Form No. 3403-582 Rev B

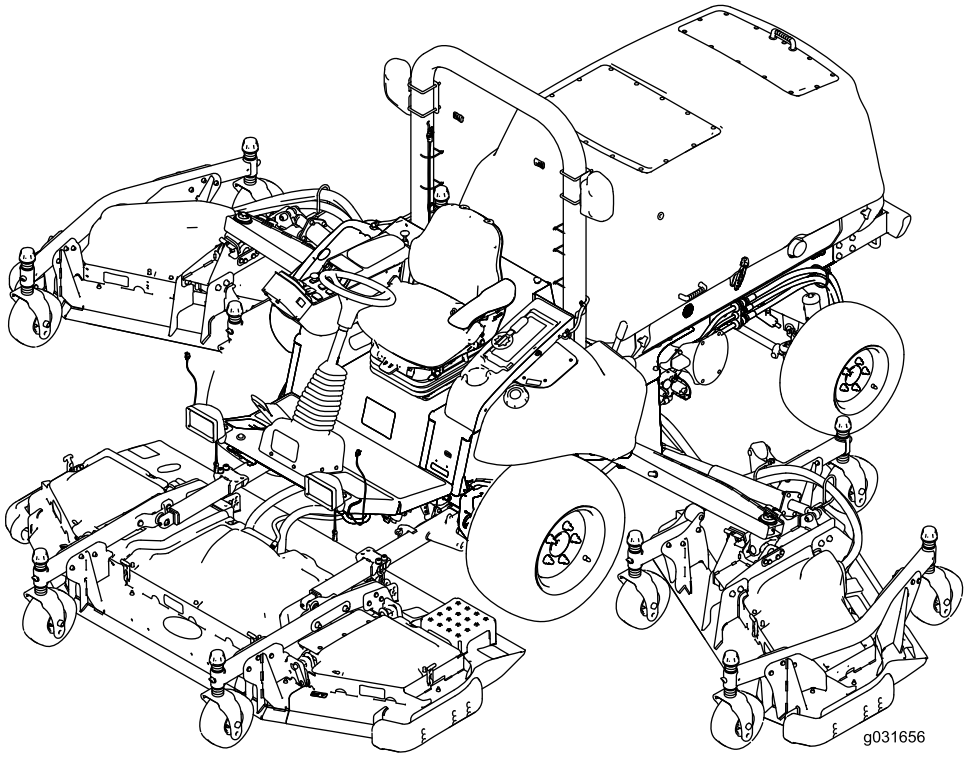
TORO®

Count on it.

Operator's Manual

Groundsmaster® 5900 and 5910 Rotary Mower

Model No. 31698—Serial No. 316000001 and Up
Model No. 31699—Serial No. 316000001 and Up



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

CE

3403-582 B

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

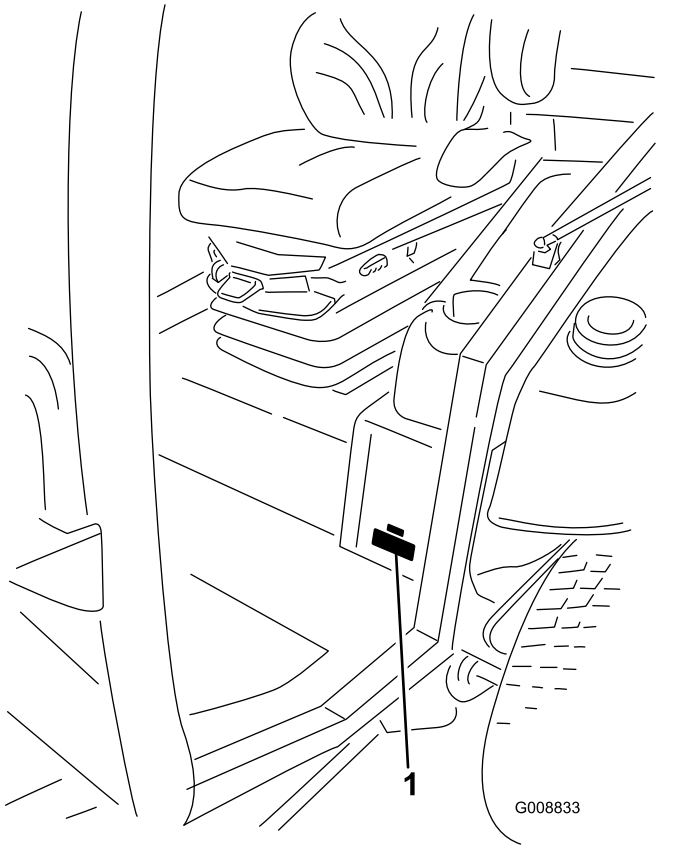
⚠ WARNING

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.



g008833

Figure 1

1. Model and serial number location

Introduction

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

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

You may contact Toro directly at www.Toro.com for product safety and operation training materials, accessory information, help finding a dealer, or to register your product.

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

Model No. _____

Serial No. _____

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



g000502

Figure 2

1. Safety-alert symbol

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

© 2017—The Toro® Company
8111 Lyndale Avenue South
Bloomington, MN 55420

Contact us at www.Toro.com.
Printed in the USA
All Rights Reserved

Contents

Safety 4
General Safety 4
Sound Power Level 4
Sound Pressure Level 5
Vibration Level 5
Engine-Emission Certification 5
Safety and Instructional Decals 6
Setup 17
1 Removing the Wing-Deck-Shipping Straps and Braces 17
2 Lowering the Front-Deck Winglets 17
3 Checking the Tire and Caster Wheel Pressure 19
4 Leveling the Front, Center Deck 19
5 Leveling the Winglet Decks to the Front, Center Deck 19
6 Checking the Fluid Levels 20
7 Greasing the Machine 20
Product Overview 21
Controls 22
Cab Controls 23
InfoCenter Control 24
Specifications 34
Attachments/Accessories 34
Before Operation 35
Before Operation Safety 35
Checking the Engine-Oil Level 36
Checking the Cooling Systems 36
Checking the Hydraulic System 36
Filling the Fuel Tank 36
Checking the Tire Pressure 37
Checking the Caster Wheel Tire Pressure 37
Checking the Torque of the Wheel-Lug Nuts 38
Adjusting the Height of Cut 38
Adjusting the Skids 40
Adjusting the Mower Deck Anti-Scalp Rollers 41
Checking a Mismatch Between Mower Decks 42
Adjusting the Mirrors 44
Aiming the Headlights 44
Checking the Safety-Interlock Switches 44
Checking the Blade Stopping Time 45
During Operation 45
During Operation Safety 45
Starting and Stopping the Engine 46
Raising or Lowering the Decks 47
Cutting Grass with the Machine 47
Diesel Particulate Filter Regeneration 48
Understanding the Operating Characteristics of the Machine 56
Understanding the 12 V and 24 V Electrical Systems 56
Automatic Reversing-Fan Cycle 56
Operating Tips 57
After Operation 58
After Operation Safety 58
Pushing or Towing the Machine 58
Identifying the Tie-Down Points 59
Hauling the Machine 59
Maintenance 60
Recommended Maintenance Schedule(s) 60
Daily Maintenance Checklist 61
Service-Interval Chart 63
Pre-Maintenance Procedures 64
Pre-Maintenance Safety 64
Using the Battery-Disconnect Switch 64
Raising the Machine 65
Removing and Installing the Inner-Wing-Deck Covers 65
Lubrication 66
Greasing the Bearings and Bushings 66
Engine Maintenance 69
Engine Safety 69
Servicing the Air Cleaner 69
Servicing the Engine Oil 71
Adjusting the Engine-Valve Clearance 73
Cleaning the Engine EGR Cooler 73
Inspecting the Engine Crankcase-Breather System 73
Checking and Replacing Fuel Hoses and Engine-Coolant Hoses 73
Lapping or Adjusting the Engine Intake and Exhaust Valves 73
Inspecting and Cleaning Engine-Emission-Control Components and Turbocharger 74
Servicing the Diesel-Oxidation Catalyst (DOC) and the Soot Filter 74
Fuel System Maintenance 75
Servicing the Fuel System 75
Servicing the Water Separator 75
Replacing the Fuel Filter Element 76
Electrical System Maintenance 76
Electrical System Safety 76
Locating the Fuses 76
Checking the Condition of the Batteries 78
Charging the Batteries 78
Jump-Starting the Machine 79
Drive System Maintenance 80
Calibrating the Traction Pedal 80
Adjusting the Traction-Pedal Angle 80
Checking the Rear Wheel Toe-In 80
Cooling System Maintenance 81
Cooling System Safety 81
Checking the Engine-Cooling System 81
Cleaning the Cooling Systems 82
Changing the Engine-Cooling-System Fluid 83
Belt Maintenance 84
Servicing the 12 V Alternator Belt 84

Servicing the 24 V Alternator Belt and AC Compressor Belt 84
Replacing the Blade-Drive Belts 84
Hydraulic System Maintenance 86
Hydraulic System Safety 86
Checking the Hydraulic Fluid 86
Changing the Hydraulic Fluid and Filters 87
Checking the Hydraulic Lines and Hoses 88
Inspecting the Hydraulic System Test Ports 88
Mower Maintenance 89
Pivoting (Tilting) the Front Mower Deck Upright 89
Pivoting (Tilting) the Front Mower Deck Down 90
Adjusting the Mower-Deck Pitch 90
Servicing the Caster-Arm Bushings 91
Servicing the Caster Wheels and Bearings 91
Blade Maintenance 92
Blade Safety 92
Checking for a Bent Blade 92
Removing and Installing a Blade 92
Inspecting and Sharpening a Blade 93
Correcting a Mower-Deck Mismatch 93
Cab Maintenance 94
Cleaning the Cab 94
Cleaning the Cab Air Filters 94
Cleaning the Air-Conditioning-Condenser Coil 95
Storage 95
Preparing the Machine for Storage 95

Safety

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

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 you start the engine. Ensure that everyone using this product knows how to use it and understands the warnings.
- 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 a safe distance 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 items of safety information in their respective sections throughout this manual.

Sound Power Level

Model 31698

This unit has a guaranteed sound power level of 105 dBA, which includes an Uncertainty Value (K) of 1.0 dBA.

Sound power level was determined according to the procedures outlined in ISO 11094.

Model 31699

This unit has a guaranteed sound power level of 105 dBA, which includes an Uncertainty Value (K) of 1.0 dBA.

Sound power level was determined according to the procedures outlined in ISO 11094.

Sound Pressure Level

Model 31698

This unit has a sound pressure level at the operator's ear of 90 dBA, which includes an Uncertainty Value (K) of 1.0 dBA.

Sound pressure level was determined according to the procedures outlined in EN ISO 5395:2013.

Model 31699

This unit has a sound pressure level at the operator's ear of 82 dBA, which includes an Uncertainty Value (K) of 1.0 dBA.

Sound pressure level was determined according to the procedures outlined in EN ISO 5395:2013.

⚠ CAUTION

Long-term exposure to noise while operating the machine may cause some hearing loss.

Wear adequate hearing protection whenever you operate the machine for an extended period of time.

Vibration Level

Hand-Arm

Model 31698

Measured vibration level for right hand = 0.8 m/s^2

Measured vibration level for left hand = 1.0 m/s^2

Uncertainty Value (K) = 0.5 m/s^2

Measured values were determined according to the procedures outlined in EN ISO 5395:2013.

Model 31699

Measured vibration level for right hand = 0.8 m/s^2

Measured vibration level for left hand = 1.0 m/s^2

Uncertainty Value (K) = 0.5 m/s^2

Measured values were determined according to the procedures outlined in EN ISO 5395:2013.

Whole Body

Model 31698

Measured vibration level = 0.35 m/s^2

Uncertainty Value (K) = 0.18 m/s^2

Measured values were determined according to the procedures outlined in EN ISO 5395:2013.

Model 31699

Measured vibration level = 0.35 m/s^2

Uncertainty Value (K) = 0.18 m/s^2

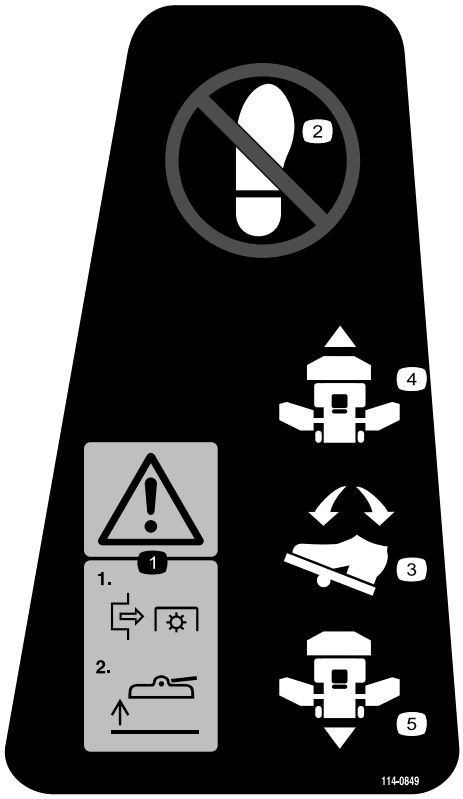
Measured values were determined according to the procedures outlined in EN ISO 5395:2013.

Engine-Emission Certification

The engine in this machine is EPA Tier 4 Final and EU Stage 3b emissions compliant.

Safety and Instructional Decals

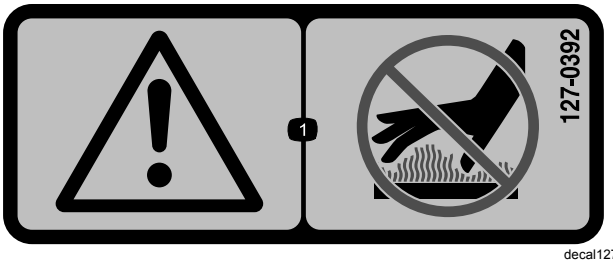
Safety decals and instructions are easily visible to the operator and are located near any area of potential danger. Replace any decal that is damaged or lost.



decal114-0849

114-0849

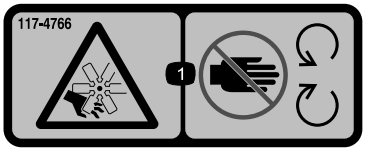
1. Warning—disengage the PTO then raise the deck.
2. No step
3. Traction-control pedal
4. Forward
5. Reverse



decal127-0392

127-0392

1. Warning—keep away from hot surfaces.



decal117-4766

117-4766

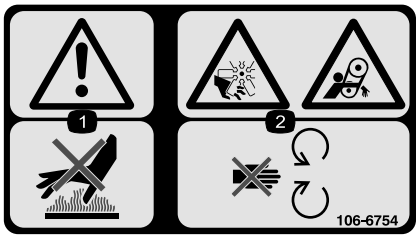
1. Cutting/dismemberment hazard, fan—stay away from moving parts; keep all guards and shields in place.



decal117-3276

117-3276

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



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.

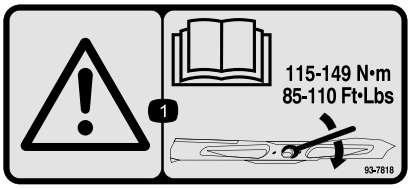


decal130-0594

130-0594

Model with Cab Only

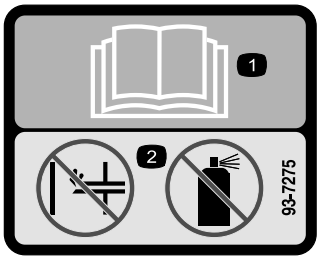
1. Warning—read the *Operator's Manual*; when sitting in the cab, always wear a seat belt; wear hearing protection.



decal93-7818

93-7818

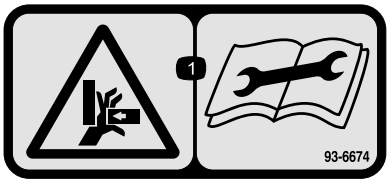
1. Warning—read the *Operator's Manual* for instructions on torquing the blade bolt/nut to 115 to 149 N·m (85 to 110 ft-lb).



decal93-7275

93-7275

1. Read the *Operator's Manual*—do not use starting fluid to start the engine.



decal93-6674

93-6674

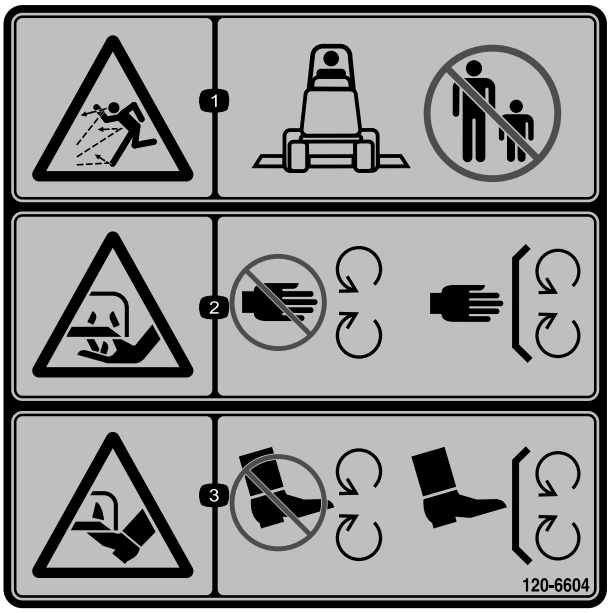
1. Crushing hazard, hand—read the instructions before servicing or performing maintenance.



decal93-6687

93-6687

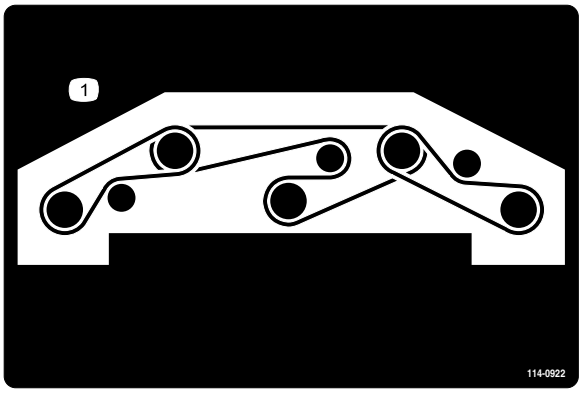
1. Do not step here.



decal120-6604

120-6604

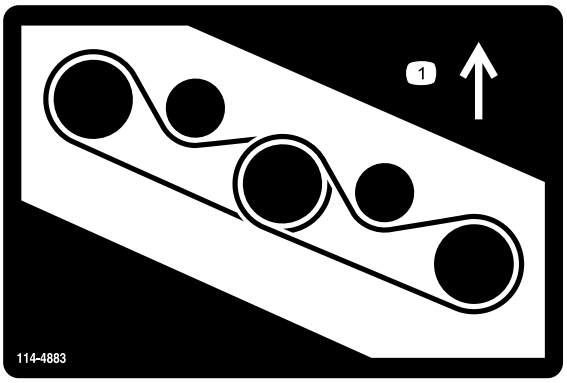
1. Thrown object hazard—keep bystanders away from the machine.
2. Cutting/dismemberment hazard of hand, mower blade—stay away from moving parts; keep all guards and shields in place.
3. Cutting/dismemberment hazard of foot, mower blade—stay away from moving parts; keep all guards and shields in place.



decal114-0922

114-0922

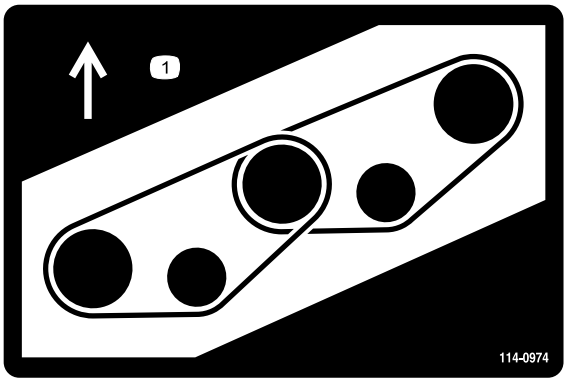
1. Belt routing



decal114-4883

114-4883

1. Belt routing



decal114-0974

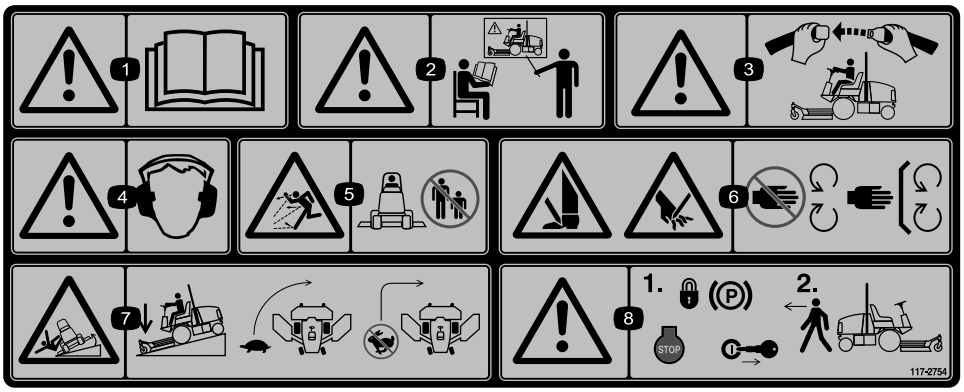
114-0974

1. Belt routing



decal117-2718

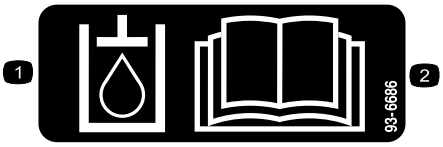
117-2718



decal117-2754

117-2754

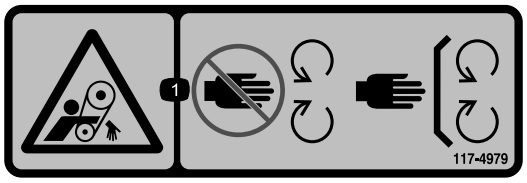
1. Warning—read the *Operator's Manual.*
2. Warning—do not operate this machine unless you are trained.
3. Warning—wear the seat belt when seated in the operator's position.
4. Warning—wear hearing protection.
5. Thrown object hazard—keep bystanders a safe distance from the machine.
6. Cutting hazard of hand or foot—stay away from moving parts; keep all guards in place.
7. Tipping hazard—lower the cutting unit when driving down slopes; slow machine before turning; do not turn at high speeds
8. Warning—set the parking brake, stop the engine, and remove the ignition key before leaving the machine.



decal93-6686

93-6686

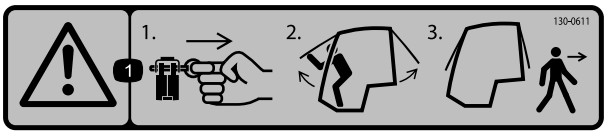
1. Hydraulic oil
2. Read the *Operator's Manual.*



decal117-4979

117-4979

1. Entanglement hazard, belt—stay away from moving parts; keep all guards and shields in place.



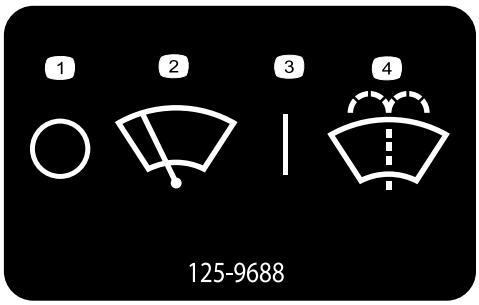
decal130-0611

130-0611

Model with Cab Only

1. Warning—1) Remove the pin; 2) Raise the doors; 3) Exit the cab

---



decal125-9688

125-9688

Model with Cab Only

1. Windshield wipers—off
2. Windshield wipers
3. Windshield wipers—on
4. Spray windshield washer fluid

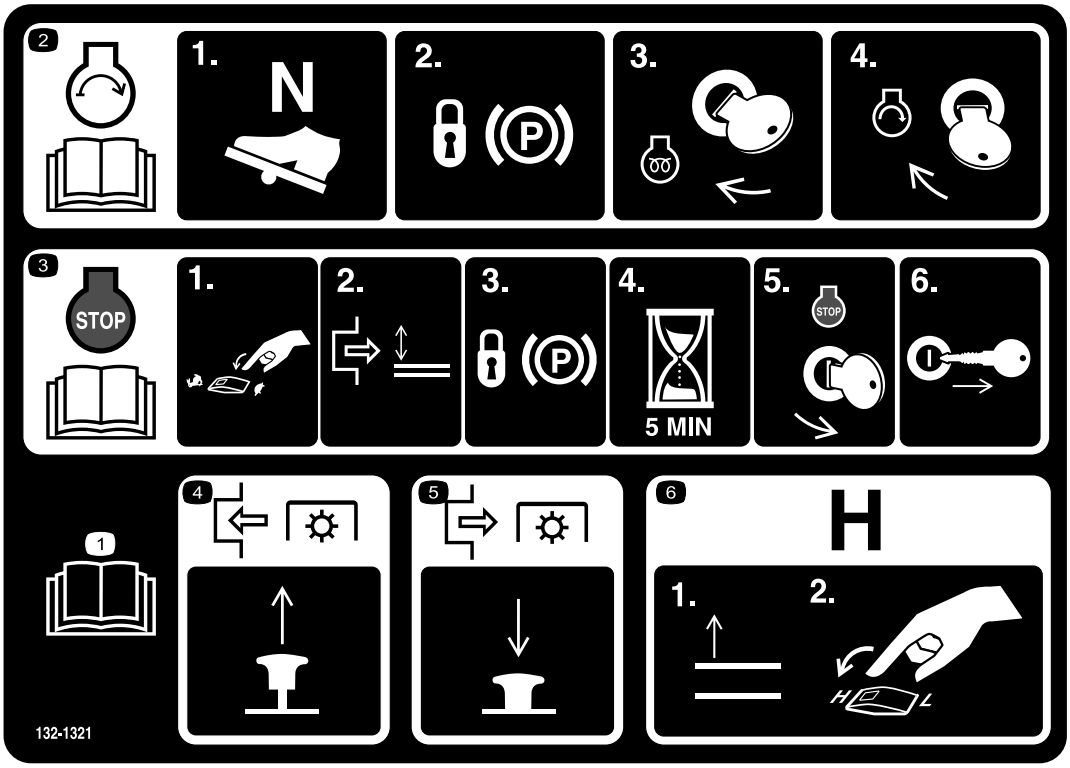


decalbatterysymbols

Battery Symbols

Some or all of these symbols are on your battery.

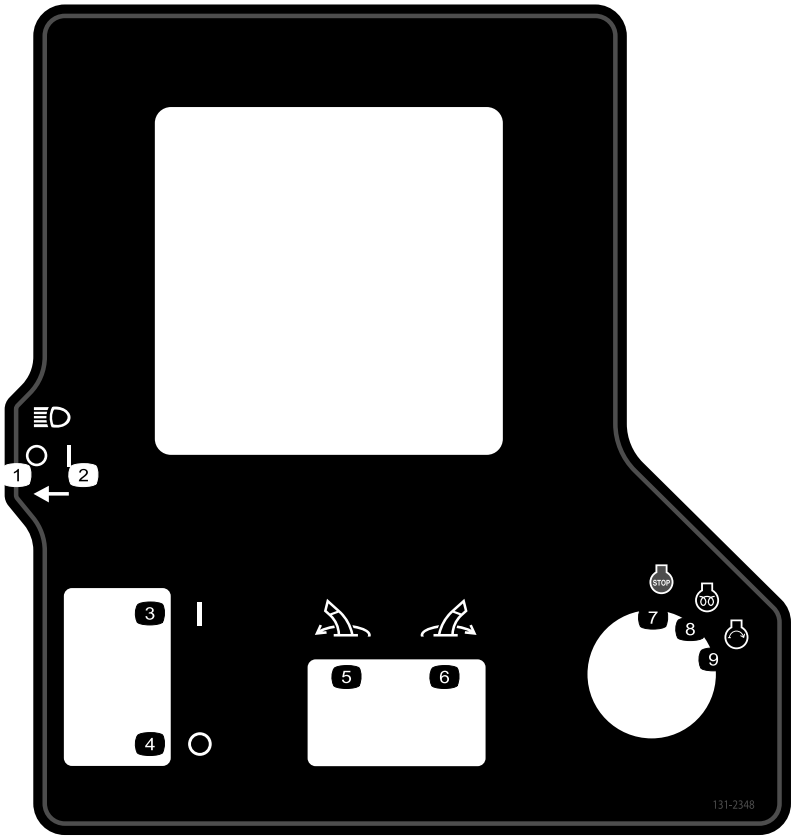
1. Explosion hazard
2. No fire, open flame, or smoking
3. Caustic liquid/chemical burn hazard
4. Wear eye protection.
5. Read the *Operator's Manual.*
6. Keep bystanders a safe distance from the battery.
7. Wear eye protection; explosive gases can cause blindness and other injuries.
8. Battery acid can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



decal132-1321

132-1321

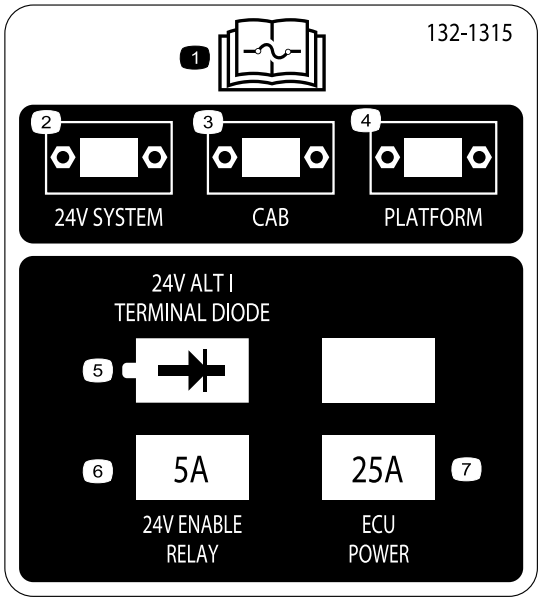
1. Read the *Operator's Manual*.
2. To start the engine: 1) Put the traction pedal in neutral; 2) Set the parking brake; 3) Turn the key to the run position; 4) Turn the key to the engine start position.
3. To shut off the engine: 1) Move the throttle switch to slow; 2) Disengage the PTO; 3) Set the parking brake; 4) Wait 5 minutes; 5) Turn the ignition key to Stop; and 6) Remove the key.
4. To engage the PTO, pull up the knob.
5. To disengage the PTO, push down the knob.
6. To switch the transmission to high speed, fully raise the attachments and switch the speed control to the HIGH position.



decal131-2348

131-2348

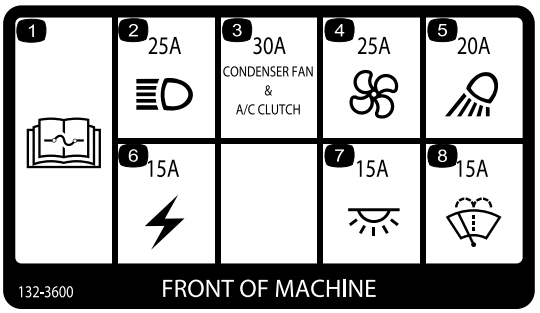
1. Headlights—off
2. Headlights—on
3. Parking brake—on
4. Parking brake—off
5. Pivot the attachment left.
6. Pivot the attachment right.
7. Engine—stop
8. Engine—run, electric preheat
9. Engine—start



decal132-1315

132-1315

1. Read the *Operator's Manual* for more information on fuses.
2. 24V system
3. Cab
4. Platform
5. 24V alt/terminal diode
6. 24V enable relay—5 A
7. ECU power—25 A

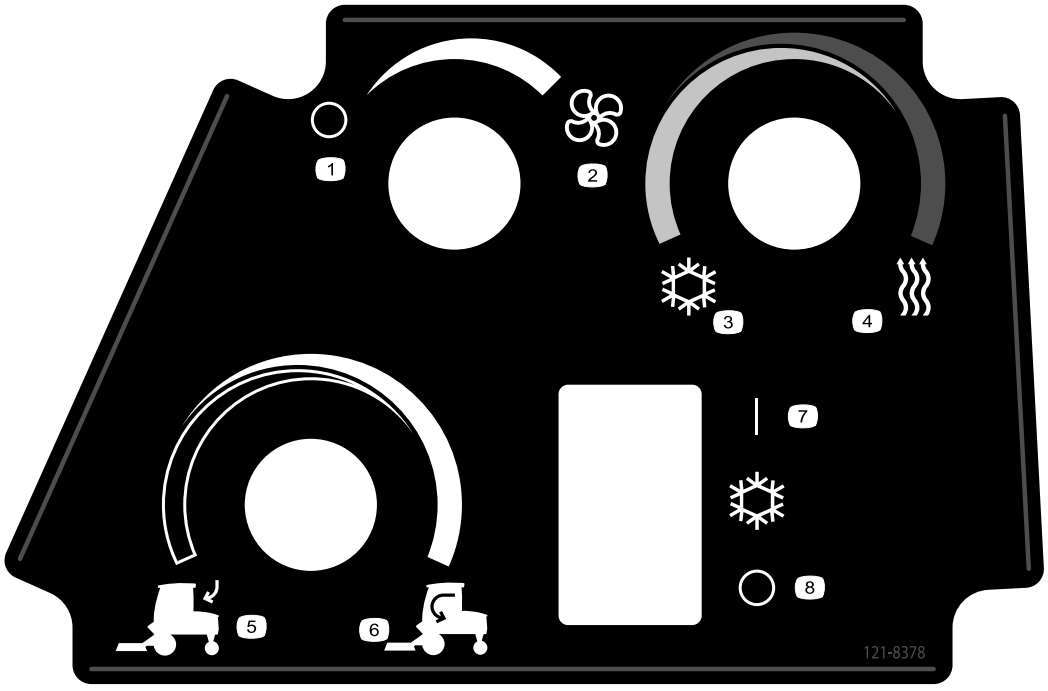


decal132-3600

132-3600

Model with Cab Only

1. Read the *Operator's Manual* for more information on fuses.
2. Headlight—25 A
3. Condenser fan and A/C clutch—30 A
4. Fan—25 A
5. Working light—20 A
6. Auxiliary power—15 A
7. Cab light—15 A
8. Windshield wipers—15 A

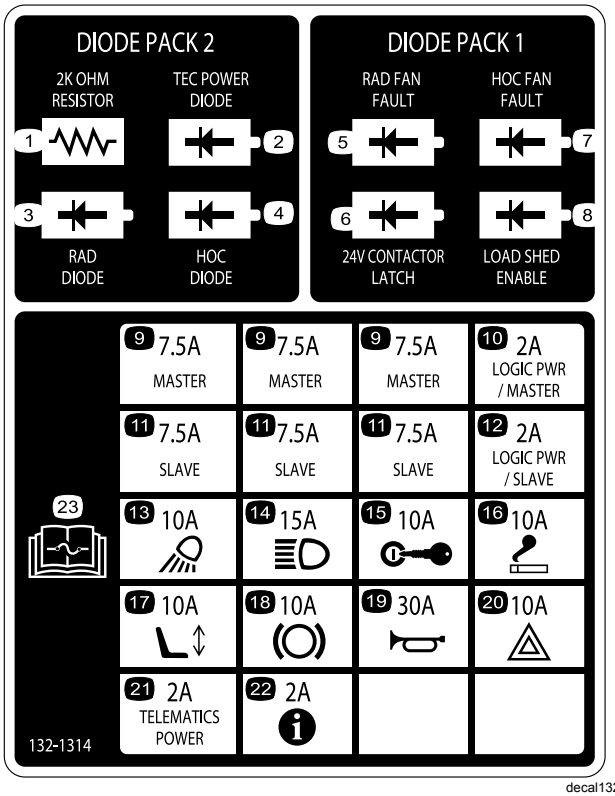


decal121-8378

121-8378

Model with Cab Only

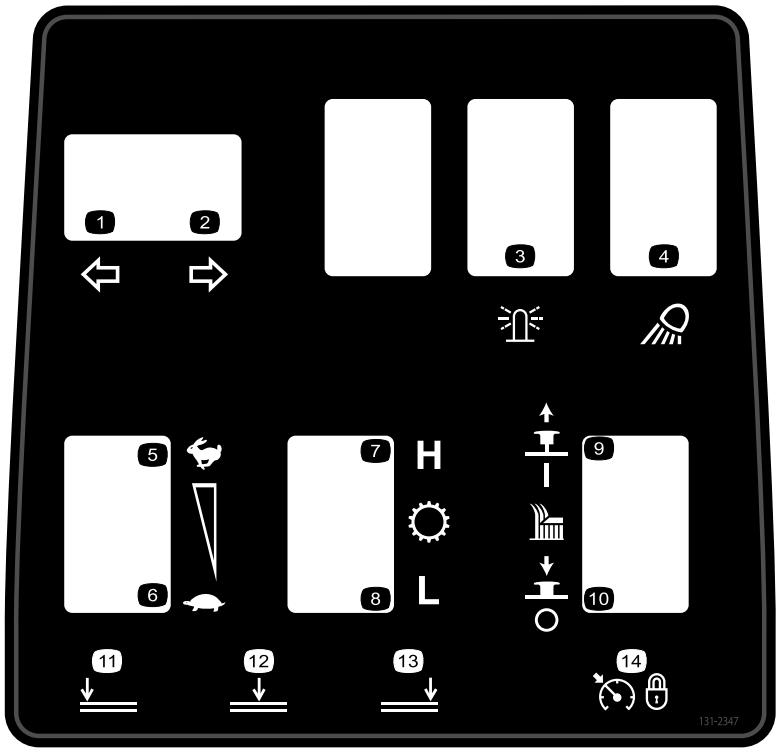
1. Fan—off
2. Fan—on full
3. Cold air
4. Hot air
5. External air
6. Internal air
7. Air conditioner—on
8. Air conditioner—off



decal132-1314

132-1314

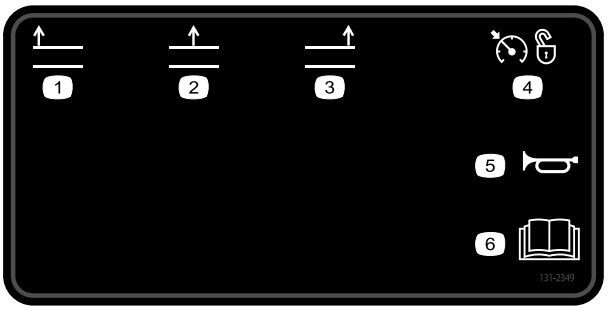
1. Resistor (2k Ohm)
2. TEC power diode
3. RAD diode
4. HOC diode
5. RAD fan fault
6. Contactor latch (24 V)
7. HOC fan fault
8. Load shed enable
9. Master—7.5 A
10. Logic power/master—2 A
11. Slave—7.5 A
12. Logic power/slave—2 A
13. Working light—10 A
14. Head light—15 A
15. Ignition—10 A
16. Cigarette lighter—10 A
17. Electric seat—10 A
18. PTO—10 A
19. Horn—30 A
20. Hazard light—10 A
21. Telematics power—2 A
22. Infocenter—2 A
23. For more information on fuses, read the *Operator's Manual*.



