant or hydraulic-oil temperature

and will automatically reverse to blow debris off the rear screen. A reverse cycle is automatically initiated when either the coolant or hydraulic-oil temperature reaches a certain point. By pressing the fan switch forward into the R position, the fan will complete a manually initiated reverse cycle. It is recommended to reverse the fan when the rear screen is clogged or prior to entering the shop or the storage area.

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 in lower heights of cut - 1.9 to 6.4 cm (3/4 to 2-1/2 inch).

Attributes:

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

High Lift Parallel Sail

The blade generally performs better in the higher heights of cut - 7 to 10 cm (2 to 4 inch).

Attributes:

- More lift and higher discharge velocity.
- Sparse or limp turf is picked up significantly at higher heights 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 lower heights 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

Choosing Accessories

Optional Equipment Configurations

	Angle Sail Blade	High Lift Parallel Sail Blade (<i>Do not use with the mulching baffle</i>)	Mulching Baffle	Roller Scraper
Grass Cutting: 1.9 to 4.4 cm (0.75 to 1.75 inch) Height-of-Cut	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 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 of grass are seen. The scrapers may actually increase clumping in certain applications.
Grass Cutting: 5 to 6.4 cm (2.00 to 2.50 inch) Height-of-Cut	Recommended for thick or lush turf	Recommended for light or sparse turf		
Grass Cutting: 7 to 10 cm (2.75 to 4.00 inch) Height-of-Cut	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 lower 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 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 in high height of cut applications 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 lower 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	

Operating Tips

Understanding the Operating Characteristics of the Machine

Practice driving the machine, because it has a hydrostatic transmission and its characteristics are different than many turf maintenance machines. Some points to consider when operating the traction unit and cutting units are the transmission, engine speed, load on the cutting blades, and the importance of the brakes.

To maintain enough power for the traction unit while operating, regulate the traction pedal to keep the engine speed high and somewhat constant. A good rule to follow is to decrease the ground speed as the load on the cutting units increases, and increase the ground speed as the load decreases.

Therefore, allow the traction pedal to move backward as the engine speed decreases, and press the pedal slowly as the engine speed increases. By comparison, when driving from one work area to another, with no load and the cutting units raised, have the throttle in the Fast position and press the

traction pedal slowly but fully to attain maximum ground speed.

Another characteristic to consider is the operation of the pedals that are connected to the brakes. You can use the brakes to assist in turning the machine. However, use them carefully, especially on soft or wet grass, because the turf may be torn accidentally. Another benefit of the brakes is to maintain traction. For example, in some slope conditions, the uphill wheel slips and loses traction. If this situation occurs, depress the uphill turn pedal gradually and intermittently until the uphill wheel stops slipping, thus, increasing traction on the downhill wheel.

Use extra care when operating the machine on slopes. Make sure that the seat latch is properly secured and the seat belt is buckled. Drive slowly and avoid sharp turns on slopes to prevent roll overs. For steering control, the cutting unit must be lowered when going downhill.

▲ WARNING

This product is designed to drive objects into the ground where they lose energy quickly in grass areas. However, careless operation, combined with terrain angle, ricochets, or improperly positioned safety guard can lead to thrown object injuries.

- When a person or pet appears suddenly in or near the mowing area, stop mowing.
- Do not resume mowing until the area is cleared.

Important: Allow the engine to idle for 5 minutes before shutting it off after a full-load operation. This allows the turbocharger to cool down before shutting the engine off. Failure to do so may lead to turbocharger trouble.

Before stopping the engine, disengage all controls and move the throttle to Slow. Moving the throttle to Slow reduces engine speed, noise, and vibration. Turn the key to the Off position to stop the engine.

Mowing 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 mowed grass.

Selecting the Proper Height of Cut

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 the height of cut to the next setting.

Mowing at Proper Intervals

Under most normal conditions you will need to mow approximately every 4 to 5 days. But remember, grass grows at different rates at different times. This means that in order to maintain the same height of cut, which is a good practice, you will need to cut more frequently in early spring; as the grass growth rate slows in midsummer, cut only every 8 to 10 days. If you are unable to mow for an extended period due to weather conditions or other reasons, mow first with the height of cut at a high level; then mow again 2 to 3 days later with a lower height setting.

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.

Changing Mowing Patterns

Change mowing patterns often to minimize after-cut appearance issues induced by repetitive operation in only one direction.

Adjusting the Counterbalance

The counterbalance system maintains hydraulic back pressure on the deck lift cylinders. This counterbalance pressure transfers cutting deck weight to the mower's drive wheels to improve traction. The counterbalance pressure has been factory set to an optimal balance of after-cut appearance and traction capability in most turf conditions. Decreasing the counterbalance setting can produce a more stable cutting deck, but can decrease the traction capability. Increasing the counterbalance setting can increase the traction capability, but may result in after-cut 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.

Transporting (Groundsmaster 4700-D Only)

Use the 2 rear transport latches for the outer cutting units when transporting over long distances, rough terrain, or when trailering.

Cleaning and Parking the Machine after Each Use

To ensure optimum performance, clean the underside of the mower housings after each use. If residue is allowed to build up in the mower housing, cutting performance will decline.

Note: Lower the cutting units to the ground whenever the machine is parked. This relieves the hydraulic load from the system, prevents wear on system parts, and also prevents accidental lowering of the cutting units.

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 8 hours	<ul style="list-style-type: none"> • Torque the wheel nuts.
After the first 50 hours	<ul style="list-style-type: none"> • Change the engine oil and filter.
After the first 200 hours	<ul style="list-style-type: none"> • Change the planetary gear drive oil. • Change the rear axle lubricant. • Change the hydraulic filters.
Before each use or daily	<ul style="list-style-type: none"> • Check the engine-oil level. • Check the coolant level. • Check the hydraulic-fluid level. • Check the tire pressure. • Check the interlock switches. • Drain water or other contaminants from the water separator. • Drain water or other contaminants from the fuel filter/water separator. • Remove debris from the engine area, oil cooler, and radiator. • Inspect the hydraulic lines and hoses for leaks, kinked lines, loose mounting supports, wear, loose fittings, weather deterioration, and chemical deterioration. • Check the blade stopping time
Every 50 hours	<ul style="list-style-type: none"> • Grease the bearings and bushings. • Check the battery condition.
Every 100 hours	<ul style="list-style-type: none"> • Check the condition and tension of the alternator belt.
Every 150 hours	<ul style="list-style-type: none"> • Change the engine oil and filter.
Every 200 hours	<ul style="list-style-type: none"> • Torque the wheel nuts. • Clean the spark arrester muffler.
Every 400 hours	<ul style="list-style-type: none"> • Service the air cleaner (earlier if the air cleaner indicator shows red, and more frequently in extremely dirty or dusty conditions). • Check the fuel lines and connections. • Replace the fuel-filter canister. • Check for end-play in the planetary drives. • Check the planetary gear drive oil level (also check if external leakage is observed). • Check the rear axle lubricant level.
Every 800 hours	<ul style="list-style-type: none"> • Drain and clean the fuel tank. • Change the planetary gear drive oil. • Change the rear axle lubricant. • Check the rear wheel toe-in. • Change the hydraulic fluid. • Change the hydraulic filters.
Before storage	<ul style="list-style-type: none"> • Drain and clean the fuel tank. • Check the tire pressure. • Check all fasteners. • Grease or oil all grease fittings and pivot points. • Paint chipped surfaces.
Yearly	<ul style="list-style-type: none"> • Check the fuel lines and connections.

Important: Refer to your engine *Operator's Manual* and cutting unit *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.

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 and fuel level.							
Check the cooling system fluid level.							
Drain the water/fuel separator.							
Check the air filter restriction indicator.							
Check the radiator, oil cooler, and screen for debris.							
Check unusual engine noises. ¹							
Check unusual operating noises.							
Check the hydraulic system oil level.							
Check hydraulic hoses for damage.							
Check for fluid leaks.							
Check the tire pressure.							
Check the instrument operation.							
Check the height-of-cut adjustment.							
Lubricate all grease fittings. ²							
Touch-up damaged paint.							

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

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

Service Interval Chart

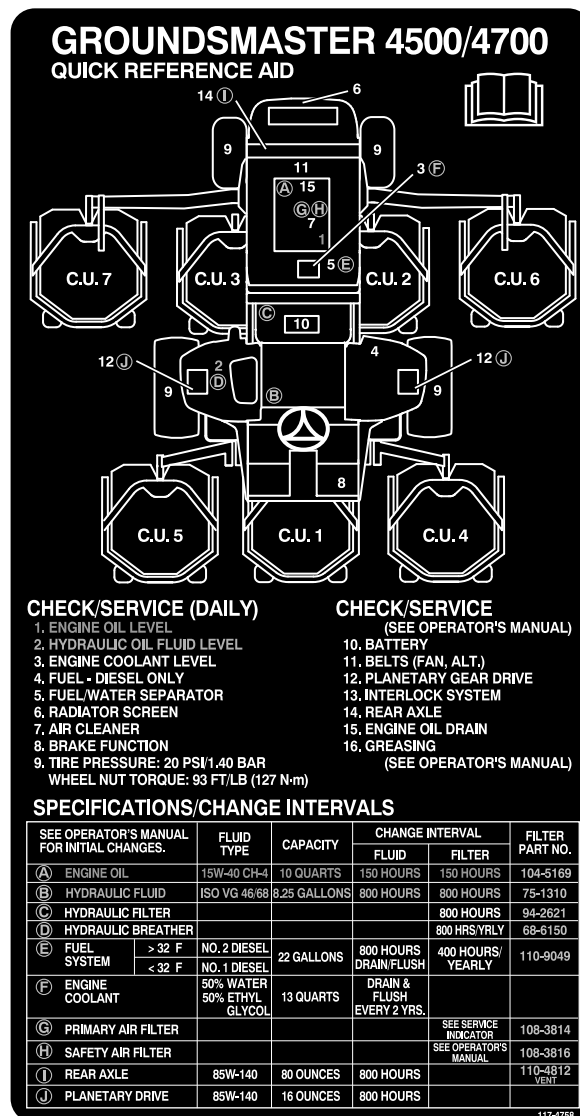


Figure 25

CAUTION

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

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

Premaintenance Procedures

Removing the Hood

1. Release hood latches (Figure 26) and pivot open the hood.

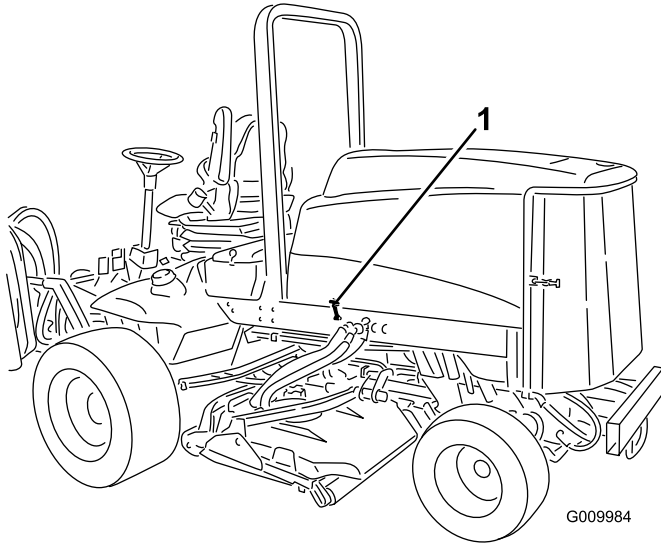


Figure 26

1. Hood latch (2)

2. Remove the cotter pins securing the rear hood brackets to the frame pins and lift off the hood.

Lubrication

Greasing the Bearings and Bushings

Service Interval: Every 50 hours

The machine has grease fittings that must be lubricated regularly with #2 general-purpose lithium-based grease. If the machine is operated under normal conditions, lubricate all bearings and bushings after every 50 hours of operation or immediately after every washing.

