Form No. 3407-736 Rev B

TORO®

Count on it.

Operator's Manual

Z Master® Professional 5000 Series Riding Mower

with 60in TURBO FORCE® Side Discharge Mower

Model No. 74915—Serial No. 316000001 and Up

g027403

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

3407-736 B

This spark ignition system complies with Canadian ICES-002

Because in some areas there are local, state, or federal regulations requiring that a spark arrester be used on the engine of this machine, a spark arrester is available as an option. If you require a spark arrestor, contact your Authorized Toro Dealer.

Genuine Toro spark arresters are approved by the USDA Forestry Service.

Note: It is a violation of California Public Resource Code Section 4442 to use or operate the engine on any forest-covered, brush-covered, or grass-covered land without a spark arrester muffler maintained in working order, or the engine constricted, equipped, and maintained for the prevention of fire. Other states or federal areas may have similar laws.

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.

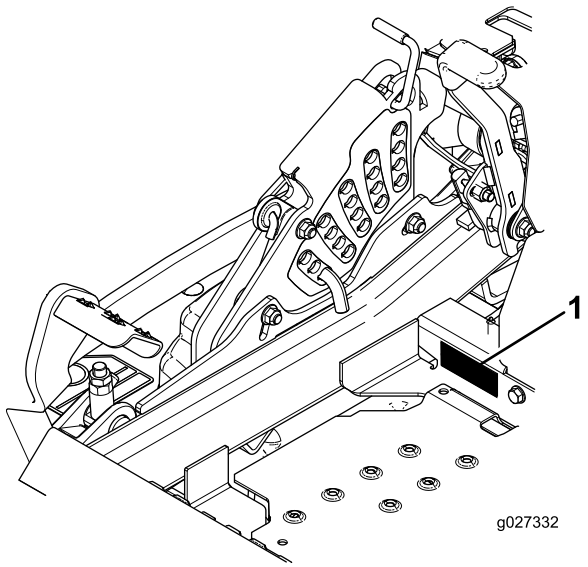
Introduction

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 for product safety and operation training material, 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.



g027332

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.

g000502

Figure 2

1. Safety-alert symbol

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

8111 Lyndale Avenue South
Bloomington, MN 55420

Contents

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 B71.4-2012.

Training

- Read the *Operator's Manual* and other training material. If the operator(s) or mechanic(s) cannot read or understand the information 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 long hair back and do not wear jewelry.
- Inspect the area where the equipment is to be used and remove all objects such as rocks, toys, and wire which can be thrown by the machine.
- Check that operator's presence controls, safety switches, and shields are attached and functioning properly. Do not operate unless they are functioning properly.

Operation

- 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.
- Never run an engine in an enclosed area.
- Only operate in good light, keeping away from holes and hidden hazards.
- Be sure all drives are in neutral and parking brake is engaged before starting the engine. Only start the engine from the operator's position.
- Be sure of your traction while using this machine, especially when backing up. Never operate on wet grass. Reduced traction 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.
- Never raise deck with the blades running.
- Never operate with the PTO shield or other guards not securely in place. Be sure all interlocks are attached, adjusted properly, and functioning properly.
- Never operate with the discharge deflector raised, removed or altered, unless using a grass catcher.
- Do not change the engine governor setting or overspeed the engine.
- Stop on level ground, disengage drives, engage the parking brake (if provided), and 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 blades after striking objects or if an abnormal vibration occurs. Make necessary repairs before resuming operations.
- Keep hands and feet away from the cutting unit.

- Look behind and down before backing up to be sure of a clear path.
- Never carry passengers on the machine.
- Keep pets and bystanders away.
- Slow down and use caution when making turns and crossing roads and sidewalks. Stop blades if not mowing.
- Be aware of the mower discharge direction and do not point it at anyone.
- Do not operate the mower while ill, tired, or 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.

Rollover Protection System (ROPS)—Use and Maintenance

- The ROPS is an integral and effective safety device. Keep a folding ROPS in the raised and locked position and use the seat belt when operating the machine.
- Lower a folding ROPS temporarily only when absolutely necessary. Do not wear the seat belt when folded down.
- Be aware there is no rollover protection when a folded 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 a folding 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.

Safe Handling of Fuels

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

Maintenance and Storage

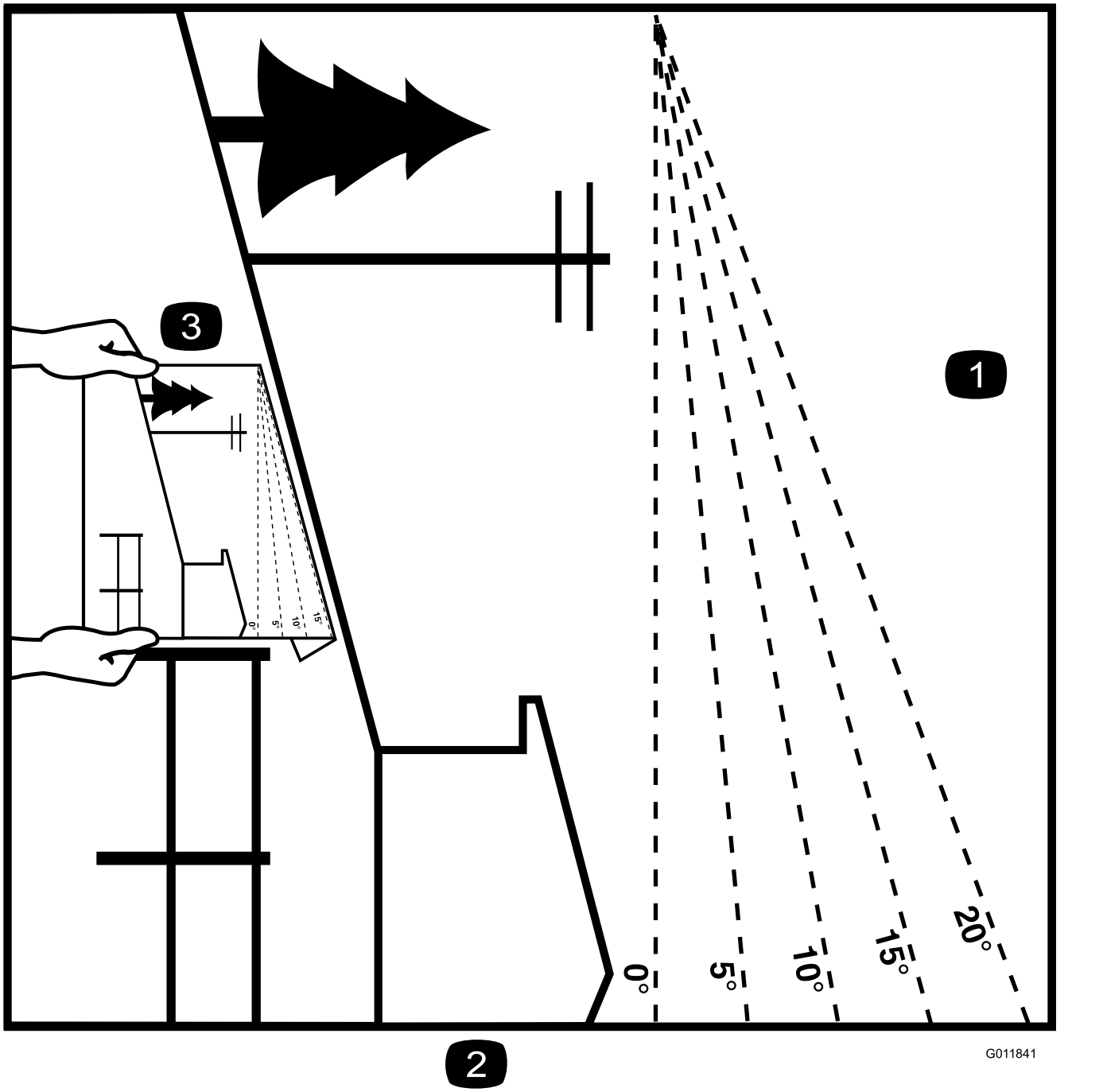
- Disengage drives, set the parking brake, Shut off the engine and remove the key or disconnect the spark-plug wire. Wait for all movement to stop before adjusting, cleaning or repairing the machine.
- Clean grass and debris from the cutting unit, the drives, the mufflers, and the engine to help prevent fires. Clean up oil or fuel spillage.
- Let the engine cool before storing and do not store near flame.
- Shut off the fuel while storing or transporting. Do not store fuel near flames or drain indoors.
- Park the machine on level ground. Set the parking brake. Never 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 the spark-plug wire before making any repairs. Disconnect the negative terminal first and the positive last. Connect the positive 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. Never straighten or weld them.

- Keep hands and feet away from moving parts. If possible, do not make adjustments with the engine running.
- Keep all parts in good working condition and all hardware tightened. Replace all worn or damaged decals.
- 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.

Hauling

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

Slope Indicator



g011841

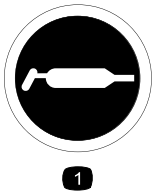
Figure 3

This page may be copied for personal use.

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.



decal58-6520

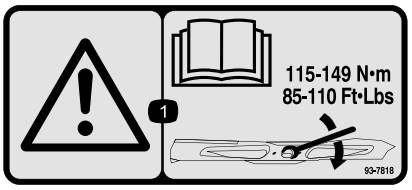
58-6520

1. Grease

decal106-5517

106-5517

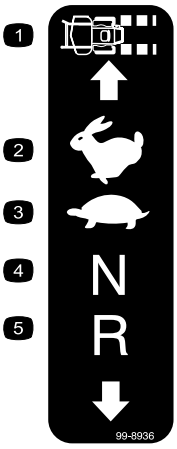
1. Warning—do not touch the hot surface.



decal93-7818

93-7818

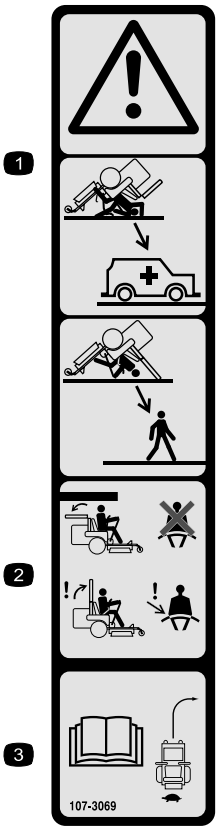
1. Warning—read the *Operator's Manual* for instructions on torquing the blade bolt/nut to 115 to 149 N·m (85 to 110 ft-lb).



decal99-8936

99-8936

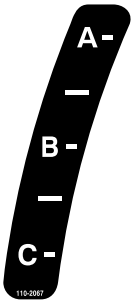
1. Machine speed
2. Fast
3. Slow
4. Neutral
5. Reverse



decal107-3069

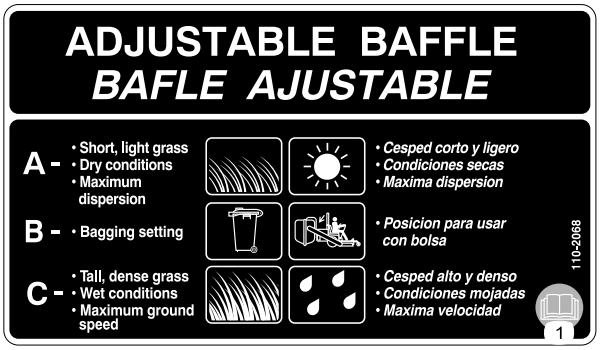
107-3069

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.



decal110-2067

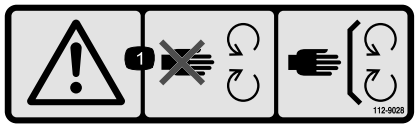
110-2067



decal110-2068

110-2068

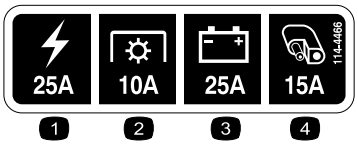
1. Read the *Operator's Manual*.



decal112-9028

112-9028

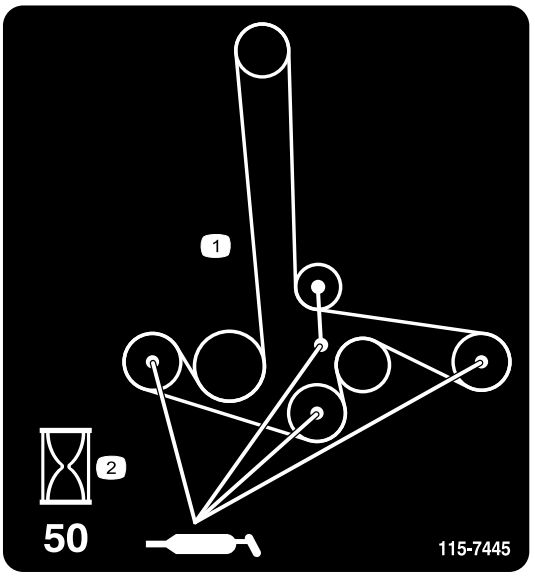
1. Warning—stay away from moving parts; keep all guards in place.



decal114-4466

114-4466

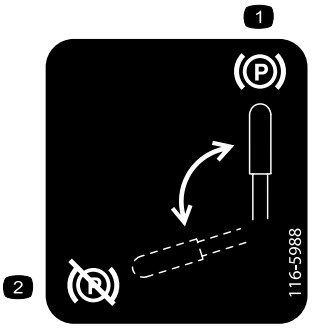
1. Main, 25 A
2. PTO, 10 A
3. Charge, 25 A
4. Auxiliary, 15 A



decal115-7445

115-7445

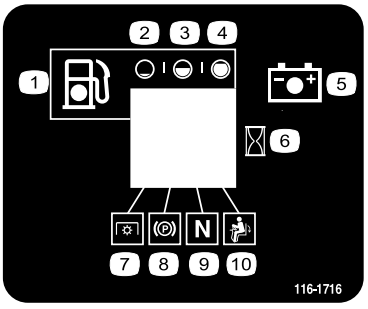
1. Grease pulleys and spindles
2. Maintenance interval—50 hours



decal116-5988

116-5988

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



decal116-1716

116-1716

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

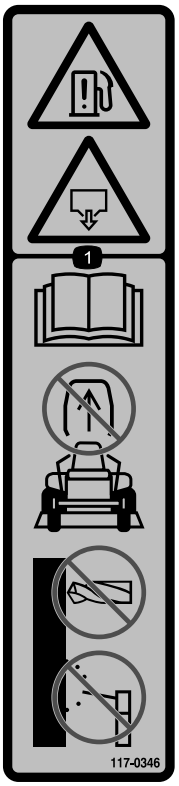
decal116-4858

116-4858

decal116-8726

116-8726

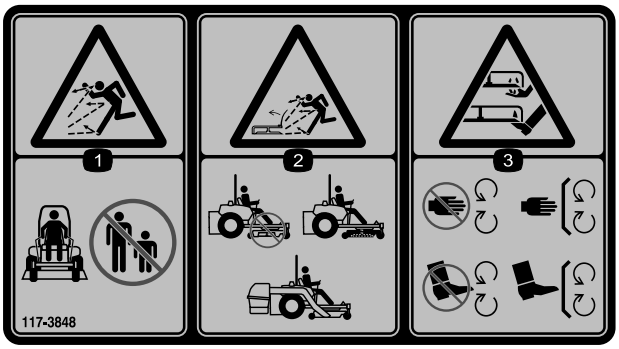
1. Read the *Operator's Manual* for recommended hydro fluid.



decal117-0346

117-0346

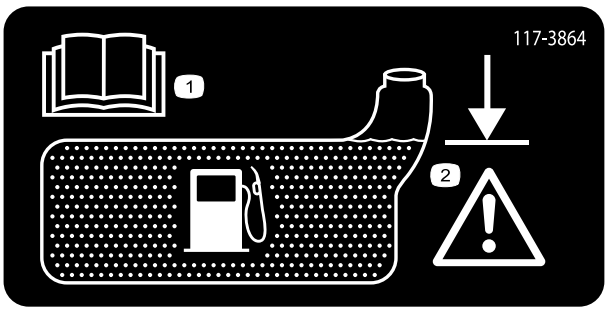
1. Fuel leak hazard—read the *Operator's Manual*; do not attempt to remove the roll bar; do not weld, drill, or modify the roll bar in any way.



decal117-3848

117-3848

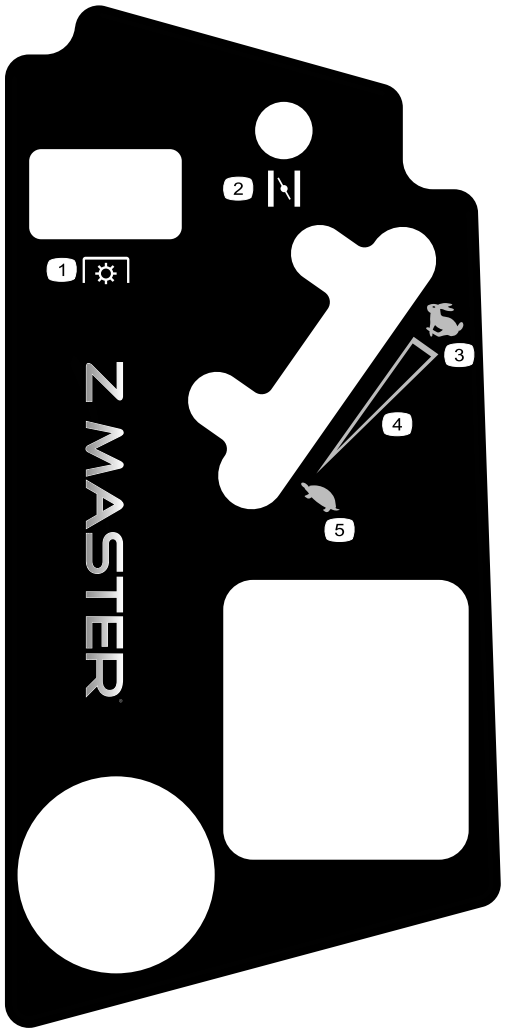
1. Thrown object hazard—keep bystanders a safe distance from the machine.
2. Thrown object hazard, mower—do not operate the machine without deflector, discharge cover, or grass collection system in place.
3. Cutting/dismemberment of hand or foot—stay away from moving parts; keep all guards and shields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



decal117-3864

117-3864

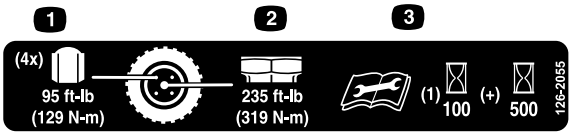
1. Read the *Operator's Manual.*
2. Fill to bottom of filler neck; warning—do not overfill the tank.



decal121-7551

121-7551

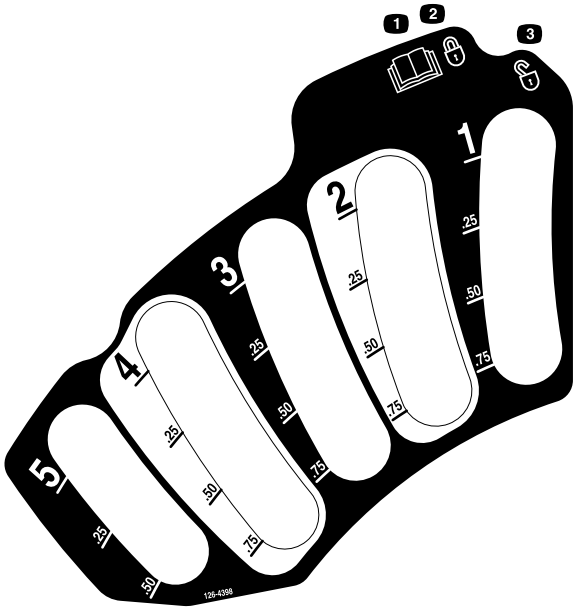
1. Power Takeoff (PTO)
2. Choke
3. Fast
4. Continuous variable setting
5. Slow



decal126-2055

126-2055

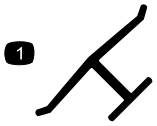
1. Wheel lug nut torque 129 N·m (95 ft-lb) (4x)
2. Wheel hub nut torque 319 N·m (235 ft-lb)
3. Read and understand the Operator's manual before performing any maintenance, check torque after first 100 hours then every 500 hours thereafter.



decal126-4398

126-4398

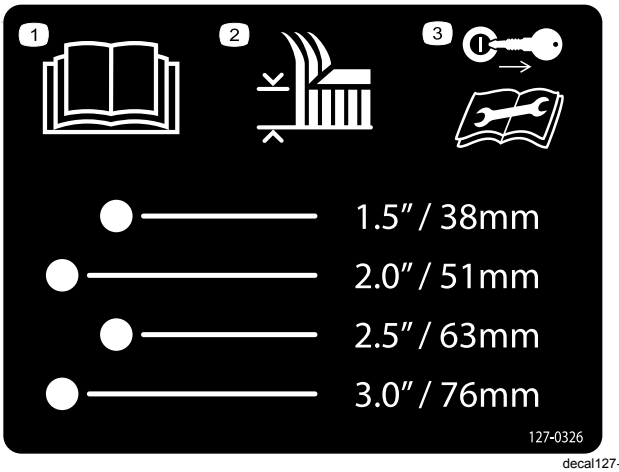
1. Read the *Operator's manual*
2. Lock
3. Unlock



decaloemmarkt

Manufacturer's Mark

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



decal127-0326

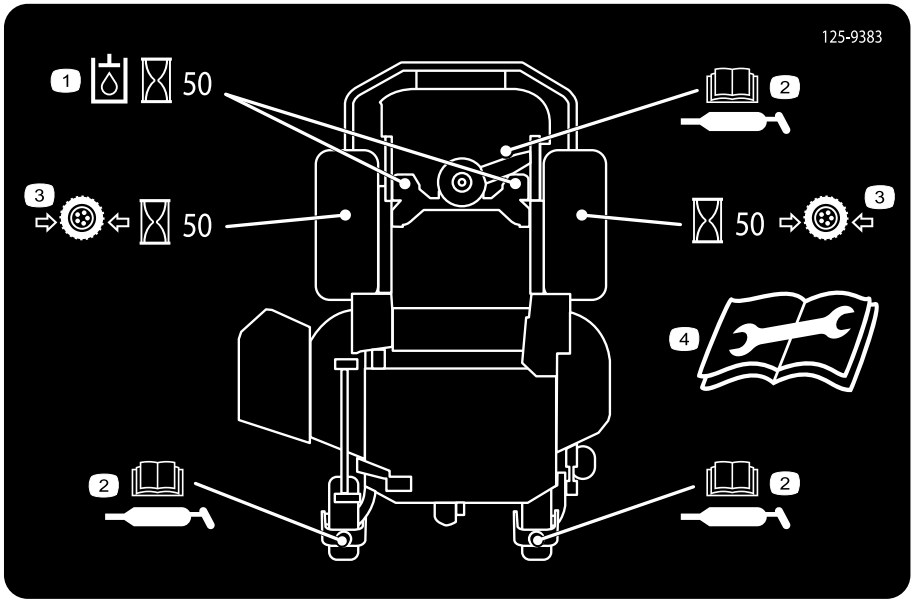
127-0326

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.

