Form No. 3458-684 Rev J

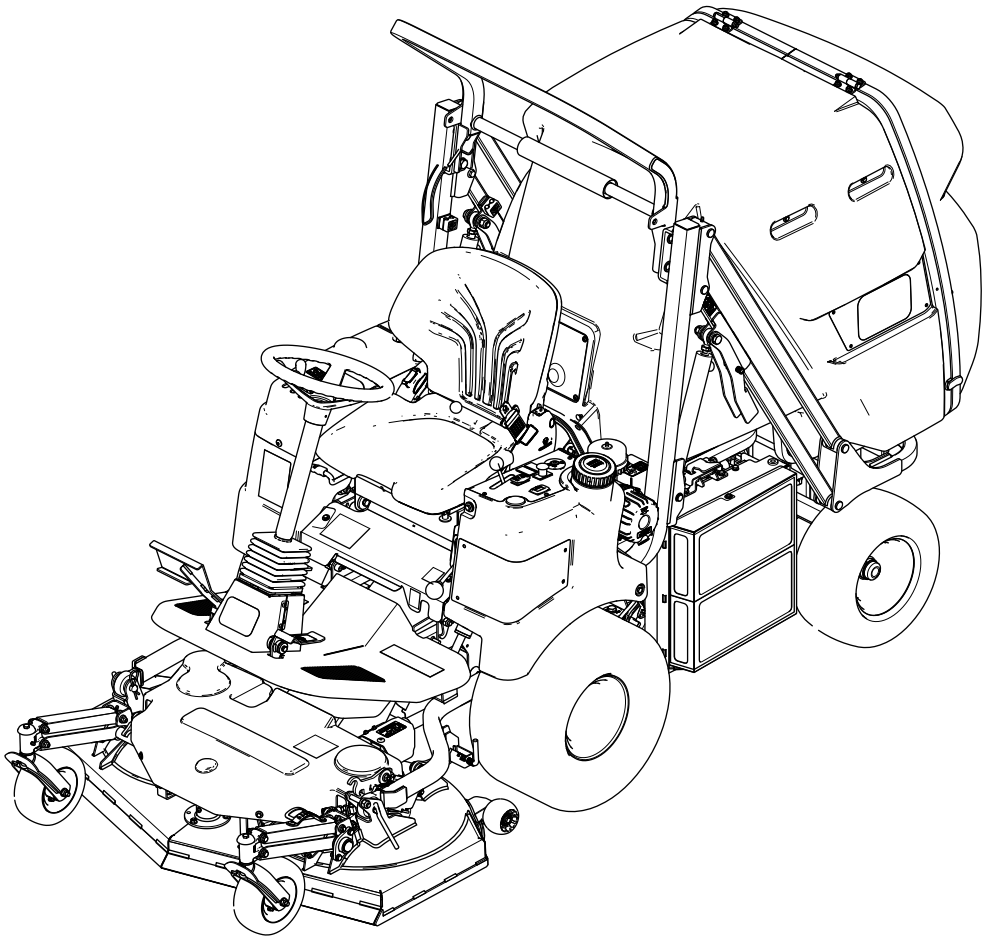
TORO®

Count on it.

Operator's Manual

ProLine H600 Rotary Mower

Model No. 31040—Serial No. 323000000 and Up
Model No. 31041—Serial No. 324000000 and Up



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

CE UK CA

3458-684

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

It is a violation of California Public Resource Code Section 4442 or 4443 to use or operate the engine on any forest-covered, brush-covered, or grass-covered land unless the engine is equipped with a spark arrester, as defined in Section 4442, maintained in effective working order or the engine is constructed, equipped, and maintained for the prevention of fire.

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.

⚠ WARNING

CALIFORNIA
Proposition 65 Warning

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

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.

Use of this product may cause exposure to chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

Introduction

This machine is a ride-on, rotary-blade lawn mower intended for used by professional operators in commercial applications. It is designed primarily for mowing grass on well-maintained lawns in parks, golf courses, sports fields, along roadways, and on commercial grounds. The machine is not designed for mowing brush 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.

Visit www.Toro.com for product safety and operation training materials, accessory information, help finding a dealer, or to register your product.

Whenever you need service, genuine Toro parts, or more information, contact an Authorized Service Dealer or Toro Customer Service and have the model and serial numbers of your product ready. Figure 1 identifies the location of the model and serial numbers on the product. Write the numbers in the space provided.

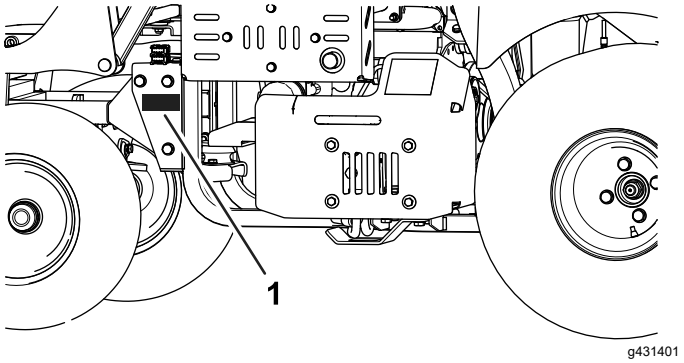


Figure 1

1. Model and serial number location

Model No. _____

Serial No. _____

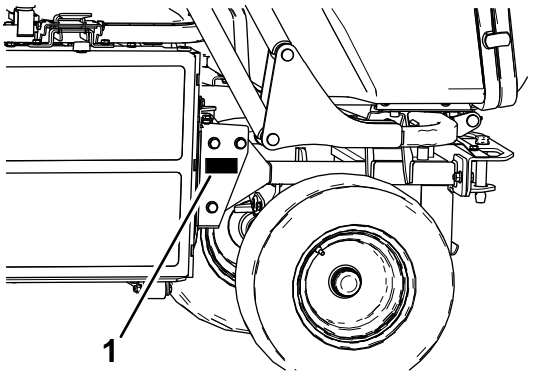


Figure 2
Homologation Kit serial number location

Model No. _____

Serial No. _____

This manual identifies potential hazards and has safety messages identified by the safety-alert symbol (Figure 3), which signals a hazard that may cause

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serious injury or death if you do not follow the recommended precautions.

g000502

Figure 3
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.

Contents

Safety

General Safety

This product is capable of amputating hands and feet and of throwing objects. Always follow all safety instructions to avoid serious personal injury.

- Read and understand the contents of this *Operator's Manual* before starting the engine.
- Use your full attention while operating the machine. Do not engage in any activity that causes distractions; otherwise, injury or property damage may occur.
- Do not operate the machine without all guards and other safety protective devices in place and functioning properly on the machine.
- Keep your hands and feet away from rotating parts. Keep clear of the discharge opening.
- Keep bystanders and children out of the operating area. Never allow children to operate the machine.
- Shut off the engine, remove the key, and wait for all movement to stop before you leave the operator's position. Allow the machine to cool before adjusting, servicing, cleaning, or storing it.

Improperly using or maintaining this machine 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 these instructions may result in personal injury or death.

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 missing.

decalbatterysymbols

Battery Symbols

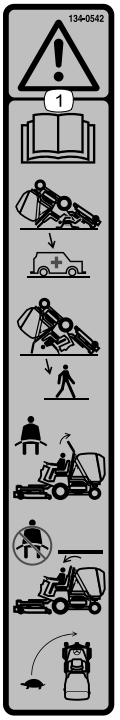
Some or all of these symbols are on your battery.

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 away 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

decal117-3276

117-3276

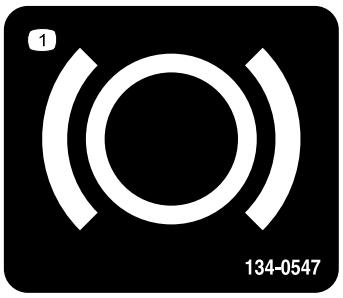
1. Engine coolant under pressure
2. Explosion hazard—read the *Operator's Manual*.
3. Warning—do not touch the hot surface.
4. Warning—read the *Operator's Manual*.



decal134-0542

134-0542

1. Warning—read the *Operator's Manual*; there is no rollover protection when the roll bar is down; keep the roll bar in the raised and locked position and wear the seat belt; only lower the roll bar when absolutely necessary, and do not wear the seat belt when the roll bar is down; slow the machine before turning.



decal134-0547

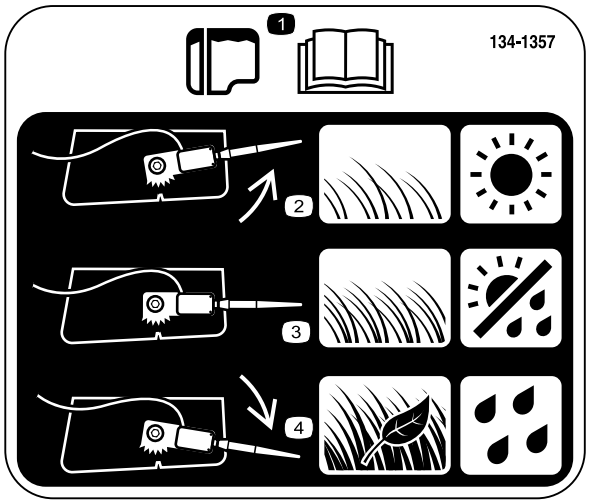
134-0547

1. Brake

decal134-0548

134-0548

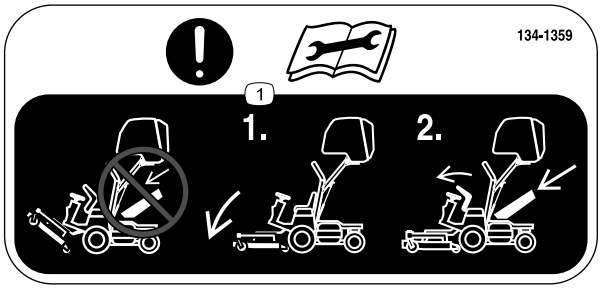
1. Parking brake



decal134-1357

134-1357

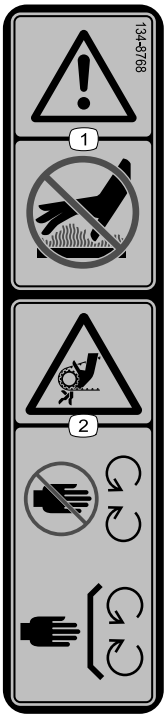
1. Read the *Operator's Manual* for hopper information.
2. Position the hopper sensor upward when grass is thin or conditions are dry.
3. Position the hopper sensor in the middle when grass and weather conditions are normal.
4. Position the hopper sensor downward when grass is thick, contains leaves, or conditions are wet.



decal134-1359

134-1359

1. Attention—read the *Operator's Manual* before performing maintenance; do not install the grass chute while the deck is raised or in the maintenance position.



decal134-8768

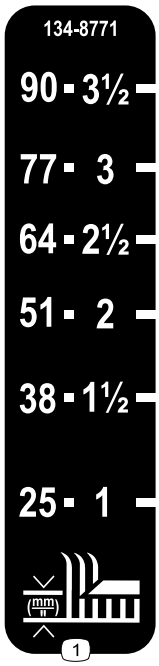
134-8768

1. Warning—do not touch hot surfaces.
2. Entanglement hazard, belt—stay away from moving parts; keep guards in place.

decal134-8770

134-8770

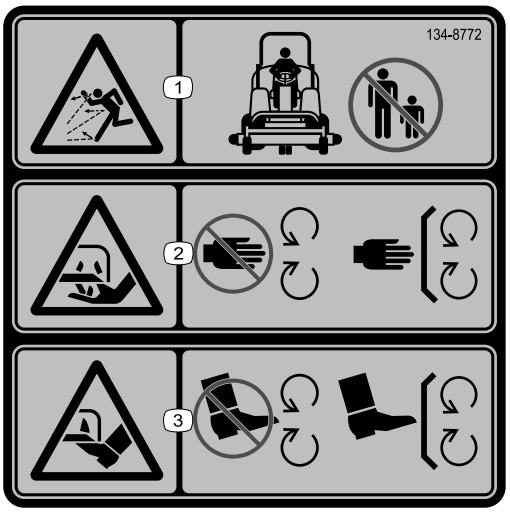
1. Arm entanglement hazard—keep away from moving parts; secure the lifting cylinders with a locking device before entering the hazardous area.



decal134-8771

134-8771

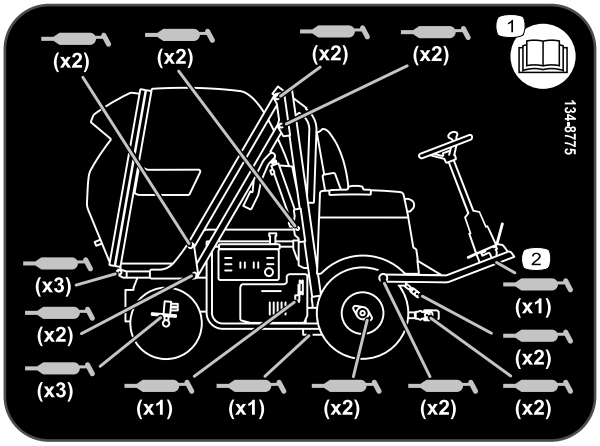
1. Height of cut



decal134-8772

134-8772

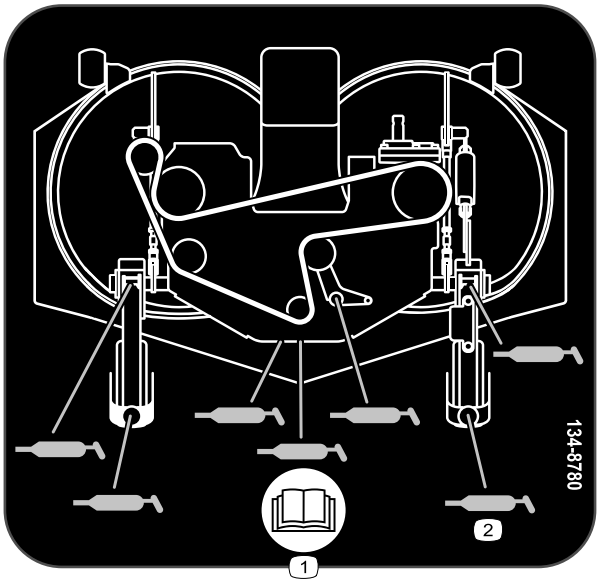
1. Thrown object hazard—keep bystanders away.
2. Cutting/dismemberment hazard of hands, mower blade—stay away from moving parts; keep all guards and shields in place.
3. Cutting/dismemberment hazard of feet, mower blade—stay away from moving parts; keep all guards and shields in place.



decal134-8775

134-8775

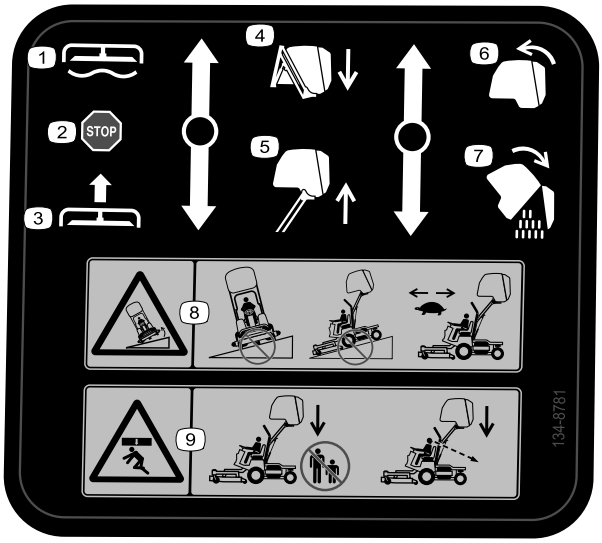
1. Read the *Operator's Manual*.
2. Grease points



decal134-8780

134-8780

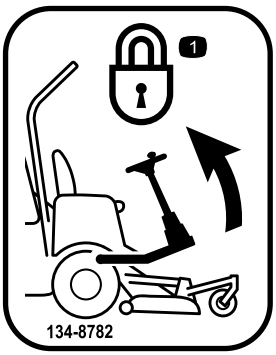
1. Read the *Operator's Manual*.
2. Grease point



decal134-8781

134-8781

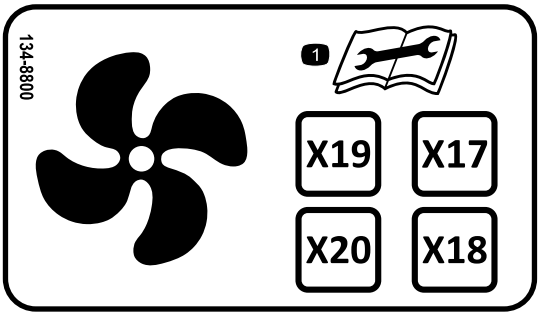
1. Lower/float the deck
2. Deck hold position
3. Raise the deck
4. Lower the hopper
5. Raise the hopper
6. Close the hopper
7. Dump the hopper
8. Tipping hazard—do not drive on slopes with the hopper raised; slow the machine when driving with the hopper raised.
9. Crushing hazard, from above—ensure that there are no bystanders nearby before lowering the hopper, look behind and down before lowering the hopper.



decal134-8782

134-8782

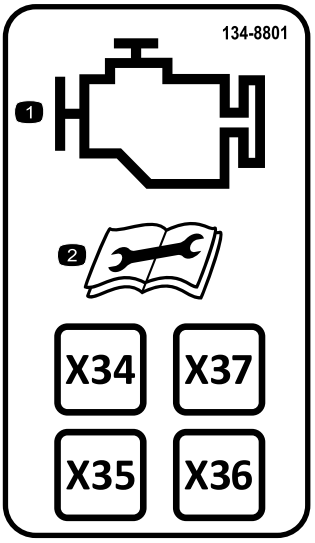
1. Lock the footplate column in the raised position.



decal134-8800

134-8800

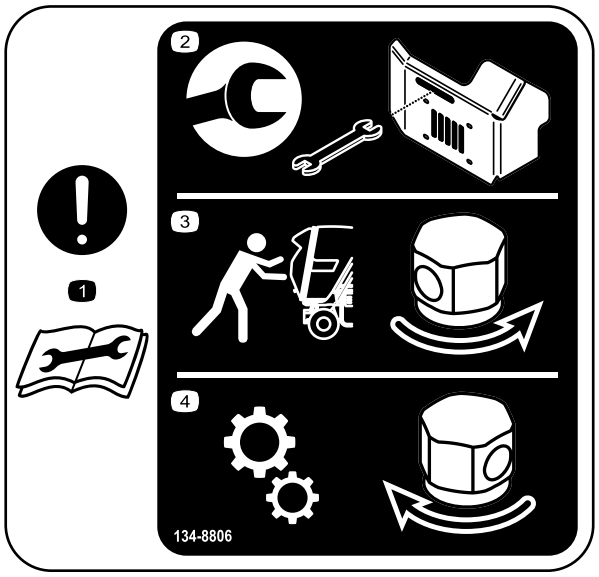
1. Read the *Operator's Manual* before performing maintenance.



decal134-8801

134-8801

1. Engine check
2. Read the *Operator's Manual* before performing maintenance.



decal134-8806

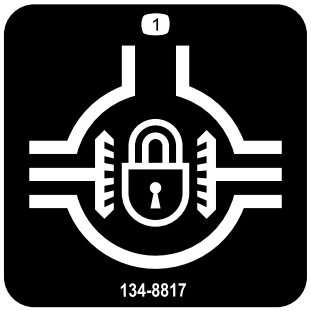
134-8806

1. Attention—read the *Operator's Manual* before performing maintenance.
2. Insert a wrench.
3. Open the bypass valve to push the machine.
4. Close the bypass valve to operate the machine.

decal134-8816

134-8816

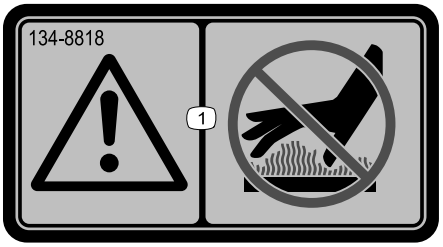
1. Warning—entanglement hazard; keep bystanders away.



decal134-8817

134-8817

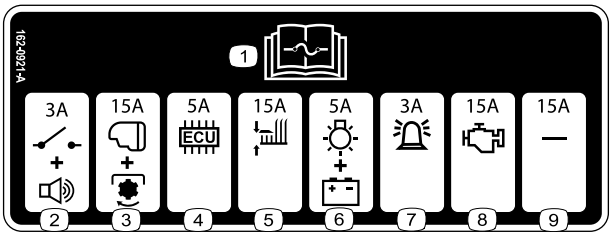
1. Differential lock



decal134-8818

134-8818

1. Warning—stay away from hot surfaces.



decal162-0921

162-0921

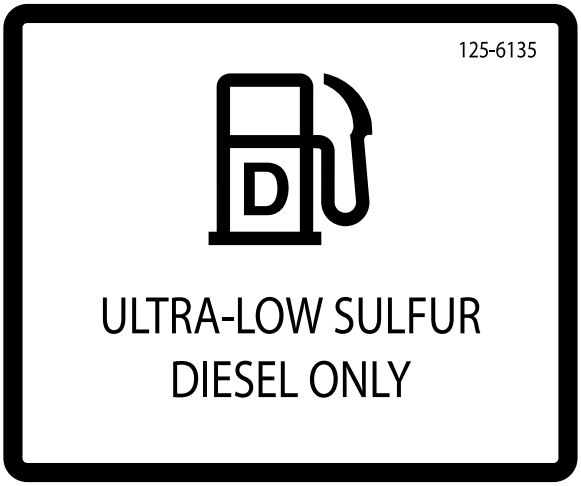
1. Read the *Operator's Manual* for information on fuses.
2. Switches and buzzer
3. Grass catcher and PTO
4. Electronic control unit
5. Cutting unit
6. Alternator and dashboard
7. Beacon
8. Engine
9. Spare fuse

Affix for non-CE machines

decal133-8062

133-8062

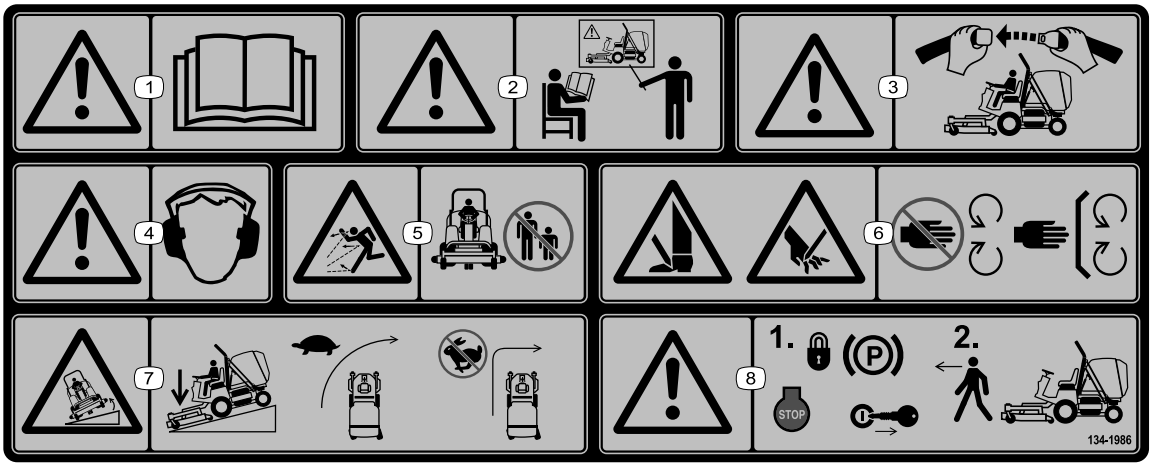
Affix for non-CE machines



decal125-6135

125–6135

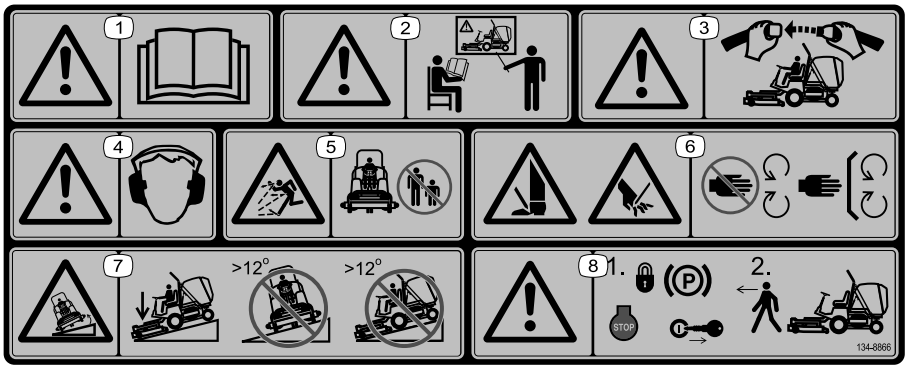
Affix over Part No. 134-0539 for non-CE machines



decal134-1986

134-1986

1. Warning—read the *Operator's Manual*.
2. Warning—all operators should be trained before operating the machine.
3. Warning—always wear a seatbelt when operating the machine.
4. Warning—wear hearing protection.
5. Thrown object hazard—keep bystanders away.
6. Cutting/dismemberment hazard of hand or foot—stay away from moving parts; keep all guards and shields in place.
7. Tipping hazard—lower the cutting units when moving downhill; drive slowly when turning; do not turn sharply while traveling fast.
8. Warning—engage the parking brake, shut off the engine, and remove the key before leaving the machine.

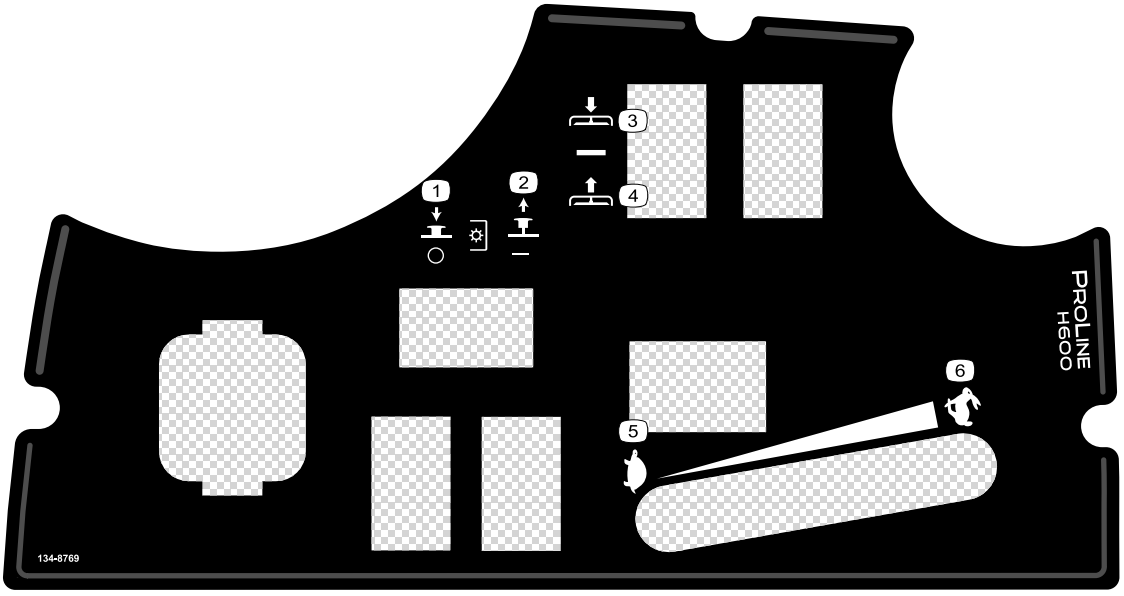


decal134-8866

134-8866

Note: This machine complies with the industry standard stability test in the static lateral and longitudinal tests with the maximum recommended slope indicated on the decal. Review the instructions for operating the machine on slopes in the *Operator's Manual* as well as the conditions in which you would operate the machine to determine whether you can operate the machine in the conditions on that day and at that site. Changes in the terrain can result in a change in slope operation for the machine.

1. Warning—read the *Operator's Manual*.
2. Warning—all operators should be trained before operating the machine.
3. Warning—always wear a seatbelt when operating the machine.
4. Warning—wear hearing protection.
5. Thrown object hazard—keep bystanders away.
6. Cutting/dismemberment hazard of hand or foot—stay away from moving parts; keep all guards and shields in place.
7. Tipping hazard—when driving down slopes, lower the mower deck; do not use on slopes greater than 12°.
8. Warning—engage the parking brake, shut off the engine, and remove the key before leaving the machine.



decal134-8769

134-8769

1. PTO—Off
2. PTO—On
3. Deck—lower
4. Deck—raise
5. Slow
6. Fast

Setup

Media and Additional Parts

Description	Qty.	Use
Operator's Manual	1	Review before operating the machine.
Engine owner's manual	1	Use to reference engine information.
Declaration of Conformity	1	

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

1

Charging the Battery

No Parts Required

Procedure

1. Connect a 3 to 4 A battery charger to the battery posts. Charge the battery at a rate of 3 to 4 A until the specific gravity of the electrolyte is 1.250 or higher and the temperature of the battery is at least 16°C (60°F), with all cells freely discharging gas.
2. When the battery is charged, disconnect the charger from the electrical outlet and then disconnect the charger from the battery posts.

   Note: Incomplete charging may result in gassing of the battery and the overflow of battery acid, causing corrosive damage to the machine.

2

Checking the Fluid Levels

No Parts Required

Procedure

- Check the engine-oil level before you start the engine; refer to Checking the Engine-Oil Level (page 50).
- Check the coolant level before you start the engine; refer to Checking the Cooling System and Coolant Level (page 60).
- Check the level of the hydraulic-fluid level before you start the engine; refer to Checking the Hydraulic-Fluid Level (page 67).

3

Checking the Air Pressure in the Tires

No Parts Required

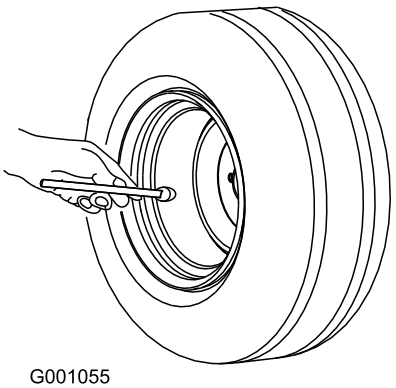
Procedure

Front and rear tires air pressure specification: 140 kPa (20 psi).

Caster tires air pressure specification: 150 kPa (21 psi).

Check the air pressure in the front and rear tires before the engine is first started.

Note: The tires may be over-inflated or under-inflated for shipping; therefore, you may have to adjust the air pressure in the tires.



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g001055

Figure 4

4

Mounting the Cutting Unit

No Parts Required

Procedure

Install the cutting unit to the traction unit; refer to Installing the Cutting Unit (page 72).

5

Removing the Machine from the Pallet

No Parts Required

Procedure

1. Remove the plastic packaging.
2. Remove the rear steel-hook.

   Note: Ensure the steel-hook is removed.
3. Remove the chocks on the wooden pallet for the wheels and the cutting unit.
4. Connect the battery cables.
5. Add fuel to the machine.
6. Turn on the ignition switch to the pre-heat position, and after the pre-heat is completed start the engine.
7. Lift the cutting unit to build pressure inside the lift cylinders.

   Note: The cutting unit maybe raised, but ensure there is pressure in the lift cylinders.
8. Raise the hopper and remove the chute; refer to Clearing the Grass Chute (page 34).
9. Lower the hopper.
10. Place the cutting unit into the working position and engage the rear-arm hooks.
11. Disengage the parking brake and drive the machine forward off the pallet.

    Note: If needed, use ramps the height of the pallet.
12. Raise the hopper, install the chute, and lower the hopper.
13. Raise the rollbar; refer to Raising the Roll Bar (page 28).
14. Check the torque on the lug nuts after the first test drive; refer to Torquing the Wheel Lug Nuts (page 58).