The grease fitting locations and quantities are as follows:

- Brake-shaft pivot bearings (5) (Figure 27)

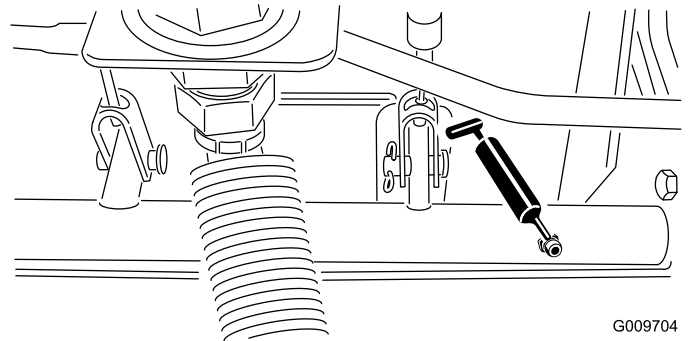


Figure 27

- Rear axle pivot bushings (2) (Figure 28)

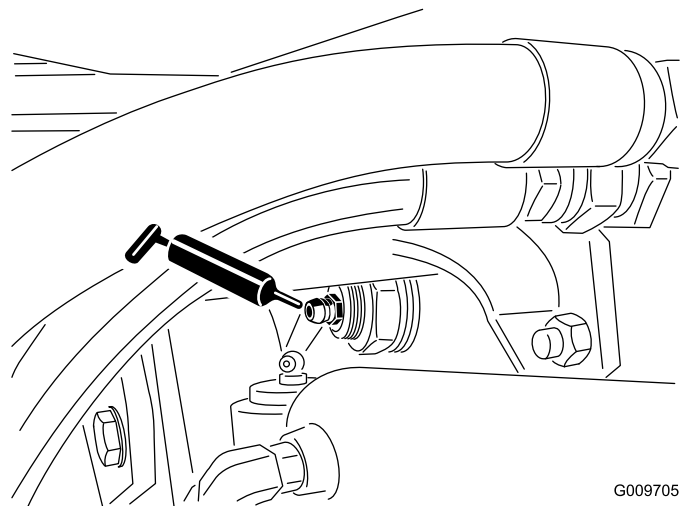


Figure 28

- Steering-cylinder ball joints (2) (Figure 29)

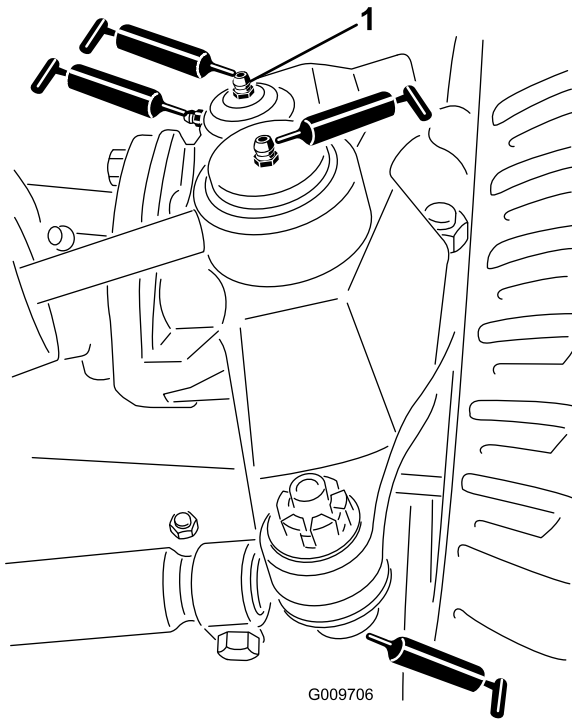


Figure 29

1. Top fitting on kingpin

- Tie-rod ball joints (2) (Figure 29)
- Kingpin bushings (2) (Figure 29). **The top fitting on the king pin should only be lubricated annually (2 pumps).**
- Lift-arm bushings (1 per deck) (Figure 30)

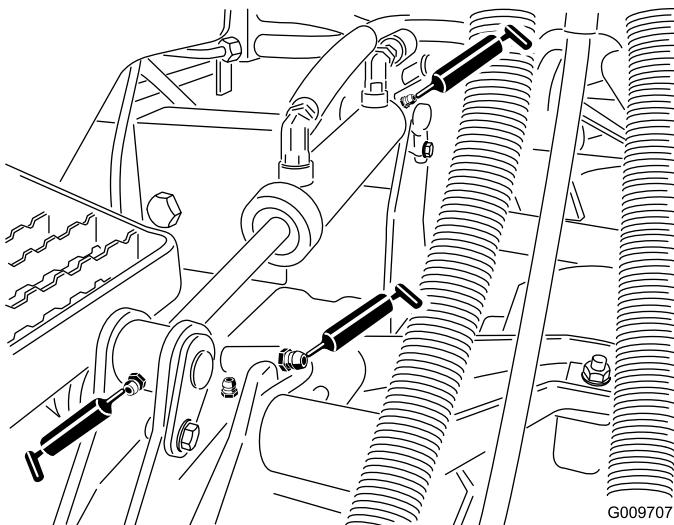


Figure 30

- Lift-cylinder bushings (2 per deck) (Figure 30)

- Cutting-unit spindle-shaft bearings (2 per cutting unit) (Figure 31)

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

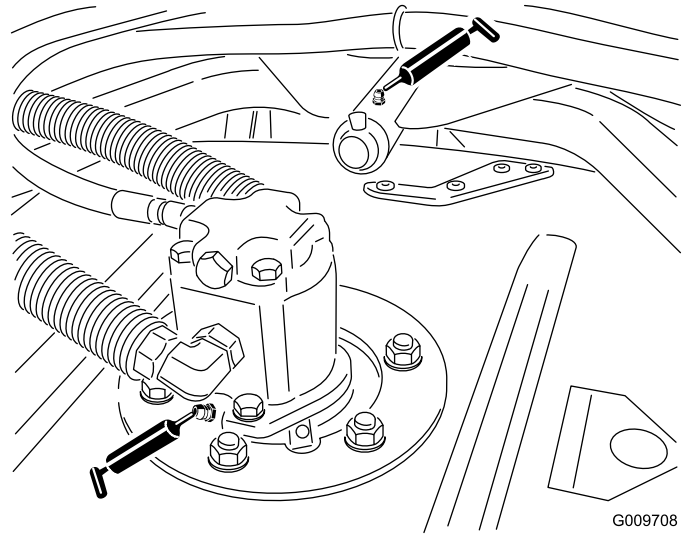


Figure 31

- Cutting-unit carrier-arm bushings (1 per cutting unit) (Figure 31)
- Rear roller bearings (2 per cutting unit) (Figure 32)

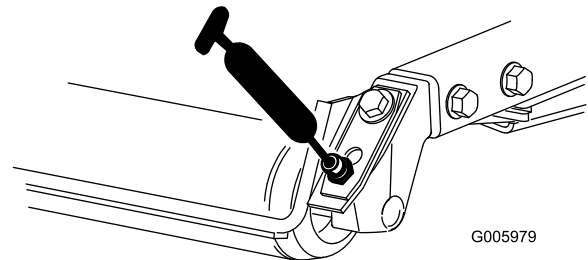


Figure 32

Important: 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 the hole, there is also an alignment mark on 1 end of the roller shaft.

Engine Maintenance

Servicing the Air Cleaner

Service Interval: Every 400 hours

Check the air-cleaner body for damage which could cause an air leak. Replace it if it is damaged. Check the whole intake system for leaks, damage, or loose hose clamps.

Service the air-cleaner filter only when the service indicator (Figure 33) requires it. Changing the air filter before it is necessary only increases the chance of dirt entering the engine when the filter is removed.

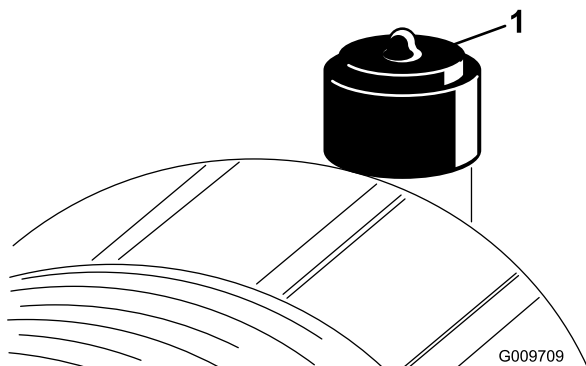


Figure 33

1. Air-cleaner indicator

Important: Be sure the cover is seated correctly and seals with the air-cleaner body.

1. Pull the latch outward and rotate the air-cleaner cover counterclockwise (Figure 34).

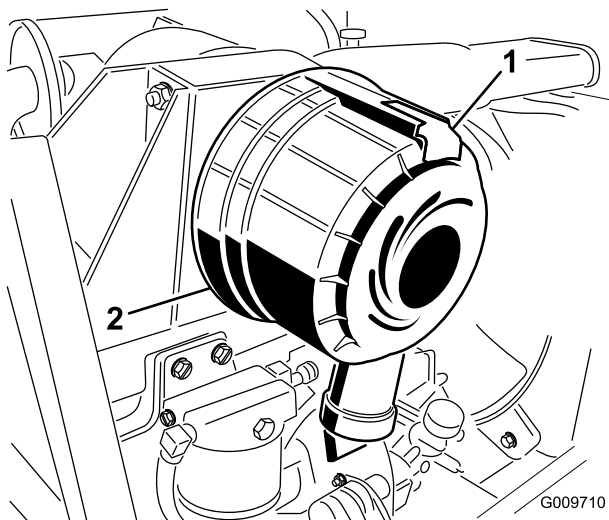


Figure 34

1. Air-cleaner latch
2. Air-cleaner cover

2. Remove the cover from the air-cleaner body.

Note: Before removing the filter, use low-pressure air (276 kPa [40 psi], clean and dry) to help remove

large accumulations of debris packed between outside of primary filter and the canister. **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 the primary filter is removed.

