



**Count on it.**

**Operator's Manual**

**30in Stand-On Aerator**

Model No. 23518—Serial No. 315000001 and Up

Model No. 29518—Serial No. 315000001 and Up

Model No. 33518—Serial No. 315000001 and Up

Model No. 39518—Serial No. 315000001 and Up



## ⚠ WARNING

### CALIFORNIA Proposition 65 Warning

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

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

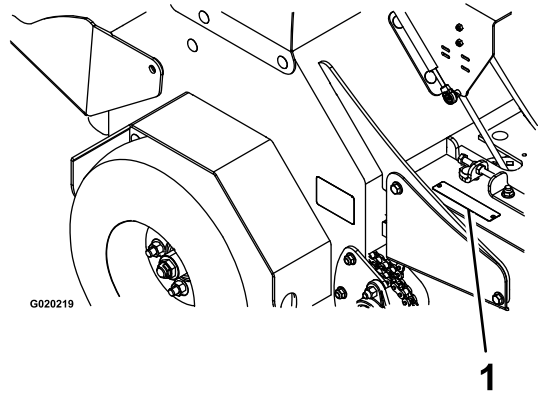


Figure 1

1. Location of the model and serial numbers

Model No. \_\_\_\_\_

Serial No. \_\_\_\_\_

This spark ignition system complies with Canadian ICES-002.

**Important:** This engine is not equipped with a spark arrester muffler. It is a violation of California Public Resource Code Section 4442 to use or operate the engine on any forest-covered, brush-covered, or grass-covered land. Other states or federal areas may have similar laws.

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

## Introduction

This aerator is intended to be used by trained operators in residential and commercial applications. It is primarily designed for aerating areas of well-maintained lawns on residential grounds, parks, sports fields, and on commercial grounds.

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

You may contact Toro directly at [www.Toro.com](http://www.Toro.com) for product and 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](#) illustrates the location of the model and serial numbers on the product. Write the numbers in the space provided.

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



Figure 2

1. Safety alert symbol

This manual uses 2 words to highlight information.

**Important** calls attention to special mechanical information and **Note** emphasizes general information worthy of special attention.

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# Safety

**Improper use or maintenance by the operator or owner can result in injury.** To reduce the potential for injury, comply with these safety instructions, and pay attention to the safety alert symbol, which means **Caution, Warning, or Danger**—“personal safety instruction.” **Failure to comply with the instructions may result in personal injury or death.**

## **▲ WARNING**

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

**Replace all parts including, but not limited to, tires, belts, and fuel system components with original Toro parts.**

**Important:** This machine was manufactured according to the appropriate regulatory standards in effect at the time of manufacture. **Modifying this machine in any way may cause it to be out of compliance with those standards and with the instructions in this Operator's Manual. Modifications to this machine should only be made by either the manufacturer or an Authorized Toro Dealer.**

This product is capable of injuring your hands and feet. Follow all safety instructions to avoid serious injury or death.

The owner/user can prevent and is responsible for accidents or injuries occurring to people, or damage to property.

Any use of this machine other than aerating turf grass could prove dangerous to the user and bystanders.

**Important:** The addition of attachments made by other manufacturers that do not meet ANSI certification may cause noncompliance of this machine.

## Safe Operating Practices

The following instructions are from ANSI standard B71.4-2012.

### Training

- Read the *Operator's Manual* and other training material.

**Note:** If the operator(s) or mechanic(s) cannot read the manual language, it is the owner's responsibility to explain this material to them.

- Become familiar with the safe operation of the equipment, operator controls, and safety signs.
  - All operators and mechanics should be trained. The owner is responsible for training the users.
  - Never let children or untrained people operate or service the equipment.
- Note:** Local regulations may restrict the age of the operator.
- The owner/user can prevent and is responsible for accidents or injuries occurring to himself or herself, other people, or damage to property.

### Preparation

- Evaluate the terrain to determine what accessories and attachments are needed to properly and safely perform the job. Only use accessories and attachments approved by the manufacturer.
- Wear appropriate clothing; including a hard hat, safety glasses, long pants, safety shoes (rubber boots, gloves, and hearing protection).

**Important:** Long hair, loose clothing or jewelry may get tangled in moving parts.

- Inspect the area where the equipment is to be used and ensure that all objects are removed from the area before use.
- Use extra care when handling fuels. They are flammable and vapors are explosive.
  - Use only an approved container.
  - Do not remove the fuel cap or add fuel with the engine running. Allow the engine to cool before refueling. Do not smoke near the machine when the engine is running.
  - Do not refuel or drain the machine indoors.
- Check that the operator's presence controls, safety switches, and shields are attached and functioning properly. Do not operate the machine unless they are functioning properly.

### Operation

- Lightning can cause severe injury or death. If lightning is seen, or thunder is heard in the area, do not operate the machine; seek shelter.
- Do not run an engine in an enclosed area.
- Only operate in well-lit areas, keeping away from holes and hidden hazards.
- Ensure that all drives are in neutral and that the parking brake is engaged before starting engine. Only start the engine from the operator's position.
- Make sure that you have good footing while using this machine, especially when backing up.

**Note:** Reduced footing could cause slipping.

- Slow down and use extra care on hillsides. Be sure to travel side to side on hillsides. Turf conditions can affect the stability of the machine. Use caution while operating near drop-offs.
- Slow down and use caution when making turns and when changing directions on slopes.
- Do not operate the machine without the shields or other guards securely in place. Be sure all interlocks are attached, adjusted properly, and functioning properly.
- Do not change the engine governor setting or overspeed the engine.
- Stop on level ground, disengage drives, engage the parking brake (if provided), shut off the engine before leaving the operator's position for any reason.
- Stop equipment and inspect the tines after striking objects or if an abnormal vibration occurs. Make the necessary repairs before resuming operations.
- Keep your hands and feet away from the tine assembly.
- Look behind and down before backing up to ensure a clear path.
- Keep pets and bystanders away from an operating machine.  
Stop the machine if anyone enters the area.
- Slow down and use caution when making turns and crossing roads and sidewalks. Fully raise the tines if you are not aerating.
- Do not operate the machine under the influence of alcohol or drugs.
- Use care when loading or unloading the machine into or from a trailer or truck.
- Use care when approaching blind corners, shrubs, trees, or other objects that may obscure vision.

## Safe handling of fuels

- To avoid personal injury or property damage, use extreme care in handling gasoline. Gasoline is extremely flammable and the vapors are explosive.
- Extinguish all cigarettes, cigars, pipes, and other sources of ignition.
- Use only an approved fuel container.
- Do not remove the fuel cap or add fuel with the engine running.
- Allow the engine to cool before fueling.
- Do not fuel the machine indoors.
- 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.
- Do not fill containers inside a vehicle, on a truck, or on a trailer bed with a plastic liner. Always place containers on the ground away from your vehicle before filling.

- Remove equipment from the truck or trailer and fuel it on the ground. If this is not possible, then add fuel with such equipment as a portable container, rather than from a fuel dispenser nozzle.
- Keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete. Do not use a nozzle lock open device.
- If fuel is spilled on clothing, change your clothing immediately.
- Do not overfill fuel tank. Replace fuel cap and tighten securely.

## Maintenance and Storage

- Do not allow untrained personnel to service machine.
- Do not touch equipment or attachment parts which may be hot from operation. Allow all of the parts of the machine to cool before attempting to maintain, adjust, or service the machine.
- Keep hands and feet away from moving parts. If possible, do not make adjustments with the engine running.
- Disengage the drives, raise the tines, set the parking brake, stop engine, and remove key or disconnect spark-plug wire. Wait for all movement to stop before adjusting, cleaning or repairing.
- Disconnect the battery or remove the spark-plug wire before making any repairs. Disconnect the negative terminal first and the positive terminal last. Reconnect the positive first and negative last.
- Use care when checking the tines. Wrap the tine(s) or wear gloves, and use caution when servicing them. Only replace tines; do not straighten or weld them.
- Clean grass, dirt, and debris from the tines, drives, mufflers, and engine to help prevent fires.
- Clean up oil or fuel spillage.
- Park machine on level, hard ground. Never allow untrained personnel to service machine.
- Use jack stands to support components when required.
- Carefully release pressure from components with stored energy.
- Do not store fuel near flames or drain indoors.
- Let the engine cool before storing.
- Keep all parts in good working condition and all hardware tightened. Replace all worn or damaged decals.

## Hauling

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

# Aerator Safety

The following list contains safety information specific to Toro products and other safety information you must know.

## General Operation

- Check carefully for overhead clearances (i.e. branches, doorways, electrical wires, etc.) before operating under any objects, and do not contact them.
- Use caution when you are riding on the platform and driving the machine over curbs, rocks, roots, or other obstructions.
- Do not jerk the controls; use a steady motion.
- Do not carry passengers.
- Do not carry equipment on the machine.

## Slope Operation

Use extreme caution when aerating and/or turning on slopes as loss of traction and/or tip-over could occur. The operator is responsible for safe operation on slopes.

- Use [Figure 3](#) to help you determine the appropriate slope angle of area to aerate
- Remove or mark obstacles such as rocks, tree limbs, etc. from the aerating area.
- Watch for holes, ruts or bumps.

**Note:** Tall grass can hide obstacles.

- Use caution near drop-offs, ditches, or embankments.

**Note:** The machine could suddenly turn over if a wheel goes over the edge of a cliff or ditch, or if an edge caves in.

- Be aware that operating on wet grass, across steep slopes or downhill may cause the machine to lose traction. Loss of traction to the drive wheels may result in sliding and a loss of braking and steering.
- Do not aerate slopes greater than 15 degrees.
- Avoid sudden starts and stops when aerating uphill because the machine may tip backward.

**Note:** The machine is more stable going uphill with the tines raised.

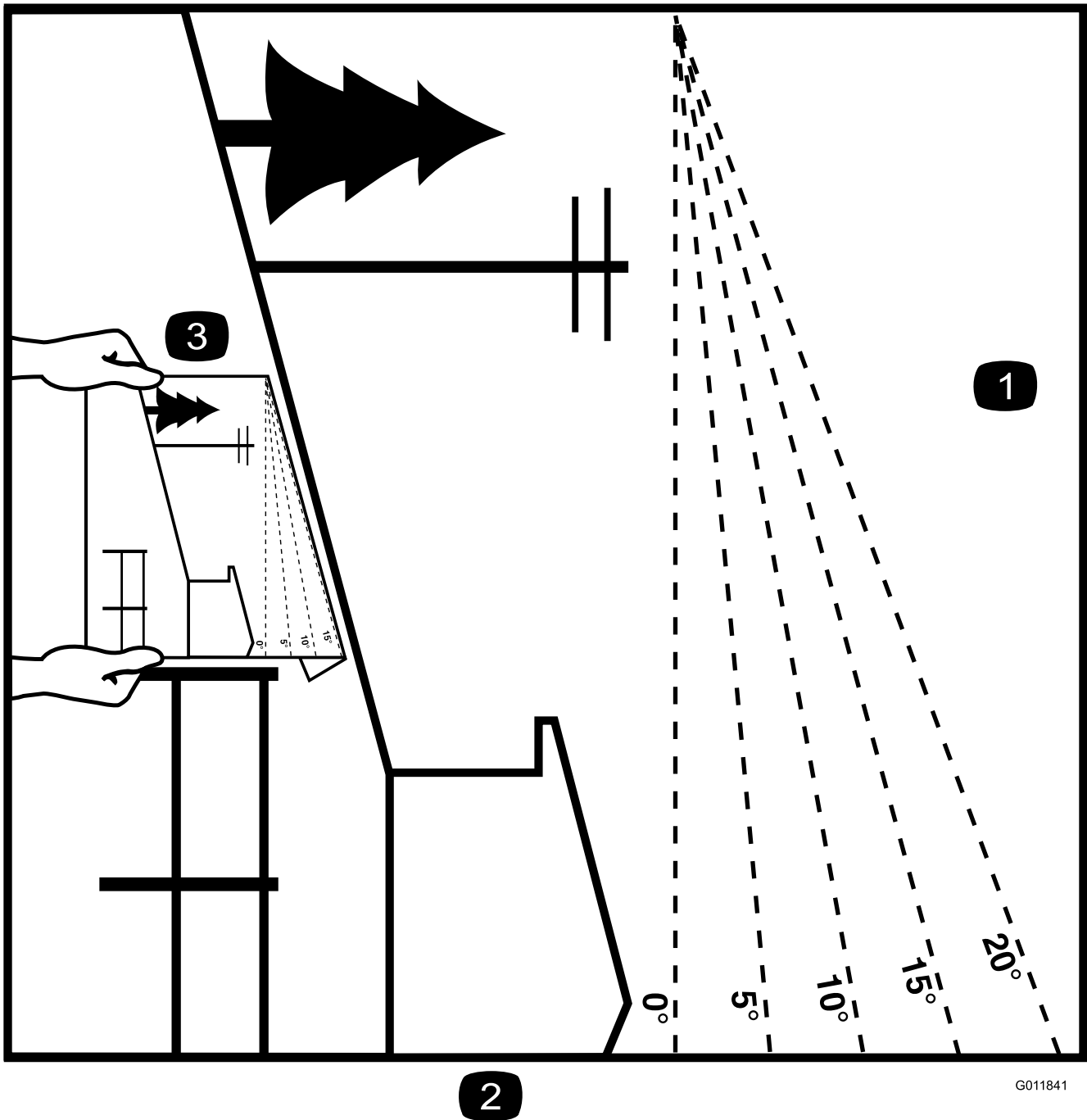
- Keep all movement on slopes slow and gradual.
- Do not make sudden changes in speed or direction.
- Reduce the tine-down pressure to prevent the drive tires from raising off the ground and to prevent the front tires from raising off the ground while aerating uphill.
- Follow the manufacturer's recommendations for wheel weights or counter weights to improve stability.
- Use extra care with attachments.

**Note:** Use of attachments can change the stability of the machine.

## Service

- To best protect your investment and maintain optimal performance of your Toro equipment, count on Toro genuine parts. When it comes to reliability, Toro delivers replacement parts designed to the exact engineering specifications of our equipment. For peace of mind, insist on Toro genuine parts.
- Never remove or tamper with safety devices. Check their proper operation regularly. Never do anything to interfere with the intended function of a safety device or to reduce the protection provided by a safety device.
- Check brake operation frequently. Adjust and service as required.

# Slope Indicator



2

G011841

Figure 3

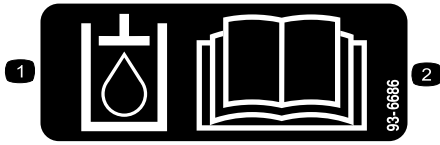
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1. The maximum slope you can safely operate the machine on is **15 degrees**. Use the slope chart to determine the degree of slope of hills before operating. **Do not operate this machine on a slope greater than 15 degrees**. Fold along the appropriate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

# Safety and Instructional Decals

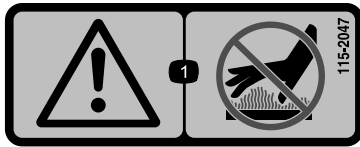


Safety decals and instructions are easily visible to the operator and are located near any area of potential danger. Replace any decal that is damaged or lost.



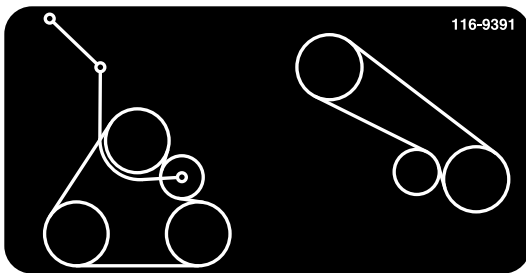
93-6686

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



115-2047

1. Warning—do not touch the hot surface.



116-9391

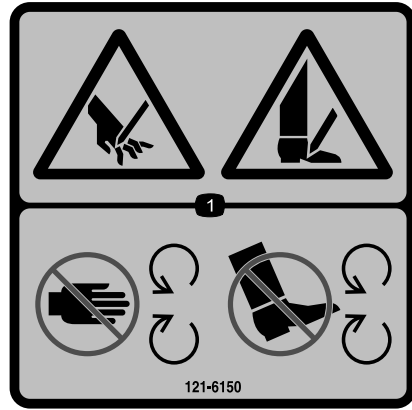
**CALIFORNIA SPARK ARRESTER WARNING**  
 Operation of this equipment may create sparks that can start fires around dry vegetation. A spark arrester may be required. The operator should contact local fire agencies for laws or regulations relating to fire prevention requirements. 117-2718

117-2718



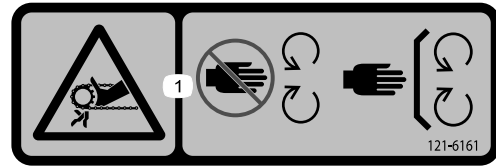
120-9570

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



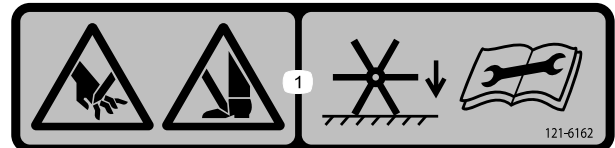
121-6150

1. Cutting hazard of hand and foot—stay away from moving parts.



121-6161

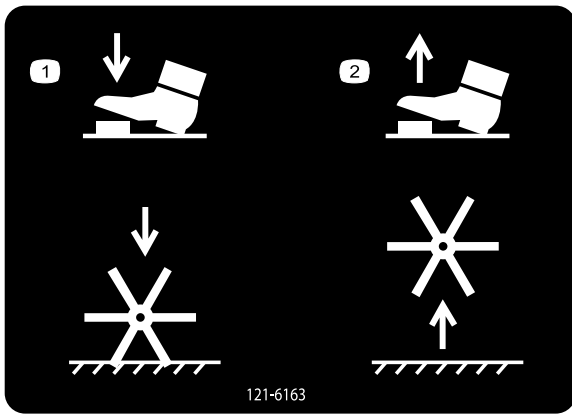
1. Entanglement hazard, belt—stay away from moving parts; keep all guards in place.



121-6162

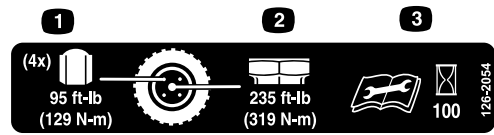
1. Cutting/dismemberment hazard of hand or foot—lower the tines to the ground; read the *Operator's Manual* for disassembly procedure.





