



**Count on it.**

Form No. 3400-952 Rev B

# Operator's Manual

## **Z Master® Professional 6000 Series Riding Mower with 60in and 72in TURBO FORCE® Side Discharge Mower**

Model No. 74946—Serial No. 316000001 and Up

Model No. 74947—Serial No. 316000001 and Up



This spark ignition system complies with Canadian ICES-002

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.

## ⚠ WARNING

**Removing standard original equipment parts and accessories may alter the warranty, traction, and safety of the machine. Failure to use original Toro parts could cause serious injury or death. Making unauthorized changes to the engine, fuel or venting system, may violate EPA and CARB regulations.**

**Replace all parts including, but not limited to, tires, belts, blades, and fuel system components with original Toro parts.**

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

## ⚠ WARNING

### CALIFORNIA Proposition 65 Warning

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

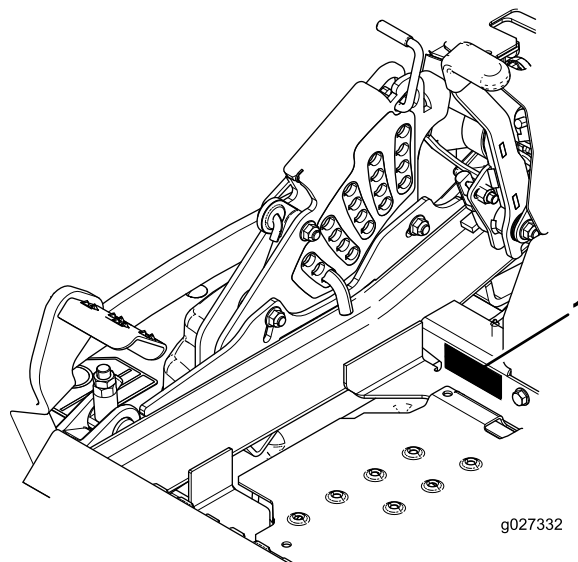
# Introduction

This rotary-blade, riding lawn mower is intended to be used by residential homeowners or professional, hired operators. It is designed primarily for cutting grass on well-maintained lawns on residential or commercial properties. It is not designed for cutting brush or for agricultural uses.

Read this information carefully to learn how to operate and maintain your product properly and to avoid injury and product damage. You are responsible for operating the product properly and safely.

You may contact Toro directly at [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.



**Figure 1**

1. Model and serial number location

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

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

This manual identifies potential hazards and has safety messages identified by the safety-alert symbol ([Figure 2](#)), which signals a hazard that may cause serious injury or death if you do not follow the recommended precautions.



Figure 2

g000502

1. Safety-alert symbol

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

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# Safety

Improper use or maintenance by the operator or owner can result in injury. To reduce the potential for injury, comply with these safety instructions, and pay attention to the safety alert symbol , which means Caution, Warning, or Danger—"personal safety instruction." Failure to comply with the instructions may result in personal injury or death.

This machine was manufactured according to the appropriate regulatory standards in effect at the time of manufacture. Modifying this machine in any way may cause it to be out of compliance with those standards and with the instructions in this *Operator's Manual*. Modifications to this machine should only be made by either the manufacturer or an Authorized Toro Dealer.

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

The owner/user can prevent and is responsible for accidents or injuries occurring to people, or damage to property.

The addition of attachments made by other manufacturers that do not meet American National Standards Institute certification will cause noncompliance of this machine.

## Safe Operating Practices

The following instructions are adapted from ANSI standard B71.4-2012.

### Training

- Read the *Operator's Manual* and other training material.
- If the operator(s) or mechanic(s) cannot read the manual language, it is the owner's responsibility to explain this material to them.
- Become familiar with the safe operation of the equipment, operator controls, and safety signs.
- All operators and mechanics should be trained. The owner is responsible for training the users.
- Never let children or untrained people operate or service the equipment. Local regulations may restrict the age of the operator.
- The owner/user can prevent and is responsible for accidents or injuries occurring to people, or damage to property.

## Preparation

- Evaluate the terrain to determine what accessories and attachments are needed to properly and safely perform the job. Only use accessories and attachments approved by the manufacturer.
- Wear appropriate clothing including: substantial slip-resistant footwear, safety glasses, and hearing protection. Tie back long hair and do not wear jewelry.
- Inspect the area where the equipment is used, and remove all objects that can be thrown by the machine.
- Check that operator's presence controls, safety switches, and shields are attached and functioning properly. Do not operate unless they are functioning properly.

## Operation

- Lightning can cause severe injury or death. If lightning is seen, or thunder is heard in the area, do not operate the machine; seek shelter.
- Do not run an engine in an enclosed area.
- Operate only in well-lit areas, keeping away from holes and hidden hazards.
- Ensure that all drives are in neutral and that the parking brake is engaged before starting engine. Start the engine only from the operator's position.
- Make sure that you have good footing while using this machine, especially when backing up. Reduced footing could cause slipping.
- Slow down and use extra care on hillsides. Be sure to travel side to side on hillsides. Turf conditions can affect the stability of the machine. Use caution while operating near drop-offs.
- Slow down and use caution when making turns and when changing directions on slopes.
- Do not raise the mower deck with the blades running.
- Do not operate the machine without the PTO shield or other guards securely in place. Be sure that all interlocks are attached, adjusted properly, and functioning properly.
- Do not operate with the discharge deflector raised, removed or altered, unless you are using a grass catcher.
- Do not change the engine governor setting or overspeed the engine.
- Stop on level ground, disengage drives, engage the parking brake (if provided), shut off the engine before leaving the operator's position for any reason, including emptying the catchers or unclogging the chute.
- Stop equipment and inspect the blades after striking objects or if an abnormal vibration occurs.

Make the necessary repairs before resuming operations.

- Keep your hands and feet away from the cutting unit.
- Look behind and down before backing up to ensure a clear path.
- Keep pets and bystanders away from an operating machine.
- Slow down and use caution when making turns and crossing roads and sidewalks. Stop the blades if you are not mowing.
- Be aware of the mower-discharge direction and do not point it at anyone.
- Do not operate the mower under the influence of alcohol or drugs.
- Use care when loading or unloading the machine into or from a trailer or truck.
- Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.

## Safe Handling of Fuels

- To avoid personal injury or property damage, use extreme care in handling gasoline. Gasoline is extremely flammable and the vapors are explosive.
- Extinguish all cigarettes, cigars, pipes, and other sources of ignition.
- Use only an approved fuel container.
- Do not remove the fuel cap or add fuel with the engine running.
- Allow the engine to cool before fueling.
- Do not fuel the machine indoors.
- 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 fill containers inside a vehicle, on a truck, or on a trailer bed with a plastic liner. Always place containers on the ground away from your vehicle before filling.
- Remove equipment from the truck or trailer and fuel it on the ground. If this is not possible, then add fuel with such equipment as a portable container rather than from a fuel-dispenser nozzle.
- Keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete.
- Do not use a nozzle lock-open device.
- If you spill fuel on clothing, change your clothing immediately.
- Do not overfill the fuel tank. Replace the fuel cap and tighten securely.

## Maintenance and Storage

- Disengage drives, set the parking brake, stop the engine, and remove the key or disconnect spark-plug wire. Wait for all movement to stop before adjusting, cleaning, or repairing.
- Park the machine on a level surface.
- Clean grass and debris from the cutting unit, drives, mufflers, and engine to help prevent fires.
- Clean up oil or fuel spills.
- Let the engine cool before storing the machine.
- Do not store fuel near flames or drain fuel indoors.
- Do not allow untrained personnel to service the machine.
- Use jack stands to support components when required.
- Carefully release pressure from components with stored energy.
- Disconnect the battery or remove the spark-plug wire before making any repairs. Disconnect the negative terminal first and the positive terminal last. Connect the positive terminal first and negative last.
- Use care when checking the blades. Wrap the blade(s) or wear thickly padded gloves, and use caution when servicing them. Only replace blades; do not straighten or weld them.
- Keep hands and feet away from moving parts. If possible, do not make adjustments with the engine running.
- Keep all parts in good working condition and all hardware tightened. Replace all worn or damaged decals.

## Hauling

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

## Toro Mower Safety

The following list contains safety information specific to Toro products and other safety information that you must know.

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

This product is designed for cutting and recycling grass, or, when equipped with a grass bagger, for catching cut grass. Any use for purposes other than these could prove dangerous to the user and bystanders.

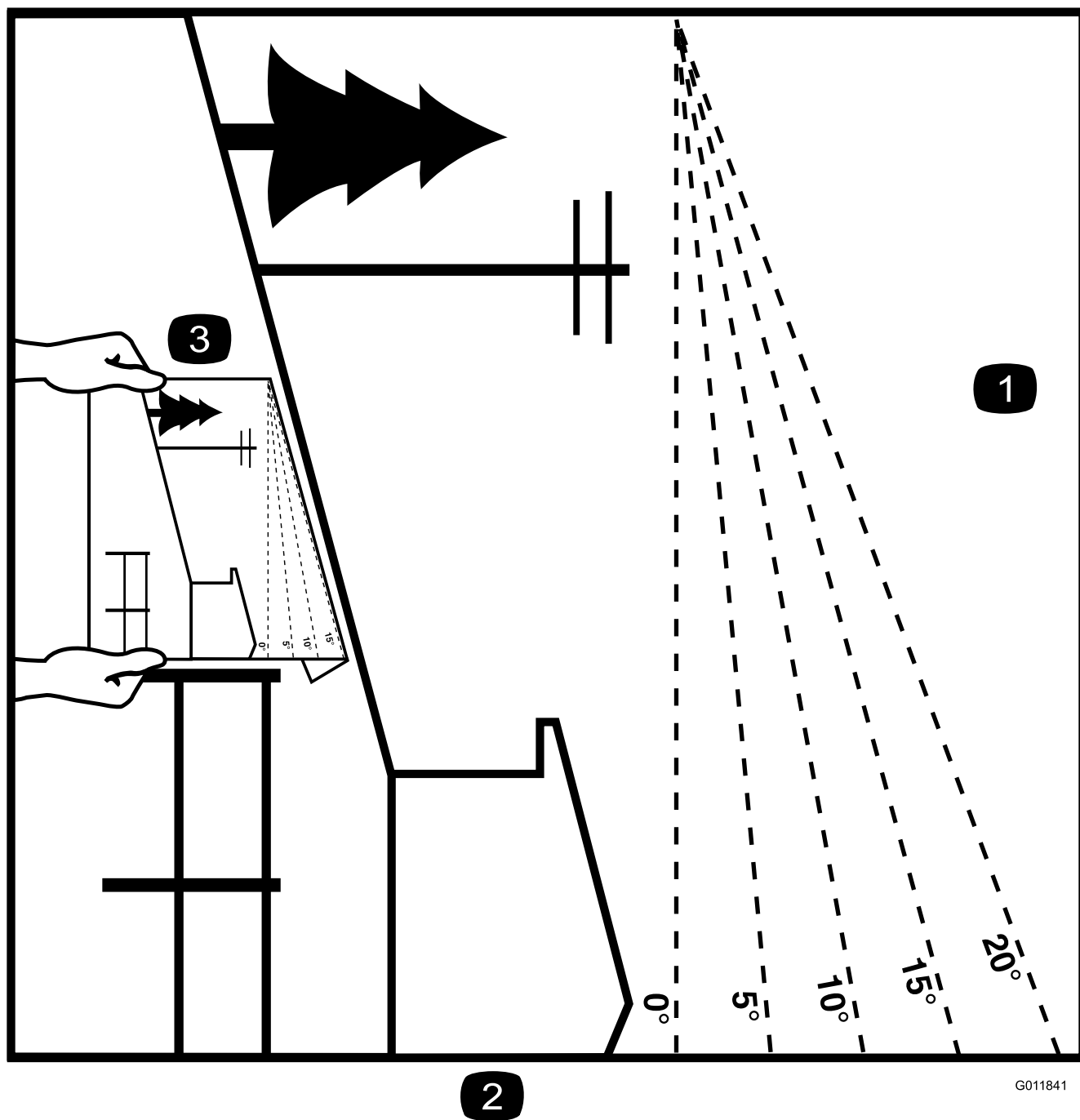
## Using the Rollover-Protection System (ROPS)

- The ROPS is an integral and effective safety device. Keep the ROPS in the raised and locked position and use the seat belt when operating the machine.
- Lower the ROPS temporarily only when absolutely necessary. Do not wear the seat belt when the ROPS is folded down.
- Be aware there is no rollover protection when the ROPS is in the down position.
- Be certain that the seat belt can be released quickly in the event of an emergency.
- Check the area to be mowed and never fold down the ROPS in areas where there are slopes, drop offs or water.
- Check carefully for overhead clearances (i.e. branches, doorways, electrical wires) before driving under any objects and do not contact them.
- Keep the ROPS in safe operating condition by periodically thoroughly inspecting for damage and keeping all mounting fasteners tight.
- Replace a damaged ROPS. Do not repair or revise.
- **Do not** remove the ROPS.
- Any alterations to a ROPS must be approved by the manufacturer.
- Do not mow slopes greater than 15 degrees.

## Service

- Do not store the machine or a fuel container inside where there is an open flame, such as near a water heater or furnace.
- Keep the nuts and bolts tight, especially the blade-attachment bolts.
- Never interfere with the intended function of a safety device or reduce the protection provided by a safety device. Check their proper operation regularly.
- To best protect your investment and maintain optimal performance of your Toro equipment, count on Toro genuine parts. When it comes to reliability, Toro delivers replacement parts designed to the exact engineering specifications of our equipment. For peace of mind, insist on Toro genuine parts.
- Check brake operation frequently. Adjust and service as required.

# Slope Indicator



G011841

g011841

**Figure 3**

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1. The maximum slope you can safely 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 lost.



1

58-6520

decal58-6520

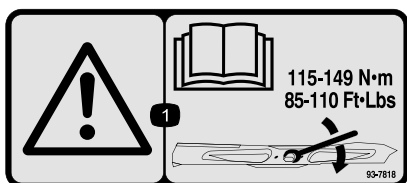
1. Grease



106-2655

decal106-2655

1. Warning—do not touch or approach moving belts; remove the ignition key and read the instructions before servicing or performing maintenance.



93-7818

decal93-7818

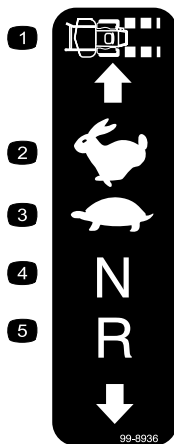
1. Warning—read the *Operator's Manual* for instructions on torquing the blade bolt/nut to 115-149 N·m (85-110 ft-lb).



106-5517

decal106-5517

1. Warning—do not touch the hot surface.



99-8936

decal99-8936

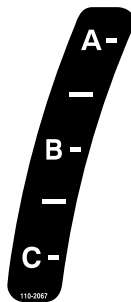
- |                  |            |
|------------------|------------|
| 1. Machine speed | 4. Neutral |
| 2. Fast          | 5. Reverse |
| 3. Slow          |            |



107-3069

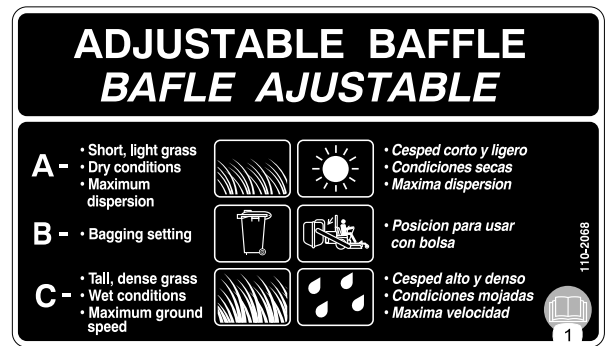
decal107-3069

1. Warning—there is no rollover protection when the roll bar is down.
2. 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 the seat belt when the roll bar is down.
3. Read the *Operator's Manual*; drive slowly and carefully.



110-2067

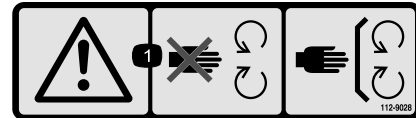
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110-2068

decal110-2068

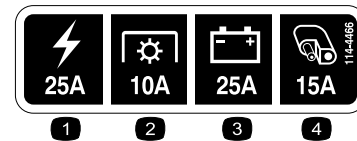
1. Read the *Operator's Manual*.



112-9028

decal112-9028

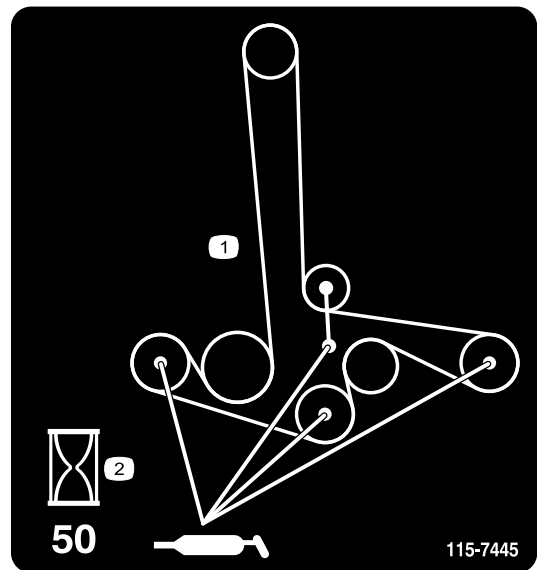
1. Warning—stay away from moving parts; keep all guards in place.



114-4466

decal114-4466

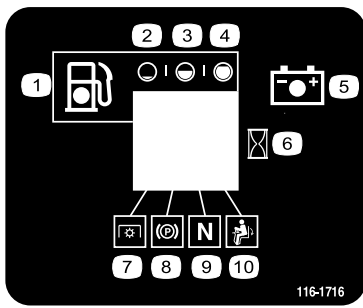
1. Main, 25A
2. PTO, 10A
3. Charge, 25A
4. Auxiliary, 15A



115-7445

decal115-7445

1. Grease pulleys and spindles
2. Maintenance interval—50 hours



116-1716

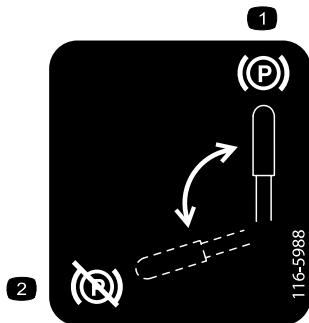
decal116-1716

- |            |                              |
|------------|------------------------------|
| 1. Fuel    | 6. Hour meter                |
| 2. Empty   | 7. PTO                       |
| 3. Half    | 8. Parking brake             |
| 4. Full    | 9. Neutral                   |
| 5. Battery | 10. Operator-presence switch |



116-4858

decal116-4858



116-5988

decal116-5988

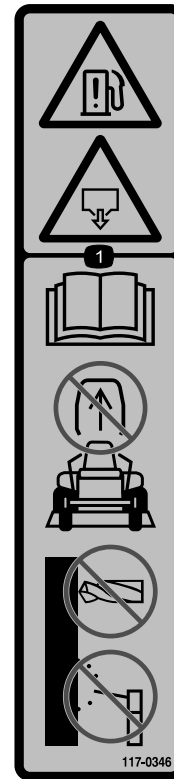
- |                          |                             |
|--------------------------|-----------------------------|
| 1. Parking brake—engaged | 2. Parking brake—disengaged |
|--------------------------|-----------------------------|



116-8726

decal116-8726

1. Read the *Operator's Manual* for recommended hydro oil.



117-0346

decal117-0346

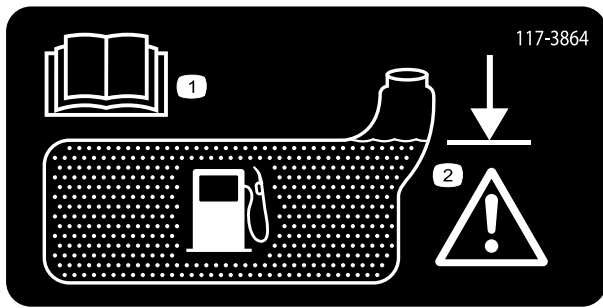
1. Fuel leak hazard—read the *Operator's Manual*; do not attempt to remove the roll bar; do not weld, drill, or modify the roll bar in any way.



117-3848

decal117-3848

1. Thrown object hazard—keep bystanders a safe distance from the machine.
2. Thrown object hazard, mower—do not operate the machine without deflector, discharge cover, or grass collection system in place.
3. Cutting/dismemberment of hand or foot—stay away from moving parts; keep all guards and shields in place.



117-3864

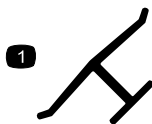
1. Read the *Operator's Manual*.
2. Fill to bottom of filler neck; warning—do not overfill the tank.



### Battery Symbols

Some or all of these symbols are on your battery

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



### Manufacturer's Mark

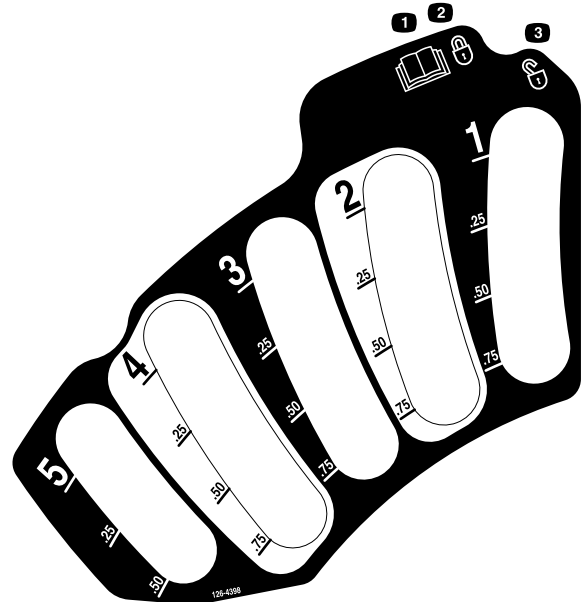
1. Indicates the blade is identified as a part from the original machine manufacturer.



decal126-2055

126-2055

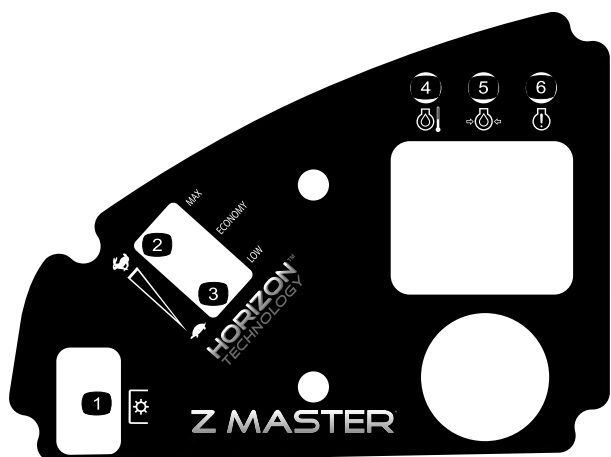
1. Wheel lug nut torque 129 N·m (95 ft-lb) (4x)
2. Wheel hub nut torque 319 N·m (235 ft-lb)
3. Read and understand the *Operator's manual* before performing any maintenance, check torque after first 100 hours then every 500 hours thereafter.



decal126-4398

126-4398

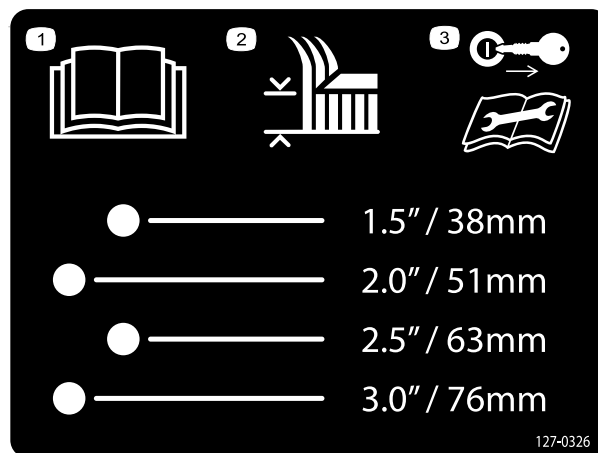
1. Read the *Operator's Manual*
2. Lock
3. Unlock



**127-0314**

decal127-0314

1. PTO switch
2. Maximum speed
3. Low speed
4. High oil-temperature indicator
5. Low oil-pressure indicator
6. Malfunction-indicator light (MIL)



**127-0326**

decal127-0326

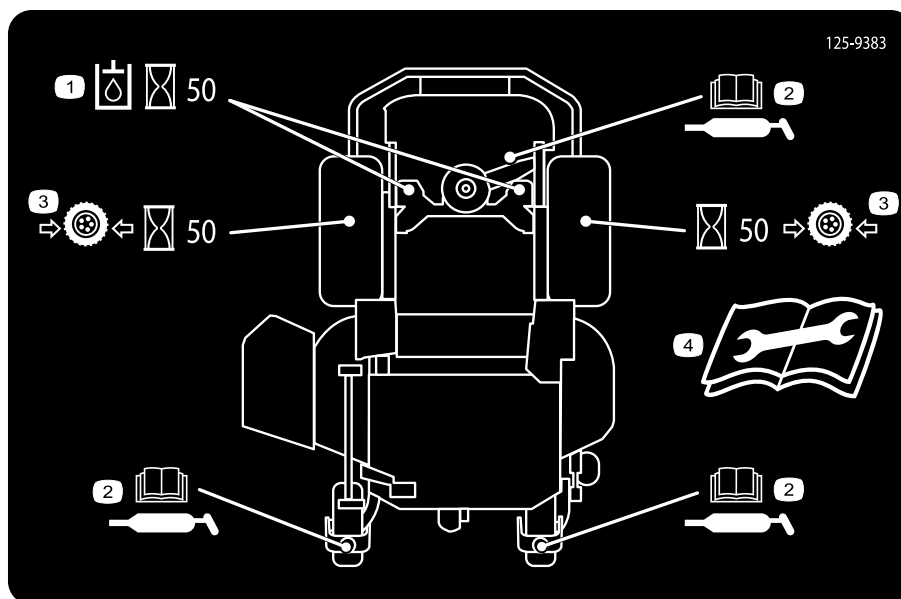
1. Read the *Operator's Manual*.
2. Height-of-cut
3. Remove the key from the ignition and read the *Operator's Manual* before performing maintenance or servicing the machine.