3. Remove and replace the primary filter (Figure 35).

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

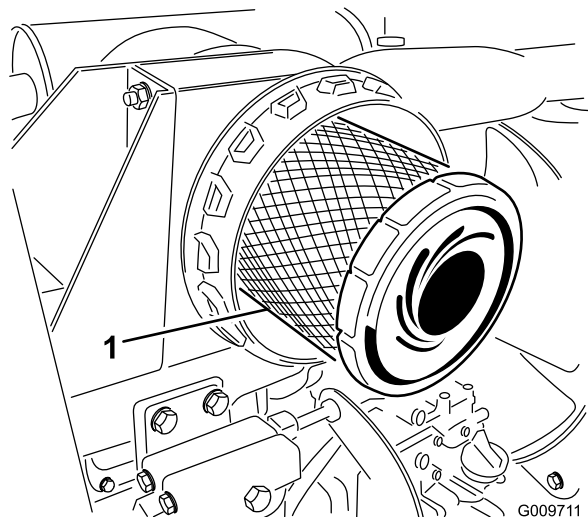


Figure 35

1. Air-cleaner primary filter

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

Note: Do not use a damaged element. Insert the new filter by applying pressure to the outer rim of the element to seat it in the canister. **Do not apply pressure to the flexible center of the filter.**

Important: Never attempt to clean the safety filter (Figure 36). Replace the safety filter with a new one after every 3 primary filter services.

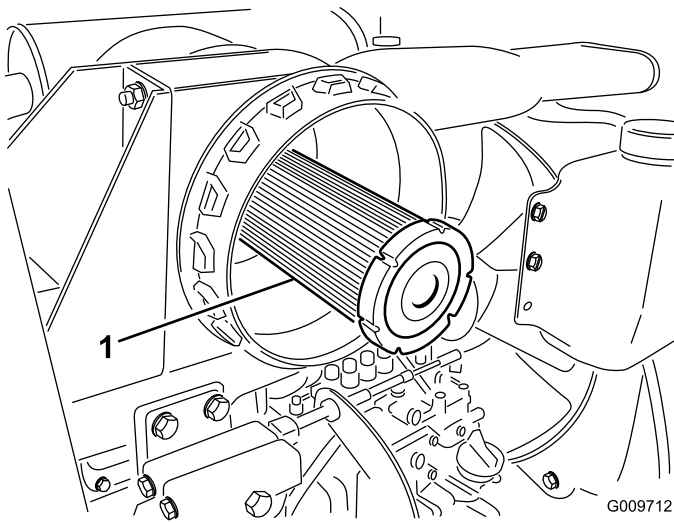


Figure 36

1. Air-cleaner safety filter

5. Clean the dirt-ejection port located in the removable cover.
6. Remove the rubber outlet valve from the cover, clean the cavity, and install the outlet valve.
7. Install the cover, orienting the rubber outlet valve in a downward position—between approximately 5:00 to 7:00 when viewed from the end.
8. Reset the indicator ([Figure 33](#)) if it shows red.

Servicing the Engine Oil and Filter

Service Interval: After the first 50 hours

Every 150 hours

1. Remove the rear drain plug ([Figure 37](#)) and let the oil flow into a drain pan. When the oil stops, install the drain plug.

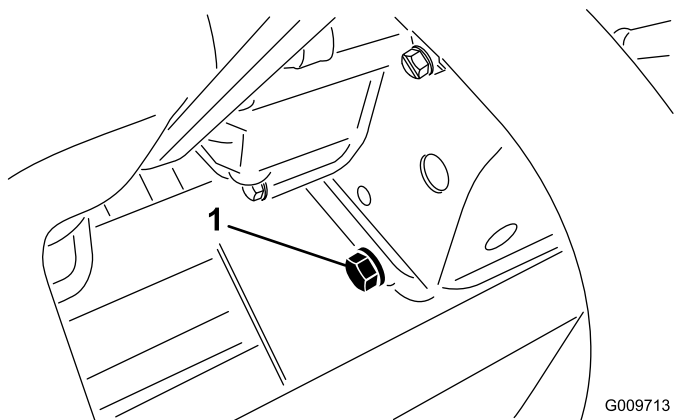


Figure 37

1. Engine oil drain plug

2. Remove the oil filter ([Figure 38](#)).

Note: Apply a light coat of clean oil to the new filter seal before screwing it on. Do not overtighten the filter.

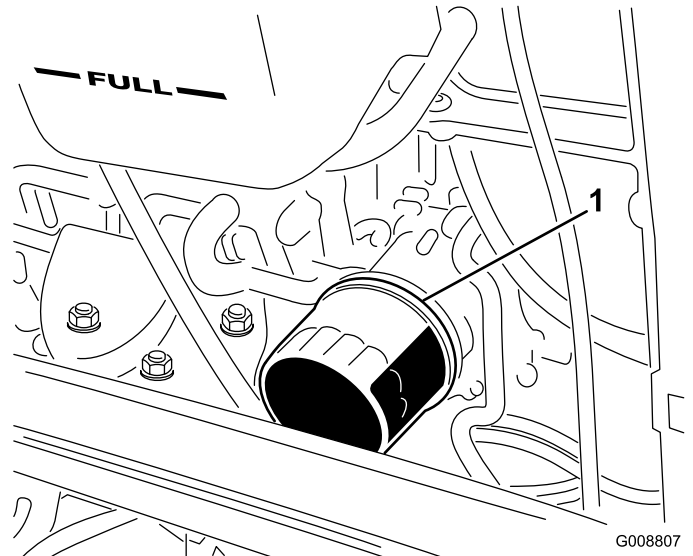


Figure 38

1. Engine oil filter

3. Add oil to the crankcase; refer to [Checking the Engine-oil Level](#) (page 27).

Adjusting the Throttle

Adjust the throttle cable (Figure 39) so that the governor lever on the engine contacts the high speed set bolt at the same point that the throttle cable contacts the end of the slot in the control arm.

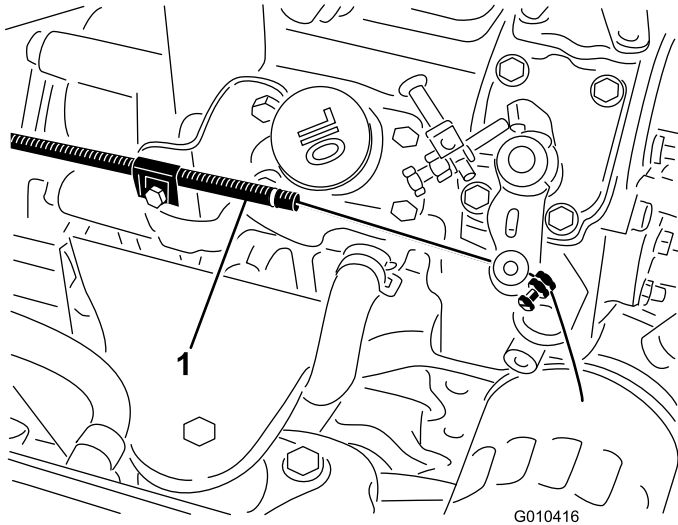


Figure 39

1. Throttle cable

Fuel System Maintenance

⚠ DANGER

Under certain conditions, diesel fuel and fuel vapors are highly flammable and explosive. A fire or explosion from fuel can burn you and others and can cause property damage.

- Use a funnel and fill the fuel tank outdoors, in an open area, when the engine is off and is cold. Wipe up any fuel that spills.
- Do not fill the fuel tank completely full. Add fuel 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 the fuel to expand.
- Never smoke when handling fuel, and stay away from an open flame or where fuel fumes may be ignited by a spark.
- Store fuel in a clean, safety-approved container and keep the cap in place.

Servicing the Fuel Tank

Every 800 hours—Drain and clean the fuel tank.

Before storage—Drain and clean the fuel tank.

Drain and clean the fuel tank every 800 hours. Also, drain and clean the tank if 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.

Checking the Fuel Lines and Connections

Service Interval: Every 400 hours—Check the fuel lines and connections.

Yearly—Check the fuel lines and connections.

Check the fuel lines and connections every 400 hours or yearly, whichever comes first. Inspect them for deterioration, damage, or loose connections.

Servicing the Water Separator

Service Interval: Before each use or daily—Drain water or other contaminants from the fuel filter/water separator.

Every 400 hours—Replace the fuel-filter canister.

Drain water or other contaminants from water separator daily. Replace filter canister after every 400 hours of operation.

1. Place a clean container under the fuel filter (Figure 40).

- Loosen the drain plug on the bottom of the filter canister.

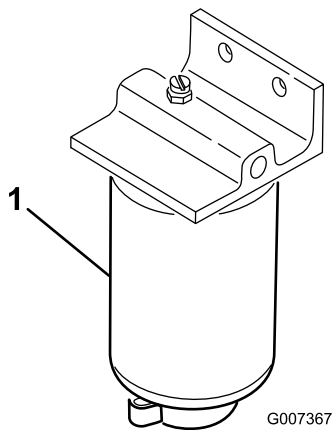


Figure 40

- Water-separator filter canister

- Clean the area where the filter-canister mounts.
- Remove the filter canister and clean the mounting surface.
- Lubricate the gasket on the filter canister with clean oil.
- Install the filter canister by hand until the gasket contacts mounting surface, then rotate it an additional 1/2 turn.
- Tighten the drain plug on the bottom of the filter canister.

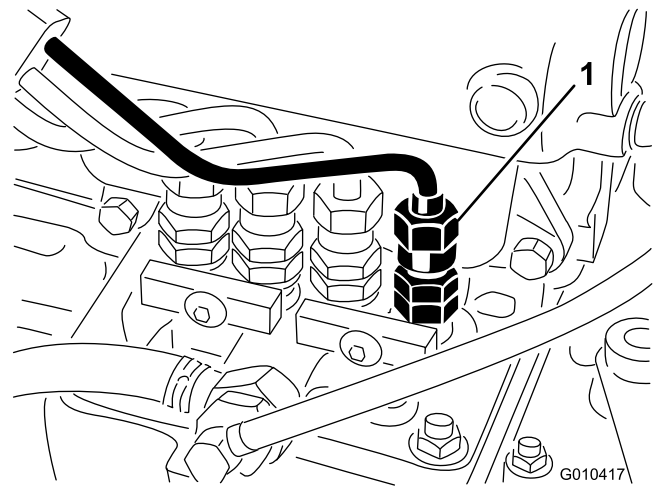


Figure 41

- #1 injector nozzle

- Move the throttle to the Fast position.
- Turn the key in the ignition switch to the Start position and watch the fuel flow around the connector.
- Turn the key to the Off position when you observe solid flow.
- Tighten the pipe connector securely.
- Repeat the procedure on the remaining nozzles.