decal131-2347

131-2347

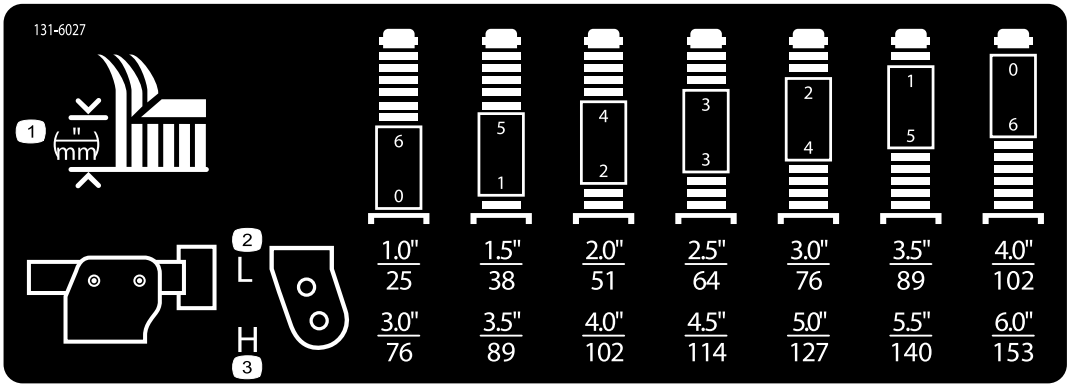
1. Left-turn signal
2. Right-turn signal
3. Beacon
4. Work light
5. Engine speed—fast
6. Engine speed—slow
7. Transmission—high range
8. Transmission—low range
9. Pull up to turn on the cutting unit.
10. Push down to turn off the cutting unit.
11. Lower the left cutting unit.
12. Lower the center cutting unit.
13. Lower the right cutting unit.
14. Cruise control—set



decal131-2349

131-2349

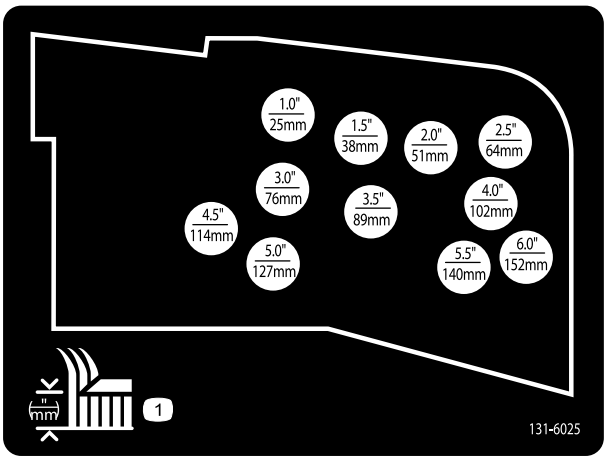
1. Raise the left cutting unit.
2. Raise the center cutting unit.
3. Raise the right cutting unit.
4. Cruise control—off
5. Horn
6. Read the *Operator's Manual*.



decal131-6027

131-6027

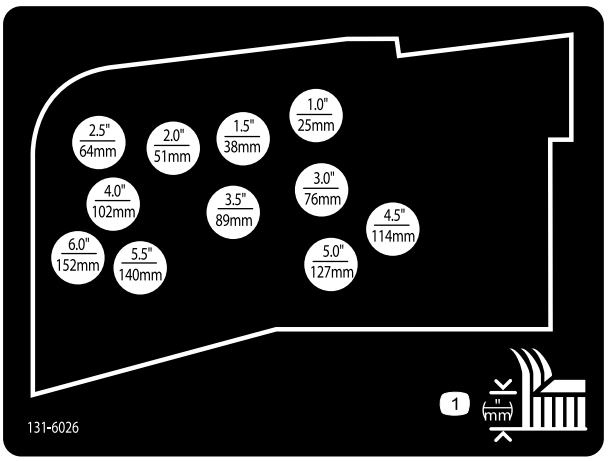
1. Height-of-cut settings
2. Upper caster position—heights of cut 25 to 102 cm (1 to 4 inches)
3. Lower caster position—heights of cut 76 to 153 cm (3 to 6 inches)



decal131-6025

131-6025

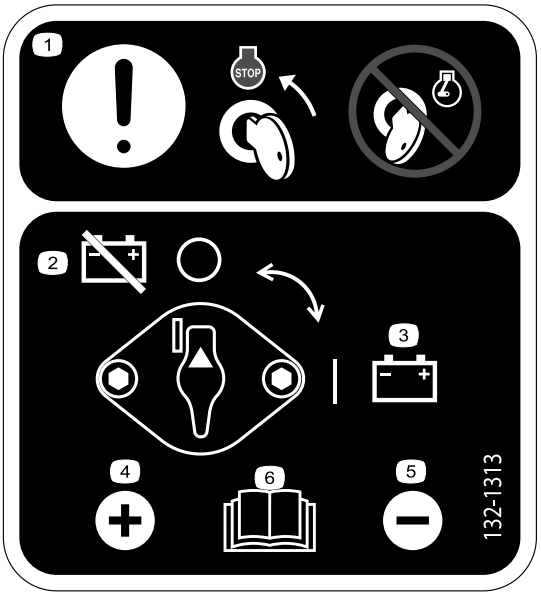
1. Height of cut



decal131-6026

131-6026

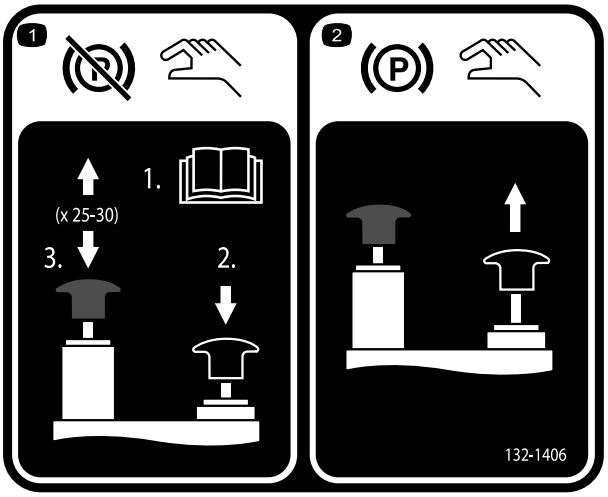
1. Height of cut



decal132-1313

132-1313

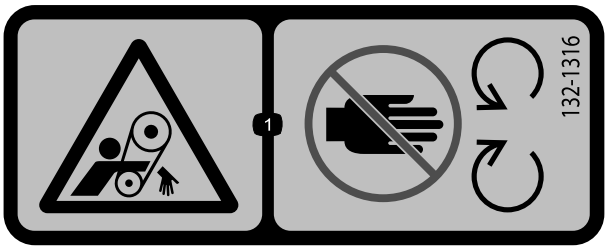
1. Attention—move the key to the engine stop position before servicing the battery; do not service the battery with the engine running.
2. Battery—disconnect
3. Battery—connect
4. Positive terminal
5. Negative terminal
6. Read the *Operator's Manual* for more information on servicing the battery.



decal132-1406

132-1406

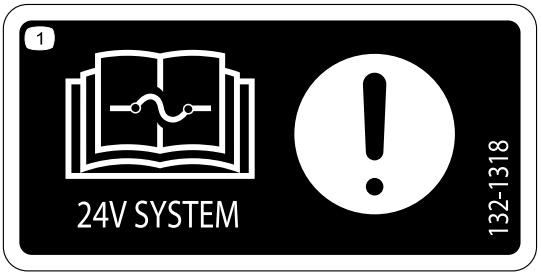
1. Releasing the parking brake when the engine is off—1) Open the tow valves on the traction pump (read the *Operator's Manual*); 2) Push down and hold the black knob to release the parking brake; 3) Work the hand pump up and down. You can release the black knob after 2 to 3 pumps. The parking brake will release after 25 to 30 pumps.
2. Engaging the parking brake—pull up on the black knob; the manual valve resets when you start the engine.



decal132-1316

132-1316

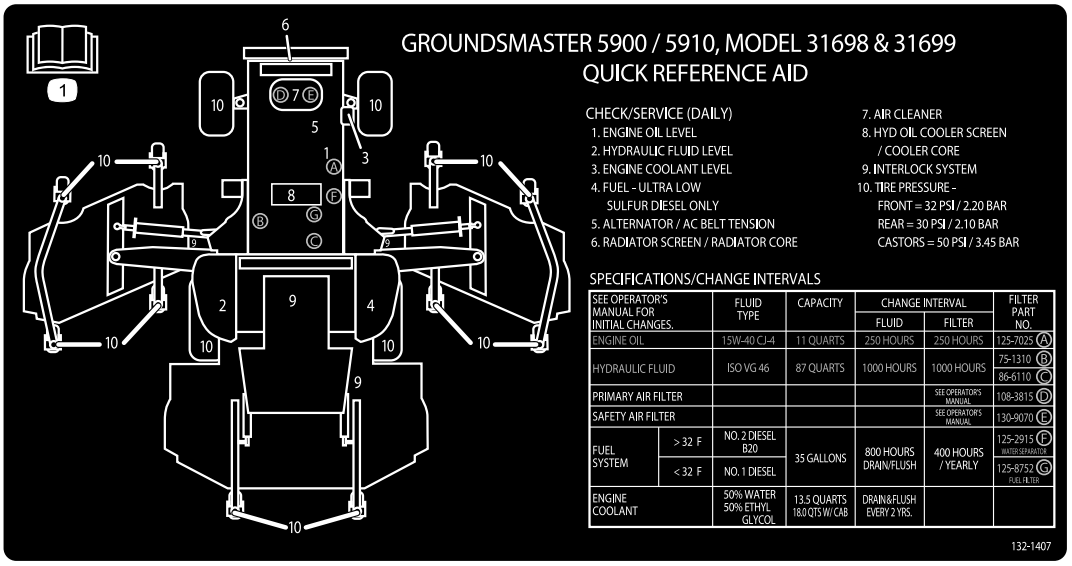
1. Entanglement hazard, belt—keep away from moving parts.



decal132-1318

132-1318

1. Attention—read the *Operator's Manual* for information on fuses.



decal132-1407

132-1407

1. Read the *Operator's Manual* for more information on servicing 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	–	Remove the wing-deck-shipping straps and braces.
2	Right deck cover Left deck cover V-belt	1 1 2	Lower the front-deck winglets.
3	No parts required	–	Check the tire and caster wheel pressure.
4	No parts required	–	Level the front, center deck.
5	No parts required	–	Level the winglet decks to the front, center deck.
6	No parts required	–	Check the fluid levels.
7	No parts required	–	Grease the machine.

Media and Additional Parts

Description	Qty.	Use
Operator's Manual	1	Review it before operating the machine.
Engine owner's manual	1	Use it to reference engine information.
Parts Catalog	1	Use it to reference part numbers and order replacement parts.
Operator training materials	1	Read the materials before operating the machine.
Declaration of conformity	1	For CE compliance

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

1

Removing the Wing-Deck-Shipping Straps and Braces

No Parts Required

Procedure

Remove the straps and braces securing the wing decks for shipping.

2

Lowering the Front-Deck Winglets

Parts needed for this procedure:

1	Right deck cover
1	Left deck cover
2	V-belt

Procedure

1. Remove the nuts securing the front and rear stop bolts to the right winglet-deck mounts (Figure 3).

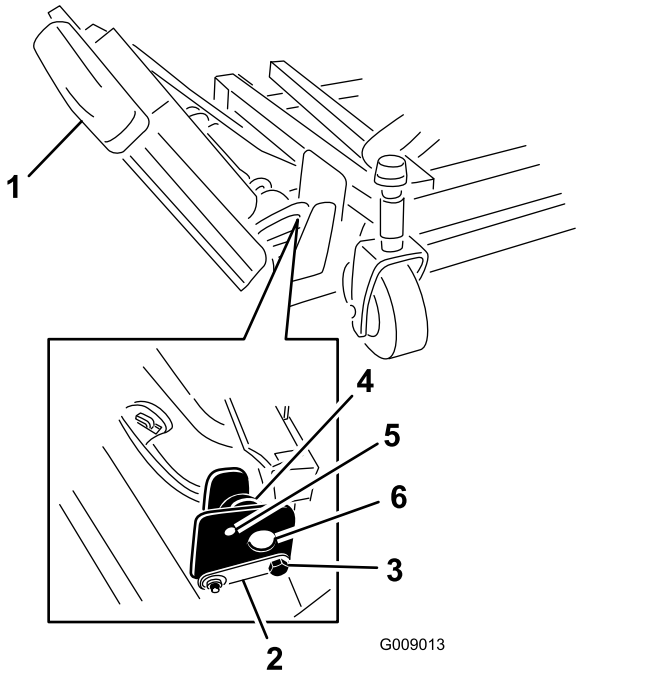


Figure 3

1. Winglet
2. Hinge pin
3. Stop bolt
4. Eccentric
5. Upper hole
6. Deck mounts

2. While supporting the right winglet, remove the front and rear stop bolts from the deck mounts (Figure 3).

   Note: Leave the eccentrics positioned between the deck mounts.

3. Lower the winglet to the operating position.
4. Install the front and rear stop bolts through the upper-mounting holes and eccentrics (Figure 4).

   Note: Ensure that the stop bolt engages the tab on the hinge pin.

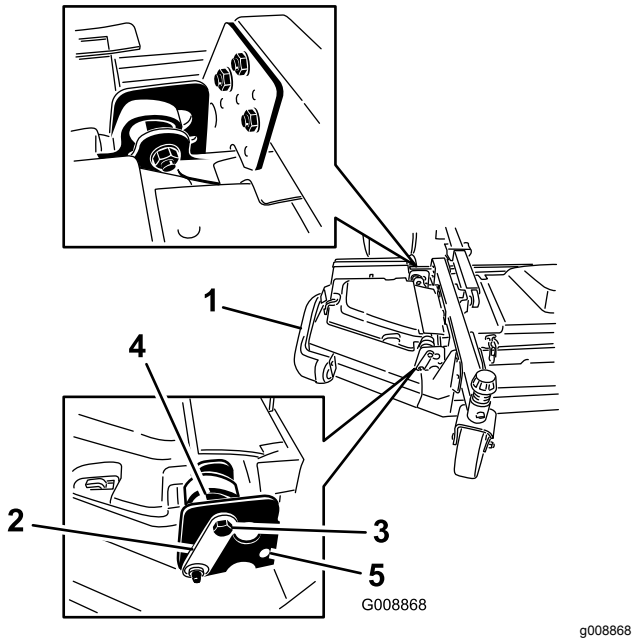


Figure 4

1. Winglet
2. Hinge pin
3. Bolt
4. Eccentric
5. Lower hole

5. Install the nuts securing the stop bolts.

   Note: Do not tighten the nuts at this time.

6. Repeat this procedure on left winglet.
7. Install the winglet belts as follows:

   A. Start the belt around the winglet-spindle pulley and the front-deck-spindle pulley (Figure 5).

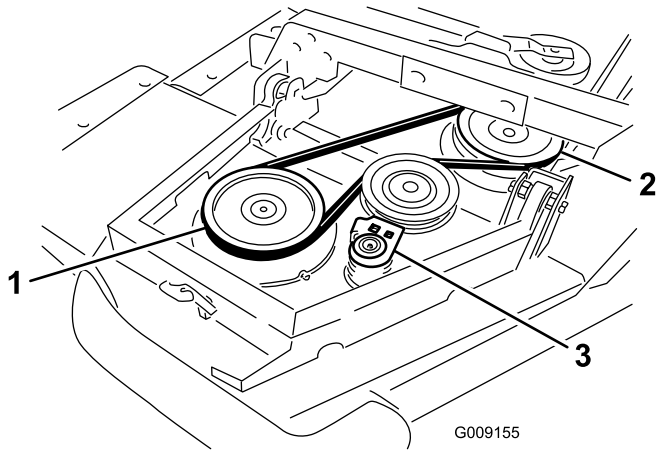


Figure 5

1. Winglet-spindle pulley
2. Front-deck-spindle pulley
3. Idler pulley

B. Using a ratchet wrench or a similar tool, move the idler pulley away from the pulleys (Figure 5).

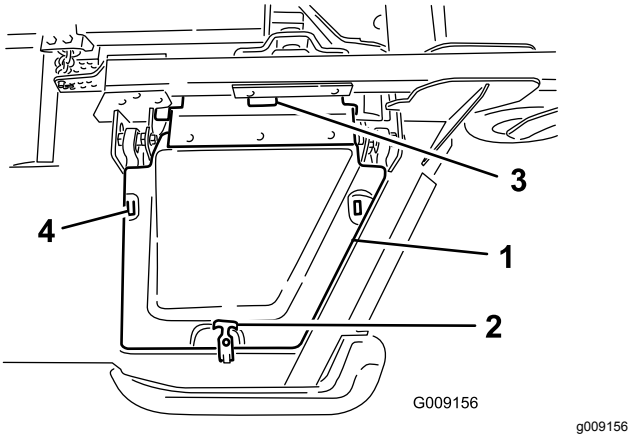
C. Route the belt around the winglet-spindle pulley and the upper-spindle pulley on the front deck.

D. Release the idler pulley to put tension on the belt.

8. Install the winglet-deck cover and secure it with the rubber latch (Figure 6).

   Note: Ensure that you slide the cover under the front, center deck-cover tabs before inserting it onto the mounting hooks and post.

9. Repeat this procedure on the other winglet.



g009156

Figure 6

1. Cover
2. Rubber latch
3. Front, center deck-cover tabs
4. Mount hooks

3

Checking the Tire and Caster Wheel Pressure

No Parts Required

Procedure

Check the tire and caster wheel pressure before use; refer to Checking the Tire Pressure (page 37) and Checking the Caster Wheel Tire Pressure (page 37).

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

Important: **Traction performance, including tire-slip control, is dependent on the ratio of the tire size between the front and rear tires. Only use genuine Toro tires.**

4

Leveling the Front, Center Deck

No Parts Required

Procedure

Note: Perform this procedure on a flat, level surface.

Refer to Adjusting the Height of Cut (page 38).

1. Rotate the blade on each outer spindle until the ends face forward and backward.
2. Measure from the floor to the front tip of the blade.
3. Adjust the 3 mm (1/8 inch) shims on the front caster fork(s) to match the desired height of cut.
4. Rotate the blades 180° and measure from the floor to the rear-facing tip of the blade.
5. Loosen the lower jam nuts on the height-of-cut chain U-bolt.
6. Adjust the nuts to raise or lower the rear of the mower deck so that the tips of the rear blades are 6.35 mm (1/4 inch) to 9.53 mm (3/8 inch) higher than the front tips.
7. Tighten the jam nuts.

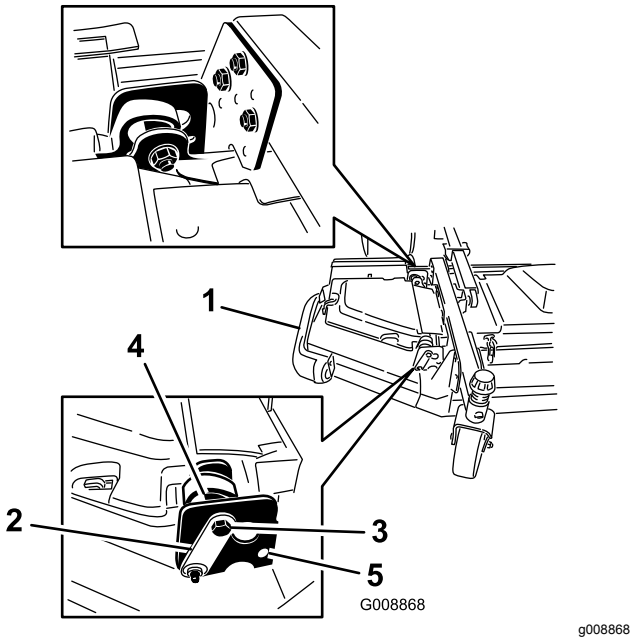
5

Leveling the Winglet Decks to the Front, Center Deck

No Parts Required

Procedure

1. Rotate the blade on each winglet so that it points side to side.
2. Loosen the bolts and nuts securing the 2 eccentric spacers to the winglets (Figure 7).



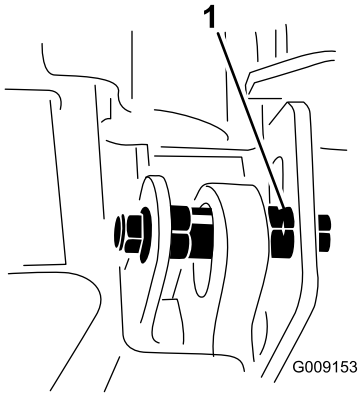
g008868

Figure 7

1. Winglet
2. Hinge pin
3. Stop bolt
4. Eccentric
5. Upper hole

3. Rotate the forward eccentric until it reaches maximum clearance with the inner-slot surface of the winglet-pivot bracket.
4. Rotate the rear (closest to the traction unit) eccentric until the outside blade tip is about 3 mm (1/8 inch) higher than the desired height of cut (Figure 7).

   Note: There is a notch on the eccentric hex, which is 180° from the lobe on the eccentric cam (Figure 8). Use the notches to reference the location of the lobes when adjusting the eccentrics.



g009153

Figure 8

1. Eccentric notch

5. Tighten the bolt and nut for this eccentric to 149 N·m (110 ft-lb).
6. Adjust the forward eccentric until it just makes contact with the inner slot surface of the winglet-pivot brackets.
7. Tighten the bolt and nut for this eccentric to 149 N·m (110 ft-lb).
8. Repeat the procedure on the opposite winglet.

6

Checking the Fluid Levels

No Parts Required

Procedure

1. Check the engine-oil level before starting the engine; refer to Checking the Engine-Oil Level (page 71).
2. Check the hydraulic-fluid level before starting the engine; refer to Checking the Hydraulic Fluid (page 86).
3. Check the cooling system before starting the engine; refer to Checking the Engine-Cooling System (page 81).

7

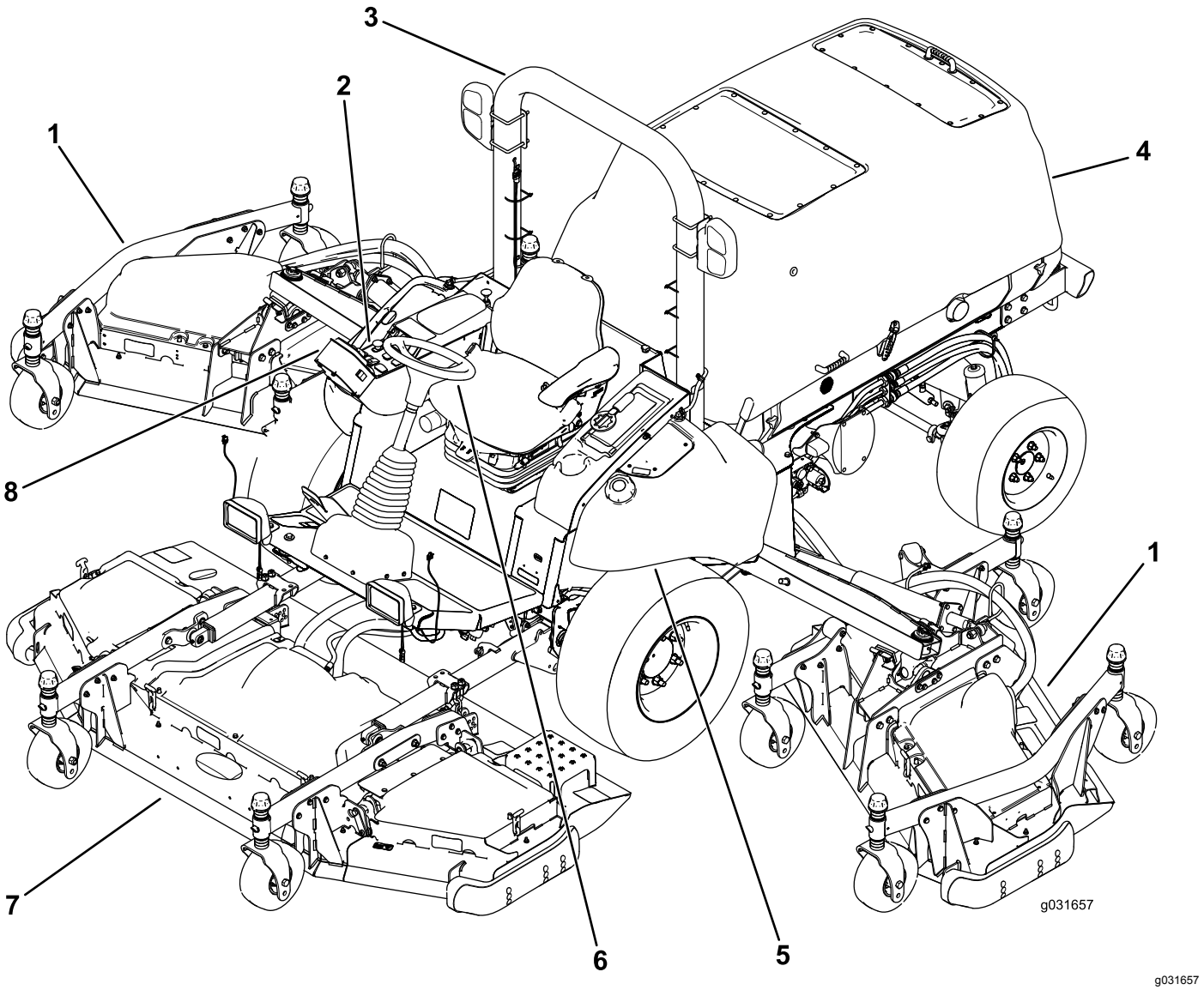
Greasing the Machine

No Parts Required

Procedure

Grease the machine before use; refer to Lubrication (page 66). Failure to properly grease the machine results in premature failure of critical parts.

Product Overview



g031657

Figure 9

1. Wing mower deck
2. Control panel
3. Rollover-Protection System (ROPS)
4. Hood
5. Fuel tank
6. Steering wheel
7. Front mower deck
8. InfoCenter

Controls

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

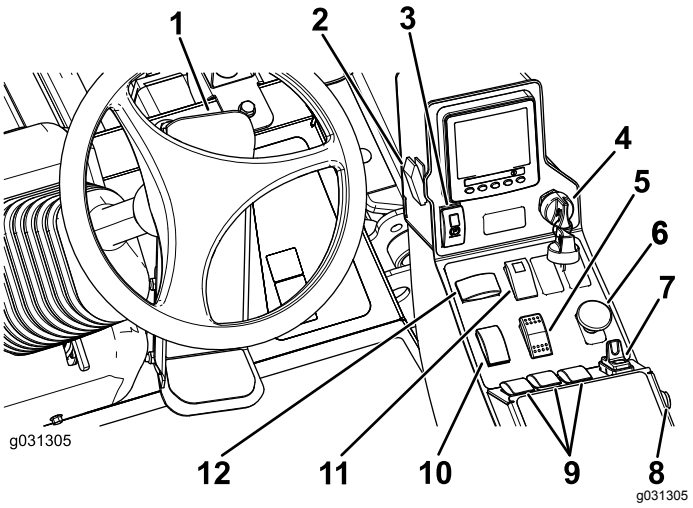


Figure 10

1. Traction pedal
2. Light switch
3. Parking-brake switch
4. Key switch
5. High—Low range-speed switch
6. PTO switch
7. Cruise-control switch
8. Horn button
9. Deck-lift switches
10. Throttle switch
11. Hazard switch
12. Turn-signal switch

Traction Pedal

The traction pedal controls the forward and reverse operation. Press the top of the pedal to move the machine forward and the bottom to move it backward. Ground speed depends on how far you press the pedal. For maximum ground speed, fully press the pedal while the throttle is in the HIGH IDLE position (Figure 10).

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

Light Switch

Press the light switch upward to turn the lights to the ON position (Figure 10).

Press the light switch downward to turn the lights to the OFF position.

Parking-Brake Switch

The parking-brake switch requires 2 actions to set the brake. While holding the small latch back, press the parking-brake switch forward to engage the parking brake. Press the parking-brake switch rearward to disengage the parking brake (Figure 10).

Key Switch

The key switch has 3 positions: STOP, RUN/PREHEAT, and START (Figure 10).

High-Low Range-Speed Switch

Press the front of the switch to select HIGH-SPEED RANGE. Press the rear of the switch to select LOW-SPEED RANGE. The machine must be stationary or traveling at less than 1.0 km/h (0.6 mph) to shift between HIGH and LOW (Figure 10).

PTO Switch

The PTO switch has 2 positions: OUT (start) and IN (stop). Pull out the PTO button to engage the implement or mower-deck blades. Push in the button to disengage the implement operation (Figure 10).

Cruise-Control Switch

The cruise-control switch sets your desired speed of the machine.

Move the cruise-control switch to the center position to turn the cruise control to the ON position. Press the switch forward to set the speed. Press the switch rearward to disengage the cruise control.(Figure 10).

Note: Foot pedal movement also disengages the cruise control.

When you engage the cruise control, you can change the cruise-control speed; refer to Setting the Cruise-Control Speed (page 30).

Horn Button

Press the horn button to activate the horn (Figure 10).

Deck-Lift Switches

The deck-lift switches raise and lower the mower decks (Figure 10).

Press the switches forward to lower the mower deck and rearward to raise the mower deck.

Note: The decks do not lower while the machine is in the HIGH-speed range, and the decks do not raise or lower if you are out of the seat while the engine is running.

Note: The deck-raising function is limited at engine speeds below 2,000 rpm. Only 1 deck raises at a time below 2,000 rpm.

Throttle Switch

The throttle switch has 2 positions: LOW IDLE and HIGH IDLE (Figure 10).

Press the switch forward for 2 or more seconds to set the throttle at HIGH IDLE; press the switch rearward for 2 or more seconds to set the throttle at LOW IDLE; or momentarily press the switch in either direction to increase or decrease the engine speed in 100-rpm increments.

Hazard Switch

Press the hazard switch forward to engage the hazard lights and rearward to disengage the hazard lights (Figure 10).

Turn-Signal Switch

Press the left side of the turn-signal switch to activate the left-turn signal and the right side of the switch to activate the right-turn signal (Figure 10).

Note: The center position is off.

Power Point

You can insert your portable charger into the power point to charge a personal device, such as a phone or other electronic device (Figure 11).

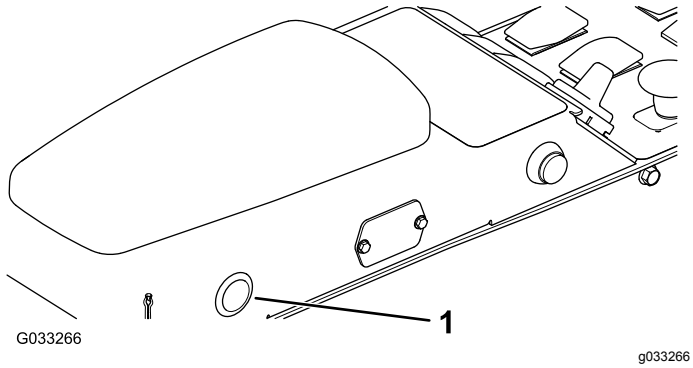


Figure 11

1. Power point

Audible Alarm (Console)

The alarm is activated when a fault is detected.

The buzzer sounds when the following occur:

- When the engine sends a stop fault
- When the engine sends a check-engine fault
- When the fuel level is low

Cab Controls

Model 31699 Only

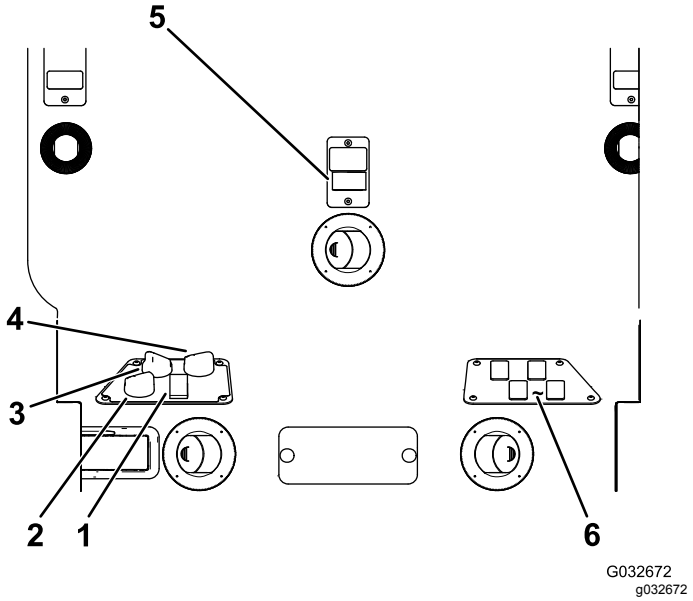


Figure 12

1. Air-conditioning switch
2. Air-recirculation control
3. Fan control
4. Temperature control
5. Windshield-wiper switch
6. Blank switches for optional kits

Air-Recirculation Control

Sets the cab to either recirculate the air in the cabin or to draw air into the cabin from outside (Figure 12).

- Set it to recirculate the air when using the air-conditioning.
- Set it to draw air in when using the heater or fan.

Fan Control

Rotate the fan control knob to regulate the speed of the fan (Figure 12).

Temperature Control

Rotate the temperature control knob to regulate the air temperature in the cab (Figure 12).

Windshield-Wiper Switch

Use this switch to turn the windshield wipers on or off (Figure 12).

Air Conditioning Switch

Use this switch to turn the air conditioning on or off (Figure 12).

Wind Shield Latch

Lift up on latches to open the wind shield (Figure 13). Press in on latch to lock wind shield in open position.

Pull out and down on latch to close and secure wind shield.

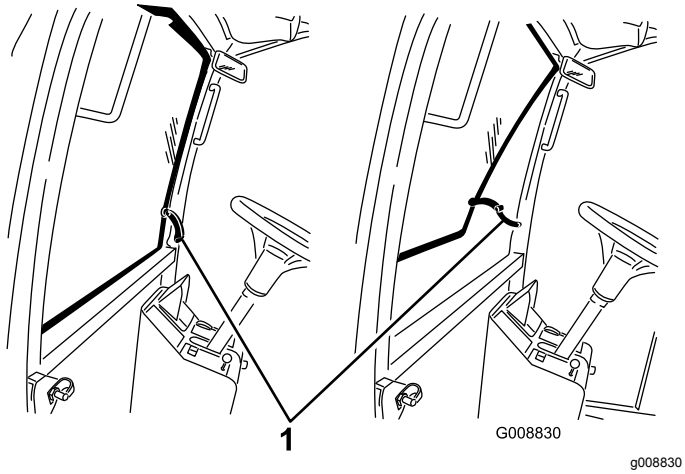


Figure 13

1. Wind shield latch

Rear Window Latch

Lift up on latches to open the rear window. Press in on latch to lock window in open position. Pull out and down on latch to close and secure window (Figure 13).

Important: **The rear window must be closed before opening the hood or damage may occur.**

Seat-Adjusting Lever

Pull out the lever to slide the seat forward or rearward.

Seat-Back-Adjusting Lever

Move the lever to adjust the seat-back angle.

Armrest-Adjusting Knob

Rotate the knob to adjust the angle of the armrest.

InfoCenter Control

Start-Up Screen

When you start the machine, the start-up screen appears, displaying the corresponding icons that apply (i.e., the parking brake is applied, the PTO is in the ON position, cruise control is in the ON position).

Note: The following figure is an example screen; this screen is meant to show all of the **potential** icons that could appear on the screen while operating.

Refer to the following graphic for all of the icon meanings (Figure 14).

