Form No. 3411-104 Rev C

TORO®

Count on it.

Operator's Manual

Groundsmaster® 4300-D Traction Unit

Model No. 30864—Serial No. 400000000 and Up

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

CE

3411-104 C

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

⚠ WARNING

CALIFORNIA
Proposition 65 Warning

This product contains a chemical or chemicals known to the State of California to cause cancer, birth defects, or reproductive harm.

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

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.

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

Model No. _____

Serial No. _____

This manual identifies potential hazards and has safety messages identified by the safety-alert symbol (Figure 1), which signals a hazard that may cause serious injury or death if you do not follow the recommended precautions.

g000502

Figure 1

1. Safety-alert symbol

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

Introduction

This machine is a ride-on, rotary-blade lawn mower intended to be used by professional, hired operators in commercial applications. It is primarily designed for cutting grass on well-maintained lawns in parks, sports fields, and on commercial grounds. It is not designed for cutting brush, mowing grass and other growth alongside highways, or for agricultural uses.

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

You may contact Toro directly at www.Toro.com for product safety and operation training 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. The model and serial numbers are on a plate mounted on the left side of the frame under the footrest. Write the numbers in the space provided.

8111 Lyndale Avenue South
Bloomington, MN 55420

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

Contents

Safety

This machine has been designed in accordance with EN ISO 5395:2013 and ANSI B71.4-2012.

Important: **For CE required regulatory data, refer to the Declaration of Conformity supplied with the machine.**

General Safety

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

Using this product for purposes other than its intended use could prove dangerous to you and bystanders.

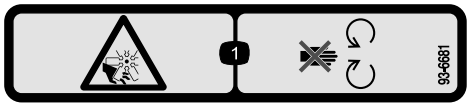
- Read and understand the contents of this *Operator's Manual* before starting the engine.
- Do not put your hands or feet near moving components of the machine.
- Do not operate the machine without all guards and other safety protective devices in place and working on the machine.
- Keep clear of any discharge opening. Keep bystanders and pets a safe distance away from the machine.
- Keep children out of the operating area. Never allow children to operate the machine.
- Stop the machine and shut off the engine before servicing, fueling, or unclogging the machine.

Improperly using or maintaining this machine can result in injury. To reduce the potential for injury, comply with these safety instructions and always pay attention to the safety-alert symbol, which means Caution, Warning, or Danger—personal safety instruction. Failure to comply with these instructions may result in personal injury or death.

You can find additional safety information where needed throughout this *Operator's Manual*.

Safety and Instructional Decals

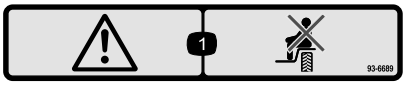
Safety decals and instructions are easily visible to the operator and are located near any area of potential danger. Replace any decal that is damaged or missing.



decal93-6681

93-6681

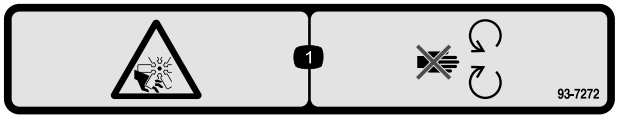
1. Cutting/dismemberment—hazard, fan-stay away from moving parts.



decal93-6689

93-6689

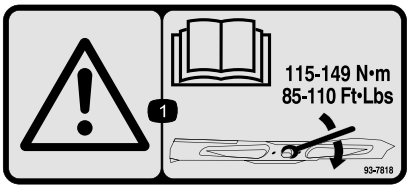
1. Warning—do not carry passengers.



decal93-7272

93-7272

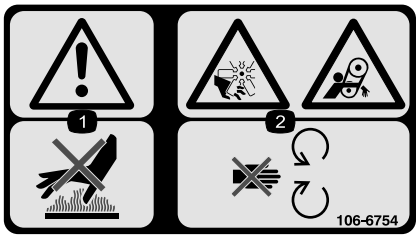
1. Cutting/dismemberment hazard; fan—stay away from moving parts.



decal93-7818

93-7818

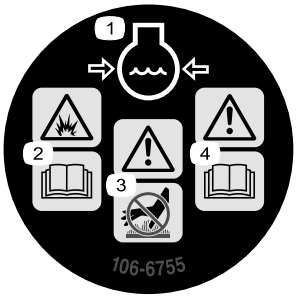
1. Warning—read the *Operator's Manual* for instructions on torquing the blade bolt/nut to 115 to 149 N·m (85 to 110 ft-lb).



decal106-6754

106-6754

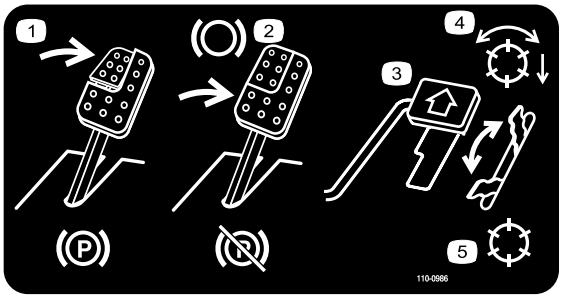
1. Warning—do not touch the hot surface.
2. Cutting/dismemberment hazard, fan and entanglement hazard, belt—stay away from moving parts.



decal106-6755

106-6755

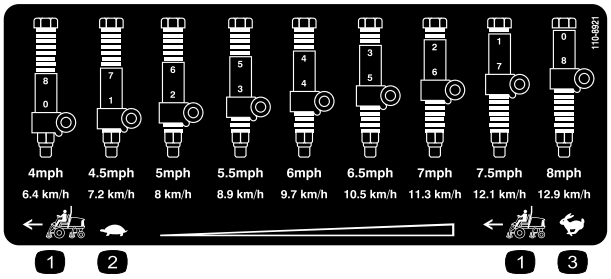
1. Engine coolant under pressure.
2. Explosion hazard—read the *Operator's Manual.*
3. Warning—do not touch the hot surface.
4. Warning—read the *Operator's Manual.*



decal110-0986

110-0986

1. Press the brake pedal and parking-brake pedal to engage the parking brake.
2. Press the brake pedal to apply the brake.
3. Press the traction pedal to move the machine forward.
4. PTO enabled mode
5. Transport mode (No PTO)



decal110-8921

110-8921

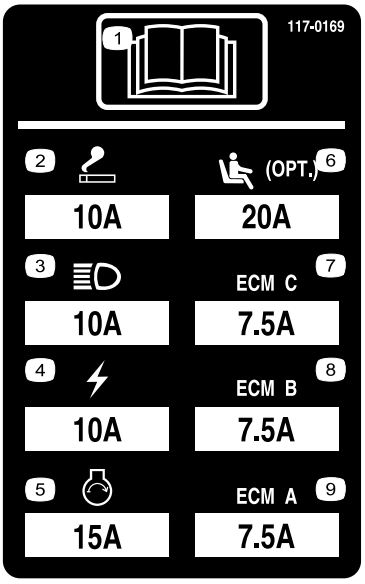
1. Traction unit speed
2. Slow
3. Fast

CALIFORNIA SPARK ARRESTER WARNING

Operation of this equipment may create sparks that can start fires around dry vegetation. A spark arrester may be required. The operator should contact local fire agencies for laws or regulations relating to fire prevention requirements. 117-2718

decal117-2718

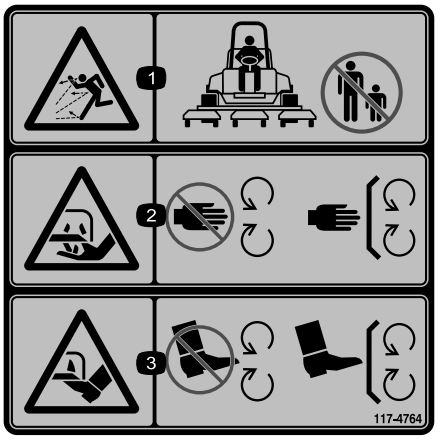
117-2718



decal117-0169

117-0169

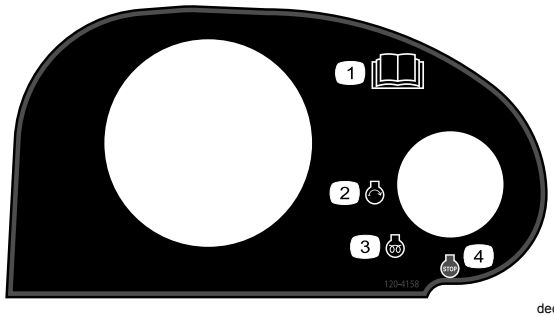
1. Read the *Operator's Manual.*
2. Power point (10 A)
3. Head lights (10 A)
4. Power (10 A)
5. Engine start (15 A)
6. Optional air ride seat suspension (20 A)
7. Engine computer management C (7.5 A)
8. Engine computer management B (7.5 A)
9. Engine computer management A (7.5 A)



decal117-4764

117-4764

1. Thrown object hazard—keep bystanders a safe distance away from the machine.
2. Cutting hazard of hand, mower blade—stay away from moving parts, keep all guards and shields in place.
3. Cutting hazard of foot, mower blade—stay away from moving parts, keep all guards and shields in place.



decal120-4158

120-4158

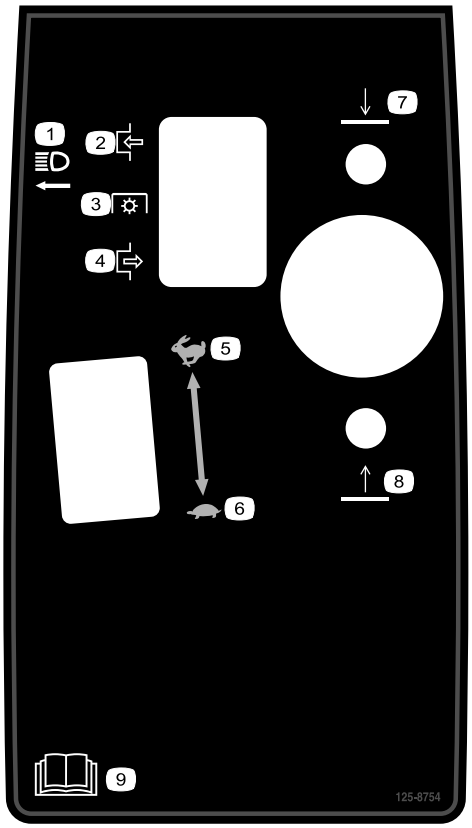
1. Read the *Operator's Manual*.
2. Engine—start
3. Engine—preheat
4. Engine—shut off

decalbatterysymbols

Battery Symbols

Some or all of these symbols are on your battery

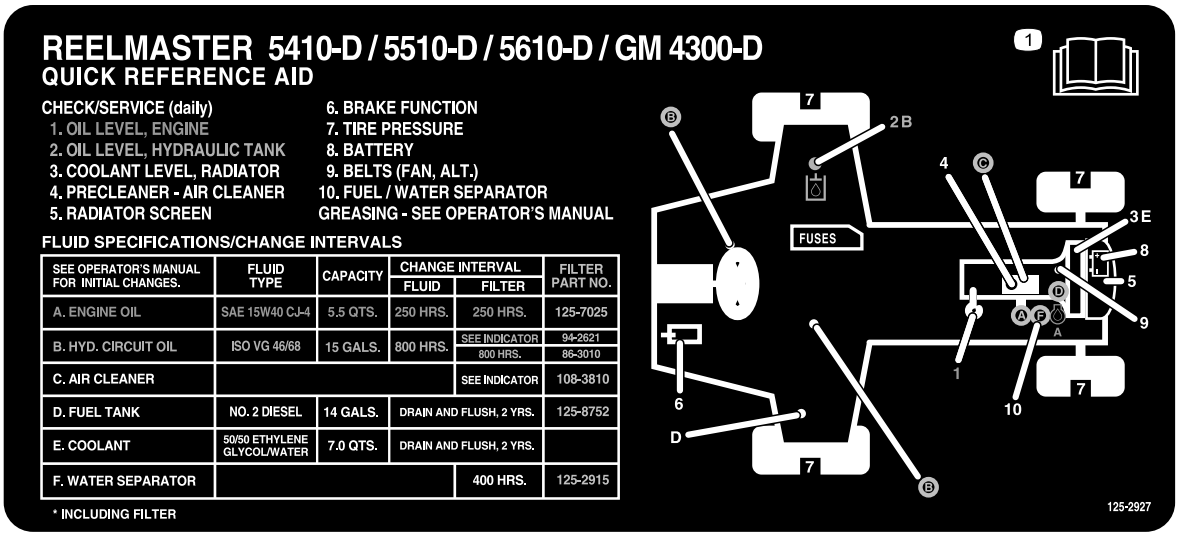
1. Explosion hazard
2. No fire, open flame, or smoking
3. Caustic liquid/chemical burn hazard
4. Wear eye protection.
5. Read the *Operator's Manual.*
6. Keep bystanders a safe distance away from the battery.
7. Wear eye protection; explosive gases can cause blindness and other injuries.
8. Battery acid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



decal125-8754

125-8754

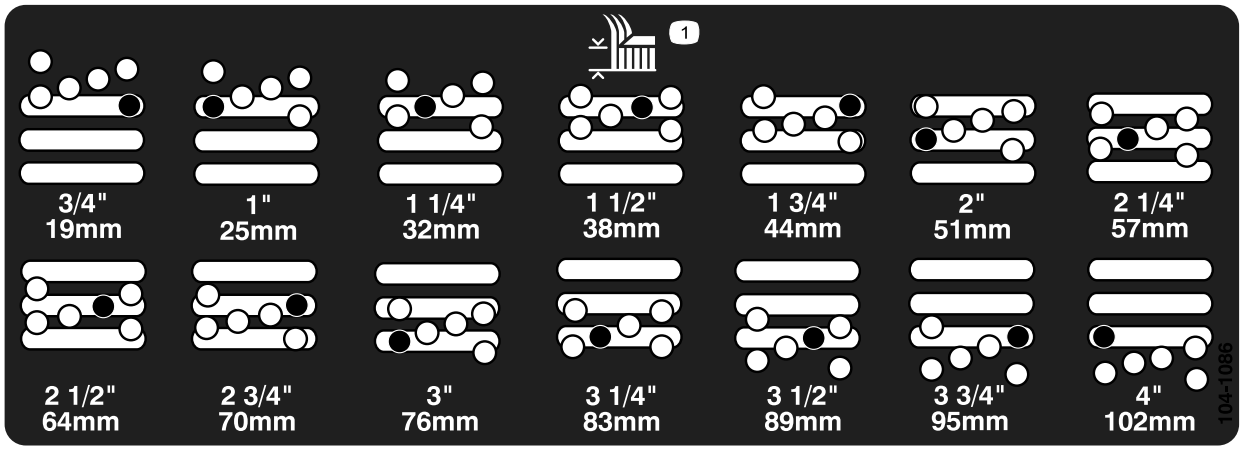
1. Head lights
2. Engage
3. Power take-off (PTO)
4. Disengage
5. Fast
6. Slow
7. Lower the cutting units
8. Raise the cutting units
9. Read the *Operator's Manual*.



decal125-2927

125-2927

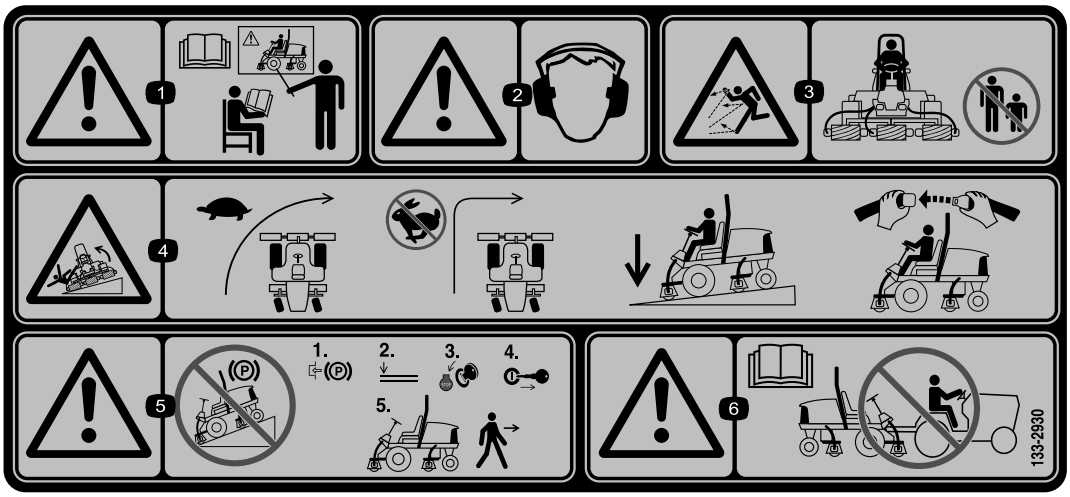
1. Read the *Operator's Manual* for maintenance information.



decal104-1086

104-1086

1. Height of cut



decal133-2930

133-2930

1. Warning—read the *Operator's Manual*; do not operate this machine unless you are trained.
2. Warning—wear hearing protection.
3. Thrown object hazard—keep bystanders a safe distance away from the machine.
4. Tipping hazard—slow the machine before turning; do not turn at high speeds; only drive on slopes with the cutting units lowered; always wear a seatbelt.
5. Warning—do not park on slopes; lock the parking brake, shut off the engine and remove the ignition key before leaving the machine.
6. Warning—read the *Operator's Manual*; do not tow the machine.

decal133-2931

133-2931

1. Warning—read the *Operator's Manual*; do not operate this machine unless you are trained.
2. Warning—wear hearing protection.
3. Thrown object hazard—keep bystanders a safe distance away from the machine
4. Tipping hazard—do not drive across or down slopes greater than 15 degrees; only drive on slopes with the cutting units lowered; always wear a seatbelt
5. Warning—do not park on slopes; lock the parking brake, shut off the engine and remove the ignition key before leaving the machine.
6. Warning—read the *Operator's Manual*; do not tow the machine.

Setup

Loose Parts

Use the chart below to verify that all parts have been shipped.

Procedure	Description	Qty.	Use
1	No parts required	–	Adjust the control arm position.
2	No parts required	–	Remove shipping blocks and pins.
3	No parts required	–	Adjust the roller scraper (optional).
4	No parts required	–	Install the mulching baffle (optional).
5	No parts required	–	Prepare the machine.

Media and Additional Parts

Description	Qty.	Use
Operator's Manual	1	Review these materials before operating the machine.
Engine operator's manual	1	
Parts catalog	1	
Operator training material	1	

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

1

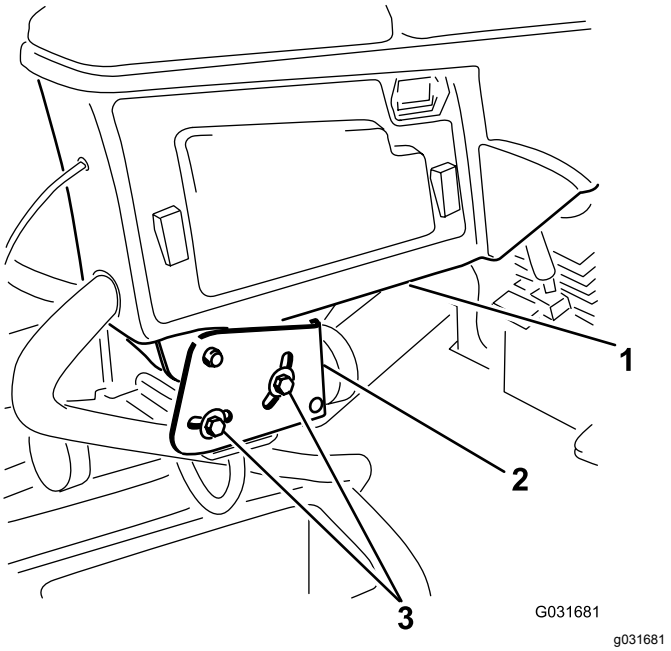
Adjusting the Control Arm Position

No Parts Required

Procedure

The control arm position can be adjusted for your comfort.

1. Loosen the 2 bolts securing the control arm to the retaining bracket (Figure 2).



g031681

Figure 2

1. Control arm
2. Retaining brackets
3. Bolts (2)

2. Rotate the control arm to the desired position and tighten the 2 bolts.

2

Removing the Shipping Blocks and Pins

No Parts Required

Procedure

1. Remove and discard the shipping blocks from the cutting decks.
2. Remove and discard the shipping pins from the cutting deck suspension arms.

   Note: The shipping pins stabilize the cutting decks during shipping; remove the pins before operating the machine.

3

Adjusting the Roller Scraper (Optional)

No Parts Required

Procedure

The optional rear roller scraper is designed to work best when there is an even gap of 0.5 to 1 mm (0.020 to 0.040 inch) between the scraper and roller.

1. Loosen the grease fitting and the mounting screw (Figure 3).

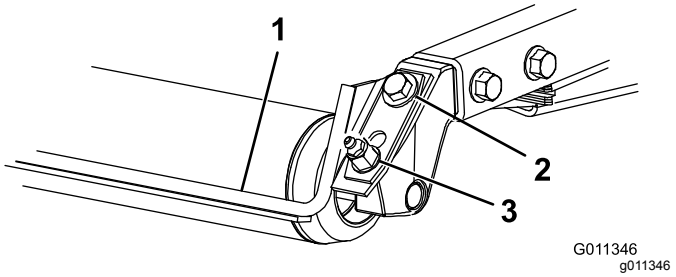


Figure 3

1. Roller scraper
2. Mounting screw
3. Grease fitting

2. Slide the scraper up or down until a gap of 0.5 to 1 mm (0.020 to 0.040 inch) is achieved between the rod and the roller.
3. Torque the grease fitting and screw to 41 N·m (30 ft-lb) in an alternating sequence.

4

Installing the Mulching Baffle (Optional)

No Parts Required

Procedure

1. Thoroughly clean debris from the mounting holes on the rear wall and left side wall of the chamber.
2. Install the mulching baffle in the rear opening and secure it with 5 flange-head bolts (Figure 4).

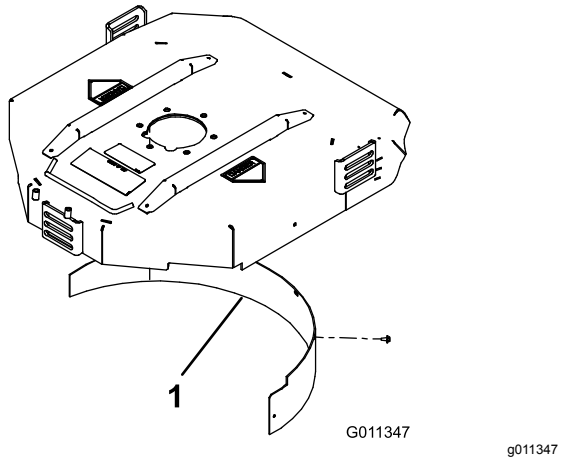


Figure 4

1. Mulching baffle

3. Verify that the mulching baffle does not interfere with the tip of the blade and does not protrude inside the surface of the rear chamber wall.

⚠ DANGER

The high-lift blade, if used with the mulching baffle, could break, resulting in personal injury or death.

Do not use the high-lift blade with the mulching baffle.

5

Preparing the Machine

No Parts Required

Checking the Tire Pressure

Check the tire pressure before use; refer to Checking the Tire Pressure (page 22).