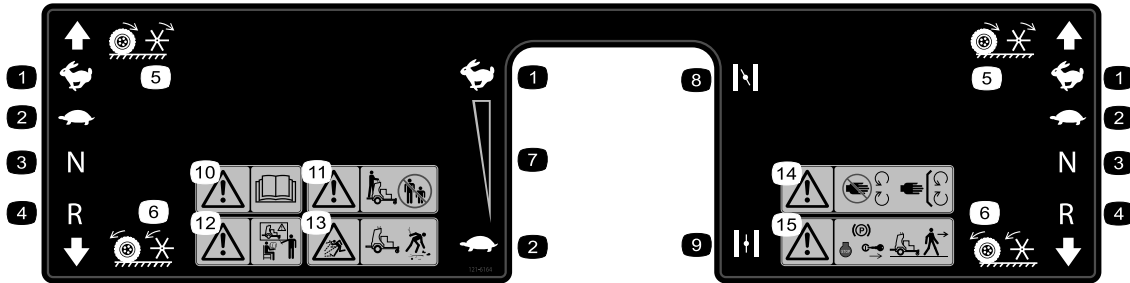
121-6163

1. Press to lower the tines.
2. Release to raise the tines.



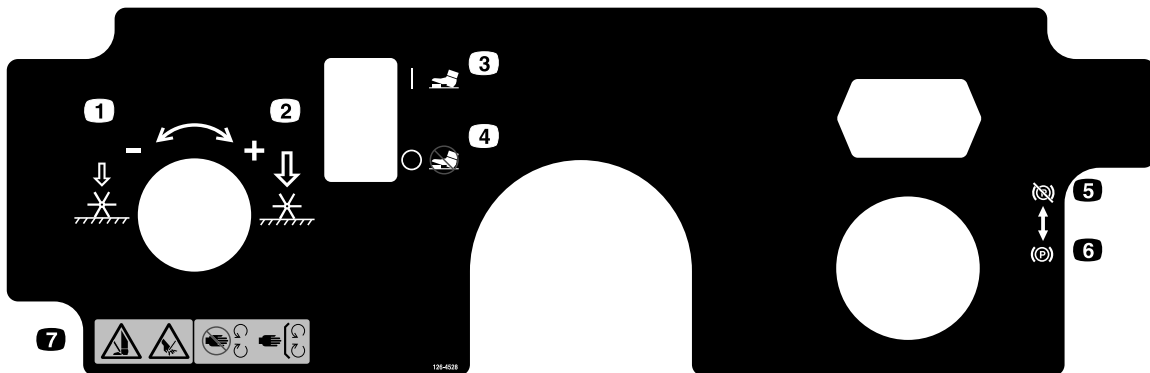
126-2054

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



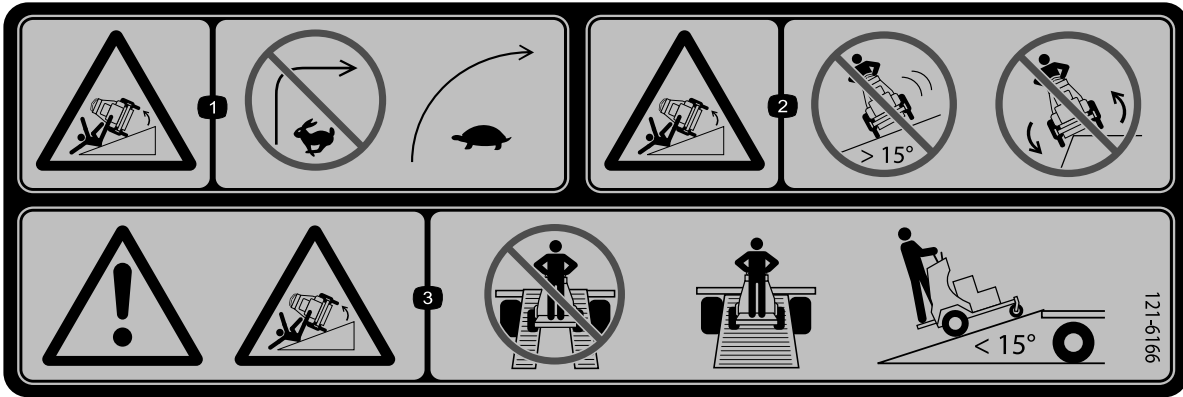
121-6164

- |  |   |  |
|--|---|--|
| 1. Fast  | 6. Wheels and tines rotate when moving backward | 11. Warning—keep bystanders a safe distance from the machine.  |
| 2. Slow  | 7. Continuous variable setting                  | 12. Warning—do not operate the machine unless you are trained.   |
| 3. Neutral                                     | 8. Choke—on                                     | 13. Thrown object hazard—pick up debris before operating the machine.  |
| 4. Reverse                                     | 9. Choke—off                                    | 14. Warning—keep away from moving parts; keep all guards in place.   |
| 5. Wheels and tines rotate when moving forward | 10. Warning—read the <i>Operator's Manual</i> . | 15. Warning—stop the engine, engage the parking break, and remove the ignition key before leaving the machine. |



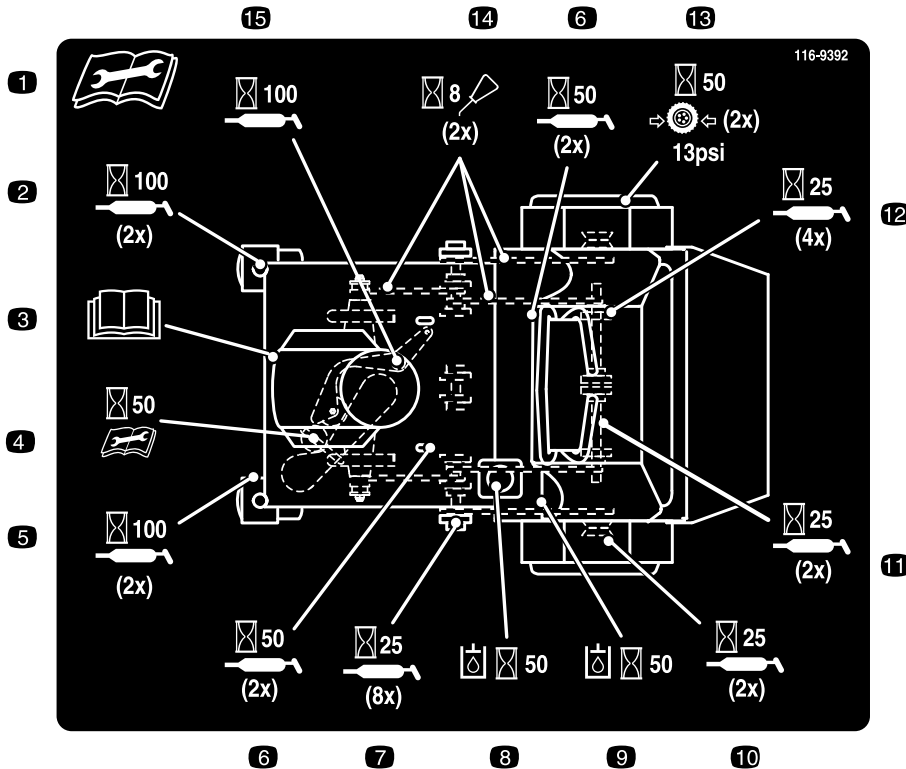
126-4528

- |   |  |
|---|--|
| 1. Rotate counterclockwise to decrease pressure | 5. Parking brake - release   |
| 2. Rotate clockwise to increase pressure        | 6. Parking brake - engage  |
| 3. On - tine ground engagement foot switch      | 7. Cutting/dismemberment hazard of hand or foot, tines—stay away from moving parts; keep all guards in place |
| 4. Off - tine ground engagement foot switch     |  |



121-6166

1. Tipping hazard—do not turn sharply while travelling fast; slow down and turn gradually.
2. Tipping hazard—do not operate the machine on slopes greater than 15 degrees; do not operate the machine near drop-offs.
3. Warning; tipping hazard—do not use split ramps; use full width ramps to load a machine for transport; use a loading ramp at a maximum of 15 degrees.



116-9392

1. Read the instructions before servicing or performing maintenance; read the *Operator's Manual* for information on lubricating the machine.

# Setup

## Media and Additional Parts

Description	Qty.	Use
Operator's Manual	1	Read before operating the machine.
Key	2	Start the machine.

# 1

## Checking Tire Pressure

### No Parts Required

### Procedure

1. Check the tire pressure in the drive tires.

**Note:** Proper inflation for drive tires is 83 to 97 kPa (12 to 14 psi).

2. Adjust the tire pressure if necessary.

# 2

## Servicing the Battery

### No Parts Required

### Procedure

#### **⚠ WARNING**

#### **CALIFORNIA Proposition 65 Warning**

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

#### **⚠ DANGER**

Charging or jump starting the battery may produce explosive gases. Battery gases can explode causing serious injury.

- Keep sparks, flames, or cigarettes away from battery.
- Ventilate when charging or using battery in an enclosed space.
- Make sure that the venting path of battery is always open once the battery is filled with acid.
- Always shield eyes and face from battery.

#### **⚠ DANGER**

Battery electrolyte contains sulfuric acid, which is poisonous and can cause severe burns. Swallowing electrolyte can be fatal or if it touches skin can cause severe burns.

- Wear safety glasses to shield your eyes and rubber gloves to protect your skin and clothing when handling electrolyte.
- Do not swallow electrolyte.
- In the event of an accident, flush with water and call a doctor immediately.

**Note:** The machine is shipped with a filled, lead-acid battery.

1. Move the ignition switch to the Off position and remove the key.
2. Measure the voltage of the battery with a voltmeter.
3. Use the table below to locate the charge state or the battery, and if needed, the battery-charger setting and charging interval recommended to charge the battery to 12.6 volts or greater; refer to the battery charge table below.

**Important:** Make sure that the negative battery cable is disconnected and the battery charger used for charging the battery has an output of 16 volts and 7 amps or less to avoid damaging the battery (see chart for recommended charger settings).

### Battery Charge Table

Voltage Reading	Percent Charge	Maximum Charger Settings	Charging Interval
12.6 or greater	100%	16 volts/ 7 amps	No Charging Required
12.4 – 12.6	75–100%	16 volts/ 7 amps	30 Minutes
12.2 – 12.4	50–75%	16 volts/ 7 amps	1 Hour
12.0–12.2	25–50%	14.4 volts/ 4 amps	2 Hours
11.7–12.0	0–25%	14.4 volts/ 4 amps	3 Hours
11.7 or less	0%	14.4 volts/ 2 amps	6 Hours or More

### ⚠ CAUTION

If the ignition is in the On position there is potential for sparks and engagement of components. Sparks could cause an explosion or moving parts could accidentally engage causing personal injury.

**Be sure ignition switch is in the Off position before charging the battery.**

4. If the positive cable is also disconnected, connect the **positive (red) cable** to the positive battery terminal and slip terminal cover over the positive terminal.
5. Remove the screw, washer, and ground cable from the engine. Connect the negative battery cable as shown in [Figure 4](#).

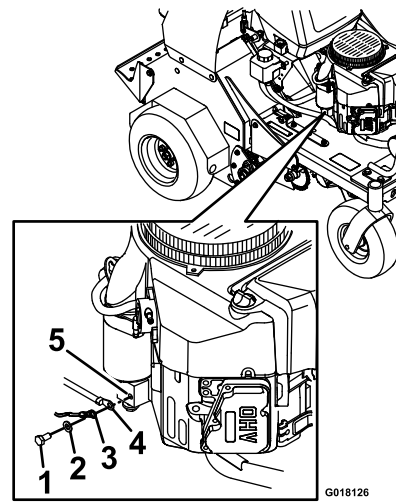


Figure 4

1. Screw
2. Washer
3. Ground wire
4. Negative battery cable
5. Engine

**Note:** If time does not permit charging the battery or if charging equipment is not available, connect the negative battery cables and run the vehicle continuously for 20 to 30 minutes to charge the battery.

## 3

## Servicing the Engine Oil

### No Parts Required

### Procedure

The engine is shipped with oil; check engine-oil level and, if necessary, add to the appropriate level. Refer to [Checking the Engine-Oil Level \(page 17\)](#) for instructions and the oil specification.

# 4

## Servicing the Transmission Oil

### No Parts Required

### Procedure

Transmission oil type: Toro Hypr-oil 500

The machine is shipped with hydraulic oil in the expansion tank.

1. Run the machine for approximately 15 minutes to allow any extra air to purge out of the hydraulic system.
2. Shut off the engine and allow the machine to cool off.
3. Check the hydraulic-oil level in the expansion tank (Figure 5).

**Note:** The transmission-oil level should cover the Full Cold line molded into the side of the tank.

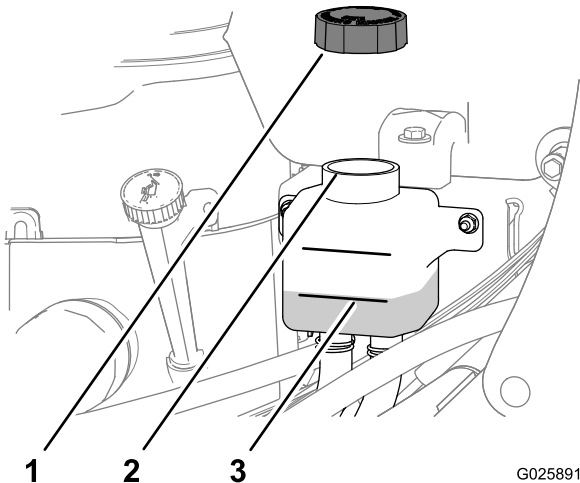


Figure 5

- |                                 |                   |
|---------------------------------|-------------------|
| 1. Cap                          | 3. Full Cold line |
| 2. Filler neck (expansion tank) |                   |

- 
4. If necessary, add the specified transmission oil until the oil level is at the Full Cold line of the expansion tank (Figure 5).
  5. Replace cap onto the expansion-tank and tighten the cap until it is snug.

**Note:** Do not overtighten expansion-tank cap.

# 5

## Servicing the Auxiliary Hydraulic Oil

### No Parts Required

### Procedure

Hydraulic oil type: AW-32 hydro oil

**Note:** The machine is shipped with hydraulic oil in the reservoir.

1. Run the machine for approximately 15 minutes to allow any extra air to purge out of the hydraulic system.
2. Completely raise and lower tines 3 times to purge the air.
3. Shut off the engine and allow the machine to cool down.
4. Loosen the 4 bolts inside the frame securing the pad to the machine.
5. Lift the pad up and back to remove it (Figure 6).

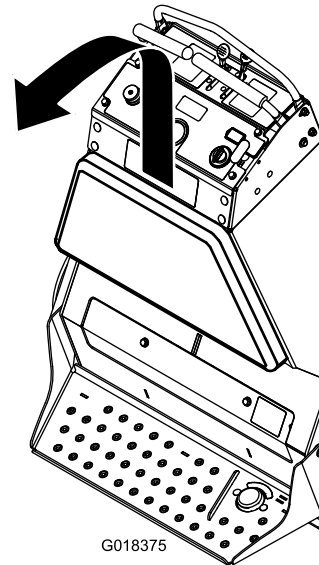
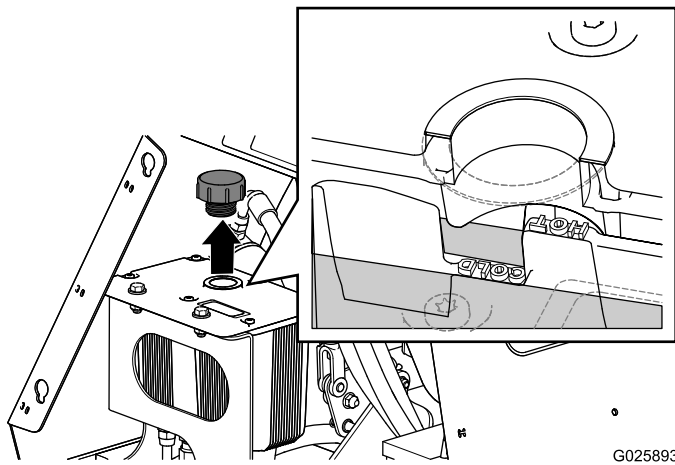


Figure 6

- 
6. Remove the cap and check hydraulic oil level in the reservoir (Figure 7).

**Note:** The hydraulic oil level should cover the word **Cold** that is embossed into the baffle of the reservoir.



**Figure 7**

G025893

1. Cold oil level
2. Hot oil level

7. If necessary, add the specified hydraulic oil to the reservoir until the oil covers the **Cold** oil level on the baffle (Figure 7).

**Note:** The baffle in the reservoir is labeled **Hot** and **Cold**. You will fill the reservoir to the appropriate level depending upon the temperature of the oil. The oil level will vary with the temperature of the oil. The **Cold** level shows the level of the oil when it is at 24°C (75°F). The **Hot** level shows the level of oil when it is at 107°C (225°F).

For example: If the oil is at ambient-air temperature (about 24°C (75° F)), fill only to the **Cold** level. If the oil is about 65°C (150° F), fill to halfway between the **Hot** and **Cold** levels.

8. Replace hydraulic reservoir cap and tighten until snug (Figure 7).
9. Install the pad that you removed in steps 4 and 5 top the frame, and tighten the 4 bolts to 1978 to 2542 N-cm (175 to 225lb-in).

**Note:** Do not overtighten the reservoir cap.

# 6

## Removing Cylinder Stop (for Model 33518)

### No Parts Required

### Procedure

**Note:** The tines must be in the raised position before removing the cylinder stop. Running the engine will charge the hydraulic system and raise the tines.

1. Add a small amount of fuel to the fuel tank; refer to [Adding Fuel \(page 18\)](#).

2. Open the fuel-shutoff valve by aligning the lever for the fuel-shutoff valve with the fuel line; refer to [Opening the Fuel Shut-off Valve \(page 21\)](#).
3. Move the traction-control levers to the neutral position and set the parking brake; refer to [Traction-Control Levers \(page 15\)](#).
4. Place the throttle midway between the Slow and Fast positions; refer to [Throttle Lever \(page 15\)](#).
5. Push forward the choke lever to set the choke to the On position; refer to [Choke Lever \(page 15\)](#).
6. Turn the ignition switch to the Start position; refer to [Ignition Switch \(page 16\)](#).

**Note:** Release the switch as soon as the engine starts.

**Important:** Do not crank the engine continuously for more than 10 seconds at a time. If the engine does not start, allow a 60 second cool-down period between starting attempts. Failure to follow these guidelines can burn out the starter motor.

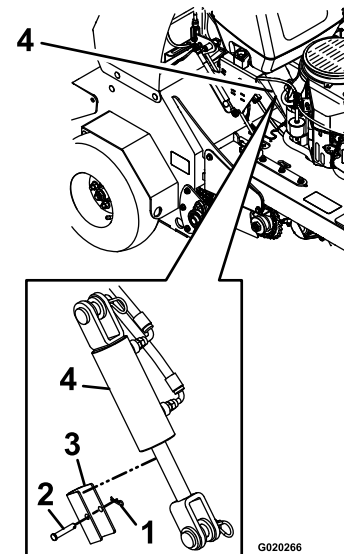
7. Gradually move the lever for the choke lever to the Off position as the engine warms up.

**Note:** Allow the engine to run an additional 30 seconds

8. Turn the ignition switch to the Off position to stop the engine.
9. Remove the key and pull the wires off of the spark plugs.

**Note:** Push the wires aside so they do not accidentally contact the spark plugs.

10. Remove and retain the hairpin, clevis pin, and cylinder stop as shown in Figure 8.



**Figure 8**

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1. Hairpin
2. Clevis pin
3. Cylinder stop
4. Cylinder

11. Replace the spark-plug wires.

# Product Overview

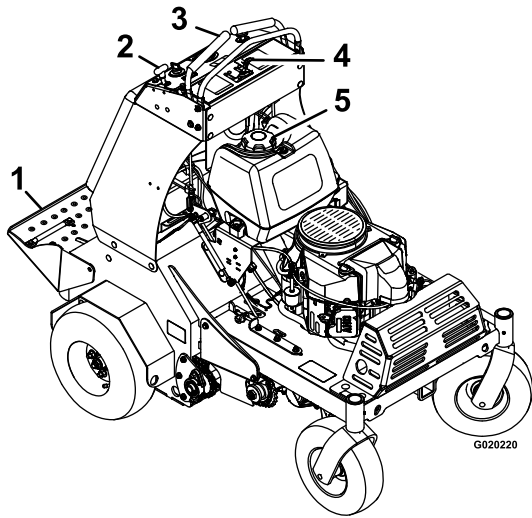


Figure 9

- |                            |                    |
|----------------------------|--------------------|
| 1. Platform                | 4. Engine controls |
| 2. Parking-brake knob      | 5. Fuel cap        |
| 3. Traction-control levers |                    |

## Controls

### Traction-Control Levers

The traction-control levers are located on each side of the top console, and control the forward and reverse motion of the machine.

Move the levers forward or backward to control the drive wheel on the same side forward or reverse respectively. The wheel speed is proportional to the amount the lever is moved.

**Important:** The tines rotate when the traction-control levers are moved out of the Neutral position.

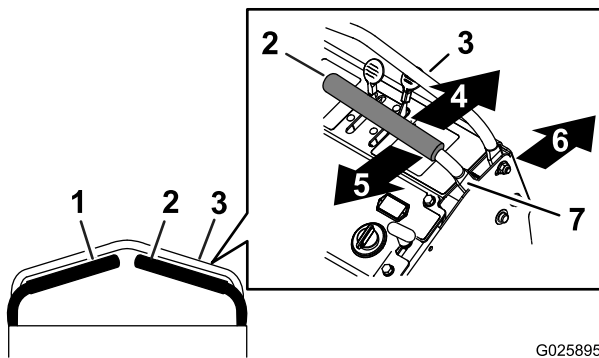


Figure 10

- |                                      |                         |
|--------------------------------------|-------------------------|
| 1. Left hand traction-control lever  | 5. Reverse              |
| 2. Right hand traction-control lever | 6. Front of the machine |
| 3. Front reference bar               | 7. Neutral              |
| 4. Forward                           |                         |

## Tine-Pressure Control

The tine-pressure control is located on the left side of the control console (Figure 11).

Use the ties-pressure control to adjust the downward pressure on the tines and core depth. Rotate the control counterclockwise to decrease the pressure and the length of the aeration plug; rotate clockwise to increase pressure and increase the length of the aeration plug.

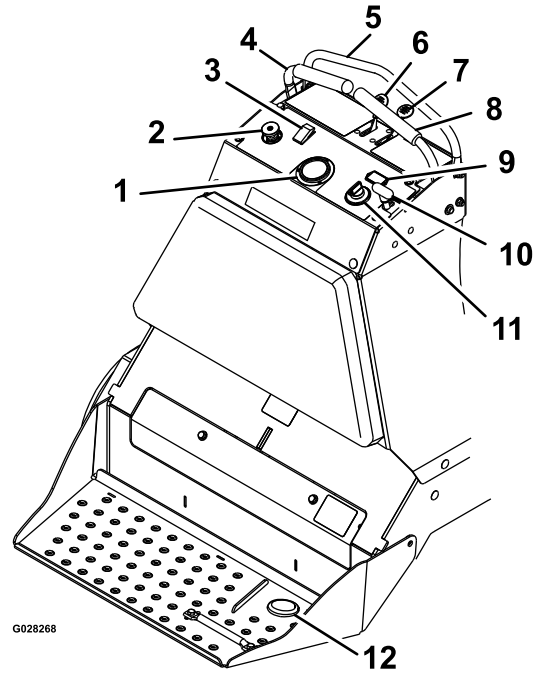


Figure 11

- |  |  |
|--|--|
| 1. Tine down pressure gauge                  | 7. Choke                               |
| 2. Tine down pressure control                | 8. RH Motion control lever             |
| 3. On/Off-Tine ground engagement foot switch | 9. Hour meter                          |
| 4. LH Motion control lever                   | 10. Park brake                         |
| 5. Front reference bar                       | 11. Ignition switch                    |
| 6. Throttle                                  | 12. Tine ground engagement foot switch |

### Throttle Lever

The throttle lever (Figure 11) is located on the control console (red lever).

Use the throttle lever to control engine speed. Move the throttle lever forward to increase engine speed; moving the throttle lever to the rearward to decrease engine speed.

**Note:** Move the throttle lever forward into the detent for full throttle.

### Choke Lever

The choke lever (Figure 11) is located on the control console (black lever).