Battery Symbols

Some or all of these symbols are on your battery

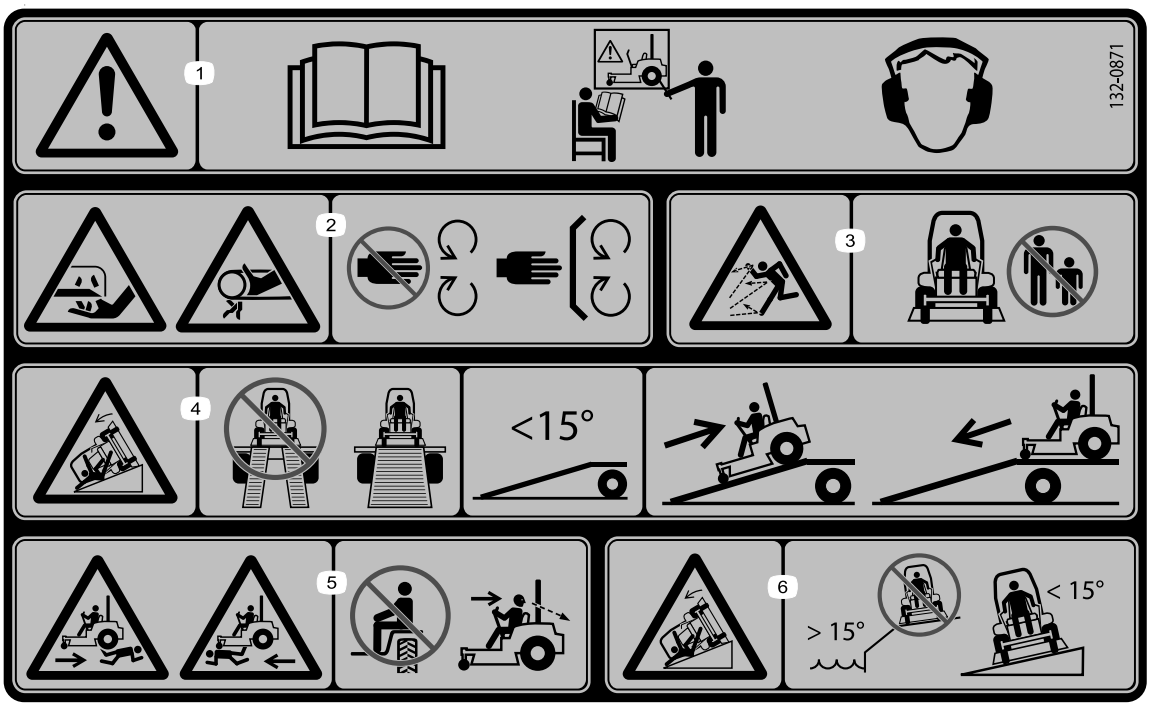
1. Explosion hazard
2. No fire, open flame, or smoking.
3. Caustic liquid/chemical burn hazard
4. Wear eye protection
5. Read the *Operator's Manual.*
6. Keep bystanders a safe distance from the battery.
7. Wear eye protection; explosive gases can cause blindness and other injuries
8. Battery acid can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



decal125-9383

125–9383

1. Check hydraulic fluid 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.



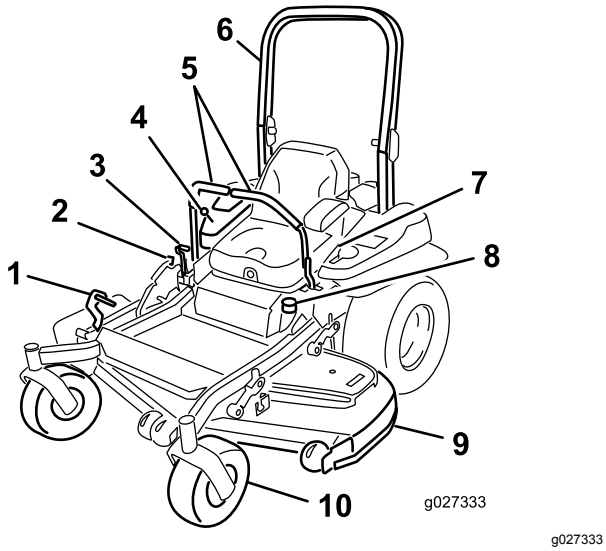
decal132-0871

132-0871

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



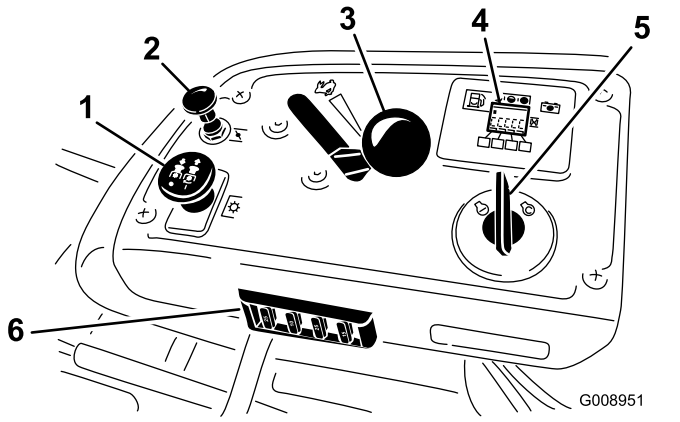
g027333

Figure 4

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

Controls

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



g008951

Figure 5

1. PTO Switch
2. Choke
3. Throttle control
4. Hour meter/Safety-interlock display
5. Ignition switch
6. 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).

Fuel Gauge

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

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

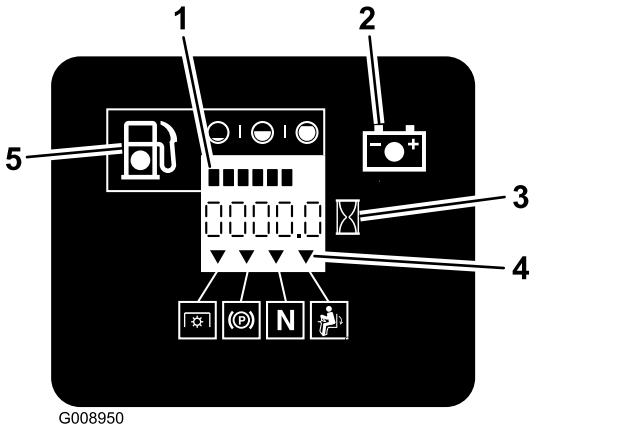
Safety-Interlock Indicators

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

Battery-Indicator Light

If the ignition key is turned to the ON position for a few seconds, the battery voltage will be displayed in the area where the hours are normally displayed.

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



g008950

Figure 6

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

Throttle Control

The throttle control is variable between FAST and SLOW.

Choke

Use the choke to start a cold engine. Pull the choke knob up to engage it.

Blade-Control Switch (PTO)

Use the blade-control switch (PTO) is used 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

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

Neutral-Lock Position

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

Attachments/Accessories

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

Specifications

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

Width

Without Deck	135 cm (53 inches)
Deflector Up	157 cm (62 inches)
Deflector Down	192 cm (76 inches)

Length

Roll Bar - Up	211 cm (83 inches)
Roll Bar - Down	215 cm (85 inches)

Height

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

Weight

569 kg (1255 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 the entire exhaust system in place and in proper working condition.**

⚠ DANGER

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

- **Always place 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 fuel the equipment with the wheels on the ground.**

  If this is not possible, then fuel such equipment on a truck or trailer from a portable container, rather than from a gasoline-dispenser nozzle.
- **If a gasoline dispenser must be used, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete.**

⚠ 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 Fuel Stabilizer/Conditioner

Use a fuel stabilizer/conditioner in the machine to keep the fuel fresh during storage of 90 days or less. If you are storing the machine for longer, drain the fuel tank; refer to Servicing the Fuel Tank (page 45).

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

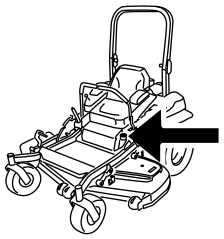
Add the correct amount of fuel stabilizer/conditioner to the fuel, and follow the directions of the manufacturer.

Note: 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 and remove it. Add regular unleaded 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 space in the tank allows the gasoline to expand. Do not fill the fuel tank completely full; refer to (Figure 7).



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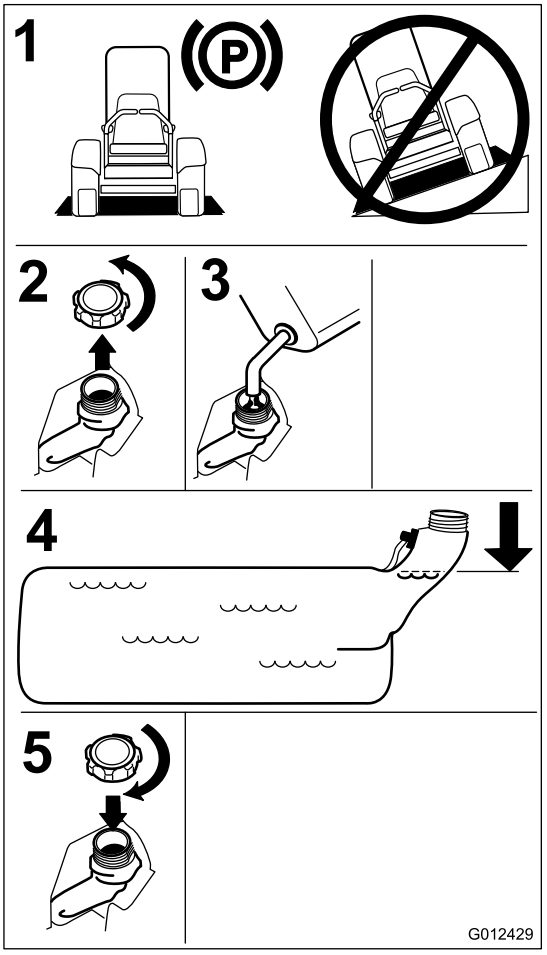

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Figure 7

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 18).

Breaking in a New Machine

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

Using the Rollover Protection System (ROPS)

⚠ WARNING

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

Ensure that the seat is secured to the machine.

⚠ WARNING

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

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

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° so they are not engaged (Figure 8).
3. Lower the roll bar to the down position (Figure 8).

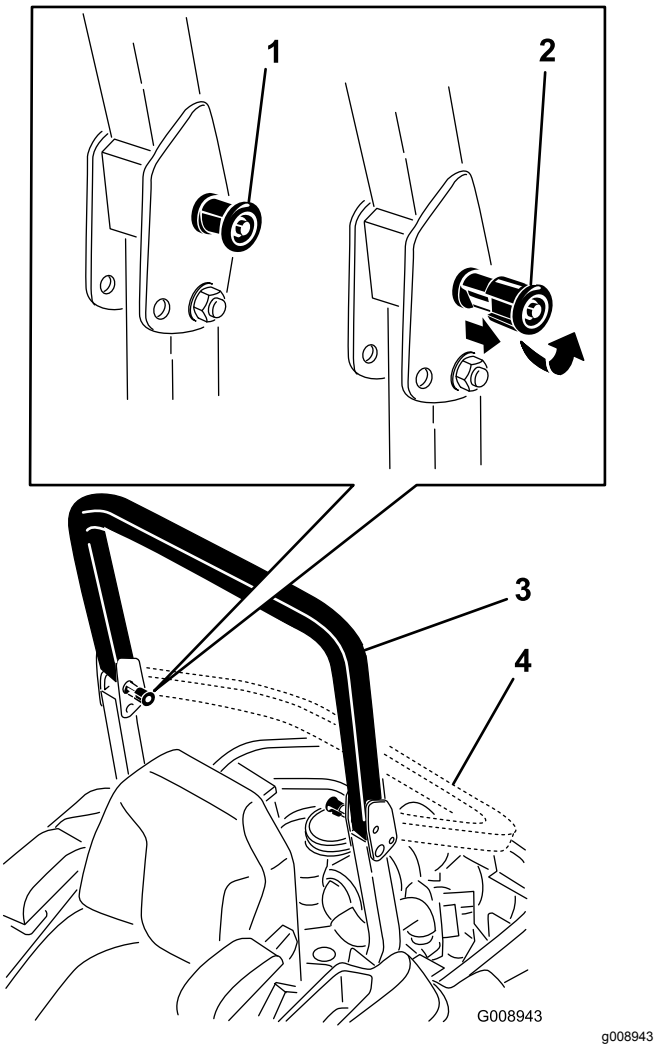

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Figure 8

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

4. To raise the roll bar, raise the roll bar to the operate position, 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 and the pins will snap into position when the holes align with the pins (Figure 8).

   Important: **Always use the seat belt with the roll bar in the raised position.**
6. Push on the roll bar and ensure that both pins are engaged.

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.

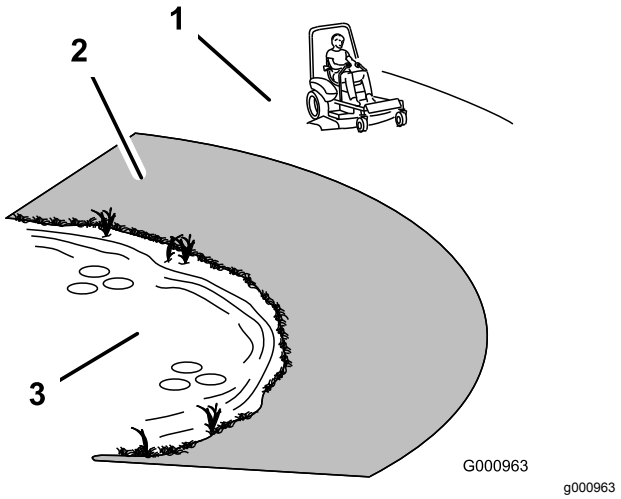

Figure 9

1. Safe zone—use the machine 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.

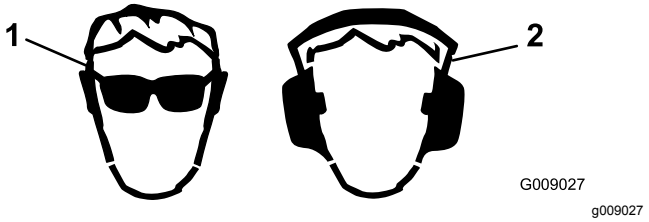

Figure 10

1. Wear eye protection.
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

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

Do not park on slopes unless wheels are chocked or blocked

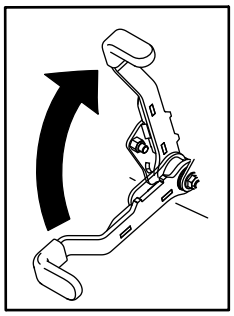

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Figure 11

Releasing the Parking Brake

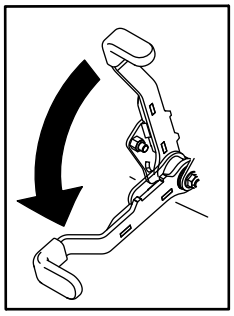

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Figure 12

Operating the Mower Blade-Control Switch (PTO)

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

Engaging the Blade-Control Switch (PTO)

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

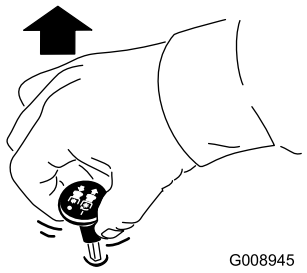

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Figure 13

Disengaging the Blade-Control Switch (PTO)

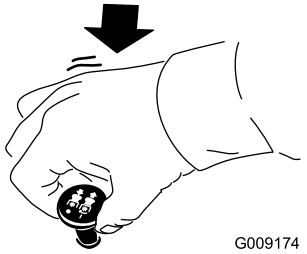

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Figure 14

Operating the Throttle

The throttle control can be moved between FAST and SLOW positions (Figure 15).

Always use the FAST position when turning on the mower deck with the blade-control switch (PTO).

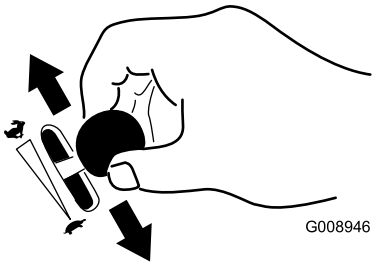

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Figure 15

Operating the Choke

Use the choke to start a cold engine.

1. Pull up the choke knob to engage the choke before using the ignition switch (Figure 16).
2. Push down the choke to disengage the choke after starting the engine (Figure 16).

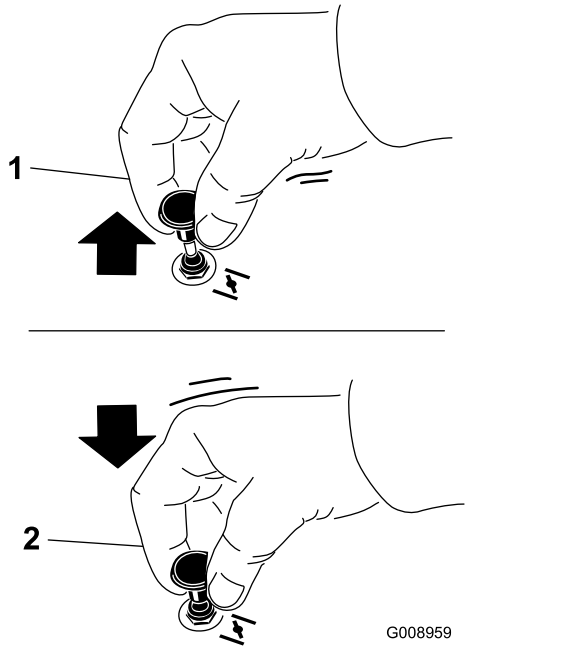

Figure 16

1. ON position
2. OFF position

Operating the Ignition Switch

1. Turn the ignition key to the START position (Figure 17).

   Note: When the engines starts, release the key.

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

   Note: Additional starting cycles may be required when starting the engine for the first time after the fuel system has been without fuel completely.

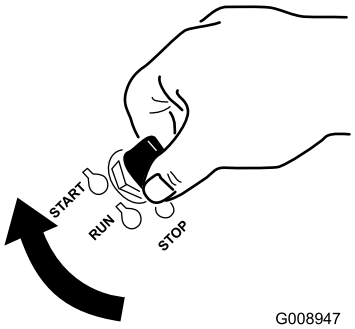

Figure 17

2. Turn the ignition key to STOP to shut off 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.

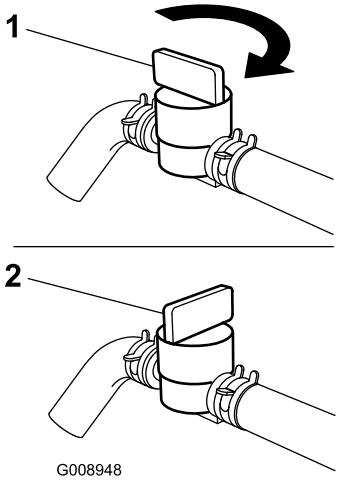

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Figure 18

1. On position
2. Off position

Starting and Stopping the Engine

Starting the Engine

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.**

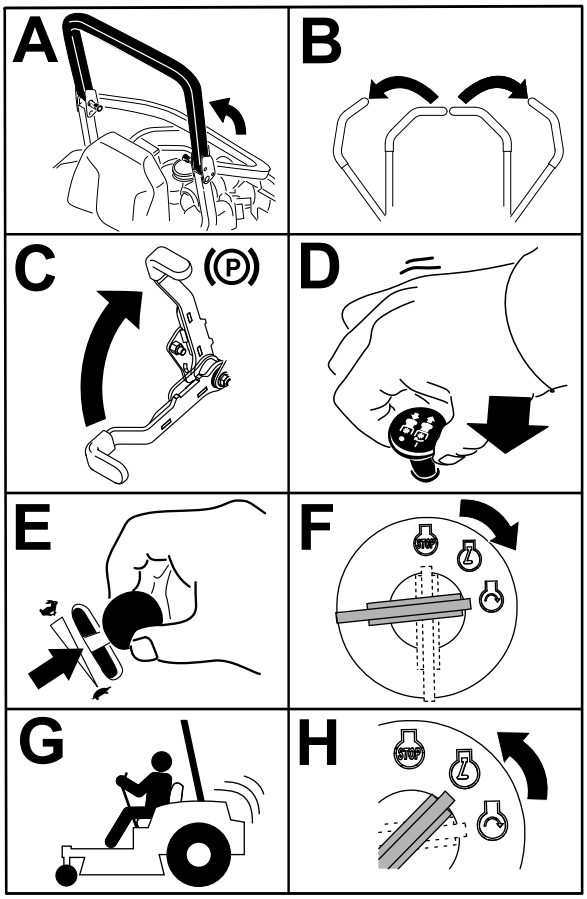

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Figure 19

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.