**131-4036**

decal131-4036

1. Maximum drawbar pull 36 kg (80 lb)
2. Read the *Operator's Manual*.



**125-9383**

decal125-9383

1. Check hydraulic oil every 50 operating hours.
2. Read the *Operator's Manual* for information on lubricating the machine.
3. Check the tire pressure every 50 operating hours.
4. Read the *Operator's Manual* before servicing or performing maintenance.



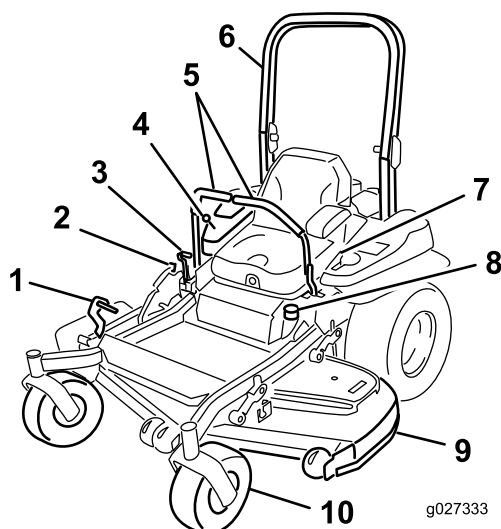
132-0871

decal132-0871

**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 those conditions on that day and at that site. Changes in the terrain can result in a change in slope operation for the machine. If possible, keep the cutting units lowered to the ground while operating the machine on slopes. Raising the cutting units while operating on slopes can cause the machine to become unstable.

1. Warning—read the *Operator's Manual*; do not operate this machine unless you are trained; wear hearing protection.
2. Cutting, dismembering, and entanglement hazard—keep hands away from moving parts; keep all guards and shields in place.
3. Thrown object hazard—keep bystanders away.
4. Ramp hazard—when loading onto a trailer, do not use dual ramps; only use a singular ramp wide enough for the machine and that has an incline less than 15°; back up the ramp (in reverse) and drive forward off the ramp.
5. Bodily harm hazard—do not carry passengers; look behind you when mowing in reverse.
6. Tipping hazard on slopes—do not use on slopes near open water; do not use on slopes greater than 15°.

# Product Overview

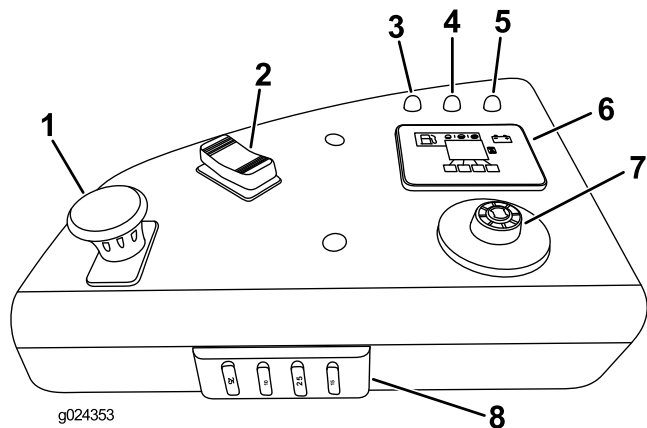


**Figure 4**

- |                                  |                  |
|----------------------------------|------------------|
| 1. Height-of-cut deck-lift pedal | 6. Roll bar      |
| 2. Transport lock                | 7. Seat belt     |
| 3. Parking-brake lever           | 8. Fuel cap      |
| 4. Controls                      | 9. Mower deck    |
| 5. Motion-control levers         | 10. Caster wheel |

## Controls

Become familiar with all the controls before you start the engine and operate the machine (Figure 4 and Figure 5).

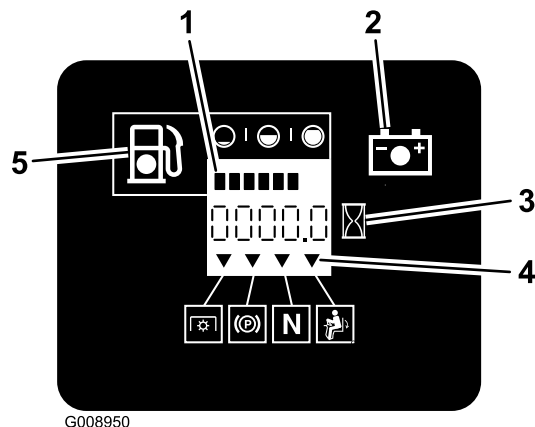


**Figure 5**

- |                                   |   |
|-----------------------------------|---|
| 1. PTO switch                     | 5. Malfunction-indicator light (MIL)              |
| 2. Throttle switch                | 6. Hour meter/Safety-interlock display/Fuel gauge |
| 3. High oil-temperature indicator | 7. Ignition switch                                |
| 4. Low oil-pressure indicator     | 8. Fuses  |

## 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).



**Figure 6**

- |                      |                             |
|----------------------|-----------------------------|
| 1. Fuel gauge (bars) | 4. Safety-interlock symbols |
| 2. Battery light     | 5. Low-fuel indicator light |
| 3. Hour meter        |                             |

## Fuel Gauge

The fuel gauge is located with the hour meter and the bars light up when the ignition switch is on (Figure 6).

The indicator light appears when the fuel level is low (approximately 1 gallon remaining in the fuel tank).

## Safety-Interlock Indicators

There are symbols on the hour meter that indicate with a black triangle that the interlock component is in the correct position (Figure 6).

## Battery-Indicator Light

If you turn the ignition key to the ON position for a few seconds, the battery voltage displays in the area where the hours are normally displayed.

The battery light turns on when you turn the ignition on and when the charge is below the correct operating level (Figure 6).

## Throttle Control

There are 3 speed positions: **Max**, **Economy**, and **Low**.

## Blade-Control Switch (PTO)

Use the blade-control switch (PTO) to engage the electric clutch and drive the mower blades. Pull the switch up to engage the blades and release. To disengage the blades, push the blade-control switch (PTO) down or move a motion-control lever into the NEUTRAL-LOCK position.

## Ignition Switch

This switch is used to start the mower engine and has 3 positions: **Start**, **Run**, and **Off**.

## Motion-Control Levers

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

## Neutral-Lock Position

Use the NEUTRAL-LOCK position with the safety-interlock system to engage and to determine the NEUTRAL position.

## Fuel-Shutoff Valve

Close the fuel-shutoff valve (under the seat) when transporting or storing the mower.

## High-Oil Temperature Indicator Light

This is the malfunction-indicator light found on the left side ([Figure 5](#)).

If the engine-oil temperature rises above the safe level, the light illuminates, the engine automatically reduces the rpm, and the machine remains in a safe mode until the corrective action is taken; refer to [Troubleshooting \(page 74\)](#).

## Low-Oil Pressure Indicator Light

This is the middle malfunction-indicator light ([Figure 5](#)).

If the engine-oil pressure drops below a safe level, this light illuminates, the engine automatically reduces the rpm, and the machine remains in a safe mode until the corrective action is taken; refer to [Troubleshooting \(page 74\)](#).

## Electronic Control Unit Malfunction Indicator Light

The electronic control unit (ECU) continuously monitors the operation of the EFI system.

If a problem or fault within the system is detected, the malfunction indicator light (MIL) illuminates.

The MIL is the red light located in the right console panel.

Once the MIL illuminates, make initial troubleshooting checks. Refer to the MIL section under [Troubleshooting \(page 74\)](#).

If these checks do not correct the problem, further diagnosis and servicing by an Authorized Service Dealer is necessary.

## Attachments/Accessories

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



# Specifications

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

## Width:

	60-inch Deck	72-inch Deck
Without Deck	135 cm (53 inches)	150 cm (59 inches)
Deflector Up	157 cm (62 inches)	187 cm (74 inches)
Deflector Down	192 cm (76 inches)	222 cm (88 inches)

## Length:

	60-inch Deck	72-inch Deck
Roll Bar - Up	211 cm (83 inches)	219 cm (83 inches)
Roll Bar - Down	215 cm (85 inches)	223 cm (88 inches)

## Height:

Roll Bar - Up	Roll Bar - Down
179 cm (71 inches)	119 cm (47 inches)

## Weight:

Model	Weight
74946	576 kg (1269 lb)
74947	612 kg (1349 lb)

# Operation

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

## Adding Fuel

- For best results, use only clean, fresh (less than 30 days old), unleaded gasoline with an octane rating of 87 or higher ((R+M)/2 rating method).
- Ethanol:** Gasoline with up to 10% ethanol (gasohol) or 15% MTBE (methyl tertiary butyl ether) by volume is acceptable. Ethanol and MTBE are not the same. Gasoline with 15% ethanol (E15) by volume is not approved for use. **Never use gasoline that contains more than 10% ethanol by volume**, such as E15 (contains 15% ethanol), E20 (contains 20% ethanol), or E85 (contains up to 85% ethanol). Using unapproved gasoline may cause performance problems and/or engine damage which may not be covered under warranty.
- Do not** use gasoline containing methanol.
- Do not** store fuel either in the fuel tank or fuel containers over the winter unless a fuel stabilizer is used.
- Do not** add oil to gasoline.

## **⚠ DANGER**

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

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

## ⚠ DANGER

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

- Always place gasoline containers on the ground away from your vehicle before filling.
- Do not fill gasoline containers inside a vehicle or on a truck or trailer bed, because interior carpets or plastic truck bed liners may insulate the container and slow the loss of any static charge.
- When practical, remove gas-powered equipment from the truck or trailer and refuel the equipment with its wheels on the ground.
- If this is not possible, then refuel such equipment on a truck or trailer from a portable container rather than from a gasoline-dispenser nozzle.
- If you must use a gasoline-dispenser nozzle, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete.

## ⚠ WARNING

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

- Avoid prolonged breathing of vapors.
- Keep face away from nozzle and gas tank or conditioner bottle opening.
- Avoid contact with skin; wash off spills with soap and water.

## Using Stabilizer/Conditioner

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

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

**Important:** Do not use fuel additives containing methanol or ethanol.

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

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

## Filling the Fuel Tank

1. Park the machine on level ground.
2. Shut the engine off and set the parking brake.
3. Clean around the fuel-tank cap.
4. Fill the fuel tank to the bottom of the filler neck (Figure 7).

**Note:** Ensure that there is empty space in the tank to allow the gasoline to expand

**Note:** Do not fill the fuel tank completely full. Fill the fuel tank to the bottom of the filler neck.

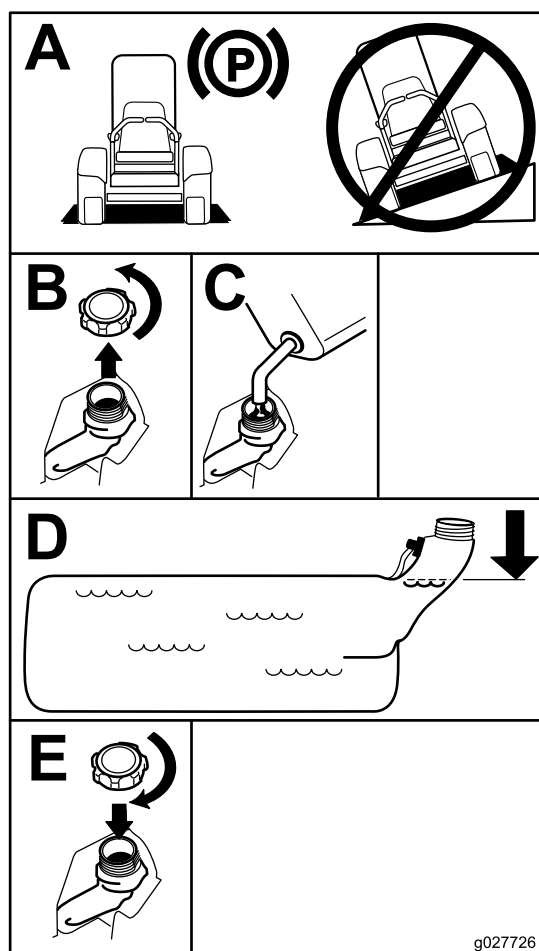


Figure 7

g027726

# Checking the Engine-Oil Level

Before you start the engine and use the machine, check the oil level in the engine crankcase; refer to [Checking the Engine-Oil Level \(page 42\)](#).

## Breaking in a New Machine

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

**Important:** Ensure that the seat is secured to the machine.

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 8](#)).
3. Lower the roll bar to the down position ([Figure 8](#)).

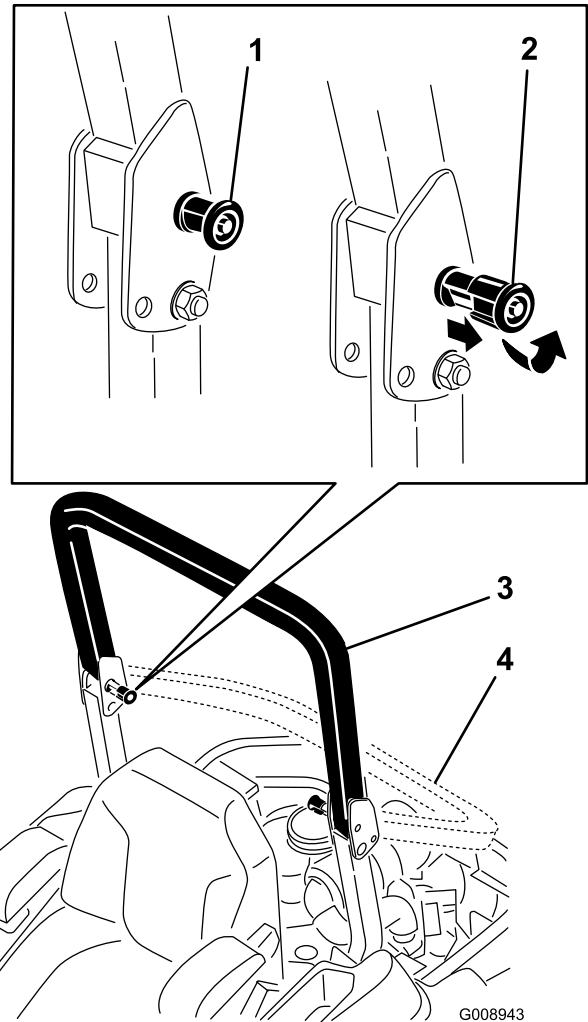


Figure 8

- |   |                                     |
|---|-------------------------------------|
| 1. ROPS knob  | 3. Roll bar in the upright position |
| 2. Pull the ROPS knob out and rotate it 90 degrees. | 4. Roll bar in the folded position  |

4. To raise the roll bar, raise the roll bar to the operate position and rotate the knobs so that they move partially into the grooves ([Figure 8](#)).
5. 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 8](#)).
6. Push on the roll bar and ensure that both pins are engaged.

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

# Think Safety First

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

## ⚠ DANGER

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

- Do not operate on slopes greater than 15 degrees.
- Reduce speed and use extreme caution on slopes.
- Do not operate the machine near water.

## ⚠ DANGER

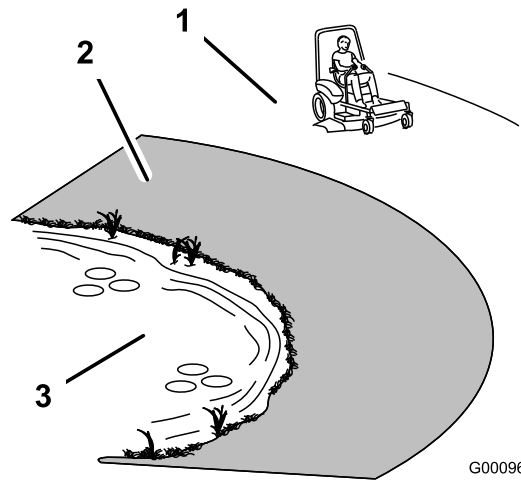
Wheels dropping over edges can cause rollovers, which may result in serious injury, death, or drowning.

Do not operate the machine near drop-offs.

## ⚠ DANGER

Operating the machine while the roll bar is down may lead to serious injury or death in the event of a rollover.

Always keep the roll bar in the fully raised and locked position and use the seat belt.



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g000963

Figure 9

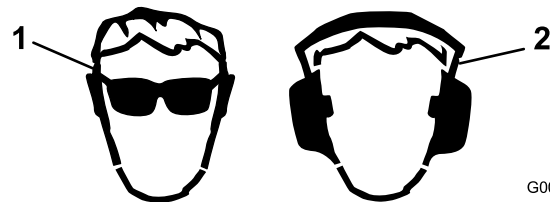
1. Safe Zone—use the Z Master here on slopes less than 15 degrees or flat areas.
2. Danger Zone—use a walk-behind mower and/or a hand trimmer on slopes greater than 15 degrees, near drop-offs and water.
3. Water

## ⚠ CAUTION

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

Wear hearing protection when operating this machine.

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



G009027

g009027

Figure 10

1. Wear safety glasses
2. Wear hearing protection

## Operating the Parking Brake

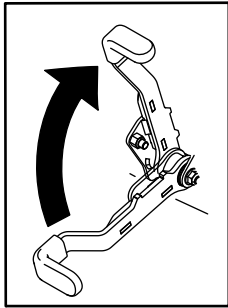
Always set the parking brake when you stop the machine or leave it unattended.

## Setting the Parking Brake

### **⚠ WARNING**

The parking brake may not hold a machine parked on a slope and could cause personal injury or property damage.

Do not park the machine on slopes unless the wheels are chocked or blocked.

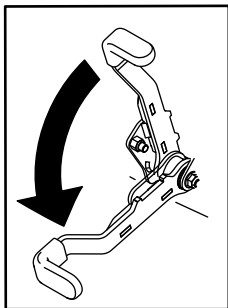


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Figure 11

g027334

## Releasing the Parking Brake



g027335

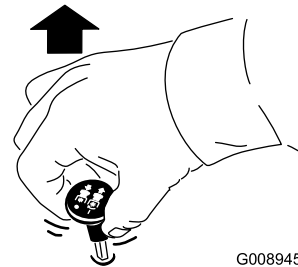
Figure 12

g027335

## 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)

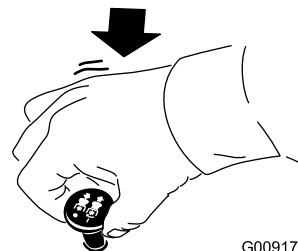


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g008945

Figure 13

## Disengaging the Blade-Control Switch (PTO)



G009174

g009174

Figure 14

# Operating the Throttle with Horizon™ Technology

There are 3 positions that the throttle switch can operate at—**Max, Economy, and Low** (Figure 15).

From the ECONOMY (middle) position, push down the front of the switch to place the throttle into the MAXIMUM position (Figure 15).

From the ECONOMY (middle) position, push down the back of the switch to place the throttle into the Low position (Figure 15).

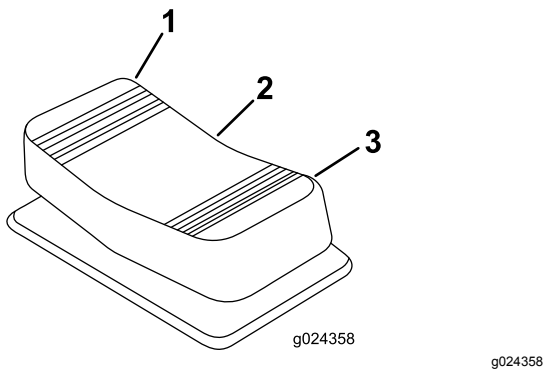


Figure 15

- 1. MAXIMUM (front) position
- 2. ECONOMY (middle) position
- 3. LOW (rear) position

Positioning the throttle switch to Max, Economy, or Low allows for 6 different operational modes—3 modes with the PTO disengaged (transport) and 3 modes with the PTO engaged (mow). See the following table to determine the appropriate engine speed.

Throttle-Switch Position	PTO Disengaged (Transport Mode)	PTO Engaged (Mow Mode)
MAX (front) position	Maximum transport speed/High idle	Maximum throttle setting—maximum power for extreme mowing conditions.
ECONOMY (middle) position	Medium transport speed/Clutch engagement	Economy throttle setting—standard power for normal mowing conditions. This is the lowered engine rpm and is the most fuel-efficient mode for mowing.
Low (rear) position	Low transport speed/Low idle	Low throttle setting—reduces the deck packing in wet mowing conditions.

# Operating the Ignition Switch

1. Turn the ignition key to the START position (Figure 16).

**Note:** When the engine starts, release the key.

**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 when you start it the first time after the fuel system has been without fuel completely.

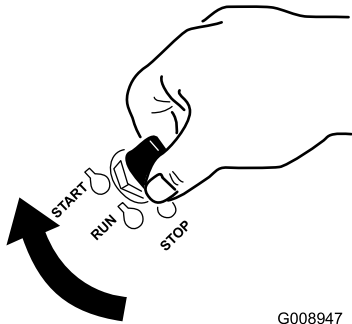


Figure 16

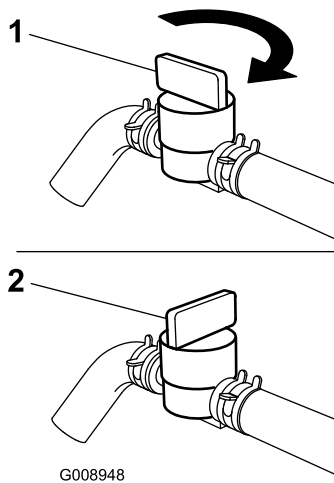
2. Turn the ignition key to the STOP position to stop the engine.

# Using the Fuel-Shutoff Valve

The fuel-shutoff valve is located under the seat. Move the seat forward to access it.

Close the fuel-shutoff valve for transport, maintenance, and storage.

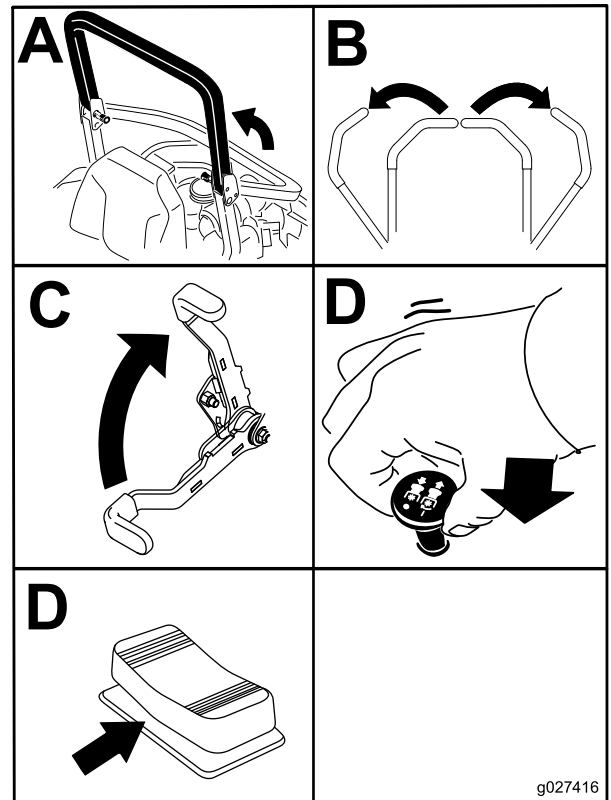
Ensure that the fuel-shutoff valve is open when starting the engine.



**Figure 17**

1. On

2. Off



**Figure 18**

## Starting and Stopping the Engine

### Starting the Engine

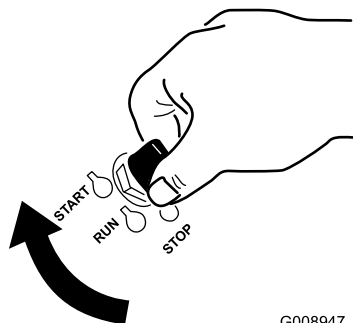
1. Raise the ROPS up, lock it into place, sit on the seat, and fasten the seat belt.
2. Move the motion-control levers to the NEUTRAL-LOCK position.
3. Set the parking brake; refer to [Setting the Parking Brake \(page 21\)](#).
4. Move the blade-control switch (PTO) to the OFF position ([Figure 18](#)).
5. Move the throttle switch to the middle position between the front and rear positions.

6. Turn the ignition key to the START position (Figure 19).

**Note:** When the engine starts, release the key.

**Important:** Do not engage 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 to attempt to start the engine multiple times when you start it for the first time after the fuel system has been without fuel completely.

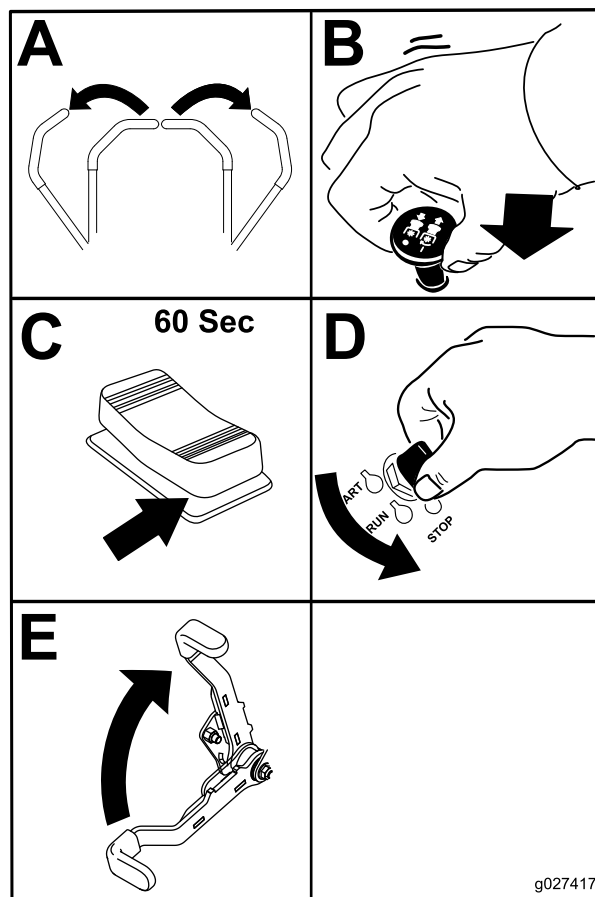


G008947

g008947

Figure 19

1. Off
2. Run
3. Start



g027417

g027417

Figure 20

## Stopping 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 ignition key and set the parking brake when leaving the machine unattended, even if just for a few minutes.

