Form No. 3450-412 Rev B

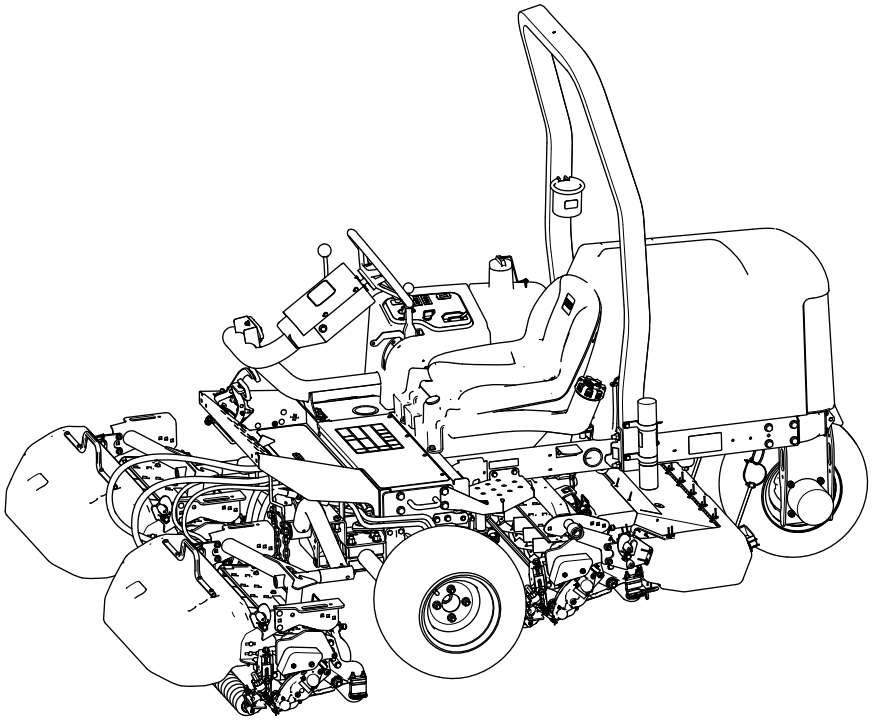
TORO®

Count on it.

Operator's Manual

Reelmaster® 3100-D Traction Unit

Model No. 03170—Serial No. 410300000 and Up
Model No. 03171—Serial No. 410500000 and Up



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

CE UK CA

3450-412

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

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.

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

⚠ WARNING

CALIFORNIA
Proposition 65 Warning

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

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

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

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

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

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

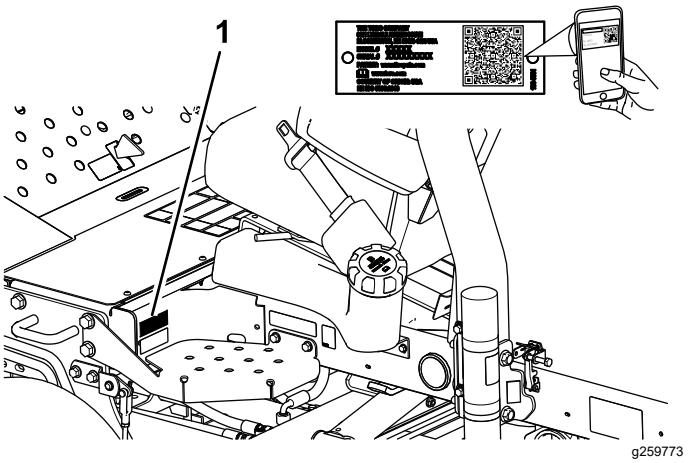


Figure 1

1. Model and serial number location

Model No. _____

Serial No. _____

Introduction

This machine is a ride-on, reel-blade lawn mower intended to be used by professional, hired operators in commercial applications. It is primarily designed for cutting grass on well-maintained turf. Using this product for purposes other than its intended use could prove dangerous to you and bystanders.

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.

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8111 Lyndale Avenue South
Bloomington, MN 55420

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Contents

Safety 4
General Safety 4
Safety and Instructional Decals 5
Setup 12
1 Installing the Wheels 13
2 Installing the Steering Wheel 13
3 Charging and Connecting the Battery 14
4 Checking the Slope Indicator 15
5 Installing the Roll Bar 15
6 Installing the Front Lift Arms 16
7 Installing the Carrier Frames to the Cutting Units 18
8 Installing the Cutting Units 20
9 Installing the Cutting Unit Drive Motors 21
10 Adjusting the Lift Arms 22
11 Adjusting Tire Air Pressure 24
12 Installing the Hood Latch 24
13 Installing the Exhaust Guard 25
14 Installing the CE Decals 26
15 Installing the Tipper Roller Kit (Optional) 27
Product Overview 28
Controls 28
Control Console 28
Mower Manifold 29
Specifications 30
Attachments/Accessories 30
Before Operation 31
Before Operation Safety 31
Fuel Specification 31
Filling the Fuel Tank 32
Performing Daily Maintenance 32
Checking the Interlock System 32
During Operation 33
During Operation Safety 33
Starting the Engine 34
Shutting Off the Engine 35
Cutting Grass with the Machine 35
Side-Shifting the Cutting Units 35
Driving the Machine in Transport Mode 35
Clip Rate (Reel Speed) 36
Adjusting Reel Speed 37
Bleeding the Fuel System 37
Operating Tips 38
After Operation 38
After Operation Safety 38
After Mowing 38
Towing the Machine 38
Identifying the Tie-Down Points 39
Hauling the Machine 39
Maintenance 40
Maintenance Safety 40
Recommended Maintenance Schedule(s) 40
Daily Maintenance Checklist 42
Pre-Maintenance Procedures 44
Preparing for Maintenance 44
Lifting the Front of the Machine 44
Lifting the Back of the Machine 44
Lifting the Back of the Machine 44
Removing the Battery Cover 45
Opening the Hood 45
Lubrication 45
Greasing the Bearings and Bushings 45
Checking the Sealed Bearings 48
Engine Maintenance 48
Engine Safety 48
Engine Oil Specification 48
Checking the Engine-Oil Level 48
Changing the Engine Oil and the Filter 49
Servicing the Air Cleaner 50
Fuel System Maintenance 51
Servicing the Fuel Tank 51
Inspecting the Fuel Lines and Fittings 51
Draining the Water Separator 51
Changing the Fuel Filter Canister 51
Bleeding Air from the Injectors 52
Electrical System Maintenance 52
Electrical System Safety 52
Servicing the Battery 52
Servicing the Fuses 53
Drive System Maintenance 54
Checking the Tire Pressure 54
Torquing the Wheel Nuts 54
Adjusting the Traction Drive for Neutral 54
Cooling System Maintenance 55
Cooling System Safety 55
Coolant Specification 55
Checking the Coolant Level 56
Cleaning the Engine Cooling System 56
Brake Maintenance 57
Adjusting the Parking Brake 57
Belt Maintenance 57
Servicing the Engine Belts 57
Controls System Maintenance 58
Adjusting Mow Ground Speed 58
Adjusting the Throttle 58
Hydraulic System Maintenance 59
Hydraulic System Safety 59
Checking the Hydraulic Lines and Hoses 59
Hydraulic Fluid Specifications 59
Checking the Hydraulic Fluid 60
Hydraulic Fluid Capacity 60
Changing the Hydraulic Fluid 60
Changing the Hydraulic Filter 61
Cutting Unit System Maintenance 62
Blade Safety 62
Checking the Reel-to-Bedknife Contact 62
Backlapping the Cutting Units 62
Cleaning 64
Washing the Machine 64
Storage 65
Storage Safety 65

Preparing the Traction Unit 65
Preparing the Engine 65
Storing the Battery 65
Troubleshooting 66
Using the Standard Control Module (SCM) 66

Safety

General Safety

This product is capable of amputating hands and feet and of throwing objects.

- Read and understand the contents of this *Operator's Manual* before starting the engine.
- Use your full attention while operating the machine. Do not engage in any activity that causes distractions; otherwise, injury or property damage may occur.
- 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 functioning properly on the machine.
- Keep bystanders and children out of the operating area. Never allow children to operate the machine.
- Shut off the engine, remove the key, and wait for all movement to stop before you leave the operator's position. Allow the machine to cool before adjusting, servicing, cleaning, or storing it.

Safety-Alert Symbol

The safety-alert symbol (Figure 2) shown in this manual and on the machine identifies important safety messages that you must follow to prevent accidents.



g000502

Figure 2
Safety-alert symbol

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

DANGER indicates an imminently hazardous situation which, if not avoided, **will** result in death or serious injury.

WARNING indicates a potentially hazardous situation which, if not avoided, **could** result in death or serious injury.

CAUTION indicates a potentially hazardous situation which, if not avoided, **may** result in minor or moderate injury.

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

Safety and Instructional Decals

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

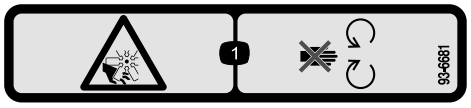


decalbatterysymbols

Battery Symbols

Some or all of these symbols are on your battery.

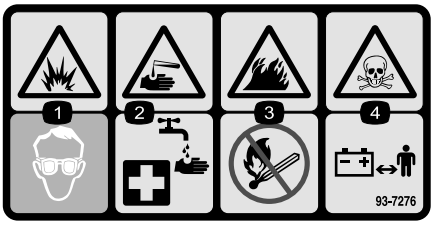
1. Explosion hazard
2. No fire, open flame, or smoking
3. Caustic liquid/chemical burn hazard
4. Wear eye protection.
5. Read the *Operator's Manual*.
6. Keep bystanders away from the battery.
7. Wear eye protection; explosive gases can cause blindness and other injuries.
8. Battery acid can cause blindness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



decal93-6681

93-6681

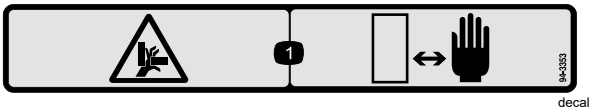
1. Cutting/dismemberment hazard, fan—stay away from moving parts.



decal93-7276

93-7276

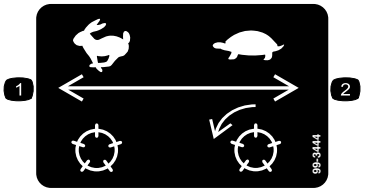
1. Explosion hazard—wear eye protection.
2. Caustic liquid/chemical burn hazard—to perform first aid, flush with water.
3. Fire hazard—no fire, open flames, or smoking.
4. Poison hazard—keep children away from the battery.



decal94-3353

94-3353

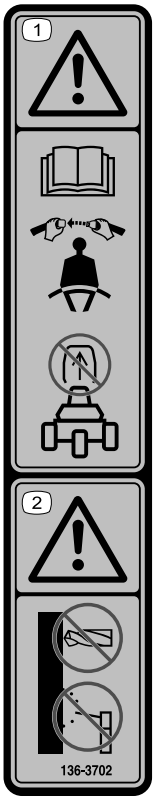
1. Crushing hazard of hand—keep hands away.



decal99-3444

99-3444

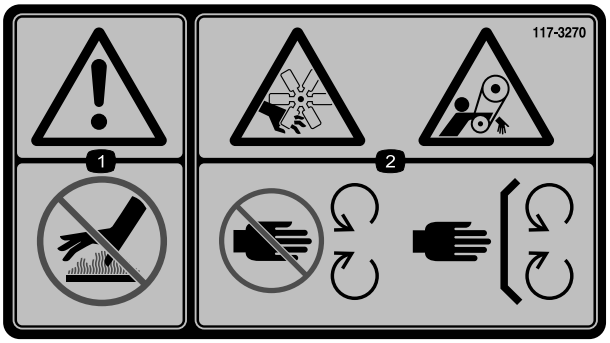
1. Transport speed—fast
2. Mowing speed—slow



decal136-3702

136-3702

1. Warning—Read the *Operator's Manual*; wear a seatbelt; do not remove the roll bar.
2. Warning—Do not modify the roll bar.

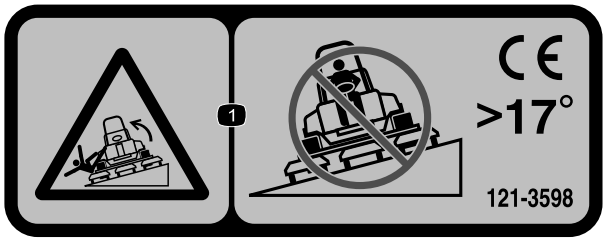


decal117-3270

117-3270

1. Warning—do not touch the hot surface.
2. Cutting/dismemberment hazard, hand; entanglement hazard, belt—stay away from moving parts, keep all guards and shields in place.

CE Machines

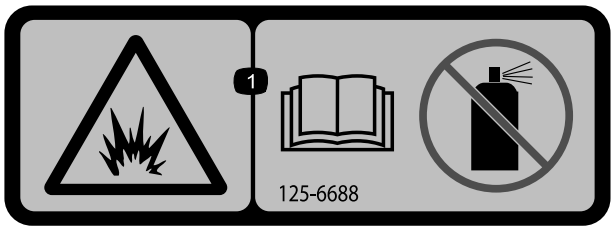


decal121-3598

121-3598

Note: This machine complies with the industry standard stability test in the static lateral and longitudinal tests with the maximum recommended slope indicated on the decal. Review the instructions for operating the machine on slopes in the *Operator's Manual* as well as the conditions in which you would operate the machine to determine whether you can operate the machine in the conditions on that day and at that site. Changes in the terrain can result in a change in slope operation for the machine. If possible, keep the cutting units lowered to the ground while operating the machine on slopes. Raising the cutting units while operating on slopes can cause the machine to become unstable.

1. Tipping hazard—do not drive across slopes greater than 17°.



decal125-6688

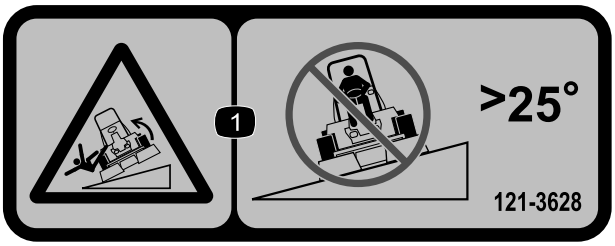
125–6688

1. Explosion hazard—Read the *Operator's Manual*; Do not use starting fluid.



decal133-8062

133-8062

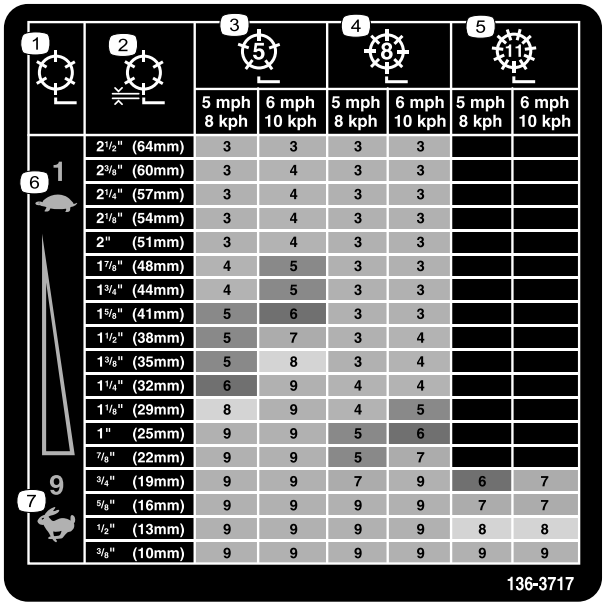


decal121-3628

121-3628

Note: This machine complies with the industry standard stability test in the static lateral and longitudinal tests with the maximum recommended slope indicated on the decal. Review the instructions for operating the machine on slopes in the *Operator's Manual* as well as the conditions in which you would operate the machine to determine whether you can operate the machine in the conditions on that day and at that site. Changes in the terrain can result in a change in slope operation for the machine. If possible, keep the cutting units lowered to the ground while operating the machine on slopes. Raising the cutting units while operating on slopes can cause the machine to become unstable.

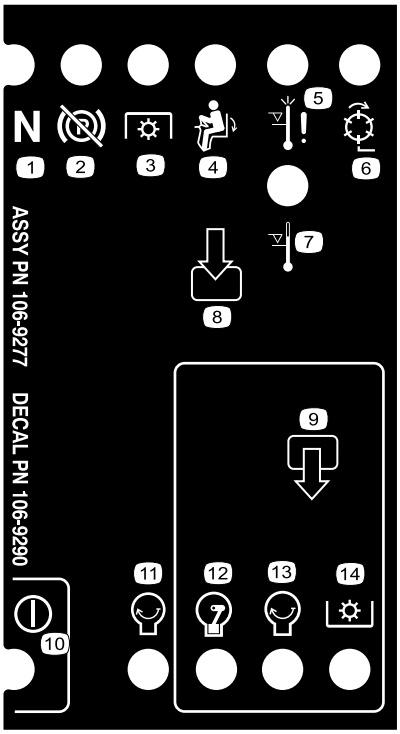
1. Tipping hazard—do not drive across slopes greater than 25°.



decal136-3717

136-3717

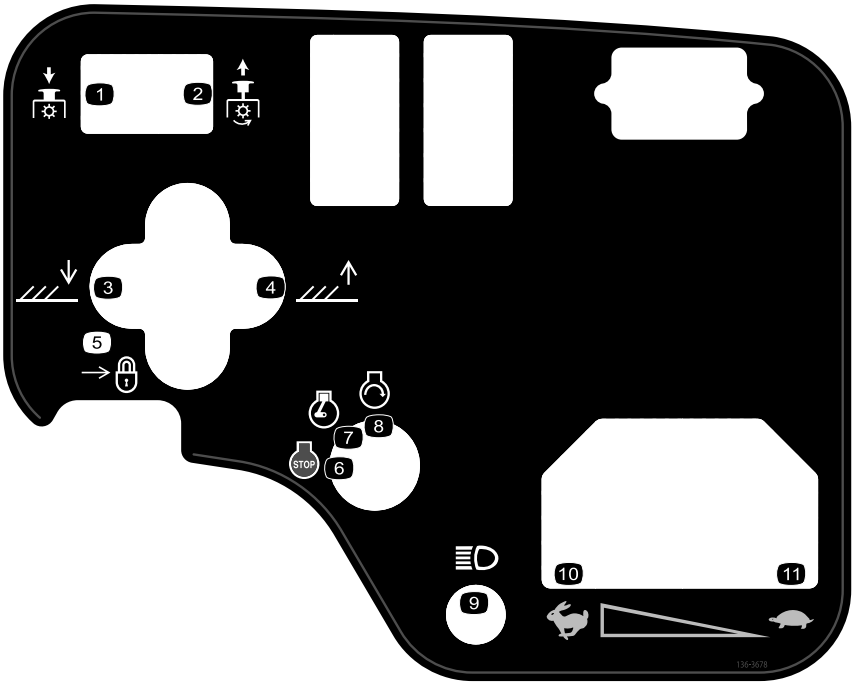
1. Reel speed
2. Reel height of cut
3. 5-blade reel adjustment
4. 8-blade reel adjustment
5. 11-blade reel adjustment
6. Slow
7. Fast



decal106-9290

106-9290

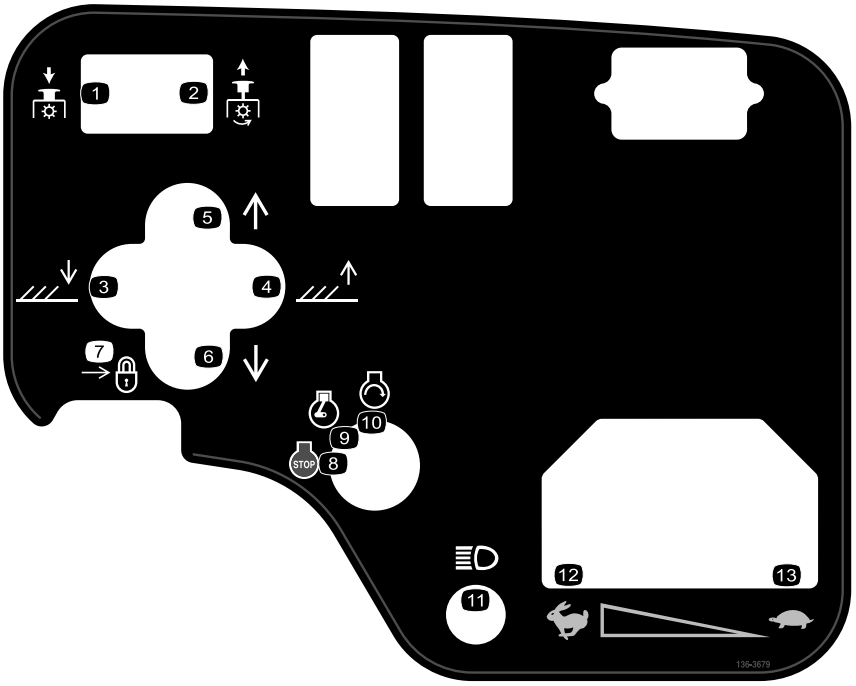
1. Neutral
2. Parking brake—Off
3. PTO
4. In seat
5. High temperature shutdown
6. Reels—active
7. High temperature warning
8. Inputs
9. Outputs
10. Power
11. Engine—Start
12. Engine—Run
13. Engine—Start
14. PTO



decal136-3678

136-3678

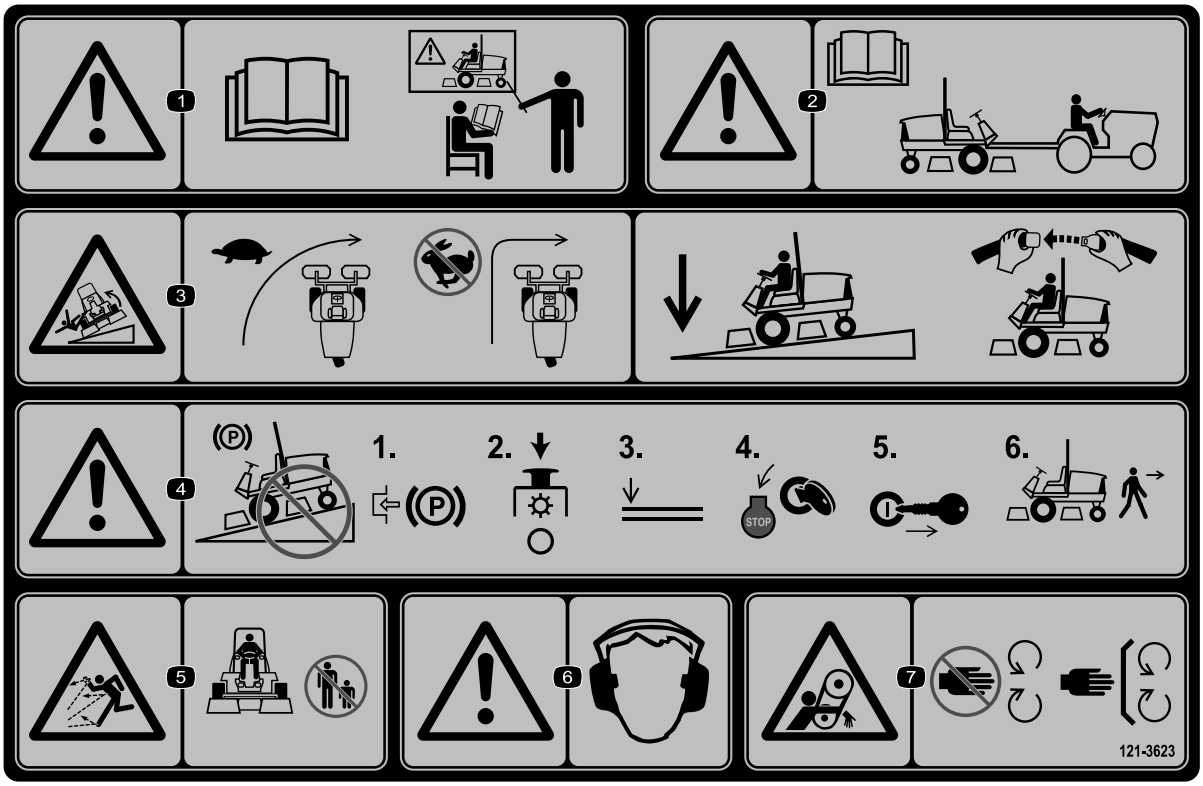
1. PTO—Disengage
2. PTO—Engage
3. Lower the cutting units.
4. Raise the cutting units.
5. Lock
6. Engine—Shut off
7. Engine—Run
8. Engine—Start
9. Lights
10. Fast
11. Slow



decal136-3679

136-3679

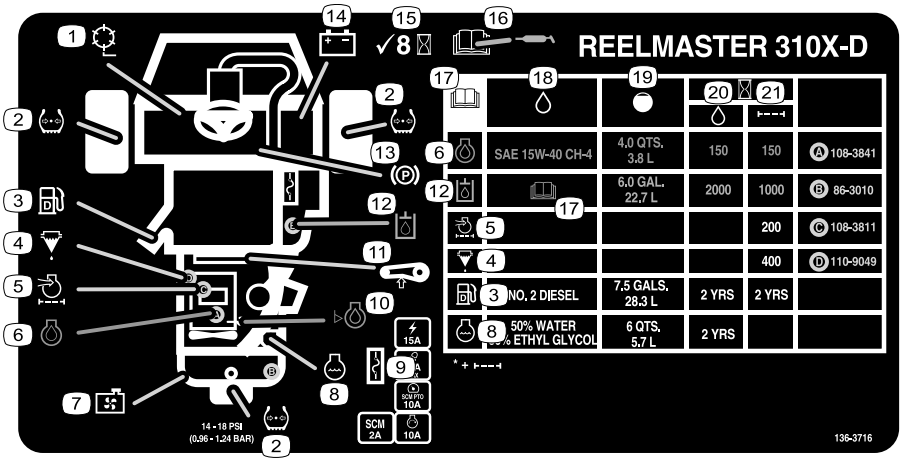
1. PTO—Disengage
2. PTO—Engage
3. Lower the cutting units.
4. Raise the cutting units.
5. Shift the cutting units to the right.
6. Shift the cutting units to the left.
7. Lock
8. Engine—Shut off
9. Engine—Run
10. Engine—Start
11. Lights
12. Fast
13. Slow



decal121-3623

121-3623

1. Warning—read the *Operator's Manual*; do not operate the machine unless you have received training.
2. Warning—read the *Operator's Manual* before towing the machine.
3. Tipping hazard—slow the machine before turning; when driving on slopes, keep the cutting units lowered and your seatbelt fastened.
4. Warning—do not park on slopes; engage the parking brake, stop the cutting units, lower the attachments, shut off the engine, and remove the key from the ignition before leaving the machine.
5. Thrown object hazard—keep bystanders away.
6. Warning—wear hearing protection.
7. Entanglement hazard—keep away from moving parts; keep all guards and shields in place.



decal136-3716

136-3716

1. Reel speed
2. Tire pressure
3. Diesel fuel
4. Fuel/water separator
5. Engine air filter
6. Engine oil
7. Radiator screen
8. Engine coolant
9. Fuses
10. Engine-oil level
11. Belt tension
12. Hydraulic fluid
13. Parking brake
14. Battery
15. Check every 8 hours.
16. Read the *Operator's Manual* for lubrication information.
17. Read the *Operator's Manual*.
18. Fluids
19. Capacity
20. Fluid interval (hours)
21. Filter interval (hours)

Setup

Loose Parts

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

Procedure	Description	Qty.	Use
1	Front wheel assembly Rear wheel assembly	2 1	Install the wheels.
2	Steering wheel Steering-wheel cap Large washer Jam nut Screw	1 1 1 1 1	Install the steering wheel.
3	No parts required	–	Charge and connect the battery.
4	Angle indicator (handheld)	1	Check the slope indicator.
5	Roll-bar assembly Flange-head bolt Locknut Hose clamp	1 4 4 1	Install the roll bar.
6	Lift arm kit (optional kit—order separately)	1	Install the front lift arms.
7	Cutting Unit (optional part—order separately)	3	Install the carrier frames to the cutting units.
8	No parts required	–	Install the cutting units.
9	No parts required	–	Install the cutting unit drive motors.
10	No parts required	–	Adjust the lift arms.
11	No parts required	–	Adjust the tire air pressure.
12	Lock bracket Rivet Washer Screw (1/4 x 2 inches) Locknut (1/4 inch)	1 2 1 1 1	Install the hood latch (CE machines).
13	Exhaust guard Self-tapping screw	1 4	Install the exhaust guard (CE machines).
14	Year of production decal CE decal Tilt danger decal (121-3598)	1 1 1	Install the CE decals, if required.
15	Tipper roller kit (not included)	1	Install the optional tipper roller kit.

