Form No. 3409-679 Rev D

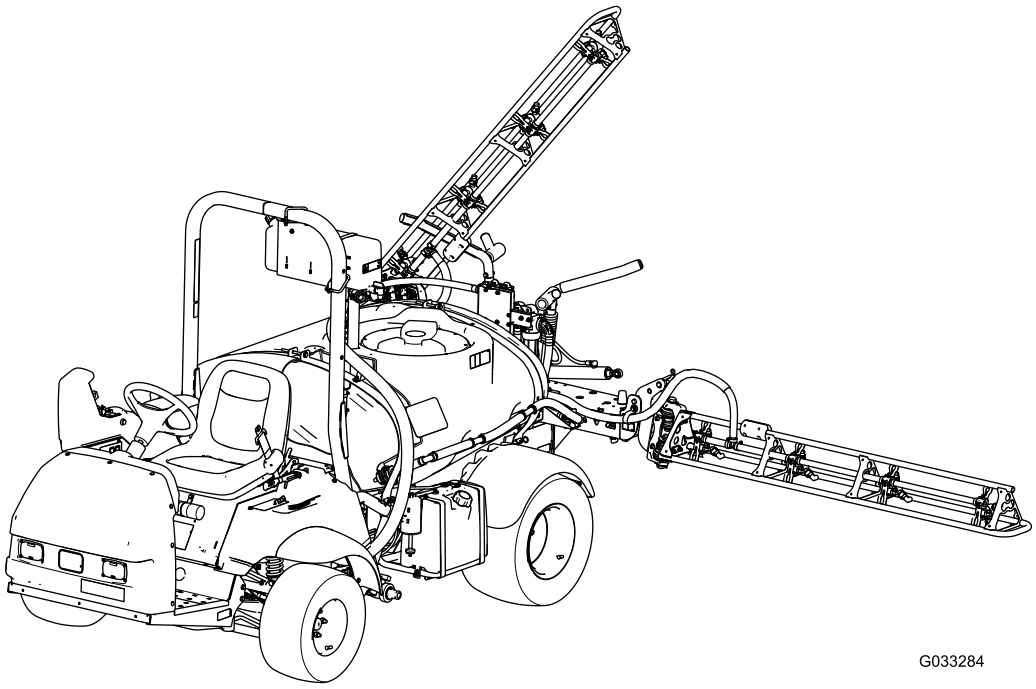
TORO®

Count on it.

Operator's Manual

Multi Pro® 1750 Turf Sprayer

Model No. 41188—Serial No. 400000000 and Up



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

CE

3409-679 D

The Multi Pro turf sprayer is a dedicated turf spray application vehicle and is intended to be used by professional, hired operators in commercial applications. It is primarily designed for spraying on well-maintained lawns in parks, golf courses, sports fields, and on commercial grounds.

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

⚠ WARNING

CALIFORNIA
Proposition 65 Warning

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

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

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

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

This spark ignition system complies with Canadian ICES-002

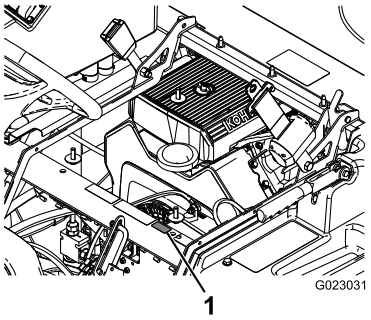
The enclosed *Engine Owner's Manual* is supplied for information regarding the US Environmental Protection Agency (EPA) and the California Emission Control Regulation of emission systems, maintenance, and warranty. Replacements may be ordered through the engine manufacturer.

Introduction

Read this manual carefully to learn how to operate and maintain your product properly. The information in this manual can help you and others avoid injury and product damage. Although Toro designs and produces safe products, you are responsible for operating the product properly and safely.

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

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



g023031

Figure 1

1. Location of the model and serial numbers

Model No. _____

Serial No. _____

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

g000502

Figure 2

1. Safety-alert symbol

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

8111 Lyndale Avenue South
Bloomington, MN 55420

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

Contents

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 always pay attention to the safety-alert symbol, which means Caution, Warning, or Danger. Failure to comply with the instruction may result in personal injury or death.

The machine was evaluated to the requirements of SAE J2258.

General Safety

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

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

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

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

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

Safe Operating Practices

Important: **The machine is designed primarily as an off-road vehicle and is not intended for extensive use on public roads. When using the machine on public roads, follow all traffic regulations and use any additional accessories that may be required by law, such as lights, turn signals, slow-moving-vehicle (SMV) sign, and others as required.**

The Multi Pro 1750 Turf Sprayer was designed and tested to offer safe service when operated and maintained properly. Although hazard control and accident prevention partially are dependent upon the design and configuration of the machine, these factors are also dependent upon the awareness, concern, and proper training of the personnel involved in the operation, maintenance and storage of the machine. Improper use or maintenance of the machine can result in injury or death.

Not all of the attachments that adapt to the Multi Pro 1750 Turf Sprayer are covered in this manual. See the specific operator's manual provided with each attachment for additional safety instructions. Read these manuals.

To reduce the potential for injury or death, comply with the following safety instructions:

Supervisor's Responsibilities

- Make sure that operators are thoroughly trained and familiar with the *Operator's Manual*, engine manual, and all labels on the machine.
- Establish your own special procedures and work rules for unusual operating conditions (e.g., slopes too steep for sprayer operation).

Before Operating

- Operate the machine only after reading and understanding the contents of this manual.
- Never allow children to operate the machine.
- This machine is designed to carry the operator. Never carry any passengers on the machine.
- Never operate the sprayer when ill, tired, or under the influence of drugs or alcohol.
- Become familiar with the controls and know how to shut off the engine quickly.
- Keep all shields, safety devices, and decals in place. If a shield, safety device, or decal is malfunctioning, illegible, or damaged, repair or replace it before operating the machine.
- Wear appropriate clothing; including safety glasses, long pants, substantial slip-resistant footwear, gloves, and hearing protection. Do not wear jewelry or loose clothing. Tie back long hair.

⚠ CAUTION

This machine produces sound levels in excess of 85 dBA at the operator's ear and can cause hearing loss through extended periods of exposure.

Wear hearing protection when operating this machine.

- Operate only in daylight or good artificial light.
- Never spray with bystanders present.
- Never spray while people, especially children or pets are nearby.
- Before operating the machine, always check the designated areas of the sprayer that are stated in the Pre-Starting Checks in the Operation section. If the machine does not function correctly or is damaged in any way, do not use the sprayer. Make sure that the problem is corrected before the sprayer or attachment is operated.
- Make sure that the operator's area is clean and free from chemical residue and debris buildup.
- Ensure that all fluid line connectors are tight and all hoses are in good condition before applying pressure to the system.

Chemical Safety

⚠ WARNING

- **Chemical substances used in the sprayer system may be hazardous and toxic to you, bystanders, animals, plants, soils or other property.**
- **Carefully read and follow the chemical warning labels and material safety data sheets (MSDS) for all chemicals used and protect yourself according to the chemical manufacturer's recommendations. Ensure that as little skin as possible is exposed while using chemicals. Use appropriate personal protective equipment (PPE) to guard against personal contact with chemicals, such as:**
  - **safety glasses, goggles, and/or face shield**
  - **respirator or filter mask**
  - **chemical resistant gloves**
  - **rubber boots or other substantial footwear**
  - **hearing protection**
  - **clean change of clothes, soap, and disposable towels, to be kept on hand, in the event of a chemical spill.**

Important: **Keep in mind that there may be more than 1 chemical used, and information on each chemical should be assessed.**

Refuse to operate or work on the sprayer if this information is not available.

Before working on a sprayer system, make sure that the system has been triple rinsed and neutralized according to the recommendations of the chemical manufacturer(s) and all of the valves have been cycled 3 times.

Verify there is an adequate supply of clean water and soap nearby, and immediately wash off any chemicals that contact you.

- Obtain proper training before using or handling chemicals.
- Use the correct chemical for the job.
- Follow the chemical manufacturer's instructions for the safe application of the chemical. Do not exceed recommended system application pressure.
- Do not fill, calibrate, or clean the unit when people, especially children, or pets are in the area.
- Handle chemicals in a well ventilated area.
- Have clean water available especially when filling the spray tank.
- Do not eat, drink, or smoke while working with chemicals.
- Do not clean spray nozzles by blowing through them or placing in your mouth.
- Always wash your hands and other exposed areas as soon as possible after you finish working with chemicals.
- Keep chemicals in their original packages and stored in a safe location.
- Properly dispose of unused chemicals and chemical containers as instructed by the chemical manufacturer and your local codes.
- Chemicals and fumes are dangerous; never enter the tank or place your head over or in the opening of a tank.
- Follow all local, state, and federal regulations for spreading or spraying chemicals.

While Operating

⚠ WARNING

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

Do not run engine indoors or in an enclosed area.

- Remain seated whenever the sprayer is in motion. Keep both hands on the steering wheel whenever possible. Keep your arms and legs within the operator's compartment at all times.

- Failure to operate the machine safely may result in an accident, tip over of the sprayer, and serious injury or death. Drive carefully. To prevent tipping or loss of control:
  - Use extreme caution, reduce speed, and maintain a safe distance around sand traps, ditches, creeks, ramps, unfamiliar areas, or any areas that have abrupt changes in ground conditions or elevation.
  - Watch for holes or other hidden hazards.
  - Use extra caution when operating the machine on wet surfaces, in adverse weather conditions, at higher speeds, or with a full load. Stopping time and distance increases with a full load.
  - Avoid sudden stops and starts. Do not go from reverse to forward or forward to reverse without first coming to a complete stop.
  - Slow down before turning. Do not attempt sharp turns or abrupt maneuvers or other unsafe driving actions that may cause a loss of sprayer control.
  - Before backing up, look to the rear and ensure that no one is behind you. Back up slowly.
  - Watch out for traffic when you are near or crossing roads. Always yield the right of way to pedestrians and other vehicles. This sprayer is not designed for use on streets or highways. Always signal your turns or stop early enough so that other people know what you plan to do. Obey all traffic rules and regulations.
  - The electrical and exhaust systems of the sprayer can produce sparks capable of igniting explosive materials. Never operate the sprayer in or near an area where there is dust or fumes in the air which are explosive.
  - If you are ever unsure about safe operation, stop work and ask your supervisor.
- Do not touch the engine or muffler while the engine is running or soon after it has shut off. These areas may be hot enough to cause burns.
- If the machine ever vibrates abnormally, stop immediately, wait for all motion to stop, and inspect the sprayer for damage. Repair all damage before resuming operation.
- Before getting off the seat:
  1. Stop the machine.
  2. Place the range selector in the NEUTRAL position and set the parking brake.
  3. Turn the ignition key to the OFF position.
  4. Remove the ignition key.

Important: **Do not park the machine on an incline.**

- 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.

Braking

- Slow down before you approach an obstacle. This gives you extra time to stop or turn away. Hitting an obstacle can damage the machine and its contents. More important, it can injure you.
- Gross Vehicle Weight (GVW) has a major impact on your ability to stop and/or turn. Heavy loads and attachments make a machine harder to stop or turn. The heavier the load, the longer it takes to stop.
- Turf and pavement are much more slippery when they are wet. It can take 2 to 4 times as long to stop on wet surfaces as on dry surfaces. If you drive through standing water deep enough to get the brakes wet, they will not work well until they are dry. After driving through water, you should test the brakes to make sure that they work properly. If they do not, drive slowly while putting light pressure on the brake pedal. This will dry the brakes out.

ROPS Safety

Note: For each machine covered in this *Operator's Manual*, a cab installed by Toro is a ROPS.

- Do not remove the ROPS from the machine.
- Fasten the seat belt and ensure that you can release it quickly in an emergency. Always wear your seat belt when the roll bar is up or on a machine with a cab installed by Toro.
- Check carefully for overhead obstructions and do not contact them.
- Keep the ROPS in safe operating condition by thoroughly inspecting it periodically for damage and keeping all the mounting fasteners tight.
- Replace any damaged ROPS component. Do not repair or alter it.

Operating on Hills and Rough Terrain

Operating the sprayer on a hill may cause tipping or rolling of the machine, or the engine may stall and you could lose headway on the hill. This could result in personal injury.

- Do not accelerate quickly or suddenly apply the brakes when backing down a hill, especially with a load.

- Never drive across a steep hill; always drive straight up or down or go around the hill.
- If the engine stalls or you begin to lose headway while climbing a hill, gradually apply the brakes and slowly back straight down the hill.
- Turning while traveling up or down hills can be dangerous. If you have to turn while on a hill, do it slowly and cautiously. Never make sharp or fast turns.
- Heavy loads affect stability. Reduce the weight of the load and your speed when operating on hills.
- Avoid stopping on hills, especially with a load. Stopping while going down a hill will take longer than stopping on level ground. If you must stop the machine, avoid sudden speed changes, which may initiate tipping or rolling of the machine. Do not suddenly apply the brakes when rolling backward, as this may cause the machine to overturn.
- Use the seat belt when operating the machine and be certain that it can be released quickly in the event of an emergency.
- Do not remove or alter the rollover protection system (ROPS).
- Always keep the transmission in gear when you drive the machine down a slope.
- Reduce speed and load when operating on rough terrain, uneven ground, and near curbs, holes, and other sudden changes in terrain. Loads may shift, causing the machine to become unstable.

⚠ WARNING

Sudden changes in terrain may cause abrupt steering wheel movement, possibly resulting in hand and arm injuries.

Grip the steering wheel loosely around the perimeter. Keep your hands clear of the steering wheel spokes

Loading

The weight of the cargo can change the center of gravity of the machine and the handling of it. To avoid loss of control and personal injury, follow these guidelines:

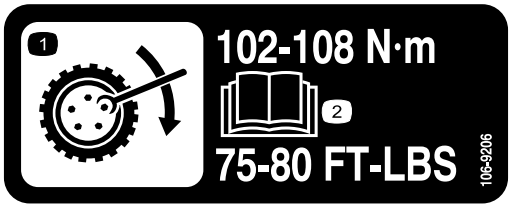
- Liquid loads can shift. This shifting happens most often while turning, going up or down hills, suddenly changing speeds, or while driving over rough surfaces. Shifting loads can cause the machine to tip over.
- When operating with a heavy load, reduce your speed and allow for sufficient braking distance. Do not suddenly apply the brakes. Use extra caution on slopes.
- Be aware that heavy loads increase your stopping distance and reduce your ability to turn quickly without tipping over.

Maintenance

- Only permit qualified and authorized personnel to maintain, repair, adjust, or inspect the machine.
- Before servicing or making adjustments to the machine, park the machine on a level surface, engage the parking brake, shut off the engine, and remove the key to prevent someone from accidentally starting the engine.
- To make sure that the entire machine is in good condition, keep all nuts, bolts, and screws properly tightened.
- To reduce the potential for fire, keep the engine area free of excessive grease, grass, leaves, and accumulation of dirt.
- Never use an open flame to check the level or leakage of fuel or battery electrolyte.
- If you must run the engine to perform a maintenance adjustment, keep your hands, feet, clothing, and any parts of your body away from the engine and any moving parts. Keep everyone away.
- Do not use open pans of fuel or flammable cleaning fluids when cleaning parts.
- Do not adjust the traction control speed. To ensure safety and accuracy, have an Authorized Toro Distributor check the ground speed.
- Keep your body and hands away from pinhole leaks or nozzles that eject high-pressure fluid. Use cardboard or paper to find leaks. Fluid escaping under pressure can penetrate skin and cause injury requiring surgery within a few hours by a qualified surgeon; otherwise, gangrene may result.
- If major repairs are ever needed or assistance is required, contact an Authorized Toro Distributor.
- To be sure of optimum performance and safety, always purchase genuine Toro replacement parts and accessories. Replacement parts and accessories made by other manufacturers could be dangerous. Altering this machine in any manner that may affect sprayer operation, performance, durability, or its use, may result in injury or death. Such use could void the product warranty.

Safety and Instructional Decals

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



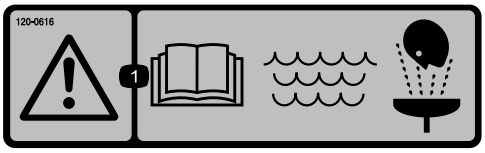
decal106-9206

106-9206

1. Wheel torque specifications
2. Read the *Operator's Manual*.

decal117-2718

117–2718



decal120-0616

120–0616

1. Warning—read the *Operator's Manual*; use fresh, clean water for first-aid washing.

decal120-0617

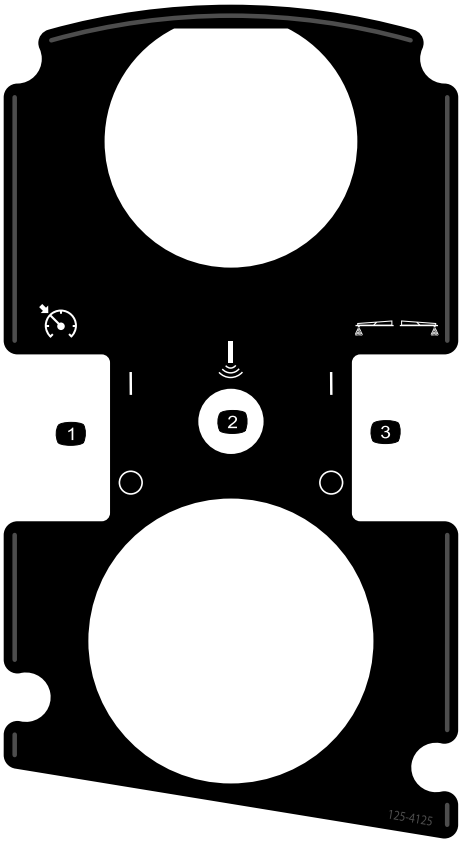
120–0617

1. Severing hazard of hand, pinching point—keep away from actuated joints.
2. Crushing hazard—keep bystanders away from the machine.

decal120-0622

120–0622

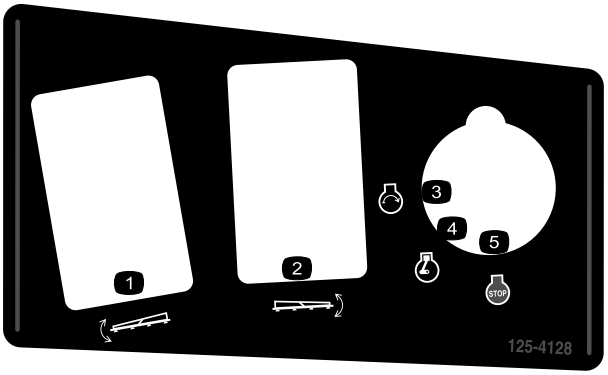
1. Warning—read the *Operator's Manual*.
2. Warning—do not enter the sprayer tank.
3. Chemical burn hazard; toxic gas inhalation hazard—wear hand and skin protection; wear eye and respiratory protection.



decal125-4125

125–4125

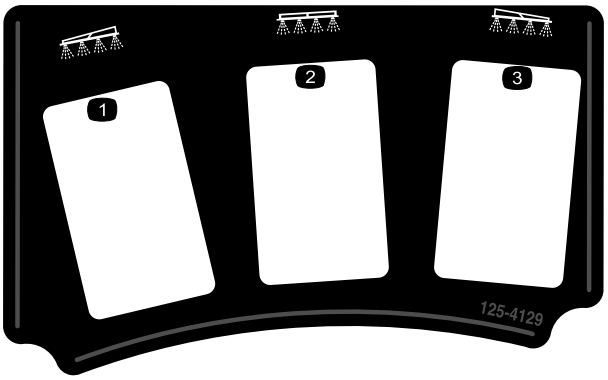
1. Turn the throttle lock/speed lock on/off
2. Sonic boom (optional)
3. Turn the foam makers on/off (optional)



decal125-4128

125–4128

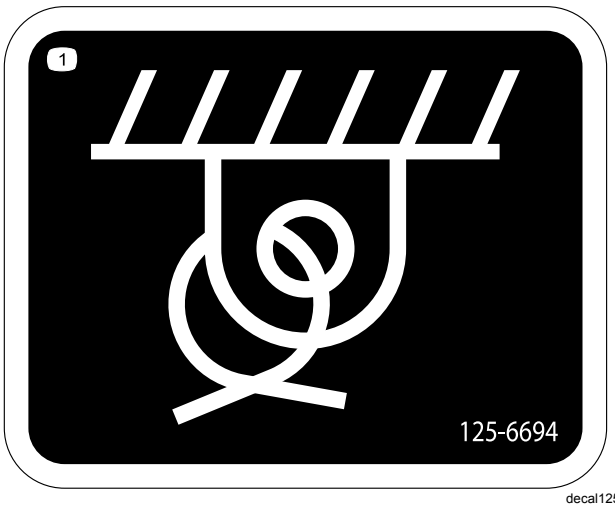
1. Raise/lower left section
2. Raise/lower right section
3. Engine—start
4. Engine—run
5. Engine—shut off



decal125-4129

125–4129

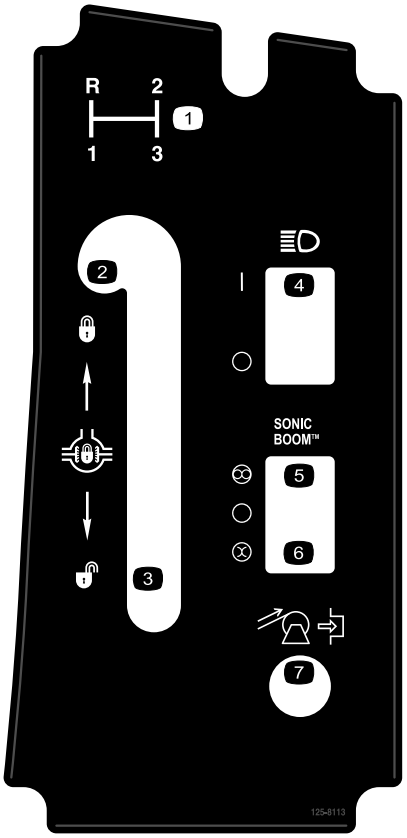
1. Left section
2. Center section
3. Right section



decal125-6694

125–6694

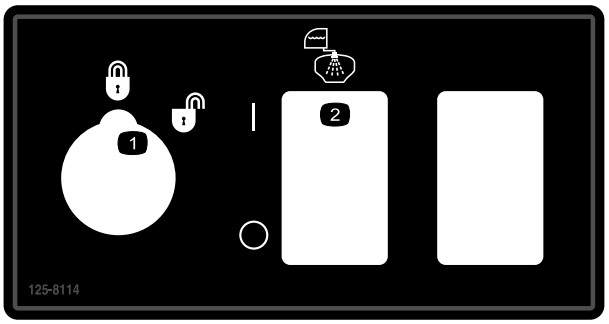
1. Tie down location



decal125-8113

125–8113

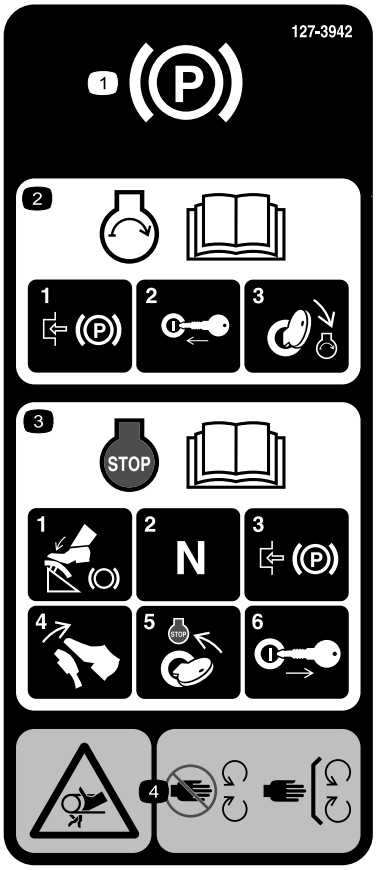
1. Gear selection
2. Lock differential lock
3. Unlock differential lock
4. Toggle headlights on/off
5. Automatic (optional)
6. Manual (optional)
7. Rewind hose reel (optional)



decal125-8114

125–8114

1. Rate lockout locked/unlocked
2. Toggle rinse pump on/off



decal127-3935

127–3935

1. Parking brake
2. For information on starting the engine, read the *Operator's Manual*—1) Engage the parking brake; 2) Insert the key into the ignition; 3) Turn the key to the engine run position.
3. For information on shutting off the engine, read the *Operator's Manual*—1) Press down on the brake pedal; 2) Set the gear to neutral; 3) Engage the parking brake; 4) Release the brake pedal; 5) Turn the ignition key to STOP position; 6) Remove the key from the ignition.
4. Entanglement hazard, belt—keep away from moving parts; keep all guards and shields in place.

decal127-3937

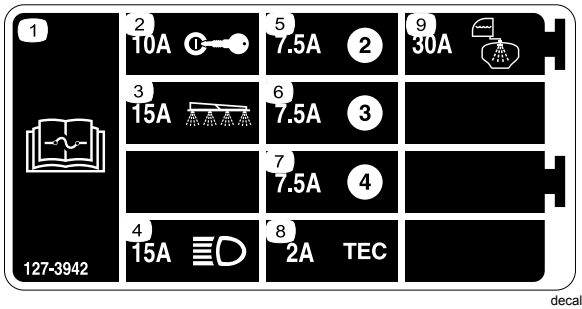
127–3937

1. Warning—do not step.
2. Warning—keep away from hot surfaces.
3. Entanglement hazard, belt—keep away from moving parts; keep all guards and shields in place.

decal127-3939

127–3939

1. Warning—read the *Operator's Manual*; always wear a seat belt when operating the machine; do not tip the machine.
2. Falling hazard—do not carry passengers on the sprayer tank.
3. Cutting/dismemberment hazard—keep arms and legs inside the vehicle at all times.
4. Warning—do not drill, weld, or alter the ROPS system.