**Important:** Make sure that you close the fuel-shutoff valve before transporting or storing the machine, as fuel leakage may occur. Set the parking brake before transporting the machine. Make sure to remove the key as the fuel pump may run and cause the battery to lose charge.



# Using the Safety-Interlock System

## ⚠ CAUTION

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

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

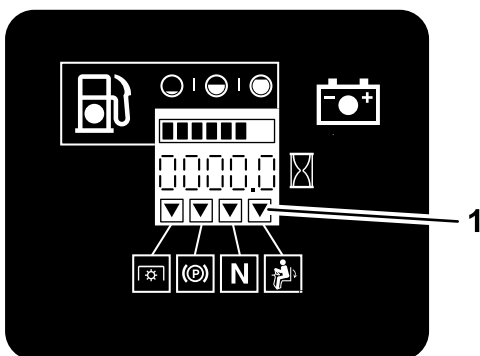
## Understanding the Safety-Interlock System

The safety-interlock system is designed to prevent the engine from starting unless:

- The parking brake is engaged.
- The blade-control switch (PTO) is disengaged.
- The motion-control levers are in the NEUTRAL-LOCK position.

The safety-interlock system also is designed to stop the engine when you move the traction controls from the locked position with the parking brake engaged or if you rise from the seat when the PTO is engaged.

The hour meter has symbols to notify you when the interlock component is in the correct position. When the component is in the correct position, a triangle lights up in the corresponding square.



G009181

g009181

Figure 21

1. Triangles light up when the interlock components are in the correct position.

# Testing the Safety-Interlock System

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

Test the safety-interlock system before you use the machine each time. If the safety system does not operate as described below, have an Authorized Service Dealer repair the safety system immediately.

1. Sit on the seat, engage the parking brake and move the blade-control switch (PTO) to the ON position. Try starting the engine; the engine should not crank.
2. Sit on the seat, engage the parking brake and move the blade-control switch (PTO) to the OFF position. Move either motion-control lever (out of the NEUTRAL-LOCK position). Try starting the engine; the engine should not crank. Repeat for other control lever.
3. Sit on the seat, engage the parking brake, move the blade-control switch (PTO) to the OFF position, and move the motion-control levers to the NEUTRAL-LOCK position. Start the engine. While the engine is running, release the parking brake, engage the blade-control switch (PTO), and rise slightly from the seat; the engine should stop.
4. Sit on the seat, engage the parking brake, move the blade-control switch (PTO) to the OFF position, and move the motion-control levers to NEUTRAL-LOCK position. Start the engine. While the engine is running, center either motion-control lever and move it forward or reverse; the engine should stop. Repeat for other motion-control lever.
5. Sit on the seat, disengage the parking brake, move the blade-control switch (PTO) to the OFF position, and move the motion-control levers to NEUTRAL-LOCK position. Try starting the engine; the engine should not crank.

# Driving Forward or Backward

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

## ⚠ CAUTION

**Machine can spin very rapidly. You may lose control of machine and injure yourself or damage the machine.**

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

## Using the Motion-Control Levers

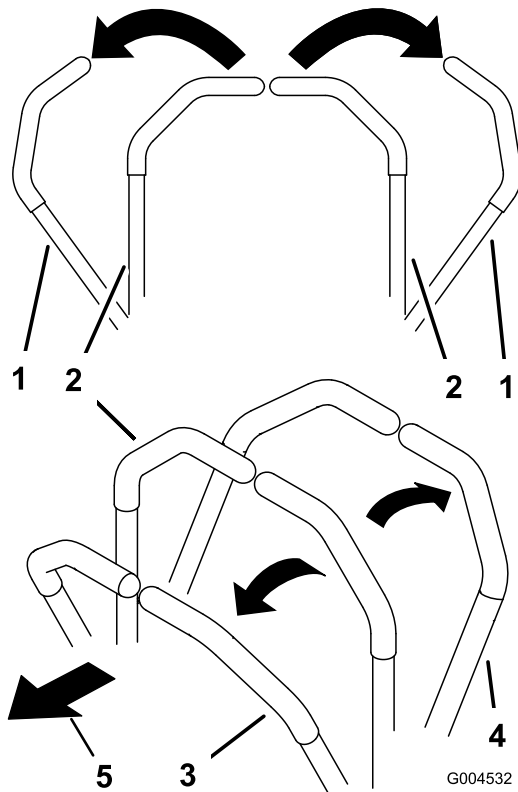


Figure 22

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

## Driving Forward

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

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

1. Release the parking brake; refer to [Releasing the Parking Brake \(page 21\)](#).
2. Move the levers to the center, unlocked position.
3. To go forward, slowly push the motion-control levers forward ([Figure 23](#)).

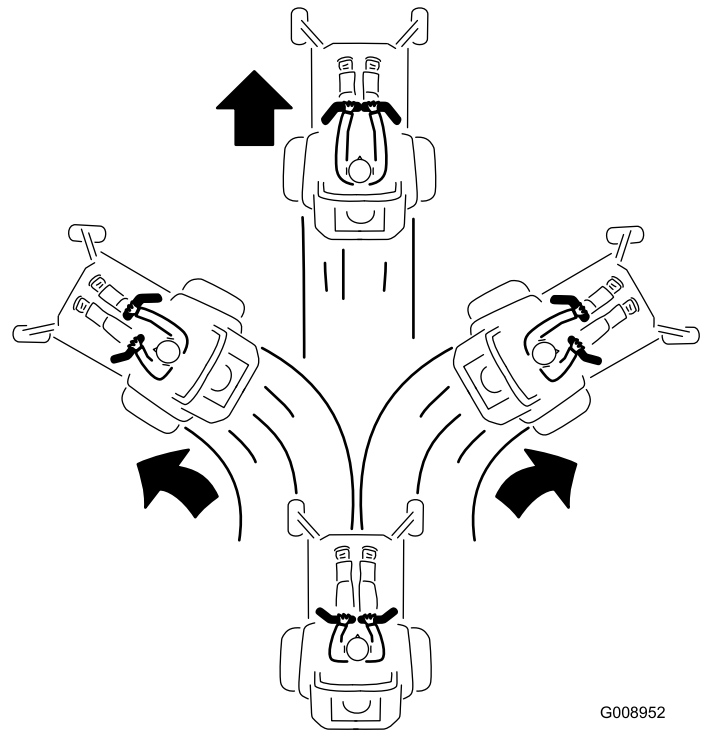
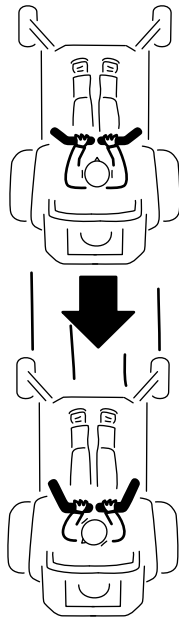


Figure 23

G008952  
g008952

## Driving Backward

1. Move the levers to the center, unlocked position.
2. To go backward, slowly pull the motion-control levers rearward ([Figure 24](#)).



G008953

g008953

**Figure 24**

## Stopping the Machine

To stop the machine, move the motion-control levers to neutral and then to the NEUTRAL-LOCK position, disengage the blade-control switch (PTO), and turn the ignition key to the OFF position.

Set the parking brake when you leave the machine; refer to [Setting the Parking Brake \(page 21\)](#). Remove the key from the ignition switch.

### **⚠ CAUTION**

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

**Always remove the ignition key and set the parking brake when leaving the machine unattended, even if just for a few minutes.**

## Adjusting the Height-of-Cut

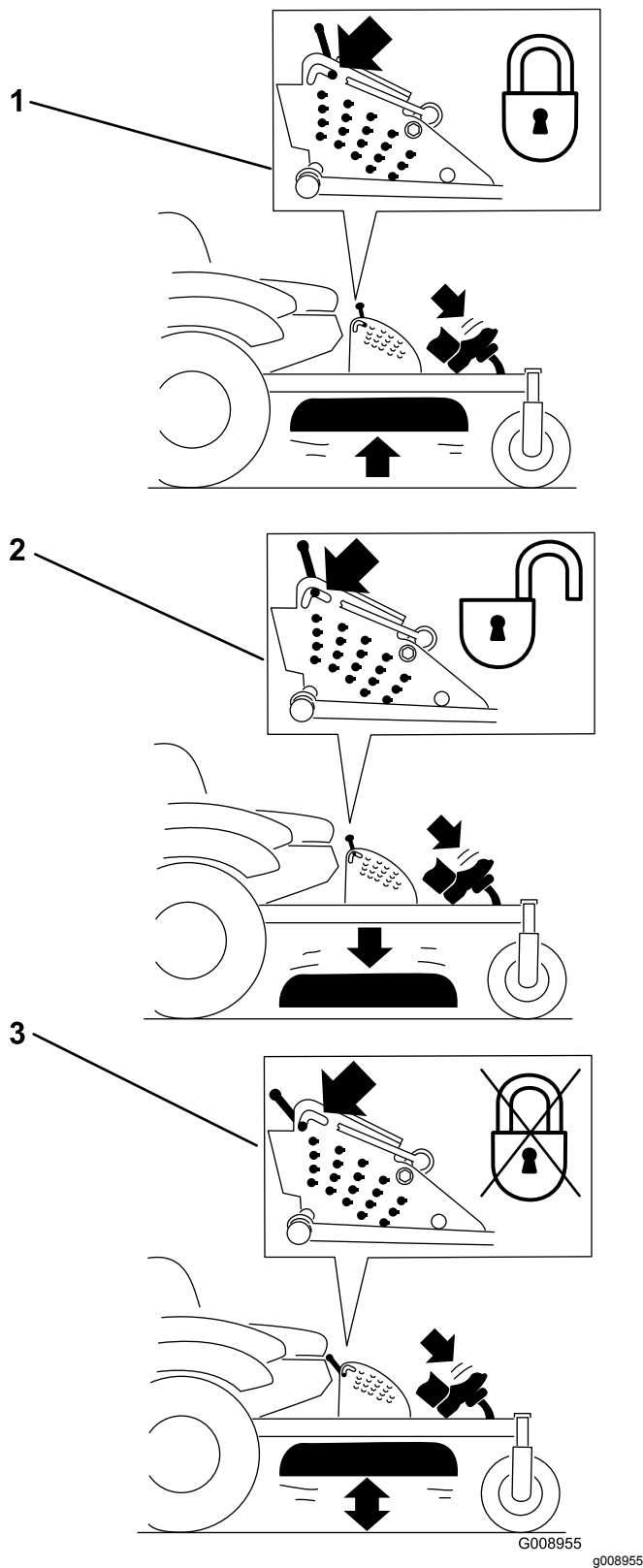
### Using the Transport Lock

The transport lock has 2 positions, and is used with the deck-lift pedal. There is a LOCK position and an UNLOCK position for the transport position of the mower deck ([Figure 25](#)).

## Adjusting the Height-of-Cut Pin

Adjust the height-of-cut from 25 to 140 mm (1 to 5-1/2 inches) in 6 mm (1/4 inch) increments by moving the clevis pin into different hole locations.

1. Move the transport lock to the LOCK position.
2. Push on the deck-lift pedal with your foot and raise the mower deck to the Transport position (also the 140 mm or 5-1/2 inch cutting-height position) as shown in [Figure 26](#).
3. To adjust, rotate the pin 90 degrees and remove the pin from the height-of-cut bracket ([Figure 26](#)).
4. Select a hole in the height-of-cut bracket corresponding to the height-of-cut desired, and insert the pin ([Figure 26](#)).
5. Push on the deck lift, pull back on the transport lock, and slowly lower the mower deck.



**Figure 25**

Transport-Lock Positions

1. Transport lock
2. Lock position—The mower deck locks into the transport position.
3. UNLOCK position—The mower deck does not lock into the transport position.

# Adjusting the Anti-Scalp Rollers

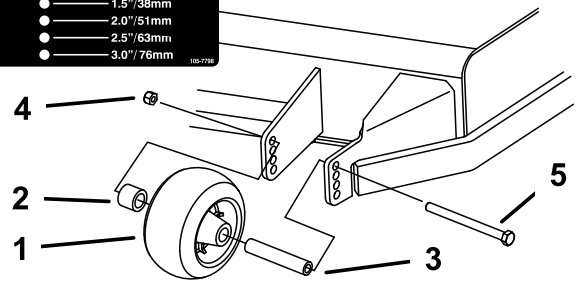
Whenever you change the height-of-cut, adjust the height of the anti-scalp rollers.

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.

**ANTI-SCALP ROLLER  
ADJUSTMENT**  
FOR MAXIMUM DECK FLOTATION,  
PLACE ROLLERS IN POSITIONS SHOWN.  
TURN ENGINE OFF BEFORE  
MAKING ROLLER ADJUSTMENTS.

●	1.5" / 38mm
●	2.0" / 51mm
●	2.5" / 63mm
●	3.0" / 76mm

105-2708

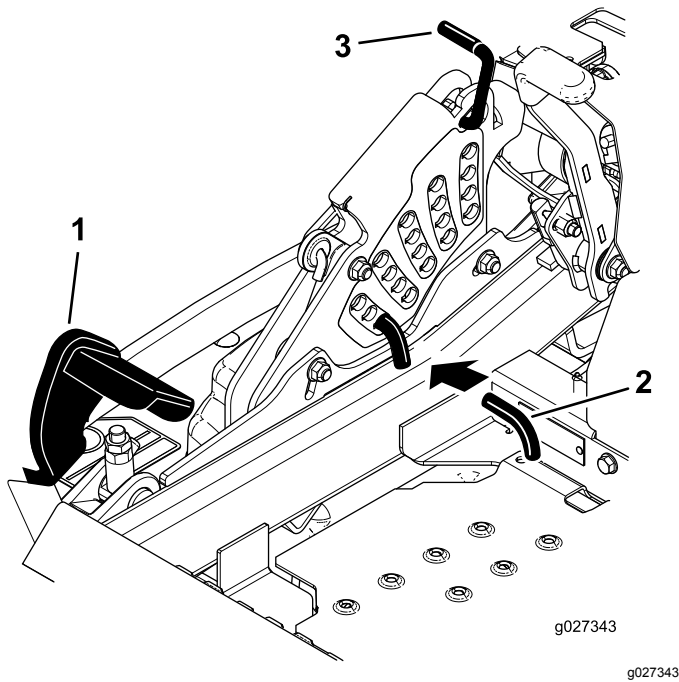


G000942

g000942

**Figure 27**

- |                      |               |
|----------------------|---------------|
| 1. Anti-scalp roller | 4. Flange nut |
| 2. Spacer            | 5. Bolt       |
| 3. Bushing           |               |

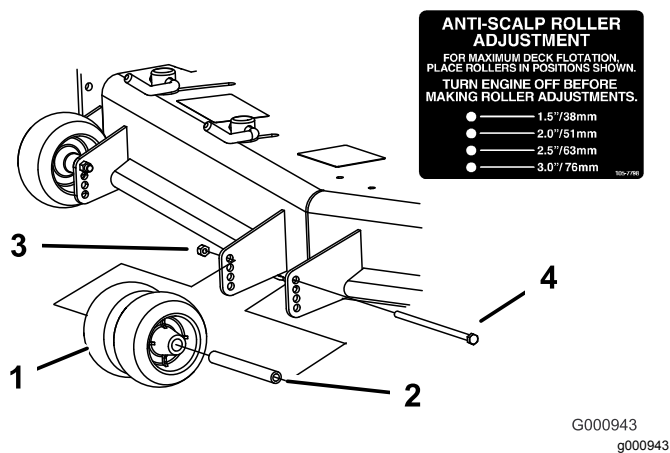


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**Figure 26**

- |                      |                   |
|----------------------|-------------------|
| 1. Deck-lift pedal   | 3. Transport lock |
| 2. Height-of-cut pin |                   |



**Figure 28**

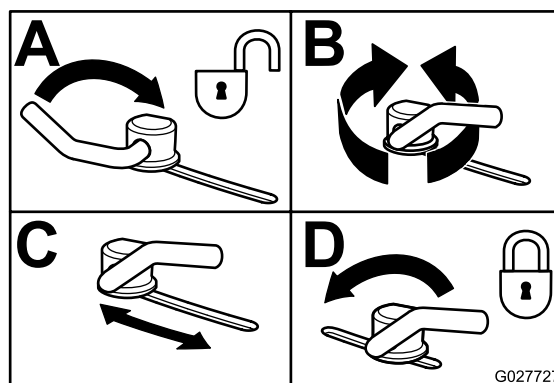
- |                      |               |
|----------------------|---------------|
| 1. Anti-scalp roller | 3. Flange nut |
| 2. Bushing           | 4. Bolt       |

## Adjusting the Flow-Baffle-Cam Locks

This procedure is applicable only to machines with flow-baffle locks. Certain models have nuts and bolts in place of the flow-baffle locks and can be adjusted the same.

You can adjust the mower-discharge flow for different types of mowing conditions. Position the cam locks and baffle to achieve the best quality of cut.

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set 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. To adjust the cam locks, swing the lever up to loosen the cam lock (Figure 29).
4. Adjust the baffle and cam locks in the slots to the desired discharge flow.
5. Swing the lever back over to tighten the baffle and cam locks (Figure 29).
6. If the cam locks do not lock the baffle into place or it is too tight, loosen the lever and then rotate the cam lock. Adjust the cam lock until you achieve the desired locking pressure.



**Figure 29**

# Positioning the Flow Baffle

The following figures are only recommendations for use. Adjustments vary by grass type, moisture content, and height of grass.

**Note:** If the engine power draws down and the mower ground speed is the same, open up the baffle.

## Position A

This is the full rear position. Use this position for the following.

- Short, light grass mowing conditions.
- Dry conditions.
- Smaller grass clippings.
- Propelling grass clippings farther away from the mower.

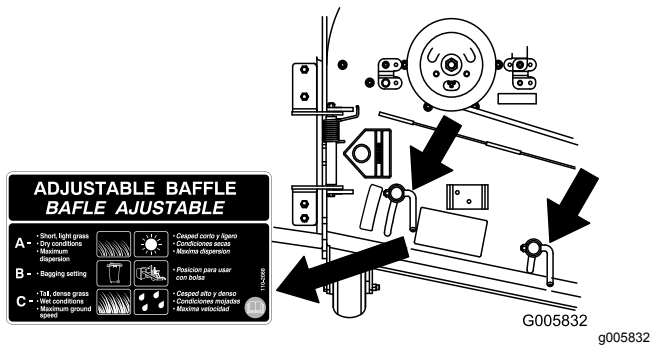
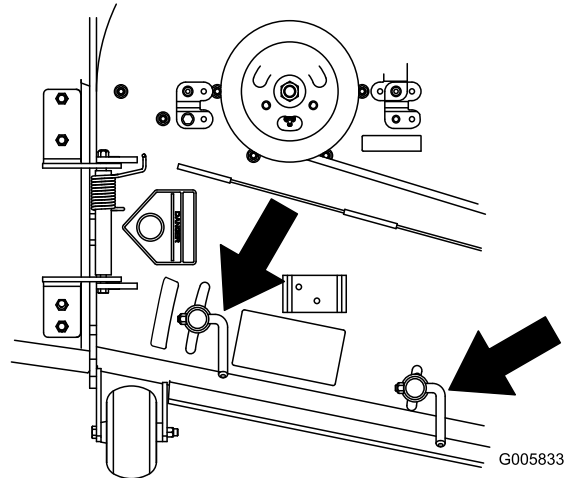


Figure 30

## Position B

Use this position when bagging. Always align it with the blower opening.



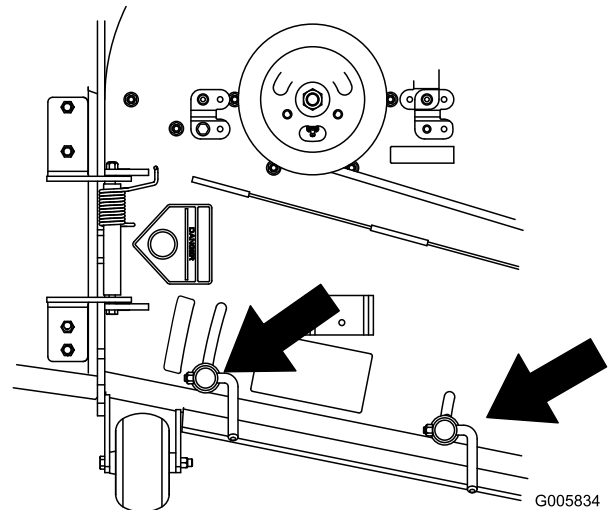
g005833

Figure 31

## Position C

This is the full open position. Use this position for the following:

- Tall, dense grass mowing conditions.
- Wet conditions.
- Lowering the engine power consumption.
- Increased ground speed in heavy conditions.



g005834

Figure 32

**Note:** This position is similar to the benefits of the Toro SFS mower.

## Positioning the Seat

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

To adjust the seat, move the lever sideways to unlock seat (Figure 33).

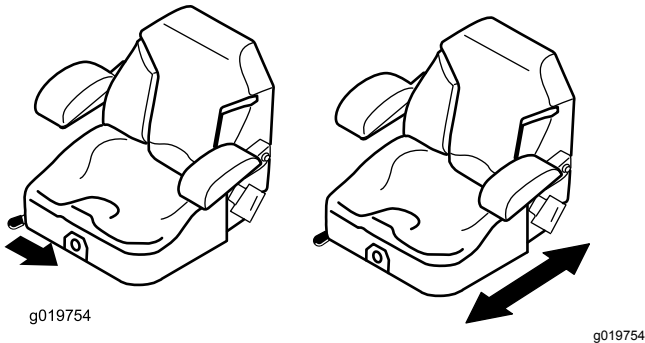


Figure 33

## Unlatching the Seat

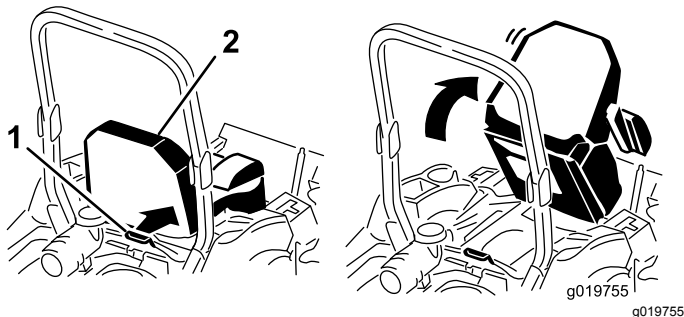


Figure 34

1. Seat latch

2. Seat

## Changing the Seat Suspension

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

To adjust the seat, turn the knob in front either direction to provide the best comfort (Figure 35).

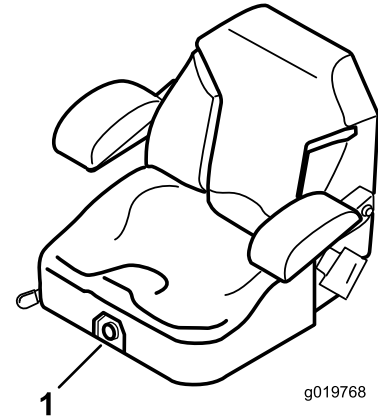


Figure 35

1. Seat-suspension knob

## Using the Drive-Wheel Release Valves

### ⚠ WARNING

Hands may become entangled in the rotating drive components below the engine deck, which could result in serious injury.

Stop the engine, remove the key, and wait for all moving parts to stop before accessing the drive-wheel release valves.

### ⚠ WARNING

The engine and hydraulic drive units can become very hot. Touching a hot engine or hydraulic drive units can cause severe burns.

Wait for the engine and hydraulic drive units to cool completely before accessing the drive-wheel release valves.

The drive-wheel release valves are located in the back of each hydraulic drive unit, under the seat.

**Note:** Make sure that the release valves are in the fully horizontal position when operating the machine or severe damage to the hydraulic system can occur.



1. Disengage the blade-control switch (PTO) and turn the ignition key to off. Move the levers to the NEUTRAL-LOCK position and apply the parking brake. Remove the key.
2. Rotate the release-valve levers vertically to push the machine (Figure 36).

**Note:** This allows hydraulic oil to bypass the pump, enabling the wheels to turn.

3. Disengage the parking brake before pushing the machine.

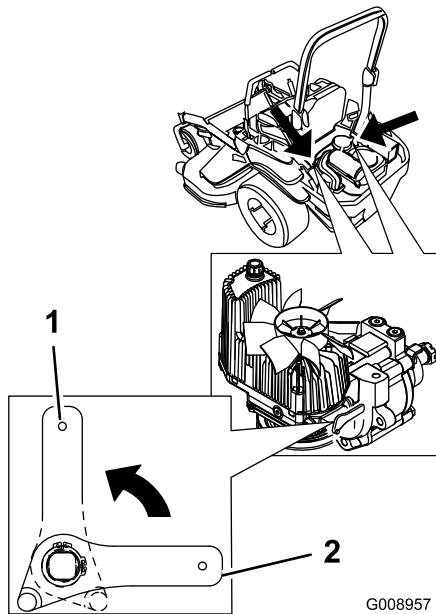


Figure 36

1. Vertical to push the machine
2. Horizontal to run the machine

4. Rotate the release-valve levers horizontally to run the machine (Figure 36).

## Using the Side Discharge

The mower has a hinged grass deflector that disperses clippings to the side and down toward the turf.