Media and Additional Parts

Description	Qty.	Use
Ignition key	2	Start the engine.
Operator's Manual Engine operator's manual	1 1	Read before operating the machine.
Operator training material	1	View before operating the machine.
Pre-delivery checklist	1	Check to ensure that the machine has been properly set up.
Certificate of compliance	1	Ensure CE compliance.

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

1

Installing the Wheels

Parts needed for this procedure:

2	Front wheel assembly
1	Rear wheel assembly

Procedure

Important: **The rim and tire of the rear wheel is narrower than that of the front 2 rims and tires.**

1. Mount a wheel assembly onto the wheel hub with the valve stem aligned outward.
2. Secure the wheel to the hub with the lug nuts, and torque the nuts in a crossing pattern to 61 to 88 N·m (45 to 65 ft-lb).
3. Repeat steps 1 and 2 for the other wheel assemblies.

2

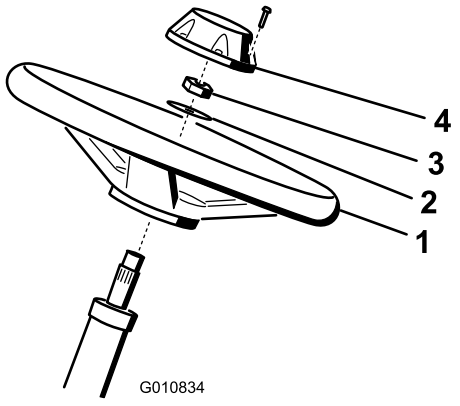
Installing the Steering Wheel

Parts needed for this procedure:

1	Steering wheel
1	Steering-wheel cap
1	Large washer
1	Jam nut
1	Screw

Procedure

1. Slide the steering wheel onto the steering shaft (Figure 3).



g010834

Figure 3

1. Steering wheel
2. Washer
3. Jam nut
4. Cap

2. Slide the washer onto the steering shaft (Figure 3).

3. Secure the steering wheel to the shaft (Figure 3) with a jam nut and tighten it to 27 to 35 N·m (20 to 26 ft-lb).
4. Install the cap to the steering wheel and secure it with a screw (Figure 3).

3

Charging and Connecting the Battery

No Parts Required

Procedure

⚠ DANGER

Battery electrolyte contains sulfuric acid, which is lethal if consumed and causes severe burns.

- **Do not drink electrolyte and avoid contact with skin, eyes, or clothing. Wear safety glasses and rubber gloves.**
- **Fill the battery where clean water is always available for flushing the skin.**

1. Remove the 2 knobs that secure the battery cover to the machine, and remove the cover (Figure 4).

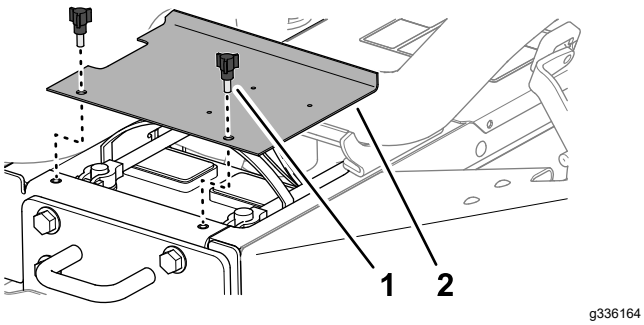


Figure 4

1. Knob
2. Battery cover

2. Measure the battery voltage.

   Note: If you measure 12.4 V or higher, the battery is charged.
3. If you measure 12.3 V or less, charge the battery at a rate of 3 to 4 A for 4 to 8 hours.

⚠ WARNING

Charging the battery produces gasses that can explode.

- **Keep sparks and flames away from battery.**
- **Never smoke near the battery.**

4. When the battery is charged, disconnect the charger from the electrical outlet and battery posts.
5. Install the positive cable (red) to the positive (+) battery terminal, and secure them with T-bolt and nut (Figure 5).

   Note: Ensure that the positive (+) terminal is all the way onto the post and the cable is positioned snug to the battery.

   Important: **The cable must not contact the battery cover.**
6. Install the negative cable (black) to the negative (–) battery terminal of the battery, and secure them with T-bolt and nut (Figure 5).

⚠ WARNING

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

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

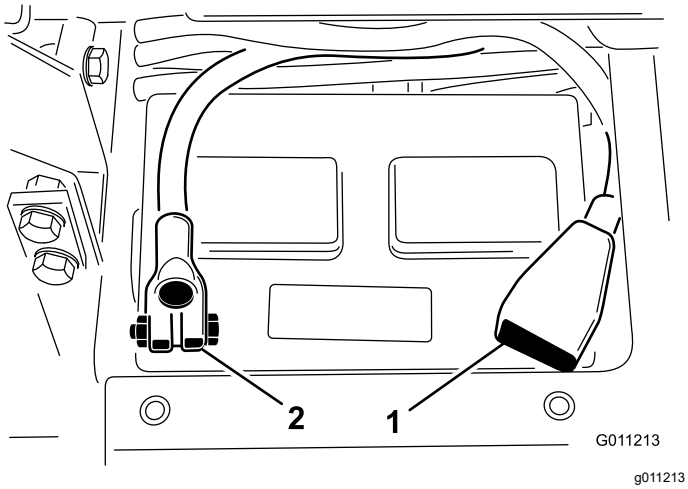


Figure 5

1. Positive (+) battery cable
2. Negative (–) battery cable

Important: **If you ever remove the battery, ensure that the battery clamp bolts are installed with the bolt heads positioned on the bottom side and the nuts on the top side. If the clamp bolts are reversed, they may interfere with the hydraulic tubes when you shift the cutting units.**

7. Coat both battery connections with Grafo 112X skin-over grease (Toro Part No. 505-47) or light grease to prevent corrosion.
8. Slide the rubber boot over the positive terminal to prevent a possible short from occurring.
9. Install the battery cover.

4

Checking the Slope Indicator

Parts needed for this procedure:

1	Angle indicator (handheld)

Procedure

1. Park the machine on a flat, level surface.
2. Verify that the machine is level by placing a handheld angle indicator (supplied with the machine) on the frame cross rail, by the fuel tank (Figure 6).

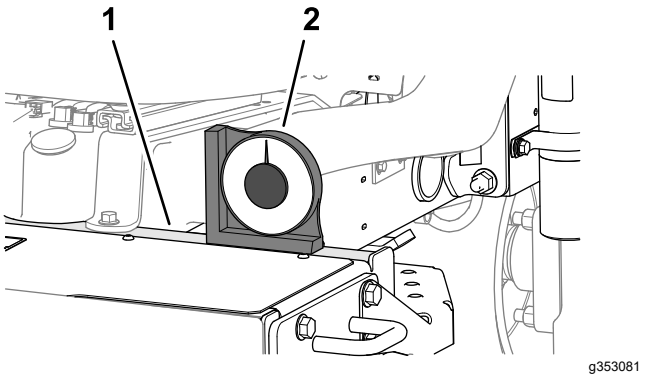


Figure 6

1. Cross rail (frame)
2. Handheld angle indicator

3. If the angle indicator does not read 0°, move the machine to a location where you can attain a 0° reading on the handheld angle indicator.
4. Check the slope indicator mounted on the steering tube of the machine (Figure 7).

   Note: The slope indicator should read 0° when viewed from the operator's position.

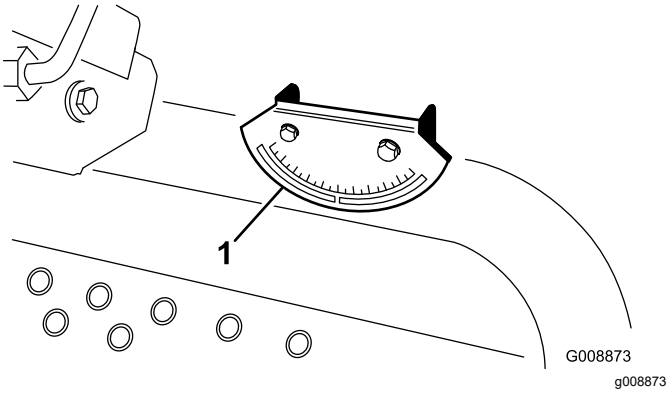


Figure 7

1. Angle indicator

5. If the slope indicator does not read 0°, loosen the 2 screws and 2 locknuts securing the angle indicator to the mounting bracket, adjust the indicator to attain a 0° reading, and tighten the screws and nuts.

5

Installing the Roll Bar

Parts needed for this procedure:

1	Roll-bar assembly
4	Flange-head bolt
4	Locknut
1	Hose clamp

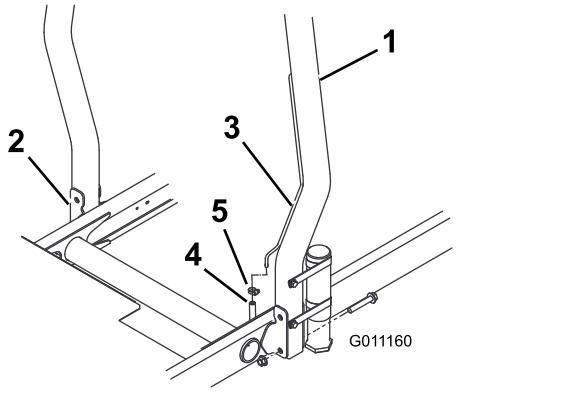
Procedure

⚠ WARNING

Operating the machine with a modified or damaged roll bar may not adequately protect you, causing possible injury or death in a rollover.

- **Do not install a damaged or modified roll bar on the machine.**
- **Replace a damaged roll bar; do not repair or alter it.**

1. Lower the roll bar onto the traction unit mounting brackets, aligning the mounting holes. Ensure that the vent tube on the roll bar is on the left side of the machine (Figure 8).



g011160

Figure 8

1. Roll bar
2. Mounting bracket
3. Vent tube
4. Fuel line vent tube hose
5. Hose clamp

2. Secure each side of the roll bar to the mounting brackets with 2 flange head bolts and 2 locknuts (Figure 8). Torque the fasteners to 81 N·m (60 ft-lb).
3. Secure the fuel line vent hose to the vent tube on the roll bar with the hose clamp.

⚠ CAUTION

Starting the engine with the fuel line vent hose disconnected from the vent tube will cause fuel to flow from the hose, increasing the risk of fire or explosion. A fire or explosion from fuel can burn you and others and can cause property damage.

Connect the fuel line vent hose to the vent tube prior to starting the engine.

6

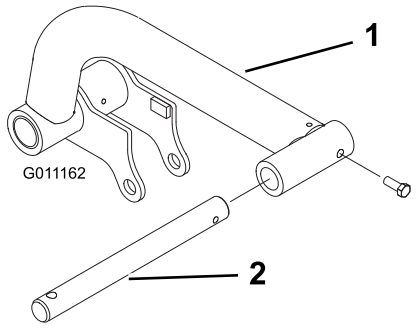
Installing the Front Lift Arms

Parts needed for this procedure:

1	Lift arm kit (optional kit—order separately)

Preparing to Install the Lift Arms

1. Insert a pivot rod into each lift arm and align the mounting holes (Figure 9).



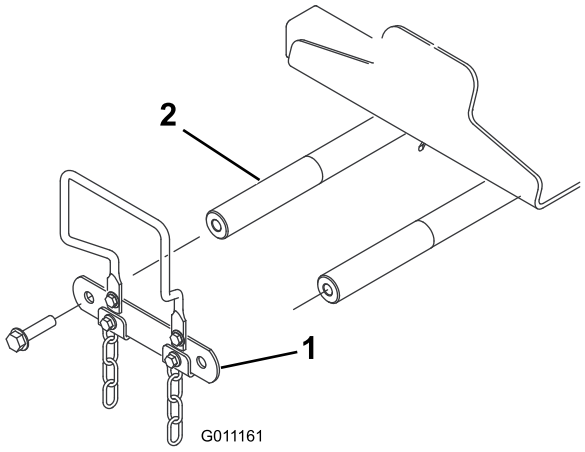
g011162

Figure 9

1. Lift arm
2. Pivot rod

2. Secure the pivot rods to the lift arms with 2 bolts (5/16 x 7/8 inch).
3. Torque the bolts to 37 to 45 N·m (27 to 33 ft-lb).
4. At the front of the machine, remove the 2 flange capscrews (1/2 x 2 inches) that secure the pivot-shaft link to the lift arm pivot shafts, and remove the link (Figure 10).

   Note: Retain the pivot shaft link and capscrews.



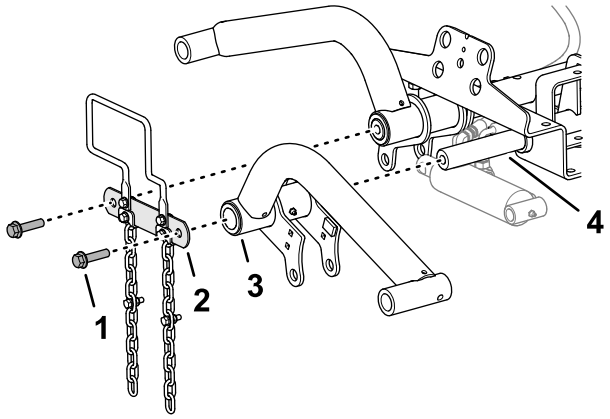
g011161

Figure 10

1. Pivot-shaft link
2. Lift arm pivot shaft

Assembling the Lift Arms to the Machine

1. Assemble the lift arms onto the lift arm pivot shafts as shown in Figure 11).



g346437

Figure 11

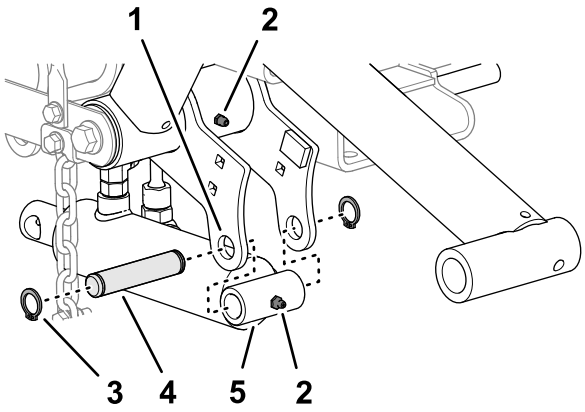
1. Bolt (1/2 x 2 inches)
2. Pivot-shaft link
3. Lift arm
4. Lift arm pivot shaft

2. Assemble pivot-shaft link to the lift arm pivot shafts (Figure 11) with the 2 flange capscrews (1/2 x 2 inches) that you removed in Preparing to Install the Lift Arms (page 16).
3. Torque the capscrews to 95 N·m (70 ft-lb).

Assembling the Lift Cylinder to the Left Lift Arm

Grease type: No. 2 lithium grease

1. Align the cap end of the lift cylinder with the holes in the left lift-arm flanges (Figure 12).



g346438

Figure 12

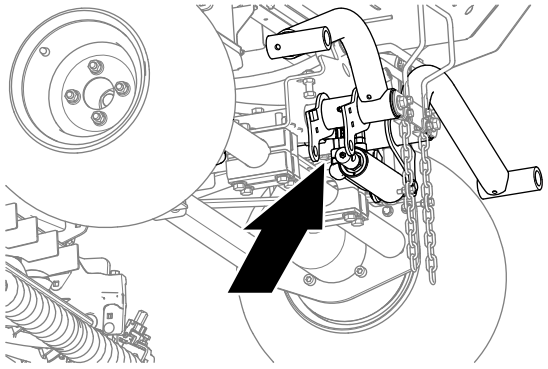
1. Grease fitting
2. Lift arm flange (left)
3. Snap ring
4. Mounting pin
5. Lift cylinder (cap end)

2. Assemble the cylinder to the flanges with the mounting pin and 2 snap rings (Figure 12).
3. Apply No. 2 lithium grease to the grease fittings of the lift arm and the hydraulic cylinder (Figure 12).

Assembling the Lift Cylinder to the Right Lift Arm

Grease type: No. 2 lithium grease

1. Align a drain pan below the hydraulic fittings of the lift cylinder (Figure 13).



g346441

Figure 13

2. At the lift cylinder, loosen the straight swivel fitting of the return hose and the 90° swivel fitting of the lift hose (Figure 14).

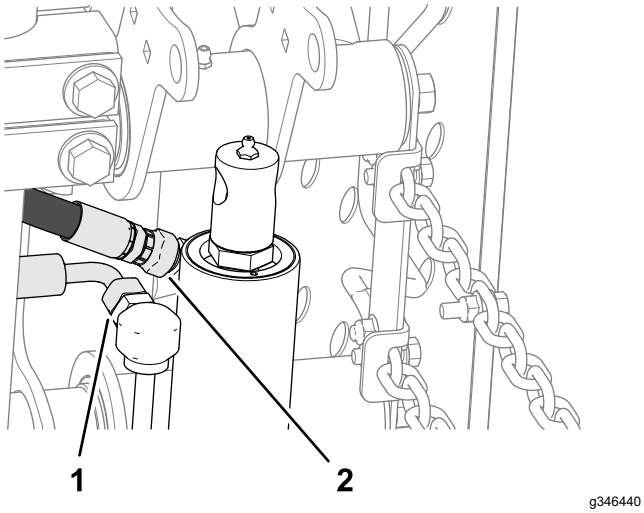


Figure 14

1. Straight swivel fitting (return hose)
2. 90° swivel fitting (lift hose)

3. Wrap a rag around the hose fittings.
4. Slowly move the lift-cylinder rod until it aligns with the holes in the right lift-arm flanges (Figure 15).

   Important: **Some hydraulic fluid is forced out at the hose fittings when you move the lift-cylinder rod.**

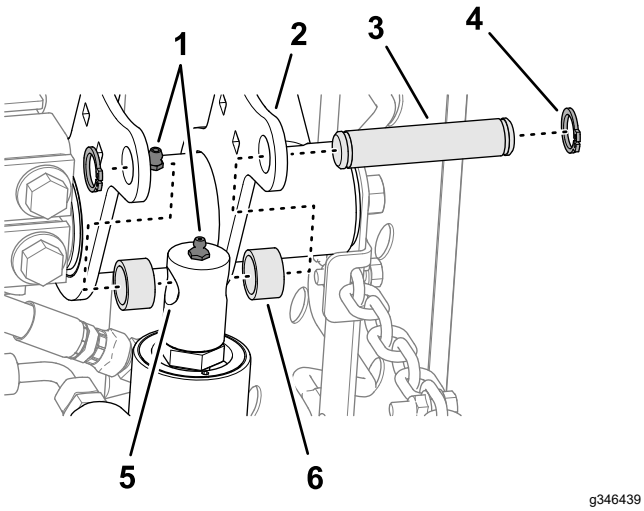


Figure 15

1. Grease fitting
2. Lift arm flange (right)
3. Mounting pin
4. Snap ring
5. Lift-cylinder rod
6. Spacer

5. Assemble the rod to the flanges with the mounting pin, 2 spacers, and 2 snap rings (Figure 15).
6. Apply No. 2 lithium grease to the grease fittings of the lift arm and the hydraulic cylinder (Figure 15).
7. Torque the swivel fittings of the return and lift hoses to 37 to 45 N·m (27 to 33 ft-lb).

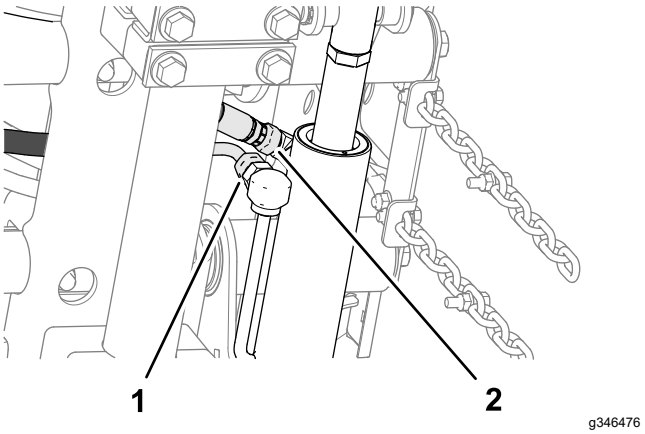


Figure 16

1. Straight swivel fitting (return hose)
2. 90° swivel fitting (lift hose)

8. Clean hydraulic fluid from the machine.

7

Installing the Carrier Frames to the Cutting Units

Parts needed for this procedure:

3	Cutting Unit (optional part—order separately)

Preparing the Cutting Units

1. Remove the cutting units from the cartons.
2. Adjust the cutting units as instructed in the *Operator's Manual* for the cutting units.

Assembling the Carrier Frames for the Front Cutting Units

Cutting Unit with Links

Note: The front carrier frames are part of the optional lift arm kit.

1. Align the holes in the plates of the front-carrier frame with the holes in the cutting unit mounting plates (Figure 17).

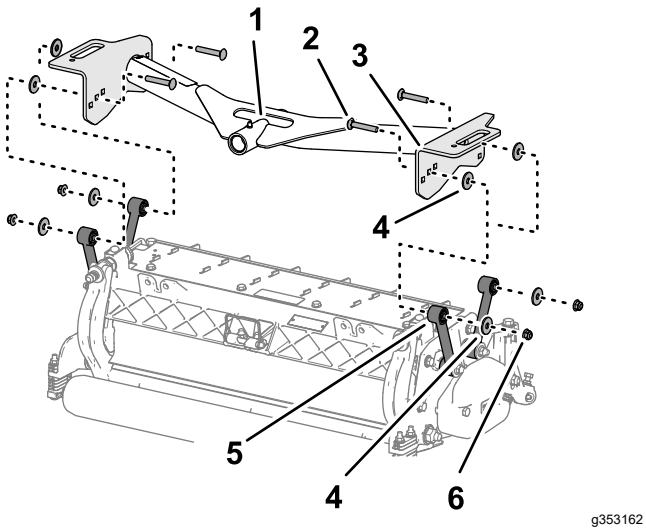


Figure 17

1. Pivot tube (front-carrier frame)
2. Carriage bolt (3/8 x 2-1/4 inches)
3. Plate (front carrier frame)
4. Washer
5. Link (cutting unit)
6. Flange locknut (3/8 inch)

2. Align a washer between the carrier plate and link (Figure 17), and loosely assemble the plates and spacer with a carriage bolt (3/8 x 2-1/4 inches), washer, and flange locknut (3/8 inch).

   Note: If you are starting assembly at the back of the cutting unit, use the middle hole of the plate.
3. Repeat step 2 at the other plate holes and links.
4. Torque the flange locknuts to 37 to 45 N·m (27 to 33 ft-lb).
5. Repeat steps 1 through 4 for the other front cutting unit and carrier frame.