decal127-3942

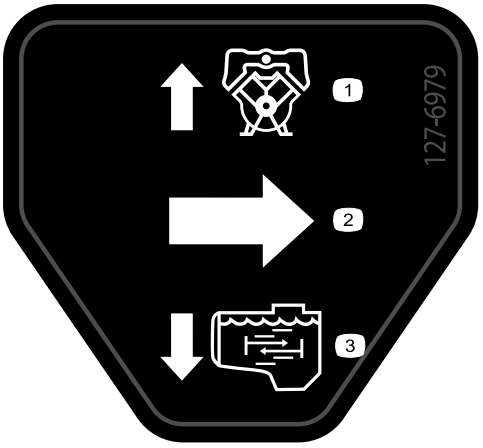
127–3942

1. Read the *Operator's Manual* for information on fuses.
2. 10 A—Ignition
3. 15 A—Sprayer section
4. 15 A—Headlights
5. 7.5 A
6. 7.5 A
7. 7.5 A
8. 2 A—TEC
9. 30 A—Rinse tank

decal127-6976

127-6976

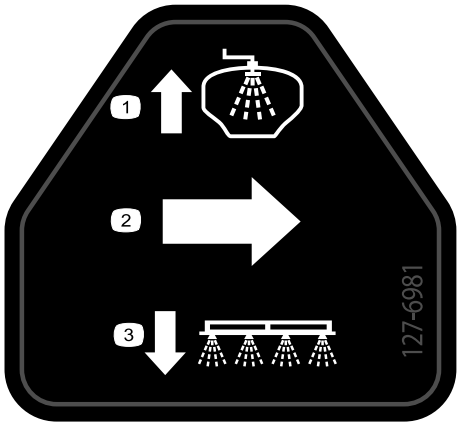
1. Decrease
2. Increase



decal127-6979

127-6979

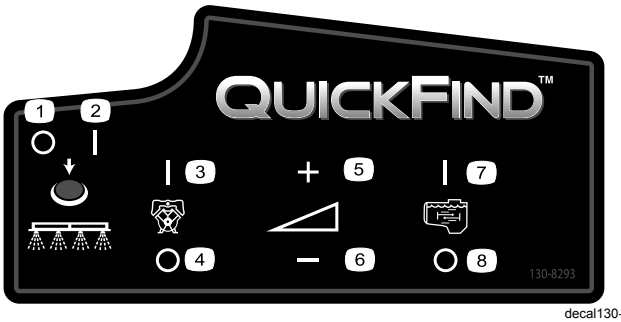
1. Pump-return flow
2. Flow
3. Agitation flow



decal127-6981

127-6981

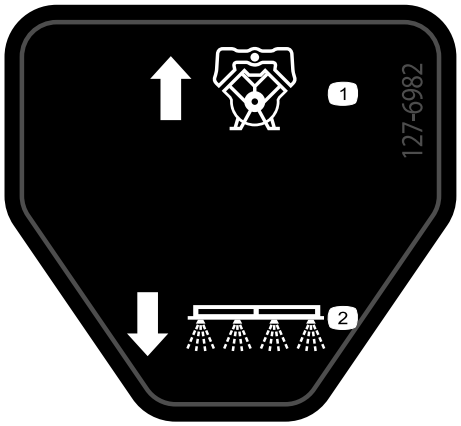
1. Bypass-return flow
2. Flow
3. Section spray



decal130-8293

130-8293

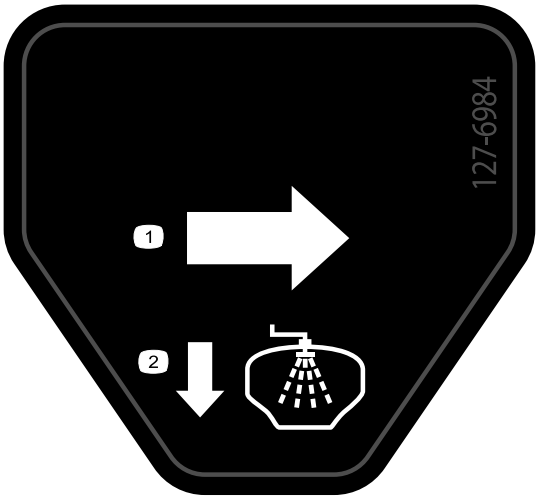
1. Sprayer off
2. Sprayer on
3. Engine on
4. Engine off
5. Increase speed
6. Decrease speed
7. Agitation on
8. Agitation off



decal127-6982

127-6982

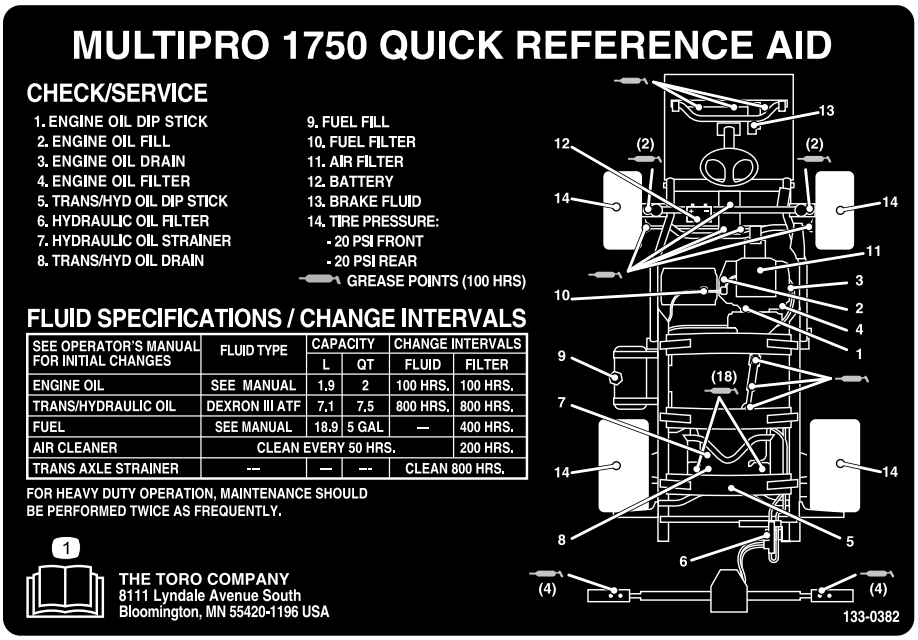
1. Bypass-return flow
2. Section spray



decal127-6984

127-6984

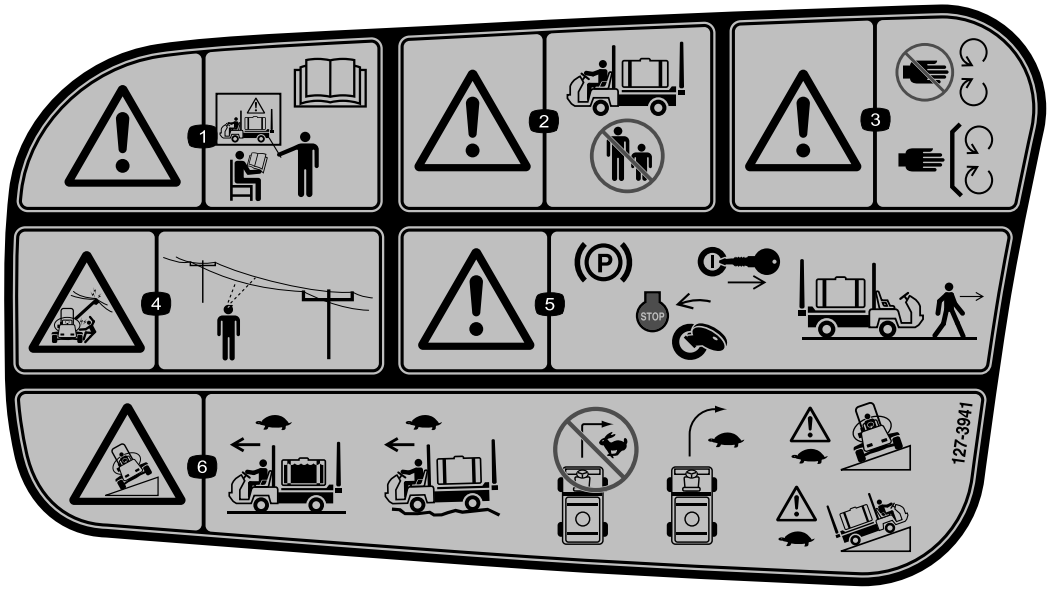
1. Flow
2. Tank-return flow



decal133-0382

133-0382

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



decal127-3941

127–3941

1. Warning—do not operate the machine without proper training; read the *Operator's Manual*.
2. Warning—keep bystanders away when operating the machine.
3. Warning—keep away from moving parts; keep all guards and shields in place.
4. Electrical shock hazard, overhead power lines—check the area for overhead power lines before operating the machine in the area.
5. Warning—Engage the parking brake, shut off the engine, and remove the key from the ignition before leaving the machine.
6. Tipping hazard—Move slowly when the sprayer tank is full; move slowly when driving over rough terrain; do not turn at high speed; turn slowly; drive slowly when driving across or up slopes.

Setup

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

1

Installing the Anti-Siphon Fill Receptacle

Parts needed for this procedure:

1	90° fitting
1	Quick coupler
1	Hose adapter
1	Fill-receptacle bracket
1	Flange-head bolt (5/16 x 3/4 inch)
1	Anti-siphon hose

Procedure

1. Place the fill-receptacle bracket over the threaded hole in the tank and secure it with a flange-head bolt (5/16 x 3/4 inch) as shown in Figure 3.

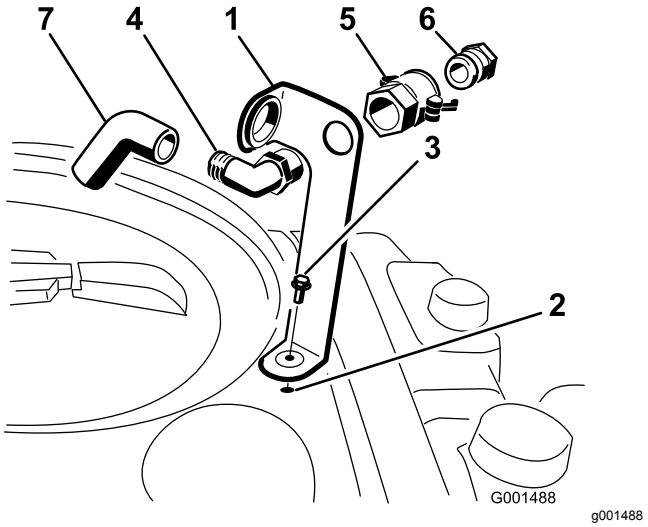


Figure 3

1. Fill-receptacle bracket
2. Threaded hole in the tank
3. Flange bolt (5/16 x 3/4 inch)
4. 90° elbow fitting
5. Quick coupler
6. Hose adapter
7. Anti-siphon hose

2. Place the threaded end of the 90° elbow fitting through the bracket and thread the quick coupler onto it, securing it to the bracket (Figure 3).

   Note: Install the fitting with the open end pointing toward the large opening in the bracket and toward the tank opening so that the water arcs into the tank when you fill it.

3. Install the hose adapter into the quick coupler (Figure 3).
4. Lock the adapter into place by swinging the levers toward the adapter and then secure them with the hairpin cotters (Figure 3).
5. Install the anti-siphon hose through the large opening on the bracket and onto the barbed end of the 90° elbow fitting (Figure 3).

   Important: **Do not lengthen the hose to allow contact with the tank fluids.**

2

Checking the Section-Hinge Springs

No Parts Required

Procedure

Important: **Operating the spray system with the section-hinge springs under the incorrect compression could damage the boom assembly. Measure the springs and use the jam nut to compress the springs to 3.96 cm (1.56 inches) if necessary.**

The sprayer is shipped with the section extensions swung forward to facilitate shipping the machine. The springs are not fully tightened at the time of manufacture to allow the sections to be in this position for transit. Before operating the machine, the springs must be adjusted to the correct compression.

1. If necessary, remove the packing components that secure the right and left extension sections during shipping.
2. Support the sections while they are extended to the spray position.
3. At the section hinge, measure the compression of the upper and lower springs while the sections are in their extended position (Figure 4).

A. All springs must be compressed until they measure 3.96 cm (1.56 inches).

B. Use the jam nut to compress any spring that measure greater than 3.96 cm (1.56 inches).

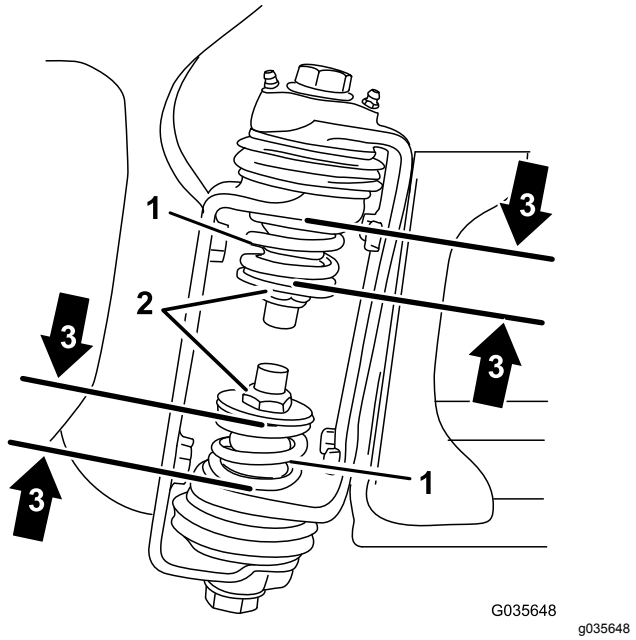


Figure 4

1. Section-hinge spring
2. Jam nut
3. Compressed spring dimension—3.96 cm (1.56 inches)

4. Repeat the procedure for each spring on both section hinges.
5. Move the sections into the transport ‘X’ position. See Using the Boom-Transport Cradle (page 29) for more information.

3

Learning More about Your Product

Parts needed for this procedure:

1	Ignition key
1	*Operator's Manual*
1	Engine operator's manual
1	*Parts Catalog*
1	Operator training material
1	Registration card
1	Pre-delivery Inspection Sheet

Procedure

1. Read the manuals.
2. View the operator training material.
3. Complete the registration card and return it to Toro.
4. Store the documentation in a safe place.

Product Overview

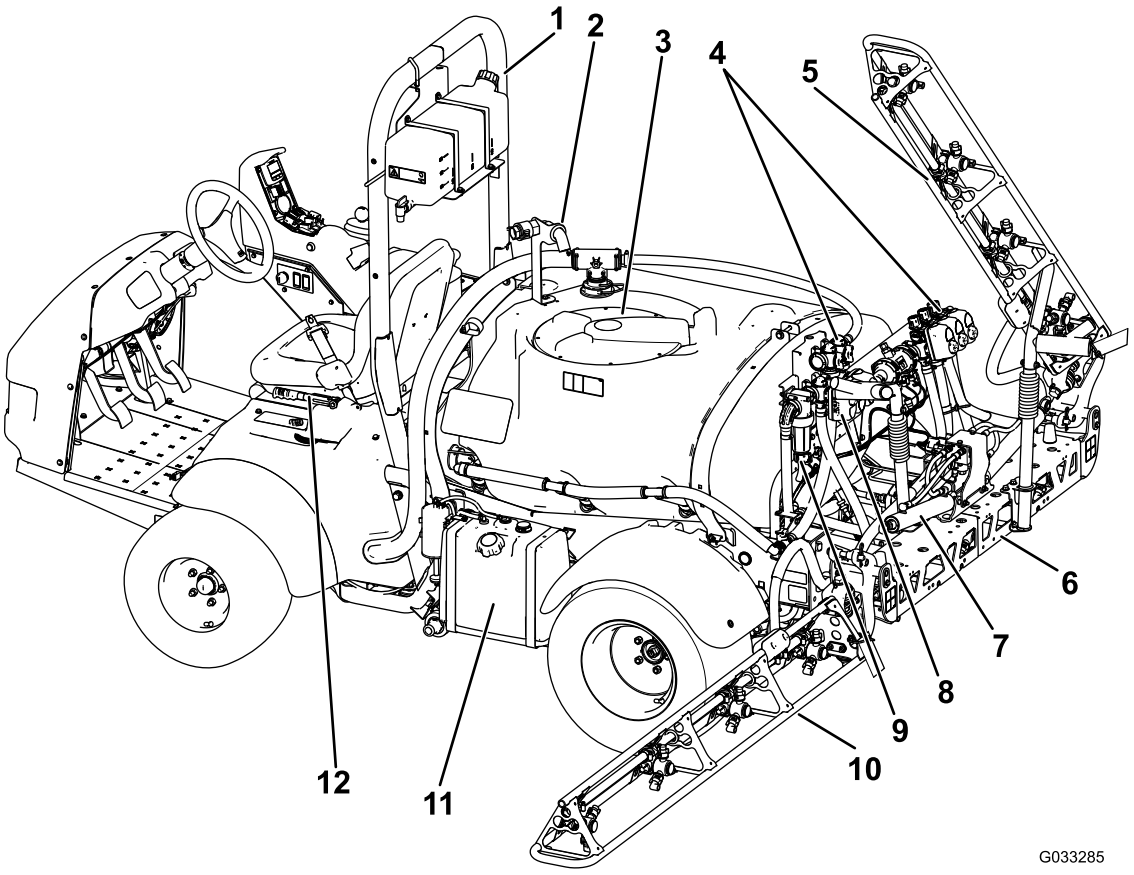


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Figure 5

1. Roll bar
2. Anti-siphon receptacle
3. Chemical-tank lid
4. Valve manifolds
5. Right section
6. Center section
7. Section-control cylinder
8. Agitation-throttle valve
9. Pressure filter
10. Left section
11. Fuel tank
12. Parking brake

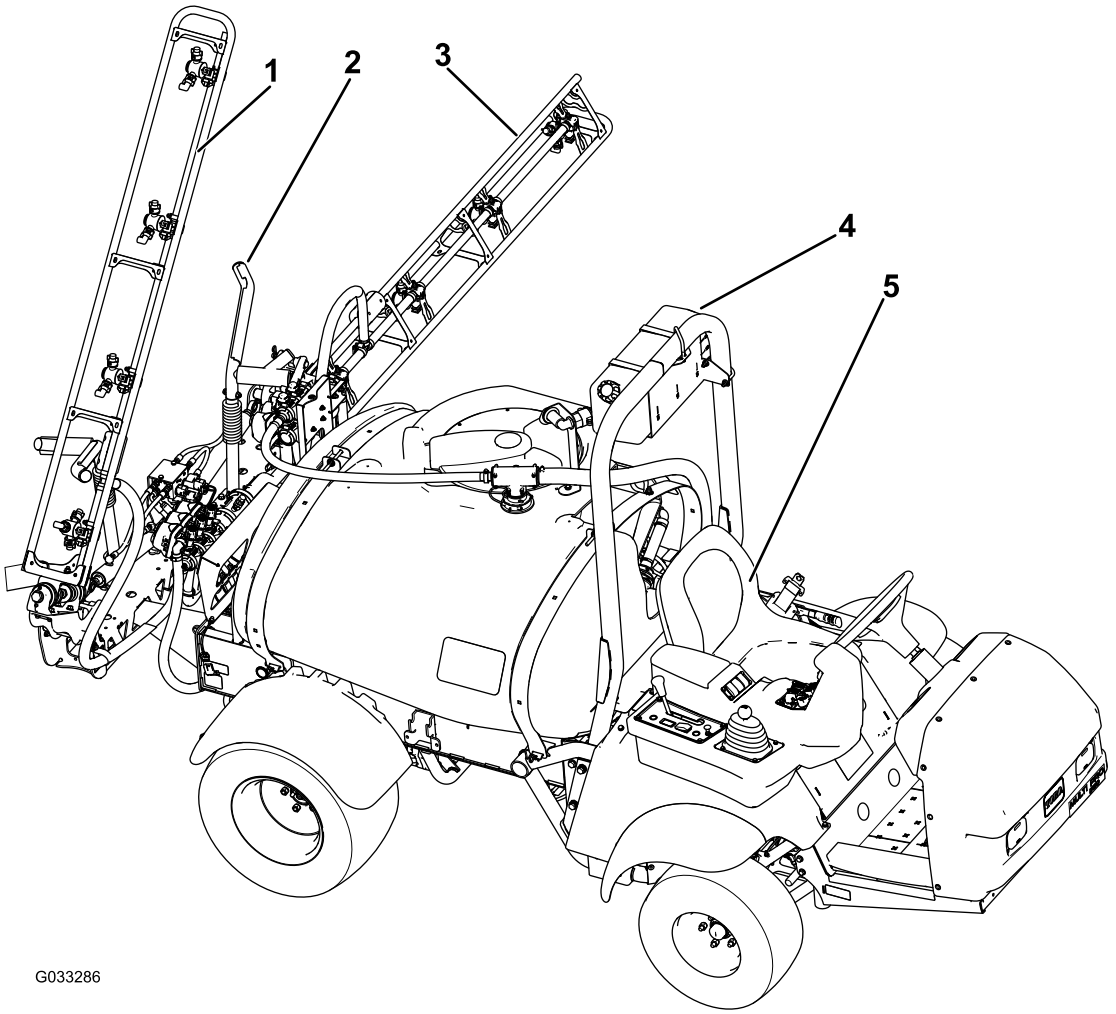

Figure 6

1. Right section
2. Boom-transport cradle
3. Left section
4. Fresh-water tank
5. Operator’s seat

Controls

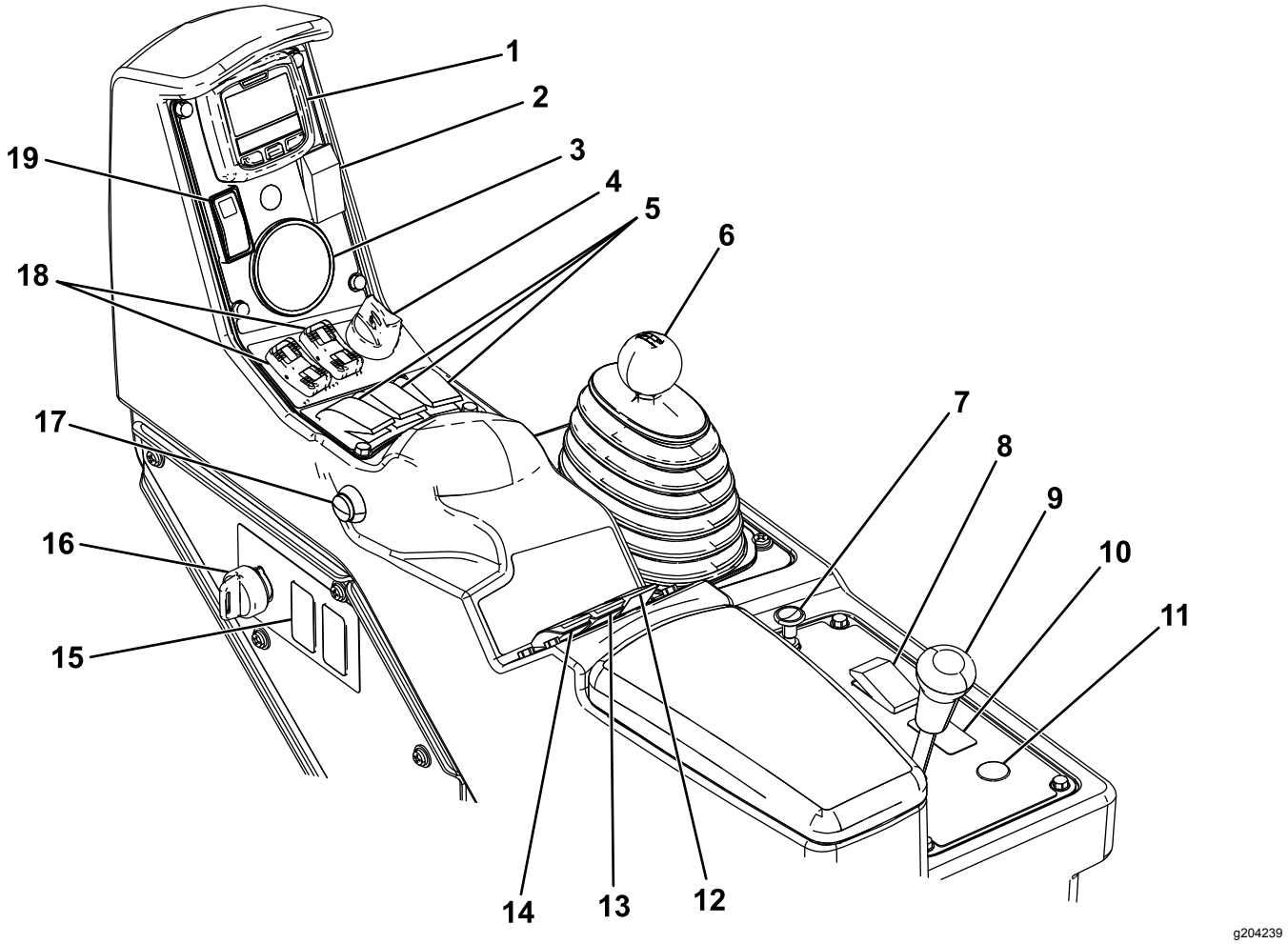

Figure 7

1. InfoCenter
2. Foam-marker switch (optional)
3. Pressure gauge
4. Engine switch
5. Left, center, and right section switches
6. Range selector
7. Choke
8. Headlight switch
9. Differential lock
10. Sonic-boom switch (optional)
11. Hose-reel-rewind button (optional)
12. Agitation switch
13. Spray-pressure switch
14. Spray-pump switch
15. Rinse-tank switch (optional)
16. Supervisor (rate-lockout) switch
17. Master section switch
18. Boom-section lift switches
19. Throttle/speed lock switch

Accelerator Pedal

The accelerator pedal (Figure 8) gives you the ability to vary the ground speed of the sprayer. Pressing the pedal increases ground speed. Releasing the pedal slows the sprayer and reduces the engine speed to idle.

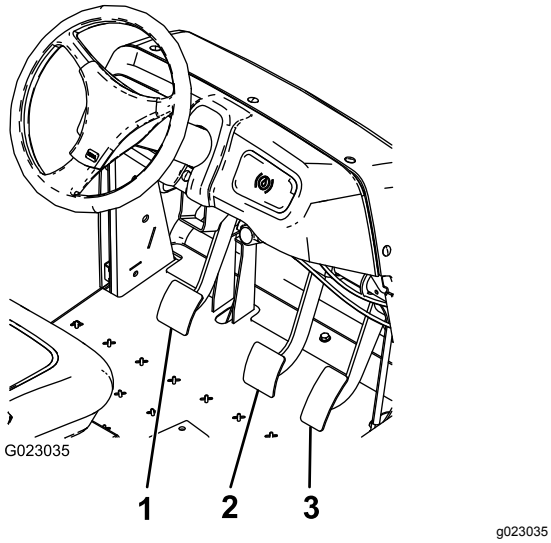

Figure 8

1. Clutch pedal
2. Brake pedal
3. Accelerator pedal

Clutch Pedal

Fully press the clutch pedal (Figure 8) to disengage the clutch when starting the engine or shifting transmission gears. Release the pedal smoothly when the transmission is in gear to prevent unnecessary wear on the transmission and other related parts.

Important: **Do not ride the clutch pedal during operation. The clutch pedal must be fully out or the clutch will slip, causing heat and wear. Never hold the vehicle stopped on a hill using the clutch pedal. Damage to the clutch may occur.**

Brake Pedal

Use the brake pedal to stop or slow the sprayer (Figure 8).

⚠ CAUTION

Brakes can become worn or can be adjusted incorrectly resulting in personal injury.

If brake pedal travels to within 2.5 cm (1 inch) of the sprayer floor board, adjust or repair the brakes.

Parking Brake

The parking brake is a large lever to the left of the seat (Figure 9). Engage the parking brake whenever you plan on leaving the seat to prevent accidental movement of the sprayer. To engage the parking brake, pull up and back on the lever. To disengage, push it forward and down. If the sprayer is parked on a steep grade, apply the parking brake and place blocks at the downhill side of the wheels.

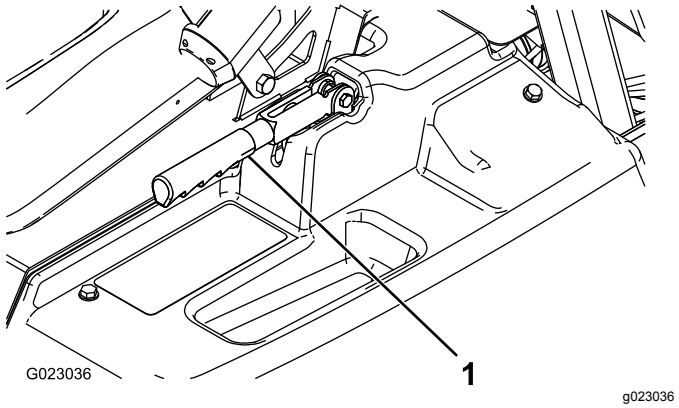

Figure 9

1. Parking-brake lever

Hill Assist

Hill assist prevents the sprayer from rolling or jerking by temporarily holding the sprayer on hilly terrain when you move your foot from the brake pedal to the accelerator pedal. To engage hill assist, engage the clutch and push down on the brake pedal firmly. When hill assist is engaged, the hill assist icon appears on the InfoCenter; refer to the *Multi Pro 1750 Turf Sprayer Software Guide*. Hill assist holds the machine for 2 seconds after releasing the brake pedal.

Note: The hill assist only temporarily holds the machine, you cannot use it in place of the parking brake.