Product Overview

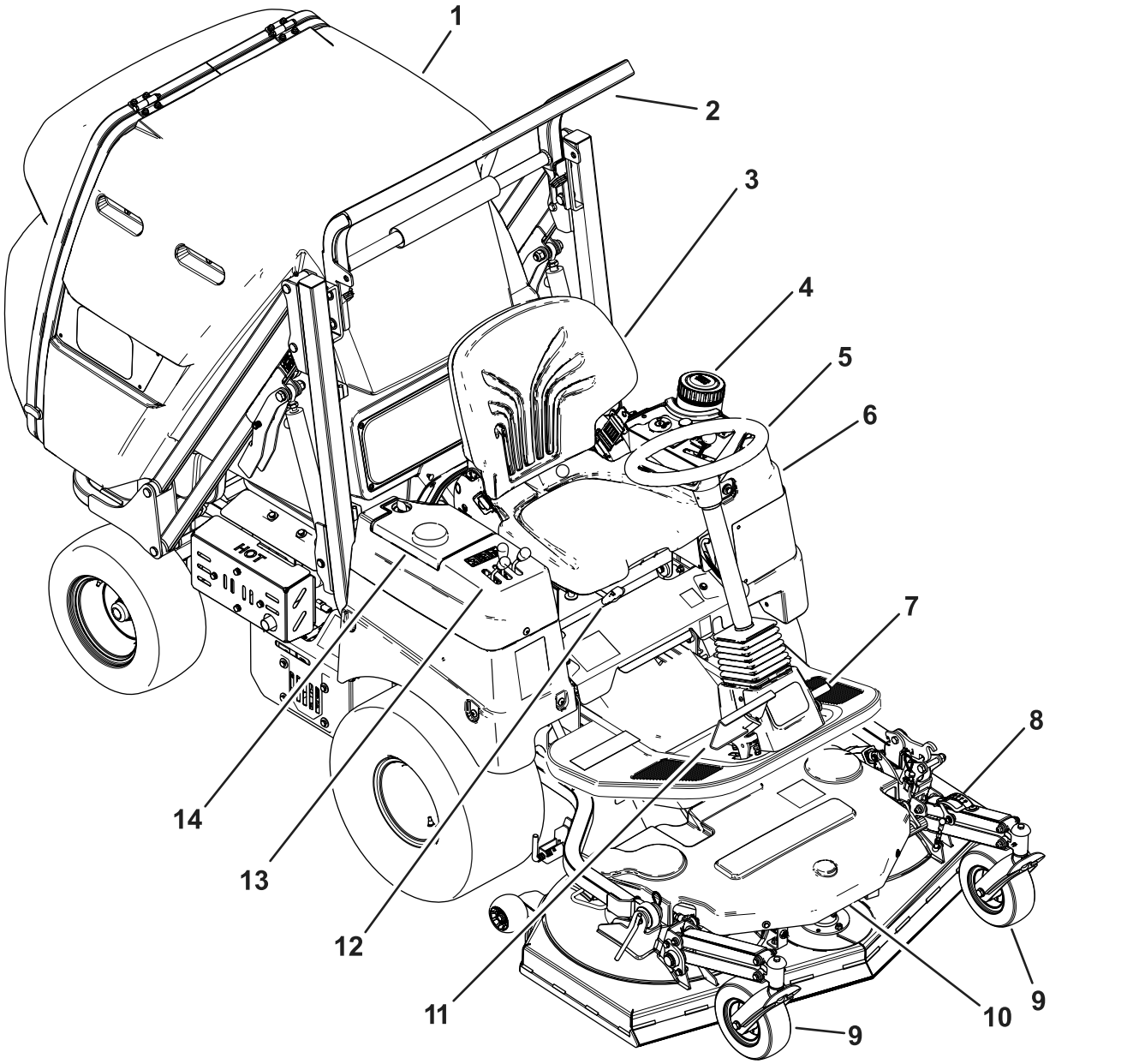

Figure 5

1. Hopper
2. Roll bar
3. Seat
4. Fuel tank
5. Steering wheel
6. Left console
7. Differential-lock pedal
8. Cutting unit
9. Caster wheel
10. Belt cover
11. Traction pedal
12. Seat adjustment lever
13. Right console
14. Cover for coolant and hydraulic reservoir

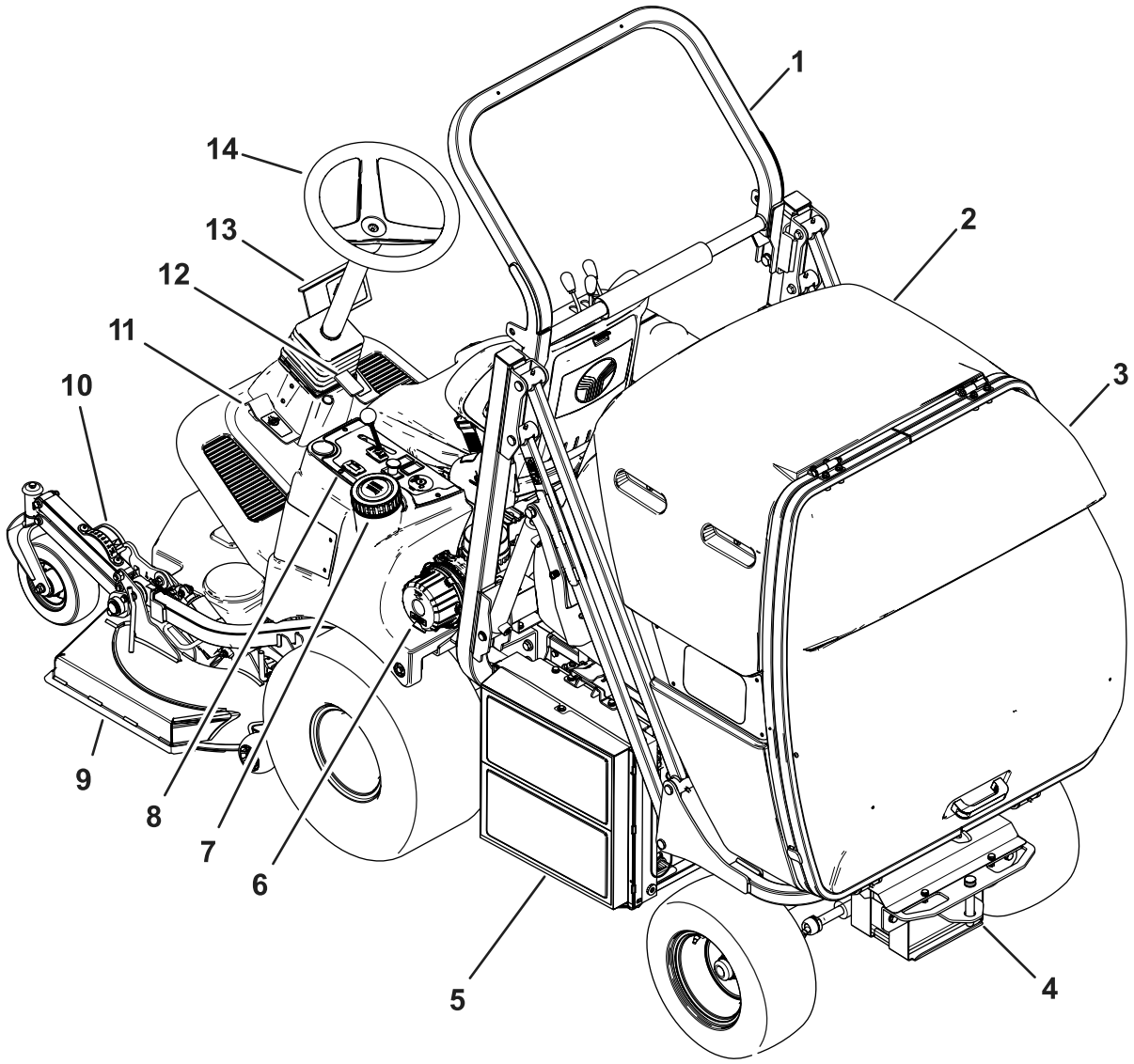

Figure 6

1. Roll bar
2. Hopper
3. Hopper door
4. HItch and battery location
5. Radiator
6. Air cleaner
7. Fuel tank
8. Left console
9. Cutting unit
10. Height-of-cut (HOC) gauge
11. Differential-lock pedal
12. Steering-column tilt lever
13. Traction pedal
14. Steering wheel

Controls

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

Right and Left Console

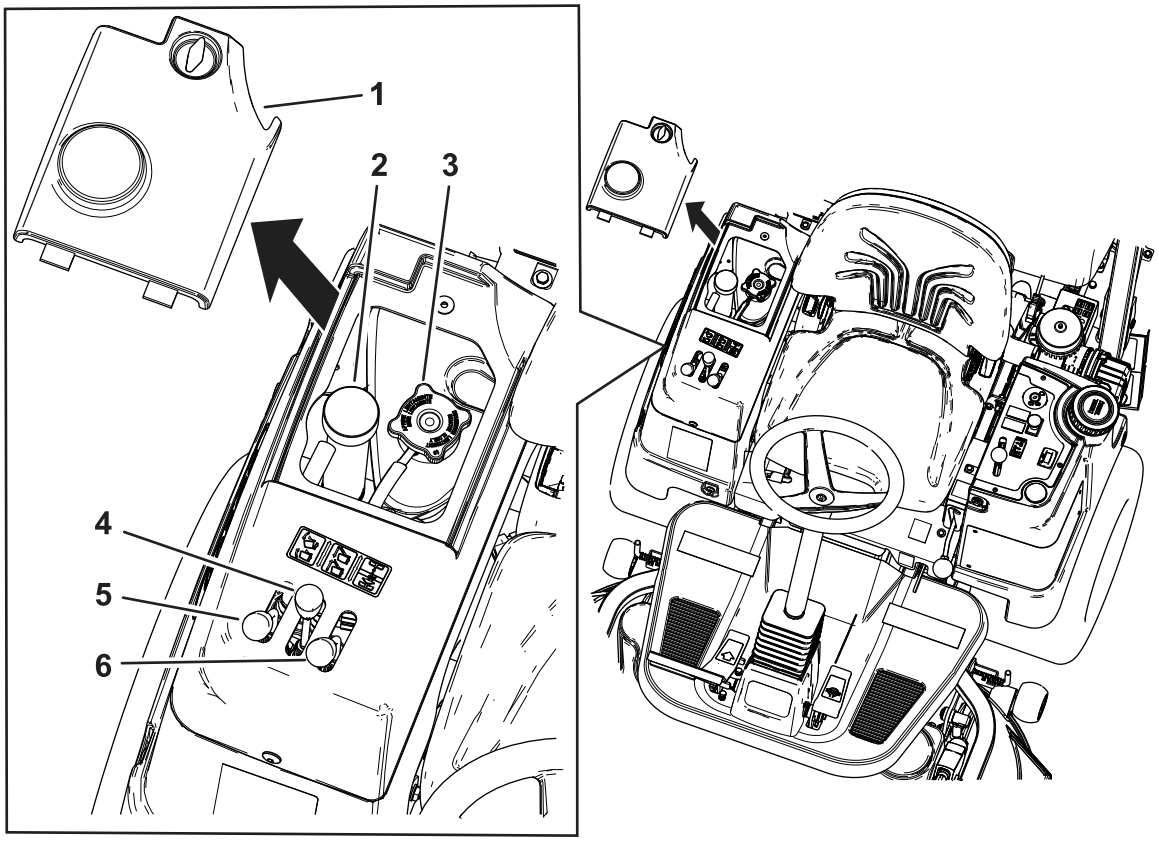

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Figure 7

1. Cover
2. Hydraulic-fluid cap
3. Coolant cap
4. Hopper-lift lever
5. Hopper-door release lever
6. Cutting-unit lift lever

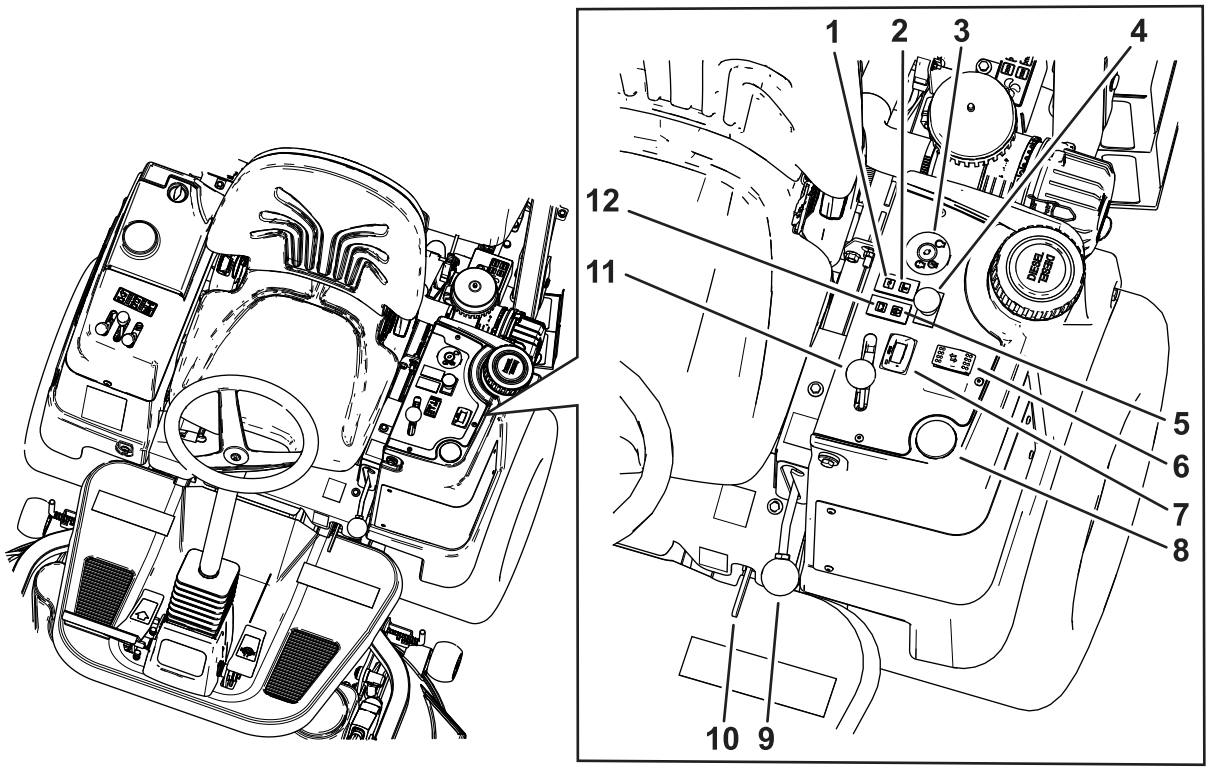

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Figure 8

1. Oil-pressure warning indicator
2. Engine-temperature warning indicator
3. Key switch
4. PTO switch
5. Glow-plug indicator
6. Height-of-cut (HOC) switch
7. Hour meter
8. Fuel guage
9. Parking-brake lever
10. Platform latch
11. Throttle lever
12. Battery-charge indicator

Battery-Charge Indicator

The charge indicator (Figure 8) illuminates if electrical charging system is operating below the normal operating range. Check and/or repair the electrical charging system.

Glow-Plug Indicator

The glow-plug indicator (Figure 8) glows red when the glow plugs are activated.

Oil-Pressure Warning Indicator

The oil-pressure warning indicator (Figure 8) illuminates if the engine-oil pressure drops below a safe level while the engine is running. If the light flickers or remains on, stop the machine, shut off the engine, and check the oil level. If the oil level is within the acceptable range, but the light does not go out as the engine runs, shut off the engine immediately and contact your authorized Toro distributor for assistance.

Check the operation of warning light as follows:

1. Engage the parking brake.
2. Turn the key switch to the ON/PREHEAT position, but do not start the engine.

   Note: The oil-pressure light should glow red. If the light does not function, either a bulb is burned out or there is a malfunction in the system which must be repaired.

Engine-Temperature Indicator

The engine-temperature indicator (Figure 8) illuminates if cooling system is operating above the normal operating range. Check and/or repair the cooling system.

PTO Switch

The PTO switch (Figure 8) has 2 positions: OUT (engaged) and IN (disengaged). Pull out the PTO switch to engage the implement or cutting-unit blades. Push in the button to disengage the implement operation.

Note: If you leave the operator's seat while the PTO switch is in the ON position, the machine automatically shuts off the engine after a 1-second delay; refer to Checking the Safety-Interlock System (page 25).

Differential-Lock Pedal

Press down and hold the differential-lock pedal (Figure 9) to engage the differential lock.

To disengage the differential lock, release the pedal.

Engage the pedal when there is wheel slip or when loading the machine using ramps.

Traction Pedal

Use the traction pedal (Figure 9) to move the machine forward or rearward. Press the top of the pedal to move the machine forward and the bottom to move it rearward. Ground speed depends on how far you press the pedal. For maximum ground speed, move the throttle lever to the FAST position, and fully press traction pedal. The maximum forward speed is approximately 13 km/h (8 mph). To get maximum power under a heavy load or when ascending a hill, move the throttle lever to the FAST position and keep the engine speed (rpm) high, while pressing traction pedal gradually. When the engine speed begins to decrease, release the traction pedal slightly to allow the engine speed to increase.

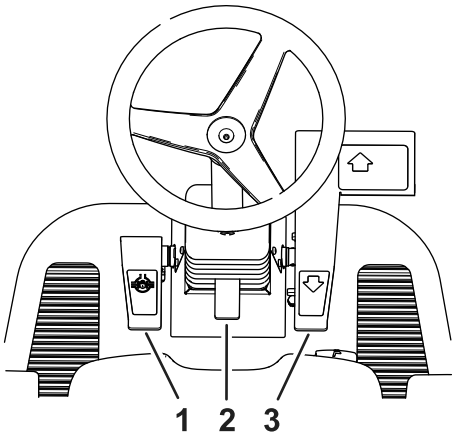

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Figure 9

1. Differential-lock pedal
2. Tilt-steering lever
3. Traction pedal

Tilt-Steering Lever

To tilt the steering wheel toward you, press the tilt-steering lever (Figure 10) down and pull the steering tower toward you. Release the lever when the steering tower is at a position that allows you to comfortably handle the steering wheel.

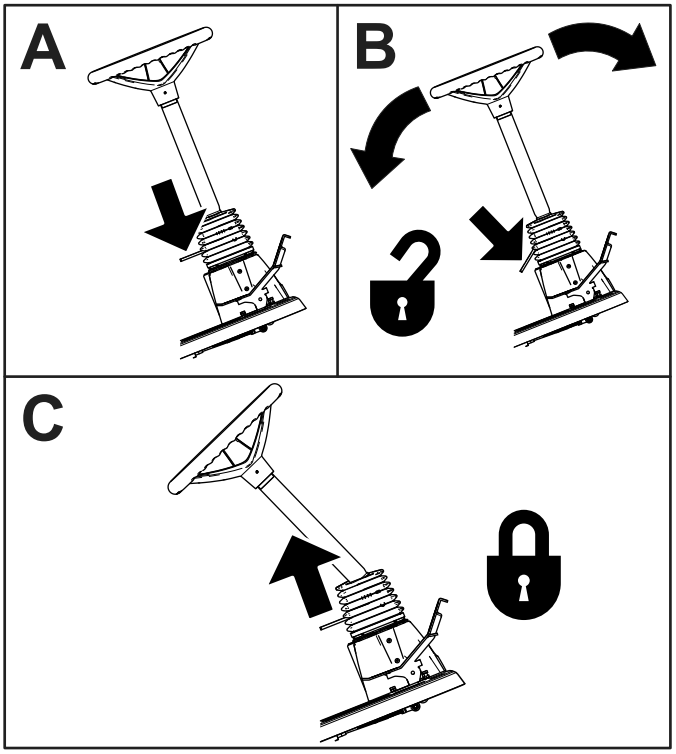

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Figure 10

Parking-Brake Lever

Whenever you shut off the engine, engage the parking brake (Figure 11) to prevent the machine from accidentally moving.

- **Engage the parking brake:** Pull the handle up to the ENGAGED position.

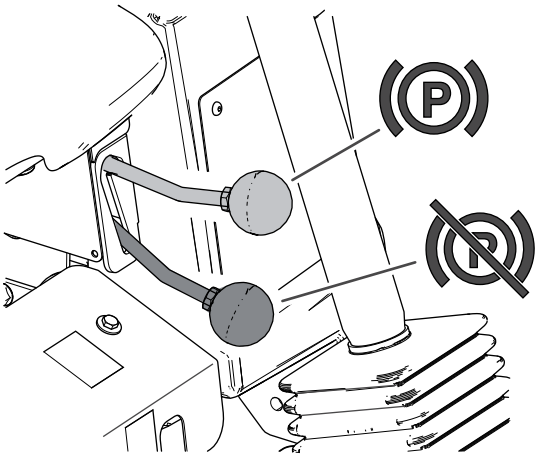

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Figure 11

- **Disengage the parking brake:** Lower the handle down to the DISENGAGED position.

  Note: If the handle is not completely lowered, the machine shuts off when you engage the traction pedal.

Fuel Gauge

The fuel gauge (Figure 8) indicates the level of fuel remaining in the fuel tank.

Height-of-Cut Switch

Use the height-of-cut switch (Figure 8) to raise or lower the cutting unit to your desired height of cut.

Height-of-Cut Gauge

The height-of-cut gauge (Figure 12) indicates the nominal cutting unit cutting height.

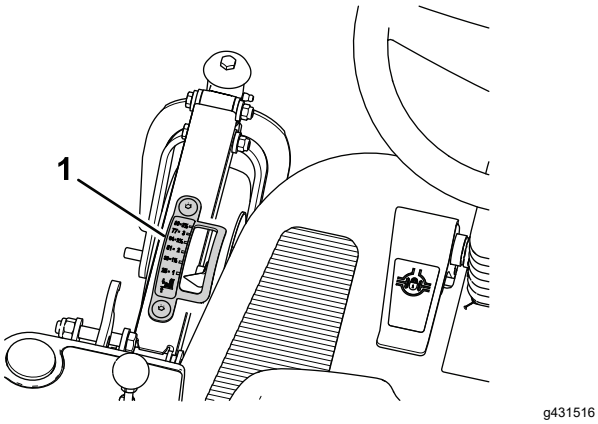

Figure 12

1. Height-of-cut gauge

Throttle Lever

Use the throttle lever (Figure 8) to control the engine speed. Moving the throttle lever forward toward the FAST position increases the engine speed. Moving the throttle lever rearward toward the SLOW position decreases the engine speed. The throttle lever controls the speed of the blades and, with the traction pedal, controls the ground speed of the machine.

Hour Meter/Service Due Indicator

The hour meter (Figure 8) records and displays accumulated hours of engine operation.

Pressing the button below the display once displays the number of hours until the next engine oil and filter change.

Pressing the button below the display again displays the number of hours until the next lubrication at the grease fittings.

Pressing the button below the display a third time returns to the working-hours screen.

Note: When there 10 hours left for an oil change, the indicator flashes automatically with “OIL CHANGE” when you need to change the engine oil and filter.

Note: When there 5 hours left before greasing needed, the indicator flashes automatically with “LUBE” when you need to lubricate the machine.

Important: **During the first 50 hours while in the oil change mode, take care to not inadvertently hold the button of the hour meter longer than 6-seconds. Holding the button longer than 6-seconds will set the oil service interval from 50 hours to 250 hours.**

After changing the engine oil and filter or lubricating the machine and cutting unit, perform the following:

1. Push the button until you reach the desired screen.
2. Push and hold the button until a series of zeros (000000) appear.

Note: You cannot reset the total working hours of the machine.

Cutting-Unit Lift Lever

Move the lever rearward to raise the cutting unit (Figure 13).

Move the lever forward to lower the cutting unit and fully forward to allow it to float (Figure 13).

Important: **To avoid damaging the cutting-unit lift system, set the cutting-unit lift lever to the forward (FLOAT) position whenever you drive the machine with the cutting unit on the ground.**

Note: Lower the cutting unit and hopper whenever you are not using the machine.

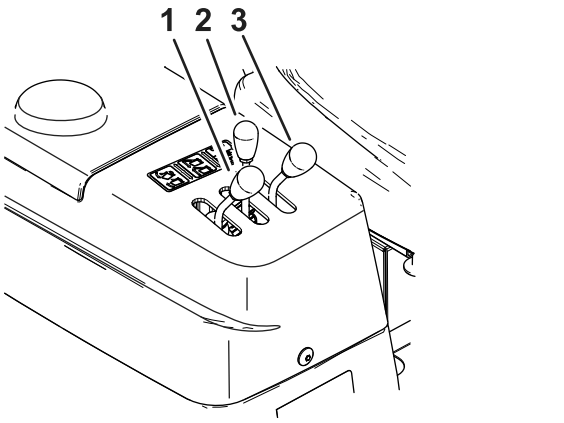

Figure 13

1. Hopper dump lever
2. Hopper lift lever
3. Cutting-unit lift lever

Hopper Lift Lever

Move the lever rearward to raise the hopper (Figure 13).

Move the lever forward to lower the hopper.

Hopper Dump Lever

Move the lever rearward to dump the clippings from the hopper (Figure 13).

Move the lever forward to close the hopper after dumping.

Key Switch

The key switch has 3 positions: OFF, ON/PREHEAT, and START.

Note: If the engine stops running and the key switch is in the ON/PREHEAT position, and you leave the operator's seat, after a short delay a buzzer will sound to alert you to turn the key to the OFF position.

Trimming Edge Indicator

The cutting unit has 2 slots that indicate the actual cutting width of the blades; refer to Figure 14.

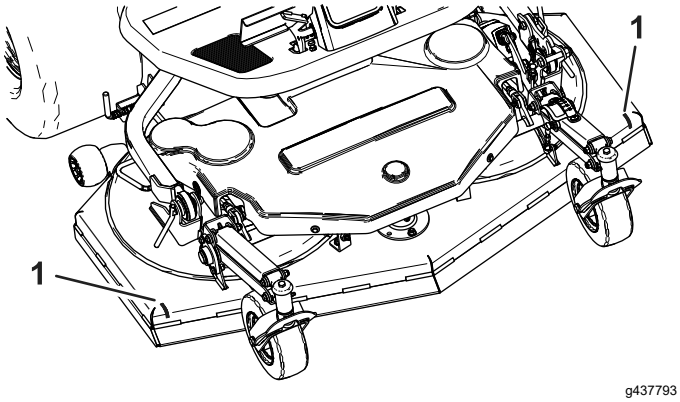

Figure 14

1. Slot

Specifications

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

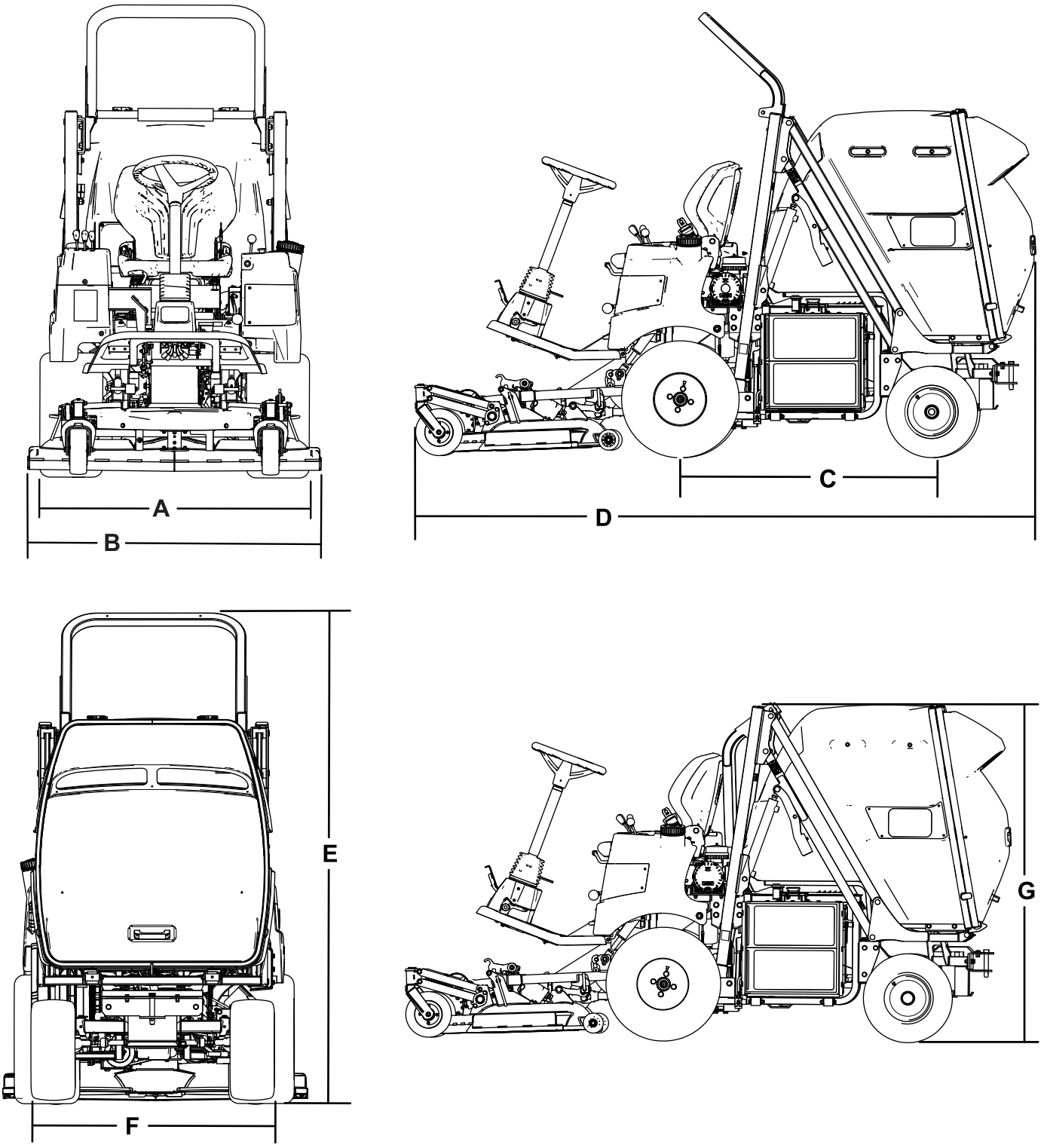

Figure 15

Description	Figure 15 Reference	Dimension or Weight
Height with roll bar raised	E	193 cm (76 inches)
Height with roll bar lowered	G	151 cm (59-1/2 inches)
Overall length	D	271 cm (106-3/4 inches)
Overall width	B	121 cm (47-1/2 inches)
Wheel-base length	C	110 cm (43-1/2 inches)
Front-wheel tread width	A	114 cm (44-7/8 inches)
Rear-wheel tread width	F	97 cm (38-1/4 inches)
Ground clearance		12 cm (4-3/4 inches)
Net weight (with cutting unit)		630 kg (1389 lb)
Net weight (without cutting unit)		530 kg (1169 lb)
Speed		0 to 13 km/h (0 to 8 mph)
Cutting width		113 cm (44-1/2 inches)

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 authorized Toro distributor or go to www.Toro.com for a list of all approved attachments and accessories.

Use only genuine Toro replacement parts and accessories. Replacement parts and accessories made by other manufacturers could be dangerous, and such use could void the product warranty.

Operation

Before Operation

Before Operation Safety

General Safety

- Never allow children or untrained people to operate or service the machine. Local regulations may restrict the age of the operator. The owner is responsible for training all operators and mechanics.
- Become familiar with the safe operation of the equipment, operator controls, and safety signs.
- Shut off the engine, remove the key, and wait for all movement to stop before you leave the operator's position. Allow the machine to cool before adjusting, servicing, cleaning, or storing it.
- Know how to stop the machine and shut off the engine quickly.
- Check that operator-presence controls, safety switches, and guards are attached and functioning properly. Do not operate the machine unless they are functioning properly.
- Before mowing, always inspect the machine to ensure that the blades, blade bolts, and cutting assemblies are in good working condition. Replace worn or damaged blades and bolts in sets to preserve balance.
- Inspect the area where you will use the machine and remove all objects that the machine could throw.
- This product generates an electromagnetic field. If you wear an implantable electronic medical device, consult your health care professional before using this product.

Fuel Safety

- Use extreme care in handling fuel. It is flammable and its vapors are explosive.
- Extinguish all cigarettes, cigars, pipes, and other sources of ignition.
- Use only an approved fuel container.
- Do not remove the fuel cap or fill the fuel tank while the engine is running or hot.
- Do not add or drain fuel in an enclosed space.
- Do not store the machine or fuel container where there is an open flame, spark, or pilot light, such as on a water heater or other appliance.
- If you spill fuel, do not attempt to start the engine; avoid creating any source of ignition until the fuel vapors have dissipated.

Performing Daily Maintenance

Before starting the machine each day, perform the Each Use/Daily procedures listed in Daily Maintenance Checklist (page 41).

Checking the Air Pressure in the Tires

Service Interval: Before each use or daily

Front and rear tires air pressure specification: 150 kPa (21 psi).

⚠ DANGER

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

Do not under-inflate the tires.

Check the air pressure in the front and rear tires. Add or remove air as needed to set the air pressure in the tires to the tire air pressure specification.

Important: **Maintain pressure in all tires to ensure a good quality of cut and proper machine performance.**

Check the air pressure in all the tires before operating the machine.

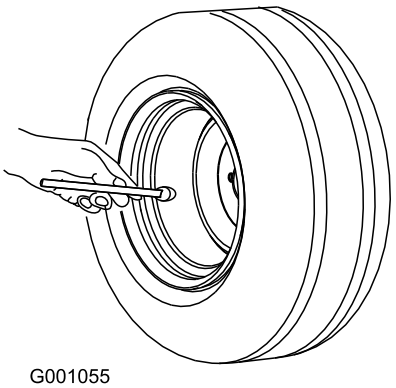

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Figure 16

Checking the Safety-Interlock System

The purpose of the safety-interlock system is to prevent the engine from cranking or starting unless the traction pedal is in neutral, the PTO switch is in the OFF position, the parking brake is engaged, or the operator is in the seat.

In addition, the engine should shut off when:

- The operator leaves the seat with the PTO switch in the ON position;
- The operator leaves the seat with the traction pedal out of neutral;
- The traction pedal is pressed with the parking brake engaged.

⚠ CAUTION

If the 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.**

Checking the Engine Cranking Safety-Interlock System

Service Interval: Before each use or daily

Check the operation of the safety-interlock switches by ensuring the following:

Engine Cranking Interlock Table

Conditions	Result
Parking brake disengaged Traction pedal in neutral PTO switch in the OFF position No operator in the seat	The engine should not crank.
Parking brake disengaged Traction pedal in neutral PTO switch in the OFF position Operator in the seat	The engine should not crank.
Parking brake disengaged Traction pedal pushed down PTO switch in the OFF position Operator in the seat	The engine should not crank.

Engine Cranking Interlock Table (cont'd.)

Conditions	Result
Parking brake engaged Traction pedal pushed down PTO switch in the OFF position Operator in the seat	The engine should not crank.
Parking brake engaged Traction pedal in neutral PTO switch in the OFF position No operator in the seat	The engine should crank.

Checking the Engine Shut-Off Safety-Interlock System

Service Interval: Before each use or daily

Before doing the following checks, perform the following:

1. Sit in the operator's seat.
2. Engage the parking brake.
3. Move the traction pedal to neutral.
4. Disengage the PTO.
5. Start the engine.
6. Disengage the parking brake.

Check the operation of the safety-interlock switches by ensuring the following:

Engine Shut-Off Interlock Table

Conditions	Result
Parking brake disengaged Operator rises slightly from the seat	The engine should shut off.
Parking brake engaged Operator rises slightly from the seat	The engine should continue to run.
Parking brake engaged Operator in the seat Traction pedal pushed down	The engine should shut off.
Parking brake disengaged Operator in the seat Traction pedal pushed down	The engine should continue to run.

Checking the PTO Safety-Interlock System

Service Interval: Before each use or daily

Before doing the following checks, perform the following:

1. Sit in the operator's seat.
2. Engage the parking brake.
3. Move the traction pedal to neutral.
4. Disengage the PTO.
5. Start the engine.
6. Disengage the parking brake.

Check the operation of the safety-interlock switches by ensuring the following:

PTO Interlock Table

Conditions	Result
PTO switch in the ON position and the cutting unit running Operator rises slightly from the seat	The engine and the cutting unit should shut off.
PTO switch in the ON position and the cutting unit running Raise the hopper	The cutting unit should shut off.

Checking the Back-Up Alarm Safety-Interlock System

Service Interval: Before each use or daily

Check the operation of the safety-interlock switches by ensuring the following:

Back-Up Alarm Table

Conditions	Result
Key in the RUN position Traction pedal in reverse	The back-up alarm should sound.

Adding Fuel

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:22 L (5.8 US gallons)

Use summer-grade diesel fuel (No. 2-D) at temperatures above -7°C (20°F) and winter-grade (No. 1-D or No. 1-D/2-D blend) below that temperature. Using winter-grade fuel at lower temperatures provides lower flash point and cold flow characteristics which will ease starting and reduce fuel filter plugging.

Using 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.**

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.
- If you spill biodiesel fuel blends, the fuel may damage painted surfaces.
- Use B5 (biodiesel content of 5%) or lesser blends in cold weather.
- Monitor the seals, hoses, and gaskets in contact with fuel as they may degrade over time.
- Expect fuel filter plugging for a time after converting to biodiesel blends.
- Contact your authorized Toro distributor if you want more information on biodiesel.