Important: **Maintain pressure in all tires to ensure a good quality of cut and proper machine performance. *Do not underinflate the tires.***

Checking the Fluid Levels

1. Check the engine-oil level before starting the engine; refer to Checking the Engine-Oil Level (page 46).
2. Check the hydraulic-fluid level before starting the engine; refer to Checking the Hydraulic System (page 22).
3. Check the cooling system before starting the engine; refer to Checking the Cooling System (page 52).

Greasing the Machine

Grease the machine before use; refer to Greasing the Bearings and Bushings (page 43). Failure to properly grease the machine results in premature failure of critical parts.

Product Overview

Controls

Seat Adjusting Knobs

The seat-adjusting lever (Figure 5) allows you to adjust the seat forward and rearward. The weight-adjusting knob adjusts the seat for your weight. The weight gauge indicates when the seat is adjusted to your weight. The height-adjusting knob adjusts the seat for your height.

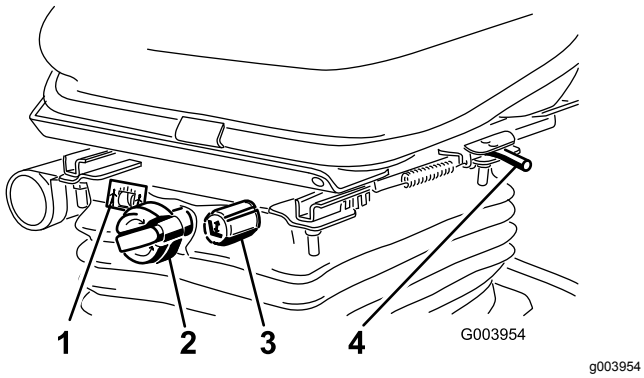


Figure 5

1. Weight gauge
2. Weight-adjusting knob
3. Height-adjusting knob
4. Adjusting lever (forward and rearward)

Traction Pedal

The traction pedal (Figure 6) controls the forward and reverse operation. Press the top of the pedal to move forward and the bottom to move rearward. Ground speed depends on how far you press the pedal. For no load, maximum ground speed, fully press the pedal while the throttle is in the FAST position.

To stop, reduce foot pressure on the traction pedal and allow it to return to the center position.

Mow-Speed Limiter

When the mow-speed limiter (Figure 6) is flipped up it will control the mow speed and allow the cutting decks to be engaged. Each spacer adjusts the mowing speed by 0.8 km/h (0.5 mph). The more spacers you have on the top of the bolt, the slower you will go. For transport, flip back the mow speed limiter for maximum-transport speed.

Brake Pedal

Press the brake pedal (Figure 6) to stop the machine.

Parking Brake

To engage the parking brake, (Figure 6) push down the brake pedal and press the top forward to latch. To disengage the parking brake, press the brake pedal until the parking-brake latch retracts.

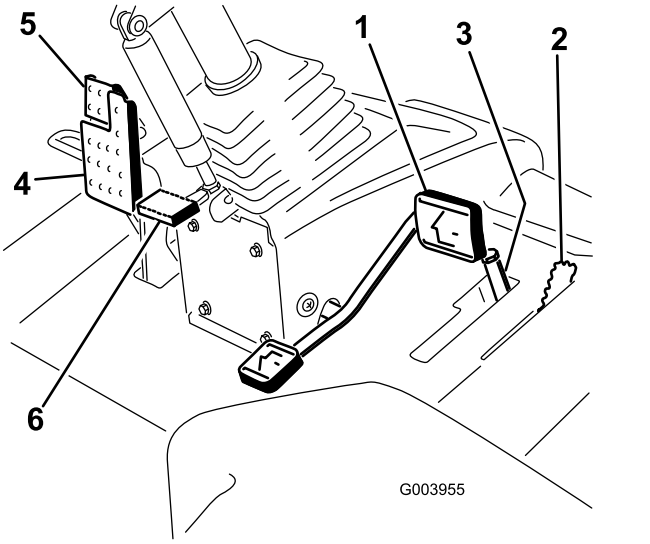


Figure 6

1. Traction pedal
2. Mow-speed limiter
3. Spacers
4. Brake pedal
5. Parking brake
6. Tilt-steering pedal

Tilt-Steering Pedal

To tilt the steering wheel toward you, press the foot pedal (Figure 6) down, and the steering tower toward you to the most comfortable position, and release the pedal.

Engine-Speed Switch

The engine-speed switch (Figure 7) has 2 modes to change the engine speed. Tap the switch to increase or decrease the engine speed in 100 rpm increments. Hold the switch down to automatically move the engine to High or Low idle, depending on which end of the switch that you press.

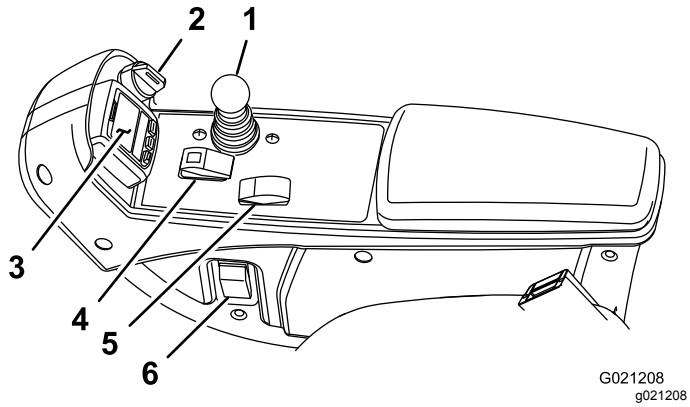


Figure 7

1. Lower mow/raise control lever
2. Key switch
3. InfoCenter
4. Enable/disable switch
5. Engine-speed switch
6. Headlight switch

Key Switch

The key switch (Figure 7) has 3 positions: OFF, ON/PREHEAT, and START.

Lower Mow/Raise Control Lever

This lever (Figure 7) raises and lowers the cutting decks and also starts and stops the mowers when the mowers are enabled in the mow mode. When starting the decks in the down position, this lever will turn the decks on if the PTO and the mow speed limiter are engaged.

Headlight Switch

Pivot the switch downward to turn on the headlights (Figure 7).

Enable/Disable Switch

Use the enable/disable switch (Figure 7) in conjunction with the lower mow/raise control lever to operate the mowers. The mowers cannot be lowered when the mow/transport lever is in the TRANSPORT position.

InfoCenter

The InfoCenter LCD display shows information about your machine such as the operating status, various diagnostics and other information about the machine (Figure 7).

Hydraulic-Filter-Restriction Indicator

With the engine running at normal operating temperature, view the indicator (Figure 8), it should be in the green zone. When the indicator is in the red zone, change the hydraulic filters.

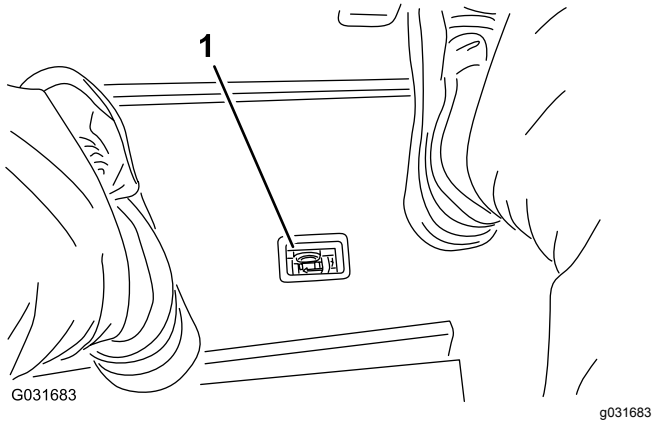


Figure 8

1. Hydraulic-filter-restriction indicator

Power Point

The power point is a 12 V power supply for electronic devices (Figure 9).

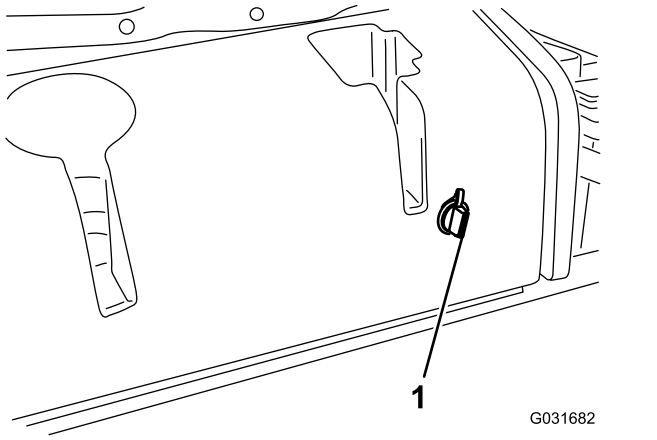
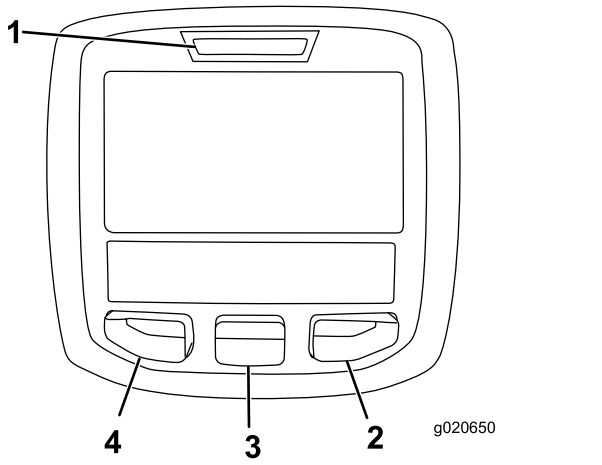


Figure 9

1. Power point

Using the InfoCenter LCD Display

The InfoCenter LCD display shows information about your machine such as the operating status, various diagnostics and other information about the machine (Figure 10) There is a splash screen and main information screen of the InfoCenter. You can switch between the splash screen and main information screen, at any time, by pressing any of the InfoCenter buttons and then selecting the appropriate directional arrow.



g020650

Figure 10

1. Indicator light
2. Right button
3. Middle button
4. Left button

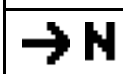
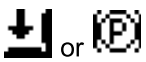
- Left Button, Menu Access/Back Button—press this button to access the InfoCenter menus. You can use it to back out of any menu you are currently using.
- Middle Button—use this button to scroll down menus.
- Right Button—use this button to open a menu where a right arrow indicates additional content.

Note: The purpose of each button may change depending on what is required at the time. Each button is labeled with an icon displaying its current function.

InfoCenter Icon Description

SERVICE DUE	Indicates when scheduled service should be performed
n min	Engine rpm/status—indicates the engine rpm
	Hour meter
i	Info icon
	Fast
	Slow
	Fuel level
	Stationary regeneration required
	The glow plugs are active
	Raise the cutting units
	Lower the cutting units
	Sit in the seat
(P)	The parking brake is engaged
H	The range is high (Transport)
N	Neutral
L	The range is low (Mow)
	Coolant Temperature (°C or °F)
	Temperature (hot)
	The PTO is engaged
	Not allowed
	Start the engine
STOP	Shut off the engine

InfoCenter Icon Description (cont'd.)

	Engine
	Key switch
	Cutting units are lowering
	Cutting units are raising
PIN	PIN code
CAN	CAN bus
	InfoCenter
Bad	Bad or failed
	Bulb
OUT	Output of TEC controller or control wire in harness
	Switch
	Release the switch
	Change to indicated state
Symbols are often combined to form sentences. Some examples are shown below	
	Put the machine into neutral
	Engine start is denied
	Engine shutdown
	Engine coolant is too hot
 48.1g/l	DPF ash accumulation notification. Refer to Diesel Particulate Filter Regeneration (page 28) for details.
 or	Sit down or engage the parking brake

Using the Menus

To access the InfoCenter menu system, press the menu access button while at the main screen. This brings you to the main menu. Refer to the following tables for a synopsis of the options available from the menus:

Main Menu	
Menu Item	**Description**
Faults	Contains a list of the recent machine faults. Refer to the *Service Manual* or your Toro Distributor for more information on the Faults menu and the information contained there.
Service	Contains information on the machine such as hours of use, counters, and other similar numbers.
Diagnostics	Displays the state of each machine switch, sensor, and control output. You can use this to troubleshoot certain issues as it quickly tells you which machine controls are ON and which are OFF.
Settings	Allows you to customize and modify configuration variables on the InfoCenter display.
About	Lists the model number, serial number, and software version of your machine.

Service	
Menu Item	**Description**
Hours	Lists the total number of hours that the machine, engine, and PTO have been on, as well as the number of hours the machine has been transported and service due.
Counts	Lists numerous counts the machine has experienced.

Diagnostics	
Menu Item	**Description**
Cutting Units	Indicates the inputs, qualifiers, and outputs for raising and lowering the cutting units.
Hi/Low Range	Indicates the inputs, qualifiers, and outputs for driving in transport mode.
PTO	Indicates the inputs, qualifiers, and outputs for enabling the PTO circuit.
Engine Run	Indicates the inputs, qualifiers, and outputs for starting the engine.

Settings	
Menu Item	**Description**
Units	Controls the units used on the InfoCenter (English or Metric).
Language	Controls the language used on the InfoCenter*.
LCD Backlight	Controls the brightness of the LCD display.
LCD Contrast	Controls the contrast of the LCD display.
Protected Menus	Allows a person authorized by your company with the PIN code to access protected menus.
Counterbalance	Controls the amount of counterbalance applied to the cutting decks.

*Only operator-faced text is translated. Faults, Service, and Diagnostics screens are service-faced. Titles appear in the selected language, but menu items are in English.

About	
Menu Item	**Description**
Model	Lists the model number of the machine.
SN	Lists the serial number of the machine.
Machine Controller Revision	Lists the software revision of the master controller.
InfoCenter Revision	Lists the software revision of the InfoCenter.
CAN Bus	Lists the machine communication bus status.

Protected Menus

There are 2 operating configuration settings that are adjustable within the Settings Menu of the InfoCenter: auto idle time delay and counterbalance. To lock these settings, use the Protected Menu.

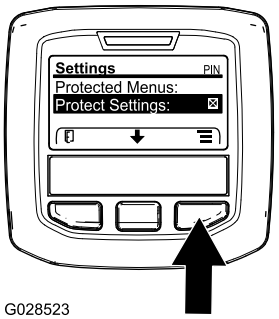
Note: At the time of delivery, the initial password code is programmed by your distributor.

Accessing Protected Menus

Note: The factory default PIN code for you machine is either 0000 or 1234.

If you changed the PIN code and forgot the code, contact your Authorized Toro Distributor for assistance.

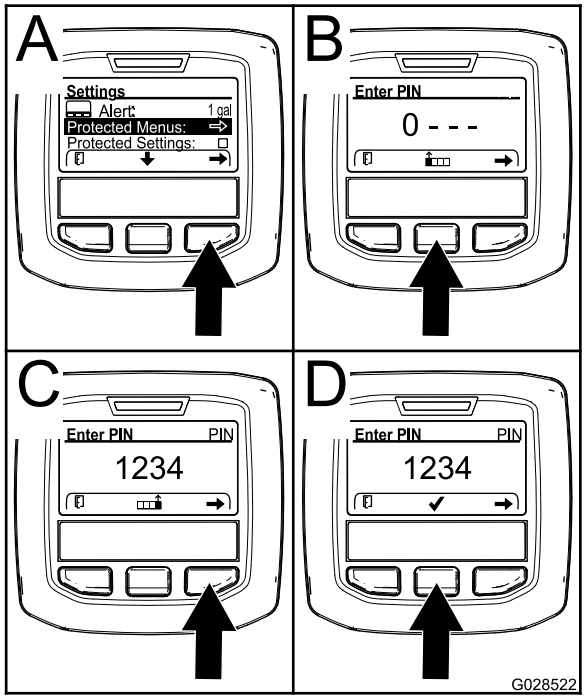
1. From the MAIN MENU, use the center button to scroll down to the SETTINGS MENU and press the right button (Figure 11).



G028523 g028523

Figure 11

2. In the SETTINGS MENU, use the center button to scroll down to the PROTECTED MENU and press the right button (Figure 12A).



g028522

Figure 12

3. To enter the PIN code, press the center button until the correct first digit appears, then press the right button to move on to the next digit (Figure 12B and Figure 12C). Repeat this step until the last digit is entered and press the right button once more.
4. Press the middle button to enter the PIN code (Figure 12D).

   Wait until the red indicator light of the InfoCenter illuminates.

   Note: If the InfoCenter accepts the PIN code and the protected menu is unlocked, the word “PIN” displays in the upper right corner of the screen.

Note: Rotate the key switch to the OFF position and then to the ON position locks the protected menu.

You have the ability to view and change the settings in the Protected Menu. Once you access the Protected Menu, scroll down to Protect Settings option. Use the right button to change the setting. Setting the Protect Settings to OFF allows you to view and change the settings in the Protected Menu without entering the PIN code. Setting the Protect Settings to ON hides the protected options and requires you to enter the PIN code to change the setting in the Protected Menu. After you set the PIN code, rotate the key switch OFF and back to the ON position to enable and save this feature.

Viewing and Changing the Protected Menu Settings

1. In the Protected Menu, scroll down to Protect Settings.
2. To view and change the settings without entering a passcode, use the right button to change the Protect Settings to OFF.
3. To view and change the settings with a passcode, use the left button to change the Protect Settings to ON, set the passcode, and turn the key in the ignition switch to the OFF position and then to the ON position.

Setting the Counterbalance

1. In the Settings Menu, scroll down to Counterbalance.
2. Press the right button to select counterbalance and change between the low, medium, and high settings.

Setting the Auto Idle

1. In the Settings Menu, scroll down to Auto Idle.
2. Press the right button to change the auto idle time between OFF, 8S, 10S, 15S, 20S, and 30S.

Specifications

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

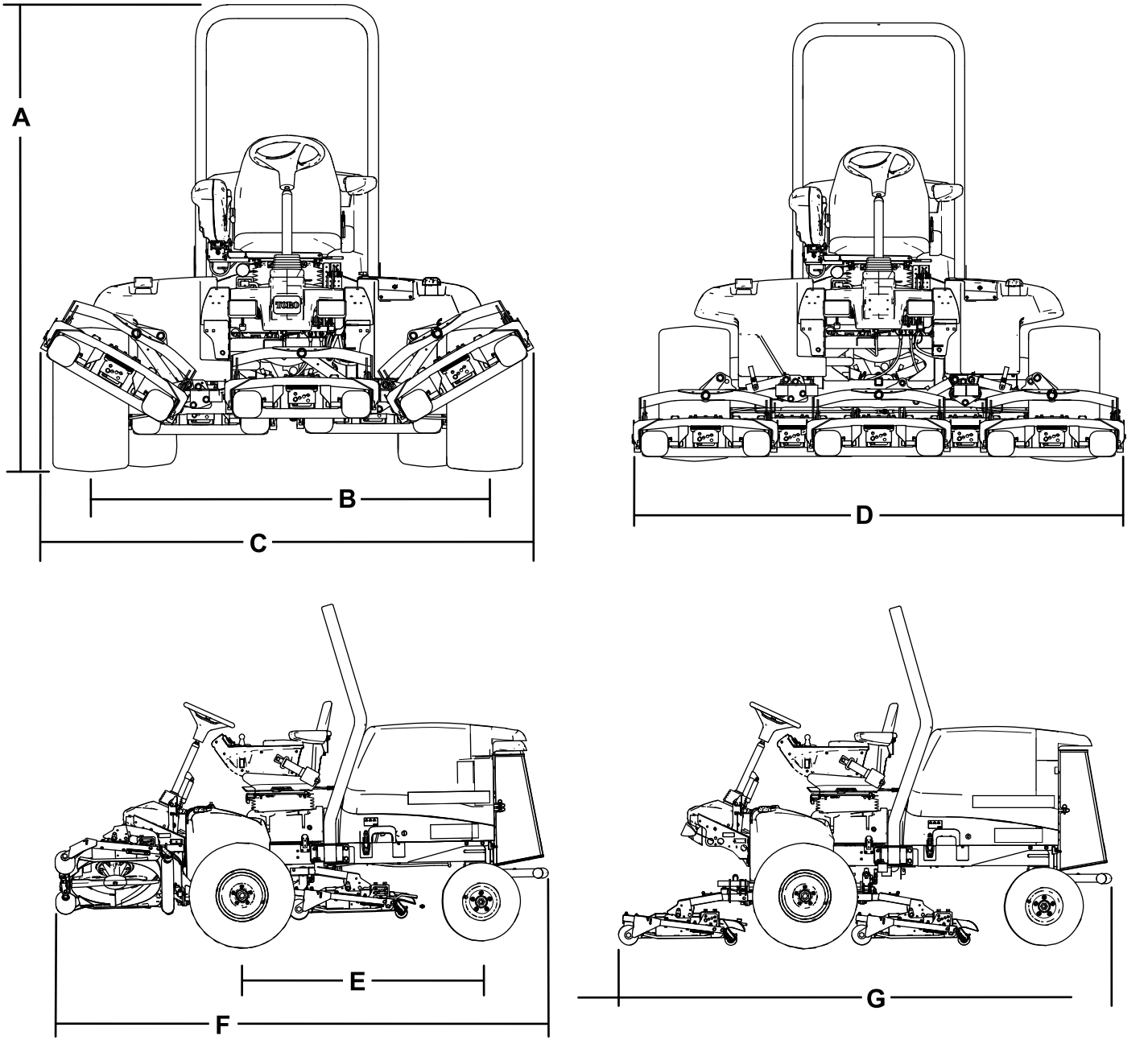


Figure 13

Description	Figure 13 reference	Dimension or Weight
Overall height	A	217.2 cm (85-1/2 inches)
Wheel tread (tire center to center) rear	B	184.5 cm (72.6 inches)
Overall width (transport position)	C	231 cm (91 inches)
Overall width (mowing position)	D	246.5 cm (97 inches)
Wheel base	E	152.4 cm (60 inches)
Overall length (transport position)	F	315 cm (124 inches)
Overall length (mowing position)	G	315 cm (124 inches)
Fuel-tank capacity		51 L (13.5 US gallons)
Transport speed		0 to 16 km/h (0 to 10 mph)
Mowing speed		0 to 13 km/h (0 to 8 mph)
Net weight (with cutting decks and fluids)		1492 kg (3,289 lb)

Cutting Unit Specifications

Length	86.4 cm (34 inches)
Width	86.4 cm (34 inches)
Height	24.4 cm (9.6 inches) to carrier mount 26.7 cm (10–1/2 inches) at 3/4 inch height of cut 34.9 cm (13–3/4 inches) at 4 inch height of cut
Weight	88 kg (195 lb)

Attachments/Accessories

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

To best protect your investment and maintain optimal performance of your Toro equipment, count on Toro genuine parts. When it comes to reliability, Toro delivers replacement parts designed to the exact engineering specification of our equipment. For peace of mind, insist on Toro genuine parts.

Operation

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

Before Operation

Before Operation Safety

General Safety

- Never allow children or untrained people to operate or service the machine. Local regulations may restrict the age of the operator. The owner is responsible for training all operators and mechanics.
- Become familiar with the safe operation of the equipment, operator controls, and safety signs.
- Know how to stop the machine and engine quickly.
- Check that operator-presence controls, safety switches, and shields are attached and functioning properly. Do not operate the machine unless they are functioning properly.
- Before mowing, always inspect the machine to ensure that the blades, blade bolts, and cutting assemblies are in good working condition. Replace worn or damaged blades and bolts in sets to preserve balance.
- Inspect the area where you will use the machine and remove all objects that the machine could throw.
- Avoid sudden starts and stops, holes, dropoffs, and hidden hazards in the terrain.
- For braking, move the traction pedal to the neutral position or to the direction opposite the travel direction.