Use the choke lever is used to aid in starting a cold engine. Move the choke lever forward to set the choke to the On position; move the choke lever to the rearward to reduce the choke.

**Note:** Pull the choke lever back into the detent to set the choke to the Off position.

**Note:** Do not run a warm engine with choke in the On position.

## Parking-Brake Handle

The parking-brake handle is located on the control console, to the right of the ignition switch (Figure 11).

**Note:** The brake handle sets a parking brake in each of the transmissions.

- To set the brake, pull handle out and slide it rearward.
- To release, push the handle forward into the detent.

When parking on a steep slope, the wheels must be chocked or blocked in addition to the brake being set. The machine must be tied down and brake set when transporting.

## Hour Meter

The hour meter is located above the ignition switch (Figure 11).

The hour meter displays the total number of hours that you have run the machine.

## Ignition Switch

The ignition switch is located on the right side of the control console (Figure 11).

Use the ignition switch is used to start and stop the engine. The switch has 3 positions: Off, On, and Start (Figure 12).

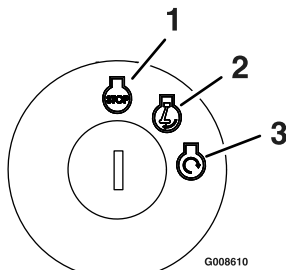


Figure 12

1. Off
2. On
3. Start

## On/Off Tine Ground Engagement Foot Switch

Located above the tine down pressure control on the control console.

Push down on the top of the switch to enable the tines ground engagement foot switch. Push down on the rear of the switch to disable the foot switch..

## Tine-Pressure Gauge

The tine-pressure gauge is located in the middle of the control console (Figure 11).

The tine-pressure gauge to indicates the downward pressure the machine exerts on the tines when aerating.

## Tines-Elevation Switch

**Keep hands and feet away from the tines. Make sure the tines area is clear of any obstructions before lowering it.**

The tine-elevation switch is located on the operator platform (Figure 11).

To lower the tines into the ground, stand on the tine-elevation switch. To raise the tines, remove your foot from the switch.

## Fuel Shut-Off Valve

The fuel shut-off valve is located behind the engine and under the fuel tank (Figure 13).

Use the fuel-shutoff valve to shut off the fuel when the machine will not be used for a few days, when transporting the machine to and from the jobsite, or when the machine is parked inside a building.

- To open for fuel shut-off valve, rotate the handle of the fuel shut-off valve until it is aligned with the fuel line.
- To close the fuel shut-off valve, rotate the handle 90° to the fuel line.

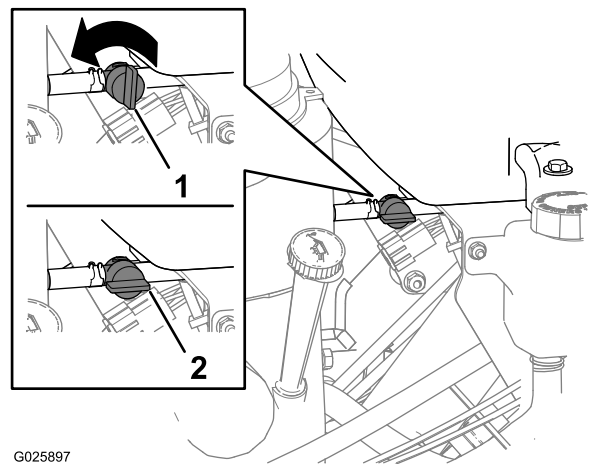


Figure 13

1. Off position
2. On position



## Specifications

Height	132.1 cm (52 inches)
Length	162.6 cm (64 inches)
Width	121.3 cm (47.75 inches)
Aeration Width	76.2 cm (30 inches)
Coring range	5.1–12.7 cm (2–5 inches)
Weight	460 kg (1,015 lb )

## Operation

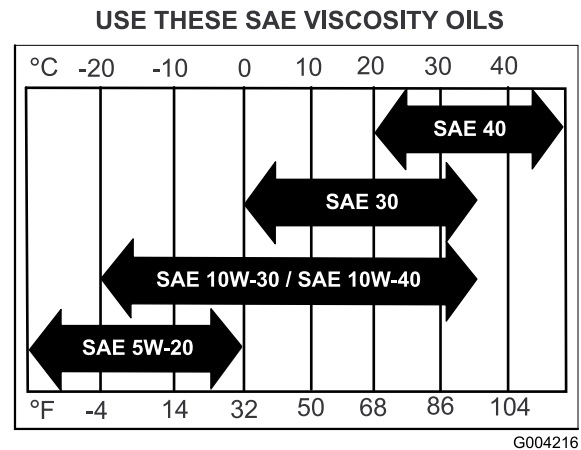
**Note:** Determine the left and right sides of the machine from the normal operating position.

## Checking the Engine-Oil Level

**Service Interval:** Before each use or daily

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

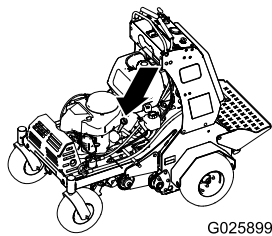
**Oil viscosity:** Refer to the table below.



**Figure 14**

**Important:** Do not operate the engine with the oil level below the Low (or Add) mark on the dipstick, or over the Full mark.

1. Stop the engine, remove the key, and wait for all moving parts to stop before leaving the operating position
2. Allow the engine to cool.
3. Check the engine-oil level as shown in [Figure 15](#).



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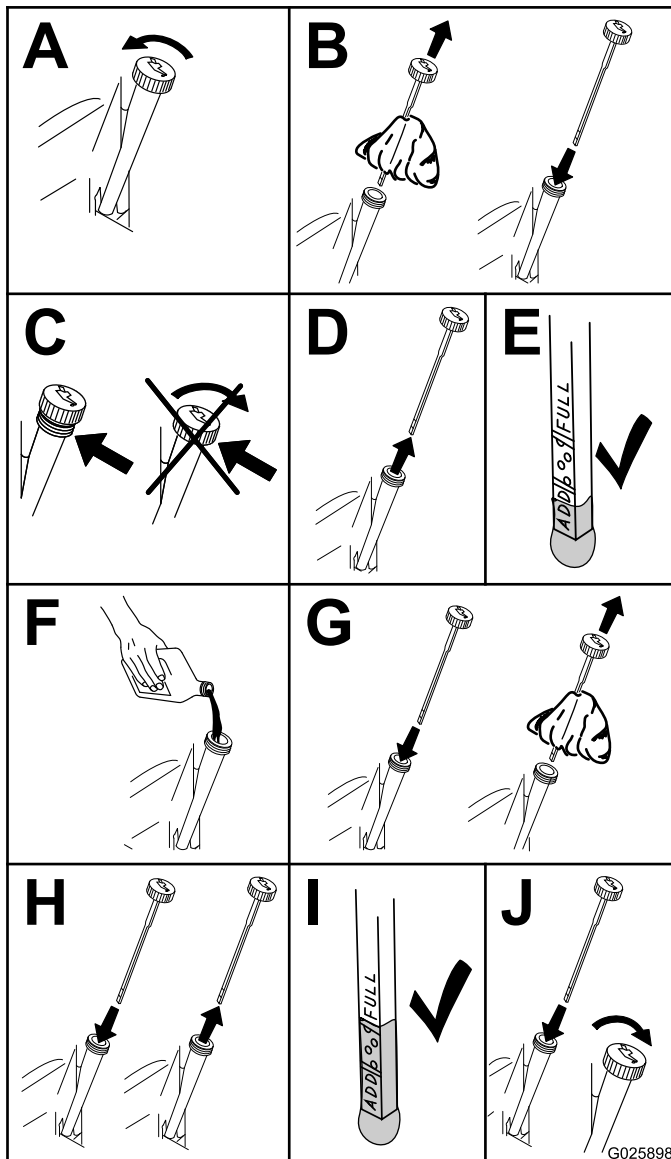


Figure 15

- If the oil level is low, wipe off the area around the oil fill cap, remove cap and add the specified oil until the oil level is at the Full mark on the dipstick.

**Note:** Do not overfill the engine with oil.

## Adding Fuel

**Fuel tank capacity:** 18.9 l (5 US Gallons)

- For best results, use only clean, fresh (less than 30 days old), unleaded gasoline with an octane rating of 87 or higher ((R+M)/2 rating method).
- ETHANOL:** Gasoline with up to 10% ethanol (gasohol) or 15% MTBE (methyl tertiary butyl ether) by volume is acceptable. Ethanol and MTBE are not the same. Gasoline with 15% ethanol (E15) by volume is not approved for use. Never use gasoline that contains more than 10% ethanol by volume, such as E15 (contains 15% ethanol), E20 (contains 20% ethanol), or E85 (contains up to 85% ethanol). Using unapproved gasoline may cause performance problems and/or engine damage which may not be covered under warranty.
- Do not use gasoline containing methanol.
- Do not store fuel either in the fuel tank or fuel containers over the winter unless a fuel stabilizer is used.
- Do not add oil to gasoline

### ⚠ DANGER

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

- Fill the fuel tank outdoors, in an open area, and when the engine is cold. Wipe up any gasoline that spills.
- Do not fill the fuel tank completely full. Add gasoline to the fuel tank until the level is 6 to 13 mm (1/4 to 1/2 inch) below the bottom of the filler neck. This empty space in the tank allows the gasoline to expand.
- Never smoke when handling gasoline, and stay away from an open flame or where a spark may ignite the gasoline fumes.
- Store gasoline in an approved fuel container and keep it out of the reach of children.
- Never buy more than a 30-day supply of gasoline.

## **⚠ DANGER**

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

- Always place gasoline containers on the ground away from your vehicle before filling.
- Do not fill gasoline containers inside a vehicle or on a truck or trailer bed because interior carpets or plastic truck bed liners may insulate the container and slow the loss of any static charge.
- When practical, remove gas-powered equipment from the truck or trailer and refuel the equipment with its wheels on the ground.
- If this is not possible, then refuel such equipment on a truck or trailer from a portable container, rather than from a gasoline dispenser nozzle.
- If a gasoline dispenser nozzle must be used, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete.

## **⚠ WARNING**

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

- Avoid prolonged breathing of vapors.
- Keep face away from nozzle and gas tank or conditioner bottle opening.
- Avoid contact with skin; wash off spillage with soap and water.

## **Using Stabilizer/Conditioner**

Use a fuel stabilizer/conditioner in the machine to provide the following benefits:

- Keeps gasoline fresh during storage of 90 days or less. For longer storage it is recommended that the fuel tank be drained.
- Cleans the engine while it runs
- Eliminates gum-like varnish buildup in the fuel system, which causes hard starting

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

Add the correct amount of gas stabilizer/conditioner to the gas.

**Note:** A fuel stabilizer/conditioner is most effective when mixed with fresh gasoline. To minimize the chance of varnish deposits in the fuel system, use fuel stabilizer at all times.

## **Fueling the Machine**

1. Clean around the fuel tank cap.
2. Remove the cap from the tank.
3. Fill the fuel tank with unleaded gasoline to within 6 to 13 mm (1/4 to 1/2 inch) from the top of the tank. **Do not fill into the filler neck.**

**Important:** Do not fill the tank more than 6 mm (1/4 inch) from the top of the tank because the gasoline must have room to expand.

4. Install the fuel tank cap and wipe up any spilled gasoline.

## **Lubricating the Chains**

### **Checking the Condition of the Sprockets**

**Service Interval:** Before each use or daily

1. Stop engine, set the parking brake, wait for all moving parts to stop, and remove key.
2. Inspect sprockets for wear and replace as required (Figure 16).

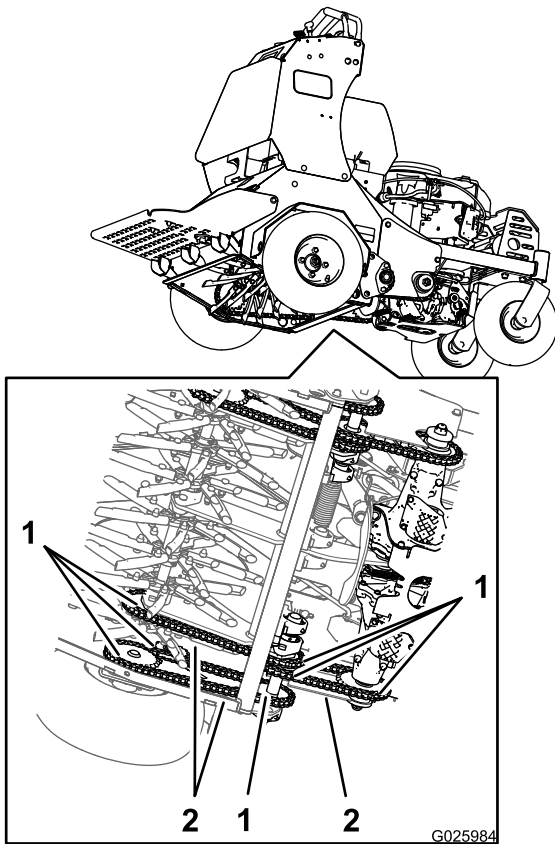


Figure 16

1. Sprockets

2. Chains

## ⚠ CAUTION

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

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

3. Start engine and move throttle level ahead to 1/2 throttle position.

## ⚠ WARNING

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

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

4. Release the parking brake.
5. With the engine running, slowly move the traction-control levers forward and lubricate all six chains (Figure 16).
6. Check the condition and tension of the chains; refer to [Checking the Condition of the Chains](#) (page 20).

## Checking the Condition of the Chains

**Service Interval:** Before each use or daily

1. Stop engine, set the parking brake, wait for all moving parts to stop, and remove key.
2. Check the chain tension (Figure 16) at both sides of the machine.

**Note:** The chains should move up and down 6 to 12 mm (1/4 to 1/2 inch).

3. If chains pop or snap; refer to [Adjusting the Jackshaft Drive Chain Tension](#) (page 38), [Adjusting the Drive Wheel Chain Tension](#) (page 39), or [Adjusting the Tine-Drive Chain](#) (page 47).

## Lubricating the Chains

**Service Interval:** Before each use or daily

**Important:** Do not lubricate chains with penetrating oil or solvents. Use oil or chain lubricant.

1. Stop engine, set the parking brake, wait for all moving parts to stop, and remove key.
2. Raise the machine and support it with jack stands with a 460 kg (1,015 lb) capacity.

## Checking the Safety 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.

### Understanding the Safety Interlock System

The safety interlock system is designed to prevent the engine from starting unless the traction-control levers are in the neutral position.

### Checking the Safety Interlock System

1. Disconnect the spark-plug wires; refer to [Checking the Spark Plugs](#) (page 33).

2. While on level ground, block the wheels of the machine to prevent unintended movement.
3. Disengage the parking brake; refer to [Parking-Brake Handle \(page 16\)](#).
4. With the traction-control levers in the neutral position turn the key to the start position — the starter must not crank; refer to [Traction-Control Levers \(page 15\)](#) and [Ignition Switch \(page 16\)](#).

**Note:** If the machine does not pass this test, do not operate. Contact your authorized Toro Service Dealer.

**Important:** It is essential that the operator safety mechanisms be connected and in proper operating condition prior to use for aerating.

## Checking for Loose Hardware

**Service Interval:** Before each use or daily

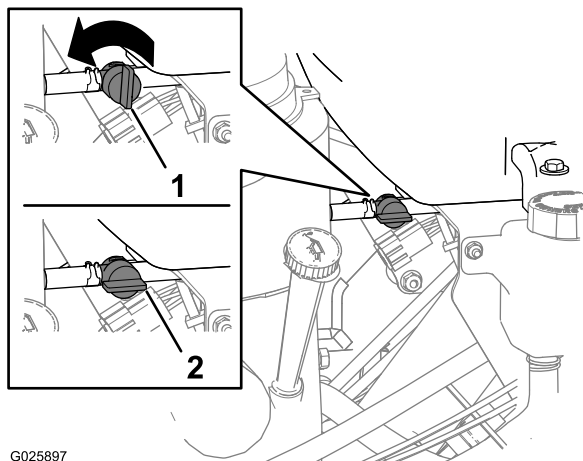
1. Stop engine, set the parking brake, wait for all moving parts to stop, and remove key.
2. Visually inspect machine for any loose hardware or any other possible problem.

**Note:** Tighten all loose hardware or repair the problem before operating the machine.

## Operating the Machine

### Opening the Fuel Shut-off Valve

Rotate the lever of the fuel shut-off valve to align the lever with the fuel line.



**Figure 17**

1. Off position
2. On position

### Starting the Engine

1. Move the traction-control levers in neutral position and set the parking brake; refer to [Traction-Control Levers \(page 15\)](#) and [Parking-Brake Handle \(page 16\)](#).

**Note:** To start the engine, the parking brake must be engaged. (It is not necessary for the operator to be on the platform.)

2. Place the throttle lever midway between the Slow and Fast positions; refer to [Throttle Lever \(page 15\)](#).
3. If the engine is cold, push the choke lever forward to the On position; refer to [Choke Lever \(page 15\)](#).

**Note:** If the engine is warm, pull the choke lever to the Off position.

4. Rotate the ignition switch to the Start position; refer to [Ignition Switch \(page 16\)](#).

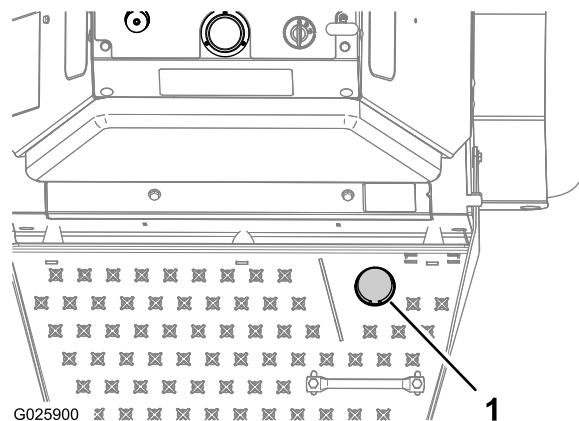
**Note:** Release the switch as soon as the engine starts.

**Important:** Do not crank the engine continuously for more than ten seconds at a time. If the engine does not start, allow a 60 second cool-down period between starting attempts. Failure to follow these guidelines can burn out the starter motor

5. If the choke lever is in the On position, gradually move the lever toward the Off position as the engine warms up.

### Lowering the Tines

1. Set throttle lever to the Midway position; refer to [Throttle Lever \(page 15\)](#).
2. Step on the tine-elevation switch to lower the tines ([Figure 18](#)).



**Figure 18**

1. Tine-elevation switch
- 
3. Stand on the switch and move the traction-control levers forward to aerate ([Figure 18](#)); refer to [Traction-Control Levers \(page 15\)](#).
  4. Adjust the throttle for the working conditions; refer to [Throttle Lever \(page 15\)](#).

## Adjusting the Tine Down Pressure

**Important:** Keep the drive tires on the ground at all times.

Adjust the plug depth by rotating the tine pressure control as follows:

**Note:** First time use: set the tine pressure control so that the tine-pressure gauge (Figure 19) indicates 24 bar (350 psi).

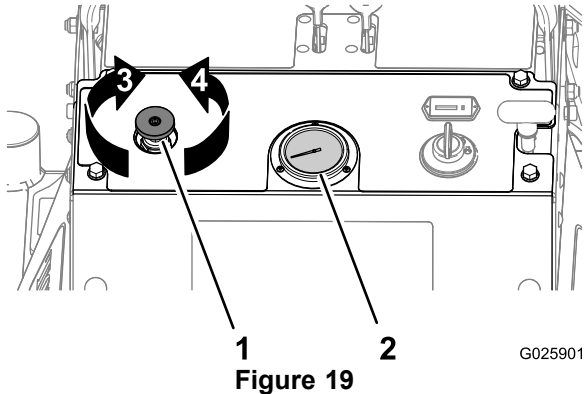


Figure 19

1. Tine-pressure control
2. Tine-pressure gauge
3. Decrease pressure (shorter plug)
4. Increase pressure (longer plug)

- Rotate the tine-pressure control **counterclockwise** (Figure 19) to decrease the downward pressure in order to remove a **shorter** plug.
- Rotate the tine-pressure control **clockwise** (Figure 19) to increase downward pressure in order to remove a **longer** plug.

**Note:** Ideal plug depth is 7.6–10 cm (3-4 inches). Rotate the tine-pressure control to adapt to the soil conditions.

## Raising the Tines

To raise the tines, remove your foot from the tine-elevation switch (Figure 18).

**Important:** The tines will rotate when the traction-control lever is moved out of the neutral position.

## Stopping the Engine

1. Move the traction-control levers to the neutral position and bring the machine to a full stop; refer to [Traction-Control Levers](#) (page 15).
2. Lift your foot off of the tine ground engagement foot switch control to raise the tines; refer to [Raising the Tines](#) (page 22).
3. Place the throttle in the midway between the Slow and Fast positions; refer to [Throttle Lever](#) (page 15).
4. Allow the engine to run for a minimum of 15 seconds, then turn the ignition switch to the Off position to stop the engine; refer to [Ignition Switch](#) (page 16).

5. Set the parking brake; refer to [Parking-Brake Handle](#) (page 16).
6. Remove the key to prevent children or other unauthorized persons from starting the engine.
7. Close the fuel shut-off valve when the machine will not be in use for a few days, when transporting, or when the machine is parked inside a building; refer to [Fuel Shut-Off Valve](#) (page 16).