Filling the Fuel Tank

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

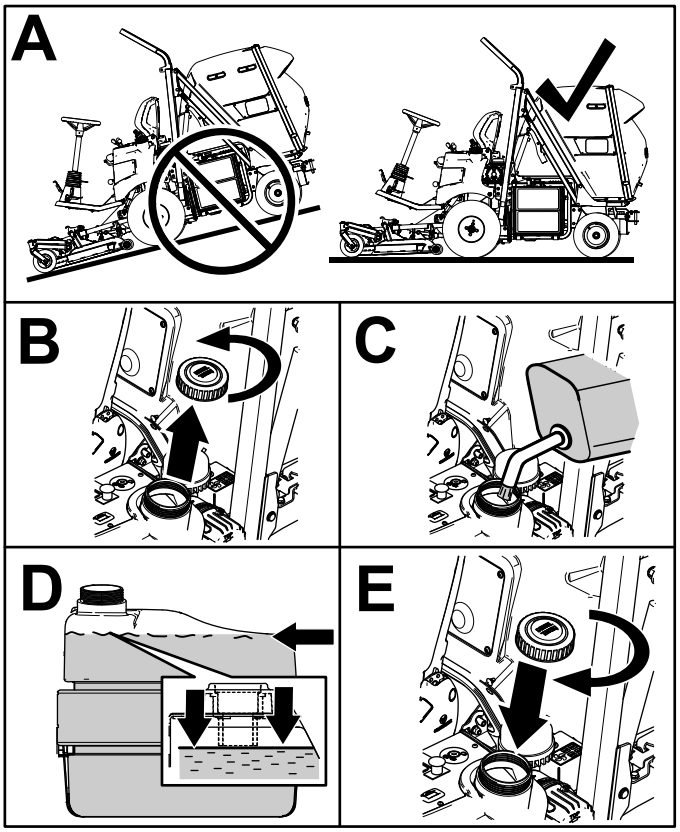

Figure 17

Adjusting the Rollover Protection System (ROPS)

⚠ WARNING

To avoid injury or death from rollover, keep the roll bar in the raised locked position and use the seat belt.

Ensure that the seat is secured with the seat latch.

⚠ WARNING

There is no rollover protection when the roll bar is in the down position.

- **Do not operate the machine on uneven ground or on a hill side with the roll bar in the down position.**
- **Lower the roll bar only when absolutely necessary.**
- **Do not wear the seat belt when the roll bar is in the down position.**
- **Drive slowly and carefully.**
- **Raise the roll bar as soon as clearance permits.**
- **Check carefully for overhead clearances (i.e., branches, doorways, electrical wires) before driving under any objects and do not contact them.**

Lowering the Roll Bar

Important: **Lower the roll bar only when absolutely necessary.**

1. Park the machine on a level surface.
2. Disengage the PTO, lower the cutting unit, and engage the parking brake.
3. Shut off the engine and remove the key.
4. Remove the nuts, bolts, and washers (Figure 18).
5. Tilt the seat forward (Figure 18).
6. Lower the roll bar and secure it in place with the nuts, bolts, and washers (Figure 18).

7. Tilt the seat rearward to the locked position.

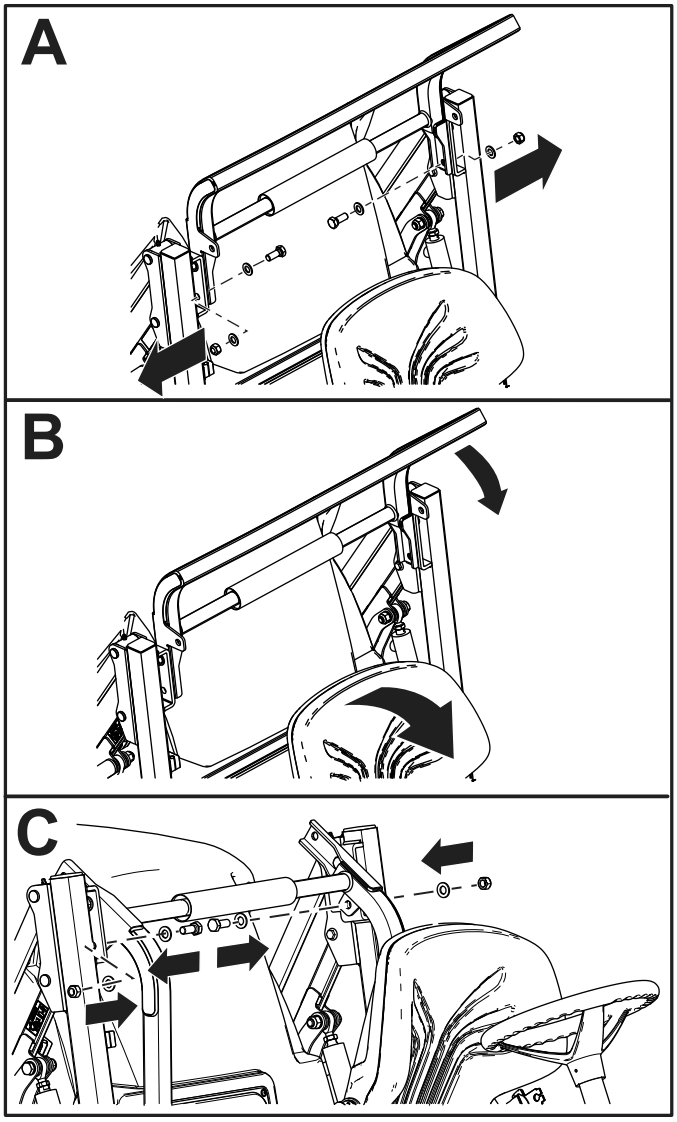

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Figure 18

Raising the Roll Bar

Note: Use Figure 18 in reverse order to raise the roll bar.

1. Park the machine on a level surface.
2. Disengage the PTO, lower the cutting unit, and engage the parking brake.
3. Shut off the engine and remove the key.
4. Tilt the seat forward (Figure 18).
5. Remove the nuts, bolts, and washers from the roll bar (Figure 18).
6. Raise the roll bar and secure it in place with the nuts, bolts, and washers (Figure 18).
7. Tilt the seat rearward to the locked position.

Adjusting the Steering Column

Adjust the steering column to your desired position as shown in Figure 10.

Positioning the Seat

⚠ WARNING

If you hang your belongings, such as items of clothing or a bag, over the back of the operator's seat, they could fall off and contact hot or moving parts of the machine. This could cause a fire or objects to be thrown toward you and/or bystanders, possibly resulting in serious injury.

Do not hang your belongings over the back of the operator's seat.

The seat moves forward and backward. Position the seat where you have the best control of the machine and are most comfortable.

To adjust, pull the lever upward and move the seat forward or rearward (Figure 19).

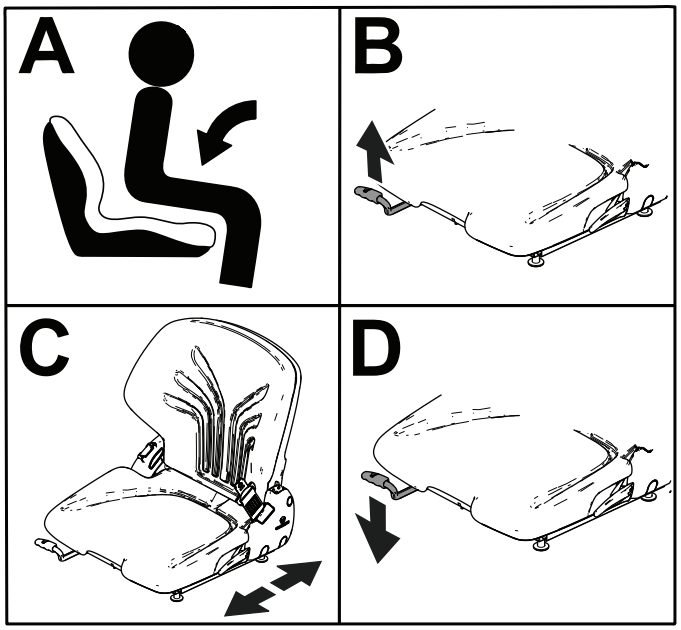

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Figure 19

Tilting the Back of the Seat

Pull the lever (Figure 20) upward to tilt the back of the seat.

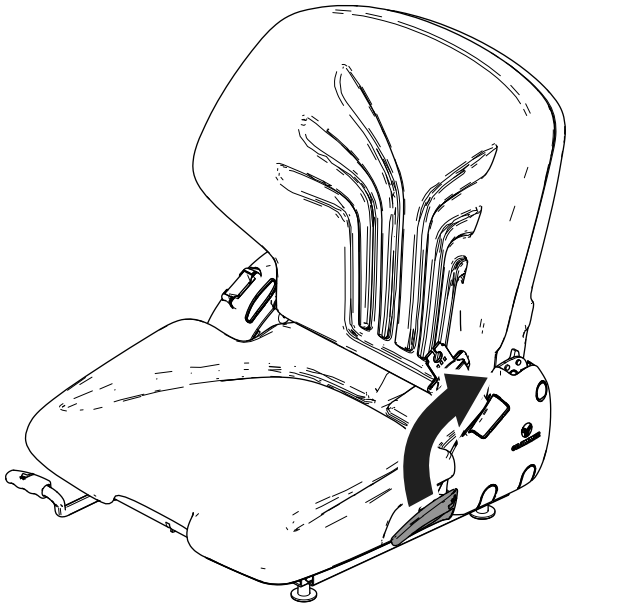

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Figure 20

Tilting the Seat Forward

Lift the seat-tilt lever (Figure 21) upward and tilt the seat forward.

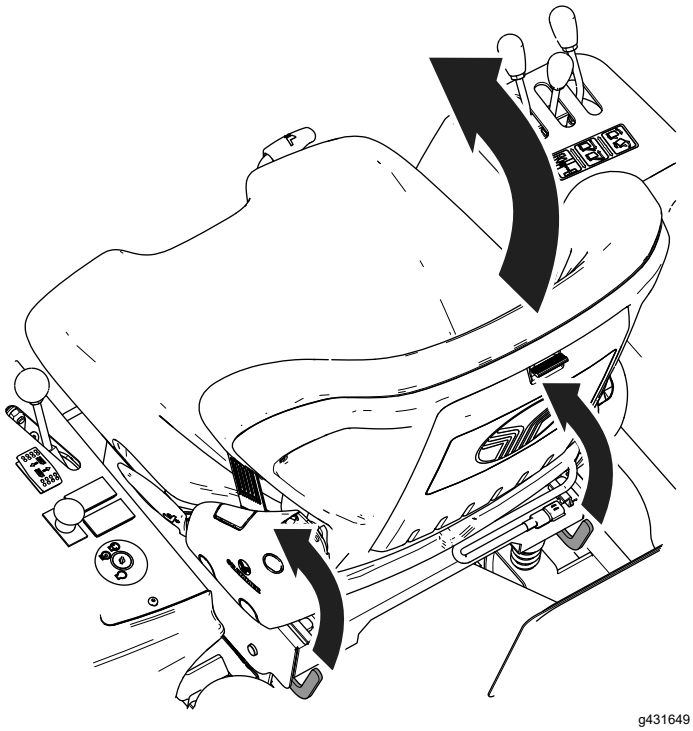

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Figure 21

During Operation

During Operation Safety

General Safety

- The owner/operator can prevent and is responsible for accidents that may cause personal injury or property damage.
- Wear appropriate clothing, including eye protection; long pants; substantial, slip-resistant footwear; and hearing protection. Tie back long hair and do not wear loose clothing or loose jewelry.
- Do not operate the machine while ill, tired, or under the influence of alcohol or drugs.
- Use your full attention while operating the machine. Do not engage in any activity that causes distractions; otherwise, injury or property damage may occur.
- Before you start the engine, ensure that all drives are in neutral, the parking brake is engaged, and you are in the operating position.
- Do not carry passengers on the machine and keep bystanders and children out of the operating area.
- Operate the machine only in good visibility to avoid holes or hidden hazards.
- Avoid mowing on wet grass. Reduced traction could cause the machine to slide.
- Keep your hands and feet away from rotating parts. Keep clear of the discharge opening.
- Look behind and down before backing up to be sure of a clear path.
- Use care when approaching blind corners, shrubs, trees, or other objects that may obscure your vision.
- Stop the blades whenever you are not mowing.
- Stop the machine, remove the key, and wait for all moving parts to stop before inspecting the attachment after striking an object or if there is an abnormal vibration in the machine. Make all necessary repairs before resuming operation.
- Slow down and use caution when making turns and crossing roads and sidewalks with the machine. Always yield the right-of-way.
- Disengage the drive to the cutting unit, shut off the engine, remove the key, and wait for all movement to stop before adjusting the height of cut (unless you can adjust it from the operating position).
- Operate the engine only in well-ventilated areas. Exhaust gases contain carbon monoxide, which is lethal if inhaled.
- Never leave a running machine unattended.

- Before you leave the operator's position, do the following:
  - Park the machine on a level surface.
  - Disengage the power takeoff and lower the attachments.
  - Engage the parking brake.
  - Shut off the engine and remove the key.
  - Wait for all movement to stop.
- Operate the machine only in good visibility. Do not operate the machine when there is the risk of lightning.
- Do not use the machine as a towing vehicle.
- Use accessories, attachments, and replacement parts approved by Toro only.
- Use the cruise control (if equipped) only when you can operate the machine in an open, flat area that is free from obstacles and where the machine can move at a constant speed without interruption.

Rollover Protection System (ROPS) Safety

- The ROPS is an integral and effective safety device.
- Do not remove any of the ROPS components from the machine.
- Ensure that the seat belt is attached to the machine.
- Pull the belt strap over your lap and connect the belt to the buckle on the other side of the seat.
- To disconnect the seat belt, hold the belt, press the buckle button to release the belt, and guide the belt into the auto-retract opening. Ensure that you can release the belt quickly in an emergency.
- Check carefully for overhead obstructions and do not contact them.
- Keep the ROPS in safe operating condition by thoroughly inspecting it periodically for damage and keeping all the mounting fasteners tight.
- Replace damaged ROPS components. Do not repair or alter them.

Additional ROPS Safety for Machines with a Foldable Roll Bar

- Keep a folding roll bar in the raised and locked position, and wear your seat belt when operating the machine with the roll bar in the raised position.
- Lower a folding roll bar temporarily only when necessary. Do not wear the seat belt when the roll bar is folded down.
- Be aware that there is no rollover protection when a folded roll bar is in the down position.
- Check the area that you will be mowing and never fold down a folding roll bar in areas where there are slopes, drop-offs, or water.

Slope Safety

- Slopes are a major factor related to loss of control and rollover accidents, which can result in severe injury or death. You are responsible for safe slope operation. Operating the machine on any slope requires extra caution.
- Evaluate the site conditions to determine if the slope is safe for machine operation, including surveying the site. Always use common sense and good judgment when performing this survey.
- Review the slope instructions listed below for operating the machine on slopes and to determine whether you can operate the machine in the conditions on that day and at that site. Changes in the terrain can result in a change in slope operation for the machine.
- Avoid starting, stopping, or turning the machine on slopes. Avoid making sudden changes in speed or direction. Make turns slowly and gradually.
- Do not operate a machine under any conditions where traction, steering, or stability is in question.
- Remove or mark obstructions such as ditches, holes, ruts, bumps, rocks, or other hidden hazards. Tall grass can hide obstructions. Uneven terrain could overturn the machine.
- Be aware that operating the machine on wet grass, across slopes, or downhill may cause the machine to lose traction. Loss of traction to the drive wheels may result in sliding and a loss of braking and steering.
- Use extreme caution when operating the machine near drop-offs, ditches, embankments, water hazards, or other hazards. The machine could suddenly roll over if a wheel goes over the edge or the edge caves in. Establish a safety area between the machine and any hazard.
- Identify hazards at the base of the slope. If there are hazards, mow the slope with a pedestrian-controlled machine.
- If possible, keep the cutting unit(s) lowered to the ground while operating on slopes. Raising the cutting unit(s) while operating on slopes can cause the machine to become unstable.
- Use extreme caution with grass-collection systems or other attachments. These can change the stability of the machine and cause a loss of control.

Starting the Engine

Important: **You may need to bleed the fuel system when starting a new machine, the engine no longer runs due to lack of fuel, or you have replaced or serviced the fuel system components.**

1. Raise the roll bar and secure it into place.
2. Sit on the seat and fasten the seat belt.
3. Ensure that the parking brake is set and the PTO switch is in the OFF position.
4. Remove your foot from traction pedal and ensure that it is in neutral.
5. Rotate the key switch to the ON/PREHEAT position.

   Note: An automatic timer then controls the preheat for a few seconds.
6. After preheating, rotate the key switch to the START position, **crank the engine for no longer than 15 seconds**, and release the key when the engine starts.

   Note: If additional preheating is required, turn the key to the OFF position, then to the ON/PREHEAT position. Repeat this process as required.
7. Move the throttle to idle speed or partial throttle and run the engine until it warms up.

   Important: **When you start the engine for the first time; or after you change the engine oil, hydraulic fluid, overhaul the engine, or replace traction components; operate the machine in forward and reverse for 1 to 2 minutes. Also, operate the lift lever and PTO switch to ensure that all parts are properly operating. Turn the power-steering wheel to the left and right to check the steering response. Then shut the engine off, check the fluid levels, and check for oil leaks, loose parts, and any other malfunctions.**

Shutting Off the Engine

⚠ CAUTION

To prevent personal injury, shut the engine off and wait for all moving parts to stop before checking for oil leaks, loose parts, or other malfunctions.

1. Move the throttle control rearward to the SLOW position.
2. Move the PTO switch to the OFF position.
3. Rotate key switch to the OFF position. Remove key from the switch to prevent accidental starting.

Note: If the engine stops running and the key switch is in the ON/PREHEAT position, and you leave the operator's seat, after a short delay a buzzer will sound to alert you to turn the key to the OFF position.

Engaging the Parking Brake

Pull the brake lever up and over to the left to engage the brake.

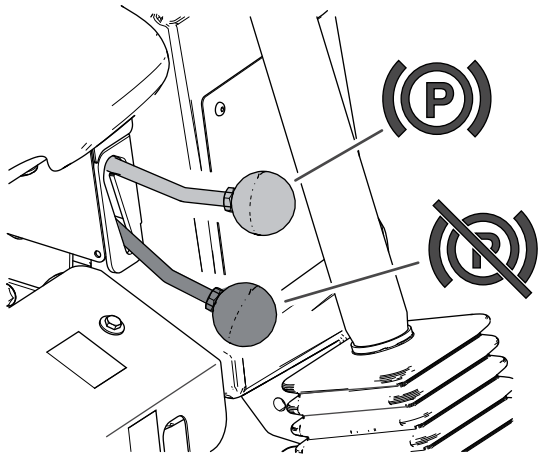

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Figure 22

Disengaging the Parking Brake

Pull the brake lever up and over to the right and lower the lever to disengage the brake.

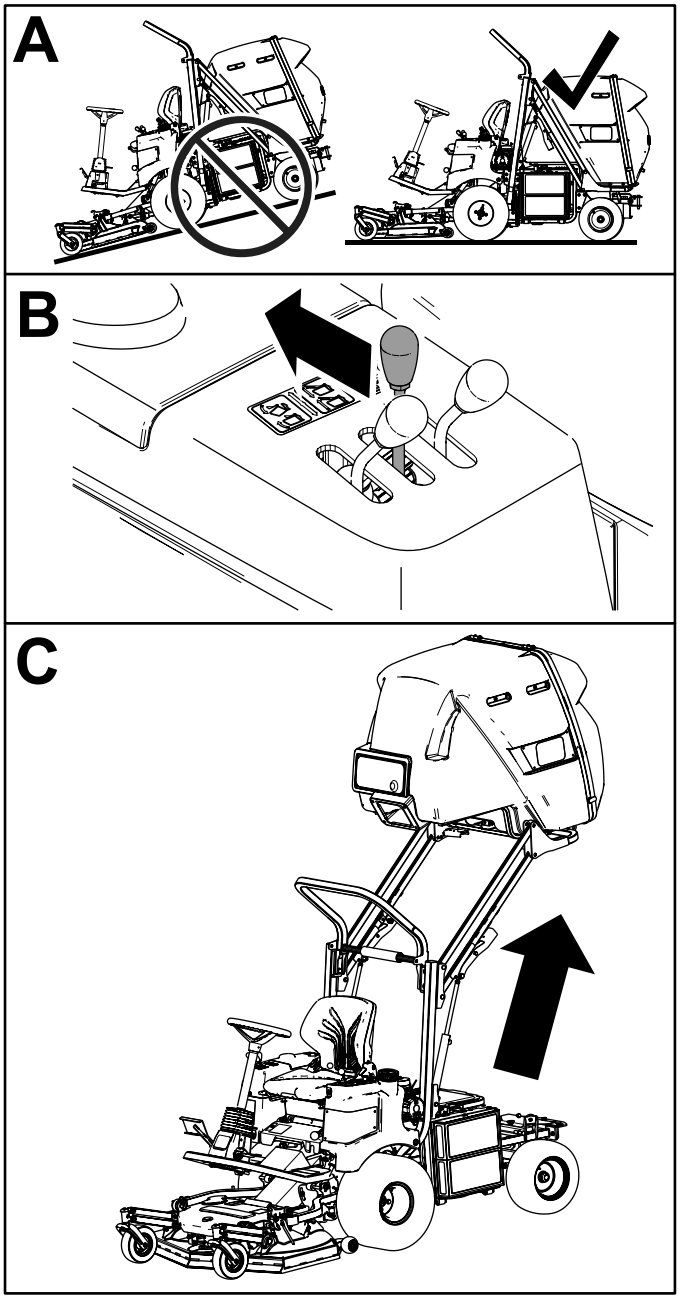
Operating the Hopper

Operating the Hopper Safety

- When dumping, do not let anyone stand behind the machine.
- Ensure that there is enough clearance above when raising the hopper; otherwise, you could damage the machine.
- Use extra caution when operating the machine on wet surfaces, on slopes, at higher speeds, or with a full load. Stopping time increases with a full load.
- Keep all bystanders away. Before backing up, look to the rear and ensure that no one is behind the machine. Back up slowly.
- Use extra caution and avoid moving the machine with the hopper in the raised position.
- Keep bystanders away from the machine when lowering the hopper.

Raising the Hopper

1. Park the machine on a level surface.
2. Move the hopper lift lever rearward to raise the hopper (Figure 23).

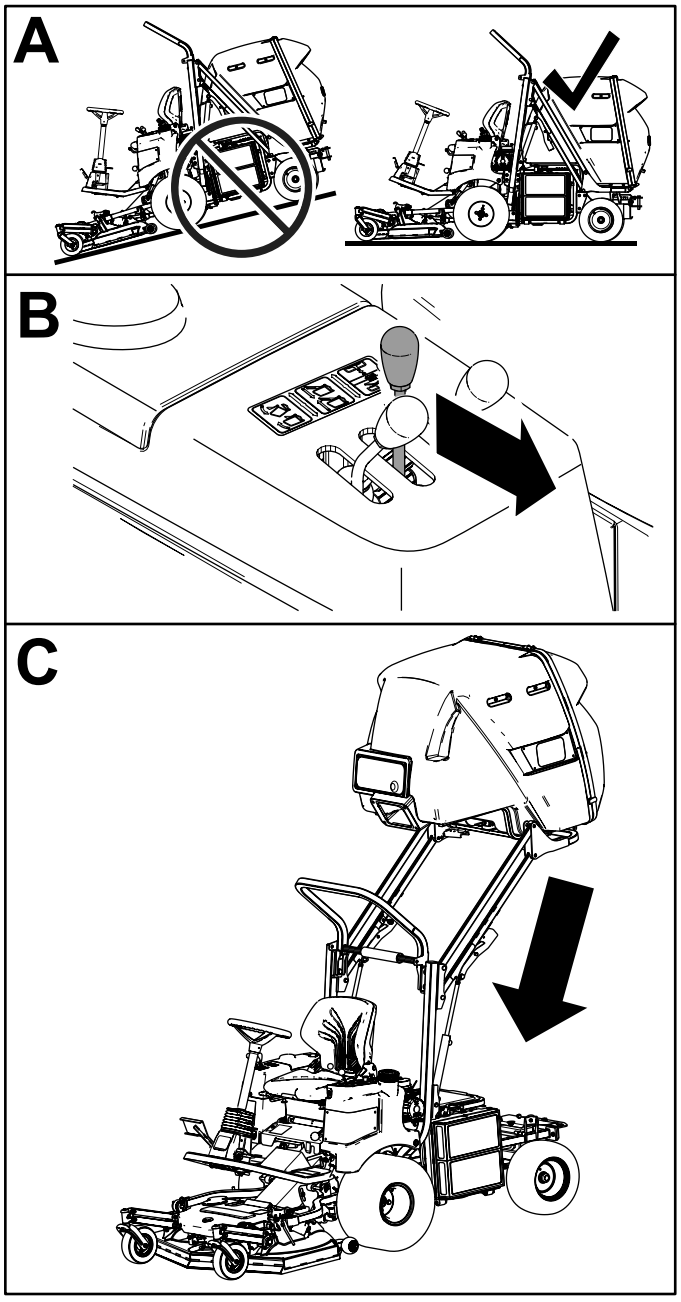


g474746

Figure 23

Lowering the Hopper

1. Park the machine on a level surface.
2. Move the hopper lift lever forward to lower the hopper (Figure 24).



g474745

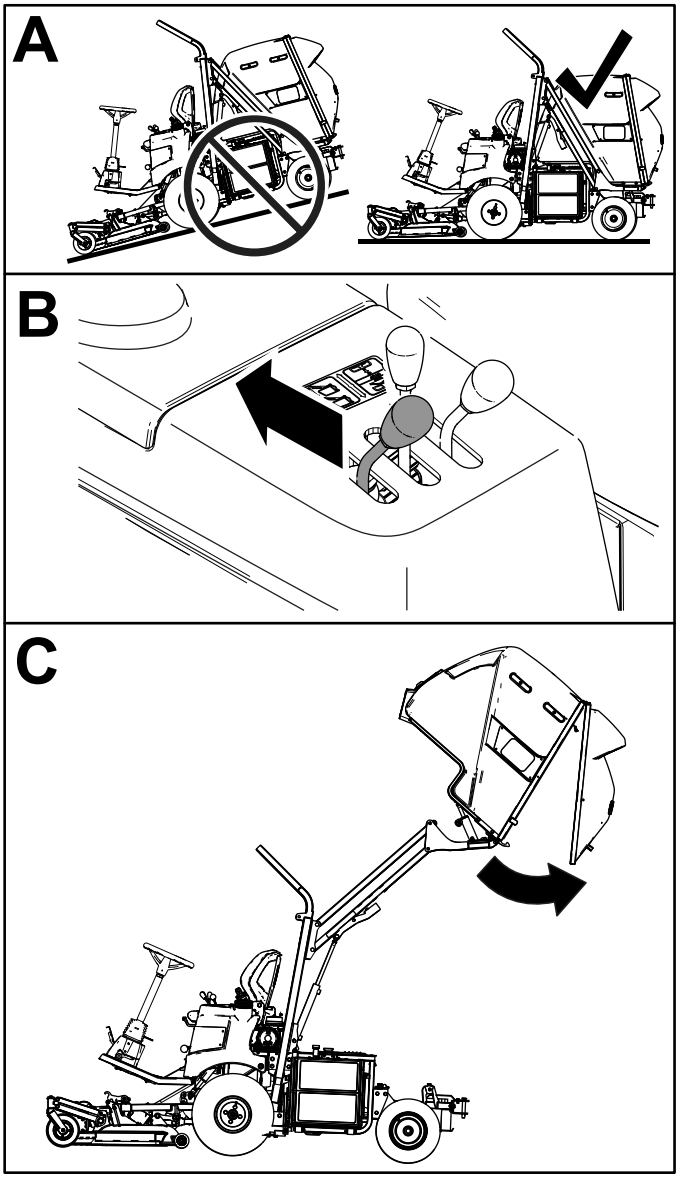
Figure 24

Dumping the Hopper

Note: You can dump the hopper at any height.

1. Park the machine on a level surface.
2. Move the hopper dump lever rearward to dump the clippings from the hopper (Figure 25).

   Note: The hopper door automatically unlatches when dumping the hopper.



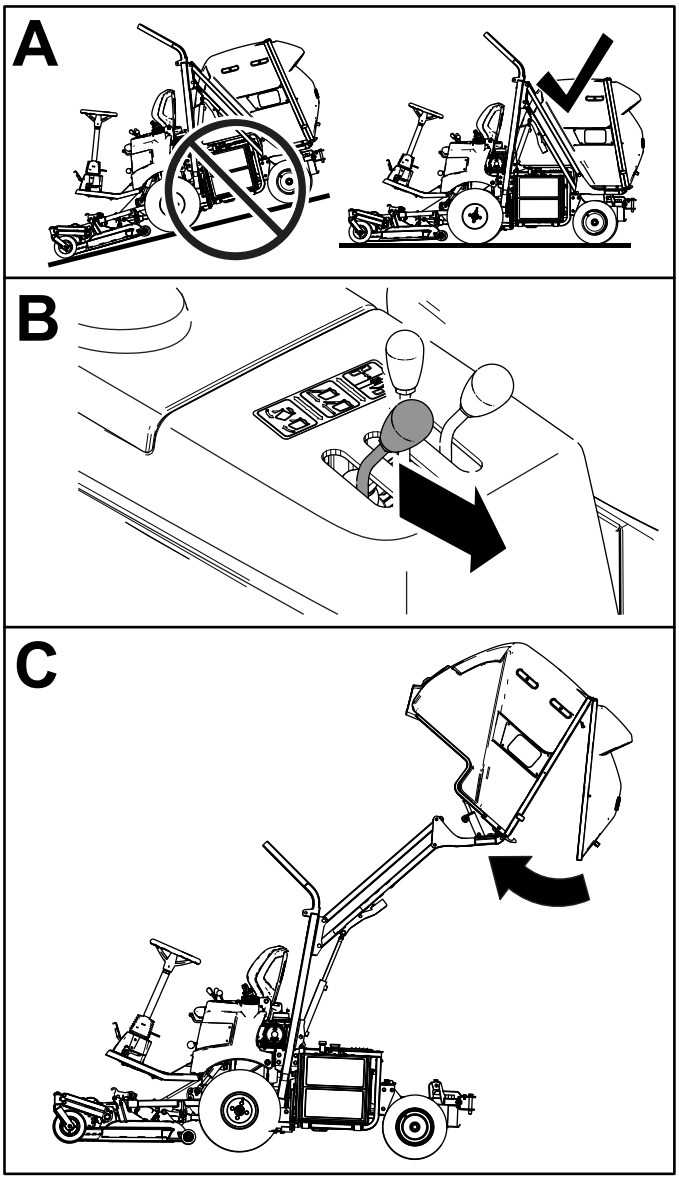
g474744

Figure 25

Closing the Hopper

1. Park the machine on a level surface.
2. After dumping, move the hopper dump lever forward to close the hopper (Figure 26).

   Note: The hopper door automatically latches when closing the hopper.

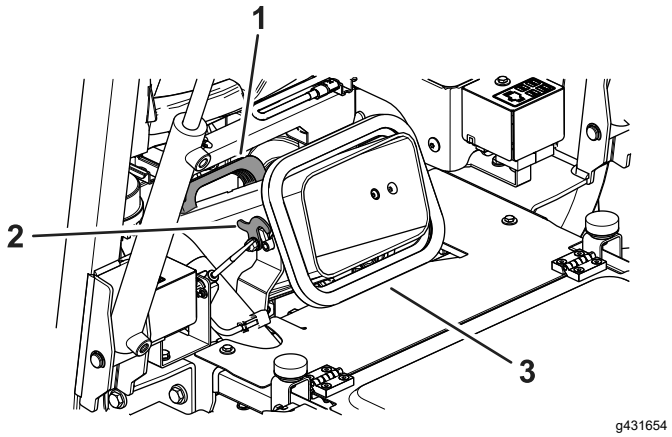


g474743

Figure 26

Clearing the Grass Chute

1. Park the machine on a level surface.
2. Disengage the PTO, lower the cutting unit, and engage the parking brake.
3. Raise the hopper and secure it; refer to Raising the Hopper (page 32) and Securing the Hopper in the Raised Position (page 42).
4. Shut off the engine and remove the key.
5. Tilt the seat forward.
6. Unlatch the grass chute (Figure 27).



g431654

Figure 27

1. Handle
2. Latch
3. Chute

7. Using the handle on the chute, remove the chute and clear it and the cutting unit opening (Figure 27).
8. Install the chute and secure it with the latches (Figure 27).
9. Lower the hopper; refer to Lowering the Hopper (page 33).

Adjusting the Hopper Sensor

If the hopper sensor activates and the PTO automatically disengages when the hopper is not full or if the chute clogs before the sensor activates, you need to adjust the sensor position.

Adjust the sensor as follows:

1. Open the hopper door and use the prop rod to hold it open.
2. Adjust the hopper sensor based on the following:
   - For normal grass and weather conditions, rotate the sensor to the mid-point position (Figure 28).
   - For wet, dense grass conditions, when picking up leaves, or if the hopper fills before the sensor activates, rotate the sensor downward (Figure 28).
   - For dry, sparse grass conditions, or if the cutting unit disengages before the hopper fills, rotate the sensor upward (Figure 28).

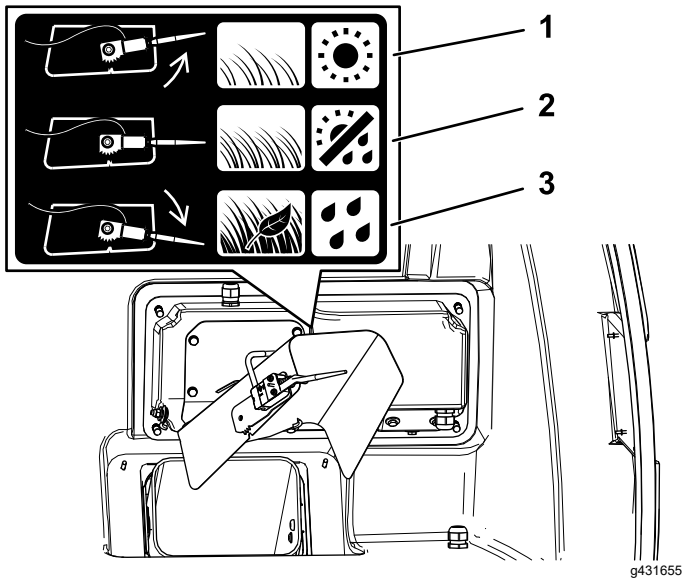


Figure 28

1. Position the hopper sensor upward when grass is thin or conditions are dry.
2. Position the hopper sensor in the middle when grass and weather conditions are normal.
3. Position the hopper sensor downward when grass is thick, contains leaves, or conditions are wet.

Adjusting the Height of Cut

You can adjust the height of cut continually from 2.5 to 9 cm (1 to 3-1/2 inches) by using the height-of-cut switch.

Push the height-of-cut switch (Figure 29) forward to lower the height of cut. Push the height-of-cut switch rearward to increase the height of cut.

Read the height of cut indicator on the height-of-cut gauge to ensure that it is set at the desired height.

Monitor the height-of-cut gauge as you mow and adjust the height of cut if needed.