Fuel Safety

- Use extreme care in handling fuel. It is flammable and its vapors are explosive.
- Extinguish all cigarettes, cigars, pipes, and other sources of ignition.
- Use only an approved fuel container.
- Never remove the fuel cap or fill the fuel tank while the engine is running or hot.
- Never refuel the machine in an enclosed space.
- Never store the machine or fuel container where there is an open flame, spark, or pilot light, such as on a water heater or other appliance.
- If you spill fuel, do not attempt to start the engine; avoid creating any source of ignition until the fuel vapors have dissipated.

Filling the Fuel Tank

Fuel Tank Capacity

Fuel tank capacity: 53 L (14 US gallons)

Fuel Specification

Important: **Use only ultra-low sulphur diesel fuel. Fuel with higher rates of sulfur degrades the diesel oxidation catalyst (DOC), which causes operational problems and shortens the service life of engine components.**

Failure to observe the following cautions may damage the engine.

- Never use kerosene or gasoline instead of diesel fuel.
- Never mix kerosene or used engine oil with the diesel fuel.
- Never keep fuel in containers with zinc plating on the inside.
- Do not use fuel additives.

Petroleum Diesel

Cetane rating: 45 or higher

Sulfur content: Ultra-low sulfur (<15 ppm)

Fuel Table

Diesel fuel specification	Location
ASTM D975 No. 1-D S15 No. 2-D S15	USA
EN 590	European Union
ISO 8217 DMX	International
JIS K2204 Grade No. 2	Japan
KSM-2610	Korea

- Use only clean, fresh diesel fuel or biodiesel fuels.
- Purchase fuel in quantities that can be used within 180 days to ensure fuel freshness.

Use summer-grade diesel fuel (No. 2-D) at temperatures above -7°C (20°F) and winter-grade fuel (No. 1-D or No. 1-D/2-D blend) below that temperature.

Note: Using winter-grade fuel at lower temperatures provides lower flash point and cold flow characteristics which eases starting and reduces fuel filter plugging.

Using summer-grade fuel above -7°C (20°F) contributes toward longer fuel pump life and increased power compared to winter-grade fuel.

Biodiesel

This machine can also use a biodiesel blended fuel of up to B20 (20% biodiesel, 80% petroleum diesel).

Sulfur content: Ultra-low sulfur (<15 ppm)

Biodiesel fuel specification: ASTM D6751 or EN14214

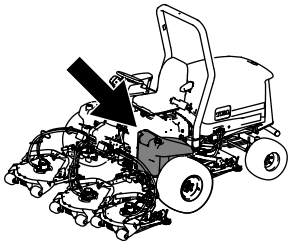
Blended fuel specification: ASTM D975, EN590, or JIS K2204

Important: **The petroleum diesel portion must be ultra-low sulfur.**

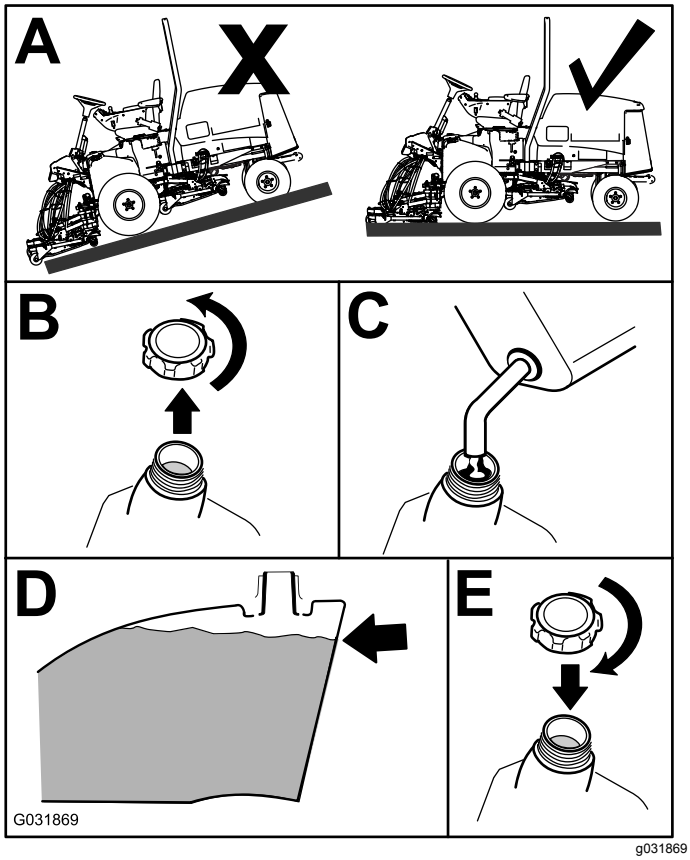
Observe the following precautions:

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

Adding Fuel



g194207



g031869

Figure 14

Fill the tank to about 6 to 13 mm (1/4 to 1/2 inch) below the top of the tank, not the filler neck, with Number 2-D diesel fuel.

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

Checking the Engine-Oil Level

Before you start the engine and use the machine, check the oil level in the engine crankcase; refer to Checking the Engine-Oil Level (page 22).

Checking the Cooling System

Before you start the engine and use the machine, check the cooling system; refer to Checking the Cooling System (page 52).

Checking the Hydraulic System

Before you start the engine and use the machine, check the hydraulic system; refer to Checking the Hydraulic Lines and Hoses (page 58).

Draining the Water Separator

Drain water or other contaminants from the water separator; refer to Servicing the Water Separator (page 49).

Checking the Tire Pressure

Service Interval: Before each use or daily

The correct air pressure in the front and rear tires is 83 to 103 kPa (12 to 15 psi).

Important: **Maintain pressure in all tires to ensure a good quality of cut and proper machine performance. *Do not under-inflate the tires.***

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

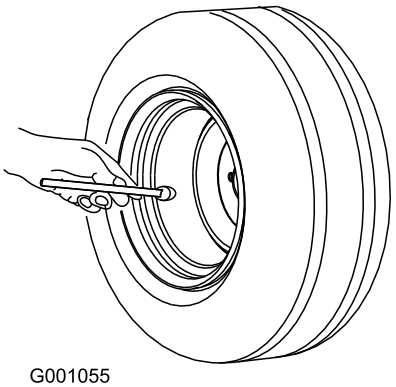


Figure 15

Checking the Torque of the Wheel-Lug Nuts

Service Interval: After the first hour

After the first 10 hours

Every 250 hours

⚠ WARNING

Failure to maintain the proper torque of the wheel nuts could result in failure or loss of a wheel, and may result in personal injury.

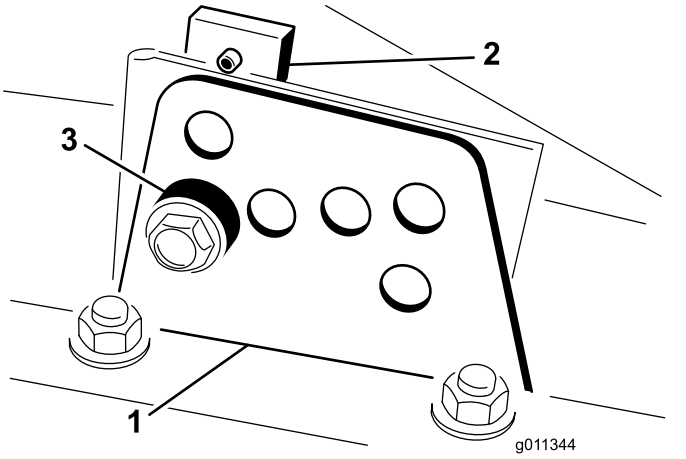
Torque the front and rear-wheel nuts to 94 to 122 N·m (70 to 90 ft-lb) after the first hour of operation, after the first 10 hours of operation, and every 250 hours thereafter.

Adjusting the Height of Cut

Important: **This cutting deck often cuts approximately 6 mm (1/4 inch) lower than a reel cutting unit with the same bench setting. It may be necessary to have the bench of the rotary cutting deck set 6 mm (1/4 inch) above that of reels cutting in the same area.**

Important: **Access to the rear cutting units is greatly improved by removing the cutting unit from the tractor. If the unit is equipped with a Sidewinder®, sidewind the cutting units to the right, remove the rear cutting unit, and slide it out to the right side.**

1. Lower the cutting deck to the ground, shut off the engine, and remove the key from the ignition switch.
2. Loosen the bolt securing each height-of-cut bracket to the height-of-cut plate (front and each side) as shown in Figure 16.
3. Beginning with the front adjustment, remove the bolt.

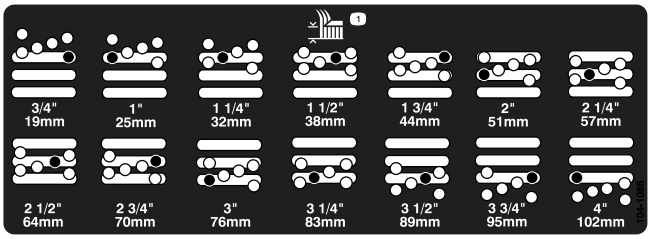


g011344

Figure 16

1. Height-of-cut bracket
2. Height-of-cut plate
3. Spacer

4. While supporting the chamber, remove the spacer (Figure 16).
5. Move the chamber to the desired height of cut and install a spacer into the designated height-of-cut hole and slot (Figure 17).



g026184

Figure 17

6. Position the tapped plate in-line with the spacer.
7. Install the bolt finger-tight.
8. Repeat steps through for each side adjustment.
9. Torque all 3 bolts to 41 N·m (30 ft-lb). Always tighten the front bolt first.

   Note: Adjustments of more than 3.8 cm (1-1/2 inches) may require temporary assembly to an intermediate height to prevent binding (e.g., changing from 3.1 to 7 cm (1-1/4 to 2-3/4 inches) height of cut).

Checking the Safety-Interlock Switches

Service Interval: Before each use or daily

⚠ CAUTION

If 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.**

The interlock switches stop the machine when you raise from the seat while the traction pedal is pressed. However, the operator may get off the seat while the engine is running and the traction pedal is in the NEUTRAL position. Although the engine continues to run if the PTO switch is disengaged and the traction pedal is released, shut off the before rising from the seat.

1. Park the machine on a level surface, lower the cutting unit, shut off the engine, and engage the parking brake.
2. Press the traction pedal. Turn the key in the ignition switch to the ON position.

   Note: If the engine cranks, there is a malfunction in the interlock system. Correct this malfunction before operating the machine.
3. Turn the key in the ignition switch to the ON position, start the engine, rise from the seat, and move the PTO switch to the ON position.

   Note: The PTO should not engage. If the PTO engages, there is a malfunction in the interlock system. Correct this malfunction before operating the machine.
4. Engage the parking brake, turn the key in the ignition switch to the ON position, start the engine, and move the traction pedal out of the NEUTRAL position.

   Note: The InfoCenter displays "traction denied" and the machine should not move. If the machine does move, there is a malfunction in the interlock system. Correct this malfunction before operating the machine.
5. Start the engine with the PTO engaged.

   Note: If the engine cranks, there is a malfunction in the interlock system. Correct this malfunction before operating the machine.

Burnishing the Brakes

To ensure optimum performance of the parking-brake system, burnish (break in) the brakes before use. Set the forward traction speed to 6.4 km/h (4 mph) to match the reverse traction speed (all 8 spacers moved to the top of the mow-speed control). With the engine at high idle, proceed forward with the mow-speed-control stop engaged and ride the brake for 15 seconds. Proceed backward at full reverse speed and ride the brake for 15 seconds. Repeat this 5 times, waiting 1 minute between each forward and reverse cycle to avoid overheating the brakes; refer to Adjusting the Parking Brakes (page 54).

Selecting a Blade

Standard Combination Sail

This blade is designed to provide excellent lift and dispersion in almost any condition. If more or less lift and discharge velocity is required, consider a different blade.

Attributes: Excellent lift and dispersion in most conditions.

Angled Sail

The blade generally performs best in lower heights of cut—1.9 to 6.4 cm (3/4 to 2-1/2 inches).

Attributes:

- Discharge remains more even at lower heights of cut.
- Discharge has less tendency to throw left and thus a cleaner look around bunkers and fairways.
- Lower power requirement at lower heights and dense turf.

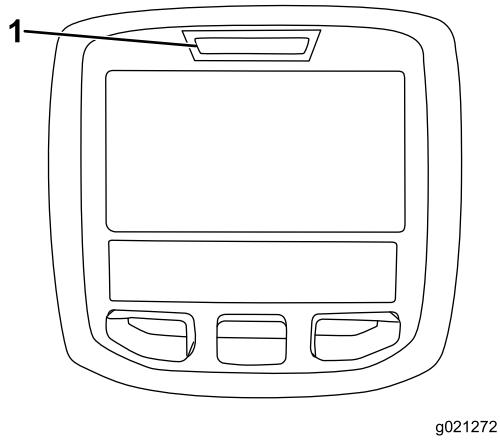
Atomic Blade

This blade is designed to provide excellent leaf mulching.

Attribute: Excellent leaf mulching

Understanding the Diagnostic Light

The machine is equipped with a diagnostic, light which indicates if the machine detects a malfunction. The diagnostic light is located on the InfoCenter, above the display screen (Figure 18). When the machine functions properly and the key switch is moved to the ON/RUN position, the diagnostic light turns on briefly to indicate that the light is working properly. When a machine advisory message displays, the light illuminates when the message is present. When a fault message is displayed, the light blinks until the fault is resolved.



g021272

Figure 18

1. Diagnostic light

Changing the Counterbalance Settings

During different times of the mowing season or when turf conditions vary, the amount of counterbalance (upward lift) required on the cutting decks can be changed to meet the conditions.

1. Position the machine on a level surface, lower the cutting decks, shut off the engine, engage the parking brake, and remove the key from the ignition switch.
2. In the InfoCenter Settings Menu, scroll down to Counterbalance.
3. Press the right button to select counterbalance and change between the low, medium, and high settings.

   Note: Once the adjustment has been completed, move the machine to a test area and operate the machine with the new setting. The new counterbalanced setting may change the effective height of cut.

Choosing Accessories

Optional Equipment Configurations

	Angle Sail Blade	**High Lift Parallel Sail Blade** ***(Do not use with the mulching baffle)***	**Mulching Baffle**	**Roller Scraper**
Grass Cutting: 1.9 to 4.4 cm (3/4 to 1-3/4 inches) height of cut	Recommended in most applications	May work well in light or sparse turf	Has been shown to improve dispersion and after-cut performance on northern grasses that are cut at least 3 times per week and less than 1/3 of the grass blade is removed; ***do not use with the high-lift, parallel-sail blade***	Can use any time that rollers build up with grass or large flat grass clumps of grass are seen; the scrapers may increase clumping in certain applications.
Grass Cutting: 5 to 6.4 cm (2 to 2-1/2 inches) height of cut	Recommended for thick or lush turf	Recommended for light or sparse turf		
Grass Cutting: 7 to 10 cm (2-3/4 to 4 inches) height of cut	May work well in lush turf	Recommended in most applications		
Leaf Mulching	Recommended for use with the mulching baffle	**Not Allowed**	Use with combination sail or angle sail blade only	
Pros	Even discharge at lower height of cut; cleaner look around bunkers and fairways; l ower power requirements	More lift and higher discharge velocity; sparse or limp turf is picked up at high height of cut; wet or sticky clippings are discharged efficiently	May improve dispersion and appearance in certain grass cutting applications; very good for leaf mulching	Reduces roller buildup in certain applications
Cons	Does not lift the grass well in high height-of-cut applications; wet or sticky grass has a tendency to build up in the chamber, leading to poor quality of cut and higher power requirements	Requires more power to run in some applications; tends to windrow at lower height of cut in lush grass; do not use with the mulching baffle	Grass will build up in the chamber if attempting to remove too much grass with the baffle in place	

During Operation

During Operation Safety

General Safety

- The owner/operator can prevent and is responsible for accidents that may cause personal injury or property damage.
- Wear appropriate clothing, including eye protection; slip-resistant, substantial foot protection; and hearing protection. Tie back long hair and do not wear jewelry.
- Do not operate the machine while ill, tired, or under the influence of alcohol or drugs.
- Never carry passengers on the machine and keep bystanders and pets away from the machine during operation.
- Operate the machine only in good visibility to avoid holes or hidden hazards.
- Avoid mowing on wet grass. Reduced traction could cause the machine to slide.
- Before you start the engine, ensure that all drives are in neutral, the parking brake is engaged, and you are in the operating position.
- Keep your hands and feet away from the cutting units. Keep clear of the discharge opening at all times.
- Look behind and down before backing up to be sure of a clear path.
- Use care when approaching blind corners, shrubs, trees, or other objects that may obscure your vision.
- Do not mow near drop-offs, ditches, or embankments. The machine could suddenly roll over if a wheel goes over the edge or if the edge gives way.
- Stop the blades whenever you are not mowing.
- Stop the machine and inspect the blades after striking an object or if there is an abnormal vibration in the machine. Make all necessary repairs before resuming operation.
- Slow down and use caution when making turns and crossing roads and sidewalks with the machine. Always yield the right-of-way.
- Disengage the drive to the cutting unit and shut off the engine before adjusting the height of cut (unless you can adjust it from the operating position).
- Never run an engine in an area where exhaust gasses are enclosed.
- Never leave a running machine unattended.
- Before leaving the operating position (including to empty the catchers or to unclog the chute), do the following:
  - Park the machine on level ground.
  - Disengage the power take-off and lower the attachments.
  - Engage the parking brake.
  - Shut off the engine and remove the key.
  - Wait for all moving parts to stop.
- Do not operate the machine when there is the risk of lightning.
- Do not use the machine as a towing vehicle.
- Use accessories, attachments, and replacement parts approved by The Toro® Company only.

Rollover Protection System (ROPS) Safety

- **Do not** remove the ROPS from the machine.
- Ensure that the seat belt is attached and that you can release it quickly in an emergency.
- Check carefully for overhead obstructions and do not contact them.
- Keep the ROPS in safe operating condition by thoroughly inspecting it periodically for damage and keeping all the mounting fasteners tight.
- Replace a damaged ROPS. Do not repair or alter it.

Machines with a Fixed Roll Bar

- The ROPS is an integral safety device.
- Always wear your seat belt.

Slope Safety

- Slow down the machine and use extra care on hillsides. Travel up and down on hillsides. Turf conditions can affect the stability of the machine.
- Avoid turning the machine on slopes. If you must turn the machine, turn it slowly and gradually downhill, if possible.
- Do not turn the machine sharply. Use care when reversing the machine.
- Use extra care while operating the machine with attachments; they can affect the stability of the machine.

Starting and Shutting Off the Engine

Important: **The fuel system automatically bleeds itself before starting the engine if you are starting the engine for the first time, the engine has shut off due to lack of fuel, or you have performed maintenance on the fuel system.**

Starting the Engine

1. Sit on the seat, keep your foot off the traction pedal so that it is in NEUTRAL, engage the parking brake, set the engine-speed switch to the MID position, and ensure that the Enable/Disable switch is in the DISABLE position.
2. Turn the key in the ignition switch to the RUN position.
3. When the glow indicator dims, turn the key in the ignition switch to the START position. Release the key immediately when the engine starts and allow it to return to the RUN position.
4. Run the engine at low idle speed until it warms up.

Shutting Off the Engine

1. Move all controls to NEUTRAL, engage the parking brake, move the engine-speed switch to the LOW IDLE position and allow the engine to reach low idle speed.

   Important: **Allow the engine to idle for 5 minutes before shutting it off after a full load operation. Failure to do so may lead to trouble on a turbo-charged engine.**
2. Turn the key in the ignition switch to the OFF position and remove the key.

Cutting Grass with the Machine

Note: Cutting grass at a rate that loads the engine promotes DPF regeneration.

1. Move the machine to the job site.
2. Whenever possible, set the engine-speed switch to high idle.
3. Engage the PTO switch.
4. Gradually move the traction pedal forward and slowly drive the machine over the mowing area.
5. Once the front of the cutting units are over the mowing area, lower the cutting units.
6. Cut grass so that the blades can cut and discharge clippings at a high rate while producing a good quality of cut.

   Note: If the cutting rate is too high, the quality of cut may deteriorate. Reduce the ground speed of the machine or reduce the width of cut to regain high idle engine speed.
7. When the cutting units are over the far edge of the mowing area, lift the cutting units.
8. Perform a tear-shaped turn to quickly line up for your next pass.

Diesel Particulate Filter Regeneration

The diesel particulate filter (DPF) is part of the exhaust system. The diesel-oxidation catalyst of the DPF reduces harmful gasses and the soot filter removes soot from the engine exhaust.

The DPF regeneration process uses heat from the engine exhaust to incinerate the soot accumulated on the soot filter, converting the soot to ash, and clears the channels of the soot filter so that filtered engine exhaust flows out the DPF.

The engine computer monitors the accumulation of soot by measuring the back pressure in the DPF. If the back pressure is too high, soot is not incinerating in the soot filter through normal engine operation. To keep the DPF clear of soot, remember the following:

- Passive regeneration occurs continuously while the engine is running—run the engine at full engine speed when possible to promote DPF regeneration.
- If the back pressure is too high, the engine computer signals you through the InfoCenter when additional processes (assist and reset regeneration) are running.
- Allow the assist and reset regeneration process to complete before shutting off the engine.

Operate and maintain your machine with the function of the DPF in mind. Engine load at high idle engine speed generally produce adequate exhaust temperature for DPF regeneration.

Important: **Minimize the amount of time that you idle the engine or operate the engine at low-engine speed to help reduce the accumulation of soot in the soot filter.**

⚠ CAUTION

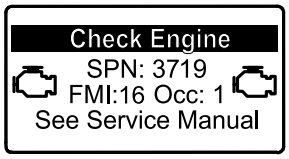
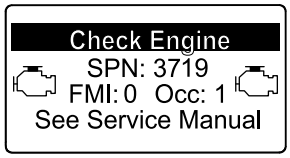
The exhaust temperature is hot (approximately 600°C (1,112°F) during DPF parked regeneration or recovery regeneration. Hot exhaust gas can harm you or other people.

- **Never operate the engine in an enclosed area.**
- **Make sure that there are no flammable materials around the exhaust system.**
- **Never touch a hot exhaust system component.**
- **Never stand near or around the exhaust pipe of the machine.**

DPF Soot Accumulation

- Over time, the DPF accumulates soot in the soot filter. The computer for the engine monitors the soot level in the DPF.
- When enough soot accumulates, the computer informs you that it is time to regenerate the diesel particulate filter.
- DPF regeneration is a process that heats the DPF to convert the soot to ash.
- In addition to the warning messages, the computer reduces the power produced by the engine at different soot-accumulation levels.

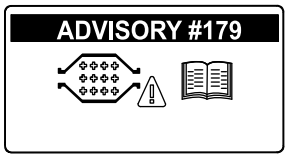
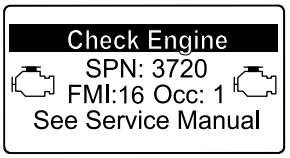
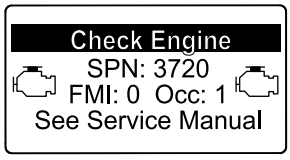
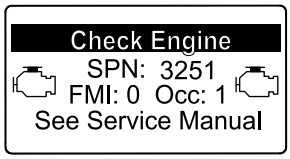
Engine Warning Messages—Soot Accumulation

Indication Level	Fault Code	Engine Power Rating	Recommended Action
Level 1: Engine Warning	 g213866 **Figure 19** Check Engine SPN 3719, FMI 16	The computer de-rates the engine power to 85%	Perform a parked regeneration as soon as possible; refer to Parked Regeneration (page 33).
Level 2: Engine Warning	 g213867 **Figure 20** Check Engine SPN 3719, FMI 0	The computer de-rates the engine power to 50%	Perform a recovery regeneration as soon as possible; refer to Recovery Regeneration (page 36).

