Form No. 3417-811 Rev C

TORO®

Count on it.

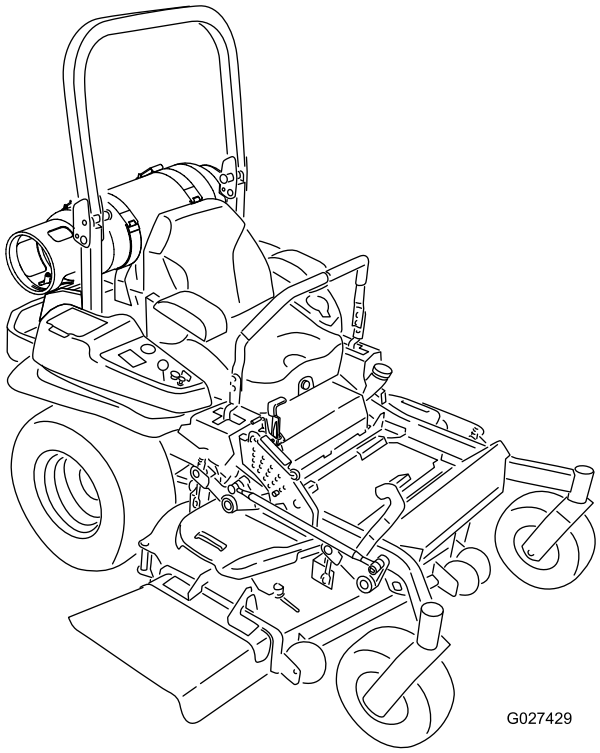
Operator's Manual

Z Master® Professional 5000 Series Riding Mower

with 60in or 72in TURBO FORCE® Side Discharge Mower

Model No. 74933—Serial No. 401000000 and Up

Model No. 74934—Serial No. 401000000 and Up



G027429

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

3417-811 C

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

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

Please refer to the engine manufacturer's information included with the machine.

⚠ 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.

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

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

Introduction

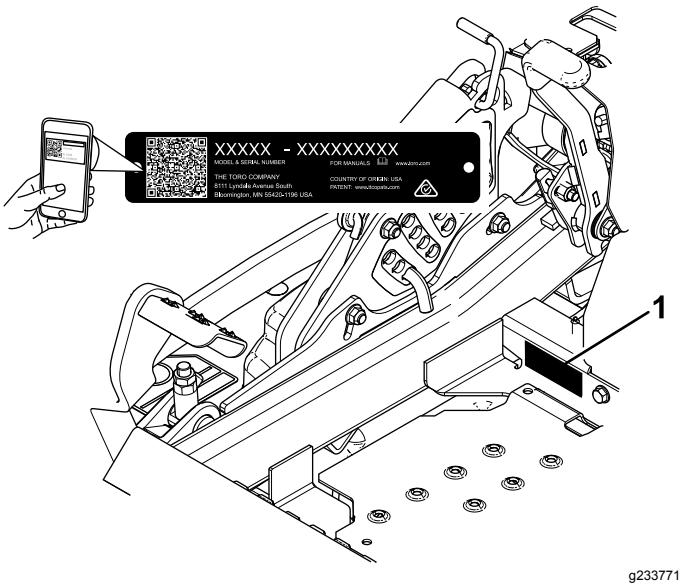
This rotary-blade, riding lawn mower is intended to be used by professional, hired operators. It is designed primarily for cutting grass on well-maintained lawns on residential or commercial properties.

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

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

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

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



g233771

Figure 1

1. Model and serial number location

Model No. _____

Serial No. _____

8111 Lyndale Avenue South
Bloomington, MN 55420

Contact us at www.Toro.com.
Printed in the USA

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

Contents

Safety

This machine has been designed in accordance with ANSI B71.4-2017.

Safety Alert Symbol

This Safety Alert Symbol (Figure 2) is used both in this manual and on the machine to identify important safety messages which must be followed to avoid accidents.

This symbol means: **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**

g000502

Figure 2
Safety Alert Symbol

The safety alert symbol appears above information which alerts you to unsafe actions or situations and will be followed by the word **DANGER**, **WARNING**, or **CAUTION**.

DANGER: Indicates an imminently hazardous situation which, if not avoided, **Will** result in death or serious injury.

WARNING: Indicates a potentially hazardous situation which, if not avoided, **Could** result in death or serious injury.

CAUTION: Indicates a potentially hazardous situation which, if not avoided, **May** result in minor or moderate injury.

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

General Safety

This machine is capable of amputating hands and feet and of throwing objects. Toro designed and tested this lawn mower to offer reasonably safe service; however, failure to comply with safety instructions may result in injury or death.

- Read, understand, and follow all instructions and warnings in the Operator's Manual and other training material, on the machine, engine, and attachments. All operators and mechanics should be trained. If the operator(s) or mechanic(s) can not read this manual, it is the owner's responsibility to explain this material to them; other languages may be available on our website.
- Only allow trained, responsible, and physically capable operators that are familiar with the safe operation, operator controls, and safety signs and instructions to operate the machine. Never let children or untrained people operate or service the equipment. Local regulations may restrict the age of the operator.
- Always keep the roll bar in the fully raised and locked position and use the seat belt.
- Do Not operate the machine near drop-offs, ditches, embankments, water, or other hazards, or on slopes greater than 15 degrees.
- Do Not put your hands or feet near moving components of the machine.
- Never operate the machine with damaged guards, shields, or covers. Always have safety shields, guards, switches and other devices in place and in proper working condition.
- Stop the machine, shut off the engine, and remove the key before servicing, fueling, or unclogging the machine.

Slope Indicator

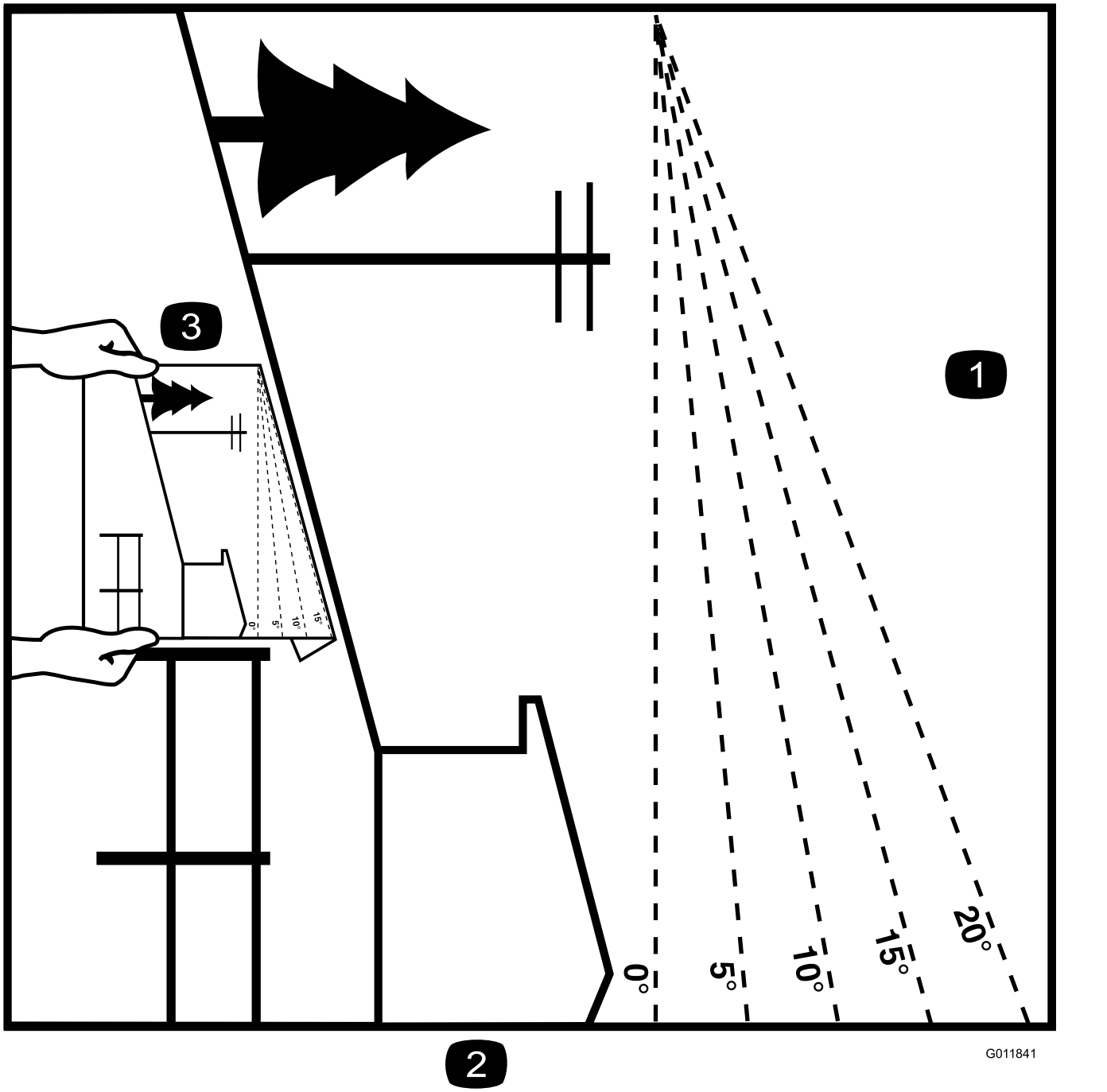


Figure 3

You may copy this page for personal use.

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

Safety and Instructional Decals

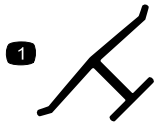
Safety decals and instructions are easily visible to the operator and are located near any area of potential danger. Replace any decal that is damaged or missing.

decalbatterysymbols

Battery Symbols

Some or all of these symbols are on your battery.

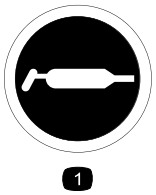
1. Explosion hazard
2. No fire, open flame, or smoking
3. Caustic liquid/chemical burn hazard
4. Wear eye protection.
5. Read the *Operator's Manual*.
6. Keep bystanders away from the battery.
7. Wear eye protection; explosive gases can cause blindness and other injuries.
8. Battery acid can cause blindness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



decaloemmarkt

Manufacturer's Mark

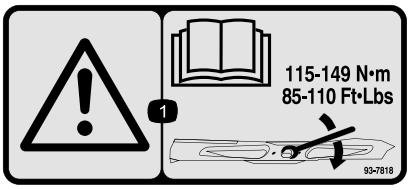
1. This mark indicates that the blade is identified as a part from the original machine manufacturer.



decal58-6520

58-6520

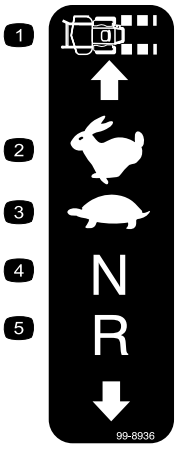
1. Grease



decal93-7818

93-7818

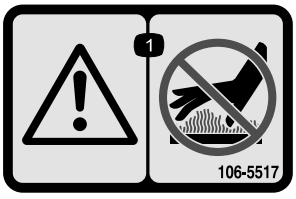
1. Warning—read the *Operator's Manual* for instructions on torquing the blade bolt/nut to 115 to 149 N·m (85 to 110 ft-lb).



decal99-8936

99-8936

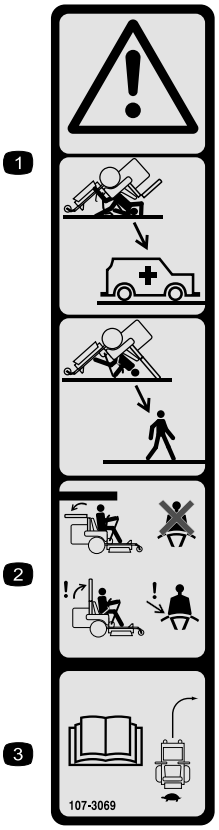
1. Machine speed
2. Fast
3. Slow
4. Neutral
5. Reverse



decal106-5517

106-5517

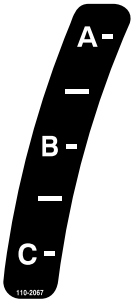
1. Warning—do not touch the hot surface.



decal107-3069

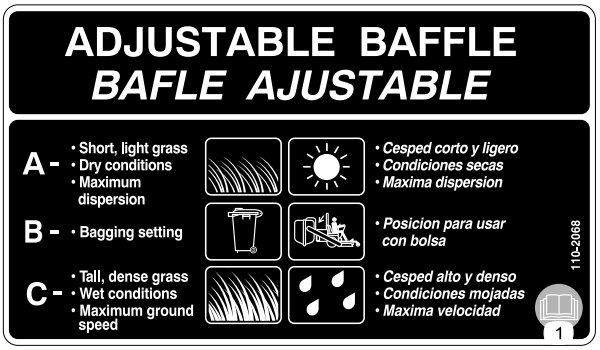
107-3069

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 raised and locked position and wear the seat belt. Lower the roll bar only when absolutely necessary; do not wear the seat belt when the roll bar is down.
3. Read the *Operator's Manual*; drive slowly and carefully.



decal110-2067

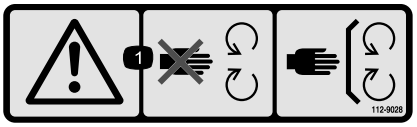
110-2067



decal110-2068

110-2068

1. Read the *Operator's Manual*.



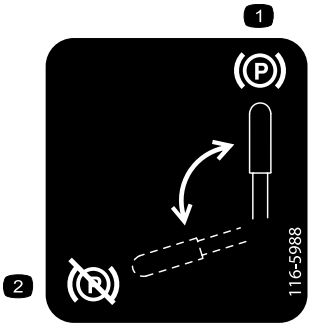
decal112-9028

112-9028

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

decal116-4858

116-4858



decal116-5988

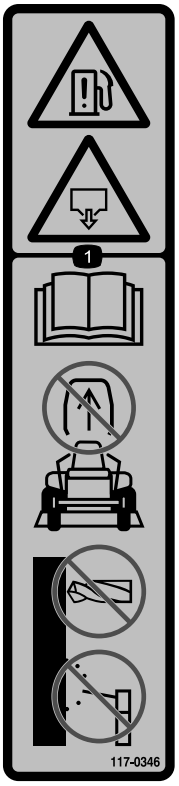
116-5988

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

decal116-8726

116-8726

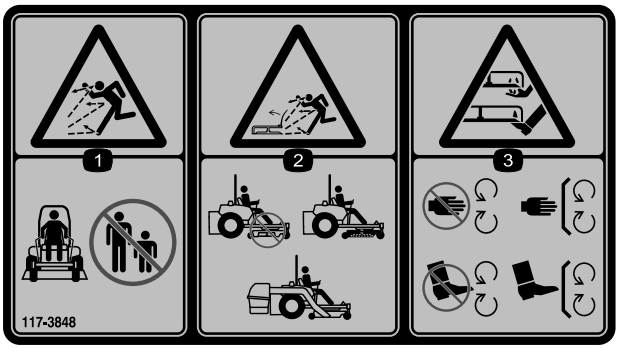
1. Read the *Operator's Manual* for the recommended hydraulic fluid.



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

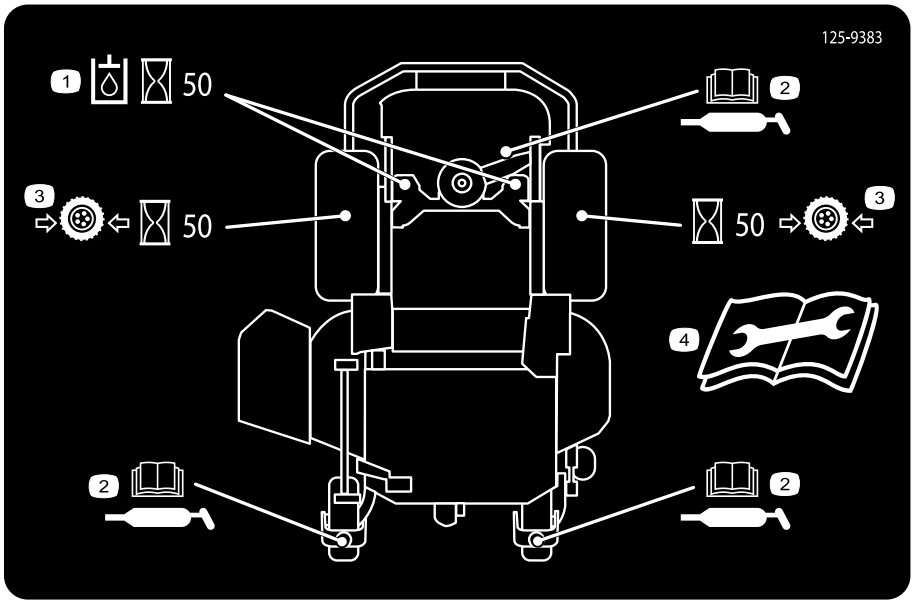
117-3848

1. Thrown object hazard—keep bystanders a safe distance away from the machine.
2. Thrown object hazard, mower—do not operate the machine without the 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.

decal119-6807

119-6807

1. Warning—no step



decal125-9383

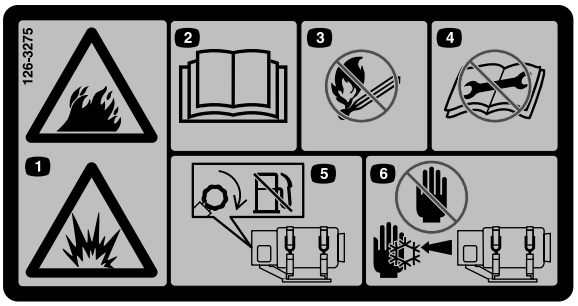
125-9383

1. Check the 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.

decal126-2055

126-2055

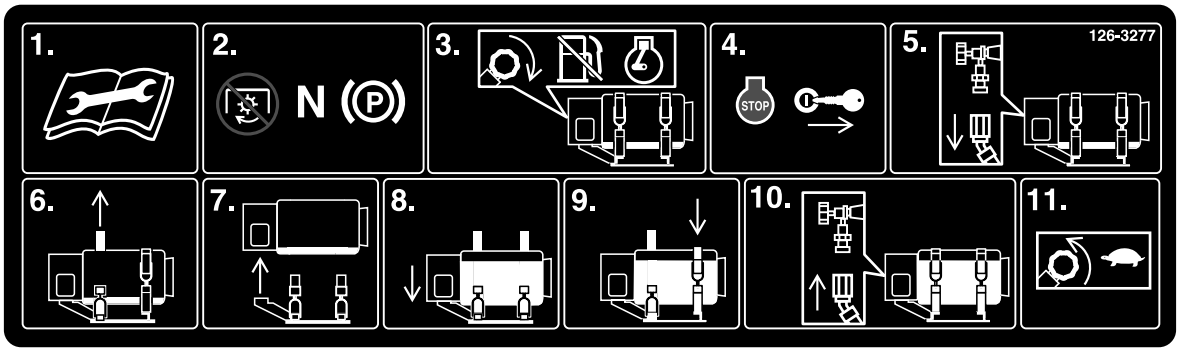
1. Wheel lug nut torque 129 N·m (95 ft-lb) (4x)
2. Wheel hub nut torque 319 N·m (235 ft-lb)
3. Read and understand the *Operator's Manual* before performing any maintenance, check torque after first 100 hours then every 500 hours thereafter.



decal126-3275

126-3275

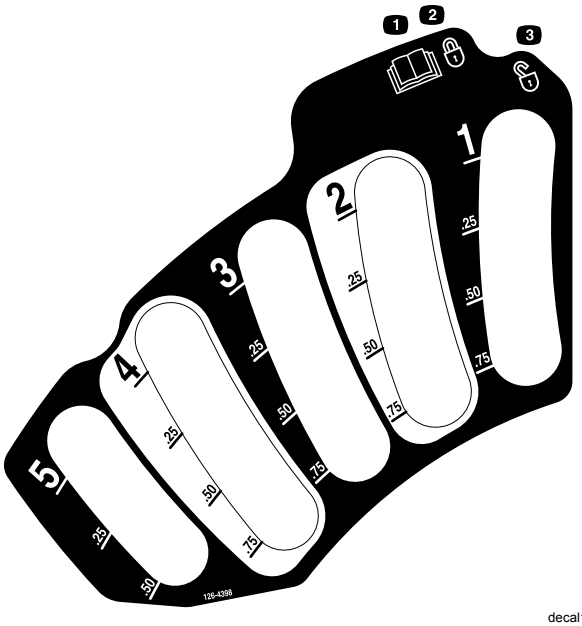
1. Danger—LPG fuel is extremely flammable and vapors are explosive.
2. Read the *Operator's Manual*.Consult NFPA 58: Liquefied Petroleum Gas Code for additional safety information.
3. Do not smoke or replace the tank(s) around sources of fuel ignition.
4. Do not attempt to repair or modify the tank or its components. Contact trained and qualified person. Use only LPG tank(s) approved by the LPG System manufacturer.
5. Close the fuel valve when mower is not in use, in storage, or transporting.
6. Avoid contact with LPG fuel. Escaping vapors and liquids freezes skin on contact.



decal126-3277

126-3277

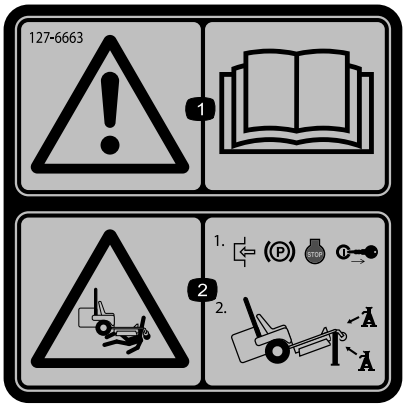
1. IMPORTANT: Use only replacement tank(s) that are free of dents or damage. Match size and type required on tank specification decal.
2. Stop the machine on a level surface, disengage the PTO, and engage the parking brake.
3. Close the fuel valve(s) on the tanks by rotating them clockwise; continue to run the engine.
4. When the engine shuts off, remove the key.
5. Disconnect the LPG fuel hose(s).
6. Unlatch the cylinder bracket(s).
7. Remove the empty tank(s). Check the valve and fittings for debris or damaged O-rings.
8. Install full replacement tank(s) by aligning the center hole on the tank collar over the mounting tab/index pin.
9. Latch the bracket(s) and ensure that the tank(s) is securely fastened to the mower.
10. Connect the fuel hose(s).
11. Slowly open the fuel valve(s) counterclockwise to equalize the pressure. Check for leaks.



decal126-4398

126-4398

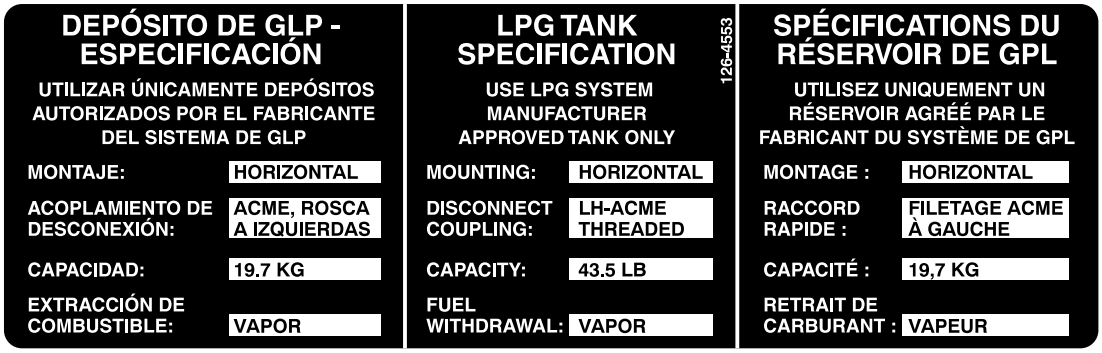
1. Read the *Operator's Manual*.
2. Lock
3. Unlock



decal127-6663

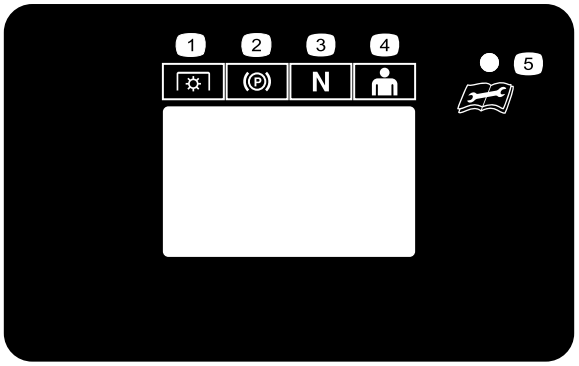
127-6663

1. Warning—read the *Operator's Manual*.
2. Crushing hazard—engage the parking brake, shut off the engine, and remove the key; jack the machine using a manufacturer-approved jack, and always use a jackstand.



decal126-4553

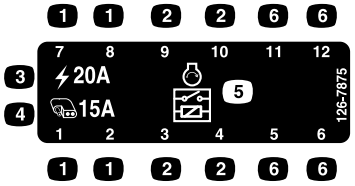
126-4553



g224114

126-5641

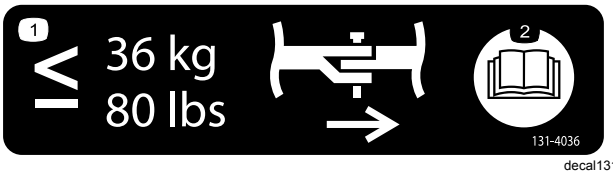
1. PTO
2. Parking brake
3. Neutral
4. Operator-presence switch
5. See user's guide for operating condition code



decal126-7875

126-7875

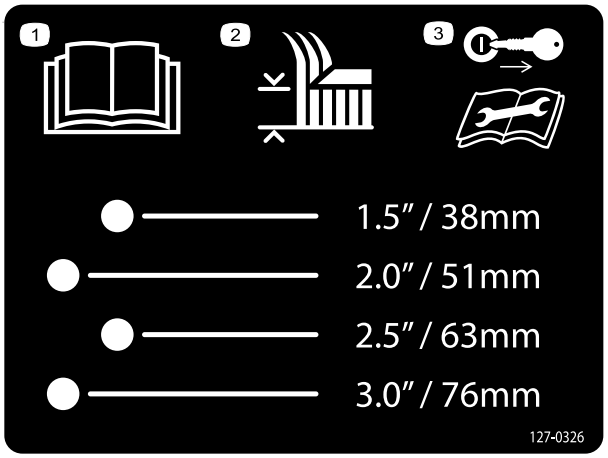
1. Fuse location
2. Relay location
3. Main (20 A)
4. Auxiliary (15 A)
5. Start relay
6. Not used



decal131-4036

131-4036

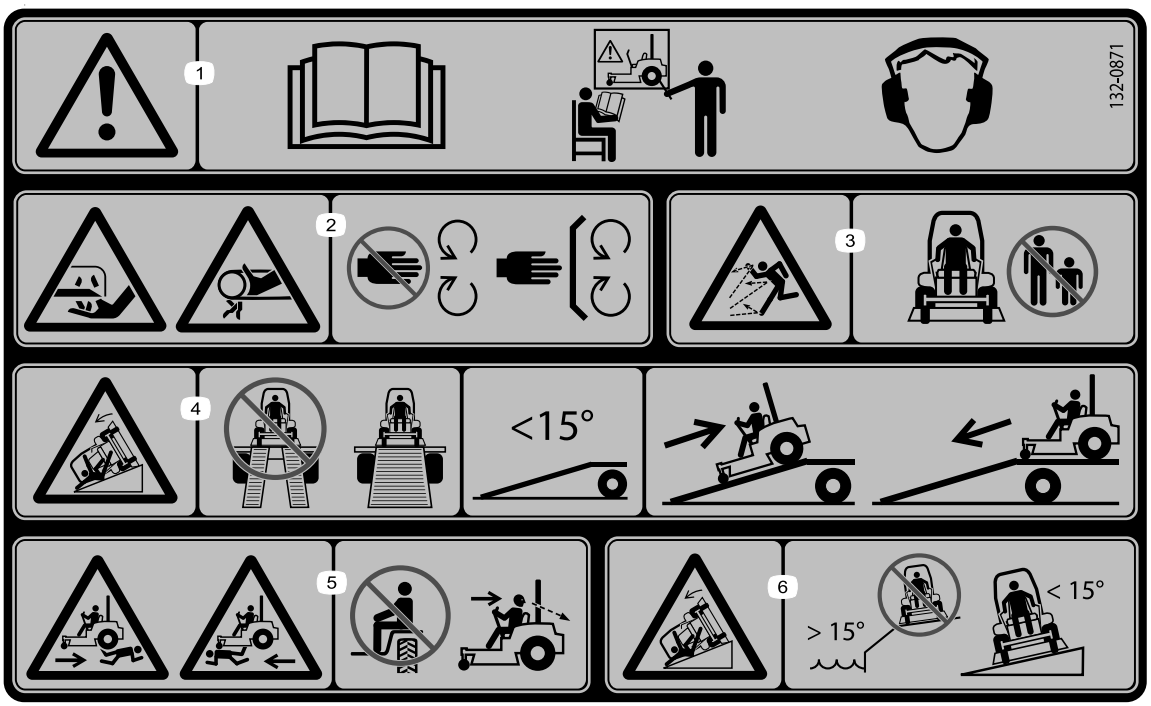
1. Maximum drawbar pull 36 kg (80 lb)
2. Read the *Operator's Manual*.



decal127-0326

127-0326

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

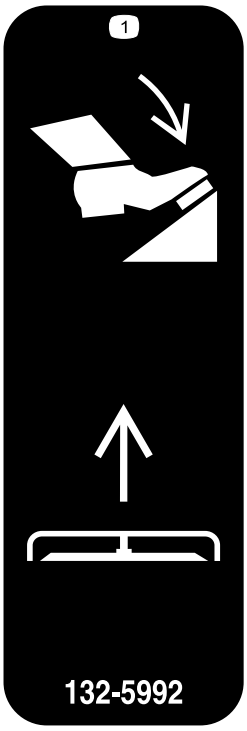


decal132-0871

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.