Assembling the Cutting Unit and Rear Carrier Frame

Cutting Unit with Links

Note: The rear carrier frame is part of the optional lift arm kit.

1. Align the hole in the plates rear-carrier frame with the hole in the cutting unit mounting plates

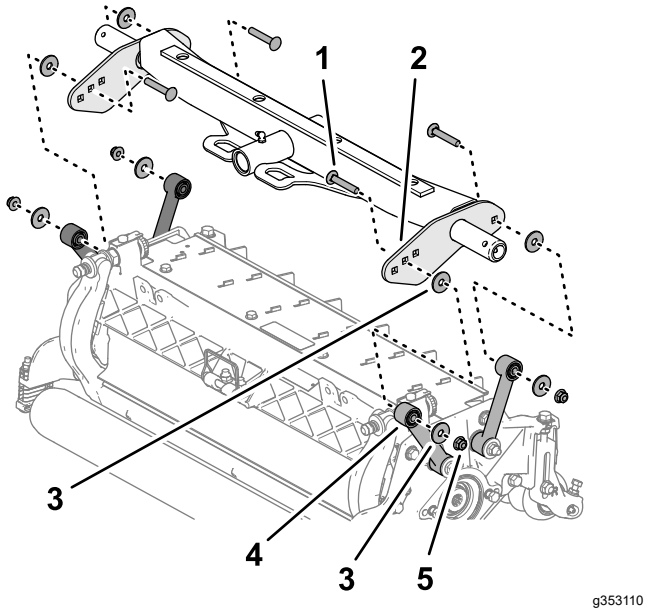


Figure 18

1. Carriage bolt (3/8 x 2-1/4 inches)
2. Plate (rear carrier frame)
3. Washer
4. Link (cutting unit)
5. Flange locknut (3/8 inch)

2. Align a washer between the carrier plate and link (Figure 18), and loosely assemble the plates and spacer with a carriage bolt (3/8 x 2-1/4 inches), washer, and flange locknut (3/8 inch).

   Note: If you are starting assembly at the back of the cutting unit, use the middle hole of the plate.
3. Repeat step 2 at the other plate holes and links.
4. Torque the flange locknuts to 37 to 45 N·m (27 to 33 ft-lb).

Assembling the Carrier Frames for the Front Cutting Units

Cutting Unit with Mounting Plates

Note: The front carrier frames are part of the optional lift arm kit.

1. Align the holes in the plates of the front-carrier frame with the holes in the cutting unit mounting plates (Figure 19).

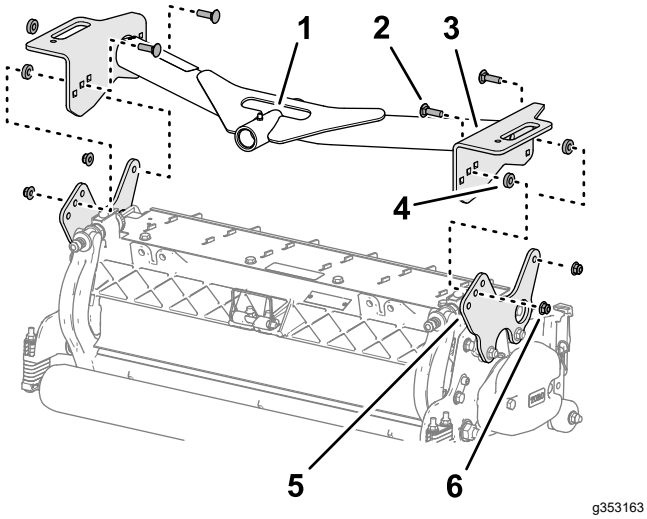


Figure 19

1. Pivot tube (front-carrier frame)
2. Carriage bolt (3/8 x 1-1/4 inches)
3. Plate (front carrier frame)
4. Spacer
5. Mounting plate (cutting unit)
6. Flange locknut (3/8 inch)

2. Align a spacer between the carrier plate and mounting plate (Figure 19), and loosely assemble the plates and spacer with a carriage bolt (3/8 x 1-1/4 inches) and flange locknut (3/8 inch).

   Note: If you are starting assembly at the back of the cutting unit, use the middle holes of each plate.
3. Repeat step 2 at the other plate holes.
4. Torque the flange locknuts to 37 to 45 N·m (27 to 33 ft-lb).
5. Repeat steps 1 through 4 for the other front cutting unit and carrier frame.

Assembling the Cutting Unit and Rear Carrier Frame

Cutting Unit with Mounting Plates

Note: The rear carrier frame is part of the optional lift arm kit.

1. Align the holes in the plates of the rear-carrier frame with the holes in the cutting unit mounting plates (Figure 15).

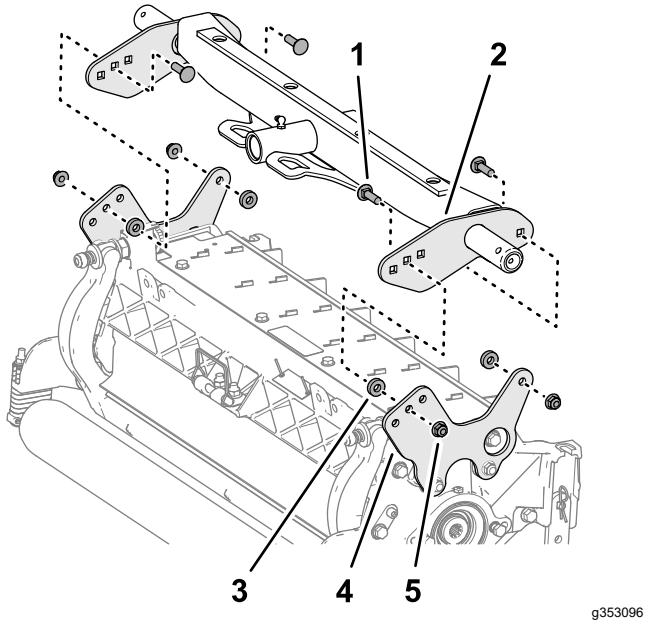


Figure 20

1. Carriage bolt (3/8 x 1-1/4 inches)
2. Plate (rear carrier frame)
3. Spacer
4. Mounting plate (cutting unit)
5. Flange locknut (3/8 inch)

2. Align a spacer between the carrier plate and mounting plate (Figure 16), and loosely assemble the plates and spacer with a carriage bolt (3/8 x 1-1/4 inches) and flange locknut (3/8 inch).

   Note: If you are starting assembly at the back of the cutting unit, use the middle holes of each plate.
3. Repeat step 2 at the other plate holes.
4. Torque the flange locknuts to 37 to 45 N·m (27 to 33 ft-lb).

8

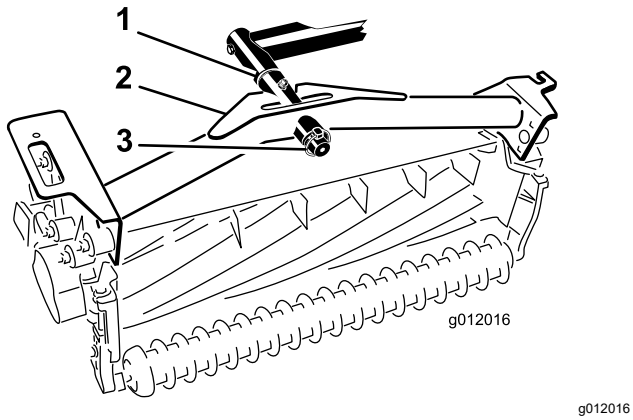
Installing the Cutting Units

No Parts Required

Procedure

1. Slide a thrust washer onto each front lift arm pivot rod.
2. Slide the cutting unit carrier frame onto the pivot rod and secure it with a lynch pin (Figure 21).

   Note: On rear cutting unit, position the thrust washer between the rear of the carrier frame and the lynch pin.



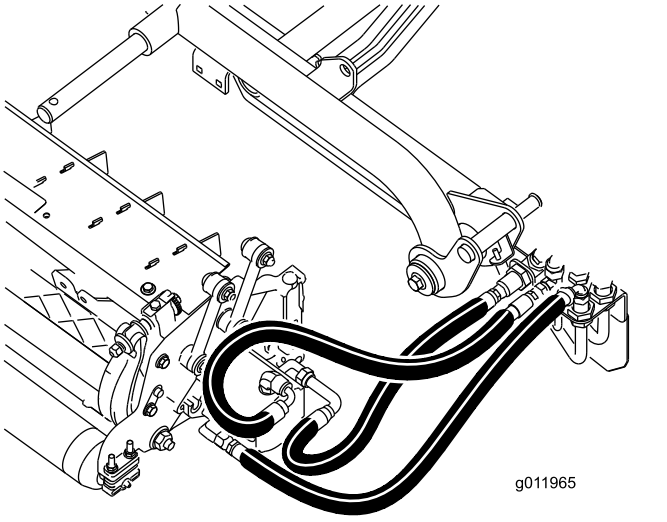
g012016

Figure 21

1. Thrust washer
2. Carrier frame
3. Lynch pin

3. Grease all the lift arm and carrier frame pivot points.

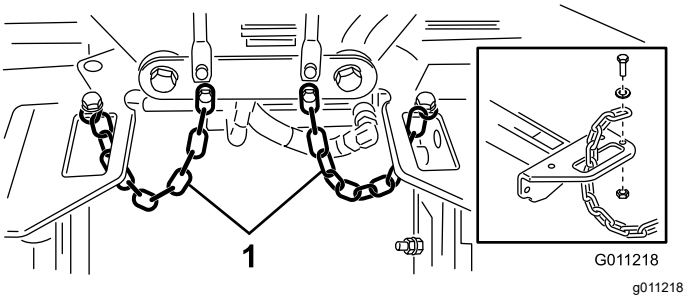
   Important: **Ensure that the hoses are free of twists or sharp bends and that the rear cutting unit hoses are routed as show in (Figure 22). Raise the cutting units and shift them to the left (Model 03171). The rear cutting unit hoses must not contact the traction cable bracket. Reposition the fittings and/or hoses if necessary.**



g011965

Figure 22

4. Route a tipper chain up through the slot on the end of each carrier frame. Secure the tipper chain to the top of the carrier frame with a bolt, a washer, and a locknut (Figure 23).



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Figure 23

1. Tipper chain

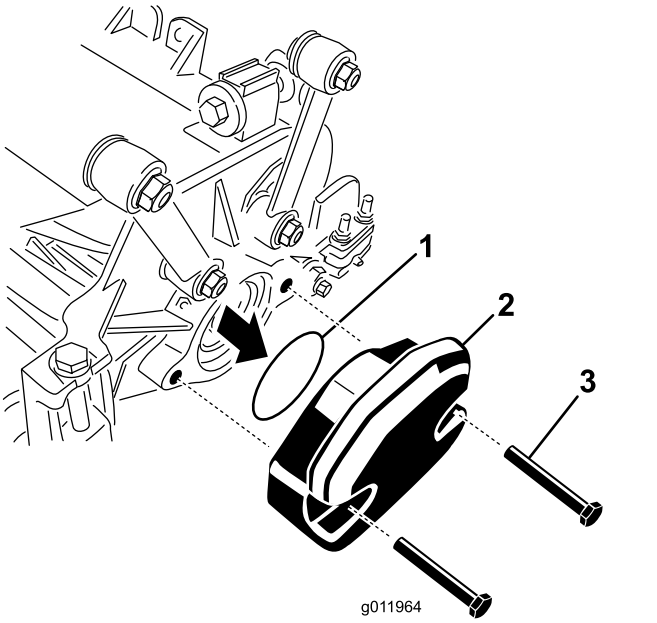
9

Installing the Cutting Unit Drive Motors

No Parts Required

Procedure

1. Position the cutting units in front of the lift arm pivot rods.
2. Remove the weight and O-ring (Figure 24) from the inside end of the right cutting unit.

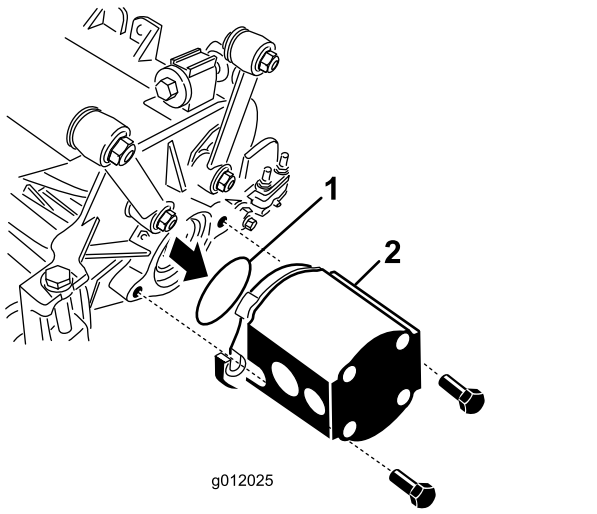


g011964

Figure 24

1. O-ring
2. Weight
3. Mounting bolts

3. Remove the plug from the bearing housing on the outside end of the right cutting unit and install the weights and gasket.
4. Remove the shipping plug from the bearing housings on the remaining cutting units.
5. Insert the O-ring (supplied with the cutting unit) on the flange of the drive motor (Figure 25).



g012025

Figure 25

1. O-ring
2. Reel motor

6. Mount the motor to the drive end of the cutting unit, and secure it with 2 capscrews provided with cutting unit (Figure 25).

10

Adjusting the Lift Arms

No Parts Required

Checking Lift Arm and Rear Cutting Unit Clearance

1. Start the engine.
2. Raise the cutting units.
3. At the front cutting units, measure the distance between the left lift arm and the floor plate bracket, and the right lift arm and the floor plate bracket (Figure 26).

   Note: The correct clearance is 5 to 8 mm (3/16 to 5/16 inch). If the clearance is not in this range, adjust the cutting unit lift cylinder; refer to Adjusting Lift Arm Clearance (page 23) and Adjusting the Lift Arm Stop Bolts (page 23).

Important: **A lack of clearance at the front plate bracket could damage the lift arms.**

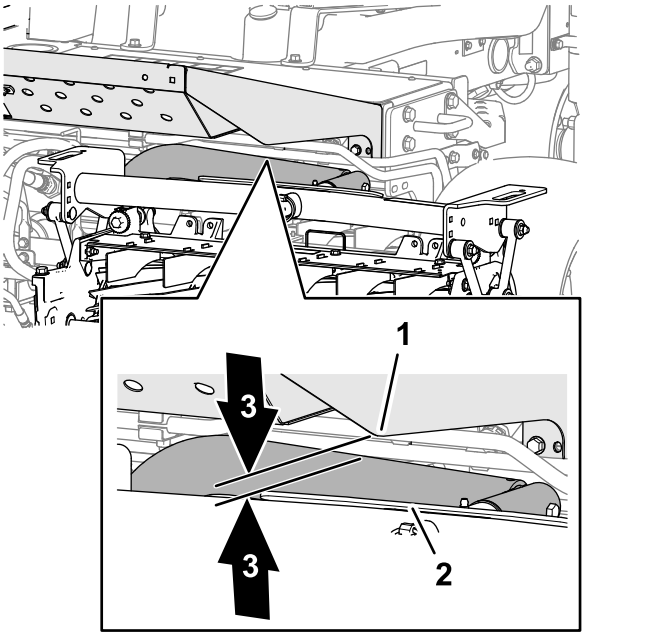


Figure 26

1. Lift arm
2. Floor plate bracket
3. 5 to 8 mm (3/16 to 5/16 inch) gap

4. At the rear cutting unit, measure the clearance between the wear strap on the top of the rear cutting unit wear bar and the bumper stop (Figure 27).

   Note: The correct clearance is 0.51 to 2.54 mm (0.02 to 0.10 inch). If the clearance is not in this range, adjust the cutting unit lift cylinder; refer to Adjusting the Rear Cutting Unit Clearance (page 24).

Important: **A lack of clearance at the rear wear bar could damage the cutting unit.**

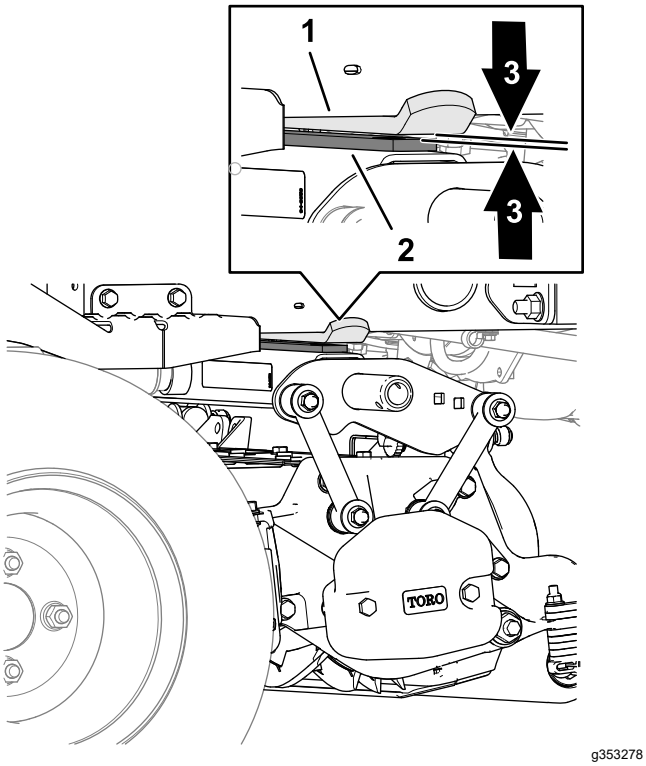


Figure 27

1. Bumper strap
2. Wear bar (rear cutting unit)
3. 0.51 to 2.54 mm (0.02 to 0.10 inch) gap

5. Start the engine, lower the cutting units, shut off the engine, remove the key, and wait for all moving parts to stop.

Adjusting Lift Arm Clearance

1. At each side of the machine, loosen the jam nuts and back off the lift arm-stop bolts (Figure 28).

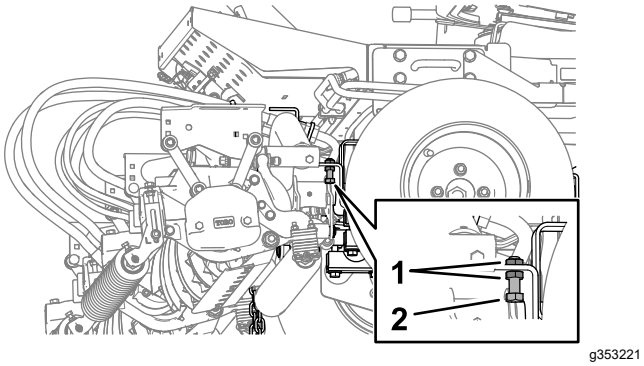


Figure 28

1. Jam nut
2. Lift arm-stop bolt

2. Loosen the jam nut on the lift-cylinder rod (Figure 29).

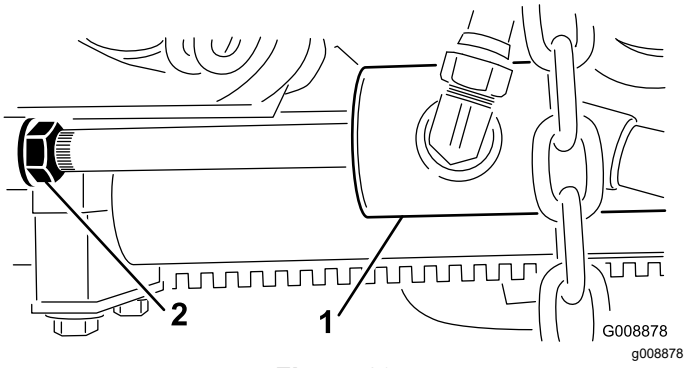


Figure 29

1. Front lift cylinder
2. Jam nut

3. Remove the pin from the rod end and rotate the clevis.
4. Install the pin and check the clearance.
5. Repeat steps 1 through 4 if necessary.
6. Start the engine, raise the cutting units, shut off the engine, remove the key and wait for all moving parts to stop.
7. Measure the distance between the left and right lift arms and the floor plate brackets.

   Note: The correct clearance is 0.51 to 2.54 mm (0.02 to 0.10 inch).
8. Repeat steps 3 through 7 as needed.
9. Tighten the clevis jam nut.
10. Repeat steps 2 through 9 at the other side of the machine, then perform the Adjusting the Lift Arm Stop Bolts (page 23) procedure.

Adjusting the Lift Arm Stop Bolts

Important: **A lack of clearance at the stop bolts could damage the lift arms.**

Note: If the rear lift arm clunks during transport, reduce the clearance.

1. Start the engine, raise the cutting units, shut off the engine, remove the key and wait for all moving parts to stop.
2. Adjust the stop bolt until you measure 0.13 to 1.02 mm (0.005 to 0.040 inches) between the stop bolt and the lift-arm plate.

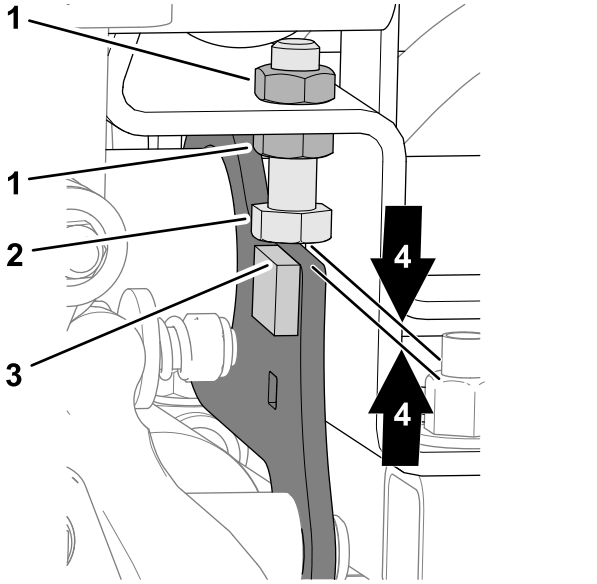


Figure 30

1. Jam nut
2. Stop bolt
3. Lift-arm plate
4. 0.13 to 1.02 mm (0.005 to 0.040 inches) gap

3. Repeat step 2 at the stop bolt for the other lift arm.
4. Start the engine, lower the cutting units, shut off the engine, remove the key, and wait for all moving parts to stop.

Adjusting the Rear Cutting Unit Clearance

1. Loosen the jam nut of the lift cylinder (Figure 31).

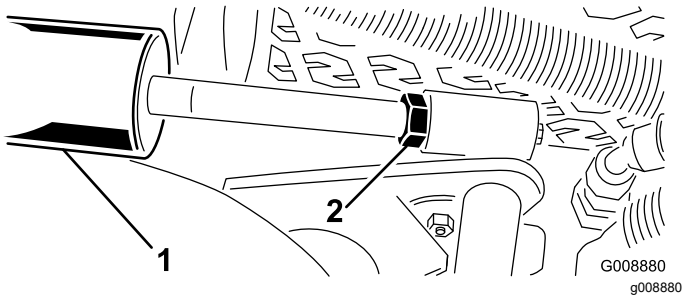


Figure 31

1. Lift cylinder (rear cutting unit)
2. Jam nut

2. Grasp the cylinder rod close to the nut with a pliers and rag, and rotate the rod.

   Note: Shortening the rod reduces wear strap and bumper stop clearance.
3. Start the engine.
4. Raise the cutting units and measure the clearance between the wear strap on the top of the rear cutting unit wear bar and the bumper stop.

   The correct clearance is 0.51 to 2.54 mm (0.02 to 0.10 inch).
5. Repeat steps 1 through 4 as needed.
6. Lower the cutting units, shut off the engine, remove the key, and wait for all moving parts to stop.
7. Tighten the jam nut.

11

Adjusting Tire Air Pressure

No Parts Required

Procedure

Adjust the tire air pressure at each of the tires; refer to Checking the Tire Pressure (page 54).

Note: The tires are over-inflated for shipping.

12

Installing the Hood Latch

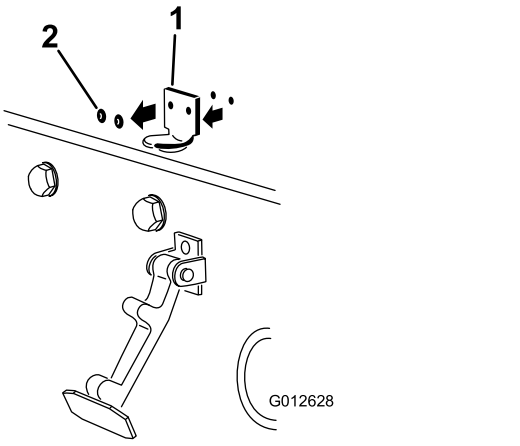
CE Machines

Parts needed for this procedure:

1	Lock bracket
2	Rivet
1	Washer
1	Screw (1/4 x 2 inches)
1	Locknut (1/4 inch)

Procedure

1. Unhook the hood latch from the hood-latch bracket.
2. Remove the rivets (2) securing the hood-latch bracket to the hood (Figure 32). Remove the hood-latch bracket from the hood.

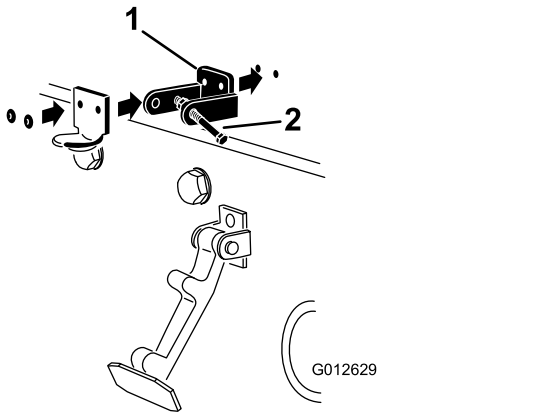


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Figure 32

1. Hood-latch bracket
2. Rivets

3. While aligning the mounting holes, position the CE lock bracket and the hood-latch bracket onto the hood. The lock bracket must be against the hood (Figure 33). Do not remove the bolt and nut assembly from the lock bracket arm.