Differential Lock

The differential lock allows you to lock the rear axle for increased traction. You may engage the differential lock (Figure 7) while the sprayer is in motion. Move the lever forward and to the right to engage the lock.

Note: You may need to drive the machine forward while turning slightly to engage or disengage the differential lock.

⚠ CAUTION

Turning with the differential lock on can result in loss of machine control.

Do not operate with differential lock on when making sharp turns or at high speeds; refer to Adjusting the Differential-Lock Cable (page 49).

Choke Control

The choke control is a small knob behind the range selector (Figure 7). To start a cold engine, pull the choke control up. After the engine starts, regulate the choke to keep the engine running smoothly. As soon as possible, push the control down to the OFF position. A warm engine requires little or no choking.

Range Selector

The range selector (Figure 7) has 5 positions: 3 forward speeds, NEUTRAL, and REVERSE. The engine starts only when the range selector is in the NEUTRAL position.

Ignition Switch

The ignition switch (Figure 7), has 3 positions: STOP, RUN, and START. Rotate the key clockwise to the START position to start the engine and release it to the RUN position when started. Rotate the key to the STOP position to shut off the engine.

Headlight Switch

Toggle the switch to operate the headlights (Figure 7). Push it forward to turn the lights on and rearward to turn them off.

Throttle/Speed-Lock Switch

When the range selector is in the NEUTRAL position, you can use the accelerator pedal to speed up the engine, then push the switch below the InfoCenter forward to set the engine at that speed. This is necessary to run the chemical agitation while stationary or operating attachments such as the hand sprayer (Figure 7).

Important: **The range selector must be in the NEUTRAL position and the parking brake must be set for the switch to work.**

Fuel Gauge

The fuel gauge is located on top of the fuel tank, on the left side of the machine, and shows the amount of fuel in the tank.

Master Section Switch

The master section switch (Figure 7) is located on the side of the console and to the right of the operator. It allows you to start or stop the spray operation. Press the switch to enable or disable the spray system.

Left, Center, and Right Section Switches

The left, center, and right section switches are located on the control panel (Figure 7). Toggle each switch forward to turn the corresponding section on and rearward to turn them off. When the switch is turned on, a light on the switch illuminates. These switches affect the spray system only when the master section switch is on.

Pump Switch

The pump switch is located on the control panel to the right of the seat (Figure 7). Toggle this switch forward to run the pump or rearward to stop the pump.

Important: **The pump switch will only engage when the engine is at low idle to avoid damaging the pump drive.**

Application-Rate Switch

The application-rate switch is located on the control panel to the right of the seat (Figure 7). Press and hold the switch forward to increase the spray system pressure, or press and hold it rearward to decrease the pressure.

Supervisor (Rate-Lockout) Switch

The supervisor switch is located on the control panel to the right of the seat (Figure 7). Turn the key counterclockwise to the LOCK position to disable the application-rate switch, thereby keeping anyone from accidentally changing the application rate. Turn the key clockwise to the UNLOCKED position to enable the application-rate switch.

Boom-Section Lift Switches

The boom-section lift switches are located on the control panel and are used to raise the outer boom sections.

Hour Meter

The hour meter indicates the total number of hours the engine has run. This number is displayed on the first screen of the InfoCenter. The hour meter starts

to function whenever the key is turned to the RUN position.

Foam-Marker Switch Locations (Optional)

If you install the Foam Marker kit, you will add switches to the control panel for controlling their operation. The sprayer comes with plastic plugs in these locations.

Regulating (Rate-Control) Valve

This valve, located behind the tank (Figure 10), controls the amount of fluid routed to the sections or the rate return to the tank.

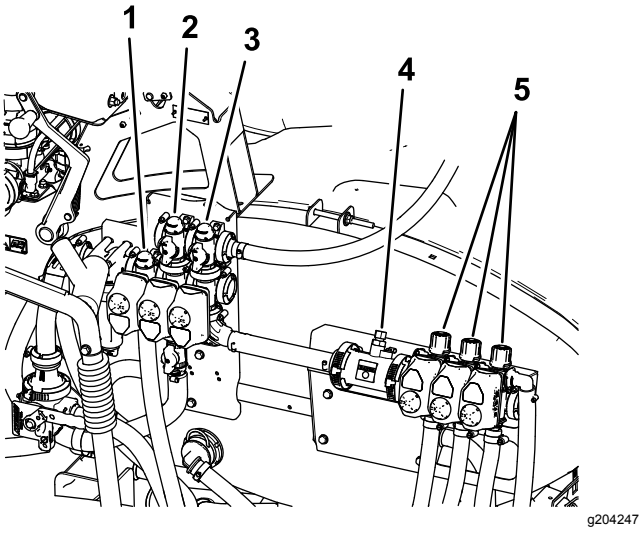

Figure 10

1. Regulating (rate-control) valve
2. Agitation valve
3. Master section valve
4. Flow meter
5. Section valves

Master-Section Valve

The master-section valve (Figure 10) controls the flow to the flow meter and section valves.

Flow meter

The flow meter measures the flow rate of the fluid for use by the InfoCenter system (Figure 10).

Section Bypass Valves

These valves turn the right, center, and left sections on or off (Figure 10).

Section-Bypass Shutoff Valve

The section bypass shutoff valve redirects the fluid flow for a section to the tank when you turn off the section. You can adjust the section bypass to ensure that the section pressure remains constant no matter how many sections are on. Refer to Adjusting the Master-Section-Bypass Valve (page 33).

Agitation Valve

This valve is located on the rear of the tank (Figure 10). When agitation is on, the flow is directed through the agitation nozzles in the tank. When agitation is off, the flow is directed through the pump suction.

Pressure Gauge

The pressure gauge is located on the control panel (Figure 7). This gauge shows the pressure of the fluid in the system in psi and kPa.

InfoCenter LCD Display

The InfoCenter LCD display shows information about your machine and battery pack, such as the current battery charge, the speed, diagnostics information, and more (Figure 7).

For more information, refer to the *Multi Pro 1750 Software Guide*.

Agitation-Throttle Valve

The agitation-throttle valve is used to reduce the flow available for the agitation circuit. It provides additional flow for the sections.

Specifications

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

Weight with standard spray system, empty, without operator	953 kg (2,100 lb)
Weight with standard spray system, full, without operator	1678 kg (3,700 lb)
Maximum gross vehicle weight (GVW) (on level ground)	1814 kg (4,000 lb)
Overall length with standard spray system	343 cm (135 inches)
Overall height with standard spray system	191 cm (75 inches)
Overall height with standard spray system to the top of the sections stored in the X position	246 cm (97 inches)
Overall width with standard spray system sections stored in the 'X' position	178 cm (70 inches)
Ground clearance	14 cm (5.5 inches)
Wheel base	155 cm (61 inches)
Tank capacity (includes the CE 5% overflow)	662 L (175 US gallons)

Attachments/Accessories

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

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

Operation

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

Safety First

Please carefully read all of the safety instructions and decals in the safety section. Knowing this information could help you or bystanders avoid injury.

Preparing to Drive the Machine

Checking the Engine Oil

The engine is shipped with oil in the crankcase; however, the level of oil must be checked before you first start the engine and after you have run it.

1. Position the machine on a level surface.
2. Remove the dipstick and wipe it with a clean rag (Figure 11).
3. Insert the dipstick into the tube and make sure that it is seated fully. Remove the dipstick and check the oil level.

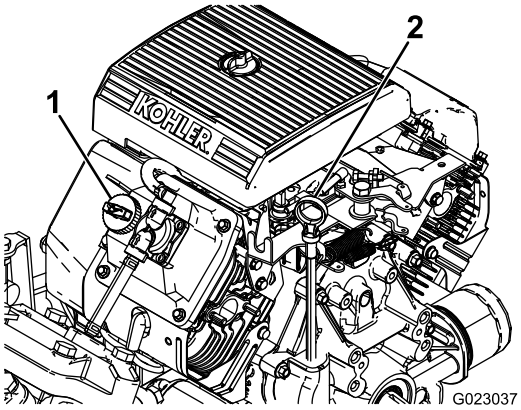

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Figure 11

1. Filler cap
2. Dipstick

4. If the oil level is low, remove the filler cap from the valve cover (Figure 11) and pour oil into the opening until the oil level is up to the FULL mark on the dipstick; refer to Servicing the Engine Oil (page 43) for the proper oil type and viscosity.

   Note: Add the oil slowly and check the level often during this process. Do not overfill.
5. Install the dipstick firmly in place.

Checking the Tire Pressure

Check the tire pressure every 8 hours or daily to ensure proper levels. Fill the tires to 138 kPa (20 psi). Also, check the tires for wear or damage.

Adding Fuel

⚠ DANGER

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

- **Fill the fuel tank outdoors, in an open area, when the engine is cold. Wipe up any fuel that spills.**
- **Never fill the fuel tank inside an enclosed trailer.**
- **Do not fill the fuel tank completely full. Add fuel 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 fuel to expand.**
- **Never smoke when handling fuel, and stay away from an open flame or where sparks may ignite fuel fumes.**
- **Store fuel in an approved container and keep it out of the reach of children. Never buy more than a 30-day supply of fuel.**
- **Do not operate the machine without the entire exhaust system in place and in proper working condition.**

⚠ DANGER

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

- **Always place fuel containers on the ground away from your vehicle before filling.**
- **Do not fill fuel 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 fuel-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 fuel-dispenser nozzle.**
- **If you must use 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.**

- 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 you use a fuel stabilizer.
- Do not add oil to gasoline.

Filling the Fuel Tank

The fuel tank capacity is approximately 19 L (5 US gallons).

Note: The fuel-tank cap contains a gauge which shows the fuel level; check it frequently.

1. Park the machine on a a level surface, engage the parking brake, shut off the engine, and remove the key.
2. Clean the area around the fuel-tank cap (Figure 12).

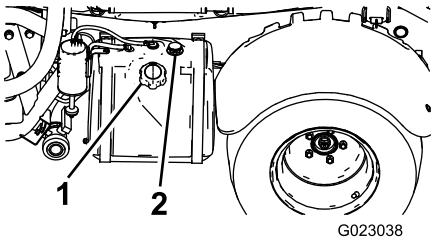

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Figure 12

1. Fuel-tank cap
2. Fuel gauge

3. Remove the fuel-tank cap.
4. Fill the tank to about 2.5 cm (1 inch) below the top of the tank (bottom of the filler neck).

   Note: This air space in the tank allows fuel to expand. Do not overfill the tank.
5. Install the fuel-tank cap to the tank securely.
6. Wipe up any fuel that may have spilled.

Performing the Pre-Starting Checks

Check the following items each time you begin using the sprayer for the day:

- Check the tire pressure.

  Note: These tires are different than car tires; they require less pressure to minimize turf compaction and damage.
- Check all fluid levels and add the appropriate amount of specified fluids, if any are found to be low.
- Check the brake pedal operation.
- Check to see that the lights are working.
- Turn the steering wheel to the left and right to check steering response.
- Check for oil leaks, loose parts, and any other noticeable malfunctions. Make sure that the engine is off and all moving parts have stopped before checking for oil leaks, loose parts, and other malfunctions.

If any of the above items are not correct, notify your mechanic or check with your supervisor before taking the sprayer out for the day. Your supervisor may want you to check other items on a daily basis, so ask what your responsibilities are.

Operating the Machine

Starting the Engine

1. Sit in the operator's seat, insert the key into the ignition switch, and rotate the key clockwise to the RUN position.
2. Press the clutch and move the range selector to the NEUTRAL position.
3. Ensure that the pump switch is in the OFF position.
4. If the engine is cold, pull the choke knob up.

   Important: **Do not use the choke if the engine is warm.**
5. Turn the key to the START position until the engine starts.

   Important: **Do not hold the key in the START position for more than 10 seconds. If the engine has not started after 10 seconds, wait 1 minute before trying again. Do not attempt to push or tow the sprayer to start the engine.**
6. Once the engine starts, push the choke knob down slowly.

Driving the Machine

1. Release the parking brake.
2. Fully press the clutch pedal.
3. Move the gear shift lever to first gear.
4. Release the clutch pedal smoothly while pressing the accelerator pedal.
5. When the vehicle gains enough speed, remove your foot from the accelerator pedal, fully press the clutch pedal, move the gear shift lever to the next gear and release the clutch pedal while pressing the accelerator pedal. Repeat the procedure until the desired speed is attained.

   Important: **Always stop the vehicle before shifting from a forward gear to reverse or from reverse to a forward gear.**

   Note: Avoid long periods of engine idling.

   Use the chart below to determine the ground speed of an empty vehicle at 3,400 rpm.

Gear	Ratio	Speed (km/h)	Speed (mph)
1	66.4:1	5.6	3.5
2	38.1:1	9.8	6.1
3	19.6:1	19.2	11.9
R	80.7:1	4.7	2.9

Note: Leaving the ignition switch in the ON position for long periods of time without running the engine will discharge the battery.

Important: **Do not attempt to push or tow the vehicle to get it started. Damage to the drive train could result.**

Setting the Throttle Lock

Note: You must have the parking brake and spray pump on and the range selector in the NEUTRAL position to set the throttle lock.

1. Press down on the accelerator pedal to obtain the desired engine rpm.
2. Toggle the throttle lock switch on the control panel to the ON position.
3. To release the throttle lock, toggle the switch to the OFF position, or press the brake or clutch pedal.

Setting the Speed Lock

Note: Before setting the speed lock, you must sit in the operator's seat with the parking brake off, the pump on, and the range selector in gear.

1. Press down on the accelerator pedal to obtain the desired engine speed.
2. Toggle the speed lock switch on the control panel to the ON position.
3. To release the speed lock, toggle the switch to the OFF position, or press the brake or clutch pedal.

Shutting Off the Engine

1. Press the clutch and apply the brake to stop the sprayer.
2. Pull the parking-brake lever up and back to set it.
3. Move the range selector out of gear into the NEUTRAL position.
4. Turn the ignition key to the STOP position.
5. Remove the key from the switch to prevent accidental starting.

Breaking in a New Sprayer

Service Interval: After the first 100 hours—To provide proper performance and long sprayer life, follow these guidelines for the first 100 operating hours:

- Check the engine-oil and fluid levels regularly and be alert for indications of overheating in any component of the sprayer.
- After starting a cold engine, let it warm up for about 15 seconds before accelerating.
- To optimize the brake system, burnish (break in) the brakes as follows:
  1. Load 454 L (120 US gallons) of water into the tank.
  2. Move the machine to an open-level area.
  3. Drive the machine at full speed.
  4. Apply the brakes rapidly.

     Note: Stop the machine in a straight line without locking up the tires.
  5. Wait 1 minute to allow the brakes to cool.
  6. Repeat steps 3 through 5 an additional 9 times.
- Avoid racing the engine.
- Vary the sprayer speed during operation. Avoid fast starts and quick stops.
- Refer to Maintenance (page 37) for any special, low-hour checks.

Preparing to Use the Sprayer

Cleaning the Suction Filter

Service Interval: Before each use or daily—Clean the suction filter. Clean the suction filter (more often when using wettable powders).

1. Park the machine on a level surface, engage the parking brake, shut off the pump, shut off the engine, and remove the key.
2. At the top of the sprayer tank, remove the retainer that secures the hose fitting attached to the large hose from the filter housing (Figure 13).

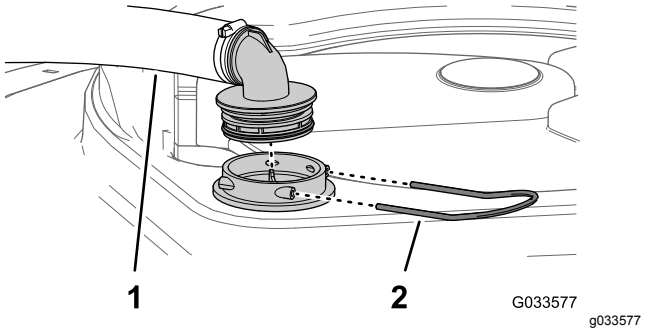

Figure 13

1. Suction hose
2. Retainer

3. Remove the hose and hose fitting from the filter housing (Figure 13).
4. Pull the suction strainer out of the filter housing in the tank (Figure 14).

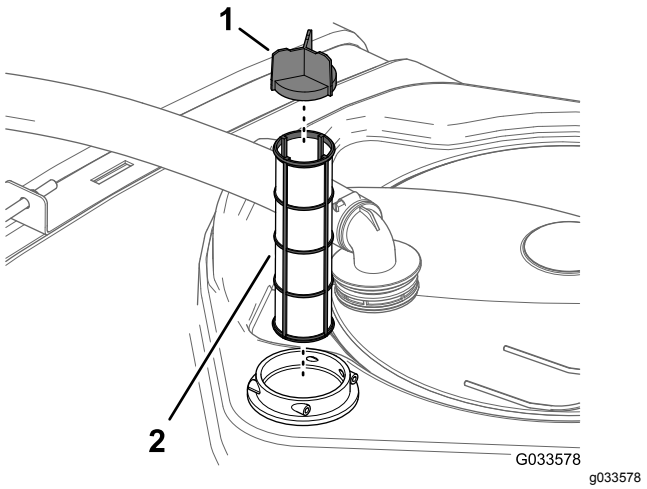

Figure 14

1. Screen vane
2. Suction strainer

5. Clean the suction filter with clean water.

   Important: **Replace the filter if it is damaged or cannot be cleaned.**

6. Insert the suction filter into the filter housing until the filter is fully seated.
7. Align the hose and hose fitting to the filter housing at the top of the tank, and secure fitting and housing with the retainer that you removed in step 2.

Cleaning the Pressure Filter

Service Interval: Before each use or daily—Clean the pressure filter. Clean the pressure filter (more often when using wettable powders).

1. Park the machine on a level surface, engage the parking brake, shut off the sprayer pump, shut off the engine, and remove the key.
2. Align a drain pan under the pressure filter (Figure 15).

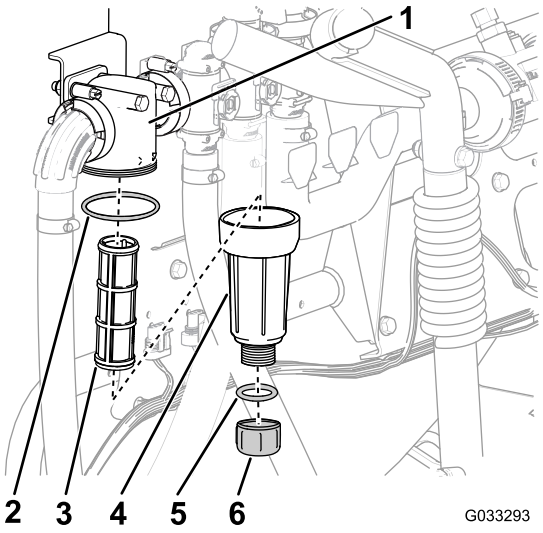

Figure 15

1. Filter head
2. Gasket (bowl)
3. Filter element
4. Gasket (drain plug)
5. Drain cap
6. Bowl

3. Rotate the drain cap counterclockwise and remove it from the bowl of the pressure filter (Figure 15).

   Note: Allow the bowl to drain completely.

4. Rotate the bowl counterclockwise and remove the filter head (Figure 15).
5. Remove the pressure filter element (Figure 15).
6. Clean the pressure filter element with clean water.

   Important: **Replace the filter if it is damaged or cannot be cleaned.**

7. Check the gasket for the drain plug (located inside the bowl) and the gasket for bowl (located

inside the filter head) for damage and wear (Figure 15).

Important: **Replace any damaged or worn gaskets for the plug, bowl, or both.**

8. Install the pressure filter element into the filter head (Figure 15).

   Note: Ensure that the filter element is firmly seated into the filter head.

9. Install the bowl onto the filter head, and tighten by hand (Figure 15).
10. Assemble the drain cap onto the fitting at the bottom of the bowl, and tighten the cap by hand (Figure 15).

Cleaning the Nozzle Filter

1. Park the machine on a level surface, engage the parking brake, shut off the sprayer pump, shut off the engine, and remove the key.
2. Remove the nozzle from the spray turret (Figure 16).

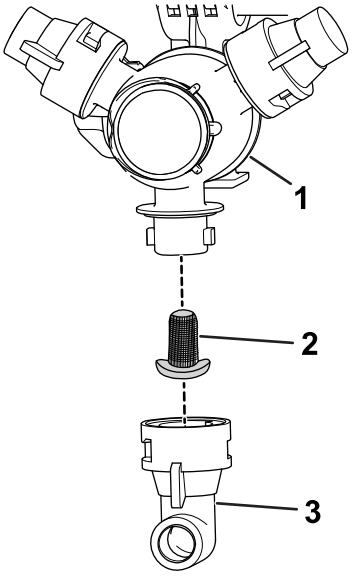

Figure 16

1. Spray turret
2. Nozzle filter
3. Nozzle

3. Remove the nozzle filter (Figure 16).
4. Clean the nozzle filter with clean water.

   Important: **Replace the filter if it is damaged or cannot be cleaned.**

5. Install the nozzle filter (Figure 16).

   Note: Ensure that the filter is fully seated.

6. Install the nozzle onto the spray turret (Figure 16).

Inspecting the Tank Straps

Service Interval: Before each use or daily—Check the tank straps.

Important: **Overtightening the tank strap fasteners can result in deforming and damaging the tank and straps.**

1. Fill the main tank with water.
2. Check to see if there is any movement between the tank straps and the tank (Figure 17).

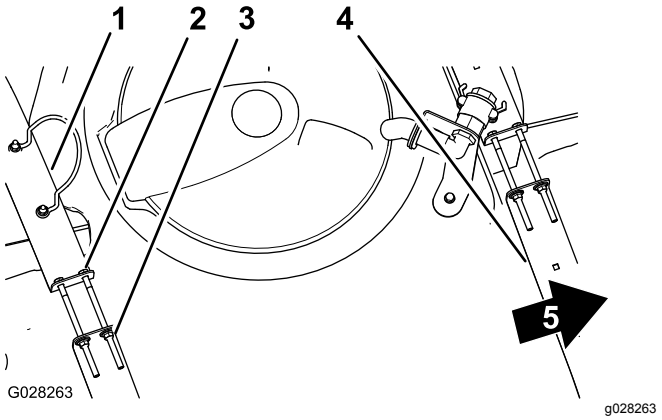

Figure 17

1. Rear tank strap
2. Bolt
3. Flanged locknut
4. Forward tank strap
5. Front of the machine

3. If the tank straps fit loose to the tank, tighten the flanged locknuts and bolts at the top of straps until the straps are flush with the surface of the tank (Figure 17).

   Note: **Do not overtighten the tank strap hardware.**

Operating the Sprayer

To operate the Multi Pro Sprayer, first fill the spray tank, then apply the solution to the work area, and finally clean the tank. Complete all 3 of these steps in sequence to avoid damaging the sprayer. For example, do not mix and add chemicals in the spray tank at night and then spray in the morning. This would lead to separation of the chemicals and to possible damage to the sprayer components.

⚠ CAUTION

Chemicals are hazardous and can cause personal injury.

- **Read the directions on the chemical labels before handling the chemicals, and follow all manufacturer recommendations and precautions.**
- **Keep chemicals away from your skin. Should contact occur, wash the affected area thoroughly with soap and clean water.**
- **Wear goggles and any other protective equipment recommended by the chemical manufacturer.**

The Multi Pro Sprayer has been specifically designed to have high durability in order to give it the long sprayer life you need. Different materials have been chosen for specific reasons at different locations on your sprayer to meet this goal. Unfortunately, there is no single material which is perfect for all foreseeable applications.

Some chemicals are more aggressive than others, and each chemical interacts differently with various materials. Some consistencies (e.g., wettable powders, charcoal) are more abrasive and lead to higher-than-normal wear rates. If a chemical is available in a formulation that would provide increased life to the sprayer, use this alternative formulation.

As always, remember to clean your sprayer thoroughly after all applications. This will do the most to ensure that your sprayer has a long and trouble-free life.

Using the Differential Lock

The differential lock increases the sprayer's traction by locking the rear wheels so that 1 wheel will not spin out. This can help when you have heavy loads to haul on wet turf or slippery areas, going up hills, and on sandy surfaces. It is important to remember, however, that this extra traction is intended for temporary or limited use. Its use does not replace the safe operation, already discussed concerning steep hills and heavy loads.

The differential lock causes the rear wheels to turn at the same speed. When using differential lock your ability to make sharp turns is somewhat restricted and the tires may scuff the turf. Use the differential lock only when needed, at slower speeds and only in first or second gear.

⚠ WARNING

Tipping or rolling the sprayer on a hill will cause serious injury.

- **The extra traction available with the differential lock can be enough to get you into dangerous situations such as climbing slopes that are too steep to turn around. Be extra careful when operating with the differential lock on, especially on steeper slopes.**
- **If the differential lock is on when making a sharp turn at a higher speed and the inside rear wheel lifts off the ground, there may be a loss of control which could cause the sprayer to skid. Use the differential lock only at slower speeds.**

Filling the Fresh-Water Tank

Always fill the fresh-water tank with clean water before handling or mixing any chemicals.

The fresh-water tank is located on the left side of the ROPS bar. It supplies a source of fresh water for you to wash chemicals off your skin, eyes, or other surfaces in the case of accidental exposure.

To open the fresh-water tank spigot, turn the lever on the spigot.

Filling the Spray Tank

Install the Chemical Pre-Mix Kit for optimal mixing and exterior tank cleanliness.

Important: **Ensure that the chemicals you will be using are compatible for use with Viton™ (see the manufacturer's label; it should indicate if it is not compatible). Using a chemical that is not compatible with Viton™ will degrade the O-rings in the sprayer, causing leaks.**

Important: **Verify that the proper application rate has been set prior to filling the tank with chemicals.**

1. Stop the sprayer on a level surface, move the range selector to the NEUTRAL position, shut off the engine, and set the parking brake.

2. Ensure that the tank drain valve is closed.
3. Determine the amount of water needed to mix the amount of chemical you need as prescribed by the chemical manufacturer.
4. Open the tank cover on the spray tank.

   Note: The tank cover is located in the center of the top of the tank. To open it, turn the front half of the cover counterclockwise and swing it open. You can remove the strainer inside for cleaning. To seal the tank, close the cover and rotate the front half clockwise.
5. Add 3/4 of the required water to the spray tank using the anti-siphon fill receptacle.

   Important: **Always use fresh clean water in the spray tank. Do not pour concentrate into an empty tank.**
6. Start the engine and set the pump switch to the ON position.
7. Press the accelerator pedal to the floor and set the throttle lock to the ON position.
8. Set the master section switch to the OFF position.
9. Turn the agitation valve to the ON position.
10. Add the proper amount of chemical concentrate to the tank as directed by the chemical manufacturer.

    Important: **If you are using a wettable powder without full agitation, mix the powder with a small amount of water to form a slurry before adding it to the tank.**
11. Add the remaining water to the tank.

Operating the Sections

The boom-section lift switches on the sprayer control panel allows you to move the sections between the TRANSPORT position and the SPRAY position without leaving the operator's seat. It is recommended to change section positions while the machine is not moving.

Changing the Section Position

1. Stop the sprayer on level ground.
2. Use the boom-section lift switches to lower the sections.

   Note: Wait until the sections reach the full, extended SPRAY position.
3. When the sections need to be retracted, stop the sprayer on level ground.
4. Use the boom-section lift switches to raise the sections until they have moved completely into boom-transport cradle forming the 'X' transport position and the section cylinders are fully retracted.

   Important: **To prevent damage to the section actuator cylinder, make sure that the actuators are fully retracted before transport.**

Using the Boom-Transport Cradle

The sprayer is equipped with a boom-transport cradle that has a unique safety feature. In the event of accidental section contact with a low overhead object while in the TRANSPORT position, you can push the section(s) out of the transport cradles. If this occurs, the sections will come to rest in a near horizontal position to the rear of the vehicle. While the sections will not be damaged due to this movement, they should be immediately put back into the transport cradle.