## Driving the Machine

### ⚠ CAUTION

Machine can spin very rapidly by positioning one lever too much ahead of the other. Operator may lose control of the machine, which may cause damage to the machine or injury.

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

**Important:** To begin movement (forward or backward), the brake lever must be disengaged (pushed forward) before the traction-control levers can be moved.

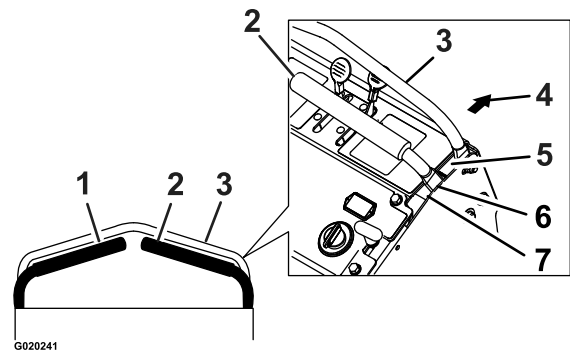
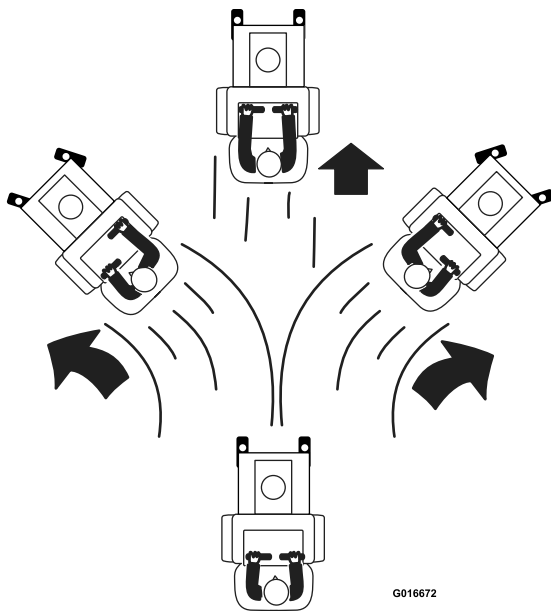


Figure 20

1. Left hand traction-control lever
2. Right hand traction-control lever
3. Front reference bar
4. Front of the machine
5. Forward lever
6. Neutral lever
7. Reverse

## Driving Forward

1. Make sure the traction-control levers are in the neutral position.
2. Release the parking brake.
3. To move forward in a straight line, move both levers forward with equal pressure.



**Figure 21**

To turn left or right, pull the traction-control lever back toward neutral in the desired turn direction. The tines can be in the down position when making gradual turns.

To make zero turns, lift your foot off of the tine engagement foot switch control to raise the tines. The head will raise in one second.

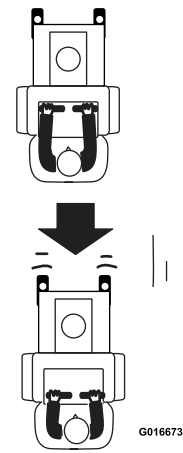
**Important:** Do not make a zero turn when the tines are down as turf tearing will result.

The machine will move faster the farther the traction-control levers are moved from the neutral position.

4. To stop, position both traction-control levers in the neutral operate position.

#### Driving in Reverse

1. Move the traction-control levers to the neutral operate position.
2. To move rearward in a straight line, slowly move both levers rearward with equal pressure.



**Figure 22**

To turn left or right, release pressure on the traction-control lever toward the desired turn direction.

To make zero turns, lift your foot off of the tine elevation switch to raise the tines. The head will raise in 1 second.

**Important:** Do not make a zero turn when the tines are in the down position.

3. To stop, position both traction-control levers in the neutral operate position.

## Transporting the Machine

Machine weight: 460 kg (1,015 lb)

### **⚠ CAUTION**

This machine does not have proper turn signals, lights, reflective markings, or a slow moving vehicle emblem. Driving on a street or roadway without such equipment is dangerous and can lead to accidents causing personal injury. Driving on a street or roadway without such equipment may also be a violation of State laws and the operator may be subject to traffic tickets and/or fines.

**Do not drive a machine on a public street or roadway.**

## Loading the Machine onto a Transport Vehicle

### ⚠ WARNING

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

- Use extreme caution when operating a machine on a ramp.
- Use only a single, full-width ramp; do not use individual ramps for each side of the machine.
- If individual ramps must be used, use enough ramps to create an unbroken ramp surface wider than the machine.
- Do not exceed a 15-degree angle between ramp and ground, or between a ramp, a trailer, or a truck.
- Avoid sudden acceleration while driving machine up a ramp to avoid tipping backward.
- Avoid sudden deceleration while backing machine down a ramp to avoid tipping backward.

**Important:** Do not attempt to turn the machine while on the ramp; you may lose control and drive off the side.

- Use extreme caution when loading units onto trailers or trucks.
- Use 1 full-width ramp that is wide enough to extend beyond the rear tires is recommended instead of individual ramps for each side of the machine (Figure 23). The platform, when down and locked into position, must extend back between the rear wheels and serves as a stop for tipping backward. Having a full-width ramp provides a surface for the platform to contact if the machine starts to tip backward. With the platform up, a full-width ramp provides a surface to walk on behind the machine.
- The ramp should be long enough so that the angles do not exceed 15 degrees (Figure 23). A steeper angle may cause tine components to get caught, as the machine moves from ramp to trailer or truck. A steeper angle may also cause the machine to tip backward. If loading on or near a slope, position the trailer or truck so it is on the down side of the slope and the ramp extends up the slope. This will minimize the ramp angle. The trailer or truck should be as level as possible.

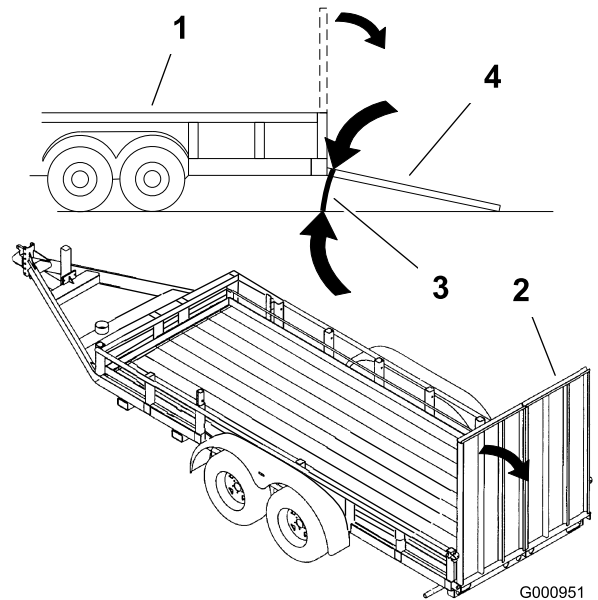


Figure 23

- |                    |                                |
|--------------------|--------------------------------|
| 1. Trailer         | 3. Not greater than 15 degrees |
| 2. Full-width ramp | 4. Full-width ramp (side view) |

- The operator should determine if it is best to have the platform up or down when loading, depending on conditions. If it is not possible to use one full-width ramp, use enough individual ramps to simulate a full-width, continuous ramp.
- Avoid sudden acceleration when driving up a ramp and sudden deceleration when backing down a ramp. Both maneuvers can cause the machine to tip backward.

## Transporting the Machine

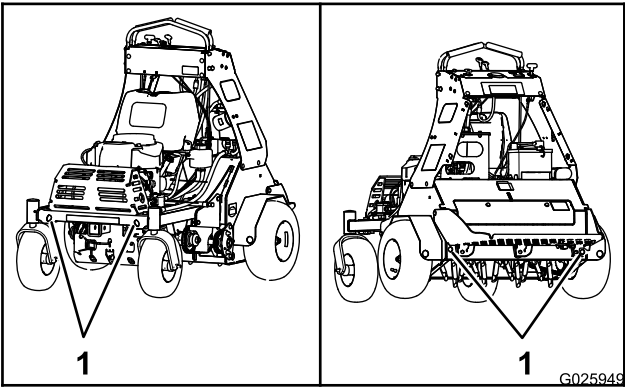
Use a heavy-duty trailer or truck to transport the machine. Ensure that the trailer or truck has all the necessary brakes, lighting, and marking as required by law. Please carefully read all the safety instructions.

To transport the machine:

1. Raise the tines of the machine before driving onto the trailer or truck.
2. If using a trailer, connect it to the towing vehicle and connect the safety chains.
3. If applicable, connect the trailer brakes.
4. Load the machine onto the trailer or truck.
5. Stop the engine, remove the key, set the brake, and close the fuel valve.
6. Set the parking brake and block the tires.
7. Use the tie-down points on the machine to securely bind the machine to the trailer or truck with straps, chains, cable, or ropes (Figure 24).

**Note:** Refer to your local ordinances for specific trailer and tie-down regulations.





**Figure 24**

1. Tie-down points

---

# Maintenance

## ⚠ WARNING

While you are maintaining or adjusting the machine, someone could start the engine. Accidentally starting the engine could seriously injure you or other bystanders.

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

## ⚠ WARNING

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

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

## Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first 100 hours	<ul style="list-style-type: none"> <li>• Change the auxiliary hydraulic reservoir filter and fluid.</li> <li>• Change the transmission filters.</li> <li>• Fill the transmission with oil when changing the filter.</li> </ul>
Before each use or daily	<ul style="list-style-type: none"> <li>• Check the engine-oil level.</li> <li>• Check the condition of the sprockets.</li> <li>• Check the condition and tension of the chains.</li> <li>• Lubricate the chains.</li> <li>• Check the safety interlock system.</li> <li>• Check for loose hardware.</li> <li>• Check the tines.</li> <li>• Clean the engine and the exhaust system area.</li> <li>• Clean the grass and debris buildup from the machine.</li> </ul>
Every 25 hours	<ul style="list-style-type: none"> <li>• Grease the jackshaft bearings.</li> <li>• Grease the wheel bearings.</li> <li>• Grease the tine shaft bearings.</li> <li>• Grease the tine assembly idlers.</li> </ul>
Every 50 hours	<ul style="list-style-type: none"> <li>• Grease the control pivots.</li> <li>• Check spark arrester (if equipped).</li> <li>• Check the pressure in the tires.</li> <li>• Check the condition and tension of the belts.</li> <li>• Check the auxiliary hydraulic oil level.</li> <li>• Check the hydraulic transmission oil level.</li> </ul>
Every 80 hours	<ul style="list-style-type: none"> <li>• Remove the engine shrouds and clean the cooling fins.</li> </ul>
Every 100 hours	<ul style="list-style-type: none"> <li>• Check, clean and gap the spark plug.</li> <li>• Check the battery.</li> </ul>
Every 160 hours	<ul style="list-style-type: none"> <li>• Check the spark plugs.</li> </ul>
Every 200 hours	<ul style="list-style-type: none"> <li>• Check the paper air-cleaner element (more often under severe conditions).</li> <li>• Change the engine-oil filter.</li> </ul>
Every 250 hours	<ul style="list-style-type: none"> <li>• Replace the primary air cleaner element — check secondary air cleaner element; replace if dirty. (May need more often under severe conditions. See the Engine manual for additional information.)</li> <li>• Clean the foam air-cleaner element (more often under severe conditions).</li> <li>• Change the auxiliary hydraulic reservoir filter and fluid.</li> <li>• Change the transmission filters.</li> <li>• Fill the transmission with oil when changing the filter.</li> </ul>

Maintenance Service Interval	Maintenance Procedure
Every 500 hours	<ul style="list-style-type: none"> <li>• Replace the secondary air cleaner element. (May need more often under severe conditions. See the Engine manual for additional information.)</li> <li>• Replace the paper air-cleaner element (more often under severe conditions).</li> </ul>
Every 800 hours	<ul style="list-style-type: none"> <li>• Replace the fuel filter.</li> </ul>
Yearly	<ul style="list-style-type: none"> <li>• Grease the front caster pivots.</li> <li>• Grease the belt idler pivot.</li> <li>• Grease the caster pivots and hubs.</li> <li>• Lubricate the caster wheel hubs.</li> <li>• Lubricate the caster wheel hubs.</li> <li>• Check the torque of the wheel hub nuts.</li> <li>• Check the torque on the wheel lug nuts.</li> <li>• Check the torque of the transmission output shaft nut.</li> </ul>
Yearly or before storage	<ul style="list-style-type: none"> <li>• Touch up chipped paint</li> </ul>

## Premaintenance Procedures

### ⚠ CAUTION

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

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

## Preparing for the Machine for Maintenance

Perform the following before servicing, cleaning, or making any adjustments to the machine.

1. Move the machine to a level surface.
2. Shut off the engine, set the parking brake, wait for all moving parts to stop.
3. Remove the key from the key switch.

## Accessing the Console Compartment

### Removing the Console Pad

1. Loosen the 4 flanged-head bolts that secure the pad to the left and right console panels (Figure 25).

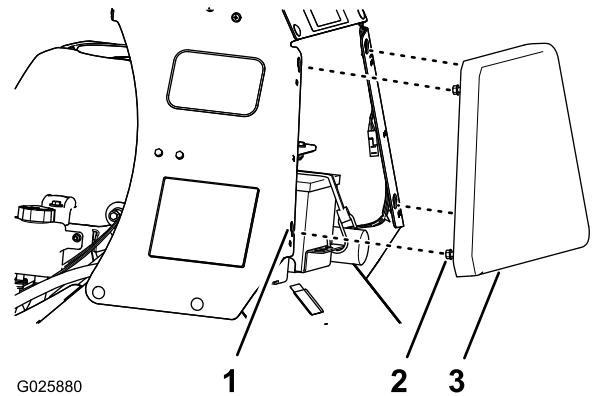


Figure 25

1. Keyhole slot (console panel)
  2. Fanged-head bolt
  3. Pad
2. Lift up the console pad (Figure 25) approximately 13 mm (1/2 inch).
  3. Pull the console pad straight back and remove the pad from the machine (Figure 25).

### Installing the Console Pad

1. Align the 4 flanged-head bolts at the forward face of the console pad to the 4 keyhole slots in the frame of the console (Figure 25).
2. Move the pad forward until the pad is flush to the console frame (Figure 25).
3. Move the pad down until the flanged-head bolts are seated in the keyhole slots (Figure 25).
4. Tighten the flanged-head bolts to 1978 to 2542 N-cm (175 to 225lb-in).

# Lubrication

## Lubricating the Grease Fittings

**Grease type:** National Lubricating Grease Institute (NLGI) grade #2 multi-purpose gun grease.

**Note:** Refer to the lubrication chart for service intervals.

### Lubrication Chart

Fitting Locations	Initial Pumps	Number of Places	Service Interval
1. Front Caster Pivots	*0	2	Yearly
2. Jackshaft Bearings	1	8	25 hours
3. Wheel Bearings	1	2	25 hours
4. Tine Shaft Bearings	1	4	25 hours
5. Tine Assembly Idlers	1	2	25 hours
6. Control Pivots	1	4	50 hours
7. Belt Idler Pivot	1	1	Yearly
8. Front Caster Hubs	*0	2	Yearly

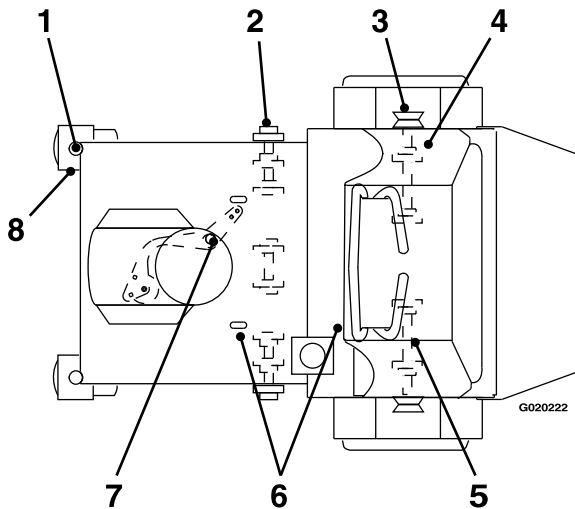


Figure 26

1. Stop engine, set the parking brake, wait for all moving parts to stop, and remove key.
2. Wipe clean the grease fittings with a rag (Figure 26).
3. Connect a grease gun to the fitting (Figure 26).
4. Pump grease into the fittings until grease begins to ooze out of the bearings.
5. Wipe up any excess grease.

## Lubricating the Casters

**Grease type:** National Lubricating Grease Institute (NLGI) grade #2 multi-purpose gun grease.

### Greasing the Caster Pivots

**Service Interval:** Yearly

1. Remove cap and hex plug from the top of the caster pivot (Figure 27).

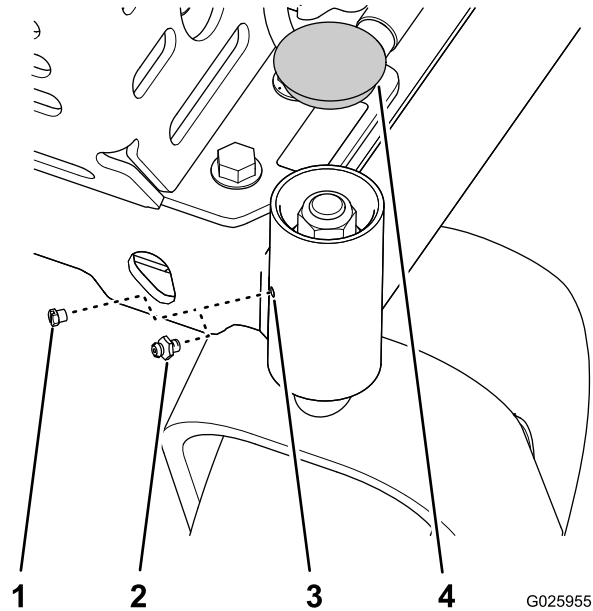


Figure 27

1. Hex plug
2. Grease fitting
3. Caster pivot
4. Cap

2. Thread grease fitting in hole (Figure 27).
3. Pump grease into the fitting until grease oozes out around top bearing (Figure 27).
4. Remove grease fitting and install the plug that you removed in 1 (Figure 27).
5. Install the cap that you removed in step 1 (Figure 27).
6. Repeat steps 1 through 5 to the other caster.

## Lubricating the Caster-Hubs Bearings

**Service Interval:** Yearly

### Removing the Caster-Wheel Assembly

1. Stop engine, set the parking brake, wait for all moving parts to stop, and remove key.
2. Lift the front of the machine and support it with jack stands.
3. Remove the wheel nut and bolt, and remove the caster-wheel assembly from the fork (Figure 28).

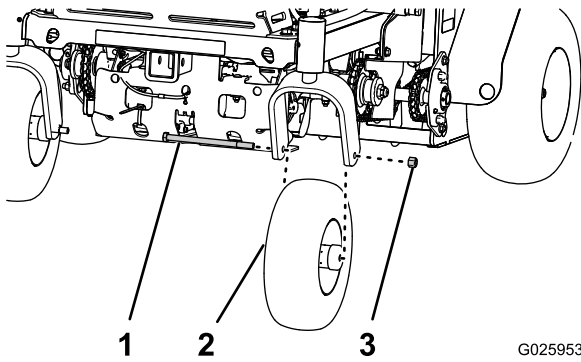


Figure 28

- |                          |              |
|--------------------------|--------------|
| 1. Wheel bolt            | 3. Wheel nut |
| 2. Caster-wheel assembly |              |

### Disassembling the Caster-Wheel Hub and Greasing the Bearings

**Service Interval:** Yearly

**Important:** Use new bearing seals when lubricating the caster-wheel hubs.

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

**Grease type:** National Lubricating Grease Institute (NLGI) grade #2 multi-purpose gun grease.

1. Remove the 2 seal guards from the wheel hub (Figure 29).

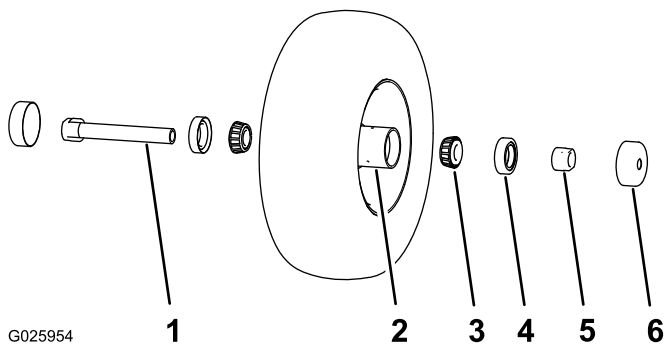


Figure 29

- |                                      |                 |
|--------------------------------------|-----------------|
| 1. Axle (spacer nut still assembled) | 4. Spacer nut   |
| 2. Hub                               | 5. Bearing seal |
| 3. Bearing                           | 6. Seal guard   |

2. Remove 1 of the spacer nuts from the axle assembly in the caster wheel (Figure 29).

**Note:** Note that thread locking adhesive has been applied to lock the spacer nuts to the axle (Figure 29).

3. Remove the axle (with the other spacer nut still assembled to it) from the caster-wheel assembly (Figure 29).
4. Pry out both of the bearing seals (Figure 29).  
**Note:** Discard the old seals.
5. Remove both of the bearings and inspect each one for wear or damage (Figure 29).  
**Note:** Replace the bearing if it is worn or damaged.
6. Pack the 2 bearings with the specified grease.