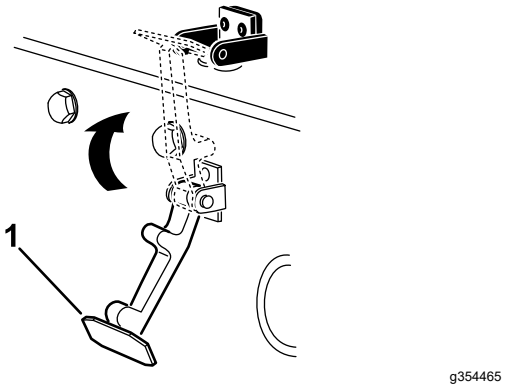


g012629

Figure 33

1. CE lock bracket
2. Bolt and nut assembly

4. Align the washers with the holes on the inside of the hood.
5. Rivet the brackets and the washers to the hood (Figure 33).
6. Hook the latch onto the hood-latch bracket (Figure 34).



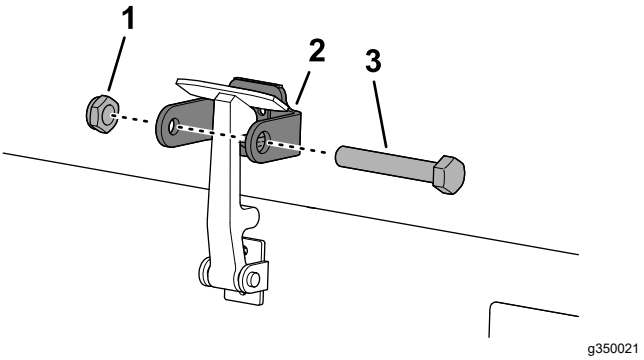
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Figure 34

1. Hood latch

7. Screw the bolt into the other arm of hood-lock bracket to lock the latch in position (Figure 35).

   Note: Tighten the nut and bolt until the bolt no longer moves forward and backward in the CE lock bracket.



g350021

Figure 35

1. Nut
2. Arm of hood-lock bracket
3. Bolt

13

Installing the Exhaust Guard

CE Machines

Parts needed for this procedure:

1	Exhaust guard
4	Self-tapping screw

Procedure

1. Position the exhaust guard around the muffler while aligning the mounting holes with the holes in the frame (Figure 36).

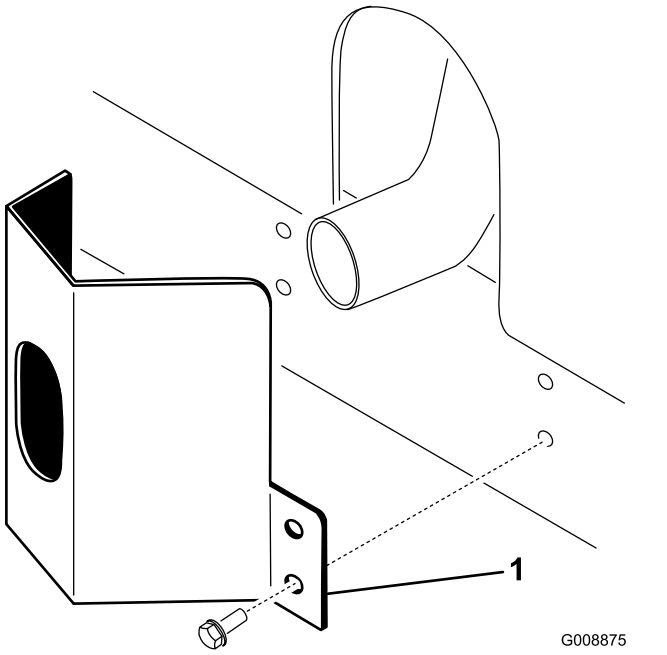


Figure 36

1. Exhaust guard

2. Secure the exhaust guard to the frame with 4 self-tapping screws (Figure 36).

14

Installing the CE Decals

CE Machines

Parts needed for this procedure:

1	Year of production decal
1	CE decal
1	Tilt danger decal (121-3598)

Applying the Year of Production Decal and CE Decal

1. Wipe clean the left frame near the model/serial plate with alcohol, and allow the frame to dry (Figure 37).

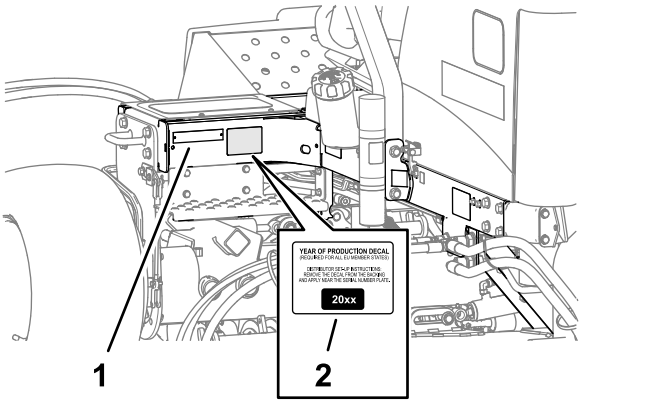


Figure 37

1. Model/serial plate
2. Year of production decal

2. Remove the backing and apply the Year of Production decal to the frame near the serial plate as shown in Figure 37.
3. Wipe clean the left frame near the hood lock with alcohol, and allow the frame to dry (Figure 38).

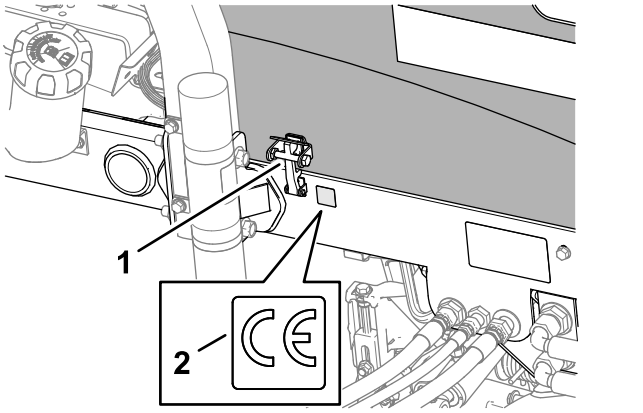


Figure 38

1. CE hood latch
2. CE decal

4. Remove the backing and apply the CE decal to the frame as shown in Figure 38.

Applying the CE Tilt Danger Decal

1. Wipe clean the tilt decal on the slope indicator with alcohol, and allow the decal to dry (Figure 39).

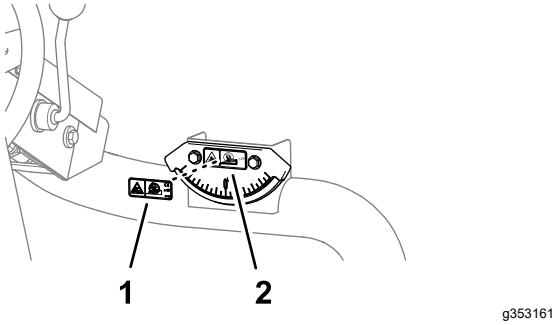


Figure 39

1. Tilt decal (slope indicator)
2. CE tilt danger decal (Part No. 121-3598)

2. Remove the backing and apply the CE tilt danger decal to the tilt decal on the slope indicator (Figure 39).

15

Installing the Tipper Roller Kit (Optional)

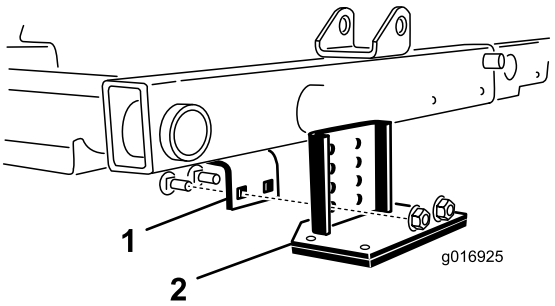
Parts needed for this procedure:

1	Tipper roller kit (not included)

Procedure

When cutting in higher heights of cut, install the Tipper Roller Kit.

1. Raise the cutting units all the way up.
2. Locate the frame bracket above the center cutting unit (Figure 40).
3. While pressing down on the front roller of the center cutting unit, determine which holes on the tipper bracket align with the frame bracket holes to attain the same roller contact when the tipper bracket is installed (Figure 40).



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Figure 40

1. Frame bracket
2. Tipper bracket

4. Lower the cutting units and mount the tipper bracket to the frame with the 2 carriage bolts and 2 nuts supplied with the kit (Figure 40).

Product Overview

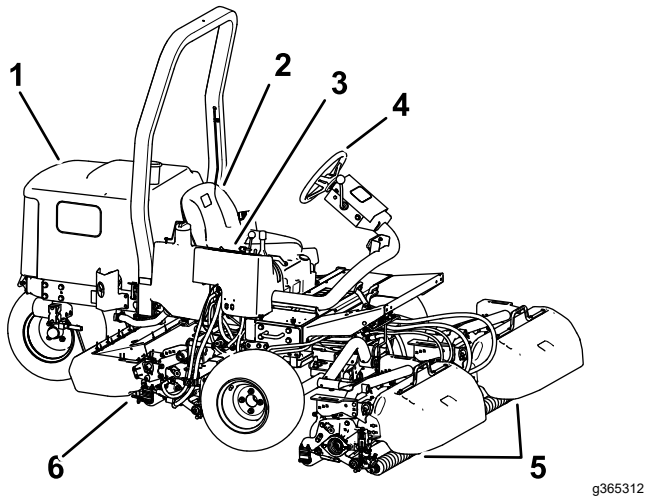


Figure 41

1. Engine hood
2. Operator's seat
3. Control arm
4. Steering wheel
5. Front cutting units
6. Rear cutting unit

Controls

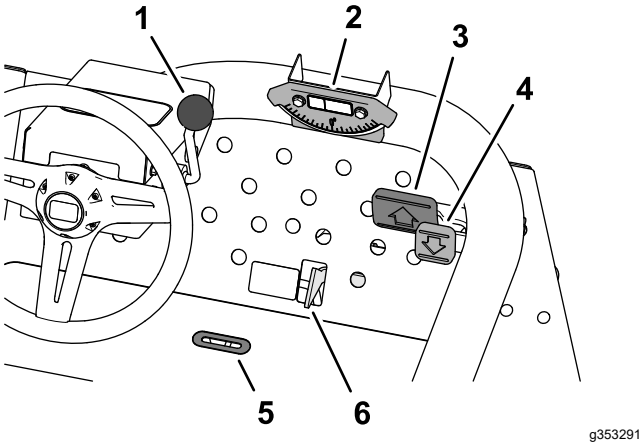


Figure 42

1. Tilt steering lever
2. Slope indicator
3. Forward traction pedal
4. Reverse traction pedal
5. Indicator slot
6. Mow/transport slide

Traction Pedals

Press the traction forward pedal (Figure 42) to move forward. Press the traction reverse pedal (Figure 42) to move backward or to assist in stopping when moving forward. Also, allow the pedal to move or move it to the NEUTRAL position to stop the machine.

Mow/Transport Slide

Using your heel, move the mow/transport slide (Figure 42) left to the TRANSPORT position or right to the MOW position.

- The cutting units only operate when the mow/transport slide is in the MOW position.
- The cutting units do not lower when the mow/transport slide is in the TRANSPORT position.

Tilt-Steering Lever

Pull the tilt-steering lever (Figure 42) back to tilt the steering wheel to the desired position. Then push the lever forward to secure the position.

Indicator Slot

The slot in the operator platform (Figure 42) indicates when the cutting units are in the center position.

Slope Indicator

The slope indicator (Figure 42) indicates the side hill angle of the machine in degrees.

Control Console

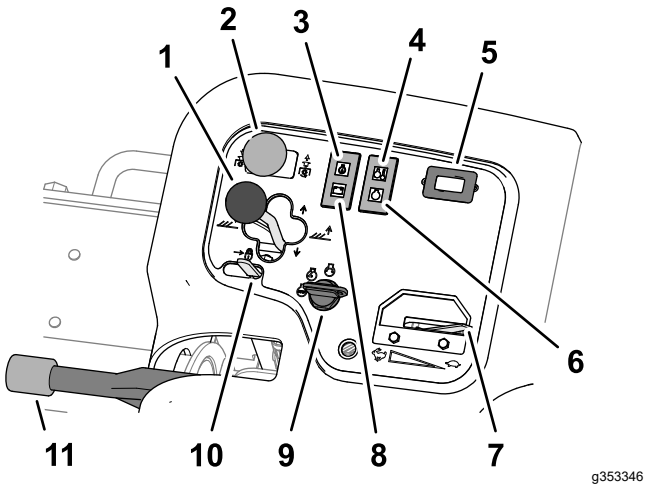


Figure 43

1. Cutting-unit shift lever
2. Cutting-unit drive switch
3. Oil-pressure light
4. Engine coolant temperature light
5. Hour meter
6. Glow-plug indicator light
7. Throttle
8. Alternator light
9. Ignition switch
10. Lift lever lock
11. Parking brake

Cutting Unit Shift Lever—Raise/Lower

- To lower the cutting units to the ground, push forward the cutting unit shift lever forward to the LOWER position (Figure 43).

Note: The cutting units do not lower unless the engine is running. You do not need to hold the lever in the forward position while the cutting units are lowered.

- To raise the cutting units, pull the shift lever rearward to the RAISE position.

  Note: The reels do not run while the cutting units are raised.

Cutting Unit Shift Lever—Side Shift

Model 03171

Move the lever to the right or left to move the cutting units in the same direction. Sideshift the cutting units only when they are raised or if they are on the ground and the machine is moving.

⚠ DANGER

Shifting the cutting units downhill decreases machine stability. This could cause a rollover, which may result in personal injury or death.

Shift the cutting units uphill while on a side hill.

Cutting Unit Drive Switch

The cutting unit drive switch (Figure 43) has 2 positions: ENGAGE and DISENGAGE. The rocker switch operates a solenoid valve on the valve bank to drive the cutting units.

Oil Pressure Warning Light

The oil pressure warning light (Figure 43) glows if the engine oil pressure drops below a safe level.

Engine Coolant Temperature Warning Light

The temperature warning light (Figure 43) illuminates if the engine coolant temperature is high. At this temperature, the cutting units shut off. If the coolant temperature rises another 5.5°C (10°F), the engine shuts off to prevent further damage.

Hour Meter

The hour meter (Figure 43) indicates the total hours of machine operation. The hour meter starts to function whenever the key switch is on.

Glow-Plug Indicator

The glow-plug indicator light (Figure 43) illuminates when the glow plugs are energized.

Throttle

Move the throttle (Figure 43) forward to increase the engine speed and rearward to decrease the engine speed.

Alternator Light

The alternator light (Figure 43) shuts off when the engine runs. If the alternator light illuminates while the engine runs, check the charging system and repair it as necessary.

Ignition Switch

Use the ignition switch (Figure 43) to run the engine and lights. The ignition switch has 3 positions:

- The SHUT OFF position shuts off the engine.
- The RUN/PREHEAT position allows the engine to run or preheats the cylinder head of the engine.
- The START position energizes the starter.

Note: When the key is in the RUN/PREHEAT position, the glow plug energizes and the indicator light illuminates for approximately 7 seconds.

Lift Lever Lock

Move the lift lever lock (Figure 43) rearward to prevent the cutting units from dropping.

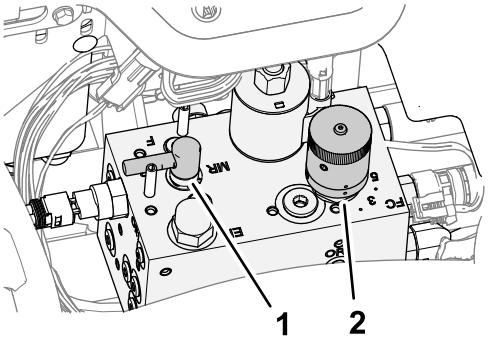
Parking Brake

Whenever the engine is shut off, engage the parking brake (Figure 43) to prevent accidental movement of the machine. To engage the parking brake, pull up on the lever; to disengage the brake, push down the lever.

Note: The engine shuts off if you press the traction pedal with the parking brake engaged.

Mower Manifold

The mower manifold is located under the control-console cover (Figure 44).



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Figure 44

1. Backlap control
2. Reel speed control

Reel Speed Knob

Use the reel speed knob of the mower manifold to adjust the clip rate (reel speed) of the cutting units (Figure 44).

- Turn the reel speed knob counterclockwise to increase the reel speed.
- Turn the knob clockwise to slow the reel speed.

Refer to Clip Rate (Reel Speed) (page 36) and Adjusting Reel Speed (page 37) for information on how to adjust the reel speed control.

Backlap Lever

The backlap lever to control the direction the cutting units rotate when you are mowing or when you backlap the reels and bedknives (Figure 44).

- Rotate the backlap lever to the F position when mowing.
- Rotate the lever to the R position when backlapping the cutting units.

Important: **Do not change the backlap lever position while the reels are rotating.**

Fuel Gauge

The fuel gauge (Figure 45) registers the amount of fuel in the tank.

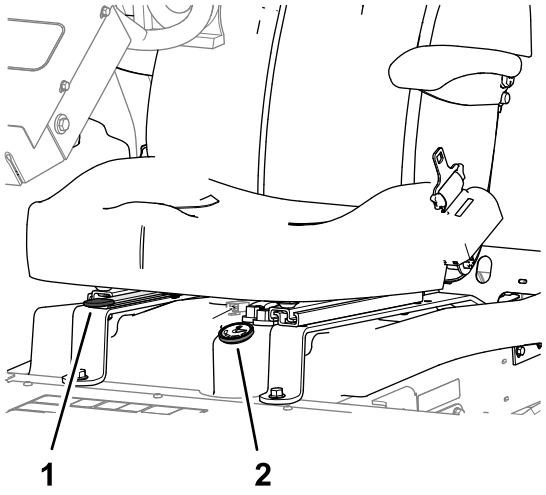


Figure 45

1. Seat adjustment lever
2. Fuel gauge

Seat Adjustment Lever

Move the lever (Figure 45) on the side of the seat outward, slide the seat to the desired position, and release the lever to lock the seat into position.

Specifications

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

Transport width	203 cm (80 inches) in 183 cm (72 inches) width of cut 234 cm (92 inches) in 216 cm (85 inches) width of cut
Width of cut	183 cm (72 inches) or 216 cm (85 inches)
Length	248 cm (93 inch)
Height	193 cm (76 inches) with ROPS
Net weight*	844 kg (1,860 lb)
Fuel tank capacity	28 L (7.5 US gallons).
Ground speed	Mow: 0 to 10 km/h (0 to 6 mph); Transport: 0 to 14 km/h (0 to 9 mph). Reverse: 0 to 6 km/h (0 to 4 mph)
* With cutting units and fluids	

Attachments/Accessories

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

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

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.
- Before you leave the operator's position, do the following:
  - Park the machine on a level surface.
  - Disengage and lower the cutting units.
  - Engage the parking brake.
  - Shut off the engine and remove the key.
  - Wait for all movement to stop.
  - Allow the machine to cool before adjusting, servicing, cleaning, or storing it.
- Know how to stop the machine and shut off the engine quickly.
- Do not operate the machine without all guards and other safety protective devices in place and functioning properly on the machine.
- Before mowing, always inspect the machine to ensure that the cutting units are in good working condition.
- Inspect the area where you will use the machine and remove all objects that the machine could throw.
- This product generates an electromagnetic field. If you wear an implantable electronic medical device, consult your health care professional before using this product.

Fuel Safety

- Use extreme care in handling fuel. It is flammable and its vapors are explosive.
- Extinguish all cigarettes, cigars, pipes, and other sources of ignition.
- Use only an approved fuel container.
- Do not remove the fuel cap or fill the fuel tank while the engine is running or hot.
- Do not add or drain fuel in an enclosed space.
- Do not store the machine or fuel container where there is an open flame, spark, or pilot light, such as on a water heater or other appliance.
- If you spill fuel, do not attempt to start the engine; avoid creating any source of ignition until the fuel vapors have dissipated.

Fuel Specification

Use only clean, fresh diesel fuel with ultra low (<15 ppm) or low (<1000 ppm) sulfur content. Purchase fuel in quantities that can be used within 180 days to ensure fuel freshness.

Important: **If you use high-sulfur diesel fuel (sulfur content 0.50 % (5000 ppm) to 1.0 % (10000 ppm), change the engine oil and oil filter every 75 hours.**

Use summer-grade diesel fuel (No. 2-D) at temperatures above -7°C (20°F) and winter-grade (No. 1-D or No. 1-D/2-D blend) below that temperature. Using winter-grade fuel at lower temperatures provides a lower flash point and cold flow characteristics, which eases starting and reduces plugging of the fuel filter.

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% petrodiesel). The petrodiesel portion should be low or ultra low sulfur. Observe the following precautions:

- The biodiesel portion of the fuel must meet specification ASTM D6751 or EN14214.
- The blended fuel composition should meet ASTM D975 or EN590.
- Biodiesel blends may damage painted surfaces.
- Use B5 (biodiesel content of 5%) or lesser blends in cold weather.
- Monitor seals, hoses, gaskets in contact with fuel as they may degrade over time.
- The fuel filter may plug up for a period after converting to biodiesel blends.
- Contact a distributor for more information on biodiesel blended fuel.

Filling the Fuel Tank

Fuel tank capacity: approximately 28 L (7.5 US gallons)

1. Park the machine on a level surface, lower the cutting units, engage the parking brake, shut off the engine, and remove the key.
2. Clean the area around the fuel-tank cap (Figure 46).

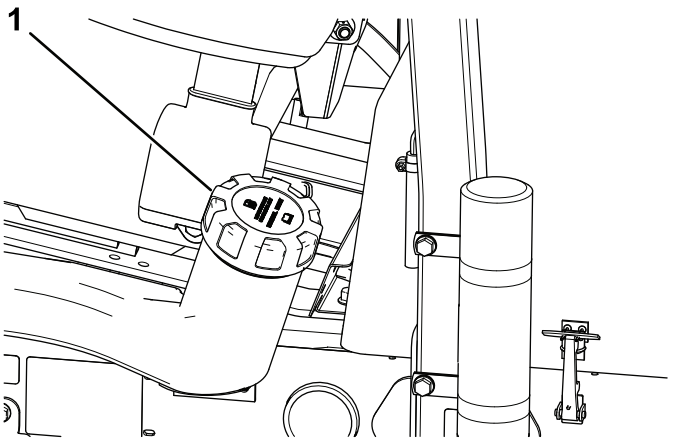


Figure 46

1. Fuel-tank cap

3. Remove the fuel-tank cap.
4. Fill the tank to the bottom of the filler neck.

   Note: Do not overfill the fuel tank.
5. Install the cap.
6. Wipe up any spilled fuel.

Performing Daily Maintenance

Service Interval: Before each use or daily

Before starting the machine each day, perform the Each Use/Daily procedures listed in Maintenance (page 40).

Checking the Interlock System

Service Interval: Before each use or daily

⚠ CAUTION

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

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

Important: **If your machine fails any of the interlock switch checks, contact your authorized Toro distributor.**

Preparing the Machine

1. Drive the machine slowly to an open area.
2. Lower the cutting units, shut off the engine, and engage the parking brake.

Checking the Traction Pedal Start-Interlock

1. Sit in the operator's seat.
2. Engage the parking brake.
3. Press the cutting unit drive switch to the DISENGAGE position.
4. Press the traction pedal.
5. Rotate the key to the START position.

   Note: The starter should not crank the engine with the traction pedal pressed.

Checking the Cutting Unit Drive Switch Start-Interlock

1. Sit in the operator's seat.
2. Engage the parking brake.
3. Press the cutting unit drive switch to the ENGAGE position.
4. Keep you foot off the traction pedal.
5. Rotate the key to the START position.

   Note: The starter should not crank the engine with the cutting unit drive switch to the ENGAGE position.

Checking the Parking Brake and Seat Run-Interlock

1. Sit in the operator's seat.
2. Engage the parking brake.
3. Press the cutting unit drive switch to the DISENGAGE position.

4. Keep you foot off the traction pedal.
5. Start the engine.
6. Disengage the parking brake.
7. Rise off the operator's seat.

   Note: The engine should shut off if you are out of the operator's seat and the parking brake is disengaged.

Checking the Parking Brake and Traction Pedal Run-Interlock

1. Sit in the operator's seat.
2. Engage the parking brake.
3. Press the cutting unit drive switch to the DISENGAGE position.
4. Keep you foot off the traction pedal.
5. Start the engine.
6. Press the traction pedal.

   Note: The engine should shut off if the parking brake is ENGAGED and the traction pedal is pressed.

Checking the Seat and Traction Pedal Run-Interlock

1. Sit in the operator's seat.
2. Engage the parking brake.
3. Press the cutting unit drive switch to the DISENGAGE position.
4. Keep you foot off the traction pedal.
5. Start the engine.
6. Disengage the parking brake.
7. Rise off the operator's seat.
8. Press the traction pedal.

   Note: The engine should shut off in 1 second if you are out of the operator's seat and press the traction pedal.