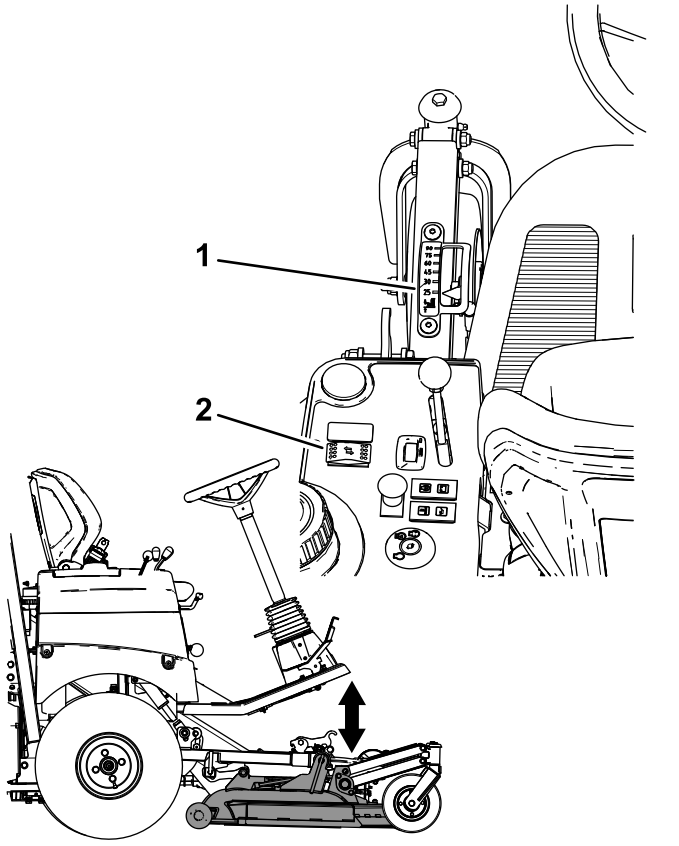


Figure 29

1. Height-of-cut gauge
2. Height-of-cut switch

Resetting the PTO Function

Note: If you leave the operator's seat while the PTO switch is in the ON position, the machine will automatically shut off the engine.

Perform the following to reset the PTO function:

1. Push in the PTO switch knob.
2. Rotate the key to the OFF position.
3. Rotate the key to the ON/PREHEAT position, then start the engine.
4. Pull out the PTO switch knob.

Operating Tips

- Practice driving before operating the machine, because it has a hydrostatic transmission and its characteristics are different than some turf-maintenance machines.
- To maintain enough power for the machine and cutting unit while mowing, regulate the traction pedal to keep the engine speed (rpm) high and constant. Decrease the ground speed as the load on the cutting blades increases; increase the ground speed as the load on the blades decreases. This allows the engine, working with the transmission, to sense the proper ground speed while maintaining a high blade-tip speed necessary for good quality of cut. Therefore, allow the traction pedal to move upward as the engine speed decreases, and press pedal slowly as the speed increases. When driving from 1 work area to another (with no load and the cutting unit raised), have throttle in the FAST position and press the traction pedal slowly but fully to attain the maximum ground speed.
- Before shutting off the engine, move all controls to the NEUTRAL position and move the throttle to the SLOW position. Rotate the key switch to the OFF position to shut off the engine.
- The engine does not run when the engine coolant is in over-temperature condition. Let the engine and cooling system cool, and check the cooling system; refer to Checking the Cooling System and Coolant Level (page 60).
- It is important to carry a 16 mm (5/8 inch) wrench while operating the machine. Use the wrench to open the bypass valve if you need to push or tow the machine (Figure 30).

After Operation

After Operation Safety

General Safety

- Shut off the engine, remove the key, and wait for all movement to stop before you leave the operator's position. Allow the machine to cool before adjusting, servicing, cleaning, or storing it.
- To help prevent fires, ensure that the cutting units, drives, mufflers, cooling screens, and engine compartment are free from grass and debris buildup. Clean up oil or fuel spills.
- If the cutting units are in the transport position, use the positive mechanical lock (if available) before you leave the machine unattended.
- Allow the engine to cool before storing the machine in any enclosure.
- Remove the key and shut off the fuel (if equipped) before storing or hauling the machine.
- 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.
- Maintain and clean the seat belt(s) as necessary

Pushing or Towing the Machine

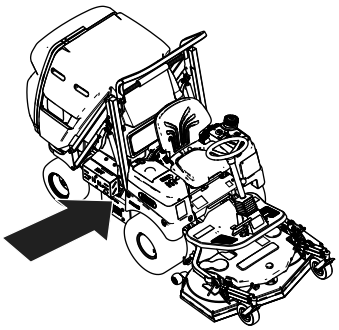
Operator provided tool: 16 mm (5/8 inch) wrench

In case of an emergency, you can tow the machine a very short distance. However, Toro does not recommend this as standard procedure.

Important: **Pushing or towing the machine faster than 3 to 5 km/h (2 to 3 mph) may damage the transmission. Do not push or tow the machine more than 100 m (110 yds). If you must move the machine a long distance, transport it on a truck or trailer. Whenever you push or tow the machine, open the bypass valve.**

Opening the Bypass Valve on the Hydraulic Pump to Push or Tow the Machine

1. Locate the the bypass valve at the right side of the machine (Figure 30).



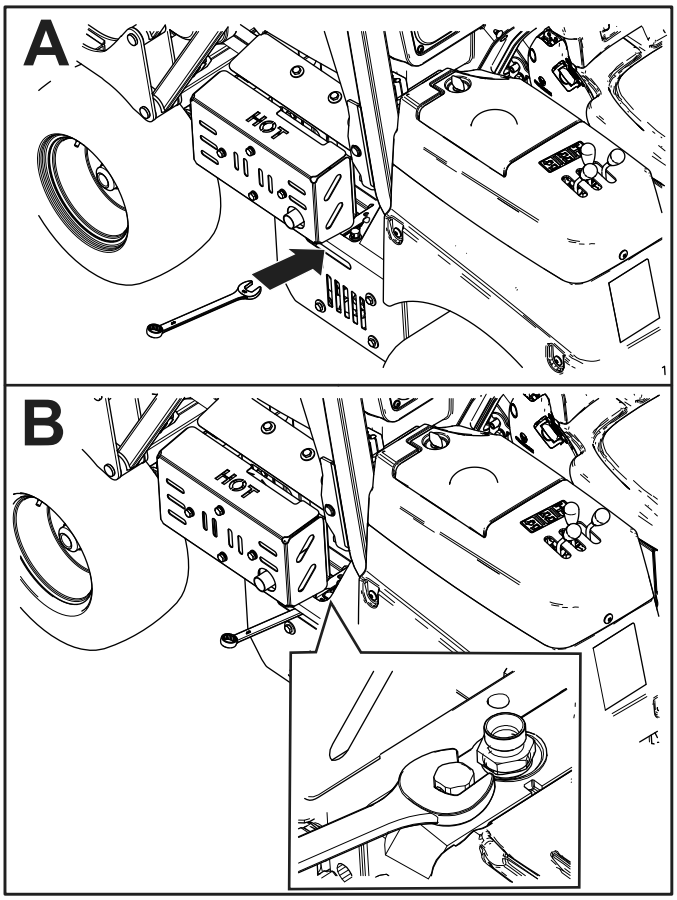


Figure 30

2. Using a 16 mm (5/8 inch) wrench, rotate the control knob 3 turns counterclockwise (Figure 30).

   Important: **Do not rotate the control knob more that 3 turns.**

Closing the Bypass Valve on the Hydraulic Pump to Operate the Machine

1. Locate the control knob for the bypass valve at the left side of the hydraulic pump (Figure 30).
2. Using a 16 mm (5/8 inch) wrench, rotate the control knob (Figure 30) clockwise until you feel resistance (the bypass valve is closed).

Hauling the Machine

- Use care when loading or unloading the machine into a trailer or a truck.
- Use full-width ramps for loading the machine into a trailer or a truck.
- Before tying down machine, lower the cutting unit completely.
- Bind the machine securely to the transport vehicle using straps, chains, cable, or ropes. Align both front and rear straps down and outward from the machine.

  Important: **Do not loop tie-down straps, chains, cable, or ropes across the operator platform.**

Binding the Front of the Machine

Loop tie-downs around the anchor hoops (Figure 31).

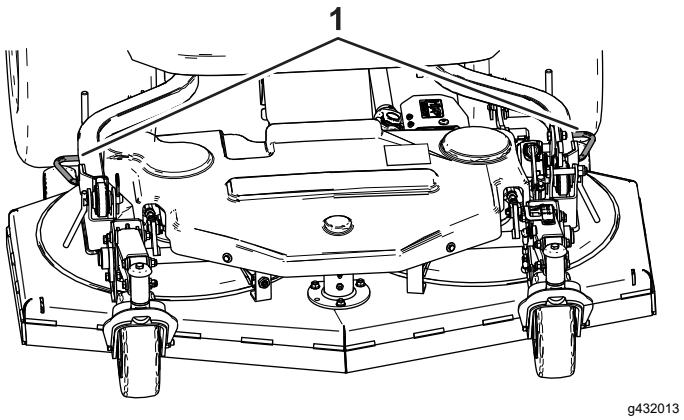
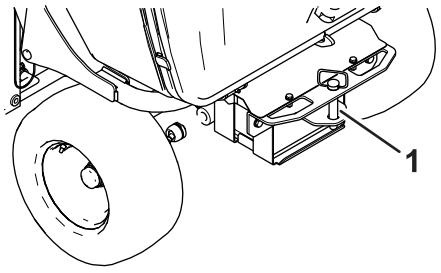


Figure 31

1. Front tie-down locations

Binding the Back of the Machine

Insert a bolt or drawbar pin into the hitch and use it as the rear tie-down point (Figure 32).



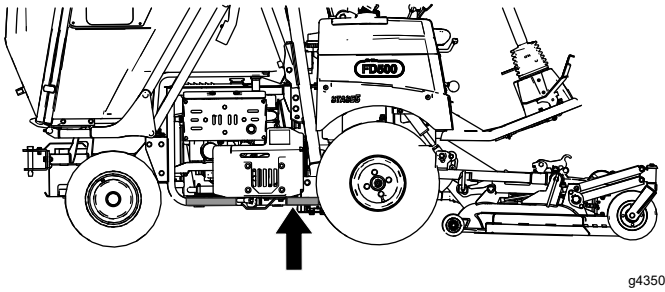
g511514

Figure 32

1. Rear tie-down location

Jacking Up the Front, Right and Front, Left Sides of the Machine

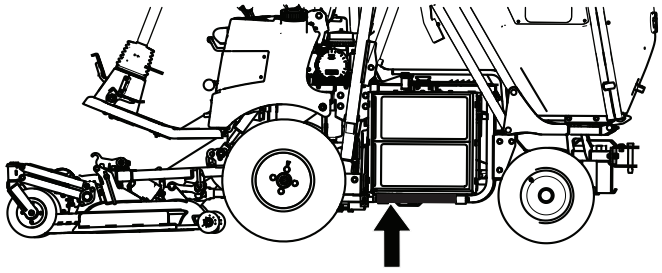
1. Rotate the radiator; refer to Accessing the Engine from the Left Side (page 48).
2. Place a jack under the frame tube (Figure 33 and Figure 34), directly under the ROPS tube, or as close as possible.



g435000

Figure 33

Frame tube



g434427

Figure 34

Frame tube

Jacking Up the Rear of the Machine

Jack up the rear-left or rear-right side of the machine using the jacking points shown in Figure 35.

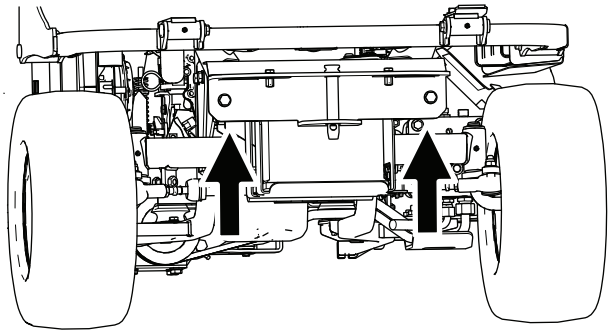


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Figure 35

Rear jacking points

Towing a Trailer

Your machine can tow trailers on flat ground with a maximum gross trailer weight (GTW) up to 200 kg (441 lb). Use a drawbar pin when towing a trailer (Figure 32).

Important: **When hauling cargo or towing a trailer, do not overload the machine or trailer. Overloading can cause poor performance or damage to the hydraulic-drive units, tires, and frame.**

Maintenance

Note: Download a free copy of the electrical or hydraulic schematic by visiting www.Toro.com and searching for your machine from the MANUALS link on the home page.

Important: **Refer to your engine owner's manual for additional maintenance procedures.**

⚠ CAUTION

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

Remove the key from the switch before you perform any maintenance.

Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first hour	• Torque the wheel lug nuts.
After the first 10 hours	• Torque the wheel lug nuts. • Check and adjust the parking brake. • Check the tension of the alternator belt. • Check the tension of the PTO belt.
After the first 50 hours	• Change the engine oil and engine-oil filter. • Check and adjust the parking brake. • Check the tension of the PTO belt. • Change the oil in the cutting-unit gearbox.
After the first 100 hours	• Replace the hydraulic fluid and filter.
After the first 500 hours	• Replace the front axle oil.
Before each use or daily	• Check the air pressure in the tires. • Check the engine cranking safety-interlock system. • Check the shut-off safety-interlock system. • Check PTO safety-interlock system. • Check the back-up alarm safety-interlock system. • Check the air cleaner. • Check the engine-oil level. • Check the cooling system and the coolant level. • Check the radiator screen and radiator for debris. • Check the hydraulic-fluid level. • Inspect the blades. • Clean under the cutting unit belt cover. • Clean the cutting unit. • Clean the hopper screen.
Every 25 hours	• Check the electrolyte level. (If the machine is in storage, check it every 30 days.)
Every 40 hours	• Grease the cutting unit. • Grease the bearings and bushings. • Check the condition of the wire harness and cables.
Every 50 hours	• Remove the air-cleaner cover and clean out the debris. Do not remove the filter.
Every 75 hours	• Change the engine oil (more frequently when operating conditions are extremely dusty or sandy).
Every 100 hours	• Lubricate the driveshaft sliding joint. • Replace the air-cleaner filter. More frequently in extreme dusty or dirty conditions.
Every 150 hours	• Change the engine-oil filter (more frequently when operating conditions are extremely dusty or sandy).

Maintenance Service Interval	Maintenance Procedure
Every 200 hours	• Lubricate the driveshaft U-joints. • Torque the wheel lug nuts. • Check the rear wheel alignment. • Inspect the cooling-system hoses. • Check the condition of the alternator belt. • Check the tension of the alternator belt. • Check the condition of and tension of the PTO belt.
Every 300 hours	• Change the oil in the cutting-unit gearbox.
Every 400 hours	• Replace the fuel-filter element. • Empty and clean the fuel tank. • Inspect the fuel lines and connections. • Replace the hydraulic fluid and filter.
Every 1,000 hours	• Replace the front axle oil.
Every 1,500 hours	• Replace any moving hoses. • Flush and replace the cooling-system fluid.

Daily Maintenance Checklist

Duplicate this page for routine use.

Maintenance Check Item	For the week of:						
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Check the safety-interlock operation.							
Ensure that the roll bar is fully raised and locked in position.							
Check the brake operation.							
Check the fuel level.							
Check the engine-oil level.							
Check the cooling-system-fluid level.							
Check the radiator and screen for debris.							
Check for unusual engine noises.[1].							
Check for unusual operating noises.							
Check the hydraulic-fluid level.							
Check the hydraulic hoses for damage.							
Check for fluid leaks.							
Check the tire pressure.							
Check the instrument gauge operation.							
Check the condition of the blades.							
Lubricate all the grease fittings.[2]							
Touch up any damaged paint.							

1. Check the glow plug and injector nozzles if you notice that the engine is hard to start, produces excessive exhaust smoke, or runs rough.

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

Important: **Refer to your engine owner's manual for additional maintenance procedures.**

Notation for Areas of Concern		
Inspection performed by:		
Item	Date	Information

Pre-Maintenance Procedures

Maintenance Safety

- Before you leave the operator's position, do the following:
  - Park the machine on a level surface.
  - Disengage the power takeoff and lower the attachments.
  - Engage the parking brake.
  - Shut off the engine and remove the key.
  - Wait for all movement to stop.
- Wear appropriate clothing, including eye-protection; long pants and substantial, slip-resistant footwear. Keep hands, feet, clothing, jewelry, and long hair away from moving parts.
- If you leave the key in the switch, someone could accidently start the engine and seriously injure you or other bystanders. Remove the key from the switch before you perform any maintenance.
- Allow machine components to cool before performing maintenance.
- If the cutting units are in the transport position, use the positive mechanical lock (if equipped) before you leave the machine unattended.
- If possible, do not perform maintenance while the engine is running. Keep away from moving parts.
- Operate the engine only in well-ventilated areas. Exhaust gases contain carbon monoxide, which is lethal if inhaled.
- Support the machine with jack stands whenever you work under the machine.
- Carefully release pressure from components with stored energy.
- Keep all parts of the machine in good working condition and all hardware tightened, especially blade-attachment hardware.
- Replace all worn or damaged decals.
- To ensure safe, optimal performance of the machine, use only genuine Toro replacement parts. Replacement parts made by other manufacturers could be dangerous, and such use could void the product warranty.

Securing the Hopper in the Raised Position

1. Park the machine on a level surface.
2. Raise the hopper to the fully raised position; refer to Raising the Hopper (page 32).
3. Secure the hopper by performing the following:
   A. Push the pin on magnetic safety lock inward (Figure 36).
   B. While still holding the pin in, lower magnetic safety lock onto the hydraulic cylinder (Figure 36).
   C. Repeat steps A and B on the other side.

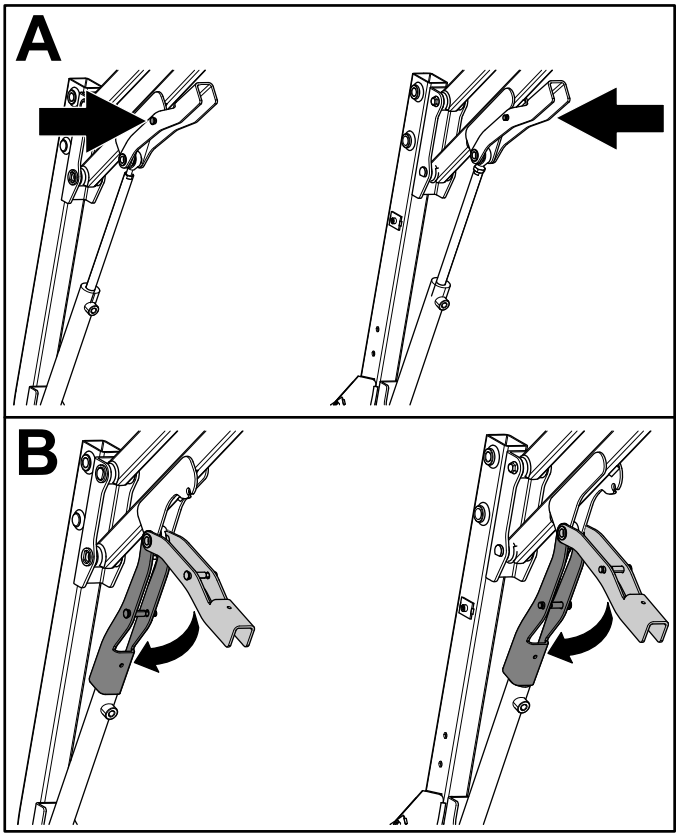


Figure 36

Lubrication

Greasing the Cutting Unit

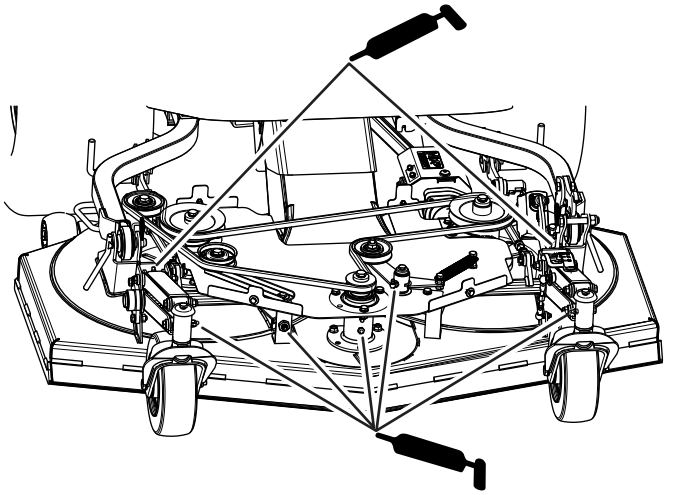
Service Interval: Every 40 hours—Grease the cutting unit. When operating the machine in extremely dusty and dirty conditions, lubricate the cutting unit daily.

Grease specification: No. 2 lithium grease

Important: **Dusty and dirty operating conditions could cause dirt to get into the bearings and bushings, resulting in accelerated wear.**

Note: Lubricate the grease fittings immediately after every washing, regardless of interval specified.

1. Remove the bolts at the front of the cover and remove the belt cover.
2. Wipe the grease fitting clean so debris is not forced into the bearing or bushing.
3. Pump grease into the bearing or bushing.
4. Wipe off excess grease.
5. Install the belt cover and bolts.



g432134

Figure 37

Greasing the Bearings and Bushings

Service Interval: Every 40 hours—Grease the bearings and bushings. When operating the machine in extremely dusty and dirty conditions, lubricate the bearings and bushings daily.

Grease specification: No. 2 lithium grease

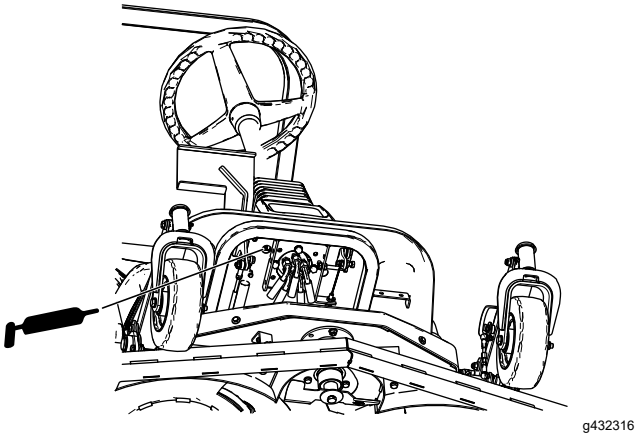
Important: **Dusty and dirty operating conditions could cause dirt to get into the bearings and bushings, resulting in accelerated wear.**

Note: Lubricate the grease fittings immediately after every washing, regardless of interval specified.

1. Wipe the grease fitting clean so debris is not forced into the bearing or bushing.
2. Pump grease into the bearing or bushing.
3. Wipe off excess grease.

The bearing and bushing lubrication points are as follows:

- Traction pedal pivot bushing (Figure 38)



g432316

Figure 38

- Cutting unit lift arm pivot points (Figure 39)

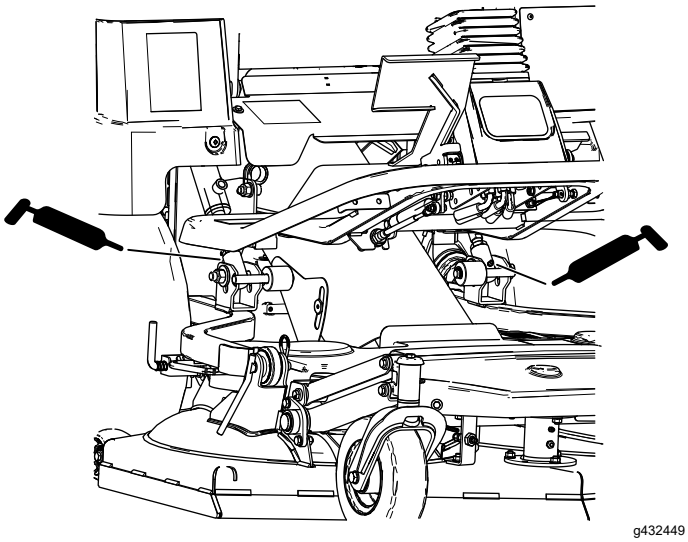


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Figure 39

- Remove the cover and grease PTO idler-pulley bracket (Figure 40)

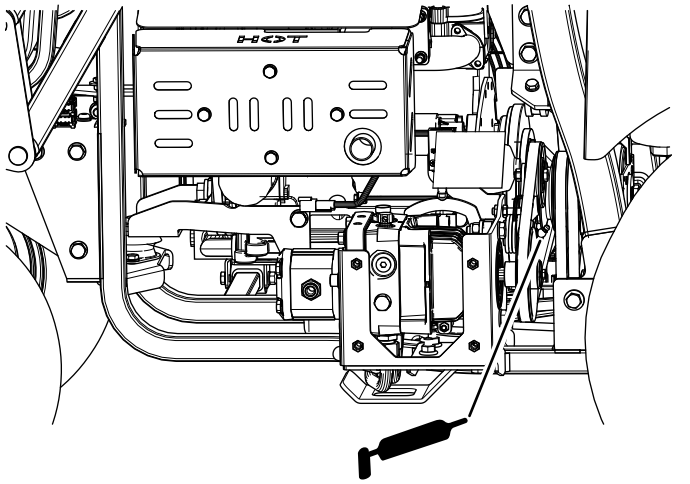

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Figure 40

- Transmission idler (Figure 41).

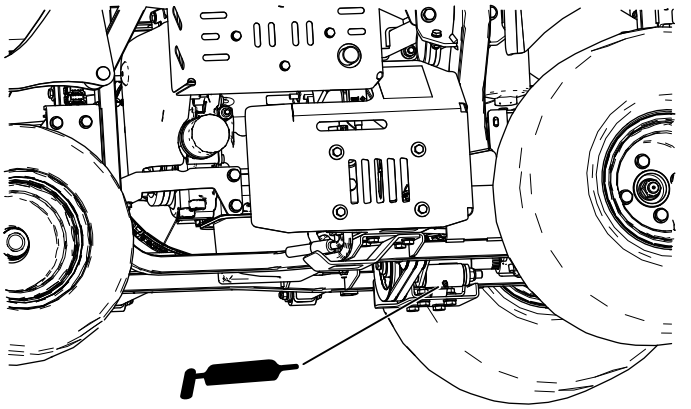

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Figure 41

- Front wheel bearings (Figure 42)

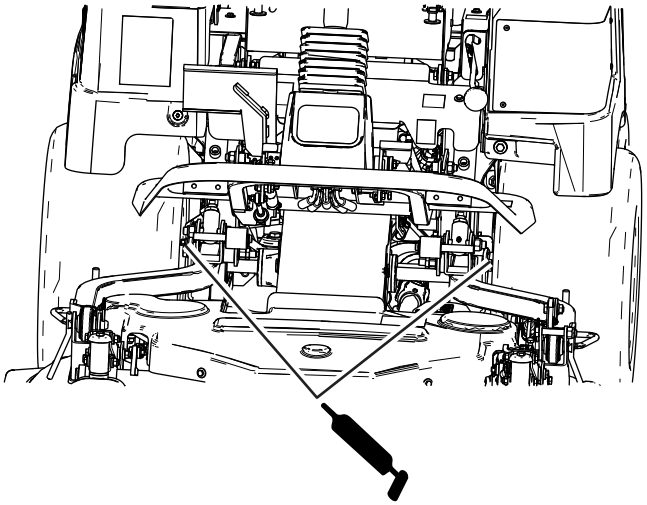

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Figure 42

- Hopper arms (Figure 43)

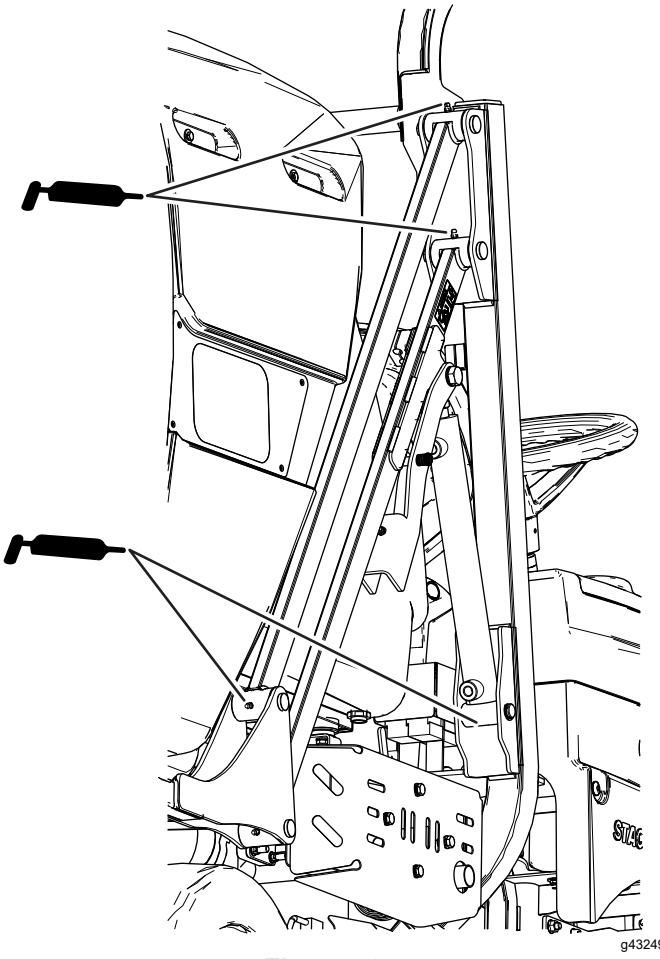

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Figure 43

Right side shown; repeat on other side

- Hopper pivots and steering pivot points (Figure 44)

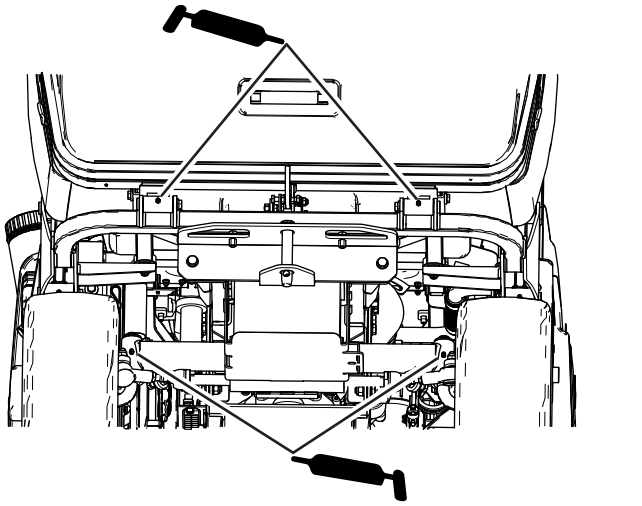

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Figure 44

- Hopper cylinder pivot and rear-axle pivot (Figure 45)

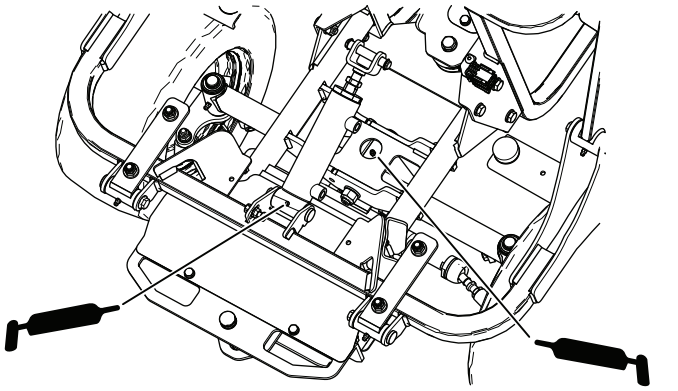

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Figure 45

Lubricating the Driveshaft U-Joints

Service Interval: Every 200 hours—Lubricate the driveshaft U-joints.

Grease specification: No. 2 lithium grease

Important: **Dusty and dirty operating conditions could cause dirt to get into the bearings and bushings, resulting in accelerated wear.**

Note: Lubricate the grease fittings immediately after every washing, regardless of interval specified.

1. Wipe grease fitting clean so debris is not forced into the bearing or bushing.
2. Pump grease into the bearing or bushing.
3. Wipe off excess grease.
4. Remove the bolt and open the forward shield.

- Forward U-joint of the driveshaft at the mower gearbox (Figure 46).

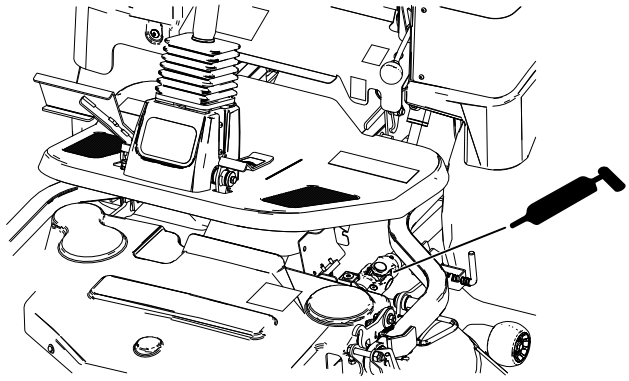

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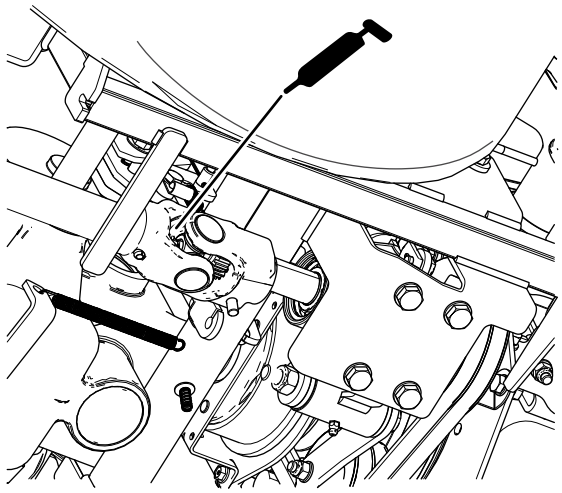
Figure 46

- Rear U-joint of the driveshaft at the PTO (Figure 47).



g434998

Figure 47

Lubricating the Driveshaft Sliding Joints

Service Interval: Every 100 hours—Lubricate the driveshaft sliding joint.

Lubrication specification: Anti-sieze compound

1. Disconnect the driveshaft from the cutting-unit gearbox; refer to Disconnecting the Driveshaft from the Cutting-Unit Gearbox (page 71).
2. Pull the front half of the driveshaft (Figure 48) forward about 25 cm (10 inches).