DPF Ash Accumulation

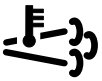
- The lighter ash is discharged through the exhaust system; the heavier ash collects in the soot filter.
- Ash is a residue of the regeneration process. Over time, the diesel particulate filter accumulates ash that does not discharge with the engine exhaust.
- The computer for the engine calculates the amount of ash accumulated in the DPF.
- When enough ash accumulates, the engine computer sends information to the InfoCenter in the form of a system advisory or an engine fault to indicate the accumulation of ash in the DPF.
- The advisory and faults are indications that it is time to service the DPF.
- In addition to the warnings, the computer reduces the power produced by the engine at different ash-accumulation levels.

InfoCenter Advisory and Engine Warning Messages—Ash Accumulation

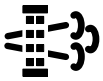
Indication Level	Advisory or Fault Code	Engine Speed Reduction	Engine Power Rating	Recommended Action
Level 1: System Advisory	 g213865 **Figure 21** Advisory #179	None	100%	Notify your service department that advisory #179 displays in the InfoCenter.
Level 2: Engine Warning	 g213863 **Figure 22** Check Engine SPN 3720, FMI 16	None	The computer de-rates the engine power to 85%	Service the DPF; refer to Servicing the Diesel-Oxidation Catalyst (DOC) and the Soot Filter (page 48)
Level 3: Engine Warning	 g213864 **Figure 23** Check Engine SPN 3720, FMI 0	None	The computer de-rates the engine power to 50%	Service the DPF; refer to Servicing the Diesel-Oxidation Catalyst (DOC) and the Soot Filter (page 48)
Level 4: Engine Warning	 g214715 **Figure 24** Check Engine SPN 3251, FMI 0	Engine speed at max torque + 200 rpm	The computer de-rates the engine power to 50%	Service the DPF; refer to Servicing the Diesel-Oxidation Catalyst (DOC) and the Soot Filter (page 48)

Types of Diesel Particulate Filter Regeneration

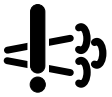
Types of diesel particulate filter regeneration that are performed while the machine is operating:

Type of Regeneration	Conditions for DPF regeneration	DPF description of operation
Passive	Occurs during normal operation of the machine at high-engine speed or high-engine load	The InfoCenter does not display an icon indicating passive regeneration. During passive regeneration, the DPF processes high-heat exhaust gasses; oxidizing harmful emissions and burning soot to ash. Refer to Passive DPF Regeneration (page 32).
Assist	Occurs as a result of low-engine speed, low-engine load, or after the computer detects back pressure in the DPF	 When the assist/reset-regeneration icon is displayed in the InfoCenter, an assist regeneration is in progress. During assist regeneration, the computer controls the intake throttle to increase the exhaust temperature, enabling assist regeneration to occur. Refer to Assist DPF Regeneration (page 32).
Reset	Occurs after assist regeneration only if the computer detects that assist regeneration did not sufficiently reduce the soot level Also occurs every 100 hours to reset baseline sensor readings	 When the assist/reset-regeneration icon is displayed in the InfoCenter, a regeneration is in progress. During reset regeneration, the computer controls the intake throttle and fuel injectors to increase the exhaust temperature during regeneration. Refer to Reset Regeneration (page 33).

Types of diesel particulate filter regeneration that require you to park the machine:

Type of Regeneration	Conditions for DPF regeneration	DPF description of operation
Parked	Soot buildup occurs as a result of prolonged operation at low-engine speed or low-engine load. May also occur as a result of using incorrect fuel or oil The computer detects back pressure due to soot buildup and requests a parked regeneration	 When the parked-regeneration icon is displayed in the InfoCenter, a regeneration is requested. Perform the parked regeneration as soon as possible to avoid needing a recovery regeneration. A parked regeneration requires 30 to 60 minutes to complete. You must have at least a 1/4 tank of fuel in the tank. You must park the machine to perform a recovery regeneration. Refer to Parked Regeneration (page 33).

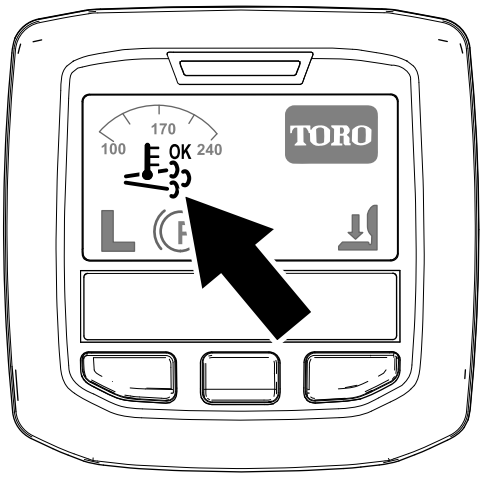
Types of diesel particulate filter regeneration that require you to park the machine: (cont'd.)

Type of Regeneration	Conditions for DPF regeneration	DPF description of operation
Recovery	Occurs as a result of ignoring parked regeneration requests and continuing operation, adding more soot when the DPF is already in need of a parked regeneration	When the recovery-regeneration icon  is displayed in the InfoCenter, a recovery regeneration is requested. Contact your authorized Toro distributor to have a service technician perform the recovery regeneration. A recovery regeneration requires up to 4 hours to complete. You must have at least a 1/2 tank of fuel in the machine. You must park the machine to perform a recovery regeneration. Refer to Recovery Regeneration (page 36).

Passive DPF Regeneration

- Passive regeneration occurs as part of normal engine operation.
- While operating the machine, run the engine at full-engine speed when possible to promote DPF regeneration.

Assist DPF Regeneration



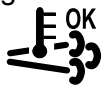
g214711

Figure 25
Assist/reset-regeneration icon

- The assist/reset-regeneration icon displays in the InfoCenter (Figure 25).
- The computer takes control of the intake throttle to increase the temperature of the engine exhaust.
- While operating the machine, run the engine at full engine speed when possible to promote DPF regeneration.
- The 

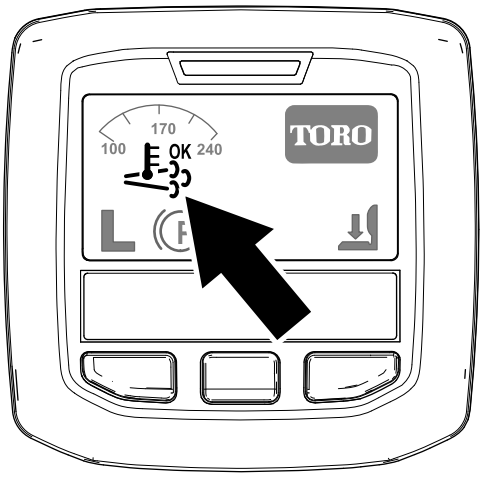
icon displays in the InfoCenter while the assist regeneration is processing.
- Whenever possible, do not shut off the engine or reduce engine speed while the assist regeneration is processing.

  Important: **Allow the machine to complete the assist regeneration process before shutting off the engine.**

  Note: The assist regeneration is finished processing when the 

icon disappears from the InfoCenter.

Reset Regeneration



g214711

Figure 26

Assist/reset-regeneration icon

- The assist/reset-regeneration icon displays in the InfoCenter (Figure 26).
- The computer takes control of the intake throttle and changes the fuel injection operation to increase the temperature of the engine exhaust.

  Important: **The assist/reset-regeneration icon indicates that the exhaust temperature discharged from of your machine may be hotter than during regular operation.**
- While operating the machine, run the engine at full engine speed when possible to promote DPF regeneration.
- The 

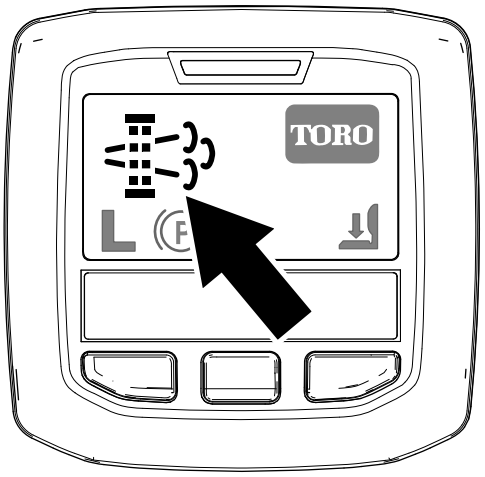
icon displays in the InfoCenter while the reset regeneration is processing.
- Whenever possible, do not shut off the engine or reduce engine speed while the reset regeneration is processing.

  Important: **Allow the machine to complete the reset regeneration process before shutting off the engine.**

  Note: The reset regeneration is finished processing when the 

icon disappears from the InfoCenter.

Parked Regeneration

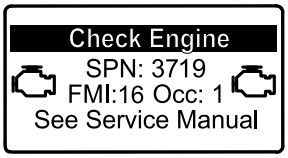


g214713

Figure 27

Parked-regeneration request icon

- The parked-regeneration requested icon displays in the InfoCenter (Figure 27).
- If a parked regeneration is needed, the InfoCenter displays engine warning SPN 3719, FMI 16 (Figure 28) and the engine computer derates engine power to 85%.



g213866

Figure 28

Important: **If you do not complete a parked regeneration within 2 hours, the engine computer derates engine power to 50%.**

- A parked regeneration requires 30 to 60 minutes to complete.
- If you are authorized by your company, you need the PIN code to perform the parked-regeneration process.

Preparing to Perform a Parked or Recovery Regeneration

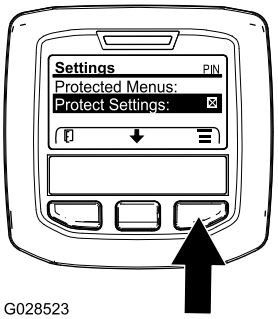
1. Ensure that the machine has at least 1/4 tank of fuel.
2. Move the machine outside to an area away from combustible materials.
3. Park the machine on a level surface.
4. Ensure that the traction control or motion-control levers are in the NEUTRAL position.
5. If applicable, lower the cutting units and shut them off.

6. Engage the parking brake.
7. Set the throttle to the low IDLE position.

Performing a Parked Regeneration

Note: For instructions on unlocking protected menus, refer to Accessing Protected Menus (page 16).

1. Access the protected menu and unlock the protected settings submenu (Figure 29); refer to Accessing Protected Menus (page 16).



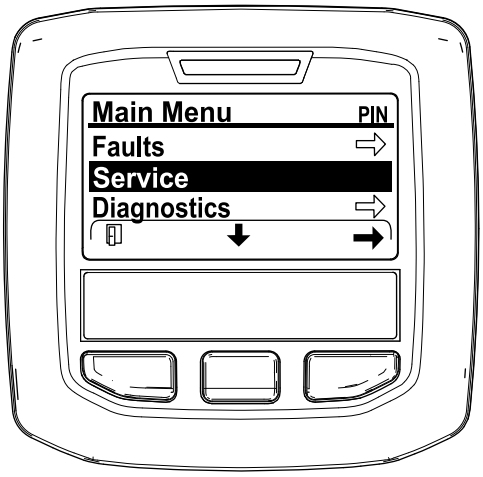
G028523

g028523

Figure 29

2. Navigate to the MAIN MENU, press the center button to scroll down to the SERVICE MENU, and press the right button to select the SERVICE option (Figure 30).

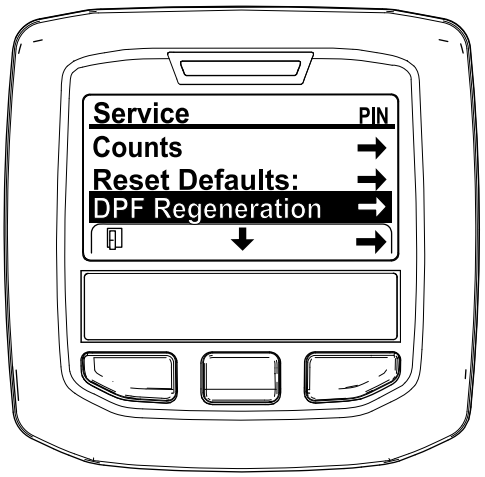
   Note: The InfoCenter should display the PIN indicator in the upper right corner of the display.



g212371

Figure 30

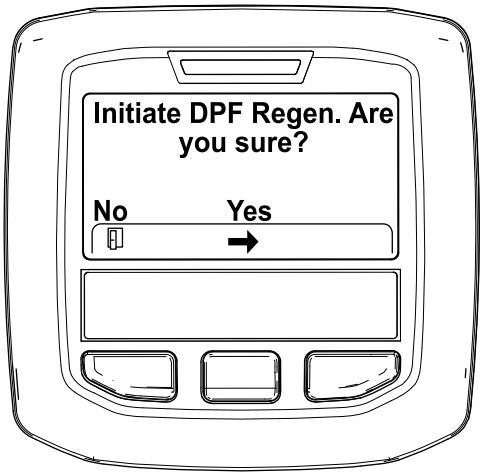
3. In the SERVICE MENU, press the middle button until the DPF REGENERATION options displays, and press the right button to select the DPF REGENERATION option (Figure 31).



g212138

Figure 31

4. When the “Initiate DPF Regen. Are you sure?” message displays, press the center button (Figure 32).



g212125

Figure 32

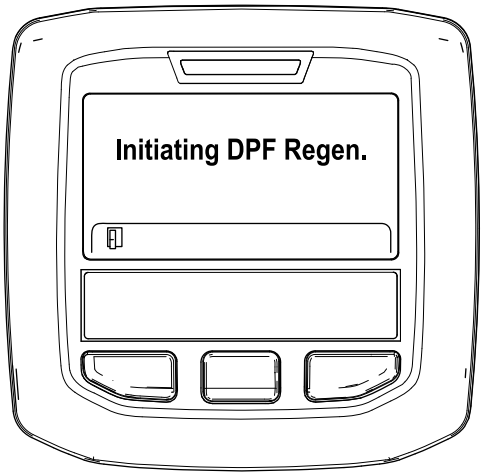
5. If the coolant temperature is below 60°C (140°F), the “Insure is running and above 60C/140F” message displays. (Figure 33).

   Observe the temperature in the display, and run the machine at full throttle until the temperature reaches 60°C (140°F), then press the center button.

   Note: If the coolant temperature is above 60°C (140°F), this screen is skipped.

g211986

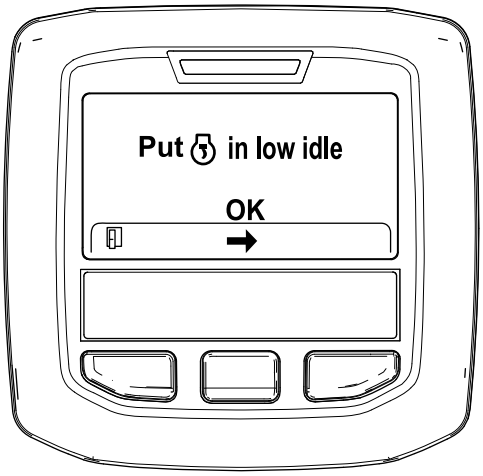
Figure 33



g212405

Figure 35

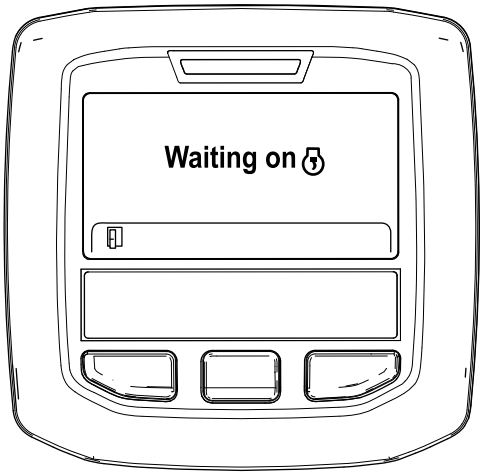
6. Move the throttle control to LOW IDLE and press the center button (Figure 34).



g212372

Figure 34

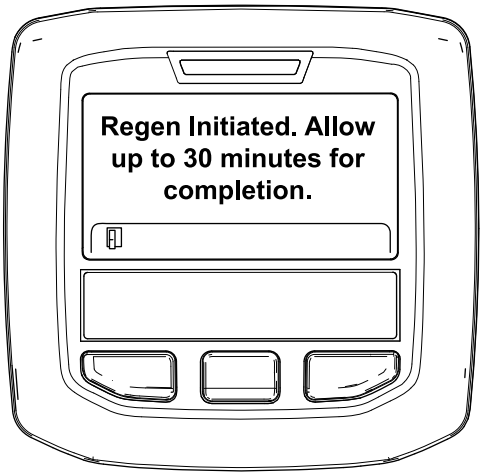
7. The following messages display as the parked regeneration process begins:
   A. The “Initiating DPF Regen.” message displays (Figure 35).
   B. The “Waiting on ” message displays (Figure 36).



g212406

Figure 36

   C. The computer determines whether the regeneration runs. One of the following messages displays in the InfoCenter:
      - If the regeneration is allowed, the “Regen Initiated. Allow up to 30 minutes for completion” message displays in the InfoCenter, wait for the machine to complete the parked regeneration process (Figure 37).

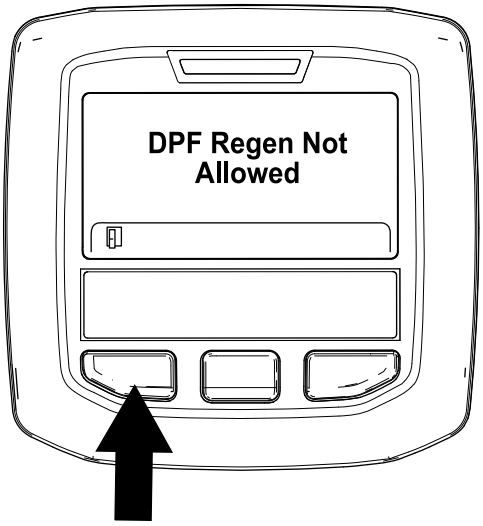


g213424

Figure 37

- If the regeneration process is not allowed by the engine computer, the “DPF Regen Not Allowed” message displays in the InfoCenter (Figure 38). Press the left button to exit to the home screen

  Important: **If you did not meet all the requirements for regeneration or if less than 50 hours have passed since the last regeneration, the “DPF Regen Not Allowed” message appears.**



g212410

Figure 38

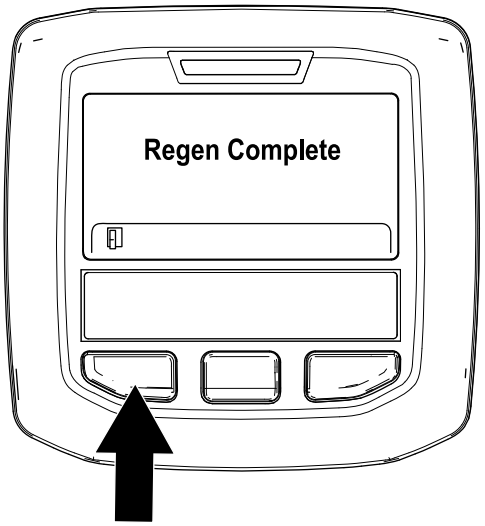
8. While the regeneration is running, the InfoCenter returns to the home screen and shows the following icons:

The engine is cold—wait.

The engine is warm—wait.

The engine hot—regeneration in progress (percent complete).

9. The parked regeneration is complete when the “Regen Complete” message displays in the InfoCenter. Press the left button to exit to the home screen (Figure 39).

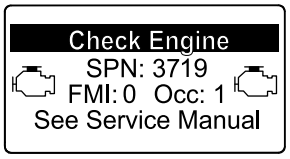


g212404

Figure 39

Recovery Regeneration

- If you ignore the request for a parked regeneration (displayed in the InfoCenter) and continue to operate the machine, a critical amount of soot builds up in the DPF.
- If a recovery regeneration is needed, the InfoCenter displays engine warning SPN 3719, FMI 16 (Figure 40) and the engine computer derates engine power to 85%.



g213867

Figure 40

Important: **If you do not complete a recovery regeneration within 15 minutes, the engine computer derates engine power to 50%.**

- Perform a recovery-regeneration whenever there is a loss of engine power and a parked regeneration cannot effectively clean the DPF of soot.
- A recovery regeneration requires up to 4 hours to complete.
- You need a distributor technician to perform the recovery regeneration process; contact your Authorized Toro Distributor.

Operating Tips

Becoming Familiarized with the Machine

Before mowing grass, practice operating the machine in an open area. Start and shut off the engine. Operate in forward and reverse. Lower and raise the cutting decks and engage and disengage the mowers. When you feel familiar with the machine, practice operating up and down slopes at different speeds.

Mowing

Turn the key in the ignition switch to the ON position, start the engine, and move the throttle to the FAST position. Move the Enable/Disable switch to the ENABLE position and use the Lower Mow/Raise lever to control the cutting decks. To move forward and cut grass, press the traction pedal forward.

Note: Allow the engine to idle for 5 minutes before shutting it off after a full load operation. Failure to do so may lead to turbo-charger trouble.

Mowing when the Grass Is Dry

Mow either in the late morning to avoid the dew, which causes grass clumping, or in late afternoon to avoid the damage that may be caused by direct sunlight on the sensitive, freshly mowed grass.

Selecting the Proper Height-of-Cut Setting to Suit Conditions

Remove approximately 1 inch or no more than 1/3 of the grass blade when cutting. In exceptionally lush and dense grass you may have to raise the height-of-cut setting.

Mowing with Sharp Blades

A sharp blade cuts cleanly and without tearing or shredding the grass blades like a dull blade. Tearing and shredding causes the grass to turn brown at the edges which impairs growth and increases susceptibility to diseases. Always make sure that the blade is in good condition and a full sail is present.

Checking the Condition of the Decks

Make sure that the cutting chambers are in good condition. Straighten any bends in the chamber components to ensure that the correct blade tip/chamber clearance.

Checking the Mower Housing After Operating

To ensure that optimum performance is met, clean the underside of mower housing. If you allow residue to build up in mower housing, cutting performance will decrease.

Transporting the Machine

Move the Enable/Disable switch to the Disable position and raise the cutting decks to the transport position. Move the Mow/Transport lever to the transport position. Be careful when driving between objects so you do not accidentally damage the machine or cutting decks. Use extra care when operating the machine on slopes. Drive slowly and avoid sharp turns on slopes to prevent rollovers. Lower the cutting decks when going downhill for steering control.

After Operation

After Operation Safety

- Clean grass and debris from the cutting units, mufflers, and engine compartment to help prevent fires. Clean up oil or fuel spills.
- If the cutting units are in the transport position, use the positive mechanical lock (if available) before you leave the machine unattended.
- Allow the engine to cool before storing the machine in any enclosure.
- Shut off the fuel before storing or transporting the machine.
- Never store the machine or fuel container where there is an open flame, spark, or pilot light, such as on a water heater or on other appliances.
- Keep all parts of the machine in good working condition and all hardware tightened, especially blade-attachment hardware.
- Replace all worn or damaged decals.