Let the engine idle at SLOW throttle (turtle) for 60 seconds before turning the key to the OFF position.

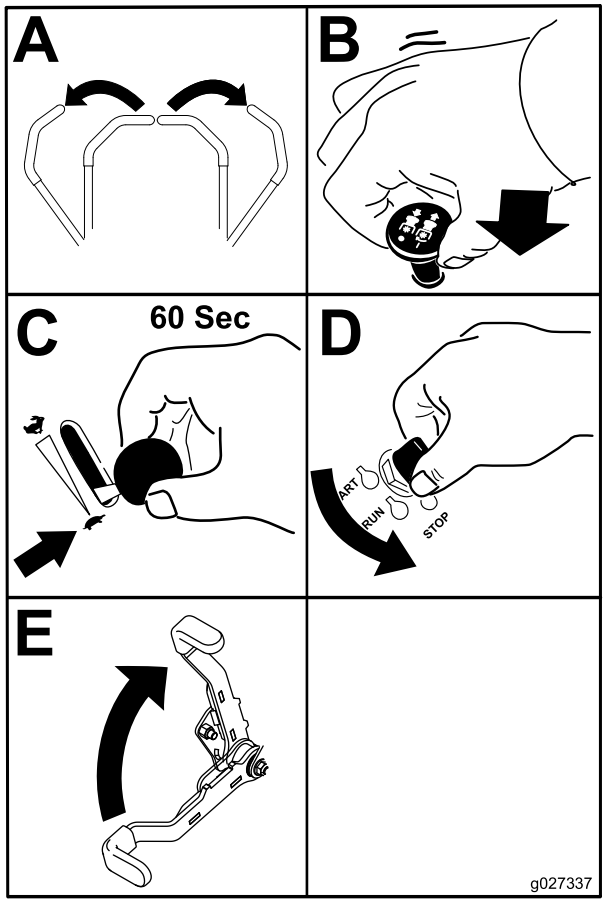

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Figure 20

Important: **Ensure that the fuel-shutoff valve is closed before transporting or storing the machine, as fuel leakage may occur. Set the parking brake before transporting. Ensure that you 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 shut off the engine when you move the traction controls from the LOCK 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.

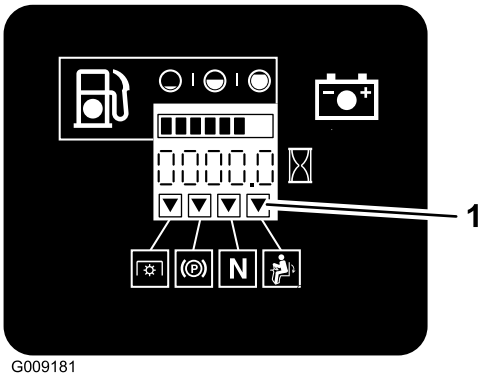

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Figure 21

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 start.
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 start. 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 shut off.
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 shut off. 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 start.

Driving Forward or Backward

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

⚠ CAUTION

Machine can spin very rapidly. Operator may lose control of machine and cause personal injury or damage to machine.

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

Using the Motion-Control Levers

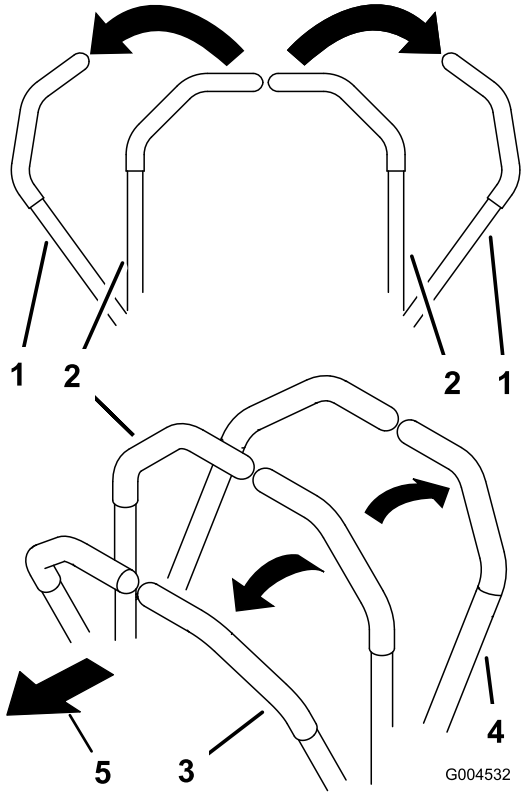

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Figure 22

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

Driving Forward

Note: The engine will shut off if the traction-control levers are moved with the parking brake engaged.

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

1. Release the parking brake; refer to Releasing the Parking Brake (page 20).
2. Move the levers to the center, NEUTRAL position.
3. To go forward, slowly push the motion-control levers forward (Figure 23).

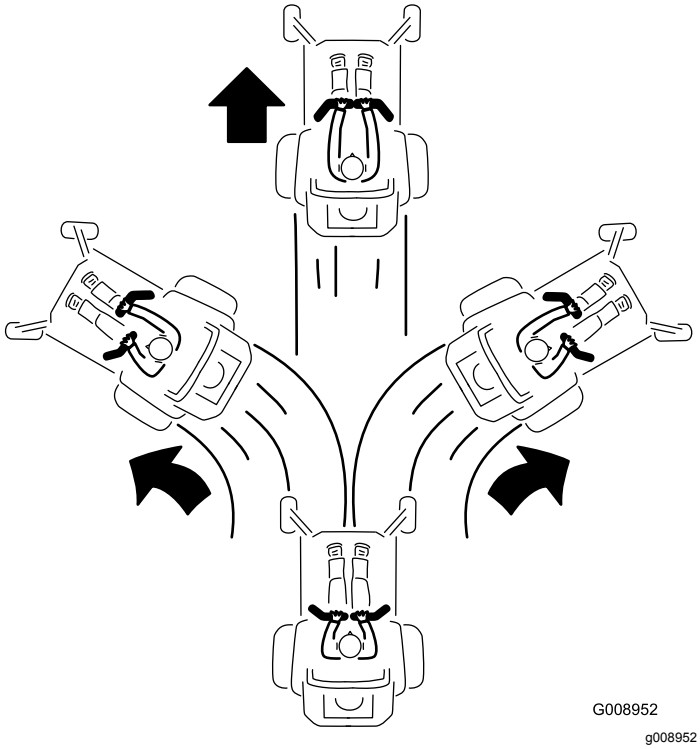

Figure 23

Driving Backward

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

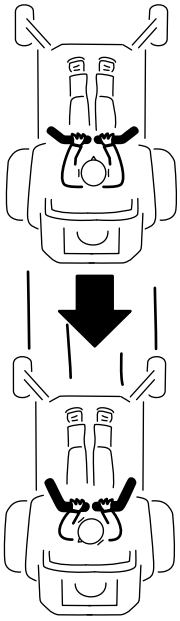

Figure 24

Stopping the Machine

To shut off the machine, move the traction-control levers to NEUTRAL, and then move them to the LOCK position, disengage the power take off (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 20). 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

Adjusting the Height-of-Cut Pin

The height-of-cut is adjusted from 25 to 140 mm (1 to 5-1/2 inches) in 6 mm (1/4 inch) increments by relocating 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 (5-1/2 inches) cutting height position) as shown in Figure 25.
3. To adjust, rotate the pin 90 degrees and remove the pin from the height-of-cut bracket (Figure 25).
4. Select a hole in the height-of-cut bracket corresponding to the height-of-cut desired, and insert the pin (Figure 25).
5. Push on the deck lift, pull back on the transport lock, and slowly lower the mower deck.

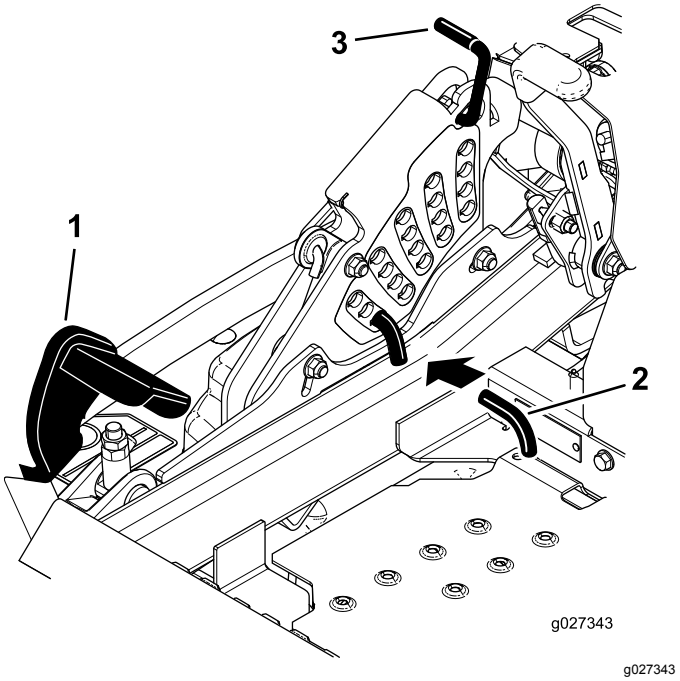

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Figure 25

1. Deck-lift pedal
2. Cut-of-height pin
3. Transport lock

Adjusting the Anti-Scalp Rollers

Whenever you change the height-of-cut, it is recommended to 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. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Adjust the anti-scalp rollers as shown in Figure 26, Figure 27, and Figure 28.

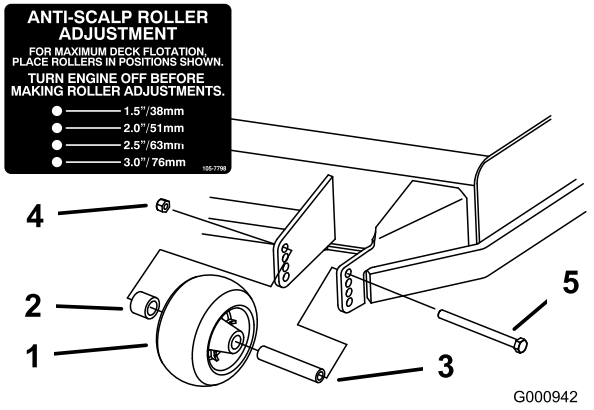

Figure 26

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

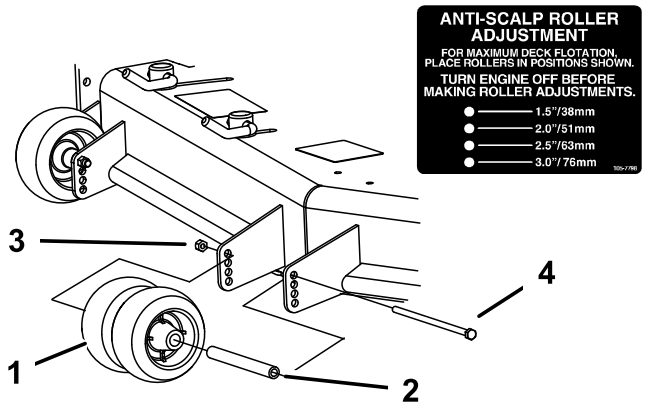

Figure 27

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

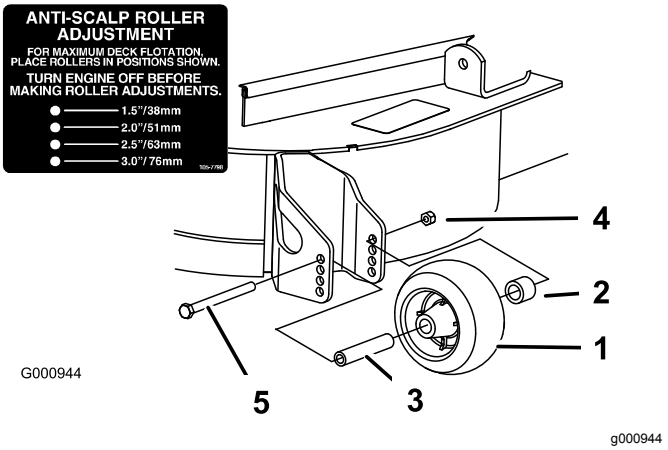

Figure 28

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

Adjusting the Flow Baffle Cam Locks

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

The mower-discharge flow can be adjusted for different types of mowing conditions. Position the cam locks and baffle to give 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.

   Note: Adjust the cam lock until the desired locking pressure is achieved.

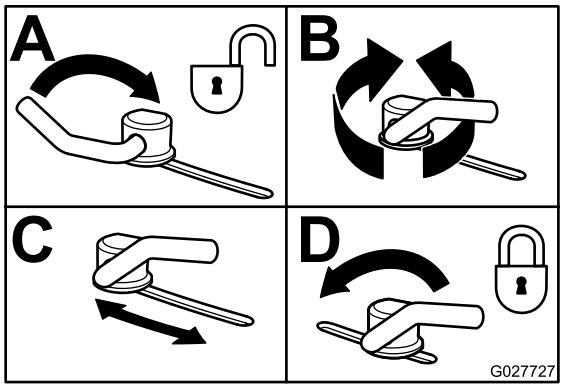

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Figure 29

Positioning the Flow Baffle

The following figures are only recommendations for use. Adjustments will vary by grass type, moisture content, and the height of the 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. The suggested use for this position is as follows:

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

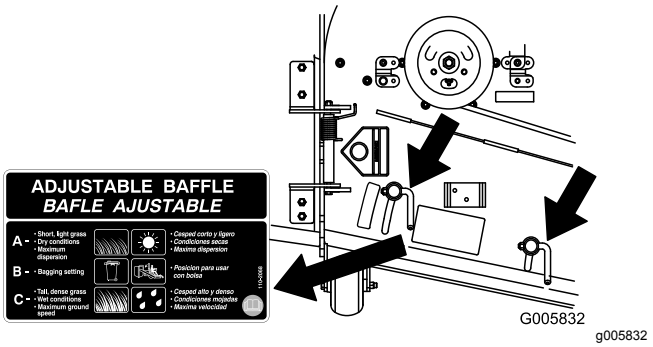

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Figure 30

Position B

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

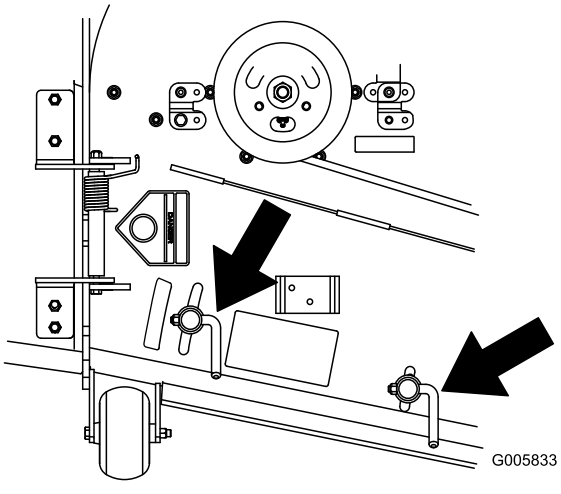

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Figure 31

Position C

This is the full open position. The suggested use for this position is as follows:

- Tall, dense grass mowing conditions
- Wet conditions
- Lowers the engine-power consumption
- Allows increased ground speed in heavy conditions
- This position is similar to the benefits of the Toro SFS mower

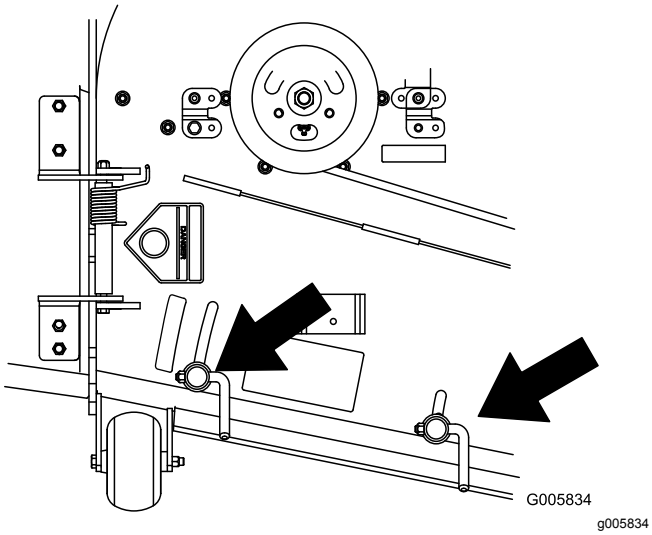

Figure 32

Positioning the Seat

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

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

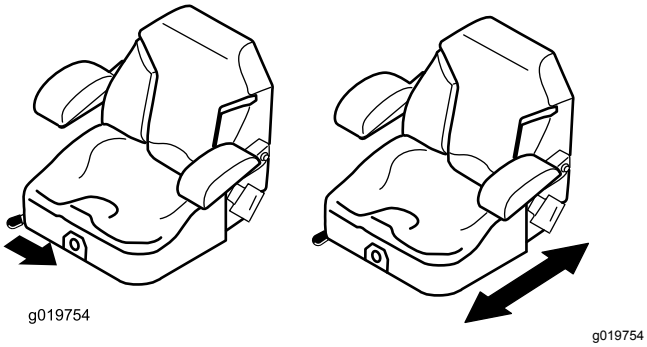

Figure 33

Unlatching the Seat

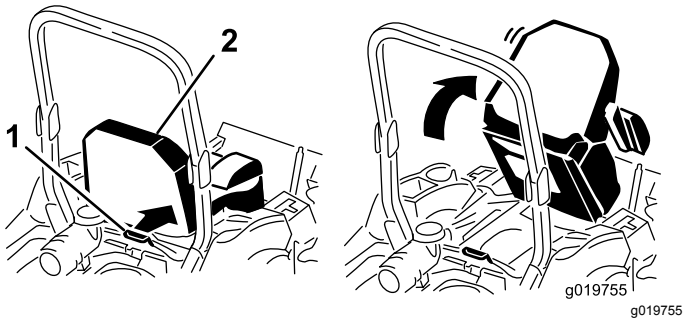

Figure 34

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

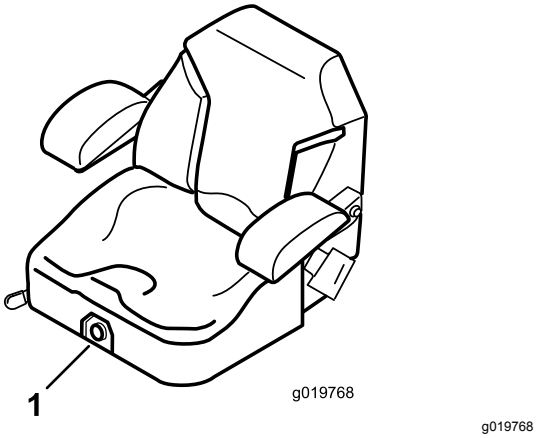

Figure 35

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.

Shut off the engine, remove the key, and allow 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.

Allow 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: Ensure 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 PTO (blade-control switch) and turn the ignition key to the OFF position, move the levers to NEUTRAL-LOCK position, apply the parking brake, and remove the key.
2. Rotate the release-valve levers vertically to push the machine (Figure 36).

   Note: This allows hydraulic fluid to bypass the pump enabling the wheels to turn.
3. Disengage the parking brake before pushing the machine.

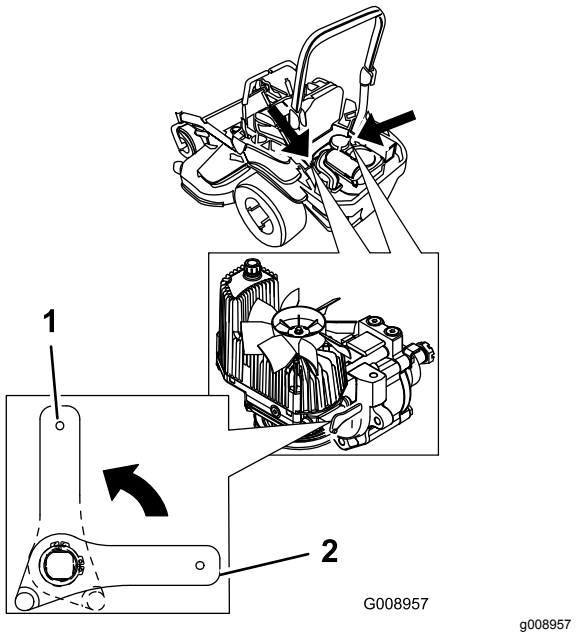

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Figure 36

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 will 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 power take off (blade-control switch (PTO) to the Off position, rotate the ignition key to the OFF position, and remove the key.**
- **Ensure 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 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. Shut off 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 the machine to the trailer or truck with straps, chains, cable, or ropes (Figure 37).

