

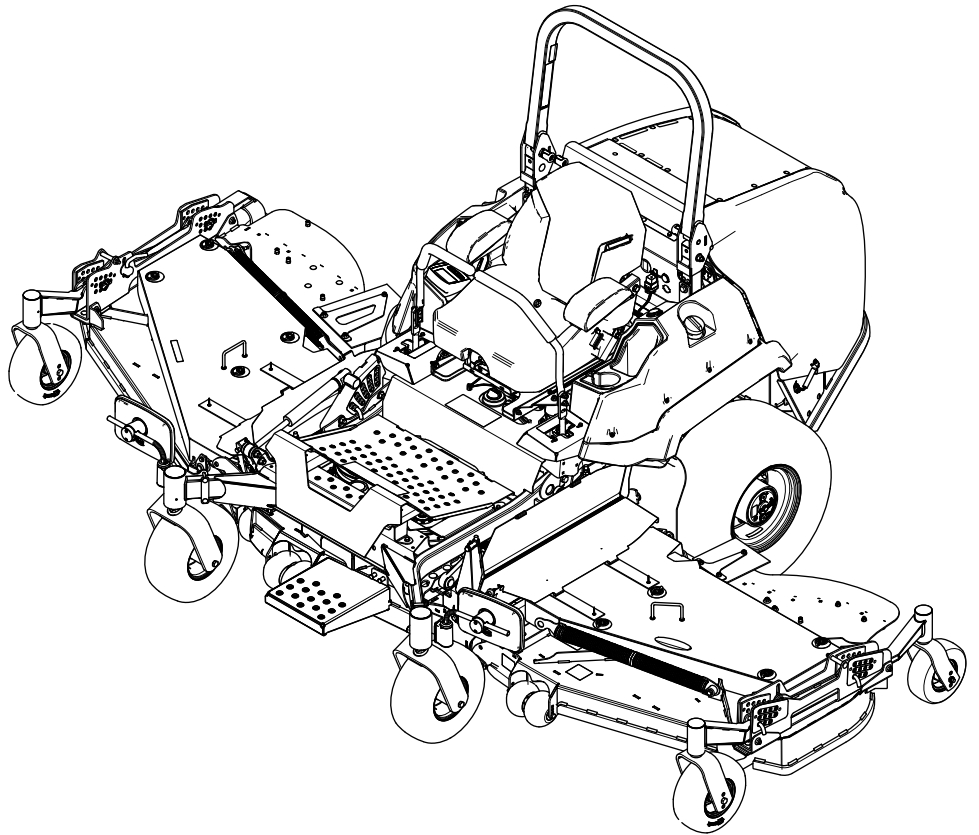


**Count on it.**

**Operator's Manual**

**Z Master<sup>®</sup> Professional 7500-D  
Series Riding Mower  
With 144in TURBO FORCE<sup>®</sup> Rear Discharge  
Mower**

Model No. 72144—Serial No. 40000000 and Up



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.

**Gross or Net Torque:** The gross or net torque of this engine was laboratory rated by the engine manufacturer in accordance with the Society of Automotive Engineers (SAE) J1940 or J2723. As configured to meet safety, emission, and operating requirements, the actual engine torque on this class of mower will be significantly lower. Please refer to the engine manufacturer's information included with the machine.

### **⚠ 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

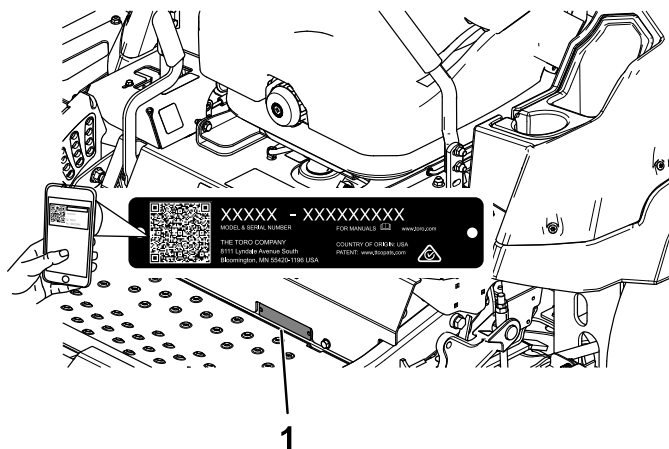
This rotary-blade, riding lawn mower is intended to be used by professional, hired operators. It is designed primarily for cutting grass on well-maintained lawns on residential or commercial properties. Using this product for purposes other than its intended use could prove dangerous to you and bystanders.

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](http://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 additional information, contact an Authorized Service Dealer or Toro Customer Service and have the model and serial numbers of your product ready. **Figure 1** identifies the location of the model and serial numbers on the product. Write the numbers in the space provided.

**Important:** With your mobile device, you can scan the QR code (if equipped) on the serial number decal to access warranty, parts, and other product information.



**Figure 1**

g235670

1. Model and serial number location

Model No. \_\_\_\_\_

Serial No. \_\_\_\_\_

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

The safety-alert symbol (Figure 2) appears both in this manual and on the machine to identify important safety messages that you must follow to avoid accidents. This symbol will appear with the word **Danger**, **Warning**, or **Caution**.

- **Danger** indicates an imminently hazardous situation which, if not avoided, **will** result in death or serious injury.
- **Warning** indicates a potentially hazardous situation which, if not avoided, **could** result in death or serious injury.
- **Caution** indicates a potentially hazardous situation which, if not avoided, **may** result in minor or moderate injury.



sa-black

**Figure 2**  
Safety-alert symbol

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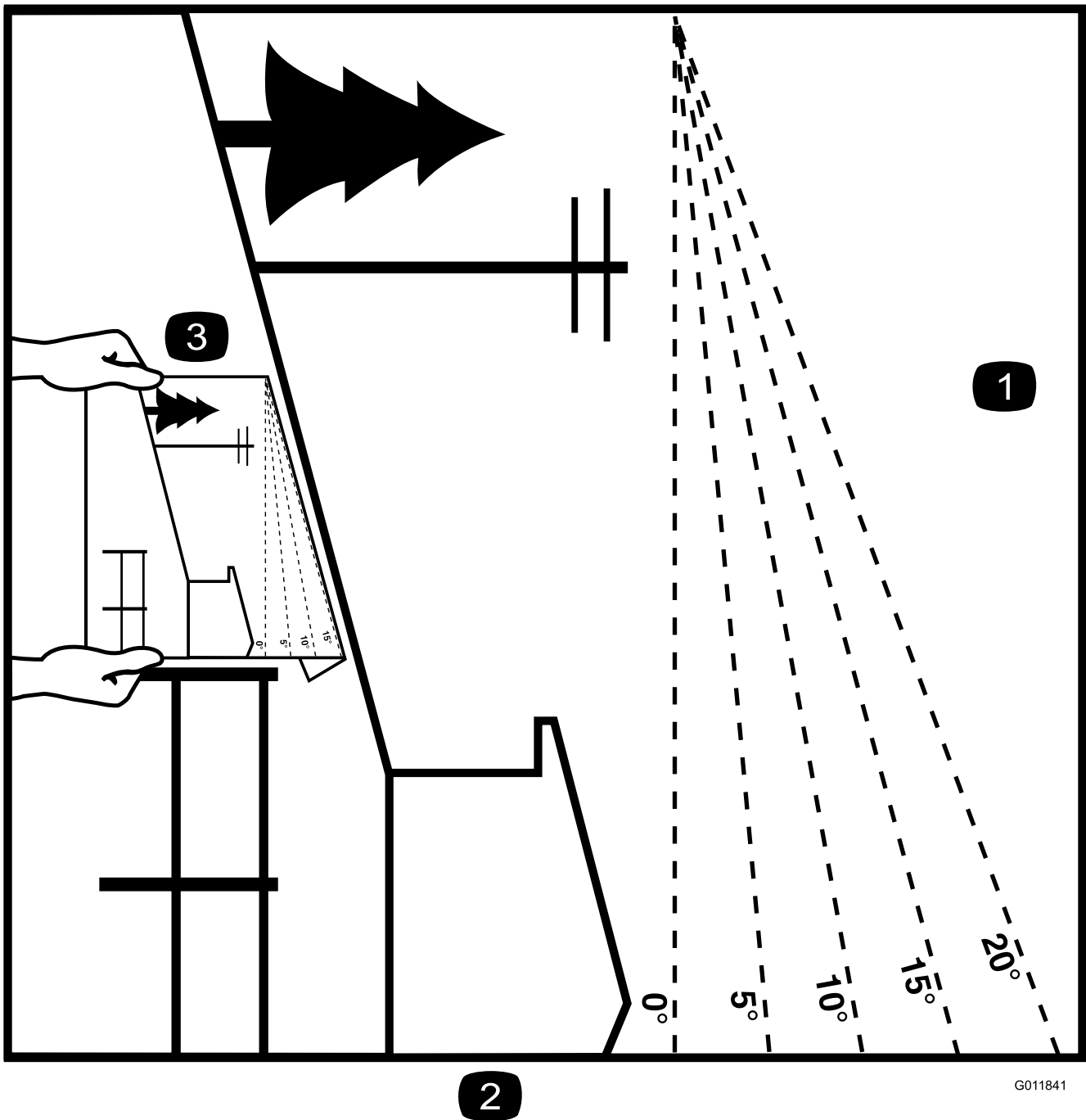
# Safety

## 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 or death.

- Read and understand the contents of this *Operator's Manual* before starting the engine.
- Keep bystanders and children away.
- Do not allow children or untrained people to operate or service the machine. Allow only people who are responsible, trained, familiar with the instructions, and physically capable to operate or service the machine.
- Always keep the roll bar in the fully raised and locked position and use the seat belt.
- Do not operate the machine near drop-offs, ditches, embankments, water, or other hazards, or on slopes greater than 15°.
- Do not put your hands or feet near moving components of the machine.
- Do not operate the machine without all guards, safety switches, and other safety protective devices in place and functioning properly.
- Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operator's position. Allow the machine to cool before servicing, adjusting, fueling, cleaning, or storing it.

# Slope Indicator



G011841

g011841

**Figure 3**

You may copy this page for personal use.

1. The maximum slope you can operate the machine on is **15 degrees**. Use the slope chart to determine the degree of slope of hills before operating. **Do not operate this machine on a slope greater than 15 degrees**. Fold along the appropriate line to match the recommended slope.
2. Align this edge with a vertical surface, a tree, building, fence pole, etc.
3. Example of how to compare slope with folded edge

# Safety and Instructional Decals



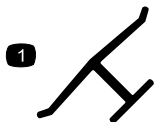
Safety decals and instructions are easily visible to the operator and are located near any area of potential danger. Replace any decal that is damaged or missing.



## Battery Symbols

Some or all of these symbols are on your battery.

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



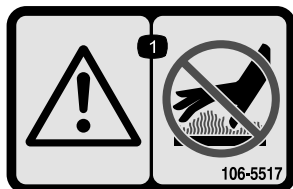
## Manufacturer's Mark

- Indicates the blade is identified as a part from the original machine manufacturer.



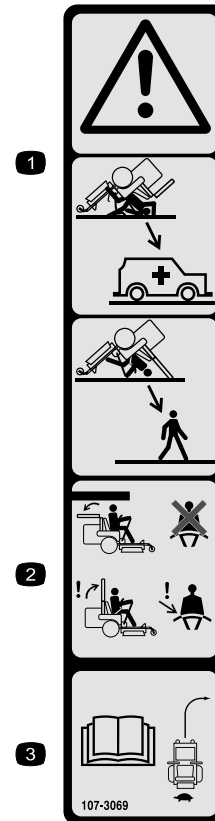
93-6687

- Do not step here.



106-5517

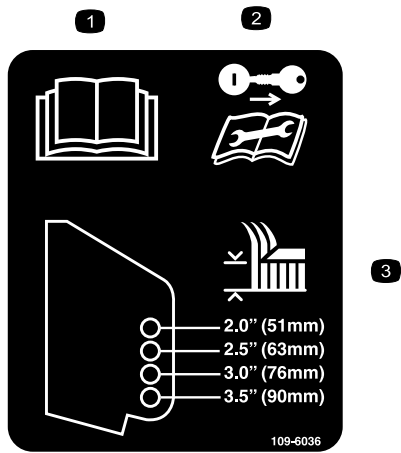
- Warning—do not touch the hot surface.



107-3069

- Warning—there is no rollover protection when the roll bar is down.
- To avoid injury or death from a rollover accident, keep the roll bar in the fully raised and locked position and wear the seat belt. Lower the roll bar only when absolutely necessary; do not wear the seat belt when the roll bar is down.
- Read the *Operator's Manual*; drive slowly and carefully.





**109-6036**

Rear Discharge Machines Only

1. Read the *Operator's Manual*.
2. Remove the key and read the instructions before servicing or performing maintenance.
3. Height of cut

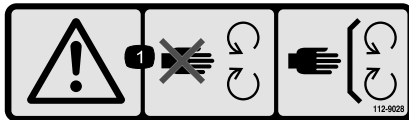
decal109-6036



**117-3276**

decal117-3276

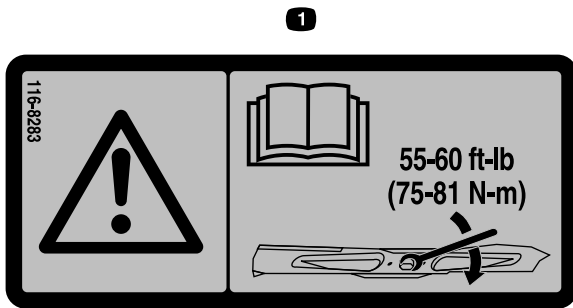
1. Engine coolant under pressure
2. Explosion hazard—read the *Operator's Manual*.
3. Warning—do not touch the hot surface.
4. Warning—read the *Operator's Manual*.



**112-9028**

decal112-9028

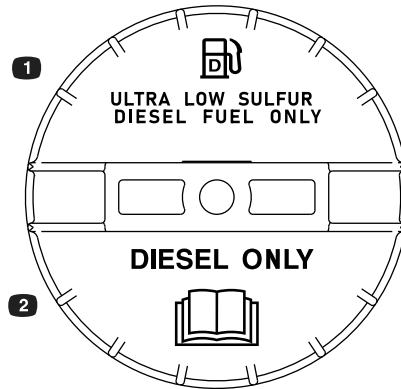
1. Warning—stay away from moving parts; keep all guards and shields in place.



**116-8283**

decal116-8283

1. Warning—read the *Operator's Manual* for instructions on torquing the blade bolt/nut to 75 to 81 N·m (55 to 60 ft-lb).



**Fuel Cap**

144-inch Deck Models Only

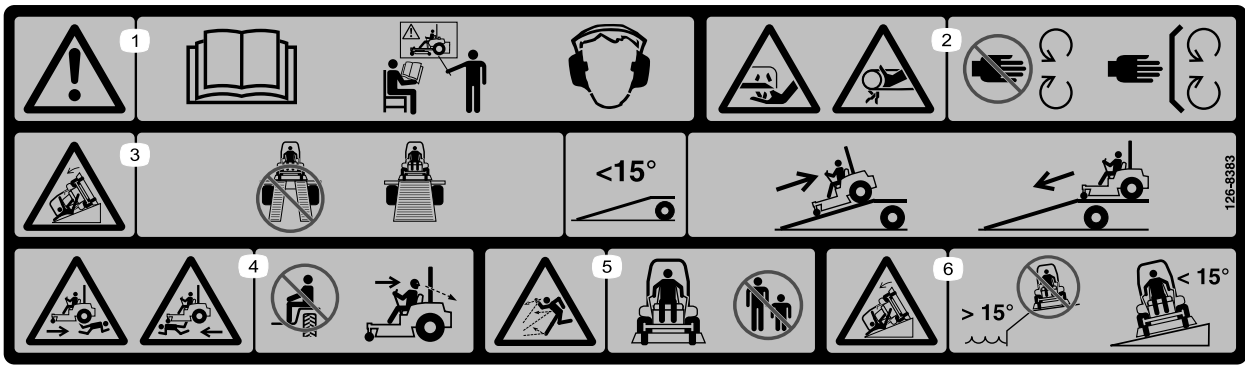
decaldieselonly

1. Ultra-Low Sulfur Diesel Fuel Only
2. Diesel Only—Read the *Operator's Manual*.



**133-8062**

decal133-8062

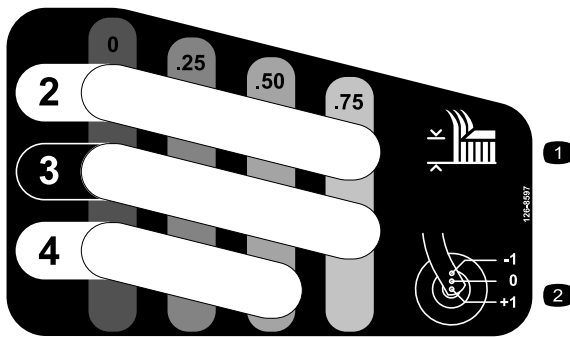


decal126-8383

**126-8383**

**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.

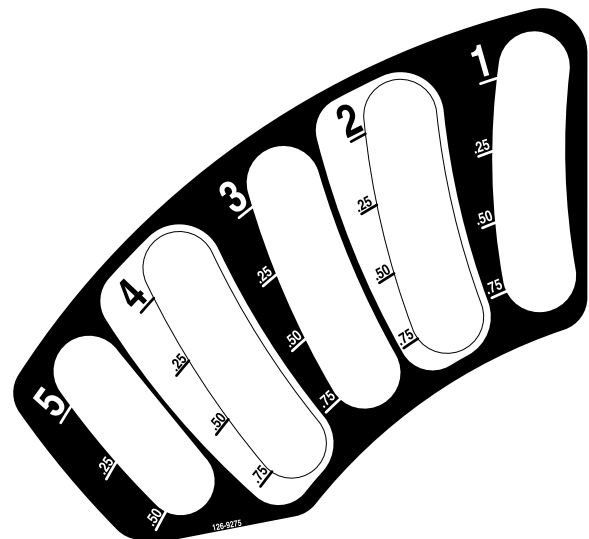
1. Warning—read the *Operator's Manual*; do not operate this machine unless you are trained; wear hearing protection.
2. Cutting/dismemberment hazard of the hand, mower blade; entanglement hazard of the hand, belt—stay away from moving parts; keep all guards and shields in place.
3. Ramp hazard—do not use dual ramps when loading onto a trailer; use 1 ramp wide enough for the machine; use a ramp with a slope less than  $15^\circ$ ; back up the ramp when loading the machine and drive forward off the ramp when unloading.
4. Runover/backover hazard—do not carry passengers; look behind you when mowing in reverse.
5. Thrown object hazard—keep bystanders away.
6. Tipping hazard—do not use the machine near drop-offs or on slopes greater than  $15^\circ$ ; only operate across slopes less than  $15^\circ$ .



decal126-8597

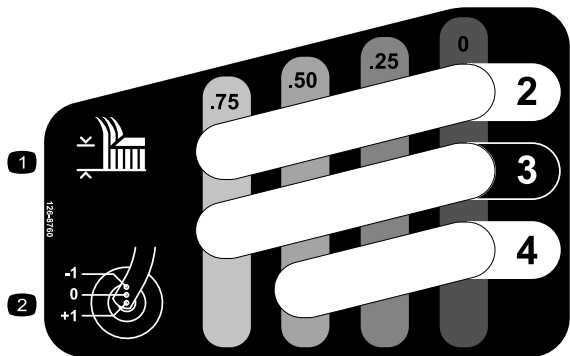
**126-8597**

1. Height of cut
2. Range adjustment



decal126-9275

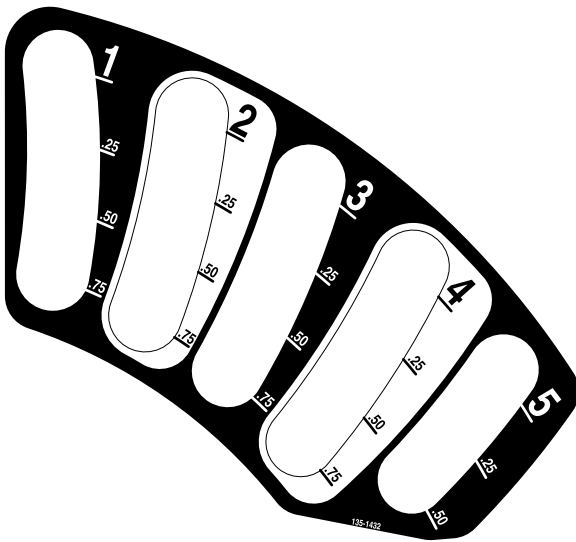
**126-9275**



decal126-8760

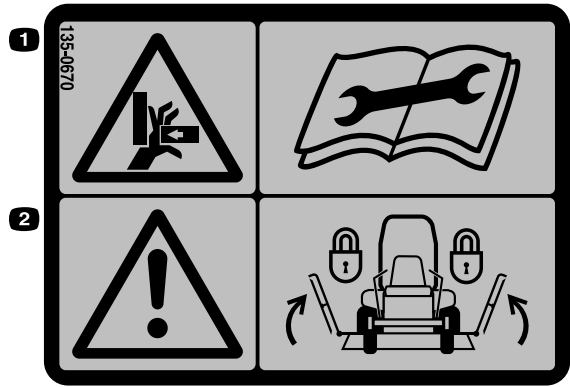
**126-8760**

1. Height of cut
2. Range adjustment



135-1432

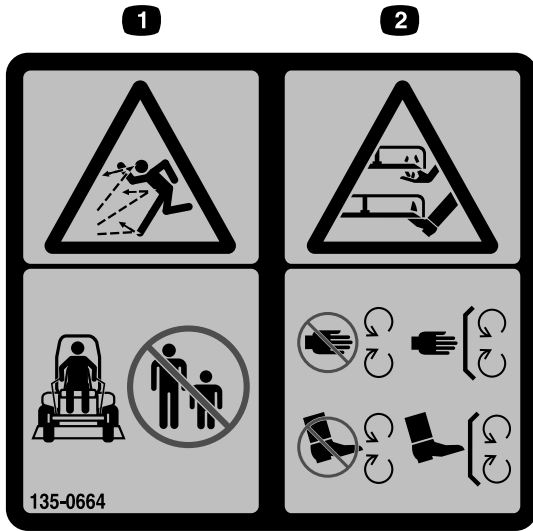
decal135-1432



135-0670

decal135-0670

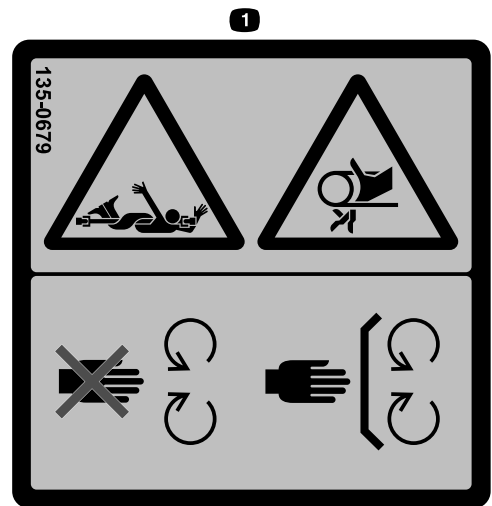
1. Crushing hazard, hand—read the instructions before servicing or performing maintenance.
2. Warning—lock the deck wings and read the instructions before servicing or performing maintenance.



135-0664

decal135-0664

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



135-0679

decal135-0679

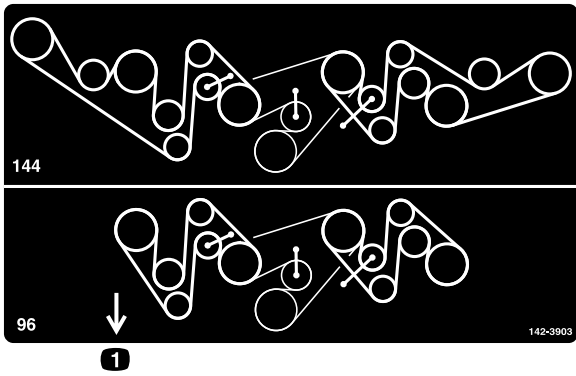
1. Rotating driveline hazard/entanglement hazard; belt—stay away from moving parts; keep all guards and shields in place.



135-2837

decal135-2837

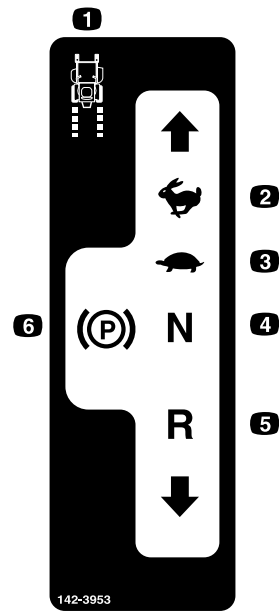
1. Read the *Operator's Manual* for more information; Use red Toro wet-clutch transmission fluid; do not use green hydraulic fluid.