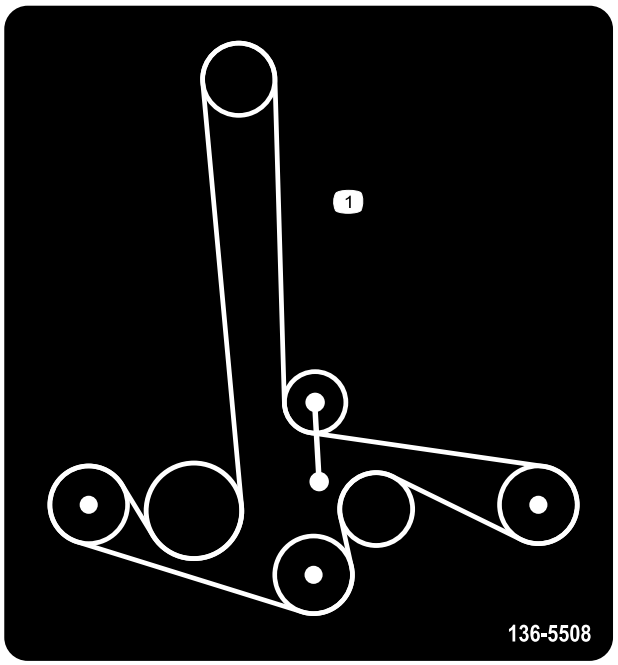
1. Warning—read the *Operator's Manual*; do not operate this machine unless you are trained; wear hearing protection.
2. Cutting, dismembering, and entanglement hazard—keep hands away from moving parts; keep all guards and shields in place.
3. Thrown object hazard—keep bystanders away.
4. Ramp hazard—when 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°.



decal132-5992

132-5992

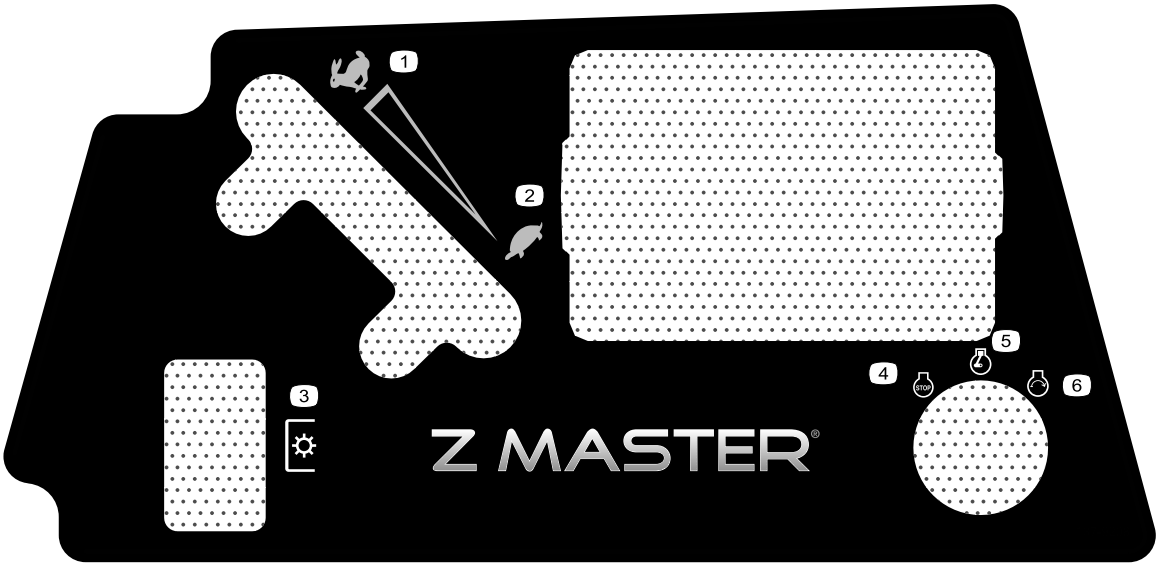
1. Press down on the pedal to lift the deck.



decal136-5508

136-5508

1. Belt routing



decal137-9208

137-9208

1. Fast
2. Slow
3. PTO
4. Engine—stop
5. Engine—run
6. Engine—start

Product Overview

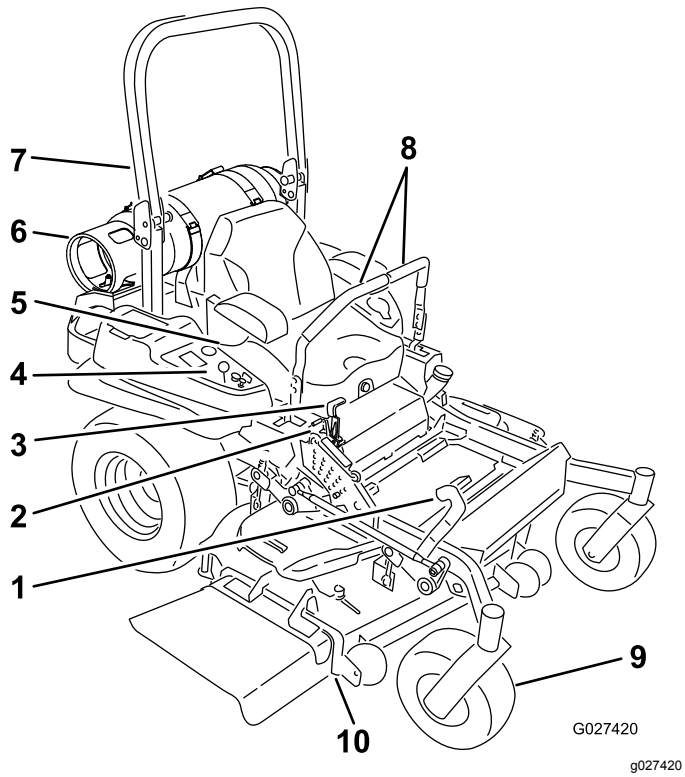


Figure 4

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

Controls

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

Control Panel

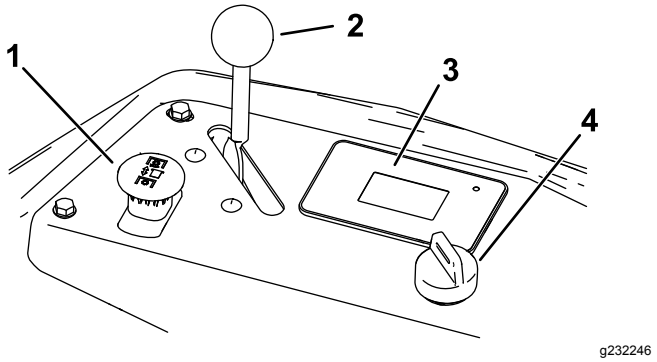


Figure 5

1. Blade-control switch (power takeoff)
2. Throttle control
3. Hour meter/Safety-interlock display
4. Key switch

Key Switch

The key switch, used to start and shut off the engine, has 3 positions: OFF, RUN, and START. Refer to Starting the Engine (page 29).

Throttle Control

The throttle controls the engine speed, and it has a continuous-variable setting from the SLOW to FAST position (Figure 5).

Choke Control

Use the choke control to start a cold engine.

Blade-Control Switch (Power Takeoff)

The blade-control switch, represented by a power-takeoff (PTO) symbol, engages and disengages power to the mower blades (Figure 5).

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).

The hour meter displays when you are operating the machine and momentarily when you shut off the engine. The display turns off after 5 minutes.

Refer to the *Software Guide* for more information.

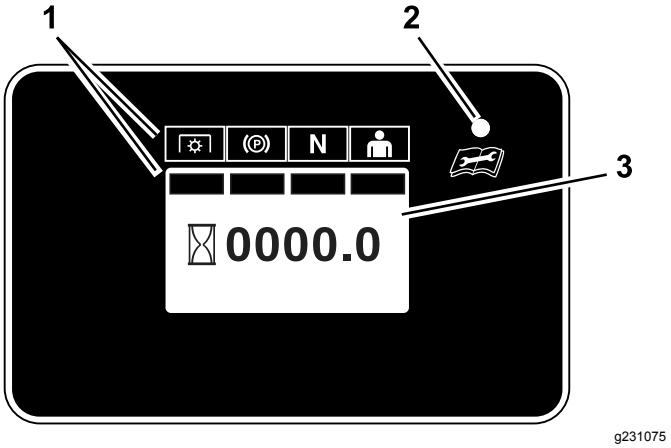


Figure 6

1. Safety-interlock indicators
2. LED status light
3. Information screen

LED Status Light

The LED is multi-colored to indicate the system status and is located on the right side of the panel.

- **Solid Green**—indicates normal operating activity.
- **Blinking Red**—indicates a fault is active.
- **Blinking Green and Orange**—indicates a clutch reset is required.
- **Solid Red**—indicates maintenance is required.

Refer to the *Software Guide* for more information.

Fuel Gauge

When the fuel-tank level is low, the LED status light flashes a red light and the fuel-level symbol on the screen flashes.

Refer to the *Software Guide* for more information.

Safety-Interlock Indicators

There are symbols on the hour meter that indicate with a black bar that the interlock component is positioned correctly (Figure 6).

Motion-Control Levers

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

Neutral-Lock Position

Move the motion-control levers outward from the center to the NEUTRAL-LOCK position when exiting the machine (Figure 23). Always position the motion-control levers into the NEUTRAL-LOCK position when you stop the machine or leave it unattended.

Parking-Brake Lever

Whenever you shut off the engine, engage the parking brake to prevent accidental movement of the machine.

Fuel-Shutoff Valve

Close the LPG-shutoff valve on the cylinder tank when transporting or storing the mower.

Safety Pressure-Relief Valve

The relief valve is located on the LPG-fuel tank (Figure 7).

The safety pressure-relief valve relieves the excess pressure in the LPG tank.

Important: **This valve has a protective-plastic cap that should never be removed. If the cap is damaged or missing, contact trained and qualified personnel immediately.**

LPG Cylinder Brackets

The brackets are located above the engine.

The LPG-cylinder brackets are used to fasten the removable LPG tank to the mower.

Attachments/Accessories

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

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

Specifications

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

Width

	60-inch Deck	72-inch Deck
Without Deck	134.6 cm (53.0 inches)	150.1 cm (59.1 inches)
Deflector Up	156.8 cm (61.7 inches)	187 cm (73.6 inches)
Deflector Down	192.2 cm (75.7 inches)	222.4 cm (87.6 inches)

Length

	60-inch Deck	72-inch Deck
Roll Bar - Up	211.1 cm (83.1 inches)	218.7 cm (86.1 inches)
Roll Bar - Down	215.4 cm (84.8 inches)	223.0 cm (87.8 inches)

Height

Roll Bar - Up	Roll Bar - Down
179.1 cm (70.5 inches)	118.9 cm (46.8 inches)

Weight

Model	Weight
60-inch Deck	593 kg (1,307 lb)
72-inch Deck	774 kg (1,707 lb)

Tank Type and Refilling

Note: The LPG tank used on this mower is a special tank with internal baffles designed for this application.

- Horizontal Tank Specifications:
  - Tank Material: Aluminum
  - Capacity: 19.7 kg (43.5 lb)
  - Disconnect coupling: Left hand ACME threaded
  - Fuel Withdrawal: Vapor
  - Fuel-Shutoff Valve: Rotate clockwise to close.
  - Type of fuel: HD5 grade propane
- New tanks must be properly filled by trained and qualified personnel.
- Use only tanks recommended by Toro. Failure to do so will result in improper operation of the fuel system.

Important: **Using a liquid-withdrawal tank will result in icing or freezing of the LPG regulator and prevent the engine from operating. This may also result in permanent fuel-system damage and the release of highly-flammable-propane liquid or vapor.**

Operation

Before Operation

Before Operation

Before Operation Safety

What is LPG? LPG stands for liquefied petroleum gas and is more commonly called propane. LPG is a liquid fuel that is stored in a tank under pressure. Before the liquid leaves the tank, it is converted into a vapor. Since LPG is stored as both liquid and gas, it may leak from joints or connections that are not sealed properly. LPG becomes flammable when it is mixed with air.

The LPG information in this Operator's manual is provided only as a guide. Consult the NFPA 58: Liquefied Petroleum Gas Code for additional safety information. This National Fire Protection Association (NFPA) code pertains to the handling, storing, transporting, and usage of LPG.

- 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 Toro.
- Inspect the area where the equipment is to be used and remove all rocks, toys, sticks, wires, bones, and other foreign objects. These can be thrown or interfere with the operation of the machine and may cause personal injury to the operator or bystanders.
- Wear appropriate personal protective equipment such as safety glasses, substantial slip-resistant footwear, and hearing protection. Tie back long hair and avoid loose clothing and loose jewelry which may get tangled in moving parts.

⚠ 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.

- Check that the operator presence controls, safety switches, and shields are attached and functioning properly. Do Not operate unless they are functioning properly.
- Do Not operate the mower when people, especially children, or pets are in the area. Stop the machine and attachment(s) if anyone enters the area.
- Do Not operate the machine without the entire grass collection system, discharge deflector, or other safety devices in place and in proper working condition. Grass catcher components are subject to wear, damage and deterioration, which could expose moving parts or allow objects to be thrown. Frequently check for worn or deteriorating components and replace them with the manufacturer's recommended parts when necessary.

Pre-Start

LPG tanks supplied from Toro Do Not contain LPG fuel for shipping reasons and safety. Have the LPG tanks filled by trained and qualified personnel. For best results, use clean, fresh HD5 grade propane.

Do Not allow the LPG tanks to be overfilled. Overfilling LPG tanks builds excess pressure within the tank which causes the relief valve to open.

Make sure you understand the controls, their locations, their functions, and their safety requirements.

Refer to the Maintenance section and perform all the necessary inspection and maintenance steps.

Fuel Safety

Use extreme care when handling LPG fuel.

⚠ DANGER

LPG fuel is extremely flammable and vapors are explosive.

A fire or explosion from LPG fuel can burn you, others, and cause property damage.

- **Never smoke around tank(s) and stay away from an open flame or where fumes may be ignited by a spark.**
- **Extinguish all sources of spark or flame when approaching LPG tanks or mowers. The hazard increases for enclosed trailers or storage locations where vapor leakage may occur and collect.**
- **LPG is heavier than air and may accumulate in low lying areas, such as ditches, drains, or pits.**
- **LPG tank(s) should be filled by trained and qualified personnel ONLY.**
- **Never tamper with or repair the tank(s); contact trained and qualified personnel.**
- **Do Not change the tank(s) when the engine is running.**
- **Before disconnecting the hose(s), purge all LPG vapors from the system, by closing the fuel valve(s) on ALL tanks and allowing the engine to run until it stops.**
- **Store the tank(s) away from heat, sparks, or open flames.**
- **Do Not operate without entire exhaust system in place and in proper working condition.**

⚠ DANGER

LPG fuel is extremely flammable and vapors are explosive.

- **In case of fire take the following steps:**
  1. **If you can safely do so, stop the flow of gas as quickly as possible. Never put out flame unless gas can be shut off.**
  2. **Notify the Fire Department and clear immediate area of all people.**
  3. **When gas flow is stopped, put out the fire. Usually when flow of gas is cutoff, fire will automatically stop.**
  4. **If gas flow cannot be immediately stopped, direct water on tanks to keep them cool, but Do Not put out fire.**
- **Storage locations and trailers should be equipped with at least one approved portable fire extinguisher having a minimum capacity of 18 lb (8.2 kg) dry chemical with a B:C rating. Do Not use Carbon Tetrachloride extinguishers (Pyrene etc.).**

⚠ DANGER

LPG vapors and liquid escaping from the tank may cause serious injury or death. Vapors or liquid may cause suffocation, freezing of tissue, or frostbite.

- **Store and service the mower in a well ventilated area.**
- **An approved LPG detector installed in trailers and storage areas is recommended.**
- **LPG is heavier than air and may accumulate in low lying areas, such as ditches, drains, or pits.**
- **Avoid breathing of vapors.**
- **Keep away from vent valve.**
- **Keep away from eyes and skin.**
- **Contact trained and qualified personnel if tank shows signs of frosted areas, makes a hissing sound, or emits a foul odor.**
- **Obtain immediate medical attention if contact occurs with vapors or liquid.**

⚠ WARNING

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

Use only approved fuel lines and fuel filters for high pressure systems.

To help prevent fires:

- Keep engine and engine area free from accumulation of grass, leaves, excessive grease or oil, and other debris which can accumulate in these areas.
- Clean up oil and fuel spills and remove fuel soaked debris.
- Allow the machine to cool before storing the machine in any enclosure. Do Not store near flame or any enclosed area where open pilot lights or heat appliances are present.

Inspection Safety

It is very important to check the LPG tank and components for wear or leaks.

Important: **Never check for leaks using an open flame.**

Important: **Never use bare hands when checking the fitting or valve. Escaping LPG vapor and liquid freezes skin on contact.**

Important: **Only hand tighten tank connection fitting. Over tightening by the use of tools may cause damage. If hand tightening does not stop a leak, contact trained and qualified personnel immediately.**

- **Before each use:**
  - Visually inspect the tank, hose, and fitting and be alert to a foul odor coming from the tank.
  - The LPG tank should be free of dents or damage. If the tank show signs of dents or damage, replace it immediately.
  - Check the valve and fitting openings for dirt and debris.
  - Slowly open the valve all the way and listen for a continuous hiss from the regulator, it may indicate a leak.
  - LPG has a rotten egg or skunk smell added to it to help detect a gas leak. If you detect a gas leak:
    - ◊ Turn off the LPG valve if you can safely do so.
    - ◊ Leave the area.
    - ◊ Contact trained and qualified personnel immediately.
  - Do Not use if the hoses are abraded, damaged, kinked, or flattened.
  - Make sure the tank is securely mounted to the mower. If the tank is loose, the hose or fittings may leak.
- **With each tank change:**
  - Check all gauges, fittings, and valves for damage.
  - Look for deterioration, damaged or missing o-rings on tank connection fitting.
  - Inspect the LPG tank and the fuel connection joint for leaks. Use the following procedure below to detect leaks:
    - ◊ Apply an approved leak detector solution, obtained from a trained and qualified LPG distributor, or a thick non-ammonia soapy water solution (50% non-ammonia soap and 50% water). (A leak detector solution that contains ammonia will cause the fittings to corrode and leak.)
    - ◊ Using a small brush or spray bottle, apply the solution around all the fittings of the LPG tank and the fuel connection joint.
    - ◊ Slowly open the gas valve a half-turn.
    - ◊ If bubbles are detected, the joint or fitting has a leak. Shut off the valve, tighten the leaking connection, and slowly open the valve again. If bubbles still appear, Do Not use the tank. If it is safe to do so, remove the tank from your mower; otherwise, contact trained and qualified personnel immediately.
    - ◊ If no bubbles are detected, the LPG tank may be used.
- **Weekly:**
  - Check the entire LPG fuel delivery system for damage or deterioration.
  - Check the entire LPG fuel delivery system for leaks at all joints using the same method as described in the previous section.
  - Follow all the inspection checks as specified in the two previous inspection sections.
- **Tank Requalification:**
  - USDOT (United States Department of Transportation) regulations require LPG tanks to be inspected, requalified, and marked within 12 years of the manufacture date and on a regular basis thereafter. Typically this occurs when the tank is refilled; contact a trained and qualified LPG tank provider for more details.
  - Do Not fill the LPG tank if it is beyond the requalification period.
  - Do Not fill damaged or rusted LPG tanks.

Adding Fuel

LPG (liquefied-petroleum gas) is more commonly called propane. LPG is a liquid fuel that is stored in a tank under pressure. Before the liquid leaves the tank, it is converted into a vapor. Since LPG is stored as both liquid and gas, it may leak from joints or connections that are not sealed properly. LPG becomes flammable when it is mixed with air.

The LPG information in this *Operator's Manual* is provided only as a guide. Consult the NFPA 58: Liquefied Petroleum Gas Code, 2008 Edition for additional safety information. This National Fire Protection Association (NFPA) code pertains to the handling, storing, transporting, and usage of LPG.

Type of fuel: HD5 grade propane

⚠ CAUTION

Using overfilled tanks may result in the release of highly concentrated and extremely-flammable-liquid propane.

Never use propane tanks that are filled beyond 80% capacity.

⚠ DANGER

LPG vapors and liquid escaping from the tank may cause serious injury or death. Vapors or liquid may cause suffocation, freezing of tissue, or frostbite.

- **Store and service the machine in a well-ventilated area.**
- **Install an approved LPG detector in trailers and storage areas.**
- **LPG is heavier than air and may accumulate in low lying areas, such as ditches, drains, or pits.**
- **Avoid breathing in vapors.**
- **Keep LPG vapors and liquid away from vent valves.**
- **Keep LPG vapors and liquid away from your eyes and skin.**
- **Contact trained and qualified personnel if the tank shows signs of frosted areas, makes a hissing sound, or emits a foul odor.**
- **Obtain immediate medical attention if vapors or liquid come in contact with your eyes or skin.**

⚠ DANGER

LPG fuel is extremely flammable and vapors are explosive.

- **In case of fire, take the following steps:**
  1. **If you can safely do so, stop the flow of gas as quickly as possible. Never put out the flame unless you can shut off the gas.**
  2. **Notify the fire department and clear the immediate area of all people.**
  3. **When the gas flow has stopped, put out the fire. Usually, when flow of gas is cut off, fire will automatically stop.**
  4. **If you cannot immediately stop the gas flow, direct water onto the tanks to keep them cool, but *do not* put out the fire.**
- **Storage locations and trailers should be equipped with at least 1 approved portable fire extinguisher that has a minimum capacity of 8.2 kg (18 lb) dry chemical with a B:C rating. Do not use carbon-tetrachloride extinguishers such as Pyrene.**

Changing the LPG Tank

Change the LPG tank outdoors in a well-ventilated area.

Important: **Only hand-tighten the tank-connection fitting. Overtightening by the use of tools may cause damage. If hand-tightening does not stop a leak, contact trained and qualified personnel immediately.**

1. Shut off the machine on level ground, disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Wait for all moving parts to stop before leaving the operating position.
3. With the engine running, close the fuel valve on the tank.
4. Run the engine until it stops.

   Note: This purges all vapors from the hose.
5. Remove the key.
6. Carefully disconnect the LPG fuel hose.

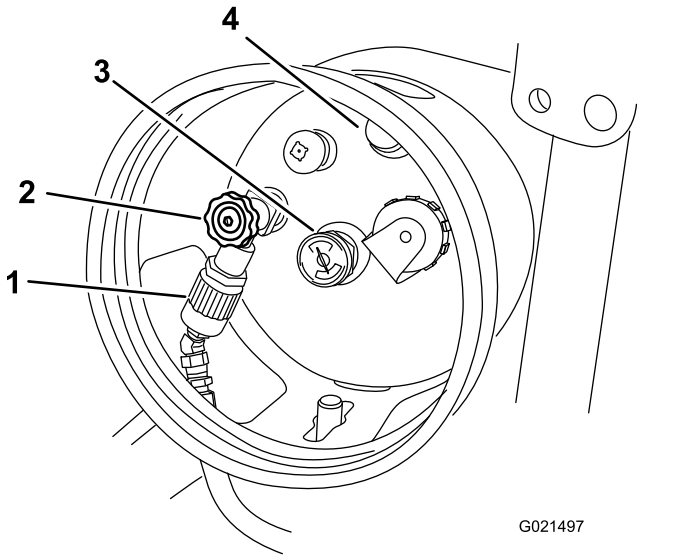


Figure 7

1. LPG fuel hose connection fitting
2. Tank valve
3. Fuel gauge
4. Safety pressure-relief valve

7. Unlatch the cylinder brackets and remove the tank.

⚠ WARNING

Fuel system components are under high pressure. Using damaged or improper components can cause system failure, fuel leakage, and possible explosion, which may result in serious injury or death.