Servicing the Fuel Pickup Tube Screen

The fuel pickup tube, located inside the fuel tank, is equipped with a screen to help prevent debris from entering the fuel system. Remove the fuel pickup tube and clean screen as required.

Bleeding Air from the Injectors

Note: This procedure should be used only if the fuel system has been purged of air through normal priming procedures and the engine will not start.

- Loosen the pipe connection to the #1 injector nozzle and holder assembly at the injection pump (Figure 41).

Electrical System Maintenance

Charging and Connecting the Battery

⚠ WARNING

CALIFORNIA Proposition 65 Warning

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

1. Unlatch and raise the operator's console panel (Figure 42).

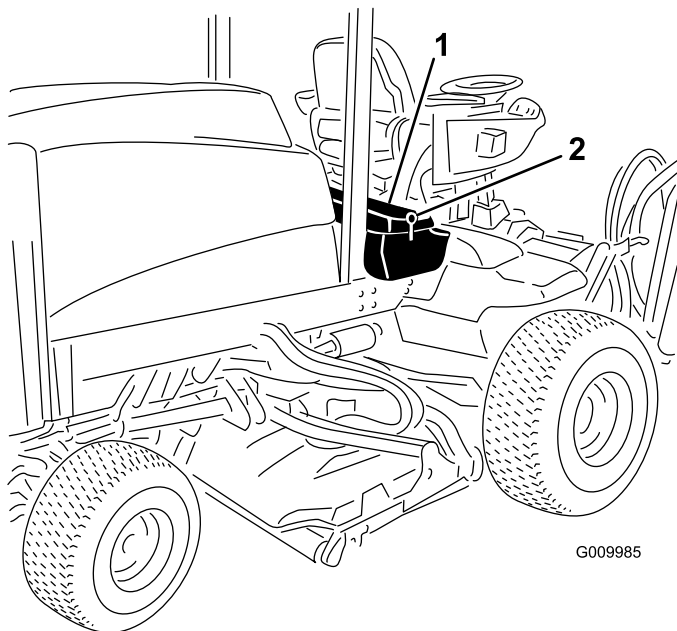


Figure 42

1. Operator's console panel
2. Latch

⚠ 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.

2. Connect a 3 to 4 ampere battery charger to the battery posts.
3. Charge the battery at a rate of 3 to 4 amperes for 4 to 8 hours.
4. When the battery is charged, disconnect the charger from the electrical outlet and battery posts.

⚠ WARNING

Charging the battery produces gasses that can explode.

Never smoke near the battery and keep sparks and flames away from battery.

5. Install the positive cable (red) to the positive (+) terminal and the negative cable (black) to the negative (-) terminal of the battery (Figure 43).

Note: Secure the cables to the posts with cap screws and nuts. 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.

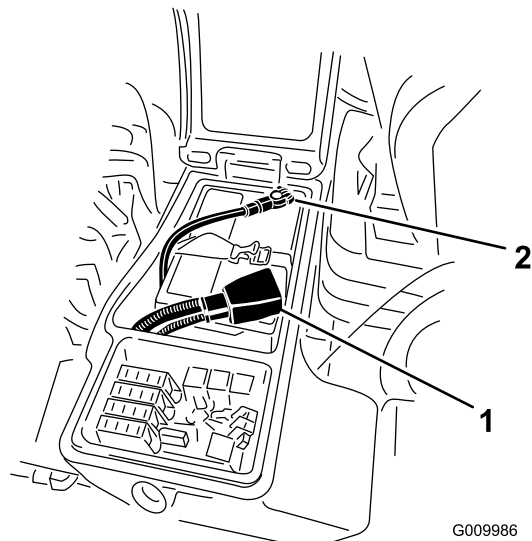


Figure 43

1. Positive battery cable
2. Negative battery cable

6. Slide the rubber boot over the positive terminal to prevent a possible short from occurring.

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.

7. Coat both battery connections with Grafo 112X (skin-over) grease, Toro part 505-47, petroleum jelly, or light grease to prevent corrosion.
8. Slide the rubber boot over the positive terminal.
9. Close the console panel and secure the latch.

⚠ WARNING

Battery terminals or metal tools could short against metal components causing sparks. Sparks can cause the battery gasses to explode, resulting in personal injury.

- When removing or installing the battery, do not allow the battery terminals to touch any metal parts of the machine.
- Do not allow metal tools to short between the battery terminals and metal parts of the machine.

⚠ WARNING

Incorrect battery cable routing could damage the machine 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.

Servicing the Battery

Service Interval: Every 50 hours

Important: Before welding on the machine, disconnect the negative cable from the battery to prevent damage to the electrical system.

Note: Check the battery condition weekly or after every 50 hours of operation. Keep the terminals and the entire battery case clean because a dirty battery will discharge slowly. To clean the battery, remove it from the machine and wash the entire case with a solution of baking soda and water. Rinse it with clear water. Coat the battery posts and cable connectors with Grafo 112X (skin-over) grease (Toro part 505-47) or petroleum jelly to prevent corrosion.

Servicing the Fuses

The fuses are located under the operator's control panel.

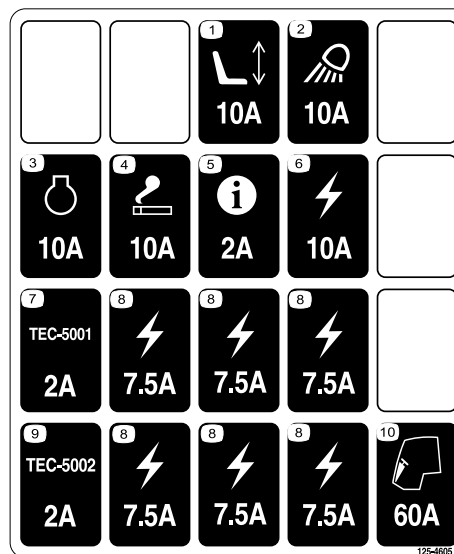


Figure 44

Unhook the latch and raise the operator's console panel (Figure 45) to expose the fuses (Figure 46).

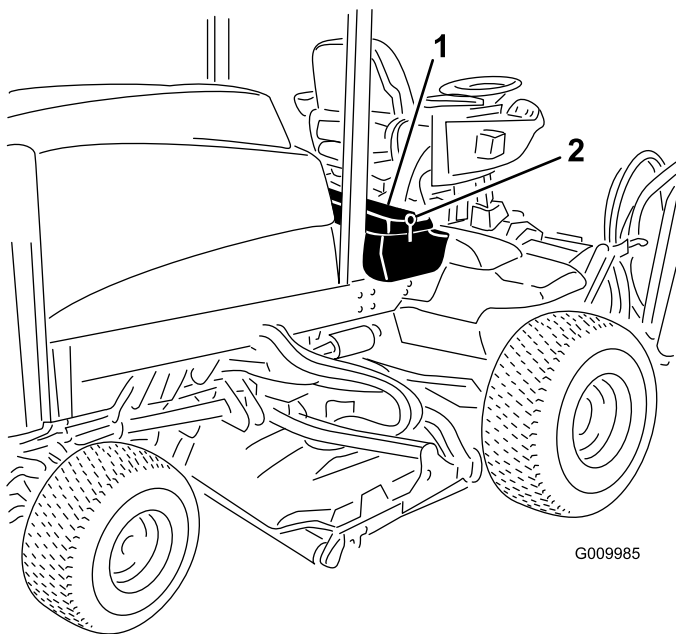


Figure 45

1. Latch

2. Operator's console panel

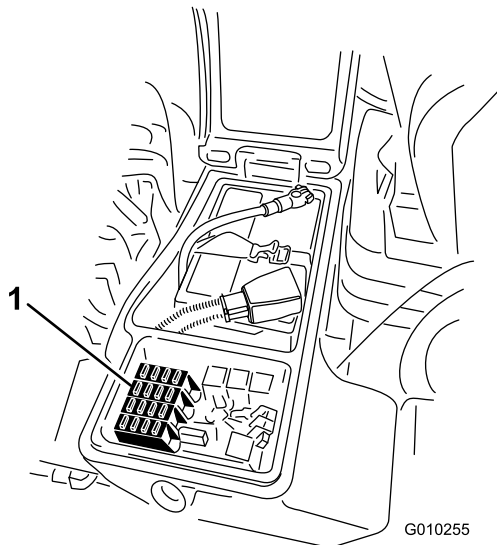


Figure 46

1. Fuses

Drive System Maintenance

Checking the Torque of the Wheel Nuts

Service Interval: After the first 8 hours

Every 200 hours

⚠ WARNING

Failure to maintain proper torque of the wheel nuts could result in wheel failure or loss of a wheel and may result in personal injury.

Torque the front and rear wheel nuts to 115 to 136 N-m (85 to 100 ft-lb) after 1 to 4 hours of operation and again after 8 hours of operation. Torque them every 200 hours thereafter.

Note: The front wheel nuts are 1/2-20 UNF. The rear wheel nuts are M12 x 1.6-6H (metric).

Checking for End-play in the Planetary Drives

Service Interval: Every 400 hours

There should be no end-play in the planetary drives/drive wheels (i.e., the wheels should not move when pulled or pushed in a direction parallel to the axle).

1. Park the machine on a level surface, lower the cutting units, stop the engine, and remove the key from the ignition switch.
2. Chock the rear wheels and raise the front of machine, supporting the front axle/frame on jack stands.

⚠ DANGER

A machine on a jack may be unstable and slip off of the jack, injuring anyone beneath it.

- Do not start the engine while the machine is on a jack.
 - Always remove the key from the ignition before getting off of the machine.
 - Block the tires when you are raising the machine with a jack.
 - Support the machine with jack stands.
3. Grasp one of the front drive wheels and push/pull it toward and away from the machine, noting any movement.