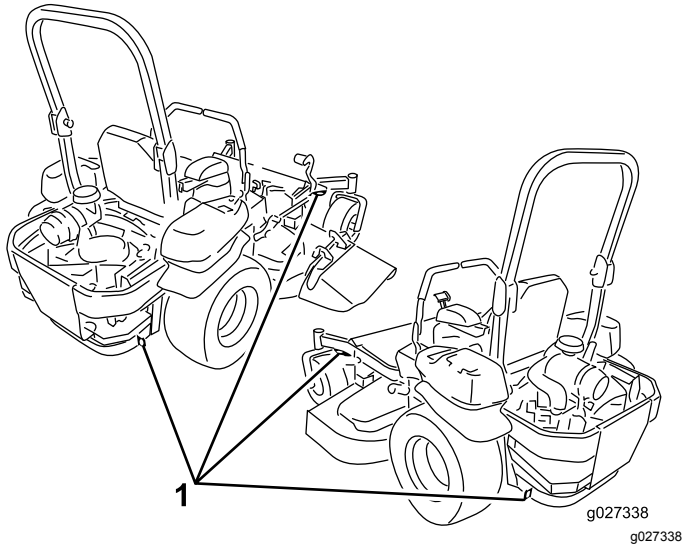

Figure 37

1. Tie-down loops

Loading the Machine

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

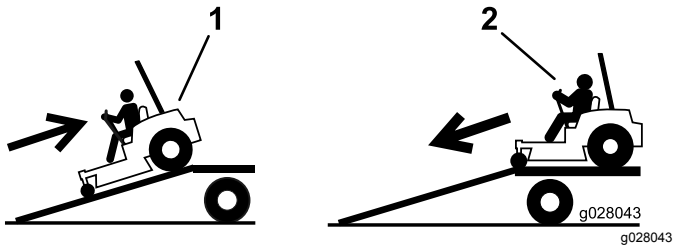

Figure 38

1. Back up ramps
2. Drive forward down 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 four times (4X) 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 unit moves from the ramp to the trailer or truck. Steeper angles may also cause the machine to tip or lose control. If loading 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 will minimize the ramp angle.

⚠ WARNING

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

- **Use extreme caution when operating a machine on a ramp.**
- **Ensure that the ROPS is in the up position and use the seat belt when loading or unloading the machine. Ensure that the ROPS will clear 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 four times (4X) as long as the height of the trailer or truck bed to the ground. This will ensure that the ramp angle does not exceed 15 degrees on flat ground.**
- **Back up the ramps and drive 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 situation.**

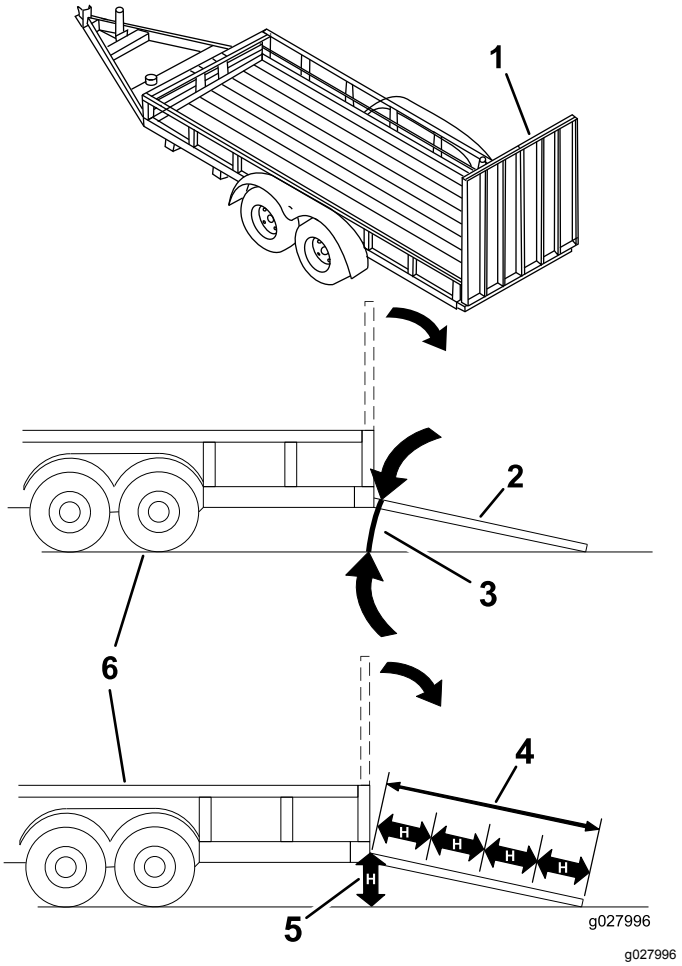

Figure 39

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

Operating Tips

Using the Fast Throttle Setting

For best mowing and maximum air circulation, operate the engine at the FAST position. Air is required to thoroughly cut grass clippings, so do not set the height-of-cut so low as to totally surround the mower 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 grass slightly longer than normal to ensure that the cutting height of the mower does not scalp any uneven ground. However, the cutting height used in the past is generally the best one to use. When cutting grass longer than 15 cm (6 inches) tall, you may want to cut the lawn twice to ensure an acceptable quality of cut.

Cutting a Third of the Grass Blade

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

Alternating the Mowing Direction

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

Mowing at Correct Intervals

Grass grows at different rates at different times of the year. To maintain the same cutting height, mow more often in early spring. As the grass growth rate slows in mid summer, mow less frequently. If you cannot mow for an extended period, first mow at a high cutting height, then mow again 2 days later at a lower height setting.

Using a Slower Cutting Speed

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

Avoiding Cutting Too Low

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

Stopping

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

Keeping the Underside of the Mower Clean

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

Maintaining the Blade(s)

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

Maintenance

Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first 8 hours	• Change the engine oil.
After the first 100 hours	• Check the wheel lug-nut torque. • Check the wheel hub slotted-nut torque. • Check the parking brake adjustment.
After the first 250 hours	• Change the hydraulic filters and hydraulic fluid when using any type of fluid.
Before each use or daily	• Check the safety system. • Check the engine-oil level. • Check the seat belt. • Check the rollover-protection-system (ROPS) knobs. • Clean the engine screen and the oil cooler. • Check and clean the hydraulic-unit shrouds. • Inspect the blades. • Clean the mower deck.
Every 50 hours	• Grease the mower-deck spindles and the idler arm. • Check spark arrester (if equipped). • Check the tire pressure. • Inspect the belts for cracks and wear. • Check the hydraulic fluid level.
Every 100 hours	• Lubricate the mower deck lift pivots. • Inspect the primary filter and the air-inlet screen. • Change the engine oil (more often in dirty or dusty conditions). • Clean the engine-oil cooler. • Check and clean engine-cooling fins and shrouds.
Every 200 hours	• Replace the primary air filter (more often in dusty or sandy conditions). • Change the engine-oil filter.
Every 250 hours	• Check the inner air filter. • Change the hydraulic filters and hydraulic fluid when using Mobil® 1 hydraulic fluid (more often in dirty or dusty conditions).
Every 500 hours	• Replace the inner air filter. • Check, clean and regap the spark plug. • Replace the fuel filter (more often in dirty or dusty conditions). • Check the wheel lug-nut torque. • Check the wheel hub slotted-nut torque. • Adjust the caster-pivot bearing. • Check the parking brake adjustment. • Change the hydraulic filters and hydraulic fluid when using Toro® HYPR-OIL™ 500 hydraulic fluid (more often in dirty or dusty conditions).
Monthly	• Check the battery.
Yearly	• Grease the pump-belt-idler arm. • Grease the front caster pivots (more often in dirty or dusty conditions). • Repack the front caster-wheel bearings (more often in dirty or dusty conditions). • Lubricate the caster-wheel hubs.
Yearly or before storage	• Paint chipped surfaces. • Check all maintenance procedures listed above before storage.

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

⚠ CAUTION

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

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

Lubrication

Lubricating the Machine

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

Grease Type: No. 2 lithium or molybdenum-based grease

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. Clean the grease fittings with a rag.

   Note: Ensure that you 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.

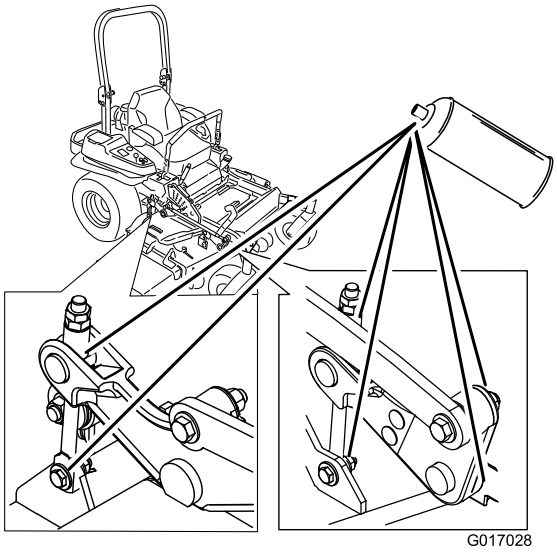

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Figure 40

Greasing the Mower

Service Interval: Every 50 hours—Grease the mower-deck spindles and the 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).

Important: **Ensure that the cutting-unit spindles are full of grease weekly.**

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 (Figure 41).

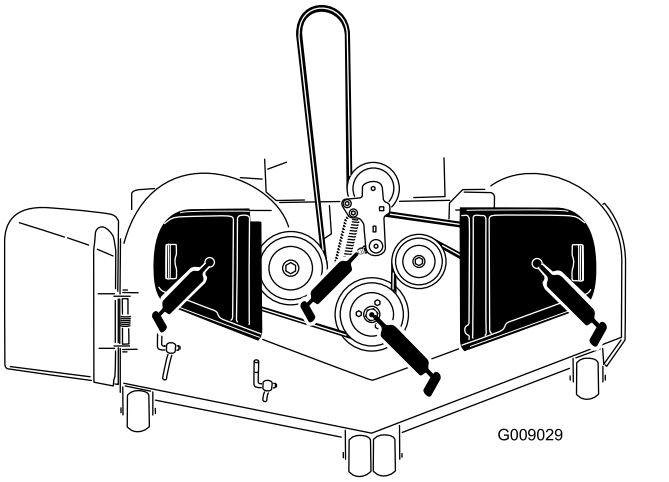

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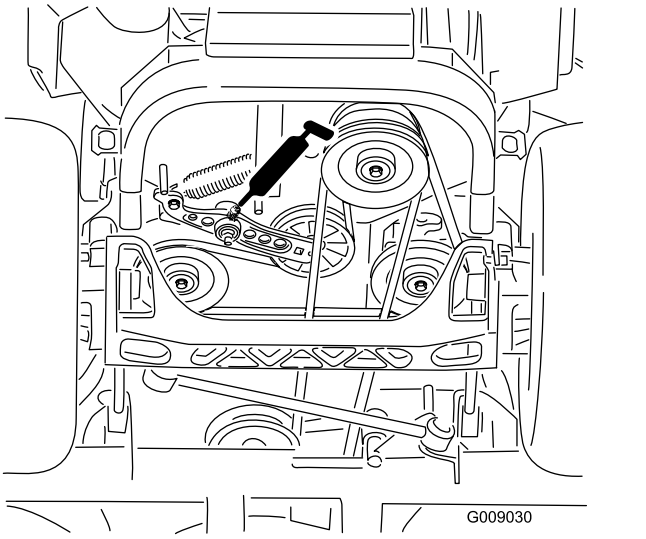
Figure 41

5. Grease the drive-belt-idler arm (Figure 42).



g009030

Figure 42

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

   Note: Keep the dust cap off until greasing is done; refer to Adjusting the Caster-Pivot Bearing (page 50).
7. Remove the hex plug.
8. Thread a grease fitting into the hole.
9. Pump grease into the fitting until it oozes out around the top bearing.
10. Remove the grease fitting in the hole.
11. Install the hex plug and dust cap (Figure 43).

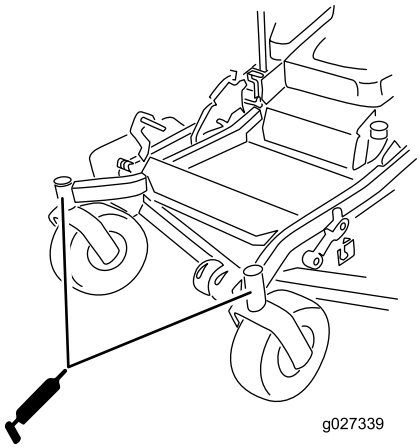


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Figure 43

12. Grease the caster-wheel bearings (Figure 43).

Lubricating the Caster-Wheel Hubs

Service Interval: Yearly

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

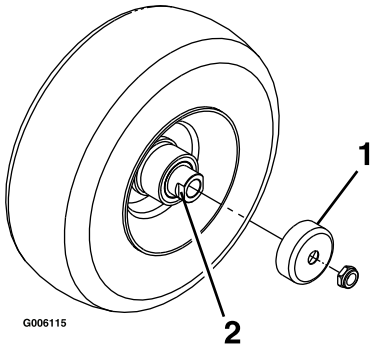

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Figure 44

1. Seal guard
2. Spacer nut with wrench flats

2. Raise the mower for access.
3. Remove the caster wheel from the caster forks.
4. Remove the seal guards from the wheel hub.
5. Remove one of the spacer nuts from the axle assembly in the caster wheel.

   Note: Thread-locking adhesive has been applied to lock the spacer nuts to the axle.
6. Remove the axle (with the other spacer nut still assembled to it) from the wheel assembly.
7. Pry out seals and inspect bearings for wear or damage and replace if necessary.
8. Pack the bearings with a general-purpose grease.
9. Insert 1 bearing and 1 new seal into the wheel.

   Note: The seals must be replaced.
10. If the axle assembly has had both spacer nuts removed (or broken loose), apply a thread-locking adhesive 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.
11. Insert the assembled nut and axle into the wheel on the side of the wheel with the new seal and bearing.

12. With the open end of the wheel facing up, fill the area inside the wheel around the axle full of general-purpose grease.
13. Insert the second bearing and new seal into the wheel.
14. Apply a thread-locking adhesive to the second spacer nut, and thread it onto the axle with the wrench flats facing outward.
15. Torque the nut to 8 to 9 N·m (75 to 80 in-lb), loosen, then torque to 2 to 3 N·m (20 to 25 in-lb).

    Note: Ensure that the axle does not extend beyond the nut.
16. Install the seal guards over the wheel hub, and insert wheel into the caster fork.
17. 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 adhesive.**

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 100 hours

Every 200 hours/Yearly (whichever comes first)—Replace the primary air filter (more often in dusty or sandy conditions).

Every 250 hours—Check the inner air filter.

Every 500 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 PTO, move the motion-control levers to the NEUTRAL-LOCK position, and set the parking brake.
2. Shut off the engine, remove the key from the ignition, 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-inlet cover off the air-cleaner body (Figure 45).
4. Clean the air-inlet screen and cover.
5. Install the air-inlet cover and secure it with the latches (Figure 45).

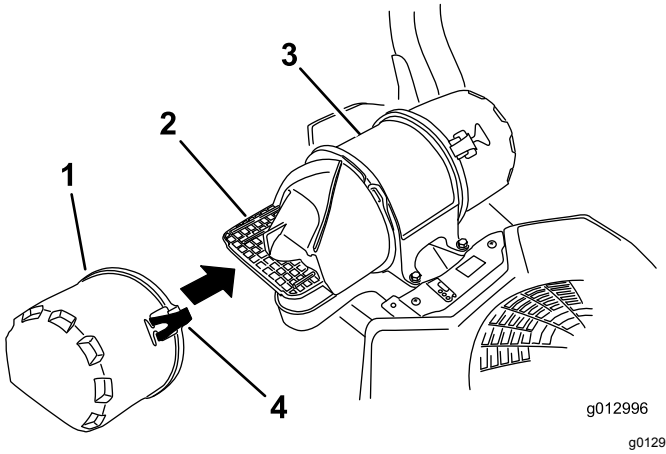

Figure 45

1. Air-inlet cover
2. Air-inlet screen
3. Air-cleaner body
4. Latch

6. Release the latches on the air cleaner and pull the air-cleaner cover off the air-cleaner body (Figure 46).
7. Clean the inside of the air-cleaner cover with compressed air.
8. Gently slide the primary filter out of the air-cleaner body (Figure 46).

   Note: Avoid knocking the filter into the side of the body.
9. Remove the inner filter only if you intend to replace it.

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

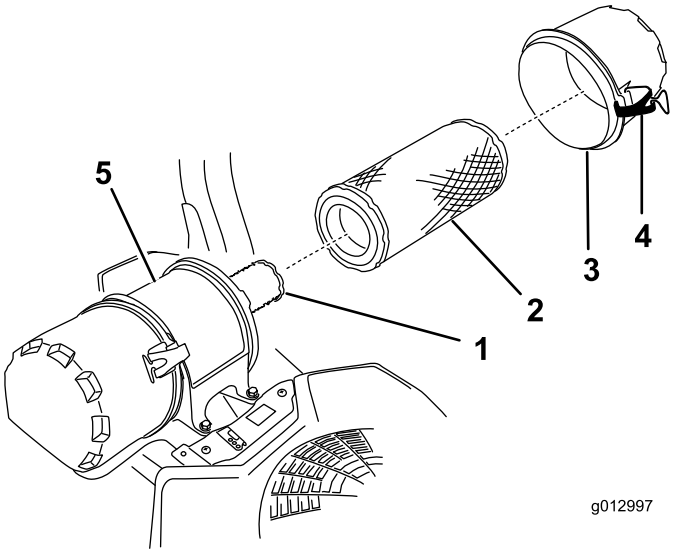

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Figure 46

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

10. 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 will 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 Safety Filter

Replace the safety filter, never clean 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.**

Installing the Filters

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

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

   Note: Do not use a damaged filter.
2. If the inner filter is being replaced, carefully slide it into the filter body (Figure 46).
3. Carefully slide the primary filter over the inner filter (Figure 46).

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

   Important: **Do not press on the soft, inside area of the filter.**
4. Install the air-cleaner cover and secure the latches (Figure 46).

Servicing the Engine Oil

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

Oil Capacity: with a filter change, 1.8 L (61 oz); with no filter change, 1.6 L (54 oz)

Viscosity: See the table below.

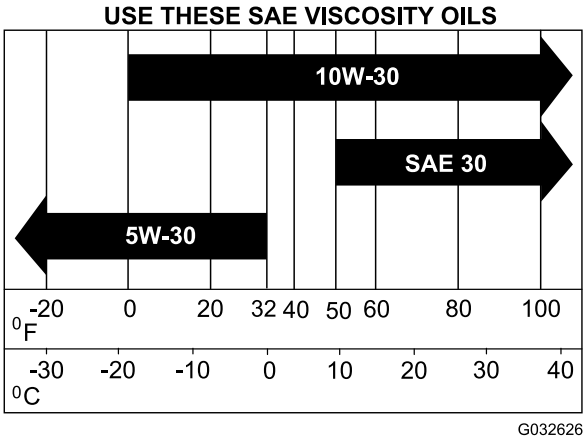

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Figure 47

Note: Use of synthetic oil is acceptable.

Checking the Engine-Oil Level

Service Interval: Before each use or daily

Note: Check the oil when the engine is cold.

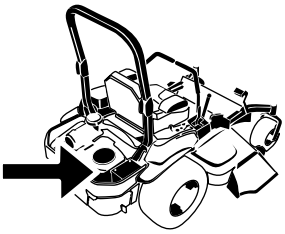
⚠ WARNING

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. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position (Figure 48).



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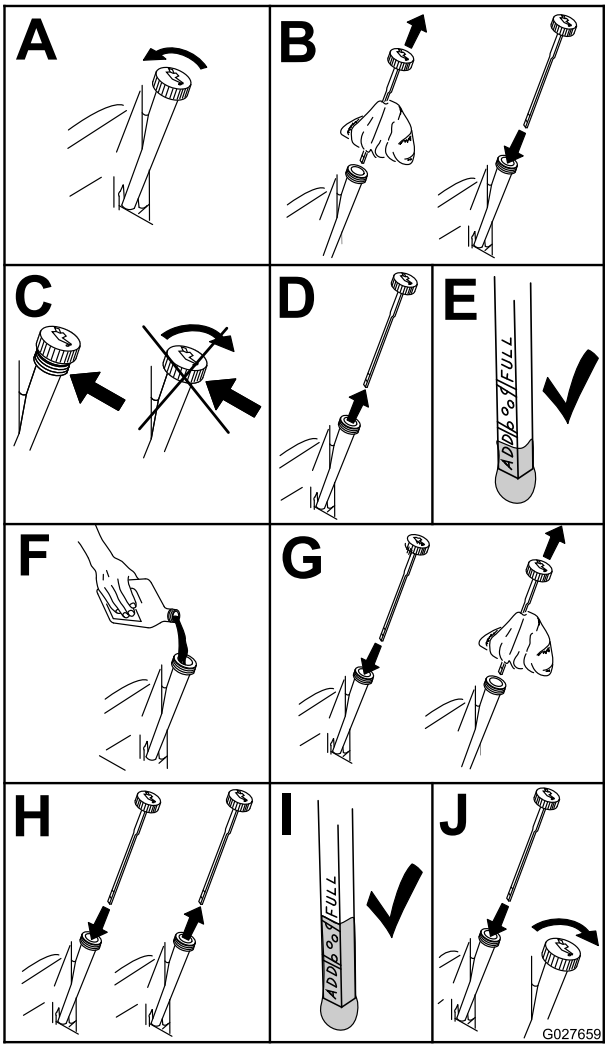

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Figure 48

Changing the Engine Oil

Service Interval: After the first 8 hours

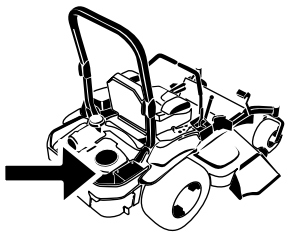
Every 100 hours (more often in dirty or dusty conditions).

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. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position (Figure 49).