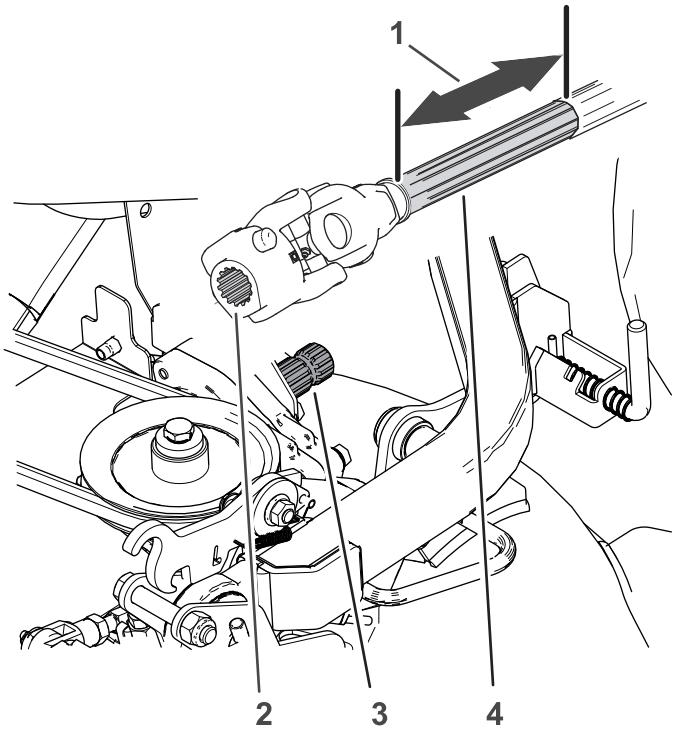


Figure 48

1. 25 cm (10 inches)
2. Splines (U-joint coupling)
3. Splines (gearbox shaft)
4. Splines (driveshaft)

3. Wipe clean the splines of the gearbox shaft and the splines of the driveshaft (Figure 48).
4. Wipe clean the sliding surface of the forward driveshaft (Figure 48).
5. Apply anti-sieze compound to the splines of the gearbox shaft and U-joint coupling (Figure 48).
6. Apply anti-sieze to the sliding surface of the forward driveshaft (Figure 48).
7. Move the front half of the driveshaft rearward to align the U-joint coupling with the gearbox shaft.
8. Wipe off excess anti-sieze compound from the driveshaft.
9. Connect the driveshaft to the cutting-unit gearbox; refer to Connecting the Driveshaft to the Cutting-Unit Gearbox (page 71).

Engine Maintenance

Engine Safety

- Shut off the engine and remove the key before checking the oil or adding oil to the crankcase.
- Do not change the governor speed or overspeed the engine.

Accessing the Engine

Manually Rotating the Hopper

Important: **Use this procedure to access the engine when the engine is not running.**

Note: If there is grass in the hopper when you manually rotate it, the grass will spill out.

1. Have another person pull rearward and hold the hopper dump lever (Figure 49).

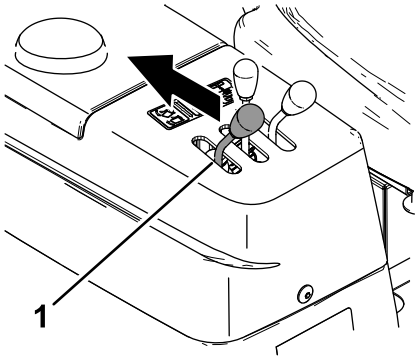


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Figure 49

1. Hopper dump lever

2. Pivot the hopper up and back (Figure 50) by hand.

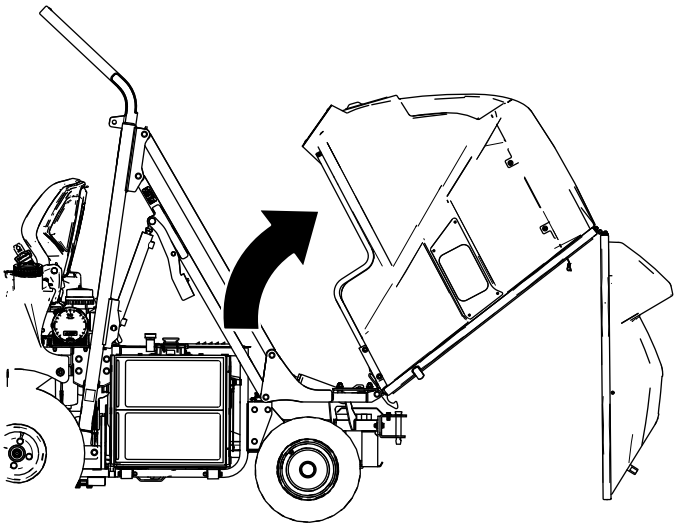

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Figure 50

Accessing the Engine from the Engine-Access Cover

1. Manually rotate the hopper open or raise the hopper to the fully raised position and secure it with the magnetic safety locks; refer to Raising the Hopper (page 32) and Securing the Hopper in the Raised Position (page 42).
2. Remove the fasteners and raise the cover to access the engine (Figure 51).

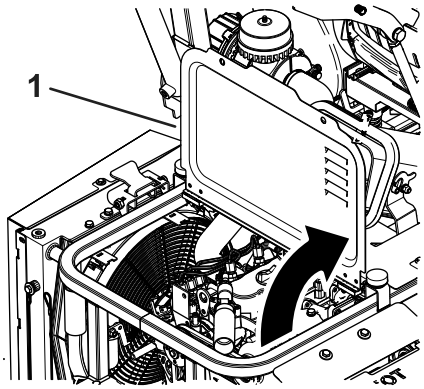

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Figure 51

1. Engine-access cover

Accessing the Engine from the Left Side

Push down on the latch and lower the radiator to access the engine (Figure 52).

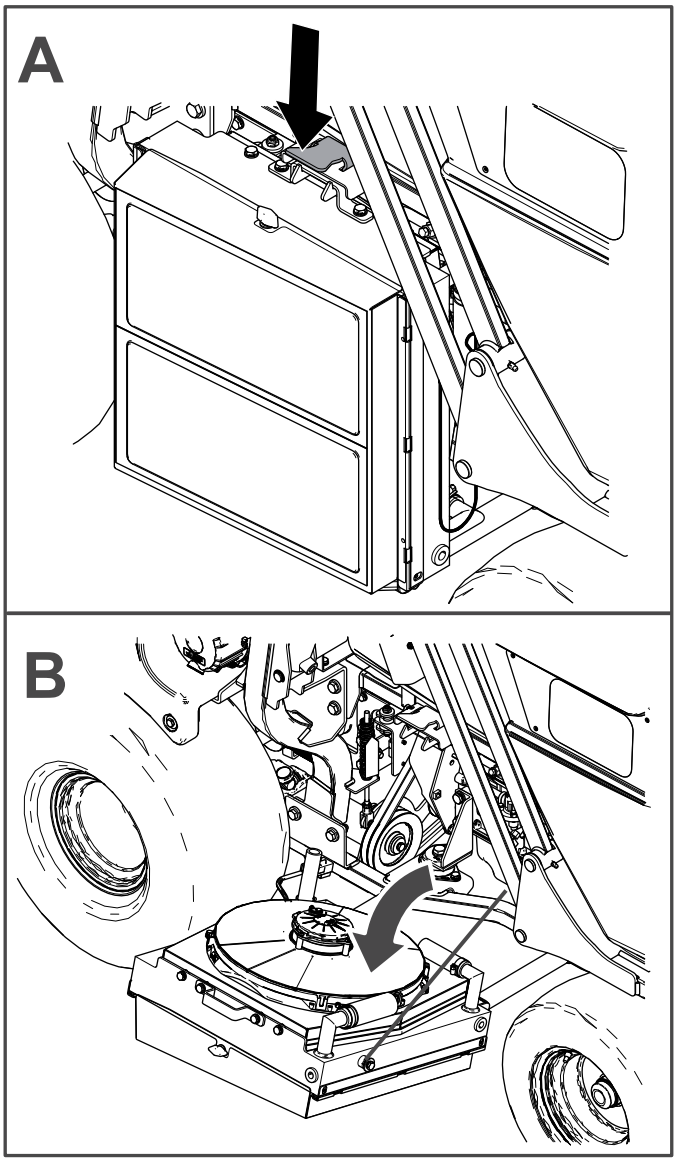

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Figure 52

Servicing the Air Cleaner

Note: Replace the air cleaner more frequently (every few hours) if operating conditions are extremely dusty or sandy.

Cleaning the Air-Cleaner Cover

Service Interval: Every 50 hours—Remove the air-cleaner cover and clean out the debris. Do not remove the filter.

Check the air-cleaner body for damage which could cause an air leak. Replace a damaged air-cleaner body.

Clean the air-cleaner cover as shown in Figure 53.

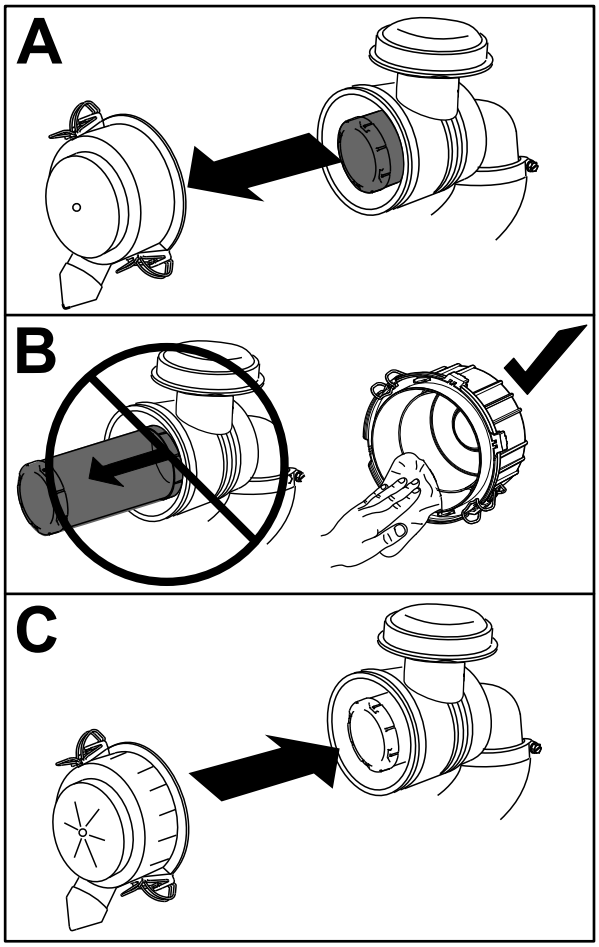

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Figure 53

Servicing the Air-Cleaner Filters

Service Interval: Before each use or daily

Every 100 hours—Replace the air-cleaner filter. More frequently in extreme dusty or dirty conditions.

1. Gently slide the primary filter out of the air-cleaner body (Figure 54).

   Note: Avoid knocking the filter into the side of the body.

   Important: **Do not attempt to clean the primary filter.**

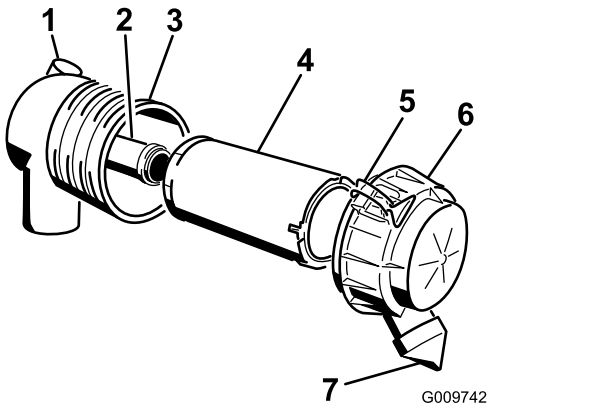

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Figure 54

1. Air intake
2. Safety filter
3. Air-filter body
4. Primary filter
5. Latches
6. Air-cleaner cover
7. Dust cap

2. Remove the safety filter (if equipped).

   Note: Remove the safety filter only if you intend to replace it.

   Important: **Never attempt to clean the safety filter. If the safety filter is dirty, then the primary filter is damaged, and you should replace both filters.**

3. Inspect the new filter(s) for damage by looking into the filter while shining a bright light on the outside of the filter.

   Note: Holes in the filter appear as bright spots. Inspect the element for tears, an oily film, or damage to the rubber seal. If the filter is damaged, do not use it.

4. If you are replacing the safety filter, carefully slide the new filter into the filter body (Figure 54).

   Important: **To prevent engine damage, always operate the engine with both air filters and cover installed.**

5. Carefully slide the new primary filter over the safety filter and ensure that it is fully seated by pushing on the outer rim of the filter while installing it.

   Important: **Do not press on the soft inside area of the filter.**

6. Install the air-cleaner cover with the side indicated as “UP” facing upward and secure the latches (Figure 54).

Servicing the Engine Oil

The engine ships with oil in the crankcase.

Crankcase capacity: approximately 3.2 L (3.4 US qt) with the filter.

Engine oil specification:

- **Engine oil-type:**API Classification Level Required: CH-4, CI-4 or higher.
- **Engine oil viscosity:** See the table below.
  - Preferred oil: SAE 15W-40 (above 0°F)
  - Alternate oil: SAE 10W-30 or 5W-30 (all temperatures)

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

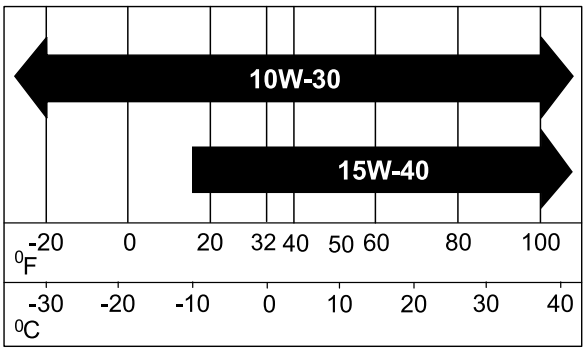

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Figure 55

Checking the Engine-Oil Level

Service Interval: Before each use or daily—Check the engine-oil level. Check the engine-oil level before the engine is first started and daily thereafter.

Note: The best time to check the engine oil is when the engine is cool before it has been started for the day. If you have already run the engine, 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 low mark on the dipstick, add oil to bring the oil level to the high mark. Do not overfill. If the oil level is between the high and low marks, you do not need to add oil.

1. Lower the radiator and check the engine-oil level as shown in Figure 52 and Figure 56.
2. If needed, raise the hopper to the fully raised position, secure it with the magnetic safety locks, and raise the engine cover after removing the cover fasteners.

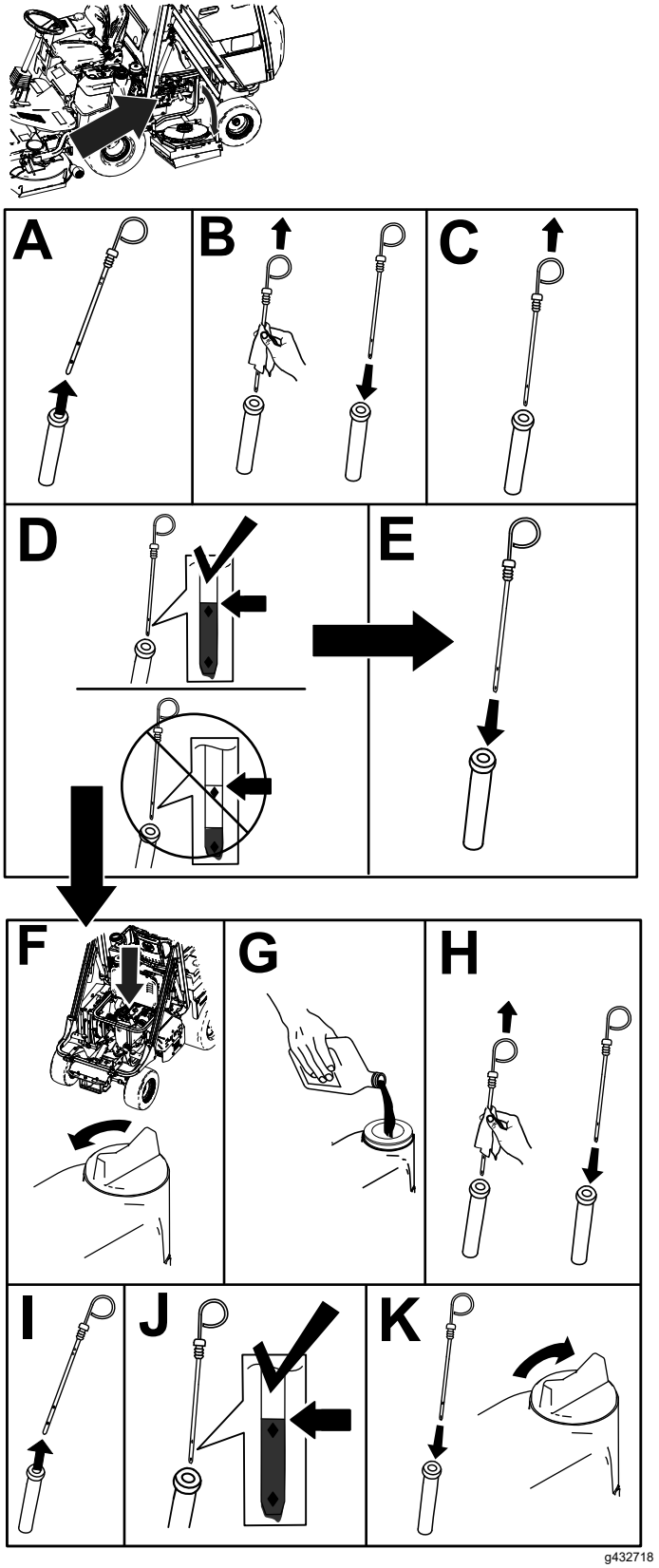

Figure 56

Changing the Engine Oil and Filter

Service Interval: After the first 50 hours—Change the engine oil and engine-oil filter.

Every 75 hours—Change the engine oil (more frequently when operating conditions are extremely dusty or sandy).

Every 150 hours—Change the engine-oil filter (more frequently when operating conditions are extremely dusty or sandy).

Note: Change the engine oil and filter more frequently when the operating conditions are extremely dusty or sandy.

1. Start the engine and let it run 5 minutes to allow the oil to warm up.
2. Park the machine on a level surface.
3. Disengage the PTO, lower the cutting unit, and engage the parking brake.
4. Raise and secure the hopper, and open the engine-access cover; refer to Accessing the Engine from the Engine-Access Cover (page 47).
5. Shut off the engine and remove the key.
6. Change the engine oil and engine-oil filter as shown in Figure 57.
7. Close the engine-access cover and lower the hopper; refer to Lowering the Hopper (page 33).

   Note: Tighten the filter until the oil-filter gasket touches the engine, and then turn it an extra 3/4 turn.

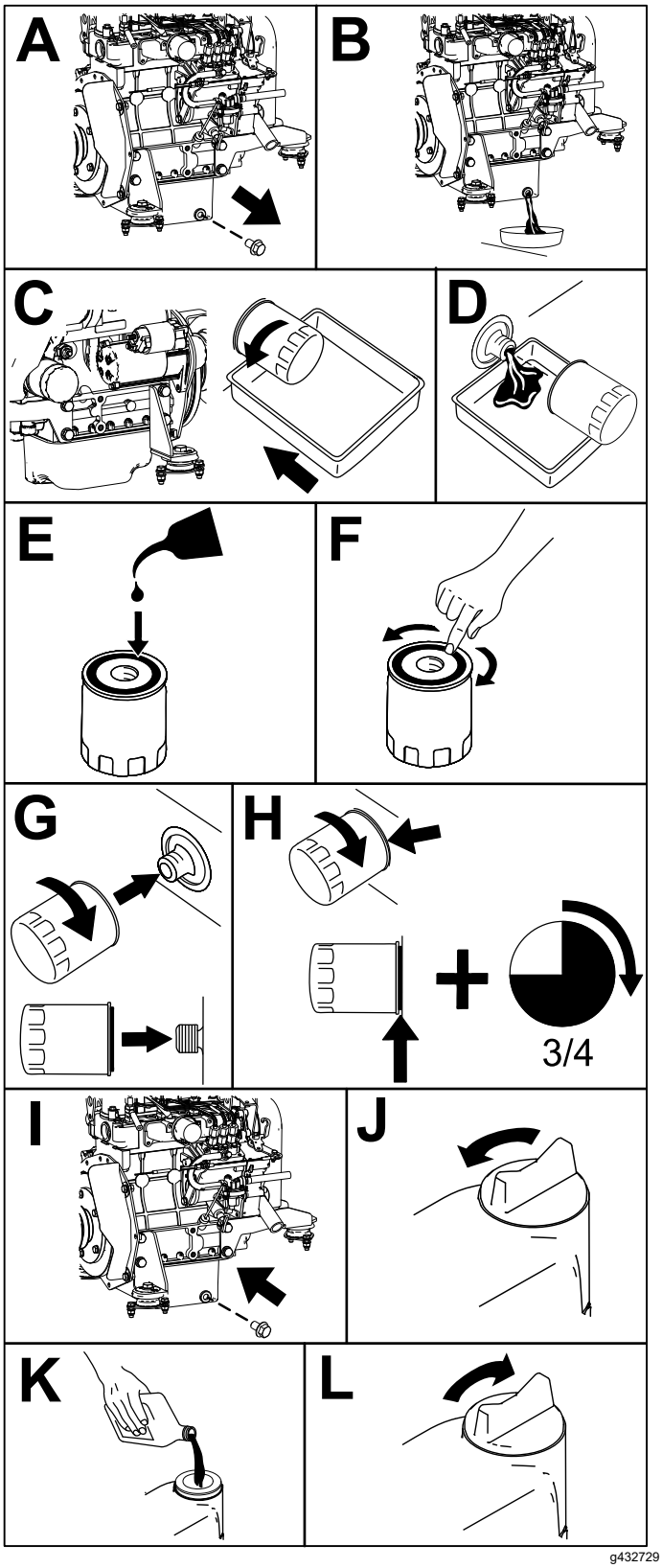

Figure 57

Fuel System Maintenance

Note: Refer to Adding Fuel (page 26) for proper the fuel recommendations.

⚠ 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.

Never smoke when handling fuel, and stay away from an open flame or where a spark may ignite fuel fumes.

Fuel Maintenance

This *Operator's Manual* contains more detailed fuel and fuel system maintenance information than the engine *Owner's Manual*, which is a general-purpose reference relating to fuel and fuel maintenance.

Ensure that you understand that the fuel system maintenance, fuel storage, and fuel quality require your attention to avoid downtime and extensive engine repairs.

The fuel system has extremely tight tolerances due to the emissions and control requirements. Diesel fuel quality and cleanliness is more important for the longevity of today's high-pressure common rail (HPCR) fuel-injection system used on diesel engines.

Important: **Water or air in the fuel system will damage your engine! Do not assume that new fuel is clean. Ensure that your fuel is from a quality supplier, store your fuel correctly, and use your fuel supply within 180 days.**

Important: **If you do not follow the procedures for fuel filter replacement, fuel system maintenance, and fuel storage, the engine fuel system could fail prematurely. Perform all fuel system maintenance at the specified intervals or whenever the fuel is contaminated or its quality is poor.**

Storing Fuel

Appropriate fuel storage is critical for your engine. Proper maintenance of fuel storage tanks is often overlooked and leads to the contamination of fuel delivered to the machine.

- Acquire only enough fuel that you will consume within 180 days. Do not use fuel that has been stored for more than 180 days. This helps eliminate water and other contaminates in the fuel.
- If you do not remove the water from the storage tank or machine fuel tank, it can lead to rust or contamination in the storage tank and fuel system components. Tank sludge developed by mold, bacteria, or fungus restricts flow and clogs the filter and fuel injectors.
- Inspect your fuel storage tank and machine fuel tank regularly to monitor the fuel quality in the tank.
- Ensure that your fuel comes from a quality supplier.
- If you find water or contaminants in your storage tank or machine fuel tank, work with your fuel provider to correct the problem and perform all fuel system maintenance.
- Do not store diesel fuel in tanks or canisters made with zinc-plated components.

Bleeding the Fuel System

1. Park the machine on a level surface.
2. Engage the parking brake.
3. Wait for the engine to cool.
4. Ensure that the fuel tank is at least half full.
5. Unlatch the radiator; refer to Accessing the Engine from the Left Side (page 48).
6. Place a drain pan under the air-bleed screws.
7. Confirm and ensure the fuel filter lever is in the ON position (Figure 58).
8. Open the first air-bleed screw on the fuel-injection pump (Figure 58).
9. Allow the air to escape and wait for fuel to escape.
10. After fuel starts to escape, tighten the first air-bleed screw (Figure 58).
11. Open the second air-bleed screw on the fuel-injection pump (Figure 58).
12. Allow the air to escape and wait for fuel to escape.
13. After fuel starts to escape, tighten the second air-bleed screw (Figure 58).

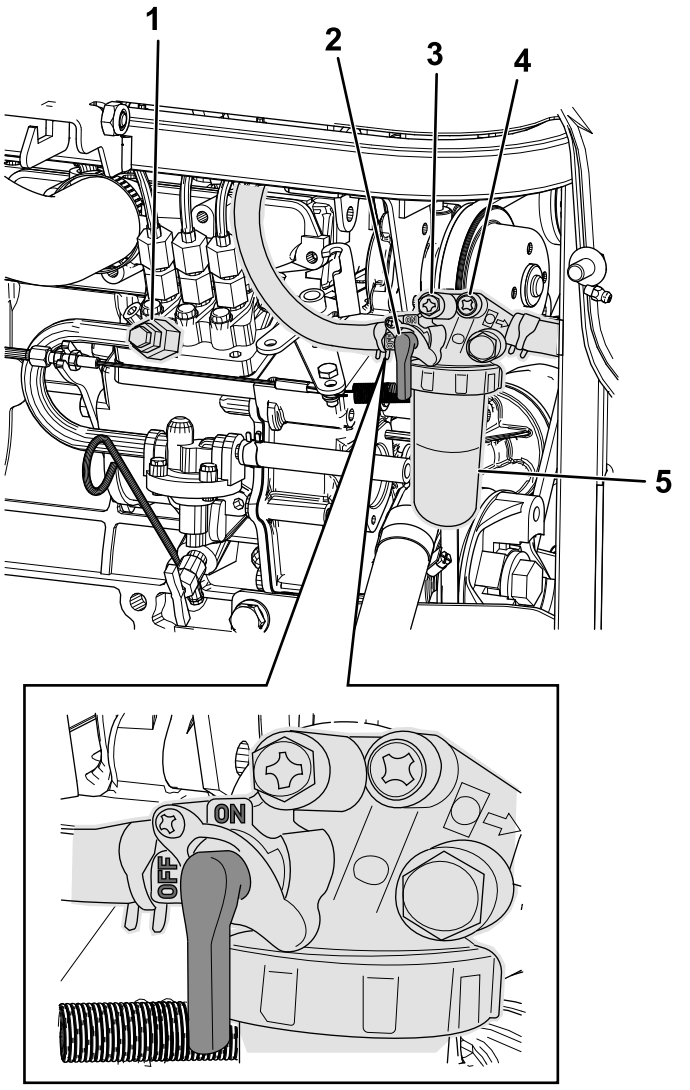

Figure 58

1. Engine air-bleed screw
2. Fuel filter lever in the ON position
3. First air-bleed screw
4. Second air-bleed screw
5. Fuel filter

Note: The engine should start after you perform this procedure. However, if the engine does not start, air may be trapped between the injection pump and the injectors. Contact your authorized Toro distributor.

14. Wipe clean any fuel that has accumulated around the injection pump.

Replacing the Fuel-Filter Element

Service Interval: Every 400 hours—Replace the fuel-filter element.

1. Clean the area around the fuel-filter (Figure 59).
2. Rotate the fuel filter lever to the OFF position (Figure 59).
3. Remove the filter and clean the filter-mounting surface (Figure 59).
4. Lubricate the filter gasket with clean fuel.
5. Assemble the filter element onto the filter assembly.
6. Assemble the filter bowl and bowl nut onto the filter head and tighten the nut by hand
7. Rotate the fuel filter lever to the ON position (Figure 58).

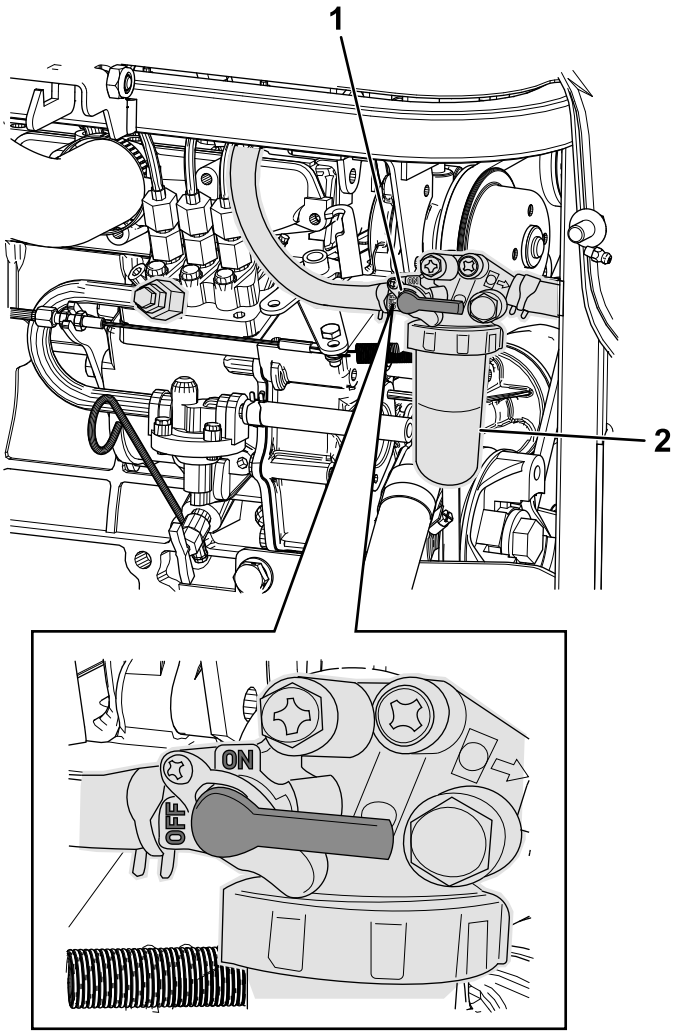

Figure 59

1. Fuel filter lever in the OFF position
2. Fuel filter

8. Prime the fuel system; refer to Bleeding the Fuel System (page 52).

Note: Repair all fuel leaks before operating the machine.

Cleaning the Fuel Tank

Service Interval: Every 400 hours/Yearly (whichever comes first)—Empty and clean the fuel tank.

- If you store the machine for an extended period, use a siphon pump to empty the fuel tank.
- If the fuel system becomes contaminated, use a siphon pump to empty the fuel tank, clean the tank, and use clean diesel fuel to flush out the tank.

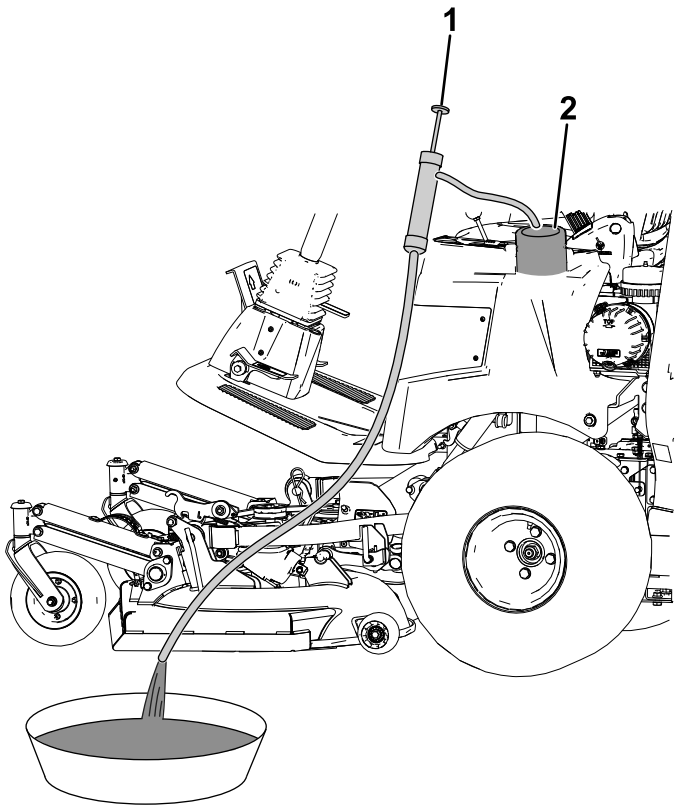

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Figure 60

Inspecting the Fuel Lines and Connections

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

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

Electrical System Maintenance

Electrical System Safety

- Disconnect the battery before repairing the machine. Disconnect the negative terminal first and the positive last. Connect the positive terminal first and the negative last.
- Charge the battery in an open, well-ventilated area, away from sparks and flames. Unplug the charger before connecting or disconnecting the battery. Wear protective clothing and use insulated tools.

Accessing the Battery

1. Park the machine on a level surface.
2. Disengage the PTO, lower the cutting unit, and engage the parking brake.
3. Shut off the engine and remove the key.
4. Raise and secure the hopper; refer to (Securing the Hopper in the Raised Position (page 42)).
5. Remove the 2 bolts and washers from the battery cover (Figure 61).
6. Remove the battery cover (Figure 61).

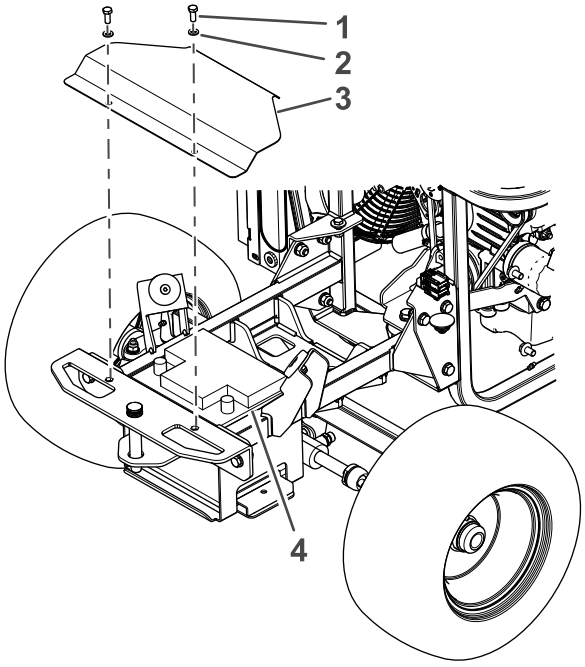

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Figure 61

1. Bolt
2. Washer
3. Battery cover
4. Battery

Servicing the Battery

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

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

Removing the Battery

⚠ WARNING

Battery terminals or metal tools could short against metal machine 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.**

1. Park the machine on a level surface.
2. Disengage the PTO, lower the cutting unit, and engage the parking brake.
3. Shut off the engine and remove the key.
4. Access the battery; refer to Accessing the Battery (page 54).
5. Remove the battery as shown in Figure 62.

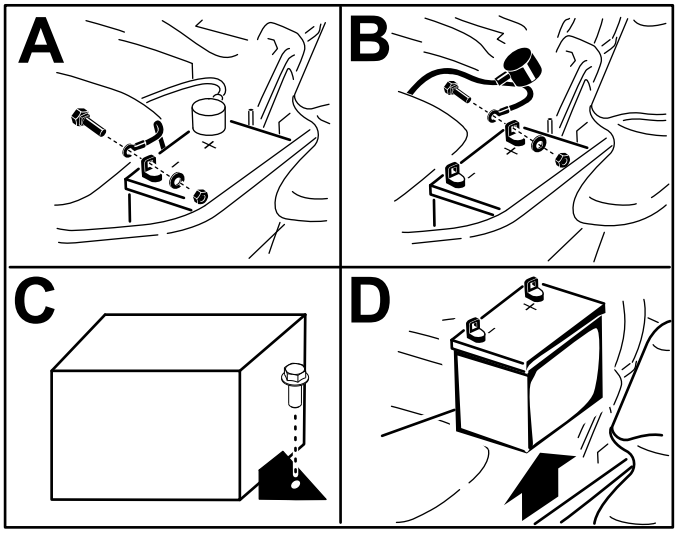

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Figure 62

Installing the Battery

Install the battery as shown in Figure 63.