- **Do not attempt to repair or modify the valves, fittings, or other tank components.**
- **Use only the Toro-approved LPG tank, fittings, and hoses that were designed for your machine.**

8. Inspect the filled tank valve and fitting openings for dirt, debris, or damage.
9. Inspect the tank hose connection fitting for damaged or missing o-rings.
10. Ensure that the replacement tank type and size match the tank specification decal.
11. Align the center hole over the mounting pin that points straight up on the mower as shown in Figure 8.

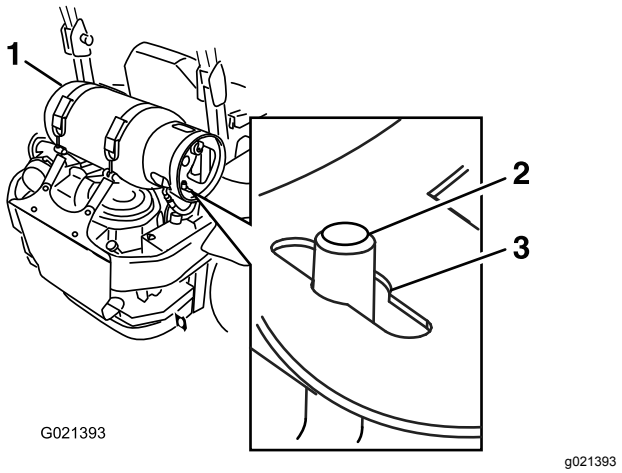


Figure 8

1. Cylinder brackets
2. Mounting pin
3. Center hole

Important: **The valves and gauges may not function properly if the LPG tank is not installed correctly.**

12. Latch the cylinder brackets and ensure that the tank is securely fastened to the mower.
13. Carefully connect the fuel hose. Ensure the hose is not kinked.
14. Slowly open the fuel valve to equalize the pressure in the tank.

    Note: If the fuel valve is opened too quickly, the pressure-relief valve is equipped with a back pressure check valve that will shut off the fuel supply. If this happens, close the fuel valve completely and wait 5 seconds.
15. Check for leaks as described in Inspecting the LPG System (page 53).

Performing Daily Maintenance

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

Breaking in a New Machine

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

Using the Rollover Protection System (ROPS)

⚠ WARNING

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

Ensure that the seat is secured to the machine.

⚠ WARNING

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

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

Lowering the Roll Bar

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

1. To lower the roll bar, apply forward pressure to the upper part of the roll bar.
2. Pull both knobs out and rotate them 90 degrees so they are not engaged (Figure 9).
3. Lower the roll bar to the down position (Figure 9).

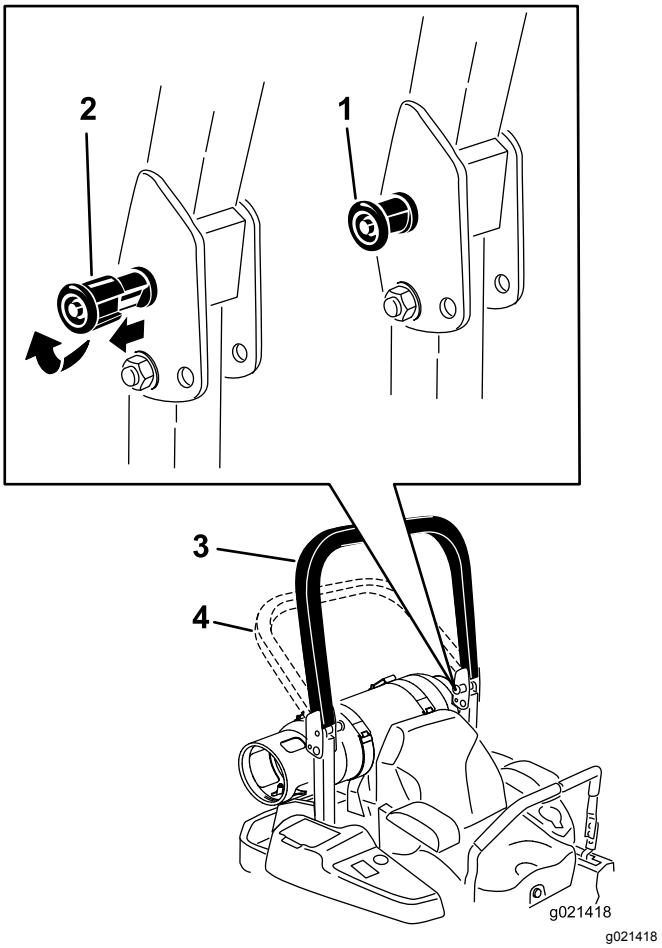


Figure 9

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

Raising the Roll Bar

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

1. Raise the roll bar to the operating position and rotate the knobs until they move partially into the grooves (Figure 9).
2. Raise the roll bar to the full upright position while pushing on the upper roll bar so that the pins snap into position when the holes align with the pins (Figure 9).
3. Push on the roll bar and ensure that both pins are engaged.

Using the Safety-Interlock System

⚠ WARNING

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

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

Understanding the Safety-Interlock System

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

- 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 the motion-control levers are moved from the NEUTRAL-LOCK position with the parking brake engaged or if you rise from the seat when the PTO is engaged.

The hour meter has indicators to notify the user when the interlock component is in the correct position. When the component is in the correct position, an indicator displays on the screen.

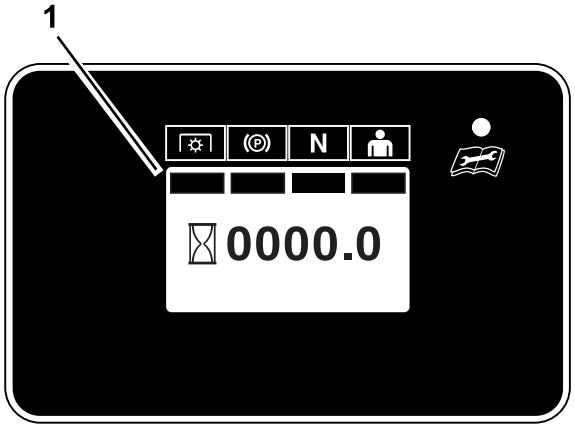


Figure 10

1. Indicators display 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 the 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. Now start the engine. While the engine is running, disengage 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 the NEUTRAL-LOCK position. Now start the engine. While the engine is running, center either motion control and move (forward or reverse); the engine should shut off. Repeat for other motion control.
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 the NEUTRAL-LOCK position. Try starting the engine; the engine should not start.

Positioning the Seat

The seat can move forward and backward. Position the seat where you have the best control of the machine and are most comfortable (Figure 11).

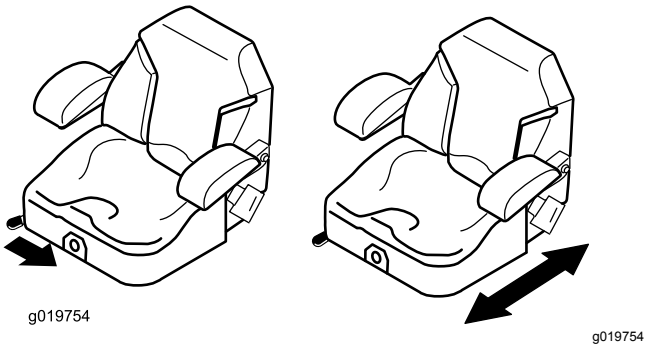


Figure 11

Unlatching the Seat

To unlatch the seat, push the seat latch forward (Figure 12).

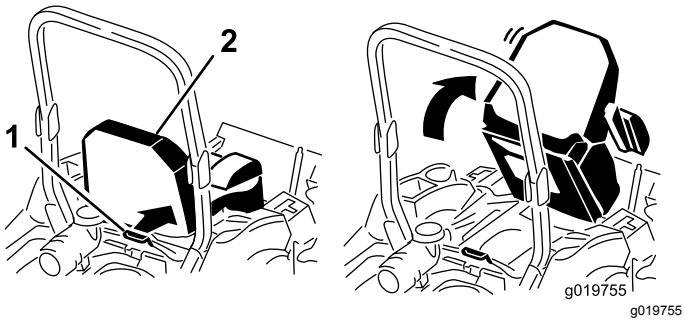


Figure 12

1. Seat latch
2. Seat

Changing the Seat Suspension

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

To adjust it, turn the knob in front either direction to provide the best comfort (Figure 13).

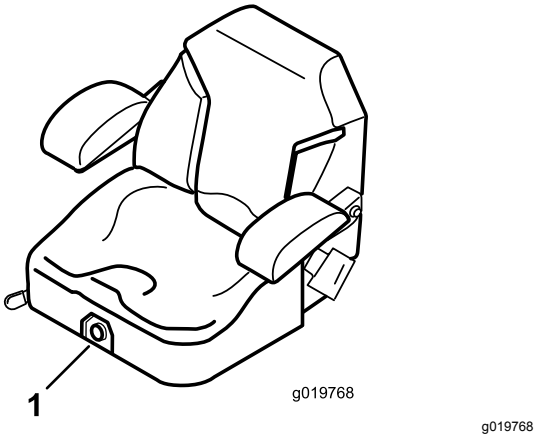


Figure 13

1. Seat-suspension knob

During Operation

During Operation Safety

General Safety

The operator must use their full attention when operating the machine. **Do Not** engage in any activity that causes distractions; otherwise, injury or property damage may occur.

⚠ WARNING

Operating engine parts, especially the muffler, become extremely hot. Severe burns can occur on contact and debris, such as leaves, grass, brush, etc. can catch fire.

- **Allow engine parts, especially the muffler, to cool before touching.**
- **Remove accumulated debris from muffler and engine area.**

⚠ WARNING

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

Do Not run engine indoors or in a small confined area where dangerous carbon monoxide fumes can collect.

- The owner/user can prevent and is responsible for accidents or injuries occurring to himself or herself, other people or property.
- This mower was designed for one operator only. Do not carry passengers and keep all others away from machine during operation.
- Do Not operate the machine under the influence of alcohol or drugs.
- Operate only in daylight or good artificial light.
- Lightning can cause severe injury or death. If lightning is seen or thunder is heard in the area, Do Not operate the machine; seek shelter.
- Use extra care while operating with accessories or attachments, such as grass collection systems. These can change the stability of the machine and cause a loss of control. Follow directions for counter weights if required.
- Keep away from holes, ruts, bumps, rocks, and other hidden hazards. Use care when approaching blind corners, shrubs, trees, tall grass or other objects that may hide obstacles or obscure vision. Uneven terrain could overturn the machine or cause the operator to lose their balance or footing.
- Be sure all drives are in neutral and parking brake is engaged before starting engine. Use seat belts with the roll bar in the raised and locked position.
- Start the engine carefully according to instructions with feet well away from the blades.
- Never operate the mower with damaged guards, shields, or covers. Always have safety shields, guards, switches and other devices in place and in proper working condition.
- Keep clear of the discharge opening at all times. Never mow with the discharge door raised, removed or altered unless there is a grass collection system or mulch kit in place and working properly.
- Keep hands and feet away from moving parts. If possible, Do Not make adjustments with the engine running.

⚠ WARNING

Hands, feet, hair, clothing, or accessories can become entangled in rotating parts. Contact with the rotating parts can cause traumatic amputation or severe lacerations.

- **Do Not operate the machine without guards, shields, and safety devices in place and working properly.**
- **Keep hands, feet, hair, jewelry, or clothing away from rotating parts.**

- Never raise the deck with blades running.
- Be aware of the mower discharge path and direct discharge away from others. Avoid discharging material against a wall or obstruction as the material may ricochet back toward the operator. Stop the blades, slow down, and use caution when crossing surfaces other than grass and when transporting the mower to and from the area to be mowed.
- Be alert, slow down and use caution when making turns. Look behind and to the side before changing directions. Do Not mow in reverse unless absolutely necessary.
- Do Not change the engine governor setting or overspeed the engine.
- Park the machine on level ground. Stop engine, wait for all moving parts to stop, and remove the spark plug wire(s).
  - Before checking, cleaning or working on the mower.
  - After striking a foreign object or abnormal vibration occurs (inspect the mower for damage and make repairs before restarting and operating the mower).
  - Before clearing blockages.
  - Whenever you leave the mower. Do Not leave a running machine unattended.
- Stop engine, wait for all moving parts to stop:
  - Before refueling.
  - Before dumping the grass catcher.
  - Before making height adjustments.
- Tragic accidents can occur if the operator is not alert to the presence of children. Children are often attracted to the machine and the mowing activity. Never assume that children will remain where you last saw them.
  - Keep children out of the mowing area and under the watchful care of another responsible adult, not the operator.
  - Be alert and turn the machine off if children enter the area.

– Before and while backing or changing direction, look behind, down, and side-to-side for small children.

– Never allow children to operate the machine.

– Do Not carry children, even with the blades shut off. Children could fall off and be seriously injured or interfere with the safe operation of the machine. Children that have been given rides in the past could suddenly appear in the working area for another ride and be run over or backed over by the machine.

Slope Safety

- Slopes are a major factor related to loss of control and rollover accidents, which can result in severe injury or death. The operator is responsible for safe slope operation. Operating the machine on any slope requires extra caution. Before using the machine on a slope, the operator must:

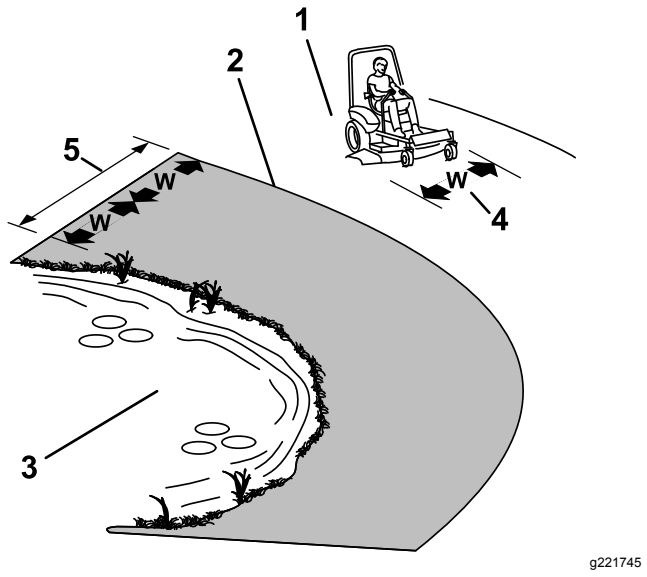
  – Review and understand the slope instructions in the manual and on the machine.

  – Use an angle indicator to determine the approximate slope angle of the area.

  – Never operate on slopes greater than 15 degrees.

  – Evaluate the site conditions of the day to determine if the slope is safe for machine operation. Use common sense and good judgment when performing this evaluation. Changes in the terrain, such as moisture, can quickly affect the operation of the machine on a slope.

- Identify hazards at the base of the slope. Do Not operate the machine near drop offs, ditches, embankments, water or other hazards. The machine could suddenly roll over if a wheel goes over the edge or the edge collapses. Keep a safe distance (twice the width of the machine) between the machine and any hazard. Use a walk behind machine or a hand trimmer to mow the grass in these areas.



g221745

Figure 14

1. Safe Zone-Use the mower here on slopes less than 15 degrees
2. Danger Zone-Use a walk-behind mower and/or hand trimmer on slopes greater than 15 degrees
3. Water
4. W=width of the machine
5. Keep a safe distance (twice the width of the machine) between the machine and any hazard.

- Avoid starting, stopping or turning the machine on slopes. Avoid making sudden changes in speed or direction; turn slowly and gradually.
- Do Not operate a machine under any conditions where traction, steering or stability is in question. Be aware that operating the machine on wet grass, across slopes or downhill may cause the machine to lose traction. Loss of traction to the drive wheels may result in sliding and a loss of braking and steering. The machine can slide even if the drive wheels are stopped.
- Remove or mark obstacles such as ditches, holes, ruts, bumps, rocks or other hidden hazards. Tall grass can hide obstacles. Uneven terrain could overturn the machine.
- Use extra care while operating with accessories or attachments, such as grass collection systems. These can change the stability of the machine and cause a loss of control. Follow directions for counter weights.
- If possible, keep the deck lowered to the ground while operating on slopes. Raising the deck while operating on slopes can cause the machine to become unstable.

Rollover Protection System (ROPS) Safety

A Rollover Protection System (roll bar) is installed on the machine.

⚠ WARNING

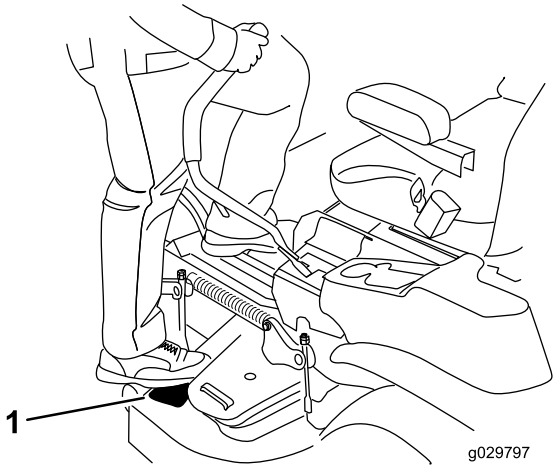
There is no rollover protection when the roll bar is down. Wheels dropping over edges, ditches, steep banks, or water can cause rollovers, which may result in serious injury, death or drowning.

- **Do Not remove the ROPS.**
- **Keep the roll bar in the raised and locked position and use seat belt.**
- **Lower the roll bar only when absolutely necessary.**
- **Do Not wear seat belt when the roll bar is down.**
- **Drive slowly and carefully.**
- **Raise the roll bar as soon as clearance permits.**

- Be certain that the seat belt can be released quickly in the event of an emergency.
- Check carefully for overhead clearances (i.e. branches, doorways, and electrical wires) before driving under any objects and Do Not contact them.
- In the event of a rollover, take the unit to an Authorized Service Dealer to have the ROPS inspected.
- Replace a damaged ROPS. Do Not repair or revise.
- Any accessories, alterations, or attachments added to the ROPS must be approved by Toro.

Entering the Operator's Position

Use the mower deck as a step to get into the operator's position (Figure 15).



g029797

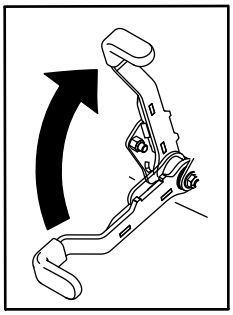
Figure 15

Operating the Parking Brake

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

Engaging the Parking Brake

Park the machine on a level surface.



g027334

Figure 16

Disengaging the Parking Brake

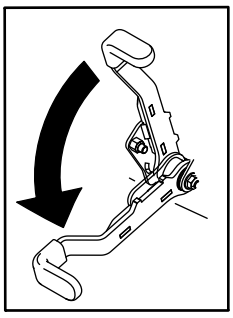


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Figure 17

Operating the Mower Blade-Control Switch (PTO)

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

Engaging the Blade-Control Switch (PTO)

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

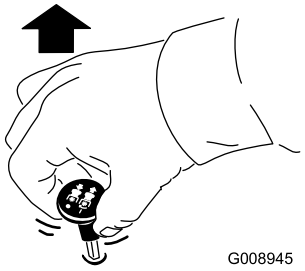


Figure 18

Disengaging the Blade-Control Switch (PTO)

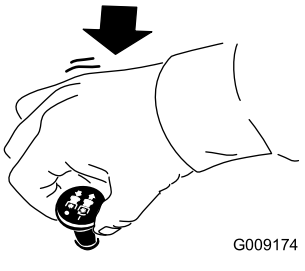


Figure 19

Operating the Throttle

You can move the throttle control between FAST and SLOW positions (Figure 20).

Always use the FAST position when engaging the PTO.

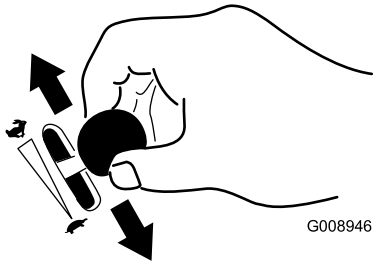
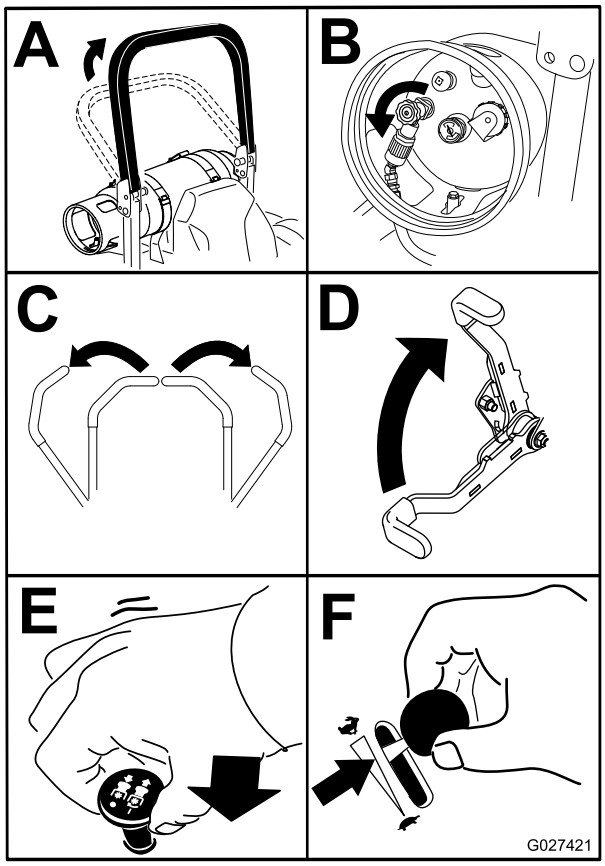


Figure 20

Starting the Engine

1. Raise the roll bar up and lock it into place, sit on the seat, and fasten the seat belt (Figure 21).
2. Slowly open the fuel valve to equalize the pressure in the tank (Figure 21).

   Note: The fuel valve is located on the top end of the LPG tank. If the fuel valve is opened too quickly, the pressure-relief valve is equipped with a back pressure check valve that shuts off the fuel supply. If this happens, close the fuel valve completely and wait 5 seconds.
3. Move the motion controls to NEUTRAL-LOCK position (Figure 21).
4. Engage the parking brake; refer to Engaging the Parking Brake (page 28).
5. Move the blade-control switch (PTO) to the OFF position (Figure 21).
6. Move the throttle lever to the 3/4 throttle position between the SLOW and FAST positions (Figure 21).
7. Turn the key to the START position (Figure 21). When the engines starts, release the key.



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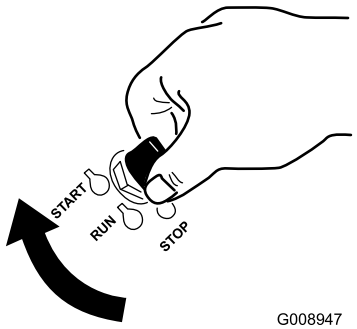


g008947

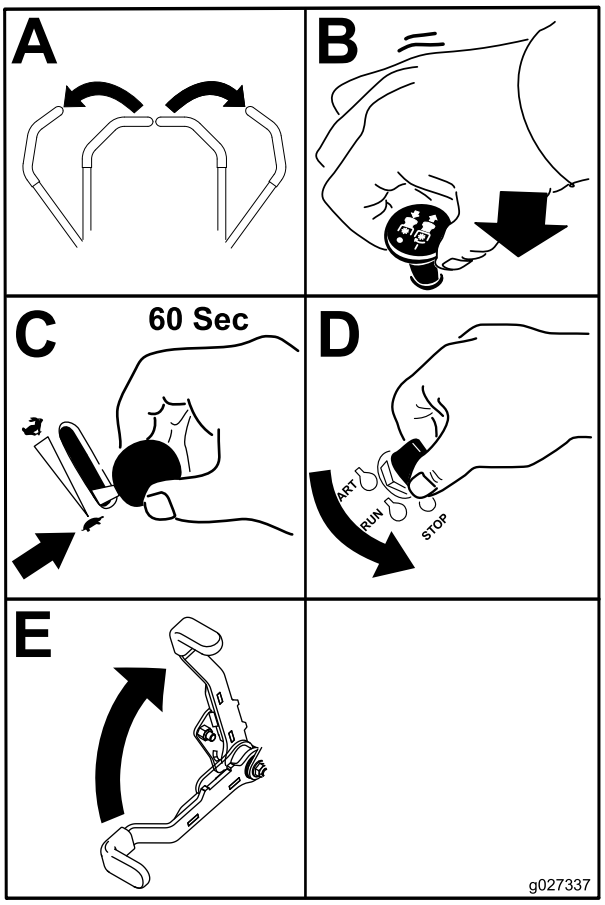
Figure 21

Shutting Off the Engine

⚠ CAUTION

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

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



g027337

Figure 22

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

Using the Motion-Control Levers

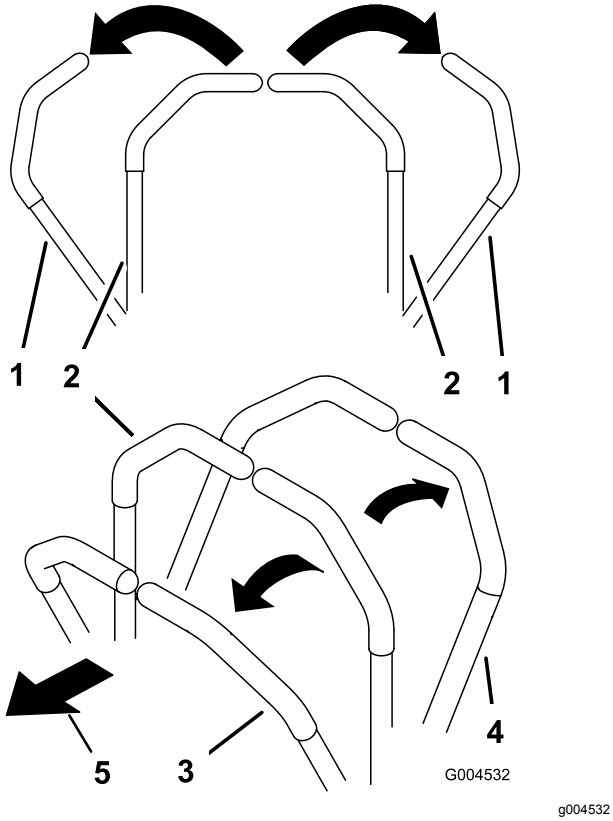


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Figure 23

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

Driving the Machine

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

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

⚠ WARNING

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

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

Driving Forward

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

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

1. Disengage the parking brake; refer to Disengaging the Parking Brake (page 28).
2. Move the levers to the center, unlocked position.
3. To go forward, slowly push the motion-control levers forward (Figure 24).