142-3903

decal142-3903

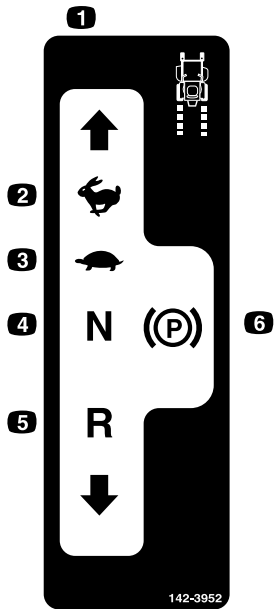
- 1. Front of the mower deck



142-3953

decal142-3953

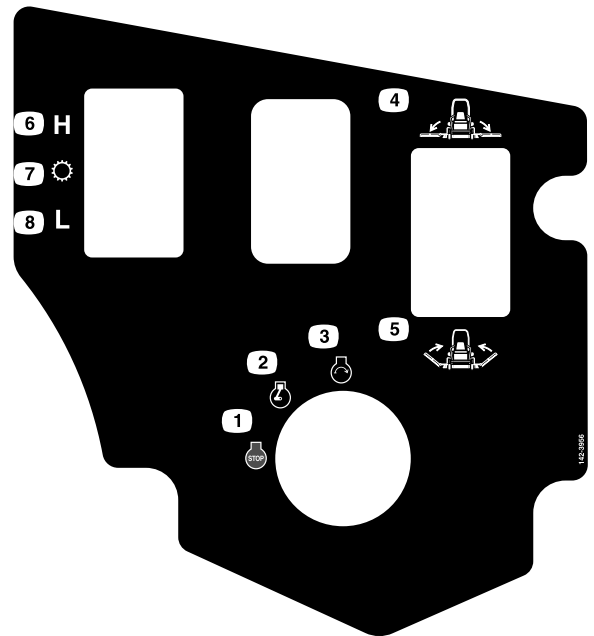
- 1. Machine speed
- 2. Fast
- 3. Slow
- 4. Neutral
- 5. Reverse
- 6. Parking brake—engaged



142-3952

decal142-3952

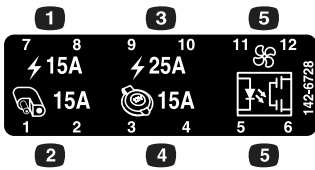
- 1. Machine speed
- 2. Fast
- 3. Slow
- 4. Neutral
- 5. Reverse
- 6. Parking brake—engaged



142-3956

decal142-3956

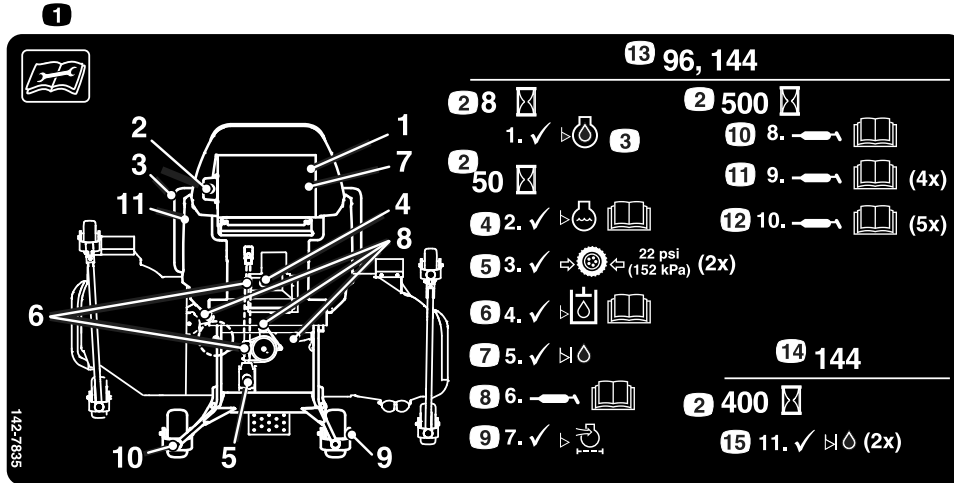
- 1. Engine—Off
- 2. Engine—On
- 3. Engine—Start
- 4. Lower the center deck and wings
- 5. Raise the center deck and wings
- 6. High range
- 7. Transmission
- 8. Low range



decal142-6728

**142-6728**

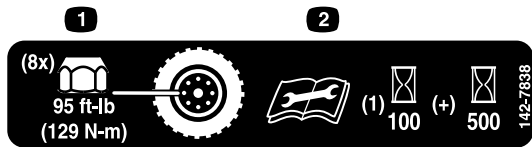
1. Chassis (15 A)
2. Accessory (15 A)
3. Main (25 A)
4. Power port (15 A)
5. Fan, photo relay



decal142-7835

**142-7835**

1. Read the instructions before servicing or performing maintenance.
2. Time interval
3. Check the engine-oil level.
4. Check the coolant level; refer to the *Operator's Manual* for further instructions.
5. Check the tire pressure (2 locations)
6. Check the hydraulic-fluid level; refer to the *Operator's Manual* for further instructions.
7. Check the oil level in jackshaft.
8. Grease the deck-drive PTO; refer to the *Operator's Manual* for further instructions.
9. Check the air cleaner
10. Grease the idler pivots; refer to the *Operator's Manual* for further instructions (3 locations)
11. Grease the front caster wheel bearings; refer to the *Operator's Manual* for further instructions (4 locations)
12. Grease the front caster pivots; refer to the *Operator's Manual* for further instructions (5 locations)
13. 96 and 144-inch Models
14. 144-inch models only
15. Check the oil level in the wheel drive gearbox (2 locations)

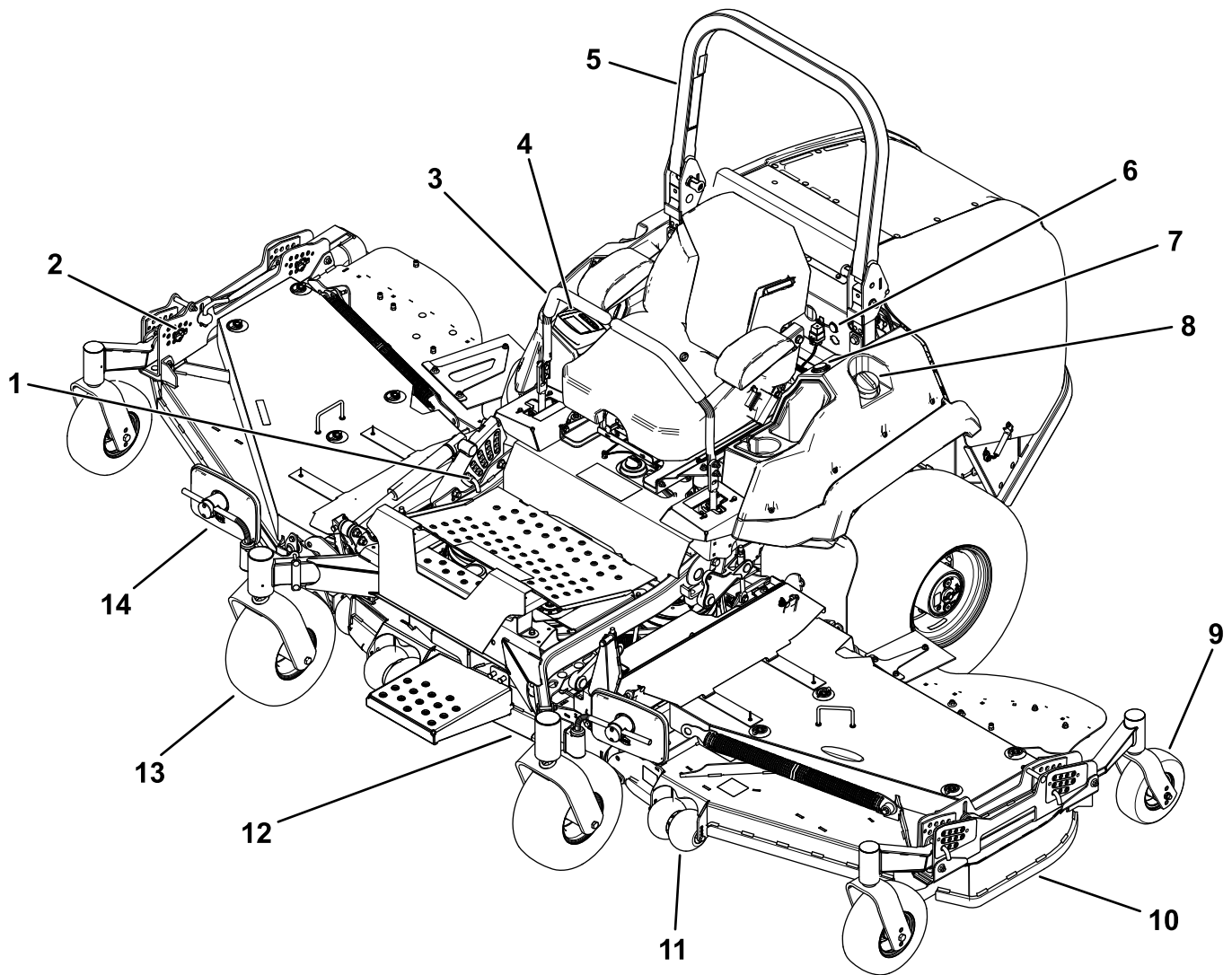


decal142-7838

**142-7838**

1. Torque the wheel lug nuts to 95 ft-lb (129 N·m) (8x)
2. Read and understand the *Operator's Manual* before performing any maintenance; check the torque after the first 100 hours, then every 500 hours, thereafter.

# Product Overview



g362295

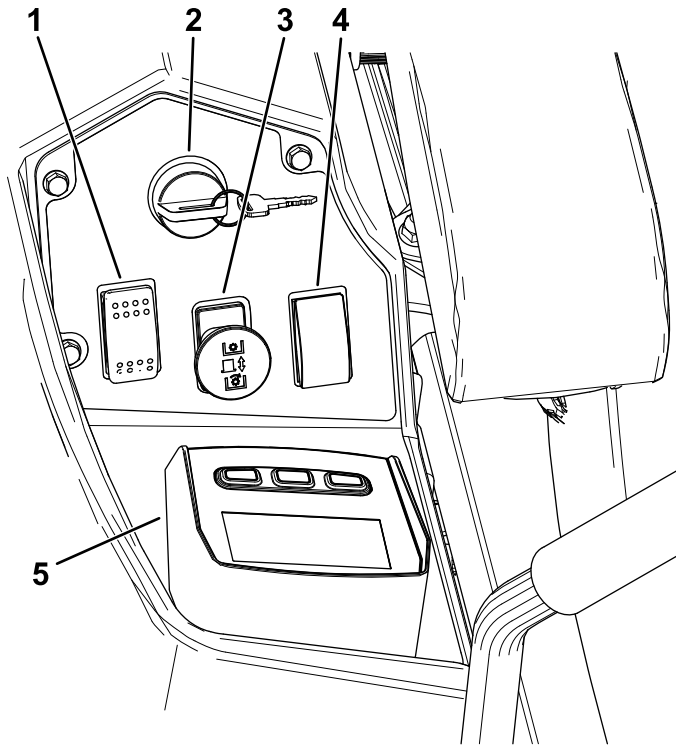
**Figure 4**

- |                                  |                           |                          |
|----------------------------------|---------------------------|--------------------------|
| 1. Center deck height-of-cut pin | 6. Audible alarm          | 11. Anti-scalp roller    |
| 2. Wing deck height-of-cut pin   | 7. Fuel gauge             | 12. Center deck          |
| 3. Motion-control lever          | 8. Fuel-tank cap          | 13. Machine caster wheel |
| 4. Display monitor               | 9. Wing deck caster wheel | 14. Mirror               |
| 5. Roll bar                      | 10. Wing deck             |                          |

# Controls

Become familiar with all the controls before you start the engine and operate the machine.

## Control Panel



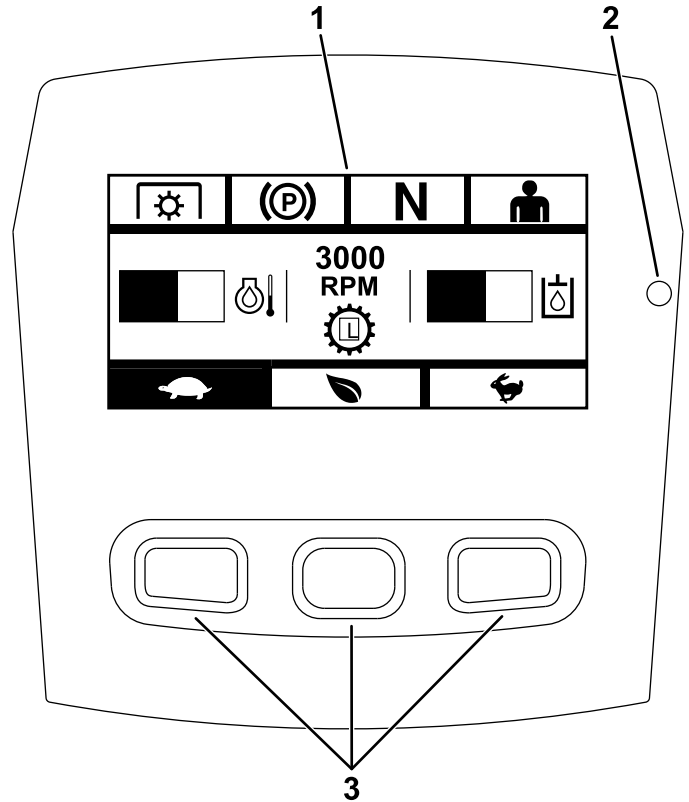
g362360

Figure 5

- |   |                                |
|---|--------------------------------|
| 1. Deck lift and wing deck fold/unfold switch | 4. High-Low speed range switch |
| 2. Key switch                                 | 5. Horizon display monitor     |
| 3. Blade-control switch (power takeoff)       |                                |

## Horizon Display Monitor

Refer to the *Software Guide* for detailed information explaining the operator interface that allows you to access information, reset counters, modify system settings, and troubleshoot the equipment.



g362697

Figure 6

Horizon Display Monitor

- |                     |            |
|---------------------|------------|
| 1. Screen           | 3. Buttons |
| 2. LED status light |            |

### Information Screen

The information screen displays information relative to machine operation; refer to the *Software Guide* for more information.

### Buttons

The multi-functional buttons are located at the bottom of the panel. The icons displayed on the information screen above the buttons indicate the current function. The buttons allow you to select the engine speed and navigate through system menus.

Refer to the *Software Guide* for more information.

### LED Status Light

The LED status light is multi-colored to indicate the system status and is located on the right side of the panel. During startup, the LED illuminates red to orange to green to verify functionality.

- **Solid green**—indicates normal operating activity
- **Blinking red**—indicates an active fault
- **Blinking green and orange**— indicates that a clutch reset is required

Refer to the *Software Guide* for more information.

### Alarm

If an error occurs, an error message displays, the LED turns red, and the alarm sounds audibly as follows:

- A fast chirp sound indicates critical errors.
- A slow chirping sound indicates less critical errors, such as required maintenance or service intervals.

**Note:** During startup, the alarm sounds briefly to verify functionality.

Refer to the *Software Guide* for more information.

### Hour Meter

The hour meter records the number of hours the engine has operated. It operates when the engine is running. Use these times for scheduling regular maintenance (Figure 6).

Hours are displayed in **Engine-Off** screen or in the **Engine Hour Counter** menu.

Refer to the *Software Guide* for more information.

## Key Switch

Use this switch to start the engine. It has 3 positions: START, RUN, and OFF.

**Note:** The LCD indicators appear when each control meets the “safe to start” mode (e.g., the indicator turns on when you are in the seat.)

**Note:** The engine ECU controls the glow plugs during cold starts. If the coolant temperature is too low, the glow symbol displays on the monitor and the starter does not crank when you turn the engine to the START position. The glow plugs activate in the ON or START position. Once the glow has been on long enough for the current temperature, the glow symbol on the monitor disappears and the engine cranks when turned to the START position.

**Note:** The system allows you to start the machine the with the PTO switch engaged, but does not engage the blades. You must reset the PTO to engage the PTO.

## Throttle Control

The throttle controls the engine speed, and there are 3 speeds: Maximum, Efficient, and Low.

Refer to the *Software Guide* for more information.

## Blade-Control Switch (Power Takeoff)

The blade-control switch (PTO) engages and disengages power to the mower blades (Figure 5).

The LCD indicator appears on the information screen when the PTO switch is disengaged.

**Note:** Machines equipped with the Horizon Display Monitor have a clutch saver, which allows the throttle to automatically reduce the engine speed when you disengage the PTO switch. Engaging and disengaging the PTO switch changes the engine throttle between the MOW and TRANSPORT modes.

**Note:** The system allows you to start the machine with the PTO switch engaged, but does not engage the blades. Engaging the PTO requires you to reset the PTO switch by disengaging, then engaging it.

**Important:** You must unfold the wing decks before you can engage the PTO.

## High-Low Speed Range Switch

This switch (Figure 5) controls the machines 2 speed ranges—high and low.

Push the switch forward to select the HIGH position.

Push the switch rearward to select the LOW position.

You can change the switch position at any time, but it is recommended that you only switch between speed ranges when the traction pedal is in neutral and the machine is stopped.

**Note:** If you have the switch in the HIGH position, you cannot lower the decks from the fully-raised position unless the machine is in neutral and the machine is stopped.



## Deck Lift and Wing Deck Fold/Unfold Switch

Push the top of the switch (Figure 5) to raise the center deck and fold the wing decks.

Push the bottom of the switch to lower the center deck and unfold the wing decks.

## Motion-Control Levers

Use the motion-control levers to drive the machine forward, reverse, and turn either direction (Figure 4).

## Parking Brake

Move the motion-control levers outward from the center to engage the parking brake (Figure 7).

**Note:** When the parking brake is activated, the parking-brake symbol appears on the display (Figure 8).

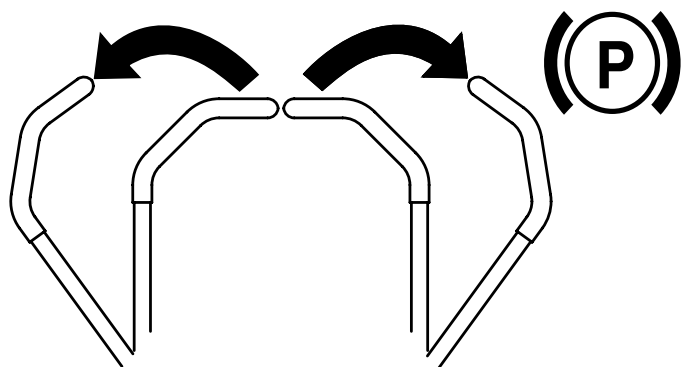


Figure 7

g362882

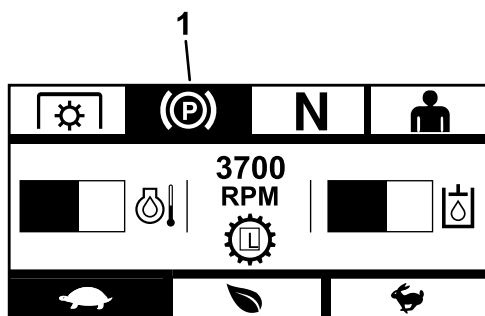


Figure 8

g363137

1. Parking brake engaged

## Specifications

Overall width	Working width—368.1 cm (144-7/8 inches)
	Transport width set at the 3-inches height of cut—211 cm (83 inches)
Overall length	257.3 cm (101-5/16 inches)
Overall height	Roll bar up—182.4 cm (71-13/16 inches)
	Roll bar down—129.5 cm (51 inches)
Tread width (center-to-center of tires, widthwise)	Drive wheels—131 cm (51-1/2 inches)
	Caster wheels—120.7 cm (47-1/2 inches)
Wheel base (center of the caster tire to the center of the drive tire)	147 cm (57-11/16 inches)
Overall weight	1483 kg (3,270 lb)

## Attachments/Accessories

A selection of Toro approved attachments and accessories is available for use with the machine to enhance and expand its capabilities. Contact your Authorized Service Dealer or authorized Toro distributor or go to [www.Toro.com](http://www.Toro.com) for a list of all approved attachments and accessories.

To ensure optimum performance and continued safety certification of the machine, use only genuine Toro replacement parts and accessories. Replacement parts and accessories made by other manufacturers could be dangerous, and such use could void the product warranty.

# Operation

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

## *Before Operation*

## Before Operation Safety

### General Safety

- Do not 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.
  - Inspect the area where you will use the machine, and remove all objects that could interfere with the operation of the machine or that the machine could throw.
  - Become familiar with the safe operation of the equipment, operator controls, and safety signs.
  - Check that operator-presence controls, safety switches, and guards are attached and working properly. Do not operate the machine unless they are functioning properly.
  - Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operator's position. Allow the machine to cool before servicing, adjusting, fueling, cleaning, or storing it.
  - Before mowing, inspect the machine to ensure that the cutting assemblies are working properly.
  - Evaluate the terrain to determine the appropriate equipment and any attachments or accessories required to operate the machine properly and safely.
  - 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 carry passengers on the machine.
  - Keep bystanders and pets away from the machine during operation. Shut off the machine and attachment(s) if anyone enters the area.
  - Do not operate the machine unless all guards and safety devices, such as the deflectors, are in place and functioning properly. Replace worn or deteriorated parts when necessary.
- ### Fuel Safety
- Fuel is extremely flammable and highly explosive. A fire or explosion from fuel can burn you and others and can damage property.
    - To prevent a static charge from igniting the fuel, remove the machine from the truck or trailer and refuel it on the ground, away from all vehicles. If this is not possible, place a portable fuel container on the ground, away from all vehicles, and fill it; then refuel the machine from the fuel container rather than from a fuel-dispenser nozzle.
    - Fill the fuel tank outdoors on level ground, in an open area, and when the engine is cold. Wipe up any fuel that spills.
    - Do not handle fuel when smoking or around an open flame or sparks.
    - Do not remove the fuel cap or add fuel to the tank while the engine is running or hot.
    - If you spill fuel, do not attempt to start the engine. Avoid creating a source of ignition until the fuel vapors have dissipated.
    - Store fuel in an approved container and keep it out of the reach of children.
  - Fuel is harmful or fatal if swallowed. Long-term exposure to vapors can cause serious injury and illness.
    - Avoid prolonged breathing of vapors.
    - Keep your hands and face away from the nozzle and the fuel-tank opening.
    - Keep fuel away from your eyes and skin.
  - 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 on other appliances.
  - Do not operate the machine without the entire exhaust system in place and in proper working condition.
  - Keep the fuel-dispenser nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete. Do not use a nozzle lock-open device.
  - If you spill fuel on your clothing, change your clothing immediately.
  - Do not overfill the fuel tank. Replace the fuel cap and tighten it securely.
  - Clean grass and debris from the cutting unit, muffler, drives, and engine compartment to help prevent fires. Clean up oil or fuel spills.

# Adding Fuel

## Recommended Fuel

The engine runs on clean, fresh diesel fuel with a minimum cetane rating of 40. Purchase fuel in quantities that can be used within 30 days to ensure fuel freshness.

Use summer-grade diesel fuel (No. 2-D) at temperatures above -7°C (20°F) and winter-grade diesel fuel (No. 1-D or No. 1-D/2-D blend) below -7°C (20°F). Use of winter-grade diesel fuel at lower temperatures provides lower flash point and pour point characteristics, therefore easing startability and lessening chances of chemical separation of the fuel due to lower temperatures (wax appearance, which may plug filters).

Using summer-grade diesel fuel above -7°C (20°F) contributes toward longer life of the pump components.

**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 ultra low sulfur.

Observe the following precautions:

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

## Filling the Fuel Tank

1. Park the machine on a level surface.
2. Engage the parking brake.
3. Shut off the engine and remove the key.
4. Clean around the fuel-tank cap.

5. Fill the fuel tank to the bottom of the filler neck (Figure 9).

**Note:** Do not fill the fuel tank completely full. The empty space in the tank allows the fuel to expand.

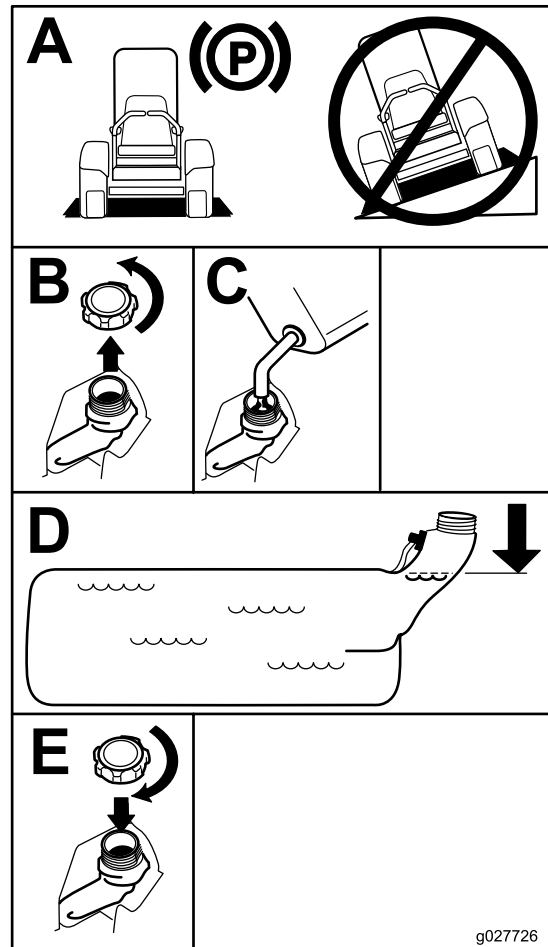


Figure 9

g027726

## Performing Daily Maintenance

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

## Breaking in a New Machine

New engines take time to develop full power. Mower decks and drive systems have higher friction when new, placing additional load on the engine. Allow 40 to 50 hours of break-in time for new machines to develop full power and best performance.

# Using the Rollover Protection System (ROPS)

## ⚠ WARNING

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

Ensure that the seat is secured to the machine.

## ⚠ WARNING

There is no rollover protection when the roll bar is 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. To lower the roll bar, apply forward pressure to the upper part of the roll bar.
2. Pull both knobs out and rotate them 90 degrees so they are not engaged (Figure 10).
3. Lower the roll bar to the down position (Figure 10).

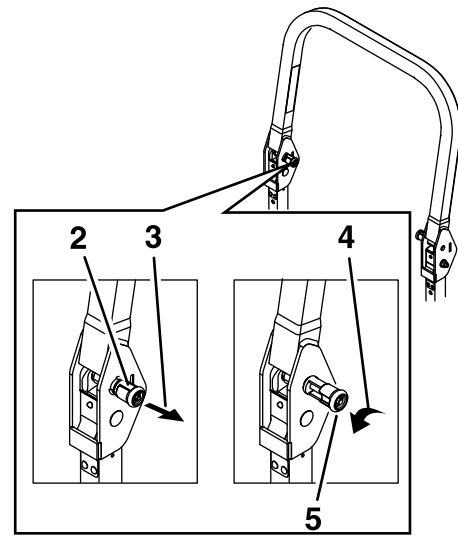


Figure 10

g225804

1. Upper part of the roll bar
2. Knob in the latched position
3. Pull the knob to unlatch.
4. Rotate the knob out 90° to hold it in the unlatched position.
5. Knob in the unlatched position

## Raising the Roll Bar

**Important:** Always use the seat belt with the roll bar in the raised position.

1. Raise the roll bar to the operating position and rotate the knobs until they move partially into the grooves (Figure 11).
2. Raise the roll bar to the full upright position while pushing on the upper roll bar so that the pins snap into position when the holes align with the pins (Figure 11).
3. Push on the roll bar and ensure that both pins are engaged (Figure 11).

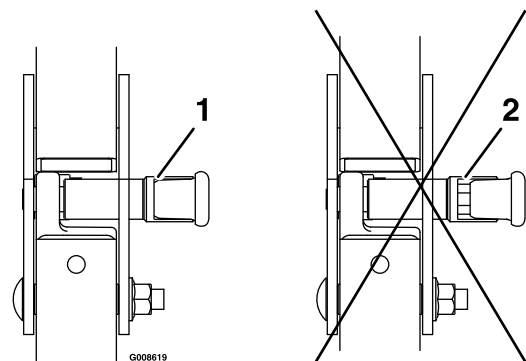


Figure 11

g008619

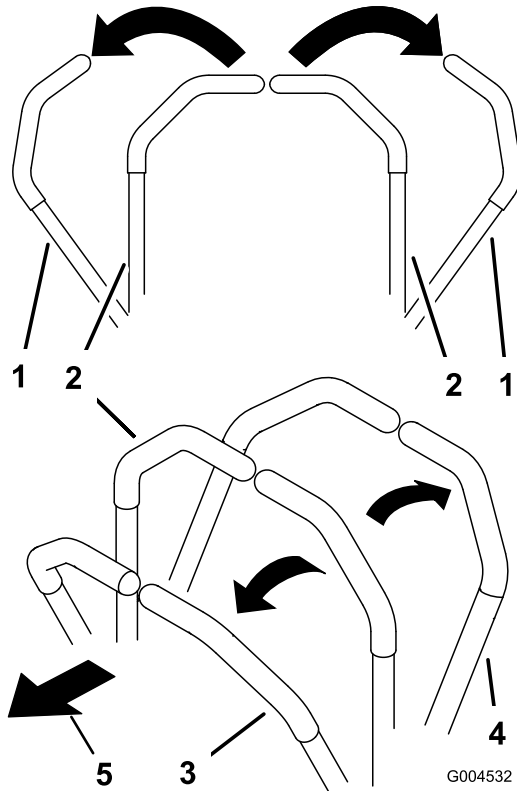
1. Engaged
2. Partially engaged—do not operate the machine with the ROPS in this position.

# Adjusting the Mirrors

While in the operating position, the mirrors should provide a wide-angle view to assist with blind spots.

Adjust the left and right mirror to ensure that you have an optimal viewing angle.

# Using the Motion-Control Levers



**Figure 12**

g004532

- 1. Motion-control levers—NEUTRAL-LOCK position
- 2. Center, unlocked position
- 3. Forward
- 4. Reverse
- 5. Front of the machine

# Checking the Safety-Interlock System

Service Interval: Before each use or daily

## ⚠ WARNING

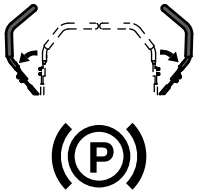



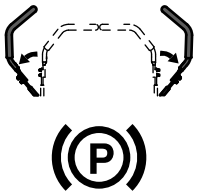



If the safety-interlock switches are disconnected or damaged, the machine could operate unexpectedly, causing personal injury.

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

**Note:** If machine does not pass any of these tests, do not operate the machine. Contact an Authorized Service Dealer.

**Note:** To prevent engine cut-outs on rough terrain, the seat has a half-second delay before the engine begins to shutdown.