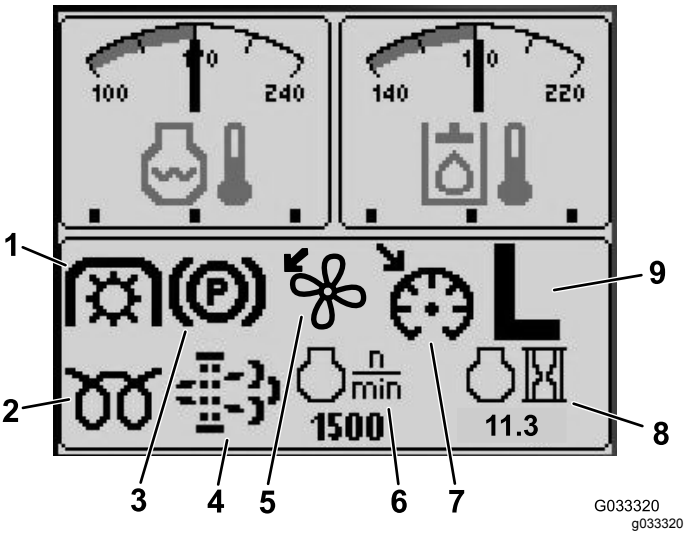


Figure 14

1. PTO indicator
2. Glow-plug indicator
3. Parking-brake indicator
4. Diesel-particulate filter (DPF) maintenance indicator
5. Fan-reverse indicator
6. Engine speed
7. Cruise-control-set indicator
8. Engine-hours indicator
9. H / L (High/Low) transmission-range indicator

Screen Functions

Press the corresponding button to view screen 1 or screen 2, to stop the audible alarm, to view the fault screen, or to exit (Figure 15).



G033145
g033145

Figure 15

1. Screen 1—top, left screen
2. Button 1
3. Screen 2—top, right screen
4. Button 2
5. Button 3
6. Audible alarm
7. Button 4
8. Fault screen
9. Button 5
10. Exit

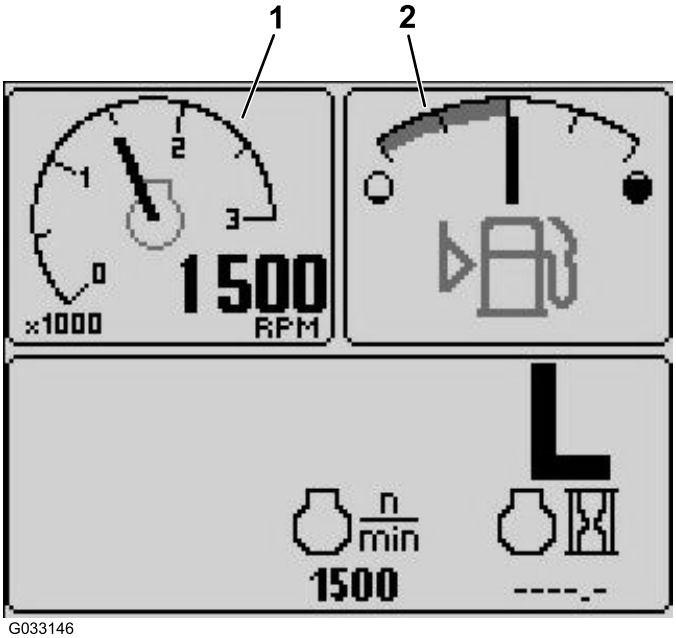
Press buttons 1 to 4 to access the pop-up-menu bar on the bottom of the screen (Figure 15).

After the start-up screen appears, you can select what you would like displayed in both the top, left corner and top, right corner of the display screen by pressing button 1 or button 2 on the InfoCenter control (Figure 15).

Note: When you shut off the machine, the top 2 screens will remain at the previous setting before the machine was shut off.

You can toggle between the following screens by pressing button 1 and button 2:

- Tachometer—top, left screen Figure 16
- Fuel-level indicator—top, right screen (Figure 16)

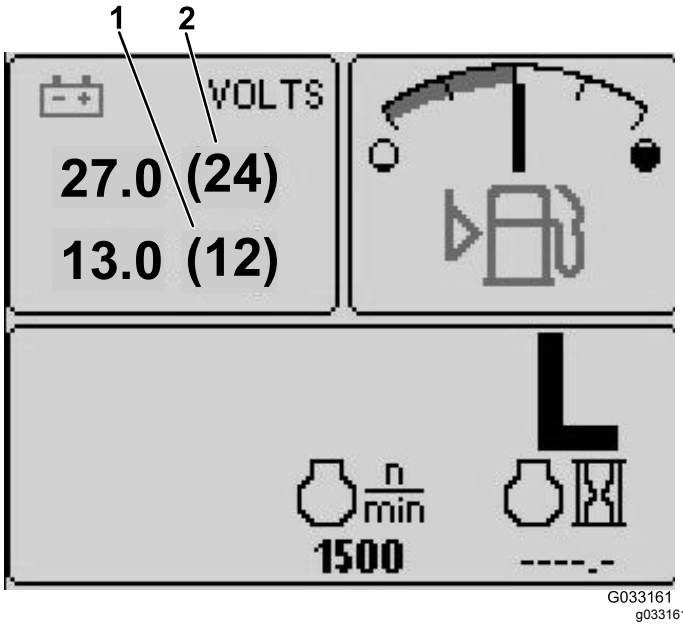


G033146
g033146

Figure 16

1. Tachometer
2. Fuel-level indicator

- 12 V battery-voltage indicator—top, left screen (Figure 17)
- 24 V battery-voltage indicator—top, left screen(Figure 17)



G033161
g033161

Figure 17

- Hydraulic-fluid-temperature and fan indicator—top, right screen (Figure 18)

  Note: In example Figure 18, the hydraulic-fluid-cooling fans are running at 25% speed in the forward direction.
- Engine-coolant-temperature and fan indicator—top, left screen (Figure 18)

Note: In example Figure 18, the engine-coolant fans are running at 50% speed in the reverse direction.

This display indicates (Figure 14) fan speed and direction. The fan speed is controlled by the hydraulic-fluid temperature or the engine-coolant temperature, and automatically reverses as needed. A reverse cycle automatically initiates to help blow debris off the respective hood screen, when either the temperature of the engine coolant or the hydraulic fluid reaches a certain point. Additionally, the radiator fans perform a reverse cycle every 21 minutes regardless of the coolant temperature.

Fan direction is also indicated on the engine-coolant-temperature screen and the hydraulic-fluid-temperature screen. If the bar is to the right of the midpoint hash mark, the fans are running in the forward direction. If the bar is to the left of the midpoint hash mark, the fans are running in the reverse direction (Figure 18).

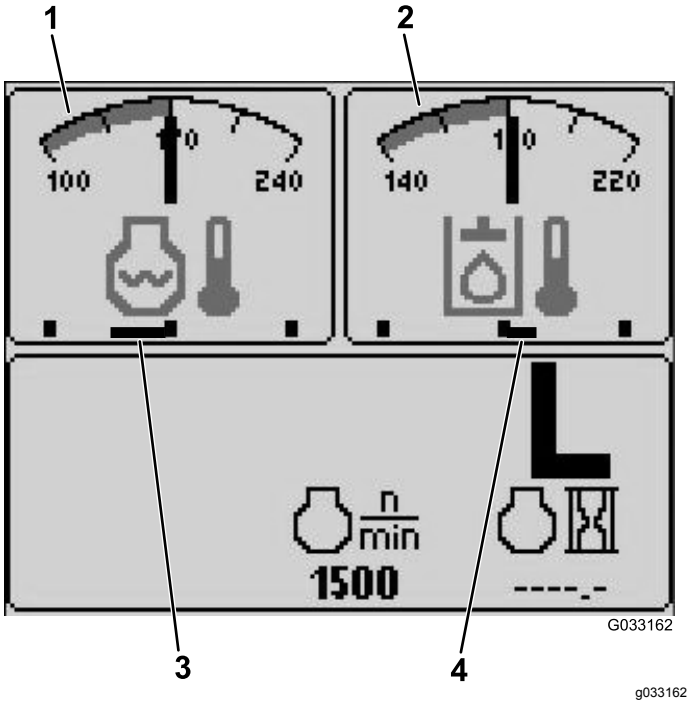


Figure 18

1. Engine-coolant-temperature indicator
2. Hydraulic-fluid-temperature indicator
3. Engine-coolant fans running at 50% speed in the reverse direction
4. Hydraulic-fluid-cooling fans running at 25% speed in the forward direction

---

If a fault appears on the screen, press any key to view the active fault advisory (Figure 15).

Note: Contact your supervisor or mechanic to relay the fault advisory and determine the course of action.

Press the arrow keys to navigate the fault screen.

Press any key to reveal the information keys on the screen.

Diesel-Particulate-Filter (DPF) Maintenance Indicator

If the diesel-particulate-filter (DPF) maintenance indicator (Figure 14) appears on the screen, immediately contact your Toro distributor for service; refer to Diesel Particulate Filter Regeneration (page 48).

Fuel-Level Indicator

This display indicates the level of fuel in the tank (Figure 16).

PTO Indicator

This display indicates (Figure 14) when the PTO is engaged.

Parking-Brake Indicator

This display indicates that the parking brake is engaged (Figure 14).

Cruise-Control Indicator

This display (Figure 14) indicates when the cruise control is set.

H / L (High/Low Range) Speed-Range Indicator

This display indicates the selected transmission speed range (Figure 14).

Glow-Plug Indicator

This display indicates when the engine is pre heating (Figure 14).

Engine-Hours Indicator

This display shows the total hours that the engine has been operated (Figure 14).

Tachometer

This display shows the engine-operating speed in rpm (Figure 16).

Hydraulic-Fluid-Temperature Indicator and Cooling-Fan-Status Indicator

This display indicates the hydraulic-fluid temperature and the status of the cooling fan (Figure 18).

Engine-Coolant-Temperature Indicator and Cooling-Fan-Status Indicator

This display indicates the engine-coolant temperature and the status of the cooling fan (Figure 18).

Battery Voltage

This display shows both the 12 V and 24 V battery voltage (Figure 17).

Service-Due Indicator

This display indicates the time until the next regular service interval.

Note: After you service the machine, reset the indicator.

1. Press and hold the far, right button on the InfoCenter.

   Note: The Main Menu screen appears.
2. Select Service using the 2 buttons on the left; press the button below the right arrow to continue.
3. Select Hours and press the button below the right arrow.
4. Press the button below Reset Hours.
5. Select the Hours for the appropriate next service time and press the button below the right arrow.

   Note: A check mark appears once the indicator has been reset.
6. When you are finished, press the button below the exit icon (picture of an open door) to return to the main screen, or press cancel to exit.

Audible Alarm (InfoCenter)

The alarm sounds during the following scenarios:

Lowering the deck

- The engine is not running
- Any deck is being lowered

Deck is out of float

- The PTO is requested and qualified
- Any deck is below the limit, but not floating

Machine sends a request to the InfoCenter

- The engine sends a red, stop lamp message

  Note: If the alarm stops or if the operator acknowledges the alarm by pressing any button on the InfoCenter, then the alarm should stop.
- Regeneration requested by the engine
- Any engine fault
- Any advisory; refer to InfoCenter Advisories (page 31)
- The engine sends an amber-warning message
- The fuel level is below 2.2%

Main Menu

Press and hold the fifth button (far right) on the InfoCenter to access the main menu.

From the main menu screen, you can access the Service screen, Diagnostics screen, Settings screen, or the About screen (Figure 19).

Service Screen

If you have an issue that requires use of the Service screen (i.e., calibrating the traction pedal), contact your Authorized Toro Service Dealer for assistance.

InfoCenter PIN Entry

1. From the start-up screen, press and hold button 5 until the Main Menu appears (Figure 19).



G033167
g033167

Figure 19

2. Press button 2 until you reach Settings on the Main Menu screen and press button 4 to select Settings (Figure 19).
3. From the Settings screen, press button 4 to select Display (Figure 20).

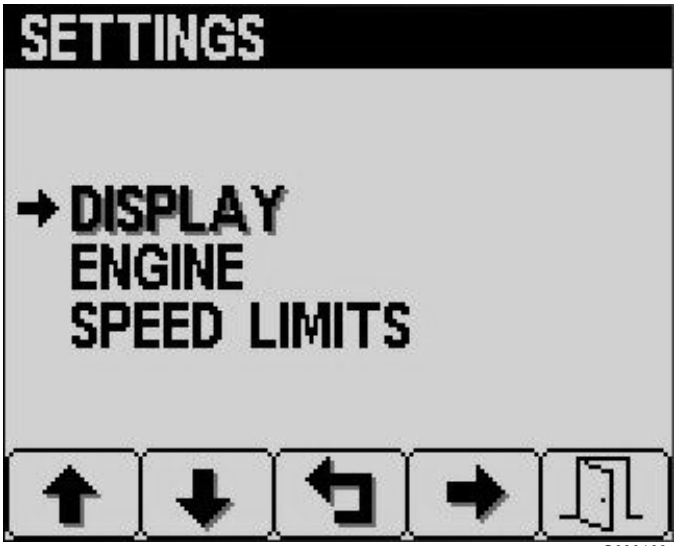


Figure 20

4. Press button 2 until you reach PIN Settings on the Display screen and press button 4 to select PIN Settings (Figure 21).



Figure 21

5. From the PIN Setting screen, press button 4 to select PIN Entry (Figure 22).

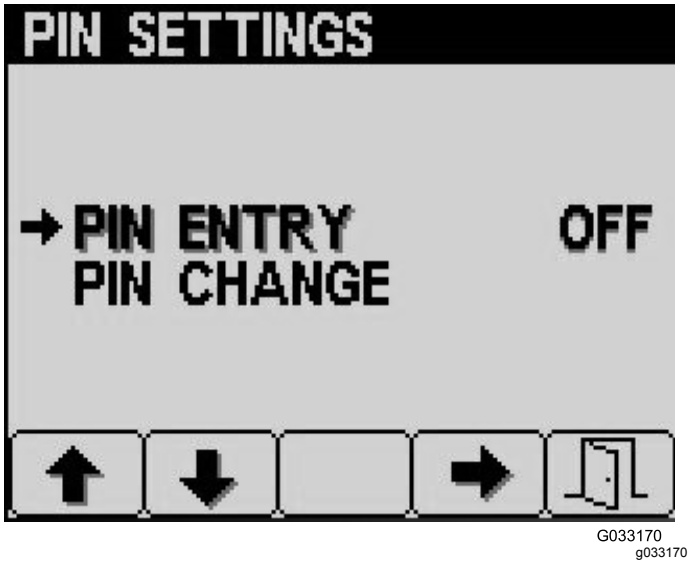


Figure 22

6. Enter the default PIN, 5900, into the Enter PIN screen by using buttons 1 to 4 to select the digits and press button 5 to complete the PIN (Figure 23).

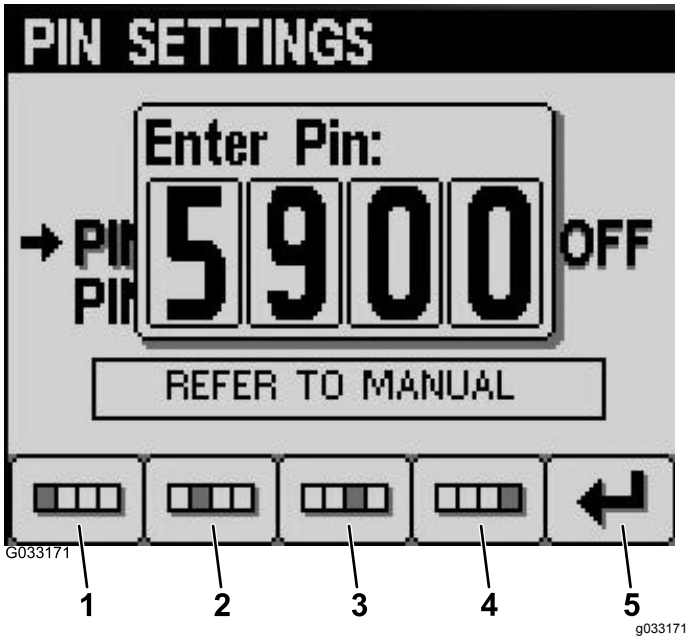


Figure 23

1. Digit 1
2. Digit 2
3. Digit 3
4. Digit 4
5. Enter PIN

Changing the InfoCenter PIN

1. From the start-up screen, press and hold button 5 until the Main Menu appears (Figure 19).
2. Press button 2 until you reach Settings on the Main Menu screen and press button 4 to select Settings (Figure 19).
3. From the Settings screen, press button 4 to select Display (Figure 20).
4. Press button 2 until you reach PIN Settings on the Display screen and press button 4 to select PIN Settings (Figure 21).
5. Press button 2 until you reach PIN Change on the PIN Settings screen and press button 4 to select PIN Change (Figure 22).
6. Enter your old PIN using buttons 1 to 4 and press button 5 when you complete the PIN (Figure 24).

   Note: The default PIN when you initially set up your PIN is 5900.

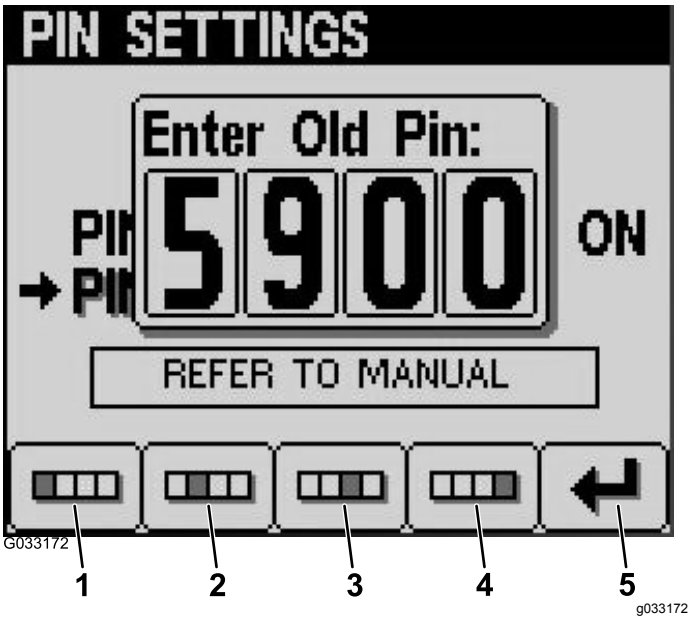


Figure 24

1. Digit 1
2. Digit 2
3. Digit 3
4. Digit 4
5. Enter PIN

7. Enter your new PIN using buttons 1 to 4 and press button 5 when you complete your new PIN (Figure 25).

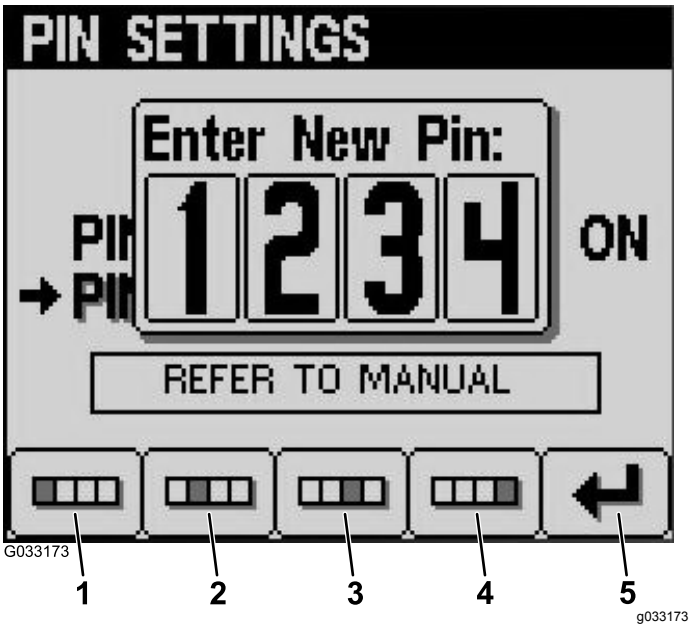


Figure 25

1. Digit 1
2. Digit 2
3. Digit 3
4. Digit 4
5. Enter PIN

8. Confirm your new PIN using buttons 1 to 4 and press button 5 when you complete the PIN (Figure 26).

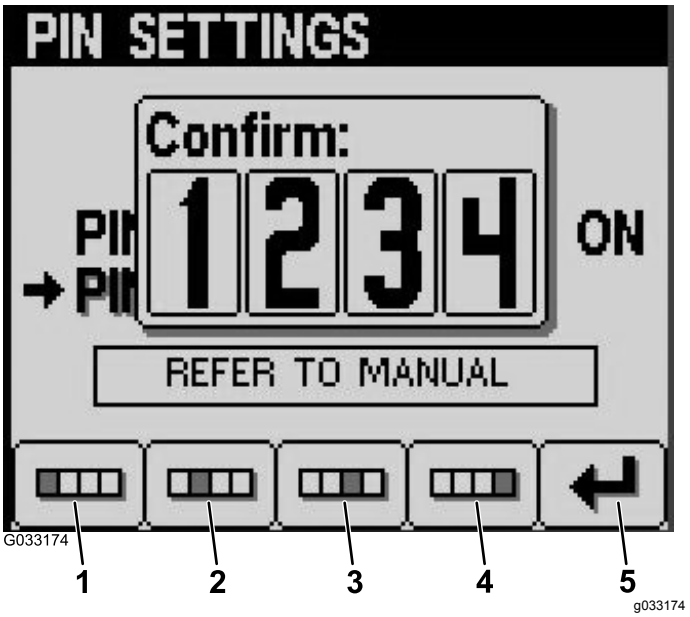


Figure 26

1. Digit 1
2. Digit 2
3. Digit 3
4. Digit 4
5. Enter PIN

Changing the InfoCenter Display Brightness/Contrast

1. From the start-up screen, press button 5 to access the brightness/contrast pop-up-menu bar (Figure 27).

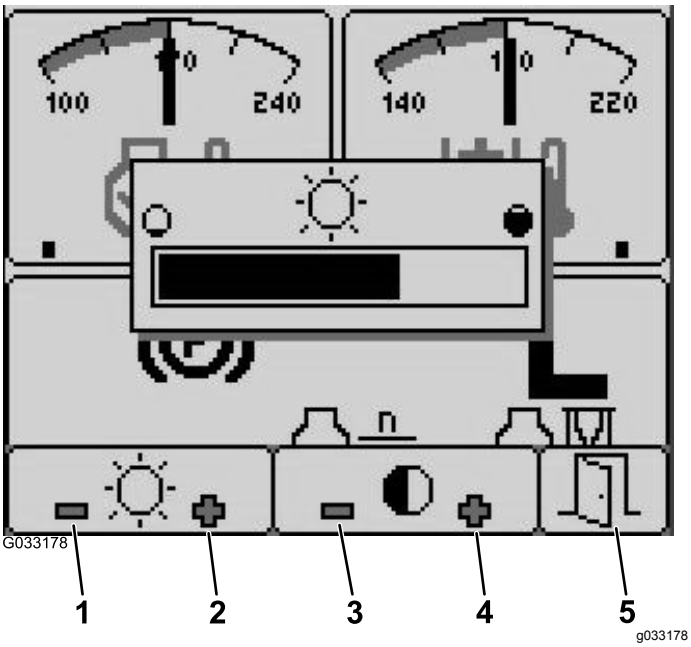


Figure 27

1. Decrease brightness
2. Increase brightness
3. Decrease contrast
4. Increase contrast
5. Exit

2. Press button 1 to decrease brightness, button 2 to increase brightness, button 3 to decrease contrast, and button 4 to increase contrast (Figure 27).
3. When you have set your brightness/contrast, press button 5 to exit (Figure 27).

Setting the Cruise-Control Speed

You can set the cruise-control speed by moving the cruise-control switch momentarily forward, via the Infocenter as follows:

1. Move the cruise-control switch to the ON position (Figure 10).
2. When the cruise-control icon appears on the display screen, press button 1 to 4 to access the pop-up-menu bar.
3. Press button 3 to access the Cruise Control screen (Figure 28).

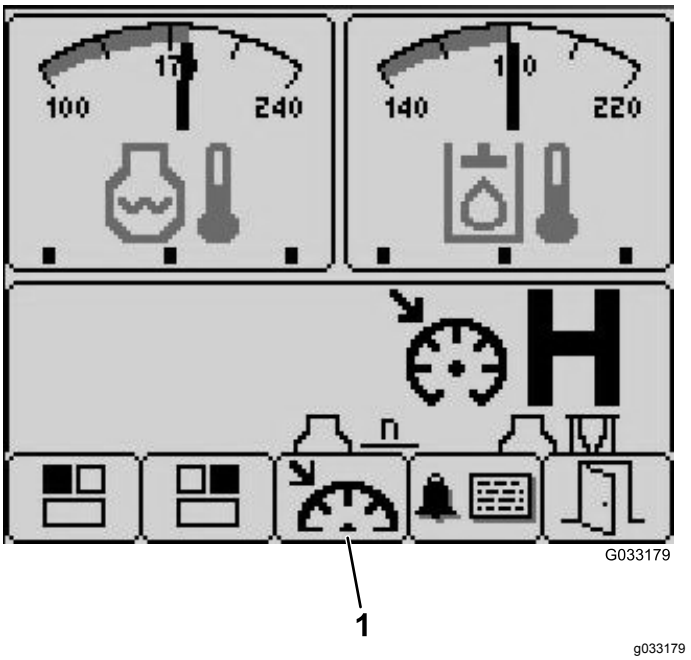


Figure 28

1. Cruise-control selection

4. From the Cruise Control screen, press button 1 to decrease the cruise-control speed or button 2 to increase the cruise-control speed (Figure 29).

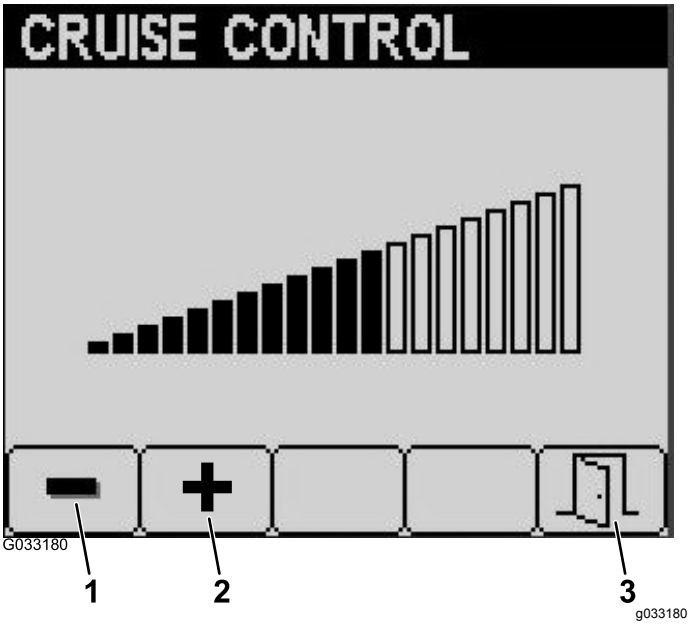


Figure 29

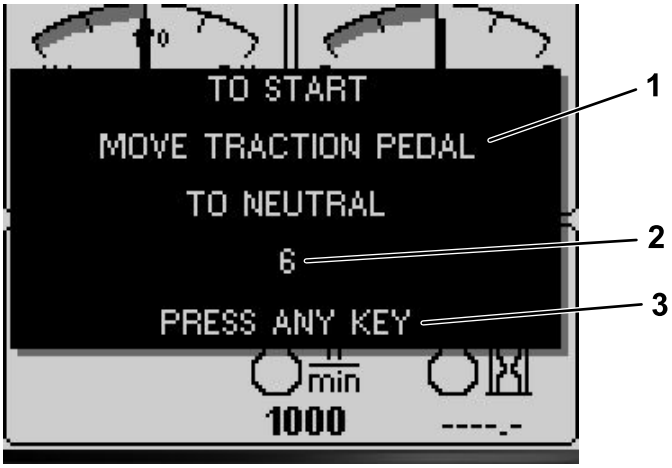
1. Decrease cruise-control speed
2. Increase cruise-control speed
3. Exit

5. When you have set your desired cruise-control speed, press button 5 to exit (Figure 29).

InfoCenter Advisories

Operator advisories automatically display on the InfoCenter screen when a machine function requires additional action. For example, if you attempt to start the engine while pressing the traction pedal, an advisory displays, indicating that the traction pedal must be in the NEUTRAL position.

For each advisory that occurs, there is a **condition** (e.g., start denied, PTO denied, cruise control denied), an advisory **code** (number), a **qualifier** (the cause of the advisory displayed), and a **display text** (what the advisory displays as text on the screen) as shown in Figure 30.



g031999

Figure 30

1. Display text
2. Code
3. Press any key on the InfoCenter to clear the text from the display screen.

Note: Advisories do not log into the fault log.

Note: You can clear an advisory from the display screen by pressing any of the InfoCenter keys.

Refer to the following table for all the InfoCenter advisories:

Condition	Code	Qualifier	Display Text
Start Denied	4	Teach engaged	N/A
Start Denied	5	PTO engaged	To start, disengage PTO
Start Denied	6	Not in NEUTRAL	To start, move traction pedal to NEUTRAL
Start Denied	7	Neither in seat nor parking brake applied	To start, must be seated or set parking brake
Start Denied	8	Deck switch engaged	To start, disengage deck switch
Start Denied	9	Recycle power	To start, turn key switch off, then on
PTO Denied	102	In high range (only cut in low)	To engage PTO, must be in low range
PTO Denied	106	Out of seat	To engage PTO, operator must be seated
PTO Denied	107	No decks floating (hit a down key)	To engage PTO, lower decks
PTO Denied	108	Engine hot	To engage PTO, let engine cool
PTO Denied	109	Loss of CAN bus (service required)	To engage PTO, requires service

PTO Denied	110	Hydraulic oil too cold	To engage PTO, let hydraulic oil warm up
Cruise Control Denied	202	Too slow to capture cruise control	Increase ground speed
Deck Lower Denied	302	Can't lower in transport	To lower deck, return traction pedal to NEUTRAL
Deck Lower Denied	303	Out of seat	To lower deck, operator must be seated
Deck Lower Denied	304	Service required	To lower deck, requires service
Deck Not Floating (on engine start)	402	Advise operator to press down switches	To float, lower decks
Range Hi Denied	502	Left deck not up	To set high range, lift left deck
Range Hi Denied	503	Center deck not up	To set high range, lift center deck
Range Hi Denied	504	Right deck not up	To set high range, lift right deck
Range Hi Denied	505	Left deck floating	To set high range, lift left deck fully
Range Hi Denied	506	Center deck floating	To set high range, lift center deck fully
Range Hi Denied	507	Right deck floating	To set high range, lift right deck fully
Range Hi Denied	508	PTO switch engaged	To set high range, disengage PTO
Range Hi Denied	509	Cruise control engaged	To set high range, disengage cruise
Range Hi Denied	510	Speed too high	To set high range, reduce ground speed
Range Hi Denied	511	Loss of CAN bus (service required)	To set high range, requires service
Range Hi Denied	512	Hydraulic oil too cold	To set high range, let hydraulic oil warm up
Range Lo Denied	602	Cruise control engaged	To set low range, disengage cruise
Range Lo Denied	603	Speed too high	To set low range, reduce ground speed
Range Lo Denied	604	Loss of CAN bus (service required)	To set low range, requires service
Traction Disabled	804	Parking brake ON	For traction, release parking brake
Traction Disabled	805	Not in NEUTRAL	For traction, move traction pedal to NEUTRAL
Traction Disabled	806	Out of seat	For traction, operator must be seated
Engine Advisory	1205	Starter has been active for 30 seconds	Engine 30 second starter time out
Engine Advisory	1206	Replace engine air filter	Check the air filter
Engine Advisory	1207	Service due	Engine service due approaching
Engine Advisory	1208	Service past due	Engine service past due
Engine Advisory	1209	DPF service required	Regeneration required within 30 minutes

Engine Advisory	1210	Engine derate due to high temperature	Let engine cool
Engine Advisory	1211	Engine speed restricted: hydraulic oil too cold	Hydraulic oil is less than 4°C (40°F), so derate the engine speed to 1,650 rpm
Fuel Level	1302	Fuel level is low	Add fuel
TP Not Calibrated	1402	Traction pedal is out of calibration	Calibrate the traction pedal
Teach	1500	Entered teach mode	Entered traction pedal teach—please wait
Teach	1502	Traction pedal is out of NEUTRAL	Return traction pedal to NEUTRAL
Teach	1503	Slowly move the traction pedal forward	Slowly move the traction pedal forward
Teach	1504	Neutral forward capture passed	Neutral forward capture passed
Teach	1505	Neutral forward capture failed—too fast	Neutral forward capture failed—movement too fast; try again
Teach	1506	Neutral forward capture failed (out of range)—voltage captured was out of specification	Restart teach mode
Teach	1507	Move traction pedal to MAX FORWARD and hold	Move traction pedal to MAX FORWARD and hold
Teach	1508	Max forward capture passed	Max forward capture passed
Teach	1509	Max forward capture failed (out of range)—voltage captured was out of specification	Restart teach mode
Teach	1510	Slowly move the traction pedal in REVERSE	Slowly move the traction pedal in REVERSE
Teach	1511	Neutral rev capture passed	Neutral rev capture passed
Teach	1512	Neutral rev capture failed—too fast	Neutral rev capture failed—movement too fast; try again
Teach	1513	Neutral rev capture failed (out of range)—voltage captured was out of specification	Restart teach mode
Teach	1514	Move traction pedal to MAX REVERSE and hold	Move traction pedal to MAX REVERSE and hold
Teach	1515	Max reverse capture passed	Max reverse capture passed
Teach	1516	Max reverse capture failed (out of range)—voltage captured was out of specification	Restart teach mode
Teach	1517	TP teach done/values stored	Exit teach
Teach	1518	TP teach was unsuccessful	Exit teach and try again
Deck Raise Denied	1602	Out of seat	Operator must be seated
Deck Raise Denied	1603	Parking brake not set	Set parking brake
Deck Raise Denied	1604	Not in NEUTRAL	Return traction pedal to NEUTRAL

Deck Raise Denied	1605	Service required	Contract your Toro distributor
Deck Raise Denied	1606	All deck not raising together	Increase the engine speed to 2,000 rpm, and the decks will raise one at a time when all 3 switches are held down simultaneously

Specifications

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

Width of cut	
Overall	488 cm (192 inches)
Front mower deck	234 cm (92 inches)
Wing mower deck	145 cm (57 inches)
Front and one-wing mower deck	361 cm (142 inches)
Overall width	
Mower decks down	505 cm (199 inches)
Mower decks up (transport)	251 cm (99 inches)
Overall height (with wing mower decks down)	
With ROPS	216 cm (85 inches)
Without ROPS	160 cm (63 inches)
With cab	240 cm (94.5 inches)
Overall length	442 cm (174 inches)
Minimum ground clearance (at the machine centerline)	26.2 cm (10.3 inches)
Wheel tread (to the center of the tire)	
Front	158.8 cm (62.5 inches)
Rear	142 cm (56 inches)
Wheel tread (to the outside of the tire)	
Front	190.5 cm (75 inches)
Rear	170 cm (67 inches)
Wheel base	194 cm (76.5 inches)
Net Weight (with mower decks)	
Without cab	2,935 kg (6,470 lb)
With cab	3,202 kg (7,060 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 all safety devices are attached and functioning properly. This includes, but is not limited to, operator-presence controls; safety switches and shields; the rollover protection system (ROPS); attachments; and brakes. Do not operate the machine unless all safety devices are in position and functioning as intended by the manufacturer.
- Always inspect the machine to ensure that the blades, blade bolts, and cutting assembly are not worn or damaged. 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 potentially throw.
- Evaluate the terrain to determine the appropriate equipment and any attachments or accessories required to operate the machine properly and safely.

Fuel Safety

⚠ DANGER

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

- **Fill the fuel tank outdoors, in an open area, when the engine is cold. Wipe up any fuel that spills.**
- **Never fill the fuel tank inside an enclosed trailer.**
- **Never smoke when handling fuel, and stay away from an open flame or where fuel fumes may be ignited by a spark.**
- **Store fuel in an approved container and keep it out of the reach of children. Never buy more than a 180-day supply of fuel.**
- **Do not operate the machine without the entire exhaust system in place and in proper working condition.**

⚠ WARNING

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

- **Avoid prolonged breathing of vapors.**
- **Keep your hands and face away from the nozzle and the fuel-tank opening.**
- **Keep fuel away from your eyes and skin.**
- Use only an approved fuel container.
- Never remove the fuel cap or add fuel to the fuel tank while the engine is running.
- Never fill containers inside a vehicle or on a truck or trailer bed with a plastic liner. Always place containers on the ground and away from your vehicle before filling.
- Remove the equipment from the truck or trailer and add fuel to it while it is on the ground. If this is not possible, then add fuel using a portable container rather than from a fuel-dispenser nozzle.
- Keep the fuel-dispenser nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete. Do not use a nozzle lock-open device.
- If you spill fuel on your clothing, change your clothing immediately.
- Fill the fuel tank until the fuel level is 25 mm (1 inch) below the bottom of the filler neck. Do not

overfill the fuel tank. Replace the fuel-tank cap and tighten it securely.

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 71).