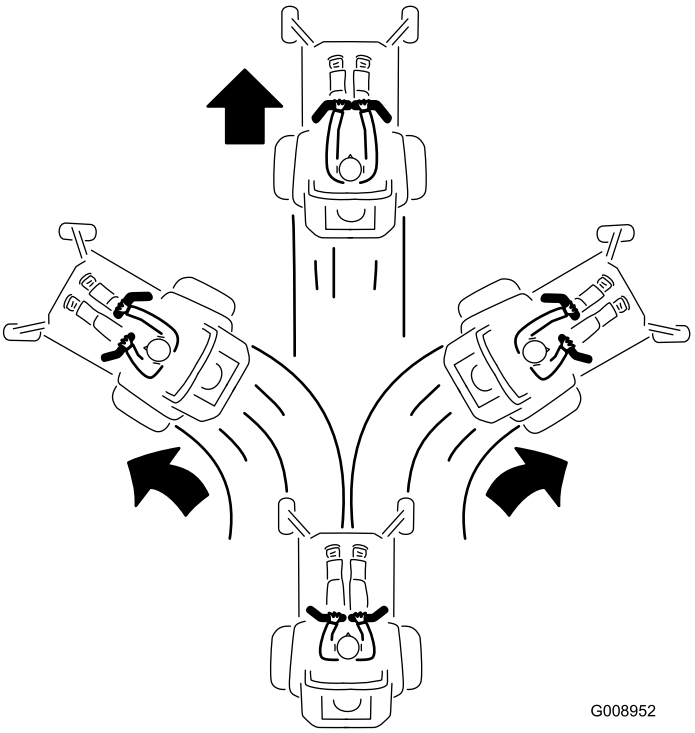


Figure 24

Driving Backward

1. Move the levers to the center, unlocked position.
2. To go backward, slowly pull the motion-control levers rearward (Figure 25).

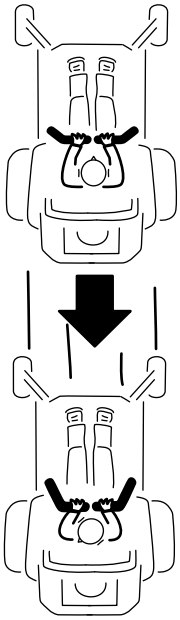


Figure 25

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 deck 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 deck.**
- **Never try to clear the discharge area or mower blades unless you move the blade-control switch (PTO) to the OFF position, rotate the key switch to the OFF position, and remove the key from the key switch.**
- **Make sure that the grass deflector is in the down position.**

Adjusting the Height of Cut

Using the Transport Lock

The transport lock has 2 positions, and is used with the deck-lift pedal. There is a LOCK position and an UNLOCK position for the transport position of the mower deck (Figure 26).

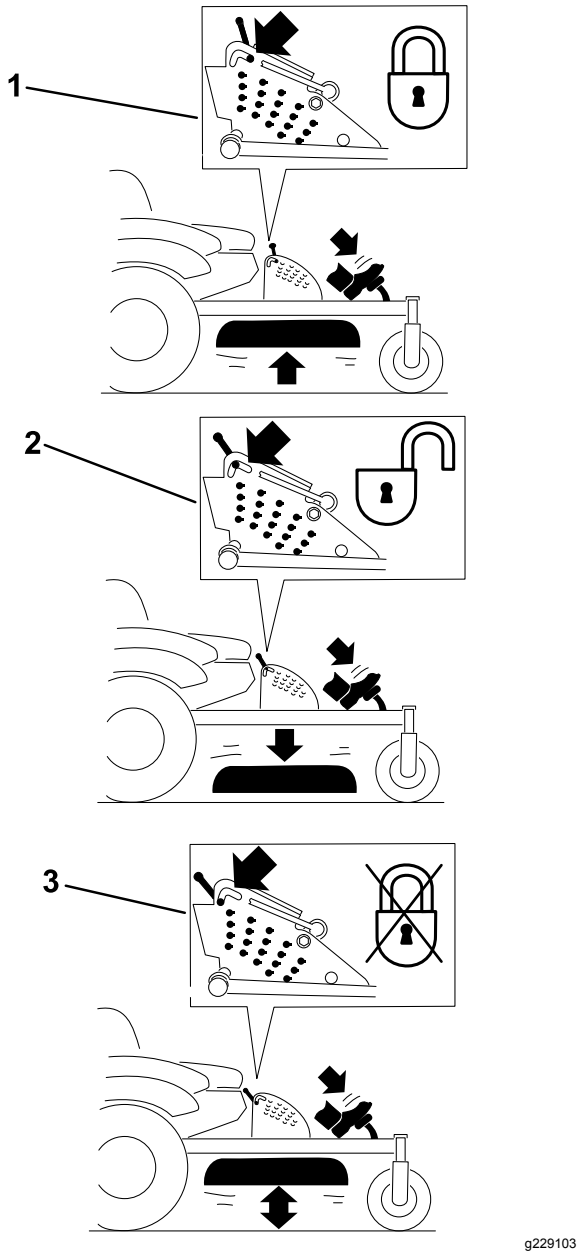


Figure 26

Transport-Lock Positions

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

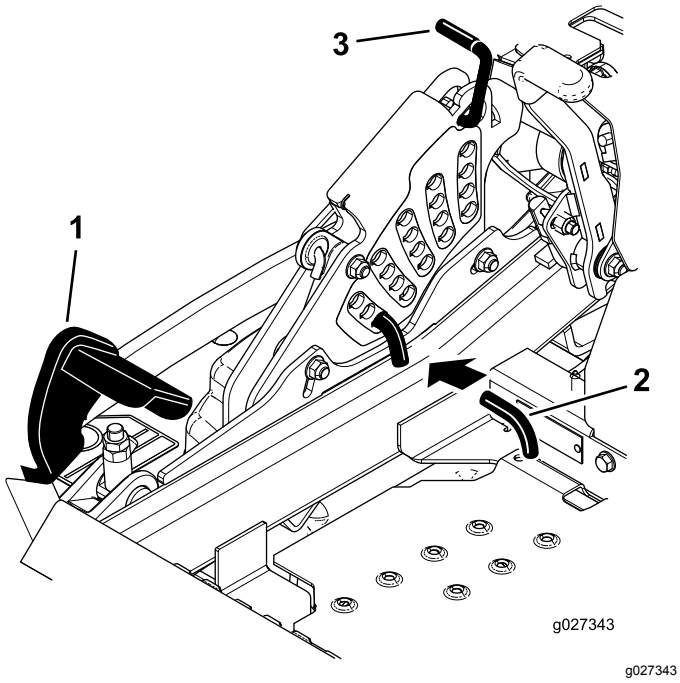
Adjusting the Height-of-Cut Pin

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 inch) cutting height position) as shown in Figure 27.

3. To adjust, rotate the pin 90 degrees and remove the pin from the height-of-cut bracket (Figure 27).
4. Select a hole in the height-of-cut bracket corresponding to the height-of-cut desired, and insert the pin (Figure 27).
5. Push on the deck lift, pull back on the transport lock, and slowly lower the mower deck.



g027343

Figure 27

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

Adjusting the Anti-Scalp Rollers

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

1. Park the machine on a level surface, disengage the blade-control switch, and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Adjust the anti-scalp rollers as shown in Figure 28, Figure 29, and Figure 30.

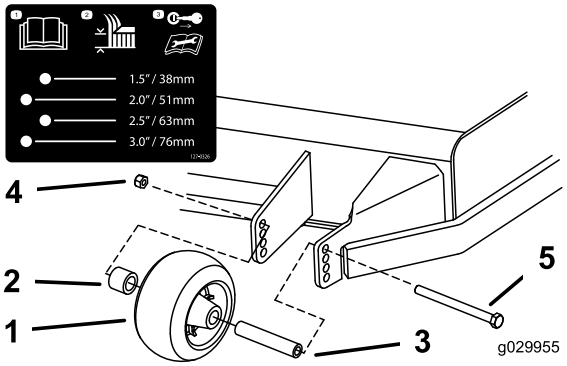


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Figure 28

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

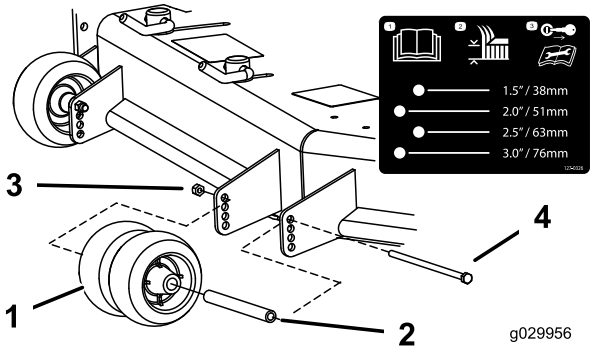

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Figure 29

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

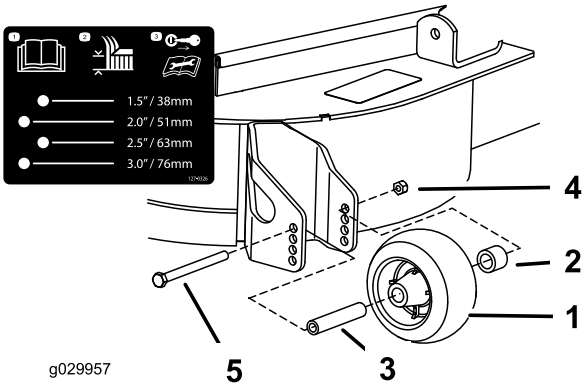


Figure 30

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 have nuts and bolts in place of the flow-baffle locks and can be adjusted the same.

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

1. Park the machine on a level surface, disengage the blade-control switch, and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. To adjust the cam locks, swing the lever up to loosen the cam lock (Figure 31).
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 31).
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.

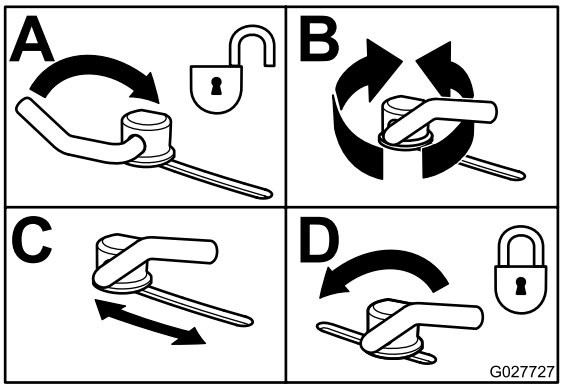


Figure 31

Positioning the Flow Baffle

The following figures are only recommendations for use. Adjustments 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

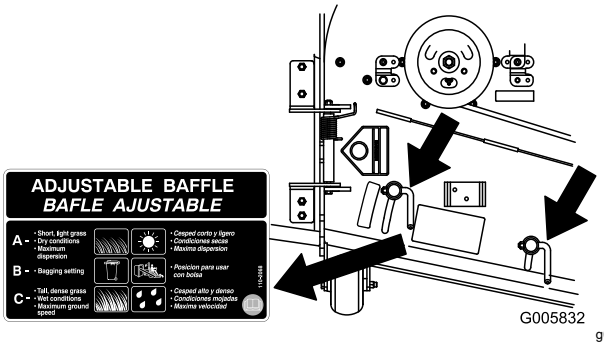


Figure 32

Position B

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

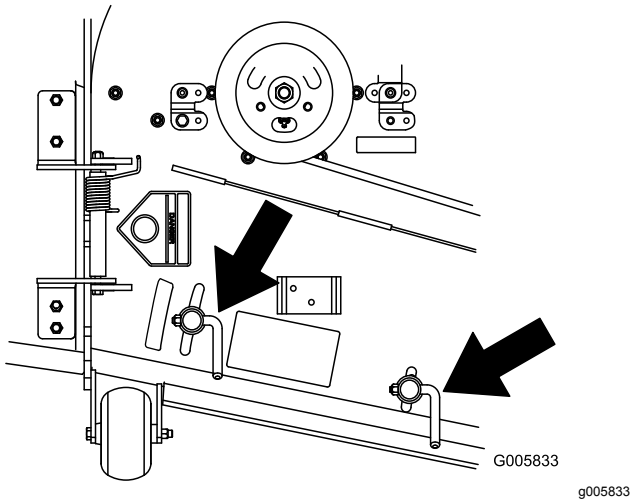


Figure 33

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

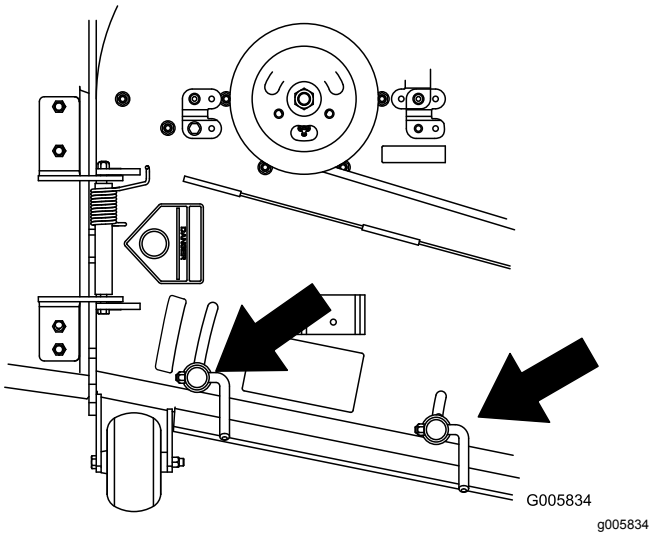


Figure 34

Operating Tips

Using the Fast Throttle Setting

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

Cutting a Lawn for the First Time

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

Cutting a Third of the Grass Blade

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

Alternating the Mowing Direction

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

Mowing at Correct Intervals

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

Using a Slower Cutting Speed

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

Avoiding Cutting Too Low

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

Stopping the Machine

If you must stop the forward motion of the machine while mowing, a clump of grass clippings may

drop onto your lawn. To avoid this, move onto a previously cut area with the blades engaged or you can disengage the mower deck while moving forward.

Keeping the Underside of the Mower Deck Clean

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

Maintaining the Blade(s)

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

After Operation

After Operation

General Safety

- Park machine on level ground, disengage drives, set parking brake, stop engine, remove key or disconnect spark plug wire. Wait for all movement to stop and allow the machine to cool before adjusting, cleaning, repairing, or storing. Never allow untrained personnel to service machine.
- Clean the machine as stated in the Maintenance section. Keep engine and engine area free from accumulation of grass, leaves, excessive grease or oil, and other debris which can accumulate in these areas. These materials can become combustible and may result in a fire.
- Frequently check for worn or deteriorating components that could create a hazard. Tighten loose hardware.

Transporting

Transporting the Machine

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

To transport the machine:

- Lock the brake and block the wheels.
- Be sure the fuel shut-off valve is closed.
- Securely fasten the machine to the trailer or truck with straps, chains, cable, or ropes. Only use the four designated tie-down locations on the mower–two on the left side and two on the right (see Figure 35). Use these locations even when transporting the mower with an attached accessory. Using non-designated locations may cause damage to the mower and/or attachment.

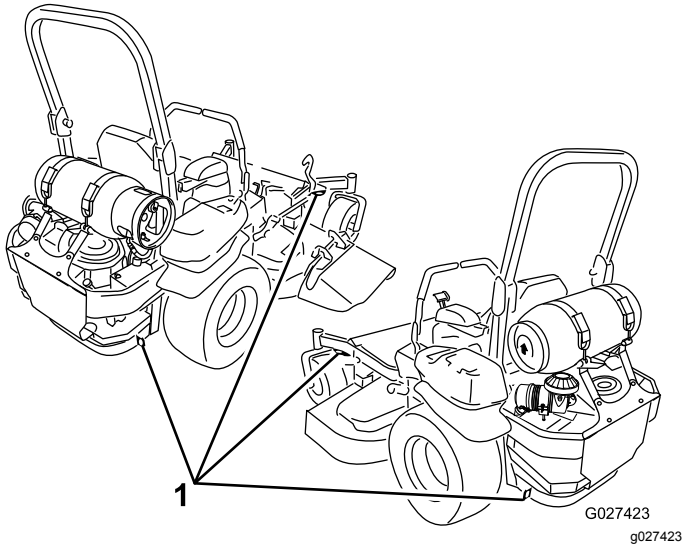


Figure 35
Right side shown

1. Tie-down location

- Secure a trailer to the towing vehicle with safety chains.

⚠ 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 machine on a public street or roadway.

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 36).

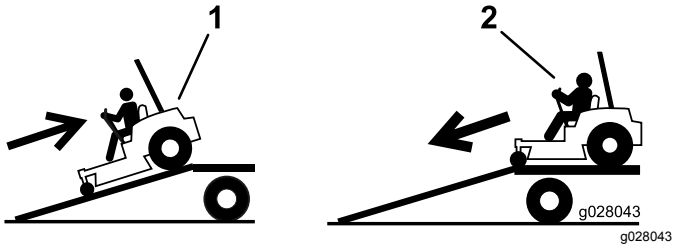


Figure 36

1. Back up ramps
2. Drive forward down ramps

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

Ensure the ramp is long enough so that the angle with the ground does not exceed 15 degrees (Figure 37).

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 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 ramp angle does not exceed 15 degrees on flat ground.**
- **Back up ramps and drive forward down 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.**

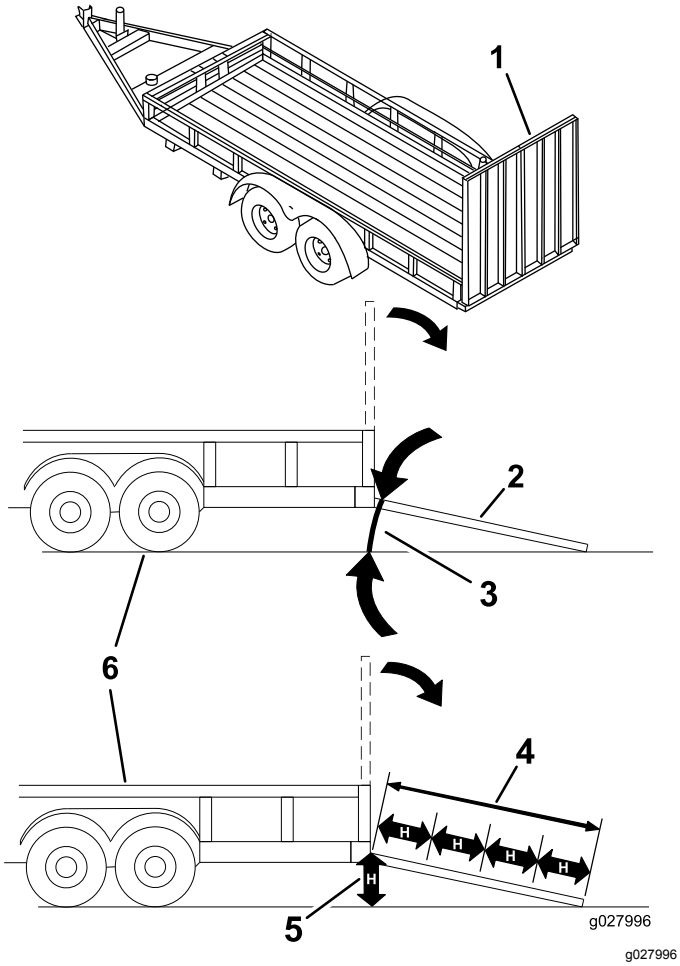


Figure 37

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

Consult the NFPA 58: Liquefied Petroleum Gas Code for additional information regarding LPG transportation.

- Be sure the fuel valve is closed on the tank(s).
- Place spare LPG tank(s) in a DOT approved storage cage.
  - Transport tanks in an upright, vertical and secure position to minimize movement, tipping, or physical damage relative to other tanks or to the storage cage while in transit.
  - Place tanks so that valves, fittings, or gauges are protected from physical damage during transport.
- Place tank(s) in a well-ventilated trailer.
- Do Not store the tank(s) or machine with tank(s) in an area where the temperature can rise above 120°F (49°C). If the temperature exceeds approximately 160°F (71°C), the tank will release highly flammable propane vapor. See Preparation in the Safety Section.
- Do Not transport LPG tank(s) in the passenger space of a vehicle.
- Do Not transport leaking fuel tanks.
- Trailers must have appropriate markings to transport LPG.
- Follow NFPA 58 and state and local regulations for transporting LPG.

Towing the Machine

- Do not attach towed equipment except at the hitch point.
- Follow the attachment manufacturer's recommendation for weight limits for towed equipment and towing on slopes. Towed weight must not exceed the weight of the machine, operator, and ballast; otherwise hydrostatic transmission failure may occur. Use counterweights or wheel weights as described in the attachment manufacturer's manual.
- Never allow children or others in or on towed equipment.
- On slopes, the weight of the towed equipment may cause loss of traction, increased risk of rollover, and loss of control. Reduce the towed weight and slow down.
- Stopping distance increases with the weight of the towed load. Travel slowly and allow extra distance to stop.
- Make wide turns to keep the attachment clear of the machine.

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.

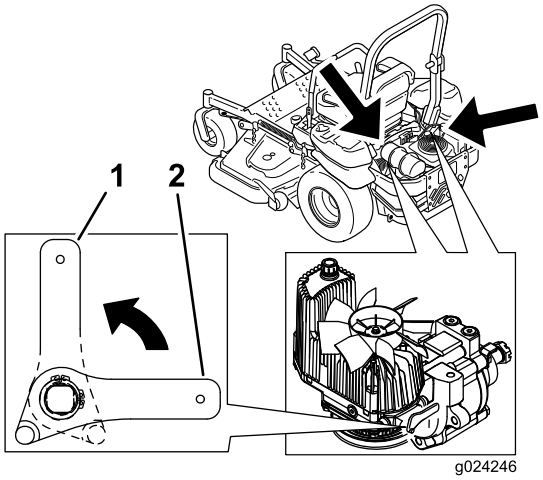
Allow the engine and hydraulic-drive units to cool completely before accessing the drive-wheel-release valves.

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

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

1. Park the machine on a level surface, disengage the blade-control switch, and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Rotate the release-valve levers vertically to push the machine (Figure 38).

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



g024246

Figure 38

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

5. Rotate the release valve levers horizontally to run the machine (Figure 38).

Maintenance

Maintenance Safety

⚠ WARNING

While maintenance or adjustments are being made, someone could start the engine. Accidental starting of the engine could seriously injure you or other bystanders.

Remove the key from the ignition switch, engage parking brake, and pull the wire(s) off the spark plug(s) before you do any maintenance. Also push the wire(s) aside so it does not accidentally contact the spark plug(s).

⚠ WARNING

The engine can become very hot. Touching a hot engine can cause severe burns.

Allow the engine to cool completely before service or making repairs around the engine area.

- Park machine on level ground, disengage drives, set parking brake, stop engine, remove key or disconnect spark plug wire. Wait for all movement to stop and allow the machine to cool before adjusting, cleaning or repairing. Never allow untrained personnel to service machine.
- Disconnect battery or remove spark plug wire before making any repairs. Disconnect the negative terminal first and the positive last. Reconnect positive first and negative last.
- Keep the machine, guards, shields and all safety devices in place and in safe working condition. Frequently check for worn or deteriorating components and replace them with the manufacturer's recommended parts when necessary.

⚠ WARNING

Removal or modification of original equipment, parts and/or accessories may alter the warranty, controllability, and safety of the machine. Unauthorized modifications to the original equipment or failure to use original Toro parts could lead to serious injury or death. Unauthorized changes to the machine, engine, fuel or venting system, may violate applicable safety standards such as: ANSI, OSHA and NFPA and/or government regulations such as EPA and CARB.

⚠ WARNING

Hydraulic fluid escaping under pressure can penetrate skin and cause injury. Fluid accidentally injected into the skin must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.

- **If equipped, make sure all hydraulic fluid hoses and lines are in good condition and all hydraulic connections and fittings are tight before applying pressure to hydraulic system.**
- **Keep body and hands away from pinhole leaks or nozzles that eject high pressure hydraulic fluid.**
- **Use cardboard or paper, not your hands, to find hydraulic leaks.**
- **Safely relieve all pressure in the hydraulic system by placing the motion control levers in neutral and shutting off the engine before performing any work on the hydraulic system.**

⚠ WARNING

Fuel system components are under high pressure. The use of damaged or improper components can cause system failure, fuel leakage, and possible explosion, which may result in serious injury or death.

- **Do Not attempt to repair or modify the valves, fittings, or other tank components.**
- **ONLY use the Toro approved LPG tank, fittings, and hoses that were designed for your mower.**

- Use care when checking blades. Wrap the blade(s) or wear gloves, and use caution when servicing them. Only replace damaged blades. Never straighten or weld them.
- Use jack stands to support the machine and/or components when required.

⚠ CAUTION

Raising the machine for service or maintenance relying solely on mechanical or hydraulic jacks could be dangerous. The mechanical or hydraulic jacks may not be enough support or may malfunction allowing the machine to fall, which could cause injury.

Do not rely solely on mechanical or hydraulic jacks for support. Use adequate jack stands or equivalent support.

- Carefully release pressure from components with stored energy.
- Keep hands and feet away from moving parts. If possible, Do Not make adjustments with the engine running. If maintenance or adjustment procedure require the engine to be running and drive wheels turning, use extreme caution.

⚠ WARNING

If the engine must be running so an 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.

- Check all bolts frequently to maintain proper tightness.
- The empty tank(s) should be treated as if it was full.
- Store the tank(s) outside of buildings in an open well ventilated area, away from spark and flames.
- Do Not store the tank(s) or machine with tank(s) in an area where the temperature can rise above 120°F (49°C). If the temperature exceeds approximately 160°F (71°C), the tank will release highly flammable propane vapor. See Preparation in the Safety Section.
- Store the tank(s) in upright position or with pressure relief valve towards the top.
- Do Not drag, drop, or abuse the tank(s).
- Storage of the empty tank(s) should follow local and state regulations.

Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
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.
Before each use or daily	• Check the safety-interlock system. • Check the air cleaner for dirty, loose or damaged parts. • Check the engine-oil level. • Check the LPG tank and components. • 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 40 hours	• Check the LPG hoses, regulator, and connections.
Every 50 hours	• Check the 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. • Change the engine oil (more often in dirty or dusty conditions). • Check and clean engine-cooling fins and shrouds.