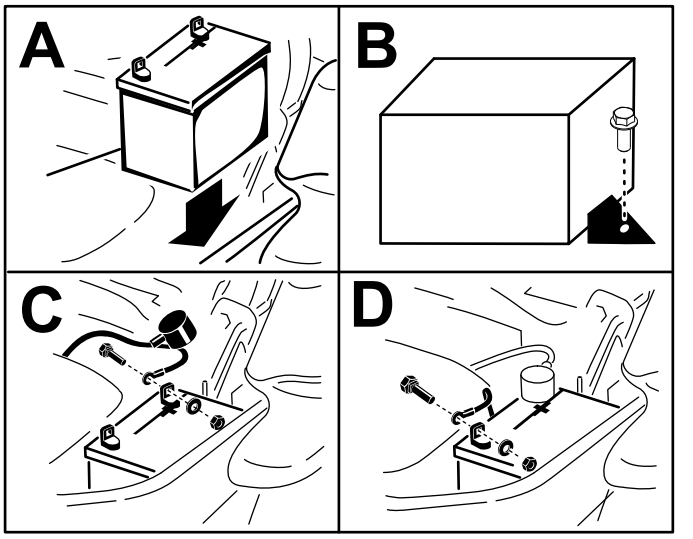

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Figure 63

Charging the Battery

⚠ WARNING

Charging the battery produces gasses that can explode.

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

Important: **Always keep the battery fully charged (1.265 specific gravity). This is especially important to prevent battery damage when the temperature is below 0°C (32°F).**

1. Charge battery for 10 to 15 minutes at 25 to 30 A or 30 minutes at 10 A.
2. When the battery is fully charged, unplug the charger from the electrical outlet, then disconnect the charger leads from the battery posts (Figure 64).
3. Install the battery in the machine and connect the battery cables; refer to Installing the Battery (page 55).

   Note: Do not run the machine with the battery disconnected, electrical damage may occur.

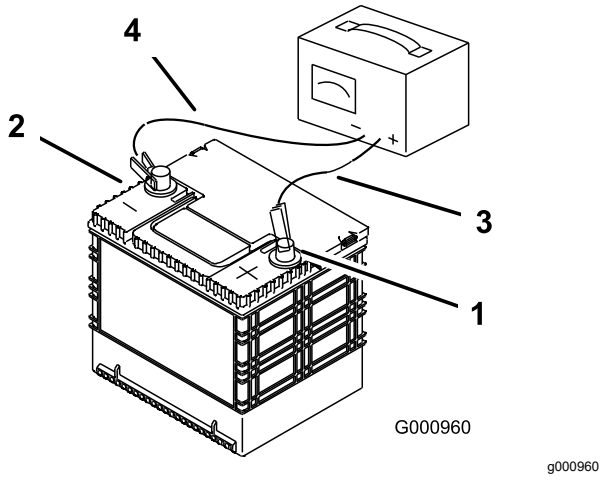

Figure 64

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

Servicing the Fuses

The electrical system is protected by fuses. It requires no maintenance, however, if a fuse blows check the component/circuit for a malfunction or short.

The fuse block and fuses are located to the left of the operator's seat (Figure 65).

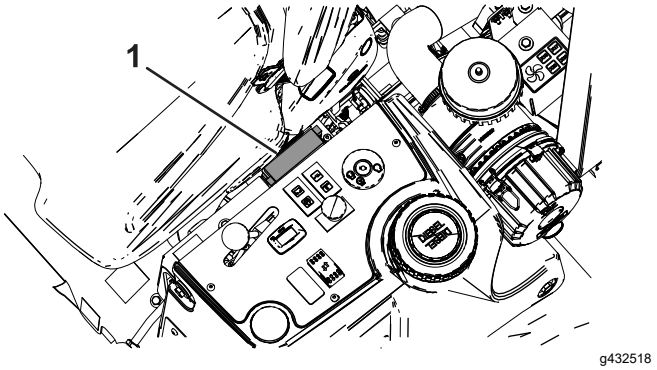

Figure 65

1. Fuse block

Use the following table when replacing a fuse:

Safety Fuses—Figure 66

Circuit	Fuse Type
Switches and buzzer	3 A
Grass catcher and PTO clutch	15 A
Electronic control unit	5 A
Cutting unit	15 A
Alternator and dashboard	5 A
Beacon	3 A
Engine	15 A
Reserved for accessories	15 A

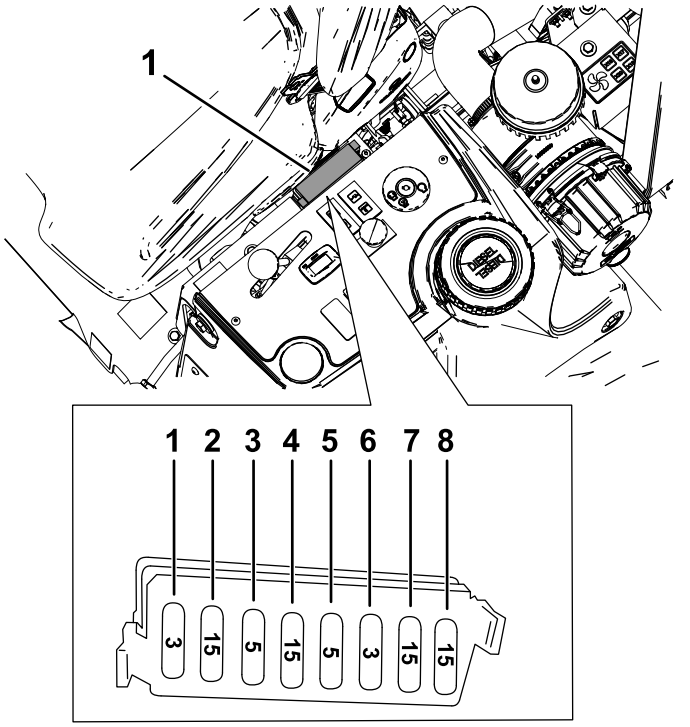

Figure 66

1. Switches and buzzer (3 A)
2. Grass catcher and PTO clutch (15 A)
3. Electronic control unit (5 A)
4. Cutting unit (15 A)
5. Alternator and dashboard (5 A)
6. Beacon (3 A)
7. Engine (15 A)
8. Reserved for accessories (15 A)

There are also 2 fuses (40 A) that protect the main machine wire harness (Figure 67).

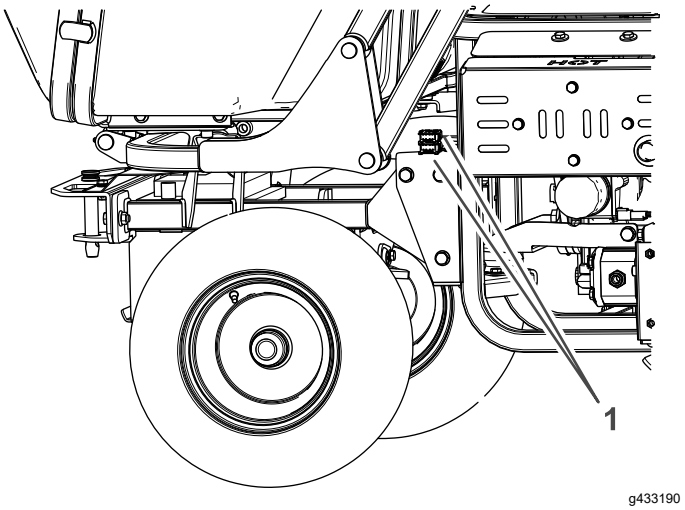

Figure 67

1. Fuses (40 A)

Servicing the Wiring Harness

Service Interval: Every 40 hours

Prevent corrosion of wiring terminals by applying Grafo 112X (Skin-over) grease, Toro Part No. 505-47, to the inside of all harness connectors whenever you replace the harness.

Important: **Whenever working with the electrical system, always disconnect the battery cables, negative (-) cable first, to prevent wiring damage from short-outs.**

Drive System Maintenance

Torquing the Wheel Lug Nuts

Service Interval: After the first hour

After the first 10 hours

Every 200 hours

Wheel lug nut torque specification: 85 to 90 N·m (62 to 66 ft-lb)

Torque the lug nuts at the front and rear wheels in a crossing pattern as shown in Figure 68 to the specified torque.

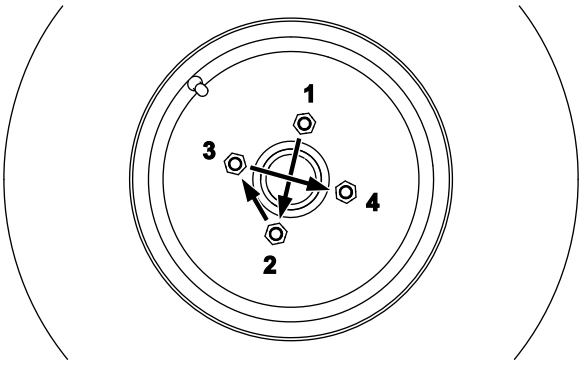

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Figure 68

Maintaining the Rear Wheel Alignment

Checking the Rear Wheel Alignment

Service Interval: Every 200 hours—Check the rear wheel alignment.

1. Park the machine on a level surface.
2. Disengage the PTO, lower the cutting unit, and engage the parking brake.
3. Shut off the engine and remove the key.
4. Rotate the steering wheel so that the rear wheels are straight ahead.
5. Measure the center-to-center distance at wheel hub height, in front and in back of the rear tires.

   Note: The rear wheels should not toe-in or toe-out when they are aligned correctly.
6. If the wheels toe-in or toe-out, align the wheels; refer to Adjusting the Rear Wheel Toe-In (page 58).

Adjusting the Rear Wheel Toe-In

1. Loosen the jam nuts at both ends of the left and right tie rods.
2. Adjust both tie rods until center-to-center distance at front and back of rear wheels is the same (Figure 69).
3. When rear wheels are adjusted correctly, tighten jam nuts against tie rods.

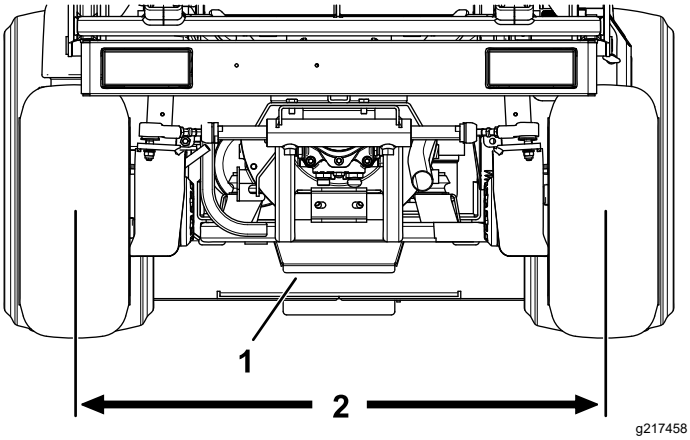

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Figure 69

1. Steering plate
2. Same dimension at front and rear of wheels

Adjusting Steering Stops

The rear-axle-steering stops help prevent over-travel of the steering cylinder in case of impact on the rear wheels. Adjust the stops so that there is 0.23 cm (0.090 inch) clearance between the bolt head and the knuckle on the axle when you turn the steering wheel completely to the left or to the right.

Thread the bolts in or out until you attain a clearance of 0.23 cm (0.090 inch); refer to Figure 70.

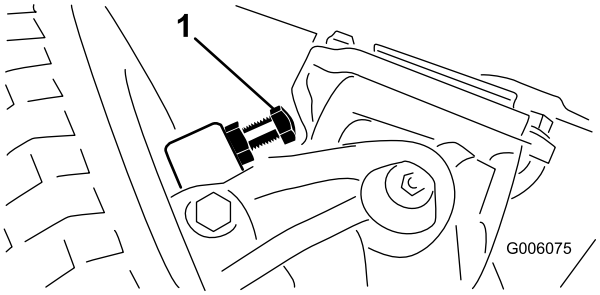

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Figure 70

1. Steering stop (right side shown)

Changing the Front Axle Oil

Service Interval: After the first 500 hours—Replace the front axle oil.

Every 1,000 hours—Replace the front axle oil.

Front axle capacity: 1.5 L (50.7 US oz)

Axle oil specification: ISO VG220

1. Park the machine on a level surface.
2. Disengage the PTO, lower the cutting unit, and engage the parking brake.
3. Raise and secure the hopper; refer to Raising the Hopper (page 32).
4. Rotate the seat forward.
5. Remove the grass chute; refer to Clearing the Grass Chute (page 34).
6. Shut off the engine and remove the key.
7. Place a drain pan under the drain plug.
8. Remove the drain plug and allow the oil to drain.

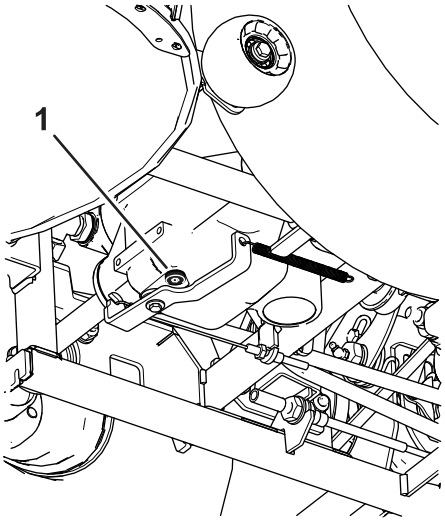

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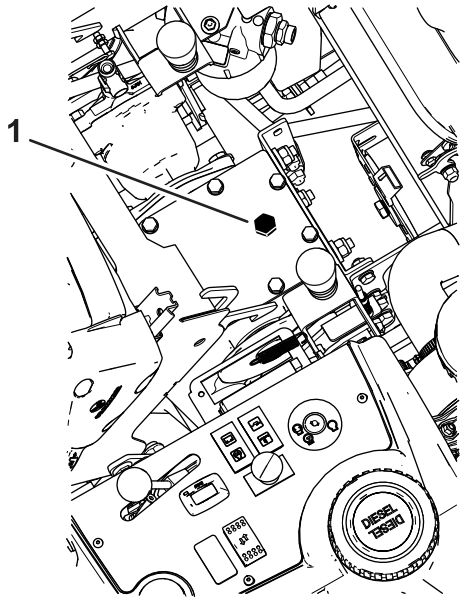
Figure 71

1. Drain plug

9. Install the drain plug.
10. Remove the fill plug.



g436337

Figure 72

1. Fill plug

11. Using a funnel, add the correct amount of new oil.
12. Install the grass chute.
13. Lower the hopper; refer to Lowering the Hopper (page 33).

Cooling System Maintenance

Cooling System Safety

- Swallowing engine coolant can cause poisoning; keep out of reach from children and pets.
- Discharge of hot, pressurized coolant or touching a hot radiator and surrounding parts can cause severe burns.
  - Always allow the engine to cool at least 15 minutes before removing the radiator cap.
  - Use a rag when opening the radiator cap, and open the cap slowly to allow steam to escape.
- Do not operate the machine without the covers in place.
- Keep your fingers, hands, and clothing clear of the rotating fan and drive belt.

Coolant Specification

Cooling system capacity: 6.4 L (6.8 US qt)

Coolant-type specification:

Recommended Coolant

Note: Coolant must meet or exceed ASTM Standard 3306

Glycol based pre-diluted coolant (50/50 blend)

or

Glycol based coolant mixed with **distilled** water (50/50 blend)

or

Glycol based coolant mixed with good quality water (50/50 blend)

$CaCO_3 + MgCO_3$ <170 ppm

Chloride <40 ppm (Cl)

Sulfur <100 ppm (SO_4)

Checking the Cooling System and Coolant Level

Service Interval: Before each use or daily

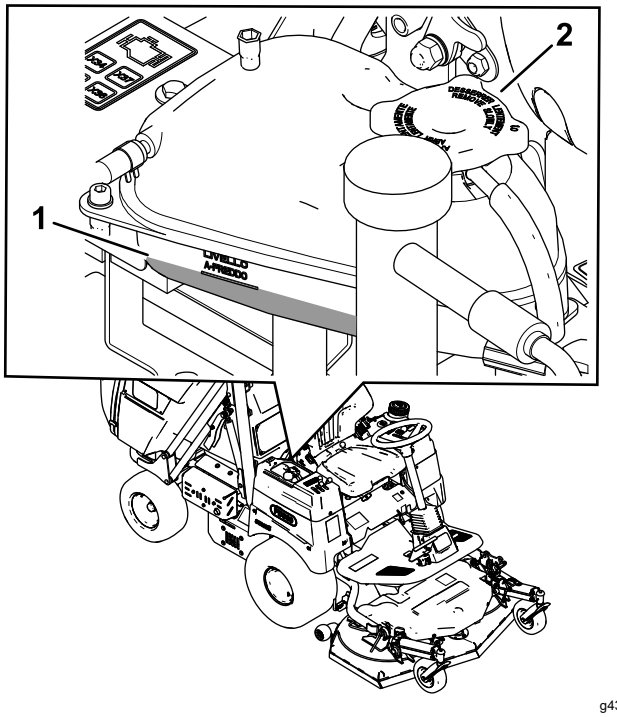
⚠ WARNING

If the engine has been running, the radiator will be pressurized and the coolant inside will be hot. If you remove the cap, coolant may spray out, causing severe burns.

- **Do not remove the recovery-tank cap to check coolant levels. Instead, look at the level from the side of the tank.**
- **Do not remove the recovery-tank cap when the engine is hot. Allow the engine to cool for at least 15 minutes or until the radiator cap is cool enough to touch without burning your hand.**

1. Check the level of the coolant in the expansion tank (Figure 7).
2. If the coolant is low, remove the expansion-tank cap and add the recommended replacement coolant as required.

   Do not use water only or alcohol-based coolants. Do not overfill.
3. Install the expansion-tank cap.



g435733

Figure 73

1. Cold level for coolant
2. Expansion-tank cap

Checking the Radiator Screen and Radiator for Debris

Service Interval: Before each use or daily

To prevent the engine from overheating, keep the radiator screen and radiator clean. Check the radiator screen and radiator for buildup of grass, dust, and debris, and if necessary, clean any debris off these parts (Figure 74).

Cleaning the Radiator Screen and Radiator

Service Interval: Every 200 hours—Inspect the cooling-system hoses.

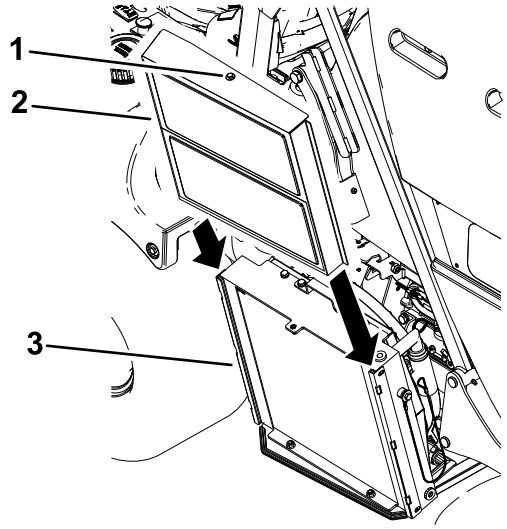
Every 1,500 hours—Replace any moving hoses.

Every 1,500 hours—Flush and replace the cooling-system fluid.

Note: If the PTO shuts off due to high engine temperature, first check the radiator screen and radiator for an excessive buildup of debris. Clean the system before operating the machine. Do not shut off the engine immediately; allow the engine to cool by running it without a load.

Clean the radiator as follows:

1. Remove the radiator screen.
2. Working from the fan side of the radiator, blow with low pressure, 172 kPa (25 psi), compressed air **(do not use water)**. Repeat this step from the front of the radiator and again from the fan side.
3. After you have thoroughly cleaned the radiator, clean out any debris that may have collected in the channel at the radiator base.
4. Clean the radiator screen and install it onto the machine.



g435732

Figure 74

1. Bolt
2. Screen
3. Radiator

Brake Maintenance

Adjusting the Parking Brake

Service Interval: After the first 10 hours—Check and adjust the parking brake.

After the first 50 hours—Check and adjust the parking brake.

After adjusting the service brakes after the first 50 hours of operation, you may need to adjust the brakes again after considerable use.

1. Park the machine on a level surface.
2. Disengage the PTO, lower the cutting unit, and engage the parking brake.
3. Shut off the engine and remove the key.
4. Disengage the parking brake (Figure 11).
5. Check the gap between the disc and the brake pads (Figure 75). Ensure the gap is between 0.4 and 0.6 mm (0.016 to 0.024 inch).
6. If an adjustment is necessary, loosen the front and rear jam nut of the brake cable (Figure 75).

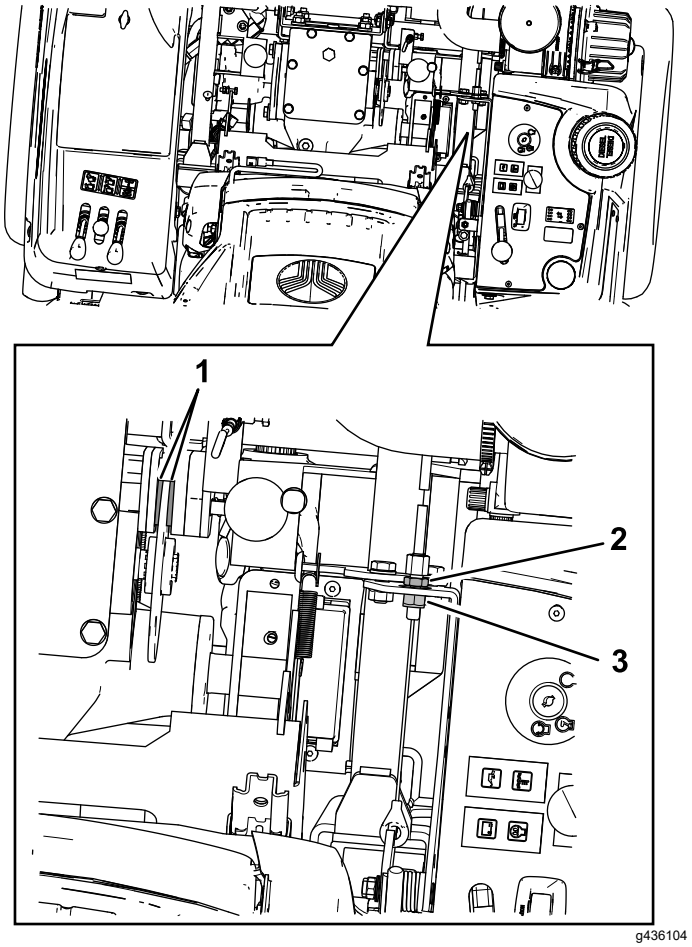


Figure 75

1. Brake pad gap (0.4 and 0.6 mm or 0.016 to 0.024 inch)
2. Back jam nut
3. Front jam nut

7. Tighten the jam nuts to lock the cable position.
8. Check the gap with the brake disengaged.
9. Repeat steps 6 through 8 until you set the parking brake to the desired position.

Belt Maintenance

Checking the Condition of the Alternator Belt

Service Interval: Every 200 hours

Check alternator belt for wear or damage.

Note: Replace the alternator belt if you find it worn or damaged.

Tensioning the Alternator Belt

Service Interval: After the first 10 hours

Every 200 hours

1. Park the machine on a level surface.
2. Disengage the PTO, lower the cutting unit, and engage the parking brake.
3. Shut off the engine and remove the key.
4. Loosen the alternator pivot bolt and lock bolt (Figure 76).
5. Tension the alternator belt until you achieve 10 mm (3/8 inch) belt deflection midway between the pulleys with a force of 4.5 kg (10 lb).
6. Tighten the alternator lock bolt (Figure 76).
7. Tighten the alternator pivot bolt (Figure 76).

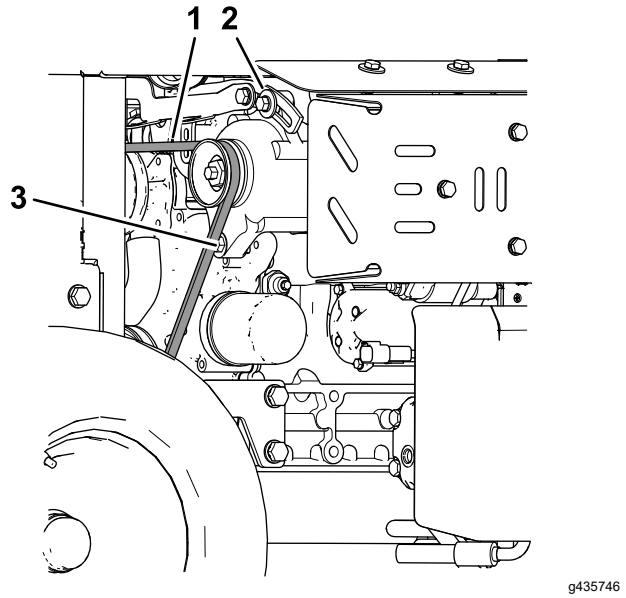


Figure 76

1. Alternator belt
2. Alternator lock bolt
3. Alternator pivot bolt

Servicing the PTO Belts

Checking the PTO Belt Tension

Service Interval: After the first 10 hours—Check the tension of the PTO belt.

After the first 50 hours—Check the tension of the PTO belt.

Every 200 hours—Check the condition of and tension of the PTO belt.

1. Park the machine on a level surface.
2. Disengage the PTO, lower the cutting unit, and engage the parking brake.
3. Shut off the engine and remove the key.
4. Look at the tension-indicator arrow of the idler-pulley tensioner.

   The outer surface of the washer should align with the tension-indicator arrow
5. If needed, rotate the nut for the idler-pulley tensioner until the tension-indicator arrow aligns with the outer surface of the washer (Figure 77).

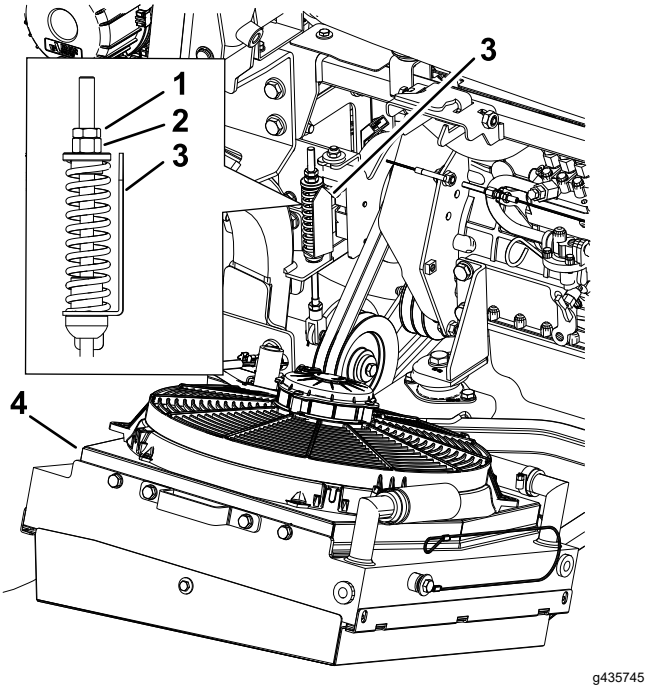


Figure 77

1. Jam nut
2. Nut
3. Tension-indicator arrow
4. Belt-tensioning spring
5. Washer
6. Radiator

Replacing the PTO Belts

Important: **Replace the PTO belts as a matched set.**

Removing the PTO Belts

1. Park the machine on a level surface.
2. Disengage the PTO, lower the cutting unit, and engage the parking brake.
3. Shut off the engine and remove the key.
4. Access the left side and top of the engine; refer to Accessing the Engine from the Engine-Access Cover (page 47) and Accessing the Engine from the Left Side (page 48).
5. Disconnect the wire connector for the clutch (Figure 78).
6. Remove the 3 bolts and 3 nuts that secure the clutch bracket to the frame and clutch (Figure 78).

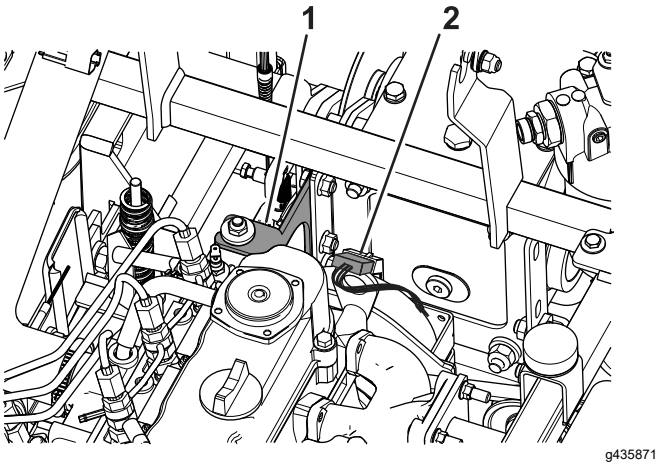


Figure 78

1. Clutch bracket
2. Wire connector

7. Loosen the nut for the idler-pulley tensioner; refer to Checking the PTO Belt Tension (page 63).
8. Move the idler pulley upward and remove the belts from the machine (Figure 77).

Installing the PTO Belts

1. Align the be PTO belts over the pulleys (Figure 77).
2. Install the clutch bracket to the frame and clutch with the previously removed bolts and nuts; refer to Removing the PTO Belts (page 64).
3. Tighten the nut for the idler-pulley tensioner; refer to Checking the PTO Belt Tension (page 63).
4. Close the radiator to the machine; refer to Accessing the Engine from the Left Side (page 48).

Adjusting the Traction Pedal

Adjusting the Traction-Pedal Stop

You can adjust the traction pedal for operator comfort or to reduce or increase the maximum forward speed of the machine.

You can also adjust the traction pedal to reduce or increase the maximum reverse speed of the machine.

1. Move the traction pedal fully forward (Figure 79).

   For maximum speed, there should be a 3 mm (1/8 inch) gap between the traction pedal and the traction-pedal stop.

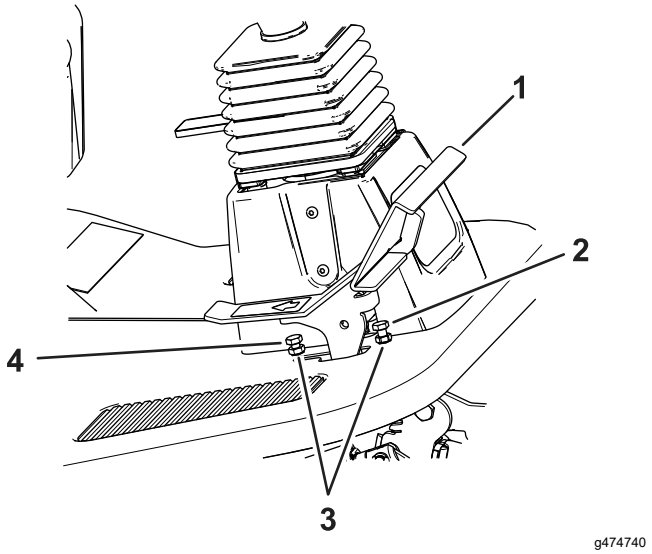


Figure 79

1. Traction pedal
2. Forward traction-pedal stop
3. Jam nuts
4. Reverse traction-pedal stop

2. If you want to reduce the forward speed of the machine, perform the following:

   A. Using a wrench, hold the forward traction-pedal stop and loosen the jam nut on the back side of the bracket (Figure 79).

   B. Move the traction pedal to the desired position (Figure 79).

   C. Adjust the jam nut on the back of the bracket until traction-pedal stop contacts the traction pedal (Figure 79).

   Note: Shortening the traction-pedal stop position will increase the forward speed of the machine.

   D. While holding the traction-pedal stop, torque the jam nut at the front of the bracket to 37 to 45 N·m (27 to 33 ft-lb).

Adjusting the Traction Cable

If more adjustment is required, adjust the traction as follows:

1. Park the machine on a level surface.
2. Disengage the PTO, lower the cutting unit, and engage the parking brake.
3. Shut off the engine and remove the key.
4. Loosen the jam nut securing traction cable rod-end bearing to the pedal (Figure 80).
5. Remove the bolt and nut securing traction cable rod-end bearing to the pedal (Figure 80).
6. Rotate the rod-end bearing until you achieve the desired length.
7. Tighten the jam nut (Figure 80) and secure the rod-end bearing to the traction pedal with the bolt and nut removed to lock the angle of the foot pedal.

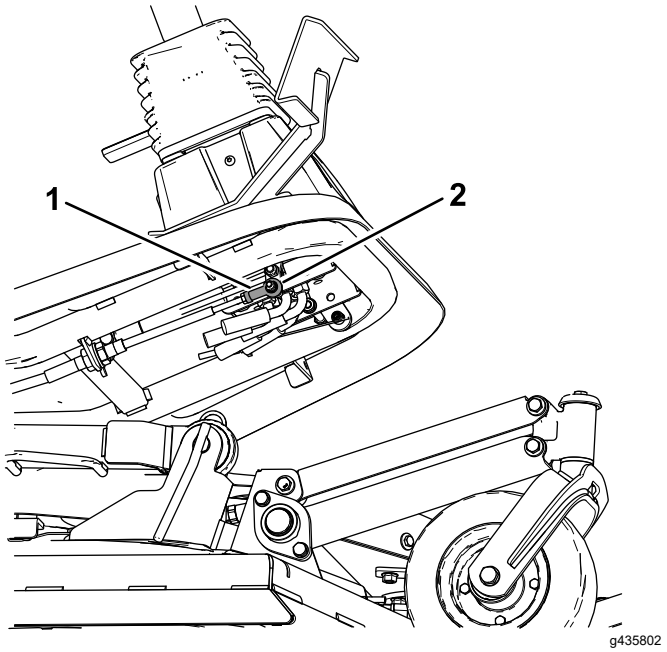


Figure 80

1. Rod-end bearing
2. Nut and bolt

Hydraulic System Maintenance

Hydraulic System Safety

- Seek immediate medical attention if fluid is injected into skin. Injected fluid must be surgically removed within a few hours by a doctor.
- Ensure that all hydraulic-fluid hoses and lines are in good condition and all hydraulic connections and fittings are tight before applying pressure to the hydraulic system.
- Keep your body and hands away from pinhole 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.

Hydraulic Fluid Specification

The hydraulic-fluid reservoir is filled at the factory with high-quality hydraulic fluid. **Check the level of the hydraulic fluid before you start the engine for the first time and daily thereafter.**

Hydraulic fluid viscosity: **5W-50**

Use fluids that meet all the following material properties and industry specifications. Consult with your lubricant distributor to identify a satisfactory product.