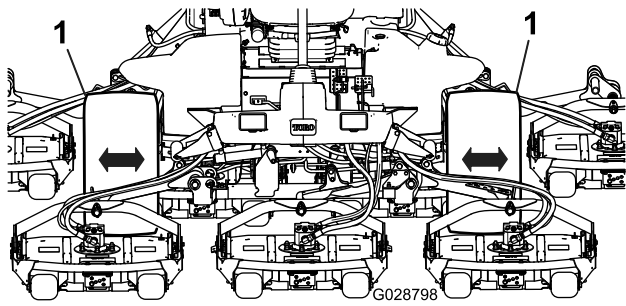


Figure 47

1. Front drive wheels

4. Repeat step 3 for the other drive wheel.
5. If either wheel moves, contact your Toro Distributor to have the planetary drive rebuilt.

Checking the Planetary Gear Drive Oil

Service Interval: Every 400 hours

Check the oil level after every 400 hours of operation. Use high-quality SAE 85W-140 gear lube as a replacement.

1. With the machine on level surface, position the wheel so that one check plug (Figure 48) is at the 12 o'clock position and the other is at the 3 o'clock position.

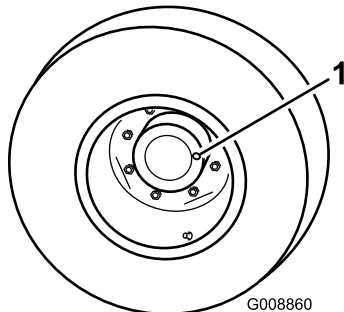


Figure 48

1. Check/drain plug (2)
2. Remove the plug at the 3 o'clock position (Figure 48).
Note: The oil level should be at the bottom of the check-plug hole.
3. If the oil level is low, remove the plug at the 12 o'clock position and add oil until it begins to flow out of the hole at the 3 o'clock position.
4. Install both plugs.
5. Repeat steps 1 through 4 on the opposite planetary gear assembly.

Changing the Planetary Gear Drive Oil

Service Interval: After the first 200 hours

Every 800 hours/Yearly (whichever comes first)

Change the oil initially after first 200 hours of operation. Thereafter, change the oil every 800 hours, or yearly, whichever occurs first. Use a high-quality SAE 85W-140 gear lube as a replacement.

1. With the machine on a level surface, position a wheel so that 1 of the check plugs is at the lowest (6 o'clock) position (Figure 49).

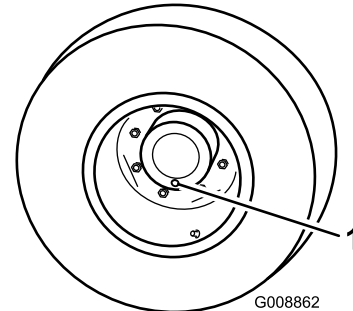


Figure 49

1. Check/drain plug

2. Place a drain pan under the planetary hub, remove the plug, and allow the oil to drain.
3. Place a drain pan under the brake housing, remove the drain plug, and allow the oil to drain (Figure 50).

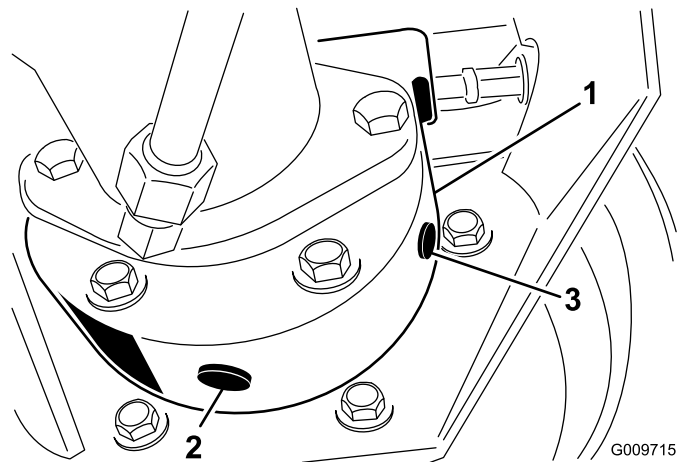


Figure 50

1. Brake housing
2. Drain plug

4. When all of the oil has drained from both locations, install the plug in the brake housing.
5. Rotate the wheel until the open plug hole in the planetary is at the twelve o'clock position.
6. Through the open hole, slowly fill the planetary with 0.65 L (22 fl oz) of high-quality SAE 85W-140 gear lube.

Important: If the planetary fills before the 0.65 L (22 fl oz) of oil is added, wait one hour or install the plug and move the machine approximately 10

feet to distribute the oil through the brake system. Then, remove the plug and add the remaining oil.

7. Install the plug.
8. Repeat the procedure on the opposite planetary/brake assembly.

Checking the Rear Axle Lubricant

Service Interval: Every 400 hours

The rear axle is shipped from the factory filled with SAE 85W-140 gear lube. Check the oil level before the engine is first started and every 400 hours thereafter. The capacity is 2.4 L (80 fl oz). Visually inspect for leaks daily.

1. Position the machine on a level surface.
2. Remove a check plug from one end of the axle (Figure 51) and make sure that the lubricant is up to the bottom of the hole.

Note: If the level is low, remove the fill plug (Figure 51) and add enough lubricant to bring the level up to the bottom of the check plug holes.

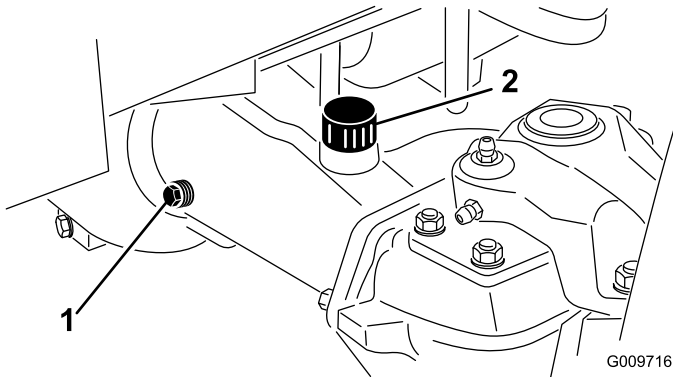


Figure 51

1. Check plug
2. Fill plug

Changing the Rear Axle Lubricant

Service Interval: After the first 200 hours

Every 800 hours

1. Position the machine on a level surface.
2. Clean the area around the 3 drain plugs—1 on each end and 1 in the center (Figure 52).

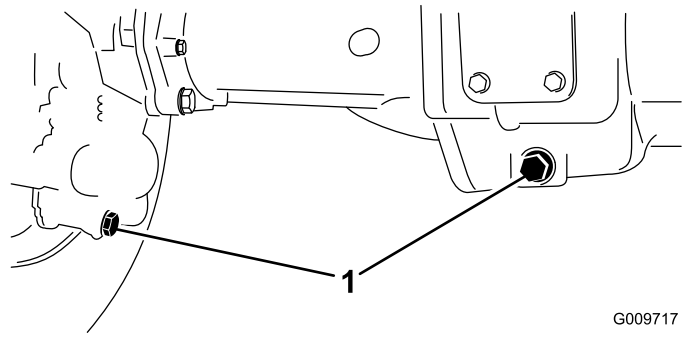


Figure 52

1. Drain plug location

3. Remove the oil-level check plugs and the main axle vent cap to ease draining the oil.
4. Remove the drain plugs and allow the oil to drain into the pans.
5. Install the plugs.
6. Remove a check plug and fill the axle with approximately 2.4 L (80 fl oz) of 85W-140 gear lube or until the lubricant is up to the bottom of the hole.
7. Install the check plug.

Adjusting the Traction Drive for Neutral

The machine must not creep when the traction pedal is released. If it does creep, adjust it.

1. Park the machine on a level surface, shut the engine off, position the speed control into the Low range, and lower the cutting units to the floor.

Note: Press only the right brake pedal, and set the parking brake.

2. Jack up the left side of the machine until the left front tire is off the shop floor.
3. Support the machine with jack stands to prevent it from falling accidentally.
4. Start the engine and allow it to run at low idle.
5. Adjust the jam nuts on the pump rod end to move the pump control tube forward to eliminate forward creep or rearward to eliminate rearward creep (Figure 53).

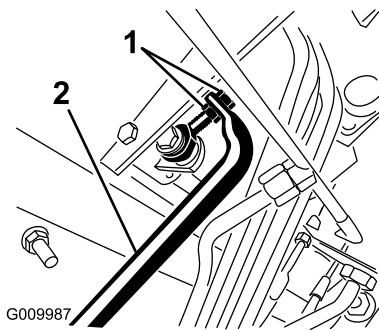


Figure 53

1. Pump-rod jam nuts
2. Pump-control tube

6. After wheel rotation ceases, tighten the jam nuts to secure the adjustment.
7. Stop the engine and release the right brake.
8. Remove the jack stands and lower the machine to the shop floor.
9. Test drive the machine to make sure that it does not creep.

Checking the Rear Wheel Toe-in

Service Interval: Every 800 hours/Yearly (whichever comes first)

1. Measure the center-to-center distance (at axle height) at the front and rear of the steering tires ([Figure 54](#)).

Note: The front measurement must be 3 mm (1/8 inch) less than the rear measurement.

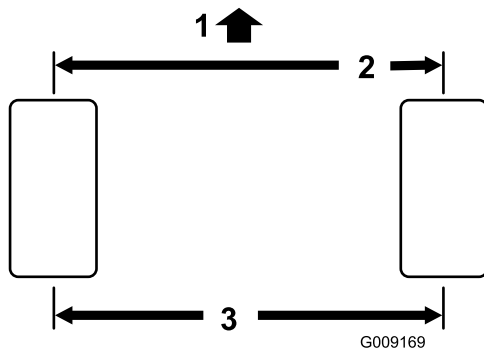


Figure 54

1. Front of traction unit
2. 3 mm (1/8 inch) less than rear of tire
3. Center-to-center distance

2. To adjust, remove the cotter pin and nut from either tie-rod ball joint ([Figure 55](#)).

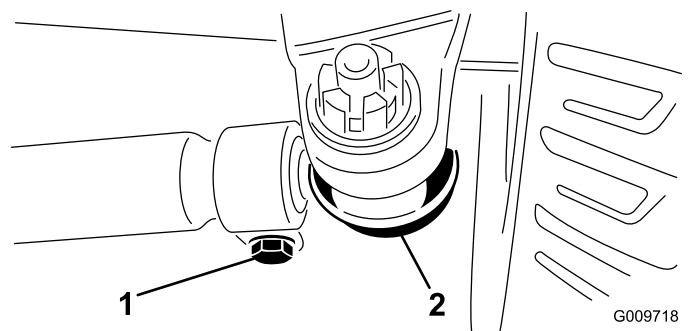


Figure 55

1. Tie-rod clamp
2. Tie-rod ball joint

3. Remove the tie-rod ball joint from the axle-case support.
4. Loosen the clamps at both ends of the tie rods ([Figure 55](#)).
5. Rotate the detached ball joint inward or outward 1 complete revolution.
6. Tighten the clamp at the loose end of tie rod.
7. Rotate the entire tie rod assembly the same direction (inward or outward) 1 complete revolution.
- Note:** Tighten the clamp at connected end of the tie rod.
8. Install the ball joint in the axle-case support and tighten the nut finger tight.
9. Measure the toe-in.
10. Repeat this procedure if necessary.
11. Tighten the nut and install a new cotter pin when the adjustment is correct.