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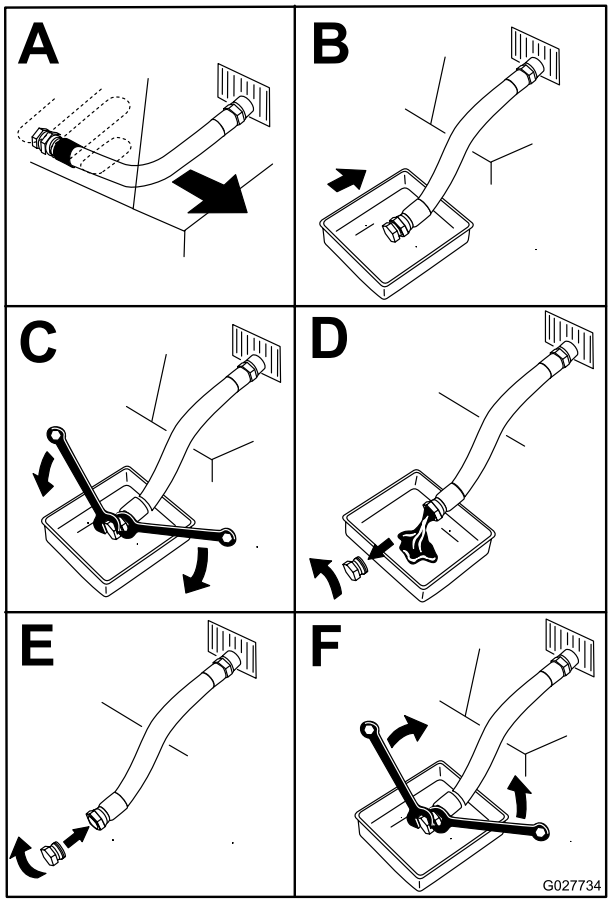

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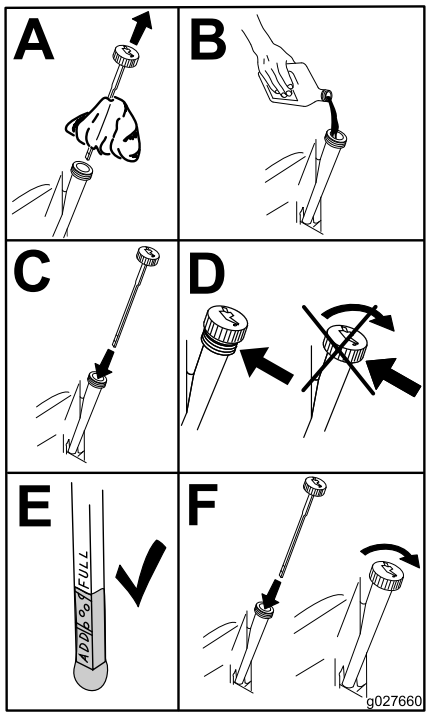
Figure 49

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).



g027660

Figure 50

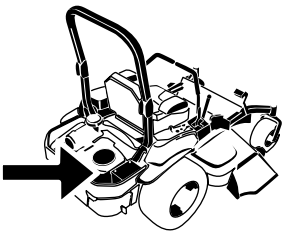
6. Start the engine and drive to a flat area.
7. Check the oil level again.

Changing the Engine-Oil Filter

Service Interval: Every 200 hours

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

1. Drain the oil from the engine; refer to Changing the Engine Oil (page 40).
2. Change the engine-oil filter (Figure 51).



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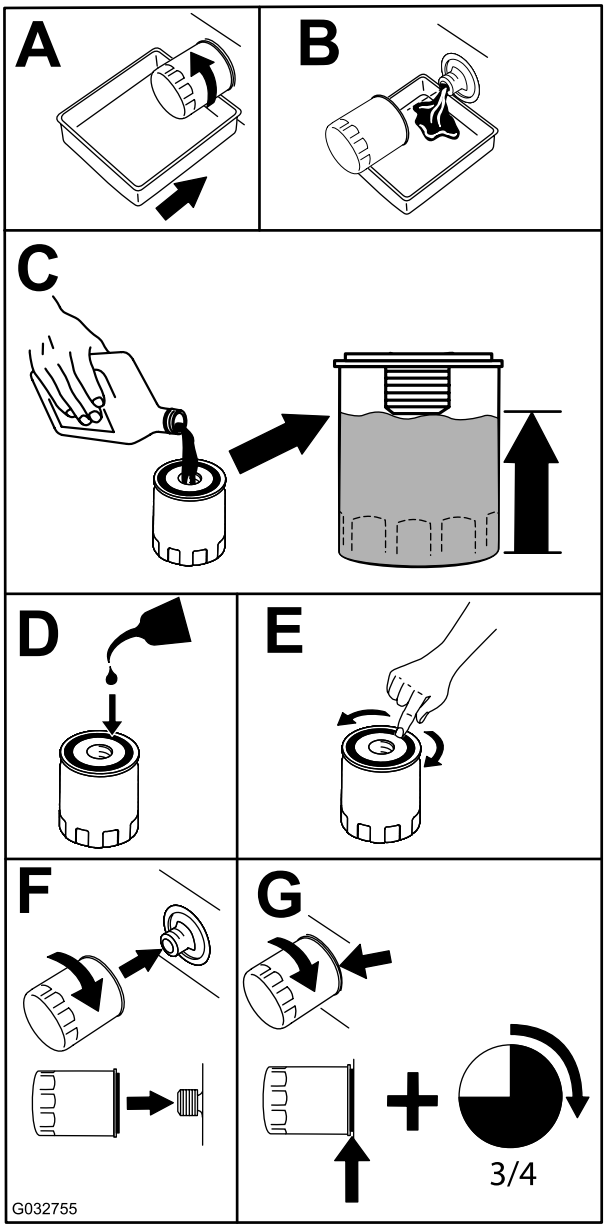

g032755

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 Servicing the Engine Oil (page 39).

Servicing the Engine-Oil Cooler

Service Interval: Every 100 hours

1. Remove the bolts holding the oil cooler to the engine housing .
2. Clean the inside of the oil cooler with a brush.
3. Install the oil cooler to the engine housing.

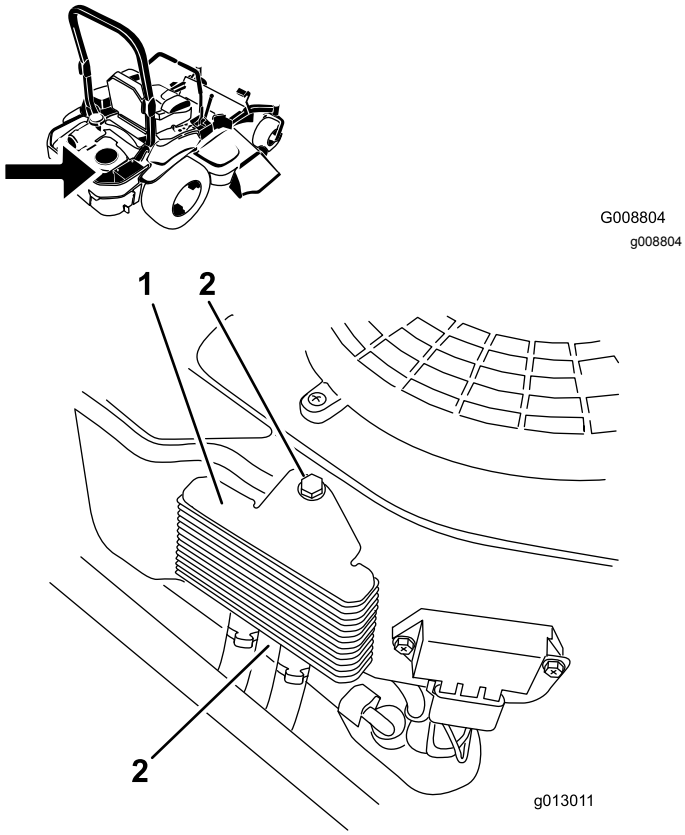

Figure 52

1. Engine-oil cooler
2. Bolts

Servicing the Spark Plug

Service Interval: Every 500 hours

Ensure that the air gap between the center and side electrodes is correct before installing the spark plug. Use a spark-plug wrench for removing and installing the spark plug(s) and 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 (0.03 inches)

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 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 in Figure 53.

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

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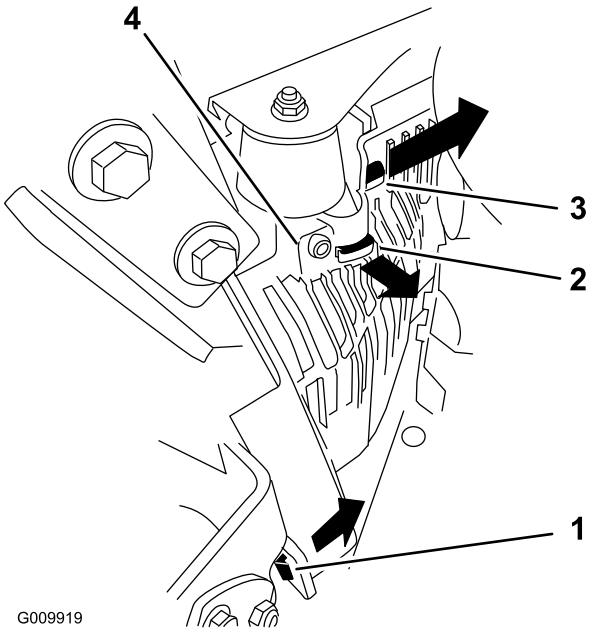

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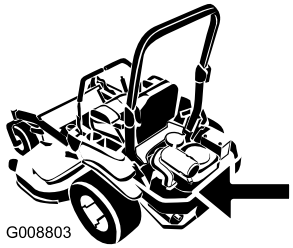
Figure 53

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.



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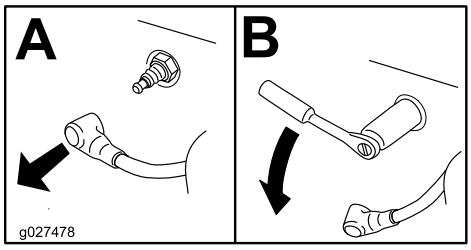

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Figure 54

5. Install the left hand hydraulic-unit shroud (Figure 53).

Checking the Spark Plug

Important: **Do not clean the spark plug(s). Always replace the spark plug(s) when it has: a black coating, worn electrodes, an oily film, or cracks.**

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 (0.03 inches).

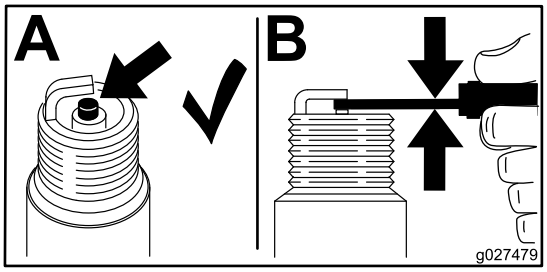

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Figure 55

Installing the Spark Plug

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

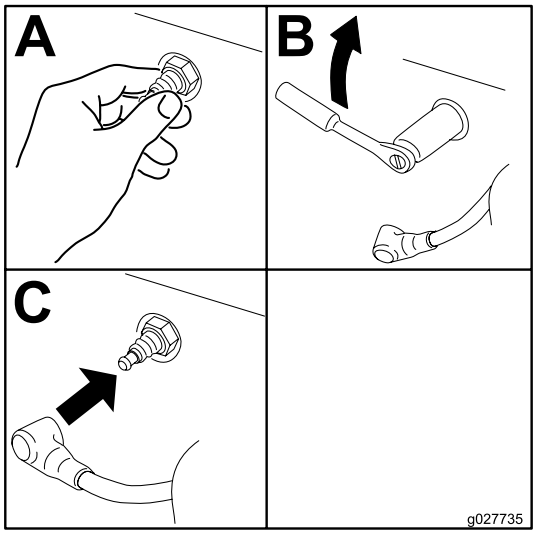

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Figure 56

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

Replacing the Fuel Filter

Service Interval: Every 500 hours/Yearly (whichever comes first) (more often in dirty or dusty conditions).

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

1. Disengage the 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. Allow the machine to cool down.
4. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
5. Close the fuel-shutoff valve under the seat (Figure 57).

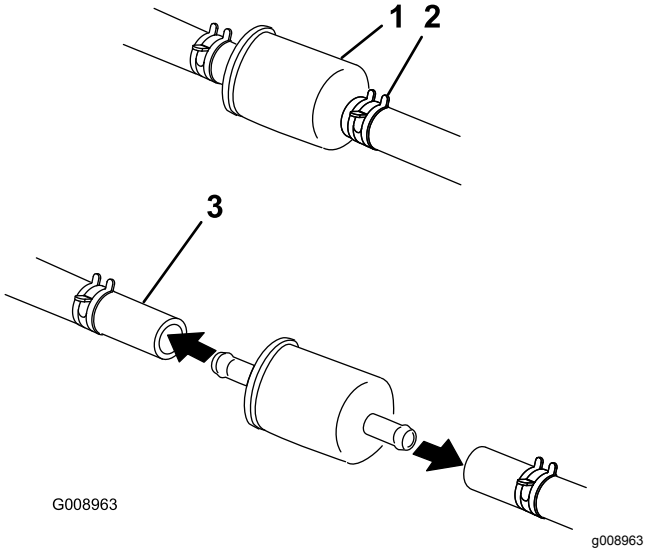

Figure 57

1. Fuel filter
2. Hose clamp
3. Fuel shutoff valve

6. Squeeze the ends of the hose clamps together and slide them away from the filter (Figure 57).
7. Remove the filter from the fuel lines.
8. Install a new filter and move the hose clamps close to the filter (Figure 57).
9. Open the fuel-shutoff valve.

Note: It is important to 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 Fuel Tank

Do not attempt to drain the fuel tank. Ensure that an Authorized Service Dealer drains the fuel tank and services any components of the fuel system.

Electrical System Maintenance

Servicing the Battery

Service Interval: Monthly

⚠ 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. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove the battery as shown in Figure 58.

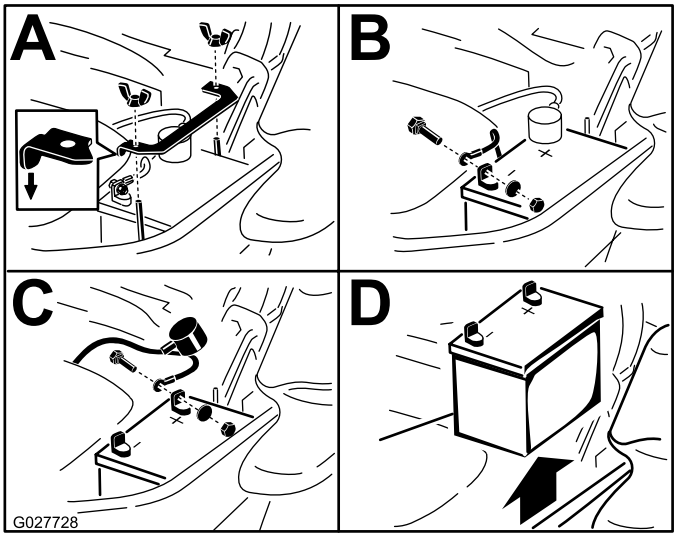

Figure 58

Installing the Battery

Note: Position battery in the tray with the terminal posts opposite from the hydraulic tank (Figure 59).

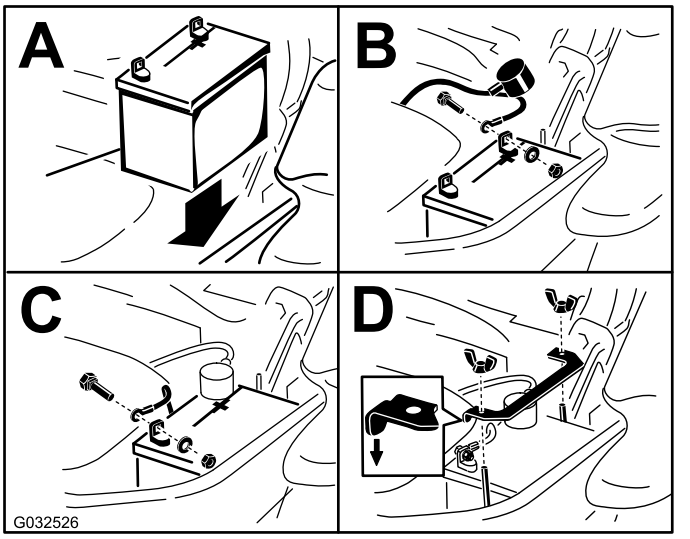

Figure 59

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 60).
3. Install the battery in the machine and connect the battery cables; refer to Installing the Battery (page 46).

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

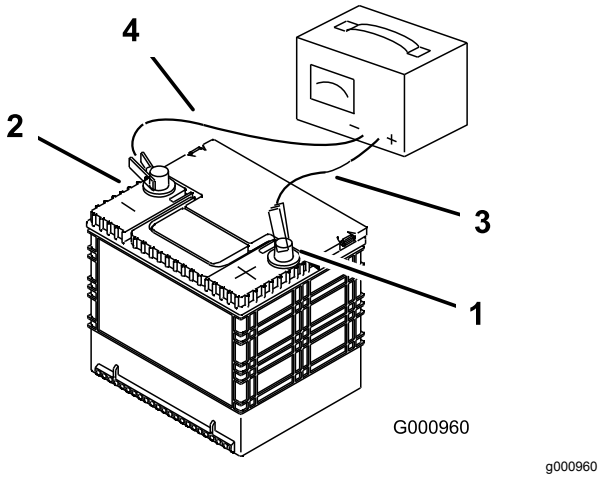

Figure 60

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

Servicing the Fuses

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

1. The fuses are located on right hand console next to the seat (Figure 61).
2. To replace the fuses, pull out the fuse to remove it.
3. Install a new fuse (Figure 61).

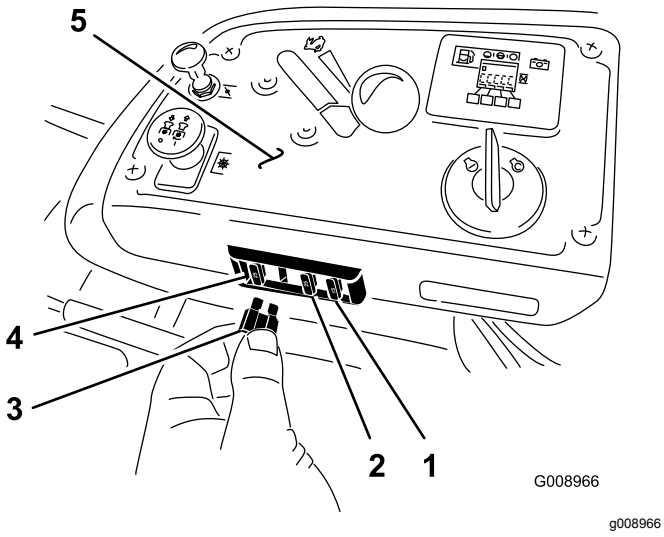

Figure 61

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

Jump-Starting the Machine

1. Check and clean corrosion from the battery terminals before jump-starting. Ensure that the connections are tight.

⚠ CAUTION

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

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

⚠ DANGER

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

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

2. Ensure that the booster battery is a good and fully charged lead-acid battery at 12.6 volts or greater.

Note: Use properly sized jumper cables with short lengths to reduce voltage drop between systems. Ensure that the cables are color coded or labeled for the correct polarity.

⚠ CAUTION

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

Be certain of battery terminal polarity and jumper cable polarity when hooking up batteries.

⚠ WARNING

Batteries contain acid and produce explosive gases.

- **Shield the eyes and face from the batteries at all times.**
- **Do not lean over the batteries.**

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

3. Connect the positive (+) cable to the positive (+) terminal of the discharged battery that is wired to the starter or solenoid as shown in Figure 62.

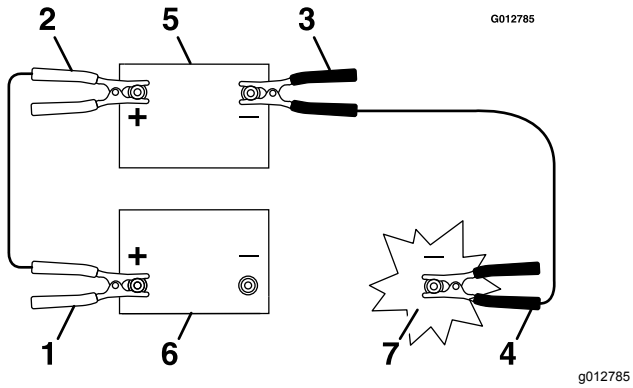

Figure 62

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

4. Connect the other end of the positive cable to the positive terminal of the booster battery.
5. Connect the black negative (–) cable to the other terminal (negative) of the booster battery.
6. **Make the final connection on the engine block of the stalled vehicle (not to the negative battery post) away from the battery and stand back (Figure 64).**

Figure 63

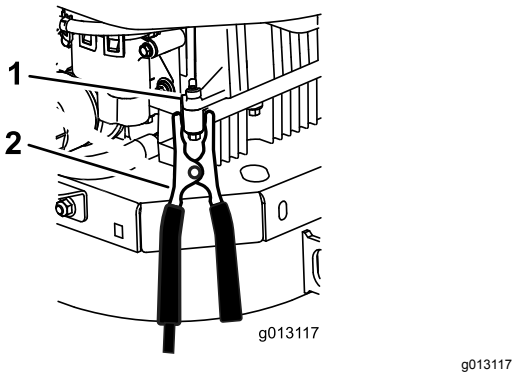

Figure 64

1. Engine block
2. Negative (–) cable

7. Start the vehicle and remove the cables in the reverse order of connection (the engine block (black) connection is the first to disconnect).

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. Ensure 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 get both knobs fully engaged (Figure 65).