Important: **You can damage the sections if you transport them in any position other than the 'X' transport position using the boom-transport cradle.**

To put the sections back into the transport cradle, lower the sections(s) to the SPRAY position, and then raise the section(s) back into the TRANSPORT position. Make sure that the section cylinders are fully retracted to prevent actuator rod damage.

Spraying

Important: **To ensure that your solution remains well mixed, use the agitation feature whenever you have a solution in the tank. For agitation to work, you must have the pump on and the engine running above an idle. If you stop the vehicle and need agitation, set the parking brake, turn the pump on, press the accelerator pedal to floor, and switch the throttle lock to the ON position.**

Note: This procedure assumes that the pump is on from the Operating the Sprayer (page 28) procedure.

1. Lower the sections into position.
2. With the master-section switch in the OFF position, set the 3 section switches to the ON position.
3. Drive to the location where you will be spraying.
4. Set the master-section switch to the ON position to begin spraying.

   Note: The InfoCenter shows the sections with the spray on.

   Note: When the tank is nearly empty, the agitation may cause foaming in the tank. To prevent this, turn the agitation valve off.

Alternatively, you can use an anti-foaming agent in the tank.

5. Use the rate switch to adjust and set a target.
6. When finished spraying, set the master-section switch to the OFF position to turn off all sections, then set the pump switch to the OFF position.

Spraying Tips

- Do not overlap areas that you have previously sprayed.
- Watch for plugged nozzles. Replace all worn or damaged nozzles.
- Use the master-section switch to stop the spray flow before stopping the sprayer. Once stopped, place the range selector in the NEUTRAL position and use the neutral engine speed lock to hold the engine speed up to keep the agitation running.
- You will obtain better results if the sprayer is moving when you turn the sections on.
- Watch for changes in the application rate that may indicate that your speed has changed beyond the range of the nozzles or there is a problem with the spray system.

Calibrating the Sprayer Flow

Before using the sprayer for the first time, if you change the nozzles, or as needed, calibrate the sprayer flow.

Operator supplied equipment: Stop watch capable of measuring ± 1/10 second and a container graduated in 50 ml (1 fl oz) increments.

Preparing to Calibrate the Sprayer Flow

1. Fill the spray tank with clean water.

   Note: Ensure that there is enough water in the tank to complete the calibration.
2. Set the parking brake and turn the engine on.
3. Set the pump switch to the ON position, and turn on the agitation.
4. Press down on the accelerator pedal until you reach the maximum engine speed, and toggle the throttle lock switch to the ON position.

Performing a Catch Test

1. Set all 3 section switches and the master-section switch to the ON position.
2. Turn the supervisor (rate-lockout) switch to the UNLOCK position.
3. Prepare to perform a catch test using the graduated container.
4. Start at 2.75 bar (40 psi) and use the application-rate switch to adjust the spray pressure so a catch test yields the amounts listed in the table below.

   Note: Repeat the test 3 times and use the average.

Nozzle Color	Milliliters collected in 15 seconds	Ounces collected in 15 seconds
Yellow	189	6.4
Red	378	12.8
Brown	473	16.0
Gray	567	19.2
White	757	25.6
Blue	946	32.0
Green	1,419	48.0

5. Once the catch test has yielded the amounts listed in the table above, set the supervisor rate lock out switch to the LOCK position.
6. Turn off the master-section switch.

Performing the Sprayer Flow Calibration

1. On the InfoCenter, navigate to the Calibration menu and select FLOW CAL as follows:

   Note: Selecting the Home Screen icon at any time cancels calibrations.

   A. Press the center selection button on the InfoCenter twice to access the menus.

   B. Enter the calibration menu by pressing the right selection button on the InfoCenter.

   C. Select FLOW CAL by highlighting FLOW CAL and press the right selection button on the InfoCenter.

   D. In the next screen, enter the known quantity of water that will be sprayed out of the sections for the calibration procedure; refer to the chart below.

   E. Press the right selection button on the InfoCenter.

2. Using the plus (+) and minus (-) symbols, enter the flow volume according to the table that follows:

Nozzle Color	Liters	US Gallons
Yellow	42	11
Red	83	22
Brown	106	28
Gray	125	33
White	167	44
Blue	208	55
Green	314	83

3. Turn on the master-section switch for 5 minutes.

   Note: As the machine sprays, the InfoCenter displays the quantity of fluid that it is counting.

4. After the 5 minute duration of spraying click the check mark by pressing the center button on the InfoCenter.

   Note: It is acceptable if the gallons displayed during the calibration process do not match the known quantity of water entered into the InfoCenter.

5. After 5 minutes, turn off the master-section switch and select the check mark on the InfoCenter.

   Note: Calibration is now complete.

Calibrating the Sprayer Speed

Before using the sprayer for the first time, if you change the nozzles, or as needed, calibrate the sprayer speed.

1. Fill the tank with fresh water.
2. On an open, flat area, mark off a distance between 45 to 152 m (150 to 500 ft).

   Note: Toro recommends marking off 152 m (500 ft) for more accurate results.

3. Start the engine and drive to the start of the marked-off distance.

   Note: Align the center of the front tires with the starting line for the most accurate measurement.

4. On the InfoCenter, navigate to the Calibration menu and select SPEED CAL.

   Note: Selecting the Home Screen icon at any time cancels calibrations.

5. Select the Next arrow (→) on the InfoCenter.
6. Using the plus (+) and minus (-) symbols, enter the marked-off distance into the InfoCenter.
7. Shift the machine into first gear and drive the marked distance in a straight line at full throttle.
8. Stop the machine at the marked-off distance and select the check mark on the InfoCenter.

   Note: Slow down and roll to a stop to align the center of the front tires with the finish line, for the most accurate measurement.

   Note: Calibration is now complete.

Calibrating the Section-Bypass Valves

Before using the sprayer for the first time, if you change the nozzles, or as needed, calibrate the sprayer section bypass

Important: **Select an open flat area to perform this procedure.**

Preparing to Calibrate the Section-Bypass Valves

1. Fill the spray tank halfway with clean water.
2. Lower the sprayer sections.
3. Move the range selector to the NEUTRAL position and set the parking brake.
4. Set the 3 section switches to the ON position, but leave the master-section switch off.
5. Set the pump switch to the ON position, and turn on the agitation.
6. Press down on the accelerator pedal until you reach the maximum engine speed, and toggle the throttle lock switch to the ON position.
7. On the InfoCenter, navigate to the Calibration menu and select TEST SPEED.

   Note: Selecting the Home Screen icon at any time cancels the calibration.

8. Using the plus (+) and minus (-) symbols, enter a test speed of 5.6 km/h (3.5 mph), then select the Home icon.
9. Turn the supervisor (rate-lockout) switch to the UNLOCK position, and turn the master-section switch to the ON position.

Adjusting the Bypass Valves

1. Using the application-rate switch, adjust the application rate according to the table below.

Nozzle Color	SI (Metric)	English	Turf
Yellow	159 l/ha	17 gpa	0.39 gpk
Red	319 l/ha	34 gpa	0.78 gpk
Brown	394 l/ha	42 gpa	0.96 gpk
Gray	478 l/ha	51 gpa	1.17 gpk
White	637 l/ha	68 gpa	1.56 gpk
Blue	796 l/ha	85 gpa	1.95 gpk
Green	1,190 l/ha	127 gpa	2.91 gpk

2. Turn off the left section and adjust the section-bypass knob (Figure 18) until the pressure reading is at the previously adjusted level (typically 2.75 bar or 40 psi).

   Note: The numbered indicators on the bypass knob and needle are for reference only.

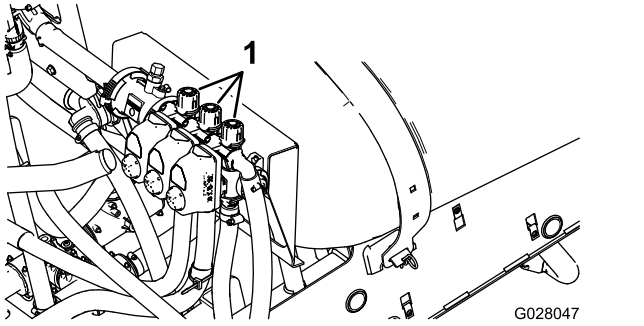

Figure 18

1. Section-bypass adjustment knobs

3. Turn on the left section and turn off the right section.
4. Adjust the right section-bypass knob (Figure 18) until the pressure reading is at the previously adjusted level (typically 2.75 bar or 40 psi).
5. Turn on the right section and turn off the center section.
6. Adjust the center section-bypass knob (Figure 18) until the pressure reading is at the previously adjusted level (typically 2.75 bar or 40 psi).
7. Turn each section off.
8. Turn the pump off.

   Note: Calibration is now complete.

Agitation-Bypass Valve Knob Position

- The agitation-bypass valve is in the full open position as shown in Figure 19A.
- The agitation-bypass valve is in the closed (0) position as shown in Figure 19B.
- The agitation-bypass valve is in an intermediate (adjusted relative to the pressure gauge for the sprayer system) position as shown in Figure 19C.

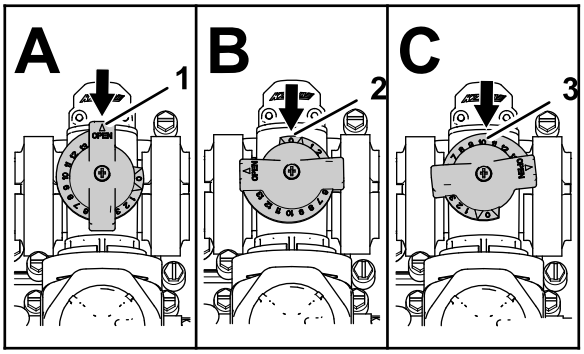

Figure 19

1. Open
2. Closed (0)
3. Intermediate position

Calibrating the Agitation-Bypass Valve

Service Interval: Yearly

Select an open flat area to perform this procedure.

1. Fill the spray tank with clean water.
2. Verify the agitation-control valve is open. If it has been adjusted, open it completely at this time.
3. Set the parking brake and start the engine.
4. Set the range selector to NEUTRAL.
5. Set the pump switch to the ON position.
6. Press the accelerator pedal to achieve maximum engine speed and set the throttle lock.
7. Set the 3 section valves to the OFF position.
8. Set the master-section switch to the ON position.
9. Set the system pressure to MAXIMUM.
10. Press the agitation switch to the OFF position and read the pressure gauge.
    - If the reading remains at 6.9 bar (100 psi) the agitation-bypass valve is properly calibrated.
    - If the pressure gauge reads differently, continue to the next step.
11. Adjust the agitation-bypass valve (Figure 20) on the backside of the agitation valve until the

pressure reading on the gauge is 6.9 bar (100 psi).

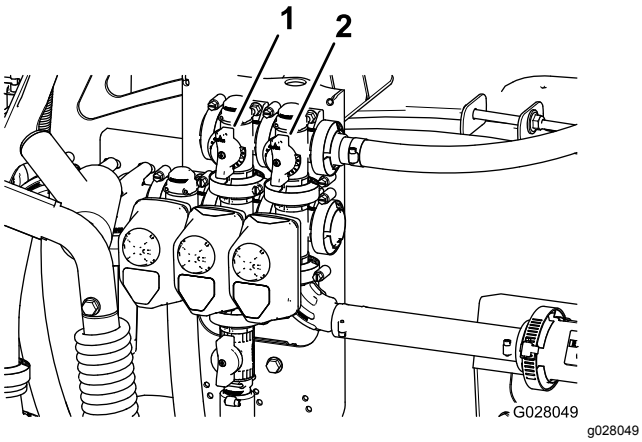

Figure 20

1. Agitation-bypass valve
2. Master-section bypass

12. Press the pump switch to the OFF position, shift the throttle lever to the IDLE position, and turn the ignition switch to the OFF position.

Adjusting the Master-Section-Bypass Valve

Note: Adjusting the master-section-bypass valve reduces or increases the amount of flow sent to the agitation nozzles in the tank when the master-section switch is set to the OFF position.

1. Fill the sprayer tank 1/2 full with clean water.
2. Move the machine to an open level surface.
3. Set the parking brake.
4. Set the range selector to the NEUTRAL position.
5. Set the pump switch to the ON position.
6. Set the agitation switch to the ON position.
7. Set the master-section switch to the OFF position.
8. Increase the engine speed to full throttle and set the throttle lock to the ON position.
9. Adjust the master-section-bypass handle to control the amount of agitation occurring in the tank (Figure 20).
10. Reduce the throttle speed to idle.
11. Set the agitation switch and pump switch to the OFF position.
12. Shut off the machine.

Locating the Spray Pump

The spray pump is located under the seat (Figure 21).

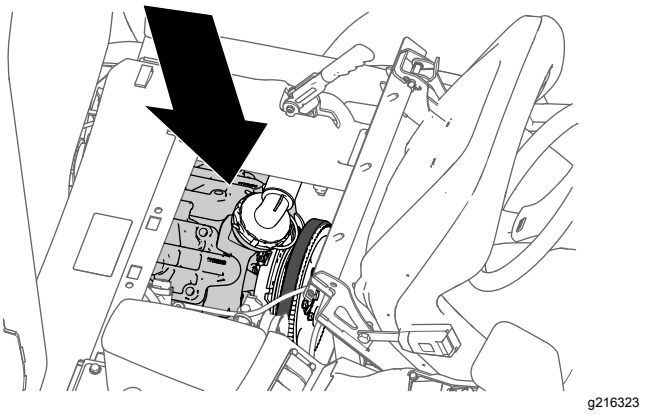

Figure 21

Hauling the Machine

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

Transporting the Sprayer

When moving the sprayer long distances, use a trailer.

- Secure the sprayer to the trailer.
  - Use the tie-down loop at the front of the frame; refer to Figure 22A.
  - Use the 2 tie-down loops at the rear of the frame; refer to Figure 22B.
- Ensure that the outer-boom sections are tied down and secure.

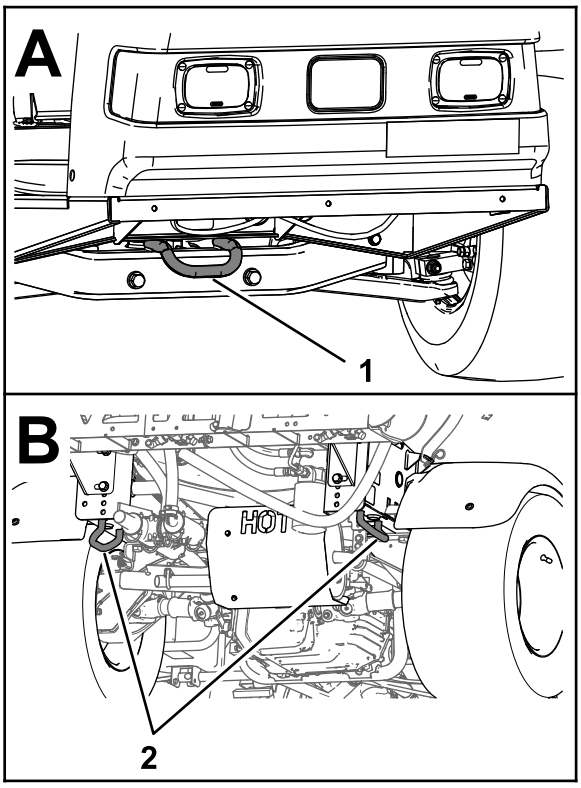

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Figure 22

1. Front tie-down loop
2. Rear tie-down loops

Towing the Sprayer

In case of an emergency, you can tow the sprayer for a short distance. However, do not use this as a standard procedure.

⚠ WARNING

Towing at excessive speeds could cause a loss of steering control, resulting in personal injury.

Never tow the sprayer faster than 8 km/h (5 mph).

Towing the sprayer is a 2–person job. If you must move the machine a considerable distance, transport it on a truck or trailer; refer to Transporting the Sprayer (page 33).

1. Attach a tow line to the frame.
2. Put the range selector in the NEUTRAL position and release the parking brake.
3. Tow the sprayer at less than 8 km/h (5 mph).

Spray Filter Recommendations

Selecting a Suction Filter

Standard Equipment: 50 mesh suction filter (blue)

Use the suction filter table to identify the screen mesh for the spray nozzles you are using based on chemicals products or solutions with a viscosity equivalent to water.

Suction Filter Table

Spray Nozzle Color Code (flow rate)	Screen Mesh Size*	Filter Color Code
Yellow (0.2 gpm)	50	Blue
Red (0.4 gpm)	50	Blue
Brown (0.5 gpm)	50 (or 30)	Blue (or green)
Gray (0.6 gpm)	30	Green
White (0.8 gpm)	30	Green
Blue (1.0 gpm)	30	Green
Green (1.5 gpm)	30	Green

*The mesh size of the suction filters in this table are based on spray chemicals or solutions with the viscosity equivalent to water.

Important: **When you spray with higher viscosity (thicker) chemical products or solutions with wettable powders, you may need to use an coarser screen mesh for the optional suction filter; refer to Figure 23.**

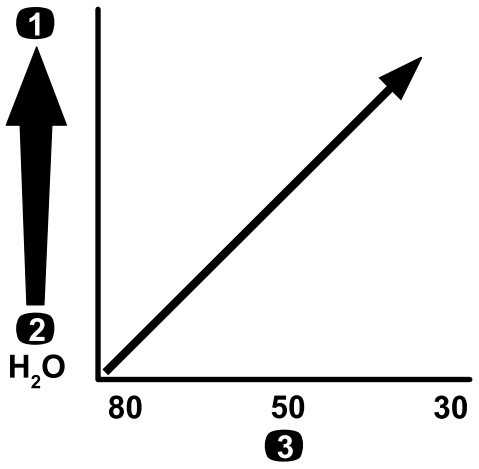

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Figure 23

Mesh size—chemical or solution viscosity

1. Higher-viscosity chemicals or solutions
2. Lower-viscosity chemicals or solutions
3. Screen mesh size

When you spray at a higher application rate, consider using an courser optional suction-filter mesh; refer to Figure 24.

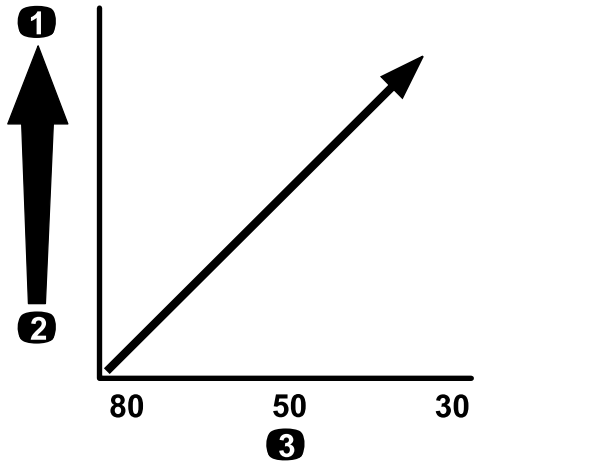

Figure 24

Mesh size—application rate

1. Higher application rate
2. Lower application rate
3. Screen mesh size

Selecting a Pressure Filter

Available screen sizes include:

Standard Equipment: 50 mesh suction filter (blue)

Use the pressure filter table to identify the screen mesh for the spray nozzles you are using based on chemicals products or solutions with a viscosity equivalent to water.

Pressure Filter Table

Spray Nozzle Color Code (flow rate)	Screen Mesh Size*	Filter Color Code
As required for low viscosity chemicals or solutions or low application rates	100	Green
Yellow (0.2 gpm)	80	Yellow
Red (0.4 gpm)	50	Blue
Brown (0.5 gpm)	50	Blue
Gray (0.6 gpm)	50	Blue
White (0.8 gpm)	50	Blue
Blue (1.0 gpm)	50	Blue
Green (1.5 gpm)	50	Blue
As required for high viscosity chemicals or solutions or high application rates	30	Red

Pressure Filter Table (cont'd.)

Spray Nozzle Color Code (flow rate)	Screen Mesh Size*	Filter Color Code
As required for high viscosity chemicals or solutions or high application rates	16	Brown
*The mesh size of the pressure filters in this table are based on spray chemicals or solutions with the viscosity equivalent to water.		

Important: **When you spray with higher viscosity (thicker) chemical products or solutions with wettable powders, you may need to use a coarser screen mesh for the optional pressure-filter; refer to Figure 25.**

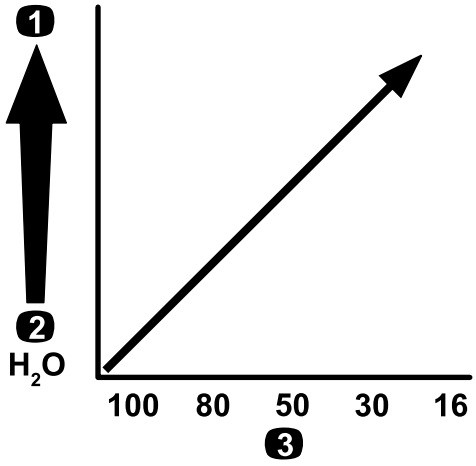

Figure 25

Mesh size—chemical or solution viscosity

1. Higher-viscosity chemicals or solutions
2. Lower-viscosity chemicals or solutions
3. Screen mesh size

When you spray at a higher application rate, consider using an courser optional pressure-filter mesh; refer to Figure 26.

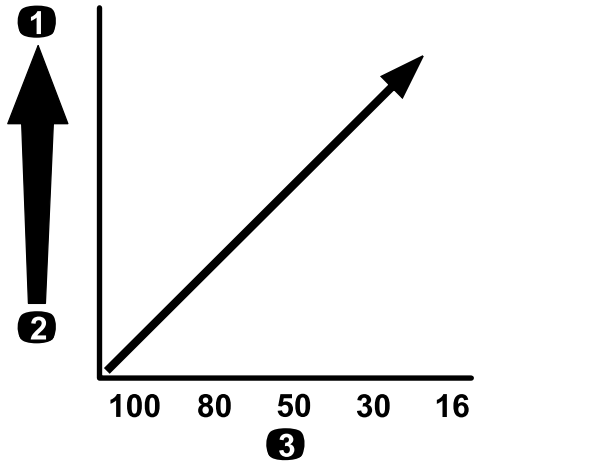

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Figure 26

Mesh size—application rate

1. Higher application rate
2. Lower application rate
3. Screen mesh size

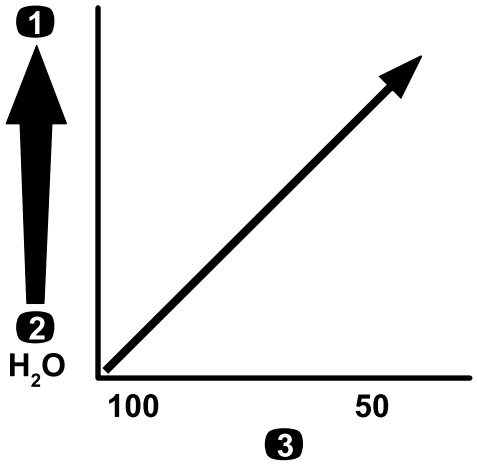

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Figure 27

Mesh size—chemical or solution viscosity

1. Higher-viscosity chemicals or solutions
2. Lower-viscosity chemicals or solutions
3. Screen mesh size

Selecting a Nozzle-Tip Filter (Optional)

Note: The use the optional nozzle-tip filter to protect the spray-nozzle tip and increase its service life.

Use the nozzle-tip filter table to identify the screen mesh for the spray nozzles you are using based on chemicals products or solutions with a viscosity equivalent to water.

Nozzle-Tip Filter Table

Spray Nozzle Color Code (flow rate)	Filter Mesh Size*	Filter Color Code
Yellow (0.2 gpm)	100	Green
Red (0.4 gpm)	50	Blue
Brown (0.5 gpm)	50	Blue
Gray (0.6 gpm)	50	Blue
White (0.8 gpm)	50	Blue
Blue (1.0 gpm)	50	Blue
Green (1.5 gpm)	50	Blue
*The mesh size of the nozzle filters in this table are based on spray chemicals or solutions with the viscosity equivalent to water.		

Important: **When you spray with higher viscosity (thicker) chemical products or solutions with wettable powders, you may need to use a coarser screen mesh for the optional tip-filter; refer to Figure 27.**

When you spray at a higher application rate, consider using an courser tip-filter mesh; refer to Figure 28.

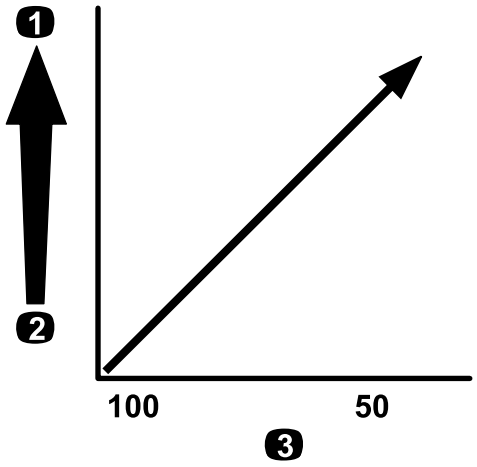

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Figure 28

Mesh size—application rate

1. Higher application rate
2. Lower application rate
3. Screen mesh size

Maintenance

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

For additional information about the sprayer system, refer to the sprayer system schematic in Schematics (page 72).

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

Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first 8 hours	• Torque the wheel-lug nuts. • Replace the hydraulic filter.
After the first 50 hours	• Change the engine oil. • Check the air filter for the carbon canister. • Replace the carbon-canister filter.
After the first 100 hours	• To provide proper performance and long sprayer life, follow these guidelines for the first 100 operating hours:
Before each use or daily	• Clean the suction filter. • Clean the pressure filter. • Check the tank straps. • Check the engine-rotating screen. • Check the engine oil. • Check the tire pressure.
Every 50 hours	• Lubricate the pump. • Clean and oil the air-cleaner foam element (more often in dusty, dirty conditions). • Check the battery-cable connections. • Check the battery-electrolyte level.
Every 100 hours	• Lubricate all grease fittings. • Lubricate the section hinges. • Clean the engine-rotating screen (more often in dusty, dirty conditions). • Change the engine oil (more often when operating under heavy load or in high temperature). • Replace the engine-oil filter. • Replace the fuel filter. • Torque the wheel-lug nuts. • Inspect the condition and wear of the tires. • Check front wheel toe-in. • Inspect the brakes.
Every 200 hours	• Replace the air-cleaner paper element (more often in dusty, dirty conditions). • Change the spark plugs. • Check the air filter for the carbon canister. • Replace the carbon-canister filter. • Check the adjustment of the differential-lock cable. • Check the parking brake. • Check the transaxle/hydraulic fluid. • Inspect all hoses and connections for damage and proper attachment. • Clean the flow meter (more often when using wettable powders).

Maintenance Service Interval	Maintenance Procedure
Every 400 hours	• Complete all yearly maintenance procedure specified in the engine operator's manual. • Inspect the fuel lines. • Drain and clean the fuel tank. • Change the suction filter. • Change the pressure filter. • Inspect the pump diaphragms and replace if necessary (see an Authorized Toro Service Distributor). • Inspect the pump check valves and replace if necessary (see an Authorized Toro Service Distributor). • Inspect the nylon pivot bushings.
Every 800 hours	• Change the transaxle/hydraulic fluid and clean strainer. • Replace the hydraulic filter.
Yearly	• Calibrate the agitation-bypass valve.

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

Daily Maintenance Checklist

Duplicate this page for routine use.