Checking the Cooling Systems

Before you start the engine and use the machine, check the cooling systems; refer to Checking the Engine-Cooling System (page 81) and Cleaning the Cooling Systems (page 82).

Checking the Hydraulic System

Before you start the engine and use the machine, check the hydraulic system; refer to Checking the Hydraulic Fluid (page 86).

Filling the Fuel Tank

Fuel Tank Capacity

132 L (35 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: Use of 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

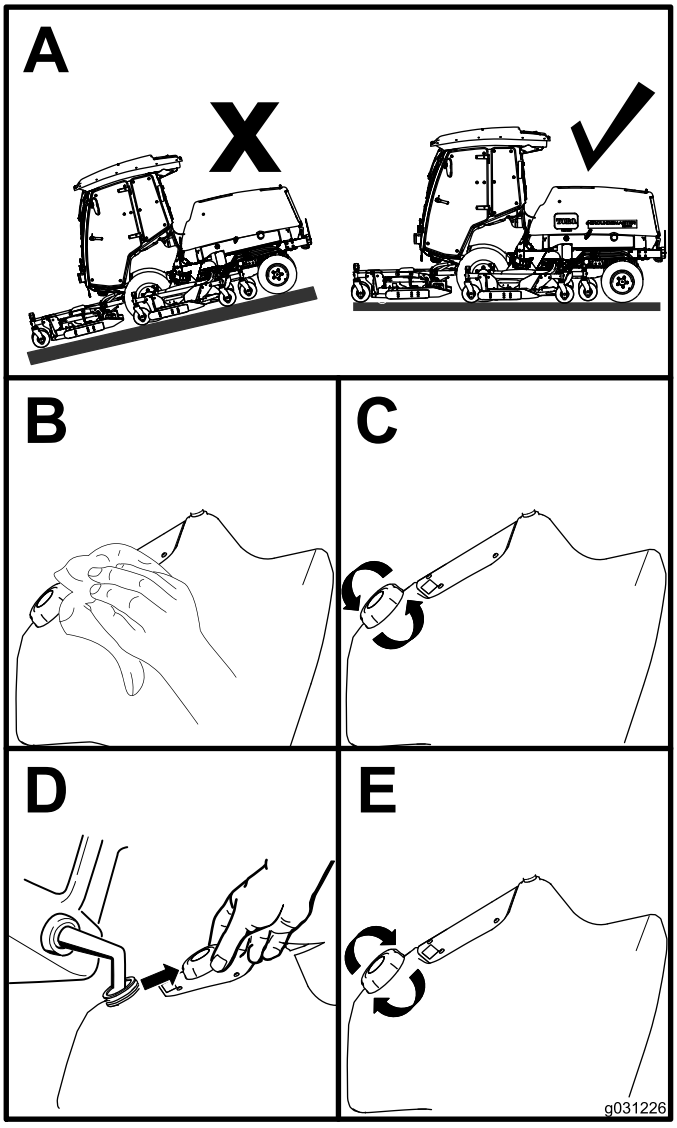
Important: **The petroleum diesel portion must be ultra-low sulfur.**

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 be degraded 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

1. Park the machine on a level surface (Figure 31).
2. Shut off the engine and engage the parking brake.
3. Clean around the fuel-tank cap and remove the cap.
4. Add fuel and install the fuel-tank cap. Wipe up any spilled fuel.



g031226

Figure 31

Checking the Tire Pressure

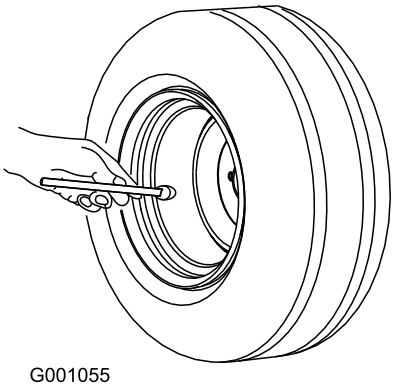
Service Interval: Before each use or daily

The correct air pressure in the front tires is 220 kPa (32 psi) and the rear tires is 207 kPa (30 psi) as shown in Figure 32.

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

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

Traction performance, including tire-slip control, is dependent on the ratio of the tire size between the front and rear tires. Only use genuine Toro tires.



G001055

g001055

Figure 32

Checking the Caster Wheel Tire Pressure

The correct air pressure in the caster wheel tires is 340 kPa (50 psi).

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

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

Checking the Torque of the Wheel-Lug Nuts

Service Interval: 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 135 to 150 N·m (100 to 110 ft-lb) after 10 hours of operation. Torque the nuts every 250 hours thereafter.

Adjusting the Height of Cut

You can adjust the height of cut from 25 to 153 mm (1 to 6 inches) in 13 mm (1/2 inch) increments. To adjust the height of cut, position the caster-wheel axles in the upper or lower holes of the caster forks, add or remove an equal number of spacers from the caster forks, and adjust the rear chain (front deck only) to the desired holes.

Adjusting the Front Mower Deck

1. Start the engine and raise the mower decks so you can change the height of cut.
2. Shut off the engine and remove the key after the mower deck is raised.
3. Position the caster-wheel axles in the same holes in all of the caster forks; refer to the chart (Figure 33) to determine the correct holes for the setting.

   Note: To prevent grass buildup between the wheel and the fork, operate the machine at the 76 mm (3 inches) height of cut or higher and install the axle bolt in the bottom caster-fork hole. When operating the machine at a height of cut lower than 76 mm (3 inches) and when you detect grass buildup, reverse the direction of the machine to pull any clippings away from the wheel and fork.

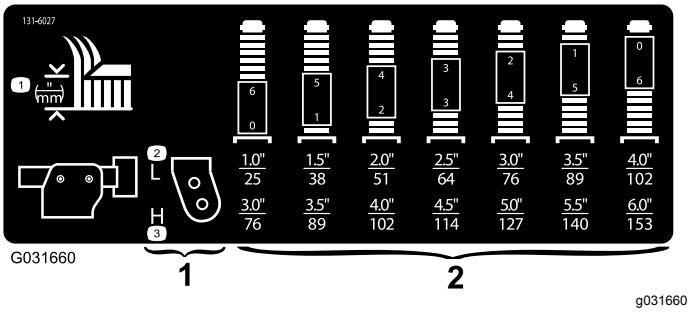


Figure 33

1. Caster wheel height-of-cut mounting holes
2. Caster fork height-of-cut spacers

4. Using the supplied caster-cap wrench, loosen the tensioning cap and remove it from the caster-spindle shaft and slide the caster shaft out of the caster arm (Figure 34).

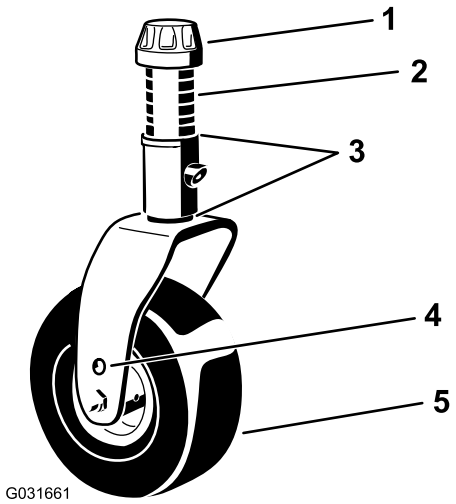


Figure 34

1. Tensioning cap
2. Spacers (6)
3. Shims (2 top and 2 bottom)
4. Top axle-mounting hole
5. Caster wheel

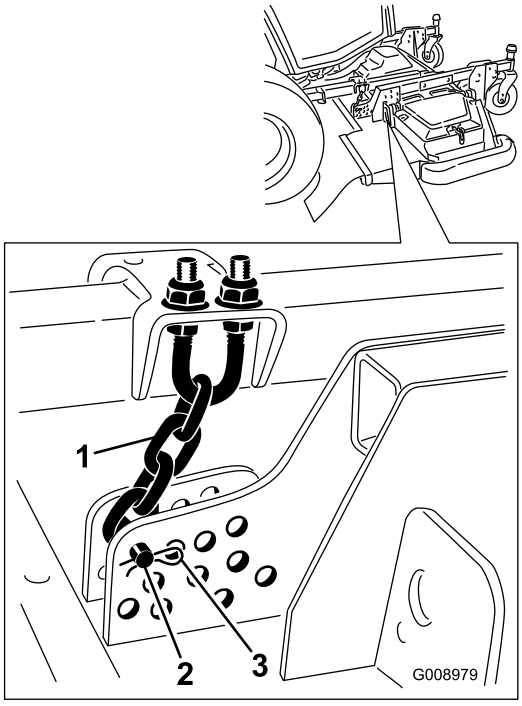
5. Slide the appropriate number of spacers onto the shaft to get the desired height of cut.

   Note: Refer to the chart to determine the combinations of spacers for the setting (Figure 33).

   Note: You may use the shims in any combination above or below the caster-arm hub (as required) to achieve the desired height of cut or deck level.

6. Push the caster shaft through the front caster arm.
7. Install the shims (as originally installed) and the remaining spacers onto the shaft (Figure 34).

8. Install the tensioning cap and tighten it with the supplied caster-cap wrench to secure the assembly (Figure 34).
9. Remove the hairpin cotter and clevis pin securing the height-of-cut chains to the rear of the mower deck (Figure 35).



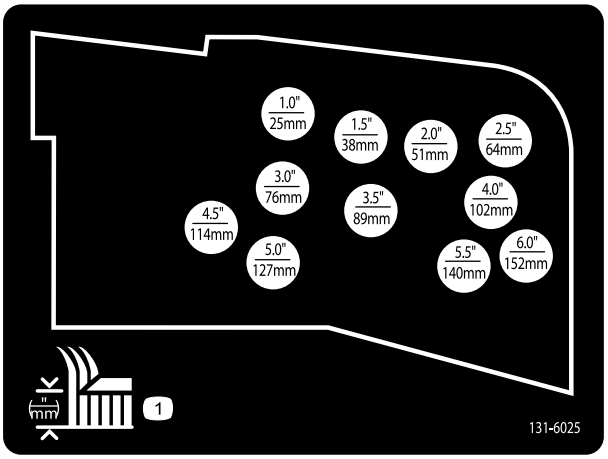
g008979

Figure 35

1. Height-of-cut chain
2. Clevis pin
3. Hairpin cotter

10. Mount the height-of-cut chains to the desired height-of-cut hole with the clevis pin and hairpin cotter (Figure 36).

    Note: When mowing at a height of cut below 51 mm (2 inches), move the skids, gage wheels, and rollers to the highest holes.



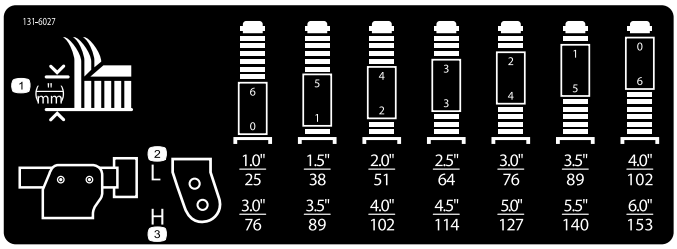
decal131-6025

Figure 36

Adjusting the Wing Mower Decks

1. Start the engine and raise the mower decks so you can change the height of cut.
2. Shut off the engine and remove the key after you raise the mower deck.
3. Position the caster-wheel axles in the same holes in all of the caster forks; refer to the chart to determine the correct holes for the height-of-cut setting (Figure 37).

    Note: To prevent grass buildup between the wheel and the fork, operate the machine at the 76 mm (3 inches) height of cut or higher and install the axle bolt in the bottom caster-fork hole. When operating the machine at a height of cut lower than 76 mm (3 inches) and when you detect grass buildup, reverse the direction of the machine to pull any clippings away from the wheel and fork.



g031395

g031395

Figure 37

4. Using the supplied caster-cap wrench, loosen the tensioning cap and remove it from the caster-spindle shaft and slide the caster shaft out of the caster arm (Figure 38).

    Note: You may use shims in any combination above or below the caster arm hub as required to achieve the desired height of cut or deck level.

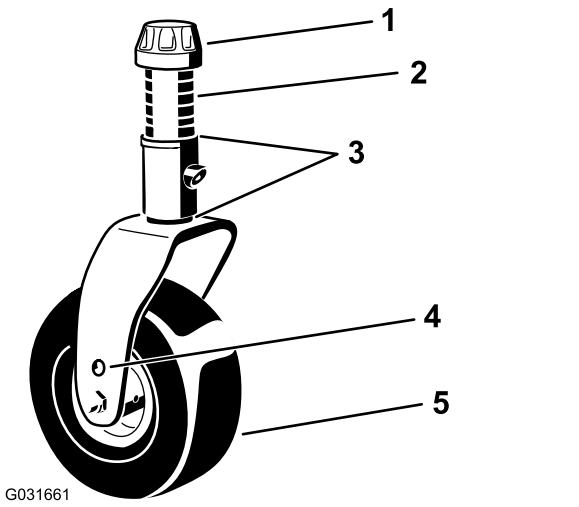


Figure 38

1. Tensioning cap
2. Spacers (6)
3. Shims (2 top and 2 bottom)
4. Top axle-mounting hole
5. Caster wheel

5. 5. Install 2 shims onto the shaft as originally installed and slide the appropriate number of spacers onto the shaft to get the desired height of cut.
6. Push the caster shaft through the caster arm.
7. Install the shims (as originally installed) and the remaining spacers onto the shaft.
8. Install the tensioning cap and tighten it with the supplied caster-cap wrench to secure the assembly.

Adjusting the Skids

Adjusting the Inner Skids

Mount the inner skids in the lower position when operating at heights of cut greater than 51 mm (2 inches) and in the higher position when operating at heights of cut lower than 51 mm (2 inches).

Adjust the inner skids (Figure 39).

Important: **Torque the screw at the front of each inner skid to 9 to 11 N·m (80 to 100 in-lb).**

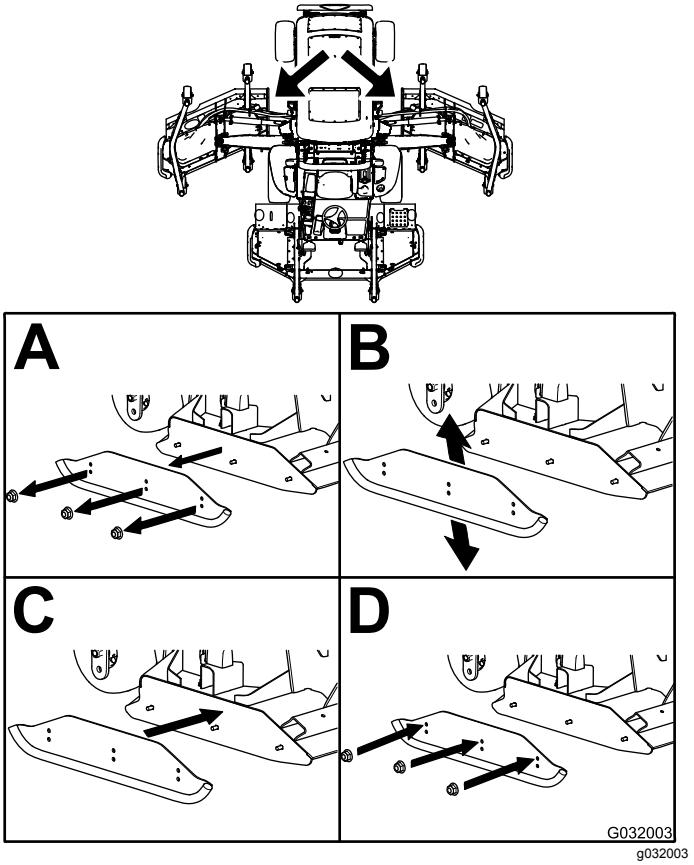


Figure 39

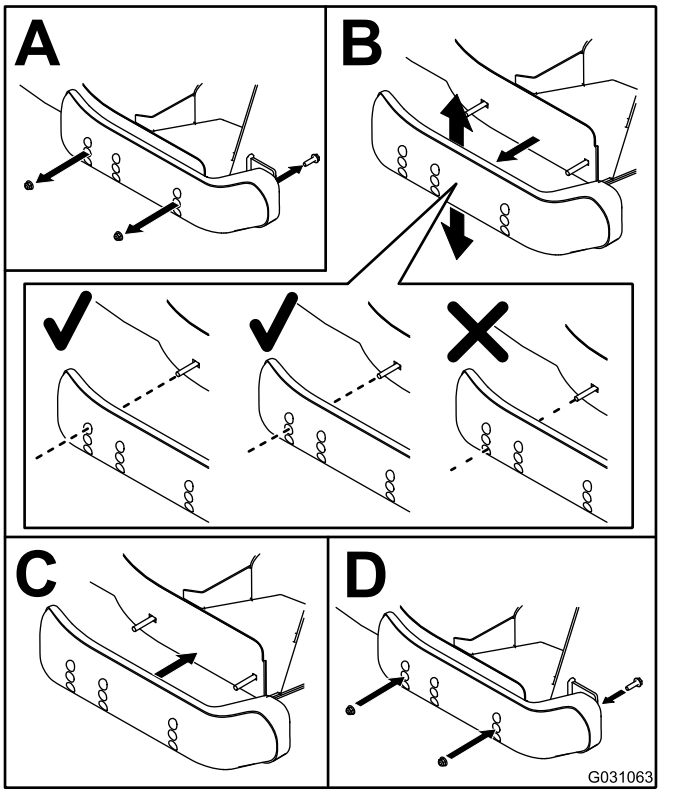
Adjusting the Outer Skids

Mount the outer skids in the lower position when operating at heights of cut greater than 51 mm (2 inches) and in the higher position when operating at heights of cut lower than 51 mm (2 inches).

Note: When the outer skids become worn, you can switch them to the opposite sides of the mower by flipping them over. This allows you to use the outer skids longer before replacing them.

Adjust the outer skids (Figure 40).

Important: **Torque the screw at the front of each outer skid to 9 to 11 N·m (80 to 100 in-lb).**



g031063

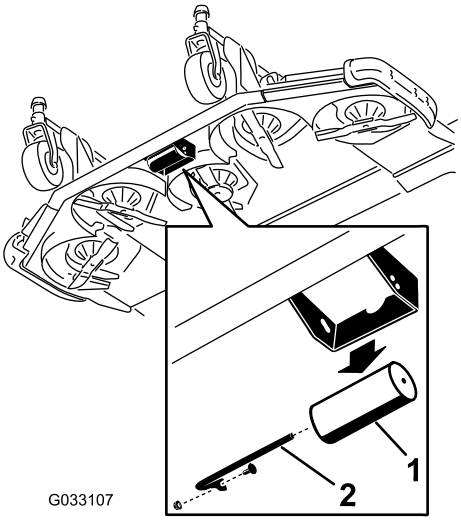
Figure 40

Adjusting the Mower Deck Anti-Scalp Rollers

Mount the roller in the lower position when operating at heights of cut greater than 51 mm (2 inches) and in a higher position when operating at heights of cut lower than 51 mm (2 inches).

Adjusting the Roller

1. Remove the roller shaft, screw, and nut securing the roller to the deck bracket (Figure 41).

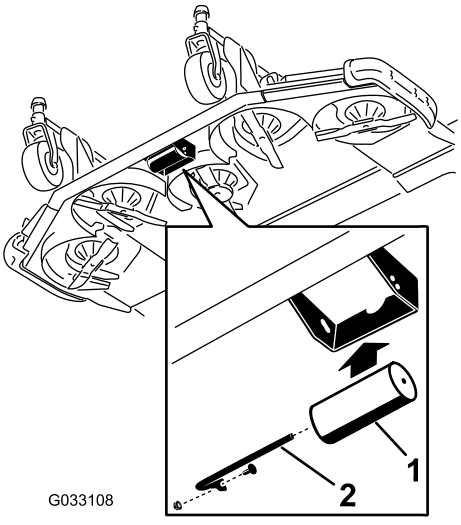


g033107

Figure 41

1. Roller
2. Roller shaft, screw, and nut

2. Align the roller with the top holes and install the shaft with the screw and nut (Figure 42).



g033108

Figure 42

1. Roller
2. Roller shaft, screw, and nut

Checking a Mismatch Between Mower Decks

Due to differences in grass conditions and the counterbalance setting of the traction unit, you should cut the grass and check the appearance before you begin mowing the entire area.

1. Set all mower decks to the desired height of cut; refer to Adjusting the Height of Cut (page 38).
2. Check and adjust the front and rear tire pressure.

   Note: The correct air pressure in the front tires is 220 kPa (32 psi) and the rear tires is 207 kPa (30 psi).
3. Check and adjust all caster tire pressures to 340 kPa (50 psi).
4. Check the lift and counterbalance pressures with the engine throttle at HIGH IDLE using the test ports; refer to Inspecting the Hydraulic System Test Ports (page 88).
5. Check for bent blades; refer to Checking for a Bent Blade (page 92).
6. Cut grass in a test area to determine if all mower decks are mowing at the same height.
7. If you need to adjust a mower deck, find a flat surface using a 2 m (6 ft) or longer straight edge to ensure that the surface is flat.
8. To ease measuring the blade plane, raise the height of cut to the highest position; refer to Adjusting the Height of Cut (page 38).
9. Lower the mower decks onto the flat surface and remove the covers from the tops of the mower decks.

Wing Mower Decks

1. Rotate the blade of each spindle until the ends face forward and backward.
2. For the outside blade spindle only, equally adjust the shims on the front caster forks to match the desired height of cut.
3. Measure from the floor to the front tip of the mowing blade.
4. Rotate the blade 180° and measure from the floor to the tip of the mowing blade.

   Note: The rear of the blade should be 7.5 mm (0.3 inch) higher than the front.

   Note: If you need to make an adjustment, adjust the shims on the rear caster forks.

Matching the Height of Cut Between Mower Decks

1. Position the blade side to side on the outside spindle of both wing mower decks.
2. Measure from the floor to the tip of the cutting edge on both units and compare the measurements.

   Note: These numbers should be within 3 mm (1/8 inch) of each other. Make no adjustment at this time.
3. Position the blade side to side on the inside spindle of the wing mower deck and the corresponding outside spindle of the front mower deck.
4. Measure from the floor to the tip of the cutting edge on the inside edge of the wing mower deck to the corresponding outside edge of the front mower deck and compare.

   Note: The wing mower deck caster wheels should remain on the ground with counterbalance applied.

   Note: If you need to make an adjustment to match the cut between the front and wing mower deck, make them to the wing mower decks only.
5. If the inside edge of the wing mower deck is too high relative to the outside edge of the front mower deck, remove 1 shim from the bottom of the front, inside caster arm on the wing mower deck (Figure 43 and Figure 44).

   Note: Check the measurement between the outside edges of both wing mower decks and the inside edge of the wing mower deck to outside edge of the front mower deck again.

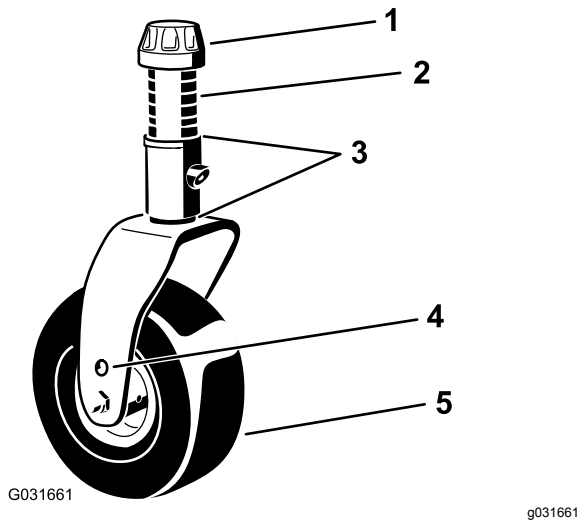


Figure 43

1. Tensioning cap
2. Spacers (6)
3. Shims (2 top and 2 bottom)
4. Top axle-mounting hole
5. Caster wheel

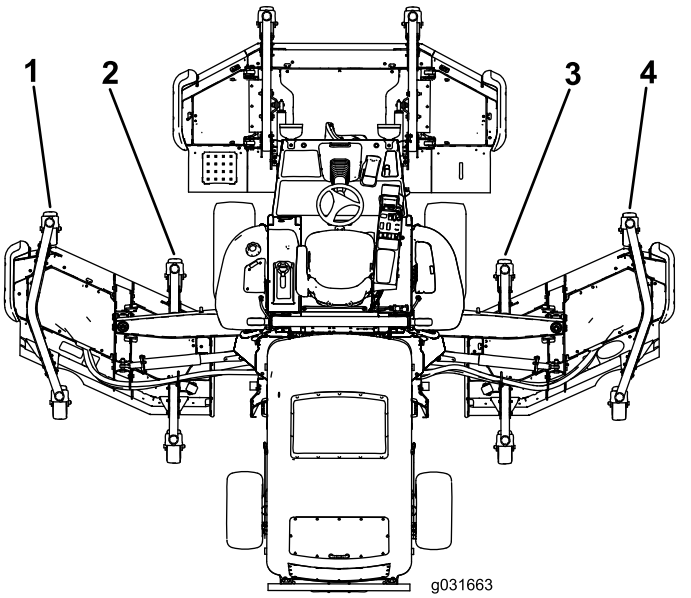


Figure 44

1. Left, front, outside caster arm
2. Left, front, inside caster arm
3. Right, front, inside caster arm
4. Right, front, outside caster arm

6. If the inside edge is still too high, remove an additional shim from the bottom of the front, inside caster arm of the wing mower deck and 1 shim from the front, outside caster arm of the wing mower deck (Figure 43 and Figure 44).
7. If the inside edge of the wing mower deck is too low relative to the outside edge of the front mower deck, add 1 shim (1/8 inch) to the bottom of the front, inside caster arm on the wing mower deck (Figure 43 and Figure 44).

Note: Check the measurement between the outside edges of both wing mower decks and the inside edge of the wing mower deck to the outside edge of the front mower deck again.

8. If the inside edge is still too low, add an additional shim to the bottom of front, inside caster arm of the wing mower deck and 1 shim to the front, outside caster arm of the wing mower deck.
9. Once the mowing height matches at the edges of the front and wing mower decks, verify that the mower deck unit pitch is still 7.6 mm (0.3 inch).

Adjusting the Mirrors

Model 31699 Only

Rear-View Mirror

While sitting in the seat, adjust the rear-view mirror to attain the best view out of the rear window. Pull the lever rearward to tilt the mirror to reduce the brightness and glare of light (Figure 45).

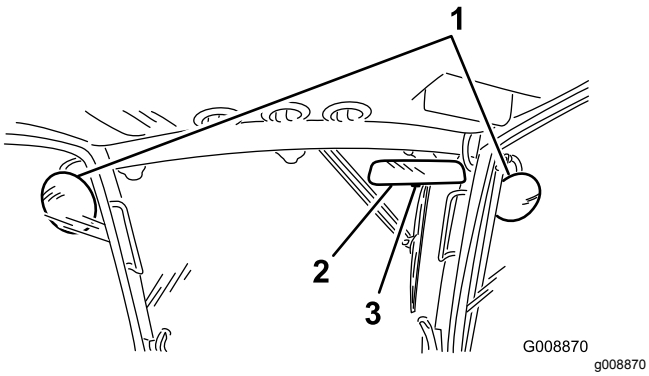


Figure 45

1. Side-view mirrors
2. Rear-view mirror
3. Lever

Side-View Mirrors

While sitting in the seat, have another person adjust the side-view mirrors to attain the best view around the side of the machine (Figure 45).

Aiming the Headlights

Model 31698 Only

1. Loosen the mounting nuts and position each headlight so that it points straight ahead.

   Note: Tighten the mounting nut just enough to hold the headlight in position.
2. Place a flat piece of sheet metal over the face of the headlight.
3. Mount a magnetic protractor onto the plate.
4. While holding the assembly in place, carefully tilt the headlight downward 3° then tighten the nut.
5. Repeat this procedure on the other headlight.

Checking the Safety-Interlock Switches

⚠ CAUTION

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

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

The machine safety-interlock system is designed to disable the traction drive when the operator leaves the seat with the traction pedal out of the NEUTRAL position. The deck drive also disengages under the same condition. However, you may get off the seat while the engine is running if the traction pedal is in the NEUTRAL position.

1. Drive the machine slowly to a large, open area.
2. Lower the mower deck(s), shut off the engine, and engage the parking brake.

Checking the Traction Neutral Safety-Interlock Function

1. Move the traction pedal out of the NEUTRAL position and start the engine.

   Note: The engine should not start. If it does start, there is a malfunction in the interlock system that you should correct before resuming operation.
2. Remove your foot from the traction pedal, start the engine, and engage the parking brake.
3. With the engine running, move the traction pedal out of the NEUTRAL position.

   Note: The traction drive should not function. If it does function, there is a malfunction in the interlock system that you should correct before resuming operation.

Checking the PTO Safety-Interlock Function

1. Start the engine.
2. With the engine running, rise from the seat and engage the PTO.

   Note: The PTO should not engage. If it does engage, there is a malfunction in the interlock system that you should correct before resuming operation.
3. Sit on the seat and disengage the PTO.
4. With the engine running, engage the PTO and rise from the seat.

   Note: The PTO drive should disengage after a 1-second delay. If it does not shut off, there is a malfunction in the interlock system that you should correct before resuming operation.
5. Sit on the seat, disengage the PTO, and start the engine.
6. With the engine running, engage the PTO and raise each mower deck individually.

   Note: The blades of the raised mower deck should stop. If the blades do not stop, there is a malfunction in the interlock system that you should correct before resuming operation.

Checking the Blade Stopping Time

Service Interval: Before each use or daily

The blades of the mower deck should come to a complete stop in approximately 5 seconds after you shut down the mower-deck-engagement switch.

Note: Ensure that the decks are lowered onto a clean section of turf or hard surface to avoid thrown dust and debris. To verify the stopping time, have someone stand back from the deck at least 6 m (20 ft) and watch the blades on 1 of the mower decks. Shut the mower decks down and record the time that it takes for the blades to come to a complete stop. If the time is greater than 7 seconds, adjust the braking valve; contact your Toro Distributor for assistance in making this adjustment.

During Operation

During Operation Safety

General Safety

- The owner/user can prevent and is responsible for accidents that may cause injuries to himself/herself and others and for damage to property.
- Wear appropriate clothing, including eye protection; slip-resistant, substantial footwear; and hearing protection. Wearing safety shoes and long pants is advisable and required by some local ordinances and insurance regulations. Tie back long hair, secure loose clothing, and do not wear jewelry.
- Ensure that all drives are in the NEUTRAL position, the parking brake is engaged, and you are in the operating position before you start the engine.
- Keep all body parts, including hands and feet, away from all moving parts.
- Do not operate the machine while ill, tired, or under the influence of alcohol or drugs.
- Keep the direction of the mower discharge away from people and pets.
- Do not mow in reverse unless it is absolutely necessary. If you must mow in reverse, look behind and down for small children before and while moving the machine in reverse. Stay alert and stop the machine if a child enters the area.
- Use extreme care when approaching blind corners, shrubs, trees, or other objects that may block your view.
- 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 caves in.
- Never carry passengers on the machine.
- Operate the machine only in good visibility and appropriate weather conditions. Do not operate the machine when there is the risk of lighting.
- Do not mow on wet grass. Reduced traction could cause the machine to slide.
- Never raise the mower deck with the blades running.
- 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.
- Stop the blades whenever you are not mowing, especially while crossing loose terrain such as gravel.

- Slow down and use caution when making turns and crossing roads and sidewalks with the machine. Always yield the right-of-way.
- Turn on the flashing warning lights on the machine whenever you travel on a public road, except where such use is prohibited by law.
- Disengage the drive to the attachment and shut off the engine before adding fuel and adjusting the height of cut.
- Reduce the throttle setting before stopping the engine and, if the engine has a fuel-shutoff valve, shut off the fuel when you have finished operating the machine.
- Never run an engine in an area where exhaust gases are enclosed.
- Never leave a running engine unattended.
- Before leaving the operating position, do the following:
  - Stop the machine on level ground.
  - Disengage the power take-off and lower the attachments.
  - Set the parking brake.
  - Shut off the engine and remove the key.
  - Wait for all moving parts to stop.
- Do not change the governor settings on or overspeed the engine. Operating the engine at excessive speed may increase the potential for personal injury.
- Do not use the machine as a towing vehicle.
- Use accessories and attachments 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 the event of an emergency.
- Always wear your seat belt when the ROPS is up.
- Check carefully for overhead clearances, such as branches, doorways, and electrical wires, before driving the machine under them. 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 revise it.
- Any alterations to a ROPS must be approved by The Toro® Company.

Slope Safety

- Slow down the machine and use extra care on hillsides. Travel in the recommended direction on hillsides. Turf conditions can affect the stability of the machine.
- Avoid starting, stopping, or turning the machine on a slope. If the tires lose traction, disengage the blade(s) and proceed slowly straight down the slope.
- Do not turn the machine sharply. Use care when reversing the machine.
- When operating the machine on a slope, always keep all cutting units lowered.
- Avoid turning the machine on slopes. If you must turn, turn slowly and gradually downhill, if possible.
- Use extra care while operating the machine with attachments; they can affect the stability of the machine.

Starting and Stopping the Engine

1. Ensure that the parking brake is engaged.
2. Remove your foot from the traction pedal and ensure that it is in the NEUTRAL position.
3. Turn the ignition key to the RUN position.
4. When the glow indicator dims, turn the ignition key to the START position.
5. Release the key immediately when the engine starts and allow it to return to the RUN position.
6. Allow the engine to warm up at low speed (without load) for 3 to 5 minutes, then actuate the throttle switch to attain the desired engine speed.

   Important: **The starter motor automatically disengages after 30 seconds to prevent premature starter motor failure. If the engine fails to start after 30 seconds, turn the key to the OFF position, check the controls and procedures again, wait 2 minutes, and repeat the starting procedure.**

   Note: When the hydraulic-oil temperature is below 4°C (40°F), the machine operates in a warm-up mode; limiting the engine speed to 1,650 rpm and preventing traction-drive operation in High range. When the oil temperature reaches 4°C (40°F), the warm-up mode disables.
7. To stop the engine, set the throttle switch to the LOW-IDLE position, move the PTO switch to the

OFF position, set the parking brake, and turn the ignition key to OFF.

8. Remove the key from the switch to prevent accidental starting.

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 turbo-charger complications.**

Raising or Lowering the Decks

Raising the Decks

1. While sitting in the operator's seat, start the engine.

   Note: Whenever you are running the machine at **under 2,000 rpm** (e.g., when you are running the engine at idle or transporting the machine into or out of a building), you will not be able raise all the mowers at once. Instead, you can only raise 1 mower deck at a time.

2. Push the deck-lift switches rearward to raise the decks.

Lowering the Decks

1. While sitting in the operator's seat, turn the ignition key to the RUN position.
2. Using the handle, unhook the latches holding the decks in the raised position (Figure 46).

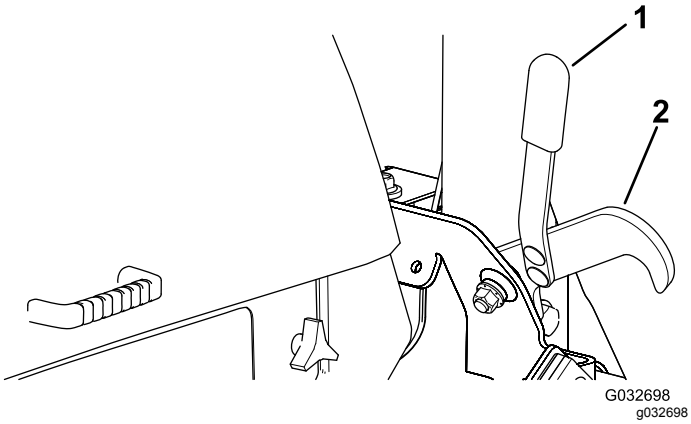


Figure 46

1. Handle
2. Latch

3. Push the deck-lift switches forward to lower the decks.

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.

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 (1112°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	Regeneration Icon	Fault Code	Engine Power Rating	Recommended Action
Level 1: Engine Warning	 g211812 **Figure 47**	 g214934 **Figure 48** Check Engine	The computer de-rates the engine power to 85%.	Perform a parked regeneration as soon as possible; refer to Parked Regeneration (page 53).
Level 2: Engine Warning	 g211810 **Figure 49**	 g214934 **Figure 50** Check Engine	The computer de-rates the engine power to 50%.	Perform a recovery regeneration as soon as possible; refer to Recovery Regeneration (page 53).