### Assembling the Caster-Wheel Hub

1. Install 1 bearing into the hub of the wheel (Figure 29).
2. Install the bearing seal into the hub at the bearing (Figure 29).
3. If you removed (or broke loose) both of the spacer nuts from the axle assembly, perform the following:
  - A. Clean the threads of the axle and spacer nut.
  - B. Apply a thread locking adhesive to the threads at one end of the axle.
  - C. Thread the axle nut, with the wrench flats facing outward, onto the end of the axle that is prepared with thread-locking compound (Figure 29).

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

4. Insert the assembled nut and axle into the wheel at the side of the wheel with the new seal and bearing (Figure 29).
5. With the open end of the wheel facing up, fill the area inside wheel cavity (around the axle) with the specified grease.
6. Install the other bearing and new seal into the wheel (Figure 29).
7. Apply a thread locking adhesive to the 2nd spacer nut and thread onto the axle with the wrench flats facing outward.
8. Torque the spacer nut to 8-9 N-m (75-80 in-lb), loosen, then re-torque to 2-3 N-m (20-25 in-lb).

**Note:** Make sure axle does not extend beyond either nut.

9. Install the seal guards over the wheel hub (Figure 29).

### Installing the Caster-Wheel Assembly

1. Align the hole in the axle of the caster-wheel assembly between the holes in the fork of the caster (Figure 28).
2. Secure the to the fork with the wheel nut and bolt (Figure 28) that you removed in step 3 of Removing the Caster-Wheel Assembly (page 28).
3. Torque the wheel nut to 91 to 113 N-m (67 to 83 ft-lb).

# Engine Maintenance

## Servicing the Air Cleaner

**Service Interval:** Every 250 hours—Replace the primary air cleaner element — check secondary air cleaner element; replace if dirty. (May need more often under severe conditions. See the Engine manual for additional information.)

Every 500 hours— Replace the secondary air cleaner element. (May need more often under severe conditions. See the Engine manual for additional information.)

1. Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
2. See the engine owner's manual for maintenance instructions.

## Servicing the Air Cleaner

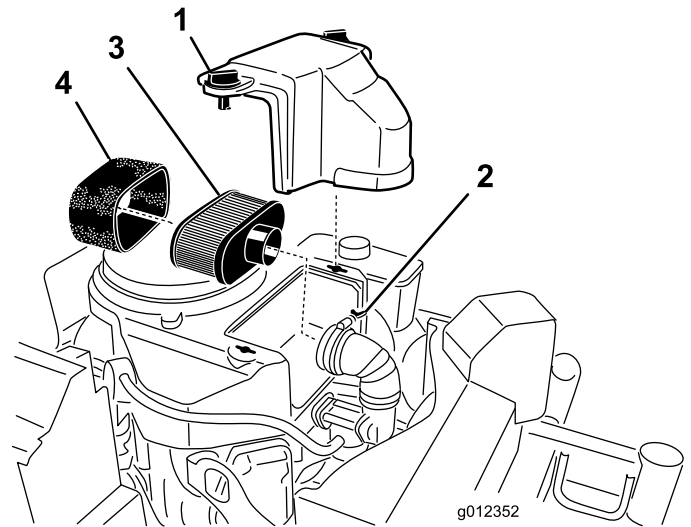
Inspect the foam and paper elements, and replace them if they are damaged or excessively dirty.

**Note:** Service the air cleaner more frequently (every few operating hours) if the operating conditions are extremely dusty or sandy.

**Important:** Do not apply oil to the foam or paper element.

## Removing the Foam and Paper Elements

1. Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
2. Clean around the air cleaner to prevent dirt from getting into the engine and causing damage (Figure 30).



**Figure 30**

- |               |                  |
|---------------|------------------|
| 1. Cover      | 3. Paper element |
| 2. Hose clamp | 4. Foam element  |

3. Rotate the cover knobs 1/4 turn counterclockwise and remove the air-cleaner cover (Figure 30).
4. Rotate the thumbscrew of the hose clamp counterclockwise until you can separate the air-cleaner assembly from the inlet duct (Figure 30).
5. Carefully pull the foam element off the paper element (Figure 30).

## Servicing the Foam Air-Cleaner Element

**Service Interval:** Every 250 hours (more often under severe conditions).

1. Inspect the element for tears, an oily film, or damaged (Figure 30).

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

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

## Servicing the Paper Air-Cleaner Element

**Service Interval:** Every 200 hours—Check the paper air-cleaner element (more often under severe conditions).

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

**Important:** Do not wash the paper air-cleaner element.

1. Inspect the element for tears, an oily film, or damage to the rubber seal (Figure 30).

**Note:** Replace the paper element if it is damaged.

- Clean the paper element by gently tapping it to remove dust and debris.

**Note:** If the element is very dirty, replace the air-cleaner element.

**Note:** Do not use pressurized air to clean the paper element.

## Installing the Foam and Paper Elements

**Important:** To prevent engine damage, always operate the engine with the complete foam and paper air-cleaner assembly installed.

- Carefully slide the foam element onto the paper air-cleaner element (Figure 30).
- Align the air-cleaner assembly onto the inlet duct and secure it with the hose clamp (Figure 30).
- Align the air-cleaner cover onto engine cover and secure the cover by rotating the cover knobs 1/4 turn clockwise (Figure 30).

## Servicing the Engine Oil

**Oil Type:** Detergent oil (API service SJ or later)

**Engine Oil Capacity:** 1.7 L (1.8 US qt) with the filter removed; 1.5 L (1.6 US qt) without the filter removed

**Oil viscosity:** Refer to the table below.

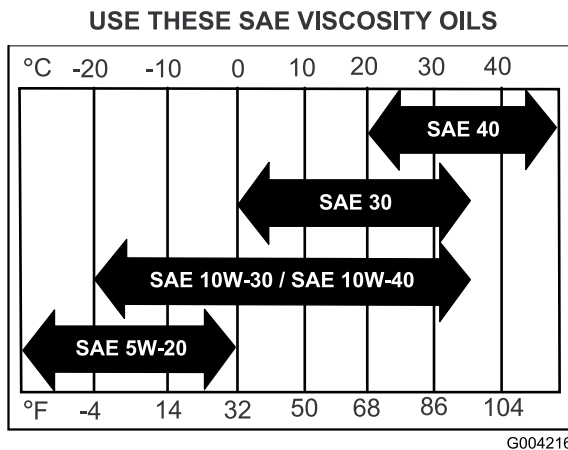


Figure 31

## Changing the Engine Oil

**Note:** Dispose of the used oil at a recycling center.

- Park the machine so that the drain side is slightly lower than the opposite side to assure the oil drains completely.
- Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.

- Change the engine oil as shown in Figure 33.

**Note:** Torque drain plug to 27-33 N-m (20-24 ft-lb).

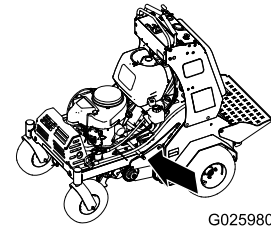


Figure 32

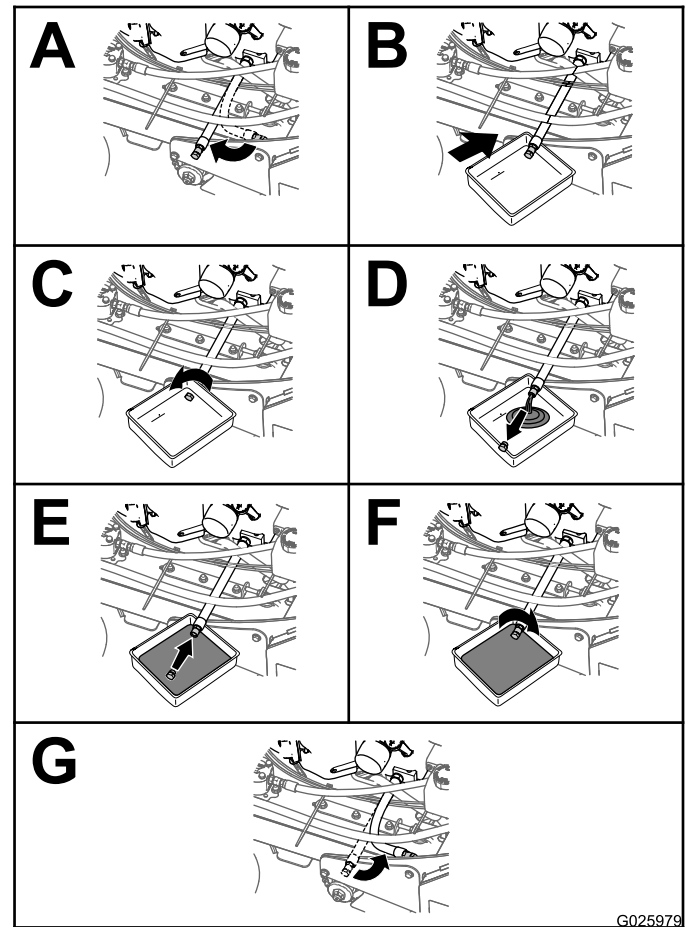


Figure 33

- Slowly pour approximately 80% of the specified oil into the filler tube, and slowly add the additional oil to bring it to the Full mark (Figure 34).

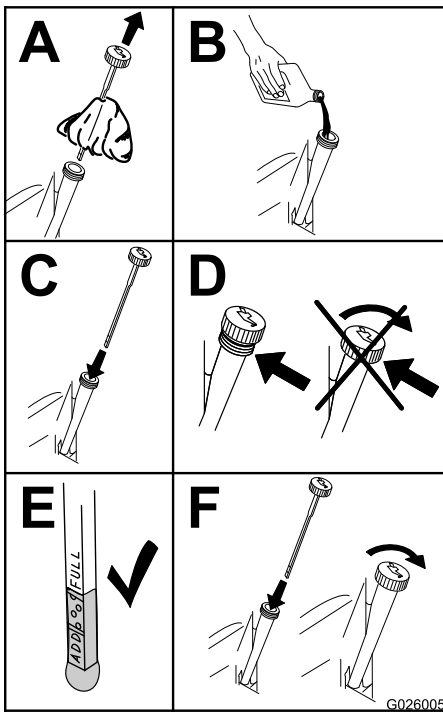
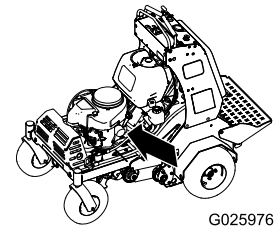


Figure 34



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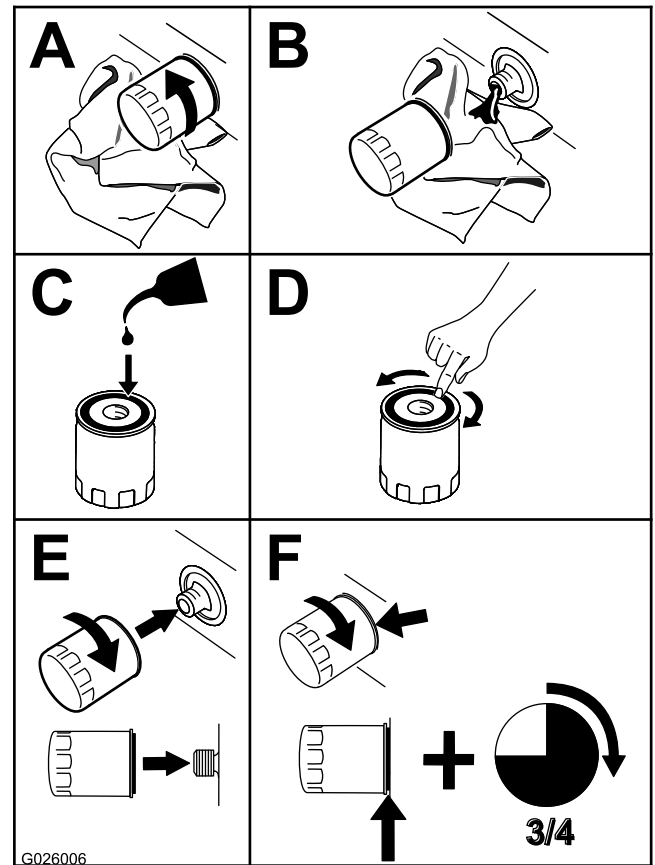


Figure 35

5. Start the engine and drive to a flat area.
6. Check the engine-oil level.

## Changing the Engine-Oil Filter

**Service Interval:** Every 200 hours

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

1. Drain the oil from the engine; refer to [Changing the Engine Oil](#) (page 31).
2. Place a rag under the oil filter to soak up any spilled oil.

**Important:** Spilled oil may drain under the engine and onto the clutch. Oil spilled on the clutch may damage the clutch, cause the blades to stop slowly when the clutch is in the Off position, and cause the clutch to slip when the clutch is switched to the On position. Wipe up any spilled oil.

3. Change the engine-oil filter ([Figure 35](#)).

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

4. Fill the crankcase with the specified type of new oil; refer to [Figure 31](#).



# Checking the Spark Plugs

**Service Interval:** Every 160 hours

Remove spark plugs, check condition and reset gaps, or replace with new plugs. See the *Engine Owner's Manual*.

# Servicing the Spark Plug

**Service Interval:** Every 100 hours

**Type for all Engines:** NGK BPR4ES or equivalent

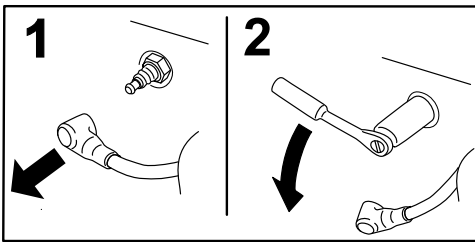
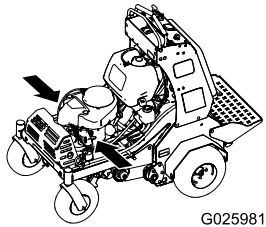
**Air Gap:** 0.75 mm (0.03 inch)

Make sure the air gap between the center and side electrodes is correct before installing the spark plug.

Use a spark plug wrench for removing and installing the spark plug(s) and a gapping tool/feeler gauge to check and adjust the air gap. Install a new spark plug(s) if necessary.

# Removing the Spark Plug

1. Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
2. Remove the spark plug as shown in [Figure 36](#).



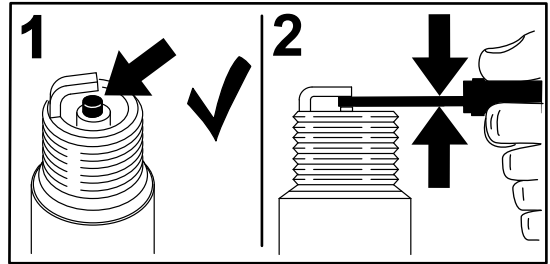
**Figure 36**

# Checking the Spark Plug

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

If you see light brown or gray on the insulator, the engine is operating properly. A black coating on the insulator usually means the air cleaner is dirty.

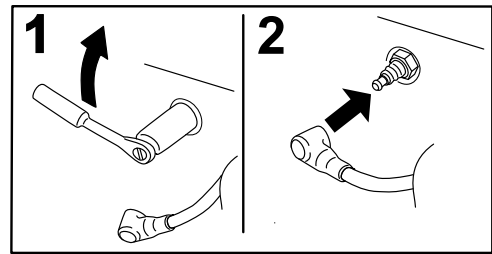
Set the gap to 0.75 mm (0.03 inch).



**Figure 37**

# Installing the Spark Plug

Tighten the spark plug(s) to 22 N-m (16 ft-lb).



**Figure 38**

# Checking the Spark Arrester (if equipped)

Service Interval: Every 50 hours

## ⚠ WARNING

Hot exhaust system components may ignite gasoline vapors even after the engine is stopped. Hot particles exhausted during engine operation may ignite flammable materials. Fire may result in personal injury or property damage.

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

1. Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
2. Allow the muffler to cool.
3. Check the spark arrester for breaks in the spark-arrester screen or welds.

**Note:** Replace arrester if it is worn or damaged.

4. If you see that the screen is plugged, perform the following:
  - A. Remove the spark arrester.
  - B. Shake loose the particles from of the arrester and clean screen with a wire brush.

**Note:** Soak the arrester screen in solvent if necessary.

- C. Install spark arrester onto exhaust outlet.

# Fuel System Maintenance

## Servicing the Fuel Filter

### Replacing the Fuel Filter

Service Interval: Every 800 hours/Yearly (whichever comes first)

**Note:** Wipe up any spilled fuel.

1. Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
2. Close the fuel shut-off valve; refer to [Fuel Shut-Off Valve \(page 16\)](#).
3. Squeeze the ends of the hose clamps together and slide them away from the filter ([Figure 39](#)).

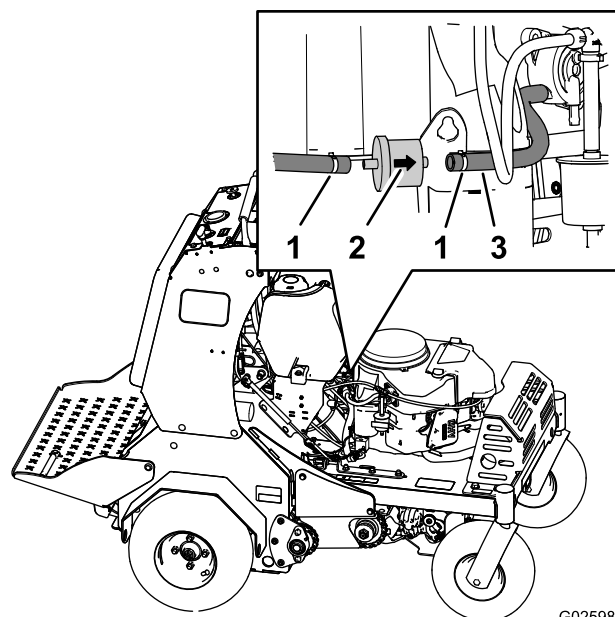


Figure 39

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1. Hose clamp
2. Flow direction arrow (fuel filter)
3. Hose

4. Remove the filter from the fuel hoses ([Figure 39](#)).

**Note:** Do not install a dirty filter if it is removed from the fuel line.

5. Install a new filter with the flow-direction arrow aligned as illustrated in [Figure 39](#).

**Note:** Ensure that the fuel hoses are fully seated onto the hose fittings of the fuel filter.

6. Align the hose clamps over the hose and the fuel-filter fittings ([Figure 39](#)).

7. Open the fuel shut-off valve; refer to [Fuel Shut-Off Valve \(page 16\)](#).
8. Check for fuel leaks and repair if needed.
9. Wipe up any spilled fuel.

# Electrical System Maintenance

## Servicing the Battery

**Service Interval:** Every 100 hours

Always keep the battery clean and fully charged. Use a paper towel to clean the battery case. If the battery terminals are corroded, clean them with a solution of four parts water and one part baking soda. Apply a light coating of grease to the battery terminals to prevent corrosion.

Voltage: 12 volts

### **⚠ WARNING**

#### **CALIFORNIA**

#### **Proposition 65 Warning**

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

**Wash hands after handling.**

### **⚠ DANGER**

**Do not drink electrolyte, and avoid contact with skin, eyes or clothing. Wear safety glasses to shield your eyes and rubber gloves to protect your hands.**

**Battery electrolyte contains sulfuric acid which is a deadly poison and causes severe burns.**

## Removing the Battery

### **⚠ WARNING**

**Battery terminals or metal tools could short against metal machine components causing sparks. Sparks can cause the battery gasses to explode, resulting in personal injury.**

- **When removing or installing the battery, do not allow the battery terminals to touch any metal parts of the machine.**
- **Do not allow metal tools to short between the battery terminals and metal parts of the machine.**

## ⚠ WARNING

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

- Always disconnect the negative (black) battery cable before disconnecting the positive (red) cable.
  - Always connect the positive (red) battery cable before connecting the negative (black) cable.
1. Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
  2. Remove the console pad; refer to [Removing the Console Pad](#) (page 27).
  3. At the battery, lift the black terminal cover on the negative cable ([Figure 40](#)).

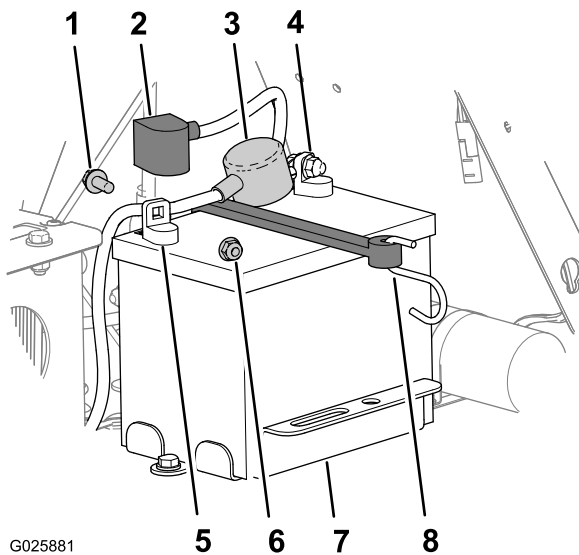


Figure 40

- |   |                                  |
|---|----------------------------------|
| 1. Flanged bolt                                     | 5. Negative (-) battery terminal |
| 2. Terminal cover (black—negative-battery terminal) | 6. Flanged nut                   |
| 3. Terminal cover (red—positive-battery terminal)   | 7. Battery tray                  |
| 4. Positive (+) battery terminal                    | 8. Battery strap                 |
- 
4. Disconnect the negative battery cable from the negative (-) battery terminal, and remove the cable from the battery ([Figure 40](#)).
  5. Slide the red terminal cover off the positive battery terminal ([Figure 40](#)).
  6. Disconnect the positive (red) battery cable, and remove the cable from the battery ([Figure 40](#)).