Maintenance Check Item	For the week of:						
	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.
Check the brake and parking brake operation.							
Check the gear shift/neutral operation.							
Check the fuel level.							
Check the engine-oil level.							
Check the transaxle oil level.							
Inspect the air filter.							
Inspect the engine cooling fins.							
Check any unusual engine noises.							
Check any unusual operating noises.							
Check the tire pressure.							
Check for fluid leaks.							
Check the instrument operation.							
Check the accelerator operation.							
Clean the suction strainer.							
Check toe-in.							
Lubricate all grease fittings.[1]							
Touch up and damaged paint.							

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

Notation for Areas of Concern

Inspection performed by:		
Item	**Date**	**Information**
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

⚠ CAUTION

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

Remove the key from the ignition and disconnect the wire(s) from the spark plug(s) before you perform any maintenance. Set the wire(s) aside so that it does not accidentally contact the spark plug(s).

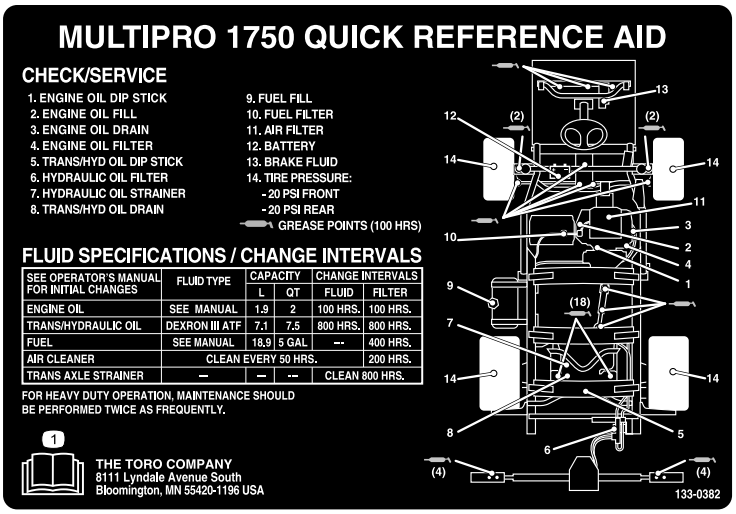

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Figure 29

Pre-Maintenance Procedures

Raising the Sprayer

Whenever the engine is run for routine maintenance and/or engine diagnostics, the rear wheels of the sprayer should be 2.5 cm (1 inch) off the ground with the rear axle supported on jack stands.

⚠ DANGER

A sprayer on a jack may be unstable and slip off the jack, injuring anyone beneath it.

- **Do not start the engine while the sprayer is on a jack.**
- **Always remove the key from the ignition before getting off the sprayer.**
- **Block the tires when the sprayer is on a jack.**

The jacking point at the front of the sprayer is under the front crossbar (Figure 30A). The jacking point at the rear of the sprayer is on the rear frame support, behind the rear tie-down loops (Figure 30B).

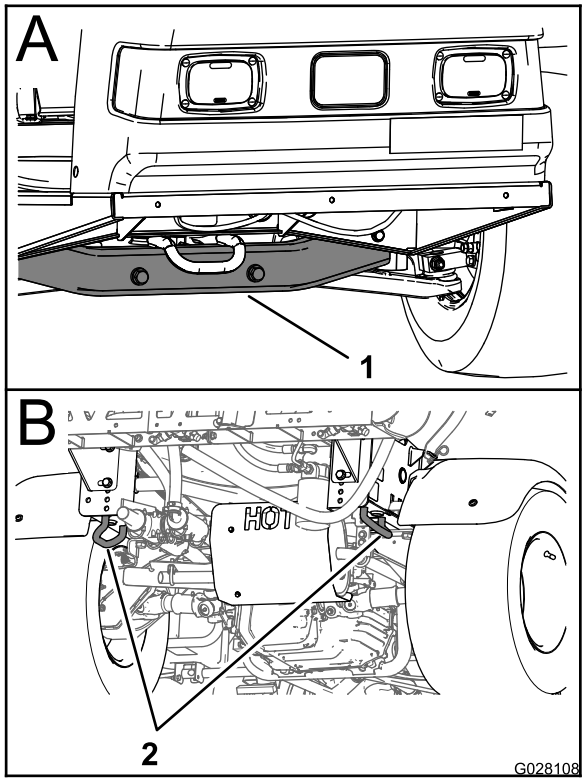

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Figure 30

1. Front jacking point
2. Rear tie-down loops

Lubrication

Greasing the Machine

Service Interval: Every 100 hours/Yearly (whichever comes first)—Lubricate all grease fittings.

Grease Type: No. 2 lithium grease

Refer Figure 31 for the grease-point locations.

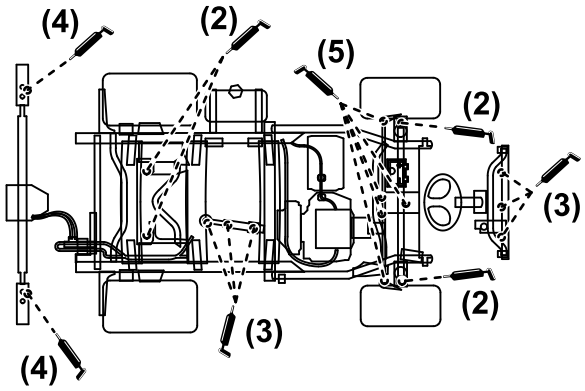


Figure 31

1. Wipe the grease fitting clean so that you do not force dirt or debris into the bearing or bushing.
2. Pump grease into the bearing or bushing.
3. Wipe off the excess grease.

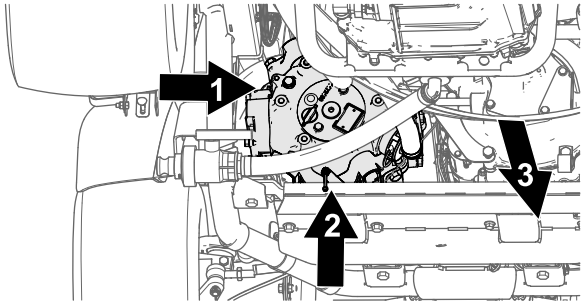
Greasing the Sprayer Pump

Service Interval: Every 50 hours—Lubricate the pump.

Grease Type: Mobil XHP 461

1. Raise the sprayer; refer to Raising the Sprayer (page 40).
2. Locate the sprayer pump.

   Note: The pump is located below the seat; refer to Locating the Spray Pump (page 33).
3. Wipe the 2 remote grease fittings clean (Figure 32A and Figure 32B).



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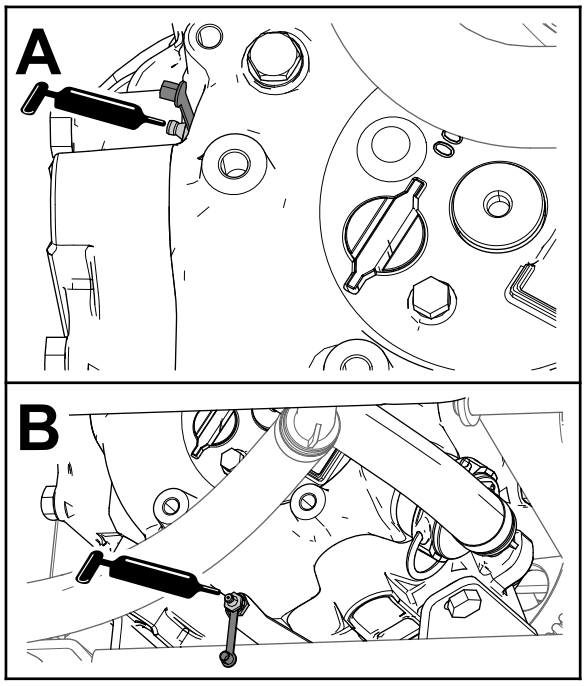

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Figure 32

1. Grease fitting (outboard side of the spray pump)
2. Grease fitting (bottom, rear side of the spray pump)
3. Front of the machine

4. Pump grease into each remote grease fitting (Figure 32A and Figure 32B).
5. Wipe off the excess grease.

Greasing the Section Hinges

Service Interval: Every 100 hours

Important: **If the section hinge is washed with water, clear all water and debris from the hinge assembly and apply fresh grease.**

Grease Type: No. 2 lithium grease

1. Wipe the grease fittings clean so that foreign matter cannot be forced into the bearing or bushing.
2. Pump grease into the bearing or bushing at each fitting (Figure 33).

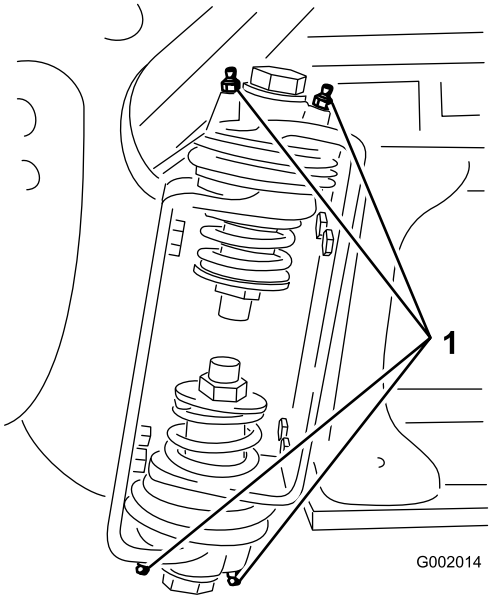

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Figure 33

1. Grease fitting

3. Wipe off excess grease.
4. Repeat the procedure for each section pivot.

Engine Maintenance

Checking the Air-Intake Screen

Service Interval: Before each use or daily—Check the engine-rotating screen.

Every 100 hours—Clean the engine-rotating screen (more often in dusty, dirty conditions).

Check and clean as necessary the air-intake screen on the front of the engine before each use or daily.

Servicing the Air Cleaner

Service Interval: Every 50 hours/Yearly (whichever comes first) (more often in dusty, dirty conditions).

Every 200 hours/Yearly (whichever comes first) (more often in dusty, dirty conditions).

Removing the Foam and Paper Elements

1. Set the parking brake, stop the pump, shut off the engine, and remove the ignition key.
2. Release the latch on the back of the seat and lift the seat forward.
3. Clean around the air cleaner to prevent dirt from getting into the engine and causing damage (Figure 34).

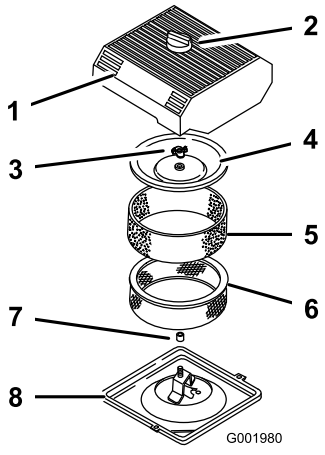

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Figure 34

1. Air-cleaner cover
2. Knob
3. Cover nut
4. Cover
5. Foam element
6. Paper element
7. Rubber seal
8. Air-cleaner base

4. Loosen the knob on the air-cleaner cover and remove the cover (Figure 34).
5. Carefully slide the foam element off the paper element (Figure 34).
6. Unscrew the cover nut and remove the cover and paper element (Figure 34).

Cleaning the Foam Element

1. Wash the foam element in liquid soap and warm water.
2. When the element is clean, rinse it thoroughly.
3. Dry the element by squeezing it in a clean cloth.
4. Put 30 to 59 ml (1 to 2 fl oz) of oil on the element (Figure 35).

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

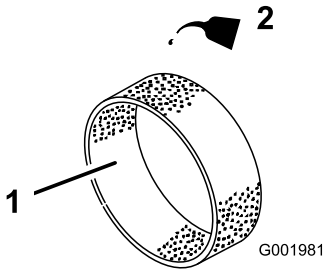

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Figure 35

1. Foam element
2. Oil

5. Squeeze the element to distribute the oil.

Checking the Paper Element

Inspect the paper element for tears, an oily film, damage to the rubber seal, excessive dirt, or other damage (Figure 36). If any of these conditions exist, replace the filter.

Important: **Do not clean the paper element with pressurized air or liquids, such as a solvent, gasoline, or kerosene.**

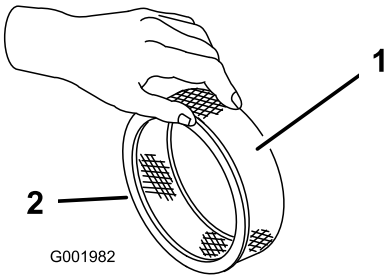

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Figure 36

1. Paper element
2. Rubber seal

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

Installing the Foam and Paper Elements

1. Carefully slide the foam element onto the paper air-cleaner element (Figure 34).
2. Slide the air-cleaner assembly and cover onto the long rod.
3. Install the cover nut finger-tight against the cover (Figure 34).

   Note: Ensure that the rubber seal is flat against the air-cleaner base and cover.
4. Install the air-cleaner cover and knob (Figure 34).
5. Close and latch the seat.

Servicing the Engine Oil

Crankcase Capacity is 2.0 L (2.1 US qt) with the filter.

Use high-quality engine oil that meets the following specifications:

- API classification Level required: SJ, JK, SL, or higher.
- Preferred oil: SAE 10W30 (above 0°F)
- Alternate oil: SAE 5W30 (below 32°F)

Toro Premium Engine Oil is available from your distributor in either 10W30 or 5W30 viscosity. See the *Parts Catalog* for part numbers.

Checking the Engine Oil

Service Interval: Before each use or daily

Every 400 hours/Yearly (whichever comes first)

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

1. Position the machine on a level surface.
2. Remove the dipstick and wipe it with a clean rag (Figure 37). Insert the dipstick into the tube and make sure that it is seated fully. Remove the dipstick and check the oil level.

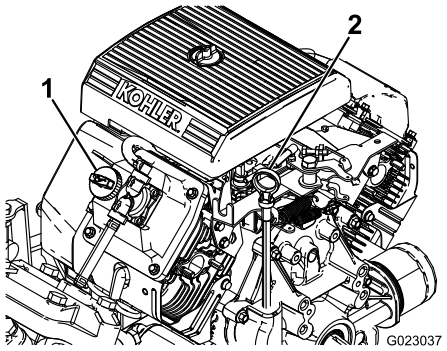

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Figure 37

1. Filler cap
2. Dipstick

3. If the oil level is low, remove the filler cap from the valve cover (Figure 37) and pour oil into the opening until the oil level is up to the FULL mark on the dipstick. Add the oil slowly and check the level often during this process. Do not overfill.
4. Install the dipstick firmly in place.

Changing the Engine Oil

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

Every 100 hours—Change the engine oil (more often when operating under heavy load or in high temperature).

1. Start the engine and let it run for 5 minutes. This warms the oil so it drains better.
2. Position the machine on a level surface, engage the parking brake, shut off the sprayer pump, shut off the engine, and remove the key.
3. Release the latch on the back of the seat and lift the seat forward.

⚠ CAUTION

Components under the seat are hot if the sprayer has been running. If you touch hot components, you may be burned.

Allow the sprayer to cool before performing maintenance or touching components under the hood.

4. Place a pan below the oil drain.
5. Remove the drain plug (Figure 38).

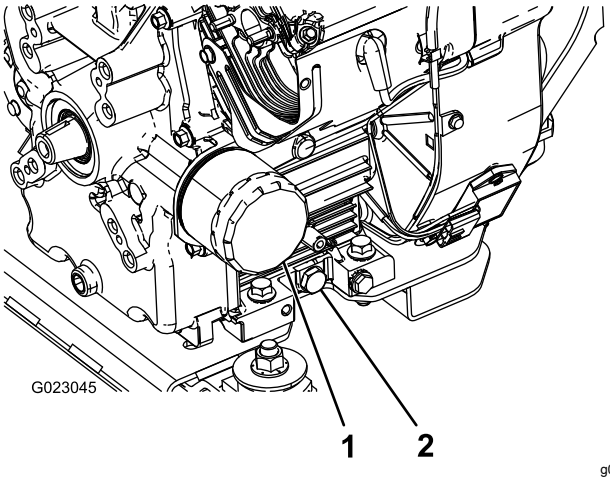


Figure 38

1. Oil filter
2. Oil-drain plug

6. When the oil has drained completely, replace the drain plug and torque it to 13.6 N·m (10 ft-lb).
7. Dispose of the used oil at a certified recycling center.
8. Slowly pour approximately 80% of the specified amount of oil into the oil filler tube (Figure 37).
9. Check the oil level.
10. Slowly add additional oil to bring the oil level to the FULL mark on the dipstick.

Important: **Overfilling the crankcase with oil may cause engine damage.**

Changing the Engine-Oil Filter

Service Interval: Every 100 hours

1. Drain the oil from the engine; refer to Changing the Engine Oil (page 43), steps 1 through 7.
2. Remove the oil filter (Figure 38).
3. Wipe the filter adapter gasket surface.
4. Apply a thin coat of new oil to the rubber gasket on the replacement filter.
5. Install the replacement oil filter to the filter adapter. Turn the oil filter clockwise until the rubber gasket contacts the filter adapter, then tighten the filter an additional 1/2 turn (Figure 38).
6. Fill the crankcase with the correct type of new oil; refer to Changing the Engine Oil (page 43), steps 8 through 10.
7. Dispose of the used oil filter at a certified recycling center.

Changing the Spark Plugs

Service Interval: Every 200 hours

Type: Champion RC-12YC (or equivalent)

Air Gap: 0.76 mm (0.030 inch)

Make sure that the air gap between the center and side electrodes is correct before installing the spark plugs. Use a spark-plug wrench for removing and installing the spark plugs and a gapping tool/feeler gauge to check and adjust the air gap.

Removing the Spark Plugs

1. Position the machine on a level surface, engage the parking brake, shut off the sprayer pump, shut off the engine, and remove the key.
2. Release the latch on the back of the seat and lift the seat forward.
3. Pull the wires off the spark plugs (Figure 39).
4. Clean around the spark plugs to prevent dirt from falling into the engine and potentially causing damage.
5. Remove the spark plugs and metal washers.

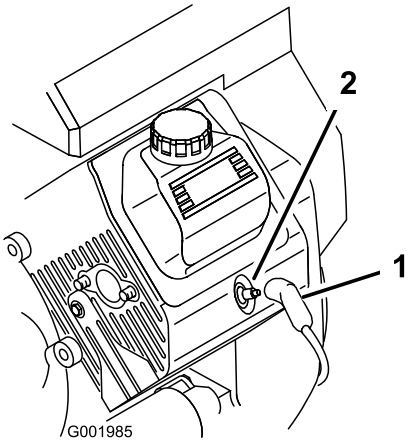


Figure 39

1. Spark-plug wire
2. Spark plug

Checking the Spark Plugs

1. Look at the center of the spark plugs (Figure 40).

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

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

2. Check the gap between the center and side electrodes (Figure 40) and bend the side electrode, if the gap is not correct.

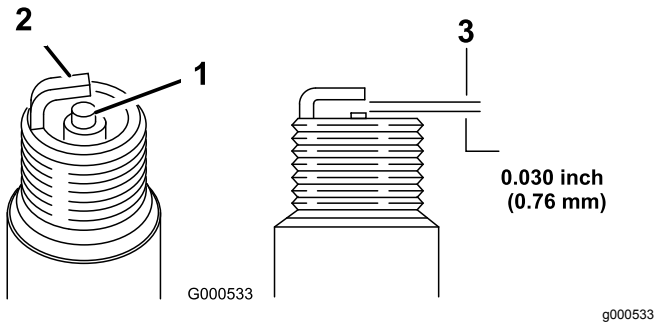


Figure 40

1. Center-electrode insulator
2. Side electrode
3. Air gap (not to scale)

Installing the Spark Plugs

1. Install the spark plugs and metal washers.
2. Tighten the spark plugs to 24.4 to 29.8 N·m (18 to 22 ft-lb).
3. Push the wires onto the spark plugs (Figure 39).
4. Close and latch the seat.

Fuel System Maintenance

Replacing the Fuel Filter

Service Interval: Every 100 hours—Replace the fuel filter.

Every 400 hours/Yearly (whichever comes first)—Inspect the fuel lines.

1. Set the parking brake, stop the pump, shut off the engine, and remove the ignition key.
2. Release the latch on the back of the seat and lift the seat forward.
3. Clamp off the hose on either side of the fuel filter to prevent gas from pouring out of the hoses when you remove the filter.
4. Place a drain pan under the filter.
5. Squeeze the ends of the hose clamps together and slide them away from the filter (Figure 41).
6. Remove the filter from the fuel lines.

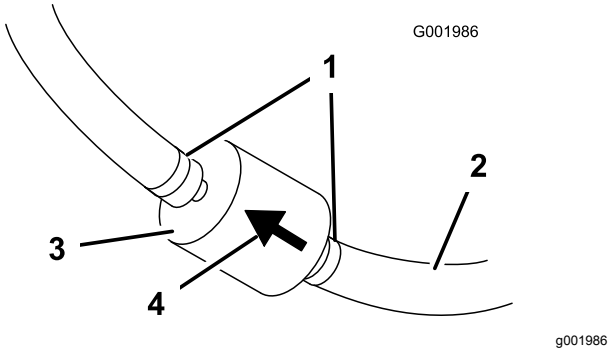


Figure 41

1. Hose clamp
2. Fuel line
3. Filter
4. Flow-direction arrow

7. Install a new filter and move the hose clamps close to the filter.

   Ensure that the flow-direction arrow points toward the engine.

Servicing the Carbon Canister

Checking the Air Filter for the Carbon Canister

Service Interval: After the first 50 hours

Every 200 hours

Check the opening at the bottom of the air filter for the carbon canister to ensure that it is clean and free of debris and obstructions (Figure 42).

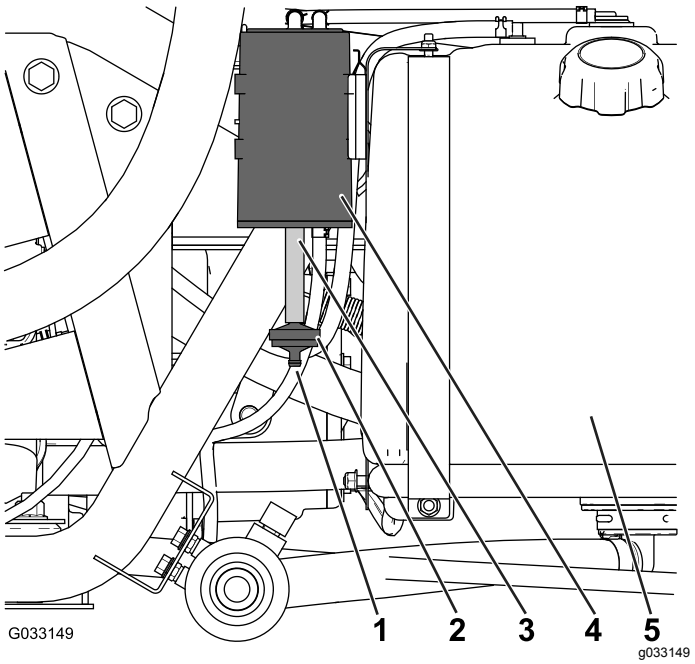


Figure 42

1. Air-filter opening
2. Carbon-canister filter
3. Hose
4. Carbon canister
5. Fuel tank

Replacing the Carbon-Canister Filter

Service Interval: After the first 50 hours

Every 200 hours

1. Remove the barbed fitting of the carbon-canister filter from the hose at the bottom of the carbon canister, and remove the filter (Figure 42).

   Note: Discard the old filter.

2. Fully insert the barbed fitting of the new carbon-canister filter into the hose at the bottom of the carbon canister.

Draining the Fuel Tank

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

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

1. Transfer the fuel from the tank into an approved fuel container using a siphon pump, or remove the tank from the machine and pour the fuel out of the tank fill spout into the fuel container.

   Note: If you remove the fuel tank, also remove the fuel and return hoses from the tank before removing the tank.

2. Replace the fuel filter; refer to Replacing the Fuel Filter (page 45).
3. Flush the tank with fresh, clean fuel, if necessary.
4. Install the tank if you removed it.
5. Fill the tank with fresh, clean fuel.

Electrical System Maintenance

Locating the Fuses

There are 2 fuse blocks and 1 empty slot in the electrical system. They are located beneath the seat (Figure 43).

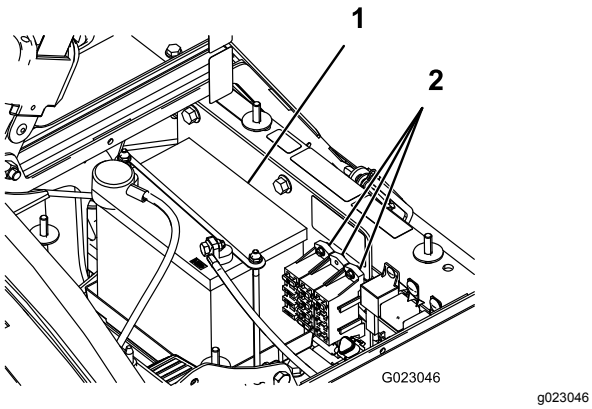


Figure 43

1. Battery
2. Fuse blocks

Servicing the Battery

⚠ 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.

Important: **Do not jump start the sprayer.**

Always keep the battery clean and fully charged. Use a paper towel to clean the battery and battery box. If the battery terminals are corroded, clean them with a solution of 4 parts water and 1 part baking soda. Apply a light coating of grease to the battery terminals to prevent corrosion.

Voltage: 12 V with 280 cold cranking A at 0°F

Removing the Battery

1. Position the sprayer on a level surface, engage the parking brake, shut off the sprayer pump, shut off the engine, and remove the key.
2. The battery is located on the right side of the machine behind the pump (Figure 43).
3. Disconnect the negative (black) ground cable from the battery post.

⚠ WARNING

Incorrect battery-cable routing could damage the sprayer 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.**

⚠ WARNING

Battery terminals or metal tools could short against metal sprayer 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 sprayer.**
- **Do not allow metal tools to short between the battery terminals and metal parts of the sprayer.**
- **Always keep the battery strap in place to protect and secure the battery.**

4. Disconnect the positive (red) cable from the battery post.
5. Remove the battery retainer and fasteners (Figure 43).
6. Remove the battery.

Installing the Battery

Service Interval: Every 50 hours—Check the battery-cable connections.

1. Set the battery on the battery box so that the battery posts are toward the front of the sprayer.
2. Install the battery retainer and secure it with the fasteners you removed previously (Figure 43).

Important: **Always keep the battery retainer in place to protect and secure the battery.**

3. Connect the positive (red) cable to the positive (+) battery post and the negative (black) cable to the negative (-) battery post using the bolts and wing nuts. Slide the rubber boot over the positive battery post.
4. Install the battery cover and secure it with the 2 knobs (Figure 43).

Checking the Electrolyte Level

Service Interval: Every 50 hours

Note: When the machine is in storage check the battery-electrolyte level every 30 days.

1. Loosen the knobs on the sides of the battery box and remove the battery cover (Figure 43).
2. Remove the filler caps. If the electrolyte is not up to the fill line, add the required amount of distilled water; refer to Adding Water to the Battery (page 48).

⚠ DANGER

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

- **Do not drink electrolyte or allow it to contact your skin, eyes or clothing. Wear safety glasses to shield your eyes and rubber gloves to protect your hands.**
- **Fill the battery where clean water is always available for flushing the skin.**

Adding Water to the Battery

The best time to add distilled water to the battery is just before you operate the machine. This lets the water mix thoroughly with the electrolyte solution.

1. Clean the top of the battery with a paper towel.
2. Remove the filler caps from the battery and slowly fill each cell with distilled water until the level is up to the fill line. Replace the filler caps.

Important: **Do not overfill the battery. Electrolyte will overflow onto other parts of the sprayer and severe corrosion and deterioration will result.**

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 (1.260 specific gravity). This is especially important to prevent battery damage when the temperature is below 0°C (32°F).**

1. Remove the battery from the chassis; refer to Removing the Battery (page 47).
2. Check the electrolyte level; refer to Checking the Electrolyte Level (page 48).
3. Connect a 3 to 4 A battery charger to the battery posts. Charge the battery at a rate of 3 to 4 A for 4 to 8 hours (12 V).