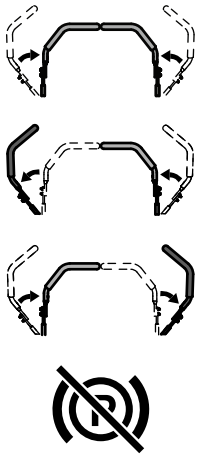



## Checking the Normal Engine-Starting Chart

	System			
	Motion Control Levers/Parking Brake	PTO	Operator	Outcome
State of the System	Both Levers Out = Parking Brake Engaged 	Blades disengaged 	In the seat or out of the seat 	Starter should crank 
	Both Levers Out = Parking Brake Engaged 	Up position, but blades disengaged* 	In the seat or out of the seat 	Starter should crank 

\*: The starter will crank with the PTO switch in the ON (pulled up) position; however, the system will disengage the PTO and a reset PTO error will occur. Engaging the PTO will require the operator to reset the PTO switch by turning it OFF (pushed down) and then turning it ON.


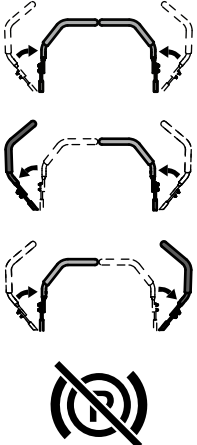


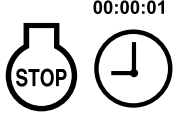

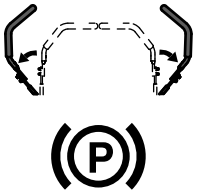



# Checking the Engine-Starting Circuit Chart

**Note:** In the **Checking the Engine-Starting Circuit Chart**, the state of system item that is in bold text is being checked in each scenario.

	System			
	<b>Motion Control Levers/Parking Brake</b>	<b>PTO (Blades)</b>	<b>Operator</b>	<b>Outcome</b>
<b>State of the System</b>	<p>Both levers moved in, or right or left lever moved in = Parking Brake Disengaged</p> 	<p>Disengaged</p> 	<p>Operator in the seat</p> 	<p>Starter must not crank</p> 

# Checking the Shutdown-Circuit Chart


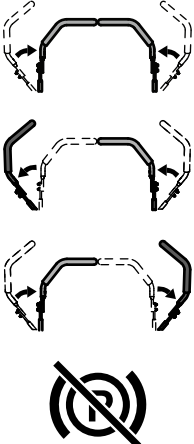
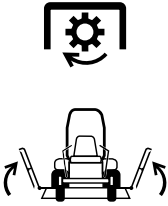


**Note:** The state of the system items in bold text are being checked in each scenario.

	System				
	Engine	Motion Control Levers/Parking Brake	PTO (Blades)	Operator	Outcome
State of the System	Running idle (1/3 throttle or efficient mode) 	Both levers moved in, or right or left lever moved in = Parking Brake Disengaged 	Disengaged 	Raise off the seat (but do not get off) 	Engine must begin shutdown within 1 second 
	Running idle (1/3 throttle or efficient mode) 	Both Levers Out = Parking Brake Engaged 	Engaged 	Raise off the seat (but do not get off) 	PTO must begin shutdown within 1 second; engine stays running. 

## Checking the Shutdown-Circuit Chart (continued)

	System				
	Engine	Motion Control Levers/Parking Brake	PTO (Blades)	Operator	Outcome



<p><b>State of System</b></p>	<p>Running idle (1/3 throttle or efficient mode)</p> 	<p>Both levers moved in, or right or left lever moved in = Parking Brake Disengaged</p> 	<p><b>Engaged and Deck wings up</b></p> 	<p>Operator in the seat</p> 	<p><b>PTO must begin shutdown within 1 second; engine stays running.</b></p> <p>00:00:01</p> 
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## Positioning the 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, move the lever sideways to unlock the seat (Figure 13).

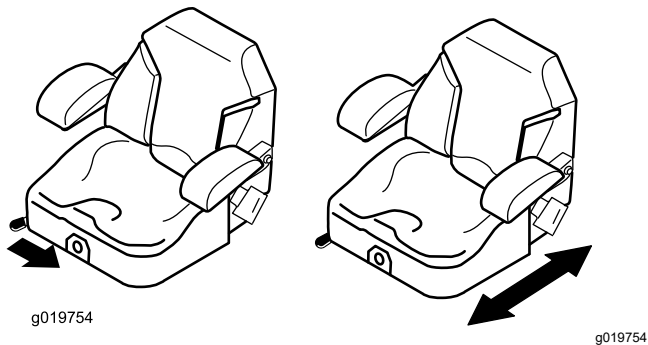


Figure 13

## Unlatching the Seat

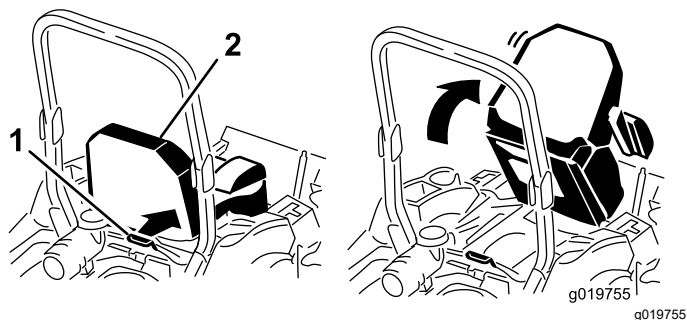


Figure 14

1. Seat latch

2. Seat

## Changing the Seat Suspension

The seat is adjustable to provide a smooth and comfortable ride. Position the seat where you are most comfortable.

To adjust it, turn the knob in front either direction to provide the best comfort (Figure 15).

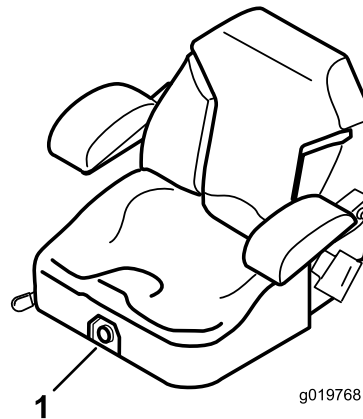


Figure 15

1. Seat-suspension knob

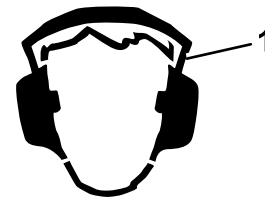
# ***During Operation***

## **During Operation Safety**

### **General Safety**

- The owner/operator can prevent and is responsible for accidents that may cause personal injury or property damage.
- 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 while ill, tired, or under the influence of alcohol or drugs.
- Contacting the blade can result in serious personal injury. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position. When you turn the key to the OFF position, the engine should shut off and the blade should stop. If not, stop using your machine immediately and contact an Authorized Service Dealer.
- Operate the machine only in good visibility and appropriate weather conditions. Do not operate the machine when there is the risk of lightning.
- Keep your hands and feet away from the cutting units. Keep clear of the discharge opening.
- Do not mow in reverse unless it is absolutely necessary. Always look down and behind you before moving the machine in reverse.
- Use extreme care when approaching blind corners, shrubs, trees, or other objects that may block your view.
- Stop the blades whenever you are not mowing.
- If the machine strikes an object or starts to vibrate, immediately shut off the engine, remove the key (if equipped), and wait for all moving parts to stop before examining the machine for damage. 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.
- Before you leave the operating 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 moving parts to stop.

- Operate the engine only in well-ventilated areas. Exhaust gases contain carbon monoxide, which is lethal if inhaled.
- Never leave a running machine unattended.
- Attach towed equipment to the machine only at the hitch point.
- Do not operate the machine unless all guards and safety devices, such as the deflectors, are in place and functioning properly. Replace worn or deteriorated parts when necessary.
- Use only accessories and attachments approved by Toro.
- This machine produces sound levels in excess of 85 dBA at the operator's ear and can cause hearing loss through extended periods of exposure.



**Figure 16**

g229846

1. Wear hearing protection.

- 
- Clean grass and debris from the cutting unit, drives, muffler, and engine to help prevent fires.
  - Start the engine with your feet well away from the blades.
  - Be aware of the mower discharge path and direct the discharge away from others. Avoid discharging material against a wall or obstruction because the material may ricochet back toward you.
  - Stop the blades, slow down the machine, and use caution when crossing surfaces other than grass or when transporting the machine to and from the operating area.
  - Do not change the engine governor speed or overspeed the engine.
  - Children are often attracted to the machine and the mowing activity. Never assume that children will remain where you last saw them.
  - Keep children out of the operating area and under the watchful care of a responsible adult other than the operator.
  - Be alert and shut off the machine if children enter the operating area.
  - Before backing up or turning the machine, look down and all around for small children.
  - Do not carry children on the machine, even when the blades are not moving. Children could fall

off and be seriously injured or prevent you from safely operating the machine. Children who have been given rides in the past could appear in the operating area without warning and be run over or backed over by the machine.

Changes in the terrain, such as moisture, can quickly affect the operation of the machine on a slope.

## **Rollover Protection System (ROPS) Safety**

- The ROPS is an integral safety device. Do not remove any of the ROPS components from the machine.
  - Ensure that the seat belt is attached and that you can release it quickly in an emergency.
  - Keep the roll bar in the fully raised and locked position and always wear your seat belt whenever the roll bar is up.
  - Check carefully for overhead objects before you drive under them, and do not contact them.
  - Replace damaged ROPS components. Do not repair or alter them.
  - There is no rollover protection when the roll bar is down.
  - Wheels dropping over edges, over steep banks, or into water can cause a rollover, which may result in serious injury or death.
  - Do not wear the seat belt when the roll bar is down.
  - Lower the roll bar only when absolutely necessary; raise it as soon as clearance permits.
  - In the event of a rollover, take the machine to an Authorized Service Dealer to inspect the ROPS.
  - Use only Toro approved accessories and attachments for the ROPS.
- Identify hazards at the base of the slope. Do not operate the machine near drop-offs, ditches, embankments, water, or other hazards. The machine could suddenly roll over if a wheel goes over the edge or the edge collapses. Keep a safe distance (twice the width of the machine) between the machine and any hazard. Use a walk-behind machine or a hand trimmer to mow the grass in these areas.
  - Avoid starting, stopping, or turning the machine on slopes. Avoid making sudden changes in speed or direction; turn slowly and gradually.
  - Do not operate a machine under any conditions where traction, steering, or stability is in question. 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. The machine can slide even if the drive wheels are stopped.
  - Remove or mark obstacles such as ditches, holes, ruts, bumps, rocks, or other hidden hazards. Tall grass can hide obstacles. Uneven terrain could overturn the machine.
  - Use extra care while operating with accessories or attachments. These can change the stability of the machine and cause a loss of control. Follow directions for counterweights.
  - If possible, keep the deck lowered to the ground while operating on slopes. Raising the deck while operating on slopes can cause the machine to become unstable.

## **Slope Safety**

- Slopes are a major factor related to loss of control and rollover accidents, which can result in severe injury or death. The operator is responsible for safe slope operation. Operating the machine on any slope requires extra caution. Before using the machine on a slope, do the following:
  - Review and understand the slope instructions in the manual and on the machine.
  - Use an angle indicator to determine the approximate slope angle of the area.
  - Never operate on slopes greater than 15°.
  - Evaluate the site conditions of the day to determine if the slope is safe for machine operation. Use common sense and good judgment when performing this evaluation.

# Lowering the Wing Decks

**Important:** You must unfold the wing decks before you can engage the PTO.

1. Remove the clevis pin and hairpin cotter that secures each wing in the upright position and place them in the storage position (Figure 18 and Figure 19).

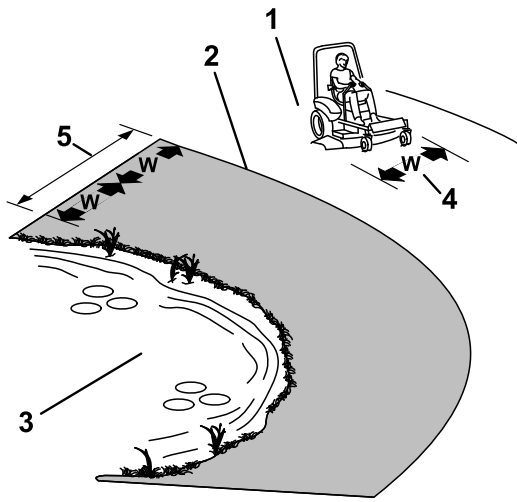


Figure 17

g221745

1. Safe Zone—use the machine here on slopes less than 15° or flat areas.
2. Danger Zone—use a walk-behind mower and/or a hand trimmer on slopes greater than 15° and near drop-offs or water.
3. Water
4. W = Width of the machine
5. Keep a safe distance (twice the width of the machine) between the machine and any hazard.

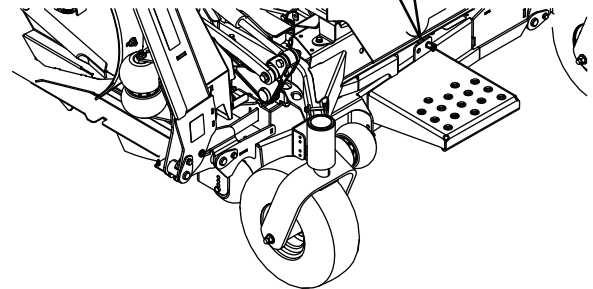
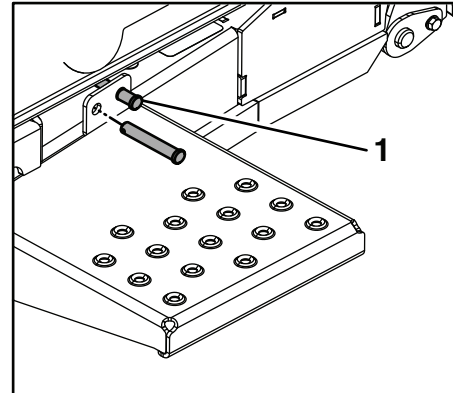
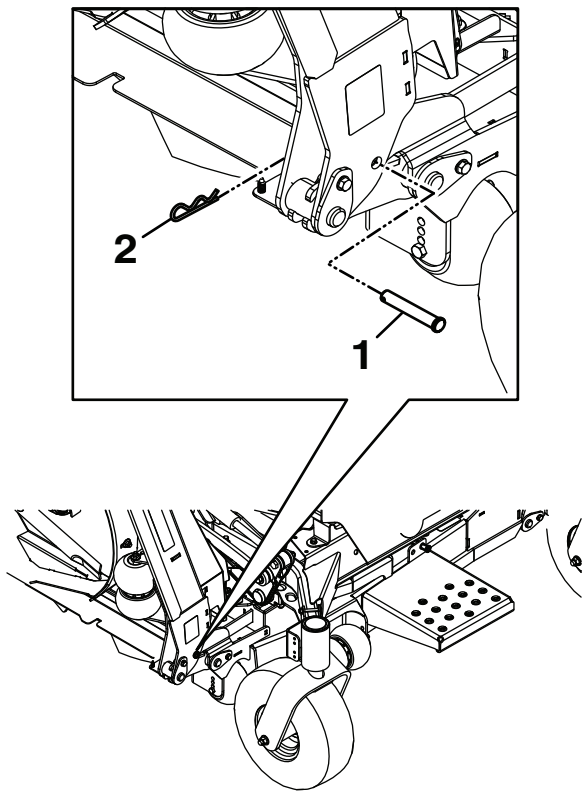


Figure 18

g363149

1. Pin storage location



**Figure 19**

g363150

1. Clevis pin

2. Hairpin

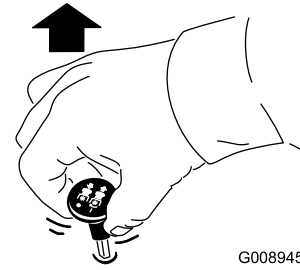
2. Ensure that all persons are clear of the deck wings.
3. Press and hold the bottom of the deck-lift switch; the wing decks lower first, then the center deck.

## Operating the Mower Blade-Control Switch (PTO)

The blade-control switch (PTO) starts and stops the mower blades and any powered attachments.

### Engaging the Blade-Control Switch (PTO)

**Note:** Engaging the blade-control switch (PTO) with the throttle position at half or less causes excessive wear to the drive belts.

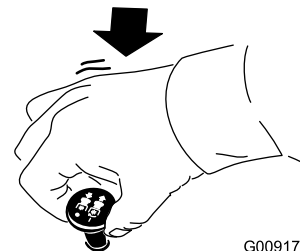


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**Figure 20**

### Disengaging the Blade-Control Switch (PTO)



G009174

g009174

**Figure 21**

# Starting the Engine

**Important:** Do not engage the starter for more than 5 seconds at a time. If the engine fails to start, wait 15 seconds between attempts. Failure to follow these instructions can burn out the starter motor.

**Note:** You may need multiple attempts to start the engine the first time after adding fuel to an empty fuel system.

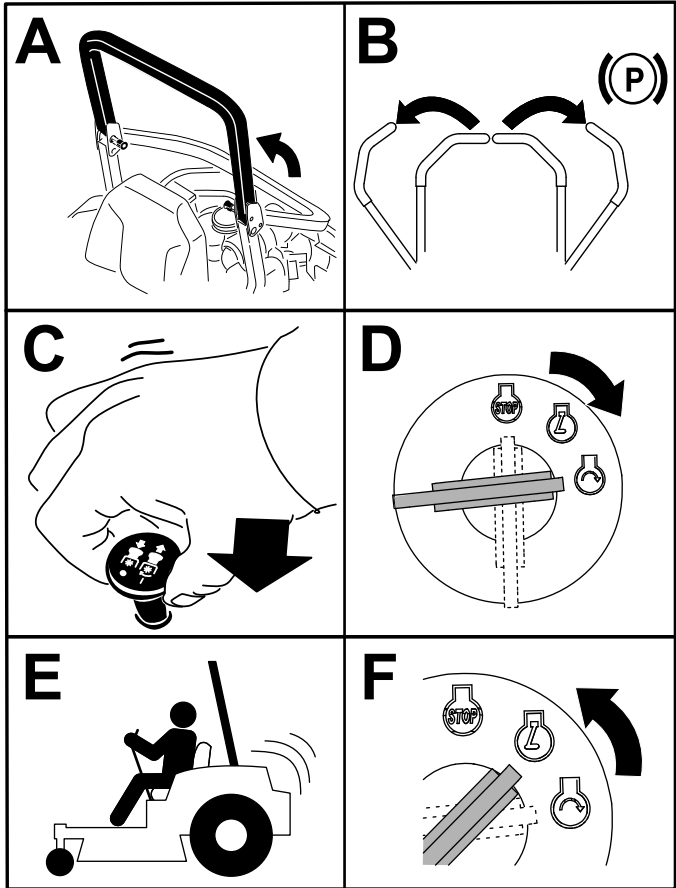


Figure 22

g363138

# Shutting Off the Engine

## ⚠ CAUTION

Children or bystanders may be injured if they move or attempt to operate the machine while it is unattended.

Always remove the key and engage the parking brake when leaving the machine unattended.

Wait until the recommended engine cool-down time symbol (D of Figure 23) disappears from the display before shutting off the engine.

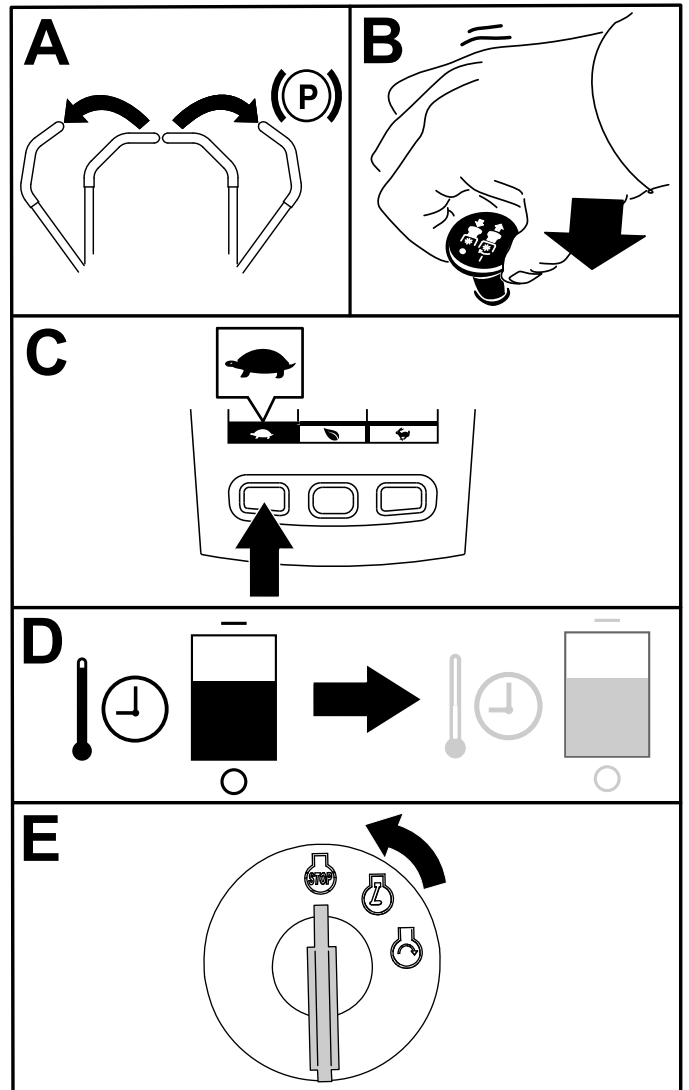
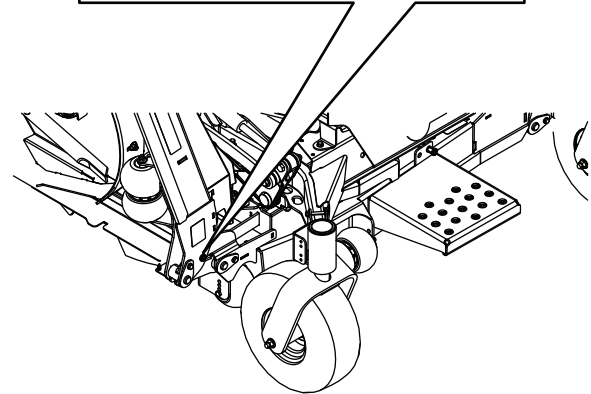
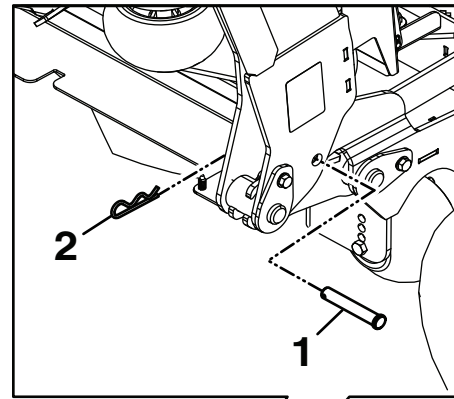


Figure 23

g363162

# Raising and Locking the Wing Decks

1. Ensure that all persons are clear of the deck wings.
2. Park the machine on a level surface, disengage the blade-control switch, and engage the parking brake.
3. Press and hold the top of the deck-control switch; the center deck will raise first, then the wing decks.
4. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
5. Remove the clevis pin and hairpin cotter from the storage location and secure each wing in the upright position (Figure 24 and Figure 25).

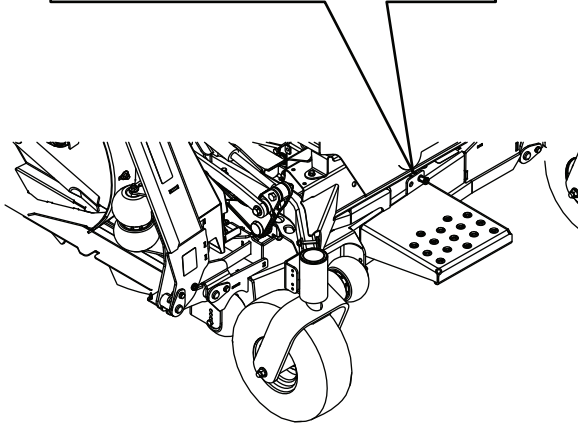
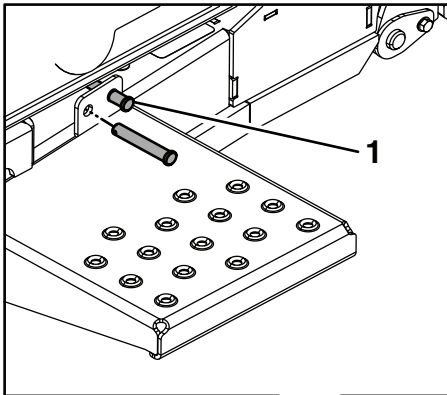


**Figure 25**

g363150

1. Clevis pin

2. Hairpin cotter



**Figure 24**

g363149

1. Pin storage location



# Driving the Machine

The drive wheels turn independently, powered by hydraulic motors on each axle. You can turn 1 side in reverse while you turn the other forward, causing the machine to spin rather than turn. This greatly improves the machine maneuverability but may require some time for you to adapt to how it moves.

The throttle control regulates the engine speed as measured in rpm (revolutions per minute). Place the throttle control in the FAST position for best performance. Always operate in the full throttle position when mowing.

## **⚠ WARNING**

The machine can spin very rapidly. You may lose control of the machine and cause personal injury or damage to the machine.

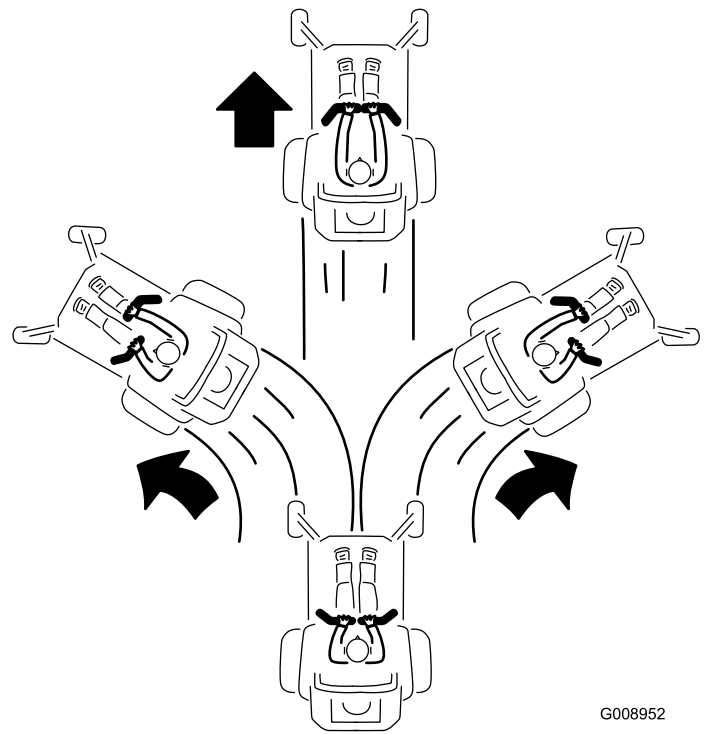
- Use caution when making turns.
- Slow the machine down before making sharp turns.

## Driving Forward

**Note:** The engine shuts off when you move the traction-control with the parking brake engaged.

To stop the machine, pull the motion-control levers to the NEUTRAL position.

1. Disengage the parking brake.
2. Move the motion-control levers to the center, unlocked position.
3. To go forward, slowly push the motion-control levers forward (Figure 26).

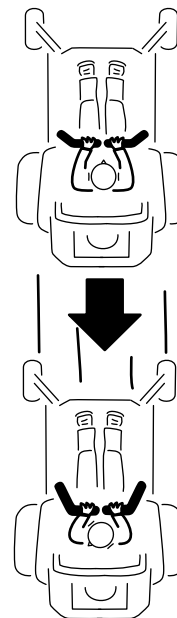


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g008952

Figure 26

## Driving in Reverse

1. Move the motion-control levers to the center, unlocked position.
2. To go in reverse, slowly pull the motion-control levers rearward (Figure 27).