Cooling System Maintenance

Servicing the Engine Cooling System

Service Interval: Before each use or daily

Remove debris from the engine area, oil cooler and radiator daily. Clean them more frequently in dirty conditions.

1. Unlatch and swing open the rear screen (Figure 56).
Clean the screen thoroughly of all debris.

Note: To remove the screen, lift it off the hinge pins.

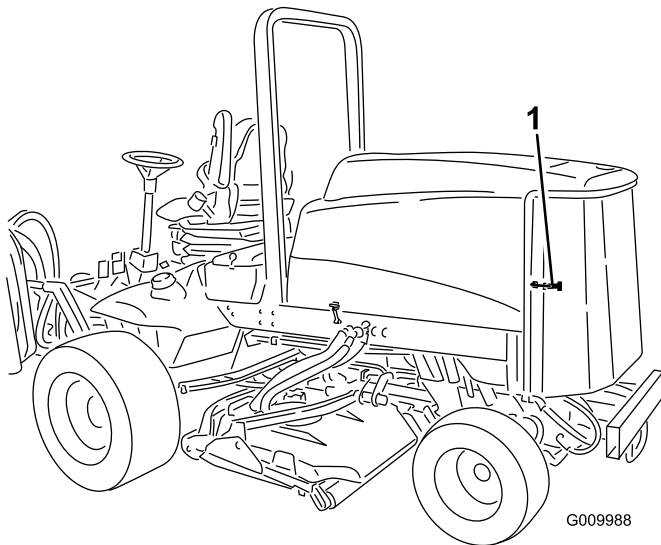


Figure 56

1. Rear-screen latch

2. Rotate the latches (Figure 57) securing the oil cooler to the frame.

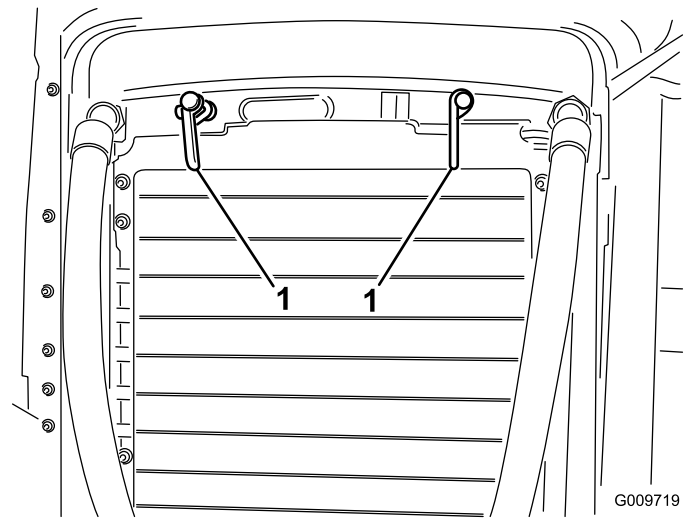


Figure 57

1. Oil-cooler latches

3. Pivot the oil cooler rearward.

Note: Start from the front and blow the debris out toward the back. Then clean from the back side and blow towards the front. Repeat the procedure several times until all the chaff and debris is removed.

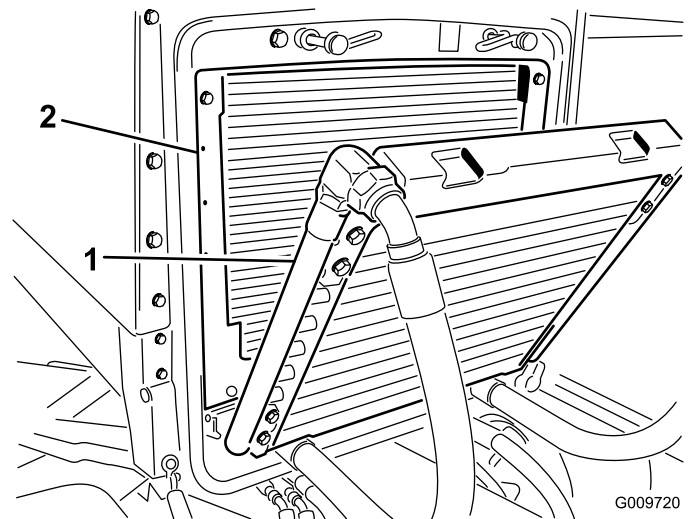


Figure 58

1. Oil cooler
2. Radiator

Important: Cleaning the radiator or oil cooler with water will promote premature corrosion damage to components and compact debris.

4. Clean both sides of the oil cooler and radiator area (Figure 58) thoroughly with compressed air.
5. Pivot the oil cooler back into position.

Note: Secure it to the frame with the latches, and close the screen.

Brake Maintenance

Adjusting the Service Brakes

Adjust the service brakes when there is more than 25 mm (1 inch) of free travel of the brake pedal, or when the brakes do not work effectively. Free travel is the distance the brake pedal moves before braking resistance is felt.

1. Release the locking latch from the brake pedals so that both pedals work independently of each other.
2. To reduce free travel of the brake pedals, tighten the brakes:
 - A. Loosen the front nut on the threaded end of the brake cable (Figure 59).

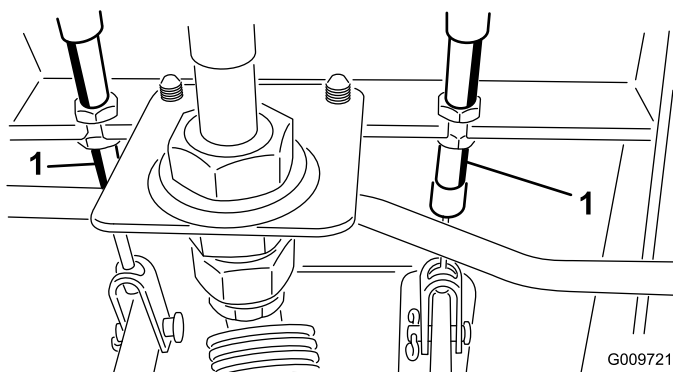


Figure 59

1. Brake cable

- B. Tighten the rear nut to move the cable backward until the brake pedals have 13 to 25 mm (1/2 to 1 inch) of free travel.
- C. Tighten the front nuts after the brakes are adjusted correctly.

Belt Maintenance

Servicing the Alternator Belt

Service Interval: Every 100 hours

Check the condition and tension of the belts (Figure 60) after every 100 operating hours.

1. Proper tension will allow 10 mm (3/8 inch) deflection when a force of 4.5 kg (10 lb) is applied on the belt midway between the pulleys.
2. If the deflection is not 10 mm (3/8 inch), loosen the alternator mounting bolts (Figure 60).

Note: Increase or decrease the alternator belt tension and tighten the bolts. Check the deflection of the belt again to ensure that the tension is correct.

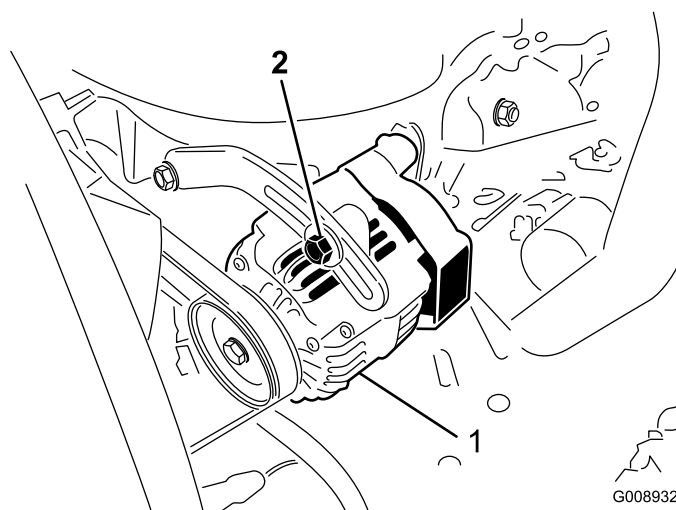


Figure 60

1. Alternator

2. Mounting bolt

Hydraulic System Maintenance

Changing the Hydraulic Fluid

Service Interval: Every 800 hours

Change the hydraulic fluid after every 800 operating hours, in normal conditions. 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 case return line from the bottom of the reservoir and let the hydraulic fluid flow into a large drain pan.
3. Connect the line when the hydraulic fluid stops draining.
4. Fill the reservoir with approximately 28.4 L (7.5 US gallons) of hydraulic fluid.

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

5. Install the reservoir cap.
6. Start the engine and use all of the hydraulic controls to distribute hydraulic fluid throughout the system.
7. Check for leaks; then stop the engine.
8. Check the fluid level and add enough to raise level the level to the Full mark on the dipstick.

Note: Do not overfill the reservoir.

Replacing the Hydraulic Filters

Service Interval: After the first 200 hours

Every 800 hours

Change the 2 hydraulic filters initially after the first 200 operating hours. Thereafter, change the filters after every 800 operating hours, in normal conditions.

Use Toro replacement filters part 94-2621 for the rear (cutting unit) of the machine and 75-1310 for the front (charge) of the machine.

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

1. Position the machine on a level surface, lower the cutting units, stop the engine, engage the parking brakes, and remove the ignition key.
2. Clean the area around the filter mounting area.
3. Place a drain pan under the filter and remove the filter (Figure 61 and Figure 62).