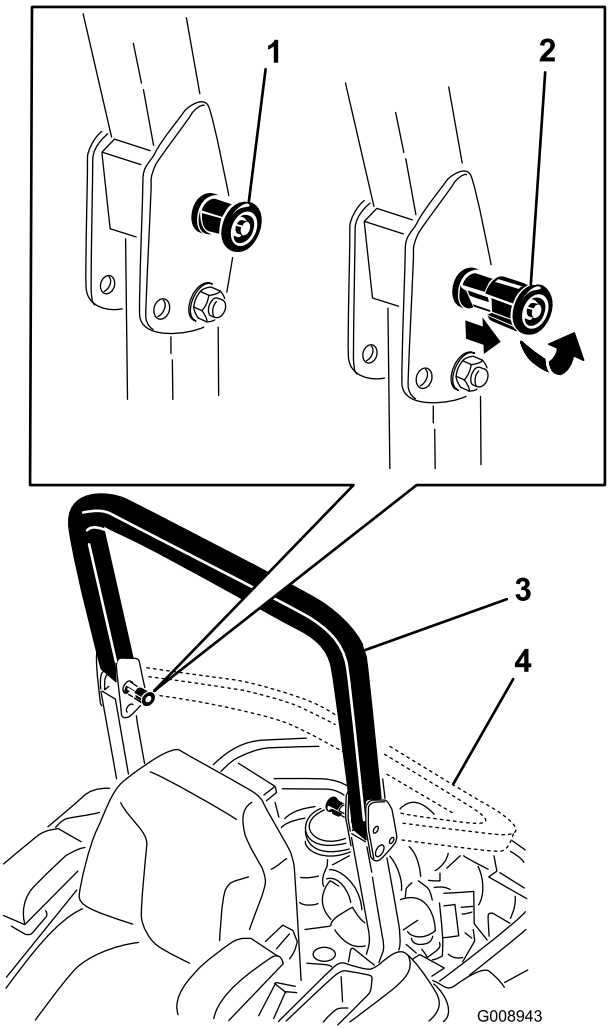

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Figure 65

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

Refer to Adjusting the Tracking (page 49).

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.

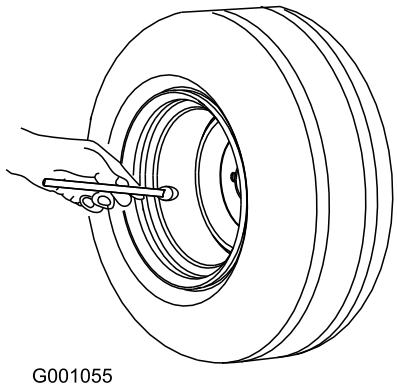

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Figure 66

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 on wheel hub.

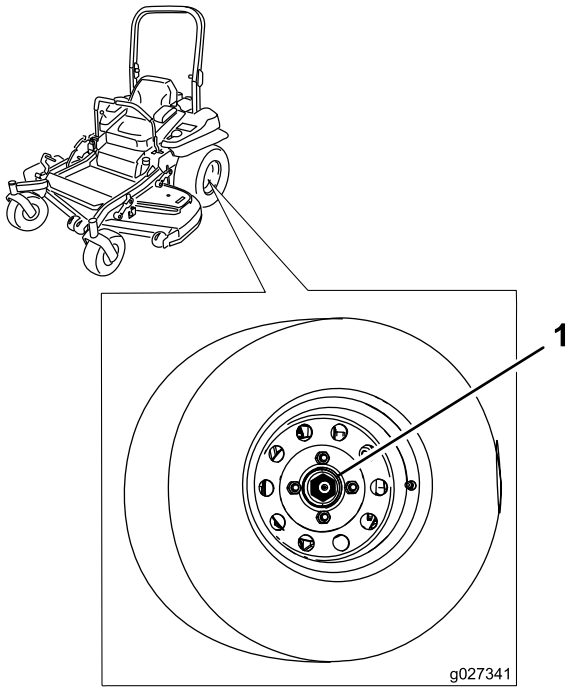

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Figure 67

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. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove the dust cap from caster and tighten the lock nut (Figure 68).
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 68).

   Important: **Ensure that the spring washers are installed correctly as shown in Figure 68.**
5. Install the dust cap (Figure 68).

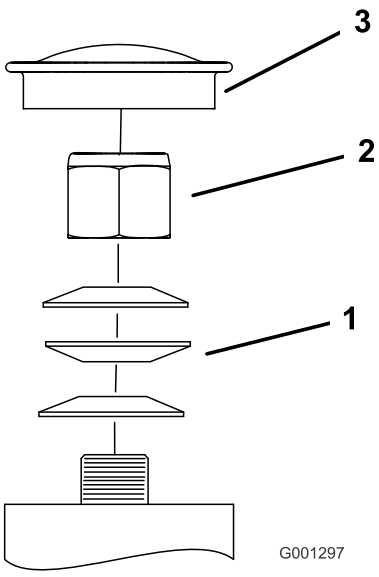

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Figure 68

1. Spring washers
2. Lock nut
3. Dust cap

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, the shim can be removed to extend the clutch life.

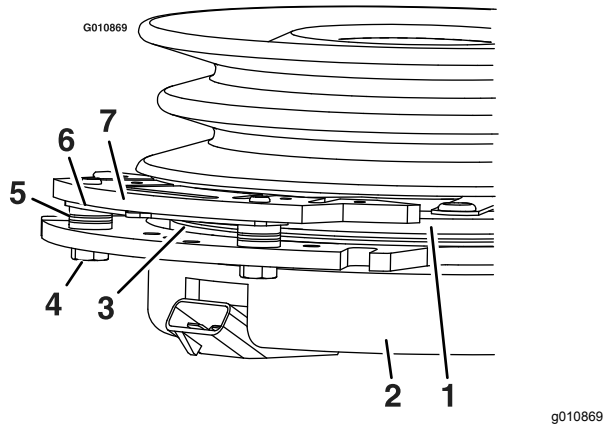

Figure 69

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

Removing the Clutch Shim

1. Shut off the engine, wait for all moving parts to stop, remove the key ignition, engage the parking brake, and allow the machine to cool completely before starting these instructions.
2. Using an air compressor, blow out any debris from under the brake pole and around the brake spacers.

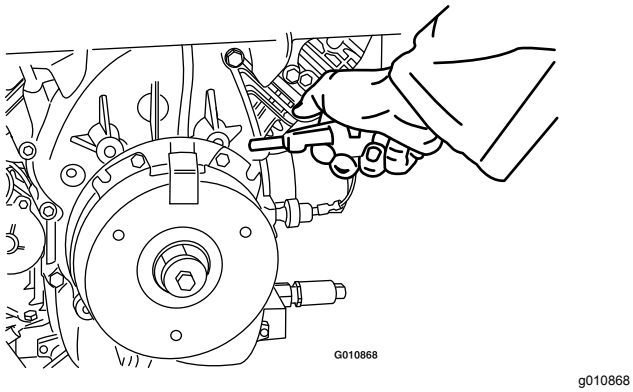

Figure 70

3. Check the condition of the wire-harness leads, connectors, and terminals.

   Note: Clean or repair as necessary.
4. Verify that 12V is present at the clutch connector when the PTO switch is engaged.
5. 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 below.

   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 the shim is removed to ensure the proper brake torque.

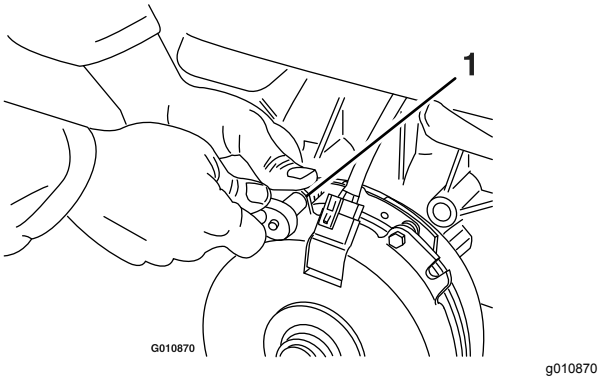

Figure 71

1. Brake-mounting bolt

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

   Note: Do not discard the shim until proper clutch function has been confirmed.

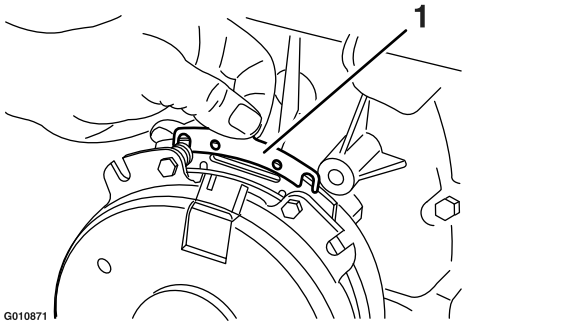

Figure 72

1. Shim

   C. Using a pneumatic line to blow out any debris from under the brake pole and around the brake spacers.

   D. Torque each bolt (M6 x 1) to 13 N·m (10 ft-lb) +/-0.7 N·m (0.5 ft-lb).

   E. Using a 0.25 mm (0.01 inch) thick feeler gauge, verify that a gap is present between the rotor and the armature face on both sides of the brake pole as shown.

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

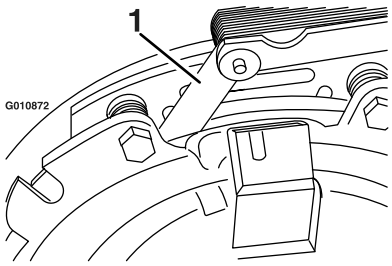

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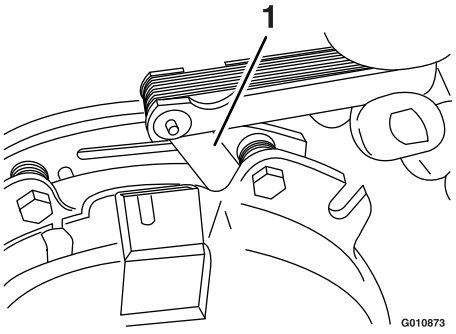
Figure 73

1. Feeler gauge



g010873

Figure 74

1. Feeler gauge

- If the gap is less than 0.25 mm (0.01 inch), then install the shim and refer to Using the Clutch Shim (page 50).
- 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. Ensure that the blades do not engage with the PTO switch in the OFF position, and that the clutch is disengaged.

If the clutch does not disengage, install the shim again and refer to Using the Clutch Shim (page 50).

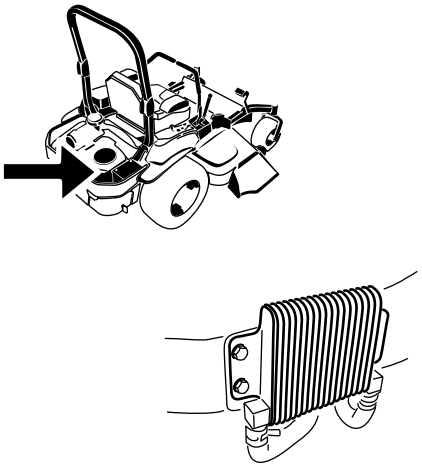
iii. Engage and disengage the PTO switch 10 consecutive times to ensure that the clutch is functioning properly.

Cooling System Maintenance

Cleaning the Engine Screen and Engine-Oil Cooler

Service Interval: Before each use or daily

Remove any buildup of grass, dirt, or other debris from the oil cooler (Figure 75).



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G009191

g009191

Figure 75

Before each use, remove any buildup of grass, dirt, or other debris from the engine screen. This will help ensure adequate cooling, correct the engine speed, and will reduce the possibility of overheating and mechanical damage to the engine (Figure 76).

Cleaning the Engine-Cooling Fins and Shrouds

Service Interval: Every 100 hours/Yearly (whichever comes first)

1. Disengage the 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 the air-intake screen, the recoil starter, and the fan housing (Figure 76).
4. Clean the debris and grass from the engine parts.
5. Install the air-intake screen, the recoil starter, and the fan housing (Figure 76).

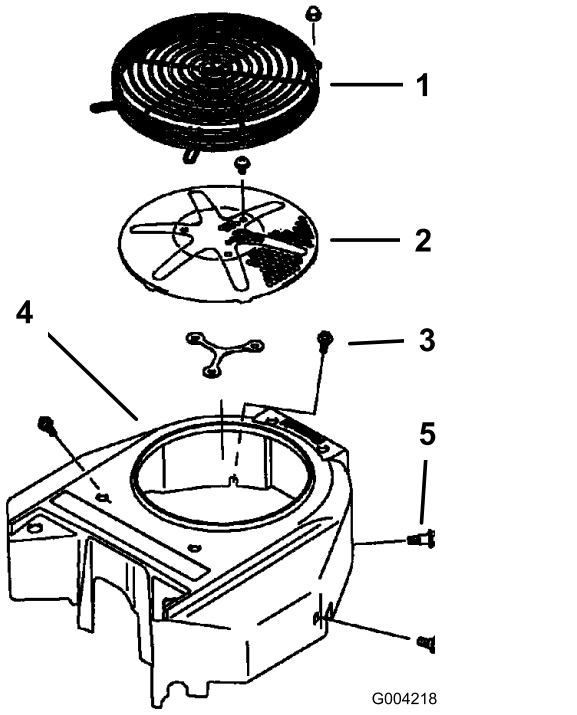

Figure 76

1. Engine guard
2. Engine air-intake screen
3. Bolt
4. Fan housing
5. Screw

Checking and Cleaning the Hydraulic-Unit Shrouds

Service Interval: Before each use or daily

1. Disengage the 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-unit shrouds (Figure 77).
5. Position the seat.

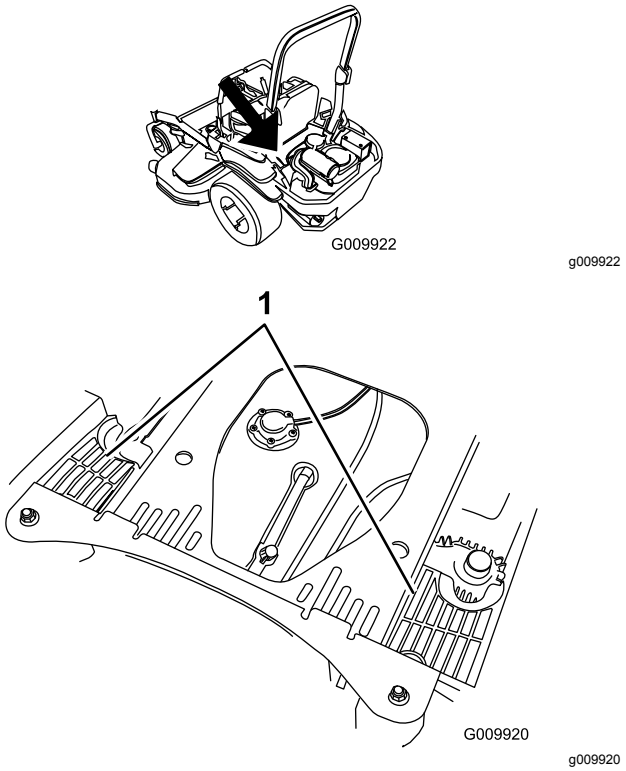

Figure 77

1. Hydraulic-unit shrouds

Brake Maintenance

Adjusting the Parking Brake

Service Interval: After the first 100 hours

Every 500 hours thereafter

Check to ensure that the brake is adjusted properly before adjusting.

Note: This procedure must be followed after the first 100 hours or when a brake component has been removed or replaced.

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 up and support the machine with jack stands.

⚠ DANGER

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

- **Use jack stand when supporting 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 30).
8. Check to see if there is a visible gap between the L-bracket and the linkage stop (Figure 78).

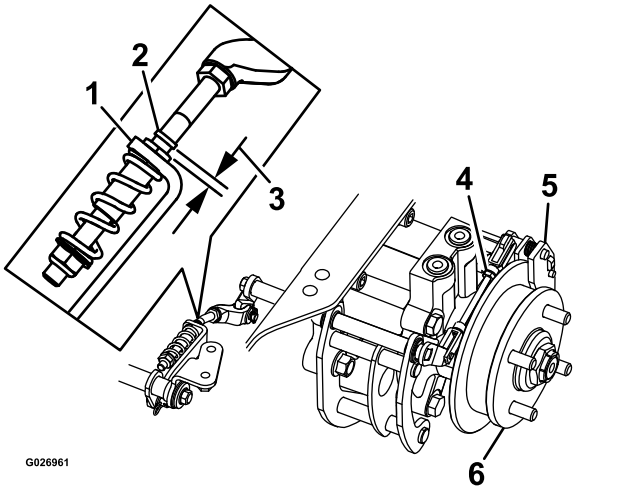

Figure 78

Left Side Shown

1. L-bracket
2. Linkage stop
3. Gap
4. Rear linkage assembly
5. Caliper
6. Wheel hub

9. Disengage the parking brake, the lever should be in the down position.
10. Turn the wheel hub by hand in both directions relative to the caliper; 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. Reconnect the rear linkage assembly.
12. Engage the parking brake and check the gap.
13. Repeat steps 9 through 13 until a visible gap is achieved 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 30).
16. Install the rear tires and torque the lug nuts. Refer to Checking the Wheel Lug Nuts (page 50).
17. Remove the jack stands.

Belt Maintenance

Inspecting the Belts

Service Interval: Every 50 hours

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

Replacing the Mower Belt

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

1. Disengage the 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. Lower the mower to the 76 mm (3 inches) height-of-cut.
4. Remove the belt covers (Figure 79).

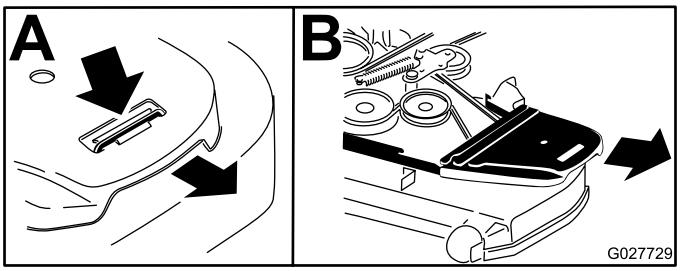

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Figure 79

1. Push the tab down
2. Remove the belt cover

5. Use a ratchet in the square hole in the idler arm to remove tension on the idler spring (Figure 80).
6. Remove the belt from the mower-deck pulleys.
7. Remove the belt guide on the spring-loaded idler arm (Figure 80).
8. Remove the existing belt.
9. Install the new belt around the mower pulleys and the clutch pulley under the engine (Figure 80).

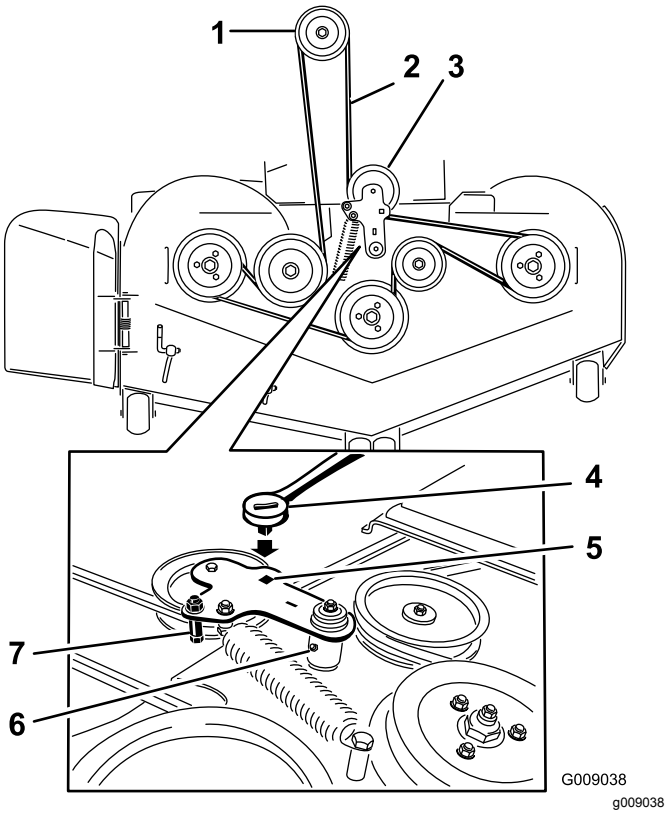

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Figure 80

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

10. Install the belt guide on the idler arm (Figure 80).
11. Using the ratchet in the square hole, install the idler spring (Figure 80).

    Note: Ensure that the spring ends are seated in the anchor grooves.
12. Install the belt covers (Figure 81).

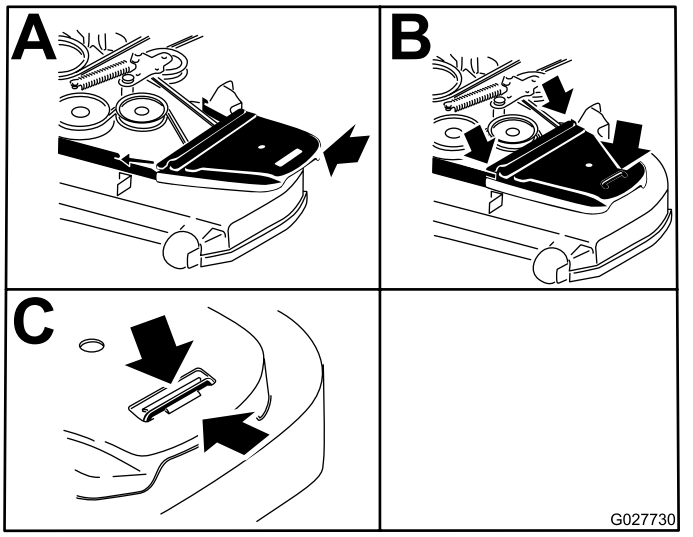

Figure 81

1. Position the belt cover
2. Slide the belt cover under the side catches
3. Ensure that the tab is under the metal catch

Replacing the Hydraulic Pump-Drive Belt

1. Disengage the 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 the mower belt; refer to Replacing the Mower Belt (page 55).
4. Raise the machine and support it with jack stands (Figure 82).