G008953

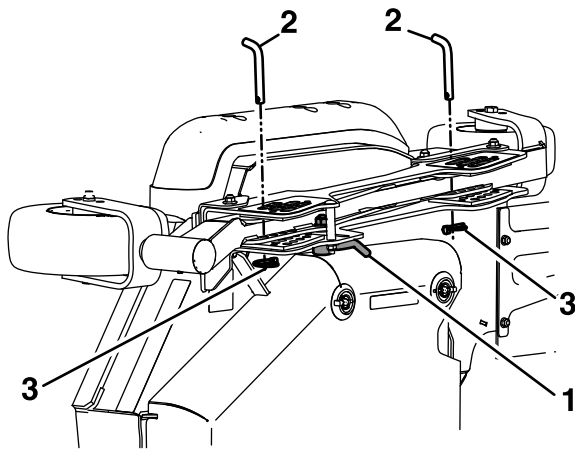
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Figure 27

# Adjusting the Height of Cut

The cutting height of the mower deck can be adjusted from 2.54 cm to 14 cm (1 to 5-1/2 inches) in 6.4 mm (1/4 inch) increments.

1. Park the machine on a level surface, disengage the blade-control switch, and engage the parking brake.
2. Press the top of deck-lift switch to raise the center deck and wing decks.
3. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
4. Adjust the center deck by performing the following procedure:
  - A. Remove the height-of-cut pin from the deck-lift plate on the right side of the center deck.
  - B. Insert the height-of-cut pin into the hole corresponding to the desired cutting height. See the decal on the side of the deck-lift plate for the cutting heights.
5. Adjust the side wing decks by performing the following procedure:
  - A. Ensure that the wing decks are locked in place.
  - B. Unlock the cam locks located on the height-of-cut channel on the wing deck (Figure 28).



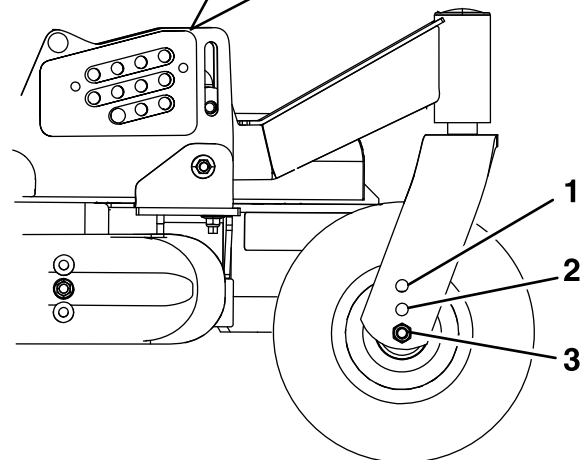
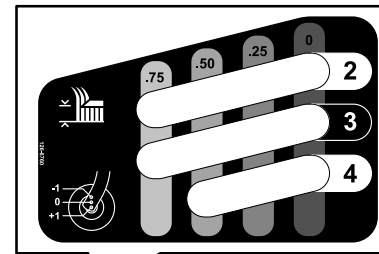
**Figure 28**

g239055

1. Cam lock
2. Height-of-cut pin
3. Lynch pin

- E. Lock the cam lock.
  - F. Repeat for the other wing deck.
6. If you desire additional height-of-cut range, adjust the front and rear gauge wheels on the wing deck as follows:
    - A. Remove the mounting hardware from the gauge wheel.
    - B. Adjust the front and rear gauge wheels to the appropriate hole location (see the chart below and Figure 29) and install the mounting hardware.

Hole Location	Height-of-Cut Range
Top hole (-1 on the decal)	25 to 89 mm (1 to 3-1/2 inches)
Middle hole (0 on the decal)	51 to 114 mm (2 to 4-1/2 inches)
Bottom hole (+1 on the decal)	76 to 140 mm (3 to 5-1/2 inches)



**Figure 29**  
Height-of-cut range

g212253

1. Top hole (-1 on the decal)
2. Middle hole (0 on the decal)
3. Bottom hole (+1 on the decal)

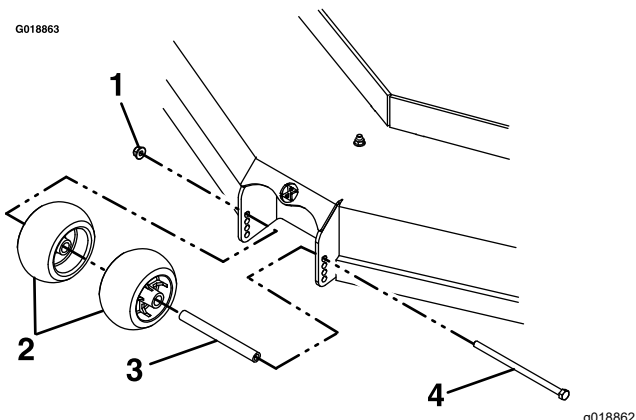
- C. Remove the lynch pin from the height-of-cut pin on both the front and rear channels.
- D. Move the wing deck to the appropriate height and install the height-of-cut pins and lynch pins (Figure 28).

- C. Repeat for the other wing deck.

# Adjusting the Anti-Scalp Rollers

For maximum deck flotation, install the rollers 1 hole position lower. Rollers should maintain a 6 mm (1/4 inch) clearance to the ground. Do not adjust the rollers to support the deck.

1. Park the machine on a level surface.
2. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
3. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
4. After adjusting the height of cut, adjust the anti-scalp rollers by removing the mounting hardware (Figure 30).

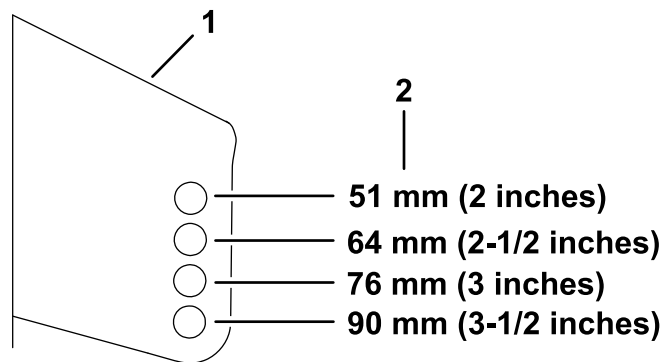


**Figure 30**

- |                       |           |
|-----------------------|-----------|
| 1. Locknut (3/8 inch) | 3. Spacer |
| 2. Anti-scalp rollers | 4. Bolt   |

5. Place the rollers in 1 of the positions shown in Figure 31.

**Note:** The rollers will maintain 19 mm (3/4 inch) clearance to the ground to minimize gouging and roller wear or damage. For cutting heights above 90 mm (3-1/2 inches), use the bottom hole. The rollers are still effective against scalping.

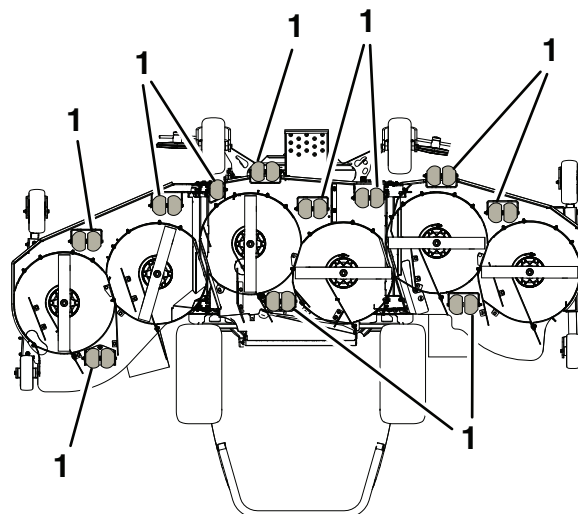


**Figure 31**

1. Anti-scalp roller mounting
2. Cutting height bracket

6. Torque the locknut (3/8 inch) to 41 to 47 N·m (30 to 35 ft·lb) as shown in Figure 30.

The 144-inch deck has 21 anti-scalp roller locations to adjust (Figure 32).



**Figure 32**

1. Anti-scalp roller

# Operating with the Overheat Sensor

The PTO disengages, an alarm sounds, and a bar graph displays the engine temperature when it reaches an overheat condition. The PTO does not engage until the engine has cooled and you manually shut off the PTO and engage it.

**Note:** If the engine-coolant level is below the indicator line on the overflow bottle when the engine is cold, the coolant temperature gauge may not register correctly during operation and/or the audible alarm may not sound if the engine overheats.

## Operating Tips

### Using the Fast Throttle Setting

For best mowing and maximum air circulation, operate the engine at the FAST position. Air is required to thoroughly cut grass clippings, so do not set the height-of-cut so low as to totally surround the mower deck in uncut grass. Always try to have 1 side of the mower deck free from uncut grass, which allows air to be drawn into the mower deck.

### Cutting a Lawn for the First Time

Cut grass slightly longer than normal to ensure that the cutting height of the mower deck does not scalp any uneven ground. However, the cutting height used in the past is generally the best one to use. When cutting grass longer than 15 cm (6 inches) tall, you may want to cut the lawn twice to ensure an acceptable quality of cut.

### Cutting a Third of the Grass Blade

It is best to cut only about a third of the grass blade. Cutting more than that is not recommended unless grass is sparse, or it is late fall when grass grows more slowly.

### Alternating the Mowing Direction

Alternate the mowing direction to keep the grass standing straight. This also helps disperse clippings, which enhances decomposition and fertilization.

### Mowing at Correct Intervals

Grass grows at different rates at different times of the year. To maintain the same cutting height, mow more often in early spring. As the grass growth rate

slows in mid summer, mow less frequently. If you cannot mow for an extended period, first mow at a high cutting height, then mow again 2 days later at a lower height setting.

### Using a Slower Cutting Speed

To improve cut quality, use a slower ground speed in certain conditions.

### Avoiding Cutting Too Low

When mowing uneven turf, raise the cutting height to avoid scalping the turf.

### Stopping the Machine

If you must stop the forward motion of the machine while mowing, a clump of grass clippings may drop onto your lawn. To avoid this, move onto a previously cut area with the blades engaged or you can disengage the mower deck while moving forward.

### Keeping the Underside of the Mower Deck Clean

Clean clippings and dirt from the underside of the mower deck after each use. If grass and dirt build up inside the mower deck, cutting quality will eventually become unsatisfactory.

### Maintaining the Blade(s)

Maintain a sharp blade throughout the cutting season because a sharp blade cuts cleanly without tearing or shredding the grass blades. Tearing and shredding turns grass brown at the edges, which slows growth and increases the chance of disease. Check the mower blades after each use for sharpness, and for any wear or damage. File down any nicks and sharpen the blades as necessary. If a blade is damaged or worn, replace it immediately with a genuine Toro replacement blade.

# After Operation

## After Operation Safety

### General Safety

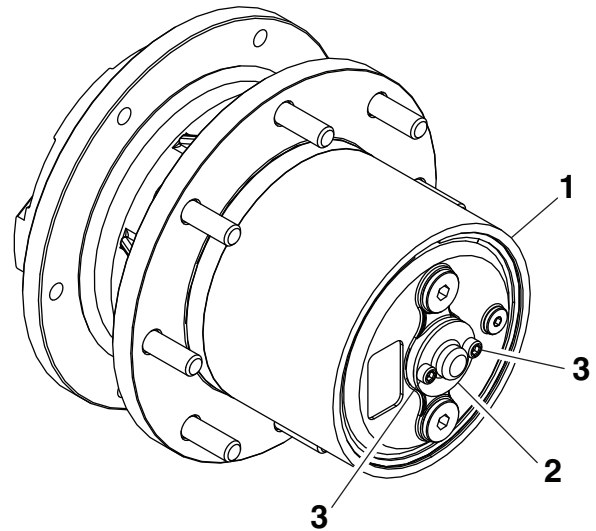
- Engage the parking brake, shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operator's position. Allow the machine to cool before servicing, adjusting, fueling, cleaning, or storing it.
- Clean grass and debris from the cutting unit, muffler, drives, and engine compartment to help prevent fires. Clean up oil or fuel spills.
- Shut off the fuel and remove the key before storing or transporting the machine.

## Using the Drive Train Brake Release

The drive train brake releases are located on each of the wheel-motor gearboxes.

Releasing the drive train brake allows you to push the machine without the engine running.

1. Park the machine on a level surface.
2. Chock or block the wheels.
3. Remove and retain the bolts from the gearbox (Figure 33).
4. Flip the cap inward to the gearbox.
5. Using the retained bolts, tighten the flipped cap until the brake releases.
6. Reverse this procedure to apply the brake.



**Figure 33**

g353165

- |                        |          |
|------------------------|----------|
| 1. Wheel motor gearbox | 3. Bolts |
| 2. Cap                 |          |

# Using the Wing Deck Fold Release Valve

## **⚠ WARNING**

The wing decks are very heavy. Lifting the wing decks by hand could result in serious injury or death.

Use lifting equipment to raise or lower the deck manually.

If the engine loses power, you can manually fold or unfold the wing decks.

To fold the wing decks, do the following:

1. Using a 1/8-inch Allen wrench to hold the set screws, loosen the sealing nuts using a 7/16-inch wrench until the nut is flush with the end of the set screw (approximately 6 turns) as shown in [Figure 34](#).

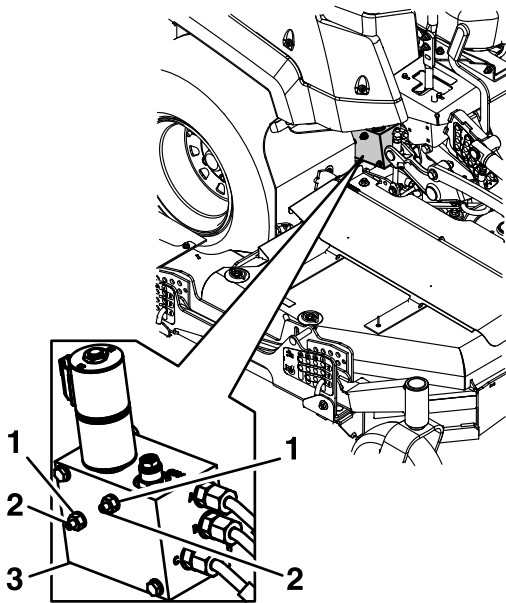


Figure 34

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- |                 |             |
|-----------------|-------------|
| 1. Sealing nuts | 3. Manifold |
| 2. Set screw    |             |

2. Remove the wrenches and tighten the set screw by hand approximately 4 turns, until you feel a slight resistance.

Continue to turn by hand 1-1/2 more turns to unseat the load-holding check valves.

**Important:** Do not tighten the set screws beyond this point; otherwise, damage may occur.

3. Using a 1/8-inch Allen wrench to hold the set screws, tighten the sealing nuts using a 7/16-inch wrench to the manifold body.

4. Using lifting equipment with at least a 227 kg (500 lb) lifting capacity, carefully pull 1 wing deck outward, then upward to fold it.

Secure the wing using the transport-lock pin.

5. Repeat this procedure for the other wing deck.

To unfold the wing decks and reset the wing-fold valve, do the following:

1. Using lifting equipment with at least a 227 kg (500 lb) lifting capacity to hold the wing deck up, remove the transport-lock pin, and carefully lower the wing deck.
2. Using a 1/8-inch Allen wrench to hold the set screws, loosen the sealing nut using a 7/16-inch wrench ([Figure 34](#)).
3. Loosen the set screw and turn it approximately 6 times.
4. Using a 1/8-inch Allen wrench to hold the set screws, torque the sealing nuts to 10 N·m (8 ft·lb) using a 7/16-inch wrench to the manifold body.

# Transporting the Machine

Use a heavy-duty trailer or truck to transport the machine. Use a full-width ramp. Ensure that the trailer or truck has all the necessary brakes, lighting, and marking as required by law. Please carefully read all the safety instructions. Knowing this information could help you or bystanders avoid injury. Refer to your local ordinances for trailer and tie-down requirements.

## ⚠ WARNING

Driving on the street or roadway without turn signals, lights, reflective markings, or a slow-moving-vehicle emblem is dangerous and can lead to accidents, causing personal injury.

Do not drive the machine on a public street or roadway.

## Selecting a Trailer

## ⚠ WARNING

Loading a machine onto a trailer or truck increases the possibility of tip-over and could cause serious injury or death (Figure 35).

- Use only a full-width ramp; do not use individual ramps for each side of the machine.
- Do not exceed a 15-degree angle between the ramp and the ground or between the ramp and the trailer or truck.
- Ensure that the length of the ramp is at least 4 times as long as the height of the trailer or truck bed to the ground. This ensures that the ramp angle does not exceed 15 degrees on flat ground.

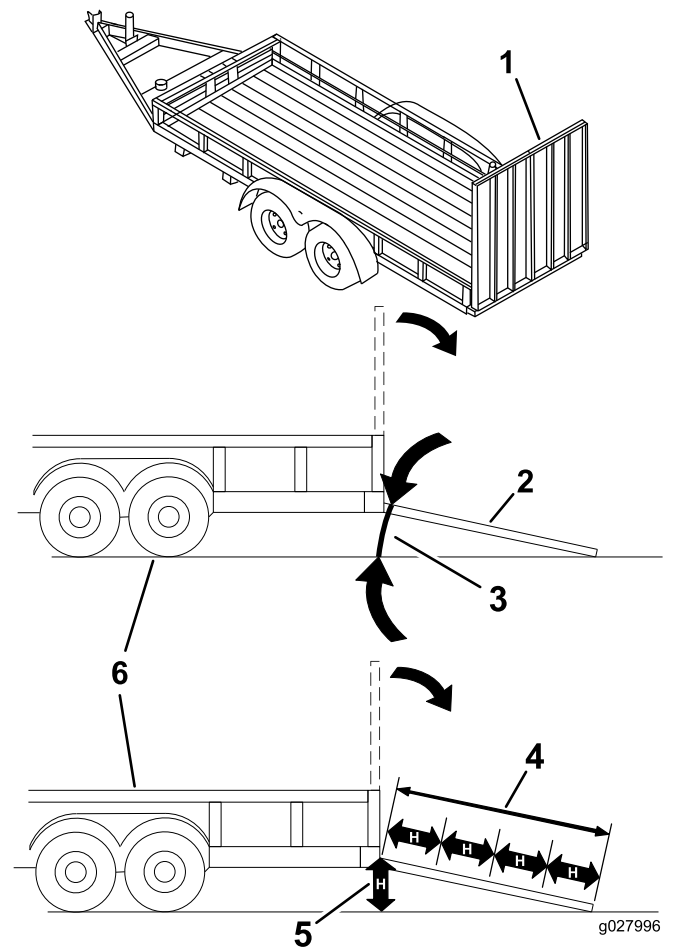


Figure 35

1. Full-width ramp in stowed position
2. Side view of full-width ramp in loading position
3. Not greater than 15 degrees
4. Ramp is at least 4 times as long as the height of the trailer or truck bed to the ground
5. H=height of the trailer or truck bed to the ground
6. Trailer

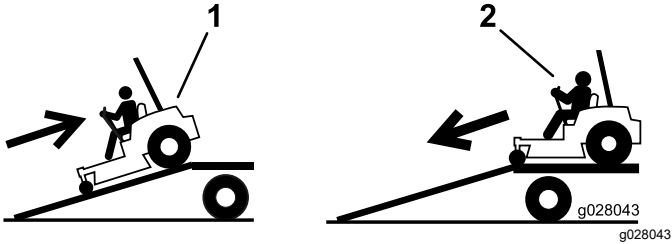
## Loading the Machine

## ⚠ WARNING

Loading a machine onto a trailer or truck increases the possibility of tip-over and could cause serious injury or death.

- Use extreme caution when operating a machine on a ramp.
- Back the machine up the ramp and drive it forward down the ramp.
- Avoid sudden acceleration or deceleration while driving the machine on a ramp as this could cause a loss of control or a tip-over situation.

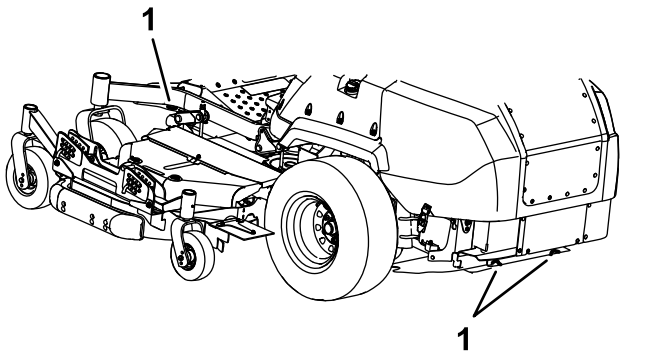
1. If using a trailer, connect it to the towing vehicle and connect the safety chains.
2. If applicable, connect the trailer brakes and lights.
3. Lower the ramp, ensuring that the angle between the ramp and the ground does not exceed 15 degrees ([Figure 35](#)).
4. Back the machine up the ramp ([Figure 36](#)).



**Figure 36**

1. Back the machine up the ramp.
2. Drive the machine forward down the ramp.

5. Shut off the engine, remove the key, and engage the parking brake.
6. Tie down the machine near the front caster wheels and the rear frame with straps, chains, cable, or ropes ([Figure 37](#)). Refer to local regulations for tie-down requirements.



**Figure 37**

1. Tie-down points

## Unloading the Machine

1. Lower the ramp, ensuring that the angle between the ramp and the ground does not exceed 15 degrees ([Figure 35](#)).
2. Drive the machine forward down the ramp ([Figure 36](#)).



# Maintenance

## Maintenance Safety

- If you leave the key in the switch, someone could accidentally start the engine and seriously injure you or other bystanders. Remove the key from the switch before you perform any maintenance.
- Before you leave the operator’s position, do the following:
  - Park the machine on a level surface.
  - Disengage the drives.
  - Engage the parking brake.
  - Shut off the engine and remove the key.
  - Allow machine components to cool before performing maintenance.
- Do not allow untrained personnel to service the machine.
- Keep your hands and feet away from moving parts or hot surfaces. If possible, do not make adjustments with the engine running.
- Carefully release pressure from components with stored energy.
- Check the parking brake operation frequently. Adjust and service it as required.
- Never tamper with safety devices. Check their proper operation regularly.
- Clean grass and debris from the cutting unit, muffler, drives, and engine compartment to prevent fires.
- Clean up oil or fuel spills and remove fuel-soaked debris.
- Do not rely on hydraulic or mechanical jacks to support the machine; support the machine with jack stands whenever you raise the machine.
- Keep all parts in good working condition and all hardware tightened, especially the blade-attachment hardware. Replace all worn or damaged decals.
- Disconnect the cable from the negative terminal of the battery before repairing the machine.
- To ensure optimum performance, 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.

## Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first 50 hours	<ul style="list-style-type: none"> <li>• Change the drive wheel gearbox oil.</li> </ul>
After the first 100 hours	<ul style="list-style-type: none"> <li>• Check the wheel lug nuts.</li> </ul>
After the first 200 hours	<ul style="list-style-type: none"> <li>• Change the engine oil and filter.</li> <li>• Change the hydraulic fluid and filter.</li> <li>• Change the deck drive gearbox oil.</li> </ul>
Before each use or daily	<ul style="list-style-type: none"> <li>• Check the safety-interlock system.</li> <li>• Check the engine-oil level.</li> <li>• Check the seat belt.</li> <li>• Check the engine-coolant level.</li> <li>• Check the hydraulic-fluid level.</li> <li>• Inspect the blades.</li> <li>• Clean the engine and exhaust system area.</li> <li>• Clean the grass and debris build-up from the machine and mower deck.</li> </ul>
Every 50 hours	<ul style="list-style-type: none"> <li>• Grease the drive U-joints and splined slip joint.</li> <li>• Drain the fuel filter/water separator.</li> <li>• Check the tire pressure</li> <li>• Clean the engine-cooling system (more often in dirty and dusty conditions).</li> <li>• Clean the engine-hood screen (more often in dirty and dusty conditions).</li> <li>• Inspect the belts for cracks and wear.</li> <li>• Check the deck drive gearbox-oil level.</li> </ul>
Every 100 hours	<ul style="list-style-type: none"> <li>• Lubricate the mower deck-lift pivots.</li> <li>• Check the alternator-belt tension.</li> <li>• Check the wing deck bushings.</li> </ul>

Maintenance Service Interval	Maintenance Procedure
Every 200 hours	<ul style="list-style-type: none"> <li>• Grease the caster pivots (more often in dirty or dusty conditions).</li> <li>• Change the engine oil and filter if not using Toro Premium Engine Oil, but any oil meeting API classification CJ-4 or higher or as stated in Engine-Oil Specifications.</li> <li>• Adjust the frame caster-pivot bearing.</li> <li>• Adjust the wing deck caster-pivot bearings.</li> </ul>
Every 400 hours	<ul style="list-style-type: none"> <li>• Grease the deck-idler pivots.</li> <li>• Service the air cleaner (More frequently in extremely dusty or dirty conditions).</li> <li>• Change the engine oil and filter if using Toro Premium Engine Oil (API classification CK-4 or higher) more often in dirty and dusty conditions.</li> <li>• Replace the fuel-filter canister for the water separator (more often in dirty and dusty conditions).</li> <li>• Check the fuel lines and connections.</li> <li>• Check the wheel gearbox oil.</li> <li>• Change the hydraulic fluid and filter if using Mobil® 424 hydraulic fluid.</li> <li>• Change the deck drive gearbox oil.</li> </ul>
Every 500 hours	<ul style="list-style-type: none"> <li>• Check the wheel lug nuts.</li> </ul>
Every 800 hours	<ul style="list-style-type: none"> <li>• Inspect the engine-valve clearance.</li> <li>• Change the drive wheel gearbox oil.</li> <li>• Change the hydraulic fluid and filter if using Toro Premium Transmission/Hydraulic Tractor Fluid.</li> </ul>
Every 2,000 hours	<ul style="list-style-type: none"> <li>• Change the engine coolant.</li> </ul>
Monthly	<ul style="list-style-type: none"> <li>• Check the battery charge.</li> </ul>
Yearly	<ul style="list-style-type: none"> <li>• Grease the deck drive PTO.</li> <li>• Repack the caster-wheel bearings (more often in dirty or dusty conditions).</li> <li>• Greasing the caster-wheel hubs.</li> <li>• If you operate the machine less than 200 hours, change the engine oil and filter.</li> </ul>

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

**⚠ CAUTION**

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

Shut off the engine and remove the key from the switch before you perform any maintenance.

# Lubrication

## Greasing the Machine

**Service Interval:** Every 400 hours/Yearly (whichever comes first)—Grease the deck-idler pivots.

Yearly—Grease the deck drive PTO.

Grease more frequently when operating conditions are extremely dusty or sandy.

**Grease Type:** No. 2 lithium or molybdenum grease

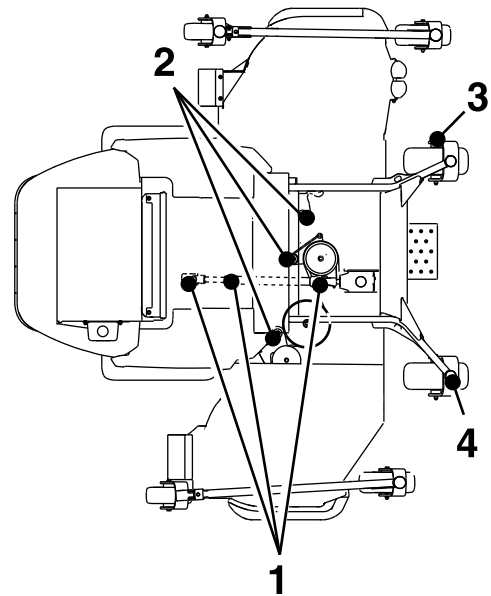
1. Park the machine on a level surface, disengage the blade-control switch, and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Clean the grease fittings with a rag.

**Note:** Make sure that you scrape any paint off the front of the fitting(s).

4. Connect a grease gun to the fitting.
5. Pump grease into the fittings until grease begins to ooze out of the bearings.
6. Wipe up any excess grease.