### **⚠ DANGER**

**Without a grass deflector, discharge cover, or a complete grass-catcher assembly mounted in place, you and others are exposed to blade contact and thrown debris. Contact with rotating mower blade(s) and thrown debris cause injury or death.**

- Never remove the grass deflector from the mower because the grass deflector routes material down toward the turf. If the grass deflector is ever damaged, replace it immediately.
- Never put your hands or feet under the mower.
- Never try to clear the discharge area or mower blades unless you move the blade-control switch (PTO) to the OFF position, rotate the ignition key to the OFF position, and remove the key.
- Make sure that the grass deflector is in the down position.

# Transporting the Machine

Use a heavy-duty trailer or truck to transport the machine. Ensure that the trailer or truck has all necessary brakes, lighting, and marking as required by law. Please carefully read all the safety instructions. Knowing this information could help you, your family, pets, or bystanders avoid injury.

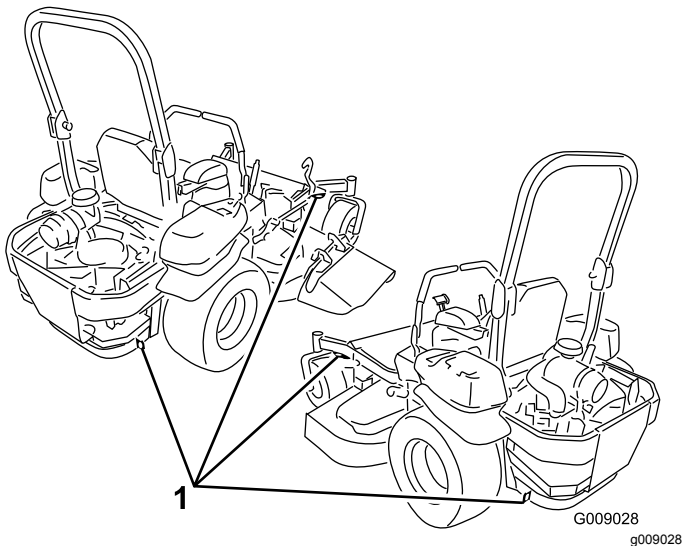
## ⚠ WARNING

**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.**

To transport the machine:

1. If you are using a trailer, connect it to the towing vehicle and connect the safety chains.
2. If applicable, connect the trailer brakes.
3. Load the machine onto the trailer or truck.
4. Stop the engine, remove the key, set the brake, and close the fuel valve.
5. Use the metal tie-down loops on the machine to securely fasten it to the trailer or truck with straps, chains, cable, or ropes (Figure 37).

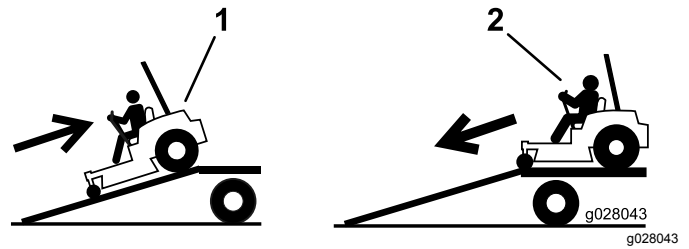


**Figure 37**

1. Traction unit tie-down loops

# Loading the Machine

Use extreme caution when loading or the unloading machine onto a trailer or a truck. Use a full-width ramp that is wider than the machine for this procedure. Back the machine up the ramps and drive it forward down the ramps (Figure 38).



**Figure 38**

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

**Important: Do not use narrow individual ramps for each side of the machine.**

Ensure that the ramp is long enough so that the angle with the ground does not exceed 15 degrees (Figure 39). On flat ground, this requires a ramp to be at least 4 times as long as the height of the trailer or truck bed to the ground. A steeper angle may cause mower components to get caught as the machine moves from the ramp to the trailer or truck. Steeper angles may also cause the machine to tip or lose control. If you are loading the machine on or near a slope, position the trailer or truck so that it is on the down side of the slope and the ramp extends up the slope. This minimizes the ramp angle.

## ⚠ WARNING

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

- Use extreme caution when operating a machine on a ramp.
- Ensure that the ROPS is in the up position and use the seat belt when loading or unloading the machine. Ensure that the ROPS clears the top of an enclosed trailer.
- 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 ramp is at least 4 times as long as the height of the trailer or truck bed to the ground. This ensures that ramp angle does not exceed 15 degrees on flat ground.
- Back the machine up the ramps and drive it forward down the ramps.
- Avoid sudden acceleration or deceleration while driving the machine on a ramp as this could cause a loss of control or a tip-over.

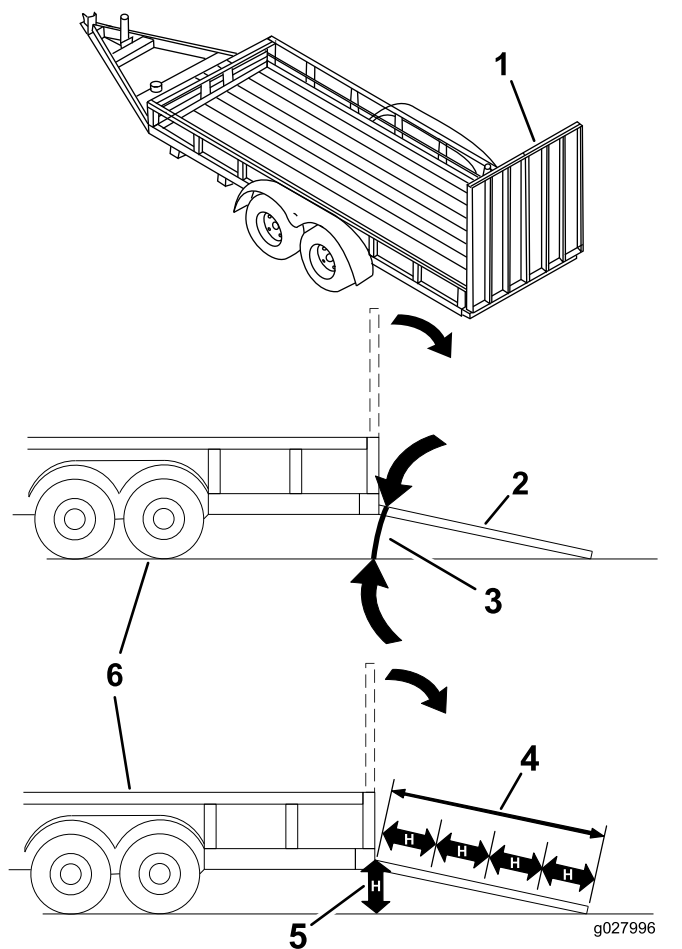


Figure 39

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

# Operating Tips

## Using the Fast Throttle Setting

For best mowing and maximum air circulation, operate the engine at the FAST throttle 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 in uncut grass. Always try to have 1 side of the mower free from uncut grass, which allows air to be drawn into the mower.

## Cutting a Lawn for the First Time

Cut the grass slightly longer than normal to ensure that the cutting height of the mower does not scalp any uneven ground. However, the cutting height you have used in the past is generally the best to use. When cutting grass longer than 15.24 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

Normally, mow every 4 days. However, grass grows at different rates at different times. To maintain the same cutting height, which is a good practice, 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.

## Adjusting the Cutting Speed

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

## Avoiding Cutting Too Low

If the cutting width of the mower is wider than the mower that you previously used, raise the cutting height to ensure that uneven turf is not cut too short.

## Cutting Long Grass

If the grass is ever allowed to grow slightly longer than normal, or if it contains a high degree of moisture, raise the cutting height higher than usual and cut the grass at this setting. Then cut the grass again using the lower, normal setting.

## Stopping

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.

## Keeping the Underside of the Mower Clean

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

## Maintaining the Blade

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 cutter blades daily 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.

# Maintenance

## Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first 8 hours	<ul style="list-style-type: none"> <li>• Change the engine oil.</li> </ul>
After the first 100 hours	<ul style="list-style-type: none"> <li>• Check the wheel lug-nut torque.</li> <li>• Check the wheel-hub slotted-nut torque.</li> <li>• Check the parking-brake adjustment (check every time you remove or replace a brake component).</li> </ul>
After the first 250 hours	<ul style="list-style-type: none"> <li>• Change the hydraulic filters and hydraulic oil.</li> </ul>
Before each use or daily	<ul style="list-style-type: none"> <li>• Check the safety system.</li> <li>• Check the engine-oil level.</li> <li>• Check the seat belt.</li> <li>• Check the rollover-protection-system (ROPS) knobs.</li> <li>• Clean the engine screen.</li> <li>• Clean the hydraulic units.</li> <li>• Inspect the blades.</li> <li>• Clean the mower deck.</li> </ul>
Every 50 hours	<ul style="list-style-type: none"> <li>• Grease the mower-deck spindles and idler arm.</li> <li>• Check spark arrester (if equipped).</li> <li>• Check the tire pressure.</li> <li>• Inspect the belts for cracks and wear.</li> <li>• Check the hydraulic oil level.</li> </ul>
Every 100 hours	<ul style="list-style-type: none"> <li>• Lubricate the mower-deck-lift pivots.</li> <li>• Change the engine oil (more often in dirty or dusty conditions).</li> </ul>
Every 150 hours	<ul style="list-style-type: none"> <li>• Inspect the primary filter.</li> <li>• Service the engine-oil cooler.</li> <li>• Clean the engine-cooling fins and shrouds.</li> </ul>
Every 200 hours	<ul style="list-style-type: none"> <li>• Change the engine-oil filter (more often in dirty or dusty conditions).</li> <li>• Check, clean and gap the spark plug.</li> <li>• Replace the fuel filter (more often in dirty or dusty conditions).</li> </ul>
Every 250 hours	<ul style="list-style-type: none"> <li>• Change the hydraulic filters and hydraulic oil when using Mobil® 1 oil (more often in dirty or dusty conditions).</li> </ul>
Every 300 hours	<ul style="list-style-type: none"> <li>• Replace the primary air filter (more often in dusty or sandy conditions).</li> <li>• Check the inner air filter.</li> </ul>
Every 500 hours	<ul style="list-style-type: none"> <li>• Check the wheel lug-nut torque.</li> <li>• Check the wheel-hub slotted-nut torque.</li> <li>• Adjust the caster-pivot bearing.</li> <li>• Check the parking-brake adjustment.</li> <li>• Change the hydraulic filters and hydraulic oil when using Toro® HYPR-OIL™ 500 hydraulic oil (more often in dirty or dusty conditions).</li> </ul>
Every 600 hours	<ul style="list-style-type: none"> <li>• Replace the inner air filter.</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 pump-belt idler arm.</li> <li>• Grease the front caster pivots (more often in dirty or dusty conditions).</li> <li>• Repack the front caster-wheel bearings (more often in dirty or dusty conditions).</li> <li>• Lubricate the caster-wheel hubs.</li> </ul>
Yearly or before storage	<ul style="list-style-type: none"> <li>• Paint chipped surfaces.</li> <li>• Check all maintenance procedures listed above before storage.</li> </ul>

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

## ⚠ CAUTION

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

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

## Lubrication

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

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

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Stop 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 to scrape any paint off the front of the fitting(s).

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

## Adding Light Oil or Spray Lubrication

**Service Interval:** Every 100 hours

Lubricate the deck-lift pivots.

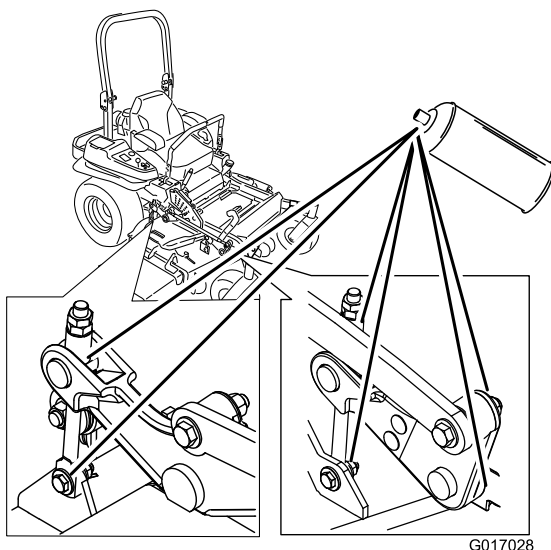


Figure 40

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## Greasing the Mower

**Service Interval:** Every 50 hours—Grease the mower-deck spindles and idler arm.

Yearly—Grease the pump-belt idler arm.

Yearly—Grease the front caster pivots (more often in dirty or dusty conditions).

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

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set 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. Grease the mower-deck idler-pulley pivot until grease come out the bottom (Figure 41).
4. Grease the 3 spindle bearings until grease comes out the lower seals (Figure 41).

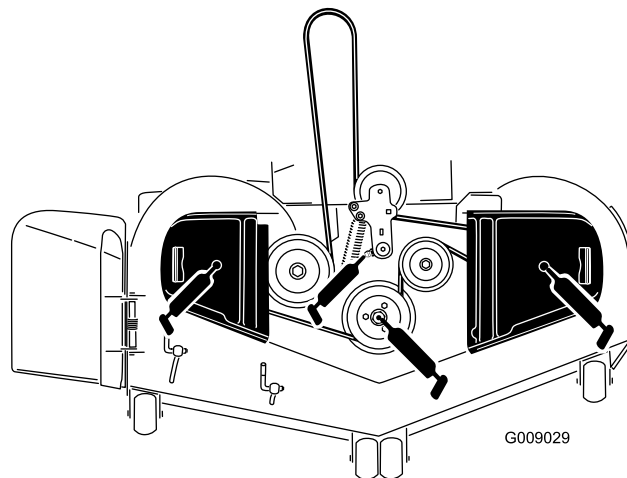


Figure 41

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5. Grease the drive-belt idler arm ([Figure 41](#)).

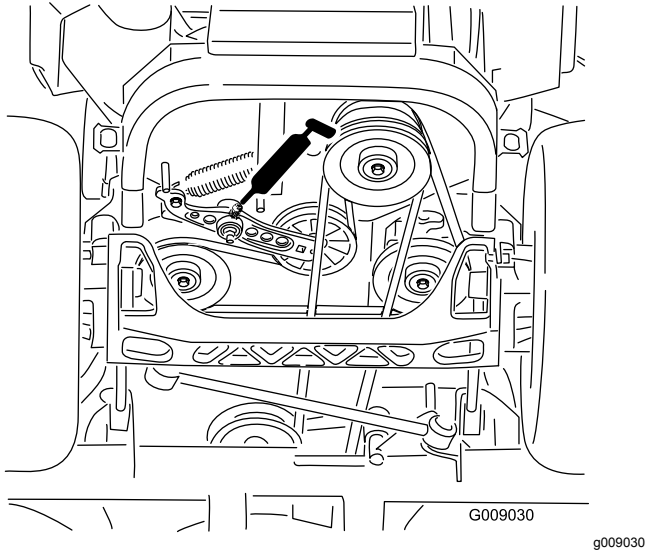


Figure 42

6. Remove the dust cap and adjust the caster pivots.

**Note:** Keep the dust cap off until greasing is complete. Refer to [Adjusting the Caster-Pivot Bearing](#) (page 52).

7. Remove the hex plug and thread a grease fitting into the hole.
8. Pump grease into the fitting until it oozes out around the top bearing.
9. Remove the grease fitting from the hole.
10. Install the hex plug and dust cap ([Figure 43](#)).

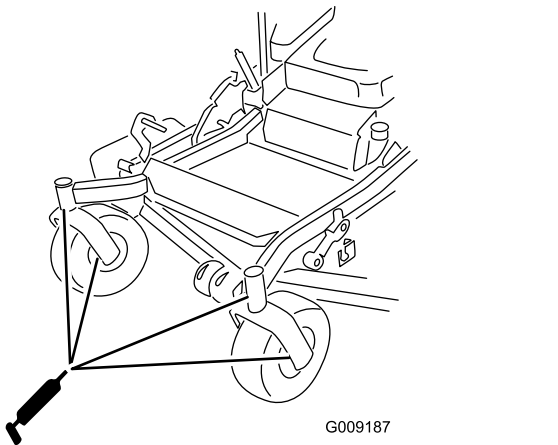


Figure 43

## Lubricating the Caster-Wheel Hubs

**Service Interval:** Yearly

1. Stop the engine, wait for all moving parts to stop, remove the key, and engage the parking brake.

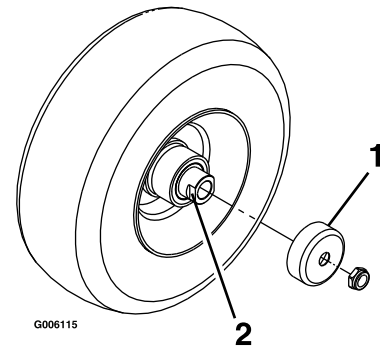


Figure 44

1. Seal guard
  2. Spacer nut with wrench flats
- 
2. Remove the caster wheel from the caster forks.
  3. Remove the seal guards from the wheel hub.
  4. 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.
5. Remove the axle (with the other spacer nut still assembled to it) from the wheel assembly.
  6. Pry out seals and inspect bearings for wear or damage and replace if necessary.
  7. Pack the bearings with a general-purpose grease.
  8. Insert 1 bearing and 1 new seal into the wheel.
- Note:** Replace the seals.
9. If both spacer nuts have been removed (or broken loose) from the axle assembly, 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.
10. Insert the assembled nut and axle into the wheel on the side with the new seal and bearing.
  11. With the open end of the wheel facing up, fill the area inside the wheel around the axle full of general-purpose grease.

12. Insert the second bearing and new seal into the wheel.
13. Apply a thread-locking compound to the second spacer nut and thread it onto the axle with the wrench flats facing outward.
14. 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).

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

15. Install the seal guards over the wheel hub and insert wheel into the caster fork.
16. Install the caster bolt and tighten the nut fully.

**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

### ⚠ WARNING

Contact with hot surfaces may cause personal injury.

Keep hands, feet, face, clothing and other body parts away the muffler and other hot surfaces.

## Servicing the Air Cleaner

**Service Interval:** Every 150 hours—Inspect the primary filter.

Every 300 hours/Yearly (whichever comes first)—Replace the primary air filter (more often in dusty or sandy conditions).

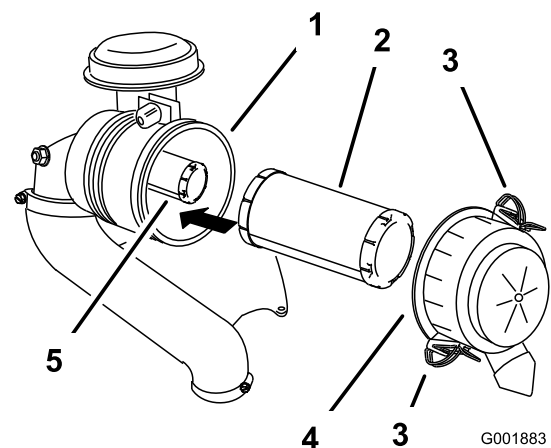
Every 300 hours—Check the inner air filter.

Every 600 hours—Replace the inner air filter.

**Note:** Check the filters more frequently if the operating conditions are extremely dusty or sandy.

## Removing the Filters

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Release the latches on the air cleaner and pull the air-cleaner cover off the air-cleaner body (Figure 45).



**Figure 45**

- |                     |                      |
|---------------------|----------------------|
| 1. Air-cleaner body | 4. Air-cleaner cover |
| 2. Primary filter   | 5. Safety filter     |
| 3. Latch            |                      |



4. Clean the inside of the air-cleaner cover with compressed air.

5. Gently slide the primary filter out of the air-cleaner body ([Figure 45](#)).

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

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

**Important:** Do not attempt to clean the safety filter. If the safety filter is dirty, then the primary filter is damaged. Replace both filters.

7. Inspect the primary filter for damage by looking into the filter while shining a bright light on the outside of the filter.

**Note:** Holes in the filter appear as bright spots. If the filter is damaged, discard it.

## Servicing the Primary Filter

- If the primary filter is dirty, bent, or damaged, replace it.
- Do not clean the primary filter.

## Servicing the Inner Filter

Replace the inner filter, never clean it.

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

## Installing the Filters

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

1. If installing new filters, check each filter for shipping damage.

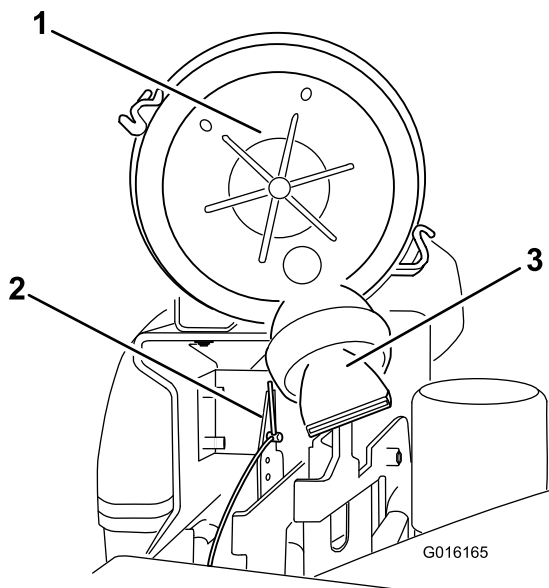
**Note:** Do not use a damaged filter.

2. If you are replacing the inner filter, carefully slide it into the filter body ([Figure 45](#)).
3. Carefully slide the primary filter over the inner filter ([Figure 45](#)).

**Note:** Ensure that the primary filter is fully seated by pushing on its outer rim while installing it.

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

4. Position the air-cleaner cover, so that the breather valve does not interfere with the throttle mechanism ([Figure 46](#)).



**Figure 46**

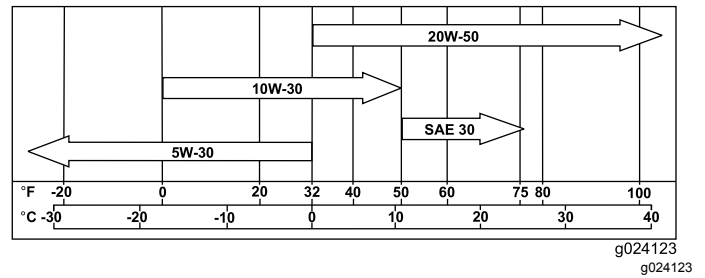
1. Air-cleaner cover
2. Throttle mechanism
3. Breathe valve
5. Secure the cover with the latches (Figure 46).

## Servicing the Engine Oil

**Oil Type:** Detergent oil (API service class SJ or higher)

**Oil Capacity:** with a filter change, 2.9 L (99 oz)

**Viscosity:** See the table below.



**Figure 47**

**Note:** Use of synthetic oil having 5W-30 rating is acceptable up to 4° C (40° F).

**Note:** Synthetic oils will provide better starting in extreme cold below -23° C (-10° F).

## Checking the Engine-Oil Level

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

**Note:** Check the oil when the engine is cold.

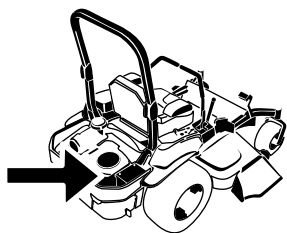
### ⚠ WARNING

**Contact with hot surfaces may cause personal injury.**

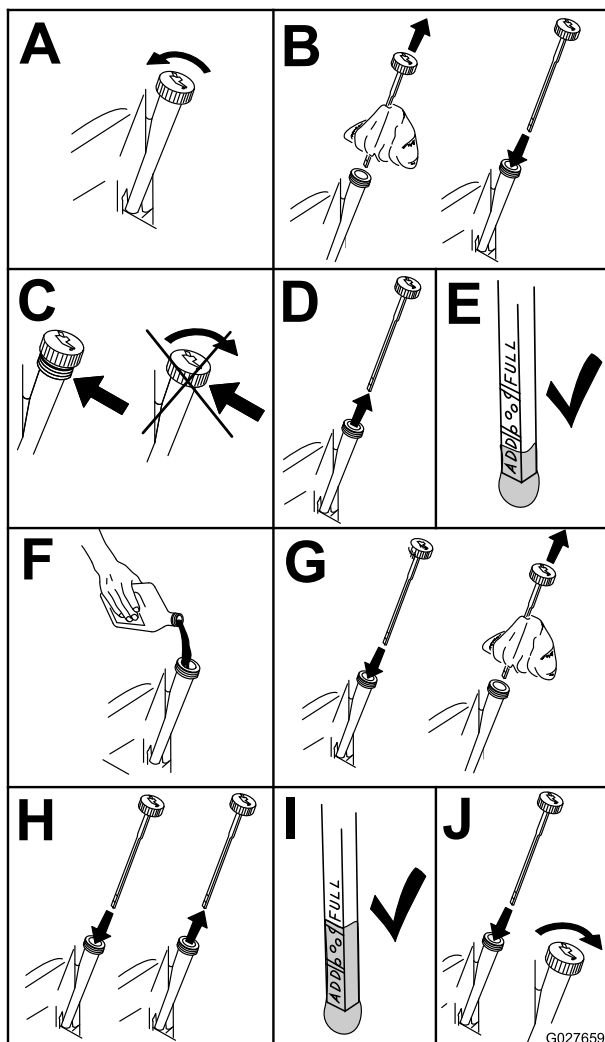
**Keep hands, feet, face, clothing, and other body parts away from the muffler and other hot surfaces.**

**Important:** Do not overfill the crankcase with oil because that could damage engine. Do not run engine with oil below the Low mark because the engine may be damaged.

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position (Figure 48).



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Figure 48

## Changing the Engine Oil

**Service Interval:** After the first 8 hours

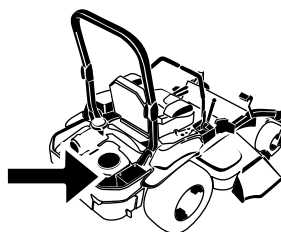
Every 100 hours (more often in dirty or dusty conditions).