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

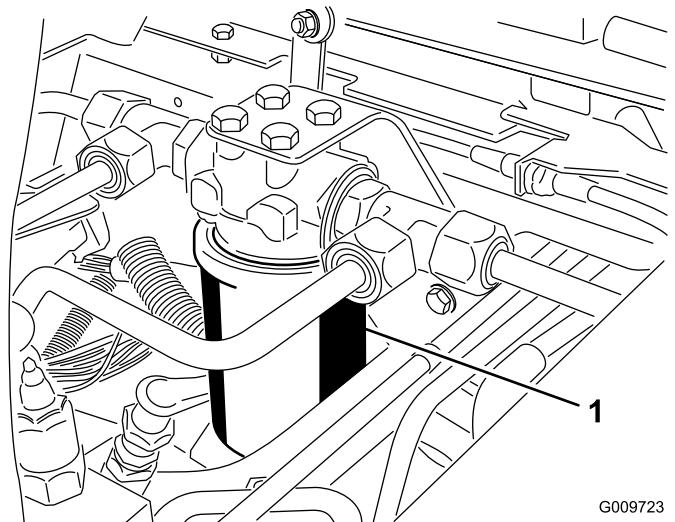


Figure 61

1. Hydraulic filter

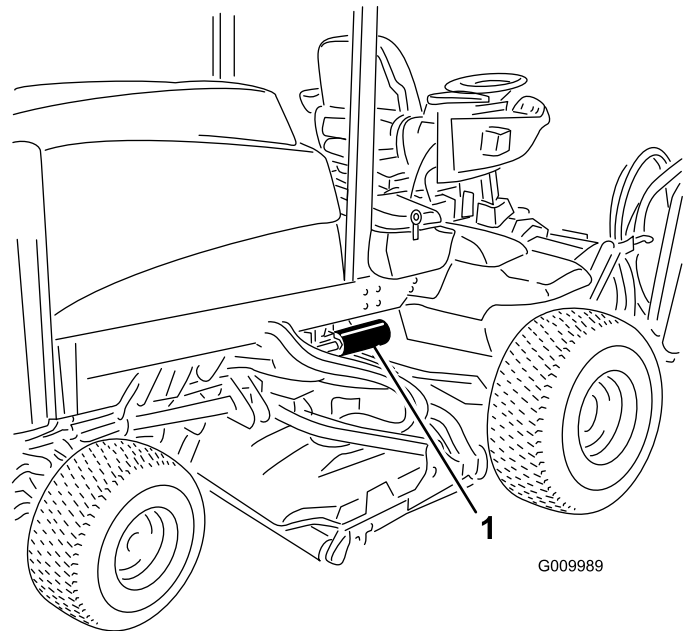


Figure 62

1. Hydraulic filter

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

Checking the Hydraulic Lines and Hoses

Service Interval: Before each use or daily

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

⚠ WARNING

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

- Make sure 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.

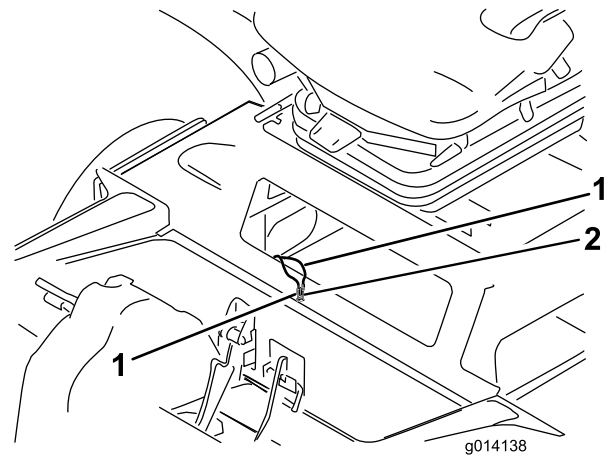


Figure 63

1. Counterbalance jumper wires
2. Wire cap

4. With the key in the Off position, remove the cap from jumper wires and plug the wires together (Figure 64).

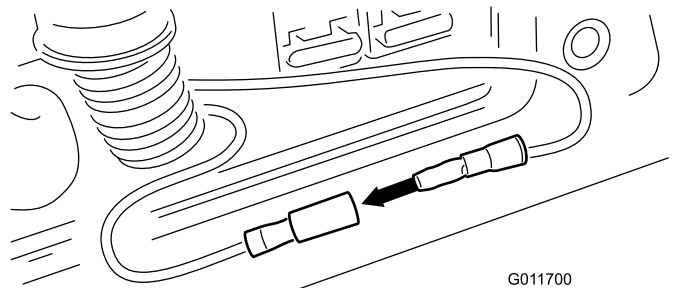


Figure 64

Changing the Counterbalance Settings

During different times of the mowing season or when turf conditions vary, the amount of counterbalance (upward lift) required on the cutting decks can be changed to meet the conditions.

1. Position the machine on a level surface, lower the cutting decks, stop the engine, engage the parking brake, and remove the key from the ignition switch.
2. Remove the access panel below the front of the seat.
3. Locate the 2 capped counterbalance jumper wires inside the compartment (Figure 63)
5. Turn the key to the Run position but **do not** start the machine.
6. The current counterbalance setting will flash on the diagnostic light. The system allows for 3 settings.
7. The counterbalance setting is changed by using the center raise-lower switch. To change the counterbalance setting proceed as follows:
 - Moving the switch forward to the lower position and releasing it will lower the counterbalance setting, thus increasing the effective weight of each cutting deck in the turf.
 - Moving the switch rearward to the raise position and releasing it will increase the counterbalance setting, thus decreasing the effective weight of each cutting deck in the turf.
 - After the switch is released, the diagnostic light will flash the new counterbalance setting (1, 2, or 3).
8. When the desired setting is attained, rotate the key to the Off position.
9. Unplug the jumper wires, install the cap on the wires and put the wires back into the compartment.
10. Install the access cover.

Note: The machine cannot be operated while in the counterbalance adjustment mode. Once the adjustment has been completed, move the machine to a test area and operate the machine with the new setting. The new counterbalanced setting may change the effective height of cut.

Cutting Deck Maintenance

Separating the Cutting Decks from the Traction Unit

1. Position the machine on a level surface, lower the cutting decks to the floor, shut the engine off, and engage the parking brake.
2. Disconnect and remove the hydraulic motor from the deck (Figure 65). Cover the top of the spindle to prevent contamination.

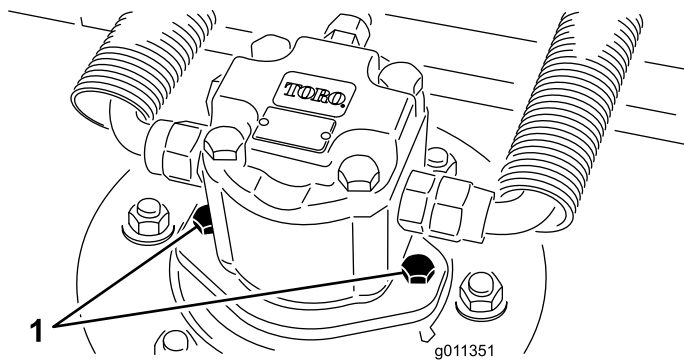


Figure 65

1. Motor mounting screws

-
3. Remove the lynch pin or retaining nut (GM 4700 only) securing the deck carrier frame to the lift arm pivot pin (Figure 66).

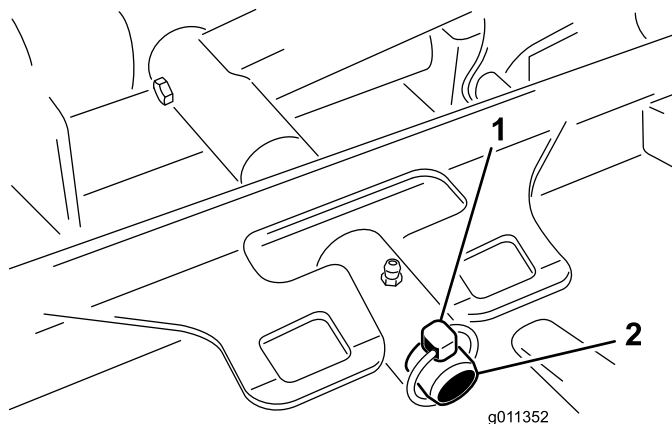


Figure 66

1. Lynch pin
2. Lift arm pivot pin

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

Mounting the Cutting Decks to the Traction Unit

1. Position machine on a level surface and shut engine off.
2. Move cutting deck into position in front of traction unit.
3. Slide deck carrier frame onto lift arm pivot pin. Secure with lynch pin or retaining nut (GM 4700 only) (Figure 66).
4. Install the hydraulic motor to the deck (Figure 65). Make sure that the O-ring is in position and not damaged.
5. Grease the spindle.

Servicing the Blade Plane

The rotary deck comes from the factory preset at 5 cm (2.00 inch) height-of-cut and blade rake of 7.9 mm (0.310 inch). The left-hand and right-hand heights are also preset to within ± 0.7 mm (0.030 inch) of the other.

The cutting deck 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 deck and remove the cutting deck from the tractor.
2. Use a hoist (or minimum of two people) and place the cutting deck 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) (Figure 67) and measure height from table to cutting edge of blade.

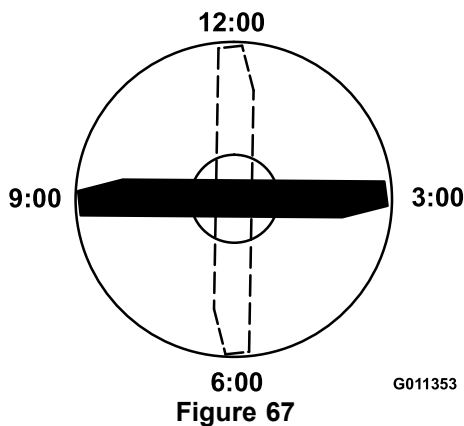


Figure 67

5. Rotate the marked end of the blade to the 3 and 9 o'clock positions (Figure 67) and measure the heights.

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.

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 deck frame (Figure 68).
2. Adjust 1.5 mm (0.060 inch) shims and/or 0.7 mm (0.030 inch) shim between the deck frame and bracket to achieve the desired height setting (Figure 68).

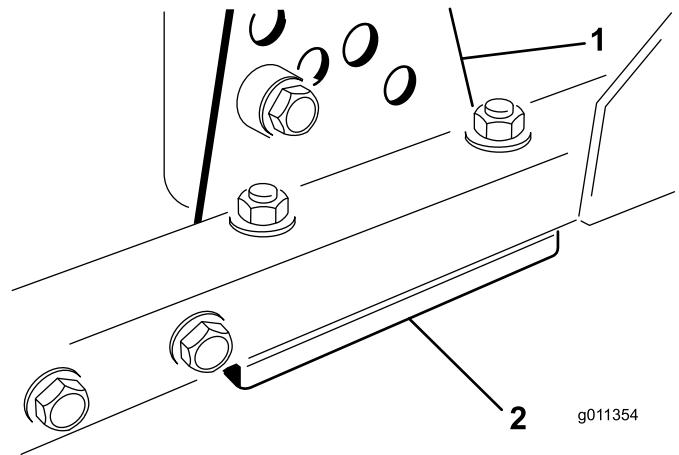


Figure 68

1. Height of cut bracket
2. Shims

3. Install the height-of-cut bracket to the deck 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 Loctite to prevent the spacer from falling inside the deck 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 deck to the highest position, shut the engine off, and engage the parking brake. Block the cutting deck 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 69).