DPF Ash Accumulation

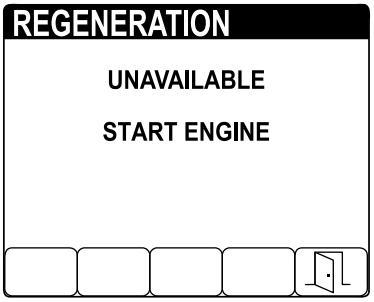
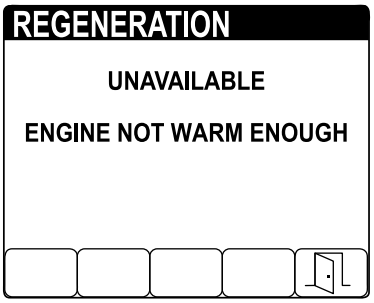
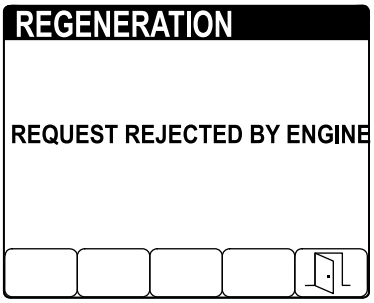
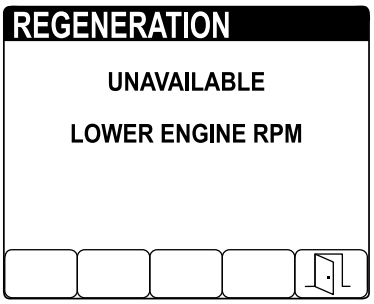
- The lighter ash is discharged through the exhaust system; the heavier ash collects in the soot filter.
- Ash is a residue of the regeneration process. Over time, the diesel particulate filter accumulates ash that does not discharge with the engine exhaust.
- The computer for the engine calculates the 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 Active Fault Messages—Ash Accumulation

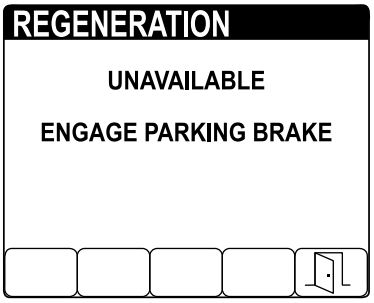
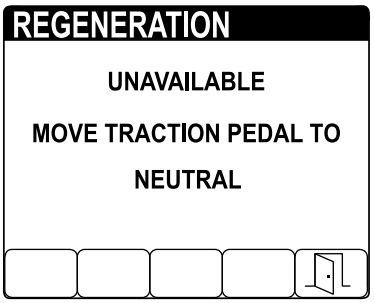
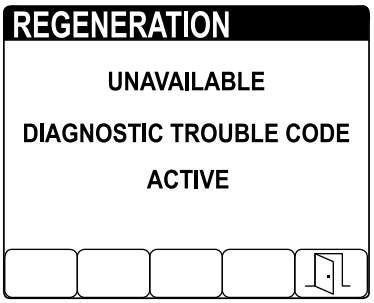
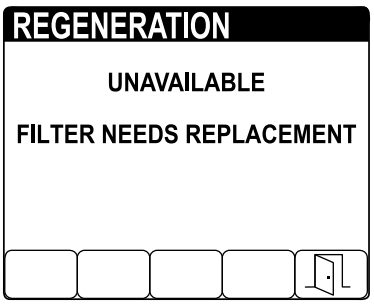
Indication Level	Active Fault	Engine Speed Reduction	Engine Power Rating	Recommended Action
Level 2: Engine Warning	 g214980 **Figure 51** Check Engine SPN 3720 Too High Severe	None	The computer de-rates the engine power to 85%	Service the DPF; refer to Servicing the Diesel-Oxidation Catalyst (DOC) and the Soot Filter (page 74).
Level 3: Engine Warning	 g214979 **Figure 52** Check Engine SPN 3720	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 74).
Level 4: Engine Warning	 g214978 **Figure 53** Check Engine SPN 3251 High	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 74).

Regeneration Unavailable Messages

Unavailable Message Table

Message	Condition	Recommended Action
 g214114 **Figure 54**	The engine is not running.	Start the engine.
 g214111 **Figure 55**	The engine coolant temperature is cooler than 60°C (140°F).	Run the engine until the coolant temperature is hotter than 60°C (140°F).
 g214488 **Figure 56**	The engine ran less than 50 hours since last regeneration.	Operate the machine until the parked regeneration icon displays in the InfoCenter.
	The exhaust temperature is less than 250°C (482°F)	Run the engine at full throttle or under high load before starting the parked regeneration.
	The engine ran less than 50 hours since last regeneration and the exhaust temperature is less than 250°C (482°F).	Operate the machine until the parked regeneration icon displays in the InfoCenter and run the engine at full throttle or under high load before starting the parked regeneration.
 g214137 **Figure 57**	The engine speed is faster that slow idle.	Reduce the engine speed to slow idle.

Unavailable Message Table (cont'd.)

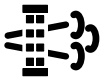
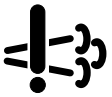
Message	Condition	Recommended Action
 g214110 **Figure 58**	The parking brake is not engaged.	Engage the parking brake.
 g214113 **Figure 59**	The traction pedal is in the FORWARD or REVERSE position.	Move the traction pedal to the NEUTRAL position.
 g214109 **Figure 60**	The engine computer has sent a diagnostic trouble code.	Troubleshoot the diagnostic fault code and/or repair the engine.
 g214112 **Figure 61**	The soot filter needs service.	Refer to Servicing the Diesel-Oxidation Catalyst (DOC) and the Soot Filter (page 74).

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 53).
Assist	Occurs as a result of low-engine speed, low-engine load, or after the computer detects back pressure in the DPF	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 53).
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	During reset regeneration, the computer controls the intake throttle and fuel injectors to increase the exhaust temperature during regeneration. Refer to Reset Regeneration (page 53).

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 53).
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. • A recovery regeneration requires approximately 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 53).

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

- 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.

Reset Regeneration

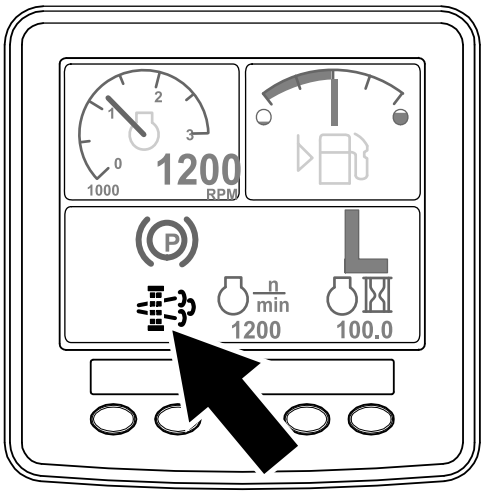
- The computer takes control of the intake throttle and changes the fuel injection operation to increase the temperature of the engine exhaust.

  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.

Parked Regeneration and Recovery Regeneration

Parked Regeneration

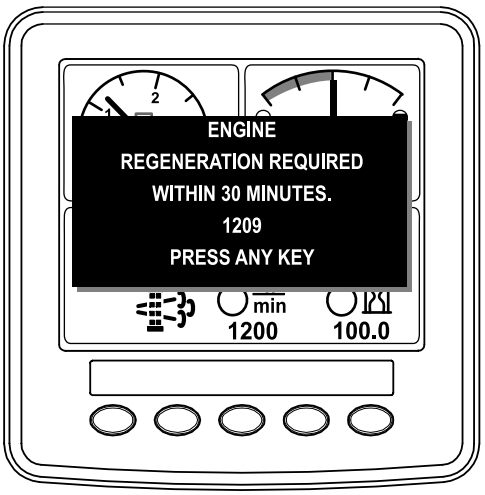
- The parked-regeneration requested icon displays in the InfoCenter (Figure 62).



g214646

Figure 62

- If you ignore the request for a parked regeneration (displayed in the InfoCenter) and continue to operate the machine (Figure 63), a critical amount of soot may accumulate in the DPF.



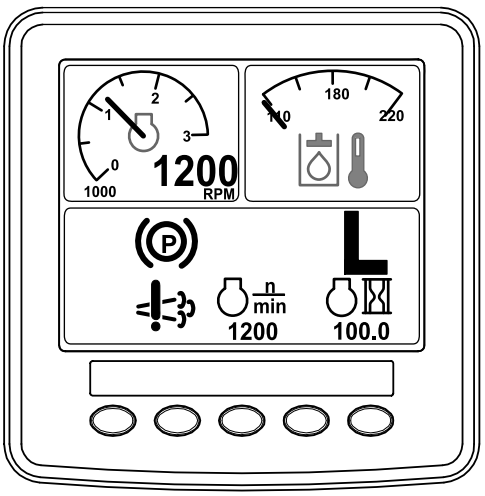
g214645

Figure 63

- If you are authorized by your company, you need the PIN code to perform the parked-regeneration process.

Recovery Regeneration

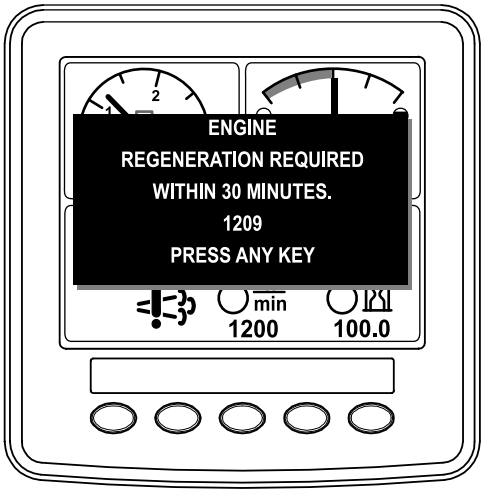
- The recovery-regeneration icon displays in the InfoCenter (Figure 64).



g214648

Figure 64

- If you ignore the request for a parked regeneration (displayed in the InfoCenter) and continue to operate the machine (Figure 65), a critical amount of soot may accumulate in the DPF.



g214647

Figure 65

- If you are authorized by your company, you need the PIN code to perform the recovery-regeneration process.

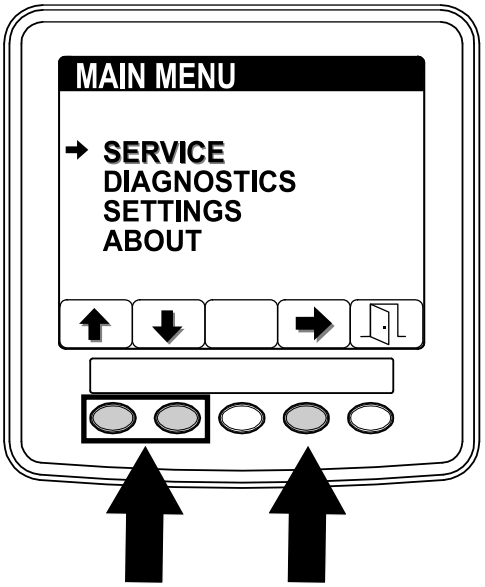
Preparing to Perform a Parked or Recovery Regeneration

1. Ensure that the machine has fuel in the tank for the type of regeneration you are performing:
   - **Parked Regeneration:** Ensure that you have 1/4 tank of fuel before performing the parked regeneration.
   - **Recovery Regeneration:** Ensure that you have 1/2 tank of fuel before performing the recovery regeneration.
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 the Regeneration

Note: For instructions on unlocking protected menus, refer to Accessing Protected Menus on the Software Guide for you machine.

1. On the MAIN MENU, press button 1 or button 2 to navigate to the SERVICE option, and press button 4 to select the SERVICE entry (Figure 66).

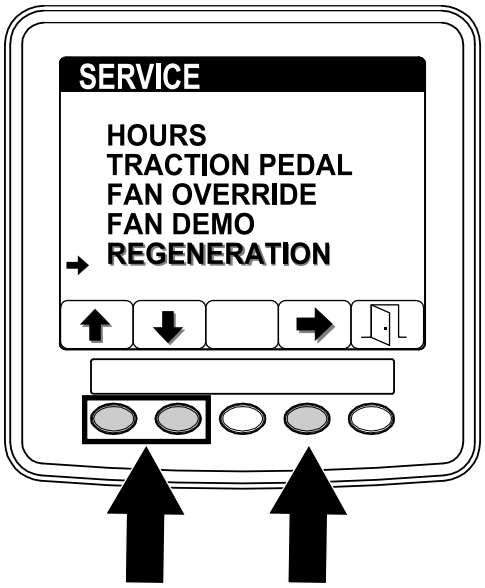


g214884

Figure 66

2. On the SERVICE menu, press button 1 or button 2 to navigate to the REGENERATION option, and press button 4 to select the REGENERATION entry (Figure 67).

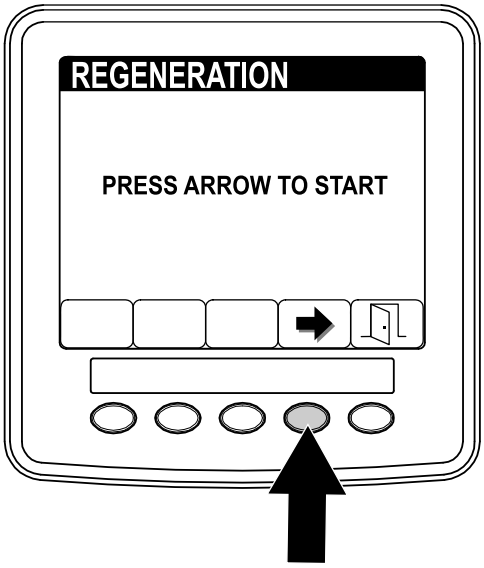
   If an UNAVAILABLE MESSAGE displays in the InfoCenter, perform the recommended actions described in the unavailable message table of Regeneration Unavailable Messages (page 50).



g214887

Figure 67

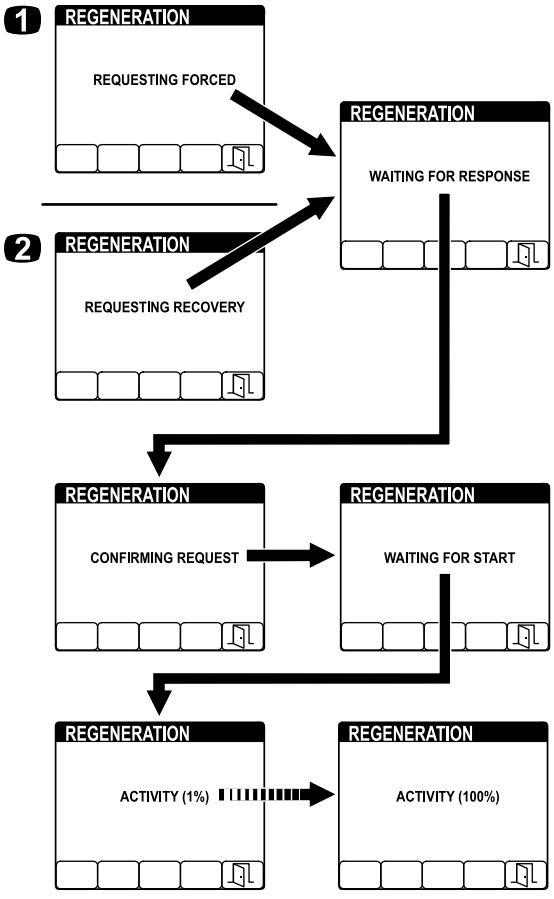
3. On the regeneration screen, press button 4 to start the regeneration process (Figure 68).



g214486

Figure 68

4. The InfoCenter displays a series of screens (Figure 69) as the regeneration processes:

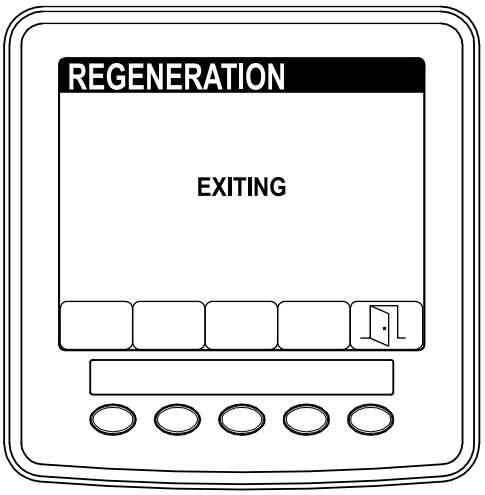


g214903

Figure 69

1. REQUESTING FORCED is displayed during a parked regeneration
2. REQUESTING RECOVERY is displayed during a recovery regeneration

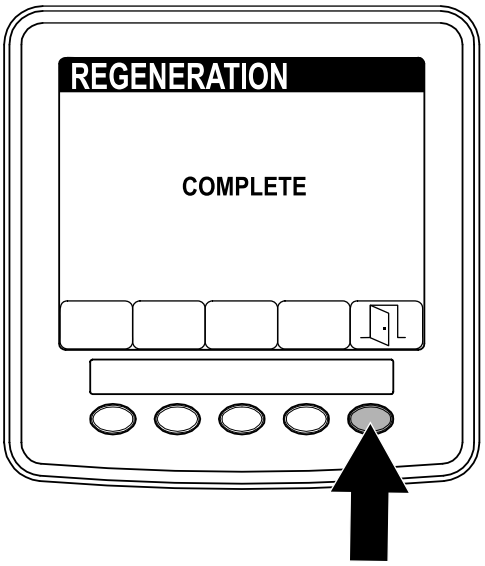
Note: If you press button 5 while the regeneration is processing, you will exit the regeneration process. At the EXIT screen press button 5 to return to the SERVICE menu (Figure 70).



g214485

Figure 70

5. When regeneration completes, the COMPLETE screen displays in the InfoCenter. Press button 5 to return to the SERVICE menu (Figure 71).



g214483

Figure 71

Understanding the Operating Characteristics of the Machine

Practice driving the machine, as it has a hydrostatic transmission, and its characteristics may differ from other turf-maintenance machines.

With Toro Smart Power™, the operator does not have to listen to the engine speed in heavy load conditions. Smart Power prevents the engine from bogging down in heavy cutting conditions by automatically controlling the machine speed and optimizing cutting performance.

If Toro Smart Power™ is disabled, to maintain enough power for the traction unit and implement while operating, regulate the traction pedal to keep the engine speed (rpm) high and constant. Decrease the ground speed as the load on the implement increases, and increase the ground speed as the load decreases.

Allow the traction pedal to move backward as the engine speed (rpm) decreases, and press the pedal slowly as the engine speed increases. By comparison, when driving between work areas, with no load and the mower deck raised, set the throttle in the highest position and press the traction pedal slowly, but fully, to attain maximum ground speed.

Before stopping the engine, disengage all controls and decrease the engine speed to LOW IDLE (1,000 rpm). Turn the ignition key to the OFF position to shut off the engine.

Before transporting the machine, raise the mower decks and secure the transport latches on the wing mower deck (Figure 72).

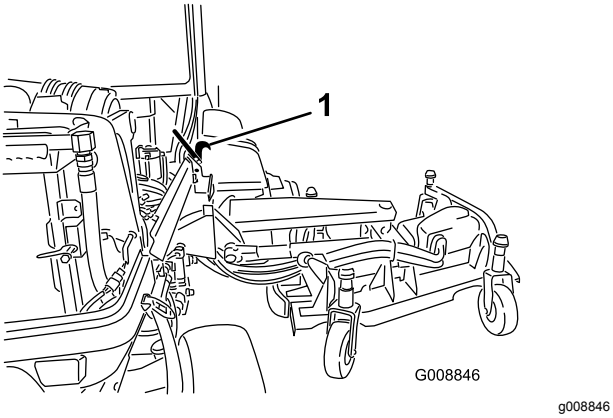


Figure 72

1. Transport latch

Understanding the 12 V and 24 V Electrical Systems

This machine is designed with 2 voltage systems: 12 V and 24 V.

The 12 V system powers all functions of the machine, except for the engine-cooling fans and hydraulic-cooling fans. The 2 large 12 V batteries at the rear, right corner of the machine are connected in parallel to provide 12 V nominal. The 12 V engine alternator charges these batteries.

The 24 V system powers the engine-cooling fans and hydraulic-cooling fans. The 2 small 12 V batteries at the rear, left corner of the machine are connected in series to provide 24 V nominal. The 24 V alternator charges these batteries.

The battery-disconnect switch is located at the rear, right side of the machine. This switch can be used to disconnect power from the batteries during service or maintenance procedures.

Automatic Reversing-Fan Cycle

The hydraulic-fan speed is controlled by hydraulic-oil temperature. The radiator-fan speed is controlled by the engine-coolant temperature. A reverse cycle automatically initiates when either the engine coolant or hydraulic-oil temperature reaches a certain point. This reversal blows debris off the screens, lowering the engine and hydraulic-oil temperatures (Figure 73). Additionally, the radiator fans perform a reverse cycle every 21 minutes regardless of the coolant temperature.



Figure 73

Operating Tips

Selecting the Proper Height-of-Cut Setting

Remove approximately 25 mm (1 inch) or no more than a third of the grass blade when mowing. In exceptionally lush and dense grass, you may need to raise the height-of-cut to the next setting (Figure 74).

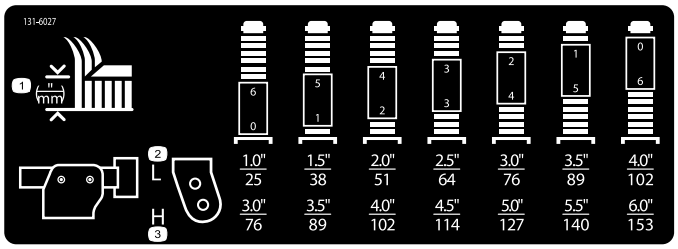


Figure 74

Mowing When 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 direct sunlight can do to sensitive, freshly-mowed grass.

Mowing at the Proper Intervals

Under most normal conditions, you will need to mow approximately every 4 to 5 days. But, grass grows at different rates at different times. So, to maintain the same height of cut (which is a good practice), you will need to cut more frequently in the early spring; as the grass growth rate slows in mid summer, cut only every 8 to 10 days. If you are unable to mow for an extended period due to weather conditions or other reasons, mow first with a high height of cut; then mow again 2 to 3 days later with a lower height setting.

Adjusting the Mower-Deck Pitch

Mower-deck pitch is the difference in height-of-cut from the front of the blade plane to the back of the blade plane. Use a blade pitch of 7.6 mm (0.3 inch). A pitch larger than 7.6 mm (0.3 inch) results in less power required, larger clippings, and a poorer quality of cut. A pitch less than 7.6 mm (0.3 inch) results in more power required, smaller clippings, and a better quality of cut.

Maximizing the Air Conditioner Performance

- To limit solar heating, park the machine in a shaded area or leave the doors open in direct sun.
- Ensure that the air-conditioning screen is clean.
- Ensure that the air-conditioning-condenser fins are clean.
- Operate the air-conditioner blower at the mid-speed setting.
- Ensure that there is a continuous seal between the roof and the headliner and correct it as needed.
- Measure the air temperature at the front, center vent in the headliner. This should typically stabilize at less than or equal to 10° C (50° F).
- Refer to the Service Manual for additional information.

After Operation

After Operation Safety

General Safety

- Clean grass and debris from the cutting units, drives, mufflers, and engine to help prevent fires. Clean up oil or fuel spills.
- Shut off the fuel while storing or transporting the machine.
- Disengage the drive to the attachment whenever you are transporting or not using the machine.
- Use full-width ramps for loading the machine into a trailer or truck. Do not exceed a 15° angle between the ramp and the trailer or truck.
- Tie the machine down securely using straps, chains, cable, or ropes. Both front and rear straps should be directed down and outward from the machine.
- Allow the engine to cool before storing the machine in any enclosure.
- 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.

Towing Safety

- Tow only with a machine that has a hitch designed for towing. Do not attach towed equipment except at the hitch point.
- Follow the manufacturer's recommendation for weight limits for towed equipment and towing on slopes. On slopes, the weight of the towed equipment may cause loss of traction and loss of control.
- Never allow children or others in or on towed equipment.
- Travel slowly and allow extra distance to stop when towing.

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.**

1. Raise the hood and locate the bypass valves on the pump

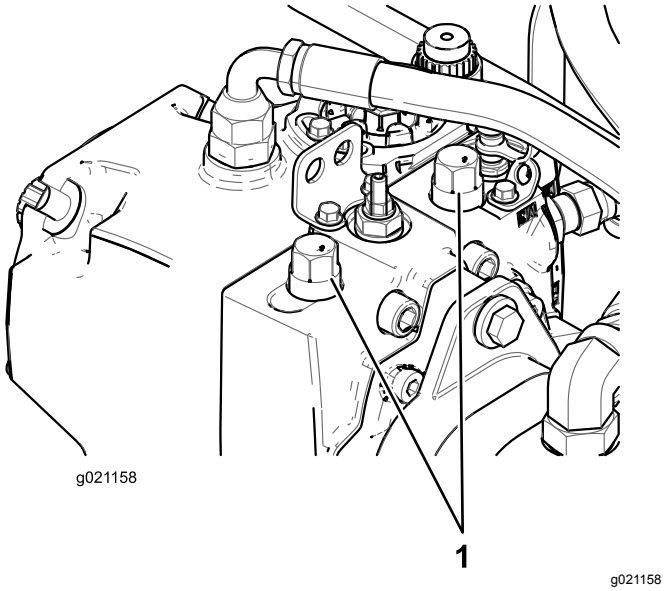
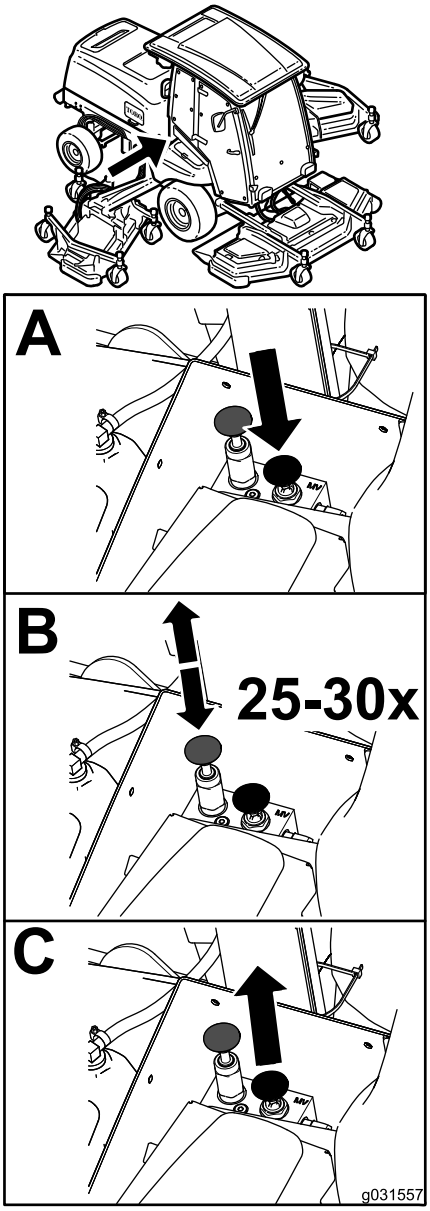


Figure 75

1. Bypass valves (2)

2. Loosen both tow valves on the hydrostatic transmission.
3. Rotate each valve 3 turns counter-clockwise to open and allow oil to bypass internally.
4. Manually release the automatic parking brake using the bypass valve and plunger as shown in Figure 76.



g031557

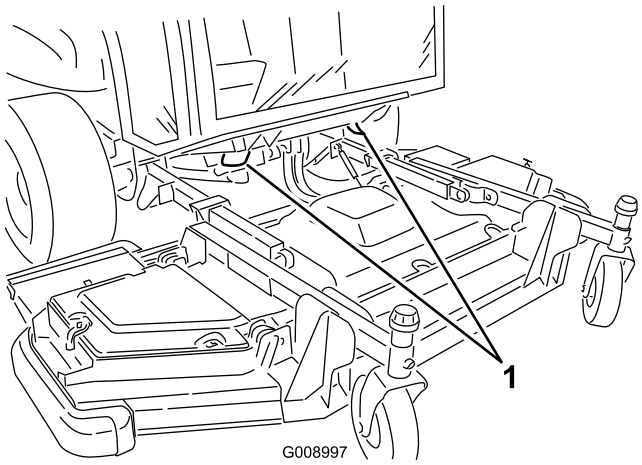
Figure 76

5. Close the bypass valves before starting the engine and torque to 70 N·m (52 ft-lb) to close the valve.

   Note: The manual parking-brake release automatically resets when the engine is started.

Identifying the Tie-Down Points

Front of the machine—under the front of the operator's platform (Figure 77)

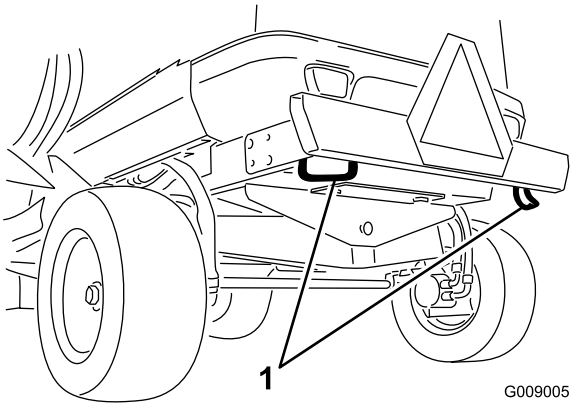


g008997

Figure 77

1. Front tie downs

Rear of the machine—on the bumper (Figure 78)



g009005

Figure 78

1. Rear tie downs

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.

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

Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first 10 hours	• Check the wheel-lug nuts. • Check the 12 V alternator belt. • Check the 24 V alternator belt and AC compressor belt. • Check the blade-bolt torque.
After the first 50 hours	• Change the engine oil and engine-oil filter.
Before each use or daily	• Check the tire pressure. • Check the blade stopping time. • Check the engine-oil level. • Drain the water separator. • Check the engine-coolant level in the overflow reservoir. • Remove debris from the hydraulic-fluid-cooler core and the radiator core with compressed air. • Check the hydraulic-fluid level. • Check the condition of the mower blade. • Check the safety-interlock system.
Every 50 hours	• Lubricate all grease fittings. • Remove the air-cleaner cover and clean out the debris. Do not remove the filter. • Check the condition of the batteries. • Inspect the blade-drive belts. • Check the blade-bolt torque. • Remove all debris and chaff from the engine compartment, radiator, and oil cooler.
Every 100 hours	• Inspect the cooling-system hoses.
Every 250 hours	• Check the wheel-lug nuts. • Clean the cab air filters; replace them if they are torn or excessively dirty. • Clean the air-conditioning-condenser coil. Clean it more frequently in extremely dusty or dirty conditions.
Every 400 hours	• Check the air-cleaner body for damage which could cause an air leak. Replace if damaged. • Check the whole air-intake system for leaks, damage, or loose hose clamps. • Replace the fuel/water separator element.
Every 500 hours	• Change the engine oil and engine-oil filter. • Inspect the fuel lines and connections. • Replace the fuel-filter element. • Inspect the mower deck caster-wheel assemblies.
Every 800 hours	• Drain and clean the fuel tank.
Every 1,000 hours	• Adjust the engine-valve clearance (if necessary). • Calibrate the traction pedal. • Check the rear wheel toe-in. • Flush the engine-cooling system and replace the fluid. • Check the 12 V alternator-belt tension. • Check the 24 V alternator belt and AC compressor-belt tension. • Replace the blade-drive belts. • Change the hydraulic fluid and the 2 hydraulic filters.
Every 1,500 hours	• Clean the engine EGR cooler. • Inspect the engine crankcase-breather system.

Maintenance Service Interval	Maintenance Procedure
Every 2,000 hours	• Check and replace (if necessary) fuel hoses and engine-coolant hoses. • Lap or adjust the engine intake and exhaust valves (if necessary).
Every 3,000 hours	• Inspect and clean (if necessary) the engine-emission-control components and turbocharger.
Every 6,000 hours	• Disassemble, clean, and assemble the soot filter of the DPF. or clean the soot filter if active faults SPN 3251 HIGH, SPN 3720 TOO HIGH SEVERE, or SPN 3720 HIGH display in the InfoCenter.
Every 2 years	• Replace moving hydraulic lines and hoses.

Daily Maintenance Checklist

Duplicate this page for routine use.

	For the week of:						
Maintenance Check Item	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**
Check the safety-interlock operation.							
Check the brake operation.							
Check the engine-oil level.							
Check the cooling-system-fluid level.							
Drain the water/fuel separator.							
Check the air filter, dust cup, and burp valve.							
Check for unusual engine noises.[2]							
Check the radiator and hydraulic-oil-cooler screens for debris and blow out with compressed air.							
Check for unusual operating noises.							
Check the hydraulic-system-oil level.							
Check the hydraulic hoses for damage.							
Check for fluid leaks.							
Check the fuel level.							
Check the tire and caster pressure.							
Check the instrument operation.							
Check the height-of-cut adjustment.							
Lubricate all of the grease fittings.[2]							

Maintenance Check Item	For the week of:						
	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**
Touch up any damaged paint.							

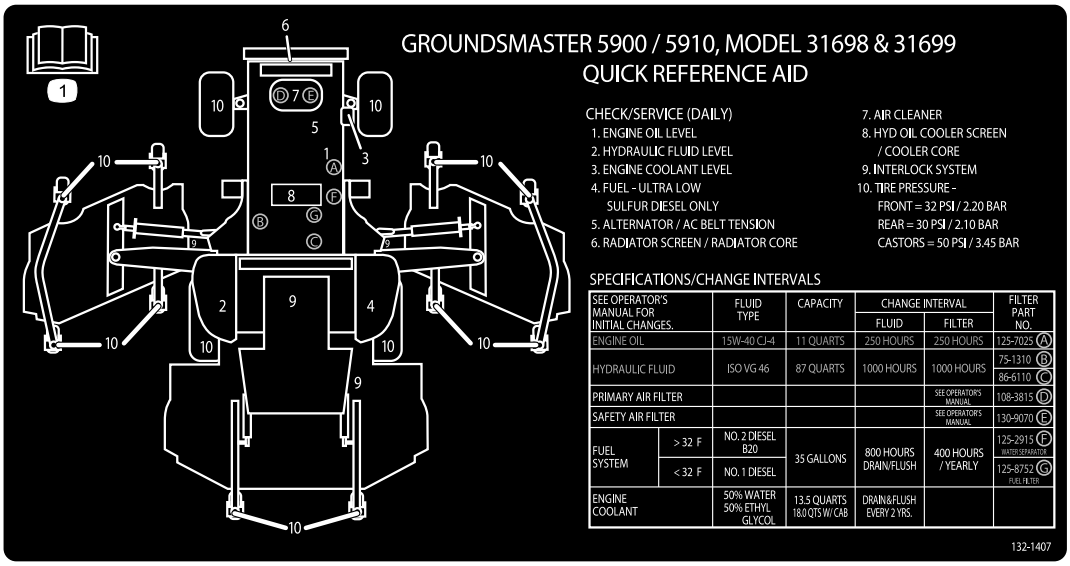
[1]Check the glow plug, injector nozzles and engine air filters if starting is hard, there is excess smoke, or rough running is noted.

[2]Immediately **after every** washing, regardless of the interval listed.

Notation for Areas of Concern

Inspection performed by:		
Item	**Date**	**Information**

Service-Interval Chart



decal132-1407

Figure 79

Pre-Maintenance Procedures

Pre-Maintenance Safety

- Keep all parts of the machine in good working condition and all hardware tightened, especially blade-attachment hardware. Replace all worn or damaged decals.
- Never allow untrained personnel to service the machine.
- Before adjusting, cleaning, or repairing the machine, do the following:
  1. Move the machine to level ground.
  2. Disengage the drives.
  3. Lower the cutting units.
  4. Move the traction pedal to the NEUTRAL position.
  5. Engage the parking brake.
  6. Move the throttle switch to the LOW-IDLE position.
  7. Shut off the engine and remove the key.
  8. Turn the battery-disconnect switch to the OFF position.
  9. Wait for all moving parts to stop.
- Whenever you park or store the machine, or leave it unattended, lower the cutting units unless you use a positive mechanical lock.
- If possible, do not perform maintenance on the machine while the engine is running. If you must run the engine to perform maintenance on the machine, keep your hands, feet, other body parts, and clothing away from all moving parts, the mower-discharge area, and the underside of the mowers.
- Do not touch parts of the machine or an attachment that may be hot from operation. Allow the parts to cool before attempting to maintain, adjust, or service them.
- Use jack stands to support the machine and/or its components when required.
- Carefully release pressure from components with stored energy.
- If your machine requires major repairs or if you desire assistance, contact an Authorized Toro Distributor.
- Use only genuine Toro replacement parts and accessories. Replacement parts and accessories made by other manufacturers could be dangerous, and such use could void the product warranty.

Using the Battery-Disconnect Switch

Open the hood to access the battery-disconnect switch.

Turn the battery-disconnect switch to the ON or OFF position to perform the following:

- To energize the machine electrically, rotate the battery-disconnect switch clockwise to the ON position (Figure 80).
- To de-energize the machine electrically, rotate the battery-disconnect switch counterclockwise to the OFF position (Figure 80).