7. Remove the hook of the battery strap from the battery tray ([Figure 40](#)), and remove the battery.

## Installing the Battery

1. Place the battery onto the machine ([Figure 40](#)).
2. Secure the battery to the battery tray with the battery strap.
3. Install the positive (red) battery cable to positive (+) battery terminal with a flanged bolt and flanged nut ([Figure 40](#)).
4. Slide the red terminal cover over the positive-battery terminal.
5. Install the negative battery cable and the ground wire to the negative (-) battery terminal with a flanged bolt and flanged nut ([Figure 40](#)).
6. Slide the black terminal cover over the negative-battery terminal.

## Charging the Battery

### ⚠ WARNING

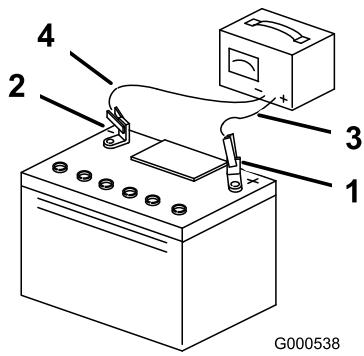
Charging the battery produces gasses that can explode.

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

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

1. Remove the battery from the chassis; refer to [Removing the Battery](#) (page 35).
2. Check the electrolyte level.
3. Ensure that the filler caps are installed on the battery.
4. Charge the battery for 1 hour at 25 to 30 amps or 6 hours at 4 to 6 amps.
5. When the battery is fully charged, unplug the charger from the electrical outlet, and disconnect the charger leads from the battery posts ([Figure 41](#)).
6. Install the battery onto the machine and connect the battery cables; refer to [Installing the Battery](#) (page 36).

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



**Figure 41**

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

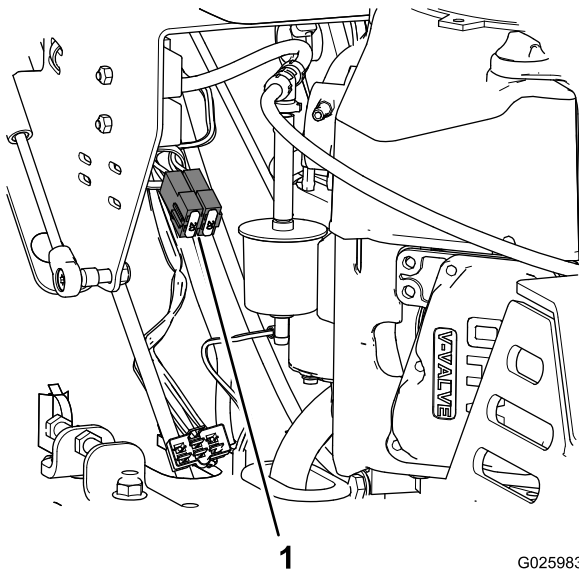
## Servicing the Fuses

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

1. Release the cushion from the rear of the machine.
2. Remove the negative-battery cable from the battery terminal; refer to steps 4 and 5 of [Removing the Battery](#) (page 35).

**Note:** Ensure that the negative battery cable does not touch the battery terminal.

3. Pull the fuse from the socket of the fuse block ([Figure 42](#)).



**Figure 42**

1. Fuse block

4. Install a fuse of the same type and amperes into the socket of the fuse block ([Figure 42](#)).
5. Install the negative-battery cable from the battery terminal; refer to steps 5 and 6 of [Installing the Battery](#) (page 36).

## Drive System Maintenance

### Checking the Air Pressure in the Tires

**Service Interval:** Every 50 hours

**Note:** The semi-pneumatic caster tires do not need to be inflated.

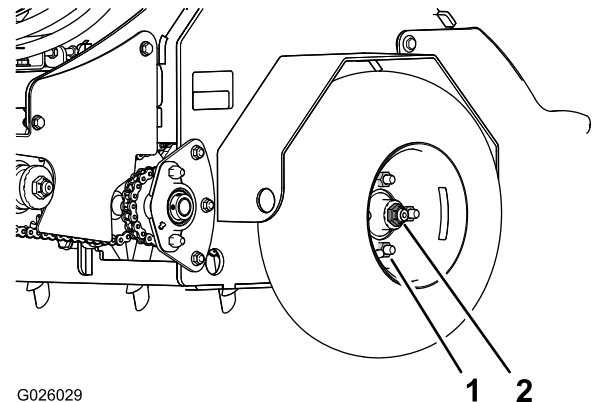
1. Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
2. Check tire pressure in drive tires.
3. Inflate drive tires to 83-97 kPa (12-14 psi).

### Checking the Wheel Hub Nuts

**Service Interval:** Yearly

Torque the wheel hub nuts ([Figure 43](#)) to 285 to 350 N-m (210 to 260 ft-lb).

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



**Figure 43**

1. Lug nut
2. Hub nut

### Checking the Torque of the Wheel Lug Nuts

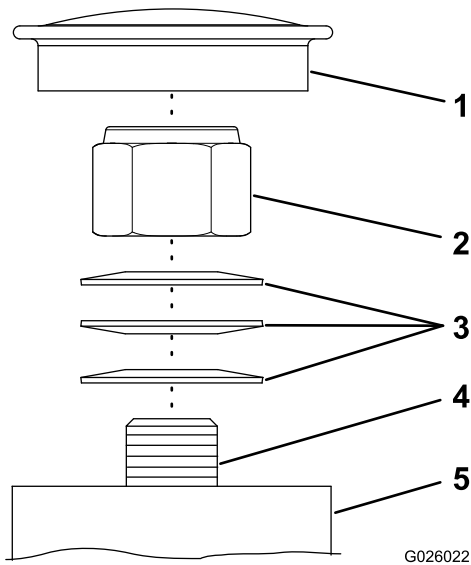
**Service Interval:** Yearly

Torque the wheel lug nuts ([Figure 43](#)) to 122 to 129 N-m (90 to 95 ft-lb).

# Adjusting the Caster Pivot Bearings Pre-Load

**Note:** If you disassemble the caster pivot bearings, ensure that the spring-disc washers are installed as shown in [Figure 44](#).

1. Remove dust cap from caster hub ([Figure 44](#)).



**Figure 44**

- |                        |               |
|------------------------|---------------|
| 1. Dust cap            | 4. Spindle    |
| 2. Lock nut            | 5. Caster hub |
| 3. Spring-disc washers |               |

2. Tighten lock nut clockwise until spring-disc washers are flat ([Figure 44](#)).
3. Rotate the lock nut counterclockwise 1/4 of a turn ([Figure 44](#)).
4. Install the dust cap ([Figure 44](#)).

## Maintaining the Chain

### Adjusting the Jackshaft Drive Chain Tension

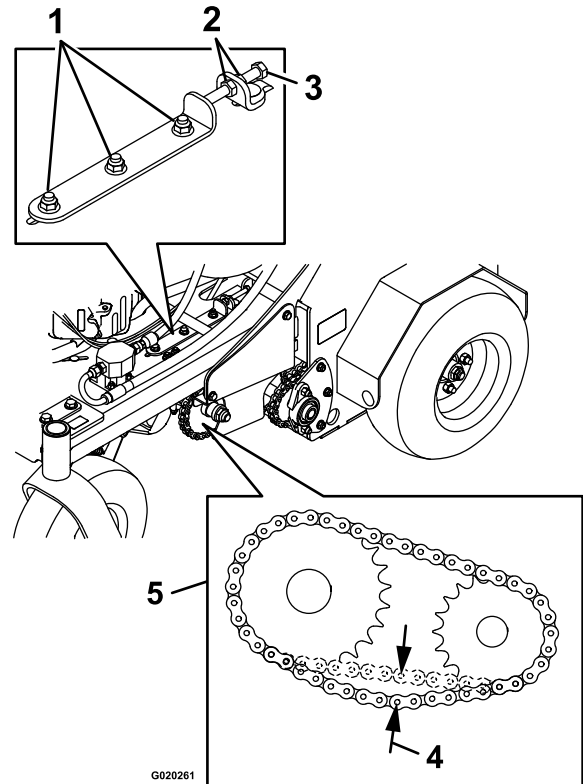
1. Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
2. Lift the rear of the machine and support it using jack stands or equivalent support.
3. Check the chains on both sides of the machine for proper tension.

**Note:** The chains should move up and down 6 to 12 mm (1/4 to 1/2 inch).

4. At each side of the machine, loosen the 3 nuts and bolts that secure the transmission mount and tensioner

plate, and the two nuts securing the adjustment bolt at the tensioner plate as shown in [Figure 45](#).

**Note:** You must loosen the nuts and bolts that secure the transmission mount and tensioner plate at both sides of the machine.



**Figure 45**

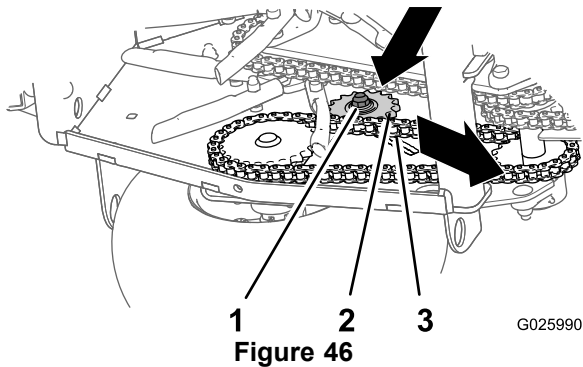
- |                                  |                              |
|----------------------------------|------------------------------|
| 1. Hydro mounting bolts and nuts | 4. 6-12 mm (1/4-1/2 inch)    |
| 2. Nuts                          | 5. Guard removed for clarity |
| 3. Adjustment bolt               |                              |

5. Turn the adjustment bolt to move transmission adjustment plates and transmission.
6. When the chains can move up and down 6 to 12 mm (1/4 to 1/2 inch), tighten the nuts on both sides of the adjustment bolts.
7. Tighten nuts and bolts that secure the hydro mounting.
8. Adjust traction-control linkage, refer to [Adjusting the Traction-Control Linkage \(page 42\)](#).

## Adjusting the Drive Wheel Chain Tension

1. Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
2. Lift the rear of the machine and support it using jack stands.
3. Check the tension of the drive-wheel chains (Figure 46).

**Note:** The chains should move up and down 6 to 12 mm (1/4 to 1/2 inch).



**Figure 46** G025990

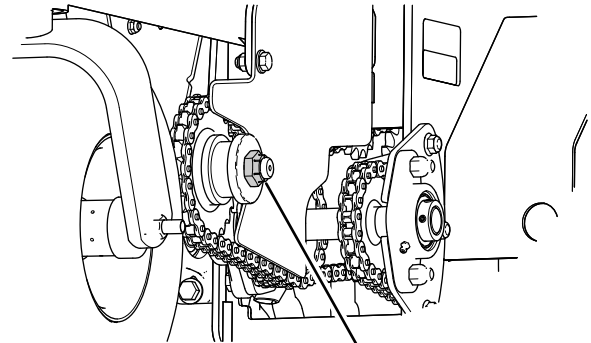
1. Lock nut
2. Idler sprocket
3. Drive-wheel chain

4. Loosen the lock nut and carriage bolt that secure the idler sprocket (Figure 46).
5. Increase or decrease chain tension by performing the following:
  - Push down and forward on the sprocket to increase the chain tension as shown in Figure 46.
  - Lift up and back on the sprocket to decrease the chain tension.
6. Torque the lock nut to 91 to 113 N-m (67 to 83 ft-lb).
7. Check the chain tension and if necessary repeat steps 4 through 6 until you can move the chain up and down 6 to 12 mm (1/4 to 1/2 inch).

## Checking the Transmission Output Shaft Nut Torque

**Service Interval:** Yearly

Torque the nut (Figure 47) on the transmission output tapered shaft to 285-353 N-m (210-260 ft-lb).



**Figure 47**

G025989

1. Transmission output shaft nut

# Brake Maintenance

## Adjusting the Parking Brake

If the parking brake does not hold securely, an adjustment is required.

1. Park the machine on a level surface.
2. Shut off engine and wait for all moving parts to stop.
3. Check the air pressure in the drive tires.

**Note:** If needed, adjust to the recommended inflation; refer to [Checking the Air Pressure in the Tires \(page 37\)](#).

4. Loosen the jam nut on the brake cable under the console ([Figure 48](#)).

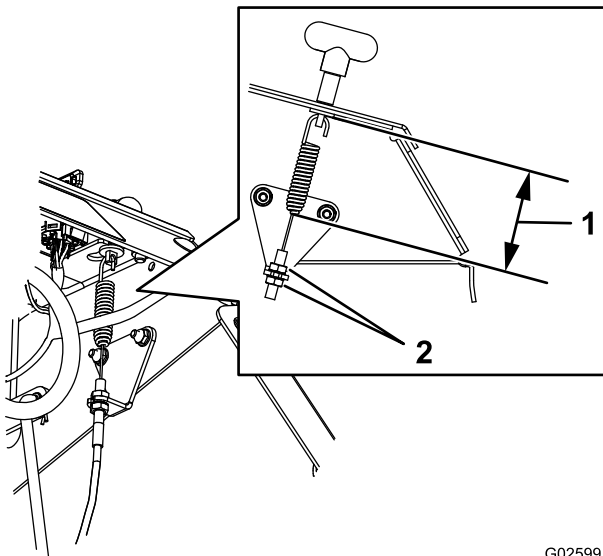


Figure 48

G025991

1. 7.9 cm (3-1/8 inch)

5. Set the parking brake ([Figure 48](#)).
6. Adjust the jam nut position until 7.9 cm (3-1/8 inch) from the bottom of the link to the bottom of the spring ([Figure 48](#)).
7. Secure the adjustment of the cable by tightening the jam nuts ([Figure 48](#)).
8. Check the parking brake; if necessary, repeat steps 4 through 7.

## Adjusting the Brake Switch

1. Park the machine on a level surface.
2. Shut off the engine and wait for all moving parts to stop.
3. Prior the adjusting the brake switch ensure the parking brake is properly adjusted; refer to [Adjusting the Parking Brake \(page 40\)](#).

4. Set the parking brake.
5. Check the distance between the parking brake-switch bracket to the brake arm of the transmission ([Figure 49](#)).

**Note:** The distance should be 3.2 mm (1/8 inch).

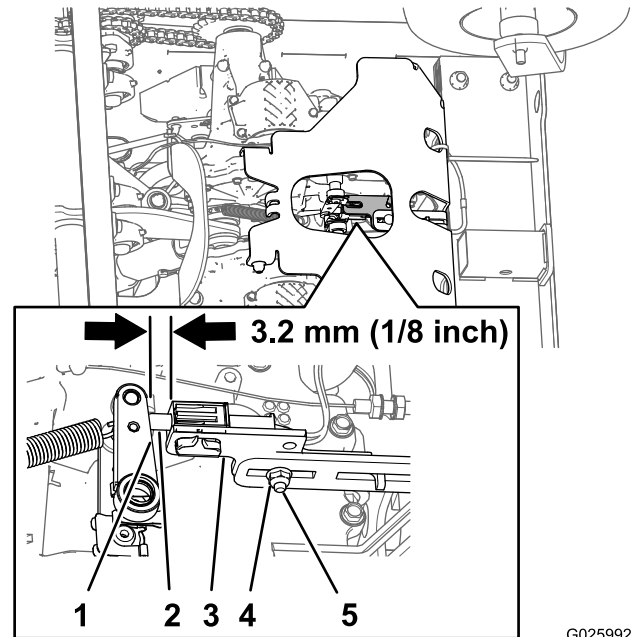


Figure 49

G025992

1. Brake arm (transmission)
2. Plunger (brake switch)
3. Brake-switch bracket
4. Lock nut
5. Carriage bolt

6. If adjustment is required, perform the following:
  - A. Loosen the lock nut and carriage bolt securing the parking brake switch bracket ([Figure 49](#)).
  - B. Adjust the position of the brake-switch bracket until the gap ([Figure 49](#)) between the switch bracket and the brake arm is 3.2 mm (1/8 inch)
  - C. Tighten the lock nut and carriage bolt ([Figure 49](#)) securing the brake-switch bracket to 1017 to 1243 N-cm (90 to 110 lb-in).



# Belt Maintenance

## Checking the Condition and Tension of the Belts

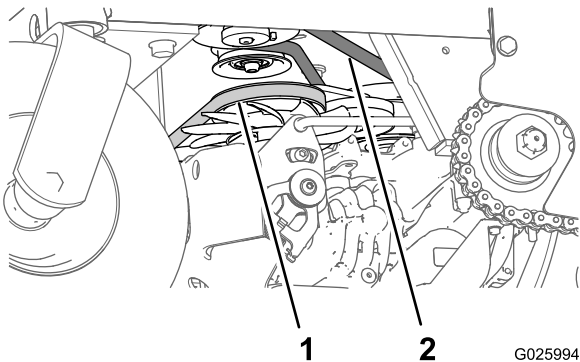
**Service Interval:** Every 50 hours

1. Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
2. Raise the machine and support it with jack stands with a 460 kg (1,015 lb) capacity.
3. Check the auxiliary pump-drive belt condition and tension (Figure 50).

**Note:** The belt should deflect 1.3 cm (1/2 inch) when 1.4 kg (3 lb) of force is applied to the belt midway between the auxiliary pump and engine pulleys. If the belt tension is too high or too low, refer to [Adjusting the Auxiliary Pump Drive Belt](#) (page 41).

4. Check condition of the transmission-drive belt (Figure 50).

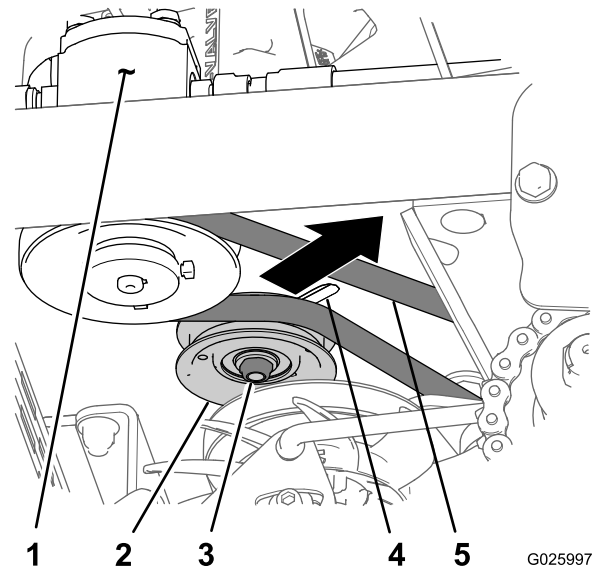
**Note:** The transmission belt has a automatic-spring tensioner.



1. Transmission-drive belt
2. Auxiliary pump-drive belt

## Adjusting the Auxiliary Pump Drive Belt

1. Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
2. Loosen the lock nut (3/8 inch) that secures the auxiliary pump-idler pulley to the chassis of the machine.



**Figure 51**

1. Auxiliary pump
2. Auxiliary pump-idler pulley
3. Lock nut (3/8 inch)
4. Adjustment slot (chassis)
5. Auxiliary pump-drive belt

3. Adjust the belt tension as follows:

- Move the auxiliary pump-idler pulley rearward and outward to tighten the belt.
- Move the auxiliary pump-idler pulley forward and inward to loosen the belt.

**Note:** The belt should deflect 1.3 cm (1/2 inch) when 1.4 kg (3 lb) of force is applied to the belt midway between the auxiliary pump and engine pulleys.

4. Tighten lock nut to 37 to 45 N-m (27 to 33 ft-lb).

## Replacing the Transmission-Drive Belt

**Note:** No adjustments are required for belt tension.

1. Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
2. Insert a breaker bar into the socket of the belt-tension bracket and move the bracket outward and forward (Figure 52).

# Controls System Maintenance

## Adjusting the Traction-Control Linkage

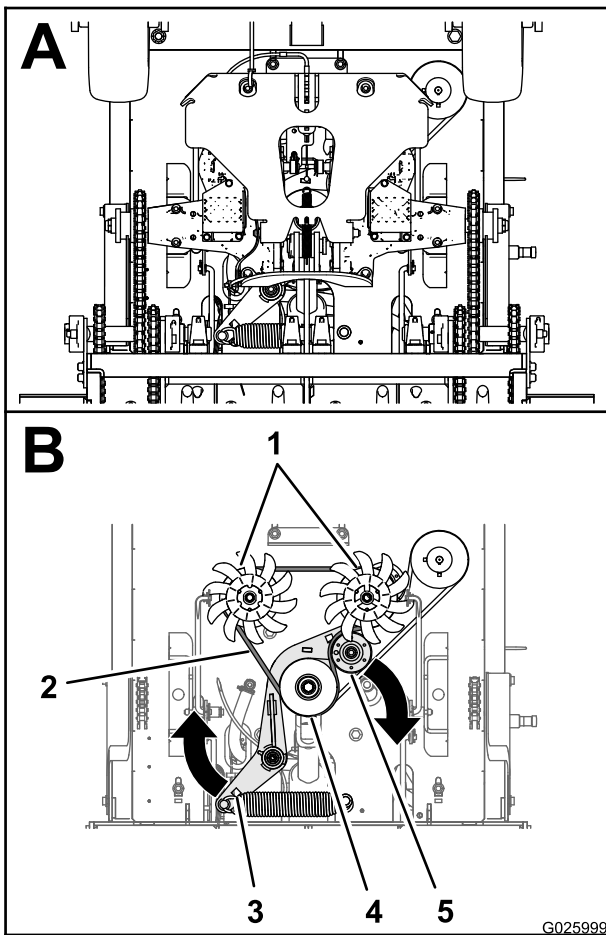


Figure 52

1. Transmission pullys
2. Transmission
3. Socket (belt-tension bracket)
4. Engine pulley
5. Tensioner pulley

3. Slip the transmission-drive belt of the engine, tensioner, and transmission pulleys (Figure 52).
4. Route the new transmission-drive belt around the engine, tensioner, and transmission pulleys as shown in Figure 52
5. Release the belt-tension bracket and allow the spring to tension the belt (Figure 52).