Maintenance Service Interval	Maintenance Procedure
Every 200 hours	• Change the engine-oil filter (more often in dirty or dusty conditions). • Check the spark plug(s).
Every 250 hours	• Service or replace the air-cleaner foam element (more often under dusty, dirty conditions). • After the initial change—change the hydraulic-system filters and fluid when using Mobil 1 15W50 fluid. (Change it more often under dirty or dusty conditions)
Every 400 hours	• Grease the caster pivots (more often in dirty or dusty conditions).
Every 500 hours	• Replace the air-cleaner paper element (more often under dusty, dirty conditions). • Replace the spark plug(s). • Check the wheel lug-nut torque. • Check the wheel-hub slotted-nut torque. • Adjust the caster-pivot bearing. • Check the parking brake adjustment. • After the initial change—change the hydraulic-system filters and fluid when using Toro® HYPR-OIL™ 500 fluid. (Change it more often under dirty or dusty conditions)
Monthly	• Check the battery charge.
Yearly	• Grease the pump-belt-idler arm. • Repack the caster-wheel bearings (more often in dirty or dusty conditions). • Greasing 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 switch, someone could accidently start the engine and seriously injure you or other bystanders.

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

Lubrication

Greasing the Machine

Grease the machine more often in dirty or dusty conditions.

Grease Type: No. 2 lithium or molybdenum grease

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

   Note: Scrape any paint off the front of the fitting(s).
4. Connect a grease gun to the fitting.
5. Pump grease into the fittings until grease begins to ooze out of the bearings.
6. Wipe up any excess grease.

Lubricating the Mower Deck-Lift Pivots

Service Interval: Every 100 hours

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

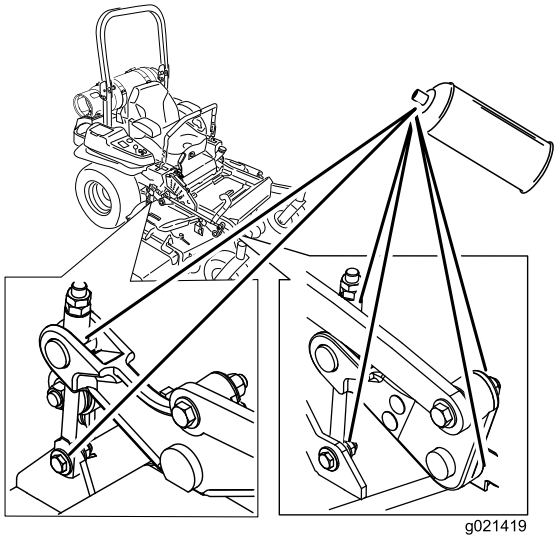


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Figure 39

Greasing the Mower Deck

Service Interval: Yearly—Grease the pump-belt-idler arm.

1. Park the machine on a level surface, disengage the blade-control switch, and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Grease the mower deck idler-pulley pivot until grease comes out the bottom (Figure 40).

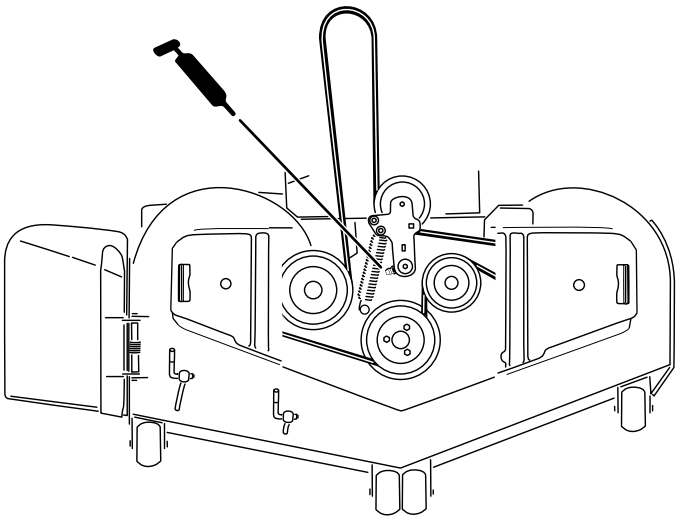

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Figure 40

4. Grease the drive-belt-idler arm (Figure 41).

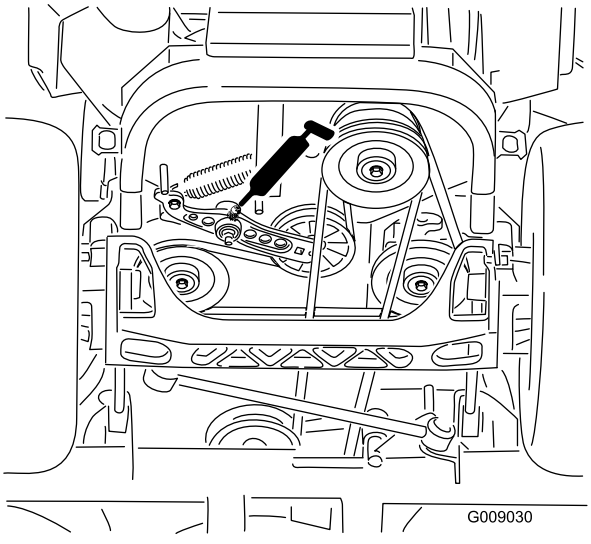

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Figure 41

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

Note: Keep the dust cap off until greasing is done.

6. Remove the hex plug.
7. Thread a grease fitting into the hole.
8. Pump grease into the fitting until it oozes out around the top bearing.
9. Remove the grease fitting in the hole.
10. Install the hex plug and dust cap (Figure 42).

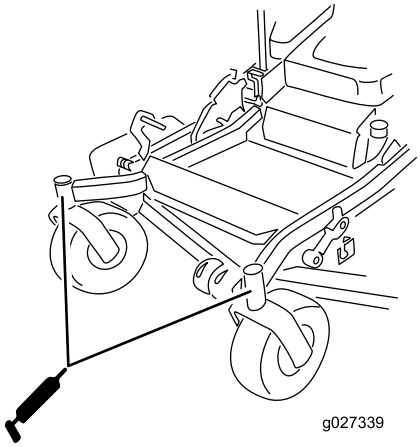

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Figure 42

11. Grease the caster-wheel bearings (Figure 42).

Greasing the Caster Pivots

Service Interval: Every 400 hours/Yearly (whichever comes first) (more often in dirty or dusty conditions).

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

1. Park the machine on a level surface, disengage the blade-control switch, and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove the dust cap and adjust the caster pivots and keep the dust cap off until greasing is done; refer to Adjusting the Caster-Pivot Bearing (page 60).
4. Remove the hex plug.
5. Thread a grease fitting into the hole.
6. Pump grease into the fitting until it oozes out around the top bearing.
7. Remove the grease fitting from the hole. Install the hex plug and cap.

Greasing the Caster-Wheel Hubs

Service Interval: Yearly

1. Park the machine on a level surface, disengage the blade-control switch, and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Raise the mower for access.
4. Remove the caster wheel from the caster forks.
5. Remove the seal guards from the wheel hub.

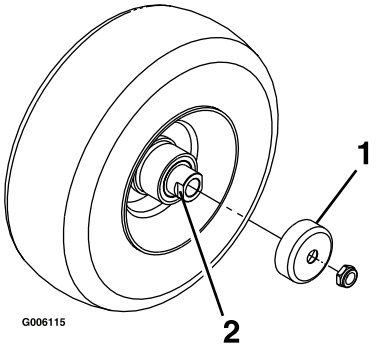

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Figure 43

1. Seal guard
2. Spacer nut with wrench flats

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

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

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

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

    Note: Make sure that the axle does not extend beyond either nut.
17. Install the seal guards over the wheel hub, and insert the wheel into the caster fork.
18. Install the caster bolt and tighten the nut fully.

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

Engine Maintenance

Engine Safety

- Shut off the engine and remove the key before checking the oil or adding oil to the crankcase.
- Keep your hands, feet, face, clothing, and other body parts away the muffler and other hot surfaces.

Servicing the Air Cleaner

Service Interval: Before each use or daily—Check the air cleaner for dirty, loose or damaged parts.

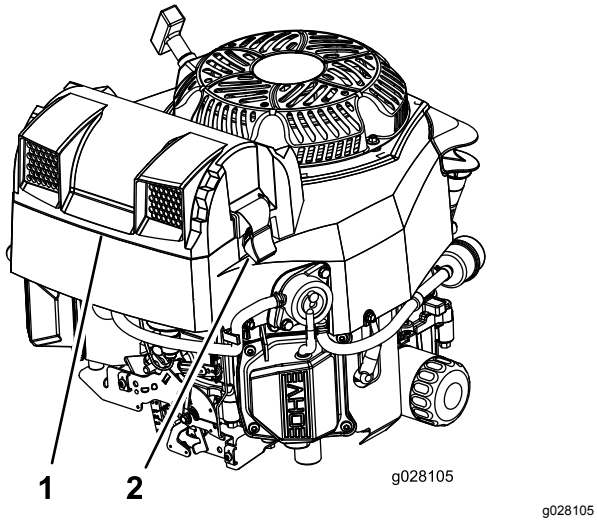
Every 250 hours—Service or replace the air-cleaner foam element (more often under dusty, dirty conditions).

Every 500 hours—Replace the air-cleaner paper element (more often under dusty, dirty conditions).

Note: Service the air cleaner more frequently if operating conditions are extremely dusty or sandy.

Removing the Filters

1. Park the machine on a level surface, disengage the blade-control switch (PTO), and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Release the latches on the air cleaner and pull the air-inlet cover off the air-cleaner body (Figure 44).
4. Clean the air-inlet screen and cover.
5. Install the air-inlet cover and secure it with the latches (Figure 44).



g028105

Figure 44

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 45).
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 45).

   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.**

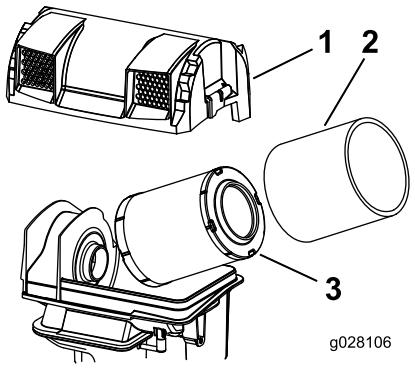


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Figure 45

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 Foam Element

1. Wash the foam element in liquid soap and warm water. When the element is clean, rinse it thoroughly.
2. Dry the element by squeezing it in a clean cloth.

   Important: **Replace the foam element if it is torn or worn.**

Servicing the Paper Element

1. Gently tap the paper element to dislodge dirt.

   Note: Do not wash the paper element or use pressurized air, as this will damage the element.

   Note: Replace a dirty, bent, or damaged element. Handle the new element carefully; do not use if the sealing surfaces are bent or damaged.
2. Clean the air-cleaner base as required, and check the condition.

Installing the Filters

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

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

   Note: Do not use a damaged filter.

2. If you are replacing the inner filter, carefully slide it into the filter body (Figure 45).

3. Carefully slide the primary filter over the safety filter (Figure 45).

   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 45).

Servicing the Engine Oil

Service Interval: Before each use or daily

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

Every 200 hours—Change the engine-oil filter (more often in dirty or dusty conditions).

Engine-Oil Specifications

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

Oil Capacity: 1.9 L (64 fl oz) with a filter change; 1.6 L (54 fl oz) without a filter change

Viscosity: See the table below.

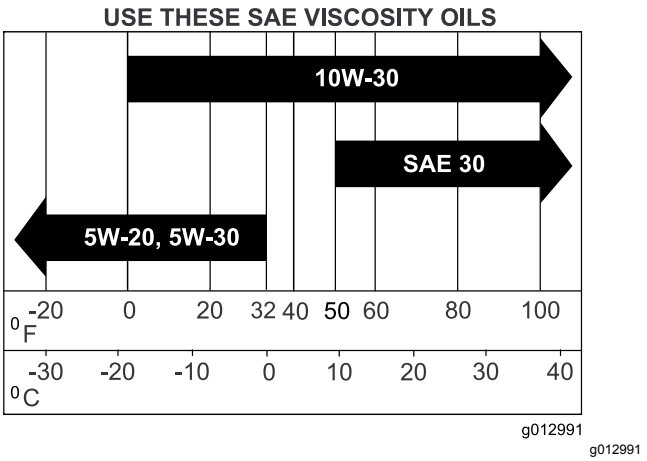


Figure 46

Checking the Engine-Oil Level

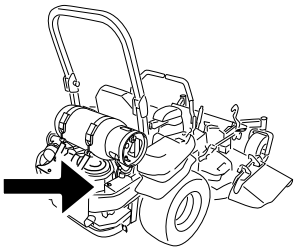
Note: Check the oil when the engine is cold.

Important: **If you overfill or underfill the engine crankcase with oil and run the engine, you may damage the engine.**

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

   Note: Ensure that the engine is cool so that the oil has had time to drain into the sump.

3. To keep dirt, grass clippings, etc., out of the engine, clean the area around the oil-fill cap and dipstick before removing it (Figure 47).



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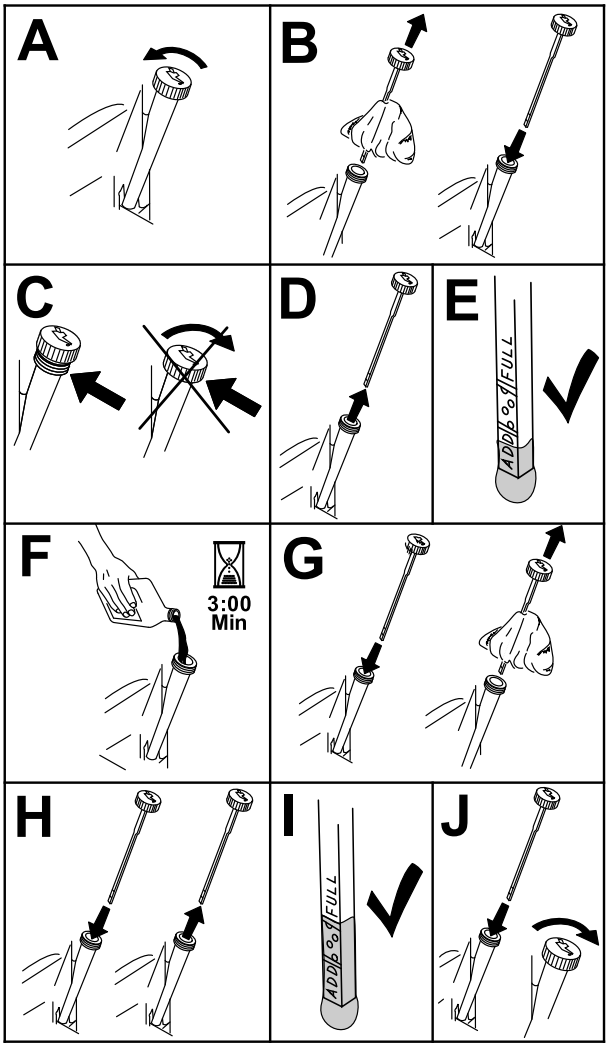

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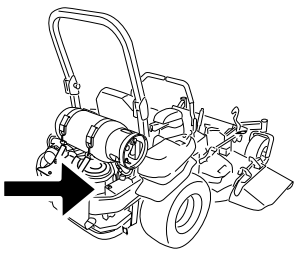
Figure 47

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



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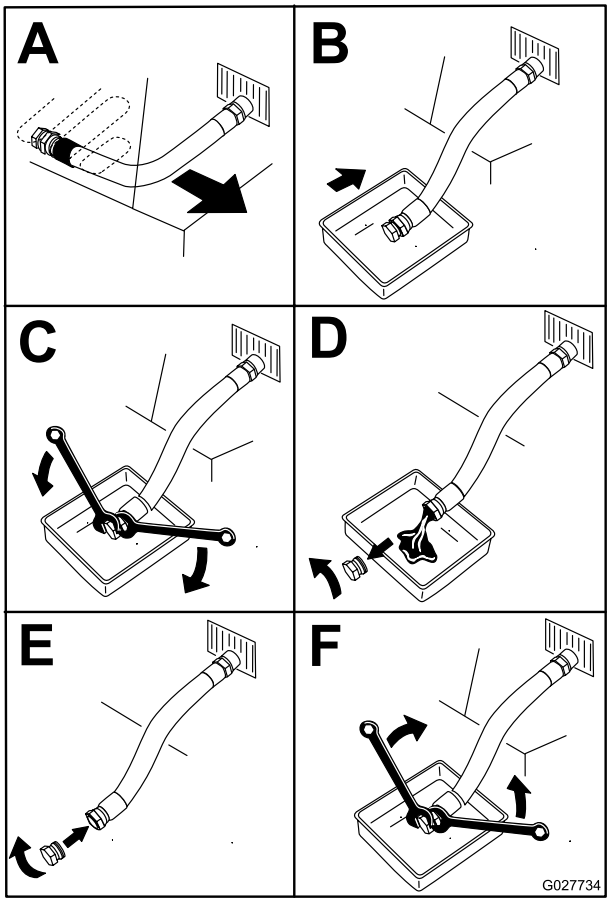

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Figure 48

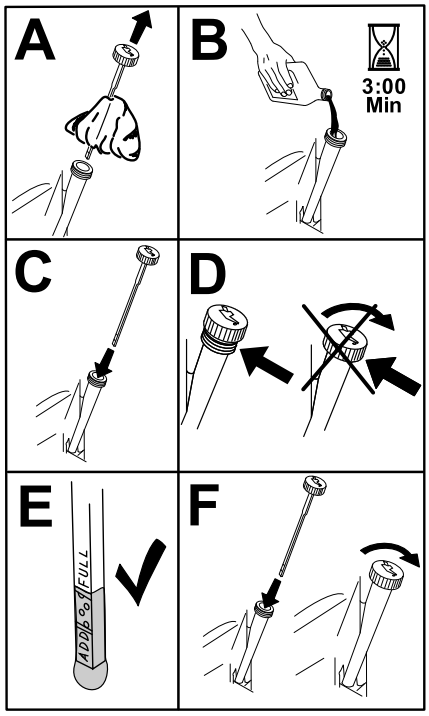
Changing the Engine Oil

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 drain side is slightly lower than the opposite side to ensure that the oil drains completely.
3. Disengage the blade-control switch (PTO) and engage the parking brake.

6. 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 49).



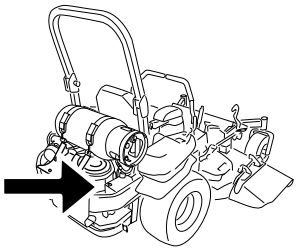
g194610

Figure 49

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

Changing the Engine-Oil Filter

1. Drain the oil from the engine; refer to Changing the Engine Oil (page 49).
2. Change the engine-oil filter (Figure 50).



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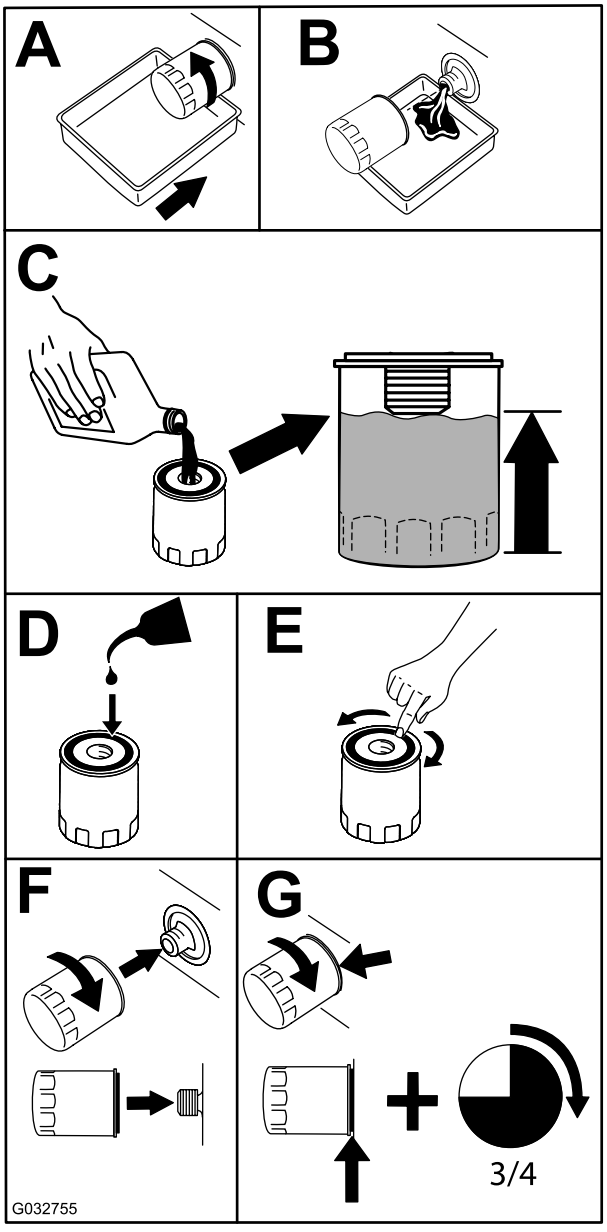

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Figure 50

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

3. Fill the crankcase with the proper type of new oil; refer to Engine-Oil Specifications (page 48).

Servicing the Spark Plug(s)

Service Interval: Every 200 hours—Check the spark plug(s).

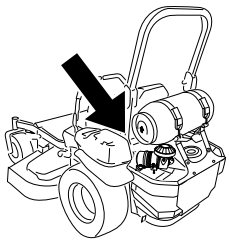
Every 500 hours—Replace the spark plug(s).

Type: Champion XC12YC

Air Gap: 0.76 mm (0.03 inch)

Removing the Spark Plug(s)

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 engage the parking brake.
3. Remove the left hydraulic-unit shroud in the order listed with Figure 51. This gives you access to the front spark plug.



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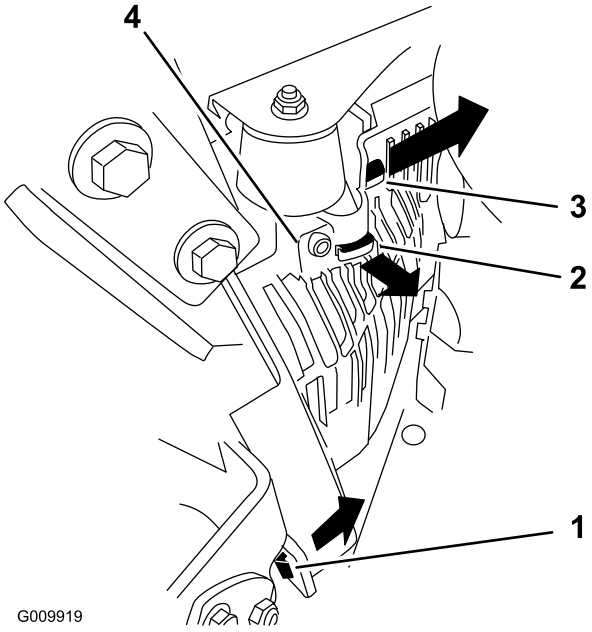

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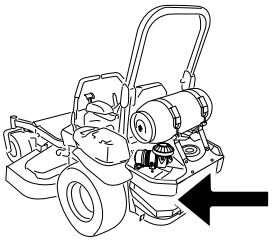
Figure 51

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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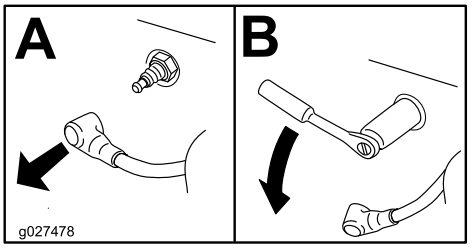

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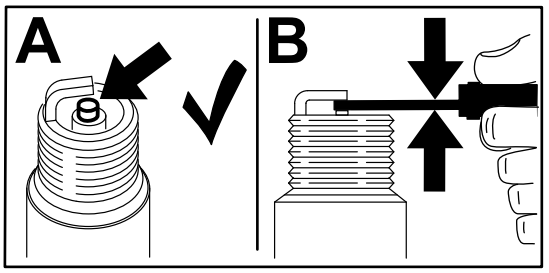
Figure 52

Checking the Spark Plug(s)

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 inch).

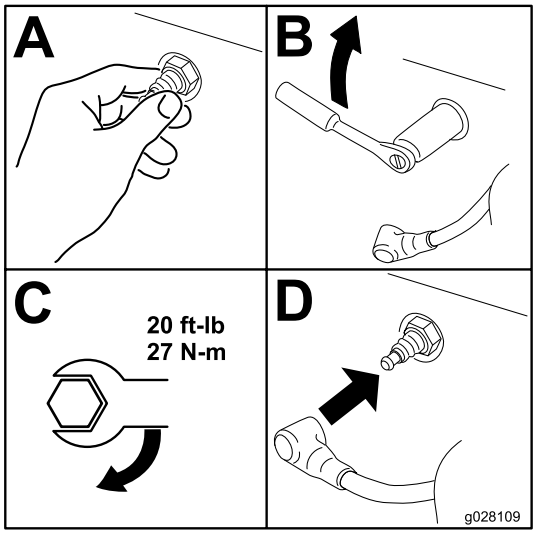


g206628

Figure 53

Installing the Spark Plug(s)

1. Install the spark plug(s) as shown in Figure 54.
2. Install the hydraulic shroud (Figure 51).



g028109

Figure 54

Checking the Spark Arrester

For Machines with a Spark Arrester

Service Interval: Every 50 hours

⚠ WARNING

Hot exhaust-system components may ignite fuel vapors even after you shut off the engine. Hot particles exhausted during engine operation may ignite flammable materials, resulting in personal injury or property damage.

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

1. Park the machine on a level surface, disengage the PTO, and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Wait for the muffler to cool.
4. If you see any breaks in the screen or welds, replace the arrester.
5. If the screen is plugged, remove the arrester, shake loose particles out of the arrester, and clean the screen with a wire brush (soak the screen in solvent if necessary).
6. Install the arrester on the exhaust outlet.

Fuel System Maintenance

Inspecting the LPG System

Service Interval: Before each use or daily—Check the LPG tank and components.

Every 40 hours—Check the LPG hoses, regulator, and connections.

It is very important to check the LPG tank and components for wear or leaks.

Important: **Never check for leaks using an open flame.**

Important: **Never use bare hands when checking the fitting or valve. Escaping LPG vapor and liquid freezes skin on contact.**

Inspecting the System Before Each Use

1. Visually inspect the tank, hose, and fitting and be alert to a foul odor coming from the tank. Do not use the LPG system if the hoses are abraded, damaged, kinked, or flattened.
2. Ensure that the LPG tank is free of dents or damage. If the tank shows signs of dents or damage, replace it immediately.
3. Check the valve and fitting openings for dirt and debris.
4. Slowly open the valve all the way and listen for a continuous hiss from the regulator, which may indicate a leak.