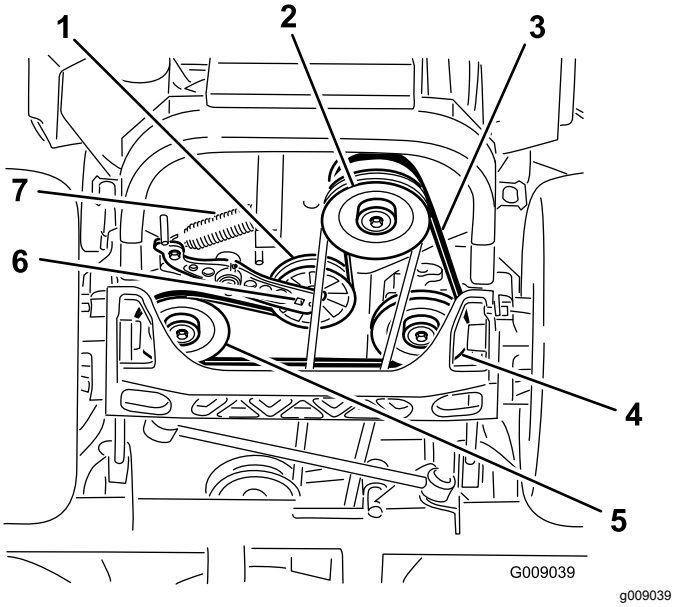

Figure 82

1. Idler pulley
2. Clutch pulley
3. Pump-drive belt
4. Right hand hydraulic-pump pulley
5. Left hand hydraulic-pump pulley
6. Square hole in the idler arm
7. Idler spring

5. Use a ratchet in the square hole in the idler arm to remove the idler spring (Figure 82).
6. Unhook the idler spring from the frame (Figure 82).
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 82).
10. Install the mower belt; refer to Replacing the Mower Belt (page 55).

Controls System Maintenance

Adjusting the Control-Handle Position

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

1. Disengage the 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. Loosen the bolts and flange nuts installed in the levers (Figure 83).
4. Align the levers in the front-to-rear position by bringing the levers together to the NEUTRAL position, and slide them until they are aligned, then tighten the bolts (Figure 84).

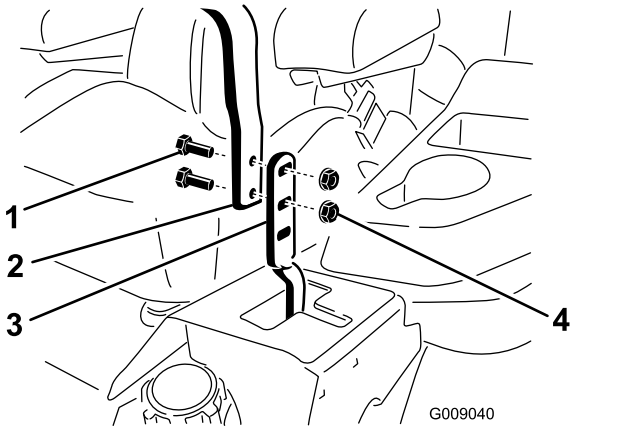

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Figure 83

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

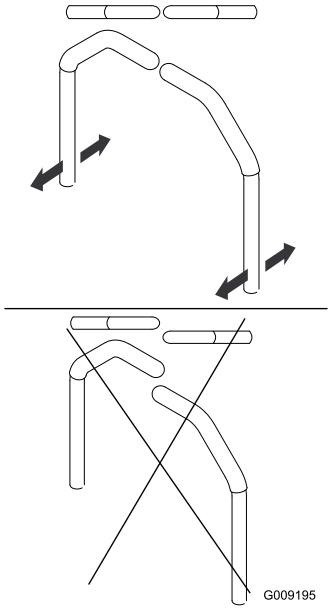

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Figure 84

5. If the ends of the levers hit against each other, refer to Adjusting the Motion Control Neutral-Lock Pivot (page 59) .
6. Repeat to adjust the control levers.

Adjusting the Motion-Control Linkage

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

⚠ WARNING

Engine must be running and drive wheels must be turning so motion control adjustment can be performed. Contact with moving parts or hot surfaces may cause personal injury.

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

1. Prior to starting the engine, push the deck-lift pedal, and remove the height-of-cut pin.
2. Lower deck to the ground.
3. Raise the rear of machine up and support it with jack stands (or equivalent support).

   Note: Raise the machine just high enough to allow drive wheels to turn freely.

4. 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.

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

6. Start the engine and run it at full throttle and release the brake.

   Note: The brake must be engaged and the motion-control levers must be out to start the engine. The operator does not have to be in the seat, because of the jumper wire being used.

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

   Note: The motion-control levers needs to be in the NEUTRAL-LOCK position while making any necessary adjustments.

8. Bring the motion-control levers into the NEUTRAL-LOCK position.

9. 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 85).

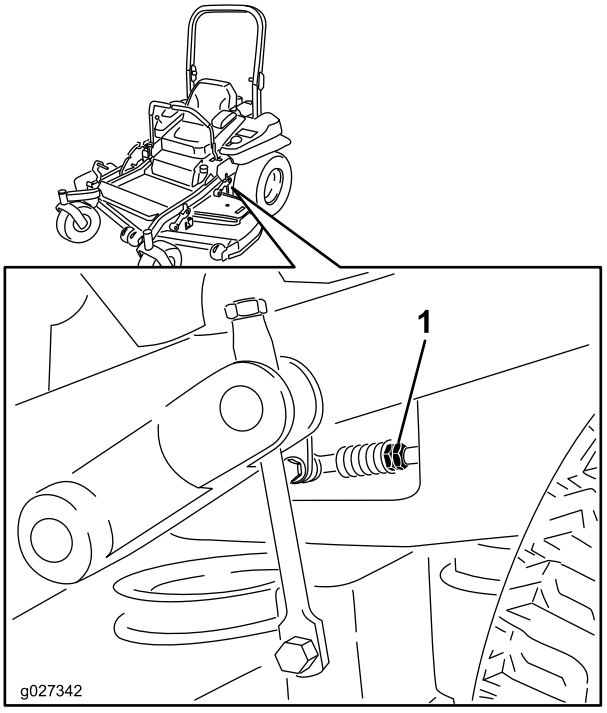

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Figure 85

1. Double nuts

10. 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-LOCK position.

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

11. Shut off the unit, remove the jumper wire from the wire harness, and plug the connector into the seat switch.

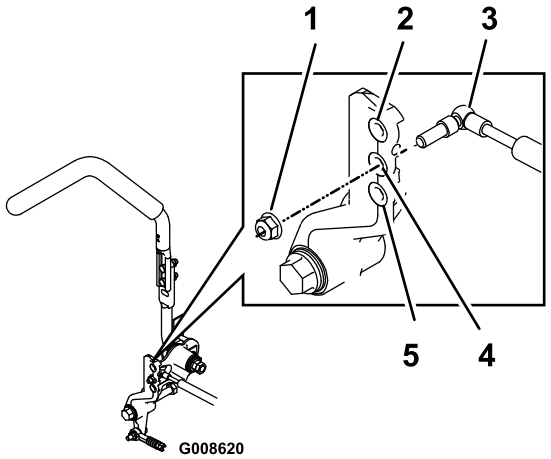
12. Remove the jack stands.

13. Raise the deck and install the height-of-cut pin.

14. Check that the machine does not creep in neutral with the park brakes disengaged.

Adjusting the Motion-Control Damper

The top damper mounting bolt can be adjusted to obtain a more desired motion-control lever resistance. See Figure 86 for mounting options.



g008620

Figure 86

Right-hand control shown

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

Adjusting the Motion Control Neutral-Lock Pivot

The flanged nut can be adjusted to obtain a more desired motion-control lever resistance when moving it to the NEUTRAL-LOCK position. See Figure 87 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.

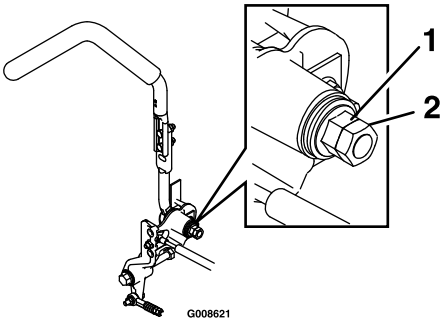


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Figure 87

1. Flanged nut
2. Jam nut

Hydraulic System Maintenance

Servicing the Hydraulic System

Hydraulic Fluid Type: Toro® HYPR-OIL™ 500 hydraulic fluid or Mobil® 1 15W-50.

Important: **Use the specified fluid. Other fluids could cause system damage.**

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

Checking the Hydraulic Fluid

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

1. Position the machine on a level surface.
2. Disengage the 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. Allow the engine and the hydraulic system to cool for 10 minutes.

   Note: The fluid level on the dipstick will be incorrect when the fluid is checked and the unit is hot.
5. Move the seat forward.
6. Clean the area around the dipsticks of hydraulic-system reservoirs (Figure 88).
7. Remove one dipstick from the hydraulic reservoir (Figure 88).
8. Wipe the dipstick off and thread the dipstick into the reservoir.
9. Remove the dipstick and look at the end (Figure 88).

   Important: **Do not overfill the hydraulic units with fluid as damage may occur. Do not run the machine with the fluid below the add mark.**
10. If the fluid level is at the add mark , slowly pour only enough fluid into the hydraulic reservoir to raise the level to the full or **H** line.
11. Install the dipstick.
12. Repeat the procedure for the opposite dipstick.

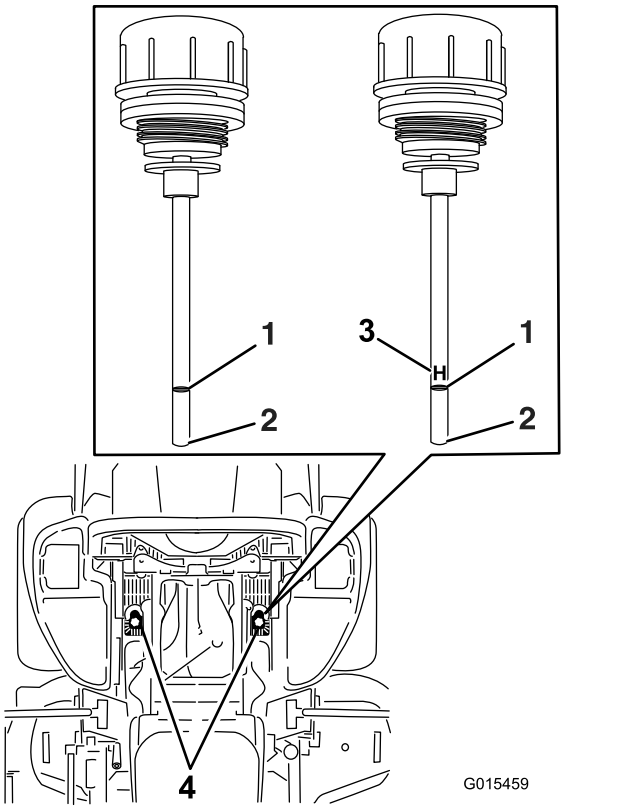

Figure 88

Either dipstick will be used in the machine

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

⚠ WARNING

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

- **If hydraulic fluid 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 pinhole leaks or nozzles that eject high-pressure hydraulic fluid.**
- **Use cardboard or paper to find hydraulic leaks.**
- **Safely relieve all pressure in the hydraulic system before performing any work on the hydraulic system.**
- **Ensure that all hydraulic-fluid hoses and lines are in good condition, and all hydraulic connections and fittings are tight before applying pressure to the hydraulic system.**

Replacing the Hydraulic Filters and Hydraulic Fluid

Service Interval: After the first 250 hours—Change the hydraulic filters and hydraulic fluid when using any type of fluid.

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

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

To replace the hydraulic fluid, the filters need to be removed. Replace both at the same time; refer to Servicing the Hydraulic System (page 59) for the fluid 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 89).

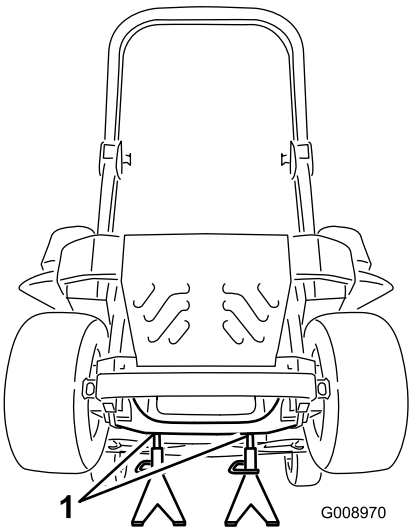

Figure 89

1. Jack stands

4. Remove both the mower belt and the pump-drive belt; refer to Replacing the Mower Belt (page 55) and Replacing the Hydraulic Pump-Drive Belt (page 56).

   Note: This prevents fluid from getting on the belts.

5. Place a drain pan under the filter, remove the old filter, and wipe the surface clean (Figure 90).

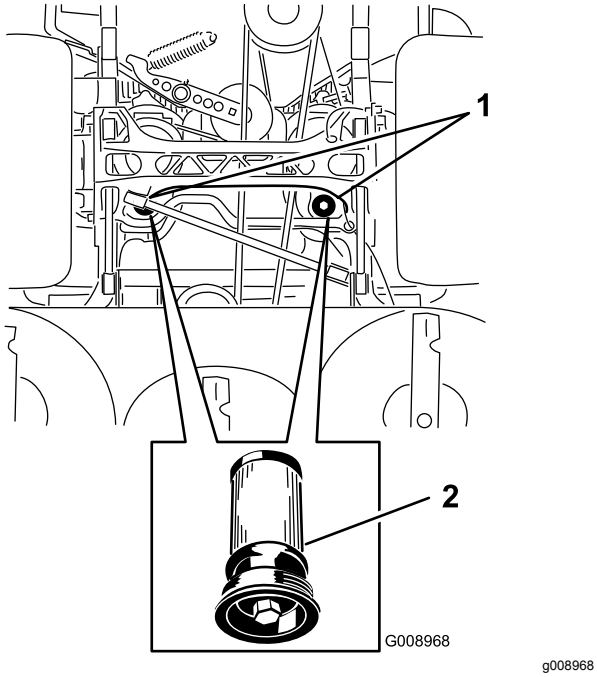

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Figure 90
Bottom View of Machine

1. Filter locations
2. Hydraulic filter

6. Apply a thin coat of hydraulic fluid to the rubber gasket on the replacement filter (Figure 90).
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 89).
10. Add fluid to the hydraulic reservoir and check for any leaks.
11. Clean up any spilled fluid.
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 fluid level while the fluid is cold.
15. If required, add fluid 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 leveled 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. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
4. Check tire pressure of the drive tires.
5. If needed, adjust to 90 kPa (13 psi).
6. Position the mower to the 76 mm (3 inches) height-of-cut position.

Leveling the Deck

1. Move the mower on a flat surface.
2. Shut off the 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 and the deck will latch at the 140 mm (5-1/2 inches) transport position (Figure 91).

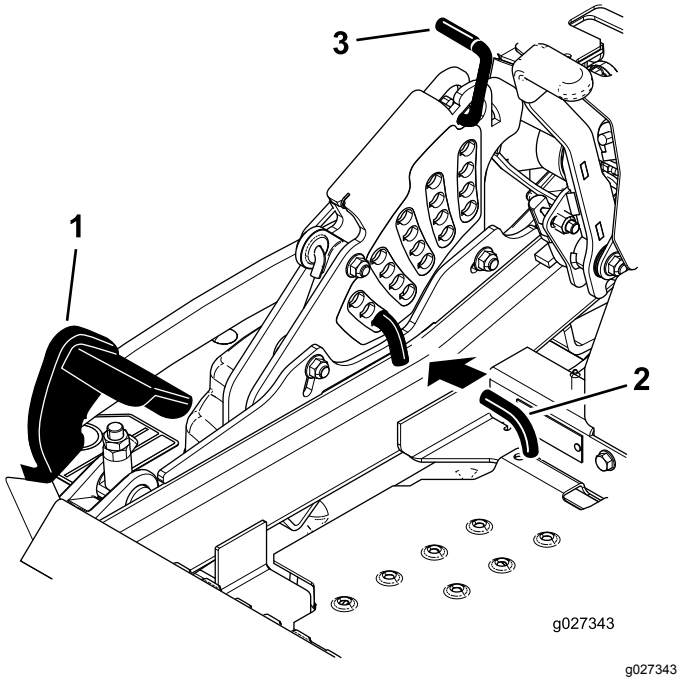


Figure 91

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

6. Insert the height adjustment pin into the 76 mm (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 (Postion A) as shown in Figure 92.

   Note: The measurement should read 76 mm (3 inches)

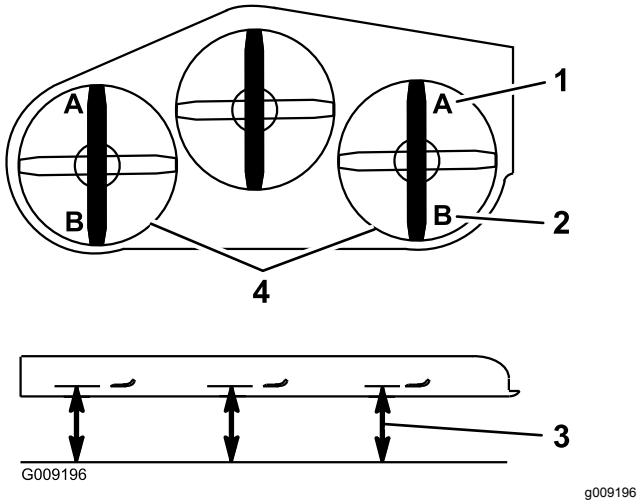


Figure 92

1. 76 mm (3 inches) at position A is correct
2. 83 mm (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. If needed, loosen the whizlock nut on the side of the yoke and the jam nut on top (Figure 93).
11. Fine tune the screw adjuster by turning it to get 76 mm (3 inches) height.

    Note: To increase the height, turn the adjuster screw clockwise; to decrease, turn it counterclockwise.

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

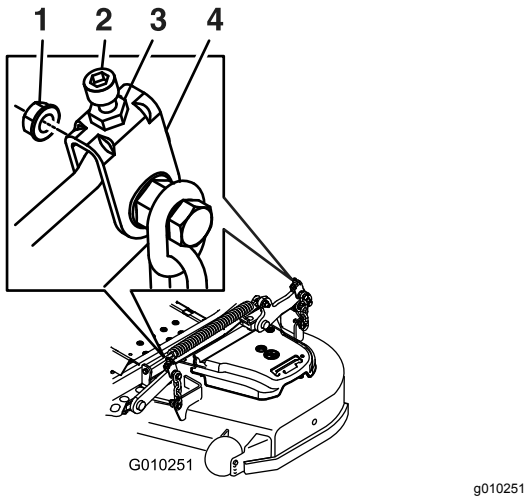


Figure 93

1. Whizlock nut
2. Adjuster screw
3. Jam nut
4. Yoke

12. To adjust the single point system, loosen the 2 bolts at the bottom of the height-of-cut plate (Figure 94).

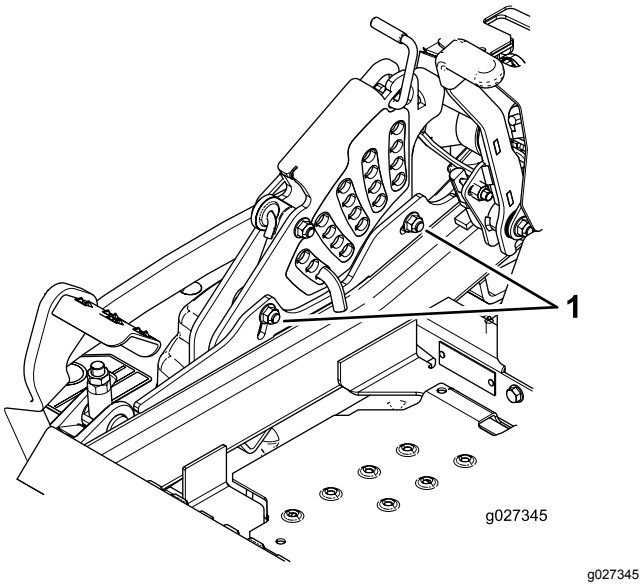


Figure 94

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 95).

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

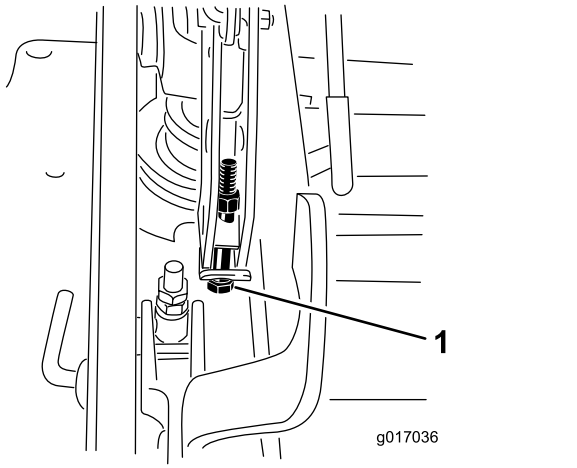


Figure 95

1. Single-point adjustment bolt

14. Tighten the 2 bolts at the bottom of the height-of-cut plate (Figure 94). T

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

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 (postion B) as shown in Figure 92.

    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 93).

    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 of 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, you may want to keep extra blades on hand.

⚠ WARNING

A worn or damaged blade can break, and a piece of the blade could be thrown into the operator's or bystanders' area, 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

Park the machine on a level surface, disengage the blades and set the parking brake. 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 96).
2. If the edges are not sharp or have nicks, remove and sharpen the blade; refer to Sharpening the Blades (page 65).
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 96).