Identifying the Tie-Down Points

- **Front of the machine**—the hole in the rectangular pad, under the axle tube, inside each front tire (Figure 41).

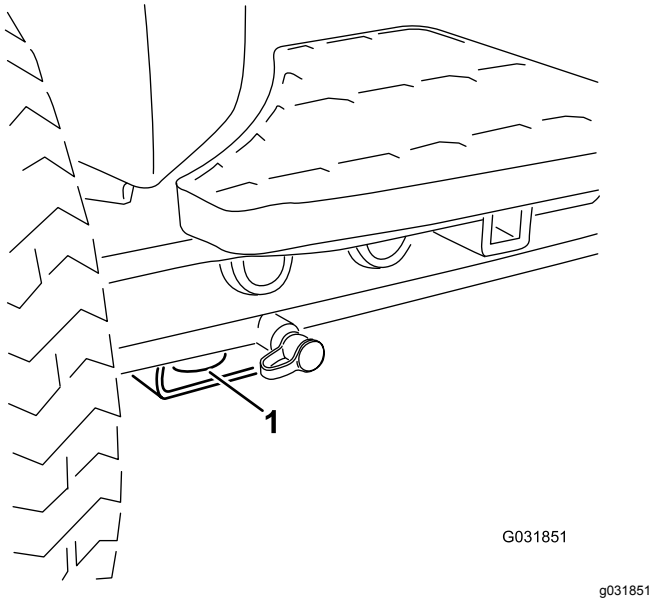


Figure 41

1. Front tie-down

- **Rear of the machine**—each side of the machine on the rear frame (Figure 42).

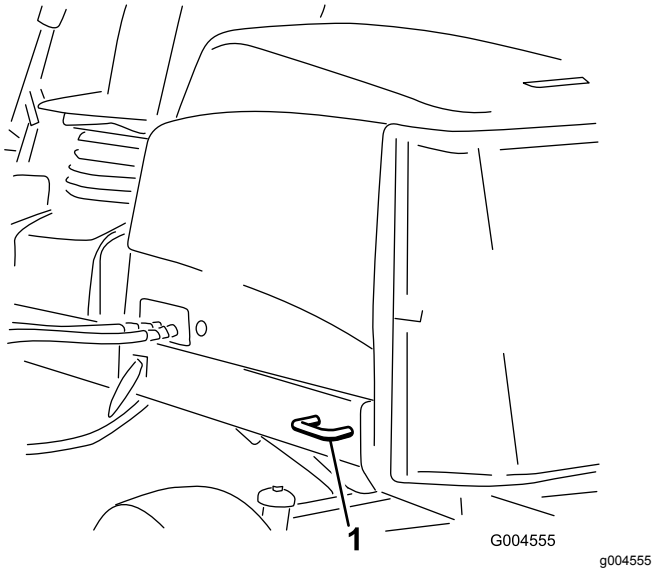


Figure 42

1. Rear tie-down

Pushing or Towing the Machine

In an emergency, the machine can be moved by actuating the bypass valve in the variable displacement hydraulic pump and pushing or towing the machine.

Important: **Do not push or tow the machine faster than 3 to 4.8 km/h (2 to 3 mph) because internal transmission damage may occur. The bypass valve must be open whenever the machine is pushed or towed.**

1. The bypass valve is located on the left side of the hydrostat (Figure 43). Rotate the bolt 1-1/2 turns to open and allow the oil to bypass internally. Because fluid is bypassed, the machine can be moved slowly without damaging the transmission.

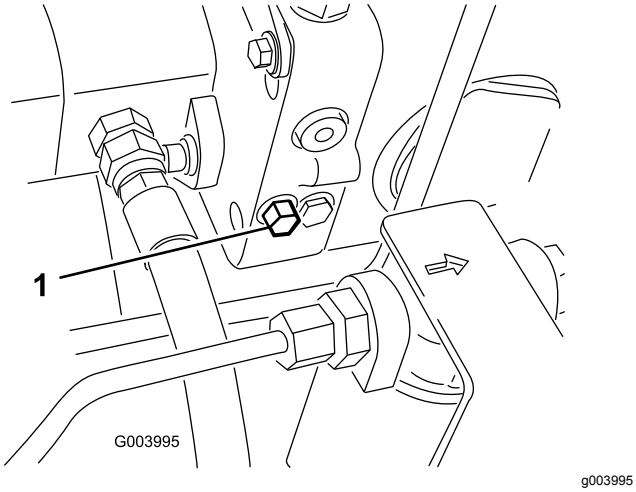


Figure 43

1. Bypass valve

2. Close the bypass valve before starting the engine. However, do not exceed 7 to 11 N·m (5 to 8 ft-lb) torque to close the valve.

   Important: **Running the engine with the bypass valve open will cause the transmission to overheat.**

Hauling the Machine

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

Maintenance

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

Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first hour	• Torque the wheel-lug nuts to 94 to 122 N·m (70 to 90 ft-lb).
After the first 10 hours	• Torque the wheel-lug nuts to 94 to 122 N·m (70 to 90 ft-lb). • Check the alternator belt tension.
After the first 50 hours	• Change the engine oil and filter.
Before each use or daily	• Check the tire pressure. • Check the operation of the safety-interlock switches. • Check the engine-oil level. • Drain water or other contaminants from the water separator. • Check the level of coolant in the expansion tank and clean debris off the screen, oil cooler, and front of the radiator. • Remove debris from the screen and radiator/oil cooler (more frequently in dirty operating conditions). • Check the hydraulic-fluid level. • Check the hydraulic lines and hoses for leaks, kinked lines, loose mounting supports, wear, loose fittings, weather deterioration, and chemical deterioration.
Every 50 hours	• Grease the bearings and bushings. (Grease them immediately after every washing regardless of the interval listed.) • Check the condition of and clean the battery. • Check the battery cable connections.
Every 100 hours	• Inspect the cooling system hoses. • Check the condition and tension of the alternator belt.
Every 250 hours	• Torque the wheel-lug nuts to 94 to 122 N·m (70 to 90 ft-lb). • Change the engine oil and filter.
Every 400 hours	• Service the air cleaner. (Service the air cleaner earlier if the air cleaner indicator shows red. Service it more frequently in extremely dirty or dusty conditions.) • Replace the fuel filter. • Replace the fuel filter canister. • Check the fuel lines and connections for deterioration, damage, or loose connections, (or yearly, whichever comes first).
Every 800 hours	• Drain and clean the fuel tank. • Check the rear wheel toe-in. • Change the hydraulic fluid. • Change the hydraulic filters (sooner if the service interval indicator is in the red zone). • Pack the rear-wheel bearings.
Every 6,000 hours	• Disassemble, clean, and assemble the soot filter of the DPF. or clean the soot filter if engine faults SPN 3720 FMI 16, SPN 3720 FMI 0, or SPN 3720 FMI 16 display in the InfoCenter.
Before storage	• Drain and clean the fuel tank.
Every 2 years	• Flush and replace the cooling system fluid. • Drain and flush the hydraulic tank. • Replace all moving hoses.

Daily Maintenance Checklist

Duplicate this page for routine use.

Maintenance Check Item	For the week of:						
	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.
Check the safety-interlock operation.							
Check the brake operation.							
Check the engine oil and fuel level.							
Drain the water/fuel separator.							
Check the air-filter-restriction indicator.							
Check the radiator and screen for debris.							
Check unusual engine noises.[1]							
Check unusual operating noises.							
Check the hydraulic-system-fluid level.							
Check the hydraulic-filter indicator.[2]							
Check hydraulic hoses for damage.							
Check for fluid leaks.							
Check the tire pressure.							
Check the instrument operation.							
Check the height-of-cut adjustment.							
Check the condition of the blades.							
Check all grease fittings for lubrication.[3]							
Touch-up damaged paint.							

1. Check the glow plug and injector nozzles if hard starting, excess smoke, or rough running is noted.
2. Check with the engine running and the oil at operating temperature
3. Immediately after every washing, regardless of the interval listed

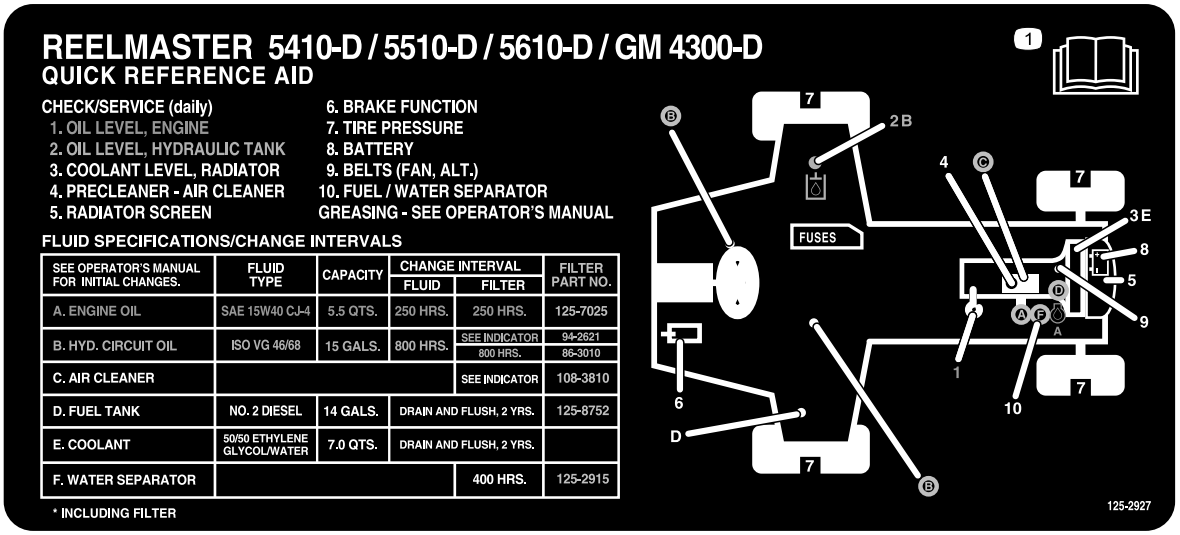
Notation for Areas of Concern

Inspection performed by:		
Item	**Date**	**Information**
1		
2		
3		
4		
5		
6		
7		
8		

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

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

Service Interval Chart



decal125-2927

Figure 44

⚠ CAUTION

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

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

Pre-Maintenance Procedures

Pre-Maintenance Safety

- Before adjusting, cleaning, repairing, or leaving the machine, do the following:
  - Park the machine on a level surface.
  - Move the throttle switch to the low-idle position.
  - Disengage the cutting units.
  - Lower the cutting units.
  - Ensure that the traction is in neutral.
  - Engage the parking brake.
  - Shut off the engine and remove the key.
  - Wait for all moving parts to stop.
  - Allow machine components to cool before performing maintenance.
- If the cutting units are in the transport position, use the positive mechanical lock (if available) before you leave the machine unattended.
- If possible, do not perform maintenance while the engine is running. Keep away from moving parts.
- Use jack stands to support the machine or components when required.
- Carefully release pressure from components with stored energy.

Raising the Machine

Use the following as points to jack up the machine:

- **Front of the machine**—rectangular pad, under the axle tube, inside each front tire (Figure 45).

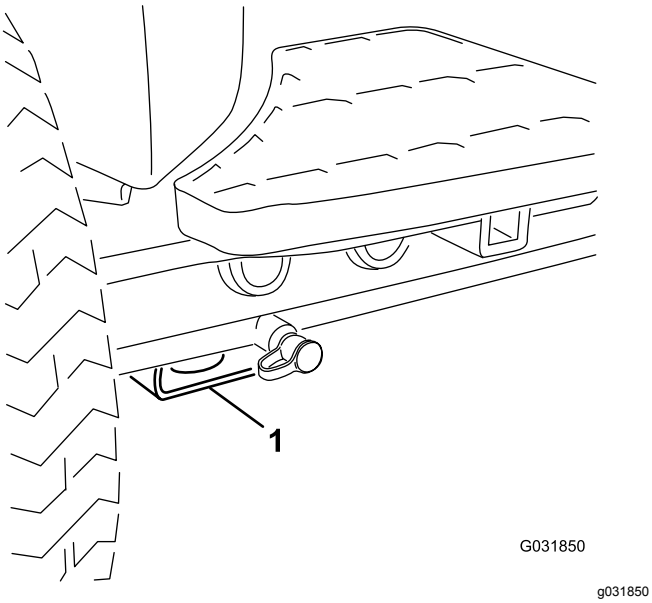


Figure 45

1. Front jacking point

- **Rear of the machine**—rectangular axle tube on the rear axle.

Lubrication

Greasing the Bearings and Bushings

If you operate the machine under normal conditions, lubricate all grease fittings for the bearings and bushings after **every 50 hours of operation** with No. 2 lithium grease. Lubricate bearings and bushings **immediately** after every washing, regardless of the interval listed.

The grease fitting locations and quantities are as follows:

- Pump driveshaft U-joint (3)—Figure 46

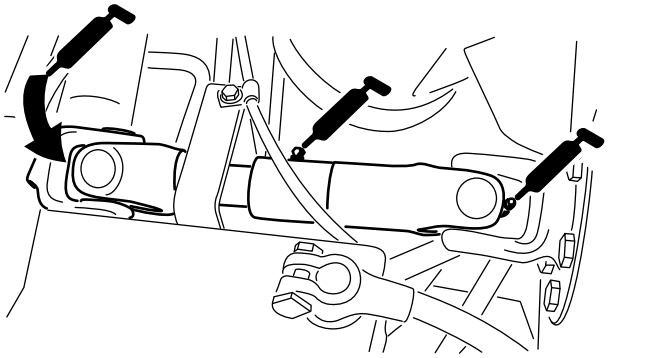


Figure 46

- Cutting unit lift-arm cylinders (2 each)—Figure 47

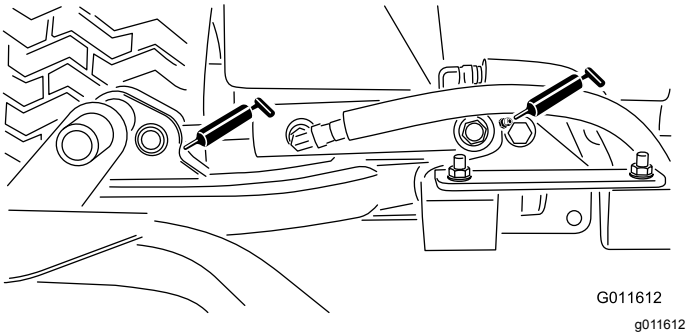


Figure 47

- Lift-arm pivots (1 each)—Figure 47

- Cutting unit carrier-frame pivot (1 each)—Figure 48

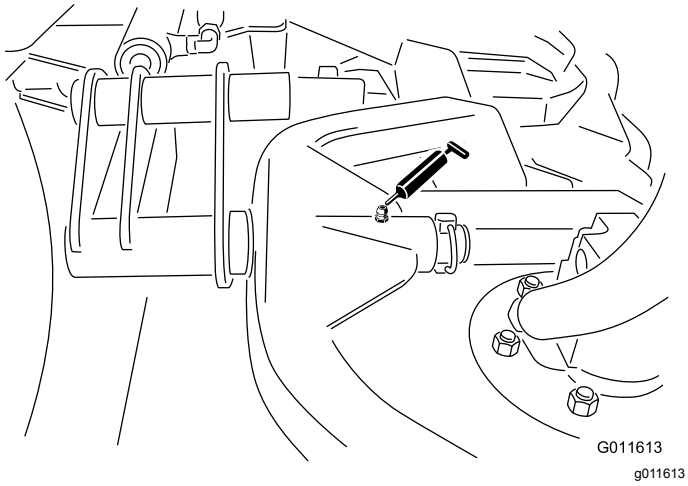


Figure 48

- Lift-arm pivot shaft (1 each)—Figure 49

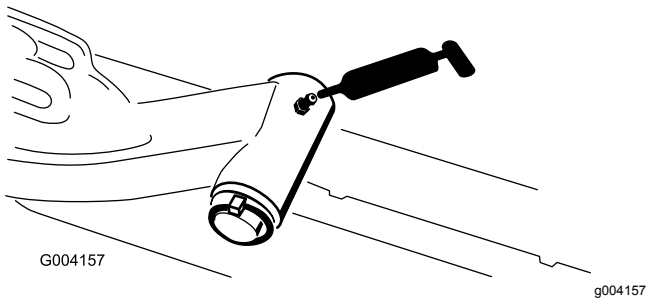


Figure 49

- Rear axle tie rod (2)—Figure 50

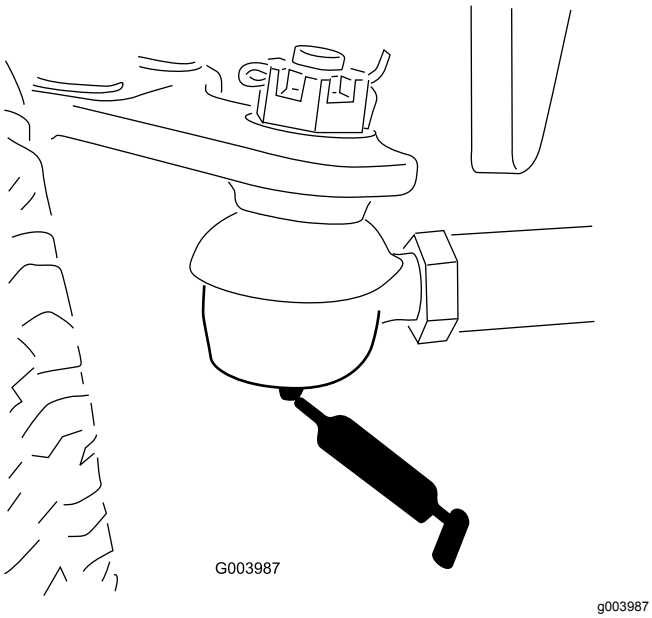


Figure 50

- Axle-steering pivot (1)—Figure 51

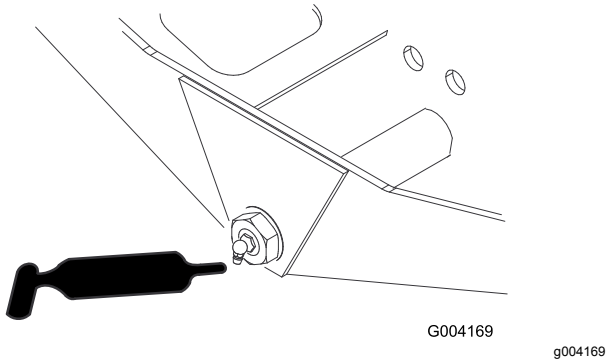


Figure 51

- Steering-cylinder ball joints (2) and rear axle (1)—Figure 52

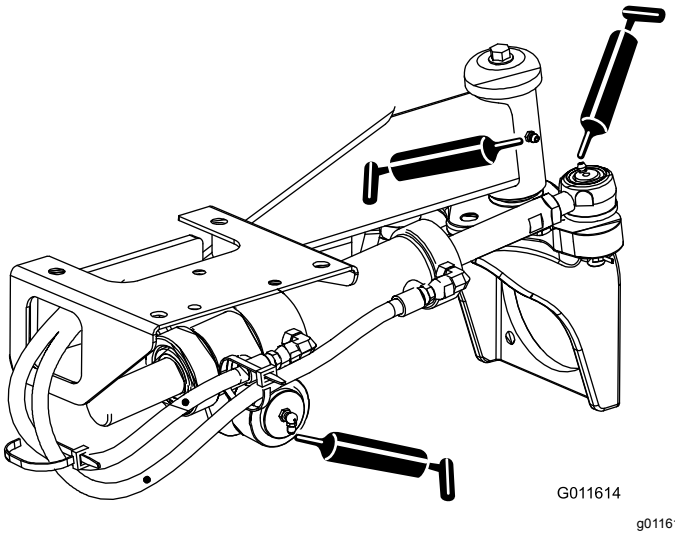


Figure 52

- Brake pedal (1)—Figure 53

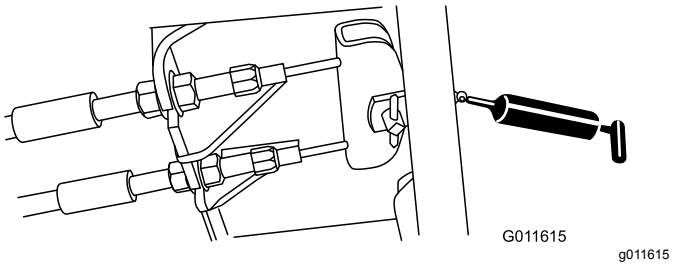


Figure 53

- Cutting unit spindle-shaft bearings (2 per cutting unit)—Figure 54

  Note: You can use either fitting, whichever is more accessible. Pump grease into the fitting until a small amount appears at bottom of the spindle housing (under the deck).

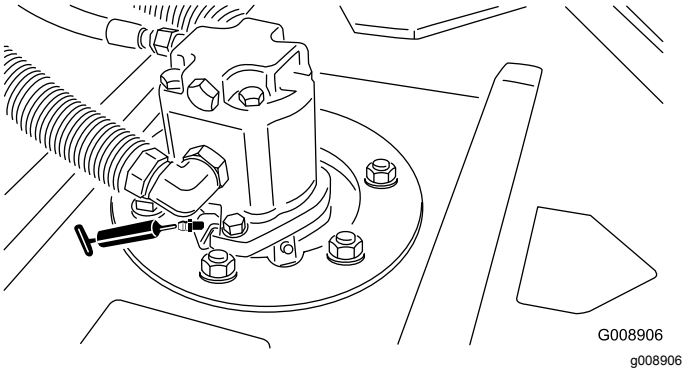


Figure 54

- Rear-roller bearings (2 per cutting unit)—Figure 55

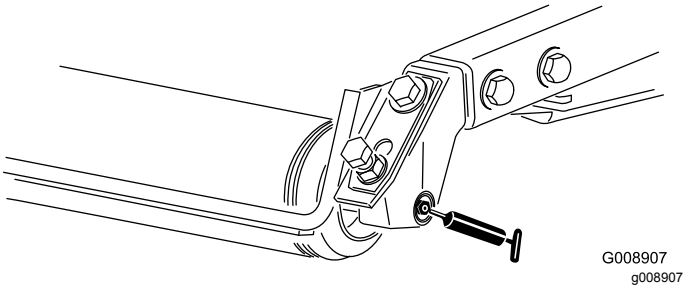


Figure 55

Note: Make sure that the grease groove in each roller mount aligns with the grease hole in each end of the roller shaft. To help align the groove and hole, there is also an alignment mark on 1 end of the roller shaft.

Engine Maintenance

Engine Safety

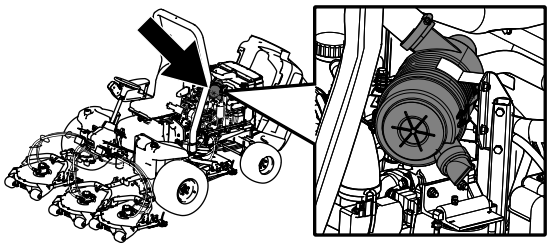
- Shut off the engine before checking the oil or adding oil to the crankcase.
- Do not change the governor speed or overspeed the engine.