Important: **Do not turn the battery-disconnect switch to the OFF position while the engine is running. Ensure that the machine is shut off before turning the battery-disconnect switch to the OFF position, as you may cause damage to the engine and/or machine.**

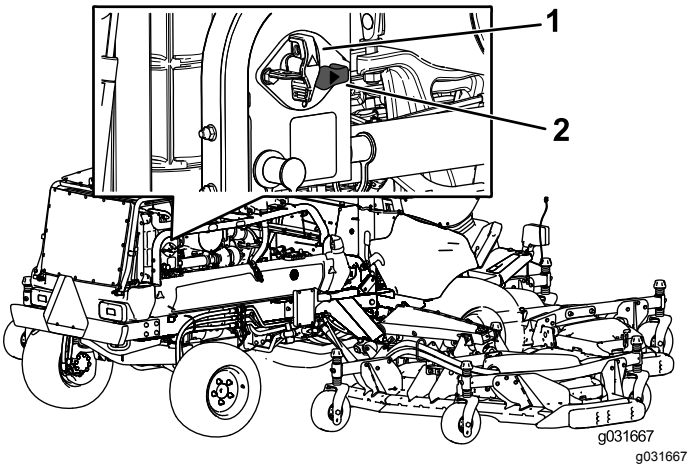


Figure 80

1. Battery-disconnect switch (OFF position)
2. Battery-disconnect switch (ON position)

Raising the Machine

Use the following as points to jack up the machine:

Front of the machine—on the frame, on the inside of each drive tire (Figure 81)

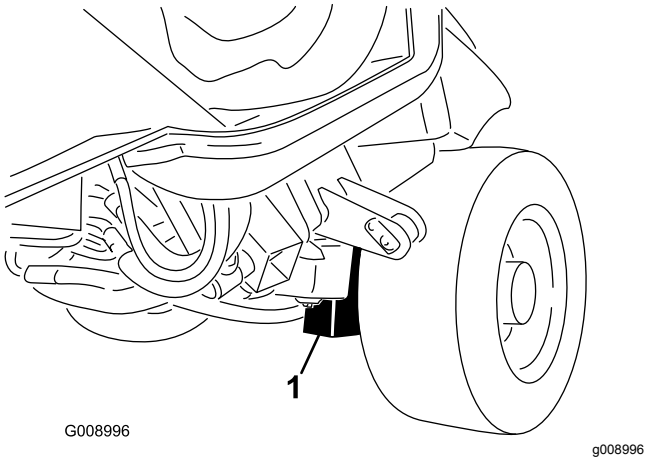


Figure 81

1. Front jacking point (2)

Rear of the machine—at the center of the axle (Figure 82)

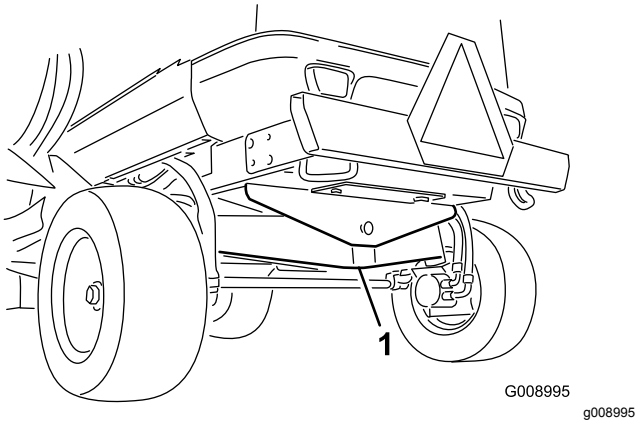


Figure 82

1. Rear jacking point

Removing and Installing the Inner-Wing-Deck Covers

Removing the Inner-Wing-Deck Covers

1. Lower the wing deck onto a level surface.
2. Disengage the cover latch.
3. Remove the bolt securing the belt cover (if equipped).
4. Lift the rear and inside cover edges off the mounting posts (Figure 83).

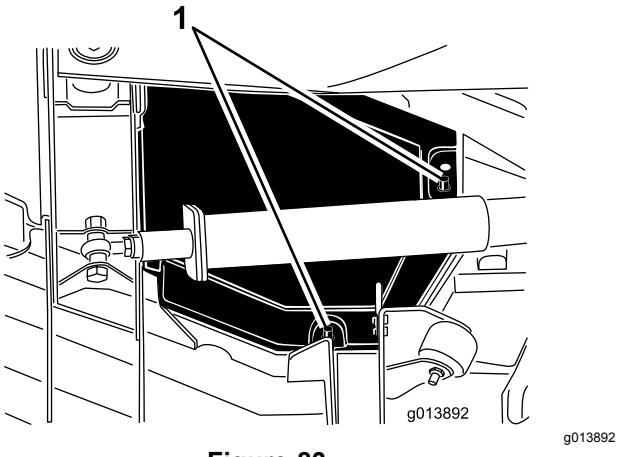


Figure 83

1. Mounting posts

5. While lifting the cover, slide it toward the traction unit approximately 2.5 cm (1 inch), to disengage the outer cover edge from the deck (Figure 84).

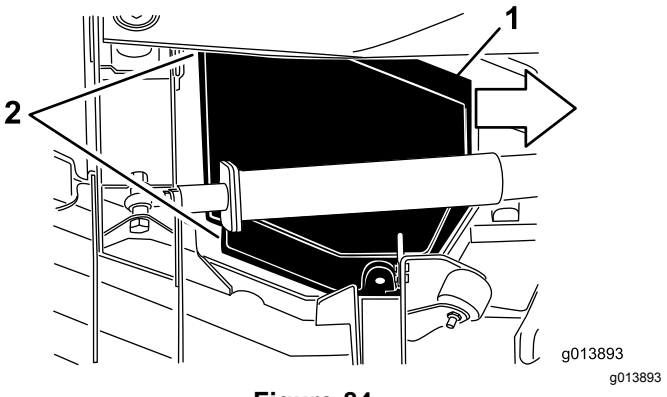
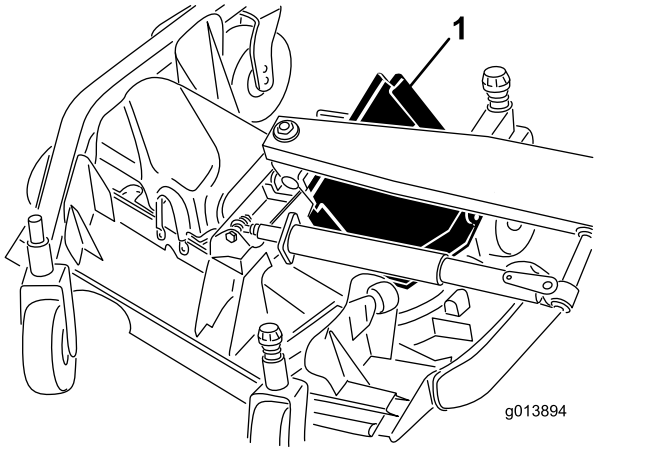


Figure 84

1. Slide the cover inward approximately 2.5 cm (1 inch).
2. Disengage these cover edges.

6. Lift the front edge and guide it between the lift arm and the roller to remove it (Figure 85).



g013894

Figure 85

1. Slide the cover out between the lift arm and roller.

Installing the Inner-Wing-Deck Covers

1. Lower the wing deck onto a level surface.
2. Slide the cover into position by guiding the rear edge between the lift arm and the roller.
3. While sliding the cover away from the traction unit, guide the outside edge under the front and rear brackets on the deck.
4. Align the deck mounting posts with the holes in the cover and lower the cover into position.
5. Install the bolt securing the belt cover, if so equipped.
6. Engage the deck-cover latch.

Lubrication

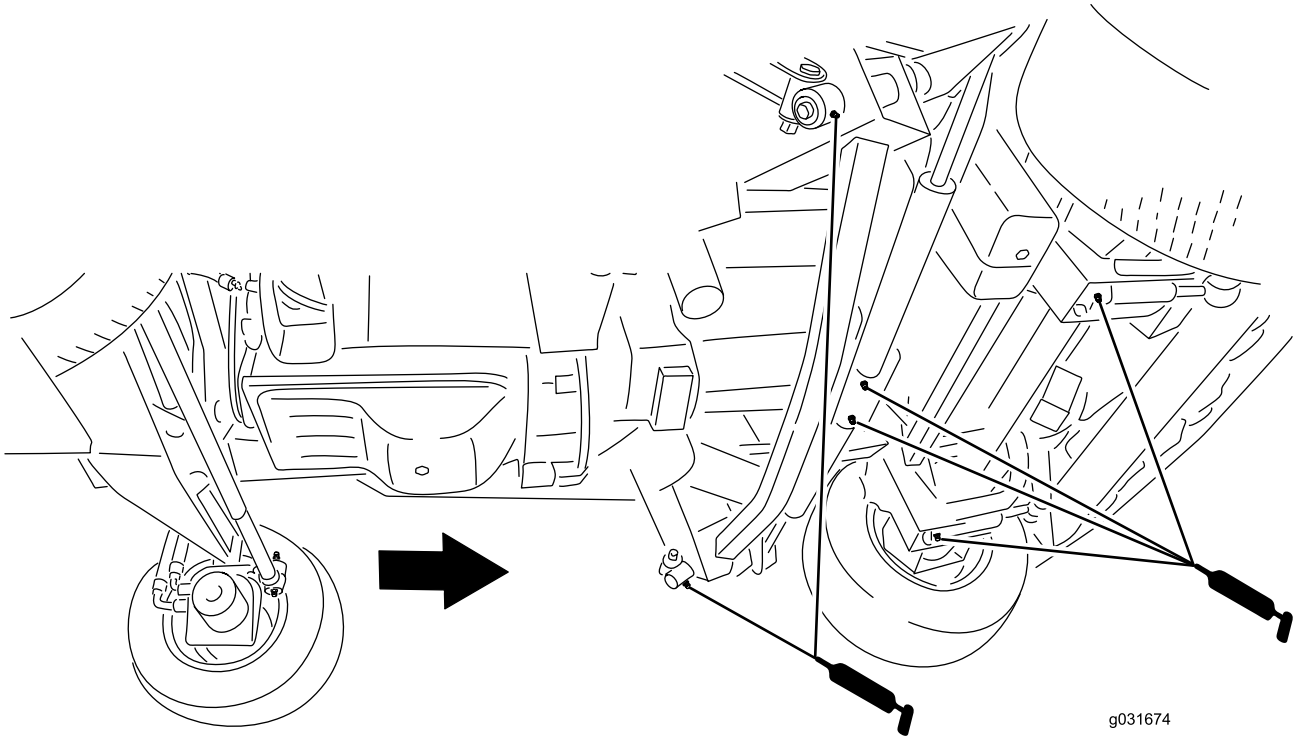
Greasing the Bearings and Bushings

Service Interval: Every 50 hours—Lubricate all grease fittings.

The machine has grease fittings that you must lubricate regularly with No. 2 lithium grease. Also, lubricate the machine immediately after every washing.

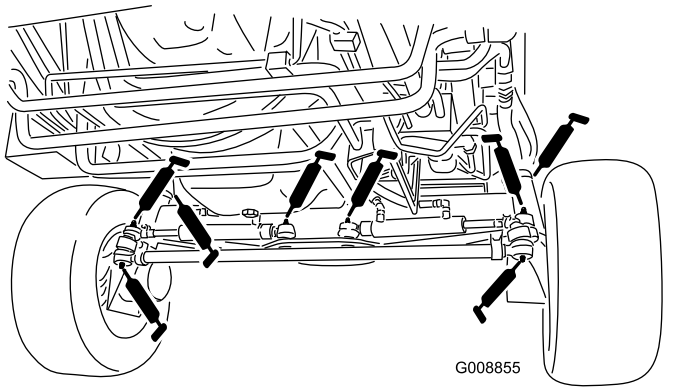
Traction Unit

- 2 impact arms (Figure 86)
- 2 front deck-lift-cylinder pivots (Figure 86)
- 2 side deck-lift-cylinder pivots (Figure 86)
- 4 steering-cylinder-ball joints (Figure 87)
- 2 tie-rod-ball joints (Figure 87)
- 2 king-pin bushings (Figure 87)
- 1 rear axle-pivot bushing (Figure 88)



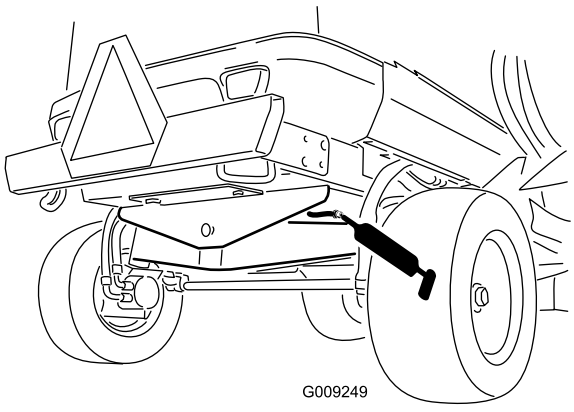
g031674

Figure 86



g008855

Figure 87

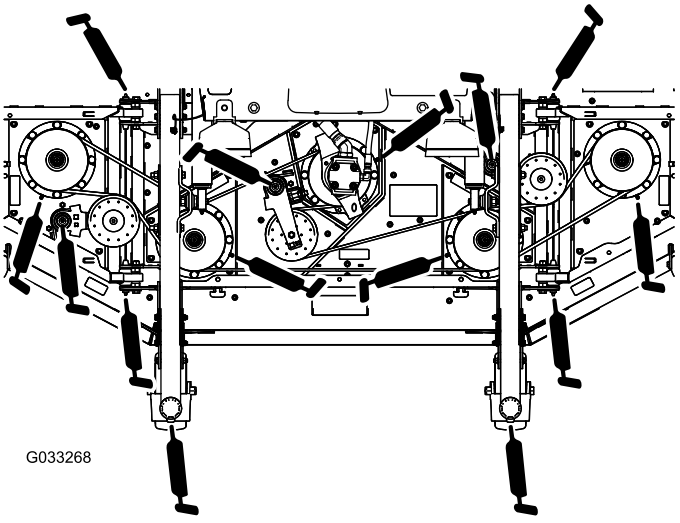


g009249

Figure 88

Front Mower Deck

- 2 caster-fork-shaft bushings (Figure 89)
- 5 spindle-shaft bearings (located on the spindle housing) as shown in Figure 89
- 3 idler-arm-pivot bushings (located on the idler-pivot shaft) as shown in Figure 89
- 4 winglet-deck bushings (located on the winglet-pivot pins) as shown in Figure 89



g033268

Figure 89

Front Lift Assemblies

- 2 lift-arm bushings (Figure 90)
- 2 lift-arm-ball joints (Figure 90)
- 2 front deck lift-cylinder pivots (Figure 90)

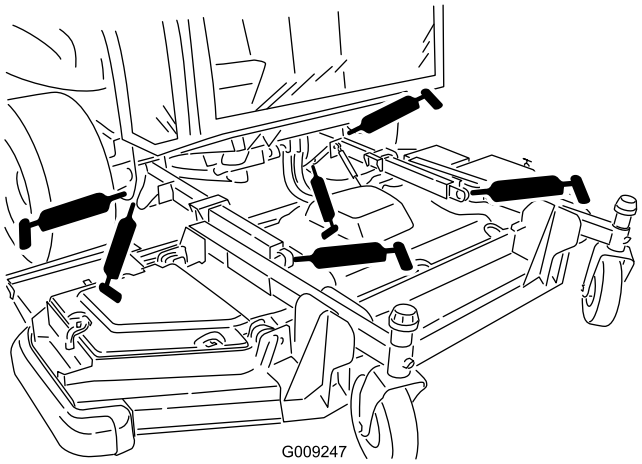


Figure 90

Wing Mower Decks (Each Wing)

- 4 caster-fork-shaft bushing (Figure 91)
- 3 spindle-shaft bearings (located on the spindle housing) as shown in Figure 91
- 2 idler-arm-pivot bushings (located on the idler-pivot shaft) as shown in Figure 91

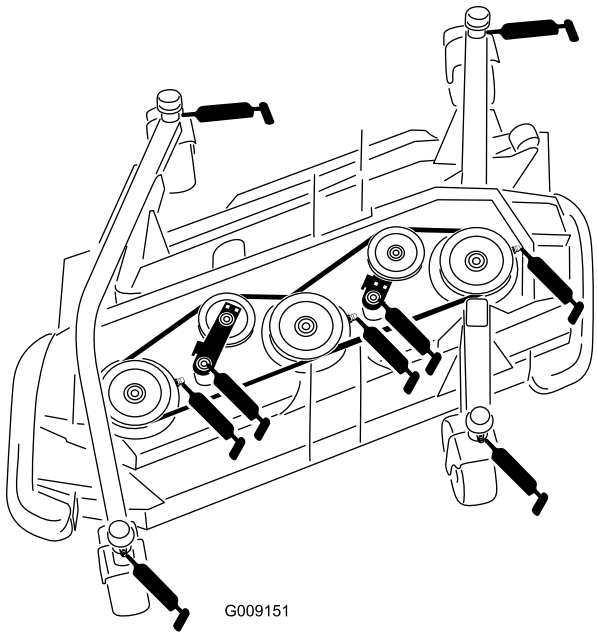


Figure 91

Wing Lift Assemblies (Per Wing)

- 3 main lift-arm bushings (Figure 92)
- 1 lift-cylinder bushing (Figure 92)

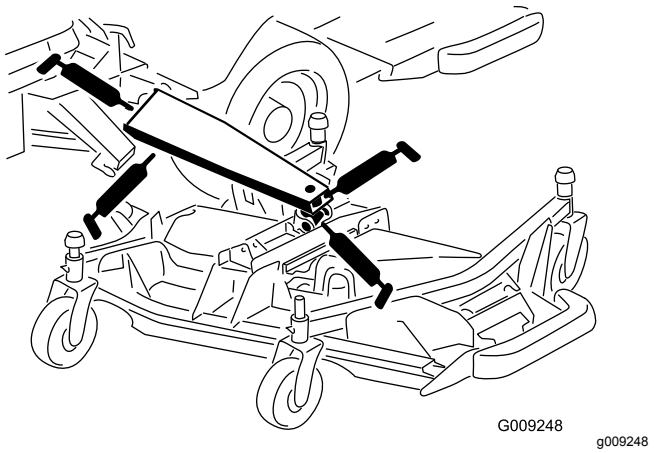
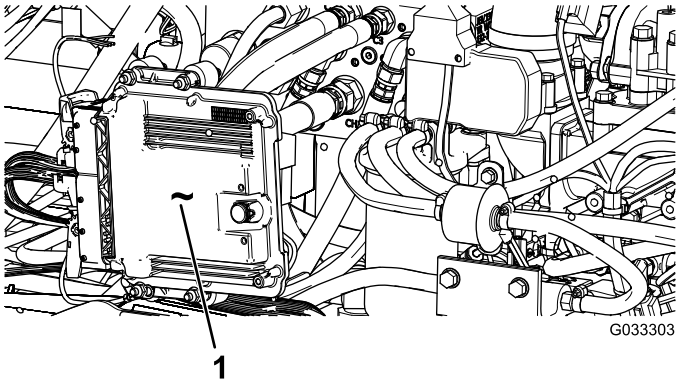


Figure 92

Engine Maintenance

Important: **Do not directly contact the engine-control unit (ECU) or electrical connectors with water, as this may cause damage; refer to Figure 93 for the ECU and electrical connections location.**



g033303

Figure 93

Located on the left side of the machine under the hood

1. Engine-control unit (ECU)

Engine Safety

Shut off the engine before checking the oil or adding oil to the crankcase.

Servicing the Air Cleaner

Check the air-cleaner body for damage that could cause an air leak and replace it if it is damaged. Check the entire intake system for leaks, damage, or loose hose clamps. Also, inspect the rubber intake-hose connections at the air cleaner and turbocharger to ensure that the connections are complete.

Service the air-cleaner filter only when the “Check Air Filter” message is displayed on the InfoCenter (Figure 94). Changing the air filter before it is necessary only increases the chance of dirt entering the engine when you remove the filter.

Ensure that the cover is seated correctly and seals with the air-cleaner body.



g021157

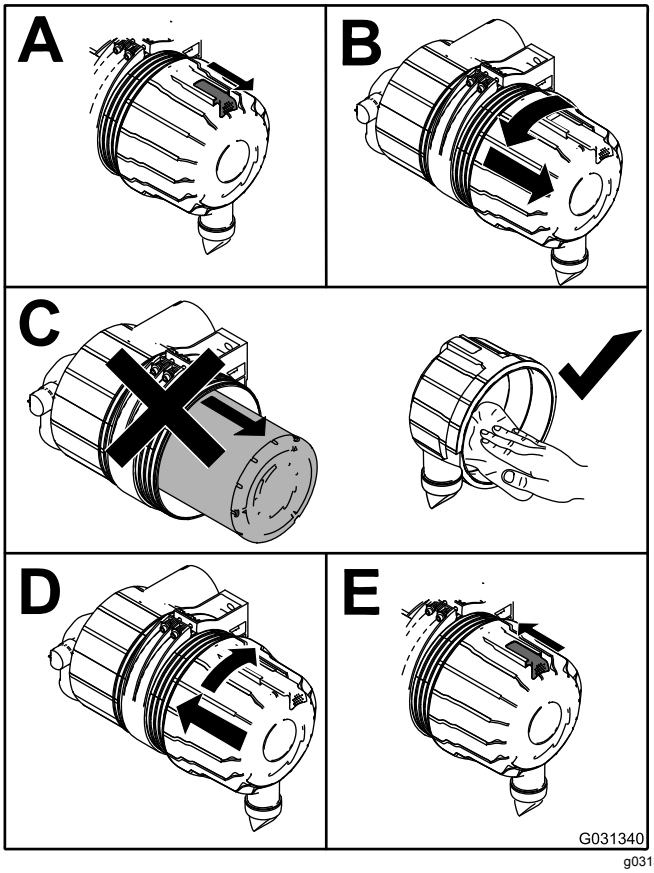
Figure 94

Servicing the Air-Cleaner Cover

Service Interval: Every 50 hours—Remove the air-cleaner cover and clean out the debris. Do not remove the filter.

Check the air-cleaner body for damage which could cause an air leak. Replace a damaged air cleaner body.

Clean the air-cleaner cover (Figure 95).



g031340

Figure 95

Servicing the Air-Cleaner Filter elements

Service Interval: Every 400 hours

Every 400 hours

The air-intake system on this machine is continuously monitored by an air-restriction sensor that will display an advisory when the air filter needs to be replaced. Do not replace the elements until this occurs.

Important: **Replace the secondary filter element only every 3 primary filter services. Do not remove the secondary element when cleaning or replacing the primary element. The inner element prevents dust from entering the engine when you service the primary element.**

Important: **Do not operate the engine without the air-cleaner elements as this would allow foreign material to enter the engine and damage it.**

1. Release the latches securing the air-cleaner cover to the air-cleaner body (Figure 96).

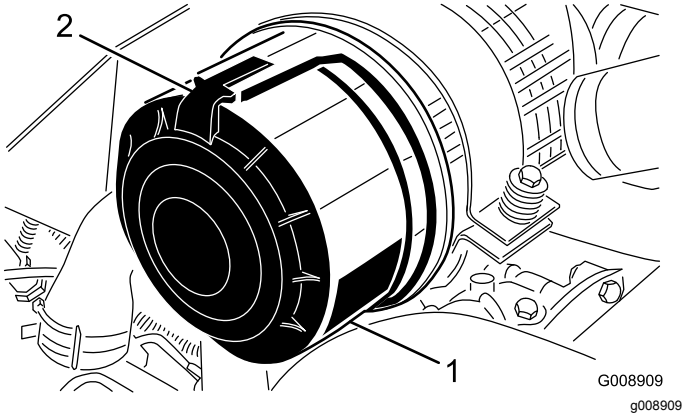


Figure 96

1. Air-cleaner cover
2. Air-cleaner latch

2. Remove the cover from the air-cleaner body.
3. Before removing the filter, use low-pressure air (275 kPa or 40 psi, clean and dry) to help remove large accumulations of debris packed between the outside of the primary filter and the canister.

   Note: Avoid using high-pressure air that could force dirt through the filter into the intake. This cleaning process prevents debris from migrating into the intake when the primary filter is removed.
4. Remove the primary filter (Figure 97).

   Note: Do not clean the used element due to the possibility of damage to the filter media.

   Note: Replace the secondary filter every 3 primary filter services (Figure 98).

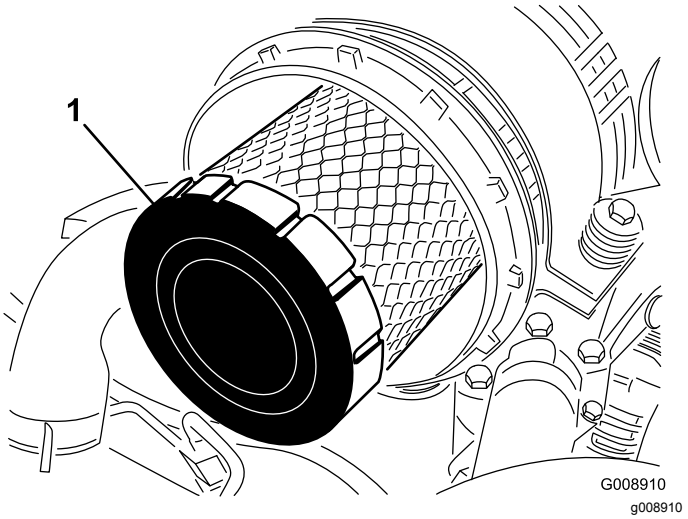


Figure 97

1. Primary filter

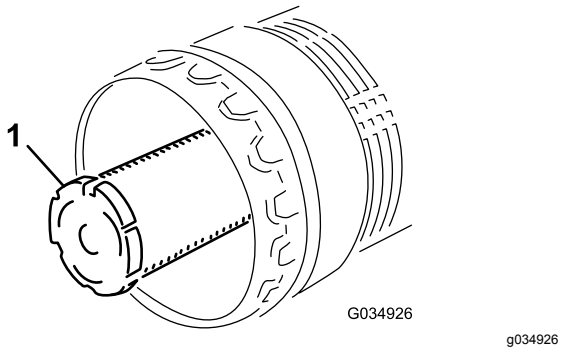


Figure 98

1. Secondary filter

5. Inspect the new filter for shipping damage, checking the sealing end of the filter and the body.

   Important: **Do not use a damaged element.**
6. Insert the new filter by applying pressure to the outer rim of the element to seat it in the canister.

   Important: **Do not apply pressure to the flexible center of the filter, as this may damage the filter.**
7. Clean the dirt-ejection port located in the removable cover.
8. Remove the rubber outlet valve from the cover, clean the cavity, and replace the outlet valve.
9. Install the cover orienting the rubber outlet valve in a downward position—approximately between the 5 o'clock and 7 o'clock position when viewed from the end.
10. Secure the cover latches.

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—Check the engine-oil level.

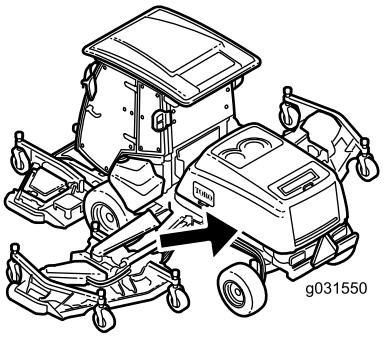
The engine is shipped with oil in the crankcase; however, the oil level must be checked before and after the engine is first started.

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.**

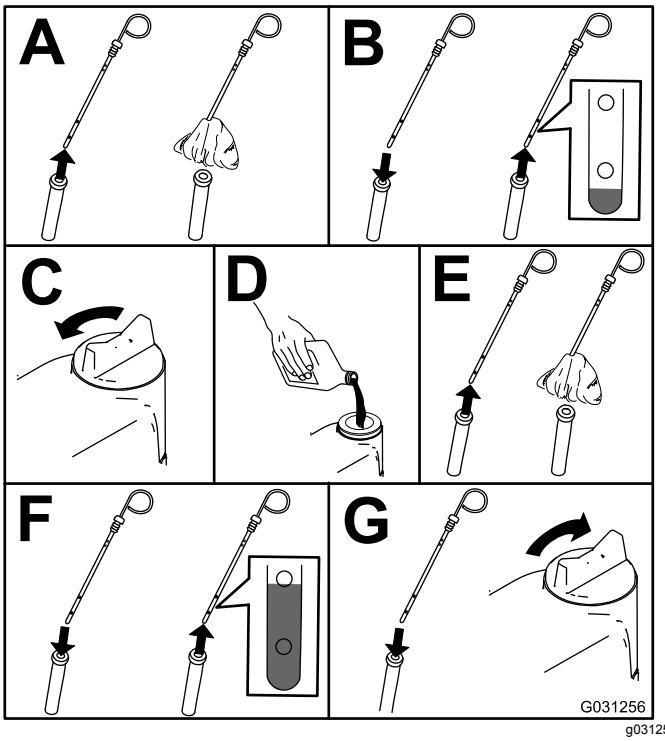
The best time to check the engine oil is when the engine is cool before it has been started for the day. If it has already been run, allow the oil to drain back down to the sump for at least 10 minutes before checking. If the oil level is at or below the Add mark on the dipstick, add oil to bring the 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.**

Check the engine-oil level as shown in Figure 99.



g031550



g031256

Figure 99

Crankcase Oil Capacity

10.4 L (11 US qt) with the filter

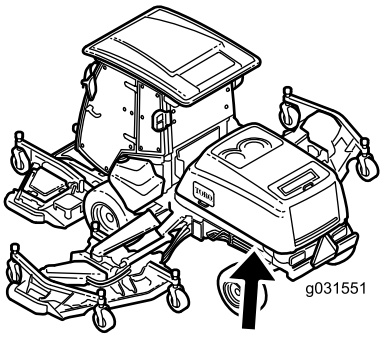
Changing the Engine Oil and Engine-Oil Filter

Service Interval: After the first 50 hours—Change the engine oil and engine-oil filter.

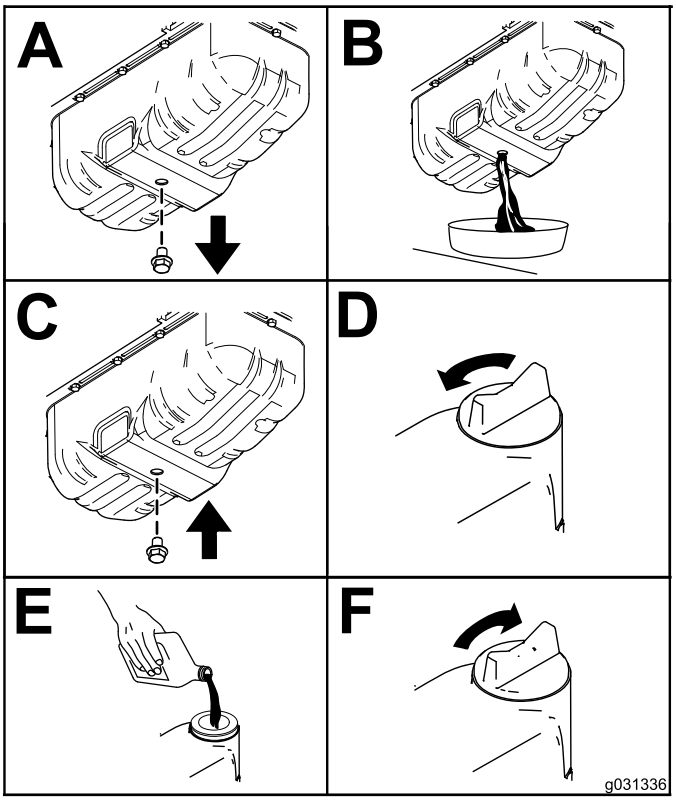
Every 500 hours—Change the engine oil and engine-oil filter.

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

1. Start the engine and let it run 5 minutes to allow the oil to warm up.
2. Park the machine on a level surface, engage the parking brake, lower the cutting deck, shut off the engine, and remove the key.
3. Change the engine oil as shown in Figure 100.



g031551

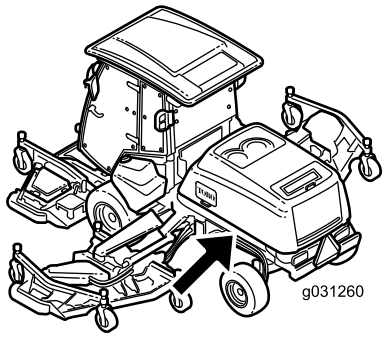


g031336

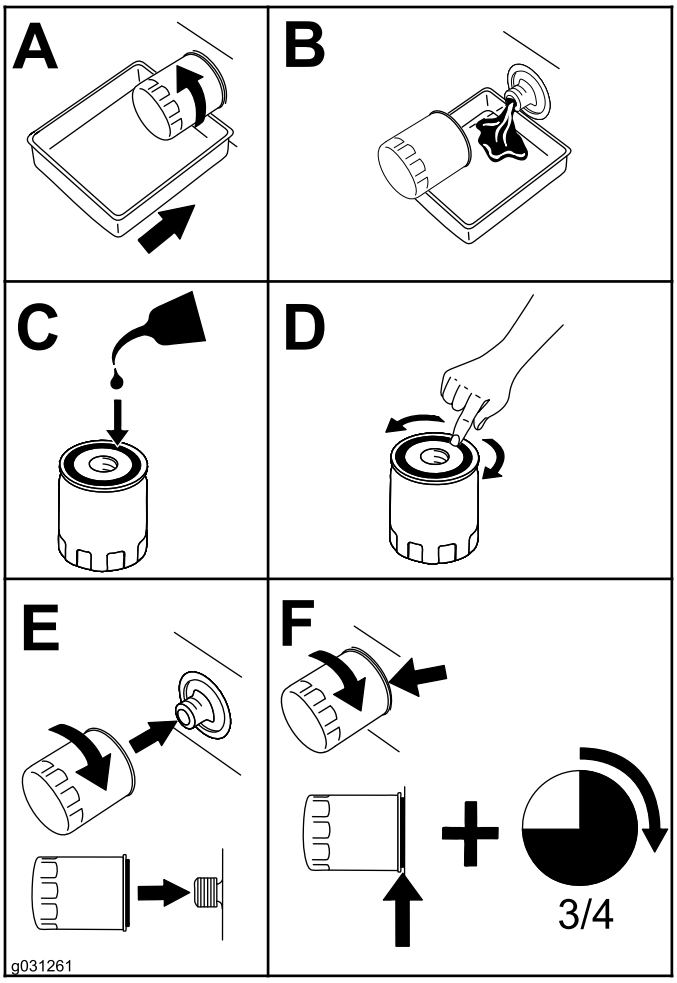
Figure 100

4. Change the engine-oil filter (Figure 101).

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



g031260



g031261

Figure 101

Adjusting the Engine-Valve Clearance

Service Interval: Every 1,000 hours

Refer to your engine operator's manual for the adjustment procedure.

Cleaning the Engine EGR Cooler

Service Interval: Every 1,500 hours

For information on cleaning the engine EGR cooler, refer to your engine operator's manual.

Inspecting the Engine Crankcase-Breather System

Service Interval: Every 1,500 hours

For information on inspecting the engine crankcase-breather system, refer to your engine operator's manual.

Checking and Replacing Fuel Hoses and Engine-Coolant Hoses

Service Interval: Every 2,000 hours

For information on checking and replacing fuel hoses and engine-coolant hoses, refer to your engine operator's manual.

Lapping or Adjusting the Engine Intake and Exhaust Valves

Service Interval: Every 2,000 hours

For information on lapping or adjusting the engine intake and exhaust valves, refer to your engine operator's manual.

Inspecting and Cleaning Engine-Emission-Control Components and Turbocharger

Service Interval: Every 3,000 hours

For information on inspecting and cleaning the engine-emission-control components, refer to your engine operator's manual.

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

Service Interval: Every 6,000 hours or clean the soot filter if active faults SPN 3251 HIGH, SPN 3720 TOO HIGH SEVERE, or SPN 3720 HIGH display in the InfoCenter.

If engine faults ACTIVE FAULT SPN 3251 HIGH, ACTIVE FAULT SPN 3720 TOO HIGH SEVERE, or ACTIVE FAULT SPN 3720 HIGHin the InfoCenter (Figure 102) display in the InfoCenter, clean the soot filter using the steps that follow:



g214978

Figure 102



g214980

Figure 103



g214979

Figure 104

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 System

Draining the Fuel Tank

Service Interval: Every 800 hours—Drain and clean the fuel tank.

Drain and clean the tank also if the fuel system becomes contaminated or if you are storing the machine for an extended period of time. Use clean fuel to flush out the tank.

Inspecting the Fuel Lines and Connections

Service Interval: Every 500 hours—Inspect the fuel lines and connections.

Check the fuel lines and connections every 500 hours or yearly, whichever comes first. Inspect them for deterioration, damage, or loose connections.

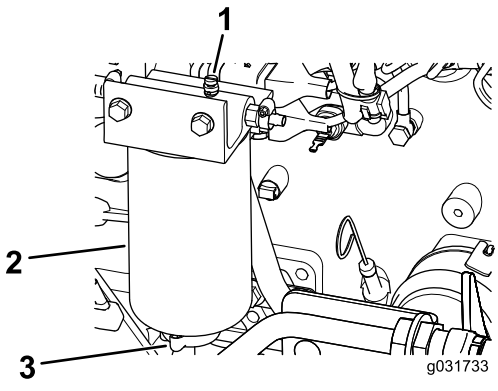
Servicing the Water Separator

Service Interval: Before each use or daily—Drain the water separator.

Every 400 hours—Replace the fuel/water separator element.

Draining the Water Separator

1. Place a drain pan under the fuel filter.
2. Loosen the drain valve on the bottom of the filter (Figure 105).



g031733

Figure 105

1. Vent plug
2. Water separator/filter
3. Drain valve

3. Tighten the valve after draining.

Replacing the Water-Separator Element

1. Place a clean container under the water separator.
2. Drain some fuel by loosening the vent plug and opening the drain valve (Figure 105).
3. Clean the area where the filter element mounts to the head.
4. Remove the filter element.
5. Apply a coating of clean fuel or engine oil to the new O-ring and element seal.
6. Install the new filter canister by hand until the gasket contacts the filter head, then tighten it an additional 1/2 turn.