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

Lubrication Chart			
Fitting Locations	Pumps	Number of Places	Service Interval
1. Deck-drive PTO	1	3	Every 50 hours
2. Deck-idler pivots	1	3	Every 400 hours or yearly
3. Caster-wheel bearings	0	4	Yearly
4. Caster pivots	0	5	Every 400 hours or yearly

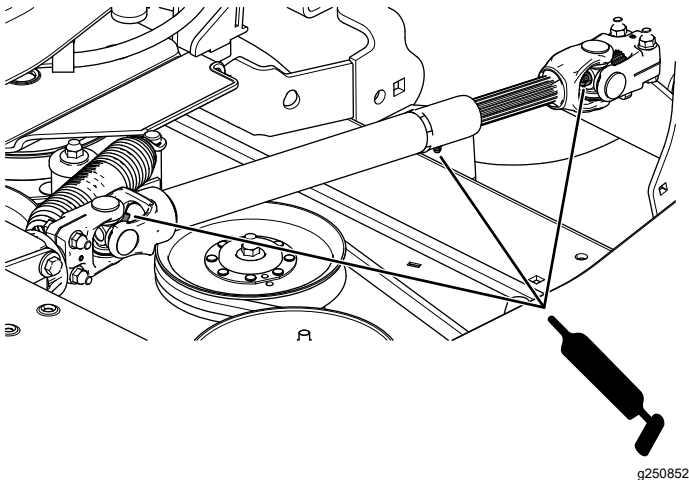


# Lubricating the Drive U-Joints and Splined Slip Joint

**Service Interval:** Every 50 hours—Grease the drive U-joints and splined slip joint.

**Note:** For easier access to the drive U-joints and splined slip joint, remove the floor pan and fully lower the mower deck.

1. Park the machine on a level surface, disengage the blade-control switch, 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. Clean the grease fittings with a rag.
4. Connect a grease gun to the fitting.
5. Pump grease into the fittings until grease begins to ooze out of the bearings.
6. Wipe up any excess grease.

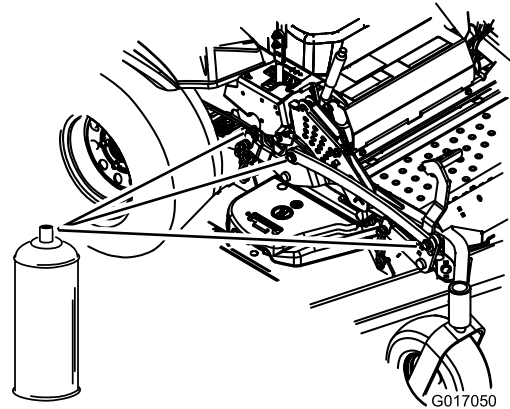


**Figure 38**

# Lubricating the Mower Deck-Lift Pivots

**Service Interval:** Every 100 hours

Use light oil or spray lubricant to lubricate the deck-lift pivots.



**Figure 39**

# Greasing the Caster Pivots

**Service Interval:** Every 200 hours/Yearly (whichever comes first) (more often in dirty or dusty conditions).

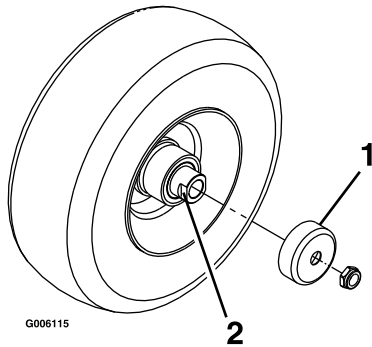
Yearly—Repack the caster-wheel bearings (more often in dirty or dusty conditions).

1. Park the machine on a level surface, disengage the blade-control switch, 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. Remove the dust cap and adjust the caster pivots and keep the dust cap off until greasing is done; refer to [Adjusting the Frame Caster-Pivot Bearing \(page 55\)](#).
4. Remove the hex plug.
5. Thread a grease fitting into the hole.
6. Pump grease into the fitting until it oozes out around the top bearing.
7. Remove the grease fitting from the hole. Install the hex plug and cap.

# Greasing the Caster-Wheel Hubs

**Service Interval:** Yearly

1. Park the machine on a level surface, disengage the blade-control switch, 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. Raise the mower for access.
4. Remove the caster wheel from the caster forks.
5. Remove the seal guards from the wheel hub.



**Figure 40**

1. Seal guard
2. Spacer nut with wrench flats

6. Remove a spacer nut from the axle assembly in the caster wheel.

**Note:** Thread-locking compound has been applied to lock the spacer nuts to the axle.

7. Remove the axle (with the other spacer nut still assembled to it) from the wheel assembly.
8. Pry out seals and inspect bearings for wear or damage and replace if necessary.
9. Pack the bearings with a general-purpose grease.
10. Insert 1 bearing and 1 new seal into the wheel.
11. If the axle assembly is missing both spacer nuts, apply a thread-locking compound to 1 spacer nut and thread it onto the axle with the wrench flats facing outward.

**Note:** Do not thread the spacer nut all of the way onto the end of the axle. Leave approximately 3 mm (1/8 inch) from the outer surface of the spacer nut to the end of the axle inside the nut.

12. Insert the assembled nut and axle into the wheel on the side with the new seal and bearing.

13. With the open end of the wheel facing up, fill the area inside the wheel around the axle full of general-purpose grease.
14. Insert the second bearing and new seal into the wheel.
15. Apply a thread-locking compound to the second spacer nut, and thread it onto the axle with the wrench flats facing outward.
16. Torque the nut to 8 to 9 N·m (75 to 80 in-lb), loosen the nut, then torque it to 2 to 3 N·m (20 to 25 in-lb).
17. Install the seal guards over the wheel hub, and insert the wheel into the caster fork.
18. Install the caster bolt and tighten the nut fully.

**Note:** Make sure that the axle does not extend beyond either nut.

**Important:** To prevent seal and bearing damage, check the bearing adjustment often. Spin the caster tire. The tire should not spin freely (more than 1 or 2 revolutions) or have any side play. If the wheel spins freely, adjust the torque on the spacer nut until there is a slight amount of drag. Apply another layer of thread-locking compound.

# Engine Maintenance

## Engine Safety

- Keep your hands, feet, face, other body parts, and clothing away from the muffler and other hot surfaces. Allow engine components to cool before performing maintenance.
- Do not change the engine governor speed or overspeed the engine.

## Servicing the Air Cleaner

**Service Interval:** Every 400 hours

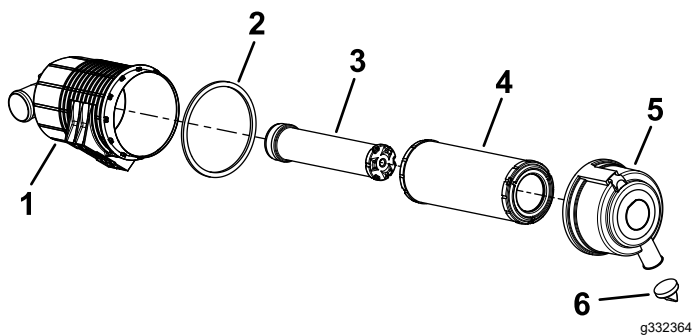
### Checking the Air Cleaner

1. Park the machine on a level surface, 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. Check the air-cleaner body for damage, which could possibly cause an air leak.

Replace a damaged air-cleaner body.

4. Check the air-intake system for leaks, damage, or loose hose clamps.
5. Service the air-cleaner filter and safety element when alerted (Figure 41).

**Important:** Do not over-service the air filter.



**Figure 41**

- |                     |                        |
|---------------------|------------------------|
| 1. Air-cleaner body | 4. Filter              |
| 2. Gasket           | 5. Air-cleaner cover   |
| 3. Safety element   | 6. Rubber outlet valve |

6. Ensure that the cover seats correctly and seals with the air-cleaner body.

## Servicing the Air Cleaner

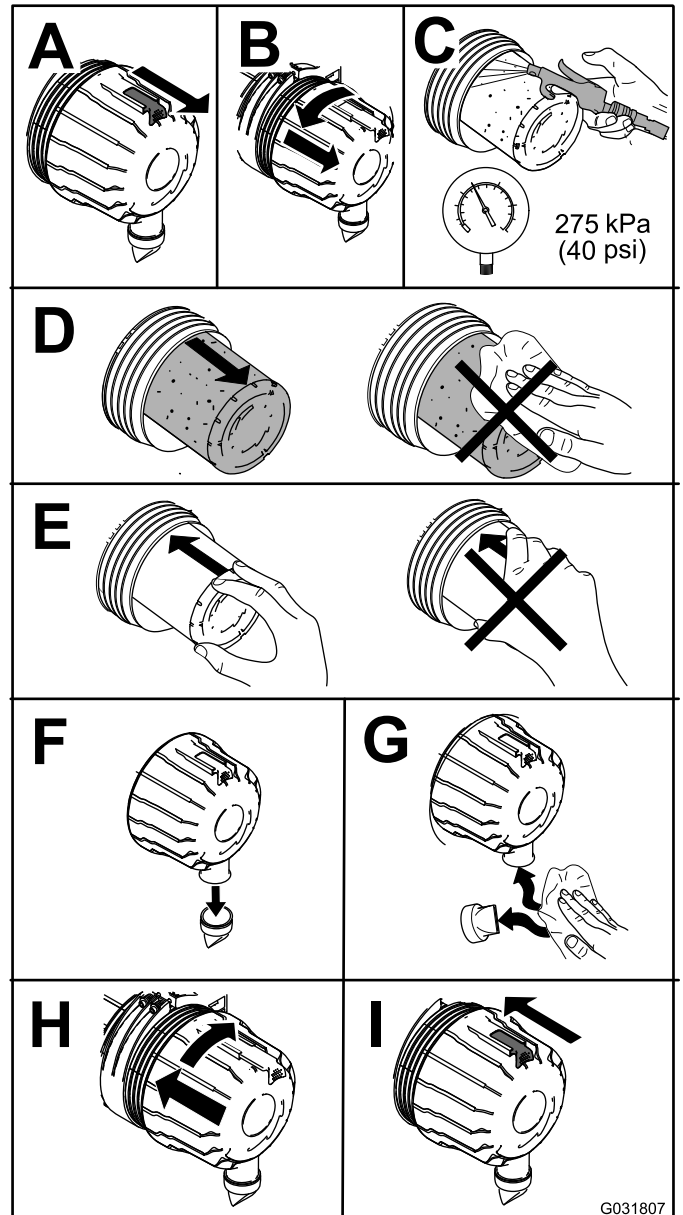
**Note:** If the foam gasket in the cover is damaged, replace it.

**Important:** Avoid using high-pressure air, which could force dirt through the filter into the intake tract.

**Important:** Do not clean the used filter to avoid damaging the filter media.

**Important:** Do not use a damaged filter.

**Important:** Do not apply pressure to the flexible center of the filter.



**Figure 42**

g031807

# Servicing the Engine Oil

## Engine-Oil Specifications

The engine ships with oil in the crankcase; however, check the oil level before and after you first start the engine. Check the oil level before operating the machine each day or each time you use the machine.

**Crankcase capacity:** 6.6 L (7 US qt) with the filter

**Preferred engine oil:** Toro Premium Engine Oil

If using an alternate oil, use high-quality, low-ash engine oil that meets or exceeds the following specifications:

- API service category CJ-4 or higher
- ACEA service category E6
- JASO service category DH-2

**Important:** Using engine oil other than API classification CJ-4 or higher, ACEA E6, or JASO DH-2 may cause the diesel particulate filter to plug or cause engine damage.

Use the following engine oil viscosity grade:

- SAE 10W-30 or 5W-30 (all temperatures)
- SAE 15W-40 (above 0° F)

**Note:** Toro Premium Engine oil is available from your distributor. See the *Parts Catalog* or contact an authorized Toro distributor for part numbers.

## Checking the Engine-Oil Level

**Service Interval:** Before each use or daily

1. Park the machine on a level surface, lower the mower deck, move the throttle lever to the SLOW position, shut off the engine, and remove the key.
2. Open the hood.
3. Check the engine-oil level as shown in [Figure 43](#).

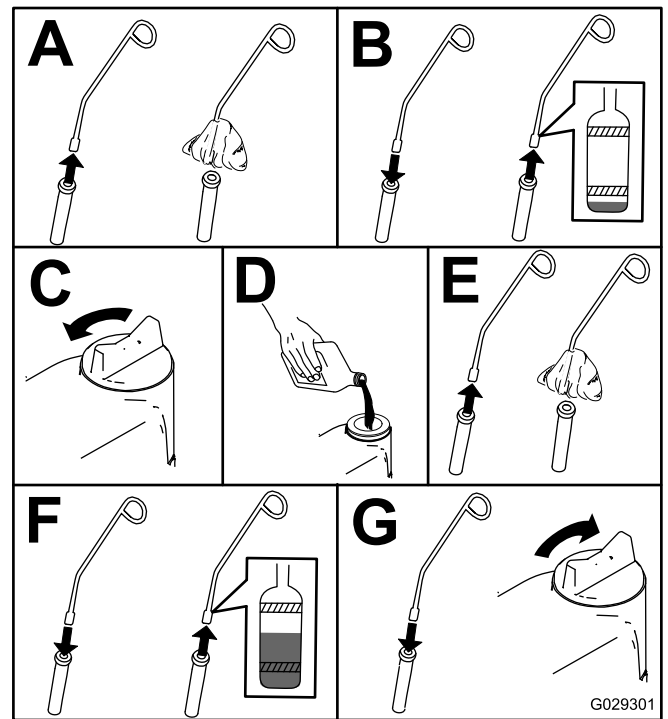


Figure 43

# Changing the Engine Oil and Filter

**Service Interval:** After the first 200 hours—Change the engine oil and filter.

Every 200 hours—Change the engine oil and filter **if not using** Toro Premium Engine Oil, but any oil meeting API classification CJ-4 or higher or as stated in Engine-Oil Specifications.

Every 400 hours—Change the engine oil and filter **if using** Toro Premium Engine Oil (API classification CK-4 or higher) more often in dirty and dusty conditions.

Yearly—If you operate the machine less than 200 hours, change the engine oil and filter.

If possible, run the engine just before changing the oil because warm oil flows better and carries more contaminants than cold oil.

1. Park machine on a level surface.
2. Engage the parking brake.
3. Shut of the engine and remove the key.
4. Open the hood.
5. Change the engine oil as shown in [Figure 44](#).

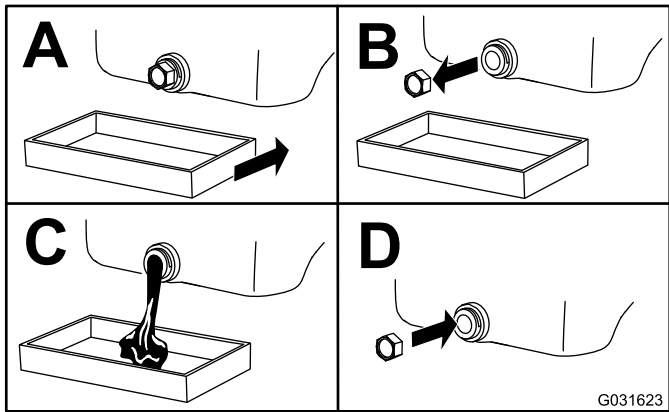


Figure 44

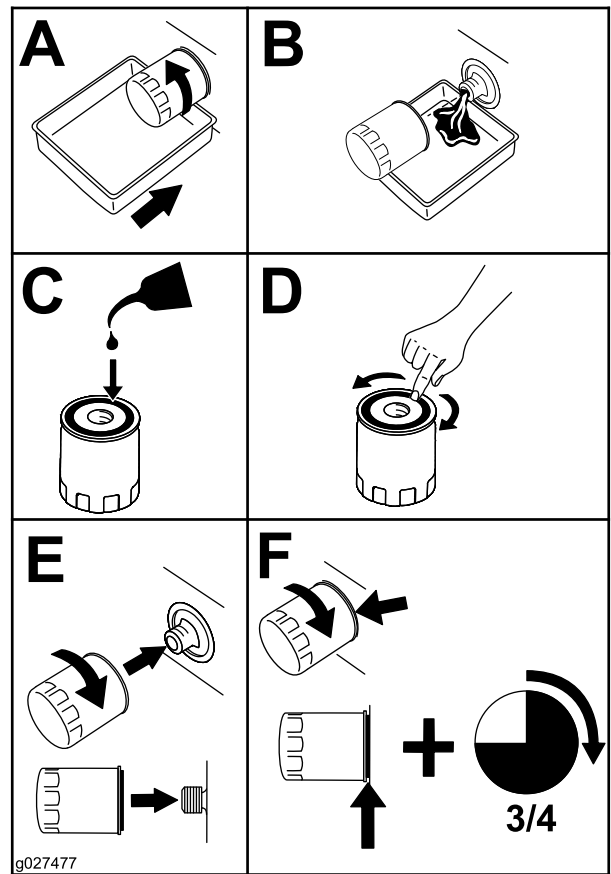


Figure 45

7. Fill the crankcase with oil; refer to [Engine-Oil Specifications \(page 47\)](#).

## Inspecting the Engine-Valve Clearance

**Service Interval:** Every 800 hours

Inspect the engine-valve clearance. Refer to the engine owner's manual.

6. Replace the engine-oil filter as shown in [Figure 45](#).



# Fuel System Maintenance

## ⚠ WARNING

Fuel-system components are under high pressure. The use of improper components can result in system failure, fuel leakage, and possible explosion.

Use only approved fuel lines and fuel filters.

## Draining the Fuel Filter/Water Separator

**Service Interval:** Every 50 hours—Drain the fuel filter/water separator.

1. Park the machine on a level surface, disengage the blade-control switch, 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. Place a drain pan below the fuel filter/water separator.
4. Open the drain plug on the water separator approximately 1 turn to allow water and other contaminants to drain (Figure 46).

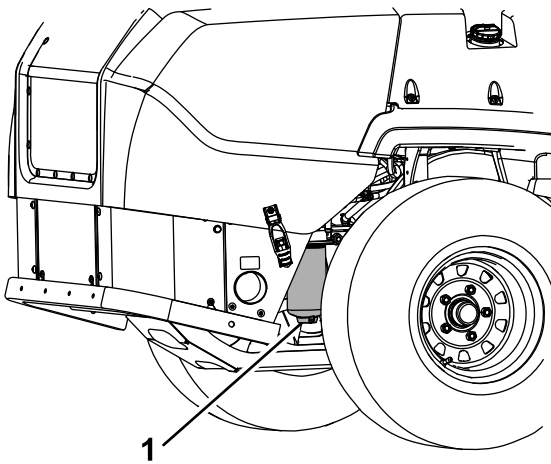


Figure 46

g231880

1. Fuel filter/water separator

- 
5. Close the drain plug when only diesel fuel comes out.

**Important:** Water or other contaminants in fuel can damage the fuel pump and/or other engine components.

# Replacing the Water Separator

**Service Interval:** Every 400 hours—Replace the fuel-filter canister for the water separator (more often in dirty and dusty conditions).

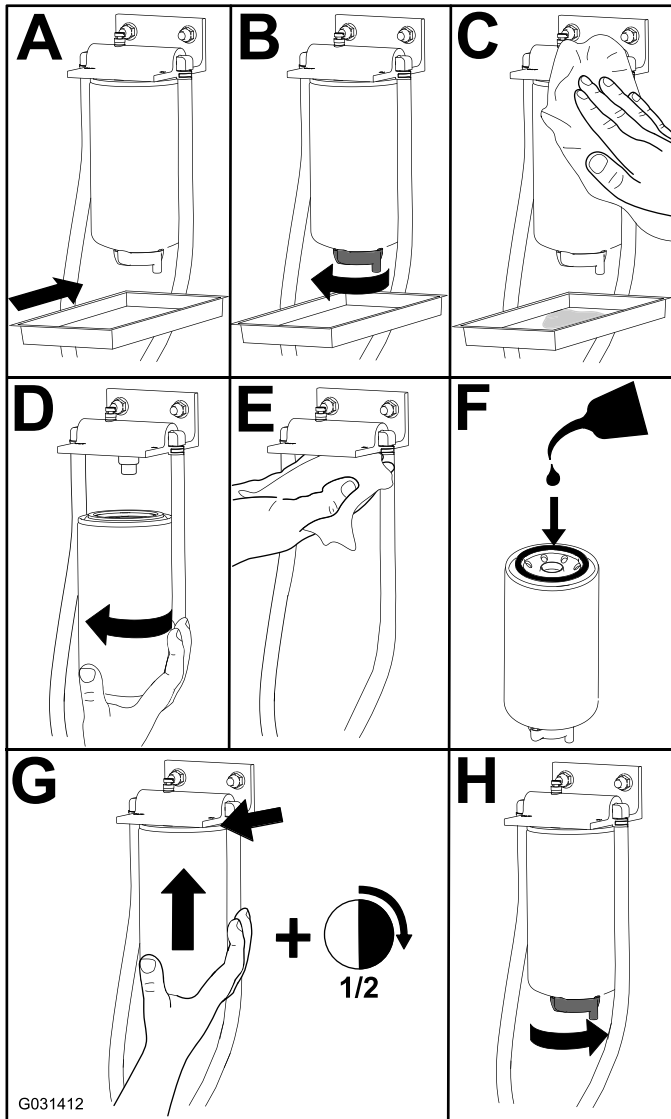


Figure 47

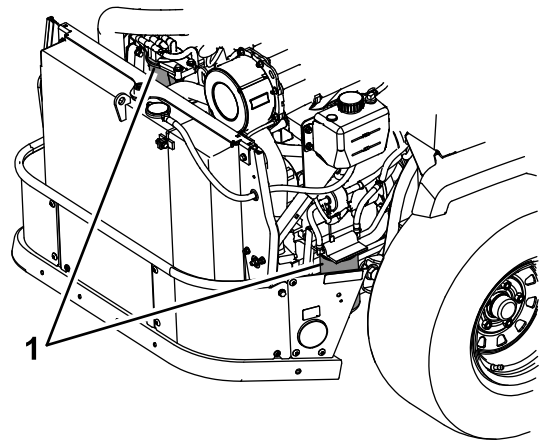


Figure 48

g233831

1. Filter locations

## Checking the Fuel Lines and Connections

**Service Interval:** Every 400 hours

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

The engine has 2 fuel filters as shown in [Figure 48](#).

# Electrical System Maintenance

## Electrical System Safety

- Disconnect the cable from the negative terminal of the battery before repairing the machine.
- 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.

## Servicing the Battery

### **▲ DANGER**

Battery electrolyte contains sulfuric acid, which is fatal if consumed and causes severe burns.

Do not drink electrolyte and avoid contact with skin, eyes or clothing. Wear safety glasses to shield your eyes and rubber gloves to protect your hands.

## Checking the Battery Charge

**Service Interval:** Monthly

Allowing the battery to stand for an extended period of time without charging it results in reduced performance and service life. To preserve optimum battery performance and life, charge the battery in storage when the open circuit voltage drops to 12.4 V.

**Note:** To prevent damage due to freezing, fully charge the battery before putting it away for winter storage.

Check the voltage of the battery with a digital voltmeter. Locate the voltage reading of the battery in the table below and charge the battery for the recommended time interval to bring the charge up to a full charge of 12.6 V or greater.

**Important:** Ensure that the negative (–) battery cable is disconnected and the battery charger used for charging the battery has an output of 16 V and 7 A or less to avoid damaging the battery (see the chart for the recommended charger settings).

Voltage Reading	Percent Charge	Maximum Charger Settings	Charging Interval
12.6 V or greater	100%	16 V/7 A	No charging required
12.4 V to 12.6 V	75% to 100%	16 V/7 A	30 minutes
12.2 V to 12.4 V	50% to 75%	16 V/7 A	1 hour
12.0 V to 12.2 V	25% to 50%	14.4 V/4 A	2 hours
11.7 V to 12.0 V	0% to 25%	14.4 V/4 A	3 hours
11.7 V or less	0%	14.4 V/2 A	6 hours or more

## Charging the Battery

### ⚠ WARNING

Charging the battery produces gasses that can explode.

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

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

1. Make sure that the filler caps are installed in battery. 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 49).
3. Install the battery in the machine and connect the battery cables.

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

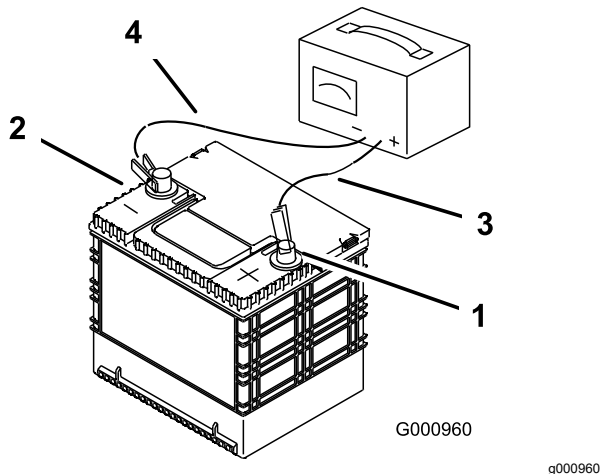


Figure 49

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

## Jump-Starting the Machine

1. Check the weak battery for terminal corrosion (white, green, or blue “snow”).

You must clean it off prior to jump-starting. Clean and tighten connections as necessary.

### ⚠ CAUTION

Corrosion or loose connections can cause unwanted electrical voltage spikes at anytime during the jump-starting procedure.

Do not attempt to jump-start with loose or corroded battery terminals; otherwise, damage may occur to the engine.

### ⚠ DANGER

Jump-starting a weak battery that is cracked, frozen, has low electrolyte level, or an open/shorted battery cell, can cause an explosion, resulting in serious injury.

Do not jump-start a weak battery if these conditions exist.

2. Ensure that the booster is a good and fully-charged lead acid battery at 12.6 V or greater. Use properly sized jumper cables (4 to 6 AWG) with short lengths to reduce voltage drop between systems. Ensure that the cables are color-coded or labeled for the correct polarity.

### ⚠ CAUTION

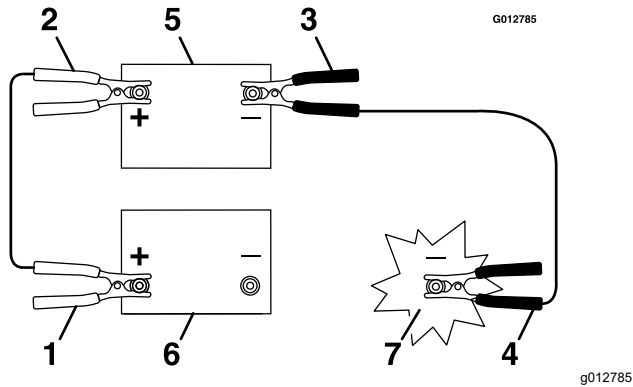
Connecting the jumper cables incorrectly (wrong polarity) can immediately damage the electrical system.

Be certain of battery-terminal polarity and jumper-cable polarity when connecting batteries.

**Note:** The following instructions are adapted from the SAE J1494 Rev. Dec. 2001 – Battery Booster Cables – Surface Vehicle Recommended Practice (SAE – Society of Automotive Engineers).

**Important:** Ensure that the vent caps are tight and level. Place a damp cloth, if available, over any vent caps on both batteries. Ensure that the machines do not touch and that both electrical systems are shut off and at the same rated system voltage. These instructions are for negative ground systems only.

3. Connect the positive (+) cable to the positive (+) terminal of the discharged battery that is wired to the starter or solenoid (Figure 50).



**Figure 50**

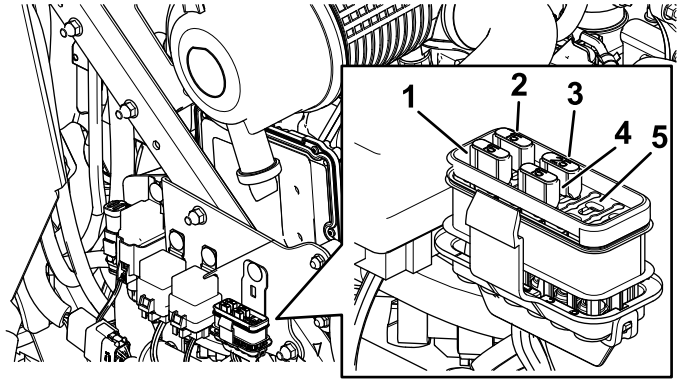
1. Positive (+) cable on the discharged battery
2. Positive (+) cable on the booster battery
3. Negative (-) cable on the booster battery
4. Negative (-) cable on the engine block
5. Booster battery
6. Discharged battery
7. Engine block

4. Connect the other end of the positive cable to the positive terminal of the booster battery.
5. Connect the black negative (-) cable to the other terminal (negative) of the booster battery.
6. Make the final connection on the engine block of the stalled machine (not to the negative post) away from the battery. Stand away from the machine.
7. Start the vehicle and remove the cables in the reverse order of connection (the engine block (black) connection is the first to disconnect).