Servicing the Air Cleaner

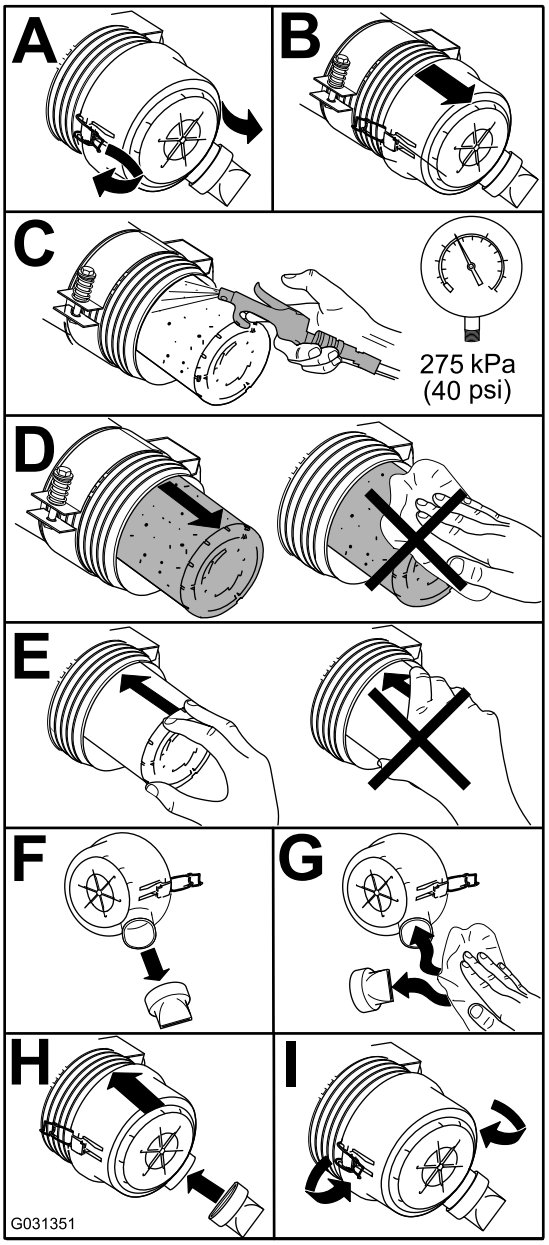
Check the whole intake system for leaks, damage, or loose hose clamps. Do not use a damaged air filter.

Service the air-cleaner filter only when the service indicator requires it. Changing the air filter before it is necessary only increases the chance of dirt entering the engine when you remove the filter.

Important: **Make sure that the cover is seated correctly and seals with the air-cleaner body.**



g194209



g031351

Figure 56

Servicing the Engine Oil

Oil Specification

Use high-quality, low-ash engine oil that meets or exceeds the following specifications:

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

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

Use the following engine oil viscosity grade:

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

Toro Premium Engine Oil is available from your Authorized Toro Distributor in either 15W-40 or 10W-30 viscosity grades. See the parts catalog for part numbers.

Checking the Engine-Oil Level

Service Interval: Before each use or daily

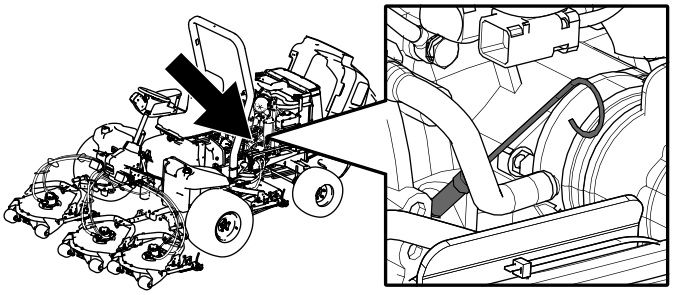
The engine is shipped with oil in the crankcase; however, the oil level must be checked before and after the engine is first started.

Important: **Check the engine oil daily. If the engine-oil level is above the Full mark on the dipstick, the engine oil may be diluted with fuel; If the engine oil level is above the Full mark, change the engine oil.**

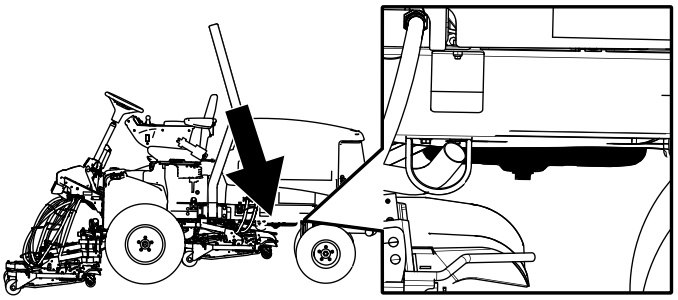
The best time to check the engine oil is when the engine is cool before it has been started for the day. If it has already been run, allow the oil to drain back down to the sump for at least 10 minutes before checking. If the oil level is at or below the Add mark on the dipstick, add oil to bring the oil level to the Full mark. **Do not overfill the engine with oil**.

Important: **Keep the engine oil level between the upper and lower limits on the dipstick; the engine may fail if you run it with too much or too little oil.**

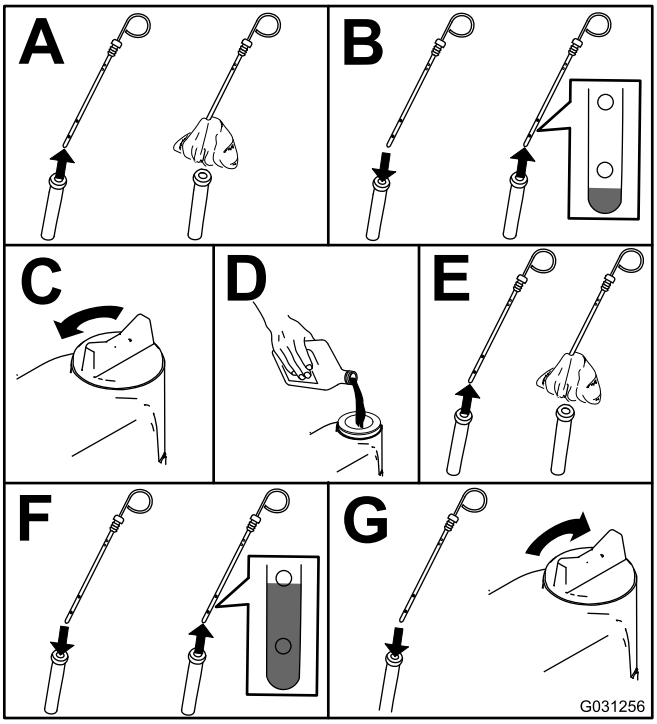
1. Park the machine on a level surface.
2. Check the engine-oil level (Figure 57).



g194204

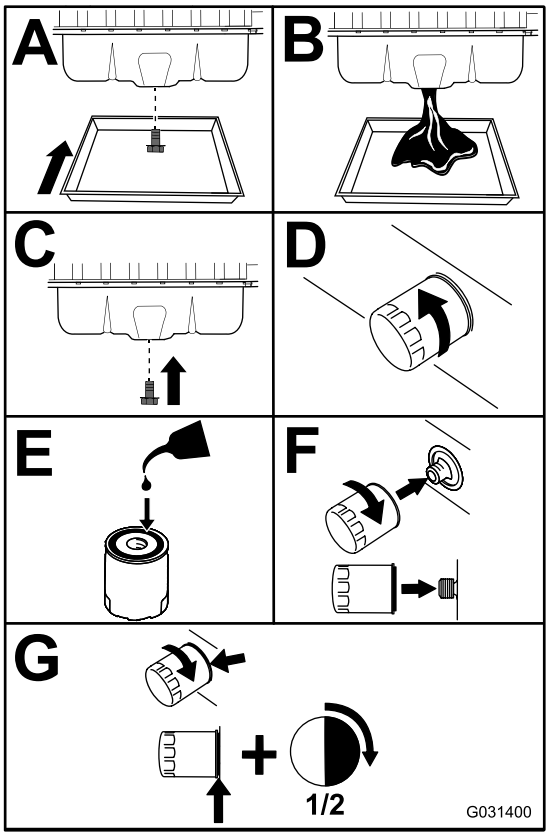


g194203



g031256

Figure 57



g031400

Figure 58

Note: When using different oil, drain all old oil from the crankcase before adding new oil.

Crankcase Oil Capacity

Approximately 5.2 L (5.5 US qt) with the filter.

Changing the Engine Oil and Filter

Service Interval: After the first 50 hours

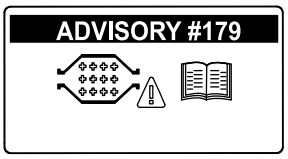
Every 250 hours

1. Start the engine and let it run 5 minutes to allow the oil to warm up.
2. With the machine parked on a level surface, shut off the engine, remove the key, and wait for all moving parts to stop before leaving the operating position.
3. Replace the engine oil and filter (Figure 58).
4. Add oil to the crankcase.

Servicing the Diesel-Oxidation Catalyst (DOC) and the Soot Filter

Service Interval: Every 6,000 hours or clean the soot filter if engine faults SPN 3720 FMI 16, SPN 3720 FMI 0, or SPN 3720 FMI 16 display in the InfoCenter.

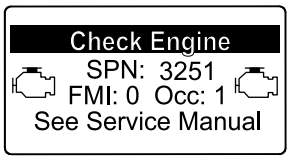
- If advisory message ADVISORY 179 displays in the InfoCenter, the DPF is nearing the recommended point for servicing the diesel-oxidation catalyst and the soot filter.



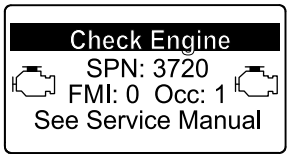
g213865

Figure 59

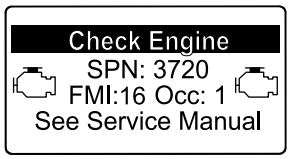
- If engine faults CHECK ENGINE SPN 3251 FMI 0, CHECK ENGINE SPN 3720 FMI 0, or CHECK ENGINE SPN 3720 FMI 16in the InfoCenter (Figure 60) display in the InfoCenter, clean the soot filter using the steps that follow:



g214715



g213864



g213863

Figure 60

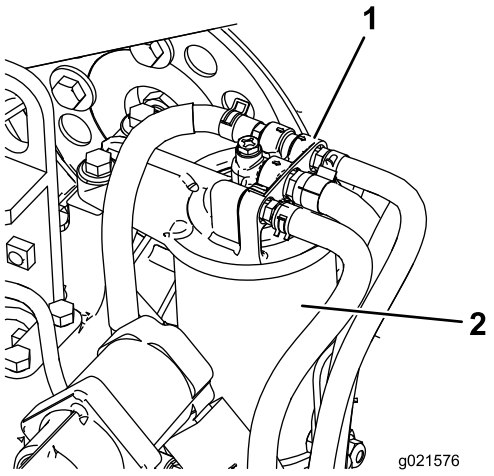
1. Refer to the Engine section in the *Service Manual* for information on disassembling and assembling the diesel-oxidation catalyst and the soot filter of the DPF.
2. Refer to your authorized Toro distributor for diesel-oxidation catalyst and the soot filter replacement parts or service.
3. Contact your authorized Toro distributor to have them reset the engine ECU after you install a clean DPF.

Fuel System Maintenance

Servicing the Fuel Filter

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

1. Clean the area around the fuel-filter head (Figure 61).



g021576

Figure 61

1. Fuel-filter head
2. Fuel filter

2. Remove the filter and clean the filter head mounting surface (Figure 61).
3. Lubricate the filter gasket with clean lubricating engine oil. Refer to the *Engine Operator's Manual* for additional information.
4. Install the dry filter canister by hand, until the gasket contacts the filter head, then rotate it an additional 1/2 turn.
5. Start the engine and check for fuel leaks around the filter head.

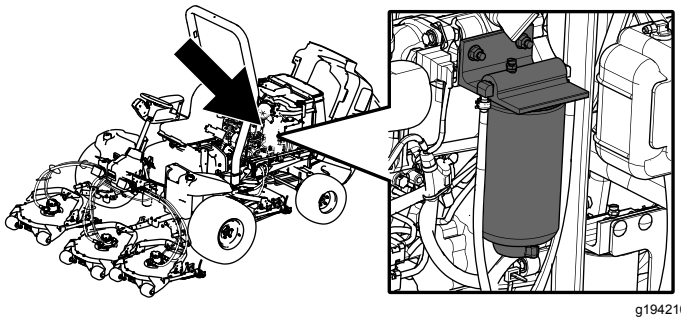
Using the Fuel-Pickup Tube

The fuel-pickup tube, located inside the fuel tank, is equipped with a screen to help prevent debris from entering the fuel system. Remove the fuel-pickup tube and clean screen as required.

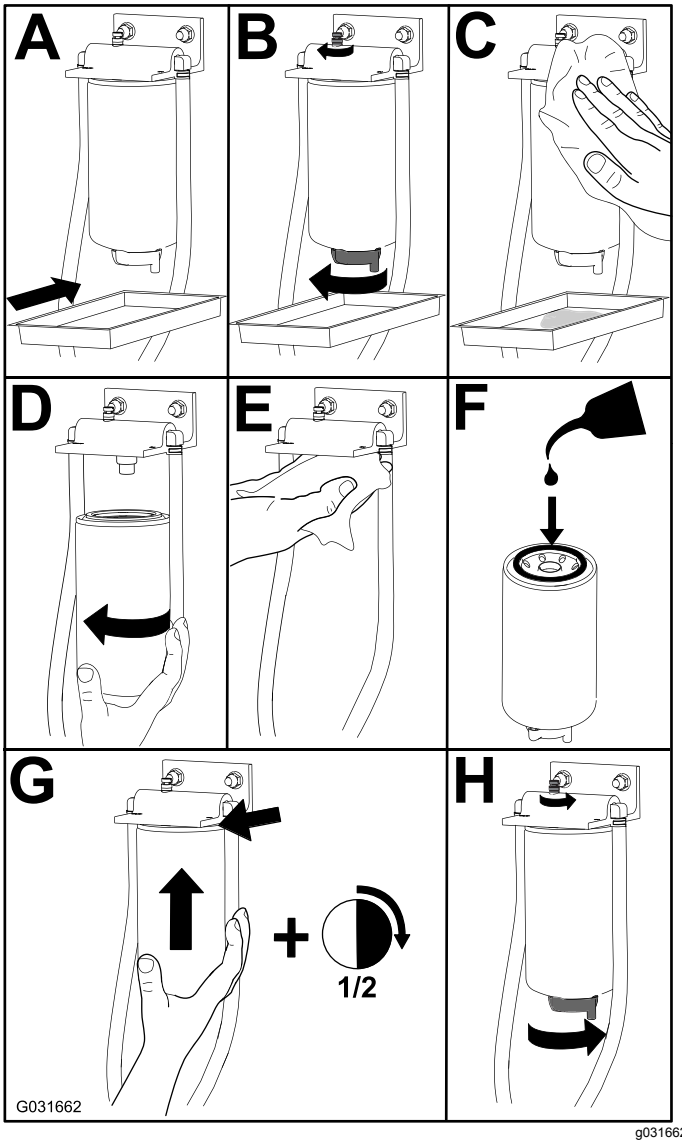
Servicing the Water Separator

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

Before each use or daily—Drain water or other contaminants from the water separator.



g194210



g031662

Figure 62

Servicing the Fuel System

Draining the Fuel Tank

Service Interval: Every 800 hours

Before storage

Drain and clean the fuel tank if the fuel system becomes contaminated or if you store the machine for an extended period. Use clean fuel to flush out the tank.

Checking the Fuel Lines and Connections

Inspect them for deterioration, damage, or loose connections.

Electrical System Maintenance

Electrical System Safety

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

WARNING

CALIFORNIA
Proposition 65 Warning

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

Locating the Fuses

There are 8 fuses in the Electrical System. The fuse block (Figure 63) is located behind the control-arm-access panel.

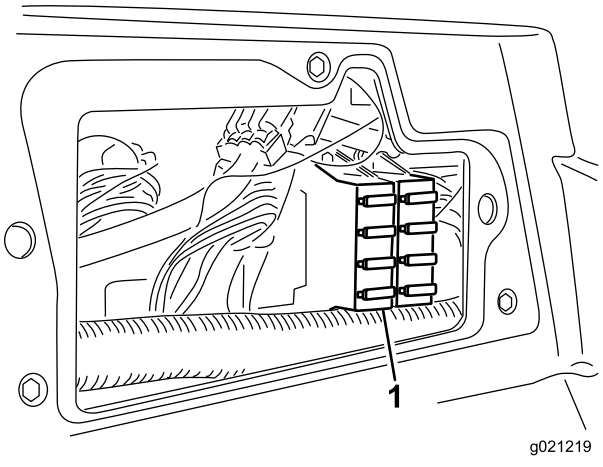
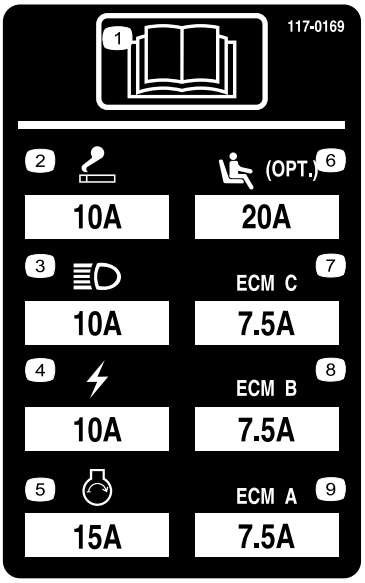


Figure 63

1. Fuse block



decal117-0169

Figure 64

Checking the Battery Condition

Service Interval: Every 50 hours

Important: **Before welding on the machine, disconnect the negative cable from the battery to prevent damage to the electrical system. Also, you must disconnect the engine, InfoCenter, and machine controllers before welding on the machine.**

Note: Keep the terminals and the entire battery case clean, because a dirty battery discharges slowly. To clean the battery, wash the entire case with a solution of baking soda and water. Rinse with clear water. Coat the battery posts and cable connectors with Grafo 112X (skin-over) grease (Toro Part No. 505-47) or petroleum jelly to prevent corrosion.

Charging the Battery

⚠ WARNING

Charging the battery produces gasses that can explode.

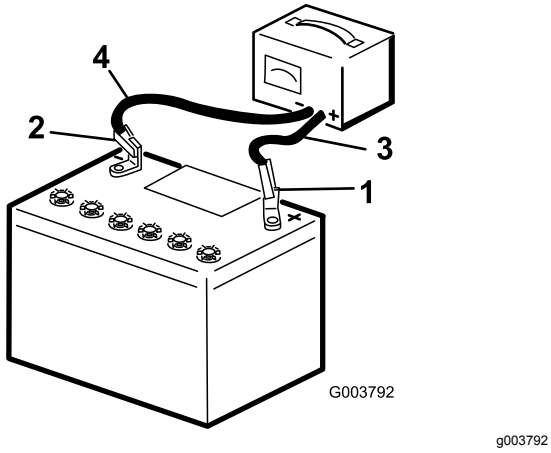
Do not smoke near the battery, and keep sparks and flames away from the battery.

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

1. Clean the exterior of the battery case and the battery posts.

   Note: Connect the leads of the battery charger to battery posts before connecting the charger to the electrical source.

2. Look at the battery and identify the positive and negative battery posts.
3. Connect the positive lead of the battery charger to the positive battery post (Figure 65).



g003792

Figure 65

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

4. Connect the negative lead of the battery charger to the negative-battery post (Figure 65).
5. Connect the battery charger to the electrical source, and charge the battery.

   Important: **Do not overcharge the battery.**

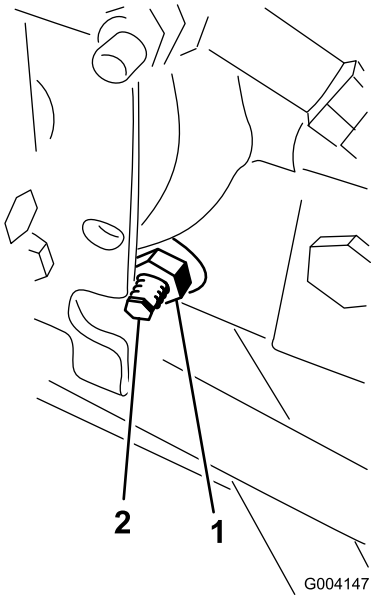
6. When the battery is fully charged, unplug the charger from the electrical source, then disconnect the charger leads from the battery posts (Figure 65).

Drive System Maintenance

Adjusting the Traction Drive for Neutral

The machine must not creep when the traction pedal is released. If it does creep, adjust as follows:

1. Park the machine on a level surface, turn the key in the ignition switch to the OFF position, and lower the cutting decks to the floor.
2. Jack up the machine until all the tires are off the shop floor. Support the machine with jack stands to prevent it from falling accidentally.
3. On the right side of the hydrostat, loosen the locknut on the traction-adjustment cam (Figure 66).



g004147

Figure 66

1. Locknut
2. Traction-adjustment cam

⚠ WARNING

The engine must be running so that the final adjustment of the traction-adjustment cam can be performed. This could cause personal injury.

Keep your hands, feet, face, and other body parts away from the muffler, other hot parts of the engine, and any rotating parts.

4. Turn the key in the ignition switch to the ON position, start the engine, and rotate the cam hex in either direction until the wheels cease rotation.
5. Tighten the locknut to secure the adjustment.
6. Turn the key in the ignition switch to the OFF position, remove the jack stands, and lower the machine to the shop floor.
7. Test drive the machine to make sure that it does not creep.

Adjusting the Rear Wheel Toe-in

Service Interval: Every 800 hours

1. Rotate the steering wheel so that the rear wheels are straight ahead.
2. Loosen the jam nut on each end of the tie rod (Figure 67).

   Note: The end of the tie rod with the external groove is a left-hand thread.

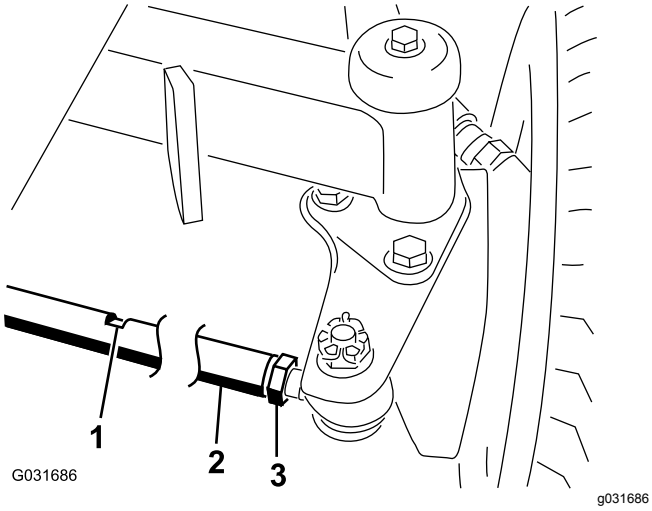


Figure 67

1. Wrench slot
2. Tie rod
3. Jam nut

3. Using the wrench slot, rotate the tie rod.
4. Measure the distance at the front and rear of the rear wheels at axle height.

   Note: The distance at the front of the rear wheels should be less than 6 mm (1/4 inch) of the distance measured at the rear of the wheels.
5. Repeat procedure as required.

Cooling System Maintenance

Cooling System Safety

- **Swallowing engine coolant can cause poisoning; keep out of reach from children and pets.**
- Discharge of hot, pressurized coolant or touching a hot radiator and surrounding parts can cause severe burns.
  - Always allow the engine to cool at least 15 minutes before removing the radiator cap.
  - Use a rag when opening the radiator cap, and open the cap slowly to allow steam to escape.