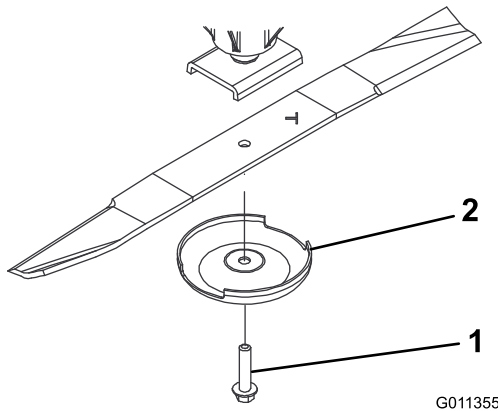


Figure 69

1. Blade bolt
2. Anti-scalp cup

3. Install the blade, sail facing toward the cutting deck, with the anti-scalp cup and blade bolt (Figure 69). Tighten 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 deck to the highest position, shut the engine off, and engage the parking brake. Block the cutting deck 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 70). 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 wear is noticed (Figure 70), replace the blade; refer to Removing the Cutter Blade.

⚠ DANGER

If the blade is allowed to wear, a slot will form between the sail and flat part of the blade (Figure 70). 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.

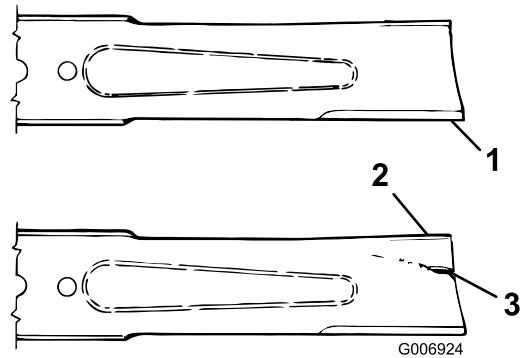


Figure 70

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 make sure of sharpness (Figure 71). The blade will remain balanced if the same amount of metal is removed from both cutting edges.

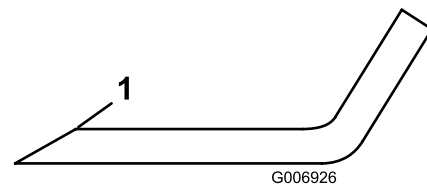


Figure 71

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. 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, sail facing toward cutting deck, with the anti-scalp cup and blade bolt. 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 deck should come to a complete stop in approximately 5 seconds after you shut down the cutting deck engagement switch.

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

To verify this stopping time, have a second person stand back from the deck at least 6 m (20 feet) and watch the blades on one of the cutting decks. Have the operator shut the cutting decks down 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 adjustment. Call your Toro Distributor for assistance in making this adjustment.

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 72).
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.

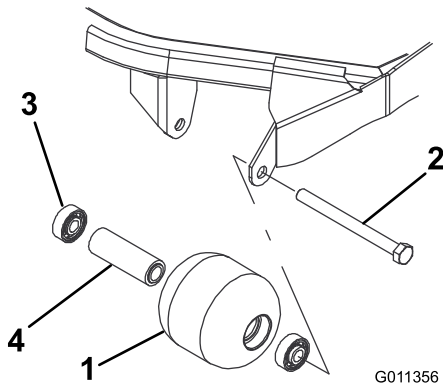


Figure 72

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

Assembling the Front Roller

1. Press the first bearing into the roller housing (Figure 72). Press on the outer race only or equally on the inner and outer race.
2. Insert the spacer (Figure 72).
3. Press the second bearing into the roller housing (Figure 72) 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.

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

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.
6. Secure the mounting bolt to 108 N-m (80 ft-lb).

3. Push the second bearing out in press.
4. Inspect the roller housing, bearings, and bearing spacer for damage (Figure 72). Replace damaged components and assemble.

Cleaning

Servicing the Spark Arrester Muffler

Service Interval: Every 200 hours

Every 200 hours operation, clear the muffler of carbon buildup.

1. Remove the pipe plug from the cleanout port at the lower side of the muffler.

⚠ CAUTION

The muffler may be hot and could cause injury.

Be careful while working around the muffler.

2. Start the engine. Plug the normal muffler exit with a block of wood or metal plate so that the exhaust flow will be forced out of the cleanout port.

Note: Continue to block the exit until carbon deposits cease coming out of the port.

⚠ CAUTION

Do not stand in line with the cleanout port.

Always wear safety glasses.

3. Stop the engine and replace the pipe plug.

Storage

Preparing the Traction Unit

1. Thoroughly clean the traction unit, the cutting units, and the engine.
2. Check the tire pressure; refer to Checking the Tire Pressure.
3. Check all fasteners for looseness; tighten as necessary.
4. Grease or oil all grease fittings and pivot points. Wipe up any excess lubricant.
5. Lightly sand and use touch-up paint on painted areas that are scratched, chipped, or rusted. Repair any dents in the metal body.
6. Service the battery and cables as follows:
 - A. Remove the battery terminals from the battery posts.
 - B. Clean the battery, terminals, and posts with a wire brush and baking soda solution.
 - C. Coat the cable terminals and battery posts with Grafo 112X skin-over grease (Toro part 505-47) or petroleum jelly to prevent corrosion.
 - D. Slowly charge the battery every 60 days for 24 hours to prevent lead sulfation of the battery.
7. Engage the transport latches (Groundsmaster 4700-D only).

Preparing the Engine

1. Drain the engine oil from the oil pan and install the drain plug.
2. Remove and discard the oil filter. Install a new oil filter.
3. Fill the oil pan with 9.5 L (10 US qt) of SAE 15W-40 CH-4, CI-4, or higher engine oil.
4. Start the engine and run it at idle speed for approximately 2 minutes.
5. Stop the engine.
6. Flush the fuel tank with fresh, clean diesel fuel.
7. Secure all of the fuel-system fittings.
8. Thoroughly clean and service the air-cleaner assembly.
9. Seal the air-cleaner inlet and the exhaust outlet with weatherproof tape.
10. Check the antifreeze protection and add a 50/50 solution of water and ethylene glycol antifreeze as needed for the expected minimum temperature in your area.

Cutting Deck

If the cutting deck is separated from the traction unit for any length of time, install a spindle plug in the top of the spindle to protect the spindle from dust and water.

International Distributor List

Distributor:	Country:	Phone Number:	Distributor:	Country:	Phone Number:
Agrolanc Kft	Hungary	36 27 539 640	Maquiver S.A.	Colombia	57 1 236 4079
Balama Prima Engineering Equip.	Hong Kong	852 2155 2163	Maruyama Mfg. Co. Inc.	Japan	81 3 3252 2285
B-Ray Corporation	Korea	82 32 551 2076	Mountfield a.s.	Czech Republic	420 255 704 220
Casco Sales Company	Puerto Rico	787 788 8383	Mountfield a.s.	Slovakia	420 255 704 220
Ceres S.A.	Costa Rica	506 239 1138	Munditol S.A.	Argentina	54 11 4 821 9999
CSSC Turf Equipment (pvt) Ltd.	Sri Lanka	94 11 2746100	Norma Garden	Russia	7 495 411 61 20
Cyril Johnston & Co.	Northern Ireland	44 2890 813 121	Oslinger Turf Equipment SA	Ecuador	593 4 239 6970
Cyril Johnston & Co.	Republic of Ireland	44 2890 813 121	Oy Hako Ground and Garden Ab	Finland	358 987 00733
Equiver	Mexico	52 55 539 95444	Parkland Products Ltd.	New Zealand	64 3 34 93760
Femco S.A.	Guatemala	502 442 3277	Perfetto	Poland	48 61 8 208 416
ForGarder OU	Estonia	372 384 6060	Pratoverde SRL.	Italy	39 049 9128 128
G.Y.K. Company Ltd.	Japan	81 726 325 861	Prochaska & Cie	Austria	43 1 278 5100
Geomechaniki of Athens	Greece	30 10 935 0054	RT Cohen 2004 Ltd.	Israel	972 986 17979
Golf international Turizm	Turkey	90 216 336 5993	Riversa	Spain	34 9 52 83 7500
Guandong Golden Star	China	86 20 876 51338	Lely Turfcare	Denmark	45 66 109 200
Hako Ground and Garden	Sweden	46 35 10 0000	Solvart S.A.S.	France	33 1 30 81 77 00
Hako Ground and Garden	Norway	47 22 90 7760	Spypros Stavrinides Limited	Cyprus	357 22 434131
Hayter Limited (U.K.)	United Kingdom	44 1279 723 444	Surge Systems India Limited	India	91 1 292299901
Hydroturf Int. Co Dubai	United Arab Emirates	97 14 347 9479	T-Markt Logistics Ltd.	Hungary	36 26 525 500
Hydroturf Egypt LLC	Egypt	202 519 4308	Toro Australia	Australia	61 3 9580 7355
Irrimac	Portugal	351 21 238 8260	Toro Europe NV	Belgium	32 14 562 960
Irrigation Products Int'l Pvt Ltd.	India	0091 44 2449 4387	Valtech	Morocco	212 5 3766 3636
Jean Heybroek b.v.	Netherlands	31 30 639 4611	Victus Emak	Poland	48 61 823 8369

European Privacy Notice

The Information Toro Collects

Toro Warranty Company (Toro) respects your privacy. In order to process your warranty claim and contact you in the event of a product recall, we ask you to share certain personal information with us, either directly or through your local Toro company or dealer.

The Toro warranty system is hosted on servers located within the United States where privacy law may not provide the same protection as applies in your country.

BY SHARING YOUR PERSONAL INFORMATION WITH US, YOU ARE CONSENTING TO THE PROCESSING OF YOUR PERSONAL INFORMATION AS DESCRIBED IN THIS PRIVACY NOTICE.

The Way Toro Uses Information

Toro may use your personal information to process warranty claims, to contact you in the event of a product recall and for any other purpose which we tell you about. Toro may share your information with Toro's affiliates, dealers or other business partners in connection with any of these activities. We will not sell your personal information to any other company. We reserve the right to disclose personal information in order to comply with applicable laws and with requests by the appropriate authorities, to operate our systems properly or for our own protection or that of other users.

Retention of your Personal Information

We will keep your personal information as long as we need it for the purposes for which it was originally collected or for other legitimate purposes (such as regulatory compliance), or as required by applicable law.

Toro's Commitment to Security of Your Personal Information

We take reasonable precautions in order to protect the security of your personal information. We also take steps to maintain the accuracy and current status of personal information.

Access and Correction of your Personal Information

If you would like to review or correct your personal information, please contact us by email at legal@toro.com.

Australian Consumer Law

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



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.