During Operation

During Operation Safety

General Safety

- The owner/operator can prevent and is responsible for accidents that may cause personal injury or property damage.
- Wear appropriate clothing, including eye protection; long pants; substantial, slip-resistant footwear; and hearing protection. Tie back long hair and do not wear loose clothing or loose jewelry.
- Do not operate the machine while ill, tired, or under the influence of alcohol or drugs.
- Use your full attention while operating the machine. Do not engage in any activity that causes distractions; otherwise, injury or property damage may occur.
- Before you start the engine, ensure that all drives are in neutral, the parking brake is engaged, and you are in the operating position.
- Do not carry passengers on the machine and keep bystanders and children out of the operating area.
- Operate the machine only in good visibility to avoid holes or hidden hazards.
- Avoid mowing on wet grass. Reduced traction could cause the machine to slide.
- Keep your hands and feet away from the cutting units.
- Look behind and down before backing up to be sure of a clear path.
- Use care when approaching blind corners, shrubs, trees, or other objects that may obscure your vision.
- Stop the cutting units whenever you are not mowing.
- Slow down and use caution when making turns and crossing roads and sidewalks with the machine. Always yield the right-of-way.
- Operate the engine only in well-ventilated areas. Exhaust gases contain carbon monoxide, which is lethal if inhaled.
- Do not leave a running machine unattended.
- Before you leave the operator's position, do the following:
  - Park the machine on a level surface.
  - Disengage and lower the cutting units.
  - Engage the parking brake.
  - Shut off the engine and remove the key.
  - Wait for all movement to stop.
  - Allow the machine to cool before adjusting, servicing, cleaning, or storing it.
- Operate the machine only in good visibility and appropriate weather conditions. Do not operate the machine when there is the risk of lightning.
- Use the cruise control (if equipped) only when you can operate the machine in an open, flat area that is free from obstacles and where the machine can move at a constant speed without interruption.

Rollover Protection System (ROPS) Safety

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

Slope Safety

- Slopes are a major factor related to loss of control and rollover accidents, which can result in severe injury or death. You are responsible for safe slope operation. Operating the machine on any slope requires extra caution.
- Evaluate the site conditions to determine if the slope is safe for machine operation, including surveying the site. Always use common sense and good judgment when performing this survey.
- Review the slope instructions, listed below, for operating the machine on slopes. Before you operate the machine, review the site conditions to determine whether you can operate the machine in the conditions on that day and at that site. Changes in the terrain can result in a change in slope operation for the machine.
  - Avoid starting, stopping, or turning the machine on slopes. Avoid making sudden changes in speed or direction. Make turns slowly and gradually.
  - Do not operate a machine under any conditions where traction, steering, or stability is in question.
  - Remove or mark obstructions such as ditches, holes, ruts, bumps, rocks, or other hidden hazards. Tall grass can hide obstructions. Uneven terrain could overturn the machine.
  - Be aware that operating the machine on wet grass, across slopes, or downhill may cause the machine to lose traction.
  - Use extreme caution when operating the machine near drop-offs, ditches, embankments, water hazards, or other hazards. The machine could suddenly roll over if a wheel goes over the edge or the edge caves in. Establish a safety area between the machine and any hazard.
  - Identify hazards at the base of the slope. If there are hazards, mow the slope with a pedestrian-controlled machine.
  - If possible, keep the cutting units lowered to the ground while operating on slopes. Raising the cutting units while operating on slopes can cause the machine to become unstable.

This triplex mower has a unique drive system for superior traction on hills. The uphill wheel does not spin out and limit traction like conventional triplex mowers. If you operate the machine on a side hill that is too steep, rollover will occur before losing traction.

- When possible, mow up and down a hill rather than across it.
- On side hills, shift the cutting units uphill (if equipped).
- If the tires lose traction, disengage the blade(s) and proceed slowly straight down the slope.
- If you must turn, turn slowly and gradually downhill, if possible.

Starting the Engine

Note: You may need to bleed the fuel system if any of the following situations have occurred; refer to Bleeding the Fuel System (page 37):

- It is the initial startup of a new engine.
- The engine has shut off because lack of fuel.
- You performed maintenance for the fuel system components, such as replacing the fuel filter.

1. Ensure that the parking brake is engaged, and the reel drive switch is in the DISENGAGE position.
2. Remove your foot from the traction pedal and ensure that the pedal is in the NEUTRAL position.
3. Move the throttle lever to the 1/2 throttle position.
4. Insert the key into the switch and rotate it to the ON/PREHEAT position until the glow plug indicator light goes out (approximately 7 seconds); then rotate the key to the START position to engage the starter motor. Release the key when the engine starts.

   Note: The key moves automatically to the ON/RUN position.

   Important: **To prevent overheating of the starter motor, do not engage the starter longer than 15 seconds. After 10 seconds of continuous cranking, wait 60 seconds before engaging the starter motor again.**
5. When the engine is started for the first time or after an overhaul of the engine, operate the machine in forward and reverse for 1 to 2 minutes. Also operate the lift lever and cutting

unit drive switch to ensure proper operation of all parts.

Note: Turn the steering wheel to the left and right to check the steering response, then shut the engine off and check for oil leaks, loose parts, and any other wear or damage.

⚠ CAUTION

Checking for oil leaks, loose parts, and other malfunctions could result in injury.

Shut off the engine and wait for all moving parts to stop before checking for oil leaks, loose parts, and other malfunctions.

Shutting Off the Engine

1. Move the throttle control to the IDLE position.
2. Engage the parking brake.
3. Move the cutting unit drive switch to DISENGAGE position.
4. Lower the cutting units.
5. Shut off the engine, remove the key, and wait for all moving parts to stop.

Cutting Grass with the Machine

1. Move the machine to the job site and align the machine outside the cutting area for the first cutting pass.
2. Ensure that the cutting-unit drive switch is pulled up (the DISENGAGE position); Cutting Unit Drive Switch (page 29).
3. Move the throttle to the FAST position; refer to Throttle (page 29).
4. Use the cutting-unit shift lever to lower the cutting units to the ground; refer to Cutting Unit Shift Lever—Raise/Lower (page 28).
5. Press the cutting-unit drive switch to prepare cutting units for operation (the ENGAGE position).
6. Use the cutting-unit shift lever to raise the cutting units off the ground.
7. Begin moving the machine toward the cutting area and lower the cutting units.

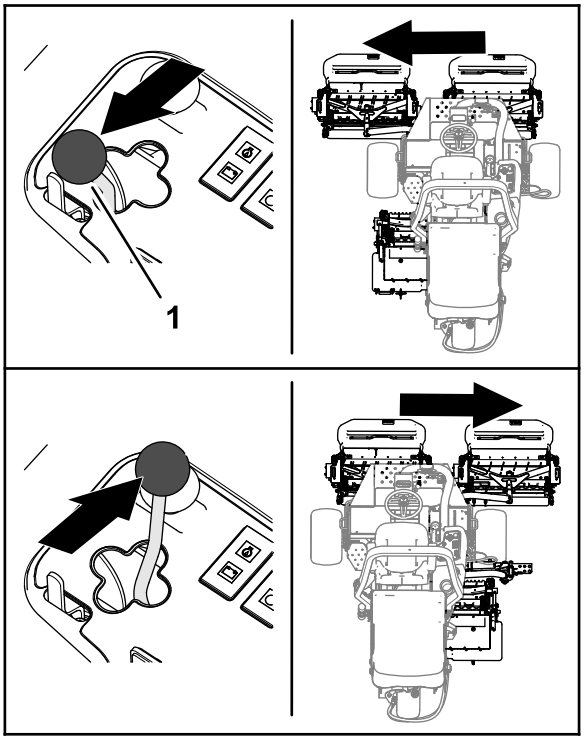
   Note: The cutting units run.
8. Before reaching the turnaround location, pull back the cutting-unit shift lever only long enough to raise the cutting units, and release the control lever.

   Important: **Do not hold the cutting-unit shift lever back while turning.**
9. Perform a tear-shaped turn to quickly line up for your next pass.

Side-Shifting the Cutting Units

Model 03171

1. Use the cutting-unit shift lever to raise the cutting units; refer to Cutting Unit Shift Lever—Raise/Lower (page 28).
2. Move the cutting-unit shift lever left or right to move the cutting units left or right (Figure 47).



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Figure 47

3. Use the cutting-unit shift lever to lower the cutting units to the ground; refer to Cutting Unit Shift Lever—Raise/Lower (page 28).

Driving the Machine in Transport Mode

1. Move the cutting unit drive switch to the DISENGAGE position.
2. Raise the cutting units to the transport position.
3. Move the mow/transport slide left to the TRANSPORT position.

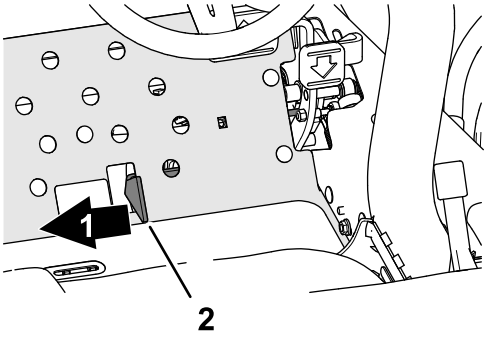


Figure 48

1. Transport
2. Mow/transport slid

Important: **Be careful when driving between objects so that you do not accidentally damage the machine or the cutting units. Use extra care when operating the machine on slopes. Drive slowly and avoid sharp turns on slopes to prevent rollovers.**

Note: You cannot lower the cutting units while operating the machine the transport mode.

Clip Rate (Reel Speed)

To achieve a consistent, high quality of cut and a uniform after-cut appearance, it is important that the reel speed be matched to the height of cut.

Important: **If the reel speed is too slow, you may notice visible clip marks. If the reel speed is too fast, the cut may have a fuzzy appearance.**

Reel Speed Selection Chart

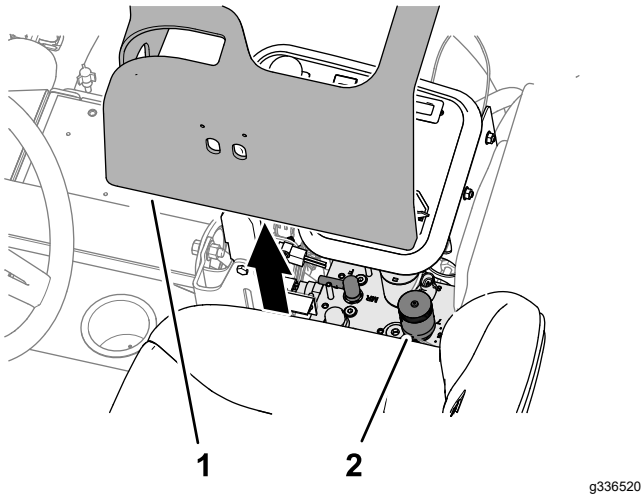
Height of Cut		5-Blade Reel		8-Blade Reel		11-Blade Reel	
		8 km/h (5 mph)	9.6 km/h (6 mph)	8 km/h (5 mph)	9.6 km/h (6 mph)	8 km/h (5 mph)	9.6 km/h (6 mph)
63.5 mm	2-1/2 inches	3	3	3*	3*	–	–
60.3 mm	2-3/8 inches	3	4	3*	3*	–	–
57.2 mm	2-1/4 inches	3	4	3*	3*	–	–
54.0 mm	2-1/8 inches	3	4	3*	3*	–	–
50.8 mm	2 inches	3	4	3*	3*	–	–
47.6 mm	1-7/8 inches	4	5	3*	3*	–	–
44.5 mm	1-3/4 inches	4	5	3*	3*	–	–
41.3 mm	1-5/8 inches	5	6	3*	3*	–	–
38.1 mm	1-1/2 inches	5	7	3	4	–	–
34.9 mm	1-3/8 inches	5	8	3	4	–	–
31.8 mm	1-1/4 inches	6	9	4	4	–	–
28.8 mm	1-1/8 inches	8	9*	4	5	–	–
25. mm	1 inch	9	9*	5	6	–	–
22.2 mm	7/8 inch	9*	9*	5	7	–	–
19.1 mm	3/4 inch	9*	9*	7	9	6	7
15.9 mm	5/8 inch	9*	9*	9	9*	7	7
12.7 mm	1/2 inch	9*	9*	9	9*	8	8
9.5 mm	3/8 inch	9*	9*	9	9*	9	9

* Toro does not recommend this height of cut and/or mowing speed.

Note: The higher the number, the higher the speed.

Adjusting Reel Speed

1. Verify the height-of-cut setting on the cutting units. Use the column of the Reel Speed Selection Chart listing either 5-blade, 8-blade, or 11-blade reels, and find the height-of-cut listing nearest the actual height-of-cut setting. Look across the chart to find the reel-speed number that corresponds to that height of cut.
2. Lift the cover from the control arm (Figure 49).

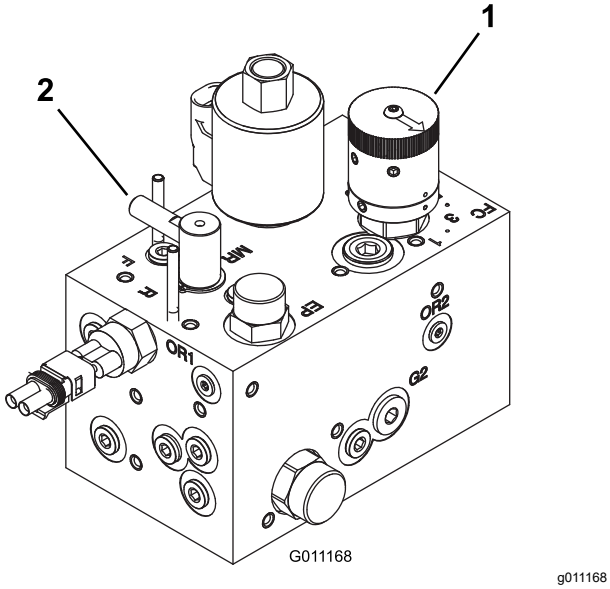


g336520

Figure 49

1. Cover (control arm)
2. Reel speed and backlap control

3. Turn the reel speed control knob (Figure 50) to the reel-speed number determined in Step 1.



g011168

Figure 50

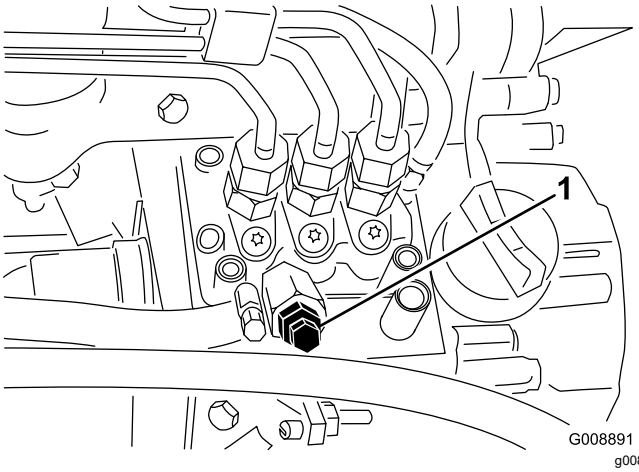
1. Reel speed control
2. Backlap control

4. Assemble the cover onto the control arm.
5. Operate the machine for several days, then examine the cut to ensure the quality of cut.

The reel speed knob may be set 1 position on either side of the reel-speed number indicated on the chart to account for differences in grass condition, grass length removed, and personal preference.

Bleeding the Fuel System

1. Park the machine on a level surface, lower the cutting units, engage the parking brake, shut off the engine, and remove the key.
2. Ensure that the fuel tank is at least half full.
3. Unlatch and raise the hood.
4. Open the air-bleed screw on the fuel-injection pump (Figure 51).



g008891

Figure 51

1. Fuel-injection pump bleed screw

5. Turn the key in the ignition switch to the ON position.

   The electric fuel pump runs, forcing air out around the air-bleed screw.

   Note: Leave the key in the ON position until a solid stream of fuel flows out around the screw.
6. Tighten the screw and turn the ignition key to OFF.

Note: The engine should start after you follow the procedure above. However, if the engine does not start, air may be trapped between the injection pump and injectors; refer to Bleeding Air from the Injectors (page 52).

Operating Tips

Mowing Techniques

- To begin cutting, engage the cutting units, then approach the mowing area slowly. Once the front cutting units are over the mowing area, lower the cutting units.
- To achieve the professional straight-line cut and striping that is desirable for some applications, find a tree or other object in the distance and drive straight toward it.
- As soon as the front cutting units reach the edge of the mowing area, lift the cutting units and perform a tear drop shaped turn to quickly line you up for your next pass.
- To mow around bunkers, ponds, or other contours easily, use the Sidewinder and move the control lever left or right, depending on your mowing application. You can also shift the cutting units to vary tire tracking.
- The cutting units tend to throw grass to the front or the rear of the machine. Front throw grass clippings when cutting smaller amounts of grass, which produces better after-cut appearance. To throw clippings to the front, simply close the rear shield on the cutting units.

⚠ CAUTION

To prevent personal injury or damage to the machine, do not open or close the cutting unit shields while the engine is running.

Shut off the engine and wait for all moving parts to stop before opening or closing the cutting unit shields.

- When cutting larger amounts of grass, position the shields to just below horizontal. **Do not open the shields too far or an excessive amount of clippings could build up on the frame, rear radiator screen, and engine area.**
- The cutting units are also equipped with balance weights on the non-motor end to give an even cut. You can add or remove weights if a mismatch occurs on your turf.

After Operation

After Operation Safety

General Safety

- Park the machine on a level surface.
- Disengage and lower the cutting units.
- Engage the parking brake.
- Shut off the engine and remove the key.
- Wait for all movement to stop.
- Allow the machine to cool before adjusting, servicing, cleaning, or storing it.
- To help prevent fires, ensure that the cutting units, drives, mufflers, cooling screens, and engine compartment are free from grass and debris buildup. Clean up oil or fuel spills.
- Disengage the drive to the attachment whenever you are hauling or not using the machine.
- Maintain and clean the seat belt(s) as necessary.
- Do not store the machine or fuel container where there is an open flame, spark, or pilot light, such as on a water heater or on other appliances.

After Mowing

Wash the machine and grease it; refer to Washing the Machine (page 64) and Greasing the Bearings and Bushings (page 45).

Towing the Machine

In case of an emergency, you can tow the machine for a short distance; however, Toro does not recommend this as a standard procedure.

Important: **Do not tow the machine faster than 3 to 4 km/h (2 to 3 mph) because it may damage the drive system. If you must move the machine a considerable distance, transport it on a truck or trailer.**

1. Unlatch and open the hood.
2. Near the right hood latch, rotate the handle bypass valve on the pump (Figure 52) and rotate the valve 90°.

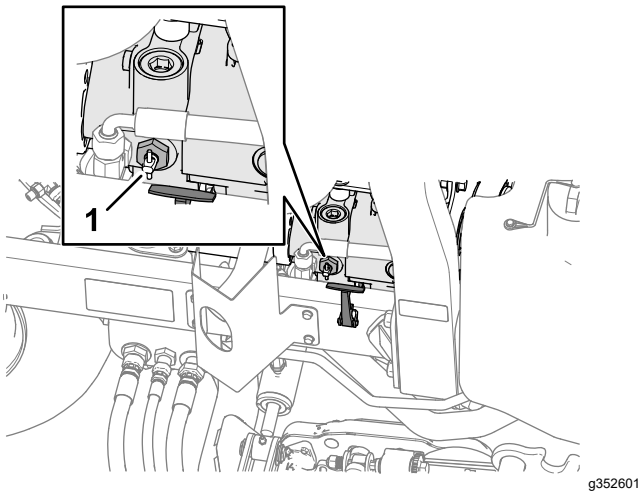


Figure 52

1. Bypass valve

3. Close and latch the hood.
4. Connect the tow vehicle to the machine at the tie-down points; refer to Identifying the Tie-Down Points (page 39).
5. Sit in the operator's seat, and if needed, use the parking brake to control your machine while being towed.

   Important: **Do not start the engine while the bypass valve is open.**
6. Before starting the engine, close the bypass valve by rotating it 90° (1/4 turn).

Identifying the Tie-Down Points

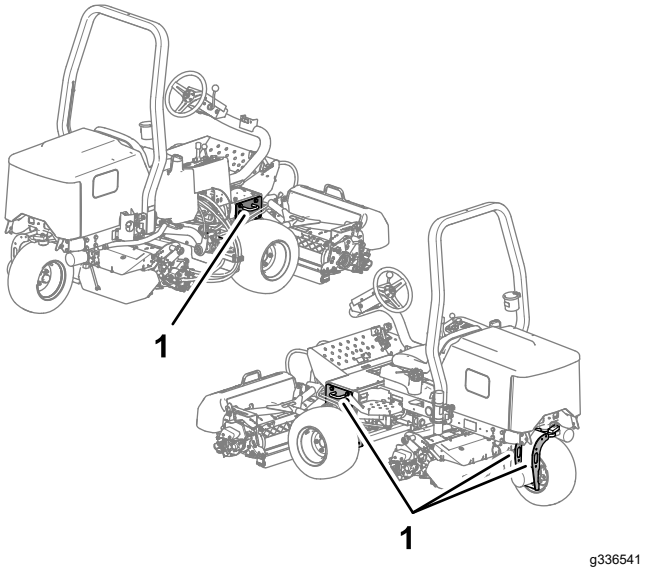


Figure 53

1. Tie-down loops

Hauling the Machine

- Use full-width ramps for loading the machine onto a trailer or truck.
- Tie the machine down securely.

Maintenance

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

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

Important: **Refer to your engine owner's manual and cutting unit *Operator's Manual* for additional maintenance procedures.**

Maintenance Safety

- Before you leave the operator's position, do the following:
  - Park the machine on a level surface.
  - Disengage and lower the cutting units.
  - Engage the parking brake.
  - Shut off the engine and remove the key.
  - Wait for all movement to stop.
  - Allow the machine to cool before adjusting, servicing, cleaning, or storing it.
- Wear appropriate clothing, including eye-protection; long pants and substantial, slip-resistant footwear. Keep hands, feet, clothing, jewelry, and long hair away from moving parts.
- Allow machine components to cool before performing maintenance.
- If possible, do not perform maintenance while the engine is running. Keep away from moving parts.
- Operate the engine only in well-ventilated areas. Exhaust gases contain carbon monoxide, which is lethal if inhaled.
- Support the machine with jack stands whenever you work under the machine.
- Carefully release pressure from components with stored energy.
- Keep all parts of the machine in good working condition and all hardware tightened.
- Replace all worn or damaged decals.
- To ensure safe, optimal performance of the machine, use only genuine Toro replacement parts. Replacement parts made by other manufacturers could be dangerous, and such use could void the product warranty.

Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first hour	• Torque the wheel nuts.
After the first 10 hours	• Torque the wheel nuts. • Check the condition and tension of all belts.
After the first 50 hours	• Change the oil and the oil filter.
Before each use or daily	• Inspect the seat belt(s) for wear, cuts, and other damage. Replace the seat belt(s) if any component does not operate properly. • Check the interlock system. • Check the engine-oil level. • Drain the water separator. • Check the tire pressure. • Check the engine-coolant level. • Clean the radiator and oil cooler. • Check the hydraulic lines and hoses. • Check the level of the hydraulic fluid. • Check the reel-to-bedknife contact.
Every 25 hours	• Check the electrolyte level (if machine is in storage, check every 30 days).
Every 50 hours	• Lubricate all bearings and bushings (lubricate all bearings and bushings daily when conditions are dusty and dirty).
Every 100 hours	• Check the condition and tension of all belts.
Every 150 hours	• Change the oil and the oil filter.

Maintenance Service Interval	Maintenance Procedure
Every 200 hours	• Service the air cleaner (more frequently in extreme dusty or dirty conditions). • Torque the wheel nuts. • Check the adjustment of the parking brake.
Every 400 hours	• Check the fuel lines and connections. • Replace the fuel filter canister.
Every 500 hours	• Grease the bearings in the rear axle.
Every 800 hours	• If you are not using the recommended hydraulic fluid or have ever filled the reservoir with an alternative fluid, change the hydraulic fluid. • If you are not using the recommended hydraulic fluid or have ever filled the reservoir with an alternative fluid, replace the hydraulic filter.
Every 1,000 hours	• If you are using the recommended hydraulic fluid, replace the hydraulic filter.
Every 2,000 hours	• If you are using the recommended hydraulic fluid, change the hydraulic fluid.
Every 2 years	• Drain and clean the fuel tank. • Drain and flush the coolant system (take the machine to an Authorized Service Dealer or Distributor or refer to the Service Manual).

Daily Maintenance Checklist

Duplicate this page for routine use.

Maintenance Check Item	For the week of: Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.
Check the safety interlock operation.							
Check the brake operation.							
Check the fuel level.							
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.[1]							
Check the radiator and screen for debris							
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 pressure.							
Check the instrument operation.							
Check the reel-to-bedknife contact adjustment.							
Check the height-of-cut adjustment.							
Lubricate all the grease fittings.[2]							
Touch-up any damaged paint.							
Wash the machine.							

[1]Check the glow plugs and injector nozzles 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**
1		
2		
3		
4		
5		

Pre-Maintenance Procedures

Preparing for Maintenance

1. Park the machine on a level surface.
2. Lower the cutting units.
3. Engage the parking brake.
4. Shut off the engine, and remove the key.
5. Wait for all parts to stop moving.

Lifting the Front of the Machine

1. Chock the tires.
2. Jack the front of the machine under the square tube of the lower frame as closely to the side plate as possible.