   Important: **Do not overcharge the battery.**
4. Install the battery in the chassis; refer to Installing the Battery (page 47).

Storing the Battery

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

Drive System Maintenance

Inspecting the Wheels and Tires

Service Interval: Before each use or daily—Check the tire pressure.

After the first 8 hours—Torque the wheel-lug nuts.

Every 100 hours—Torque the wheel-lug nuts.

Every 100 hours—Inspect the condition and wear of the tires.

Check the tire pressure every 8 hours or daily to ensure proper levels. Fill the tires to 138 kPa (20 psi). Also, check the tires for wear or damage.

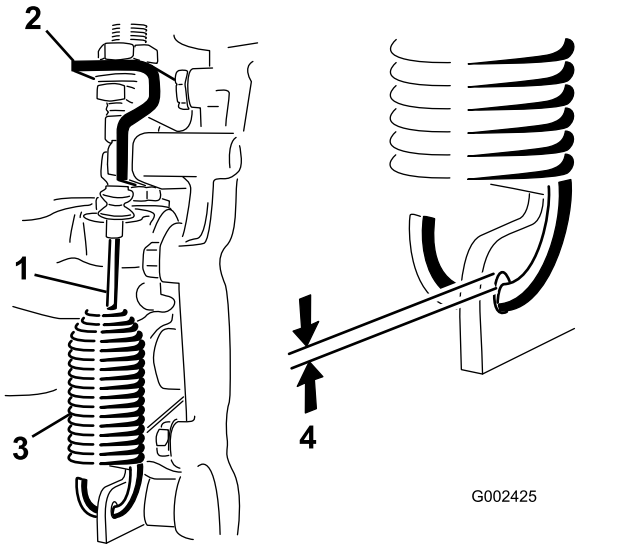
Check the wheels to ensure that they are mounted securely after the first 8 operating hours and then every 100 hours thereafter. Torque the front and rear lug nuts to 102 to 108 N·m (75 to 80 ft-lb).

Check the tire condition at least every 100 hours of operation. Operating accidents, such as hitting curbs, can damage a tire or rim and also disrupt wheel alignment, so inspect the tire condition after an accident.

Adjusting the Differential-Lock Cable

Service Interval: Every 200 hours

1. Move the differential-lock lever to the OFF position.
2. Loosen the jam nuts securing the differential-lock cable to the bracket on the transaxle (Figure 44).



g002425

Figure 44

1. Differential-lock cable
2. Transaxle bracket
3. Spring
4. 0.25 to 1.5 mm (0.01 to 0.06 inch) gap

3. Adjust the jam nuts to obtain a 0.25 to 1.5 mm (0.01 to 0.06 inch) gap between the spring hook and the outside diameter of the hole in the transaxle lever.
4. Tighten the jam nuts when finished.

Adjusting the Front Wheel Toe-in

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

The toe-in should be 0 to 6 mm (0 to 1/4 inch).

1. Fill the tank with approximately 331 L (87.5 US gallons) of water.
2. Check and fill all tires; refer to Checking the Tire Pressure (page 23).
3. Drive the sprayer back and forth a few times to relax the A-arms, then drive it forward at least 3 m (10 ft).
4. Measure the distance between both of the front tires at the axle height at both the front and rear of the front tires (Figure 45).

   Note: You will need a fixture or alignment gauge for measuring the rear of the front tires at axle height. Use the same fixture or alignment gauge to accurately measure the front of the front tires at axle height (Figure 45).

   The front of the tires should be 0 to 6 mm (0 to 1/4 inch) closer than the back side of the front tires.

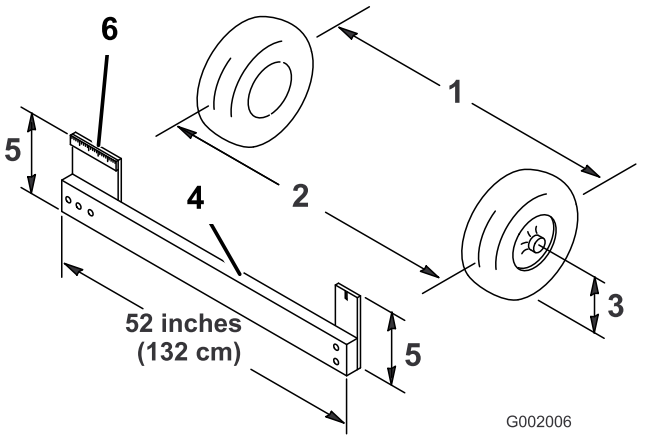


Figure 45

1. Tire centerline—back
2. Tire centerline—front
3. Axle centerline
4. Fixture
5. Axle-centerline distance
6. 15 cm (6 inches) ruler

5. If the measurement does not fall within the specified range, loosen the jam nuts at both ends of the tie rods (Figure 46).

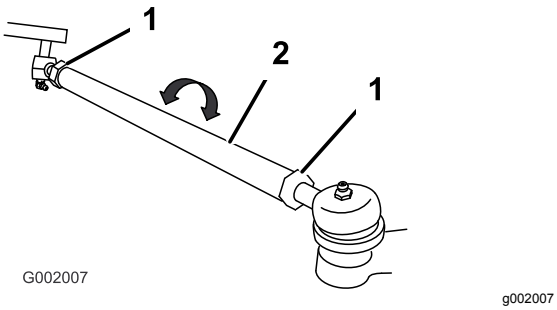


Figure 46

1. Jam nut
2. Tie rod

6. Rotate both tie rods to move the front of the tire inward or outward.

   Note: The tie rods measure the same length.

7. Tighten the tie rod jam nuts when the adjustment is correct.
8. Ensure that there is full travel of the steering wheel in both directions.

Brake Maintenance

Checking the Brake Fluid

The brake-fluid reservoir is shipped from the factory filled with DOT 3 brake fluid. Check the level before starting the engine each day.

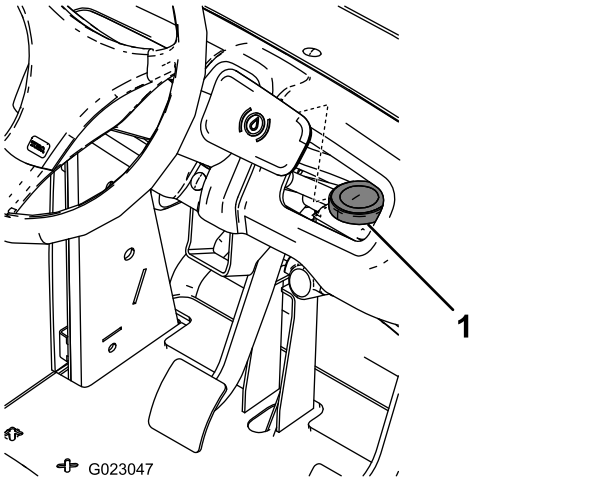


Figure 47

1. Brake-fluid reservoir

1. Position the sprayer on a level surface, set the parking brake, stop the pump, shut off the engine, and remove the ignition key.
2. The fluid level should be up to the FULL line on the reservoir.
3. If the fluid level is low, clean the area around the reservoir cap, remove the cap, and fill the reservoir to the proper level. Do not overfill.

Inspecting the Brakes

Service Interval: Every 100 hours

The brakes are a critical safety component of the sprayer. Inspect them as follows:

- Inspect the brake shoes for wear or damage. If the lining (brake pad) thickness is less than 1.6 mm (1/16 inch), replace the brake shoes.
- Inspect the backing plate and other components for signs of excessive wear or deformation. If any deformation is found, replace the appropriate components.

Adjusting the Parking Brake

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

1. Remove the plastic grip.
2. Loosen the set screw securing the knob to the parking-brake lever (Figure 48).

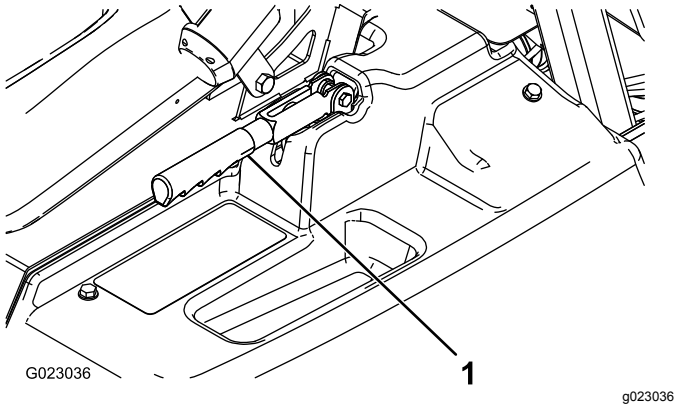


Figure 48

1. Parking-brake lever

3. Rotate the knob until a force of 18 to 23 kg (40 to 50 lb) is required to actuate lever.
4. Tighten the set screw.

Hydraulic System Maintenance

Checking the Transaxle/Hydraulic Fluid

Service Interval: Every 200 hours

1. Position the sprayer on a level surface, engage the parking brake, shut off the sprayer pump, shut off the engine, and remove the key.
2. Remove the transaxle dipstick and wipe it with a clean rag (Figure 49).

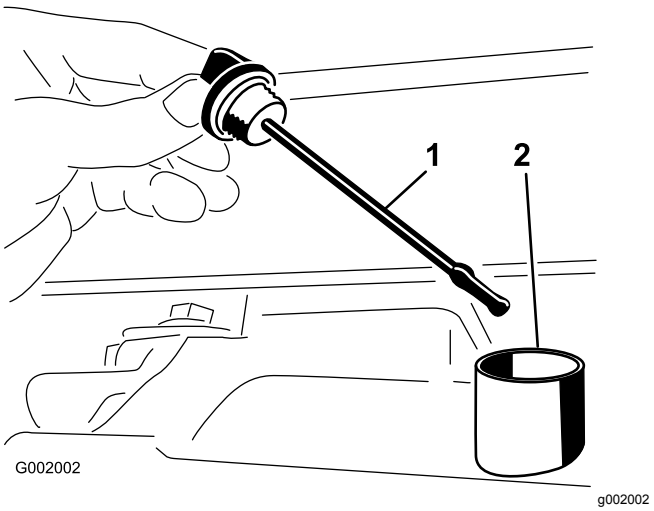


Figure 49

1. Dipstick
2. Fill hole

Important: **Be very careful not to get dirt or other contaminants into the opening when checking the transmission oil.**

3. Insert the dipstick into the tube and make sure that it is seated fully. Remove the dipstick and check the oil level.
4. The transaxle fluid level should be at the top of the flat portion of the dipstick. If it is not, fill the reservoir with the appropriate fluid; refer to Changing Transaxle/Hydraulic Fluid (page 52).
5. Install the dipstick firmly in place.

Changing Transaxle/Hydraulic Fluid

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

1. Position the sprayer on a level surface, set the parking brake, stop the pump, shut off the engine, and remove the ignition key.
2. Place a drain pan under the drain plug of the reservoir.
3. Remove the drain plug from the side of the reservoir, and let the hydraulic fluid flow into the drain pan (Figure 50).

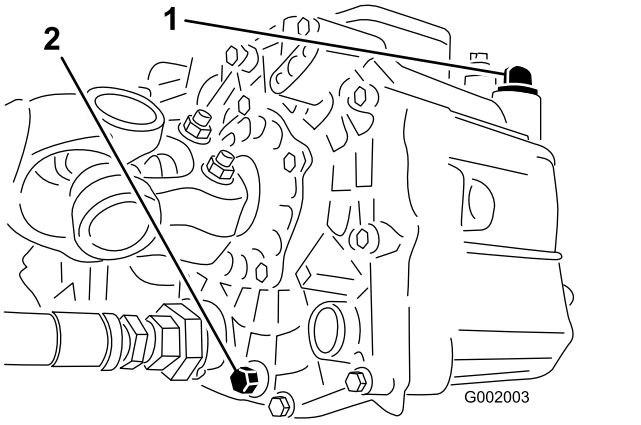


Figure 50

1. Hydraulic dipstick
2. Drain plug

4. Note the orientation of the hydraulic hose and 90° fitting connected to the strainer.
5. Remove the hydraulic hose and 90° fitting (Figure 51).

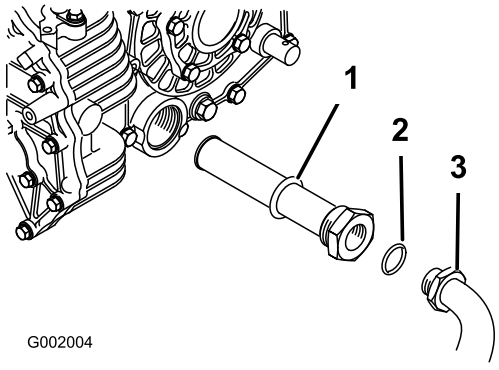


Figure 51

1. Hydraulic strainer
2. O-ring
3. 90° fitting

6. Remove the strainer and clean it by back flushing it with a clean degreaser.
7. Allow the strainer to air dry.
8. Install the strainer when the oil is draining.
9. Install the hydraulic hose and 90° fitting to the strainer.
10. Install and tighten the drain plug.
11. Fill the reservoir with approximately 7 L (7.5 US qt) of Dexron III ATF.

   Important: **Use only the hydraulic fluids specified. Other fluids could cause system damage.**
12. Start the engine and drive the sprayer to fill the hydraulic system.
13. Check the oil level and replenish it, if required.

Replacing the Hydraulic Filter

Service Interval: After the first 8 hours

Every 800 hours/Yearly (whichever comes first)

Use the Toro replacement filter (Part No. 54-0110).

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

1. Position the sprayer on a level surface, set the parking brake, stop the pump, shut off the engine, and remove the ignition key.
2. Clean the area around the filter mounting area.
3. Place a drain pan under the filter.
4. Remove the filter (Figure 52).

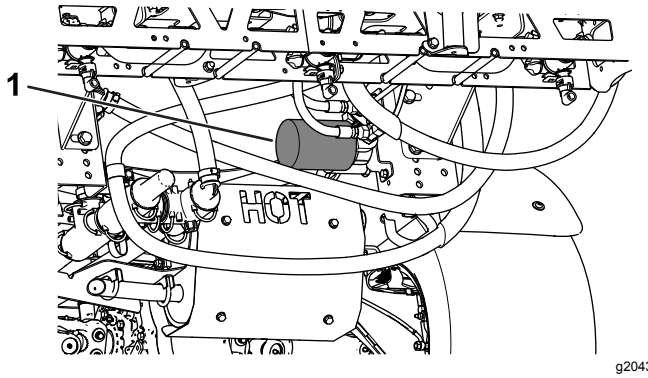


Figure 52

1. Hydraulic filter

5. Lubricate the new filter gasket.
6. Ensure that the filter mounting area is clean.
7. Screw the filter on until the gasket contacts the mounting plate, then tighten the filter 1/2 turn.
8. Start the engine and let it run for about 2 minutes to purge air from the system.

9. Shut off the engine and check the hydraulic-oil level and for leaks.

Checking the Hydraulic Lines and Hoses

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

⚠ WARNING

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

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

Spray System Maintenance

⚠ WARNING

Chemical substances used in the spray system may be hazardous and toxic to you, bystanders, animals, plants, soils or other property.

- **Carefully read and follow the chemical warning labels and material safety data sheets (MSDS) for all chemicals used and protect yourself according to the chemical manufacturer's recommendations. For example, use appropriate personal protective equipment (PPE), including face and eye protection, gloves, or other equipment to guard against personal contact with chemicals.**
- **Keep in mind that there may be more than 1 chemical used and information on each should be assessed.**
- ***Refuse to operate or work on the sprayer if this information is not available.***
- **Before working on a spray system make sure that the system has been triple rinsed and neutralized according to the recommendations of the chemical manufacturer(s) and all of the valves have been cycled 3 times.**
- **Verify that there is an adequate supply of clean water and soap nearby, and immediately wash off any chemicals that contact you.**

Inspecting the Hoses

Service Interval: Every 200 hours—Inspect all hoses and connections for damage and proper attachment.

Examine each hose in the spray system for cracks, leaks or other damage. At the same time, inspect the connections and fittings for similar damage. Replace any worn or damaged hoses and fittings.

Changing the Suction Filter

Service Interval: Every 400 hours

Note: Determine the appropriate suction filter mesh size that you need for your job; refer to Selecting a Suction Filter (page 34).

1. Park the machine on a level surface, engage the parking brake, shut off the pump, shut off the engine, and remove the key.
2. At the top of the sprayer tank, remove the retainer that secures the hose fitting attached to the large hose from the filter housing (Figure 53).

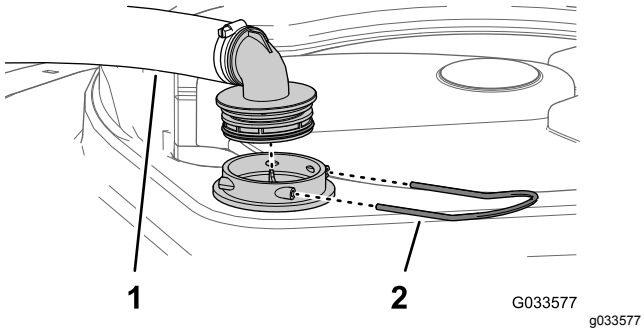


Figure 53

1. Suction hose
2. Retainer

3. Remove the hose and hose fitting from the filter housing (Figure 53).
4. Remove the old suction filter from the filter housing in the tank (Figure 54).

   Note: Discard the old filter.

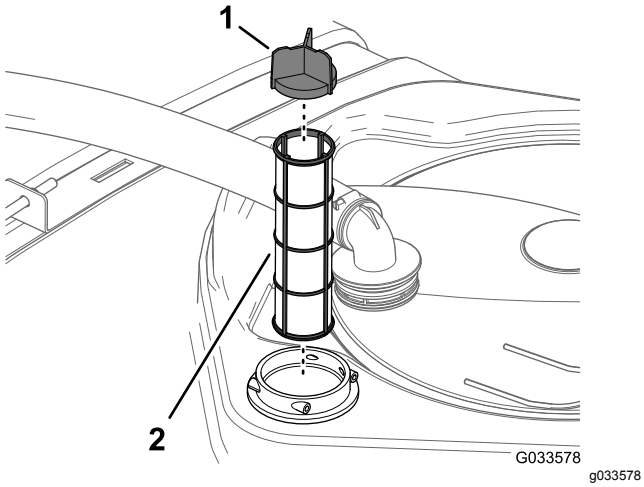


Figure 54

1. Screen vane
2. Suction filter

5. Install the new suction filter into the filter housing.

   Note: Ensure that the filter is fully seated.
6. Align the hose and hose fitting to the filter housing at the top of the tank, and secure the fitting and housing with the retainer that you removed in step 2.

Changing the Pressure Filter

Service Interval: Every 400 hours

1. Move the machine to a level surface, shut off the sprayer pump, shut off the engine, and remove the key.
2. Align a drain pan under the pressure filter (Figure 55).

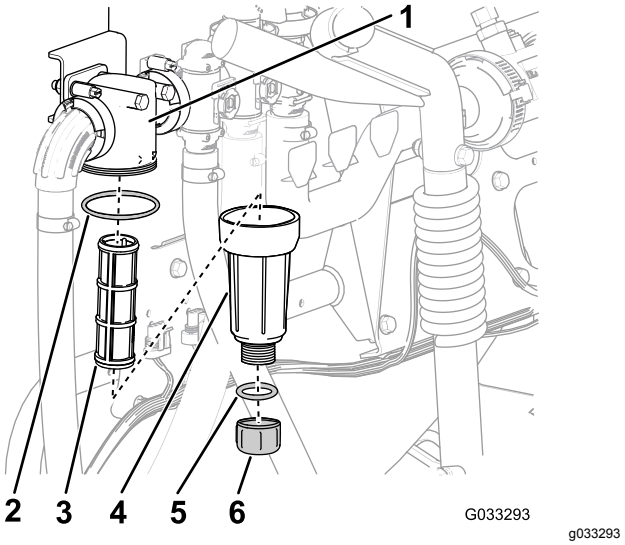


Figure 55

1. Filter head
2. O-ring (bowl)
3. Filter element
4. Bowl
5. O-ring (drain plug)
6. Drain plug

3. Rotate the drain plug counterclockwise and remove it from the bowl of the pressure filter (Figure 55).

   Note: Allow the bowl to drain completely.
4. Rotate the bowl counterclockwise and remove from its filter head (Figure 55).
5. Remove the old pressure filter element (Figure 55).

   Note: Discard the old filter.
6. Check the O-ring for the drain plug (located inside the bowl) and the O-ring for bowl (located inside the filter head) for damage and wear (Figure 55).

   Note: Replace any damaged or worn O-rings for the plug, bowl, or both.
7. Install the new pressure filter element into the filter head (Figure 55).

Note: Ensure that the filter element is firmly seated into the filter head.

8. Install the bowl onto the filter head and tighten by hand (Figure 55).
9. Install the plug into the bowl and tighten by hand (Figure 55).

Changing the Nozzle Filter

Note: Determine the appropriate nozzle filter mesh size that you need for your job; refer to Selecting a Nozzle-Tip Filter (Optional) (page 36).

1. Park the machine on a level surface, engage the parking brake, shut off the sprayer pump, shut off the engine, and remove the key.
2. Remove the nozzle from the spray turret (Figure 56).

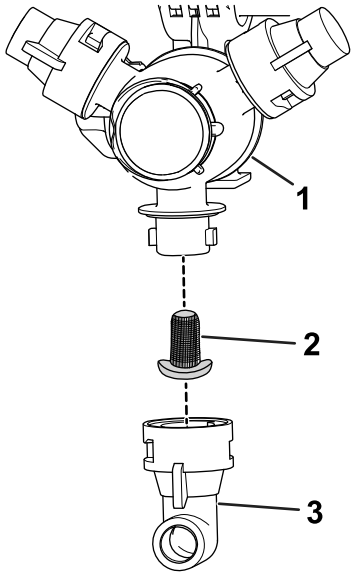


Figure 56

1. Spray turret
2. Nozzle filter
3. Nozzle

3. Remove the old nozzle filter (Figure 56).

   Note: Discard the old filter.
4. Install the new nozzle filter (Figure 56).

   Note: Ensure that the filter is fully seated.
5. Install the nozzle onto the spray turret (Figure 56).

Inspecting the Pump

Service Interval: Every 400 hours/Yearly (whichever comes first)—Inspect the pump diaphragms and replace if necessary (see an Authorized Toro Service Distributor).

Every 400 hours/Yearly (whichever comes first)—Inspect the pump check valves and replace if necessary (see an Authorized Toro Service Distributor).

Note: The following machine components are considered parts subject to consumption through use unless found defective and are not covered by the warranty associated with this machine.

Have an Authorized Toro Service Distributor check following internal pump components for damage:

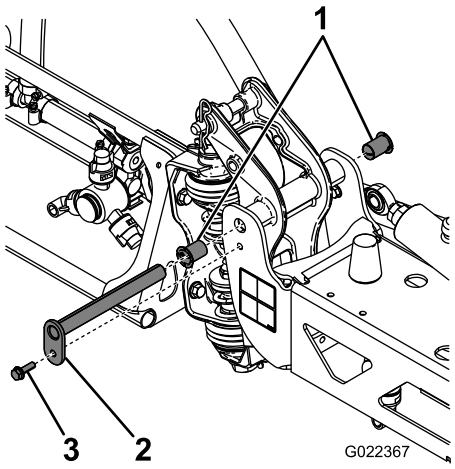
- Pump diaphragms
- Pump check valves assemblies

Replace any components, if necessary.

Inspecting the Nylon Pivot Bushings

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

1. Park the machine on a level surface, engage the parking brake, shut off the pump, shut off the engine, and remove the key.
2. Extend the outer-boom sections to the spray position and support the booms using stands or straps and lifting equipment.
3. With the weight of the boom supported, remove the bolt and nut securing the pivot pin to the boom assembly (Figure 57).



g022367

Figure 57

1. Nylon bushings
2. Pivot pin
3. Bolt

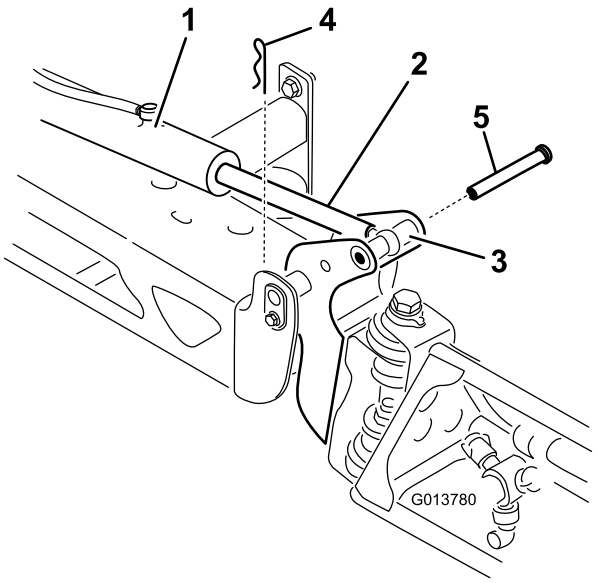
4. Remove the bolt and nut that secure the pivot pin, and remove the pin (Figure 57).
5. Remove the boom and pivot bracket assembly from the center frame to access the nylon bushings.
6. Remove and inspect the nylon bushings from the front and back sides of the pivot bracket (Figure 57).

   Note: Replace any worn or damaged bushings.
7. Place a small amount of oil on the nylon bushings, and install them into pivot bracket (Figure 57).
8. Install the boom and pivot bracket assembly into the center frame, aligning the holes (Figure 57).
9. Install the pivot pin and secure it with the bolt and nut removed in step 4.
10. Repeat steps 2 through 9 for the other outer-boom section.

Adjusting the Booms to Level

Use the following procedure to adjust the level of the left and right booms sections when they are in the spray position.

1. Extend the booms to the spray position.
2. Remove the cotter pin from the pivot pin (Figure 58).



g013780

Figure 58

1. Actuator
2. Actuator rod
3. Boom-pivot pin housing
4. Cotter
5. Pin

3. Lift up on the boom and remove the pin (Figure 58), and slowly lower the boom to the ground.
4. Inspect the pin for any damage and replace it if necessary.
5. Use a wrench on the flat sides of the actuator rod to immobilize it, then loosen the jam nut to allow the eyelet rod to be adjusted (Figure 59).

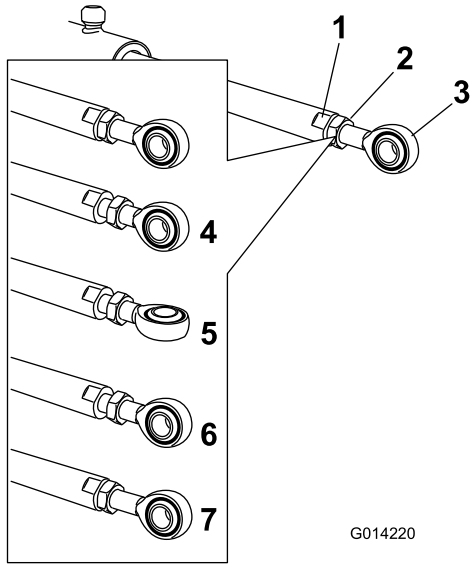


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Figure 59

1. Flat on the actuator rod
2. Jam nut
3. Eyelet
4. Jam nut loosened
5. Eyelet adjusted
6. Eyelet position for assembly
7. Jam nut tightened to lock new position

6. Turn the eyelet rod in the actuator rod to shorten or lengthen the extended actuator to the desired position (Figure 59).

   Note: You must turn the eyelet rod in half or complete revolutions so that you can assemble the rod to the boom.