**Note:** Make sure the belt-tension bracket and pulley can move freely.

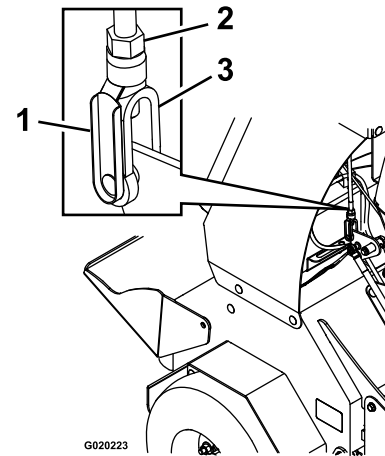


Figure 53

1. Spring-clevis pin
2. Locknut
3. Turnbuckle

- C. Adjust the fork fitting to set the initial gap as follows:
  - If the control lever **contacts the reference bar**, rotate the fork fitting (Figure 53) counterclockwise (as viewed from the top of the machine).
  - If the control lever **does not contacts the reference bar**, rotate the fork fitting (Figure 53) counterclockwise.
- D. Install the spring clevis pin (Figure 53) and move the control lever forward.
- E. Repeat this steps A through D until there is a gap approximately 1.6 mm (1/16 inch) between the control lever and the front reference bar.

- F. Remove the spring-clevis pin, rotate the turnbuckle clockwise 1-additional turn, and insert the spring-clevis pin (Figure 53).
5. Repeat steps 4A through 4 F for the other traction-control linkage.

# Hydraulic System Maintenance

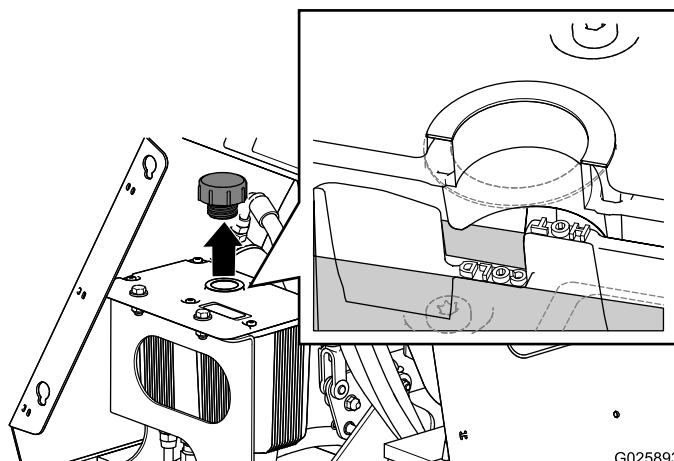
## Maintaining the Auxiliary Hydraulic System

Hydraulic oil type: AW-32 hydro oil

### Checking the Auxiliary Hydraulic Oil Level

**Service Interval:** Every 50 hours

1. Park the machine on a level surface.
2. Lower the tines to the ground.
3. Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
4. Remove the console pad; refer to [Removing the Console Pad](#) (page 27).
5. Clean area around hydraulic reservoir cap (Figure 54).



**Figure 54**

G025893

1. **Cold** oil level
2. **Hot** oil level

6. Remove the cap and check hydraulic oil level in the reservoir (Figure 54).

**Note:** The hydraulic oil level should cover the word **Cold** that is embossed into the baffle of the reservoir.

7. If necessary, add the specified hydraulic oil to the reservoir until the oil covers the **Cold** oil level on the baffle (Figure 54).

**Note:** The baffle on the reservoir is labeled **Hot** and **Cold**. You will fill the reservoir to the appropriate level depending upon the temperature of the oil. The oil level will vary with the temperature of the oil. The **Cold** level shows the level of the oil when it is at 24°C (75°F). The **Hot** level shows the level of oil when it is at 107°C (225°F).

For example: If the oil is at ambient-air temperature (about 24°C (75° F)), fill only to the **Cold** level. If the oil is about 65°C (150° F), fill to halfway between the **Hot** and **Cold** levels.

- Replace hydraulic reservoir cap and tighten until snug (Figure 54).

**Note:** Do not overtighten the reservoir cap.

- Install the console pad; refer to [Removing the Console Pad](#) (page 27).

## Changing the Auxiliary Hydraulic-Reservoir Oil and Filter

**Service Interval:** After the first 100 hours

Every 250 hours thereafter

- Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
- Carefully clean area around the front of the auxiliary pump, the fill cap for the reservoir, and the filter (Figure 55).

**Note:** It is important that no dirt or contamination enter hydraulic system.

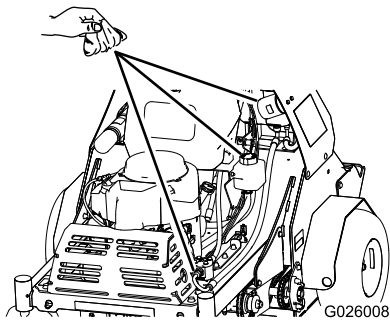


Figure 55

- At the front of the auxiliary-hydraulic pump, remove the inlet hose from the hydraulic fitting in the pump, place the end of the hose in a drain container, and allow oil to drain (Figure 56).

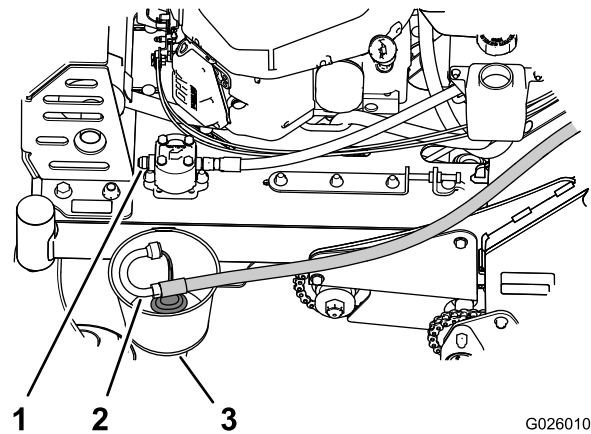


Figure 56

- Hydraulic fitting (auxiliary-hydraulic pump)
- Inlet hose
- Drain container

- Clean around the fitting for the hydraulic pump.
- Rotate the auxiliary-hydraulic filter counterclockwise and remove it from the base of the filter adapter (Figure 57).

**Note:** the filter to remove and allow oil to drain.

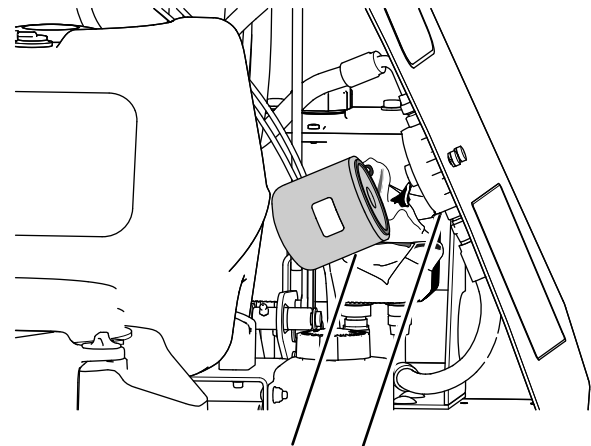


Figure 57

- Auxiliary-hydraulic filter
- Filter adapter

- Apply a thin coat of specified oil onto the seal of the new hydraulic filter.
- Install the filter by rotating it clockwise onto the filter adapter until the seal contacts the filter adapter, then tighten the filter an additional 2/3 to 3/4 turn (Figure 57).
- Install the inlet hose onto the fitting in the pump and torque the hose fitting to 50 N-m (37 ft-lb).
- Add the specified oil until the level reaches the Cold fill line located on the reservoir tank; refer to [Checking the Auxiliary Hydraulic Oil Level](#) (page 43).
- Start engine and raise and lower the tines.

- Lower the tines to the ground and refill the reservoir to the Cold fill line.

## Maintaining the Transmission

**Transmission oil type:** Toro® HYPR-OIL™ 500 hydraulic oil or Mobil® 1 15W-50 synthetic motor oil.

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

### Checking the Transmission Oil Level

**Service Interval:** Every 50 hours

- Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
- Allow the machine to cool off.
- Remove the cap from the expansion tank and check the hydraulic-oil level in the tank (Figure 58).

**Note:** The transmission-oil level should cover the Full Cold line molded into the side of the tank.

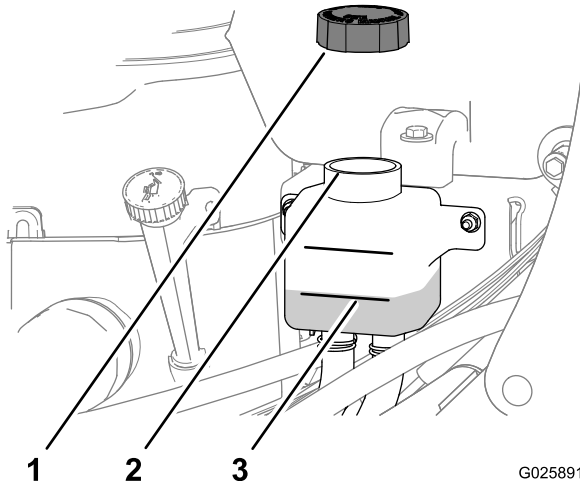


Figure 58

- Cap
- Filler neck (expansion tank)
- Full Cold line

- If necessary, add the specified transmission oil until the oil level is at the Full Cold line of the expansion tank (Figure 58).
- Replace expansion-tank cap and tighten it until snug.

**Note:** Do not overtighten the expansion-tank cap.

### Changing the Transmission Filters

**Service Interval:** After the first 100 hours  
Every 250 hours thereafter

**Note:** Do not change the hydraulic system oil (except for what can be drained when changing filter), unless the oil has been contaminated or been extremely hot.

- Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
- Raise the machine and support it with jack stands with a 460 kg (1,015 lb) capacity.
- Remove the 3 washer-head bolts (1/4 x 3/4 inch) that secure the filter guard to the transmission, and remove the guard (Figure 59).

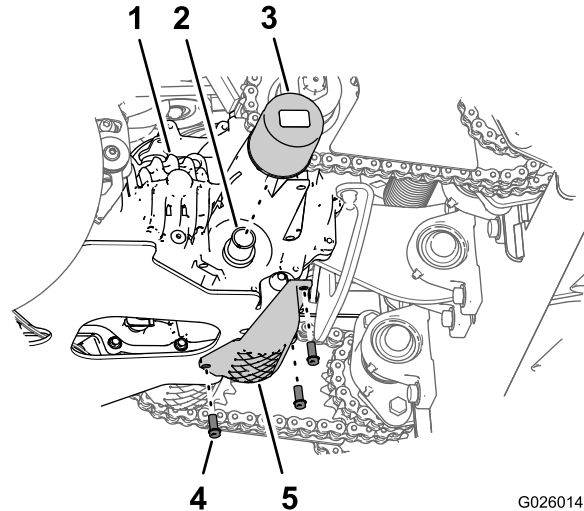


Figure 59

- Transmission
- Filter adapter
- Transmission filter
- Washer-head bolts (1/4 x 3/4 inch)
- Filter guard

- Clean the around the transmission filter (Figure 59).
- Align a drain pan under the filter.
- Rotate the filter counterclockwise and remove the filter (Figure 59).

**Note:** Allow the oil to completely drain from the filter adapter of the transmission.

- Apply a thin coat of specified oil onto the seal of the new transmission filter.
- Install the filter by rotating it clockwise onto the filter adapter until the seal contacts the base of the adapter, then tighten the filter an additional 3/4 to 1 turn (Figure 59).
- Install the filter guard with the 3 washer-head bolts (1/4 x 3/4 inch) that you removed in step 3 (Figure 59), and tighten the bolts to 1117 to 1243 N-cm (90 to 110 lb-in).

### Filling the Transmissions with Oil

**Service Interval:** After the first 100 hours  
Every 250 hours thereafter

- Raise the rear of machine up and support with jack stands (or equivalent support) just high enough to allow the drive wheels to turn freely.

## ⚠ CAUTION

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

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

2. Align a drain pan under the sight plugs of the transmissions (Figure 60 and Figure 61).

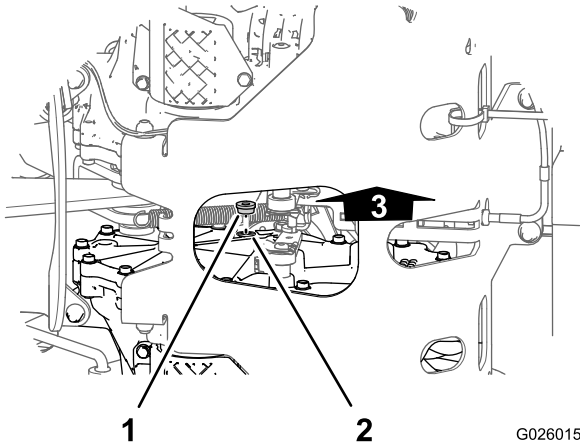


Figure 60

Left transmission shown

1. Sight plug
2. Sight-plug port
3. Up

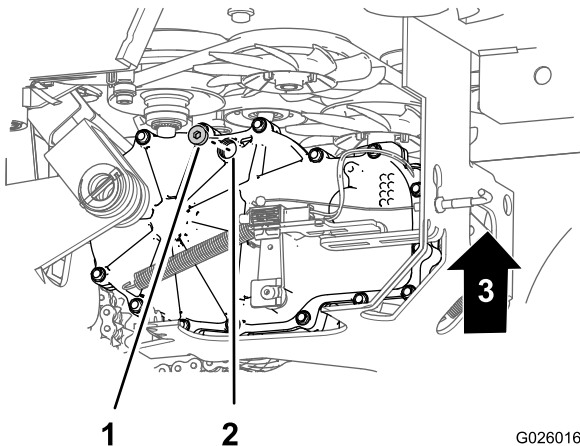


Figure 61

Left transmission shown

1. Sight plug
2. Sight-plug port
3. Up

3. At the inboard side of the transmission, near the top, remove the sight plug from 1 of the transmissions (Figure 60 and Figure 61).
4. Add the specified oil to the expansion tank until oil flow from the sight-plug port; refer to [Checking the Transmission Oil Level \(page 45\)](#).
5. Install the sight plug and torque it to 244 N-m (180 in-lb).
6. Repeat steps 3 through 5 for the other transmission.
7. Add the specified oil into the expansion tank until the oil level is at the Full Cold line of the tank.
8. Start the engine and move the throttle to the 1/2 engine speed position
9. Release the parking brake.
10. Slowly move the traction-control levers in the forward and reverse directions 5 to 6 times; refer to [Traction-Control Levers \(page 15\)](#).
- Note:** Cycling the traction-controls forward and reverse purges air from the transmissions.
11. Stopping the engine.
12. Check the oil level in the expansion tank, and add the specified oil as required; refer to [Checking the Transmission Oil Level \(page 45\)](#).
13. Repeat steps 8 through 12 until all the air is completely purged from the transmissions.
- Note:** The air is purged when the transmissions when the transmissions operate at normal noise levels and smoothly move forward and reverse at normal speeds.
14. Lower the machine and remove the jack stands.

# Tine Maintenance

## Checking the Tines

**Service Interval:** Before each use or daily

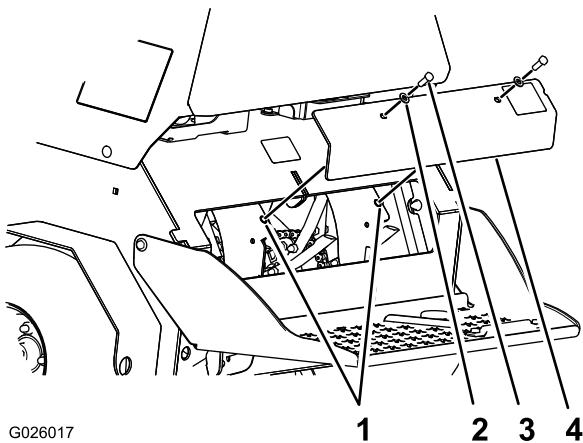
1. Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
2. Raise the machine and support it with jack stands with a 460 kg (1,015 lb) capacity.

### ⚠ CAUTION

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

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

3. Remove the 2 bolt (3/8 x 1 inch) and 2 washers (3/8 inch) that secure the rear-cover panel to the chassis, and remove the panel (Figure 62).



G026017

**Figure 62**

- |                      |                        |
|----------------------|------------------------|
| 1. Chassis holes     | 3. Bolt (3/8 x 1 inch) |
| 2. Washer (3/8 inch) | 4. Rear panel          |

4. Remove rocks and other debris from the tines.
5. Inspect the tines for wear and damage.

**Note:** Replace any tines that are worn or damaged.

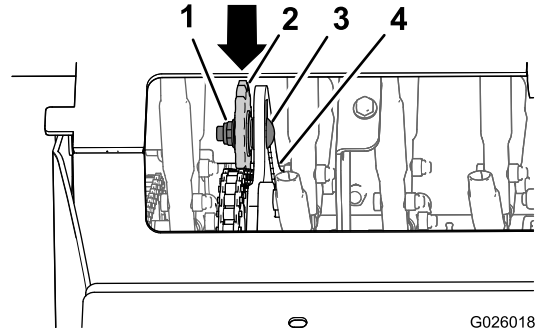
6. Align the holes in the rear-cover panel to the holes in the chassis (Figure 62).
7. Secure the cover panel to the chassis with the 2 bolts and 2 washers (Figure 62) that you removed in step 3, and torque the bolts to 37 to 45 N-m (27 to 33 lb-in)

## Adjusting the Tine-Drive Chain

1. Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
2. Remove the rear cover; refer to step 3 of [Checking the Tines](#) (page 47).
3. Check the chains on both sides of the machine for proper tension.

**Note:** The chains should move up and down 6 to 12 mm (1/4 to 1/2 inch).

4. Loosen the lock nut and carriage bolt that secure the idler sprocket (Figure 63).



G026018

**Figure 63**

- |                   |                       |
|-------------------|-----------------------|
| 1. Lock nut       | 3. Carriage bolt      |
| 2. Idler sprocket | 4. Slot (trail plate) |

5. Increase or decrease chain tension by performing the following:
  - Push down and forward on the sprocket to increase the chain tension as shown in [Figure 63](#).
  - Lift up and back on the sprocket to decrease the chain tension.
6. Torque the lock nut to 91 to 113 N-m (67 to 83 ft-lb).
7. Check the chain tension and if necessary repeat steps 4 through 6 until you can move the chain up and down 6 to 12 mm (1/4 to 1/2 inch).
8. Install the rear panel; refer to steps 6 and 7 of [Checking the Tines](#) (page 47).

# Cleaning

## Cleaning the Engine and the Exhaust System Area

**Service Interval:** Before each use or daily (may be required more often in dry or dirty conditions.)

### ⚠ CAUTION

Excessive debris around engine cooling air intake and exhaust system area can cause engine, exhaust area, and hydraulic system to overheat which can create a fire hazard.

Clean all debris from engine and exhaust system area.

1. Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
2. Clean all debris from screen at the top of the engine, around engine shrouding, and exhaust system area.
3. Wipe up any excessive grease or oil around the engine and exhaust system area.

## Removing the Engine Shrouds and Cleaning the Cooling Fins

**Service Interval:** Every 80 hours

1. Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
2. Remove cooling shrouds from engine.
3. Clean cooling fins of the engine.

**Note:** Also clean dust, dirt, and oil from external surfaces of engine which can cause improper cooling.

4. Install the cooling shrouds into the engine.

**Note:** Operating the engine without cooling shrouds will cause engine damage due to overheating.

## Cleaning the Debris from the Machine

**Service Interval:** Before each use or daily

1. Stop the engine, set the parking brake, remove the key, and wait for all moving parts to stop before leaving the operating position.
2. Clean off any oil, debris, or grass buildup on the machine and aerator deck.

3. Clean off any debris or grass under the chain guards, around the fuel tank, and around the engine and exhaust area.

## Waste Disposal

### Disposing of the Engine Oil

Engine oil and hydraulic oil are both pollutants to the environment. Dispose of used oil at a certified recycling center or according to your state and local regulations.

### Disposing of the Battery

#### ⚠ DANGER

Battery electrolyte contains sulfuric acid, which is poisonous and can cause severe burns. Swallowing electrolyte can be fatal or if it touches skin can cause severe burns.

- Wear safety glasses to shield eyes, and rubber gloves to protect skin and clothing when handling electrolyte.
- Do not swallow electrolyte.
- In the event of an accident, flush with water and call a doctor immediately.

Federal law states that batteries should not be placed in the garbage. Management and disposal practices for batteries must follow relevant federal, state, or local laws.

If a battery is being replaced or if the machine containing the battery is no longer operating and is being scrapped, remove the battery and take it to a local certified recycling center. If no local recycling is available return the battery to any certified battery reseller.