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

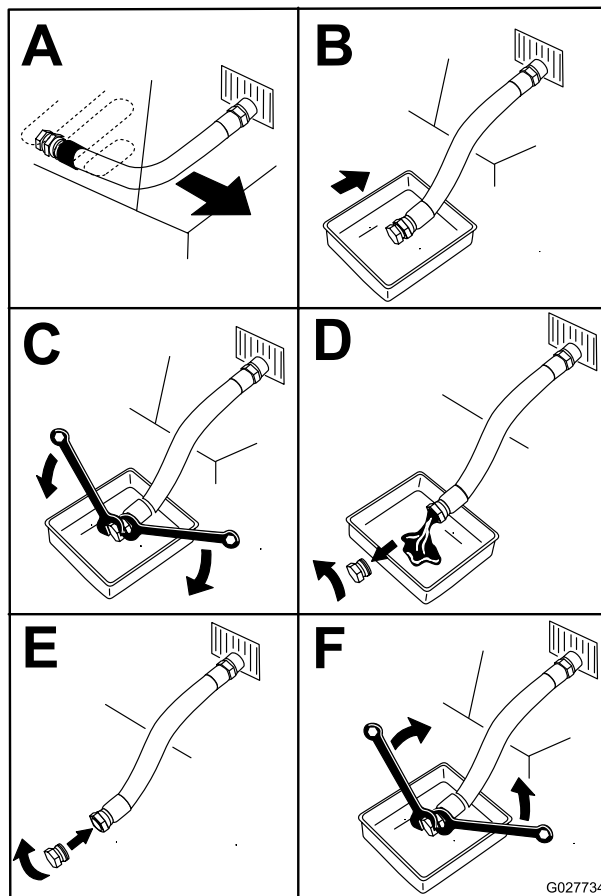
1. Start the engine and let it run for 5 minutes.

**Note:** This warms the oil so that it drains better.

2. Park the machine so that the rear is slightly lower than the front to ensure that the oil drains completely.
3. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
4. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position (Figure 49).



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Figure 49

5. Slowly pour approximately 80% of the specified oil into the filler tube and slowly add the additional oil to bring it to the **Full** mark ([Figure 50](#)).

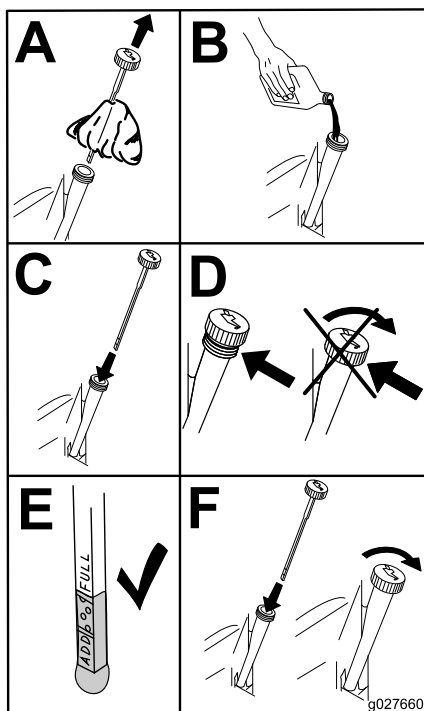


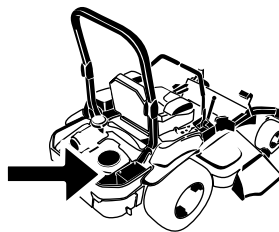
Figure 50

6. Start the engine and drive to a flat area.
7. Check the oil level again.

## Changing the Engine-Oil Filter

**Service Interval:** Every 200 hours (more often in dirty or dusty conditions).

1. Drain the oil from the engine; refer to [Changing the Engine Oil](#) (page 43).
2. Change the engine-oil filter ([Figure 51](#)).



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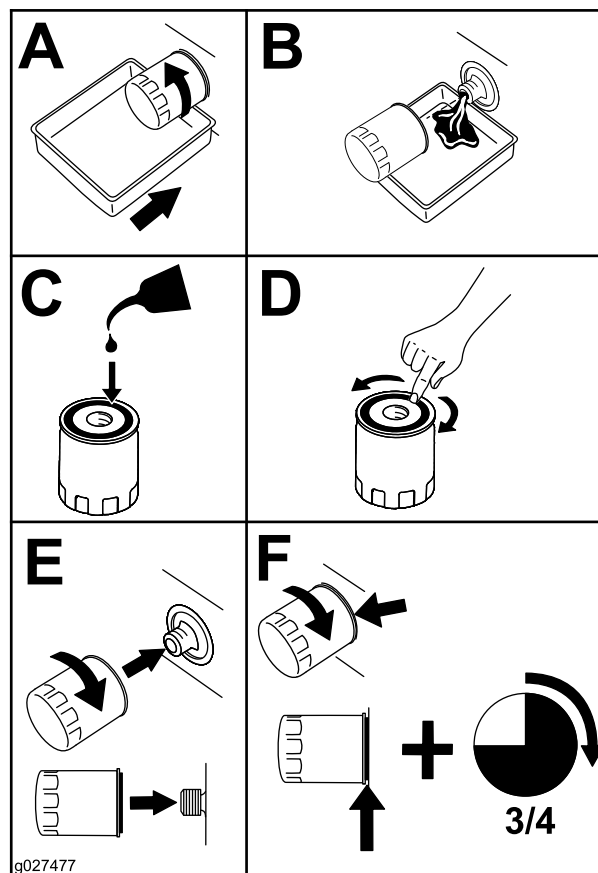


Figure 51

**Note:** Ensure that the oil-filter gasket touches the engine, and then the oil filter an extra 3/4 turn.

3. Fill the crankcase with the proper type of new oil; refer to [Changing the Engine Oil](#) (page 43).

# Servicing the Spark Plug

**Service Interval:** Every 200 hours—Check, clean and gap the spark plug.

Make sure that the air gap between the center and side electrodes is correct before installing the spark plug. Use a spark plug wrench to remove and install the spark plug(s) and use a gapping tool/feeler gauge to check and adjust the air gap. Install a new spark plug(s) if necessary.

**Type :** Champion® XC12YC, or equivalent

**Air Gap:** 0.76 mm (0.030 inch)

## Removing the Spark Plug

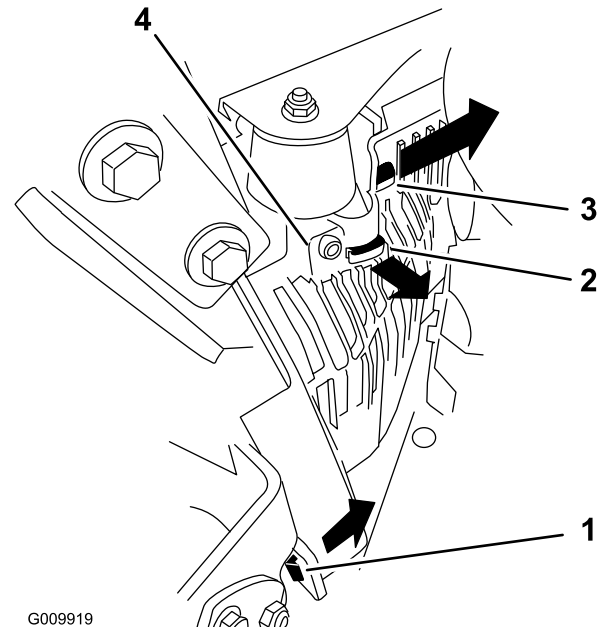
1. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
2. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
3. Remove the left hydraulic unit shroud in the order listed with [Figure 52](#).

**Note:** This gives you access to the front spark plug.



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g009922



G009919

g009919

**Figure 52**

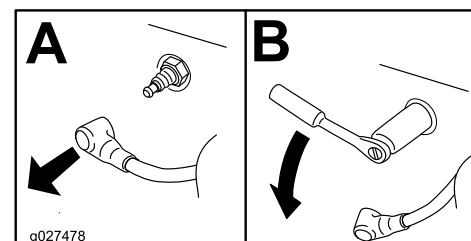
1. Pull this tab out to the side in the direction of the arrow.
2. Pull the shroud off this frame tab in the direction of the arrow.
3. Pull the shroud off this frame tab in the direction of the arrow.
4. Shroud

4. Remove the spark plug ([Figure 53](#)).



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**Figure 53**

5. Install the left hydraulic unit shroud (Figure 52).

## Checking the Spark Plug

**Important:** Replace the spark plug(s) when it has: a black coating, worn electrodes, an oily film, cracks or reuse is questionable.

If you see light brown or gray on the insulator, the engine is operating properly. A black coating on the insulator usually means the air cleaner is dirty.

Set the gap to 0.76 mm (0.030 inches).

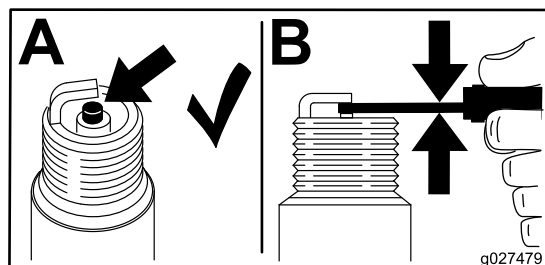


Figure 54

g027479

## Installing the Spark Plug

Tighten the spark plug(s) to 24.4 to 29.8 N·m (18 to 22 ft-lb).

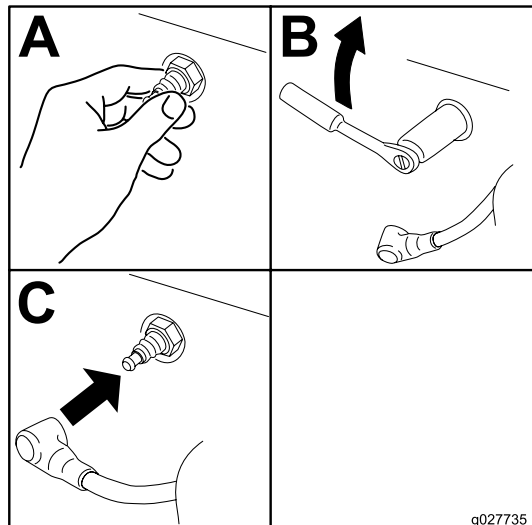


Figure 55

g027735

## Checking the Spark Arrester

### For a Model with a Spark Arrester

Service Interval: Every 50 hours

#### ⚠ WARNING

Hot exhaust system components may ignite gasoline vapors even you shut off the engine. Hot particles exhausted during engine operation may ignite flammable materials. Fire may result in personal injury or property damage.

Do not refuel or run the engine unless a spark arrester is installed.

1. Stop engine, wait for all moving parts to stop, and remove key. Engage parking brake.
2. Wait for muffler to cool.
3. If there are any breaks in the screen or welds, replace the arrester.
4. If the screen is plugged, remove the arrester and shake the loose particles out of the arrester and clean the screen with a wire brush (soak it in solvent if necessary). Install the arrester on the exhaust outlet.

# Fuel System Maintenance

## ⚠ WARNING

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

Use only approved fuel lines and fuel filters.

## Servicing the Electronic Fuel-Injection System

This machine contains an electronic fuel-injection system. It controls the fuel flow under different operating conditions.

The electronic control unit (ECU) continuously monitors the operation of the EFI system.

If a problem or fault within the system is detected, the malfunction indicator light (MIL) illuminates. The MIL is the red light located in the right console panel.

Once the MIL illuminates, make initial troubleshooting checks. Refer to the MIL section under [Troubleshooting \(page 74\)](#).

If these checks do not correct the problem, further diagnosis and servicing by an Authorized Service Dealer is necessary.

## Replacing the Low-Pressure Fuel Filter

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

The fuel filter is located near the engine on the front or rear side of the engine.

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set 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. Wait for the machine to cool down.
4. Close the fuel-shutoff valve under the seat ([Figure 56](#)).

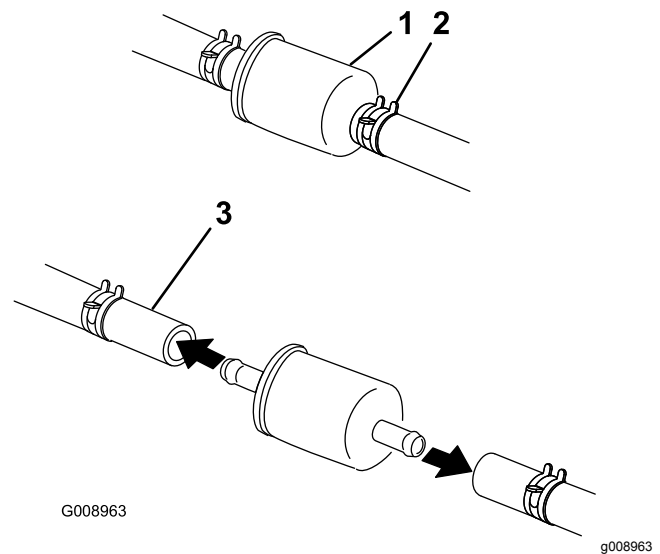


Figure 56

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

5. Squeeze the ends of the hose clamps together and slide them away from the filter ([Figure 56](#)).
6. Remove the filter from the fuel lines.
7. Install a new filter and move the hose clamps close to the filter ([Figure 56](#)).
8. Open the fuel-shutoff valve.

**Important:** Install the fuel line hoses and secure with plastic ties the same as they were originally installed at the factory to keep the fuel line away from components that can cause fuel line damage.

## Servicing the High-Pressure Fuel Filter

Do not attempt to service the high-pressure fuel filter. The high-pressure filter is integrated within the fuel-pump module. The fuel filter and other components inside the fuel-pump module are not serviceable.

**Important:** Do not attempt to open the fuel-pump module.

Ensure that an Authorized Service Dealer replaces the fuel-pump module with the high-pressure fuel filter.

## Servicing the Fuel Tank

Do not attempt to drain the fuel tank. Ensure that an Authorized Service Dealer drains the fuel tank.



# Electrical System Maintenance

## Servicing the Battery

Service Interval: Monthly

### WARNING

#### CALIFORNIA Proposition 65 Warning

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

### ⚠ DANGER

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

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

## Removing the Battery

### ⚠ WARNING

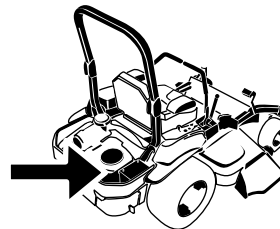
Battery terminals or metal tools could short against metal machine components, causing sparks. Sparks can cause the battery gasses to explode, resulting in personal injury.

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

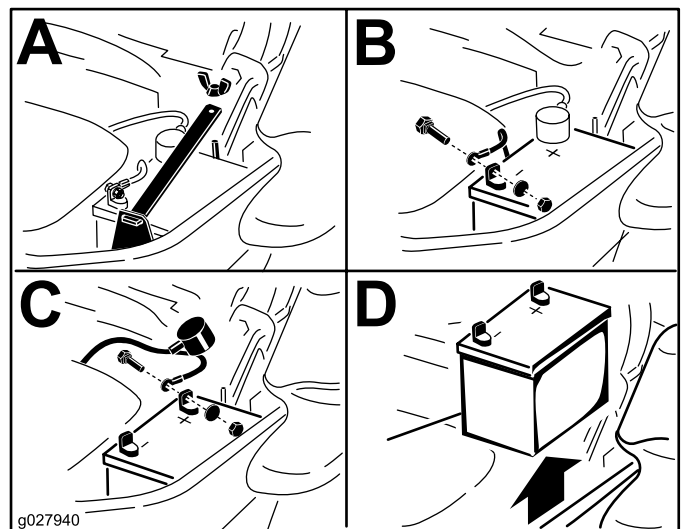
### ⚠ WARNING

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

- Always disconnect the negative (black) battery cable before disconnecting the positive (red) cable.
  - Always connect the positive (red) battery cable before connecting the negative (black) cable.
1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
  2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
  3. Disconnect the negative battery cable (black) from the negative (-) battery terminal (Figure 57).
  4. Slide the red terminal boot off the positive (red) battery terminal, and remove the positive (+) battery cable (Figure 57).
  5. Remove the wing nut securing the battery clamp (Figure 57).
  6. Remove the clamp (Figure 57).
  7. Remove the battery.



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Figure 57



## Installing the Battery

1. Position the battery in the tray with the terminal posts opposite from the hydraulic tank (Figure 57).
2. Install the positive (red) battery cable to the positive (+) battery terminal.
3. Install the negative (black) battery cable and ground wire to the negative (-) battery terminal.
4. Secure the cables with 2 bolts, 2 washers, and 2 locknuts (Figure 57).
5. Slide the red terminal boot onto the positive (+) battery terminal.
6. Install the clamp and secure it with the wing nut (Figure 57).

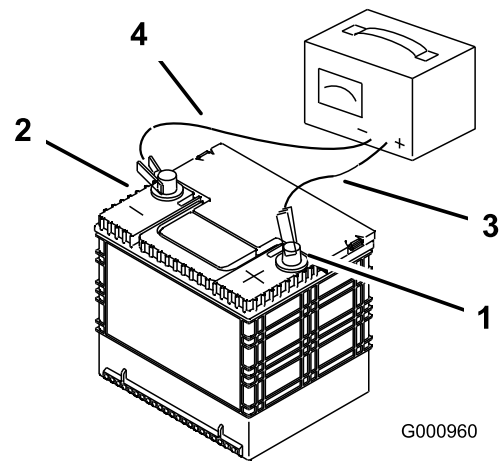


Figure 58

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

## 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. Charge battery for 10 to 15 minutes at 25 to 30 A or for 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 58).
3. Install the battery in the machine and connect the battery cables; refer to [Installing the Battery](#) (page 49).

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

## Servicing the Fuses

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

1. The fuses are located on right hand console next to the seat (Figure 59).
2. To replace the fuses, pull out on the fuse to remove it.
3. Install a new fuse (Figure 59).

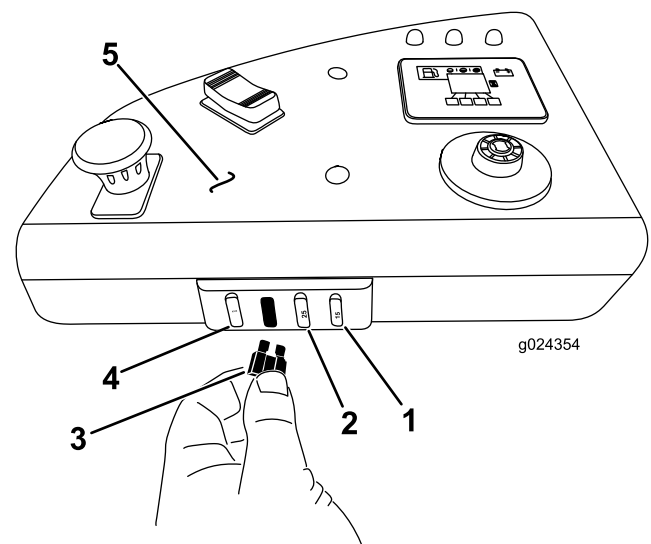


Figure 59

- |                           |             |
|---------------------------|-------------|
| 1. Optional accessory—15A | 4. Main—25A |
| 2. Charge—25A             | 5. Console  |
| 3. PTO—10A                |             |

# 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.

## Checking the Rollover-Protection-System (ROPS) Knobs

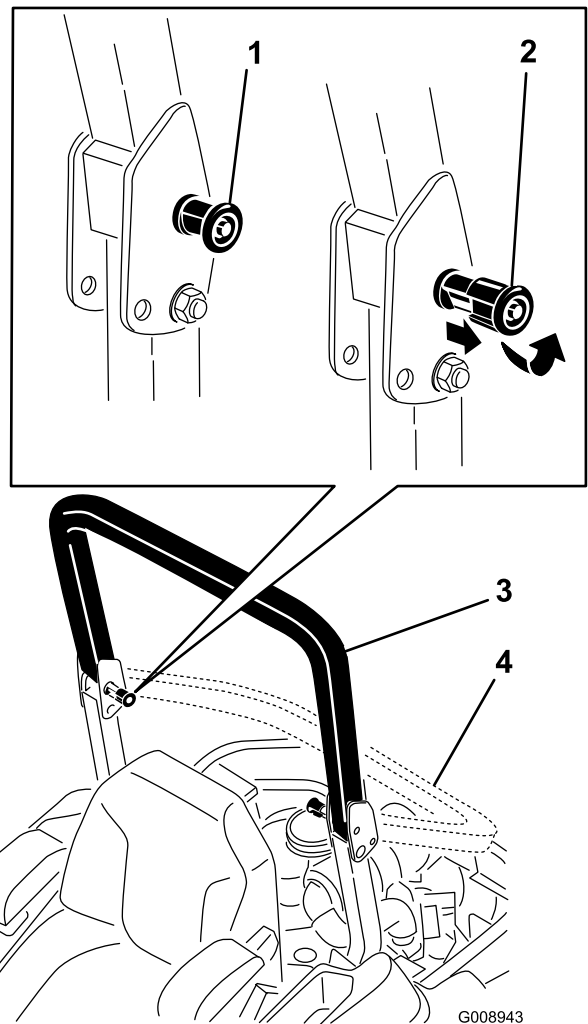
**Service Interval:** Before each use or daily

### **⚠ 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.

Check that both the mounting hardware and the knobs are in good working condition. Make sure that the knobs are fully engaged with the ROPS in the raised position. The upper hoop of the roll bar may need to be pushed forward or pulled rearward to fully engage both knobs ([Figure 60](#)).

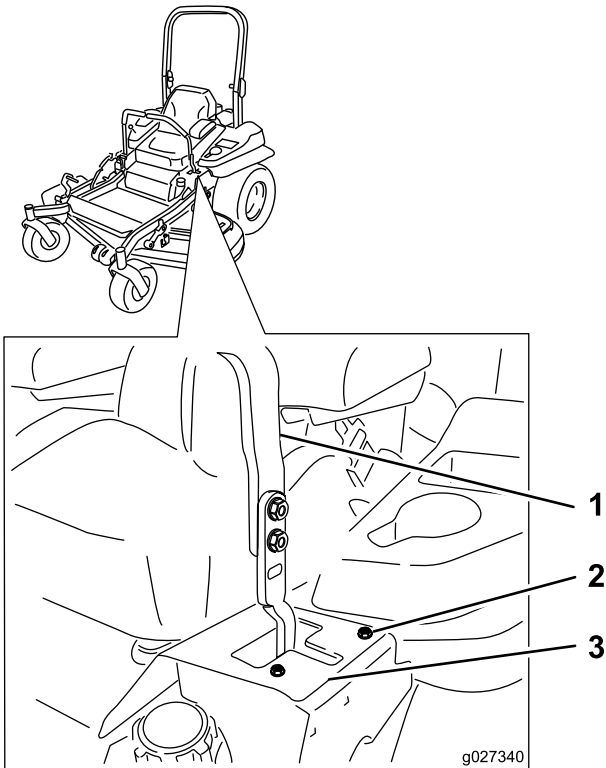


**Figure 60**

1. ROPS knob (locked position)
2. Pull the ROPS knob out, and rotate it 90 degrees to change the roll bar position.
3. Roll bar in the upright position
4. Roll bar in the folded position

## Adjusting the Tracking

1. Disengage the blade-control switch (PTO).
2. Drive to an open, flat area and 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 forward until they both hit the stops in the T-slot.
5. Check which way the machine tracks.
6. 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 61).
7. 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 61).
8. Tighten the stop plate (Figure 61).



**Figure 61**

Left control lever shown

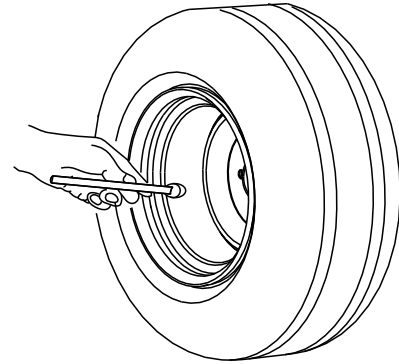
- |                  |               |
|------------------|---------------|
| 1. Control lever | 3. Stop plate |
| 2. Bolt          |               |

## Checking the Tire Pressure

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

Maintain the air pressure in the rear tires at 90 kPa (13 psi). Uneven tire pressure can cause uneven cut. Check the tires when they are cold to get the most accurate pressure reading.

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



G001055

**Figure 62**

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## Checking the Wheel Lug Nuts

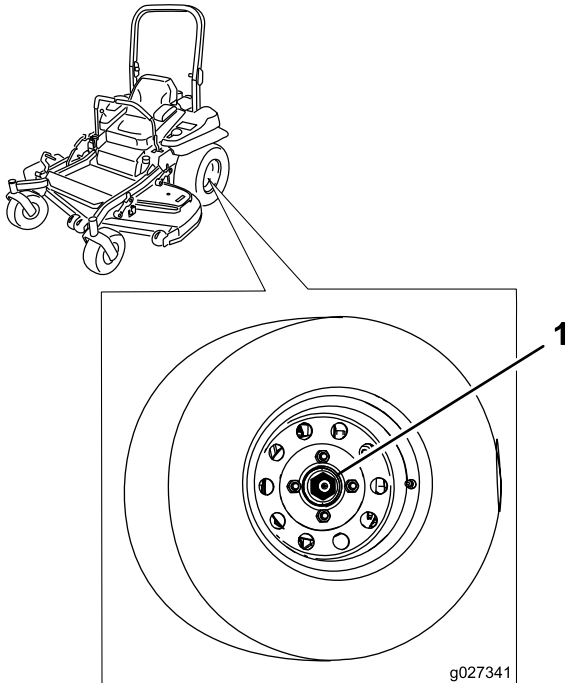
Check and torque the wheel lug nuts to 122 to 129 N·m (90 to 95 ft-lb).

# Checking the Wheel-Hub Slotted Nut

**Service Interval:** After the first 100 hours  
Every 500 hours

Check and ensure that the torque of the slotted nut is 286 to 352 N·m (211 to 260 ft-lb).