## Servicing the Fuses

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

1. Unlatch the engine hood and raise the engine hood to gain access to the fuse block.
2. To replace the fuses, pull out on the fuse to remove it.
3. Install a new fuse (Figure 51).



**Figure 51**

1. Accessory (15 A)
2. Chassis (15 A)
3. Main (25 A)
4. Power point (15 A)
5. Fan, photo relay

# Drive System Maintenance

## Checking the Seat Belt

**Service Interval:** Before each use or daily

Inspect the seat belt for wear, cuts, and proper operation of the retractor and buckle. Replace the seat belt if it is damaged.

## Adjusting the Tracking

1. Disengage the blade-control switch (PTO).
2. Drive to an open flat area, move the motion-control levers to the NEUTRAL-LOCK position.
3. Move the throttle midway between the FAST and SLOW positions.
4. Move both motion-control levers all the way forward until they both hit the stops in the T-slot.
5. Check which way the machine tracks.
6. Engage the parking brake, shut off the engine, and remove the key.
7. Adjust the stop plates as needed.
  - If the machine tracks to the right, loosen the bolts and adjust the left stop plate rearward on the left T-slot until the machine tracks straight (Figure 52).
  - If the machine tracks to the left, loosen the bolts and adjust the right stop plate rearward on the right T-slot until the machine tracks straight (Figure 52).
8. Tighten the stop plate (Figure 52).

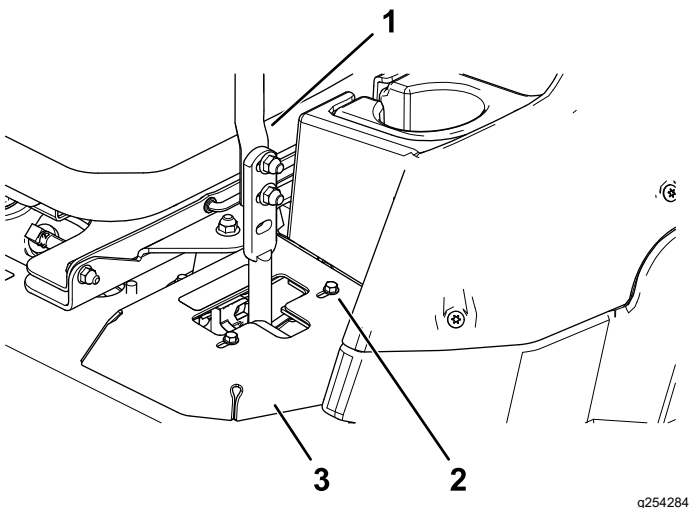


Figure 52

g254284

1. Control lever
2. Bolt
3. Stop plate

9. Align the levers in the front-to-rear position by bringing the levers together to the NEUTRAL position, and slide them until they are aligned, then tighten the bolts (Figure 53).

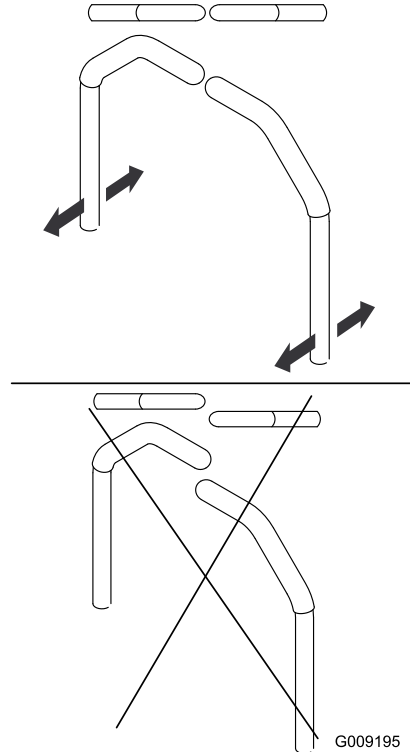


Figure 53

G009195

g009195

10. If alignment is needed, loosen the 2 motion-control lever mounting bolts on the misaligned side (Figure 54).

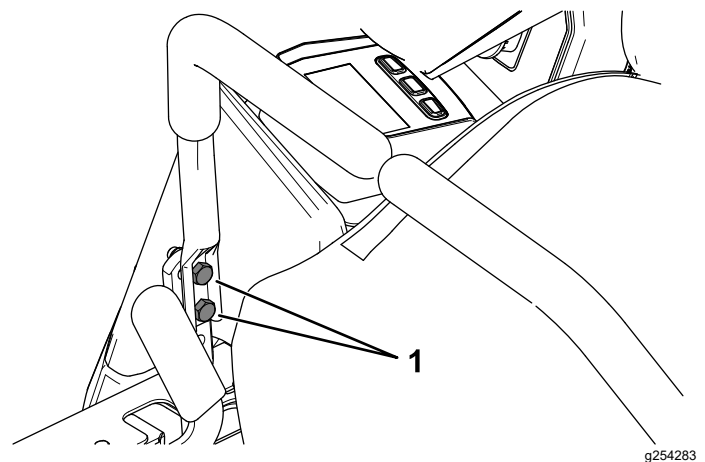


Figure 54

g254283

11. Move motion-control lever to meet the opposite side.
12. Tighten the 2 motion-control lever mounting bolts (Figure 54).

# Checking the Tire Pressure

**Service Interval:** Every 50 hours/Monthly (whichever comes first)

**Rear tire air pressure specification:** 152 kPa (22 psi)

**Note:** The caster tires are semi-pneumatic tires and do not require air pressure maintenance.

## **⚠ DANGER**

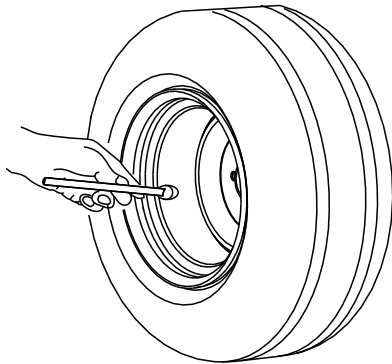
**Low tire pressure decreases machine side-hill stability. This could cause a rollover, which may result in personal injury or death.**

**Do not under-inflate the tires.**

Check the air pressure in the 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.



G001055

Figure 55

g001055

# Checking the Wheel Lug Nuts

**Service Interval:** After the first 100 hours—Check the wheel lug nuts.

Every 500 hours—Check the wheel lug nuts.

Torque the wheel lug nuts to 129 N·m (95 ft·lb).

# Adjusting the Frame Caster-Pivot Bearing

**Service Interval:** Every 200 hours/Yearly (whichever comes first)

1. Park the machine on a level surface, disengage the blade-control switch, 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. Remove the dust cap from the caster and tighten the locknut (Figure 56).
4. Tighten the locknut until the spring washers are flat, and then back off a 1/4 turn to properly set the preload on the bearings (Figure 56).

**Important:** Make sure that the spring washers are installed correctly as shown in Figure 56.

5. Install the dust cap (Figure 56).

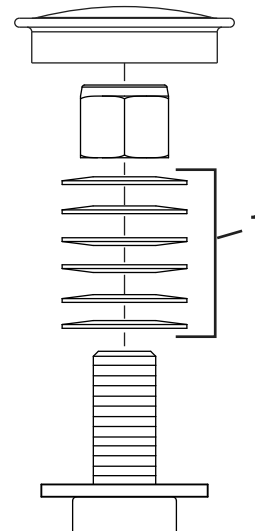


Figure 56

g228558

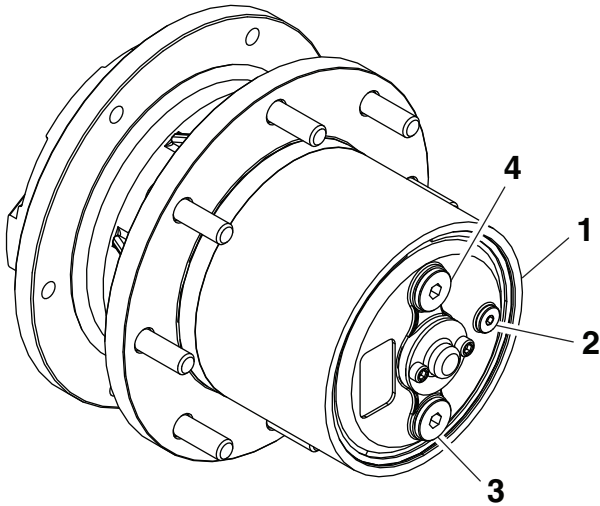
1. Spring disc washers

# Checking the Drive Wheel Gearbox Oil

**Service Interval:** Every 400 hours

Use **SAE 75W-90 synthetic** gear lube.

1. Park the machine on a level surface, disengage the blade-control switch, 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. Raise the rear of machine and support it using jack stands (or equivalent support) just high enough to allow the drive wheels to turn freely.
4. Remove the wheel and orient the gearbox with the drain port on the bottom and fill port on top (Figure 57).
5. Place a drain pan under each check port (Figure 57).  
Remove and retain the check plug.
6. Ensure that the oil level is up to check port and is correct consistency.
7. Install the check plug when complete.



**Figure 57**

g364528

- |                   |               |
|-------------------|---------------|
| 1. Wheel gear box | 3. Drain plug |
| 2. Check plug     | 4. Fill plug  |

8. Repeat on the opposite side.

**Important:** Do not overfill the gearbox; overfilling the gearbox may damage it.

# Changing the Drive Wheel Gearbox Oil

**Service Interval:** After the first 50 hours

Every 800 hours

Use **SAE 75W-90 synthetic** gear lube.

1. Park the machine on a level surface, disengage the blade-control switch, 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. Raise the rear of machine and support it using jack stands (or equivalent support) just high enough to allow the drive wheels to turn freely.
4. Remove the wheel and orient the gearbox with the drain port on the bottom and fill port on top (Figure 57).
5. Place a drain pan under each port.  
Remove the drain plug, check plug, and fill plug to allow the fluid drain (Figure 57).  
Retain the plugs.
6. Install the drain plug and add oil until it comes out of the check port (Figure 57).
7. Install check plug and fill plug.
8. Repeat on the opposite side.

**Important:** Do not overfill the drive wheel gearbox; otherwise, damage may occur.



# 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.

## Checking the Engine-Coolant Level

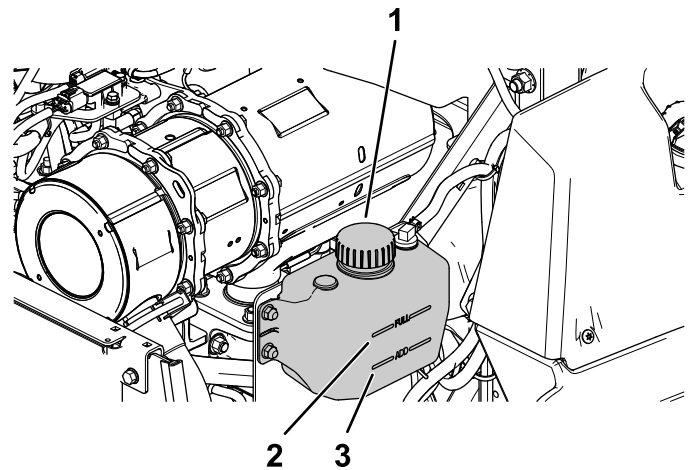
**Service Interval:** Before each use or daily

**Coolant specification:** 50/50 solution of water and permanent ethylene-glycol antifreeze

**Cooling-system capacity:** 7.6 L (8 US qt)

1. Park the machine on a level surface, disengage the blade-control switch, 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. Open the hood.
4. Check the level of the coolant in the expansion tank ([Figure 58](#)).

**Note:** The coolant level should be between the marks on the side of the tank.



**Figure 58**

g227787

1. Expansion-tank cap
2. Full line
3. Add line

5. If coolant level is low, remove the expansion-tank cap, and add the specified coolant ([Figure 58](#)).

**Important:** Do not overfill.

6. Install the expansion-tank cap.
7. Close the hood.

## Cleaning the Radiator and Engine-Hood Screen

**Service Interval:** Every 50 hours—Clean the engine-cooling system (more often in dirty and dusty conditions).

Every 50 hours—Clean the engine-hood screen (more often in dirty and dusty conditions).

Clean the radiator and hood screen to prevent the engine from overheating.

**Note:** If the mower deck or engine shuts off due to overheating, check the radiator for excessive buildup of debris.

1. Park the machine on a level surface, disengage the blade-control switch, 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. Rotate the hood forward.
4. Using compressed air, blow out debris stuck between the fins of the entire radiator, both from the top down and bottom up.
5. Using compressed air, blow out the engine-hood screen.
6. If debris remains, it may be necessary to use water from a low-pressure hose.

If the radiator is clean, proceed to step 8.

- Cover the engine with a piece of cardboard or a plastic sheet. Squirt water through the fins. Blow through with low-pressure air from both directions.
- Note:** If debris remains, repeat until clean.
- Lower the hood.
  - Start the engine to ensure that the fan functions properly.

## Changing the Engine Coolant

**Service Interval:** Every 2,000 hours/Every 2 years (whichever comes first)

- Park the machine on a level surface, disengage the blade-control switch, and engage the parking brake.
- Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
- Rotate the hood forward.
- Drain the coolant when the engine is cool.
- Remove the radiator cap, place a pan under the radiator, and remove the drain plug at the bottom of the radiator.
- Remove the coolant hose from the oil cooler and drain the coolant from the engine block (Figure 59).

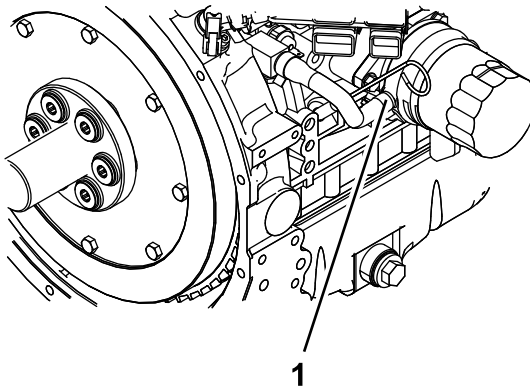


Figure 59

g233651

- Coolant hose

- 
- Install the drain plugs and hoses.
  - Fill radiator with a 50/50 mix of water and ethylene glycol.

**Note:** The use of Havoline® Xtended Life coolant is recommended.

Allow some room (approximately 12.7 mm (1/2 inch)) for expansion. Add 50/50 coolant mix to the overflow bottle on the left side of the engine as required to bring the level up to the indicator line on the bottle.

- Operate engine until the engine thermostat opens and the coolant is circulating through the radiator core.

As air purges from the engine block and the coolant level drops, add additional coolant to the radiator.

- When the radiator is completely full and no additional coolant can be added, continue running and install the radiator cap.

Ensure that the cap is completely seated by pressing down firmly while turning, until the cap stops. Once the cap is installed, shut off the engine.

# Belt Maintenance

## Inspecting the Belts

**Service Interval:** Every 50 hours

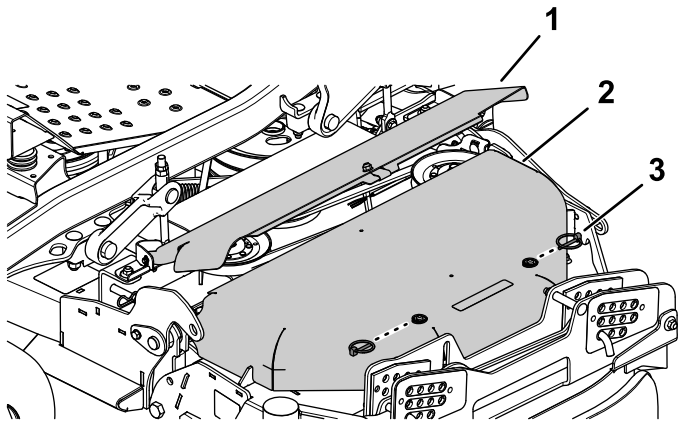
Check the belts whenever they squeal while rotating, the blades slip while cutting grass, or if the belts have frayed edges, burn marks, or cracks. If any of these conditions occur, replace the belts.

## Replacing the Mower Belts

### Replacing the Wing Deck Belts

Squealing when the belt is rotating, blades slipping when cutting grass, frayed belt edges, burn marks and cracks are signs of a worn mower belt. Replace the belt if any of these conditions are evident.

1. Park the machine on a level surface, disengage the blade-control switch, 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. Lower the mower to the 76 mm (3 inches) height of cut.
4. Remove the 2 lynch pins from the outer belt cover and remove the outer cover (Figure 60).
5. Rotate the inside belt cover upward (Figure 60).

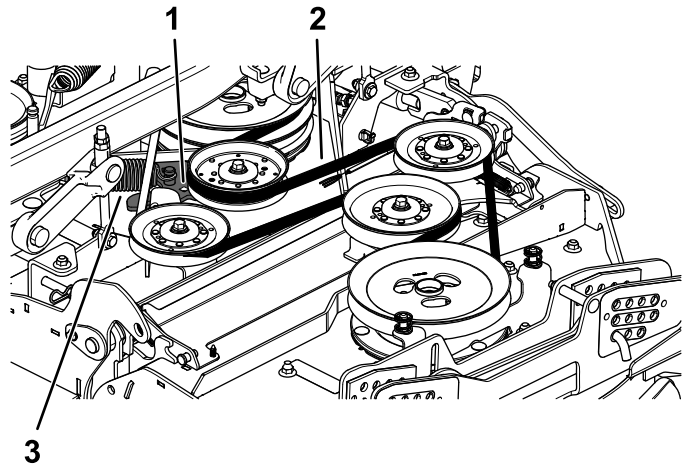


**Figure 60**

1. Inside belt cover
2. Outer belt cover
3. Lynch pin

6. Remove the floorboard.
7. Using a ratchet in the square hole in the idler arm, rotate the idler arm rearward to remove tension on the idler spring (Figure 61).

8. Remove the belt from the mower deck pulleys (Figure 61).



**Figure 61**

1. Square hole in the idler arm
2. Wing deck mower belt
3. Spring

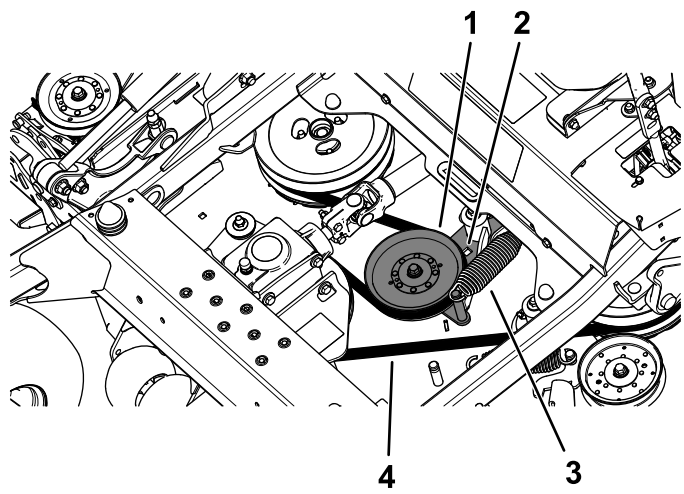
9. Install the new belt around the mower deck pulleys.
10. Install the belt covers and floorboard.
11. Repeat this procedure for the other wing deck belt.

### Replacing the Center Deck Belt

Squealing when the belt is rotating, blades slipping when cutting grass, frayed belt edges, burn marks and cracks are signs of a worn mower belt. Replace the belt if any of these conditions are evident.

1. Park the machine on a level surface, disengage the blade-control switch, 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. Lower the mower to the 76 mm (3 inches) height of cut.
4. Remove the 2 wing deck belts; refer to [Replacing the Wing Deck Belts](#) (page 59).
5. Use a ratchet in the square hole in the idler arm to remove tension on the idler spring (Figure 62).
6. Remove the belt from the mower deck pulleys (Figure 62).

**Note:** The belt comes off at the bottom of the gearbox pulley.



**Figure 62**

g243947

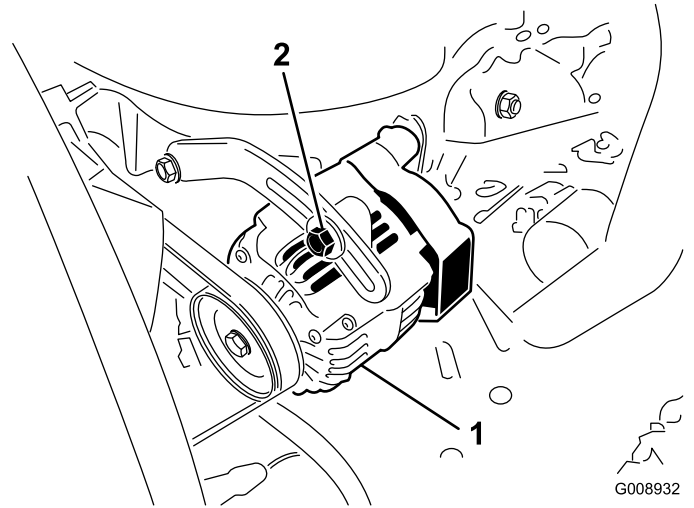
- |   |                           |
|---|---------------------------|
| 1. Spring-loaded idler pulley                   | 3. Spring                 |
| 2. Square hole in the idler arm for the ratchet | 4. Center deck mower belt |

- 
7. Install the new belt around the mower deck pulleys.
  8. Install the 2 wing decks belts; refer to [Replacing the Wing Deck Belts \(page 59\)](#).
  9. Install the belt covers and floorboard.

## Checking the Alternator-Belt Tension

**Service Interval:** Every 100 hours

1. Apply 44 N (10 lb) of force to the alternator belt, midway between the pulleys.
2. If the deflection is not 10 mm (3/8 inch), loosen the alternator mounting bolts ([Figure 63](#)).



**Figure 63**

G008932  
g008932

- |                  |               |
|------------------|---------------|
| 1. Mounting bolt | 2. Alternator |
|------------------|---------------|

- 
3. Increase or decrease the alternator-belt tension.
  4. Tighten the mounting bolts.
  5. Check the deflection of the belt again to ensure that the tension is correct.

# Controls System Maintenance

## Adjusting the Control-Handle Position

There are 2 height positions for the control levers—high and low. Remove the bolts to adjust the height for the operator.

1. Park the machine on a level surface, 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. Loosen the bolts and flange nuts installed in the levers (Figure 64).
4. Align the levers in the front-to-rear position by bringing the levers together to the NEUTRAL position, and slide them until they are aligned, then tighten the bolts (Figure 65).

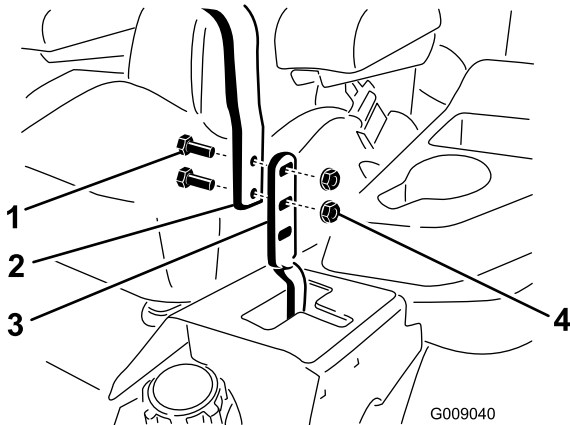


Figure 64

- |           |                  |
|-----------|------------------|
| 1. Bolt   | 3. Control lever |
| 2. Handle | 4. Nut           |

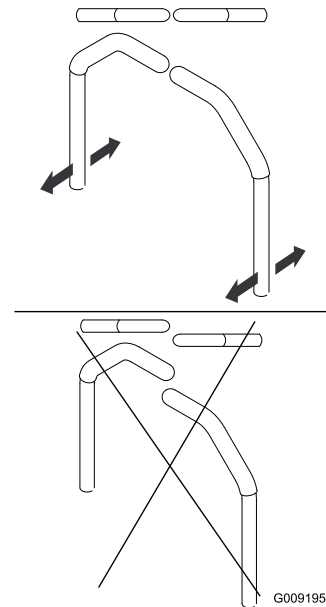


Figure 65

5. If the ends of the levers hit against each other, refer to [Adjusting the Motion-Control Linkage \(page 61\)](#).
6. Repeat to adjust the control levers.

## Adjusting the Motion-Control Linkage

Located on either side of the machine, below the seat, are the pump-control linkages. Rotating the end nut with a 1/2-inch deep socket wrench allows fine tuning adjustments so that the machine does not move in neutral. Any adjustments should be made for neutral positioning only.

### **⚠ WARNING**

**To adjust the motion control, you must run the engine and turn the drive wheels. Contact with moving parts or hot surfaces may cause personal injury.**

**Keep your fingers, hands, and clothing clear of rotating components and hot surfaces.**

1. Park the machine on a level surface, 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. Push the deck-lift pedal, remove the height-of-cut pin, and lower the mower deck to the ground

4. Raise the rear of the machine up and support it with jack stands (or equivalent support) just high enough to allow the drive wheels to turn freely.
5. Remove the electrical connection from the seat safety switch, located under the bottom cushion of the seat.

**Note:** The switch is a part of the seat assembly.

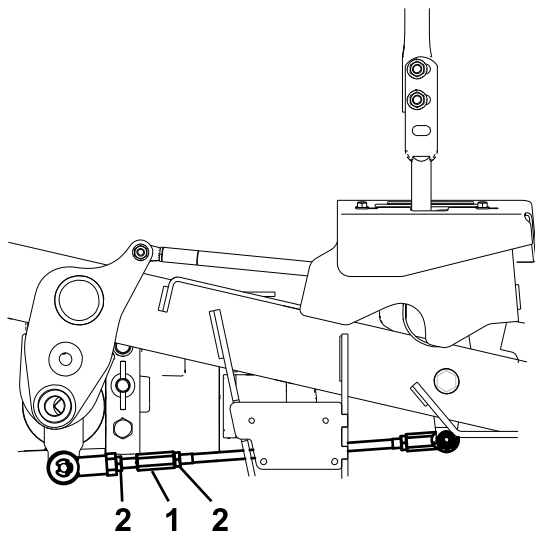
6. **Temporarily** install a jumper wire across the terminals in the connector of the main wire harness.
7. Start the engine, run it at full throttle, and disengage the parking brake.

**Note:** Before starting the engine, ensure that the parking brake is engaged and that the motion-control levers are out. You do not have to be in the seat.

8. Run the machine at least 5 minutes with the drive levers at full forward speed to bring the hydraulic fluid up to the operating temperature.

**Note:** The motion-control levers must be in neutral while you are making any adjustments.

9. Bring the motion-control levers into the NEUTRAL position.
10. Adjust the pump control rod lengths by rotating the double nuts on the rod in the appropriate direction until the wheels slightly creep in reverse (Figure 66).



**Figure 66**

g228557

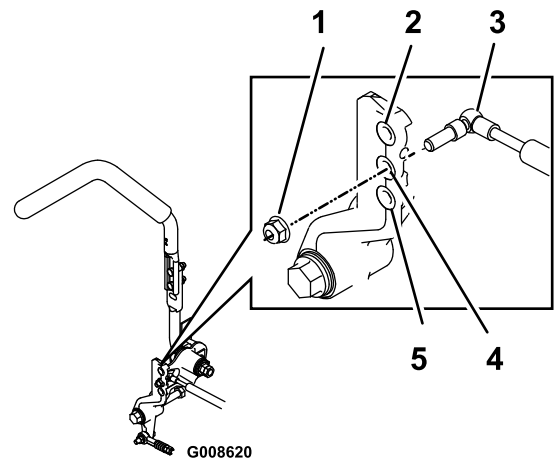
1. Turn here to adjust.
2. Loosen here (right-hand thread).

**Note:** The wheels should stop turning or slightly creep in reverse.

12. Shut off the machine.
13. Remove the jumper wire from the wire harness and plug the connector into the seat switch.
14. Remove the jack stands.
15. Raise the deck and install the height-of-cut pin.
16. Check and ensure that the machine does not creep in neutral with the parking brake disengaged.