   LPG has a rotten egg or skunk smell added to it to help detect a gas leak. If you detect a gas leak:

   - Turn off the LPG valve if you can safely do so.
   - Leave the area.
   - Contact trained and qualified personnel immediately.
5. Ensure that the tank is securely mounted to the mower. If the tank is loose, the hose or fittings may leak.

Inspecting the System With Each Tank Change

1. Check all gauges, fittings, and valves for damage.
2. Look for deterioration and worn or missing O-rings on the tank connection fitting.
3. Inspect the LPG tank and the fuel-connection joint for leaks. Use the following procedure below to detect leaks:

   A. Apply an approved leak detector solution, obtained from a trained and qualified LPG distributor, or a thick non-ammonia soapy water solution (50% non-ammonia soap and 50% water).

   Important: **A leak detector solution that contains ammonia causes the fittings to corrode and leak.**

   B. Using a small brush or spray bottle, apply the solution around all the fittings of the LPG tank and the fuel-connection joint.

   C. Slowly open the gas valve a half-turn.

   - If you detect bubbles, the joint or fitting has a leak. Shut off the valve, tighten the leaking connection, and slowly open the valve again. If bubbles still appear, **do not** use the tank. If it is safe to do so, remove the tank from your mower; otherwise, contact trained and qualified personnel immediately.
   - If you do not detect bubbles, you may use the LPG tank.

Inspecting the System Weekly

1. Check the LPG hoses, regulator, and connections for damage or deterioration.
2. Check the LPG hoses, regulator, and connections for leaks at all joints using the same method as described in Inspecting the System With Each Tank Change (page 53).
3. Follow all the inspection checks as specified in Inspecting the System Before Each Use (page 53) and Inspecting the System With Each Tank Change (page 53).

Tank Requalification

- USDOT (United States Department of Transportation) regulations require LPG tanks to be inspected, requalified, and marked within 12 years of the manufacture date and on a regular basis thereafter. Typically this occurs when the tank is refilled; contact a trained and qualified LPG tank provider for more details.
- Do not fill the LPG tank if it is beyond the requalification period.
- Do not fill damaged or rusted LPG tanks.

Servicing the Electronic Fuel-Injection System

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

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

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

Once the MIL illuminates, make initial troubleshooting checks; refer to the MIL section under Troubleshooting (page 80).

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

Electrical System Maintenance

Electrical System Safety

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

Servicing the Battery

Service Interval: Monthly

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

Incorrectly removing the cables from battery could damage the machine and cables, causing sparks. Sparks can cause the battery gasses to explode, resulting in personal injury.

- **Always disconnect the negative (black) battery cable before disconnecting the positive (red) cable.**
- **Always connect the positive (red) battery cable before connecting the negative (black) cable.**

1. Park the machine on a level surface, disengage the blade-control switch (PTO), and engage the parking brake.

2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove the battery as shown in Figure 55.

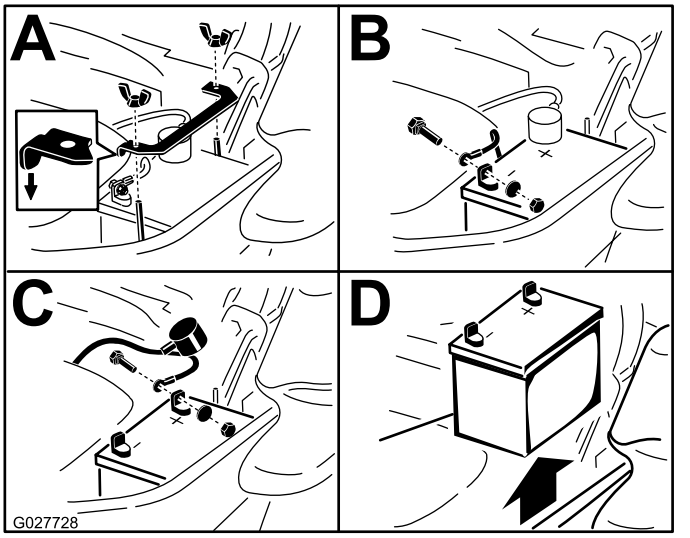


Figure 55

Charging the Battery

⚠ WARNING

Charging the battery produces gasses that can explode.

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

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

1. Remove the battery from the chassis; refer to Removing the Battery (page 54).
2. Charge the battery for 10 to 15 minutes at 25 to 30 A or for 30 minutes at 10 A.

   Note: Do not overcharge the battery.
3. When the battery is fully charged, unplug the charger from the electrical outlet, then disconnect the charger leads from the battery posts (Figure 56).
4. Install the battery in the machine and connect the battery cables; refer to Installing the Battery (page 56).

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

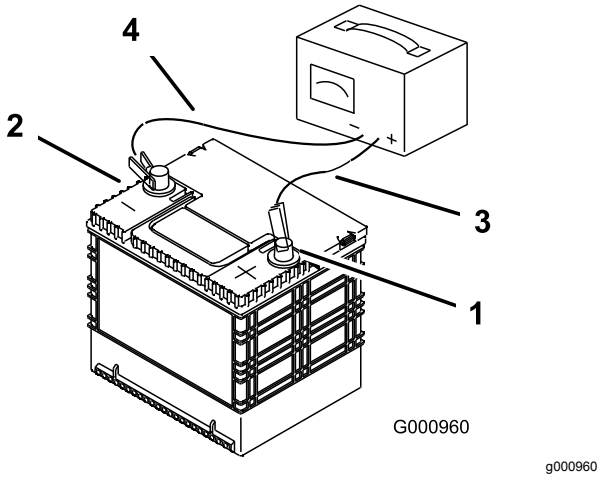


Figure 56

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

Installing the Battery

Note: Position the battery in the tray with the terminal posts opposite from the hydraulic tank (Figure 55).

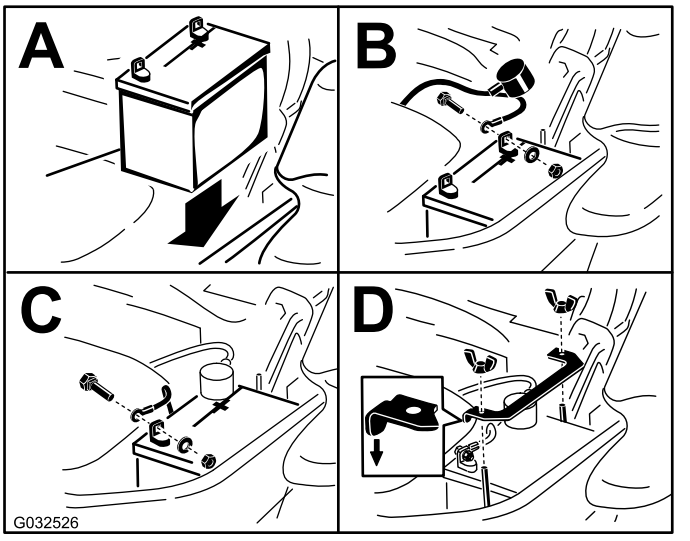


Figure 57

Servicing the Fuses

The electrical system is protected by fuses. It requires no maintenance, however, if a fuse blows check the component/circuit for a malfunction or short. The fuses are located on the console to the right of the seat (Figure 58).

To replace the fuses, remove the cover, pull out on the fuse to remove it, and install a new fuse.

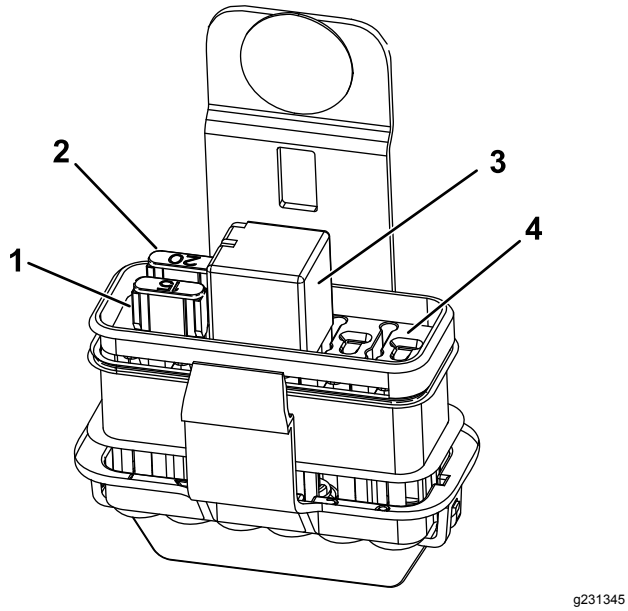


Figure 58

1. Auxiliary, 15 A
2. Main, 20 A
3. Start relay
4. Open

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 the machine 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. Make sure that the booster battery is a good and fully charged lead-acid battery at 12.6 V or greater.

Note: Use properly sized jumper cables with short lengths to reduce voltage drop between systems. Make sure 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 the batteries.

⚠ WARNING

Batteries contain acid and produce explosive gases.

- **Shield your 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

machines 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 59.

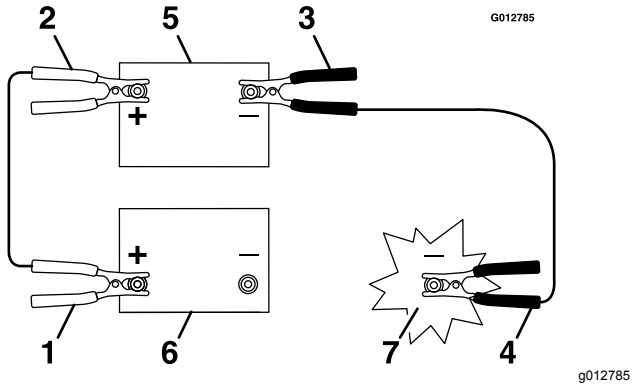
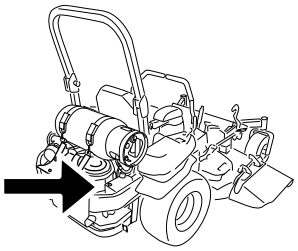


Figure 59

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 machine (not to the negative battery post), away from the battery, and stand back (Figure 60).



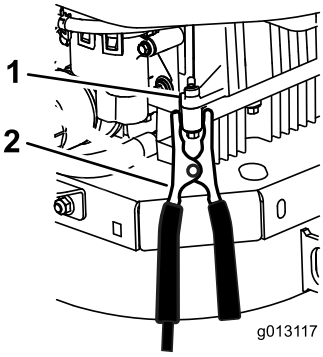


Figure 60

1. Engine block
2. Negative (–) cable

7. Start the machine and remove the cables in the reverse order of connection (disconnect the negative cable from the engine block first).

Drive System Maintenance

Checking the Seat Belt

Service Interval: Before each use or daily

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

Checking the Rollover Protection System (ROPS) Knobs

Service Interval: Before each use or daily

⚠ WARNING

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

Ensure that the seat is secured to the machine.

Check that both the mounting hardware and the knobs are in good working condition. Make sure that the knobs are fully engaged with the roll bar 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 61).

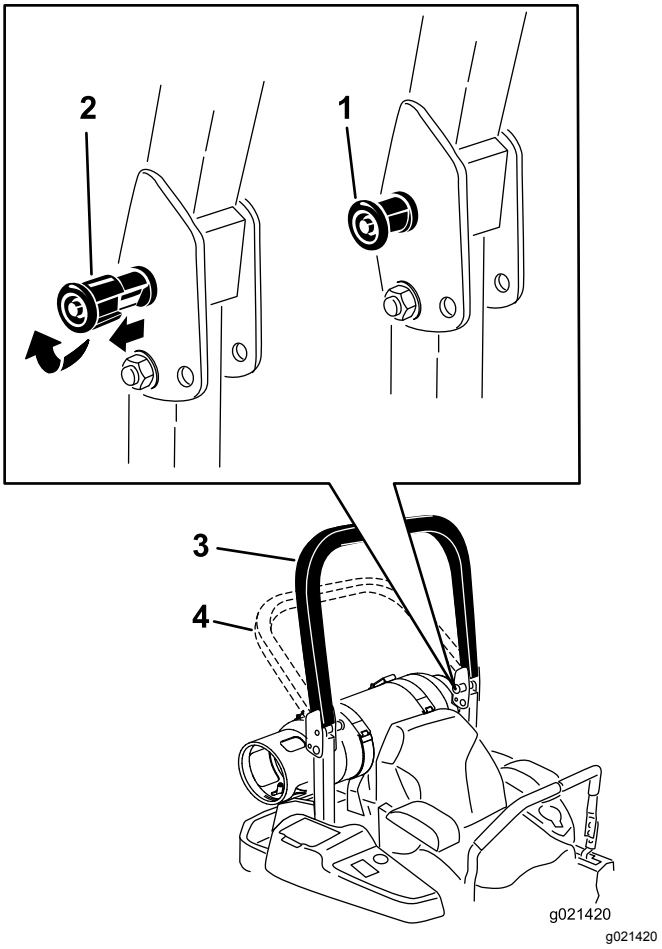


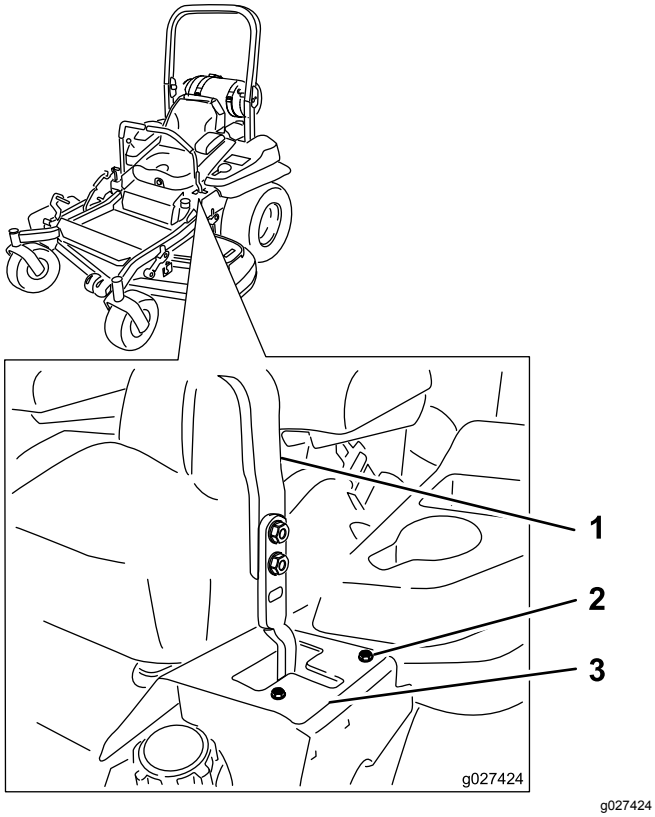
Figure 61

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

Adjusting the Tracking

1. Disengage the blade-control switch (PTO).
2. Drive to an open flat area, move the motion-control levers to the NEUTRAL-LOCK position.
3. Move the throttle midway between fast and slow.
4. Move both motion-control levers all the way forward until they both hit the stops in the T-slot.
5. Check which way the machine tracks.
   - If it tracks to the right, loosen the bolts and adjust the left stop plate rearward on the left T-slot until the machine tracks straight (Figure 62).
   - If it tracks to the left, loosen the bolts and adjust the right stop plate rearward on the right T-slot until the machine tracks straight (Figure 62).

6. Tighten the stop plate (Figure 62).



g027424

Figure 62

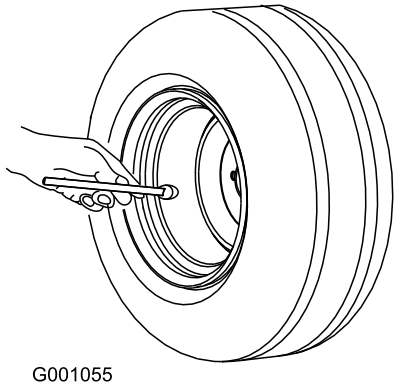
Left control lever shown

1. Control lever
2. Bolt
3. Stop plate

Checking the Tire Pressure

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

Maintain the air pressure in the front and 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.



g001055

Figure 63

Checking the Wheel Lug Nuts

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

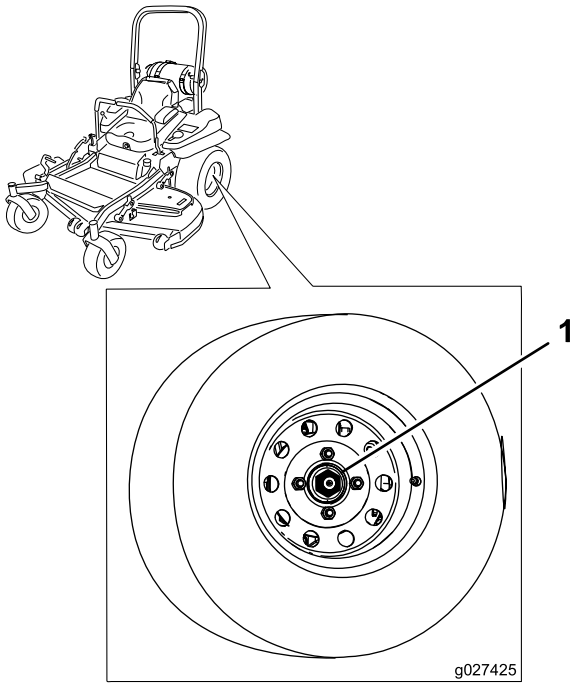
Checking the Wheel-Hub Slotted Nut

Service Interval: After the first 100 hours

Every 500 hours

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

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



g027425

Figure 64

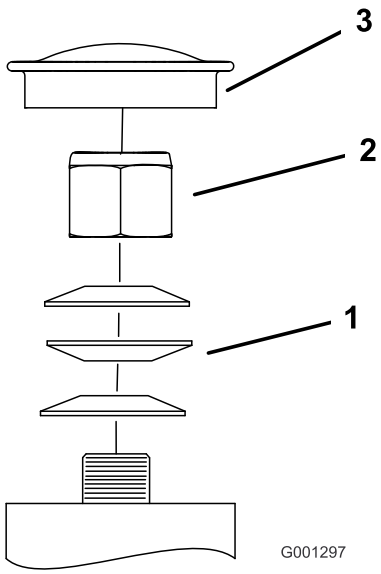
1. Slotted nut

Adjusting the Caster-Pivot Bearing

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

1. Park the machine on a level surface, disengage the blade-control switch (PTO), and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove the dust cap from caster and tighten the locknut (Figure 65).
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 65).

   Important: **Make sure that the spring washers are installed correctly as shown in Figure 65.**
5. Install the dust cap (Figure 65).



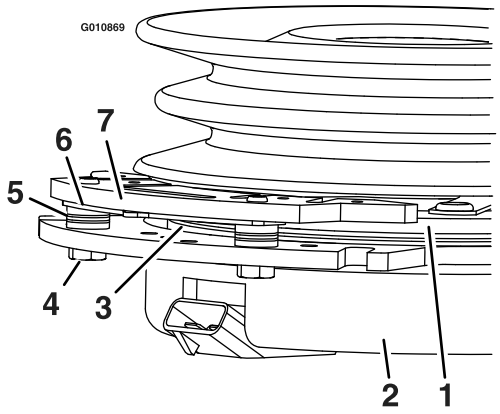
g001297

Figure 65

1. Spring washers
2. Locknut
3. Dust cap

Removing the Clutch Shim

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

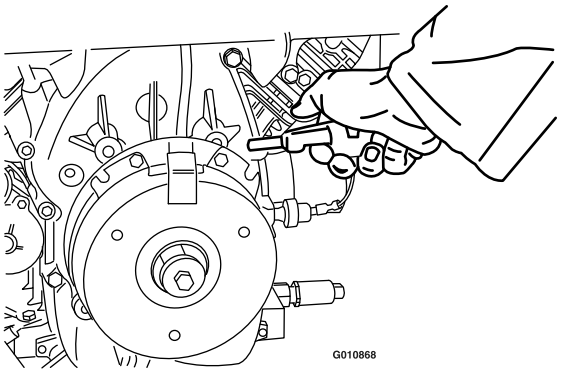


g010869

Figure 66

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

1. Park the machine on a level surface, disengage the blade-control switch (PTO), and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Using an air compressor, blow out any debris from under the brake pole and around the brake spacers (Figure 67).



g010868

Figure 67

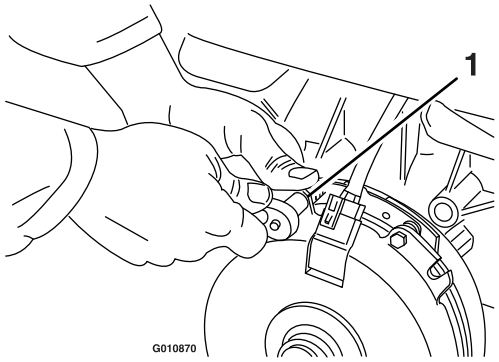
4. Check the condition of the wire-harness leads, connectors, and terminals.

   Note: Clean or repair as necessary.

5. Verify that 12 V is present at the clutch connector when the blade-control switch (PTO) switch is engaged.
6. Measure the gap between the rotor and armature. If the gap is greater than 1 mm (0.04 inch), do the following steps:

   A. Loosen both brake-mounting bolts 1/2 to 1 full turn as shown in Figure 68.

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



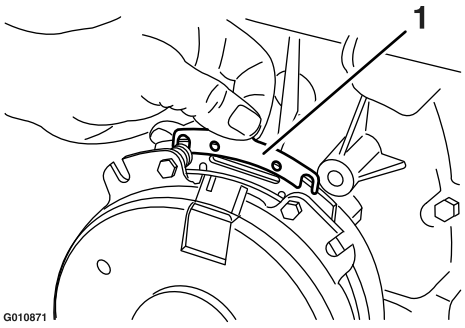
g010870

Figure 68

1. Brake-mounting bolt

   B. Using needle-nose pliers, or by hand, hold the tab and remove the shim (Figure 69).

      Note: Do not discard the shim until the clutch is functioning properly.



g010871

Figure 69

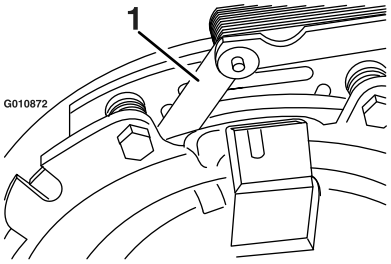
1. Shim

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

   D. Torque each bolt (M6 x 1) to 12.3 to 13.7 N·m (9.5 to 10.5 ft-lb).

   E. Using a 0.25 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 in Figure 70 and Figure 71.

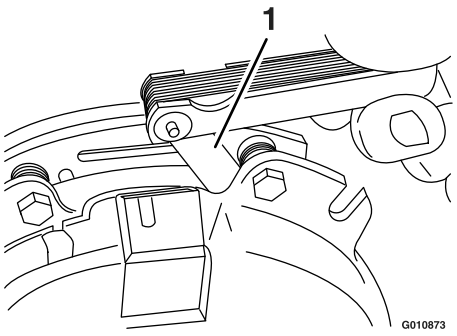
      Note: Due to the way the rotor and the armature faces wear (peaks and valleys) it is sometimes difficult to measure the gap accurately.



g010872

Figure 70

1. Feeler gauge



g010873

Figure 71

1. Feeler gauge

   - If the gap is less than 0.25 mm (0.01 inch), then install the shim; refer to Troubleshooting (page 80).
   - If the gap is sufficient, proceed to the safety check in step F.

   F. Perform the following safety check:

      i. Sit on the seat and start the engine.

      ii. Make sure that the blades do not engage with the blade-control switch (PTO) in the OFF position, and that the clutch is disengaged.

      If the clutch does not disengage, install the shim again; refer to Troubleshooting (page 80).

      iii. Engage and disengage the blade-control switch (PTO) 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 and the engine screen (Figure 72).

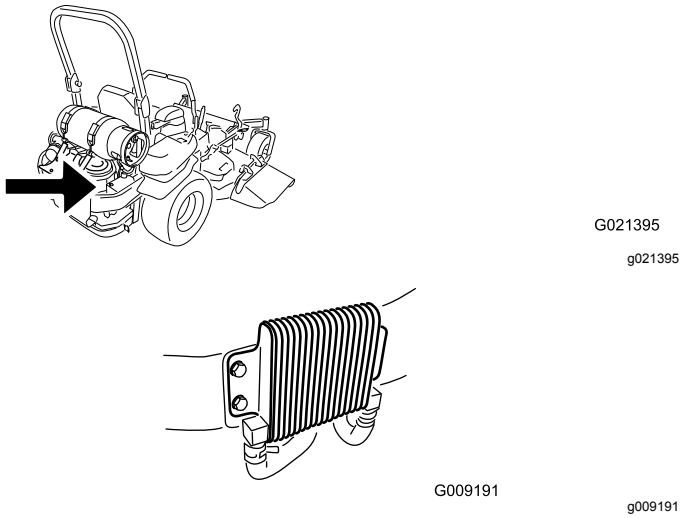


Figure 72

Remove any buildup of grass, dirt, or other debris from the engine screen. This helps ensure adequate cooling and correct engine speed and reduces the possibility of overheating and mechanical damage to the engine (Figure 69).

Cleaning the Engine-Cooling Fins and Shrouds

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

1. Park the machine on a level surface, disengage the blade-control switch (PTO), and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove the air-intake screen, the recoil starter, and the fan housing (Figure 73).
4. Clean the debris and grass from the engine parts.
5. Install the air-intake screen, the recoil starter, and the fan housing (Figure 73).

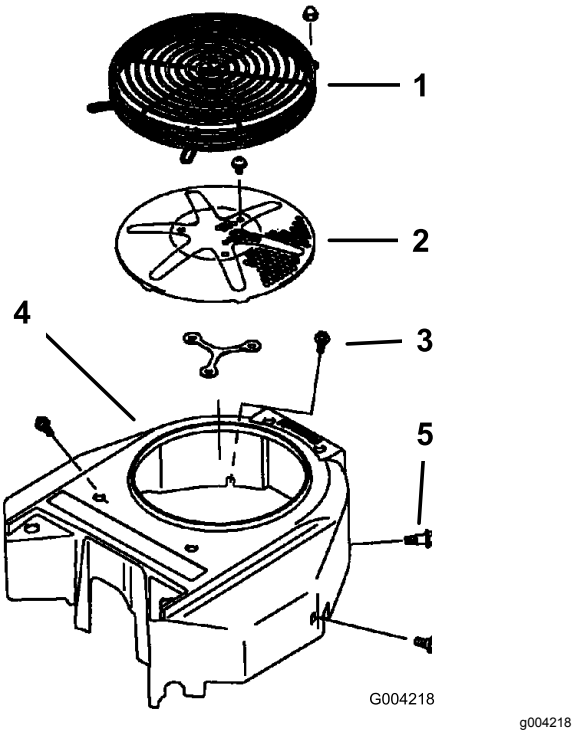


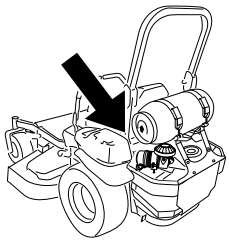
Figure 73

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. Park the machine on a level surface, disengage the blade-control switch (PTO), and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Move the seat forward.
4. Clean the debris and grass from the hydraulic-unit shrouds (Figure 74).
5. Position the seat.