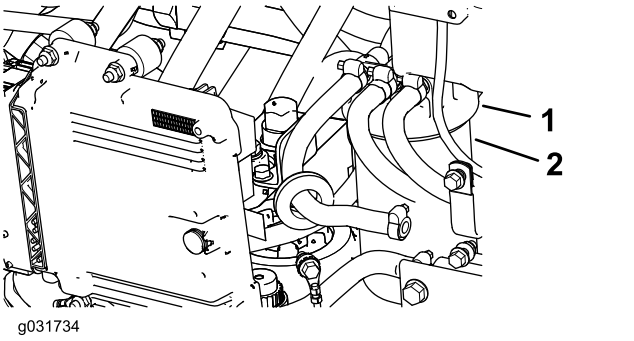
   Note: Do not use tools.
7. Close the drain plug.
8. With the vent plug still loosened, turn the ignition key to the Run position (do not start the engine) so that the electric fuel pump can fill the new filter.
9. When fuel flows from the vent plug, close the vent plug, start the engine, and check for leaks.

   Note: Correct as necessary with the engine off.

Replacing the Fuel Filter Element

Service Interval: Every 500 hours—Replace the fuel-filter element.

1. Clean the area around the fuel-filter head (Figure 106).



g031734

Figure 106

1. Fuel-filter head
2. Filter

2. Remove the filter and clean the filter-head-mounting surface (Figure 106).
3. Lubricate the filter gasket with clean, lubricating engine oil; refer to the engine owner's manual (included with the machine) 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. Turn the ignition key to the RUN position so that the electric fuel pump can fill the fuel-filter canister.
6. Start the engine and check for fuel leaks around the filter head.

Electrical System Maintenance

Electrical System Safety

- Disconnect the battery before repairing the machine.
- Turn the battery-disconnect switch to the OFF position.
- Battery acid is poisonous and can cause burns. Avoid contact with your skin, eyes, and clothing. Protect your face, eyes, and clothing when working with a battery.
- Battery gases can explode. Keep cigarettes, sparks, and flames away from the battery.
- Charge the batteries 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.
- Do not use a pressure washer near any electronic components.

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

Important: **If you are installing an auxiliary accessory to the machine, the only approved locations to source power are at the traction-unit fuse block (Figure 111) or the cab-fuse block (Figure 113). A maximum of 10 A is available from either location. Contact your local Toro distributor for assistance.**

Note: Shut off the engine and remove the key before removing the fuses.

The traction-unit fuses (Figure 107) are located in the power-center console behind the seat (Figure 108).

Additional traction-unit fuses (Figure 109) are located on the rear, right side of the machine (Figure 110).

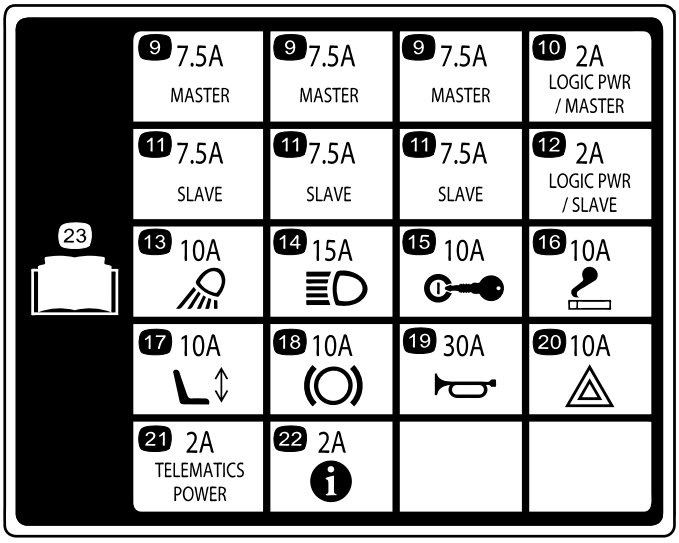


Figure 107

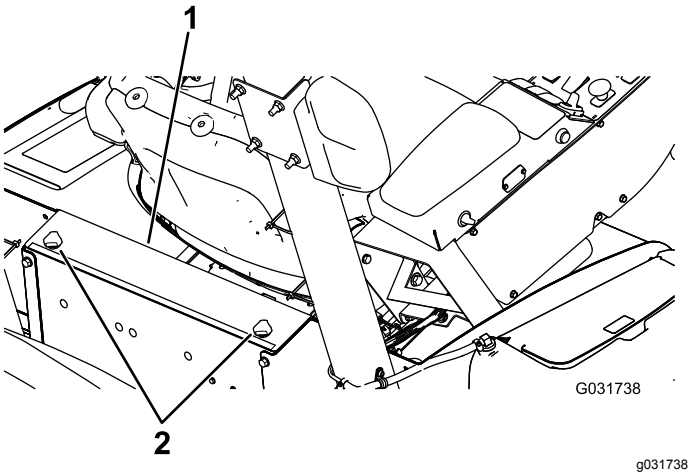


Figure 108

1. Power-center console
2. Knobs



Figure 109

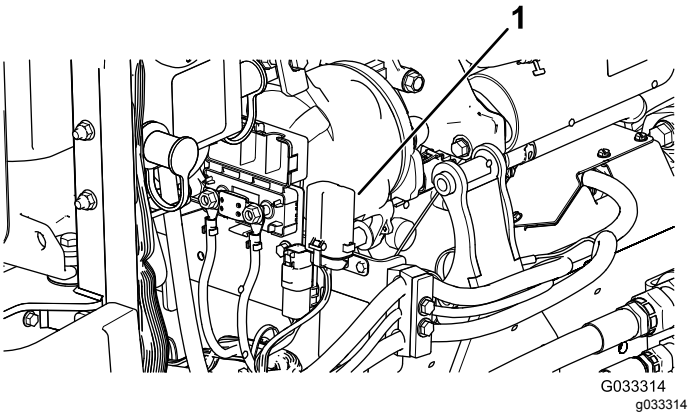


Figure 110

1. Fuse block

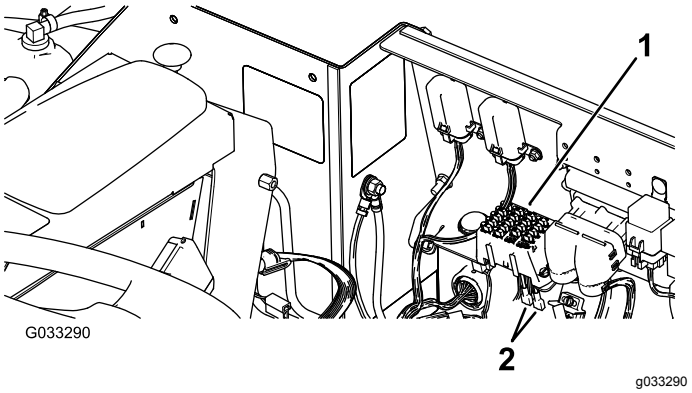


Figure 111

1. Fuse block
2. Power leads

The cab fuses (Figure 112) are located in the fuse box on the cab headliner (Figure 113).

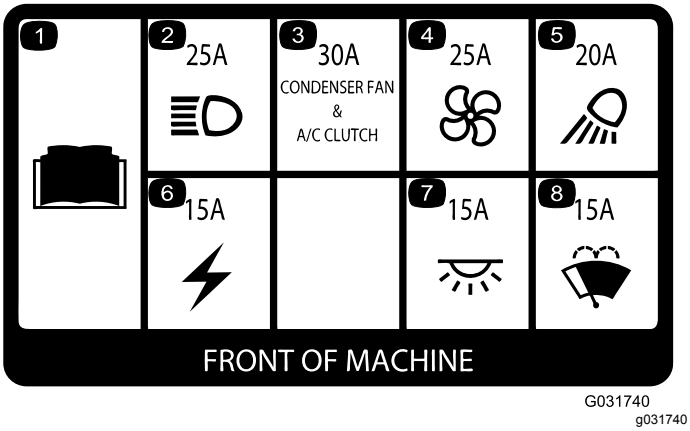


Figure 112

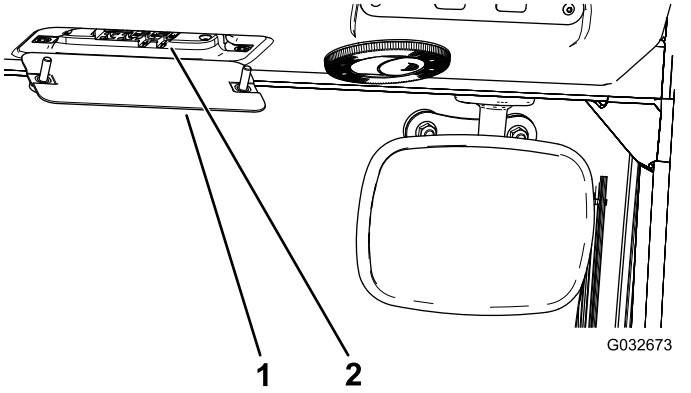


Figure 113

1. Cab fuse box
2. Fuses

Checking the Condition of the Batteries

Service Interval: Every 50 hours—Check the condition of the batteries.

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

Note: Check the battery condition weekly or after every 50 hours of operation. 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 Batteries

⚠ WARNING

Charging the batteries produces gasses that can explode.

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

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

1. Perform the pre-maintenance procedure; refer to Pre-Maintenance Safety (page 64).
2. 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.
3. Remove the covers from the jump posts (Figure 114).

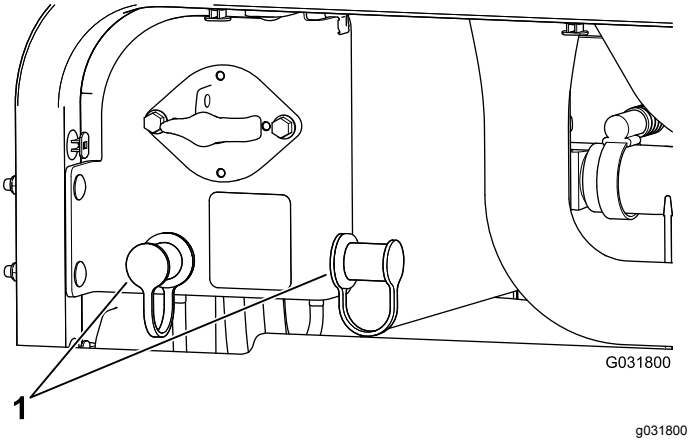


Figure 114

1. Jump-post covers

4. Connect the positive lead of the battery charger to the positive jump post (Figure 115).

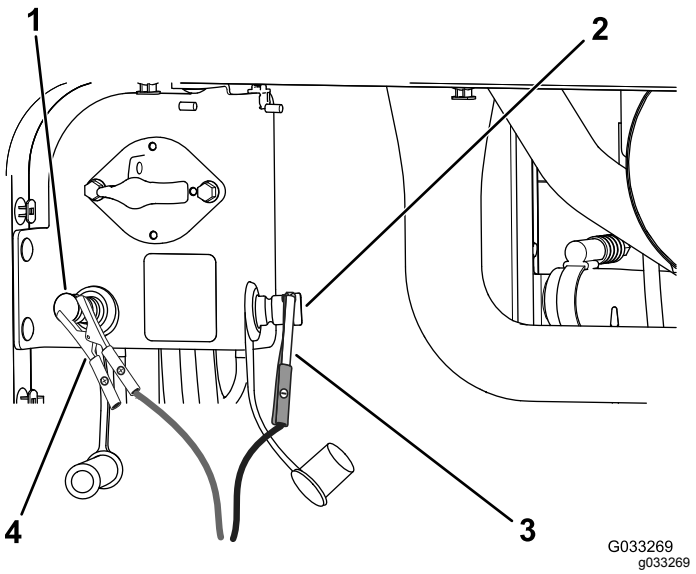


Figure 115

1. Positive (+) jump post
2. Negative (-) jump post
3. Negative (-) jumper-cable clamp
4. Positive (+) jumper-cable clamp

5. Connect the negative lead of the battery charger to the negative jump post (Figure 115).
6. Connect the battery charger to the electrical source, and charge the battery according to the Battery-charging Table that follows.

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

Battery-charger Table

Charger setting	Charging time
4 to 6 amperes	30 minutes
25 to 30 amperes	10 to 15 minutes

7. When the batteries are fully charged, unplug the charger from the electrical source, then disconnect the charger leads from the jump posts (Figure 115).

Jump-Starting the Machine

⚠ WARNING

Jump-starting the battery can produce gasses that can explode.

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

Note: This procedure requires 2 people to perform. Ensure that the person making the connections wears the proper face protection, protective gloves, and clothing.

1. Park the machine on a level surface, stop the engine, and remove the ignition key.
2. Sit in the operator seat and have the other person make the connections.

   Note: Ensure that the jumper battery is a 12-volt battery.

   Important: **If you are using another machine for power, ensure that the 2 machines are not touching each other.**
3. Remove the covers from the jump posts (Figure 114).
4. Connect the positive (+) jumper cable to the positive jump post (Figure 116).

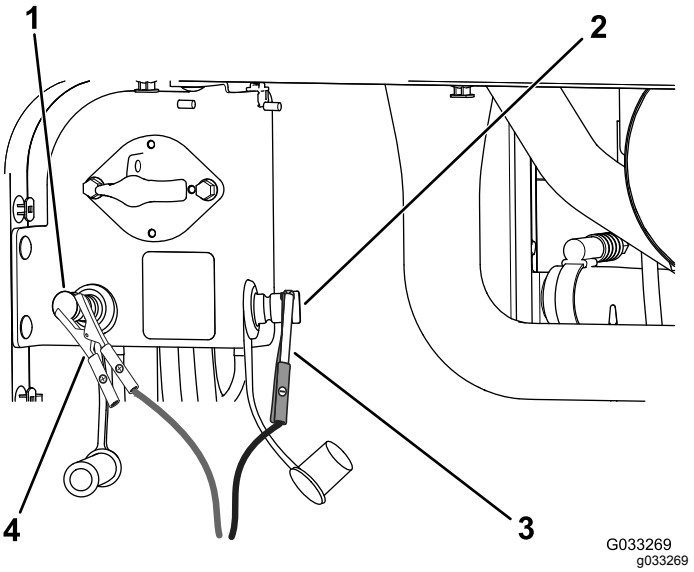


Figure 116

1. Positive (+) jump post
2. Negative (-) jump post
3. Negative (-) jumper-cable clamp
4. Positive (+) jumper-cable clamp

5. Connect the negative (-) jumper cable to the negative jump post (Figure 116).
6. Start the engine.

   Important: **If the engine starts and then stops, *do not* operate the starter motor until the starter motor stops turning. *Do not* operate the starter motor for more than 30 seconds at one time. Wait 30 seconds before operating the starter motor to cool the motor.**
7. When the engine starts, have the other person disconnect the negative (-) jumper cable from the negative jump post and then disconnect the positive (+) jumper cable (Figure 116).

Drive System Maintenance

Calibrating the Traction Pedal

Service Interval: Every 1,000 hours—Calibrate the traction pedal.

Contact your local Toro distributor or refer to the *Toro Service Manual* for assistance.

Adjusting the Traction-Pedal Angle

You can adjust the operating angle of the traction pedal for your comfort.

1. Loosen the 2 nuts and bolts securing the left side of the traction pedal to the bracket (Figure 117).

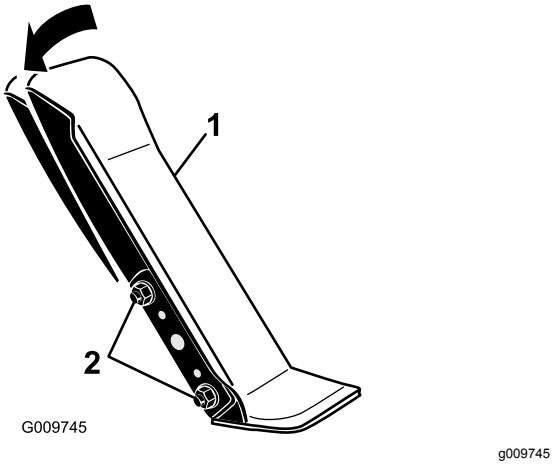


Figure 117

1. Traction pedal
2. Mounting nuts and bolts

2. Pivot the pedal to the desired operating angle and tighten the nuts (Figure 117).

Checking the Rear Wheel Toe-In

Service Interval: Every 1,000 hours—Check the rear wheel toe-in.

1. With the rear tires in a straight position, measure the outside distance (at axle height) at the front and rear of the rear tires (Figure 118).

   Note: The front measurement should be 0 to 3 mm (0 to 0.12 inch) greater than the rear measurement.

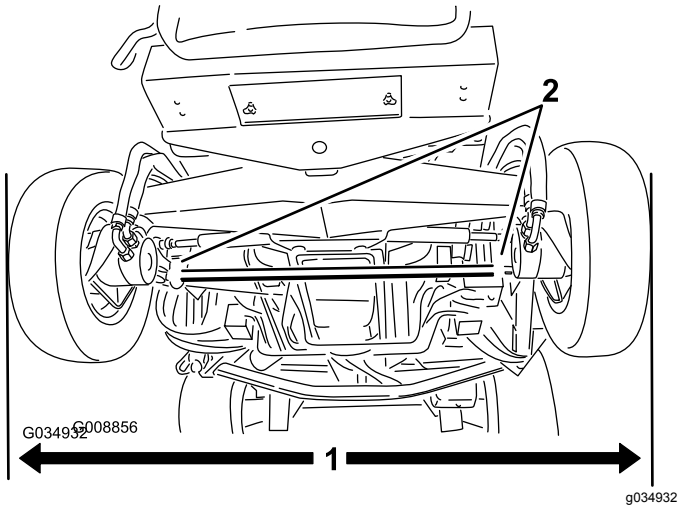


Figure 118

1. Outside distance
2. Tie-rod clamps

2. To adjust the toe-in, loosen the clamps at both ends of the tie rods (Figure 118).
3. Rotate the tie-rod to move the front of the tire inward or outward.
4. Once you achieve the correct toe-in, tighten the tie-rod clamps.

Cooling System Maintenance

Cooling System Safety

⚠ CAUTION

Discharge of hot, pressurized coolant or touching a hot radiator and surrounding parts can cause severe burns.

- **Do not remove the radiator cap when the engine is hot. Always allow the engine to cool at least 15 minutes or until the radiator cap is cool enough to touch without burning your hand before removing the radiator cap.**
- **Do not touch the radiator and surrounding parts that are hot.**

⚠ DANGER

Swallowing engine coolant can cause poisoning.

- **Do not swallow engine coolant.**
- **Keep out of reach from children and pets.**

Checking the Engine-Cooling System

Service Interval: Before each use or daily—Check the engine-coolant level in the overflow reservoir.

Every 100 hours—Inspect the cooling-system hoses.

The capacity of the system on a machine without a cab is 10.4 L (13.5 US qt) and with a cab is 17 L (18 US qt).

Recommended Coolant

Note: Coolant must meet or exceed ASTM Standard 3306

Glycol based pre-diluted coolant (50/50 blend)

or

Glycol-based coolant mixed with **distilled** water (50/50 blend)

or

Glycol-based coolant mixed with good quality water (50/50 blend) as listed in the Cummins Manual

$CaCO_3$ + $MgCO_3$ <170 ppm

Chloride <40 ppm (Cl)

Sulfur <100 ppm (SO_4)

⚠ DANGER

The rotating fans and drive belts can cause personal injury.

- **Do not operate the machine without the covers in place.**
- **Keep fingers, hands, and clothing clear of the rotating fan and drive belt.**
- **Shut off the engine, remove the ignition key, and turn the battery-disconnect switch to the OFF position 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. Carefully remove the radiator cap and expansion-tank cap (Figure 119).

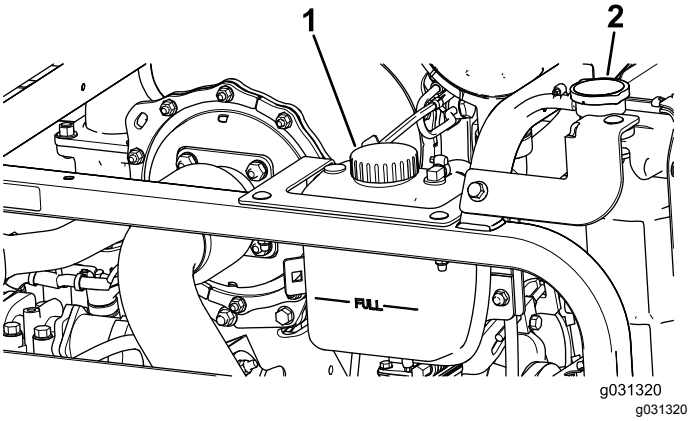


Figure 119

1. Expansion-tank cap
2. Radiator cap

2. Check the coolant level in the radiator (Figure 119).

   Note: When cool, the radiator should be filled to the top of the filler neck and the expansion tank filled to the Full mark.

3. If the coolant is low, add the recommended replacement coolant to the expansion tank to the Full mark.

   Note: Do not use water only or alcohol/methanol-based coolants.

4. Install the radiator cap and expansion-tank cap.

Cleaning the Cooling Systems

Service Interval: Before each use or daily

Perform the pre-maintenance procedure; refer to Pre-Maintenance Safety (page 64).

Important: **Do not use water to clean the radiator core or hydraulic-fluid-cooler core. Cleaning the radiator core or hydraulic-fluid-cooler core with water can promote premature corrosion and damage to components.**

Cleaning the Radiator

1. Raise the hood to the fully-open position.
2. Pivot the engine-cooling fans rearward of the radiator and lock the prop rod into the notch (Figure 120).

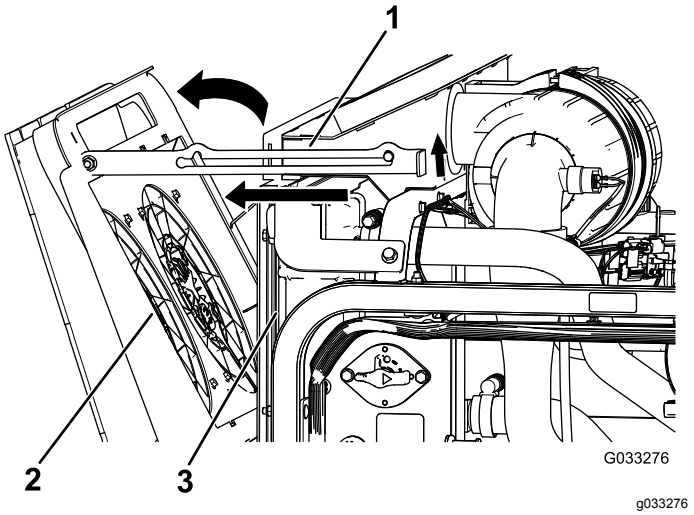


Figure 120

1. Prop rod
2. Engine-cooling fans
3. Radiator

3. Using clean, compressed air, blow the debris from the engine side rearward to clean the radiator core.
4. Pivot the engine-cooling fans forward and lock the prop rod into the notch (Figure 121).

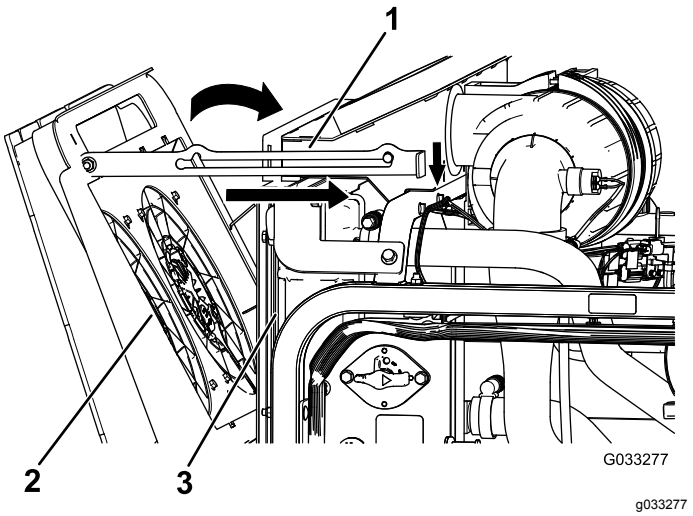


Figure 121

1. Prop rod
2. Engine-cooling fans
3. Radiator

Cleaning the Hydraulic-Fluid Cooler

1. Raise the hood to the fully-open position.
2. Pivot the hydraulic-cooling fans upward and lock the prop rod into the notch (Figure 122).

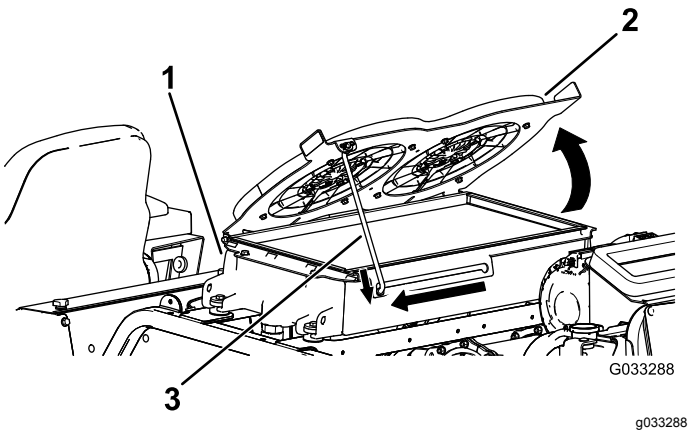


Figure 122

1. Hydraulic-fluid cooler
2. Hydraulic-cooling fans
3. Prop rod

3. Using clean, compressed air, blow the debris from the engine side upward to clean the cooling core.
4. Pivot the hydraulic-cooling fans downward and lock the prop rod into the notch (Figure 123).

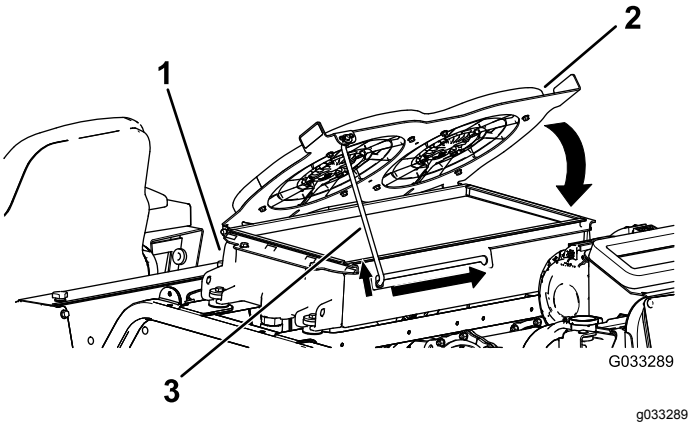


Figure 123

1. Hydraulic-fluid cooler
2. Hydraulic-cooling fans
3. Prop rod

Changing the Engine-Cooling-System Fluid

Service Interval: Every 1,000 hours—Flush the engine-cooling system and replace the fluid.

The capacity of the system on a machine without a cab is 10.4 L (13.5 US qt) and with a cab is 17 L (18 US qt).

1. Perform the pre-maintenance procedure; refer to Pre-Maintenance Safety (page 64).
2. Remove the radiator cap.
3. With the radiator-drain hose placed in a drain pan, open the drain valve on the radiator hose and drain the fluid into a drain pan (Figure 124).

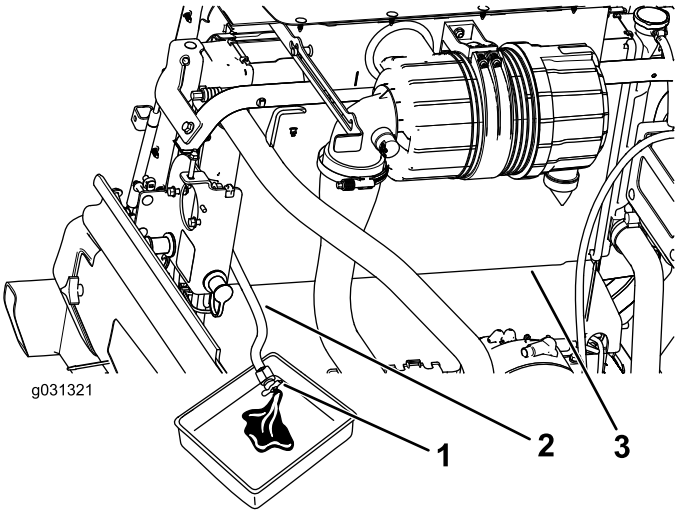


Figure 124

1. Drain valve
2. Radiator-drain hose
3. Radiator

4. Close the valve on the radiator-drain hose (Figure 124).
5. Fill the radiator with coolant until the coolant level even with the lip of the filler port (Figure 125).

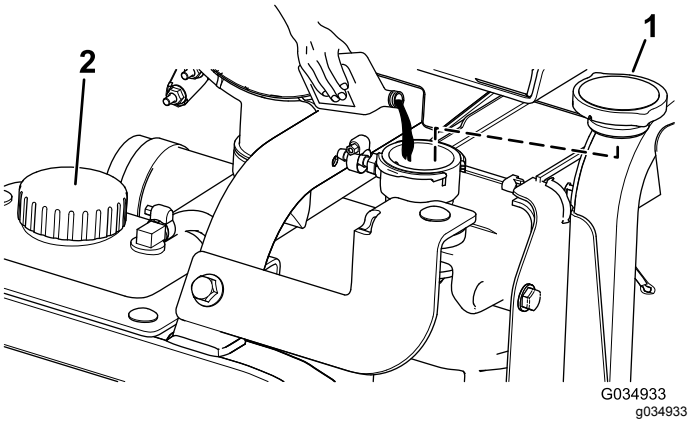
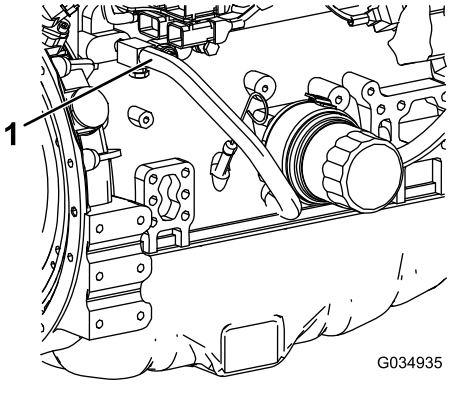


Figure 125

1. Radiator cap
2. Reserve-tank cap

6. Install the radiator cap.
7. Remove the coolant hose from the engine-oil cooler (Figure 126).



g034935

Figure 126

1. Coolant hose

8. After draining the engine coolant, close the drain valve on the radiator-drain hose and connect the coolant hose.
9. Remove the cap of the expansion tank and fill it to the Low mark with engine coolant. Install the cap.
10. Start and run the engine until it reaches operating temperature.
11. Check the engine-coolant level; refer to Checking the Engine-Cooling System (page 81).
12. Add coolant to the expansion tank to bring the coolant level to the Full mark.
13. Check all engine-coolant-hose connections for leaks.

Belt Maintenance

Servicing the 12 V Alternator Belt

Service Interval: After the first 10 hours

Every 1,000 hours

Refer to the engine owner's manual (included with the machine) for the servicing procedure.

Servicing the 24 V Alternator Belt and AC Compressor Belt

Service Interval: After the first 10 hours

Every 1,000 hours

The AC compressor and 24 V alternator belt uses a spring-loaded tensioner that is pre-set at the factory. Refer to the *Toro Service Manual* for the servicing procedure.

Replacing the Blade-Drive Belts

Service Interval: Every 50 hours—Inspect the blade-drive belts.

Every 1,000 hours—Replace the blade-drive belts.

The blade-drive belt, tensioned by the spring-loaded idler pulley, is very durable. However, after many hours of use, the belt will show signs of wear. Signs of a worn belt are squealing when the belt is rotating; blades slipping when cutting grass; frayed edges; burn marks; and cracks. Replace the belt if any of these signs occur.

Replacing the Front Mower-Deck Belts

1. Lower the mower deck to the floor.
2. Remove the belt covers from the top of the mower deck and set the covers aside.
3. On the front deck, center position, loosen the jam nuts on the idler pulley stop screw and thread the stop screw into the bracket (Figure 127).

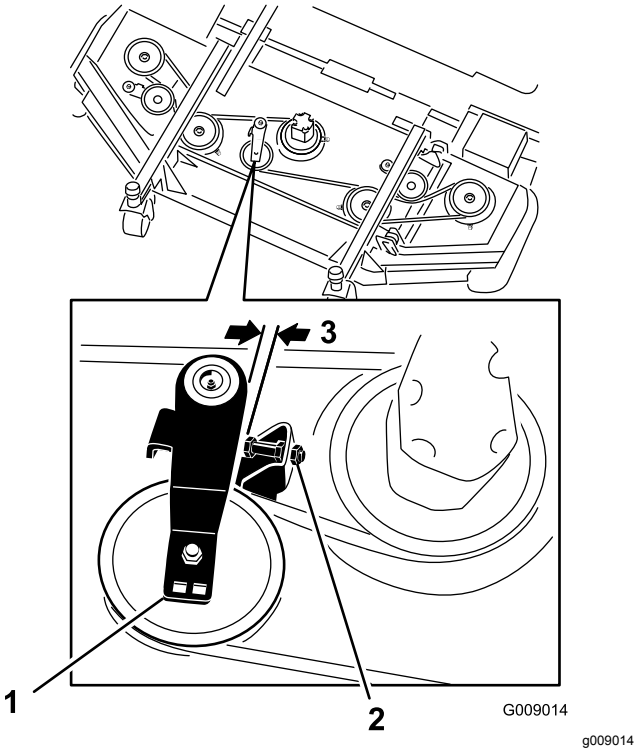


Figure 127

1. Idler-stop screw
2. Idler pulley
3. 2.5 mm to 4 mm (0.10 to 0.16 inch)

4. Using a ratchet wrench or similar tool, move each wing-deck idler pulley away from the drive belt to release the belt tension and allow the belt to slip off the wing-deck pulley (Figure 127).
5. Remove the bolts securing the hydraulic motor to the mower deck (Figure 128).

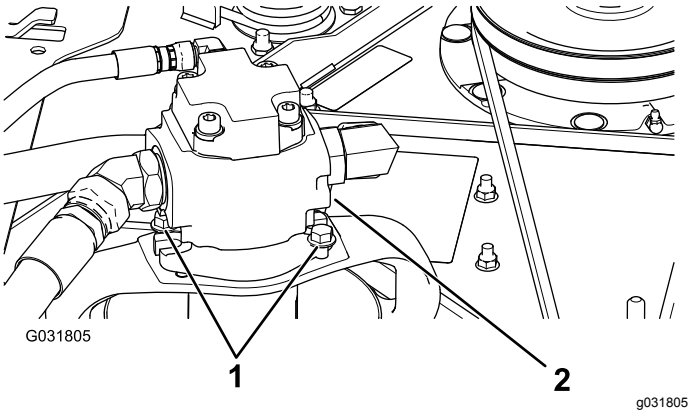


Figure 128

1. Mounting bolts
2. Hydraulic motor

6. Lift the motor off the mower deck and lay it on top of the mower deck.
7. Remove the old belt from around the spindle pulleys and idler pulley.
8. Route the new belt around the spindle pulleys and idler-pulley assembly (Figure 129).

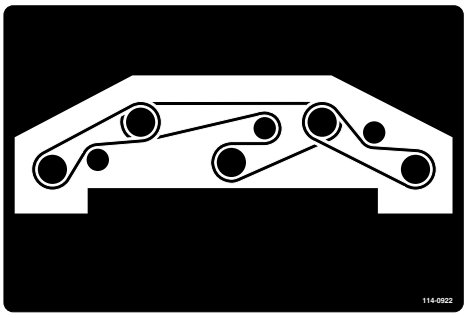


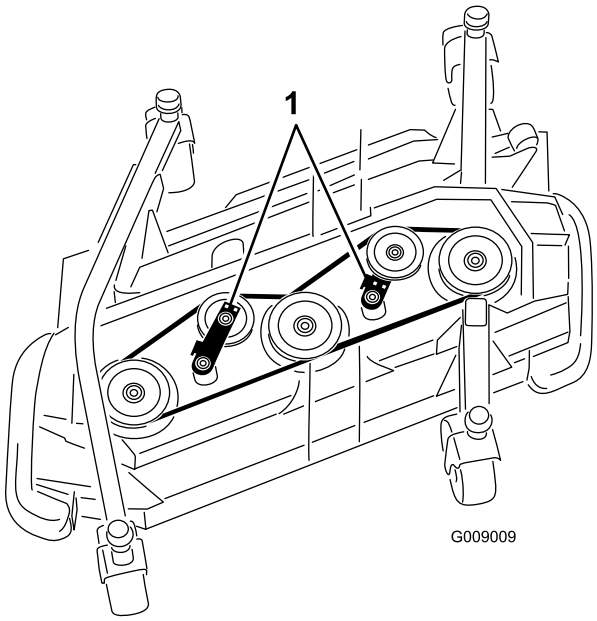
Figure 129

9. Adjust the stop screw on the idler pulley and tighten the jam nuts.
10. Install the belt covers.

Replacing the Wing Mower-Deck Belts

Note: To remove the lower belt, you must remove the upper belt first.

1. Lower the mower deck to the floor.
2. Remove the belt covers from the top of the mower deck and set the covers aside.
3. Remove the bolts securing the hydraulic motor to the mower deck (Figure 128).
4. Lift the motor off the mower deck and lay it on top of the mower deck.
5. Using a ratchet wrench or similar tool, move the idler pulleys away from the drive belt to release the belt tension and allow the belt to slip off the pulleys (Figure 130).