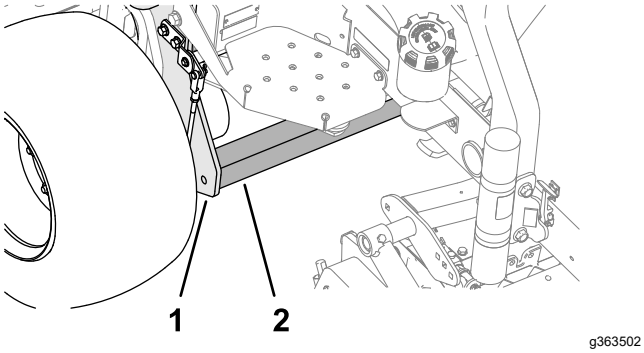


Figure 54

1. Side plate
2. Square tube

3. Support the machine with jack stands rated for the weight of the machine under the square tube or wheel motors; refer to Specifications (page 30).

Lifting the Back of the Machine

Using a Hoist

1. Chock the tires.
2. Secure the hoist to the tie-down loop of the rear-wheel fork (Figure 55).

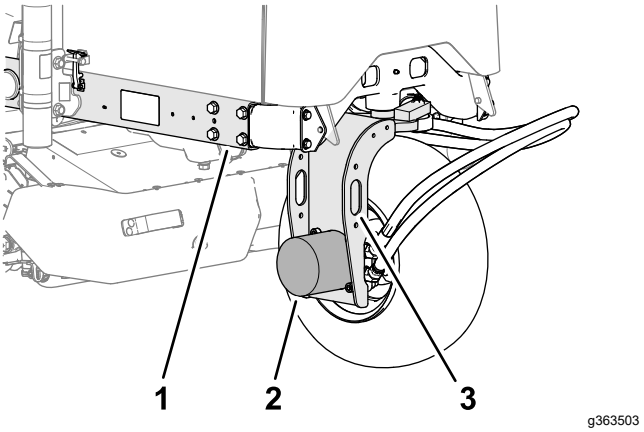


Figure 55

1. Frame
2. Rear wheel motor
3. Tie-down loop (rear-wheel fork)

3. Carefully raise the machine.
4. Support the machine with jack stands rated for the weight of the machine under the frame; refer to Specifications (page 30).

Lifting the Back of the Machine

Using a Jack

1. Chock the tires.
2. Jack the back of the machine under the rear wheel motor. (Figure 67).

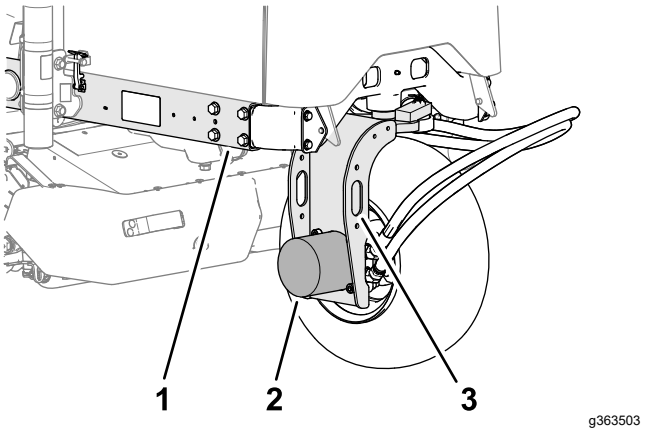


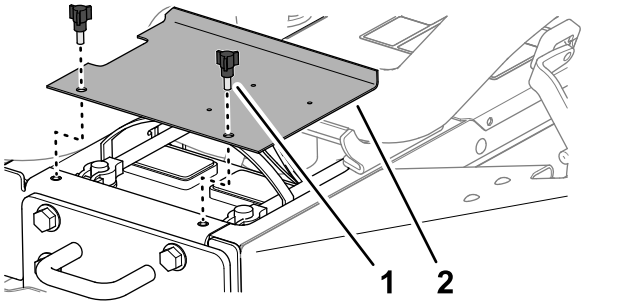
Figure 56

1. Frame
2. Rear wheel motor
3. Tie-down loop (rear-wheel fork)

3. Support the machine with jack stands rated for the weight of the machine under the frame; refer to Specifications (page 30).

Removing the Battery Cover

Remove the 2 knobs that secure the battery cover to the machine, and remove the cover (Figure 53).



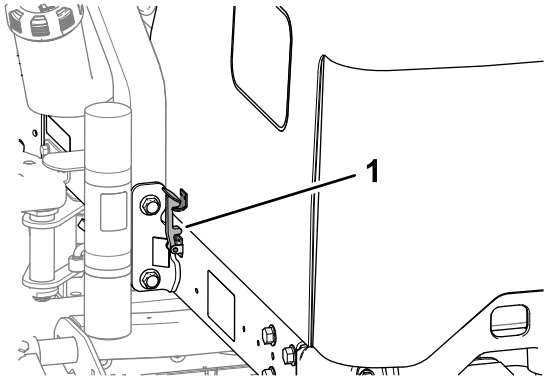
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Figure 57

1. Knob
2. Battery cover

Opening the Hood

1. Release the latches at the left side and right side of the hood (Figure 57).

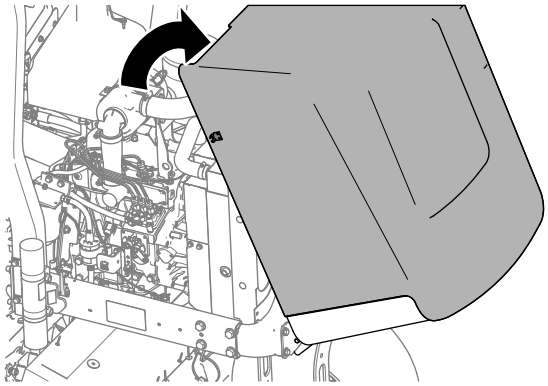


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Figure 58

1. Hood latch

2. Rotate the hood up and back (Figure 58).



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Figure 59

Lubrication

Greasing the Bearings and Bushings

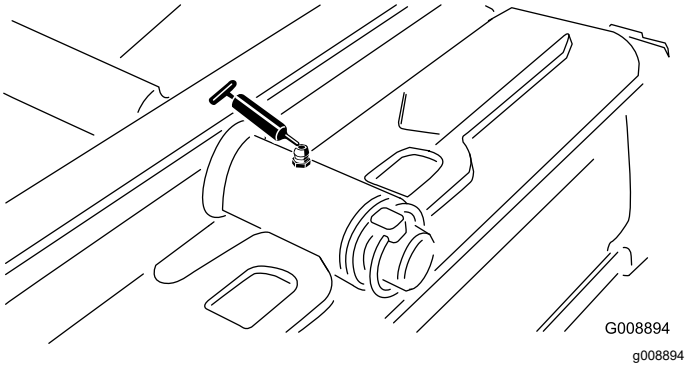
Service Interval: Every 50 hours (lubricate all bearings and bushings daily when conditions are dusty and dirty).

Every 500 hours/Yearly (whichever comes first)

Grease Specification: No. 2 lithium grease

The machine has grease fittings that must be lubricated regularly. Dusty and dirty operating conditions could cause dirt to get into the bearings and bushings, resulting in accelerated wear. Lubricate the grease fittings immediately after every washing, regardless of the interval specified.

1. Prepare the machine for maintenance; refer to Preparing for Maintenance (page 44).
2. Grease fittings at the locations and for quantities are as follows:
   - Rear cutting unit pivot (Figure 60)

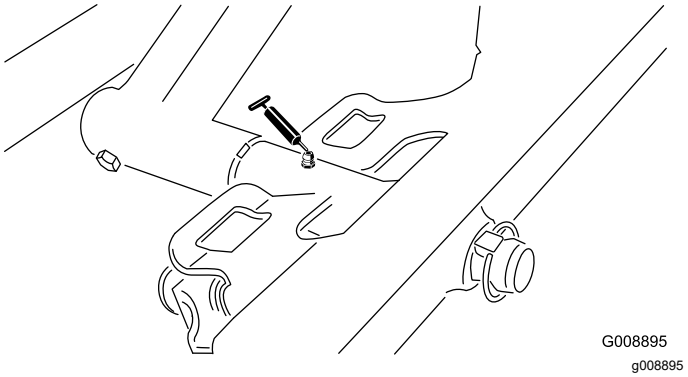


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Figure 60

   - Front cutting unit pivot (Figure 61)



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Figure 61

   - Sidewinder cylinder ends (2 fittings; Model 03171 only—Figure 62)

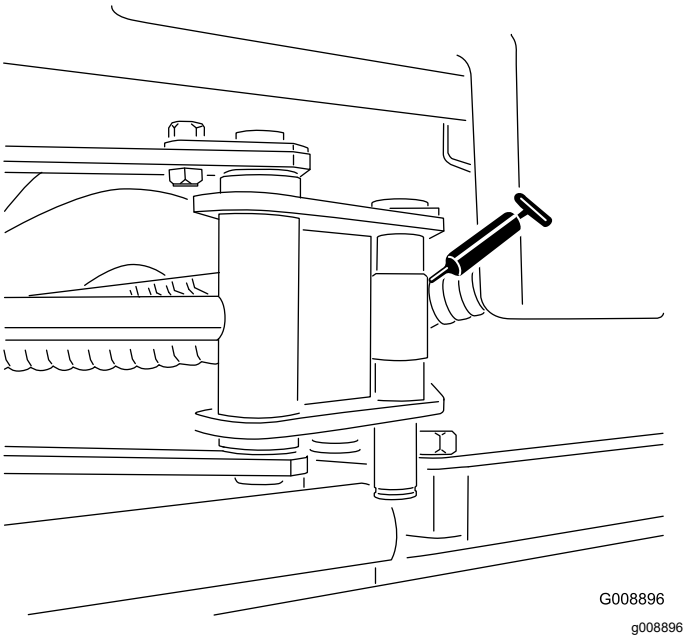


Figure 62

- Steering pivot (Figure 63)

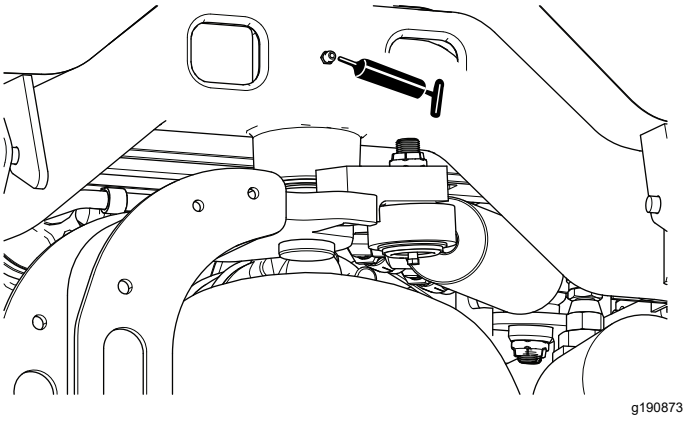


Figure 63

- Rear lift arm pivot and lift cylinder (2 fittings—Figure 64)

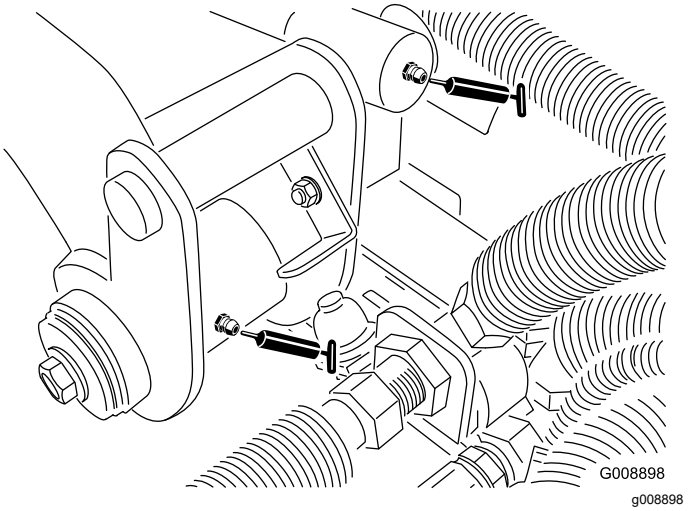


Figure 64

- Left front lift arm pivot and lift cylinder (2 fittings—Figure 65)

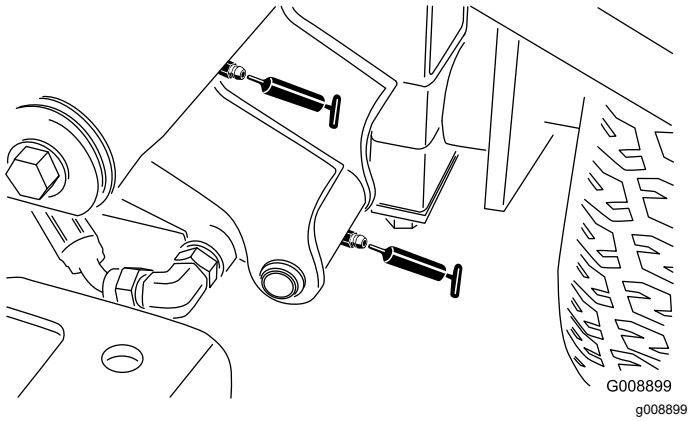


Figure 65

- Right front lift arm pivot and lift cylinder (2 fittings—Figure 66)

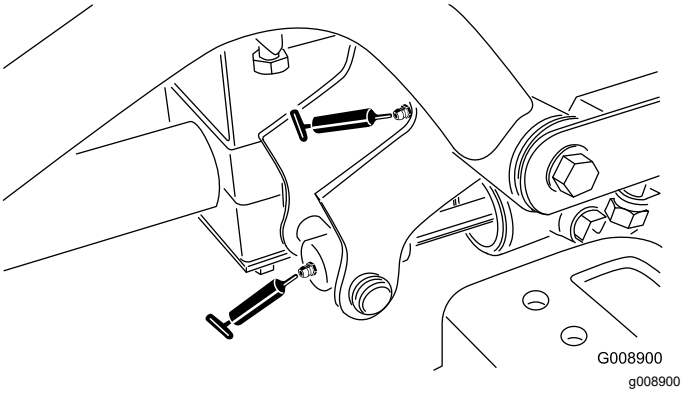


Figure 66

- Neutral adjust mechanism (Figure 67)

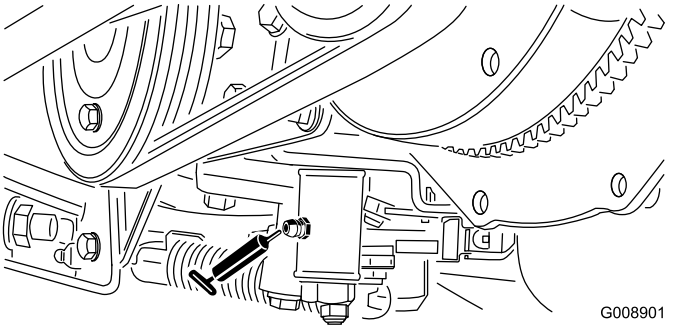


Figure 67

- Mow/transport slide (Figure 68)

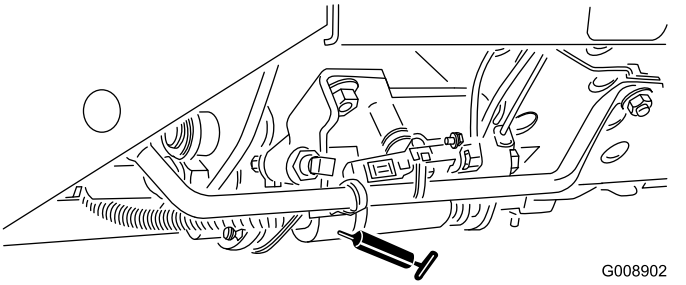


Figure 68

- Belt tension pivot (Figure 69)

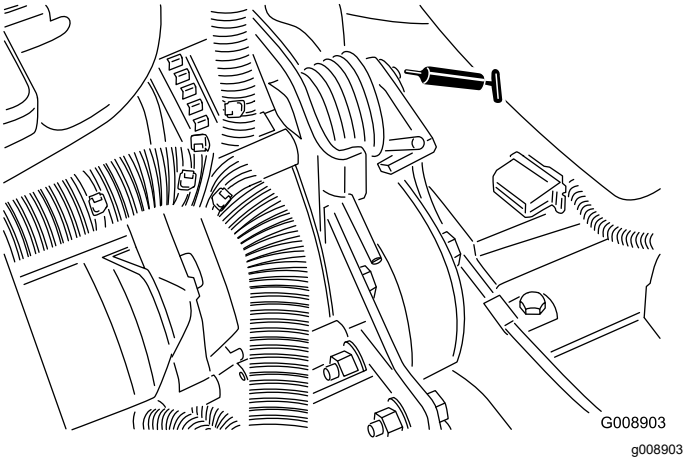


Figure 69

- Steering cylinder (Figure 70).

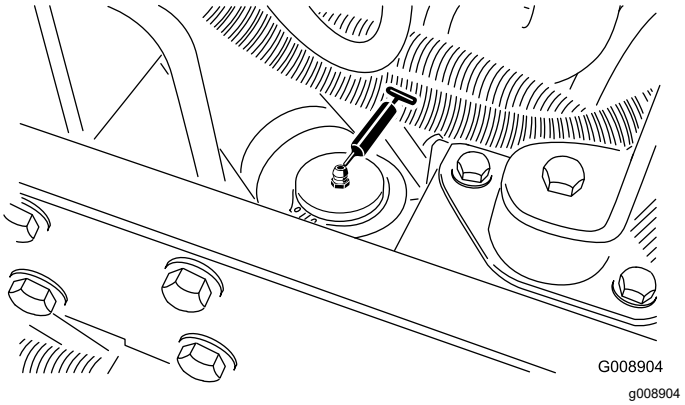


Figure 70

Note: If desired, install an additional grease fitting in the other end of the steering cylinder. Remove the tire, install the fitting, grease the fitting, remove the fitting, and install the plug (Figure 71).

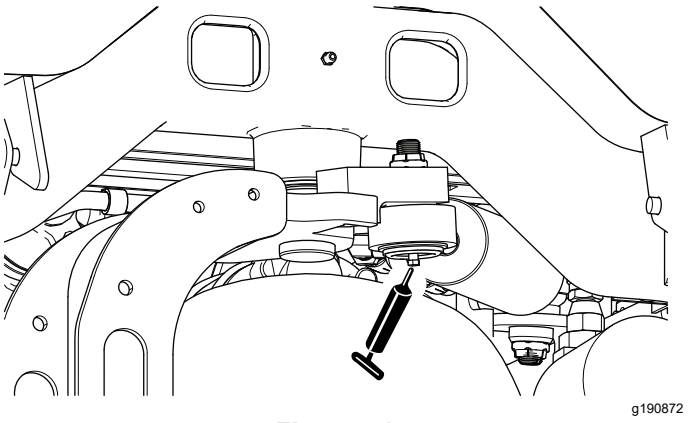


Figure 71

Checking the Sealed Bearings

Bearings rarely fail from defects in materials or workmanship. The most common reason for failure is moisture and contamination working its way past the protective seals. Bearings that are greased rely upon regular maintenance to purge harmful debris from the bearing area. **Sealed** bearings rely on an initial fill of special grease and a robust integral seal to keep contaminants and moisture out of the rolling elements.

The sealed bearings require no lubrication or short-term maintenance. This minimizes routine service required and reduces the potential of turf damage due to grease contamination. These sealed bearing packages will provide good performance and life under normal use, but you should periodically inspect the bearing condition and seal integrity to avoid downtime. Inspect the bearings seasonally and replace the them if they are damaged or worn. Bearings should operate smoothly with no detrimental characteristics such as high heat, noise, looseness, or indications of corrosion (rust).

Due to the operating conditions these bearing/seal packages are subject to (i.e., sand, turf chemicals, water, impacts, etc.) they are considered normal wear items. Bearings that fail due to causes other than defects in materials or workmanship are typically not covered under the warranty.

Note: Bearing life can be negatively affected by improper wash-down procedures. Do not wash down the machine when it is still hot and avoid directing high-pressure or high-volume spray at the bearings.

Engine Maintenance

Engine Safety

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

Engine Oil Specification

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

Service Category

ACEA—E6
API—CH-4 or higher
JASO—DH-2

Preferred oil viscosity: SAE 15W-40 [-17ºC (above 0°F)]

Alternate oil viscosity: 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.

Checking the Engine-Oil Level

Service Interval: Before each use or daily

The engine is shipped with oil in the crankcase; however, check the oil level before and after you first start the engine.

Note: Toro Premium Engine oil is available from a distributor in either 15W-40 or 10W-30 viscosity. See the parts catalog for part numbers.

Note: 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.** If the oil level is between the Full and Add marks, you do not need to add oil.

1. Prepare the machine for maintenance; refer to Preparing for Maintenance (page 44).
2. Unlatch and open the hood.
3. Remove the dipstick (Figure 72) and wipe it with a clean rag.

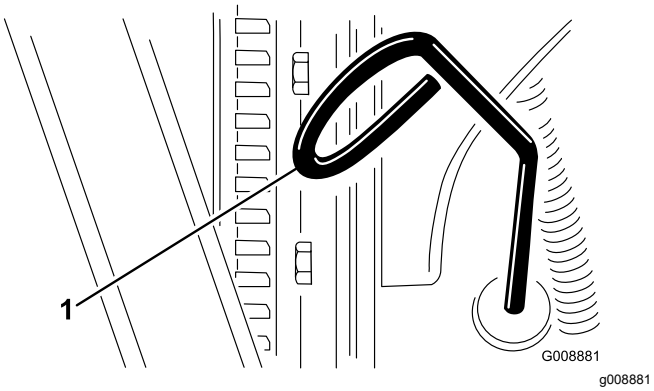


Figure 72

1. Dipstick

4. Push the dipstick down into the dipstick tube and ensure that it is seated fully, then pull the dipstick out and check the oil level.
5. If the oil level is low, remove the oil-fill cap (Figure 73) and gradually add small quantities of oil, checking the level frequently, until the level reaches the Full mark on the dipstick.

   Important: **Keep the engine-oil level between the upper and lower limits on the dipstick. Overfilling or underfilling the engine oil may cause severe engine damage.**

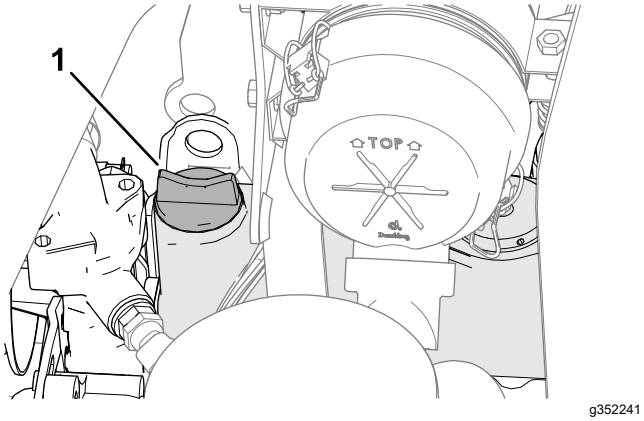


Figure 73

1. Oil-fill cap

6. Install the oil-fill cap and dipstick.
7. Close and latch the hood.

Changing the Engine Oil and the Filter

Service Interval: After the first 50 hours

Every 150 hours

Crankcase capacity: approximately 3.8 L (4.0 US qt) with the filter

1. Prepare the machine for maintenance; refer to Preparing for Maintenance (page 44).
2. Unlatch and open the hood, and wait for the engine to cool.
3. Remove either drain plug (Figure 74) and let the oil flow into a drain pan; when the oil stops flowing, install the drain plug.

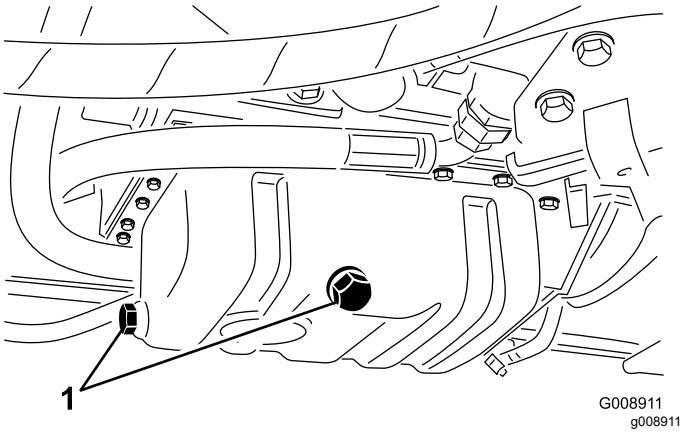


Figure 74

1. Drain plugs

4. Remove the oil filter (Figure 75).

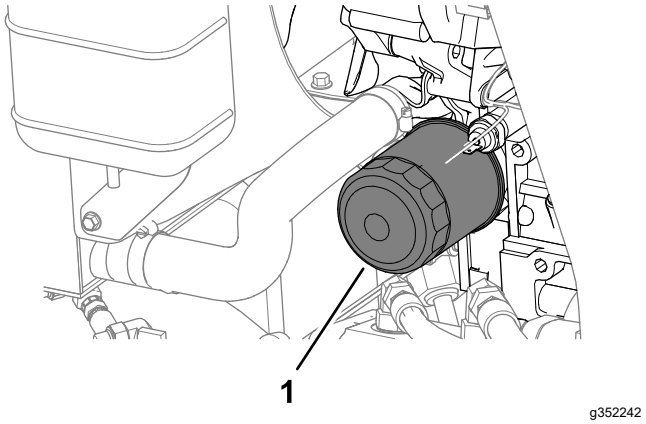


Figure 75

1. Oil filter

5. Apply a light coat of clean oil to the new filter seal and install the oil filter.

   Note: Do not overtighten the filter.

6. Add oil to the crankcase; refer to Engine Oil Specification (page 48) and Checking the Engine-Oil Level (page 48).
7. Close and latch the hood.