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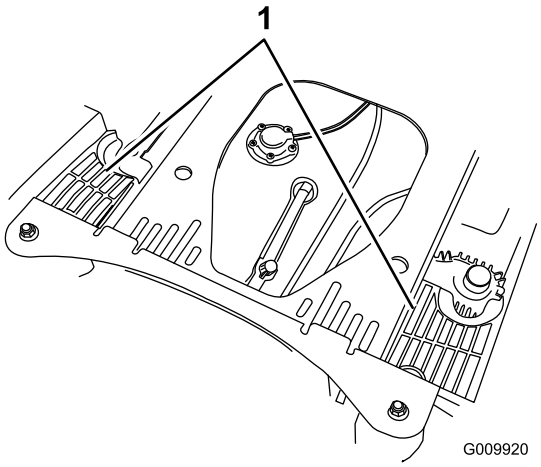


G009920

g009920

Figure 74

1. Hydraulic-unit shrouds

Brake Maintenance

Adjusting the Parking Brake

Service Interval: After the first 100 hours

Every 500 hours thereafter

Note: Perform this procedure at the recommended service interval or when a brake component has been removed or replaced.

1. Park the machine on a level surface, disengage the blade-control switch (PTO), and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Raise the back of the machine and support the machine with jack stands.

⚠ CAUTION

Raising the machine for service or maintenance relying solely on mechanical or hydraulic jacks could be dangerous. The mechanical or hydraulic jacks may not be enough support or may malfunction allowing the machine to fall, which could cause injury.

Do not rely solely on mechanical or hydraulic jacks for support. Use adequate jack stands or equivalent support.

4. Remove the rear tires from the machine.
5. Remove any debris from the brake area.
6. Rotate the drive-wheel release handle to the released position; refer to Using the Drive-Wheel-Release Valves (page 40).
7. Check to see if there is a visible gap between the L-bracket and the linkage stop (Figure 75).

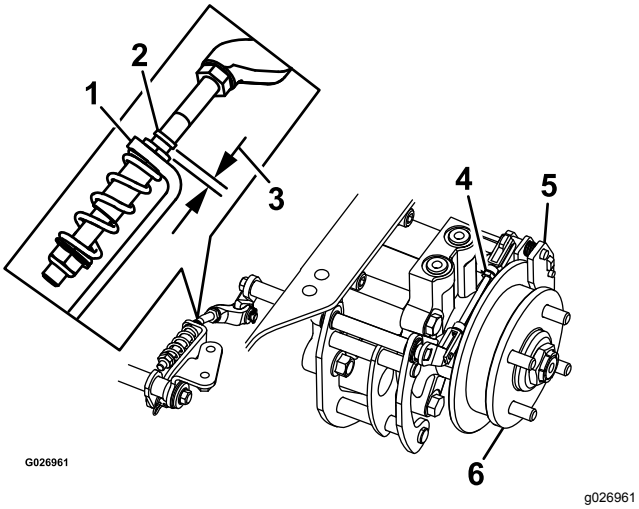


Figure 75

Left Side Shown

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

8. Disengage the parking brake, the lever should be in the down position.
9. Turn the wheel hub by hand in both directions relative to the caliper; the wheel hub should move freely between the caliper.
10. If a gap is needed or the wheel hub does not move freely:
    A. Disengage the parking brake.
    B. Disconnect and fine-tune the rear linkage assembly:
       - Shorten the link to create a gap.
       - Lengthen the link to allow wheel hub movement.
    C. Connect the rear linkage assembly.
11. Engage the parking brake and check the gap.
12. Repeat steps 8 through 12 until a visible gap is achieved and the wheel hub rotates freely.
13. Repeat this procedure for the brake on the opposite side.
14. Rotate the drive-wheel release handle to the operating position; refer to Using the Drive-Wheel-Release Valves (page 40).
15. Install the rear tires and torque the lug nuts; refer to Checking the Wheel Lug Nuts (page 59).
16. Remove the jack stands.

Belt Maintenance

Inspecting the Belts

Service Interval: Every 50 hours

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

Replacing the Mower Belt

1. Park the machine on a level surface, disengage the blade-control switch (PTO), and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Lower the mower to the 76 mm (3 inch) height of cut.
4. Remove the belt covers (Figure 76).

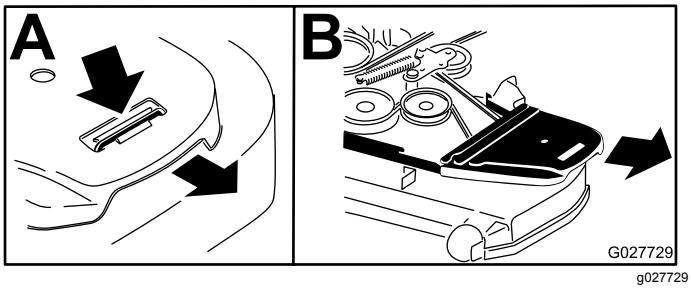


Figure 76

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 77).
6. Remove the belt from the mower-deck pulleys.
7. Remove the belt guide on the spring-loaded idler arm (Figure 77).
8. Remove the existing belt.
9. Install the new belt around the mower pulleys and the clutch pulley under the engine (Figure 77).

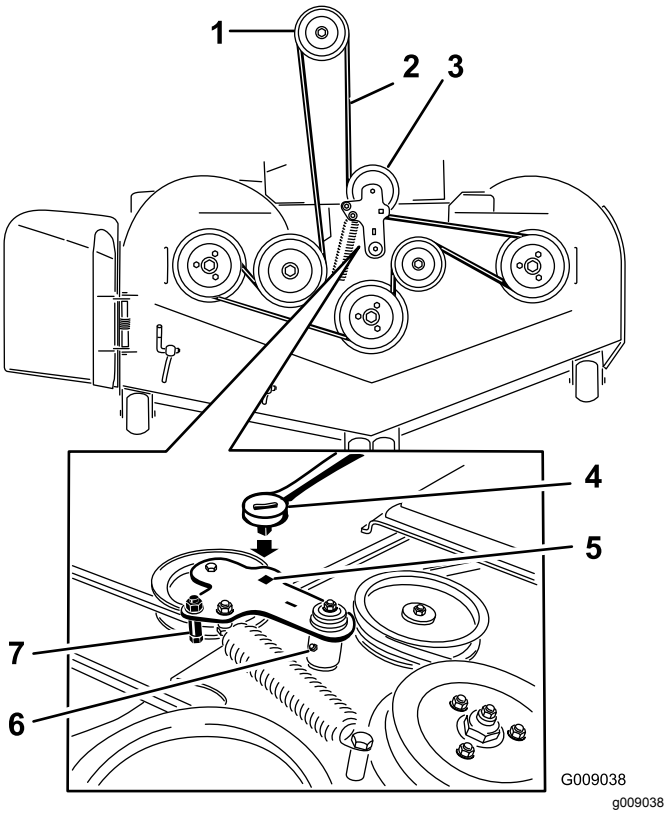


Figure 77

1. Clutch pulley
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 77).
11. Using the ratchet in the square hole, install the idler spring (Figure 77).

    Note: Make sure that the spring ends are seated in the anchor grooves.
12. Install the belt covers (Figure 78).

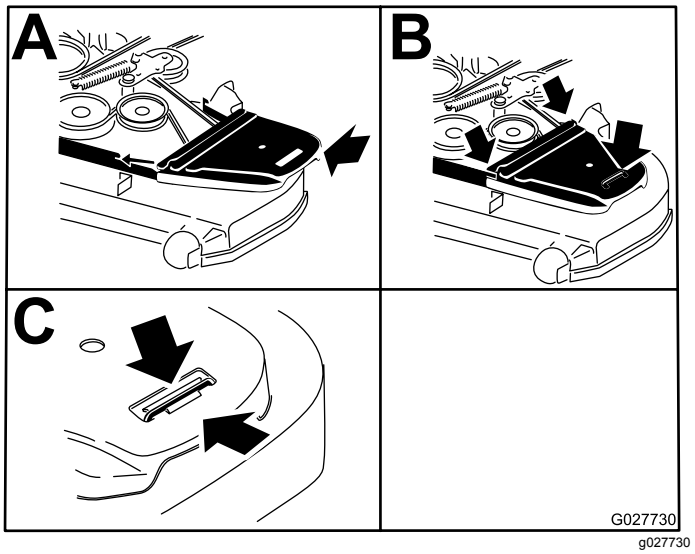
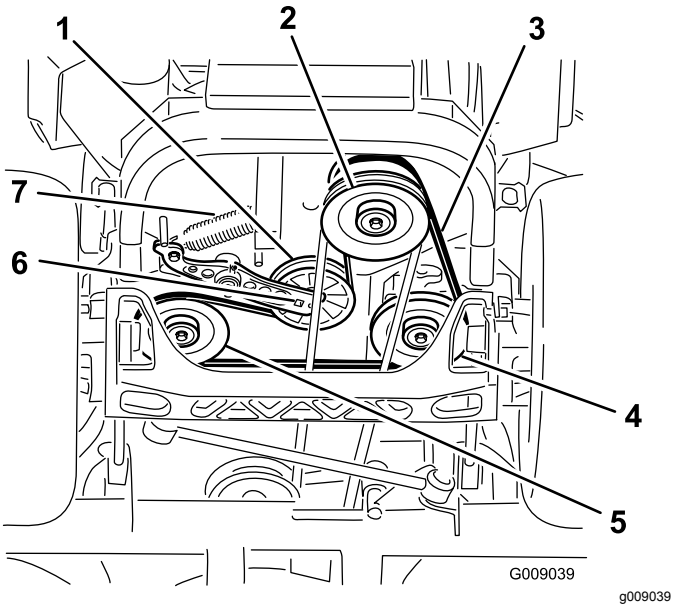


Figure 78

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. Park the machine on a level surface, disengage the blade-control switch (PTO), and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Remove the mower belt; refer to Replacing the Mower Belt (page 64).
4. Raise the machine and support it with jack stands (Figure 79).



g009039

Figure 79

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

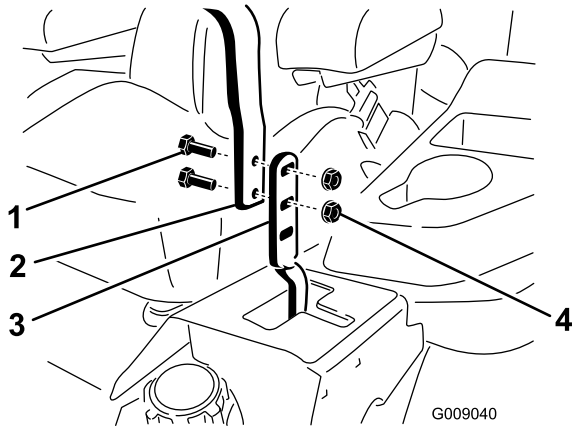
5. Use a ratchet in the square hole in the idler arm to remove the idler spring (Figure 79).
6. Unhook the idler spring from the frame (Figure 79).
7. Remove the belt from the hydraulic-unit-drive pulleys and the engine pulley.
8. Install the new belt around engine pulley and the 2 drive pulleys.
9. Using a ratchet in the square hole in the idler arm, install the idler spring to the frame (Figure 79).
10. Install the mower belt; refer to Replacing the Mower Belt (page 64).

Controls System Maintenance

Adjusting the Control-Handle Position

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

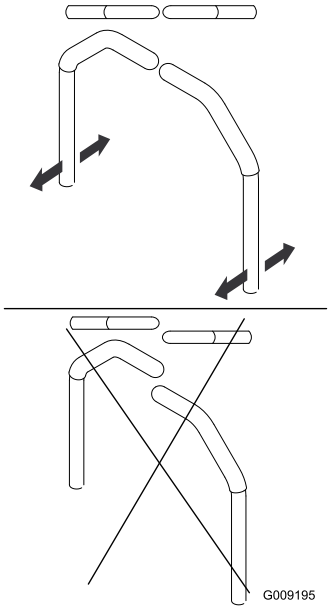
1. Park the machine on a level surface, disengage the blade-control switch (PTO), and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Loosen the bolts and flange nuts installed in the levers (Figure 80).
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 81).



g009040

Figure 80

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



g009195

Figure 81

5. If the ends of the levers hit against each other, refer to Adjusting the Motion-Control Neutral-Lock Pivot (page 68).
6. Repeat to adjust the control levers.

Adjusting the Motion-Control Linkage

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

⚠ WARNING

The engine must be running and the drive wheels turning so that you can perform the adjustments. Contact with moving parts or hot surfaces may cause personal injury.

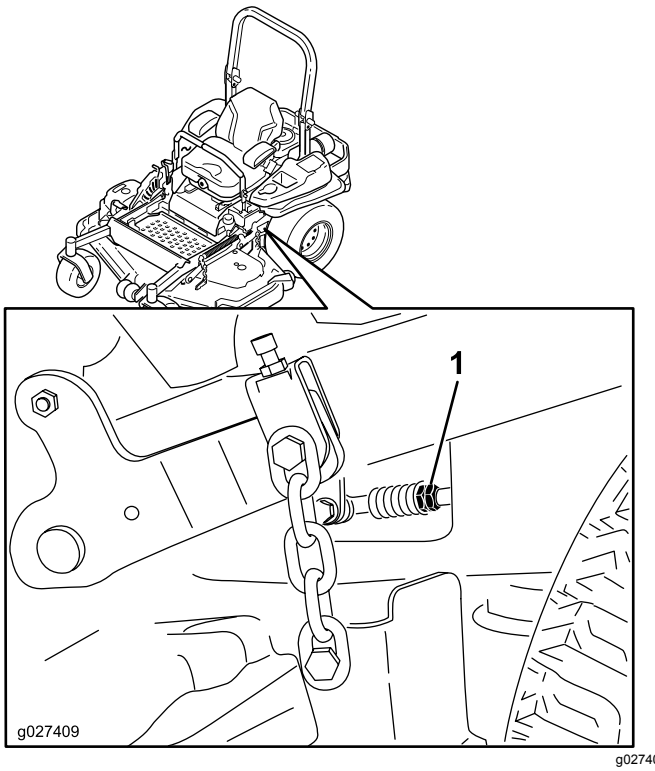
Keep your fingers, hands, and clothing clear of rotating components and hot surfaces.

1. Park the machine on a level surface, disengage the blade-control switch (PTO), move the motion-control levers to the NEUTRAL-LOCK position, and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Push the deck-lift pedal, remove the height-of-cut pin, and lower the mower deck to the ground
4. Raise the rear of the machine up and support it with jack stands (or equivalent support) just high enough to allow the drive wheels to turn freely.
5. Remove the electrical connection from the seat safety switch, located under the bottom cushion of the seat.

   Note: The switch is a part of the seat assembly.
6. **Temporarily** install a jumper wire across the terminals in the connector of the main wire harness.
7. Start the engine, run it at full throttle, and disengage the parking brake.

   Note: Before starting the engine, ensure that the parking brake is engaged and that the motion-control levers are out. You do not have to be in the seat.
8. Run the machine at least 5 minutes with the drive levers at full forward speed to bring the hydraulic fluid up to the operating temperature.

   Note: The motion-control levers must be in neutral while you are making any adjustments.
9. Bring the motion-control levers into the NEUTRAL position.
10. Adjust the pump-control-rod lengths by rotating the double nuts on the rod in the appropriate direction until the wheels slightly creep in reverse (Figure 82).



g027409

Figure 82

1. Double nuts

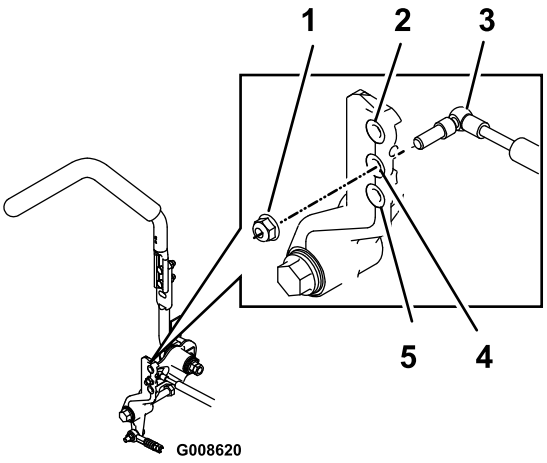
11. Move the motion-control levers to the REVERSE position and while applying slight pressure to the lever, allow the reverse-indicator springs to bring the levers back to neutral.

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

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

Adjusting the Motion-Control Damper

You can adjust the top damper-mounting bolt to obtain the desired motion-control lever resistance. Refer to Figure 83 for mounting options.



g008620

Figure 83

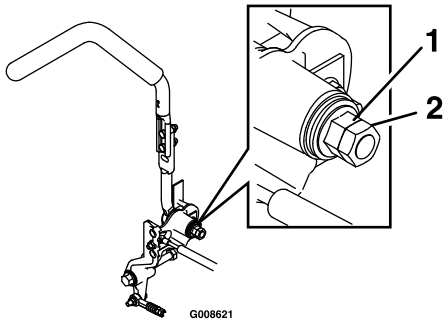
Right Motion Control Shown

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

Adjusting the Motion-Control Neutral-Lock Pivot

You can adjust the flanged nut to obtain the desired motion-control lever resistance when moving it to the NEUTRAL-LOCK position. See Figure 84 for adjustment options.

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



g008621

Figure 84

1. Flanged nut
2. Jam nut

Hydraulic System Maintenance

Hydraulic System Safety

- Seek immediate medical attention if fluid is injected into skin. Injected fluid must be surgically removed within a few hours by a doctor.
- Ensure that all hydraulic-fluid hoses and lines are in good condition and all hydraulic connections and fittings are tight before applying pressure to the hydraulic system.
- Keep your body and hands away from pinhole leaks or nozzles that eject high-pressure hydraulic fluid.
- Use cardboard or paper to find hydraulic leaks.
- Safely relieve all pressure in the hydraulic system before performing any work on the hydraulic system.

Hydraulic-Fluid Specifications

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

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

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. Park the machine on a level surface, disengage the blade-control switch (PTO), and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Allow the engine and the hydraulic system to cool for 10 minutes.

   Note: The oil level on the dipstick is incorrect when the oil is checked and the machine is hot.
4. Move the seat forward.
5. Clean the area around the dipsticks of hydraulic-system reservoirs (Figure 85).
6. Remove 1 dipstick from the hydraulic reservoir (Figure 85).
7. Wipe the dipstick off and thread the dipstick into the reservoir.
8. Remove the dipstick and look at the end (Figure 85).

   Important: **Do not overfill the hydraulic units with fluid, as damage may occur. Do not run the machine with fluid below the add mark.**
9. 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.
10. Install the dipstick.
11. Repeat the procedure for the opposite dipstick.

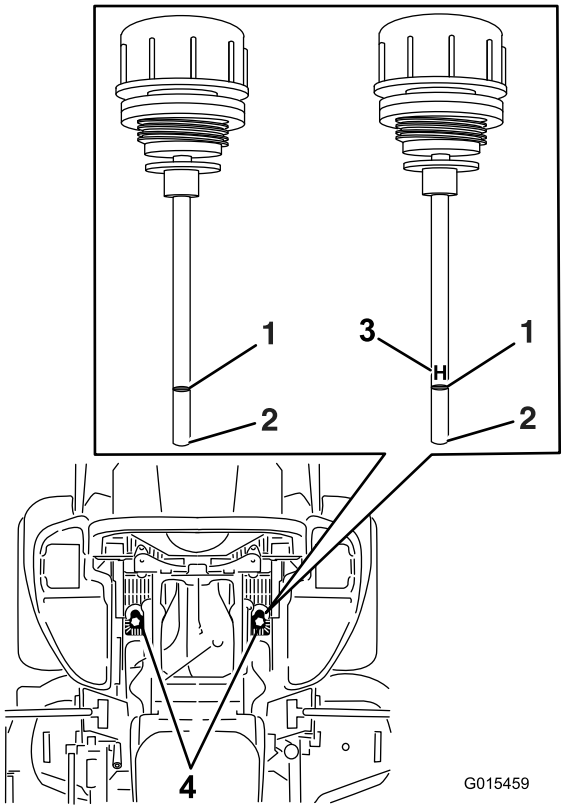


Figure 85

Either dipstick is used in the machine

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

Changing the Hydraulic Fluid and Filters

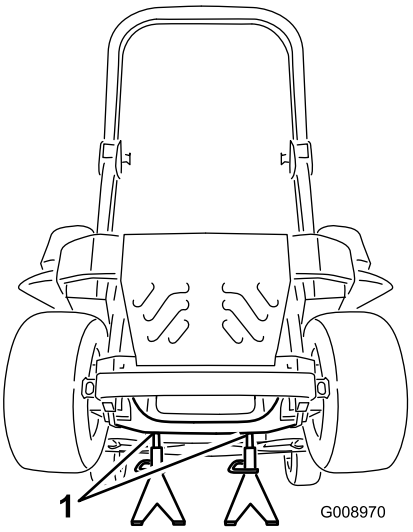
Service Interval: After the first 250 hours—Change the hydraulic filters and hydraulic fluid.

Every 250 hours—After the initial change—change the hydraulic-system filters and fluid when using Mobil 1 15W50 fluid. (Change it more often under dirty or dusty conditions)

Every 500 hours—After the initial change—change the hydraulic-system filters and fluid when using Toro® HYPR-OIL™ 500 fluid. (Change it more often under dirty or dusty conditions)

To replace the hydraulic fluid, the filters need to be removed. Replace both at the same time; refer to Hydraulic-Fluid Specifications (page 69) for fluid specifications.

1. Park the machine on a level surface, disengage the blade-control switch, and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Raise the machine and support it with jack stands (Figure 86).



g008970

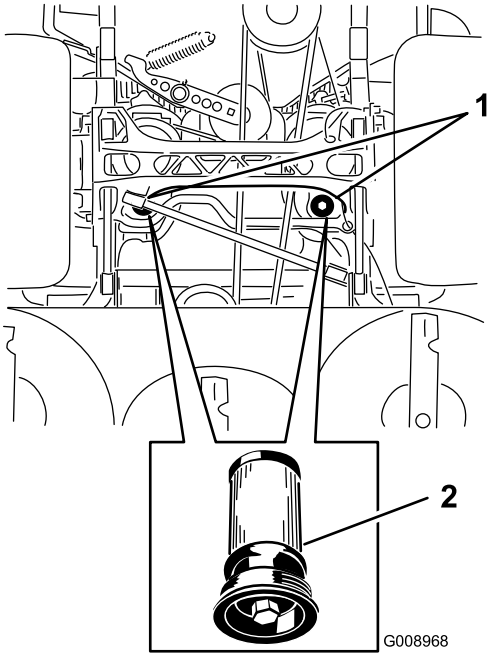
Figure 86

1. Jack stands

4. Remove both the mower belt and the pump-drive belt; refer to Replacing the Mower Belt (page 64) and Replacing the Hydraulic Pump-Drive Belt (page 66).

   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 87).



g008968

Figure 87

Bottom view of the machine

1. Filter locations
2. Hydraulic filter

6. Apply a thin coat of hydraulic fluid to the rubber gasket on the replacement filter (Figure 87).
7. Install the replacement hydraulic filter.
8. Install the pump-drive belt and the mower belt.
9. Remove the jack stands and lower the machine (Figure 86).
10. Add 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.

Blade Maintenance

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.

Blade Safety

A worn or damaged blade can break, and a piece of the blade could be thrown toward you or bystanders, resulting in serious personal injury or death. Trying to repair a damaged blade may result in discontinued safety certification of the product.

- Inspect the blades periodically for wear or damage.
- Use care when checking the blades. Wrap the blades or wear gloves, and use caution when servicing the blades. Only replace or sharpen the blades; never straighten or weld them.
- On multi-bladed machines, take care as rotating 1 blade can cause other blades to rotate.

Before Inspecting or Servicing the Blades

1. Park the machine on a level surface, disengage the blade-control switch (PTO), and engage the parking brake.
2. Shut off the engine, remove the key, and 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 88).
2. If the edges are not sharp or have nicks, remove and sharpen the blade; refer to Sharpening the Blades (page 73).
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 88).

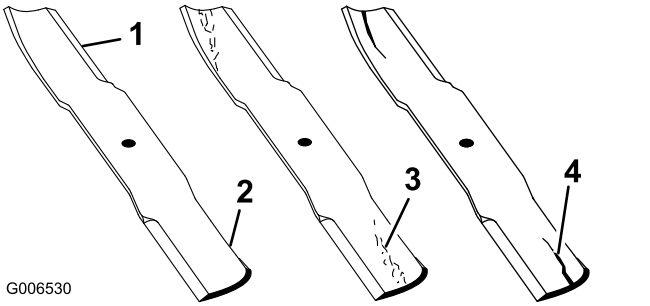


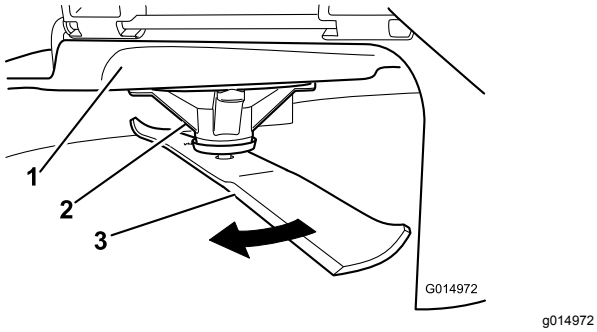
Figure 88

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

Checking for Bent Blades

Note: The machine must be on a level surface for the following procedure.

1. Raise the mower deck to the highest height-of-cut position.
2. While wearing thickly padded gloves, or other adequate hand protection, slowly rotate the blade into a position that allows you to measure the distance between the cutting edge and the level surface the machine is on (Figure 89).