Checking the Cooling System

Service Interval: Before each use or daily—Check the level of coolant in the expansion tank and clean debris off the screen, oil cooler, and front of the radiator.

The cooling system is filled with a 50/50 solution of water and permanent ethylene glycol antifreeze. The capacity of the cooling system is 9.5 L (10 US qt).

⚠ DANGER

The rotating fans and drive belts can cause personal injury.

- **Do not operate the machine without the covers in place.**
- **Keep your hands and clothing clear of the rotating fan and drive belt.**
- **Shut off the engine and remove the ignition key before performing maintenance.**

⚠ CAUTION

If the engine has been running, the pressurized, hot coolant can escape and cause burns.

- **Do not open the radiator cap when the engine is running.**
- **Use a rag when opening the radiator cap, and open the cap slowly to allow steam to escape.**

1. Check the level of coolant in the expansion tank (Figure 68).

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

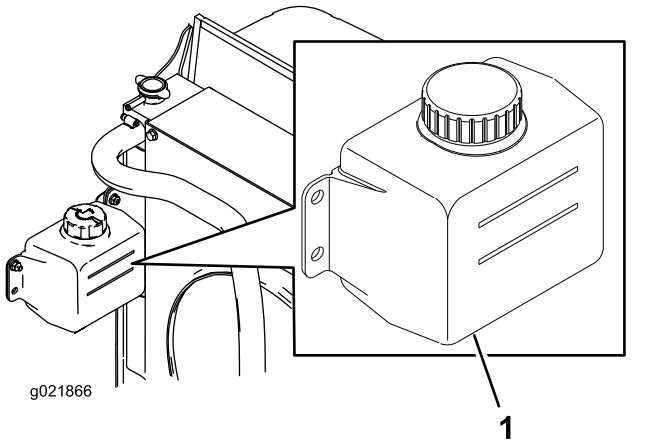


Figure 68

1. Expansion tank

2. If the coolant level is low, remove the expansion-tank cap and replenish the system. **Do not overfill.**
3. Install the expansion-tank cap.

Cleaning the Cooling System

Service Interval: Before each use or daily—Remove debris from the screen and radiator/oil cooler (more frequently in dirty operating conditions).

Every 100 hours—Inspect the cooling system hoses.

Every 2 years—Flush and replace the cooling system fluid.

Remove debris from the screen and radiator/oil cooler daily (clean more frequently in dirty conditions).

1. Turn the key in the ignition switch to the OFF position and remove the key.
2. Thoroughly clean all debris out of the engine area.
3. Unlatch the clamp and pivot open the rear screen (Figure 69).

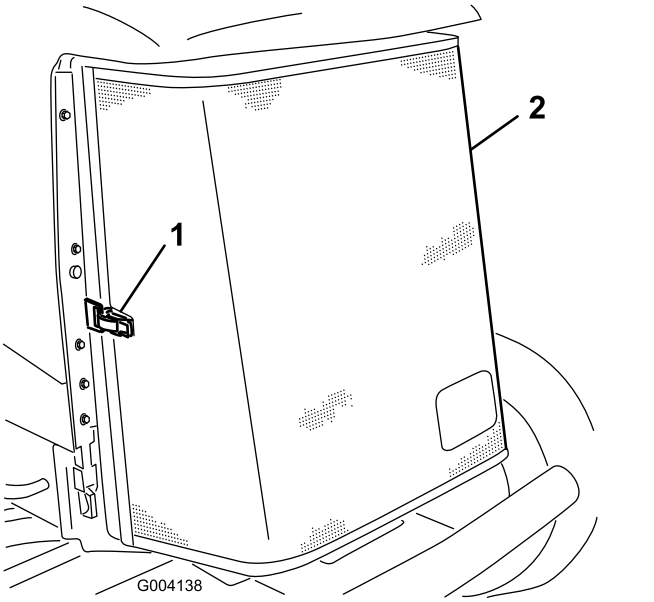


Figure 69

1. Rear screen latch
2. Rear screen

4. Thoroughly clean both sides of the radiator and oil cooler (Figure 70) with compressed air.

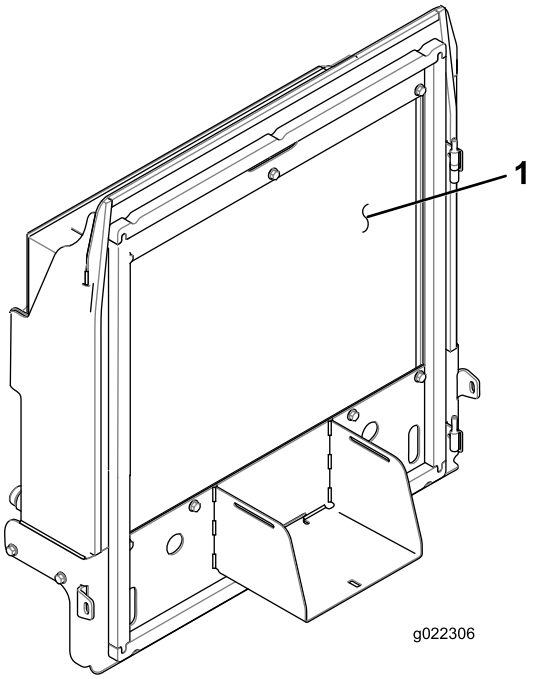


Figure 70

1. Radiator/oil cooler

5. Close the screen and secure the latch.

Brake Maintenance

Adjusting the Parking Brakes

Adjust the brakes when there is more than 2.5 cm (1 inch) of free travel (Figure 71) of the brake pedal, or when more holding force is required. Free travel is the distance the brake pedal moves before you feel braking resistance.

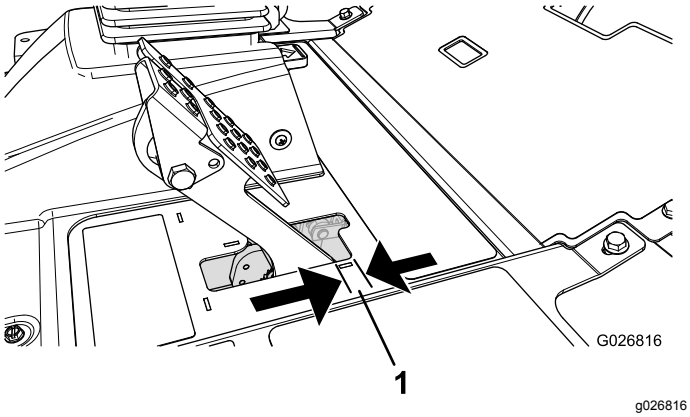


Figure 71

1. Free travel

Note: Use the wheel motor backlash to rock the drums back and forth to ensure that the drums are free prior to and after adjustment.

1. To reduce free travel of the brake pedals, tighten the brakes by loosening the front nut on the threaded end of the brake cable (Figure 72).

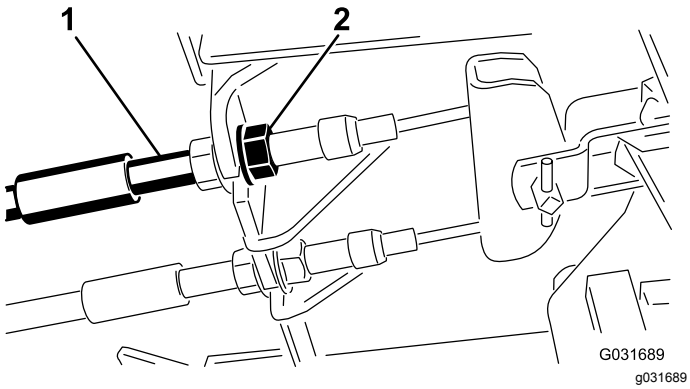


Figure 72

1. Brake cables
2. Front nuts

---

2. Tighten the rear nut to move the cable backward until brake pedals have 0.63 to 1.27 cm (1/4 to 1/2 inch) of free travel (Figure 71), before wheel lock up is achieved.
3. Tighten the front nuts, ensuring that both cables actuate the brakes simultaneously. Ensure that the cable conduit does not rotate during tightening procedure.

Adjusting the Parking-Brake Latch

If the parking brake fails to engage and latch, an adjustment to the brake pawl is required.

1. Loosen the 2 screws securing the parking brake pawl to the frame (Figure 73).

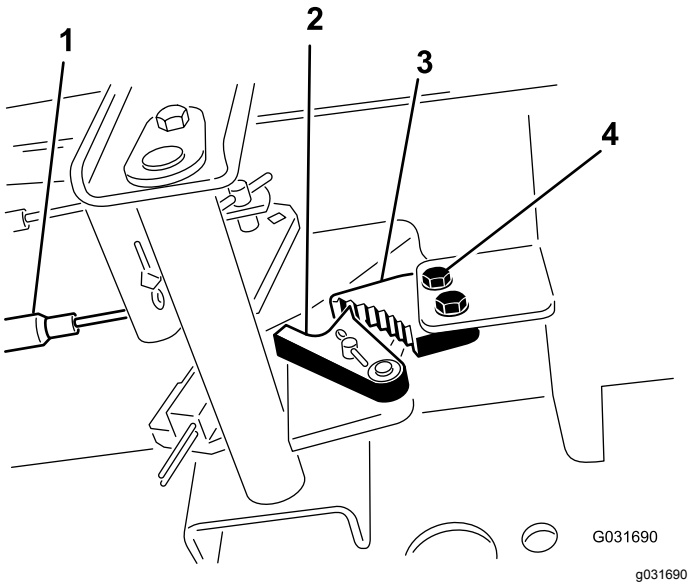


Figure 73

1. Brake cables
2. Brake detent
3. Parking brake pawl
4. Screws (2)

---

2. Press the parking brake pedal forward until the brake detent completely engages on the brake pawl (Figure 73).
3. Tighten the 2 screws locking the adjustment.
4. Press the brake pedal to disengage the parking brake.
5. Check the adjustment and adjust as required.

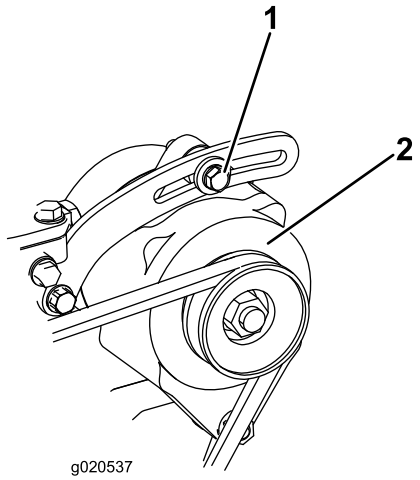
Belt Maintenance

Servicing the Alternator Belt

Service Interval: After the first 10 hours

Every 100 hours

1. Proper tension allows 10 mm (3/8 inch) deflection when a force of 4.5 kg (10 lb) is applied on the belt midway between the pulleys.
2. If the deflection is not 10 mm (3/8 inch), loosen the alternator mounting bolts (Figure 74). Increase or decrease the alternator belt tension and tighten the bolts. Check the deflection of the belt again to ensure that the tension is correct.



g020537

Figure 74

1. Mounting bolt
2. Alternator

Hydraulic System Maintenance

Hydraulic System Safety

- **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.**
- **Seek immediate medical attention if fluid is injected into skin. Injected fluid must be surgically removed within a few hours by a doctor.**

Checking the Hydraulic-Fluid Level

Service Interval: Before each use or daily

The machines reservoir is filled at the factory with approximately 37.8 L (10 US gallons) of high quality hydraulic fluid. Check the level of the hydraulic fluid before the engine is first started and daily thereafter. The recommended replacement fluid is as follows:

Toro Premium All Season Hydraulic Fluid (Available in 18.9 L (5 US gallon) pails or 208 L (55 US gallon) drums. See the *Parts Catalog* or your Toro Distributor for part numbers.)

Alternate fluids: If the Toro fluid is not available, other fluids may be used provided they meet all the following material properties and industry specifications. We do not recommend the use of synthetic fluid. Consult with your lubricant distributor to identify a satisfactory product.

Note: Toro will not assume responsibility for damage caused by improper substitutions, so use only products from reputable manufacturers who will stand behind their recommendation.

High Viscosity Index/Low Pour Point Anti-wear Hydraulic Fluid, ISO VG 46

Material Properties:

Viscosity, ASTM D445	cSt @ 40°C 44 to 50 cSt @ 100°C 7.9 to 8.5
Viscosity Index ASTM D2270	140 to 160
Pour Point, ASTM D97	-34°F to -49°F
Industry Specifications:	Vickers I-286-S (Quality Level), Vickers M-2950-S (Quality Level), Denison HF-0

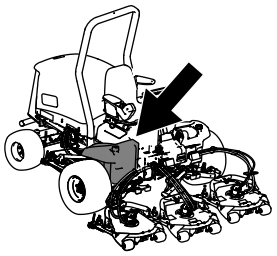
Important: **The ISO VG 46 Multigrade fluid has been found to offer optimal performance in a wide-range of temperature conditions. For operation in consistently high ambient temperatures, 18°C (65°F) to 49°C (120°F), ISO VG 68 hydraulic fluid may offer improved performance.**

Premium Biodegradable Hydraulic Fluid-Mobil EAL EnviroSyn 46H

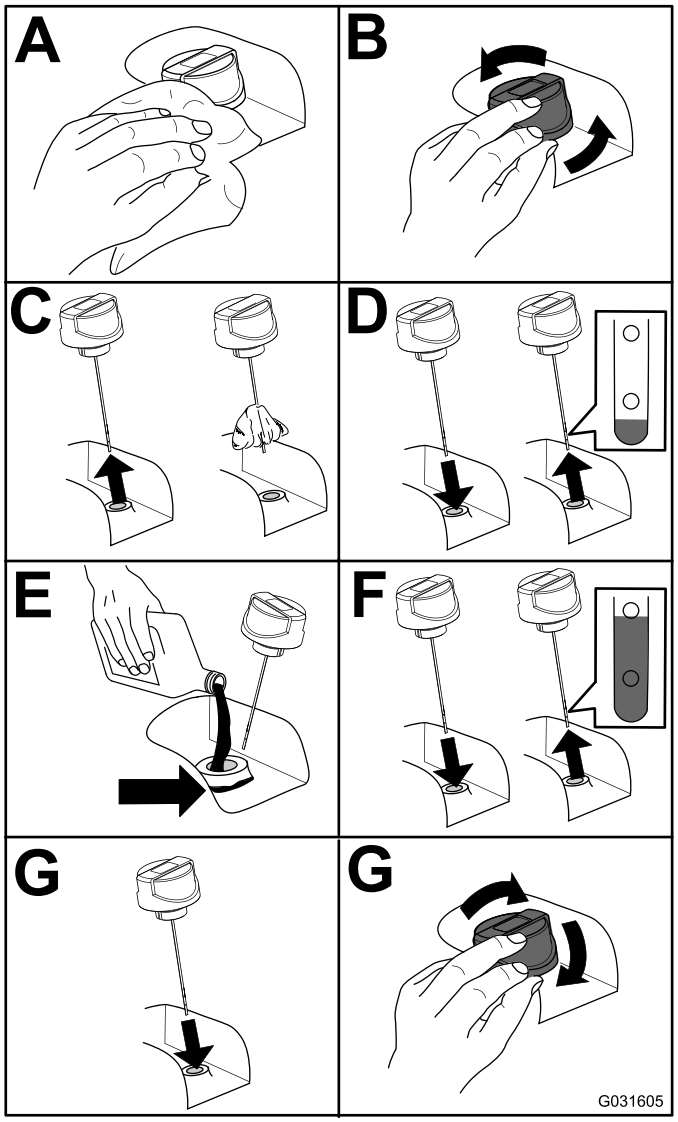
Important: **Mobil EAL EnviroSyn 46H is the only synthetic biodegradable fluid approved by Toro. This fluid is compatible with the elastomers used in Toro hydraulic systems and is suitable for a wide-range of temperature conditions. This fluid is compatible with conventional mineral oils, but for maximum biodegradability and performance the hydraulic system should be thoroughly flushed of conventional fluid. The oil is available in 19 L (5 US gallons) containers or 55 gallon drums from your Mobil Distributor.**

Note: Many hydraulic fluids are almost colorless, making it difficult to spot leaks. A red dye additive for the hydraulic-system fluid is available in 20 ml (2/3 oz) bottles. 1 bottle is sufficient for 15 to 22 L (4 to 6 US gallons) of hydraulic fluid. Order Part No. 44-2500 from your Toro Distributor.

1. Position the machine on a level surface, lower the cutting decks, and turn the key in the ignition switch to the OFF position.
2. Check the hydraulic-fluid level (Figure 75).



g194205



g031605

Figure 75

Changing the Hydraulic Fluid

Service Interval: Every 800 hours

If fluid becomes contaminated, contact your authorized Toro distributor; the system must be flushed. Contaminated fluid looks milky or black when compared to clean fluid.

1. Turn the key in the ignition switch to the OFF position and raise the hood.
2. Place a large drain pan under the fitting secured to the bottom of the hydraulic-fluid reservoir (Figure 76).

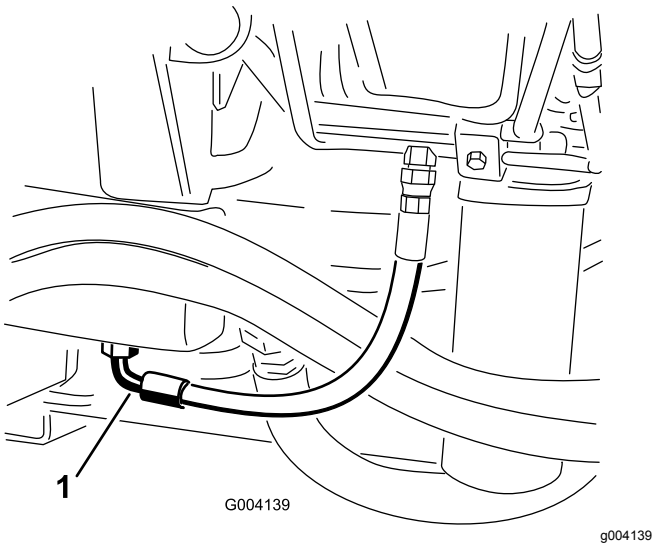


Figure 76

1. Hose

3. Disconnect the hose from the bottom of the fitting and let the hydraulic fluid flow into the drain pan.
4. Install the hose when hydraulic fluid stops draining.
5. Fill the reservoir with approximately 45 L (12 US gallons) of hydraulic fluid; refer to Changing the Hydraulic Fluid (page 57).

   Important: **Use only hydraulic fluids specified. Other fluids could cause system damage.**
6. Install the reservoir cap.
7. Turn the key in the ignition switch to the ON position, start the engine, use all of the hydraulic controls to distribute hydraulic fluid throughout the system, and check for leaks.
8. Turn the key in the ignition switch to the OFF position.
9. Check the level of the hydraulic fluid and add enough to raise level to the Full mark on the dipstick.

   Important: **Do not overfill.**

Replacing the Hydraulic Filters

The hydraulic system is equipped with a service interval indicator (Figure 77). With the engine running, view the indicator, it should be in the green zone. When the indicator is in the red zone, change the hydraulic filters.

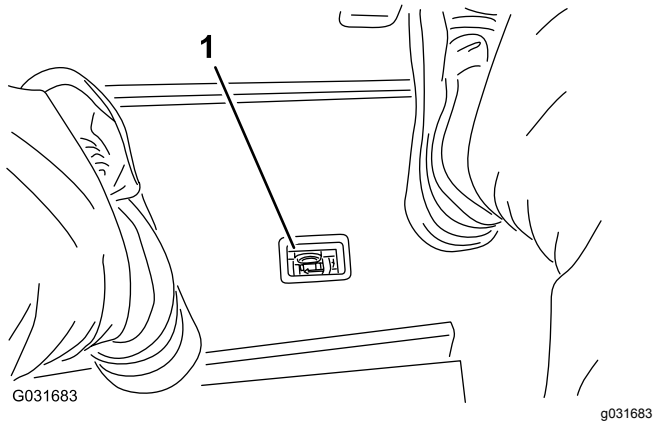
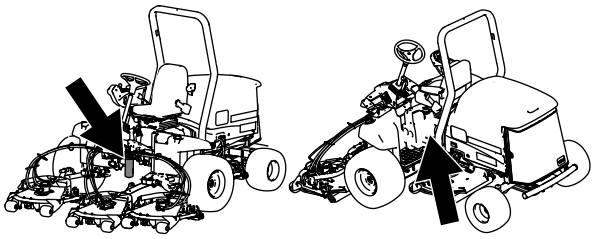


Figure 77

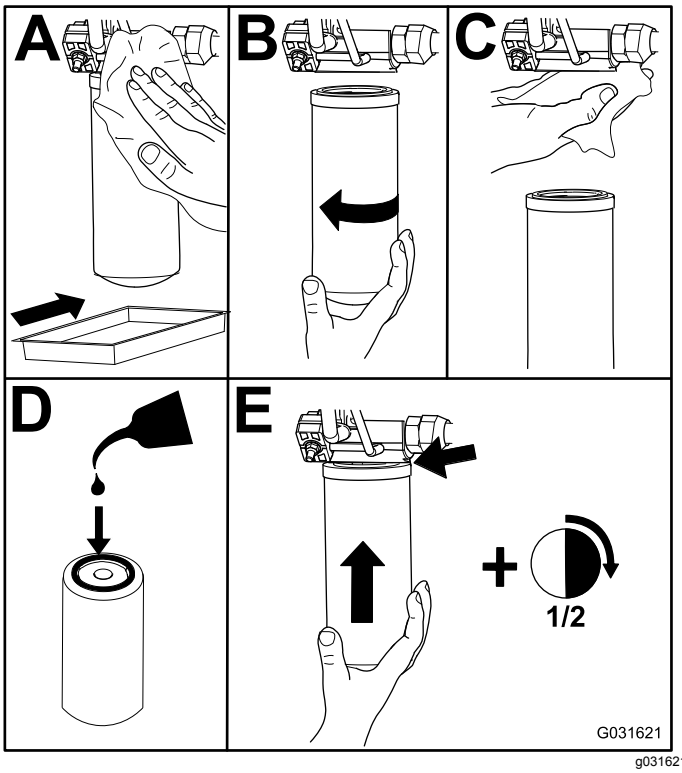
1. Hydraulic-filter restriction indicator

Important: **Use of any other filters may void the warranty on some components.**

1. Position the machine on a level surface, lower the cutting decks, turn the key in the ignition switch to the OFF position, engage the parking brake, and remove the key.
2. Replace both of the hydraulic filters (Figure 78).



g194208



g031621

Figure 78

3. Turn the key in the ignition switch to the ON position, start the engine, and let it run for about 2 minutes to purge air from the system.
4. Turn the key in the ignition switch to the OFF position and check for leaks.

Checking the Hydraulic Lines and Hoses

Service Interval: Before each use or daily

Make all necessary repairs before operating.

⚠ WARNING

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

- **Make sure 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.**
- **Get immediate medical help if fluid is injected into skin.**

Testing the Pressure in the Hydraulic System

The test ports are used to test the pressure in the hydraulic circuits. Contact your authorized Toro distributor for assistance.

Hydraulic Valve Solenoid Functions

Use the list below to identify and describe the different functions of the solenoids in the hydraulic manifold. Each solenoid must be energized to allow function to occur.