**Note:** Do not use anti-seize compound on the wheel hub.



**Figure 63**

1. Slotted nut

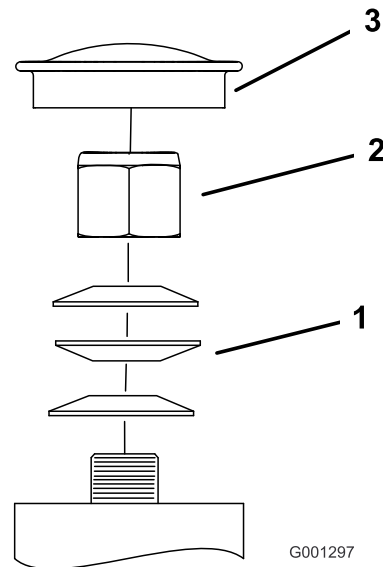
# Adjusting the Caster-Pivot Bearing

**Service Interval:** Every 500 hours/Yearly (whichever comes first)

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove the dust cap from caster and tighten the locknut (Figure 64).
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 64).

**Important:** Make sure that the spring washers are installed correctly as shown in Figure 64.

5. Install the dust cap (Figure 64).



**Figure 64**

- |                   |             |
|-------------------|-------------|
| 1. Spring washers | 3. Dust cap |
| 2. Locknut        |             |

# Using the Clutch Shim

Some later model year units have been built with clutches that contain a brake shim. When the clutch brake has worn to the point where the clutch no longer engages consistently, you can remove the shim to extend the clutch life.

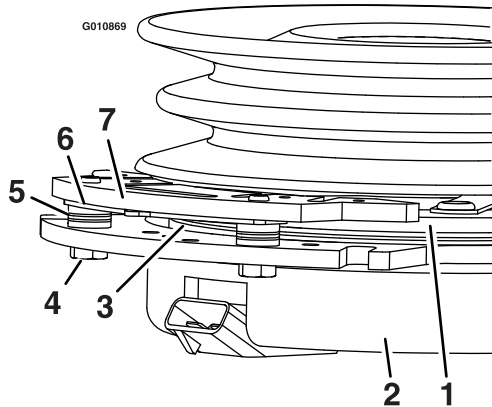


Figure 65

- |                        |                 |
|------------------------|-----------------|
| 1. Armature            | 5. Brake spacer |
| 2. Field shell         | 6. Regap shim   |
| 3. Rotor               | 7. Brake pole   |
| 4. Brake-mounting bolt |                 |

## Removing the Clutch Shim

1. Shut off the engine, wait for all moving parts to stop, and remove the key.
2. Engage the parking brake and wait for machine to cool completely.
3. Using an air compressor, blow out any debris under the brake pole and around the brake spacers.

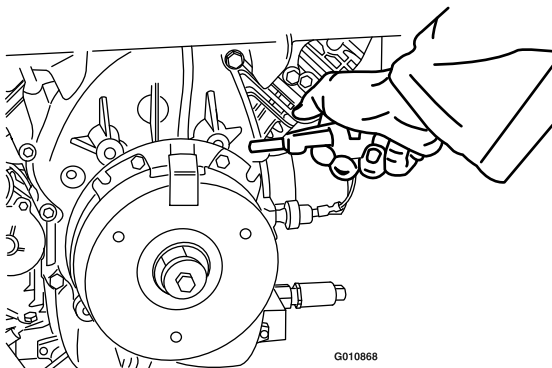


Figure 66

4. Check the condition of the wire-harness leads, connectors, and terminals. Clean or repair them as necessary.

5. Verify that 12 V is present at the clutch connector when the you engage the blade-control switch (PTO).
6. Measure the gap between the rotor and armature. If the gap is greater than 1 mm (0.04 inch), proceed with the following steps:
  - A. Loosen both brake mounting bolts 1/2 to 1 full turn as shown in Figure 67.

**Note:** Do not remove the brake pole from the field shell/armature. The brake pole has worn to match the armature and needs to continue to match after you remove the shim to ensure the proper brake torque.

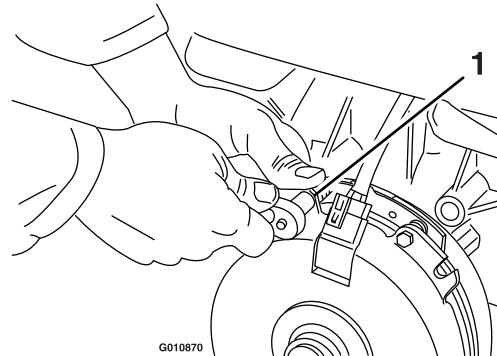


Figure 67

1. Brake-mounting bolt

- B. Using needle-nose pliers, or by hand, remove the shim.

**Note:** Do not discard the shim until you confirm that the clutch functions properly.

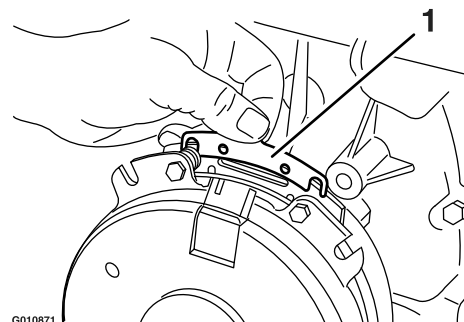


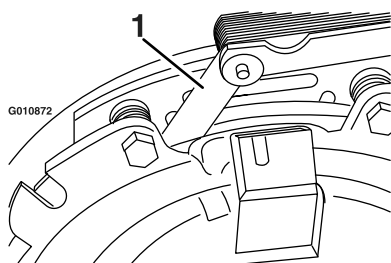
Figure 68

1. Shim

- C. Using a pneumatic line, blow out any debris under the brake pole and around the brake spacers.
- D. Torque each bolt (M6 x 1) to 12.3 to 13.7 N·m (9.5 to 10.5 ft-lb).

- E. Using a 0.010 inch thick-feeler gauge, verify that a gap is present between the rotor and armature face on both sides of the brake pole as shown in [Figure 69](#) and [Figure 70](#).

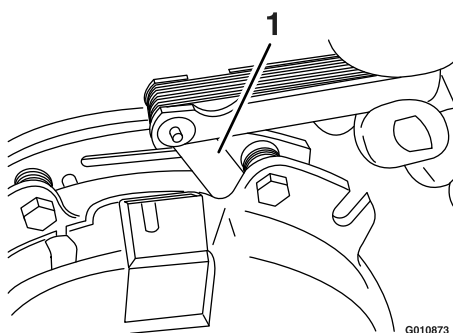
**Note:** Due to the way the rotor and armature faces wear (peaks and valleys), it is sometimes difficult to measure the true gap.



**Figure 69**

g010872

1. Feeler gauge
- 



**Figure 70**

g010873

1. Feeler gauge
- 

- If the gap is less than 0.010 inch, then install the shim and refer to [Troubleshooting \(page 74\)](#).
- If the gap is sufficient, proceed to the safety check in step **F**.

- F. Perform the following safety check:

- i. Sit on the seat and start the engine.
- ii. Make sure that the blades do not engage when the blade-control switch (PTO) is in the OFF position and the clutch is disengaged.

**Note:** If the clutch does not disengage, install the shim, and refer to [Troubleshooting \(page 74\)](#).

- iii. Engage and disengage the blade-control switch (PTO) 10 consecutive times to ensure that the clutch is functioning properly.

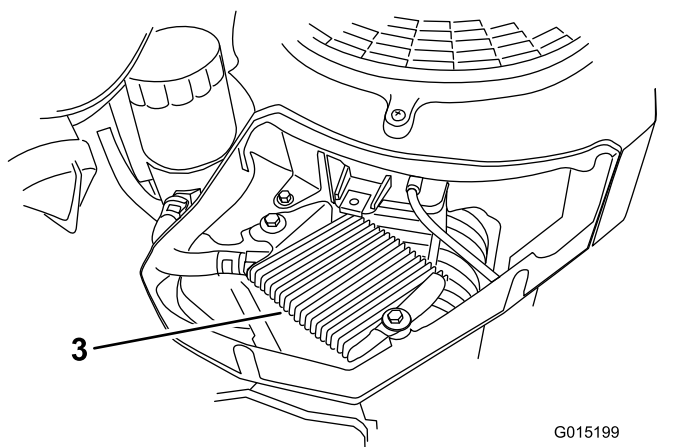
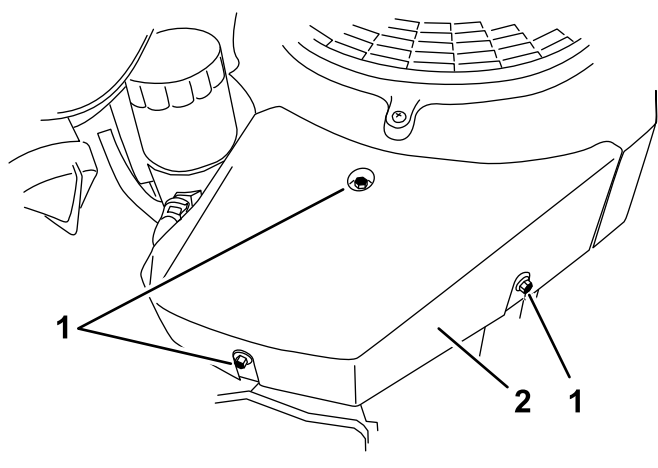
**Note:** If the clutch does not engage properly, refer to [Troubleshooting \(page 74\)](#).

# Cooling System Maintenance

## Servicing the Engine-Oil Cooler

**Service Interval:** Every 150 hours

1. Remove the top mounting screw and loosen the 2 side screws (Figure 71).
2. Remove the shroud (Figure 71).
3. Clean the engine-oil cooler with compressed air (Figure 71).
4. Install the shroud and the screws (Figure 71).



**Figure 71**

1. Shroud screws
2. Shroud
3. Engine-oil cooler

## Cleaning the Engine Screen

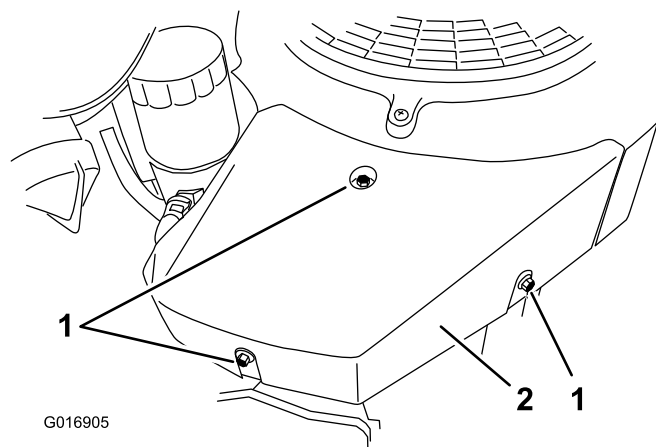
**Service Interval:** Before each use or daily

Before each use, remove any buildup of grass, dirt, or other debris from the engine screen. This helps ensure adequate cooling, correct engine speed, and reduces the possibility of overheating and mechanical damage to the engine.

## Cleaning the Engine-Cooling Fins and Shrouds

**Service Interval:** Every 150 hours/Yearly (whichever comes first)

1. Disengage the blade-control switch PTO and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove the right shroud by removing the top mounting screw and loosening the 2 side screws (Figure 72).

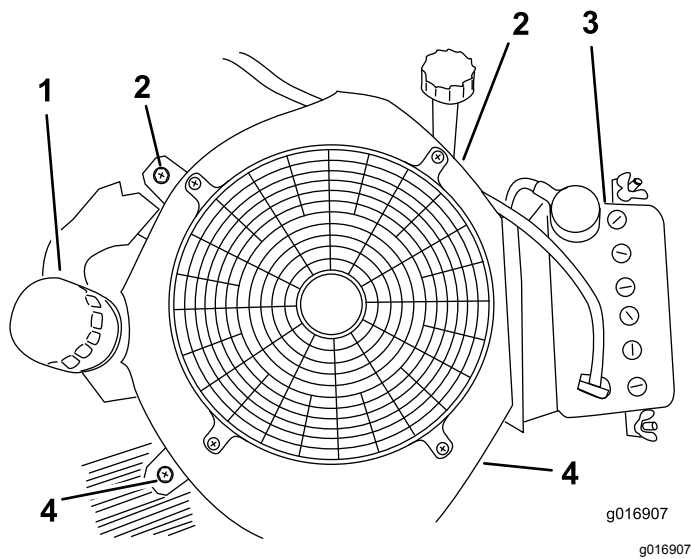


**Figure 72**

1. Shroud screws
2. Right shroud

4. Remove the top mounting screw and loosen the 2 side screws on the left shroud.
5. Pull up and remove the left shroud, feeding it out around the fuel pump and bracket.
6. Remove the 2 screws on the left and right sides in the cooling-fan housing (Figure 73).





**Figure 73**

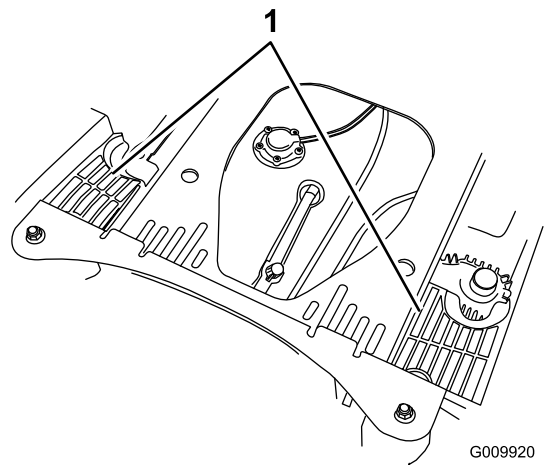
- |  |   |
|--|---|
| 1. Oil filter                                  | 3. Battery                                      |
| 2. Left side bolts for the cooling-fan housing | 4. Right side bolts for the cooling-fan housing |

- 
7. Remove the cooling-fan housing.
  8. Using compressed air, blow out any debris and grass from the engine parts, particularly around the cylinder head cooling fins and ignition coils.
  9. Install all the shrouds onto the engine.

## Cleaning the Hydraulic Units

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

1. Disengage the blade-control switch (PTO) and set 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. Move the seat forward.
4. Clean the debris and grass from the hydraulic units ([Figure 74](#)).
5. Position the seat.



**Figure 74**

- 
1. Hydraulic units



# Brake Maintenance

## Adjusting the Parking Brake

**Service Interval:** After the first 100 hours

Every 500 hours thereafter

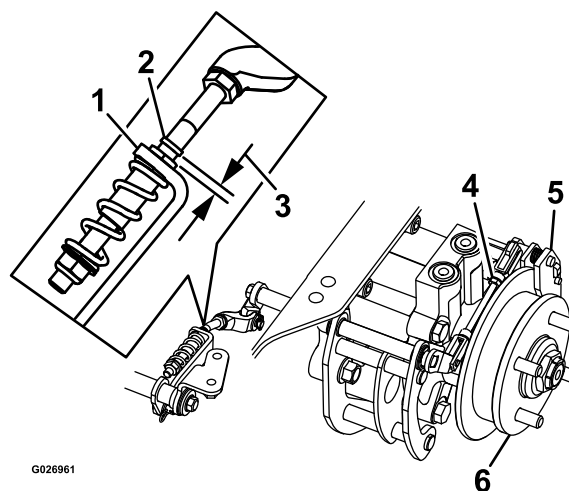
Check that the brake is adjusted properly before adjusting.

1. Drive the machine onto 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, wait for all moving parts to stop, and remove the key.
4. Raise the back of the machine and support the machine with jack stands.

### **⚠ DANGER**

**Mechanical or hydraulic jacks may fail to support machine and cause a serious injury.**

- Use a jack stand when supporting the machine.
  - Do not use hydraulic jacks.
5. Remove the rear tires from the machine.
  6. Remove any debris from the brake area.
  7. Rotate the drive-wheel release handle to the released position. Refer to [Using the Drive-Wheel Release Valves \(page 32\)](#).
  8. Check if there is a visible gap between the L-bracket and the linkage stop ([Figure 75](#)).



**Figure 75**

Left Side Shown

- |                 |                          |
|-----------------|--------------------------|
| 1. L-bracket    | 4. Rear-linkage assembly |
| 2. Linkage stop | 5. Caliper               |
| 3. Gap          | 6. Wheel hub             |
- 
9. Disengage the parking brake.
  10. Turn the wheel hub by hand in both directions relative to the caliper.  
**Note:** The wheel hub should move freely between the caliper.
  11. If a gap is needed or the wheel hub does not move freely:
    - A. Disengage the parking brake.
    - B. Disconnect and fine-tune the rear linkage assembly:
      - Shorten the link to create a gap.
      - Lengthen the link to allow wheel hub movement.
    - C. Connect the rear-linkage assembly.
  12. Engage the parking brake and check the gap.
  13. Repeat steps 9 through 13 until you achieve a visible gap and the wheel hub rotates freely.
  14. Repeat this procedure for the brake on the opposite side.
  15. Rotate the drive-wheel release handle to the operating position; refer to [Using the Drive-Wheel Release Valves \(page 32\)](#).
  16. Install the rear tires and torque the lug nuts; refer to [Checking the Wheel Lug Nuts \(page 51\)](#).
  17. Remove the jack stands.

# Belt Maintenance

## Inspecting the Belts

**Service Interval:** Every 50 hours

Replace the belt if it is worn. The signs of a worn belt include squealing while the belt is rotating; the blades slipping while cutting grass; and frayed edges, burn marks, and cracks on the belt.

## Replacing the Mower Belt

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Stop 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 inch) height-of-cut.
4. Remove the belt covers (Figure 76).

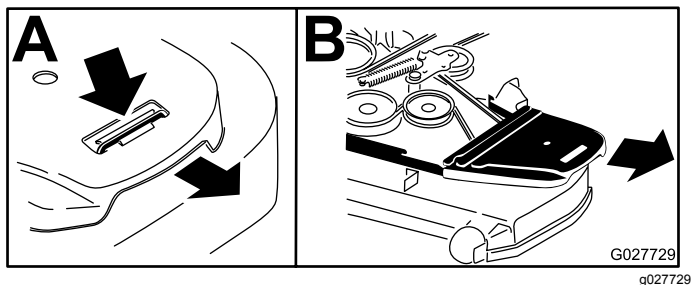


Figure 76

5. Use a ratchet in the square hole in the idler arm to remove tension on the idler spring (Figure 77).
6. Remove the belt from the mower-deck pulleys.
7. Remove the belt guide on the spring-loaded idler arm (Figure 77).
8. Remove the existing belt.
9. Install the new belt around the mower pulleys and the clutch pulley under the engine (Figure 77).

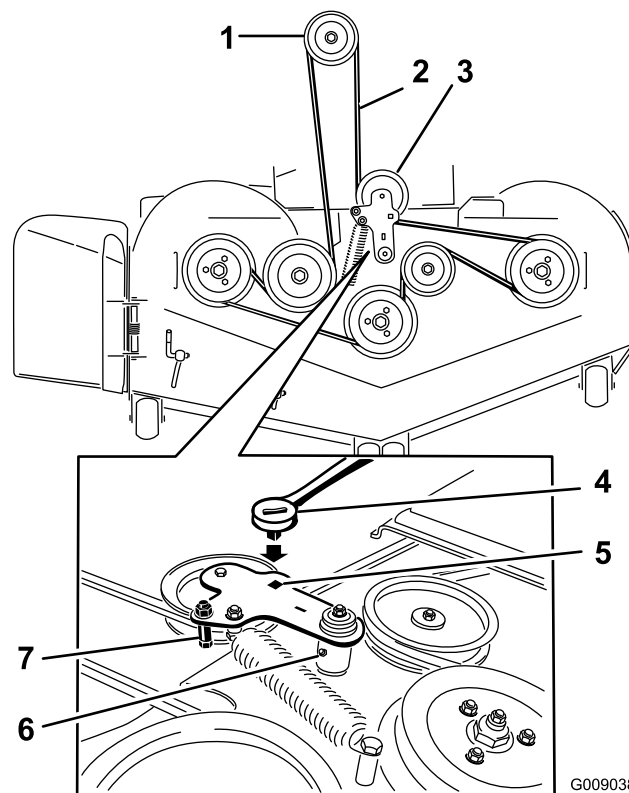


Figure 77

- |                               |   |
|-------------------------------|---|
| 1. Clutch pulley              | 5. Square hole in the idler arm for the ratchet |
| 2. Mower belt                 | 6. Idler-grease fitting                         |
| 3. Spring-loaded idler pulley | 7. Belt guide                                   |
| 4. Ratchet                    |   |

10. Install the belt guide on the idler arm (Figure 77).
11. Using the ratchet in the square hole, install the idler spring (Figure 77).

**Note:** Make sure to seat the spring ends in the anchor grooves.

12. Install the belt covers (Figure 78).

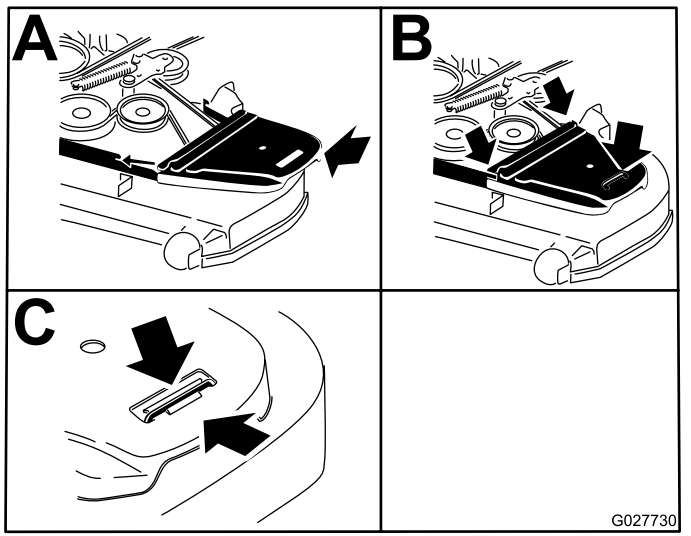


Figure 78

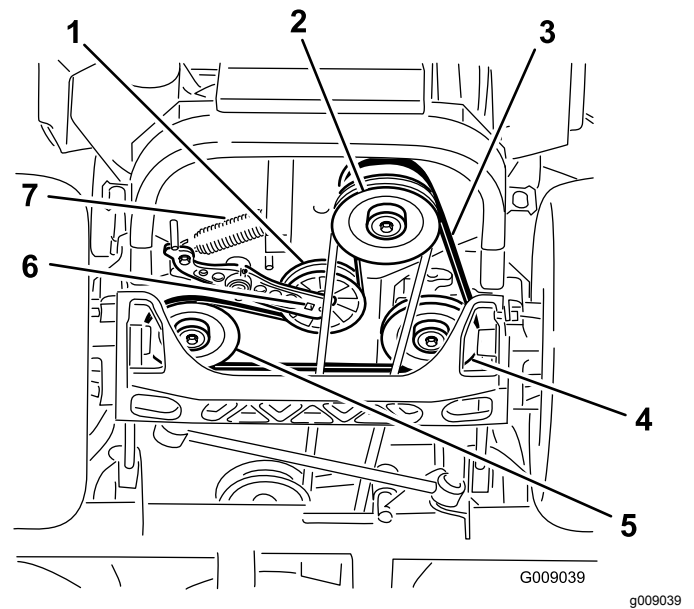


Figure 79

## Replacing the Hydraulic-Pump Drive Belt

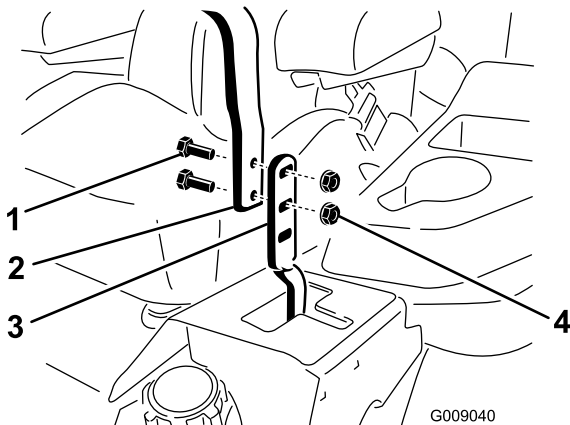
1. Disengage the blade-control switch (PTO) and set the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove mower belt; refer to [Replacing the Mower Belt \(page 58\)](#).
4. Raise the machine and support it with jack stands ([Figure 79](#)).
5. Use a ratchet in the square hole in the idler arm to remove the idler spring ([Figure 79](#)).
6. Unhook the idler spring from the frame ([Figure 79](#)).
7. Remove the belt from the hydraulic-unit-drive pulleys and the engine pulley.
8. Install the new belt around engine pulley and the 2 drive pulleys.
9. Using a ratchet in the square hole in the idler arm, install the idler spring to the frame ([Figure 79](#)).
10. Install the mower belt; refer to [Replacing the Mower Belt \(page 58\)](#).

# Controls System Maintenance

## Adjusting the Control-Handle Position

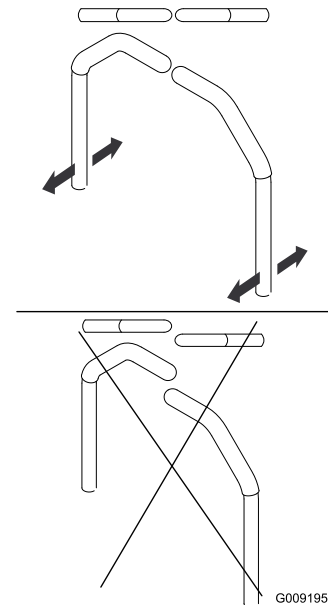
There are 2 height positions for the control levers—high and low. Remove the bolts to adjust the height.

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Stop 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 80](#)).
4. Align the levers in the front-to-rear position by bringing the levers together to the NEUTRAL position, slide them until they are aligned, and tighten the bolts ([Figure 81](#)).