Note: Toro does 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	St @ 40°C 42 to 50
	St @ 100°C 7.6 to 8.5
Viscosity Index ASTM D2270	140 or higher
Pour Point, ASTM D97	-40°F to -49°F
FZG, Fail stage	11 or better
Water content (new fluid)	500 ppm (maximum)
Industry Specifications:	Vickers I-286-S (Quality Level), Vickers M-2950-S (Quality Level), Denison HF-0

Important: **The ISO VG 46 multigrade fluid offers optimal performance in a wide range of temperature conditions. For operation in consistently high ambient temperatures, 65°F (18°C) to 120°F (49°C), ISO VG 68 hydraulic fluid may offer improved performance.**

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. 1 bottle is sufficient for 15 to 22 L (4 to 6 US gallons) of hydraulic oil. Order Toro Part No. 44-2500 from your authorized Toro distributor.**

Servicing the Hydraulic System

Preparing to Service the Hydraulic System

1. Park the machine on a level surface.
2. Disengage the PTO, lower the cutting unit, and engage the parking brake.
3. Place all controls in the NEUTRAL position and start the engine.
4. Run the engine at lowest possible engine speed to purge the system of air.

   Important: **Do not run the PTO.**
5. Cycle the steering wheel several times fully to the left and right, and align the steering wheels straight forward.

Checking the Hydraulic-Fluid Level

Service Interval: Before each use or daily

1. Park the machine on a level surface.
2. Ensure that the hopper is fully lowered and level and the cutting unit is lowered.
3. Disengage the PTO, engage the parking brake, shut off the engine, and remove the key.
4. Remove the dipstick from hydraulic tank and wipe the dipstick with a clean cloth (Figure 81).

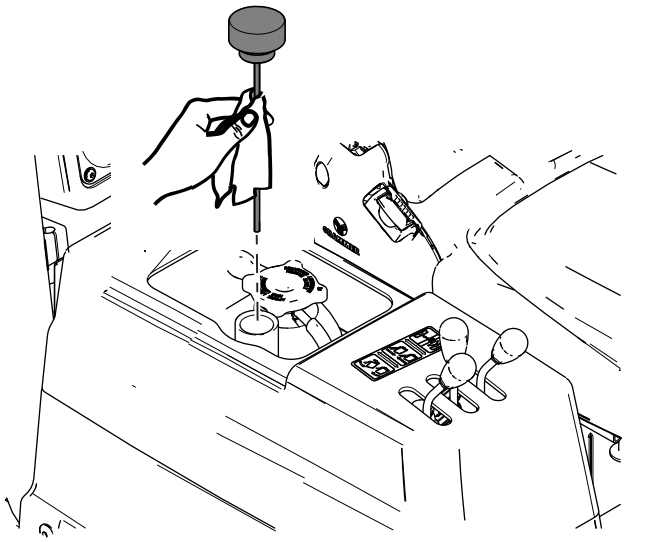


Figure 81

5. Insert the dipstick into the fill tube and thread the dipstick cap onto the tube.
6. Remove the dipstick and check the fluid level (Figure 82).

   The hydraulic fluid level is normal when the fluid is indicated between the 2 marks in the dipstick.

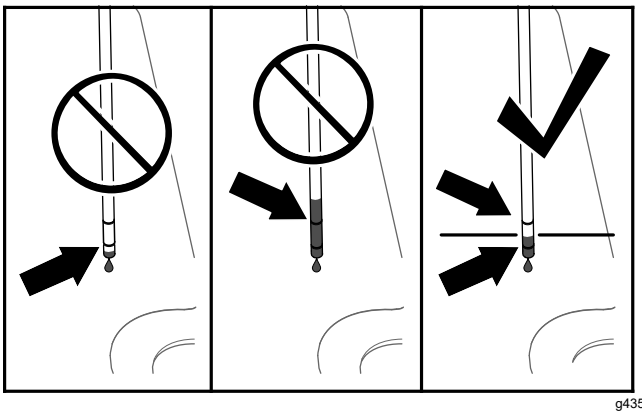


Figure 82

7. If the fluid level is below the lower mark in the dipstick, add the specified hydraulic fluid into the fill tube (Figure 82) until you can see that the fluid level is between the 2 marks the dipstick.

Important: **Do not fill the hydraulic tank with hydraulic fluid above the upper mark in the dipstick.**

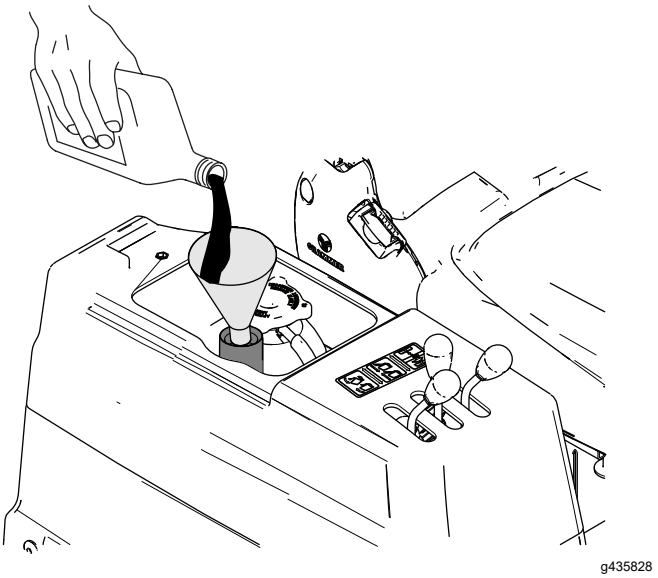


Figure 83

8. Thread the dipstick fill cap onto the filler tube.

   Note: Do not tighten the cap with a wrench.
9. Check all hoses and fittings for leaks.

Changing the Hydraulic Fluid and Filter

Service Interval: After the first 100 hours—Replace the hydraulic fluid and filter.

Every 400 hours—Replace the hydraulic fluid and filter.

Hydraulic-reservoir capacity: approximately 6.7 L (7.1 US qt)

1. Park the machine on a level surface.
2. Ensure that the hopper is fully lowered and level and the cutting unit is raised.
3. Disengage the PTO, engage the parking brake, shut off the engine, and remove the key.
4. Place a pan under the hydraulic pump on the right side to collect the hydraulic fluid.
5. To empty the hydraulic tank, remove the cover and loosen the hydraulic hose on the side of the hydraulic pump. (Figure 84).

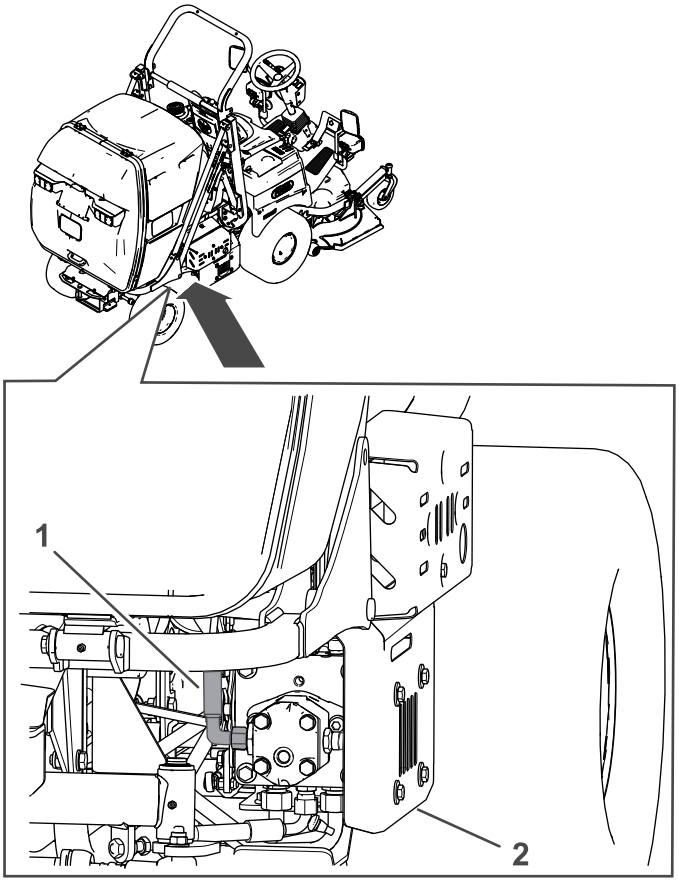


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Figure 84

1. Hydraulic hose
2. Cover

6. Remove the front right tire.
7. Replace the hydraulic filter as shown in Figure 85.

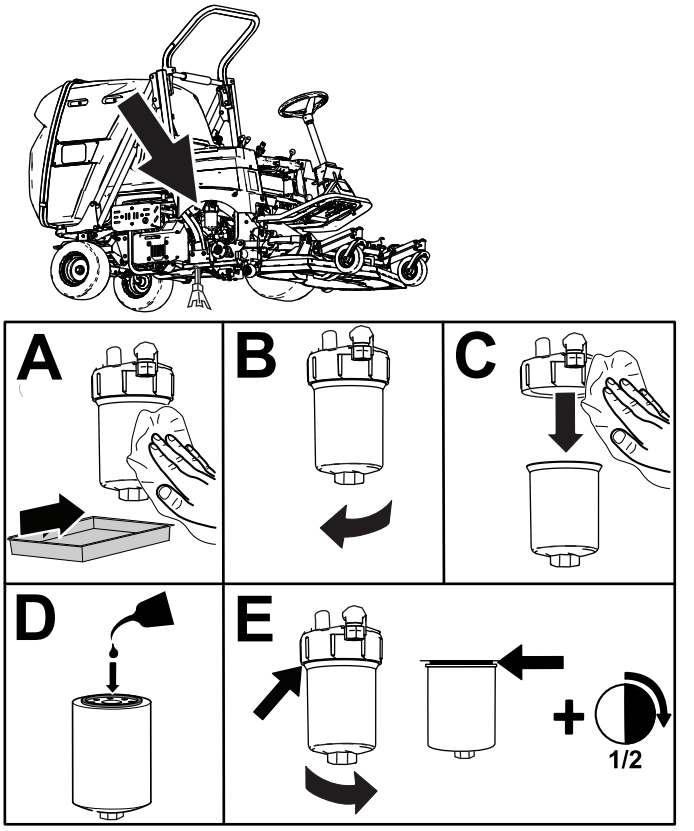

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Figure 85

8. Add the specified hydraulic fluid into the fill tube until you can see that the fluid level is between the 2 marks the dipstick (Figure 82).

   Important: **Do not fill the hydraulic tank with hydraulic fluid above the upper mark in the dipstick.**

9. Install the front right tire; refer to Torquing the Wheel Lug Nuts (page 58)
10. Start the engine, cycle the steering wheel and deck-lift cylinders, and check for fluid leaks. Allow the engine to run for about 5 minutes, then shut it off.
11. After 2 minutes, check the level of the hydraulic fluid; refer to Checking the Hydraulic-Fluid Level (page 67).

Cutting Unit Maintenance

Raising and Lowering the Cutting Unit into the Maintenance Position

Important: **Ensure that you remove the grass chute before performing this procedure; otherwise, damage may occur.**

1. Park the machine on a level surface.
2. Disengage the PTO, lower the cutting unit, and engage the parking brake.
3. Raise the hopper and engage the magnetic safety locks; refer to Securing the Hopper in the Raised Position (page 42).
4. Unlatch and remove the grass chute; refer to Clearing the Grass Chute (page 34).
5. Pull and rotate the rear latch pins on both sides of the cutting unit.

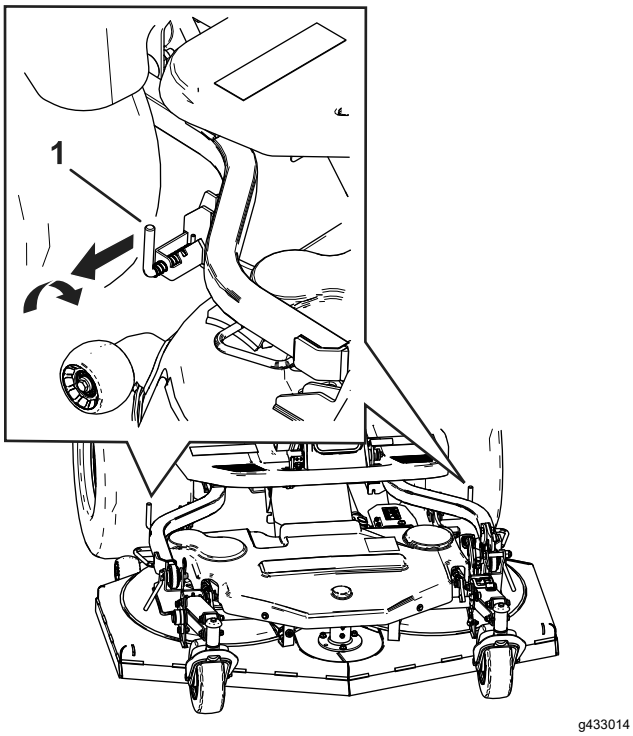

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Figure 86

1. Rear latch

6. Shut off the engine and remove the key.
7. Lift the operator platform upwards and engage the locking lever (Figure 87).
8. Raise the cutting unit by pulling up on the front of the cutting unit until it latches in the UP position.
9. Perform any maintenance on the cutting unit.
10. While holding the cutting unit, pull up on the cutting unit latch lever and lower the cutting unit.

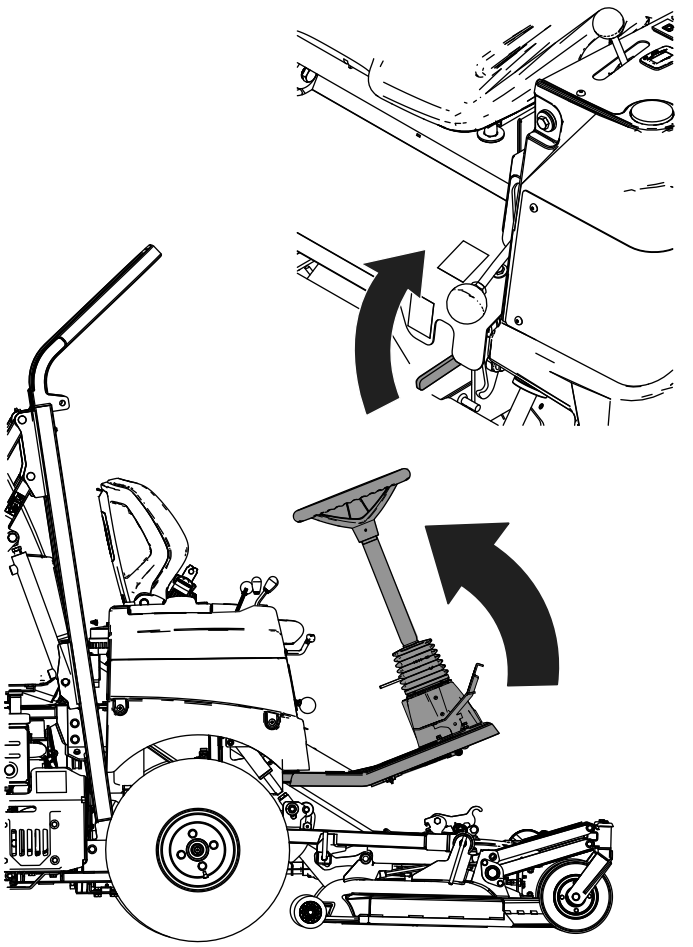

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Figure 87

11. Confirm and ensure that the rear latch pins are engaged (Figure 86).
12. Return the operator platform to the work position.
13. Lift the operator platform, allowing the locking lever to automatically disengage, lowering the operator platform back to the work position.
14. Insert the grass chute, rotate the operator's seat, and lower the hopper.

Servicing the Blades

To ensure a superior quality of cut, keep the blades sharp. For convenient sharpening and replacement, you may want to keep extra blades on hand.

Replace the blades if they hit a solid object, they are out of balance, or a they are bent. To ensure best performance and continued safety conformance of the machine, use genuine Toro replacement blades. Replacement blades made by other manufacturers may not meet the safety standards.

Blade Safety

- Inspect the blade periodically for wear or damage.
- Use care when checking the blades. Wrap the blades or wear gloves, and use caution when servicing the blades. Only replace or sharpen the blades; never straighten or weld them.
- On multi-bladed machines, take care as rotating one blade can cause other blades to rotate.

Before Servicing the Blades

Prepare the cutting unit for maintenance; refer to Raising and Lowering the Cutting Unit into the Maintenance Position (page 69).

Inspecting the Blades

Service Interval: Before each use or daily

1. Raise the cutting unit into the maintenance position.
2. Inspect the cutting edges (Figure 88 and Figure 89).
3. If the edges are not sharp or have nicks, remove and sharpen the blade.
4. Inspect the blades, especially in the sail area.
5. If you notice any cracks, wear, or a slot forming in this area, immediately install a new blade.

Removing the Blades

Note: Since there is a left and right blade, ensure you take note of how the blades are installed.

1. Hold the blades end using a cloth or a thickly padded glove.
2. Remove the blade bolt, spring lock washer, curved washer, and blade from the spindle shaft (Figure 88).

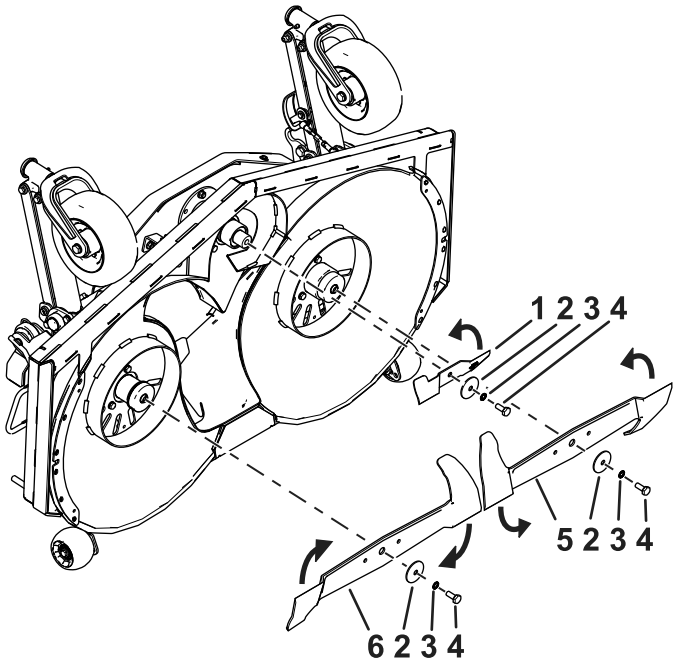


Figure 88

1. Center blade
2. Curved washer
3. Spring lock washer
4. Blade bolt
5. Left blade
6. Right blade

Sharpening and Balancing the Blades

1. Use a file or sharpening tool to sharpen the cutting edge at both ends of the blade (Figure 89).

   Note: Maintain the original angle.

   Note: The blade keeps its balance if you remove the same amount of material from both cutting edges.

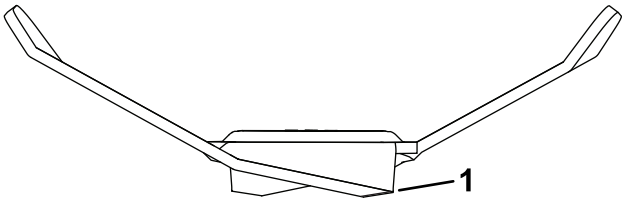


Figure 89

1. Sharpen at the original angle.

2. Check the balance of the blade by putting it on a blade balancer (Figure 90).

   Note: If the blade stays in a horizontal position, the blade balances and it is ready for use.

   Note: If the blade is not balanced, file some metal off the heavy end of the blade in the sail area only (Figure 90).

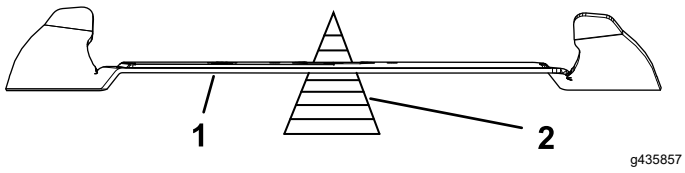


Figure 90

1. Blade
2. Balancer

3. Repeat this procedure until the blade balances.

Installing the Blades

Note: Refer to Figure 88 for the correct blade rotation and installation.

Note: Lefthand threads are used when installing the right blade

1. Hold the blade end using a cloth or a thickly padded glove.
2. Install the blade using the previously removed blade bolt, spring lock washer, and curved washer (Figure 88).

   Important: **The sail area of the blade must be pointing upward toward the inside of the mower to ensure proper cutting.**
3. Torque the blade bolt to 53 N·m (39 ft-lb).

Disconnecting the Driveshaft from the Cutting-Unit Gearbox

1. Rotate the quarter-turn fastener and open the universal-joint cover from the belt cover (Figure 91).

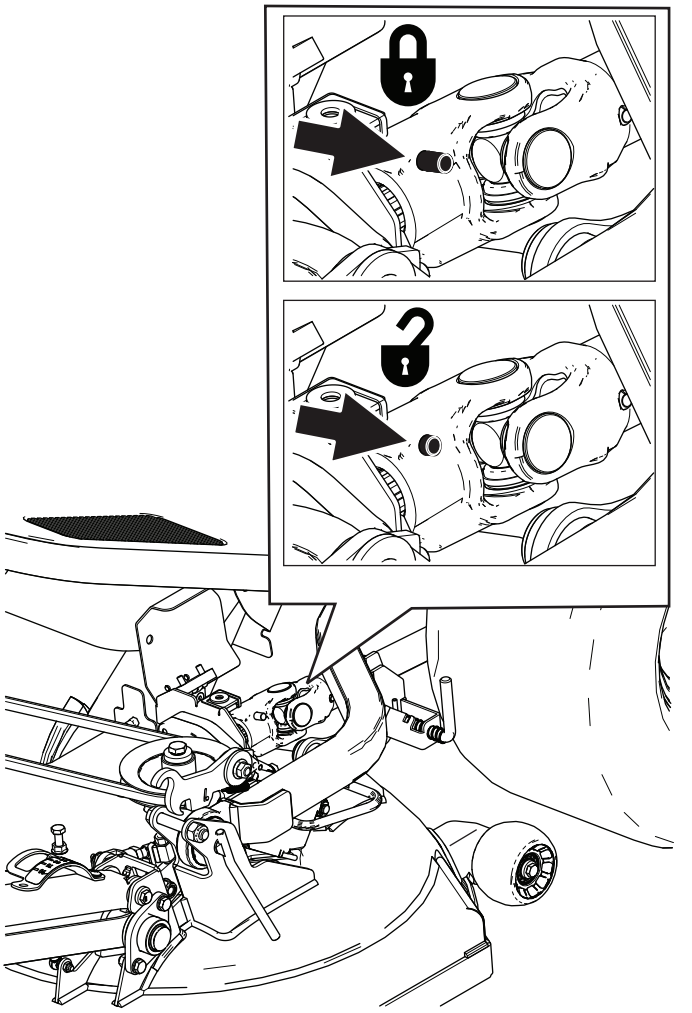


Figure 91

2. Disconnect the forward end of the driveshaft from the cutting-unit gearbox by pressing the spring-loaded pin, and then pulling the end of the driveshaft rearward (Figure 91).

Connecting the Driveshaft to the Cutting-Unit Gearbox

1. Align the splines of the driveshaft-universal joint with the splines in the gearbox coupling.
2. Press the spring-loaded pin and then push the end of the driveshaft forward.
3. Release the spring-loaded pin and check that the universal joint of the driveshaft is locked into the cutting-unit gearbox; refer to Figure 91.
4. Close the universal-joint cover and secure it with the fastener.

Removing the Cutting Unit

1. Park the machine on a level surface.
2. Disengage the PTO and engage the parking brake.
3. Before lowering the cutting unit, pull and rotate the rear link pins at both sides of the cutting unit (Figure 86).
4. Lower the cutting unit and tilt the hopper back.
5. Shut off the engine and remove the key.
6. Tilt the seat forward.
7. Remove the grass chute; refer to Clearing the Grass Chute (page 34).
8. Disconnect the electrical connectors on the right side of the cutting unit.
9. Disconnect the universal joint of the driveshaft from the cutting-unit gearbox; refer to Disconnecting the Driveshaft from the Cutting-Unit Gearbox (page 71).
10. Remove the 2 hairpin cotter pins and 2 clevis pins that secure the lift arms at each side of the cutting unit (Figure 92).

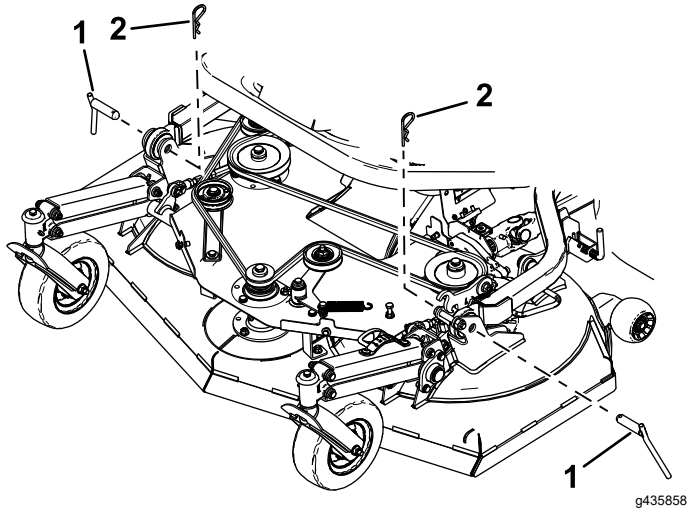


Figure 92

1. Clevis pins
2. Hairpin cotter pins

11. Roll the cutting unit forward and away from the traction unit.

Installing the Cutting Unit

1. Park the machine on a level surface.
2. Tilt the hopper back or raise the hopper and secure it with the magnetic locks in the raised position.

   Shut off the engine and remove the key.
3. Remove the grass chute; refer to Clearing the Grass Chute (page 34).
4. Roll the cutting unit rearward to the traction unit.
5. Install the hairpin cotter pin and clevis pin to secure the lift arms on each side; refer to Figure 92.
6. Connect the universal joint of the driveshaft from the cutting-unit gearbox; refer to Connecting the Driveshaft to the Cutting-Unit Gearbox (page 71).
7. Install the grass chute; refer to Clearing the Grass Chute (page 34).
8. Tilt the seat rearward.
9. Start the engine.
10. Lower the hopper.
11. Raise the cutting unit.

Removing the Belt Cover

1. Remove the 2 bolts and washers on the front of the cover (Figure 93).
2. Remove the 2 bolts and washers on the back of the cover (Figure 93).
3. Remove the belt cover from the cutting unit.

Installing the Belt Cover

1. Install the cover over the belt Figure 93.
2. Install the 2 bolts and washers on the front of the cover (Figure 93).
3. Install the 2 bolts and washers on the back of the cover (Figure 93).

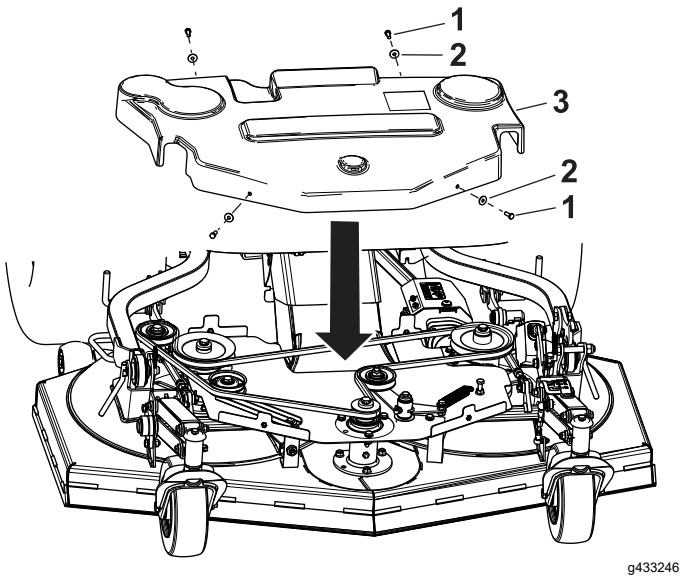


Figure 93

1. Bolt
2. Washer
3. Cover

Changing the Oil in the Cutting-Unit Gearbox

Service Interval: After the first 50 hours—Change the oil in the cutting-unit gearbox.

Every 300 hours—Change the oil in the cutting-unit gearbox.

Gearbox oil specification: PG2 and API GL4, GL5, or MT1

Gearbox oil viscosity: LSX 75W90

Gearbox oil capacity: 0.25 L (8.5 oz)

Preparing to Change the Gearbox Oil

1. Park the machine on a level surface, disengage the PTO, and lower the cutting unit.
2. Engage the parking brake, shut off the engine, and remove the key.
3. Remove the belt cover; refer to Removing the Belt Cover (page 72).

Removing the Gearbox Oil

1. Remove the cutting unit gearbox plug (Figure 94).

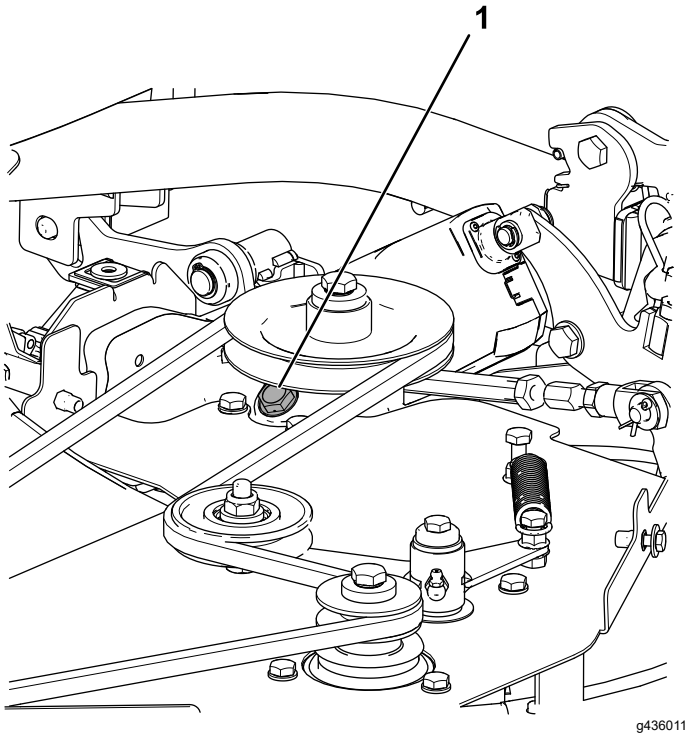


Figure 94

1. Gearbox plug

2. Place a drain pan near the cutting unit.
3. Using a siphon extract the gearbox oil from the gearbox (Figure 95).

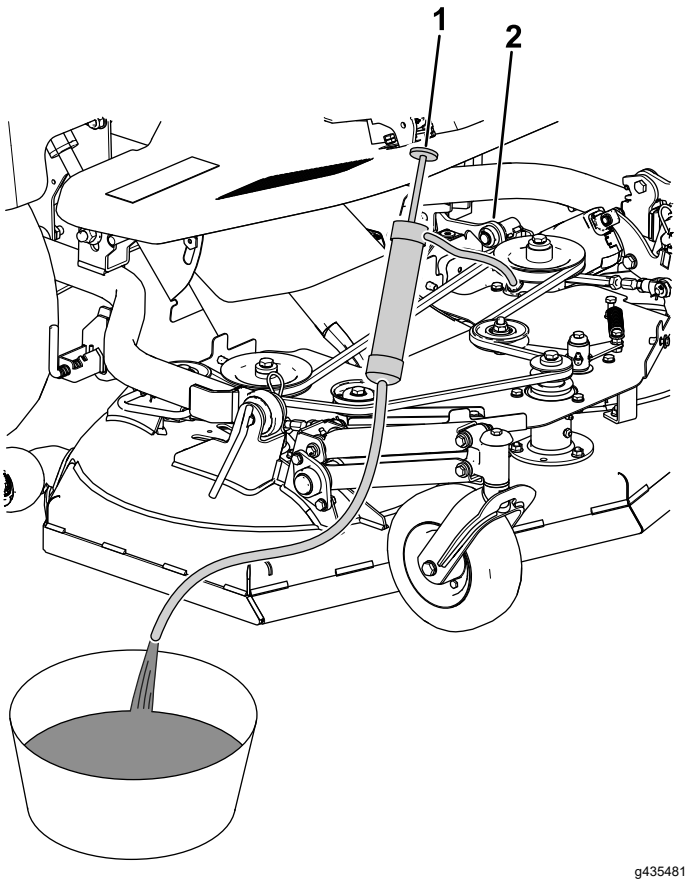
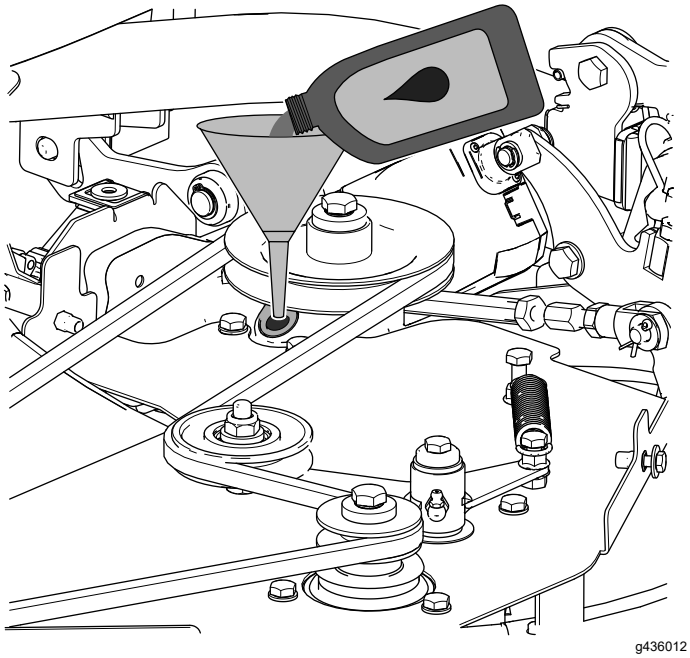


Figure 95

1. Bolt
2. Cutting-unit gearbox
3. Gearbox support

Filling the Gearbox Oil

1. Remove the plug from the cutting-unit gearbox (Figure 94).
2. Using a funnel, add the specified gearbox oil into the gearbox through the plug hole (Figure 96).



g436012

Figure 96

3. Install the plug into the cutting-unit gearbox (Figure 94).

Leveling the Cutting Unit

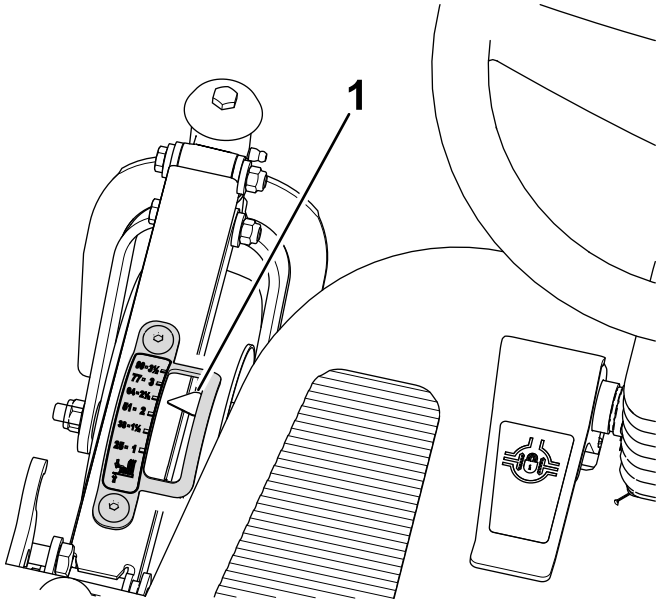
Preparing to Level the Cutting Unit

1. Park the machine on a flat level surface.
2. Lower the cutting unit and set the cutting-unit lift lever to the float position.
3. Check for bent or damaged mower blades, refer to Inspecting the Blades (page 70).