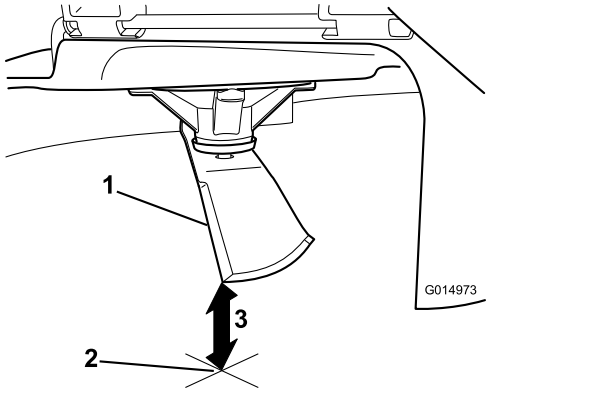


g014972

Figure 89

1. Deck
2. Spindle housing
3. Blade

3. Measure from the tip of the blade to the flat surface (Figure 90).

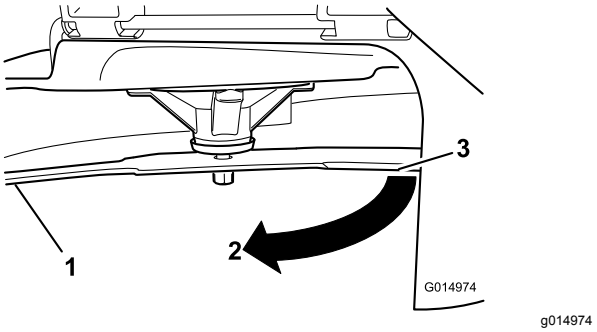


g014973

Figure 90

1. Blade (in position for measuring)
2. Level surface
3. Measured distance between blade and the surface (A)

4. Rotate the same blade 180 degrees so that the opposing cutting edge is now in the same position (Figure 91).



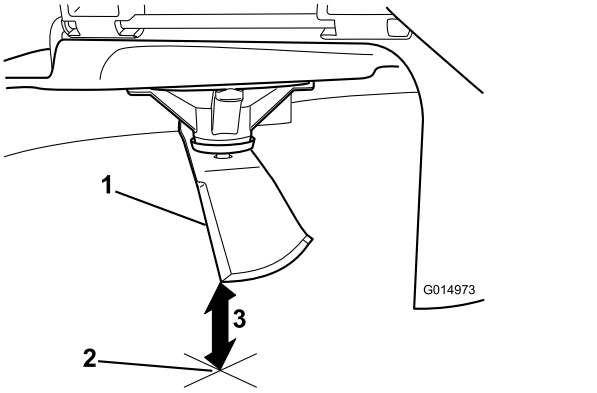
g014974

Figure 91

1. Blade (side previously measured)
2. Measurement (position used previously)
3. Opposing side of blade being moved into measurement position

5. Measure from the tip of the blade to the flat surface (Figure 92).

   Note: The variance should be no more than 3 mm (1/8 inch).



g014973

Figure 92

1. Opposite blade edge (in position for measuring)
2. Level surface
3. Second measured distance between blade and surface (B)

   A. If the difference between A and B is greater than 3 mm (1/8 inch), replace the blade with a new blade; refer to Removing the Blades (page 73) and Installing the Blades (page 73).

      Note: If a bent blade is replaced with a new blade, and the dimension obtained continues to exceed 3 mm (1/8 inch), the blade spindle could be bent. Contact an Authorized Service Dealer for service.

   B. If the variance is within constraints, move to the next blade.

6. Repeat this procedure on each blade.

Removing the Blades

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

1. Hold the blade end using a rag or thickly padded glove.
2. Remove the blade bolt, curved washer, and blade from the spindle shaft (Figure 93).

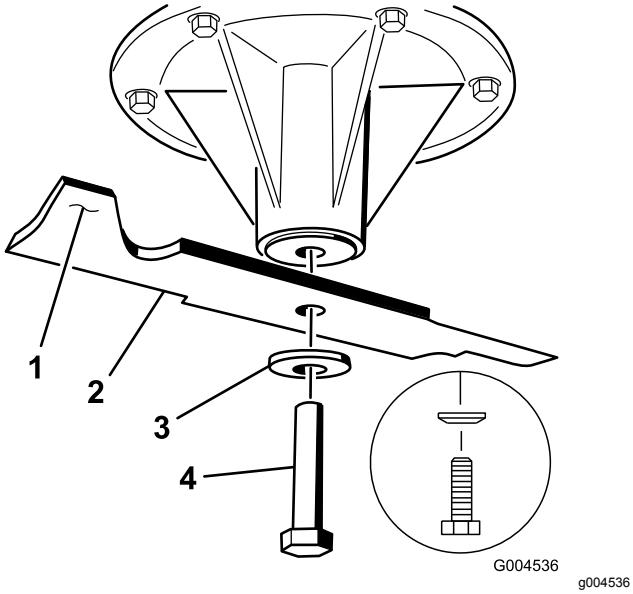


Figure 93

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 94).

   Note: Maintain the original angle.

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

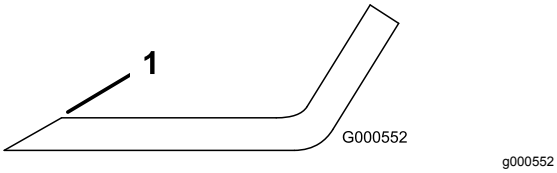


Figure 94

1. Sharpen at original angle.

2. Check the balance of the blade by putting it on a blade balancer (Figure 95).

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

   Note: If the blade is not balanced, file some metal off the end of the sail area only (Figure 94).

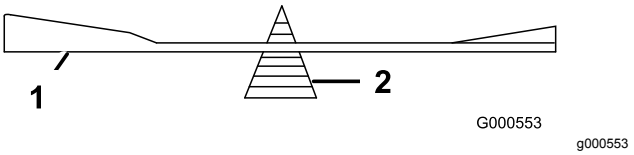


Figure 95

1. Blade
2. Balancer

3. Repeat this procedure until the blade is balanced.

Installing the Blades

1. Install the blade onto the spindle shaft (Figure 93).

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

2. Install the curved washer and blade bolt (Figure 93).

   Note: Install the curved-washer cone toward the bolt head.

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

Leveling the Mower Deck

Leveling the Deck

1. Park the machine on a level surface, disengage the blade-control switch (PTO), and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Check the tire pressure in the drive tires; refer to Checking the Tire Pressure (page 59).
4. Position the transport lock in the latching position.
5. Push the deck-lift pedal all the way forward and the deck latches at the 14 cm (5-1/2 inches) transport position (Figure 96).

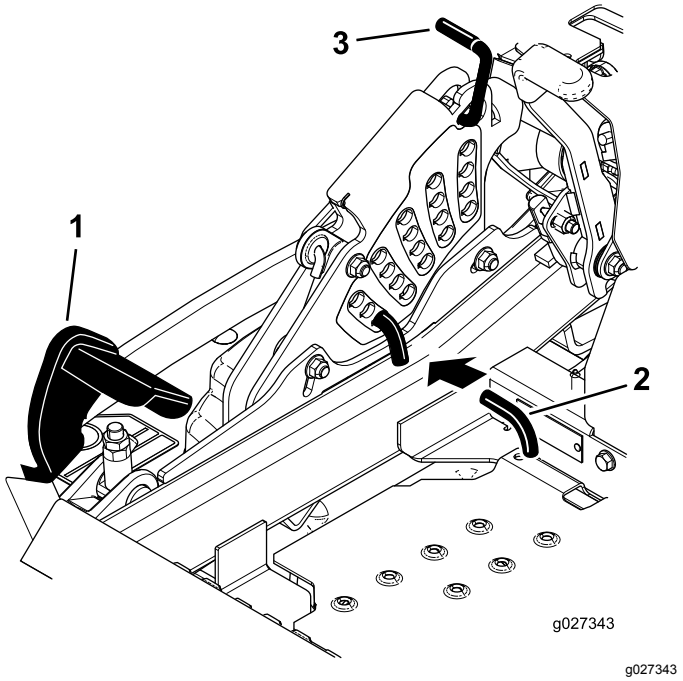


Figure 96

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

6. Insert the height-adjustment pin into the 7.6 cm (3 inches) cutting-height location.
7. Release the transport lock and allow the deck to lower to the cutting height.
8. Raise the discharge chute.
9. On both sides of the deck, measure from the level surface to the front tip of the blade (Postion A) as shown in Figure 97.

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

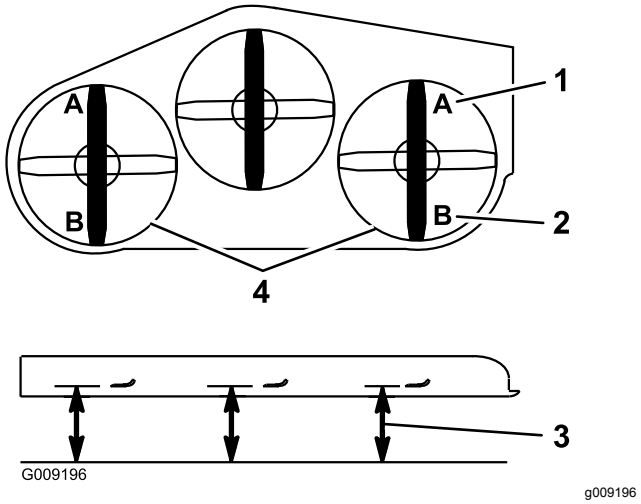


Figure 97

1. 7.6 cm (3 inch) at position A is correct
2. 8.3 cm (3-1/4 inch) 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. Fine-tune the adjustment nut on the front deck-lift assembly by turning it (Figure 98).

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

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

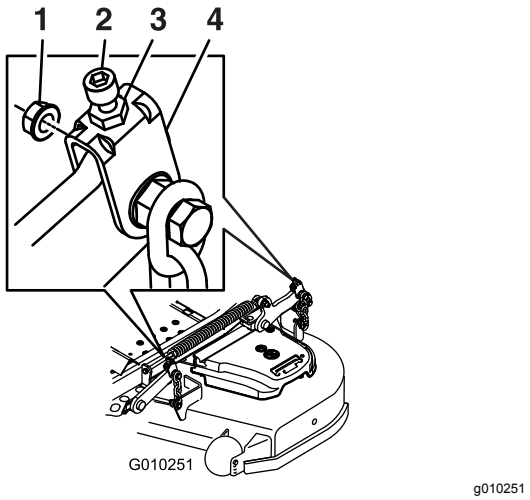


Figure 98

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

11. To adjust the single-point system, loosen the 2 bolts at the bottom of the height-of-cut plate (Figure 99).

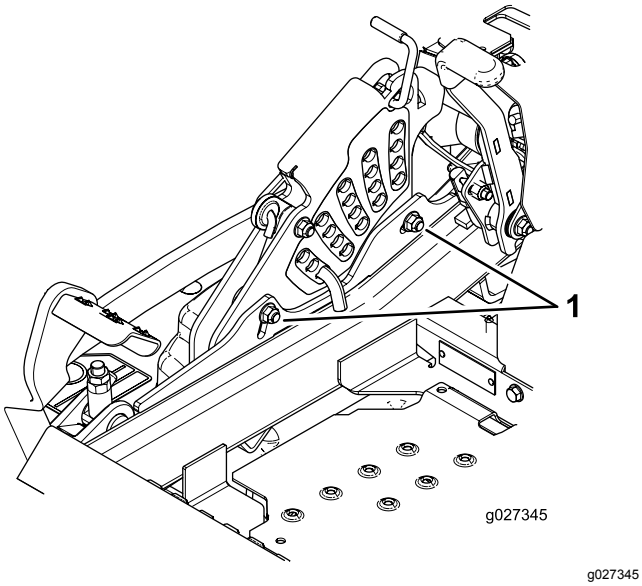


Figure 99

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

12. 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 100).

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

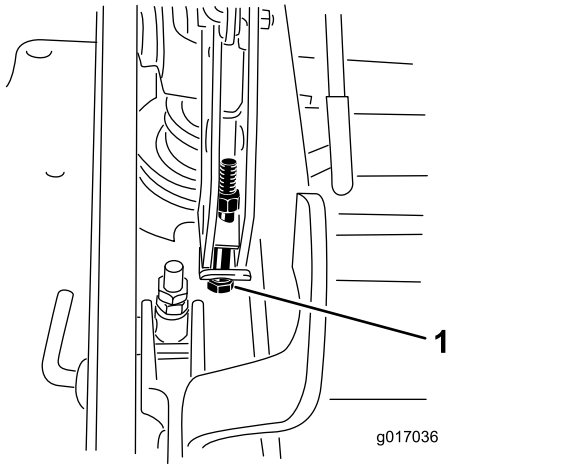


Figure 100

1. Single-point adjustment bolt

13. Tighten the 2 bolts at the bottom of the height-of-cut plate (Figure 99).

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

14. Torque the 2 bolts to 37 to 45 N·m (27 to 33 ft-lb).
15. On both sides of the deck, measure from the level surface to the back tip of the blade (postion B) as shown in Figure 97.

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

16. Fine tune the screw adjuster by turning it to get 8.3 mm (3-1/4 inches) height (Figure 98).

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

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

Removing the Mower Deck

Lock out the spring-loaded deck arms before servicing or removing the mower deck.

⚠ WARNING

Deck-lift arm assemblies have stored energy. Removing the deck with out 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. Park the machine on a level surface, disengage the blade-control switch (PTO), and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Place the height adjustment pin in the 7.6 cm (3 inch) 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 101).
6. Rotate the deck idler clockwise and remove the mower belt (Figure 101).

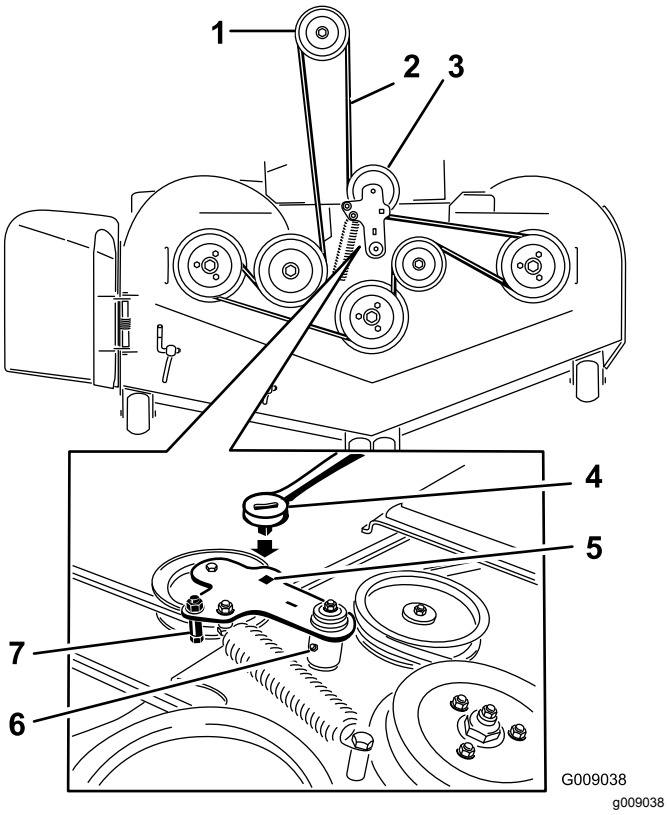


Figure 101

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

7. Remove and retain the hardware on both sides of the deck as shown in Figure 102.

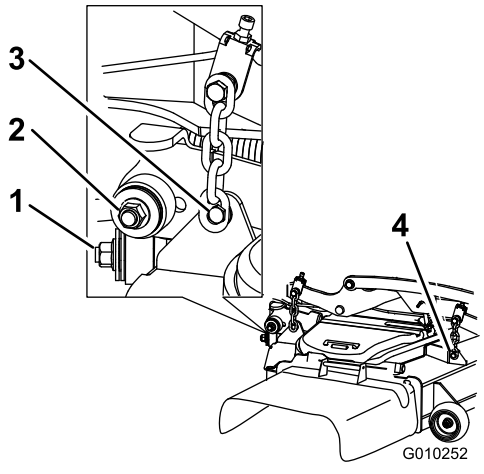


Figure 102

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

8. Raise the deck struts and secure them in the raised 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 machine to throw objects toward you or bystanders, resulting in serious injury. Also, contact with the blade could occur.

Never operate the machine unless you install a mulch plate, discharge deflector, or grass collection system.

1. Remove the locknut, bolt, spring, and spacer holding the deflector to the pivot brackets (Figure 103).
2. Remove the damaged or worn grass deflector (Figure 103).

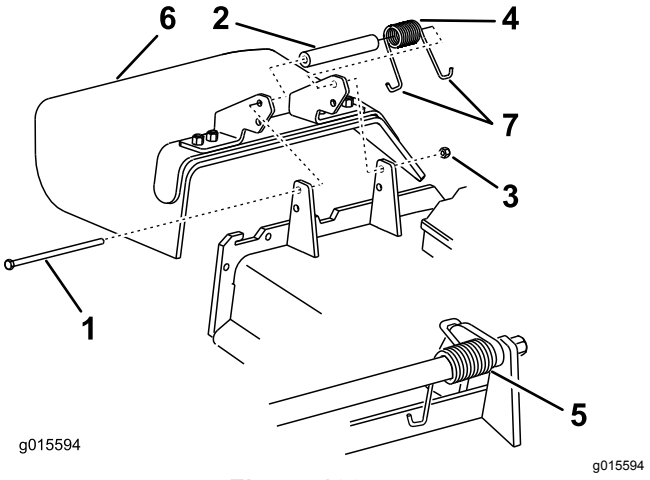


Figure 103

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

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

   Note: Make sure that 1 **J**-hook end of the spring is installed behind the deck edge before installing the bolt as shown in Figure 103.
5. Install the bolt and the nut.
6. Place 1 **J**-hook end of the spring around the grass deflector (Figure 103).

   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 Deck

Service Interval: Before each use or daily

1. Park the machine on a level surface, disengage the blade-control switch (PTO), and engage the parking brake.
2. Shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Raise the mower deck 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

Storage Safety

- Shut off the engine, remove the key, wait for all moving parts to stop, and allow the machine to cool before storing it.
- Do not store the machine or fuel near flames or drain the fuel indoors.
- Remove the key and store it in a safe place out of the reach of children.

Cleaning and Storing the Machine

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

   Important: **You can wash the machine with mild detergent and water. Do not pressure-wash the machine. Avoid excessive use of water, especially near the control panel, engine, hydraulic pumps, and motors.**
3. Check the brake; refer to Brake Maintenance (page 63).
4. Service the air cleaner; refer to Servicing the Air Cleaner (page 46).
5. Grease the machine; refer to Lubrication (page 43).
6. Change the crankcase oil; refer to Servicing the Engine Oil (page 48).
7. Check the tire pressure; refer to Checking the Tire Pressure (page 59).
8. Change the hydraulic filters; refer to Changing the Hydraulic Fluid and Filters (page 70).
9. Charge the battery; refer to Charging the Battery (page 55).
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 Inspecting the Blades (page 71).
12. Check and tighten all bolts, nuts, and screws. Repair or replace any part that is damaged.
13. Paint all scratched or bare metal surfaces. Paint is available from your Authorized Service Dealer.
14. Store the machine in a clean, dry garage or storage area.
15. Remove the key from the ignition switch and keep it out of reach of children or other unauthorized users.
16. Cover the machine to protect it and keep it clean.

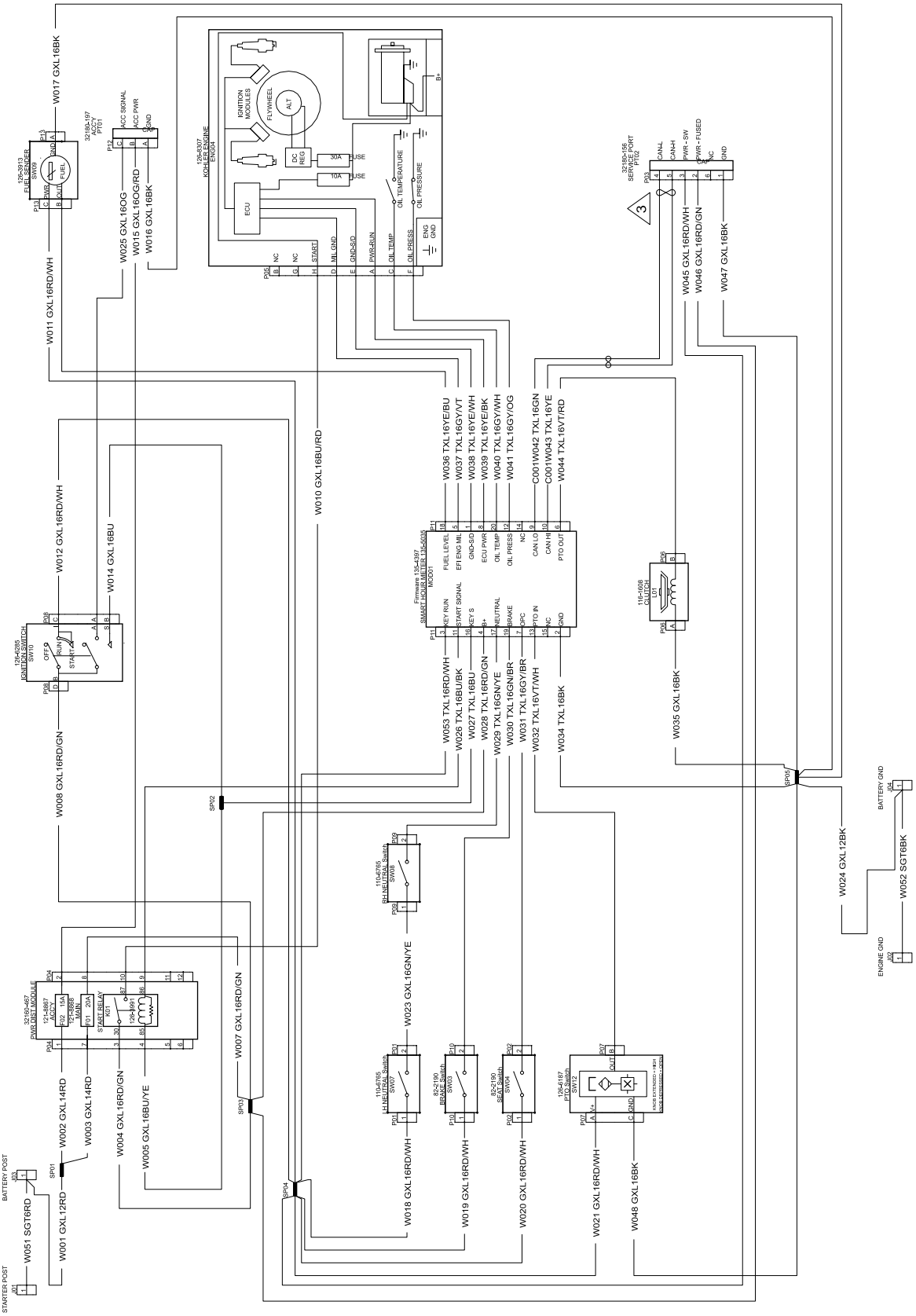
Troubleshooting

Problem	Possible Cause	Corrective Action
The malfunction-indicator light (MIL) comes on.	1. The engine is too hot. 2. There is a faulty valve in the fuel tank. 3. The air cleaner is dirty. 4. The battery is not charged. 5. The connections to the sensors electronic-control unit (ECU) and fuel injectors are not secured properly. 6. There is low voltage from the battery. 7. A fuse is blown.	1. Shut off the engine and let it cool. 2. Contact an Authorized Service Dealer. 3. Make sure that the air cleaner and precleaner are clean. Replace if necessary. 4. Charge or replace the battery. 5. Contact an Authorized Service Dealer. 6. Ensure that you are using a good 12 V battery and that it is fully charged. 7. Check and replace any blown fuses.
The starter does not crank.	1. The blade-control switch is engaged. 2. The parking brake is disengaged. 3. The motion-control levers are not in the NEUTRAL-LOCK position. 4. You are not sitting in the operator's seat. 5. The battery is dead. 6. The electrical connections are corroded or loose. 7. A fuse is blown. 8. A relay or switch is damaged.	1. Disengage the blade-control switch. 2. Engage the parking brake. 3. Move the motion-control levers outward to the NEUTRAL-LOCK position. 4. Sit on the operator's 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 LPG tank is empty. 2. The oil level in the crankcase is low. 3. The throttle is not in the correct position. 4. The air cleaner is dirty. 5. The seat switch is not functioning properly. 6. The electrical connections are corroded, loose, or damaged. 7. The relay or switch is worn or damaged. 8. The spark plug is fouled or improperly gapped. 9. The spark-plug wire is not connected.	1. Change the LPG tank. 2. Add oil to the crankcase. 3. Be sure that the throttle control is midway between the slow and fast positions. 4. Clean or replace the air-cleaner element. 5. Check the seat-switch indicator. Replace the seat if necessary. 6. Check the electrical connections for good contact. Clean the connector terminals thoroughly with electrical-contact cleaner, apply dielectric grease, and make the appropriate connections. 7. Contact an Authorized Service Dealer. 8. Adjust or replace the spark plug. 9. 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.	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.

Problem	Possible Cause	Corrective Action
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. 4. The air cleaner is dirty.	1. Reduce the ground speed. 2. Add oil to the crankcase. 3. Remove the obstruction from the cooling fins and the air passages. 4. Clean or replace the air-cleaner element.
The machine pulls to the left or right (with the motion-control 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.
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 cutting height is uneven.	1. The blade(s) is not sharp. 2. A cutting blade(s) is/are bent. 3. The mower is not level. 4. An anti-scalp roller (if applicable) is not set correctly. 5. The underside of the mower deck is dirty. 6. The tire pressure is incorrect. 7. A blade spindle is bent.	1. Sharpen the blade(s). 2. Install a new cutting blade(s). 3. Level the mower from side-to-side and front-to-rear. 4. Adjust the anti-scalp wheel height. 5. Clean the underside of the mower deck. 6. Adjust the tire pressure. 7. Contact an Authorized Service Dealer.
The blades do not rotate.	1. The mower deck belt is damaged, worn, loose, or broken. 2. The mower deck belt is off the 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 belt on the 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.

Problem	Possible Cause	Corrective Action
The clutch does not engage.	1. The fuse is blown.	1. Replace the fuse. Check the coil resistance, battery charge, charging system, and wiring connections, and replace components if necessary.
	2. There is low voltage supply at the clutch.	2. Check the coil resistance, battery charge, charging system, and wiring connections and replace parts if necessary.
	3. The coil is damaged.	3. Replace the clutch.
	4. There is inadequate current supply.	4. Repair or replace the clutch lead wire or electrical system. Clean the connector contacts.
	5. The rotor/armature air gap is too large.	5. Remove the shim or replace the clutch.

Schematics



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Electrical Schematic (Rev. B)

California Proposition 65 Warning Information

What is this warning?

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

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

What is Prop 65?

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

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

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

Does this law apply everywhere?

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

How do the California warnings compare to federal limits?

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

Why don't all similar products carry the warning?

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

Why does Toro include this warning?

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