7. Once the desired position has been achieved, tighten the jam nut to secure the actuator and eyelet rod.
8. Raise the boom to align the pivot with the actuator rod.
9. While holding the boom, insert the pin through both boom pivot and actuator rod (Figure 58).
10. With the pin in place, release the boom and secure the pin with the cotter previously removed.
11. Repeat the procedure for each actuator rod bearing, if necessary.

Cleaning

Cleaning the Flow Meter

Service Interval: Every 200 hours/Yearly (whichever comes first) (more often when using wettable powders).

1. Thoroughly rinse and drain the entire spraying system.
2. Remove the flow meter from the sprayer and flush it with clean water.
3. Remove the retainer ring on the upstream side (Figure 60).

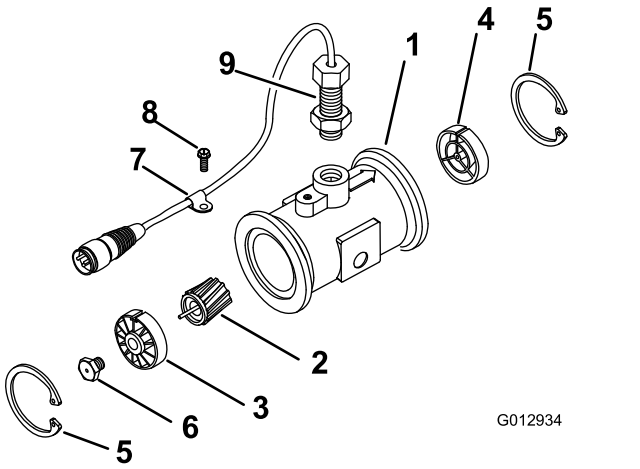

Figure 60

1. Flange (flow-meter body)
2. Downstream hub (with keyway up)
3. Retaining ring
4. Down stream arrow (flow-meter body)
5. Upstream
6. Rotor/magnet
7. Upstream hub and bearing (with keyway up)
8. Turbine stud
9. Wire-harness clamp
10. Flange-head screw
11. Sensor assembly

4. Clean the turbine and the turbine hub to remove metal filings and any wettable powders.
5. Inspect the turbine blades for wear.

   Note: Hold the turbine in your hand and spin it. It should spin freely with very little drag. If it does not, replace it.

6. Assemble the flow meter.
7. Use a low pressure (50 kPa or 5 psi) air jet to ensure that the turbine spins freely.

   Note: If the turbine does not spin freely, loosen the hex stud on the bottom of the turbine hub by 1/16 of a turn until it does spins freely.

Cleaning the Sprayer Valves

- To clean the rate-control valve, refer to the following sections:
  1. Removing the Valve Actuator (page 58)
  2. Removing the Rate-Control-Manifold Valve (page 59)
  3. Cleaning the Manifold Valve (page 62)
  4. Assembling the Manifold Valve (page 63)
  5. Installing the Rate Control Manifold Valve (page 64)
  6. Installing the Valve Actuator (page 67)
- To clean the agitation valve; refer to the following sections:
  1. Removing the Valve Actuator (page 58)
  2. Removing the Agitation-Manifold Valve (page 59)
  3. Cleaning the Manifold Valve (page 62)
  4. Assembling the Manifold Valve (page 63)
  5. Installing the Agitation-Manifold Valve (page 64)
  6. Installing the Valve Actuator (page 67)
- To clean the master-section valve, refer to the following sections:
  1. Removing the Valve Actuator (page 58)
  2. Removing the Master-Section-Manifold Valve (page 60)
  3. Cleaning the Manifold Valve (page 62)
  4. Assembling the Manifold Valve (page 63)
  5. Installing the Master-Section-Manifold Valve (page 65)
  6. Installing the Valve Actuator (page 67)
- To clean the 3 section valves; refer to the following sections:
  1. Removing the Valve Actuator (page 58)
  2. Removing the Section-Manifold Valve (page 61)
  3. Cleaning the Manifold Valve (page 62)
  4. Assembling the Manifold Valve (page 63)
  5. Installing the Section Manifold Valve (page 66)
  6. Installing the Valve Actuator (page 67)

Removing the Valve Actuator

1. Position the sprayer on a level surface, engage the parking brake, shut off the pump, shut off the engine, and remove the key.
2. Remove the 3-pin connector of the valve actuator from the 3 socket electrical connector of the sprayer harness.
3. Remove the retainer that secures the a actuator to the manifold valve for the rate control, agitation, master section, or section valve (Figure 61).

   Note: Squeeze the 2 legs of the retainer together while pushing it down.

   Note: Retain the actuator and retainer for installation in Installing the Valve Actuator (page 67).

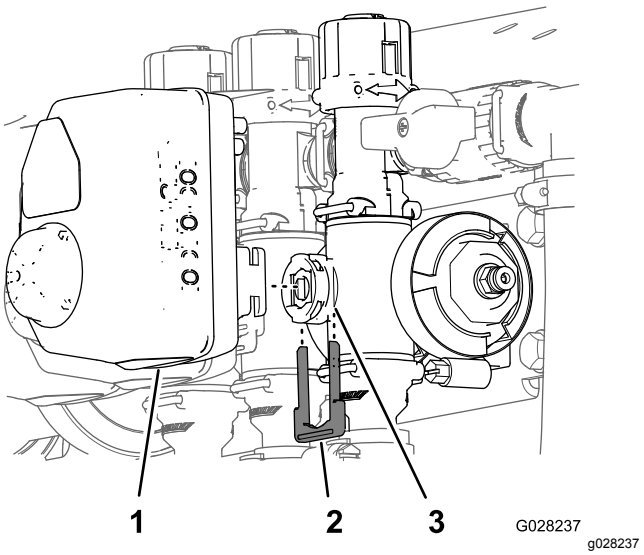

Figure 61

Section-Valve Actuator Shown (the agitation-valve actuator is similar)

1. Valve actuator (section valve shown)
2. Retainer
3. Stem port

4. Remove the actuator from the manifold valve.

Removing the Rate-Control-Manifold Valve

1. Remove the clamps and gaskets that secure the manifold for the rate-control valve (Figure 62).

   Note: Retain the clamp(s) and gasket(s) for installation in Installing the Rate Control Manifold Valve (page 64).

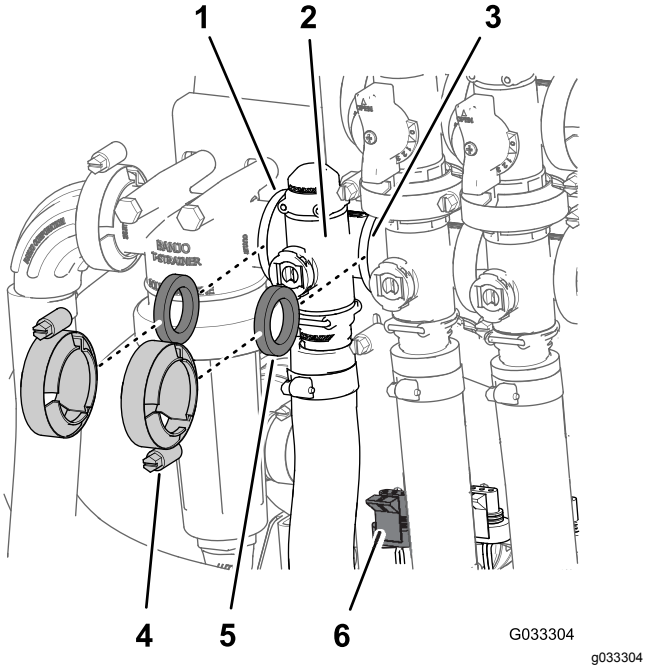

Figure 62

1. Flange (pressure-filter head)
2. Manifold (rate-control valve)
3. Flange (agitation valve)
4. Clamp
5. Gasket
6. 3-pin connector (valve actuator—rate-control valve)

2. Remove the retainer that secures the outlet fitting to the manifold for the rate-control valve (Figure 63).

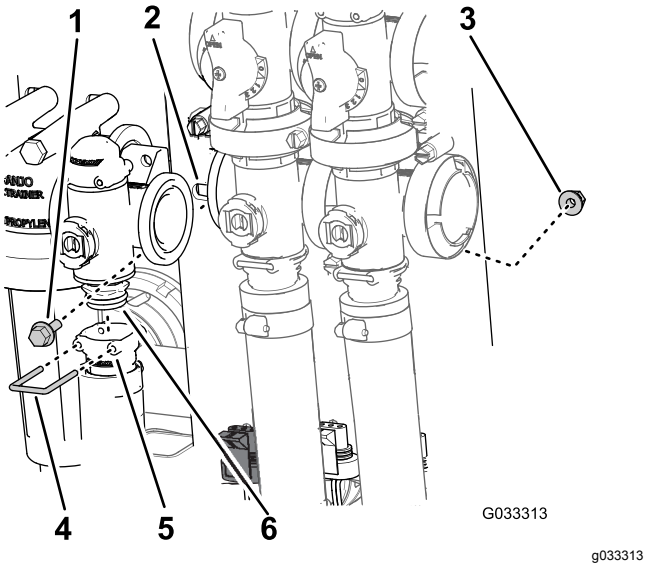

Figure 63

1. Flanged-head bolt
2. Valve mount
3. Flanged locknut
4. Retainer
5. Socket (outlet fitting)
6. Manifold-valve assembly

3. Remove the 2 flanged-head bolts and 2 flanged locknuts that secure the rate-control valve to the valve mount and remove the valve manifold from the machine (Figure 63).

   Note: If necessary, loosened the mounting hardware for the pressure-filter head to ease removal of the rate-control valve.

Removing the Agitation-Manifold Valve

1. Remove the clamps and gaskets that secure the manifold for the agitation valve (Figure 64) to the agitation-bypass valve, rate-control valve, master-section valve, and adapter fitting (agitation-throttle valve).

   Note: Retain the clamp(s) and gasket(s) for installation in Installing the Agitation-Manifold Valve (page 64).

2. Remove the retainer that secures the outlet fitting to the manifold for the agitation valve (Figure 64).

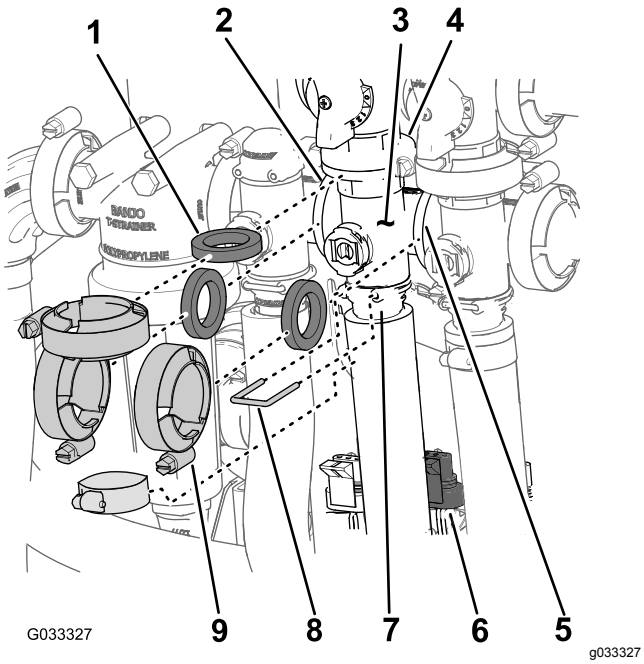

Figure 64

1. Gasket
2. Flange (pressure-filter head)
3. Manifold (agitation valve)
4. Flange (bypass valve—agitation valve)
5. Flange (master-section valve)
6. 3-pin connector (valve actuator—agitation valve)
7. Socket (outlet fitting)
8. Retainer
9. Clamp

3. Remove the flanged-head bolt and flanged locknut that secures the agitation valve to the valve mount and remove the valve manifold from the machine (Figure 65).

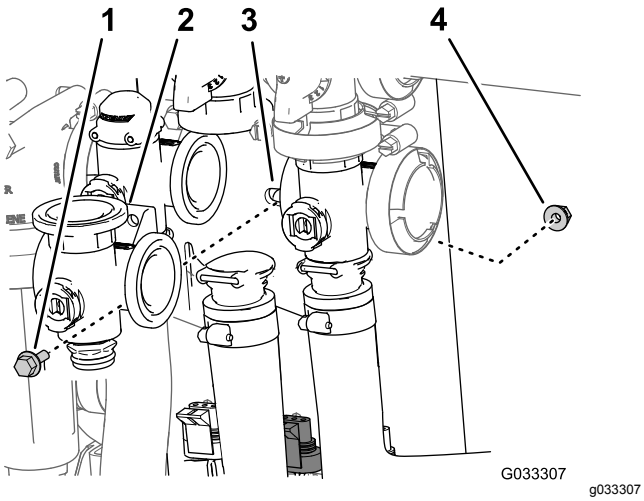

Figure 65

1. Flanged-head bolt
2. Manifold (agitation valve)
3. Valve mount
4. Flanged locknut

Removing the Master-Section-Manifold Valve

1. Remove the clamps and gaskets that secure the manifold for the master-section valve (Figure 66) to the master-section-bypass valve, agitation valve, and master-section-manifold valve (at the end of the hose for the flow meter).

   Note: Retain the clamp(s) and gasket(s) for installation in Installing the Master-Section-Manifold Valve (page 65).

2. Remove the retainer that secures the outlet fitting to the manifold for the master-section valve (Figure 66).

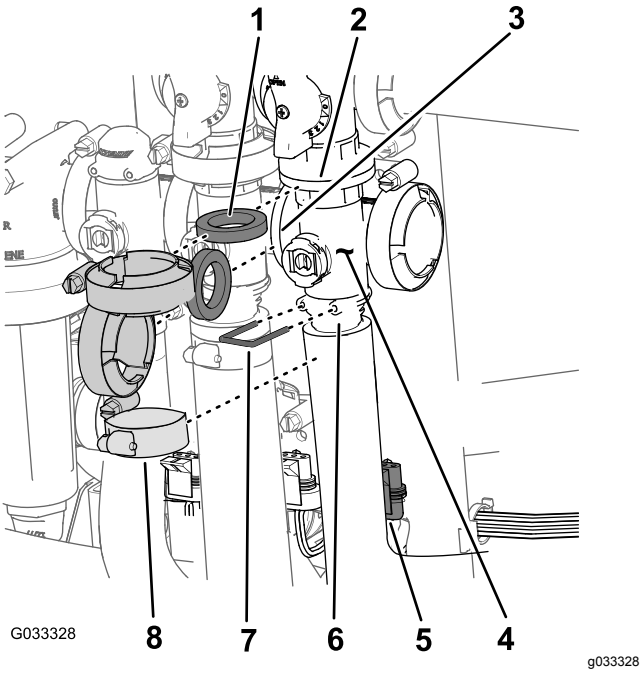

Figure 66

1. Gasket
2. Flange (bypass—master-section valve)
3. Flange (agitation valve)
4. Manifold (master-section valve)
5. 3-pin connector (valve actuator—master-section valve)
6. Socket (outlet fitting)
7. Retainer
8. Clamp

3. Remove the flanged-head bolt and flanged locknut that secures the master-section valve to the valve mount and remove the valve manifold from the machine (Figure 67).

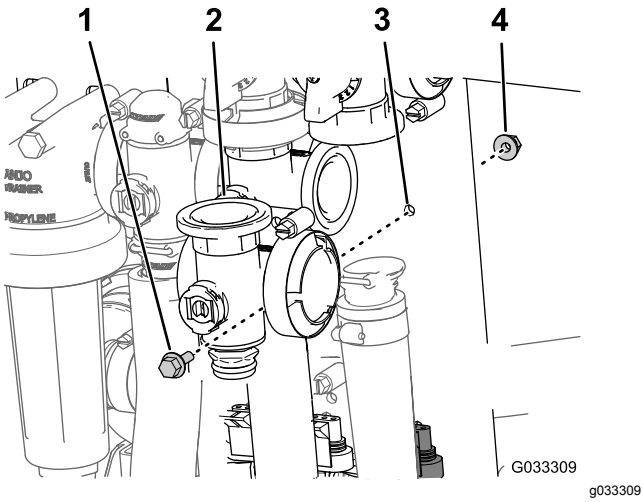

Figure 67

1. Flanged-head bolt
2. Manifold (master-section valve)
3. Valve mount
4. Flanged locknut

Removing the Section-Manifold Valve

1. Remove clamps and gaskets that secure the manifold for the section valve (Figure 68) to the adjacent section valve (if left section valve, and the reducer coupling).

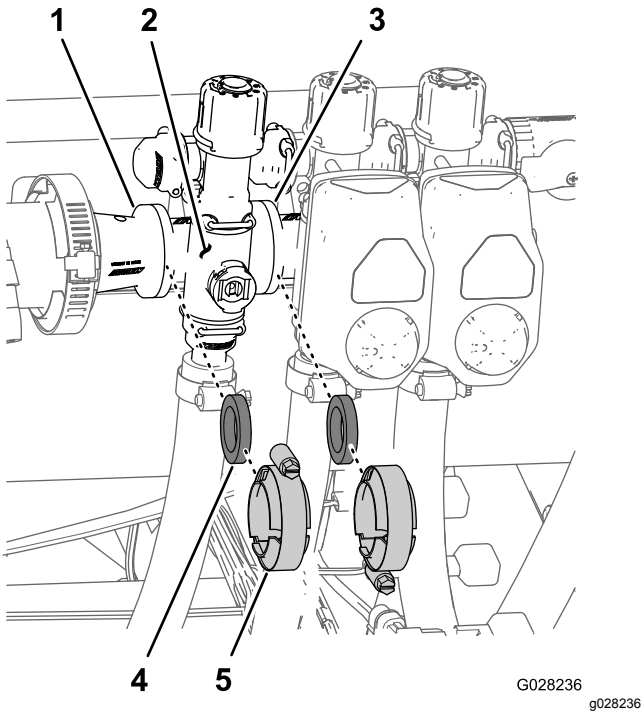

Figure 68

1. Flange (reducer coupling)
2. Manifold (section valve)
3. Flange (adjacent section valve)
4. Gasket
5. Flange clamp

2. Remove the retainers that secure the outlet fitting to the section-valve manifold and the valve manifold to the bypass fitting (Figure 69).

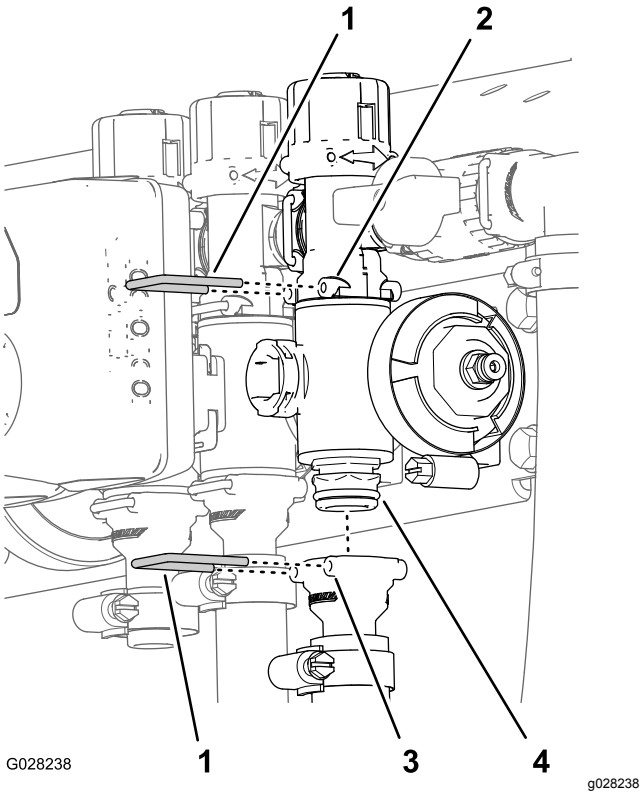

Figure 69

1. Retainer
2. Socket (bypass fitting)
3. Socket (outlet fitting)
4. Manifold-valve assembly

3. For the left or right section valves, remove the flanged-head bolts and flanged locknuts that secure the section valve(s) to the valve mount and remove the valve manifold(s) from the machine; for the center section valve, remove the section-valve manifold from the machine (Figure 70).

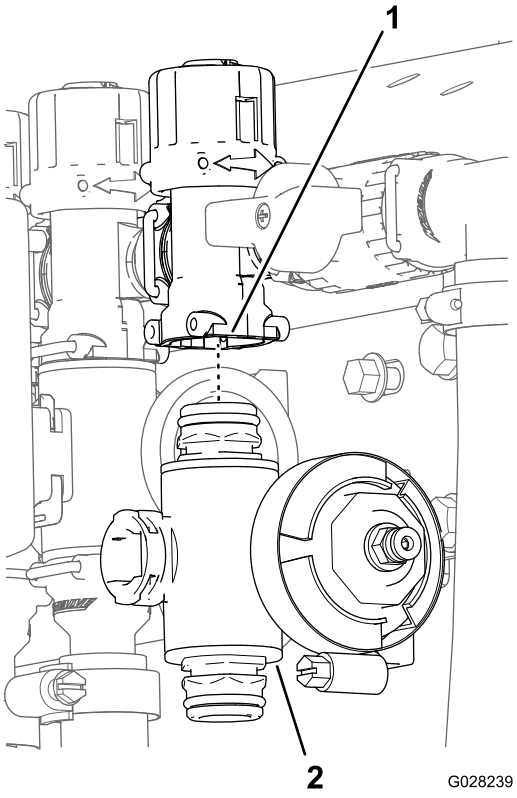

Figure 70

1. Bypass fitting
2. Section-valve manifold

Cleaning the Manifold Valve

1. Position the valve stem so that it is in the closed position (Figure 71B).

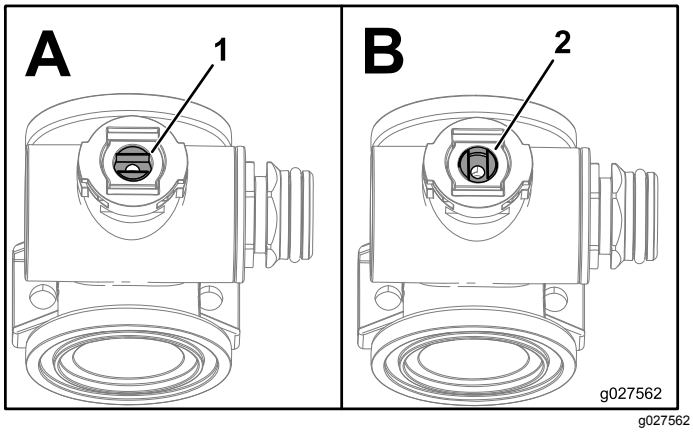

Figure 71

1. Valve open
2. Valve closed

2. Remove the 2 end-cap-fitting assemblies from each end of the manifold body (Figure 72 and Figure 73).

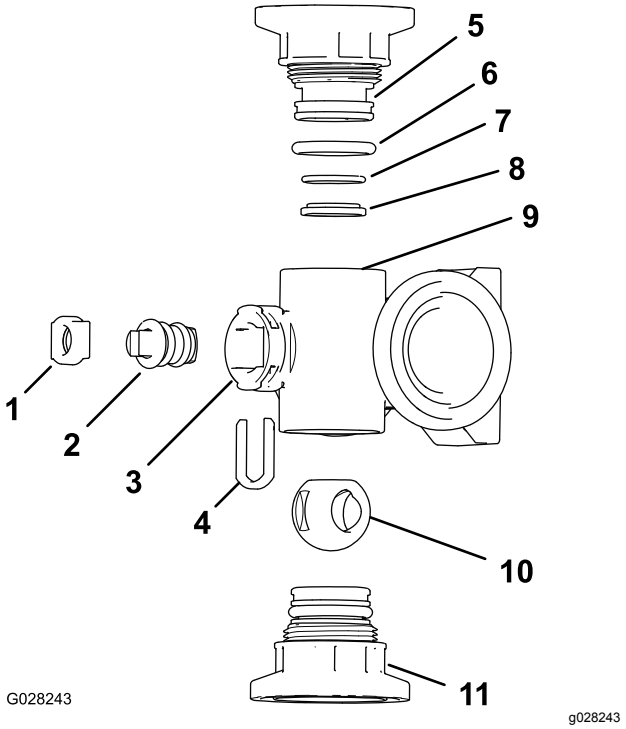

Figure 72
Agitation Valve Manifold

1. Stem retainer
2. Valve stem
3. Stem port
4. Stem-capture retainer
5. End-cap fitting
6. End-cap seal O-ring (0.796 x 0.139 inch)
7. Back seating O-ring (0.676 x 0.07 inch)
8. Valve-seat ring
9. Manifold body
10. Ball valve
11. End-cap-fitting assembly

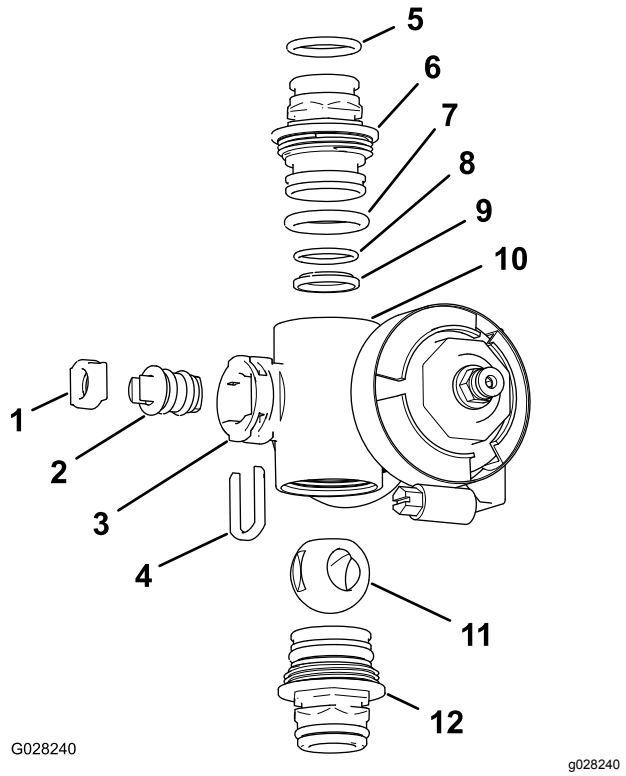

Figure 73

Section Valve Manifold

1.	Valve-stem seat	7.	End-cap O-ring (0.796 x 0.139 inch)
2.	Valve-stem assembly	8.	Back seating O-ring (0.676 x 0.07 inch)
3.	Stem port	9.	Ball seat
4.	Stem retainer	10.	Manifold body
5.	Outlet fitting O-ring (0.737 x 0.103 inch)	11.	Ball valve
6.	Coupling (manifold)	12.	Coupling assembly (manifold)

3. Turn the valve stem so that the ball is in the open position (Figure 71A).

   Note: When the valve stem is parallel with the valve flow, the ball slides out.

4. Remove the stem retainer from the slots in the stem port in the manifold (Figure 72 and Figure 73).
5. Remove the stem retainer and valve stem seat from the manifold (Figure 72 and Figure 73).
6. Reach into the manifold body and remove the valve-stem assembly (Figure 72 and Figure 73).
7. Clean the inside of the manifold and exterior of the ball valve, valve-stem assembly, stem capture, and end fittings.

Assembling the Manifold Valve

1. Check the condition of the outlet-fitting O-rings (section-valve manifold only), end-cap O-rings, back seating O-rings, ball seat for damage or wear (Figure 72 and Figure 73).

   Note: Replace any damaged or worn O-rings or seats.