   Note: Replace bent or damaged blades and disks before leveling the cutting unit.
4. Check the tire pressure; refer to Checking the Air Pressure in the Tires (page 24).

Leveling the Cutting Unit Front to Back

1. Adjust the height of cut to the 64 mm (2-1/2 inch) position (Figure 97).



g474738

Figure 97

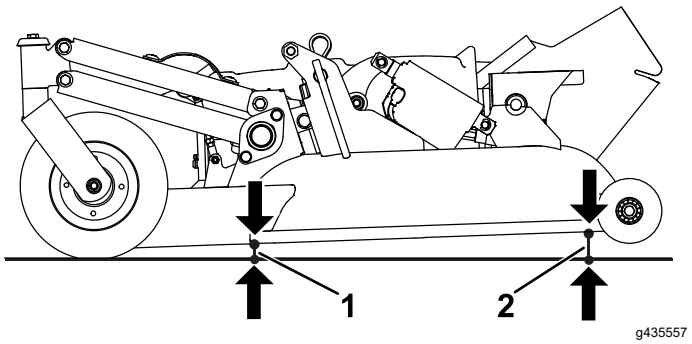
1. Height-of-cut indicator [64 mm (2-1/2 inch)]

2. Shut off the engine and remove the key.
3. Measure the distance between the ground and the forward-most point of the cutting unit (Figure 98).

Record the here: _____

4. Measure the distance between the ground and the rear-most point of the cutting unit (Figure 98).

Record the here: _____

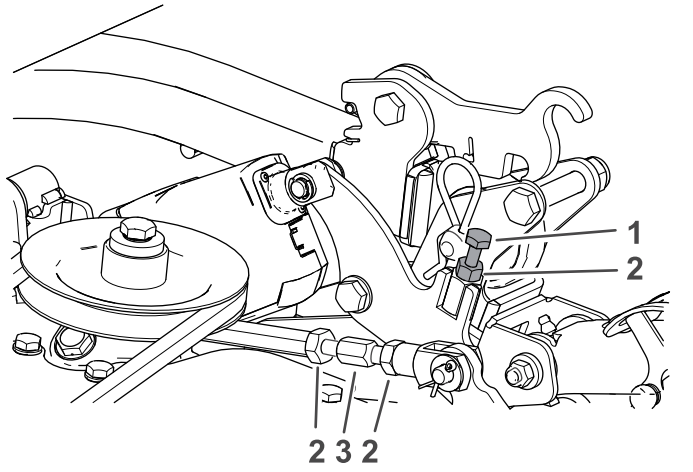


g435557

Figure 98

1. 64 mm (2-1/2 inch)
2. 69 to 79 mm (2.71 to 3.11 inches)

5. To adjust the rear of the cutting unit, perform the following:
   A. Remove the belt cover; refer to Removing the Belt Cover (page 72).
   B. To raise the front of the machine to 64 mm (2-1/2 inch), loosen the jam nut and adjust the adjustment bolt; refer to Figure 99.

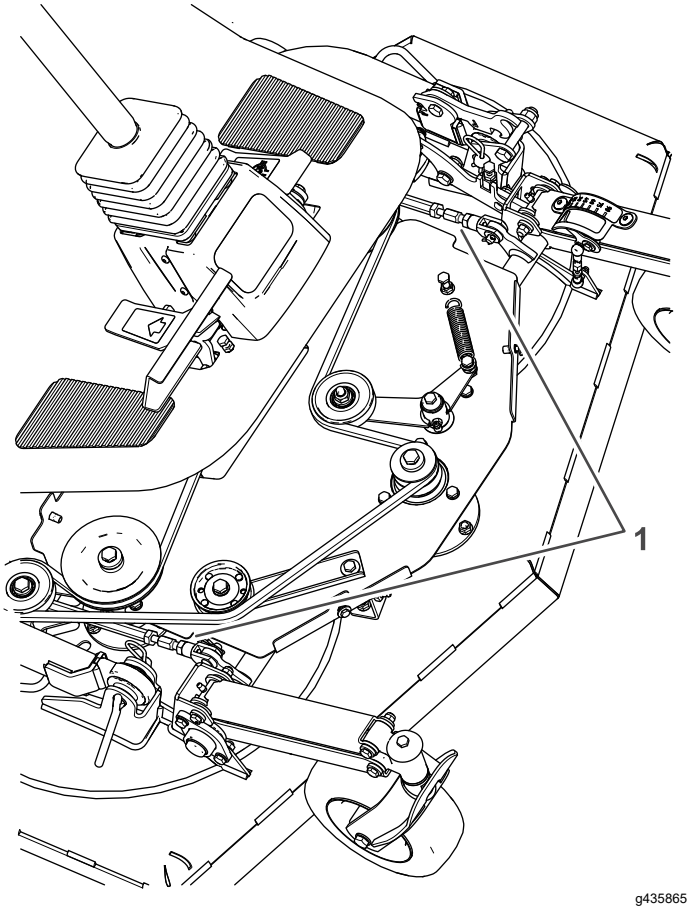


g435860

Figure 99

1. Adjustment bolt
2. Jam nut
3. Tie-rod

C. To raise the back of the cutting-unit, loosen the jam nuts for the tie-rods on both sides of the cutting unit (Figure 99 and Figure 100).



g435865

Figure 100

1. Jam nuts and tie-rods

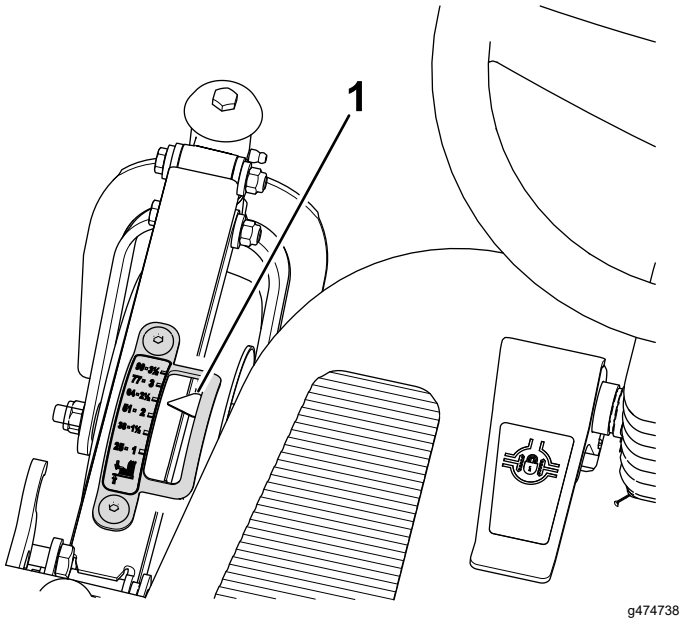
D. Rotate the tie-rods until the rear-most point of the cutting unit is 5 to 10 mm (0.20 inches to 0.39 inches) higher than the front-most point of the cutting unit.

Note: Ensure both tie-rods are adjusted the same length.

6. Tighten the jam nuts for the tie-rods (Figure 99).
7. Check the cutting unit for left to right level; refer to Leveling the Cutting Unit Left to Right (page 75).

Leveling the Cutting Unit Left to Right

1. Adjust the height of cut to the 64 mm (2-1/2 inch) position (Figure 101).



g474738

Figure 101

1. Height-of-cut indicator [64 mm (2-1/2 inch)]

2. Shut off the engine and remove the key.
3. Align a wing blade to the outermost position (Figure 102).

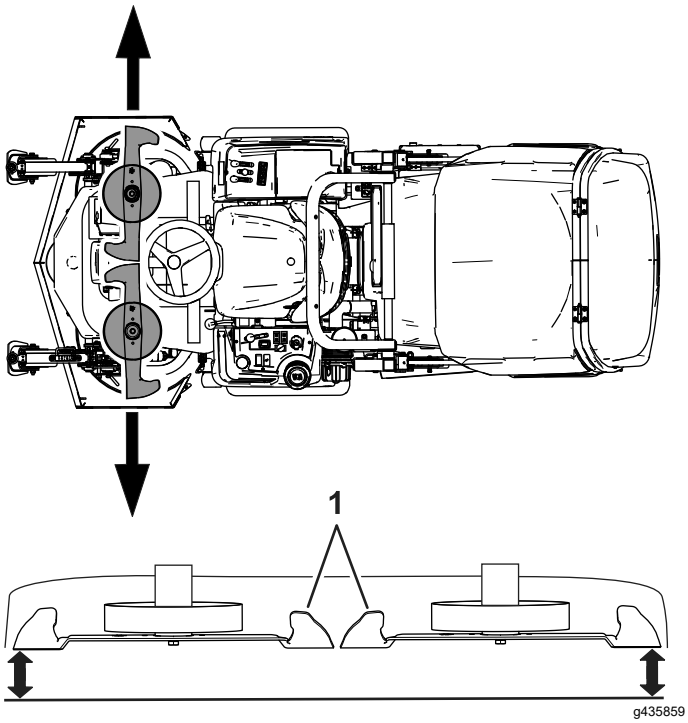


Figure 102

1. Blades

4. Measure the distance between the ground and the outermost point of the cutting edge of the blade (Figure 102).

Record your measurement here: _____

5. Align the wing blade at the other side of the cutting unit to the outermost position (Figure 102).
6. Measure the distance between the ground and the outermost point of the blade cutting edge with a gauge block (Figure 102).

Record your measurement here: _____

7. If the difference between the measurements is greater than 3.2 mm (1/8 inch), perform the following:
   A. Loosen the caster-wheel bolt on one side (Figure 103).

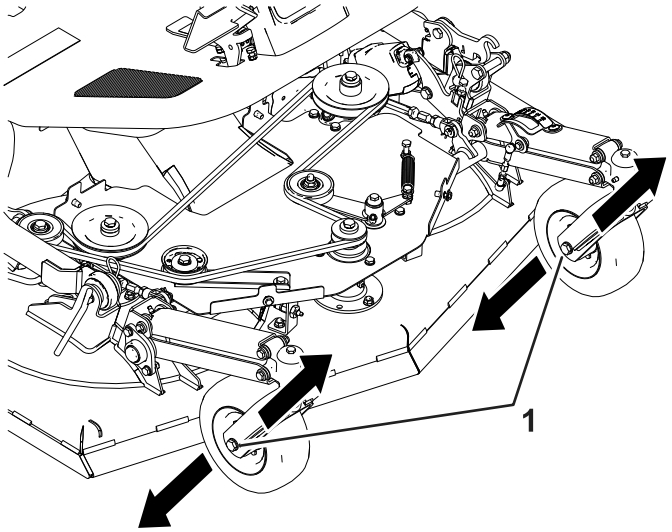


Figure 103

1. Caster-wheel bolt

   B. Adjust the caster wheel bolt in the slot and tighten the bolt (Figure 103).

   Note: If needed, adjust the opposite side caster wheel.

8. Measure the outermost point of the blade cutting edges (Figure 102).
9. Repeat the adjustment of the caster wheels until the difference between the measurements is 3.2 mm (1/8 inch) or less.
10. Install the belt cover; refer to Installing the Belt Cover (page 72).

Adjusting the Height-of-Cut Pointer

1. With the mower blades aligned front to back and the front of the blades adjusted to 64 mm (2-1/2 inch) from the ground, check the position of the height-of-cut indicator.
2. Sit in the operator's seat and look at the pointer of the height-of-cut indicator (Figure 104).

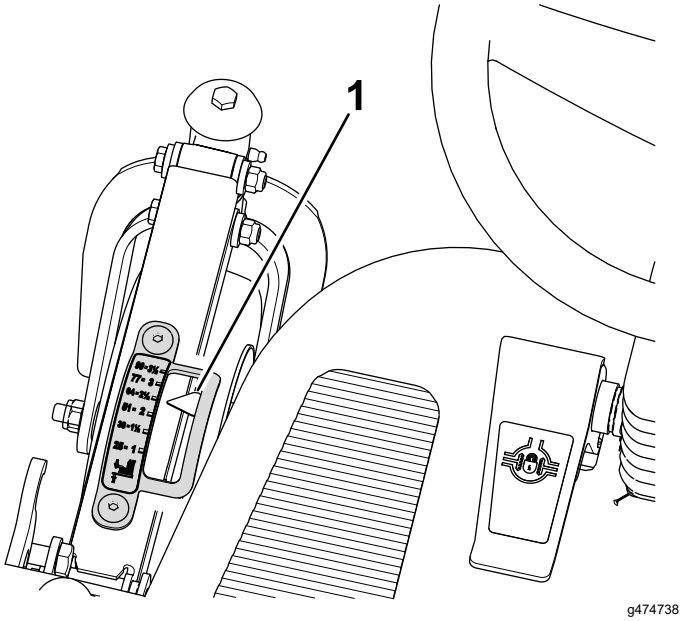


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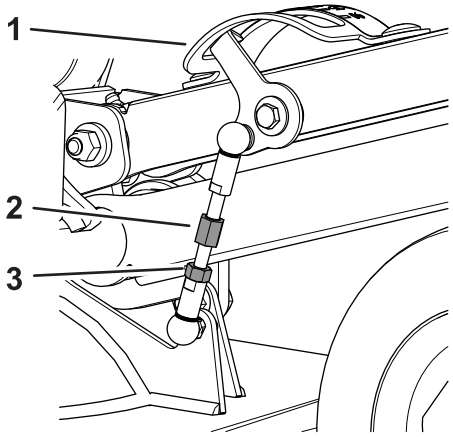
Figure 104

1. Height-of-cut indicator [64 mm (2-1/2 inch)]

3. If the pointer of the height-of-cut indicator is not aligned to 64 mm (2-1/2 inch) mark, perform the following:
   A. Loosen the jam nut that secures the height-of-cut link (Figure 105).



g435868

Figure 105

1. Pointer (height-of-cut indicator)
2. Height-of-cut link
3. Jam nut

   B. Rotate the link until the pointer of the height-of-cut indicator is aligned to 64 mm (2-1/2 inch) mark when viewed from the operator's seat (Figure 104 and Figure 105).
   C. Tighten the jam nut (Figure 105).

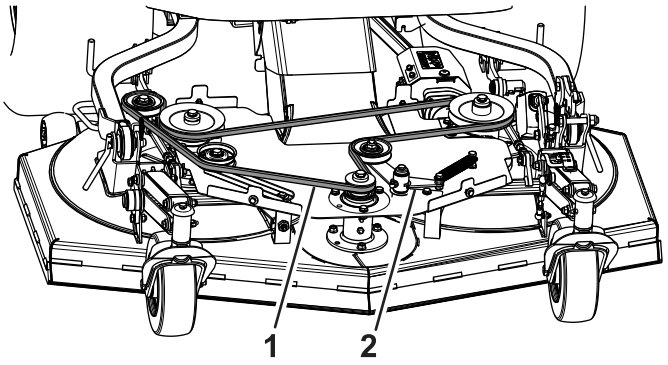
Replacing the Cutting Unit Belt

Removing the Cutting Unit Belt

1. Park the machine on a level surface, disengage the PTO, and lower the cutting unit.
2. Engage the parking brake, shut off the engine, and remove the key.
3. Remove the belt cover; refer to Removing the Belt Cover (page 72).
4. Remove the idler arm spring from the cutting unit post (Figure 106).
5. Remove the belt from the pulleys of the cutting unit.

Installing the Cutting Unit Belt

1. Route the new belt around the pulleys as shown in Figure 106.



g433222

Figure 106

1. Belt
2. Idler arm

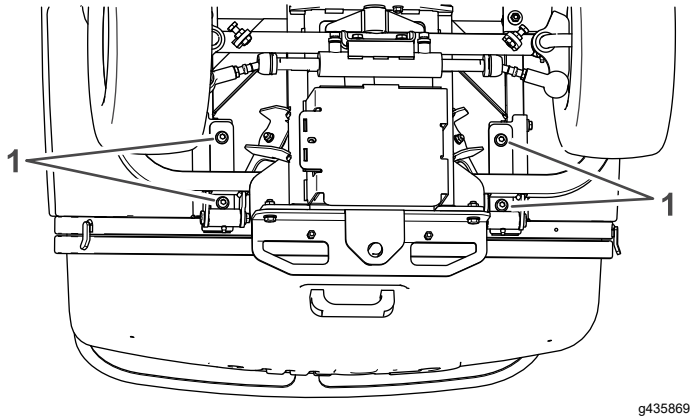
2. Install the idler arm spring onto the cutting unit post (Figure 106).
3. Install the belt cover; refer to Installing the Belt Cover (page 72).

Maintaining the Hopper

Aligning the Hopper to the Chute Seal

Ensure the hopper and chute seal properly and does not flatten the seal.

1. Loosen the 4 bolts that secure the hopper lift supports to the frame under the hopper (Figure 107).

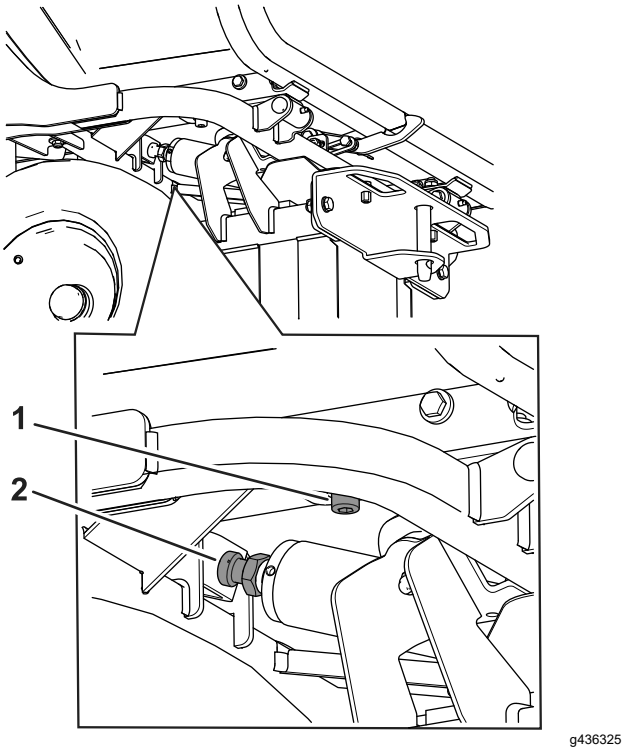


g435869

Figure 107

1. Bolts

2. If you need to get the desired movement of the hopper, loosen the safety nut at the top of the hydraulic cylinder rod (Figure 108).

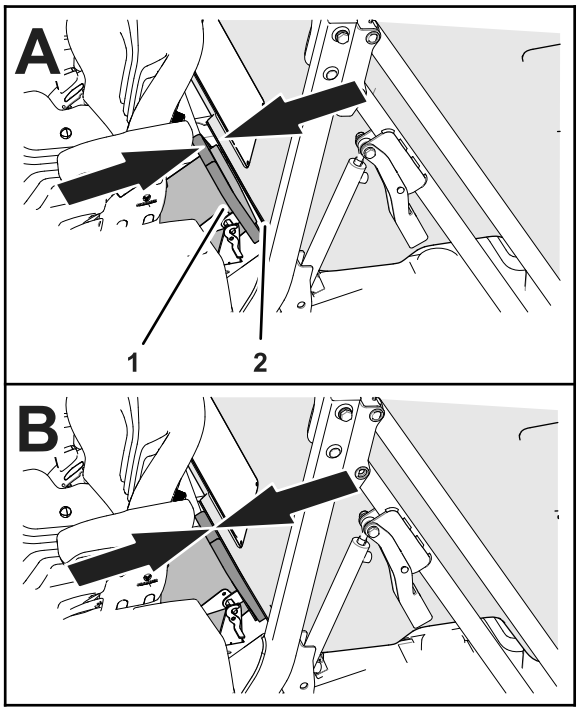


g436325

Figure 108

1. Bolt
2. Safety nut

3. Slide the hopper forward or rearward until the hopper inlet aligns with the chute seal (Figure 109).



g435870

Figure 109

1. Chute seal
2. Hopper inlet

4. Tighten the 4 bolts (Figure 107).

Adjusting the Hopper Latch

1. Check the gap between the latch and the door. Ensure it is 2 mm (0.079 inches).
2. If necessary, adjust the latch with the latch bolt to get the correct gap.

   Note: If necessary, use the door bolt to change the automatic opening angle of the door.

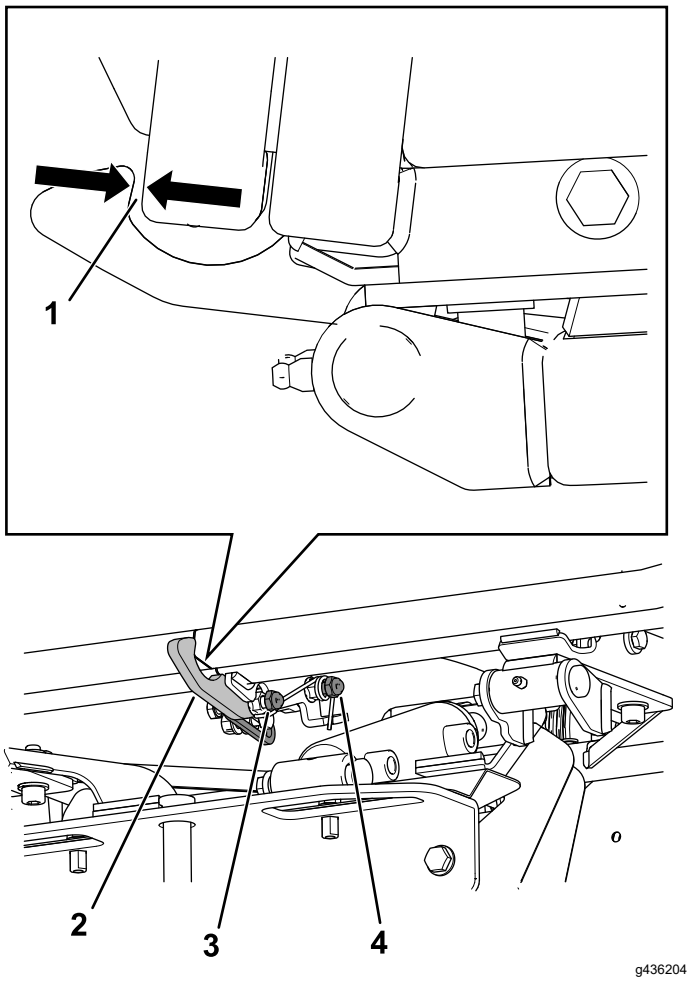


Figure 110

1. Gap (2 mm or 0.079 inches)
2. Latch
3. Latch bolt
4. Door bolt

Cleaning

Note: Improper wash-down procedures may negatively affect bearing life. Do not wash down the machine when it is still hot and avoid directing high-pressure or high-volume spray at the bearings.

Cleaning Under the Cutting Unit Belt Cover

Service Interval: Before each use or daily

1. Disengage the blade-control switch (PTO) and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Insert an air nozzle in the gap between the belt cover and the top of the cutting unit. Use compressed air to clear any accumulated grass from under the cutting unit belt cover.

Cleaning Under the Cutting Unit

Service Interval: Before each use or daily

1. Disengage the blade-control switch (PTO) and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Prepare the cutting unit for maintenance; refer to Raising and Lowering the Cutting Unit into the Maintenance Position (page 69).
4. Remove any packed grass or debris, and clean as necessary.

Cleaning the Hopper Screen

Service Interval: Before each use or daily

1. Open the hopper door.
2. Pull the release lever on the bottom of the hopper screen downward (Figure 111).

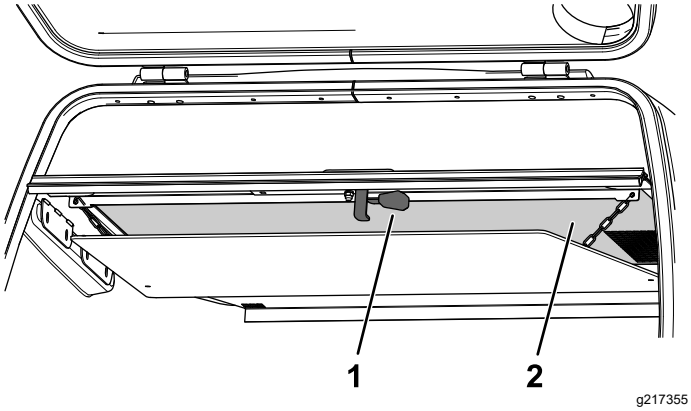


Figure 111

1. Release lever
2. Hopper screen

3. Remove the hopper screen and clean it (Figure 112).

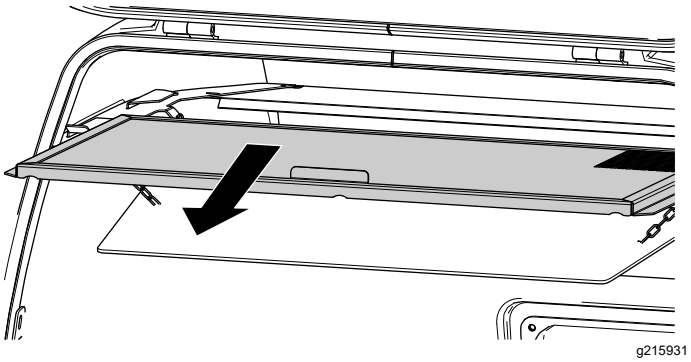


Figure 112

4. Install the hopper screen.

Disposing of Waste

Engine oil, batteries, hydraulic fluid, and engine coolant are pollutants to the environment. Dispose of these according to your state and local regulations.

Storage

Storage Safety

- Shut off the engine, remove the key, and wait for all movement to stop before you leave the operator's position. Allow the machine to cool before adjusting, servicing, cleaning, or storing it.
- Do not store the machine or fuel container where there is an open flame, spark, or pilot light, such as on a water heater or other appliance.

Storing the Battery

- Service the battery and cables as follows:
  1. Remove the battery terminals from the battery posts; refer to Removing the Battery (page 55).
  2. Clean the battery, terminals, and posts with a wire brush and baking-soda solution.
  3. Coat the cable terminals and battery posts with Grafo 112X skin-over grease (Toro Part No. 505-47) or petroleum jelly to prevent corrosion.
  4. If you plan to store the machine more than 30 days, remove the battery and charge it fully.

     Note: Slowly charge the battery for 24 hours every 60 days to prevent lead sulfation of the battery.
- Store the battery in position on the machine.
- Leave the cables disconnected if the battery is stored in the machine.
- Store the battery in a cool atmosphere to avoid quick deterioration of the charge in the battery.
- To prevent the battery from freezing, ensure that it is fully charged. The specific gravity of the electrolyte in a fully charged battery is between 1.265 to 1.299.

Preparing the Machine

Important: **Do not use brackish or reclaimed water to clean the machine.**

1. Thoroughly clean the machine, cutting unit, and the engine, paying special attention to these areas:
   - Radiator and radiator screen
   - Underneath the cutting unit
   - Under the belt covers
   - PTO shaft assembly
   - All grease fittings and pivot points
   - Remove the steering column rear access panel and clean out inside
   - Beneath the seat plate and top of the transmission
2. Check and adjust the air pressure in the tires; refer to Checking the Air Pressure in the Tires (page 24)
3. Remove, sharpen, and balance the mower blades.
4. Check for loose fasteners and tighten them as necessary.
5. Lubricate all grease fittings and apply oil to pivot points and the transmission bypass-valve pins. Wipe clean any excess lubricant.
6. Lightly sand and use touch-up paint on scratched or chipped paint, or rust. Repair any dents in the metal body.

Preparing the Engine

1. Change the engine oil and oil filter; refer to Changing the Engine Oil and Filter (page 51).
2. Start the engine and run it at idle speed for 2 minutes.
3. Shut off the engine.
4. Empty the fuel from the fuel tank, fuel lines, pump, filter, and separator.
5. Flush the fuel tank with clean diesel fuel and connect all fuel lines.
6. Thoroughly clean and service the air-cleaner assembly; refer to Servicing the Air Cleaner (page 48).
7. Seal the air-cleaner inlet and the exhaust outlet with weatherproof masking tape.
8. Secure all fuel-system fittings.
9. Check the anti-freeze protection level of the cooling system and adjust the concentration of the coolant as needed for the coldest expected temperature in your area.
10. Check the oil-filler cap and fuel-tank cap to ensure that they are secure.

Troubleshooting

Problem	Possible Cause	Corrective Action
The key switch is in the ON position, but the dash panel indicator lights do not turn on.	1. The is no current from the battery. 2. The battery electrolyte level is low. 3. The battery has no charge. 4. A fuse is bad.	1. Check the connection of the wires. 2. Check the battery electrolyte level. 3. Charge the battery. 4. Replace the fuse.
The dash panel indicator lights turn on with the key switch in the ON position, but the starter motor does not turn.	1. There is not enough current coming from the battery. 2. The traction pedal is not in the NEUTRAL position. 3. You are not sitting in the operator's seat. 4. The PTO is engaged.	1. Charge the battery. 2. Move the traction pedal to the NEUTRAL position. 3. Sit down in the operator's seat. 4. Disengage the PTO.
The engine starts only intermittently or the engine runs irregularly.	1. The air filter is bad. 2. There is sediment or dirt in the fuel.	1. Clean or replace the air filter. 2. Check and replace the fuel filter, if necessary.
The starter motor turns, but the engine does not start.	1. The fuel does not flow through the system. 2. The fuel does not flow through the system. 3. The fuel does not flow through the system. 4. The glow plugs are not warm enough when the engine is cold. 5. The glow plugs are not warm enough when the engine is cold.	1. Check the fuel-tank level. 2. Check and replace a fuel filter, if necessary. 3. Ensure that the vent on the fuel-tank cap is not blocked. 4. Wait for the glow-plug warning light to switch to the OFF position. 5. Shut off the engine and turn the key to the ON/PREHEAT position to perform a second glow cycle.
The engine shuts off while the PTO is still engaged.	1. The PTO is malfunctioning. 2. The operator leaves the seat. 3. The PTO is malfunctioning. 4. The parking brake is engaged and the traction pedal is pressed down.	1. Check the function of the PTO switch. 2. Sit down in the operator's seat. 3. Close and lower the hopper. 4. Disengage the parking brake.
The cut is uneven and collection system is insufficient.	1. The cutting unit is not parallel to the ground. 2. The cutting unit is not parallel to the ground. 3. The blade performance is poor. 4. The blade performance is poor. 5. The blade performance is poor. 6. Your speed is too fast for the grass height and condition. 7. The chute is blocked. 8. The chute is blocked. 9. The chute is blocked.	1. Ensure that the tires are properly inflated. 2. Adjust the cutting unit to ensure that it is parallel with the ground. 3. Ensure that the blades are mounted correctly. 4. Sharpen or replace the blades. 5. Adjust the PTO belt tension. 6. Slow down the travel speed. 7. Clean the chute. 8. Ensure that the maximum engine speed is 3000 rpm. 9. Clean the grass-catcher screen.
The machine vibrates while operating.	1. The blades are unbalanced. 2. Bolts are loose.	1. Balance the blades or replace them, if damaged. 2. Tighten the blade bolts, engine bolts, and frame screws if they are loose.

Problem	Possible Cause	Corrective Action
The engine-oil warning light illuminates.	1. The engine-oil pressure is insufficient. 2. The engine-oil pressure is insufficient.	1. Check the engine-oil level and fill it, if necessary. 2. Change the engine oil and engine-oil filter.
The cutting unit does not run when the PTO switch is engaged.	1. The operator is not in the seat. 2. The hopper is not in the fully lowered position.	1. Sit in the operator's seat. 2. Lower the hopper completely.

California Proposition 65 Warning Information

What is this warning?

You may see a product for sale that has a warning label like the following:

WARNING: Cancer and Reproductive Harm—www.p65Warnings.ca.gov.

What is Prop 65?

Prop 65 applies to any company operating in California, selling products in California, or manufacturing products that may be sold in or brought into California. It mandates that the Governor of California maintain and publish a list of chemicals known to cause cancer, birth defects, and/or other reproductive harm. The list, which is updated annually, includes hundreds of chemicals found in many everyday items. The purpose of Prop 65 is to inform the public about exposure to these chemicals.

Prop 65 does not ban the sale of products containing these chemicals but instead requires warnings on any product, product packaging, or literature with the product. Moreover, a Prop 65 warning does not mean that a product is in violation of any product safety standards or requirements. In fact, the California government has clarified that a Prop 65 warning "is not the same as a regulatory decision that a product is 'safe' or 'unsafe.'" Many of these chemicals have been used in everyday products for years without documented harm. For more information, go to https://oag.ca.gov/prop65/faqs-view-all.

A Prop 65 warning means that a company has either (1) evaluated the exposure and has concluded that it exceeds the "no significant risk level"; or (2) has chosen to provide a warning based on its understanding about the presence of a listed chemical without attempting to evaluate the exposure.

Does this law apply everywhere?

Prop 65 warnings are required under California law only. These warnings are seen throughout California in a wide range of settings, including but not limited to restaurants, grocery stores, hotels, schools, and hospitals, and on a wide variety of products. Additionally, some online and mail order retailers provide Prop 65 warnings on their websites or in catalogs.

How do the California warnings compare to federal limits?

Prop 65 standards are often more stringent than federal and international standards. There are various substances that require a Prop 65 warning at levels that are far lower than federal action limits. For example, the Prop 65 standard for warnings for lead is 0.5 µg/day, which is well below the federal and international standards.

Why don't all similar products carry the warning?

- Products sold in California require Prop 65 labelling while similar products sold elsewhere do not.
- A company involved in a Prop 65 lawsuit reaching a settlement may be required to use Prop 65 warnings for its products, but other companies making similar products may have no such requirement.
- The enforcement of Prop 65 is inconsistent.
- Companies may elect not to provide warnings because they conclude that they are not required to do so under Prop 65; a lack of warnings for a product does not mean that the product is free of listed chemicals at similar levels.

Why does Toro include this warning?

Toro has chosen to provide consumers with as much information as possible so that they can make informed decisions about the products they buy and use. Toro provides warnings in certain cases based on its knowledge of the presence of one or more listed chemicals without evaluating the level of exposure, as not all the listed chemicals provide exposure limit requirements. While the exposure from Toro products may be negligible or well within the "no significant risk" range, out of an abundance of caution, Toro has elected to provide the Prop 65 warnings. Moreover, if Toro does not provide these warnings, it could be sued by the State of California or by private parties seeking to enforce Prop 65 and subject to substantial penalties.