## Adjusting the Motion-Control Damper

You can adjust the top damper-mounting bolt to obtain the desired motion-control lever resistance. Refer to Figure 67 for mounting options.



g008620

**Figure 67**

Right Motion Control Shown

1. Torque the locknut to 23 N·m (17 ft-lb). The bolt must protrude past the end of the locknut after torquing.
2. Most resistance (firmest feel)
3. Damper
4. Medium resistance (medium feel)
5. Least resistance (softest feel)

11. Move the motion-control levers to the REVERSE position and while applying slight pressure to the lever, allow the reverse-indicator springs to bring the levers back to neutral.



# 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.

# Servicing the Hydraulic System

## Hydraulic-Fluid Specifications

**Hydraulic-tank capacity:** approximately 13.2 L (14 US qt)

**Recommended fluid:** Toro Premium Transmission/Hydraulic Tractor Fluid (available in 5-gallon pails or 55-gallon drums. See the *Parts Catalog* or contact an authorized Toro distributor for part numbers.)

**Alternate fluids:** If the Toro fluid is not available, Mobil® 424 hydraulic fluid may be used.

**Note:** Toro does not assume responsibility for damage caused by improper substitutions.

**Note:** Many hydraulic fluids are almost colorless, making it difficult to spot leaks. A red dye additive for the hydraulic-system fluid is available in 20 ml (2/3 fl oz) bottles. 1 bottle is sufficient for 15 to 22 L (4 to 6 gallons) of hydraulic fluid. Order Part Number 44-2500 from your authorized Toro distributor.

## Checking the Hydraulic-Fluid Level

**Service Interval:** Before each use or daily

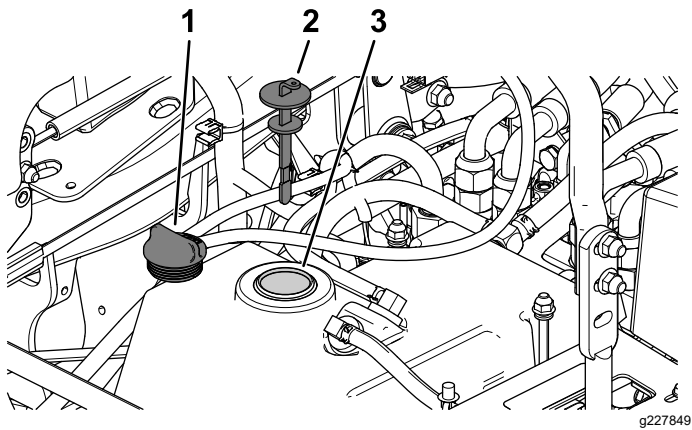
Check the hydraulic-fluid level before you first start the engine and daily thereafter.

1. Park the machine on a level surface, disengage the blade-control switch, and engage the parking brake.
2. Move the motion-control levers to the NEUTRAL-LOCK position and start the engine.

**Note:** Run the engine at the lowest possible rpm to purge any air in the system.

**Important:** Do not engage the PTO.

3. Raise the deck to extend the lift cylinders, shut off the engine, and remove the key.
4. Raise the seat to access the hydraulic-fluid tank.
5. Remove the hydraulic-tank cap ([Figure 68](#)).



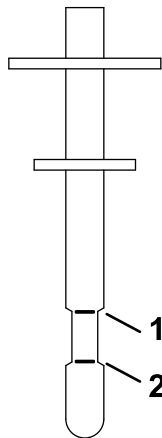
**Figure 68**

- |                       |                |
|-----------------------|----------------|
| 1. Hydraulic-tank cap | 3. Filler neck |
| 2. Dipstick           |                |

- Remove the dipstick and wipe it with a clean rag (Figure 68).
- Place the dipstick into the filler neck, remove it, and check the fluid level (Figure 69).

**Note:** If the level is not within the notched area of the dipstick, add enough high-quality hydraulic fluid to raise the level to within the notched area.

**Important:** Do not overfill.



**Figure 69**

- |              |             |
|--------------|-------------|
| 1. Full line | 2. Add line |
|--------------|-------------|

- Replace the dipstick and thread the fill cap finger-tight onto the filler neck.
- Check all hoses and fittings for leaks.

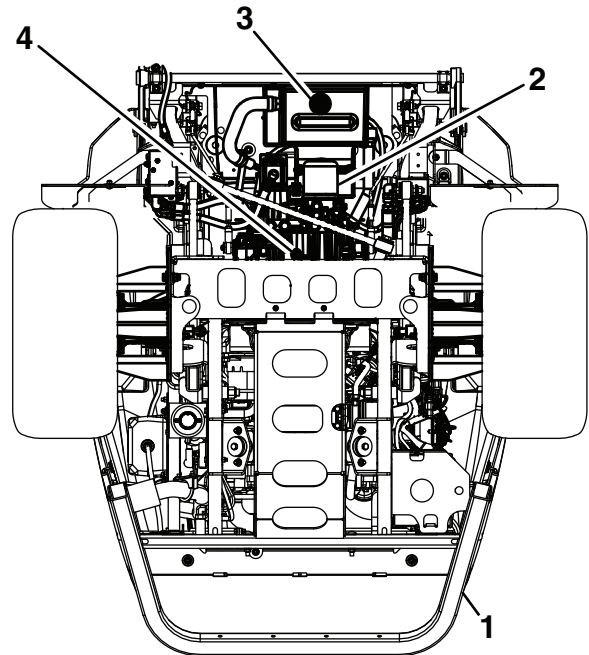
## Changing the Hydraulic Fluid and Filter

**Service Interval:** After the first 200 hours—Change the hydraulic fluid and filter.

Every 400 hours—Change the hydraulic fluid and filter if using Mobil® 424 hydraulic fluid.

Every 800 hours—Change the hydraulic fluid and filter if using Toro Premium Transmission/Hydraulic Tractor Fluid.

- Disengage the PTO, move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
- Move the throttle lever to the SLOW position, shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
- Raise the seat.
- Place a large drain pan under the hydraulic reservoir and transmission case (Figure 70).



**Figure 70**

Underside of the machine

- |               |                                   |
|---------------|-----------------------------------|
| 1. Rear frame | 3. Hydraulic reservoir drain plug |
| 2. Filter     | 4. Transmission case drain plug   |

- Unscrew the filter to remove and allow the fluid to drain from the reservoir.

**Important:** Before installing the new filter, apply a thin coat of Toro Premium Transmission/Hydraulic Tractor Fluid on the surface of the rubber seal.

Install a new filter and turn the filter clockwise until the rubber seal contacts the filter adapter, then tighten the filter an additional 2/3 to 3/4 turn.

- Wipe all the plugs clean and install all the plugs.
- Raise the rear of machine and support it using jack stands (or equivalent support) just high enough to allow the drive wheels to turn freely.



# Mower Deck Maintenance

## Blade Safety

- Inspect the blades 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.
- Replace worn or damaged blades and bolts in sets to preserve balance.

## Servicing the Cutting Blades

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

## Before Inspecting or Servicing the Blades

1. Park the machine on a level surface, disengage the blade-control switch, 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.

## Inspecting the Blades

**Service Interval:** Before each use or daily

1. Inspect the cutting edges ([Figure 71](#)).
2. If the edges are not sharp or have nicks, remove and sharpen the blade; refer to [Sharpening the Blades \(page 67\)](#).
3. Inspect the blades, especially in the curved area.
4. If you notice any cracks, wear, or a slot forming in this area, immediately install a new blade ([Figure 71](#)).

8. Start the engine for approximately 1 minute, then shut it off.
9. Start the engine and check for oil leaks.  
Move the motion-control levers to the full speed and run for several minutes.
10. Shut down the machine.
11. Check the hydraulic-fluid level; refer to [Checking the Hydraulic-Fluid Level \(page 63\)](#).  
Add enough fluid to put the level between the two marks on the dipstick. It may take 3.8 to 4.7 L (4 to 5 US qt) depending how much fluid stayed in the cooling loop while draining.
12. Install the dipstick and cap.

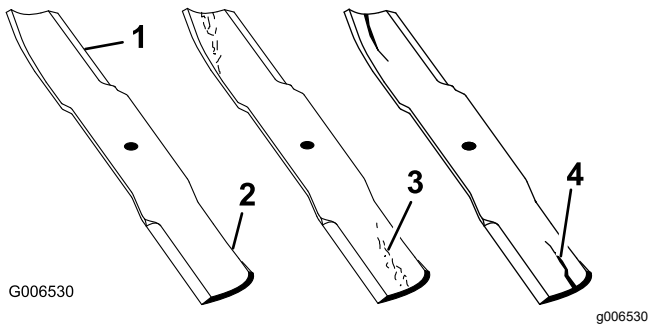


Figure 71

- |                 |                      |
|-----------------|----------------------|
| 1. Cutting edge | 3. Wear/slot forming |
| 2. Curved area  | 4. Crack             |

## Checking for Bent Blades

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, 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. Rotate the blades until the ends face forward and backward (Figure 72).
4. Measure from a level surface to the cutting edge, position A, of the blades (Figure 72).

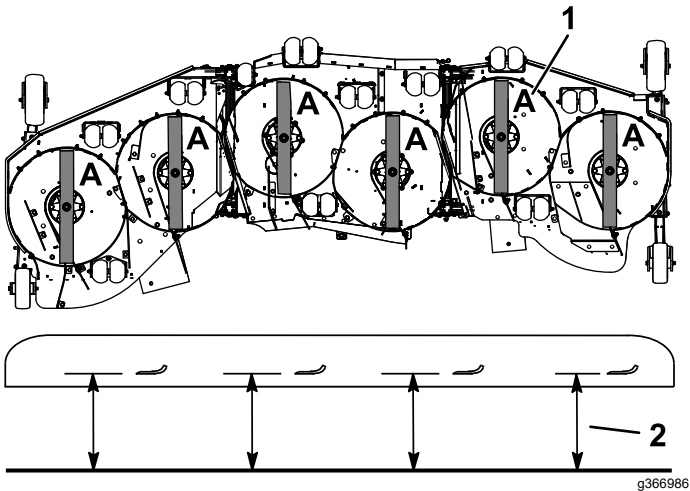


Figure 72

- |               |   |
|---------------|---|
| 1. Position A | 2. Measure here from the blade to a hard surface. |
|---------------|---|

5. Rotate the opposite ends of the blades forward.
6. Measure from a level surface to the cutting edge of the blades at the same position as in step 4.

**Note:** The difference between the dimensions obtained in steps 4 and 5 must not exceed 3 mm (1/8 inch).

**Note:** If this dimension exceeds 3 mm (1/8 inch), the blade is bent and must be replaced.

## ▲ DANGER

A blade that is bent or damaged could break apart and could seriously injure or kill you or bystanders.

- Always replace bent or damaged blade with a new blade.
- Never file or create sharp notches in the edges or surfaces of blade.

## Removing the Blades

Replace the blades if they hit a solid object, or if the blade is out of balance or bent.

1. Place a wrench on the flat of the spindle shaft or hold the blade end using a rag or thickly padded glove.
2. Remove the blade bolt, bushing, and blade from the spindle shaft (Figure 73).

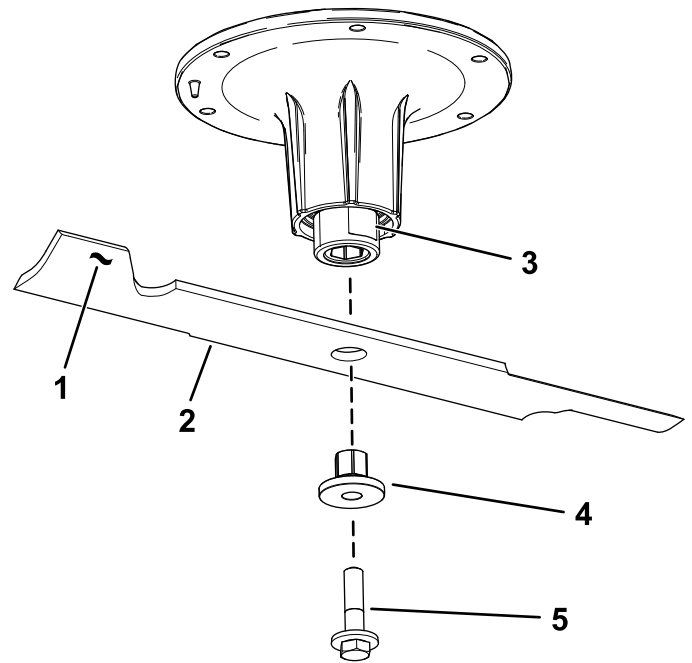


Figure 73

- |                              |               |
|------------------------------|---------------|
| 1. Sail area of the blade    | 4. Bushing    |
| 2. Blade                     | 5. Blade bolt |
| 3. Flat of the spindle shaft |               |

## Sharpening the Blades

1. Use a file to sharpen the cutting edge at both ends of the blade (Figure 74).

**Note:** Maintain the original angle.

**Note:** The blade retains its balance if the same amount of material is removed from both cutting edges.



Figure 74

1. Sharpen at original angle.
- 
2. Check the balance of the blade by putting it on a blade balancer (Figure 75).

**Note:** If the blade stays in a horizontal position, the blade is balanced and can be used.

**Note:** If the blade is not balanced, file some metal off the end of the sail area only (Figure 74).

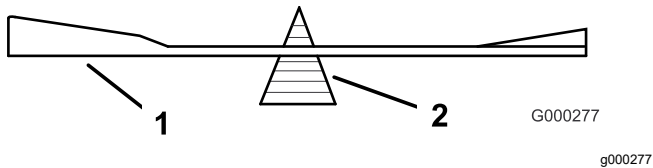


Figure 75

1. Blade
  2. Balancer
- 
3. Repeat this procedure until the blade is balanced.

## Installing the Blades

1. Install the bushing through the blade with the bushing flange on the bottom (grass) side of the blade (Figure 76).

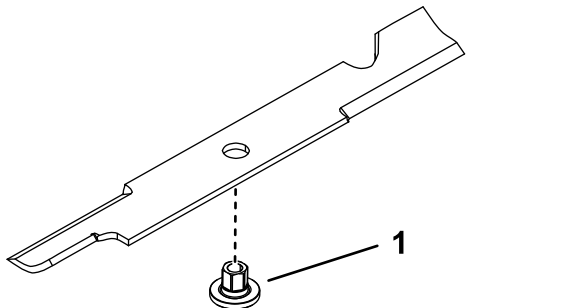


Figure 76

1. Bushing

2. Install the bushing/blade assembly into the spindle shaft (Figure 77).

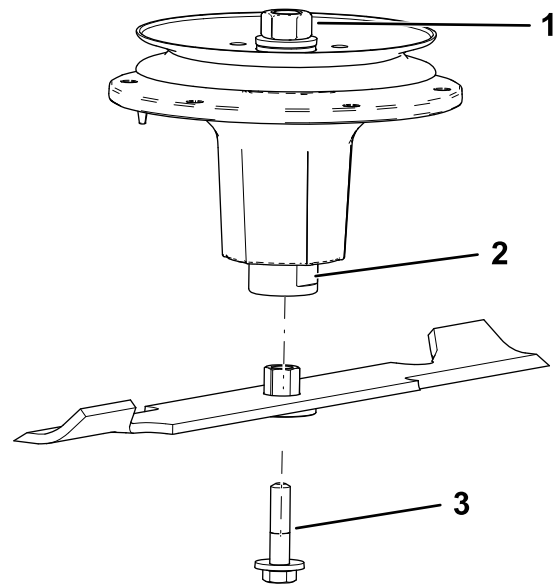


Figure 77

1. Top spindle nut
2. Flat of the spindle shaft
3. Blade bolt

3. Apply copper-based lubricant or grease to the threads of the blade bolt as needed to prevent seizing. Install the blade bolt finger-tight.
4. Place a wrench on the flat of the spindle shaft and torque the blade bolt to 75 to 81 N·m (55 to 60 ft-lb).

## Leveling the Mower Deck

### Setting up the Machine

**Note:** Ensure that the mower deck is level before matching the height of cut (HOC).

1. Park the machine on a level surface, disengage the blade-control switch, 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. Check tire pressure of the drive tires.  
If needed, adjust the rear tire to 152 kPa (22 psi).
4. Position the mower to the 102 mm (4 inches) height-of-cut position.

### Leveling the Center Deck and Wing Decks

1. Raise the center deck and fold the wings by pressing down at the rear of the deck-lift switch.

Hold the switch down until both wings are completely folded.

2. Position the mower to the 102 mm (4 inches) height-of-cut position.
3. Unlock the left and right wing deck cam locks (Figure 78).
4. Remove and retain the wing deck height-of-cut lynch pin (Figure 78).

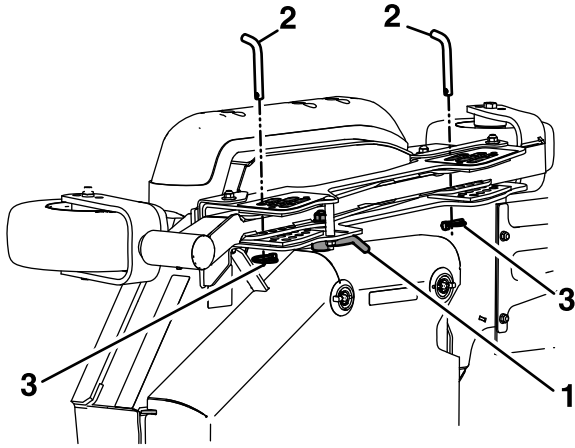


Figure 78

g239055

- |               |              |
|---------------|--------------|
| 1. Cam lock   | 3. Lynch pin |
| 2. Clevis pin |              |

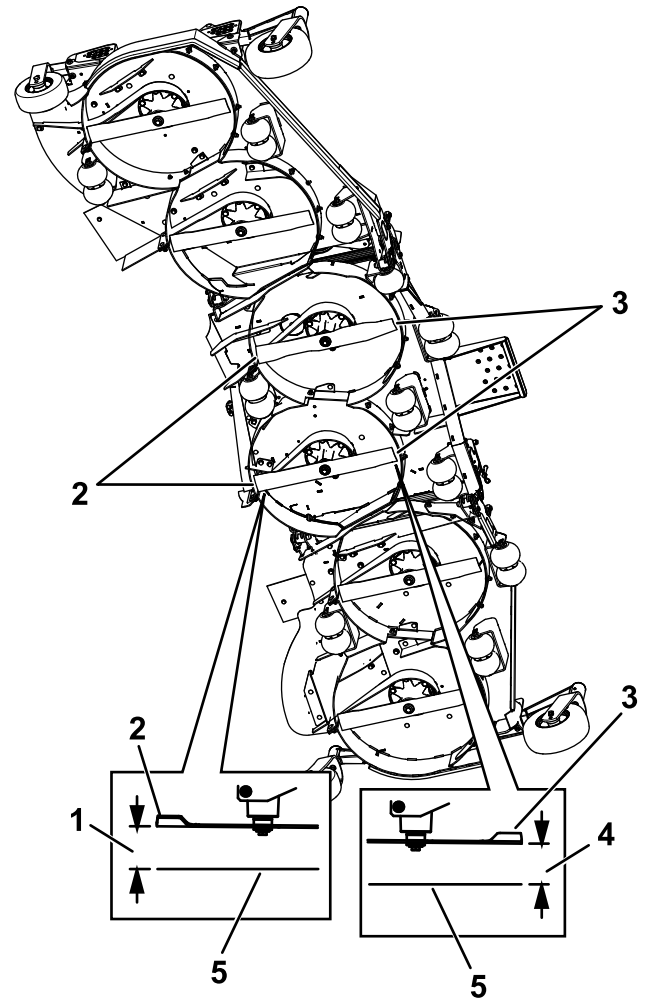


Figure 79

g366987

1. 108 mm (4-1/4 inches)
2. Rear blade tip
3. Front blade tip
4. 102 mm (4 inches)
5. Level surface

5. Insert the height-of-cut pin into the 102 mm (4 inches) location and install the lynch pin.
  6. Lock the each wing deck cam lock.
  7. Start the engine.
- Note:** The parking brake must be engaged and the motion-control levers must be out to start the engine. The operator does not have to be in the seat. Ensure that all persons are clear of the deck wings.
8. Press and hold the front of the deck-lift switch until the center deck lowers and both wings are completely unfolded to the cutting height.
  9. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
  10. Measure from the level surface to the front tip of the left and right center deck blades (Figure 79). The measurement should read 102 mm (4 inches).

## Adjusting the Center Deck

1. To increase the cutting height, turn the adjuster screw clockwise; to decrease, turn it counterclockwise.

Loosen the jam nuts on the top of each deck adjuster. Fine-tune the adjuster on the front deck-lift assembly by turning it to get the correct height for the left and right, front blade tips on the center deck (Figure 80).

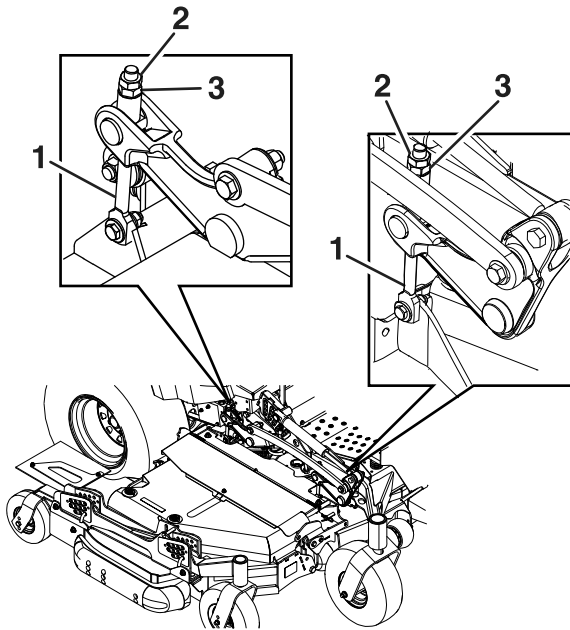
2. Measure the rear tip height.

Fine-tune the rear adjusters as required. You can adjust the single-point adjustment to gain more adjustment.

**Note:** In most conditions, you should adjust the rear tips on the blades 6.4 mm (1/4 inch) higher than the front.

3. Measure until all 4 sides are at the correct height.
4. Tighten all the nuts on the deck-lift arm assemblies.
5. If the 4 deck adjusters (Figure 80) do not have enough adjustment to achieve the accurate height of cut with the desired rake, you can utilize the single-point adjustment to gain more adjustment.
6. To adjust the single-point system, first loosen the front and rear height-of-cut plate mounting bolts (Figure 81).

Fine-tune the rear adjusters as required. You can adjust the single-point adjustment to gain more adjustment.



**Figure 80**

g239211

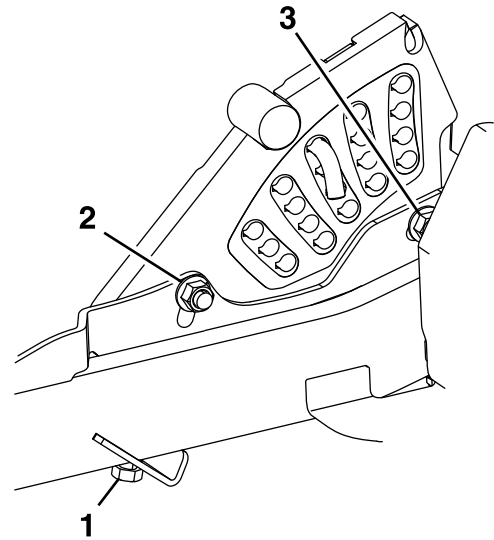
1. Adjuster link
2. Jam nut
3. Adjuster

7. If the deck is too low, tighten the single-point adjustment bolt by rotating it clockwise (Figure 81).

If the deck is too high, loosen the single-point adjustment bolt by rotating it counterclockwise. Loosen the front and rear height-of-cut plate mounting bolts. Fine-tune the rear adjusters as required. You can adjust the single-point adjustment to gain more adjustment.

**Note:** Loosen or tighten the single-point adjustment bolt enough to move the height-of-cut plate mounting bolts at least 1/3

the length of the available travel in their slots. This will attain some up and down adjustment on each of the 4 deck links.



**Figure 81**

g232012

1. Single-point height adjustment bolt
2. Front height-of-cut plate mounting bolt
3. Rear height-of-cut plate mounting bolt

8. Torque the front and rear height-of-cut plate mounting bolts to 37 to 45 N·m (27 to 33 ft-lb).

## Adjusting the Wing Decks

1. Measure from the level surface to the front tip of the left wing deck blade.

**Note:** The measurement should read 102 mm (4 inches).

2. Measure from the level surface to the front tip of the right wing deck blade.

**Note:** The measurement should read 102 mm (4 inches).

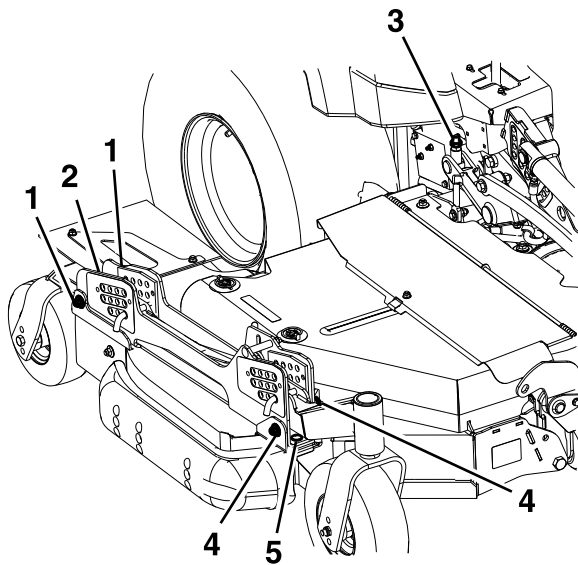
**Note:** As with the center deck, in most conditions, you should adjust the rear tips on the wing blades 6.4 mm (1/4 inch) higher than the front.

3. The left and right wing decks have blade height adjustments with front and rear adjustment points. To adjust the wing-blade height, first loosen the front and rear height-of-cut hanger mounting nuts. There are 4 locations (2 on each side of the channel) as shown in Figure 82.

# Checking the Deck Drive Gearbox-Oil Level

**Service Interval:** Every 50 hours

Use **SAE 75W-90 synthetic gear lube.**



g240665

**Figure 82**

Right wing deck shown

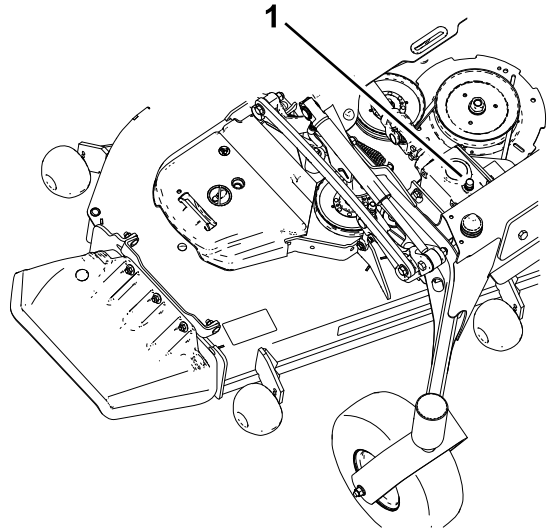
1. Rear hanger-mounting nuts
2. Rear height-adjustment hardware location
3. Single-point rear adjustment
4. Front hanger-mounting nuts
5. Front height-adjustment hardware location

- If the deck is too low, tighten the front height-adjustment bolt (Figure 82) by rotating the bottom nut clockwise.
- If the deck is too high, loosen the front height-adjustment bolt (Figure 82) by rotating the bottom nut counterclockwise. Fine-tune the rear adjusters as required.

Adjust the rear wheel height (Figure 82) so that the rear wheel lightly touches the ground with minimal pressure.

4. Measure the back of the wing blades. If either has less than 1.5 mm (1/16 inch) rake, raise the rear of the deck by tightening the left and right rear adjustments (Figure 82) until all 4 blades have a minimum of 1.5 mm (1/16 inch) rake. Adjust the rear wing wheels so that they lightly touch the ground with minimal pressure. Tighten all 4 rear hanger-mount locations (Figure 82).
5. Tighten the front and rear height-of-cut hanger jam nuts.