Servicing the Air Cleaner

Service Interval: Every 200 hours (more frequently in extreme dusty or dirty conditions).

Removing the Air Filter

- Check the air cleaner body for damage which could cause an air leak. Replace it if it is damaged. Check the whole intake system for leaks, damage, or loose hose clamps.
- Service the air cleaner at the recommended service interval or earlier if engine performance declines due to extremely dusty, dirty conditions. Changing the air filter before it is necessary only increases the chance of dirt entering the engine when the filter is removed.
- Ensure that the cover is seated correctly and seals with the air-cleaner body.

1. Prepare the machine for maintenance; refer to Preparing for Maintenance (page 44).
2. Open the hood.
3. Release the latches that secure the air-cleaner cover to the air-cleaner body (Figure 76).

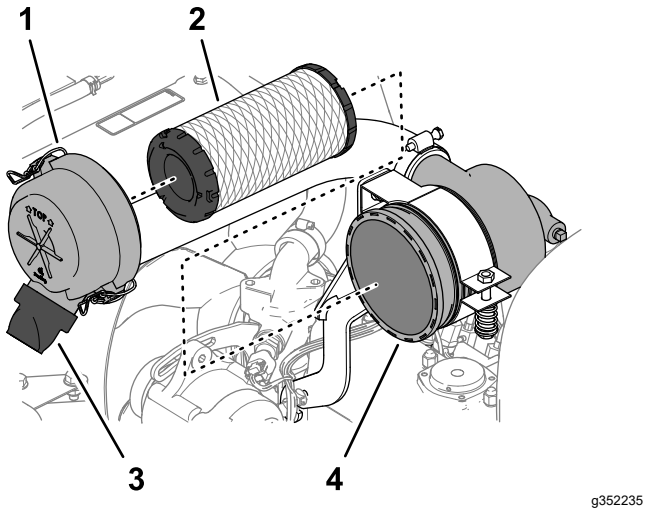


Figure 76

1. Air-cleaner cover
2. Filter element
3. Rubber outlet valve (dirt ejection port)
4. Air-cleaner body

4. Remove the cover from the air-cleaner body.
5. Before removing the filter, use low-pressure air—276 kPa (40 psi), clean and dry—to help remove large accumulations of debris packed between the outside of primary filter and the canister. Avoid using high-pressure air which could force dirt through the filter into the intake tract. This cleaning process prevents debris from migrating into the intake when you remove the primary filter.
6. Remove the filter element (Figure 76).

   Note: Cleaning the used element may damage the filter media.
7. Remove the rubber outlet valve (Figure 76) from the dirt ejection port of the air-cleaner cover.
8. Clean the ejection and outlet valve, and install the outlet valve to the port.

Installing the Air Filter

1. Inspect the new filter for shipping damage and check the sealing end of the filter and the body.

   Important: **Do not use a damaged element.**
2. 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.**
3. Install the cover orienting the rubber outlet valve in a downward position—between approximately 5 o'clock to 7 o'clock when viewed from the end.
4. Secure the cover with the 2 latches.
5. Close and latch the hood.

Fuel System Maintenance

Servicing the Fuel Tank

Service Interval: Every 2 years—Drain and clean the fuel tank.

Prepare the machine for maintenance; refer to Preparing for Maintenance (page 44).

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

Inspecting the Fuel Lines and Fittings

Service Interval: Every 400 hours/Yearly (whichever comes first)

1. Prepare the machine for maintenance; refer to Preparing for Maintenance (page 44).
2. Unlatch and open the hood.
3. Inspect the fuel lines and fittings for deterioration, damage, or loose connections.

   Note: Repair or replace any damaged or worn the fuel lines or fittings.
4. Close and latch the hood.

Draining the Water Separator

Service Interval: Before each use or daily

1. Prepare the machine for maintenance; refer to Preparing for Maintenance (page 44).
2. Unlatch and open the hood, and wait for the engine to cool.
3. Place a clean container under the fuel filter.
4. Loosen the drain valve on the bottom of the filter canister (Figure 77).

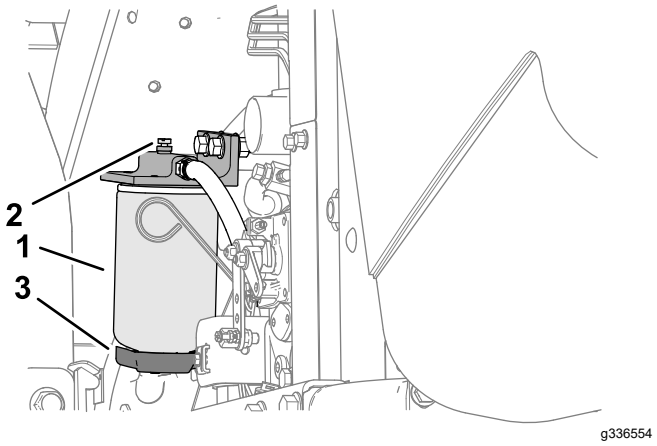


Figure 77

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

5. Tighten the valve after draining.
6. Start the engine, check for leaks, and shut off the engine.

   Note: Repair all fuel leaks.
7. Close and latch the hood.

Changing the Fuel Filter Canister

Service Interval: Every 400 hours

1. Prepare the machine for maintenance; refer to Preparing for Maintenance (page 44).
2. Unlatch and open the hood, and wait for the engine to cool.
3. Clean the area where the filter canister mounts (Figure 77).
4. Remove the filter canister and clean the mounting surface.
5. Lubricate the gasket on the filter canister with clean oil.
6. Install the filter canister by hand until the gasket contacts the mounting surface; then rotate an additional 1/2 turn.
7. Start the engine, check for leaks, and shut off the engine.

   Note: Repair all fuel leaks.
8. Close and latch the hood.

Bleeding Air from the Injectors

Note: Use this procedure only if the fuel system has been purged of air through normal priming procedures and the engine does not start; refer to Bleeding the Fuel System (page 37).

1. When possible, perform each step in Preparing for Maintenance (page 44).
2. Unlatch and open the hood, and if the engine is hot wait for it to cool.
3. Loosen the tube nut for the fuel line to the No. 1 fuel-injector nozzle.

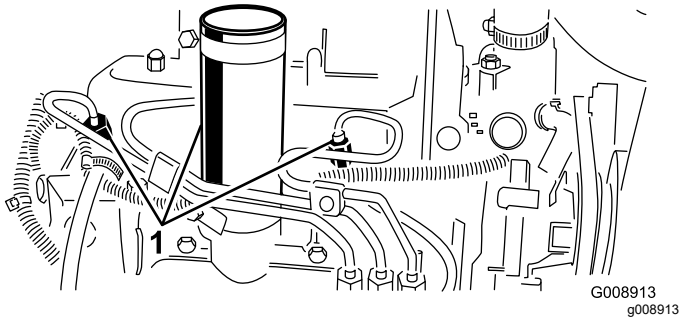


Figure 78

1. Fuel injectors

4. Move the throttle to the FAST position.
5. Turn the key in the key switch to the START position and watch the fuel flow around the connector. Turn the key to the OFF position when there is a continuous flow.

   Important: **To prevent overheating of the starter motor, do not engage the starter for longer than 15 seconds. After 10 seconds of continuous cranking, wait 60 seconds before engaging the starter motor again.**
6. Tighten the tube nut securely.
7. Clean any fuel from the engine.
8. Repeat steps 3 through 7 for the remaining fuel-injector nozzles.
9. Start the engine, check for leaks, and shut off the engine.

   Note: Repair all fuel leaks.
10. Close and latch the hood.

Electrical System Maintenance

Electrical System Safety

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

Servicing the Battery

Service Interval: Every 25 hours—Check the electrolyte level (if machine is in storage, check every 30 days).

⚠ DANGER

Battery electrolyte contains sulfuric acid which is fatal if consumed and causes severe burns.

- **Do not drink electrolyte and avoid contact with your skin, eyes, or clothing. Wear eye protection and rubber gloves.**
- **Fill the battery where clean water is always available for flushing the skin.**

⚠ WARNING

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

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

1. Prepare the machine for maintenance; refer to Preparing for Maintenance (page 44).
2. Remove the battery cover; refer to Removing the Battery Cover (page 45).
3. Remove the filler caps of the battery.
4. Maintain the battery electrolyte level in the battery cells with distilled or demineralized water.

Note: Do not fill the cells above the bottom of the split ring inside each cell.

5. Install the filler caps with the vents pointing to the rear (toward the fuel tank).
6. Clean the top of the battery by washing it periodically with a brush dipped in ammonia or bicarbonate of soda solution. Flush the top surface with water after cleaning.

   Important: **Do not remove the filler caps while cleaning.**
7. Check the battery cable clamps and battery posts for corrosion. If corrosion occurs, perform the following:
   A. Disconnect the negative (–) battery cable.
   B. Disconnect the positive (+) battery cable.
   C. Clean the clamps and posts separately.
   D. Connect the positive (+) battery cable.
   E. Connect the negative (–) battery cable.
   F. Coat the clamps and terminals with battery terminal protector.
8. Check that the battery cable clamps are tight on the battery posts.
9. Install the battery cover.

Note: Store the machine where the temperature is cooler rather than warmer to prevent the battery from discharging more rapidly.

Servicing the Fuses

1. Prepare the machine for maintenance; refer to Preparing for Maintenance (page 44).
2. Lift the cover from the control arm (Figure 79).

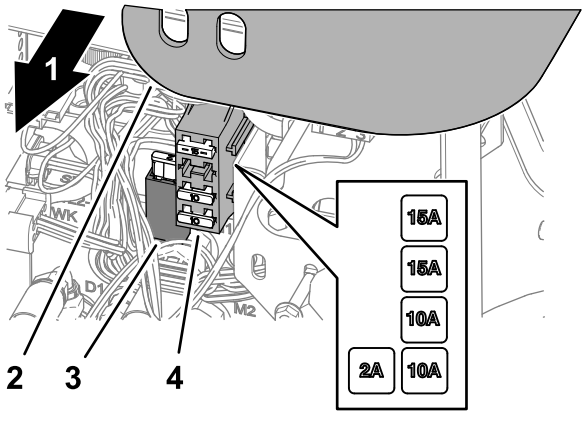


Figure 79

1. Right side of the machine
2. Control-arm cover
3. Fuse holder
4. Fuse block

3. Locate the open fuse in the fuse holder or fuse block (Figure 79).
4. Replace the fuse with the same type and amperage fuse.
5. Assemble the cover onto the control arm (Figure 79).

Drive System Maintenance

Checking the Tire Pressure

Service Interval: Before each use or daily

⚠ DANGER

Low tire pressure decreases machine side hill stability. This could cause a rollover, which may result in personal injury or death.

Do not under-inflate the tires.

Note: Maintain the recommended pressure in all tires to ensure a good quality of cut and proper machine performance.

1. Measure the air pressure in each tire. The correct air pressure in the tires is 97 to 110 kPa (14 to 16 psi).
2. If needed, add air to of remove air from the tires until you measure 97 to 110 kPa (14 to 16 psi).

Torquing the Wheel Nuts

Service Interval: After the first hour

After the first 10 hours

Every 200 hours

Torque the wheel nuts in a crossing pattern to 61 to 88 N·m (45 to 65 ft-lb).

⚠ WARNING

Failure to maintain proper torque of the wheel nuts could result in personal injury.

Ensure that the wheel nuts are torqued to 61 to 88 N·m (45 to 65 ft-lb).

Adjusting the Traction Drive for Neutral

If the machine moves when the traction pedal is in the NEUTRAL position, adjust the traction cam.

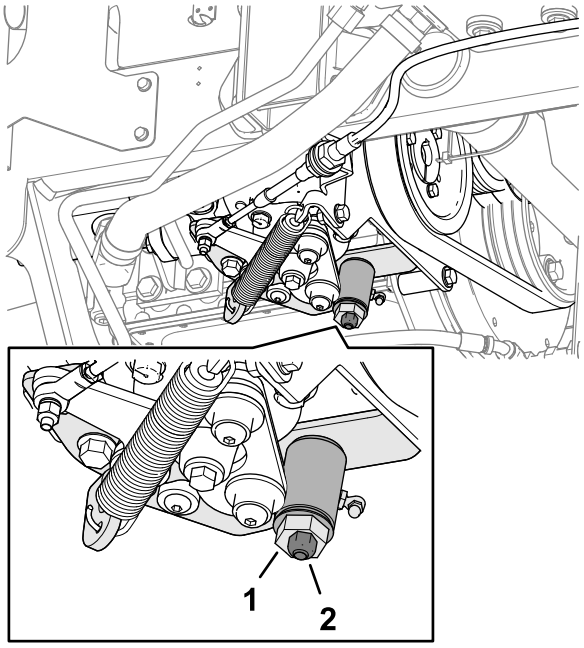
1. Park the machine on a level surface, lower the cutting units, engage the parking brake, shut off the engine, and remove the key from the ignition switch.
2. Raise a front wheel and a rear wheel off the floor and place support blocks under the frame.

⚠ WARNING

If the machine is not supported adequately, it may accidentally fall, injuring anyone under the machine.

Raise a front wheel *and* the rear wheel off the ground; otherwise, the machine will move during adjustment.

3. Loosen the locknut on the traction adjustment cam (Figure 80).



g352331

Figure 80

1. Traction adjustment cam 2. Locknut

⚠ WARNING

The engine must be running so that you can make a final adjustment of the traction adjustment cam. Contact with hot or moving parts can result in personal injury.

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

4. Start the engine and rotate the cam hex in both directions to determine the mid position of the neutral span.
5. Tighten the locknut securing the adjustment.
6. Shut off the engine.
7. Remove the support blocks and lower the machine to the shop floor. Test drive the

machine to ensure that it does not move when the traction pedal is in neutral.

Cooling System Maintenance

Cooling System Safety

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

Coolant Specification

The coolant reservoir is filled at the factory with a 50/50 solution of water and ethylene glycol base extended-life coolant.

Important: **Use only commercially available coolants that meet the specifications listed in the Extended Life Coolant Standards Table.**

Do not use conventional (green) inorganic-acid technology (IAT) coolant in your machine. Do not mix conventional coolant with extended-life coolant.

Coolant Type Table

Ethylene-Glycol Coolant Type	Corrosion Inhibitor Type
Extended-life antifreeze	Organic-acid technology (OAT)
Important: **Do not rely on the color of the coolant to identify the difference between conventional (green) inorganic-acid technology (IAT) coolant and extended-life coolant.** **Coolant manufacturers may dye extended-life coolant in one of the following colors: red, pink, orange, yellow, blue, teal, violet, and green. Use coolant that meets the specifications in the Extended Life Coolant Standards Table.**	

Extended Life Coolant Standards

ATSM International	SAE International
D3306 and D4985	J1034, J814, and 1941

Important: **Coolant concentration should be a 50/50 mixture of coolant to water.**

- **Preferred:** When mixing coolant from a concentrate, mix it with distilled water.

- **Preferred option:** If distilled water is not available, use a pre-mix coolant instead of a concentrate.
- **Minimum requirement:** If distilled water and pre-mix coolant are not available, mix concentrated coolant with clean drinkable water.

Checking the Coolant Level

Service Interval: Before each use or daily

Cooling system capacity: approximately 5.7 L (6 US qt)

⚠ 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. Prepare the machine for maintenance; refer to Preparing for Maintenance (page 44).
2. Unlatch and open the hood.
3. Check the coolant level in the expansion tank (Figure 81).

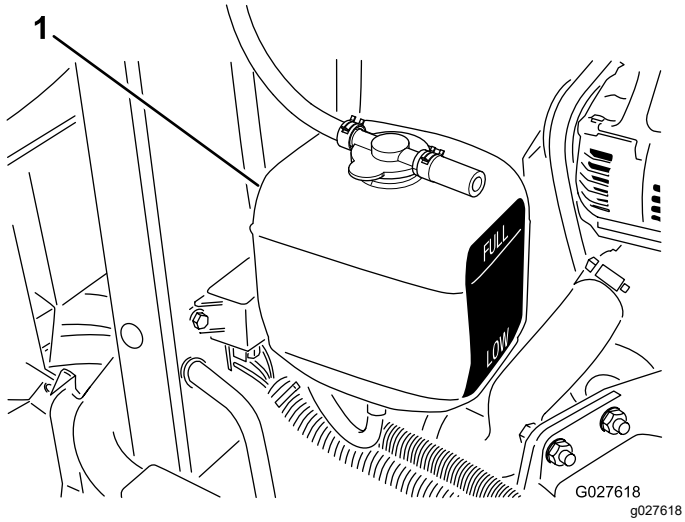


Figure 81

1. Expansion tank

Note: With a cold engine, the coolant level should be approximately midway between the marks on the side of the tank.

4. If the coolant level is low remove the expansion tank cap, add the specified coolant to the tank until the coolant level is midway between the marks on the side of the tank, and assemble the cap to the tank.

Important: **Do not overfill the expansion tank.**

5. Close and latch the hood.

Cleaning the Engine Cooling System

Service Interval: Before each use or daily

Remove debris from the oil cooler and radiator daily. Clean them more frequently in dirty conditions.

1. Prepare the machine for maintenance; refer to Preparing for Maintenance (page 44).
2. Raise the hood.
3. Clean the engine area thoroughly of all debris.
4. Remove the lower radiator shield (Figure 82).

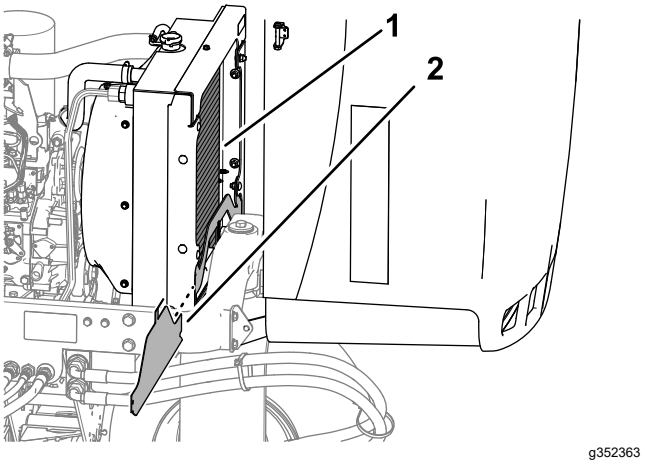


Figure 82

1. Radiator
2. Lower radiator shield

5. Clean both sides of the radiator area thoroughly with water or compressed air (Figure 82).
6. Install the lower radiator shield.
7. Close and latch the hood.

Brake Maintenance

Adjusting the Parking Brake

Service Interval: Every 200 hours—Check the adjustment of the parking brake.

1. Prepare the machine for maintenance; refer to Preparing for Maintenance (page 44).
2. Loosen the setscrew securing the knob to the parking-brake lever (Figure 83).

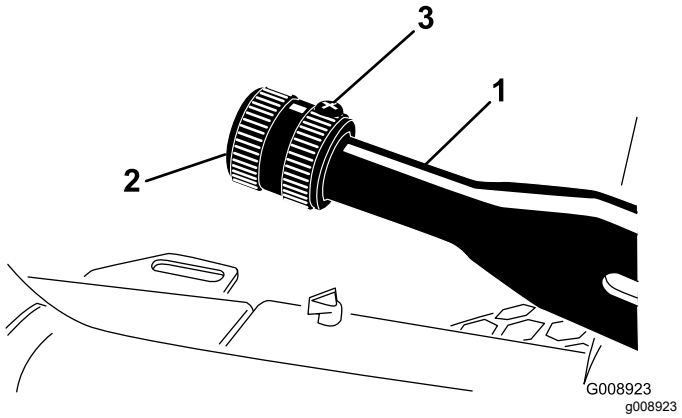


Figure 83

1. Parking-brake lever
2. Knob
3. Set screw

3. Rotate the knob until a force of 133 to 178 N (30 to 40 lb) is required to actuate the lever.
4. Tighten the setscrew.

Belt Maintenance

Servicing the Engine Belts

Service Interval: After the first 10 hours—Check the condition and tension of all belts.

Every 100 hours—Check the condition and tension of all belts.

Tensioning the Alternator/Fan Belt

1. Prepare the machine for maintenance; refer to Preparing for Maintenance (page 44).
2. Unlatch and open the hood.
3. Check the belt tension by pressing the belt midway between the alternator and crankshaft pulleys.

   Note: With 98 N (22 lb) of force, the belt should deflect 11 mm (7/16 inch).

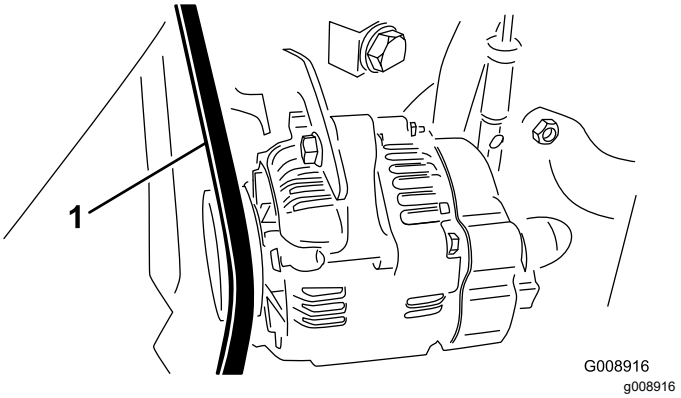


Figure 84

1. Alternator/fan belt

4. If the deflection is incorrect, complete the following procedure to tension the belt:
   A. Loosen the bolt securing the brace to the engine and the bolt securing the alternator to the brace.
   B. Insert a pry bar between the alternator and engine and pry the alternator outward.
   C. When you achieve proper belt tension, tighten the alternator and brace bolts to secure the adjustment.
5. Close and latch the hood.

Replacing the Hydrostat Drive Belt

1. Insert a nut driver or small piece of tubing onto the end of the belt tensioning spring.

⚠ WARNING

When you replace the hydrostat drive belt, you must release the tension on the spring, which is under a heavy load. Releasing the tension on the spring improperly may result in serious personal injury.

Be careful when releasing the tension on the spring.

2. Push down the end of the belt-tension spring down and out of the notch in the tab of the pump mount, and move the spring end forward (Figure 85).

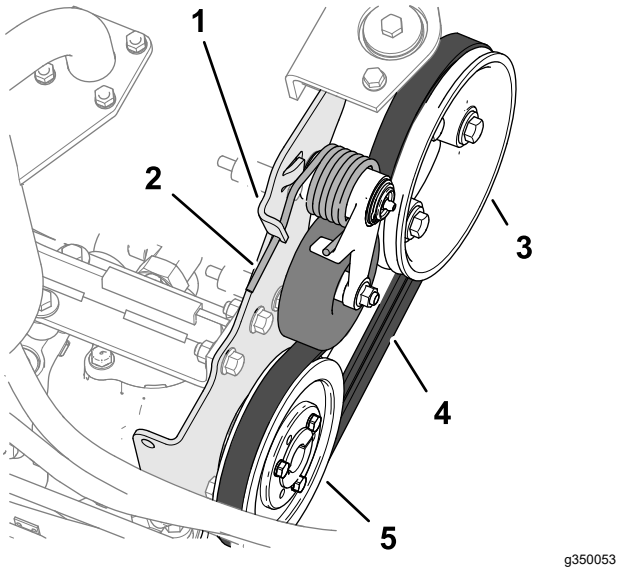


Figure 85

1. Pump mount tab
2. Belt-tension spring
3. Engine pulley
4. Drive belt
5. Hydrostat pulley

3. Replace the belt.
4. Push down the end of the belt-tension spring, and inward, and align it into the notch in the pump mount tab.

Controls System Maintenance

Adjusting Mow Ground Speed

1. Prepare the machine for maintenance; refer to Preparing for Maintenance (page 44).
2. Loosen the jam nut for the speed stop screw.
3. Adjust the speed stop screw as follow:

   Note: The mow speed is set at the factory to 9.7 km/h (6 mph).

   - To decrease the mow speed, rotate the speed stop screw (Figure 86) clockwise.
   - To increase the mow speed, rotate the speed stop screw counterclockwise.

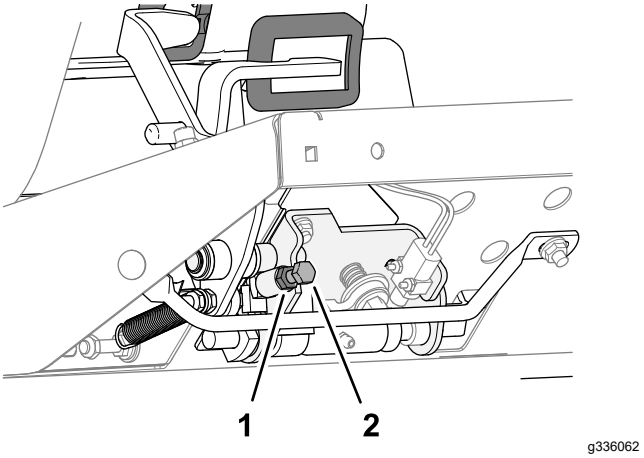


Figure 86

1. Jam nut
2. Stop screw

4. Hold the stop screw and tighten the jam nut.
5. Test drive the machine to confirm the maximum mow speed adjustment.

Adjusting the Throttle

1. Prepare the machine for maintenance; refer to Preparing for Maintenance (page 44).
2. Unlatch and open the hood.
3. Position the throttle lever rearward so that it stops against the control panel slot.
4. Loosen the throttle cable connector on the injection pump lever arm (Figure 87).