**Figure 80**

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



**Figure 81**

5. If the ends of the levers hit against each other, refer to [Adjusting the Motion-Control Neutral-Lock Pivot](#) ([page 62](#)).

# Adjusting the Motion-Control Linkage

The pump-control linkages are located on either side of the fuel tank, below the seat. Rotate the pump linkage with a 1/2 inch wrench for fine-tuning adjustments so that the machine does not move in neutral. Make any adjustments for neutral positioning only.

## **⚠ WARNING**

**The engine must be running and the drive wheels must be turning, so the motion-control adjustment can be performed. 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. Prior to starting the engine, push the deck-lift pedal, remove the height-of-cut pin, and lower the deck to the ground.
2. Raise the rear of machine and support it with jack stands (or equivalent support) just high enough to allow the drive wheels to turn freely.
3. Remove the electrical connection from the seat safety switch, located under the bottom cushion of the seat.

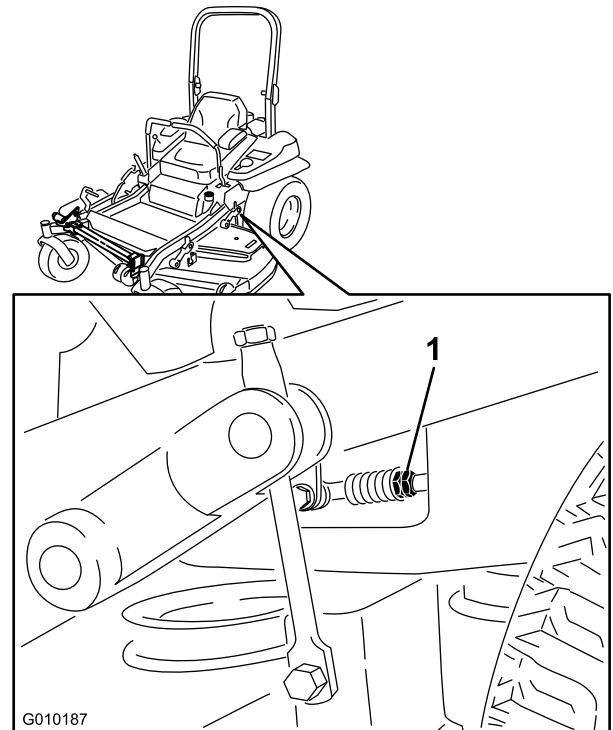
**Note:** The switch is a part of the seat assembly.

4. **Temporarily** install a jumper wire across the terminals in the connector of the main wiring harness.

5. Start the engine.

**Note:** Engage the parking brake and move the motion-control levers out before starting the engine. You do not need to be in the seat because of the jumper wire being used. Run the engine at full throttle and release the brake.

6. Run the machine at least 5 minutes with the motion-control levers at full forward speed to bring the hydraulic oil up to operating temperature.
7. Bring the motion-control levers into the NEUTRAL position.
8. 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 82).



**Figure 82**

1. Double nuts

9. 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.

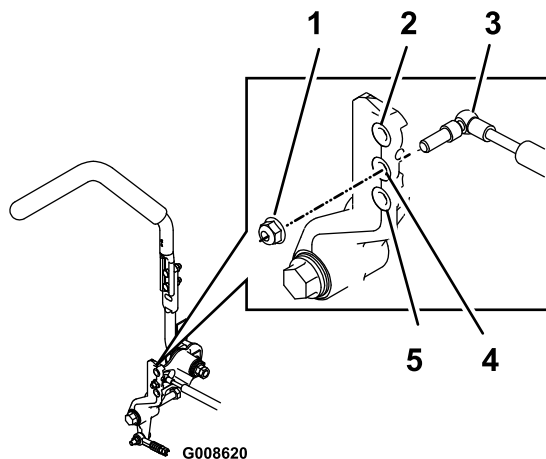
**Note:** The wheels must stop turning or slightly creep in reverse.

10. Shut off the machine.
11. Remove the jumper wire from wire harness and plug the connector into the seat switch.
12. Remove the jack stands.
13. Raise the deck and install the height-of-cut pin.

14. Check that the machine does not creep in neutral when you disengage the parking brakes.

## Adjusting the Motion-Control Damper

You can adjust the top damper mounting bolt to obtain a more desired motion-control lever resistance. See [Figure 83](#) for mounting options.



**Figure 83**

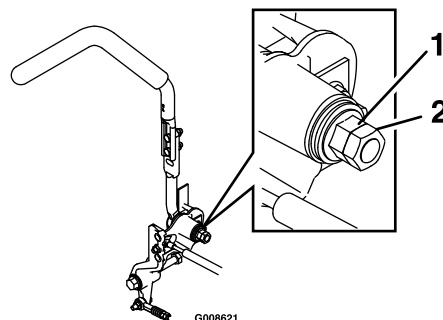
Right motion-control lever shown

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)

## Adjusting the Motion-Control Neutral-Lock Pivot

You can adjust the flanged nut to obtain the desired motion-control lever resistance when you move them to the NEUTRAL-LOCK position. See [Figure 84](#) for adjustment options.

1. Loosen the jam nut.
2. Tighten or loosen the flanged nut to the desired feel.  
**Note:** For more resistance, tighten the flanged nut.  
**Note:** For less resistance, loosen the flanged nut
3. Tighten the jam nut.



**Figure 84**

1. Flanged nut
2. Jam nut

# Hydraulic System Maintenance

## Servicing the Hydraulic System

**Hydraulic Oil Type:** Toro® HYPR-OIL™ 500 hydraulic oil or Mobil® 1 15W-50.

**Important:** Use oil specified. Other fluids could damage the hydraulic system.

**Each Hydraulic System Oil Capacity:** 1.5 L (52 oz) per side with filter change

## Checking the Hydraulic Oil

**Service Interval:** Every 50 hours—Check the hydraulic oil level.

1. Position the machine on a level surface.
2. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set 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. Wait for the engine and hydraulic system to cool for 10 minutes.

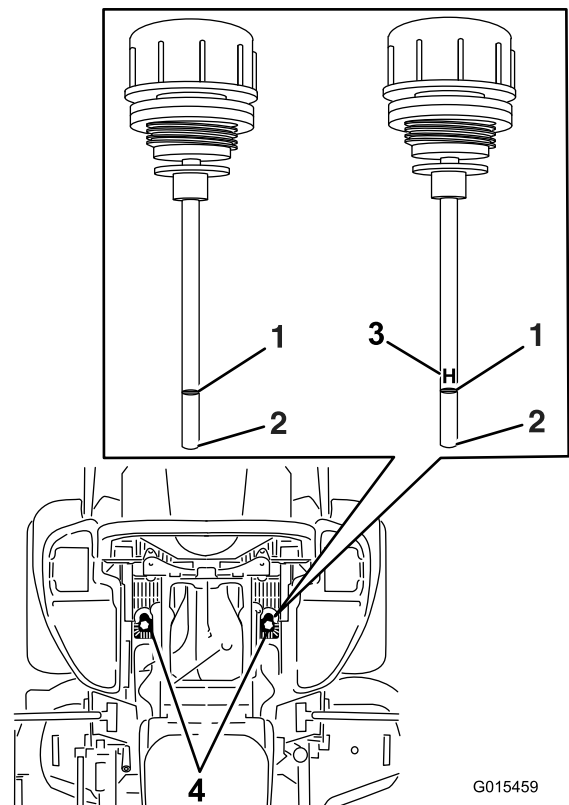
**Note:** The oil level on the dipstick is incorrect if you check the oil when the machine is hot.

5. Move the seat forward.
6. Clean the area around the dipsticks of the hydraulic system reservoirs (Figure 85).
7. Remove 1 dipstick from the hydraulic reservoir (Figure 85).
8. Wipe the dipstick off and thread the dipstick into the reservoir.
9. Remove the dipstick and look at the end (Figure 85).

**Note:** If the oil level is at the add mark, slowly pour only enough oil into the hydraulic reservoir to raise the level to the full or H line.

**Important:** Do not overfill the hydraulic units with oil, as damage may occur. Do not run the machine with the oil below the add mark.

10. Install the dipstick.
11. Repeat procedure for the opposite dipstick.



G015459

g015459

**Figure 85**

Either dipstick is used in the machine

- |         |                                  |
|---------|----------------------------------|
| 1. Full | 3. H—means high level            |
| 2. Add  | 4. Dipstick locations under seat |

### **⚠ WARNING**

**Hydraulic oil escaping under pressure can penetrate skin and cause injury.**

- If hydraulic oil is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type of injury. Gangrene may result if this is not done.
- Keep your body and hands away from pin hole leaks or nozzles that eject high-pressure hydraulic oil.
- Use cardboard or paper to find hydraulic leaks.
- Safely relieve all pressure in the hydraulic system before performing any work on the hydraulic system.
- Make sure that all hydraulic oil hoses and lines are in good condition and that all hydraulic connections and fittings are tight before applying pressure to the hydraulic system.



# Replacing the Hydraulic Filters and Hydraulic Oil

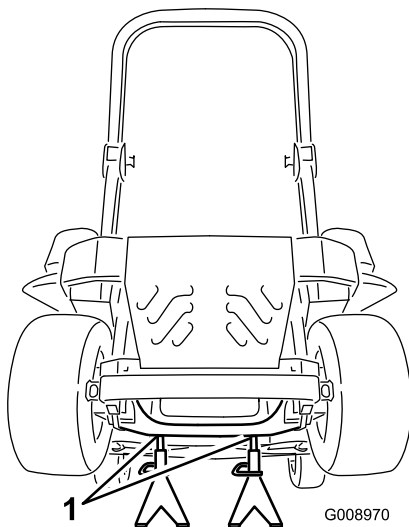
**Service Interval:** After the first 250 hours—Change the hydraulic filters and hydraulic oil.

Every 250 hours—Change the hydraulic filters and hydraulic oil when using Mobil® 1 oil (more often in dirty or dusty conditions).

Every 500 hours—Change the hydraulic filters and hydraulic oil when using Toro® HYPR-OIL™ 500 hydraulic oil (more often in dirty or dusty conditions).

To replace the hydraulic oil, you need to remove the filters. Replace both at the same time; refer to [Servicing the Hydraulic System \(page 63\)](#) for the oil specifications.

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set 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 machine and support it with jack stands ([Figure 86](#)).



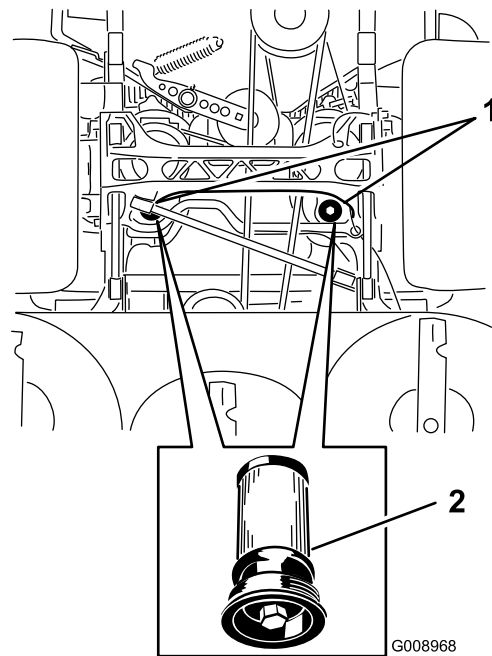
**Figure 86**

1. Jack stands

4. Remove both the mower belt and the pump-drive belt; refer to [Replacing the Mower Belt \(page 58\)](#) and [Replacing the Hydraulic-Pump Drive Belt \(page 59\)](#).

**Note:** This prevents oil from getting on the belts.

5. Place a drain pan under the filter, remove the old filter, and wipe the surface clean ([Figure 87](#)).



**Figure 87**

Bottom view of the machine

1. Filter locations
2. Hydraulic filter

6. Apply a thin coat of hydraulic oil to the rubber gasket on the replacement filter ([Figure 87](#)).
7. Install the replacement hydraulic filter.
8. Install the pump-drive belt and the mower belt.
9. Remove the jack stands and lower the machine ([Figure 86](#)).
10. Add oil to the hydraulic reservoir and check for any leaks.
11. Clean up any spilled oil.
12. Start the engine and let it run for about 2 minutes to purge air from the system.
13. Shut off the engine and check for leaks.
14. Check the oil level while the oil is cold.
15. If required, add oil to the hydraulic reservoir.

**Note:** Do not overfill.



# Mower Deck Maintenance

## Leveling the Mower Deck

### Setting Up the Machine

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

1. Position the mower on a flat surface.
2. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
3. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
4. Check the pressure of the drive tires.

**Note:** Proper inflation pressure for the tires is 90 kPa (13 psi).

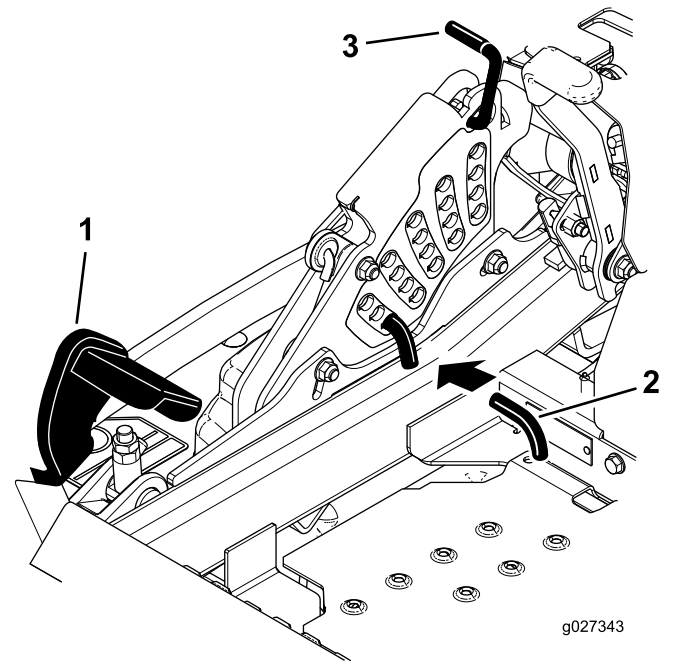
5. Position the mower deck to the 76 mm (3 inch) height-of-cut position.

### Leveling the Deck

1. Position the mower on a flat surface.
2. Stop engine, wait for all moving parts to stop, remove the key, and engage the parking brake.
3. Check the tire pressure in the drive tires.

**Note:** Proper inflation pressure for the tires is 90 kPa (13 psi).

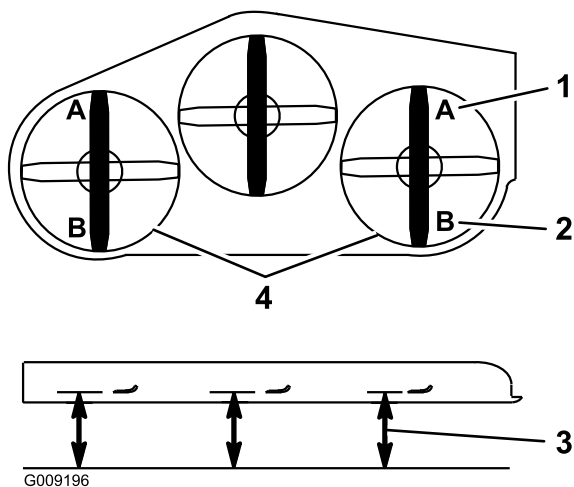
4. Position the transport lock in the latching position.
5. Push the deck-lift pedal all the way forward so that the deck latches at the 14 cm (5-1/2 inches) transport position ([Figure 88](#)).



**Figure 88**

- |                      |                   |
|----------------------|-------------------|
| 1. Deck-lift pedal   | 3. Transport lock |
| 2. Height-of-cut pin |                   |
- 
6. Insert the height adjustment pin into the 7.6 cm (3 inches) cutting height location.
  7. Release the transport lock and allow the deck to lower to the cutting height.
  8. Raise the discharge chute.
  9. On both sides of the deck, measure from the level surface to the front tip of the blade (Position A) as shown in [Figure 89](#).

**Note:** The measurement should read 7.6 mm (3 inches)

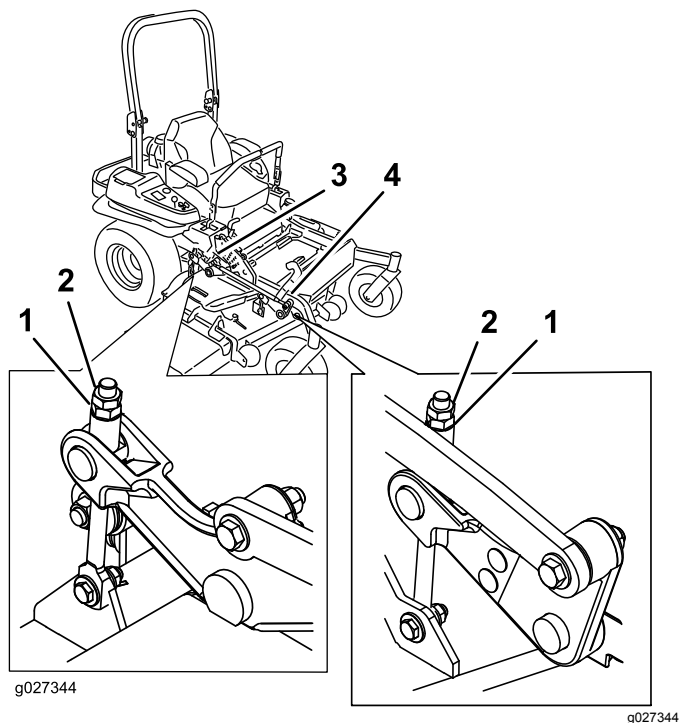


**Figure 89**

1. 7.6 cm (3 inches) at position A is correct
2. 8.3 cm (3-1/4 inches) at position B is correct
3. Measure here from the blade tip to the hard surface
4. Measure at position A and B on both sides

10. For mower decks shown in [Figure 90](#), fine-tune the adjustment nut on the front deck-lift assembly by turning it.

**Note:** To increase the height, turn the adjustment nut clockwise; to decrease the height, turn the nut counterclockwise.



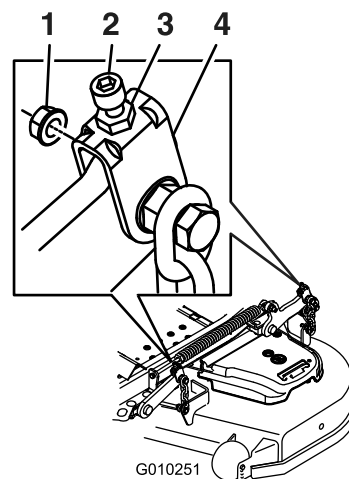
**Figure 90**

1. Adjustment nut
2. Jam nut
3. Rear deck adjustment
4. Front deck adjustment

11. For mower decks shown in [Figure 91](#), fine-tune the adjustment nut on the front deck-lift assembly by turning it ([Figure 91](#)).

**Note:** To increase the height, turn the adjustment nut clockwise; to decrease the height, turn the nut counterclockwise.

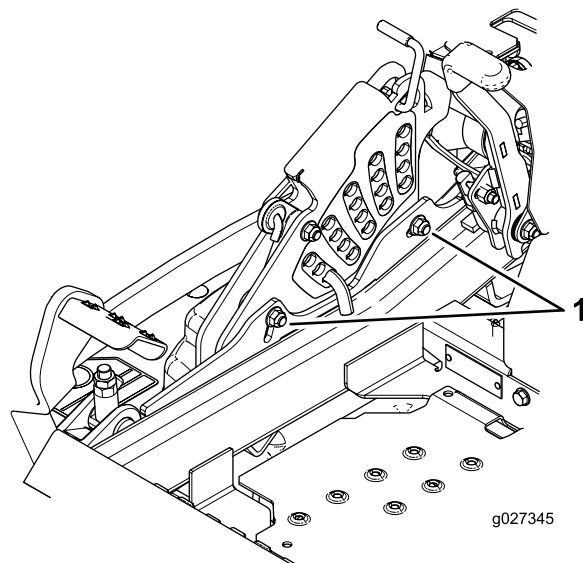
**Note:** If the front deck links do not have enough adjustment to achieve accurate cut height, you can utilize the single-point adjustment to gain more adjustment.



**Figure 91**

1. Adjustment nut
2. Jam nut
3. Rear deck adjustment
4. Front deck adjustment

12. To adjust the single-point system, loosen the 2 bolts at the bottom of the height-of-cut plate ([Figure 92](#)).



**Figure 92**

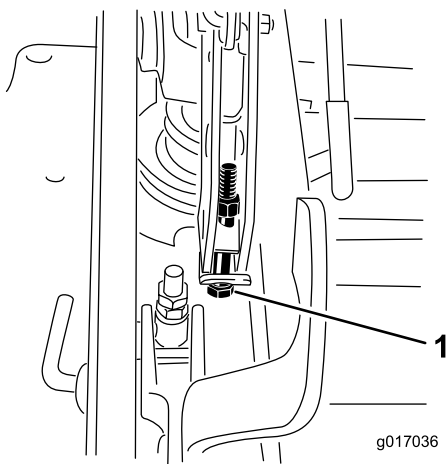
1. Bolts at the bottom of the height-of-cut plate

13. If the deck is too low, tighten the single-point adjustment bolt by rotating it clockwise. If the deck is too high, loosen the single point adjustment bolt by rotating it counterclockwise ([Figure 93](#)).

**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 gain some up and down adjustment on each of the 4 deck links.

14. Tighten the 2 bolts at the bottom of the height-of-cut plate ([Figure 93](#)).

**Note:** In most conditions, the back blade tip should be adjusted 6.4 mm (1/4 inch) higher than the front.



**Figure 93**

1. Single-point adjustment bolt

15. Torque the 2 bolts to 37 to 45 N·m (27 to 33 ft-lb).
16. On both sides of the deck, measure from the level surface to the back tip of the blade (position B) as shown in [Figure 89](#).

**Note:** The measurement should read 8.3 cm (3-1/4 inches)

17. Fine-tune the screw adjuster by turning it to get 8.3 mm (3-1/4 inches) height ([Figure 91](#)).

**Note:** To increase the height, turn the adjustment nut clockwise; to decrease, turn counterclockwise.

18. Measure until all 4 sides are the correct height.
19. Tighten all the nuts on the deck-lift-arm assemblies.
20. Lower the discharge chute.

## 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.

### ⚠ WARNING

**A worn or damaged blade can break, and a piece of the blade could be thrown at you or bystanders, resulting in serious personal injury or death.**

- Inspect the blades periodically for wear or damage.
- Replace a worn or damaged blade.

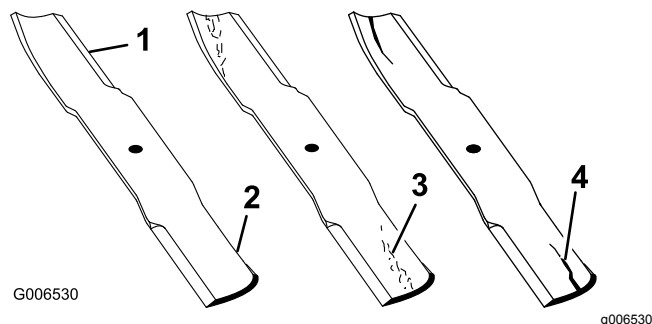
## Before Inspecting or Servicing the Blades

1. Park the machine on a level surface, Disengage the blade-control switch (PTO), and set the parking brake.
2. Turn the ignition key to off. Remove the key, and disconnect the spark plug wires from the spark plugs.

## Inspecting the Blades

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

1. Inspect the cutting edges ([Figure 94](#)).
2. If the edges are not sharp or have nicks, remove and sharpen the blade; refer to [Removing the Blades](#) (page 68) and [Sharpening the Blades](#) (page 68).
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 94](#)).

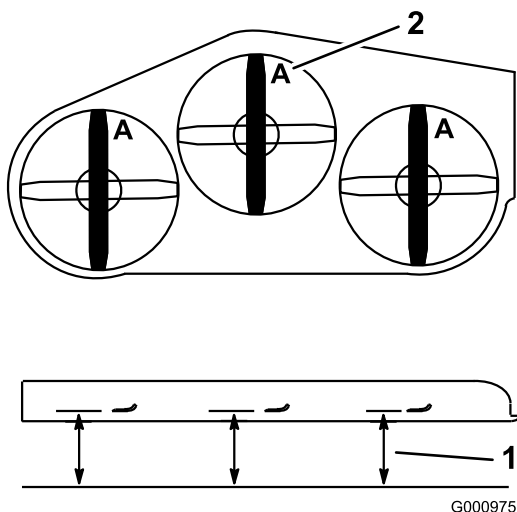


**Figure 94**

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

## Checking for Bent Blades

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Stop 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 95).
4. Measure from a level surface to the cutting edge, position A, of the blades (Figure 95).



G000975

Figure 95

1. Measure here from blade to hard surface
2. Position A

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.

### ⚠ WARNING

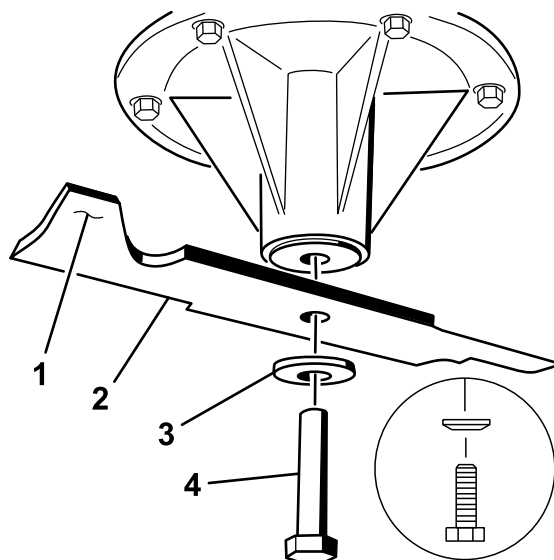
A blade that is bent or damaged could break apart and could seriously injure or kill you or bystanders.