2. Apply grease to the valve stem and insert it into the valve-stem seat (Figure 72 and Figure 73).
3. Install the valve stem and seat into the manifold and secure the stem and seat with the stem retainer (Figure 72 and Figure 73).
4. Ensure that the back seating O-ring and the ball seat are aligned and seated into the end-cap fitting (Figure 72 and Figure 73).
5. Install the end-cap-fitting assembly onto the manifold body until the flange of the end-cap fitting touches the manifold body (Figure 72 and Figure 73), then turn the end-cap fitting an additional 1/8 to 1/4 turn; torque the fitting to 225 to 282 N·cm (20 to 25 in-lb).

   Note: Use caution so as not to damage the end of the fitting.

6. Insert the ball into the valve body (Figure 74).

   Note: The valve stem should fit inside the ball drive slot. If the valve stem does not fit, adjust the position of the ball (Figure 74).

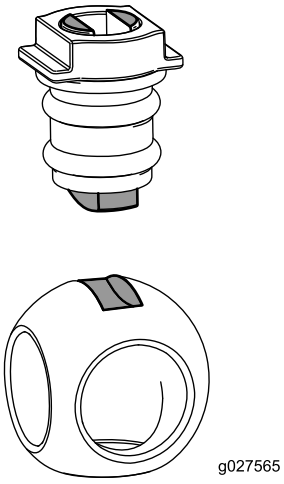

Figure 74

7. Turn the valve-stem assembly so that the valve is closed (Figure 71B)
8. Repeat steps 4 and 5 for the other end-cap-fitting assembly.

Installing the Rate Control Manifold Valve

1. Align a gasket between the flanges of the rate control valve manifold and the pressure filter head (Figure 75A).

   Note: If needed, loosen the mounting hardware for the pressure filter head as needed to provide clearance.

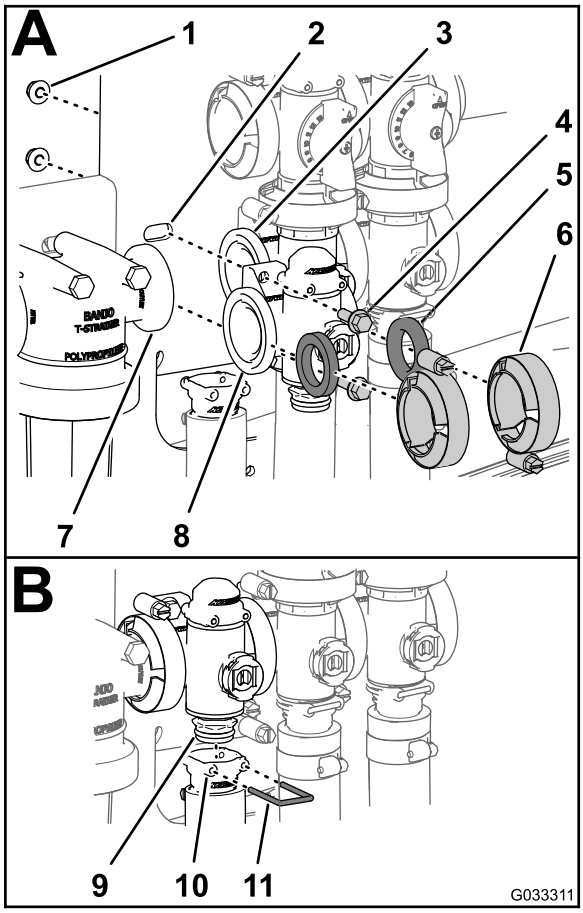

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Figure 75

1. Locknut (1/4 inch)	5. Gasket	9. Coupling (manifold-valve)
2. Valve mount	6. Flange clamp	10. Socket (outlet fitting)
3. Flange (agitation-valve)	7. Flange (pressure filter head)	11. Retainer
4. Flanged-head bolt (1/4 x 3/4 inch)	8. Flange (rate control valve)	

2. Assemble the rate control valve manifold, gasket, and pressure filter head with a flange clamp and tighten by hand (Figure 75A).
3. Align a gasket between the flanges of the rate control valve and the agitation-valve manifold (Figure 75A).
4. Assemble the rate control valve manifold, gasket, and agitation-valve manifold with a flange clamp and tighten by hand (Figure 75A).
5. Assemble the rate control valve to the valve mount with the 2 flanged-head bolts and 2 flanged locknuts (Figure 75A) that you removed in step 3 of Removing the Rate-Control-Manifold Valve (page 59) and torque the nut and bolt to 10 to 12 N·m (90 to 110 in-lb).
6. Assemble the outlet fitting onto the coupling fitting at the bottom of the manifold for the rate control valve (Figure 75B).
7. Secure the outlet fitting coupling fitting by inserting a retainer into the socket of the outlet fitting (Figure 75B).
8. If you loosened the mounting hardware for the pressure filter head, tighten the nut and bolt to 10 to 12 N·m (90 to 110 in-lb).

Installing the Agitation-Manifold Valve

1. Align the flange of the agitation-valve manifold, 1 gasket, and the flange of the agitation-bypass valve (Figure 76A).

   Note: If needed, loosen the mounting hardware for the master-section valve as needed to provide clearance.

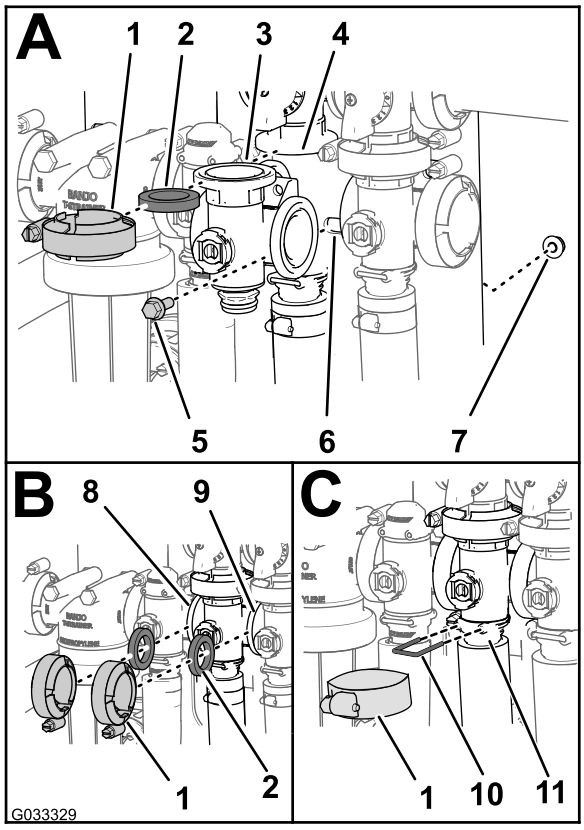

Figure 76

1. Flange clamp
2. Gasket
3. Manifold (agitation valve)
4. Flange (manifold—agitation-bypass valve)
5. Flanged-head bolt
6. Valve mount
7. Flanged locknut
8. Flange (rate-control valve)
9. Flange (master-section valve)
10. Retainer
11. Socket (outlet fitting)

2. Assemble the agitation-bypass valve, gasket, and agitation-valve manifold with a clamp tightened by hand (Figure 76A).
3. Align a gasket between the flanges of the rate-control valve and the agitation-valve manifold (Figure 76B).
4. Assemble the gasket and agitation-valve manifold with a clamp tightened by hand (Figure 76B).
5. Align a gasket between the flanges of the agitation-valve manifold and the master-section valve (Figure 76B).
6. Assemble the agitation-valve manifold, gasket, and master-section valve with a clamp tightened by hand (Figure 76B).
7. Assemble the agitation-valve manifold and socket with a clamp tightened by hand (Figure 76C).
8. Secure the end-cap fitting to the outlet fitting by inserting a retainer into the socket of the outlet fitting (Figure 76C).
9. Assemble the agitation valve to the valve mount with the flanged-head bolt and flanged locknut that you removed in step 3 of Removing the Agitation-Manifold Valve (page 59) and torque the nut and bolt to 1017 to 1243 N·cm (90 to 110 in-lb).
10. If you loosened the mounting hardware for the master-section valve, tighten the nut and bolt to 1978 to 2542 N·cm (175 to 225 in-lb).

Installing the Master-Section-Manifold Valve

1. Align the flange of the master-section-valve manifold, 1 gasket, and the flange of the master-section-bypass valve (Figure 77A).

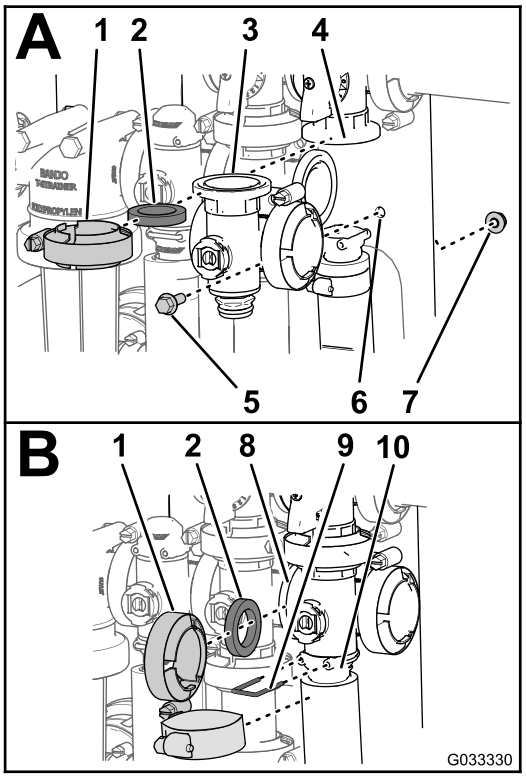

Figure 77

1. Flange clamp
2. Gasket
3. Manifold (master-section valve)
4. Flange (bypass—master-section valve)
5. Flanged-head bolt
6. Valve mount
7. Flanged locknut
8. Flange (agitation valve)
9. Retainer
10. Socket (outlet fitting)

2. Assemble the master-section-valve manifold, gasket, and master-section-bypass valve with a clamp tightened by hand (Figure 77A).
3. Align the flange of the master-section-valve manifold, a gasket, and the agitation-valve manifold (Figure 77B).
4. Assemble the master-section-valve manifold, gasket, and agitation-valve manifold with a clamp tightened by hand (Figure 77B)
5. Align the flange of the master-section-valve manifold, a gasket, and the master-section house (Figure 77B).
6. Assemble the master-section-valve manifold and socket with a clamp tightened by hand (Figure 77B).
7. Secure the end-cap fitting to the outlet fitting by inserting a retainer into the outlet fitting (Figure 77B).
8. Assemble the agitation valve to the valve mount with the flanged-head bolt and flanged locknut that you removed in step 3 of Removing the Master-Section-Manifold Valve (page 60) and torque the nut and bolt to 1017 to 1243 N·cm (90 to 110 in-lb).

Installing the Section Manifold Valve

1. Insert the upper end-cap fitting of the manifold valve into the bypass fitting (Figure 78A).

   Note: If needed, loosen the mounting hardware for the bypass fitting to provide clearance.

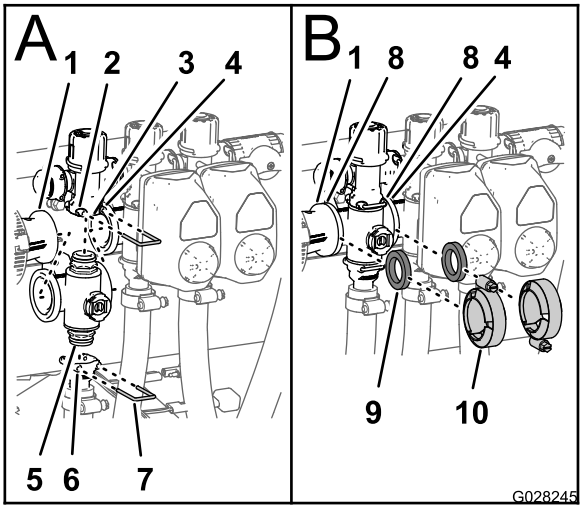

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Figure 78

1. Flange (reducer coupling)
2. Socket (bypass fitting)
3. Bypass fitting
4. Flange (adjacent manifold—agitation valve)
5. End-cap fitting (manifold valve assembly)
6. Socket (outlet fitting)
7. Retainer
8. Flange (manifold—section valve)
9. Gasket
10. Flange clamp

2. Secure the end-cap fitting to the bypass fitting by inserting a retainer into the socket of the bypass fitting (Figure 78A).
3. Assemble the outlet fitting onto the lower end-cap fitting of the manifold valve (Figure 78A).
4. Secure the end-cap fitting to the outlet fitting by inserting a retainer into the socket of the outlet fitting (Figure 78A).
5. Align a gasket between the flanges of the reducer coupling and the section valve manifold (Figure 78B).
6. Assemble the reducer coupling, gasket, and section valve manifold with a clamp and tighten by hand (Figure 78B).
7. If installing the 2 left most section valves, align a gasket between the flanges of the 2 adjacent section valve manifolds (Figure 78B).
8. Assemble the 2 adjacent section valve manifolds and gasket with a clamp and tighten by hand (Figure 78B).
9. For the left or right boom section valves, assemble the valves to the valve mount with the flanged-head bolt and flanged locknut that you removed in step 3 of Removing the Section-Manifold Valve (page 61) and torque the nuts and bolts to 10 to 12 N·m (90 to 110 in-lb).

10. If you loosened the mounting hardware for the bypass fitting, tighten the nut and bolt to 10 to 12 N·m (90 to 110 in-lb).

Installing the Valve Actuator

1. Align the actuator to the manifold valve and (Figure 61).
2. Secure the actuator and valve with the retainer that you removed in step 3 of Removing the Valve Actuator (page 58).
3. Connect the 3-pin connector of the valve-actuator harness to the 3-socket connector of the wire harness of the sprayer.

Storage

1. Position the sprayer on a level surface, engage the parking brake, shut off the pump, shut off the engine, and remove the key.
2. Clean dirt and grime from the entire machine, including the outside of the engine cylinder head fins and blower housing.

   Important: **You can wash the machine with mild detergent and water. *Do not* use *high-pressure water* to wash the machine. Pressure washing may damage the electrical system or wash away necessary grease at friction points. Avoid excessive use of water, especially near the control panel, lights, engine, and the battery.**
3. Clean the spray system; refer to Cleaning (page 57).
4. Clean the pistons in the valve assembly; refer to Cleaning the Sprayer Valves (page 58).
5. Condition the sprayer system as follows:
   A. Drain the fresh-water tank.
   B. Drain the spray system as completely as possible.
   C. Prepare rust inhibiting, non-alcohol based, RV antifreeze solution per the manufacturer's instructions.
   D. Add the RV antifreeze solution to the fresh-water tank and the sprayer tank.
   E. Run the sprayer pump for a few minutes to circulate the RV antifreeze throughout the sprayer system and any installed spray accessories.
   F. Drain the fresh-water tank and spray system as completely as possible.
6. Use the boom-section lift switches to raise the outer-boom sections. Raise the sections until they have moved completely into the boom-transport cradle, forming the ‘X’ transport position and the section cylinders are fully retracted.

   Note: Make sure that the section cylinders are fully retracted to prevent actuator rod damage.
7. Inspect the brakes; refer to Inspecting the Brakes (page 50).
8. Service the air cleaner; refer to Servicing the Air Cleaner (page 42).
9. Grease the sprayer; refer to the Lubrication (page 40).
10. Change the crankcase oil; refer to Changing the Engine Oil (page 43).

11. Check the tire pressure; refer to Checking the Tire Pressure (page 23).
12. For storage over 30 days, prepare the fuel system as follows:
    A. Add a petroleum based stabilizer/conditioner to fuel in the tank.

       Follow mixing instructions from stabilizer manufacturer. Do not use an alcohol based stabilizer (ethanol or methanol).

       Note: A fuel stabilizer/conditioner is most effective when mixed with fresh gasoline and used at all times.
    B. Run the engine to distribute conditioned fuel through the fuel system (5 minutes).
    C. Shut off the engine, allow it to cool, and drain the fuel tank.
    D. Start the engine and run it until it stops.
    E. Choke the engine.
    F. Start and run the engine until it does not start again.
    G. Dispose of fuel properly. Recycle as per local codes.

       Important: **Do not store stabilizer/conditioned fuel over 90 days.**
13. Remove the spark plugs and check their condition; refer to Changing the Spark Plugs (page 44).
14. With the spark plugs removed from the engine, pour 2 tablespoons of engine oil into the spark plug hole.
15. Use the electric starter to crank the engine and distribute the oil inside the cylinder.
16. Install the spark plugs and tighten to recommended torque; refer to Installing the Spark Plugs (page 45).

    Note: Do not install the wire on the spark plug(s).
17. Remove the battery from the chassis, check the electrolyte level, and charge it fully; refer to Removing the Battery (page 47).

    Note: Do not connect the battery cables to the battery posts during storage.

    Important: **The battery must be fully charged to prevent it from freezing and being damaged at temperatures below 0°C (32°F). A fully charged battery maintains its charge for about 50 days at temperatures lower than 4°C (40°F). If the temperatures will be above 4°C (40°F), check the water level in the battery and charge it every 30 days.**
18. Check and tighten all bolts, nuts, and screws. Repair or replace any part that is damaged.
19. Check the condition of all spray hoses, replacing any that are damaged or worn.
20. Tighten all hose fittings.
21. Paint all scratched or bare metal surfaces. Paint is available from your Authorized Service Dealer.
22. Store the machine in a clean, dry garage or storage area.
23. Remove the ignition key and put it in a safe place out of the reach of children.
24. Cover the machine to protect it and keep it clean.

Troubleshooting

Troubleshooting the Engine and Vehicle

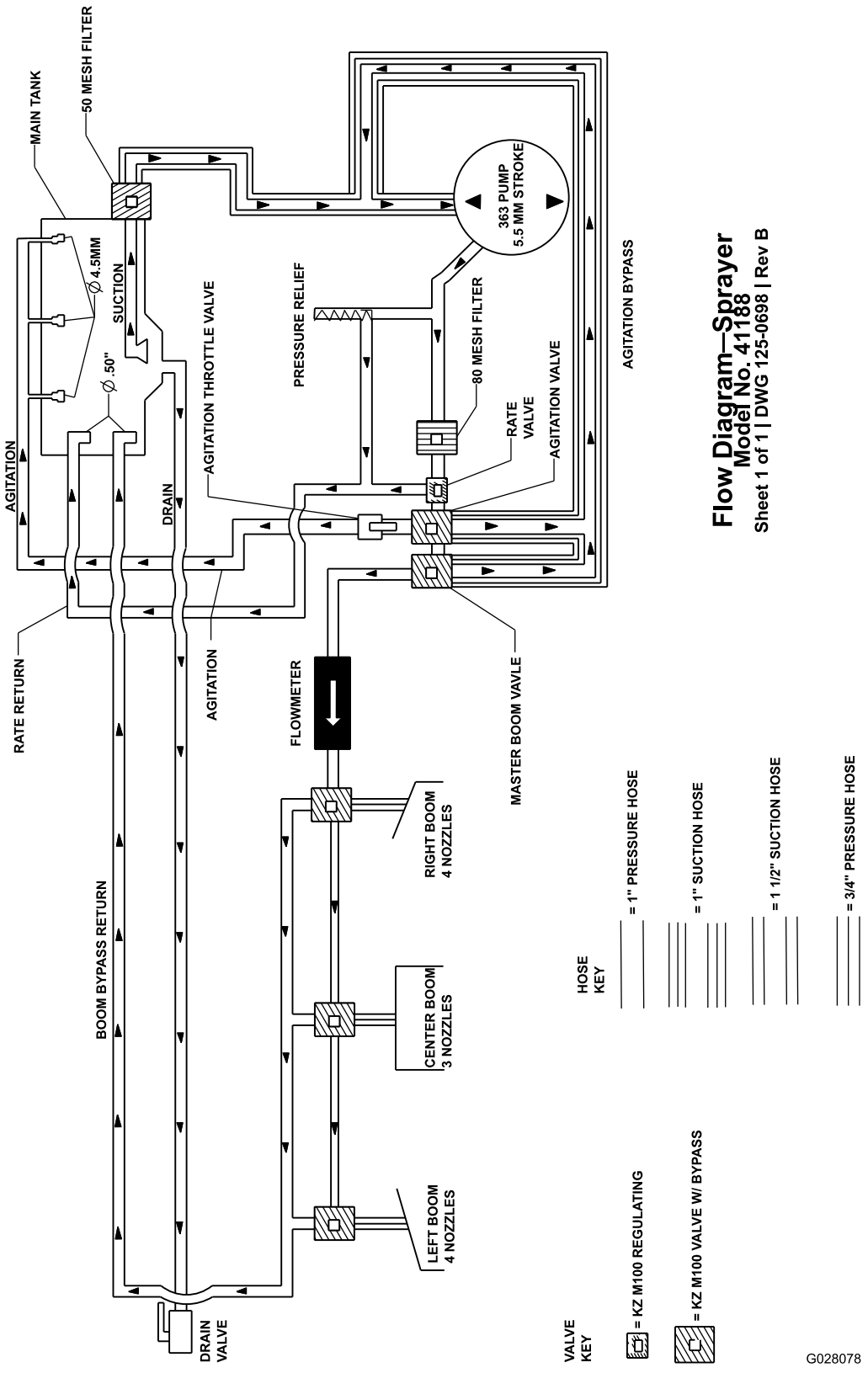
Problem	Possible Cause	Corrective Action
The starter does not crank.	1. The range selector is in a gear other than NEUTRAL. 2. The electrical connections are corroded or loose. 3. A fuse is blown or loose. 4. The battery is discharged. 5. The safety-interlock system is malfunctioning. 6. A starter or starter solenoid is broken. 7. The internal engine components have seized.	1. Press the brake pedal and move the range selector to the NEUTRAL position. 2. Check the electrical connections for good contact. 3. Correct or replace fuse. 4. Charge or replace the battery. 5. Contact your Authorized Service Dealer. 6. Contact your Authorized Service Dealer. 7. Contact your Authorized Service Dealer.
The engine cranks but does not start.	1. The fuel tank is empty. 2. Dirt, water, or stale fuel is in the fuel system. 3. The fuel line is clogged. 4. The spark plug lead is disconnected. 5. A spark plug is damaged or dirty. 6. The kill relay is not energized. 7. The ignition is broken.	1. Fill the tank with fresh fuel. 2. Drain and flush the fuel system; add fresh fuel. 3. Clean or replace the fuel system. 4. Connect the spark plug. 5. Replace the spark plug. 6. Contact your Authorized Service Dealer. 7. Contact your Authorized Service Dealer.
The engine starts but does not keep running.	1. The fuel tank vent is restricted. 2. Dirt or water is in the fuel system. 3. The fuel filter is clogged. 4. A fuse is blown or loose. 5. The fuel pump is broken. 6. The carburetor is broken. 7. There are loose wires or poor connections. 8. The cylinder head gasket is broken.	1. Replace the fuel cap. 2. Drain and flush the fuel system; add fresh fuel. 3. Replace the fuel filter. 4. Correct or replace the fuse. 5. Contact your Authorized Service Dealer. 6. Contact your Authorized Service Dealer. 7. Check and tighten wire connections. 8. Contact your Authorized Service Dealer.
The engine runs but knocks or misses.	1. Dirt, water, or stale fuel is in the fuel system. 2. A spark plug lead is loose. 3. A spark plug is broken. 4. There are loose wires or poor connections. 5. The engine is overheating.	1. Drain and flush the fuel system; add fresh fuel. 2. Connect the spark plug lead. 3. Replace the spark plug. 4. Check and tighten wire connections. 5. See “The engine overheats” below.

Problem	Possible Cause	Corrective Action
The engine does not idle.	1. The fuel tank vent is restricted. 2. Dirt, water, or stale fuel is in the fuel system. 3. A spark plug is damaged or broken. 4. Carburetor idle passages are plugged. 5. The idle speed adjusting screw is incorrectly set. 6. The fuel pump is broken. 7. There is low compression. 8. The air-cleaner element is dirty.	1. Replace the fuel cap. 2. Drain and flush the fuel system; add fresh fuel. 3. Replace the spark plug. 4. Contact your Authorized Service Dealer. 5. Contact your Authorized Service Dealer. 6. Contact your Authorized Service Dealer. 7. Contact your Authorized Service Dealer. 8. Clean or replace the element.
The engine overheats.	1. The crankcase-oil level is incorrect. 2. There is excessive loading. 3. The air-intake screens are dirty. 4. The cooling fins and air passages under the engine blower housing and/or the rotating air-intake screen are plugged. 5. The fuel mixture is lean.	1. Fill or drain to the FULL mark. 2. Reduce the load; use lower ground speed. 3. Clean with every use. 4. Clean with every use. 5. Contact your Authorized Service Dealer.
The engine loses power.	1. The crankcase-oil level is incorrect. 2. The air-cleaner element is dirty. 3. Dirt, water, or stale fuel is in the fuel system. 4. The engine is overheated. 5. A spark plug is damaged or dirty. 6. The vent hole in the fuel tank vent fitting is plugged. 7. There is low compression.	1. Fill or drain to the FULL mark. 2. Clean or replace. 3. Drain and flush the fuel system; add fresh fuel. 4. See *The Engine Overheats*. 5. Replace the spark plug. 6. Replace the fuel cap. 7. Contact your Authorized Service Dealer.
There is abnormal vibration or noise.	1. The engine mounting bolts are loose. 2. There is a problem with the engine.	1. Tighten the engine mounting bolts. 2. Contact your Authorized Service Dealer.
The machine does not operate or is sluggish in either direction because the engine bogs down or stalls.	1. The parking brake is set.	1. Release the parking brake.
The machine does not operate in either direction.	1. The range selector is in the NEUTRAL position. 2. The parking brake was not released or the parking brake is not releasing. 3. The transmission is broken. 4. The control linkage needs adjustment or replacement. 5. The driveshaft or wheel-hub key has been damaged.	1. Press the brake and shift the range selector into a gear. 2. Release the parking brake or check the linkage. 3. Contact your Authorized Service Dealer. 4. Contact your Authorized Service Dealer. 5. Contact your Authorized Service Dealer.

Troubleshooting the Spray System

Problem	Possible Cause	Corrective Action
A section does not spray.	1. The electrical connection on the section valve is dirty or disconnected. 2. There is a blown fuse. 3. There is a pinched hose. 4. A section bypass is improperly adjusted. 5. There are damaged section valve. 6. The electrical system is damaged.	1. Turn the valve off manually. Disconnect the electrical connector on the valve and clean all leads, then connect it. 2. Check the fuses and replace them as necessary. 3. Repair or replace the hose. 4. Adjust the section bypass. 5. Contact your Authorized Service Dealer. 6. Contact your Authorized Service Dealer.
A section does not turn off.	1. The section valve is damaged.	1. Disassemble the section valve; refer to the section Cleaning the Sprayer Valves. Inspect all of the parts and replace any that are damaged.
A section valve is leaking.	1. A seal is worn or damaged.	1. Disassemble the valve and replace the seals using the Valve Repair Kit; contact your Authorized Service Dealer.
A pressure drop occurs when you turn on a section.	1. The section bypass is improperly adjusted. 2. There is an obstruction in the section valve body. 3. A nozzle filter is damaged or clogged.	1. Adjust the section bypass. 2. Remove the inlet and outlet connections to the section valve and remove any obstructions. 3. Remove and inspect all nozzles.

Schematics



Sprayer System Schematic (Rev. DWG 125-0698 Rev B)

Notes:

Notes:

European Privacy Notice

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

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

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

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

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

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

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

Australian Consumer Law

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

The Toro Warranty

A Two-Year Limited Warranty

Conditions and Products Covered

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

Instructions for Obtaining Warranty Service

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

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

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

Owner Responsibilities

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

Items and Conditions Not Covered

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

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

Parts

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

Deep Cycle and Lithium-Ion Battery Warranty:

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

Maintenance is at Owner's Expense

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

General Conditions

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

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

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

Note regarding engine warranty:

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

Countries Other than the United States or Canada

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

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