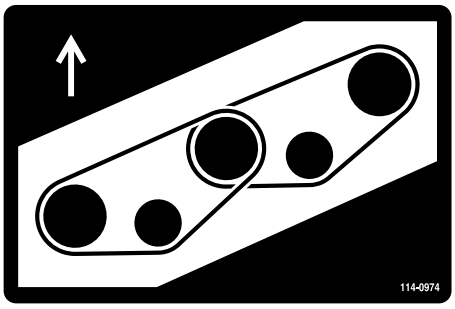


g009009

Figure 130

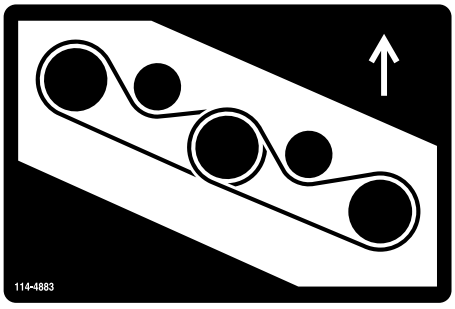
1. Idler pulleys

6. Remove the old belt from around the spindle pulleys and idler pulley.
7. Route the new belt around the spindle pulleys and idler-pulley assembly (Figure 131 and Figure 132).



decal114-0974nc

Figure 131
Right deck



decal114-4883nc

Figure 132
Left deck

Hydraulic System Maintenance

Hydraulic System Safety

⚠ WARNING

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

- **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.**

Checking the Hydraulic Fluid

Service Interval: Before each use or daily—Check the hydraulic-fluid level.

The hydraulic-fluid reservoir is filled at the factory with approximately 62.7 L (16.6 US gallons) of high-quality hydraulic fluid. **Check the level of the hydraulic fluid before you start the engine for the first time and daily thereafter.**

Use **Toro Premium All-Season Hydraulic Fluid** (Available in 5-gallon pails or 55-gallon drums. See the *Parts Catalog* or Toro distributor for part numbers.)

If the Toro fluid is not available, you may use other fluids provided that they meet all the following material properties and industry specifications. Consult with your lubricant distributor to identify a satisfactory product.

Note: Toro does 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	St @ 40°C 42 to 50
	St @ 100°C 7.6 to 8.5
Viscosity Index ASTM D2270	140 or higher
Pour Point, ASTM D97	-40°F to -49°F
FZG, Fail stage	11 or better
Water content (new fluid)	500 ppm (maximum)
Industry Specifications:	Vickers I-286-S (Quality Level), Vickers M-2950-S (Quality Level), Denison HF-0

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

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

1. Perform the pre-maintenance procedure; refer to Pre-Maintenance Safety (page 64).
2. On the right side of the machine, raise the access cover to expose the hydraulic-tank cap (Figure 133).

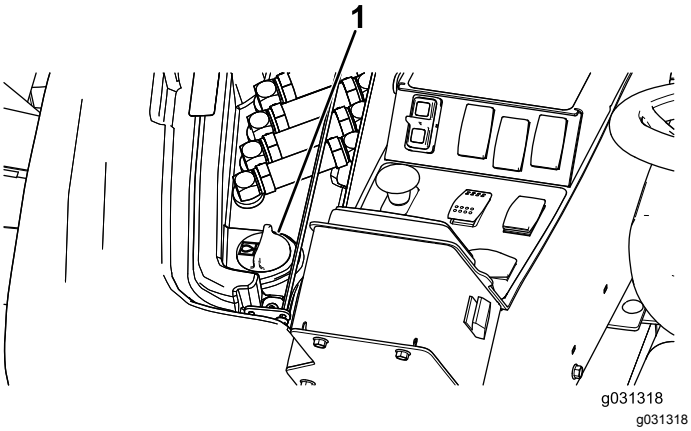
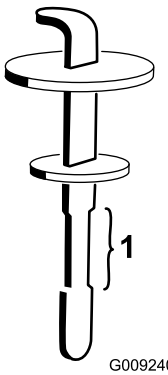


Figure 133

1. Hydraulic-tank cap

3. Clean the area around the filler neck and cap of the hydraulic tank (Figure 133).
4. Remove the cap from the filler neck.
5. Remove the dipstick from the filler neck and wipe it with a clean rag. Insert the dipstick into the filler neck, then remove it and check the fluid level (Figure 134).

   Note: The fluid level should be within the safe operating range on the dipstick.



g009240

Figure 134

1. Safe operating range

6. If the level is low, add the appropriate fluid to raise the level to the upper mark.
7. Install the dipstick and cap onto the filler neck.
8. Close the cover.

Changing the Hydraulic Fluid and Filters

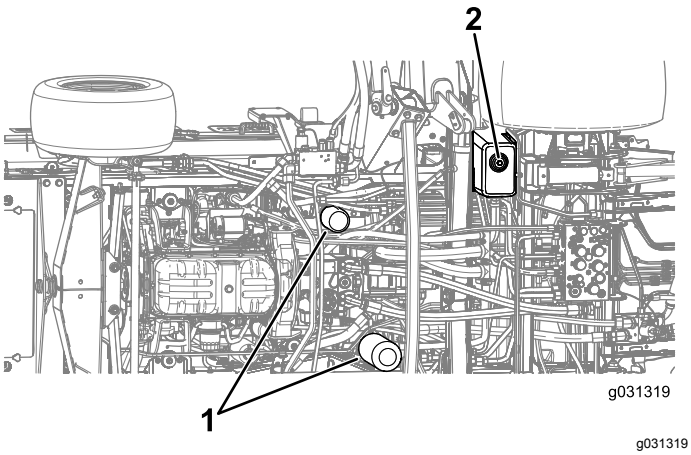
Service Interval: Every 1,000 hours

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

Use Toro replacement filters (Part No. 86-6110 for the left side of the machine and Part No. 75-1310 for the right side of the machine).

Important: **Using any other filter may void the warranty on some components.**

1. Position the machine on a level surface, lower the cutting units, shut off the engine, engage the parking brakes, and remove the ignition key.
2. Place a large drain pan under the hydraulic-fluid tank.
3. Remove the hydraulic reservoir cap and dipstick.
4. Remove the drain plug from the bottom of the tank and let the hydraulic fluid flow into the pan (Figure 135).



g031319

Figure 135

1. Hydraulic filters
2. Drain plug

5. Install the drain plug when the hydraulic fluid stops draining.
6. Clean the area around the filter-mounting areas.
7. Place a drain pan under the filter and remove the filter (Figure 135).
8. Lubricate the new filter gasket and fill the filter with hydraulic fluid.
9. Ensure that the filter-mounting area is clean and screw the filters on until the gaskets contacts the mounting plates; then tighten the filter an additional 1/2 turn.
10. Fill the reservoir with hydraulic fluid; refer to Checking the Hydraulic Fluid (page 86).

    Important: **Use only the hydraulic fluids specified. Other fluids could cause system damage.**
11. Install the reservoir dipstick and cap.
12. Start the engine and use all of the hydraulic controls to distribute hydraulic fluid throughout the system.

    Note: Also, check for leaks, then stop the engine.
13. Check the fluid level and add enough to raise the level to the Full mark on the dipstick.

    Note: Do not overfill.

Checking the Hydraulic Lines and Hoses

Service Interval: Every 2 years—Replace moving hydraulic lines and hoses.

Inspect the hydraulic lines and hoses daily for leaks, kinked lines, loose mounting supports, wear, loose fittings, weather deterioration, and chemical deterioration. Make all necessary repairs before operating the machine.

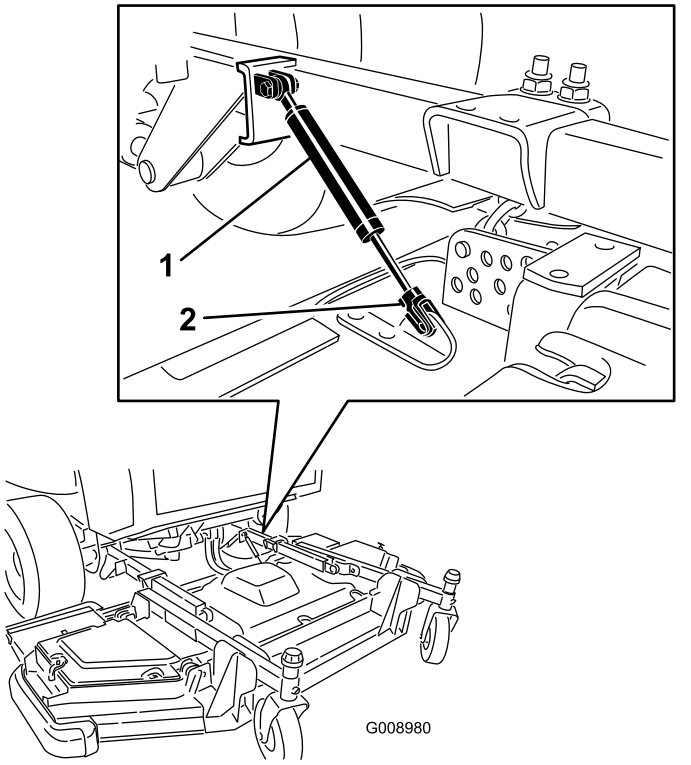
Inspecting the Hydraulic System Test Ports

The test ports are used to test the pressure in the hydraulic circuits. Contact your local Toro distributor or refer to the *Toro Service Manual* for assistance.

Pivoting (Tilting) the Front Mower Deck Upright

Note: Although not needed for normal maintenance procedures, you can pivot (tilt) the front mower deck upright.

1. Raise the front mower deck slightly off the floor.
2. Perform the pre-maintenance procedure; refer to Pre-Maintenance Safety (page 64).
3. Remove the retainer clip and disconnect the damper assembly from the mower deck (Figure 136).

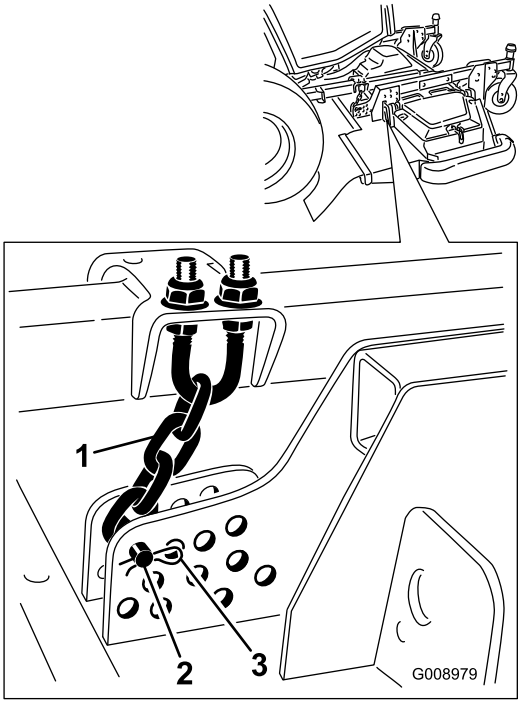


g008980

Figure 136

1. Damper assembly
2. Retainer clip

4. Remove the hairpin cotter and clevis pin securing the height-of-cut chains to the rear of the mower deck (Figure 137).

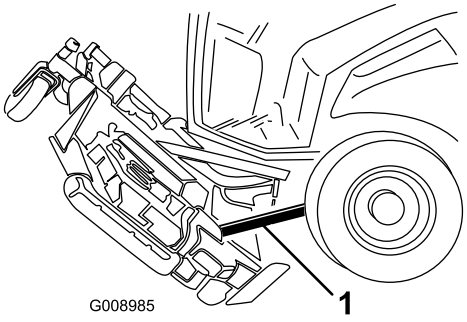


g008979

Figure 137

1. Height-of-cut chain
2. Clevis pin
3. Hairpin cotter

5. Start the engine, slowly raise the front mower deck, stop the engine, and remove the ignition key.
6. Wedge a block of wood between the rear of the deck and the machine (Figure 138).



g008985

Figure 138

1. Block of wood

Pivoting (Tilting) the Front Mower Deck Down

1. With the help of another person holding the front of the mower deck, remove the block of wood.
2. Sit on the seat, start the engine, and lower the mower deck until it is slightly off the floor.
3. Secure the height-of-cut chains to the rear of the mower deck.
4. Connect the damper assembly and secure it with the retainer clip.

Adjusting the Mower-Deck Pitch

Measuring the Mower-Deck Pitch

The mower-deck pitch is the difference between the height of cut from the front tip of the blade to the back tip. Set a blade pitch of 6.3 to 9.7 mm (0.25 to 0.38 inch); i.e., the back tip of the blade should be 7.5 mm (0.3 inch) higher than the front tip.

1. Position the machine on a level surface on the floor.
2. Set the mower deck to the desired height of cut.
3. Ensure that the winglets are level to the front deck and the front deck is level side to side.

Adjusting the Front Mower-Deck Pitch

1. Rotate each blade so that they point straight forward (Figure 139).

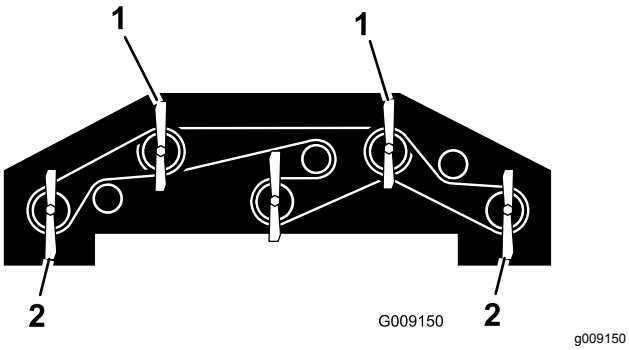


Figure 139

1. Use 1 of these blades for measuring the front-blade height.
2. Use 1 of these blades for measuring the rear-blade height.

2. Using a short ruler, measure from the floor to the front tip of the front blade and record this dimension.
3. Measure from the floor to the back tip of the winglet blade and record this dimension.
4. Subtract the front dimension from the rear dimension to calculate the pitch of each blade.
5. Loosen the jam nuts on the top or bottom of the height-of-cut chain U-bolt (Figure 140).

   Note: Loosen or tighten the height-of-cut chain nuts equally, so that the deck remains level from side to side.

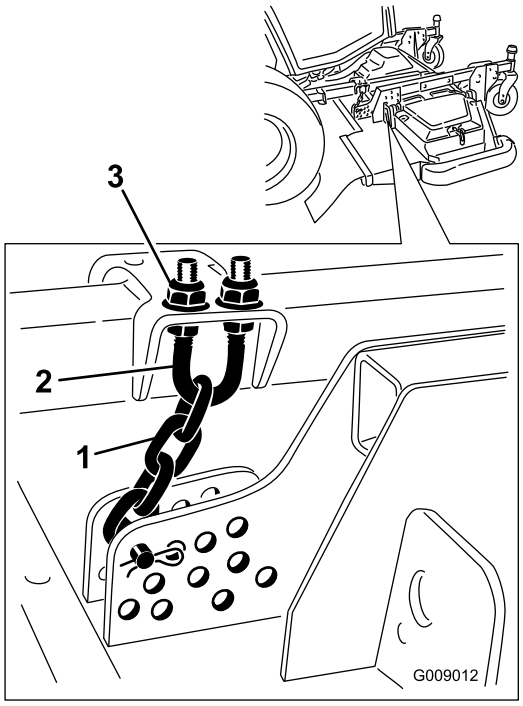


Figure 140

1. Height-of-cut chain
2. U-bolt
3. Nut (2)

6. Adjust the other set of nuts to raise or lower the rear of the mower deck and attain the correct mower-deck pitch based on the average pitch of each blade.
7. Tighten the jam nuts.

Adjusting the Wing Mower-Deck Pitch

1. Remove the tensioning cap from the caster-spindle shaft and slide the spindle out of the caster arm (Figure 141).

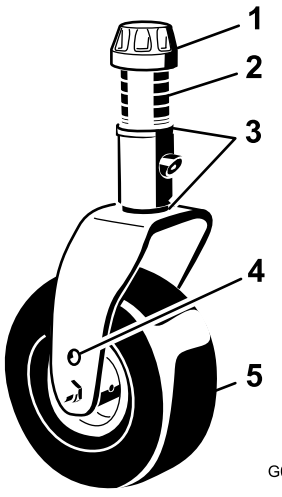


Figure 141

1. Tensioning cap
2. Spacers
3. Shims
4. Top axle-mounting hole
5. Caster wheel

2. Position the shims, as required, to raise or lower the castor wheel until the mower deck has the correct pitch.
3. Install the tensioning cap.

Servicing the Caster-Arm Bushings

The caster arms have bushings pressed into the top and bottom of the tube, and after many hours of operation, the bushings wear. To check the bushings, move the caster fork back and forth and from side to side. If the caster spindle is loose inside the bushings, the bushings are worn and must be replaced.

Remove the tensioning cap and caster fork (Figure 141).

Note: Record the position of the washers and spacers before you remove them so that you do not need to adjust the deck pitch.

Servicing the Caster Wheels and Bearings

Service Interval: Every 500 hours—Inspect the mower deck caster-wheel assemblies.

1. Remove the locknut from the bolt holding the caster-wheel assembly between the caster fork or the caster-pivot arm (Figure 142).

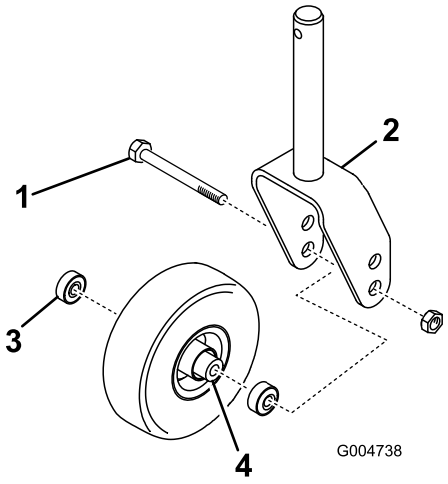


Figure 142

1. Caster wheel
2. Caster fork
3. Bearing
4. Bearing spacer

2. Grasp the caster wheel and slide the bolt out of the fork or pivot arm (Figure 142).
3. Remove the bearing from the wheel hub and allow the bearing spacer to fall out (Figure 142).
4. Remove the bearing from the opposite side of the wheel hub (Figure 142).
5. Check the bearings, spacer, and inside of the wheel hub for wear.

   Note: Replace any damaged parts.
6. To assemble the caster wheel, push the bearing into the wheel hub.

   Note: When installing the bearings, press on the outer race of the bearing.
7. Slide the bearing spacer into the wheel hub and push the other bearing into the open end of the wheel hub to captivate the bearing spacer inside the wheel hub.
8. Install the caster-wheel assembly between the caster fork and secure it in place with the bolt and locknut.

Blade Maintenance

Blade Safety

⚠ DANGER

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

Checking for a Bent Blade

After striking a foreign object, inspect the machine for damage and make repairs before restarting and operating the equipment. Torque all the spindle-pulley nuts to 176 to 203 N·m (130 to 150 ft-lb).

1. Raise the mower deck.
2. Perform the pre-maintenance procedure; refer to Pre-Maintenance Safety (page 64).
3. Block the mower deck to prevent it from accidentally falling.
4. Rotate the blade until the ends face forward and backward, and measure from the inside of the mower deck to the cutting edge at the front of the blade (Figure 143).

   Note: Record this dimension.

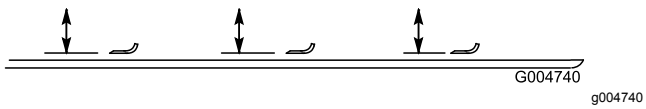


Figure 143

5. Rotate the opposite end of the blade forward and measure between the mower deck and cutting edge of the blade at the same position as in step 4.

   Note: The difference between the dimensions obtained in steps 4 and 5 must not exceed 3 mm (1/8 inch). If the dimension exceeds 3 mm (1/8 inch), the blade is bent and must be replaced; refer to Removing and Installing a Blade (page 92).

Removing and Installing a Blade

Replace the blade if it hits a solid object, if it is out of balance, or if it 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 mower deck to the highest position.
2. Perform the pre-maintenance procedure; refer to Pre-Maintenance Safety (page 64).
3. Block the mower deck to prevent it from accidentally falling.
4. Grasp the end of the blade using a rag or thickly padded glove and remove the blade bolt, anti-scalp cup, and blade from the spindle shaft (Figure 144).

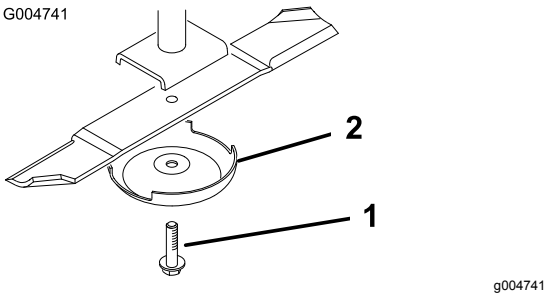


Figure 144

1. Blade bolt
2. Anti-scalp cup

5. Install the blade, anti-scalp cup, and blade bolt.
6. Torque the blade bolt to 115 to 149 N·m (85 to 110 ft-lb).

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

   Note: After striking a foreign object, torque all the spindle-pulley nuts to 176 to 203 N·m (130 to 150 ft-lb) and the blade bolts to 115 to 149 N·m (85 to 110 ft-lb).

Inspecting and Sharpening a Blade

Service Interval: After the first 10 hours

Every 50 hours

Before each use or daily

You must consider 2 areas of the blade when checking and servicing it: the sail and the cutting edge. Both cutting edges and the sail, which is the turned-up portion opposite of the cutting edge, contribute to a good quality of cut. The sail is important because it lifts the grass up straight, thereby producing an even cut. However, the sail gradually wears down during operation, which is normal. As the sail wears down, the quality of cut degrades somewhat, although the cutting edges are sharp. The cutting edge of the blade must be sharp so that the grass is cut, not torn. A dull cutting edge is evident when the tips of the grass appear brown and shredded. Sharpen the cutting edges to correct this condition.

1. Position the machine on a level surface, raise the mower deck, engage the parking brake, put the traction pedal in NEUTRAL, ensure that the PTO switch is in the OFF position, shut off the engine, and remove the ignition key.
2. Examine the cutting ends of the blade carefully (especially where the flat and curved parts of the blade meet) as shown in Figure 145.

   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 mower. If you notice wear, replace the blade (Figure 145).

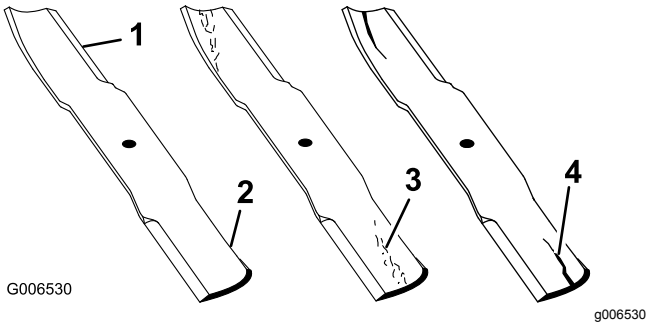


Figure 145

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

3. Examine the cutting edges of all of the blades.
4. Sharpen the cutting edges if they are dull or nicked (Figure 146).

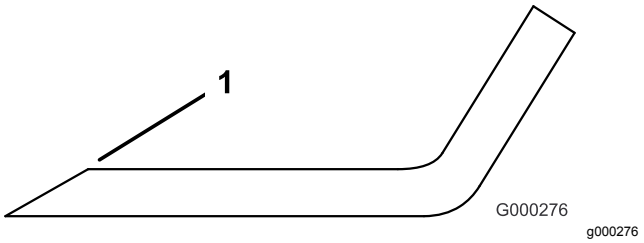


Figure 146

1. Sharpen at the original angle.

   Note: Sharpen only the top of the cutting edge and maintain the original cutting angle to ensure the sharpness.

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

Note: Remove the blades and sharpen them on a grinder. After sharpening the cutting edges, install the blade with the anti-scalp cup and blade bolt; refer to Removing and Installing a Blade (page 92).

Correcting a Mower-Deck Mismatch

When there is mismatch between the blades on a single mower deck, the grass appears streaked when it is cut. You can correct this problem by ensuring that the blades are straight.

1. Using a 1 m (3 ft) long carpenter's level, find a level surface on the shop floor.
2. Raise the height-of-cut to the highest position; refer to Adjusting the Height of Cut (page 38).
3. Lower the mower deck onto a flat surface and remove the covers from the top of the mower deck.
4. Rotate the blades until the ends face forward and backward.
5. Measure from the floor to the front tip of the cutting edge (record this dimension).
6. Rotate the same blade, so that the opposite end is forward and measure it again.

   Note: The difference between the dimensions must not exceed 3 mm (1/8 inch). If the dimension exceeds 3 mm (1/8 inch), replace the blade, because it is bent. Measure all the blades.
7. Ensure that the deck is level from side to side and adjust as required.
8. Install the belt covers.

Cab Maintenance

Cleaning the Cab

For Machines with a Cab

Important: **Use care around the cab seals and lights (Figure 147). If you are using a pressure washer, keep the washer wand at least 0.6 m (2 ft) away from the machine. Do not use the pressure washer directly on the cab seals and lights or under the rear overhang.**

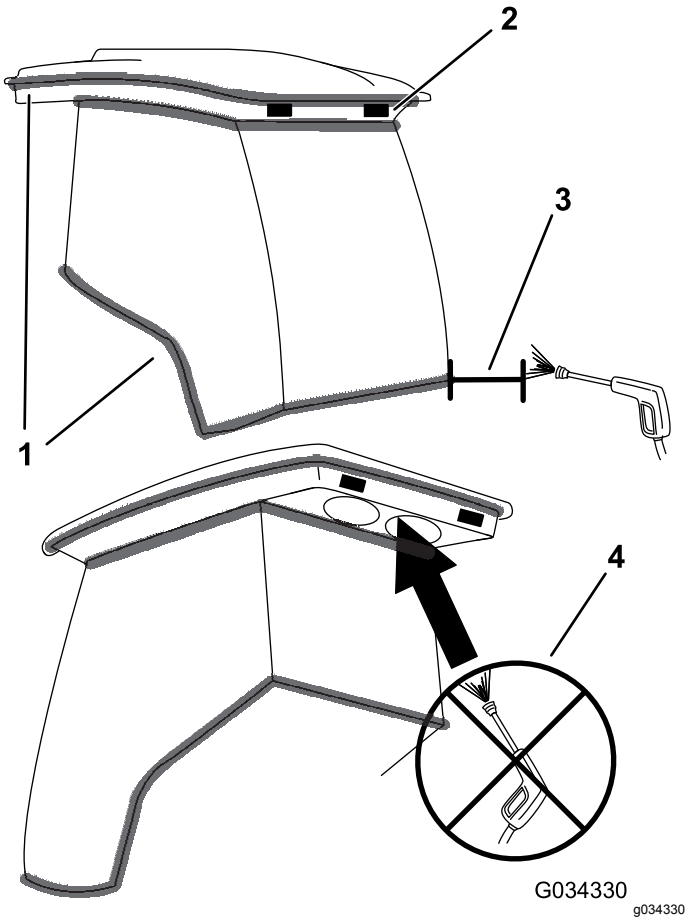


Figure 147

1. Seal
2. Light
3. Keep wand 0.6 m (2 ft) away.
4. Do not pressure-wash under the rear overhang.

Cleaning the Cab Air Filters

Service Interval: Every 250 hours

1. Remove the screws and grates from both the in-cab and rear cab air filters (Figure 148 and Figure 149).

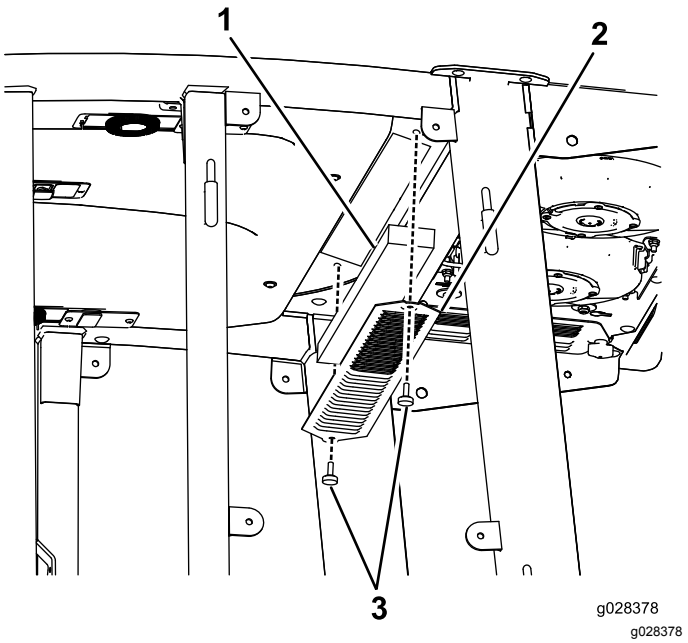


Figure 148
In-Cab Air Filter

1. Filter
2. Grate
3. Screw

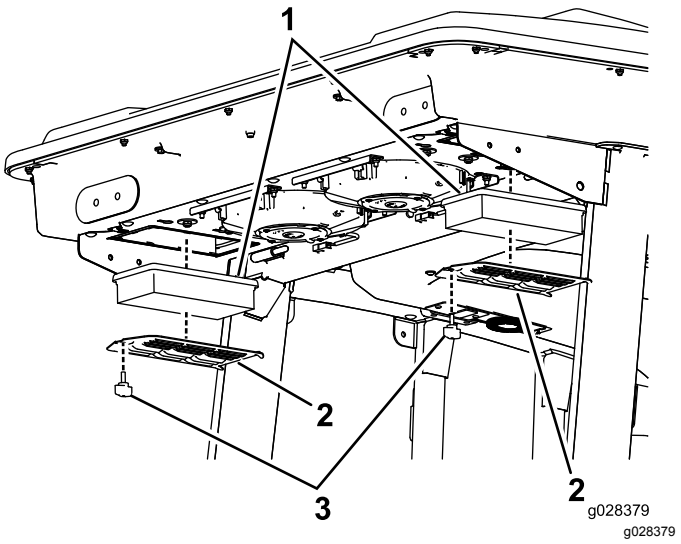


Figure 149
Rear Cab Air Filter

1. Filter
2. Grate
3. Screw

2. Clean the filters by blowing clean, oil-free, compressed air through them.

   Important: **If either filter has a hole, tear, or other damage, replace the filter.**

3. Install the filters and the grate with the thumb screws.

Cleaning the Air-Conditioning-Condenser Coil

Service Interval: Every 250 hours Clean it more frequently in extremely dusty or dirty conditions.

1. Perform the pre-maintenance procedure; refer to Pre-Maintenance Safety (page 64).
2. Disconnect the wire for each fan (Figure 150).

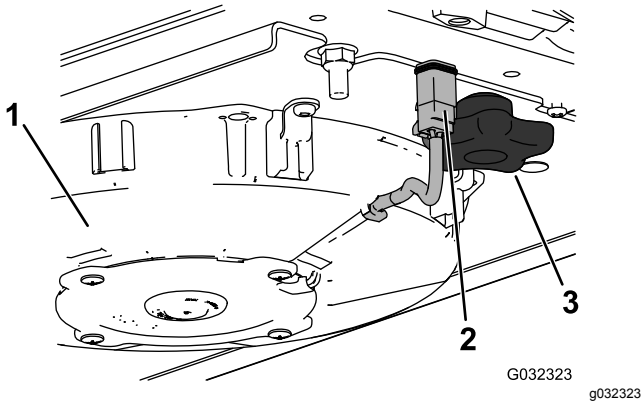


Figure 150
Right Fan Shown

1. Fan
2. Wire
3. Knob

3. Remove the 2 knobs and remove the fan assembly.
4. Open the 4 latches on the air-conditioning assembly and remove the screen (Figure 151).

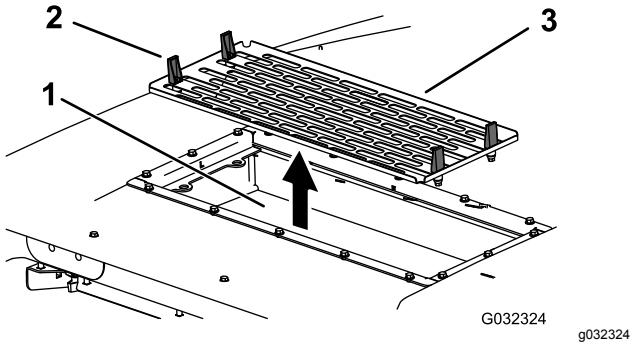


Figure 151

1. Air-conditioning-condenser coil
2. Latch
3. Air-conditioning screen

5. Remove the air filters (Figure 149).
6. Clean the air-conditioning assembly.
7. Install the air filters, screen, and fan assembly (Figure 149, Figure 150, and Figure 151).
8. Connect the wire for each fan (Figure 150).

Storage

Preparing the Machine for Storage

Preparing the Traction Unit

1. Thoroughly clean the traction unit, mower decks, and the engine.

   Important: **Do not use high-pressure water near the Info Center or engine-control unit (ECU), as this may cause damage.**
2. Check the tire pressure; refer to Checking the Tire Pressure (page 37).
3. Check all fasteners for looseness; tighten as necessary.
4. Grease or oil all grease fittings and pivot points and wipe up any excess lubricant; refer to Lubrication (page 66).
5. Lightly sand and use touch-up paint on painted areas that are scratched, chipped, or rusted, and repair any dents in the metal body.
6. Service the battery and cables as follows:
   A. Remove the battery terminals from the battery posts.
   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 No. 505-47) or petroleum jelly to prevent corrosion.
   D. Slowly charge 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 install the drain plug.
2. Remove and install a new oil filter.
3. Fill engine with 10.4 L (11 US qt) of SAE 15W-40 CJ-4 motor oil.
4. Start the engine and run it at idle speed for approximately 2 minutes.
5. Stop the engine.
6. Flush the fuel tank with fresh, clean fuel.
7. Secure all of the fuel-system fittings.
8. Thoroughly clean and service the air-cleaner assembly.

9. Seal the air-cleaner inlet and the exhaust outlet with weatherproof tape.
10. Check the anti-freeze protection and add a 50/50 solution of water and ethylene glycol anti-freeze as needed for the expected minimum temperature in your area.

Notes:

Notes:

International Distributor List

Distributor:	Country:	Phone Number:	Distributor:	Country:	Phone Number:
Agrolanc Kft	Hungary	36 27 539 640	Maquiver S.A.	Colombia	57 1 236 4079
Asian American Industrial (AAI)	Hong Kong	852 2497 7804	Maruyama Mfg. Co. Inc.	Japan	81 3 3252 2285
B-Ray Corporation	Korea	82 32 551 2076	Mountfield a.s.	Czech Republic	420 255 704 220
Brisa Goods LLC	Mexico	1 210 495 2417	Mountfield a.s.	Slovakia	420 255 704 220
Casco Sales Company	Puerto Rico	787 788 8383	Munditol S.A.	Argentina	54 11 4 821 9999
Ceres S.A.	Costa Rica	506 239 1138	Norma Garden	Russia	7 495 411 61 20
CSSC Turf Equipment (pvt) Ltd.	Sri Lanka	94 11 2746100	Oslinger Turf Equipment SA	Ecuador	593 4 239 6970
Cyril Johnston & Co.	Northern Ireland	44 2890 813 121	Oy Hako Ground and Garden Ab	Finland	358 987 00733
Cyril Johnston & Co.	Republic of Ireland	44 2890 813 121	Parkland Products Ltd.	New Zealand	64 3 34 93760
Fat Dragon	China	886 10 80841322	Perfetto	Poland	48 61 8 208 416
Femco S.A.	Guatemala	502 442 3277	Pratoverde SRL.	Italy	39 049 9128 128
FIVEMANS New-Tech Co., Ltd	China	86-10-6381 6136	Prochaska & Cie	Austria	43 1 278 5100
ForGarder OU	Estonia	372 384 6060	RT Cohen 2004 Ltd.	Israel	972 986 17979
G.Y.K. Company Ltd.	Japan	81 726 325 861	Riversa	Spain	34 9 52 83 7500
Geomechaniki of Athens	Greece	30 10 935 0054	Lely Turfcare	Denmark	45 66 109 200
Golf international Turizm	Turkey	90 216 336 5993	Lely (U.K.) Limited	United Kingdom	44 1480 226 800
Hako Ground and Garden	Sweden	46 35 10 0000	Solvert S.A.S.	France	33 1 30 81 77 00
Hako Ground and Garden	Norway	47 22 90 7760	Spypros Stavrinides Limited	Cyprus	357 22 434131
Hayter Limited (U.K.)	United Kingdom	44 1279 723 444	Surge Systems India Limited	India	91 1 292299901
Hydroturf Int. Co Dubai	United Arab Emirates	97 14 347 9479	T-Markt Logistics Ltd.	Hungary	36 26 525 500
Hydroturf Egypt LLC	Egypt	202 519 4308	Toro Australia	Australia	61 3 9580 7355
Irrimac	Portugal	351 21 238 8260	Toro Europe NV	Belgium	32 14 562 960
Irrigation Products Int'l Pvt Ltd.	India	0091 44 2449 4387	Valtech	Morocco	212 5 3766 3636
Jean Heybroek b.v.	Netherlands	31 30 639 4611	Victus Emak	Poland	48 61 823 8369

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