- Always replace bent or damaged blade with a new blade.
- Do not file or create sharp notches in the edges or surfaces of the blade.

## Removing the Blades

Replace a blade if it hits an object, if the blade is out of balance, or if the blade is bent. To ensure optimum performance and continued safety conformance of the machine, use genuine Toro replacement blades. Replacement blades made by other manufacturers may result in nonconformance with safety standards.

1. Hold the blade end using a rag or a thickly padded glove.
2. Remove the blade bolt, curved washer, and blade from the spindle shaft (Figure 96).



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g004536

Figure 96

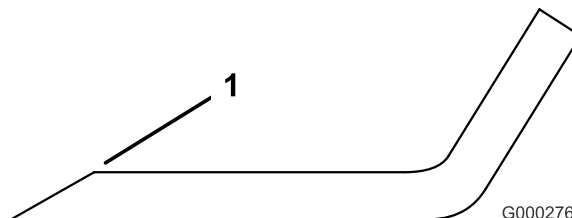
1. Sail area of the blade
2. Blade
3. Curved washer
4. Blade bolt

## Sharpening the Blades

1. Use a file to sharpen the cutting edge at both ends of the blade (Figure 97).

**Note:** Maintain the original angle.

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



G000276

g000276

Figure 97

1. Sharpen at the original angle

2. Check the balance of the blade by putting it on a blade balancer (Figure 98).

**Note:** If the blade stays in a horizontal position, the blade is balanced and ready to use.

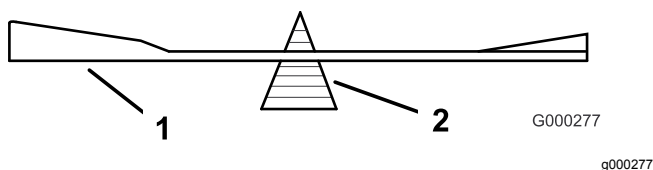


Figure 98

1. Blade
2. Balancer

3. If the blade is not balanced, file some metal off the end of the sail area only (Figure 96).
4. Repeat this procedure until the blade is balanced.

## Installing the Blades

1. Install the blade onto the spindle shaft (Figure 99).

**Important:** The curved part of the blade must point upward toward the inside of the mower to ensure proper cutting.

2. Install the spring disk and blade bolt (Figure 99).

**Note:** Install the spring-disk cone toward the bolt head.

3. Torque the blade bolt to 115 to 150 N·m (85 to 110 ft-lb).

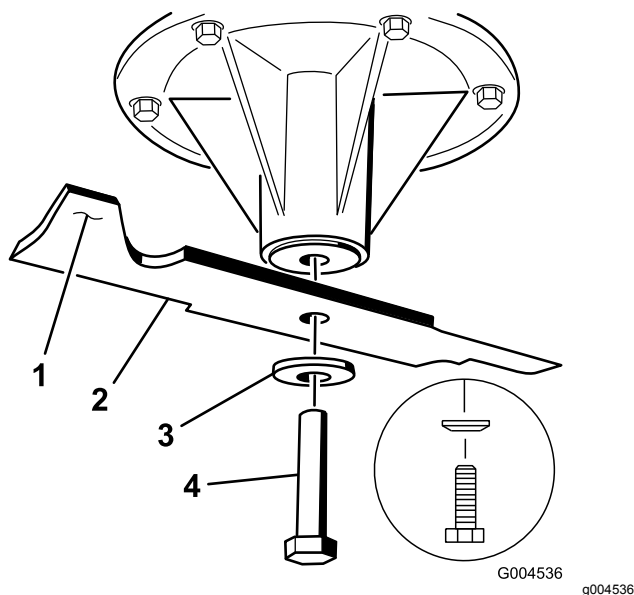


Figure 99

1. Sail area of the blade
2. Blade
3. Spring disk
4. Blade bolt

## Removing the Mower Deck

Before servicing or removing the mower deck, lock out the spring-loaded deck arms.

### ⚠ WARNING

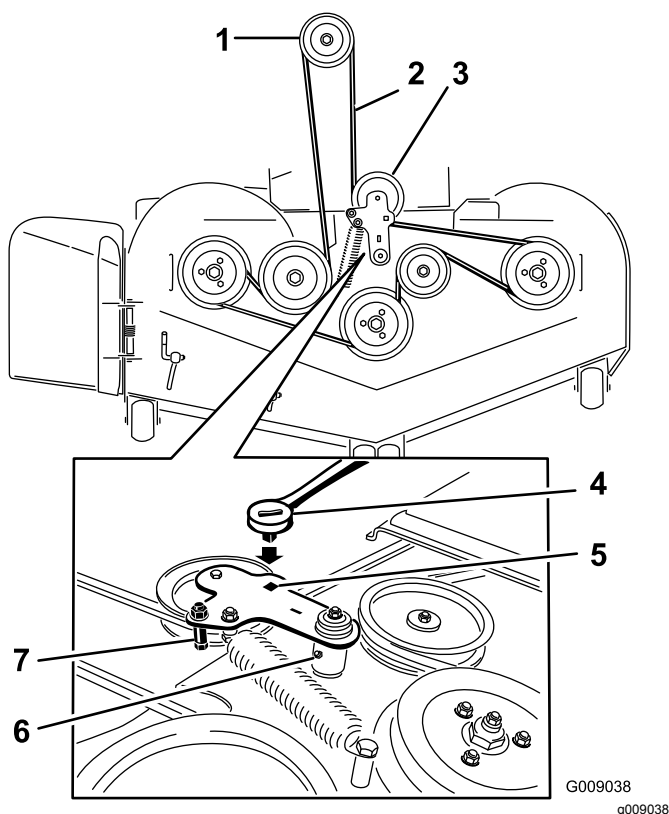
**Deck-lift-arm assemblies have stored energy. Removing the deck without releasing the stored energy can cause serious injury or death.**

**Do not attempt to disassemble the deck from the front frame without locking out the stored energy.**

1. Shut off the engine, wait for all of the moving parts to stop, remove the key, and engage parking brake.
2. Remove the height-adjustment pin and lower the deck to the ground.
3. Place the height-adjustment pin in the 7.6 cm (3 inch) height-of-cut location.

**Note:** This locks the deck-lift arms in the lowest position so that when you remove the deck, the stored energy in the deck spring is released.

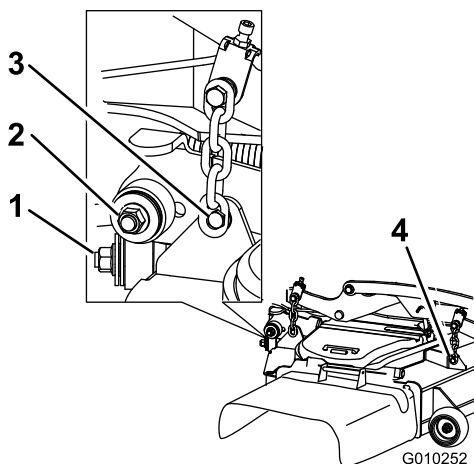
4. Remove the belt covers.
5. Lift the floor pan and insert a ratchet into the square hole in the deck idler (Figure 100).
6. Rotate the deck idler clockwise and remove the mower belt (Figure 100).



**Figure 100**

1. Clutch pulley
2. Mower belt
3. Spring-loaded idler pulley
4. Ratchet
5. Square hole in the idler arm for the ratchet
6. Idler grease fitting
7. Belt guide

7. Remove and retain the hardware on both sides of the deck as shown in [Figure 101](#).



**Figure 101**

1. Right stabilizer
2. Deck strut (right side shown)
3. Remove the shoulder bolt and nut.
4. Remove the shoulder bolt and nut.

8. Raise the deck struts and secure them in the up position.
9. Slide the deck out to the right side of the machine.

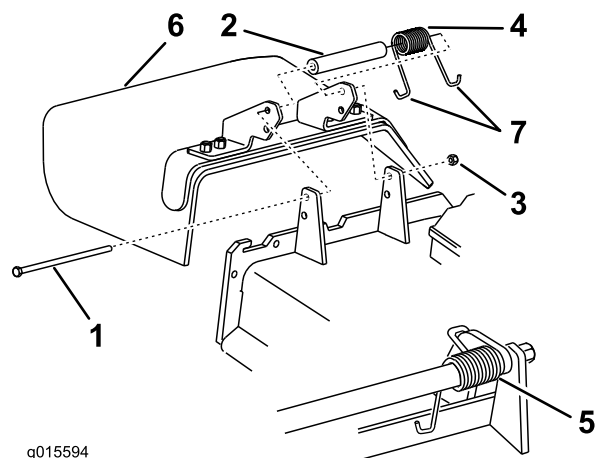
## Replacing the Grass Deflector

### ⚠ WARNING

An uncovered discharge opening could allow the lawn mower to throw objects at you or bystanders, resulting in serious injury. Also, contact with the blade could occur.

Do not operate the lawn mower unless you install a cover plate, mulch plate, grass deflector, or bagger.

1. Remove the locknut, bolt, spring, and spacer holding the deflector to the pivot brackets ([Figure 102](#)).
2. Remove the damaged or worn grass deflector ([Figure 102](#)).



**Figure 102**

1. Bolt
2. Spacer
3. Locknut
4. Spring
5. Spring installed
6. Grass deflector
7. J-hook end of spring

3. Place the spacer and the spring onto grass deflector.
4. Place 1 J-hook end of the spring behind the deck edge.

**Note:** Make sure that 1 J-hook end of the spring is installed behind the deck edge before installing the bolt as shown in [Figure 102](#).

5. Install the bolt and the nut.

6. Place 1 J-hook end of the spring around the grass deflector ([Figure 102](#)).

**Important:** The grass deflector must be able to rotate. Lift the deflector up to the full open position and ensure that it rotates into the full down position.

## Cleaning

### Cleaning under the Mower

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

1. Disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Raise the mower to the TRANSPORT position.

### Disposing of Waste

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



# Storage

## Cleaning and Storage

1. Disengage the blade-control switch (PTO), set the parking brake, and turn the ignition key to Off. 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. Check the brake.
4. Service the air cleaner; refer to [Servicing the Air Cleaner \(page 40\)](#).
5. Grease the machine; refer to [Lubrication \(page 38\)](#).
6. Change the crankcase oil; refer to [Changing the Engine Oil \(page 43\)](#).
7. Check the tire pressure; refer to [Checking the Tire Pressure \(page 51\)](#).
8. Change the hydraulic filters; refer to [Replacing the Hydraulic Filters and Hydraulic Oil \(page 64\)](#).
9. Charge the battery; refer to [Servicing the Battery \(page 48\)](#).
10. 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.

11. Check the condition of the blades; refer to [Servicing the Cutting Blades \(page 67\)](#).
12. Prepare the machine for storage when non-use occurs over 30 days. Prepare the machine for storage as follows:
  - A. Add a petroleum-based stabilizer/conditioner to fuel in the tank. Follow mixing instructions from the stabilizer manufacturer. Do not use an alcohol based stabilizer (ethanol or methanol).

**Note:** A fuel stabilizer/conditioner is most effective when mixed with fresh fuel and used at all times.

- B. Run the engine to distribute conditioned fuel through the fuel system (5 minutes).
- C. Stop the engine, allow it to cool, and drain the fuel tank; refer to [Servicing the Fuel Tank \(page 47\)](#).
- D. Restart the engine and run it until it stops.



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

***Important:* Do not store stabilizer/conditioned fuel over 90 days.**

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

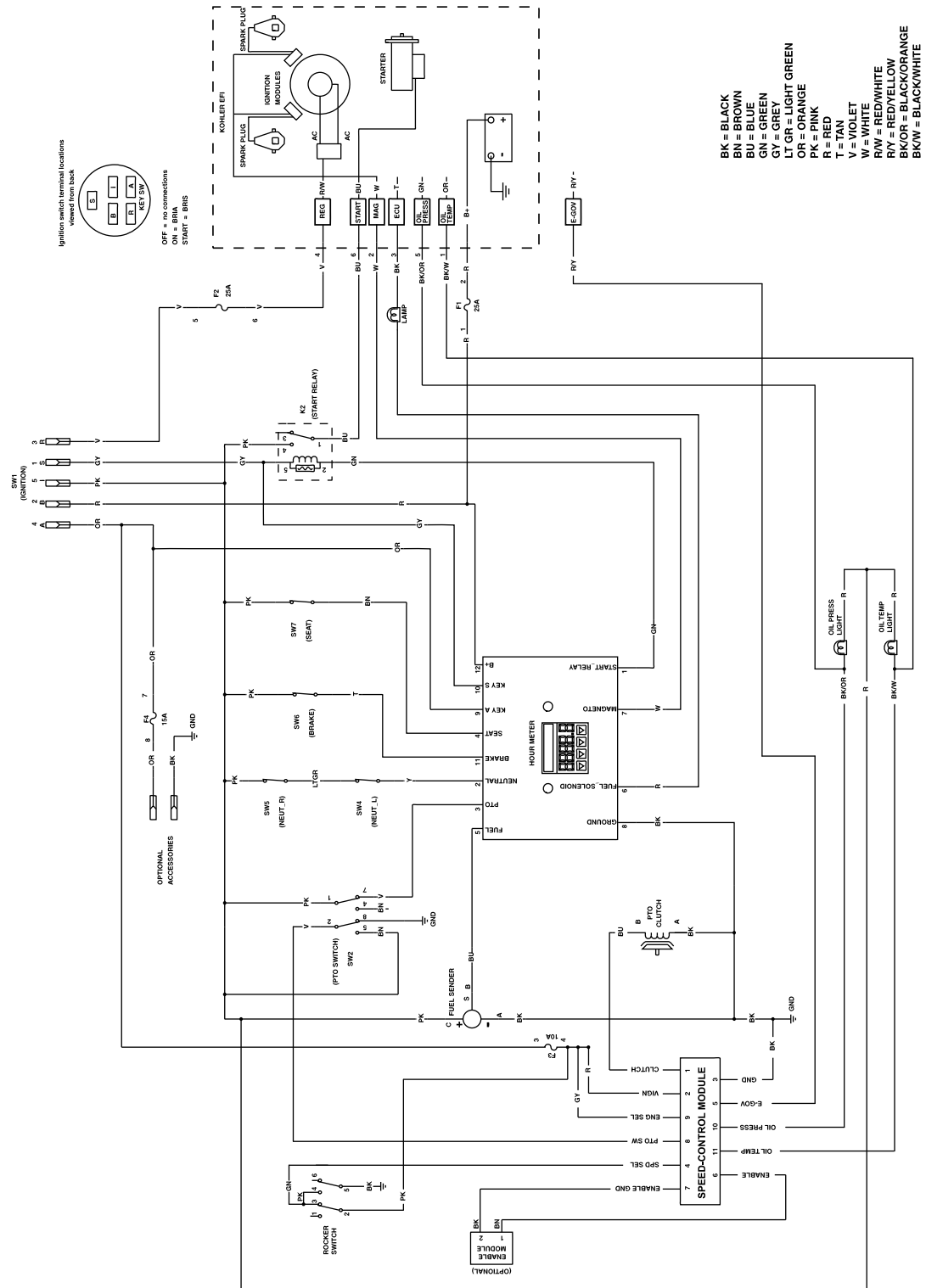
# Troubleshooting

Problem	Possible Cause	Corrective Action
The oil-temperature light is on and the engine rpm is low.	1. The engine-control unit has limited engine rpm, known as "limp" mode.	1. Check the engine-oil level. If the level is above the "add" line, contact an Authorized Toro Service Dealer.
The oil-pressure light is on and the engine rpm is low.	1. The engine-control unit has limited engine rpm, known as "limp" mode.	1. Let the engine cool and check the engine-oil level. If the level is above the "add" line, contact an Authorized Toro Service Dealer.
The malfunction indicator light (MIL) comes on.	<ol style="list-style-type: none"> <li>1. The engine is too hot.</li> <li>2. There is old gas in the gas tank.</li> <li>3. The fuel-shutoff valve is not open completely.</li> <li>4. The air cleaner is dirty.</li> <li>5. The battery is not charged.</li> <li>6. Incorrect fuel filters are being used or the fuel filters are dirty.</li> <li>7. The connections to the sensors electronic control unit (ECU) and fuel injectors are not secured properly.</li> <li>8. There is low voltage from the battery.</li> <li>9. A fuse is blown.</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn the engine off and let it cool.</li> <li>2. Use new gas.</li> <li>3. Open the fuel-shutoff valve.</li> <li>4. Make sure that the air cleaner and precleaner are clean. Replace if necessary.</li> <li>5. Charge or replace the battery.</li> <li>6. Contact an Authorized Service Dealer.</li> <li>7. Contact an Authorized Service Dealer.</li> <li>8. Ensure a good 12-volt battery is being used and is fully charged.</li> <li>9. Check and replace any blown fuses.</li> </ol>
The starter does not crank.	<ol style="list-style-type: none"> <li>1. The blade-control switch (PTO) is engaged.</li> <li>2. The parking brake is not engaged.</li> <li>3. The motion-control levers are not in the NEUTRAL-LOCK position.</li> <li>4. The operator is not seated.</li> <li>5. The battery is dead.</li> <li>6. The electrical connections are corroded or loose.</li> <li>7. The fuse is blown.</li> <li>8. The relay or switch is worn or damaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Move the blade-control switch (PTO) to the disengaged position.</li> <li>2. Set the parking brake.</li> <li>3. Ensure that the motion-control levers are in the NEUTRAL-LOCK position.</li> <li>4. Sit on the 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>

<b>Problem</b>	<b>Possible Cause</b>	<b>Corrective Action</b>
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 fuel-shutoff valve is closed.</li> <li>3. The oil level in the crankcase is low.</li> <li>4. The throttle is not in the correct position.</li> <li>5. There is dirt in the fuel filter.</li> <li>6. There is dirt, water, or stale fuel in the fuel system.</li> <li>7. The air cleaner is dirty.</li> <li>8. The seat switch is not functioning properly.</li> <li>9. The electrical connections are corroded, loose, or damaged.</li> <li>10. The relay or switch is worn or damaged.</li> <li>11. The spark plug is fouled or improperly gapped.</li> <li>12. The spark-plug wire is not connected.</li> </ol>	<ol style="list-style-type: none"> <li>1. Fill the fuel tank.</li> <li>2. Open the fuel-shutoff valve.</li> <li>3. Add oil to the crankcase.</li> <li>4. Be sure that the throttle control is midway between the slow and fast positions.</li> <li>5. Replace the fuel filter.</li> <li>6. Contact an Authorized Service Dealer.</li> <li>7. Clean or replace the air-cleaner element.</li> <li>8. Check the seat-switch indicator. Replace the seat if necessary.</li> <li>9. Check the electrical connections for good contact. Clean the connector terminals thoroughly with electrical-contact cleaner, apply dielectric grease, and make the appropriate connections.</li> <li>10. Contact an Authorized Service Dealer.</li> <li>11. Adjust or replace the spark plug.</li> <li>12. Check the spark-plug wire connection.</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 the air passages above the engine are plugged.</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 the air passages.</li> </ol>
The mower pulls left or right (with levers fully forward).	<ol style="list-style-type: none"> <li>1. The tracking needs adjustment</li> <li>2. The tire pressure is not correct in the drive tires.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the tracking.</li> <li>2. Adjust tire pressure in the drive tires.</li> </ol>
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 oil 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 oil to reservoirs or let it cool down.</li> </ol>

<b>Problem</b>	<b>Possible Cause</b>	<b>Corrective Action</b>
There is an abnormal vibration.	<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>
Mowing is resulting in uneven cutting height.	<ol style="list-style-type: none"> <li>1. The blade(s) is/are not sharp.</li> <li>2. The cutting blade(s) is/are bent.</li> <li>3. The mower deck is not level.</li> <li>4. The underside of mower is dirty.</li> <li>5. The tire pressure is not correct.</li> <li>6. The blade spindle bent.</li> </ol>	<ol style="list-style-type: none"> <li>1. Sharpen the blade(s).</li> <li>2. Install new cutting blade(s).</li> <li>3. Level the mower deck from side-to-side and front-to-rear.</li> <li>4. Clean the underside of the mower.</li> <li>5. Adjust the tire pressure.</li> <li>6. 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 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 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>
The clutch does not engage.	<ol style="list-style-type: none"> <li>1. A fuse is blown.</li> <li>2. There is low voltage supply at the clutch.</li> <li>3. The coil is damaged.</li> <li>4. There is inadequate current supply.</li> <li>5. The rotor/armature airgap is too large.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace the fuse. Check the coil resistance, battery charge, charging system, and wiring connections and replace if necessary.</li> <li>2. Check the coil resistance, battery charge, charging system, and wiring connections and replace if necessary.</li> <li>3. Replace the clutch.</li> <li>4. Repair or replace the clutch lead wire or electrical system. Clean the connector contacts.</li> <li>5. Remove the shim or replace the clutch.</li> </ol>

# Schematics



g024363

Electrical Schematic (Rev. A)

g024363

**Notes:**

**Notes:**



# The Toro Warranty

A Limited Warranty (see warranty periods below)

Landscape  
Contractor  
Equipment  
(LCE)

## Conditions and Products Covered

The Toro Company and its affiliate, Toro Warranty Company, pursuant to an agreement between them, jointly promise to the original purchaser to repair the Toro Products listed below if defective in materials or workmanship.

The following time periods apply from the date of purchase:

Products	Warranty Period
21 in. Mowers	2 years Residential Use <sup>1</sup> 1 year Commercial Use
• Engines <sup>3</sup>	Honda – 2 years Kawasaki – 3 years
30 in. Mowers	2 years Residential Use <sup>1</sup> 1 year Commercial Use
• Engines <sup>3</sup>	Kawasaki – 3 years
Mid-Size Walk-Behind Mowers	2 years
• Engines <sup>3</sup>	Kawasaki – 3 years
Grand Stand® Mowers	5 years or 1,200 hours <sup>2</sup>
• Engines <sup>3</sup>	3 years
Z Master® 2000 Series Mowers	4 years or 500 hours <sup>2</sup>
• Engines <sup>3</sup>	3 years
Z Master® 3000 Series Mowers	5 years or 1,200 hours <sup>2</sup>
• Engines <sup>3</sup>	3 years
Z Master® 5000 Series Mowers	5 years or 1,200 hours <sup>2</sup>
• Engines <sup>3</sup>	Kohler Command – 2 years Kohler EFI – 3 years
Z Master® 6000 Series Mowers	5 years or 1,200 hours <sup>2</sup>
• Engines <sup>3</sup>	Kawasaki – 3 years
Z Master® 7000 Series Mowers	5 years or 1,200 hours <sup>2</sup>
• Engines <sup>3</sup>	2 years
Z Master® 8000 Series Mowers	2 years or 1,200 hours <sup>2</sup>
• Engines <sup>3</sup>	2 years
All Mowers	
• Battery	90 days Parts and Labor 1 year Parts only
• Belts and Tires	90 days
• Attachments	1 year

<sup>1</sup>Residential use means use of the product on the same lot as your home. Use at more than one location is considered commercial use and the commercial warranty would apply.

<sup>2</sup>Whichever occurs first.

<sup>3</sup>Some engines used on Toro Products are warranted by the engine manufacturer.

## Instructions for Obtaining Warranty Service

If you think that your Toro Product contains a defect in materials or workmanship, follow this procedure:

1. Contact any Authorized Toro Service Dealer to arrange service at their dealership. To locate a dealer convenient to you, access our web site at [www.Toro.com](http://www.Toro.com). You may also call the numbers listed in item #3 to use the 24-hour Toro Dealer locator system.
2. Bring the product and your proof of purchase (sales receipt) to the Service Dealer. The dealer will diagnose the problem and determine if it is covered under warranty.
3. If for any reason you are dissatisfied with the Service Dealer's analysis or with the assistance provided, contact us at:

Toro Warranty Company  
8111 Lyndale Avenue South  
Bloomington, MN 55420-1196  
888-865-5676 (U.S. Customers)  
888-865-5691 (Canada customers)

## Owner Responsibilities

You must maintain your Toro Product by following the maintenance procedures described in the *Operator's Manual*. Such routine maintenance, whether performed by a dealer or by you, is at your expense.

## Items and Conditions Not Covered

There is no other express warranty except for special emission system coverage and engine warranty coverage on some products. This express warranty does not cover the following:

- Cost of regular maintenance service or parts, such as filters, fuel, lubricants, oil changes, spark plugs, air filters blade sharpening or worn blades, cable/linkage adjustments, or brake and clutch adjustments
- Components failing due to normal wear
- Any product or part which has been altered or misused or neglected or requires replacement or repair due to accidents or lack of proper maintenance
- Pickup and delivery charges
- Repairs or attempted repairs by anyone other than an Authorized Toro Service Dealer
- Repairs necessary due to failure to follow recommended fuel procedure (consult *Operator's Manual* for more details)
  - Removing contaminants from the fuel system is not covered
  - Use of old fuel (more than one month old) or fuel which contains more than 10% ethanol or more than 15% MTBE
  - Failure to drain the fuel system prior to any period of non-use over one month

## General Conditions

All repairs covered by these warranties must be performed by an Authorized Toro Service Dealer using Toro approved replacement parts.

**Neither The Toro Company nor Toro Warranty Company is liable for indirect, incidental or consequential damages in connection with the use of the Toro Products covered by this warranty, including any cost or expense of providing substitute equipment or service during reasonable periods of malfunction or non-use pending completion of repairs under this warranty.**

**All implied warranties of merchantability (that the product is fit for ordinary use) and fitness for use (that the product is fit for a particular purpose) are limited to the duration of the express warranty.**

**Some states do not allow exclusions of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above exclusions and limitations may not apply to you.**

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

## Countries Other than the United States or Canada

Customers who have purchased Toro products outside the United States or Canada should contact their Toro Distributor (Dealer) to obtain guarantee policies for your country, province, or state. If for any reason you are dissatisfied with your Distributor's service or have difficulty obtaining guarantee information, contact the Toro importer. If all other remedies fail, you may contact us at Toro Warranty Company.

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