1. Park the machine on a level surface and engage the parking brake.
2. Lower the mower deck to the 25 mm (1 inch) height of cut.
3. Disengage the blade-control switch, shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
4. Lift the footrest to expose the top of the mower deck.
5. Remove the dipstick/fill plug from the top of the gearbox and ensure that the lubricant is between the marks on the dipstick (Figure 83).



g231764

**Figure 83**

1. Fill plug/dipstick
6. If the oil level is low, add enough lubricant until the level is between the marks on the dipstick.

**Important:** Do not overfill the gearbox; overfilling the gearbox may damage it.



# Changing the Deck Drive Gearbox Oil

**Service Interval:** After the first 200 hours

Every 400 hours

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

1. Park the machine on a level surface and engage the parking brake.
2. Lower the mower deck to the 25 mm (1 inch) height of cut.
3. Disengage the blade-control switch, shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
4. Lift the footrest to expose the top of the mower deck.
5. Remove the dipstick/fill plug from the top of the gearbox and ensure that the lubricant is between the marks on the dipstick (Figure 83).
6. Extract the oil through the fill port using a vacuum device or remove the gearbox from the deck and pour out the oil into a drain pan.
7. Install the gearbox (if it was removed to drain).
8. Add approximately 420 ml (14 fl oz), until the level is between the marks on the dipstick

**Important:** Do not overfill the gearbox; overfilling the gearbox may damage it.

# Checking the Wing Deck Bushings

**Service Interval:** Every 100 hours

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, 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. Raise the center deck and fold the wings by pressing down the deck-lift switch.

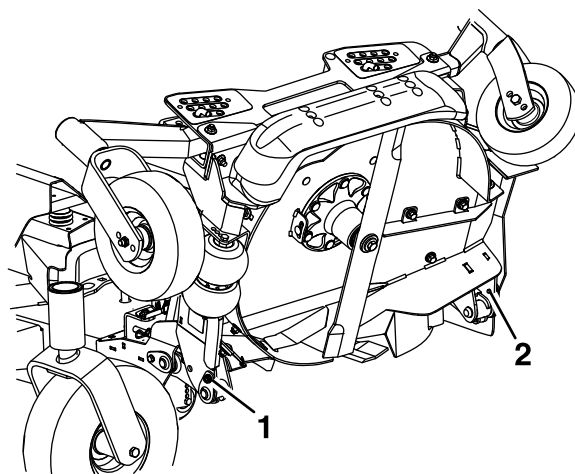
Hold the switch down until both wing decks are completely folded.

4. Push on the front corners of the deck near the lower bushings.

If there is more than 3 mm (1/8 inch) of movement, you need to replace the bushings.

# Changing the Wing Deck Bushings

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, 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. Remove and retain the clevis pins and hairpin cotters from each wing deck storage location.
4. Ensure that all persons are clear of the deck wings.
5. Press and hold the top of the deck-control switch; the center deck will raise first, then the wing decks.
6. Secure each wing deck in the upright position using the clevis pins and hairpin cotters.
7. Loosen the bolts that secure the upper pivot pins to the deck but **do not** remove the bolts (Figure 84).



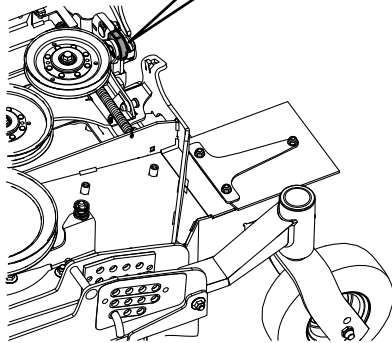
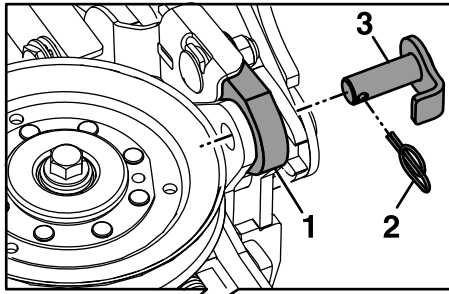
**Figure 84**

g351285

1. Front pivot pin
2. Rear pivot pin

8. Remove and retain the clevis pins and hairpin cotters from each wing deck.  
Remove the height-of-cut pin from the deck-lift plate on the right side of the center deck.
9. Lower the wing decks, but **do not** draw them into the operating position.
10. Remove and retain the left and right wing deck belt shield lynch pins, belt shield, and wing deck belts.
11. Remove and retain the locking cotter pins and cylinder pins that attach to the rod end of the deck-fold cylinders and wing decks (Figure 85).

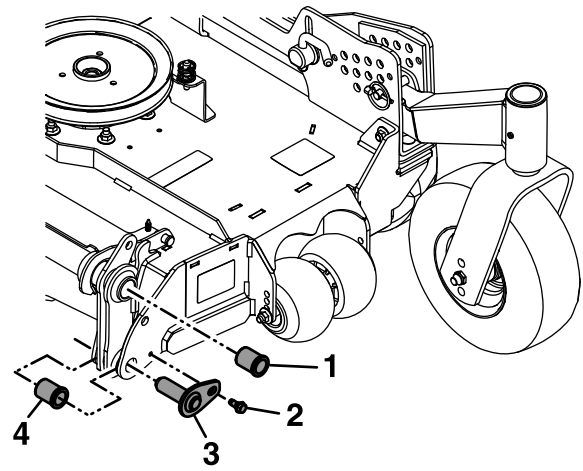
**Note:** Do not pull the wing decks into the operating position in order to remove the cylinder pins.



**Figure 85**

g350948

- 1. Cylinder rod end
- 2. Cotter pin
- 3. Cylinder pin

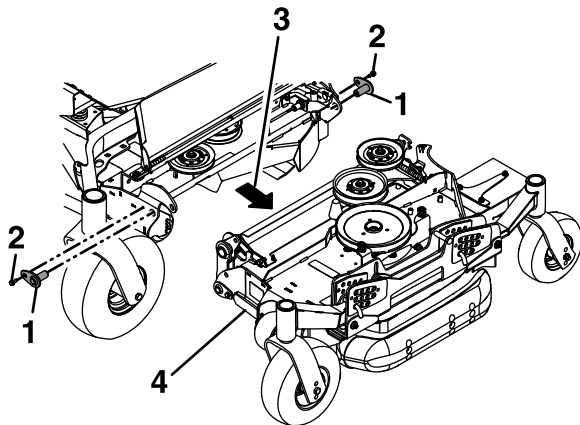


**Figure 87**

g351363

- 1. Upper pivot point bushing
- 2. Lower pivot point bolt
- 3. Deck pin assembly
- 4. Bushing

- 12. Remove and retain the bolts that secure the upper pivot pins to the deck and then remove the pivot pins (Figure 86).



**Figure 86**

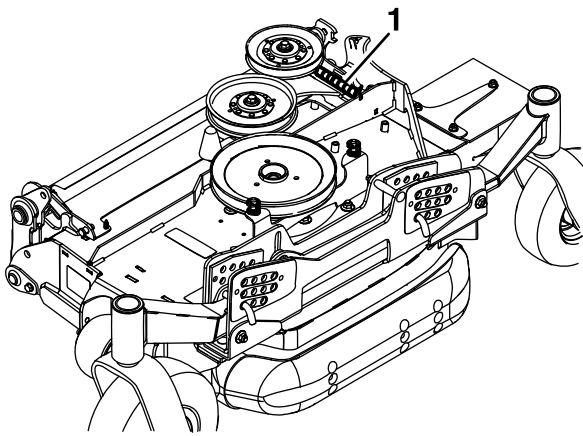
g351309

- 1. Upper pivot pins
- 2. Bolt
- 3. Pull outward
- 4. Left wing deck

- 13. Pull the wing deck outward to separate it from the center deck section (Figure 86).
- 14. Remove the flanged bushings from the upper pivot points and clean the bore (Figure 87).

- 15. Apply a thin bead of Loctite® 680 to the entire circumference of the rear edge of the new bushings.
- 16. Insert and gently tap the new bushings into the opening and properly seat them into place.
- 17. Place a block of wood under the inside edge of the center deck to make it easier to work on the lower pivot point bushings.
- 18. Remove and retain the lower pivot point bolts (Figure 84 and Figure 87).
- 19. Remove and discard the flanged bushing from the front and rear of the wing deck and clean the bore.
- 20. Apply a thin bead of Loctite® 680 to the entire circumference of the rear edge of the new bushings.
- 21. Insert and gently tap the new bushings into the opening and properly seat them into place.
- 22. Install the lower deck pin assemblies and bolts into the lower deck pivot points and hand-tighten.
- 23. To ease installing the wing deck sections, carefully remove the exposed end of the spring that applies pressure to the rear of the wing deck cover (Figure 88).





**Figure 88**

g351417

1. Spring

24. Push the left wing deck back to the center deck.  
Align and install the upper pivot deck pins in the front and rear of the deck and secure it using the previously removed bolts (Figure 86).
25. Align the lift-cylinder arm and install the previously removed pin and ensure that the locking tab aligns with the associated opening in the mount.  
Install the locking cotter pin to secure.
26. Attach the spring that was removed in step 23 that applies pressure to the rear of the wing deck cover.
27. Install the wing deck belts.
28. Install the wing deck belt shields and secure them using the lynch pins.
29. Raise the wing decks to the TRANSPORT position and secure them using the clevis pins and hairpin cotters.
30. Install the height-of-cut pin.

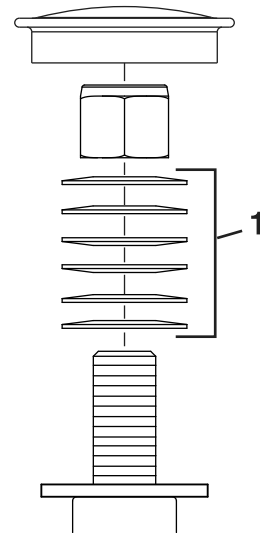
## Adjusting the Wing Deck Caster-Pivot Bearings

**Service Interval:** Every 200 hours/Yearly (whichever comes first)

1. Park the machine on a level surface, disengage the blade-control switch, 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. Remove the dust cap from the caster and tighten the locknut (Figure 89).
4. Tighten the locknut until the spring washers are flat, and then back off a 1/4 turn to properly set the preload on the bearings (Figure 89).

**Important:** Make sure that the spring washers are installed correctly as shown in Figure 89.

5. Install the dust cap (Figure 89).



**Figure 89**

g228558

1. Spring disc washers

# Cleaning

## Cleaning the Engine and Exhaust System Area

**Service Interval:** Before each use or daily—Clean the engine and exhaust system area.

**Important:** Do not use water to clean the engine. Use low-pressure compressed air. See the engine owner's manual.

1. Park the machine on a level surface, 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. Open the hood.
4. Clean all debris from the hood screens.
5. Clean around the flywheel, cylinder head, injectors, and injector pump.
6. Clean all debris from the exhaust system area.
7. Wipe up any excessive grease or oil around the engine and exhaust area.

## Cleaning the Machine and Mower Deck

**Service Interval:** Before each use or daily

1. Park the machine on a level surface, 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. Clean off any oil, debris, or grass build-up on the machine and mower deck, especially under the deck-belt shields, around the fuel tank, and around the engine and exhaust area.
4. Raise the center deck and wing decks. Lock each wing deck in the upright position.
5. Clean out any grass build-up from the underside of deck and in the discharge deflector.

## 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 moving parts 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 near flames or drain the fuel indoors or inside an enclosed trailer.
- 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 on other appliances.

## Cleaning and Storing the Machine

1. Disengage the blade-control switch (PTO), engage the parking brake, turn the ignition key to the OFF position, and remove the key.
2. Remove grass clippings, dirt, and grime from the external parts of the entire machine, especially the engine and hydraulic system. Clean dirt and chaff from the outside of the engine cylinder head fins and blower housing.

**Important:** You can wash the machine with mild detergent and water. Do not pressure wash the machine. Avoid excessive use of water, especially near the control panel, engine, hydraulic pumps, and motors.

3. Service the air cleaner; refer to [Servicing the Air Cleaner \(page 46\)](#).
4. Grease the machine; refer to [Lubrication \(page 43\)](#).
5. Change the engine oil and filter; refer to [Changing the Engine Oil and Filter \(page 48\)](#).
6. Check the tire pressure; refer to [Checking the Tire Pressure \(page 55\)](#).
7. Change the hydraulic fluid and filter; refer to [Checking the Tire Pressure \(page 55\)](#).
8. Charge the battery; refer to [Charging the Battery \(page 52\)](#).
9. Scrape any heavy buildup of grass and dirt from the underside of the mower, then wash the mower with a garden hose.

**Note:** Run the machine with the blade-control switch (PTO) engaged and the engine at high idle for 2 to 5 minutes after washing.

10. Check the condition of the blades; refer to [Servicing the Cutting Blades \(page 65\)](#).

Prepare the machine for storage when non-use occurs over 30 days. Prepare the machine for storage as follows:

- A. Run the engine to distribute conditioned fuel through the fuel system for 5 minutes.
- B. Shut off the engine, allow it to cool, and drain the fuel tank.

**Note:** Start the engine and run it until it shuts off.

- C. Dispose of fuel properly. Recycle as per local codes.

**Important:** Do not store stabilizer/conditioned fuel longer than the duration recommended by the fuel-stabilizer manufacturer.

11. Check and tighten all bolts, nuts, and screws. Repair or replace any part that is damaged.
12. Paint all scratched or bare metal surfaces. Paint is available from your Authorized Service Dealer.
13. Store the machine in a clean, dry garage or storage area. Remove the key from the ignition switch and keep it out of reach of children or other unauthorized users. Cover the machine to protect it and keep it clean.

# Troubleshooting

Problem	Possible Cause	Corrective Action
The starter does not crank.	<ol style="list-style-type: none"> <li>1. The blade-control switch is engaged.</li> <li>2. The parking brake is disengaged.</li> <li>3. The motion-control levers are not in the NEUTRAL-LOCK position.</li> <li>4. You are not sitting in the operator's seat.</li> <li>5. The battery is dead.</li> <li>6. The electrical connections are corroded or loose.</li> <li>7. A fuse is blown.</li> <li>8. A relay or switch is damaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Disengage the blade-control switch.</li> <li>2. Engage the parking brake.</li> <li>3. Move the motion-control levers outward to the NEUTRAL-LOCK position.</li> <li>4. Sit on the operator's seat.</li> <li>5. Charge the battery.</li> <li>6. Check the electrical connections for good contact.</li> <li>7. Replace the fuse.</li> <li>8. Contact an Authorized Service Dealer.</li> </ol>
The engine does not start, starts hard, or fails to keep running.	<ol style="list-style-type: none"> <li>1. The fuel tank is empty.</li> <li>2. The oil level in the crankcase is low.</li> <li>3. The throttle is not in the correct position.</li> <li>4. There is dirt in fuel filter.</li> <li>5. There is dirt, water, or stale fuel is in the fuel system.</li> <li>6. The air cleaner is dirty.</li> <li>7. The seat switch is not functioning properly.</li> <li>8. The electrical connections are corroded, loose or faulty.</li> <li>9. The relay or switch is broken.</li> </ol>	<ol style="list-style-type: none"> <li>1. Fill the fuel tank.</li> <li>2. Add oil to the crankcase.</li> <li>3. Be sure that the throttle control is midway between the SLOW and FAST positions.</li> <li>4. Replace the fuel filter.</li> <li>5. Contact an Authorized Service Dealer.</li> <li>6. Clean or replace the air-cleaner element.</li> <li>7. Check the seat switch indicator. Replace the seat if needed.</li> <li>8. Check the electrical connections for good contact. Clean the connector terminals thoroughly with electrical contact cleaner, apply dielectric grease, and connect.</li> <li>9. Contact an Authorized Service Dealer.</li> </ol>
The engine loses power.	<ol style="list-style-type: none"> <li>1. The engine load is excessive.</li> <li>2. The air cleaner is dirty.</li> <li>3. The oil level in the crankcase is low.</li> <li>4. The cooling fins and the air passages above the engine are plugged.</li> <li>5. The vent hole in the fuel cap is plugged.</li> <li>6. There is dirt in the fuel filter.</li> <li>7. There is dirt, water, or stale fuel in the fuel system.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce the ground speed.</li> <li>2. Clean the air-cleaner element.</li> <li>3. Add oil to the crankcase.</li> <li>4. Remove the obstruction from the cooling fins and the air passages.</li> <li>5. Clean or replace the fuel cap.</li> <li>6. Replace the fuel filter.</li> <li>7. Contact an Authorized Service Dealer.</li> </ol>
The engine overheats.	<ol style="list-style-type: none"> <li>1. The engine load is excessive.</li> <li>2. The oil level in the crankcase is low.</li> <li>3. The cooling fins and air passages under the engine-blower housing are plugged.</li> <li>4. The air cleaner is dirty.</li> <li>5. Dirt, water, or stale fuel is in the fuel system.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce the ground speed.</li> <li>2. Add oil to the crankcase.</li> <li>3. Remove the obstruction from the cooling fins and air passages.</li> <li>4. Clean or replace the air-cleaner element.</li> <li>5. Contact an Authorized Service Dealer.</li> </ol>
The machine pulls to the left or right (with the motion-control levers fully forward).	<ol style="list-style-type: none"> <li>1. The tracking needs adjustment</li> <li>2. The tire pressure in the drive tires is not correct.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the tracking.</li> <li>2. Adjust the tire pressure in the drive tires.</li> </ol>

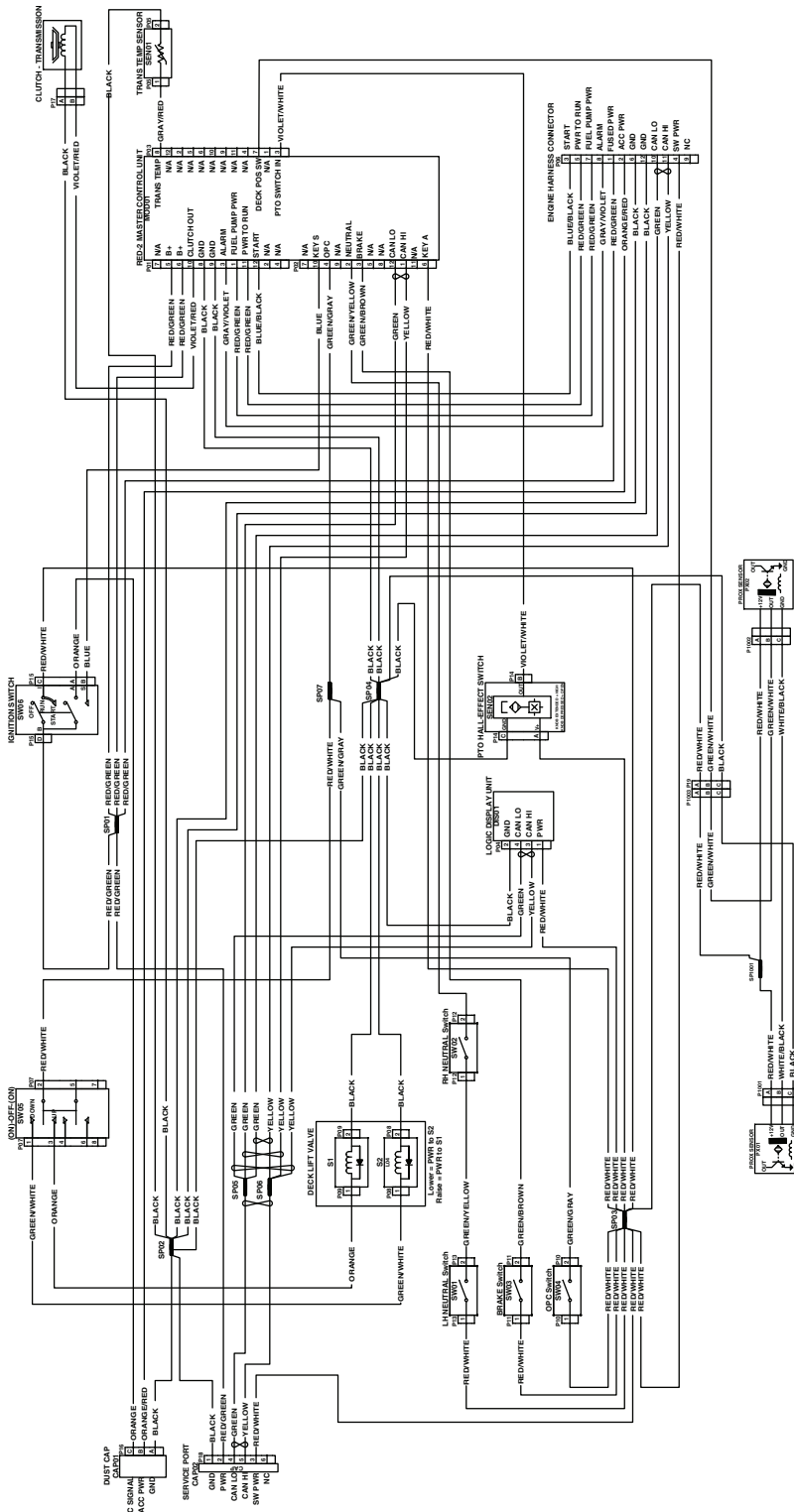
Problem	Possible Cause	Corrective Action
The machine does not drive.	<ol style="list-style-type: none"> <li>1. The bypass valves are not closed tight.</li> <li>2. The pump belt is worn, loose, or broken.</li> <li>3. The pump belt is off a pulley.</li> <li>4. The idler spring is broken or missing.</li> <li>5. The hydraulic fluid level is low or too hot.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten the bypass valves.</li> <li>2. Change the belt.</li> <li>3. Change the belt.</li> <li>4. Replace the spring.</li> <li>5. Add hydraulic fluid to the reservoirs or let it cool down.</li> </ol>
The machine vibrates abnormally.	<ol style="list-style-type: none"> <li>1. The cutting blade(s) is/are bent or unbalanced.</li> <li>2. The blade mounting bolt is loose.</li> <li>3. The engine mounting bolts are loose.</li> <li>4. The engine pulley, idler pulley, or blade pulley is loose.</li> <li>5. The engine pulley is damaged.</li> <li>6. The blade spindle is bent.</li> <li>7. The motor mount is loose or worn.</li> </ol>	<ol style="list-style-type: none"> <li>1. Install new cutting blade(s).</li> <li>2. Tighten the blade mounting bolt.</li> <li>3. Tighten the engine mounting bolts.</li> <li>4. Tighten the appropriate pulley.</li> <li>5. Contact an Authorized Service Dealer.</li> <li>6. Contact an Authorized Service Dealer.</li> <li>7. Contact an Authorized Service Dealer.</li> </ol>
The cutting height is uneven.	<ol style="list-style-type: none"> <li>1. The blade(s) is not sharp.</li> <li>2. A cutting blade(s) is/are bent.</li> <li>3. The mower is not level.</li> <li>4. An anti-scalp roller (if applicable) is not set correctly.</li> <li>5. The underside of the mower deck is dirty.</li> <li>6. The tire pressure is incorrect.</li> <li>7. A blade spindle is bent.</li> </ol>	<ol style="list-style-type: none"> <li>1. Sharpen the blade(s).</li> <li>2. Install a new cutting blade(s).</li> <li>3. Level the mower from side-to-side and front-to-rear.</li> <li>4. Adjust the anti-scalp wheel height.</li> <li>5. Clean the underside of the mower deck.</li> <li>6. Adjust the tire pressure.</li> <li>7. Contact an Authorized Service Dealer.</li> </ol>
The blades do not rotate.	<ol style="list-style-type: none"> <li>1. The mower deck belt is damaged, worn, loose, or broken.</li> <li>2. The mower deck belt is off the pulley.</li> <li>3. The pump drive belt is worn, loose, or broken.</li> <li>4. The idler spring is broken or missing.</li> </ol>	<ol style="list-style-type: none"> <li>1. Install a new deck belt.</li> <li>2. Install the mower belt on the deck pulley and check the idler pulley, idler arm, and spring for correct position and function.</li> <li>3. Check the belt tension or install a new belt.</li> <li>4. Replace the spring.</li> </ol>

# Schematics

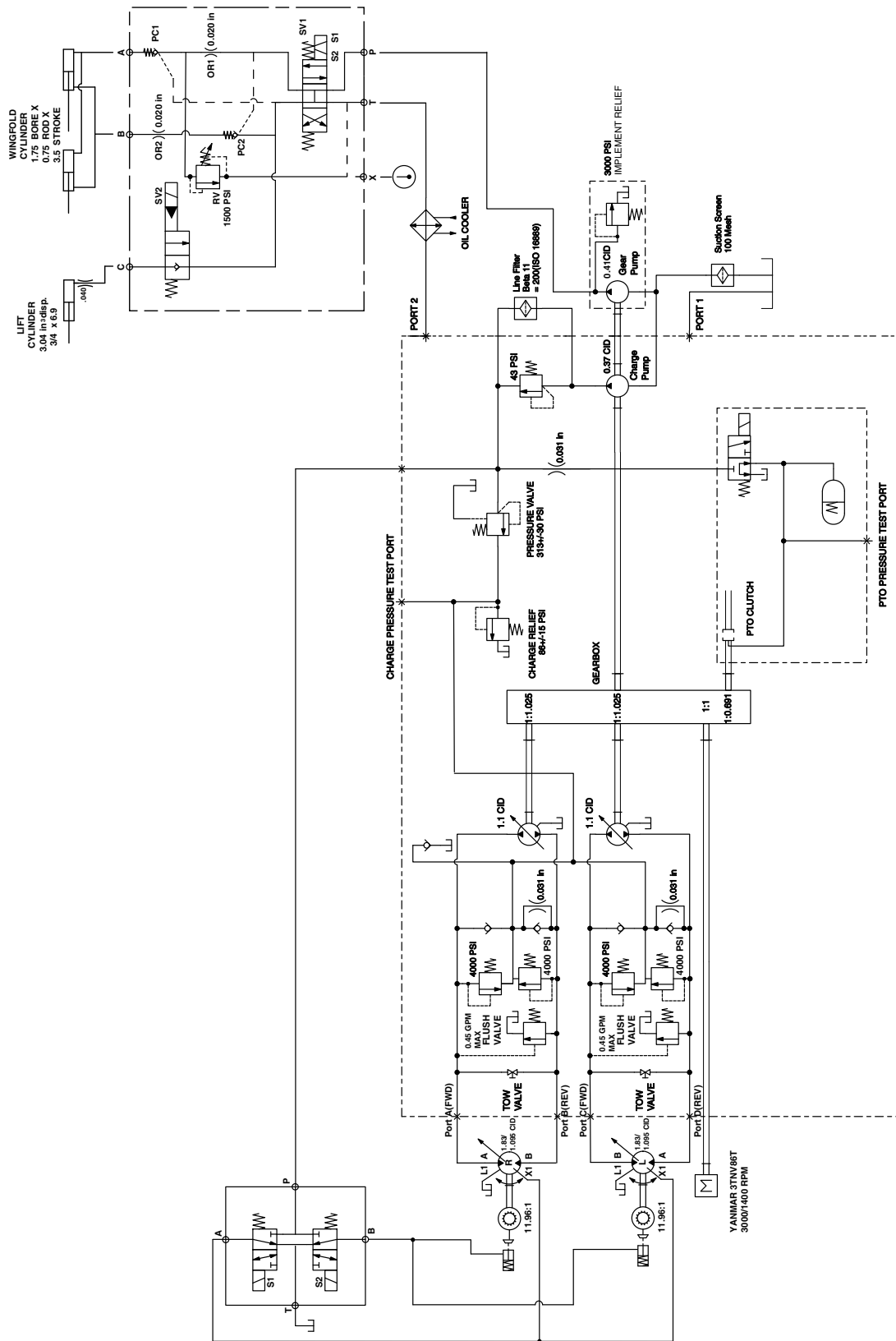


Electrical Schematic—Yanmar Engine 3TNV86CT (Rev. A)

g372447



**Electrical Schematic—Machine with Horizon Display Monitor (Rev. A)**



Hydraulic Schematic (Rev. A)

g441457



# Notes:

**Notes:**

**Notes:**

# 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](http://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.