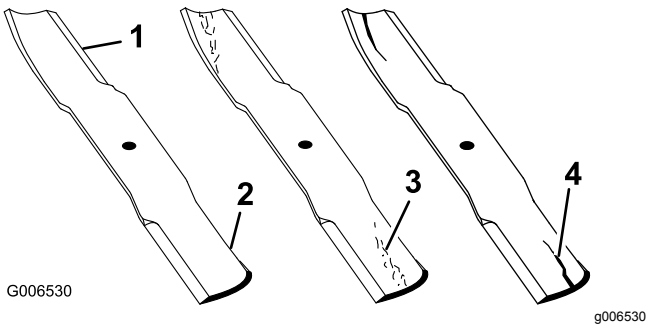


Figure 96

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

Checking for Bent Blades

1. Disengage the 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. Rotate the blades until the ends face forward and backward.
4. Measure from a level surface to the cutting edge, position **A**, of the blades (Figure 97).

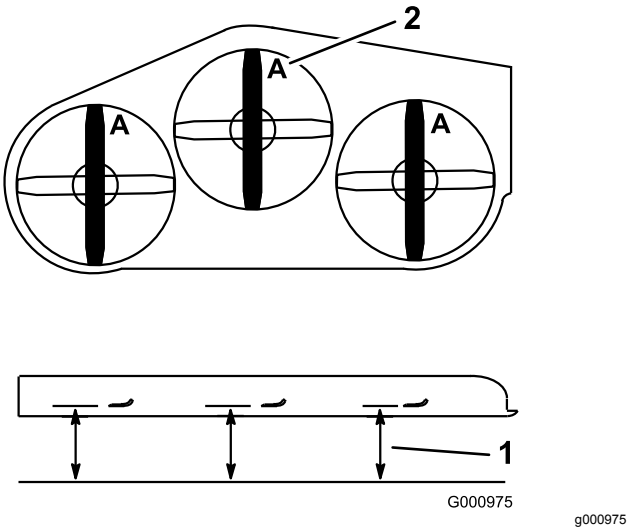


Figure 97

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 above.

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

Blades must be replaced if a solid object is hit, 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, the curved washer, and the blade from the spindle shaft (Figure 98).

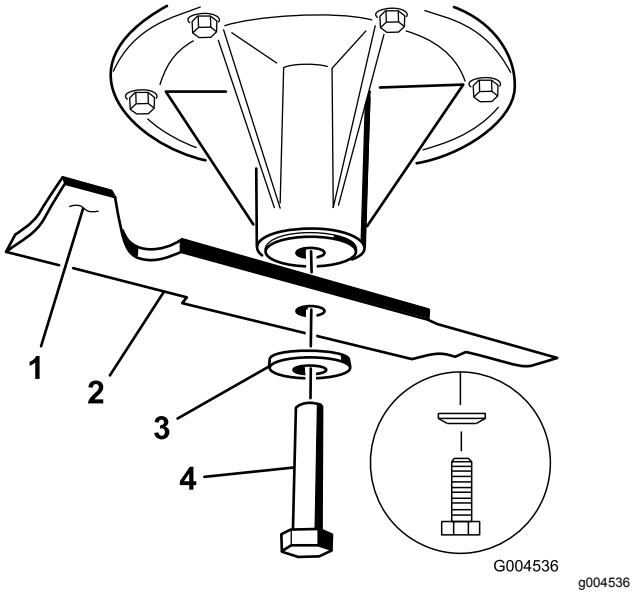


Figure 98

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 99).

   Note: Maintain the original angle.

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

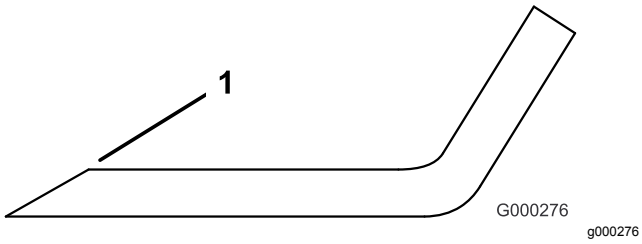


Figure 99

1. Sharpen at the original angle

2. Check the balance of the blade by putting it on a blade balancer (Figure 100).

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

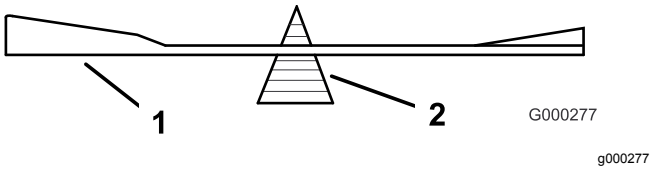


Figure 100

1. Blade
2. Balancer

3. If the blade is not balanced, file some metal off the end of the sail area only (Figure 98).
4. Repeat this procedure until the blade is balanced.

Installing the Blades

1. Install the blade onto the spindle shaft (Figure 101).

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

2. Install the spring disk and blade bolt (Figure 101).

   Note: The spring-disk cone must be installed toward the bolt head (Figure 101).

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

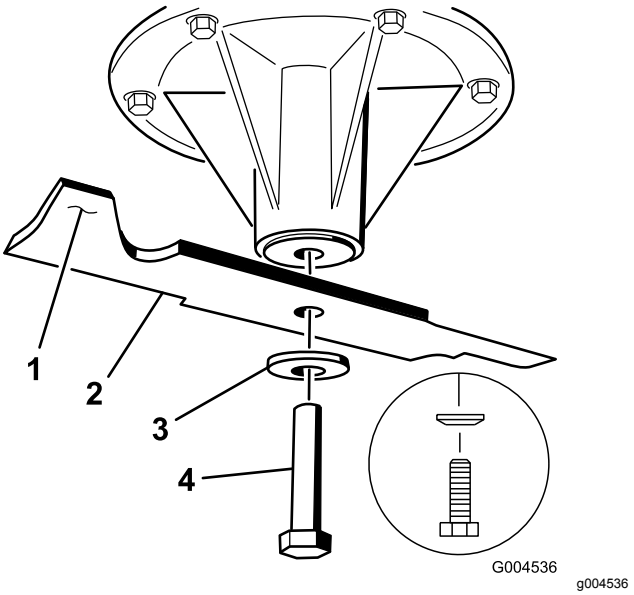


Figure 101

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, the spring-loaded deck arms must be locked out.

⚠ 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 moving parts to stop, remove the key, and engage the parking brake.
2. Remove the height-adjustment pin and lower the deck to the ground.
3. Place the height-adjustment pin in the 76 mm (3 inches) cutting-height location.

   Note: This locks the deck-lift arms in the lowest position when the deck is removed and the stored energy in the deck spring is released.
4. Remove the belt covers.
5. Lift up the floor pan and insert a ratchet into the square hole in the deck idler (Figure 102).
6. Rotate the deck idler clockwise and remove the mower belt (Figure 102).

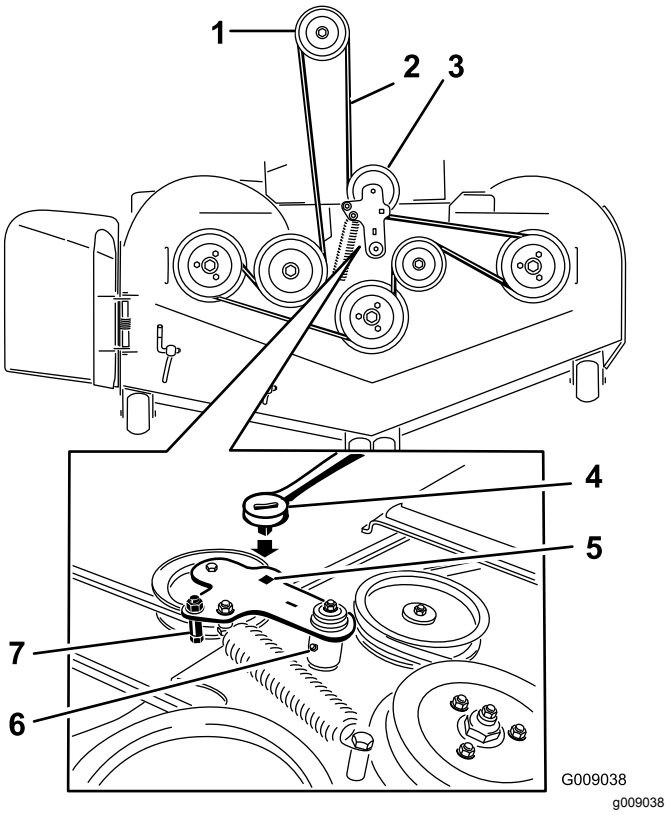


Figure 102

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 (Figure 103).

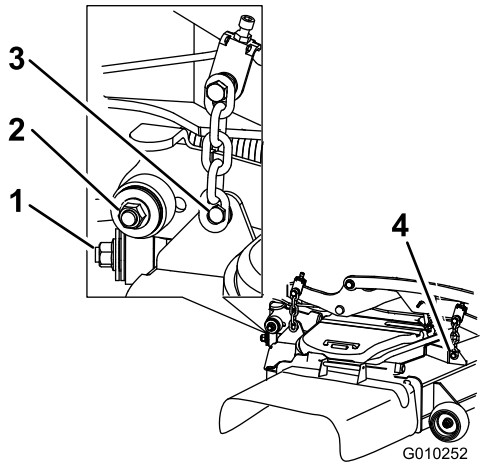


Figure 103

1. Right stabilizer
2. Deck strut (right side shown)
3. Remove the rear deck-lift attachment shoulder bolt and nut.
4. Remove the front deck-lift attachment 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 in the operator's or bystander's direction and result in serious injury. Also, contact with the blade could occur.

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

1. Remove the locknut, the bolt, the spring, and the spacer holding the deflector to the pivot brackets (Figure 104).
2. Remove the damaged or worn grass deflector (Figure 104).

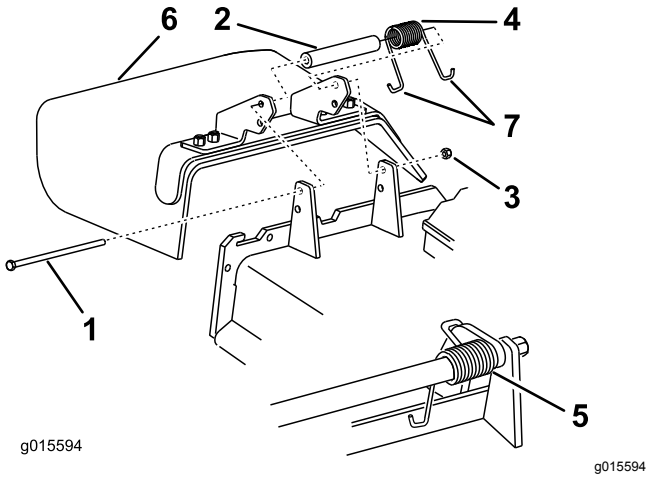


Figure 104

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 one **J**-end of the spring behind the deck edge.

   Note: Ensure that one **J**-end of the spring is installed behind the deck edge before installing the bolt as shown in Figure 104.
5. Install the bolt and the nut.
6. Place one **J**-hook end of the spring around the grass deflector (Figure 104).

   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. Shut off 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 fluid, and engine coolant are pollutants to the environment. Dispose of these according to your state and local regulations.

Storage

Cleaning and Storing the Machine

1. Disengage the power-take off (blade-control switch (PTO), set the parking brake, and turn the ignition key to the OFF position, and remove the key.
2. Remove grass clippings, dirt, and grime from the external parts of the entire machine (especially the engine and hydraulic system). Clean dirt and chaff from the outside of the engine-cylinder-head fins and the 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; refer to Adjusting the Parking Brake (page 54).
4. Service the air cleaner; refer to Servicing the Air Cleaner (page 37).
5. Grease the machine; refer to Lubrication (page 35).
6. Change the crankcase oil; refer to Lubricating the Machine (page 35).
7. Check the tire pressure; refer to Checking the Tire Pressure (page 49).
8. Change the hydraulic filters; refer to Servicing the Hydraulic System (page 59).
9. Charge the battery; refer to Charging the Battery (page 46).
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 64).
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. Shut off the engine, allow it to cool, and drain the fuel tank; refer to Servicing the Fuel Tank (page 45).

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.

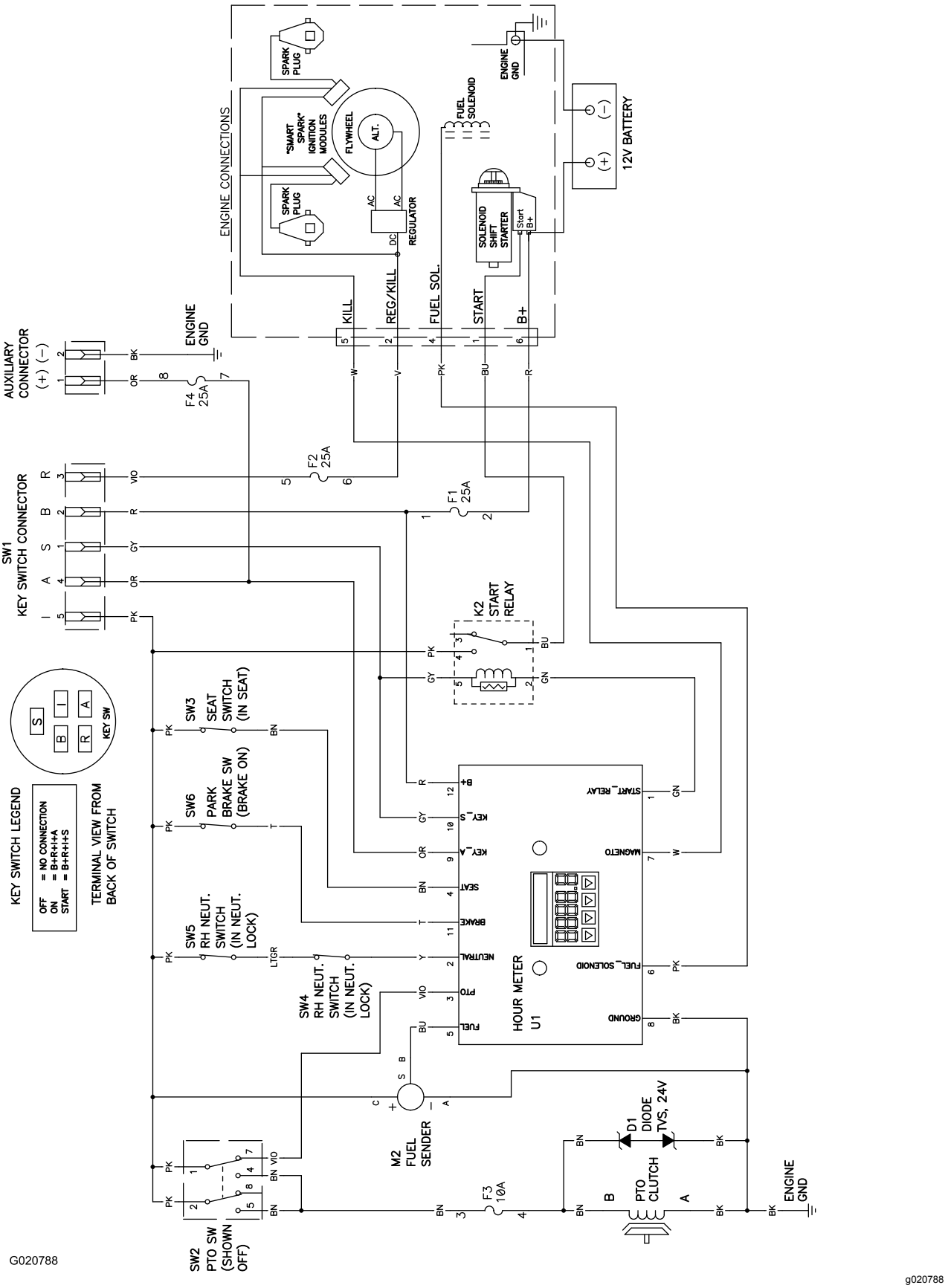
15. Store the machine in a clean, dry garage or storage area. Remove the key from the ignition switch and keep it out of reach of children or other unauthorized users. Cover the machine to protect it and keep it clean.

Troubleshooting

Problem	Possible Cause	Corrective Action
The starter does not crank.	1. The blade-control switch (PTO) is engaged. 2. The parking brake is not on. 3. The motion-control levers are not in the NEUTRAL-LOCK position. 4. The operator is not seated. 5. The battery is dead. 6. The electrical connections are corroded or loose. 7. The fuse is blown. 8. The relay or switch is worn or damaged.	1. Move the blade-control switch (PTO) to the disengaged position. 2. Set the parking brake. 3. Ensure that the motion-control levers are in the NEUTRAL-LOCK position. 4. Sit on the seat. 5. Charge the battery. 6. Check the electrical connections for good contact. 7. Replace the fuse. 8. Contact an Authorized Service Dealer.
The engine does not start, starts hard, or fails to keep running.	1. The fuel tank is empty. 2. The fuel-shutoff valve is closed. 3. The oil level in the crankcase is low. 4. The throttle is not in the correct position. 5. There is dirt in the fuel filter. 6. There is dirt, water, or stale fuel in the fuel system. 7. The air cleaner is dirty. 8. The seat switch is not functioning properly. 9. The electrical connections are corroded, loose, or damaged. 10. The relay or switch is worn or damaged. 11. The spark plug is fouled or improperly gapped. 12. The spark-plug wire is not connected.	1. Fill the fuel tank. 2. Open the fuel-shutoff valve. 3. Add oil to the crankcase. 4. Be sure that the throttle control is midway between the SLOW and FAST positions. 5. Replace the fuel filter. 6. Contact an Authorized Service Dealer. 7. Clean or replace the air-cleaner element. 8. Check the seat-switch indicator. Replace the seat if necessary. 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. 10. Contact an Authorized Service Dealer. 11. Adjust or replace the spark plug. 12. Check the spark-plug wire connection.
The engine loses power.	1. The engine load is excessive. 2. The air cleaner is dirty. 3. The oil level in the crankcase is low. 4. The cooling fins and the air passages above the engine are plugged. 5. The vent hole in the fuel cap is plugged. 6. There is dirt in the fuel filter. 7. There is dirt, water, or stale fuel in the fuel system.	1. Reduce the ground speed. 2. Clean the air-cleaner element. 3. Add oil to the crankcase. 4. Remove the obstruction from the cooling fins and the air passages. 5. Clean or replace the fuel cap. 6. Replace the fuel filter. 7. Contact an Authorized Service Dealer.
The engine overheats.	1. The engine load is excessive. 2. The oil level in the crankcase is low. 3. The cooling fins and the air passages above the engine are plugged.	1. Reduce the ground speed. 2. Add oil to the crankcase. 3. Remove the obstruction from the cooling fins and the air passages.
The mower pulls to the left or right (with levers fully forward).	1. The tracking needs adjustment 2. The tire pressure in the drive tires is not correct.	1. Adjust the tracking. 2. Adjust the tire pressure in the drive tires.

Problem	Possible Cause	Corrective Action
The machine does not drive.	1. The bypass valves are not closed tight. 2. The pump belt is worn, loose, or broken. 3. The pump belt is off a pulley. 4. The idler spring is broken or missing. 5. The hydraulic fluid level is low or too hot.	1. Tighten the bypass valves. 2. Change the belt. 3. Change the belt. 4. Replace the spring. 5. Add hydraulic fluid to the reservoirs or let it cool down.
The machine vibrates abnormally.	1. The cutting blade(s) is/are bent or unbalanced. 2. The blade mounting bolt is loose. 3. The engine mounting bolts are loose. 4. The engine pulley, idler pulley, or blade pulley is loose. 5. The engine pulley is damaged. 6. The blade spindle is bent. 7. The motor mount is loose or worn.	1. Install new cutting blade(s). 2. Tighten the blade mounting bolt. 3. Tighten the engine mounting bolts. 4. Tighten the appropriate pulley. 5. Contact an Authorized Service Dealer. 6. Contact an Authorized Service Dealer. 7. Contact an Authorized Service Dealer.
The machine produces an uneven cutting height.	1. The blade(s) is/are not sharp. 2. The cutting blade(s) is/are bent. 3. The mower deck is not level. 4. The underside of mower is dirty. 5. The tire pressure is not correct. 6. The blade spindle is bent.	1. Sharpen the blade(s). 2. Install new cutting blade(s). 3. Level the mower deck from side-to-side and front-to-rear. 4. Clean the underside of the mower. 5. Adjust the tire pressure. 6. Contact an Authorized Service Dealer.
The blades do not rotate.	1. The mower-deck belt is worn, loose, or broken. 2. The mower-deck belt is off pulley. 3. The pump-drive belt is worn, loose, or broken. 4. The idler spring is broken or missing.	1. Install a new deck belt. 2. Install the mower-deck pulley and check the idler pulley, idler arm, and spring for correct position and function. 3. Check the belt tension or install a new belt. 4. Replace the spring.
The clutch does not engage.	1. The fuse is blown. 2. There is low-voltage supply at the clutch. 3. The coil is damaged. 4. There is inadequate current supply. 5. The rotor/armature air gap is too large.	1. Replace the fuse. Check the coil resistance, battery charge, charging system, and wiring connections, and replace components if necessary. 2. Check the coil resistance, battery charge, charging system, and wiring connections and replace parts if necessary. 3. Replace the clutch. 4. Repair or replace the clutch-lead wire or electrical system. Clean the connector contacts. 5. Remove the shim or replace the clutch.

Schematics



Wire Diagram (Rev. A)

Notes:

Notes:

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The Toro Total Coverage 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 by the original owner:

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

[1]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.

[2]Whichever occurs first.

[3]Lifetime Frame Warranty - If the main frame, consisting of the parts welded together to form the tractor structure that other components such as the engine are secured to, cracks or breaks in normal use, it will be repaired or replaced, at Toro's option, under warranty at no cost for parts and labor. Frame failure due to misuse or abuse and failure or repair required due to rust or corrosion are not covered.

[4]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, refer to the Yellow Pages of your telephone directory (look under “Lawn Mowers”) or access our web site at 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:

   RLC Customer Care Department
   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 and 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 that 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.