Solenoid	Function
PRV2	Front mower circuit
PRV1	Rear mower circuit
PRV	Lift/lower cutting decks
S1	Lower cutting decks
S2	Lower cutting decks

Cutting Deck Maintenance

Separating the Cutting Decks from the Traction Unit

1. Position the machine on a level surface, lower the cutting decks to the floor, turn the key in the ignition switch to the OFF position, and engage the parking brake.
2. Disconnect and remove the hydraulic motor from the deck (Figure 79). Cover the top of the spindle to prevent contamination.

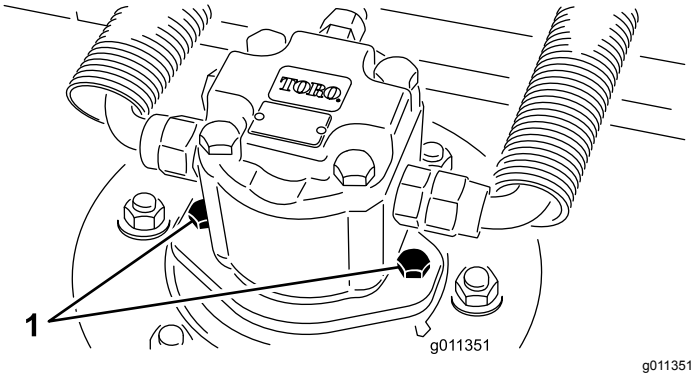


Figure 79

1. Motor-mounting screws

3. Remove the lynch pin securing the deck carrier frame to the lift arm pivot pin (Figure 80).

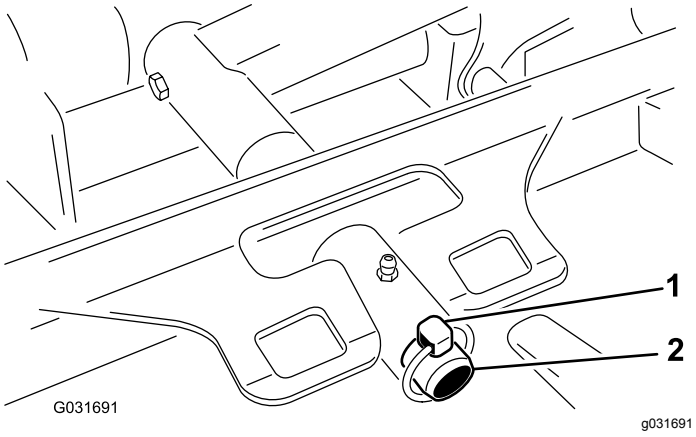


Figure 80

1. Lynch pin
2. Lift-arm pivot pin

4. Roll the cutting deck away from the traction unit.

Mounting the Cutting Decks to the Traction Unit

1. Position the machine on a level surface and turn the key in the ignition switch to the OFF position.
2. Move the cutting deck into position in front of the traction unit.
3. Slide the deck carrier frame onto the lift-arm pivot pin and secure it with the lynch pin (Figure 80).
4. Install the hydraulic motor to the deck (Figure 79). Make sure that the O-ring is in position and not damaged.
5. Grease the spindle.

Blade Maintenance

Blade Safety

⚠ DANGER

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 blade periodically for wear or damage.**
- **Never try to straighten a blade that is bent or weld a broken or cracked blade.**
- **Replace a worn or damaged blade.**

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

Servicing the Blade Plane

The rotary deck comes from the factory preset at 5 cm (2 inches) height of cut and blade rake of 7.9 mm (0.310 inch). The left and right heights are also preset to within ± 0.7 mm (0.030 inch) of the other.

The cutting deck is designed to withstand blade impacts without deformation of the chamber. If a solid object is struck, inspect the blade for damage and the blade plane for accuracy.

Inspecting the Blade Plane

1. Remove the hydraulic motor from the cutting deck and remove the cutting deck from the tractor.
2. Use a hoist (or minimum of 2 people) and place the cutting deck on a flat table.
3. Mark 1 end of the blade with a paint pen or marker. Use this end of the blade to check all heights.
4. Position the cutting edge of the marked end of the blade at 12 o'clock (straight ahead in the direction of mowing) (Figure 81) and measure height from table to cutting edge of blade.

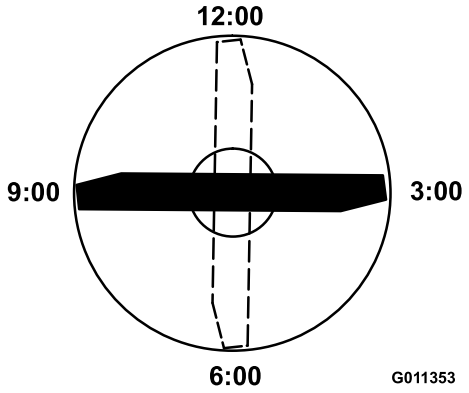


Figure 81

5. Rotate the marked end of the blade to the 3 and 9 o'clock positions (Figure 81) and measure the heights.
6. Compare the 12 o'clock measured height to the height-of-cut setting. It should be within 0.7 mm (0.030 inch). The 3 and 9 o'clock heights should be 1.6 to 6.0 mm (0.06 to 0.24 inch) higher than the 12 o'clock setting and within 1.6 to 6.0 mm (0.06 to 0.24 inch) of each other.

Note: If any of these measurements are not within specification, proceed to Adjusting the Blade Plane (page 60).

Adjusting the Blade Plane

Start with the front adjustment (change 1 bracket at a time).

1. Remove the height-of-cut bracket (front, left, or right) from the deck frame (Figure 82).
2. Adjust 1.5 mm (0.060 inch) shims and/or 0.7 mm (0.030 inch) shim between the deck frame and bracket to achieve the desired height setting (Figure 82).

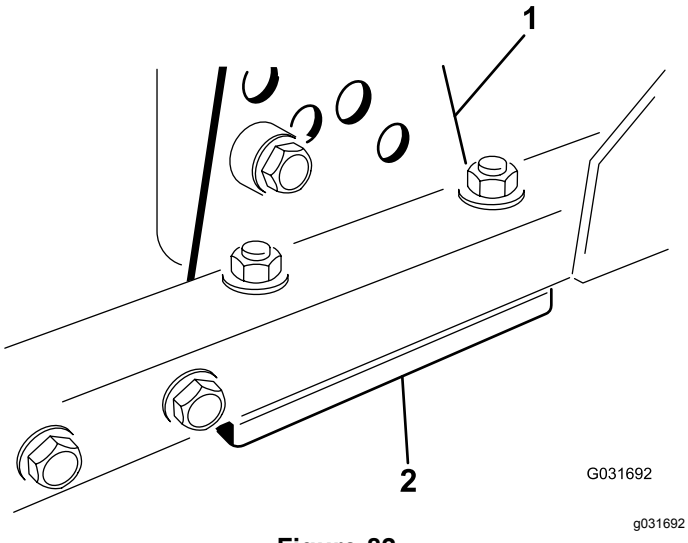


Figure 82

1. Height-of-cut bracket
2. Shims

3. Install the height-of-cut bracket to the deck frame with the remaining shims assembled below the height-of-cut bracket.
4. Secure the socket-head bolt/spacer and flange nut.

   Note: Socket-head bolt/spacer are held together with thread-locking adhesive to prevent the spacer from falling inside the deck frame.
5. Verify the 12 o'clock height and adjust if needed.
6. Determine if only 1 or both (right and left) height-of-cut brackets need to be adjusted. If the 3 or 9 o'clock side is 1.6 to 6.0 mm (0.06 to 0.24 inch) higher than the new front height then no adjustment is needed for that side. Adjust the other side to within 1.6 to 6.0 mm (0.06 to 0.24 inch) of the correct side.
7. Adjust the right and/or left height-of-cut brackets by repeating steps 1 through 3.
8. Secure the carriage bolts and flange nuts.
9. Again, verify the 12, 3, and 9 o'clock heights.

Removing and Installing a Blade

Replace the blade if a solid object is hit, the blade is out of balance, or if the blade is bent. Always use genuine Toro replacement blades to be sure of safety and optimum performance. Never use replacement blades made by other manufacturers because they could be dangerous.

1. Raise the cutting deck to the highest position, turn the key in the ignition switch to the OFF position, and engage the parking brake. Block the cutting deck to prevent it from falling accidentally.
2. Grasp the end of the blade using a rag or thickly padded glove. Remove the blade bolt, anti-scalp cup, and blade from the spindle shaft (Figure 83).

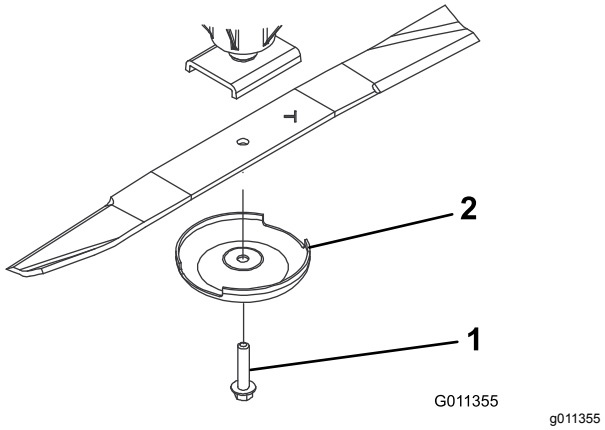


Figure 83

1. Blade bolt
2. Anti-scalp cup

3. Install the blade, sail facing toward the cutting deck, with the anti-scalp cup and blade bolt (Figure 83). Tighten the blade bolt to 115 to 149 N·m (85 to 110 ft-lb).

Inspecting and Sharpening the Blade

1. Raise the cutting deck to the highest position, turn the key in the ignition switch to the OFF position, and engage the parking brake.
2. Block the cutting deck to prevent it from falling accidentally.
3. Examine the cutting ends of the blade carefully, especially where the flat and curved parts of the blade meet (Figure 84).

   Note: Since sand and abrasive material can wear away the metal that connects the flat and curved parts of the blade, check the blade before using the machine.
4. If wear is noticed (Figure 84), replace the blade; refer to Removing and Installing a Blade (page 61).

⚠ DANGER

If the blade is allowed to wear, a slot will form between the sail and flat part of the blade (Figure 83). Eventually a piece of the blade may break off and be thrown from under the housing, possibly resulting in serious injury to yourself or bystanders.

- **Inspect the blade periodically for wear or damage.**
- **Always replace a worn or damaged blade.**

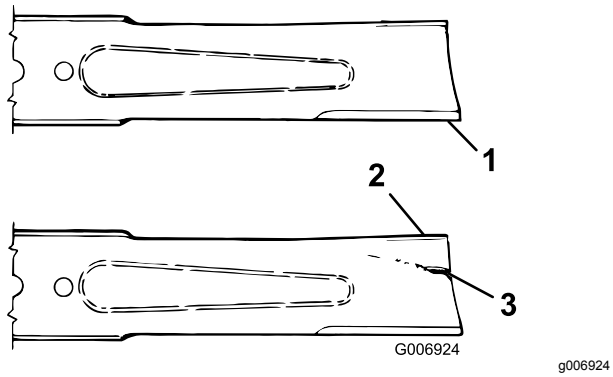


Figure 84

1. Cutting edge
2. Sail
3. Wear/slot/crack

5. Inspect the cutting edges of all blades. Sharpen the cutting edges if they are dull or nicked. Sharpen only the top of the cutting edge and maintain the original cutting angle to make sure that it is sharp (Figure 85).
6. If dull or nicked, sharpen only the top cutting edge while maintaining the original cutting angle (Figure 85).

   Note: The blade will remain balanced if the same amount of metal is removed from both cutting edges.

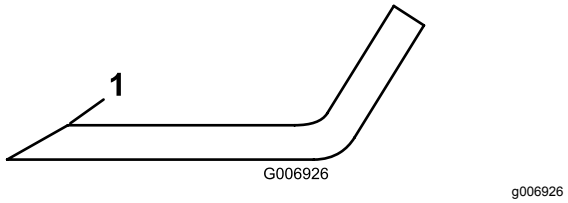


Figure 85

1. Sharpen at this angle only

7. To check the blade for being straight and parallel, lay the blade on a level surface and check its ends.

   Note: Position the ends of the blade slightly lower than the center, and the cutting edge lower than the heel of the blade. This blade produces a good quality of cut and requires minimal power from the engine. By contrast a blade that is higher at the ends than the center, or if cutting edge is higher than the heel, the blade is bent or warped and must be replaced.
8. Install the blade, sail facing toward cutting deck, with the anti-scalp cup and blade bolt. Torque the blade bolt to 115 to 149 N·m (85 to 110 ft-lb).

Miscellaneous Maintenance

Servicing the Front Roller

Inspect the front roller for wear, excess wobble, or binding. Service or replace the roller or components if any of these conditions exist.

Disassembling the Front Roller

1. Remove the roller-mounting bolt (Figure 86).
2. Insert a punch through the end of the roller housing and drive the opposite bearing out by alternating taps to the opposite side of inner bearing race. There should be a 1.5 mm (0.060 inch) lip of inner race exposed.

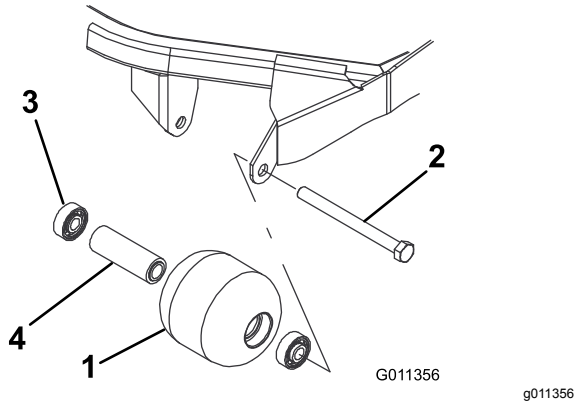


Figure 86

1. Front roller
2. Mounting bolt
3. Bearing
4. Bearing spacer

3. Push the second bearing out in press.
4. Inspect the roller housing, bearings, and bearing spacer for damage (Figure 86).
5. Replace damaged components and assemble.

Assembling the Front Roller

1. Press the first bearing into the roller housing (Figure 86). Press on the outer race only or equally on the inner and outer race.
2. Insert the spacer (Figure 86).
3. Press the second bearing into the roller housing (Figure 86) pressing equally on the inner and outer race until the inner race comes in contact with the spacer.
4. Install the roller assembly into the deck frame.

   Important: **Securing the roller assembly with a gap larger than 1.5 mm (0.060 inch) creates a side load on the bearing and can lead to premature bearing failure.**

5. Verify that there is no more than a 1.5 mm (0.060 inch) gap between roller assembly and the roller mount brackets of the deck frame. If there is a gap over 1.5 mm (0.060 inch), install enough 5/8-inch diameter washers to take up the slop.
6. Torque the mounting bolt to 108 N·m (80 ft-lb).

Storage

Preparing the Machine for Storage

Preparing the Traction Unit

1. Thoroughly clean the traction unit, cutting decks, and engine.
2. Check the tire pressure. Inflate all traction unit tires to 83 to 103 kPa (12 to 15 psi).
3. Check all fasteners for looseness and tighten them as necessary.
4. Grease all grease fittings and pivot points. Wipe up any excess lubricant.
5. Lightly sand and use touch-up paint on painted areas that are scratched, chipped, or rusted. Repair any dents in the metal body.
6. Service the battery and cables as follows:
   A. Remove the battery terminals from the battery posts.

      Note: Always disconnect the negative terminal first and the positive last. Always connect the positive terminal first and the negative last.

   B. Clean the battery, terminals, and posts with a wire brush and baking soda solution.
   C. Coat the cable terminals and battery posts with Grafo 112X skin-over grease (Toro Part Number 505-47) or petroleum jelly to prevent corrosion.
   D. Slowly recharge the battery every 60 days for 24 hours to prevent lead sulfation of the battery.

Preparing the Engine

1. Drain the engine oil from the oil pan and replace the drain plug.
2. Remove and discard the oil filter. Install a new oil filter.
3. Refill the oil pan with designated quantity of motor oil.
4. Turn the key in the ignition switch to the ON position, start the engine, and run it at idle speed for approximately 2 minutes.
5. Turn the key in the ignition switch to the OFF position.
6. Thoroughly drain all fuel from the fuel tank, lines, and the fuel filter/water separator assembly.
7. Flush the fuel tank with fresh, clean diesel fuel.
8. Secure all fuel system fittings.
9. Thoroughly clean and service the air cleaner assembly.
10. Seal the air cleaner inlet and the exhaust outlet with weatherproof tape.
11. Check the antifreeze protection and add as needed for expected minimum temperature in your area.

Storing the Cutting Deck

If the cutting deck is separated from the traction unit for any length of time, install a spindle plug in the top of the spindle to protect the spindle from dust and water.

Notes:

Notes:

European Privacy Notice

The Information Toro Collects
Toro Warranty Company (Toro) respects your privacy. In order to process your warranty claim and contact you in the event of a product recall, we ask you to share certain personal information with us, either directly or through your local Toro company or dealer.

The Toro warranty system is hosted on servers located within the United States where privacy law may not provide the same protection as applies in your country.

BY SHARING YOUR PERSONAL INFORMATION WITH US, YOU ARE CONSENTING TO THE PROCESSING OF YOUR PERSONAL INFORMATION AS DESCRIBED IN THIS PRIVACY NOTICE.

The Way Toro Uses Information
Toro may use your personal information to process warranty claims, to contact you in the event of a product recall and for any other purpose which we tell you about. Toro may share your information with Toro's affiliates, dealers or other business partners in connection with any of these activities. We will not sell your personal information to any other company. We reserve the right to disclose personal information in order to comply with applicable laws and with requests by the appropriate authorities, to operate our systems properly or for our own protection or that of other users.

Retention of your Personal Information
We will keep your personal information as long as we need it for the purposes for which it was originally collected or for other legitimate purposes (such as regulatory compliance), or as required by applicable law.

Toro's Commitment to Security of Your Personal Information
We take reasonable precautions in order to protect the security of your personal information. We also take steps to maintain the accuracy and current status of personal information.

Access and Correction of your Personal Information
If you would like to review or correct your personal information, please contact us by email at legal@toro.com.

Australian Consumer Law

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

The Toro Warranty

A Two-Year Limited Warranty

Conditions and Products Covered

The Toro Company and its affiliate, Toro Warranty Company, pursuant to an agreement between them, jointly warrant your Toro Commercial product ("Product") to be free from defects in materials or workmanship for two years or 1500 operational hours*, whichever occurs first. This warranty is applicable to all products with the exception of Aerators (refer to separate warranty statements for these products). Where a warrantable condition exists, we will repair the Product at no cost to you including diagnostics, labor, parts, and transportation. This warranty begins on the date the Product is delivered to the original retail purchaser.
* Product equipped with an hour meter.

Instructions for Obtaining Warranty Service

You are responsible for notifying the Commercial Products Distributor or Authorized Commercial Products Dealer from whom you purchased the Product as soon as you believe a warrantable condition exists. If you need help locating a Commercial Products Distributor or Authorized Dealer, or if you have questions regarding your warranty rights or responsibilities, you may contact us at:

Toro Commercial Products Service Department
Toro Warranty Company
8111 Lyndale Avenue South
Bloomington, MN 55420-1196

952–888–8801 or 800–952–2740
E-mail: commercial.warranty@toro.com

Owner Responsibilities

As the Product owner, you are responsible for required maintenance and adjustments stated in your *Operator's Manual*. Failure to perform required maintenance and adjustments can be grounds for disallowing a warranty claim.

Items and Conditions Not Covered

Not all product failures or malfunctions that occur during the warranty period are defects in materials or workmanship. This warranty does not cover the following:

- Product failures which result from the use of non-Toro replacement parts, or from installation and use of add-on, or modified non-Toro branded accessories and products. A separate warranty may be provided by the manufacturer of these items.
- Product failures which result from failure to perform recommended maintenance and/or adjustments. Failure to properly maintain your Toro product per the Recommended Maintenance listed in the *Operator's Manual* can result in claims for warranty being denied.
- Product failures which result from operating the Product in an abusive, negligent, or reckless manner.
- Parts subject to consumption through use unless found to be defective. Examples of parts which are consumed, or used up, during normal Product operation include, but are not limited to, brake pads and linings, clutch linings, blades, reels, rollers and bearings (sealed or greasable), bed knives, spark plugs, castor wheels and bearings, tires, filters, belts, and certain sprayer components such as diaphragms, nozzles, and check valves, etc.
- Failures caused by outside influence. Conditions considered to be outside influence include, but are not limited to, weather, storage practices, contamination, use of unapproved fuels, coolants, lubricants, additives, fertilizers, water, or chemicals, etc.
- Failure or performance issues due to the use of fuels (e.g. gasoline, diesel, or biodiesel) that do not conform to their respective industry standards.
- Normal noise, vibration, wear and tear, and deterioration.
- Normal "wear and tear" includes, but is not limited to, damage to seats due to wear or abrasion, worn painted surfaces, scratched decals or windows, etc.

Parts

Parts scheduled for replacement as required maintenance are warranted for the period of time up to the scheduled replacement time for that part. Parts replaced under this warranty are covered for the duration of the original product warranty and become the property of Toro. Toro will make the final decision whether to repair any existing part or assembly or replace it. Toro may use remanufactured parts for warranty repairs.

Deep Cycle and Lithium-Ion Battery Warranty:

Deep cycle and Lithium-Ion batteries have a specified total number of kilowatt-hours they can deliver during their lifetime. Operating, recharging, and maintenance techniques can extend or reduce total battery life. As the batteries in this product are consumed, the amount of useful work between charging intervals will slowly decrease until the battery is completely worn out. Replacement of worn out batteries, due to normal consumption, is the responsibility of the product owner. Battery replacement may be required during the normal product warranty period at owner's expense. Note: (Lithium-Ion battery only): A Lithium-Ion battery has a part only prorated warranty beginning year 3 through year 5 based on the time in service and kilowatt hours used. Refer to the *Operator's Manual* for additional information.

Maintenance is at Owner's Expense

Engine tune-up, lubrication, cleaning and polishing, replacement of filters, coolant, and completing recommended maintenance are some of the normal services Toro products require that are at the owner's expense.

General Conditions

Repair by an Authorized Toro Distributor or Dealer is your sole remedy under this warranty.

Neither The Toro Company nor Toro Warranty Company is liable for indirect, incidental or consequential damages in connection with the use of the Toro Products covered by this warranty, including any cost or expense of providing substitute equipment or service during reasonable periods of malfunction or non-use pending completion of repairs under this warranty. Except for the Emissions warranty referenced below, if applicable, there is no other express warranty. All implied warranties of merchantability and fitness for use are limited to the duration of this express warranty.

Some states do not allow exclusions of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above exclusions and limitations may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Note regarding engine warranty:

The Emissions Control System on your Product may be covered by a separate warranty meeting requirements established by the U.S. Environmental Protection Agency (EPA) and/or the California Air Resources Board (CARB). The hour limitations set forth above do not apply to the Emissions Control System Warranty. Refer to the Engine Emission Control Warranty Statement supplied with your product or contained in the engine manufacturer's documentation for details

Countries Other than the United States or Canada

Customers who have purchased Toro products exported from the United States or Canada should contact their Toro Distributor (Dealer) to obtain guarantee policies for your country, province, or state. If for any reason you are dissatisfied with your Distributor's service or have difficulty obtaining guarantee information, contact the Toro importer.

374-0253 Rev D