# Storage

1. Raise the tines, stop the machine, stop the engine, set the parking brake, and remove the key.
2. Remove dirt and grime from the entire machine.

**Important:** You can wash the machine with mild detergent and water. Do not pressure wash the machine. Avoid excessive use of water, especially near the engine and hydrostatic drive.

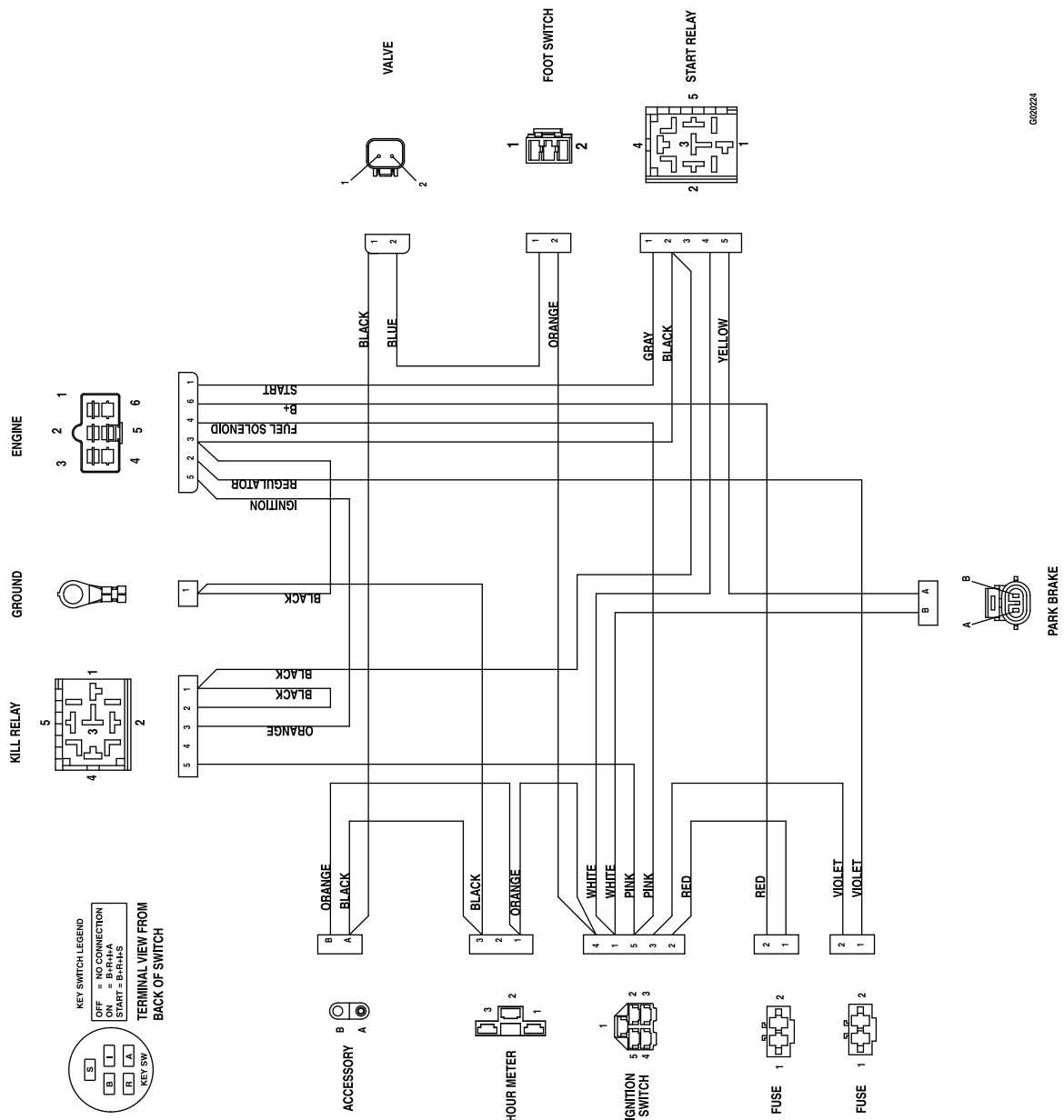
3. Service the air cleaner; refer to [Servicing the Air Cleaner \(page 30\)](#).
4. Lubricate the machine; refer to [Lubricating the Grease Fittings \(page 28\)](#).
5. Change the engine oil; refer to [Changing the Engine Oil \(page 31\)](#).
6. Check and tighten all bolts, nuts, and screws. Repair or replace any part that is damaged.
7. Paint all scratched or bare metal surfaces. Paint is available from your Authorized Service Dealer.
8. Store the machine in a clean, dry garage or storage area.
9. Cover the machine to protect it and keep it clean.

# Troubleshooting

Problem	Possible Cause	Corrective Action
The starter does not crank.	<ol style="list-style-type: none"> <li>1. The parking brake is not set.</li> <li>2. The brake switch is not adjusted properly.</li> <li>3. The battery does not have a full charge.</li> <li>4. The electrical connections are corroded, loose or faulty.</li> <li>5. A fuse is blown.</li> <li>6. A relay or switch is defective.</li> </ol>	<ol style="list-style-type: none"> <li>1. Set the parking brake.</li> <li>2. Adjust the brake switch.</li> <li>3. Charge the battery.</li> <li>4. Check the electrical connections for good contact. Clean the connector terminals thoroughly with electrical contact cleaner, apply dielectric grease, and reconnect.</li> <li>5. Replace the blown fuse.</li> <li>6. Contact an Authorized Service Dealer.</li> </ol>
The engine will not start, starts hard, or fails to keep running.	<ol style="list-style-type: none"> <li>1. The fuel tank is empty.</li> <li>2. The fuel shutoff valve is closed.</li> <li>3. The throttle and choke are not in the correct position.</li> <li>4. There is dirt in the fuel filter.</li> <li>5. There is dirt, water, or stale fuel is in the fuel system.</li> <li>6. The air cleaner is dirty.</li> <li>7. The electrical connections are corroded, loose or faulty.</li> <li>8. A relay or switch is defective.</li> <li>9. The spark plug is faulty.</li> <li>10. The spark-plug wire is not connected.</li> </ol>	<ol style="list-style-type: none"> <li>1. Fill the fuel tank.</li> <li>2. Open the fuel shutoff valve.</li> <li>3. Be sure the throttle level is midway between the Slow and Fast positions, and the choke is in the On position for a cold engine or the Off position for a warm engine.</li> <li>4. Replace the fuel filter.</li> <li>5. Contact an Authorized Service Dealer.</li> <li>6. Clean or replace the air cleaner element.</li> <li>7. Check the electrical connections for good contact. Clean connector terminals thoroughly with electrical contact cleaner, apply dielectric grease, and reconnect.</li> <li>8. Contact an Authorized Service Dealer.</li> <li>9. Clean, adjust, or replace the spark plug.</li> <li>10. Check the spark-plug wire connection.</li> </ol>
The engine loses power.	<ol style="list-style-type: none"> <li>1. The engine load is excessive.</li> <li>2. The air cleaner is dirty.</li> <li>3. The oil level in the crankcase is low.</li> <li>4. The cooling fins and air passages for the engine are plugged.</li> <li>5. There is dirt in the fuel filter.</li> <li>6. There is dirt, water, or stale fuel is in the fuel system.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce the ground speed or aeration depth.</li> <li>2. Clean or replace the air cleaner element.</li> <li>3. Add oil to the crankcase.</li> <li>4. Remove the obstructions from the cooling fins and air passages.</li> <li>5. Replace the fuel filter.</li> <li>6. Contact an Authorized Service Dealer.</li> </ol>
The engine overheats.	<ol style="list-style-type: none"> <li>1. The engine load is excessive.</li> <li>2. The oil level in the crankcase is low.</li> <li>3. The cooling fins and air passages for the engine are plugged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reduce the ground speed or aeration depth.</li> <li>2. Add oil to the crankcase.</li> <li>3. Remove the obstructions from the cooling fins and air passages.</li> </ol>
The machine pulls left or right (with levers fully forward).	<ol style="list-style-type: none"> <li>1. The tire pressure in drive tires is not correct.</li> <li>2. The tracking needs adjustment.</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the tire pressure in the drive tires.</li> <li>2. Adjust the traction-control linkage.</li> </ol>

<b>Problem</b>	<b>Possible Cause</b>	<b>Corrective Action</b>
The machine does not drive.	<ol style="list-style-type: none"> <li>1. The transmission belt worn, loose or broken.</li> <li>2. The transmission belt is off a pulley.</li> </ol>	<ol style="list-style-type: none"> <li>1. Change the belt.</li> <li>2. Change the belt.</li> </ol>
There is abnormal vibration.	<ol style="list-style-type: none"> <li>1. A tine is bent.</li> <li>2. The tine mounting bolt is loose.</li> <li>3. The engine mounting bolts are loose.</li> <li>4. There is a loose engine pulley or idler pulley.</li> <li>5. The engine pulley is damaged.</li> <li>6. A belt is damaged.</li> <li>7. The chains are not properly tensioned.</li> </ol>	<ol style="list-style-type: none"> <li>1. Install a new tine.</li> <li>2. Tighten the tine mounting bolt.</li> <li>3. Tighten the engine mounting bolts.</li> <li>4. Tighten the appropriate pulley.</li> <li>5. Contact an Authorized Service Dealer.</li> <li>6. Install a new belt.</li> <li>7. Check the jackshaft drive chain tension, the drive wheel chain tension, and the tine drive chain tension.</li> </ol>
The tines do not raise.	<ol style="list-style-type: none"> <li>1. There is an auxiliary pump belt problem.</li> <li>2. The tine down pressure setting is too low.</li> <li>3. There is a short in the wiring harness.</li> <li>4. The auxiliary reservoir is low on oil.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tension or replace the belt.</li> <li>2. Increase the down pressure.</li> <li>3. Contact an Authorized Service Dealer.</li> <li>4. Add oil to the reservoir.</li> </ol>
The tines do not engage the ground.	<ol style="list-style-type: none"> <li>1. The tine down pressure setting is too low.</li> <li>2. The harness/switch is damaged.</li> <li>3. The auxiliary reservoir is low on oil.</li> <li>4. The cylinder stop is in place (model 39518).</li> </ol>	<ol style="list-style-type: none"> <li>1. Increase the tine down pressure.</li> <li>2. Contact an Authorized Service Dealer.</li> <li>3. Add oil to the reservoir.</li> <li>4. Remove the cylinder stop, clevis pin, and hair pin.</li> </ol>

# Schematics

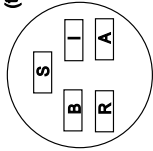


000024

Electrical Diagram (Rev. A)

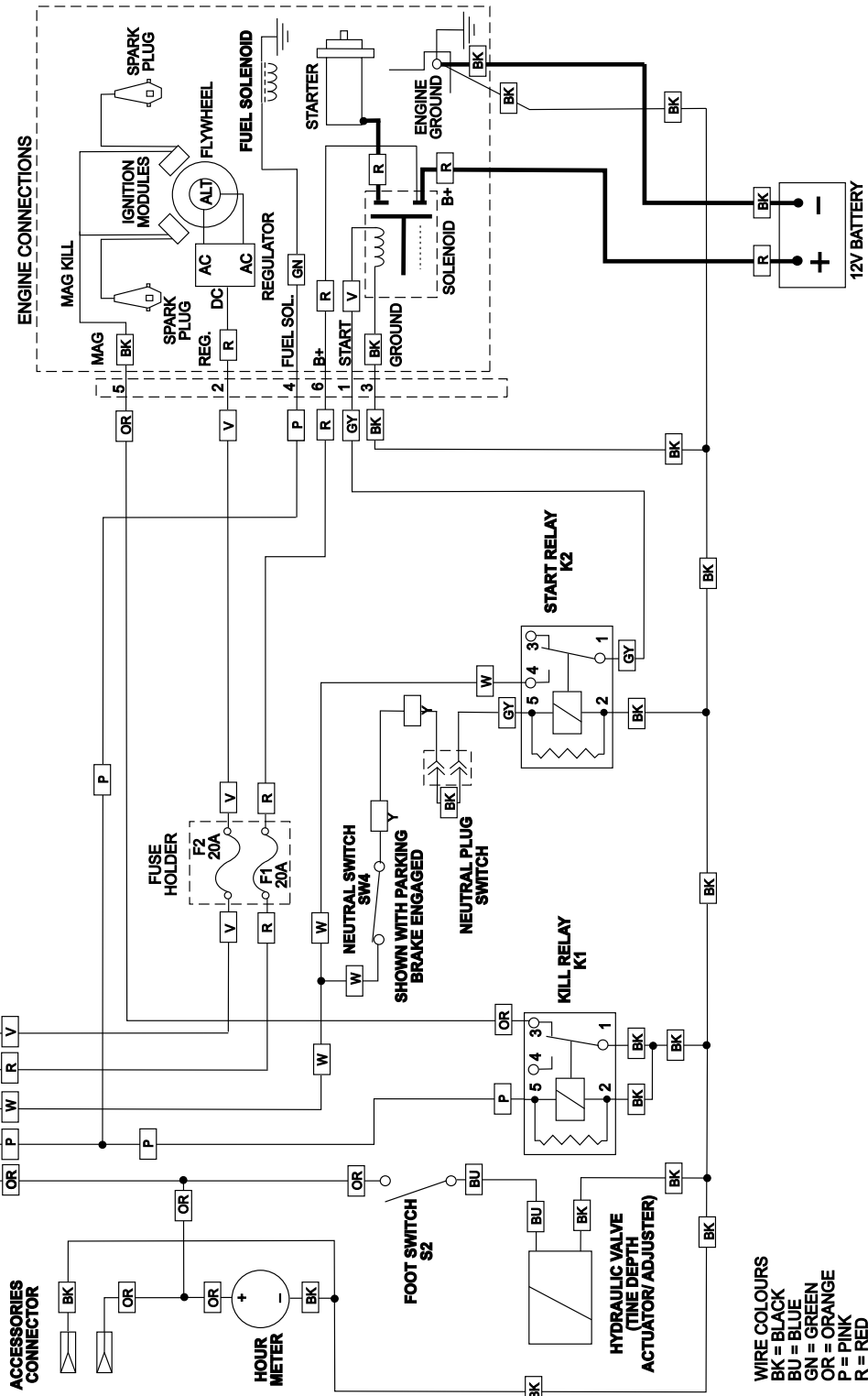
G020225

KEY SWITCH  
(terminals as viewed on rear of switch)



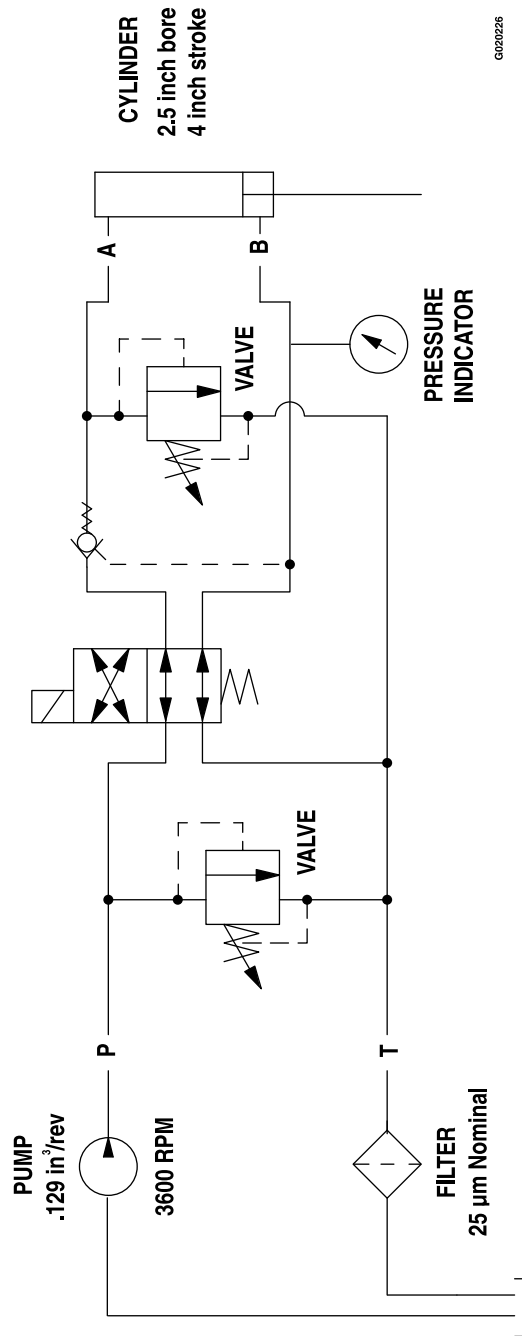
START = Terminals BRIS connected together  
ON = Terminals BR1A connected together  
OFF = No connections

KEY SWITCH  
S1



WIRE COLOURS  
BK = BLACK  
BU = BLUE  
GN = GREEN  
OR = ORANGE  
P = PINK  
R = RED  
V = VIOLET  
W = WHITE

Electrical Schematic (Rev. A)



G020226

Hydraulic Diagram (Rev. A)

**Notes:**



# The Toro Warranty

A limited warranty (see warranty periods below)

SWS  
Turf Renovation

## Conditions and Products Covered

The Toro Company and its affiliate, Exmark Warranty Company, pursuant to an agreement between them, jointly warrant your Exmark Products listed below to be free from defects in materials or workmanship.

This warranty covers the cost of parts and labor, but you must pay transportation costs.

The following time periods apply from the date of purchase:

Products	Warranty Period
Turf Renovation	
Walk-Behind Aerator	1 year
• Engine	2 years
Stand-On Aerator	1 year
• Battery	90 days Parts and Labor
	1 year Parts Only
• Engine	2 years
Dethatcher	1 year
• Engine	2 years
Turf Seeder	1 year
• Engine	2 years
Stand-On Spreader Sprayer	1 year
• Battery	90 days Parts and Labor
	1 year Parts Only
• Engine	2 years
Walk-Behind Rotary Broom	1 year
• Engine	2 years

Where a warrantable condition exists, we will repair the Product at no cost to you including diagnosis, labor, and parts.

## Instructions for Obtaining Warranty Service

If you think that your Exmark Product contains a defect in materials or workmanship, follow this procedure\*\*:

1. Contact any Authorized Servicing Outlet to arrange service at their dealership. To locate one convenient to you, access our website at [www.Toro.com](http://www.Toro.com). Select "Where to Buy" and select "Contractor" under product type. You may also call our toll free number below.
2. Bring the product and your proof of purchase (sales receipt) to them.
3. If for any reason you are dissatisfied with the Service Outlet's analysis or with the assistance provided, contact us at:

SWS Customer Care Department  
Exmark Warranty Company  
8111 Lyndale Avenue South  
Bloomington, MN 55420-1196  
Toll Free: 888-384-9940

\*\*Toro Authorized Rental Customers who have purchased products directly from Toro and have signed the Toro Rental Customer Agreement have the ability to perform their own warranty work. Please visit Toro's Rental Portal for electronic warranty claim filing procedures or call the toll free number above.

## Owner Responsibilities

You must maintain your Exmark Product by following the maintenance procedures described in the *Operator's Manual*. Such routine maintenance, whether performed by a dealer or by you, is at your expense. Parts

scheduled for replacement as required maintenance ("Maintenance Parts"), are warranted for the period of time up to the scheduled replacement time for that part. Failure to perform required maintenance and adjustments can be grounds for disallowing a warranty claim.

## Items and Conditions Not Covered

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

- Product failures which result from installation and use of add-on, modified, or unapproved accessories
- Failure to perform required maintenance and/or adjustments
- Repairs necessary due to failure to follow recommended fuel procedure (consult *Operator's Manual* for more details)
  - Removing contaminants from the fuel system is not covered
  - Use of old fuel (more than one month old) or fuel which contains more than 10% ethanol or more than 15% MTBE
  - Failure to drain the fuel system prior to any period of non-use over one month
- Product failures which result from operating the product in an abusive, negligent or reckless manner
- Parts subject to consumption through use unless found to be defective. Examples of parts which are consumed, include, belts, cutters, blades, teeth, spark plugs, tires, filters, etc.
- Failures caused by outside influence include, weather, storage, contamination, lubricants, additives, or chemicals, etc.
- Normal "wear and tear" items includes painted surfaces and scratched decals, etc.
- Any component covered by a separate manufacturer's warranty
- Pickup and delivery charges

## General Conditions

Repair by an Authorized Servicing Outlet or Self-Service as an Authorized Rental Customer is your sole remedy under the warranty.

**Neither The Toro Company nor Exmark Warranty Company is liable for indirect, incidental or consequential damages in connection with the use of the Exmark Products covered by this warranty, including any cost or expense of providing substitute equipment or service during reasonable periods of malfunction or non-use pending completion of repairs under this warranty. All implied warranties of merchantability 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.

Except for the engine warranty coverage and the Emissions warranty referenced below, if applicable, there is no other express 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) or the California Air Resources Board (CARB). Refer to the California Emission Control Warranty Statement supplied with your Product or contained in the engine manufacturer's documentation for details.

## Countries Other than the United States or Canada

Customers who have purchased Exmark products outside the United States or Canada should contact their Exmark Distributor (Dealer) to obtain guarantee policies for your country, province, or state. If for any reason you are dissatisfied with your Distributor's service or have difficulty obtaining guarantee information, contact the Exmark importer. If all other remedies fail, you may contact us at Exmark Warranty Company.

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