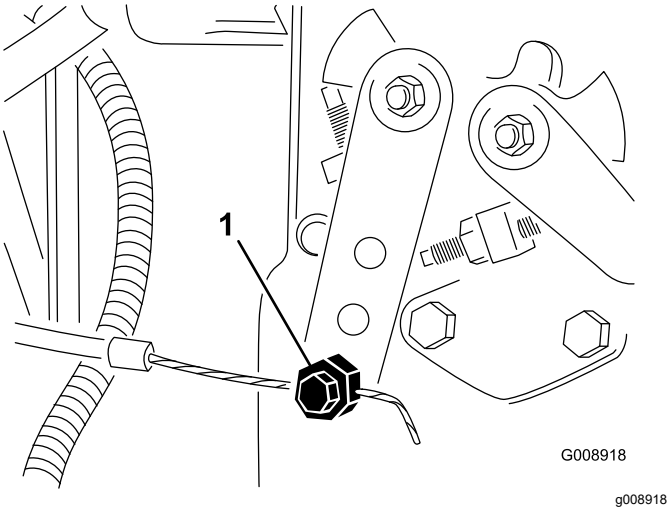


Figure 87

1. Injection pump lever arm

5. Hold the injection pump lever arm against the low idle stop and tighten the cable connector.
6. Loosen the screws securing the throttle control to the control panel.
7. Push the throttle control lever all the way forward.
8. Slide the stop plate until it contacts the throttle lever and tighten the screws securing the throttle control to the control panel.
9. If the throttle does not stay in position during operation, torque the locknut used to set the friction device on the throttle lever to 5 to 6 N·m (44 to 53 in-lb).

   Note: The maximum force required to operate the throttle lever should be 89 N (20 lb).
10. Close and latch the hood.

Hydraulic System Maintenance

Hydraulic System Safety

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

Checking the Hydraulic Lines and Hoses

Service Interval: Before each use or daily

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

Hydraulic Fluid Specifications

The reservoir is filled at the factory with high-quality hydraulic fluid. Check the level of the hydraulic fluid before you first start the engine and daily thereafter; refer to Checking the Hydraulic Fluid (page 60).

Recommended hydraulic fluid: Toro PX Extended Life Hydraulic Fluid; available in 19 L (5 US gallon) pails or 208 L (55 US gallon) drums.

Note: A machine using the recommended replacement fluid requires less frequent fluid and filter changes.

Alternative hydraulic fluids: If Toro PX Extended Life Hydraulic Fluid is not available, you may use another conventional, petroleum-based hydraulic fluid having specifications that fall within the listed range for all the following material properties and that it meets industry standards. Do not use synthetic fluid. Consult with your lubricant distributor to identify a satisfactory product.

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

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

Material Properties:

Viscosity, ASTM D445	cSt @ 40°C (104°F) 44 to 48
Viscosity Index ASTM D2270	140 or higher
Pour Point, ASTM D97	-37°C to -45°C (-34°F to -49°F)
Industry Specifications:	Eaton Vickers 694 (I-286-S, M-2950-S/35VQ25 or M-2952-S)

Note: Many hydraulic fluids are almost colorless, making it difficult to spot leaks. A red dye additive for the hydraulic fluid is available in 20 ml (0.67 fl oz) bottles. A bottle is sufficient for 15 to 22 L (4 to 6 US gallons) of hydraulic fluid. Order Part No. 44-2500 from your authorized Toro distributor.

Important: **Toro Premium Synthetic Biodegradable Hydraulic Fluid is the only synthetic biodegradable fluid approved by Toro. This fluid is compatible with the elastomers used in Toro hydraulic systems and is suitable for a wide-range of temperature conditions. This fluid is compatible with conventional mineral oils, but for maximum biodegradability and performance, the hydraulic system should be thoroughly flushed of conventional fluid. The oil is available in 19 L (5 US gallon) pails or 208 L (55 US gallon) drums from your authorized Toro distributor.**

Checking the Hydraulic Fluid

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

The reservoir is filled at the factory with high-quality hydraulic fluid. The best time to check the hydraulic oil is when the fluid is cold. The machine should be in its transport configuration.

1. Prepare the machine for maintenance; refer to Preparing for Maintenance (page 44).
2. Clean the area around the filler neck and cap of the hydraulic-fluid tank (Figure 88) and remove the cap.

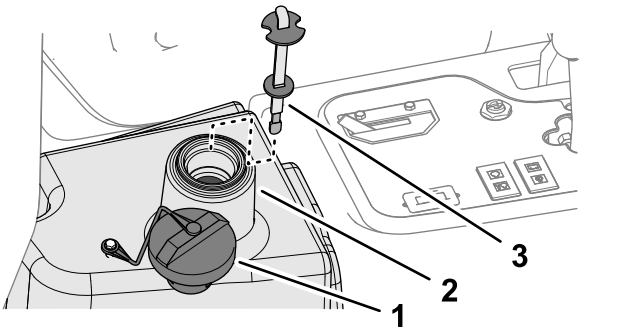


Figure 88

1. Cap
2. Filler neck (hydraulic-fluid reservoir)
3. Dipstick

3. Remove the dipstick from the filler neck and wipe it with a clean rag.
4. Insert the dipstick into the filler neck; then remove it and check the fluid level.

   Note: The fluid level should be within 6 mm (1/4 inch) of the mark on the dipstick.
5. If the level is low, add the specified fluid to raise the level to the full mark; refer to Hydraulic Fluid Specifications (page 59).

   Important: **Do not overfill the hydraulic reservoir.**
6. Install the dipstick and cap onto the filler neck.

Hydraulic Fluid Capacity

13.2 L (3.5 US gallons); refer to Hydraulic Fluid Specifications (page 59)

Changing the Hydraulic Fluid

Service Interval: Every 2,000 hours—**If you are using the recommended hydraulic fluid,** change the hydraulic fluid.

Every 800 hours—**If you are not using the recommended hydraulic fluid or have ever filled the reservoir with an alternative fluid,** change the hydraulic fluid.

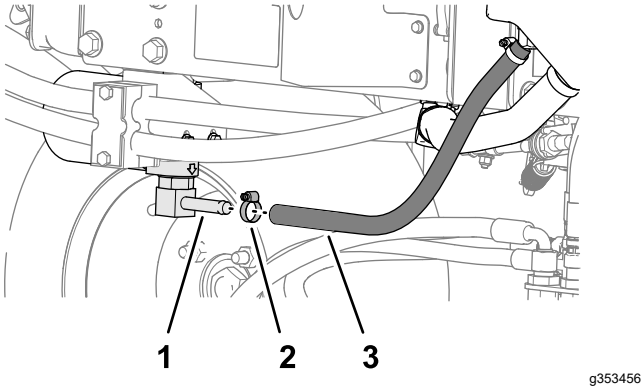
⚠ WARNING

Hot hydraulic fluid can cause severe burns.

Allow the hydraulic fluid to cool before performing any maintenance to the hydraulic system.

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

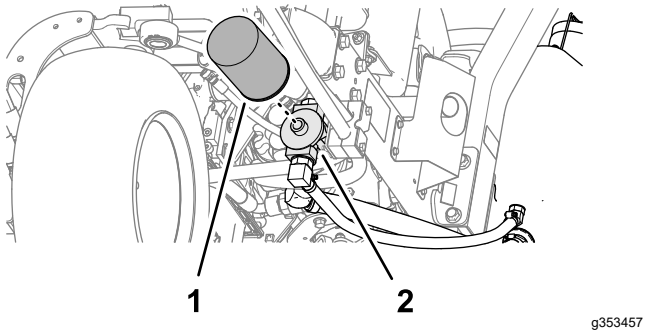
1. Prepare the machine for maintenance; refer to Preparing for Maintenance (page 44).
2. Disconnect the hydraulic hose (Figure 89) or remove the hydraulic filter (Figure 90) and drain the hydraulic fluid into a drain pan.



g353456

Figure 89

1. Filter head fitting
2. Hose clamp
3. Hydraulic hose



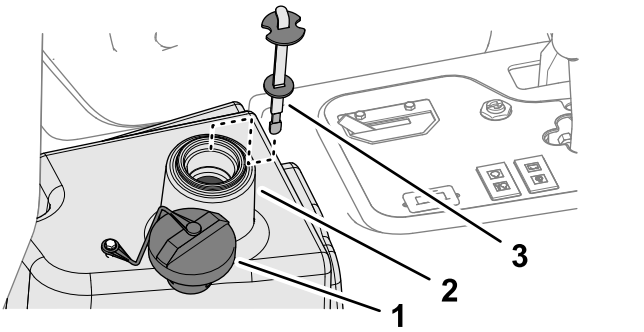
g353457

Figure 90

1. Hydraulic filter
2. Filter head

3. Install the hydraulic hose when hydraulic fluid stops draining.
4. Fill the reservoir (Figure 91) with approximately 22.7 L (6 US gallons) of hydraulic fluid; refer to Hydraulic Fluid Specifications (page 59).

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



g341294

Figure 91

1. Cap
2. Filler neck (hydraulic-fluid reservoir)
3. Dipstick

5. Install the dipstick and cap onto the filler neck.
6. Start the engine and use all the hydraulic controls to distribute the hydraulic fluid throughout the system.
7. Check for leaks; then shut off the engine.
8. Check the fluid level and add enough to raise the level to Full mark on the dipstick.

   Important: **Do not overfill the reservoir.**

Changing the Hydraulic Filter

Service Interval: Every 1,000 hours—**If you are using the recommended hydraulic fluid,** replace the hydraulic filter.

Every 800 hours—**If you are not using the recommended hydraulic fluid or have ever filled the reservoir with an alternative fluid,** replace the hydraulic filter.

⚠ WARNING

Hot hydraulic fluid can cause severe burns.

Allow the hydraulic fluid to cool before performing any maintenance to the hydraulic system.

Use a genuine Toro replacement filter (Part No. 86-3010).

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

1. Prepare the machine for maintenance; refer to Preparing for Maintenance (page 44).
2. Clean around the filter mounting area. Place a drain pan under the filter (Figure 92) and remove the filter.

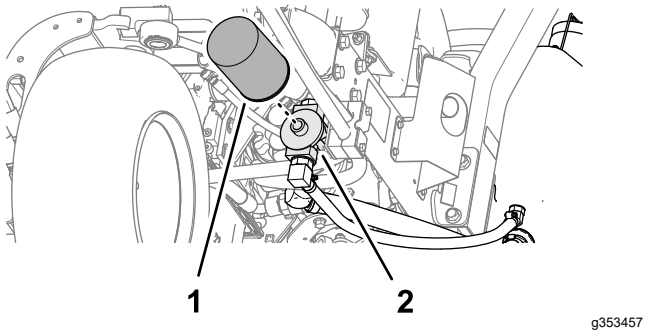


Figure 92

1. Hydraulic filter
2. Filter head

3. Lubricate the new filter gasket and fill the filter with hydraulic fluid.
4. Ensure that the filter mounting area is clean. Screw the filter on until the gasket contacts the mounting plate; then tighten the filter 1/2 turn.
5. Start the engine and let it run for about 2 minutes to purge air from the system. Shut off the engine and check for leaks.

Cutting Unit System Maintenance

Blade Safety

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

- Inspect the blades and bedknives periodically for excessive wear or damage.
- Use care when checking the blades. Wear gloves and use caution when servicing them. Only replace or backlap the blades and bedknives; never straighten or weld them.
- On machines with multiple cutting units, take care when rotating a cutting unit; it can cause the reels in the other cutting units to rotate.

Checking the Reel-to-Bedknife Contact

Service Interval: Before each use or daily

Check the reel-to-bedknife contact even if the quality of cut had been acceptable previously. There must be light contact across the full length of the reel and bedknife; refer to Adjusting Reel to Bedknife in the cutting unit operator's manual.

Backlapping the Cutting Units

⚠ WARNING

Contact with the cutting units or other moving parts can result in personal injury.

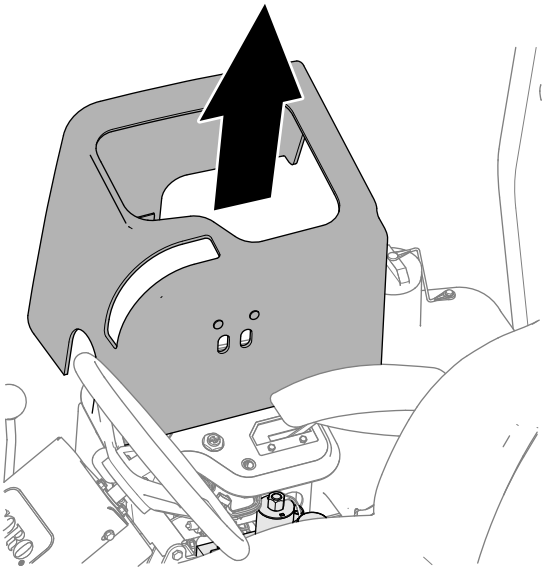
- **Keep your fingers, hands, and clothing away from the cutting units and other moving parts.**
- **Never attempt to turn the cutting units by hand or foot while the engine is running.**

Note: Additional instructions and procedures on backlapping are available in the Toro Reel Mower Basics (with sharpening guidelines), Form 09168SL.

Preparing the Machine

1. Prepare the machine for maintenance; refer to Preparing for Maintenance (page 44).
2. Make the initial reel-to-bedknife adjustments appropriate for backlapping; refer to the cutting unit *Operator's Manual*.

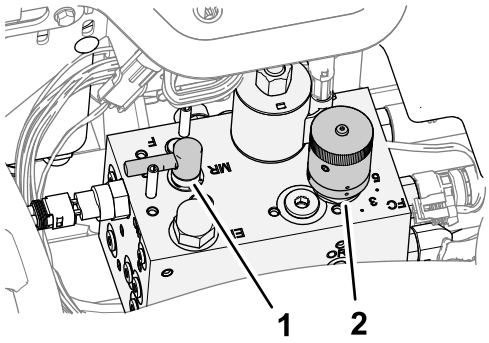
3. Lift the magnetically mounted console cover (Figure 93) to expose the mower manifold.



g353458

Figure 93

4. Move the backlap lever to the R (backlap) position (Figure 94).



g353378

Figure 94

1. Backlap control
2. Reel speed control

Lapping the Reels and Bedknife

⚠ DANGER

Changing the engine speed while backlapping may cause the cutting units to stall.

- **Never change the engine speed while backlapping**
- **Backlap only at idle engine speed.**

Note: The seat switch is bypassed when the backlap control is in the backlap position. You do not need to be in the seat, but the parking brake must be engaged for the engine to run.

1. Start the engine and allow it to run at low idle speed.
2. Press the cutting unit drive switch to the ENGAGE position.
3. Apply lapping compound to the reel with a long-handle brush.

⚠ DANGER

Contacting the cutting units when they are moving could cause personal injury.

To avoid personal injury, be certain that you are clear of the cutting units before proceeding.

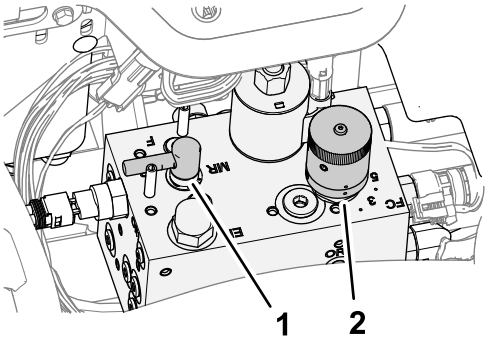
Important: **Never use a short-handled brush.**

4. If you need to make an adjustment to the cutting units while backlapping, perform the following steps:
   A. Press the cutting unit drive switch to the DISENGAGE position.
   B. Shut off the engine and remove the key.
   C. Adjust to the cutting units.
   D. Repeat steps 1 through 3.
5. Repeat steps 3 for the other cutting units that you want to backlap.

Finishing Backlapping

1. Press the cutting unit control switch to the DISENGAGE position.
2. Shut off the engine.
3. Move the backlap lever to the F (mow) position (Figure 95).

   Important: **If you do not change backlap lever to the F (mow) position after backlapping, the cutting units will not function properly.**



g353378

Figure 95

1. Backlap lever
2. Reel speed control knob

4. Assemble the console cover to the control console.

5. Wash all lapping compound off from the cutting units.
6. For a better cutting edge, run a file across the front face of the bedknife after lapping.

   Note: This removes any burrs or rough edges that may have built up on the cutting edge.

Cleaning

Washing the Machine

Wash the machine as needed using water alone or with a mild detergent. You may use a rag when washing the machine.

Important: **Do not use brackish or reclaimed water to clean the machine.**

Important: **Do not use power-washing equipment to wash the machine. Power-washing equipment may damage the electrical system, loosen important decals, or wash away necessary grease at friction points. Avoid excessive use of water near the control panel, engine, and battery.**

Important: **Do not wash the machine with the engine running. Doing so may result in internal engine damage.**

Storage

Storage Safety

- Before you leave the operator's position, do the following:
  - Park the machine on a level surface.
  - Disengage and lower the cutting units.
  - Engage the parking brake.
  - Shut off the engine and remove the key.
  - Wait for all movement to stop.
  - Allow the machine to cool before adjusting, servicing, cleaning, or storing it.
- Do not store the machine or fuel container where there is an open flame, spark, or pilot light, such as on a water heater or other appliance.

Preparing the Traction Unit

1. Park the machine on a level surface, lower the cutting units, engage the parking brake, shut off the engine, and remove the key.
2. Thoroughly clean the traction unit, cutting units, and the engine.
3. Check the tire pressure; refer to Checking the Tire Pressure (page 54).
4. Check all fasteners for looseness; tighten them as necessary.
5. Grease or oil all grease fittings and pivot points. Wipe up any excess lubricant.
6. Lightly sand and use touch-up paint on painted areas that are scratched, chipped, or rusted. Repair any dents in the metal body.
7. Service the battery and cables as follows; refer to Electrical System Safety (page 52):
   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 discard the oil filter. Install a new oil filter.
3. Fill the engine with specified motor oil.
4. Start the engine and run it at idle speed for approximately 2 minutes.
5. Shut off the engine and remove the key.
6. Flush the fuel tank with fresh, clean fuel.
7. Secure all 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 antifreeze protection and add a 50/50 solution of water and ethylene glycol antifreeze as needed for the expected minimum temperature in your area.

Storing the Battery

If you are storing the machine for more than 30 days, remove the battery and charge it fully. Either store it on the shelf or on the machine. Leave the cables disconnected if they are stored on the machine. Store the battery in a cool atmosphere to avoid quick deterioration of the charge in the battery. To prevent the battery from freezing, ensure that it is fully charged. The specific gravity of a fully charged battery is 1.265 to 1.299.

Troubleshooting

Using the Standard Control Module (SCM)

The Standard Control Module is a potted electronic device produced in a one-size-fits-all configuration. The module uses solid state and mechanical components to monitor and control standard electrical features required for safe product operation.

The module monitors inputs including neutral, parking brake, PTO, start, backlap, and high temperature. The module energizes outputs including PTO, Starter, and ETR (energize to run) solenoid.

The module is divided into inputs and outputs. Inputs and outputs are identified by green LED indicators mounted on the printed circuit board.

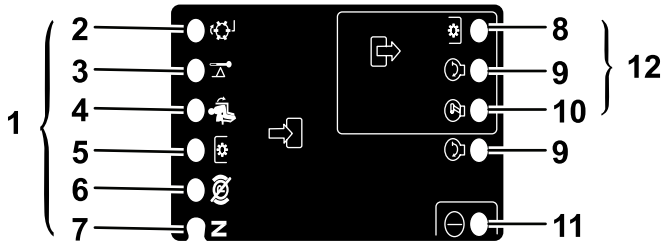
The start circuit input is energized by 12 VDC. All other inputs are energized when the circuit is closed to ground. Each input has a LED that is illuminated when the specific circuit is energized. Use the input LEDs for switch and input circuit troubleshooting.

Output circuits are energized by an appropriate set of input conditions. The 3 outputs include PTO, ETR, and START. Output LEDs monitor relay condition indicating the presence of voltage at 1 of 3 specific output terminals.

Output circuits do not determine output device integrity, so electrical troubleshooting includes output LED inspection and conventional device and wire harness integrity testing. Measure the disconnected component impedance, the impedance through wire harness (disconnect at SCM), or by temporarily ”test energizing” the specific component.

The SCM does not connect to an external computer or handheld device, cannot be re-programmed, and does not record intermittent fault troubleshooting data.

The decal on the SCM only includes symbols. Three LED output symbols are shown in the output box. All other LEDs are inputs. The chart below identifies the symbols.



g190826

Figure 96

1. Inputs
2. Backlap
3. High temperature
4. In seat
5. PTO switch
6. Parking brake off
7. Neutral
8. PTO
9. Start
10. ETR
11. Power
12. Outputs

Here are the logical troubleshooting steps for the SCM device.

1. Determine the output fault you are trying to resolve (PTO, START, or ETR).
2. Move the key switch to the ON position and ensure that the red power LED is illuminated.
3. Move all the input switches to ensure that all LEDs change state.
4. Position the input devices at the appropriate position to achieve the appropriate output. Use the following logic chart to determine the appropriate input condition.
5. If the specific output LED is illuminated without the appropriate output function, check the output harness, connections, and component. Repair as needed.
6. If the specific output LED is not illuminated, check both fuses.

7. If the specific output LED is not illuminated and the inputs are in the appropriate condition, install a new SCM and determine if the fault disappears.

Each row (across) in the logic chart that follows identifies input and output requirements for each specific product function. The product functions are listed in the left column. The symbols identify the specific circuit condition including energized to voltage, closed to ground, and open to ground.

Logic Chart

Function	INPUTS								OUTPUTS		
	Power ON	In Neutral	Start ON	Brake ON	PTO ON	In Seat	Hi Temp	Backlap	Start	ETR	PTO
Start	—	—	+	O	O	—	O	O	+	+	O
Run (Off Unit)	—	—	O	O	O	O	O	O	O	+	O
Run (On Unit)	—	O	O	—	O	—	O	O	O	+	O
Mow	—	O	O	—	—	—	O	O	O	+	+
Backlap	—	—	O	O	—	O	O	—	O	+	+
Hi Temp	—		O				—		O	O	O

- (–) Indicates a circuit closed to ground—LED ON.
- (O) Indicates a circuit open to ground or de-energized—LED OFF.
- (+) Indicates an energized circuit (clutch coil, solenoid, or start input)—LED ON.
- A blank indicates a circuit that is not involved with the logic.

To troubleshoot, turn on the key without starting the engine. Identify the specific function that does not work and work across the logic chart. Inspect the condition of each input LEDs to ensure that it matches the logic chart.

If the input LEDs are correct, check the output LED. If the output LED is illuminated but the device is not energized, measure the available voltage at the output device, the continuity of the disconnected device, and the potential voltage on the ground circuit (floating ground). Repairs will vary depending on your findings.

Notes:

Notes:

EEA/UK Privacy Notice

Toro's Use of Your Personal Information

The Toro Company ("Toro") respects your privacy. When you purchase our products, we may collect certain personal information about you, either directly from you or through your local Toro company or dealer. Toro uses this information to fulfil contractual obligations - such as to register your warranty, process your warranty claim or to contact you in the event of a product recall - and for legitimate business purposes - such as to gauge customer satisfaction, improve our products or provide you with product information which may be of interest. Toro may share your information with our subsidiaries, affiliates, dealers or other business partners in connection these activities. We may also disclose personal information when required by law or in connection with the sale, purchase or merger of a business. We will never sell your personal information to any other company for marketing purposes.

Retention of your Personal Information

Toro will keep your personal information as long as it is relevant for the above purposes and in accordance with legal requirements. For more information about applicable retention periods please contact legal@toro.com.

Toro's Commitment to Security

Your personal information may be processed in the US or another country which may have less strict data protection laws than your country of residence. Whenever we transfer your information outside of your country of residence, we will take legally required steps to ensure that appropriate safeguards are in place to protect your information and to make sure it is treated securely.

Access and Correction

You may have the right to correct or review your personal data, or object to or restrict the processing of your data. To do so, please contact us by email at legal@toro.com. If you have concerns about the way in which Toro has handled your information, we encourage you to raise this directly with us. Please note that European residents have the right to complain to your Data Protection Authority.

California Proposition 65 Warning Information

What is this warning?

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



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

What is Prop 65?

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

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

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

Does this law apply everywhere?

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

How do the California warnings compare to federal limits?

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

Why don't all similar products carry the warning?

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

Why does Toro include this warning?

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

The Toro Warranty

Two-Year or 1,500 Hours Limited Warranty

Conditions and Products Covered

The Toro Company warrants your Toro Commercial product (“Product”) to be free from defects in materials or workmanship for 2 years or 1,500 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
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*. Repairs for product issues caused by failure to perform required maintenance and adjustments are not covered under this warranty.

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.
- Product failures which result from failure to perform recommended maintenance and/or adjustments.
- Product failures which result from operating the Product in an abusive, negligent, or reckless manner.
- Parts consumed through use that are not 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, flow meters, and check valves.
- Failures caused by outside influence, including, but not limited to, weather, storage practices, contamination, use of unapproved fuels, coolants, lubricants, additives, fertilizers, water, or chemicals.
- 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.

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. Note: (Lithium-Ion battery only): Refer to the battery warranty for additional information.

Lifetime Crankshaft Warranty (ProStripe 02657 Model Only)

The Prostripe which is fitted with a genuine Toro Friction Disc and Crank-Safe Blade Brake Clutch (integrated Blade Brake Clutch (BBC) + Friction Disc assembly) as original equipment and used by the original purchaser in accordance with recommended operating and maintenance procedures, are covered by a Lifetime Warranty against engine crankshaft bending. Machines fitted with friction washers, Blade Brake Clutch (BBC) units and other such devices are not covered by the Lifetime Crankshaft Warranty.

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.

The Toro Company is not 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 Emissions 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.

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 your Authorized Toro Service Center.